

# Model Name: GA-B150M-DS3H

SHEET TITLE rev 1.0

01	COVER SHEET
02	BOM & PCB MODIFY HISTORY
03	BLOCK DIAGRAM
04	CPU_LGA1151-A
05	CPU_LGA1151-B-DDR3
06	CPU_LGA1151-C
07	CPU_LGA1150-D
08	DDR3 CHANNEL A
09	DDR3 CHANNEL B
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11	PCH_DMI,USB,PCIE
12	PCH_MISC
13	PCH SATA,PCIE,SATA_EXPRESS
14	PCH_PWR,GND
15	Dual BIOS
16	ITE 8628 LPC IO
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18	FAN CTRL--SIO
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SHEET TITLE

28	RT8237_DDR_VDDQ
29	
30	RT8237_PCH_VCC1_0_PCH
31	DISCRETE POWER
32	NCT3933
33	ATX POWER , A_-PROCHOT
34	KB_MS_USB
35	DVI CONN
36	PTN3356 - DP to VGA - IC
37	PTN3356 - DP to VGA - Conn
38	HDMI CONN
39	
40	R_USB30
41	Realtek RTL8111HS
42	USB30_LAN CONNECTOR-RTL8111HS
43	Realtek ALC887
44	REAR AUDIO JACK
45	F_USB30
46	F_USB
47	COM , LPT , TPM , THB
48	F_PANEL
49	EMI-ESD
50	POWER MAP
51	TABLE LIST

Gigabyte Technology

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Cover Sheet			
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**Rev1.0**

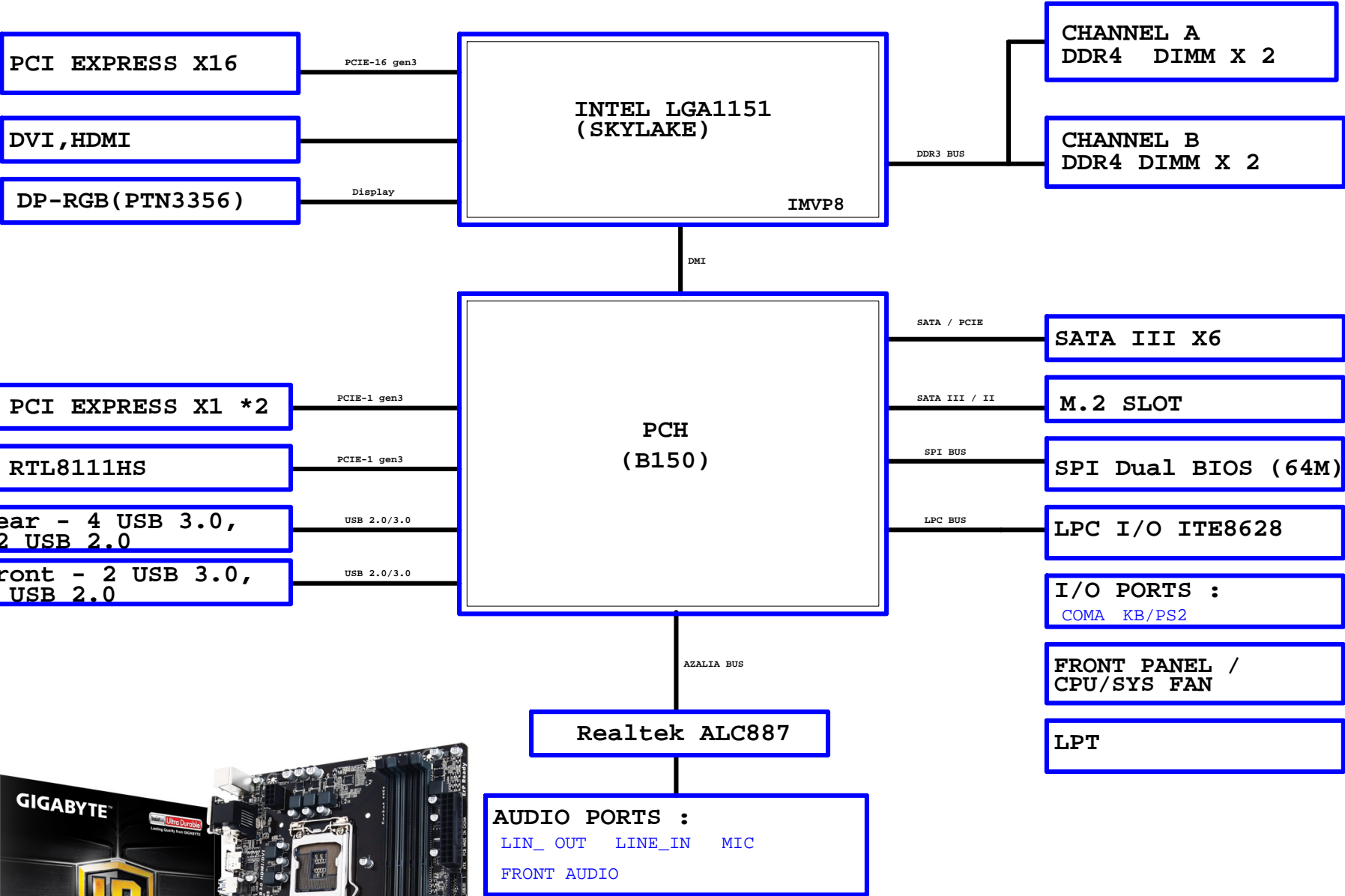
## 2015/10/08

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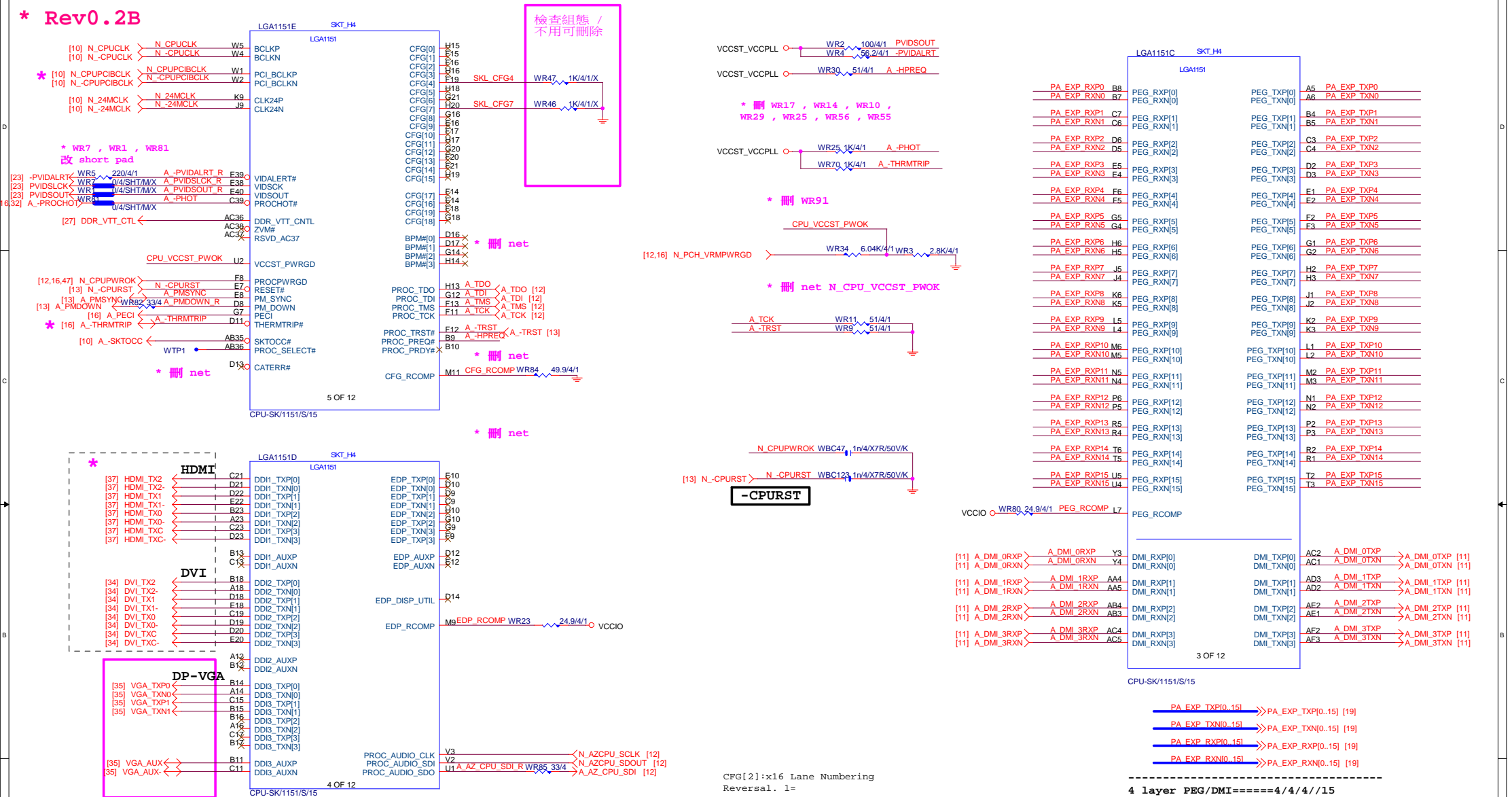
DATE	Change Item	Reason
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[illegible]

BLOCK DIAGRAM



\* Rev0.2B



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

```
4 layer HDMI/DP/eDP/=====4/4/4//15
6 layer HDMI/DP/eDP/=====4/5.5/4//15
```

Impedance=85 +- 15%

```
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

```

PA EXP TXPI[0..15]    >> PA_EXP_TXP[0..15] [19]
PA EXP TXNI[0..15]    >> PA_EXP_TXN[0..15] [19]
PA EXP RXPI[0..15]    >> PA_EXP_RXP[0..15] [19]
PA EXP RXNI[0..15]    >> PA_EXP_RXN[0..15] [19]

```

```
4 layer PEG/DMI=====4/4/4//15
6 layer PEG/DMI=====4/5.5/4//15
```

Impedance=85 +- 15%

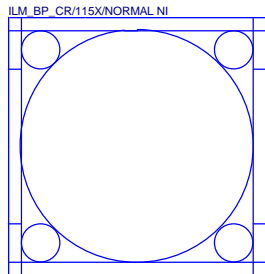
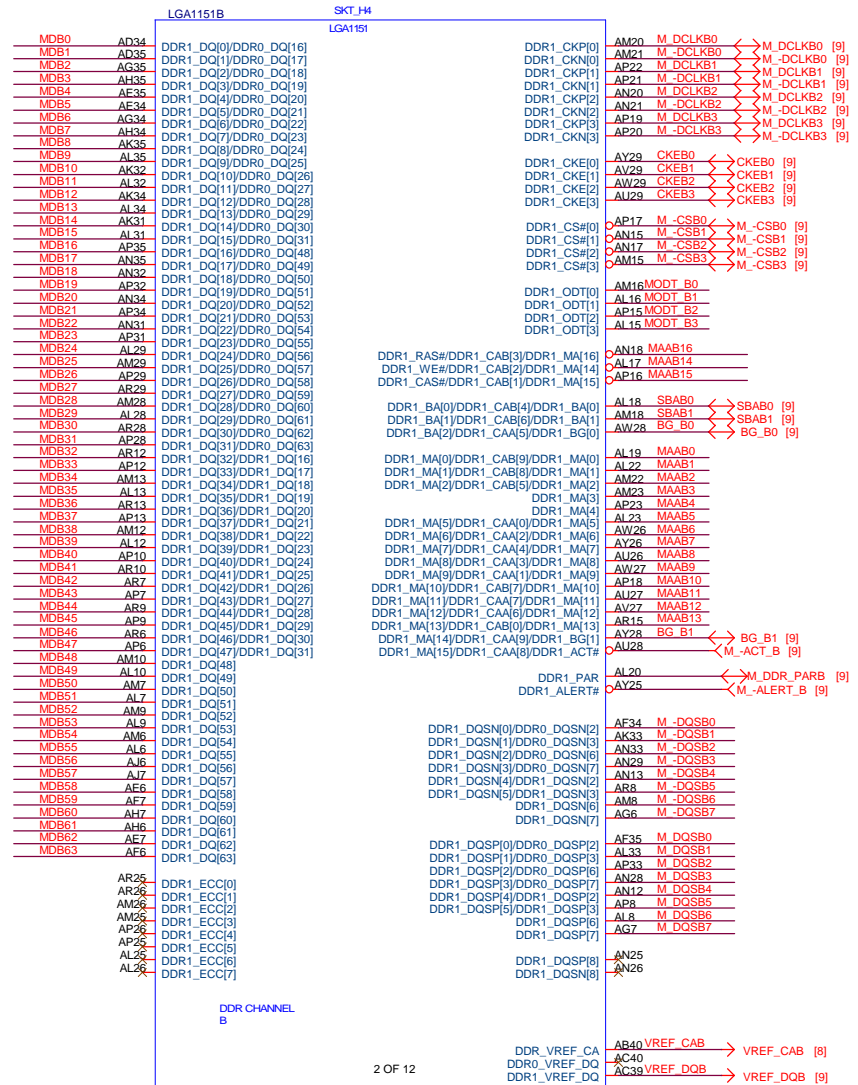
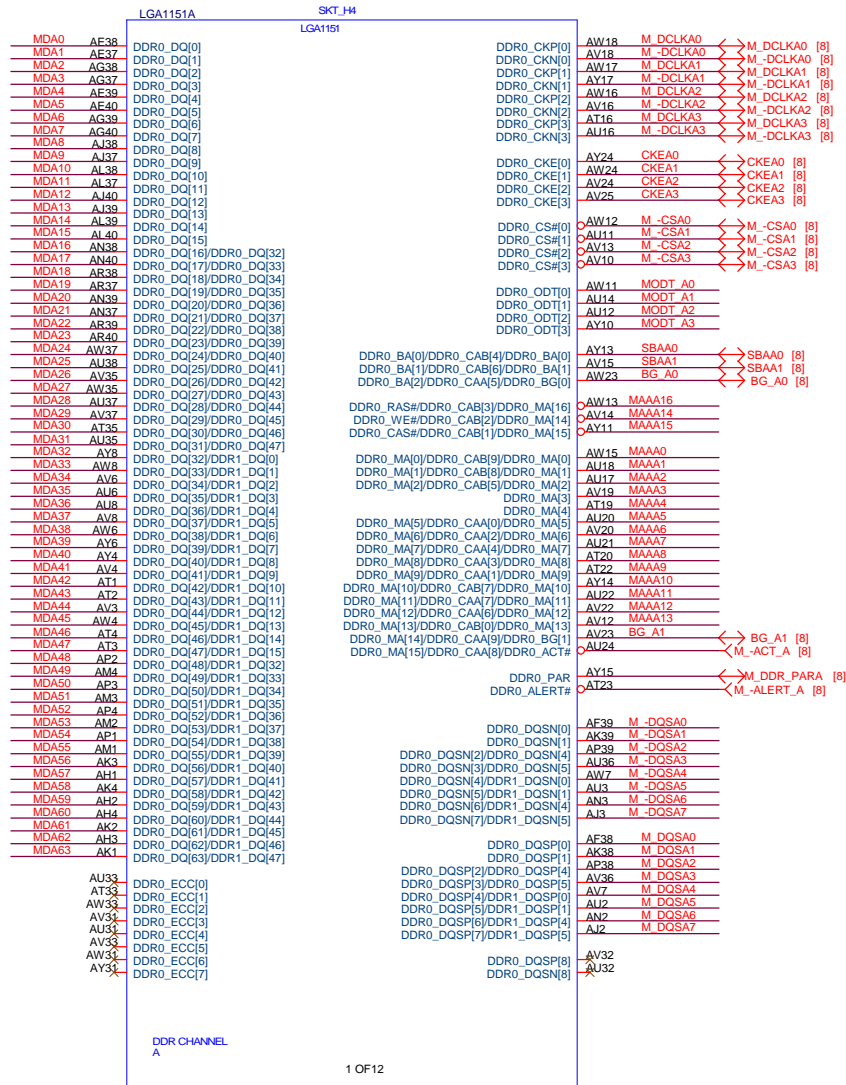
W=12 mil out of CPU  
S=15 mil out of CPU

**Gigabyte Technology**

**CPU LGA1151-A**

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\* 改DDR4 net



Need check the new CPU ME

**Gigabyte Technology**

**CPU LGA1151-B**

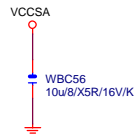
**GA-B150M-DS3H**

Rev  
1.0

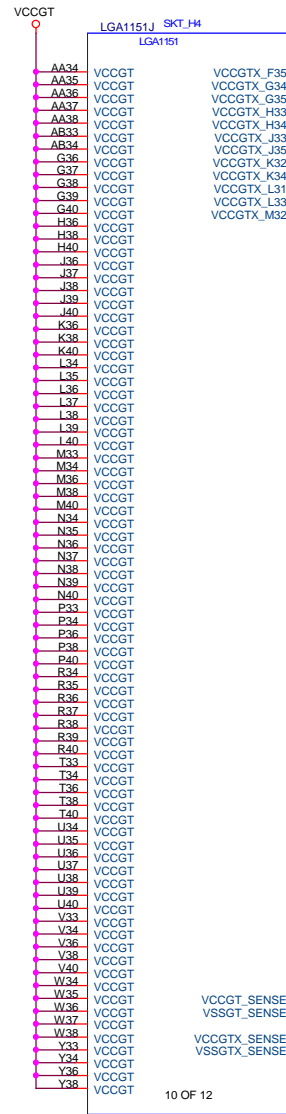
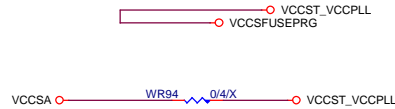
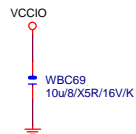
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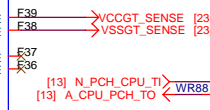
X1



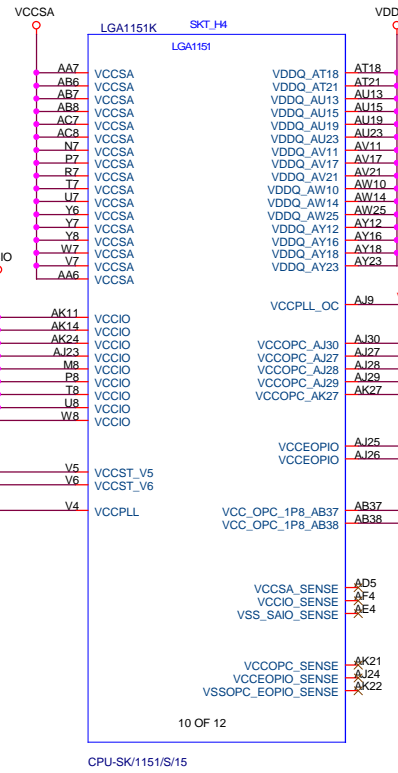
X1



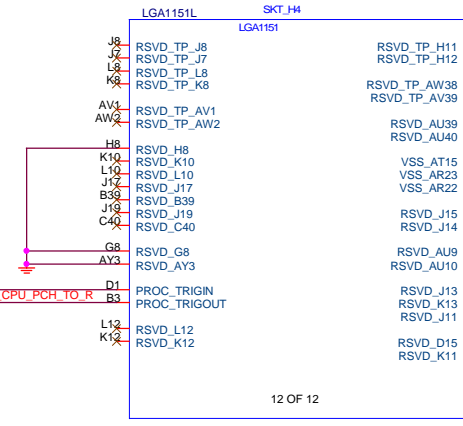
CPU-SK/1151/S/15



[13] N\_PCH\_CPU\_T1  
[13] A\_CPU\_PCH\_TO



CPU-SK/1151/S/15



CPU-SK/1151/S/15



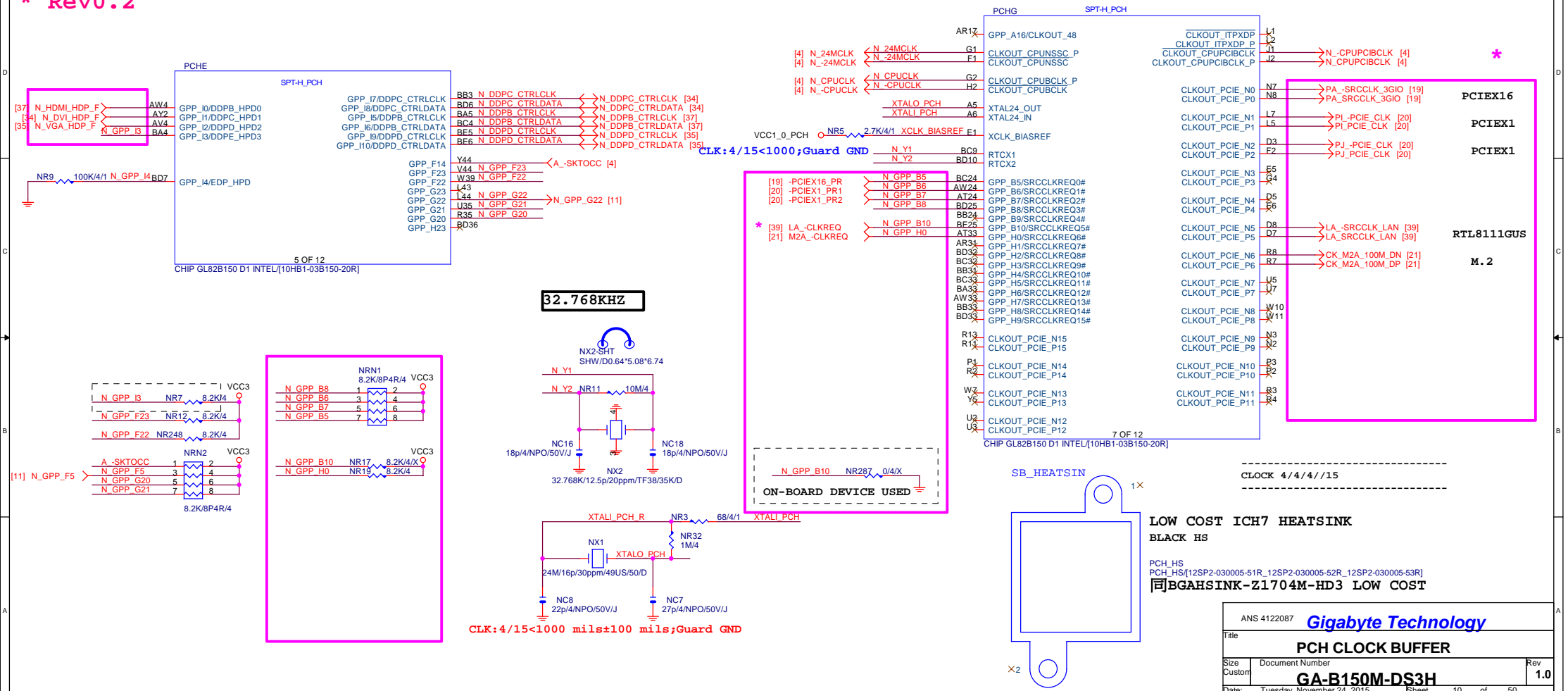


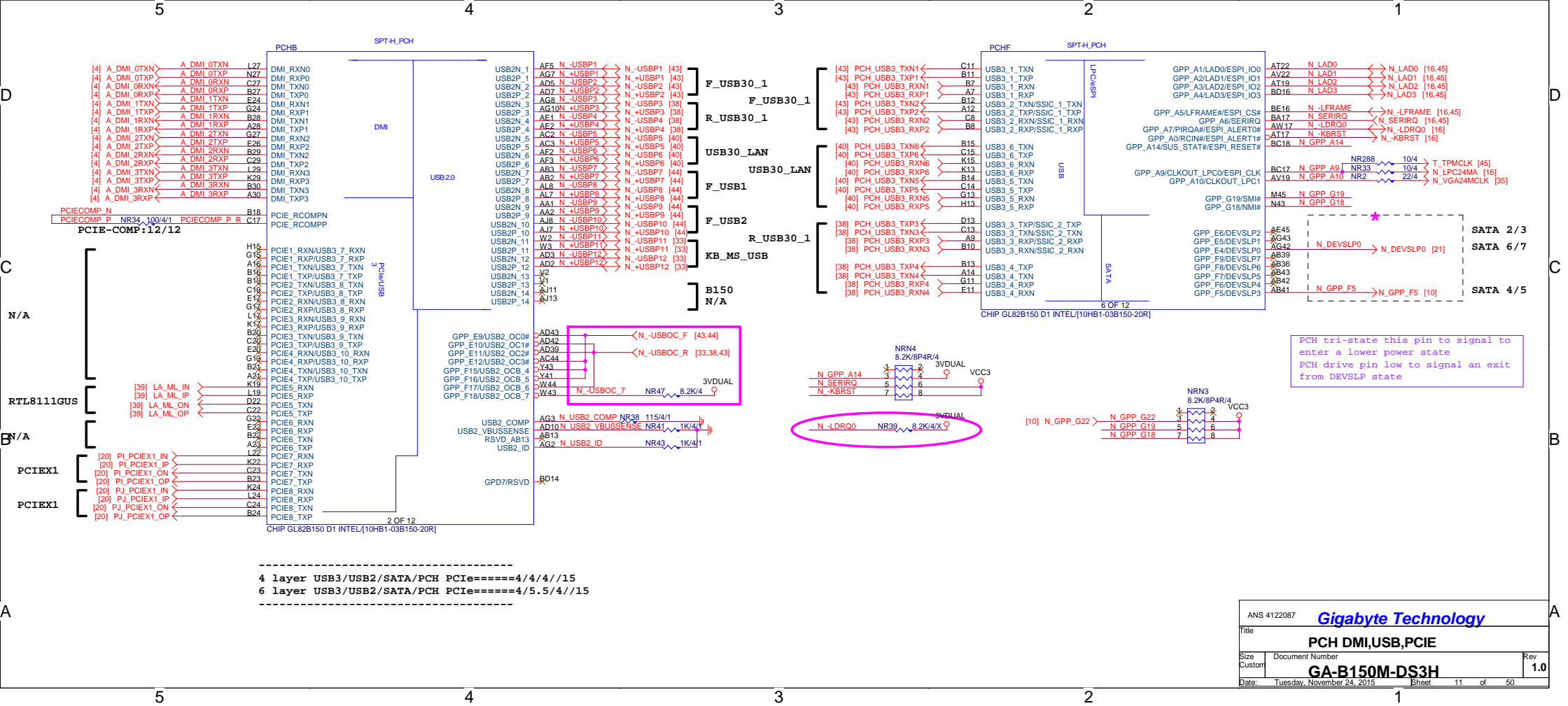


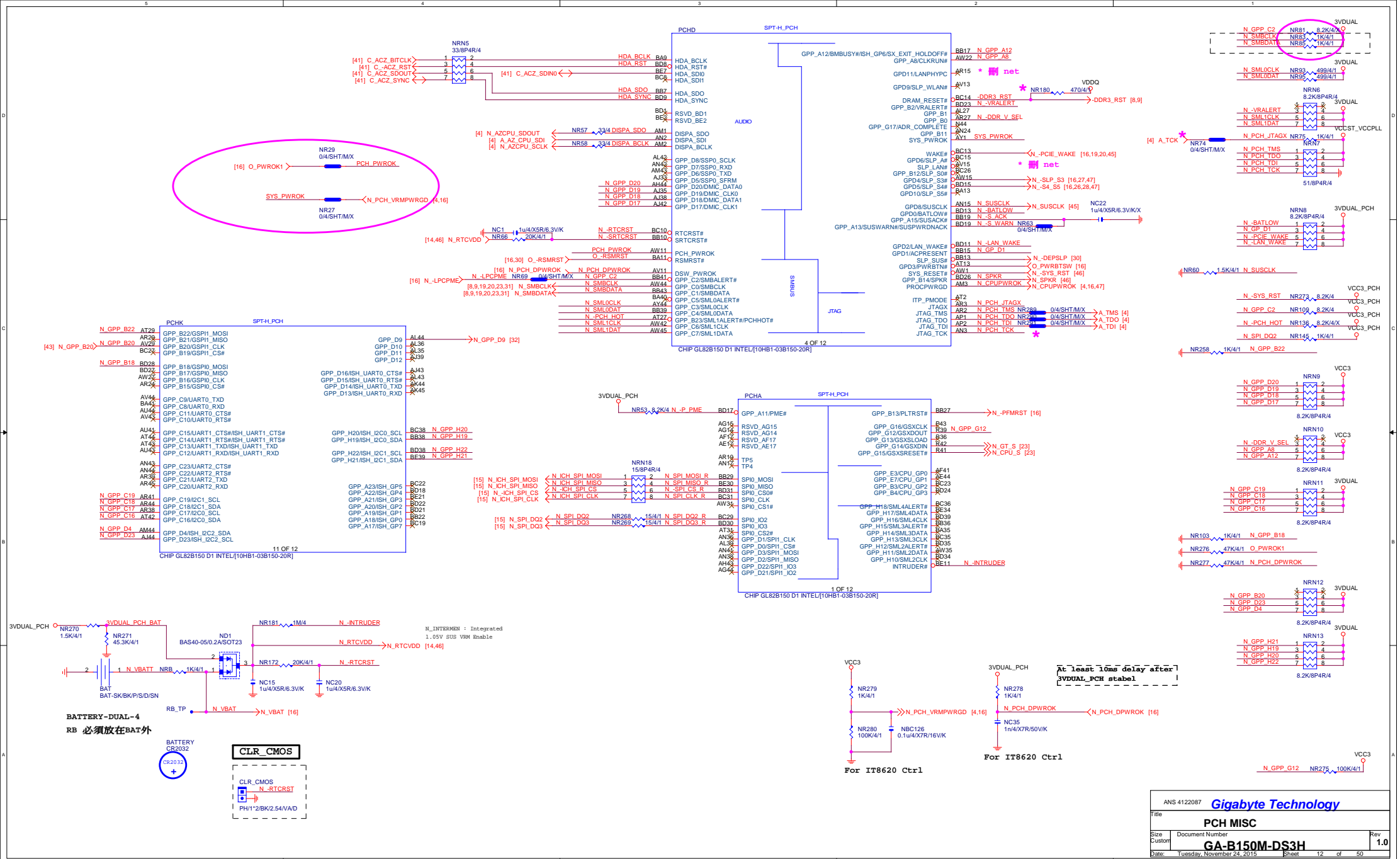




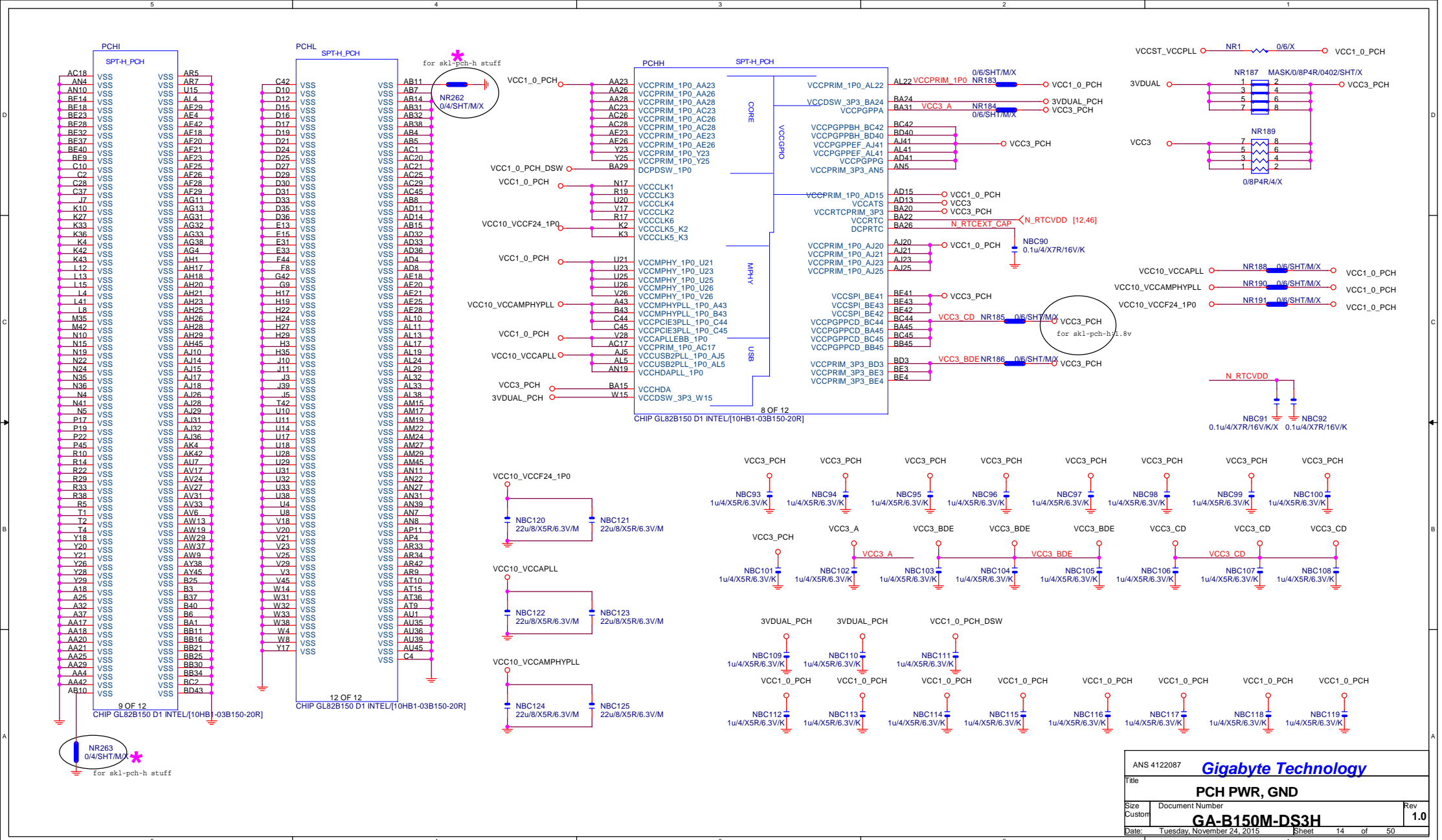
\* Rev0.2



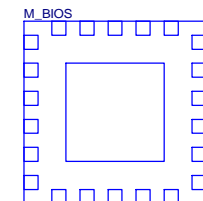








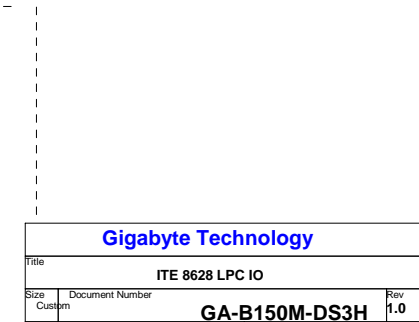
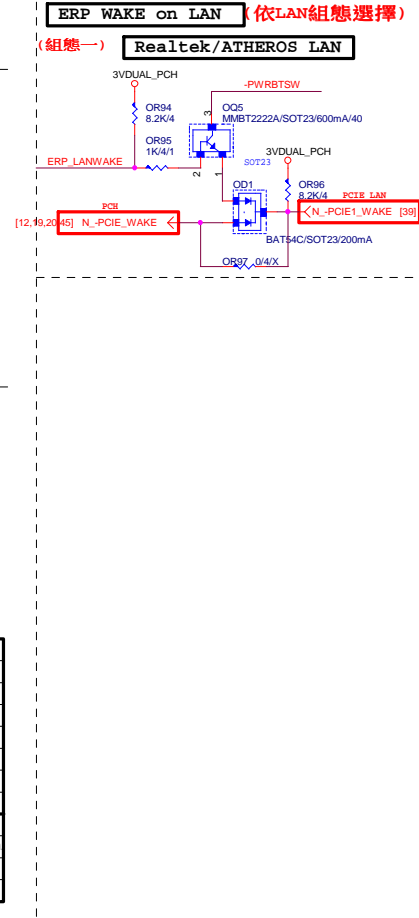
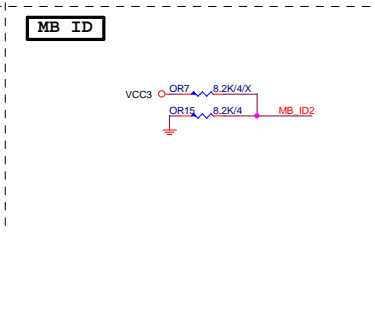
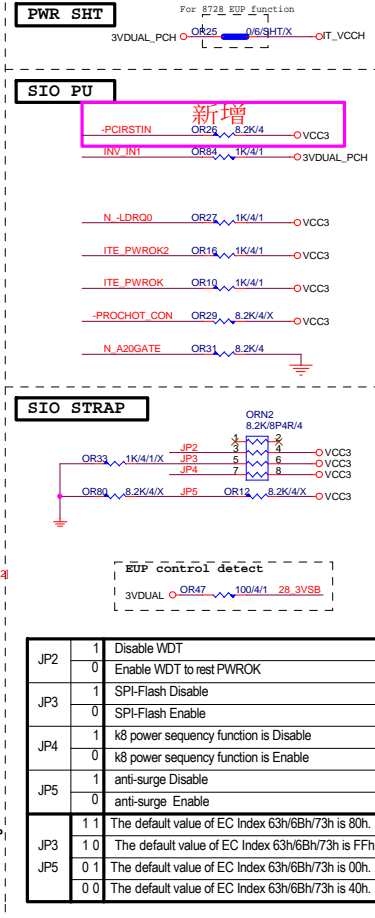
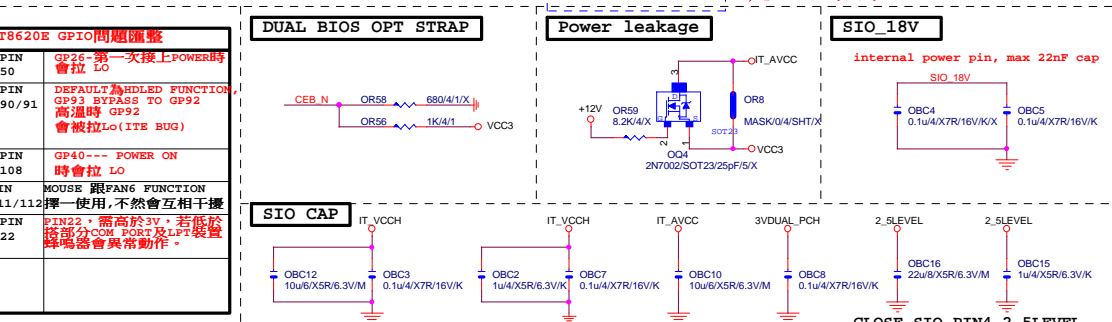
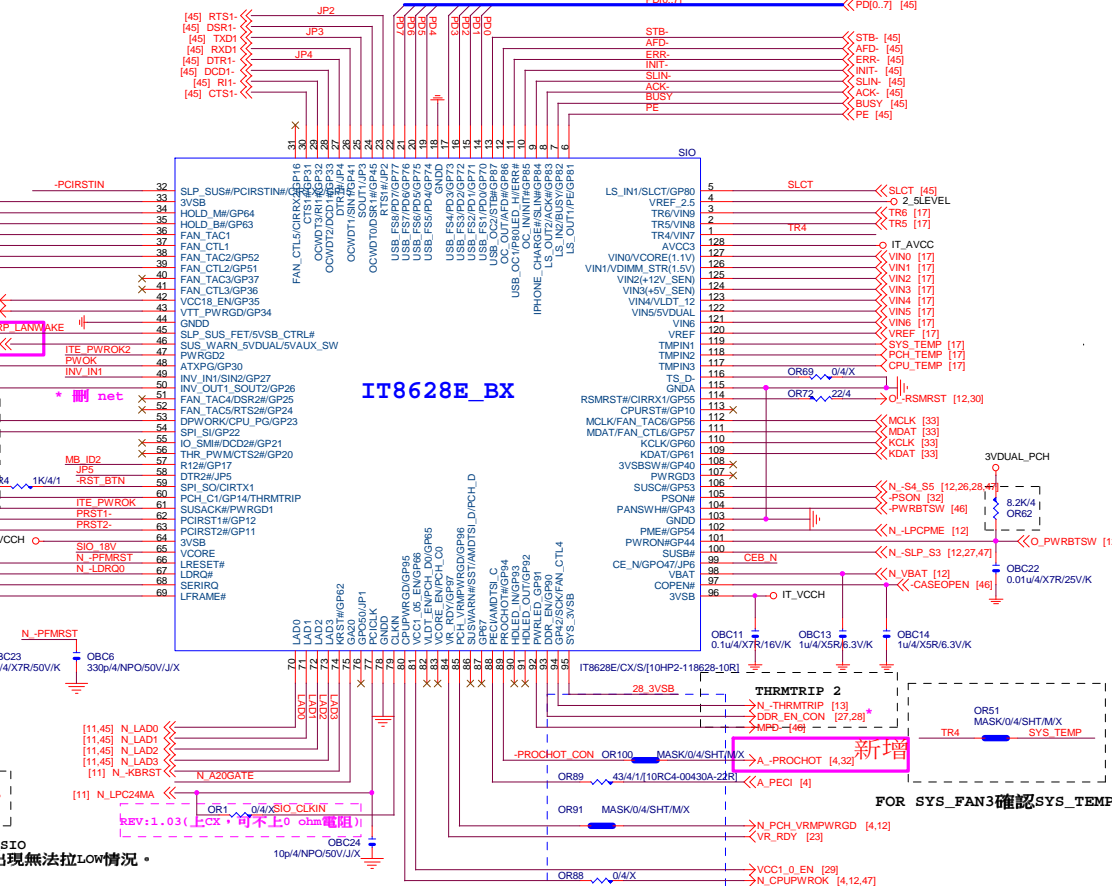
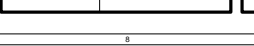
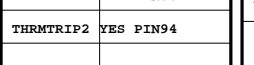
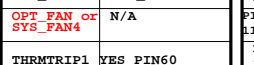
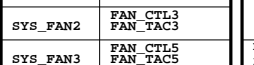
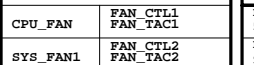
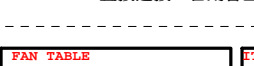
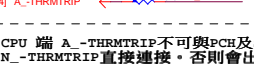
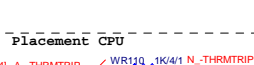
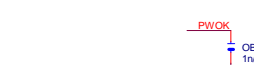
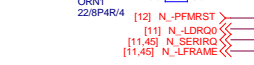
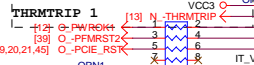
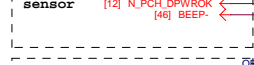
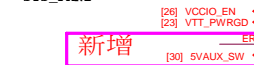
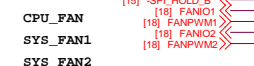
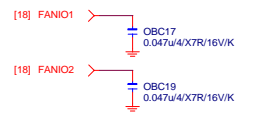




LCP/G-FL/1.27mm/200MIL/WHITE[10SL2-000008-31R]/X

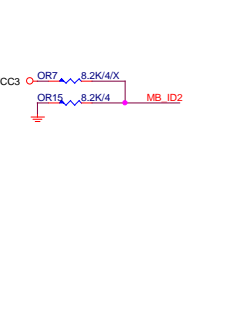
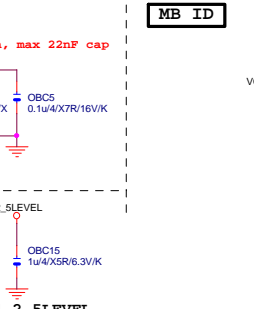
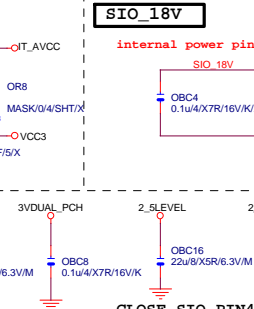
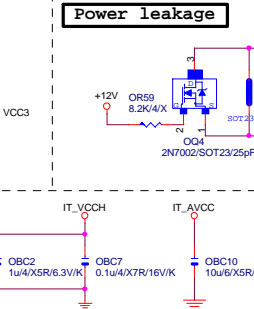
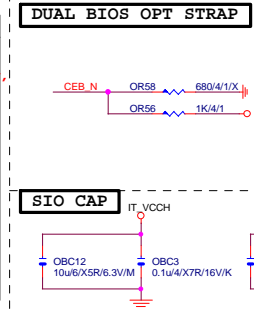
\* 試産先上 , PVT 移除

SIO IT8628BX REV:1.07

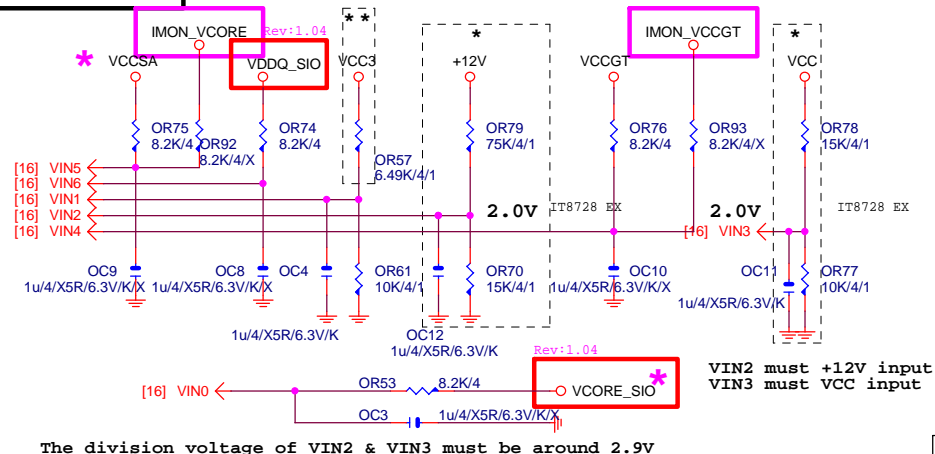
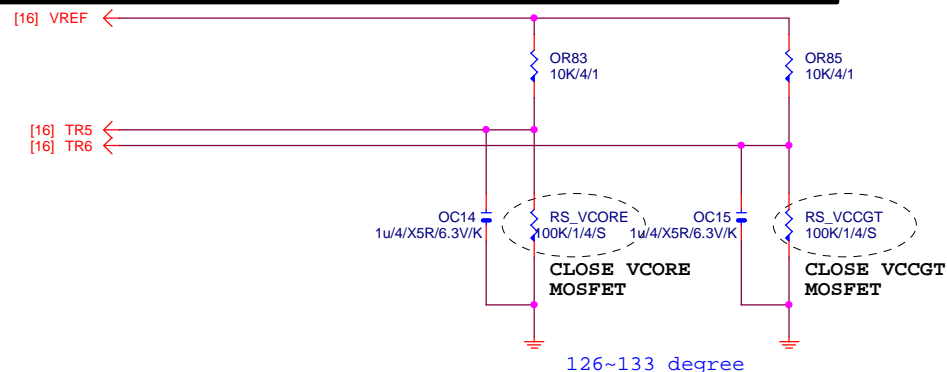
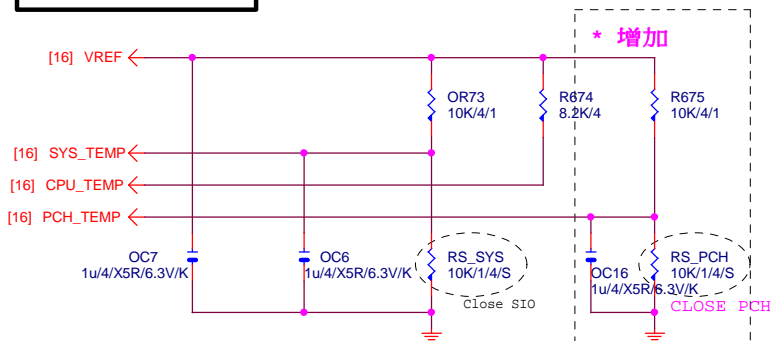


FAN TABLE	
CPU_FAN	FAN_CTL1 FAN_CTL1
SYS_FAN1	FAN_CTL2 FAN_CTL2
SYS_FAN2	FAN_CTL3 FAN_CTL3
SYS_FAN3	FAN_CTL4 FAN_CTL4
OPT_FAN or SYS_FAN4	N/A
THRMTRIP1	YES PIN60
THRMTRIP2	YES PIN94

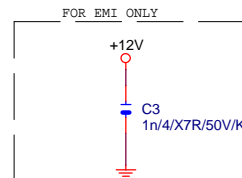
IT8620E GPIO問題匯整	
PIN 50	GP26-第一次接上POWER時 會拉 Lo
PIN 90/91	DEFAULT為HDLED FUNCTION, GP93 BYPASS TO GP92 高溫時 GP92 會被拉 Lo (ITE BUG)
PIN 108	GP40--- POWER ON 時會拉 Lo
PIN 111/112	MOUSE 跟 FAN6 FUNCTION 擇一使用,不然會互相干擾
PIN 22	PIN22, 需高於3V, 若低於 此部分COM PORT及12V裝置 線路會異常動作



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ITE 8628 LPC IO	
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The division voltage of VIN2 & VIN3 must be around 2.9V



```
VIN2 must +12V input
VIN3 must VCC input
```

## Gigabyte Technology

Title	HWM,KB/MS, FAN CTRL
-------	---------------------

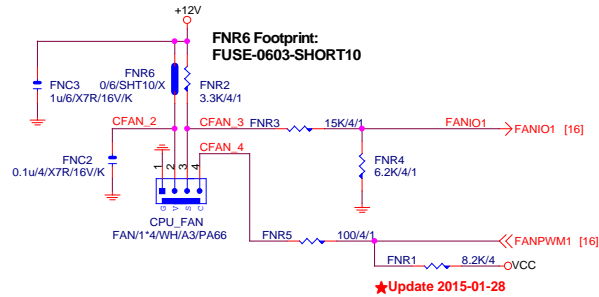
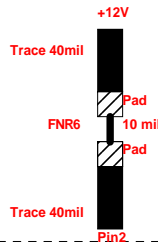
Size	Document Number
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CPU SMART FAN

Rev: 0.51



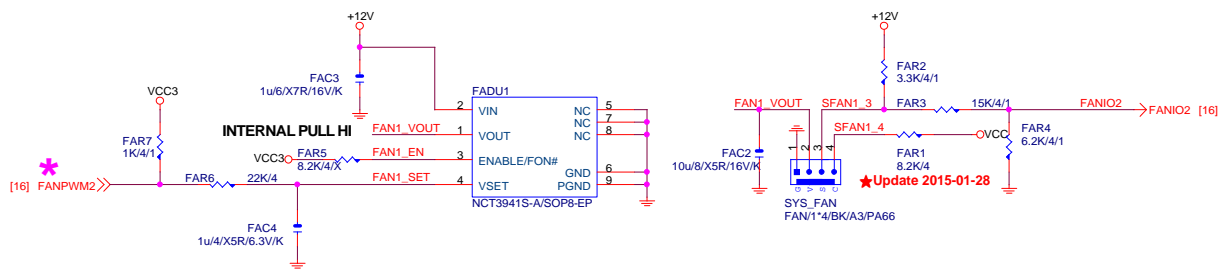
SYSTEM FAN1

A.

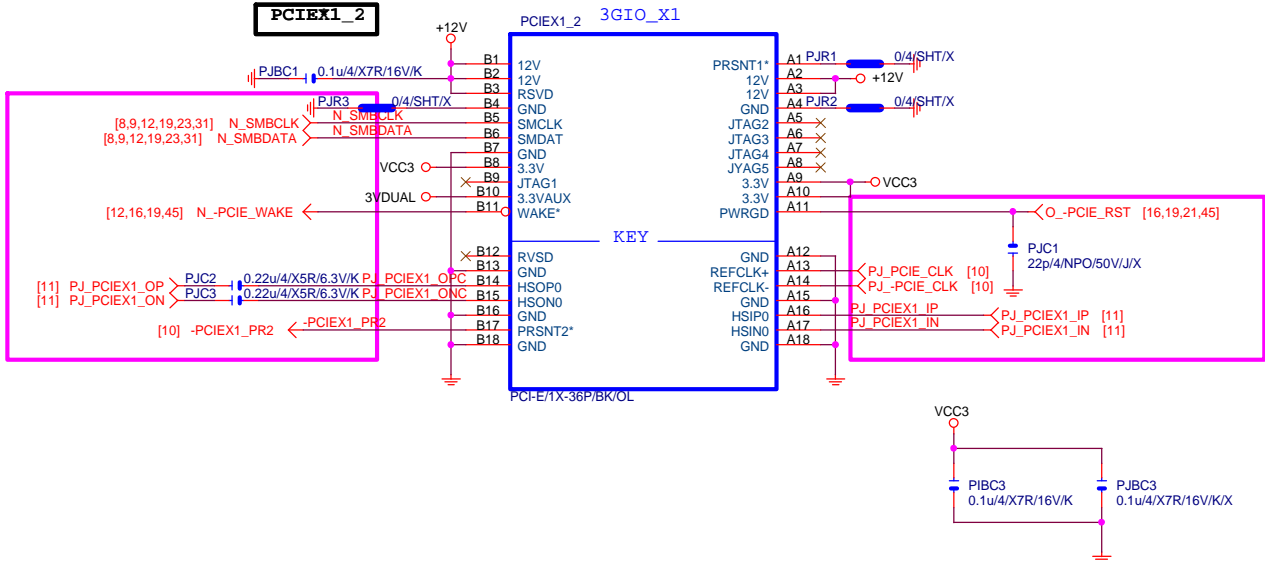
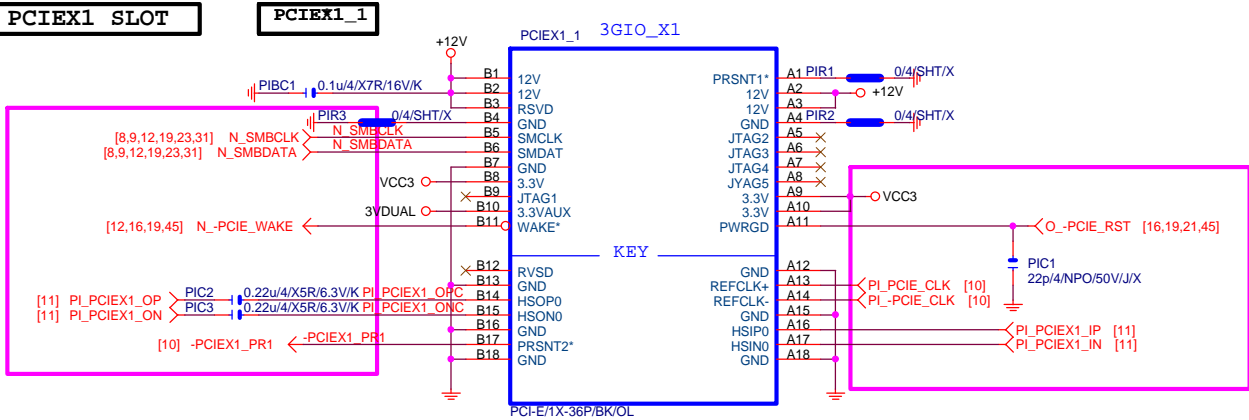
Linear SYS\_FAN

Enable Function (NCT3941S)

Full Turn On Function (NCT3941S-A)







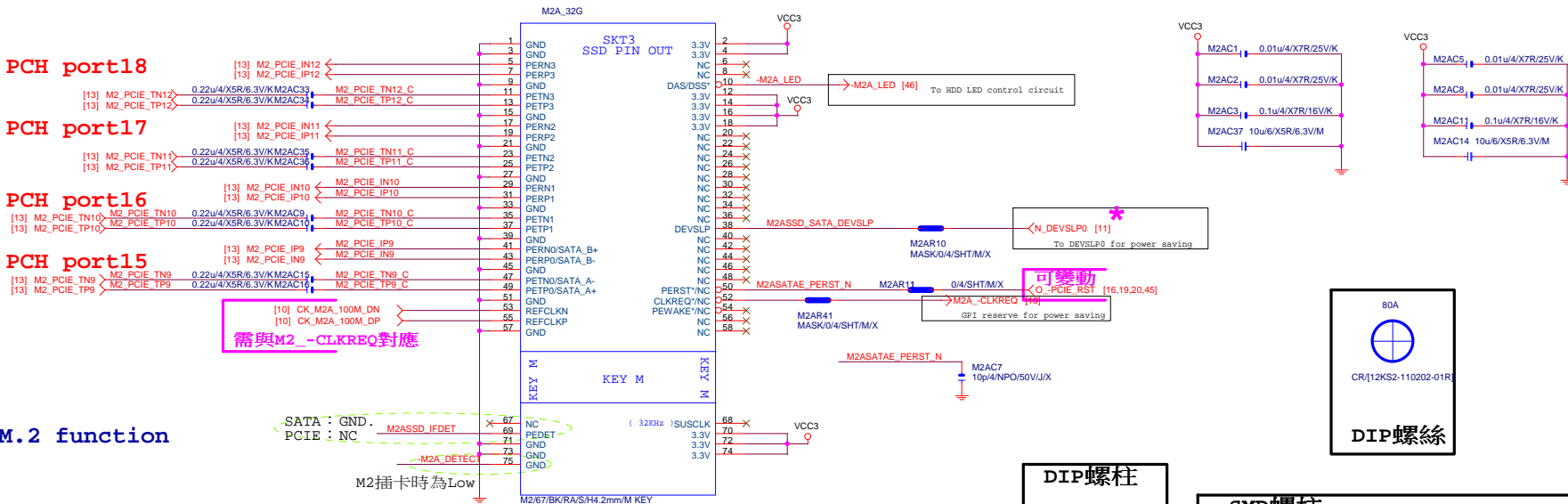


M.2 Lane4 from PCH port18

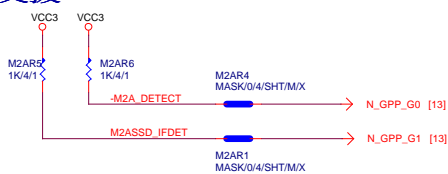
### M.2 Lane3 from PCH port17

M.2 Lane2 from PCH port16

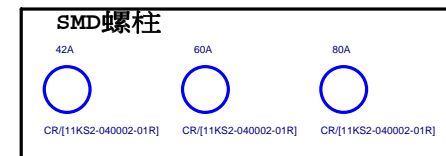
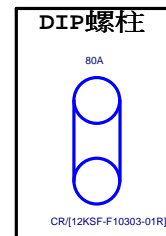
M.2 Lane2 from PCH port15

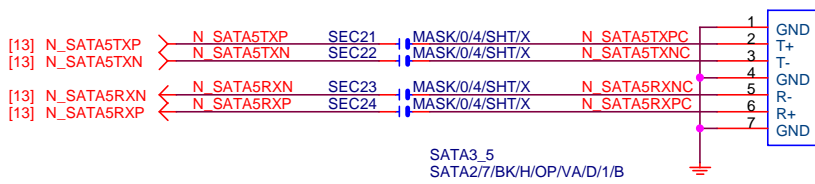
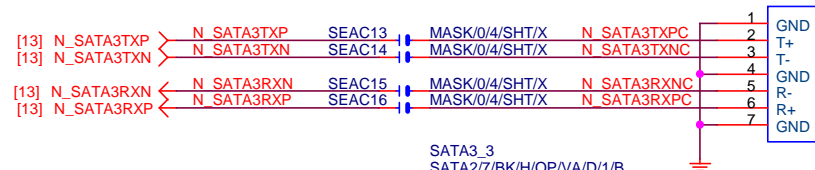
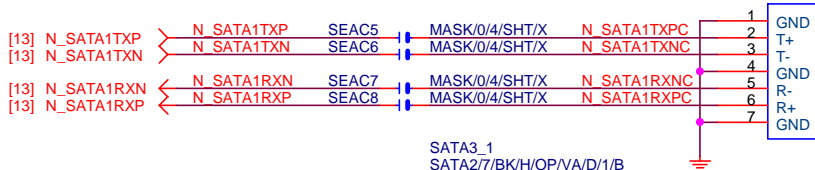
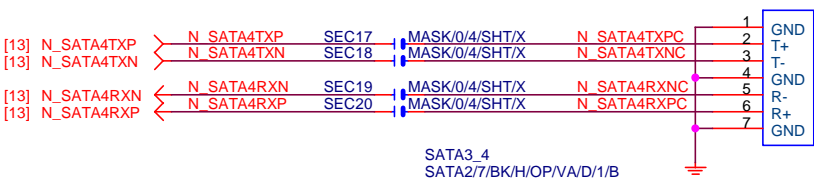
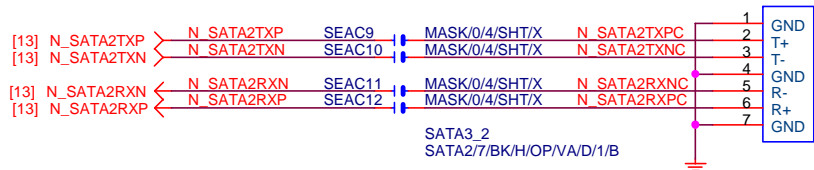
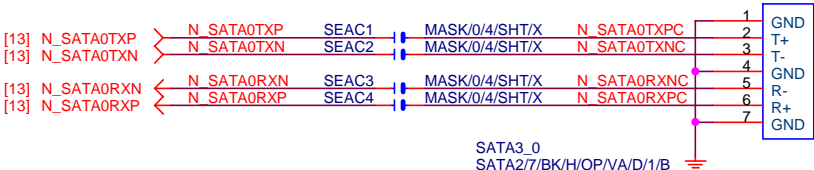


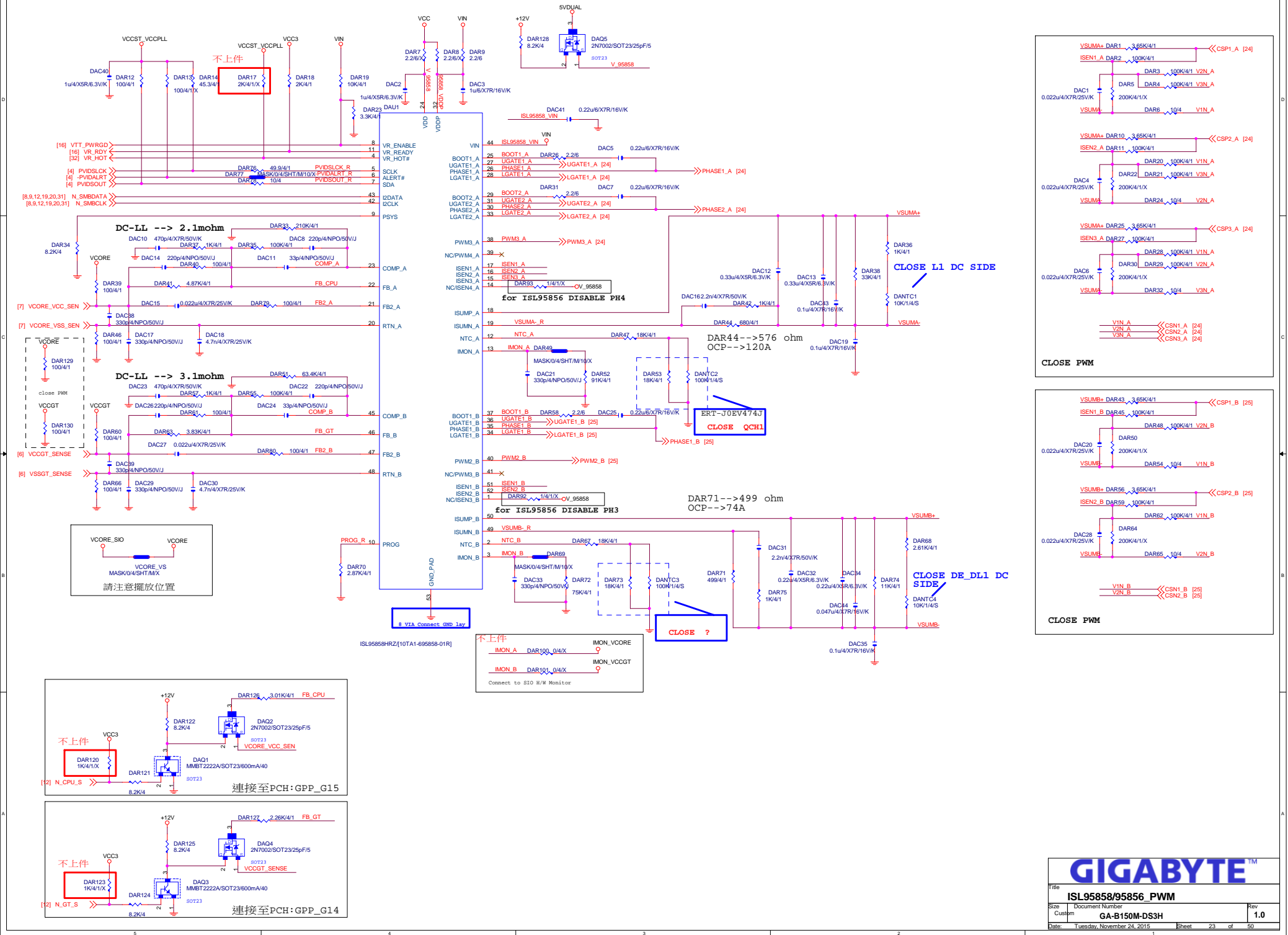
支援SATA and M.2 function



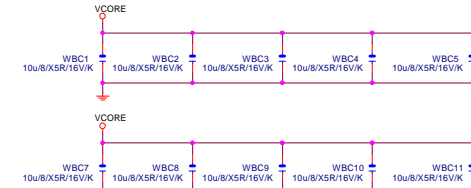
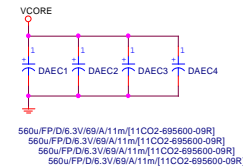
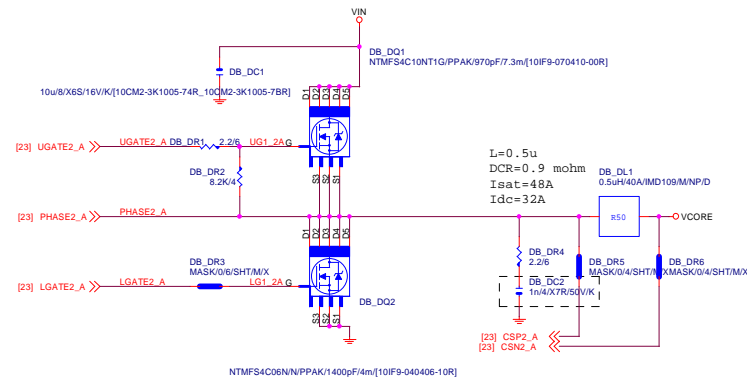
M.2 有插卡 /沒插卡 GPP_G0	M.2插何種卡？ GPP_G1	SATA Express 插何種硬碟？ GPP_E0/E2/F1	I015 (S0)	I016 (S1)	I017	I018	I019 (S0)	IP20 (S1)
有插卡 (Low)	SATA Mode (Low)	SATA (Hi)	SATA (M.2)	PCIe x1	PCIe x1	PCIe x1	PCIe x1	SATA
		SATA Express (Low)	SATA (M.2)	PCIe x1	PCIe x1	PCIe x1	SATA Express	
	PCIe Mode (Hi)	SATA (Hi)	PCIe 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	



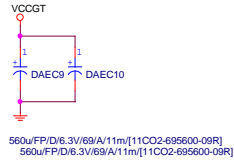


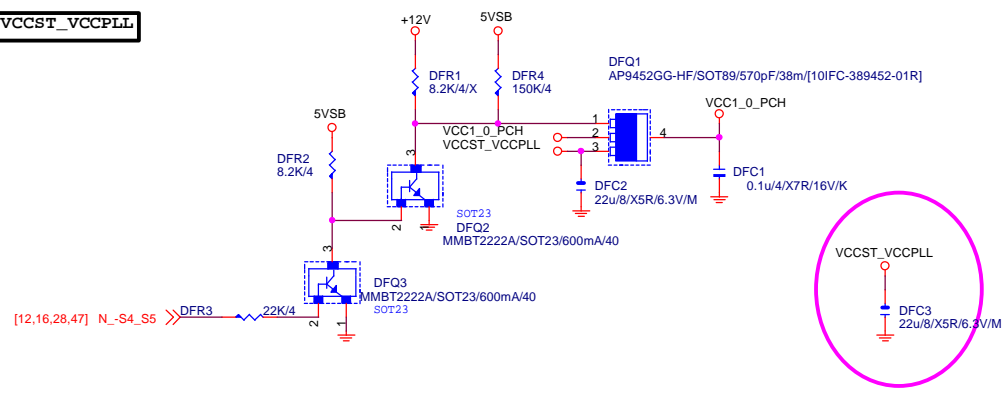
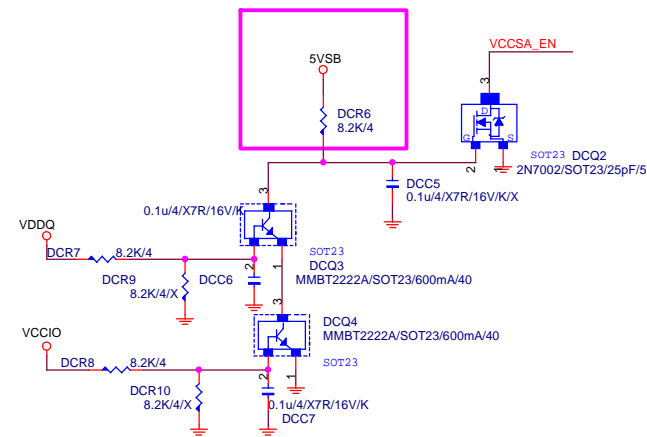
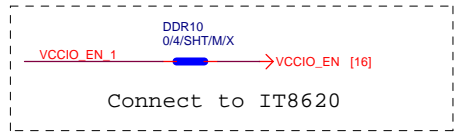
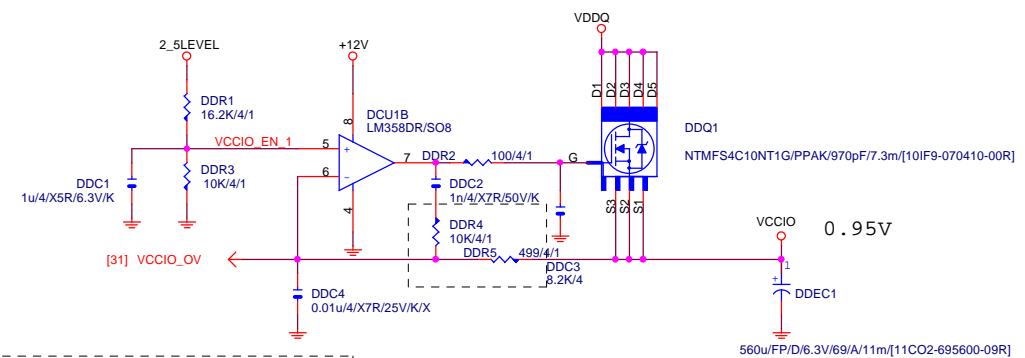
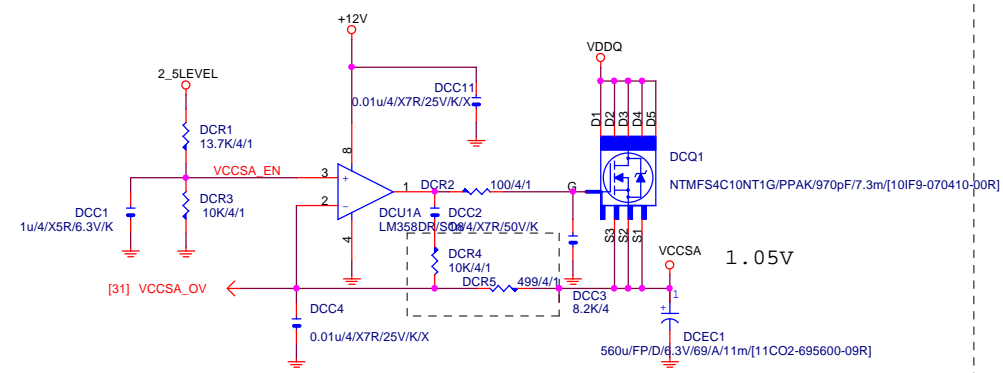


VCORE



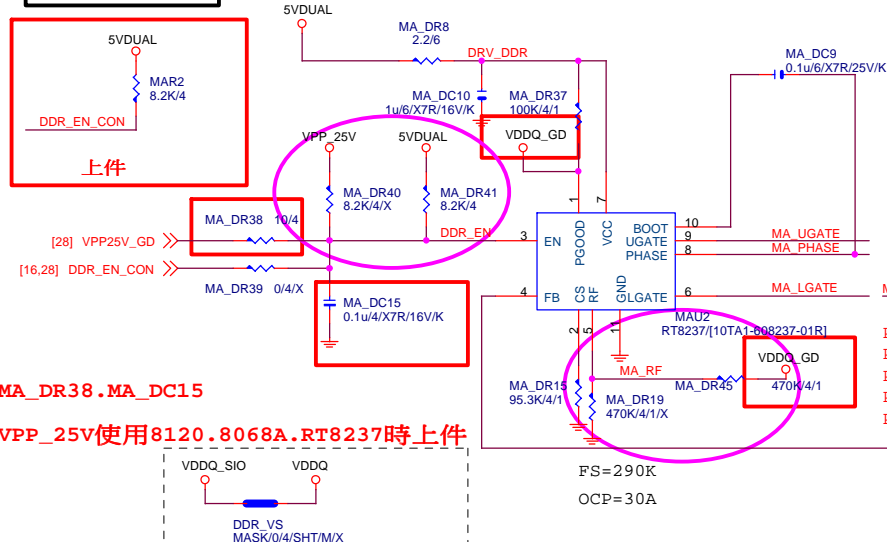
560u\*5PCS  
22u\*15PCS



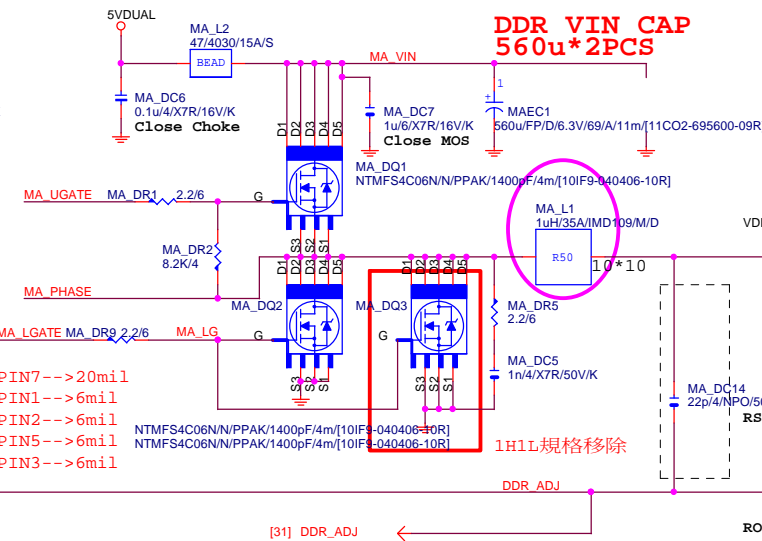




## DDR4



```
PIN7-->20mil
PIN1-->6mil
PIN2-->6mil
PIN5-->6mil
PIN3-->6mil
```



CHOKER與CAP料號可變

SUPPORT DDR4 1.2V

25A MAX  
L=0.5uH  
DCR=1.05mΩ  
Isat=40A  
MA DR13  
Idc=30A

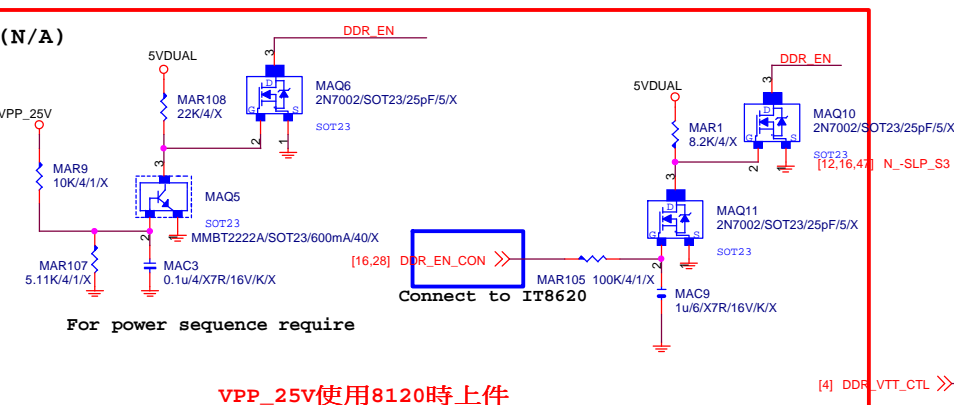
請放置CHOKE一出來位置.先預留.  
請自行確認ripple後再決定是否上件

Remote sense請從最重的負載端點拉回

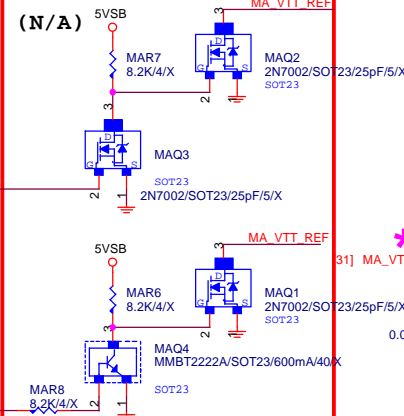
---

PWR SEQ

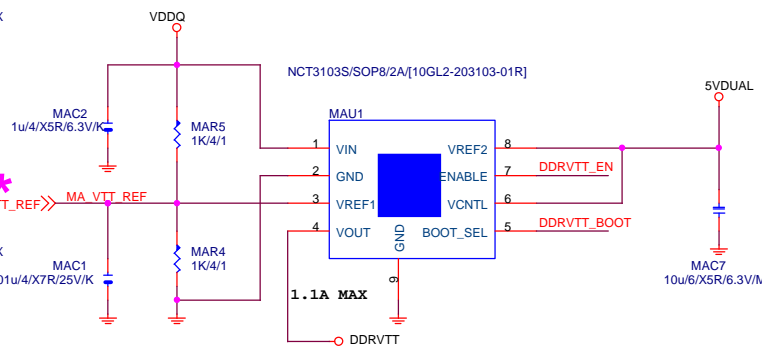
CLOSE TO DDR POWER PLANE



MAU1上RT9045時上件(不可MASK  
(N/A) 5VSB MA VTT F



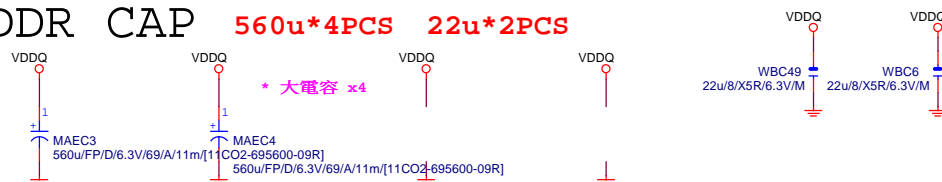
DDRVTT



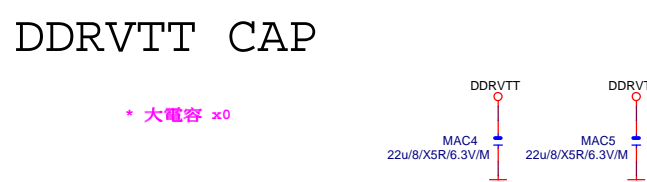
DDR VTT\_CTL MAR110 0/4 DDRVTT\_EN  
N\_SLP\_S3 MAR111 0/4 DDRVTT\_BOOT

MAU1上NCT3103S時上件(不可以改short pad)

DDR CAP 560u\*4PCS 22u\*2PCS



DDRVTT CAP



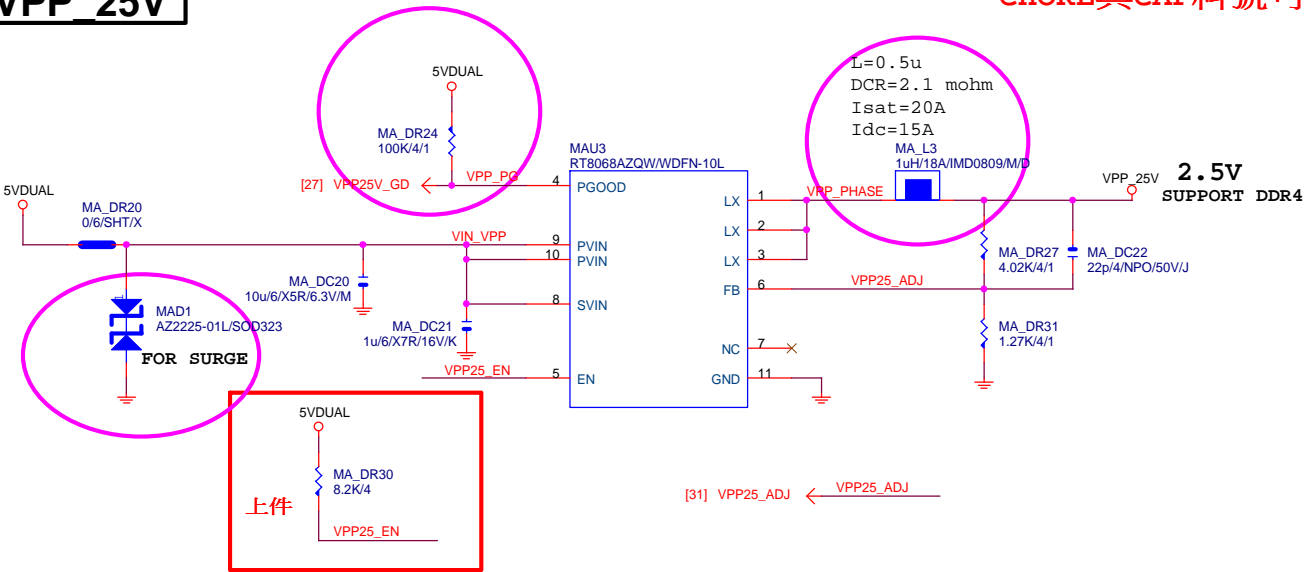
# GIGABYTE™

REV:0.33

VPP\_25V

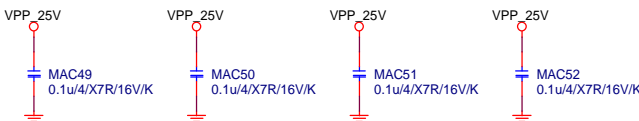
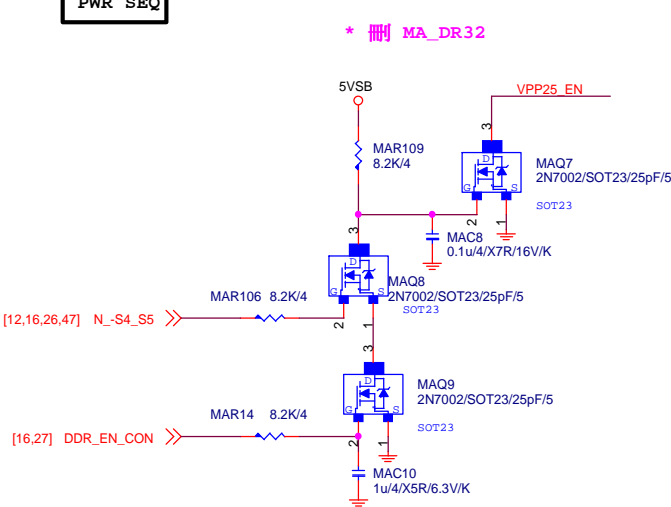
VPP25V\_GD不能使用會亂打

CHOKE與CAP料號可變



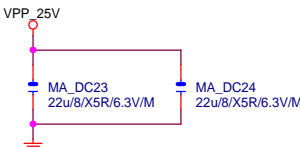
PWR\_SEQ

\* 刪 MA\_DR32



VPP CAP 22u\*1PCS

\* 大電容 x0



GIGABYTE™			
Title			
RT8068A_VPP25 POWER			
Size	Document Number	Rev	
Custom	GA-B150M-DS3H	1.0	
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REV:0.47

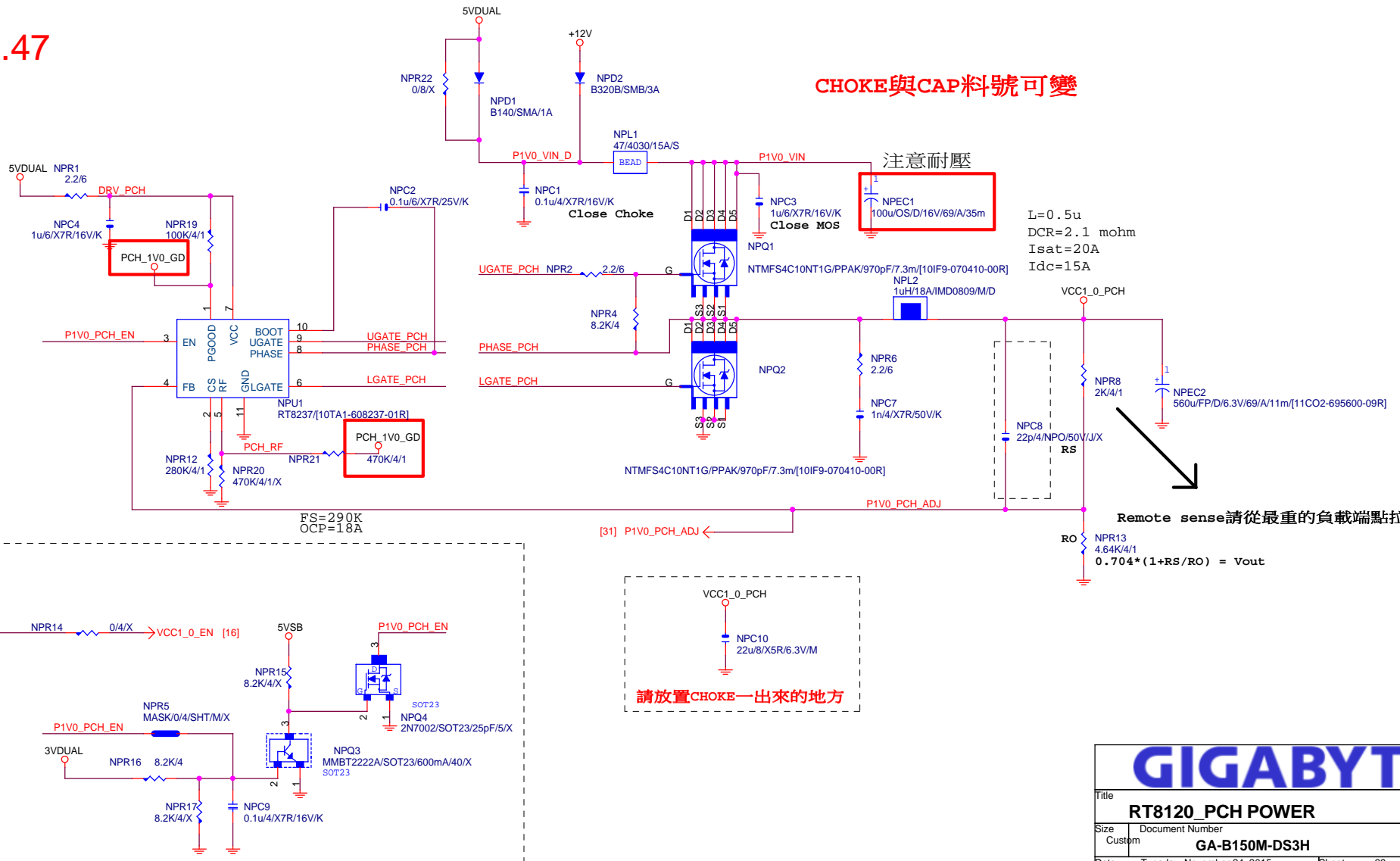
CHOKE與CAP料號可變

注意耐壓

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

Remote sense請從最重的負載端點拉回

GIGABYTE™			
Title RT8120_PCH POWER			
Size Custom	Document Number GA-B150M-DS3H		Rev 1.0
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## REV: 0.51

```
* 5Vdual , update
from SKL 0.2B
```



Title

## DISCRETE POWER

Size	Document Number
------	-----------------

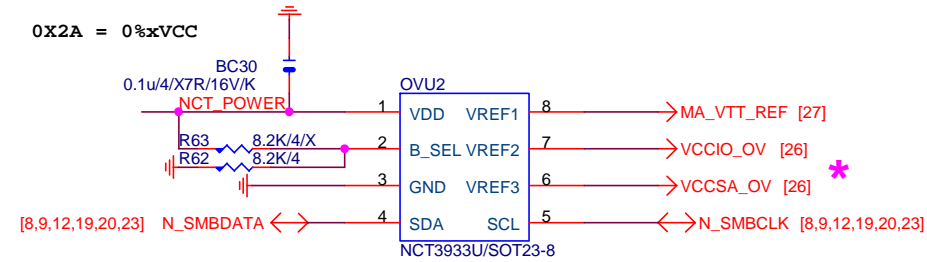
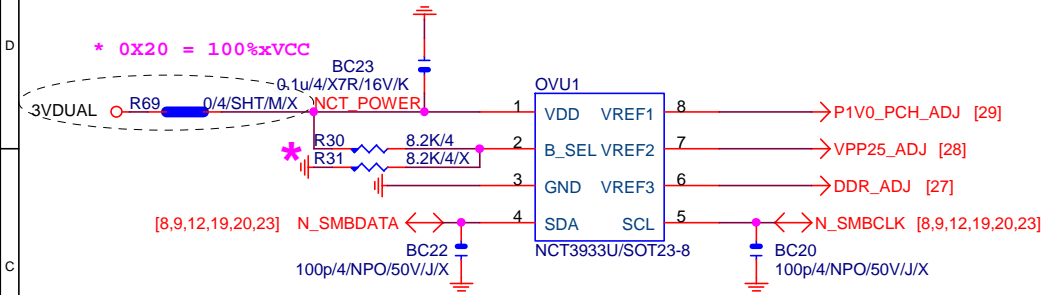
**GA-B150M-DS3H**

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OVER VOLTAGE



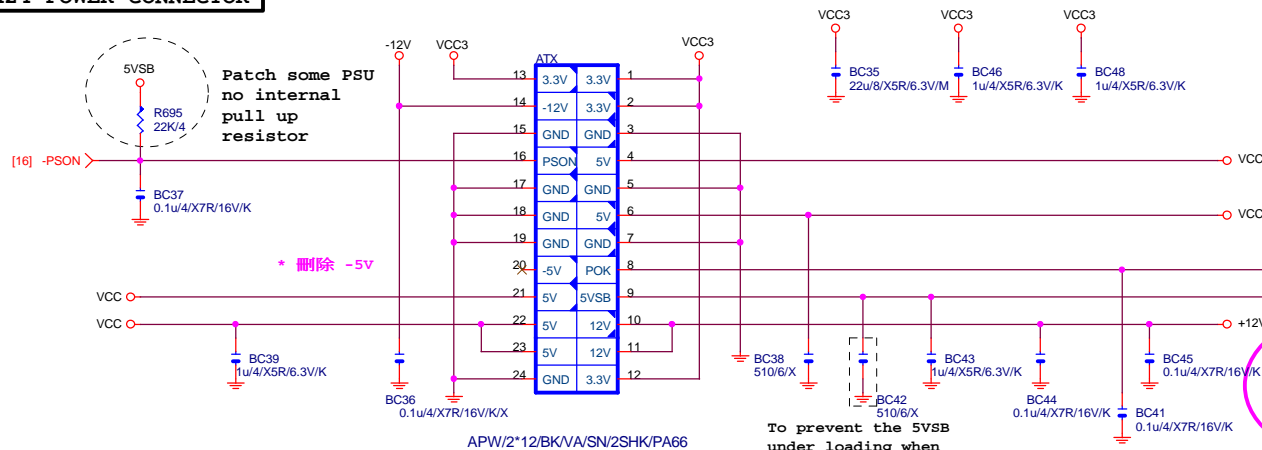
0X22 = 75%xVCC

\* 删除 OVU3

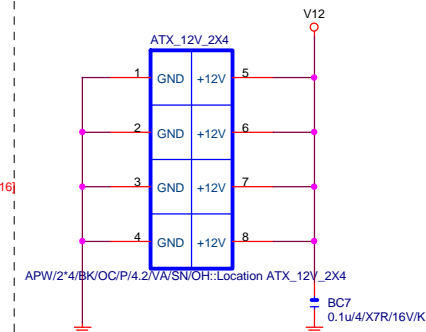
NCT3933	0X20	0X2A	
VREF1	PCH Core	DDRVTT	
VREF2	N/A	VCCIO	
VREF3	DDR	VCCSA	

Gigabyte Technology			
CPU CORE VR-2			
Size Custom	Document Number		Rev
	GA-B150M-DS3H		1.0
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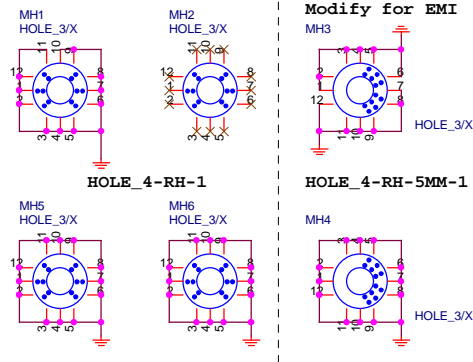
## ATXX24 POWER CONNECTOR



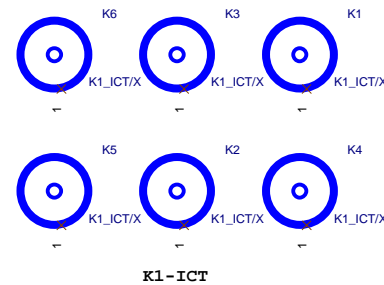
## ATXX4 POWER CONNECTOR



## 螺絲孔

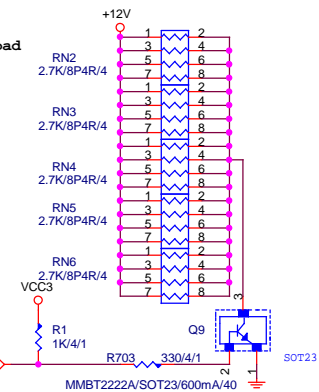


## 固定孔/光學點



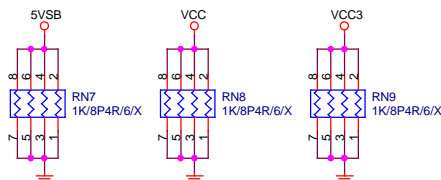
## +12V DUMMY LOAD

To fix 12V light load  
abnormal issue



【技術通報R&D技術通報153】

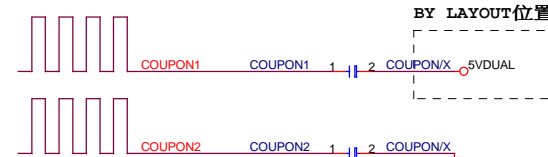
## DUMMY LOAD



## -PROHOT

[4,16] A\_-PROHOT ↔ A\_-PROCHOT R2 0/4/SHT/M/X → VR\_HOT [23]

## COUPON



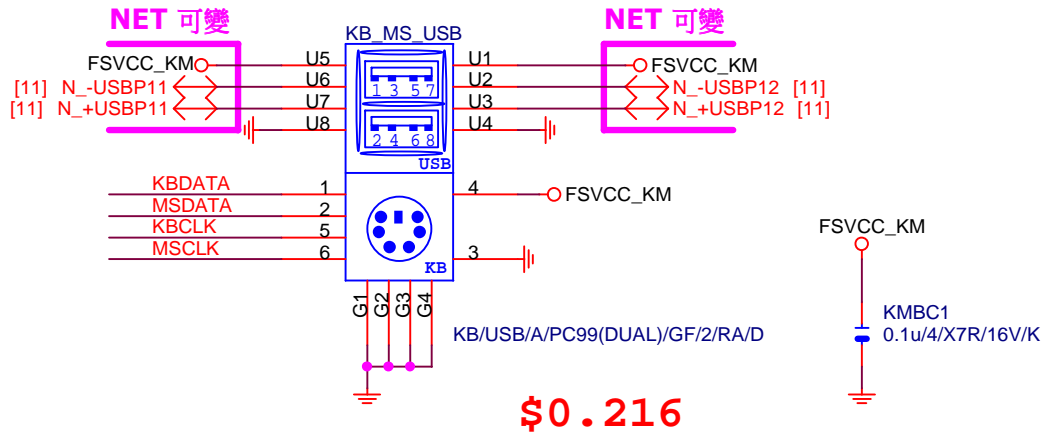
Gigabyte Technology

Title	ATX POWER CONNECTOR		
Size	Document Number	GA-B150M-DS3H	
Custom			Rev 1.0
Date:	Tuesday, November 24, 2015	Sheet 32	of 50

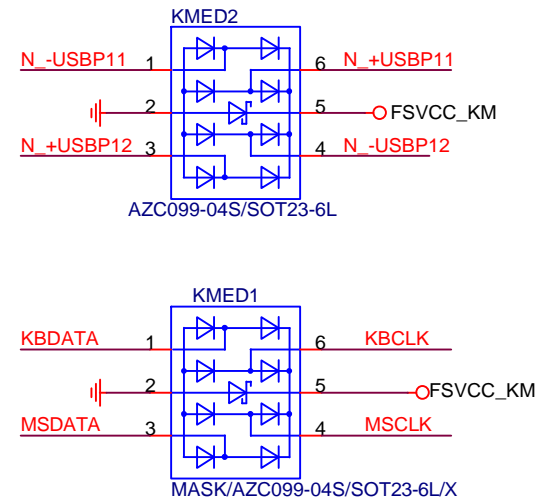


KB\_MS\_USB

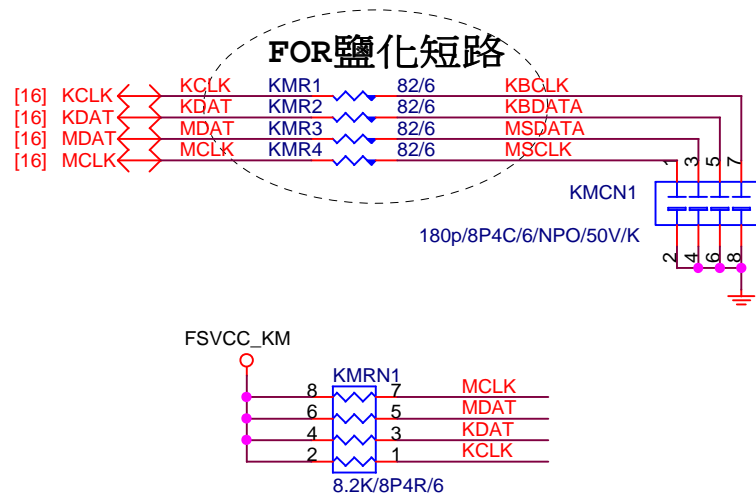
Rev: 0.54



ESD

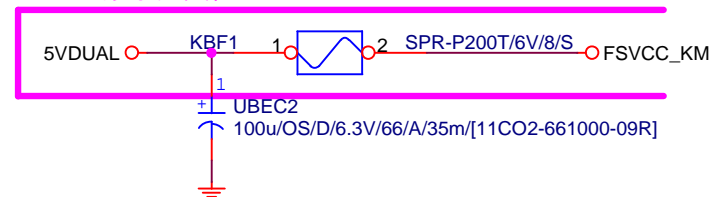


KB\_MS\_USB DAMPING/PU

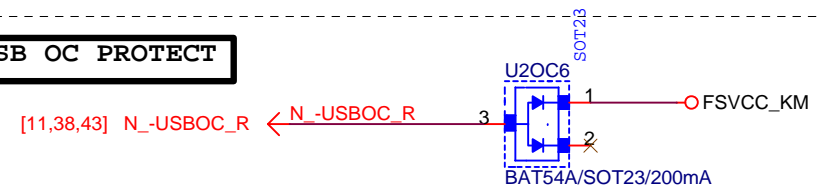


KB\_MS\_USB PWR

NET 可變, 與其他USB SHARE



USB OC PROTECT



Gigabyte Technology

Title

KB\_MS\_USB

Size  
A

Document Number

GA-B150M-DS3H

Rev  
1.0

Date: Tuesday, November 24, 2015

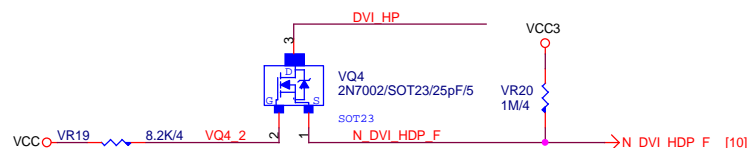
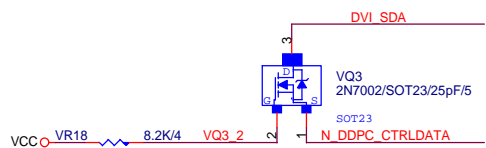
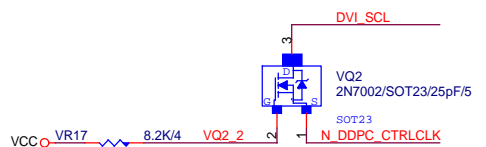
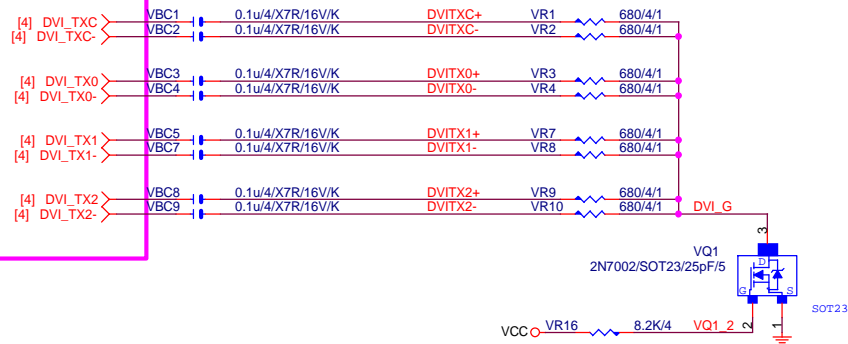
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## DVI

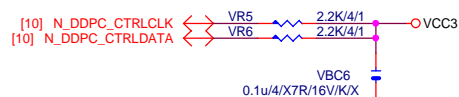
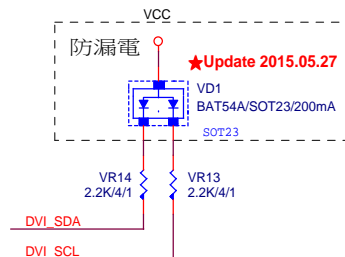
**Rev: 0.51**

## NET 可變

DVI:20/4/6/4/20  
Impedance=85 +- 17.5%



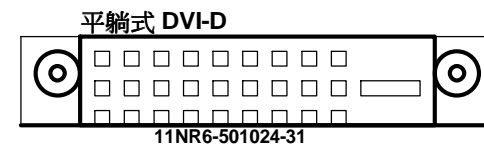
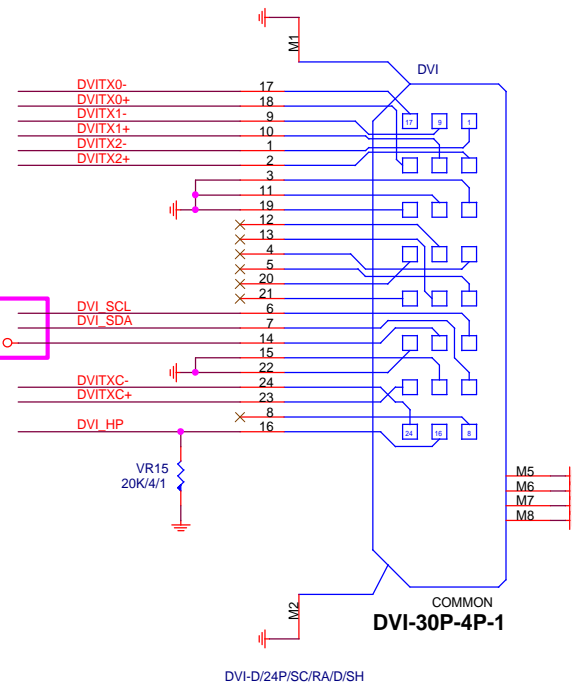
## DVI PU



## DVI CONN

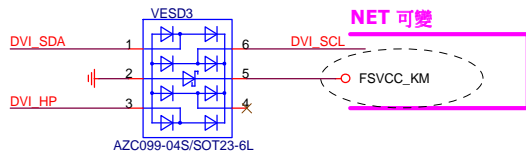
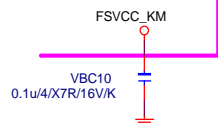
## NET 可變

— \*

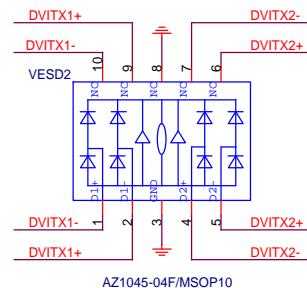


**ESD**

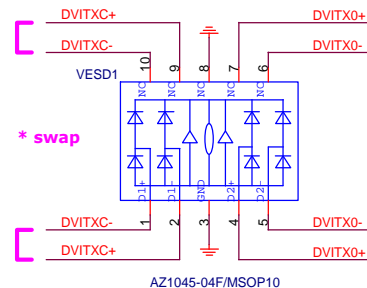
NET 可變



Close to connector



Close to connector



Close to connector

## Gigabyte Technology

Title
-------

## DVI

**GA-B150M-DS3H**

Rev	
1.0	

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[illegible]

ROM PART: PTN3356R1BS/[10HQ5-A23356-10R]

FLASH PART:

PTN3356F1BS/[10HQ5-A23356-20R]

省X'TAL COST DOWN:

1. 上件:

DVC28 [10p/4/NPO/50V/J]

DVC11 [10p/4/NPO/50V/J]~修改值

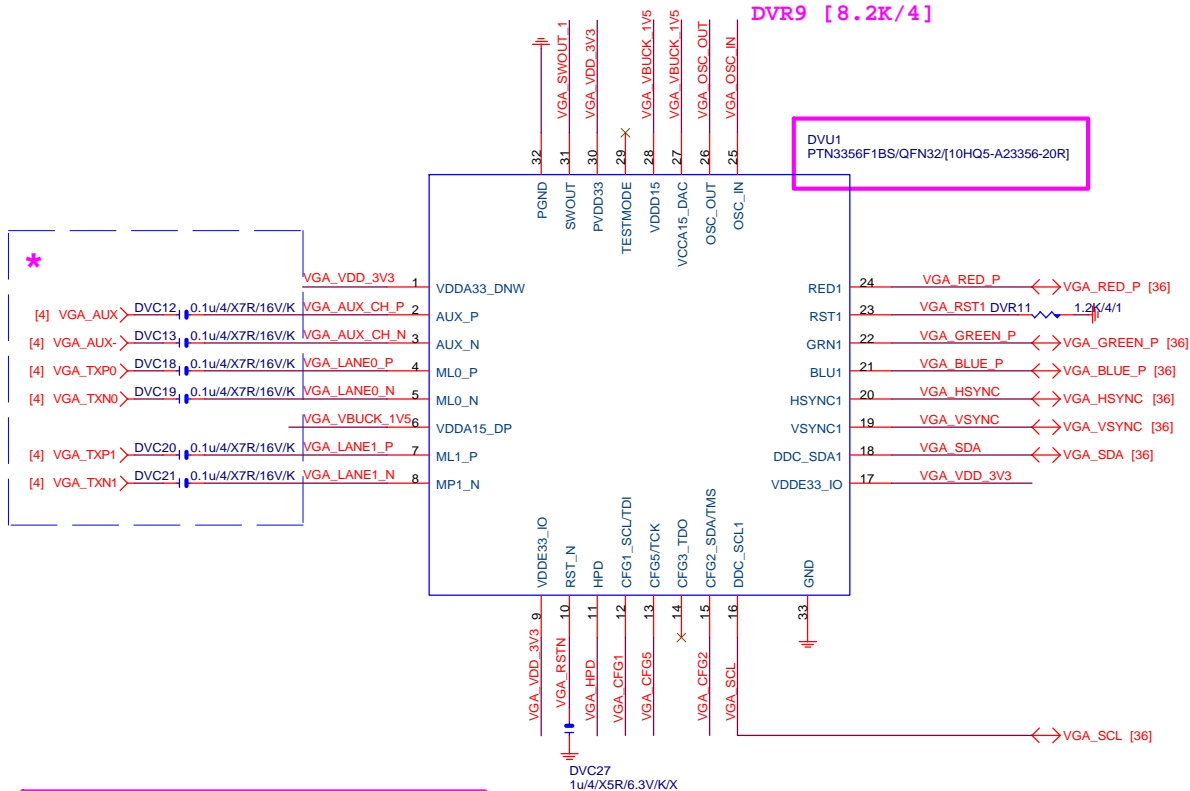
DVR10 [8.2K/4]

2. 删除:

DVX1 [25M/16p/30ppm/49US/20/D]

DVC10 [20p/4/NPO/50V/J]

DVR9 [8.2K/4]



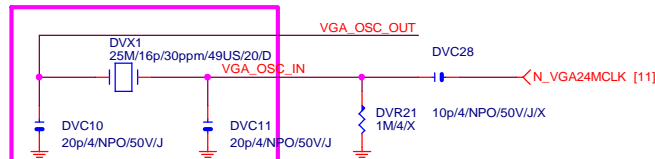
放置PCH端

[10] N\_DDPD\_CTRLCLK ↔ DVR19 [2.2K/4/1] → VCC3

[10] N\_DDPD\_CTRLDATA ↔ DVR20 [2.2K/4/1] → VCC3

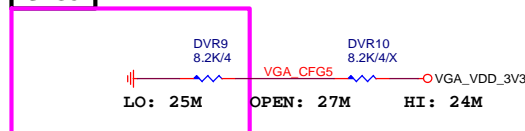
25M Crystal

FROM PCH 24MHZ ISSUE

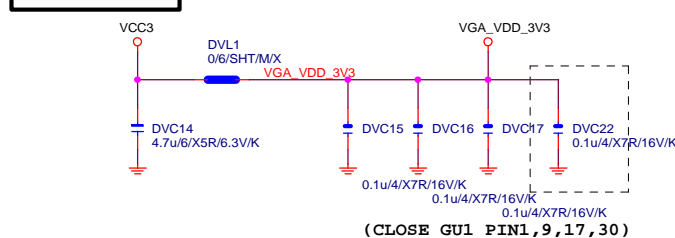


CFG5

For Crystal Less

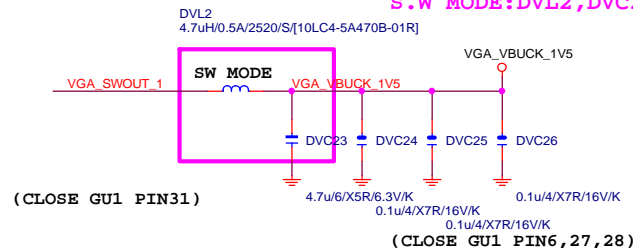


ADAPTER POWER



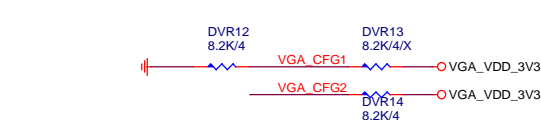
LDO MODE: DVL2, DVC23--->X

S.W MODE: DVL2, DVC23--->O

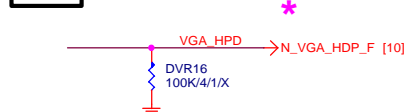


CFG1&amp;2

Non-Compliant



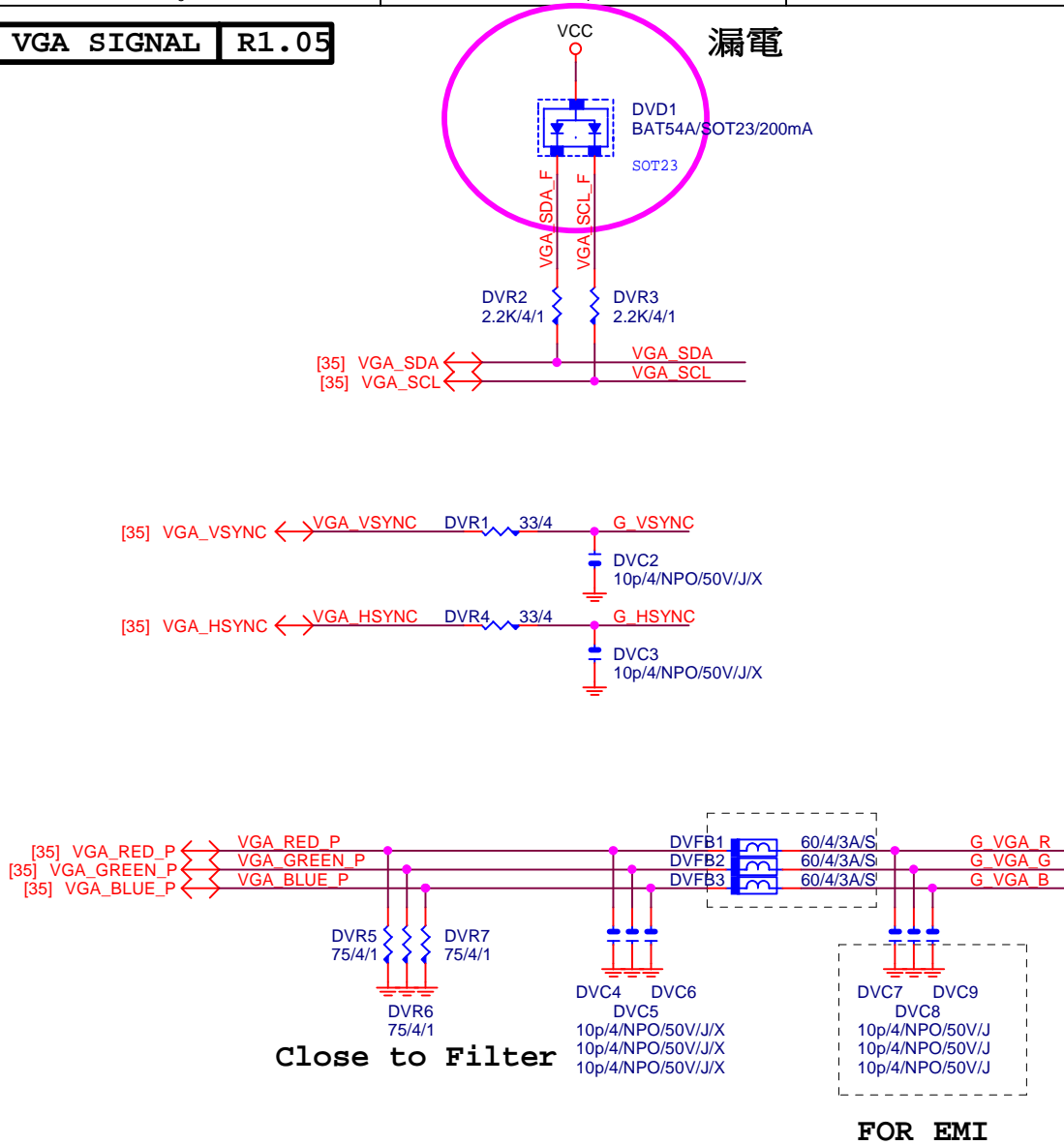
HPD



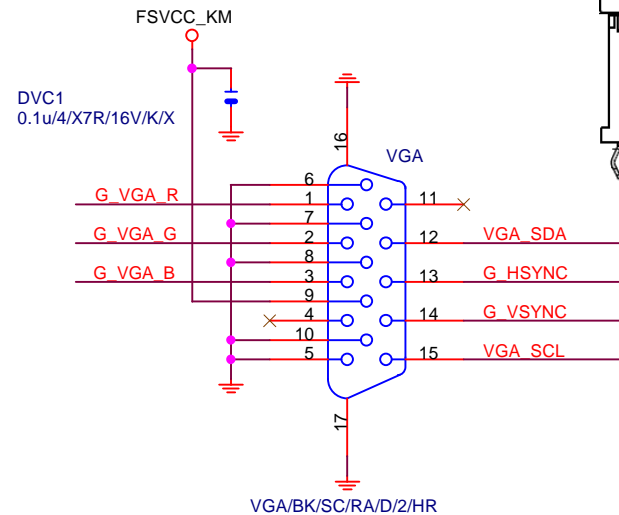
Gigabyte Technology

NXP-PTN3356

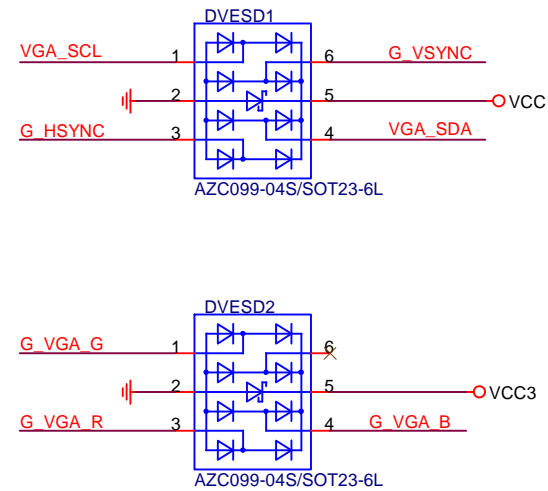
# VGA SIGNAL R1.05

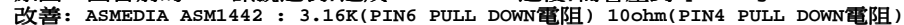


# VGA CONN. 架高型VGA ( BLACK )

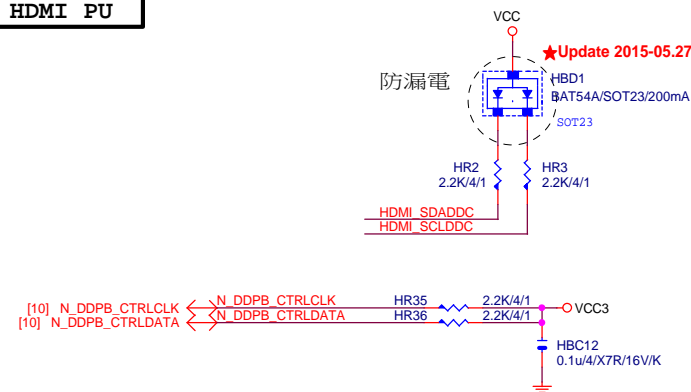


# VGA ESD

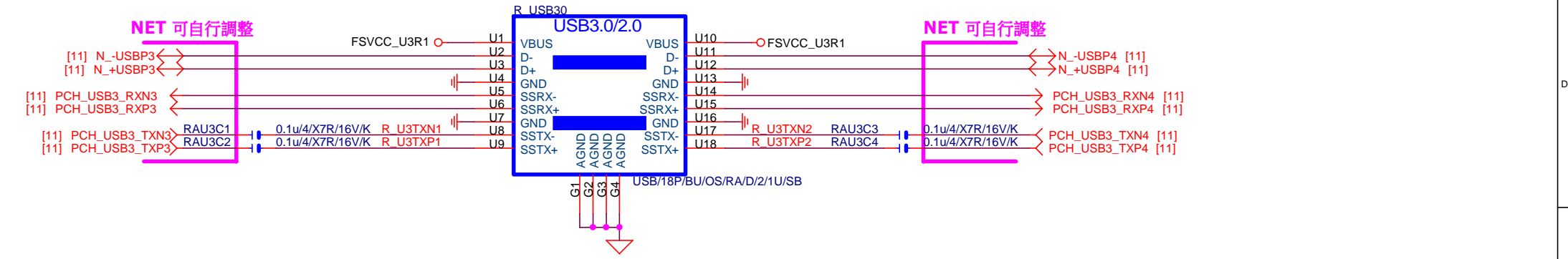


**Rev: 0.54**

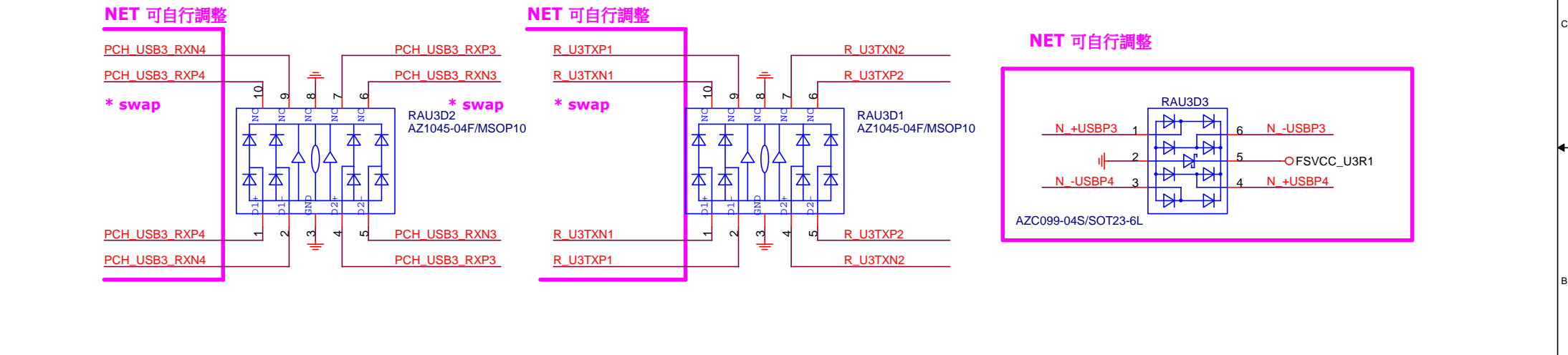
## FSVCC\_U3R1

Rev  
1.0

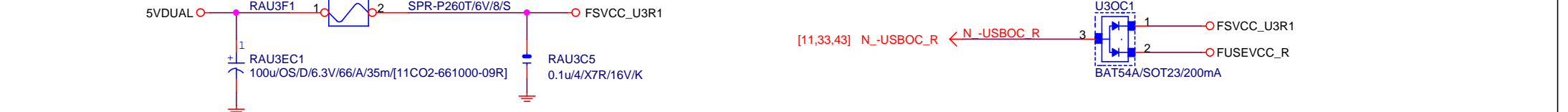
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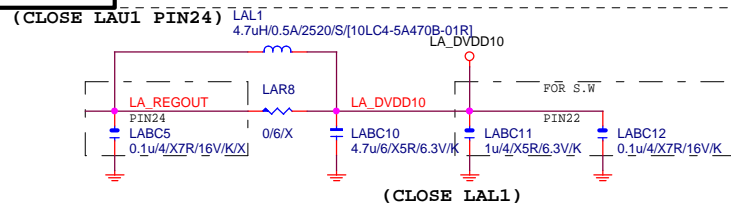
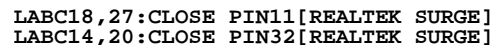
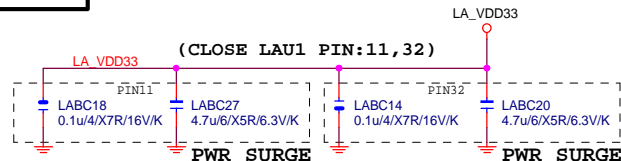
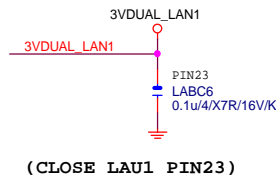
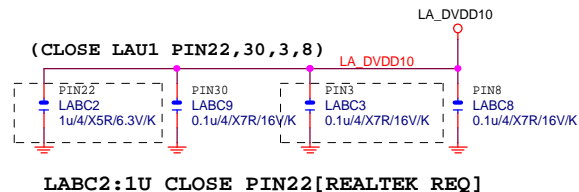
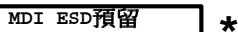
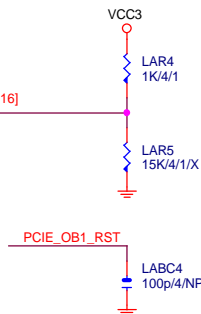
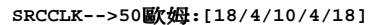


ESD



FUSE



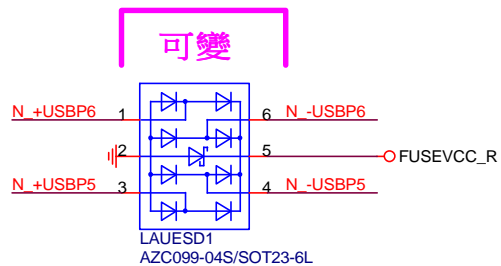


NOTE:  
RT8106E:PIN3,11,22,24-->NC  
LABC2LABC3,LABC5,LABC18,LABC27-->N/A

R1.06

RMA ESD PROTECT

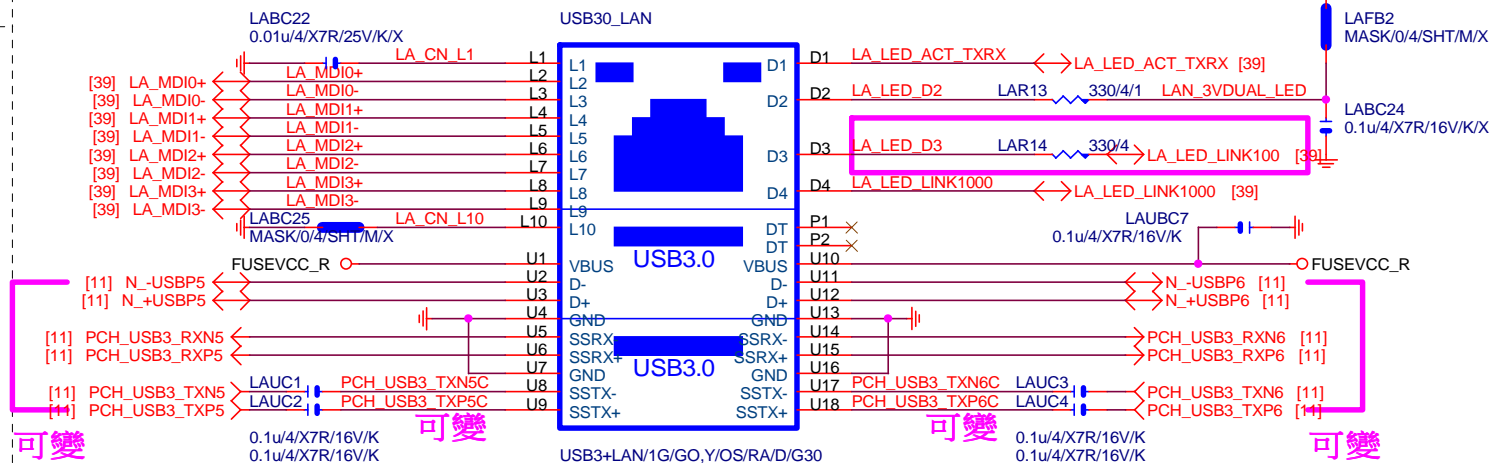
note:可變更USB NAME



## USB\_LAN CONNECTOR

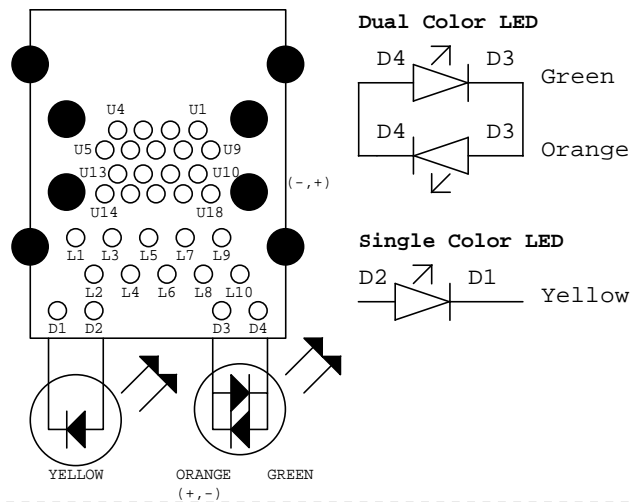
note:可變更USB NAME

[RTL8111G]



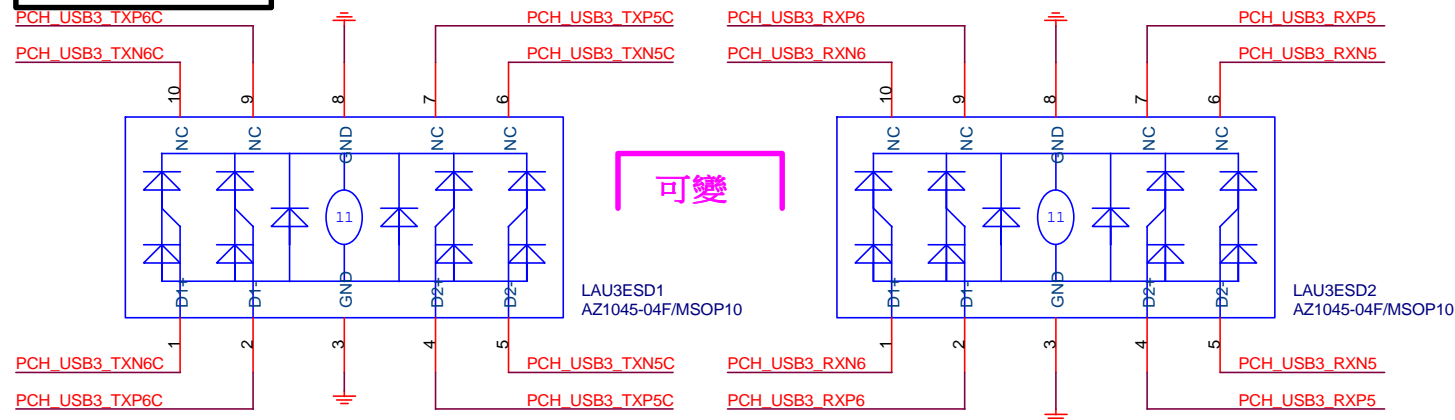
LA MDI-->100歐姆:[20/4/8/4/20]

### USB30\_LAN LAYOUT示意圖



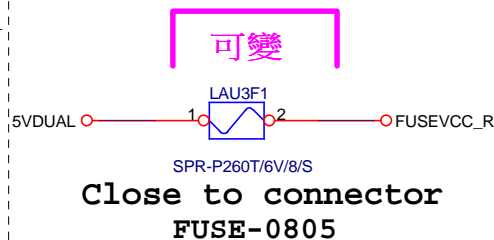
RMA ESD PROTECT

note:可變更USB NAME



## USB POWER

note:可變更FUSE



EMI SHORT PAD

PS:視EMI需求



LAN POWER

note: lan power連接及電流



## Gigabyte Technology

## LAN CONNECTOR-RTL8111G

Size	Document Number
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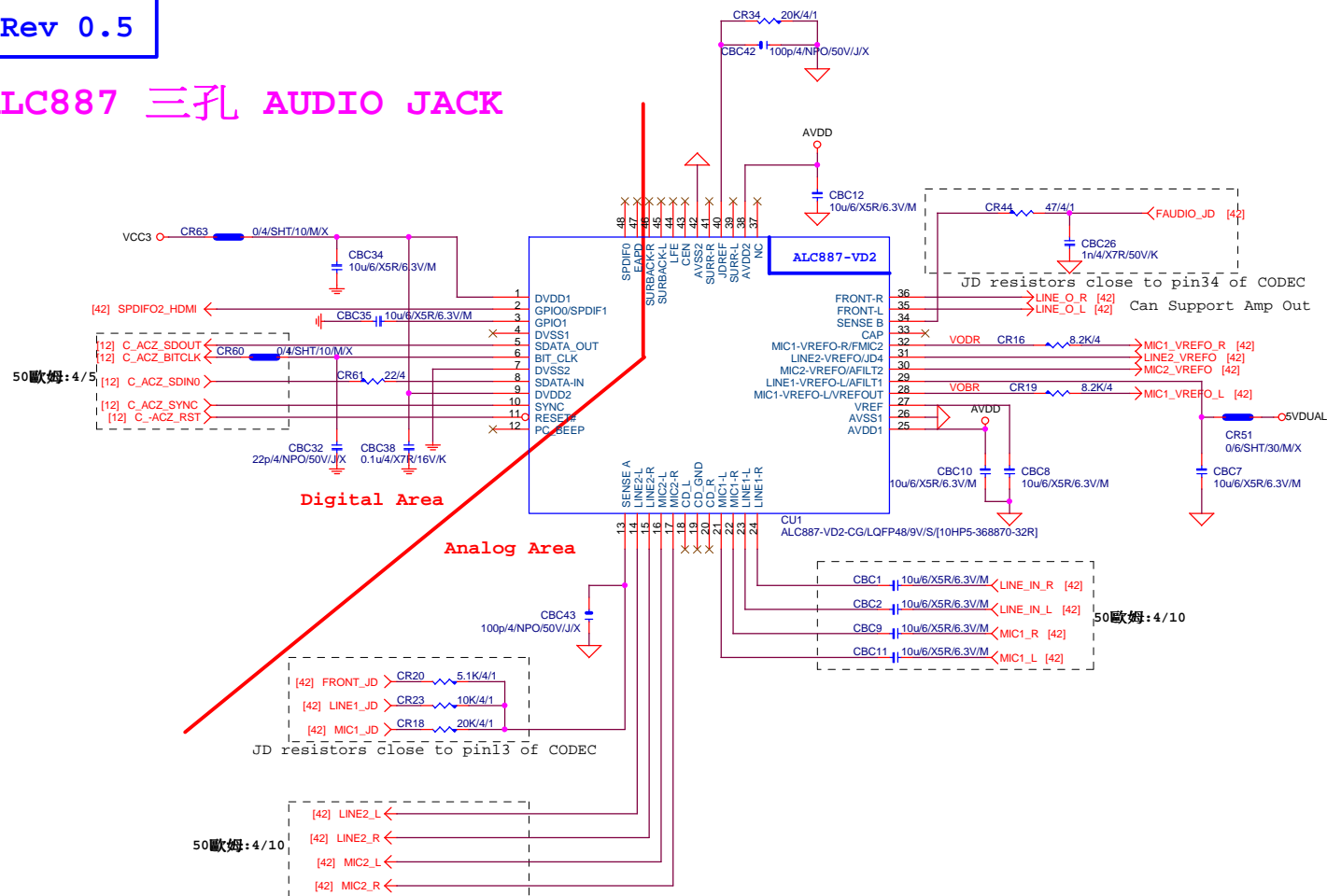
# GA-B150M-DS3H

Rev	1.0
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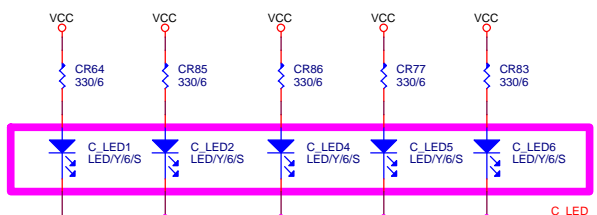
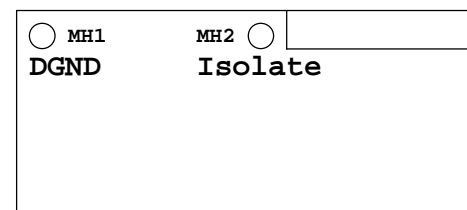


## ALC887 三孔 AUDIO JACK

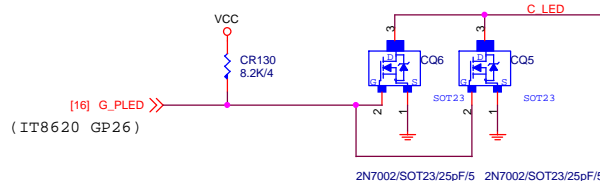


**LAYOUT注意: 螺絲孔下GND方式**

1. MH1空間夠, 下DGND
2. MH2一律改為Isolate



**VALUE可變, LED顏色請自行修改**  
(預設: 低亮度黃色LED: LED/Y/6/S)



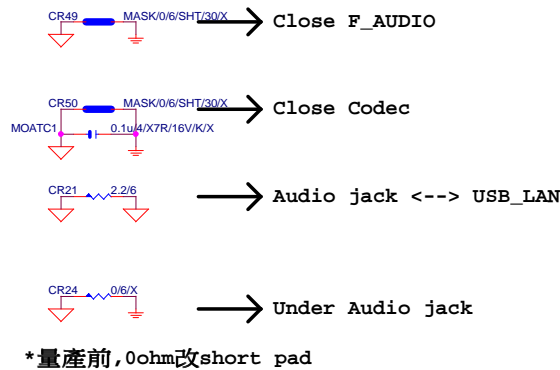
**BOM OPTION :**

1. Chemicon音效電容
2. 金屬外罩 Reserve (上件與否, 依照各Model spec)
3. LED Reserve (上件與否和LED顏色, 依照各Model spec)

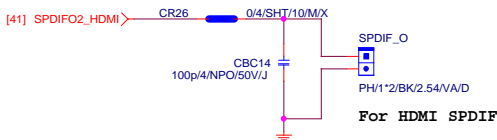
**LAYOUT注意: 要加**  
**GND切割線**



Rev 0.5

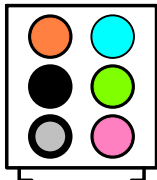


### SPDIF\_OUT

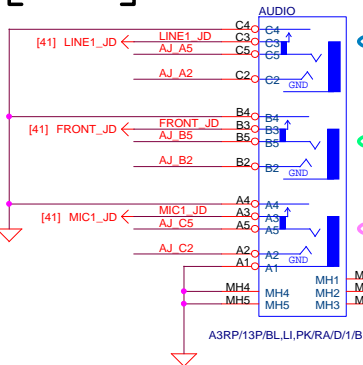


### SPDIF\_IN

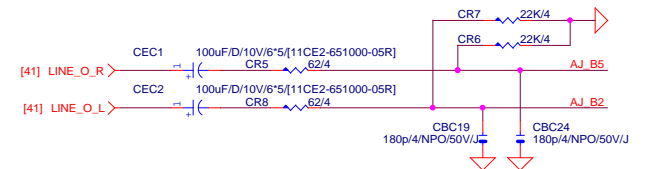
### AZALIA JACK



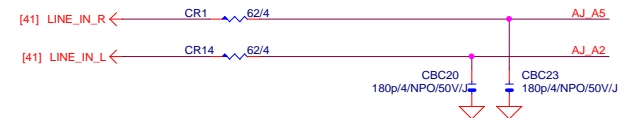
### AZALIA JACK



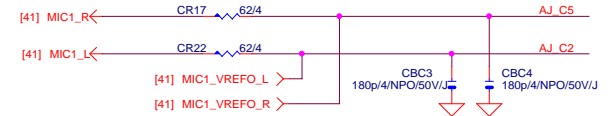
### LINE-OUT



### LINE-IN



### MIC-IN

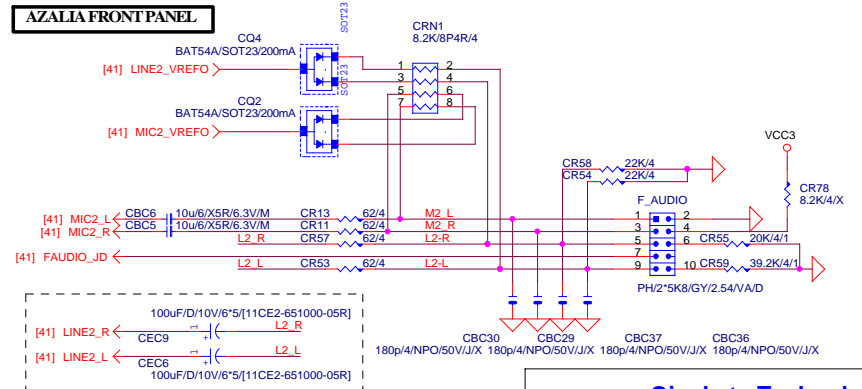


### SURROUND

### CEN/LFE

### SURRBACK

### AZALIA FRONT PANEL

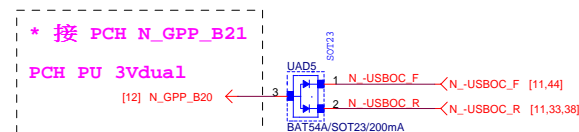
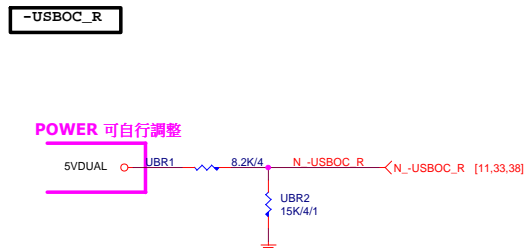
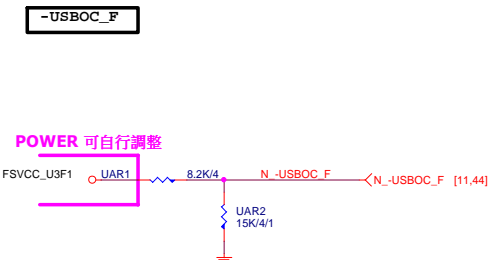
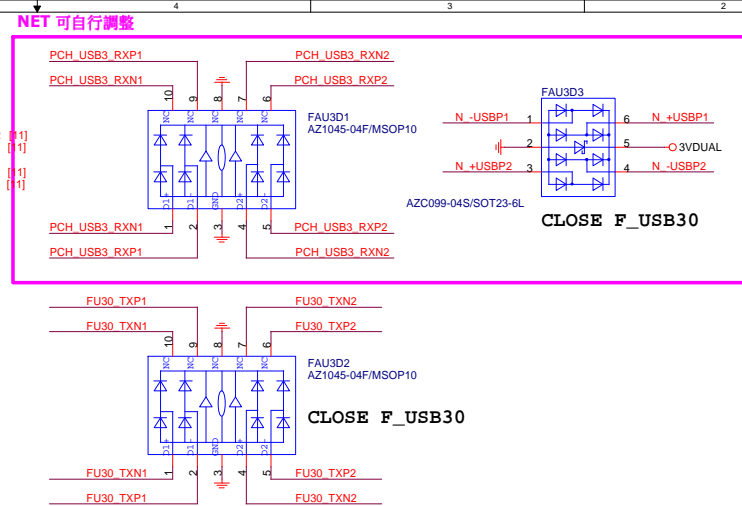
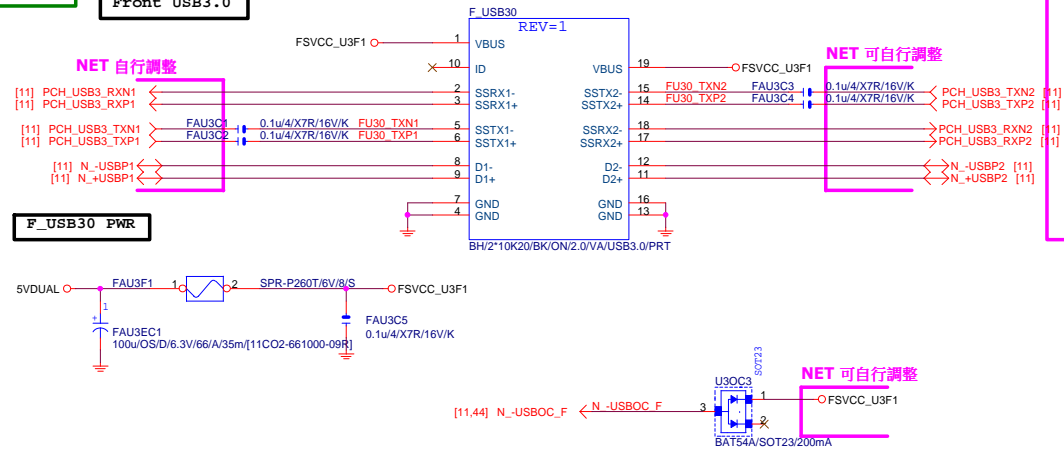


Gigabyte Technology

AUDIO JACK

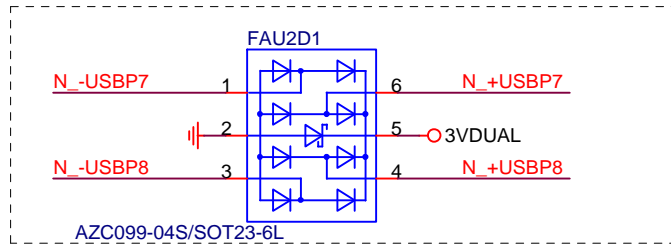
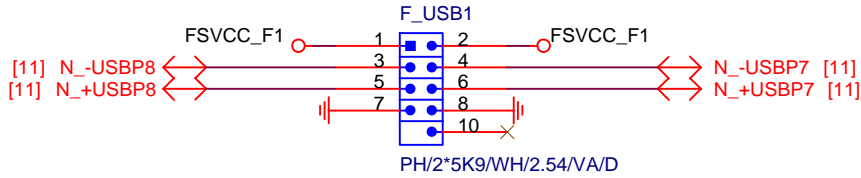
GA-B150M-DS3H

Rev 1.0

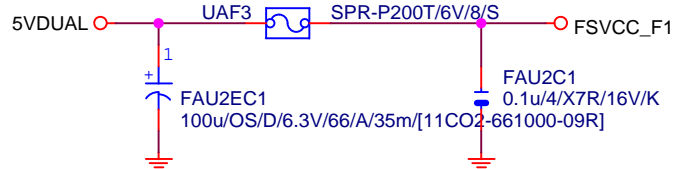


NET 可變

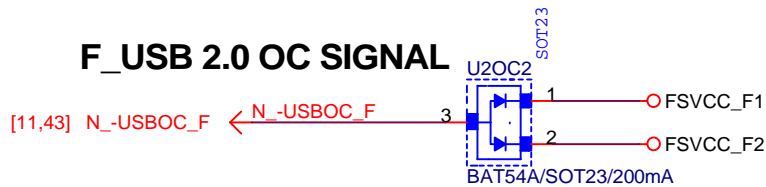
FUSB2X5-S



Close to connector  
FUSE 2 Port 1 Fuse 2A

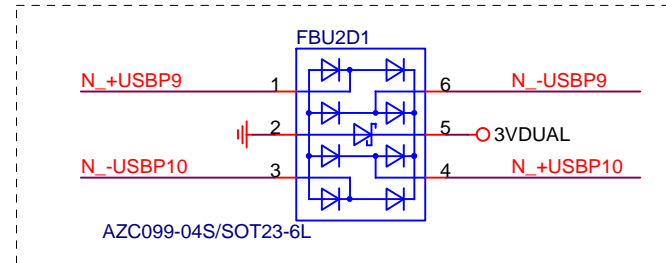
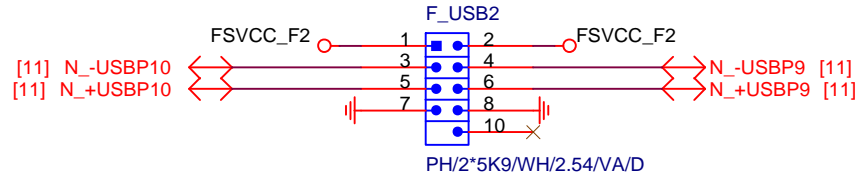


F\_USB 2.0 OC SIGNAL

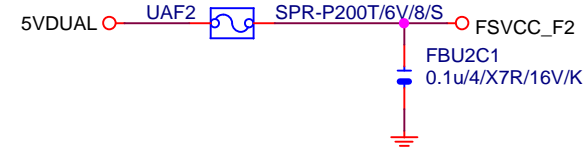


NET 可變

FUSB2X5-S



Close to connector  
FUSE 2 Port 1 Fuse 2A



Gigabyte Technology

Title

USB2.0

Size  
A

Document Number

GA-B150M-DS3H

Rev  
1.0

Date: Tuesday, November 24, 2015

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## Rev: 0.54

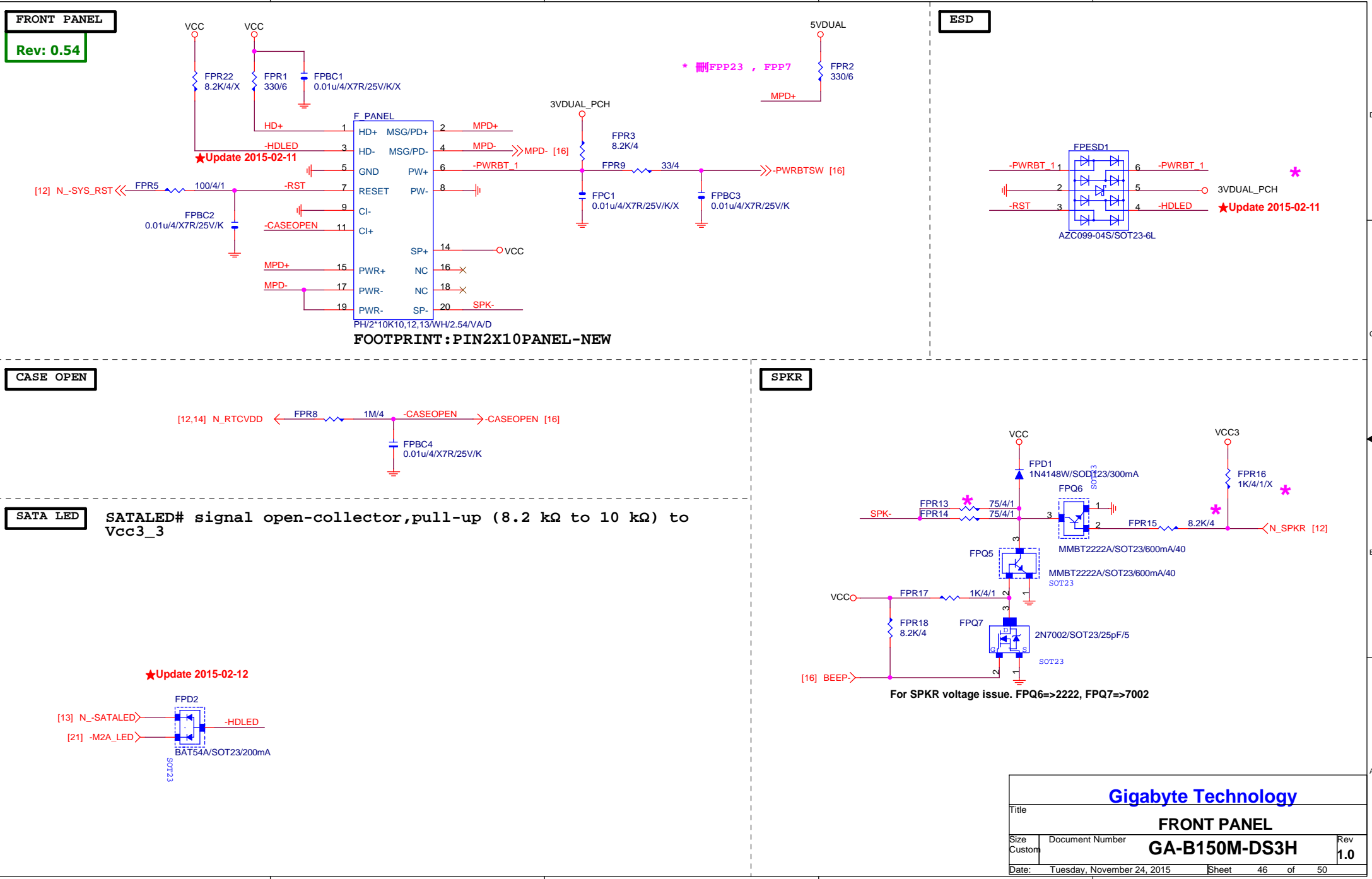


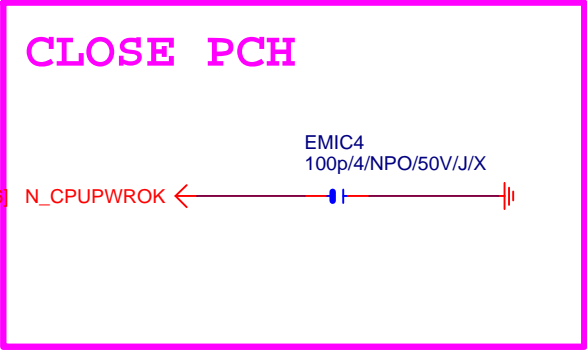
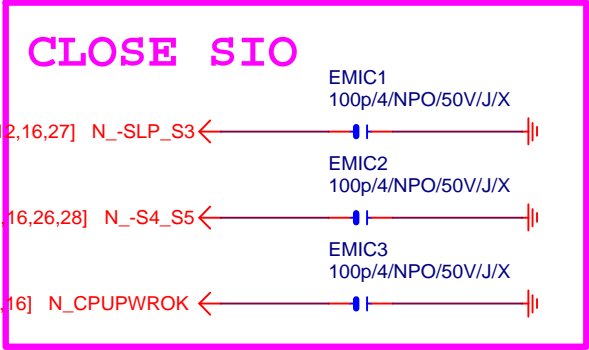
\* footprint :  
PIN2X13 LPT-CUT24

## Thunderbolt (N/A)

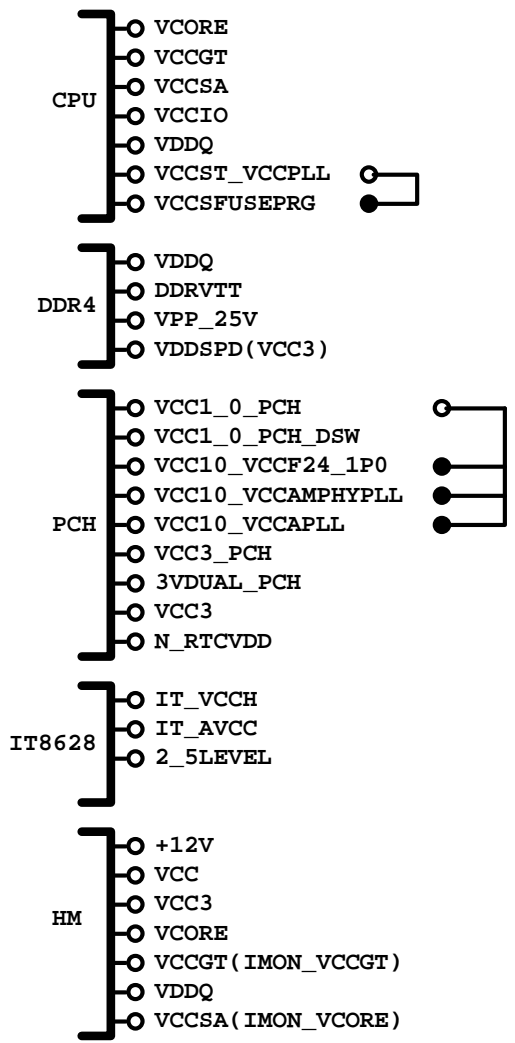
## Gigabyte Technology

Title			
FP,F_USB,USB PWR,BZ			
Size	Document Number		Rev
Custom	GA-B150M-DS3H		1.0
Date:	Tuesday, November 24, 2015	Sheet	45 of 50

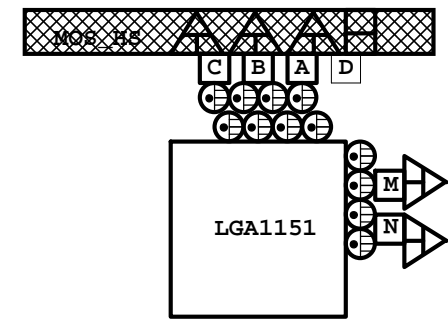
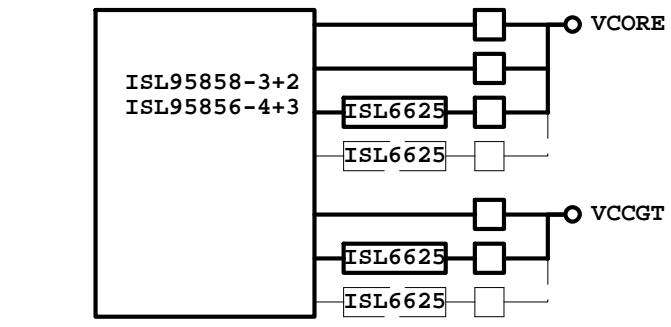




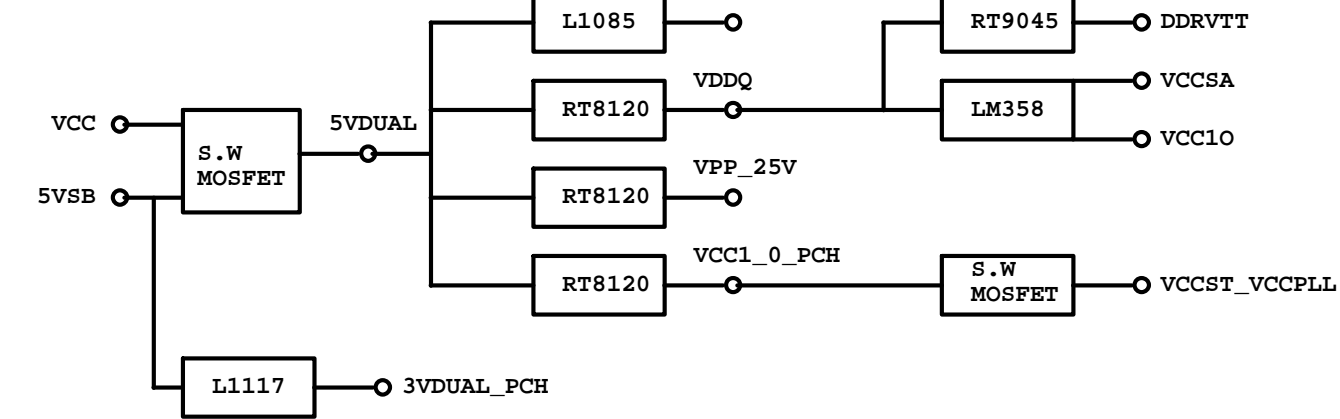
POWER BLOCK MAP



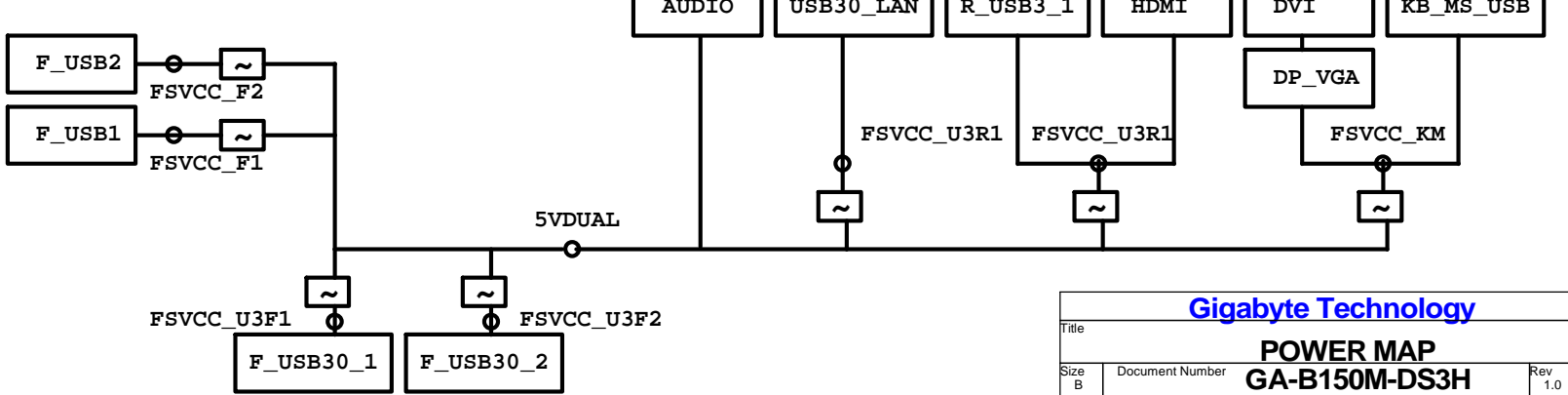
VCORE/VCCGT



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
11CO2-685600-01R	560u/FP/D/6.3V/68/8m
11CO5-882700-01R	270u/FP/D/16V/88/12m
11CO5-661000-03R	100u/OS/D/16V/66/30m
11CO2-651000-02R	100u/OS/D/6.3V/66/30m

台系固態	Capture Value
11CO2-661000-09R	100u/OS/D/6.3V/66/A/35m
11CO5-691000-09R	100u/OS/D/16V/69/A/35m
11CO5-8C2700-09R	270u/FP/D/16V/8C/A/10m
11CO2-695600-09R	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
DIP	11LC5-M2500C-01R	0.5uH/20A/IMD0809/M/D	8*8	CHOKE1U-R50M-IF

## Ferrite

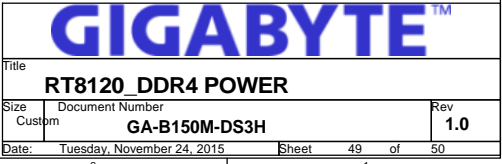
	料號	Capture Value	SIZE	Footprint
DIP	11LC5-F3500C-11R	0.5uH/32A/INCG109/FSI/D	10*10	CHOKE05U-40A-1PQ-3
DIP	11LC5-F2500C-11R	0.5uH/25A/INC0809/F/D	8*8	CHOKE1U-R50M-IF
SMD	未建(SIUC1007-R30M-JJ1W)		10*7	CHOKE11X8MM-SMD

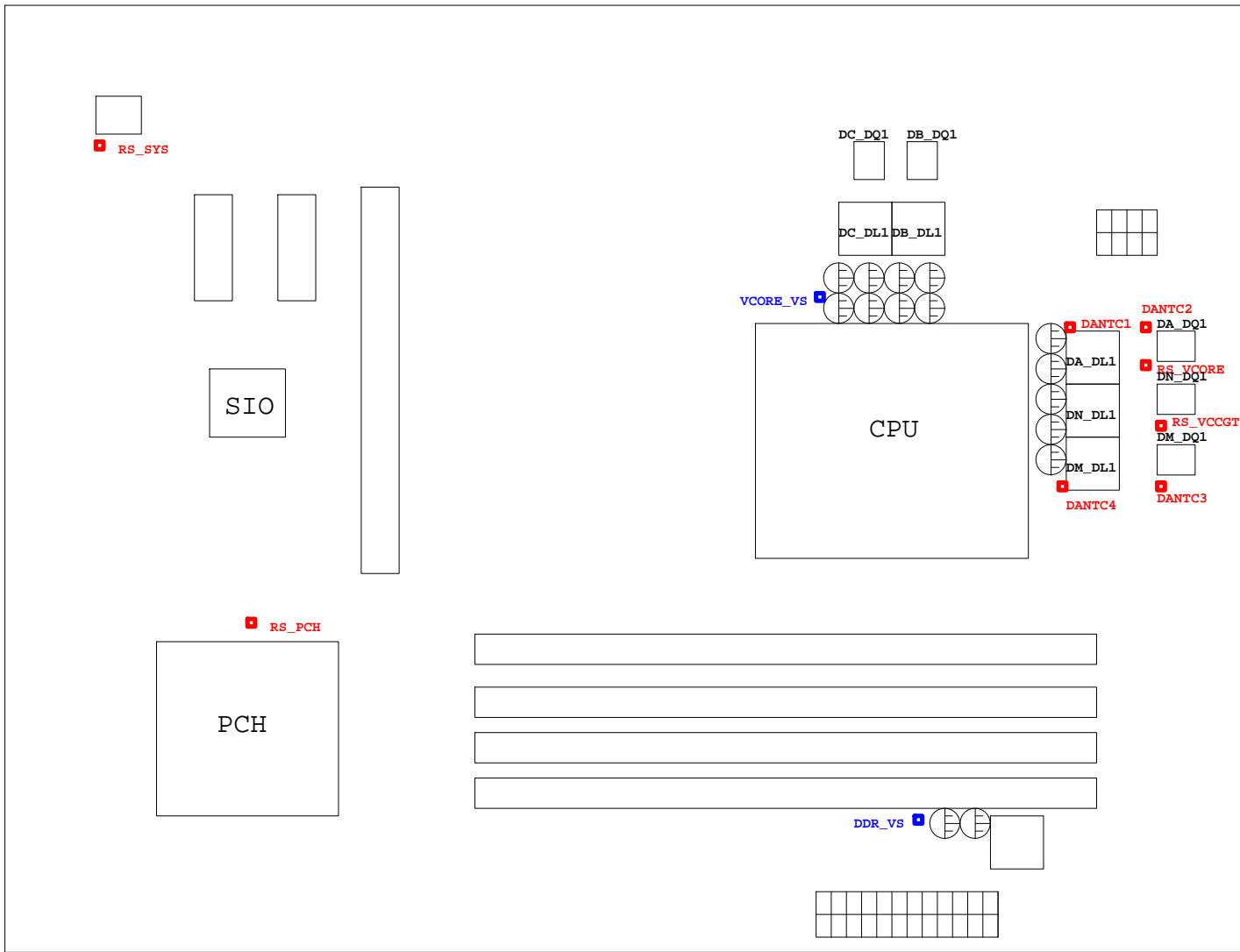
## BEAD

	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





熱敏電阻	擺放靠近位置	走線方式
DANTC1	DA_DL1	N/A
DANTC2	DA_DQ1	Differential
DANTC3	DM_DQ1	N/A
DANTC4	DM_DL1	Differential
RS_VCORE	DB_DQ1	N/A
RS_VCCGT	DN_DQ1	N/A
RS_PCH	PCH	N/A
RS_SYS	CU1	N/A