

Model Name: GA-B85M-PIO-SI Revision 1.0

SHEET

TITLE

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
08	DDR III CHANNEL B
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 SLOT
16	ITE 8620 LPC IO
17	COM,KB MS USB,USB30 20
18	HWM ,FAN CTRL ,OV , -PROCHOT
19	DUAL BIOS
20	FP ,FUSB ,SPK ,SATALED
21	Realtek ALC887-VD2
22	REAR AUDIO JACK
23	REALTEK RTL8111G
24	DISCRETE POWER
25	ATX , CLOCK GEN
26	VCORE ISL95812 1
27	VCORE ISL95812 2

SHEET

TITLE

28	RT8120 DDR POWER
29	DVI , HDMI (Pin Header)

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Gigabyte Technology

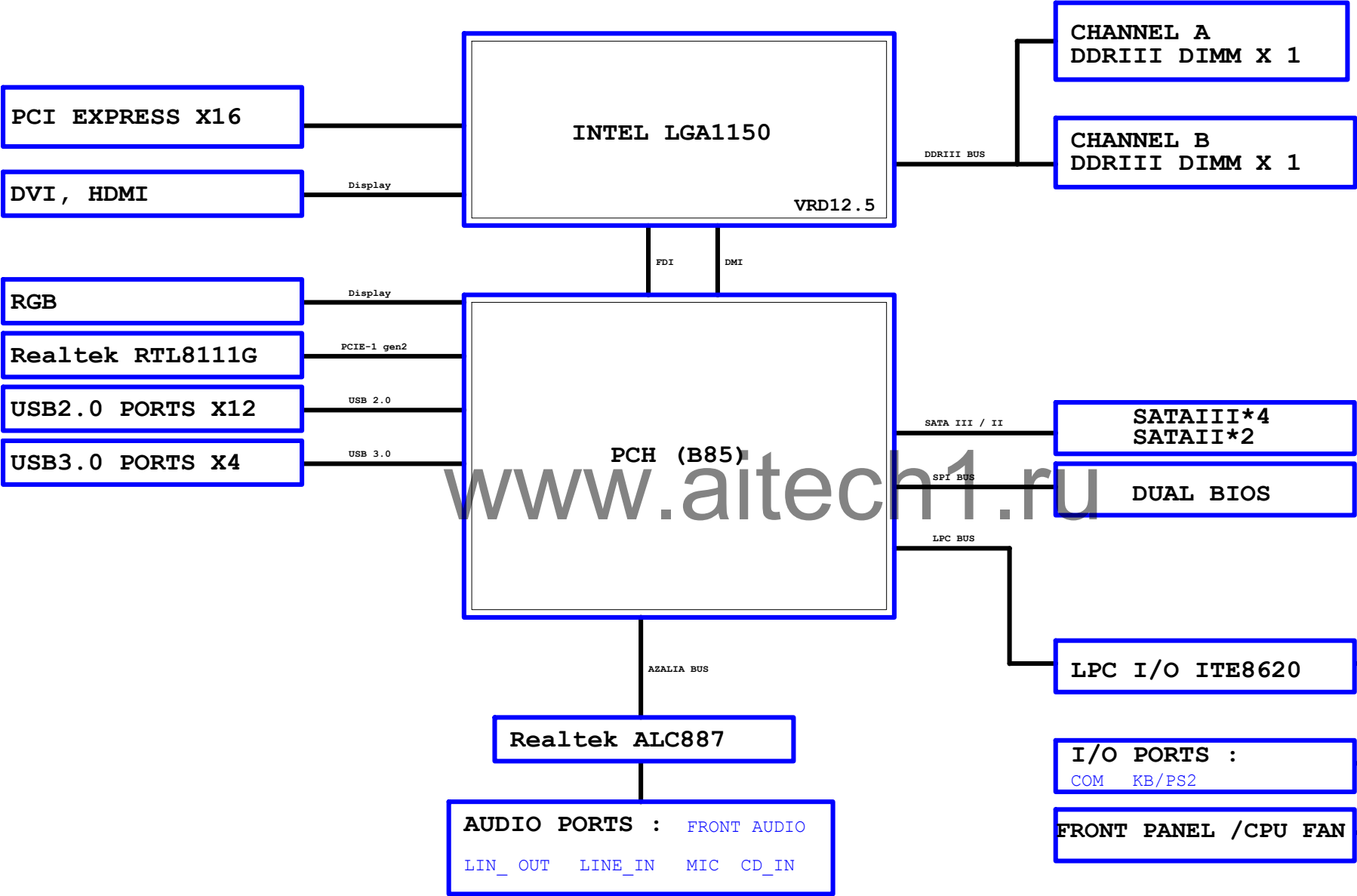
Cover Sheet

Size Custom	Document Number GA-B85M-PIO-SI	Rev 1.0
Date: Thursday, February 12, 2015	Sheet 1 of 29	

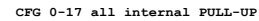
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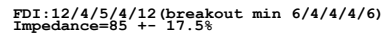
BLOCK DIAGRAM



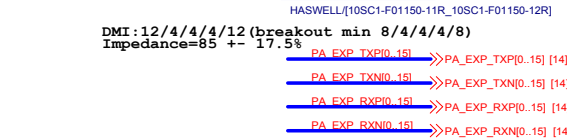
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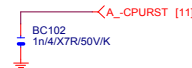


(D)



(C)





1

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	AW17	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	AY10	DDR0_MA13	DDR0_D13
MAAA14	AT20	DDR0_MA14	DDR0_D14
MAAA15	AU21	DDR0_MA15	DDR0_D15
MODT_A0	AW10	DDR0_ODT0	DDR0_D16
MODT_A1	AY3	DDR0_ODT1	DDR0_D17
	AW9	DDR0_ODT2	DDR0_D18
	AW8	DDR0_ODT3	DDR0_D19
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(F, J)



(G, H, I)



(x12)



(x0)

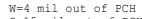
Rev
1



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

PCHB

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



S=15 mil out of PCH



放靠近 Device & PCI-E Slot

Impedance=80 +- 17.5%

```

_PCIEX1:16/5/5/5/16_(breakout_min_8/4/4/4/8)

```

PCHJ



CHIP DH82B85 C2 INTEL/[10HB1-030B85-20R]



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

PCHP



FDI_TXP[0..1] >> FDI_TXP[0..1] [4]

FDI_TXN[0..1] >> FDI_TXN[0..1] [4]

USB3.0:20/5/7/5/20 (breakout min
8/4/4/4/8) ; ONLY 3 VIAS

Impedance=85 \pm 17.5%

Back Panel < 10000 MILS
Front Panel < 6000 MILS

Front Panel < 6000 MILS

Mount for integrated clock Generation Mode



LOW COST ICH7 HEATSINK



BLACK HS

PCH_HS
PCH_HS/[12SP2-030005-51R_12SP2-030005-52R_12SP2-030005-53R]

```
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#	USB_LAN
OC2#	R_USB30
OC3#	N/A
OC4#	F_USB1
OC5#	R_USB
OC6#	F_USB2
OC7#	Not Use

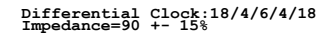
Gigabyte Technology

Title			
PCH FDI,DMI,USB ,PCIE,NVRAM			
Size	Document Number		Rev
Custom	GA-B85M-PIO-SI		1.0
Date:	Thursday, February 12, 2015	Sheet	9 of 29

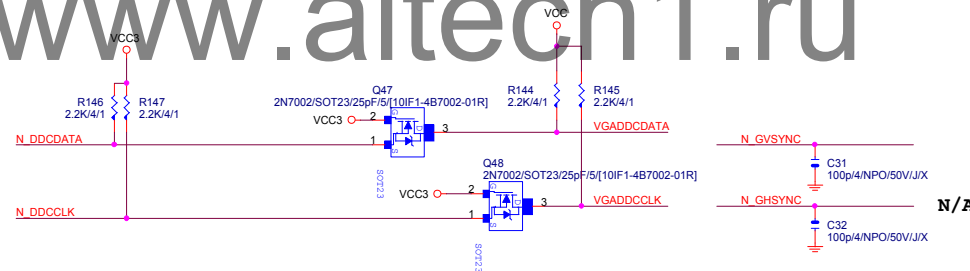
(E)



(G)



NR42 8.2K/4
NR41 8.2K/4



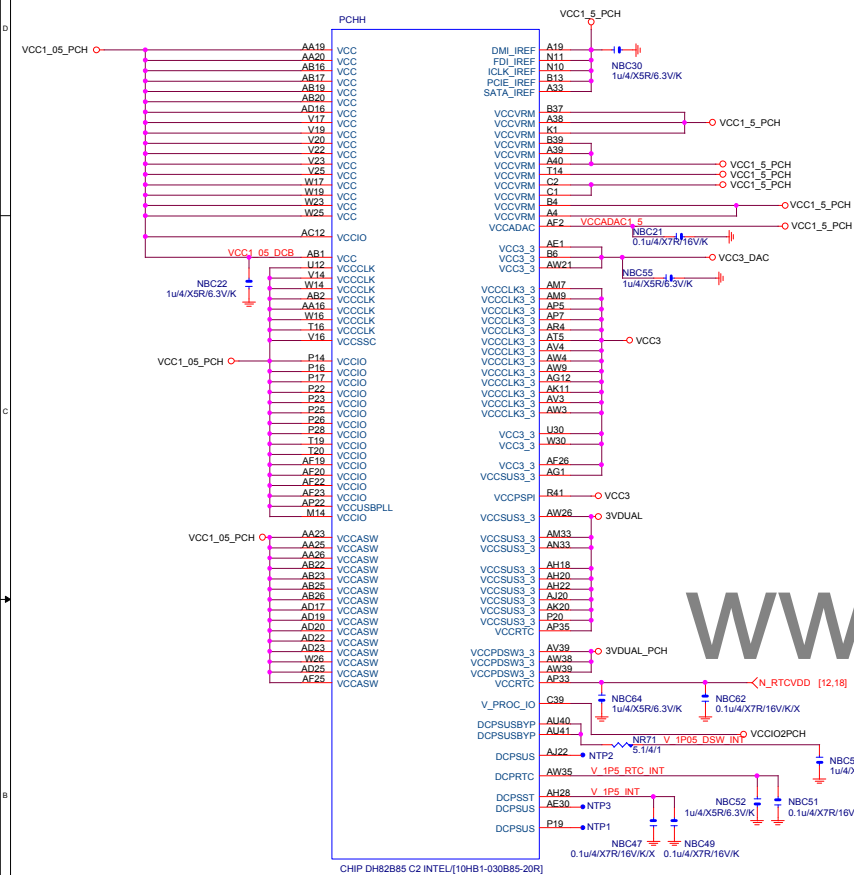
SSOP6 ESD

Close to Filter

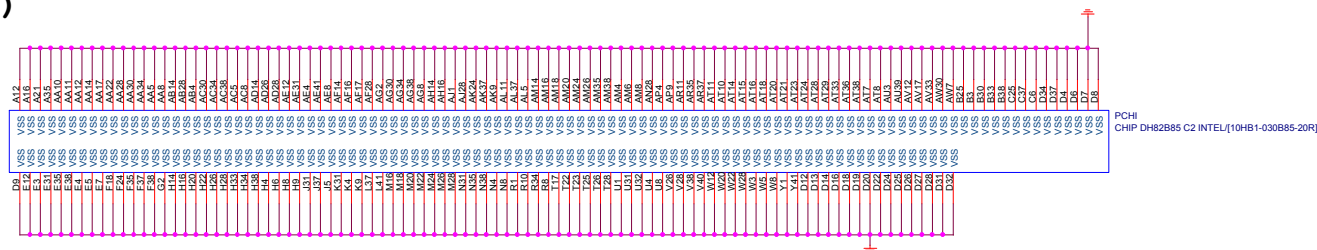
BLACK CONNECTOR

Title			
PCH DISPLAY ,CLK BUFFER			
Size	Document Number		Rev
Custom	GA-B85M-PIO-SI		1.0
Date:	Thursday, February 12, 2015	Sheet	10 of 29

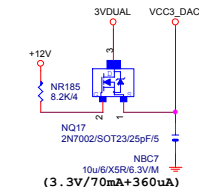
PCH (H)



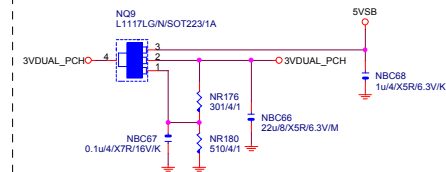
PCH (I)



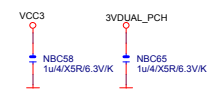
VCC3	DAC
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3VDUAL PCH

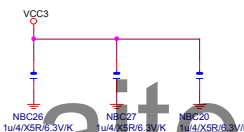


SHT PWR

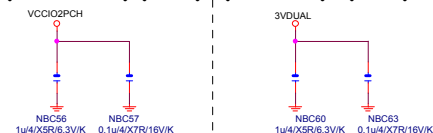


CAP

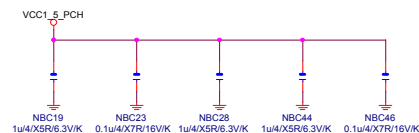
(3.3V) (x3)



(1.05V)(x2) (3.3V) (x2)

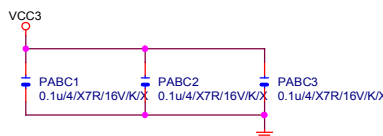


(1.5V) (x5)

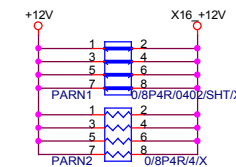


PCIEX16 CAP

N/A



PCIEX16 PROTECT SHT



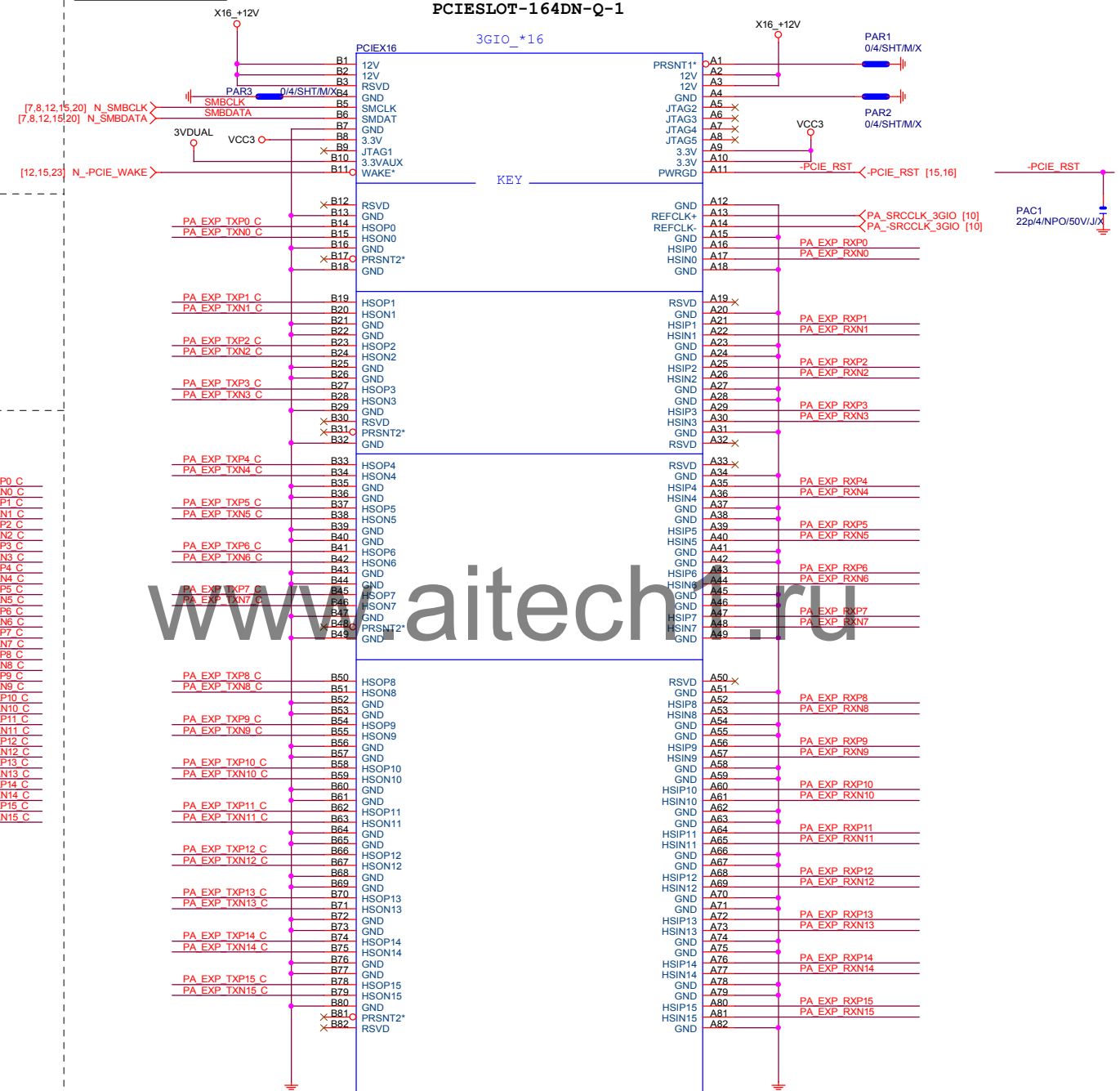
PCIEX16 AC CAP

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

PA EXP RXP0 [15] >>> PA_EXP_RXP[0..15] [4]
 PA EXP RXN0 [15] >>> PA_EXP_RXN[0..15] [4]
 PA EXP TXP0 [15] >>> PA_EXP_TXP[0..15] [4]
 PA EXP TXN0 [15] >>> PA_EXP_TXN[0..15] [4]

PCIEX16 SLOT

PCIESLOT-164DN-Q-1



PCI-E/16X-164P/BK/OL/RA/GF

BLACK CONNECTOR

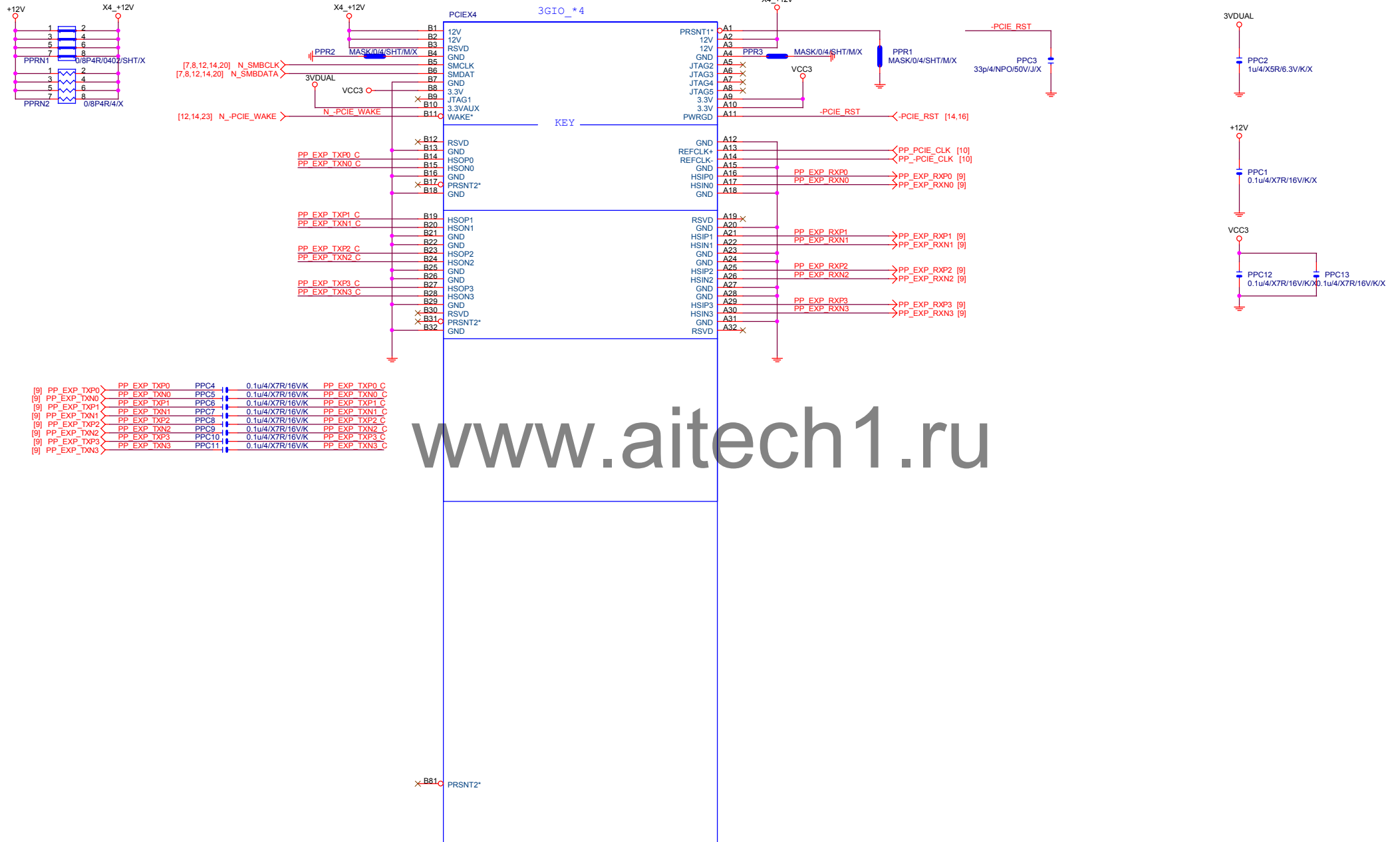
Gigabyte Technology

Title			PCI EXPRESS * 16	
Size			GA-B85M-PIO-SI	
Document Number			Rev 1.0	
Date			Thursday, February 12, 2015	
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PCIEX4 SLOT

PCIESLOT-64D-98D-P

3GIO_*4

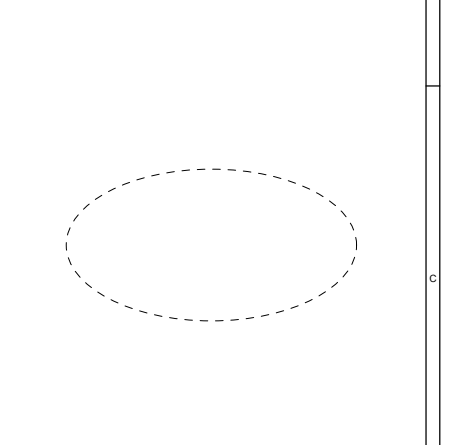
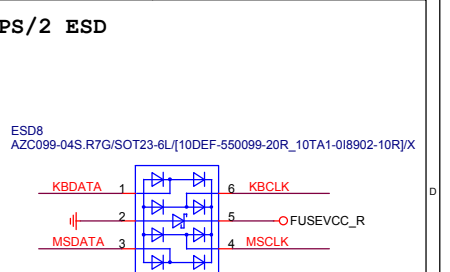
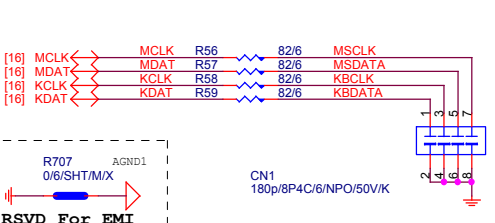
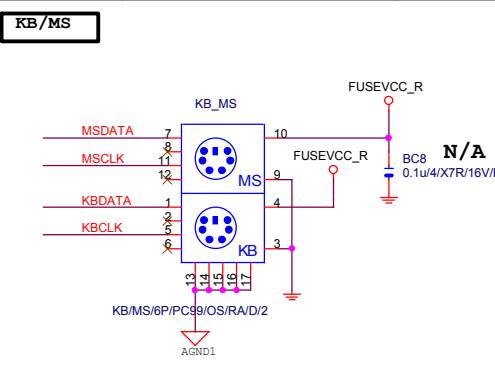
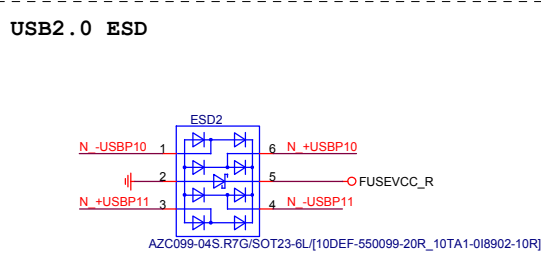
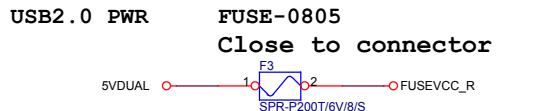
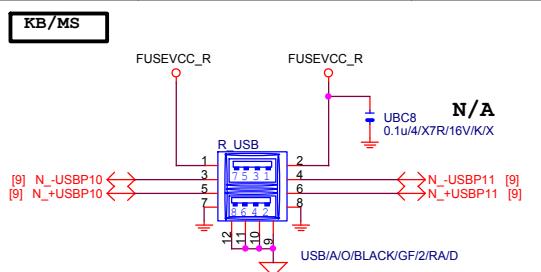
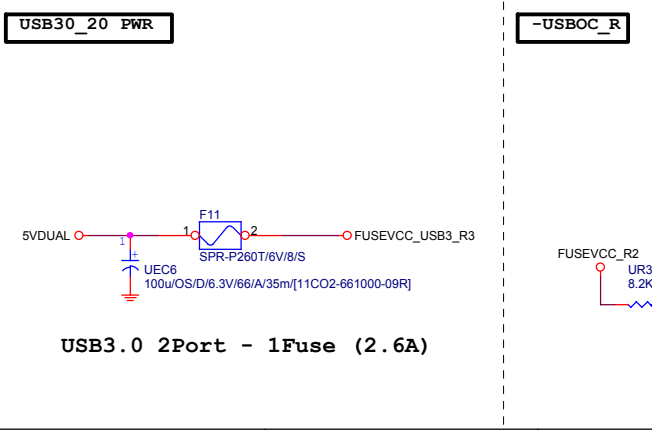
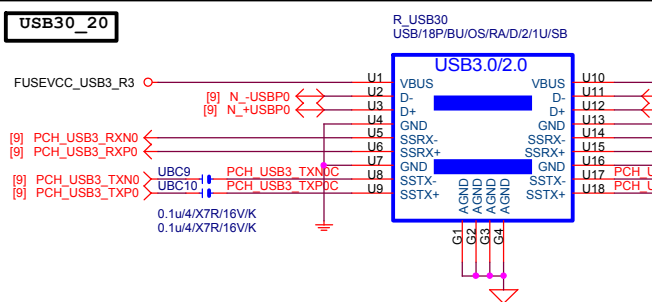
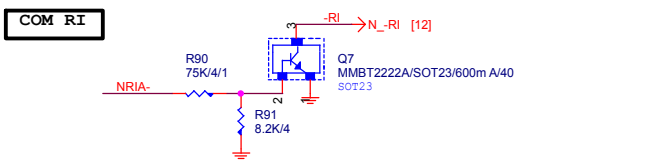
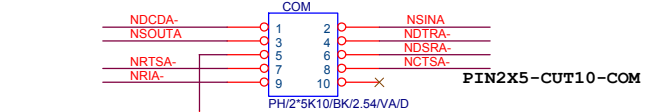
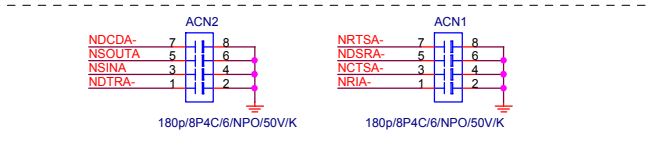
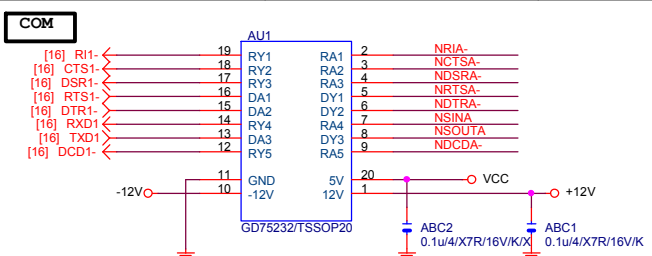


PCI-E/4X-65P/BK/LONG DOUBLE

BLACK CONNECTOR

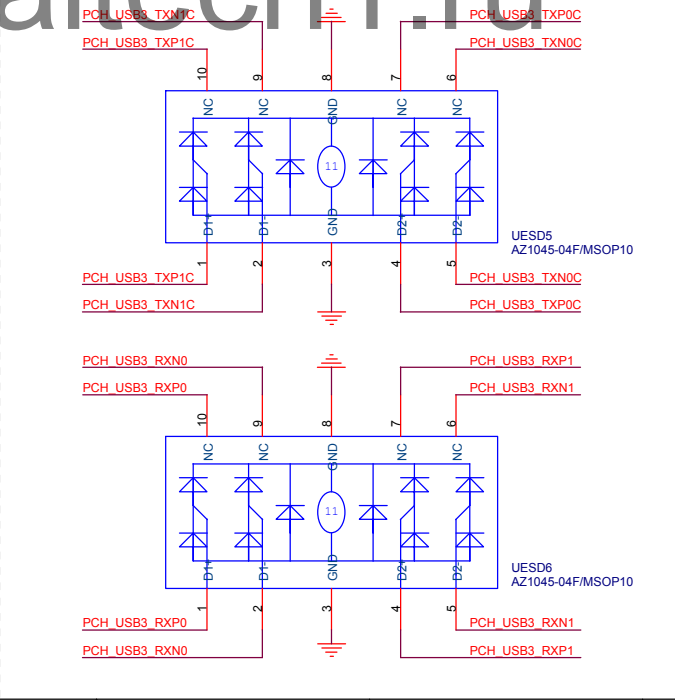
Gigabyte Technology

Title			PCI EXPRESS X 1 PORT		
Size			Document Number		
Custom			GA-B85M-PIO-SI		
Date:			Thursday, February 12, 2015		
Sheet			15 of 29		
Rev			1.0		

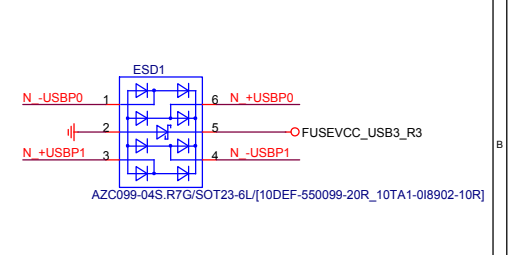


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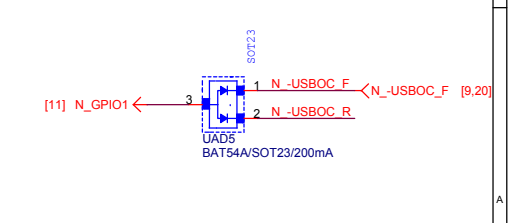
USB3.0 ESD PROTECT



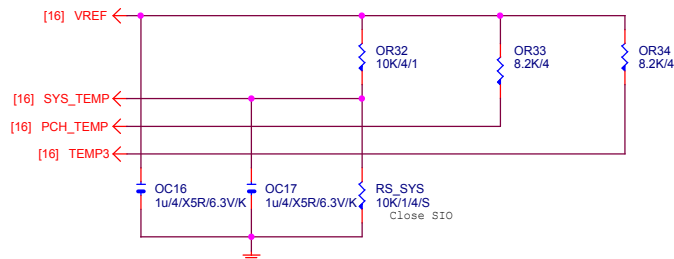
USB2.0 ESD



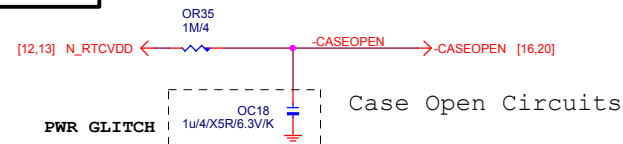
USB POWER PROTECT



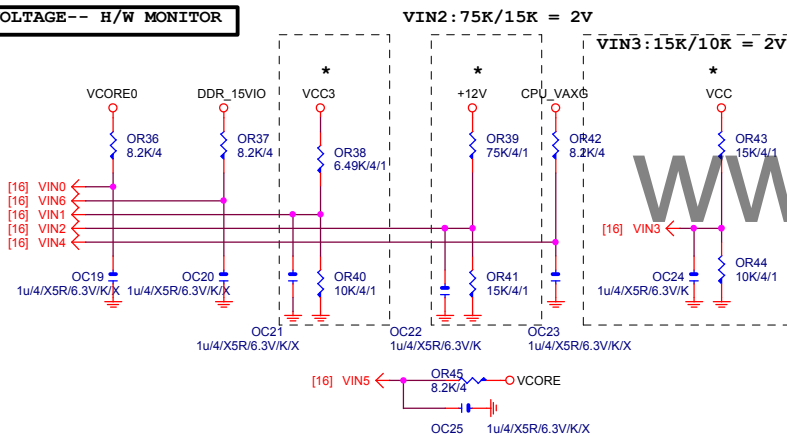
TEMP H/W MONITOR



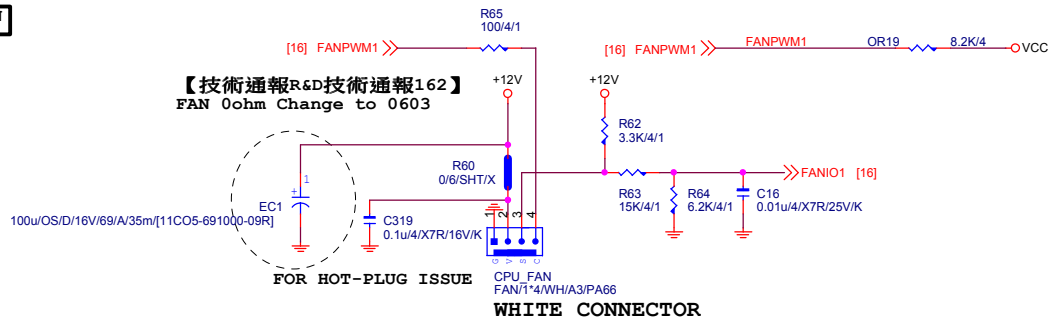
CASE OPEN



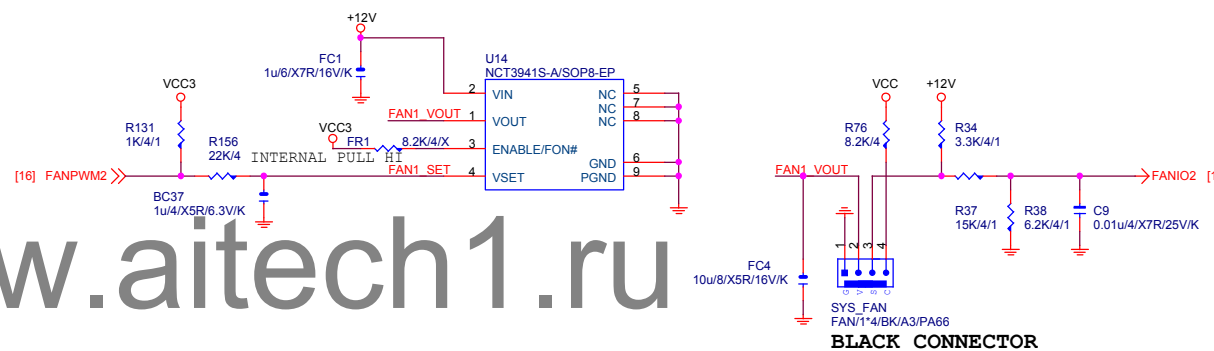
VOLTAGE-- H/W MONITOR



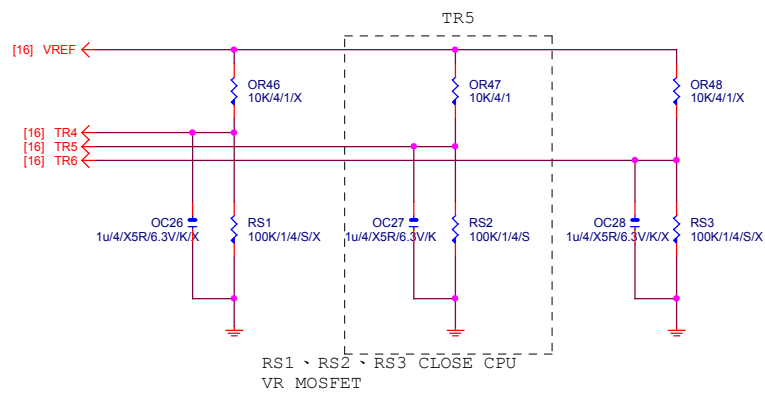
CPU SMART FAN



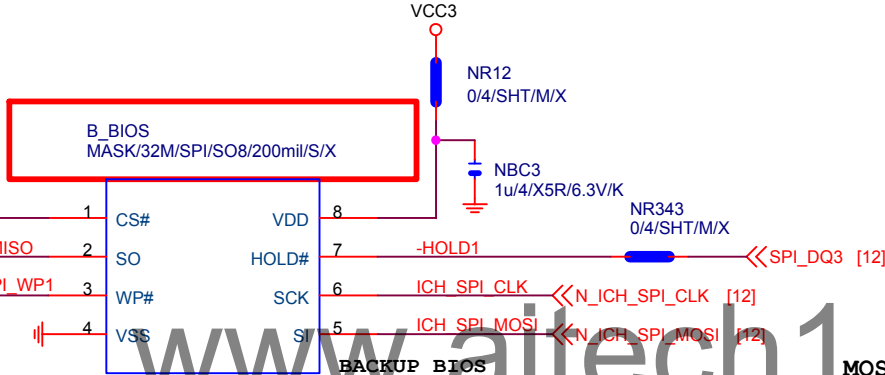
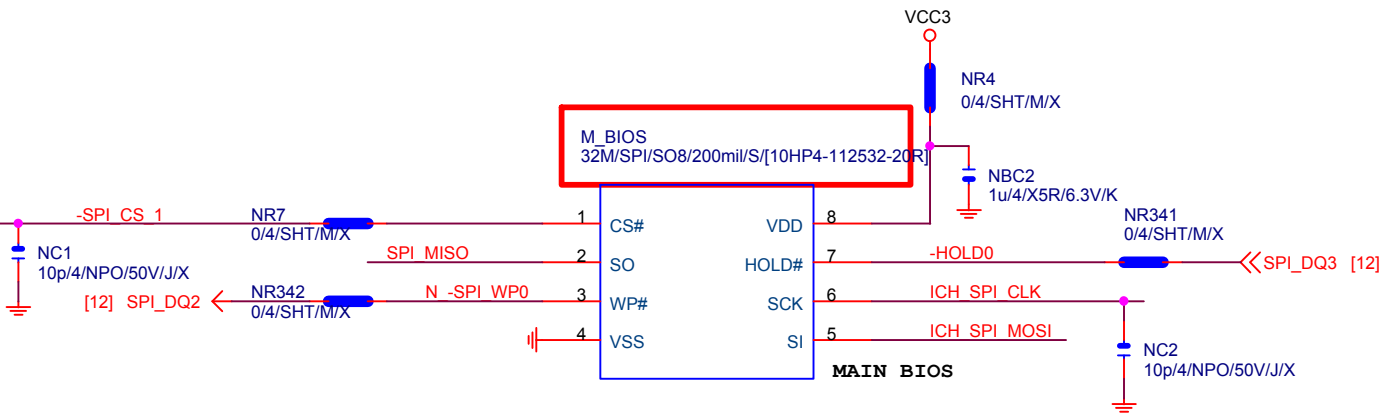
SYS SMART FAN



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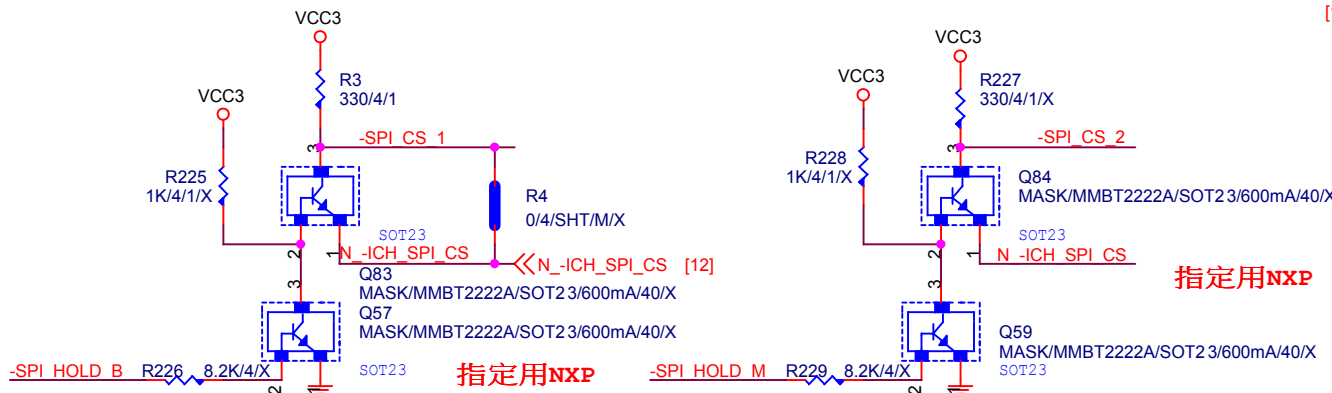
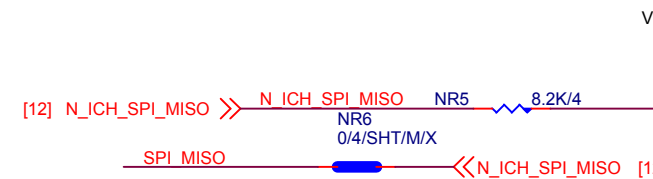
Gigabyte Technology			
Title			
HWM,FAN CTRL,OV			
Size	Document Number	GA-B85M-PIO-SI	
Custom		Rev 1.0	
Date:	Thursday, February 12, 2015	Sheet	18 of 29



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

1 means floating
0 means PD 1K

MOSI For DMI RX Termination Voltage



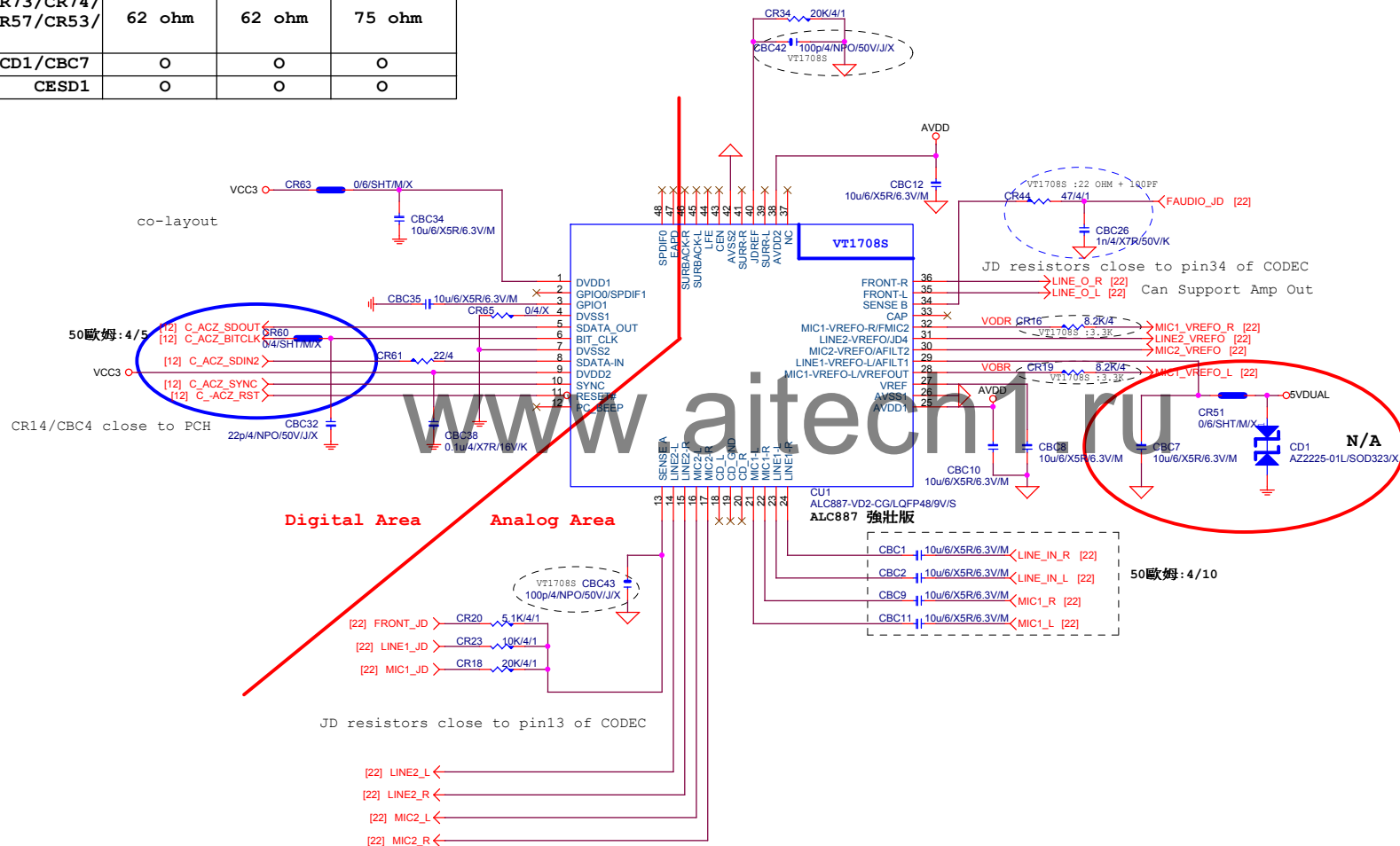
Gigabyte Technology

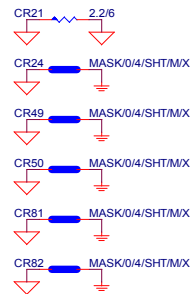
DUAL BIOS

GA-B85M-PIO-SI

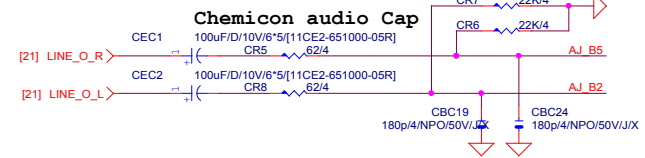
Title	Document Number	Rev
		1.0
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	ALC892	ALC887-VD2	VT1708S-CE
CR44/CBC26	47ohm+1nF	47ohm+1nF	22ohm+100P
CBC42/CBC43	X	X	100P/4
CR6/CR7/CR58/CR54/ CR67/CR68/CR69/CR70	22K/4	22K/4	10K/4/1
CR5/CR8/CR1/CR14/ CR17/CR22/CR73/CR74/ CR13/CR11/CR57/CR53/ CR75/CR76	62 ohm	62 ohm	75 ohm
CR51/CD1/CBC7	O	O	O
CESD1	O	O	O





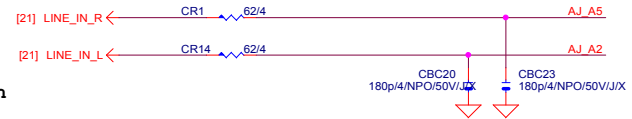
LINE-OUT



LINE-IN

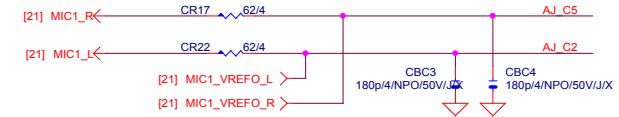
Verify MIC function
in LINE-in

Only reserved for ALC888



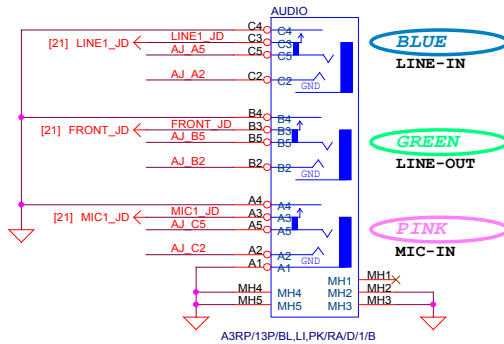
For 889A/888

MIC-IN

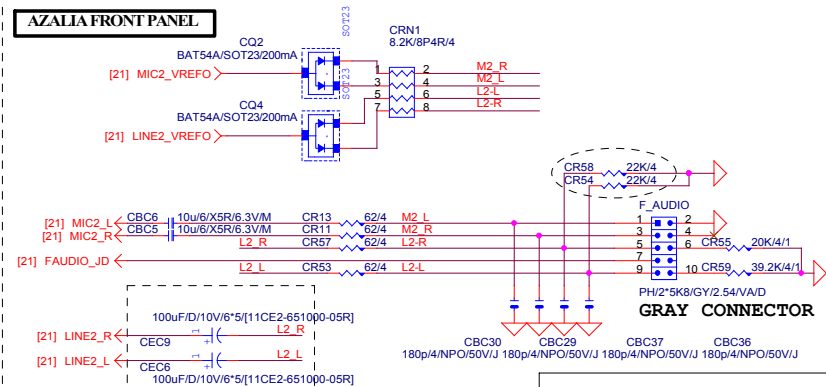


SPDIF_OUT

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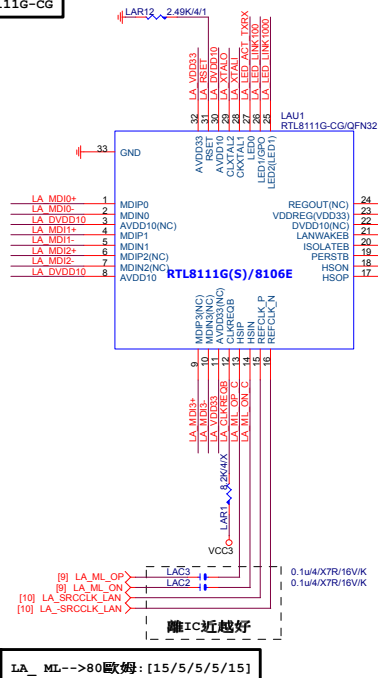
AZALIA FRONT PANEL



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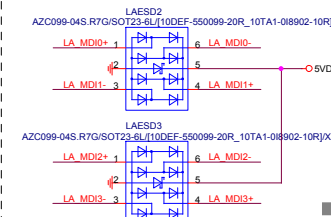
Title			
AUDIO JACK			
Size	Document Number	GA-B85M-PIO-SI	
Custom			Rev 1.0
Date:	Thursday, February 12, 2015	Sheet	22 of 29

LAN RTL8111G-CG

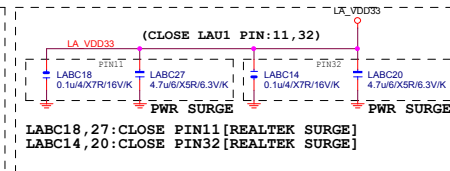
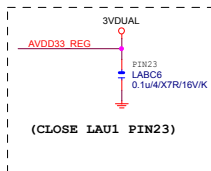
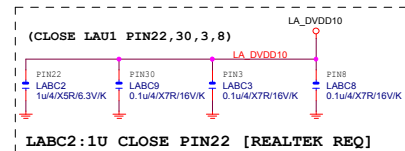


SRCCLK-->50歐姆: [18/4/10/4/18]

MDI ESD預留28KV



LAN POWER

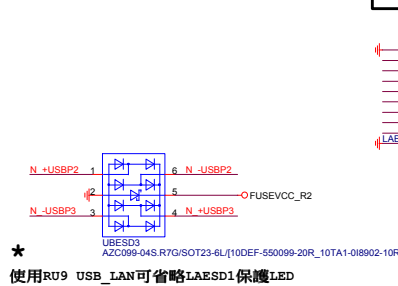


NOTE:
RT8106E: PIN3, 11, 22, 24-->NC
LABC2LABC3, LABC5, LABC18, LABC27-->N/A

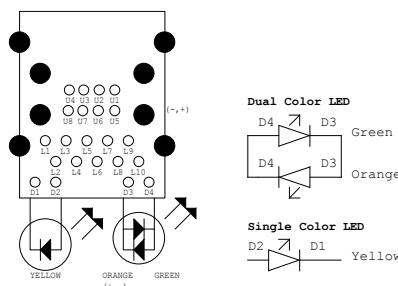
BOM NOTICE

料號 規格 廠商
11NR6-702009-96R 1G LAN (12core) UDE (RU9 ESD+)
[LED獨立走線, 可省略外加AZC099料件LAESD1]
1. 9KV ESD BOM:
USB LAN (RU9): 11NR6-702009-96R
2. 28KV ESD BOM:
USB LAN (RU9): 11NR6-702009-96R
LAESD2, LAESD3: 上件AZC398-04S

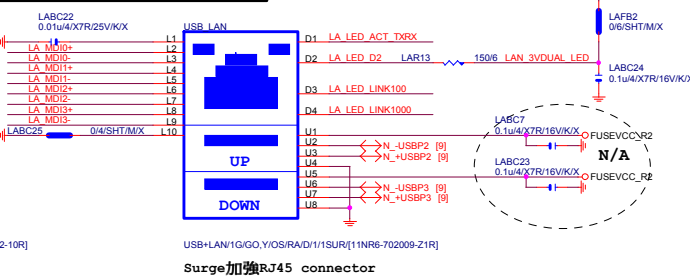
USB LAN CONNECTOR



★
AZC099-04S, R7G/SOT23-6L [10DEF-550099-20R_10TA1-018902-10R]
使用RU9 USB LAN可省略LAESD1保護LED



LA_MDI-->100歐姆: [20/4/8/4/20]



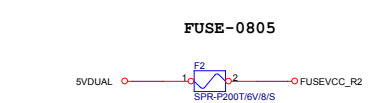
USB+LAN1G/GO, Y/OS/RA/D1/1/SUR [11NR6-702009-21R]
Surge加強RJ45 connector

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

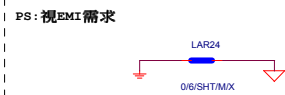
BOM NOTICE

料號 規格 廠商
11NR6-702009-96R 1G LAN (12core) UDE (RU9 ESD+)
[LED獨立走線, 可省略外加AZC099料件LAESD1]
1. 9KV ESD BOM:
USB LAN (RU9): 11NR6-702009-96R
2. 28KV ESD BOM:
USB LAN (RU9): 11NR6-702009-96R
LAESD2, LAESD3: 上件AZC398-04S

USB X3 POWER

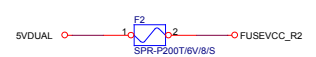


EMI SHORT PAD



PS: 視EMI需求

FUSE-0805



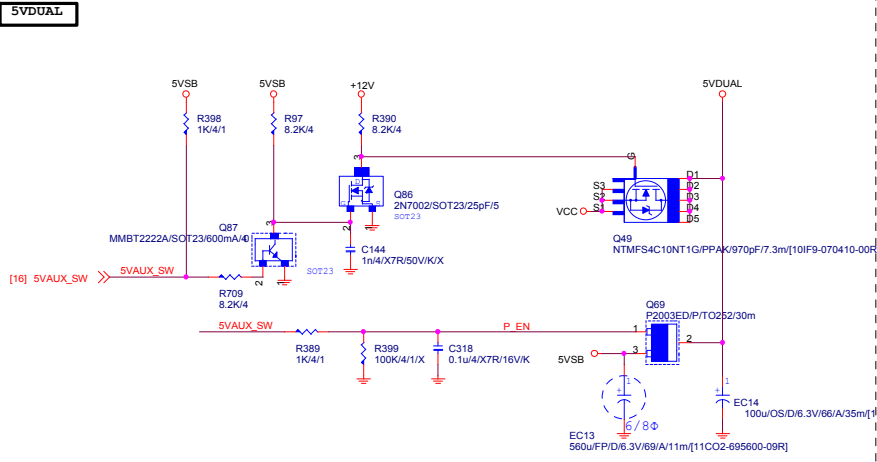
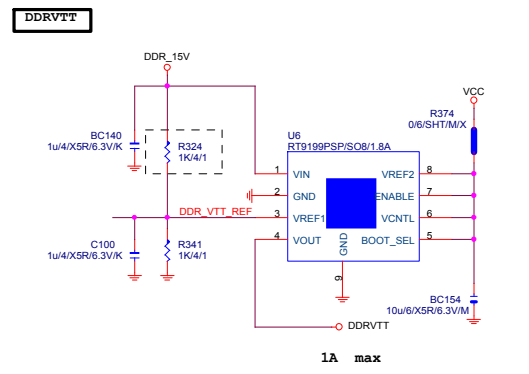
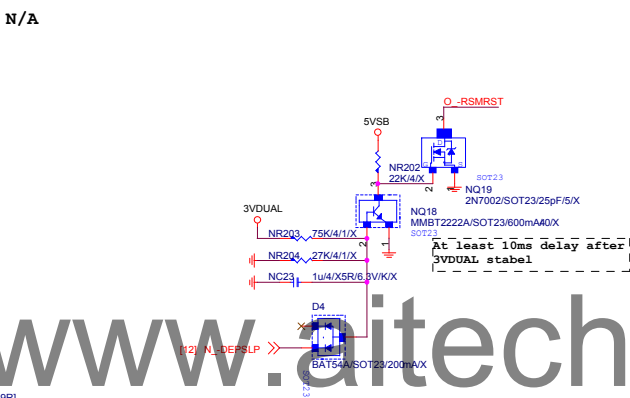
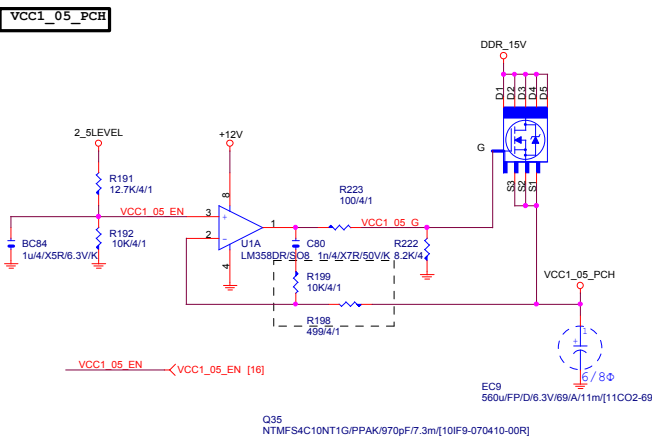
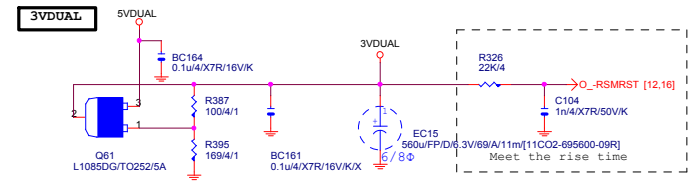
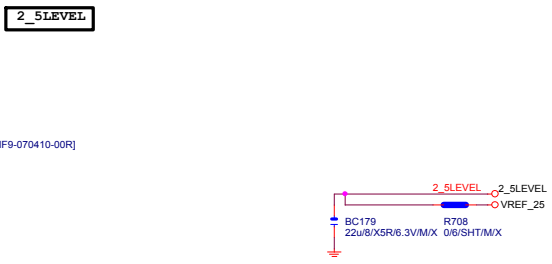
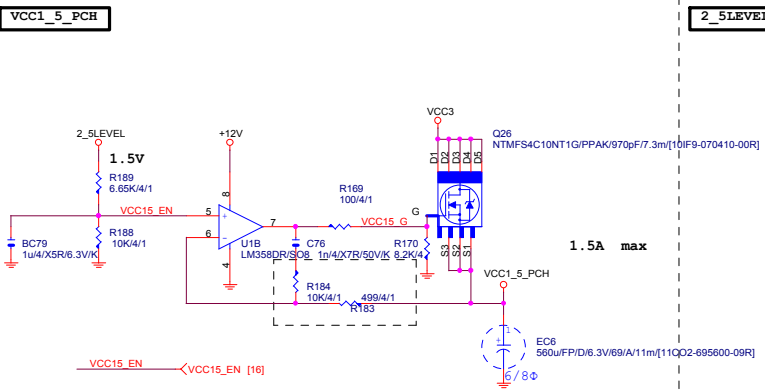
Gigabyte Technology

Realtek RTL8111G

GA-B85M-PIO-SI

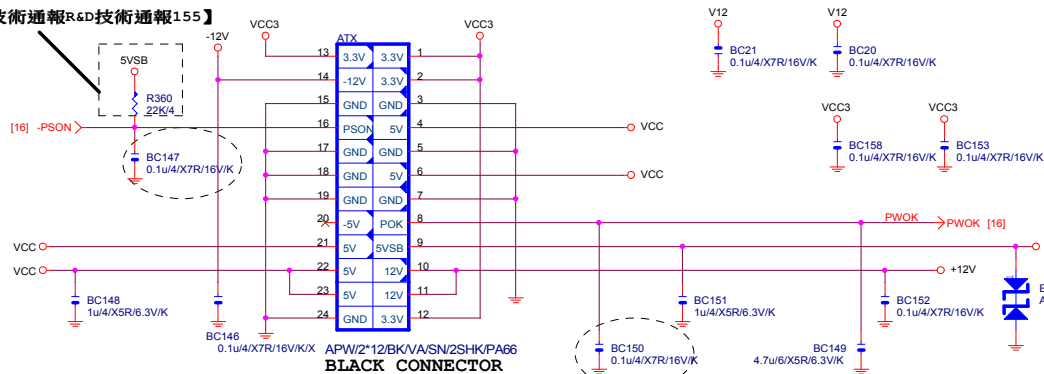
Rev 1.0

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ATXX24 POWER CONNECTOR

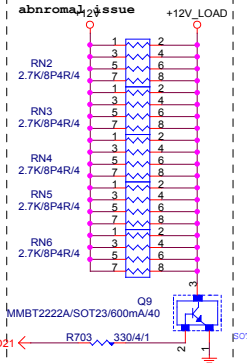
【技術通報R&D技術通報155】



BLACK CONNECTOR

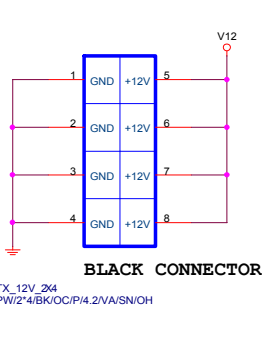
【技術通報R&D技術通報153】

To fix 12V light load abnormal issue



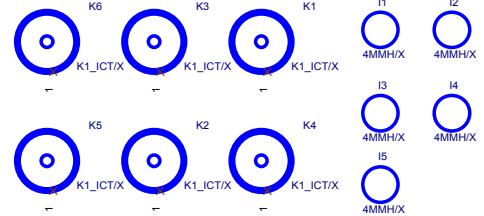
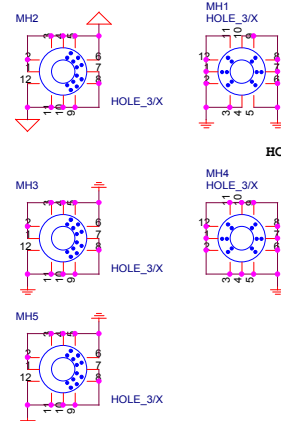
ATXX4 POWER CONNECTOR

【技術通報R&D技術通報154】



BLACK CONNECTOR

ATX_12V_24
APW/2'4/BK/OC/PI/4.2VA/SN/OH



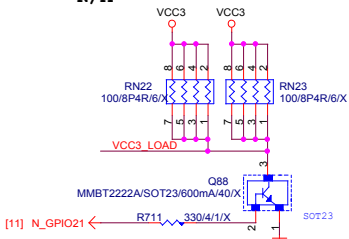
To prevent the 5VSB under loading when boot

TPM

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FIX PWR MINMUN LOAD

N/A



PWOK PATCH

【技術通報R&D技術通報154】

Gigabyte Technology

ATX CONNECTOR

GA-B85M-PIO-SI

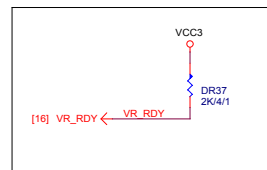
Rev 1.0

Date: Thursday, February 12, 2015 Sheet 25 of 29

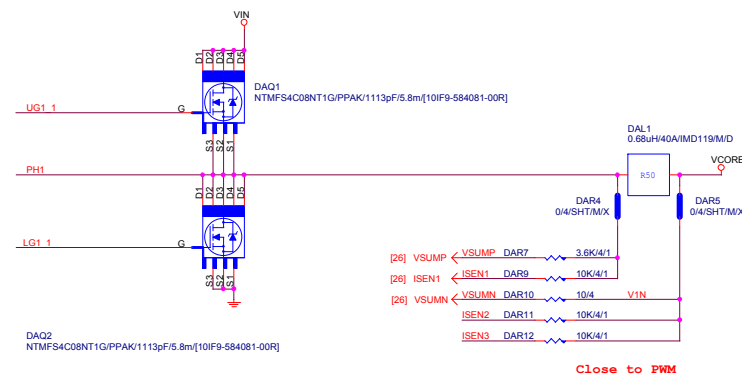
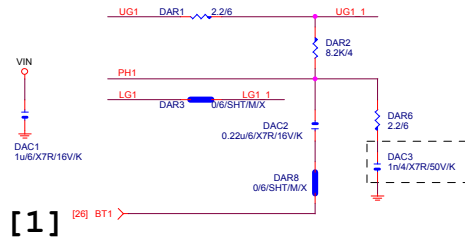
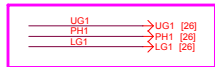
R_PROG1 (Kohm)	3-Phase Iccmax (A)
24.9	105
28.7	114
34.0	129
42.2	144

R_PROG2 (Kohm)	Fsw (KHz)	VBOOT
64.9	315	1.75
73.2	315	1.70
80.6	315	1.65
90.9	315	0

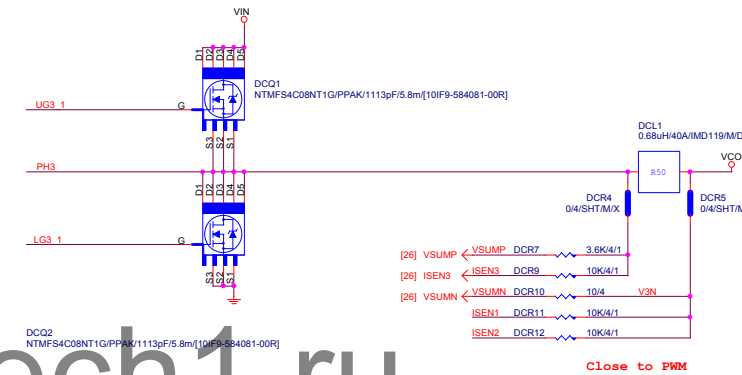
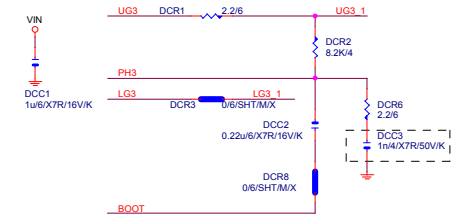
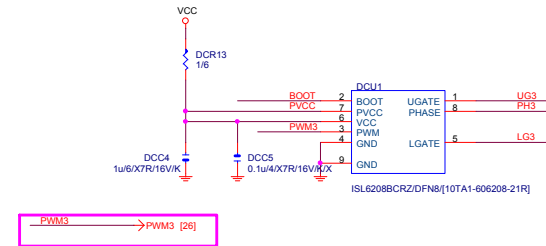
R_PROG3 (Kohm)	Fast Slew Rate (mV/us)
3.24	12
5.76	24
9.31	40
13.3	45



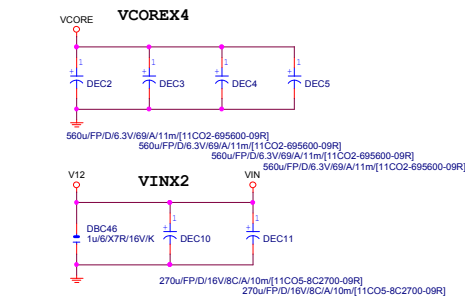
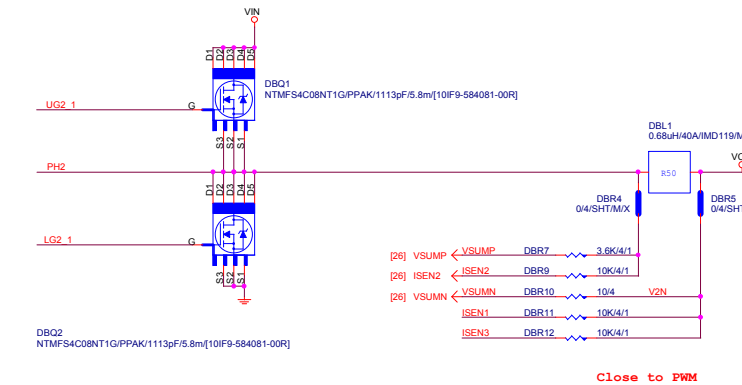
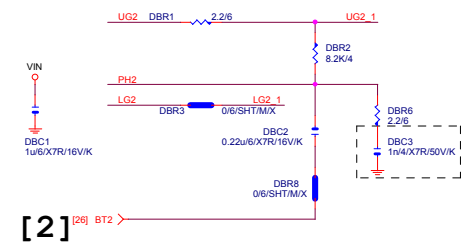
PHASE 1



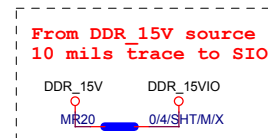
PHASE 3



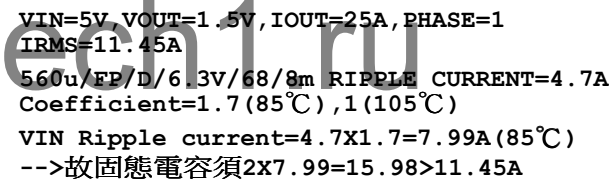
PHASE 2



Gigabyte Technology			
Title		CPU CORE VR-2	
Size		Document Number	
Custom		GA-B85M-PIO-SI	
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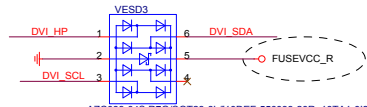
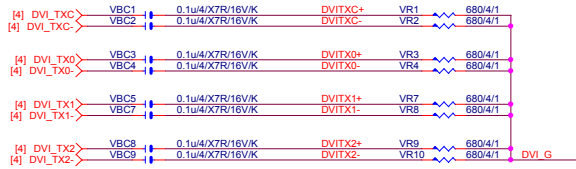


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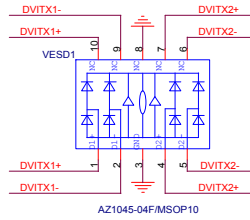
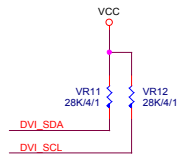
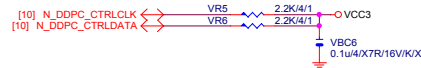


$$\begin{aligned} \text{Rocset} &= (\text{Iocp} * \text{Lgate}, \text{rdson}) / \text{Iocset} \\ \text{Rocset} &= (45\text{A} * 6.7\text{mOhm}) / 10\text{uA} = 30\text{K} \\ \text{Iocset} &= 10\text{uA} \end{aligned}$$

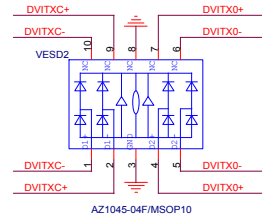
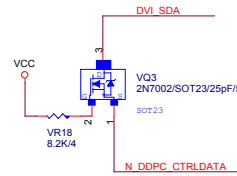
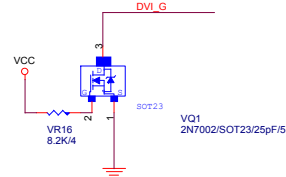
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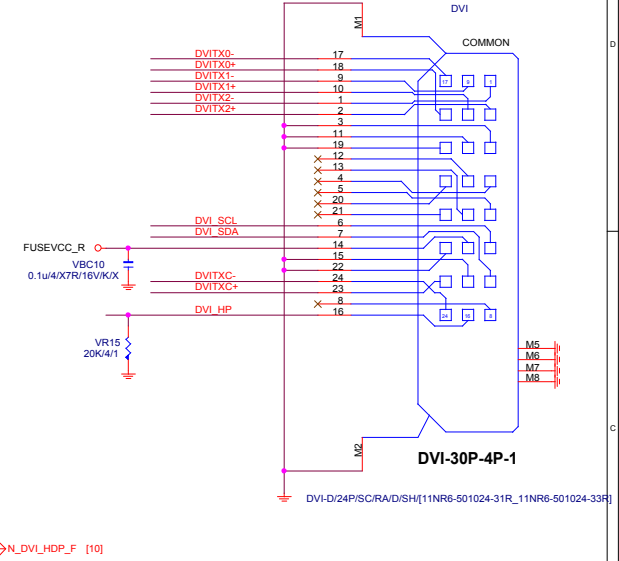
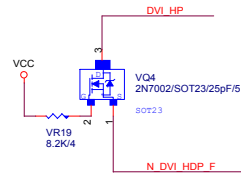
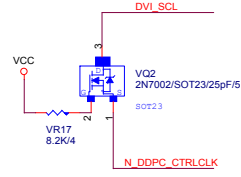
Close to connector



Close to connector

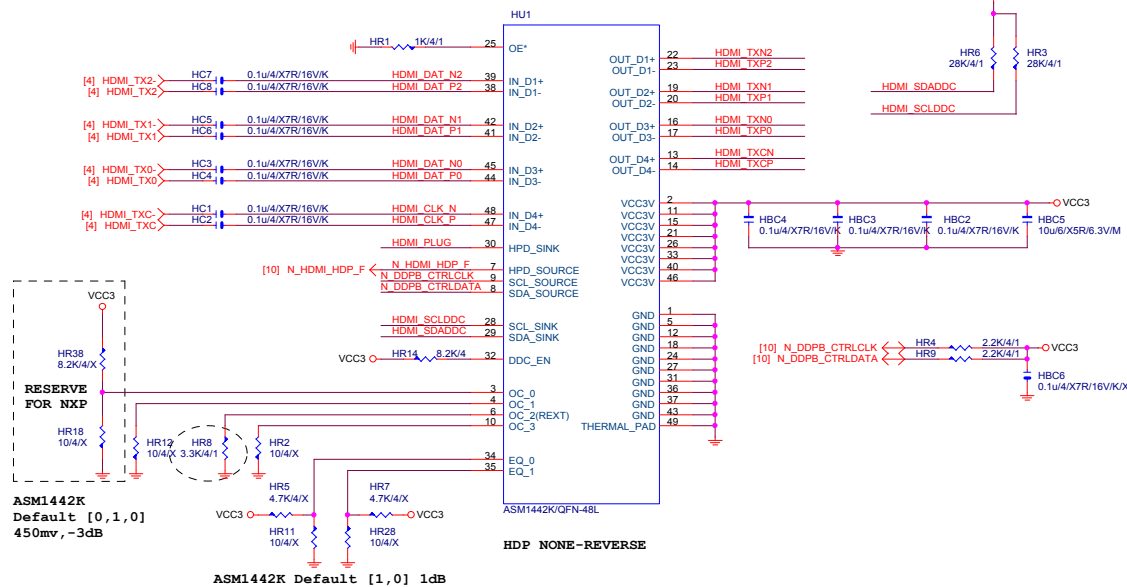


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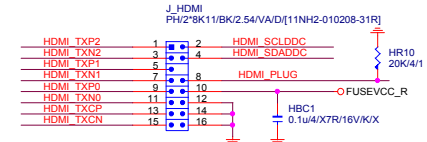


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