

Model Name: GA-H97M-GAMING 3

SHEET TITLE Revision 1.0

01	COVER SHEET
02	BOM & PCB MODIFY HISTORY
03	BLOCK DIAGRAM
04	CPU_LGA1150-A
05	CPU_LGA1150-B
06	CPU_LGA1150-C
07	DDR III CHANNEL A 1,2
08	DDR III CHANNEL B 1,2
09	PCH_FDI,DMI,USB,PCIE,NVRAM
10	PCH_DP,CLK BUFFER
11	PCH_HOST,SATA,PCI
12	PCH_GPIO,CTRL,AUDIO
13	PCH_PWR,GND
14	PCI EXPRESS*16 SLOT
15	PCI EXPRESS*4 / *1 SLOT(Share)
16	PCI Express *1 SLOT
17	ITE 8620 LPC IO
18	COM,KB_MS_USB,USB30_20
19	HWM,FAN CTRL,OV,-PROCHOT
20	DUAL BIOS
21	FP,FUSB,SPK,SATALED
22	Realtek ALC1150
23	REAR AUDIO JACK
24	Bigfoot E2201
25	DISCRETE POWER
26	ATX
27	VCORE ISL95820_1

SHEET TITLE

28	VCORE ISL95820_2
29	RT8120_DDR POWER
30	LPT, DP, M3 PWR
31	DVI, HDMI

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Gigabyte Technology			
Title			
Cover Sheet			
Size	Document Number	GA-H97M-GAMING 3	Rev
Custom			1.0
Date:	Friday, June 06, 2014	Sheet	1 of 31

Revision 1.0

Component value change history

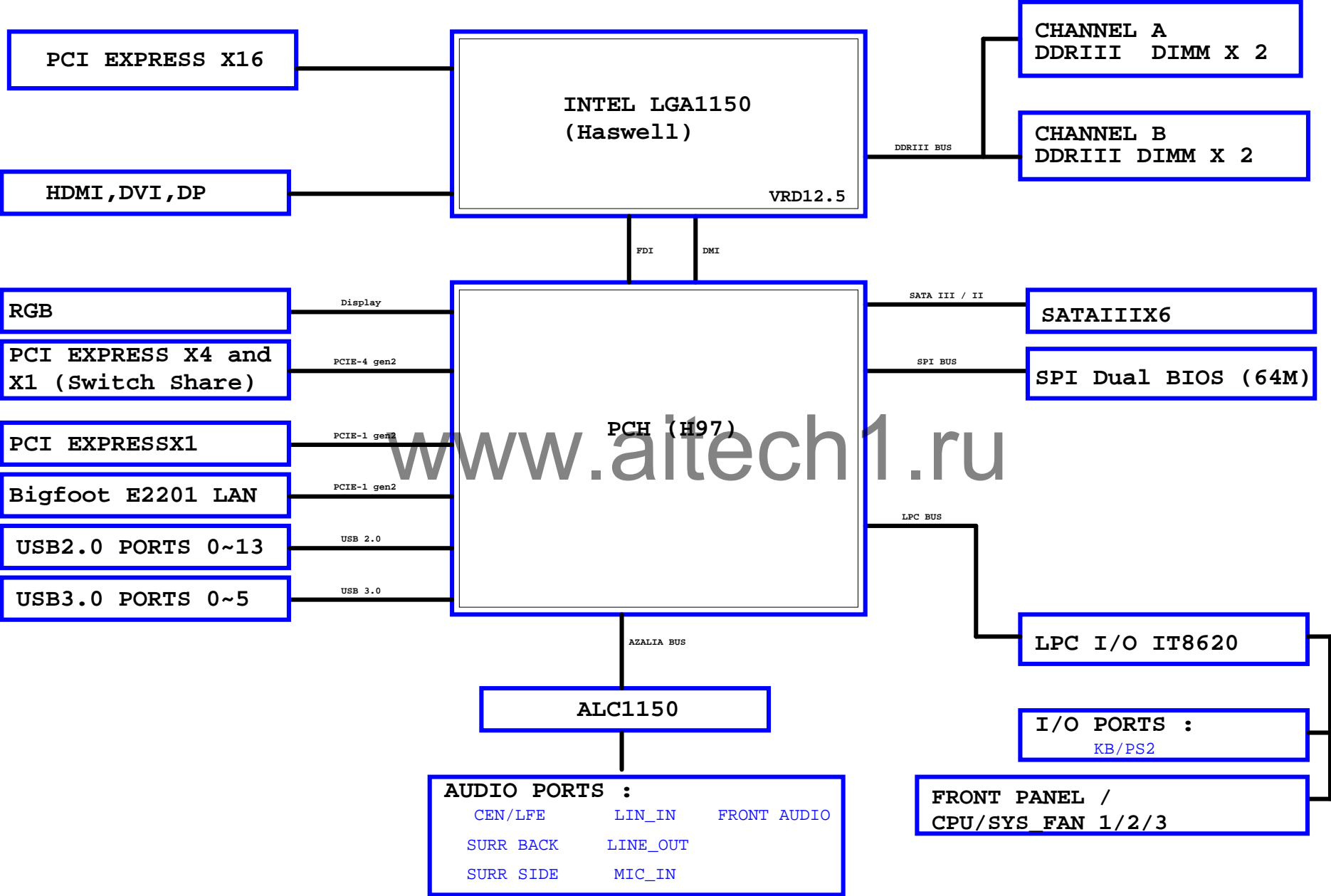
Project Code : U14012-0
Tip/Top : 9MH97MG3-00

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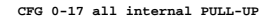
Circuit or PCB layout change

[illegible]

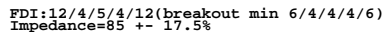
BLOCK DIAGRAM



(E)

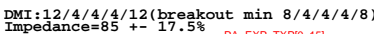


(D)



(C)

Impedance=80 +- 17.5%



100



THRMTrip DISABLE



CPU SVID

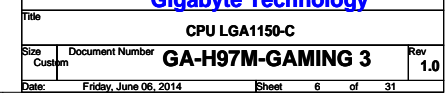
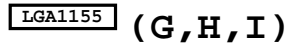


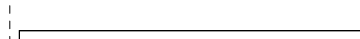
Date: Friday, June 06, 2014 Sheet 4 of 31

LGA1150 (A)

LGA1150A			
MAAA0	AU13	DDR0_MA0	DDR0_D00
MAAA1	AV16	DDR0_MA1	DDR0_D01
MAAA2	AU16	DDR0_MA2	DDR0_D02
MAAA3	AW17	DDR0_MA3	DDR0_D03
MAAA4	AU17	DDR0_MA4	DDR0_D04
MAAA5	AW18	DDR0_MA5	DDR0_D05
MAAA6	AV17	DDR0_MA6	DDR0_D06
MAAA7	AT18	DDR0_MA7	DDR0_D07
MAAA8	AU18	DDR0_MA8	DDR0_D08
MAAA9	AT19	DDR0_MA9	DDR0_D09
MAAA10	AW11	DDR0_MA10	DDR0_D10
MAAA11	AV19	DDR0_MA11	DDR0_D11
MAAA12	AU19	DDR0_MA12	DDR0_D12
MAAA13	AT20	DDR0_MA13	DDR0_D13
MAAA14	AW20	DDR0_MA14	DDR0_D14
MAAA15	AU21	DDR0_MA15	DDR0_D15
MODT_A0	AW10	DDR0_ODT0	DDR0_D16
MODT_A1	AV8	DDR0_ODT1	DDR0_D17
MODT_A2	AW9	DDR0_ODT2	DDR0_D18
MODT_A3	AU8	DDR0_ODT3	DDR0_D19
AW33		DDR0_D20	DDR0_D21
AV33		DDR0_D22	DDR0_D23
AU31		DDR0_D24	DDR0_D25
AV31		DDR0_D26	DDR0_D27
AT33		DDR0_D28	DDR0_D29
AU33		DDR0_D30	DDR0_D31
AT31		DDR0_D32	DDR0_D33
AW31		DDR0_D34	DDR0_D35
SBA00	← SBA0	DDR0_BA0	DDR0_D36
SBA01	← SBA1	DDR0_BA1	DDR0_D37
SBA02	← SBA2	DDR0_BA2	DDR0_D38
CKEA0	← CKEA0	DDR0_CKE0	DDR0_D39
CKEA1	← CKEA1	DDR0_CKE1	DDR0_D40
CKEA2	← CKEA2	DDR0_CKE2	DDR0_D41
CKEA3	← CKEA3	DDR0_CKE3	DDR0_D42
-CSA0	← -CSA0	DDR0_CS_N0	DDR0_D43
-CSA1	← -CSA1	DDR0_CS_N1	DDR0_D44
-CSA2	← -CSA2	DDR0_CS_N2	DDR0_D45
-CSA3	← -CSA3	DDR0_CS_N3	DDR0_D46
DCLKA0	← DCLKA0	DDR0_CLK_P0	DDR0_D47
DCLKA1	← DCLKA1	DDR0_CLK_P1	DDR0_D48
DCLKA2	← DCLKA2	DDR0_CLK_P2	DDR0_D49
DCLKA3	← DCLKA3	DDR0_CLK_P3	DDR0_D50
DCLKA0	← DCLKA0	DDR0_CLK_N0	DDR0_D51
DCLKA1	← DCLKA1	DDR0_CLK_N1	DDR0_D52
DCLKA2	← DCLKA2	DDR0_CLK_N2	DDR0_D53
DCLKA3	← DCLKA3	DDR0_CLK_N3	DDR0_D54
AW12		RSVD	DDR0_D55
-SRSA	← -SRSA	DDR0_RAS*	DDR0_D56
-SWEA	← -SWEA	DDR0_WE*	DDR0_D57
AV20		RSVD	DDR0_D58
AW27		RSVD	DDR0_D59
-SCASA	← -SCASA	DDR0_CAS*	DDR0_D60
-DDR3_RST	← -DDR3_RST	DDR0_RESET	DDR0_D61
WR61	0.1uH/4X7R/16V/K		DDR0_D62
WC4	0.1uH/4X7R/16V/K		DDR0_D63
			DDR0_D64
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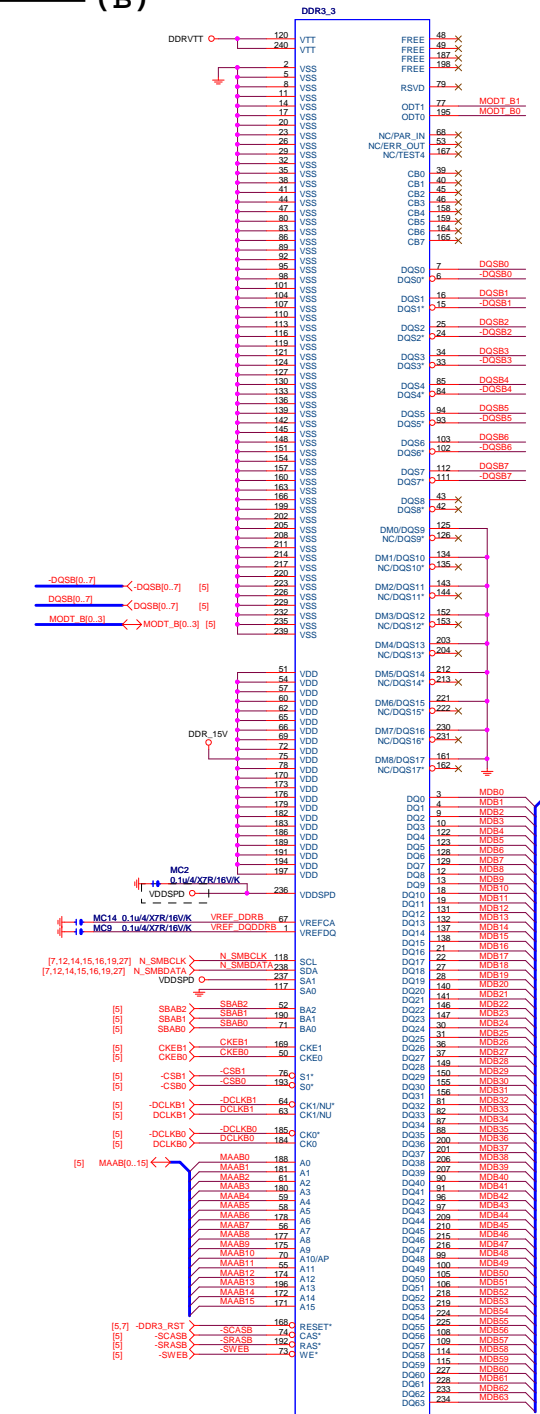
(F,J)



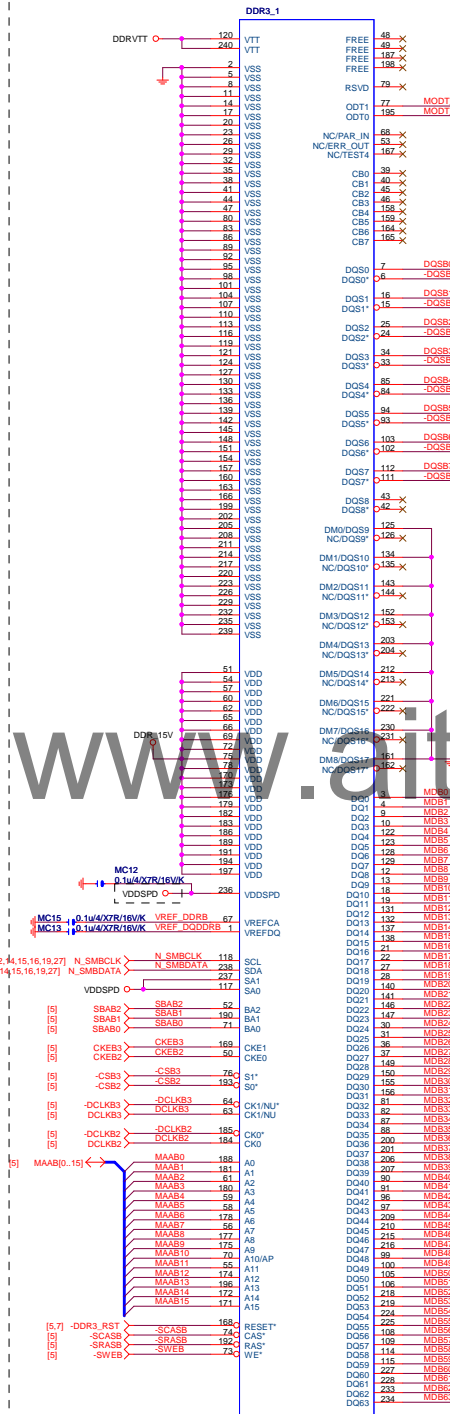


DDR3

(B)

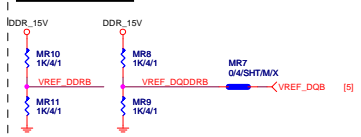


DDR3240/6K/VA/D
BLACK CONNECTOR



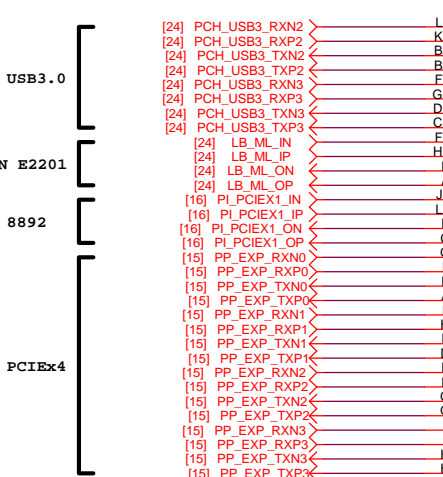
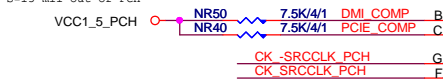
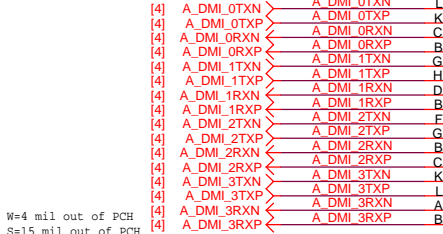
DDR3240/6K/VA/D
GRAY CONNECTOR

DDR3 VREF



PCH (B)

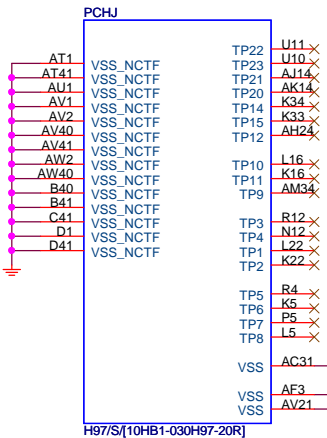
DMI:12/4/4/4/12(breakout min 8/4/4/4/8)
Impedance=85 +- 17.5%



電容放靠近 Device & PCI-E Slot
PCIEX1:15/4/4/4/15 (breakout min 8/4/4/4/8)
Impedance=85 +- 17.5%

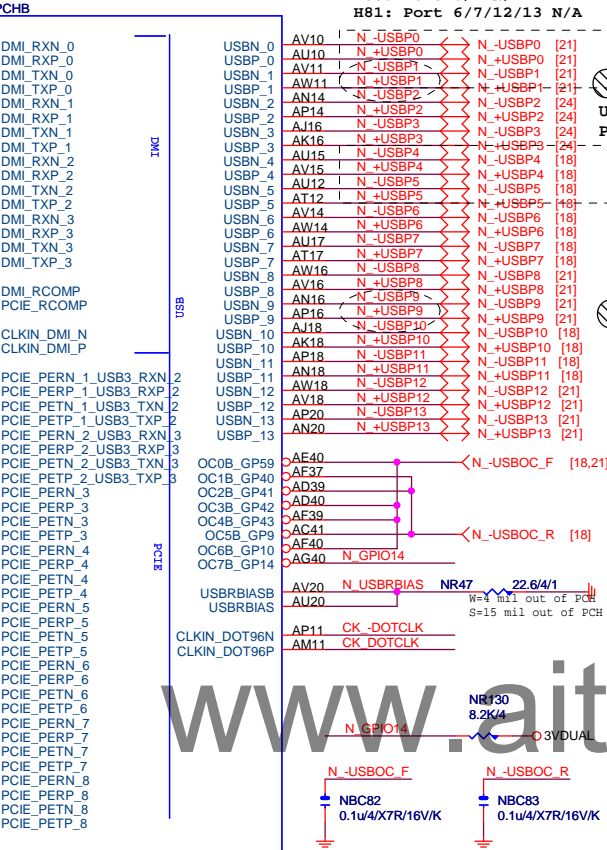
PCH (J)

usb2.0 12/5/7/5/12
usb3.0 20/5/7/5/20

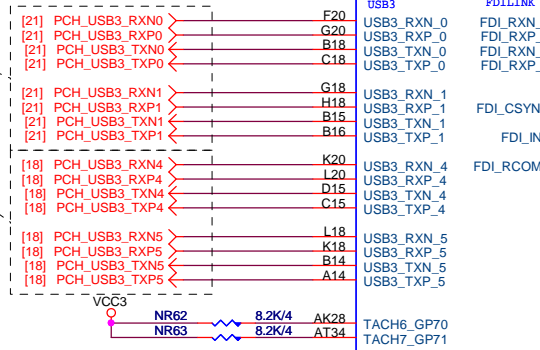


PORT1,PORT9[DEBUG PORT]FOR WHQL一定要拉出PORT

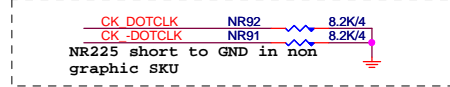
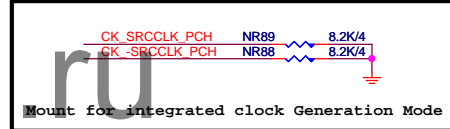
B85: Port 6/7 N/A
H81: Port 6/7/12/13 N/A



PCH (F)

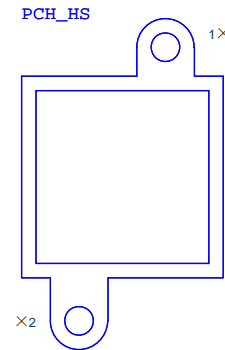


PCH CLK PD



PCH H/S

9 Series PCH Heatsink



USB TABLE

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

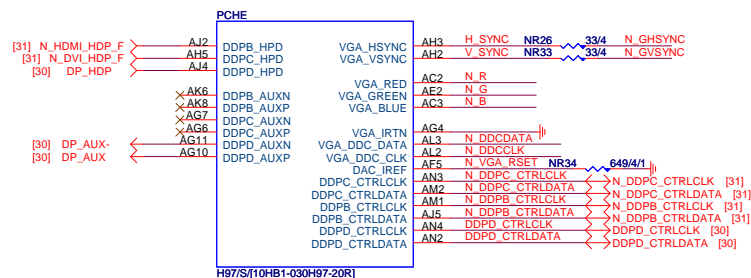
USB OC#	Configure
OC0#	F_USB30
OC1#	R_USB30
OC2#	USB30_LAN
OC3#	F_USB3
OC4#	F_USB2
OC5#	KB_MS_USB
OC6#	F_USB1
OC7#	Not Use

Gigabyte Technology

PCH FDI,DMI,USB ,PCIE,NVRAM

Title	GA-H97M-GAMING 3	Rev	1.0
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PCH (E)



VGA_DISABLE
R,G,B NC OR GND
IRTN / IREF GND
VGA_HSYNC, VGA_VSYNC, DDC_CLK, DDC_DATA NC
POWER VCCADAC(AF2), VCCADACBG(AE1) GND

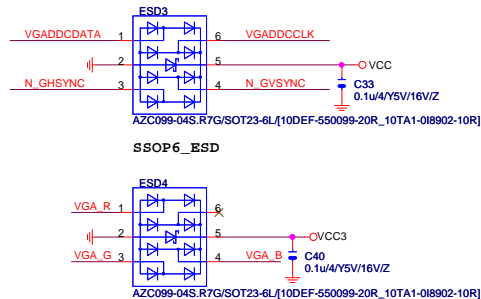
PCH CLK PD



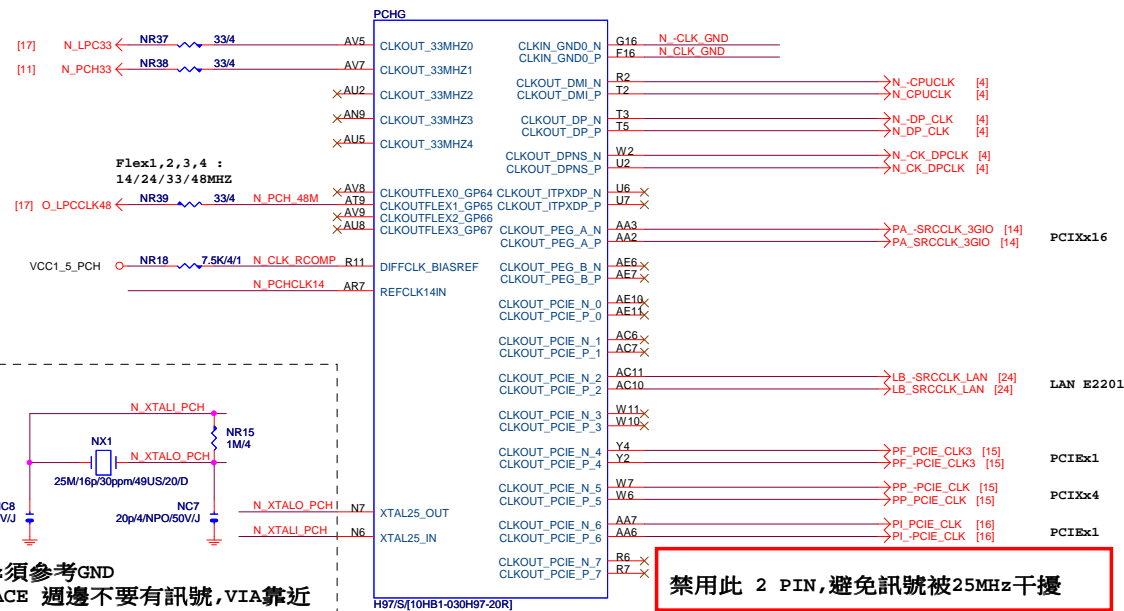
Mount for integrated clock Generation
Mode



VGA ESD

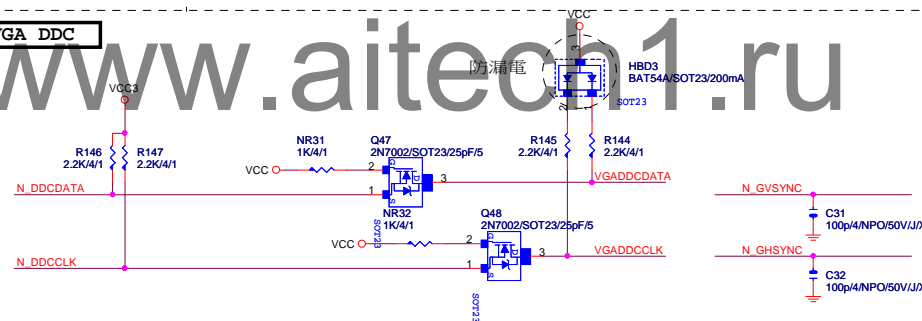


PCH (G)

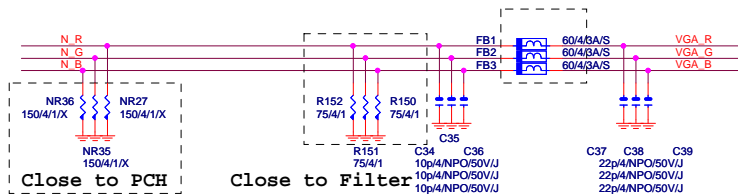


Differential Clock:18/4/6/4/18
Impedance=90 +- 15%

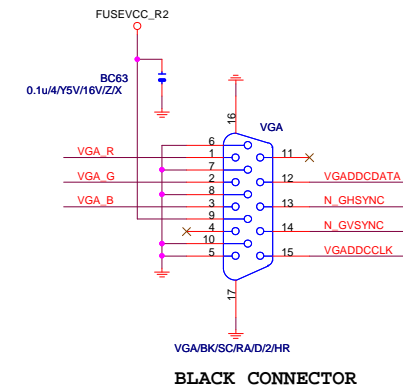
VGA DDC



VGA DDC



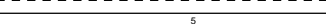
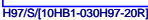
VGA CONNECTOR



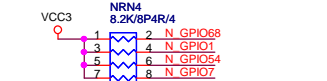
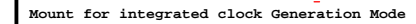
Gigabyte Technology			
Title PCH DISPLAY ,CLK BUFFER			
Size Custom	Document Number GA-H97M-GAMING 3		Rev 1.0
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H97 N/A

PCHC

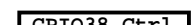


INDUAL PCH



7.97 N/A

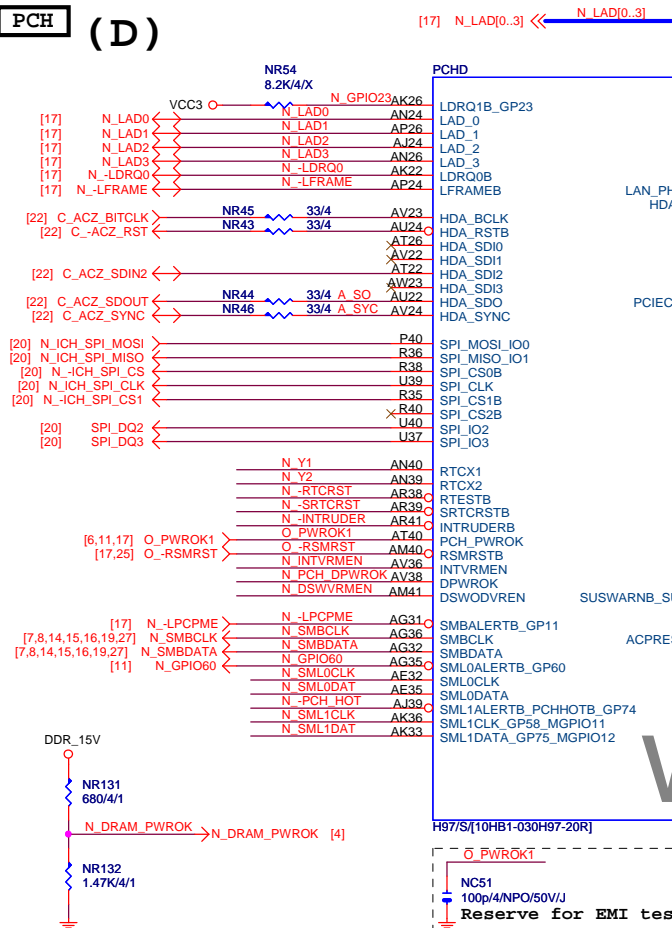
7.97 N/A



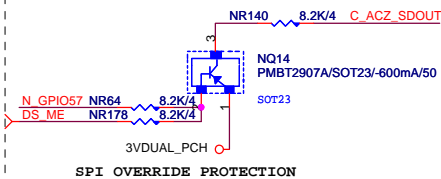
PCH HOST , SATA, PCI

Date:	Friday, June 06, 2014	Sheet	11	of	31
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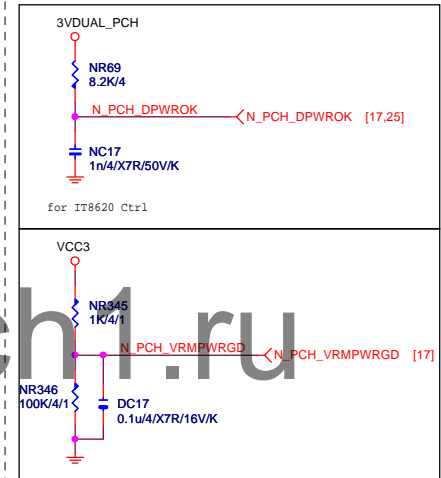
PCH (D)



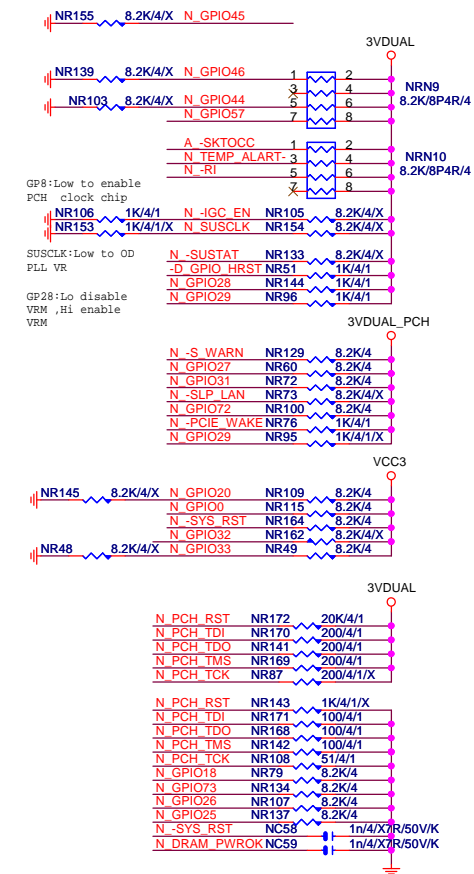
ACZ_SDOUT



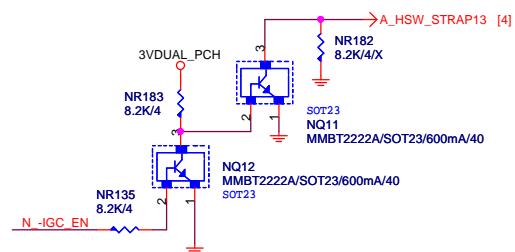
PCH_DPWROK



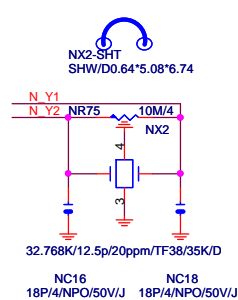
PCH PU/PD



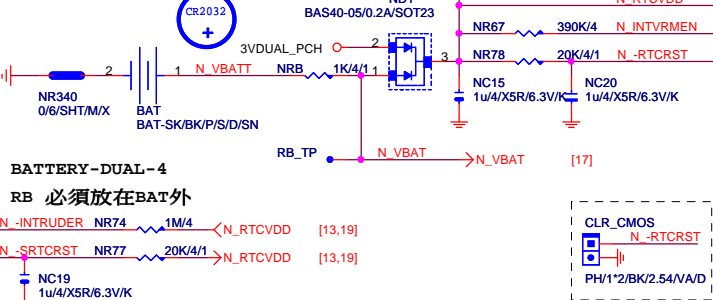
HSW_STRAP13



32.768KHZ



CLR_CMOS



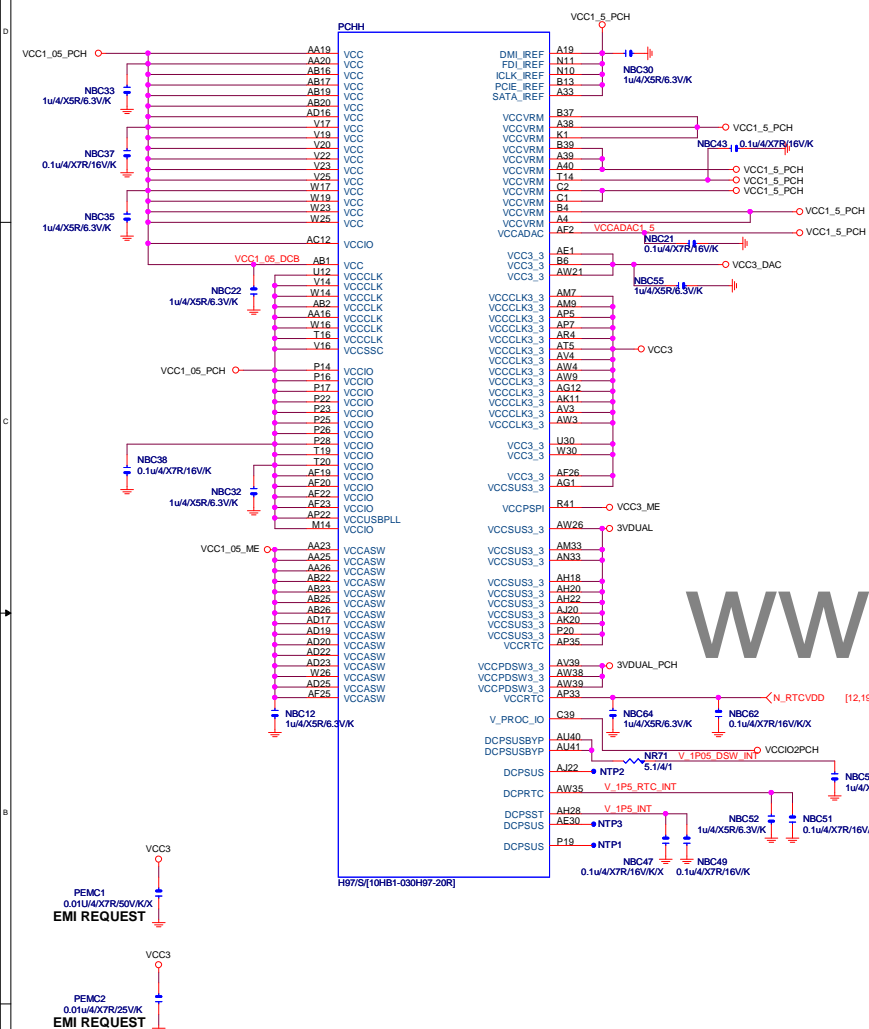
Gigabyte Technology

PCH GPIO, CTRL, AUDIO

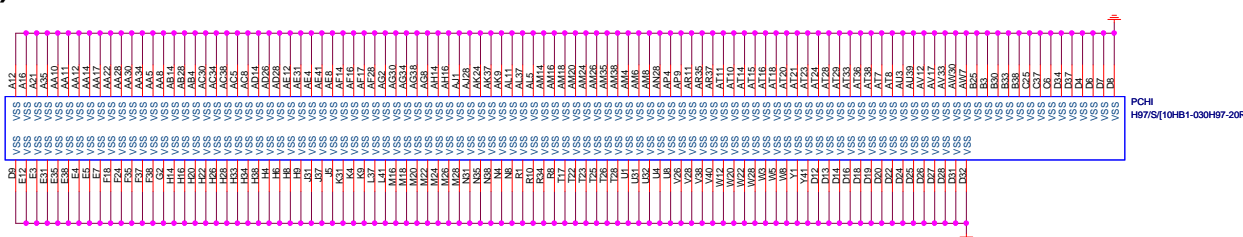
GA-H97M-GAMING 3

Title		Rev	
PCH GPIO, CTRL, AUDIO		1.0	
Size	Document Number		
Custom	GA-H97M-GAMING 3		
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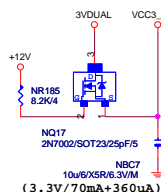
PCH (H)



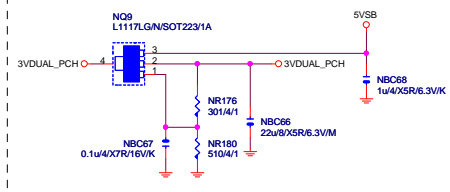
PCH (I)



VCC3_DAC



3VDUAL_PCH



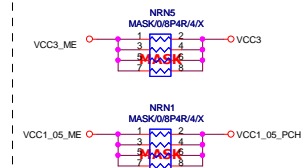
SHT PWR

H97 N/A

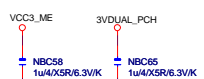
R1.0

SHORT WIRE

[Z97]

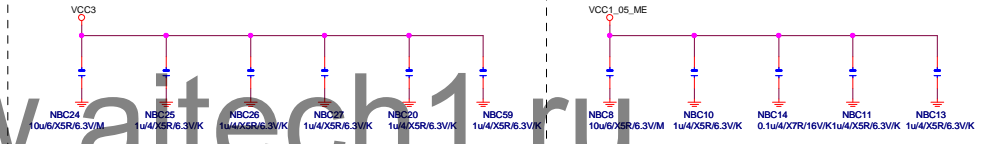


CAP

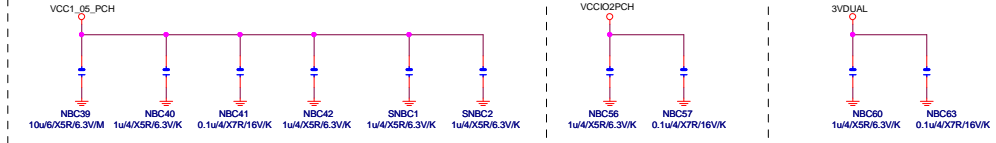


(3 . 3 V) (X 6)

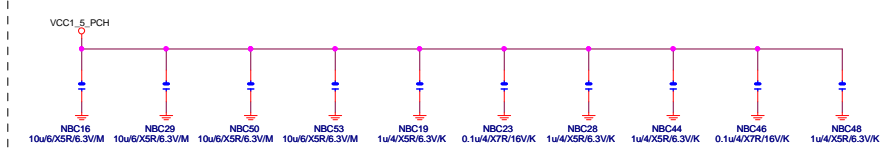
(1.05V) (x5)



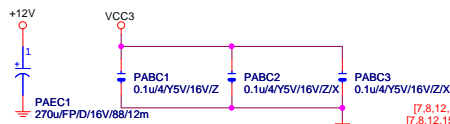
(1.05V) (X6)

$$(1.05V)(x2) \quad (3.3V)(x2)$$


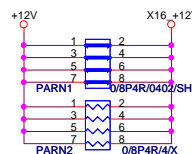
(1.05V) (x10)



PCIEX16 CAP



PCIEX16 PROTECT SHT

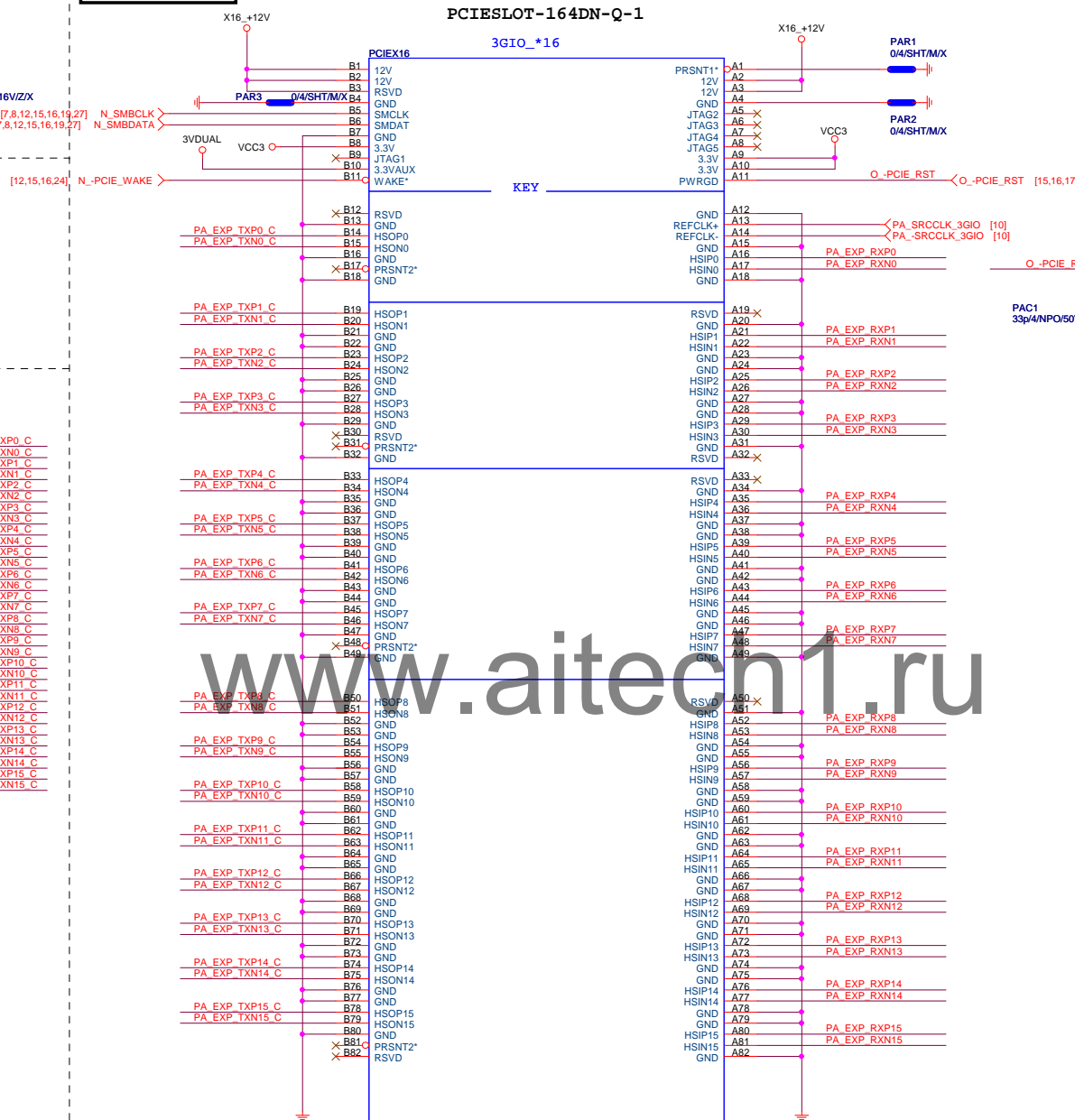


PCIEX16 AC CAP

PA_EXP_TXP0	PAC5	0.22u/4X5R6.3V/K	PA_EXP_TXP0_C
PA_EXP_TXN0	PAC4	0.22u/4X5R6.3V/K	PA_EXP_TXN0_C
PA_EXP_TXP1	PAC6	0.22u/4X5R6.3V/K	PA_EXP_TXP1_C
PA_EXP_TXN1	PAC7	0.22u/4X5R6.3V/K	PA_EXP_TXN1_C
PA_EXP_TXP2	PAC8	0.22u/4X5R6.3V/K	PA_EXP_TXP2_C
PA_EXP_TXN2	PAC9	0.22u/4X5R6.3V/K	PA_EXP_TXN2_C
PA_EXP_TXP3	PAC10	0.22u/4X5R6.3V/K	PA_EXP_TXP3_C
PA_EXP_TXN3	PAC11	0.22u/4X5R6.3V/K	PA_EXP_TXN3_C
PA_EXP_TXP4	PAC12	0.22u/4X5R6.3V/K	PA_EXP_TXP4_C
PA_EXP_TXN4	PAC13	0.22u/4X5R6.3V/K	PA_EXP_TXN4_C
PA_EXP_TXP5	PAC14	0.22u/4X5R6.3V/K	PA_EXP_TXP5_C
PA_EXP_TXN5	PAC15	0.22u/4X5R6.3V/K	PA_EXP_TXN5_C
PA_EXP_TXP6	PAC16	0.22u/4X5R6.3V/K	PA_EXP_TXP6_C
PA_EXP_TXN6	PAC17	0.22u/4X5R6.3V/K	PA_EXP_TXN6_C
PA_EXP_TXP7	PAC19	0.22u/4X5R6.3V/K	PA_EXP_TXP7_C
PA_EXP_TXN7	PAC18	0.22u/4X5R6.3V/K	PA_EXP_TXN7_C
PA_EXP_TXP8	PAC20	0.22u/4X5R6.3V/K	PA_EXP_TXP8_C
PA_EXP_TXN8	PAC21	0.22u/4X5R6.3V/K	PA_EXP_TXN8_C
PA_EXP_TXP9	PAC22	0.22u/4X5R6.3V/K	PA_EXP_TXP9_C
PA_EXP_TXN9	PAC23	0.22u/4X5R6.3V/K	PA_EXP_TXN9_C
PA_EXP_TXP10	PAC24	0.22u/4X5R6.3V/K	PA_EXP_TXP10_C
PA_EXP_TXN10	PAC25	0.22u/4X5R6.3V/K	PA_EXP_TXN10_C
PA_EXP_TXP11	PAC26	0.22u/4X5R6.3V/K	PA_EXP_TXP11_C
PA_EXP_TXN11	PAC27	0.22u/4X5R6.3V/K	PA_EXP_TXN11_C
PA_EXP_TXP12	PAC28	0.22u/4X5R6.3V/K	PA_EXP_TXP12_C
PA_EXP_TXN12	PAC29	0.22u/4X5R6.3V/K	PA_EXP_TXN12_C
PA_EXP_TXP13	PAC30	0.22u/4X5R6.3V/K	PA_EXP_TXP13_C
PA_EXP_TXN13	PAC31	0.22u/4X5R6.3V/K	PA_EXP_TXN13_C
PA_EXP_TXP14	PAC32	0.22u/4X5R6.3V/K	PA_EXP_TXP14_C
PA_EXP_TXN14	PAC33	0.22u/4X5R6.3V/K	PA_EXP_TXN14_C
PA_EXP_TXP15	PAC34	0.22u/4X5R6.3V/K	PA_EXP_TXP15_C
PA_EXP_TXN15	PAC35	0.22u/4X5R6.3V/K	PA_EXP_TXN15_C

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]

PCIEX16 SLOT



PCI-E/16X-164P/BK/LONG DOUBLE

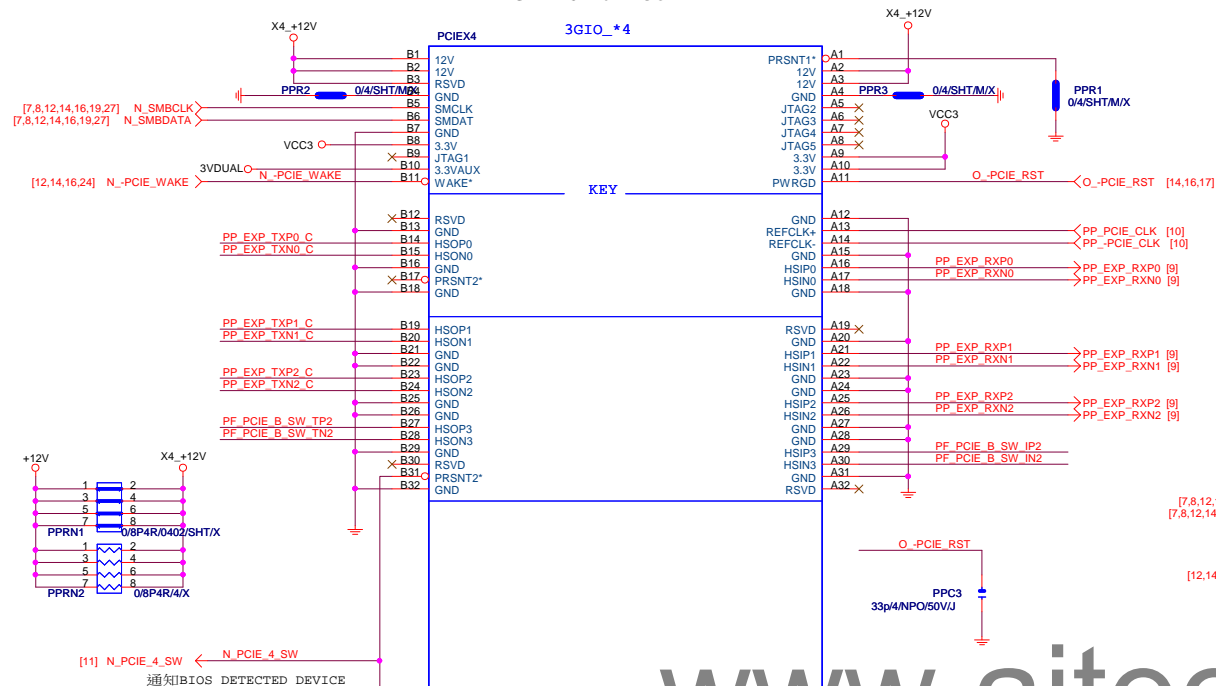
BLACK CONNECTOR

Gigabyte Technology

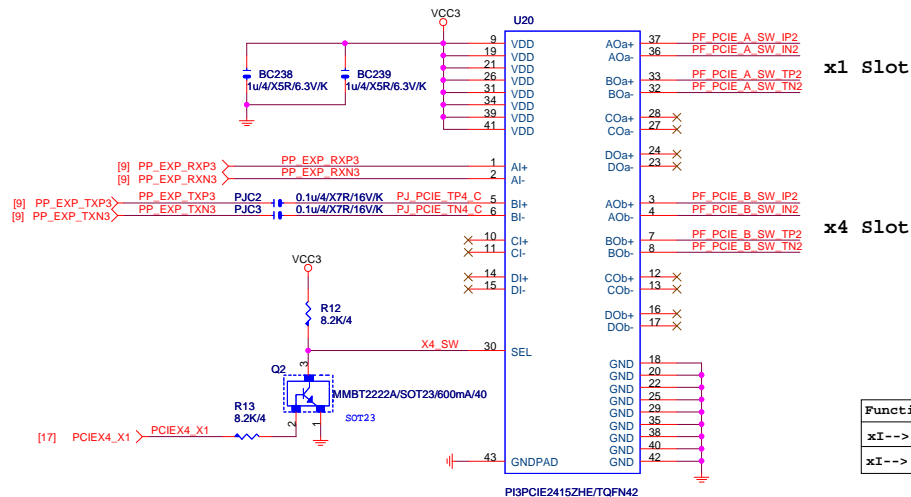
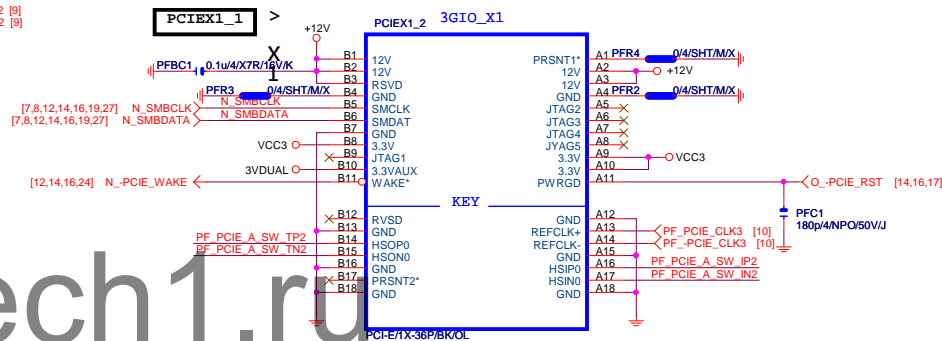
Title			
PCI EXPRESS * 16			
Size			
Custom	Document Number	GA-H97M-GAMING 3	
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Rev		1.0	

PCIEX4 SLOT

PCIESLOT-64D-98D-P



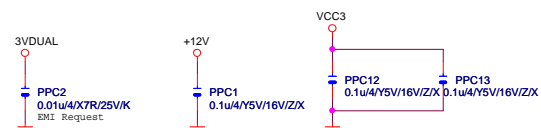
	N_PCIE_4_SW (PCH GPIO48)	PCIEX4_X1 (SIO GPIO26)
PCIEX4 No devices	H	H
PCIEX4 -> X1	H	H
PCIEX4 Have devices	L	L
PCIEX4 -> X4		
PCIEX1_1/2 --> N/A		



PCI-E/4X-65P/BK/LONG DOUBLE

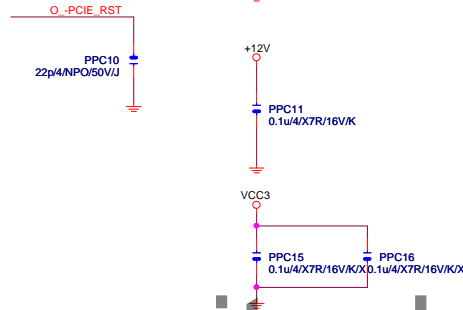
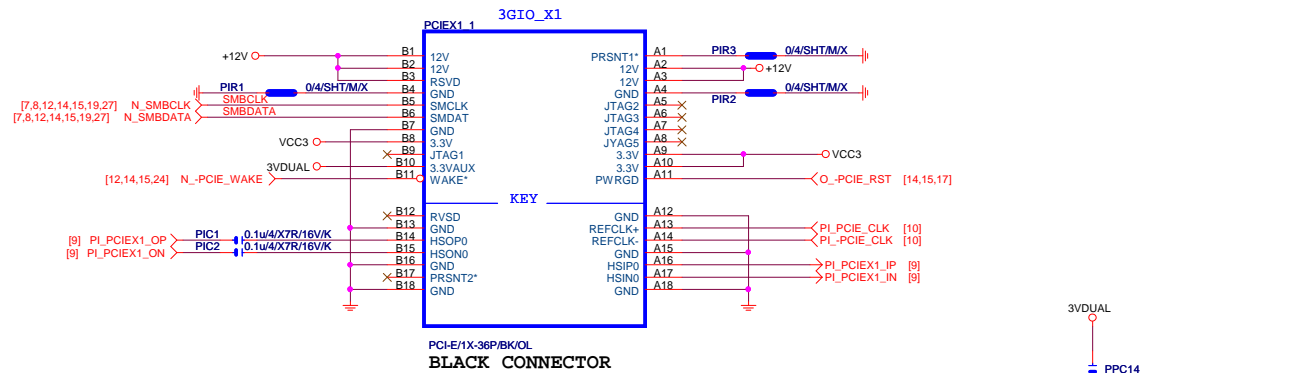
BLACK CONNECTOR

[9] PP_EXP_TXP0	PP_EXP_TXP0	PPC4	0.1u/4X7R/16V/K	PP_EXP_TXP0_C
[9] PP_EXP_TXN0	PP_EXP_TXN0	PPC5	0.1u/4X7R/16V/K	PP_EXP_TXN0_C
[9] PP_EXP_TXP1	PP_EXP_TXP1	PPC6	0.1u/4X7R/16V/K	PP_EXP_TXP1_C
[9] PP_EXP_TXN1	PP_EXP_TXN1	PPC7	0.1u/4X7R/16V/K	PP_EXP_TXN1_C
[9] PP_EXP_TXP2	PP_EXP_TXP2	PPC8	0.1u/4X7R/16V/K	PP_EXP_TXP2_C
[9] PP_EXP_TXN2	PP_EXP_TXN2	PPC9	0.1u/4X7R/16V/K	PP_EXP_TXN2_C



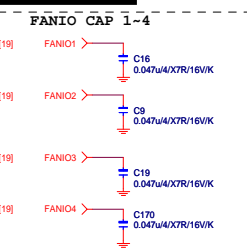
Function	SEL
xI--> x0a	L, PCIEX4 SLOT-->X1
xI--> x0b	H, PCIEX4 SLOT-->X4

Gigabyte Technology		
PCI EXPRESS X 1 PORT		
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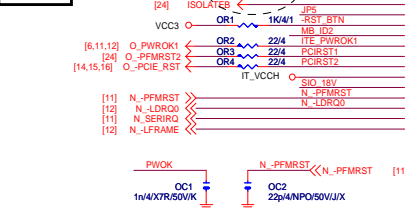


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SIO IT8620

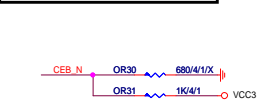


PROCHOT

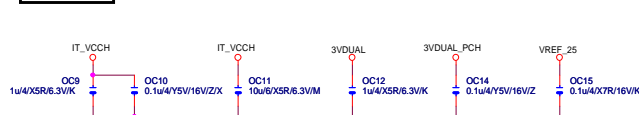


IT8620E GPIO問題匯整	
PIN 50	第一次接上POWER時會拉 LO
PIN 90/91	DEFAULT為HOLD FUNCTION, GP93 BYPASS TO GP92
PIN 108	高溫時 GP92 會被拉LO (ITE BUG)
PIN 111/112	MOUSE 與 FAN FUNCTION 擇一使用, 不然會互相干擾

DUAL BIOS OPT STRAP



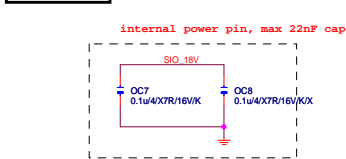
SIO CAP



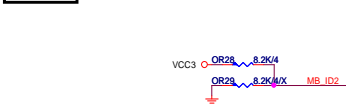
Power leakage



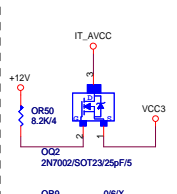
SIO_18V



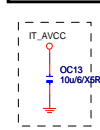
MB ID



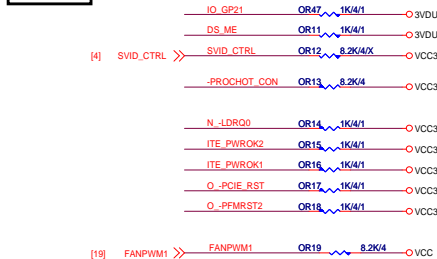
FIX ATX 插拔漏電



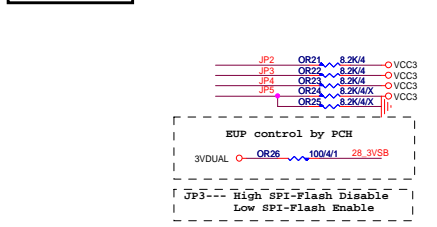
PWR_SHT



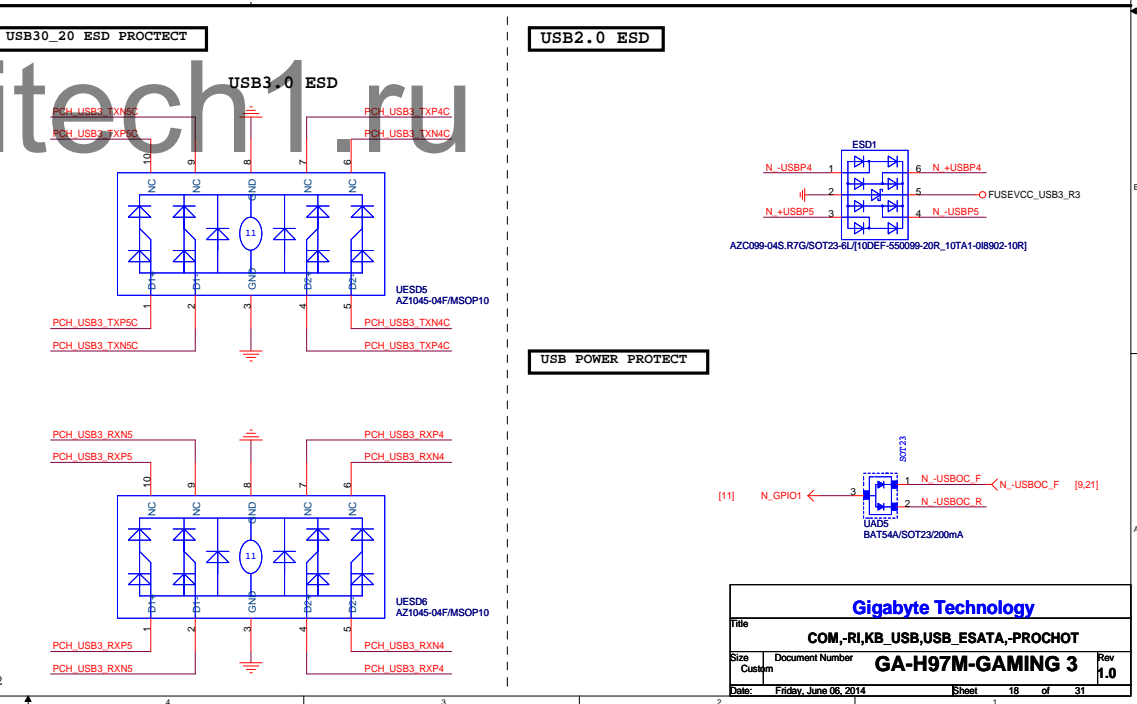
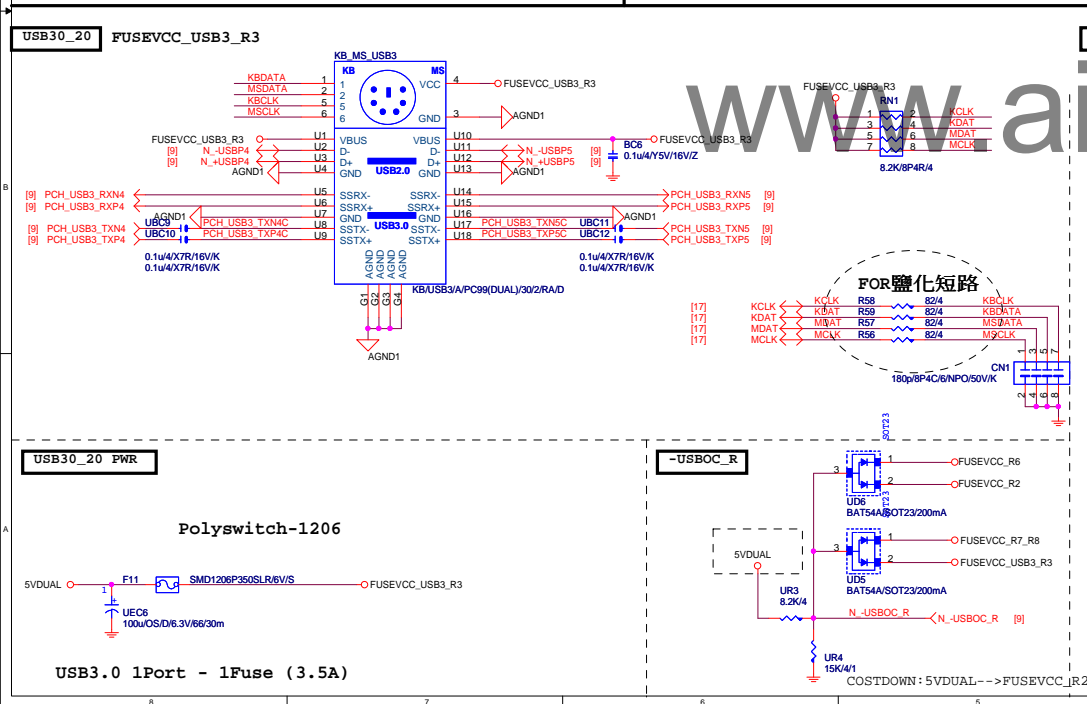
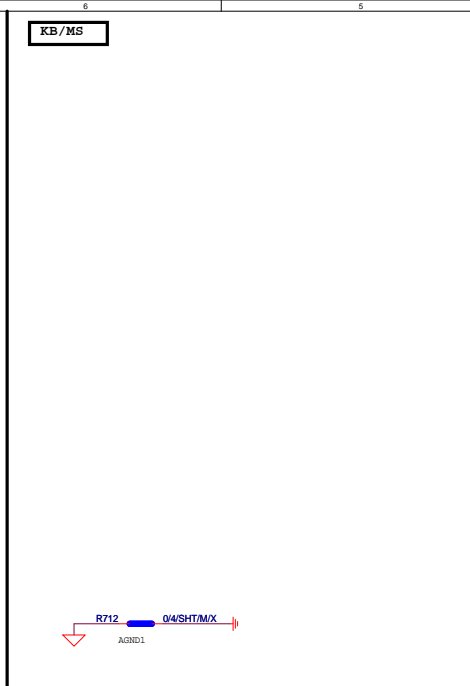
SIO_PU



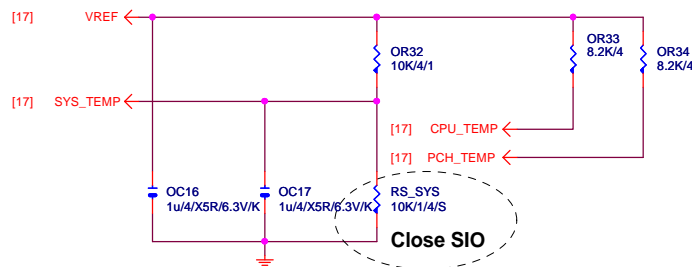
SIO STRAP



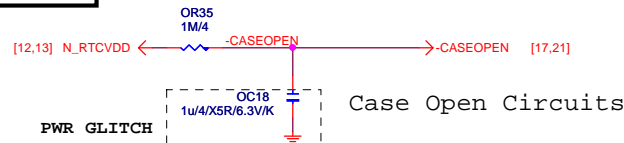
JP4	1	k8 power sequency function is Disable
	0	k8 power sequency function is Enable
JP3	1 1	The default value of EC Index 63h/6Bh/73h is 80h.
	1 0	The default value of EC Index 63h/6Bh/73h is FFh.
JP5	1 0	The default value of EC Index 63h/6Bh/73h is 00h.
	0 0	The default value of EC Index 63h/6Bh/73h is 40h.



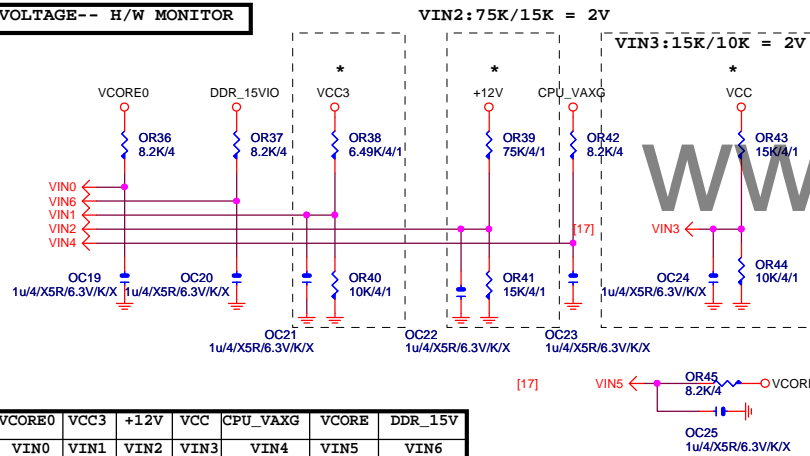
TEMP H/W MONITOR



CASE OPEN



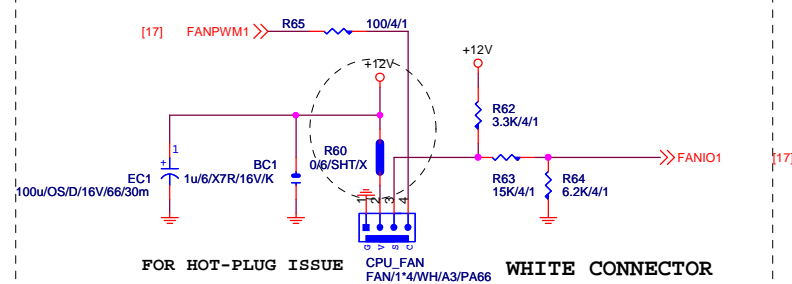
VOLTAGE-- H/W MONITOR



RS2 CLOSE CPU VR MOSFET

RS2 CLOSE MOSFET(VIN): DCQ1

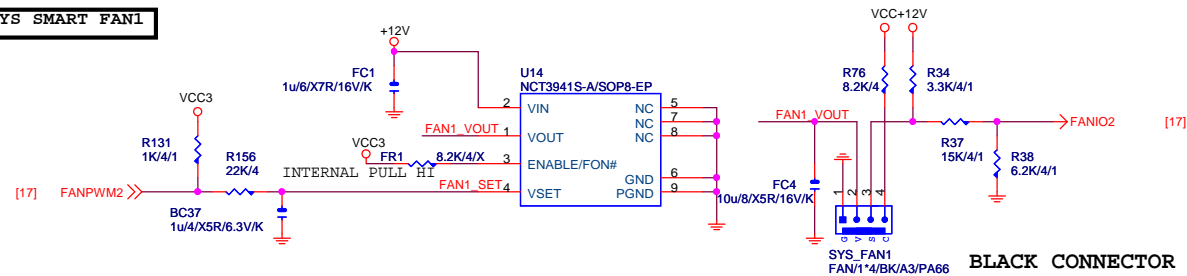
CPU SMART FAN



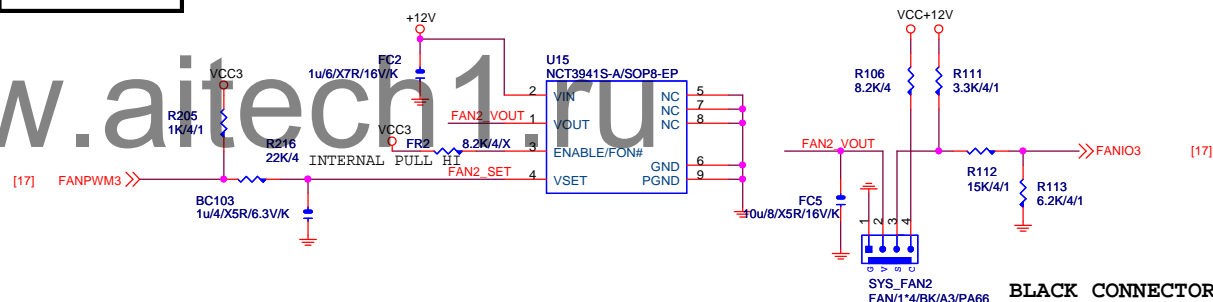
FOR HOT-PLUG ISSUE

WHITE CONNECTOR

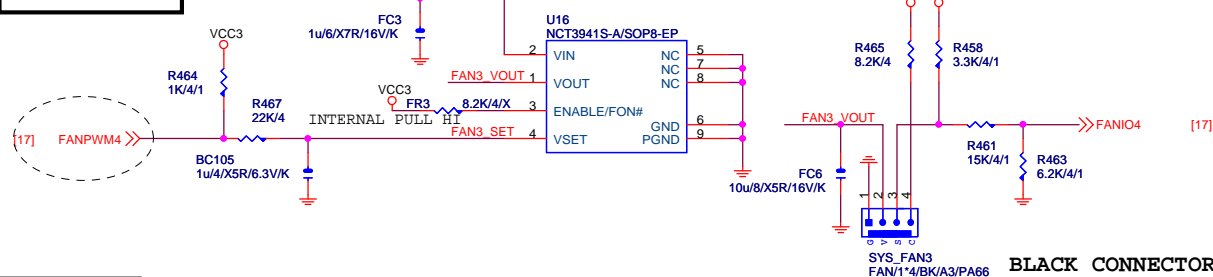
SYS SMART FAN1



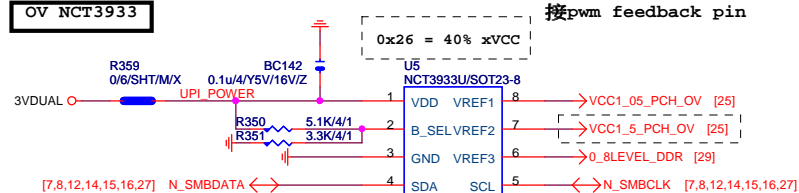
SYS SMART FAN2



SYS SMART FAN3



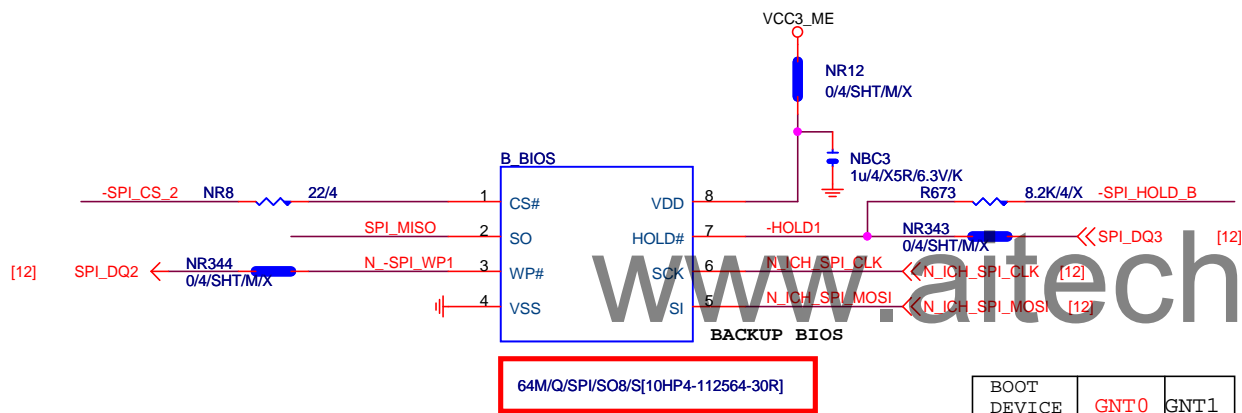
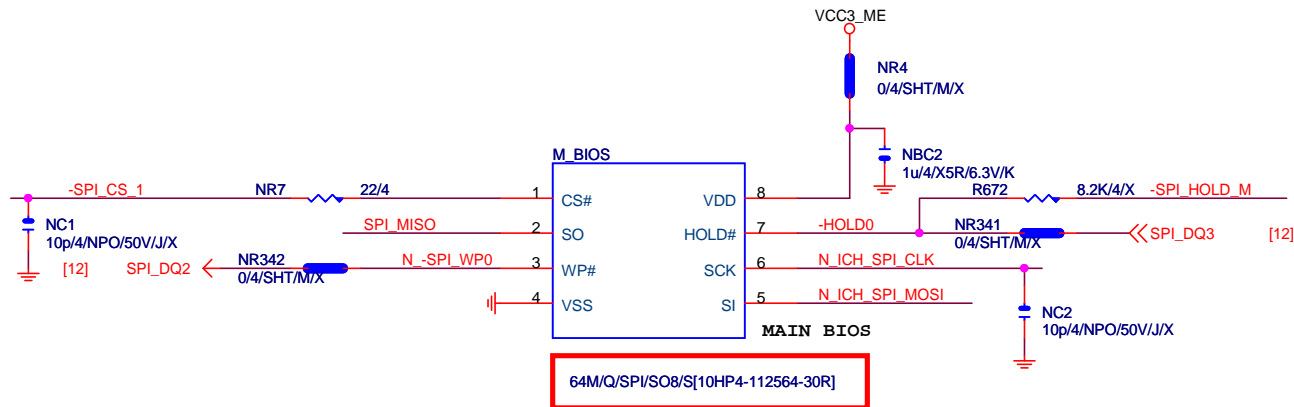
OV NCT3933



Gigabyte Technology

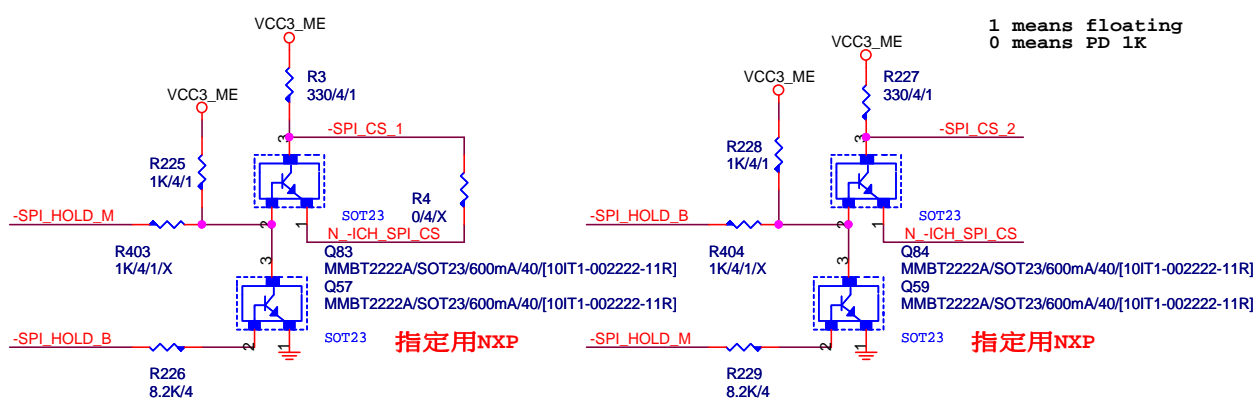
HWM,FAN CTRL,OV

Title	HWM,FAN CTRL,OV		
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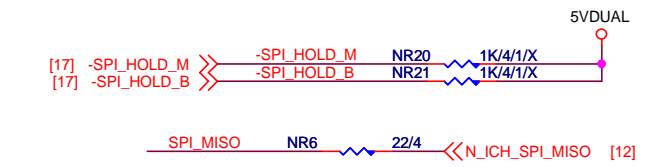
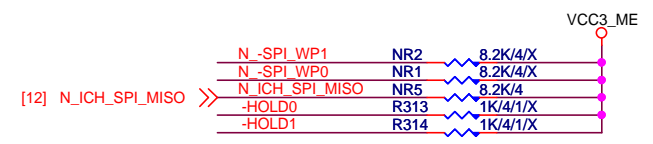
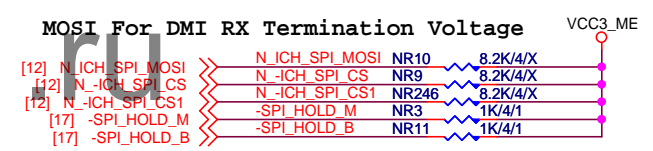
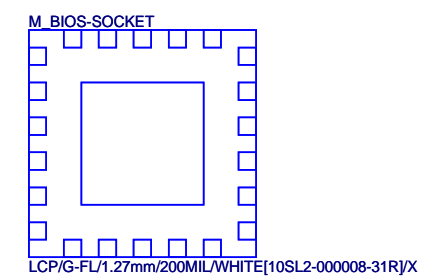
BOOT DEVICE	GNT0	GNT1
LPC	0	0
PCI	0	1
NAND	1	0
SPI	1	1

1 means floating
0 means PD 1K



BIOS DEBUG PORT

BIOS_PH R1.0 移除



Gigabyte Technology

DUAL BIOS

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AZALIA CODEC

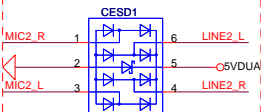
Thermal pad is DGND

Digital Area

Analog Area

MASK

SMOATR1 MASK/0/6/X
0/6/X For AGND/GND
moat under Codec Body



MASK/AZC099-04S.R7G/SOT23-6L[10DEF-550099-20R_10TA1-08902-10R]X

ALC1150/ALC887-VD2 default不上

ESD protection diode :

Without : 6~7KV , With : 8.5~9.5KV

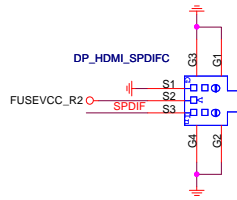
JD resistors close CODEC

EAPD: Default L
H : ON
L : OFF

Close to ALC1150

Thermal pad is DGND

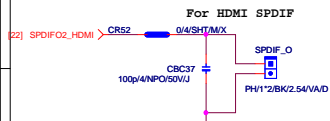
DP+HDMI+SPDIF/20P+19P+3P/BK/RA[11NR6-M10042-11R]:: Location DP_HDMI_SPDIF



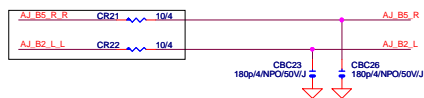
ALC1150 "CD1" 惠謀指定default要上

- BOM OPTION :
1. 台灣/日國/日黑固/MUSE MW音效電容
 2. 金屬外罩 Reserve
 3. LED Reserve (若LED有上,G_PLED p-up請上CR98)

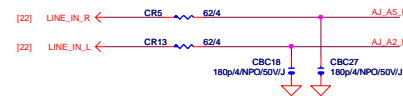
Gigabyte Technology			
Title			
HD AUDIO ALC1150			
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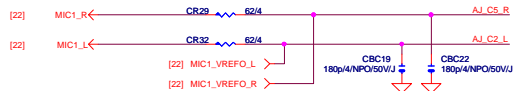
LINE-OUT



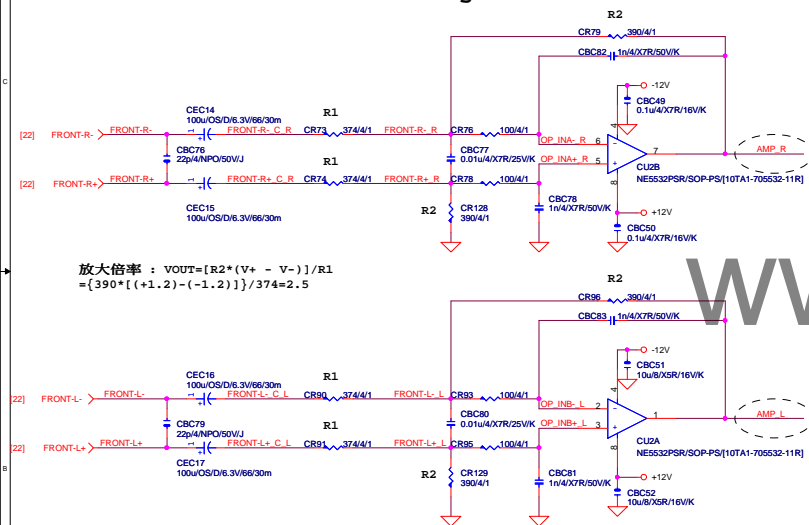
LINE-IN



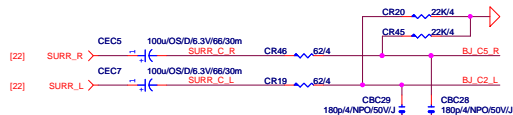
MIC-IN



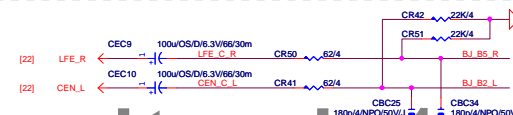
Differential to Single-End AMPLIFIED



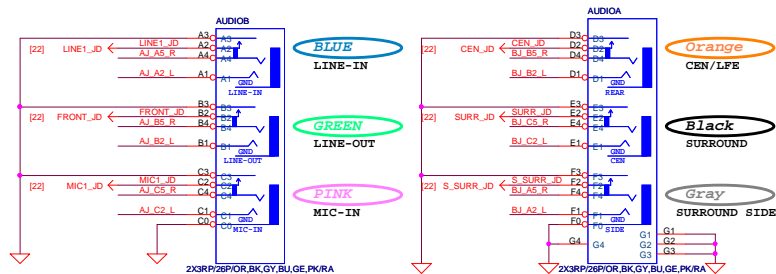
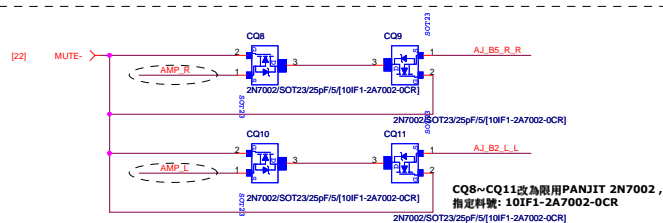
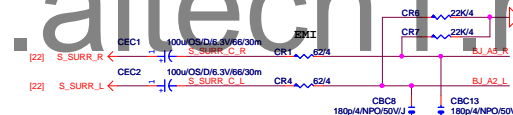
SURROUND



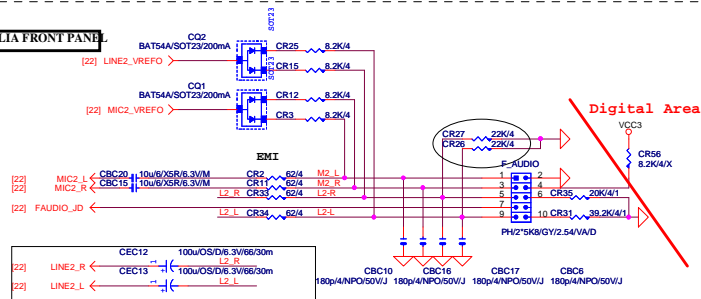
CEN/LFE



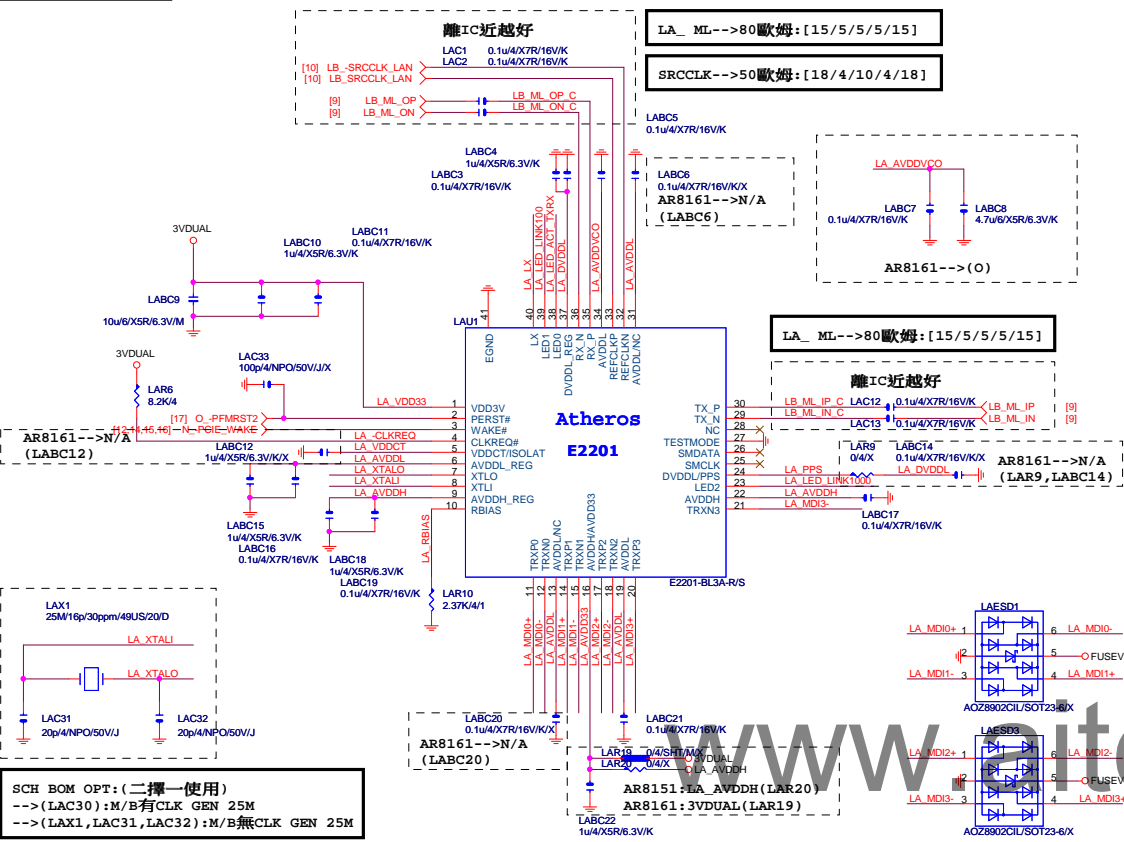
SURR BACK



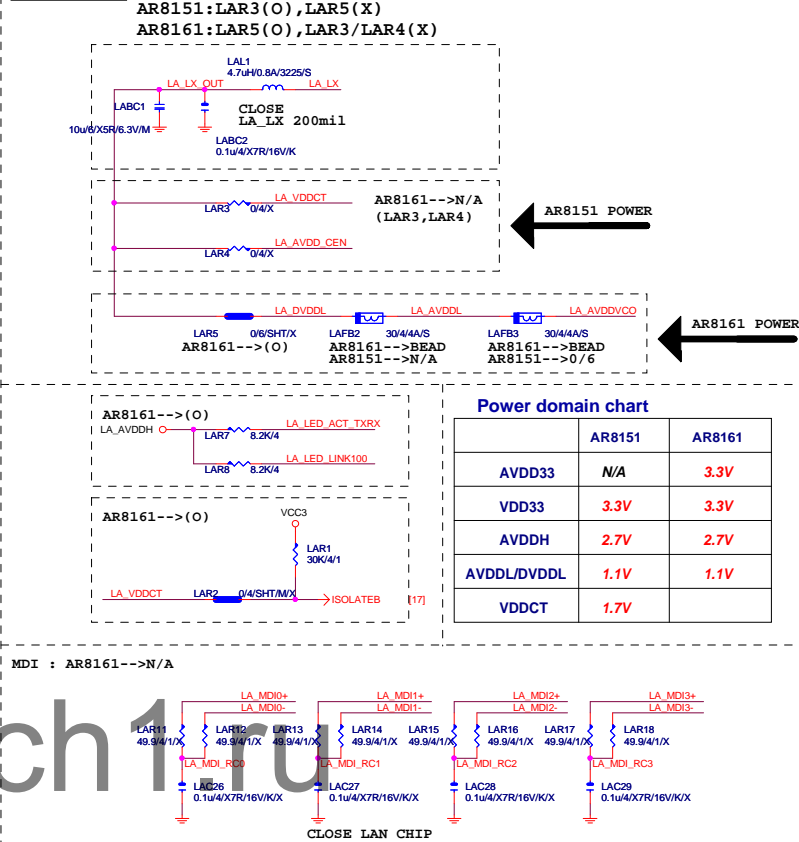
AZALIA FRONT PANE



LAN:AR8151/AR8161



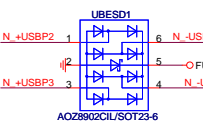
LAN POWER



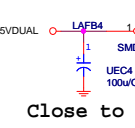
Power domain chart

	AR8151	AR8161
AVDD33	N/A	3.3V
VDD33	3.3V	3.3V
AVDDH	2.7V	2.7V
AVDDL/DVDDL	1.1V	1.1V
VDDCT	1.7V	

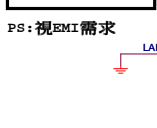
RMA ESD PROTECT



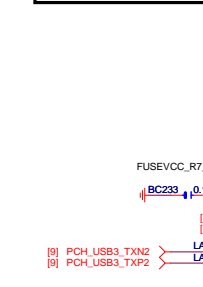
USB X3 POWER



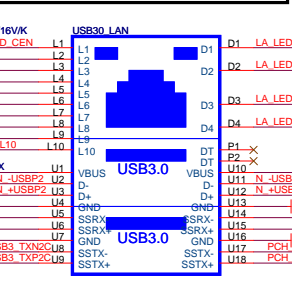
EMI SHORT PAD



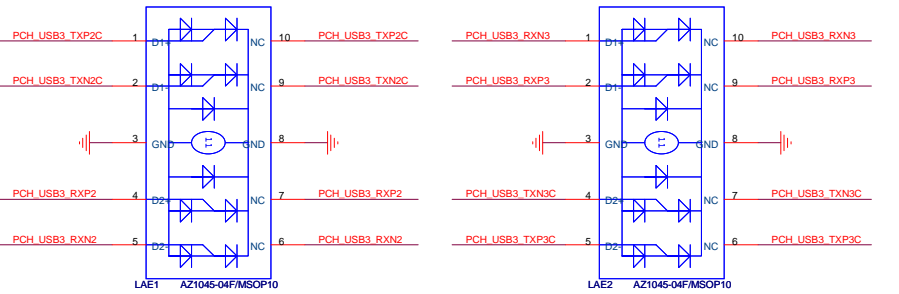
USB LAN CONNECTOR



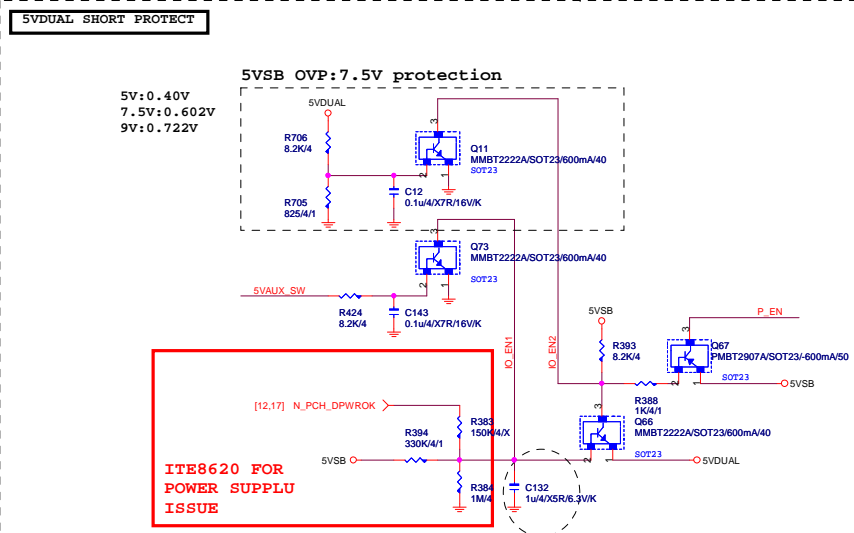
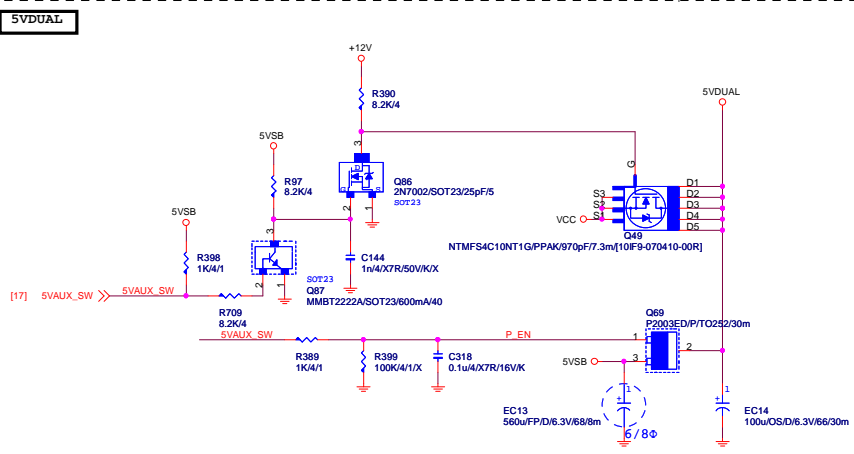
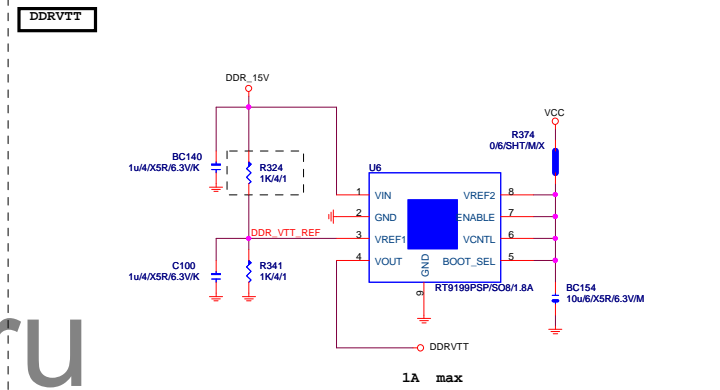
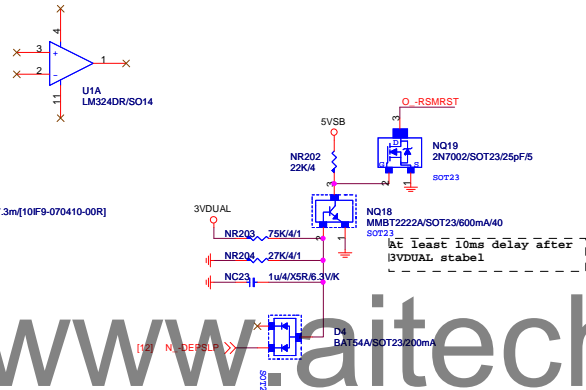
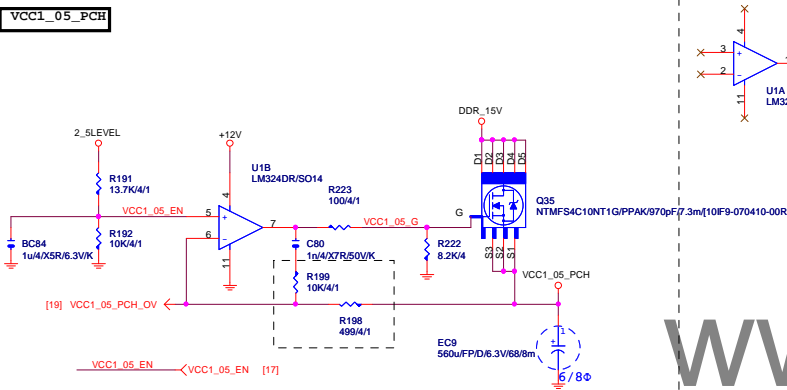
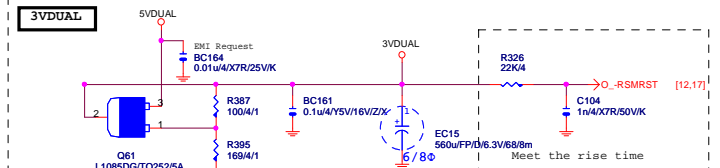
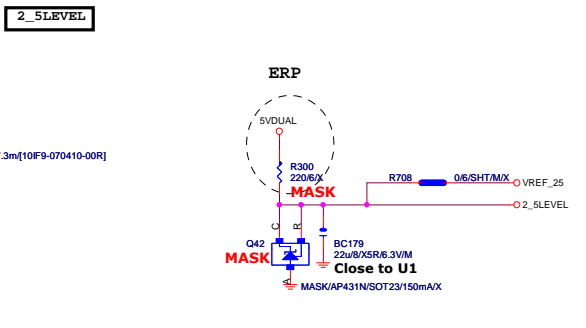
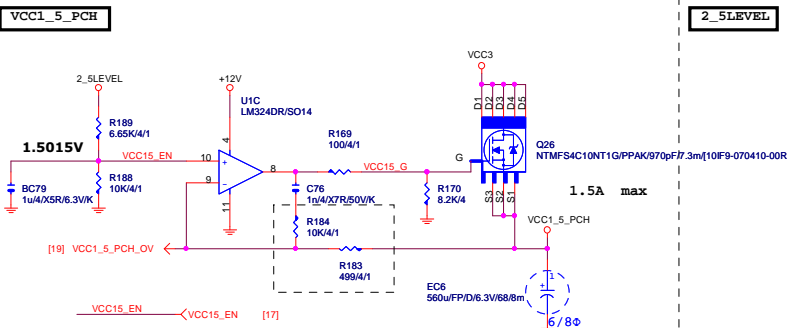
LA MDI-->100歐姆:[20/4/8/4/20]

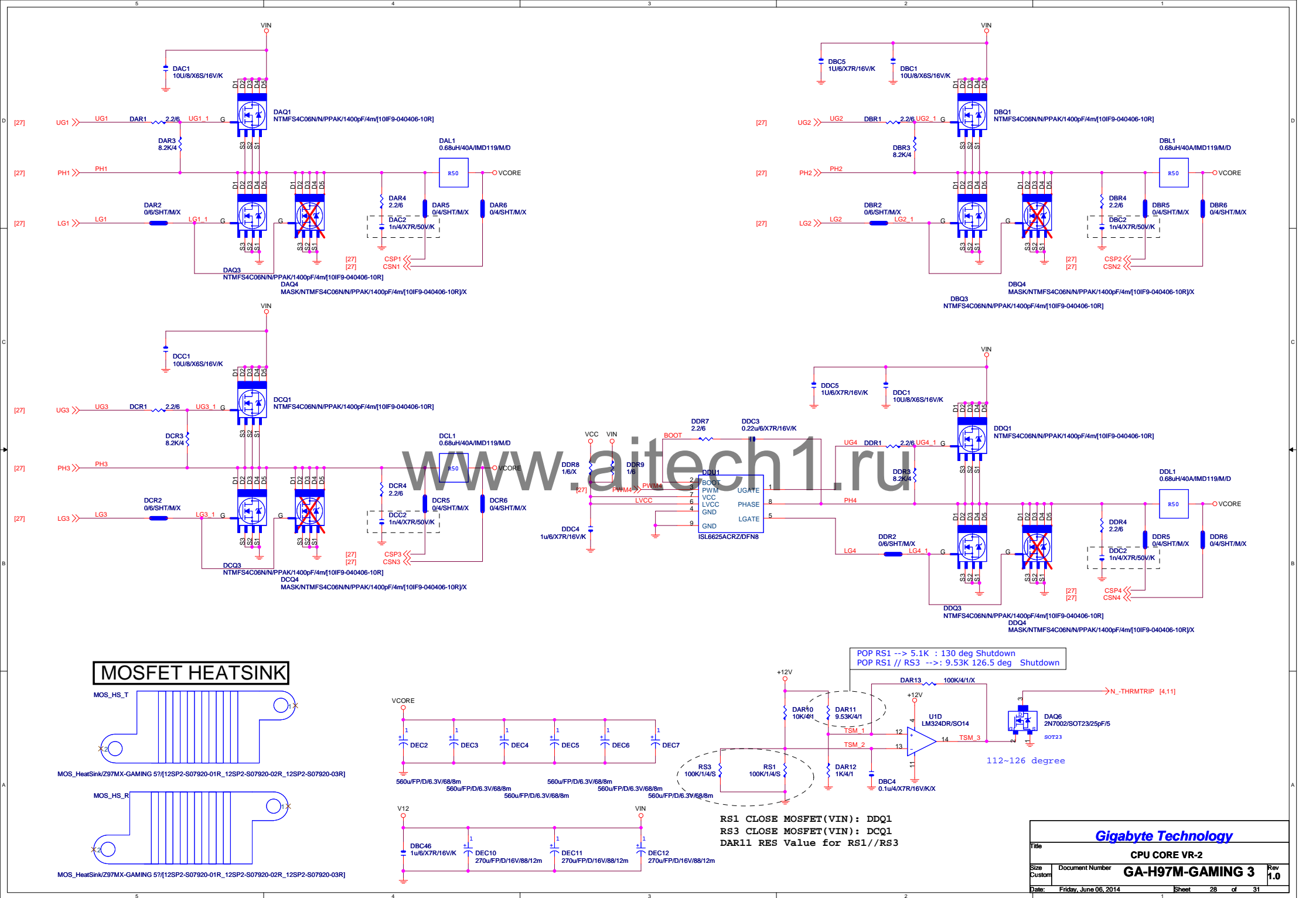


注意:USB PORT(目前:暫代6,7PORT)
USB-->90歐姆:[15/4.5/7.5/4.5/15]



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Bigfoots E2201			
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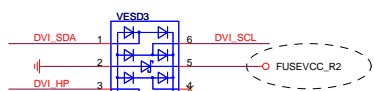
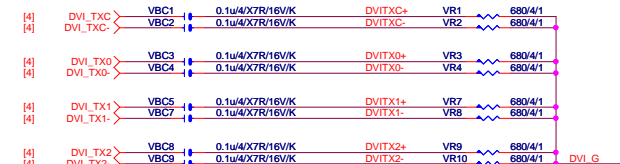


[illegible]

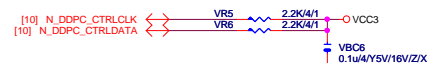
$V_{IN}=5V, V_{OUT}=1.5V, I_{OUT}=25A, PHASE=1$
 $I_{RMS}=11.45A$
 $560\mu F / P / D / 6.3V / 68/8m$ RIPPLE CURRENT=4.7A
 Coefficient=1.7(85°C), 1(105°C)
 V_{IN} Ripple current=4.7X1.7=7.99A(85°C)
 -->故固態電容須 $2 \times 7.99 = 15.98 > 11.45A$
 $R_{ocset} = (I_{ocp} \times L_{gate}, r_{dson}) / I_{ocset}$
 $R_{ocset} = (45A \times 6.7m\Omega) / 10\mu A = 30K$
 $I_{ocset} = 10\mu A$

<i>Gigabyte Technology</i>			
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DDR POWER			
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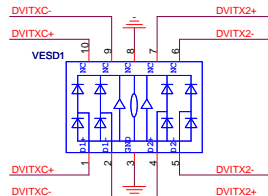
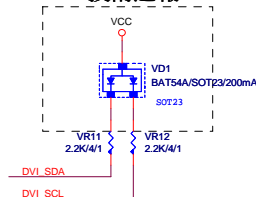
DVI LEVEL SHIFT



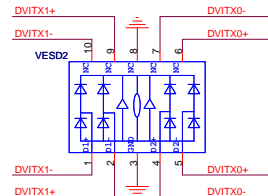
Close to connector



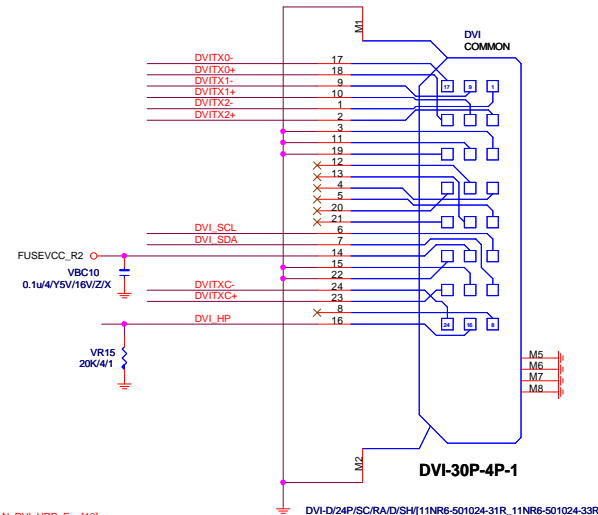
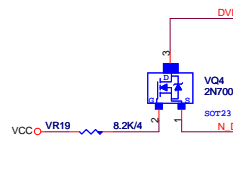
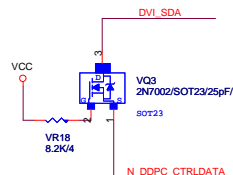
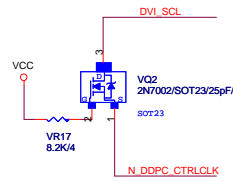
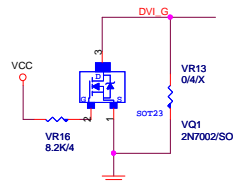
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Close to connector

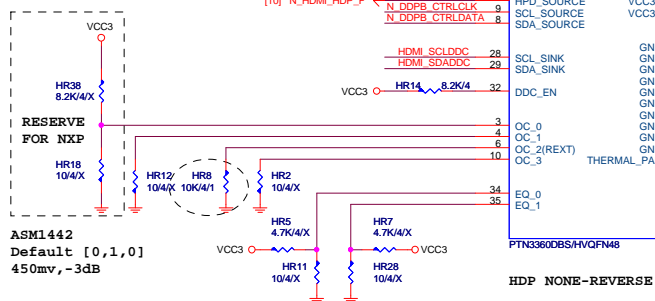
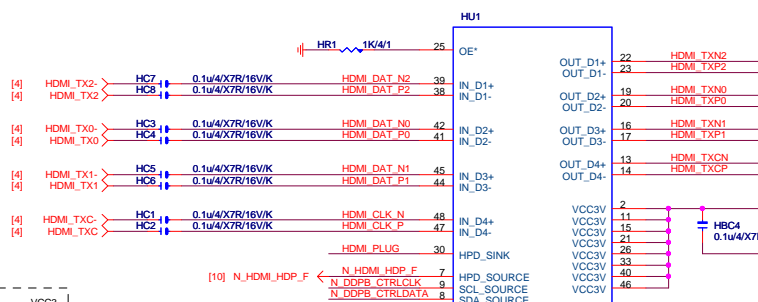


Close to connector



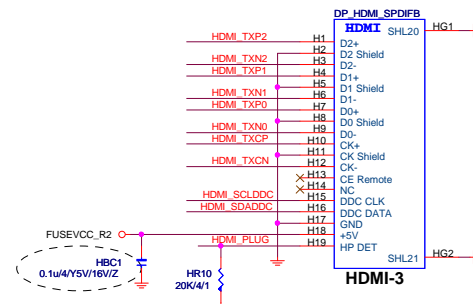
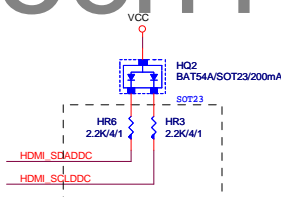
DVI-30P-4P-1

HDMI LEVEL SHIFT



ASMI442 Default [0,0] 3dB
[0,1]6dB

HDP NONE-REVERSE



HDMI-3

DP+HDMI+SPDIF/20P+19P+3P/BK/RA[11NR6-M10042-11R]:: Location DP_HDMI_SPDIF

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Gigabyte Technology

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DVI / HDMI			
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