

Model Name: GA-Z87X-UD4H

Rev 1.11 www.xinxunwei.com 400-800-9990

SHEET

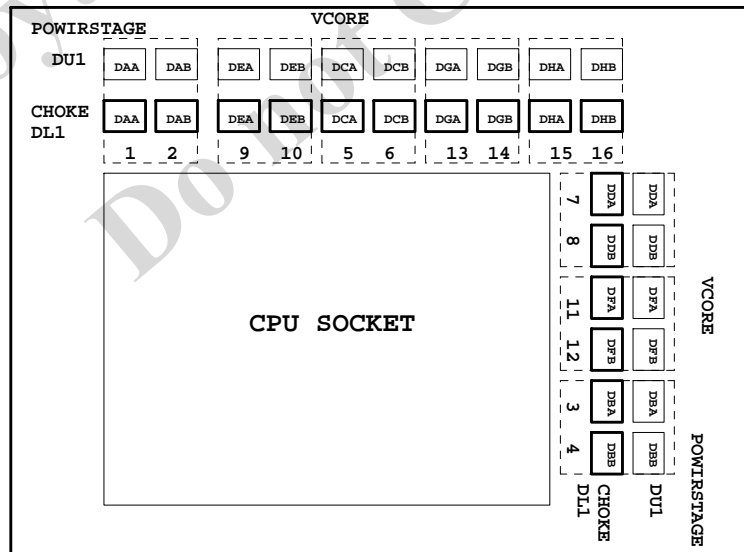
TITLE

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
10	PCH_DP,CLK BUFFER
11	PCH_HOST,SATA,PCI
12	PCH_GPIO,CTRL,AUDIO
13	PCH_PWR,GND
14	DP / DVI / HDMI
15	PCI EXPRESS*16/*8 SWITCH
16	PCI EXPRESS*16 SLOT
17	PCI EXPRESS*8 SLOT
18	PCI EXPRESS*4 SLOT
19	PCI EXPRESS*1 SLOTS X3
20	ITE 8892
21	PCI SLOT 1
22	SATA3 SWITCH
23	USB3_eSATA, KB_USB3
24	Marvell 9172
25	ALC898
26	REAR AUDIO JACK
27	Headphone Audio Amplifier
28	IR3563B PWM Controller
29	IR3553 Power Stage PH_01-04
30	IR3553 Power Stage PH_05-08
31	IR3553 Power Stage PH_09-12
32	IR3553 Power Stage PH_13-16
33	IR3570_DDR PWM Controller
34	IR3598-DDR Driver

SHEET

TITLE

35	DISCRETE POWER I
36	DISCRETE POWER II
37	INTEL LAN I217
38	uPD720210 USB3 4Ports Hub-1A
39	uPD720210 USB3 4Ports Hub-1B
40	F_USB 3.0 from PCH
41	F_USB 2.0
42	Dual BIOS
43	ITE8728 LPC I/O
44	FAN CTRL, H/W Monitor
45	F_PANEL , COM, PROCHOT#
46	Port80, O.V., Voltage Measure
47	ATX POWER, CLOCK GEN
48	TABLE LIST
49	uPD720210 USB3 4Ports Hub-2A
50	uPD720210 USB3 4Ports Hub-2b
51	VCC1_05_ME, VCC3_ME, 3VDUAL OV Protect

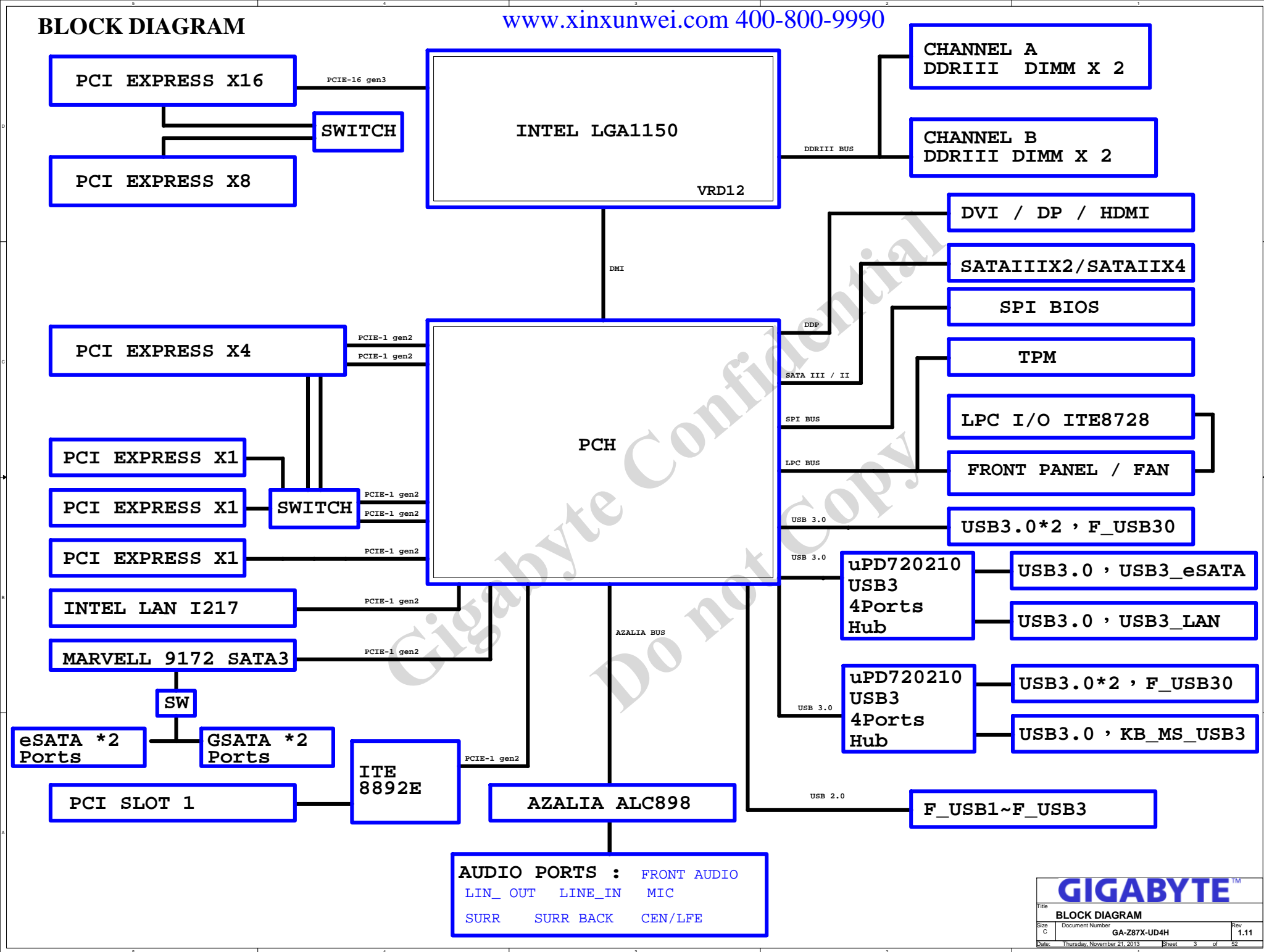


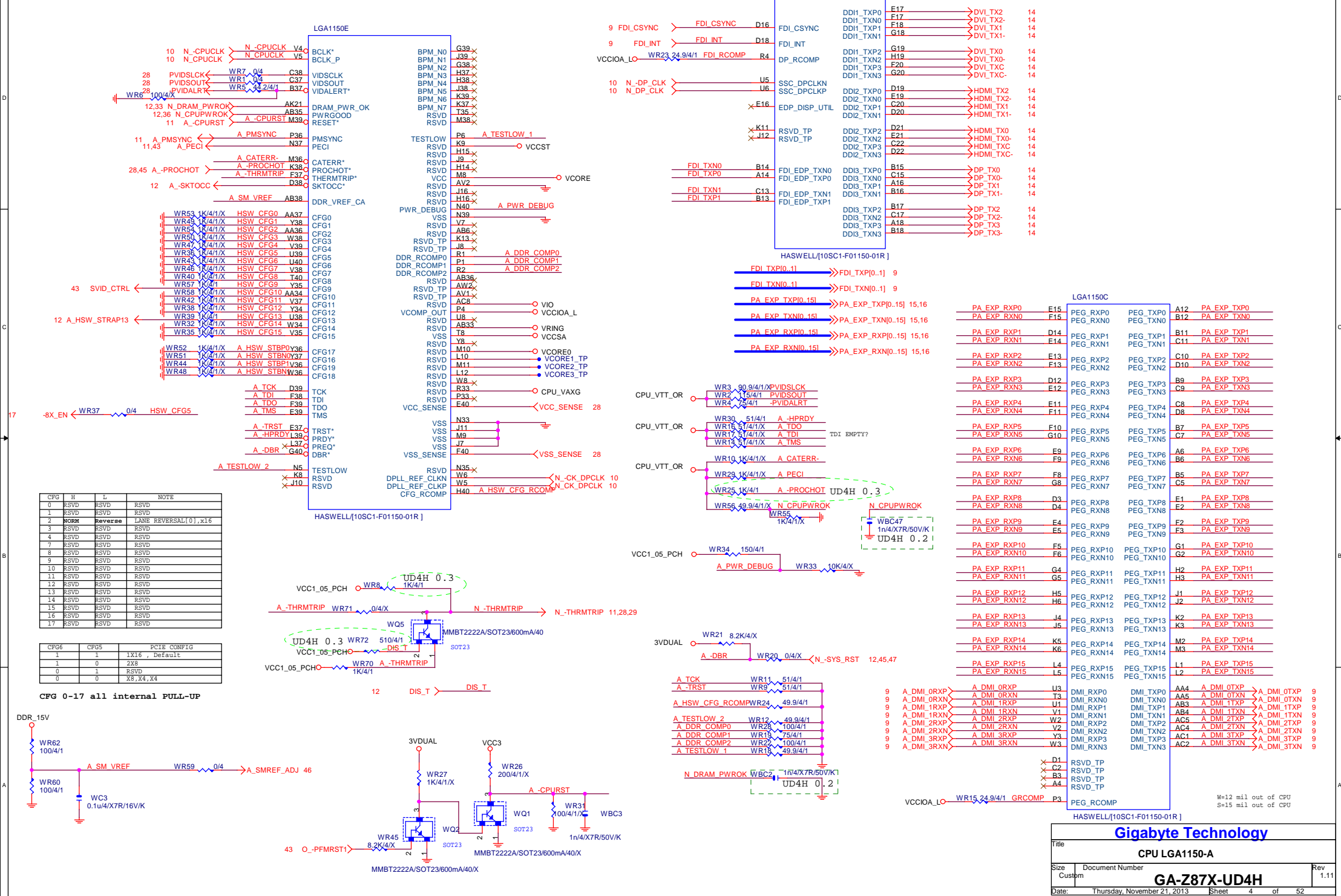
Gigabyte Technology

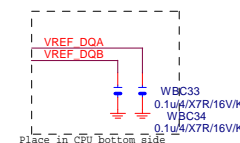
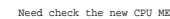
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Custom		1.11
Date	Thursday, November 21, 2013	Sheet 1 of 52

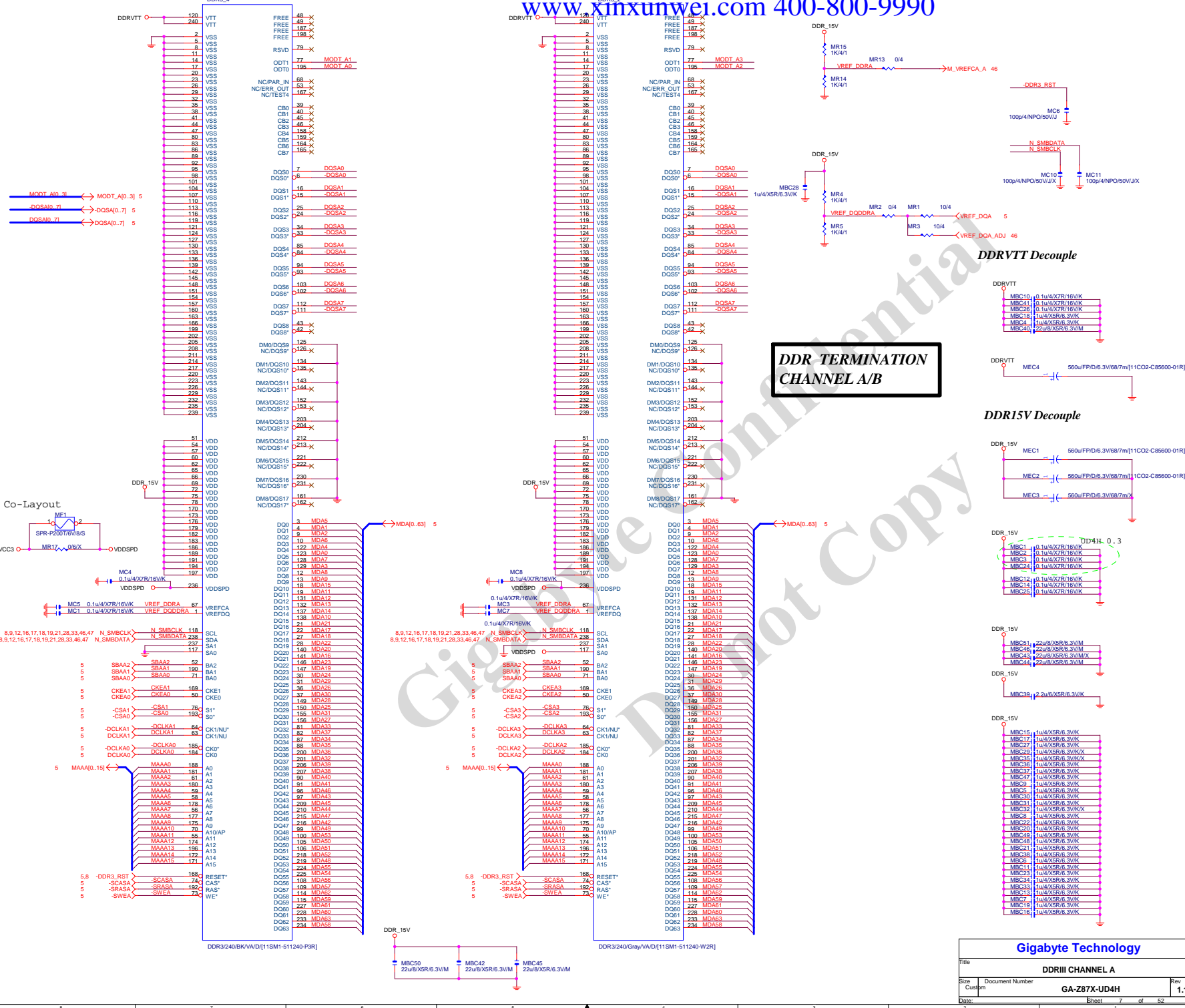
BLOCK DIAGRAM

www.xinxunwei.com 400-800-9990

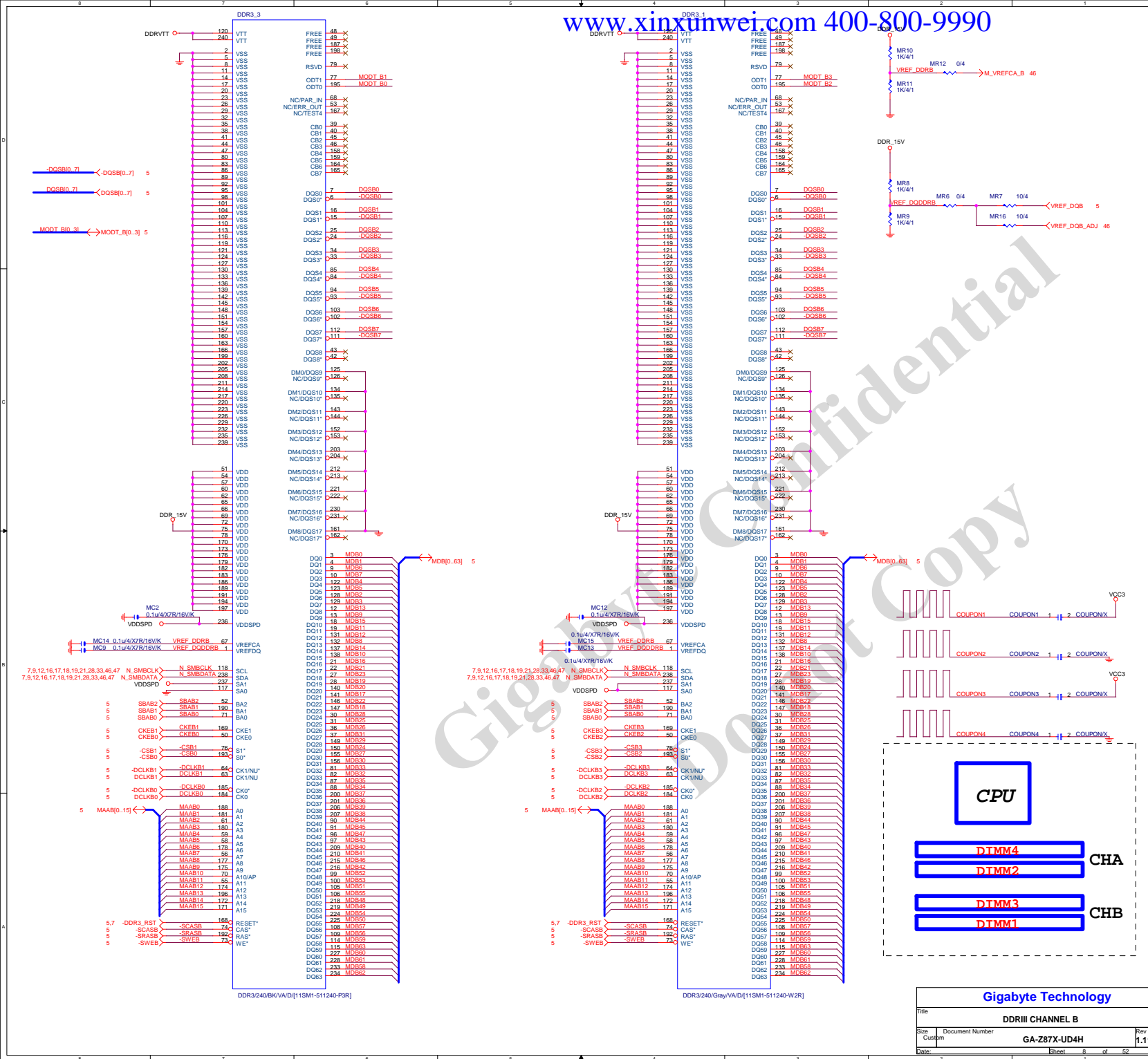


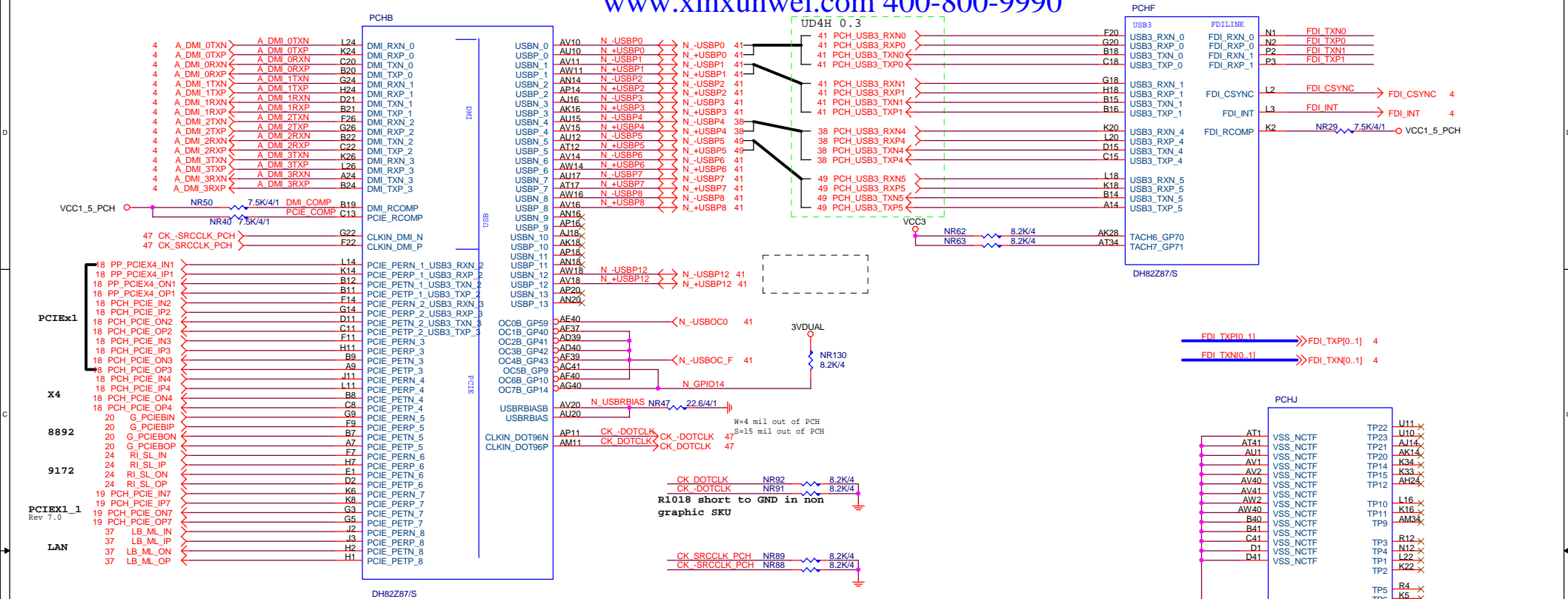






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DDRIII CHANNEL A			
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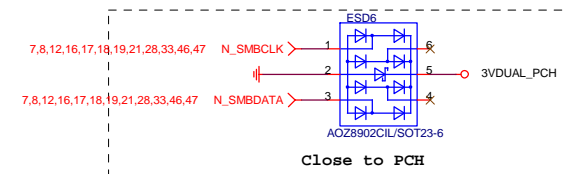




PCH & Hub USB3.0 Distribution

Port0 : F_USB30_2 (Left)
Port1 : F_USB30_2 (Right)
Port4 : uPD720210 Hub (HAU1)
Port4 : USB3_ESATA (R)
Port3 : USB3_ESATA (L)
Port2 : USB30_LAN (R)
Port1 : USB30_LAN (L)
Port5 : uPD720210 Hub (HCU1)
Port4B : KB_MS_USB3 (R)
Port3B : KB_MS_USB3 (L)
Port2B : F_USB30_1 (R)
Port1B : F_USB30_1 (L)

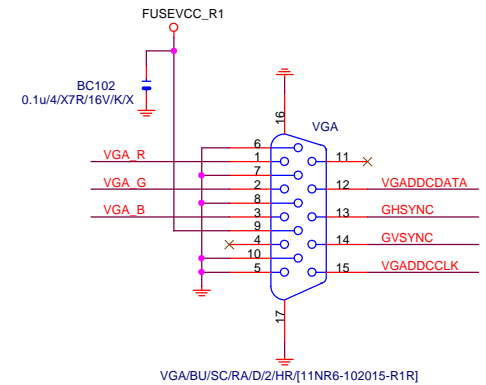
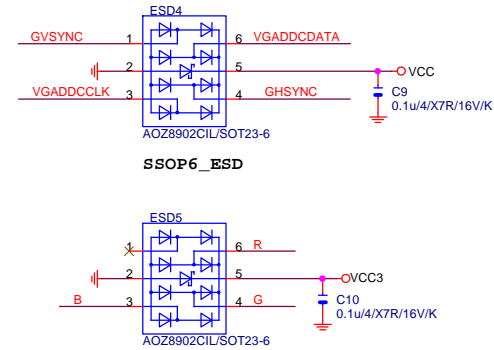
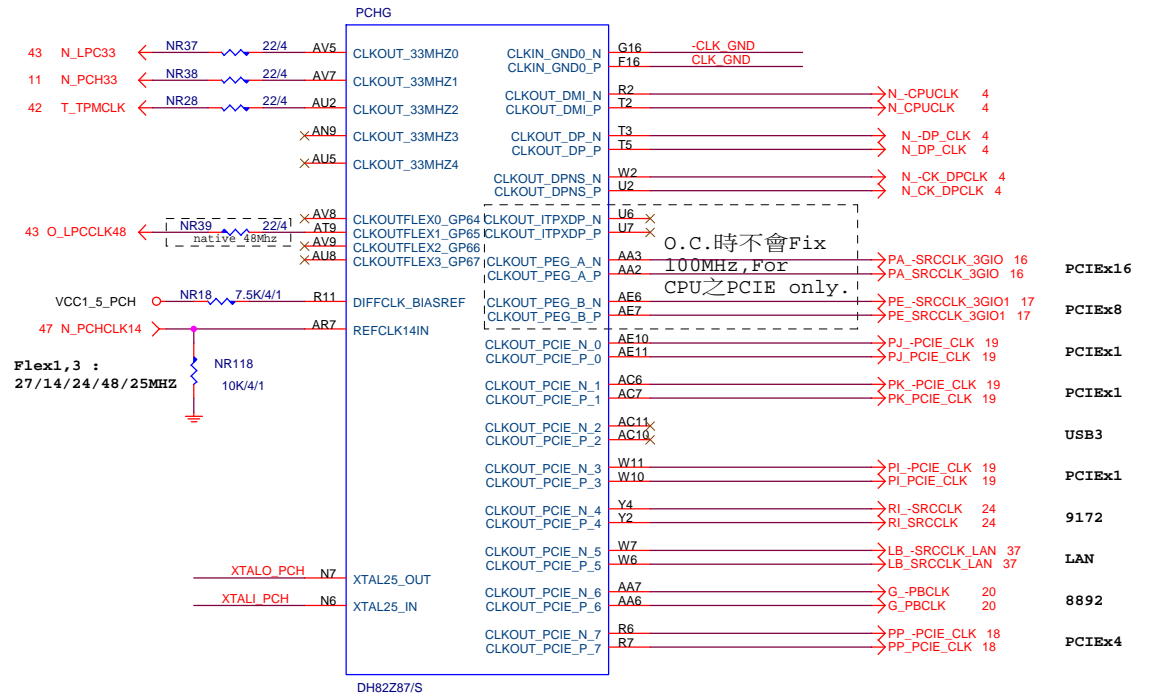
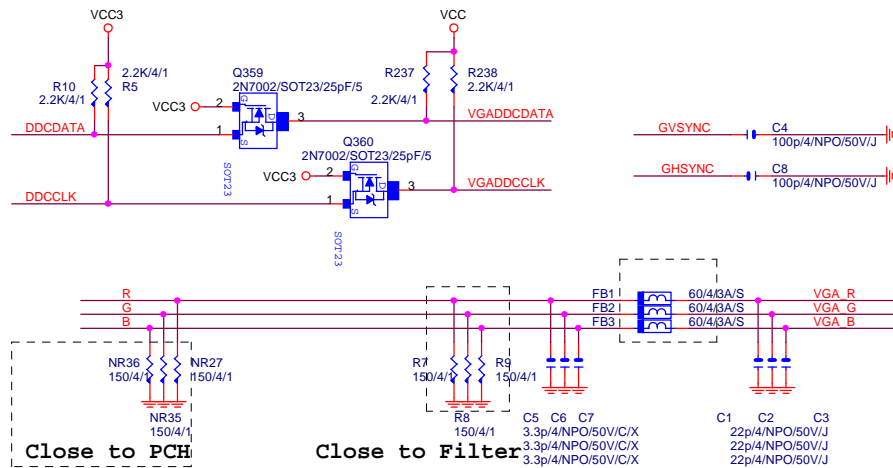
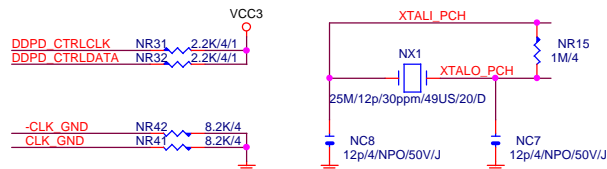
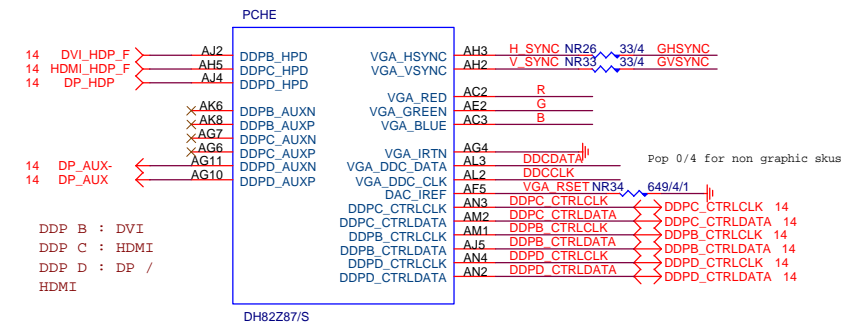
OC[3:0]# for Device 29 (ports 0-7)
 OC[7:4]# for Device 26 (ports
 8-13)



USB3	00 01	04	05	F_USB1	F_USB2
USB2	00 01	12 13 10 11	02 03 08 09	04 05	06 07
OC	OC0	OC6	OC5	OC_1_4	OC_F

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Title				
PCH FDI,DMI,USB ,PCIE,NVRAM				
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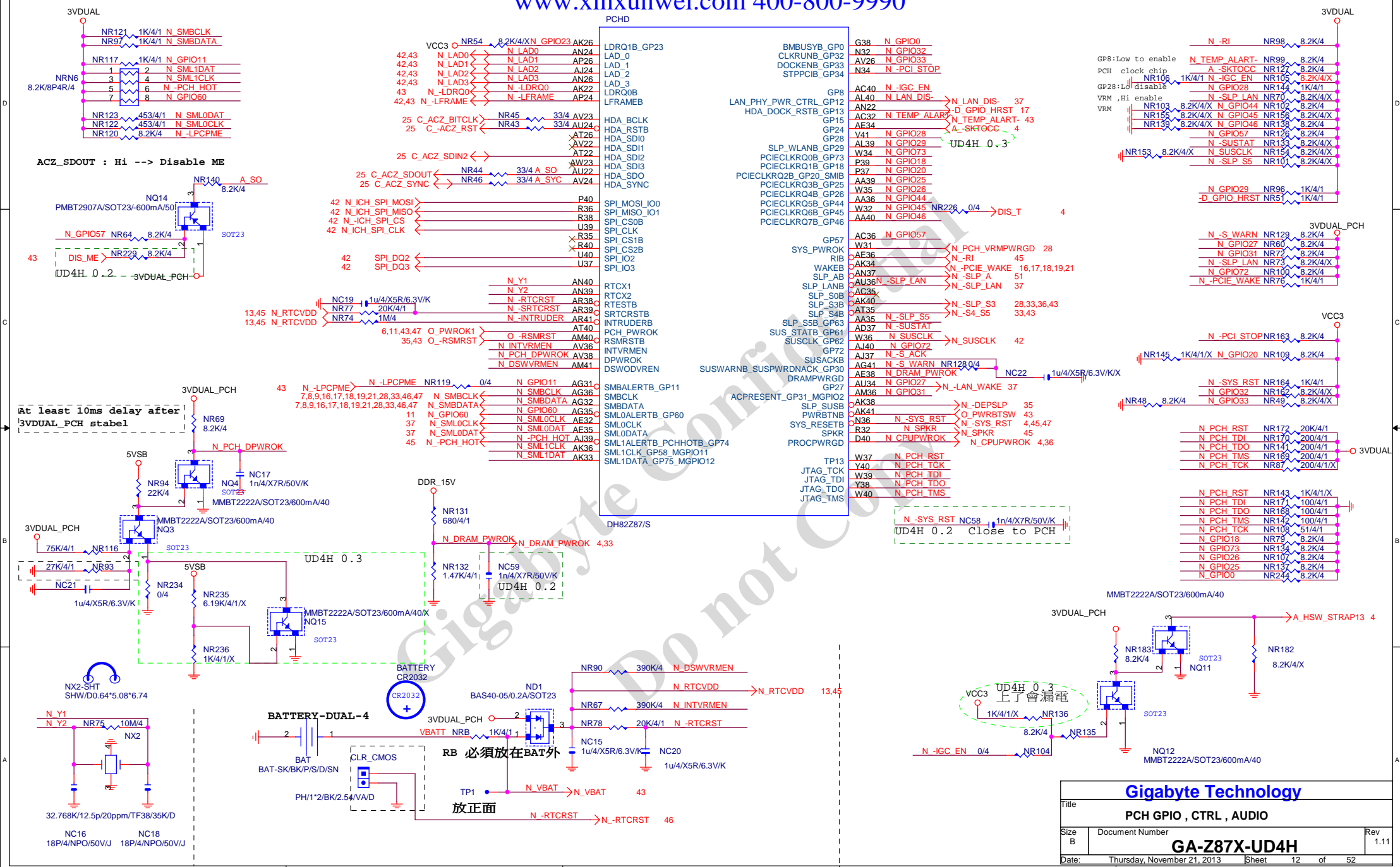


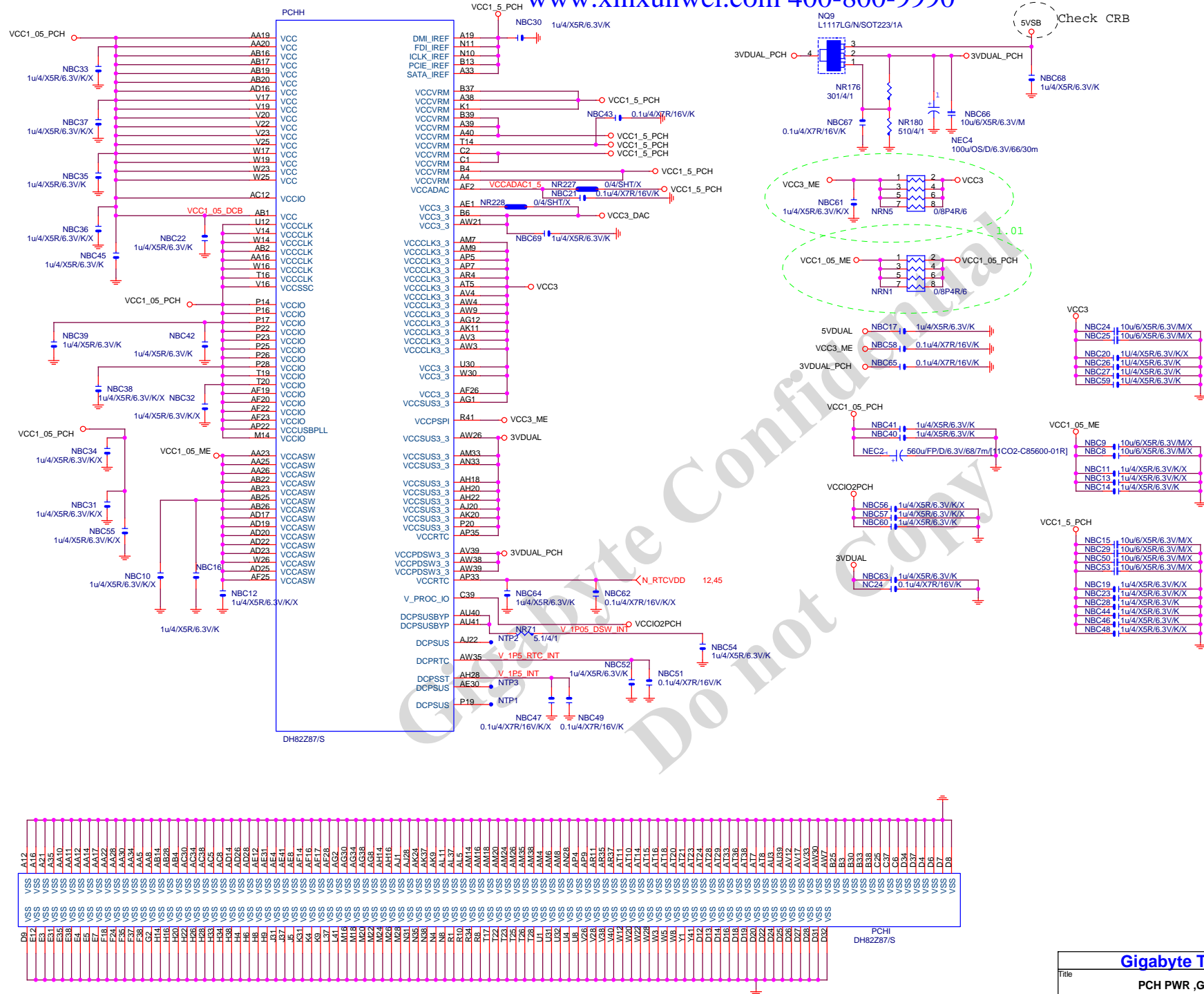
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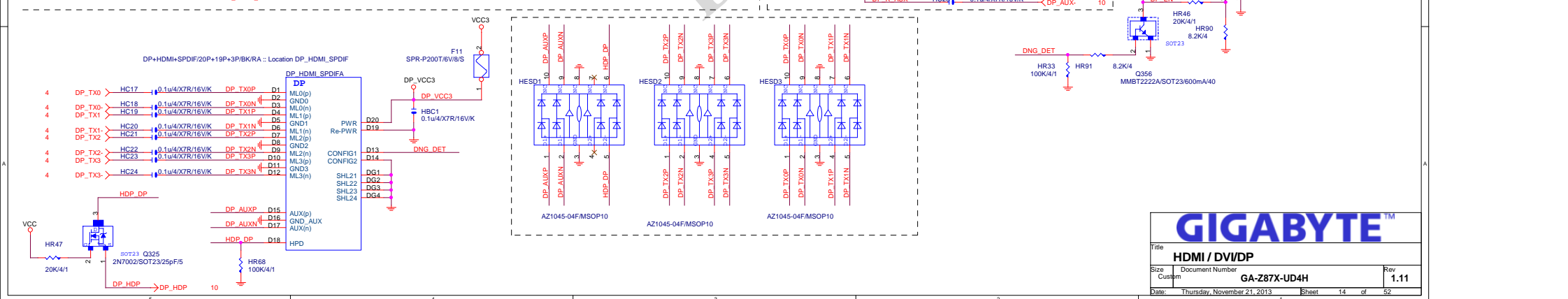
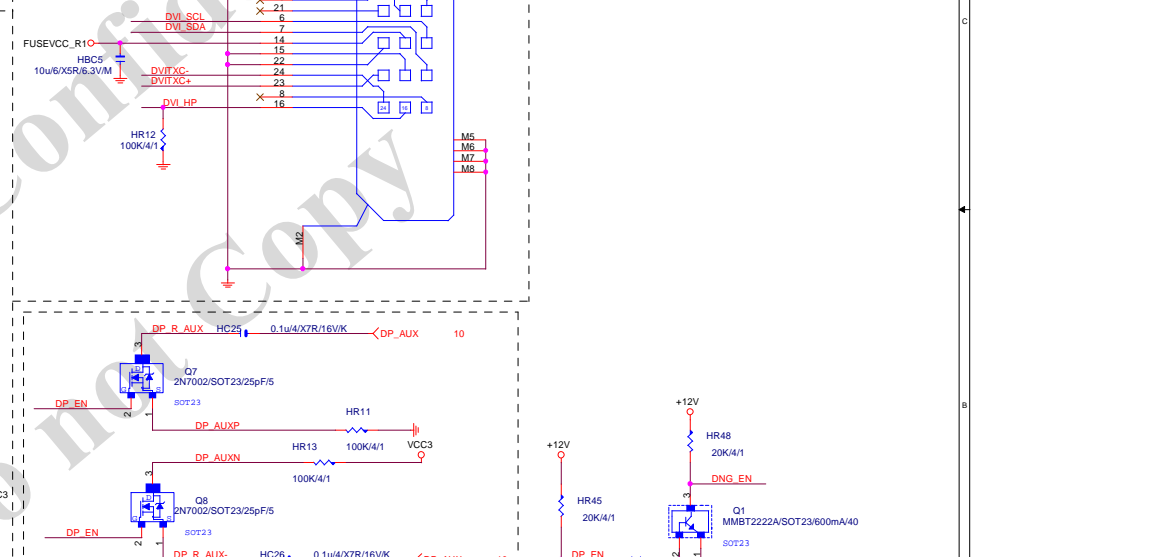
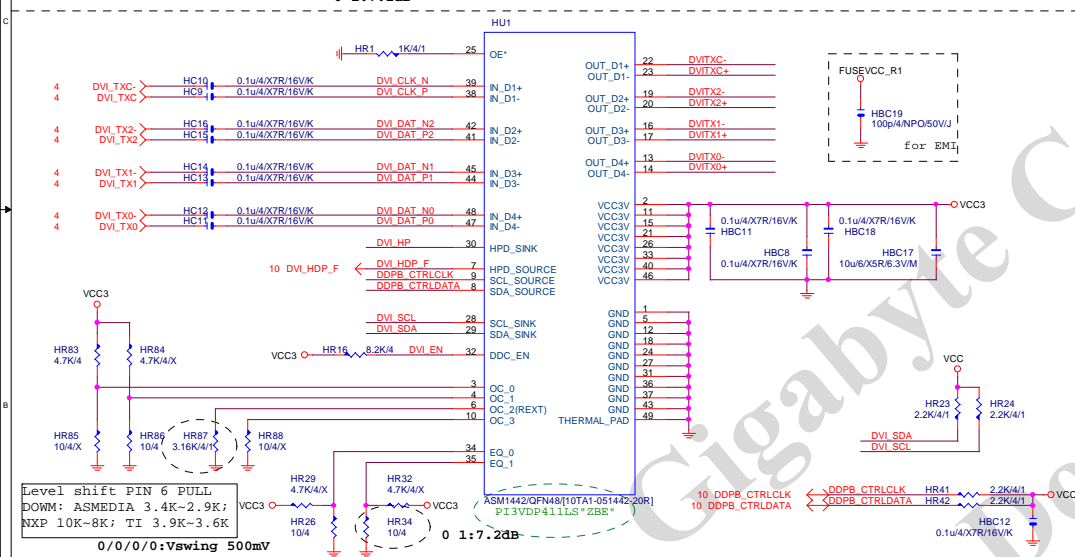
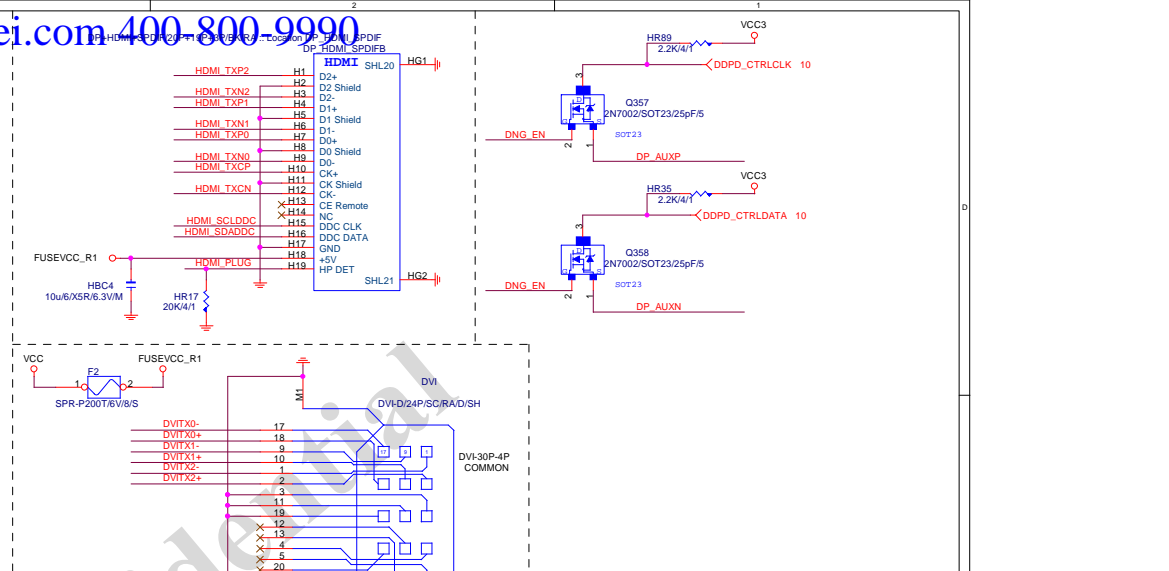
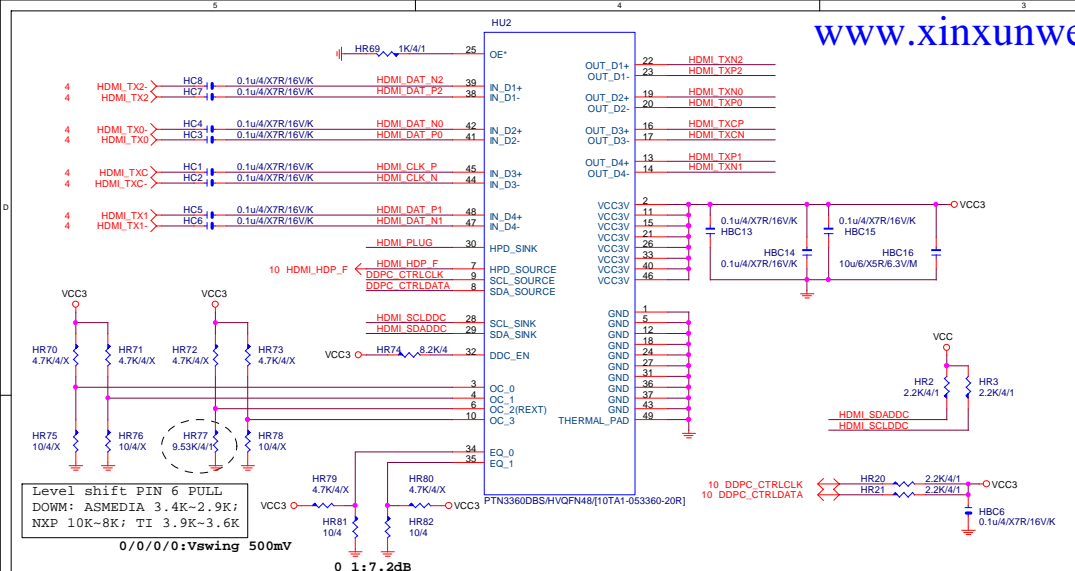
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PCH DISPLAY ,CLK BUFFER		
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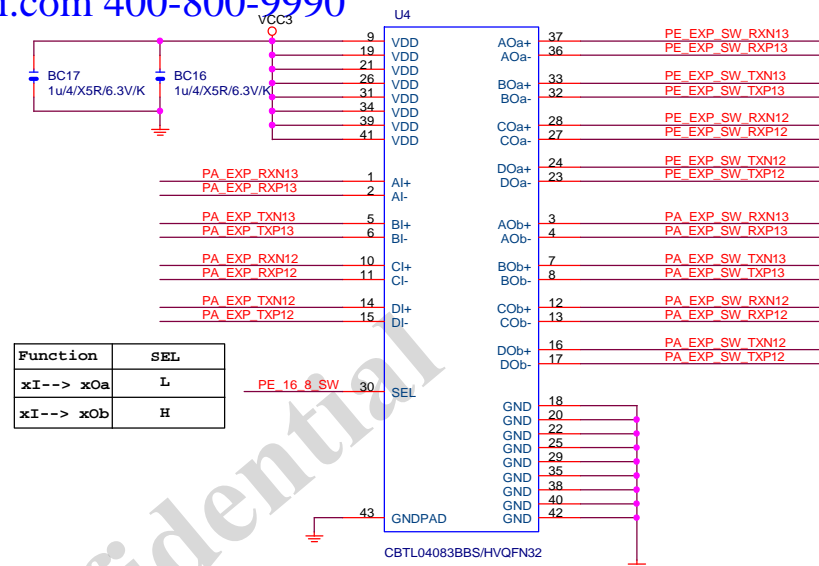
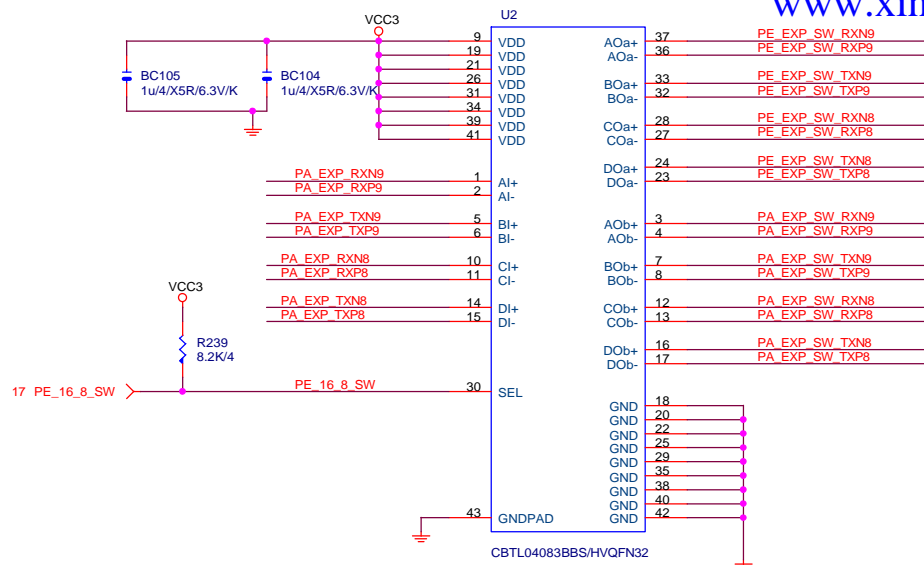


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PCH HOST , SATA, PCI			
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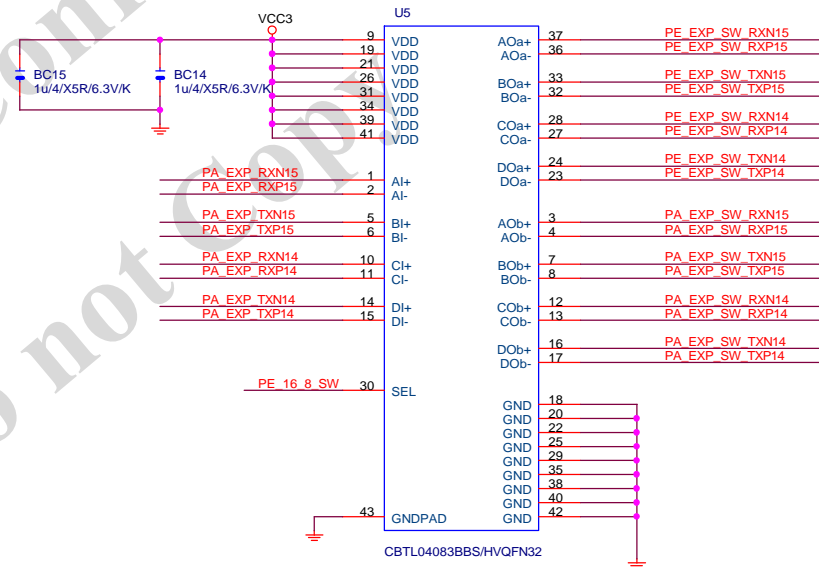
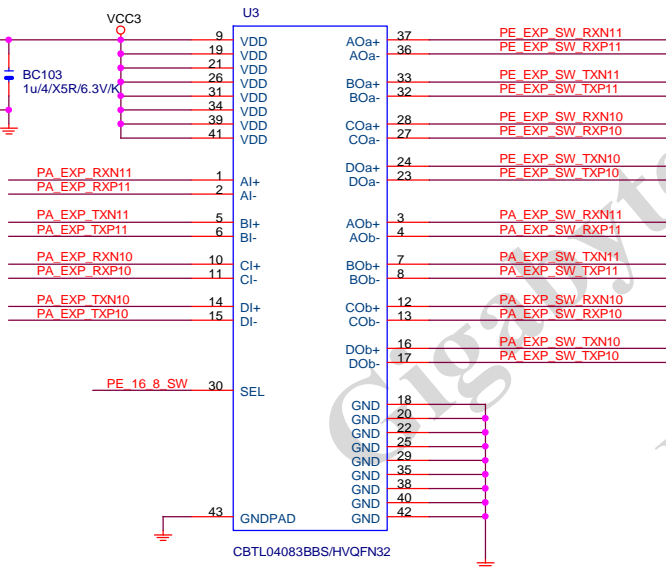








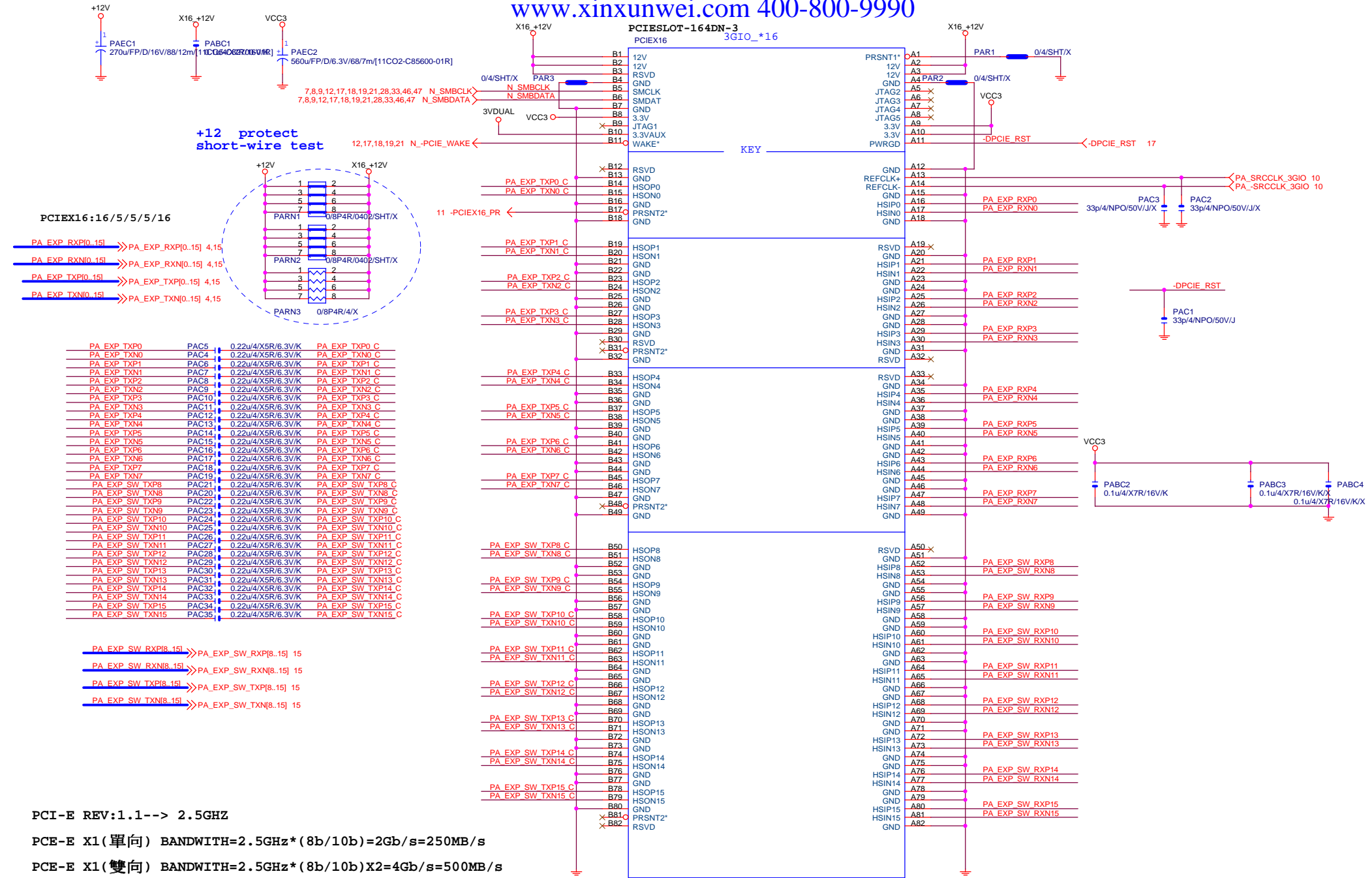
Function	SEL
xI--> xOa	L
xI--> xOb	H



PA_EXP_SW_RXP[8..15] >> PA_EXP_SW_RXP[8..15] 16
 PA_EXP_SW_RXN[8..15] >> PA_EXP_SW_RXN[8..15] 16
 PA_EXP_SW_TXP[8..15] >> PA_EXP_SW_TXP[8..15] 16
 PA_EXP_SW_TXN[8..15] >> PA_EXP_SW_TXN[8..15] 16

PE_EXP_SW_RXP[8..15] >> PE_EXP_SW_RXP[8..15] 17
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 PE_EXP_SW_TXN[8..15] >> PE_EXP_SW_TXN[8..15] 17

PA_EXP_RXP[0..15] >> PA_EXP_RXP[0..15] 4,16
 PA_EXP_RXN[0..15] >> PA_EXP_RXN[0..15] 4,16
 PA_EXP_TXP[0..15] >> PA_EXP_TXP[0..15] 4,16
 PA_EXP_TXN[0..15] >> PA_EXP_TXN[0..15] 4,16



PCI-E REV:1.1--> 2.5GHZ

PCE-E X1(單向) BANDWITH=2.5GHz*(8b/10b)=2Gb/s=250MB/s

PCE-E X1(雙向) BANDWITH=2.5GHz*(8b/10b)X2=4Gb/s=500MB/s

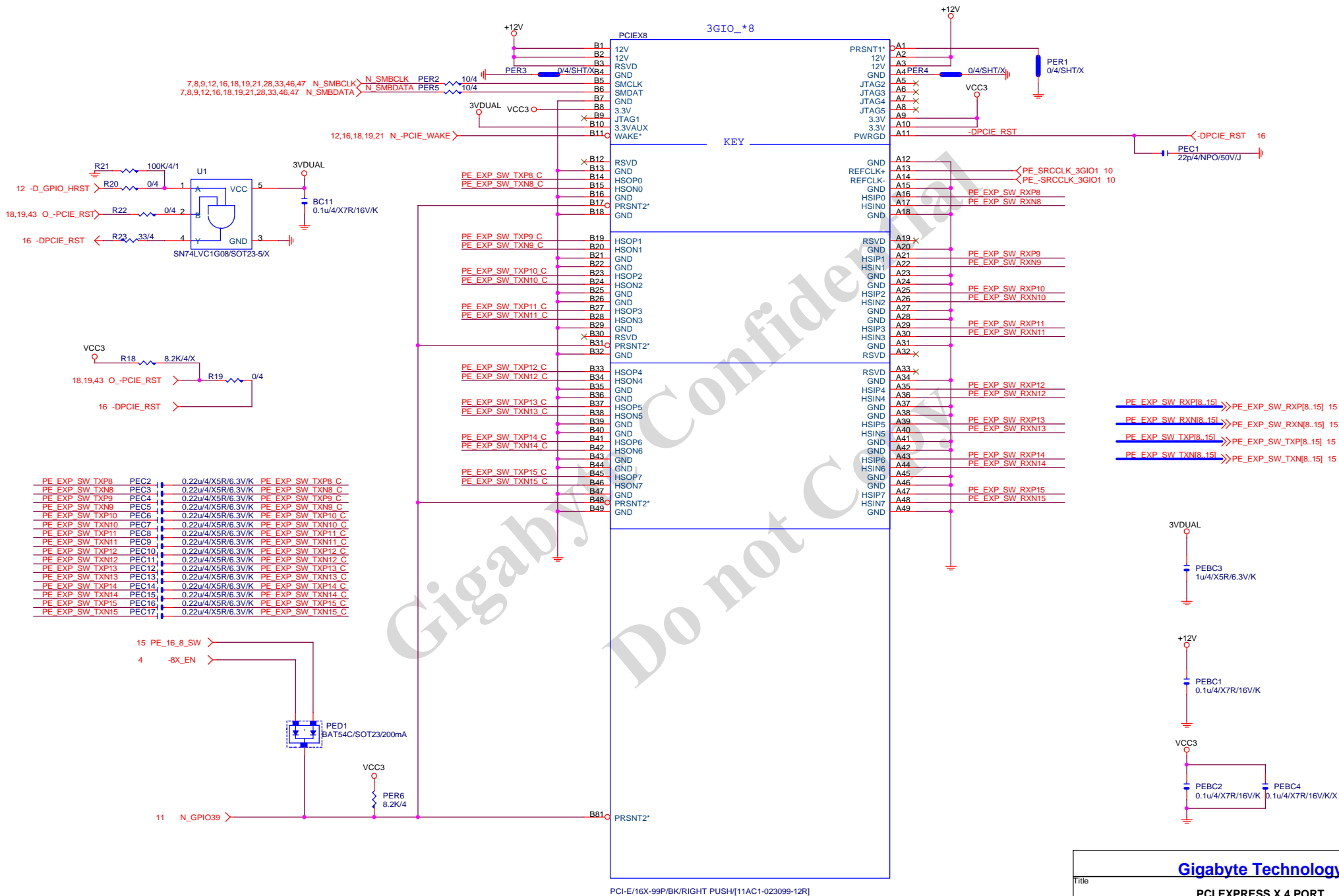
PCE-E X16(單向) BANDWITH=2.5GHz*(8b/10b)X16=32Gb/s=4GB/s

PCE-E X16(雙向) BANDWITH=2.5GHz*(8b/10b)X16X2=64Gb/s=8GB/s

PCI-E REV:2.0--> 5GHZ

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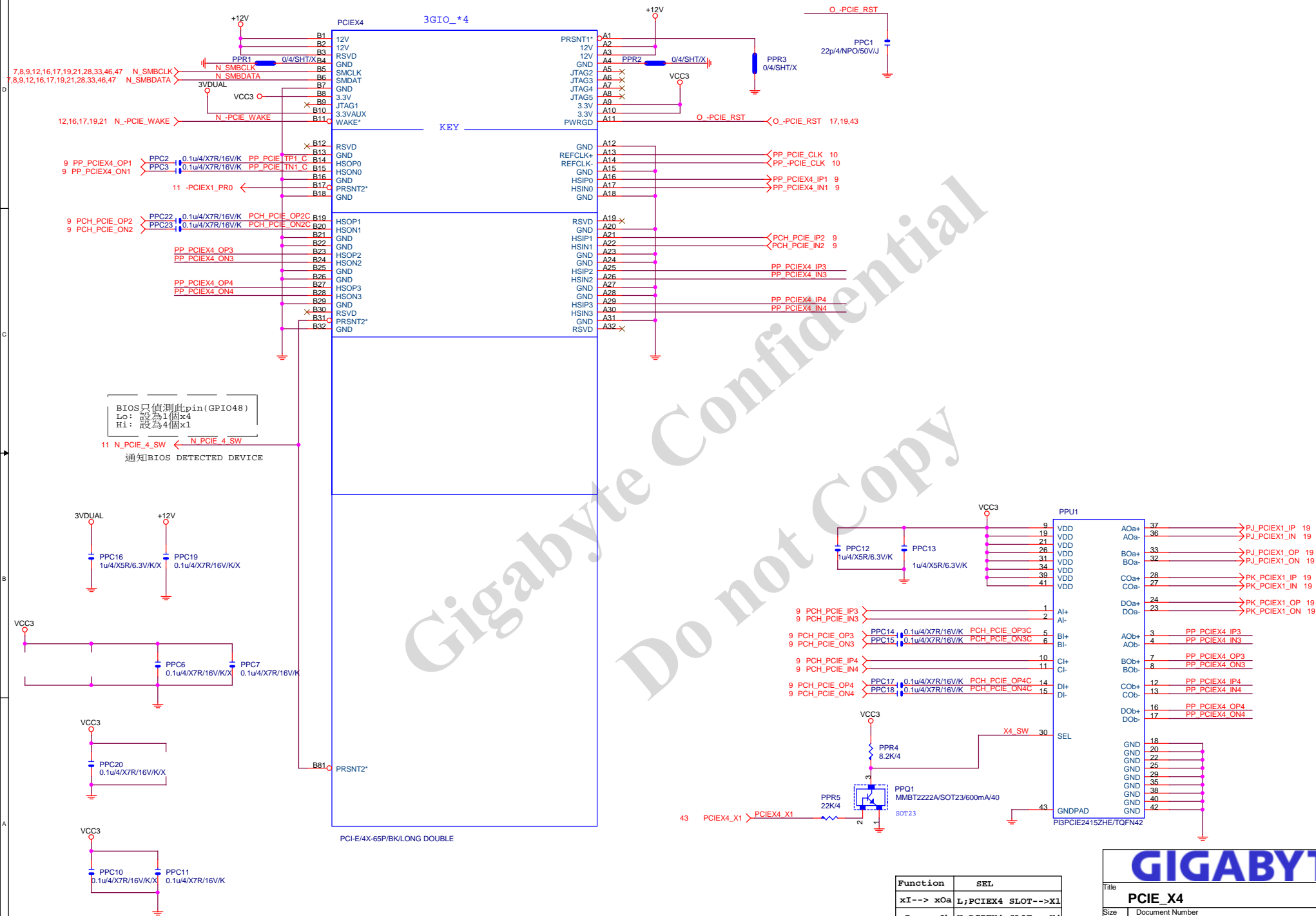
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PCI EXPRESS * 16			
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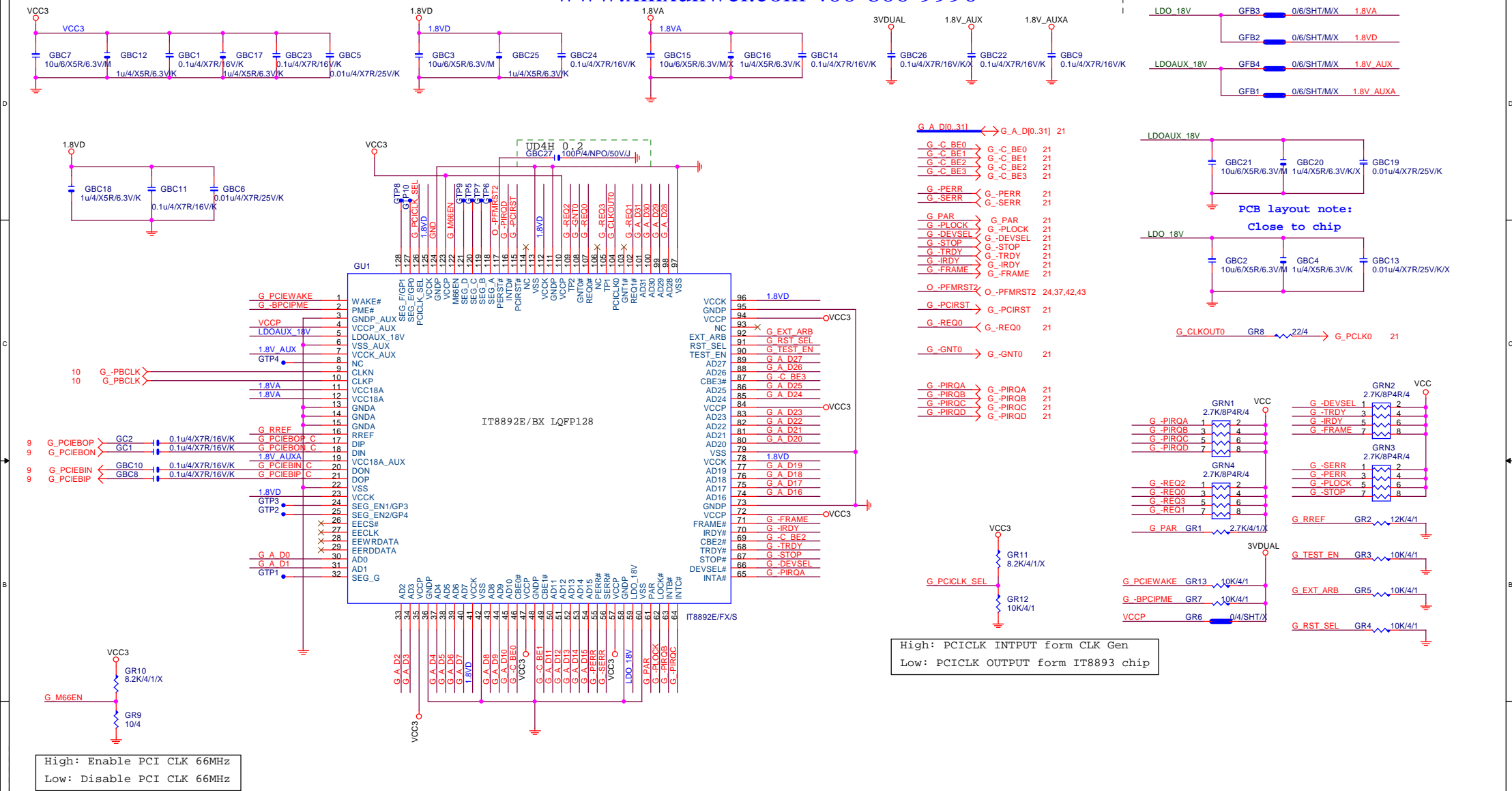
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PCIE*4

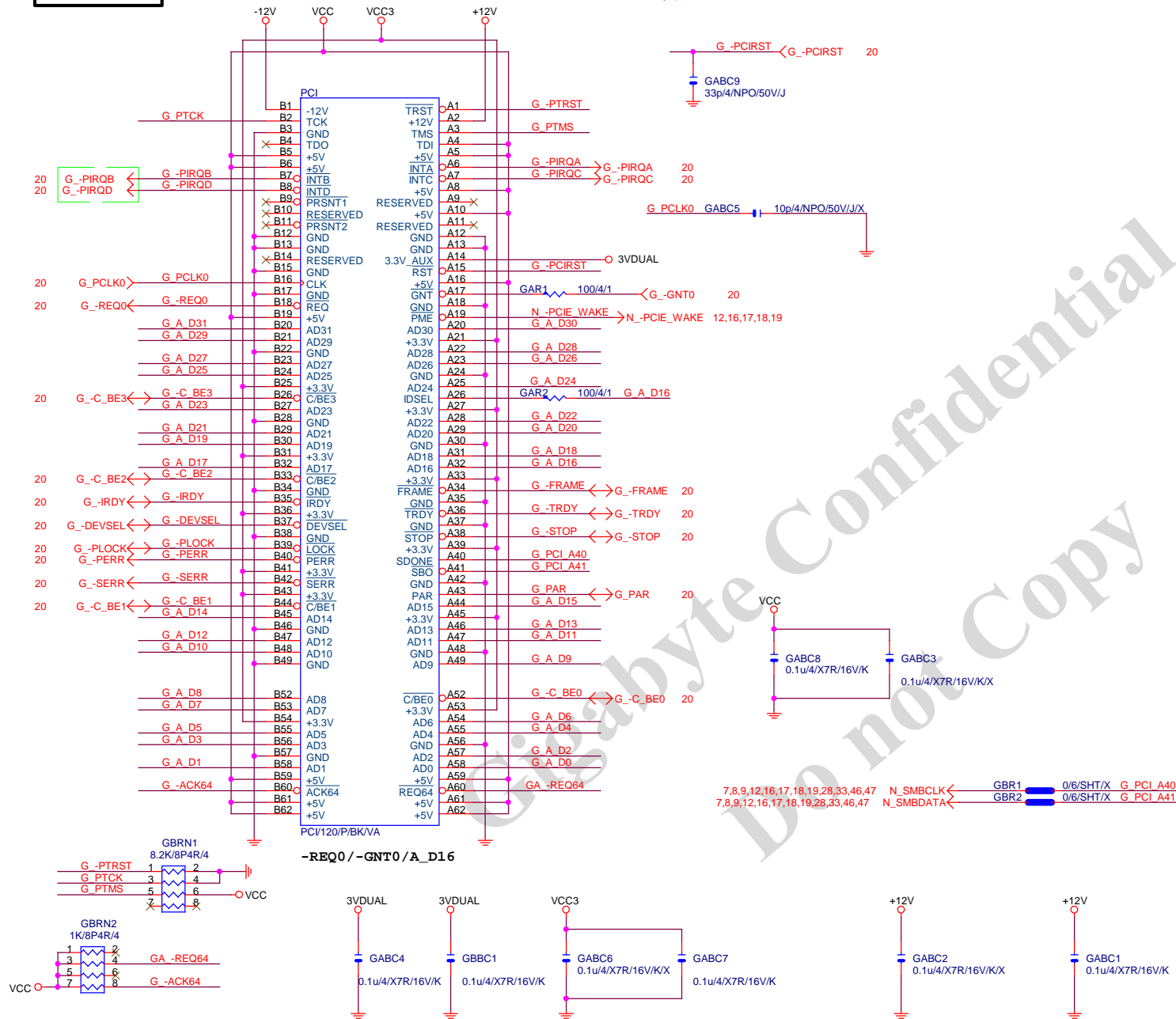


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Title PCIE_X4		
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PCI SLOT 1



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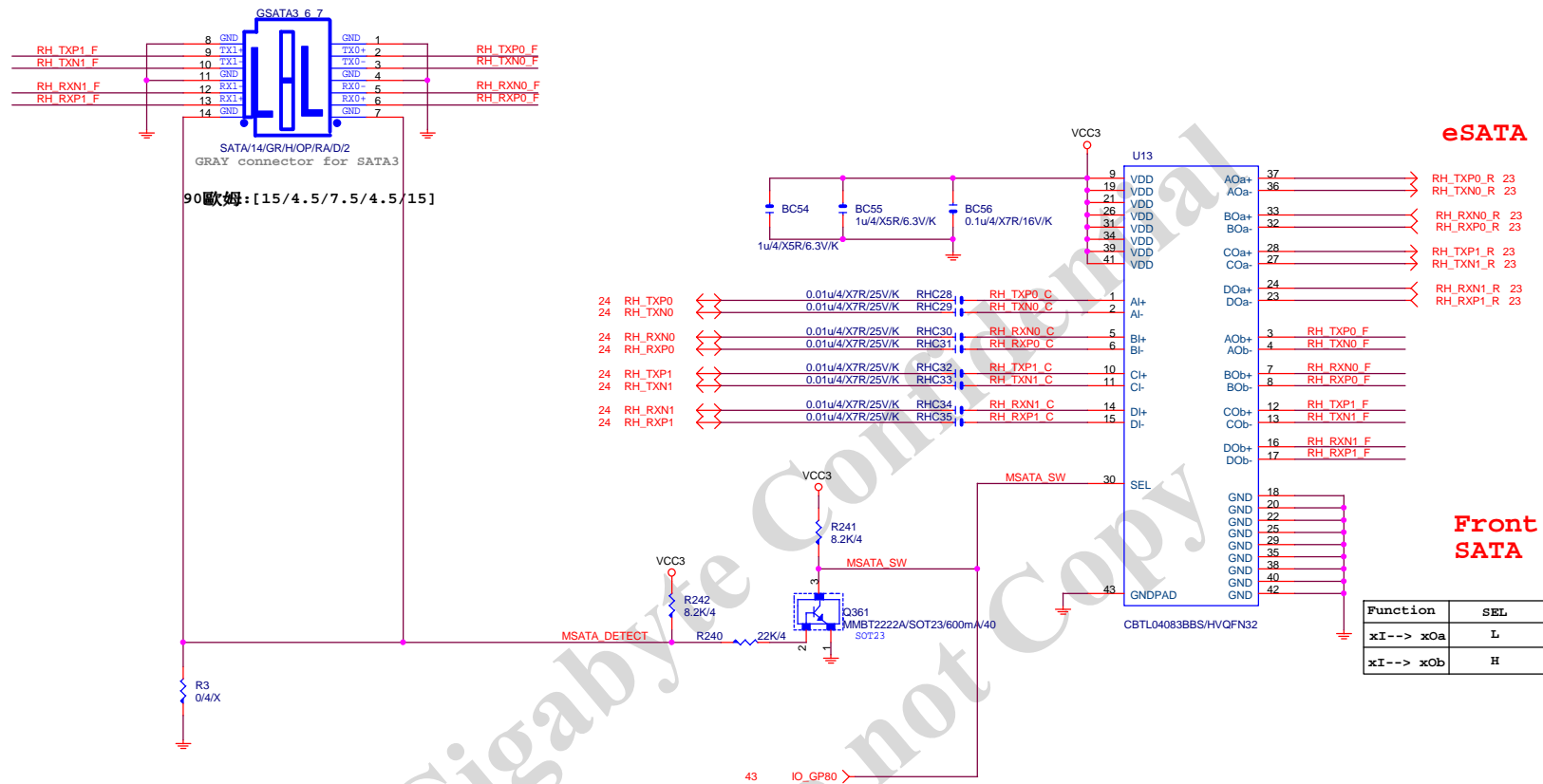
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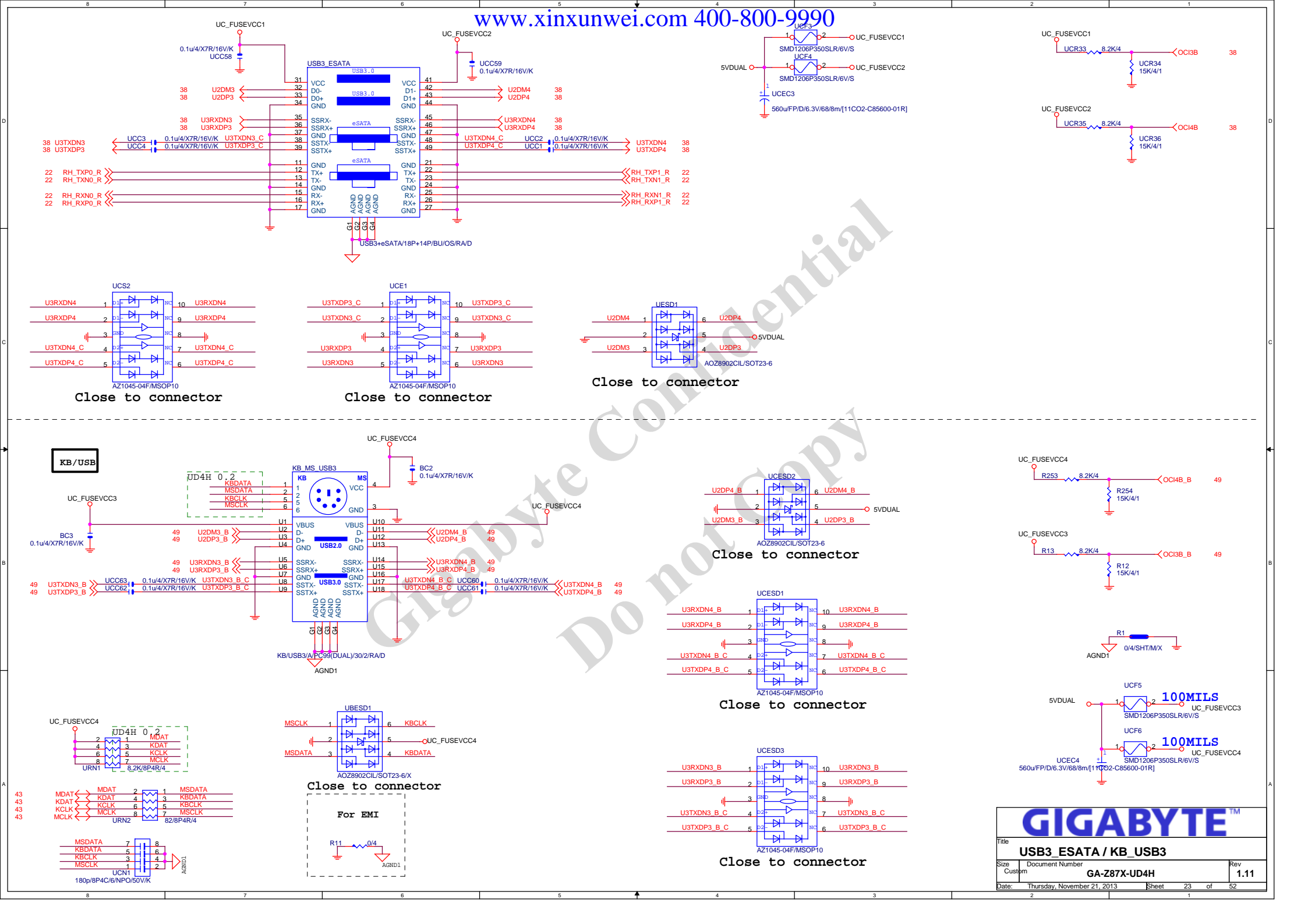
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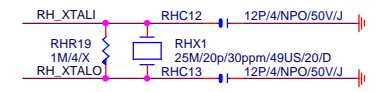
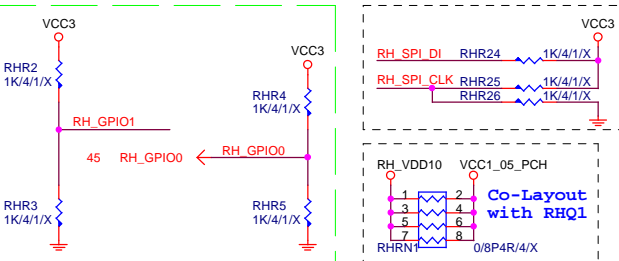
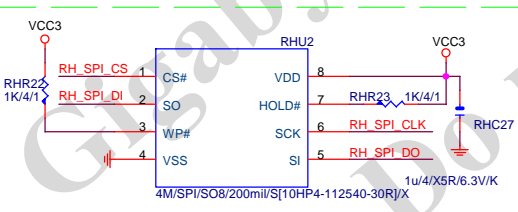
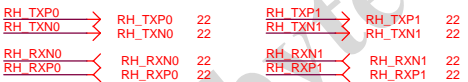
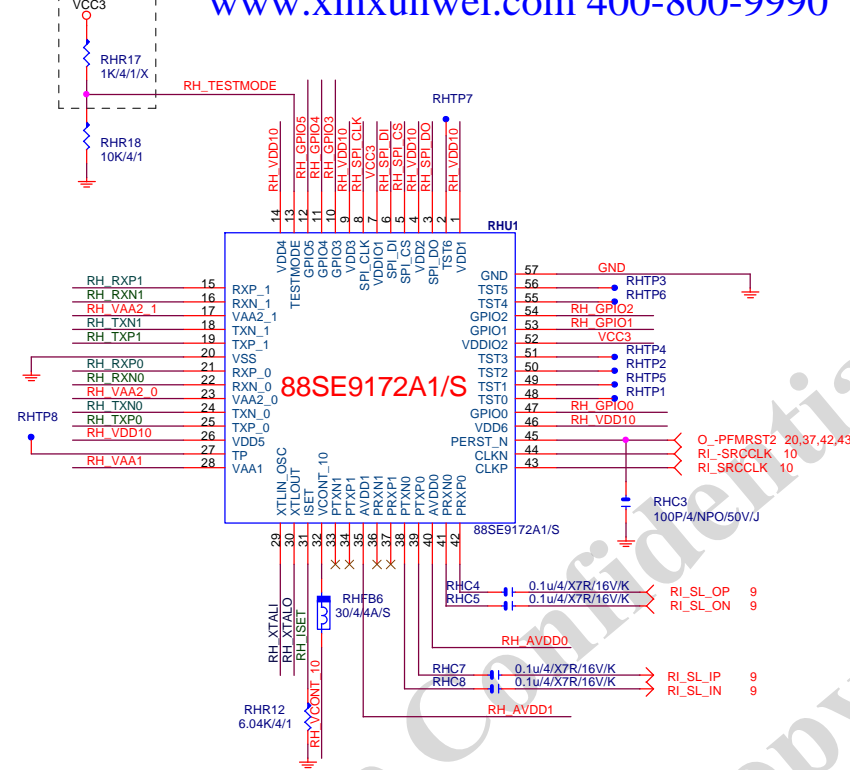
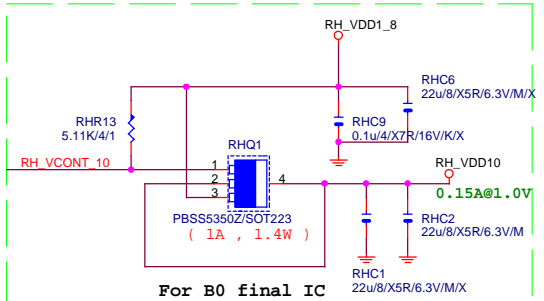
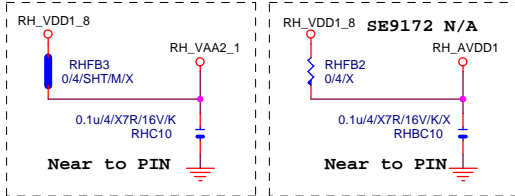
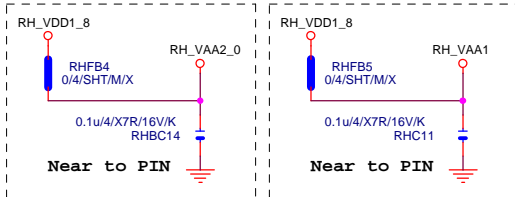
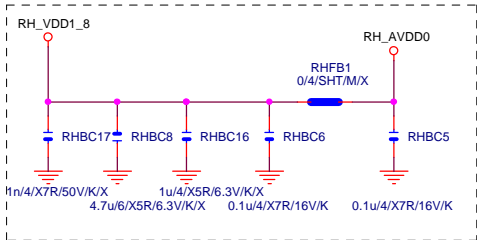
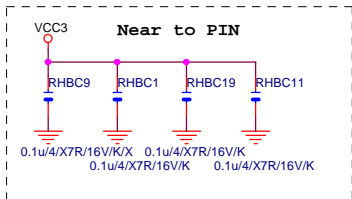
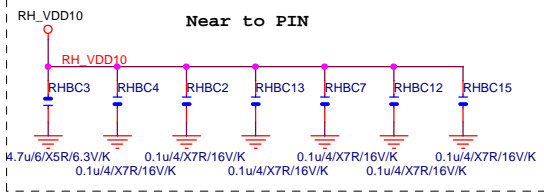
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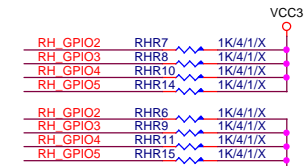
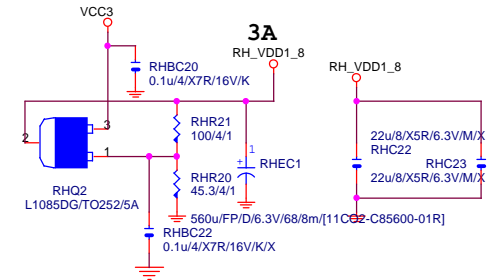
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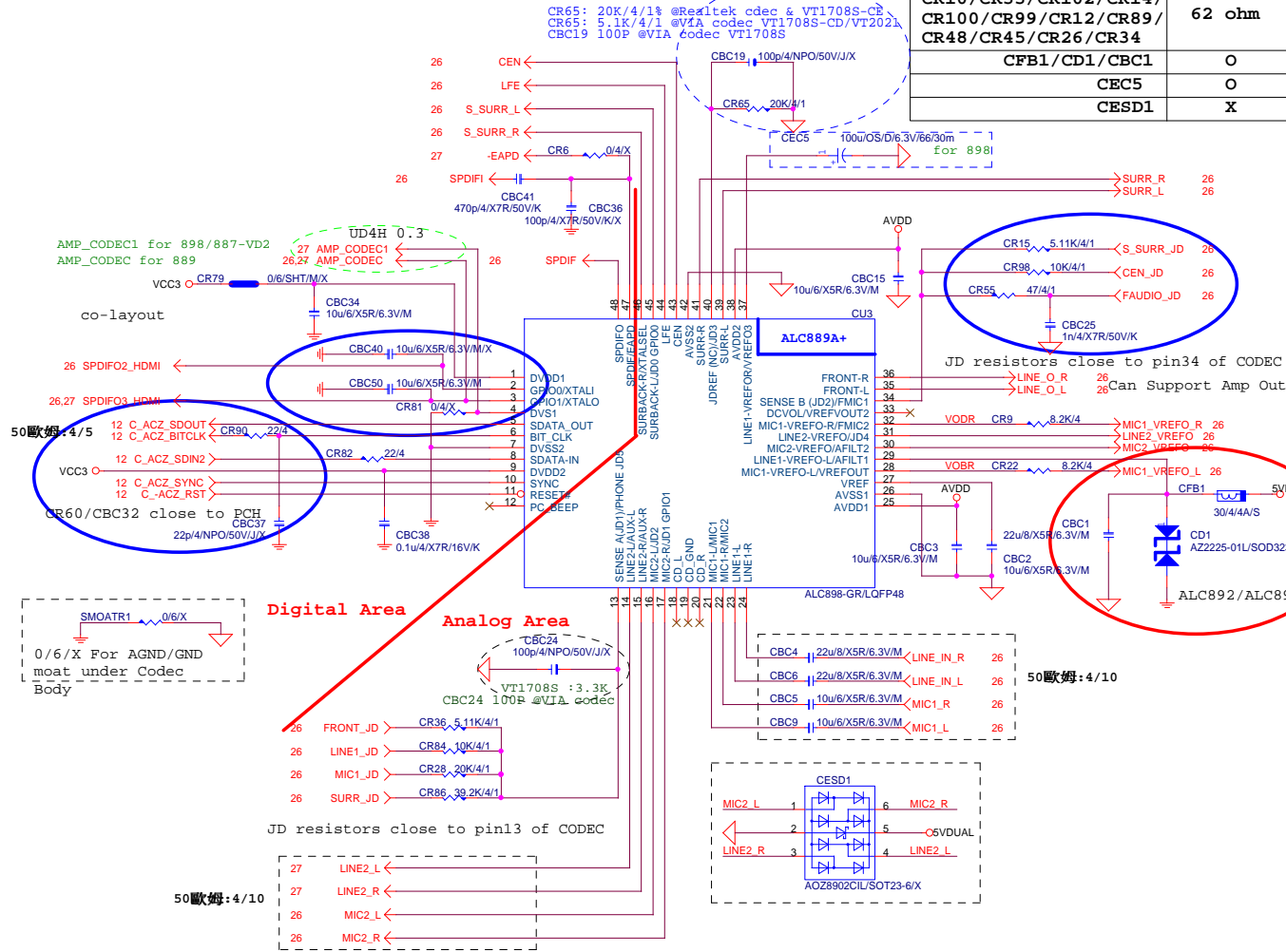




Marvell 9172 Power Requirements
Analog 1.8V 230mA
Core 1.0V 900mA
I/O 3.3V 50mA

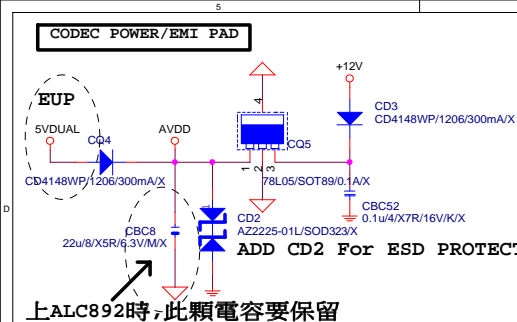


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CR81	X	X	X	O	X	O
CBC50	O	O	O	X	O	X
CR55/CBC25	47ohm+1nF	47ohm+1nF	47ohm+1nF	22ohm+100P	22ohm+100P	47ohm+1nF
CR80	O	O	O	O	O	O
CR83	X	X	X	X	X	X
CBC3/CBC15	22uF/X5R	10uF/X5R	10uF/X5R	10uF/X5R	10uF/X5R	10uF/X5R
CR65	20K/4/1	20K/4/1	20K/4/1	5.1K/4/1	20K/4/1	5.1K/4/1
CR9/CR22/ CR56/CR57/CR49/CR46/	8.2K/4	8.2K/4	8.2K/4	3.3K/4/1	3.3K/4/1	3.3K/4/1
CBC19/CBC24	X	X	X	100P/4	100P/4	X
CR66/CR18/CR13/CR88/ CR87/CR101/CR97/CR11	22K/4	22K/4	22K/4	10K/4/1	10K/4/1	10K/4/1
CR53/CR62/CR20/CR21/ CR10/CR33/CR102/CR14/ CR100/CR99/CR12/CR89/ CR48/CR45/CR26/CR34	62 ohm	62 ohm	62 ohm	75 ohm	75 ohm	75 ohm
CFB1/CD1/CBC1	O	O	X	X	O	X
CEC5	O	X	X	X	X	X
CESD1	X	O	X	O	O	X

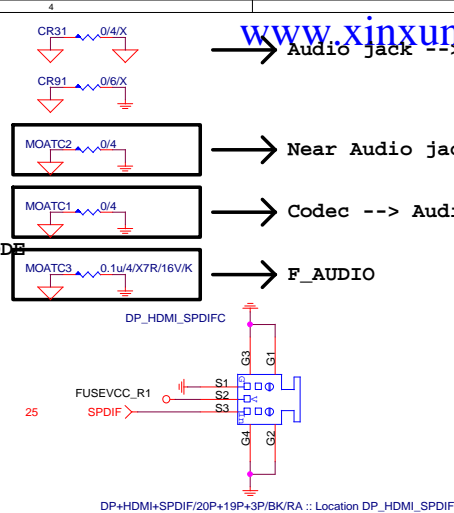


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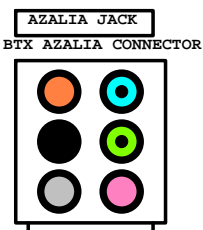
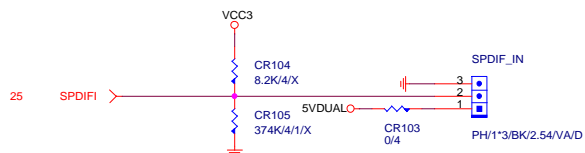
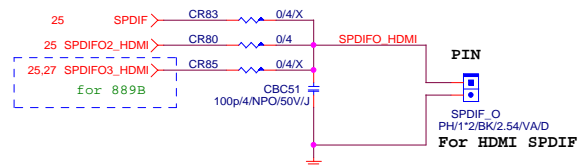
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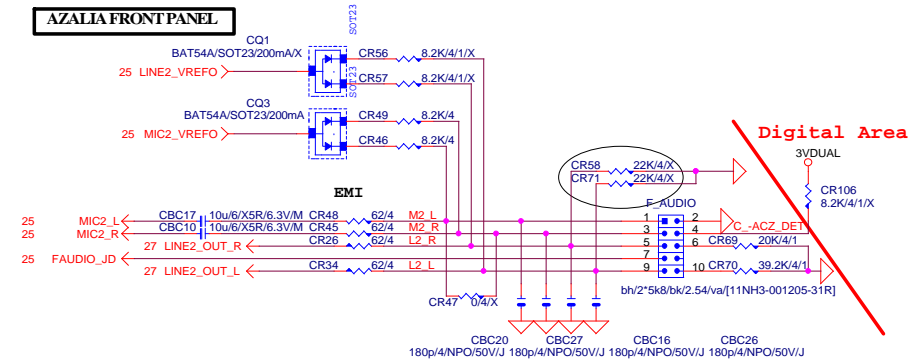
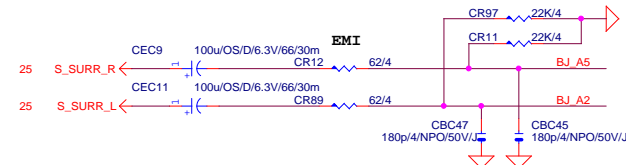
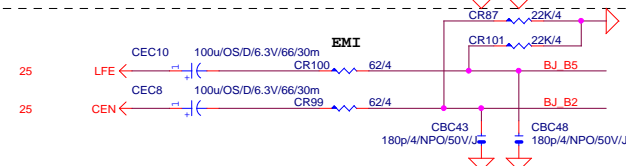
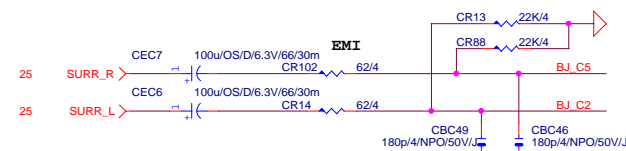
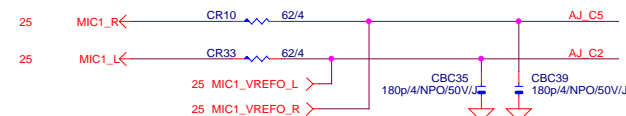
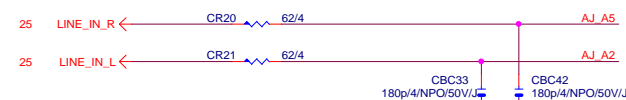
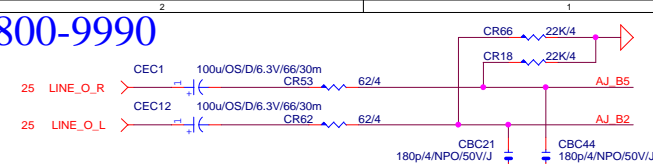
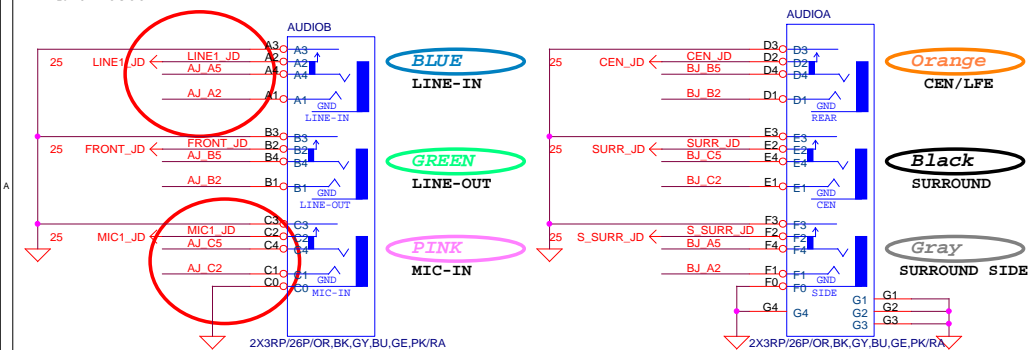
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DP+HDMI+SPDIF/20P+19P+3P/BK/RA :: Location DP_HDMI_SPDIF



11NR6-403007-21R

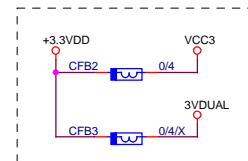
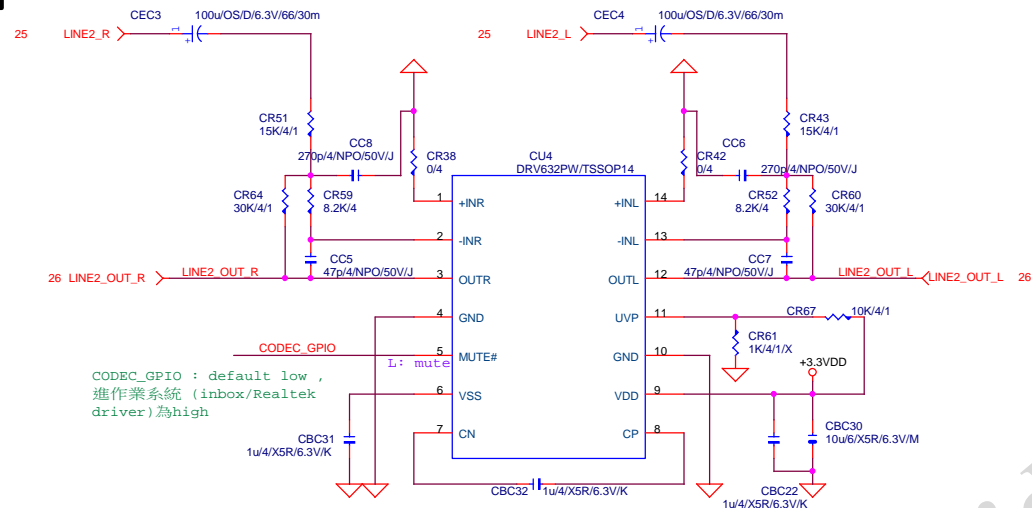


Digital Area

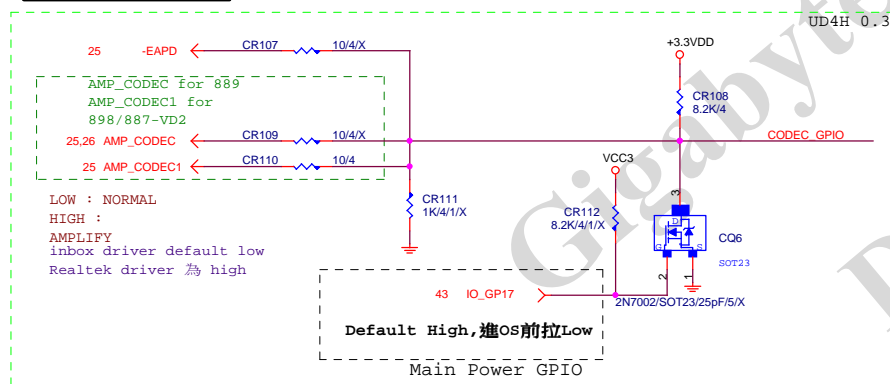
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HEADPHONE



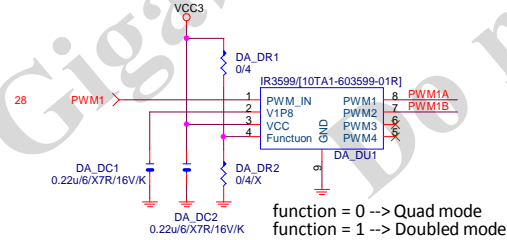
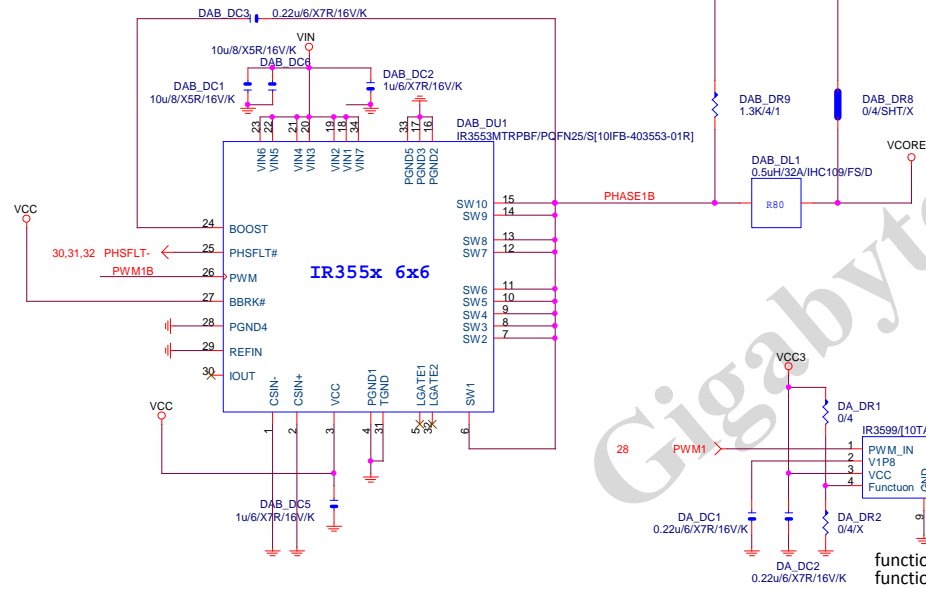
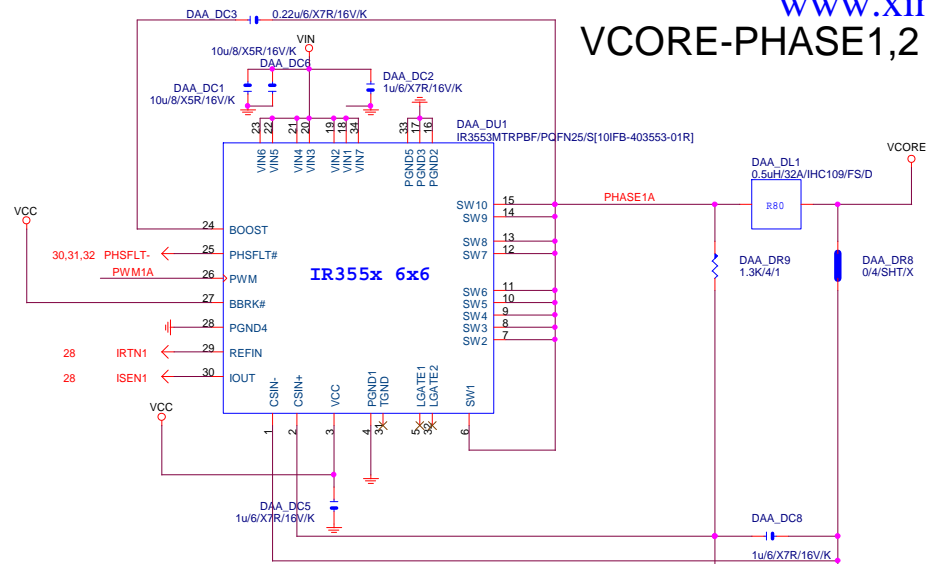
For Pop Noise



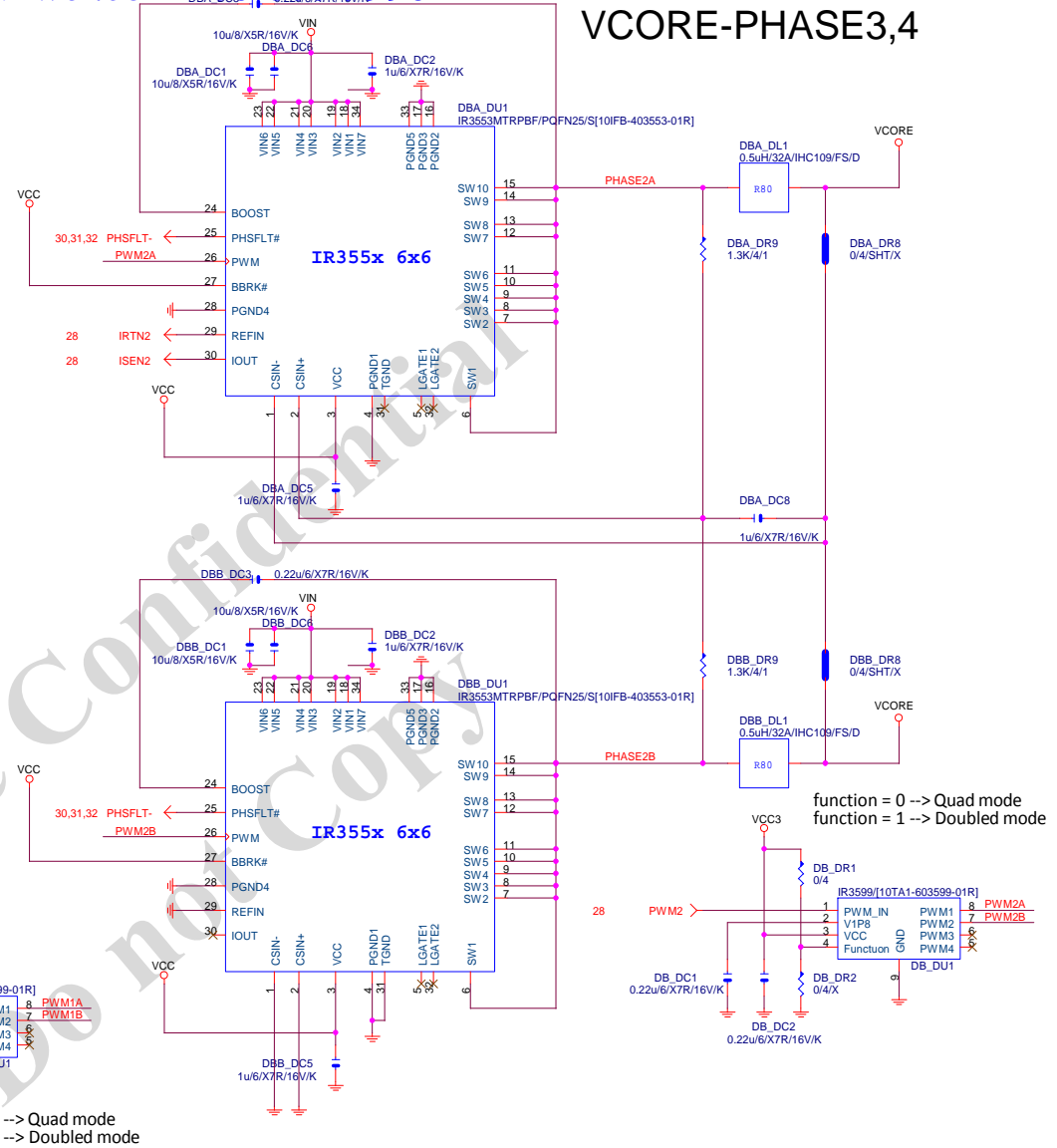
Gigabyte Technology

Title			
8-CH DAC & Anti-Pop / Mute			
Size	Document Number	GA-Z87X-UD4H	
Custom		Rev	1.11
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VCORE-PHASE1,2



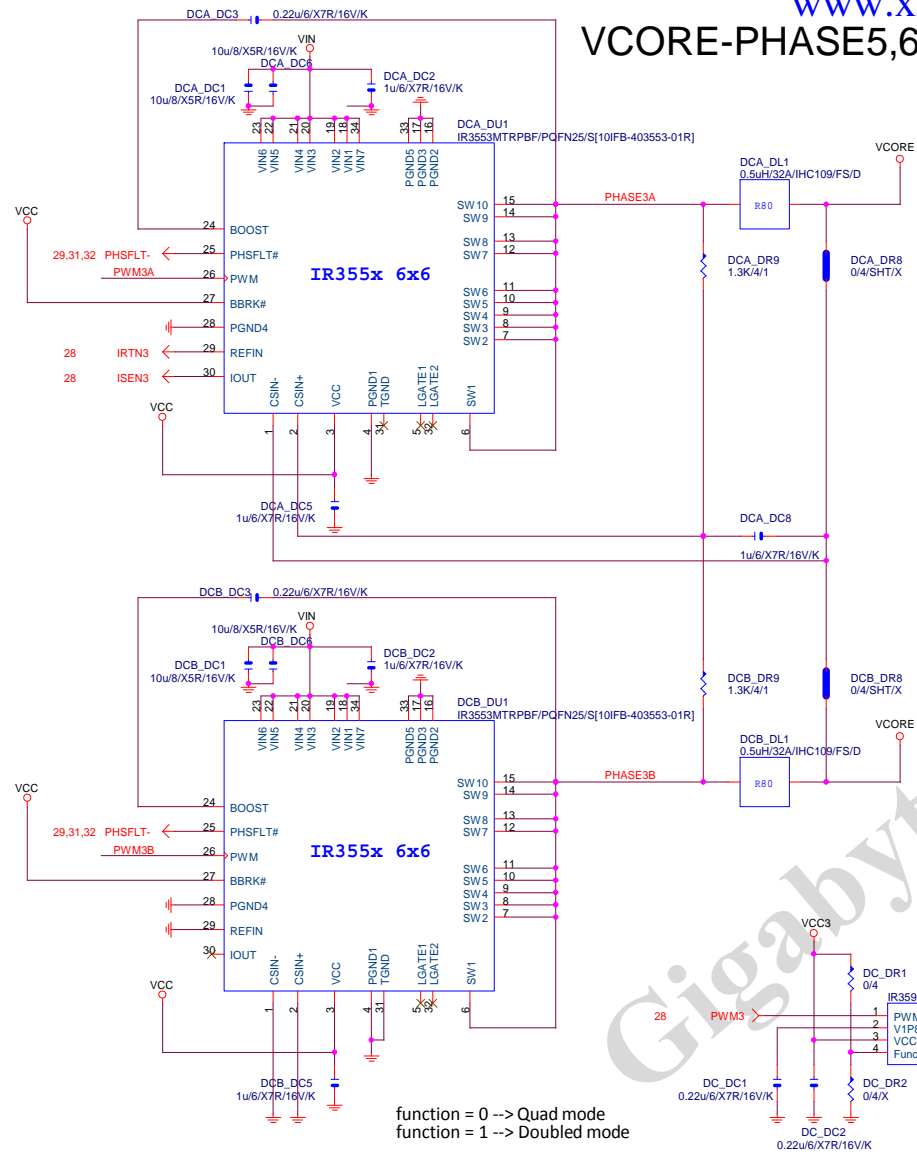
VCORE-PHASE3,4



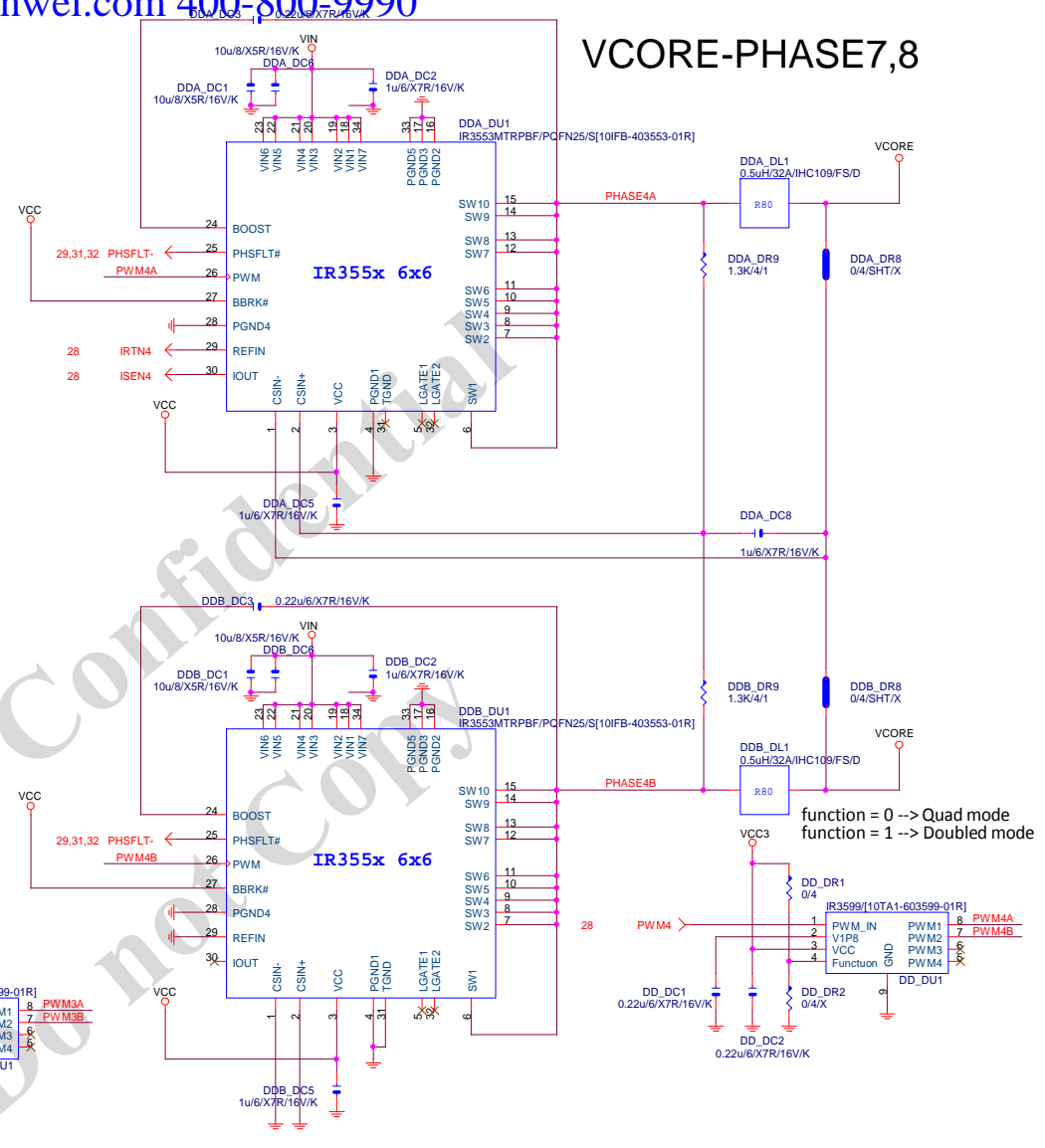
function = 0 --> Quad mode
function = 1 --> Doubled mode

Add MOSFET Anti-Burn
4.11.28 N_THRMTRIP <-- DAR109 0/4 PHSFLT- UD4H 0.3 VCC
6.2K/4/X

VCORE-PHASE5,6



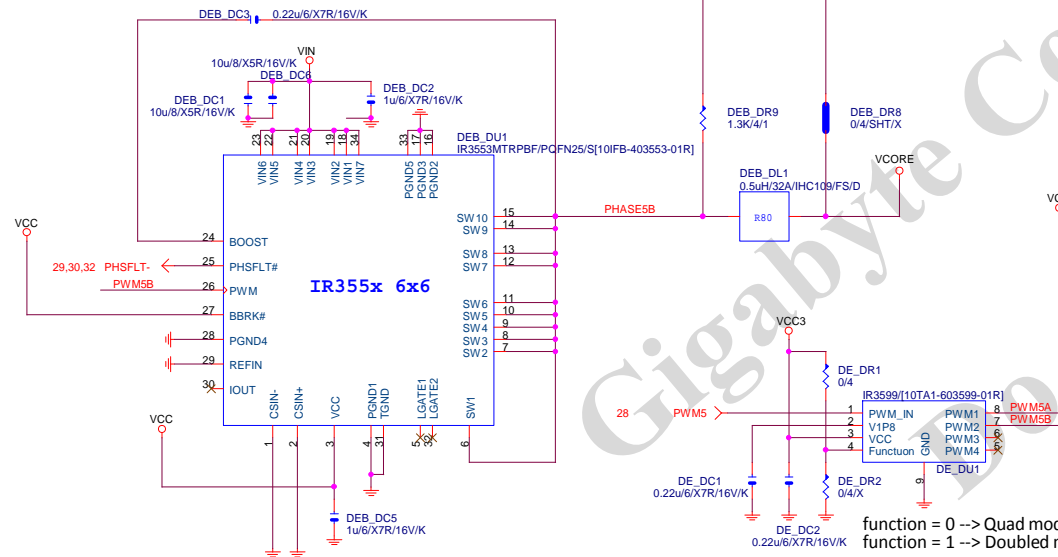
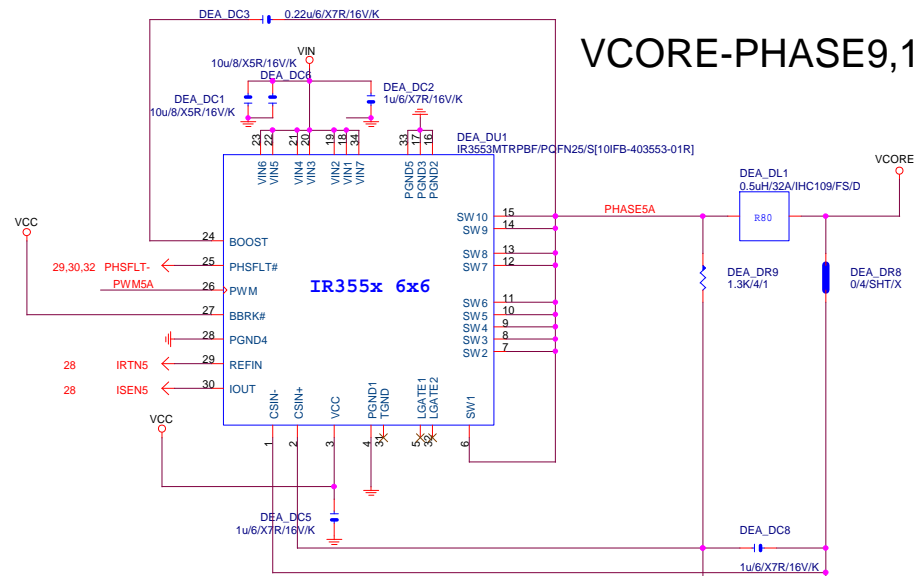
VCORE-PHASE7,8



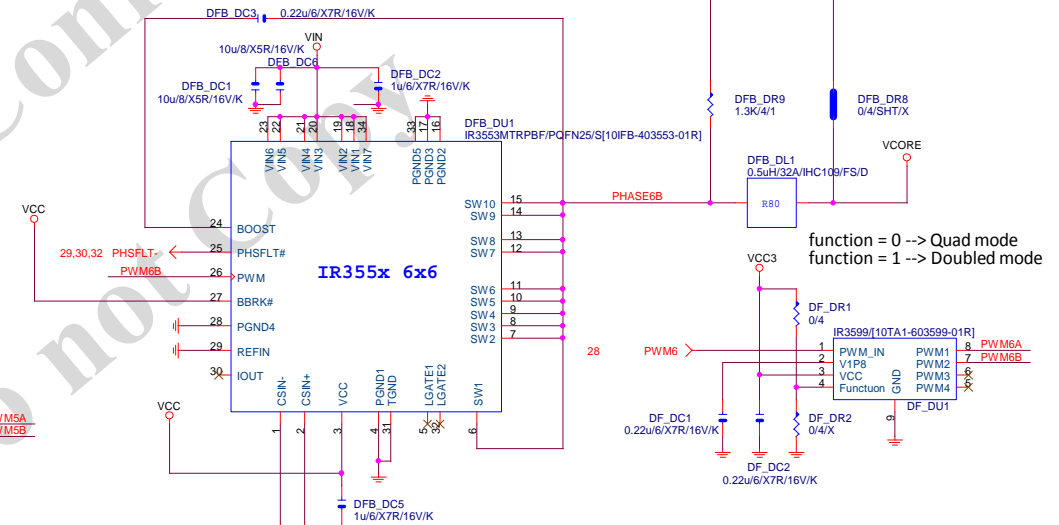
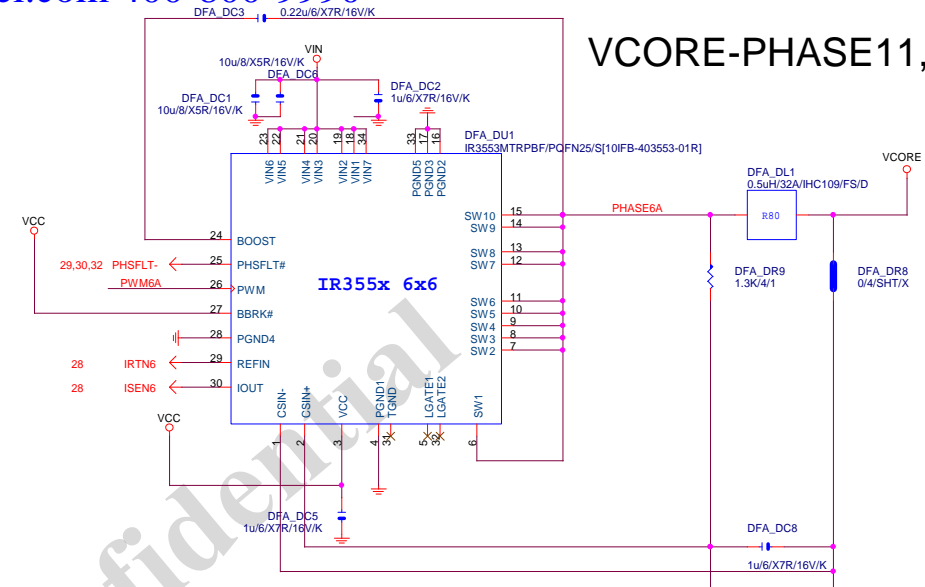
Gigabyte Technology

Title			
CPU CORE VR			
Size	Document Number	GA-Z87X-UD4H	
Custom			Rev 1.11
Date:	Thursday, November 21, 2013	Sheet	30 of 52

VCORE-PHASE9,10



VCORE-PHASE11,12

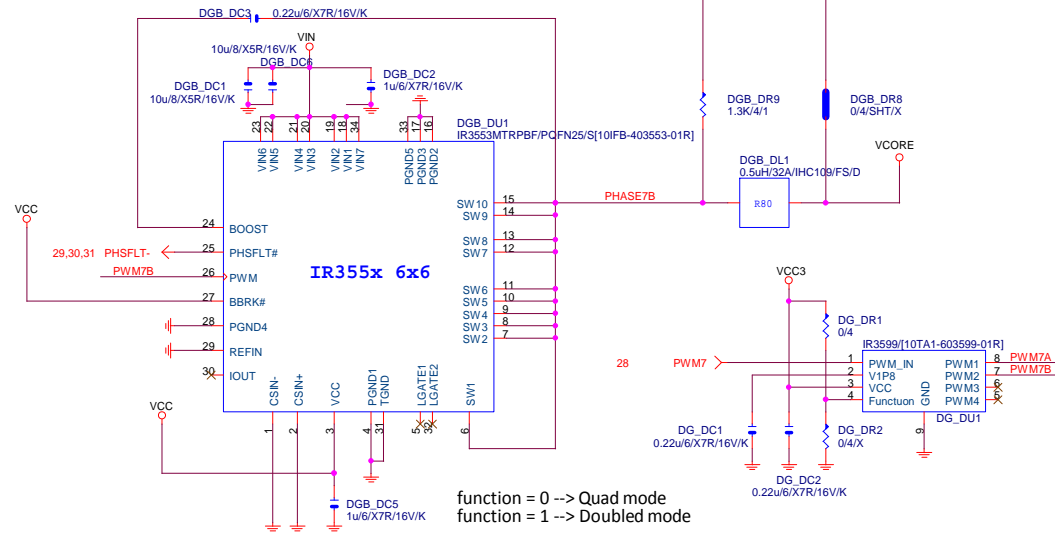
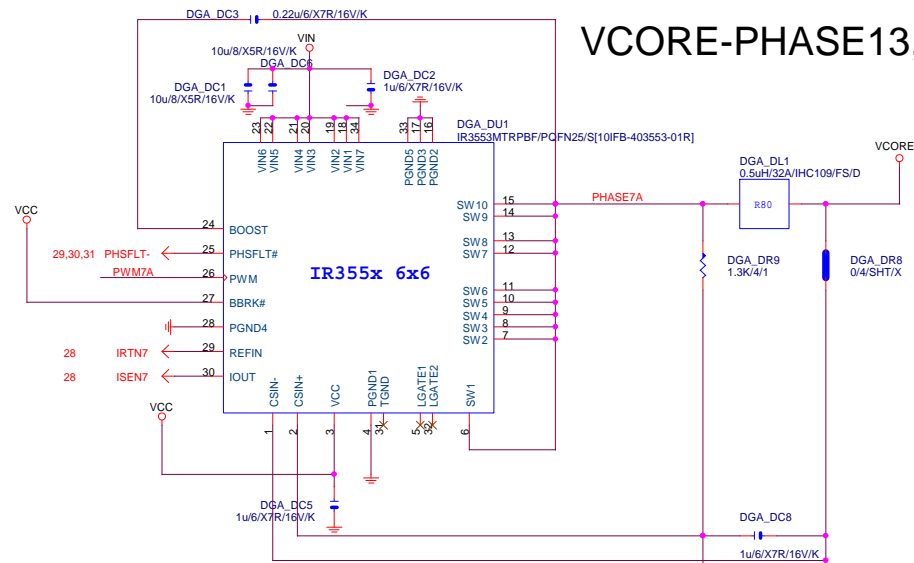


function = 0 --> Quad mode
function = 1 --> Doubled mode

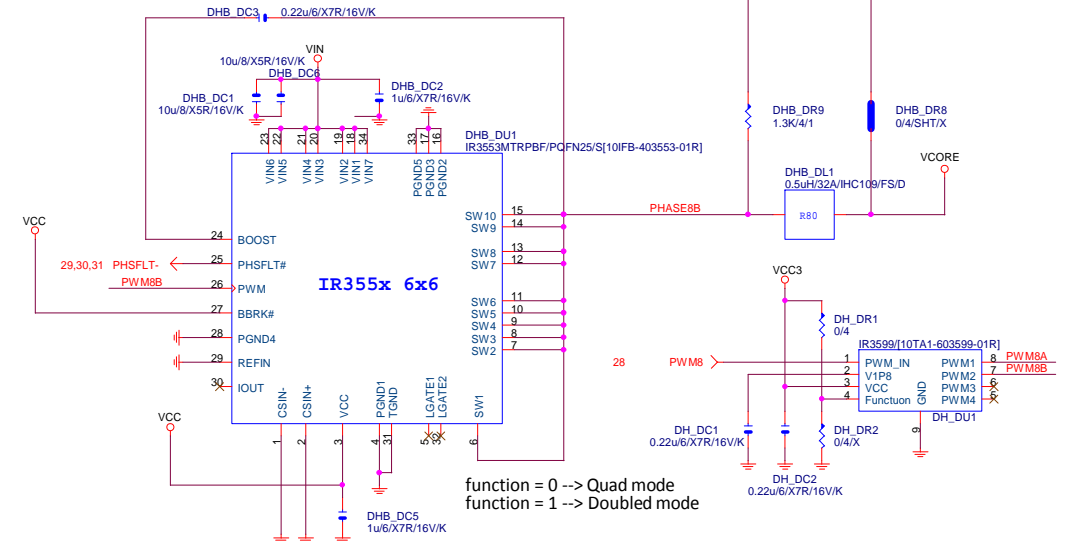
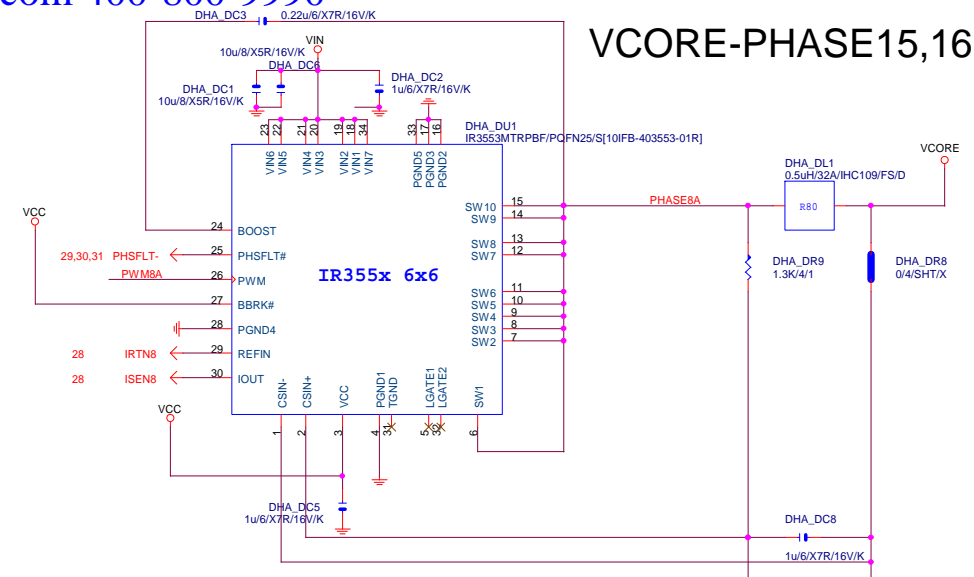
Gigabyte Technology

Title	IR3553-VCORE		
Size	Document Number	GA-Z87X-UD4H	
Custom			Rev 1.11
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VCORE-PHASE13,14



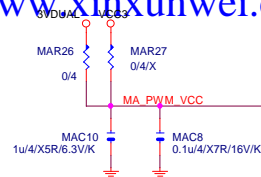
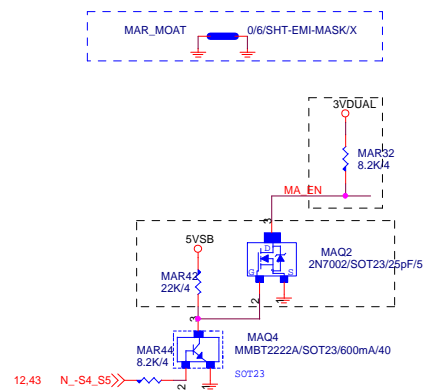
VCORE-PHASE15,16



Gigabyte Technology

Title			IR3553-VCORE
Size	Document Number	GA-Z87X-UD4H	
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Rev 1.11



MAR20 10K/4/1MA RCSP L2

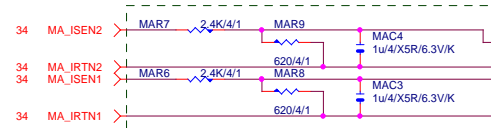
IR3570

MA_PWM2 34
MA_PWM1 34

Link to system
SMBUS

7,8,9,12,16,17,18,19,21,28,46,47
7,8,9,12,16,17,18,19,21,28,46,47

Addr: 72h



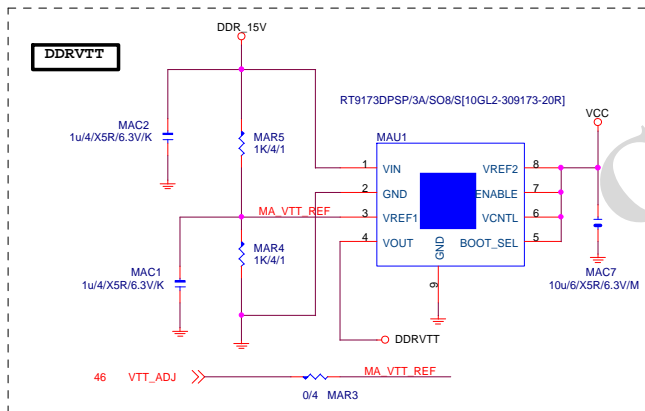
Value need check with Vendor

Close to DDR
output
inductor

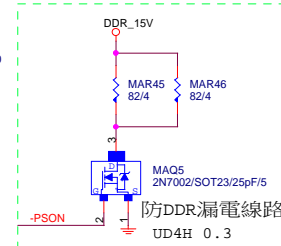
should be routed as
differential pair,
7mil width,8mil
spacing

46 DDR15V_ADJ1 >> MAR19 0/4/X MA_VSEN

DDRVTT



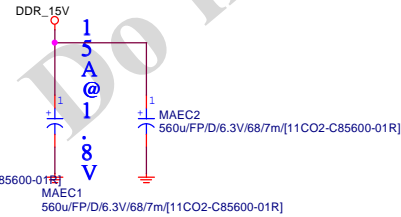
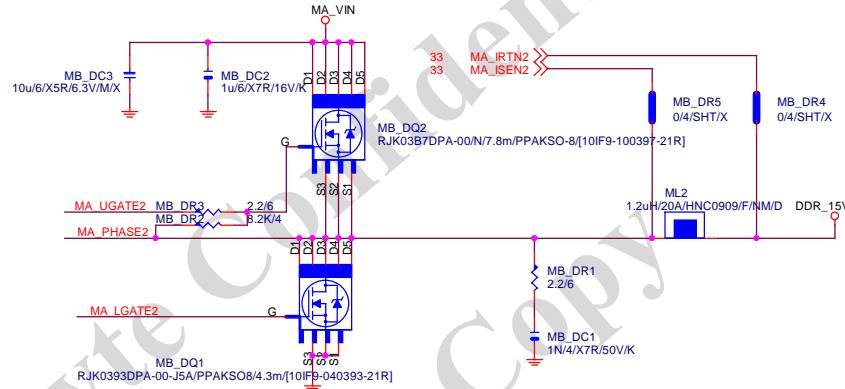
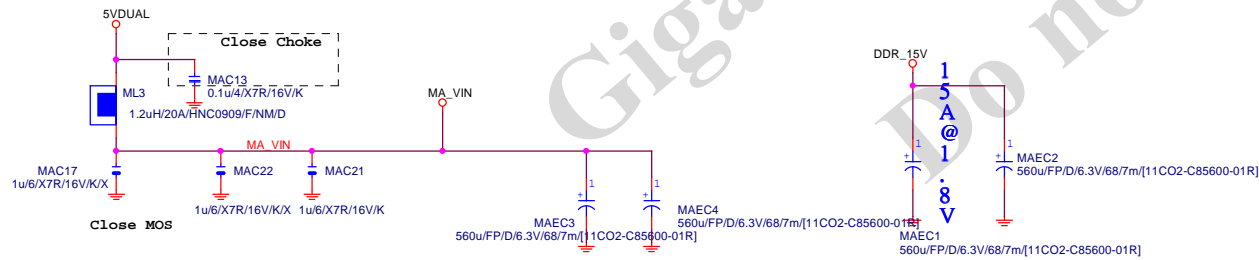
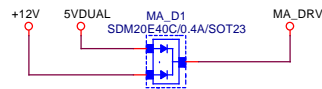
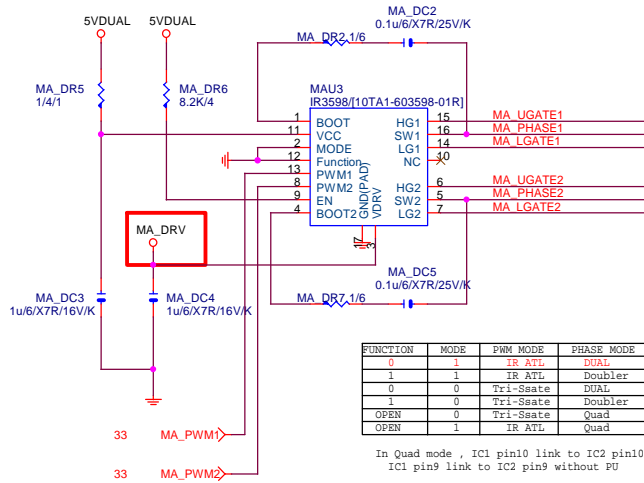
POWER ISSUE 0.1u/4/X7R/16V/K/X



防DDR漏電線路
UD4H 0.3

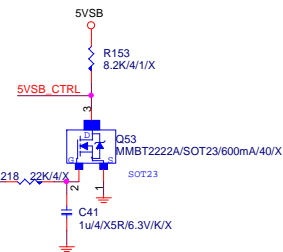
GIGABYTE™			
Title DDR POWER IR3570			
Size Custom	Document Number GA-Z87X-UD4H	Rev 1.11	
Date:	Thursday, November 21, 2013	Sheet	33 of 52

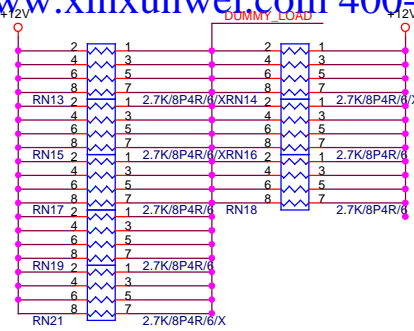
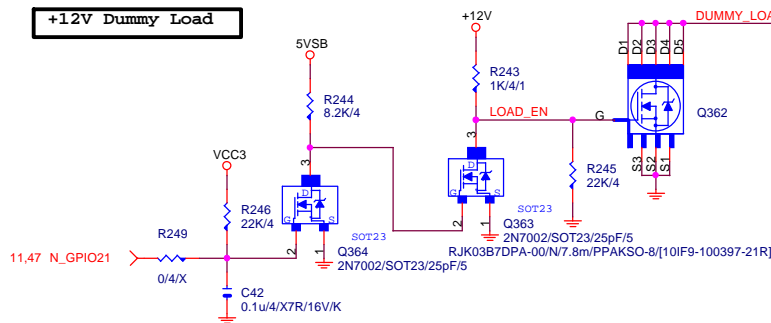
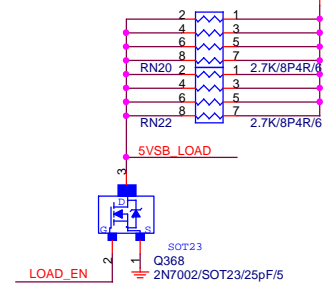
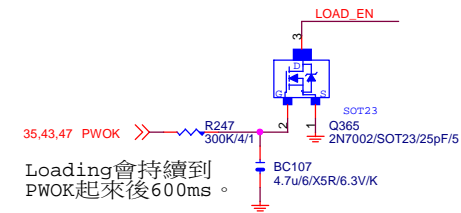
DDR_15V



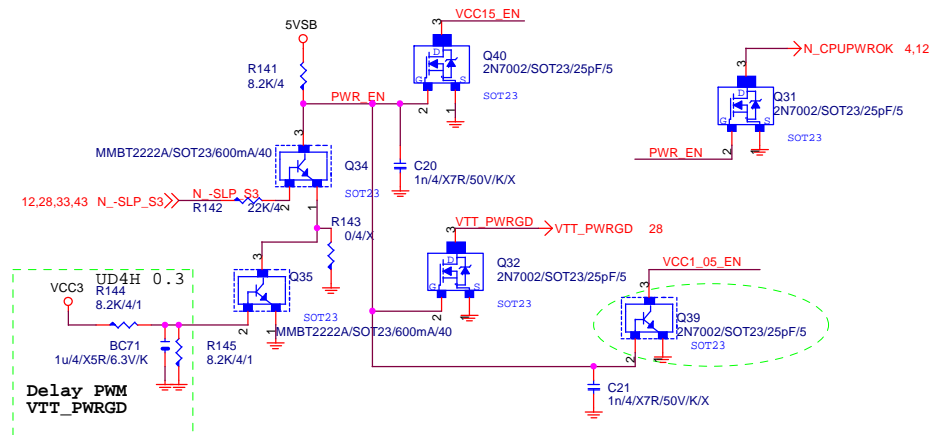
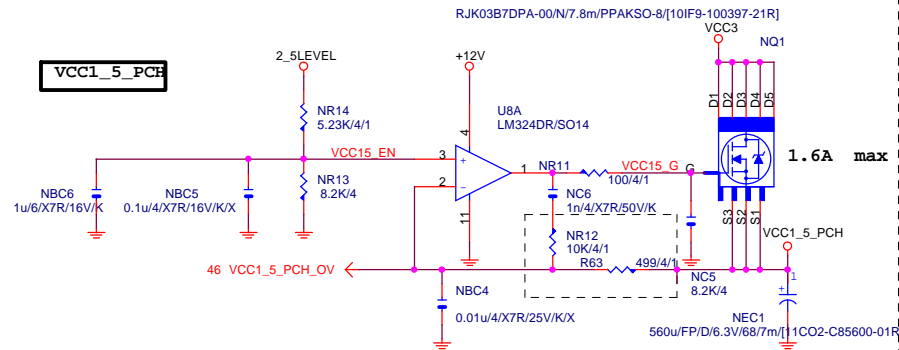
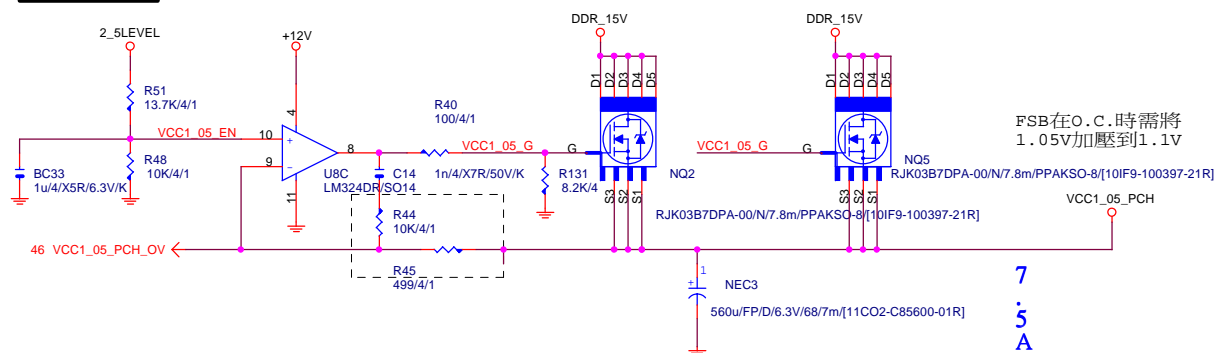
Gigabyte Technology

Title			IR3570
Size	Document Number	GA-Z87X-UD4H	
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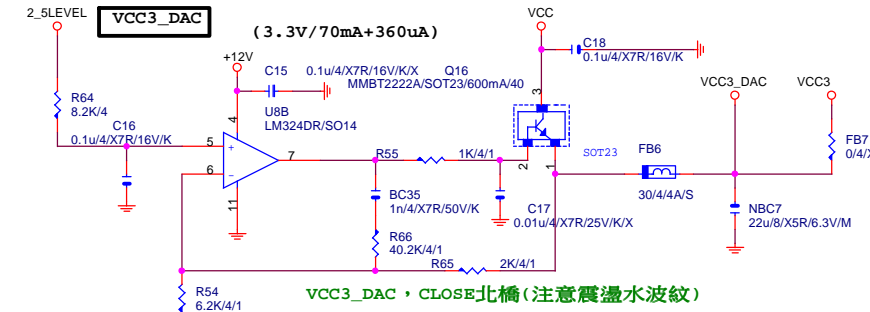


+12V Dummy Load**UD4H 0.3**

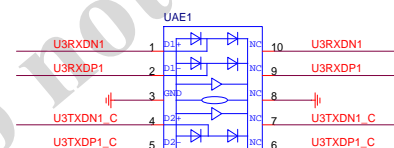
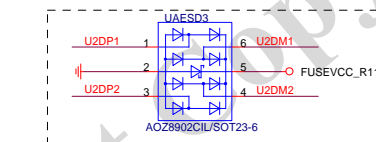
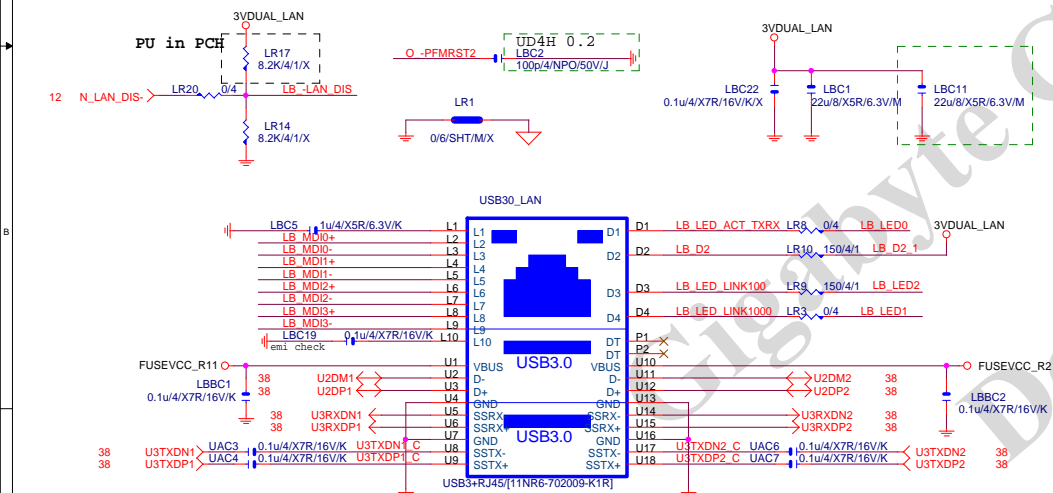
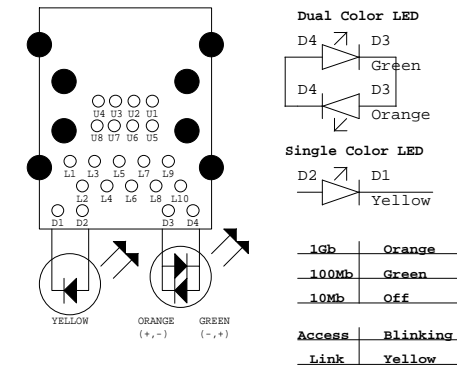
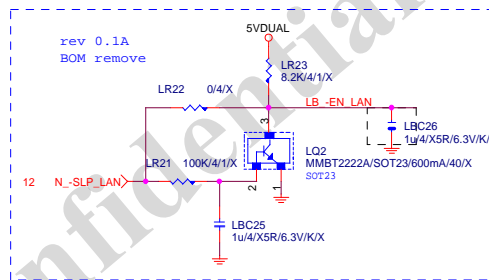
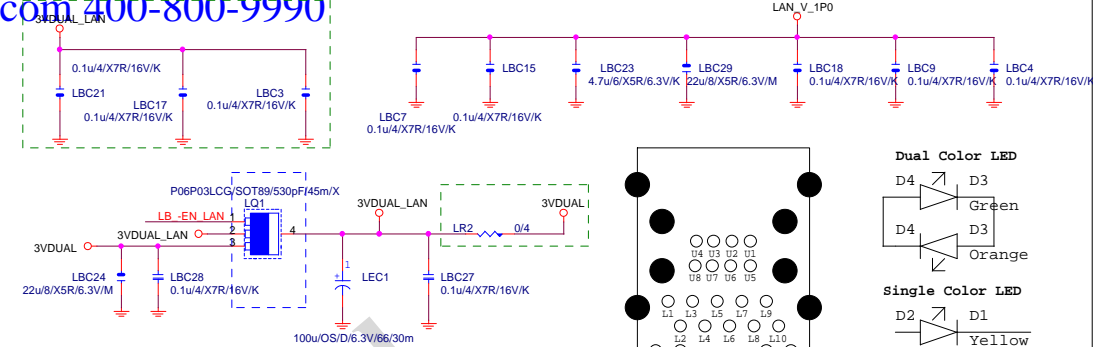
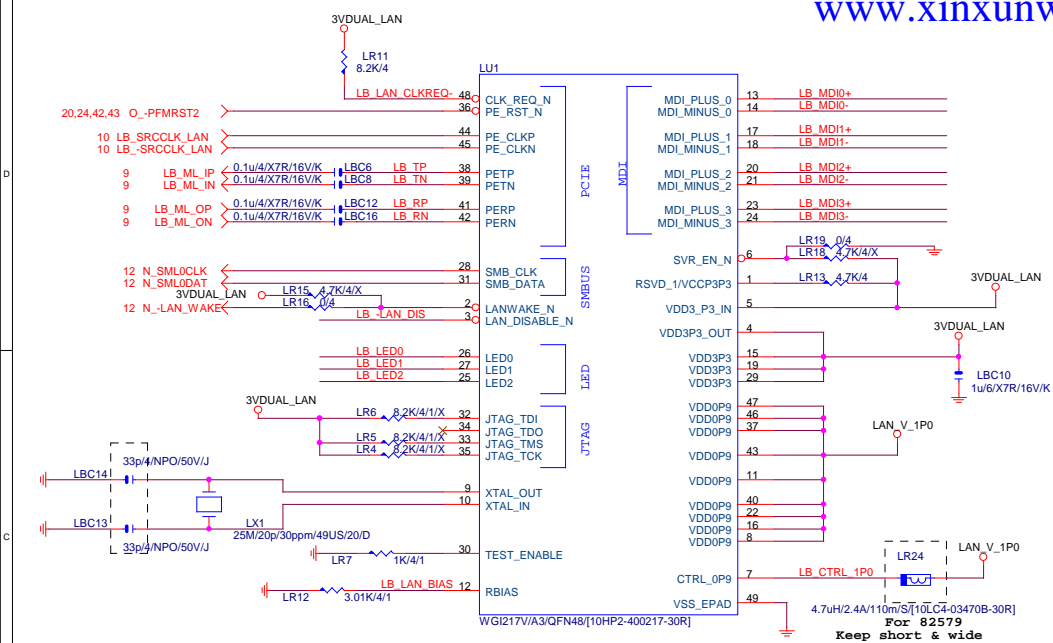
Fix S28 PSU issue.

VCC1_5_PCH**VCC1_05_PCH**FSB在O.C.時需將
1.05V加壓到1.1V

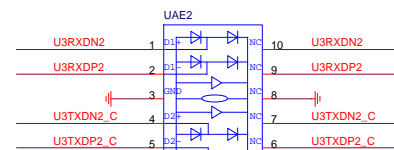
7.5A@1.055V

VCC3_DAC**Gigabyte Technology**

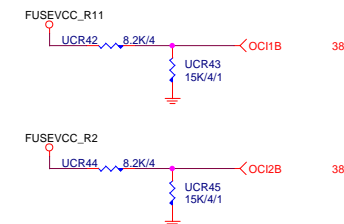
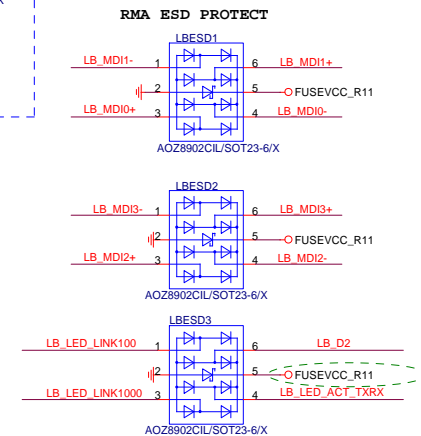
Title		
DISCRETE POWER 2		
Size	Document Number	Rev
Custom	GA-Z87X-UD4H	1.11
Date:	Thursday, November 21, 2013	Sheet 36 of 52



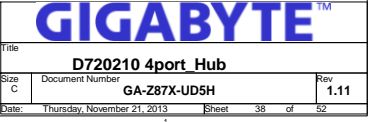
Close to connector



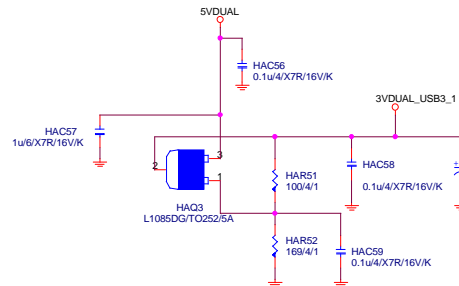
Close to connector



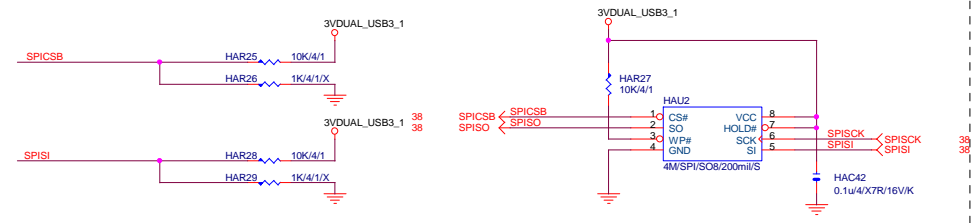
Title			
INTEL LAN i217V			
Size	Document Number	Rev	
Custom	GA-Z87X-UD4H	1.11	
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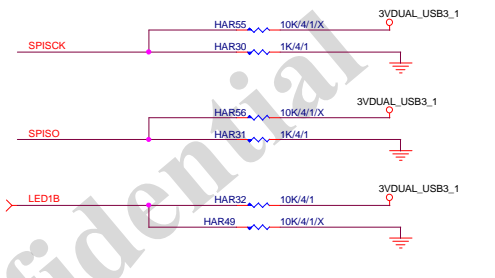
3VDUAL_USB



External SPI ROM ; SPI ROM
attached mode

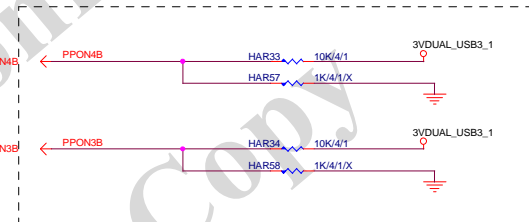


Battery Charging

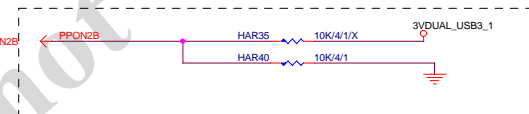


Number of Ports ; 4Ports
mode

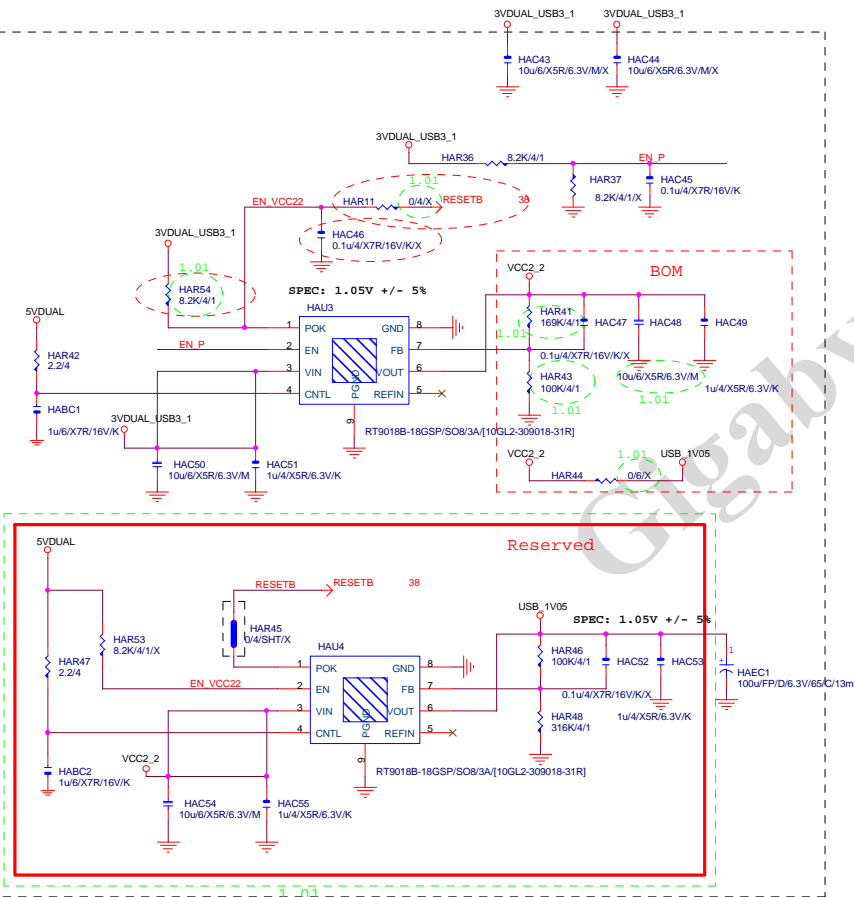
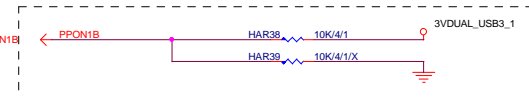
PPON3B / PPON4B : H / H (4 port)
PPON3B / PPON4B : L / L (2 port)



#5 VBUS Power Control
Individual mode



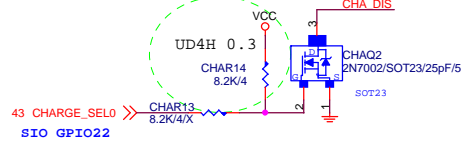
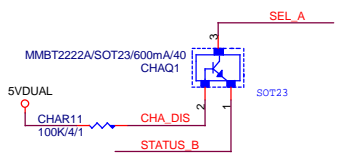
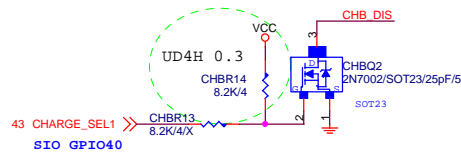
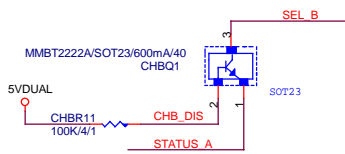
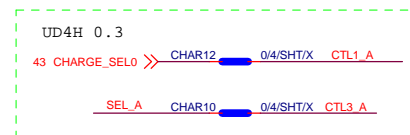
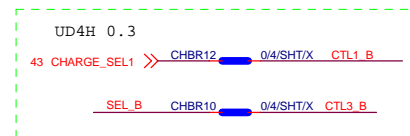
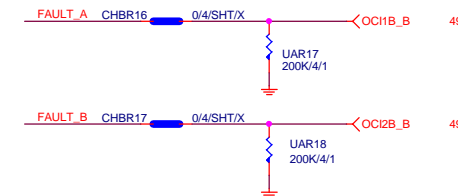
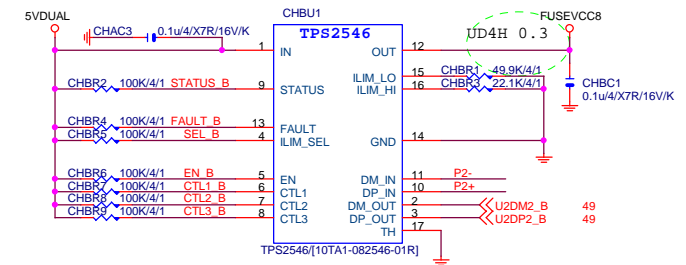
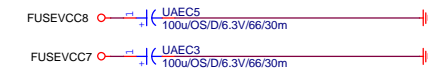
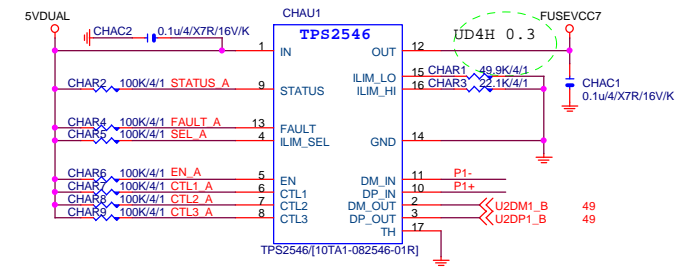
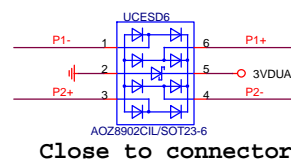
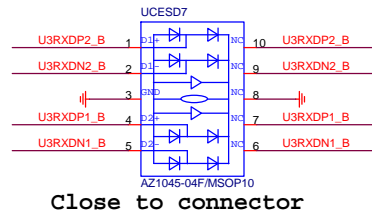
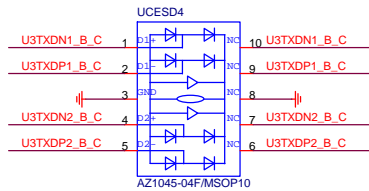
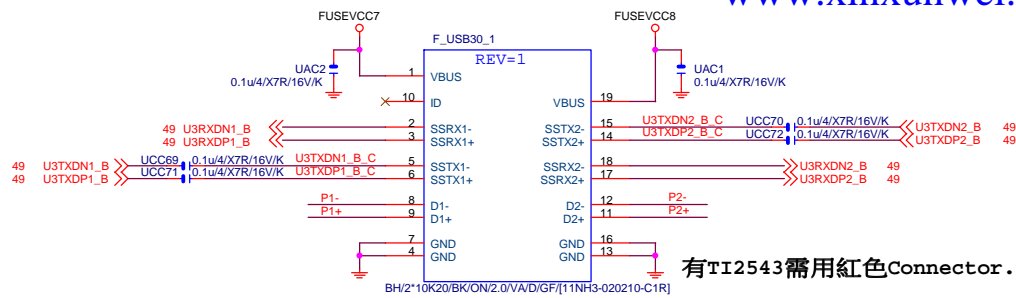
PPON1B Pin Function ;
Port1 PPONB mode

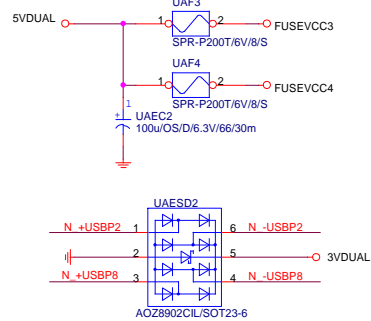
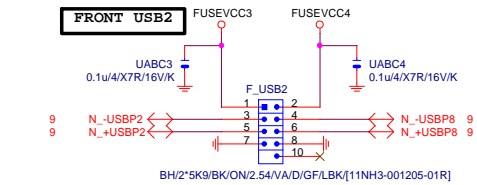
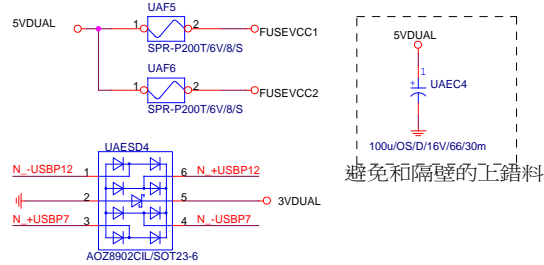
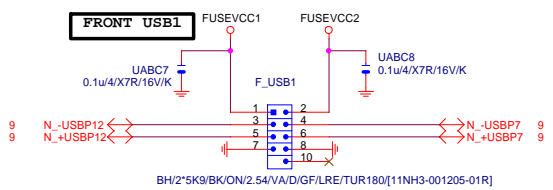


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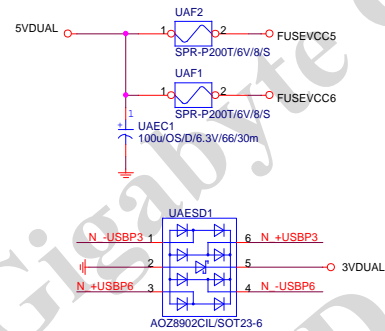
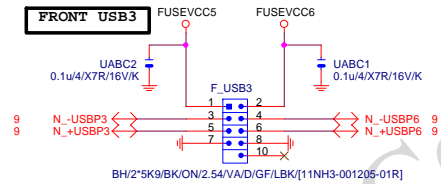
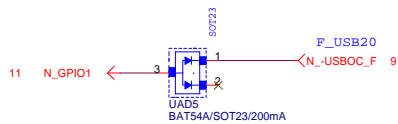
Title			D720210 4port Hub		
Size	Document Number	GA-Z87X-UD5H			Rev
Custom					1.11
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TI2543內建Fuse，移除UAFB1~2.

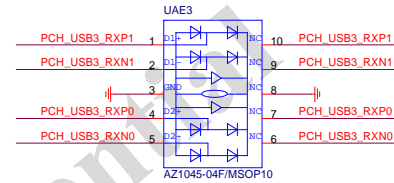
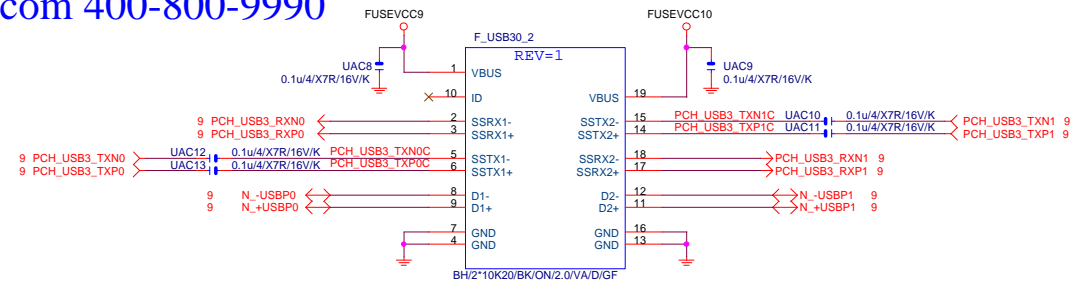
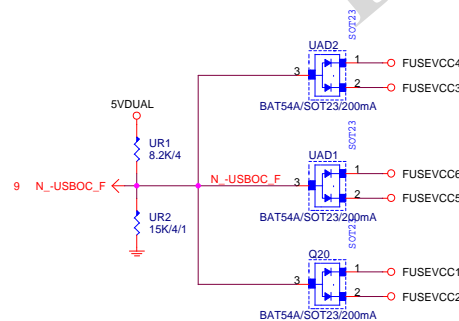




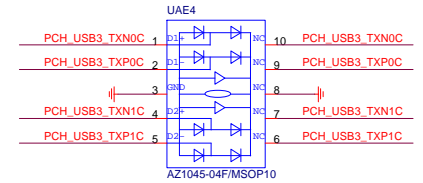
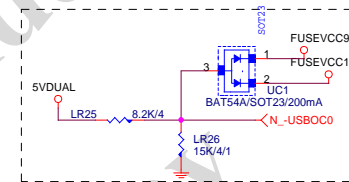
Close to connector



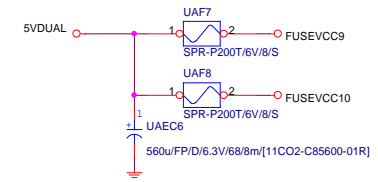
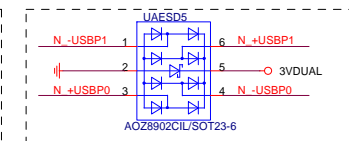
Close to connector



Close to connector

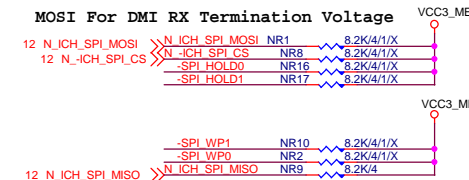
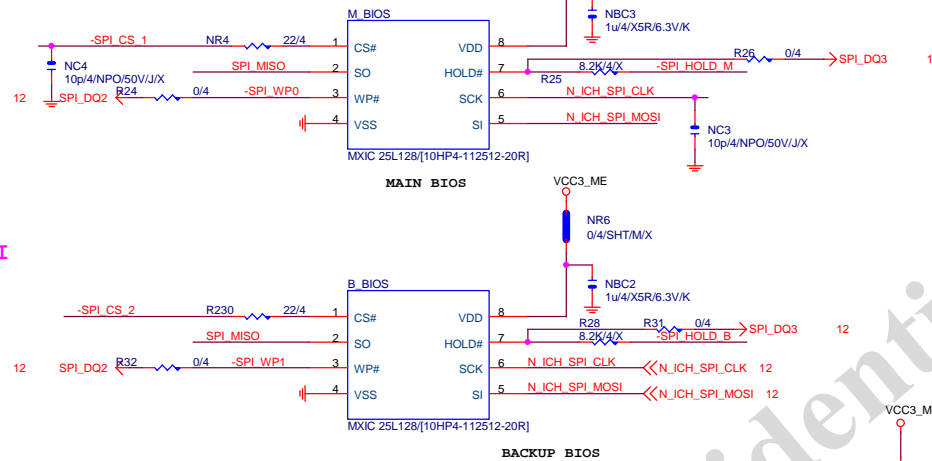
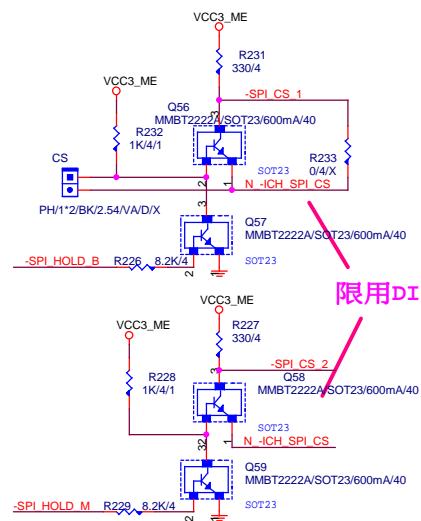


Close to connector



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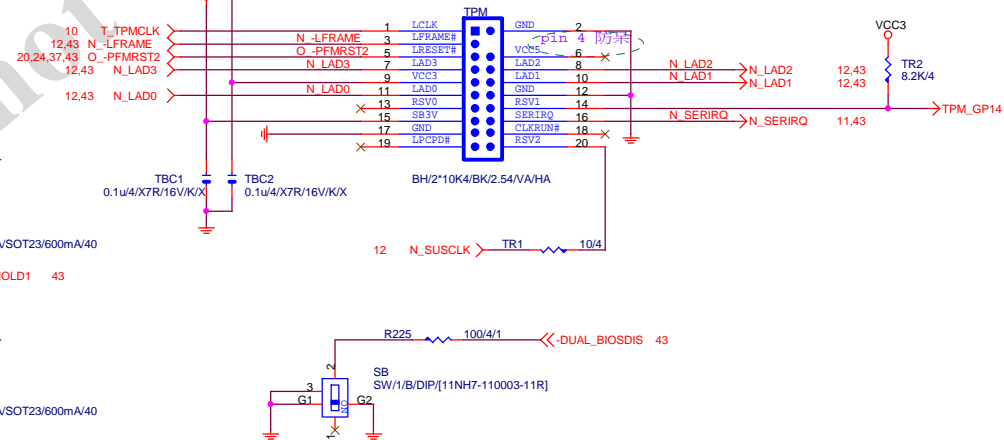
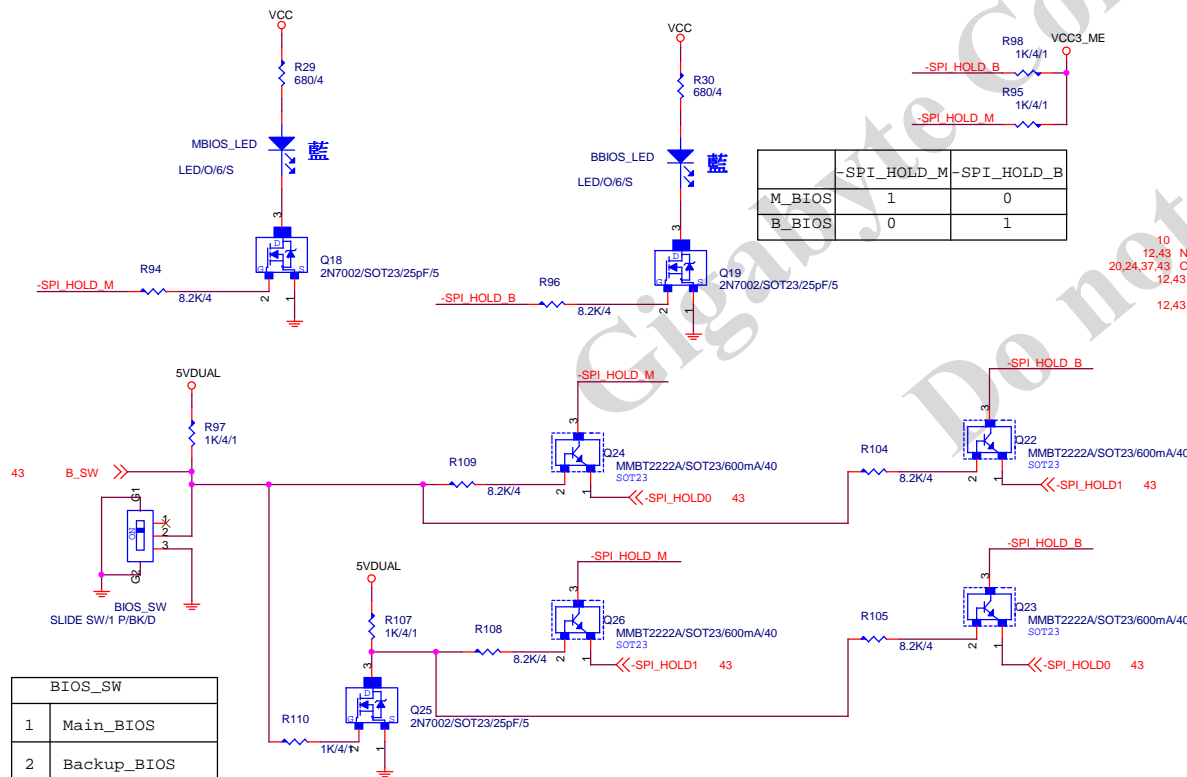
FRONT USB 2.0, F_USB30_2		
Title	Document Number	Rev
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Custom		
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1 means floating
0 means PD 1K

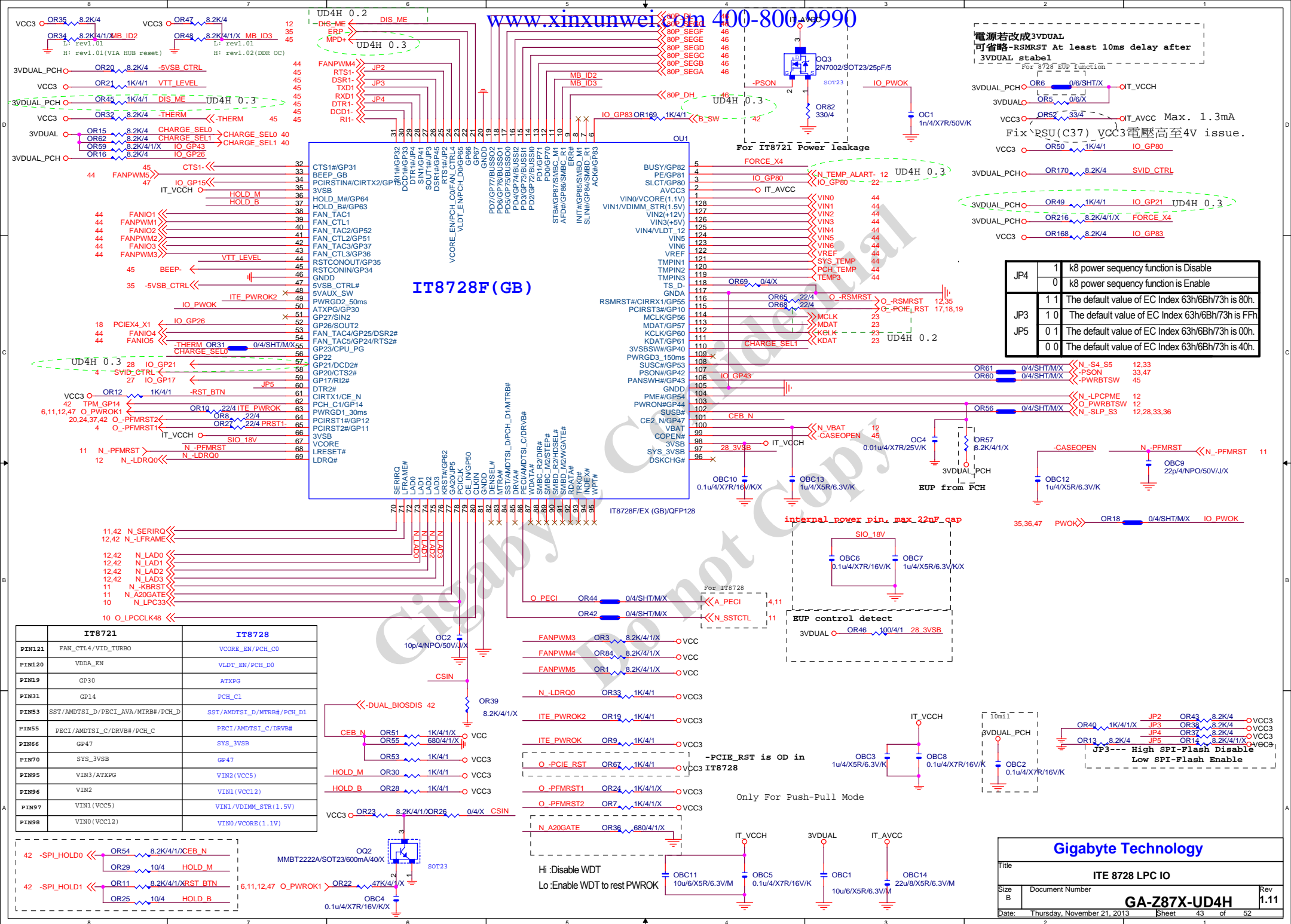
BOOT DEVICE	GNT0	GNT1
LPC	0	0
PCI	0	1
NAND	1	0
SPI	1	1

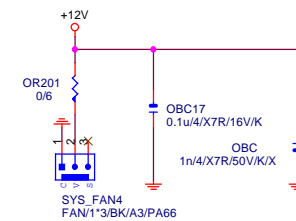
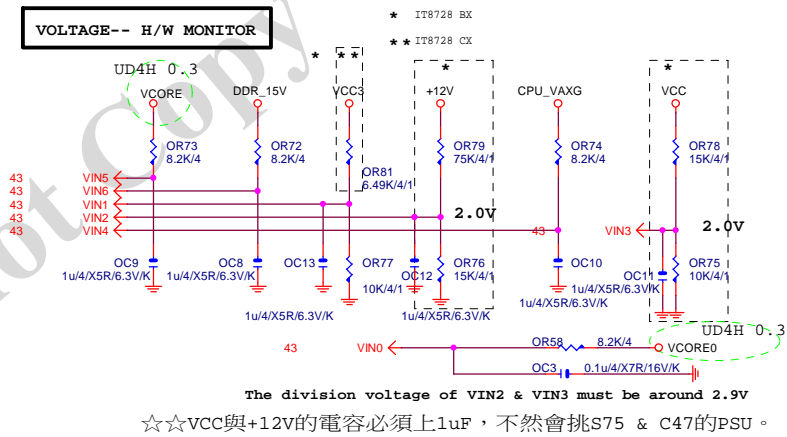
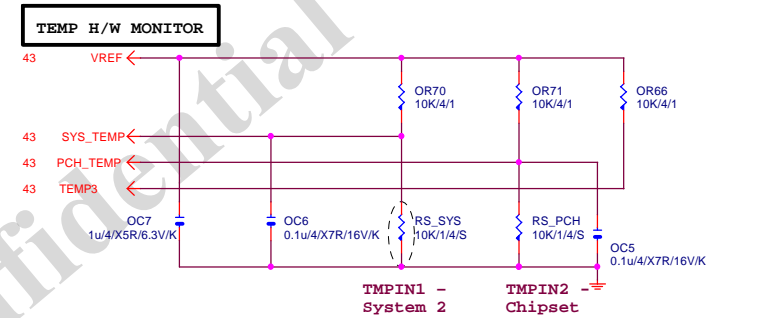
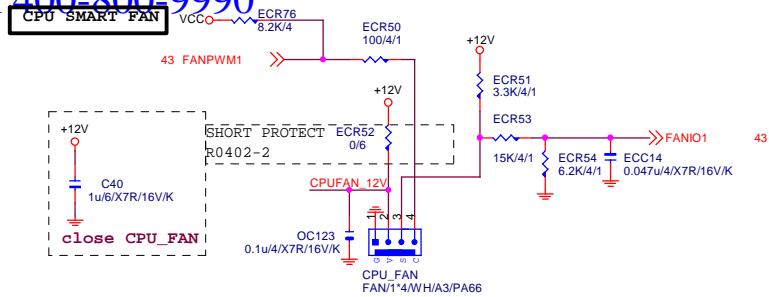
SPI ROM		
	Quad I/O	Traditional
Pin 2	SIO 1	S0
Pin 3	SIO 2	WP#
Pin 5	SIO 0	SI
Pin 7	SIO 3	HOLD#

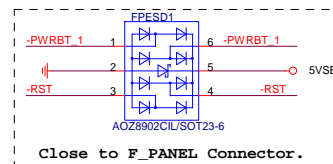
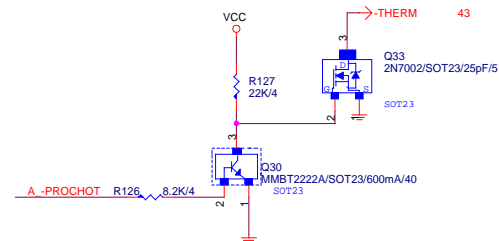
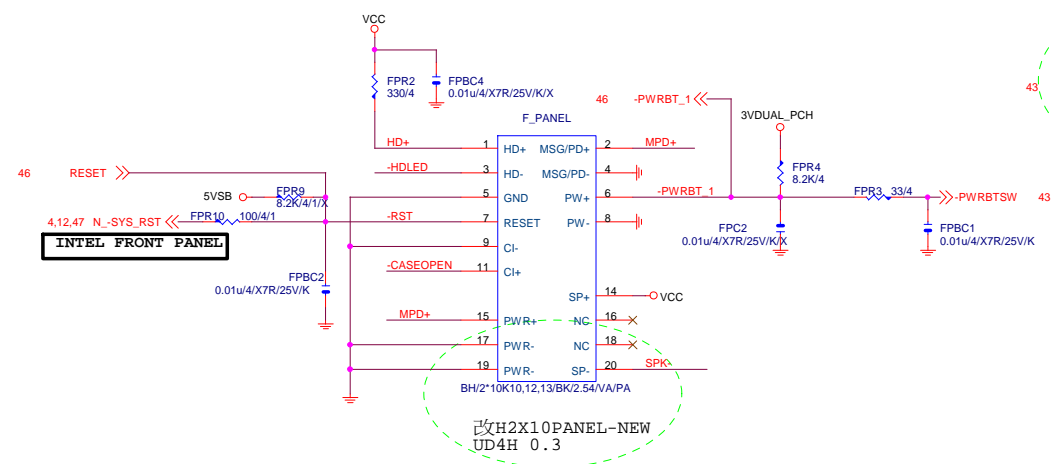
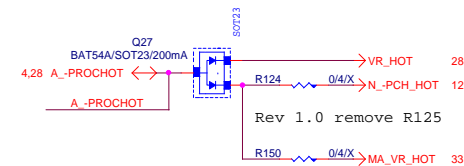
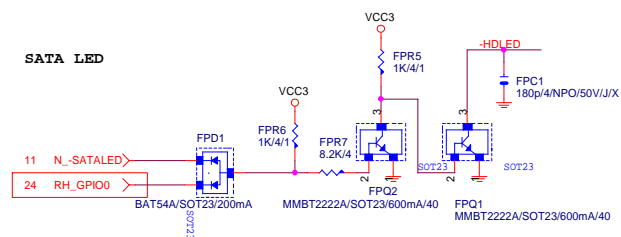
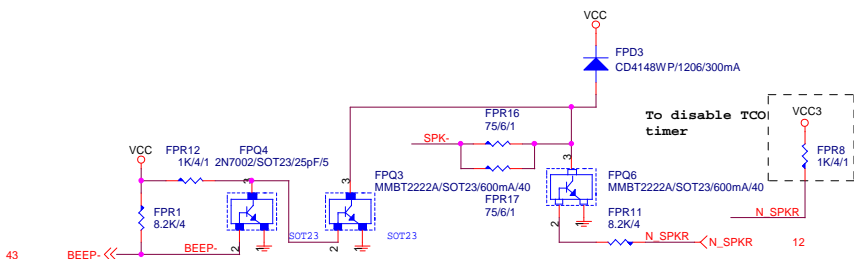
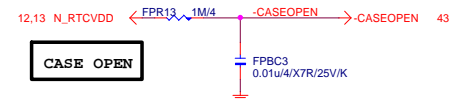
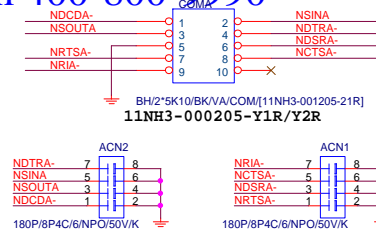
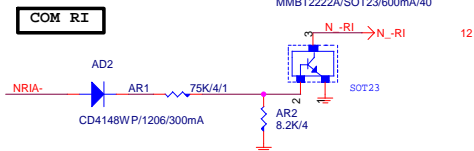
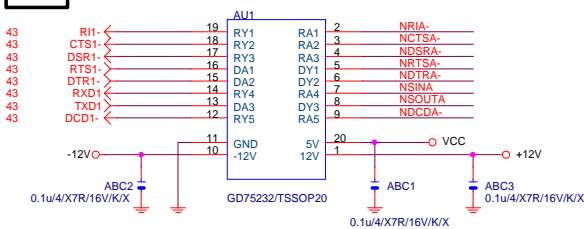


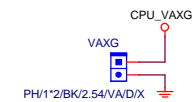
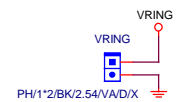
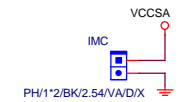
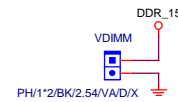
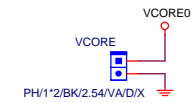
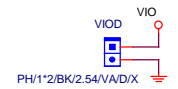
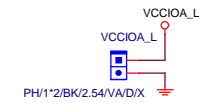
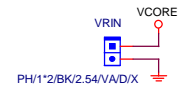
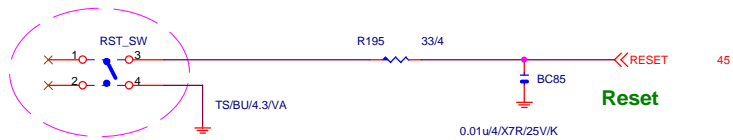
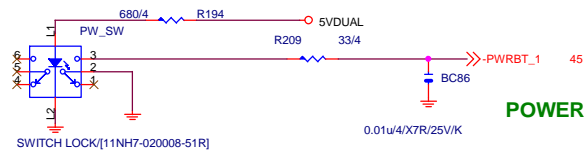
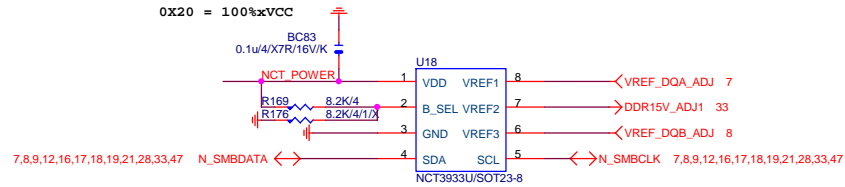
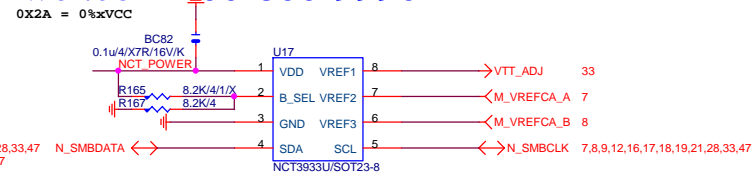
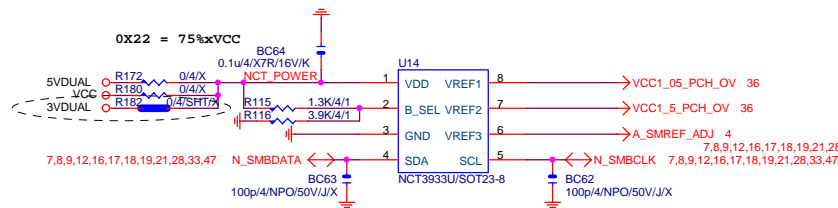
Single BIOS	
1	Disable
2	Enable

<i>Gigabyte Technology</i>				
Title Dual BIOS				
Size Custom	Document Number	GA-Z87X-UD4H		Rev 1.11
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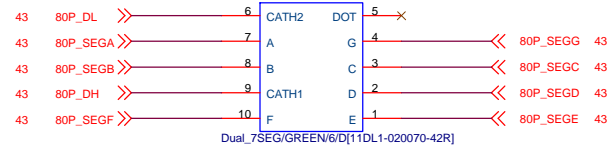
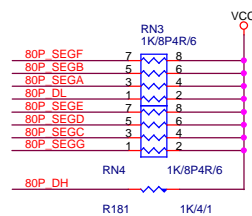






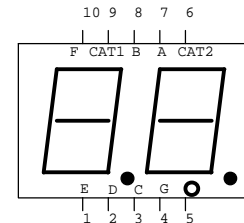


80 PORT



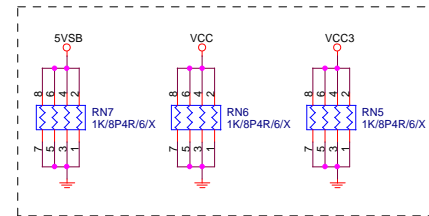
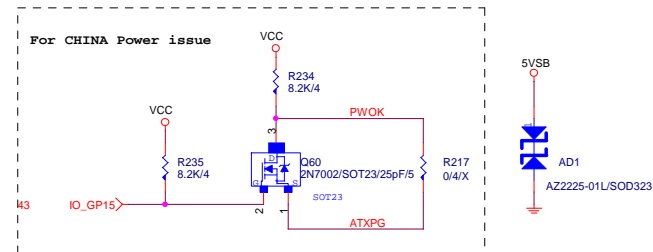
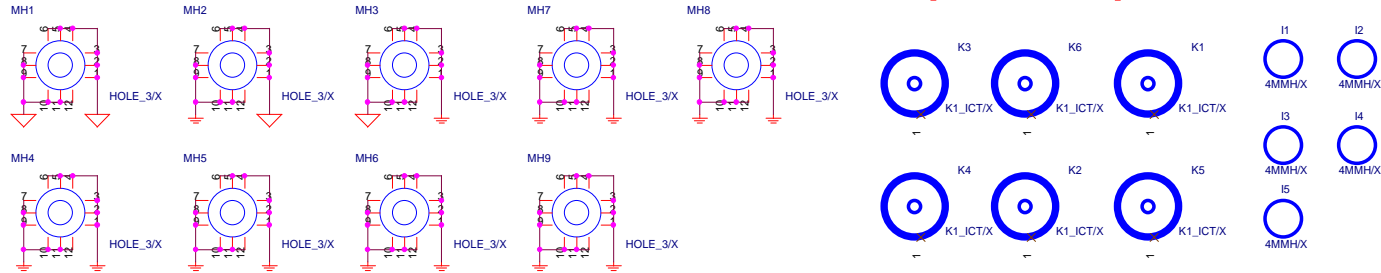
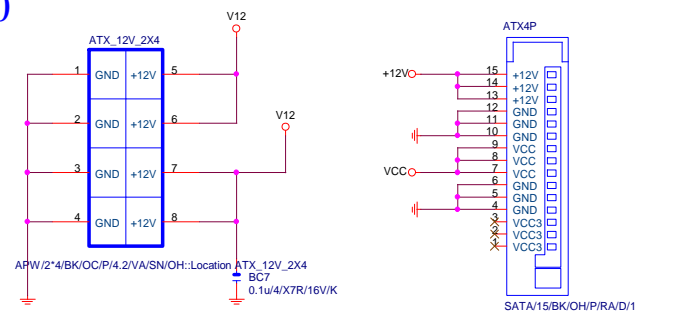
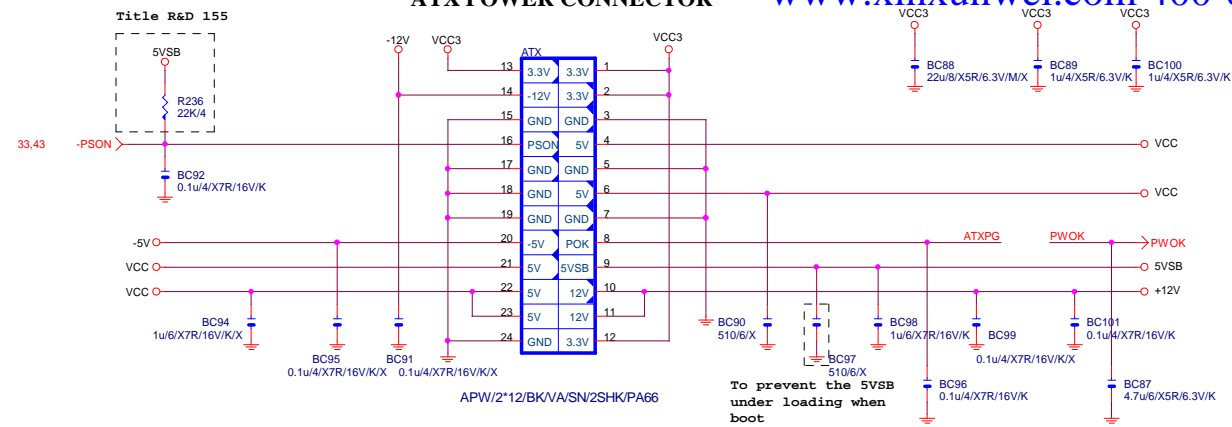
COMMON CATHODE

Physical Package (TOP VIEW)



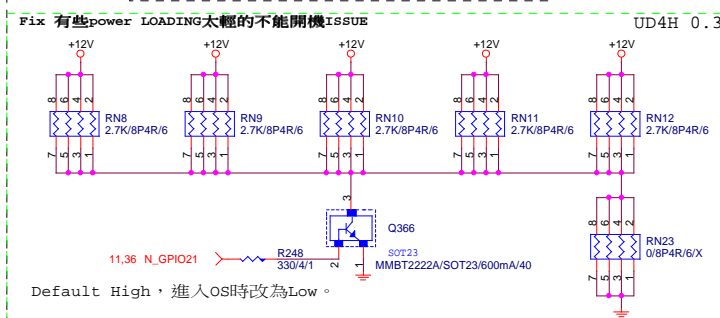
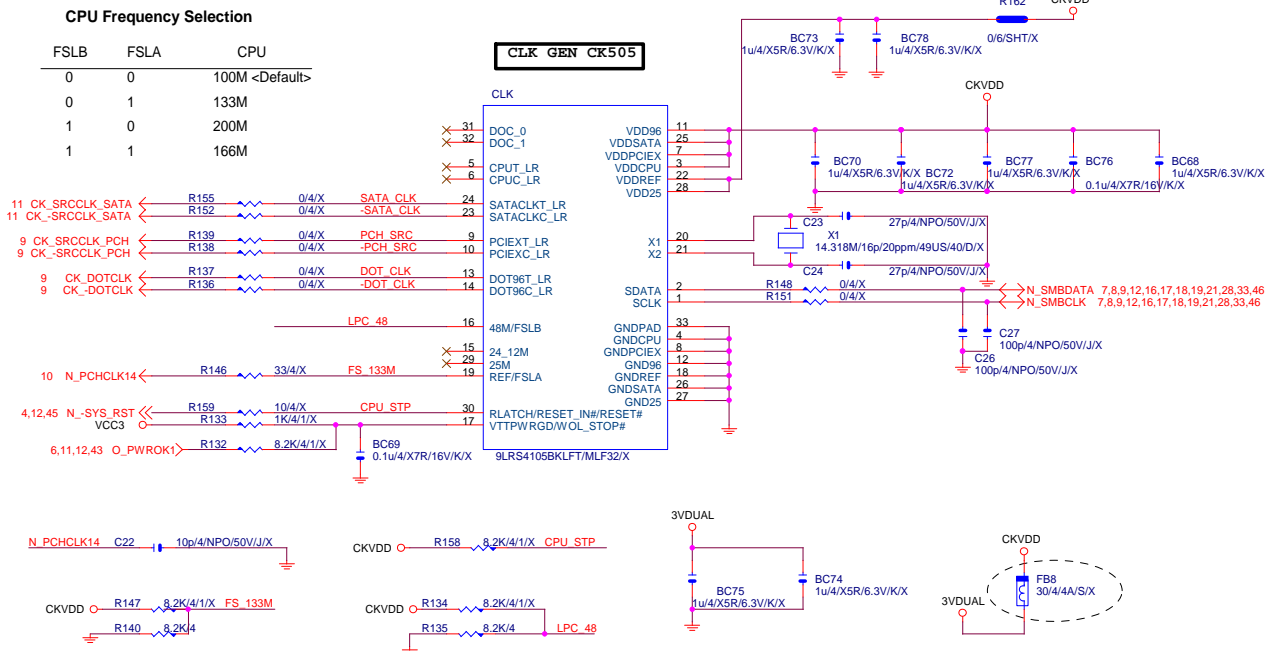
GIGABYTE™		
Title: RST, PWR, CLR_CMOS		
Size: Custom	Document Number: GA-Z87X-UD4H	Rev: 1.11
Date: Thursday, November 21, 2013	Sheet: 46	of: 52

ATX POWER CONNECTOR



CPU Frequency Selection

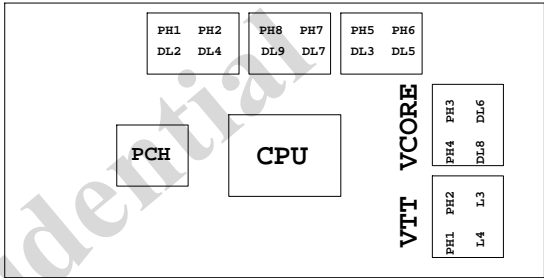
FSLB	FSLA	CPU
0	0	100M <Default>
0	1	133M
1	0	200M
1	1	166M



Super I/O ITE8720 GPIO Table

PIN NAME	USAGE	NOTE
SVC/PECI_RQT/GP14	~PECI_REQ	
PWROK1/GP13	PWROK1/ITE_PWROK	
KRST#/GP62	~KBRST	
SO/GP50	~ICH_SPI_CS	
IRTX/GP47/CE2_N/JP7	CEB_N	
GP46/IRRX	~LAN2_DSM	
PSION#/GP42	~PSON	
PWROK2#/GP41	PECI_CTL	
PCIRST3#/GP10/VDIMM_STR_EN	~PCIE_RST	
RSMRST#CIRRXL1/GP55	~RSMRST	
PME#/GP54	~LPCPME	
PD5/GP75/BUSS00	N/A	

PWM各相位的擺法如下：



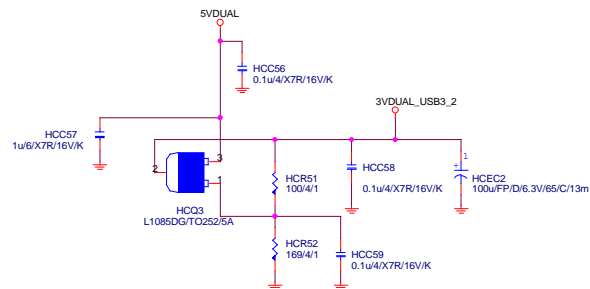
BIOS超電壓對應表：

散熱模組料號：

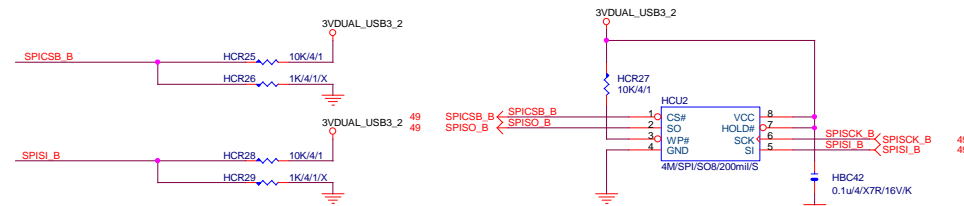
8IBP:
1.12SP2-01A001-Y1R/Y2R
2.12SP2-01A001-Z1R/Z2R
(HIBRID模組)包材階

<i>Gigabyte Technology</i>			
Title			
TABLE LIST			
Size	Document Number		Rev
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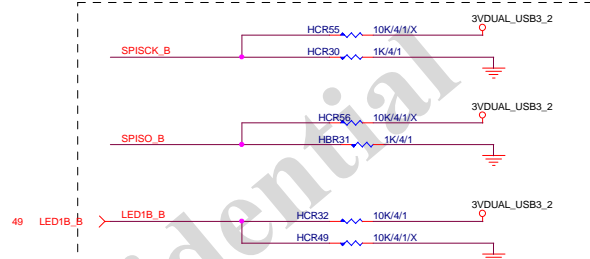




```
# External SPI ROM ; SPI ROM
attached mode
```

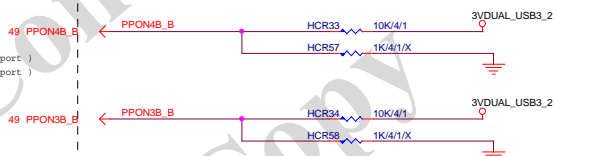


Battery Charging

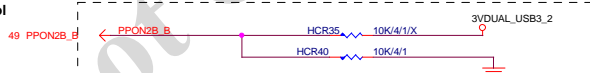


```
# Number of Ports ; 4Ports
mode
```

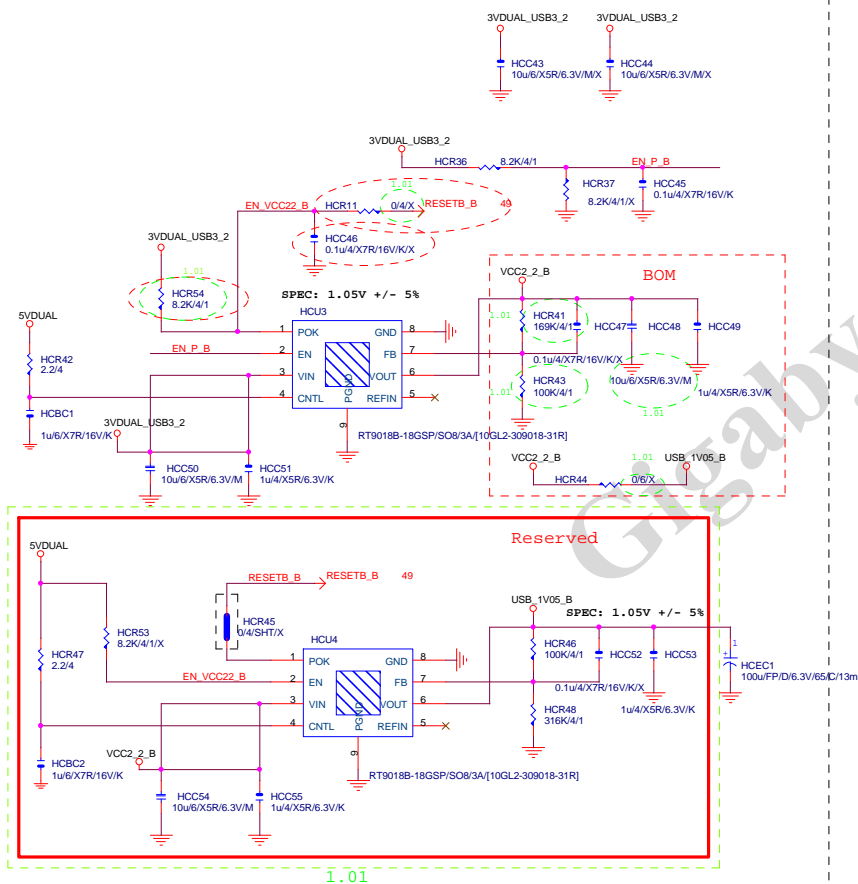
PPON3B / PPON4B : H / H (4 port)
PPON3B / PPON4B : L / L (2 port)

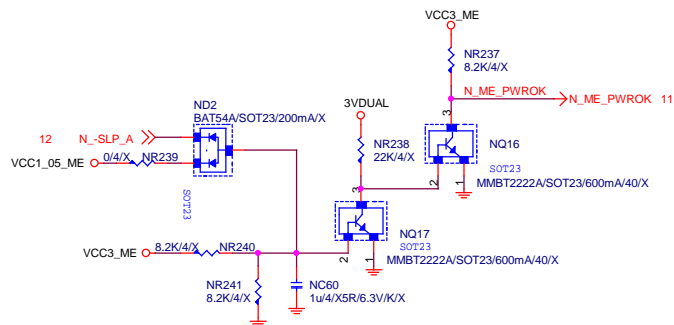
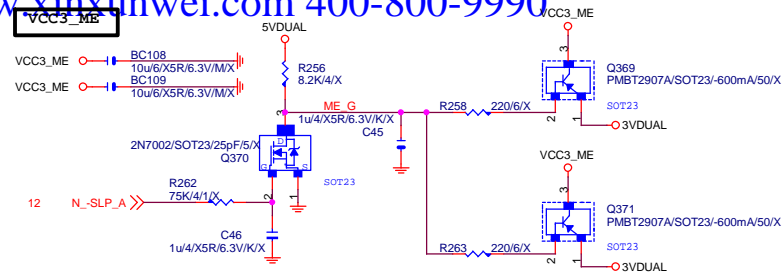
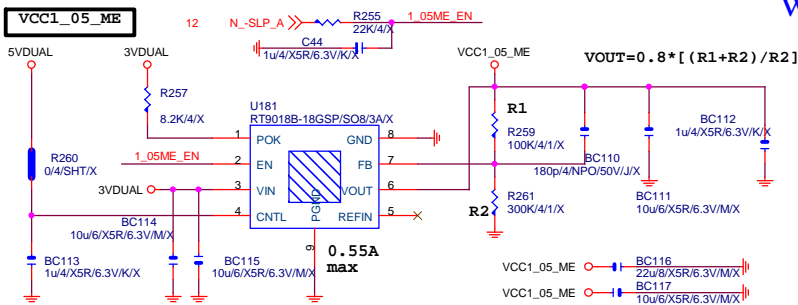


#5 VBUS Power Control : Individual mode



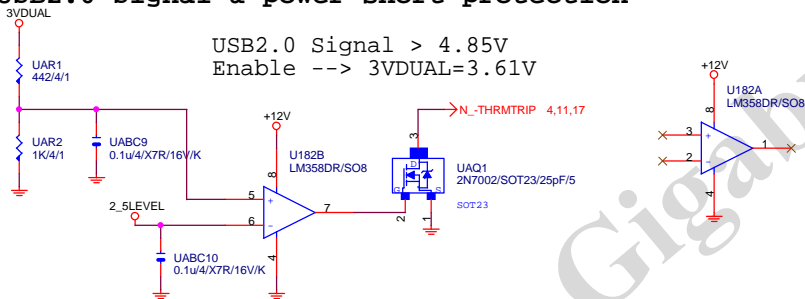
```
# PPON1B Pin Function ;
Port1 PPONB mode
```





USB2.0 Signal & power short protection

USB2.0 Signal > 4.85V
Enable --> 3VDUAL=3.61V



1.01 remove

Gigabyte Technology

Title			VCC1_05_ME, VCC3_ME, 3VDUAL OV Protect	
Size	Custom	Document Number	GA-Z87X-UD4H	
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2013/09/16

[illegible]

Circuit or PCB layout change

[illegible]