

Model Name: GA-H81M-DS2

Revision
3.0

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 X1 *2 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	LPT

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Gigabyte Technology			
Cover Sheet			
Size Custom	Document Number	GA-H81M-DS2	Rev 3.0
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Revision
3.0

Component value change history

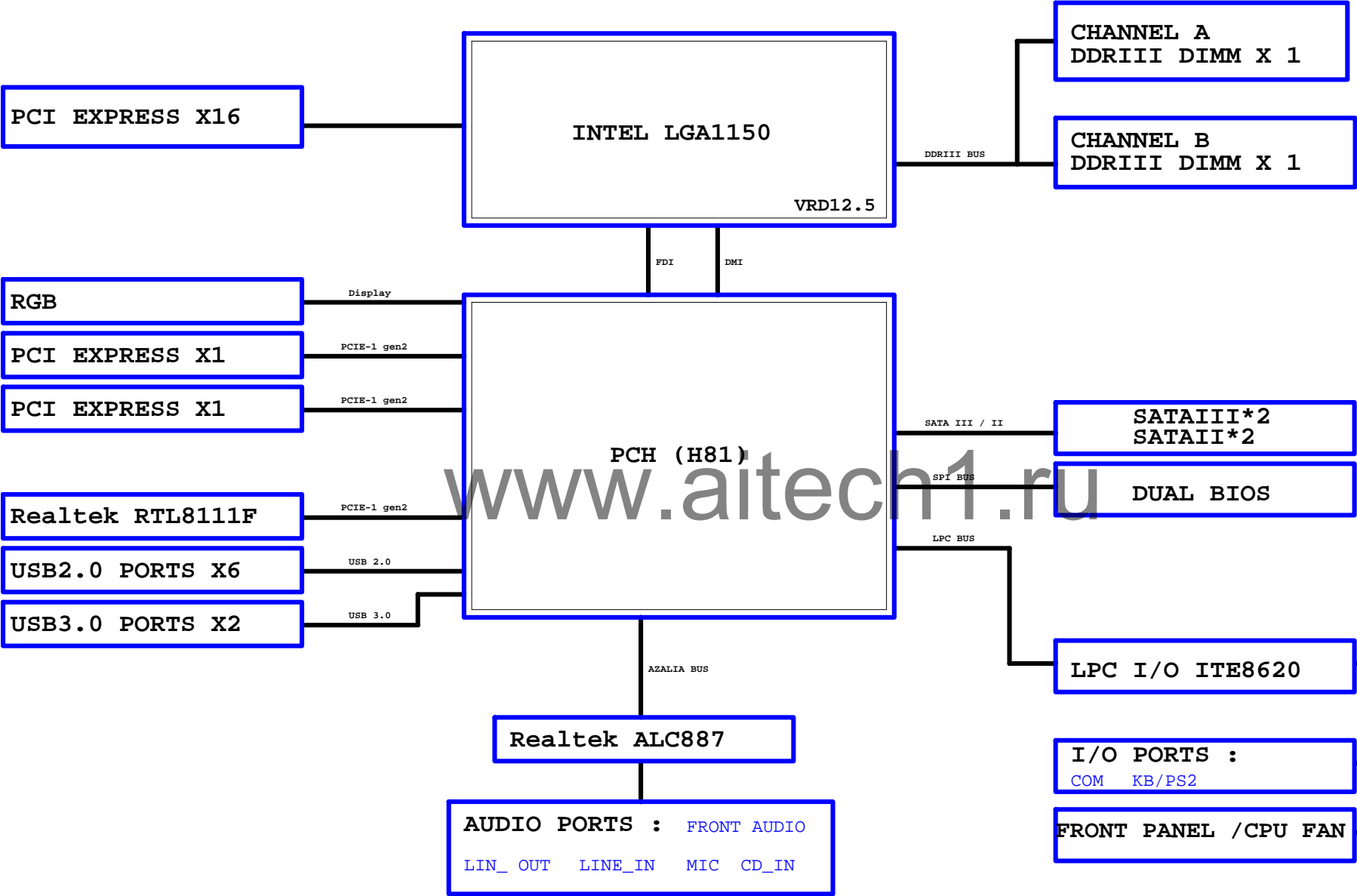
2013/06/27

[illegible]

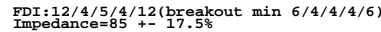
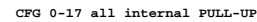
Circuit or PCB layout change

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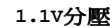
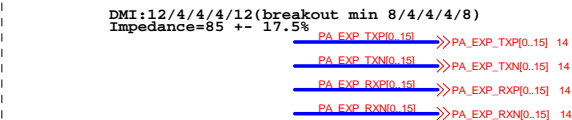
BLOCK DIAGRAM



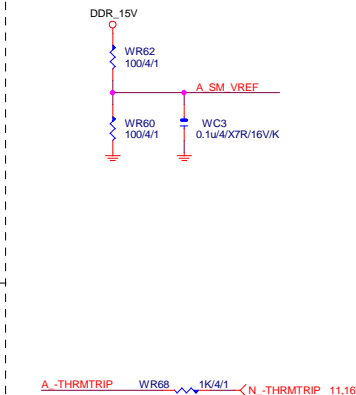
LGA1150 (D)



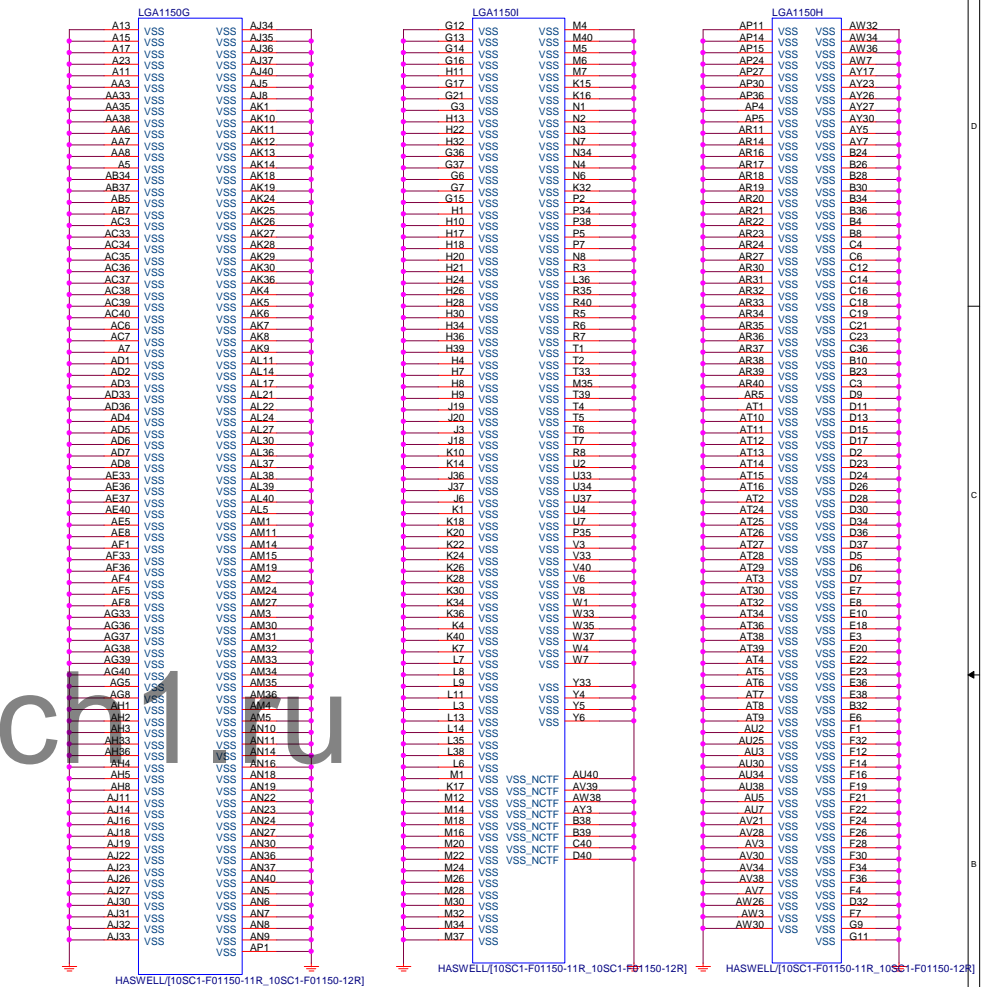
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SM	REF
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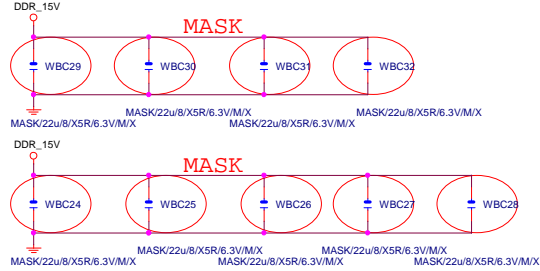


LGA1155 (G,H,I)



DDR CAP

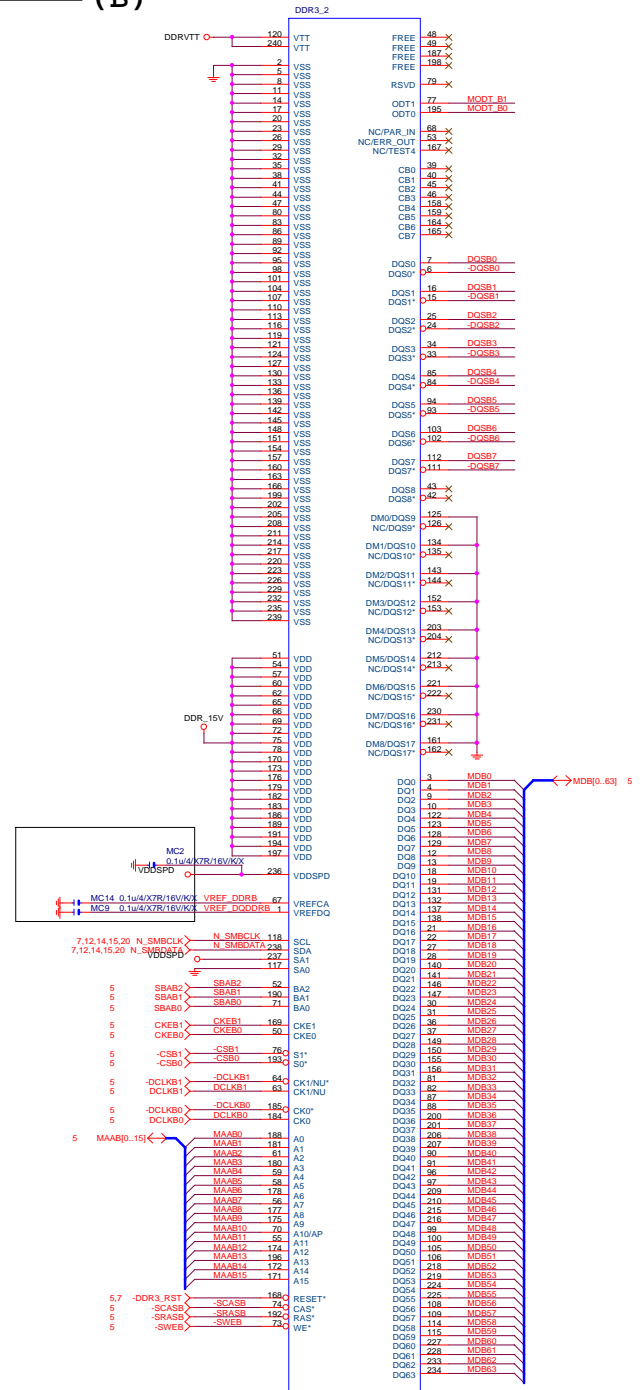
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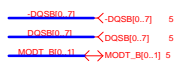
Title			
CPU LGA1150-C			
Size	Document Number	Rev	
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DDR3

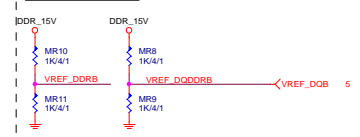
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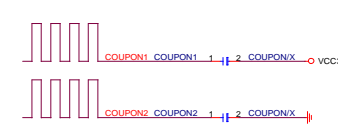
DDR3/240/BK/VA/D
BLACK CONNECTOR



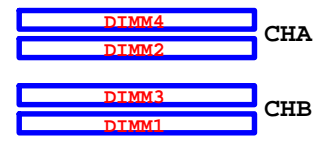
DDR3 VREF



COUPON



CPU



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

VCC1_5_PCH — NR50 — 7.5K/4/1 — DMI_COMP B19
 NR40 — 7.5K/4/1 — PCIE_COMP C13 — DMI_RCOMP
 10 CK_SRCCLK_PCH } CK_SRCCLK_PCH — G22 — DMI_RCOMP
 10 CK_SRCCLK_PCH } CK_SRCCLK_PCH — F22 — CLKIN_DMI_N
 CK_SRCCLK_PCH — F22 — CLKIN_DMI_P

□

1

PCIEX1:16/5/5/5/16 (breakout min 8/4/4/4/8)

PCHJ

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

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

```

N -USBP0          N -USBP0  17
N -USBP0          N -USBP0  17
N -USBP1          N -USBP1  17
N -USBP1          N -USBP1  17
N -USBP2          N -USBP2  23
N -USBP2          N -USBP2  23
N -USBP3          N -USBP3  23
N -USBP3          N -USBP3  23
N +USBP3          N +USBP3  23

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

N -USBP8          N -USBP8  20
N +USBP8          N +USBP8  20
N -USBP9          N -USBP9  20
N +USBP9          N +USBP9  20
N -USBP10         N -USBP10 20
N +USBP10         N +USBP10 20
N -USBP11         N -USBP11 20
N +USBP11         N +USBP11 20

```

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

OC0B_GP59 AE40

OC1B_GP40 AF37

OC2B_GP41 AD39

OC3B_GP42 AD40

OC4B_GP43 AF39

OCSB_GP9 AC41

OC6B_GP10 AF40

OC7B_GP14 AG40

N_USBOC_R 17

N_GPIO14

N_USBOC_F 20

W=4 mil out of PCH
S=15 mil out of PCH

21

PCHF	
USB3	FDILINK

17	PCH_USB3_RXN0	F20	USB3_RXN_0	FDI_RXN_0
17	PCH_USB3_RXP0	G20	USB3_RXP_0	FDI_RXP_0
17	PCH_USB3_TXN0	B18	USB3_TXN_0	FDI_RXN_1
17	PCH_USB3_TXP0	C18	USB3_TXP_0	FDI_RXP_1
17	PCH_USB3_RXN1	G18	USB3_RXN_1	FDI_CSYNC
17	PCH_USB3_RXP1	H18	USB3_RXP_1	
17	PCH_USB3_TXN1	B15	USB3_TXN_1	FDI_INT
17	PCH_USB3_TXP1	B16	USB3_TXP_1	

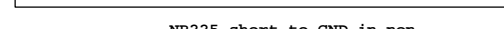
BD82B81/S/10HB1-030H81-10R

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

EDI TYNIO 11

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

Impedance=85 +/- 17.5%
Back Panel < 10000 MILS
Front Panel < 6000 MILS



NR225 short to GND in non
graphic SKU

PCHJ

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

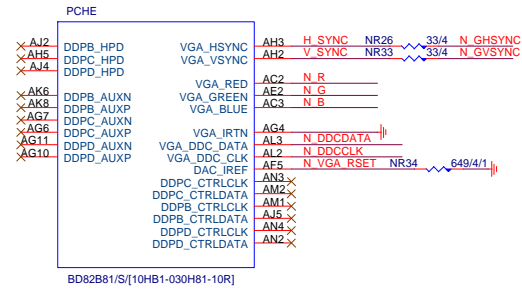
OC[7:4]# for Device 26 (ports 8-13)

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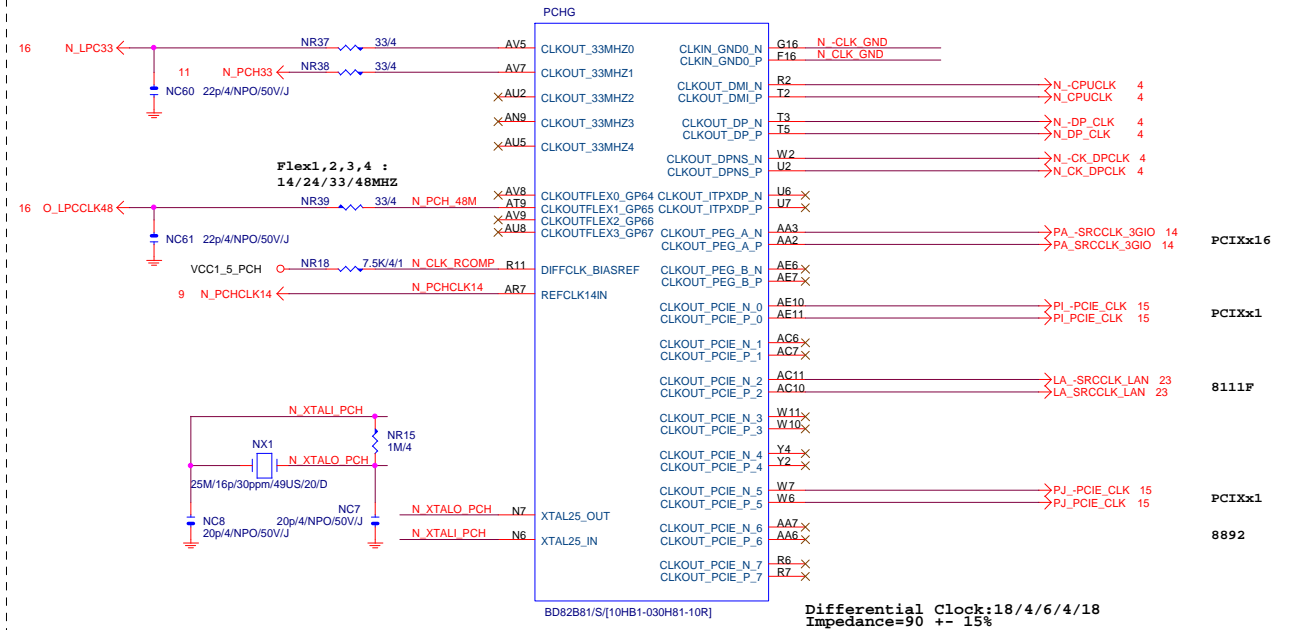
PCI EDI DMI USB PCIe NVRAM

Title			
PCH FDI,DMI,USB ,PCIE,NVRAM			
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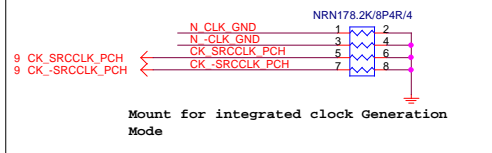
PCH (E)



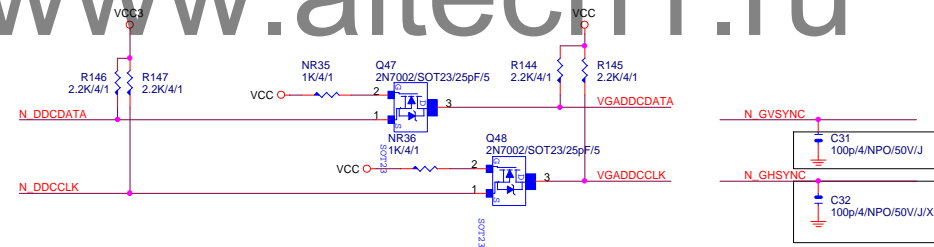
PCH (G)



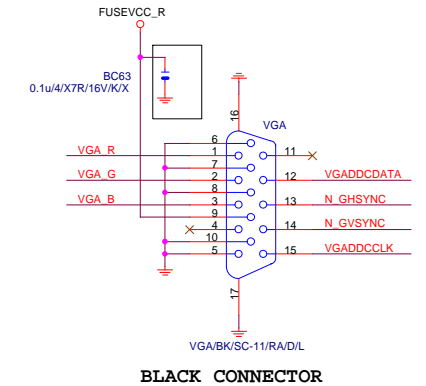
PCH CLK PD



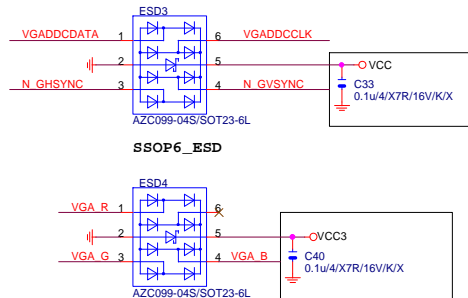
VGA DDC



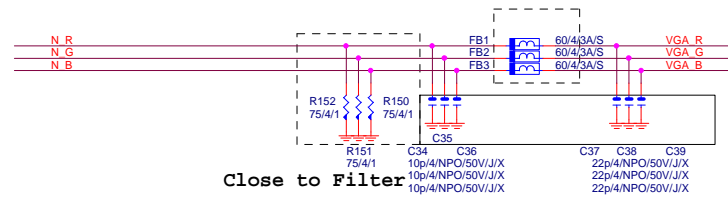
VGA CONNECTOR



VGA ESD



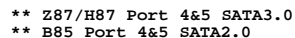
VGA DDC



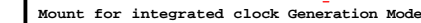
(C)



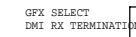
SATA CONNECTOR



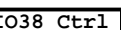
(A)



PCH	PU/PD
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ME PWROK



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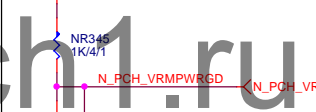
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Custom									
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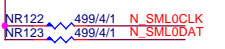
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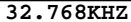
ACZ_SDOU



PCH	PU/PD
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HSW_STRAP13



CLR_CMOS

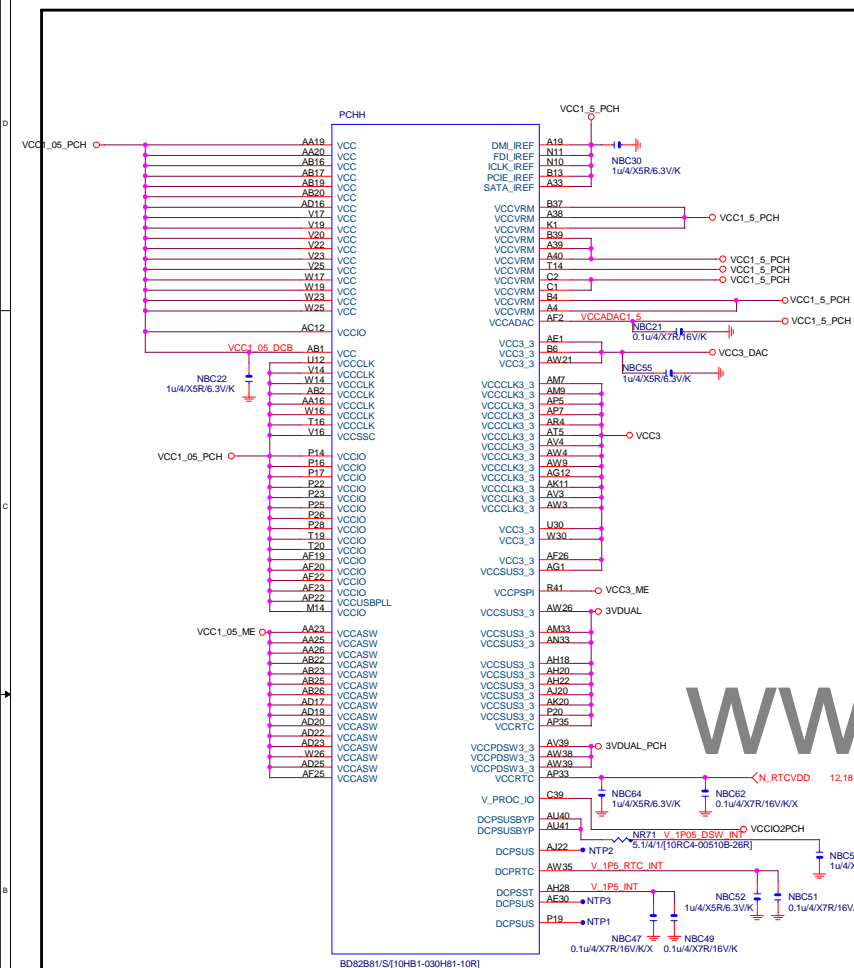


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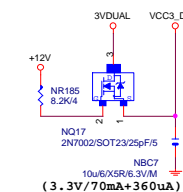
PCH GPIO , CTRL , AUDIO

GA-H81M-DS2

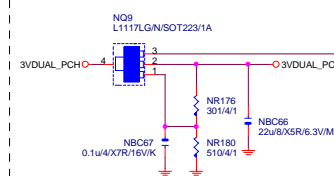
PCH (H)



VCC3_DAC



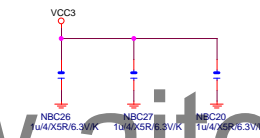
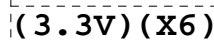
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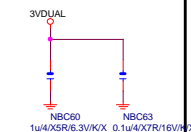
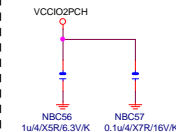
SHT PWR



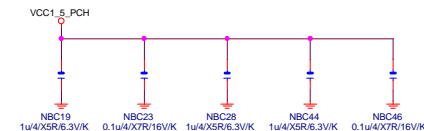
CAP



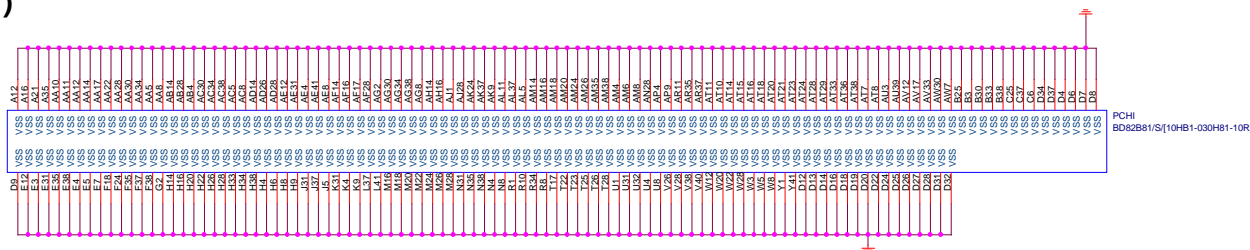
$(1.05V)(x2) + (3.3V)(x2)$



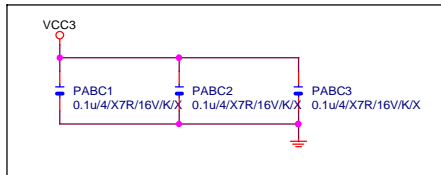
(1.05V) (x10)



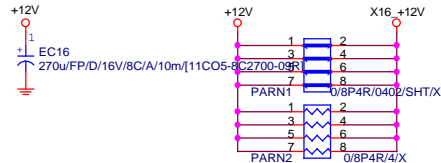
PCH (I)



PCIEX16 CAP



PCIEX16 PROTECT SHT

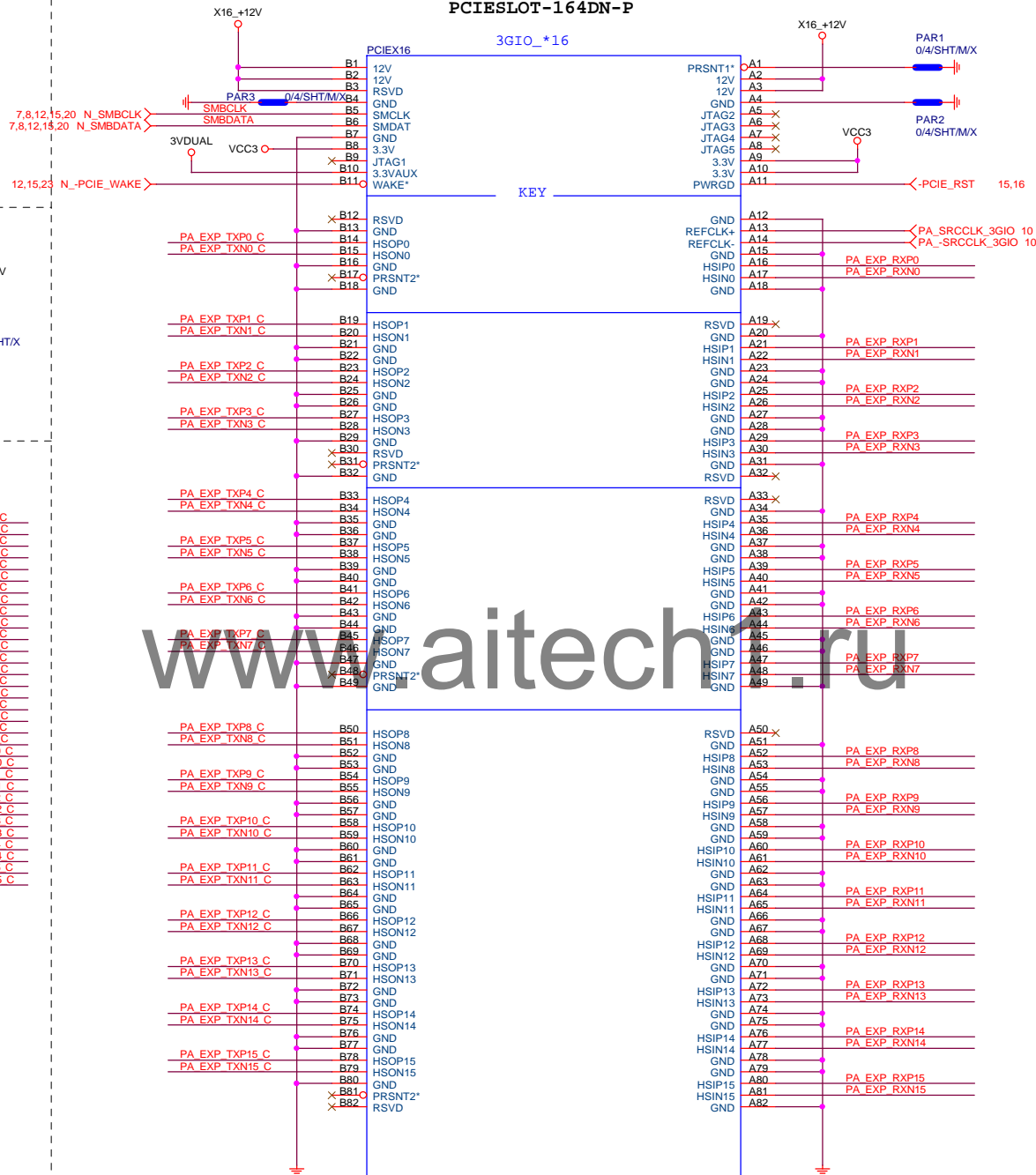


PCIEX16 AC CAP

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	PAC19	0.22u4/X5R/6.3V/K	PA EXP TXP7 C
PA EXP TXN7	PAC18	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

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



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

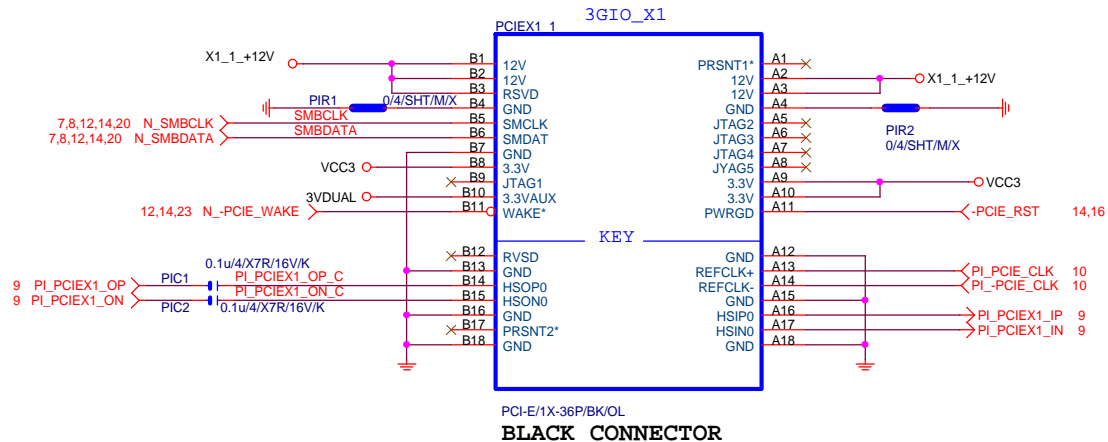
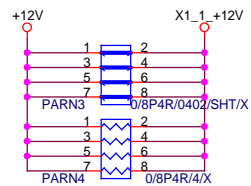
BLACK CONNECTOR

Gigabyte Technology

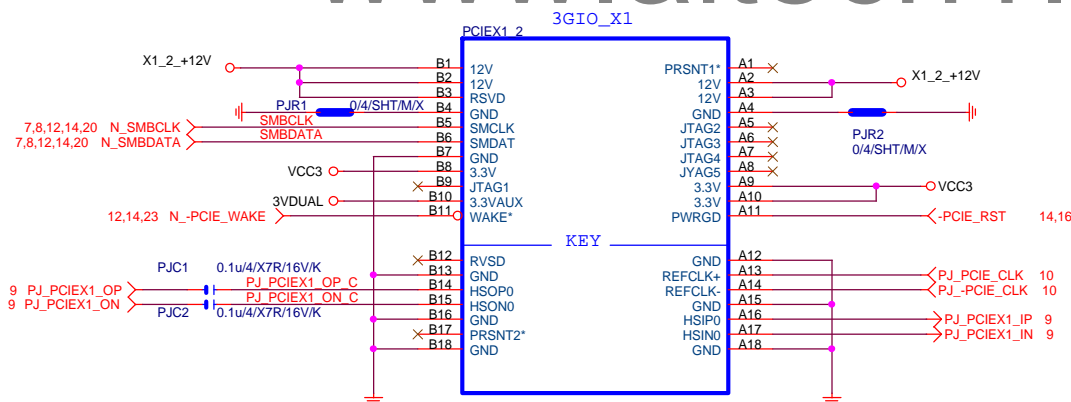
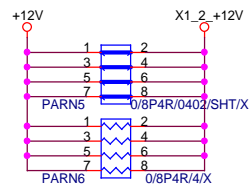
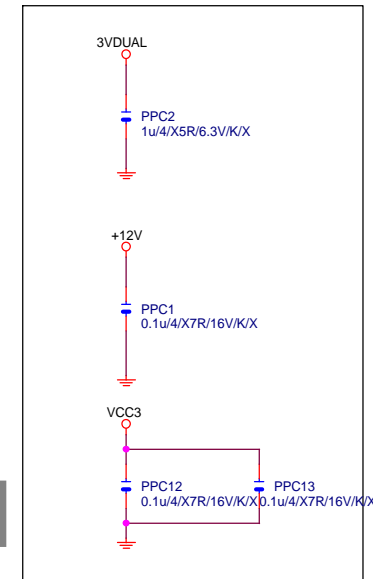
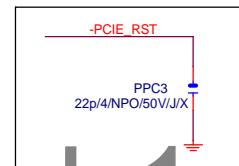
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Size			Document Number	
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PCIEX1 SLOT

PCIEX1 PROTECT SHT



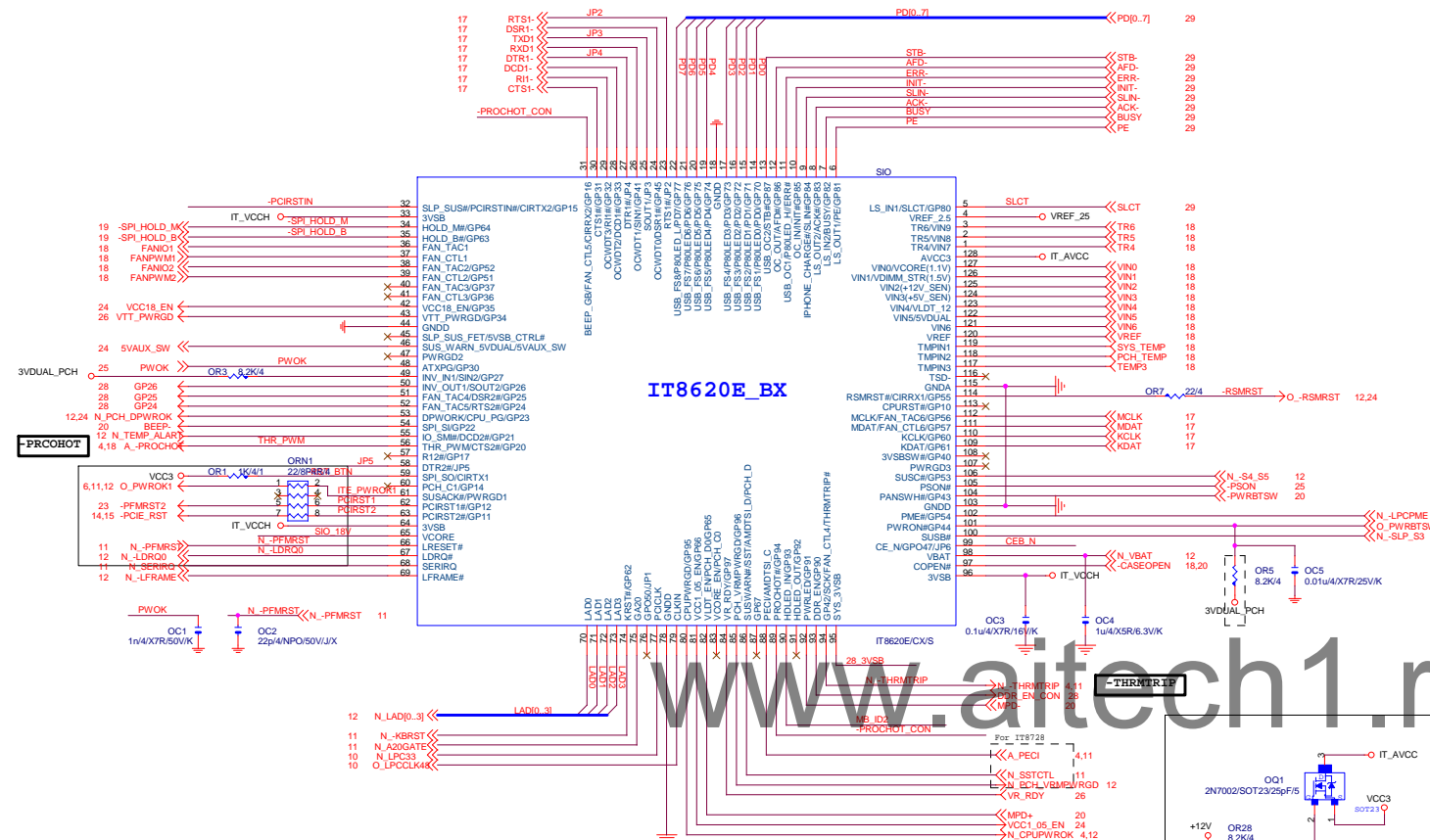
PCI-E/1X-36P/BK/OL
BLACK CONNECTOR



PCI-E/1X-36P/BK/OL
BLACK CONNECTOR

Gigabyte Technology			
PCI EXPRESS X 1 PORT			
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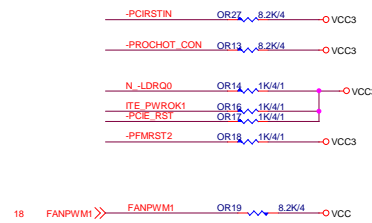
SIO IT8620



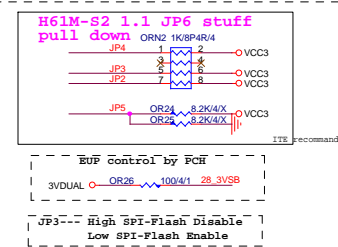
PWR SHT



SIO PU



SIO STRAP



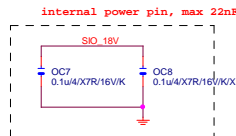
Power leakage



DUAL BIOS OPT STRAP



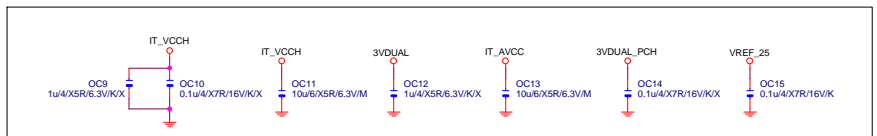
SIO 18V



MB ID

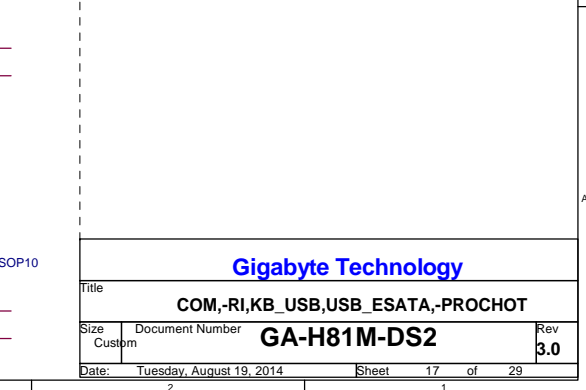
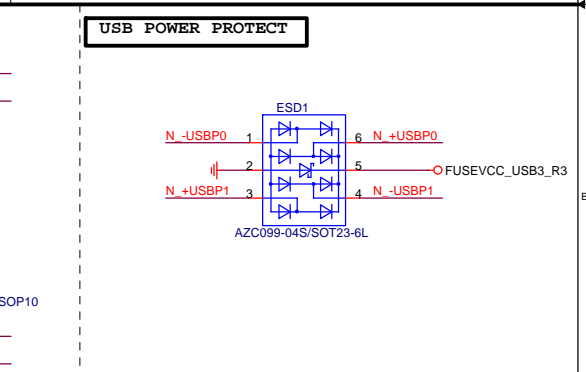
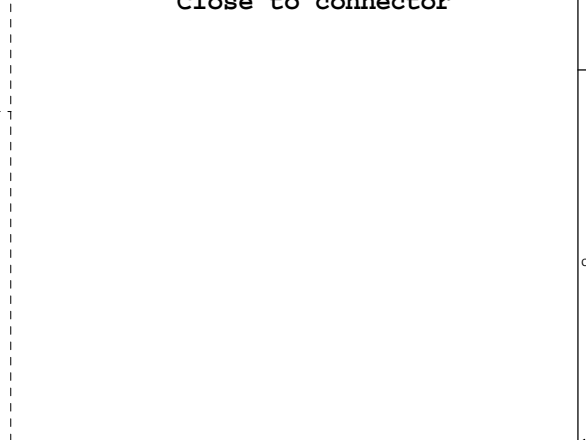
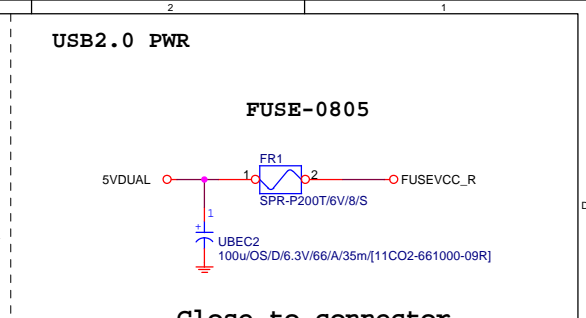


SIO CAP

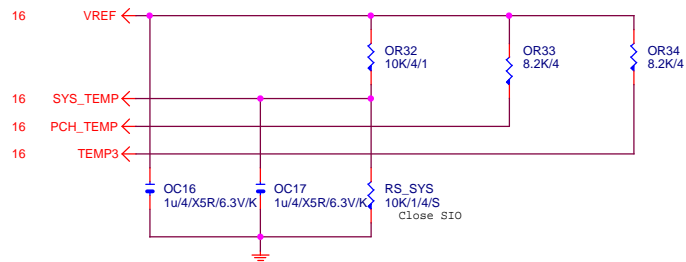


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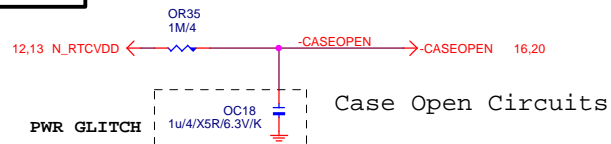
Title			PCH GPIO , CTRL , AUDIO
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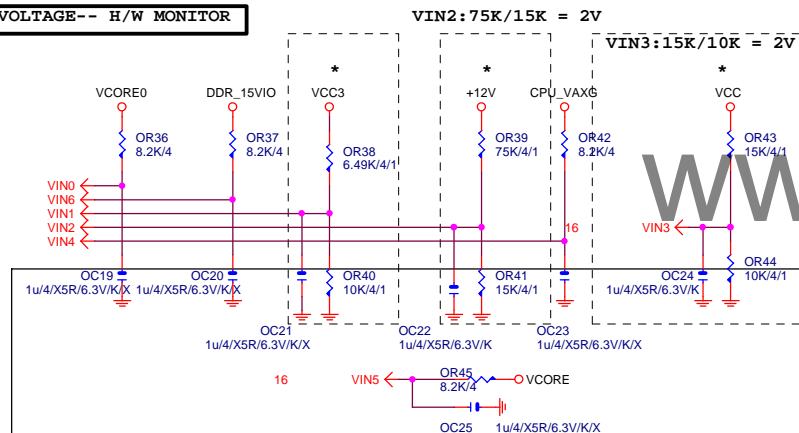
TEMP H/W MONITOR



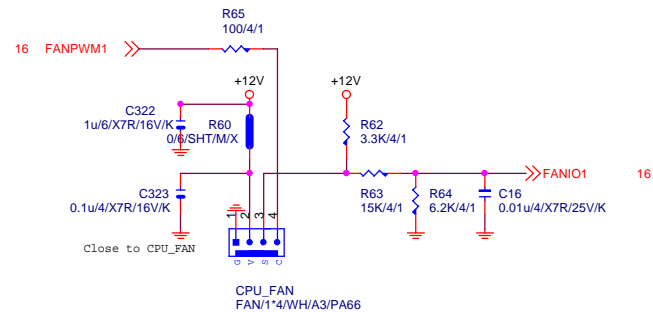
CASE OPEN



VOLTAGE-- H/W MONITOR



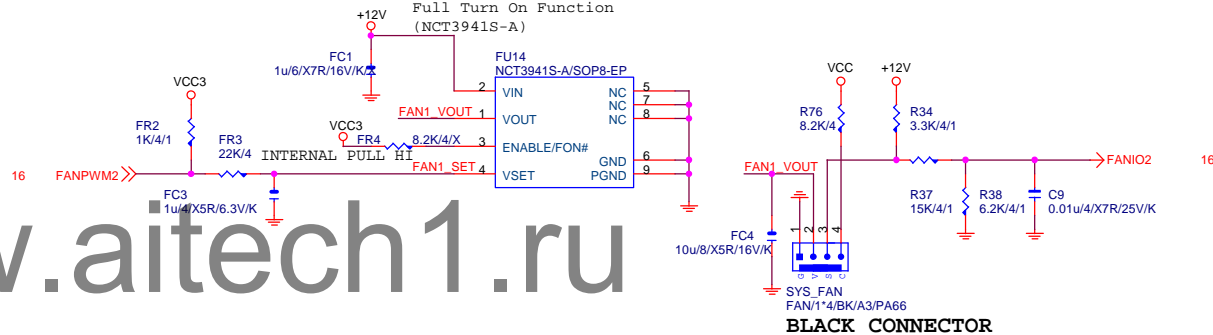
CPU SMART FAN



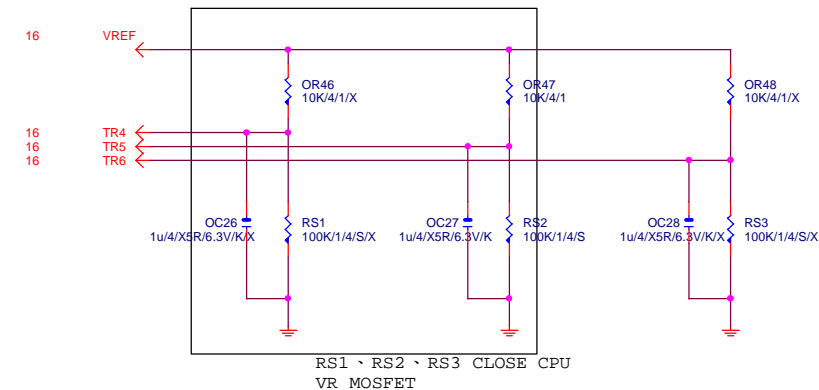
SYS SMART FAN

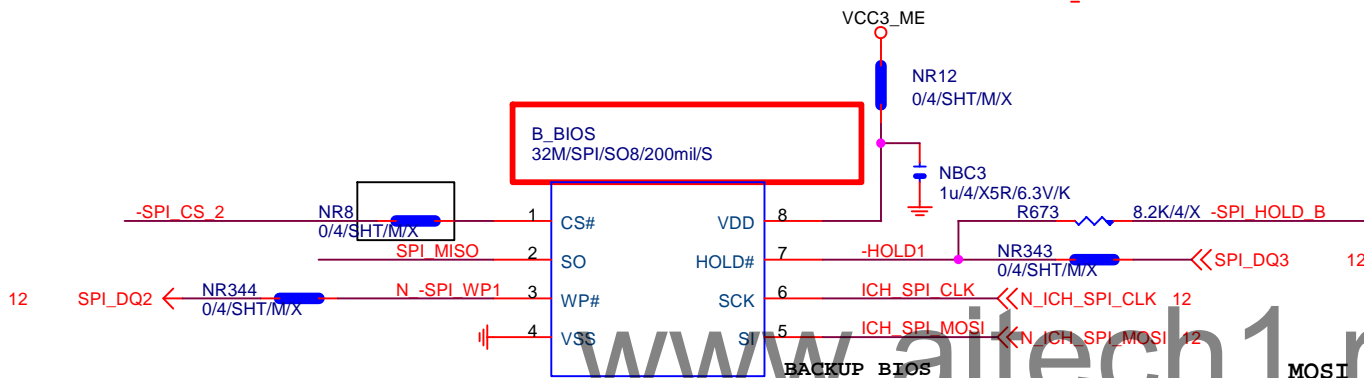
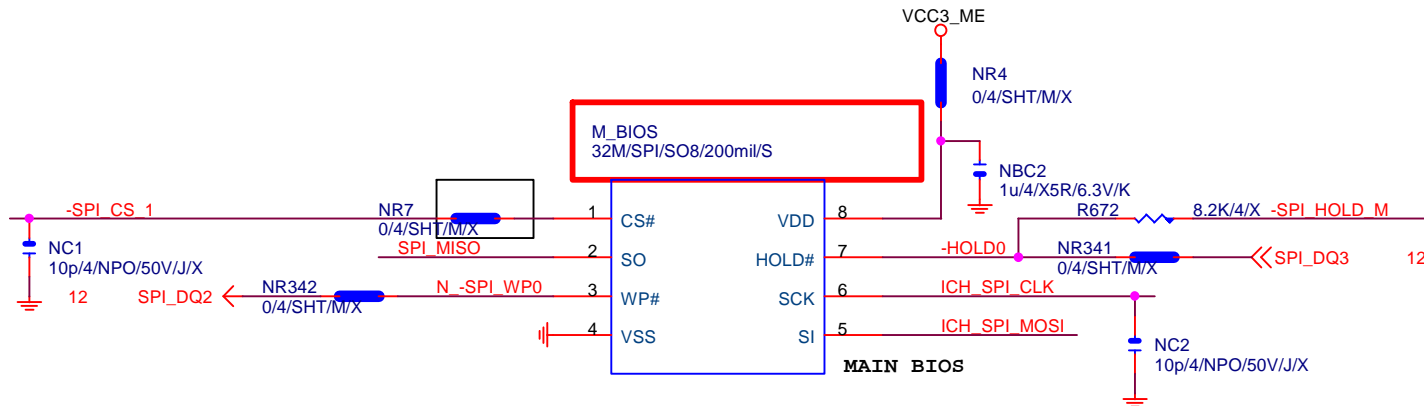
Linear SYS_FAN

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



-PROHOT

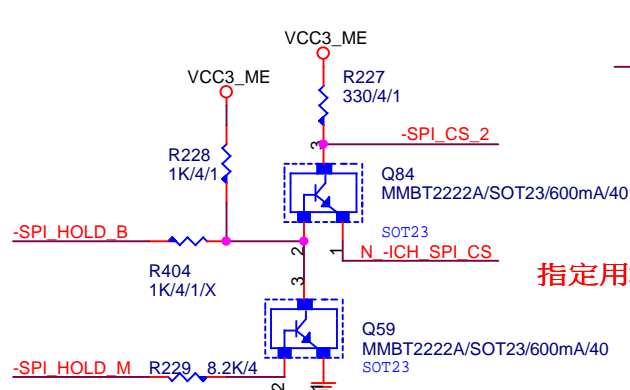
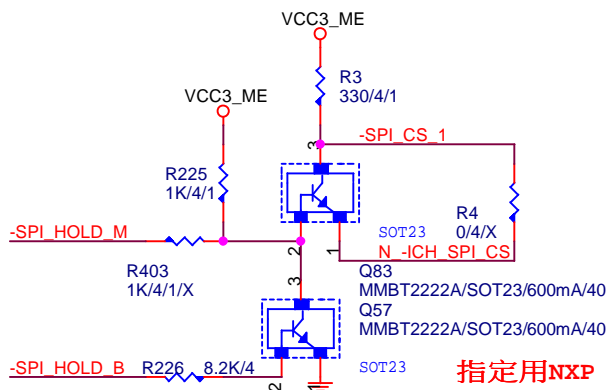
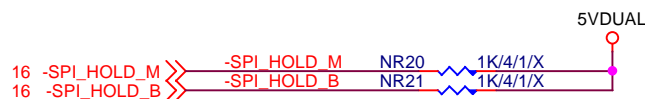
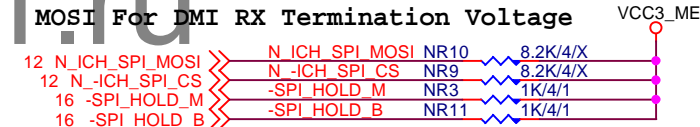




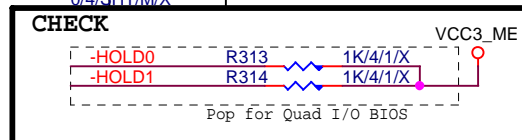
BOOT DEVICE	GNT0	GNT1
LPC	0	0
PCI	0	1
NAND	1	0
SPI	1	1

1 means floating
0 means PD 1K

MOSI For DMI RX Termination Voltage



指定用NXP



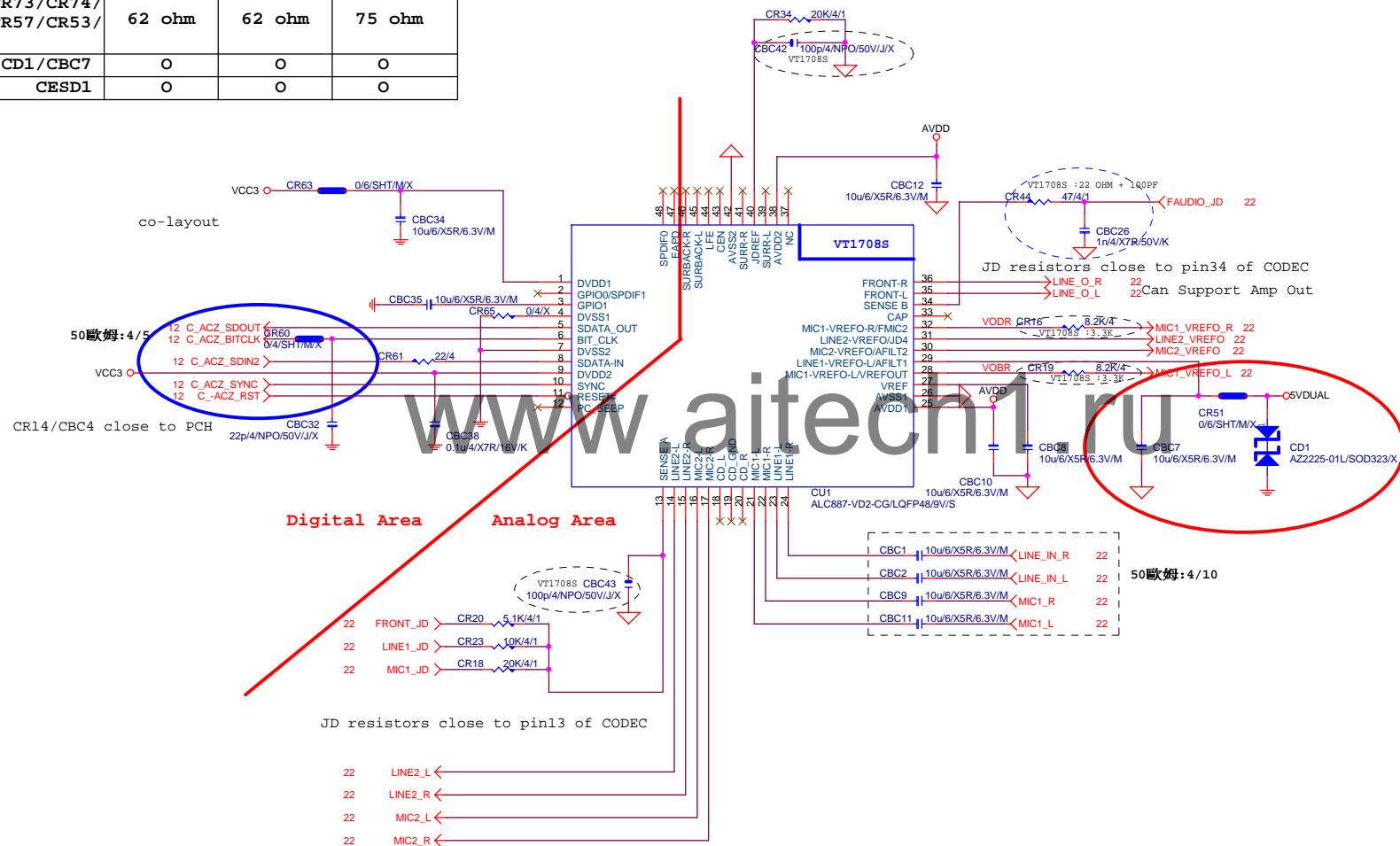
Gigabyte Technology

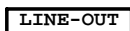
DUAL BIOS

GA-H81M-DS2

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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





Verify MIC function
in LINE-in

MIC-IN



AUDIO

BLUE
LINE-IN

GREEN
LINE-OUT

PINK
MIC-IN

21 LINE1_ID ← LINE1_JD C4
AJ A5 C3
C2
AJ A2 C2
C1
C0 GND

21 FRONT_ID ← FRONT_JD B4
AJ B5 B3
B2
AJ B2 B1
B0 GND

21 MIC1_ID ← MIC1_JD A4
AJ C5 A3
A2
AJ C2 A1
A0 GND

MH1 MH4
MH2 MH5
MH3 MH3

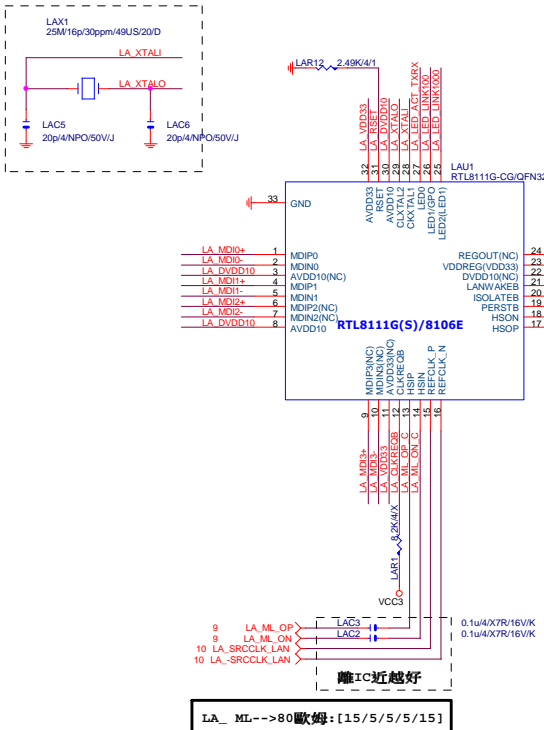
A3RP/13P/BL/LI.PK/RA/D/1/B

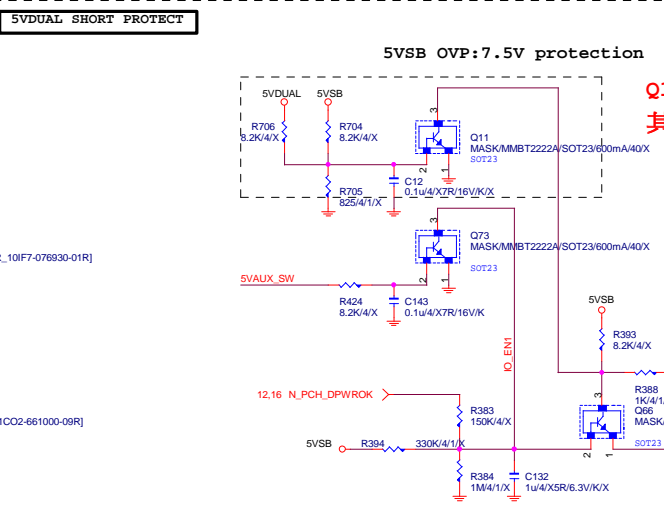
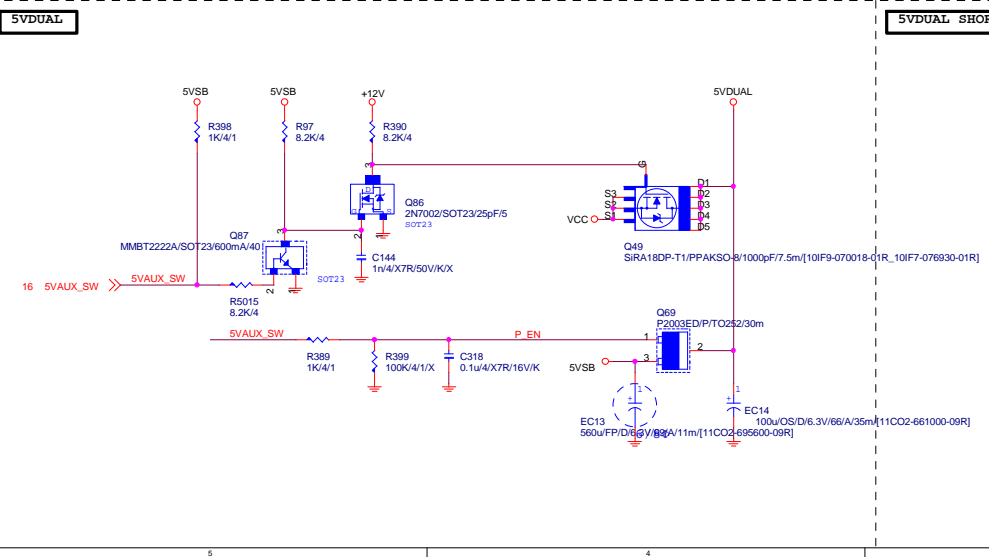
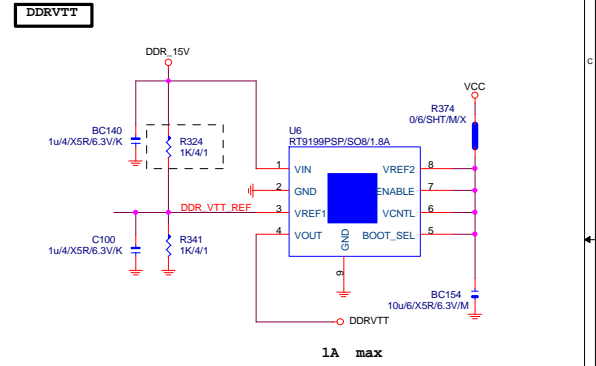
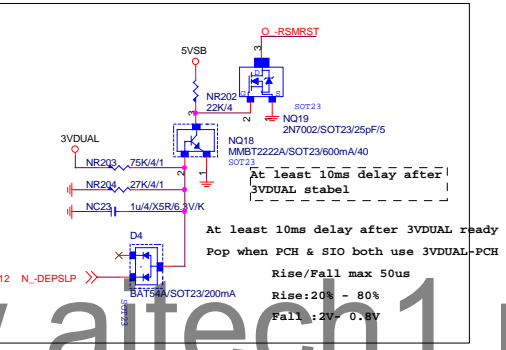
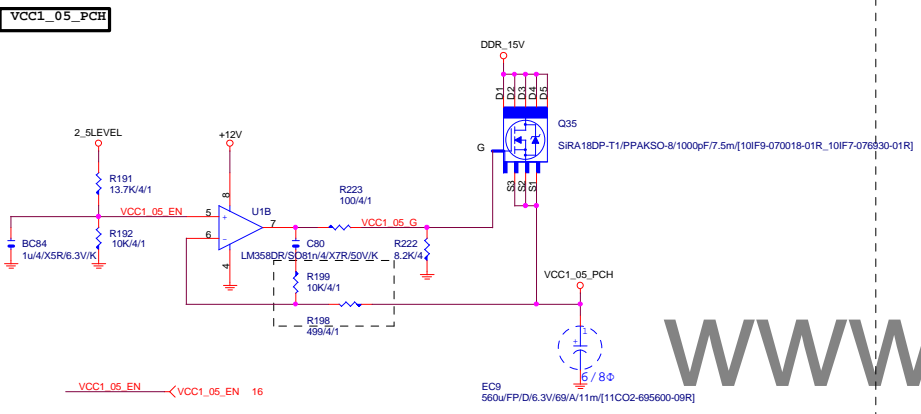
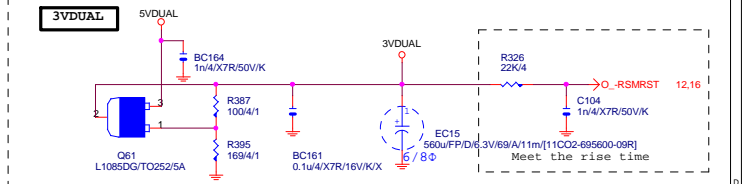
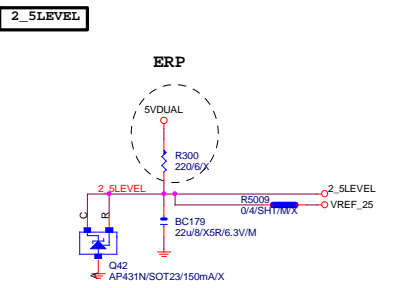
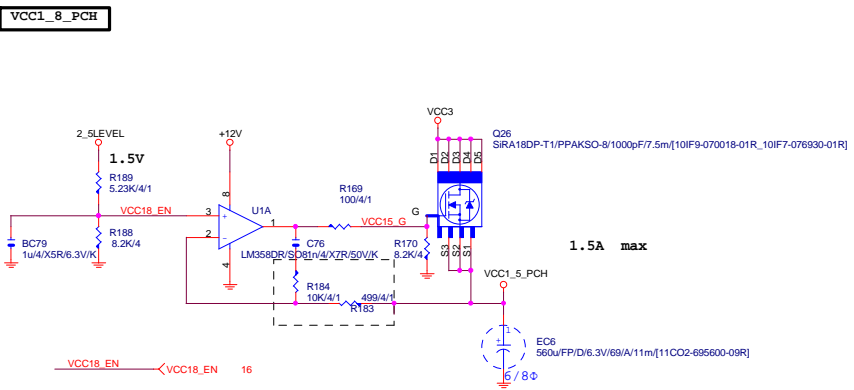
AZALIA FRONT PANEL



Title				AUDIO JACK				Rev	
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LAN:RTL8111G

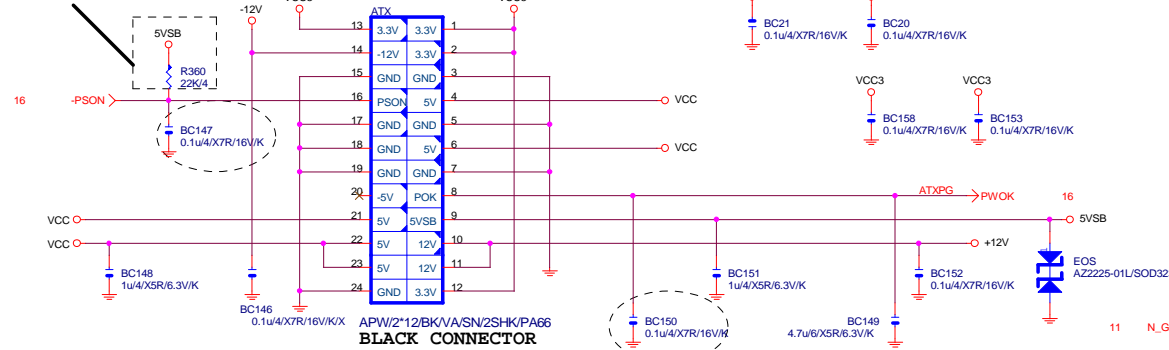




Q11.Q73.Q66.Q67 MASK
其餘BOM不上

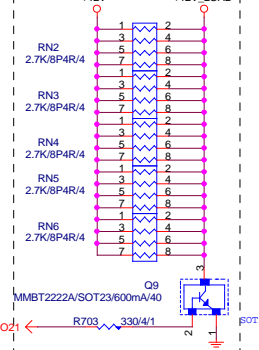
ATXX24 POWER CONNECTOR

【技術通報R&D技術通報155】



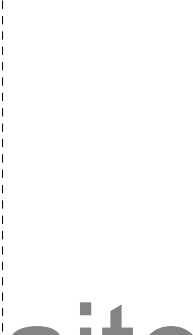
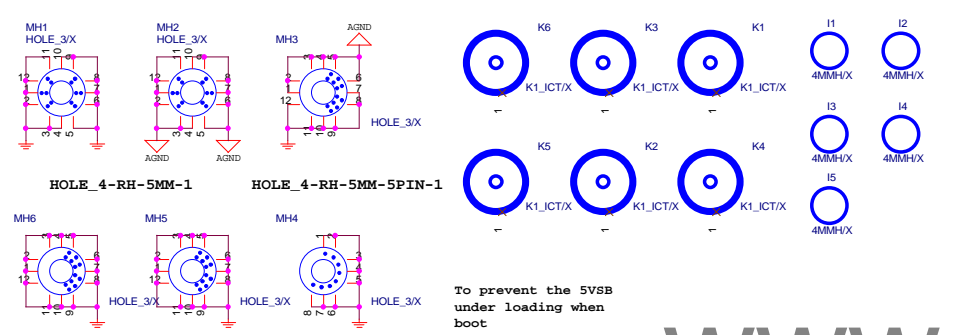
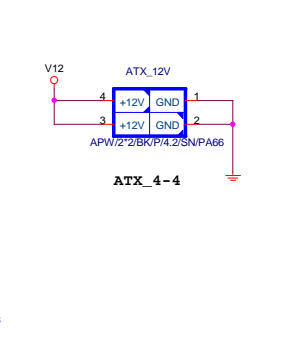
【技術通報R&D技術通報153】

To fix 12V light load abnormal issue



ATXX4 POWER CONNECTOR

To fix 12V light load abnormal issue

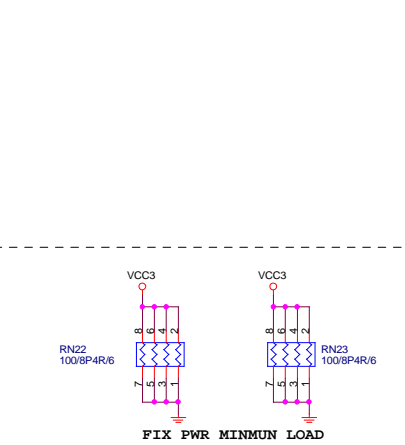


To prevent the 5VSB under loading when boot

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PWOK PATCH

【技術通報R&D技術通報154】

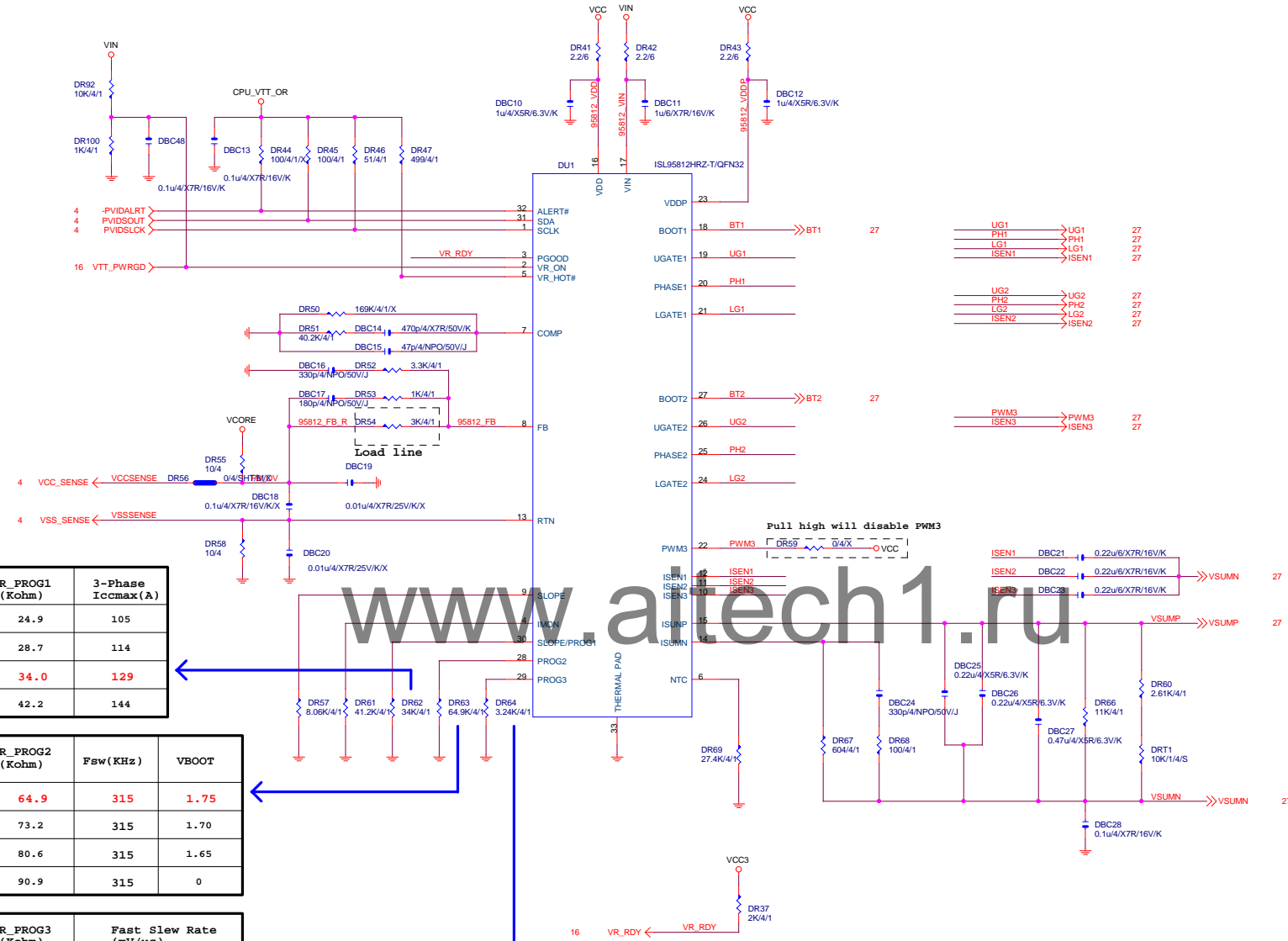


Gigabyte Technology		
ATX CONNECTOR		
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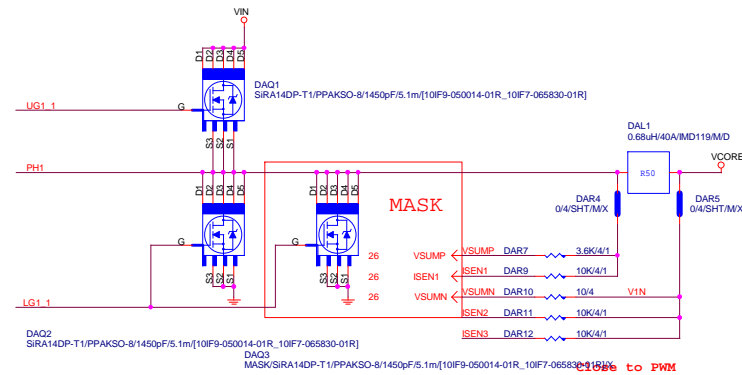
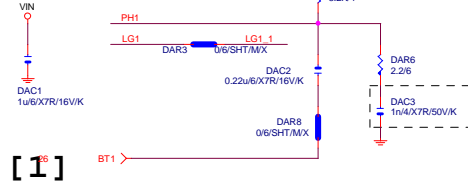
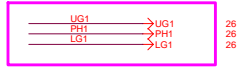
R_PROG1 (Kohm)	3-Phase Iccmax(A)
24.9	105
28.7	114
34.0	129
42.2	144

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

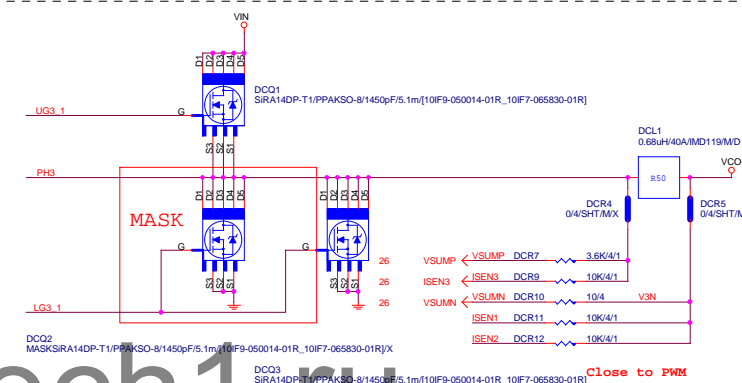
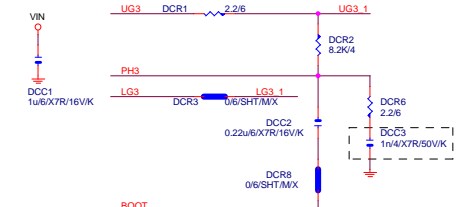
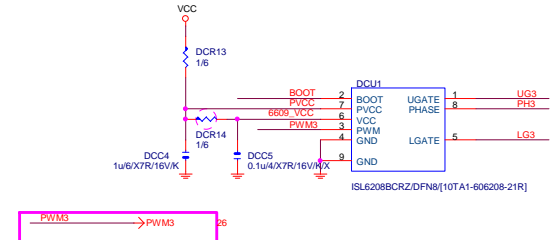
R_PROG3 (Kohm)	Fast Slew Rate (mV/us)
3.24	12
5.76	24
9.31	40
13.3	45



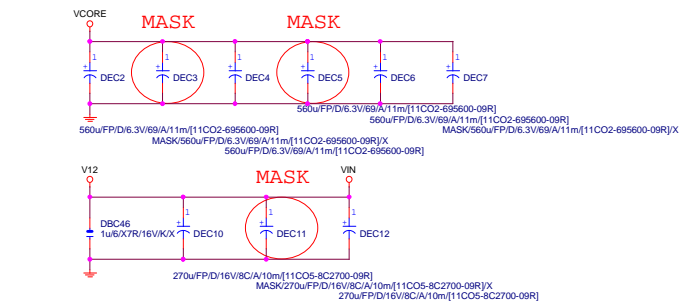
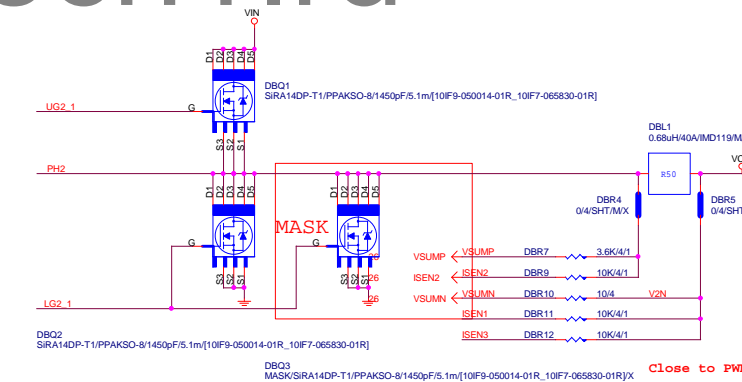
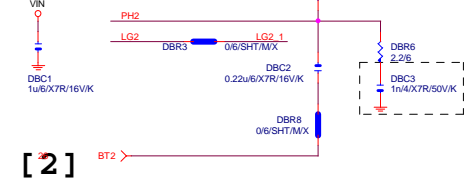
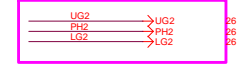
PHASE 1



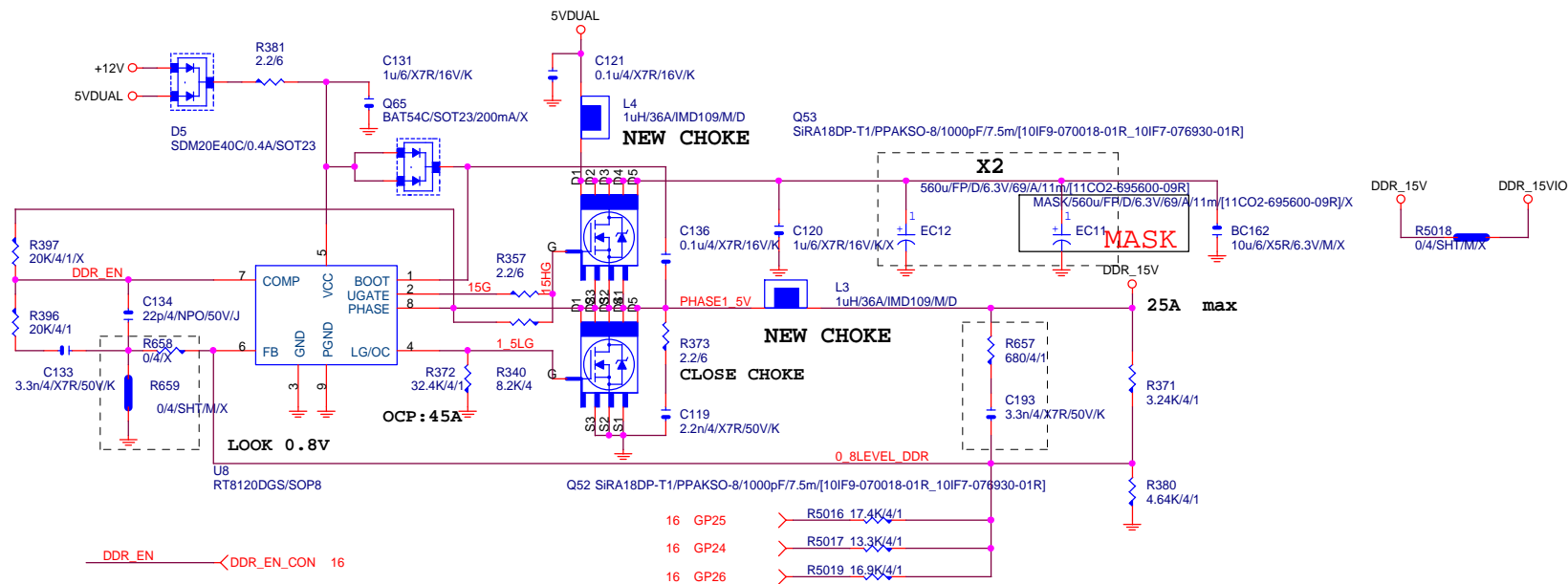
PHASE 3



PHASE 2



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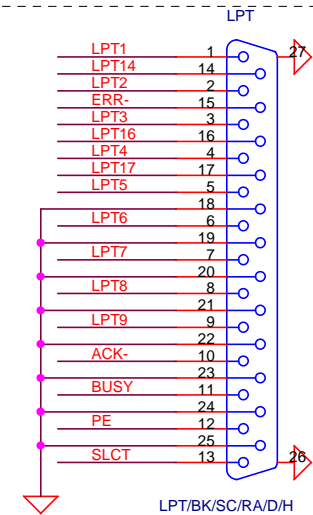
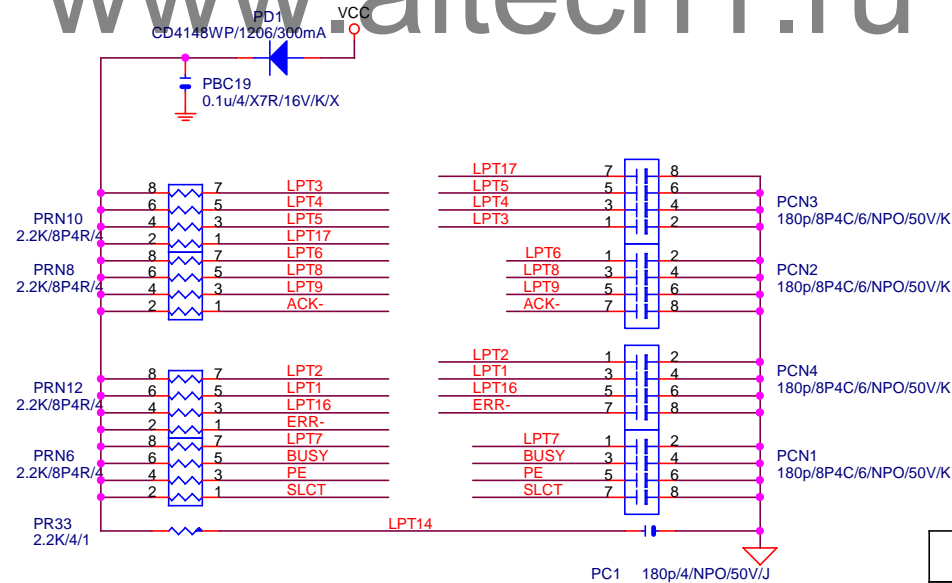
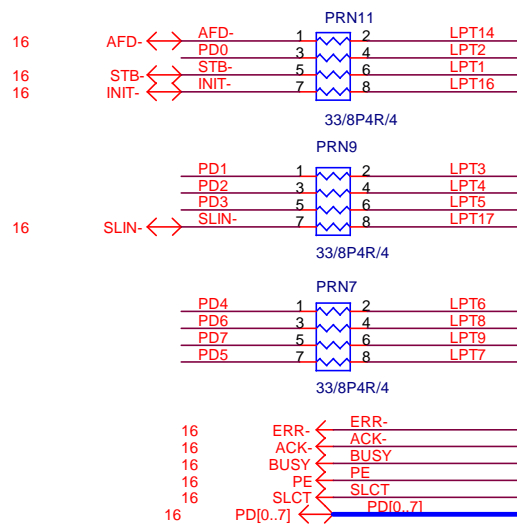
VIN=5V, VOUT=1.5V, IOU=25A, PHASE=1
 IRMS=11.45A
 560u/FP/D/6.3V/68/8m RIPPLE CURRENT=4.7A
 Coefficient=1.7(85°C), 1(105°C)
 VIN Ripple current=4.7X1.7=7.99A(85°C)
 -->故固態電容須2X7.99=15.98>11.45A

$Rocset = (I_{ocp} * L_{gate}, rdson) / I_{ocset}$
 $Rocset = (45A * 6.7m\Omega) / 10uA = 30K$
 $I_{ocset} = 10uA$

Gigabyte Technology

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DDR POWER			
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Gigabyte Technology			
Title			
LPT			
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