

Model Name: GA-Z87N-WIFI

Revision 2.02

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	ITE 8728 LPC IO
16	COM,KB_USB30
17	HWM,FAN CTRL,OV,-PROCHOT
18	DUAL BIOS
19	FP,FUSB,SPK,SATALED
20	Realtek ALC892
21	REAR AUDIO JACK
22	INTEL LAN I217 (A)
23	Artheros AR8161B (B)
24	DISCRETE POWER
25	ATX,CLK GEN
26	RT8120_DDR POWER,M3 POWER
27	VCORE ISL95820_1

SHEET

TITLE

28	VCORE ISL95820_2
29	DVI-I
30	HDMI * 2
31	mini PCI-E

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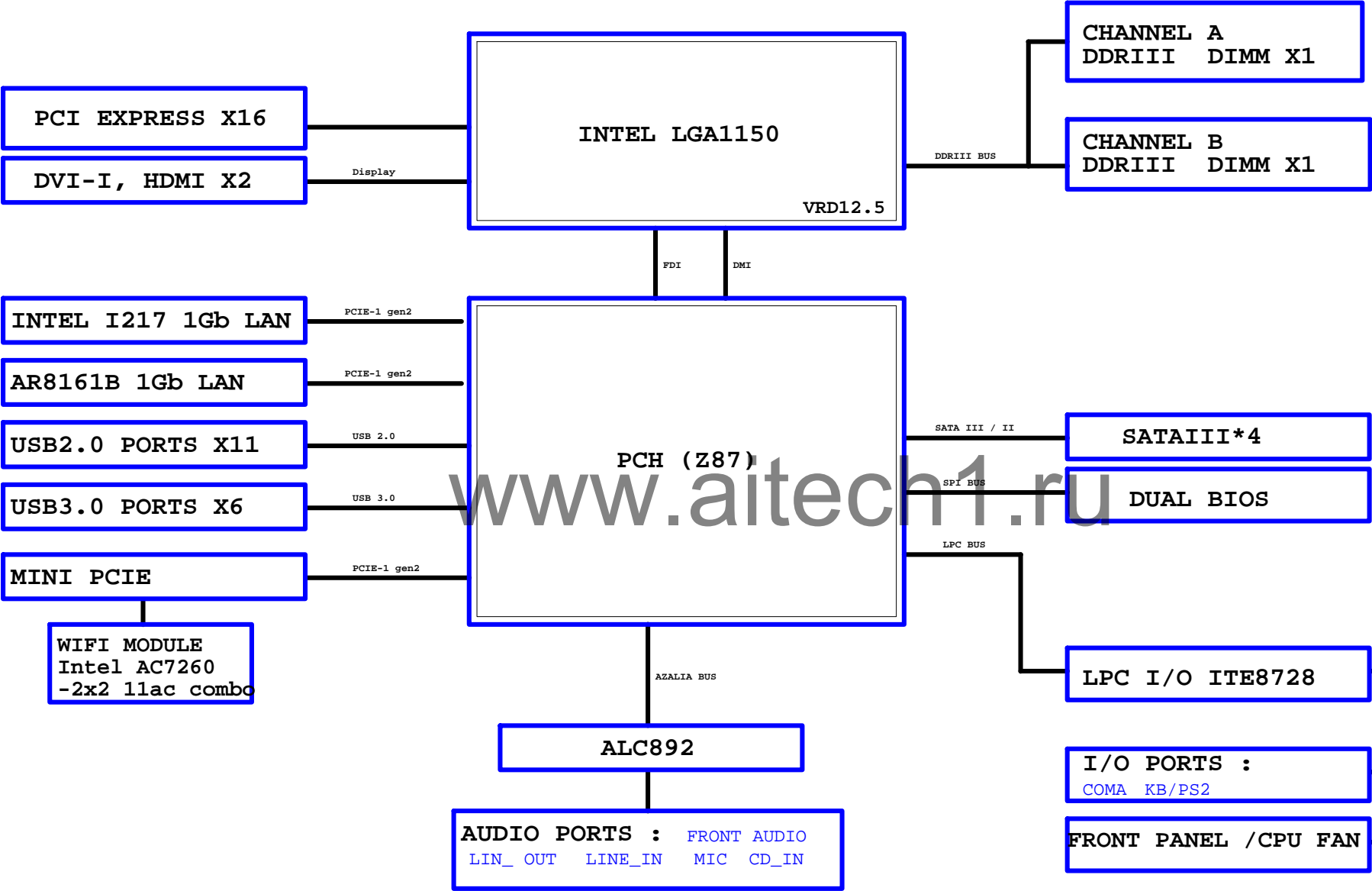
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Size	Document Number	GA-Z87N-WIFI	
Custom		Rev	2.02
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Revision 2.02

Component value change history

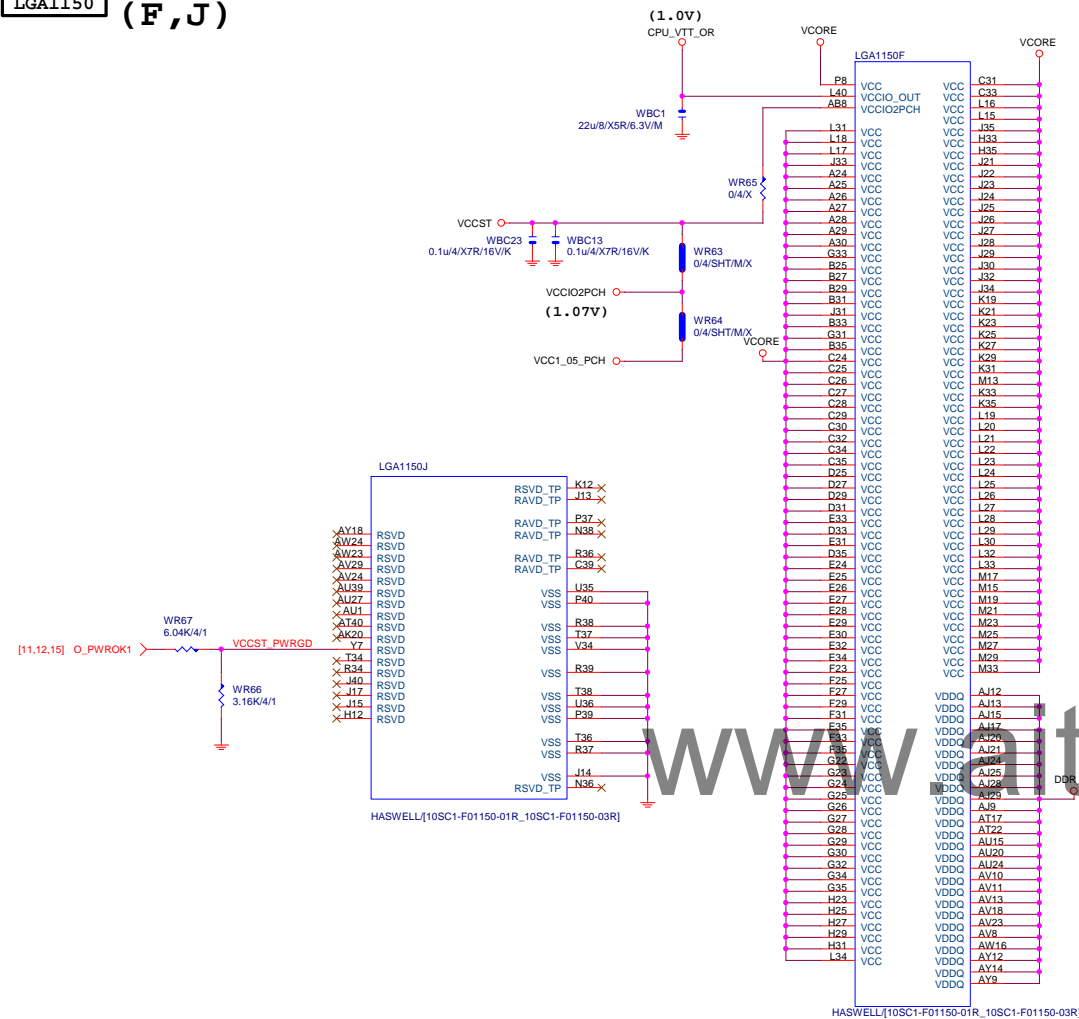
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BLOCK DIAGRAM

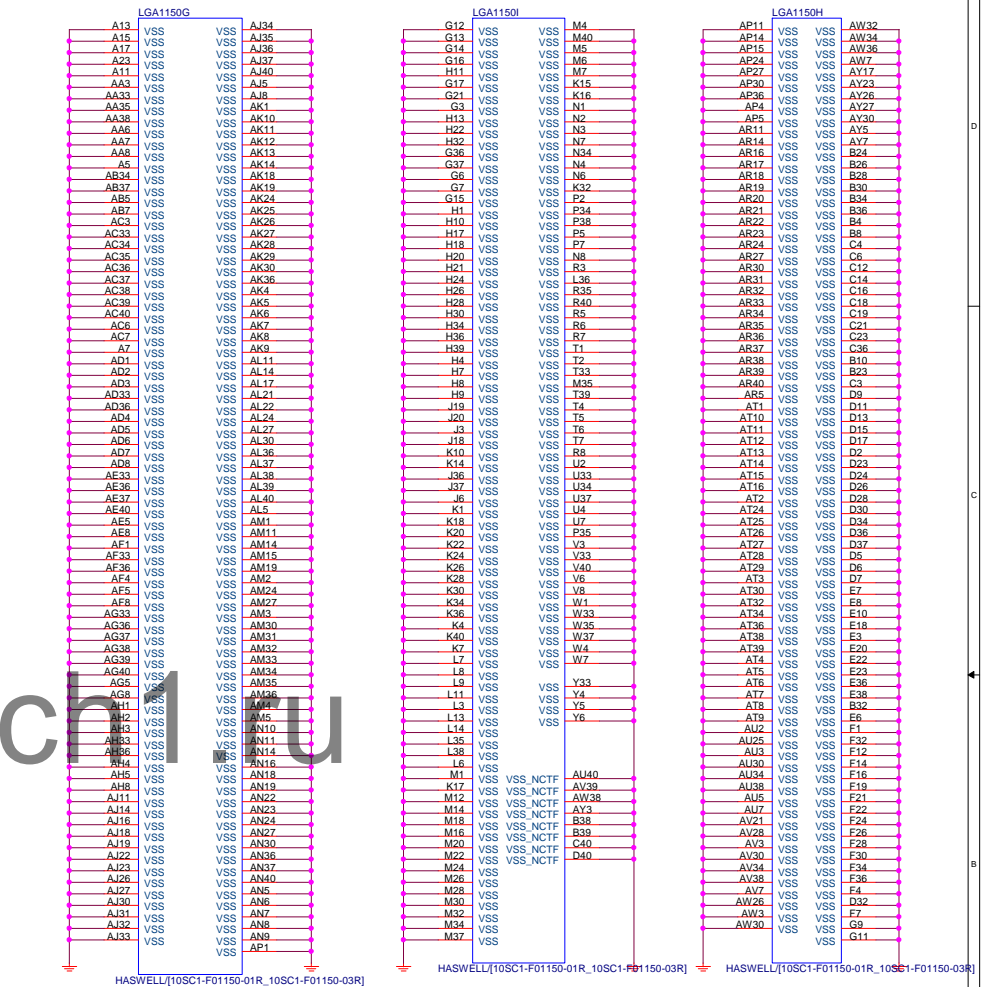


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MAAA4	AU17	DDR0_MA4	DDR0_DQ4
MAAA5	AU18	DDR0_MA5	DDR0_DQ5
MAAA6	AV17	DDR0_MA6	DDR0_DQ6
MAAA7	AT18	DDR0_MA7	DDR0_DQ7
MAAA8	AU18	DDR0_MA8	DDR0_DQ8
MAAA9	AT19	DDR0_MA9	DDR0_DQ9
MAAA10	AW11	DDR0_MA10	DDR0_DQ10
MAAA11	AV19	DDR0_MA11	DDR0_DQ11
MAAA12	AU19	DDR0_MA12	DDR0_DQ12
MAAA13	AY10	DDR0_MA13	DDR0_DQ13
MAAA14	AT20	DDR0_MA14	DDR0_DQ14
MAAA15	AU21	DDR0_MA15	DDR0_DQ15
MODT_A0	AW10	DDR0_ODT0	DDR0_ODT0
MODT_A1	AY8	DDR0_ODT1	DDR0_ODT1
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AW33	AW33	DDR0_ECC4	DDR0_ECC4
AW33	AW33	DDR0_ECC5	DDR0_ECC5
AW33	AW33	DDR0_ECC6	DDR0_ECC6
AW33	AW33	DDR0_ECC7	DDR0_ECC7
SBAA0	SBAA0	DDR0_BA0	DDR0_DQ31
SBAA1	SBAA1	DDR0_BA1	DDR0_DQ32
SBAA2	SBAA2	DDR0_BA2	DDR0_DQ33
CKEA0	CKEA0	DDR0_CKE0	DDR0_DQ34
CKEA1	CKEA1	DDR0_CKE1	DDR0_DQ35
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LGA1150 (F,J)

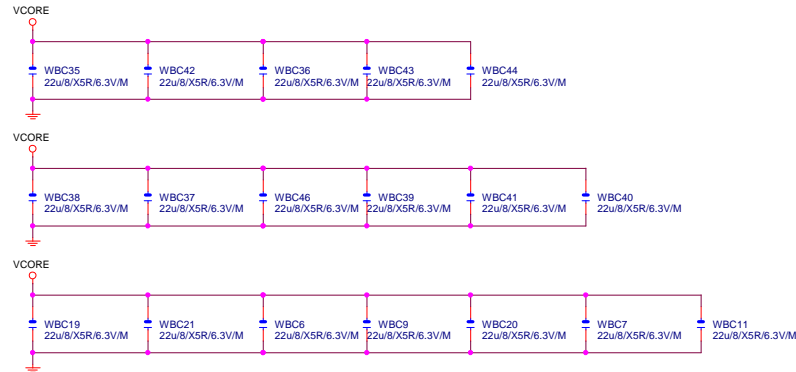


LGA1155 (G,H,I)



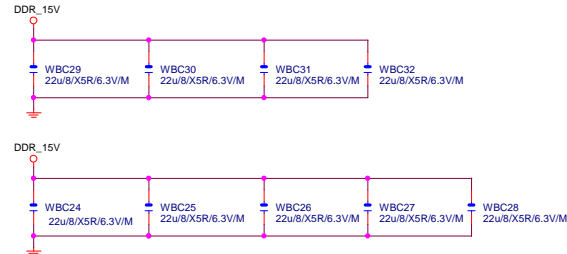
VCore CAP

(X18)



DDR CAP

(x9)

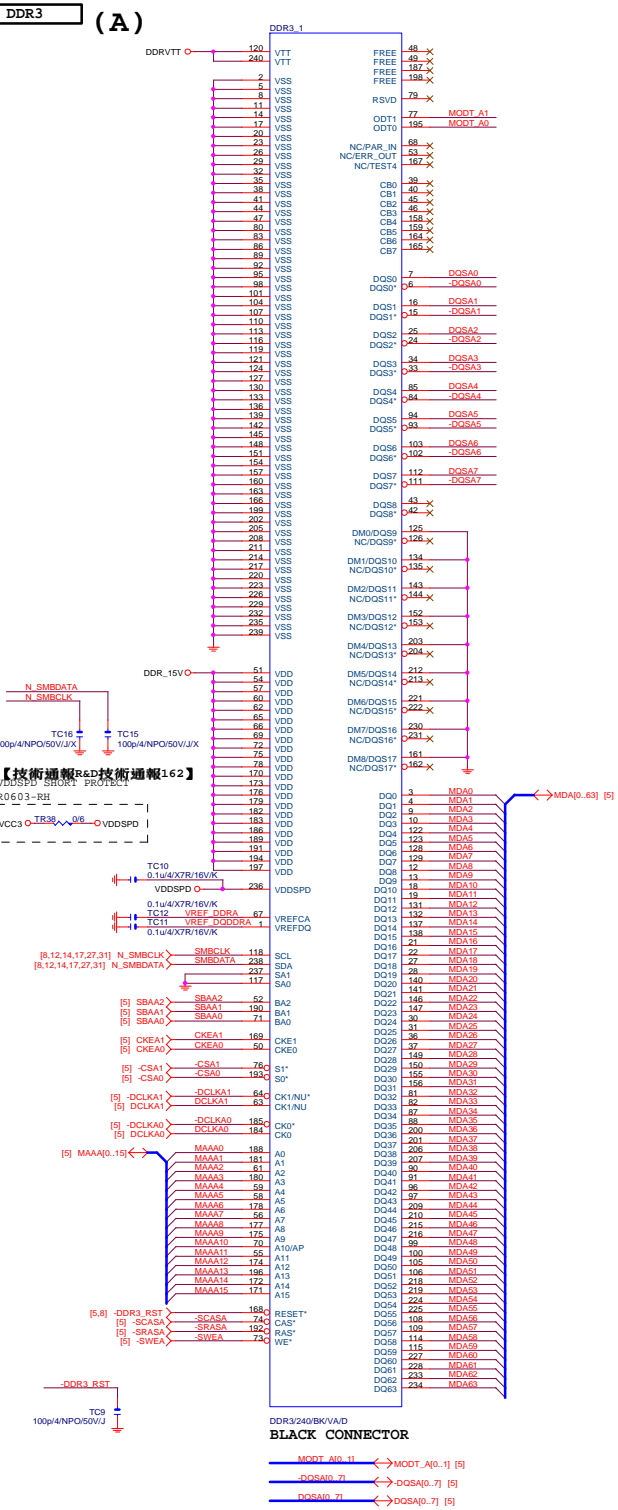


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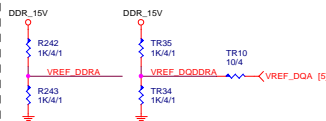
Size	Document Number	GA-Z87N-WIFI	Rev
Custom			2.00

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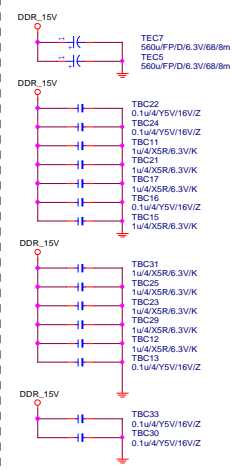


DDR3

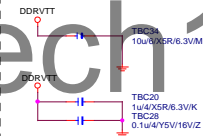
DDR3 VREF



DDR15V Decouple



DDRVTT Decouple



www.aitech1.ru

Gigabyte Technology		
DDRIII CHANNEL A		
File	Document Number	Rev
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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 B

NR40 7.5K/4/1 PCIE COMP C

CK -SRCCLK_PCH G

CK SRCCLK_PCH F

PCTEX1:16/5/5/5/16 (breakout min 8/4/4/4/8)

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

PCIE_PERP_2_USB3_RXP_3	OC0B_GP59	AE40	N_USB0C_F [16]
PCIE_PETN_2_USB3_TXN_3	OC1B_GP40	E372	
PCIE_PERP_2_USB3_TXP_3	OC2B_GP41	AD39	N_USB0C_R [16]
PCIE_PERN_4	OC2B_GP41	AD40	
PCIE_PERP_3	OC3B_GP42	AF39	
PCIE_PETN_3	OC4B_GP43	AC41	
PCIE_PERP_3	OC5B_GP9	AC40	N_GPIO14
PCIE_PERN_4	OC6B_GP10	AF40	
PCIE_PERP_4	OC7B_GP14		

W=4 mil out of P

DH82Z87 C2 INTEL/[10HB1-030Z87-20R]

/4/4/4/8.)

VCC3

NR62 8.2K/4 AK28 TACH₁

NR63 8.2K/4 AT34 TACH₂

DH82ZS

FD

FD

CK SRCCLK PCH

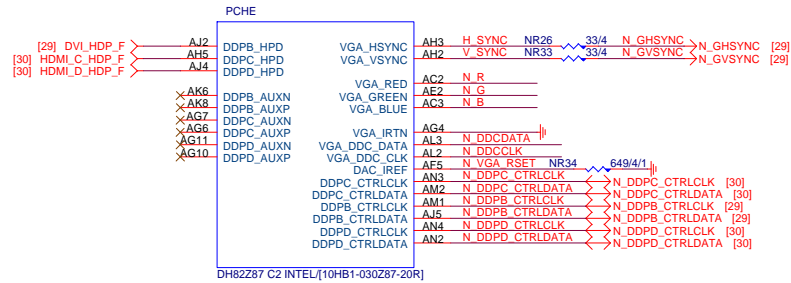


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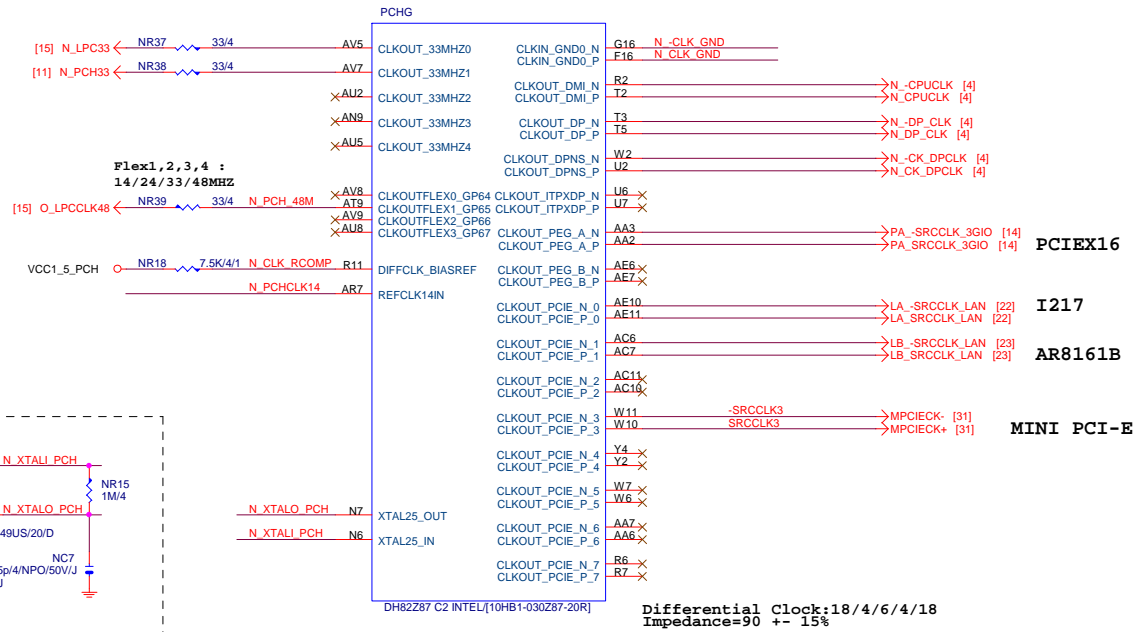
PCH FDI,DMI,USB ,PCIE,NVRAM

	1
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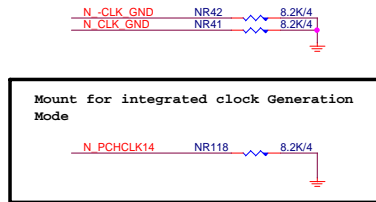
PCH (E)



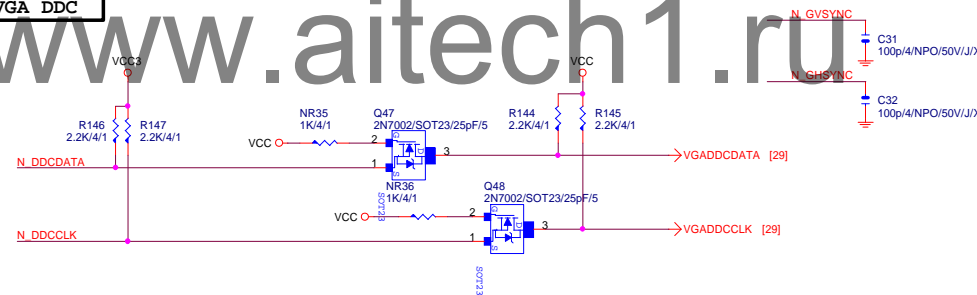
PCH (G)



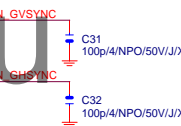
PCH CLK PD



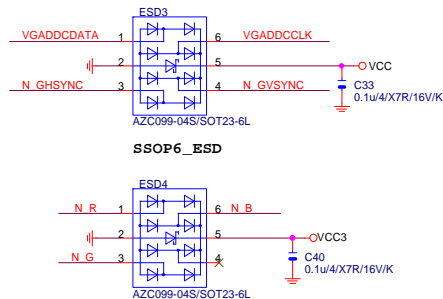
VGA DDC



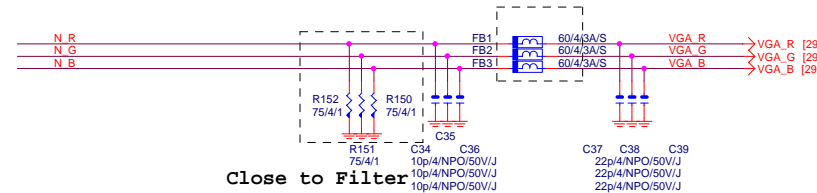
VGA CONNECTOR



VGA ESD



VGA DDC



Gigabyte Technology

PCH DISPLAY,CLK BUFFER

GA-Z87N-WIFI

Title	Document Number	Rev
Size	Custom	2.02
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PCH (C)

SATA3 : 20/7.5/4.5/7.5/20 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%
SATA2 : 15/7.5/4.5/7.5/15 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%

PCHC

CL_CLK

CL_DATA

CL_RSTB

APWROK

PWM0

PWM1

PWM2

PWM3

TACH0_GP17

TACH1_GP1

TACH2_GP6

TACH3_GP7

TACH4_GP8

TACH5_GP9

SSTCTL

SCLOCK_GP22

SLOAD_GP38

SDATAOUT0_GP39

SDATAOUT1_GP48

SATALEDB

SATA_RCOMP

SATA0GP_GP21

SATA1GP_GP19

SATA2GP_GP36

SATA3GP_GP37

SATA4GP_GP16

SATA5GP_GP49

EDP_BKLTCTL

EDP_BKLTEN

EDP_VDDEN

RSVD

RCINB

SERIRQ

THRMTRIPB

PECI

PM_SYNC

PLTRST_PROCB

PLTRSTB

GP35/NMIB

GP50

GP51

GP52

GP53

GP54

GP55

GP56

GP57

GP58

GP59

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GP297

(D)

ACZ_SDOUT

PCH_DPWROK

PCH	PU/PD
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HSW_STRAP13

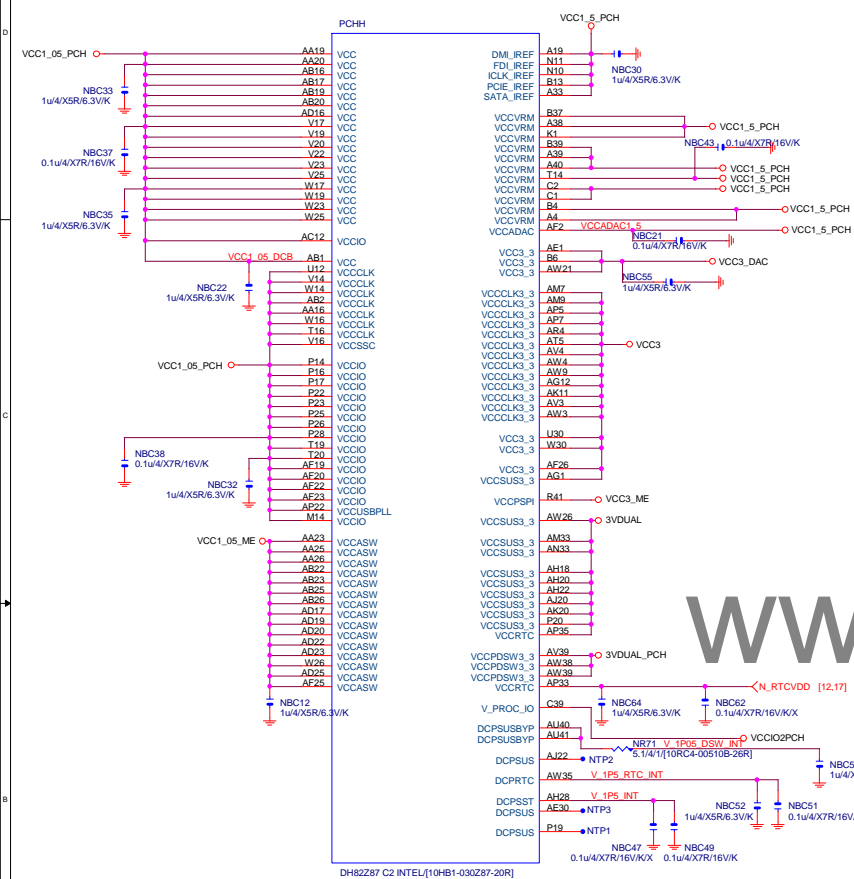
32.768KHZ

CLR_CMOS

Gigabyte Technology

Title				PCH GPIO , CTRL , AUDIO			
Size	Document Number						Rev
Custom	GA-Z87N-WIFI						2.02
Date:	Monday, January 06, 2014			Sheet	12	of	31

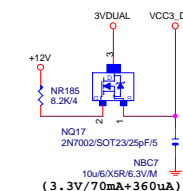
PCH (H)



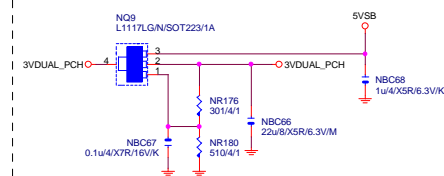
PCH (I)



VCC3_DAC

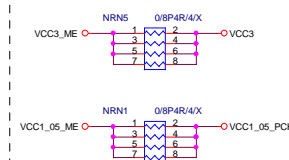


3VDUAL_PCH



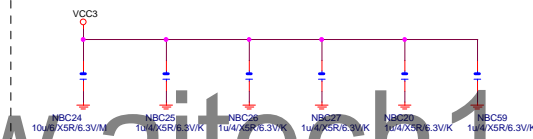
SHT PWR

M3 POWER

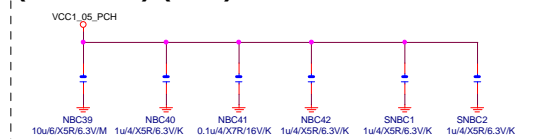


CAP

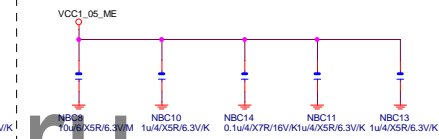
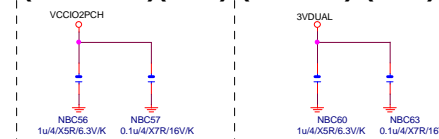
(3.3V) (X6)



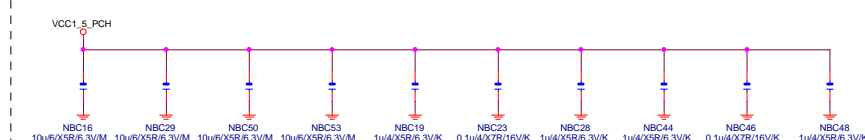
(1.05V)(x6)



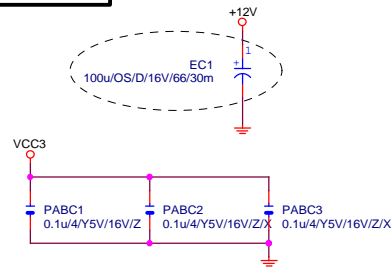
(1.05V) (x5)


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


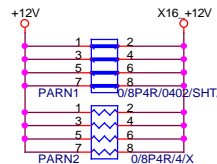
(1.05V) (x10)



PCIEX16 CAP



PCIEX16 PROTECT SHT

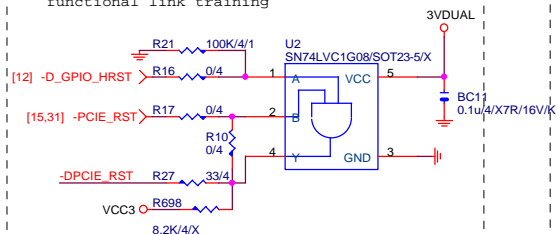


PCIEX16 AC CAP

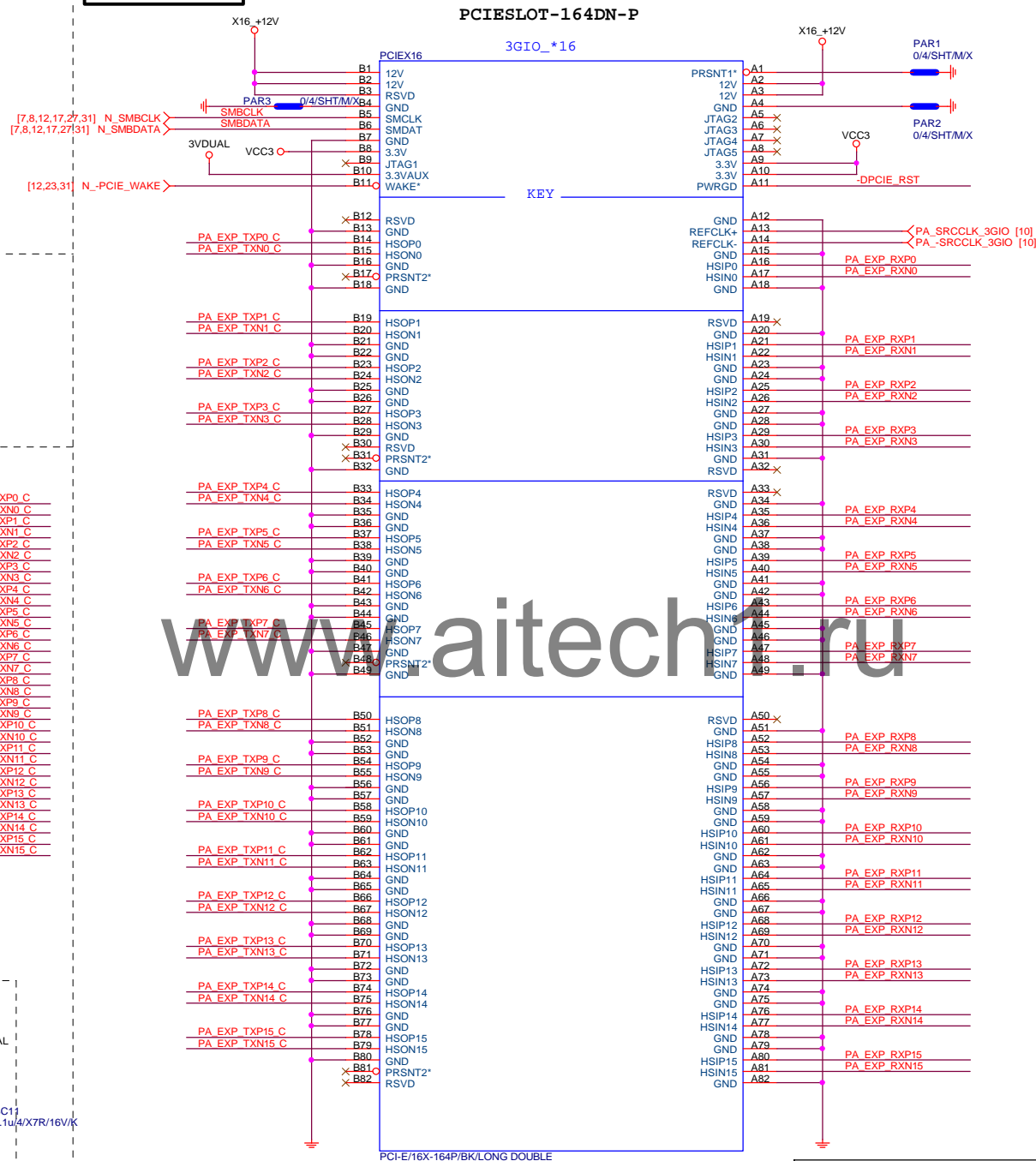
PA EXP TXP0	PAC5	0.22u/4/X5R/6.3V/K	PA EXP TXP0 C
PA EXP TXN0	PAC4	0.22u/4/X5R/6.3V/K	PA EXP TXN0 C
PA EXP TXP1	PAC6	0.22u/4/X5R/6.3V/K	PA EXP TXP1 C
PA EXP TXN1	PAC7	0.22u/4/X5R/6.3V/K	PA EXP TXN1 C
PA EXP TXP2	PAC8	0.22u/4/X5R/6.3V/K	PA EXP TXP2 C
PA EXP TXN2	PAC9	0.22u/4/X5R/6.3V/K	PA EXP TXN2 C
PA EXP TXP3	PAC10	0.22u/4/X5R/6.3V/K	PA EXP TXP3 C
PA EXP TXN3	PAC11	0.22u/4/X5R/6.3V/K	PA EXP TXN3 C
PA EXP TXP4	PAC12	0.22u/4/X5R/6.3V/K	PA EXP TXP4 C
PA EXP TXN4	PAC13	0.22u/4/X5R/6.3V/K	PA EXP TXN4 C
PA EXP TXP5	PAC14	0.22u/4/X5R/6.3V/K	PA EXP TXP5 C
PA EXP TXN5	PAC15	0.22u/4/X5R/6.3V/K	PA EXP TXN5 C
PA EXP TXP6	PAC16	0.22u/4/X5R/6.3V/K	PA EXP TXP6 C
PA EXP TXN6	PAC17	0.22u/4/X5R/6.3V/K	PA EXP TXN6 C
PA EXP TXP7	PAC19	0.22u/4/X5R/6.3V/K	PA EXP TXP7 C
PA EXP TXN7	PAC18	0.22u/4/X5R/6.3V/K	PA EXP TXN7 C
PA EXP TXP8	PAC20	0.22u/4/X5R/6.3V/K	PA EXP TXP8 C
PA EXP TXN8	PAC21	0.22u/4/X5R/6.3V/K	PA EXP TXN8 C
PA EXP TXP9	PAC22	0.22u/4/X5R/6.3V/K	PA EXP TXP9 C
PA EXP TXN9	PAC23	0.22u/4/X5R/6.3V/K	PA EXP TXN9 C
PA EXP TXP10	PAC24	0.22u/4/X5R/6.3V/K	PA EXP TXP10 C
PA EXP TXN10	PAC25	0.22u/4/X5R/6.3V/K	PA EXP TXN10 C
PA EXP TXP11	PAC26	0.22u/4/X5R/6.3V/K	PA EXP TXP11 C
PA EXP TXN11	PAC27	0.22u/4/X5R/6.3V/K	PA EXP TXN11 C
PA EXP TXP12	PAC28	0.22u/4/X5R/6.3V/K	PA EXP TXP12 C
PA EXP TXN12	PAC29	0.22u/4/X5R/6.3V/K	PA EXP TXN12 C
PA EXP TXP13	PAC30	0.22u/4/X5R/6.3V/K	PA EXP TXP13 C
PA EXP TXN13	PAC31	0.22u/4/X5R/6.3V/K	PA EXP TXN13 C
PA EXP TXP14	PAC32	0.22u/4/X5R/6.3V/K	PA EXP TXP14 C
PA EXP TXN14	PAC33	0.22u/4/X5R/6.3V/K	PA EXP TXN14 C
PA EXP TXP15	PAC34	0.22u/4/X5R/6.3V/K	PA EXP TXP15 C
PA EXP TXN15	PAC35	0.22u/4/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]

The auxiliary reset circuit is only required for PCIe Gen3 margining and functional link training



PCIEX16 SLOT



BLACK CONNECTOR

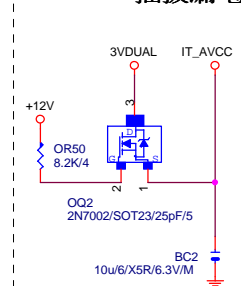
Gigabyte Technology

Title			
PCI EXPRESS * 16			
Size	Document Number	Rev	
Custom	GA-Z87N-WIFI	2.02	
Date:	Monday, January 06, 2014	Sheet	14 of 31

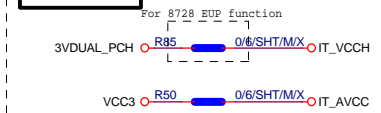
SIO IT8728F

【技術通報R&D技術通報151】
有使用PRINT PORT的 MODEL
需使用新料號:10HP2-118728-72R

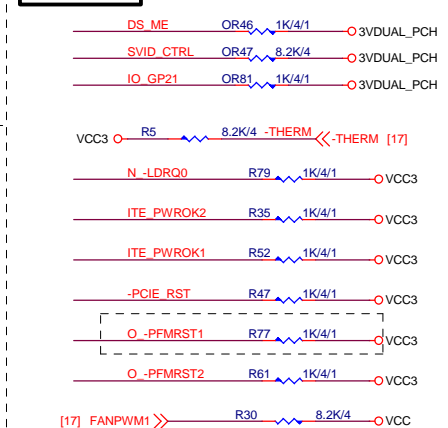
FIX ATX 插拔漏電



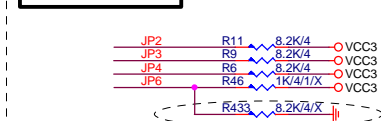
PWR SHT



SIO PU



SIO STRAP



IT8728-EX
PULL DOWN ENABLE OVP

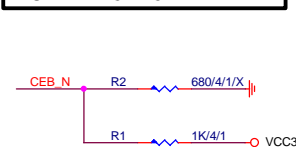
EUP control by PCH
3VDUAL 100u/4V1 R83 28_3VSB

JP3--- High SPI-Flash Disable
Low SPI-Flash Enable

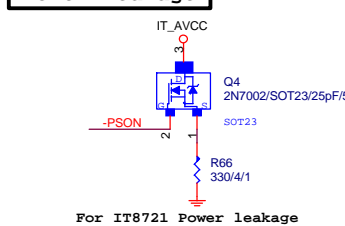
IT8728F NOTE

	IT8728
PIN121	VCORE_EN/PCH_C0
PIN120	VLDI_EN/PCH_D0
PIN19	ATXPG
PIN31	PCH_C1
PIN53	SST/AMDTSI_D/MTRB#/PCH_D1
PIN55	PECI/AMDTSI_C/DRV#
PIN66	SYS_3VSB
PIN70	GP47
PIN95	VIN2 (VCC5)
PIN96	VIN1 (VCC12)
PIN97	VIN1/VDIMM_STR(1.5V)
PIN98	VIN0/VCORE(1.1V)/NC

DUAL BIOS OPT STRAP

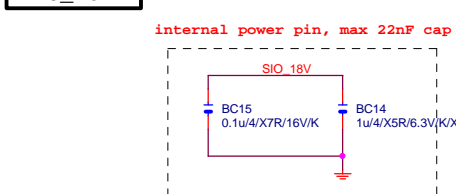


Power leakage



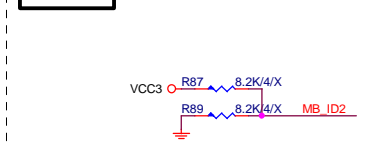
For IT8721 Power leakage

SIO_18V



FOR LOW TEMP POWER ON INTO TEST MODE ISSUE

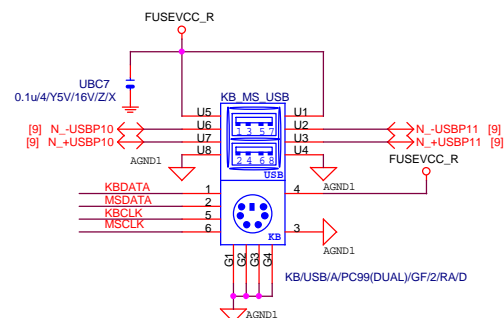
MB ID



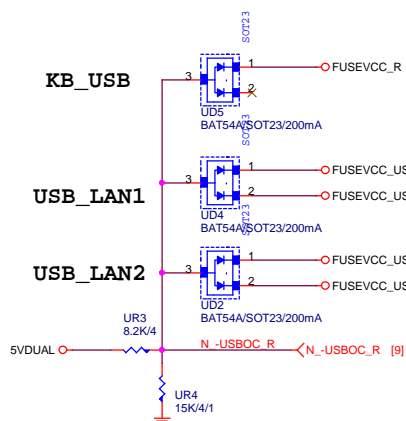
Gigabyte Technology

Title			ITE 8728 LPC IO
Size	Document Number	Rev	
Custom	GA-Z87N-WIFI	2.02	
Date:	Monday, January 06, 2014	Sheet	15 of 31

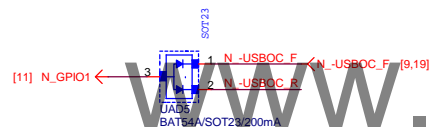
KB/MS



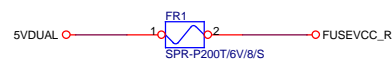
-USBOC R



USB POWER PROTECT

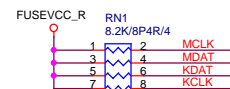


USB2.0 PWR

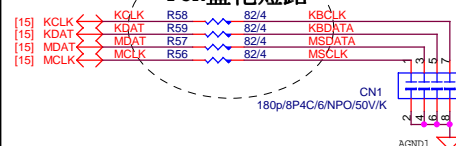


Close to connector
KB_MS_USB 2-Port 2.0A

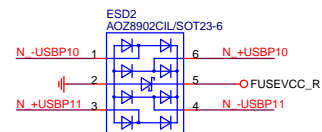
KB MS



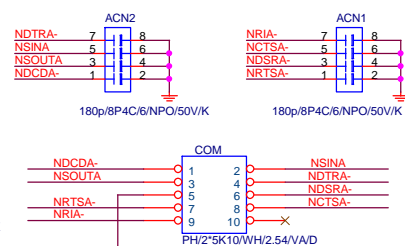
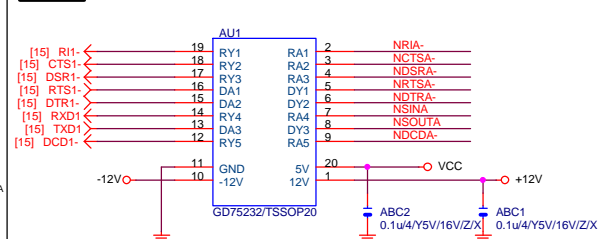
FOR鹽化短路



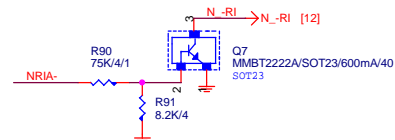
USB2.0 ESD



COM



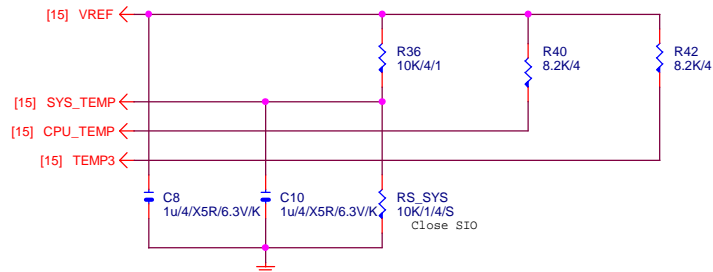
COM RI



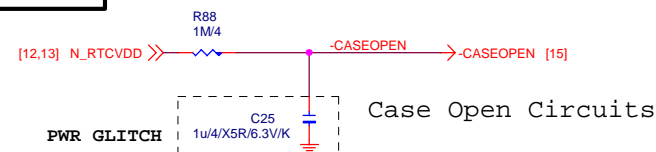
Gigabyte Technology

Title			
COM,-RI,KB_USB,USB_ESATA,-PROCHOT			
Size	Document Number	Rev	
Custom	GA-Z87N-WIFI	2.02	
Date:	Monday, January 06, 2014	Sheet	16 of 31

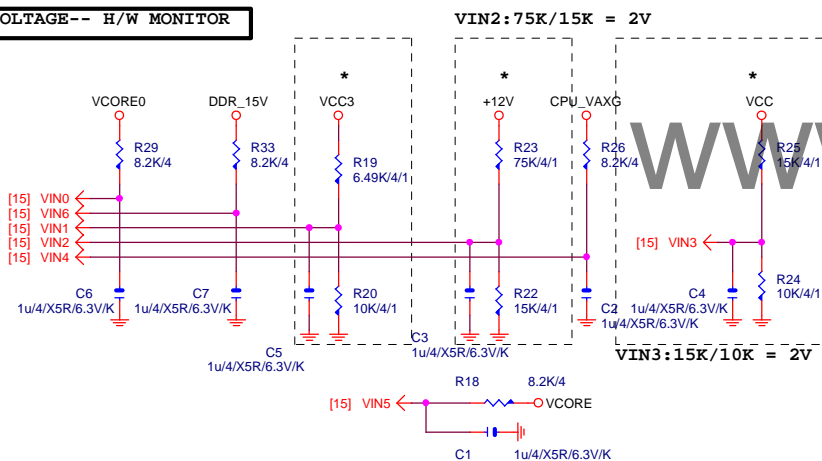
TEMP H/W MONITOR



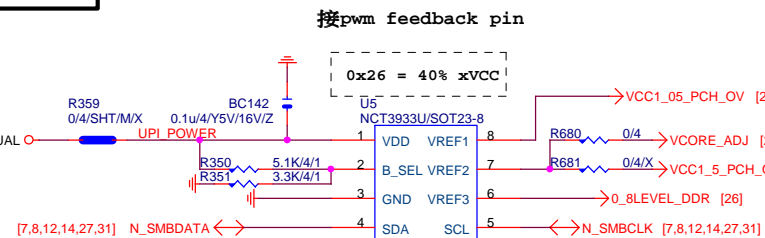
CASE OPEN



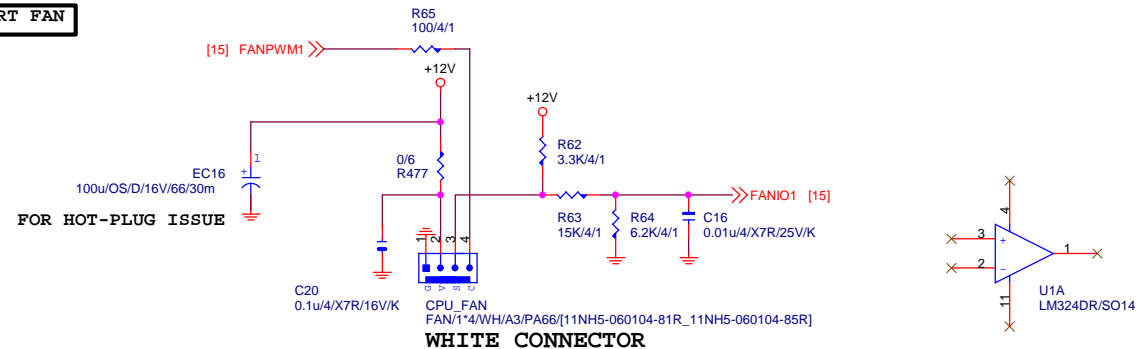
VOLTAGE-- H/W MONITOR



OV NCT3933

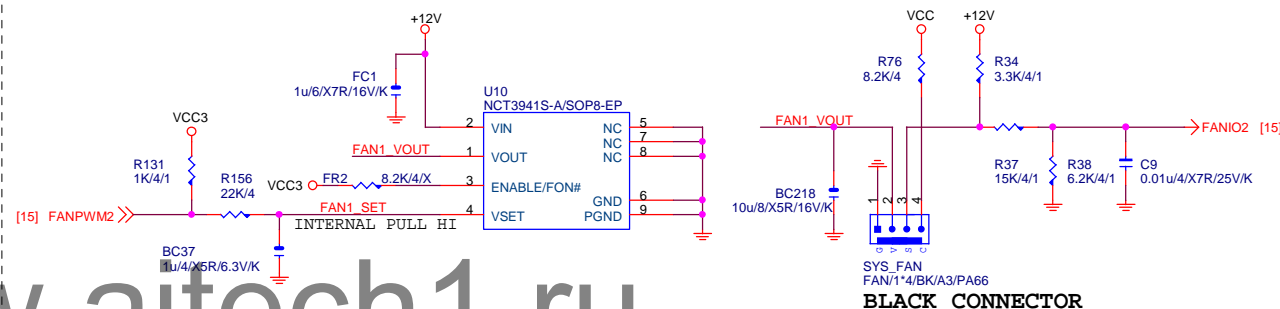


CPU SMART FAN



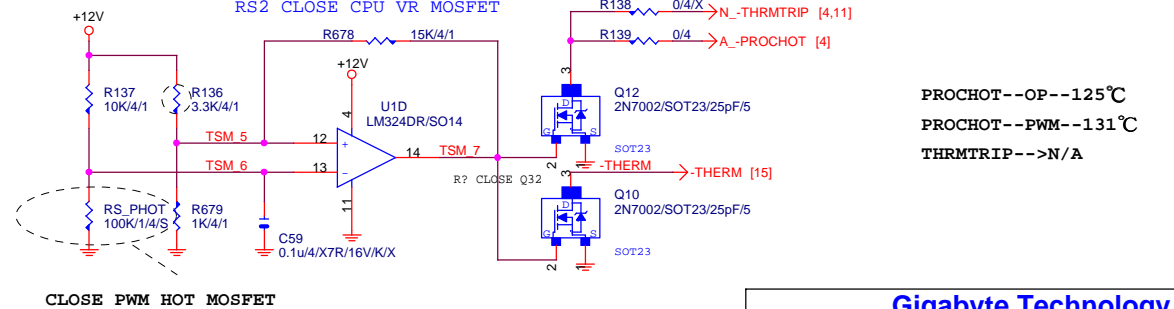
SYS SMART FAN

```
Linear SYS_FAN
```



-PROHOT

```
deasserted at 116 degree
RS2 CLOSE CPU VR MOSFET
```

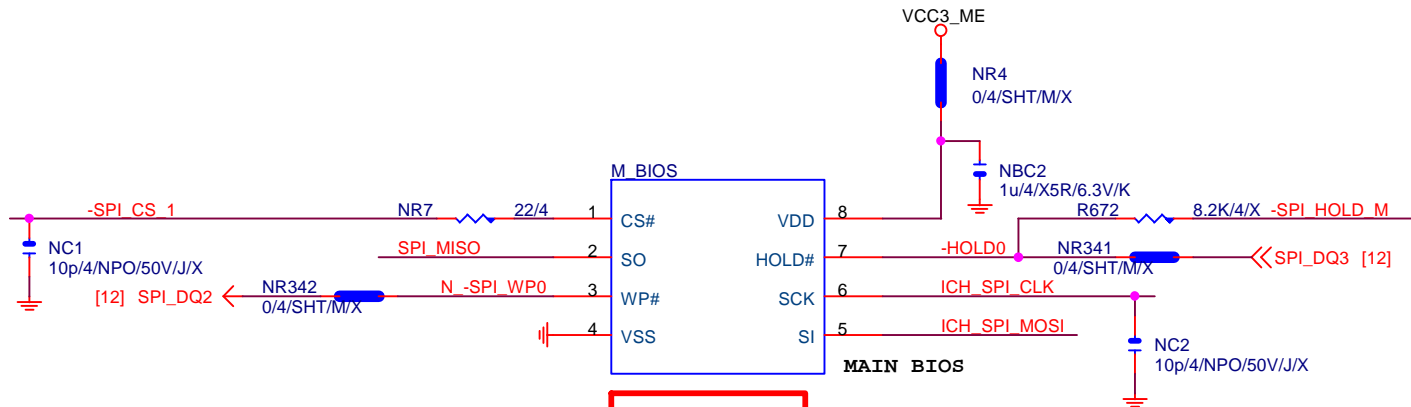


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HWM,FAN CTRL,OV

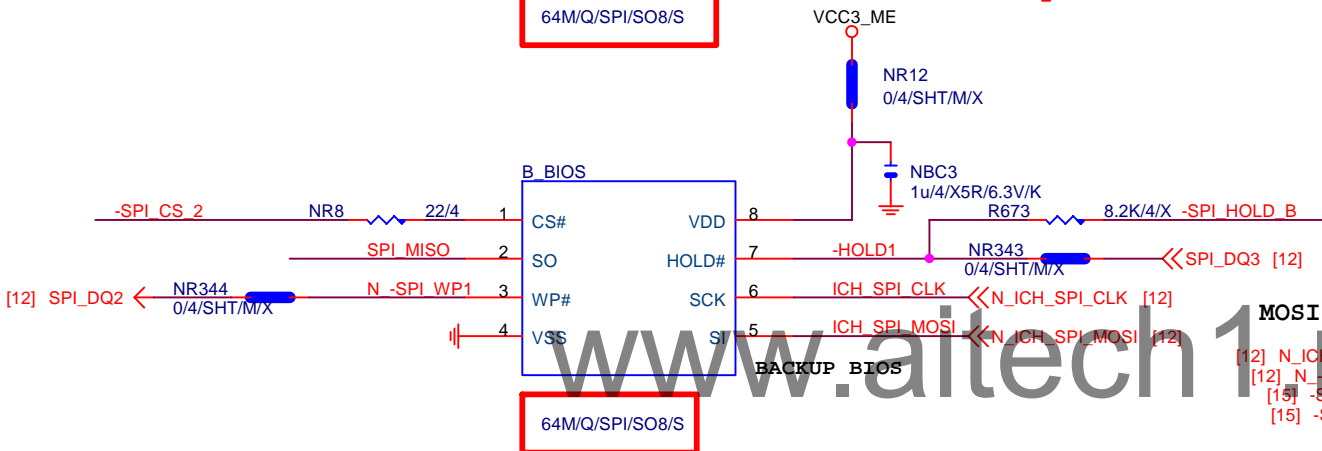
Size Custom	Document Number GA-Z87N-WIFI	Rev 2.02
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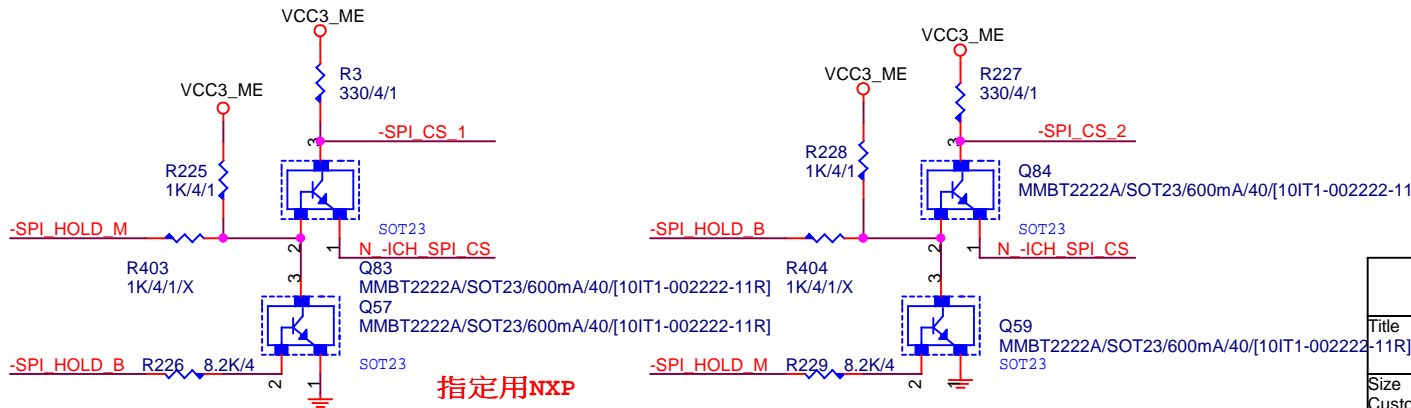
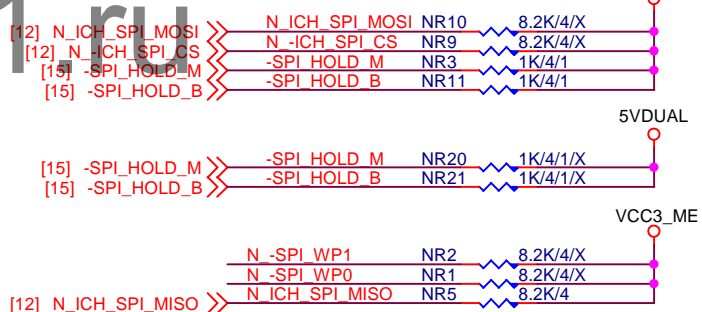


BOOT DEVICE	GNT0	GNT1
LPC	0	0
PCI	0	1
NAND	1	0
SPI	1	1

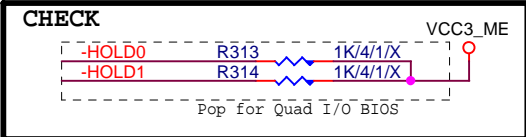
1 means floating
0 means PD 1K



MOSI For DMI RX Termination Voltage



指定用NXP



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DUAL BIOS

GA-Z87N-WIFI

Title

Size Custom

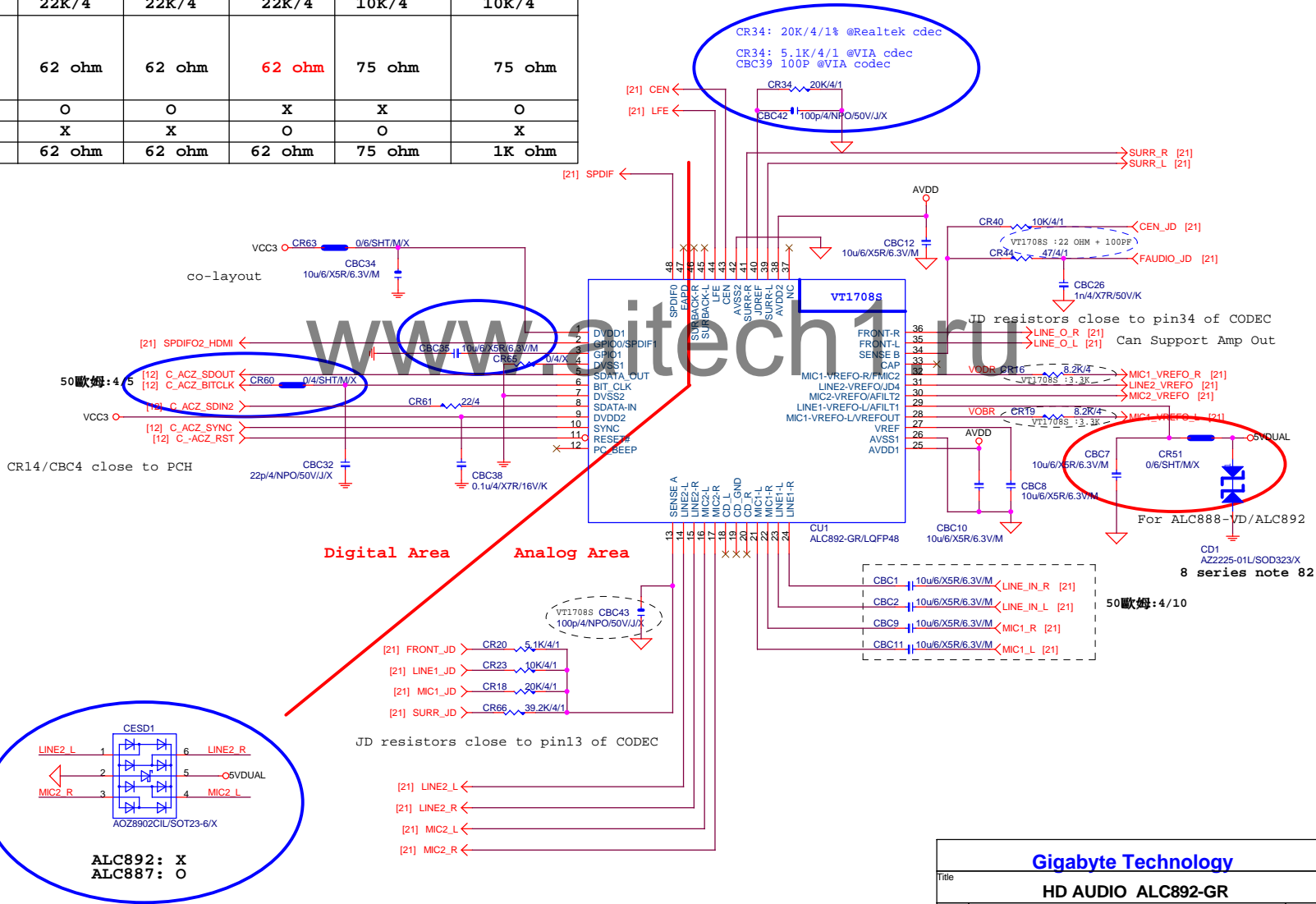
Document Number

Monday, January 06, 2014

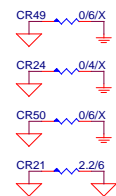
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Rev 2.02

	ALC662	ALC887-VD2	ALC889	VT1708S	VT1708SCE
CR65	X	X	O	O	X
CR64	X	X	X	X	0.1u/4
CBC35	O	O	X	X	O
CR44/CBC6	47ohm+1nF	47ohm+1nF	47ohm+1nF	22ohm+100P	22ohm+100P
CR31	X	O	O	O	O
CR30	O	X	X	X	X
CBC1/CBC2	22uF/X5R	22uF/X5R	22uF/X5R	22uF/X5R	22uF/X5R
CR20	5.11K/4/1	5.11K/4/1	5.11K/4/1	5.1K/4/1	5.1K/4/1
CR34	20K/4/1	20K/4/1	20K/4/1	5.1K/4/1	20K/4/1
CBC39/CBC40	N/A	N/A	N/A	100P/4	100P/4
CR6/CR7/CR54/CR58	22K/4	22K/4	22K/4	10K/4	10K/4
CR5/CR8/CR11/CR4/ CR17/CR22/CR45/CR33/ CR47/CR40/CR26/CR37/ CR13/CR11/CR57/CR53	62 ohm	62 ohm	62 ohm	75 ohm	75 ohm
CR51/CD1/CBC7	O	O	X	X	O
CD2/CD3/CQ3/CQ5	X	X	O	O	X
CR1/CR14/CR17/CR22	62 ohm	62 ohm	62 ohm	75 ohm	1K ohm

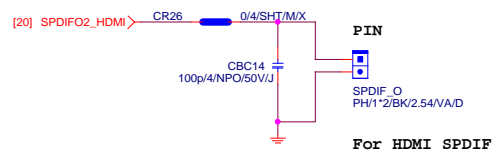


CODEC POWER/EMI PAD

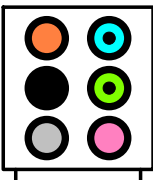


ADD CD2 For ESD PROTECT DIODE

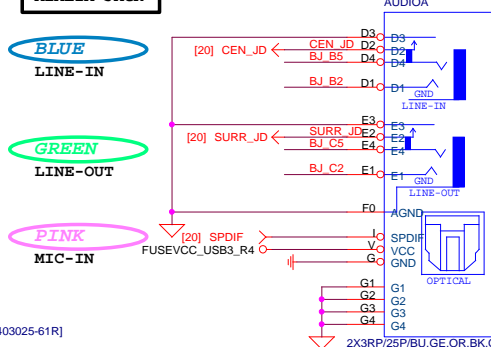
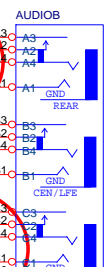
SPDIF_OUT



AZALIA JACK

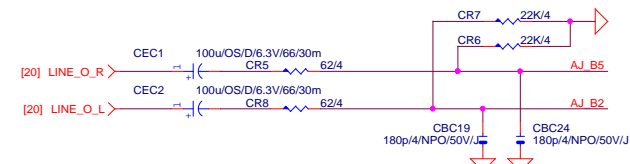


AZALIA JACK

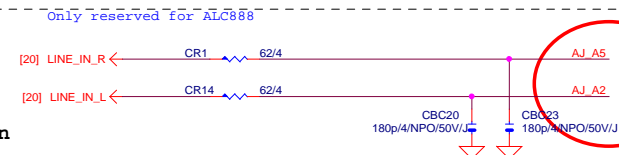
BLUE
LINE-INGREEN
LINE-OUTPINK
MIC-INOrange
CEN/LFEBlack
SURROUND

SPDIF

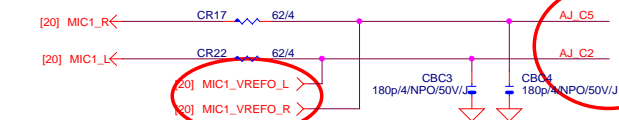
LINE-OUT



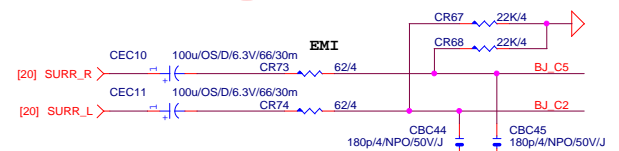
LINE-IN

Verify MIC function
in LINE-in

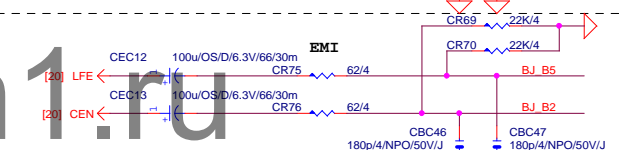
MIC-IN



SURROUND

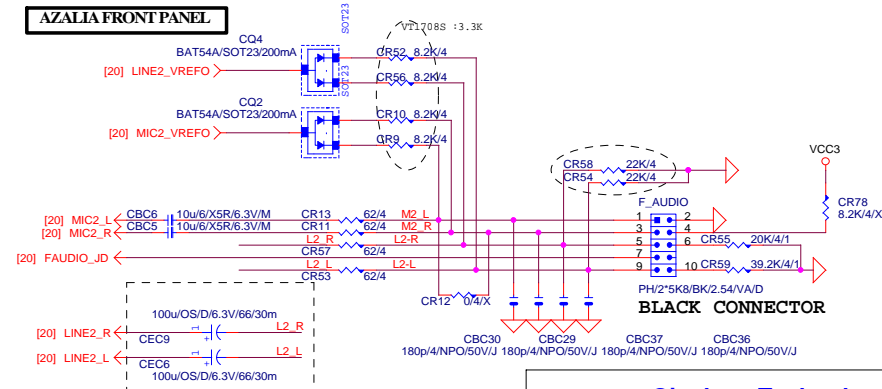


CEN/LFE



SURRBACK

AZALIA FRONT PANEL



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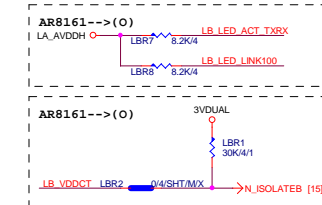
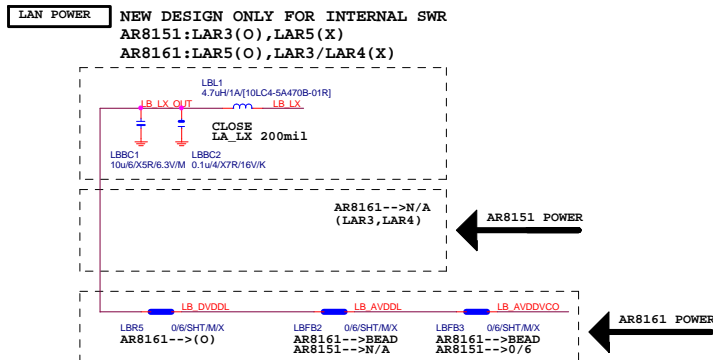
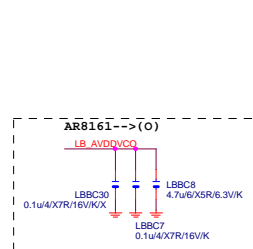
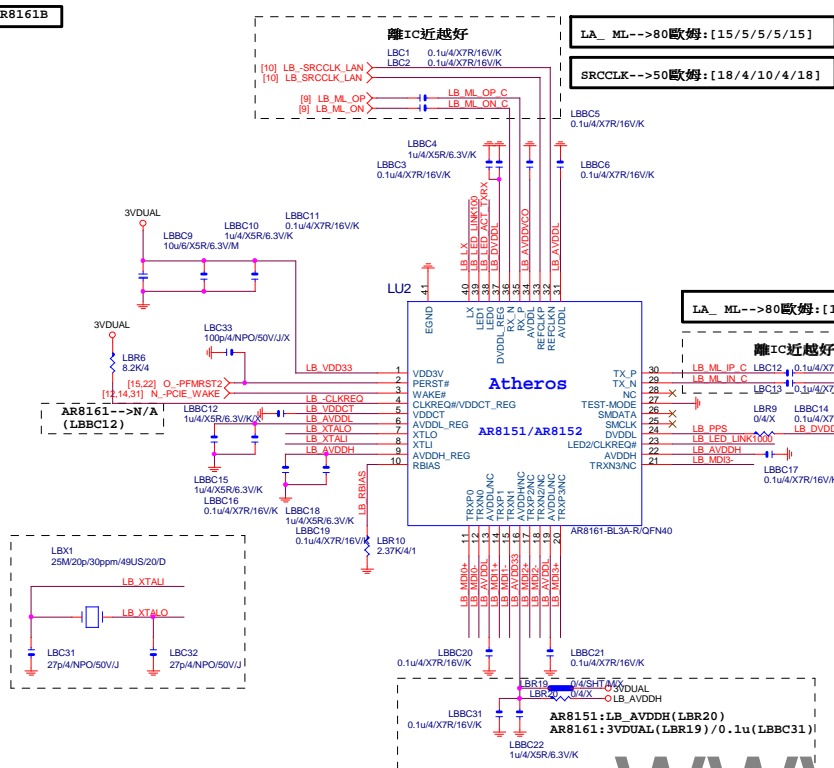
AUDIO JACK

GA-Z87N-WIFI

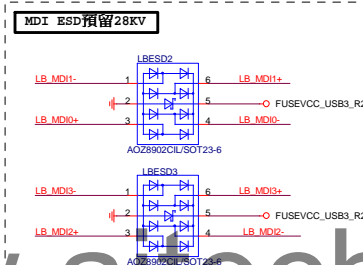
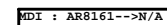
Rev
2.02

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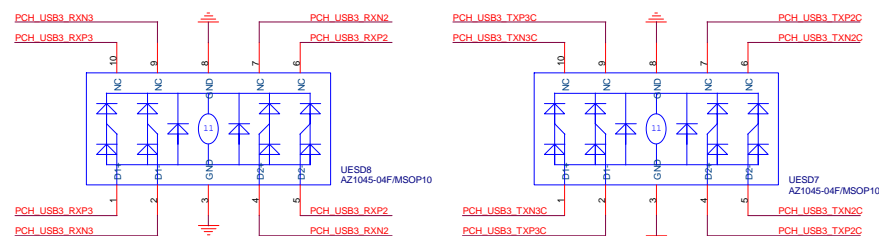
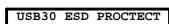
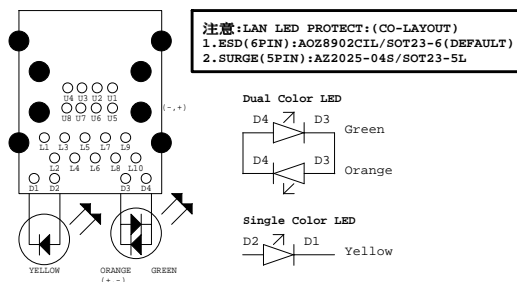
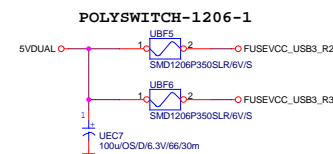
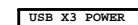
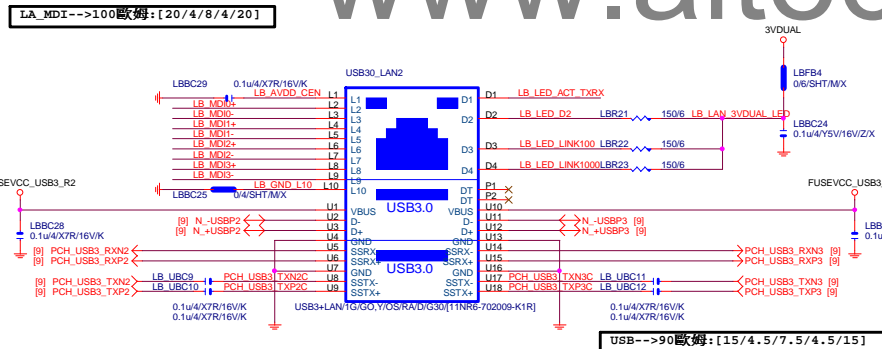
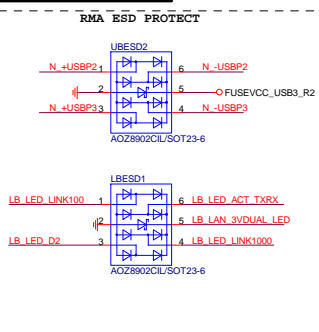
LAN:AR8161B

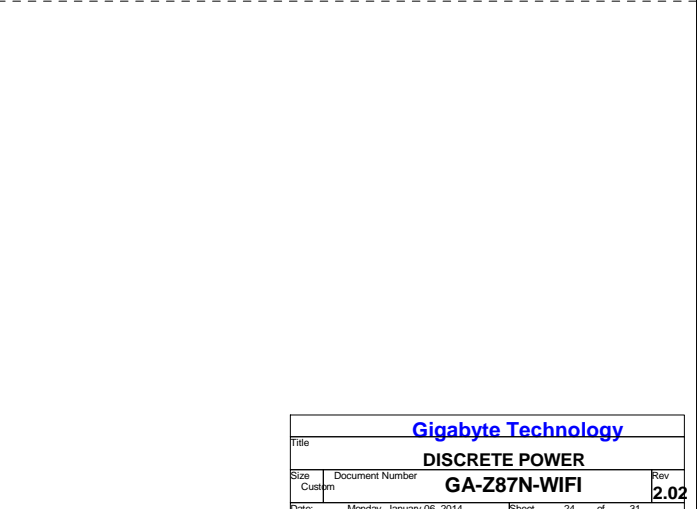
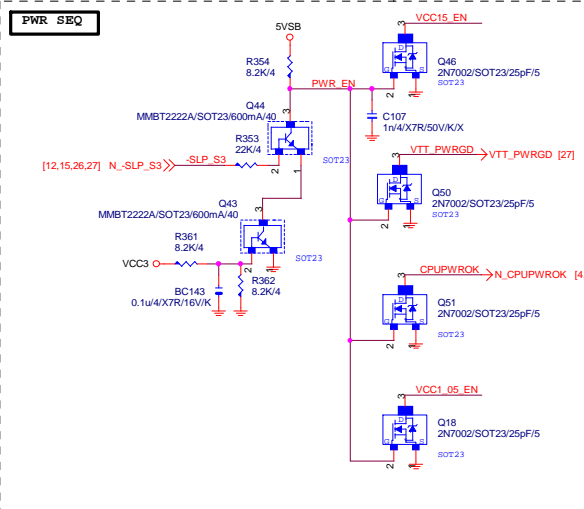
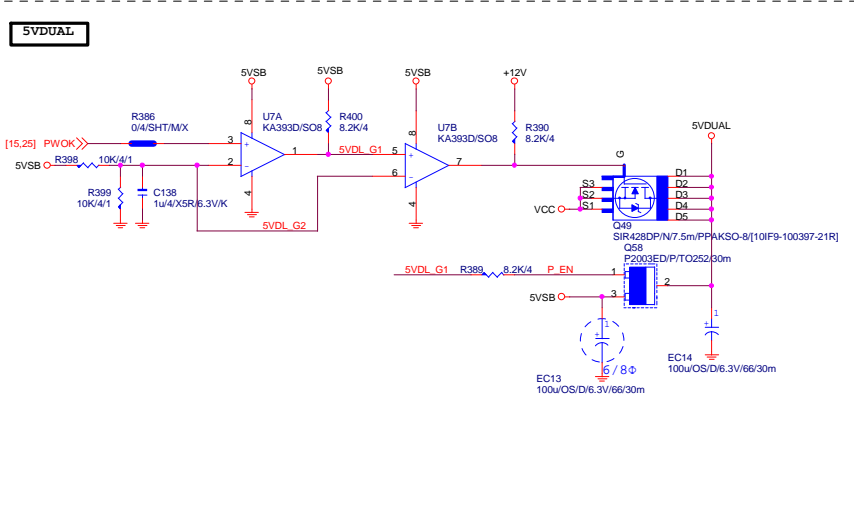
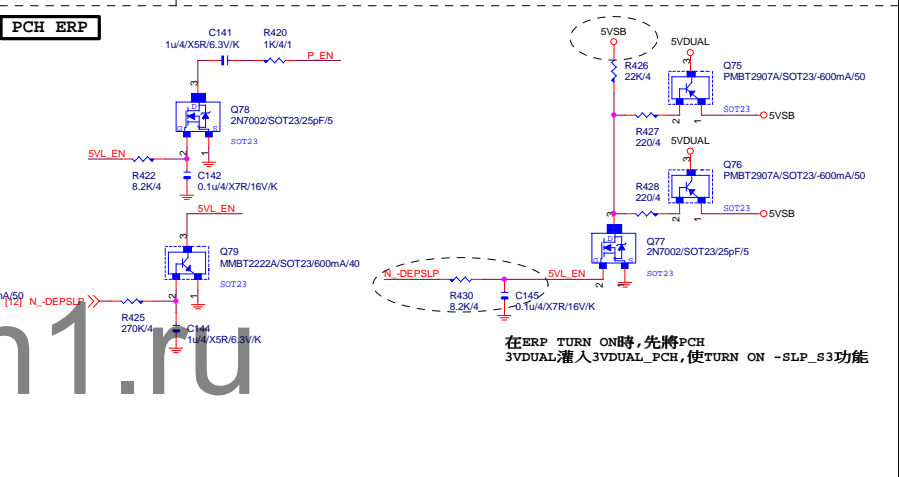
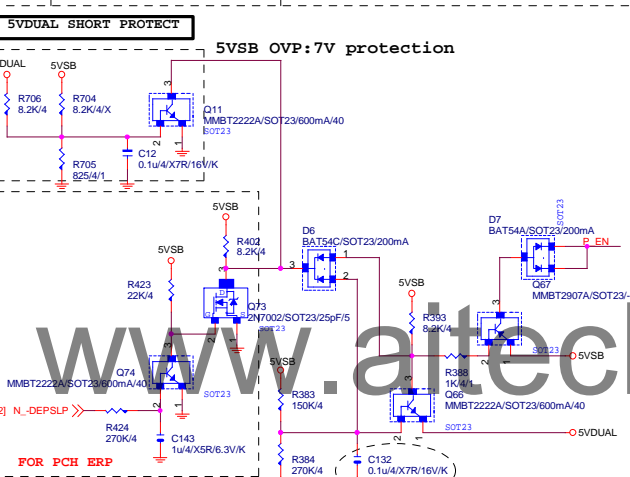
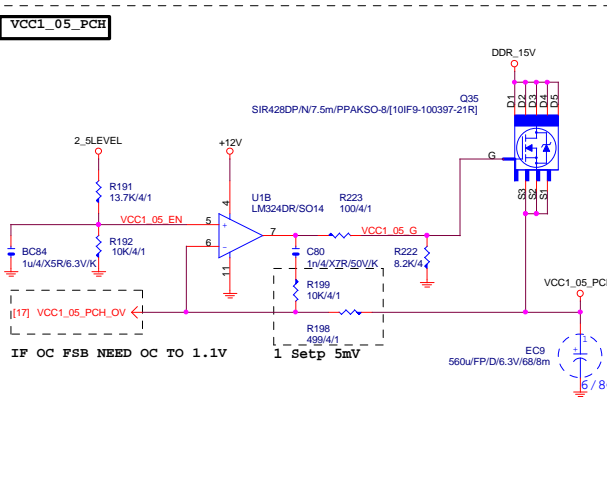
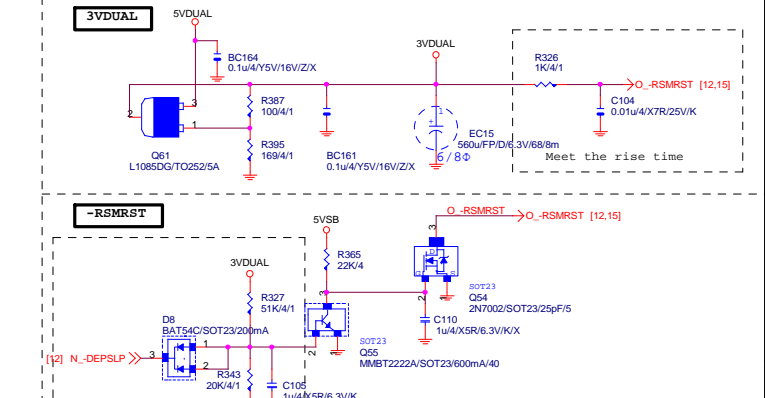
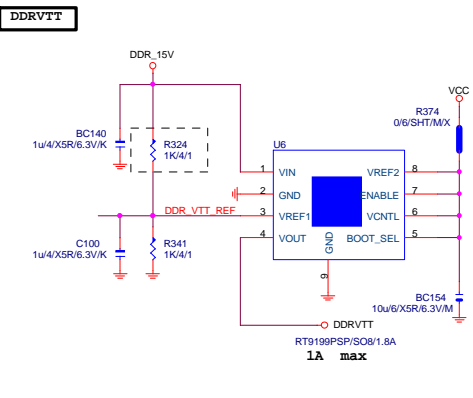
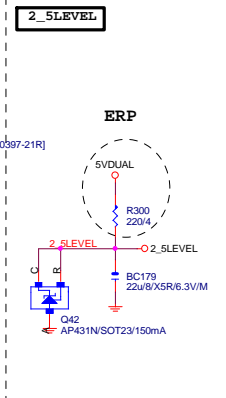
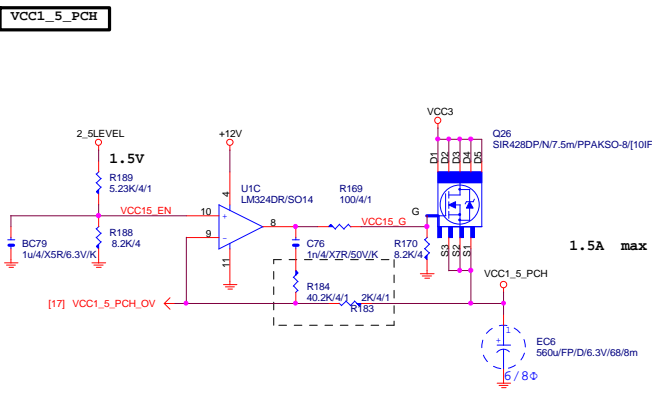


	AR8151	AR8161
AVDD33	N/A	3.3V
VDD33	3.3V	3.3V
AVDDH	2.7V	2.7V
AVDDL/DVDDL	1.1V	1.1V
VDDCT	1.7V	

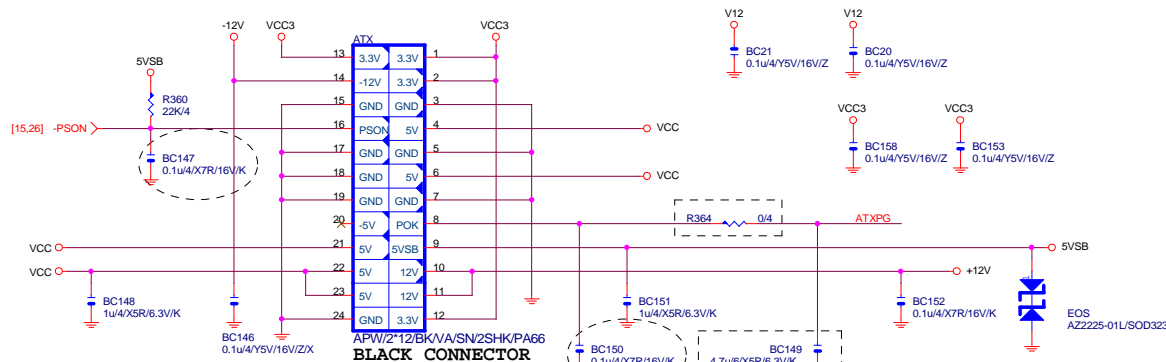


USB LAN CONNECTOR

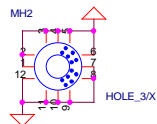




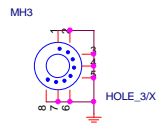
ATXX24 POWER CONNECTOR



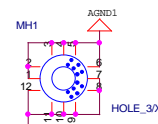
MB LOCATION



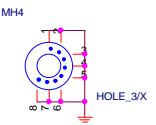
HOLE_4-RH-5MM-1



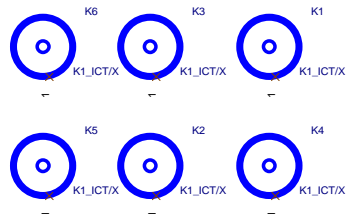
HOLE_4-RH-5MM-5PIN-1



HOLE_4-RH-5MM-1

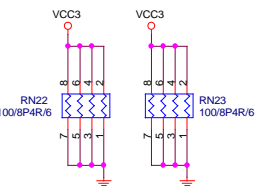


HOLE_4-RH-5MM-5PIN-1

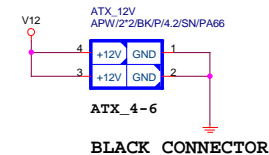


To prevent the 5VSB under loading when boot

FIX PWR MINMUN LOAD

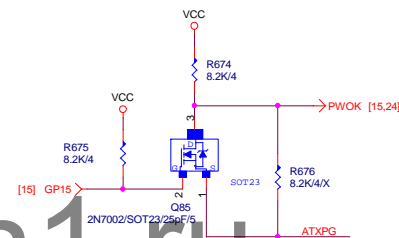


ATXX4 POWER CONNECTOR

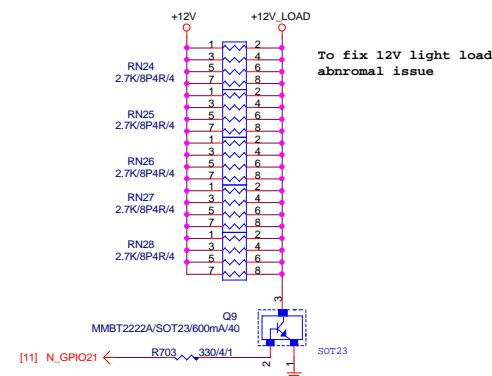


PWOK PATCH

【技術通報R&D技術通報154】



【技術通報R&D技術通報153】



To fix 12V light load abnormal issue

CLK GEN

N/A

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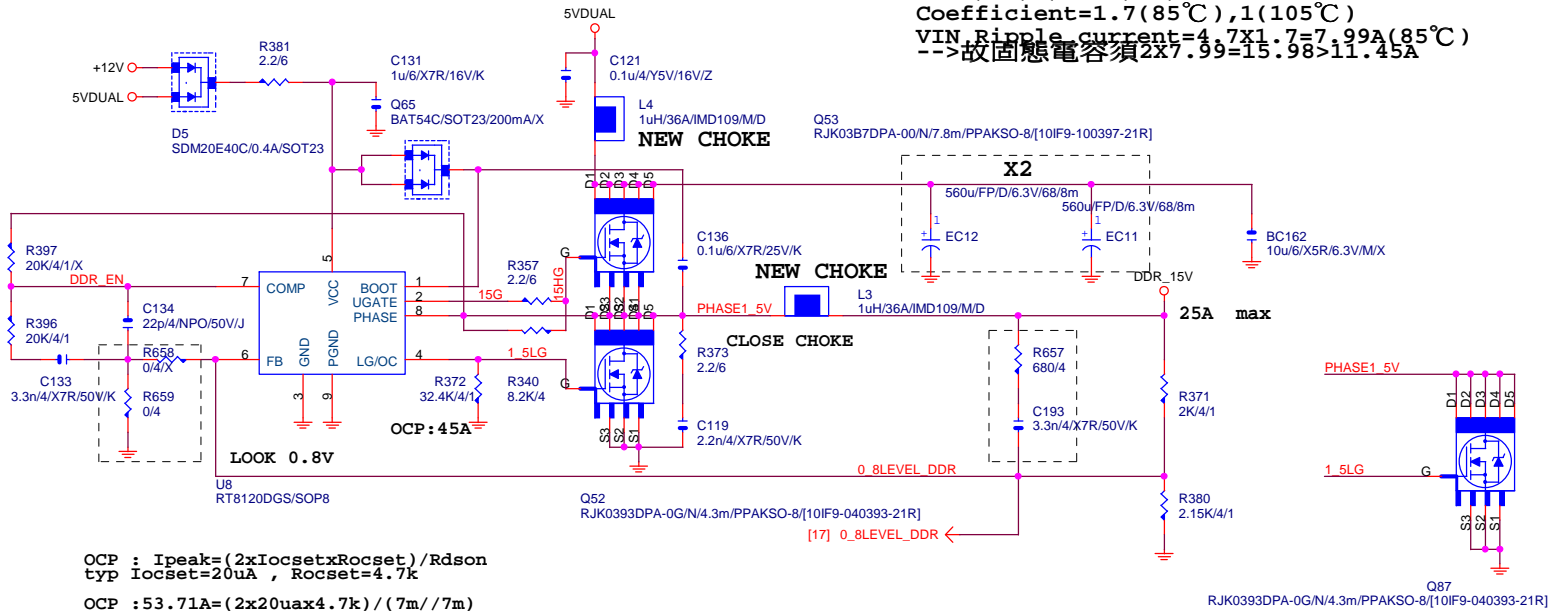
ATX CONNECTOR

GA-Z87N-WIFI

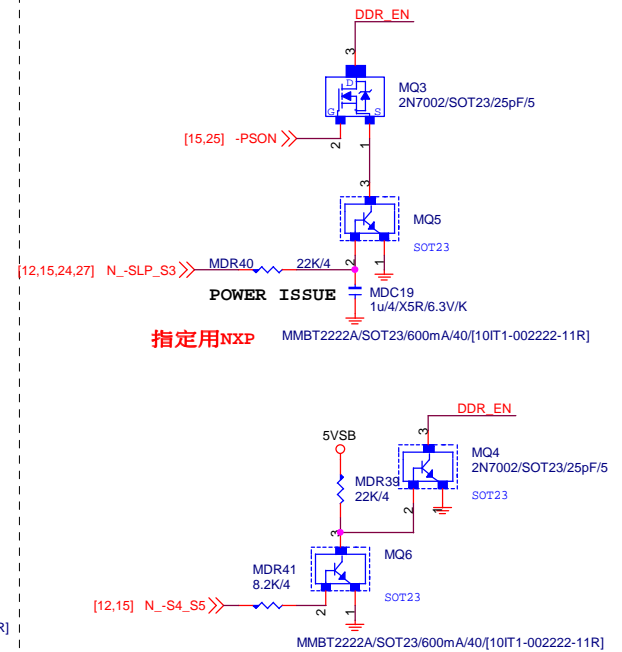
Rev 2.02

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DDR15V



PWR SEQ

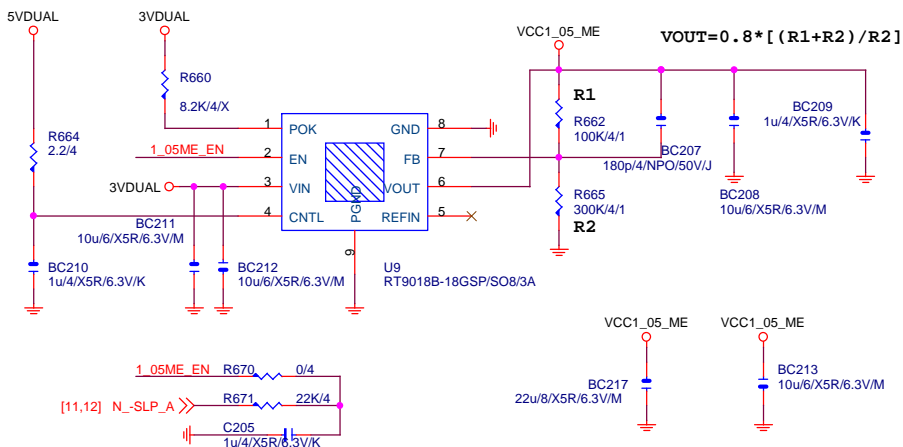


VCC1_05_ME

Z87 N/A

Z87+I217V

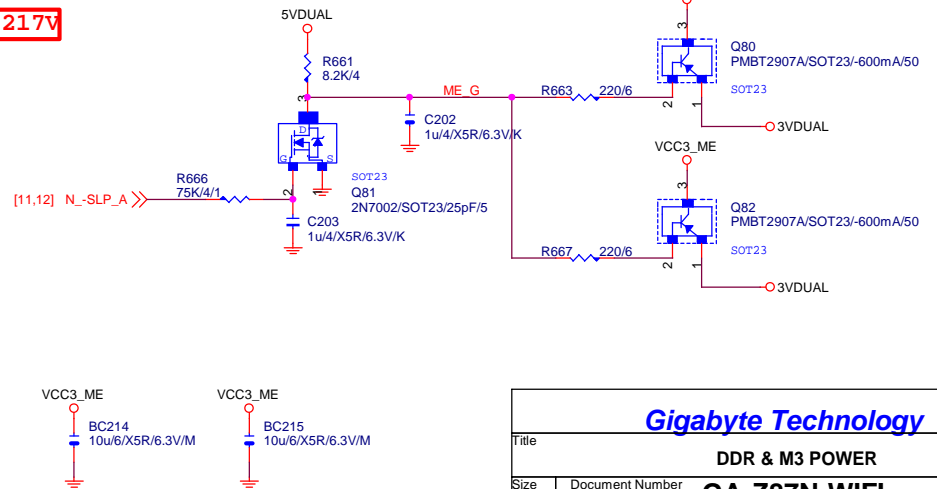
【技術通報R&D技術通報156】
 (RICHTEK), (NUVOTON), (EMC)做共用
 PIN7分壓阻值須做修改為100K以上電阻值



VCC3_ME

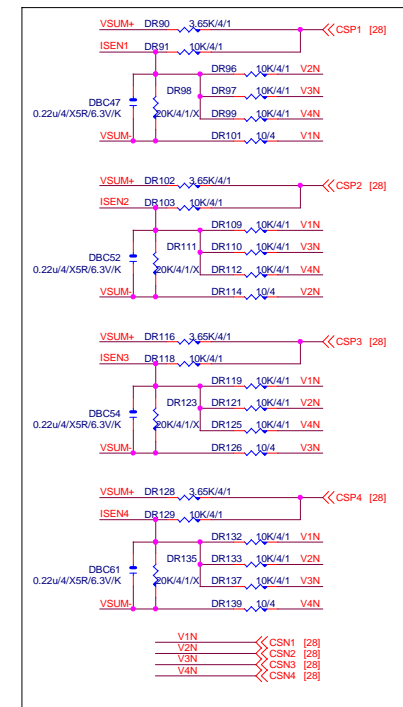
Z87 N/A

Z87+I217V

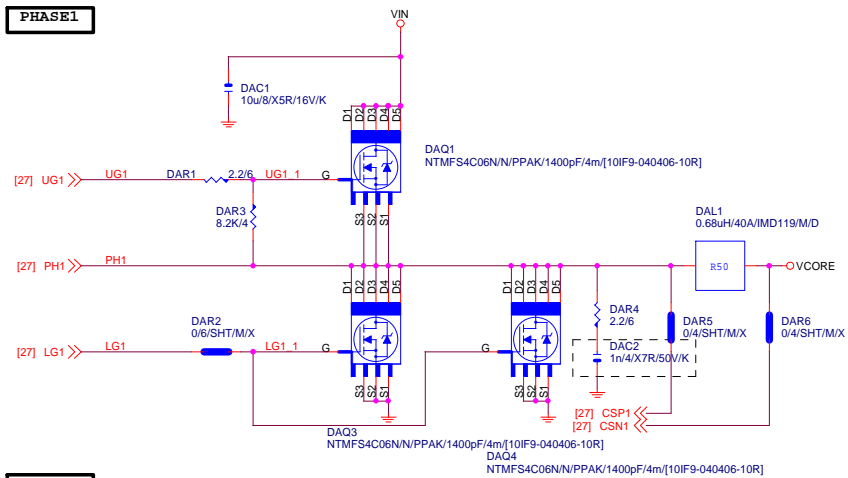


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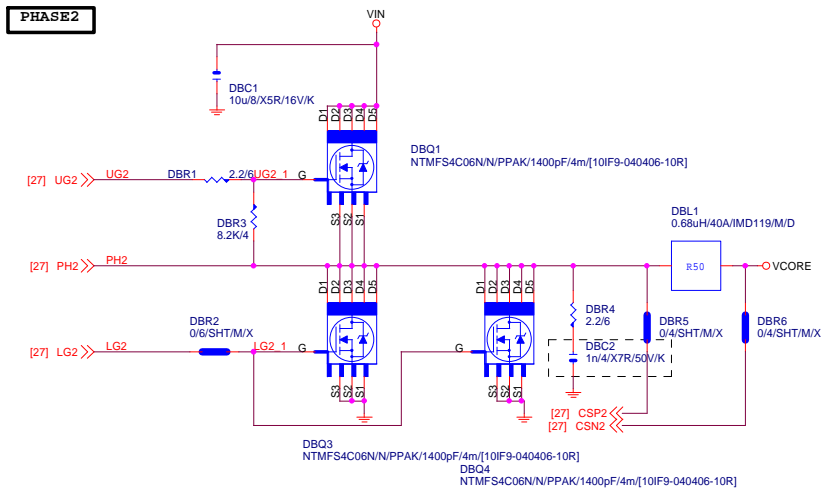
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DDR & M3 POWER			
Size	Document Number	Rev	
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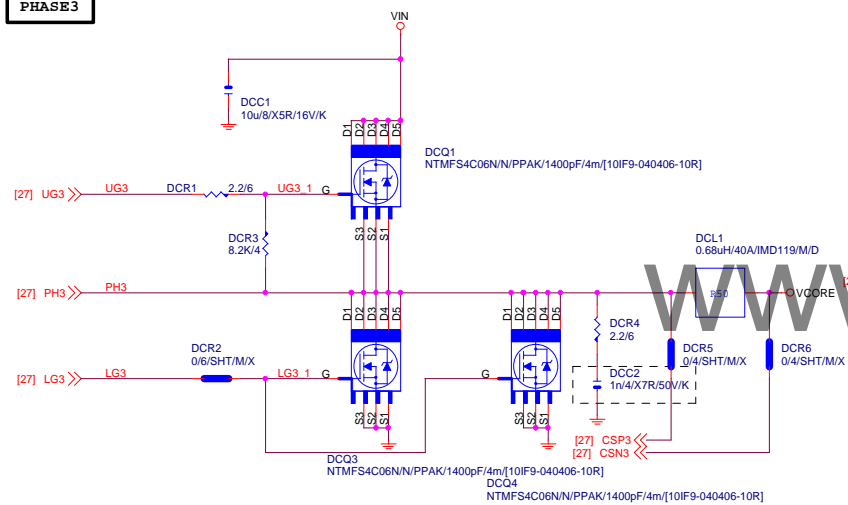
PHASE1



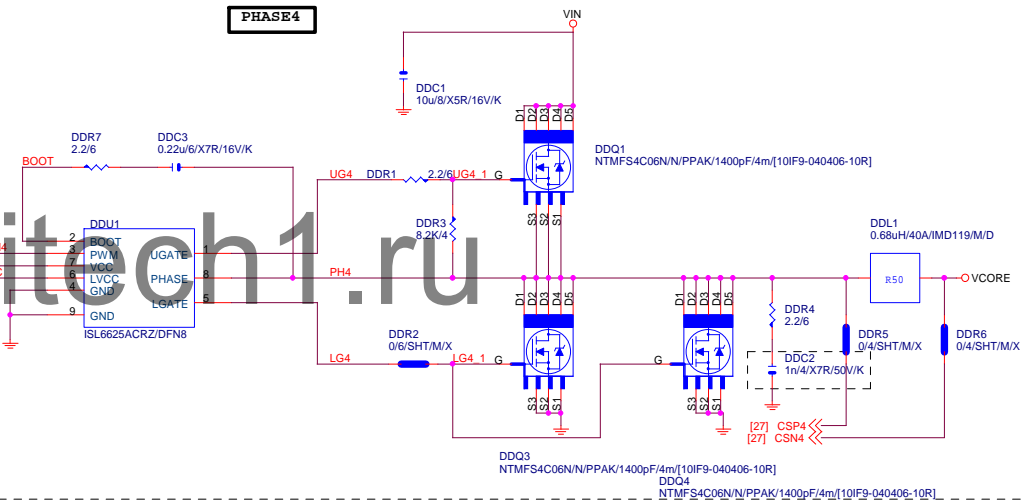
PHASE2



PHASE3

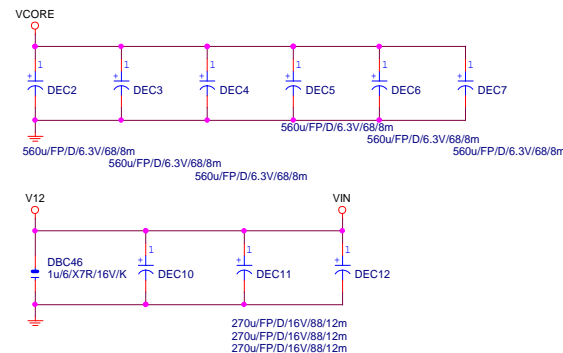


PHASE4



MOS HEATSINK

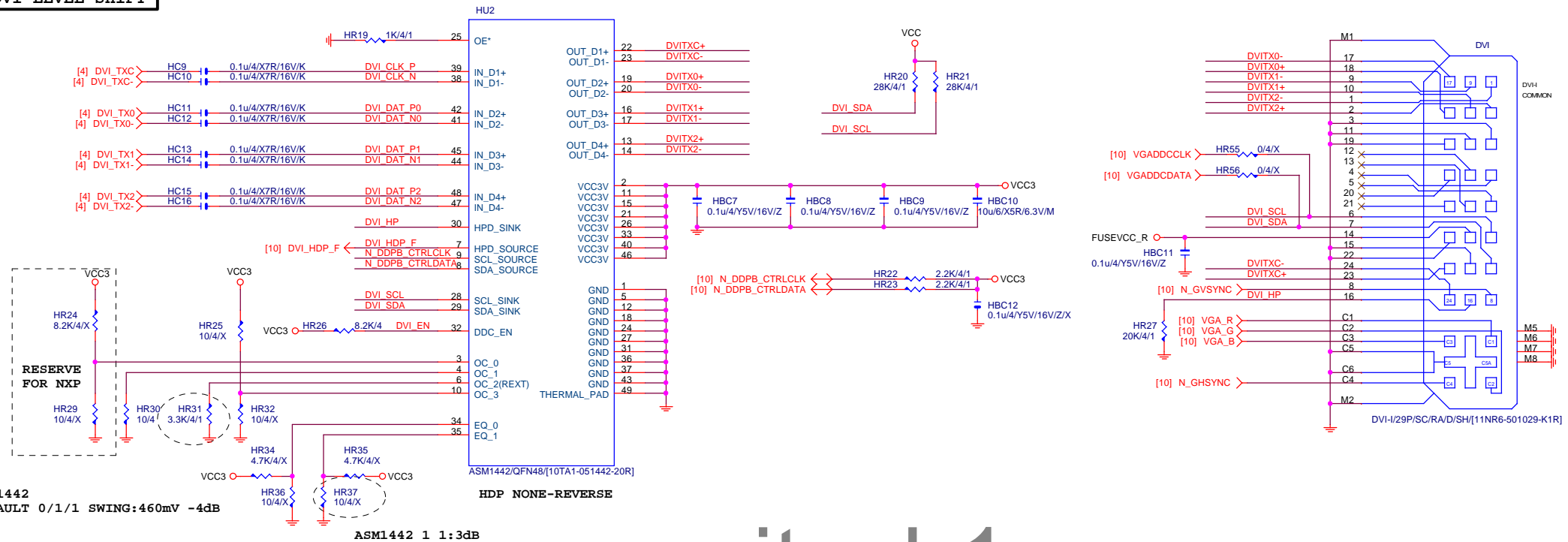
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Gigabyte Technology

Title			CPU CORE VR-2
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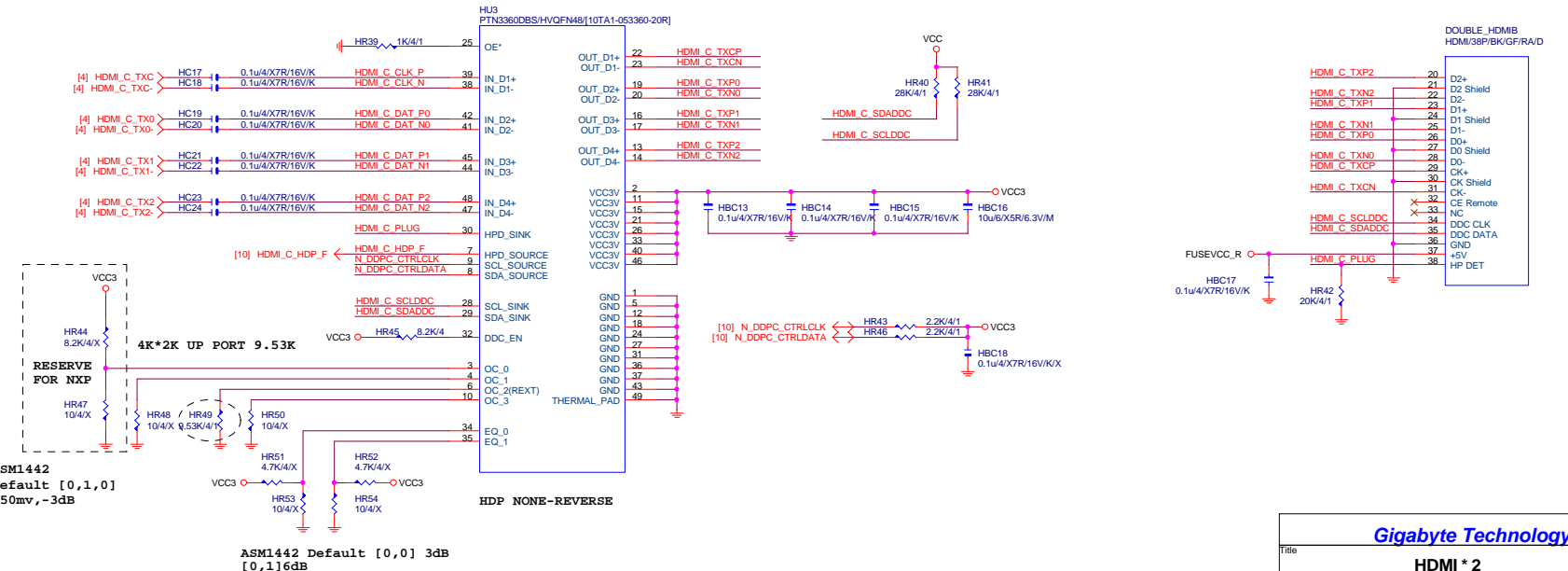
DVI LEVEL SHIFT



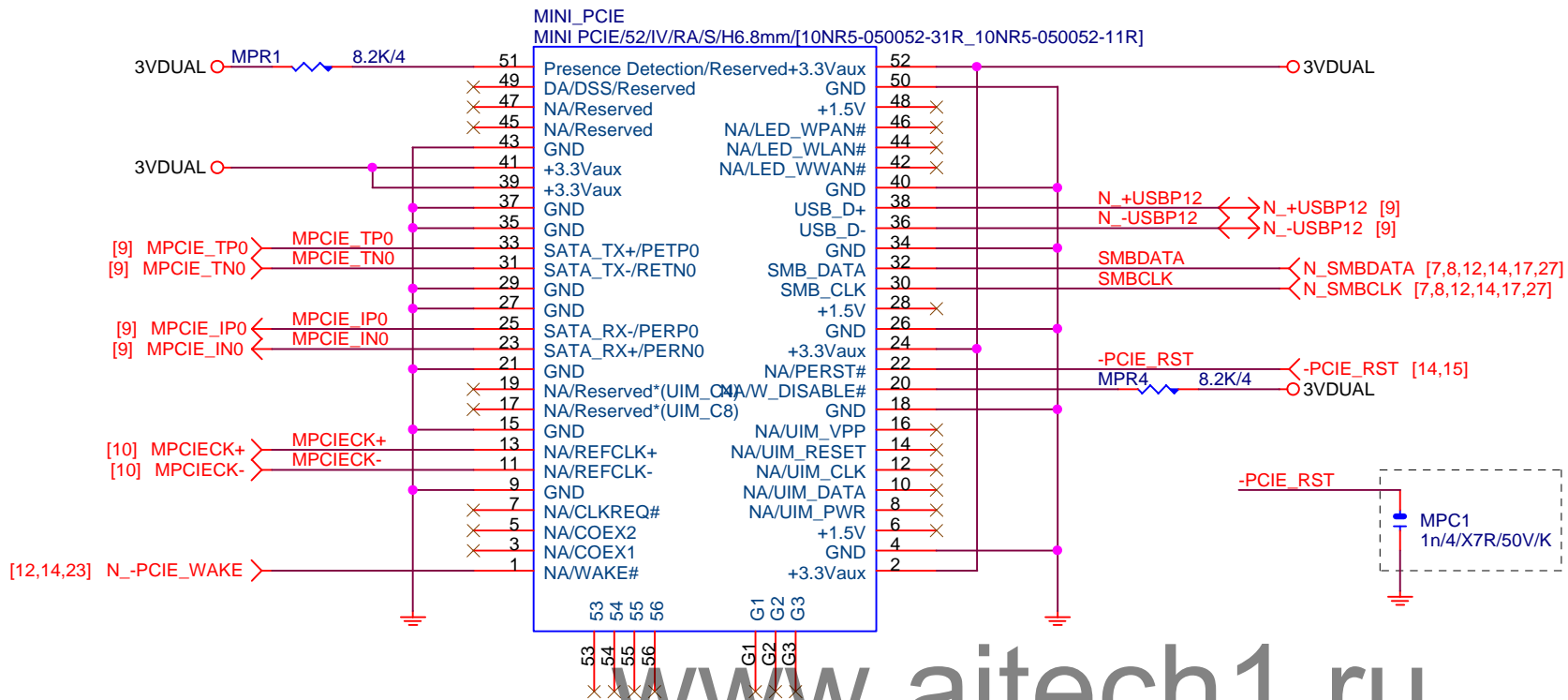
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Gigabyte Technology			
Title			
DVI			
Size	Document Number	GA-Z87N-WIFI	
Custom			Rev 2.02
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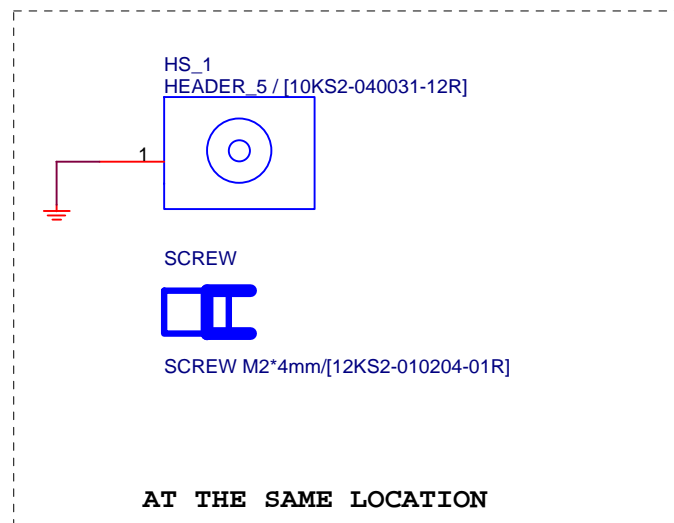
HDMI LEVEL SHIFT



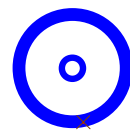
Title			
HDMI * 2			
Size	Document Number	Rev	
Custom	GA-Z87N-WIFI	2.02	
Date:	Monday, January 06, 2014	Sheet	30 of 31



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ANTENNA_BRACKET
BRACKET/[12AC2-000001-01R]



ANT1
SMA/[11NH6-010001-11R]



ANT2
SMA/[11NH6-010001-11R]

Intel 7260 - 2x2 11ac combo



WIFI_MODULE
WI-FI WITH BT MINI CARD INTEL/[20CB1-027260-00R]

Gigabyte Technology			
Title			
mini PCI-E			
Size A	Document Number	GA-Z87N-WIFI	Rev 2.02
Date:	Monday, January 06, 2014	Sheet 31 of 31	