

Model Name: GA-H87N

Revision 1.11

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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Title		Cover Sheet	
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Custom			1.11
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**Model Name: GA-H87N**

Revision 1.11

## Component value change history

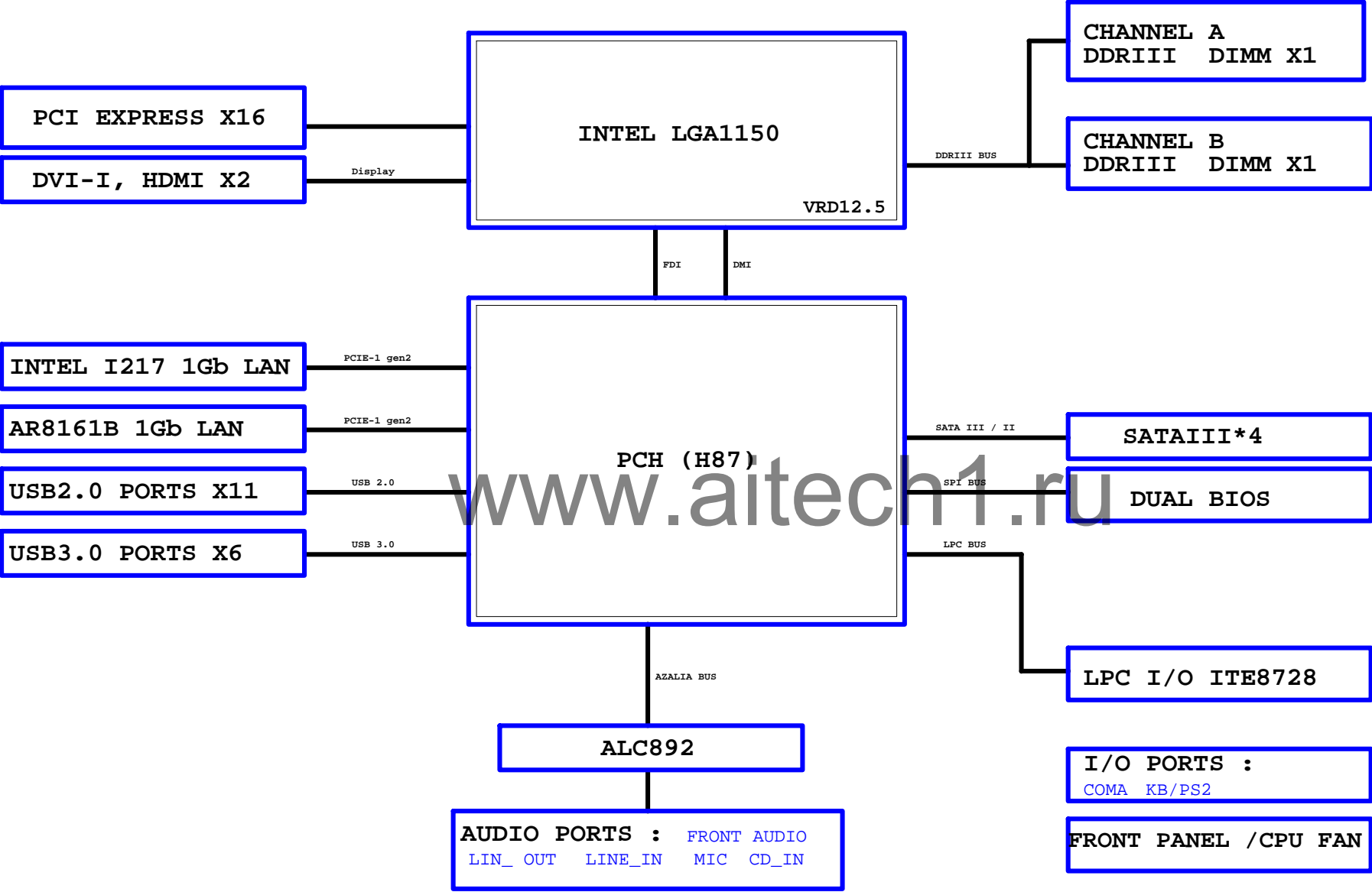
2013/08/15

[illegible]

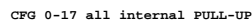
## Circuit or PCB layout change

[illegible]

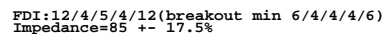
BLOCK DIAGRAM



(E)



(D)

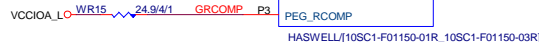


FDI\_TXP[0..1] >> FDI\_TXP[0..1] [9]

FDI\_TXN[0..1] >> FDI\_TXN[0..1] [9]

(C)

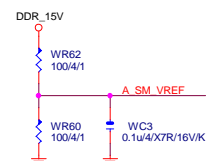
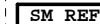
LGA11



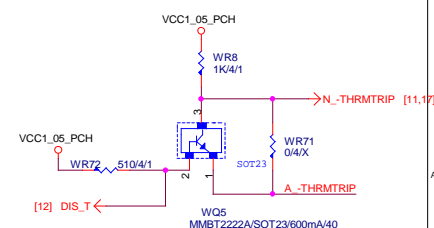
100

PA EXP TXP[0..15] >> PA\_EXP\_TXP[0..15] [14]  
PA EXP TXN[0..15] >> PA\_EXP\_TXN[0..15] [14]  
PA EXP RXP[0..15] >> PA\_EXP\_RXP[0..15] [14]  
PA EXP RXN[0..15] >> PA\_EXP\_RXN[0..15] [14]

## CPU PU/PD



THRMTrip DISABLE



## Gigabyte Technology

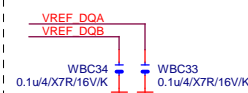
CPU LGA1150-A

Title				CPU LGA1150-A			
Size	Document Number	GA-H87N				Rev	
Custom						1.1	
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LGA1150A			
MAAA0	AU13	DDR0_M0	DDR0_DQ0
MAAA1	AV16	DDR0_M1	DDR0_DQ1
MAAA2	AU16	DDR0_M2	DDR0_DQ2
MAAA3	AW17	DDR0_M3	DDR0_DQ3
MAAA4	AU17	DDR0_M4	DDR0_DQ4
MAAA5	AU18	DDR0_M5	DDR0_DQ5
MAAA6	AV17	DDR0_M6	DDR0_DQ6
MAAA7	AT18	DDR0_M7	DDR0_DQ7
MAAA8	AU18	DDR0_M8	DDR0_DQ8
MAAA9	AT19	DDR0_M9	DDR0_DQ9
MAAA10	AW11	DDR0_M10	DDR0_DQ10
MAAA11	AV19	DDR0_M11	DDR0_DQ11
MAAA12	AU19	DDR0_M12	DDR0_DQ12
MAAA13	AY10	DDR0_M13	DDR0_DQ13
MAAA14	AT20	DDR0_M14	DDR0_DQ14
MAAA15	AU21	DDR0_M15	DDR0_DQ15
MODT_A0	AW10	DDR0_ODT0	DDR0_ODT0
MODT_A1	AY8	DDR0_ODT1	DDR0_ODT1
AW9	AW9	DDR0_ODT2	DDR0_ODT2
AW8	AW8	DDR0_ODT3	DDR0_ODT3
AW33	AW33	DDR0_ECC0	DDR0_ECC0
AW33	AW33	DDR0_ECC1	DDR0_ECC1
AW33	AW33	DDR0_ECC2	DDR0_ECC2
AW33	AW33	DDR0_ECC3	DDR0_ECC3
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_BA0
SBAA1	SBAA1	DDR0_BA1	DDR0_BA1
SBAA2	SBAA2	DDR0_BA2	DDR0_BA2
CKEA0	CKEA0	DDR0_CKE0	DDR0_CKE0
CKEA1	CKEA1	DDR0_CKE1	DDR0_CKE1
CSA0	CSA0	DDR0_CS_N0	DDR0_CS_N0
CSA1	CSA1	DDR0_CS_N1	DDR0_CS_N1
DCLKA0	DCLKA0	DDR0_CLK_P0	DDR0_CLK_P0
DCLKA1	DCLKA1	DDR0_CLK_P1	DDR0_CLK_P1
DCLKA2	DCLKA2	DDR0_CLK_P2	DDR0_CLK_P2
DCLKA3	DCLKA3	DDR0_CLK_P3	DDR0_CLK_P3
DCLKA4	DCLKA4	DDR0_CLK_P4	DDR0_CLK_P4
DCLKA5	DCLKA5	DDR0_CLK_P5	DDR0_CLK_P5
DCLKA6	DCLKA6	DDR0_CLK_P6	DDR0_CLK_P6
DCLKA7	DCLKA7	DDR0_CLK_P7	DDR0_CLK_P7
DCLKA8	DCLKA8	DDR0_CLK_P8	DDR0_CLK_P8
DCLKA9	DCLKA9	DDR0_CLK_P9	DDR0_CLK_P9
DCLKA10	DCLKA10	DDR0_CLK_P10	DDR0_CLK_P10
DCLKA11	DCLKA11	DDR0_CLK_P11	DDR0_CLK_P11
DCLKA12	DCLKA12	DDR0_CLK_P12	DDR0_CLK_P12
DCLKA13	DCLKA13	DDR0_CLK_P13	DDR0_CLK_P13
DCLKA14	DCLKA14	DDR0_CLK_P14	DDR0_CLK_P14
DCLKA15	DCLKA15	DDR0_CLK_P15	DDR0_CLK_P15
RSVD	RSVD	DDR0_RSVD	DDR0_RSVD
SRASA	SRASA	DDR0_RAS*	DDR0_RAS*
SWEA	SWEA	DDR0_WE*	DDR0_WE*
SCASA	SCASA	DDR0_CAS*	DDR0_CAS*
DDR3_RST	DDR3_RST	DDR0_RESET*	DDR0_RESET*

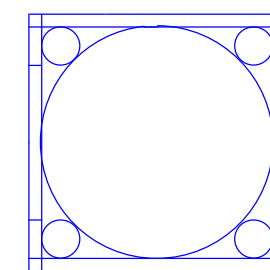
HASWELL(10SC1-F01150-01R\_10SC1-F01150-03R)

Place in CPU bottom side



LGA1150B			
MAAB0	AL19	DDR1_M0	DDR1_DQ0
MAAB1	AK23	DDR1_M1	DDR1_DQ1
MAAB2	AK22	DDR1_M2	DDR1_DQ2
MAAB3	AK23	DDR1_M3	DDR1_DQ3
MAAB4	AP23	DDR1_M4	DDR1_DQ4
MAAB5	AL23	DDR1_M5	DDR1_DQ5
MAAB6	AY24	DDR1_M6	DDR1_DQ6
MAAB7	AV25	DDR1_M7	DDR1_DQ7
MAAB8	AW26	DDR1_M8	DDR1_DQ8
MAAB9	AW25	DDR1_M9	DDR1_DQ9
MAAB10	AP18	DDR1_M10	DDR1_DQ10
MAAB11	AY26	DDR1_M11	DDR1_DQ11
MAAB12	AV25	DDR1_M12	DDR1_DQ12
MAAB13	AL15	DDR1_M13	DDR1_DQ13
MAAB14	AV27	DDR1_M14	DDR1_DQ14
MAAB15	AY28	DDR1_M15	DDR1_DQ15
MODT_B0	AM17	DDR1_ODT0	DDR1_ODT0
MODT_B1	AL16	DDR1_ODT1	DDR1_ODT1
AM16	AM16	DDR1_ODT2	DDR1_ODT2
AK15	AK15	DDR1_ODT3	DDR1_ODT3
AM26	AM26	DDR1_ECC0	DDR1_ECC0
AM25	AM25	DDR1_ECC1	DDR1_ECC1
AM25	AM25	DDR1_ECC2	DDR1_ECC2
AM26	AM26	DDR1_ECC3	DDR1_ECC3
AM26	AM26	DDR1_ECC4	DDR1_ECC4
AM25	AM25	DDR1_ECC5	DDR1_ECC5
AM26	AM26	DDR1_ECC6	DDR1_ECC6
AM25	AM25	DDR1_ECC7	DDR1_ECC7
SBAB0	SBAB0	DDR1_BA0	DDR1_BA0
SBAB1	SBAB1	DDR1_BA1	DDR1_BA1
SBAB2	SBAB2	DDR1_BA2	DDR1_BA2
CKEB0	CKEB0	DDR1_CKE0	DDR1_CKE0
CKEB1	CKEB1	DDR1_CKE1	DDR1_CKE1
CSB0	CSB0	DDR1_CS_N0	DDR1_CS_N0
CSB1	CSB1	DDR1_CS_N1	DDR1_CS_N1
DCLKB0	DCLKB0	DDR1_CLK_P0	DDR1_CLK_P0
DCLKB1	DCLKB1	DDR1_CLK_P1	DDR1_CLK_P1
DCLKB2	DCLKB2	DDR1_CLK_P2	DDR1_CLK_P2
DCLKB3	DCLKB3	DDR1_CLK_P3	DDR1_CLK_P3
DCLKB4	DCLKB4	DDR1_CLK_P4	DDR1_CLK_P4
DCLKB5	DCLKB5	DDR1_CLK_P5	DDR1_CLK_P5
DCLKB6	DCLKB6	DDR1_CLK_P6	DDR1_CLK_P6
DCLKB7	DCLKB7	DDR1_CLK_P7	DDR1_CLK_P7
DCLKB8	DCLKB8	DDR1_CLK_P8	DDR1_CLK_P8
DCLKB9	DCLKB9	DDR1_CLK_P9	DDR1_CLK_P9
DCLKB10	DCLKB10	DDR1_CLK_P10	DDR1_CLK_P10
DCLKB11	DCLKB11	DDR1_CLK_P11	DDR1_CLK_P11
DCLKB12	DCLKB12	DDR1_CLK_P12	DDR1_CLK_P12
DCLKB13	DCLKB13	DDR1_CLK_P13	DDR1_CLK_P13
DCLKB14	DCLKB14	DDR1_CLK_P14	DDR1_CLK_P14
DCLKB15	DCLKB15	DDR1_CLK_P15	DDR1_CLK_P15
RSVD	RSVD	DDR1_RSVD	DDR1_RSVD
SRASB	SRASB	DDR1_RAS*	DDR1_RAS*
SWEB	SWEB	DDR1_WE*	DDR1_WE*
VREF_DQA	VREF_DQA	DDR1_VREF_DQA	DDR1_VREF_DQA
VREF_DQB	VREF_DQB	DDR1_VREF_DQB	DDR1_VREF_DQB
DQSA0	DQSA0	DDR1_DQS_P0	DDR1_DQS_P0
DQSA1	DQSA1	DDR1_DQS_P1	DDR1_DQS_P1
DQSA2	DQSA2	DDR1_DQS_P2	DDR1_DQS_P2
DQSA3	DQSA3	DDR1_DQS_P3	DDR1_DQS_P3
DQSA4	DQSA4	DDR1_DQS_P4	DDR1_DQS_P4
DQSA5	DQSA5	DDR1_DQS_P5	DDR1_DQS_P5
DQSA6	DQSA6	DDR1_DQS_P6	DDR1_DQS_P6
DQSA7	DQSA7	DDR1_DQS_P7	DDR1_DQS_P7
DQSA8	DQSA8	DDR1_DQS_P8	DDR1_DQS_P8
DQSA9	DQSA9	DDR1_DQS_P9	DDR1_DQS_P9
DQSA10	DQSA10	DDR1_DQS_P10	DDR1_DQS_P10
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DQSA14	DQSA14	DDR1_DQS_P14	DDR1_DQS_P14
DQSA15	DQSA15	DDR1_DQS_P15	DDR1_DQS_P15
AE34	AE34	DDR1_AE34	DDR1_AE34
AE35	AE35	DDR1_AE35	DDR1_AE35
AG35	AG35	DDR1_AG35	DDR1_AG35
AG36	AG36	DDR1_AG36	DDR1_AG36
AG37	AG37	DDR1_AG37	DDR1_AG37
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AG41	AG41	DDR1_AG41	DDR1_AG41
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AG98	AG98	DDR1_AG98	DDR1_AG98
AG99	AG99	DDR1_AG99	DDR1_AG99

HASWELL(10SC1-F01150-01R\_10SC1-F01150-03R)

CR  
CPU RETENTION/X

LGA1150\_P



COVER+BLACK NI

ILM\_BP/1156/BKNI[12KRC-0F0001-61R\_12KRC-0F0001-62R]

DDR BUS

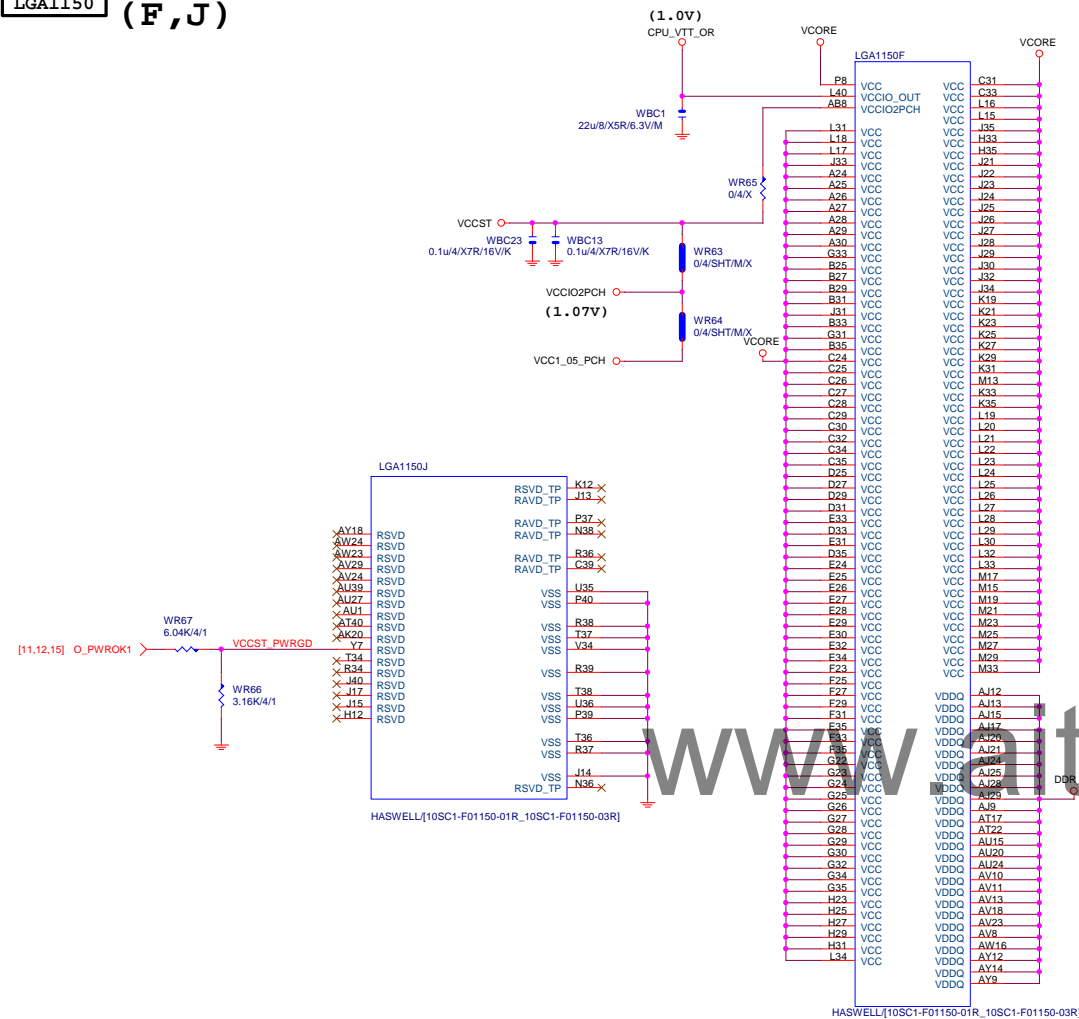
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[7] MDA[0..63]	MDA[0..63]
[8] MDB[0..63]	MDB[0..63]
[7] DQSA[0..7]	DQSA[0..7]
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[7] MAAA[0..15]	MAAA[0..15]
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Gigabyte Technology

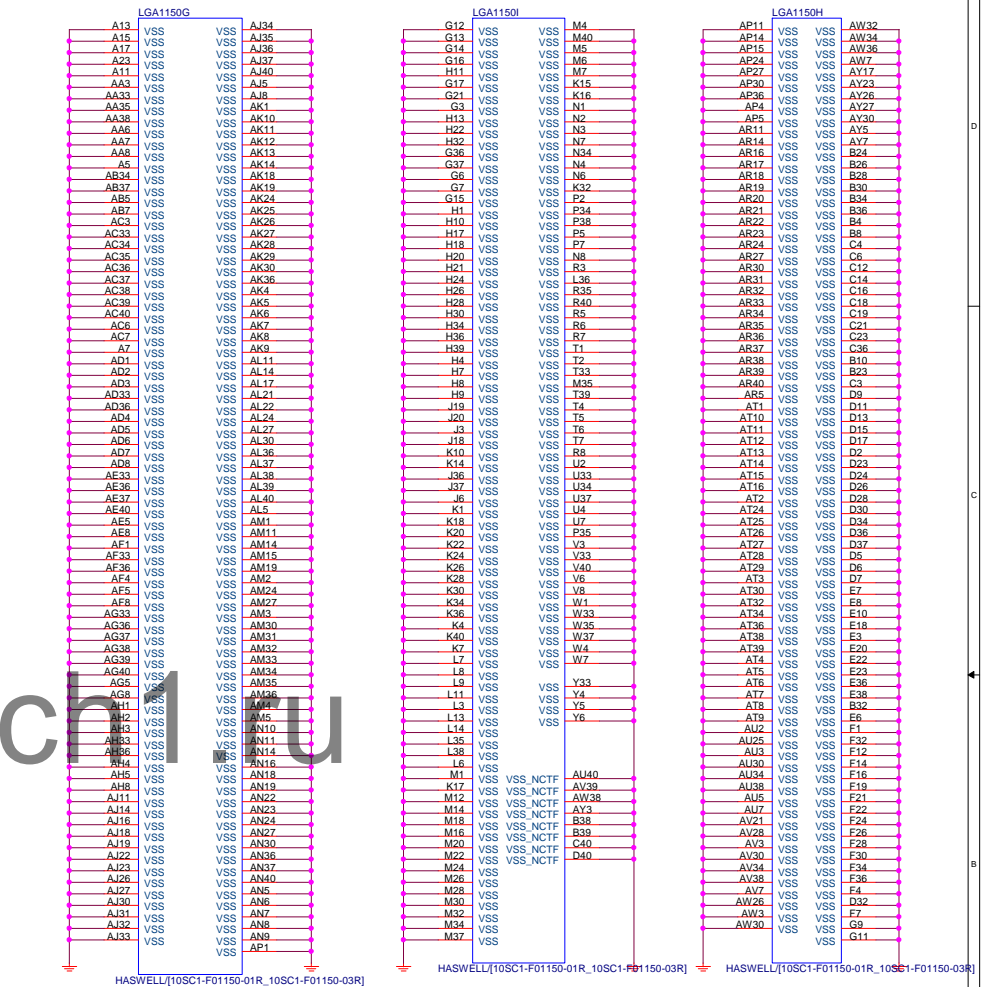
CPU LGA1156-B

Title		CPU LGA1156-B	
Size	Document Number	GA-H87N	Rev
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LGA1150 (F, J)

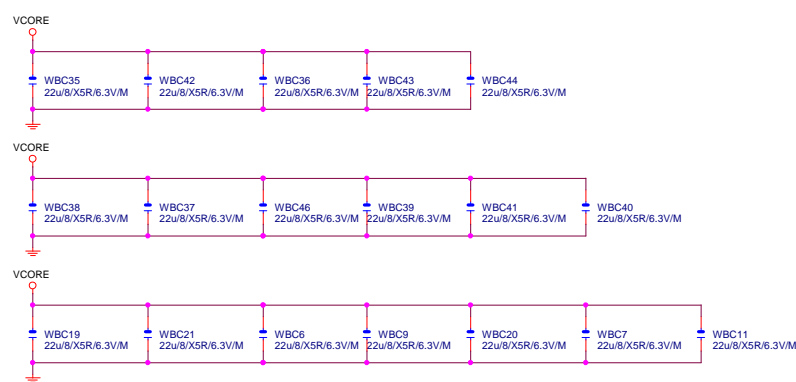


LGA1155 (G,H,I)



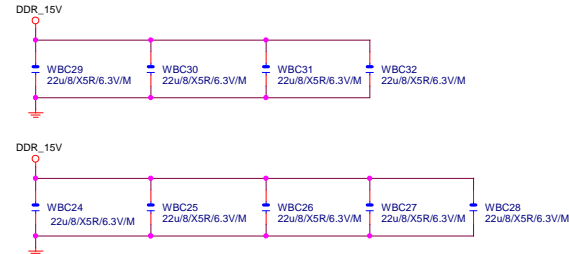
## VCore CAP

(X18)



DDR CAP

(x9)

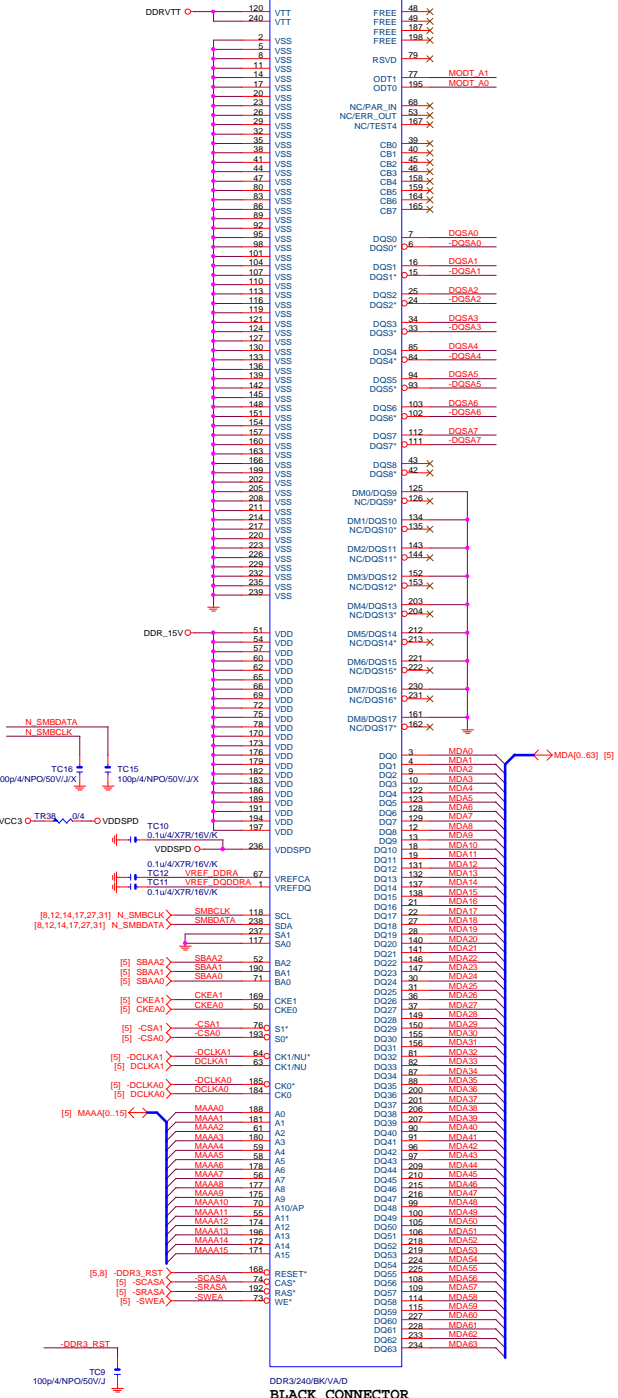


## Gigabyte Technology

Title			
CPU LGA1150-C			
Size	Document Number	Rev	
Custom	GA-H87N	1.11	
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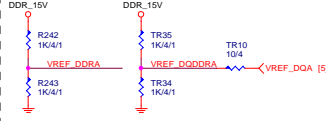
DDR3

(A)

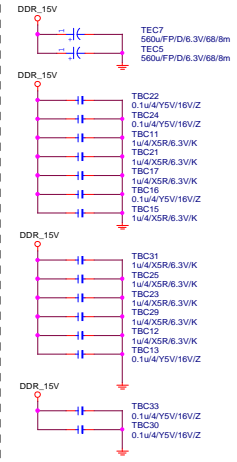


DDR3

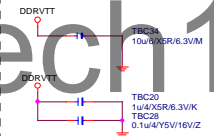
DDR3 VREF



DDR15V Decouple



DDRVTT Decouple

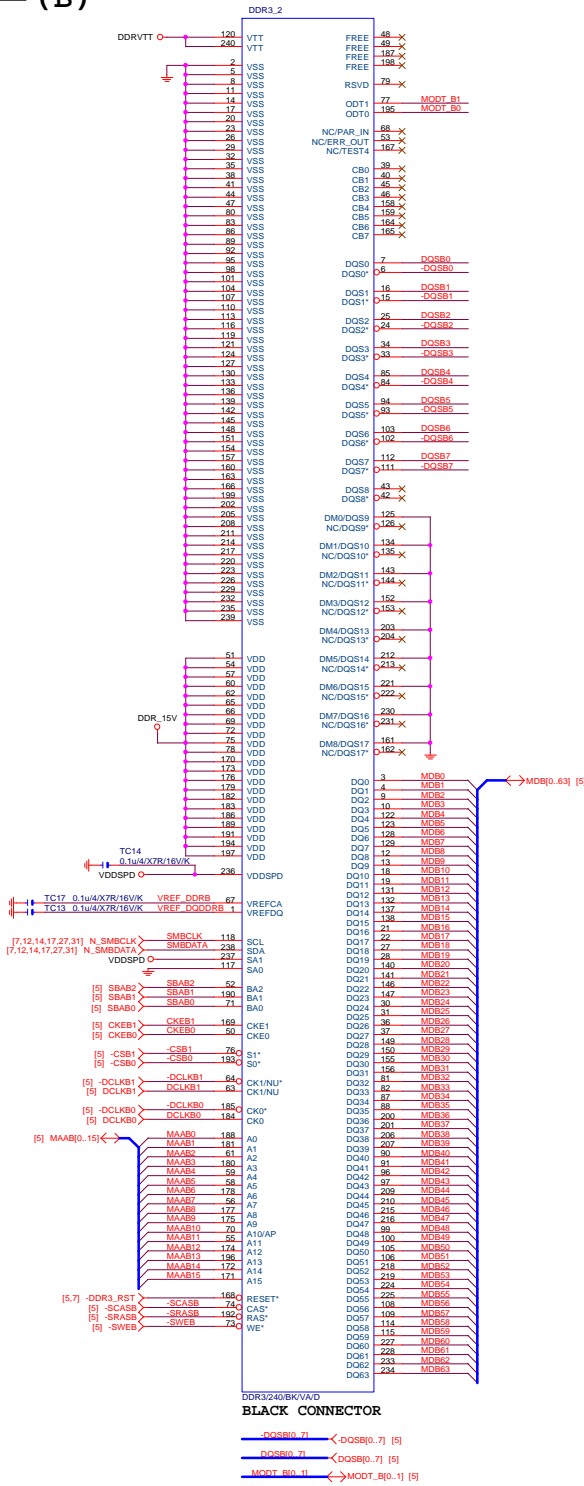


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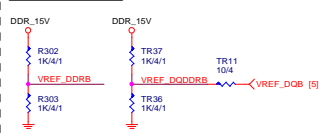
Gigabyte Technology	
DDRIII CHANNEL A	
GA-H87N	
File	Rev
Size	1.1
Document Number	
Date	

DDR3

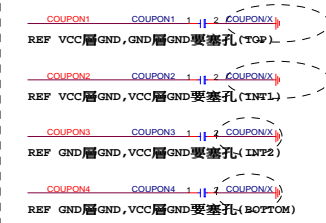
(B)



DDR3 VREF



COUPON



CPU

DIMM1 CHA  
DIMM2 CHB

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Gigabyte Technology			
File			
DDR3 CHANNEL B			
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PCH

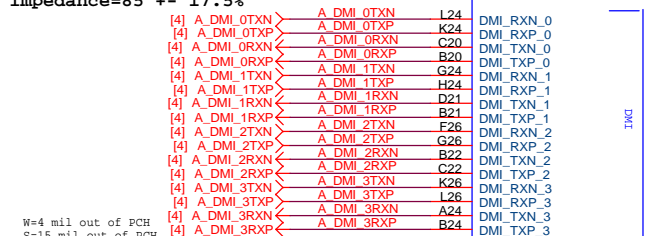
(B)

DMI:12/4/4/4/12(breakout min 8/4/4/4/8)  
Impedance=85 +- 17.5%USB2.0 : 12/4.5/7.5/4.5/12 (breakout min 8/4/4/4/8)  
Impedance=90 +- 17.5%

PCHB

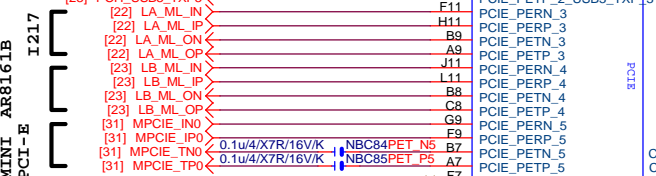
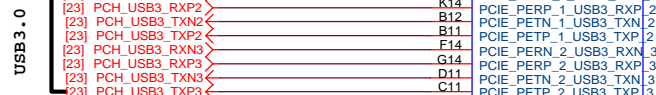
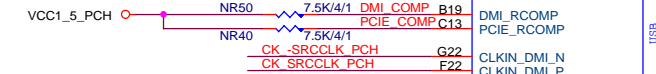
B85: Port 6/7 N/A

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



W=4 mil out of PCH

S=15 mil out of PCH



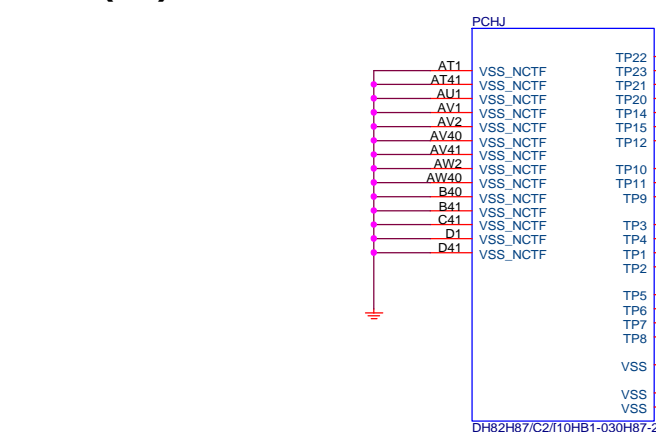
放靠近 Device &amp; PCI-E Slot

Impedance=80 +- 17.5%

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

PCH

(J)

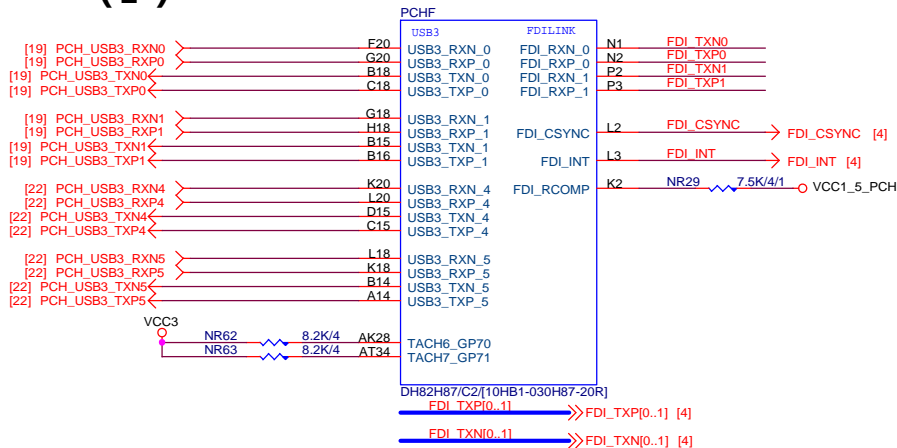


PCHJ

DH82H87/C2[10HB1-030H87-20R]

PCH

(F)



PCHF

USB3

FDILINK

USB3\_RXN\_0

FDI\_RXN\_0

USB3\_RXP\_0

FDI\_RXP\_0

USB3\_TXN\_0

FDI\_TXN\_0

USB3\_TXP\_0

FDI\_TXP\_0

USB3\_RXN\_1

FDI\_RXN\_1

USB3\_RXP\_1

FDI\_RXP\_1

USB3\_TXN\_1

FDI\_TXN\_1

USB3\_TXP\_1

FDI\_TXP\_1

USB3\_RXN\_4

FDI\_RXN\_4

USB3\_RXP\_4

FDI\_RXP\_4

USB3\_TXN\_4

FDI\_TXN\_4

USB3\_TXP\_4

FDI\_TXP\_4

USB3\_RXN\_5

FDI\_RXN\_5

USB3\_RXP\_5

FDI\_RXP\_5

USB3\_TXN\_5

FDI\_TXN\_5

USB3\_TXP\_5

FDI\_TXP\_5

TACH6\_GP70

TACH7\_GP71

DH82H87/C2[10HB1-030H87-20R]

FDI\_TXP0..11

FDI\_TXN0..11

FDI\_TXP0..11

FDI\_TXN0..11

FDI\_TXP0..11

FDI\_TXN0..11

FDI\_TXP0..11

FDI\_TXN0..11

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FDI\_TXN0..11

FDI\_TXP0..11

FDI\_TXN0..11

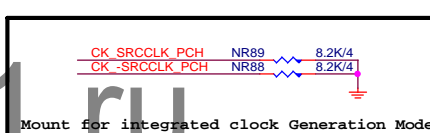
FDI\_TXP0..11

FDI\_TXN0..11

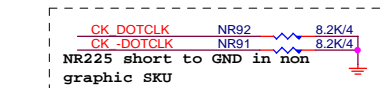
FDI\_TXP0..11

FDI\_TXN0..11

PCH CLK PD



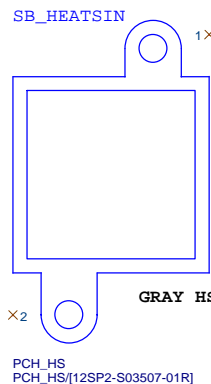
Mount for integrated clock Generation Mode



NR225 short to GND in non graphic SKU

PCH H/S

H77 HEATSINK



USB TABLE

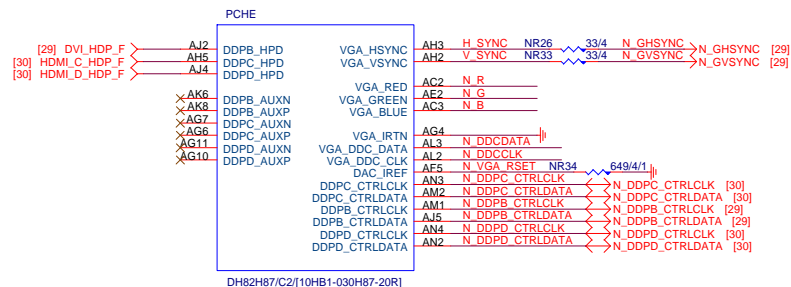
OC[3:0]# for Device 29 (ports 0-7)  
OC[7:4]# for Device 26 (ports 8-13)

USB OC#	Configure
OC0#	F_USB30
OC1#	USB30_LAN2
OC2#	USB30_LAN1
OC3#	N/A
OC4#	F_USB20
OC5#	KB_MS_USB
OC6#	MINI_PCIE
OC7#	Not Use

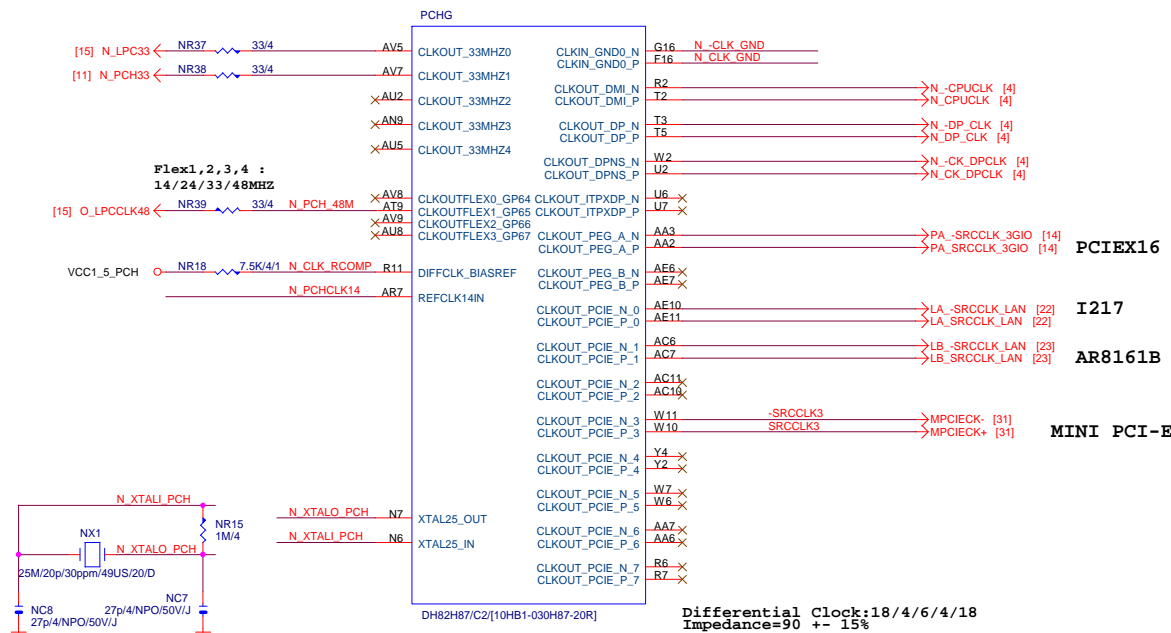
Gigabyte Technology

Title	PCH FDI,DMI,USB ,PCIE,NVRAM	Rev	1.11
Size	Custom	GA-H87N	
Date:	Wednesday, August 28, 2013	Sheet	9 of 31

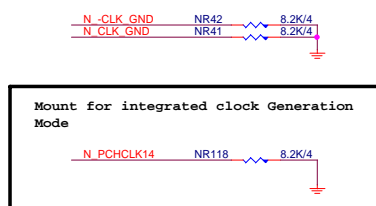
# PCH (E)



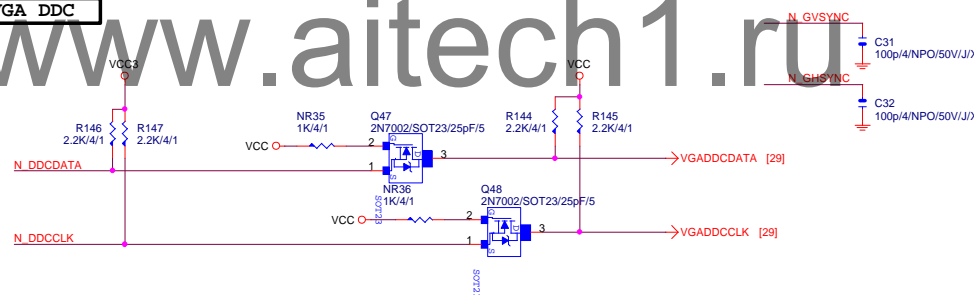
# PCH (G)



## PCH CLK PD

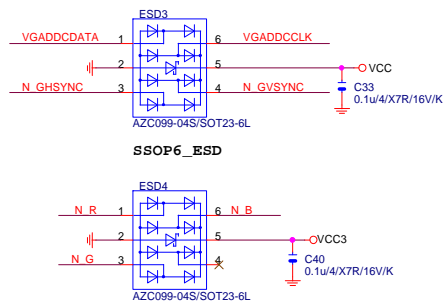


## VGA DDC

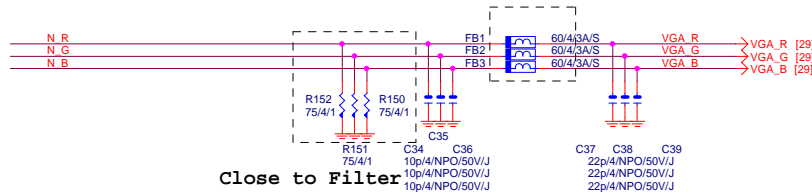


## VGA CONNECTOR

## VGA ESD



## VGA DDC



Gigabyte Technology

Title			PCH DISPLAY_CLK BUFFER		
Size			GA-H87N		
Date:			Wednesday, August 28, 2013		
Sheet			10 of 31		
Rev			1.11		

# 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

SATALEDDB

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\_SYNCN

PLTRST\_PROCB

DH82H87/C2[10HB1-030H87-20R]

SATA\_RXN\_0

SATA\_RXP\_0

SATA\_TXN\_0

SATA\_TXP\_0

SATA\_RXN\_1

SATA\_RXP\_1

SATA\_TXN\_1

SATA\_TXP\_1

SATA\_RXN\_2

SATA\_RXP\_2

SATA\_TXN\_2

SATA\_TXP\_2

SATA\_RXN\_3

SATA\_RXP\_3

SATA\_TXN\_3

SATA\_TXP\_3

SATA\_RXN\_4

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SATA\_TXP\_4

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SATA\_TXP\_6

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SATA\_TXN\_7

SATA\_TXP\_7

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SATA\_RXN\_55

SATA\_RXP\_55

SATA\_TXN\_55

SATA\_TXP\_55

SATA\_RXN\_56

SATA\_RXP\_56

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SATA\_TXN\_57

SATA\_TXP\_57

SATA\_RXN\_58

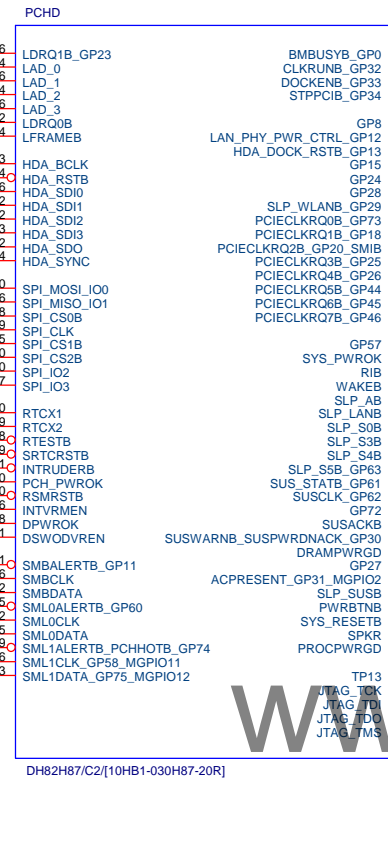
SATA\_RXP\_58

SATA\_TXN\_58

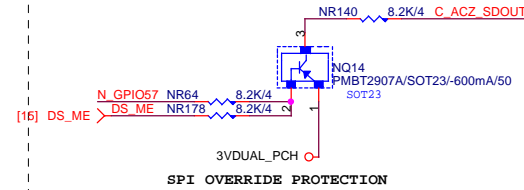
SATA\_TXP\_58

SATA\_RXN\_59

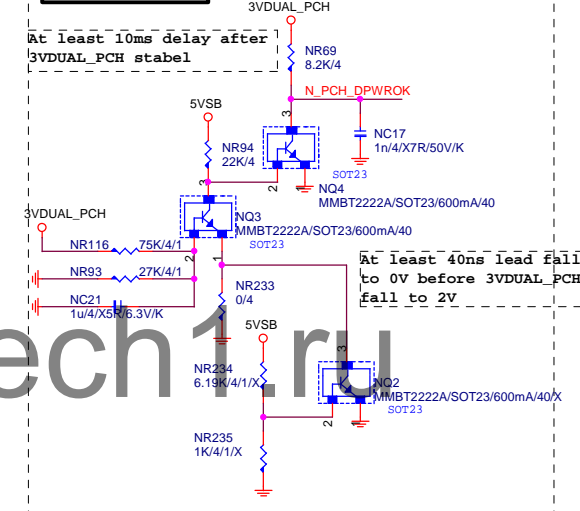
(D)



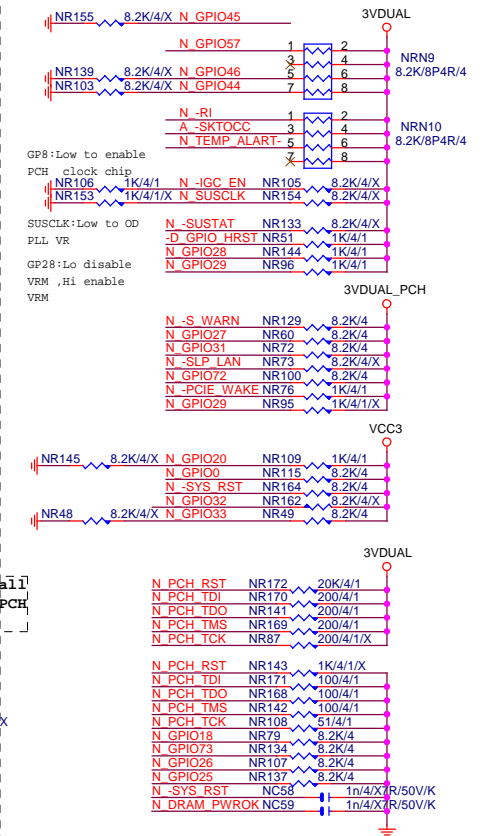
## ACZ\_SDOUT



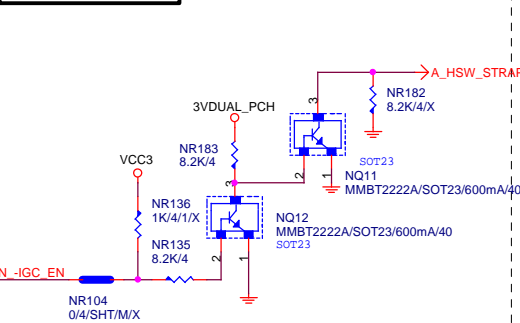
## PCH\_DPWROK



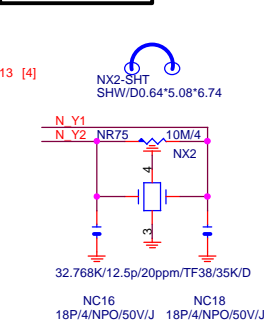
## PCH PU/PD



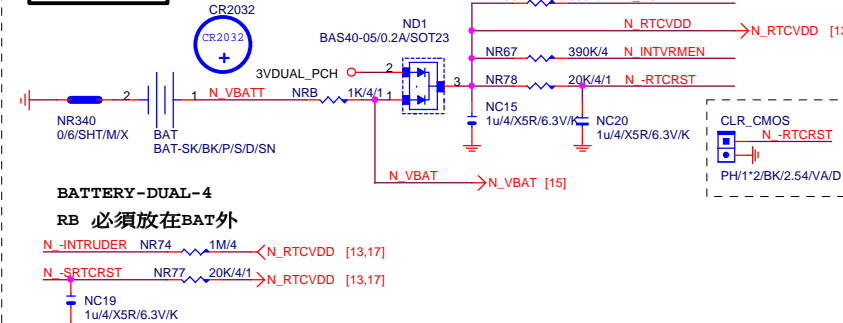
HSW_STRAP13
-------------



32.768KHZ



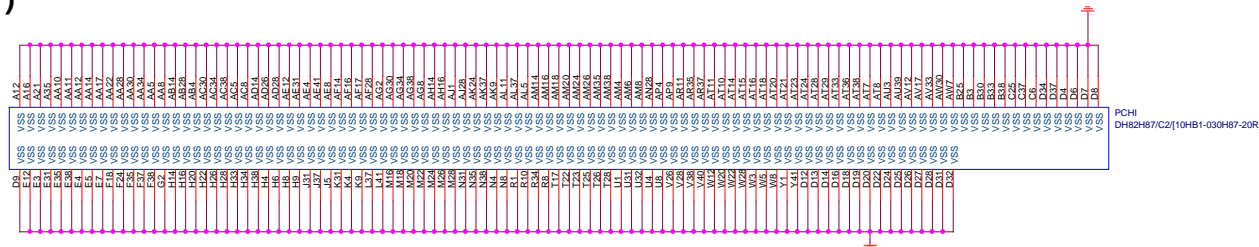
CLR_CMOS
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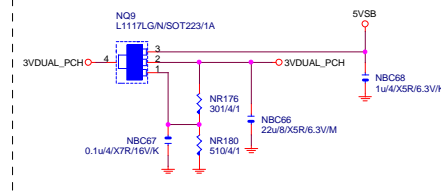
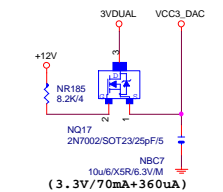
## Gigabyte Technology

Title			
PCH GPIO , CTRL , AUDIO			
Size	Document Number	Rev	
Custom	GA-H87N	1.1	
Date:	Wednesday, August 28, 2013	Sheet	12 of 31

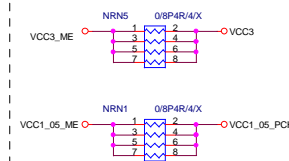
**PCH (I)**



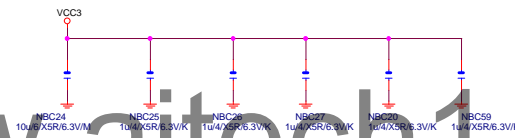
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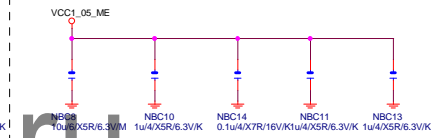
**M3 POWER**



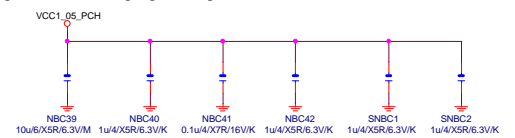
( 3.3V ) ( X6 )



(1.05V) (x5)



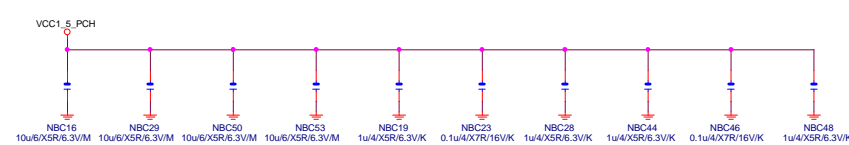
(1.05V) (x6)



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

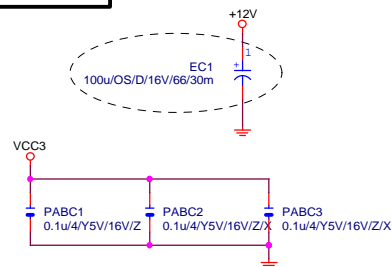


**(1.05V) (x10)**

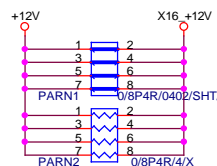




## PCIEX16 CAP



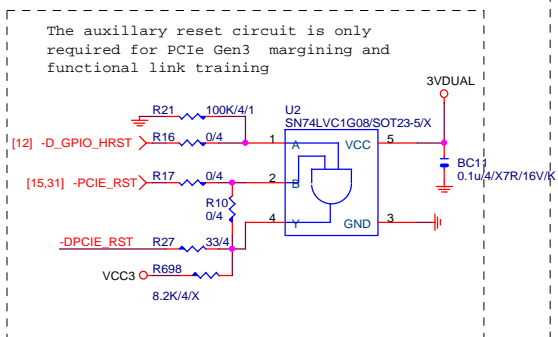
PCIEEX16 PROTECT SHT



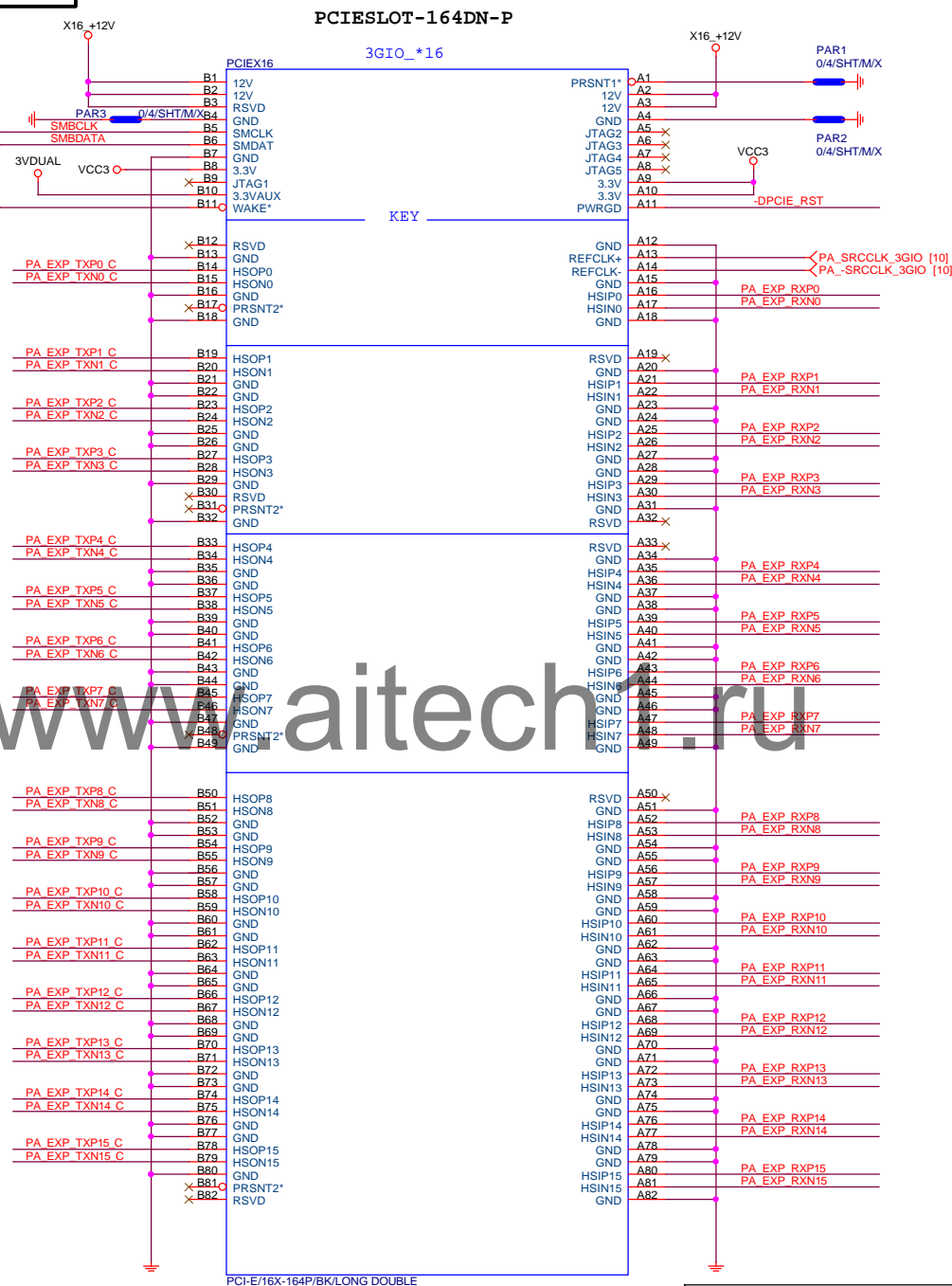
PCIEX16	AC	CAP
---------	----	-----

PA EXP TXP0	PAC5	0.22u4/5X5R/6.3V/K	PA EXP TXP0 C
PA EXP TXN0	PAC4	0.22u4/5X5R/6.3V/K	PA EXP TXN0 C
PA EXP TXP1	PAC6	0.22u4/5X5R/6.3V/K	PA EXP TXP1 C
PA EXP TXN1	PAC7	0.22u4/5X5R/6.3V/K	PA EXP TXN1 C
PA EXP TXP2	PAC8	0.22u4/5X5R/6.3V/K	PA EXP TXP2 C
PA EXP TXN2	PAC9	0.22u4/5X5R/6.3V/K	PA EXP TXN2 C
PA EXP TXP3	PAC10	0.22u4/5X5R/6.3V/K	PA EXP TXP3 C
PA EXP TXN3	PAC11	0.22u4/5X5R/6.3V/K	PA EXP TXN3 C
PA EXP TXP4	PAC12	0.22u4/5X5R/6.3V/K	PA EXP TXP4 C
PA EXP TXN4	PAC13	0.22u4/5X5R/6.3V/K	PA EXP TXN4 C
PA EXP TXP5	PAC14	0.22u4/5X5R/6.3V/K	PA EXP TXP5 C
PA EXP TXN5	PAC15	0.22u4/5X5R/6.3V/K	PA EXP TXN5 C
PA EXP TXP6	PAC16	0.22u4/5X5R/6.3V/K	PA EXP TXP6 C
PA EXP TXN6	PAC17	0.22u4/5X5R/6.3V/K	PA EXP TXN6 C
PA EXP TXP7	PAC18	0.22u4/5X5R/6.3V/K	PA EXP TXP7 C
PA EXP TXN7	PAC19	0.22u4/5X5R/6.3V/K	PA EXP TXN7 C
PA EXP TXP8	PAC20	0.22u4/5X5R/6.3V/K	PA EXP TXP8 C
PA EXP TXN8	PAC21	0.22u4/5X5R/6.3V/K	PA EXP TXN8 C
PA EXP TXP9	PAC22	0.22u4/5X5R/6.3V/K	PA EXP TXP9 C
PA EXP TXN9	PAC23	0.22u4/5X5R/6.3V/K	PA EXP TXN9 C
PA EXP TXP10	PAC24	0.22u4/5X5R/6.3V/K	PA EXP TXP10 C
PA EXP TXN10	PAC25	0.22u4/5X5R/6.3V/K	PA EXP TXN10 C
PA EXP TXP11	PAC26	0.22u4/5X5R/6.3V/K	PA EXP TXP11 C
PA EXP TXN11	PAC27	0.22u4/5X5R/6.3V/K	PA EXP TXN11 C
PA EXP TXP12	PAC28	0.22u4/5X5R/6.3V/K	PA EXP TXP12 C
PA EXP TXN12	PAC29	0.22u4/5X5R/6.3V/K	PA EXP TXN12 C
PA EXP TXP13	PAC30	0.22u4/5X5R/6.3V/K	PA EXP TXP13 C
PA EXP TXN13	PAC31	0.22u4/5X5R/6.3V/K	PA EXP TXN13 C
PA EXP TXP14	PAC32	0.22u4/5X5R/6.3V/K	PA EXP TXP14 C
PA EXP TXN14	PAC33	0.22u4/5X5R/6.3V/K	PA EXP TXN14 C
PA EXP TXP15	PAC34	0.22u4/5X5R/6.3V/K	PA EXP TXP15 C
PA EXP TXN15	PAC35	0.22u4/5X5R/6.3V/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



BLACK CONNECTOR

## Gigabyte Technology

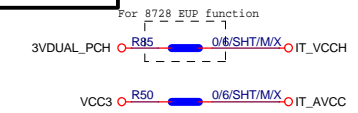
PCI EXPRESS \* 16

Title			
PCI EXPRESS * 16			
Size	Document Number	Rev	
Custom	GA-H87N	1.11	
Date:	Wednesday, August 28, 2013	Sheet	14 of 31

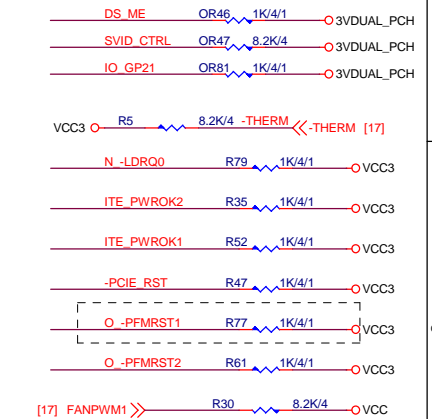
## SIO IT8728F

【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

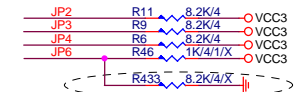
## PWR SHT



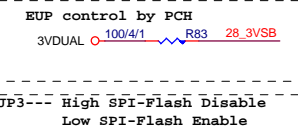
## SIO PU



## SIO STRAP



IT8728-EX  
PULL DOWN ENABLE OVP



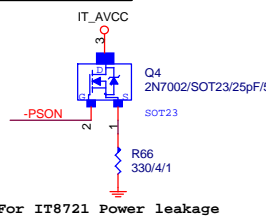
## IT8728F NOTE

	IT8728
PIN121	VCORE_EN/PCH_C0
PIN120	VLDT_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

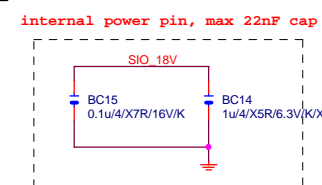
## DUAL BIOS OPT STRAP



## Power leakage

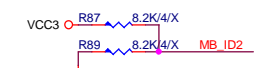


## SIO\_18V

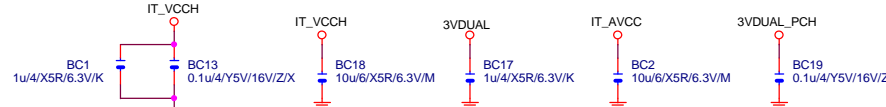


FOR LOW TEMP POWER ON INTO TEST MODE ISSUE

## MB ID



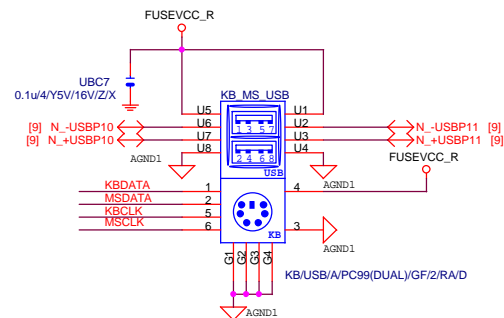
## SIO CAP



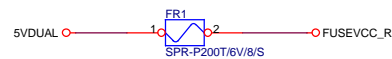
## Gigabyte Technology

Title			ITE 8728 LPC IO
Size	Document Number	GA-H87N	
Custom			Rev 1.11
Date:	Wednesday, August 28, 2013	Sheet	15 of 31

## KB/MS

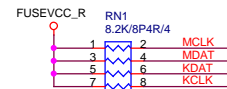


## USB2.0 PWR

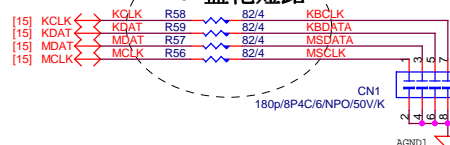


Close to connector  
KB\_MS\_USB 2-Port 2.0A

## KB\_MS

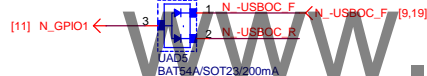
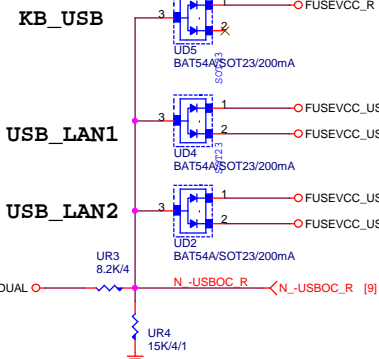


FOR 鹽化短路

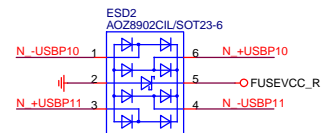


## -USBOC\_R

## USB POWER PROTECT

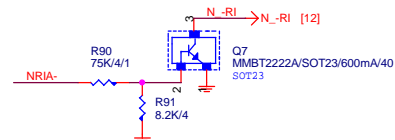
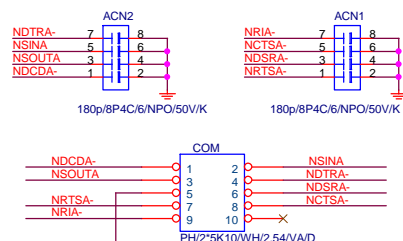
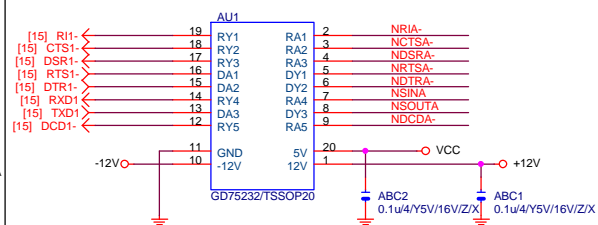


## USB2.0 ESD



## COM

## COM RI



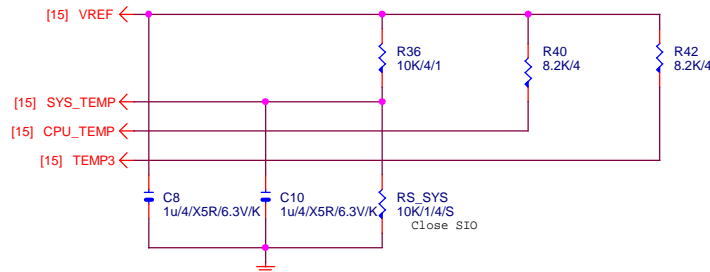
Gigabyte Technology

Title  
COM,-RI,KB\_USB,USB\_ESATA,-PROCHOTSize  
Custom  
Document Number  
GA-H87NRev  
1.11

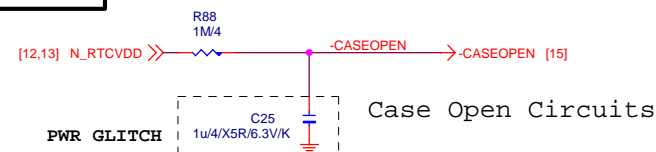
Date: Wednesday, August 28, 2013 Sheet 16 of 31



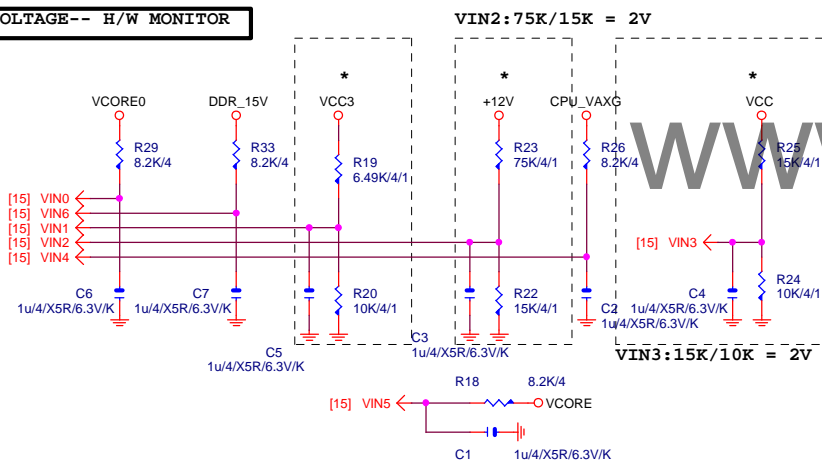
# TEMP H/W MONITOR



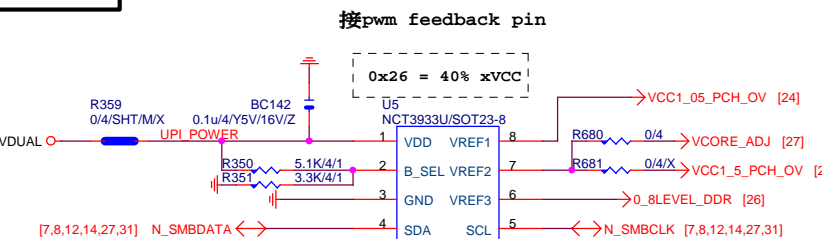
# CASE OPEN



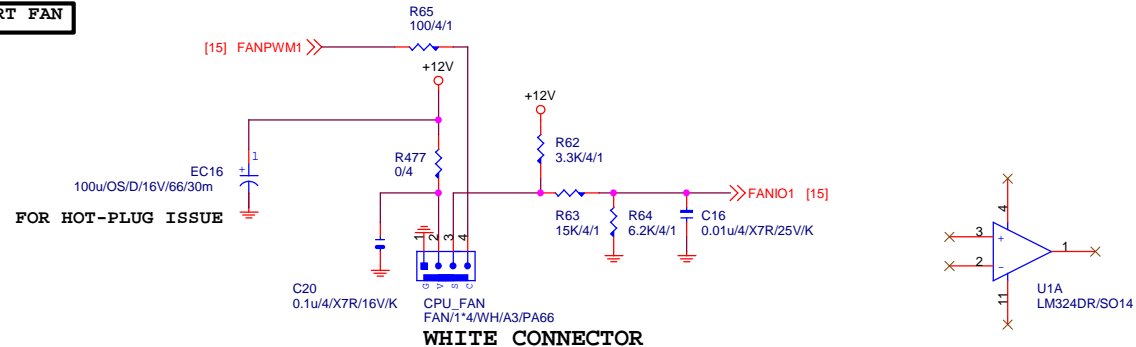
# VOLTAGE-- H/W MONITOR



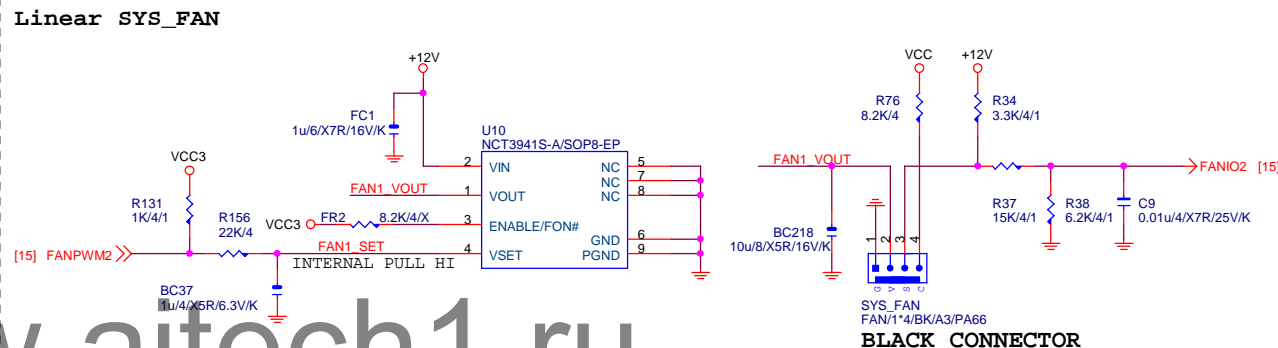
# OV NCT3933



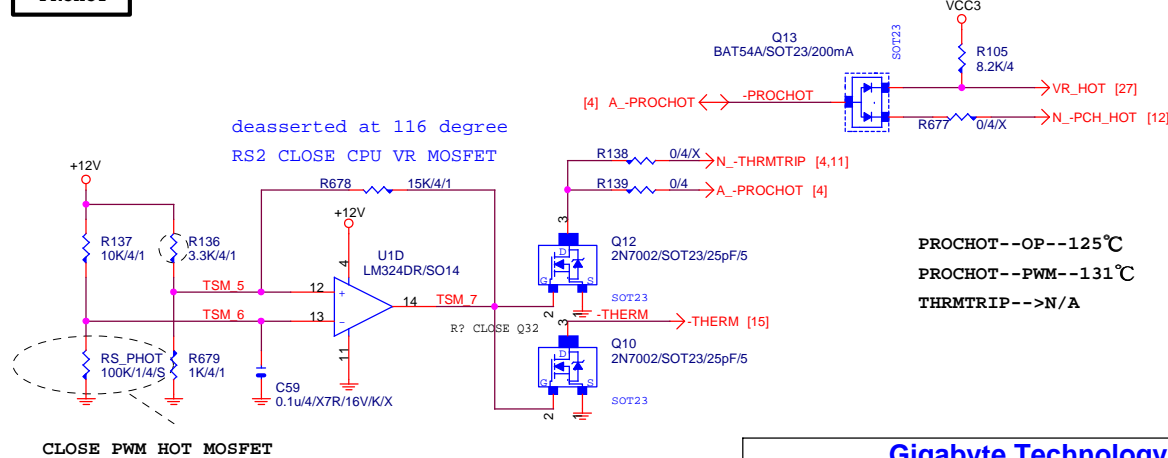
# CPU SMART FAN



# SYS SMART FAN

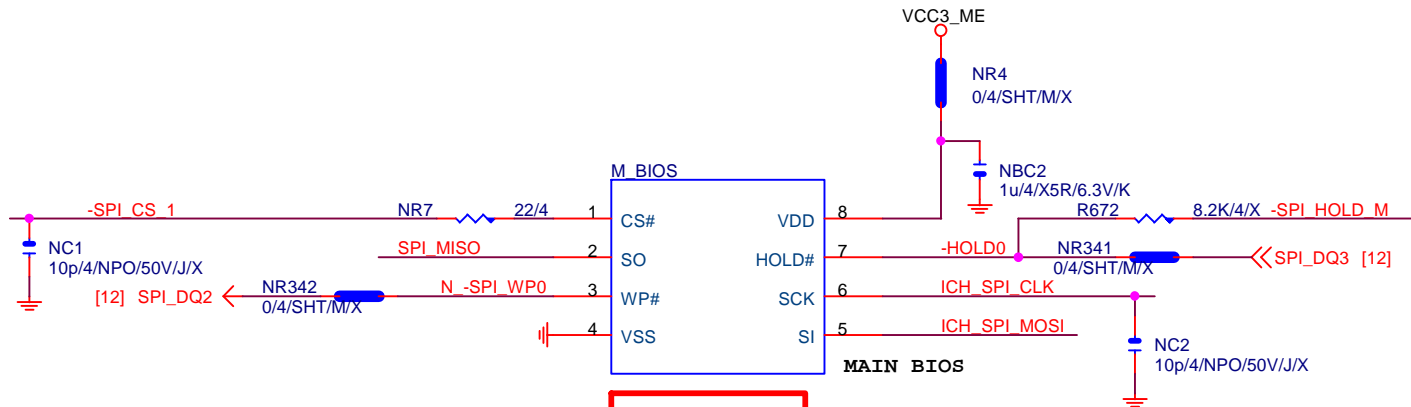


# -PROHOT



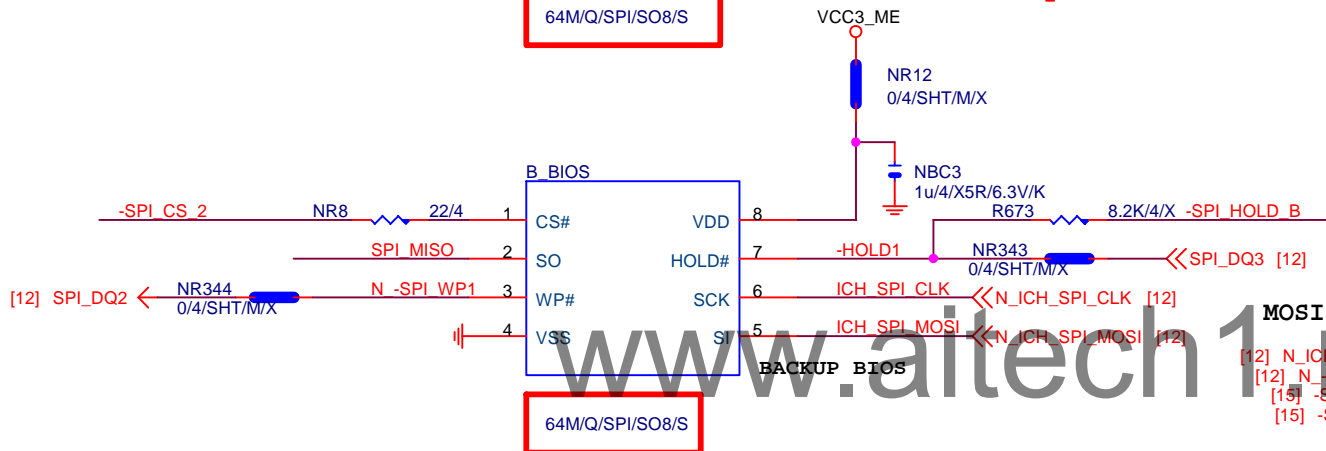
Gigabyte Technology

Title		
HWM,FAN CTRL,OV		
Size	Document Number	Rev
Custom	GA-H87N	1.11
Date:	Wednesday, August 28, 2013	Sheet 17 of 31

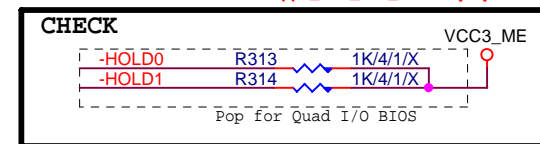
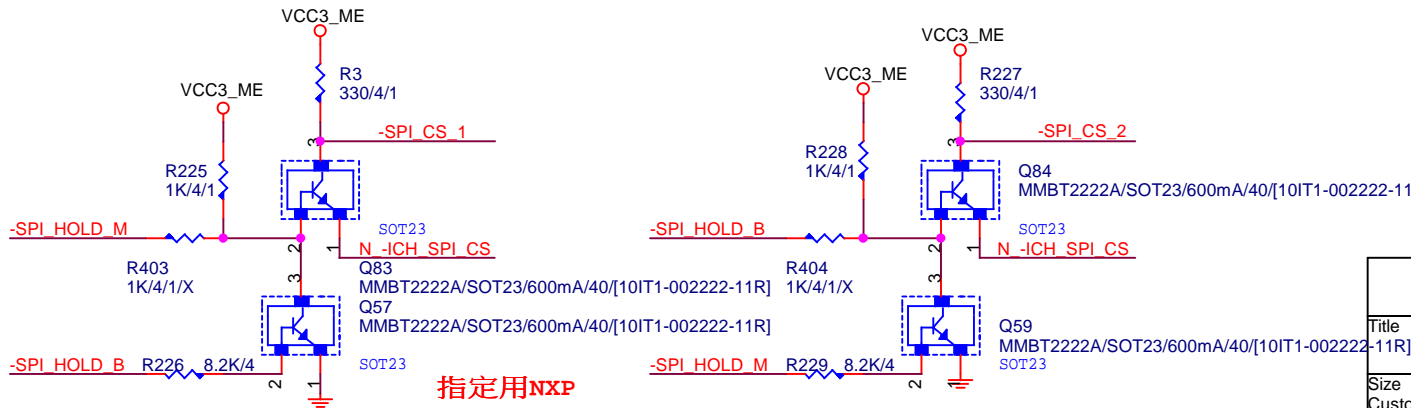
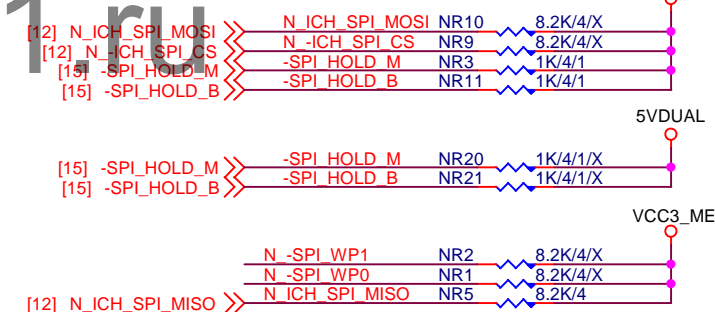


BOOT DEVICE	GNT0	GNT1
LPC	0	0
PCI	0	1
NAND	1	0
SPI	1	1

1 means floating  
0 means PD 1K



### MOSI For DMI RX Termination Voltage



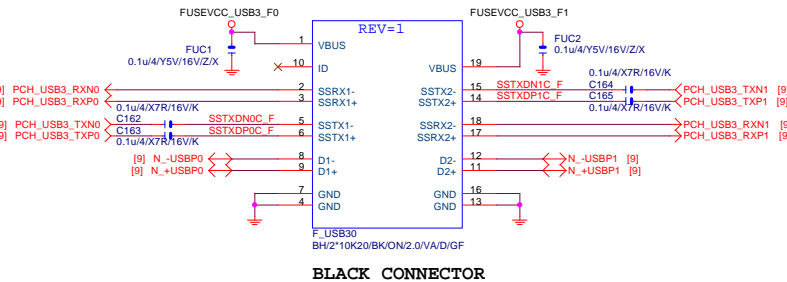
## Gigabyte Technology

### DUAL BIOS

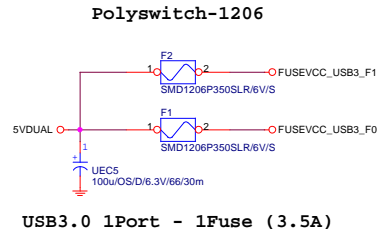
# GA-H87N

Title	Document Number		Rev
Size	Custom		1.11
Date	Wednesday, August 28, 2013	Sheet	18 of 31

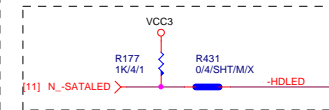
# F\_USB30



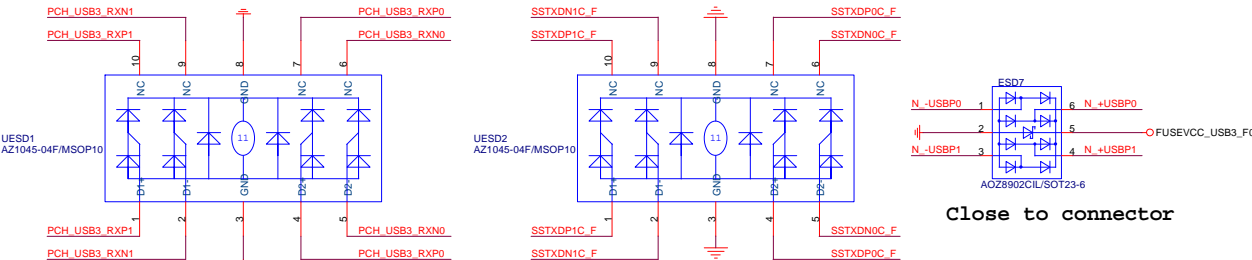
# F\_USB30 PWR



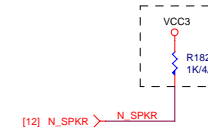
# SATA LED



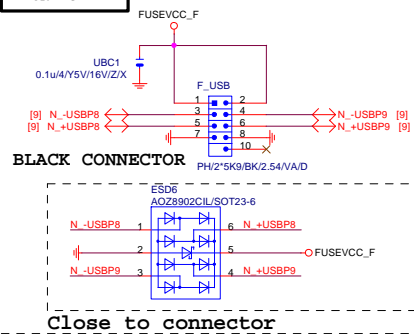
# F\_USB30 ESD PROTECT



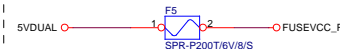
# SPKR



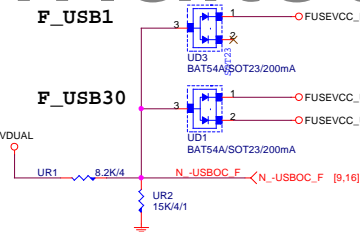
# FRONT USB1



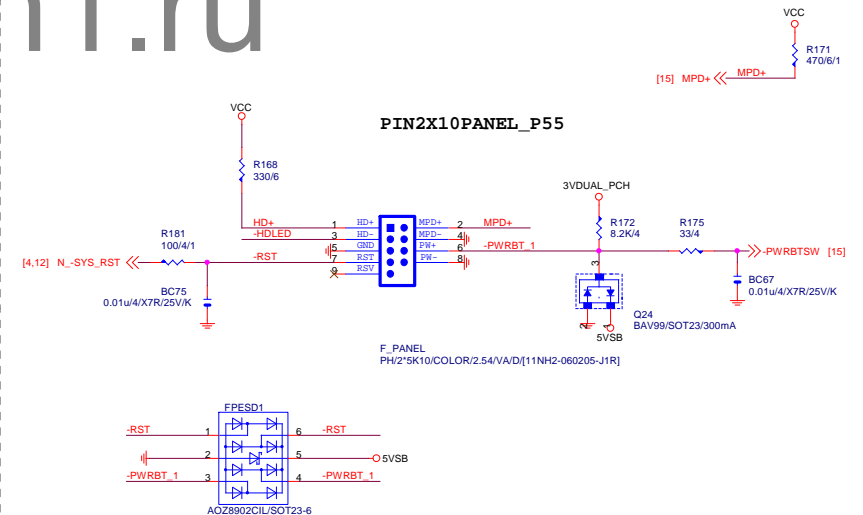
# FUSEVCC\_F



# -USBOC\_F

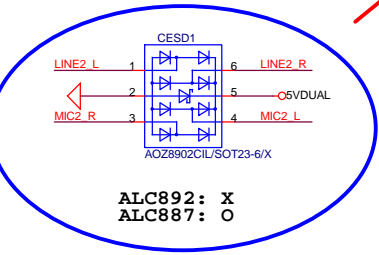


# INTEL FRONT PANEL

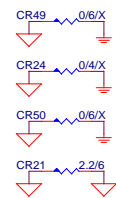


Gigabyte Technology			
Title	FP,F_USB,USB PWR,SPKR,SATA LED		
Size	Custom	Document Number	GA-H87N
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CR5/CR8/CR11/CR4/ CR17/CR22/CR45/CR33/ CR47/CR40/CR26/CR37/ CR13/CR11/CR57/CR53	62 ohm	62 ohm	62 ohm	75 ohm	75 ohm
CR51/CD1/CBC7	O	O	X	X	O
CD2/CD3/CQ3/CQ5	X	X	O	O	X
CR1/CR14/CR17/CR22	62 ohm	62 ohm	62 ohm	75 ohm	1K ohm

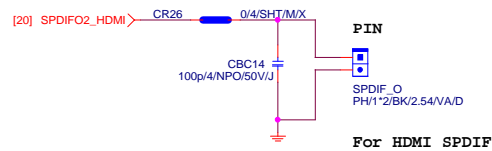


## CODEC POWER/EMI PAD

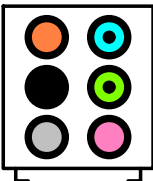


ADD CD2 For ESD PROTECT DIODE

## SPDIF\_OUT



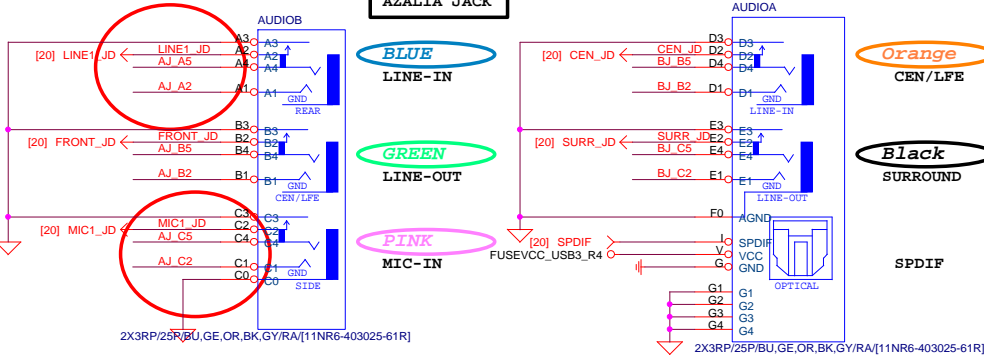
## AZALIA JACK



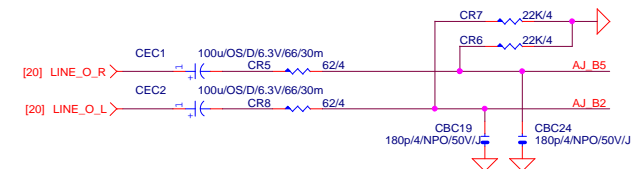
## AZALIA JACK

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

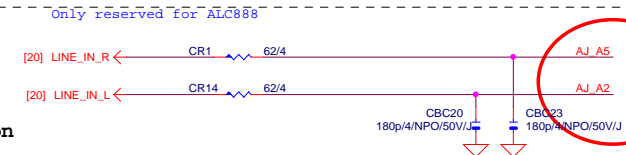
SPDIF



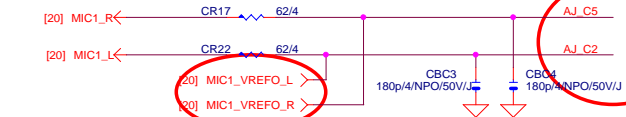
## LINE-OUT



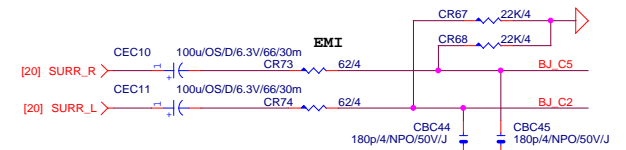
## LINE-IN

Verify MIC function  
in LINE-in

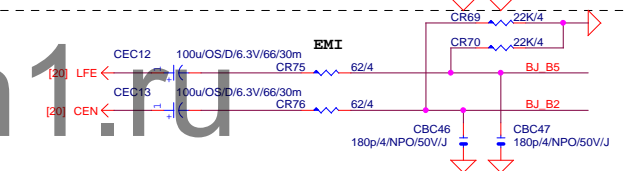
## MIC-IN



## SURROUND

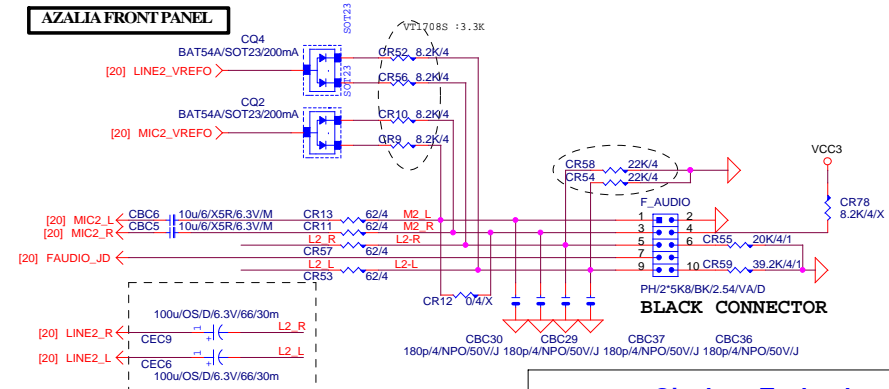


## CEN/LFE



## SURRBACK

## AZALIA FRONT PANEL



Gigabyte Technology

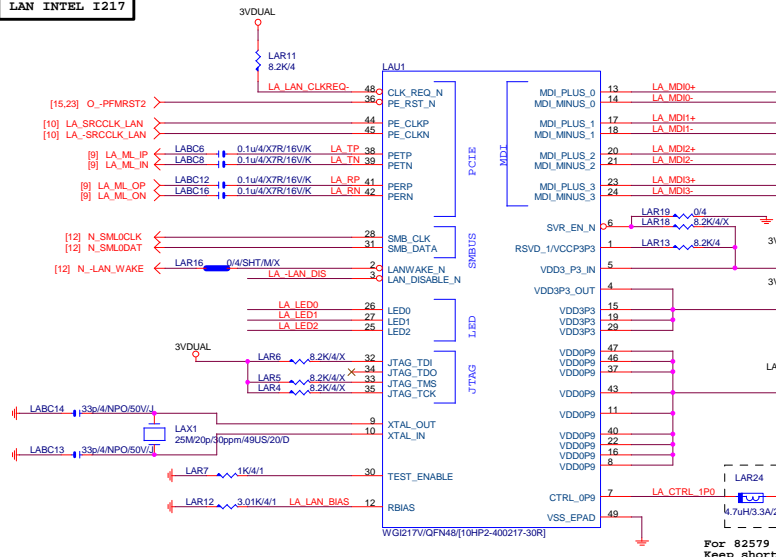
AUDIO JACK

GA-H87N

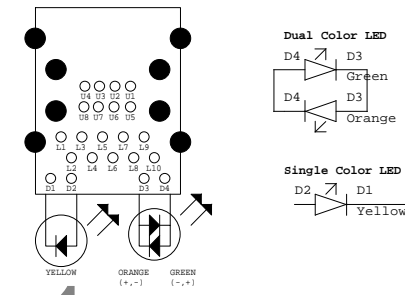
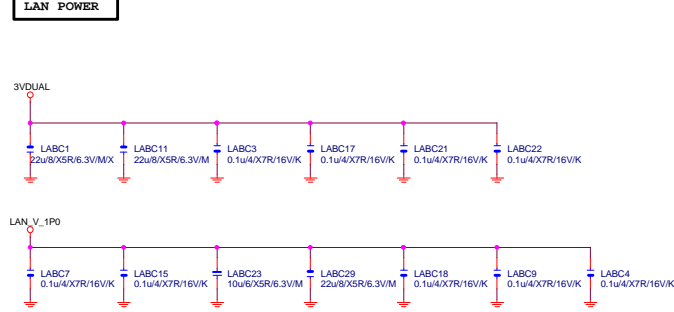
Rev  
1.11

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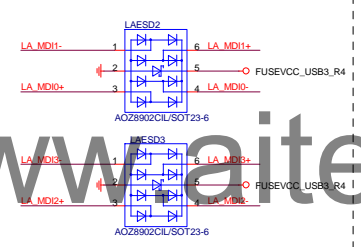
LAN INTEL I217



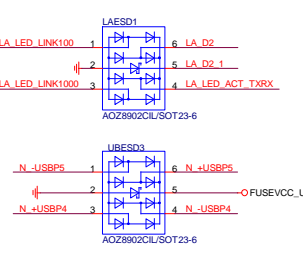
LAN POWER



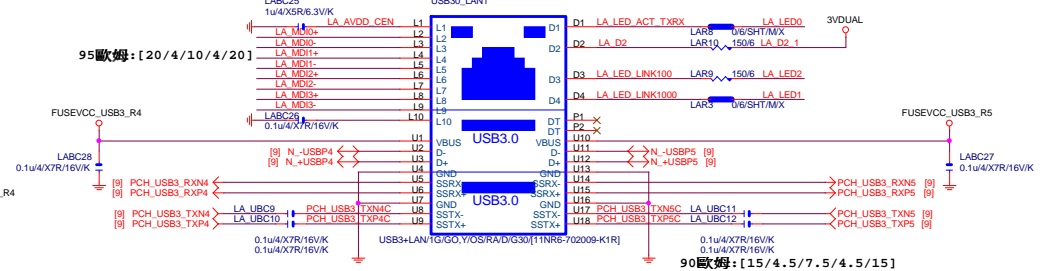
MDI ESD 预留28KV



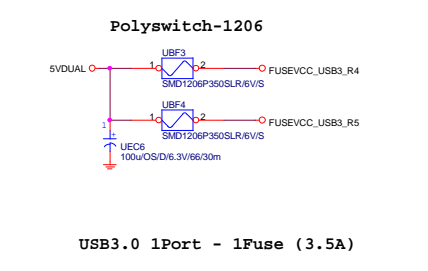
USB30\_LAN ESD



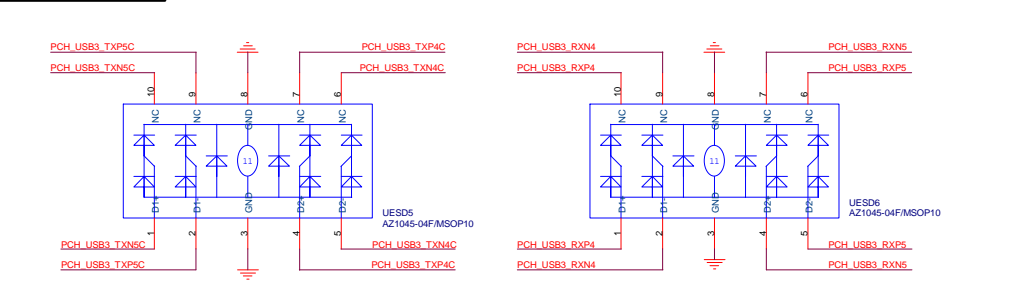
USB30\_LAN CONNECTOR



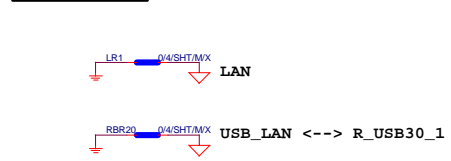
USB X3 POWER



USB30 ESD PROTECT

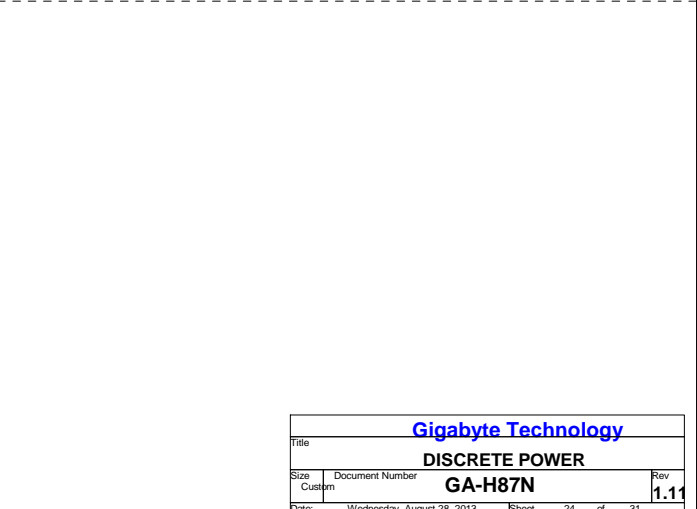
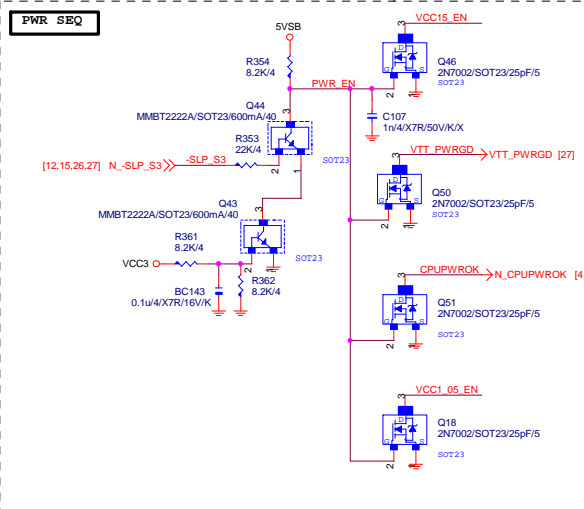
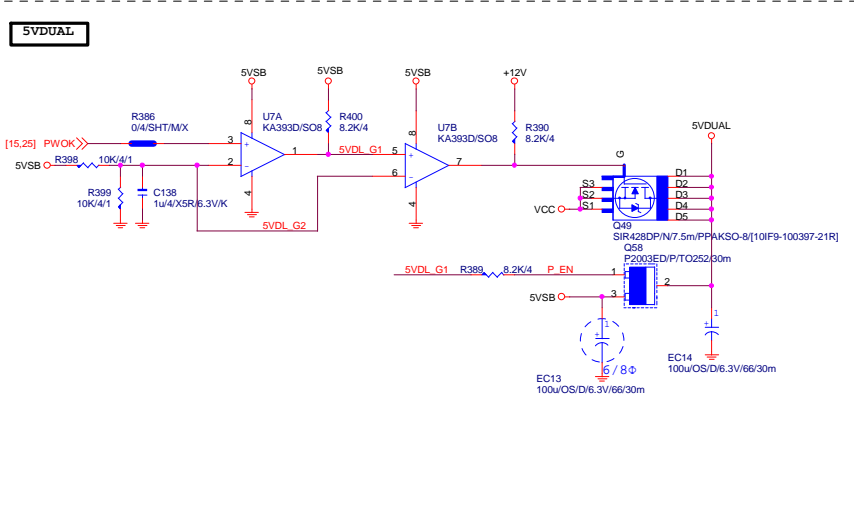
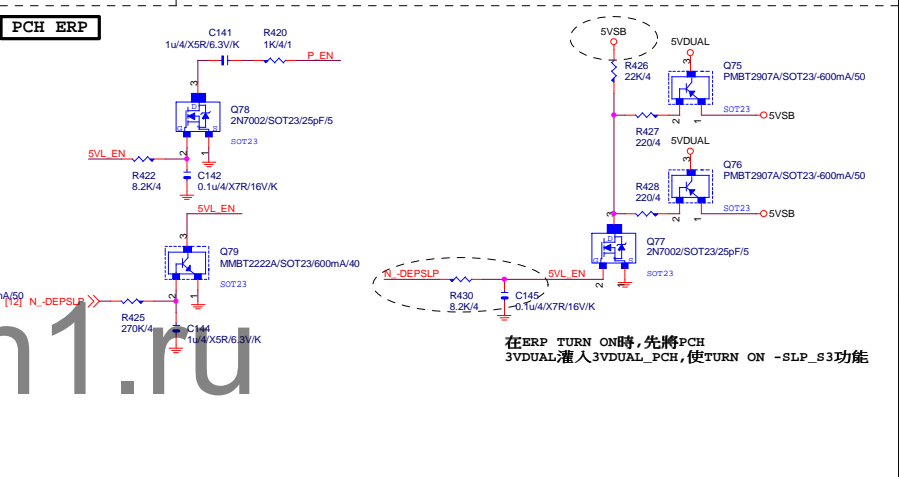
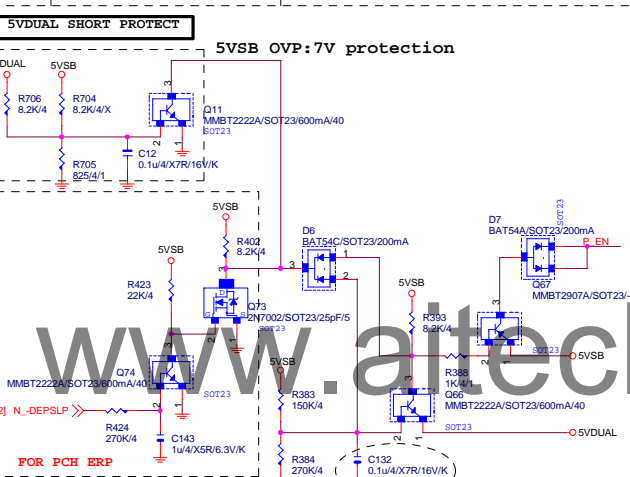
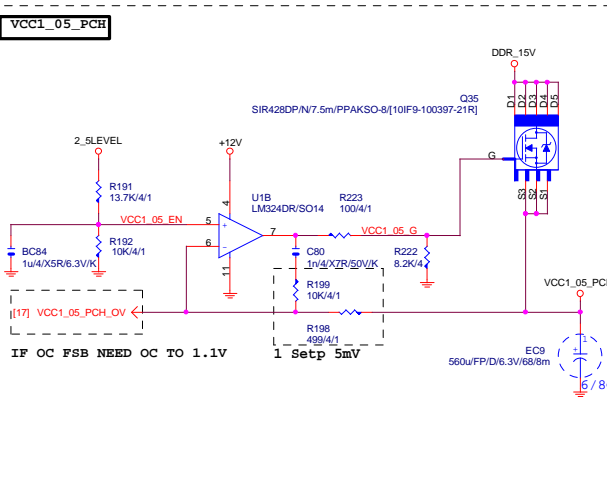
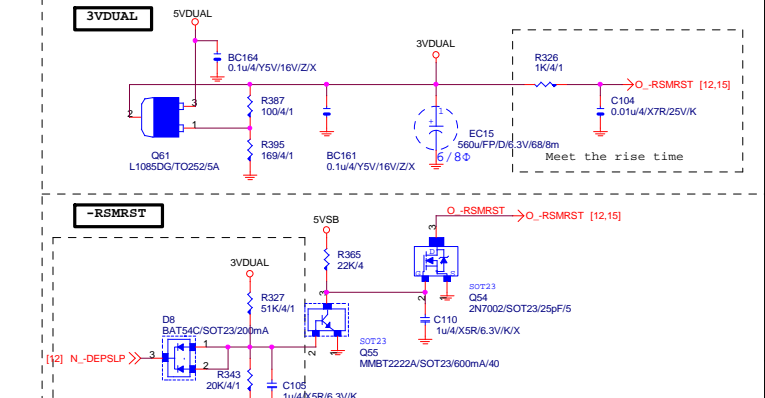
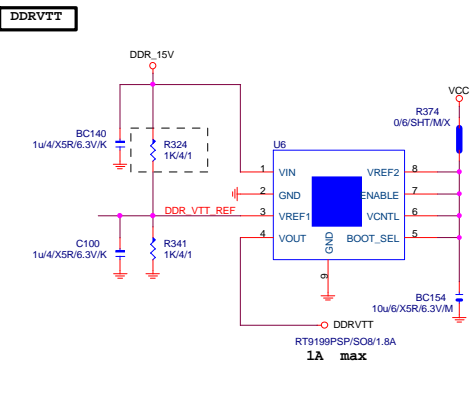
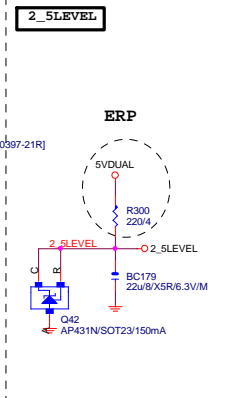
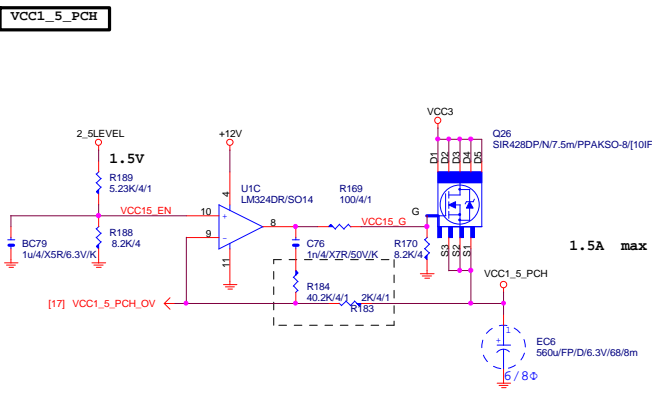


EMI SHORT PAD



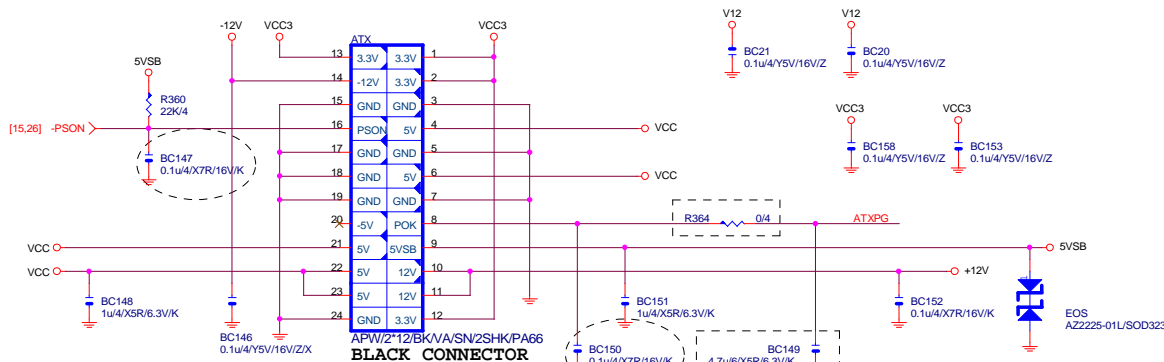
Gigabyte Technology		
INTEL LAN I217		
GA-H87N		
Rev	1.11	
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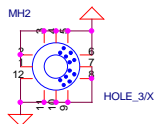




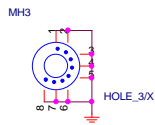
# ATXX24 POWER CONNECTOR



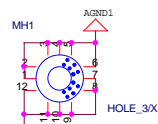
## MB LOCATION



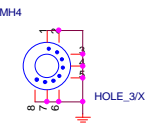
HOLE\_4-RH-5MM-1



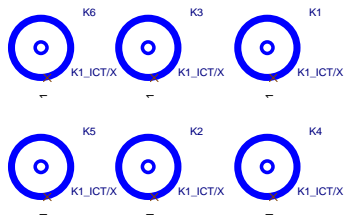
HOLE\_4-RH-5MM-5PIN-1



HOLE\_4-RH-5MM-1

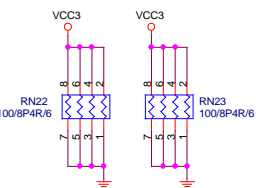


HOLE\_4-RH-5MM-5PIN-1

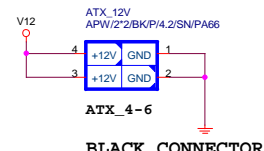


To prevent the 5VSB under loading when boot

## FIX PWR MINMUN LOAD

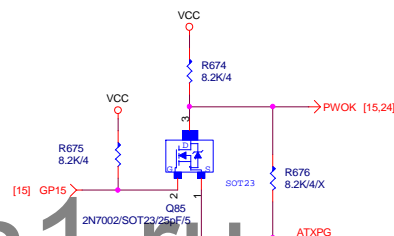


# ATXX4 POWER CONNECTOR

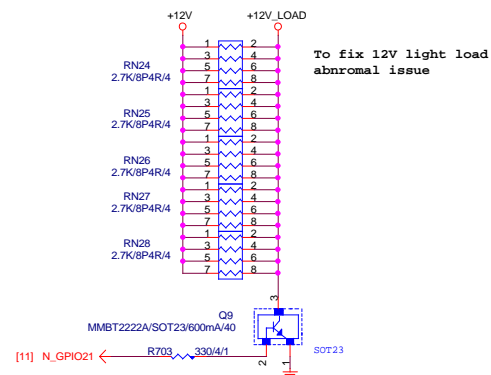


## PWOK PATCH

【技術通報R&D技術通報154】



【技術通報R&D技術通報153】



## CLK GEN

N/A

Gigabyte Technology

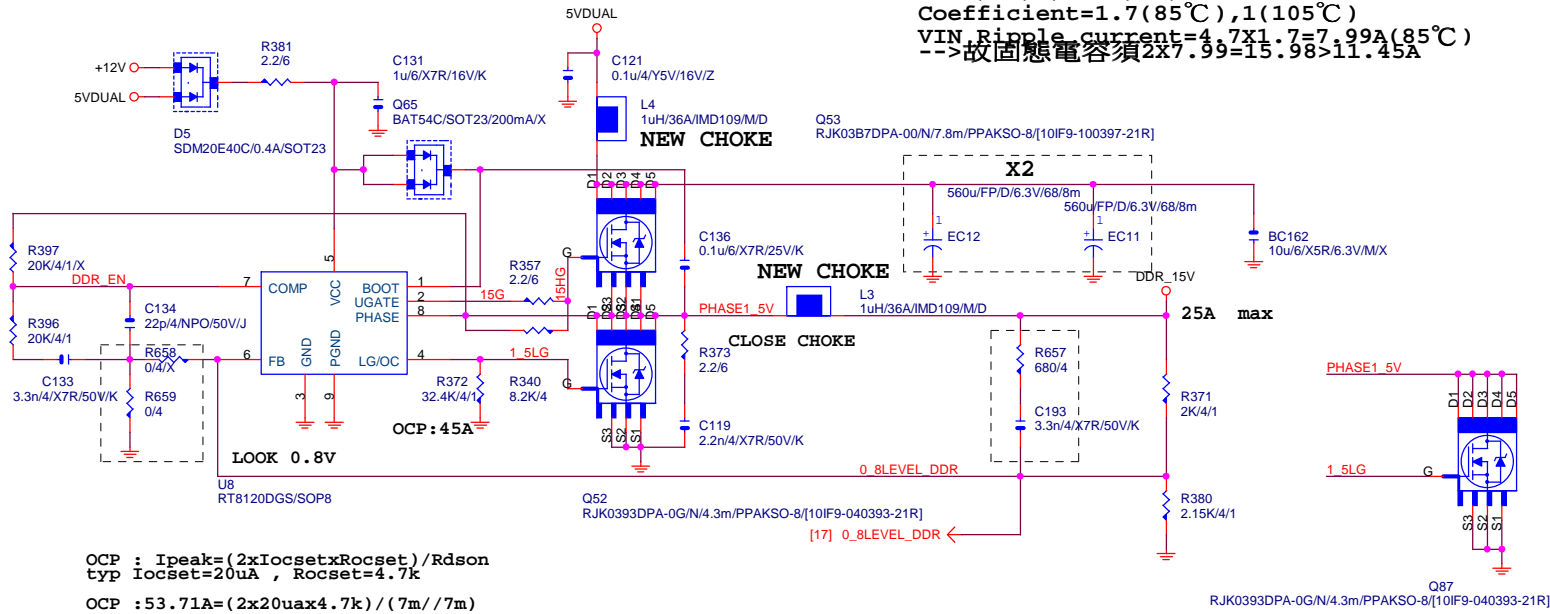
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GA-H87N

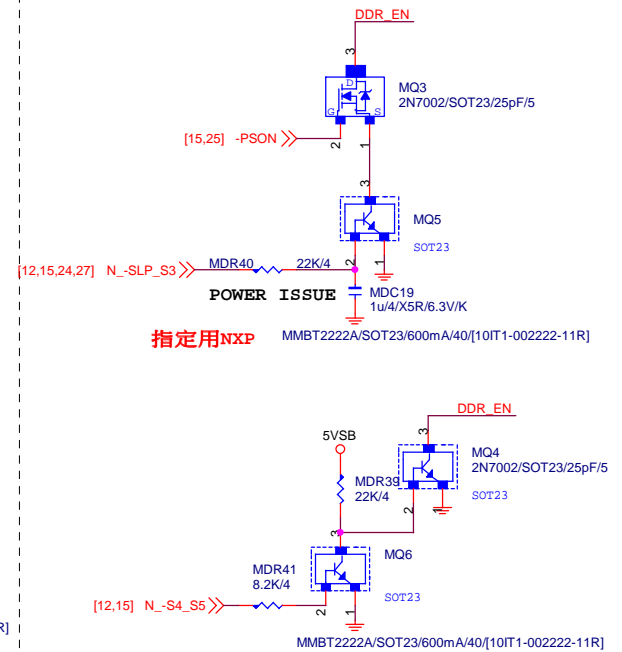
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# DDR15V



# PWR SEQ

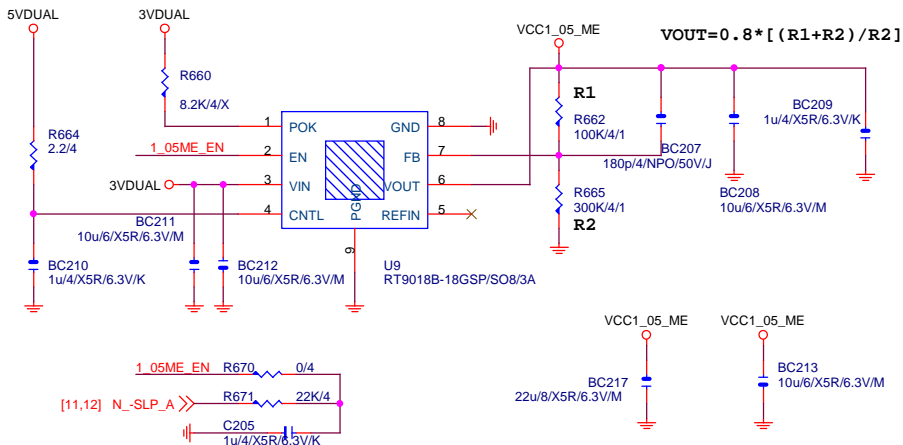


# VCC1\_05\_ME

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Z87+I217V

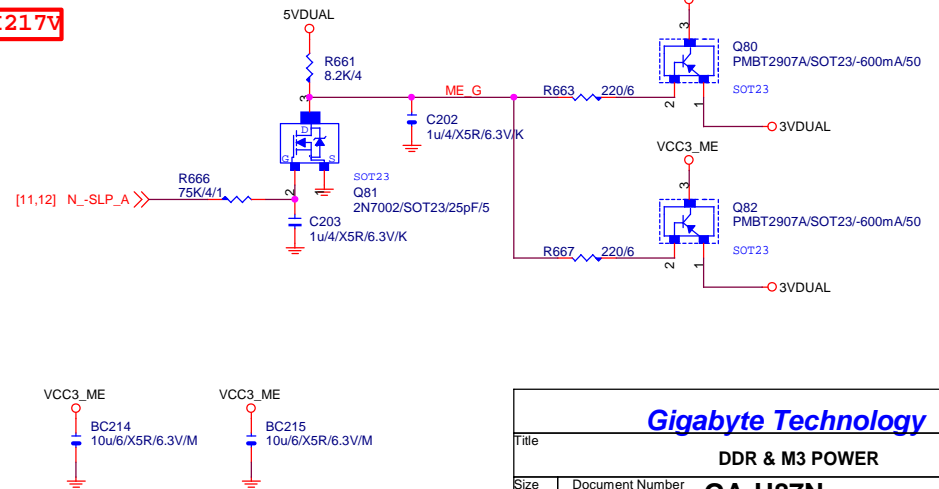
【技術通報R&D技術通報156】  
 (RICHTEK), (NUVOTON), (EMC)做共用  
 PIN7分壓阻值須做修改為100K以上電阻值



# VCC3\_ME

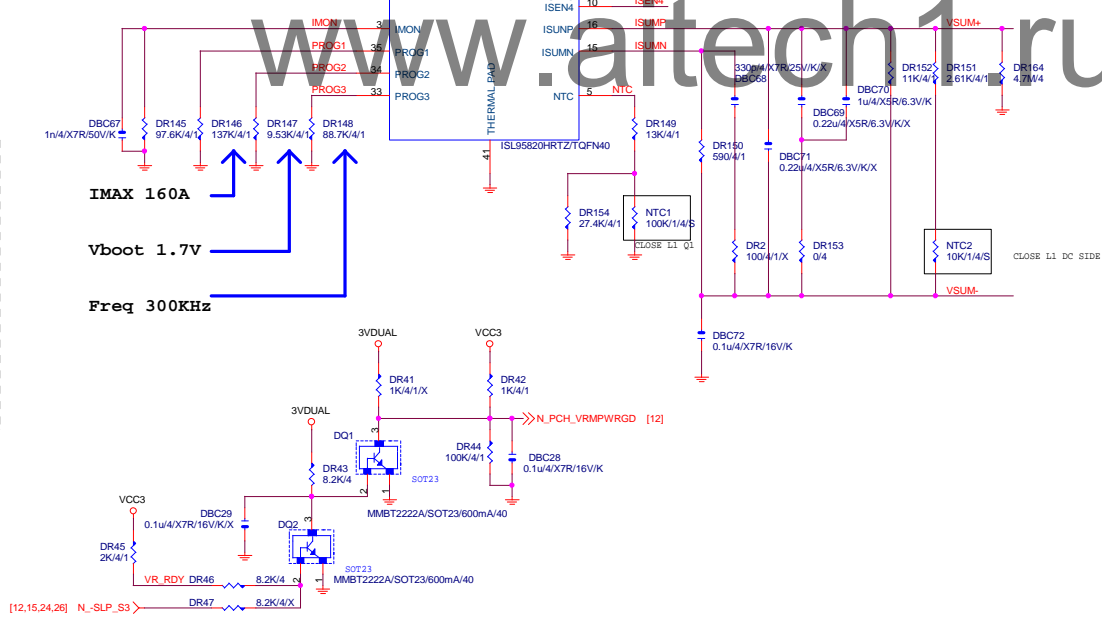
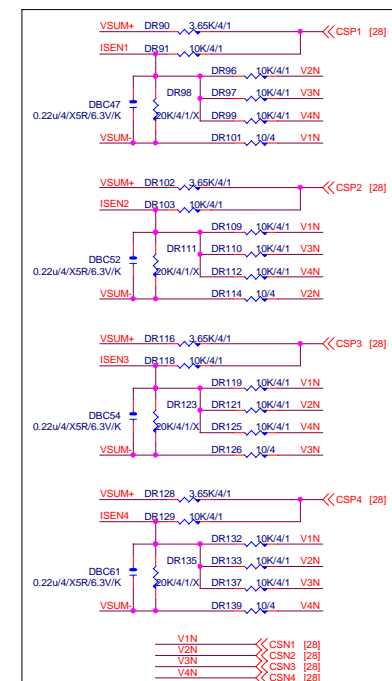
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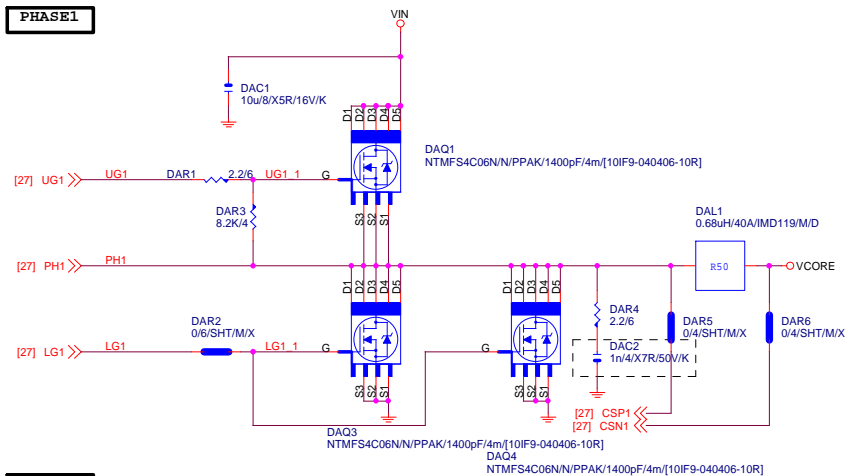


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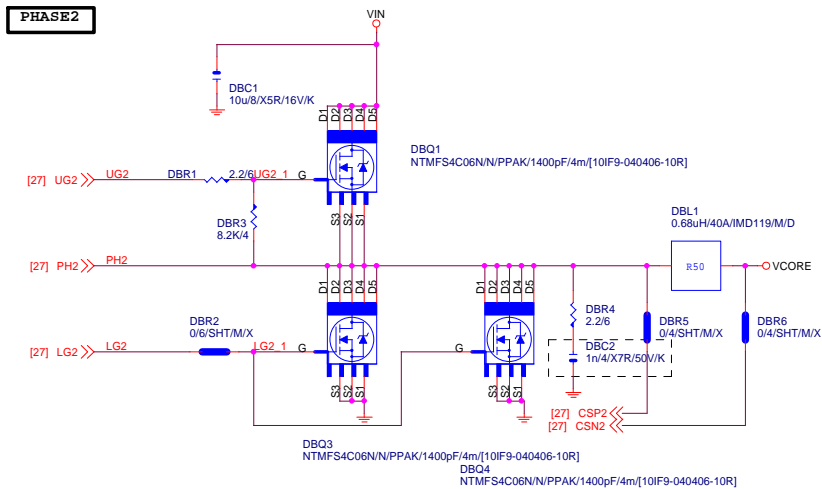
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Size	Document Number	Rev	
B	GA-H87N	1.11	
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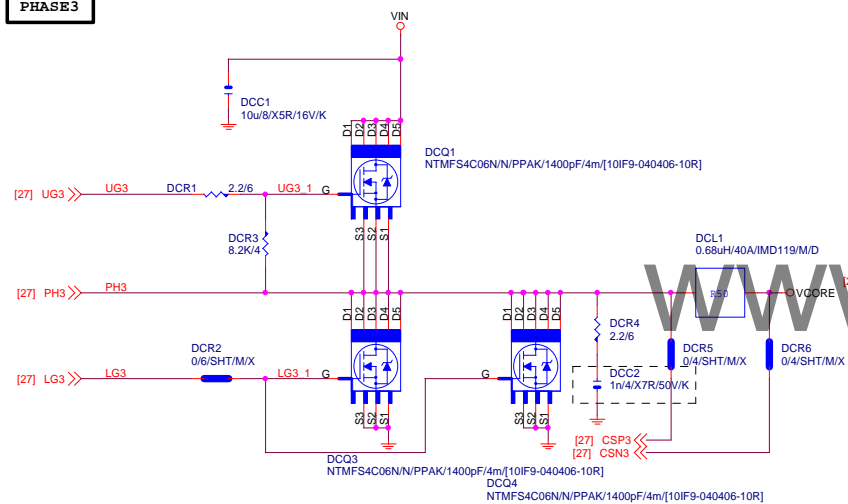
# PHASE1



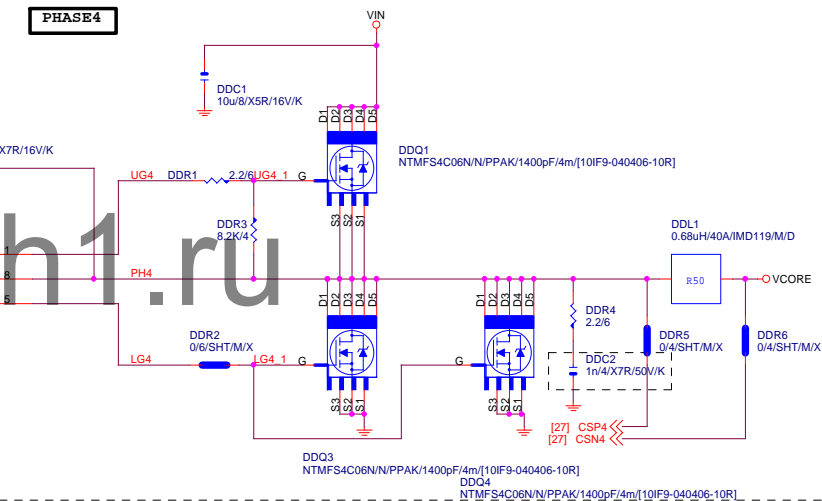
# PHASE2



# PHASE3

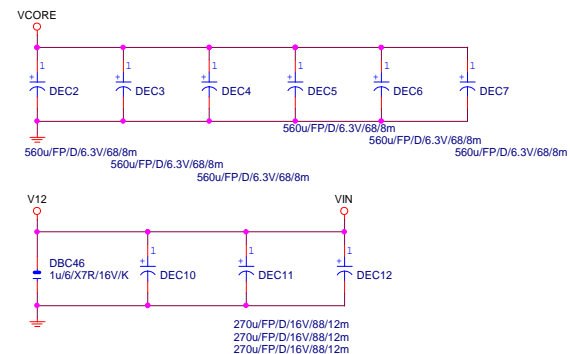


# PHASE4



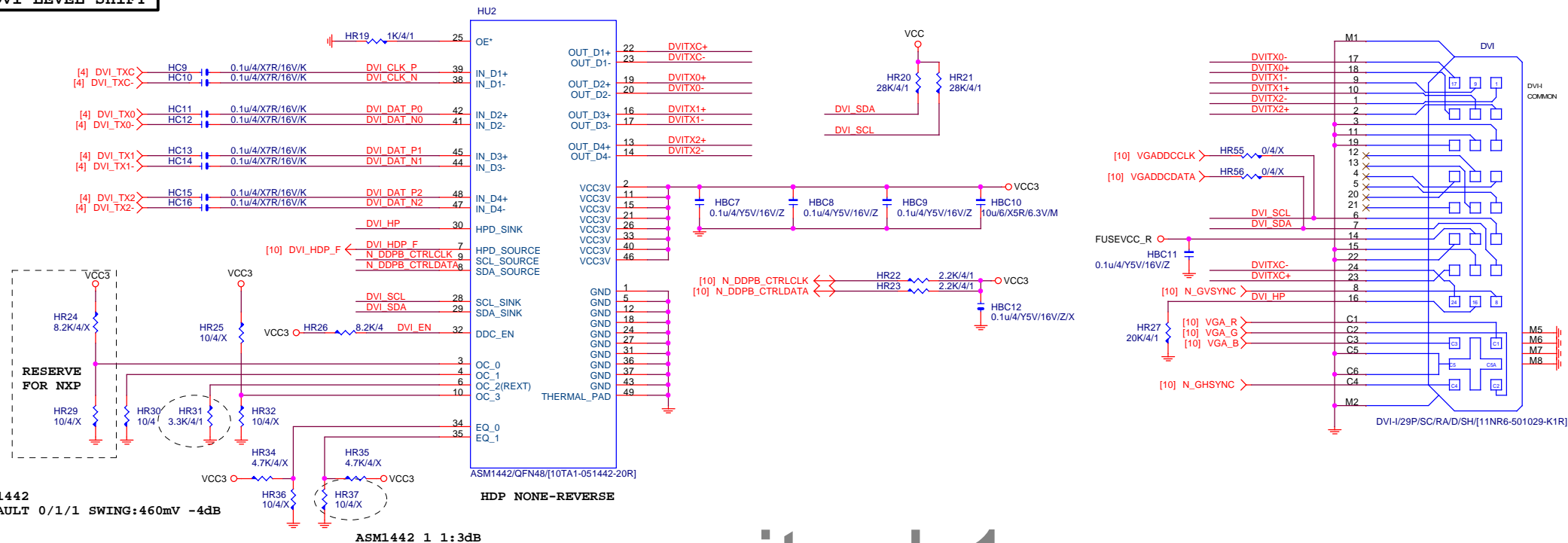
# MOS HEATSINK

N/A



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Title			
CPU CORE VR-2			
Size Custom			
Document Number			
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# DVI LEVEL SHIFT



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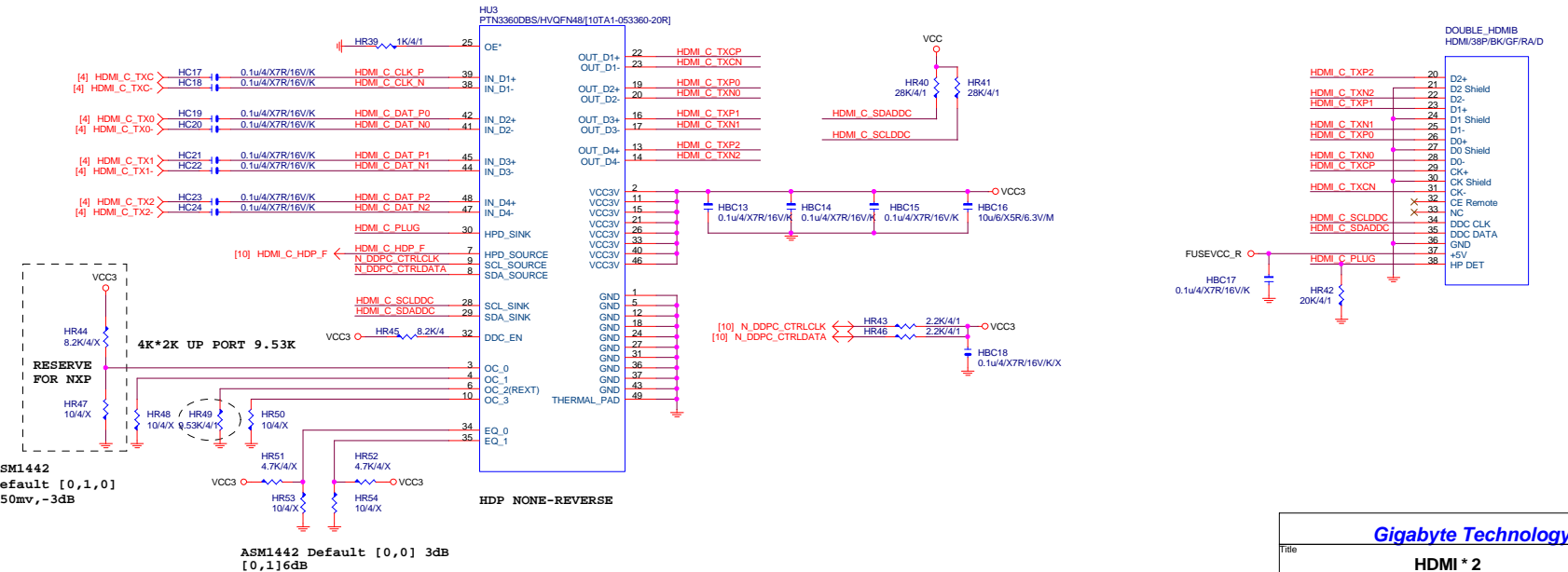
DVI

GA-H87N

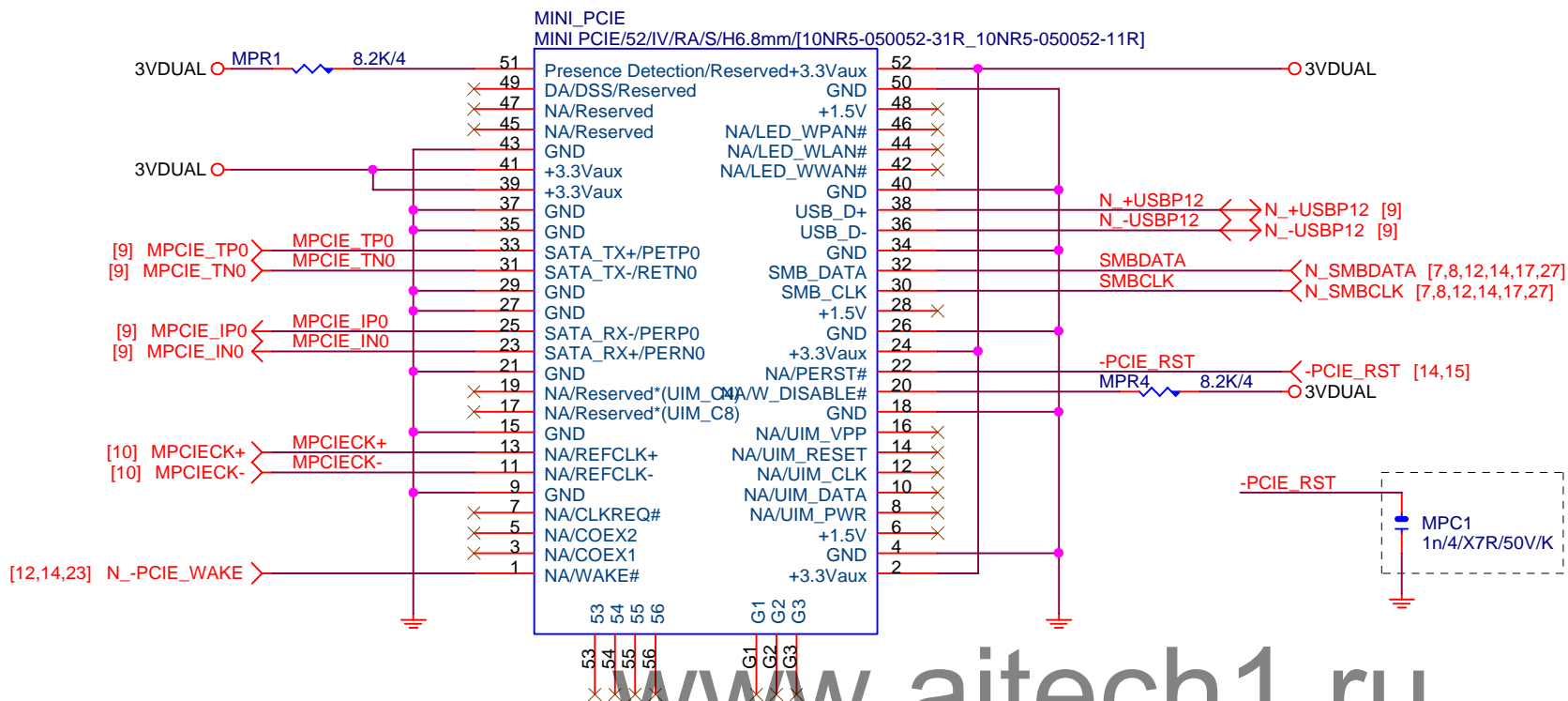
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1.11

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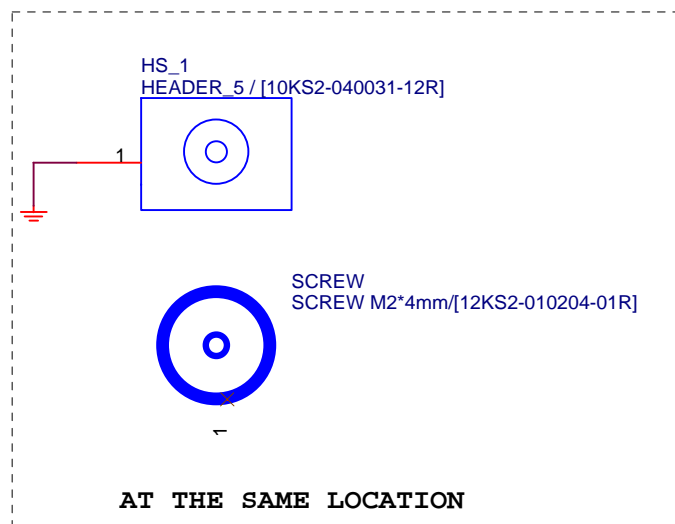
## HDMI LEVEL SHIFT



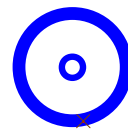
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HDMI * 2			
Size Custom	Document Number		Rev
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ANTENNA\_BRACKET  
BRACKET/[12AC2-000001-01R]/X



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

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

H87N REMOVE ANTENNA BRACKET & LINE,  
WIFI MODULE.



WIFI\_MODULE  
WI-FI WITH BT MINI CARD INTEL/[20CB1-022230-00R]/X

Gigabyte Technology		
Title		
mini PCI-E		
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