

Model Name: GA-X150M-PLUS WS rev 1.0

SHEET

TITLE

01	COVER SHEET
02	BOM & PCB MODIFY HISTORY
03	BLOCK DIAGRAM
04	CPU_LGA1151-A
05	CPU_LGA1151-B-DDR4
06	CPU_LGA1151-C
07	CPU_LGA1150-D
08	DDR3 CHANNEL A
09	DDR3 CHANNEL B
10	PCH_CLK BUFFER
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
17	HWM
18	FAN CTRL--SIO
19	PCI EXPRESS*16 SLOT
20	
21	PCI EXPRESS*1 SLOT
22	M.2X4
23	SATA EXPRESS
24	IT8892 PCI BRIDGE
25	PCI SLOT
26	ISL95858_856 PWM
27	ISL95858_856 MOS_VCORE

SHEET

TITLE

28	ISL95858_856 MOS_VCCGT-MASK
29	VCCSA_VCCIO_VCCPLL
30	RT8120_DDR_VDDQ
31	RT8068_DDR_VPP
32	RT8120_PCH_VCC1_0_PCH
33	DISCRETE POWER
34	NCT3933
35	ATX POWER , A_-PROCHOT
36	KB_MS_USB
37	DVI CONN
38	RTD2168 - DP to VGA - IC
39	RTD2168 - DP to VGA - Conn
40	R_USB30_1
41	R_USB30_2
42	REALTEK - RTL8111G
43	USB30_LAN CONNECTOR-RTL8111G
44	Realtek ALC887
45	REAR AUDIO JACK
46	F_USB30
47	F_USB
48	COM , LPT , TPM
49	F_PANEL
50	TABLE LIST
51	POWER MAP

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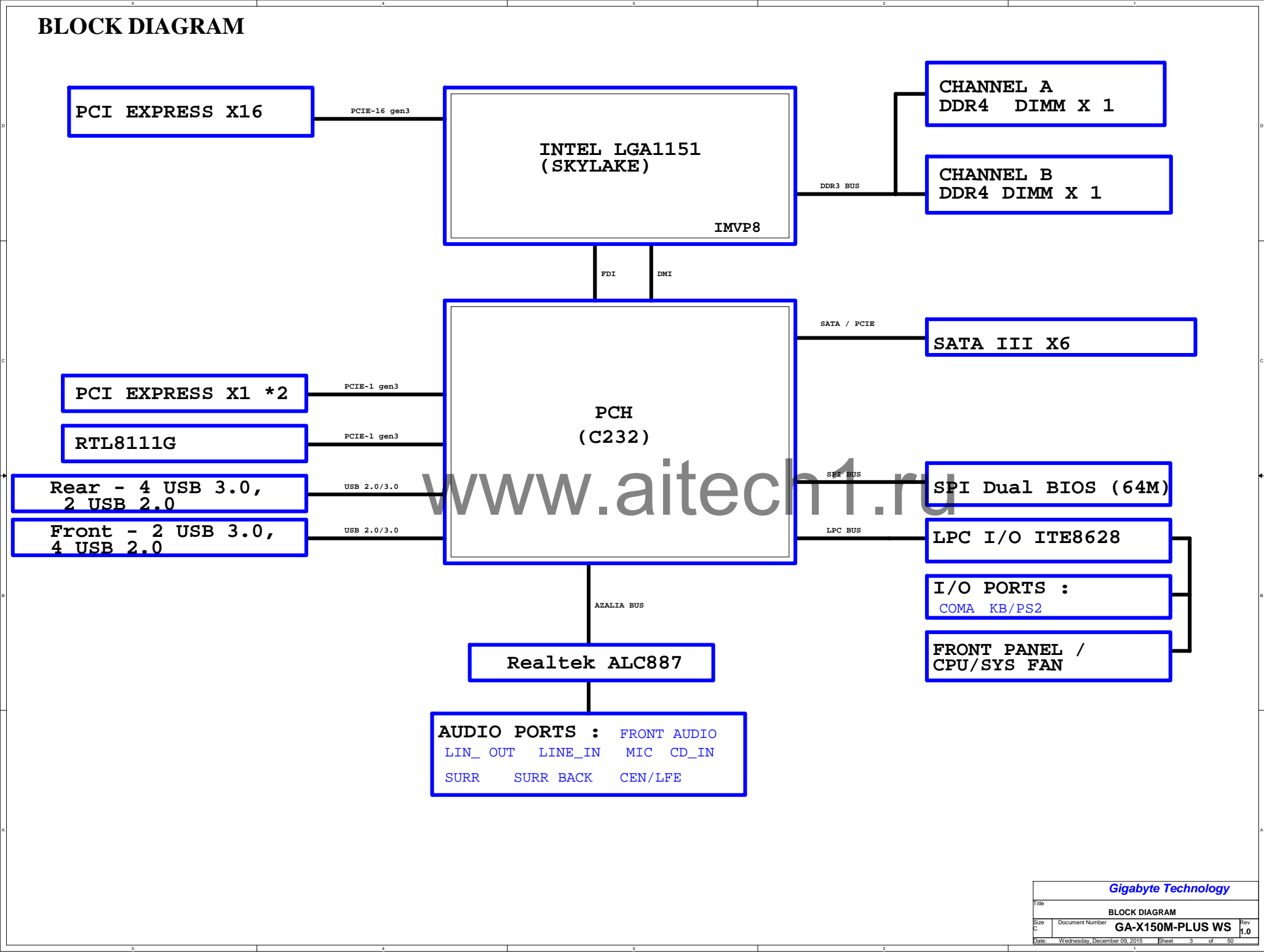
Title			
Cover Sheet			
Size	Document Number	GA-X150M-PLUS WS	Rev
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Circuit or PCB layout change

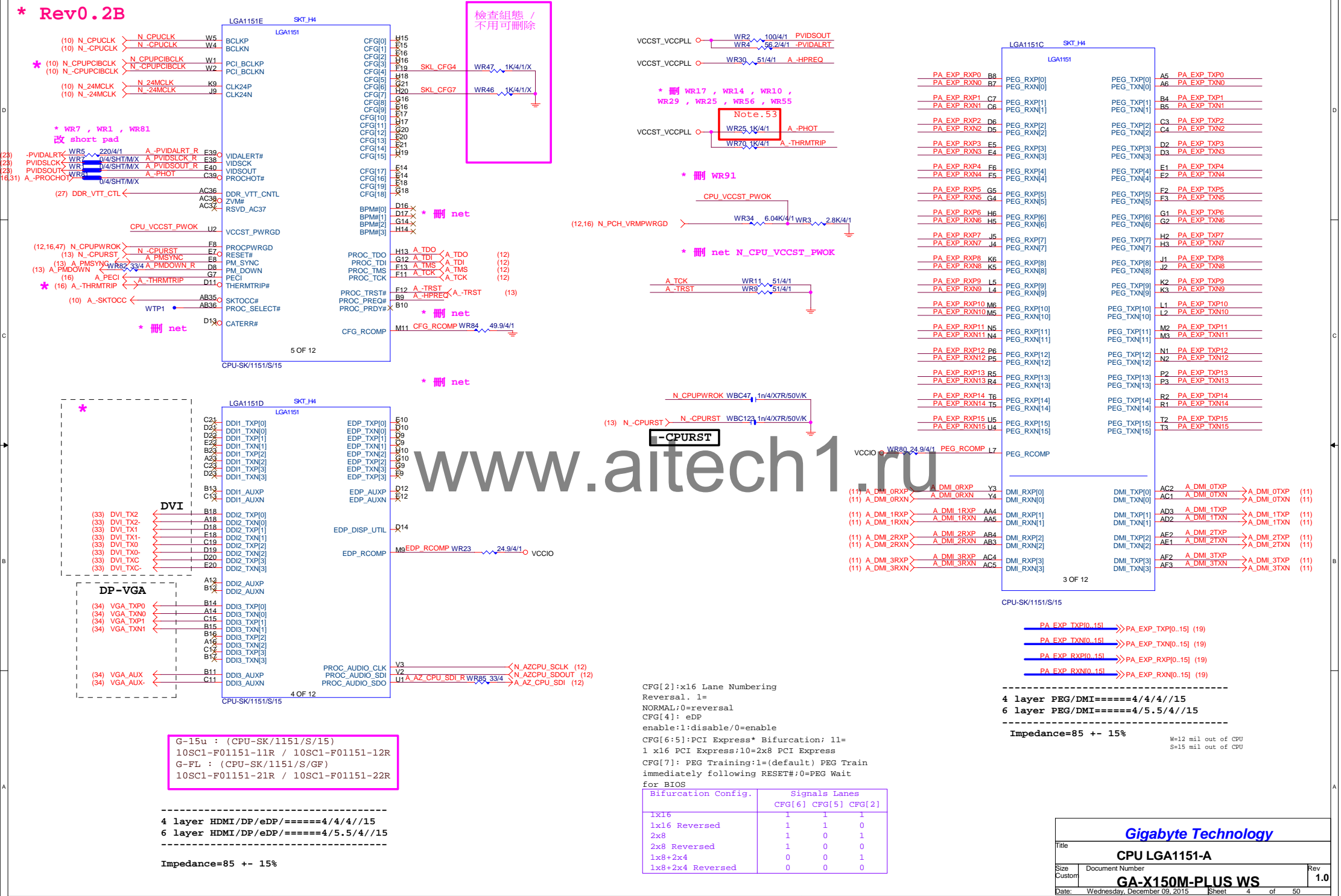
Component value change history

[illegible][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; 1l=
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

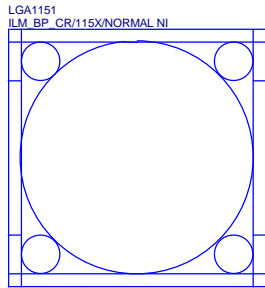
PA_EXP_TXP[0..15] >>> PA_EXP_TXP[0..15] (19)
PA_EXP_TXN[0..15] >>> PA_EXP_TXN[0..15] (19)
PA_EXP_RXP[0..15] >>> PA_EXP_RXP[0..15] (19)
PA_EXP_RXN[0..15] >>> PA_EXP_RXN[0..15] (19)

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		
Size Custom	Document Number	Rev 1.0
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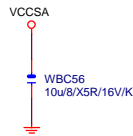
* 改DDR4 net



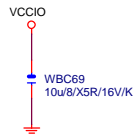
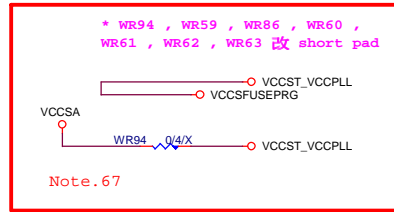
Need check the new CPU MB

- (8) MODT_A[0..1] <=> MODT_A0..11
- (9) MODT_B[0..1] <=> MODT_B0..11
- (8) MDA[0..63] <=> MDA0..63
- (9) MDB[0..63] <=> MDB0..63
- (8) M_DQSA[0..7] <=> M_DQSA0..71
- (8) M_-DQSA[0..7] <=> M_-DQSA0..71
- (8) MAAA[0..16] <=> MAAA0..161
- (9) MAAB[0..16] <=> MAAB0..161
- (9) M_DQSB[0..7] <=> M_DQSB0..71
- (9) M_-DQSB[0..7] <=> M_-DQSB0..71

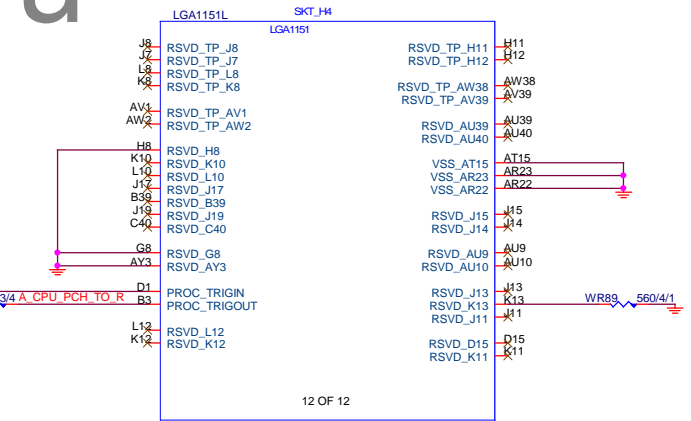
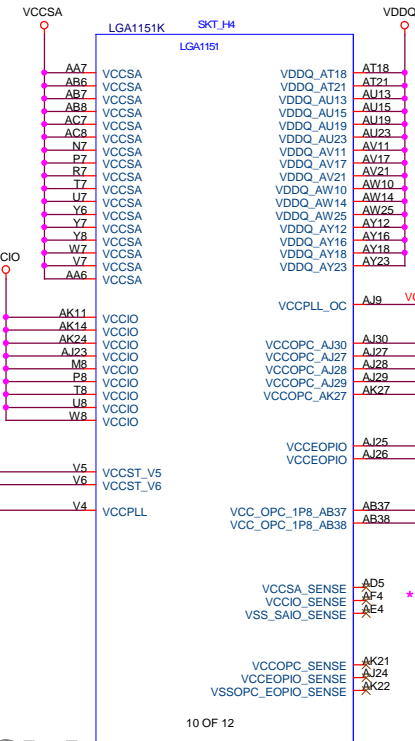
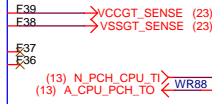
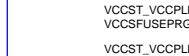
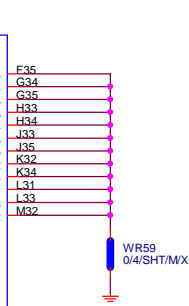
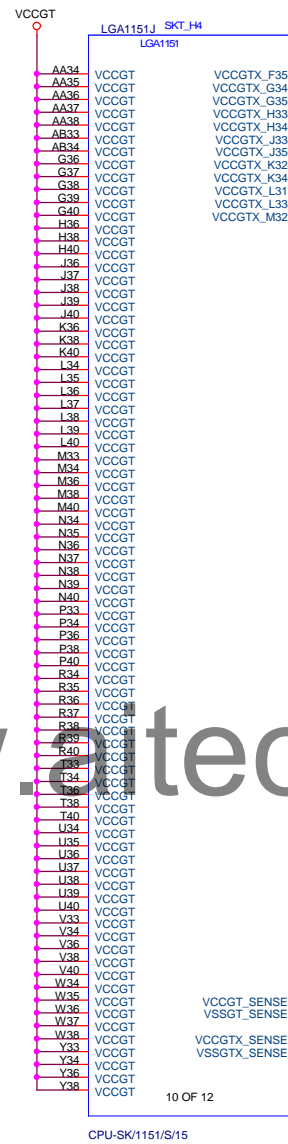
Gigabyte Technology		
Title		
CPU LGA1151-B		
Size	Document Number	Rev
Custom	GA-X150M-PLUS WS	1.0
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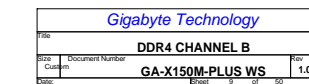
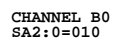


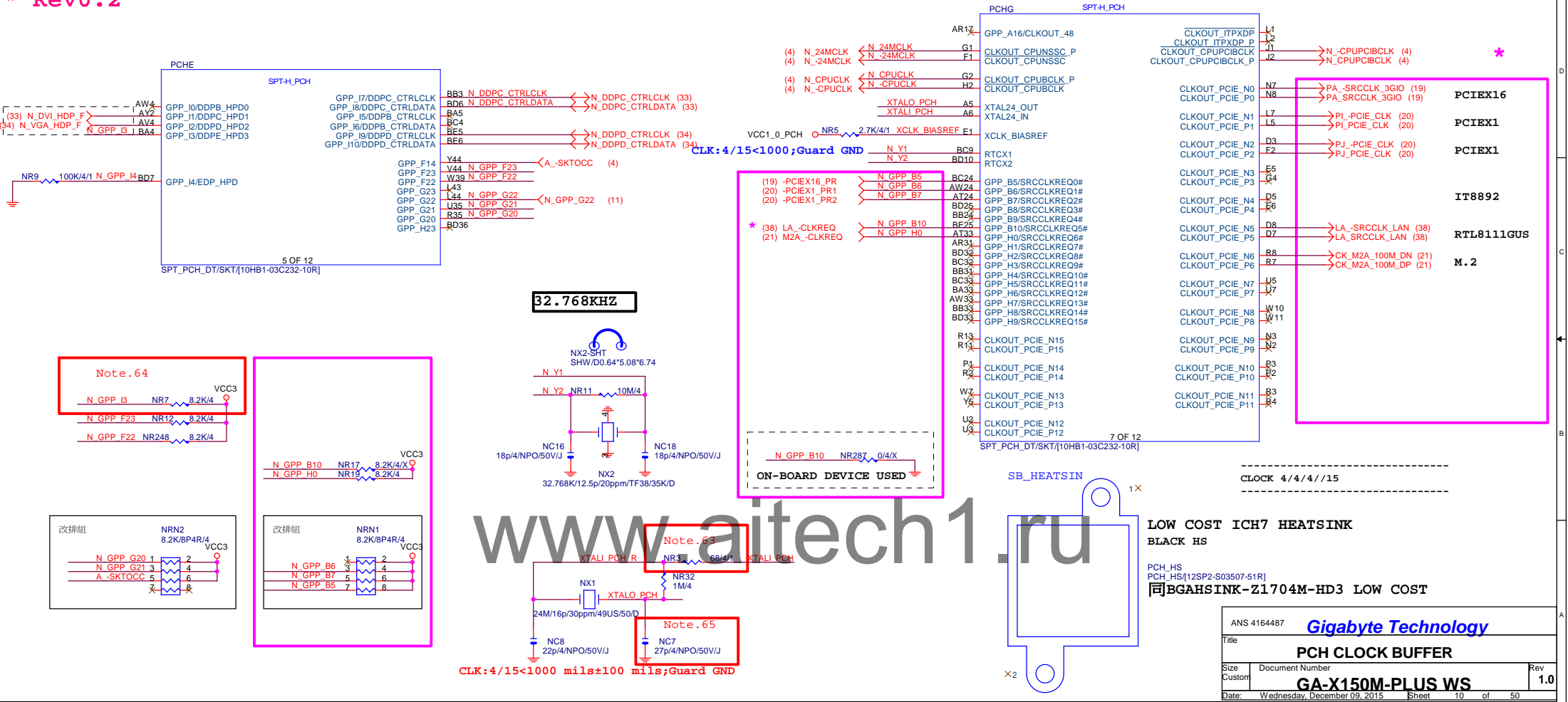
* 刪 WBC124 , WBC125 , WBC126 , WBC127 電容

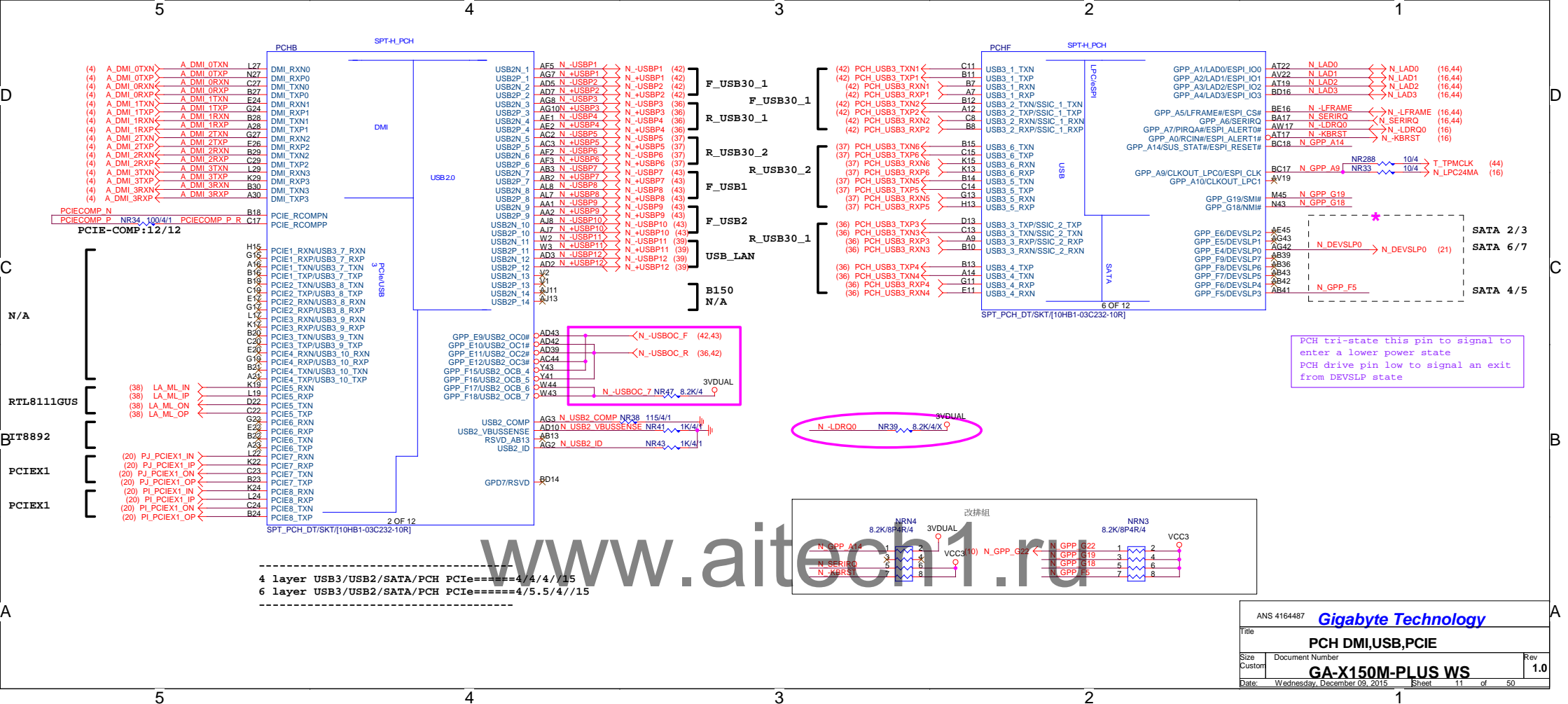


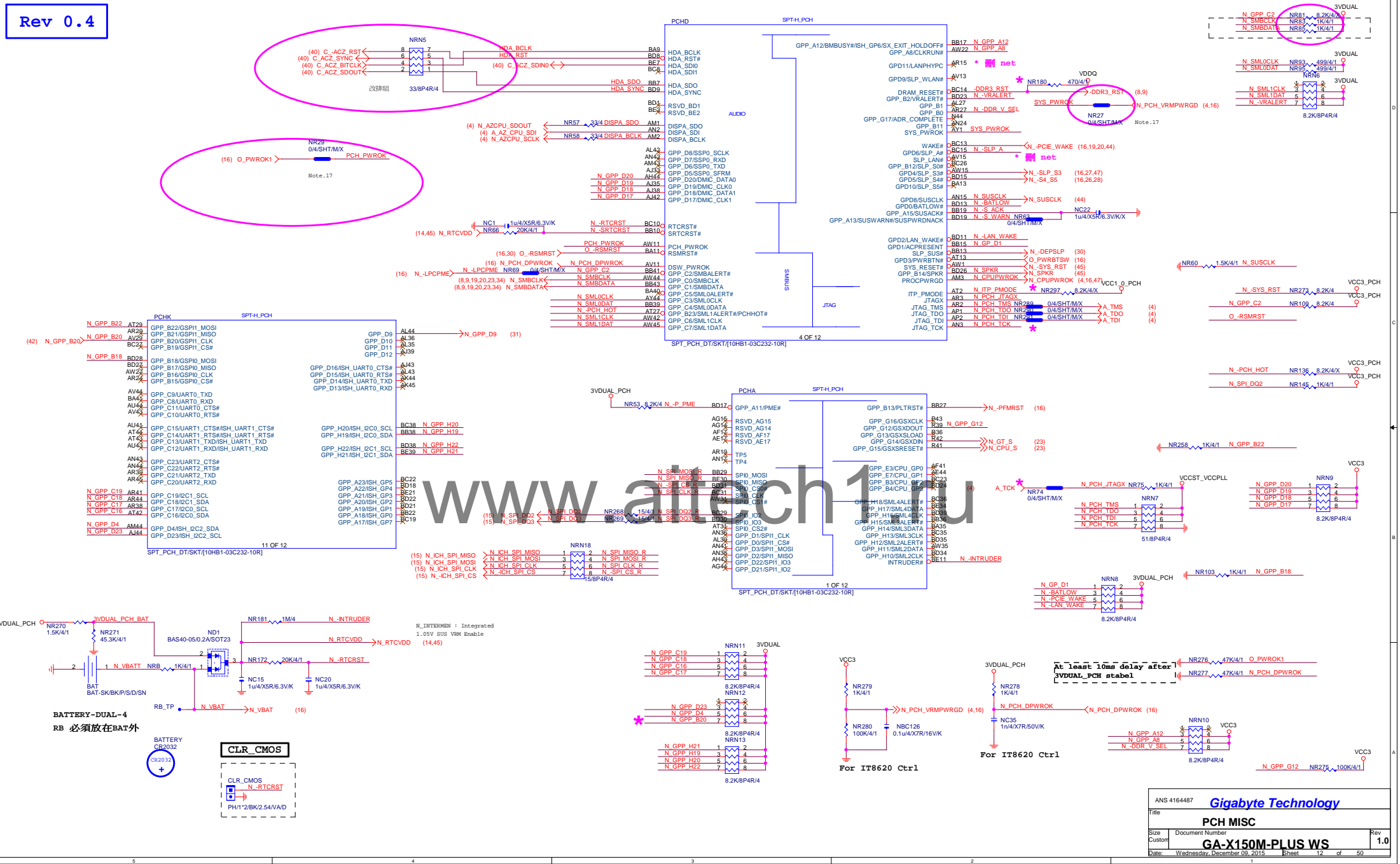
* 刪 VCCGT 電容

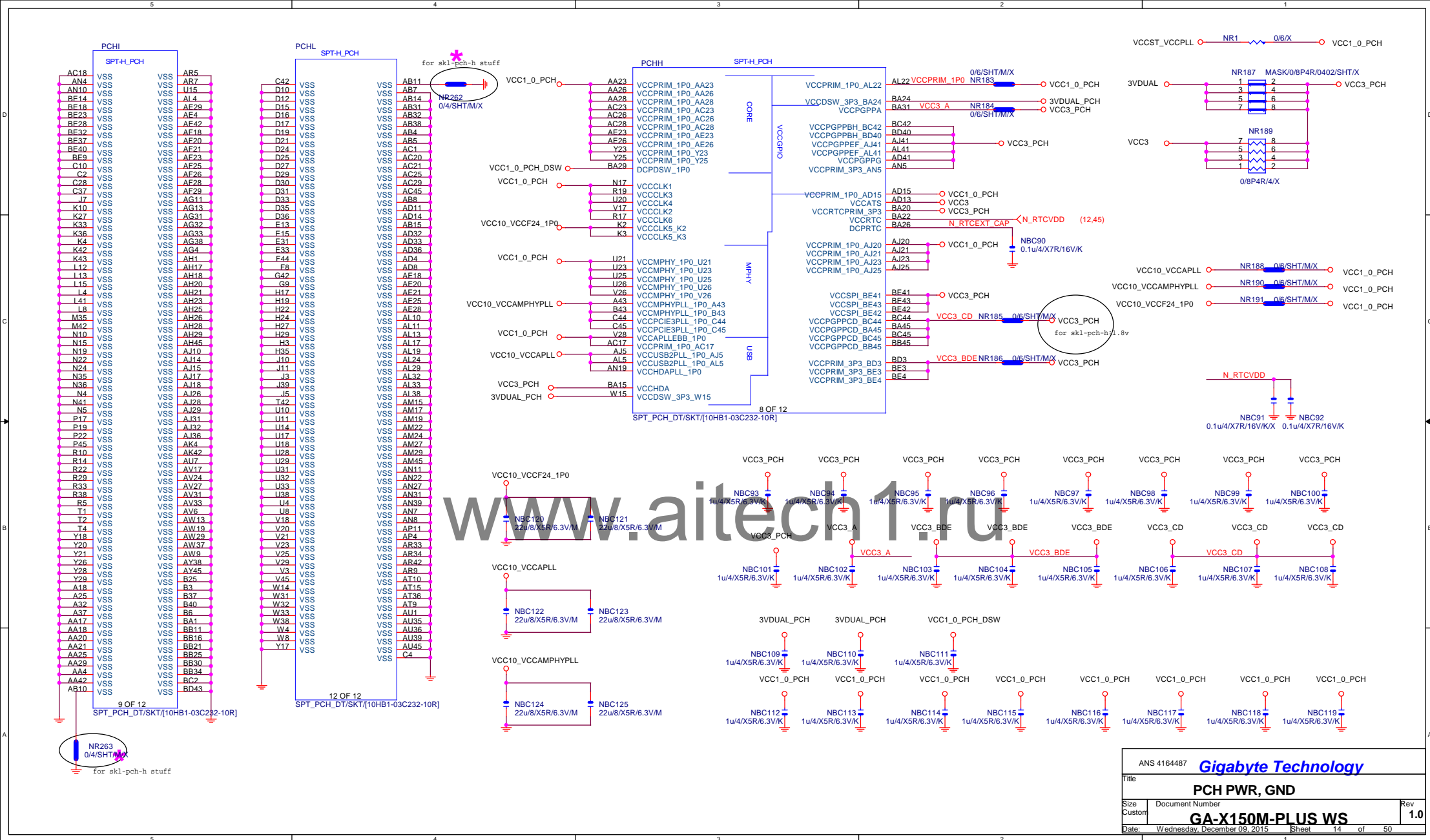








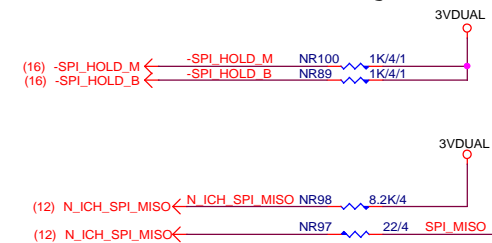
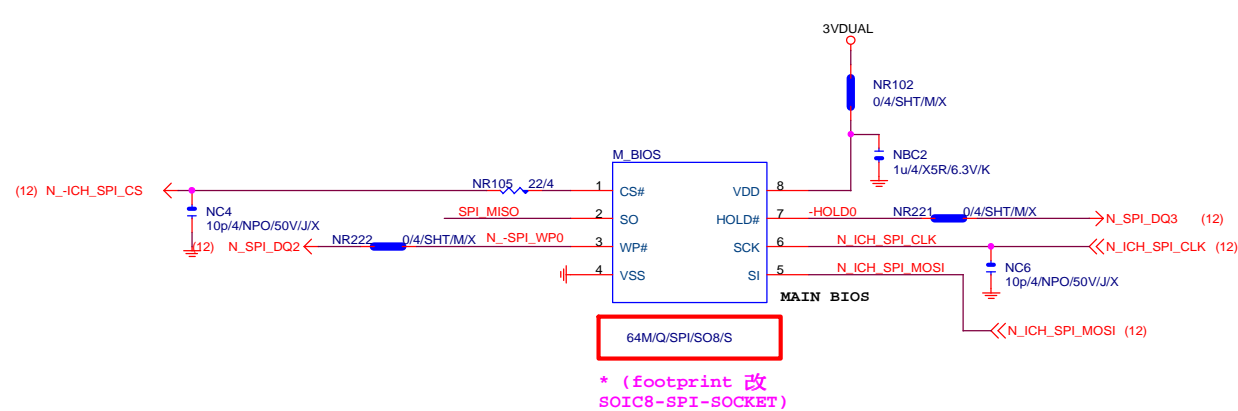




Rev 0.1

BIOS

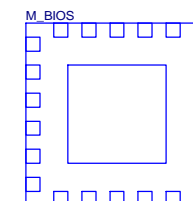
MOSI For DMI RX Termination Voltage



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

1 means floating
0 means PD 1K

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

* 試産先上, PVT 移除

BIOS_PH

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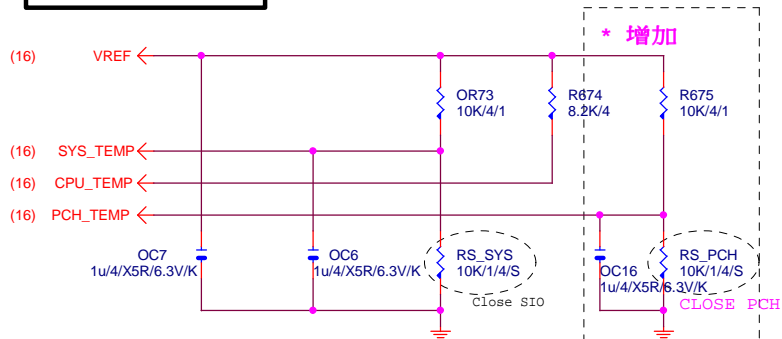
Title		BIOS	
Size	Document Number	GA-X150M-PLUS WS	
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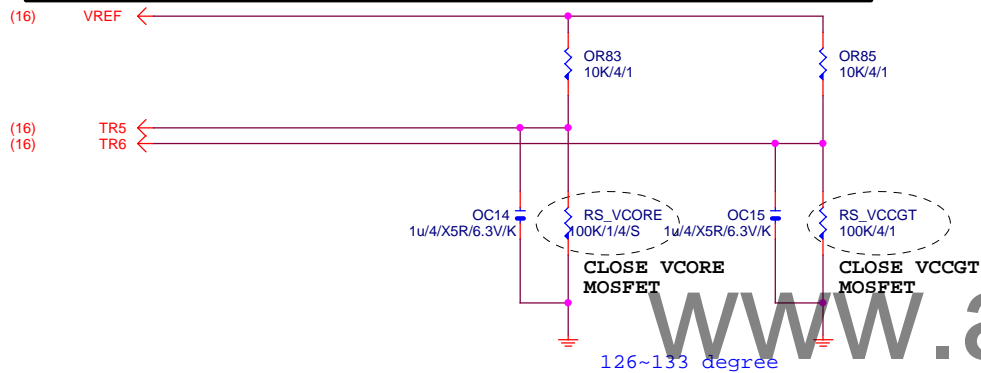
Gigabyte Technology	
Title ITE 8628 LPC IO	
Size B	Document Number GA-X150M-PLUS WS
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TEMP H/W MONITOR

REV 1.04



RS_VCORE, RS_VCCGT, CLOSE CPU_VCORE & VCCGT MOSFET

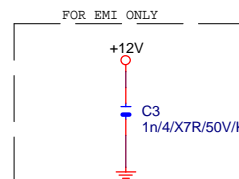
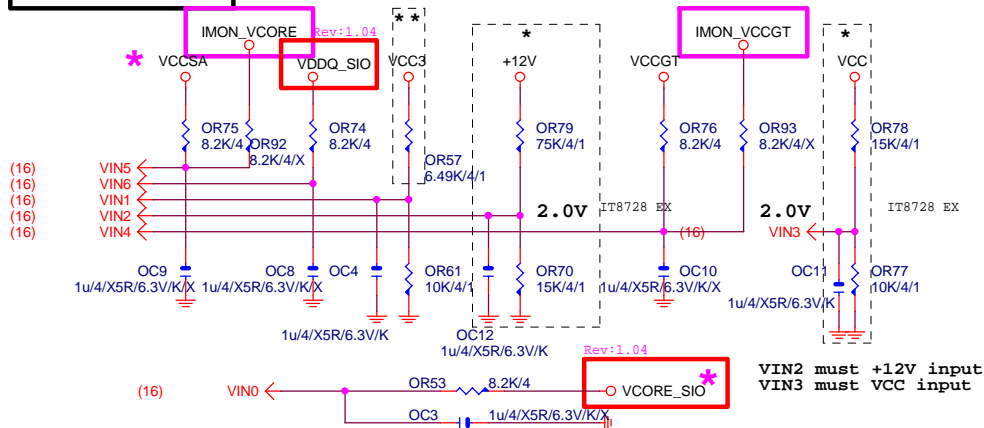
~~PROCHOT: 有mos heartsink不用prochot function~~

VOLTAGE-- H/W MONITOR

Connect to PWM

* IT8728 BX
** IT8728 CX

Connect to PWM

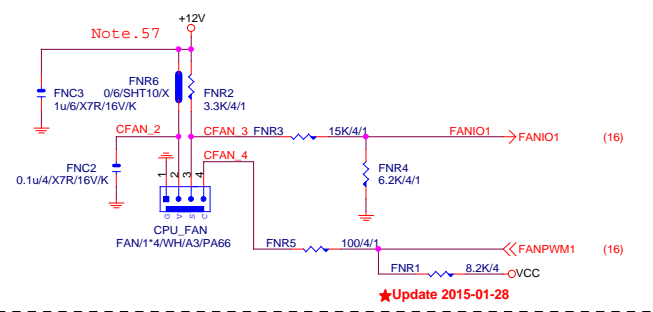
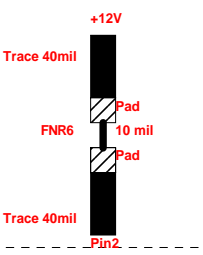


Gigabyte Technology

Title			HWM,KB/MS, FAN CTRL		
Size	Document Number				Rev
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CPU SMART FAN

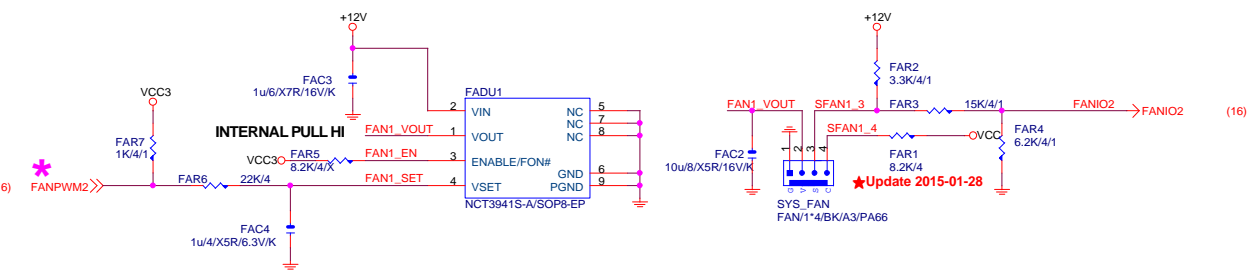
Rev: 0.53



SYSTEM FAN1

A.

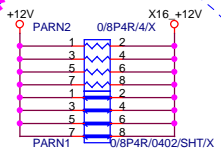
Linear SYS_FAN
Enable Function (NCT3941S)
Full Turn On Function (NCT3941S-A)



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Rev 0.2

```
+12 _protect
short-wire test
```



PA_EXP_RXP[0..15] >> PA_EXP_RXP[0..15] (4)
PA_EXP_RXN[0..15] >> PA_EXP_RXN[0..15] (4)
PA_EXP_TXP[0..15] >> PA_EXP_TXP[0..15] (4)
PA_EXP_TXN[0..15] >> PA_EXP_TXN[0..15] (4)

PA EXP TXP0	PAC5	0.22u4/X5R6.3V/3K	PA EXP TXP0 C
PA EXP TXP0	PAC4	0.22u4/X5R6.3V/3K	PA EXP TXP0 C
PA EXP TXP1	PAC6	0.22u4/X5R6.3V/3K	PA EXP TXP1 C
PA EXP TXN1	PAC7	0.22u4/X5R6.3V/3K	PA EXP TXN1 C
PA EXP TXP2	PAC8	0.22u4/X5R6.3V/3K	PA EXP TXP2 C
PA EXP TXN2	PAC9	0.22u4/X5R6.3V/3K	PA EXP TXN2 C
PA EXP TXP3	PAC10	0.22u4/X5R6.3V/3K	PA EXP TXP3 C
PA EXP TXN3	PAC11	0.22u4/X5R6.3V/3K	PA EXP TXN3 C
PA EXP TXP4	PAC12	0.22u4/X5R6.3V/3K	PA EXP TXP4 C
PA EXP TXN4	PAC13	0.22u4/X5R6.3V/3K	PA EXP TXN4 C
PA EXP TXP5	PAC14	0.22u4/X5R6.3V/3K	PA EXP TXP5 C
PA EXP TXN5	PAC15	0.22u4/X5R6.3V/3K	PA EXP TXN5 C
PA EXP TXP6	PAC16	0.22u4/X5R6.3V/3K	PA EXP TXP6 C
PA EXP TXN6	PAC17	0.22u4/X5R6.3V/3K	PA EXP TXN6 C
PA EXP TXP7	PAC18	0.22u4/X5R6.3V/3K	PA EXP TXP7 C
PA EXP TXN7	PAC19	0.22u4/X5R6.3V/3K	PA EXP TXN7 C
PA EXP TXP8	PAC21	0.22u4/X5R6.3V/3K	PA EXP TXP8 C
PA EXP TXN8	PAC20	0.22u4/X5R6.3V/3K	PA EXP TXN8 C
PA EXP TXP9	PAC22	0.22u4/X5R6.3V/3K	PA EXP TXP9 C
PA EXP TXN9	PAC23	0.22u4/X5R6.3V/3K	PA EXP TXN9 C
PA EXP TXP10	PAC24	0.22u4/X5R6.3V/3K	PA EXP TXP10 C
PA EXP TXN10	PAC25	0.22u4/X5R6.3V/3K	PA EXP TXN10 C
PA EXP TXP11	PAC26	0.22u4/X5R6.3V/3K	PA EXP TXP11 C
PA EXP TXN11	PAC27	0.22u4/X5R6.3V/3K	PA EXP TXN11 C
PA EXP TXP12	PAC28	0.22u4/X5R6.3V/3K	PA EXP TXP12 C
PA EXP TXN12	PAC29	0.22u4/X5R6.3V/3K	PA EXP TXN12 C
PA EXP TXP13	PAC30	0.22u4/X5R6.3V/3K	PA EXP TXP13 C
PA EXP TXN13	PAC31	0.22u4/X5R6.3V/3K	PA EXP TXN13 C
PA EXP TXP14	PAC32	0.22u4/X5R6.3V/3K	PA EXP TXP14 C
PA EXP TXN14	PAC33	0.22u4/X5R6.3V/3K	PA EXP TXN14 C
PA EXP TXP15	PAC34	0.22u4/X5R6.3V/3K	PA EXP TXP15 C
PA EXP TXN15	PAC35	0.22u4/X5R6.3V/3K	PA EXP TXN15 C

PCIEX16:16/5/5/5/16

PCI-E REV:1.1--> 2.5GHZ

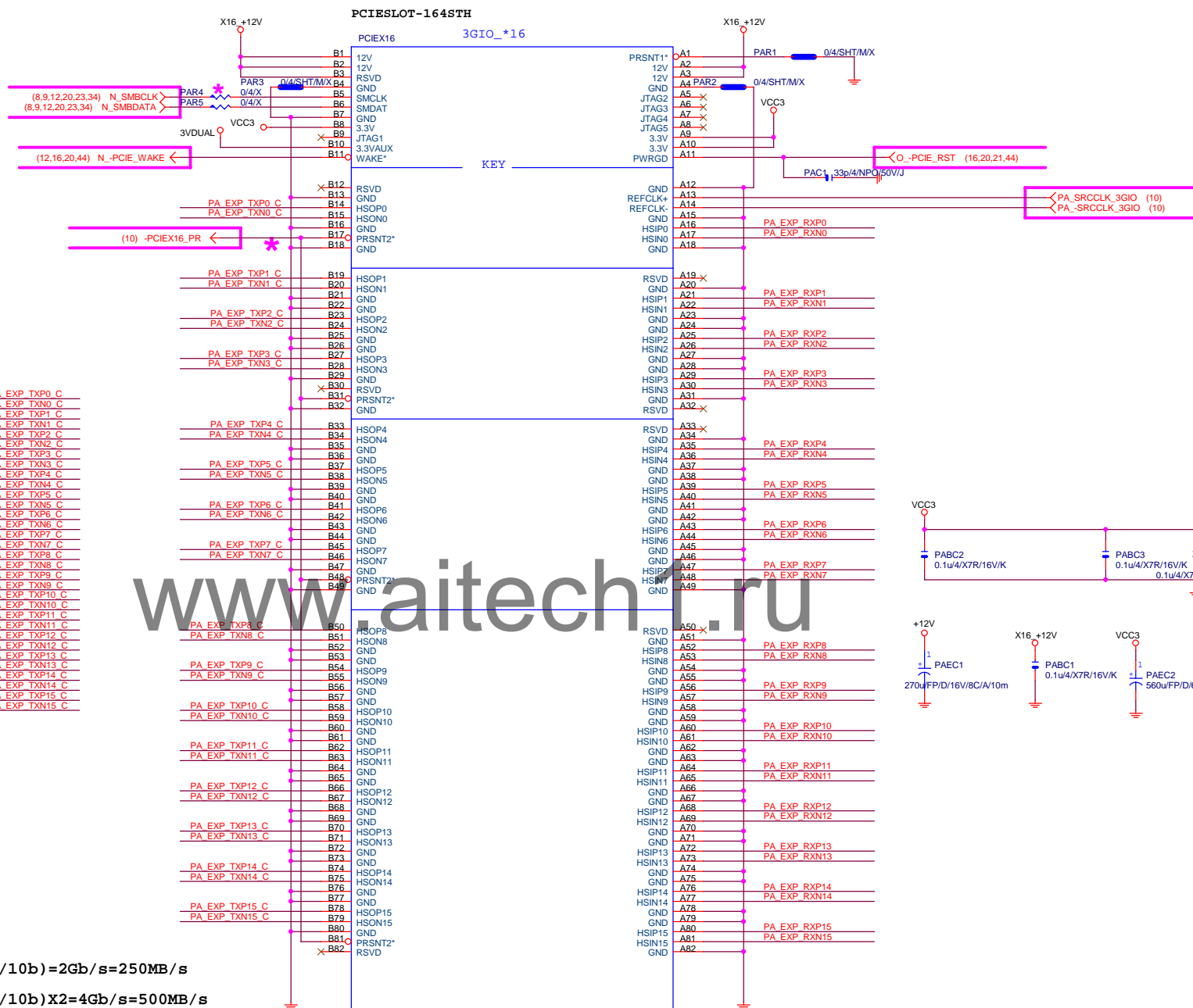
PCE-E X1(單向) BANDWIDTH=2.5GHz*(8b/10b)=2Gb/s=250MB/s

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

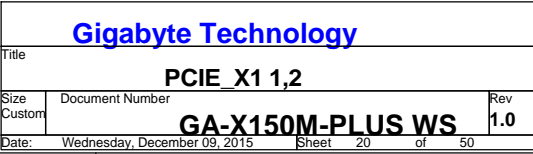
PCE-E X16(單向) BANDWIDTH=2.5GHz*(8b/10b)X16=32Gb/s=4GB/s

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

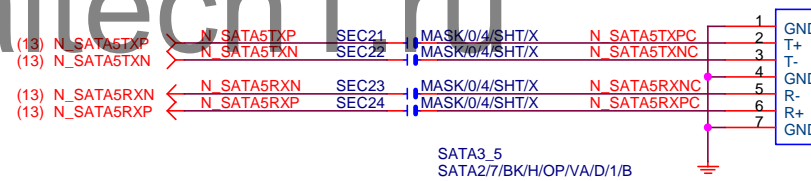
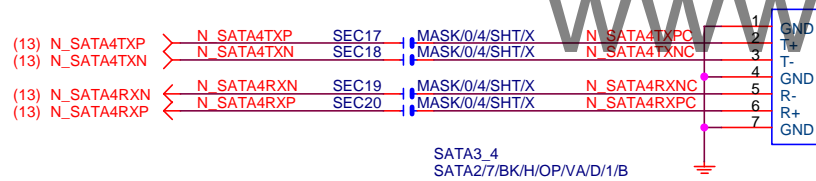
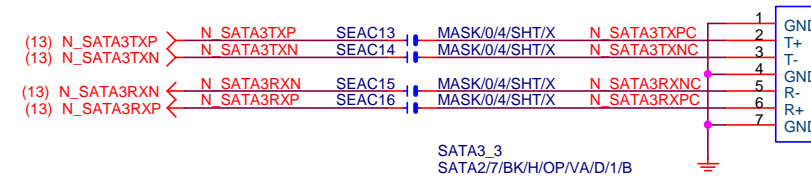
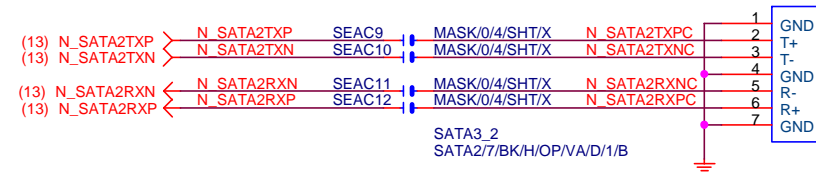
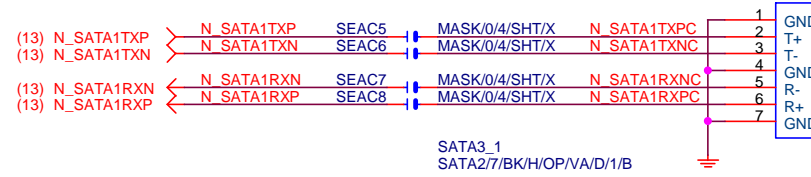
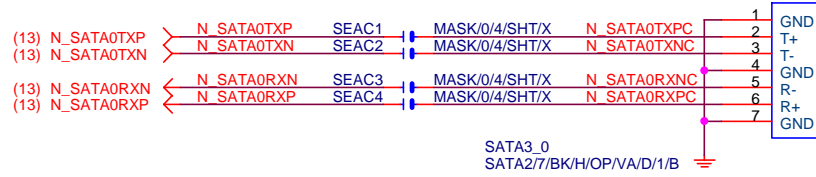
PCI-E REV:2.0--> 5GHZ



PCI-E/16X-164P/GY/LONG DOUBLE/HK*2/[11AC1-023164-J1R]



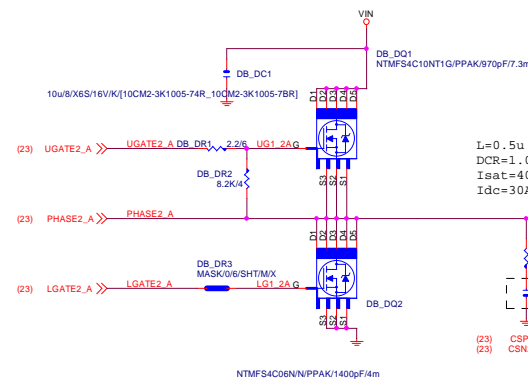
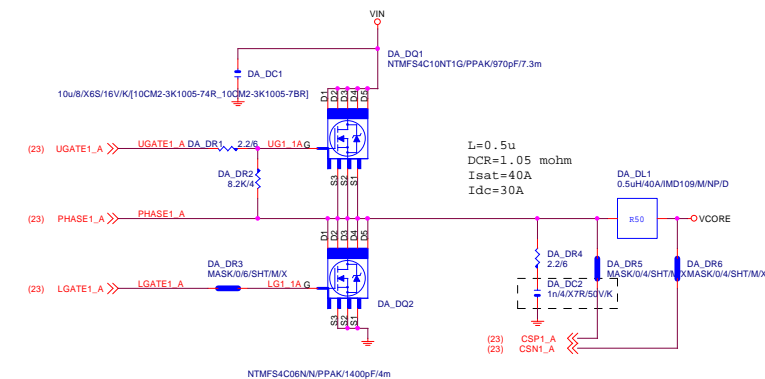
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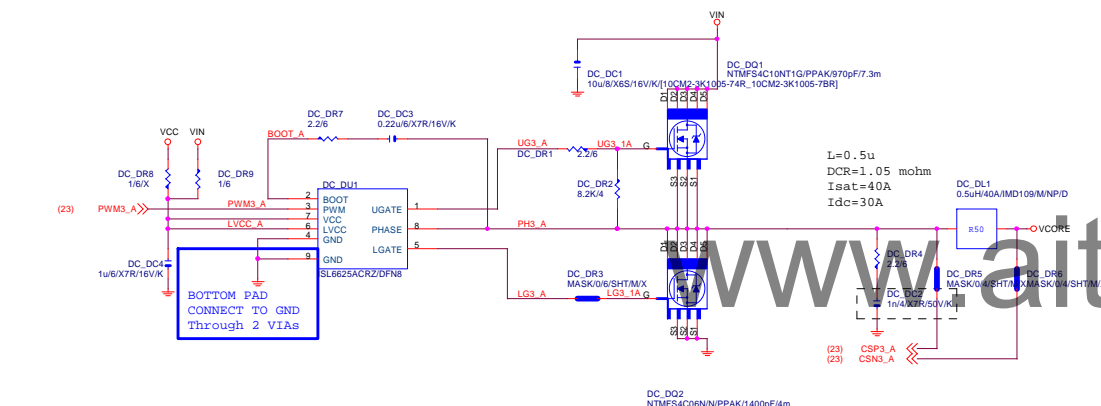
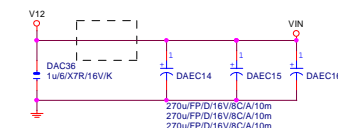
Gigabyte Technology			
Title			
SATA EXPRESS			
Size	Document Number		Rev
Custom	GA-X150M-PLUS WS		1.0
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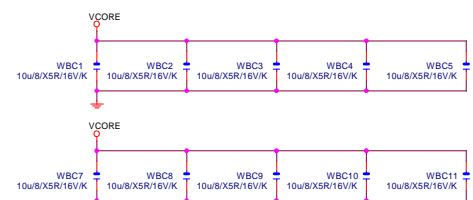
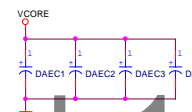
VCORE



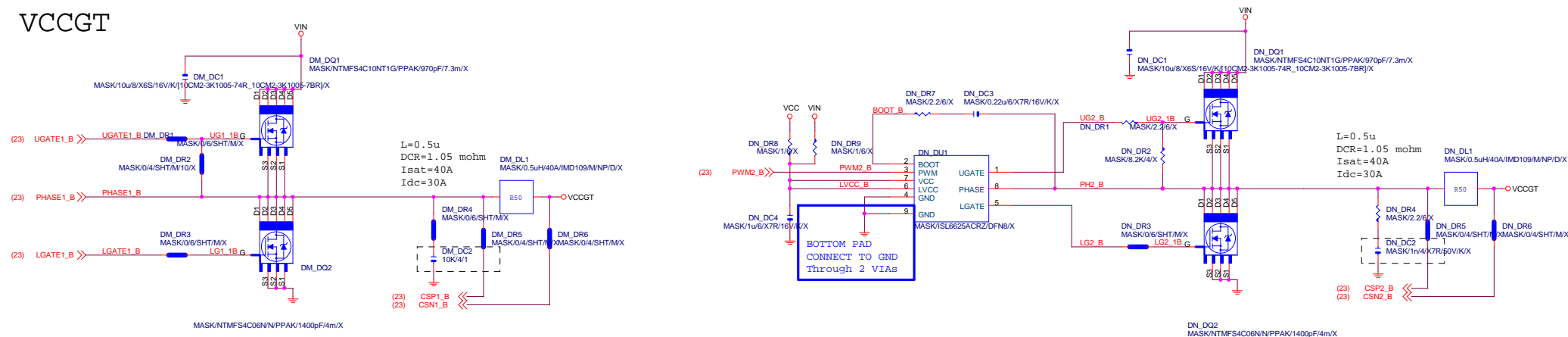
VIN CAP 270u*3PCS



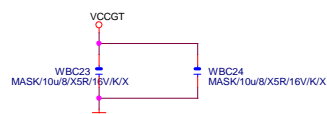
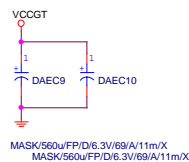
VCORE CAP 560u*4PCS 10u*10PCS



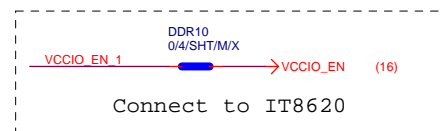
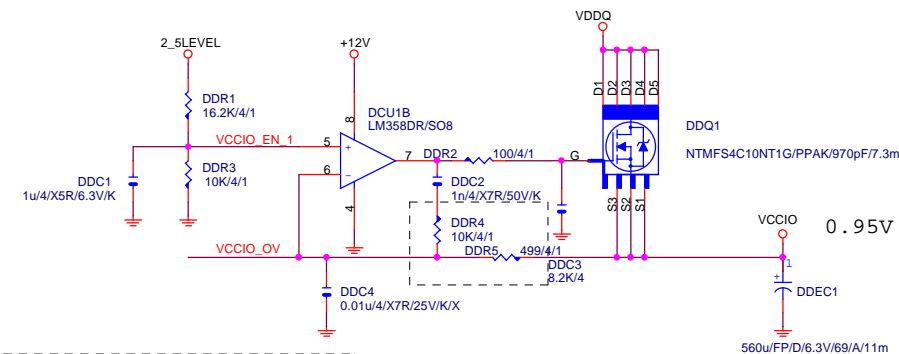
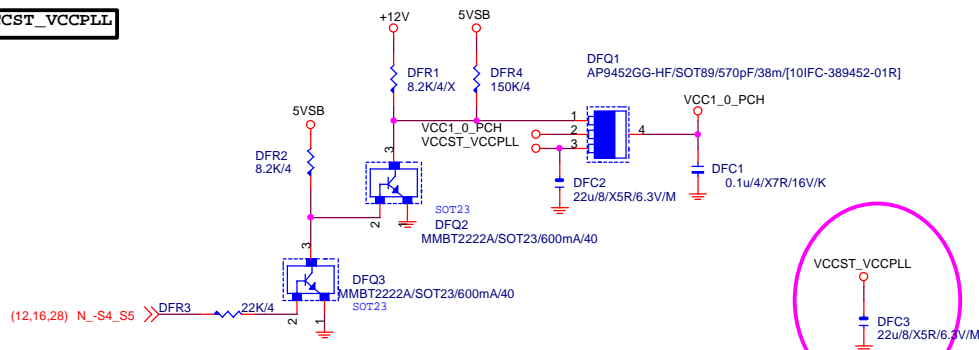
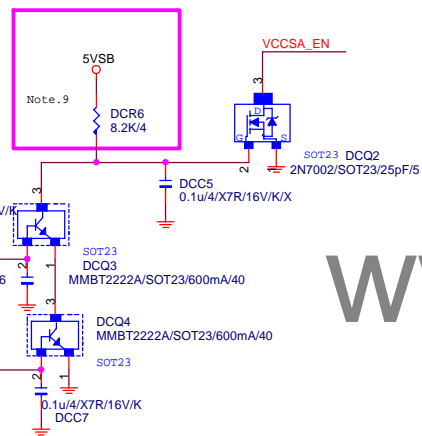
VCCGT



VCCGT CAP 560u*2PCS
10u*2PCS



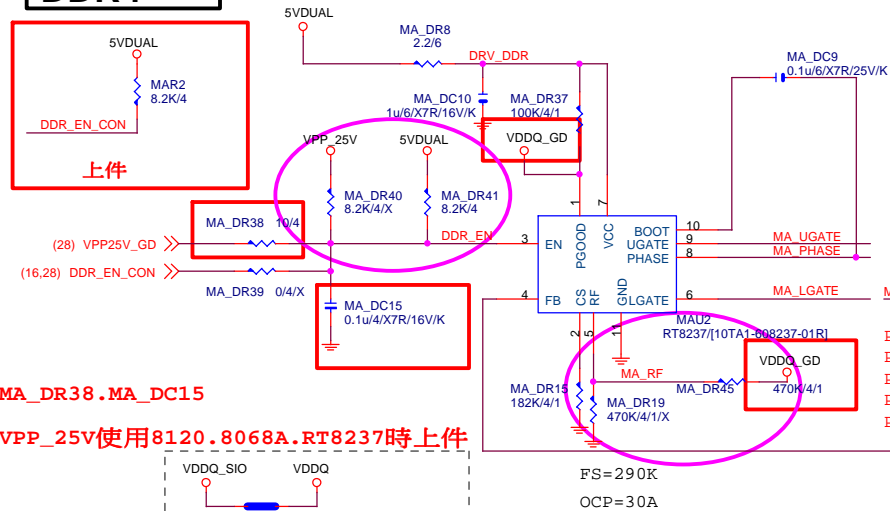
www.aitech1.ru



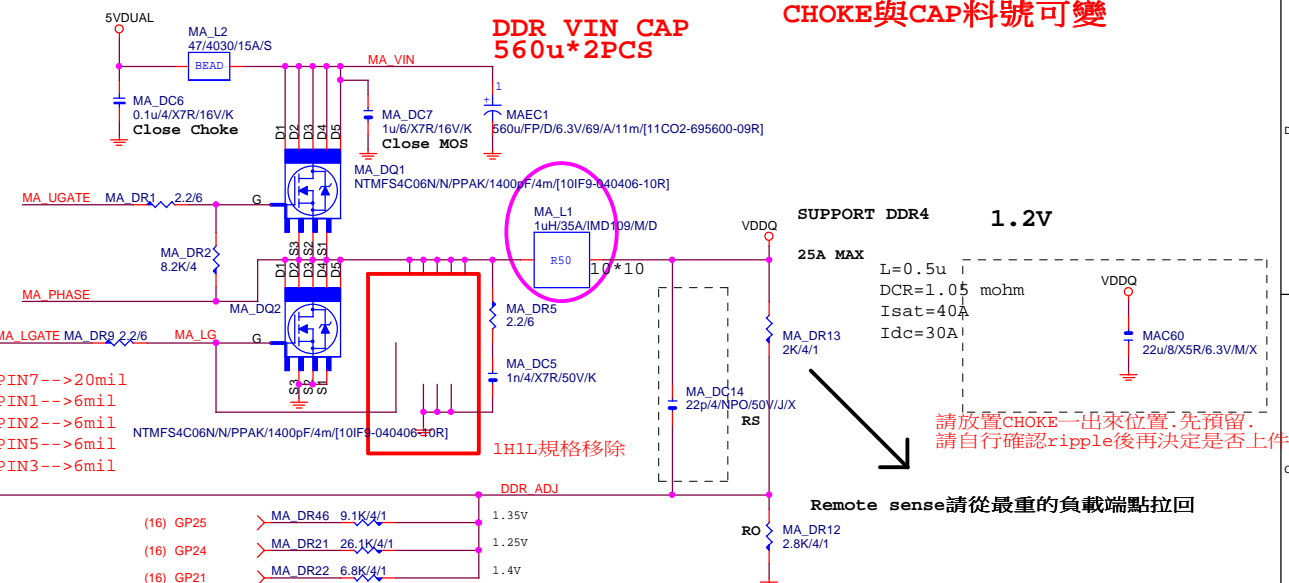
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REV: 0.38

DDR4



VPP_25V使用8120.8068A.RT8237時上件



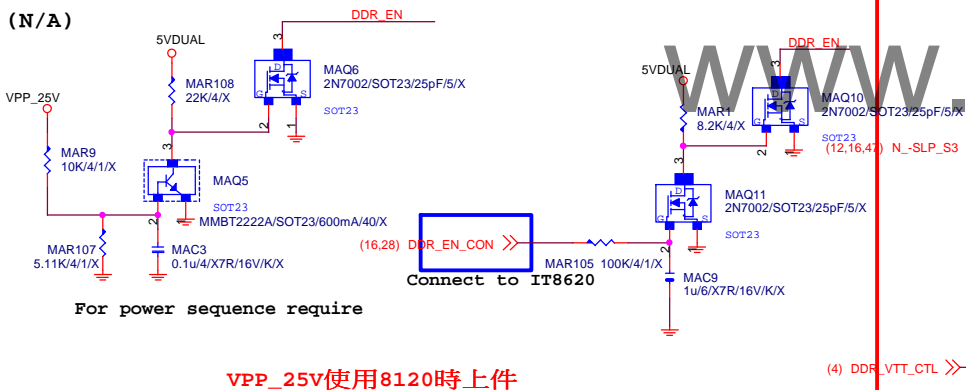
請放置CHOKE一出來位置.先預留.
請自行確認ripple後再決定是否上件

Remote sense請從最重的負載端點拉回

PWR	SEQ
-----	-----

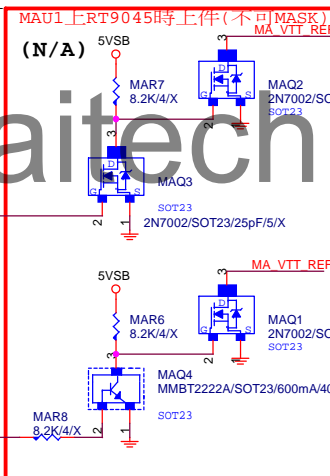
CLOSE TO DDR POWER PLANE

(N/A)

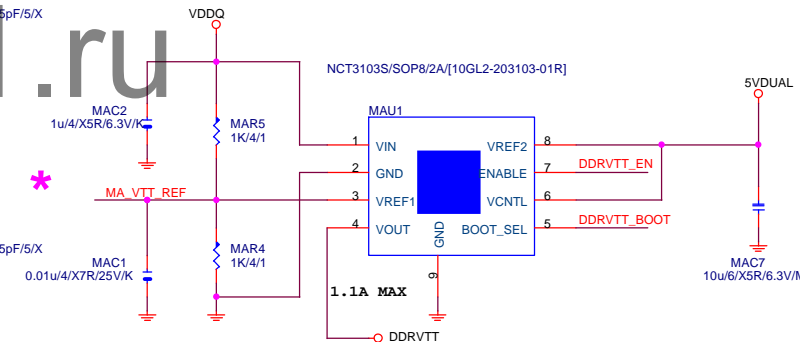


VPP_25V使用8120時上件

MAU1上RT9045時上件(不可MASK)
(N/A) 5VSB MA_VTT_RE



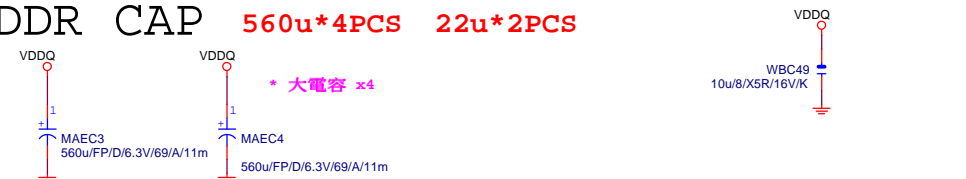
DDRVTT



DDR_VTT_CTL	MAR110	0/4	DDRVTT_EN
N_SLP_S3	MAR111	0/4	DDRVTT_BOOT

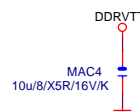
MAU1上NCT3103S時上件(不可以改short pad)

DDRVTT CAP



* 大電容 x4

* 大電容 x0

**GIGABYTE™**

Title	RT8120_DDR_POWER
-------	------------------

Size	Document Number
Custom	GA-X150M-PLUS WS

Date: Wednesday, December 09, 2015 Sheet 27 of 50

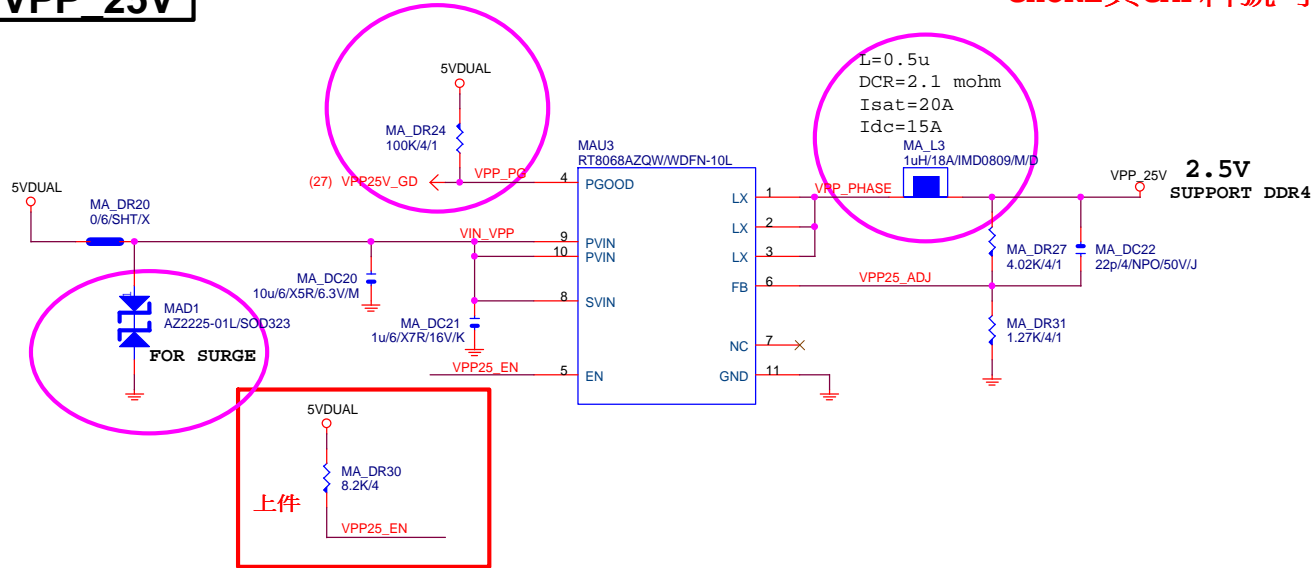
Date: Wednesday, December 09, 2015 Sheet 27 of 50

REV:0.33

VPP_25V

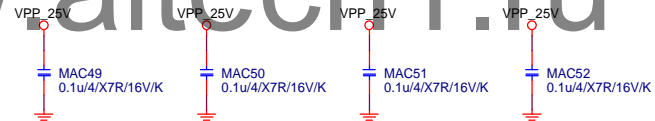
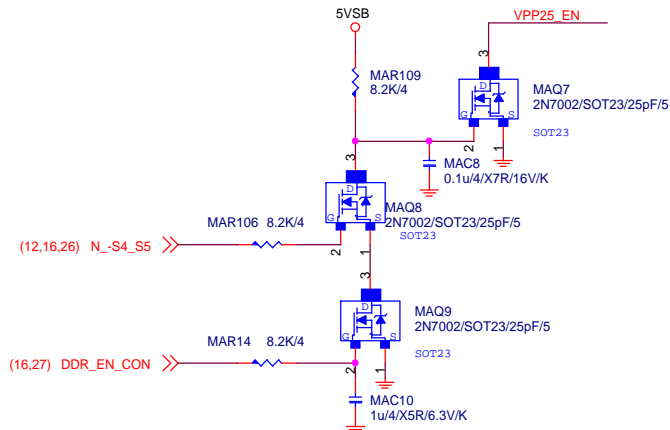
VPP25V_GD不能使用會亂打

CHOKE與CAP料號可變



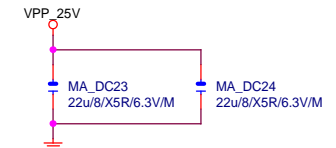
PWR_SEQ

* 刪 MA_DR32



VPP CAP 22u*1PCS

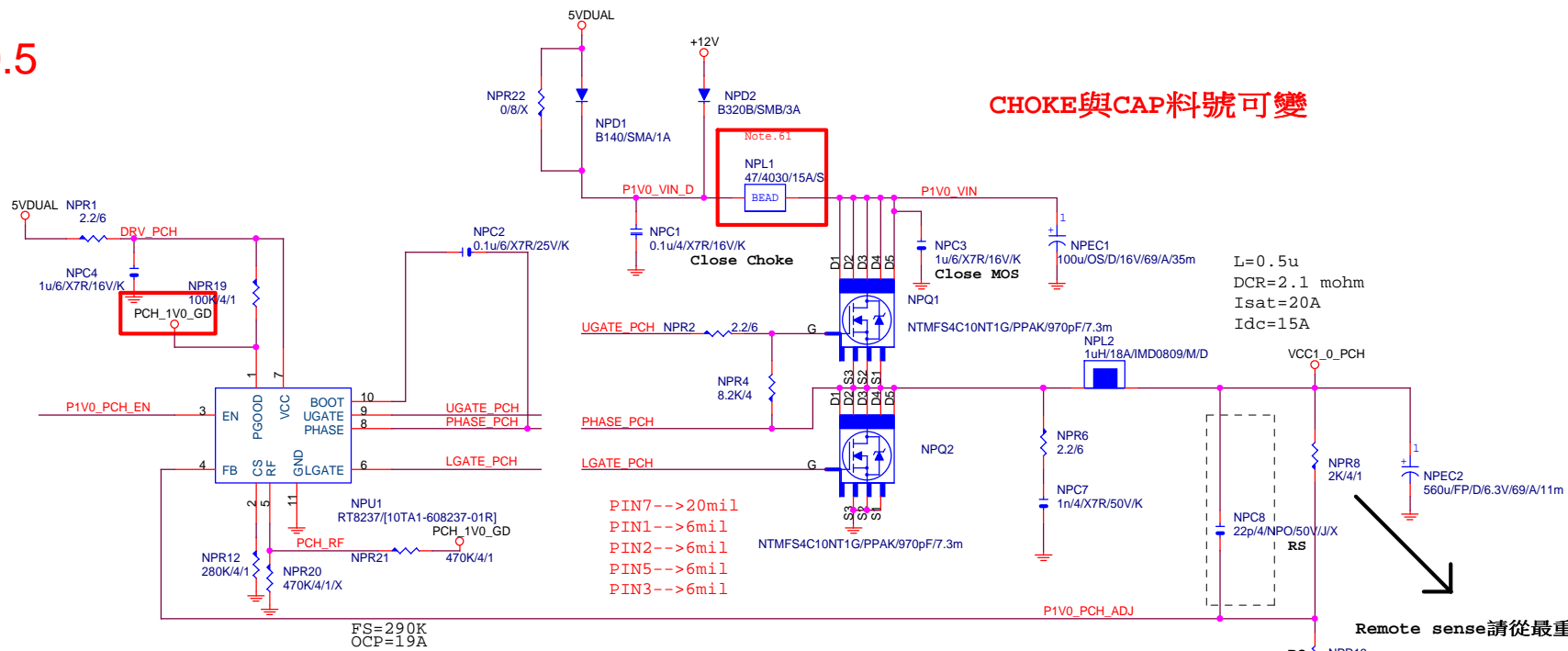
* 大電容 x0




GIGABYTE™

Title		
RT8068A_VPP25 POWER		
Size	Document Number	Rev
Custom	GA-X150M-PLUS WS	1.0
Date:	Wednesday, December 09, 2015	Sheet 28 of 50

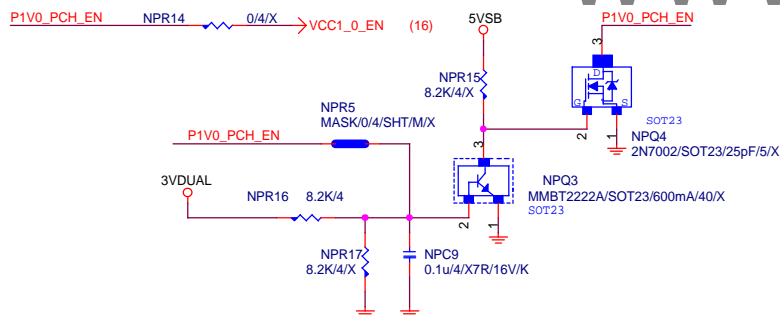
REV:0.5



Remote sense請從最重的負載端點拉回

RO  NPR13
4.12K/4/1
 $0.704 * (1 + RS / RO) = V_{out}$

請放置CHOKE一出來的地方

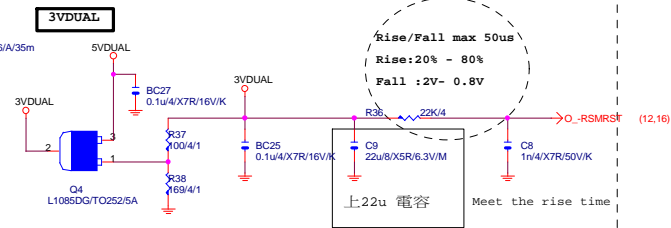
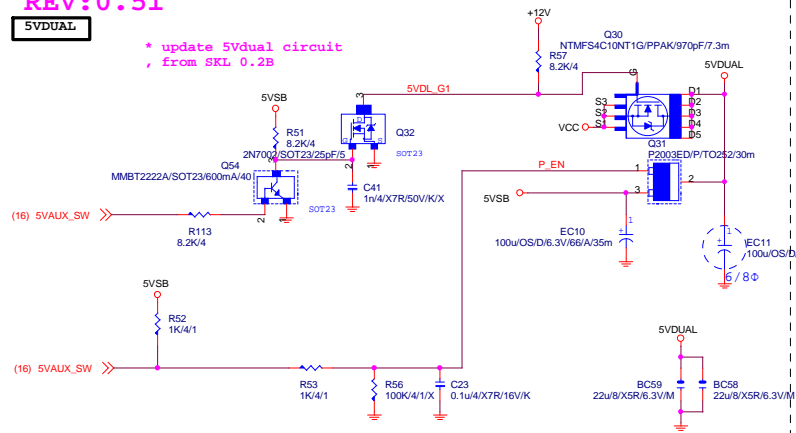


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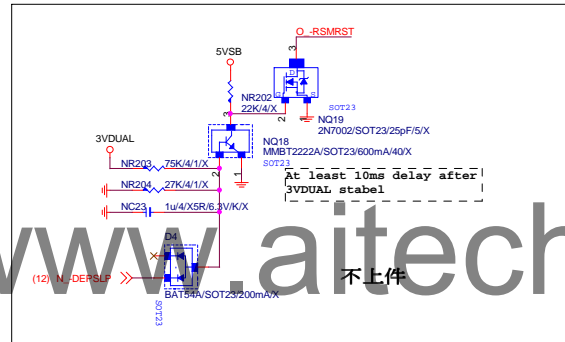
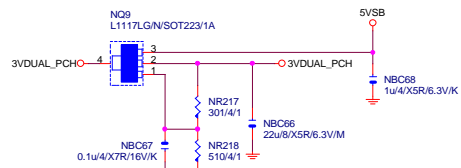
GIGABYTE™

Title			
RT8237_PCH POWER			
Size	Document Number	Rev	
Custom	GA-X150M-PLUS WS	1.0	
Date:	Wednesday, December 09, 2015	Sheet	29 of 50


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

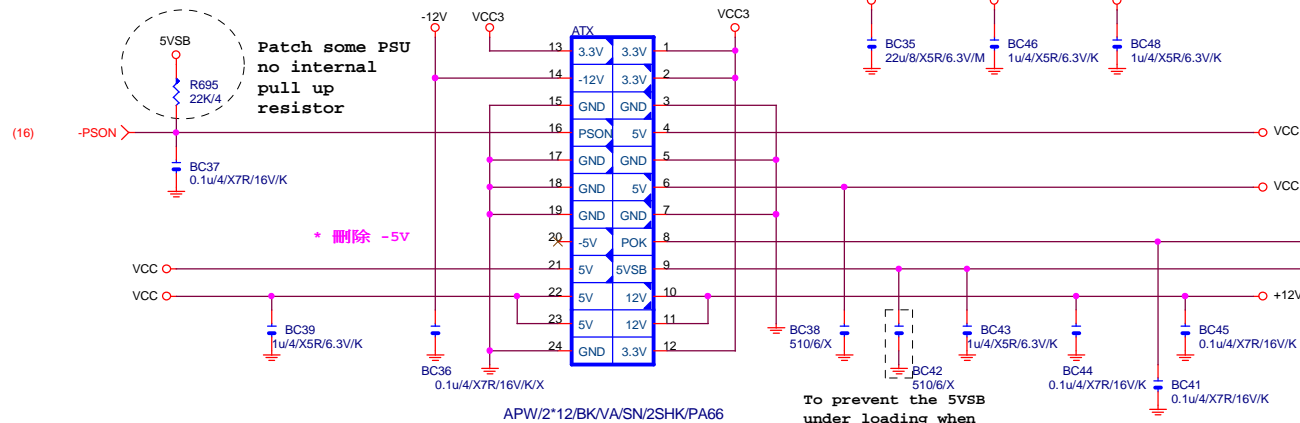


3VDUAL_PCH

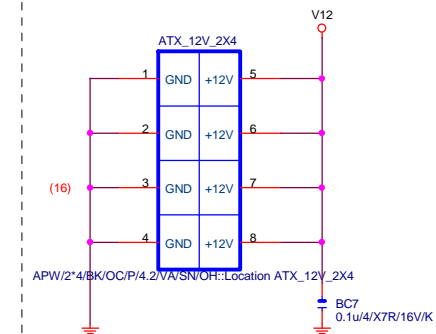


不上件

ATXX24 POWER CONNECTOR

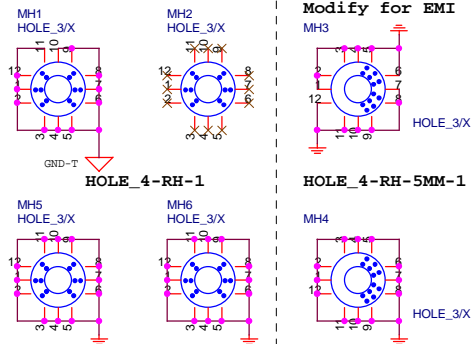


ATXX4 POWER CONNECTOR

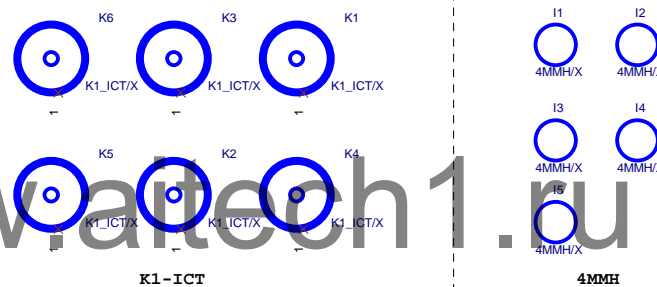


螺絲孔

MH1:GND-T
FOR EMI
TEST驗證



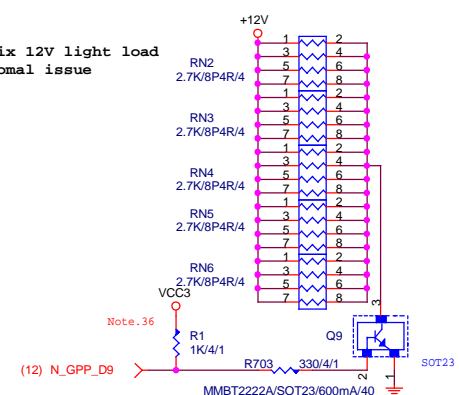
固定孔/光學點



To prevent the 5VSB under loading when boot

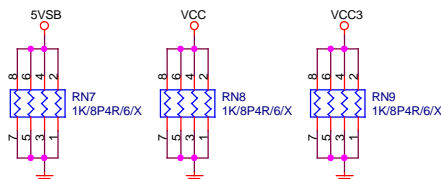
+12V DUMMY LOAD

To fix 12V light load abnormal issue

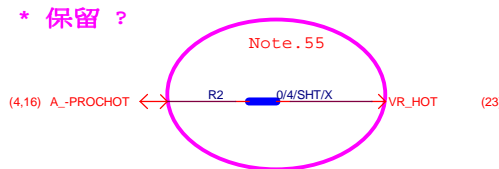


【技術通報R&D技術通報153】

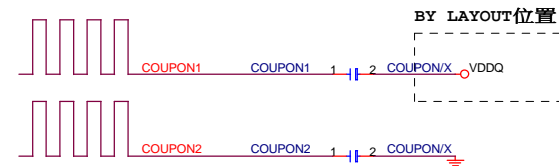
DUMMY LOAD



-PROHOT



COUPON



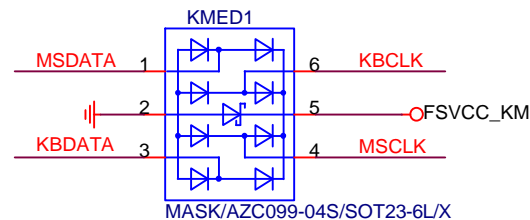
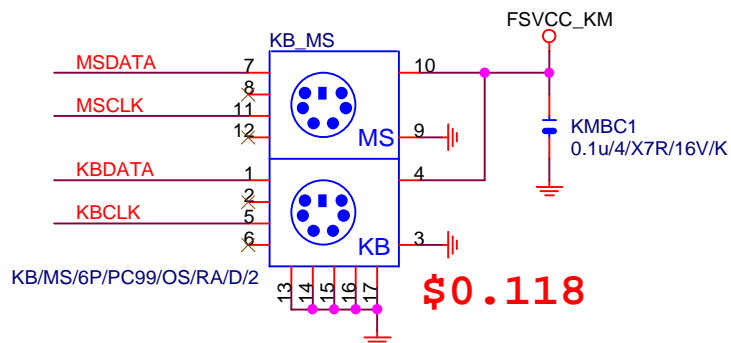
Gigabyte Technology

Title			
ATX POWER CONNECTOR			
Size	Document Number	Rev	
Custom	GA-X150M-PLUS WS	1.0	
Date:	Wednesday, December 09, 2015	Sheet	31 of 50

KB_MS_USB

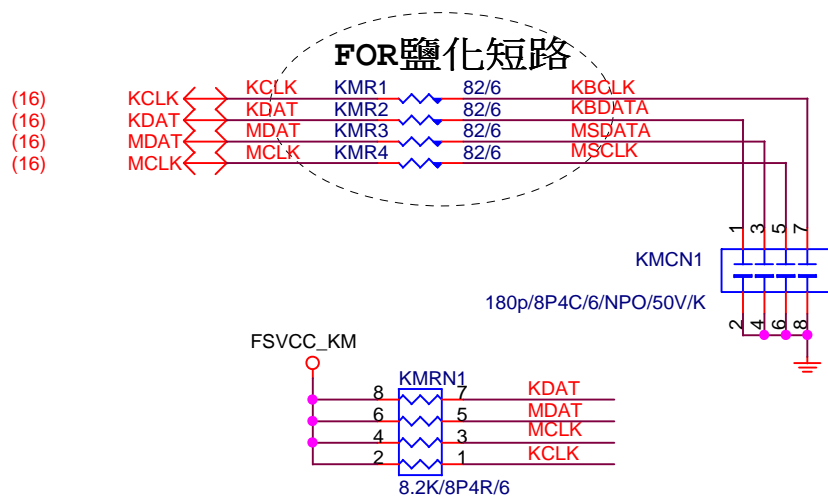
Rev: 0.51

ESD



KB_MS_USB DAMPING/PU

KB_MS_USB PWR



Gigabyte Technology

Title

KB_MS_USB

Size
A

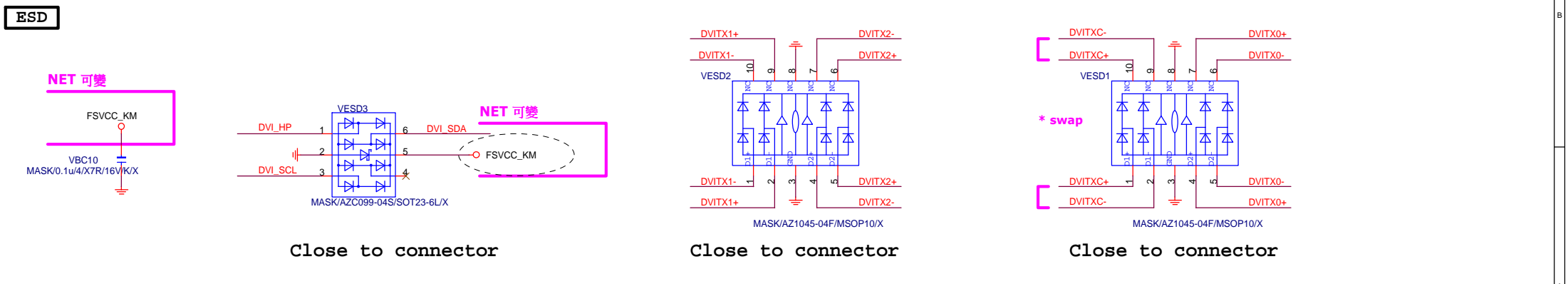
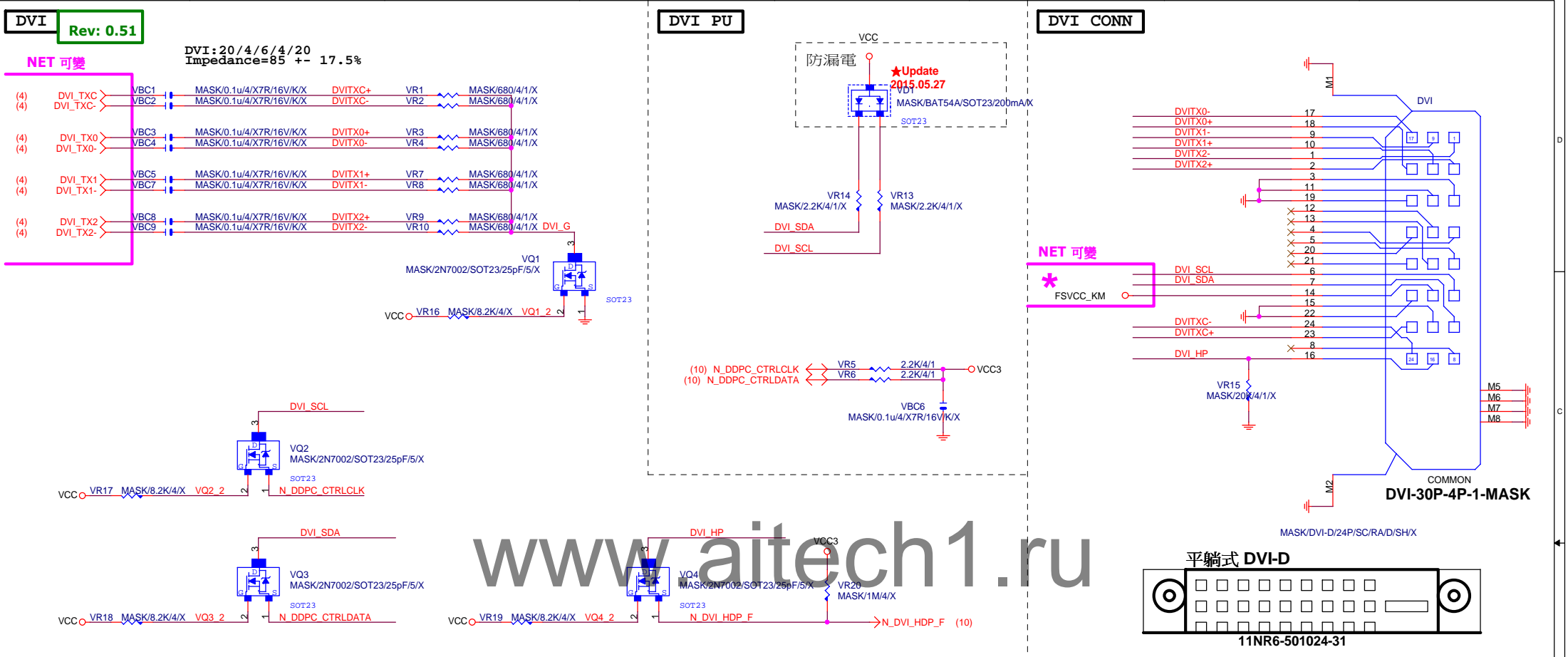
Document Number

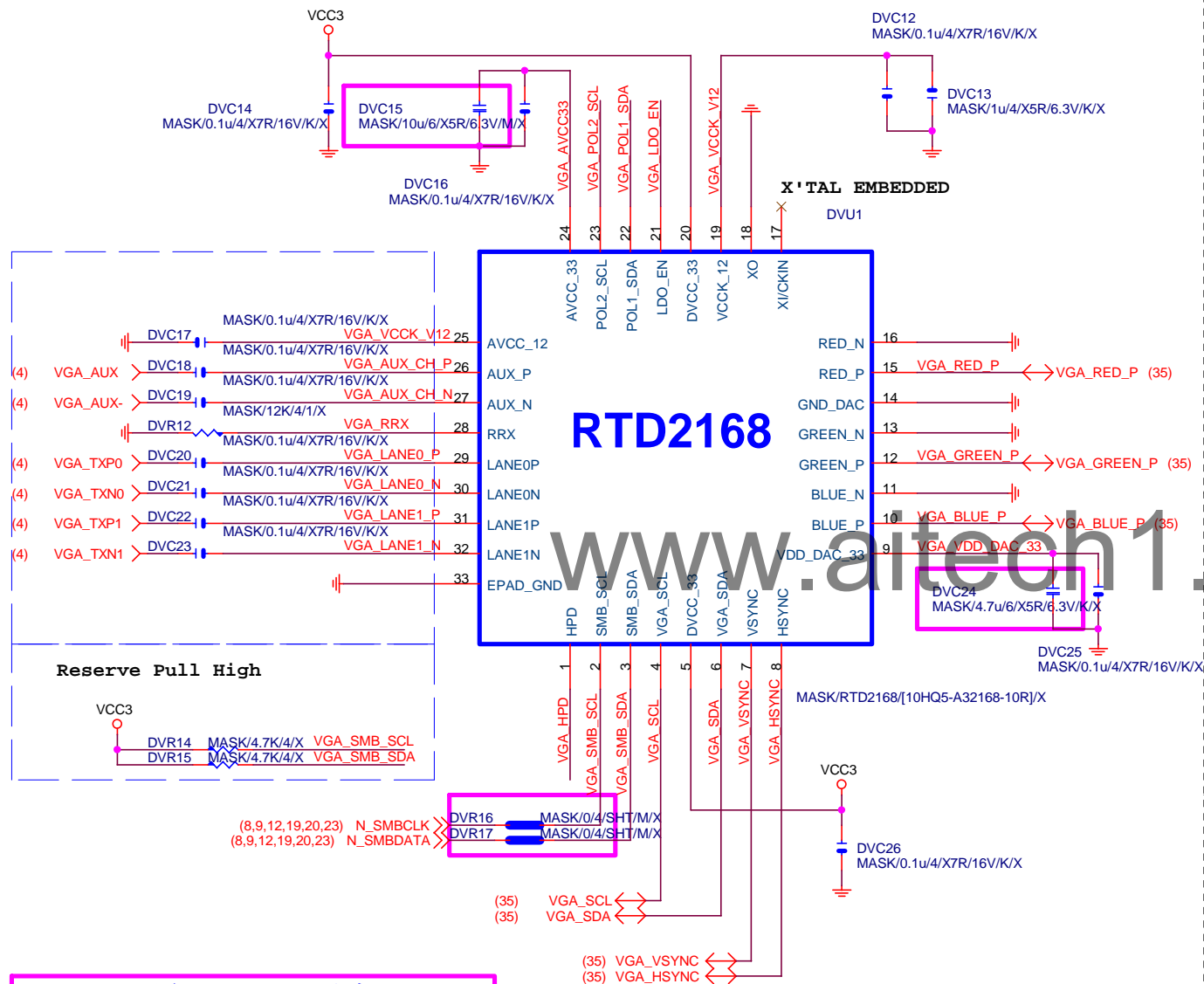
GA-X150M-PLUS WS

Rev
1.0

Date: Wednesday, December 09, 2015

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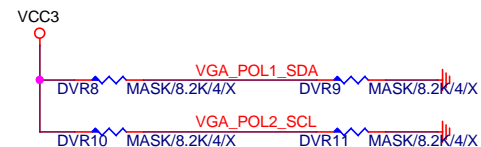
放置PCH端



POWER

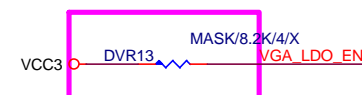


Power on latch



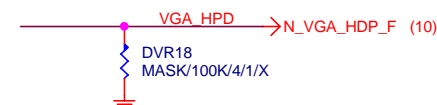
		POL1_SDA(PIN22)	
		0	1
POL2_SCL (PIN23)	0	X	EP MODE
	1	ROM ONLY MODE	EEPROM MODE

Embedded LDO

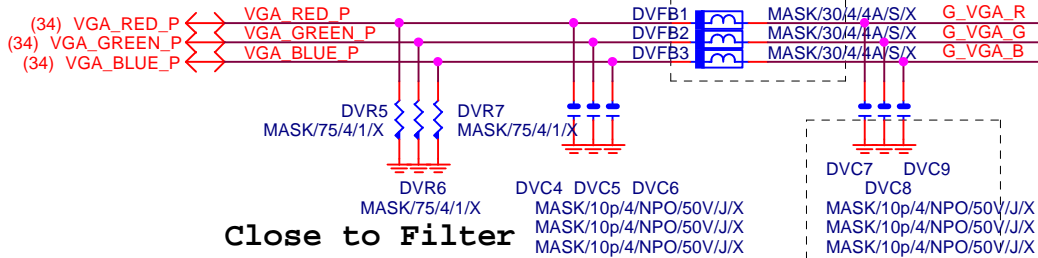
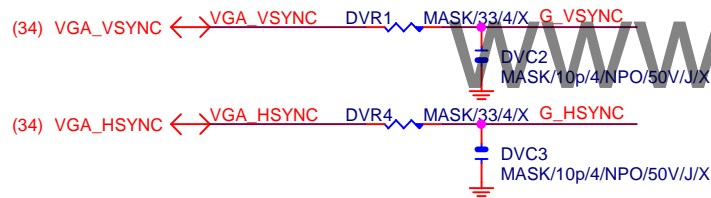
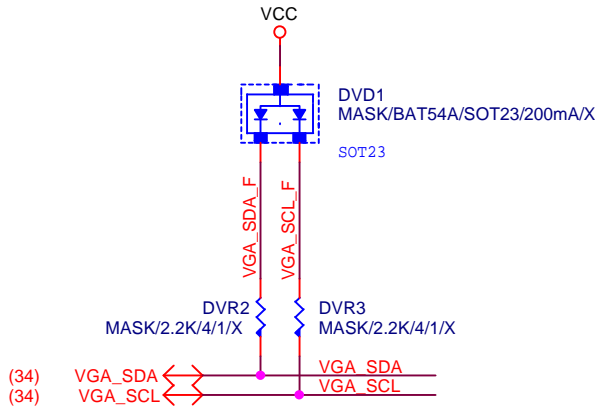


LDO_EN(PIN21)	
0	1
VCCK_V12 from External 1.2V	VCCK_V12 from Embedded LDO

DP HPD

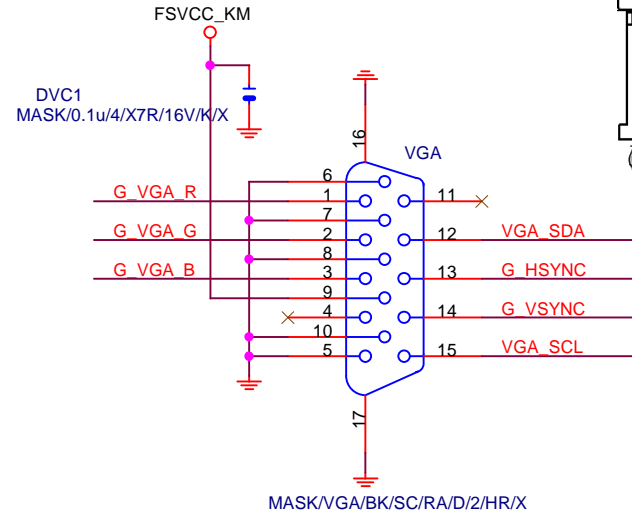


VGA SIGNAL R1.03

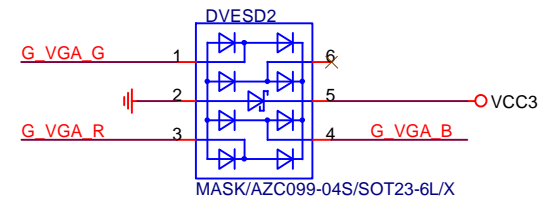
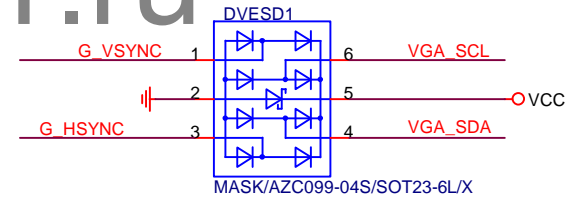


FOR EMI

VGA CONN. 架高型VGA (BLACK)



VGA ESD

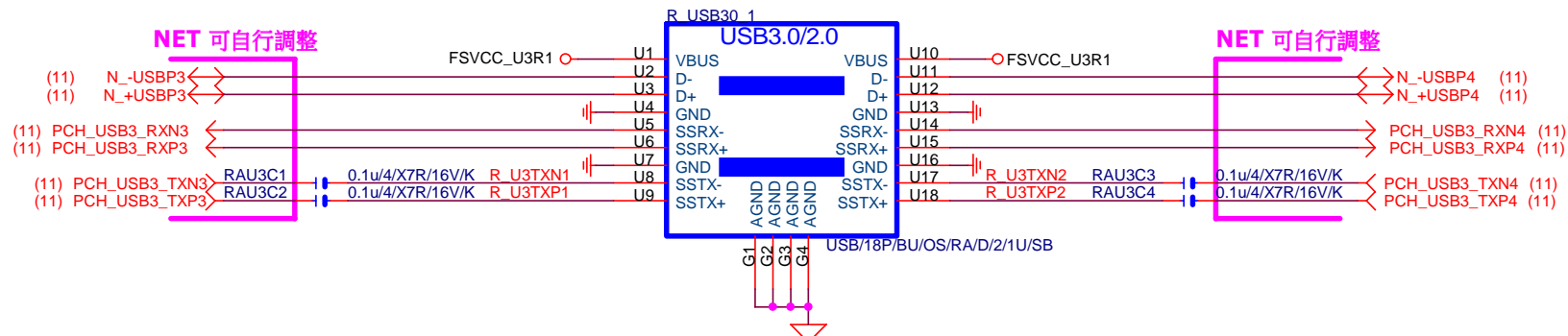


Gigabyte Technology
NXP-PTN3356

Title	GA-B150M-D2VX-SI	Rev	1.0
Size	Custom	Document Number	
Date:	Wednesday, December 09, 2015	Sheet	35 of 50

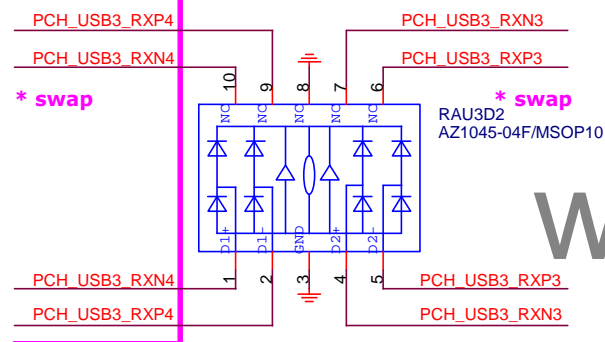
Rev: 0.53

ESD 可自行SWAP PIN ,CONN端 NET 名稱 不可

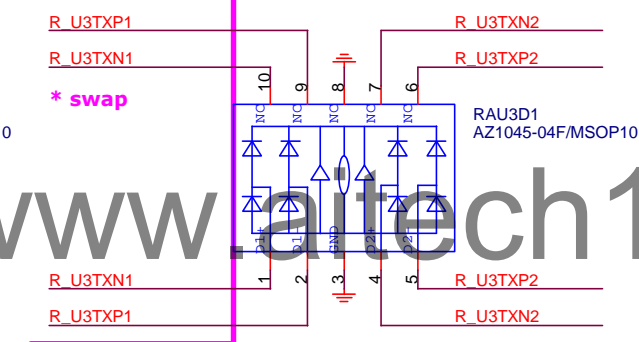


ESD

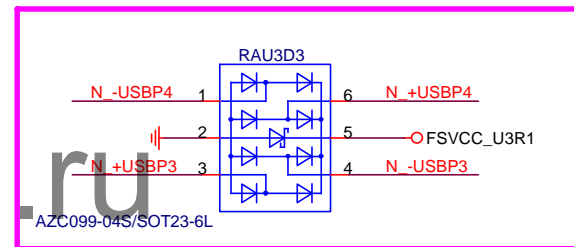
NET 可自行調整



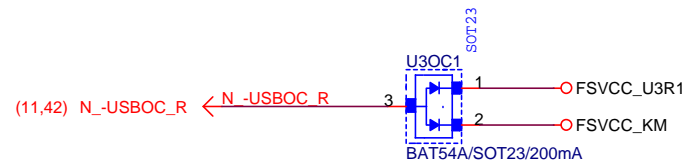
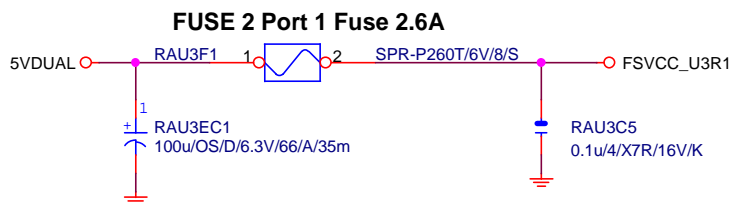
NET 可自行調整



NET 可自行調整

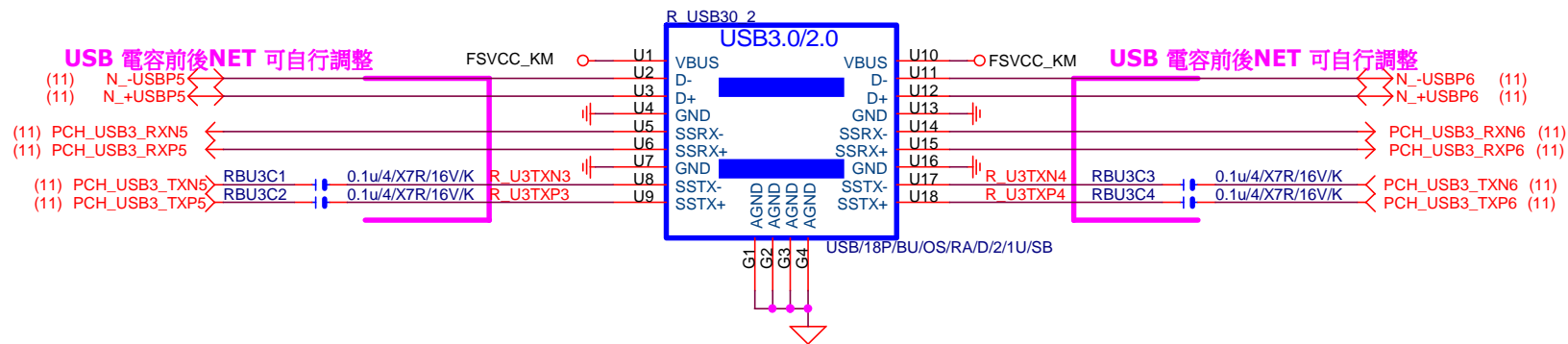


FUSE

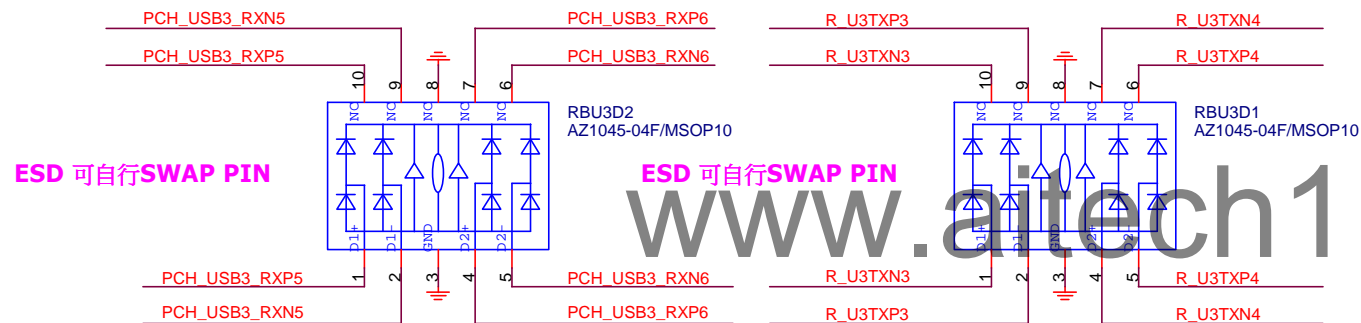


Gigabyte Technology

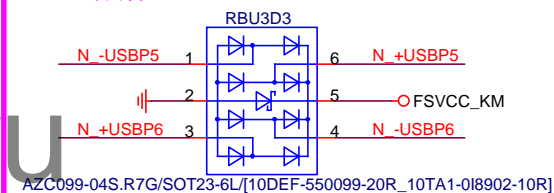
Title		R_USB30,USB_OC	
Size	Document Number	GA-X150M-PLUS WS	
Custom		1.0	
Date:	Wednesday, December 09, 2015	Sheet	36 of 50



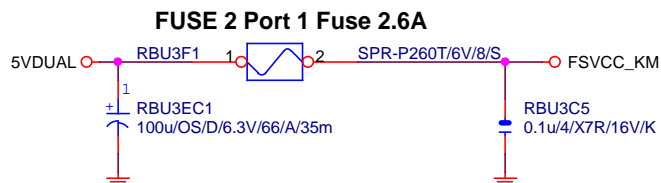
ESD



ESD 可自行SWAP PIN

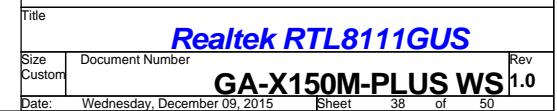


FUSE



Gigabyte Technology

Title		R_USB30,USB_OC	
Size	Document Number	GA-X150M-PLUS WS	
Custom		1.0	
Date:	Wednesday, December 09, 2015	Sheet	37 of 50

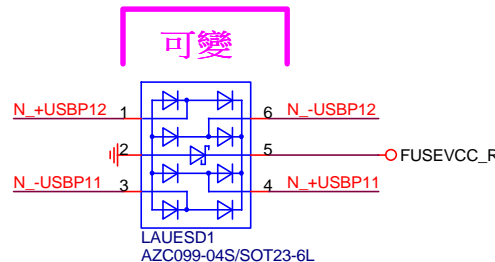


MDI ESD預留 *

USB_LAN CONNECTOR R1.06

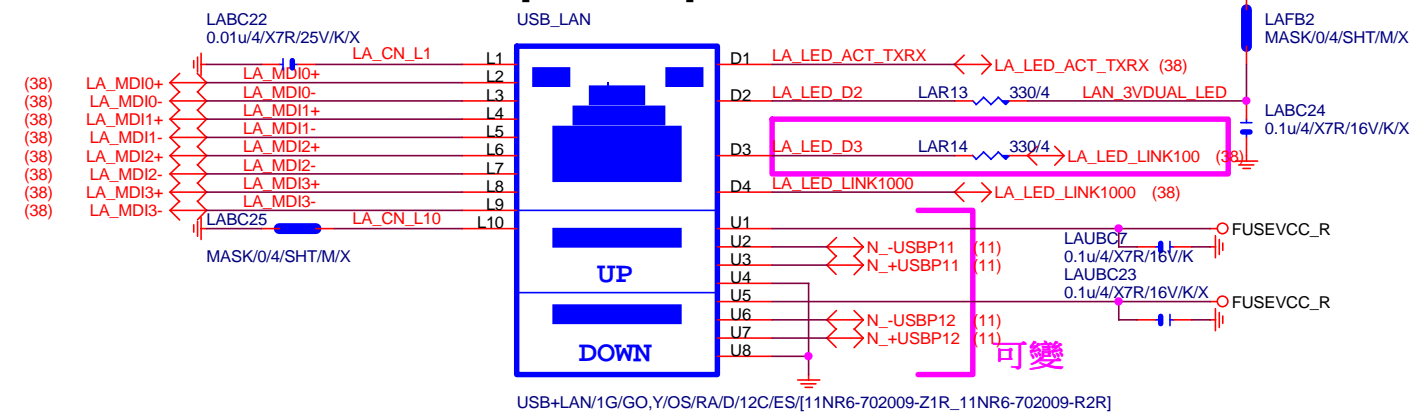
RMA ESD PROTECT

note:可變更USB NAME



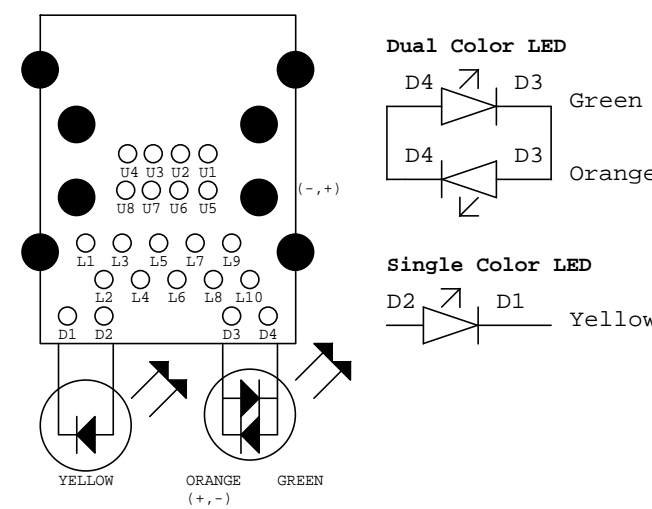
USB_LAN CONNECTOR

note:可變更USB NAME



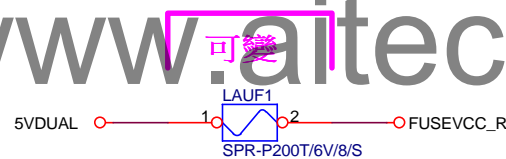
LA_MDI-->100歐姆:[20/4/8/4/20]

USB_LAN LAYOUT示意圖



USB POWER

note:可變更FUSE



Close to connector
USB_LAN 2-Port 2.0A
FUSE-0805

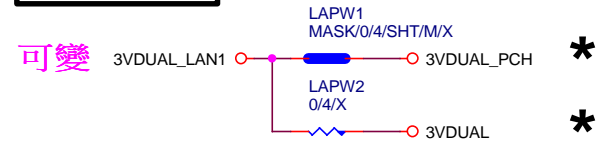
EMI SHORT PAD

PS:視EMI需求



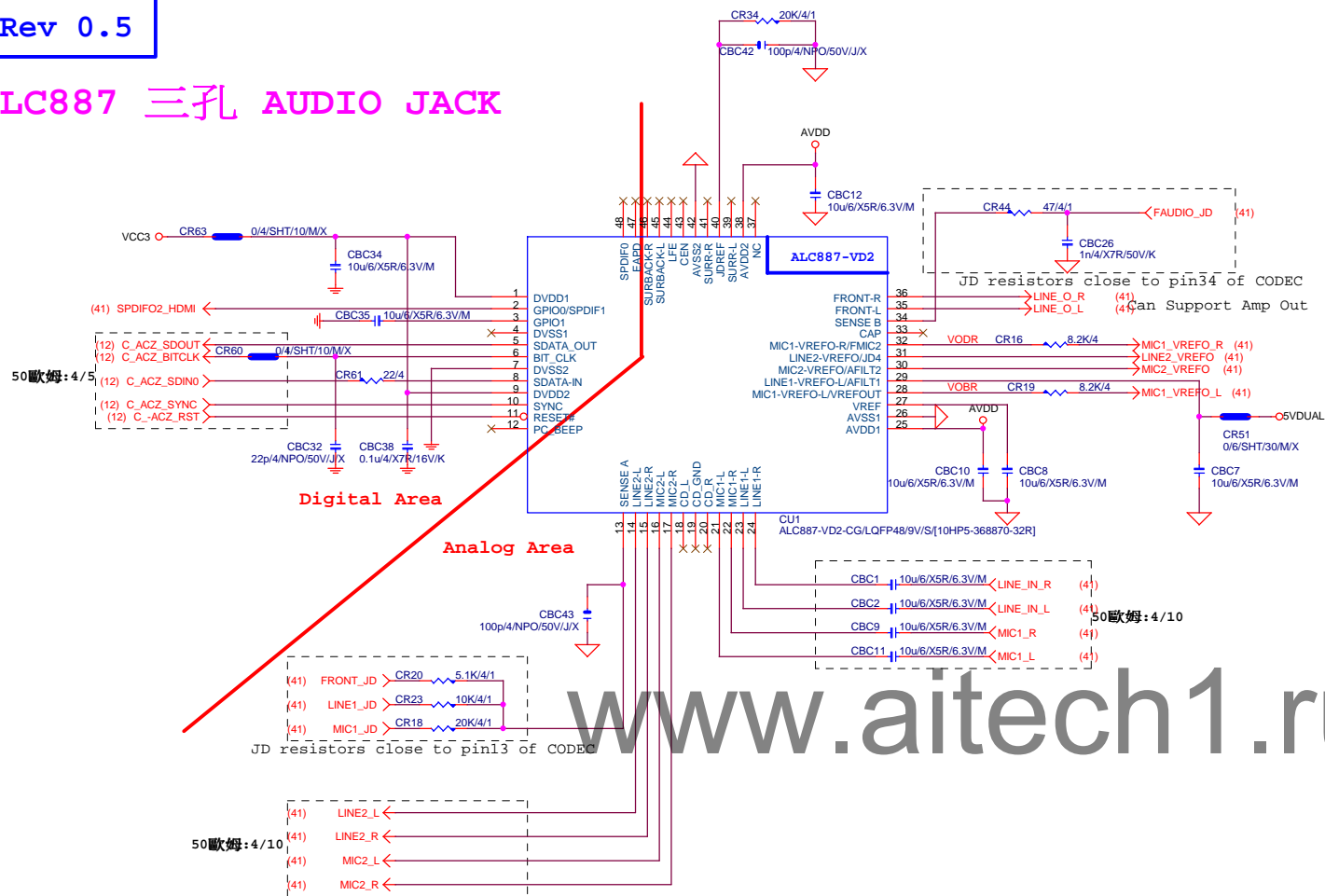
LAN POWER

note: lan power連接及電流



<div>Gigabyte Technology</div>			
<div>Title</div> <div>LAN CONNECTOR-RTL8111G</div>			
Size	Document Number		Rev
Custom	<div>GA-X150M-PLUS WS</div>		1.0
Date:	Wednesday, December 09, 2015	Sheet	39 of 50

ALC887 三孔 AUDIO JACK

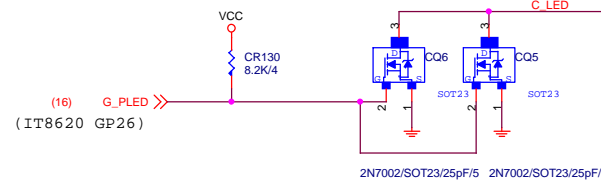
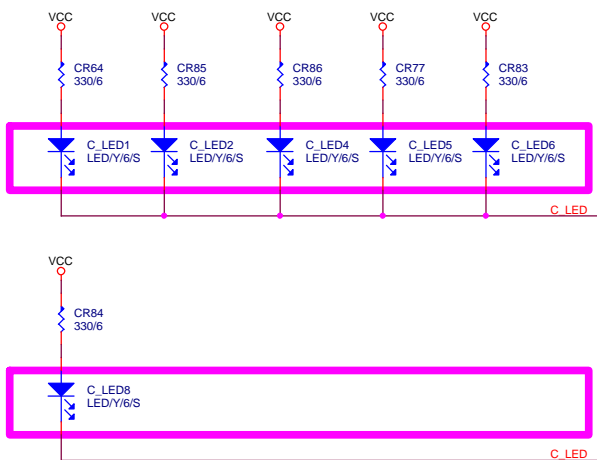


LAYOUT注意:螺絲孔下GND方式

1. MH1空間夠,下DGND
2. MH2一律改為Isolate

<input type="radio"/> MH1	<input type="radio"/> MH2
DGND	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

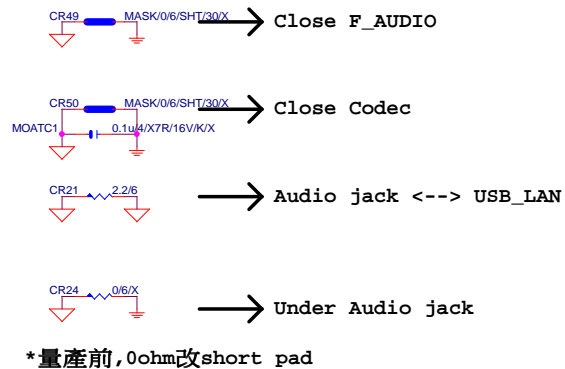
GND切割線

音效區域印刷

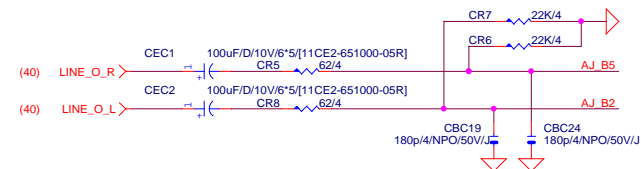
Gigabyte Technology

Title	HD AUDIO ALC887
Size	Custom
Document Number	GA-X150M-PLUS WS
Date:	Wednesday, December 09, 2015
Sheet	40 of 50
Rev	1.0

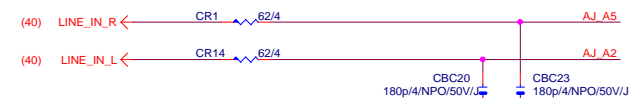
Rev 0.5



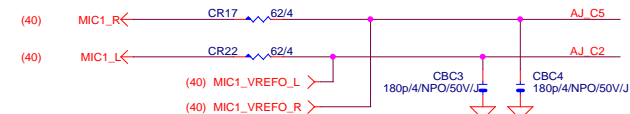
LINE-OUT



LINE-IN



MIC-IN

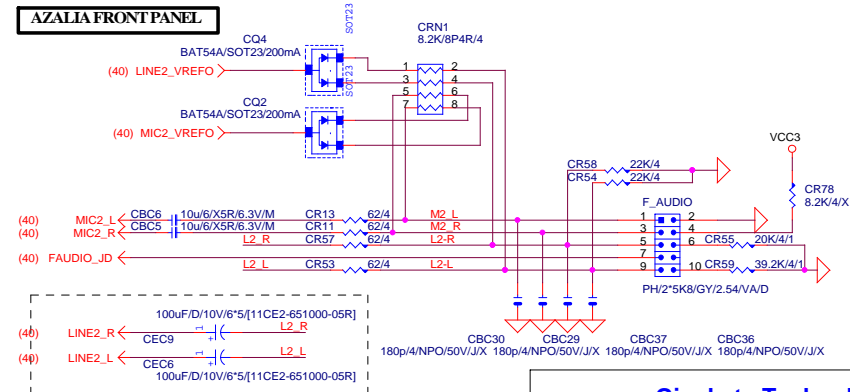


SURROUND

CEN/LFE

SURRBACK

AZALIA FRONT PANEL

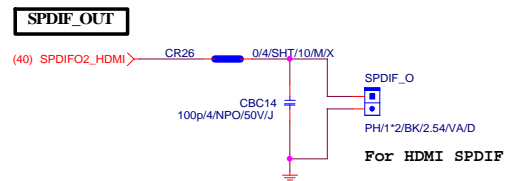


Gigabyte Technology

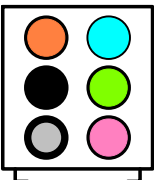
AUDIO JACK

Title	Document Number	Rev
Size	GA-X150M-PLUS WS	1.0
Custom		
Date:	Wednesday, December 09, 2015	Sheet 41 of 50

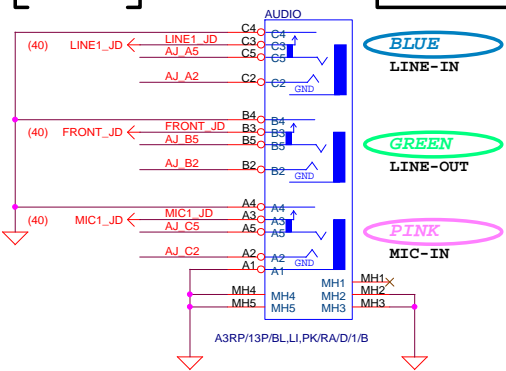
SPDIF_IN

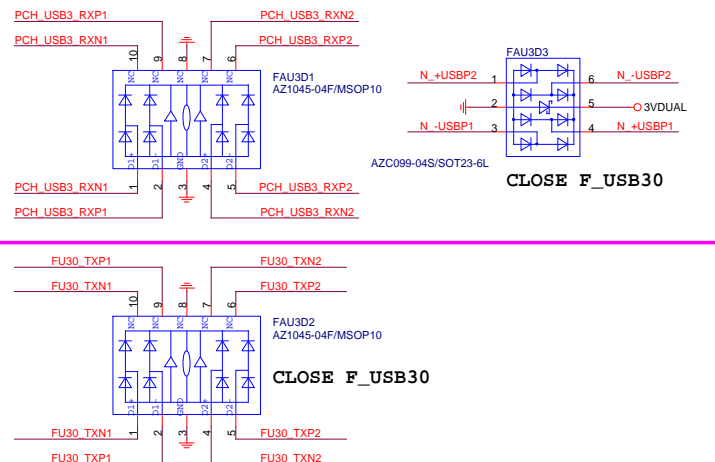


AZALIA JACK

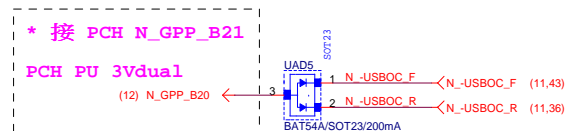
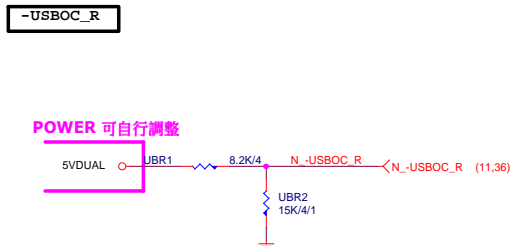


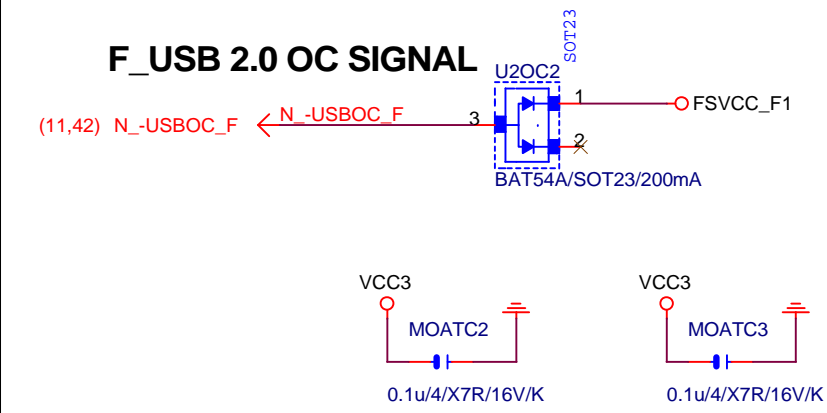
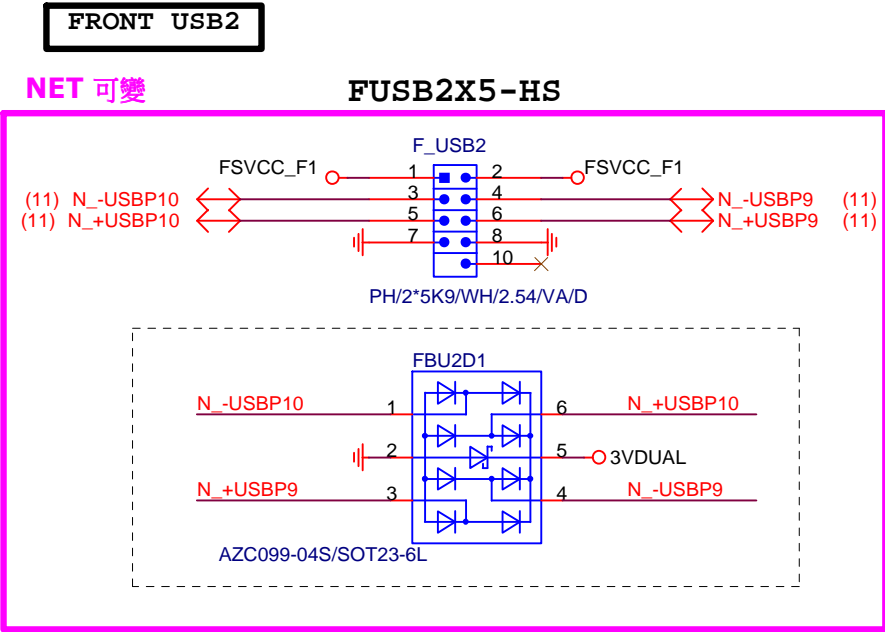
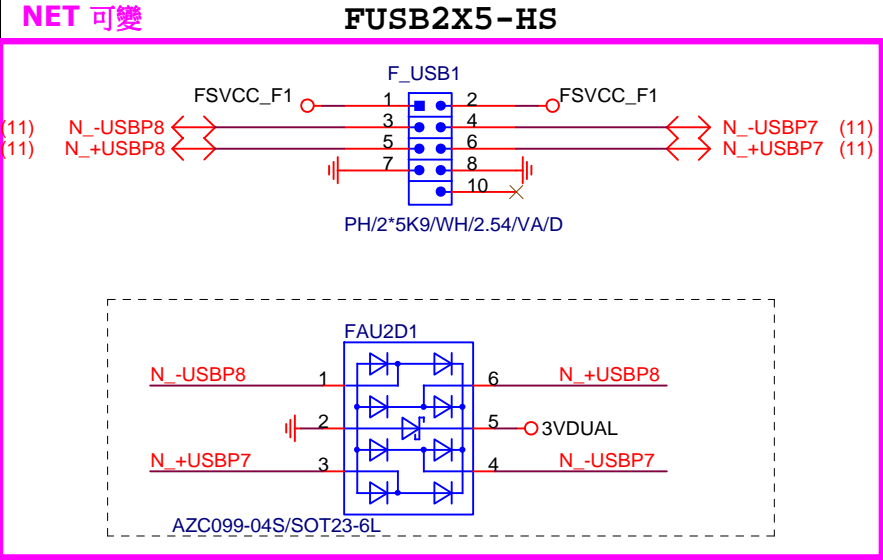
AZALIA JACK

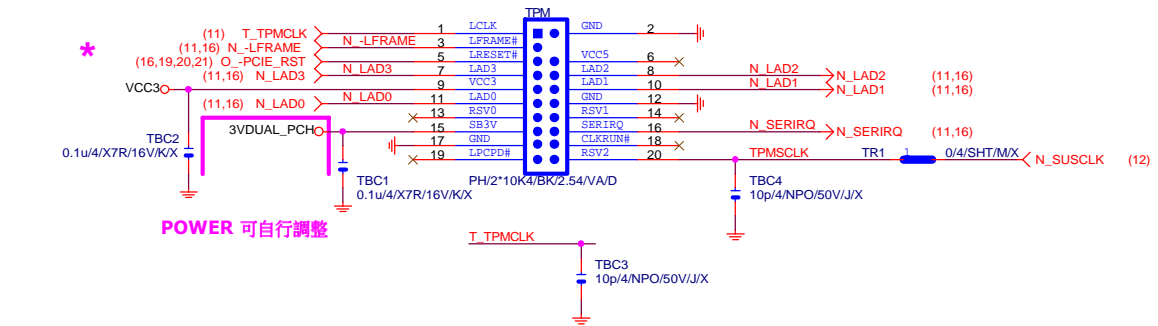
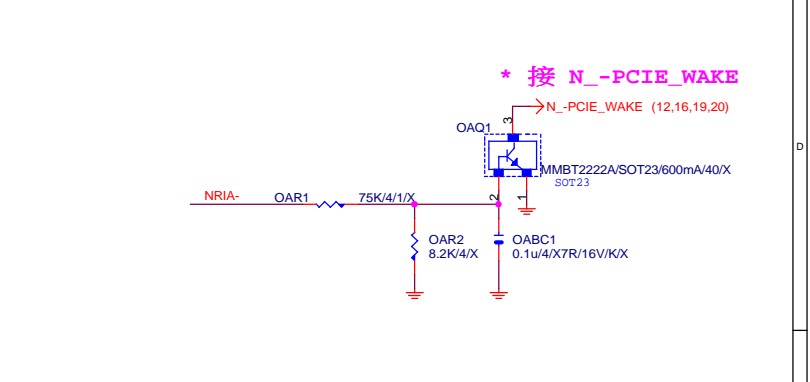
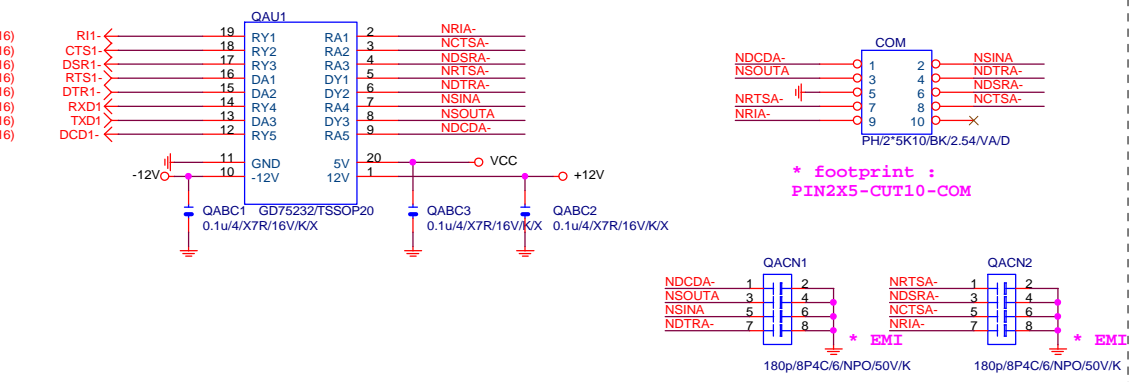




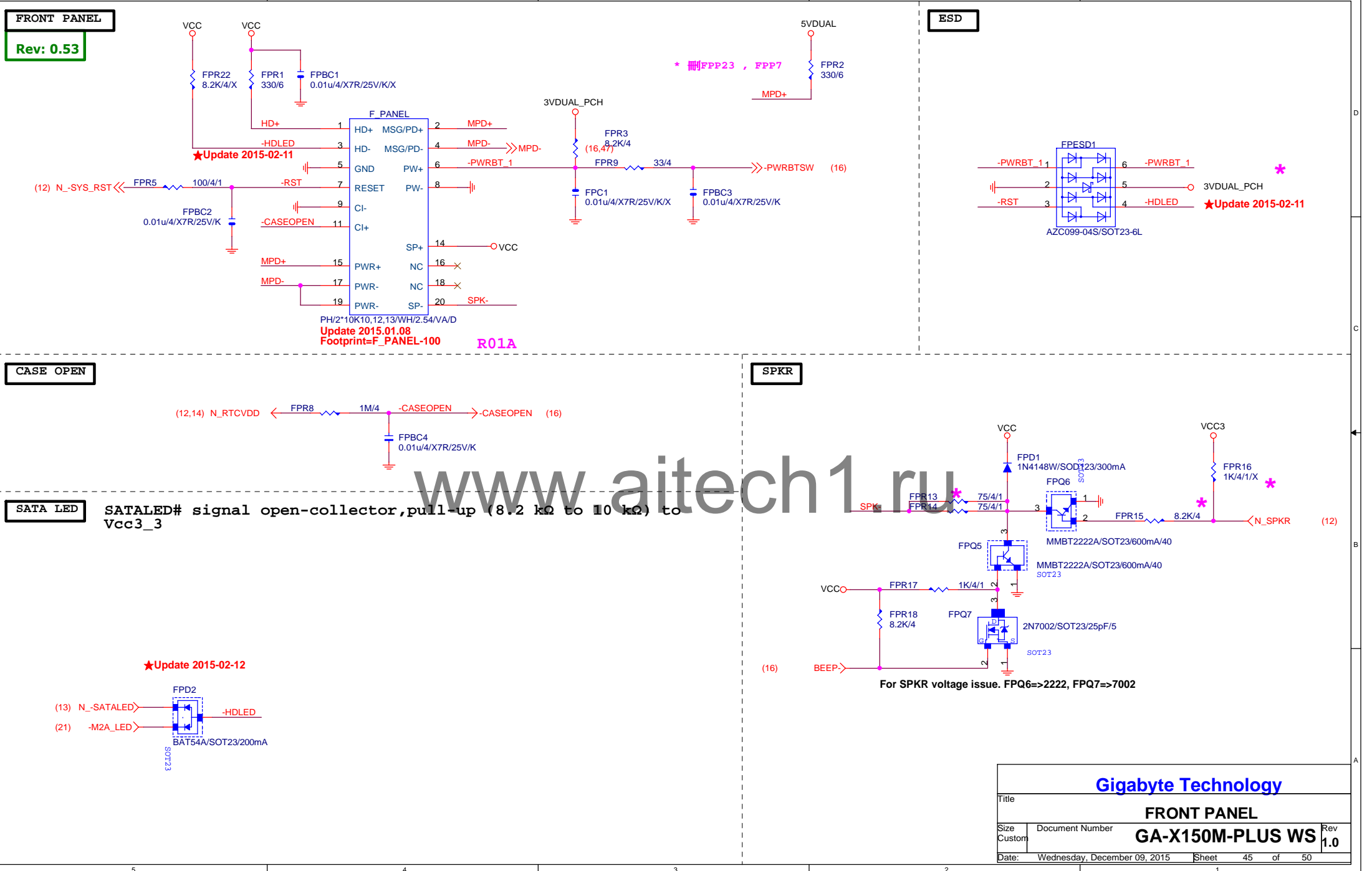
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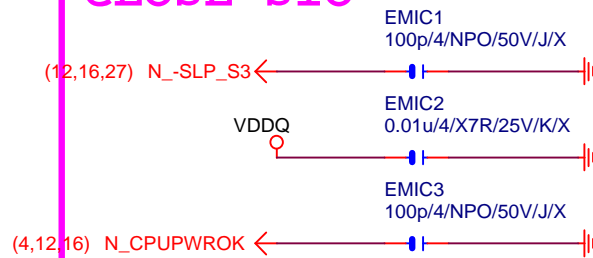


(N/A)



OVER VOLTAGE							

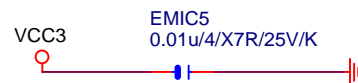
CLOSE SIO



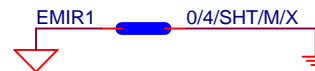
CLOSE PCH



close to PCH (NR17)



R_USB30_2 & DVI 之間



close to FRONT PANEL

**GIGABYTE™**

Title

EMI/ESDSize
A

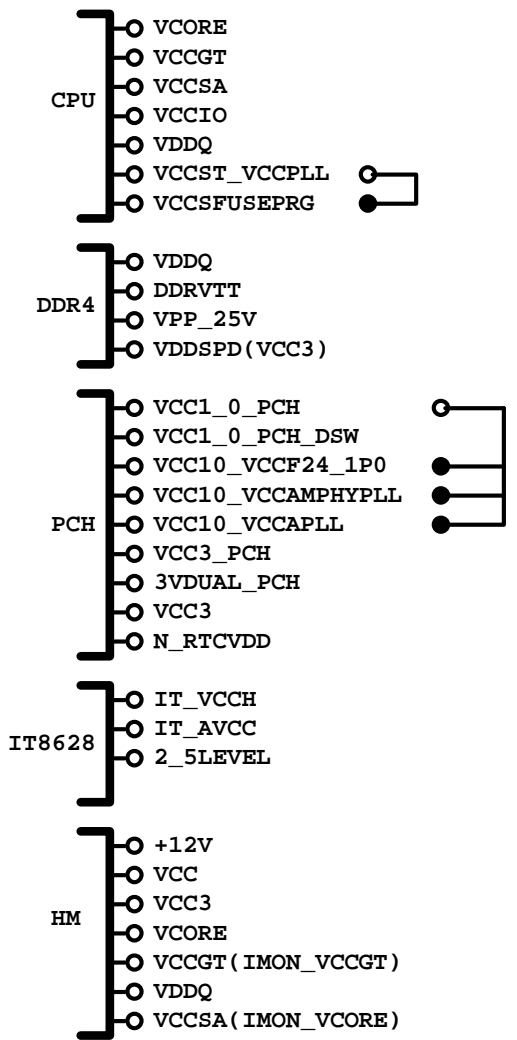
Document Number

GA-X150M-PLUS WSRev
1.0

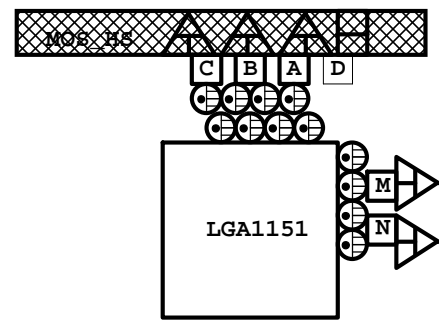
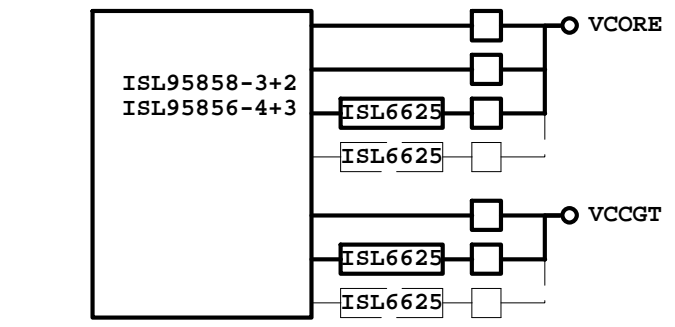
Date: Wednesday, December 09, 2015

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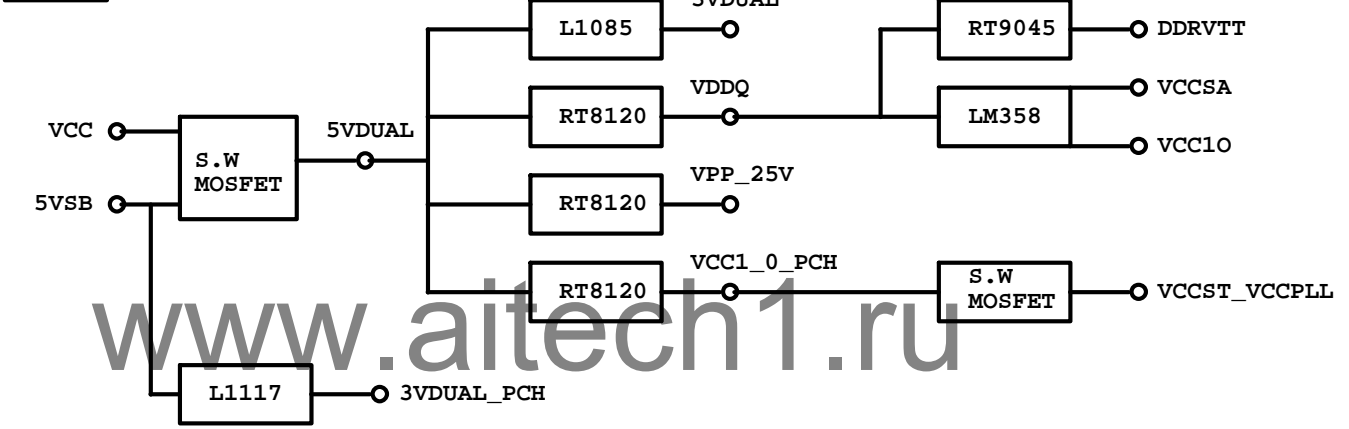
POWER BLOCK MAP



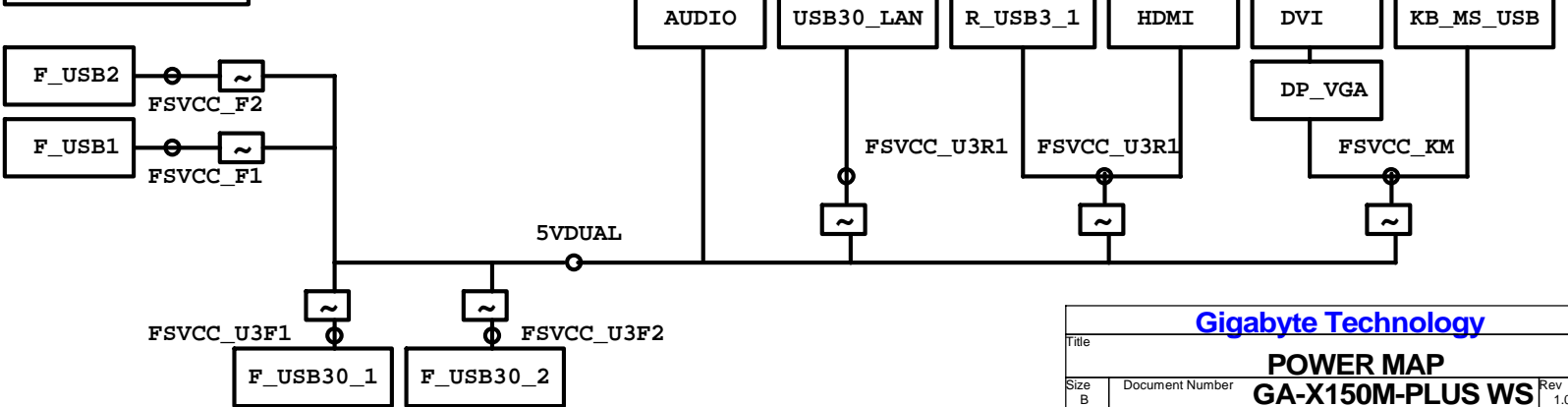
VCORE/VCCGT




POWER

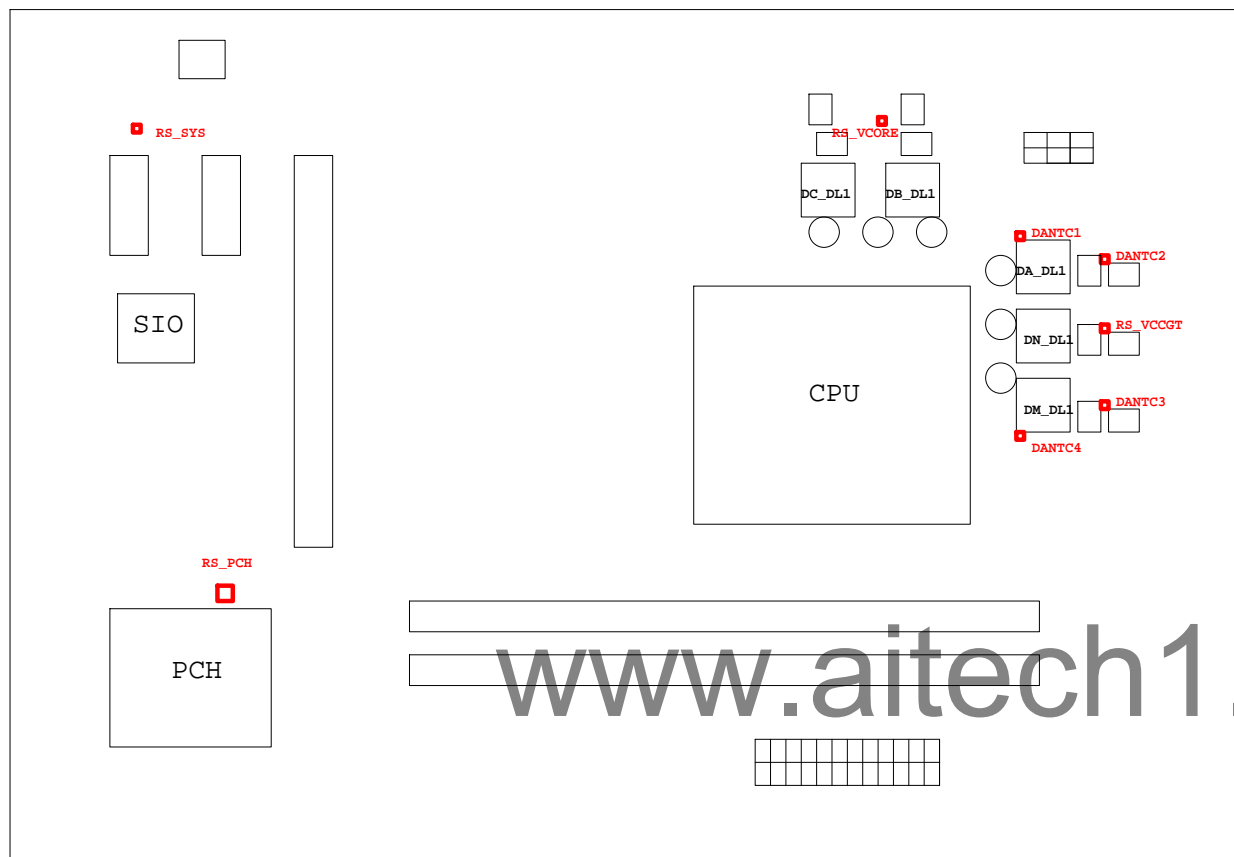


FUSE POWER F/R



Gigabyte Technology			
Title			
POWER MAP			
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RT8120_DDR4 POWER			
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熱敏電阻	擺放靠近位置	走線方式
DANTC4	DM_DL1	Differential
DANTC1	DA_DL1	Differential
DANTC3	DM_DQ1	Differential
DANTC2	DA_DQ1	Differential
RS_VCORE	DC_DQ1	N/A
RS_VCCGT	DM_DQ1	N/A
RS_PCH	PCH	N/A
RS_SYS	CU1	N/A