

Model Name: GA-X170-Extreme ECC  
SHEET TITLE

Rev 1.0  
SHEET

TITLE

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## Component value change history

Data	Change Item	Reason
2014/11/28 PCB:0.1	1.PCB first release	
	2. AUDIO_COVER 料號UPDATE	
2015/01/26 PCB:0.2	1. F_USB30_1 , F_USB30_2 & M2A_32G , M2B_32G改為紅色料號?	
	2. 注意三色LED上件方向	
	3. SATA_EXPRESS的顏色確認,SATA_EXPRESS1要做塞孔	
	4. CLK BUFFER IDT6V41510 (含蓋子) 不上件	
	5. M_BIOS , B_BIOS 改成128M	
	6. ASML061 eeprom 改成不上件 (確認BIOS OK後移除)	
	7. PCB製程修改 : B2 --> B	
2015/01/26 PCB:1.0	1. 高速訊號測點移除	
	2. 0 OHM SHORT PAD	
	3. M_BIOS SOCKET移除	
	4. CR197/CR198是否修改FOR THD+N -> 200/4/1	
	5. 注意裝甲(X3)&AUDIO_HS螺絲數量(X2)	
	6. BIOS_PH 改 MASK (3VDUAL再加強)	
	7. Update KILLER E2400 logo	
	8. SWPU2 pin30 net update PCIE4_M2 --> PCIE4_M2S	
	9. Add MAC10	
PCB:1.01	1. M_BIOS SOCKET移除	
	2. 注意裝甲(X3)&AUDIO_HS螺絲數量(X2)	
	3. Add THR124,THR125,THR126	
	4. Remove JTAG	
1.0C	1. Remove LBR14=1u/4	
1.0C-ECN-0720	1. REAR_HS加替料:12KRC-0H0001-02R	
1.0D-0731	1. 移除螺絲料件:REAR_HS*3,AUDIO_HS*2 -->12KS2-110206-11	
1.0E-0811	1. Add NR15,NR17 : 2.2K/4/1 (MB_ID : Remove OR15 , Add OR7)	
1.0F-1026	1. Update AR Thunderbolr Firmware	

9MX17GA7W-00-10A	1. E-BOM Release
9MX17GA7W-00-10B	1. 修改装甲迷彩料號
9MX170EEC-00-10A	1. E-BOM
9MX170EEC-00-10B	1. Remove LED_IO connect

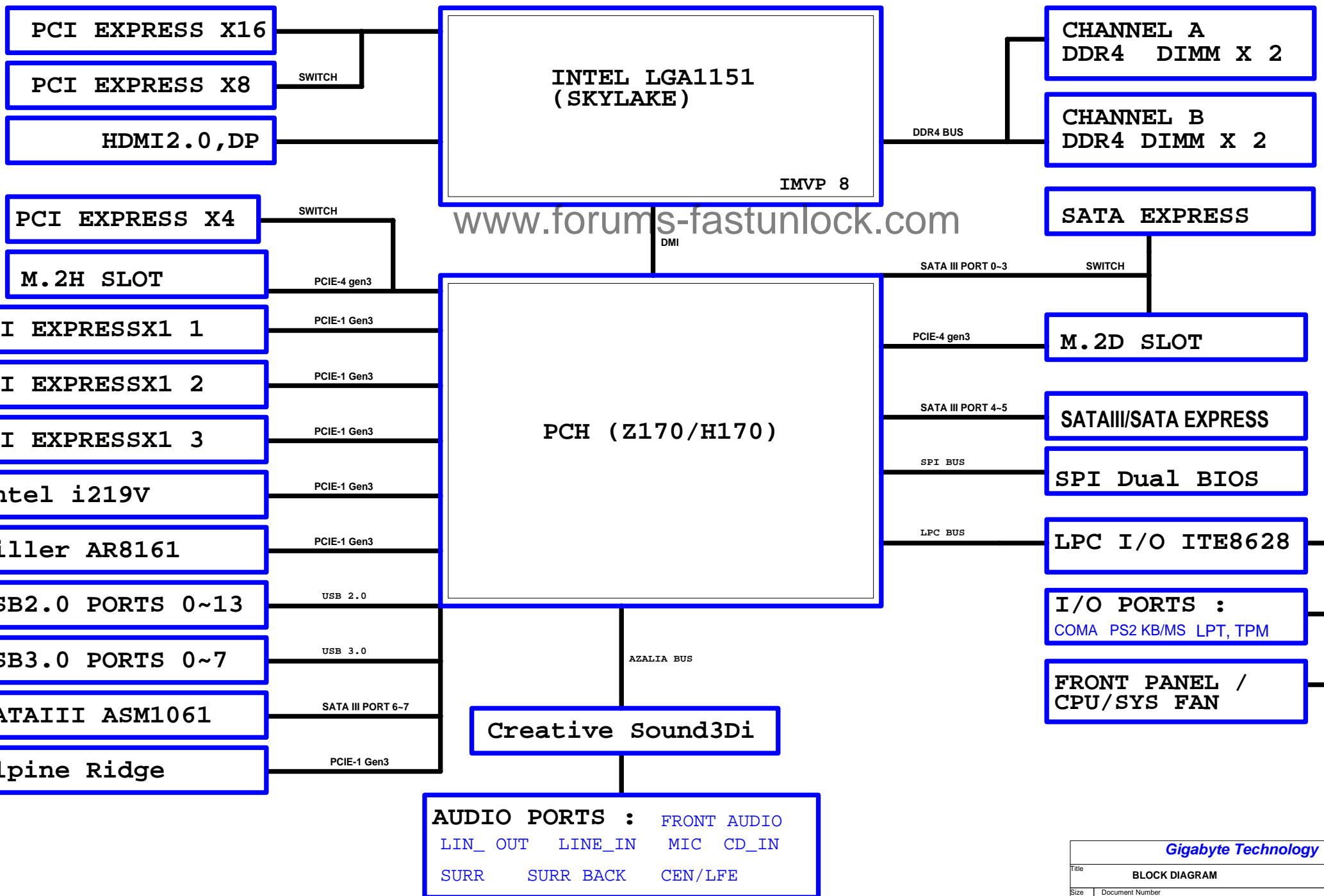
## Circuit or PCB layout change

DATE	Change Item	Reason
2015/11/17 PCB:1.0	X170-Extreme ECC	
	1. PCH:C234 (Enable DDR ECC) 2. Lan i219V --> i219LM 3. 迷彩Thermal solution 4. PCIex16/x8/x4 slot用土色+金屬覆蓋 5. DDR slots 黑土配色 6. Audio LED default改黃色 7. "SEBC1-SEBC8" footprint update "C0402-2" (Fix ASM1061 eye diagram) 8. Add "CR226" For always enable f_audio cable detect 9. MOATR2/MOATR3 footprint update to "R0402-2" (Fix F_AUDIO Audio noise)	
2015/11/17 PCB:改版	1. 預留DEMO_LED 三色燈	
9.0	1.Add OC1,OC_LED 1X2 pin 2.Add NPR22,NPC103,OC_BT,NPL2 3.Add MA DR9,MA DR10 4. PCIEX4 switch change "IO_GP20" 5. WR94 CHANGE NET to VCCSA ? VCCST_VCCPLL 6. Add DFC3 非CPU	
1.0	1. BIOS PH footprint update "BIOS2X5-RH-1-MASK" 2. SWPU2 pin30 net update PCIEX4_M2 --> PCIEX4_M2S 3. Add "MAC10"	
1.01	1. Add THR124,THR125,THR126 2. OC_LED & OC_BT swap	

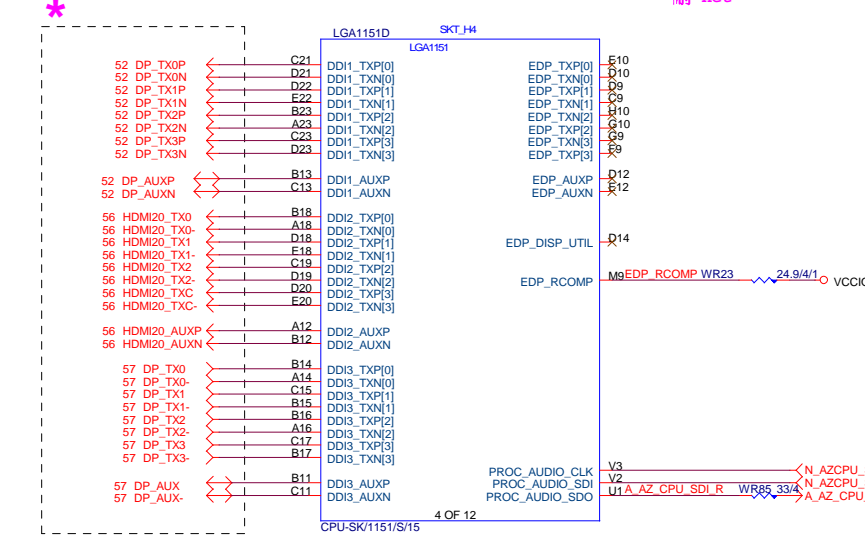
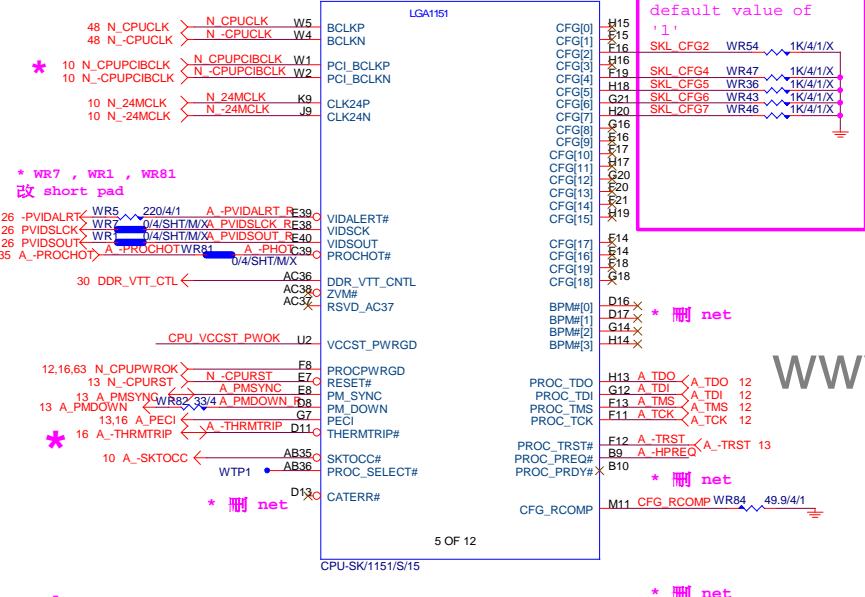
X170EXTREME ECC 1. OC & ECO Button MASK  
1.0 2. 改雙色PCB

<b>GIGABYTE™</b>			
Title <b>BOM &amp; PCB MODIFY HISTORY</b>			
Size Custom	Document Number <b>GA-X170-Extreme ECC</b>		Rev <b>1.0</b>
Date: Thursday, February 18, 2016	Sheet	2 of	67

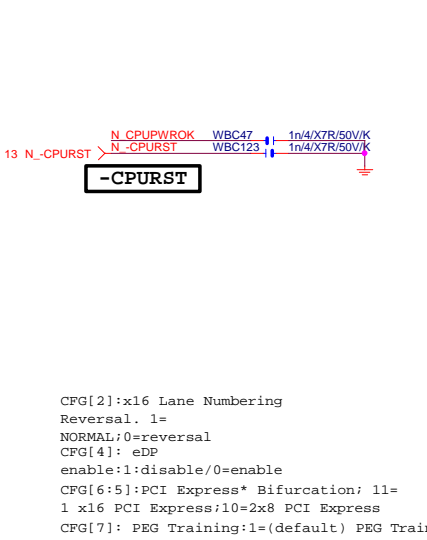
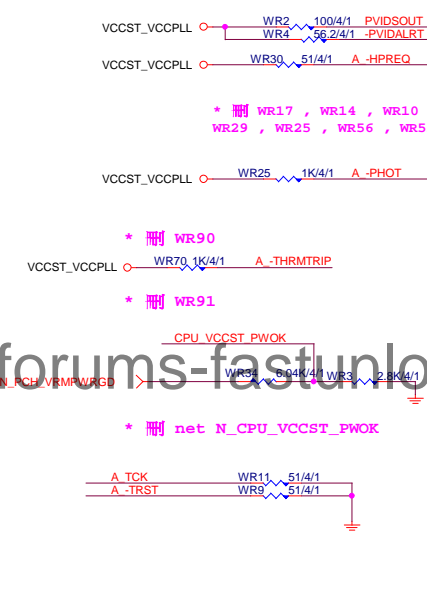
# BLOCK DIAGRAM



From SKL\_0.2B

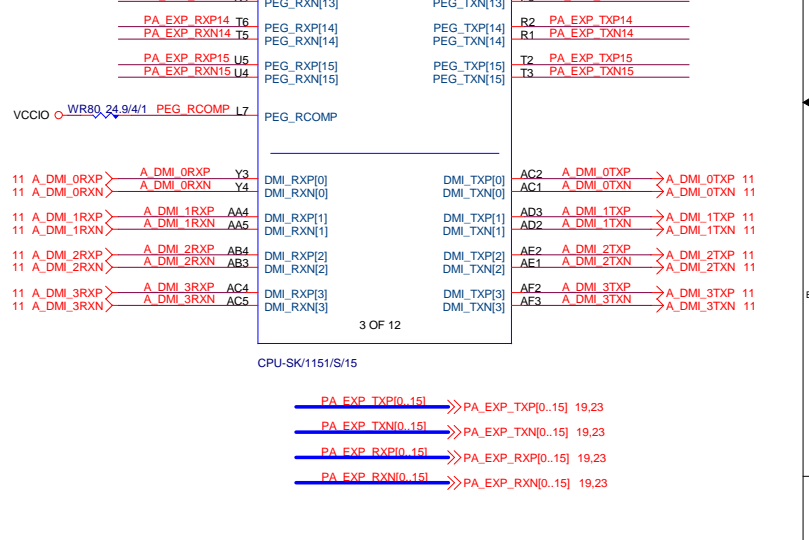


G-15u : (CPU-SK/1151/S/15)  
10SC1-F01151-11R / 10SC1-F01151-12R  
G-FL : (CPU-SK/1151/S/GF)  
10SC1-F01151-21R / 10SC1-F01151-22R



CFG[2]:x16 Lane Numbering  
Reversal\_1=  
NORMAL\_0=reversal  
CFG[4]:eDP  
enable:1:disable/0=enable  
CFG[6:5]:PCI Express\* Bifurcation: 11=  
1 x16 PCI Express:10=2x8 PCI Express  
CFG[7]: PEG Training:1=(default) PEG Train  
immediately following RESET#0=PEG Wait  
for BIOS

Bifurcation Config.	Signals Lanes		
	CFG[6]	CFG[5]	CFG[2]
1x16	1	1	1
1x16 Reversed	1	1	0
2x8	1	0	1
2x8 Reversed	1	0	0
1x8+2x4	0	0	1
1x8+2x4 Reversed	0	0	0



CFG[2]:x16 Lane Numbering  
Reversal\_1=  
NORMAL\_0=reversal  
CFG[4]:eDP  
enable:1:disable/0=enable  
CFG[6:5]:PCI Express\* Bifurcation: 11=  
1 x16 PCI Express:10=2x8 PCI Express  
CFG[7]: PEG Training:1=(default) PEG Train  
immediately following RESET#0=PEG Wait  
for BIOS

Bifurcation Config.	Signals Lanes		
	CFG[6]	CFG[5]	CFG[2]
1x16	1	1	1
1x16 Reversed	1	1	0
2x8	1	0	1
2x8 Reversed	1	0	0
1x8+2x4	0	0	1
1x8+2x4 Reversed	0	0	0

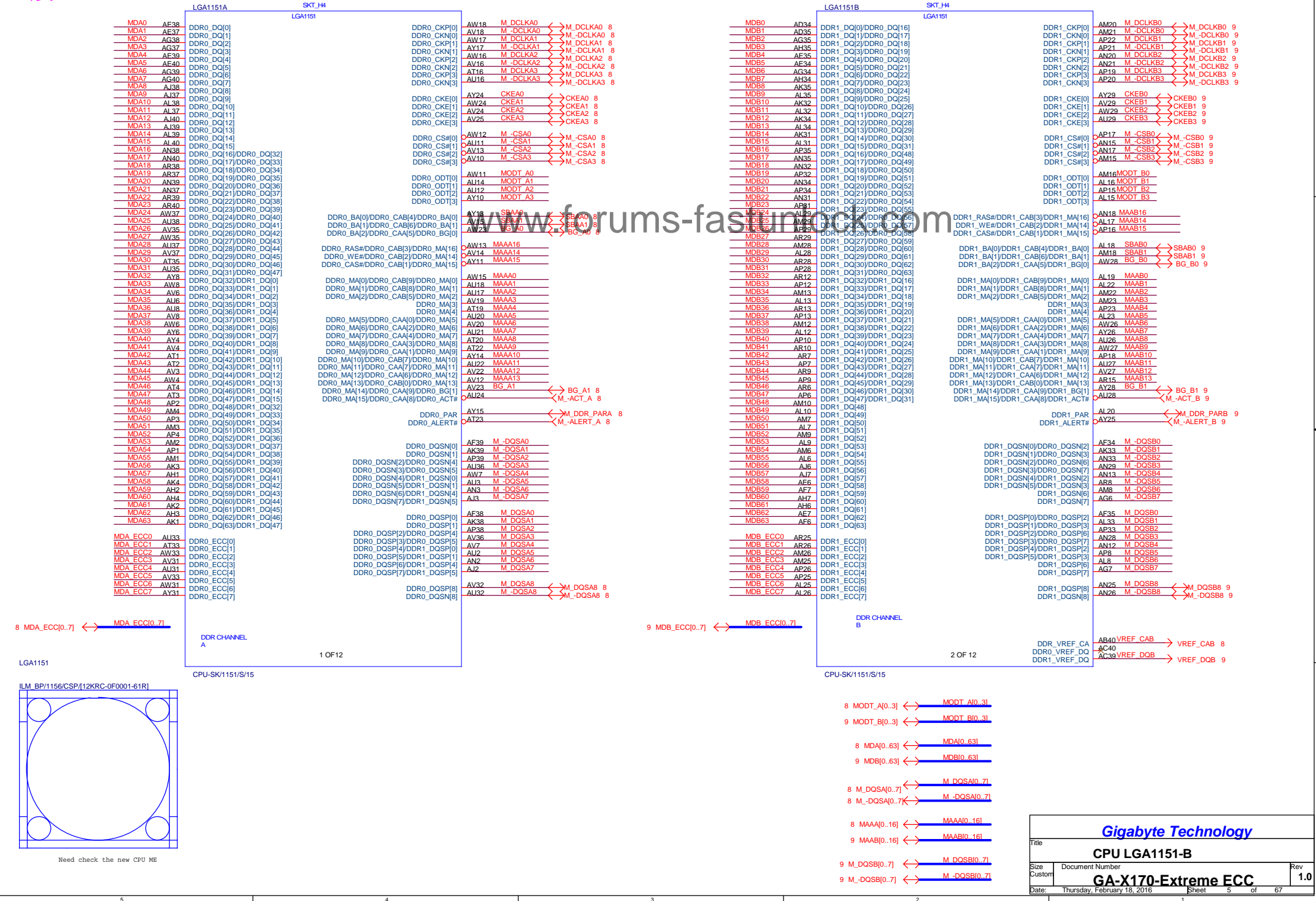
**Gigabyte Technology**

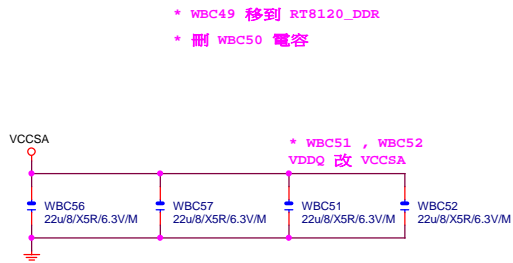
**CPU LGA1151-A**

Size Custom Document Number **GA-X170-Extreme ECC** Rev **1.0**

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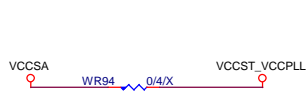
# \* 改DDR4 net



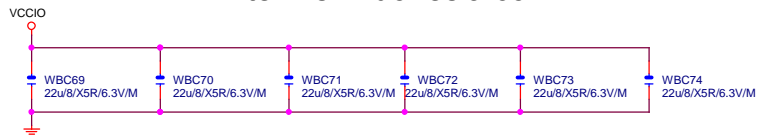


\* 刪 WBC124, WBC125, WBC126, WBC127 電容

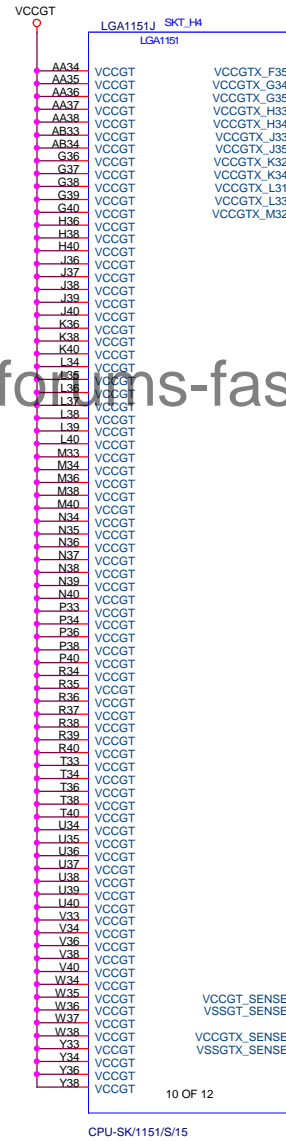
\* WR94, WR59, WR86, WR60, WR61, WR62, WR63 改 0.4/SHT/MX



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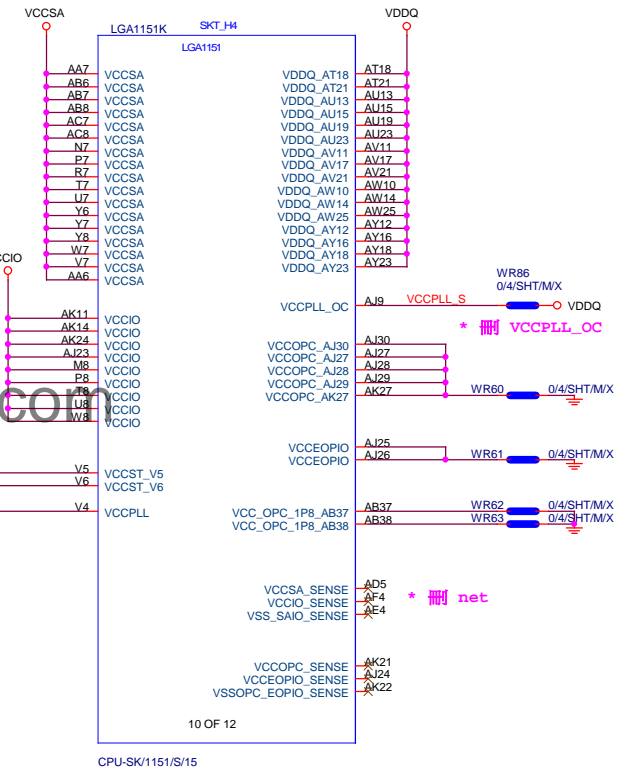


\* 刪 VCCGT 電容

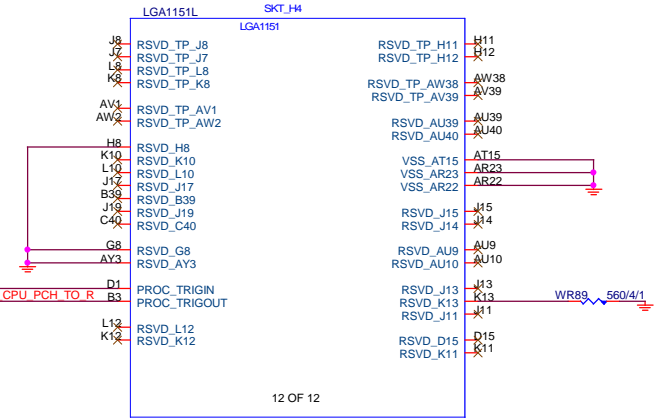


F39 → VCCGT\_SENSE 26  
F38 → VSSGT\_SENSE 26  
F37 → VCCGT\_SENSE 26  
F36 → VSSGT\_SENSE 26

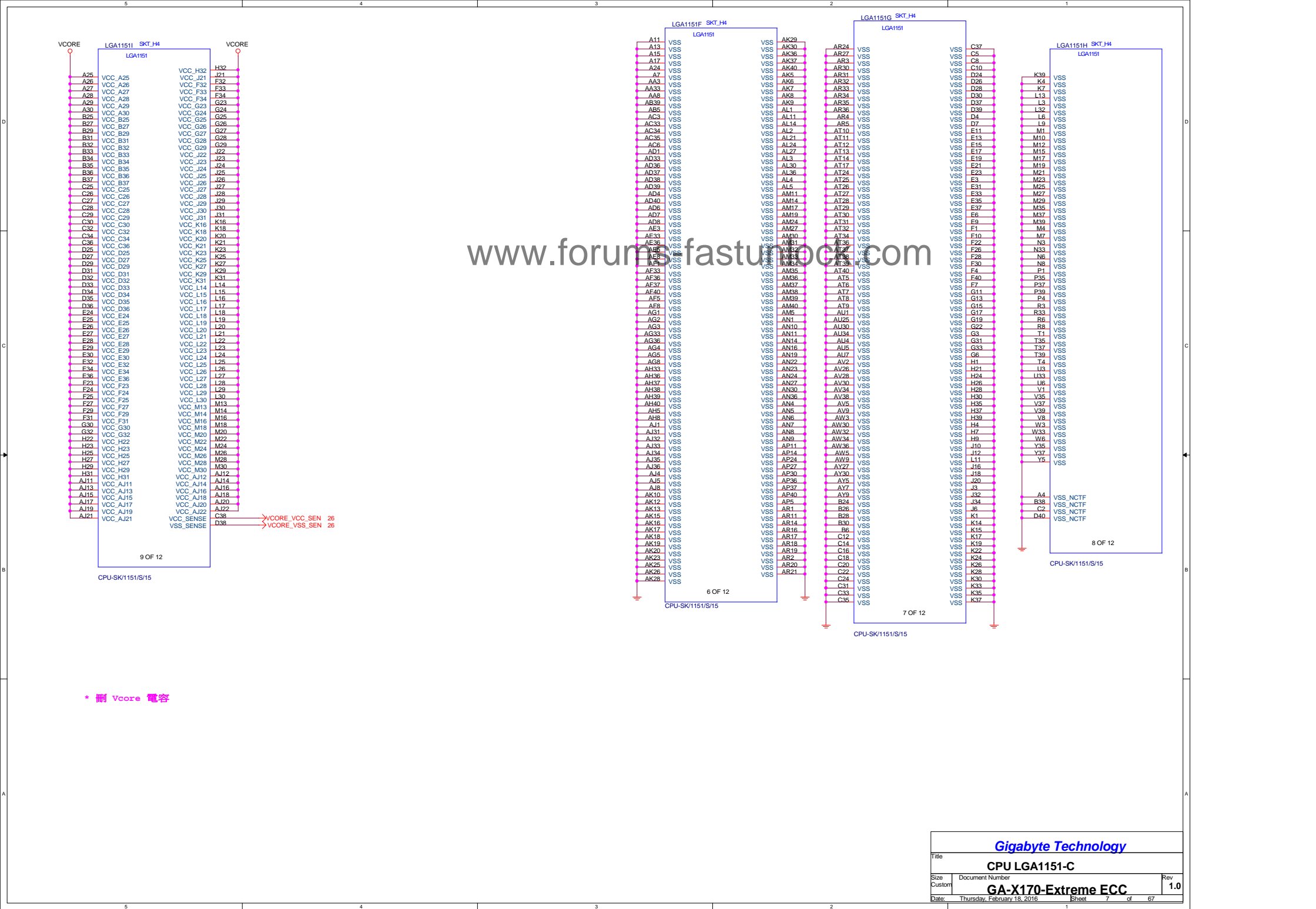
13 N\_PCH\_CPU\_T1 → WR88 33/4 A\_CPU\_PCH\_TO R

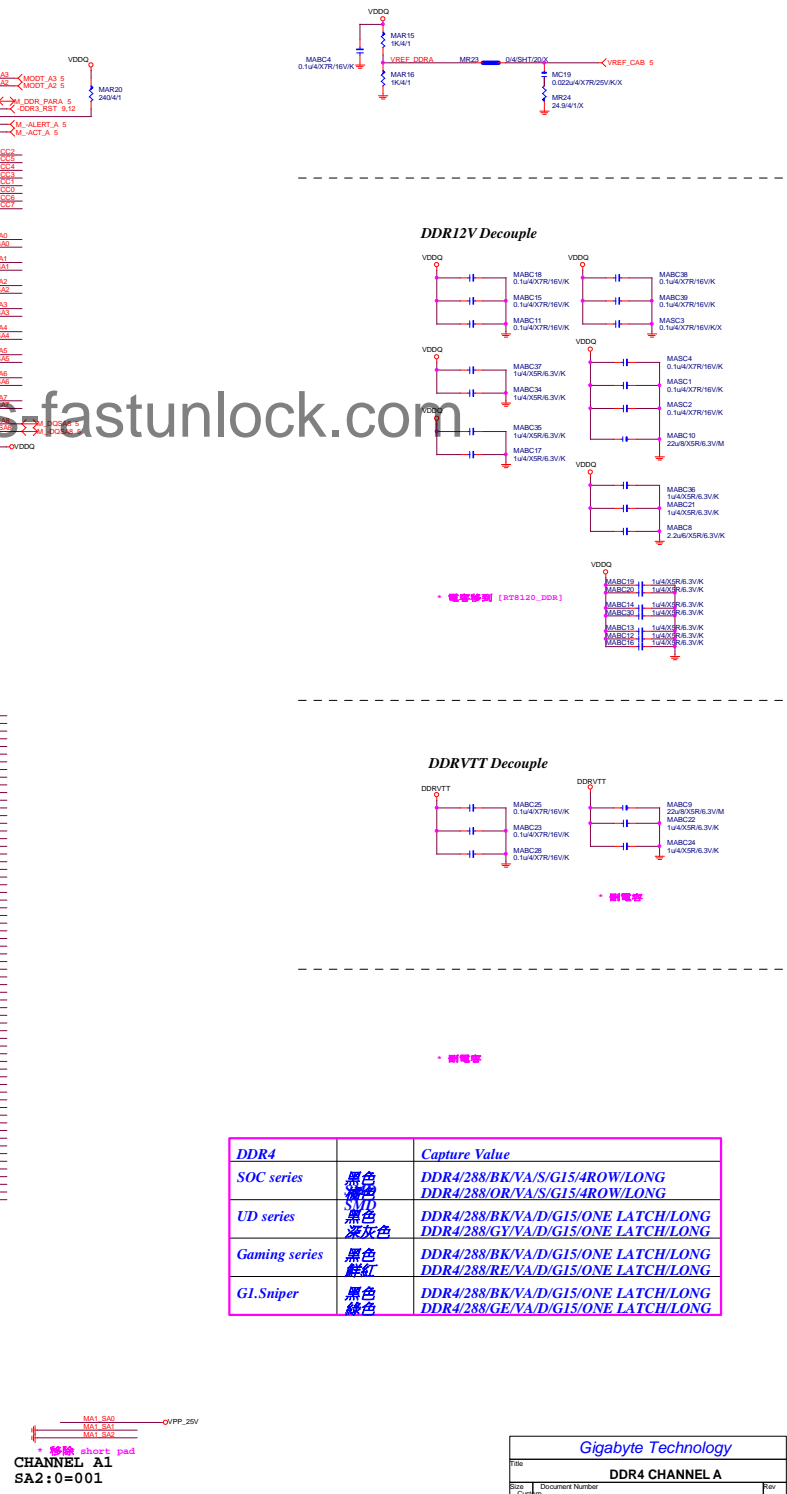
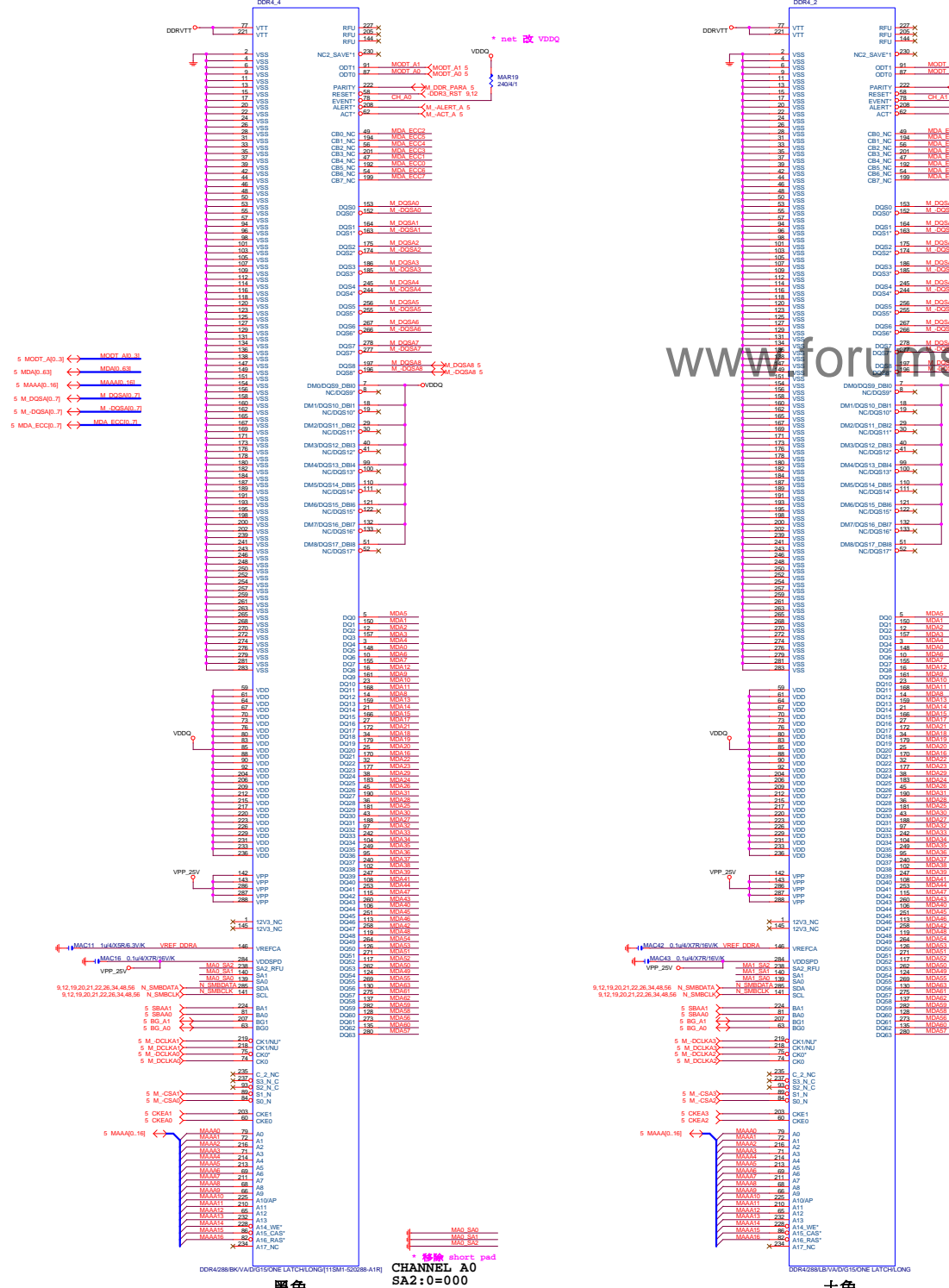


CPU-SK/1151/S/15

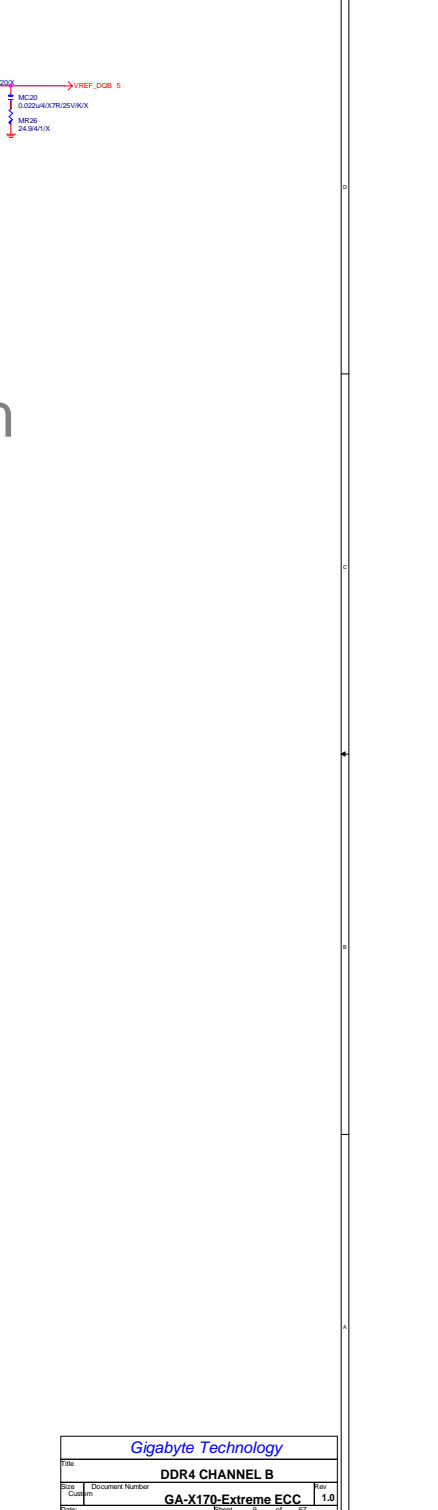
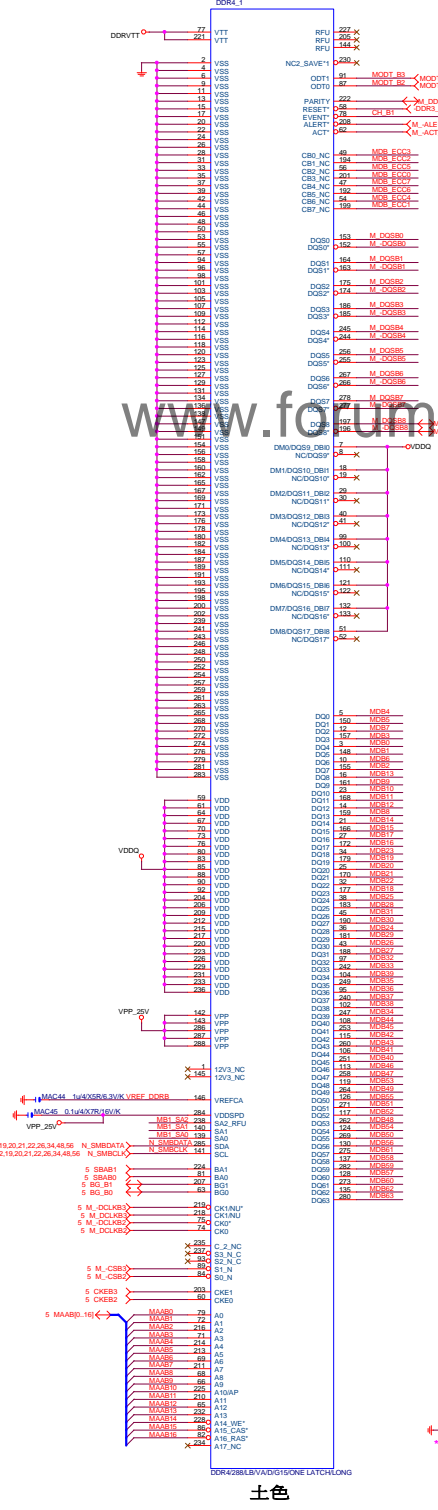
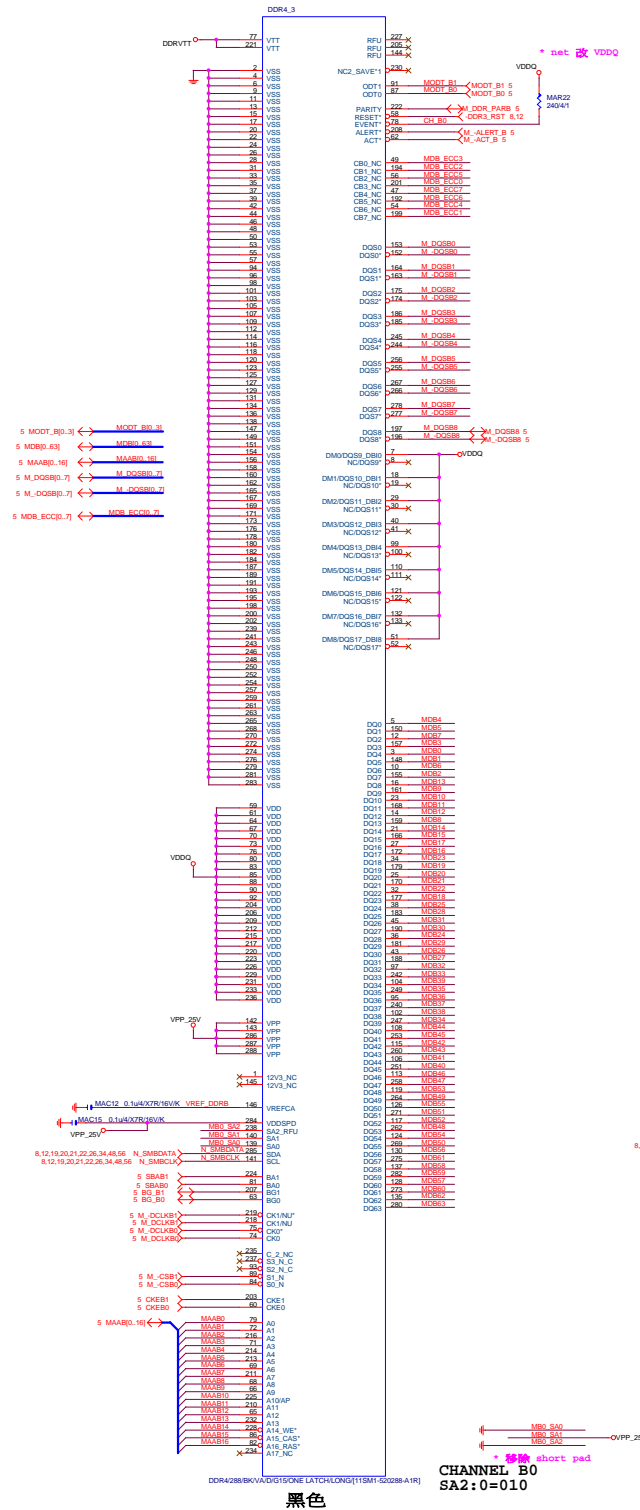


CPU-SK/1151/S/15





DDR4		Capture Value
SOC series	黑色	DDR4/288/BK/VA/S/G15/4ROW/LONG
UD series	黑色	DDR4/288/OR/VA/S/G15/4ROW/LONG
Gaming series	黑色	DDR4/288/BK/VA/D/G15/ONE LATCH/LONG
GL.Sniper	黑色	DDR4/288/GE/VA/D/G15/ONE LATCH/LONG



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File: DDR4 CHANNEL B

Size: Document Number

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For DP Enable →

VCC3

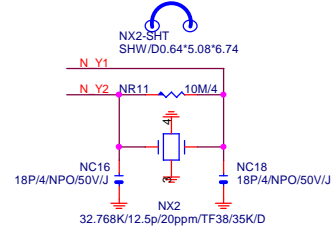
N\_DDPB\_CTRLCLK NR15 2.2K/4/1  
N\_DDPB\_CTRLDATA NR17 2.2K/4/1

PCHE

SPT-H\_PCH

52 DP\_HDP → AW4  
56 N\_HDMI20\_HDP\_F → AY2  
57 N\_DP\_HDP → AV4  
N\_GPP\_B3 BA44GPP\_I7/DDPC\_CTRLCLK BB3 N\_DDPB\_CTRLCLK → N\_DDPB\_CTRLCLK 56  
GPP\_I8/DDPC\_CTRLDATA BD3 N\_DDPB\_CTRLDATA → N\_DDPB\_CTRLDATA 56  
GPP\_I5/DDPB\_CTRLCLK BA5 N\_DDPB\_CTRLCLK → N\_DDPB\_CTRLCLK 56  
GPP\_I6/DDPB\_CTRLDATA BC4 N\_DDPB\_CTRLDATA → N\_DDPB\_CTRLDATA 56  
GPP\_I9/DDPD\_CTRLCLK BE5 N\_DDPD\_CTRLCLK → N\_DDPD\_CTRLCLK 57  
GPP\_I10/DDPD\_CTRLDATA BE6 N\_DDPD\_CTRLDATA → N\_DDPD\_CTRLDATA 57GPP\_F14 A\_SKT0CC → A\_SKT0CC 4  
GPP\_F23 V44 N\_GPP\_F23  
GPP\_F22 W39 N\_GPP\_F22  
GPP\_G23 L43  
GPP\_G22 L44 N\_GPP\_G22  
GPP\_G21 U35 N\_GPP\_G21  
GPP\_G20 R35 N\_GPP\_G20  
GPP\_H23 BD36

CHIPSET SKYLAKE INTEL(10HB1-03C236-10R)

VCC3  
N\_GPP\_B3 NR7 8.2K/4  
N\_GPP\_F23 NR12 8.2K/4  
N\_GPP\_F22 NR248 8.2K/4  
VCC3  
A\_SKT0CC NR16 8.2K/4  
N\_GPP\_G22 NR18 8.2K/4  
N\_GPP\_G21 NR20 8.2K/4  
N\_GPP\_G20 NR22 8.2K/4VCC3  
N\_GPP\_B5 NR6 8.2K/4  
N\_GPP\_B6 NR8 8.2K/4  
N\_GPP\_B7 NR10 8.2K/4  
N\_GPP\_B8 NR13 8.2K/4  
N\_GPP\_B9 NR14 8.2K/4  
VCC3  
N\_GPP\_H0 NR19 8.2K/4  
N\_GPP\_H1 NR16 8.2K/4  
N\_GPP\_H2 NR17 8.2K/4  
N\_GPP\_H3 NR18 8.2K/4  
N\_GPP\_H5 NR31 8.2K/4

32.768KHZ

CLK:4/15&lt;1000 mils±100 mils;Guard GND

VCC1\_0\_PCH NR5 2.7K/4/1 XCLK\_BIASREF E1

CLK:4/15&lt;1000;Guard GND

19 -PCIE16\_PR → N\_GPP\_B5  
21 -PCIE16\_PR1 → N\_GPP\_B6  
21 -PCIE16\_PR2 → N\_GPP\_B7  
20 -PCIE16\_PR3 → N\_GPP\_B8  
45 LA\_-CLKREQ → N\_GPP\_B10  
24 M2H\_-CLKREQ → N\_GPP\_H0  
22 -PCIE8\_PR → N\_GPP\_H1  
21 -PCIE16\_PR3 → N\_GPP\_H2  
46 LA\_-CLKREQ → N\_GPP\_H3  
58 M2D\_-CLKREQ → N\_GPP\_H4  
52 TH\_CLK\_REQ\_N → N\_GPP\_H752 REFCLK\_TBT\_N → REFCLK\_TBT\_N  
52 REFCLK\_TBT\_P → REFCLK\_TBT\_P  
ON-BOARD DEVICE USED

PCHG

SPT-H\_PCH

GPP\_A16/CLKOUT\_48 AR1X  
CLKOUT\_CPUNSSC P G1  
CLKOUT\_CPUNSSC F1  
CLKOUT\_CPUBCLK P G2  
CLKOUT\_CPUBCLK H2XTAL24\_OUT A5  
XTAL24\_IN A6  
XCLK\_BIASREF E1RTCX1 BC9  
RTCX2 BD10GPP\_B5/SRCCLKREQ0# BC24  
GPP\_B6/SRCCLKREQ1# AW24  
GPP\_B7/SRCCLKREQ2# AT24  
GPP\_B8/SRCCLKREQ3# BD25  
GPP\_B9/SRCCLKREQ4# BE25  
GPP\_B10/SRCCLKREQ5# AT33  
GPP\_H0/SRCCLKREQ6# AR31  
GPP\_H1/SRCCLKREQ7# RD32  
GPP\_H2/SRCCLKREQ8# RC32  
GPP\_H3/SRCCLKREQ9# BC31  
GPP\_H4/SRCCLKREQ10# EC33  
GPP\_H5/SRCCLKREQ11# BA33  
GPP\_H6/SRCCLKREQ12# AW33  
GPP\_H7/SRCCLKREQ13# BB33  
GPP\_H8/SRCCLKREQ14# BD33  
GPP\_H9/SRCCLKREQ15#CLKOUT\_PCIE\_N15 R13  
CLKOUT\_PCIE\_P15 R1X  
CLKOUT\_PCIE\_N14 P1  
CLKOUT\_PCIE\_P14 P1X  
CLKOUT\_PCIE\_N13 W7  
CLKOUT\_PCIE\_P13 Y5  
CLKOUT\_PCIE\_N12 U2  
CLKOUT\_PCIE\_P12 U3

7 OF 12

CHIPSET SKYLAKE INTEL(10HB1-03C236-10R)

CLKOUT\_ITPXDP L1  
CLKOUT\_ITPXDP P J1  
CLKOUT\_CPUPICBCLK J2  
CLKOUT\_CPUPICBCLK\_P J2  
CLKOUT\_PCIE\_N0 N7  
CLKOUT\_PCIE\_P0 N8  
CLKOUT\_PCIE\_N1 L5  
CLKOUT\_PCIE\_P1 L6  
CLKOUT\_PCIE\_N2 D3  
CLKOUT\_PCIE\_P2 F2  
CLKOUT\_PCIE\_N3 E5  
CLKOUT\_PCIE\_P3 G4  
CLKOUT\_PCIE\_N4 D5  
CLKOUT\_PCIE\_P4 E6  
CLKOUT\_PCIE\_N5 D8  
CLKOUT\_PCIE\_P5 D7  
CLKOUT\_PCIE\_N6 R8  
CLKOUT\_PCIE\_P6 R7  
CLKOUT\_PCIE\_N7 U5  
CLKOUT\_PCIE\_P7 U7  
CLKOUT\_PCIE\_N8 W10  
CLKOUT\_PCIE\_P8 W11  
CLKOUT\_PCIE\_N9 N3  
CLKOUT\_PCIE\_P9 N2  
CLKOUT\_PCIE\_N10 P3  
CLKOUT\_PCIE\_P10 P2  
CLKOUT\_PCIE\_N11 R3  
CLKOUT\_PCIE\_P11 R4PA\_SRCCLK\_3GIO 19  
PA\_SRCCLK\_3GIO 19  
PI\_PCIE\_CLK 21  
PI\_PCIE\_CLK 21  
PJ\_PCIE\_CLK 21  
PJ\_PCIE\_CLK 21  
PQ\_PCIE\_CLK 20  
PQ\_PCIE\_CLK 20  
RH\_SRCCLK 51  
RH\_SRCCLK 51  
LA\_SRCCLK\_LAN 45  
LA\_SRCCLK\_LAN 45  
CK\_M2H\_100M\_DN 24  
CK\_M2H\_100M\_DP 24  
PE\_SRCCLK\_3GIO1 22  
PE\_SRCCLK\_3GIO1 22  
PK\_PCIE\_CLK 21  
PK\_PCIE\_CLK 21  
LB\_SRCCLK\_LAN 46  
LB\_SRCCLK\_LAN 46  
CK\_M2D\_100M\_DN 58  
CK\_M2D\_100M\_DP 58

PCIEX16

PCIEX1\_1

PCIEX1\_2

PCIEX4

ASM1061

E2400

M2H\_32G

PCIEX8

PCIEX1\_3

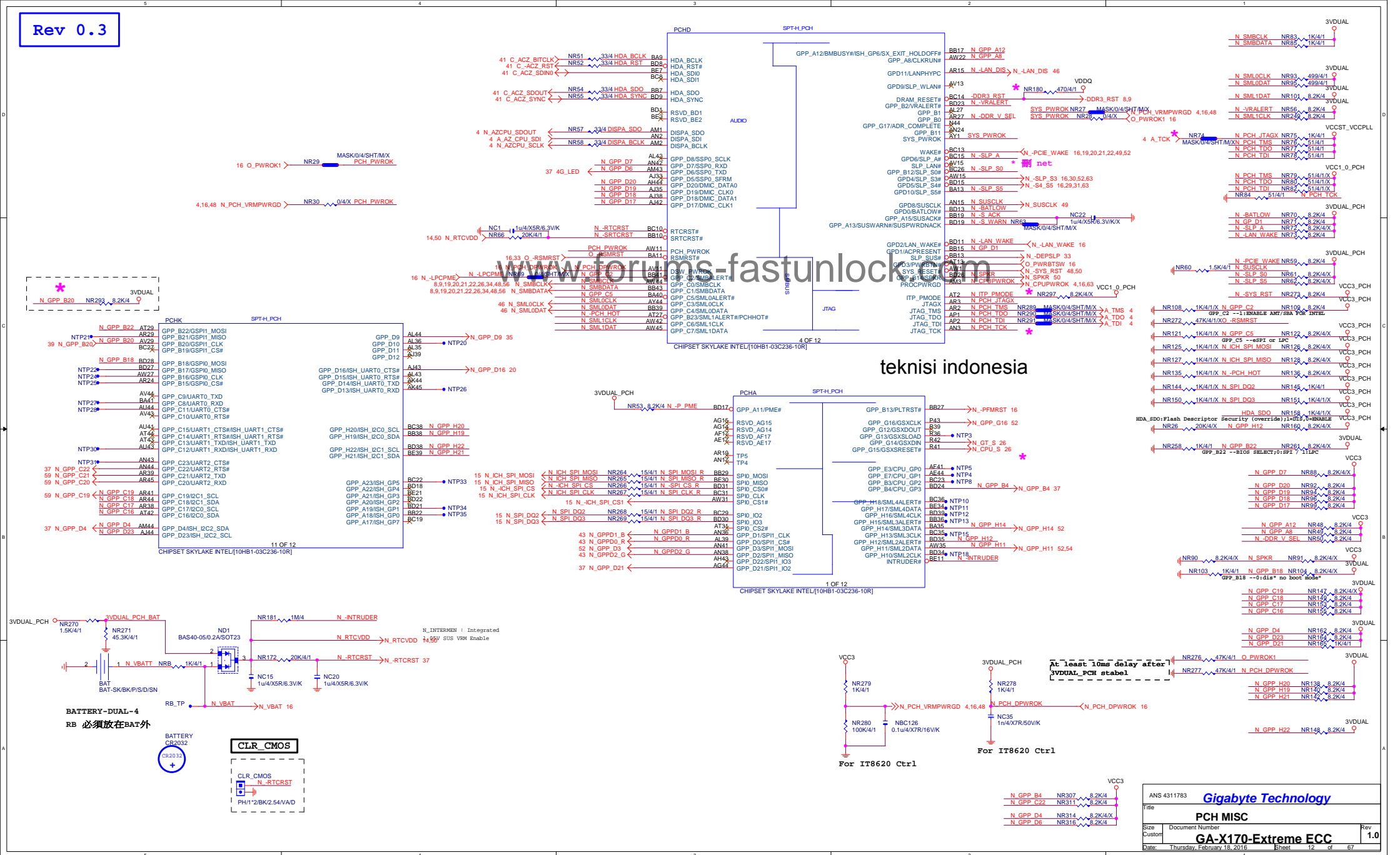
I219

M2D\_32G

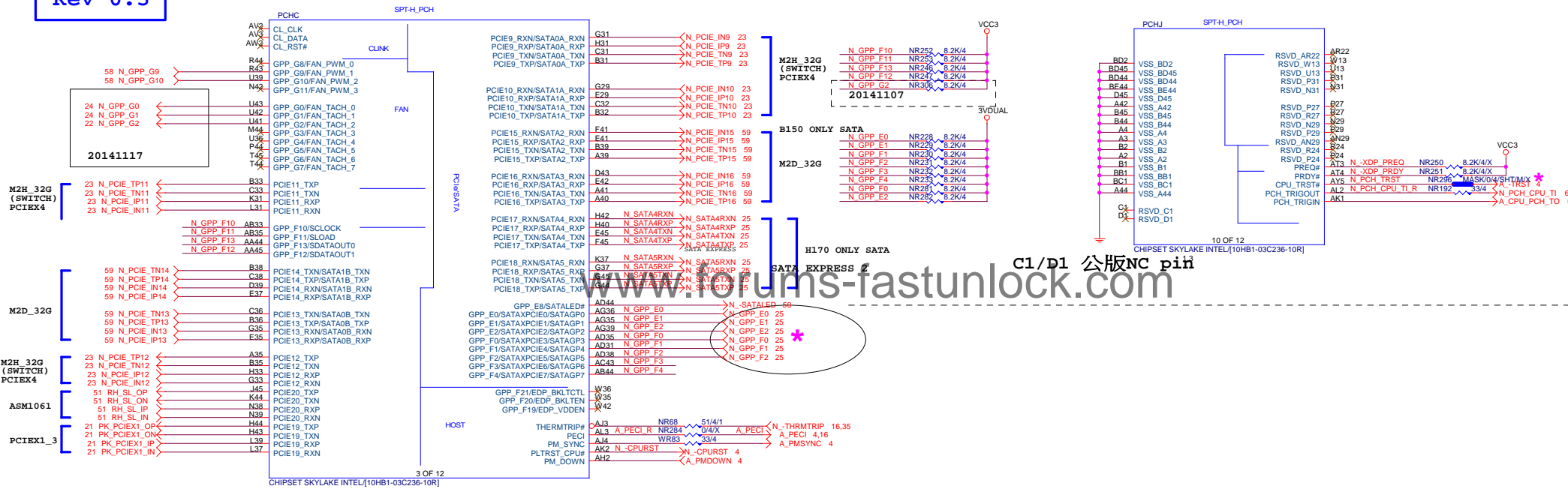
CLOCK 4/4/4/15

ANS 4311783		Gigabyte Technology	
Title		PCH CLOCK BUFFER	
Size	Document Number	Rev	
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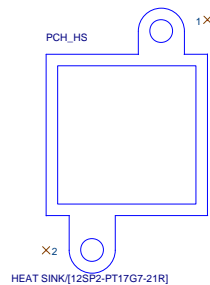




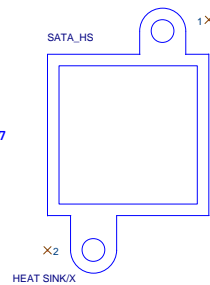
Rev 0.3



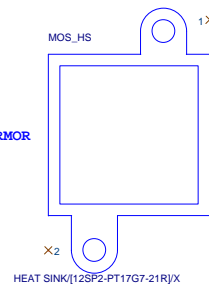
## 裝甲HEATSINK 分成五大部份



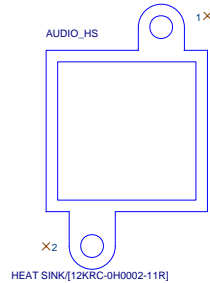
Footprint :  
BGAHSINK-Z1704X-GAMING7



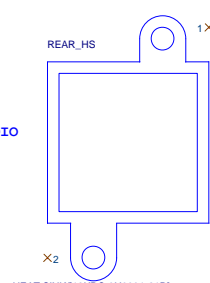
Footprint :  
1704-GAMING7-SATA\_ARMOR



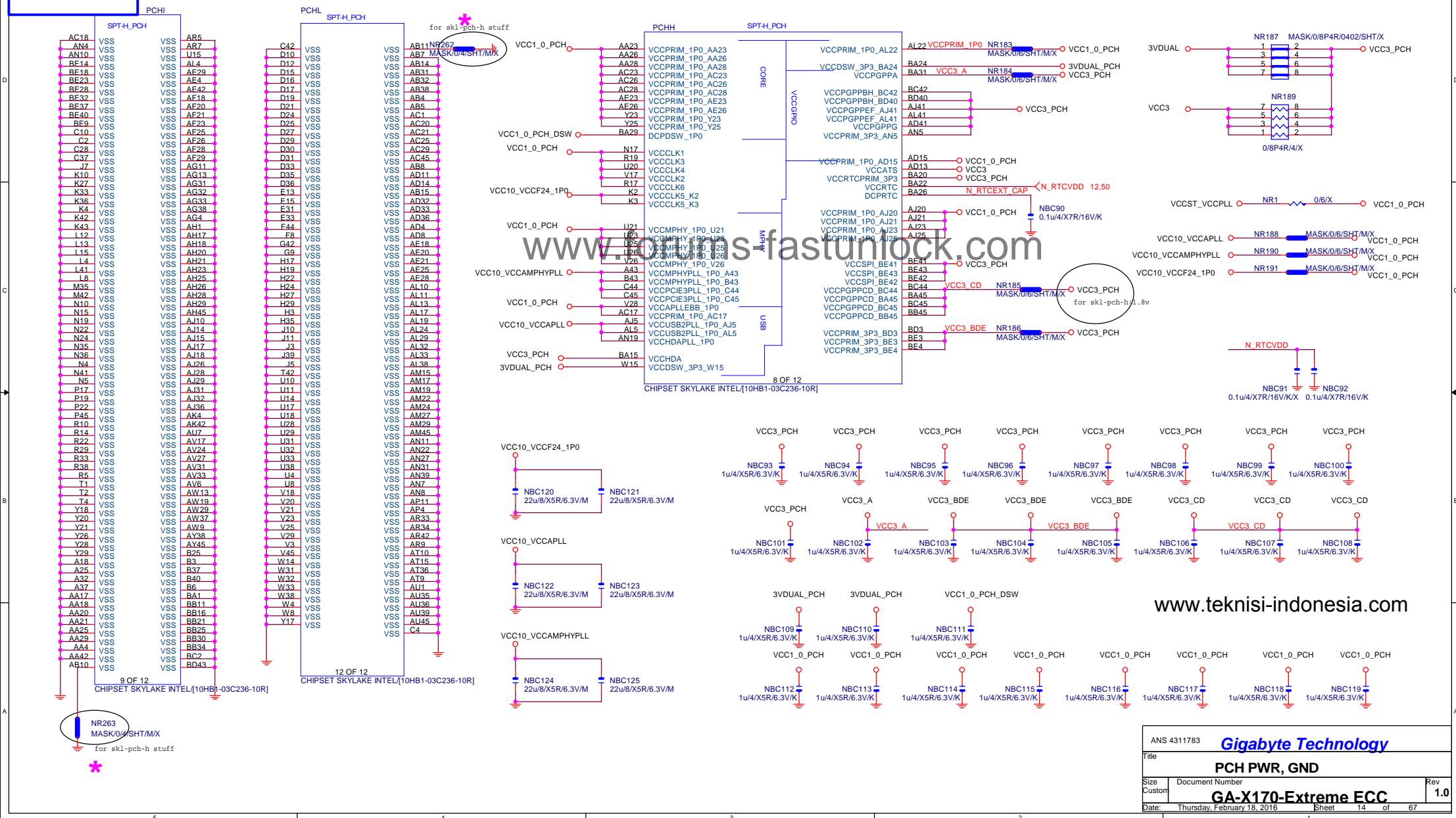
Footprint :  
MOSHHSINK-Z1704X-GAMING7



Footprint :  
1704-GAMING-ARMOR\_AUDIO



Footprint :  
1704-GAMING-ARMOR\_REAR



## DUAL BIOS

## MOSI For DMI RX Termination Voltage

指定用DII

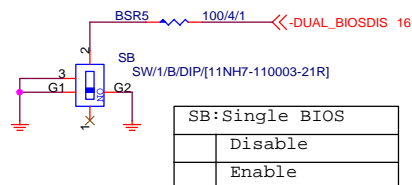
指定用DII

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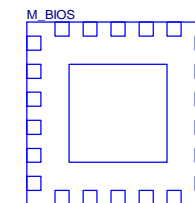
\* (footprint 改 IC8-BIOS)

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

1 means floating  
0 means PD 1K



SB:Single BIOS
Disable
Enable

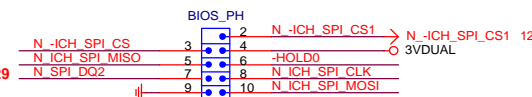


LCP/G-FL/1.27mm/200MIL/WHITE[10SL2-000008-31R]X

\* 試産先上, PVT 移除

## BIOS\_PH

★Update 2015-01.29



MASK/PH/2\*5K10/BK/2.54/VA/D/X

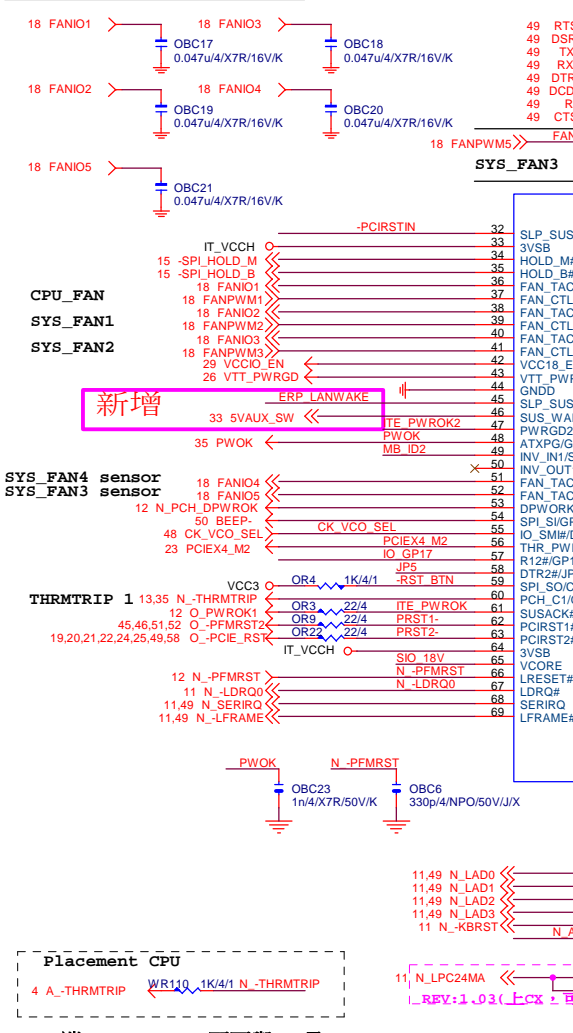
Footprint the same, confirmed by Graceing.

Use COM port pin header part.

Gigabyte Technology

Title	BIOS
Size	Document Number
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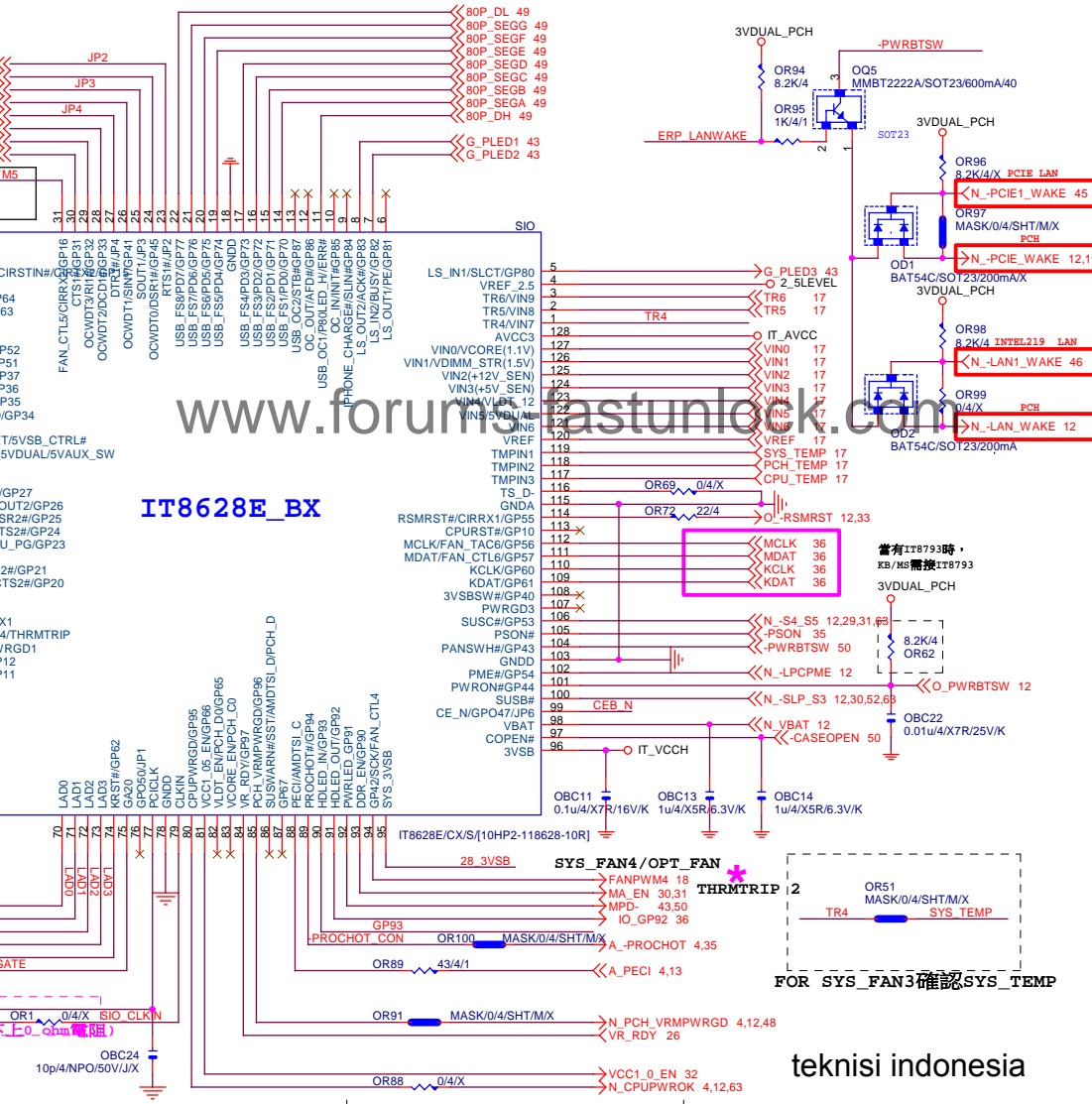
SIO IT8628BX REV:1.05



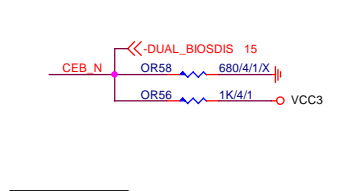
CPU 端 A\_THRMTRIP不可與PCH及SIO N\_THRMTRIP直接連接。否則會出現無法拉LOW情況。

FAN TABLE	
CPU_FAN	FAN_CTL1 FAN_TAC1
SYS_FAN1	FAN_CTL2 FAN_TAC2
SYS_FAN2	FAN_CTL3 FAN_TAC3
SYS_FAN3	FAN_CTL4 FAN_TAC4
OPT FAN or SYS_FAN4	FAN_CTL5 FAN_TAC5
THRMTRIP1	YES PIN56

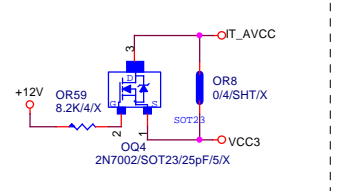
IT8628E GPIO問題匯整	
PIN 50	GP26-第一次接上POWER時會拉LO
PIN 90/91	DEFAULT為HIDLED FUNCTION, GP93 BYPASS TO GP92 高溫時 GP92 會被拉Lo(ITE BUG)
PIN 108	GP40--- POWER ON 時會拉 LO
PIN 111/112	MOUSE 跟FAN6 FUNCTION 擇一使用,不然會互相干擾
PIN 22	PIN22, 需高於3V, 若低於此部分COM PORT及LPT裝置線端會異常動作。



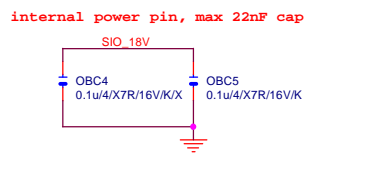
DUAL BIOS OPT STRAP



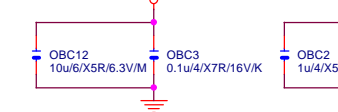
Power leakage



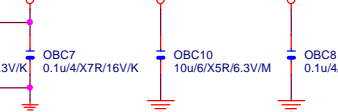
SIO\_18V



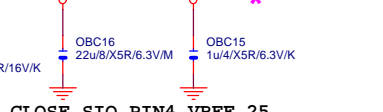
SIO CAP



Power leakage



SIO\_18V



**PWR SHT**

For 8728 BUP function

3VDUAL\_PCH OR25 0.6/SHT/X

IT\_VCC

**SIO PU**

新增

PCIRSTIN OR26 8.2K/4

IO GP17 OR84 1K/4/X

N\_LDRQ0 OR27 1K/4/1

ITE PWROK2 OR16 1K/4/1

ITE PWROK OR10 1K/4/1

PROCHOT CON OR29 8.2K/4/X

N\_A20GATE OR31 8.2K/4

GP93 OR171 8.2K/4

**SIO STRAP**

JP2 OR36 8.2K/4

JP3 OR35 8.2K/4

JP4 OR32 8.2K/4

JP5 OR12 8.2K/4/X

EUP control detect

3VDUAL OR47 100/4/1 28 3VSB

JP2	1	Disable WDT
JP2	0	Enable WDT to rest PWROK
JP3	1	Dual BIOS CS PIN Disable
JP3	0	Dual BIOS CS PIN Enable
JP4	1	k8 power sequency function is Disable
JP4	0	k8 power sequency function is Enable
JP5	1	anti-surge Disable
JP5	0	anti-surge Enable

JP3	1 1	The default value of EC Index 63h/6Bh/73h is 80h.
JP3	1 0	The default value of EC Index 63h/6Bh/73h is FFh.
JP5	0 1	The default value of EC Index 63h/6Bh/73h is 00h.
JP5	0 0	The default value of EC Index 63h/6Bh/73h is 40h.

**MB ID**

VCC3 OR7 8.2K/4

OR15 8.2K/4/X

MB\_ID2

**Gigabyte Technology**

ITE 8620 LPC IO

Title

Size Document Number

Custom

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Rev

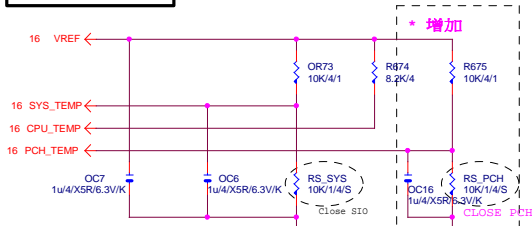
GA-X170-Extreme ECC

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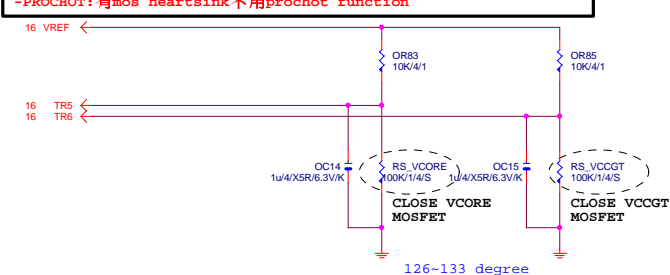
IT8628E\_BX

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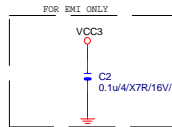
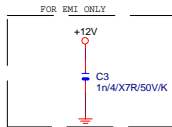
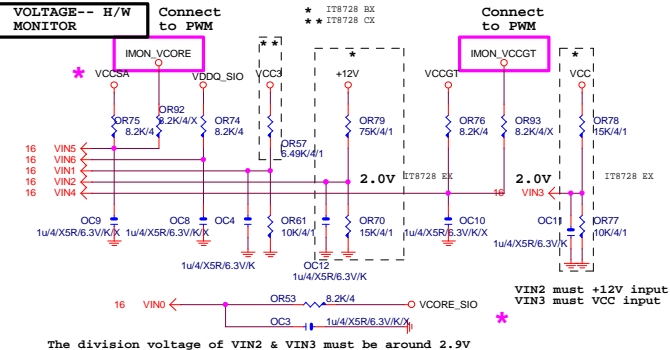
# TEMP H/W MONITOR



# RS\_VCORE、RS\_VCCGT、CLOSE CPU\_VCORE & VCCGT MOSFET



# VOLTAGE-- H/W MONITOR

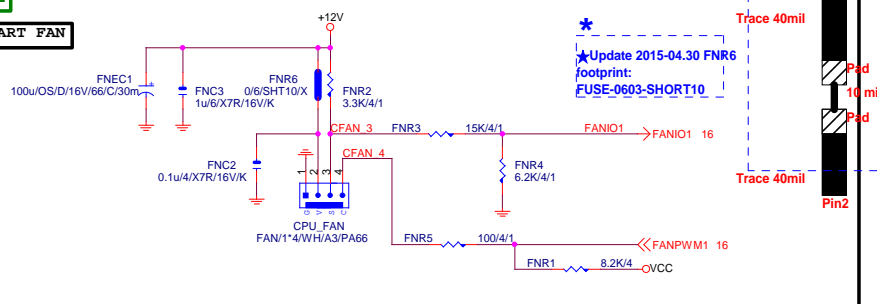


★Update 2015-04.24

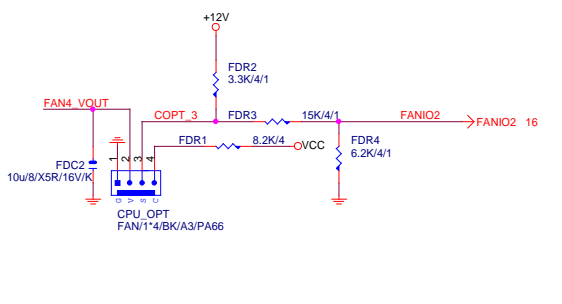
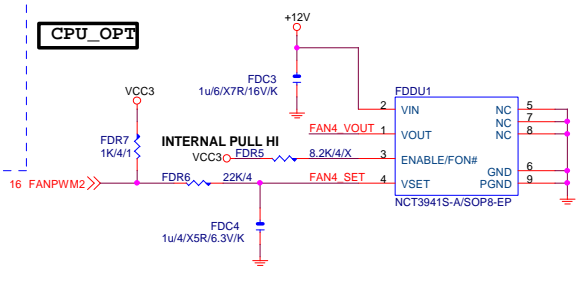
Gigabyte Technology

Title			HWM,KB/MS, FAN CTRL
Size	Document Number	Rev	1.0
Custom	GA-X170-Extreme ECC		
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CPU SMART FAN



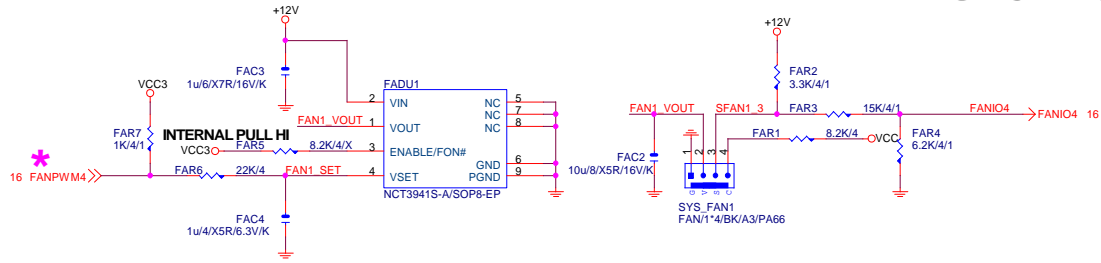
CPU\_OPT



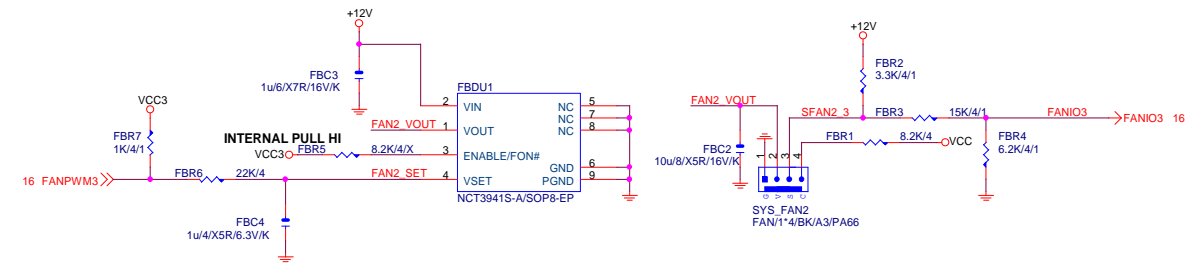
SYSTEM FAN1

Linear SYS\_FAN  
Enable Function (NCT3941S)  
Full Turn On Function (NCT3941S-A)

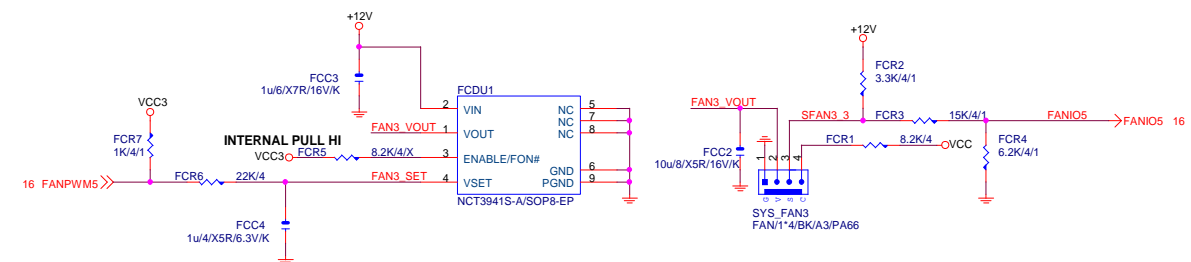
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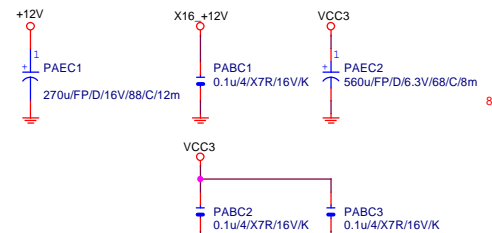
SYSTEM FAN2



SYSTEM FAN3

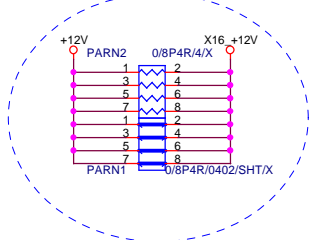


## PCIEX16 CAP



## PCIEX16 PROTECT SHT

+12 protect short-wire test



## PCIEX16 AC CAP

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PA EXP TXP0	PAC5	0.22u/4/X5R/6.3V/K	PA EXP TXP0 C
PA EXP TXN0	PAC4	0.22u/4/X5R/6.3V/K	PA EXP TXN0 C
PA EXP TXP1	PAC6	0.22u/4/X5R/6.3V/K	PA EXP TXP1 C
PA EXP TXN1	PAC7	0.22u/4/X5R/6.3V/K	PA EXP TXN1 C
PA EXP TXP2	PAC8	0.22u/4/X5R/6.3V/K	PA EXP TXP2 C
PA EXP TXN2	PAC9	0.22u/4/X5R/6.3V/K	PA EXP TXN2 C
PA EXP TXP3	PAC10	0.22u/4/X5R/6.3V/K	PA EXP TXP3 C
PA EXP TXN3	PAC11	0.22u/4/X5R/6.3V/K	PA EXP TXN3 C
PA EXP TXP4	PAC12	0.22u/4/X5R/6.3V/K	PA EXP TXP4 C
PA EXP TXN4	PAC13	0.22u/4/X5R/6.3V/K	PA EXP TXN4 C
PA EXP TXP5	PAC14	0.22u/4/X5R/6.3V/K	PA EXP TXP5 C
PA EXP TXN5	PAC15	0.22u/4/X5R/6.3V/K	PA EXP TXN5 C
PA EXP TXP6	PAC16	0.22u/4/X5R/6.3V/K	PA EXP TXP6 C
PA EXP TXN6	PAC17	0.22u/4/X5R/6.3V/K	PA EXP TXN6 C
PA EXP TXP7	PAC18	0.22u/4/X5R/6.3V/K	PA EXP TXP7 C
PA EXP TXN7	PAC19	0.22u/4/X5R/6.3V/K	PA EXP TXN7 C
PA EXP SW TXP8	PAC20	0.22u/4/X5R/6.3V/K	PA EXP SW TXP8 C
PA EXP SW TXN8	PAC21	0.22u/4/X5R/6.3V/K	PA EXP SW TXN8 C
PA EXP SW TXP9	PAC22	0.22u/4/X5R/6.3V/K	PA EXP SW TXP9 C
PA EXP SW TXN9	PAC23	0.22u/4/X5R/6.3V/K	PA EXP SW TXN9 C
PA EXP SW TXP10	PAC24	0.22u/4/X5R/6.3V/K	PA EXP SW TXP10 C
PA EXP SW TXN10	PAC25	0.22u/4/X5R/6.3V/K	PA EXP SW TXN10 C
PA EXP SW TXP11	PAC26	0.22u/4/X5R/6.3V/K	PA EXP SW TXP11 C
PA EXP SW TXN11	PAC27	0.22u/4/X5R/6.3V/K	PA EXP SW TXN11 C
PA EXP SW TXP12	PAC28	0.22u/4/X5R/6.3V/K	PA EXP SW TXP12 C
PA EXP SW TXN12	PAC29	0.22u/4/X5R/6.3V/K	PA EXP SW TXN12 C
PA EXP SW TXP13	PAC30	0.22u/4/X5R/6.3V/K	PA EXP SW TXP13 C
PA EXP SW TXN13	PAC31	0.22u/4/X5R/6.3V/K	PA EXP SW TXN13 C
PA EXP SW TXP14	PAC32	0.22u/4/X5R/6.3V/K	PA EXP SW TXP14 C
PA EXP SW TXN14	PAC33	0.22u/4/X5R/6.3V/K	PA EXP SW TXN14 C
PA EXP SW TXP15	PAC34	0.22u/4/X5R/6.3V/K	PA EXP SW TXP15 C
PA EXP SW TXN15	PAC35	0.22u/4/X5R/6.3V/K	PA EXP SW TXN15 C

## PCIEX16 SLOT

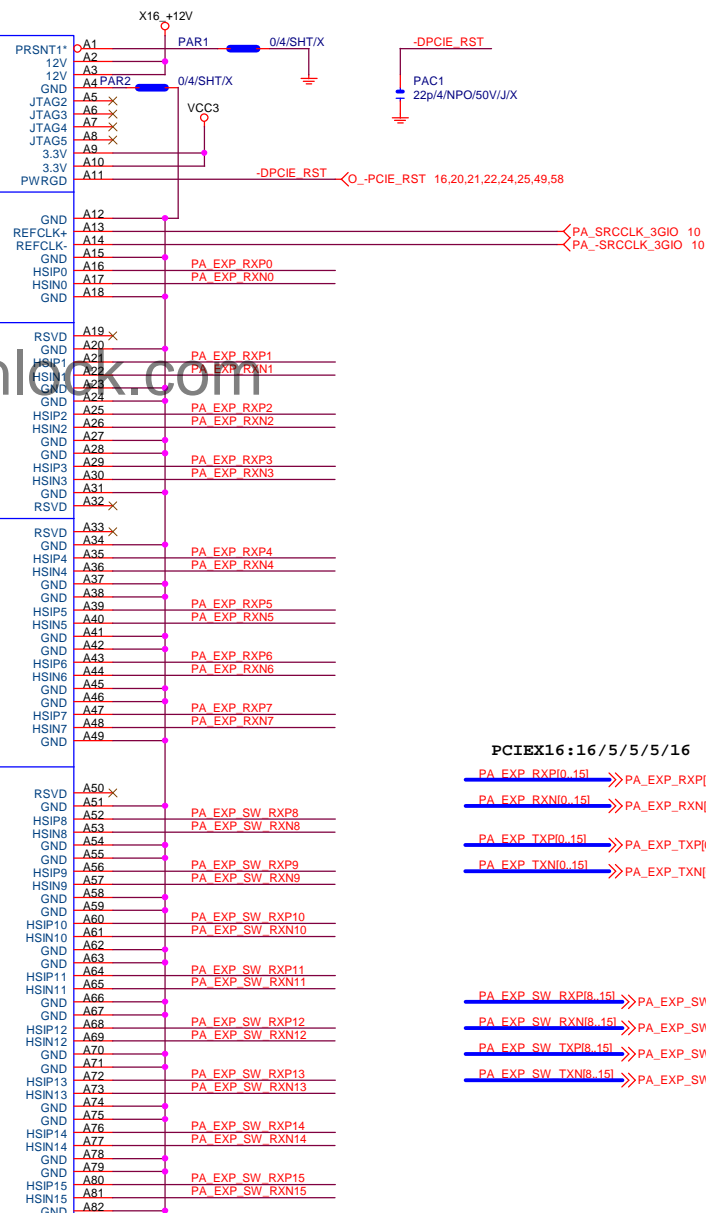


PCIESLOT-164STH

PCIEX16 3GIO\_\*16

PCI-E/16X-164P/LB/LONG DOUBLE/HK\*2/SHELL

土色



PCIEX16:16/5/5/5/16

PA EXP RXP0.15] >>>PA\_EXP\_RXP0[8..15] 4,23

PA EXP RXN0.15] >>>PA\_EXP\_RXN0[0..15] 4,23

PA EXP TXP0.15] >>>PA\_EXP\_TXP0[0..15] 4,23

PA EXP TXN0.15] >>>PA\_EXP\_TXN0[0..15] 4,23

PA EXP SW RXP8.15] >>>PA\_EXP\_SW\_RXP8[8..15] 23

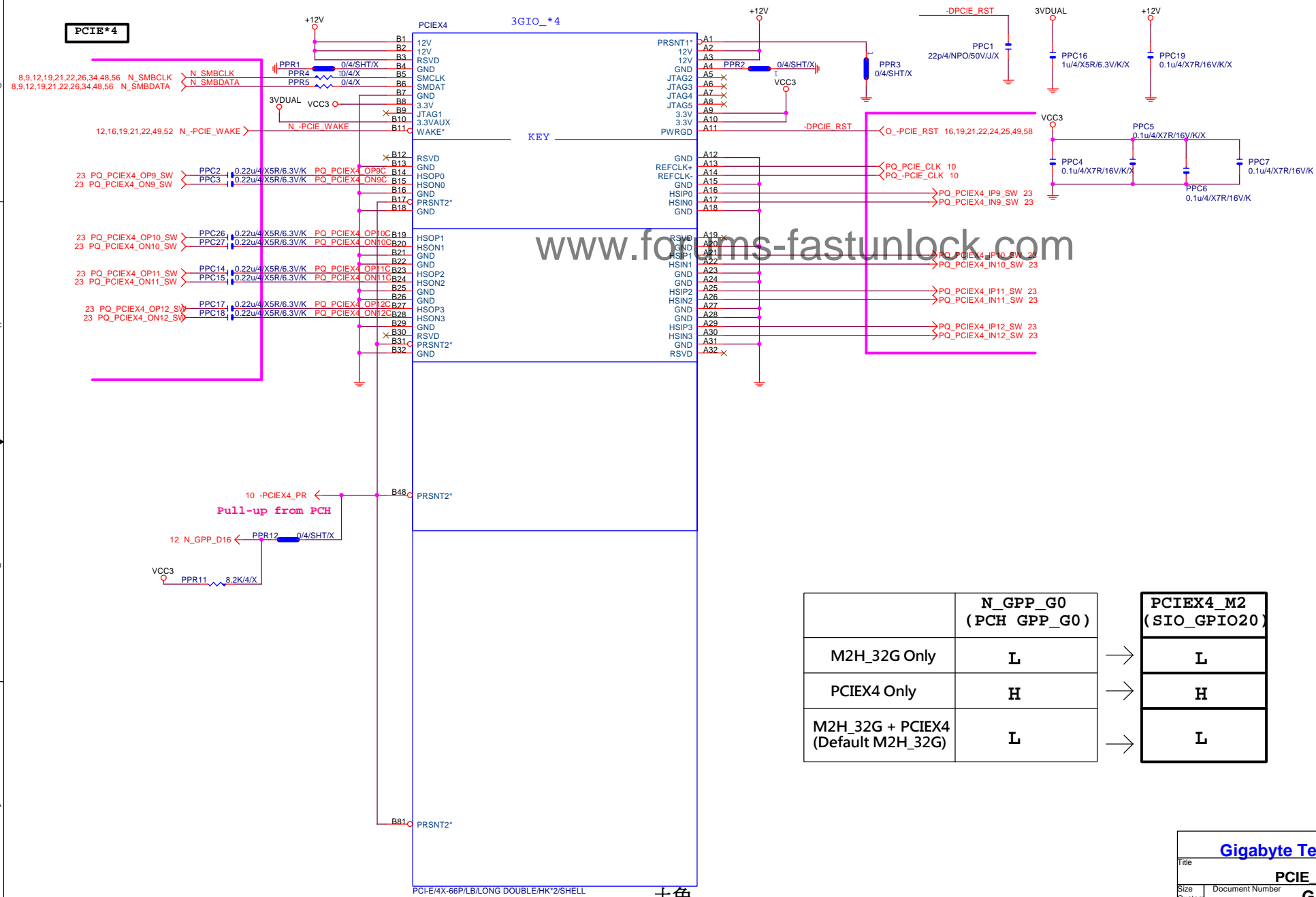
PA EXP SW RXN8.15] >>>PA\_EXP\_SW\_RXN8[8..15] 23

PA EXP SW TXP8.15] >>>PA\_EXP\_SW\_TXP8[8..15] 23

PA EXP SW TXN8.15] >>>PA\_EXP\_SW\_TXN8[8..15] 23

Gigabyte Technology			
Title			
PCI EXPRESS * 16			
Size	Document Number	Rev	
Custom	GA-X170-Extreme ECC	1.0	
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# Footprint "PCIESLOT-64STH-1"



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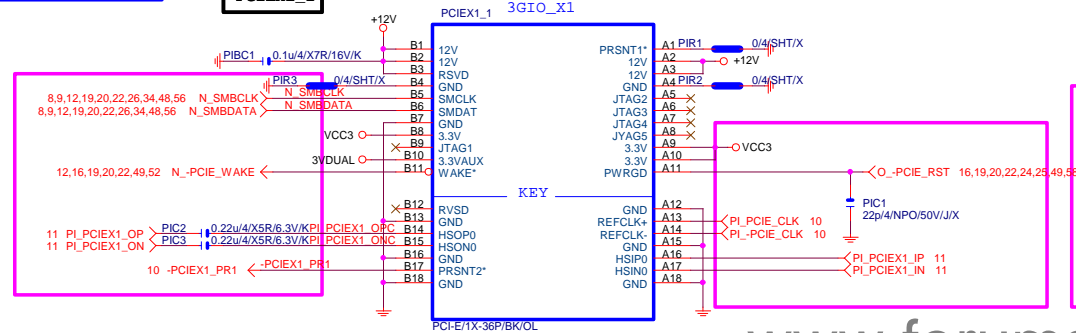
	N_GPP_G0 (PCH GPP_G0)	PCIEX4_M2 (SIO_GPIO20)
M2H_32G Only	L	L
PCIEX4 Only	H	H
M2H_32G + PCIEX4 (Default M2H_32G)	L	L

Gigabyte Technology

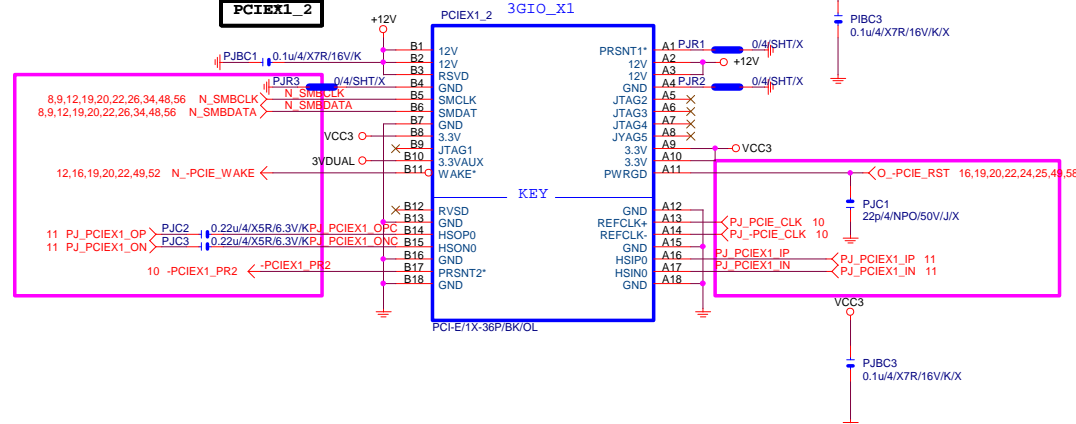
Title	PCIE X1 1.2
Size	Document Number
Custom	GA-X170-Extreme EDC
Date	Thursday, February 18, 2016
Sheet	20 of 67

土色

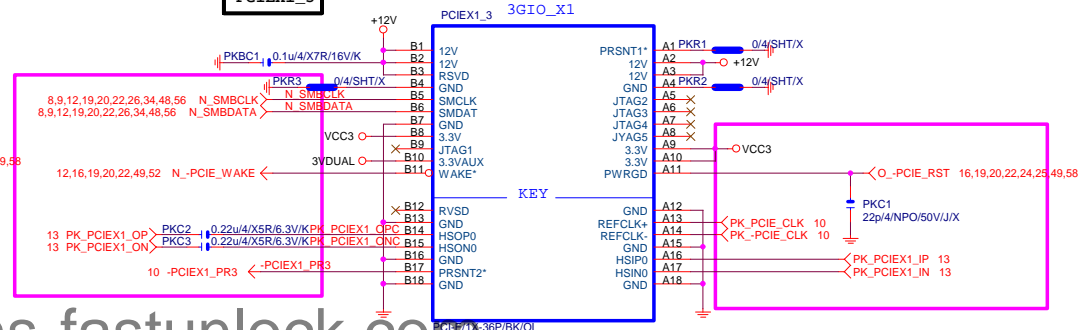
PCIE1\_1



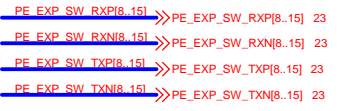
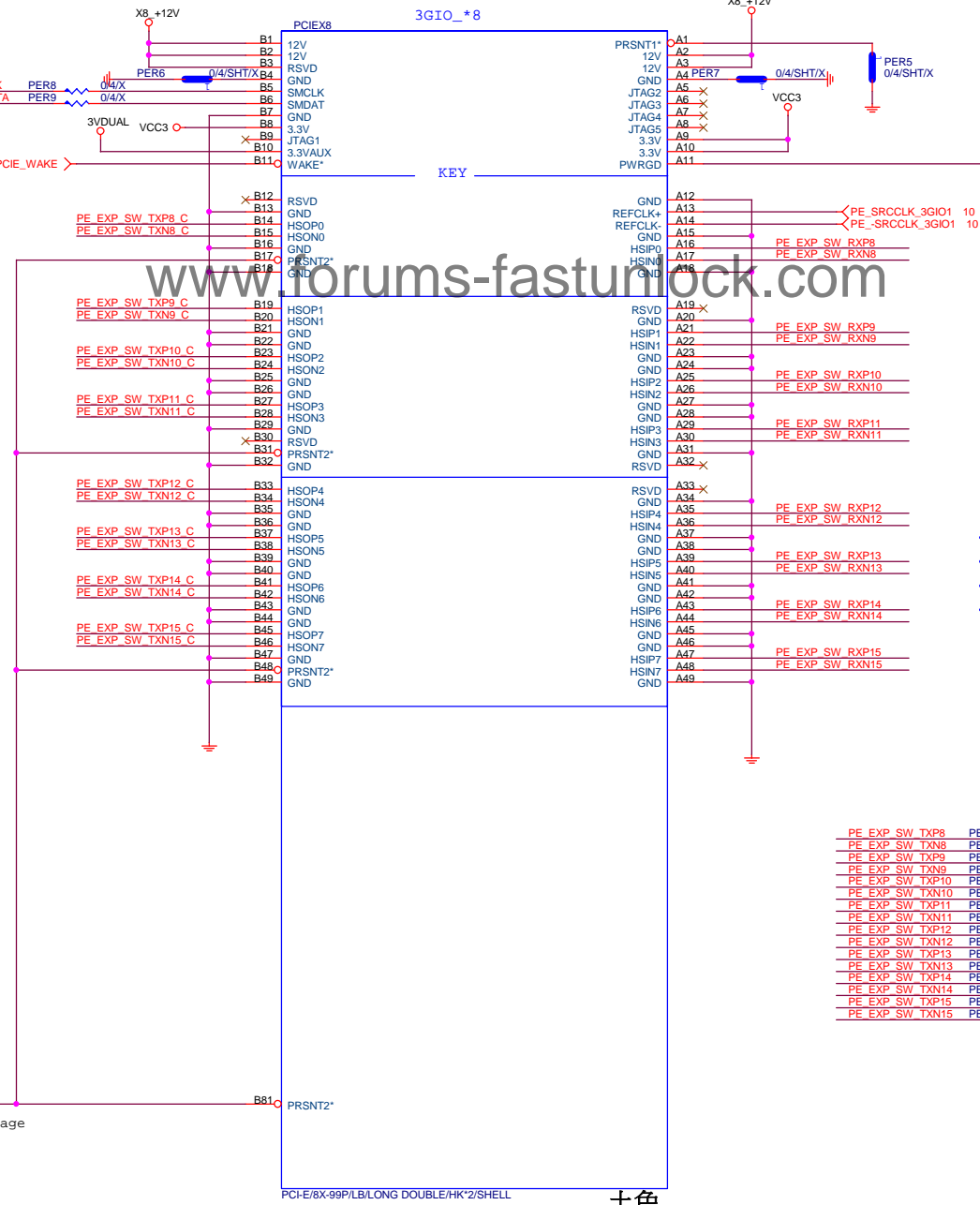
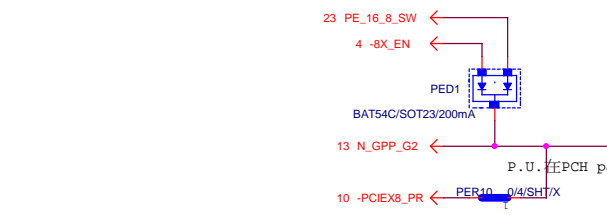
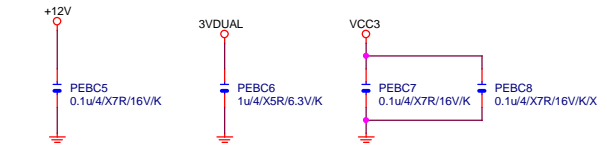
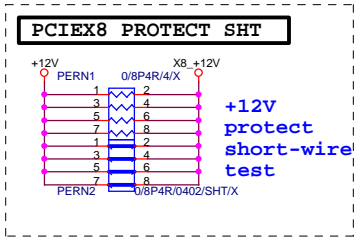
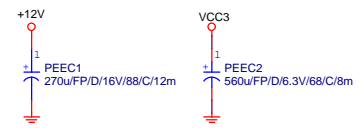
PCIE1\_2



PCIE1\_3

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Title		
PCIE_X1 1,2		
Size	Document Number	Rev
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PE_EXP_SW_TXP8	PEC7	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXP8_C
PE_EXP_SW_TXN8	PEC8	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXN8_C
PE_EXP_SW_TXP9	PEC9	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXP9_C
PE_EXP_SW_TXN9	PEC10	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXN9_C
PE_EXP_SW_TXP10	PEC11	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXP10_C
PE_EXP_SW_TXN10	PEC12	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXN10_C
PE_EXP_SW_TXP11	PEC13	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXP11_C
PE_EXP_SW_TXN11	PEC14	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXN11_C
PE_EXP_SW_TXP12	PEC15	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXP12_C
PE_EXP_SW_TXN12	PEC16	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXN12_C
PE_EXP_SW_TXP13	PEC17	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXP13_C
PE_EXP_SW_TXN13	PEC18	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXN13_C
PE_EXP_SW_TXP14	PEC19	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXP14_C
PE_EXP_SW_TXN14	PEC20	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXN14_C
PE_EXP_SW_TXP15	PEC21	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXP15_C
PE_EXP_SW_TXN15	PEC22	0.22u/4/X5R/6.3V/K	PE_EXP_SW_TXN15_C



M.2 Lane4 from PCH port18

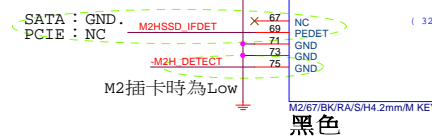
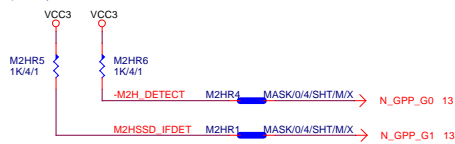
M.2 Lane3 from PCH port17

M.2 Lane2 from PCH port16

M.2 Lane2 from PCH port15

需與M2\_-CLKREQ對應

支援SATA and M.2 function

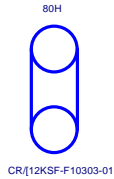


黑色

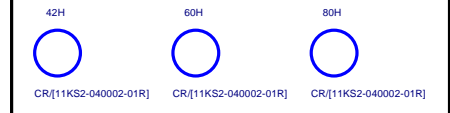
M.2 有插卡 /沒插卡 GPP_G0	M.2插何種卡? GPP_G1	SATA Express 插何種硬碟? GPP_E0/E2/F1	IO15 (S0)	IO16 (S1)	IO17	IO18	IO19 (S0)	IP20 (S1)
有插卡 (Low)	SATA Mode (Low)	SATA (Hi)	SATA (M.2)	PCIE x1	PCIE x1	PCIE X1	PCIE x1	SATA
		SATA Express (Low)	SATA (M.2)	PCIE x1	PCIE x1	PCIE x1	SATA Express	
	PCIE Mode (Hi)	SATA (Hi)	PCIE x4 (For M.2)				SATA	SATA
		SATA Express (Low)	PCIE x4 (For M.2)				SATA Express	
沒插卡 (Hi)	Don't Care (Hi)	SATA (Hi)	PCIE x4				SATA	SATA
		SATA Express (Low)	PCIE x4				SATA Express	

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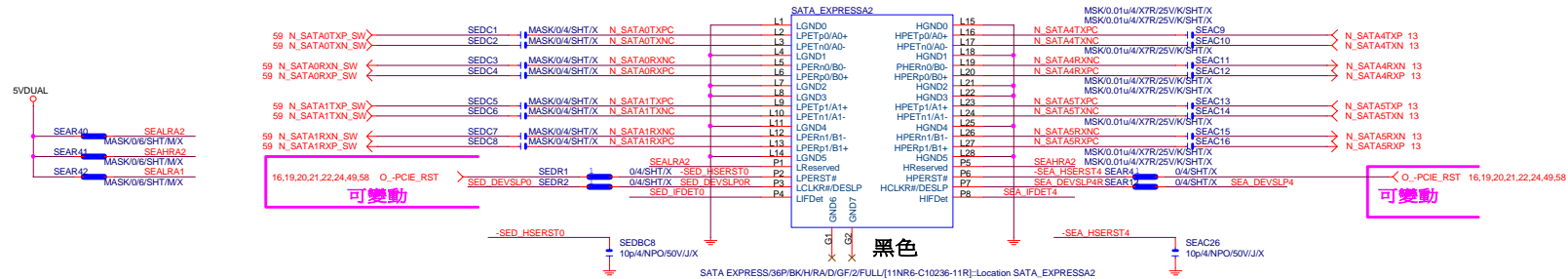
DIP螺柱



SMD螺柱

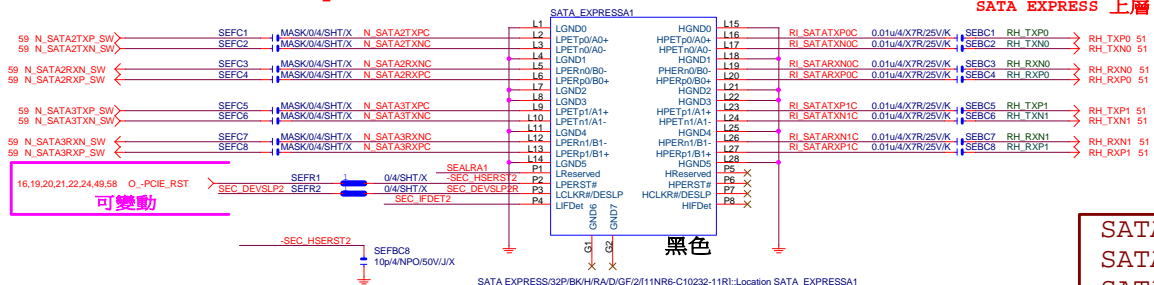


Rev 0.5

SATA EXPRESS 下層 To SATA3  
port0/1SATA EXPRESS 上層 To SATA3  
port4/5

Rev 0.5

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SATA EXPRESS料號  
雙層:TBD單層+2SATA:11NR6-C10236-03R  
單層:11NR6-C10118-03RSATA EXPRESS 下層 To SATA3  
port2/3SATA EXPRESS 上層 To SATA3 port6/7  
ASM1061

SATA 5 (文字面寫SATA 1)  
SATA 4 (文字面寫SATA 0)  
SATA 3  
SATA 2  
SATA 1 (文字面寫SATA 5)  
SATA 0 (文字面寫SATA 4)

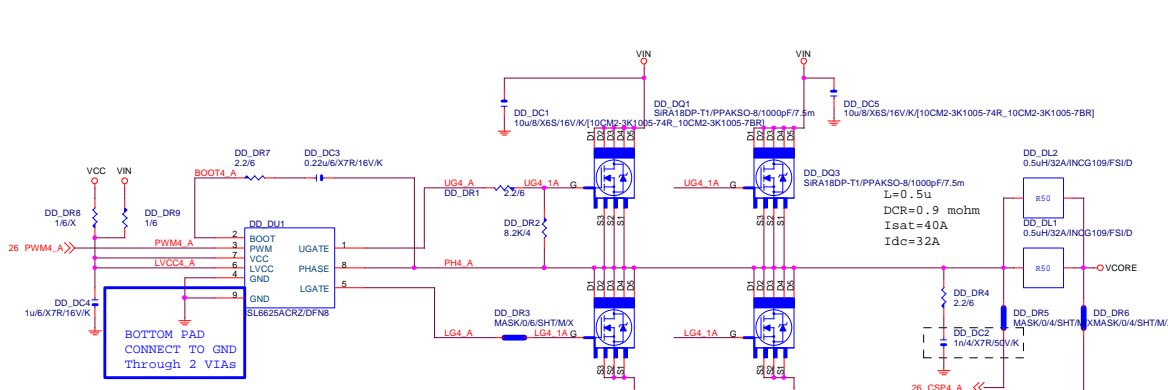
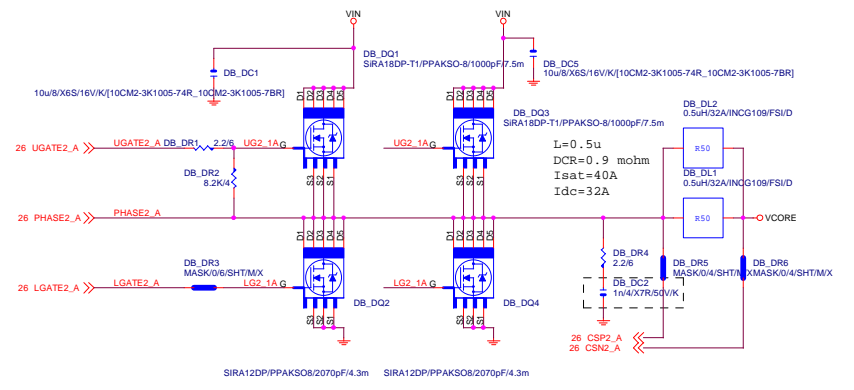
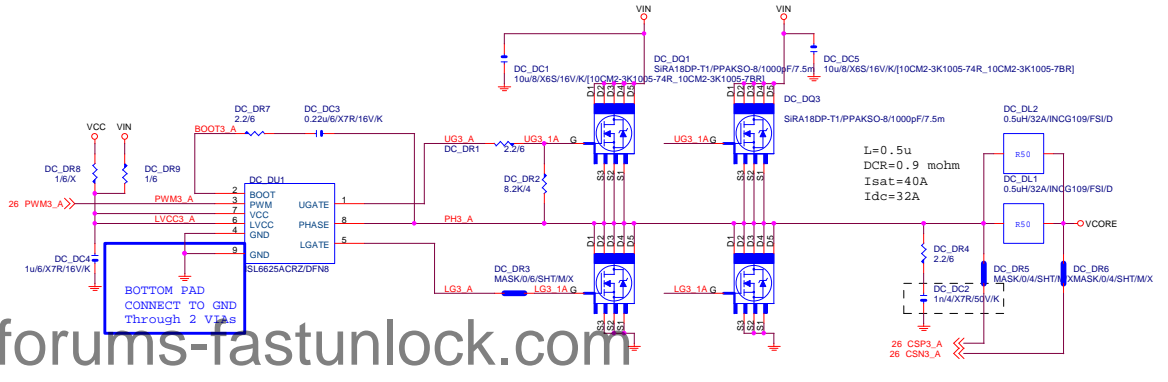
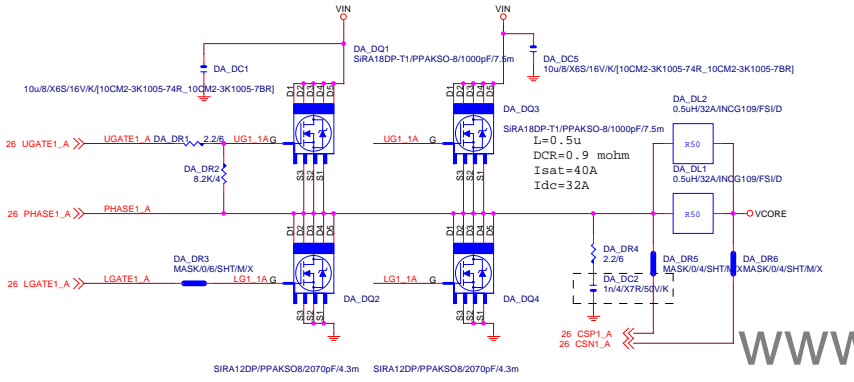
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Gigabyte Technology

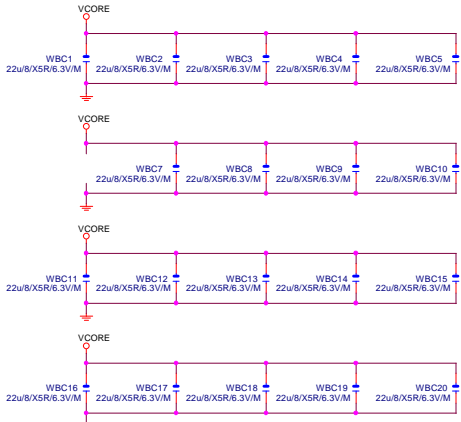
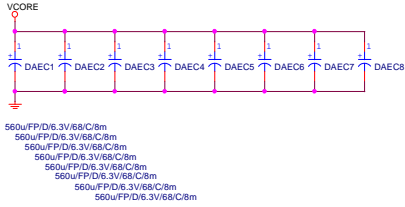
Title		SATA EXPRESS	
Size	Document Number	GA-X170-Extreme ECC	
Custom	Rev	1.0	
Date	Thursday, February 18, 2016	Sheet	25 of 67



VCORE

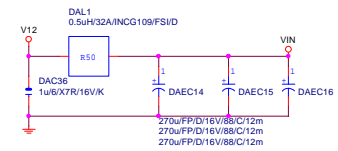


VCORE CAP 560u\*8PCS  
22u\*29PCS



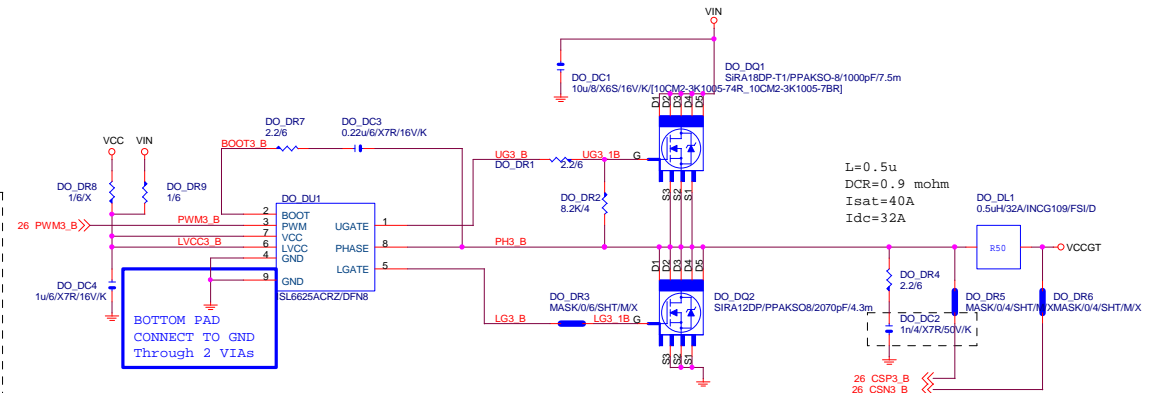
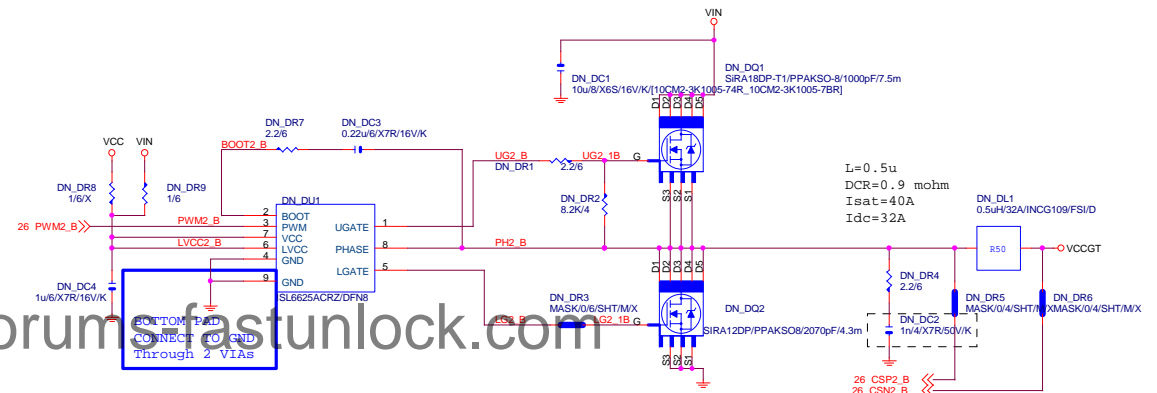
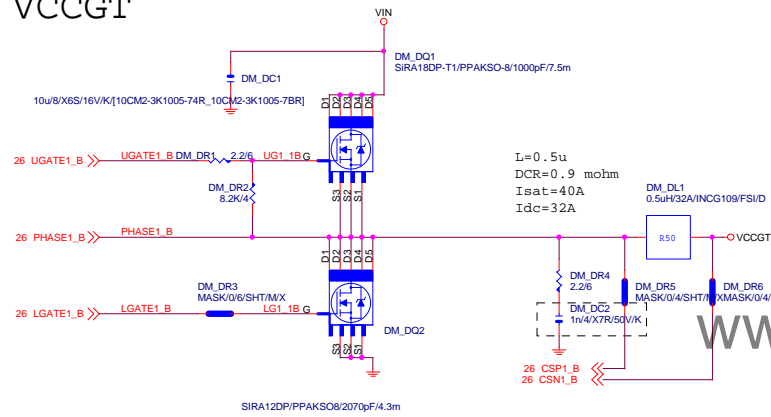
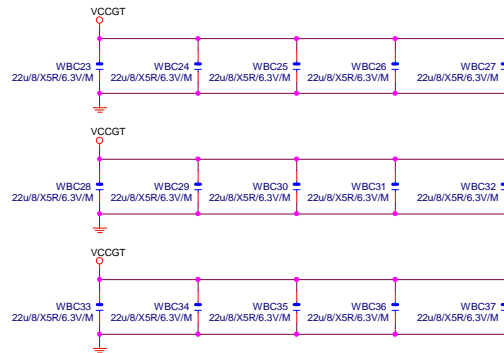
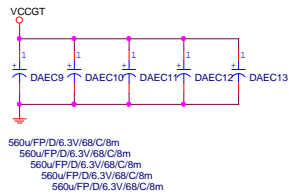
www.teknisi-indonesia.com

VIN CAP 270u\*3PCS

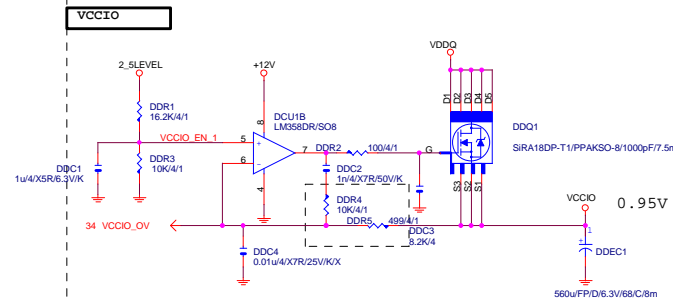
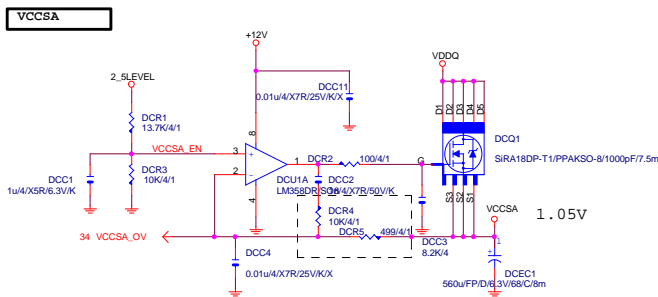


GIGABYTE™		
ISL9585E_MOS		
Size	Document Number	Rev
Custom	GA-X170-Extreme ECC	1.0
Date:	Thursday, February 18, 2016	Sheet 27 of 67

## VCCGT

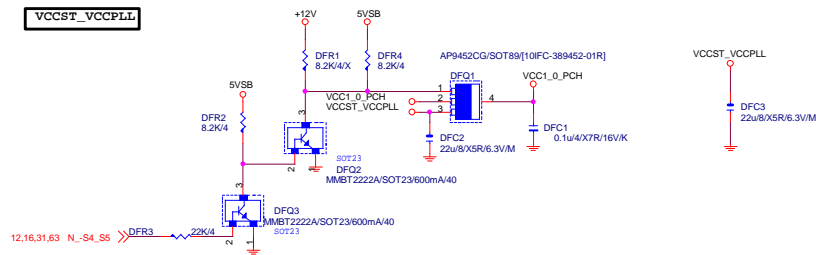
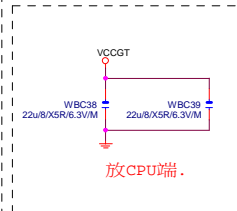
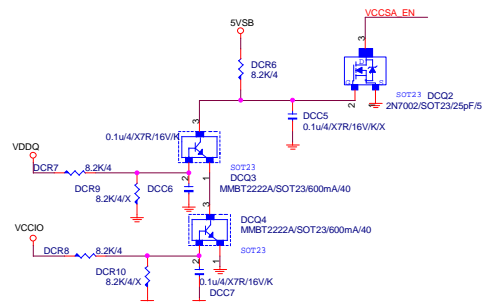
VCCGT CAP 560u\*5PCS  
22u\*15PCS

GIGABYTE™			
Title			
ISL95856_MOS			
Size	Document Number	Rev	
Custom	GA-X170-Extreme ECC	1.0	
Date:	Thursday, February 18, 2016	Sheet	28 of 67

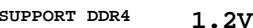


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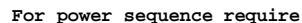


## DDR4



25A MAX  
L=0.5u  
DCR=1.05 mohm  
Isat=40A  
IDC=30A

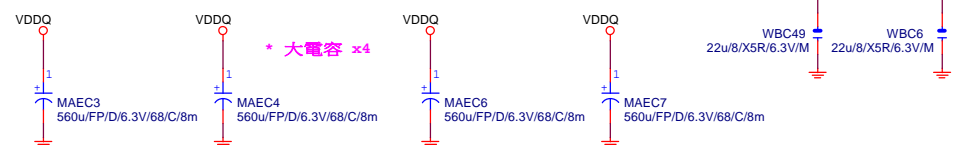
Remote sense請從最重的負載端點拉回



DDRVTT 1.1A MAX

DDR VTT CTL MAR110 0/4 DDRVTT EN  
N -SLP\_S3 MAR111 0/4 DDRVTT\_BOOT

MAU1上NCT3103S時上件



DDRVTT CAP



\* 大電容 x0

**GIGABYTE™**

RT8120\_DDR4\_POWER

Document Number	GA-X170-Extreme ECO
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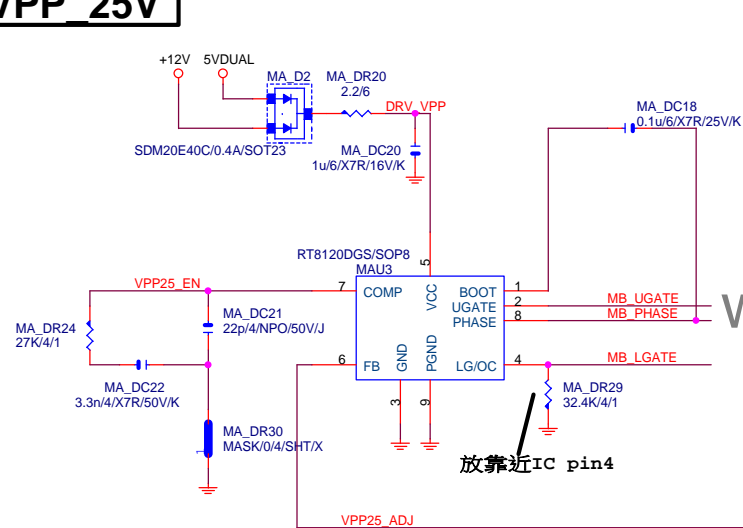
Rev	1.0
-----	-----

Date: Thursday, February 18, 2016

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REV:0.7

VPP\_25V



放靠近IC pin4

SIRA18DP-T1/PPAKSO-8/1000pF/7.5m

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L=0.5u  
DCR=2.1 mohm  
Isat=20A  
Idc=15A

CHOKE與CAP料號可變

DDR\_VPP VIN CAP  
560u\*1PCS

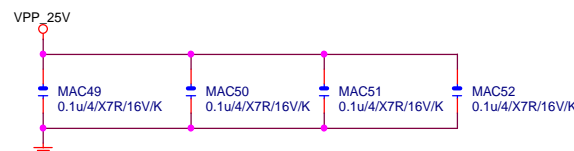
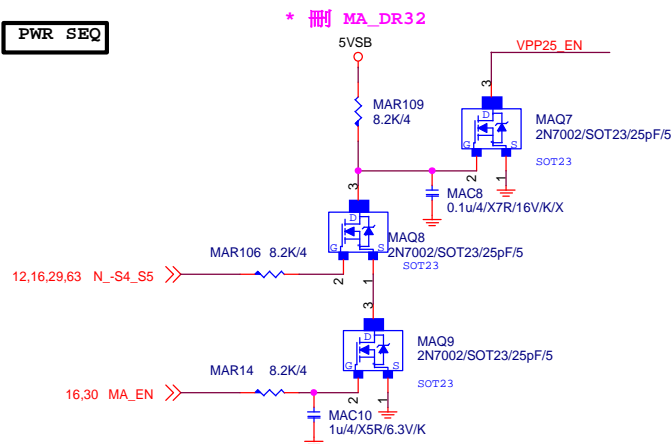
L=0.5u  
DCR=2.1 mohm  
Isat=20A  
Idc=15A

SUPPORT DDR4 2.5V

25A MAX

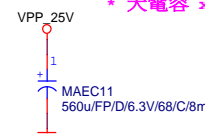
Remote sense請從最重的負載端點拉回

PWR\_SEQ



VPP CAP 560u\*1PCS

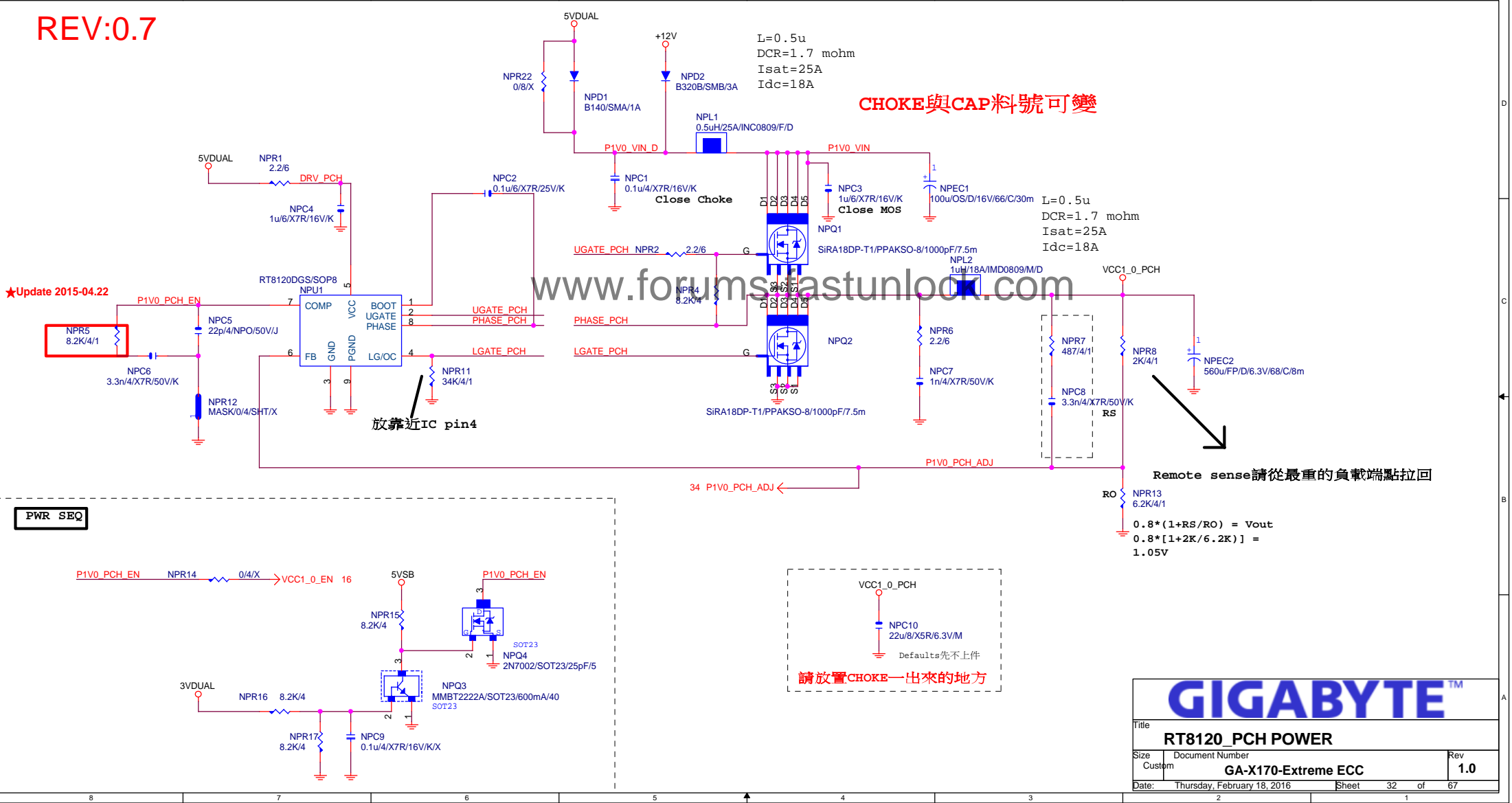
\* 大電容 x1



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Title		
RT8120_VPP25 POWER		
Size	Document Number	Rev
Custom	GA-X170-Extreme ECC	1.0
Date:	Thursday, February 18, 2016	Sheet 31 of 67

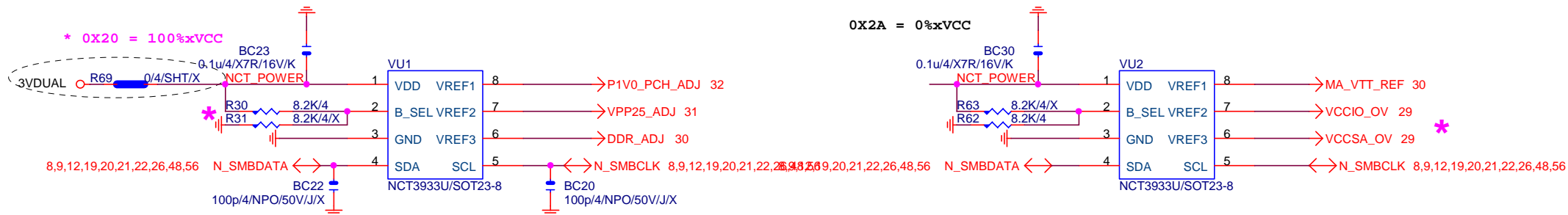
REV:0.7



GIGABYTE™			
Title			
RT8120_PCH POWER			
Size	Document Number	Rev	
Custom	GA-X170-Extreme ECC	1.0	
Date:	Thursday, February 18, 2016	Sheet	32 of 67



OVER VOLTAGE

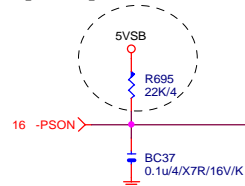


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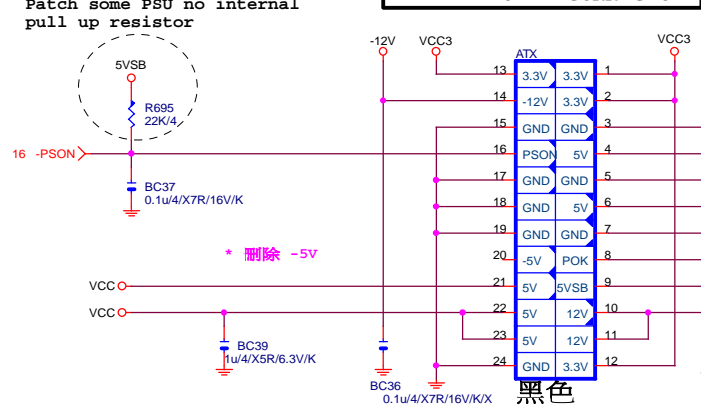
NCT3933	0X2A	0X20	0X22
VREF1	DDRVTT	VREF_DDRA_DQ	PCH Core
VREF2	VREF_DDRA_CA	N/A	VCC1_5_PCH
VREF3	VREF_DDRA_CA	VREF_DDRB_DQ	SMREF

Gigabyte Technology			
Title CPU CORE VR-2			
Size Custom	Document Number	GA-X170-Extreme ECC	
Date: Thursday, February 18, 2016		Sheet 34 of 67	Rev 1.0

Patch some PSU no internal pull up resistor



## ATXX24 POWER CONNECTOR

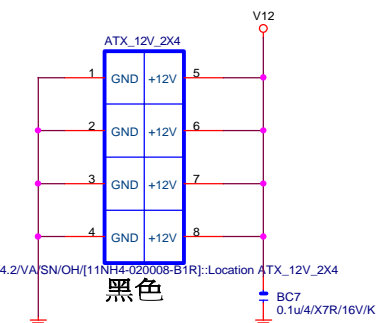


APW/2\*12/BK/VA/SN2SHK/PA66/[11NH4-020024-11R]

To prevent the 5VSB under loading when boot

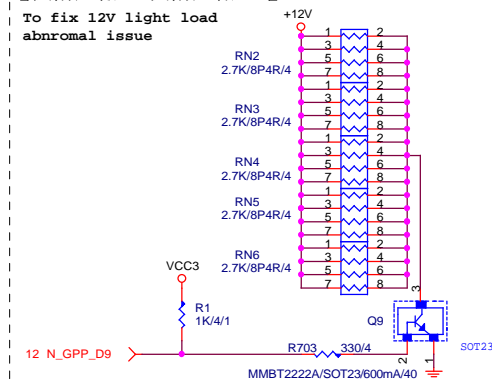
www.forums-fastunlock.com teknisi Indonesia

## ATXX4 POWER CONNECTOR

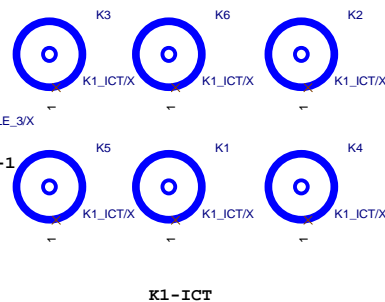
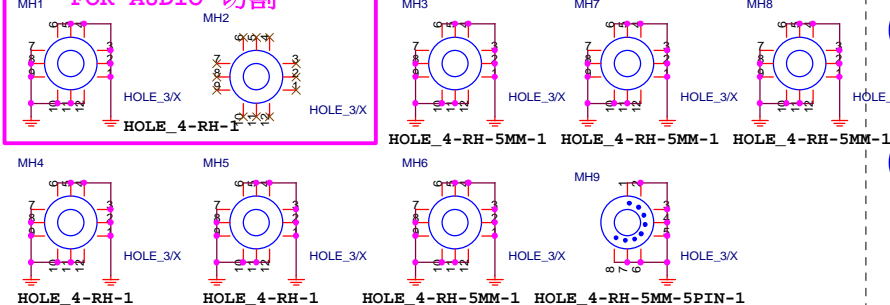


【技術通報R&D技術通報153】

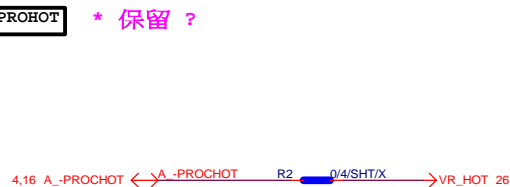
To fix 12V light load abnormal issue



## FOR AUDIO 切割

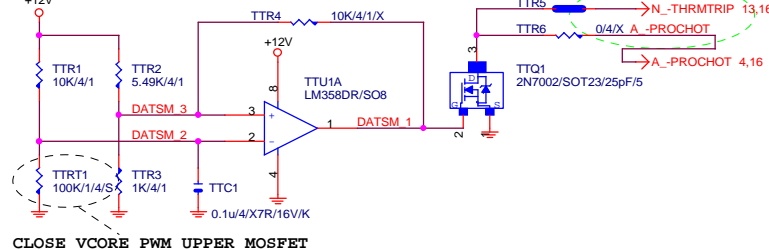


-PROHOT \* 保留 ?



-PROHOT

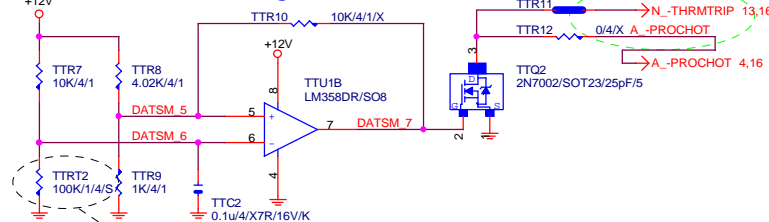
OTP:130度 / PCB THERMAL TRIP:128 度  
125 ~130degree assert



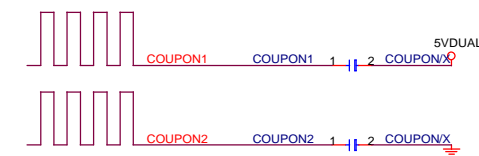
CLOSE VCORE PWM UPPER MOSFET

-PROHOT

OTP:130度 / PCB THERMAL TRIP:129 度  
125 ~130degree assert

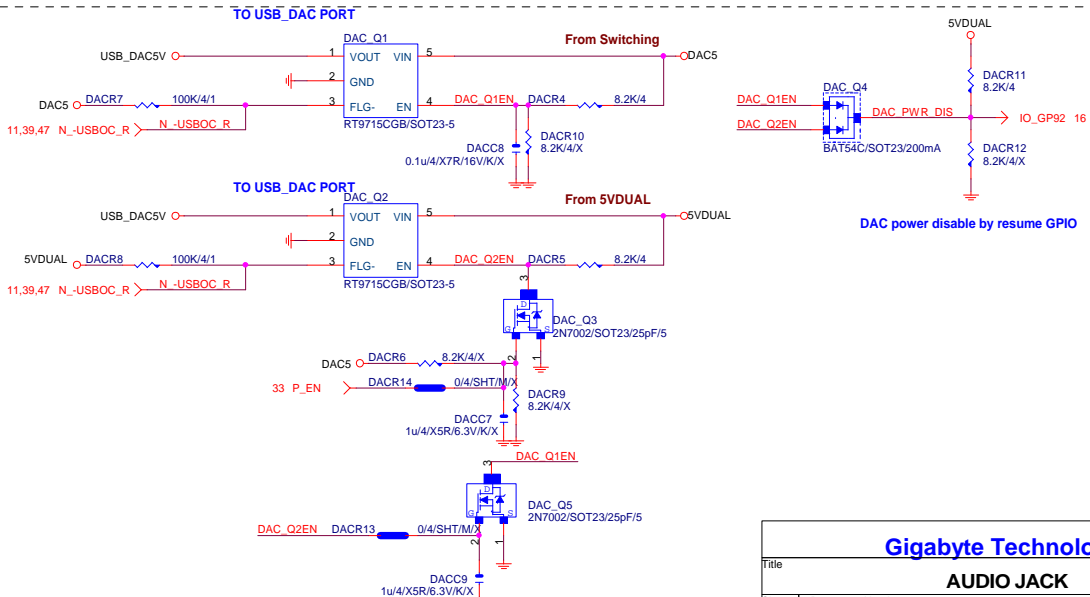
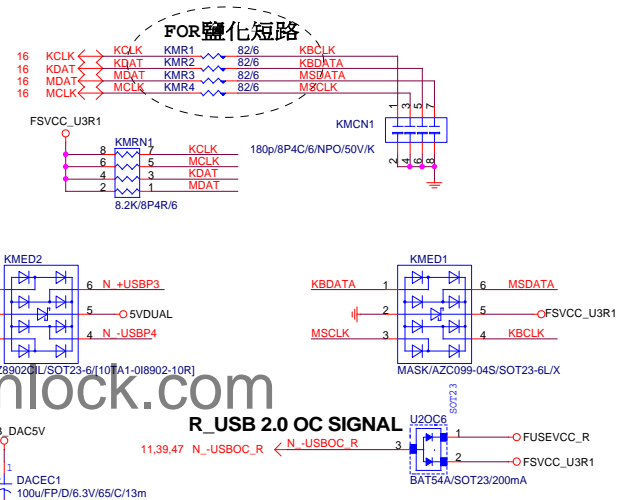


CLOSE VCCGT PWM UPPER MOSFET

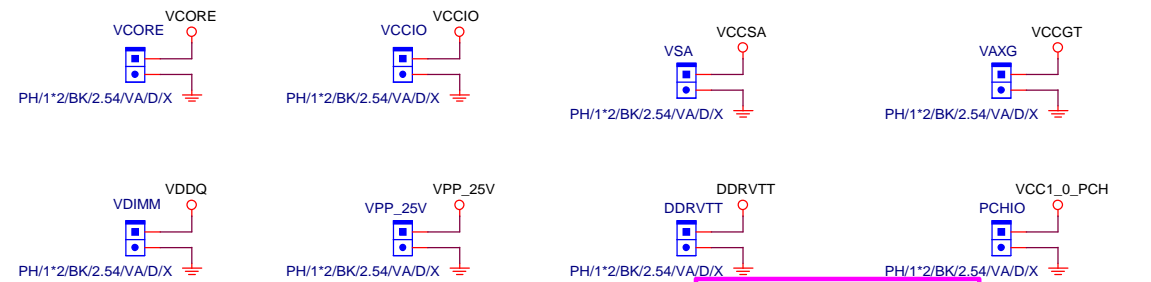


Gigabyte Technology

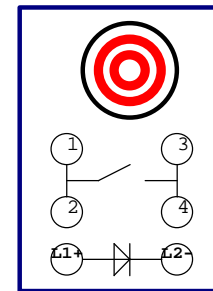
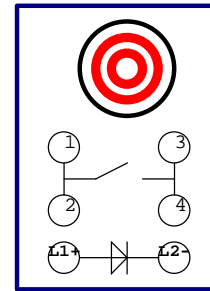
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ATX POWER CONNECTOR	
Size	Document Number
Custom	GA-X170-Extreme ECC1.0
Date:	Rev
Thursday, February 18, 2016	1.0
Sheet	of
35	67



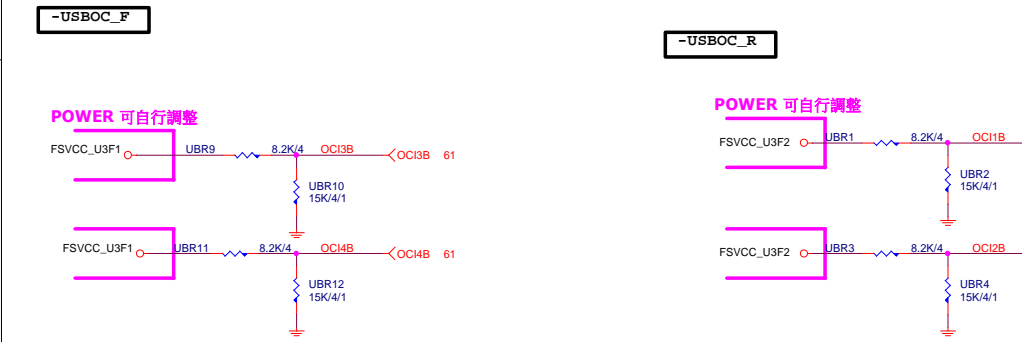
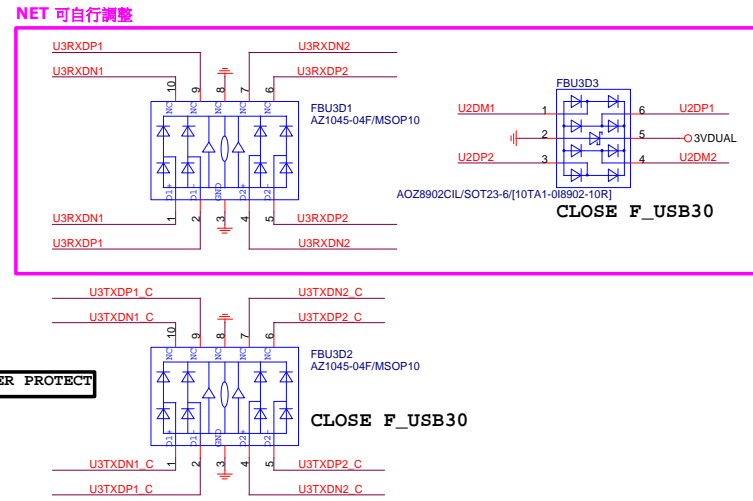
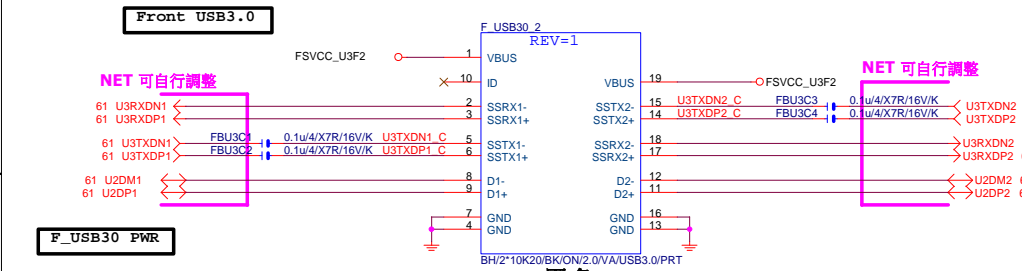
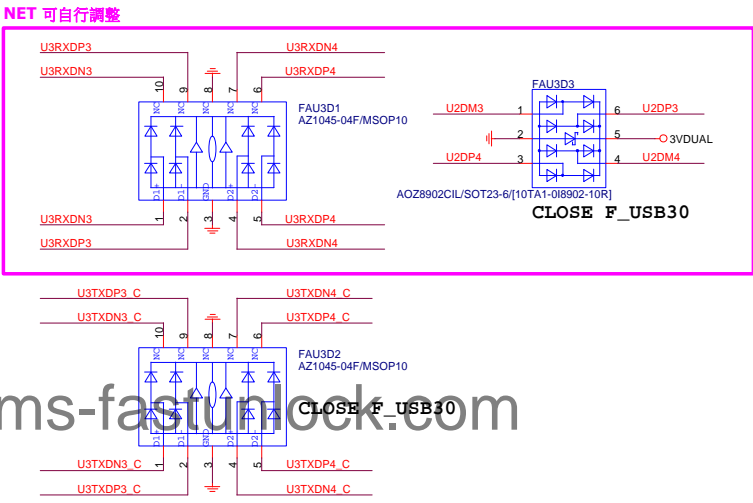
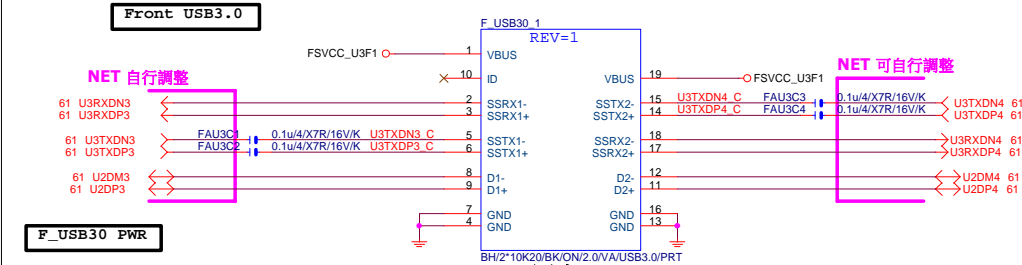
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<h2 style="text-align: center;">AUDIO JACK</h2>			
Size Custom	Document Number	<h1 style="text-align: center;">GA-X170-Extreme ECC</h1>	
Date:	Thursday, February 18, 2016	Sheet	36 of 67

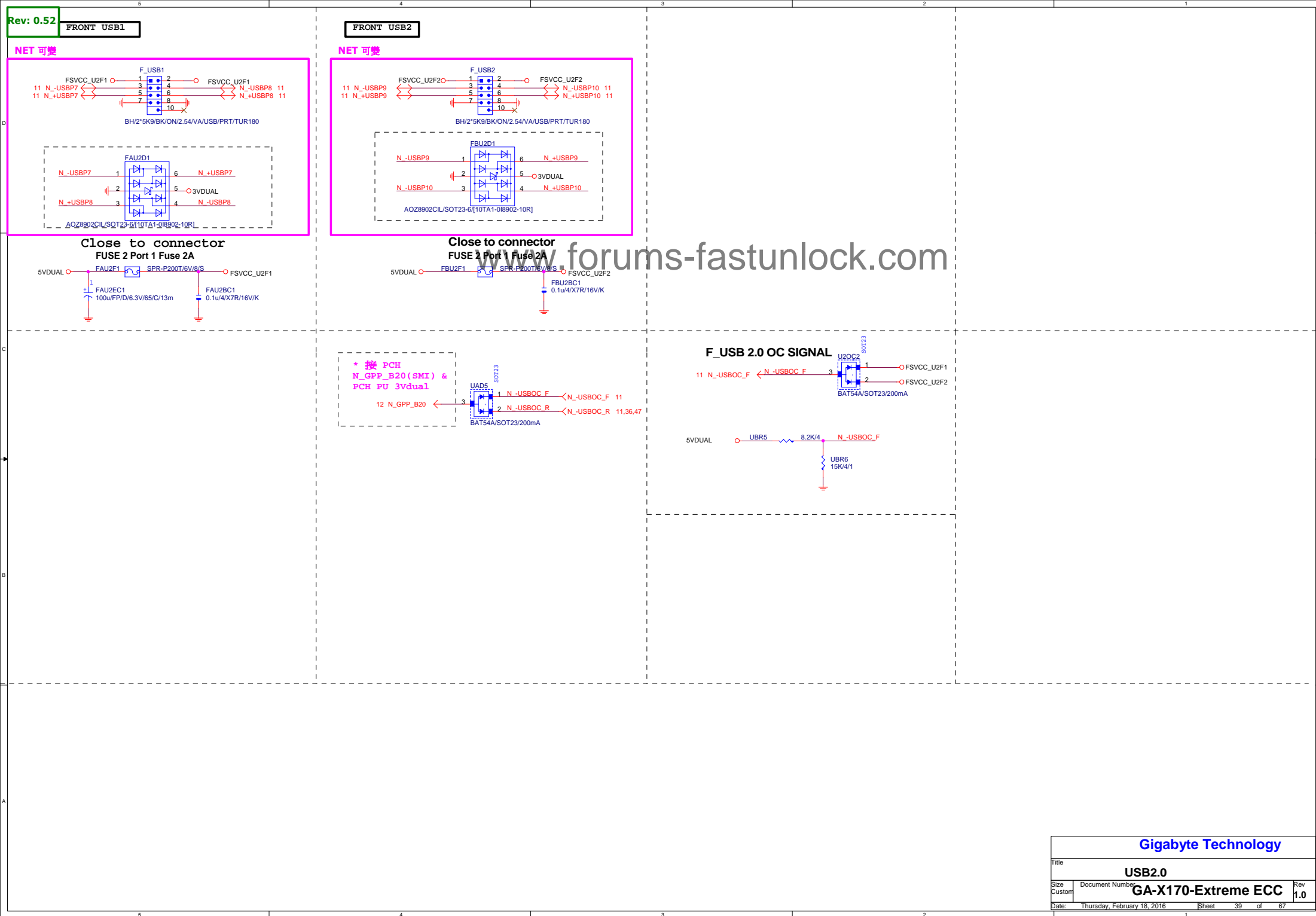


footprint : Mask



<b>Gigabyte Technology</b>			
Title			
<b>OC BOTTOM</b>			
Size	Document Number	Rev	
Custom	<b>GA-X170-Extreme ECC</b>	<b>1.0</b>	
Date:	Thursday, February 18, 2016	Sheet	37 of 67



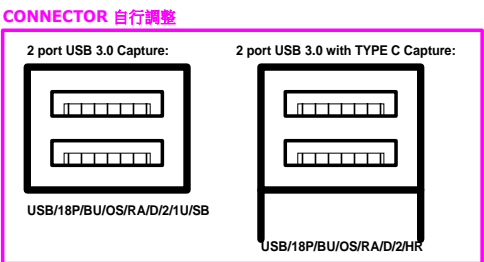
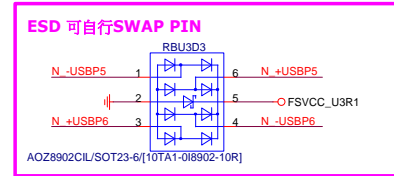
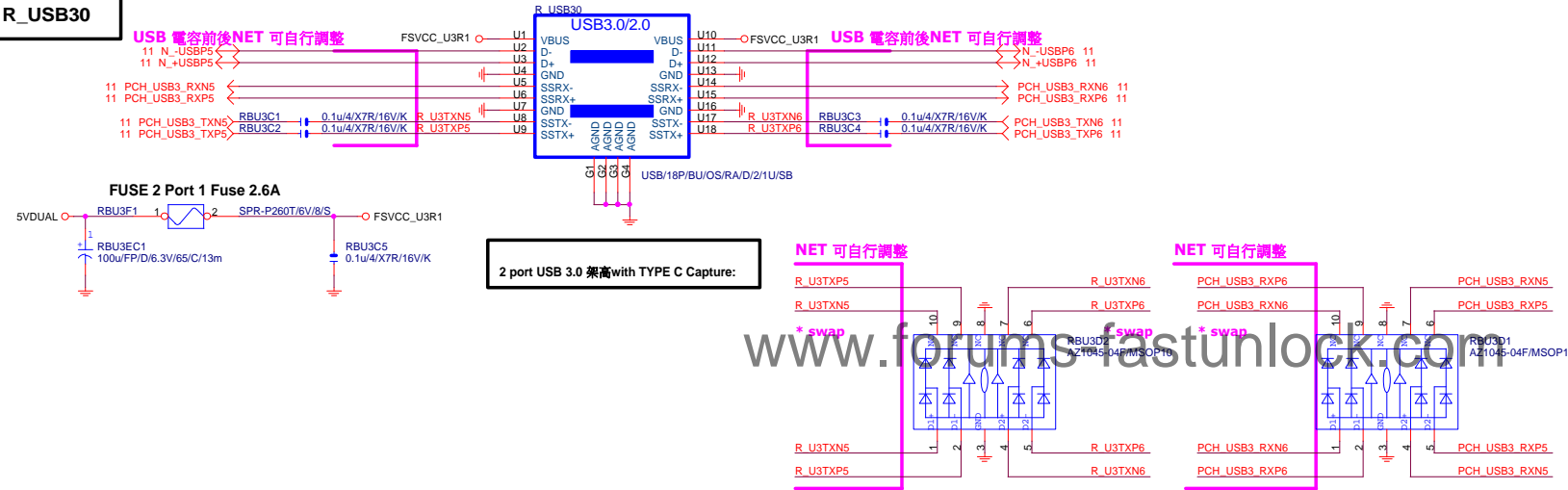


Gigabyte Technology

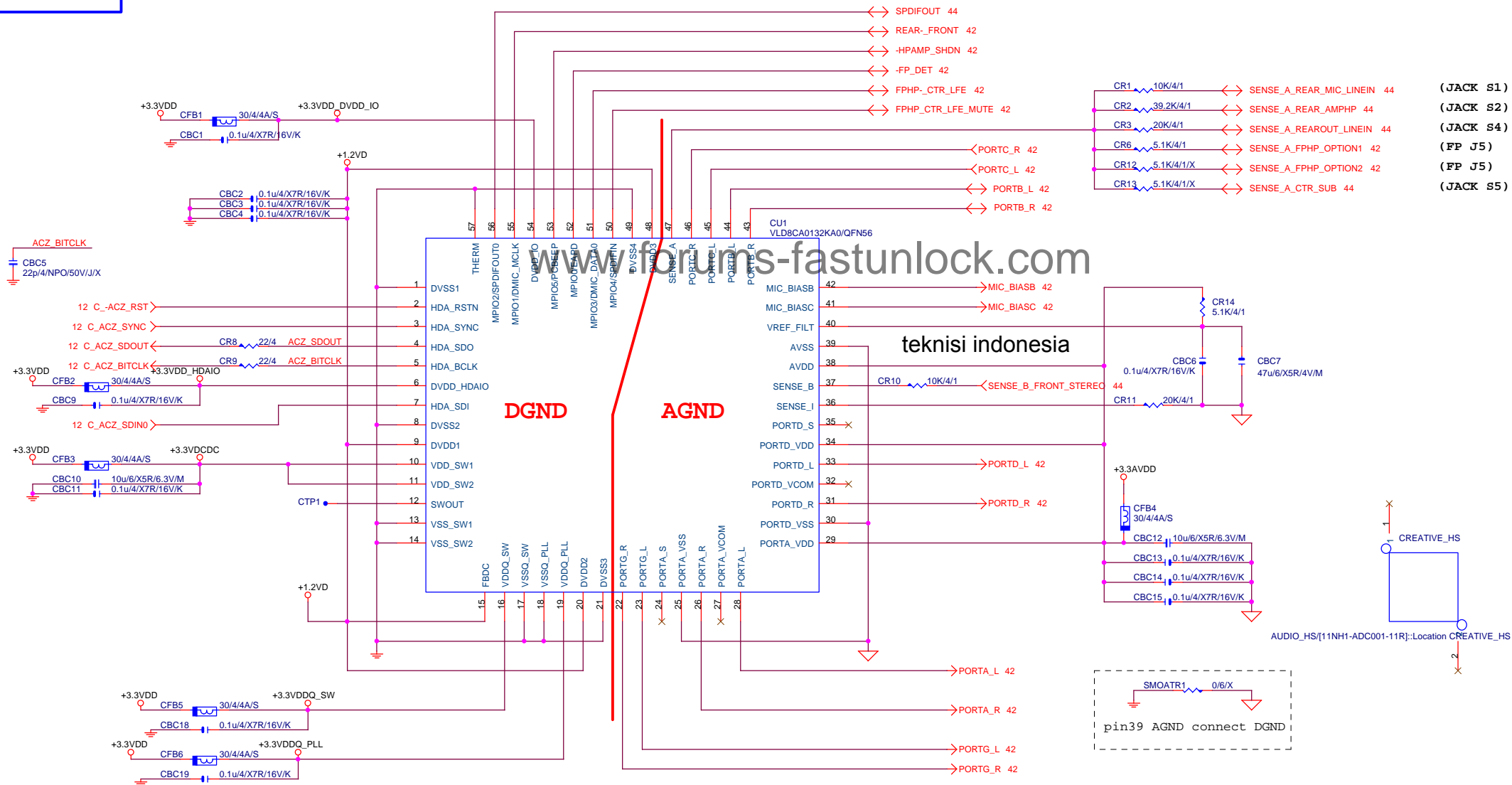
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Size	Document Number	GA-X170-Extreme ECC	
Custom	Date	Thursday, February 18, 2016	Sheet 39 of 67

Rev 1.0

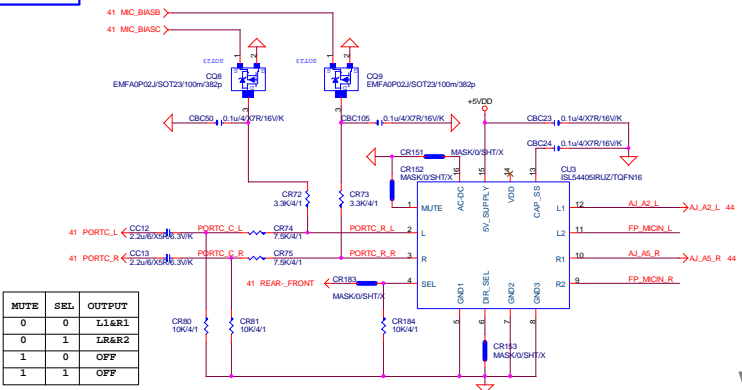
R\_USB30



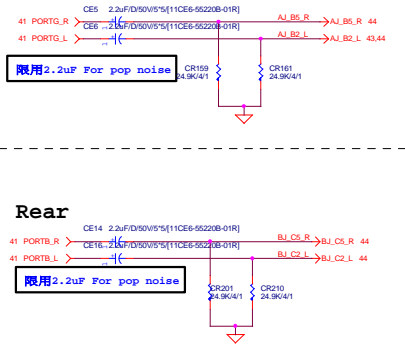
Gigabyte Technology			
Title		KB_MS_USB3, R_USB30	
Size	Document Number	Rev	
Custom	GA-X170-Extreme ECC	1.0	
Date:	Thursday, February 18, 2016	Sheet	40 of 67
2		1	



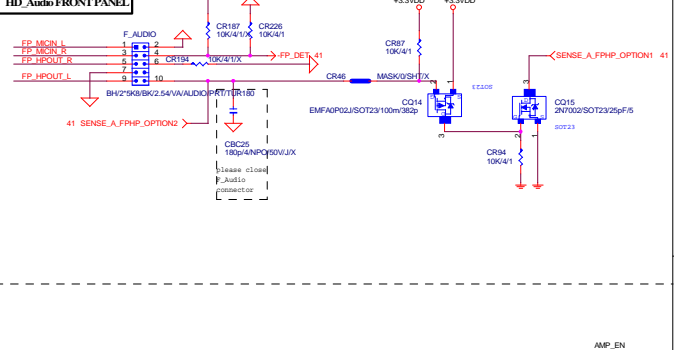
Rear MIC & FP MIC



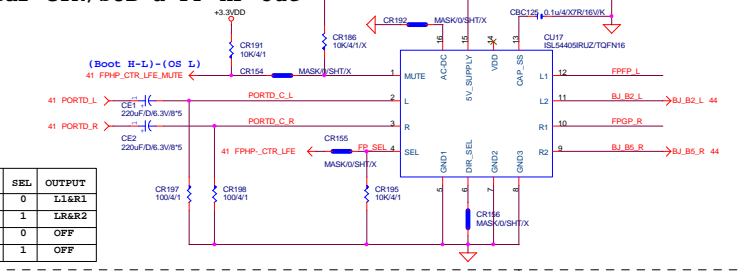
Line-Out



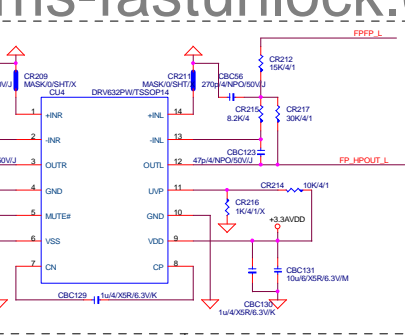
HD Audio FRONT PANEL



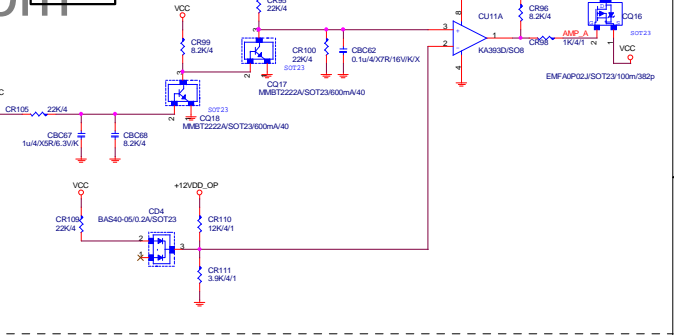
Rear CTR/SUB & FP HP-Out



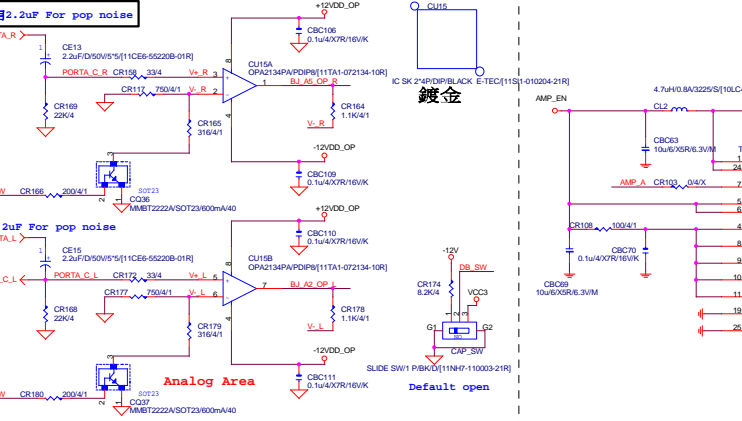
Rear



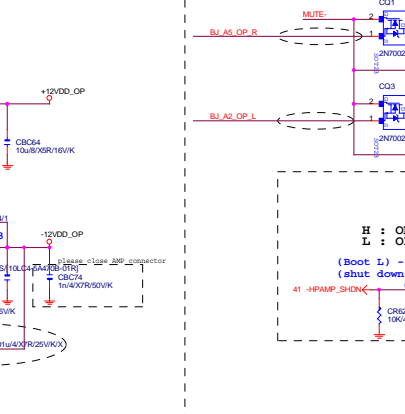
防浪涌保護



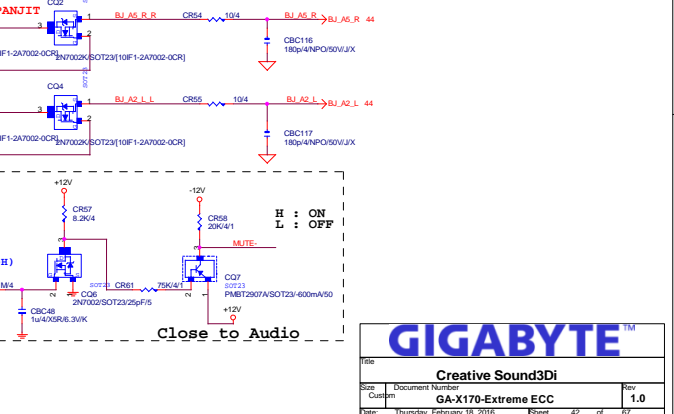
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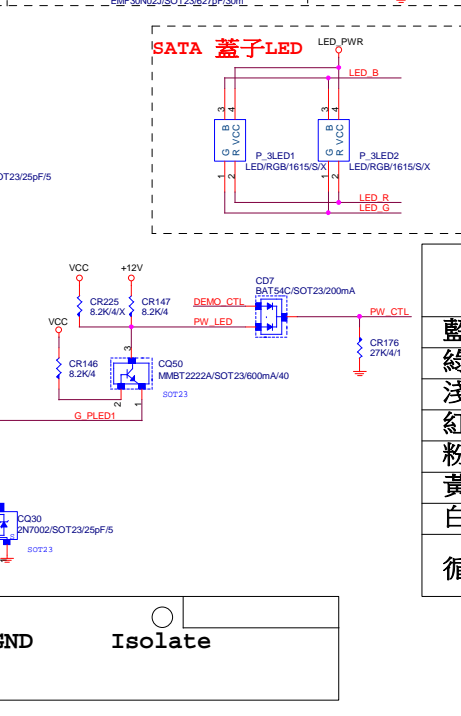
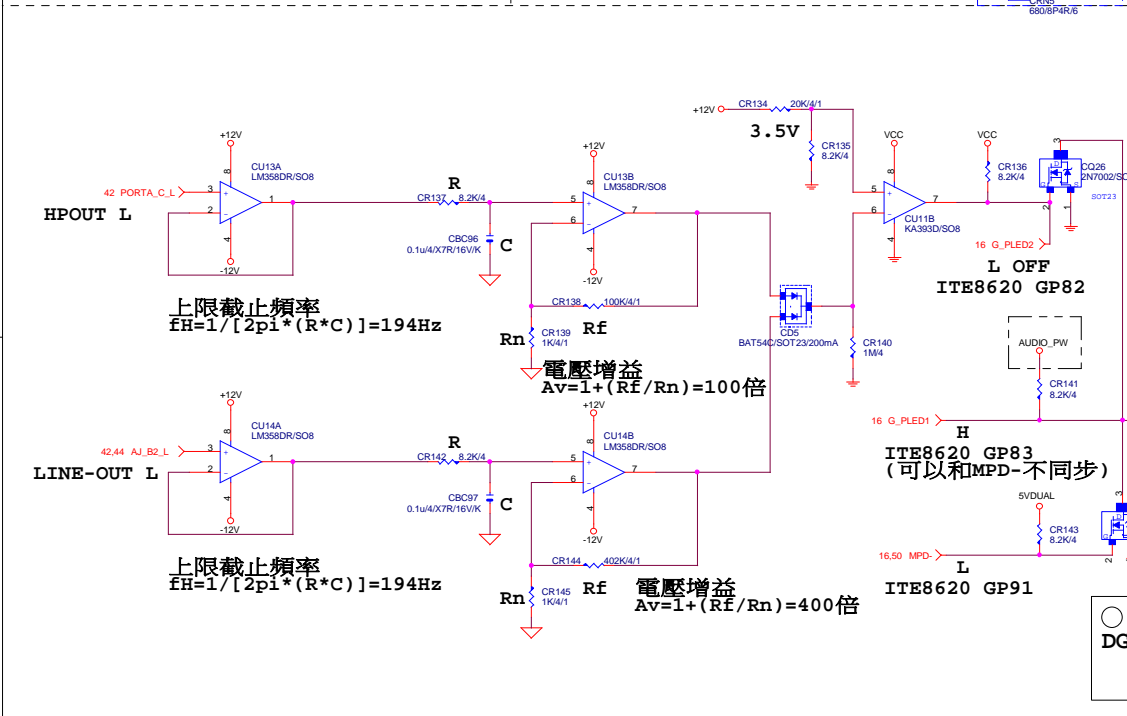
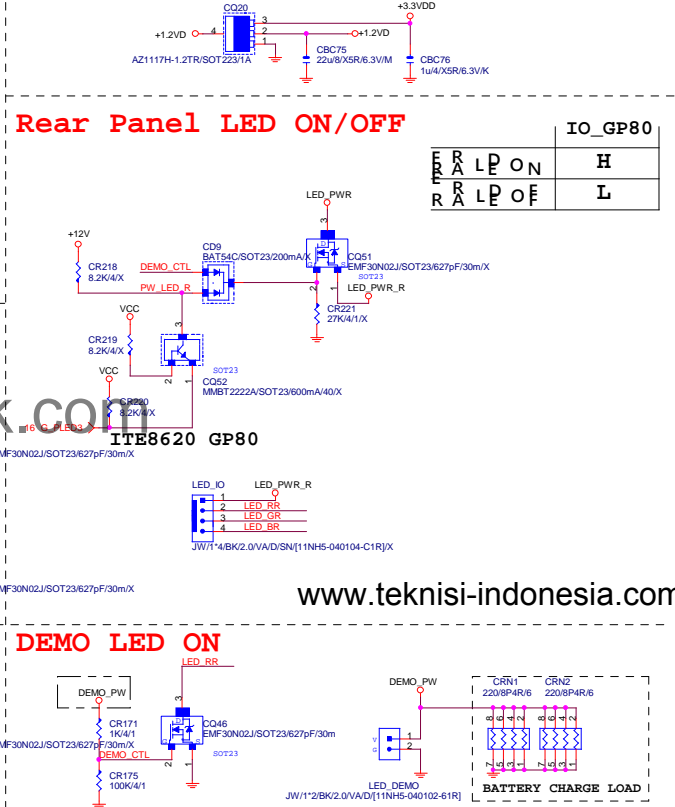
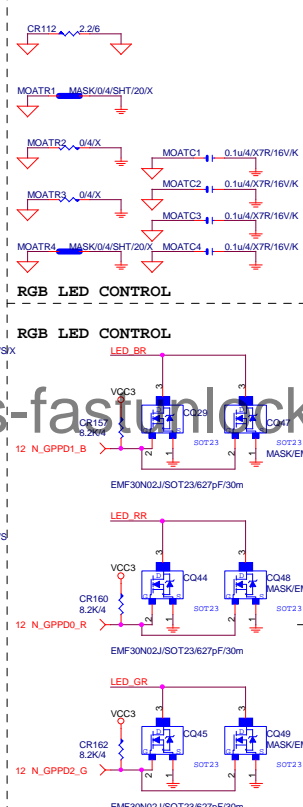
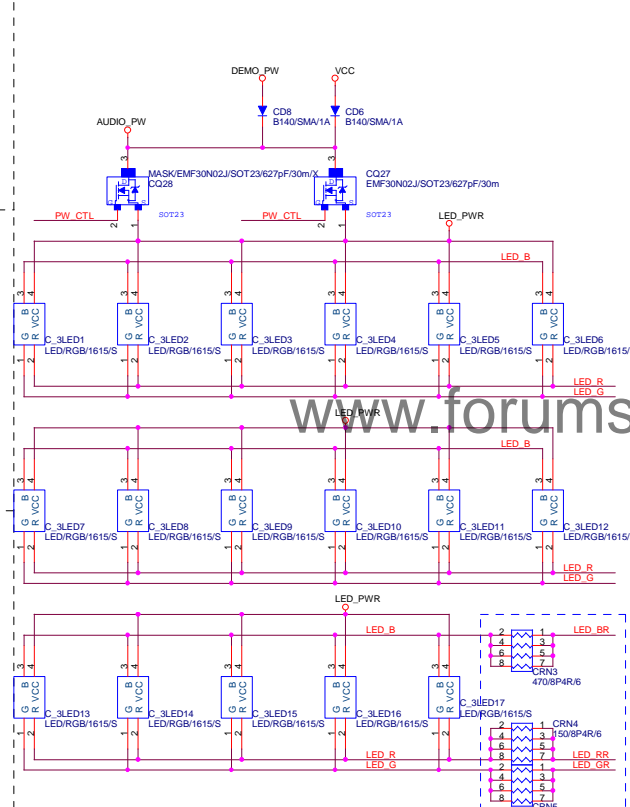
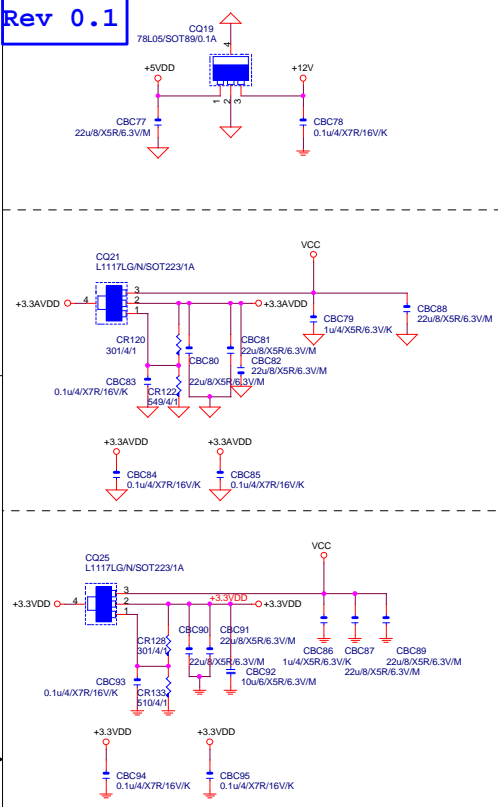


鍍金



限用PANJIT

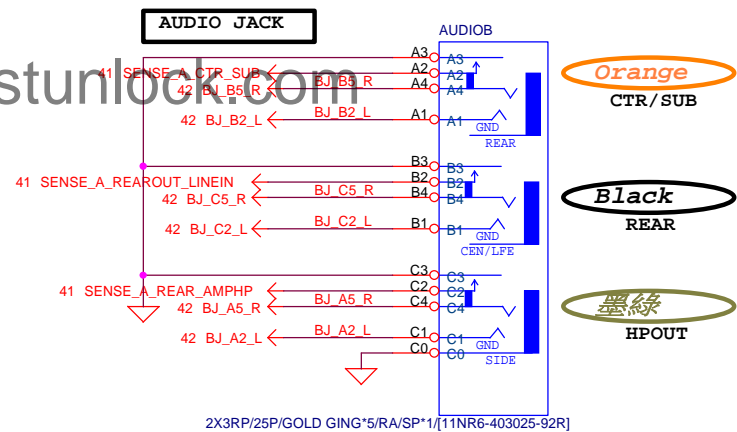
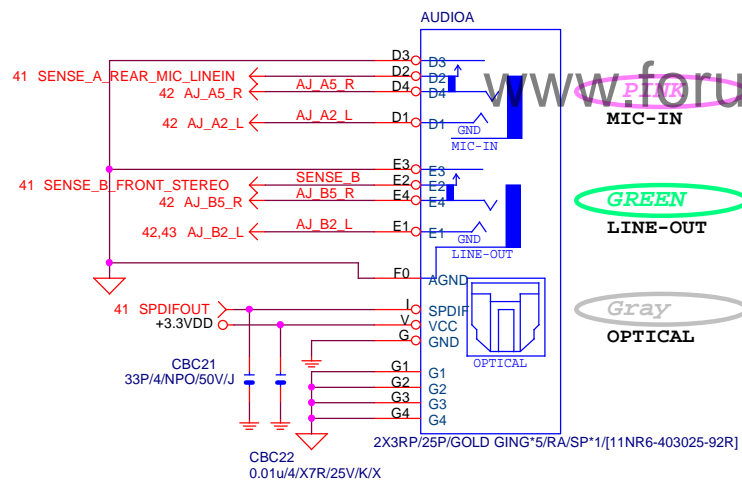




AUDIO LED Control			
	IO GP82	IO GP83	IO GP91
Limit	L	H	L
OFF Mode	L	L	L
Pluse Mode	L	H	BREATH
Beat Mode	OD	H	L

三色 LED Control			
	PCH_GPP_D0(R_PCH_GPP_D2(G_PCH_GPP_D1(B		
藍	L	L	H
綠	L	H	L
淺綠	L	H	H
紅	H	L	L
粉紅	H	L	H
黃	H	H	L
白光	H	H	H
循環	順序: 藍-綠-淺綠-紅-粉紅-黃-白光切換間隔時間為 1 秒		

**Gigabyte Technology**

Title

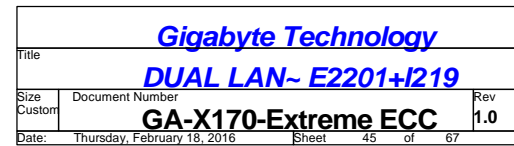
**Creative Sound3Di ZxR**Size  
Custom

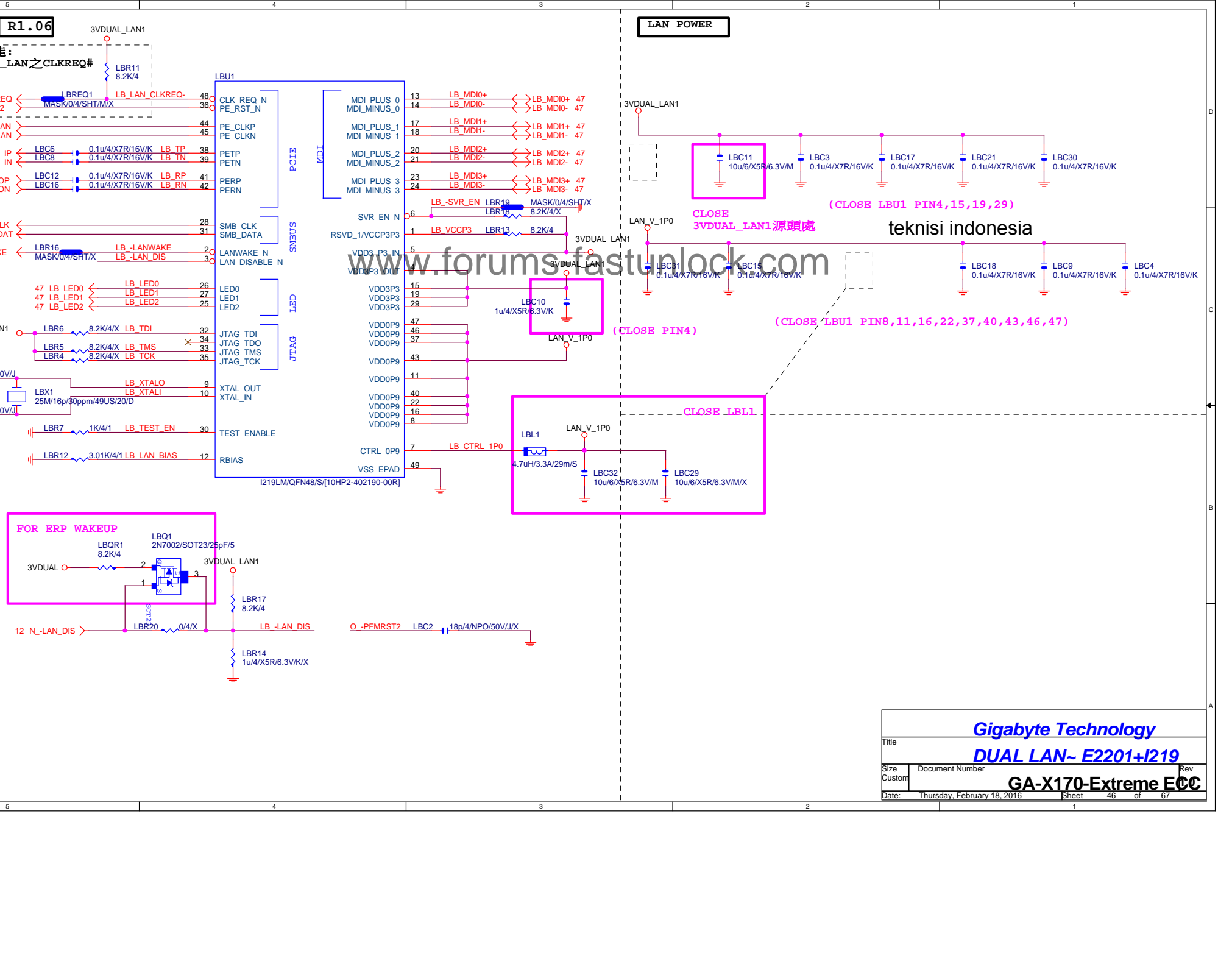
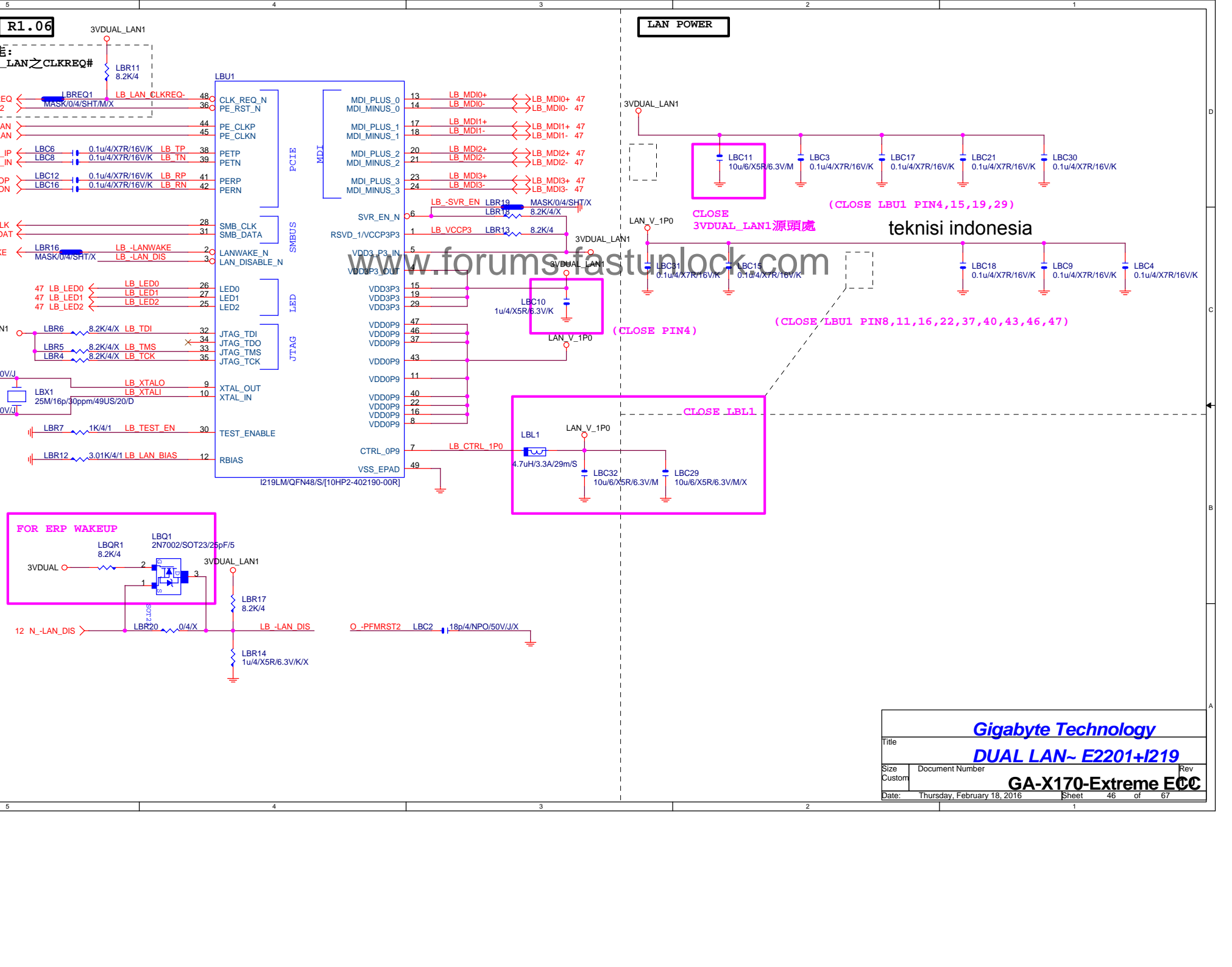
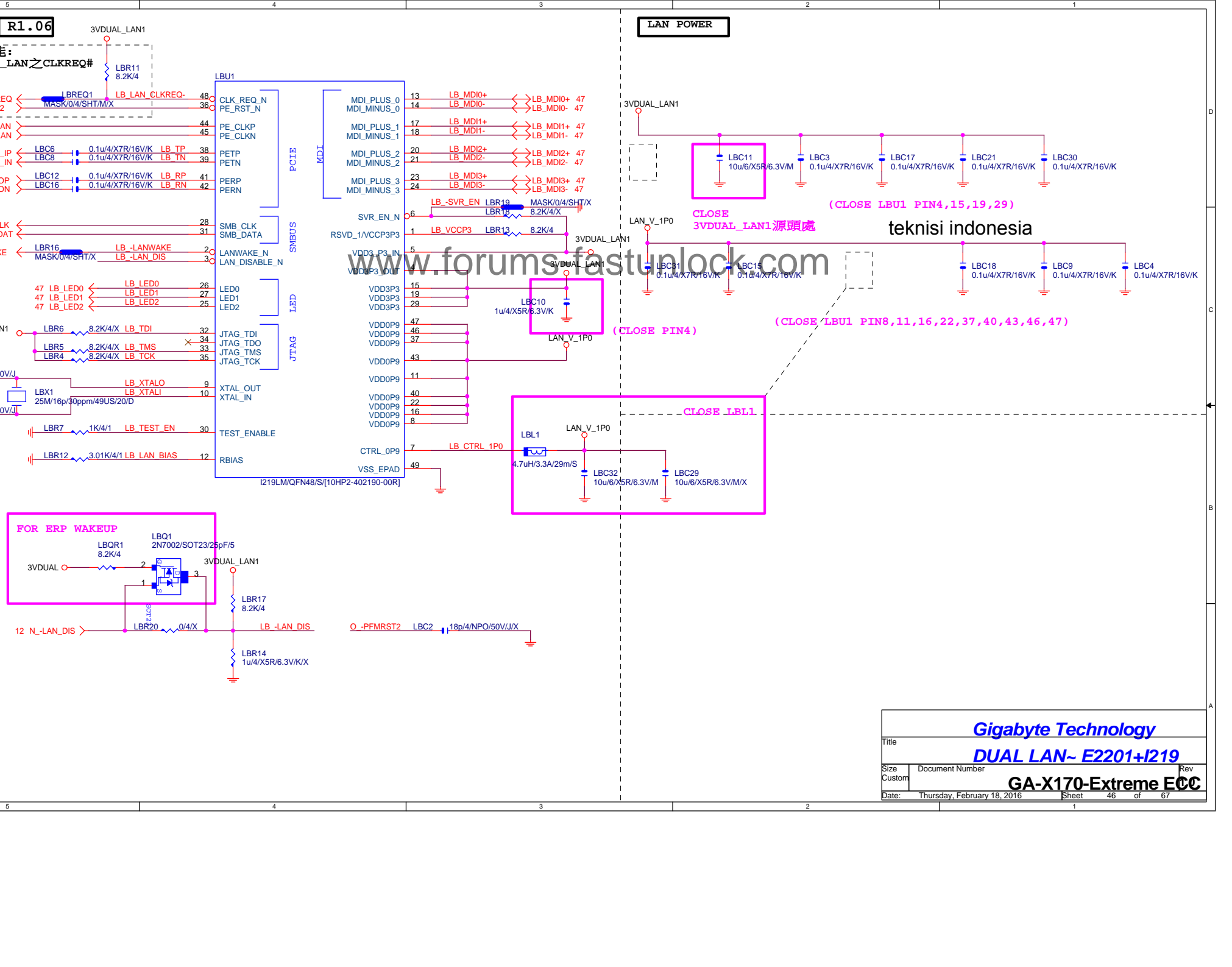
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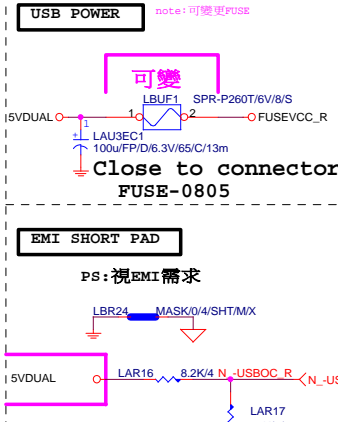
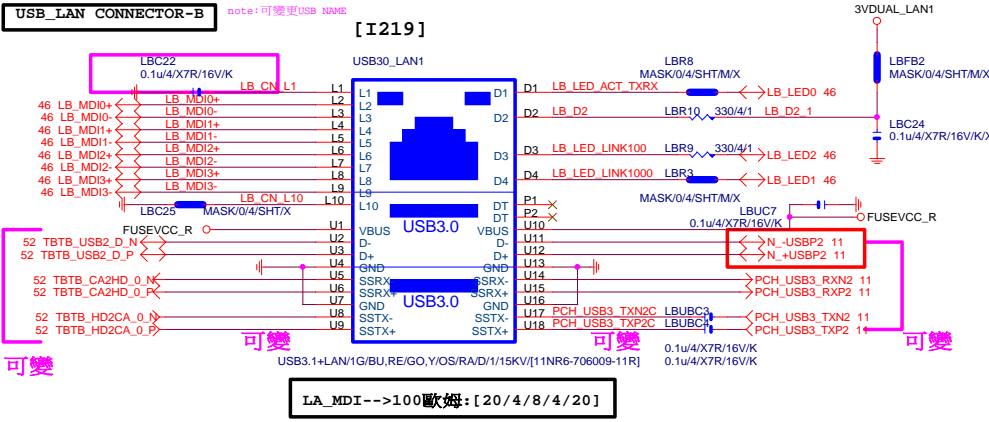
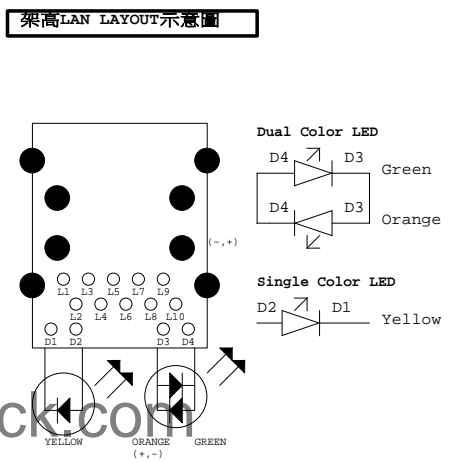
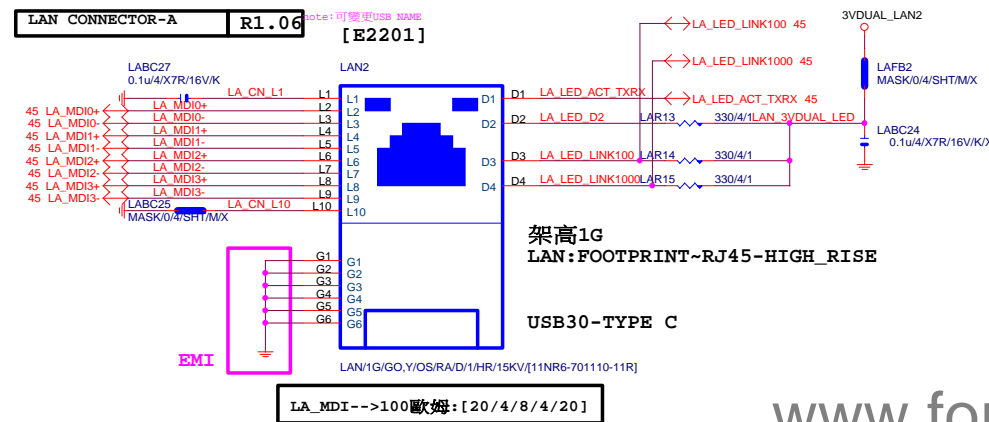
**GA-X170-Extreme ECC**Rev  
1.0

Date: Thursday, February 18, 2016

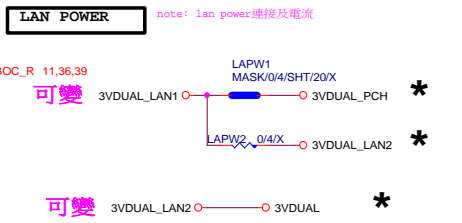
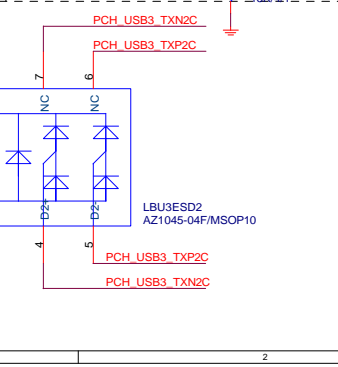
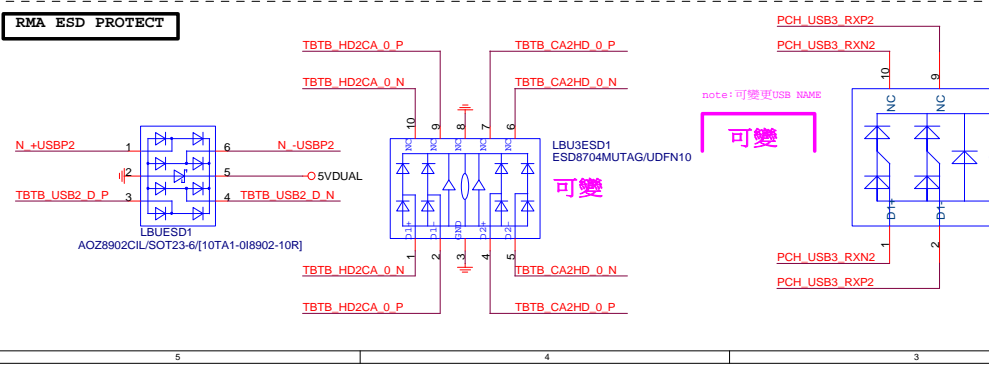
Sheet 44 of 67







- NOTE:**
- 3VDUAL\_LAN1, 3VDUAL\_LAN2 對接POWER供應電流 [目前暫接3VDUAL]
  - USB2.0/3.0對應USB PORT [目前暫接USB 0,1,2,3 PORT]
  - USB DROOP/DROP E-CAP
  - USB OC線路



~USB30\_LAN1設定在ERP可LAN WAKEUP

~USB30\_LAN2由獨立LAN POWER L1117供給

**Gigabyte Technology**

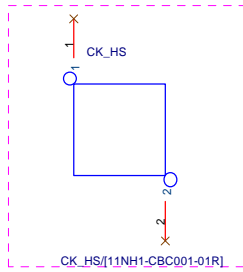
**LAN CONNECTOR-E2201+I219**

Size Custom Document Number Rev

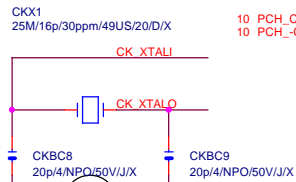
**GA-X170-Extreme ECC**

Date: Thursday, February 18, 2016 Sheet 47 of 67

REV:1.07A



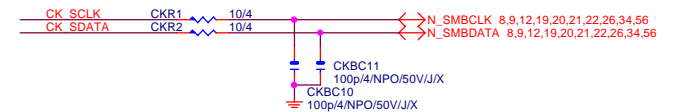
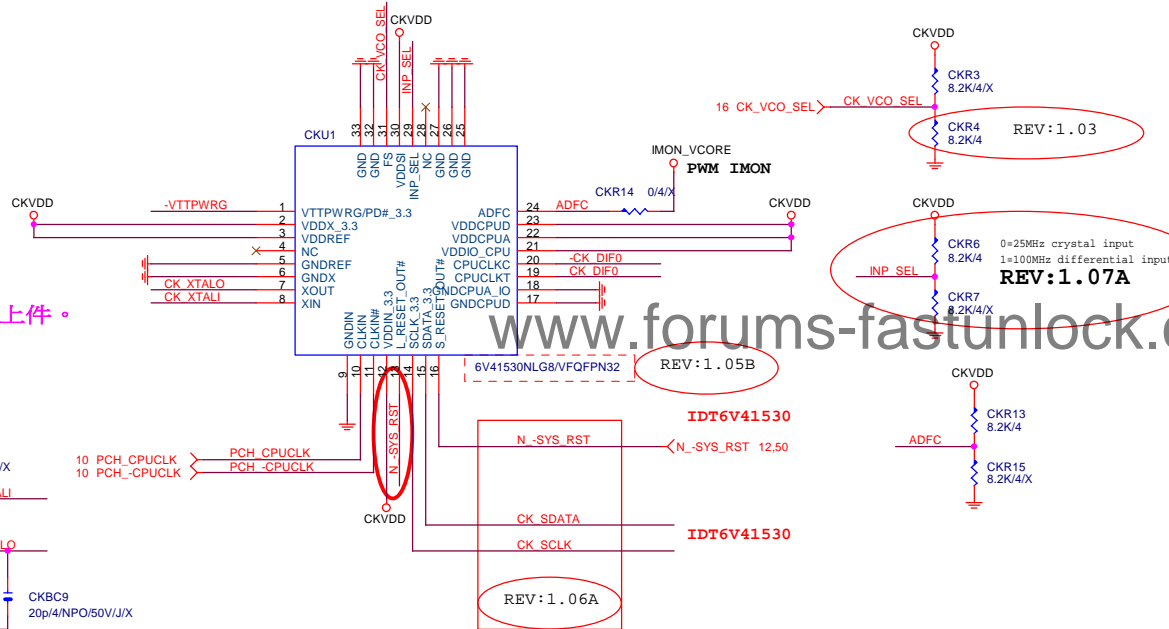
\*可變，依需求上件不上件。



電容共用GND,降低JITTER

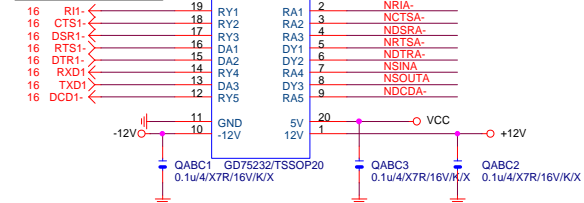
INP_SEL	Input
0	Crystal
1	CLK_INP/N

CK_VCO_SEL	VCO
0	400M
1	1200M

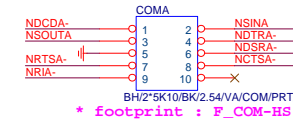


GIGABYTE™			
Title IDT6V41510_CLK BUFFER			
Size Custom	Document Number GA-X170-Extreme ECC		Rev 1.0
Date: Thursday, February 18, 2016	Sheet 48	of 67	

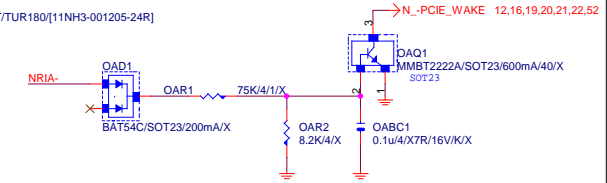
COM PORT



COMA

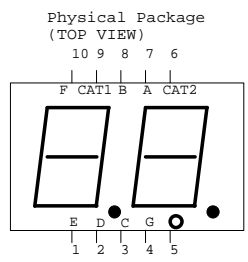
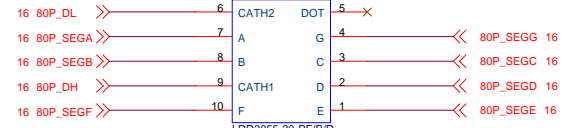
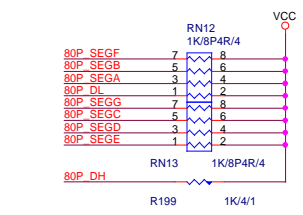


\* 接 N\_-PCIE\_WAKE

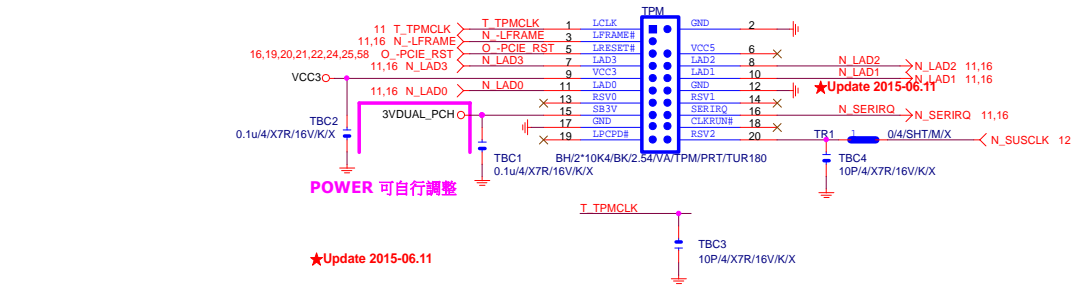


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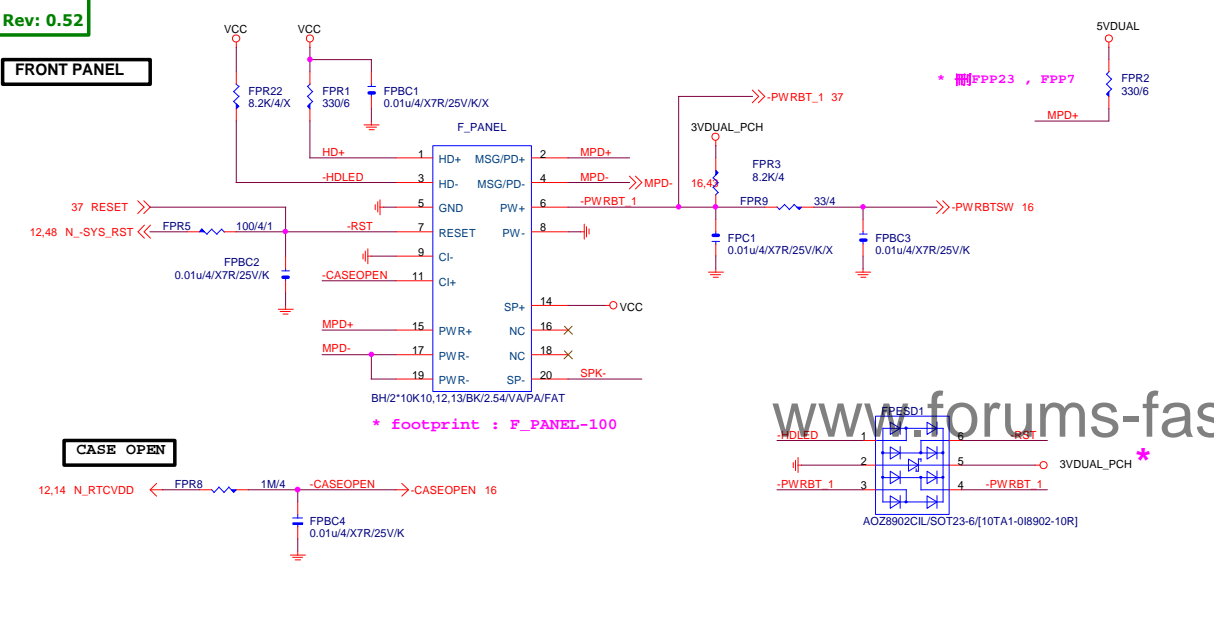
80 PORT



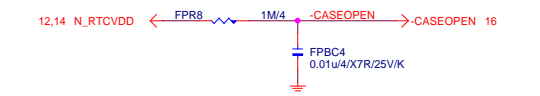
TPM CONNECT



FRONT PANEL



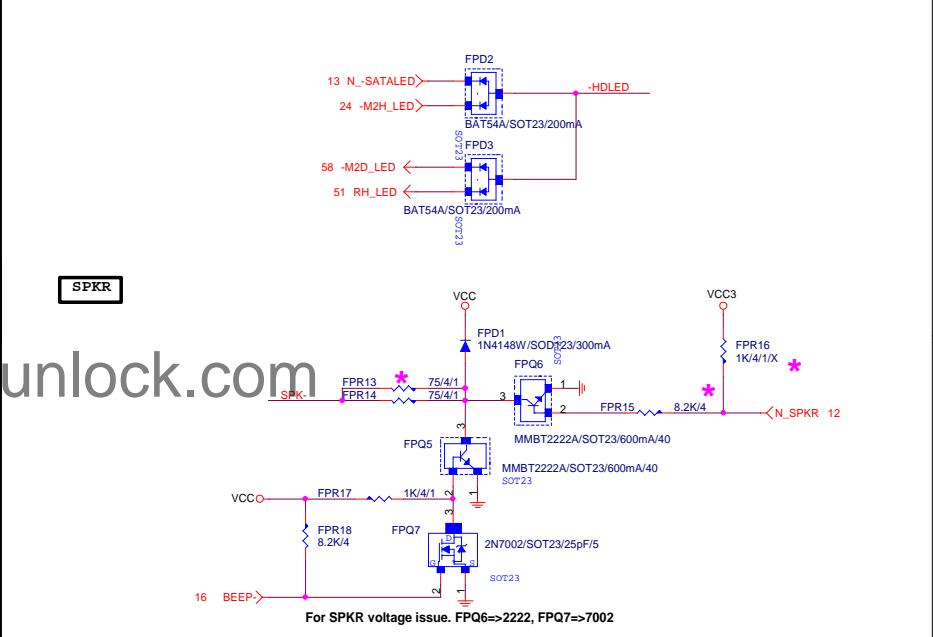
CASE OPEN

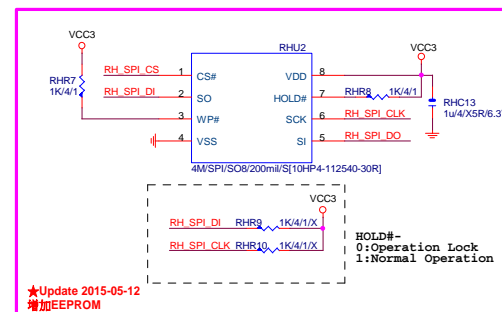
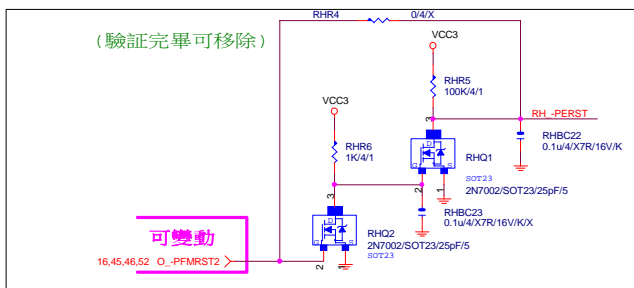
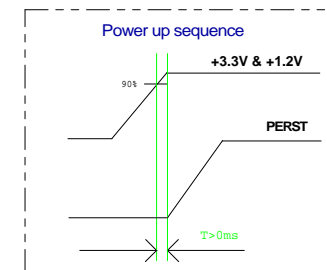
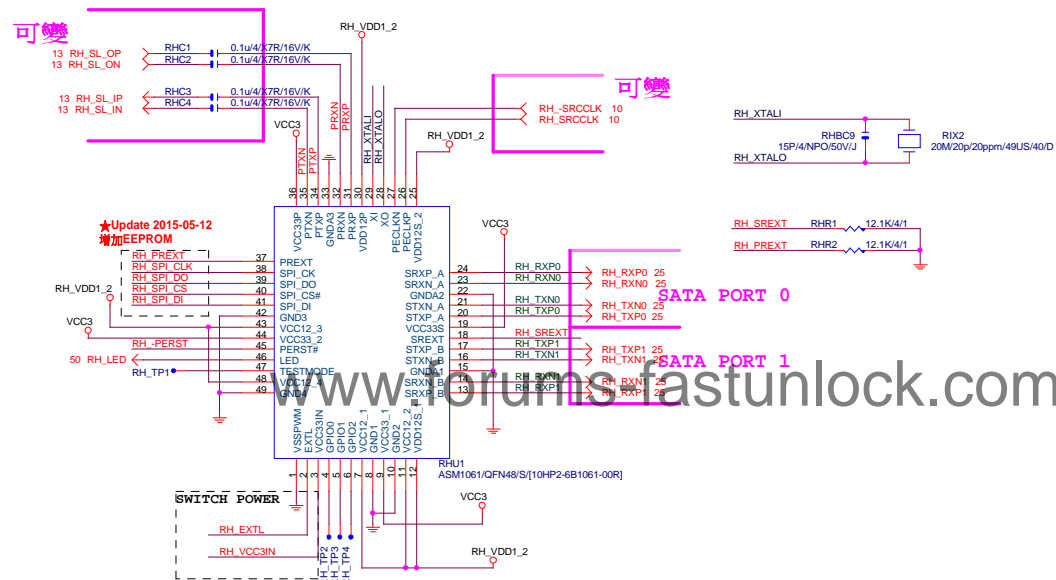
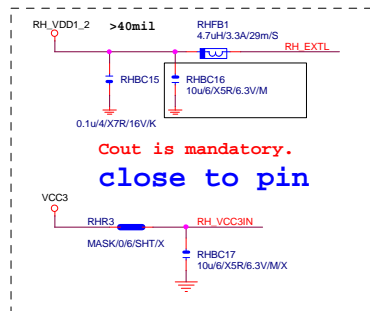
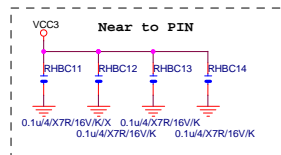
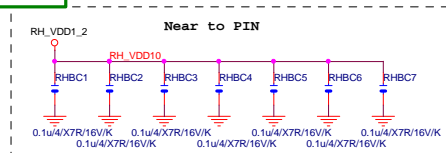


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SATA LED SATALED# signal open-collector,pull-up (8.2 kΩ to 10 kΩ) to Vcc3\_3

SPKR





H/W Strapping

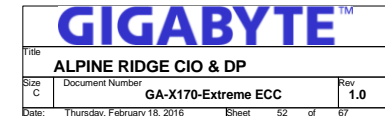
refer to datasheet:

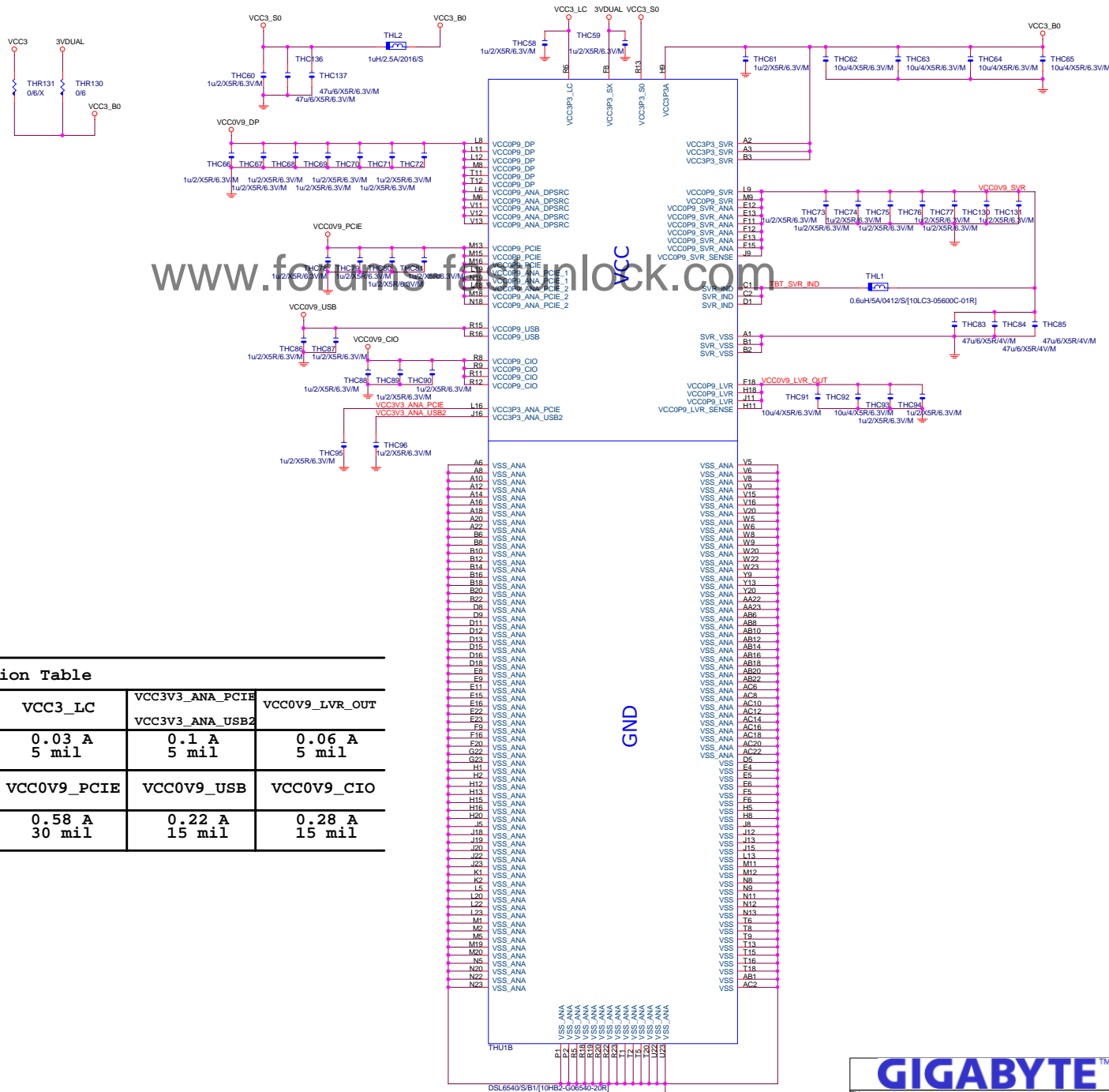
RH\_SPI\_DO RHR16 1K/4/1/X

SPI\_DO

0: Spin up by H/W

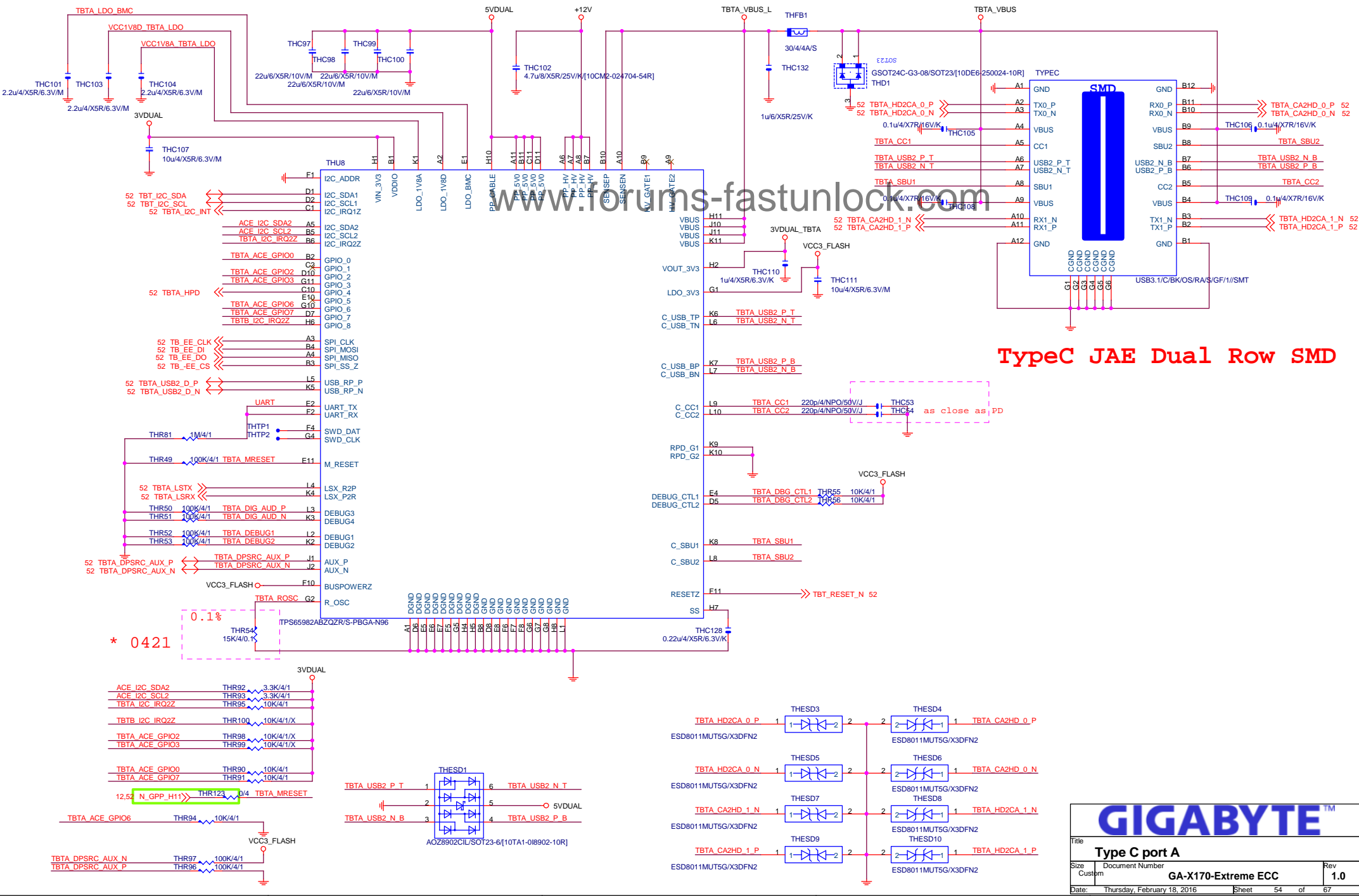
1: Spin up by S/W





Power Consumption Table

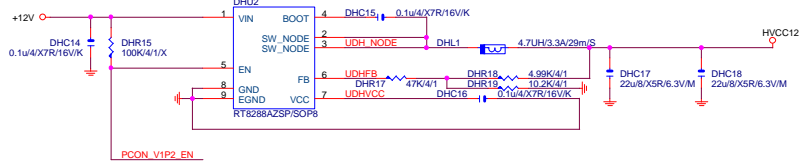
	VCC3	3VDUAL	VCC3_LC	VCC3V3_ANA_PCIE	VCC0V9_LVR_OUT
Max Current(A)	1.05 A 40 mil	0.19 A 10 mil	0.03 A 5 mil	0.1 A 5 mil	0.06 A 5 mil
	VCC0V9_SVR	VCC0V9_DP	VCC0V9_PCIE	VCC0V9_USB	VCC0V9_CIO
Max Current(A)	1.83 A 80 mil	0.7 A 30 mil	0.58 A 30 mil	0.22 A 15 mil	0.28 A 15 mil



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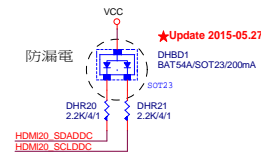
<b>GIGABYTE™</b>			
Title <b>TBT _ HDMI 2.0</b>			
Size	Document Number		Rev
Custom	<b>GA-X170-Extreme ECC</b>		<b>1.0</b>
Date:	Thursday, February 18, 2016	Sheet 55 of 67	



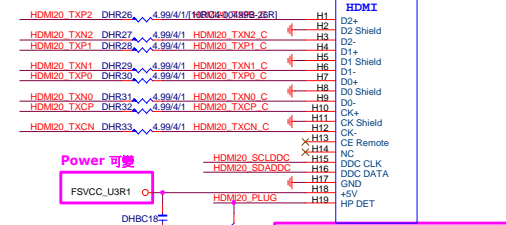
## PCH端

10 N\_DOPC\_CTRLCLK <-> N\_DOPC\_CTRLCLK DHR23 2.2K/4/1 VCC3  
10 N\_DOPC\_CTRLDATA <-> N\_DOPC\_CTRLDATA DHR24 2.2K/4/1 VCC3

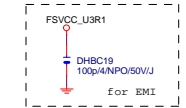
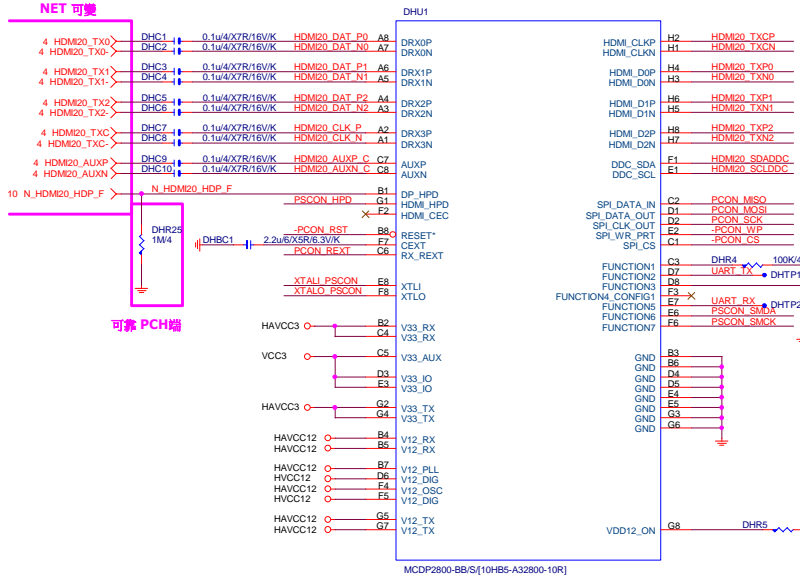
www.forums-fastunlock.com



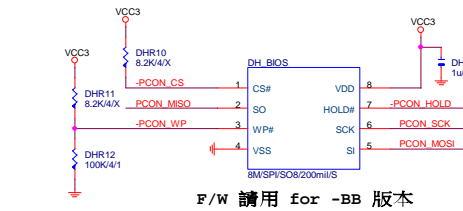
## Display Port with HDMI, or HDMI only.



橫躺式/直立式 可自行調整

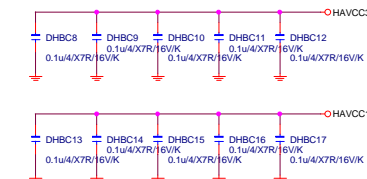
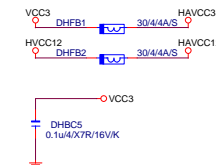
需設定為DP Port  
NET 可變

可靠 PCH端



F/W 請用 for -BB 版本

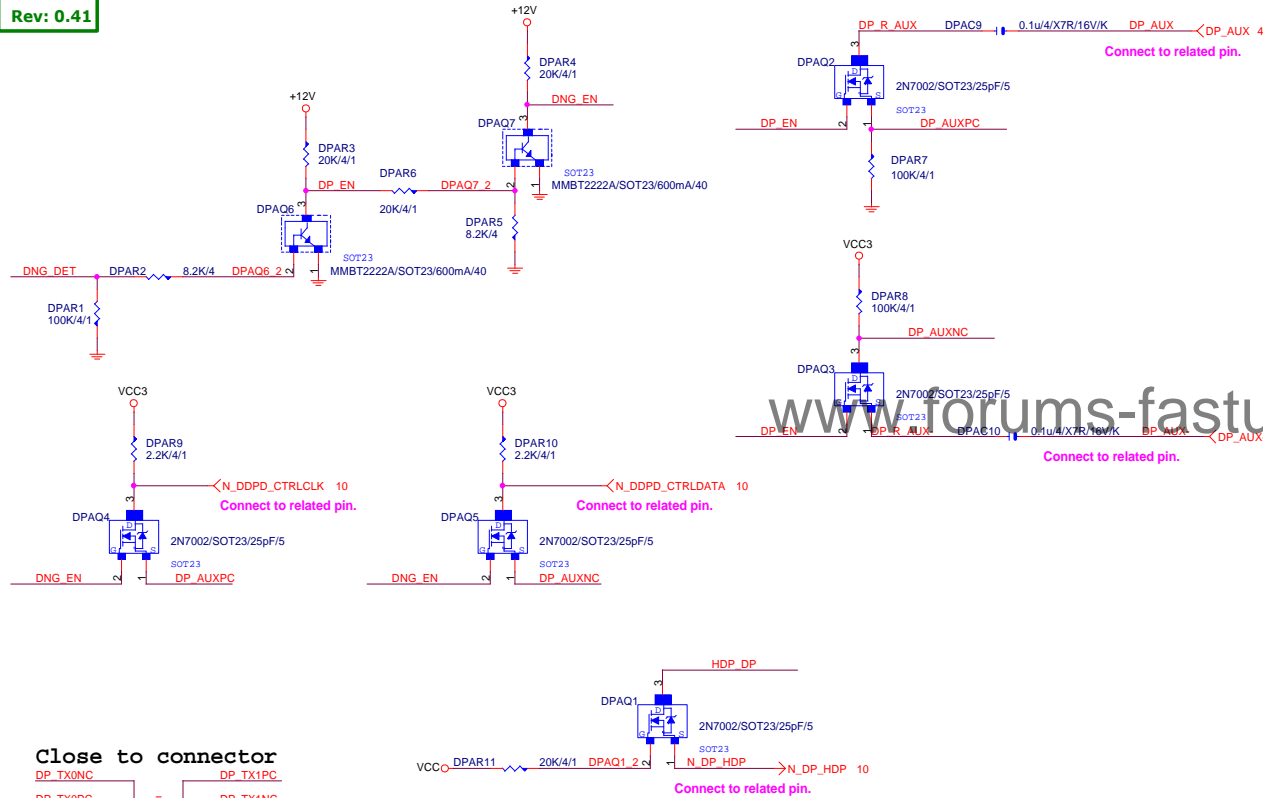
PCON\_SMDA DHR8 0/4/X <-> N\_SMBDATA 8.9,12,19,20,21,22,26,34,48  
PCON\_SMCK DHR8 0/4/X <-> N\_SMBCLK 8.9,12,19,20,21,22,26,34,48



Gigabyte Technology

HDMI20 MCDP2800-BA		
Size	Document Number	Rev
C	GA-X170-Extreme ECC	1.0
Date:	Thursday, February 18, 2016	Sheet 56 of 67

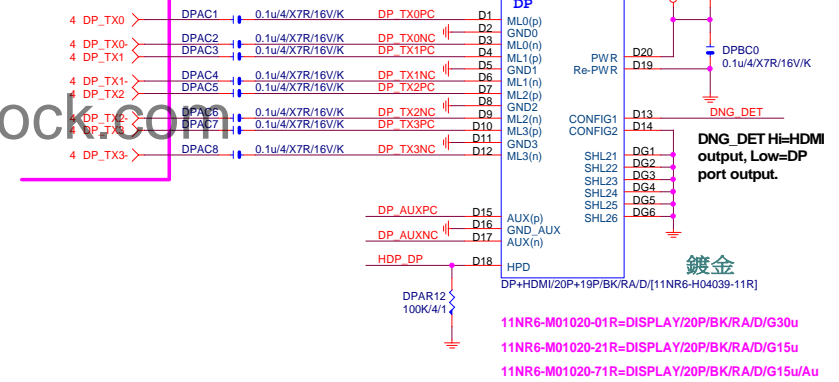
X'TAL 25MHz須參考GND  
CRYSTAL/TRACE  
週邊不要有訊號,VIA靠近  
走線遠離其他40mil以上



## SINGLE Display Port

Display Port with HDMI, or HDMI only.

NET FROM CPU 可變

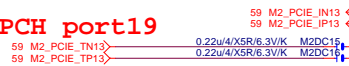


DP

GIGABYTE

Title			
DP PORT			
Size	Document Number	Rev	
Custom	GA-X170-Extreme ECC	1.0	
Date:	Thursday, February 18, 2016	Sheet	57 of 67

## M.2 Lane2 from PCH port19



## M.2 Lane2 from PCH port20



## M.2 Lane3 from PCH port21

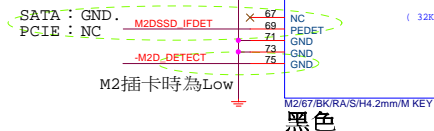
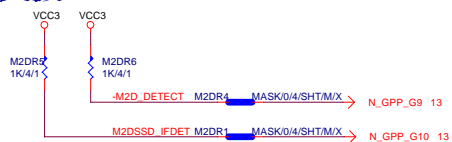


## M.2 Lane4 from PCH port22



需與M2-CLKREQ對應

## 支援SATA and M.2 function



黑色

M.2 有插卡 / 沒插卡	M.2插卡插卡? GPP_G10	SATA Express 插卡插卡? GPP_E0/E1/E2/F0	IO19 (S0)	IO20 (S1)	IO21 (S2)	IO22 (S3)
有插卡 (Low)	SATA Mode (Low)	SATA (Hi)	SATA	SATA	SATA	SATA (For M2)
		SATA Express (Low)	SATA Express (For S.E.0)	SATA	SATA	SATA (For M2)
	PCIE Mode (Hi)	SATA (Hi)		PCIEx4 (For M.2)		
		SATA Express (Low)		PCIEx4 (For M.2)		
沒插卡 (Hi)	Don't Care (Hi)	SATA (Hi)	SATA (S0)	SATA (S1)	SATA (S2)	SATA (S3)
		SATA Express (Low)	SATA Express (For S.E.0)	SATA Express (For S.E.1)		

## M.2-SATA(S3)+SATA S0&amp;S1&amp;S2

WHEN	PCH GPIO	SETUP	SWITCH
GPP_G9	L	GPP_C20	L
GPP_G10	L	GPP_C19	L
GPP_E0/E1/E2/F0	H (SATA)	GPP_C21	H

## M.2-SATA(S3)+S.E.D(S0+S1)

WHEN	PCH GPIO	SETUP	SWITCH
GPP_G9	L	GPP_C20	L
GPP_G10	L	GPP_C19	L
GPP_E0/E1/E2/F0	L (S.E.)	GPP_C21	H

## M.2X4

WHEN	PCH GPIO	SETUP	SWITCH
GPP_G9	L	GPP_C20	H
GPP_G10	H	GPP_C19	H
GPP_E0/E1/E2/F0	N/A	GPP_C21	H

## M.2X2+S.E.D(S0+S1)

WHEN	PCH GPIO	SETUP	SWITCH
GPP_G9	L	GPP_C20	L
GPP_G10	H	GPP_C19	H
GPP_E0/E1/E2/F0	L	GPP_C21	H

## M.2X2+SATA S0&amp;S1

WHEN	PCH GPIO	SETUP	SWITCH
GPP_G9	L	GPP_C20	L
GPP_G10	H	GPP_C19	H
GPP_E0/E1/E2/F0	H	GPP_C21	H

## M.2沒插卡+SATA S0~S3

WHEN	PCH GPIO	SETUP	SWITCH
GPP_G9	H	GPP_C20	L
GPP_G10	H	GPP_C19	L
GPP_E0/E1/E2/F0	H	GPP_C21	L

## M.2沒插卡+S.E.C&amp;S.E.D

WHEN	PCH GPIO	SETUP	SWITCH
GPP_G9	H	GPP_C20	L
GPP_G10	H	GPP_C19	L
GPP_E0/E1/E2/F0	L	GPP_C21	L

GIGABYTE Technology

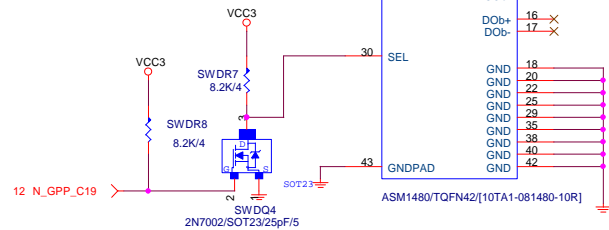
M.2 X4

GA-X170-Extreme ECC

Rev 1.0

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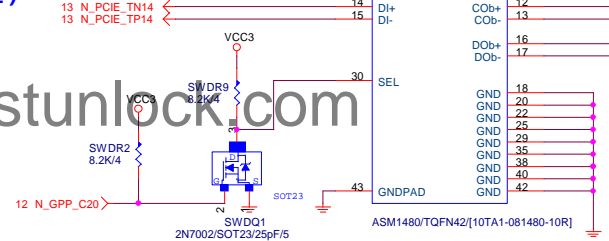
PCH (S2)



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

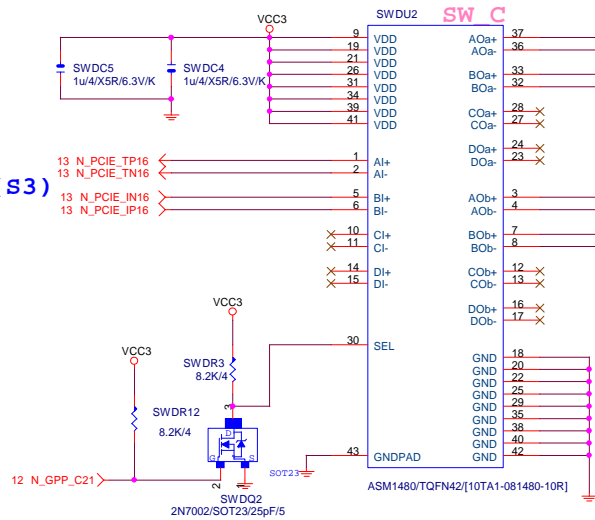
PCH (S0)

PCH (S1)

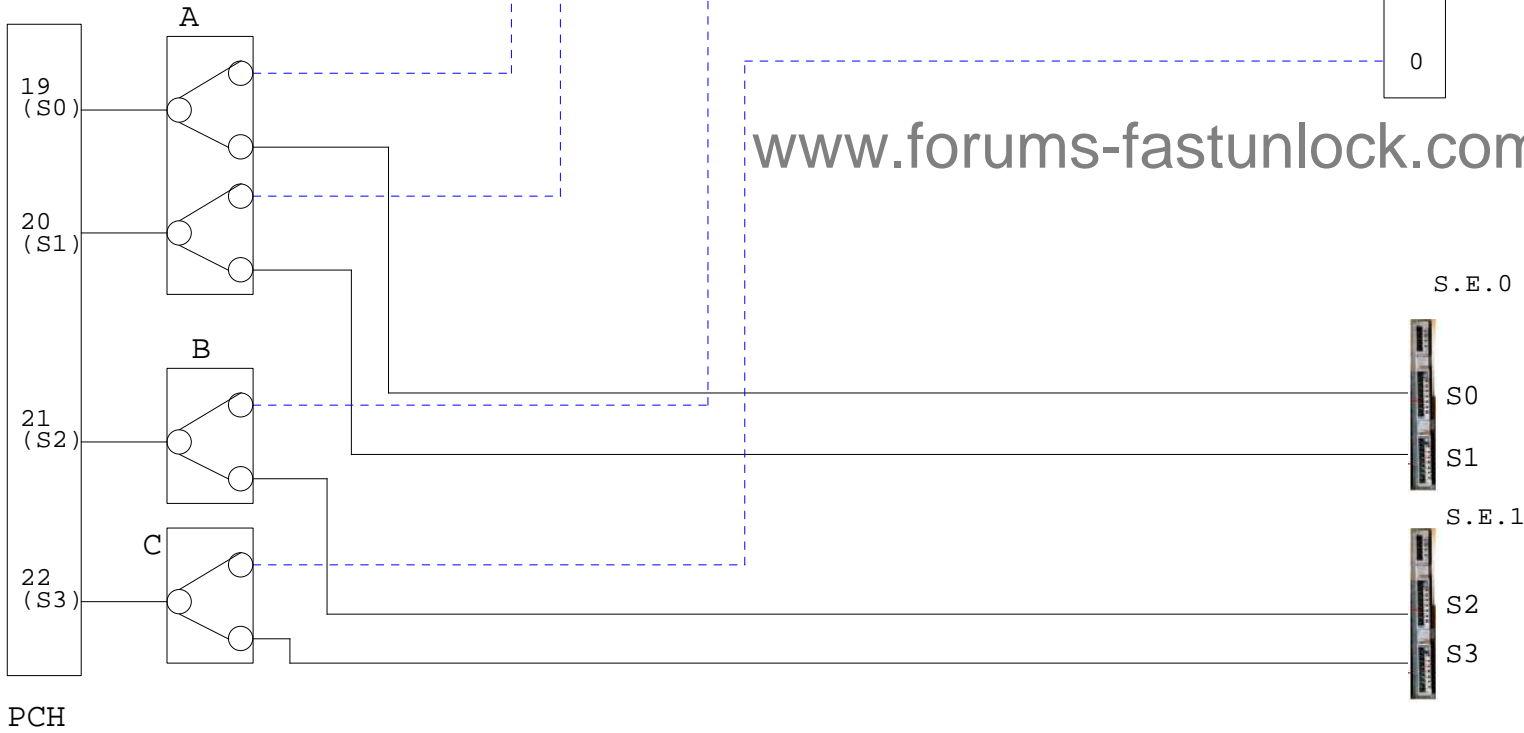


Function	SEL
xI--> xOa	L
xI--> xOb	H

PCH (S3)



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



3顆SW IC,  
當使用M.2 (X2),  
EXPRESS只可限定使用 S0&S1

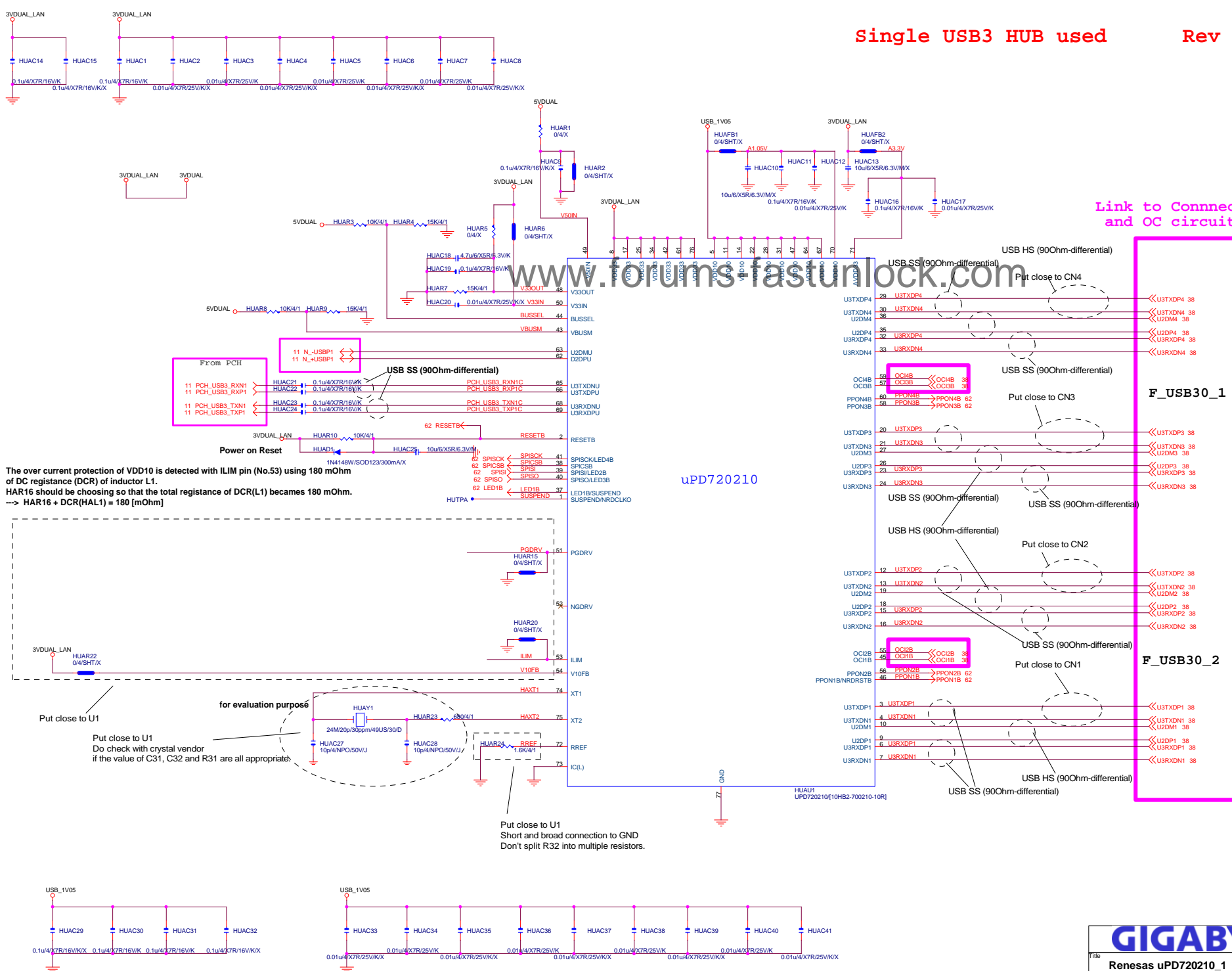
ABC的切換方式:  
下下下 : SE1+SE0  
上上上 : M.2 X4  
下上上 : M.2x2 + SE S0/S1  
下下下上 : M.2 X1 + SE  
S0/S1/S2

Title			
BLOCK DIAGRAM			
Size	Document Number		Rev
Custom	GA-X170-Extreme ECC		1.0
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	3	2	1

Single USB HUB used

Rev 0.3

Link to Connectors and OC circuits



The over current protection of VDD10 is detected with ILIM pin (No.53) using 180 mOhm of DC resistance (DCR) of inductor L1.  
HAR16 should be choosing so that the total resistance of DCR(L1) becomes 180 mOhm.  
-> HAR16 + DCR(HAL1) = 180 [mOhm]

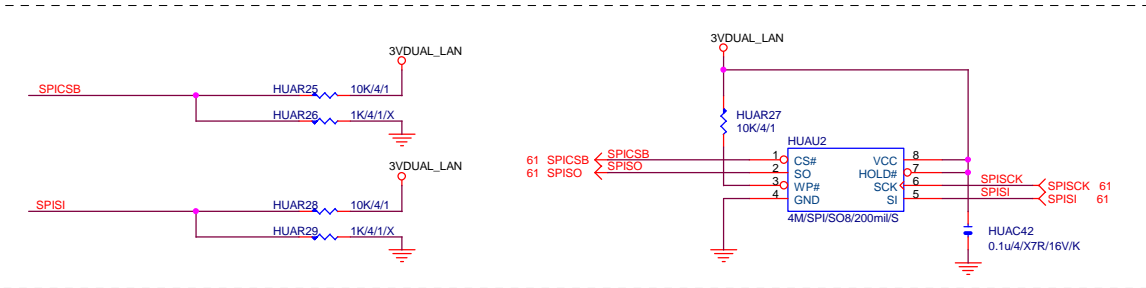
uPD720210

F\_USB30\_1

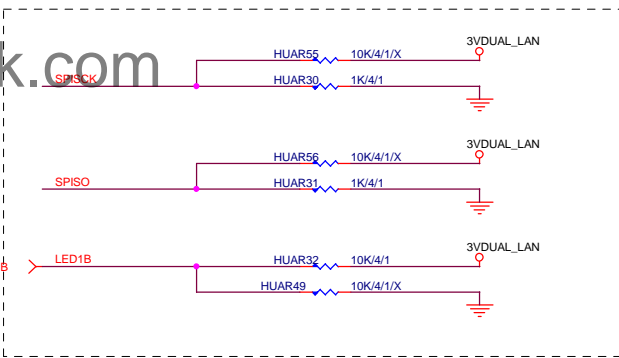
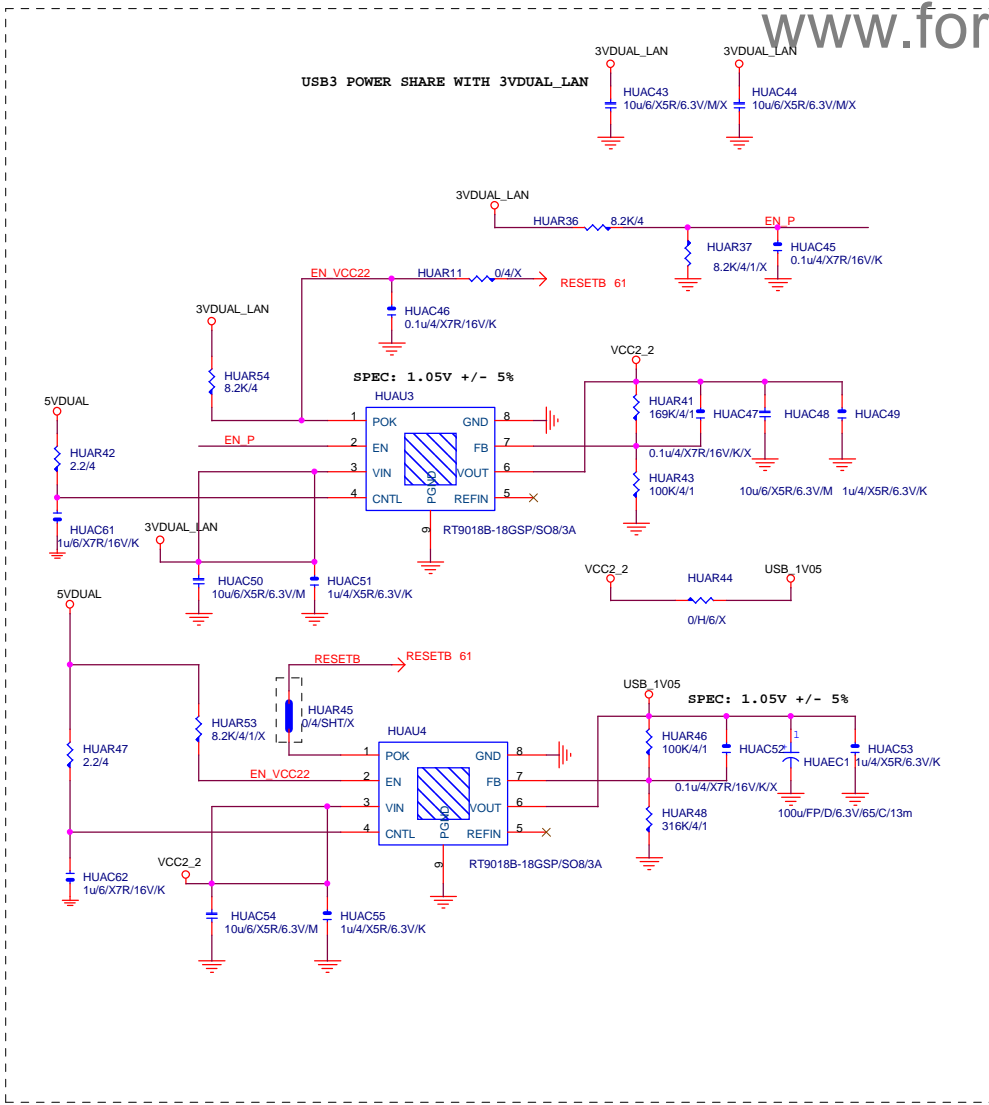
F\_USB30\_2

Single USB3 HUB used

# External SPI ROM ; SPI ROM attached mode

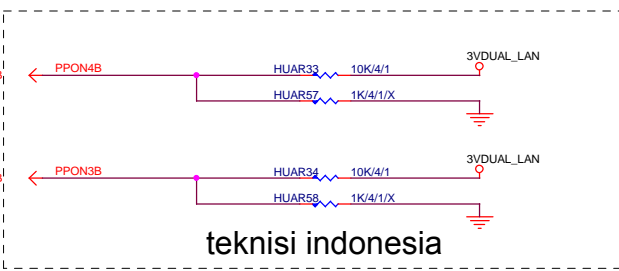


# Battery Charging

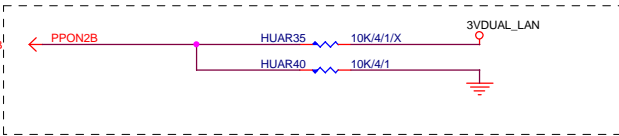


# Number of Ports ; 4Ports mode

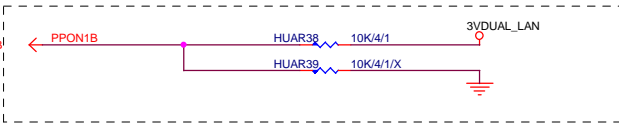
PPON3B / PPON4B : H / H ( 4 port )  
PPON3B / PPON4B : L / L ( 2 port )



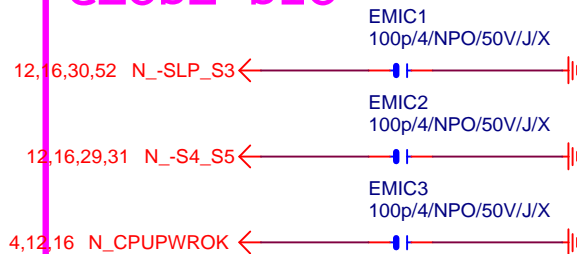
#5 VBUS Power Control ; Individual mode



# PPON1B Pin Function ; Port1 PPONB mode



## CLOSE SIO



## CLOSE PCH



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# GIGABYTE™

Title

EMI/ESD

Size  
A

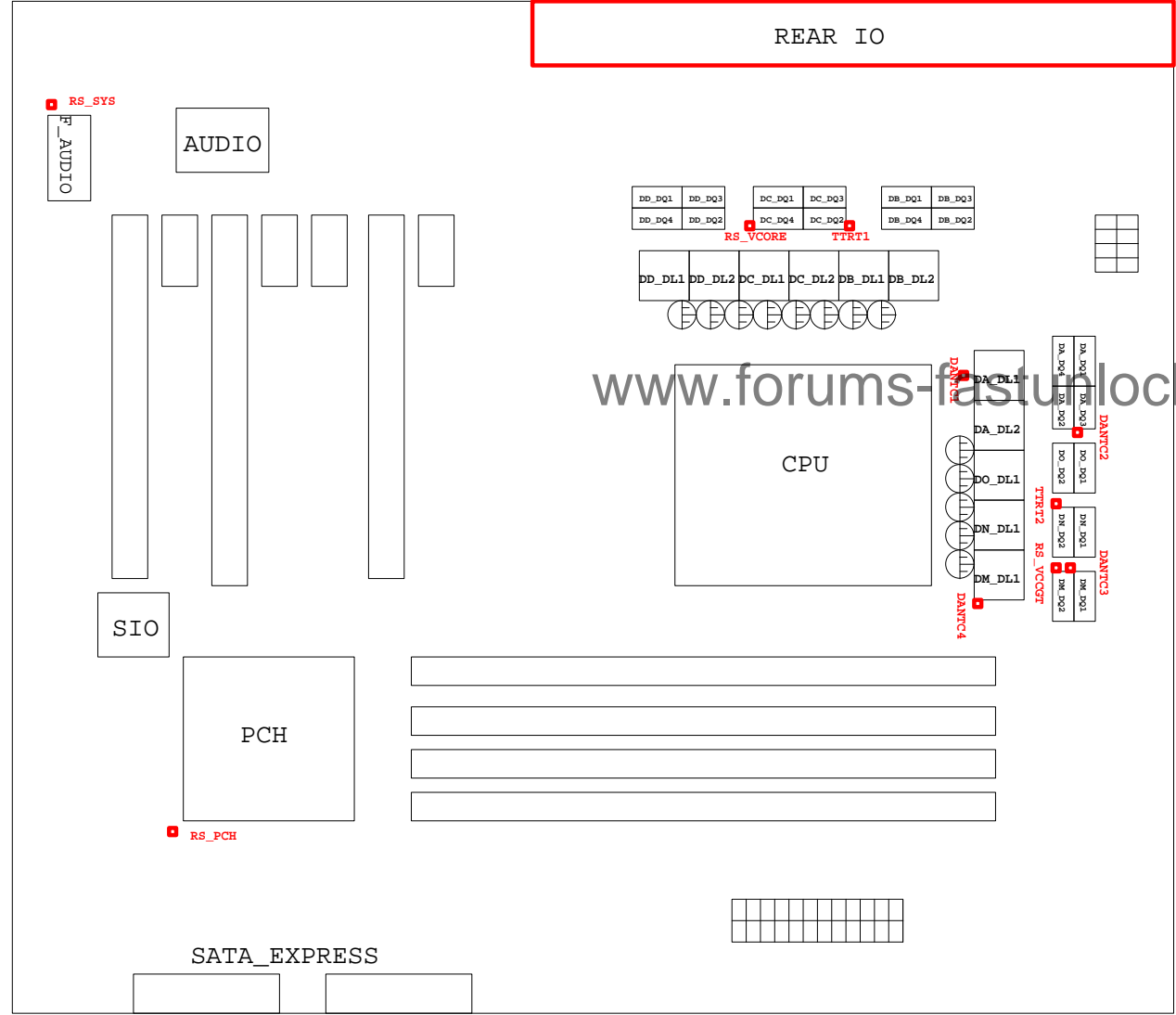
Document Number

GA-X170-Extreme ECC

Rev  
1.0

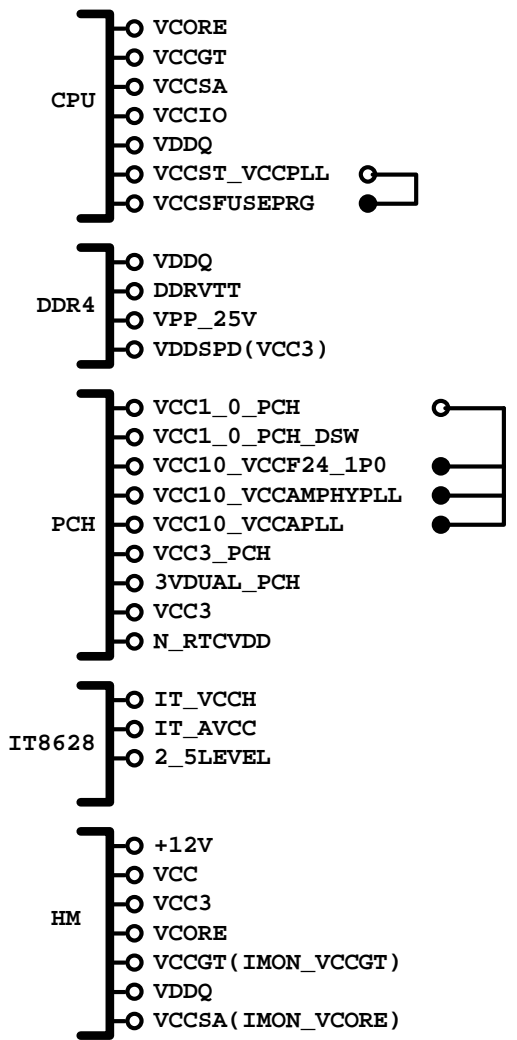
Date: Thursday, February 18, 2016

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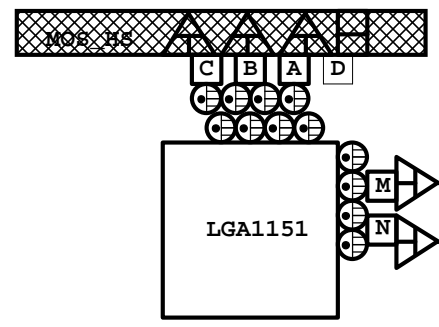
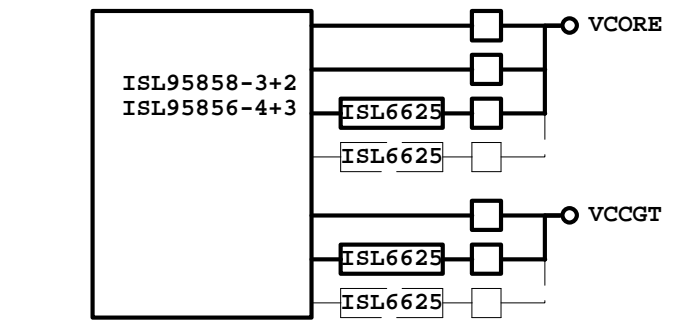


熱敏電阻	擺放靠近位置	走線方式
DANTC1	DA_DL2	Differential
DANTC2	DA_DQ3	Differential
DANTC3	DM_DQ2	Differential
DANTC4	DM_DL1	Differential
RS_VCORE	DC_DQ4	N/A
RS_VCCGT	DM_DQ2	N/A
TTRT1	DC_DQ2	N/A
TTRT2	DN_DQ2	N/A
RS_PCH	PCH	N/A
RS_SYS	F_AUDIO	N/A

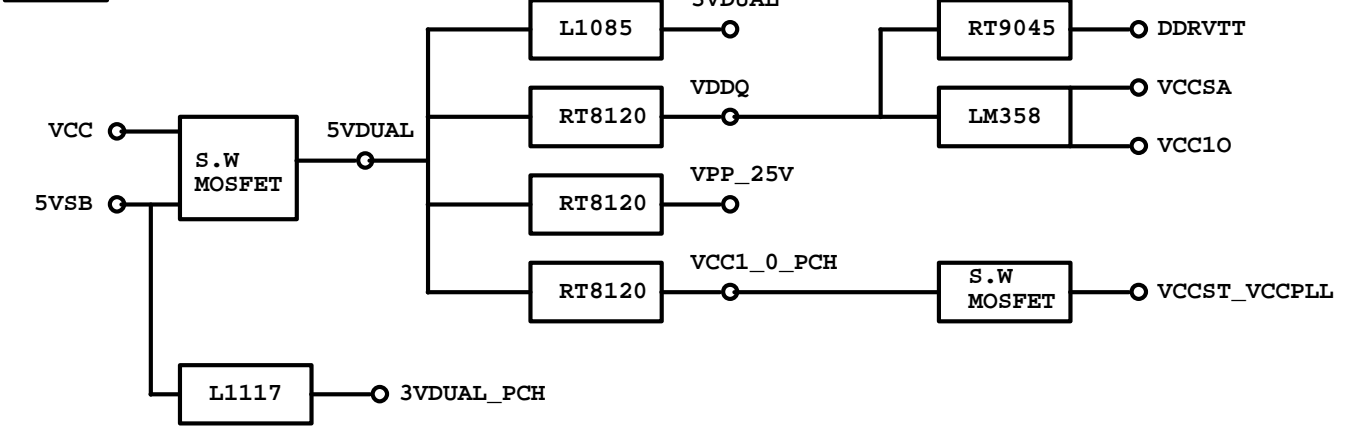
POWER BLOCK MAP



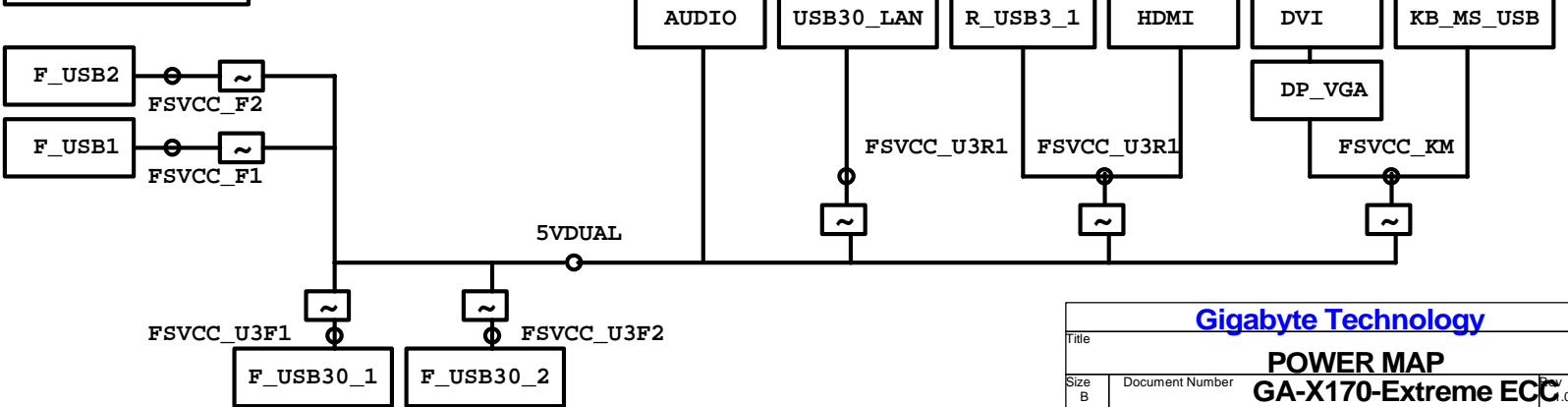
VCORE/VCCGT



POWER



FUSE POWER F/R



## 固態電容料號.請自行修改

日系黑色固態	Capture Value
11C02-C85600-01R	560u/FP/D/6.3V/68/C/8m
11C05-C82700-01R	270u/FP/D/16V/88/C/12m
11C05-C61000-01R	100u/OS/D/16V/66/C/30m
11C02-C51000-01R	100u/FP/D/6.3V/65/C/13m

日系一般固態	Capture Value
11C02-685600-01R	560u/FP/D/6.3V/68/8m
11C05-882700-01R	270u/FP/D/16V/88/12m
11C05-661000-03R	100u/OS/D/16V/66/30m
11C02-651000-02R	100u/OS/D/6.3V/66/30m

台系固態	Capture Value
11C02-661000-09R	100u/OS/D/6.3V/66/A/35m
11C05-691000-09R	100u/OS/D/16V/69/A/35m
11C05-8C2700-09R	270u/FP/D/16V/8C/A/10m
11C02-695600-09R	560u/FP/D/6.3V/69/A/11m

## IRON CHOKE

	料號	Capture Value	SIZE	Footprint	
DIP	11LC5-M4500C-01R	0.5uH/40A/IMD109/M/D	10*10	CHOKE05U-40A-1PQ-3	閃電P
DIP	11LC5-M4500C-11R	0.5uH/40A/IMD109/M/NP/D	10*10	CHOKE05U-40A-1PQ-3	無閃電P
DIP	11LC5-M2500C-01R	0.5uH/20A/IMD0809/M/D	8*8	CHOKE1U-R50M-IF	

Skylake Iron Choke閃電P導入機種如下:  
[1] Z170/H170 機種全部導入  
[2] B150/H110Gaming機種導入, 其餘不導入

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## Ferrite

	料號	Capture Value	SIZE	Footprint
DIP	11LC5-F3500C-11R	0.5uH/32A/INCG109/FSI/D	10*10	CHOKE05U-40A-1PQ-3
DIP	11LC5-F2500C-11R	0.5uH/25A/INC0809/F/D	8*8	CHOKE1U-R50M-IF
SMD	10LC5-F4300C-01R	0.3uH/40A/SIUC/FR/S	10*7	CHOKE11X8MM-SMD

## BEAD

	料號	Capture Value	SIZE	Footprint
DIP	10LFB-15470A-01R	47/4030/15A/S	4*3	BEADC8B-BPH_SMD

## PWM料號

		料號	Capture Value	Footprint
PWM	ISL95856	10TA1-695856-01R		IC52QFN-6x6-G
PWM	ISL95858	10TA1-695858-01R		IC52QFN-6x6-G
PWM	IR35201	10TA1-635201-00R		IC56QFN-9VRS4339
PWM	IR3570	10TA1-603570-00R		IC40MLFP-ISL95835
PWM	RT8237C/D	10TA1-608237-01R		IC10DFN-NIS5132

## REGULATOR

		料號	Capture Value	Footprint
	NCT3103S	10GL2-203103-01R	NCT3103S/SOP8/2A	IC8-EP50IC

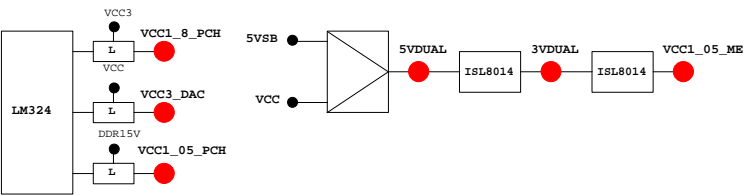
GIGABYTE™			
Title RT8120_DDR4 POWER			
Size Custom	Document Number GA-X170-Extreme ECC		Rev 1.0
Date:	Thursday, February 18, 2016	Sheet 66 of 67	

PCH GPIO LIST TABLE					
PIN NAME	PWR	Default	USAGE	NOTE	
GP0	MAIN	H-Z	GPI	GPIO0	N/A
GP1/TACH1	MAIN		GPI	GPIO1	N/A
GP2/PIRQ#	MAIN		GPI	-PIRQE	P/U 8.2K VCC3
GP3/PIRQF#	MAIN		GPI	-PIRQF	P/U 8.2K VCC3
GP4/PIRQG#	MAIN		GPI	-PIRQG	P/U 8.2K VCC3
GP5/PIRQH#	MAIN		GPI	-PIRQH	P/U 8.2K VCC3
GP6/TACH2	MAIN		GPI	PCIEX1 Detect	P/U 8.2K VCC3
GP7/TACH3	MAIN		GPI	GPIO7	P/U 8.2K VCC3
GP8	STBY	H	GPI	GPIO8	N/A
GP9/OC5#	STBY		NATIVE	USB OC5#	N/A
GP10/OC6#	STBY		NATIVE	USB OC6#	N/A
GP11/SMBALERT#	STBY		NATIVE	USB PWR protect	P/U 8.2K 3VDUAL
GP12	STBY	L	GPI	GPIO12	N/A
GP13	STBY	L	GPI	LPCPME#	P/U 8.2K 3VDUAL
GP14/OC7#	STBY		NATIVE	USB OC7#	N/A
GP15	STBY	L	GPI	GPIO15(TLS Enable)	P/U 8.2K 3VDUAL
GP16	MAIN		GPI	GPIO16	P/U 8.2K VCC3
GP17/TACH0	MAIN		GPI	GPIO17	P/U 8.2K VCC3
GP18	MAIN		GPI	Mobile Only	N/A
GP19	MAIN		GPI	GPIO19	P/U 8.2K VCC3
GP20	MAIN		GPI	GPIO20	P/U 8.2K VCC3
GP21	MAIN		GPI	GPIO21	P/U 8.2K VCC3
GP22	MAIN	H-Z	GPI	GPIO22	P/U 8.2K VCC3
GP23	MAIN		GPI	GPIO23	N/A
GP24	STBY	L	GPI	SKTOCC#	N/A
GP25	STBY			Mobile Only	N/A
GP26	STBY			Mobile Only	N/A
GP27	STBY	H	GPO	GPIO27	P/U 8.2K 3VDUAL
GP28	STBY	H	GPO	PWR LED	P/U 8.2K 3VDUAL
GP29	STBY	L	GPI	GPIO29	N/A
GP30	STBY	H-Z	GPI	Mobile Only	N/A
GP31	STBY	H-Z	GPI	Mobile Only	N/A
GP32	MAIN	H	GPO	N/A	N/A
GP33	MAIN	H	GPO	N/A	N/A
GP34	MAIN	H-Z	GPI	-PCI_STOP	P/U 8.2K VCC3
GP35	MAIN	L	GPO	-ACZ_DET	P/U 8.2K VCC3
GP36	MAIN		GPI	N/A	N/A
GP37	MAIN		GPI	N/A	N/A
GP38	MAIN	H-Z	GPI	PCIEX4 Detect	P/U 8.2K VCC3
GP39	MAIN	H-Z	GPI	GPIO39	P/U 8.2K VCC3
GP40	STBY		NATIVE	USB OC1#	N/A
GP41	STBY		NATIVE	USB OC2#	N/A
GP42	STBY		NATIVE	USB OC3#	N/A
GP43	STBY		NATIVE	USB OC4#	N/A
GP44	STBY	L	NATIVE	GPIO44	P/U 8.2K 3VDUAL
GP45	STBY		NATIVE	GPIO45	P/U 8.2K 3VDUAL
GP46	STBY	L	NATIVE	GPIO46	P/U 8.2K 3VDUAL
GP47	STBY			Mobile Only	N/A
GP48	MAIN	H-Z	IN	GPIO48	P/U 8.2K 3VDUAL
GP49	MAIN	H-Z	IN	GPIO49	P/U 8.2K 3VDUAL
GP50	MAIN		NATIVE	-REQ1	P/U 2.2K VCC
GP51	MAIN	H	NATIVE	-GNT1	N/A
GP52	MAIN		NATIVE	-REQ2	P/U 2.2K VCC
GP53	MAIN	H	NATIVE	-GNT2	N/A
GP54	MAIN		NATIVE	-REQ3	P/U 2.2K VCC
GP55	MAIN	H	NATIVE	-GNT3	N/A
GP56	STBY		NATIVE	Mobile Only	N/A
GP57	STBY	H-Z	IN	VCORE_OV1	P/U 8.2K 3VDUAL
GP58	STBY	H-Z	NATIVE	F_USB_OC	P/U 8.2K 3VDUAL
GP59	STBY		NATIVE	USB_OC0#	N/A
GP60	STBY	H-Z	NATIVE	N/A(Reverse)	P/U 8.2K 3VDUAL
GP61	STBY	L	NATIVE	-SUSTAT	N/A
GP62	STBY	L	NATIVE	SUSCLK	N/A
GP63	STBY	L	NATIVE	GPIO63	N/A
GP64	MAIN	L	NATIVE	CLKOUTFLEX0	N/A
GP65	MAIN	L	NATIVE	CLKOUTFLEX1	N/A
GP66	MAIN	L	NATIVE	CLKOUTFLEX2	N/A
GP67	MAIN	L	NATIVE	CLKOUTFLEX3	N/A
GP72	STBY	H-Z	NATIVE	VCORE_OV4	P/U 8.2K 3VDUAL
GP73	STBY			Mobile Only	N/A
GP74	STBY	H-Z	NATIVE	1_05V_OV2	P/U 8.2K 3VDUAL
GP75	STBY	H-Z	NATIVE	N/A(Reverse)	P/U 8.2K 3VDUAL

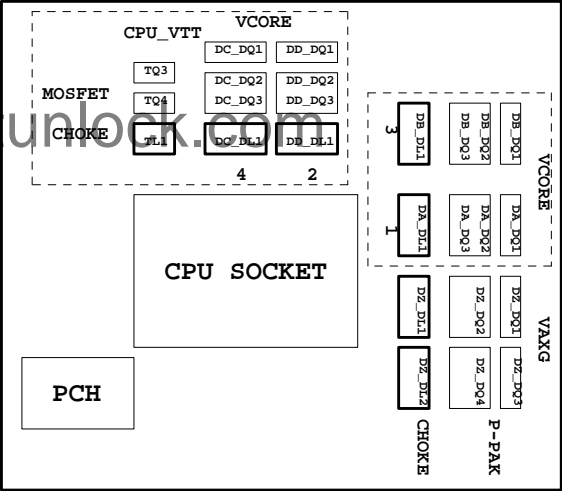
Super I/O ITE8720 GPIO Table

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	-PCI_E_RST	
RSMRST#CIRRXL/GP55	-RSMRST	
PME#/GP54	-LPCPME	
PD5/GP75/BUSS00	N/A	

PIN NAME	USAGE	NOTE
FAN_TAC2/GP52	FANIO2	
FAN_TAC3/GP37	FANIO3	
VIDO3/FAN_TAC4/GP25/DSR2#	FANIO4	
FAN_CTL2/GP51	FANPWM2	
FAN_CTL3/GP36	FANPWM3	
VID4/GP34	BEEP-	
VID3/GP33	TURBO1	
VID2/GP32	TURBO0	
VCORE_GOOD/VID6/GP63	CPUT_LED1_C	
VID5/GP35	CPUT_LED2_C	
VID1/GP31	CPUT_LED3_C	
VID0/GP30	-LAN1_DSM	NBT_LED1_C
SLCT/GP80	CPU_LED1_C	
PE/GP81	CPU_LED2_C	
BUSY/GP82	CPU_LED3_C	
PD3/GP73/BUSSI1	SB_LED1_C	
PD4/GP74/BUSSI2	SB_LED2_C	
VCORE_EN/VID7/GP64	IT_GP64	SB_LED3_C
PD0/GP70	NB_LED1_C	
PD1/GP71	NB_LED2_C	
PD2/GP72/BUSSI0	NB_LED3_C	
GP22/SCK	LOW_PWR_1	
VIDO5/GP27/SIN2	LOW_PWR_2	
PCIRST2#/GP11	-PFMRST1	
PCIRST1#/GP12	-PFMRST2	
3VBSBW#/GP40	CSI_F0	BSEL166_1
SUSC#/GP53	CSI_F1	BSEL166_2
GP23/SI	BSEL166_3/CSISBSL	
VIDO0/GP20/CTS2#	CPUT_LED1_C	BSEL166_4
GP65/VDDA_EN/GB_01	MB_ID2	
PD6/GP76/BUSS01	MB_ID3	
PD7/GP77/BUSS02	MB_ID4	
AFD#/GP86/SMBC_R	SEC_PIN	FST_2X8
INIT#/GP85/SMBD_M	SEC_2x8	GTLREF_AD2
ACK#/GP83	DDR_LED1_C	
VIDO1/GP21/DCD2#	DDR_LED2_C	
STB#/GP87/SMBC_M	DDR_LED3_C	
PWRON#GP44	VCORE_OV1	
PANSWH#/GP43	PWRBTSW	
KDAT/GP61	-PWRBTSW	
KCLK/GP60	KDAT	
MDAT/GP57	KCLK	
MACL/GP56	MDAT	
GP66/VLDT_EN/GB_02	NBT_LED1_C	MCLK
SVD/PCIRSTIN#/CIRTX/GP15	PWM2_CR	
KDAT/GP61	PWM2_CR	
GP67/CPU_PG/GB_03	EN_LOADLINE	IT_GP67/-EN_PWM2
SLIN#/GP84/SMBD_R	-EN_PWM2	
PSI_L/FAN_CLT5/CIRRXL2/GP16	-THERM	
VIDO4/GP26/SOUT2	DDR18V_PH2_EN	
VIDO2/FAN_TAC5/GP24/DSR2#	DDR18V_LED	
VIDO6/GP17/RI2#	1_1V_PH_EN	
VIDO7/JP6/DTR2#	JP6	
PD5/GP75/BUSS00	SB_LED3_C	



PWM各相位的擺法如下：



BIOS超電壓對應表：

線路圖名稱	BIOS選項
Vcore	CPU Vcore
CPU_VTT	CPU Termination
CPU_VAXG	CPU Graphic Core
VCC1_8_PCH	CPU PLL
VCC1_05_PCH	PCH core
3VDUAL	3VDUAL
DDR15V	DRAM voltage
DDRVTT	DRAM Terminatio
VREF_CA_A/VREF_CA_B	DRAM Address Ref
VREF_DQ_A/VREF_DQ_B	DRAM Data Ref

散熱模組料號：

Z77-D3H :  
PCH :  
12SP2-S05511-01R/02R/03R  
MOSFET :  
12SP2-S08924-01R/02R/03R

	3 pin FAN control	4 pin FAN control	FAN speed	Controller
CPU FAN	FANPWM1	FANPWM3	FANIO1	IT8720
	ICH_FAN_PWM2	ICH_FAN_PWM0	ICH_FAN_TACH0	PCH
SYS FAN	FANPWM2	N/A	FANIO2	IT8720
	ICH_FAN_PWM1	N/A	ICH_FAN_TACH1	PCH
PWR FAN	N/A	N/A	FANIO3	IT8720
			ICH_FAN_TACH2	PCH