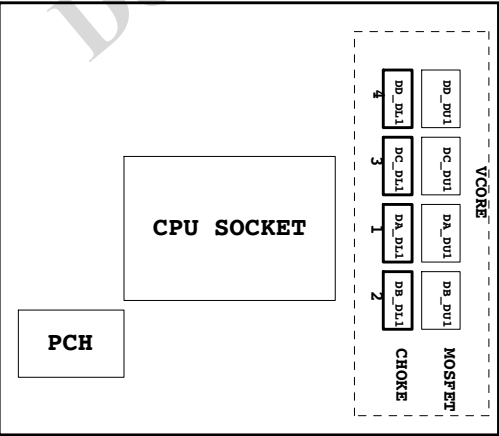


Model Name: GA-B150M-PIO-SI

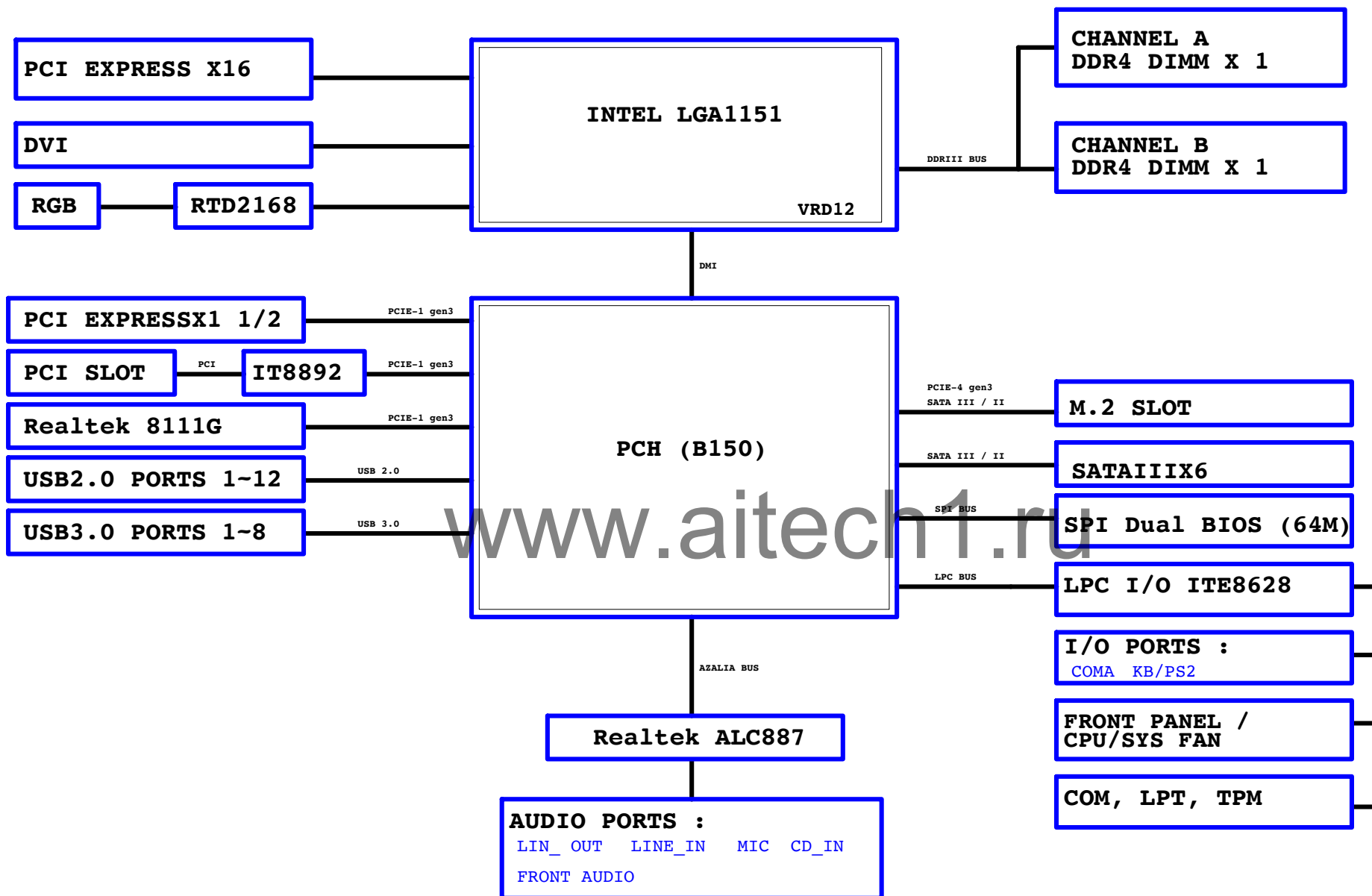
SHEET TITLE Rev 1.0

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_LGA1151-D
08	DDR 4 CHANNEL A
09	DDR 4 CHANNEL B
10	PCH CLOCK BUFFER
11	PCH DMI,USB,PCIE
12	PCH MISC
13	PCH SATA,PCIE,SATA_EXPRESS
14	PCH_PWR,GND
15	Dual BIOS
16	I/O ITE8628
17	HWM
18	FAN CTRL-SIO
19	PCIEX16 SLOT
20	PCIEX1*2 SLOT
21	M.2 x4
22	
23	IT8892
24	IT8892 POWER
25	PCI SLOT
26	ISL95858_856 PWM
27	ISL95858_856 MOS_VCORE
28	ISL95858_856 MOS_VCCGT
29	VCCSA_VCCIO_VCCPLL
30	RT8237_DDR_BEAD
31	
32	RT8237_PCH-BEAD
33	DISCRETE POWER
34	NCP3933 OVER VOLTAGE

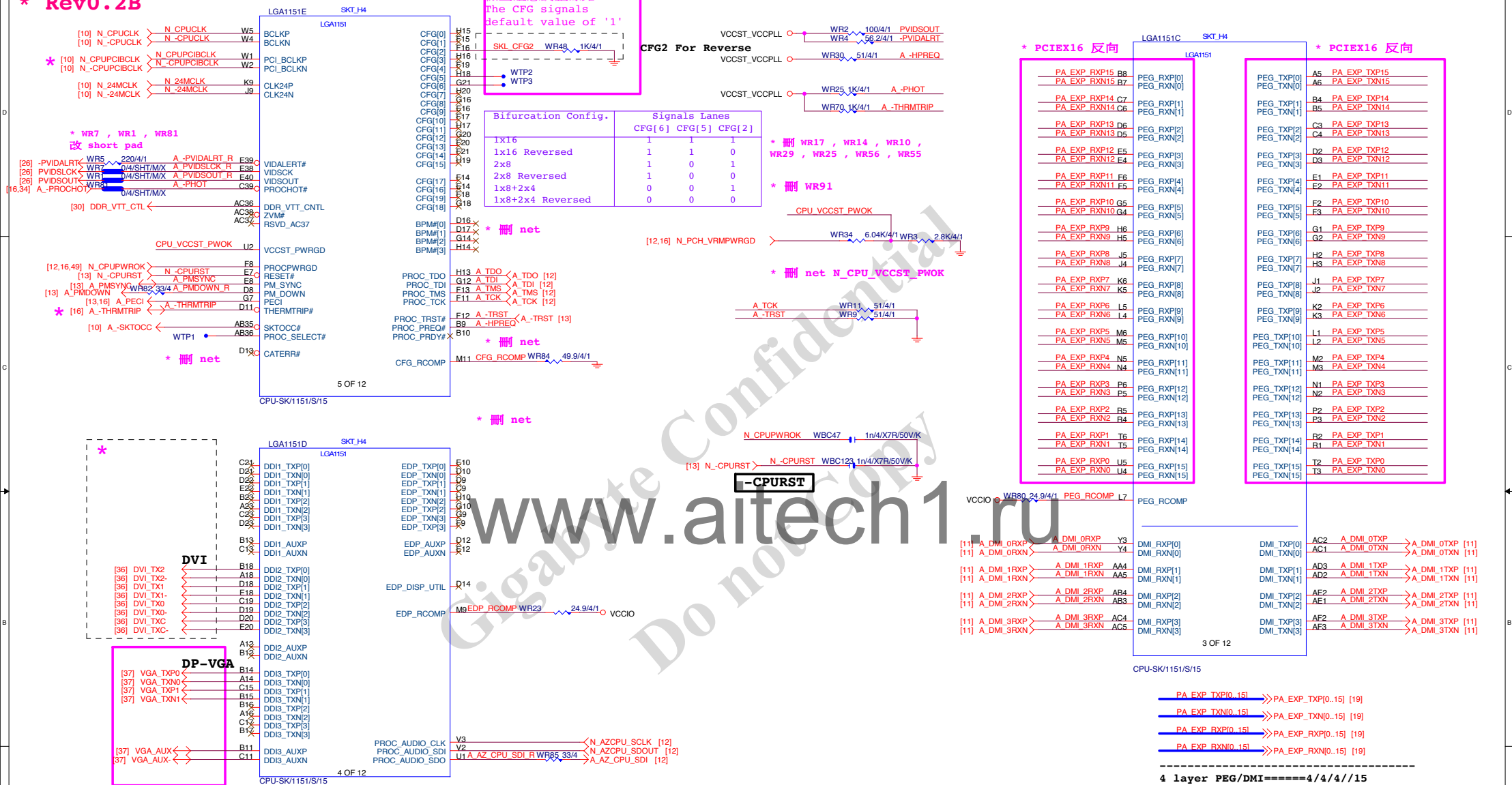
35	ATX POWER , -PROCHOT
36	KB_MS_USB
37	DVI
38	RTD2168 - DP to VGA - IC
39	RTD2168 - DP to VGA - Conn
40	HDMI
41	R_USB30
42	Realtek 8111HS
43	USB30_LAN CONNECTOR-8111HS
44	ALC887-VD2 CODEC
45	REAR AUDIO JACK
46	F_USB30
47	F_USB20
48	COM , LPT , TPM
49	F_PANEL
50	TABLE LIST



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%

```

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]

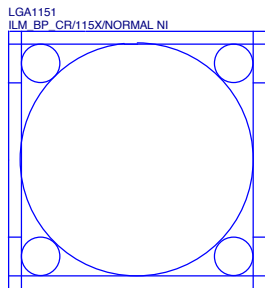
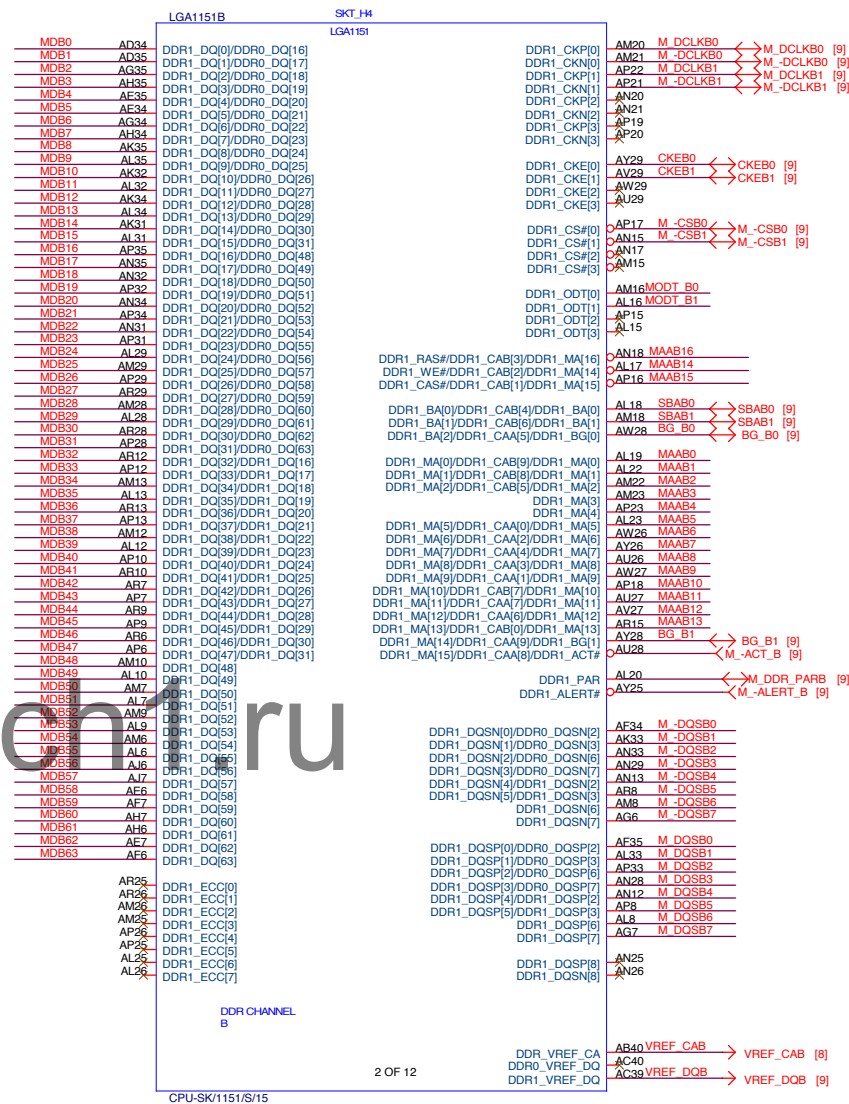
```

```
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

* 改DDR4 net



Need check the new CPU ME

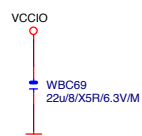
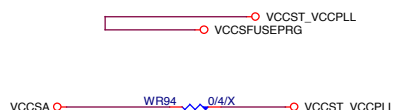
BLACK NI

Gigabyte Technology

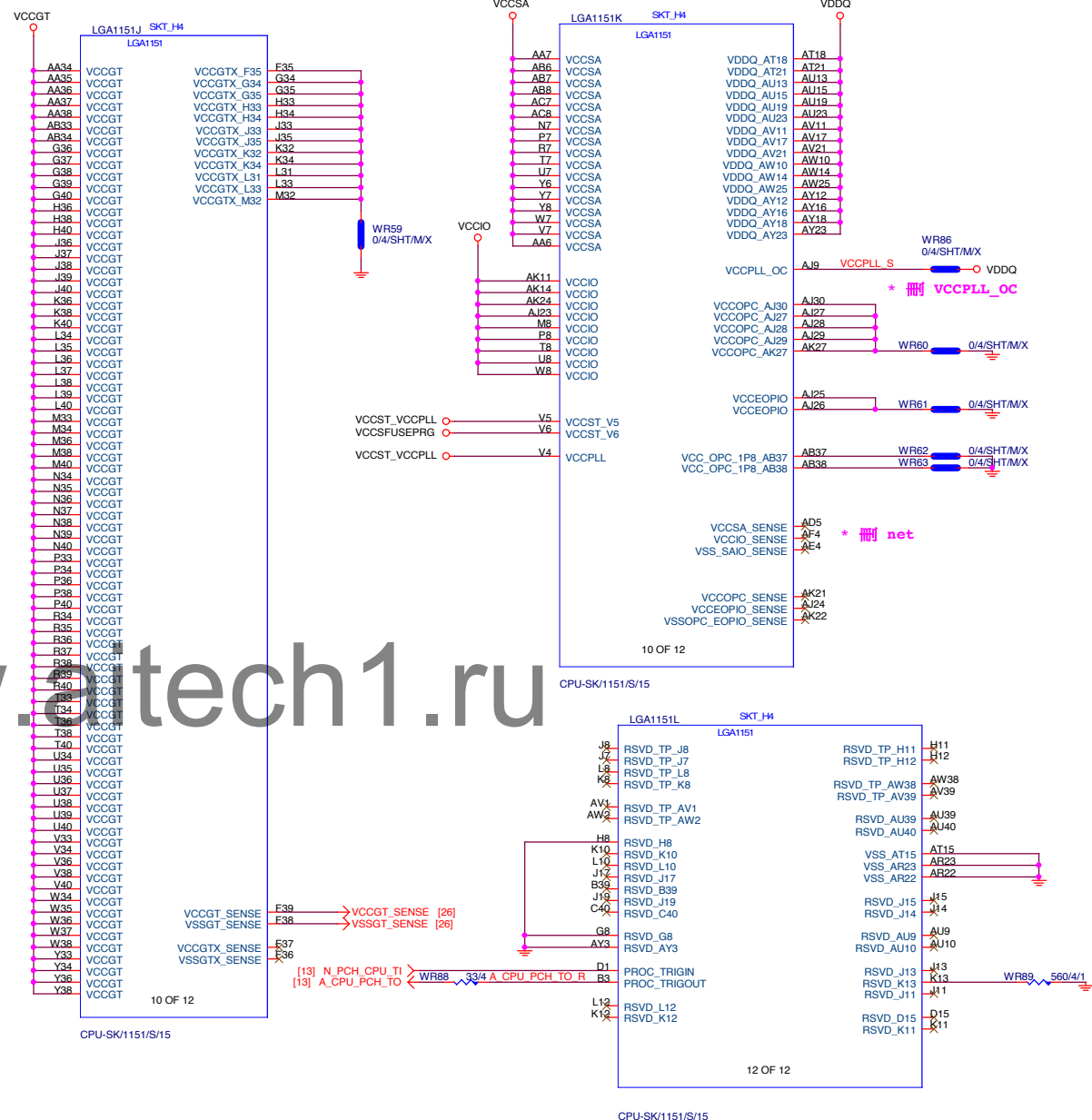
Title	CPU LGA1151-B
-------	---------------

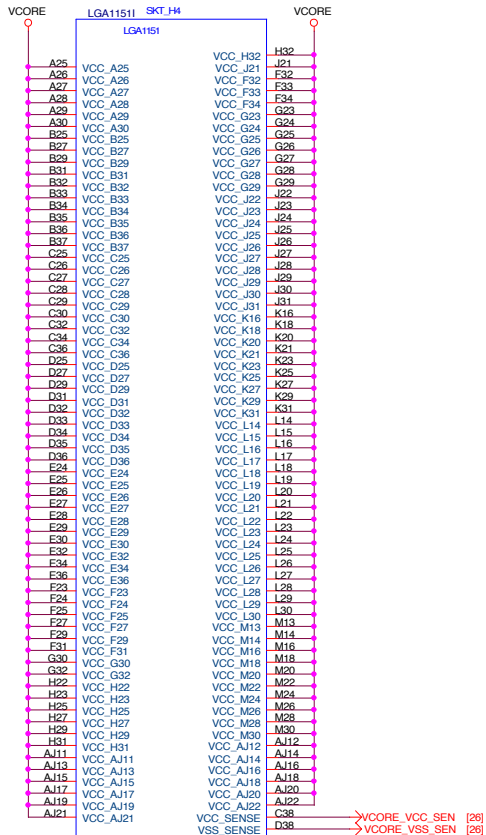
Size Custom	Document Number GA-B150M-PIO-SI	Rev 1.0
Date:	Tuesday, March 08, 2016	Sheet 5 of 52

* 刪 WBC124 , WBC125 , WBC126 , WBC127 電容

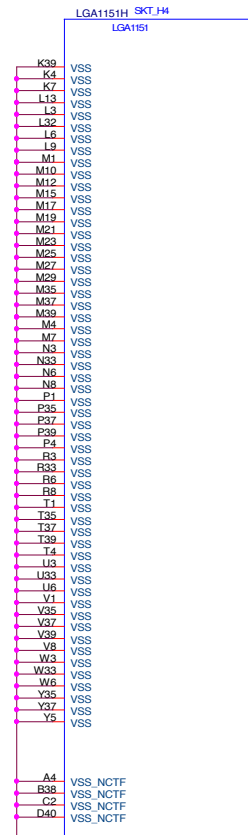
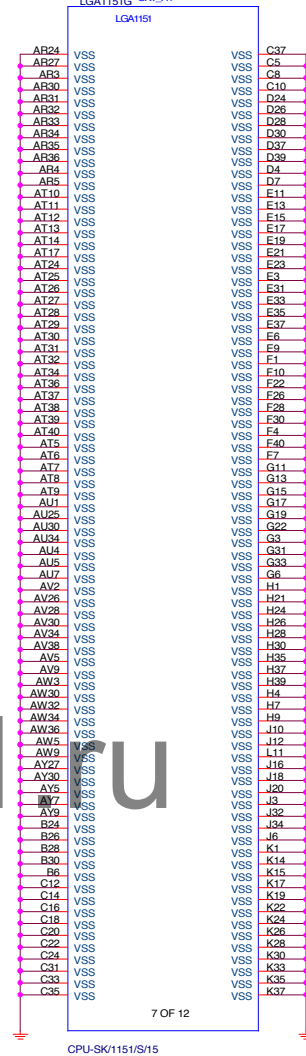
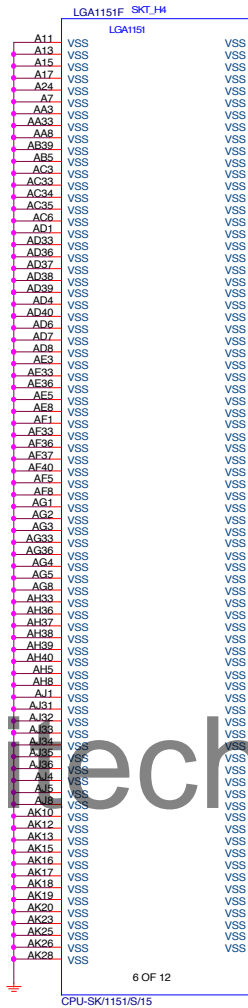


* 刪 VCCGT 電容

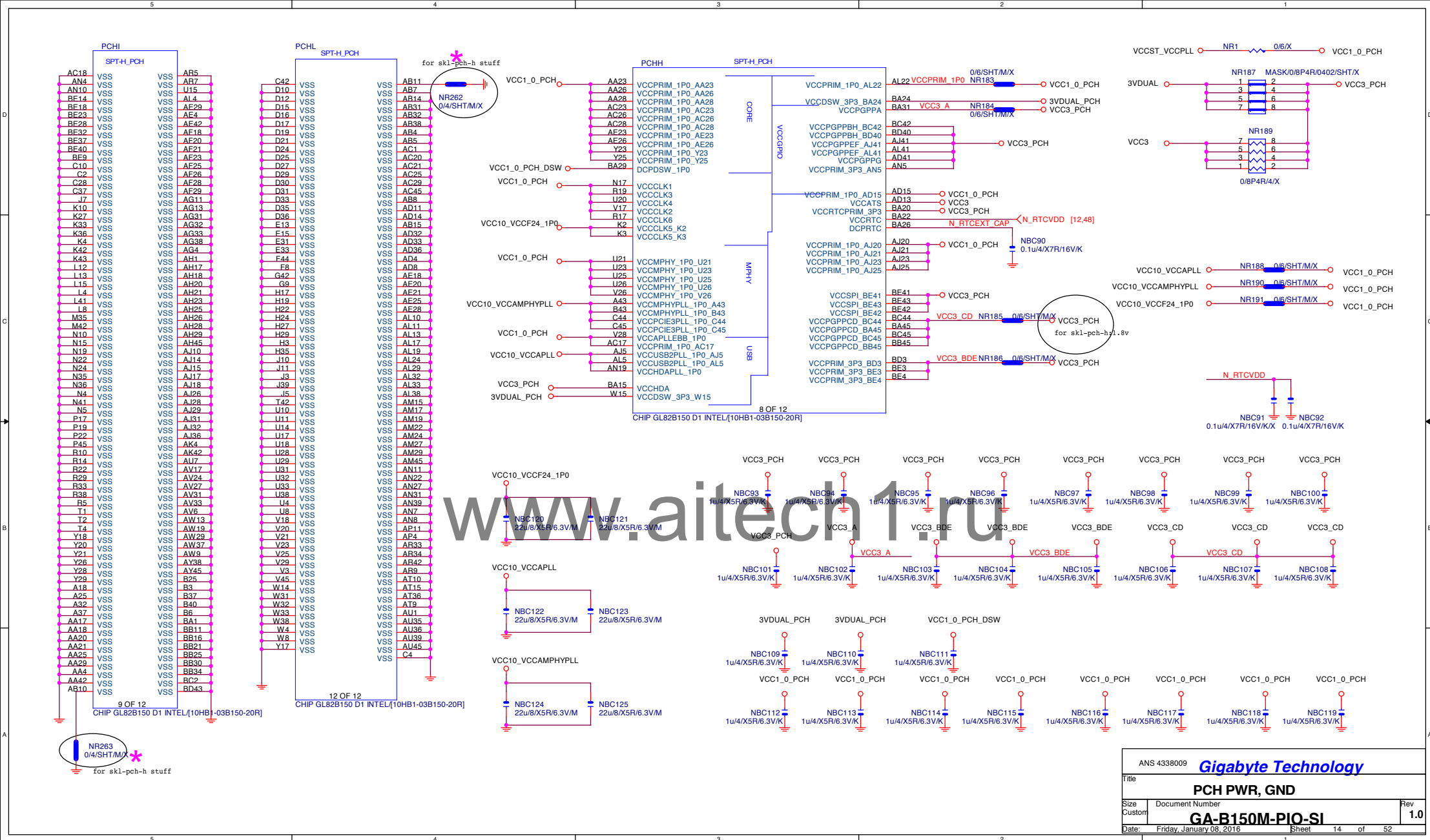


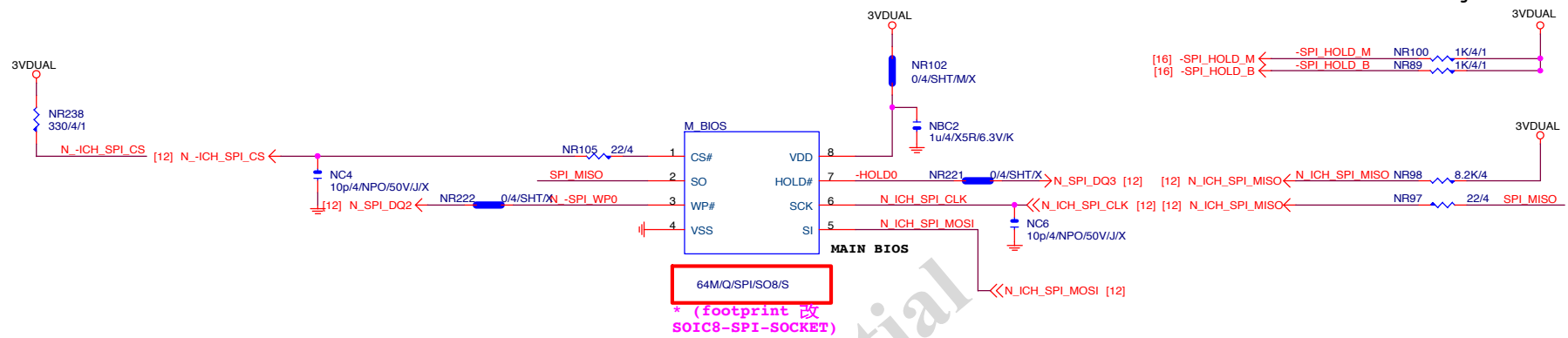


www.aitech1.com



* 刪 Vcore 電容

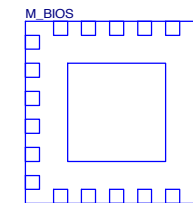




BOOT DEVICE	GNT0	GNT1
LPC	0	0
PCI	0	1
NAND	1	0
SPI	1	1

1 means floating
0 means PD 1K

www.aitech1.ru



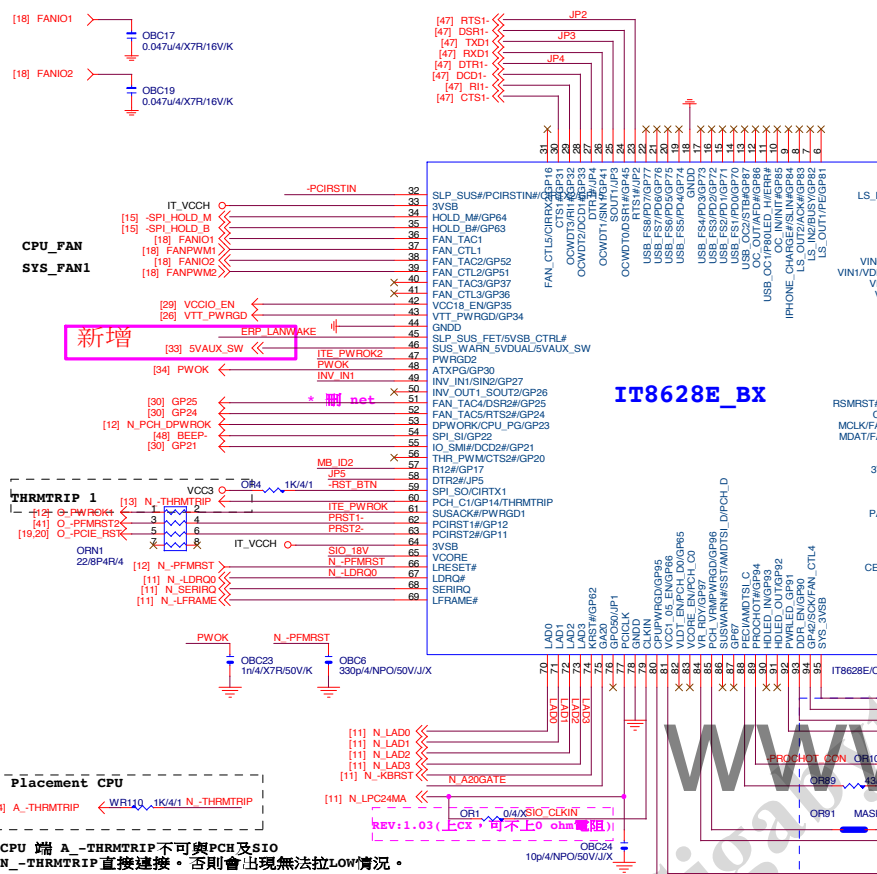
LCP/G-FL/1.27mm/200MIL/WHITE[10SL2-000008-31R]X

* 試産先上 , PVT 移除

Gigabyte Technology

Title		BIOS	
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SIO IT8628BX REV:1.05



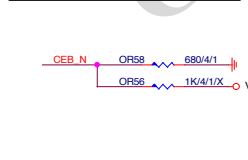
Placement CPU

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。

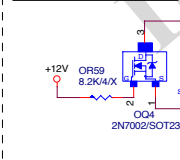
FAN TABLE	
CPU_FAN	FAN CTL1 FAN_TAC1
SYS_FAN1	FAN CTL2 FAN_TAC2
SYS_FAN2	FAN CTL3 FAN_TAC3
SYS_FAN3	FAN CTL5 FAN_TAC5
OPT FAN or SYS_FAN4	N/A
THRMTRIP1	YES PIN60
THRMTRIP2	YES PIN94

IT8628E GPIO問題匯整	
PIN 50	GP26-第一次接上POWER時會拉 Lo
PIN 90/91	DEFAULT為HDLLED 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, 若低於該部分COM PORT及LPT將會異常動作。

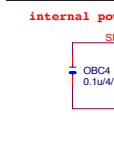
DUAL BIOS OPT STRAP



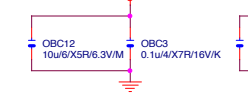
Power leakage



SIO_18V



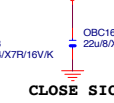
SIO CAP



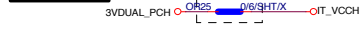
Power leakage



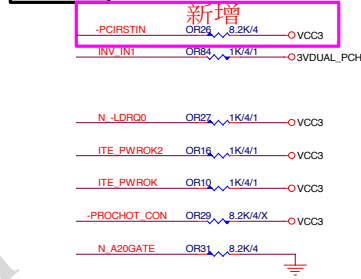
SIO_18V



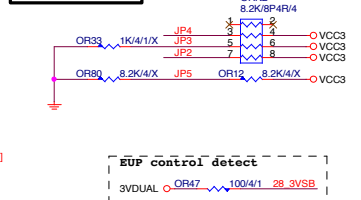
PWR SHT



SIO PU

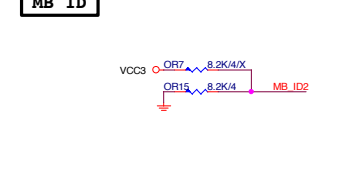


SIO STRAP

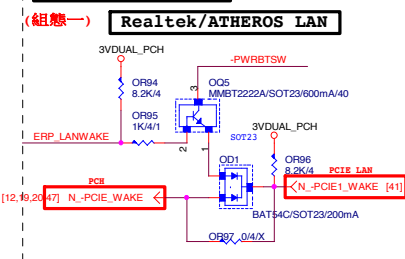


JP2	1	Disable WDT
JP2	0	Enable WDT to rest PWR0K
JP3	1	SPI-Flash Disable
JP3	0	SPI-Flash Enable
JP4	1	k8 power function is Disable
JP4	0	k8 power sequence function is Enable
JP5	1	anti-surge Disable
JP5	0	anti-surge Enable
JP5	1 1	The default value of EC Index 63h/6Bh/73h is 80h.
JP3	1 0	The default 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



ERP WAKE on LAN (依LAN組態選擇)



Realtek/ATHEROS LAN

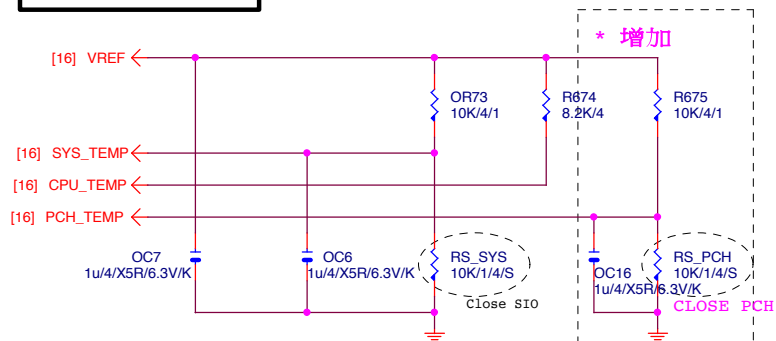


EUP control detect



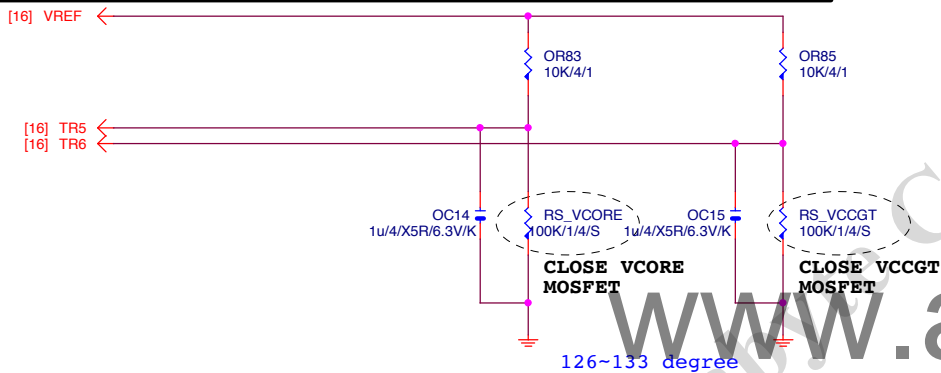
TEMP H/W MONITOR

REV 1.04



RS_VCORE, RS_VCCGT, CLOSE CPU_VCORE & VCCGT MOSFET

- Prochot: 有 mos heartsink 不用 prochot function

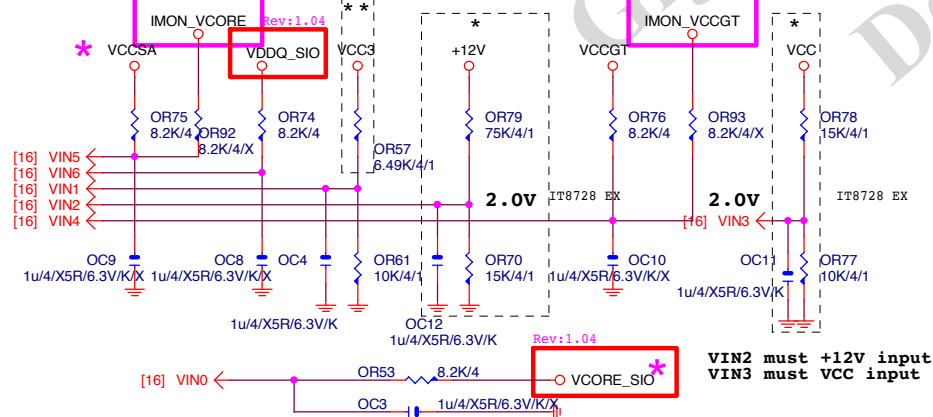


VOLTAGE-- H/W MONITOR

Connect to PWM

* IT8728 BX
** IT8728 CX

Connect to PWM



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

Rev

Custom

GA-B150M-PIO-SI

1.0

Date:

Tuesday, March 08, 2016

Sheet

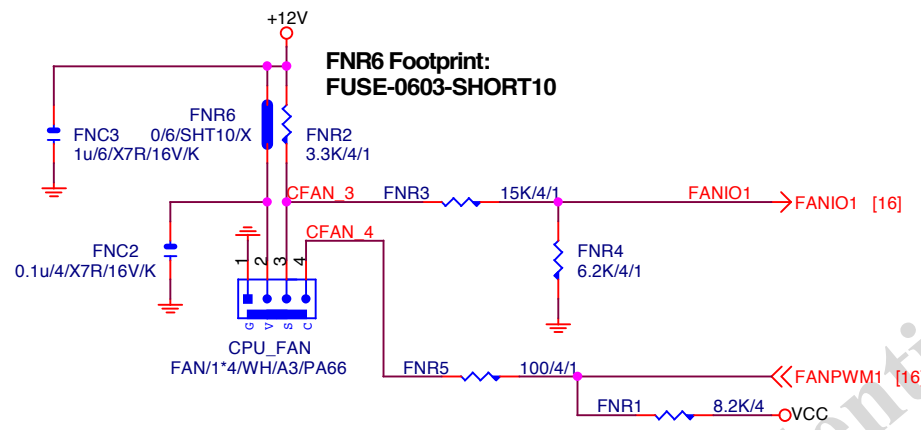
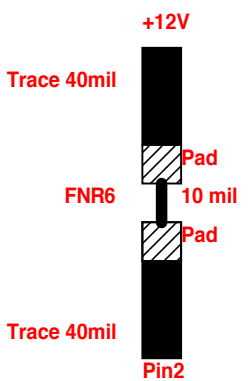
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CPU SMART FAN

Rev: 0.53

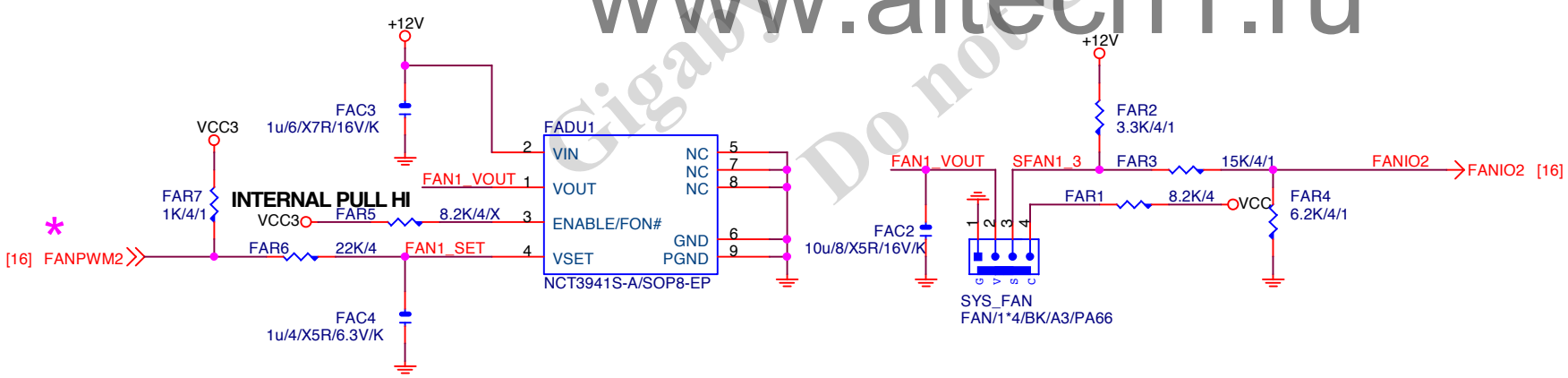


SYSTEM FAN1

Linear SYS_FAN

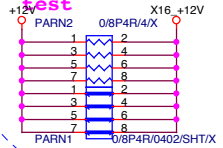
Enable Function (NCT3941S)

Full Turn On Function
(NCT3941S-A)



Gigabyte Technology			
Title			
HWM,KB/MS, FAN CTRL			
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Rev 0.2

* +12 protect
short-wire
test

PA_EXP_RXP0_15I >>> PA_EXP_RXP0[0..15] [4]
 PA_EXP_RXN0_15I >>> PA_EXP_RXN0[0..15] [4]
 PA_EXP_TXP0_15I >>> PA_EXP_TXP0[0..15] [4]
 PA_EXP_TXN0_15I >>> PA_EXP_TXN0[0..15] [4]

PA_EXP_TXP0	PAC5	0.22u4/X5R/6.3V/K	PA_EXP_TXP0 C
PA_EXP_TXN0	PAC4	0.22u4/X5R/6.3V/K	PA_EXP_TXN0 C
PA_EXP_TXP1	PAC6	0.22u4/X5R/6.3V/K	PA_EXP_TXP1 C
PA_EXP_TXN1	PAC7	0.22u4/X5R/6.3V/K	PA_EXP_TXN1 C
PA_EXP_TXP2	PAC8	0.22u4/X5R/6.3V/K	PA_EXP_TXP2 C
PA_EXP_TXN2	PAC9	0.22u4/X5R/6.3V/K	PA_EXP_TXN2 C
PA_EXP_TXP3	PAC10	0.22u4/X5R/6.3V/K	PA_EXP_TXP3 C
PA_EXP_TXN3	PAC11	0.22u4/X5R/6.3V/K	PA_EXP_TXN3 C
PA_EXP_TXP4	PAC12	0.22u4/X5R/6.3V/K	PA_EXP_TXP4 C
PA_EXP_TXN4	PAC13	0.22u4/X5R/6.3V/K	PA_EXP_TXN4 C
PA_EXP_TXP5	PAC14	0.22u4/X5R/6.3V/K	PA_EXP_TXP5 C
PA_EXP_TXN5	PAC15	0.22u4/X5R/6.3V/K	PA_EXP_TXN5 C
PA_EXP_TXP6	PAC16	0.22u4/X5R/6.3V/K	PA_EXP_TXP6 C
PA_EXP_TXN6	PAC17	0.22u4/X5R/6.3V/K	PA_EXP_TXN6 C
PA_EXP_TXP7	PAC18	0.22u4/X5R/6.3V/K	PA_EXP_TXP7 C
PA_EXP_TXN7	PAC19	0.22u4/X5R/6.3V/K	PA_EXP_TXN7 C
PA_EXP_TXP8	PAC20	0.22u4/X5R/6.3V/K	PA_EXP_TXP8 C
PA_EXP_TXN8	PAC21	0.22u4/X5R/6.3V/K	PA_EXP_TXN8 C
PA_EXP_TXP9	PAC22	0.22u4/X5R/6.3V/K	PA_EXP_TXP9 C
PA_EXP_TXN9	PAC23	0.22u4/X5R/6.3V/K	PA_EXP_TXN9 C
PA_EXP_TXP10	PAC24	0.22u4/X5R/6.3V/K	PA_EXP_TXP10 C
PA_EXP_TXN10	PAC25	0.22u4/X5R/6.3V/K	PA_EXP_TXN10 C
PA_EXP_TXP11	PAC26	0.22u4/X5R/6.3V/K	PA_EXP_TXP11 C
PA_EXP_TXN11	PAC27	0.22u4/X5R/6.3V/K	PA_EXP_TXN11 C
PA_EXP_TXP12	PAC28	0.22u4/X5R/6.3V/K	PA_EXP_TXP12 C
PA_EXP_TXN12	PAC29	0.22u4/X5R/6.3V/K	PA_EXP_TXN12 C
PA_EXP_TXP13	PAC30	0.22u4/X5R/6.3V/K	PA_EXP_TXP13 C
PA_EXP_TXN13	PAC31	0.22u4/X5R/6.3V/K	PA_EXP_TXN13 C
PA_EXP_TXP14	PAC32	0.22u4/X5R/6.3V/K	PA_EXP_TXP14 C
PA_EXP_TXN14	PAC33	0.22u4/X5R/6.3V/K	PA_EXP_TXN14 C
PA_EXP_TXP15	PAC34	0.22u4/X5R/6.3V/K	PA_EXP_TXP15 C
PA_EXP_TXN15	PAC35	0.22u4/X5R/6.3V/K	PA_EXP_TXN15 C

PCIE16:16/5/5/5/16

PCI-E REV:1.1--> 2.5GHZ

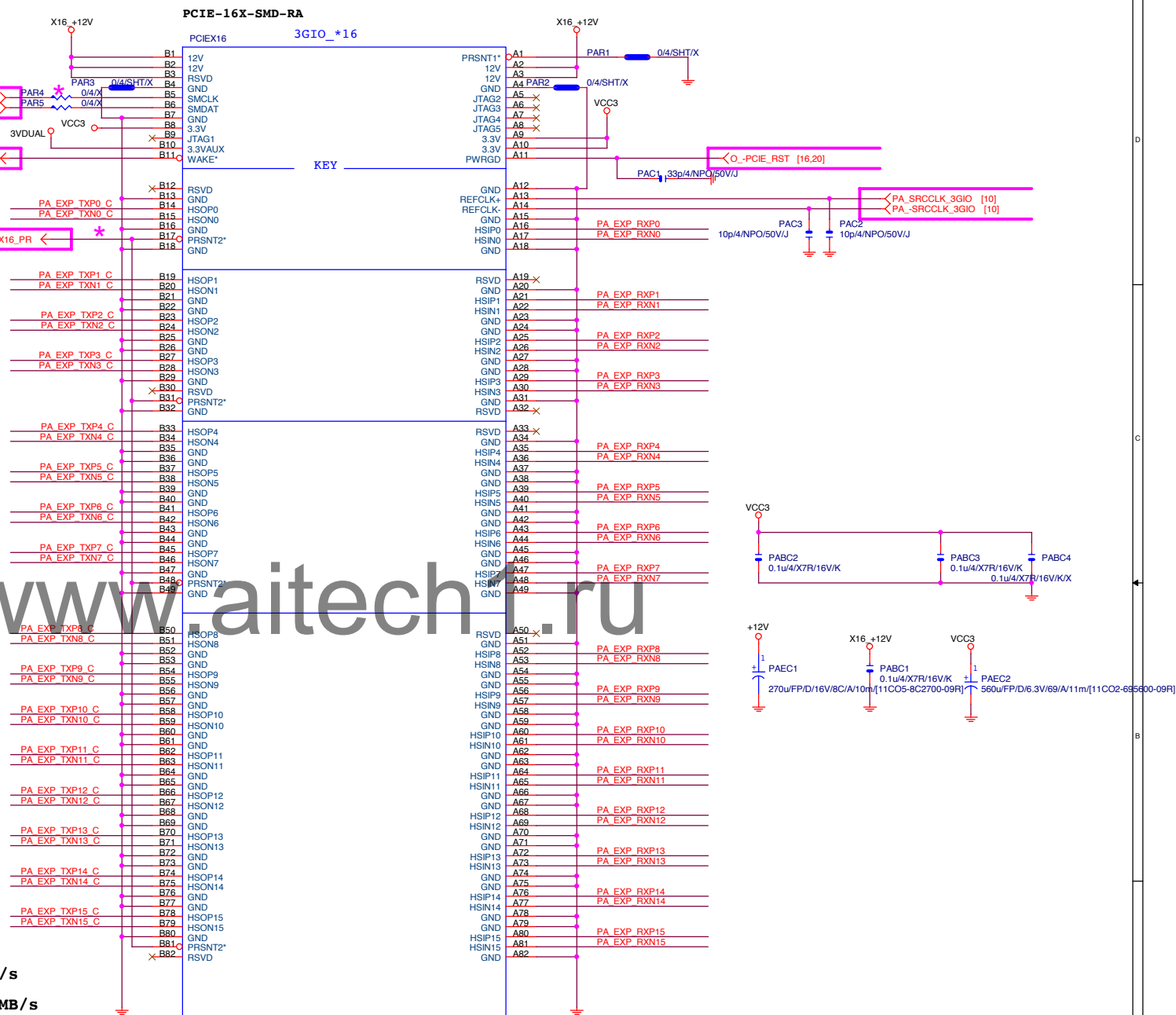
PCE-E X1(單向) BANDWIDTH=2.5GHz*(8b/10b)=2Gb/s=250MB/s

PCE-E X1(雙向) BANDWIDTH=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

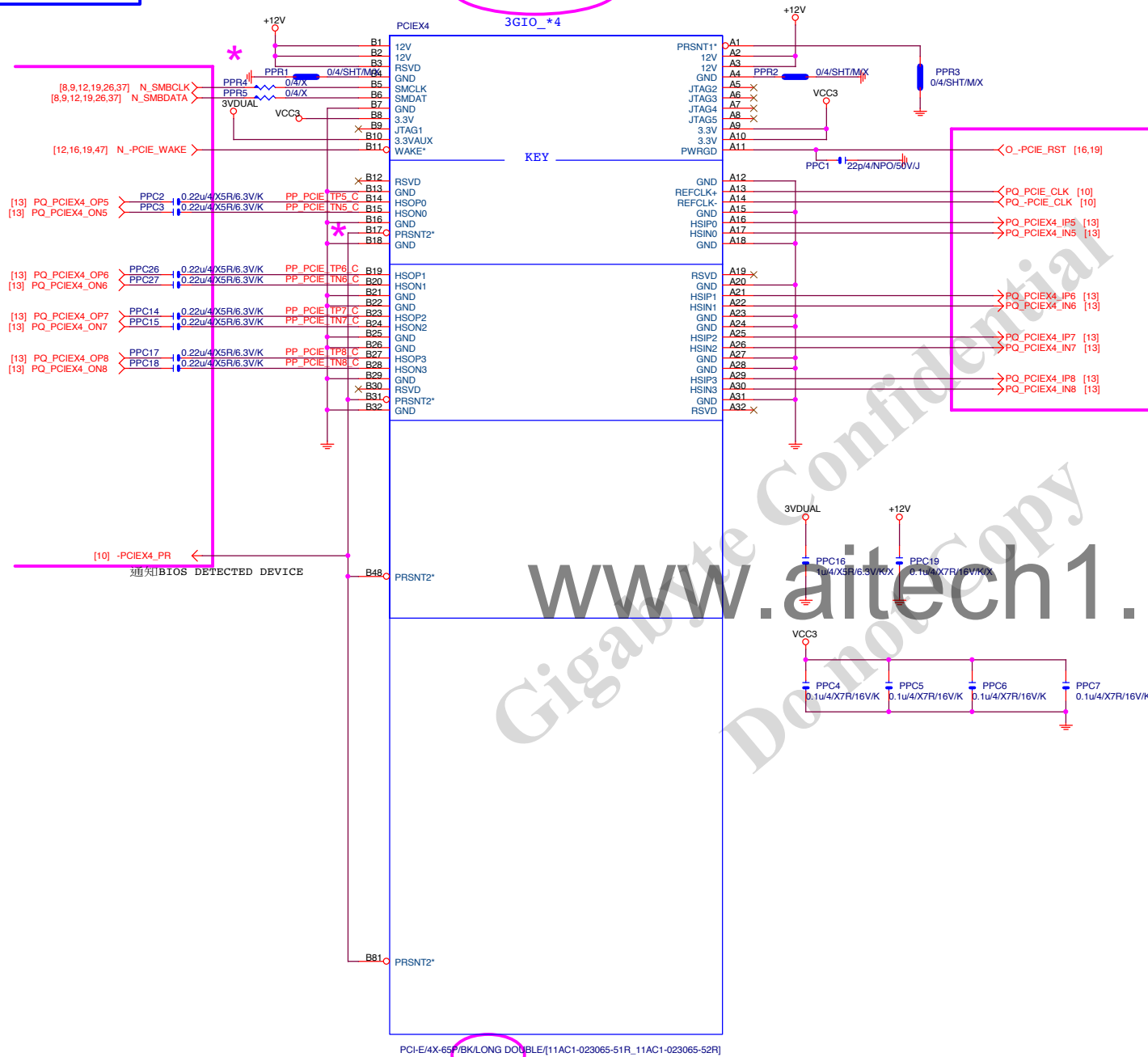


PC-E/164P/BK/RA/S/GF

R01A

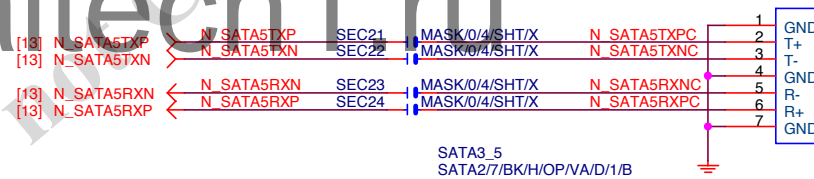
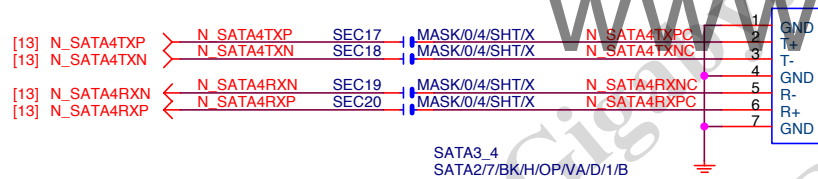
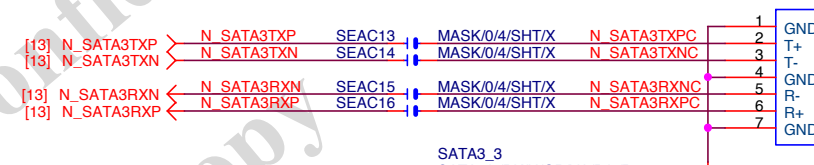
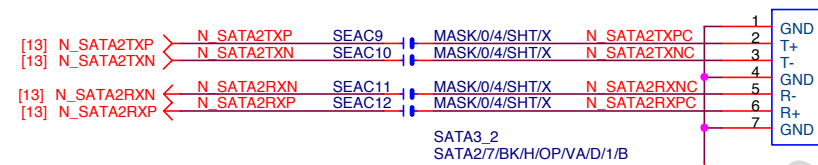
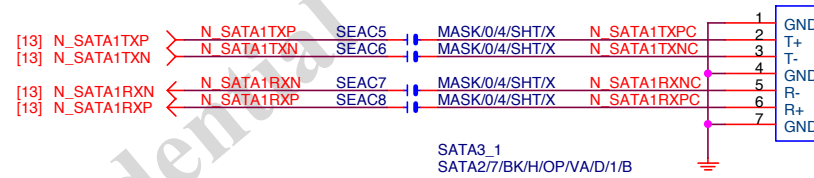
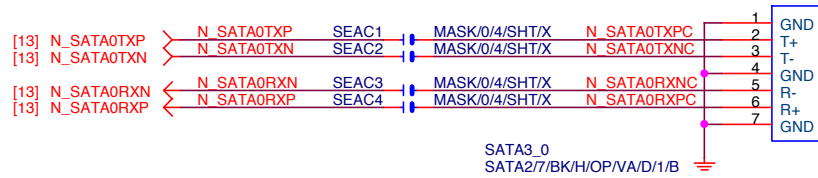
Gigabyte Technology

Title			
PCI EXPRESS * 16			
Size	Document Number	Rev	
Custom	GA-B150M-PIO-SI	1.0	
Date:	Tuesday, March 08, 2016	Sheet	19 of 52

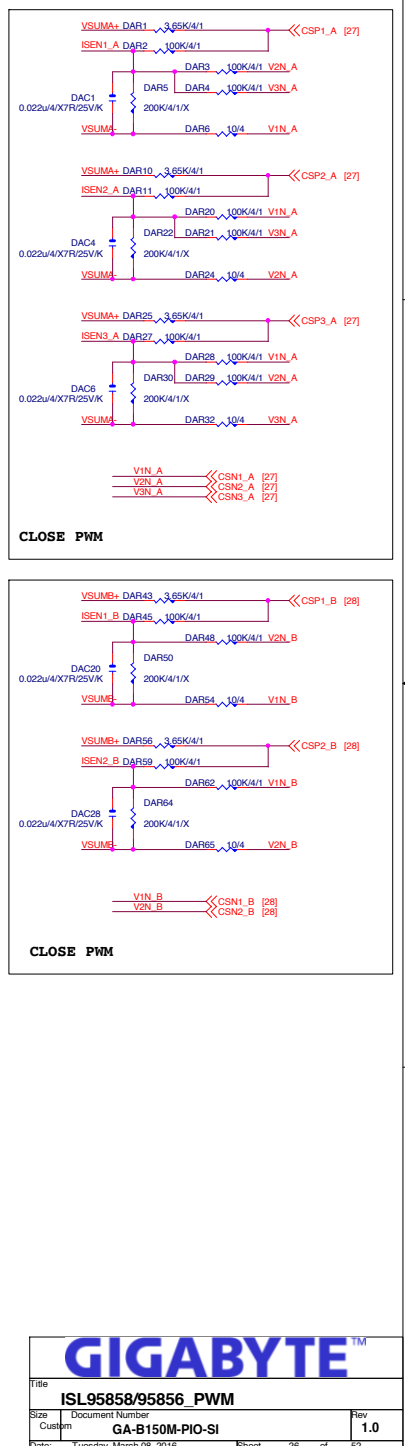


Gigabyte Technology

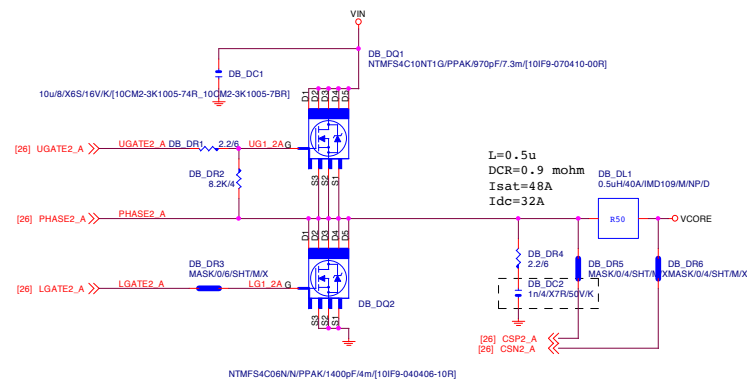
Title			PCIE_X4
Size	Document Number	Rev	1.0
Custom	GA-B150M-PIQ-SI		
Date:	Tuesday, March 08, 2016	Sheet	20 of 53

**Gigabyte Technology**

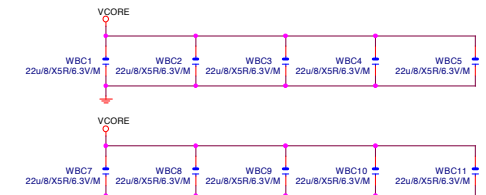
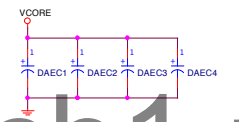
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SATA EXPRESS		
Size	Document Number	Rev
Custom	GA-B150M-PIO-SI	1.0
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VCORE

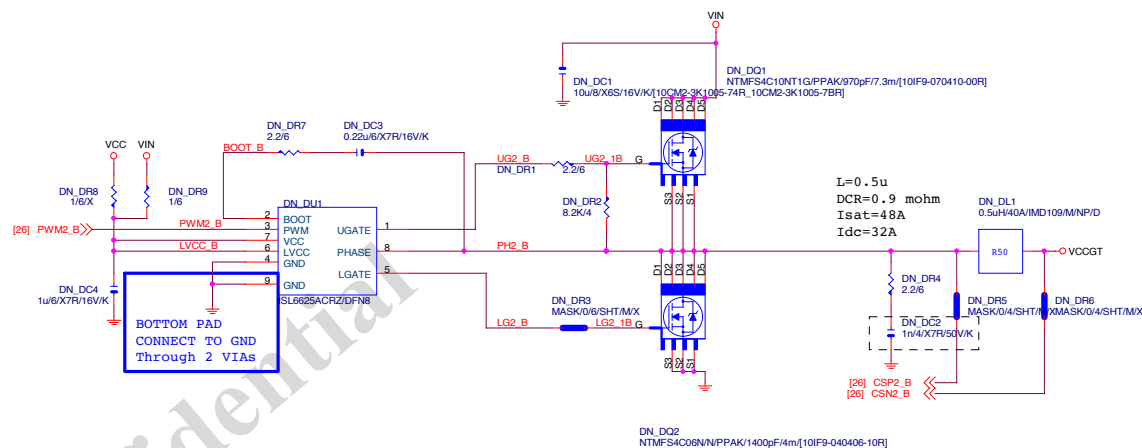
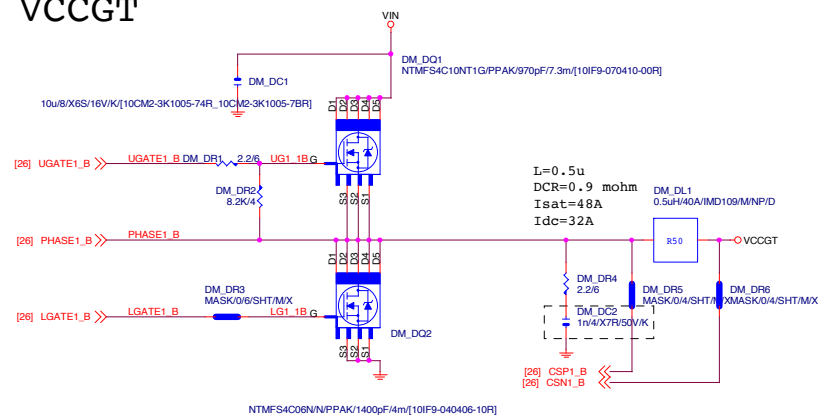


The schematic diagram shows a power supply V12 connected to a DAC36 (1u6/X7R/16V/K) and three capacitors: DAEC14, DAEC15, and DAEC16. Each capacitor is connected to a 270uF/FP/D/16V8C/A/10mF capacitor. The output of the DAC36 is connected to a VIN input.

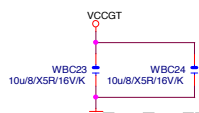
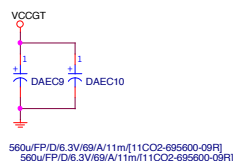


Title			
ISL95858_MOS			
Size	Document Number	Rev	
Custom	GA-B150M-PIO-SI	1.0	
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VCCGT



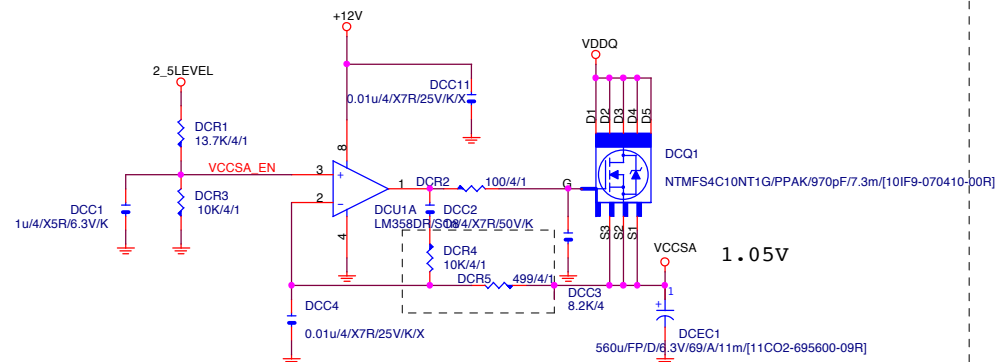
VCCGT CAP 560u*5PCS
22u*15PCS



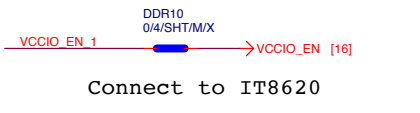
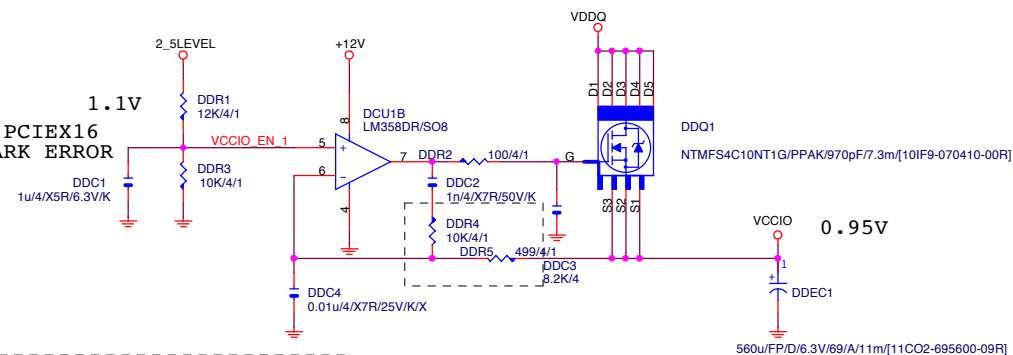
www.aitech1.ru

VCCSA

REV:0.4

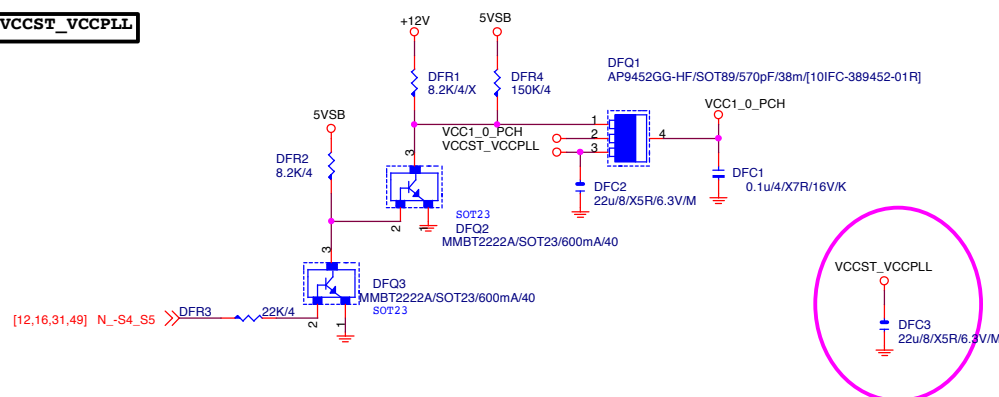


VCCIO

FIX PCIEX16
3DMARK ERROR

www.aitech1.ru

VCCST_VCCPLL



GIGABYTE™			
Title VCCSA_VCCIO			
Size Custom	Document Number GA-B150M-PIO-SI		Rev 1.0
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VPP 25V

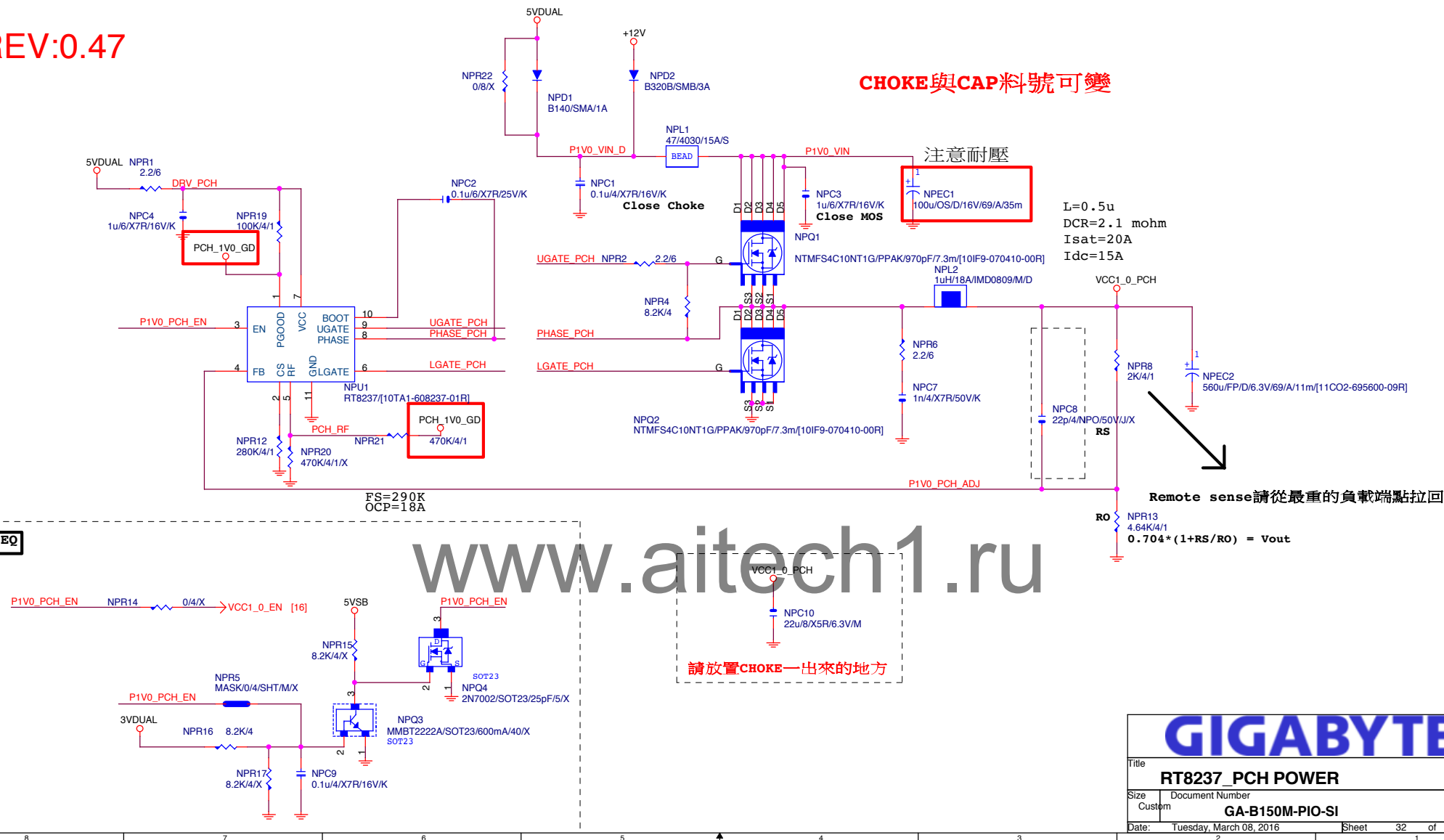
CHOKES與CAP料號可變



Title			
RT8068A_VPP25 POWER			
Size	Document Number	Rev	
Custom	GA-B150M-PIO-SI	1.0	
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REV:0.47

CHOKE與CAP料號可變

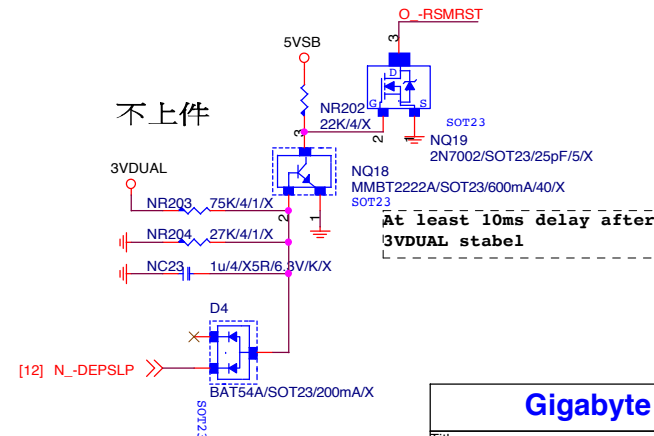
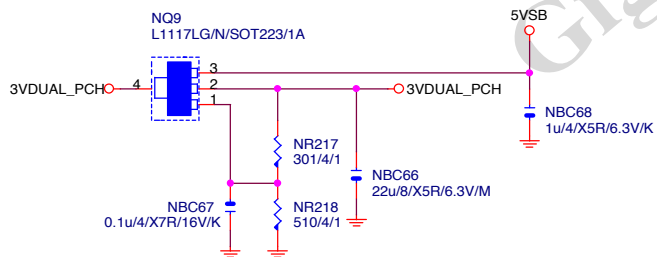
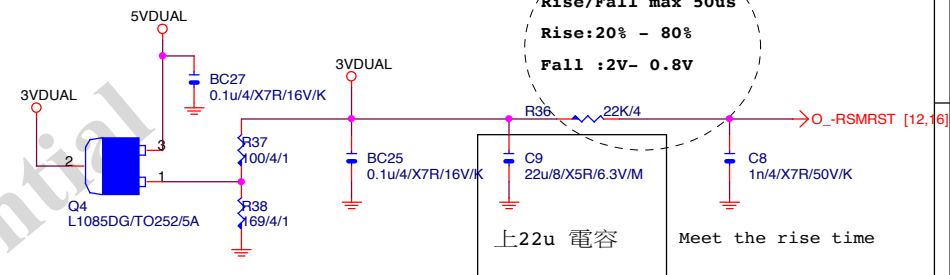
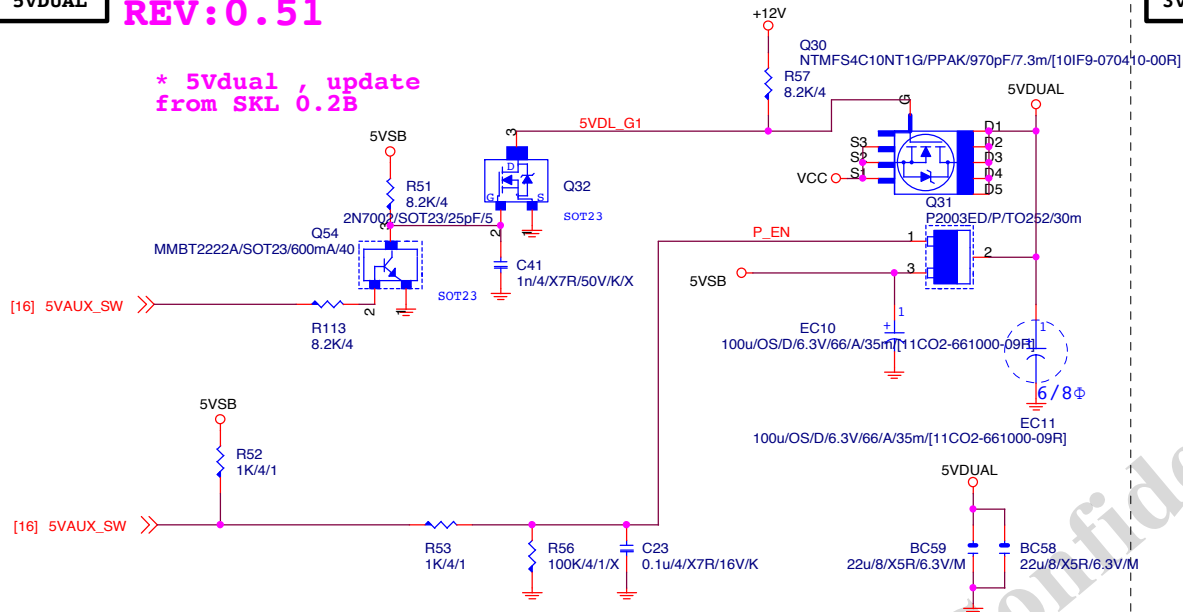


GIGABYTE™

RT8237_PCH POWER

Size	Document Number	Rev
Custom	GA-B150M-PIO-SI	1.0
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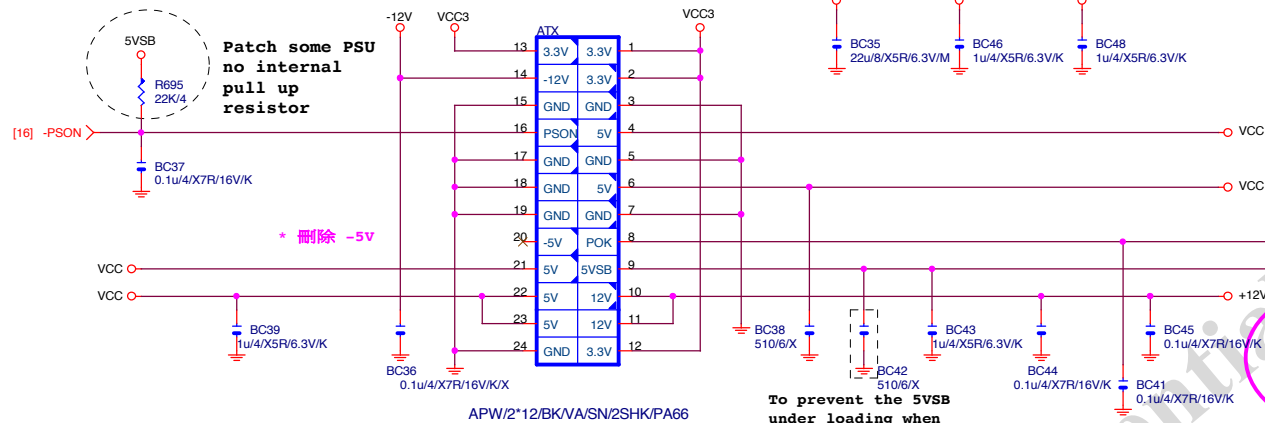
* 5Vdual , update
from SKL 0.2B



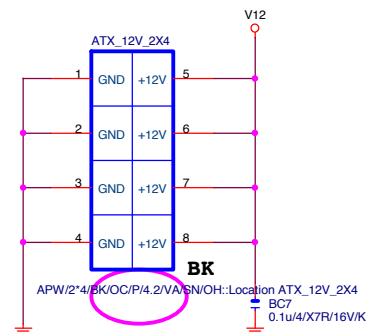
Gigabyte Technology

Title			
DISCRETE POWER			
Size	Document Number	GA-B150M-PIO-SI	
Custom			Rev 1.0
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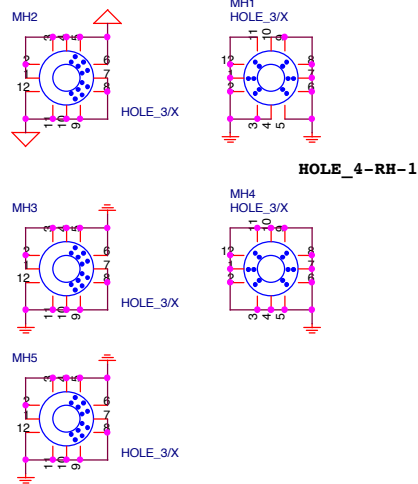
ATXX24 POWER CONNECTOR



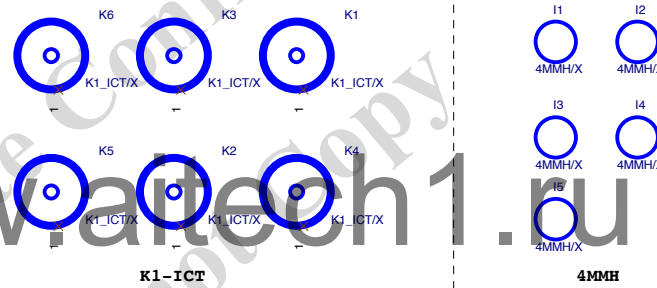
ATXX4 POWER CONNECTOR



螺絲孔

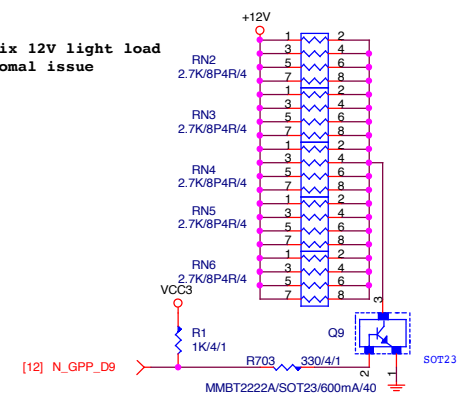


固定孔/光學點



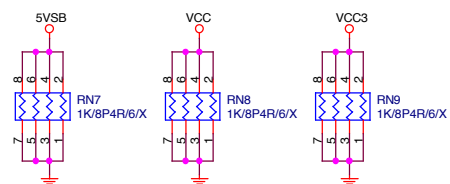
+12V DUMMY LOAD

To fix 12V light load
abnormal issue



【技術通報R&D技術通報153】

DUMMY LOAD

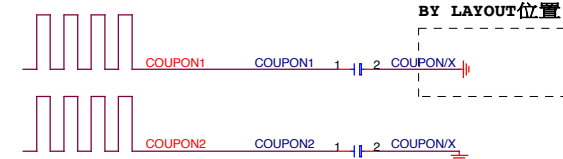


-PROHOT

* 保留 ?



COUPON



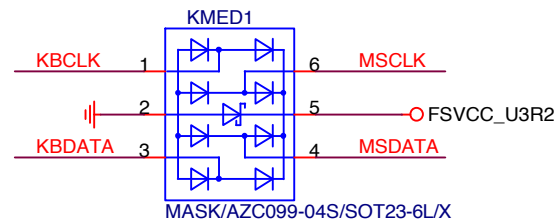
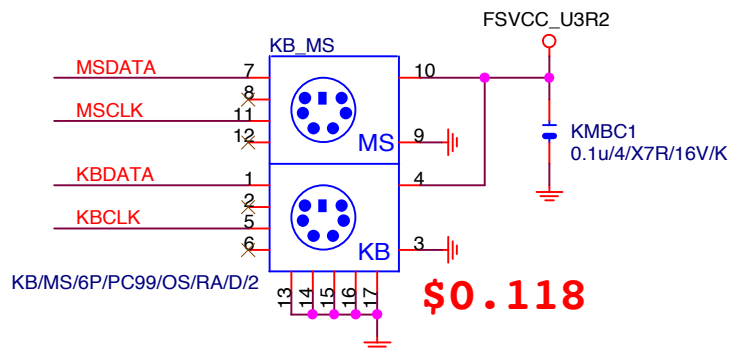
Gigabyte Technology

Title		
ATX POWER CONNECTOR		
Size	Document Number	Rev
Custom	GA-B150M-PIO-SI	1.0
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KB_MS_USB

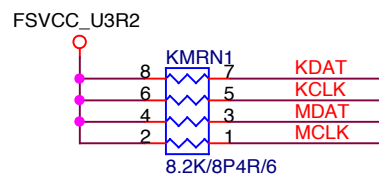
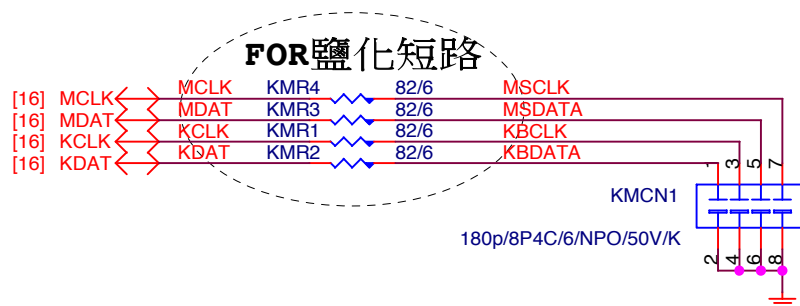
Rev: 0.7

ESD



KB_MS_USB DAMPING/PU

KB_MS_USB PWR



USB OC PROTECT

Gigabyte Technology

Title

AUDIO JACK

Size
A

Document Number

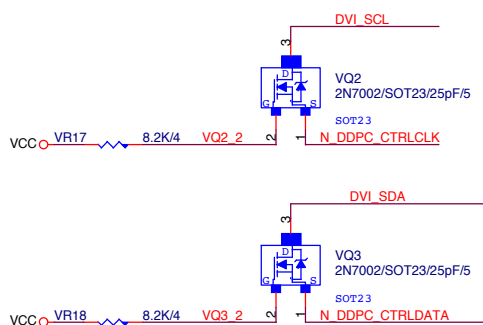
GA-B150M-PIO-SI

Rev
1.0

Date: Tuesday, March 08, 2016

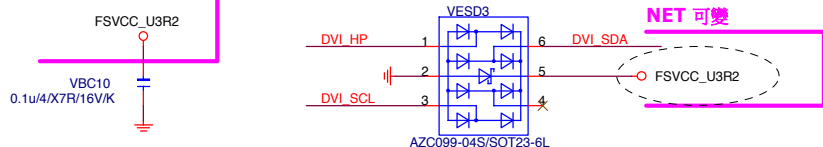
Sheet 35 of 52

NET 可變



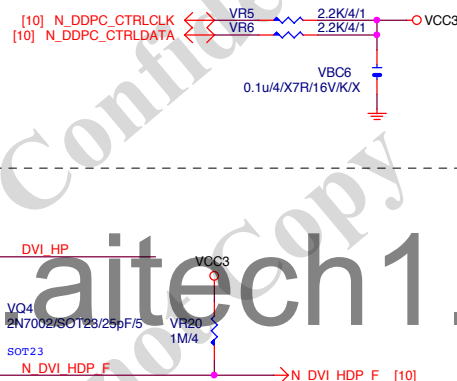
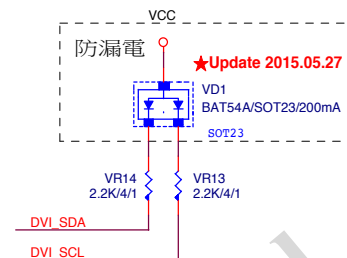
ESD

NET 可變



Close to connector

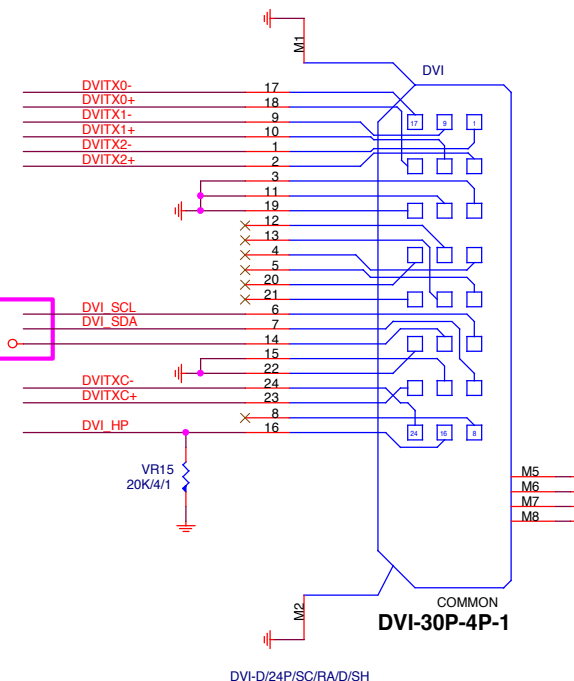
DVI PU



DVI CONN

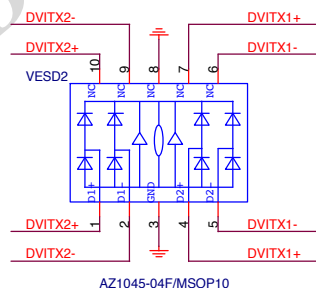
NET 可變

|| *

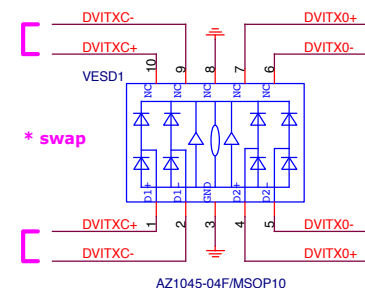


平躺式 DVI-D

11NR6-501024-31

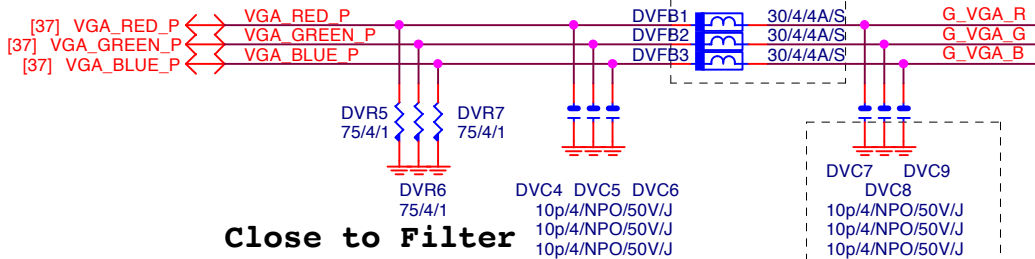
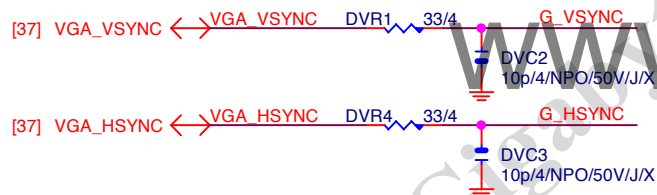
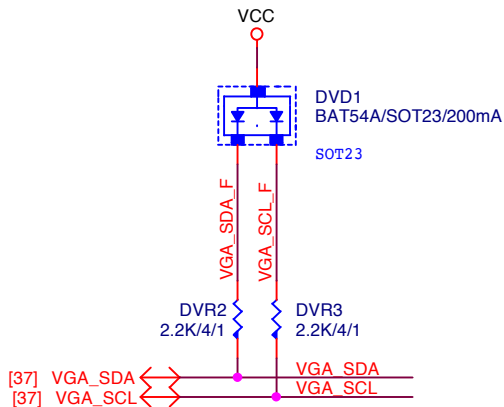


Close to connector



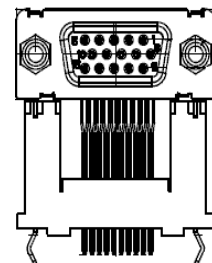
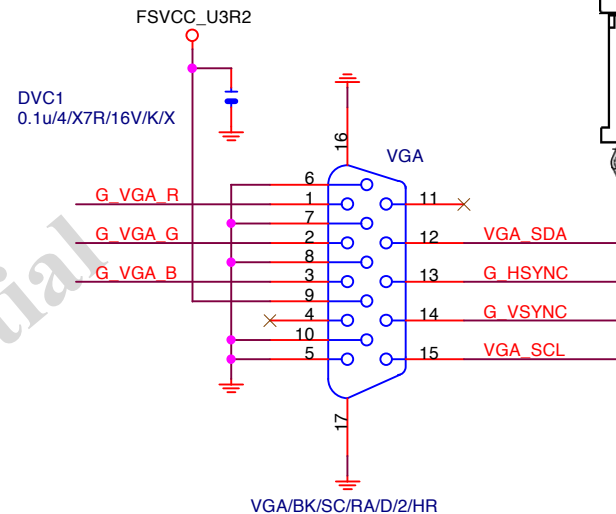
Close to connector

VGA SIGNAL R1.03

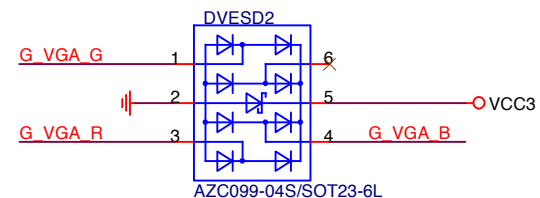
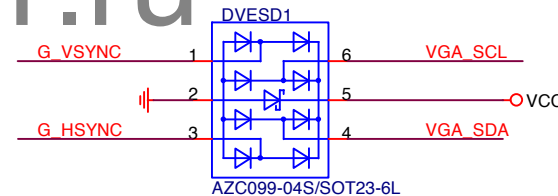


FOR EMI

VGA CONN. 架高型VGA (BLACK)



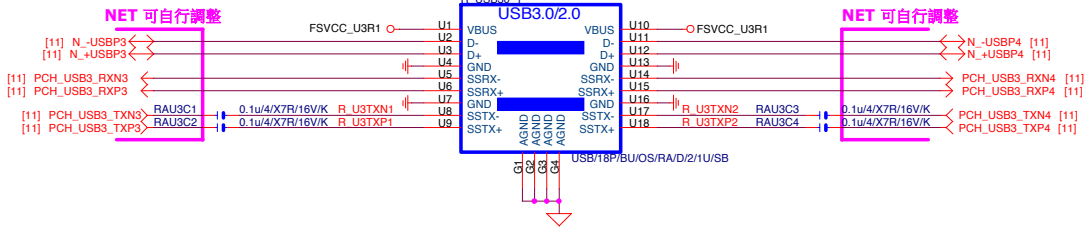
VGA ESD



Gigabyte Technology			
DP-VGA RTD2168			
Title	GA-B150M-PIO-SI		
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Custom			
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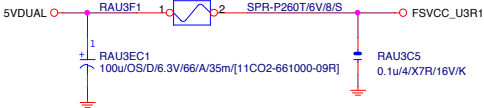
R_USB30_1

ESD 可自行SWAP PIN ,CONN端 NET 名稱 不可



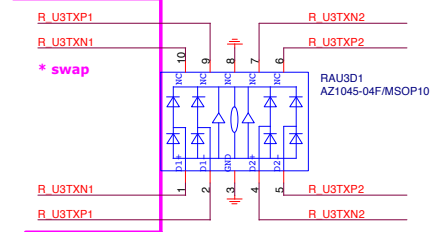
FUSE

FUSE 2 Port 1 Fuse 2.6A

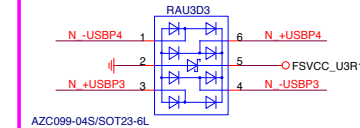


ESD

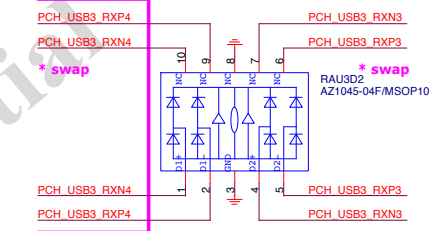
NET 可自行調整



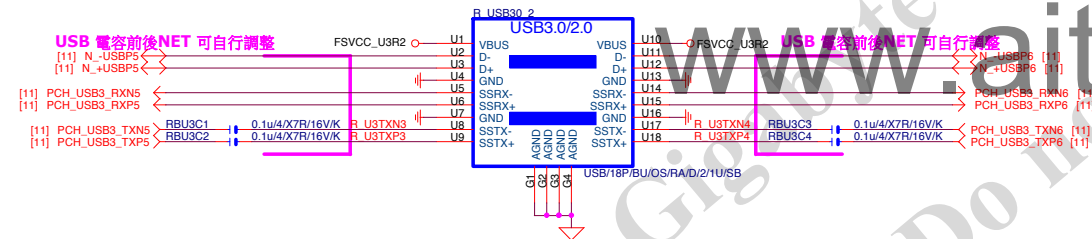
NET 可自行調整



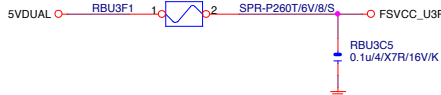
NET 可自行調整



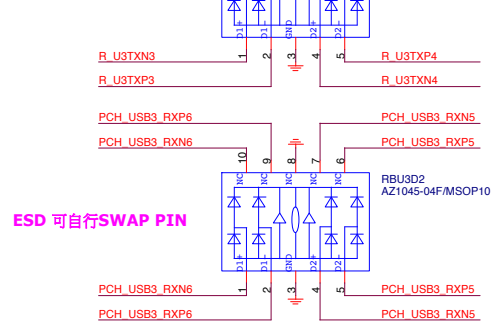
R_USB30_2



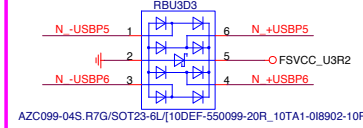
FUSE 2 Port 1 Fuse 2.6A



ESD 可自行SWAP PIN



ESD 可自行SWAP PIN

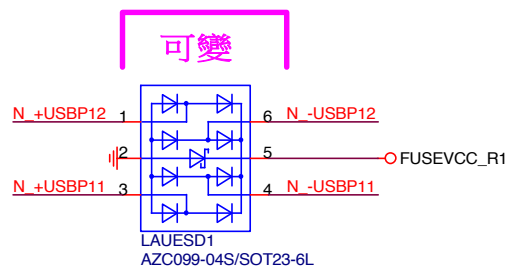


USB_LAN CONNECTOR

R1.06

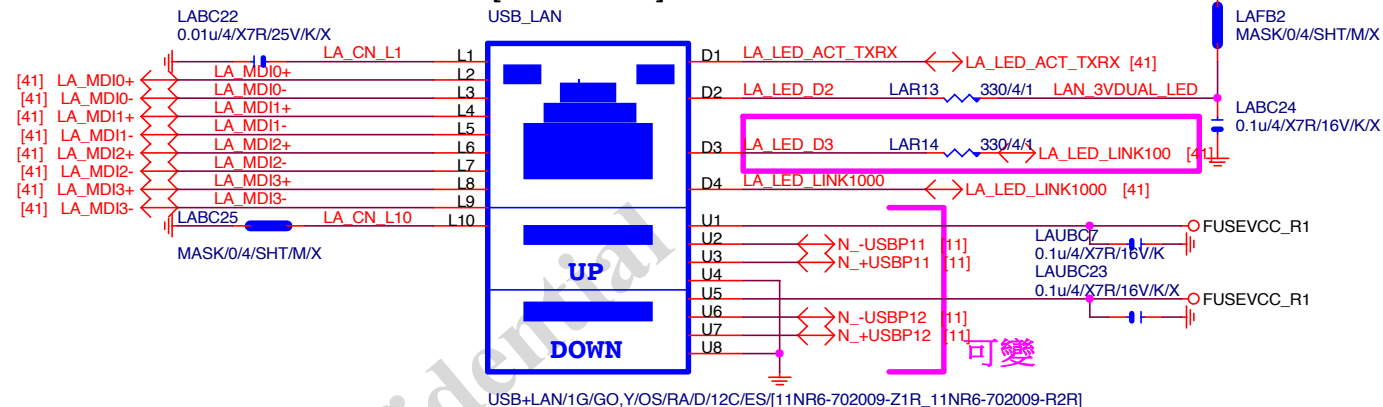
RMA ESD PROTECT

note:可變更USB NAME



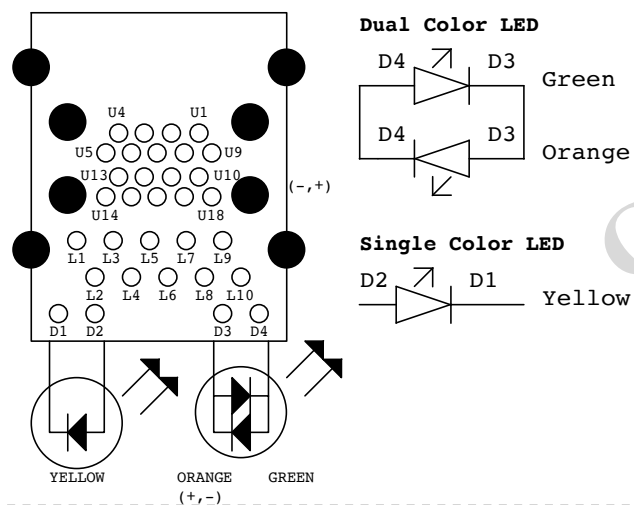
USB_LAN CONNECTOR

[RTL8111G]



LA_MDI-->100歐姆:[20/4/8/4/20]

USB30_LAN LAYOUT示意圖



RMA ESD PROTECT

USB POWER

note:可變更FUSE



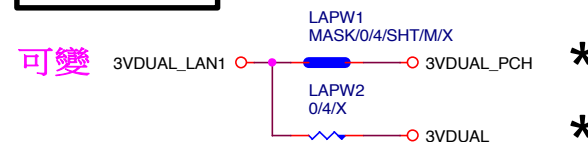
EMI SHORT PAD

PS:視EMI需求



LAN POWER

note: lan power連接及電流



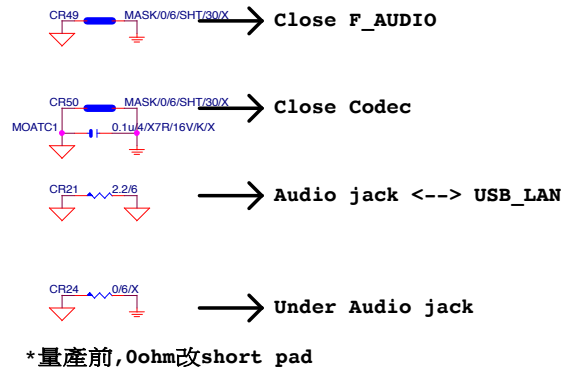
Gigabyte Technology

LAN CONNECTOR-RTL8111G

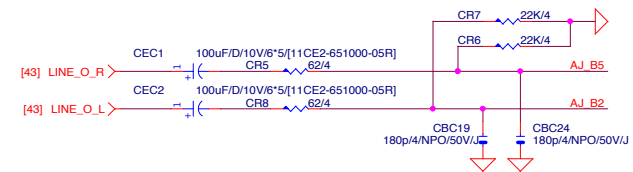
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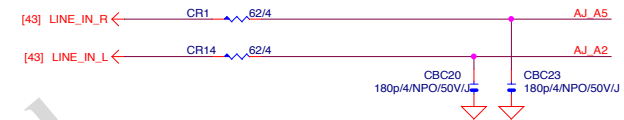
Rev 0.5



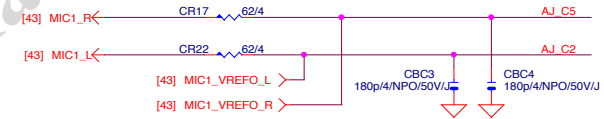
LINE-OUT



LINE-IN

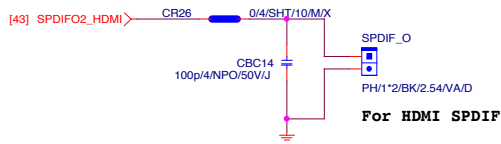


MIC-IN



SURROUND

SPDIF_OUT



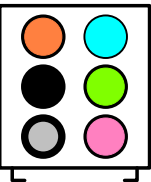
SPDIF_IN

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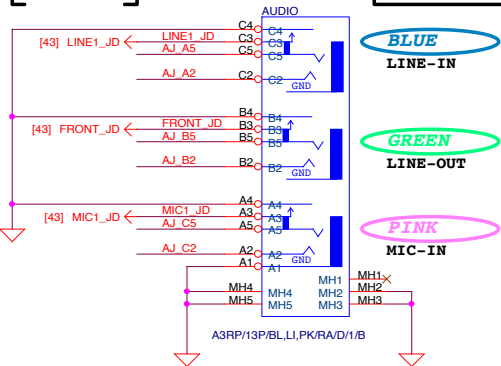
CEN/LFE

SURRBACK

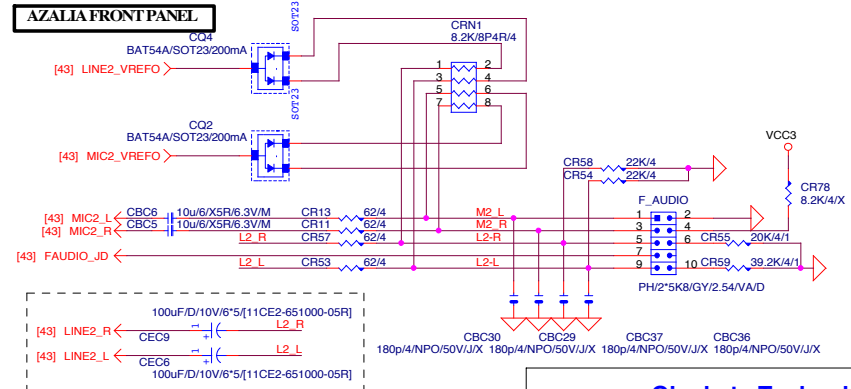
AZALIA JACK



AZALIA JACK



AZALIA FRONT PANEL

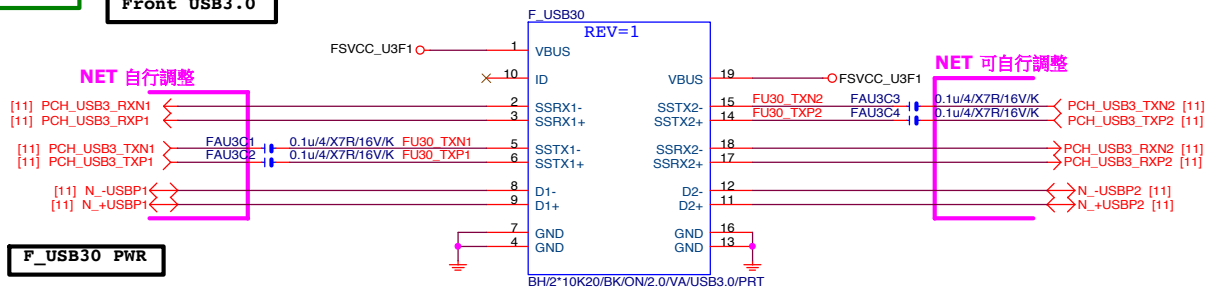


Gigabyte Technology

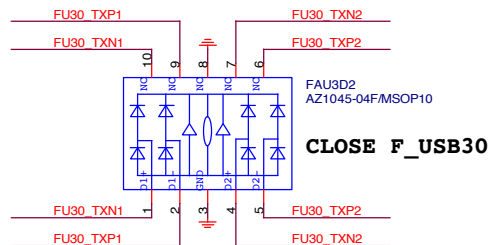
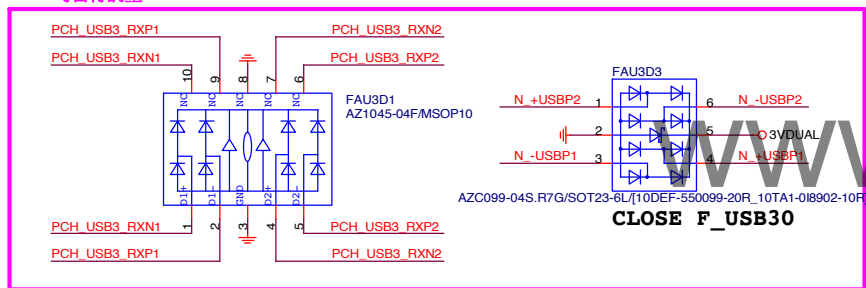
Title			
AUDIO JACK			
Size	Document Number	GA-B150M-PIO-SI	Rev
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Front USB3.0

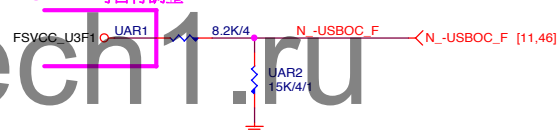


NET 可自行調整



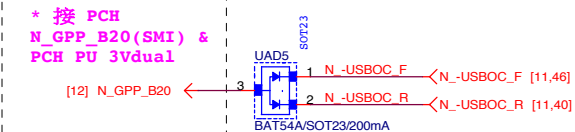
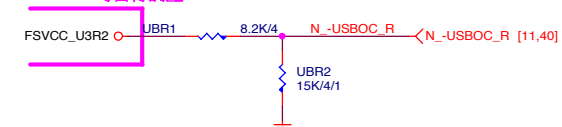
-USBOC_F

POWER 可自行調整



-USBOC_R

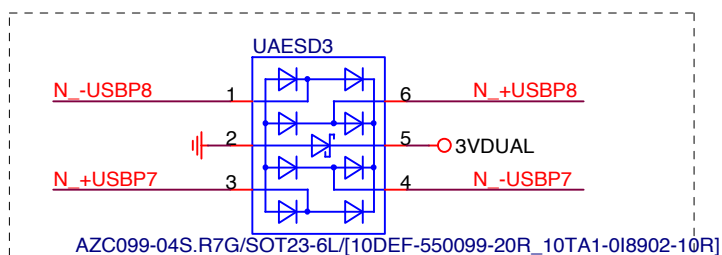
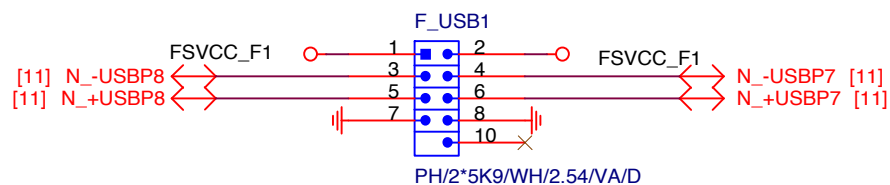
POWER 可自行調整



Gigabyte Technology

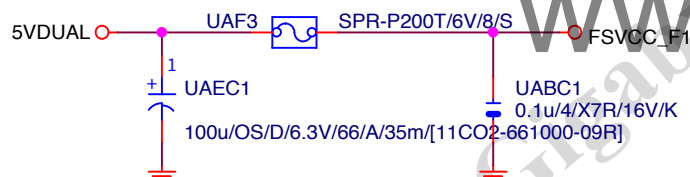
Title			
R_USB30,F_USB30, USB_OC			
Size	Document Number	GA-B150M-PIO-SI	
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NET 可變

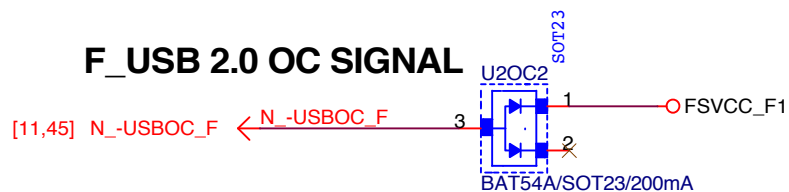


Close to connector

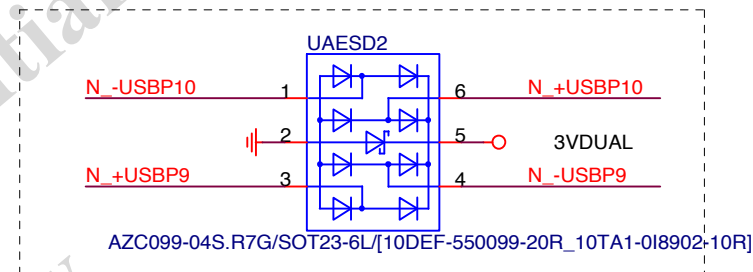
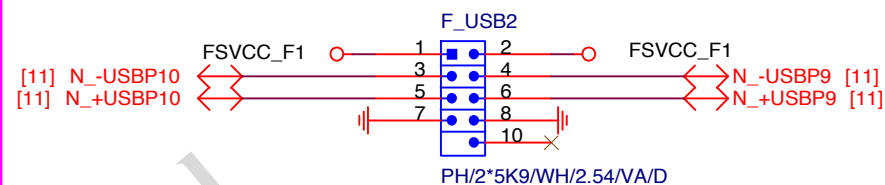
FUSE 2 Port 1 Fuse 2A



F_USB 2.0 OC SIGNAL



NET 可變



Gigabyte Technology

USB2.0

Size
Custom

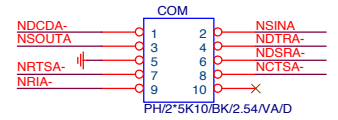
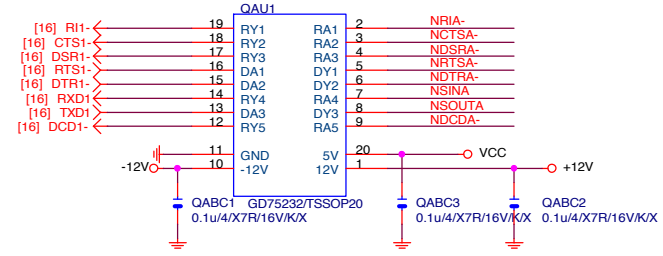
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GA-B150M-PIO-SI

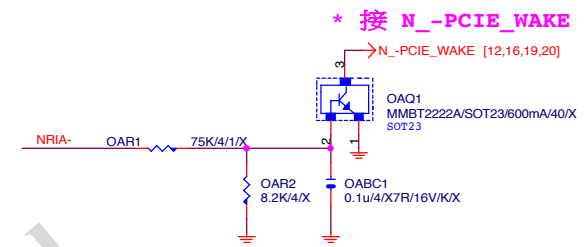
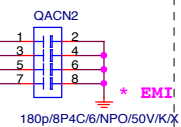
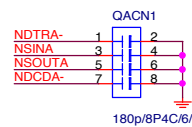
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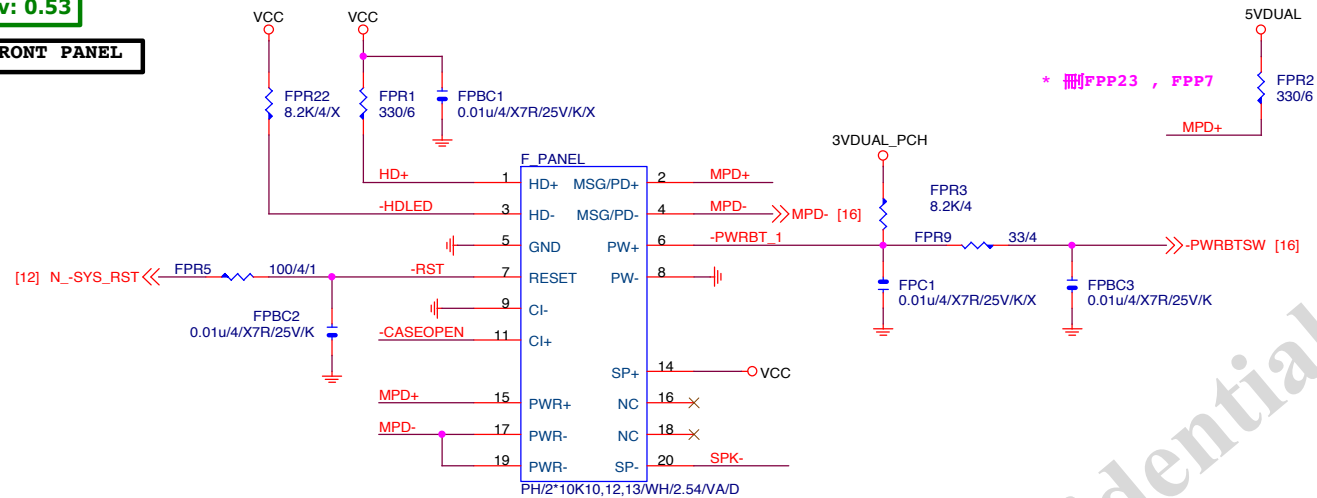
* footprint :
PIN2X5-CUT10-COM



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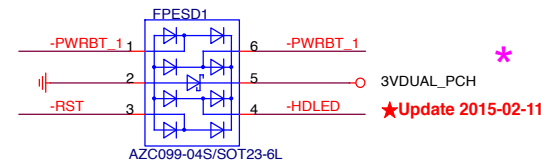
Rev: 0.53

FRONT PANEL

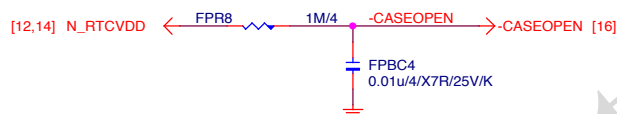


FOOTPRINT: PIN2X10PANEL-NEW

ESD

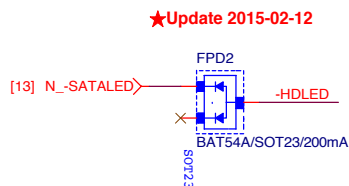


CASE OPEN

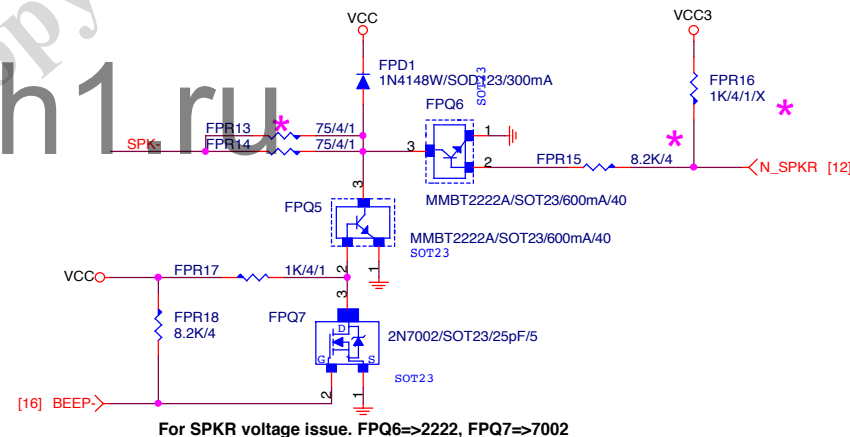


SATA LED

SATALED# signal open-collector, pull-up (8.2 kΩ to 10 kΩ) to Vcc3_3



SPKR



Gigabyte Technology

Title		
FRONT PANEL		
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CLOSE SIO

EMIC1
100p/4/NPO/50V/J/X

[12,16,30] N_SLP_S3 <

EMIC2
100p/4/NPO/50V/J/X

[12,16,29,31] N_S4_S5 <

EMIC3
100p/4/NPO/50V/J/X

[4,12,16] N_CPUPWROK <

CLOSE PCH

EMIC4
100p/4/NPO/50V/J/X

[4,12,16] N_CPUPWROK <

CLOSE PCH

EMIC6
100p/4/NPO/50V/J/X

[12,16,30] N_SLP_S3 <

EMIC7
100p/4/NPO/50V/J/X

[12,16,29,31] N_S4_S5 <

For H1703M-HD3 USB

EMIC5
0.01u/4/X7R/25V/K

VCC3 O

GIGABYTE™

Title

EM/ESD

Size
A

Document Number

GA-B150M-PIO-SI

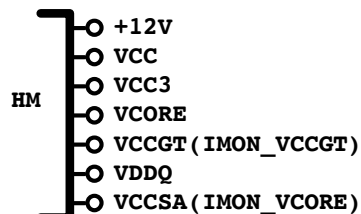
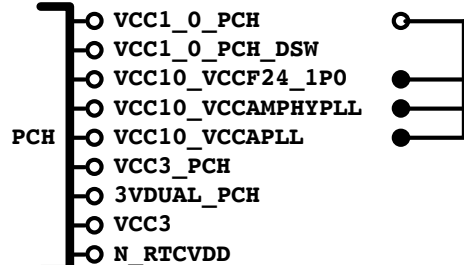
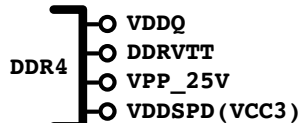
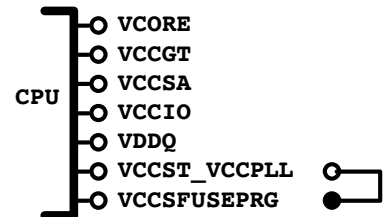
Rev

1.0

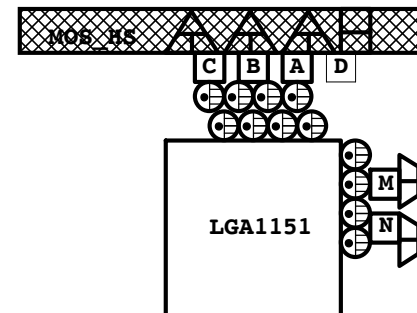
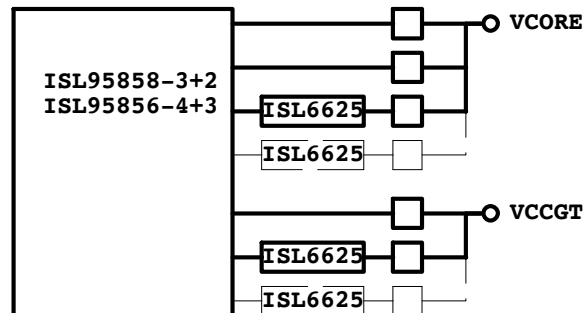
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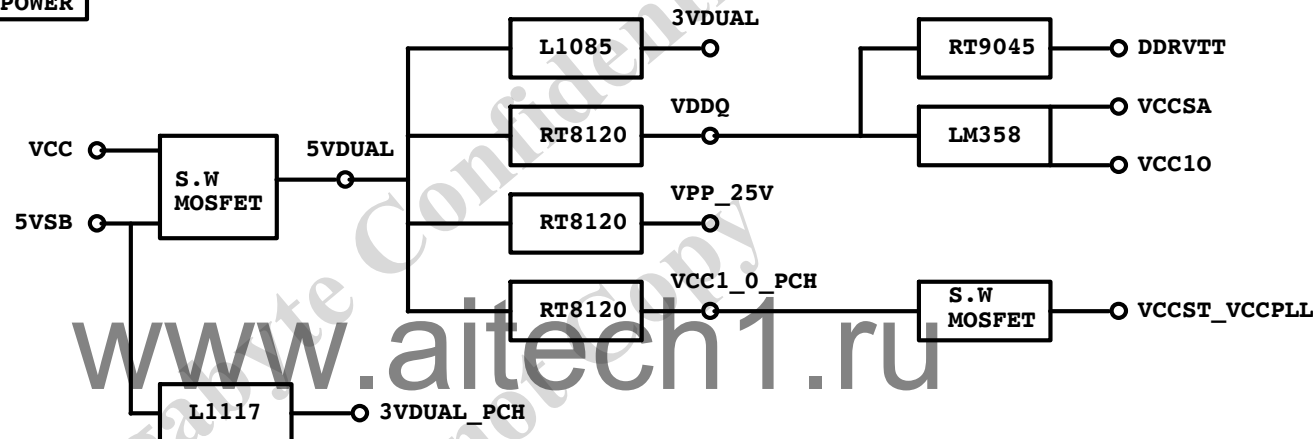
POWER BLOCK MAP



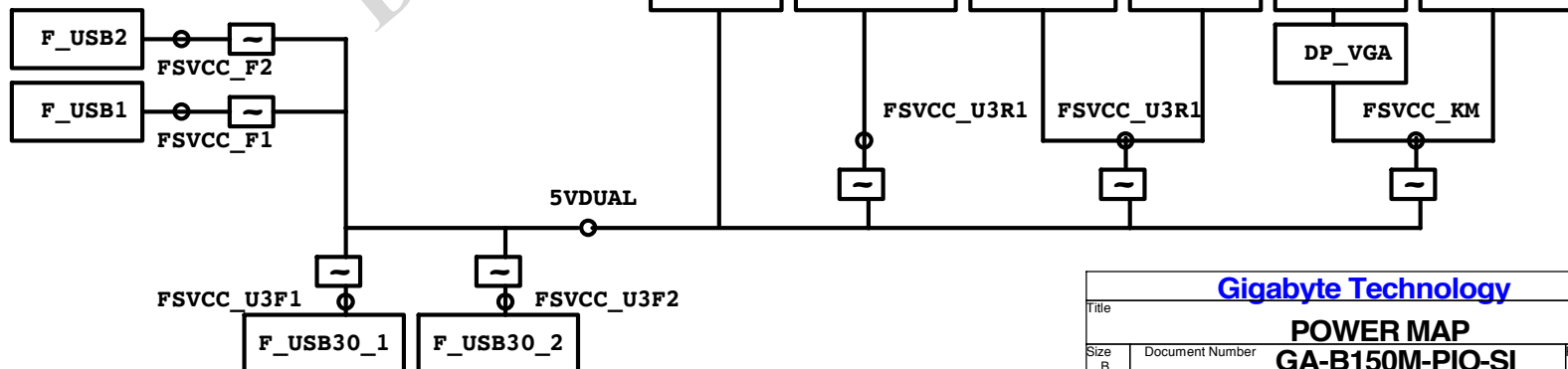
VCORE/VCCGT



POWER



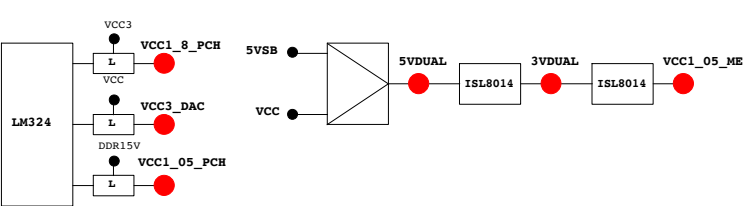
FUSE POWER F/R



Gigabyte Technology

Title		
POWER MAP		
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PIN NAME	USAGE	NOTE
SVC/PECI_RQT/GP14	-PECI_REQ	
PWROK1/GP13	PWROK1/ITE_PWROK	
KRST#/GP62	-KBRST	
SO/GP50	-ICH_SPI_CS	
IRTX/GP47/CE2_N/JP7	CEB_N	
GP46/IRRX	-LAN2_DSM	
PSION#/GP42	-PSON	
PWROK2#/GP41	PECI_CTL	
PCIRST3#/GP10/VDIMM_STR_EN	-PCIE_RST	
RSMRST#CIRRX1/GP55	-RSMRST	
PME#/GP54	-LPCPME	
PD5/GP75/BUSS00	N/A	



散熱模組料號:

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 Termination
VREF_CA_A/VREF_CA_B	DRAM Address Ref
VREF_DQ_A/VREF_DQ_B	DRAM Data Ref

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