

Model Name: GA-H87M-D3H

Revision 1.12

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 1,2
08	DDR III CHANNEL B 1,2
09	PCH_FDI,DMI,USB,PCIE,NVRAM
10	PCH_DP,CLK BUFFER
11	PCH_HOST,SATA,PCI
12	PCH_GPIO,CTRL,AUDIO
13	PCH_PWR,GND
14	PCI EXPRESS*16 SLOT
15	PCI EXPRESS*4 SLOT
16	PCI SLOT1,2
17	ITE 8728 LPC IO
18	COM,KB_MS_USB,USB30_20
19	HWM,FAN CTRL,OV,-PROCHOT
20	DUAL BIOS
21	FP,FUSB,SPK,SATALED
22	Realtek ALC892-GR
23	REAR AUDIO JACK
24	REALTEK RTL8111F
25	DISCRETE POWER
26	ATX , CLOCK GEN, TPM
27	VCORE ISL95820_1

SHEET

TITLE

28	VCORE ISL95820_2
29	RT8120_DDR POWER
30	LPT, M3 POWER
31	DVI, HDMI
32	IT8892E

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Cover Sheet

Size	Document Number	Rev
Custom	GA-H87M-D3H	1.12
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Revision 1.12

Circuit or PCB layout change

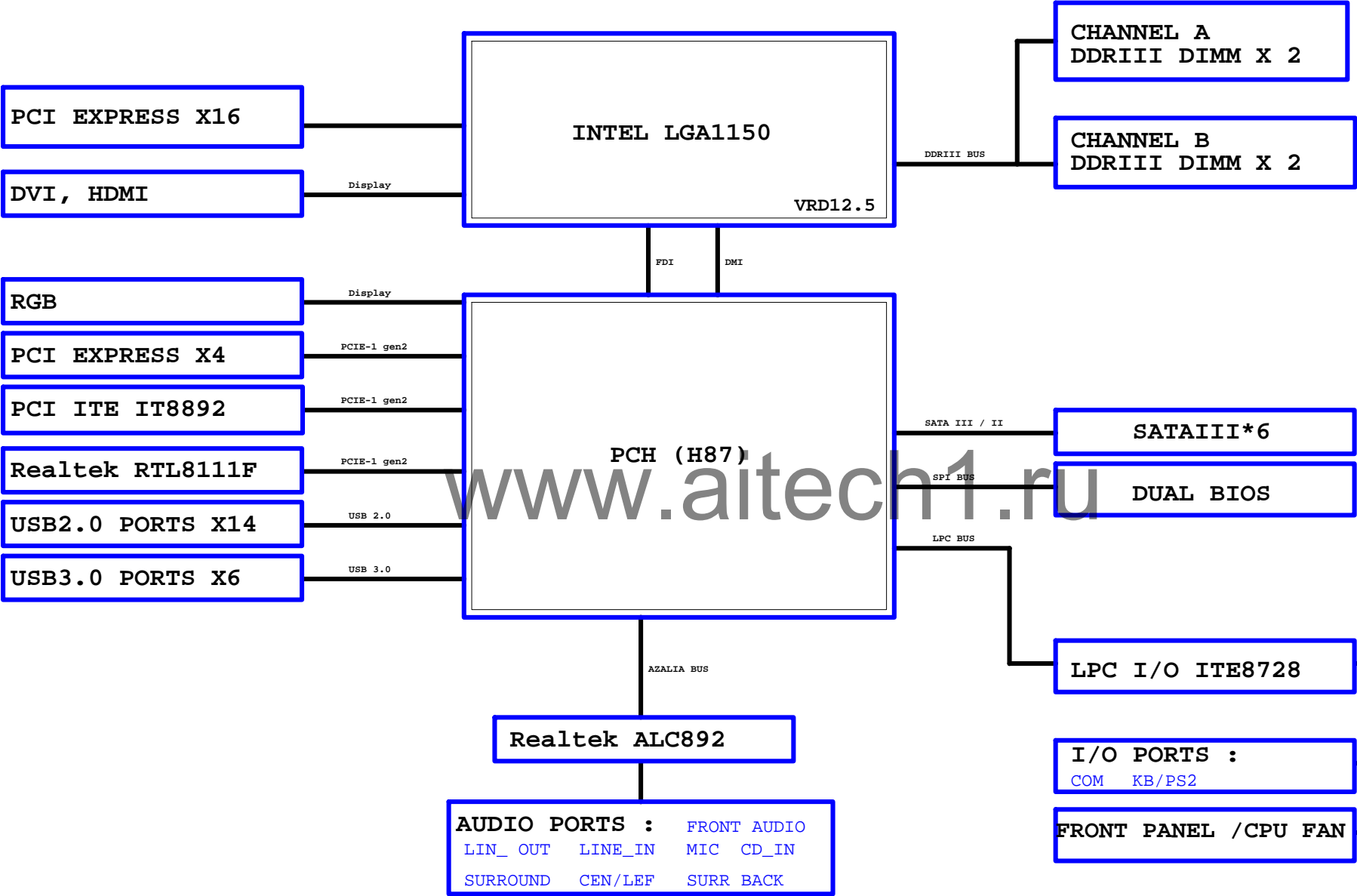
Component value change history

2013/11/27

Data	Change Item	Reason
2013/03/26	Modify form Z87M-D3H R1.01	
2013/03/28	DVI Level Shift Change to ASMedia	PBOM: 9MH87MD3H-00-10C
2013/05/23	Modify MOS_HS	PBOM: 9MH87MD3H-00-10D
	Del 12SP2-S08824-1*R	
	Add 12SP2-S08824-4*R	
2013/06/27	Update to Rev: 1.1	PBOM: 9MH87MD3H-00-11A
	Chipset change REV: C2	
	Update HDMI Footprint "HDMI-3"	
2013/07/11	5VSB OVP Protection	PBOM: 9MH87MD3H-00-11B
	DEL R704: 8.2K/4	
	ADD R706: 8.2K/4	
	R705: 715/4/1 -> 825/4/1	
	DEL AUDIO AZ2225-01L CD1	
2013/07/26	Update to Rev: 1.11	PBOM: 9MH87MD3H-00-11C
	Crystal REF GND	
	CPU FAN Color Black -> White	
2013/09/12	Update to R1.12	
	Follow Crystal Trace Rule	
	SYS_FAN, DDR 0ohm 0402 -> 0603	
	Update Fuse 1206 Footprint "POLYSWITCH-1206-1"	
	Update PPAK Footprint "Q_TDS0N8-GDS-T"	
2013/10/16		PBOM: 9MH87MD3H-00-11D
2013/10/24	NX1: 25M/20p -> 12p	PBOM: 9MH87MD3H-00-11E
	NC7, NX8: 27p -> 10p	
2013/11/04	NC7, NX8: 10p -> 12p	PBOM: 9MH87MD3H-00-11F
2013/11/27	MR17 0ohm -> 0603 FUSE(10FP5-06100B-00R)	PBOM: 9MH87MD3H-00-11G

[illegible]

BLOCK DIAGRAM



[illegible][illegible]

PCIEX16:16/5/5/16(breakout min 10/4/4/4/10)					
Impedance=80 ± 17.5%					
LGA1150C					
PA EXP RXP0	E15	PEG_RXP0	A12	PA EXP TXP0	
PA EXP RXN0	F15	PEG_RXN0	B12	PA EXP TXN0	
PA EXP RXP1	D14	PEG_RXP1	B11	PA EXP TXP1	
PA EXP RXN1	E14	PEG_RXN1	C11	PA EXP TXN1	
PA EXP RXP2	E13	PEG_RXP2	C10	PA EXP TXP2	
PA EXP RXN2	F13	PEG_RXN2	D10	PA EXP TXN2	
PA EXP RXP3	D12	PEG_RXP3	B9	PA EXP TXP3	
PA EXP RXN3	E12	PEG_RXN3	C9	PA EXP TXN3	
PA EXP RXP4	E11	PEG_RXP4	C8	PA EXP TXP4	
PA EXP RXN4	F11	PEG_RXN4	D8	PA EXP TXN4	
PA EXP RXP5	F10	PEG_RXP5	B7	PA EXP TXP5	
PA EXP RXN5	G10	PEG_RXN5	C7	PA EXP TXN5	
PA EXP RXP6	E9	PEG_RXP6	A6	PA EXP TXP6	
PA EXP RXN6	F9	PEG_RXN6	B6	PA EXP TXN6	
PA EXP RXP7	F8	PEG_RXP7	B5	PA EXP TXP7	
PA EXP RXN7	G8	PEG_RXN7	C5	PA EXP TXN7	
PA EXP RXP8	D3	PEG_RXP8	E1	PA EXP TXP8	
PA EXP RXN8	D4	PEG_RXN8	F1	PA EXP TXN8	
PA EXP RXP9	E4	PEG_RXP9	F2	PA EXP TXP9	
PA EXP RXN9	E5	PEG_RXN9	F3	PA EXP TXN9	
PA EXP RXP10	F5	PEG_RXP10	G1	PA EXP TXP10	
PA EXP RXN10	F6	PEG_RXN10	G2	PA EXP TXN10	
PA EXP RXP11	G4	PEG_RXP11	H2	PA EXP TXP11	
PA EXP RXN11	G5	PEG_RXN11	H3	PA EXP TXN11	
PA EXP RXP12	H5	PEG_RXP12	J1	PA EXP TXP12	
PA EXP RXN12	H6	PEG_RXN12	J2	PA EXP TXN12	
PA EXP RXP13	J4	PEG_RXP13	K2	PA EXP TXP13	
PA EXP RXN13	J5	PEG_RXN13	M3	PA EXP TXN13	
PA EXP RXP14	K5	PEG_RXP14	M2	PA EXP TXP14	
PA EXP RXN14	K6	PEG_RXN14	L3	PA EXP TXN14	
PA EXP RXP15	L4	PEG_RXP15	L1	PA EXP TXP15	
PA EXP RXN15	L5	PEG_RXN15	L2	PA EXP TXN15	
A DMI ORXP	U3	DMI_RXP0	AA4	A DMI OTXP	> A D
A DMI ORXN	T3	DMI_RXN0	AA3	A DMI OTXN	> A D
A DMI IRXP	U1	DMI_RXP1	AB3	A DMI ITXP	> A D
A DMI IRXN	V9	DMI_RXN1	AB4	A DMI ITXN	> A D
A DMI DRXP	W2	DMI_RXP2	AC3	A DMI DTXP	> A D
A DMI DRXN	Y3	DMI_RXN2	AC4	A DMI DTXN	> A D
A DMI SRXP	Y3	DMI_RXP3	AC1	A DMI STXP	> A D
A DMI SRXN	W5	DMI_RXN3	AC2	A DMI STXN	> A D
X D1	RSVD_TP				
X C2	RSVD_TP				
X B3	RSVD_TP				
X M4	RSVD_TP				
P3	RSCOMP				
HASWELL/10SC1-F01150-01R 10SC1-F01150-03R]					

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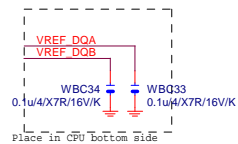
LGA1150 (A)

LGA1150A									
MAAA0	AU13	DDR0_MA0	DDR0_D00	AD38	MDA0				
MAAA1	AV16	DDR0_MA1	DDR0_D01	AD39	MDA1				
MAAA2	AU16	DDR0_MA2	DDR0_D02	AF38	MDA2				
MAAA3	AW17	DDR0_MA3	DDR0_D03	AF39	MDA3				
MAAA4	AU17	DDR0_MA4	DDR0_D04	AD37	MDA4				
MAAA5	AW18	DDR0_MA5	DDR0_D05	AD40	MDA5				
MAAA6	AV17	DDR0_MA6	DDR0_D06	AE37	MDA6				
MAAA7	AT18	DDR0_MA7	DDR0_D07	AF40	MDA7				
MAAA8	AU18	DDR0_MA8	DDR0_D08	AH40	MDA9				
MAAA9	AT19	DDR0_MA9	DDR0_D09	AH39	MDA10				
MAAA10	AW11	DDR0_MA10	DDR0_D10	AK38	MDA10				
MAAA11	AV19	DDR0_MA11	DDR0_D11	AK39	MDA11				
MAAA12	AU19	DDR0_MA12	DDR0_D12	AH37	MDA12				
MAAA13	AY10	DDR0_MA13	DDR0_D13	AH38	MDA13				
MAAA14	AT20	DDR0_MA14	DDR0_D14	AK37	MDA14				
MAAA15	AU21	DDR0_MA15	DDR0_D15	AK40	MDA15				
MODT_A0	AW10	DDR0_ODT0	DDR0_D16	AM40	MDA17				
MODT_A1	AY8	DDR0_ODT1	DDR0_D17	AM39	MDA21				
MODT_A2	AW9	DDR0_ODT2	DDR0_D18	AP38	MDA18				
MODT_A3	AU8	DDR0_ODT3	DDR0_D19	AP39	MDA19				
			DDR0_D20	AM37	MDA20				
			DDR0_D21	AM38	MDA16				
			DDR0_D22	AP37	MDA22				
			DDR0_D23	AP40	MDA23				
			DDR0_D24	AV37	MDA25				
			DDR0_D25	AW37	MDA28				
			DDR0_D26	AU35	MDA26				
			DDR0_D27	AV35	MDA27				
			DDR0_D28	AT37	MDA28				
			DDR0_D29	AU37	MDA24				
			DDR0_D30	AT35	MDA30				
			DDR0_D31	AW35	MDA31				
			DDR0_D32	AY6	MDA33				
			DDR0_D33	AU6	MDA37				
			DDR0_D34	AV4	MDA34				
			DDR0_D35	AW6	MDA35				
			DDR0_D36	AW6	MDA36				
			DDR0_D37	AW4	MDA38				
			DDR0_D38	AY4	MDA39				
			DDR0_D39	AR1	MDA41				
			DDR0_D40	AR4	MDA45				
			DDR0_D41	AN3	MDA42				
			DDR0_D42	AN4	MDA43				
			DDR0_D43	AR2	MDA44				
			DDR0_D44	AR3	MDA40				
			DDR0_D45	AN2	MDA46				
			DDR0_D46	AN1	MDA47				
			DDR0_D47	AL1	MDA49				
			DDR0_D48	AL4	MDA53				
			DDR0_D49	AL4	MDA50				
			DDR0_D50	AJ4	MDA51				
			DDR0_D51	AL2	MDA52				
			DDR0_D52	AL3	MDA48				
			DDR0_D53	AJ2	MDA54				
			DDR0_D54	AJ1	MDA55				
			DDR0_D55	AG1	MDA57				
			DDR0_D56	AG4	MDA61				
			DDR0_D57	AE3	MDA58				
			DDR0_D58	E4	MDA59				
			DDR0_D59	AG2	MDA60				
			DDR0_D60	AG3	MDA56				
			DDR0_D61	AE2	MDA62				
			DDR0_D62	AE1	MDA63				
			DDR0_D63	AE39	DQSA0				
			DDR0_D64	AJ39	DQSA1				
			DDR0_D65	AN39	DQSA2				
			DDR0_D66	AV36	DQSA3				
			DDR0_D67	AV5	DQSA4				
			DDR0_D68	AP3	DQSA5				
			DDR0_D69	AK3	DQSA6				
			DDR0_D70	AF3	DQSA7				
			DDR0_D71	AV32					
			DDR0_D72	AE38	DQSA0				
			DDR0_D73	AJ38	DQSA1				
			DDR0_D74	AN38	DQSA2				
			DDR0_D75	AJ36	DQSA3				
			DDR0_D76	AW5	DQSA4				
			DDR0_D77	AP2	DQSA5				
			DDR0_D78	AK2	DQSA6				
			DDR0_D79	AF2	DQSA7				
			DDR0_D80	AU32					

HASWELL[10SC1-F01150-01R_10SC1-F01150-03R]

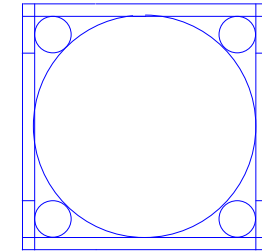
LGA1150 (B)

LGA1150B									
MAAB0	AL19	DDR1_MA0	AE34	MD80					
MAAB1	AK23	DDR1_MA1	AE35	MD81					
MAAB2	AM22	DDR1_MA2	AG35	MD82					
MAAB3	AM23	DDR1_MA3	AH35	MD83					
MAAB4	AP23	DDR1_MA4	AD34	MD84					
MAAB5	AL23	DDR1_MA5	AD35	MD85					
MAAB6	AY24	DDR1_MA6	AG34	MD86					
MAAB7	AV25	DDR1_MA7	AH34	MD87					
MAAB8	AU26	DDR1_MA8	AL34	MD88					
MAAB9	AW25	DDR1_MA9	AL35	MD89					
MAAB10	AP18	DDR1_MA10	AL31	MD810					
MAAB11	AY25	DDR1_MA11	AL31	MD811					
MAAB12	AV26	DDR1_MA12	AK34	MD812					
MAAB13	AR15	DDR1_MA13	AK35	MD813					
MAAB14	AV27	DDR1_MA14	AK32	MD814					
MAAB15	AY28	DDR1_MA15	AL32	MD815					
MODT_B0	AM17	DDR1_ODT0	AP34	MD817					
MODT_B1	AL16	DDR1_ODT1	AP34	MD821					
MODT_B2	AM16	DDR1_ODT2	AP31	MD819					
MODT_B3	AK15	DDR1_ODT3	AP35	MD820					
			AP35	MD816					
			AP32	MD818					
			AP32	MD822					
			AP29	MD825					
			AP28	MD828					
			AP28	MD827					
			AP28	MD830					
			AL28	MD824					
			AL28	MD829					
			AP29	MD826					
			AP28	MD831					
			AP12	MD832					
			AP12	MD833					
			AL13	MD834					
			AL12	MD835					
			AR13	MD836					
			AP13	MD837					
			AM13	MD838					
			AM12	MD839					
			AR9	MD845					
			AP9	MD841					
			AR6	MD847					
			AP6	MD843					
			AR10	MD844					
			AP10	MD840					
			AR7	MD846					
			AP7	MD842					
			AM9	MD852					
			AL9	MD853					
			AL6	MD850					
			AL7	MD855					
			AM10	MD848					
			AL10	MD849					
			AM6	MD854					
			AM7	MD851					
			AH6	MD861					
			AH7	MD860					
			AE6	MD859					
			AE7	MD863					
			AJ6	MD856					
			AJ7	MD857					
			AF6	MD858					
			AF7	MD862					
			AF35	DQSB0					
			AL33	DQSB1					
			AP33	DQSB2					
			AN28	DQSB3					
			AN12	DQSB4					
			AP8	DQSB5					
			AL8	DQSB6					
			AG7	DQSB7					
			AN25						
			AE34	DQSB0					
			AK33	DQSB1					
			AN33	DQSB2					
			AN29	DQSB3					
			AN13	DQSB4					
			AR8	DQSB5					
			AM8	DQSB6					
			AG6	DQSB7					
			AN26						



HASWELL[10SC1-F01150-01R_10SC1-F01150-03R]

LGA1150 (CR)

CR
CPU RETAINTION/X

LGA1150_P



ILM_BP/1156/CSP/ILM_BP/1156/CSP/[12KRC-0F0001-52R_12KRC-0F0001-51R]

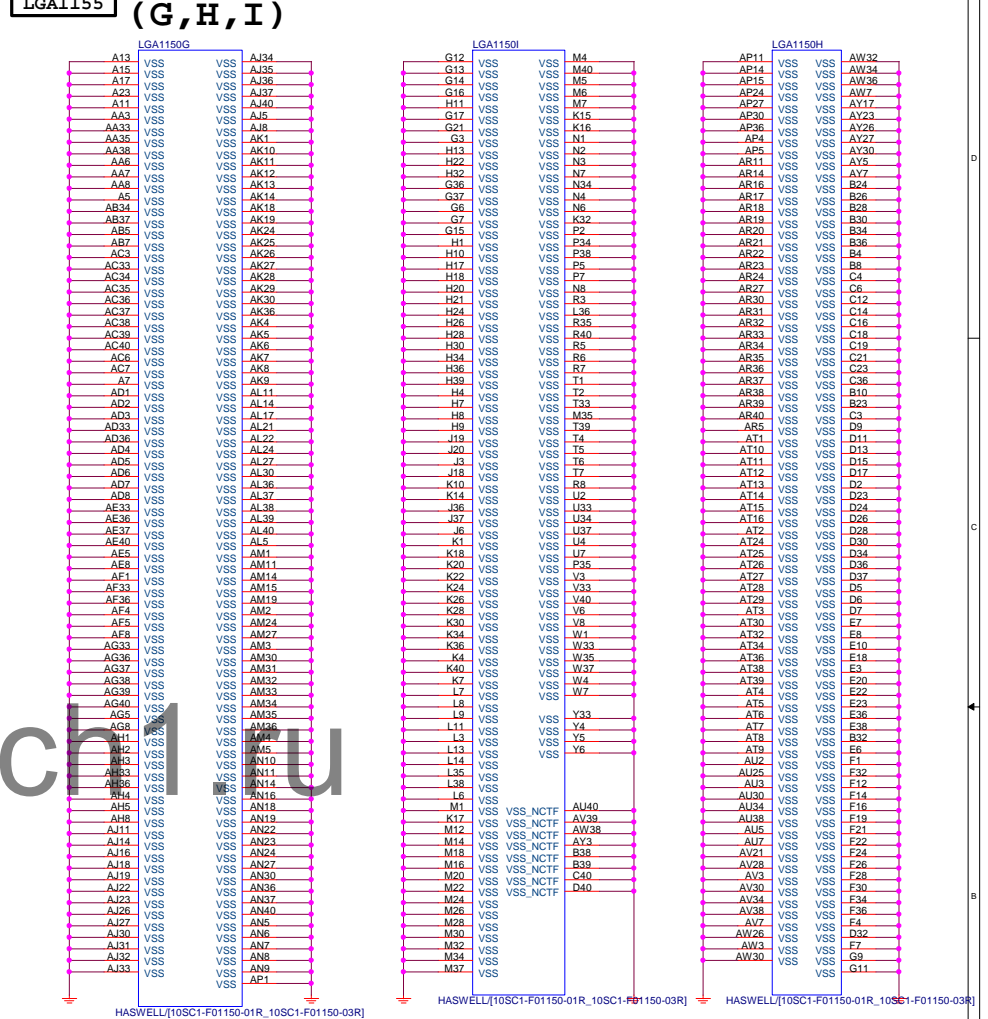
DDR BUS

[7] MODT_A[0..3]	MODT_A0..3
[8] MODT_B[0..3]	MODT_B0..3
[7] MDA[0..63]	MDA0..63
[8] MDB[0..63]	MDB0..63
[7] DQSA[0..7]	DQSA0..7
[7] DQSA[0..7]	DQSA0..7
[7] MAA[0..15]	MAA0..15
[8] MAB[0..15]	MAB0..15
[8] DQSB[0..7]	DQSB0..7
[8] DQSB[0..7]	DQSB0..7

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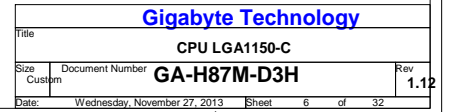
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CPU LGA1150-B			
Size			
Custom			
Document Number			
GA-H87M-D3H			
Date:			
Wednesday, November 27, 2013			
Sheet			
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Rev			
1.12			

LGA1155 (G,H,I)

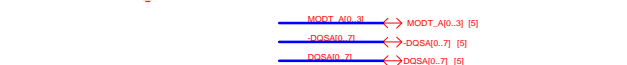


DDR CAP

(x9)



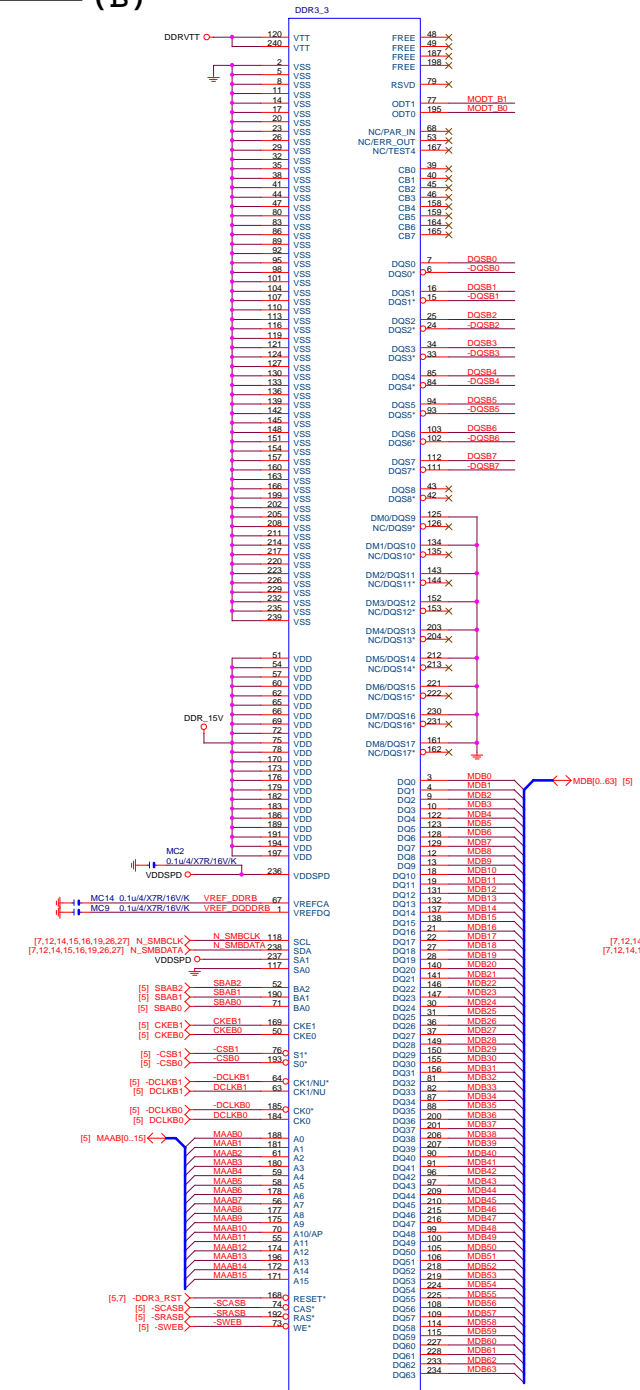
(A)





DDR3

(B)



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

PCHB

[4] A_DMI_0TXN A_DMI_0TXN L24
[4] A_DMI_0TXP A_DMI_0TXP K24
[4] A_DMI_0RXN A_DMI_0RXN C20
[4] A_DMI_0RXP A_DMI_0RXP B20
[4] A_DMI_1TXN A_DMI_1TXN G24
[4] A_DMI_1TXP A_DMI_1TXP H24
[4] A_DMI_1RXN A_DMI_1RXN B21
[4] A_DMI_1RXP A_DMI_1RXP B21
[4] A_DMI_2TXN A_DMI_2TXN F26
[4] A_DMI_2TXP A_DMI_2TXP G26
[4] A_DMI_2RXN A_DMI_2RXN B22
[4] A_DMI_2RXP A_DMI_2RXP C22
[4] A_DMI_3TXN A_DMI_3TXN K26
[4] A_DMI_3TXP A_DMI_3TXP L26
[4] A_DMI_3RXN A_DMI_3RXN B24
[4] A_DMI_3RXP A_DMI_3RXP B24

DMI RXN_0
DMI RXP_0
DMI TXN_0
DMI TXP_0
DMI RXN_1
DMI RXP_1
DMI TXN_1
DMI TXP_1
DMI RXN_2
DMI RXP_2
DMI TXN_2
DMI TXP_2
DMI RXN_3
DMI RXP_3
DMI TXN_3
DMI TXP_3

DMI_RCOMP
PCI_E_COMP C13CLKIN_DMI_N
CLKIN_DMI_P

PCIE_PERN_1 USB3_RXN_2
PCIE_PERP_1 USB3_RXP_2
PCIE_PETN_1 USB3_TXN_2
PCIE_PETP_1 USB3_TXP_2
PCIE_PERN_2 USB3_RXN_3
PCIE_PERP_2 USB3_RXP_3
PCIE_PETN_2 USB3_TXN_3
PCIE_PETP_2 USB3_TXP_3

LA_ML_IN
LA_ML_IP
LA_ML_ON
LA_ML_OP
G_PCIEBIN
G_PCIEBIP
G_PCIEBON
G_PCIEBOP
PP_EXP_RXN0
PP_EXP_RXP0
PP_EXP_TXN0
PP_EXP_TXP0
PP_EXP_RXN1
PP_EXP_RXP1
PP_EXP_TXN1
PP_EXP_TXP1
PP_EXP_RXN2
PP_EXP_RXP2
PP_EXP_TXN2
PP_EXP_TXP2
PP_EXP_RXN3
PP_EXP_RXP3
PP_EXP_TXN3
PP_EXP_TXP3

OC0B_GP59
OC1B_GP40
OC2B_GP41
OC3B_GP42
OC4B_GP43
OC5B_GP9
OC6B_GP10
OC7B_GP14
USBRBIASB
USBRBIAS
CLKIN_DOT96N
CLKIN_DOT96P

CHIP DH82H87 C2 INTEL(10HB1-030H87-20R)

CHIP DH82H87 C2 INTEL(10HB1-030H87-20R)

CHIP DH82H87 C2 INTEL(10HB1-030H87-20R)

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CHIP DH82H87 C2 INTEL(10HB1-030H87-20R)

CHIP DH82H87 C2 INTEL(10HB1-030H87-20R)

CHIP DH82H87 C2 INTEL(10HB1-030H87-20R)

CHIP DH82H87 C2 INTEL(10HB1-030H87-20R)

CHIP DH82H87 C2 INTEL(10HB1-030H87-20R)

CHIP DH82H87 C2 INTEL(10HB1-030H87-20R)

PCH

(F)

[21] PCH_USB3_RXN0 F20
[21] PCH_USB3_RXP0 G20
[21] PCH_USB3_TXN0 B18
[21] PCH_USB3_TXP0 C18
[21] PCH_USB3_RXN1 G18
[21] PCH_USB3_RXP1 H18
[21] PCH_USB3_TXN1 B16
[21] PCH_USB3_TXP1 C16
[18] PCH_USB3_RXN4 K20
[18] PCH_USB3_RXP4 L20
[18] PCH_USB3_TXN4 D15
[18] PCH_USB3_TXP4 C15
[18] PCH_USB3_RXN5 L18
[18] PCH_USB3_RXP5 K18
[18] PCH_USB3_TXN5 B14
[18] PCH_USB3_TXP5 A14

VCC3
NR62 8.2K/4
NR63 8.2K/4
AK28
AT34

TACH6_GP70
TACH7_GP71

CHIP DH82H87 C2 INTEL(10HB1-030H87-20R)
FDI_TXP0_11 FDI_TXP0[0..1] [4]
FDI_TXN0_11 FDI_TXN0[0..1] [4]

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

PCH CLK PD

CK_SRCCLK_PCH NR89 8.2K/4
CK_SRCCLK_PCH NR88 8.2K/4

Mount for integrated clock Generation Mode

CK_DOTCLK NR92 8.2K/4
CK_DOTCLK NR91 8.2K/4
NR225 short to GND in non graphic SKU

PCH

(J)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

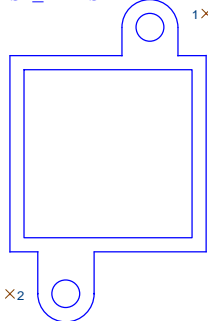
PCIEX1:16/5/5/5/16 (breakout min 8/4/4/4/8)

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

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

PCH H/S

SB_HEATSIN

PCH_HS
PCH_HS[12SP2-S04209-01R_12SP2-S04209-02R_12SP2-S04209-03R]

8 Series PCH Heatsink

USB TABLE

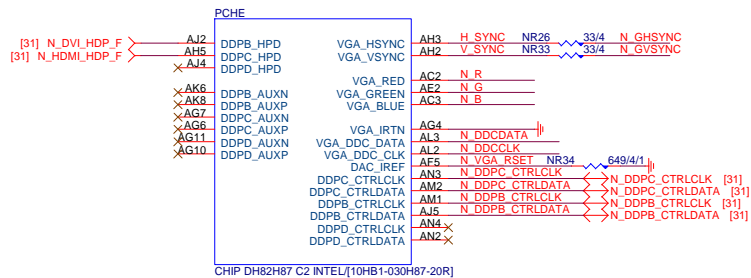
OC[3:0]# for Device 29 (ports 0-7)
OC[7:4]# for Device 26 (ports 8-13)

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

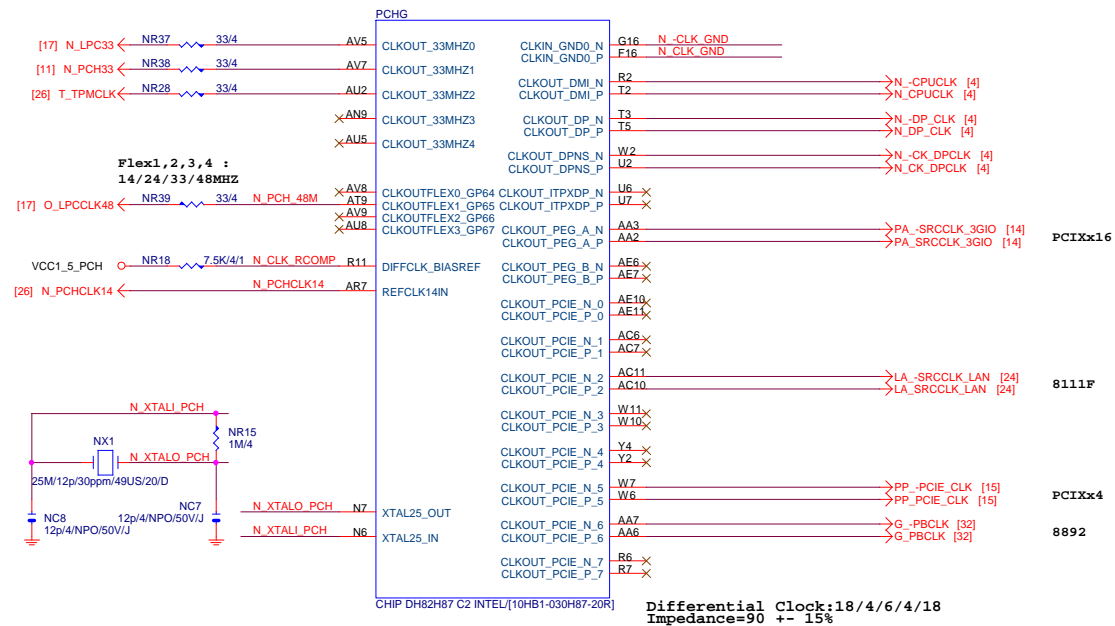
Gigabyte Technology

Title				PCH FDI,DMI,USB ,PCIE,NVRAM					
Size	Document Number			GA-H87M-D3H				Rev	1.12
Custom									
Date:	Wednesday, November 27, 2013			Sheet	9		of	32	

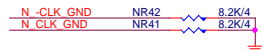
PCH (E)



PCH (G)



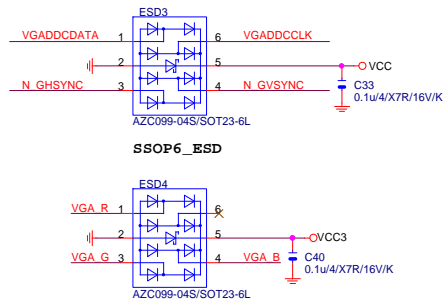
PCH CLK PD



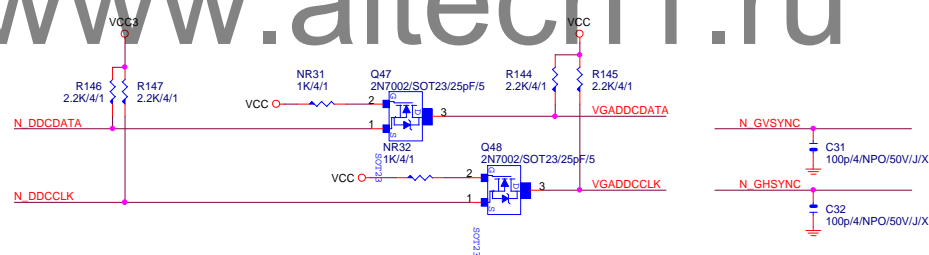
Mount for integrated clock Generation
Mode



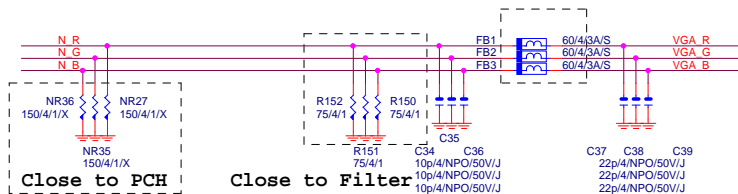
VGA ESD



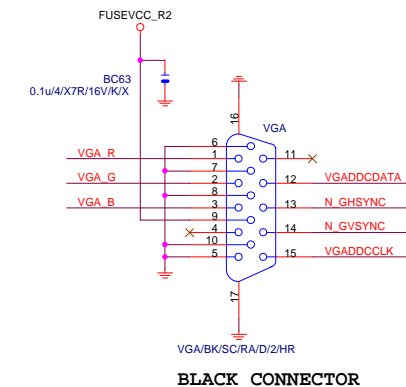
VGA DDC



VGA DDC



VGA CONNECTOR



Gigabyte Technology

PCH DISPLAY ,CLK BUFFER

GA-H87M-D3H

Size Custom	Document Number GA-H87M-D3H	Rev 1.12
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Date: Wednesday, November 27, 2013 Sheet 10 of 32

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

SATALED

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

CHIP DH82H87 C2 INTEL[10HB1-030H87-20R]

CLINK

FSN

GPIO

RST

GPIO17

GPIO18

GPIO19

GPIO20

GPIO21

GPIO22

GPIO23

GPIO24

GPIO25

GPIO26

GPIO27

GPIO28

GPIO29

GPIO30

GPIO31

GPIO32

GPIO33

GPIO34

GPIO35

GPIO36

GPIO37

GPIO38

GPIO39

GPIO40

GPIO41

GPIO42

GPIO43

GPIO44

GPIO45

GPIO46

GPIO47

GPIO48

GPIO49

GPIO50

GPIO51

GPIO52

GPIO53

GPIO54

GPIO55

GPIO56

GPIO57

GPIO58

GPIO59

GPIO60

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GPIO68

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GPIO81

GPIO82

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GPIO96

GPIO97

GPIO98

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GPIO102

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GPIO105

GPIO106

GPIO107

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GPIO110

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GPIO112

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GPIO199

GPIO200

GPIO201

GPIO202

GPIO203

GPIO204

GPIO205

GPIO206

GPIO207

GPIO208

GPIO209

GPIO210

GPIO211

GPIO212

GPIO213

GPIO214

GPIO215

GPIO216

GPIO217

GPIO218

GPIO219

GPIO220

GPIO221

GPIO222

GPIO223

GPIO224

GPIO225

GPIO226

GPIO227

GPIO228

GPIO229

GPIO230

GPIO231

GPIO232

GPIO233

GPIO234

GPIO235

GPIO236

GPIO237

GPIO238

GPIO239

GPIO240

GPIO241

GPIO242

GPIO243

GPIO244

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GPIO250

GPIO251

GPIO252

GPIO253

GPIO254

GPIO255

GPIO256

GPIO257

GPIO258

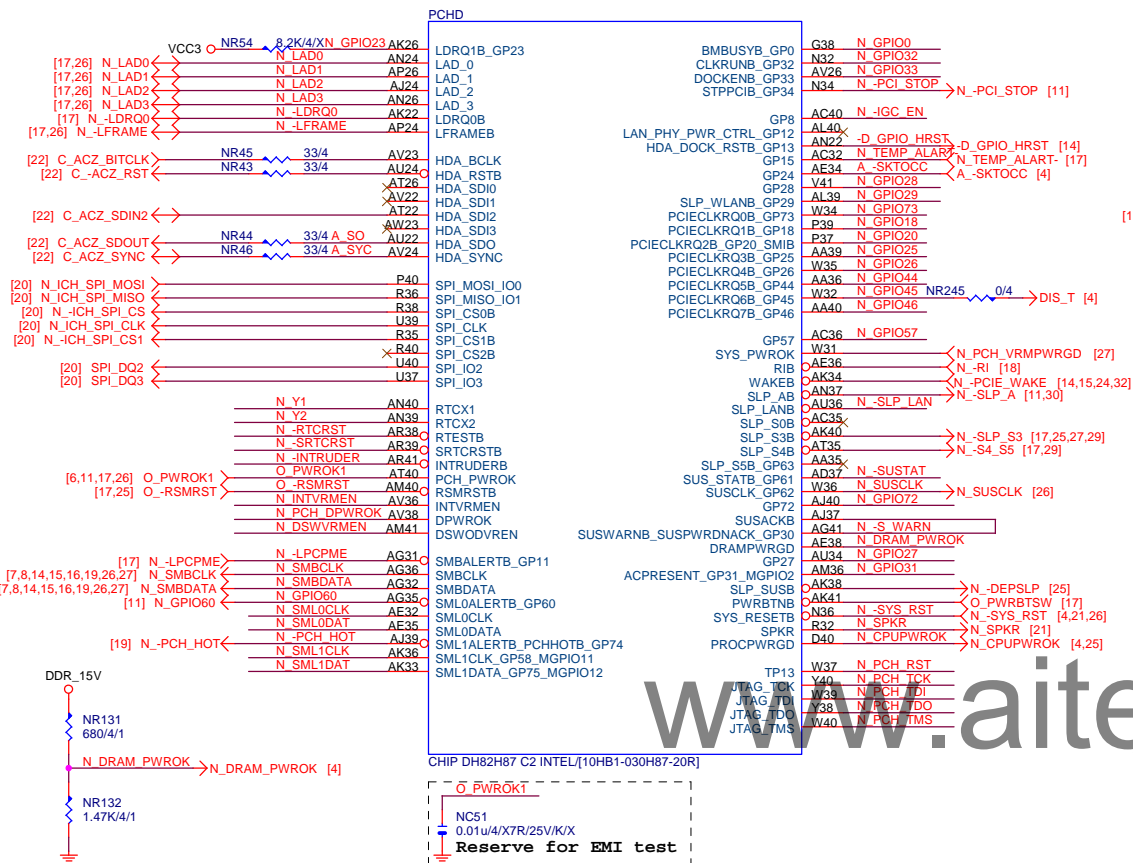
GPIO259

GPIO260

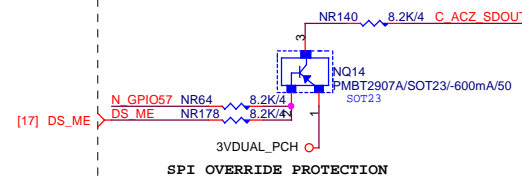
GPIO261

GPIO262

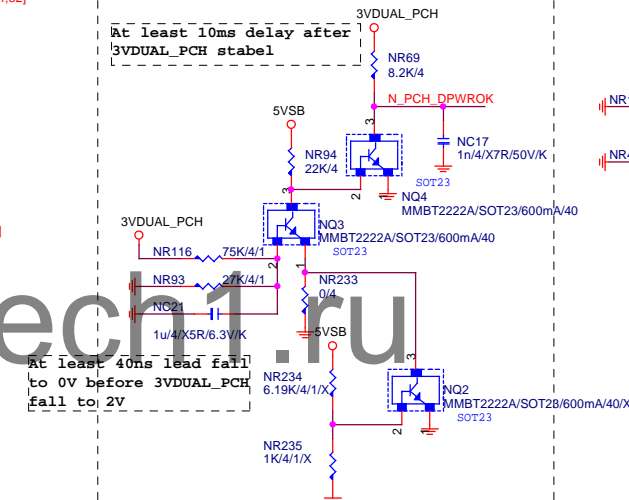
(D)



ACZ_SDOUT



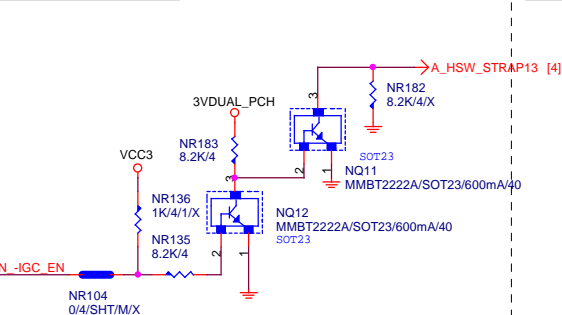
PCH_DPWROK



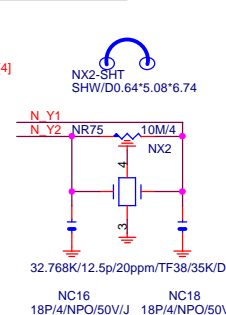
PCH	PU/PD
-----	-------



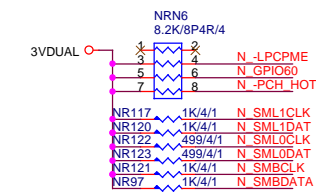
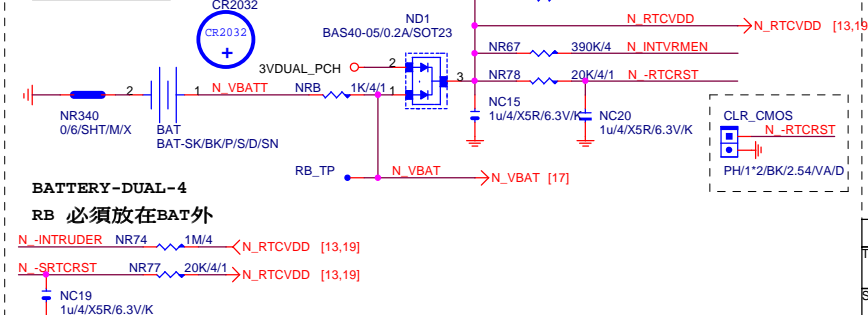
HSW_STRAP13



32.768KHZ



CLR_CMOS

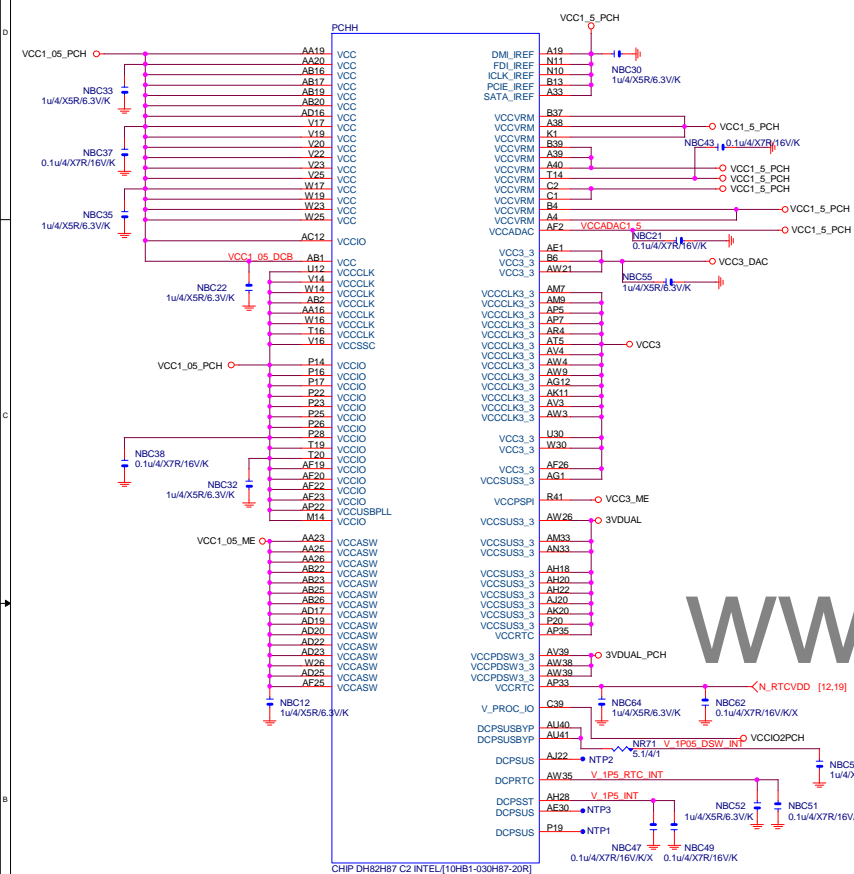


Gigabyte Technology

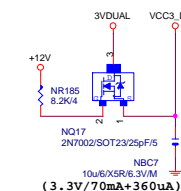
PCH GPIO , CTRL , AUDIO

Title			
PCH GPIO , CTRL , AUDIO			
Size	Document Number		Rev
Custom	GA-H87M-D3H		1.12
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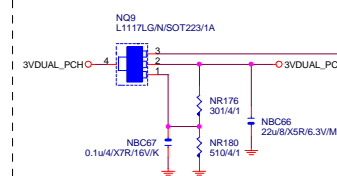
PCH (H)



VCC3_DAC

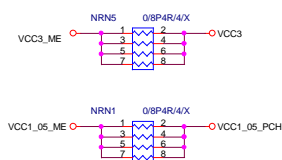


3VDUAL_PCH



SHT PWR

H87 N/A



CAP

(3.3V) (X6)

(1.05V) (x5)

(1.05V)(x6)

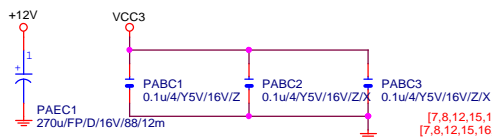
$$(1.05V)(x2)(3.3V)(x2)$$

(1.05V) (x10)

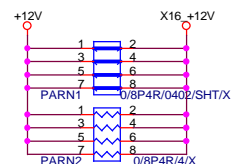
PCH (I)



PCIEX16 CAP



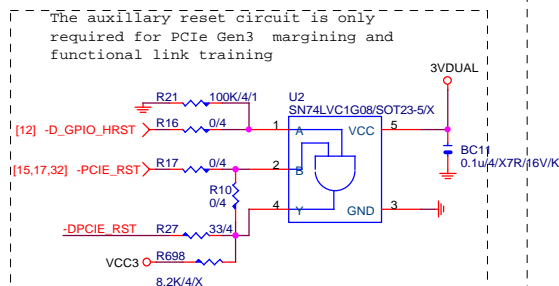
PCIEX16	PROTECT	SHT
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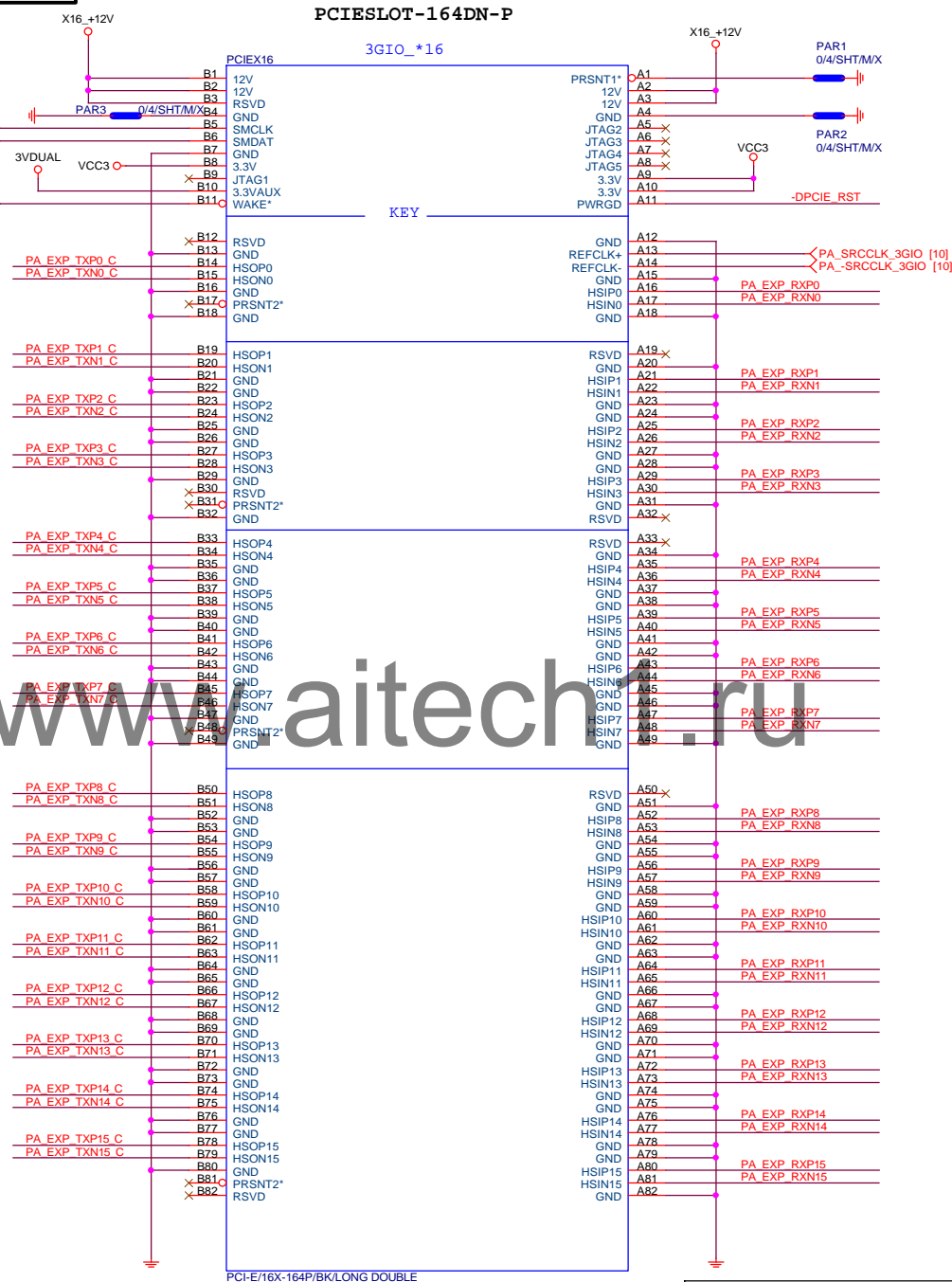
PCIEX16	AC	CAP
---------	----	-----

PA EXP TXP0	PA C5	0.22u4/X5R/6.3V/K	PA EXP TXP0 C
PA EXP TXN0	PA C6	0.22u4/X5R/6.3V/K	PA EXP TXN0 C
PA EXP TXP1	PA C6	0.22u4/X5R/6.3V/K	PA EXP TXP1 C
PA EXP TXN1	PA C7	0.22u4/X5R/6.3V/K	PA EXP TXN1 C
PA EXP TXP2	PA C8	0.22u4/X5R/6.3V/K	PA EXP TXP2 C
PA EXP TXN2	PA C9	0.22u4/X5R/6.3V/K	PA EXP TXN2 C
PA EXP TXP3	PA C10	0.22u4/X5R/6.3V/K	PA EXP TXP3 C
PA EXP TXN3	PA C11	0.22u4/X5R/6.3V/K	PA EXP TXN3 C
PA EXP TXP4	PA C12	0.22u4/X5R/6.3V/K	PA EXP TXP4 C
PA EXP TXN4	PA C13	0.22u4/X5R/6.3V/K	PA EXP TXN4 C
PA EXP TXP5	PA C14	0.22u4/X5R/6.3V/K	PA EXP TXP5 C
PA EXP TXN5	PA C15	0.22u4/X5R/6.3V/K	PA EXP TXN5 C
PA EXP TXP6	PA C16	0.22u4/X5R/6.3V/K	PA EXP TXP6 C
PA EXP TXN6	PA C17	0.22u4/X5R/6.3V/K	PA EXP TXN6 C
PA EXP TXP7	PA C19	0.22u4/X5R/6.3V/K	PA EXP TXP7 C
PA EXP TXN7	PA C20	0.22u4/X5R/6.3V/K	PA EXP TXN7 C
PA EXP TXP8	PA C20	0.22u4/X5R/6.3V/K	PA EXP TXP8 C
PA EXP TXN8	PA C21	0.22u4/X5R/6.3V/K	PA EXP TXN8 C
PA EXP TXP9	PA C22	0.22u4/X5R/6.3V/K	PA EXP TXP9 C
PA EXP TXN9	PA C23	0.22u4/X5R/6.3V/K	PA EXP TXN9 C
PA EXP TXP10	PA C24	0.22u4/X5R/6.3V/K	PA EXP TXP10 C
PA EXP TXN10	PA C25	0.22u4/X5R/6.3V/K	PA EXP TXN10 C
PA EXP TXP11	PA C26	0.22u4/X5R/6.3V/K	PA EXP TXP11 C
PA EXP TXN11	PA C27	0.22u4/X5R/6.3V/K	PA EXP TXN11 C
PA EXP TXP12	PA C28	0.22u4/X5R/6.3V/K	PA EXP TXP12 C
PA EXP TXN12	PA C29	0.22u4/X5R/6.3V/K	PA EXP TXN12 C
PA EXP TXP13	PA C30	0.22u4/X5R/6.3V/K	PA EXP TXP13 C
PA EXP TXN13	PA C31	0.22u4/X5R/6.3V/K	PA EXP TXN13 C
PA EXP TXP14	PA C32	0.22u4/X5R/6.3V/K	PA EXP TXP14 C
PA EXP TXN14	PA C33	0.22u4/X5R/6.3V/K	PA EXP TXN14 C
PA EXP TXP15	PA C34	0.22u4/X5R/6.3V/K	PA EXP TXP15 C
PA EXP TXN15	PA C35	0.22u4/X5R/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



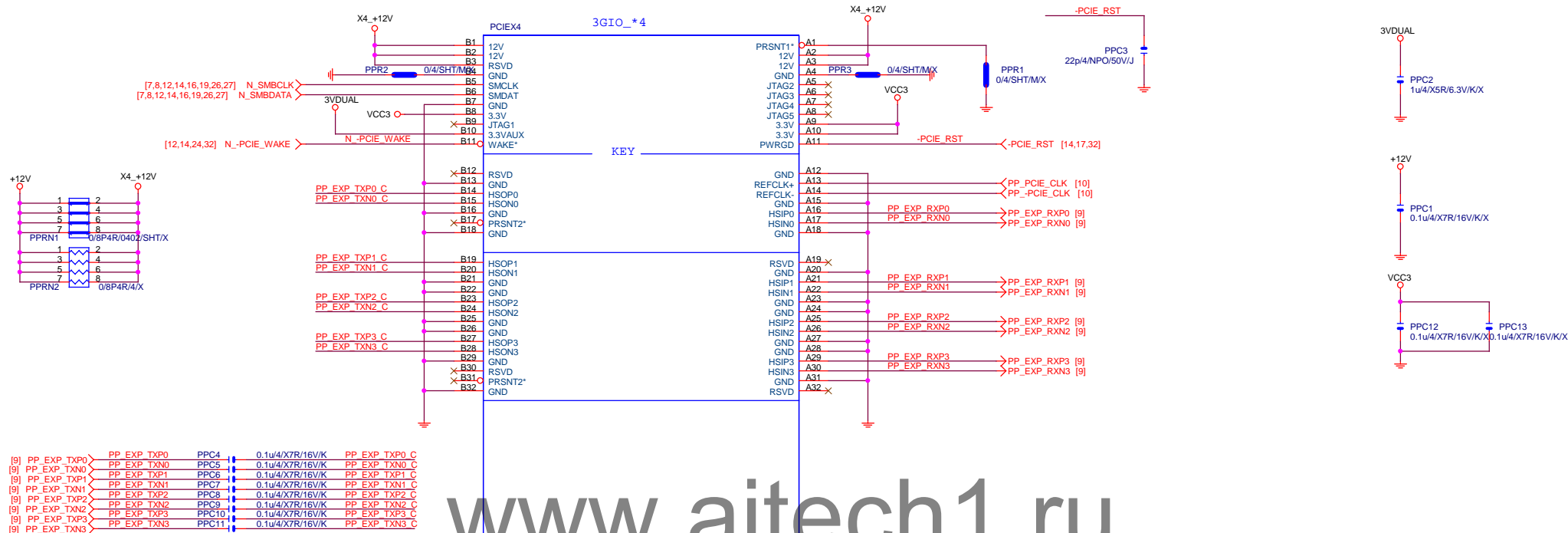
BLACK CONNECTOR

Gigabyte Technology

PCI EXPRESS * 16

Title			
PCI EXPRESS * 16			
Size Custom	Document Number	GA-H87M-D3H	Rev 1.12
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PCIEX4 SLOT



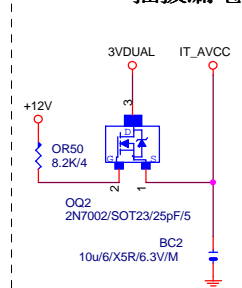
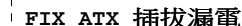
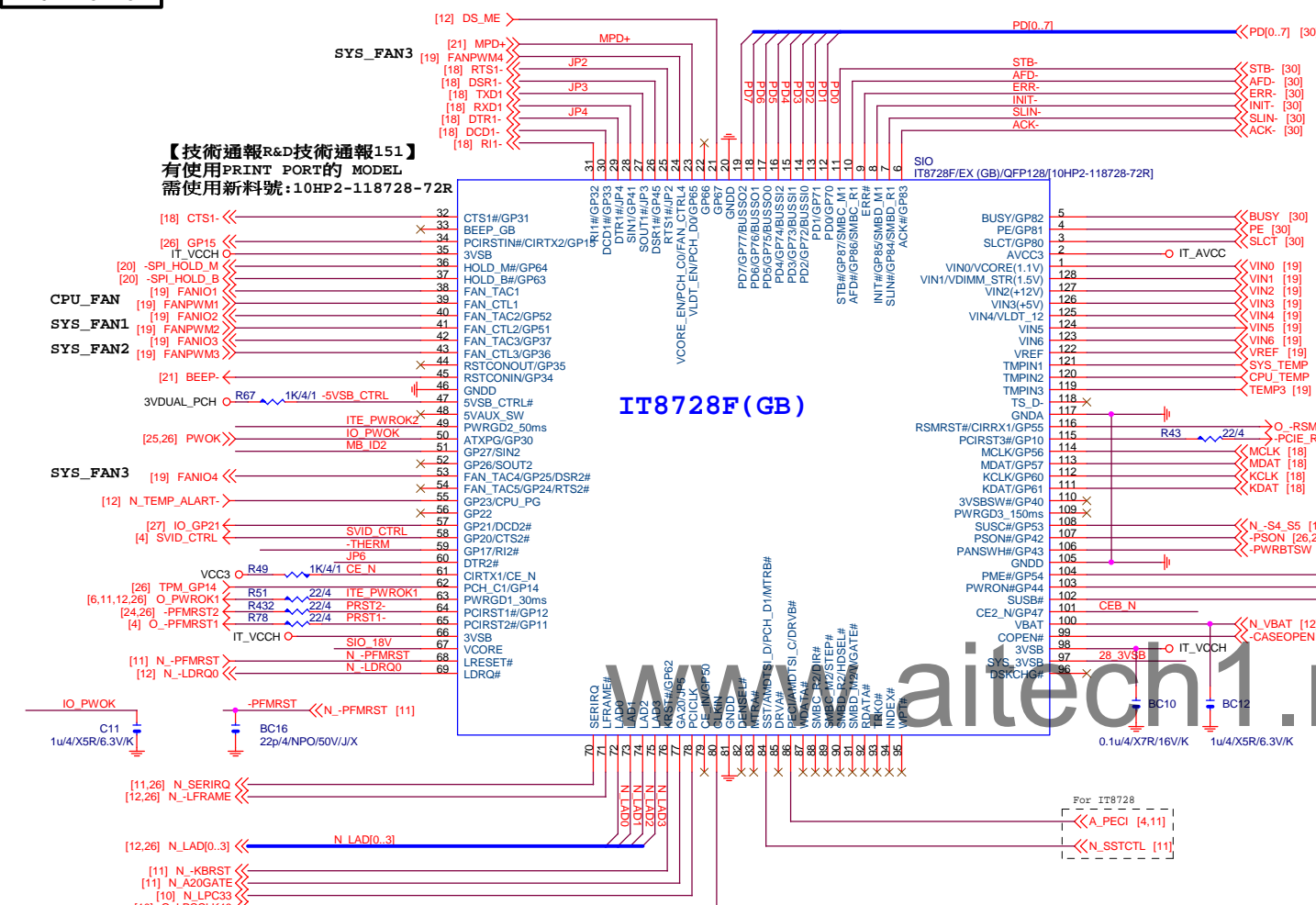
www.aitech1.ru

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

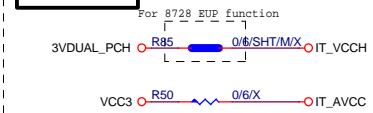
BLACK CONNECTOR

Gigabyte Technology			
Title			
PCI EXPRESS X 1 PORT			
Size	Document Number	Rev	
Custom	GA-H87M-D3H	1.12	
Date:	Wednesday, November 27, 2013	Sheet	15 of 32

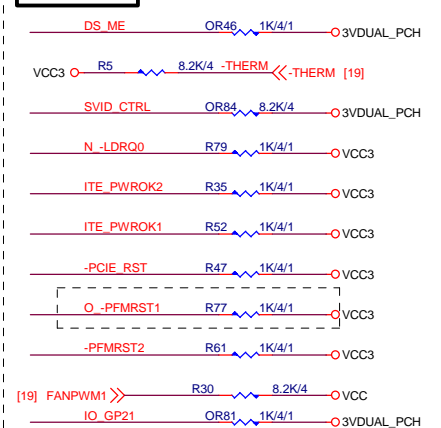
SIO IT8728F



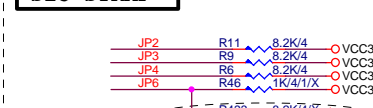
PWR	SHT
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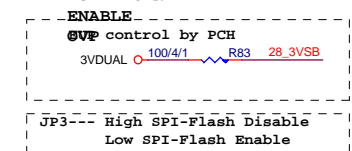
SIO PU



SIO STRAP



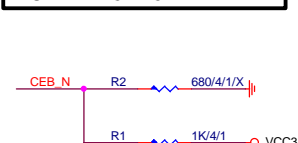
IT8728-EX
PULL DOWN



IT8728F NOTE

	IT8728
PIN121	VCORE_EN/PCF_C0
PIN120	VLDT_EN/PCF_D0
PIN19	ATXPG
PIN31	PCF_C1
PIN53	SST/AMDTSI_D/MTRB#/PCF_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

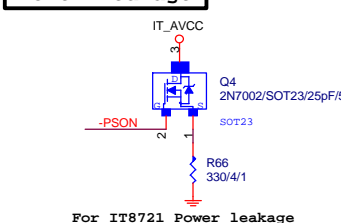
DUAL BIOS OPT STRAP



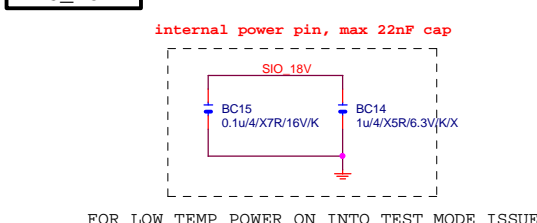
SIO CAP



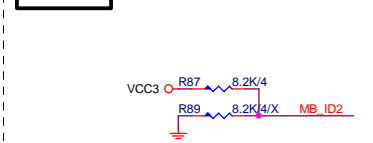
Power leakage



SIO 18V

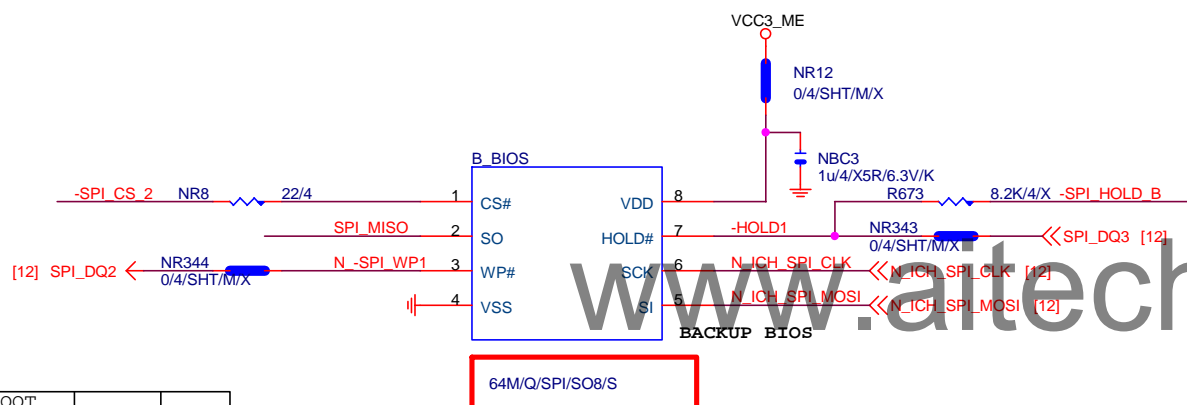
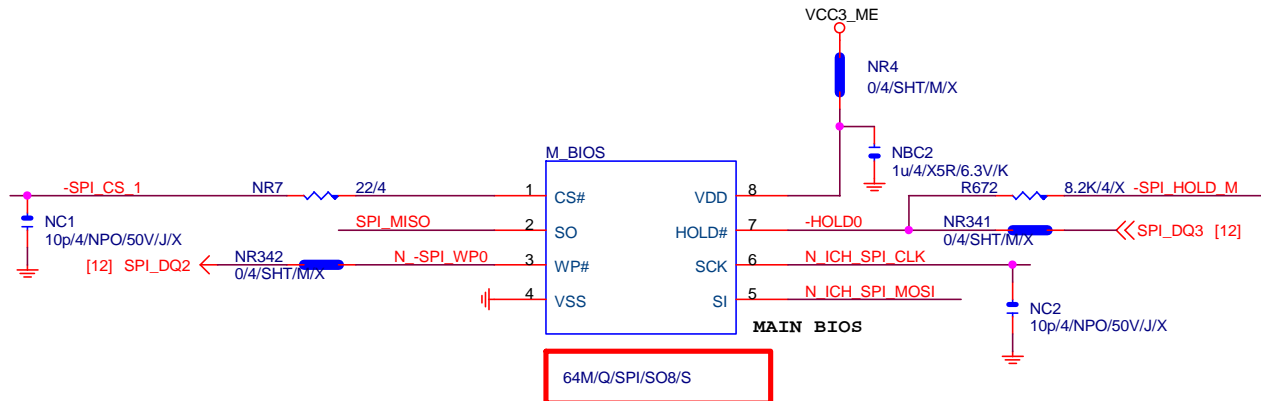


MB ID



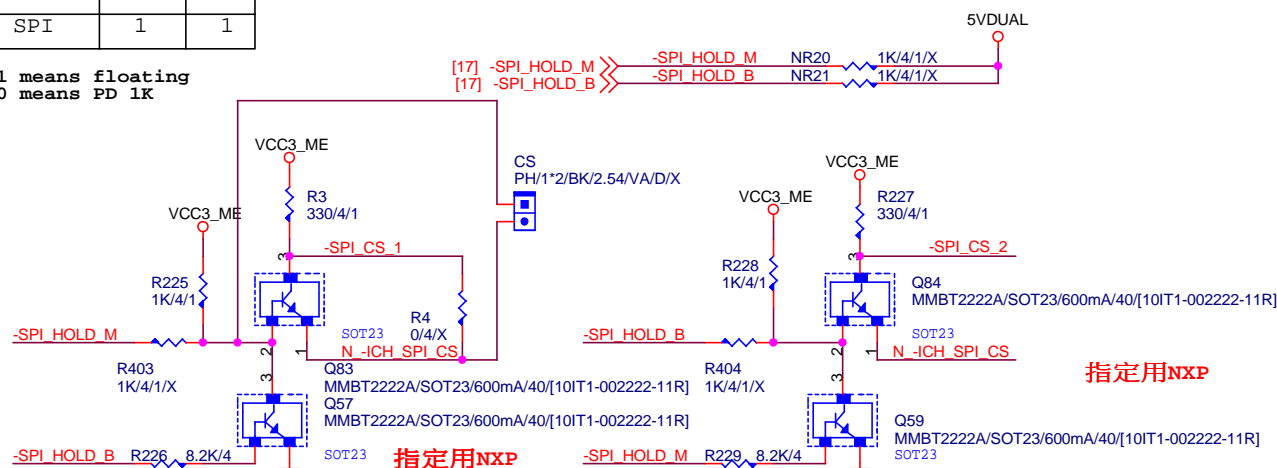
Gigabyte Technology

Title			
ITE 8728 LPC IO			
Size	Document Number		Rev
Custom	GA-H87M-D3H		1.12
Date:	Wednesday, November 27, 2013	Sheet	17 of 32

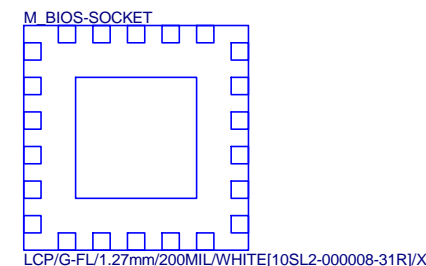
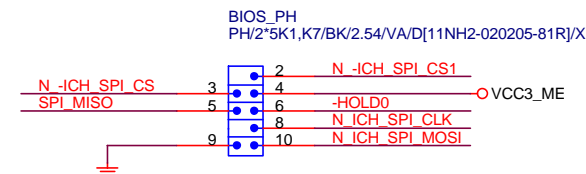


BOOT DEVICE	GNT0	GNT1
LPC	0	0
PCI	0	1
NAND	1	0
SPI	1	1

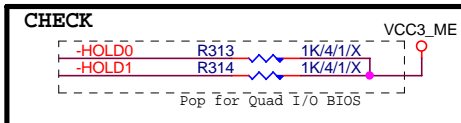
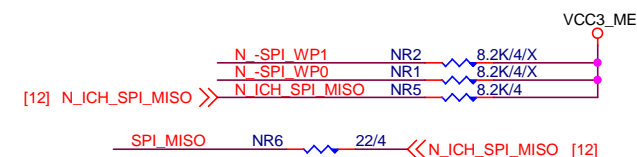
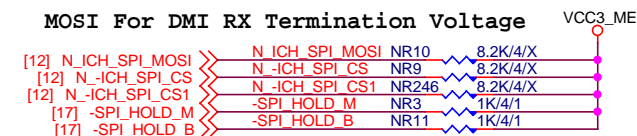
1 means floating
0 means PD 1K



BIOS DEBUG PORT



MOSI For DMI RX Termination Voltage



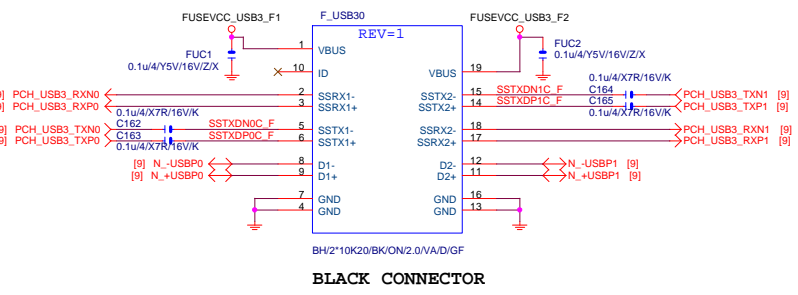
Gigabyte Technology

DUAL BIOS

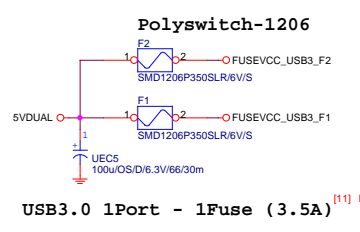
GA-H87M-D3H

Title	Document Number	Rev
Size Custom	GA-H87M-D3H	1.12
Date:	Wednesday, November 27, 2013	Sheet 20 of 32

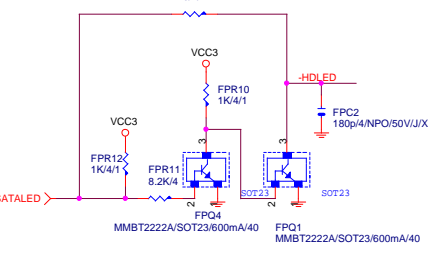
F_USB30



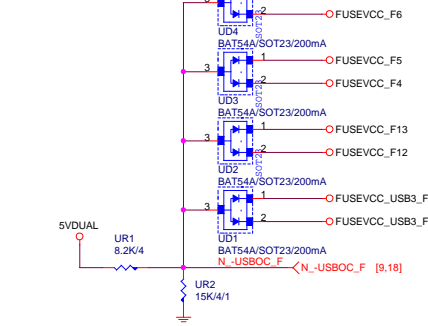
F_USB30 PWR



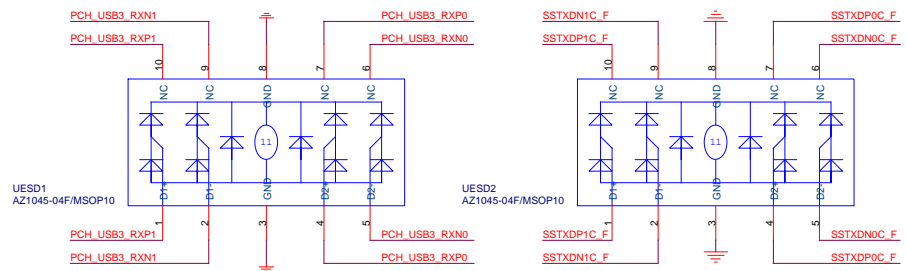
SATA LED



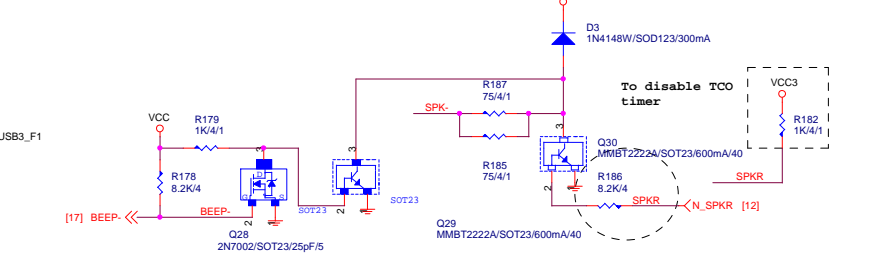
-USB0C_F



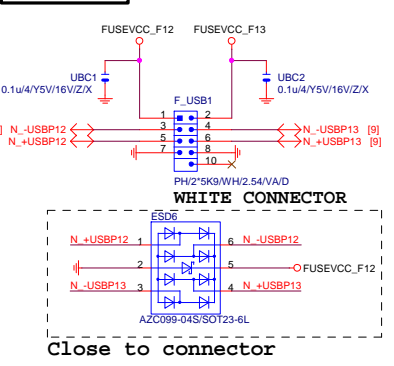
F_USB30 ESD PROTECT



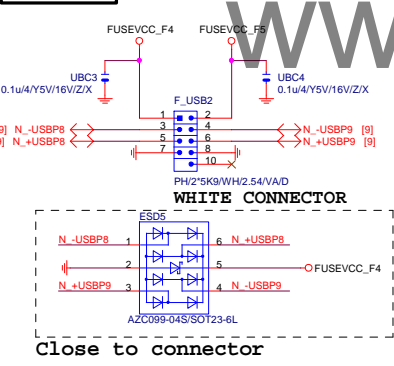
SPKR



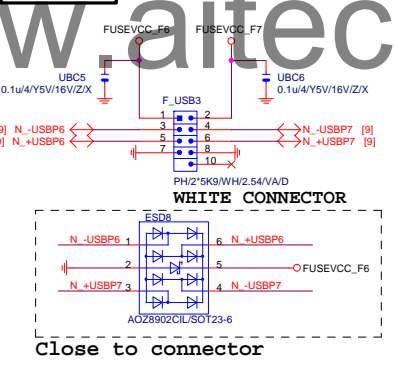
FRONT USB1



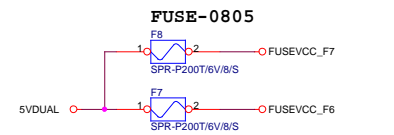
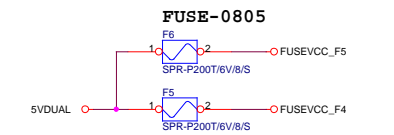
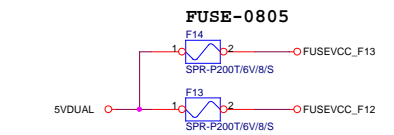
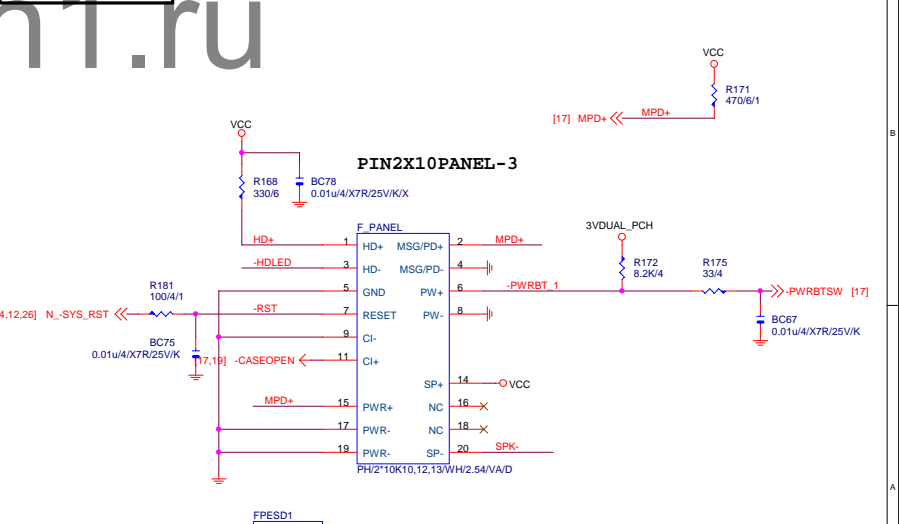
FRONT USB2



FRONT USB3



INTEL FRONT PANEL



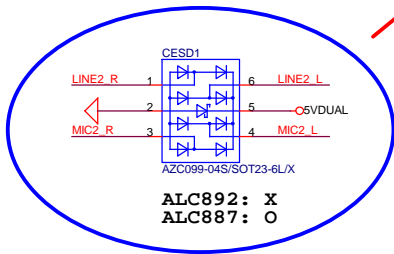
Gigabyte Technology			
FP,F_USB,USB PWR,SPKR,SATA LED			
Size	Document Number	GA-H87M-D3H	
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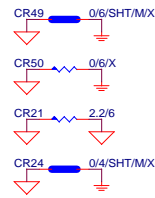
[23] CEN ←

[23] LFE ←

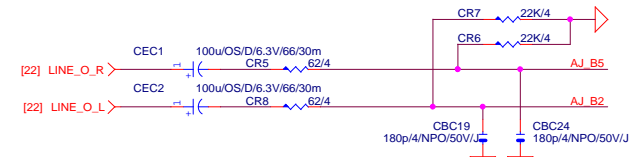
[23] S_SURR_L ←

[23] S_SURR_R ←



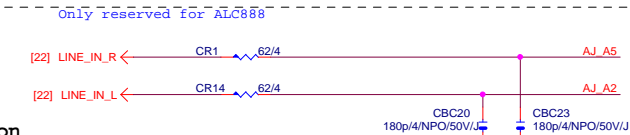


LINE-OUT

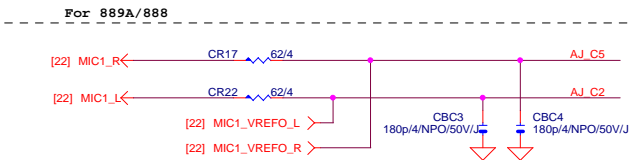


LINE-IN

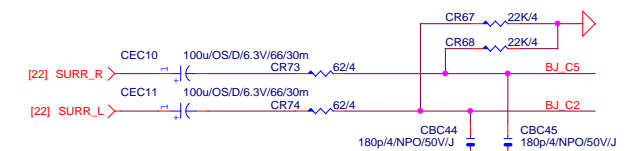
Verify MIC function
in LINE-in



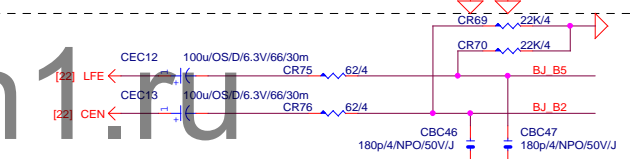
MIC-IN



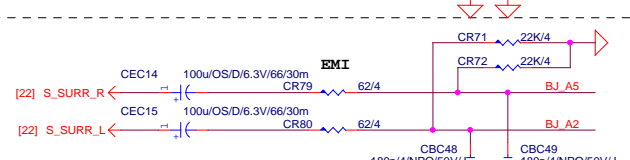
SURROUND



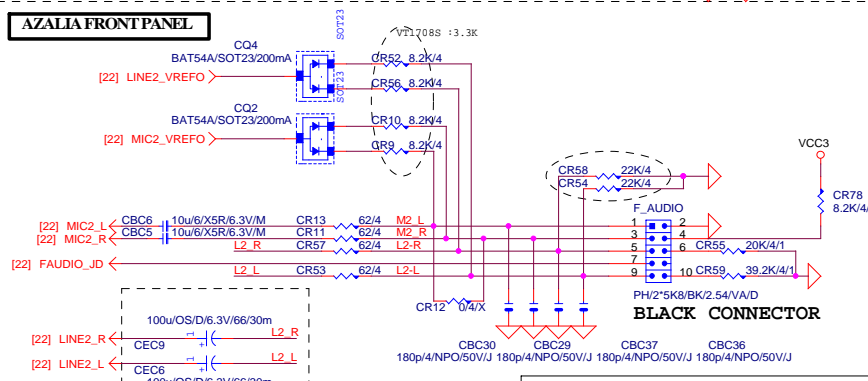
CEN/LFE



SURRBACK



AZALIA FRONT PANEL



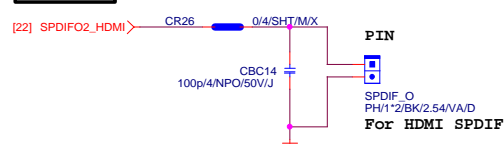
Gigabyte Technology

AUDIO JACK

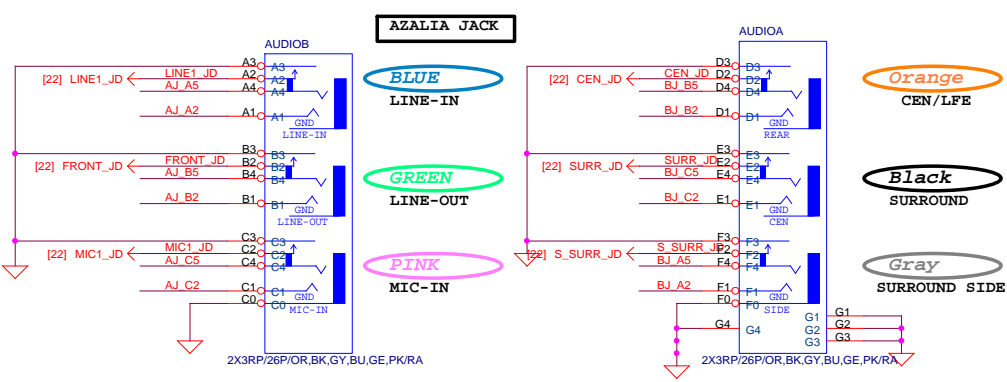
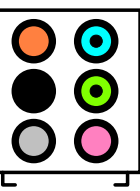
GA-H87M-D3H

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SPDIF_OUT

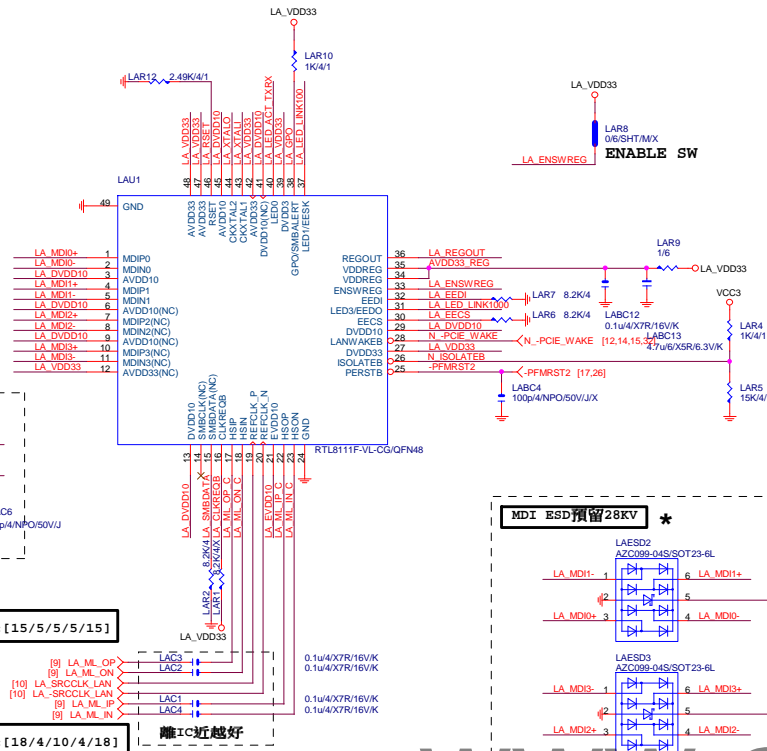


AZALIA JACK

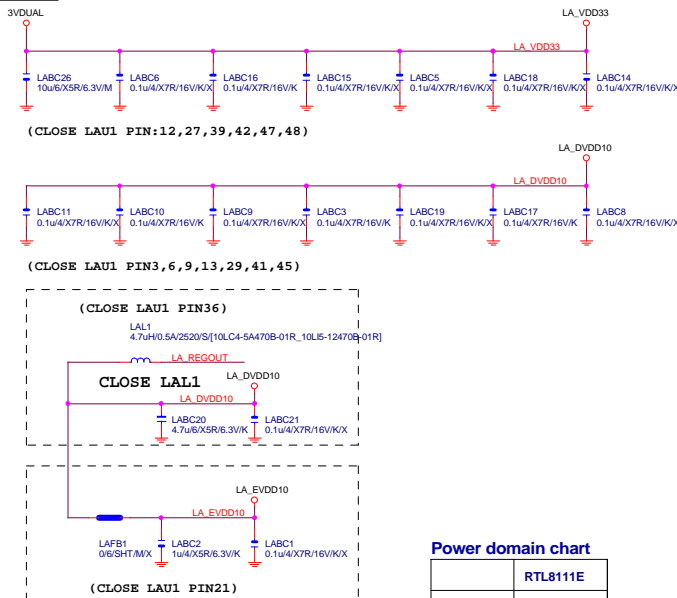


www.aitech1.ru

LAN:RTL8111F/VB/VL



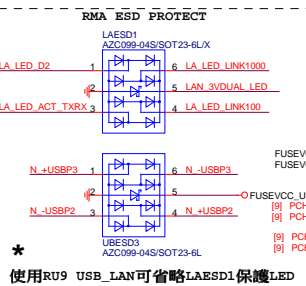
LAN POWER



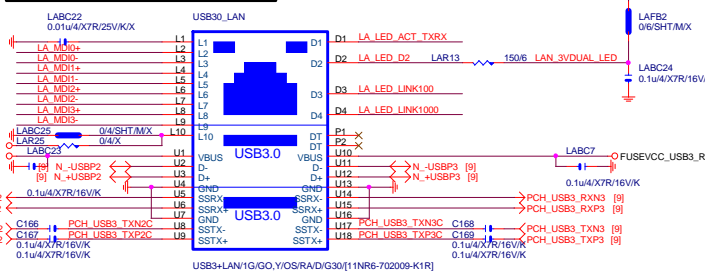
Power domain chart

	RTL8111E
AVDD33	3.3V
DVDD33	3.3V
VDDREG	3.3V
DVDD10	1.05V

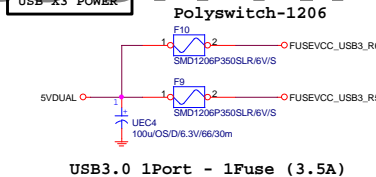
USB LAN CONNECTOR



LA_MDI-->100歐姆:[20/4/8/4/20]



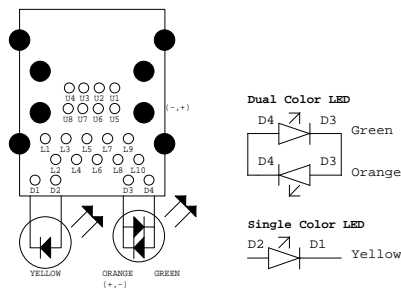
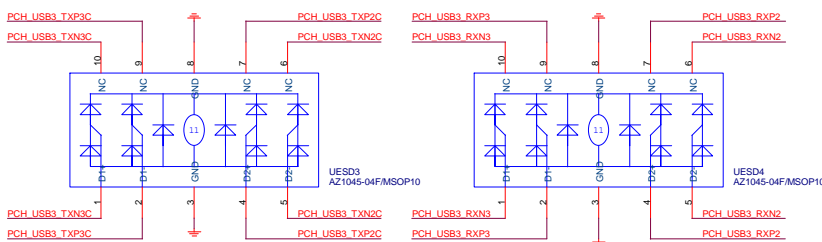
USB X3 POWER



EMI SHORT PAD



USB3.0 1Port - 1Fuse (3.5A)



BOM NOTICE *

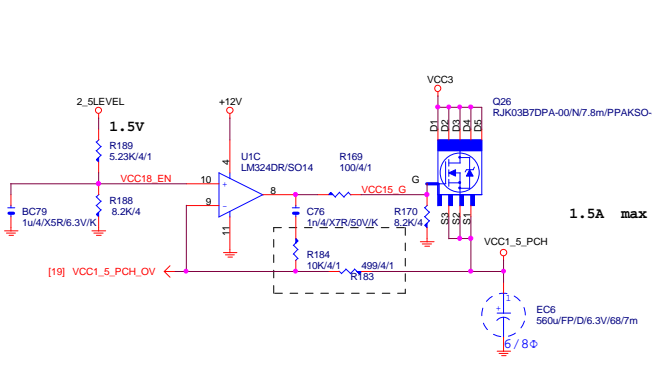
料號 規格 廠商
11NR6-702009-96R 1G LAN (12core) UDE(RU9 ESD+)
[LED獨立走線,可省略外加AZC099料件LAESD1]

- 9KV ESD BOM:
USB LAN (RU9):11NR6-702009-96R
- 28KV ESD BOM:
USB LAN (RU9):11NR6-702009-96R
LAESD2,LAESD3:上件AZC398-04S

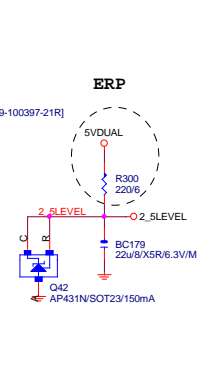
Gigabyte Technology

Title		Realtek RTL8111G
Size	Document Number	GA-H87M-D3H
Custom		Rev 1.12
Date	Wednesday, November 27, 2013	Sheet 24 of 32

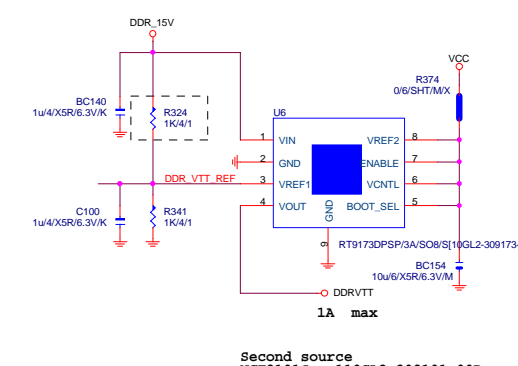
VCC1_8_PCH



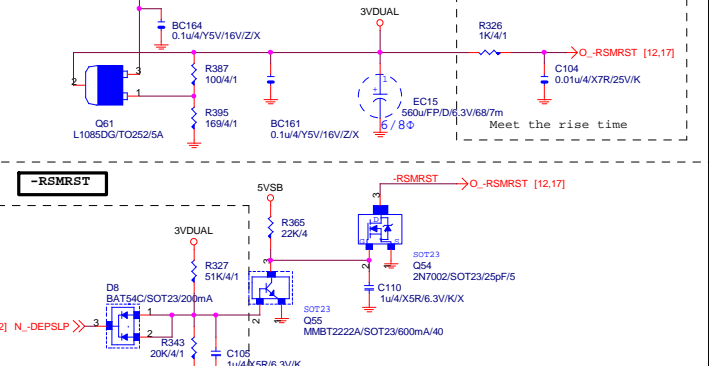
2_5LEVEL



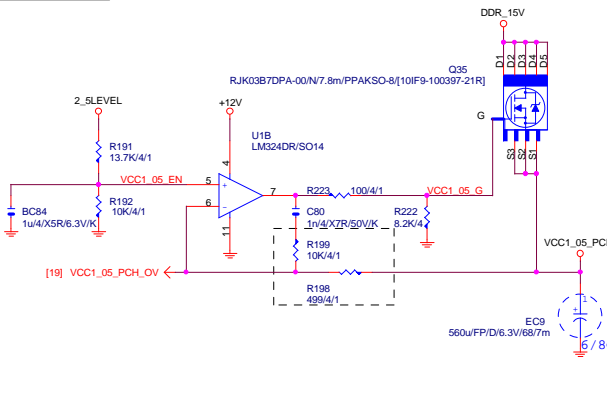
DDR_VTT



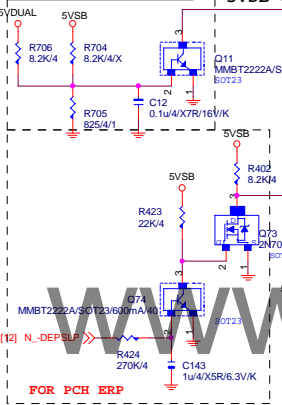
3VDUAL



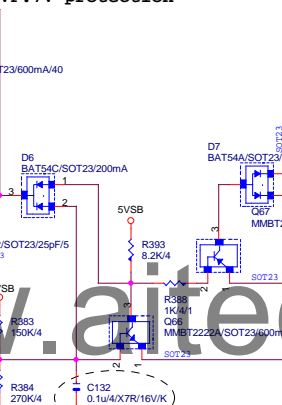
VCC1_05_PCH



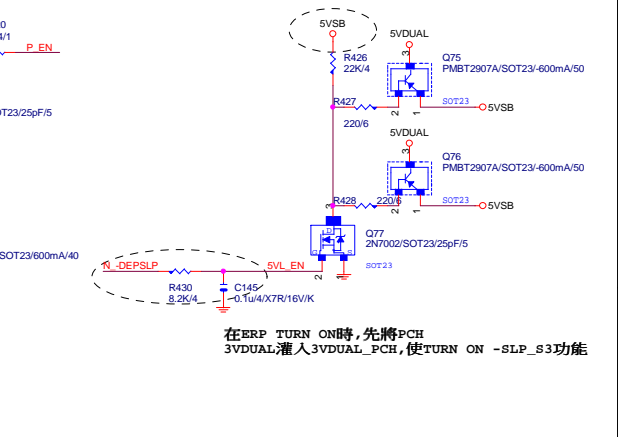
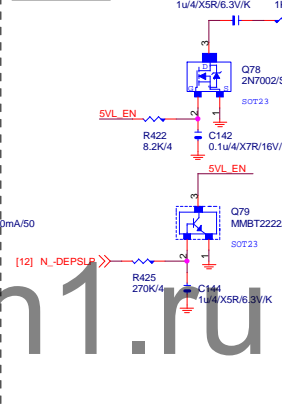
5VDUAL SHORT PROTECT



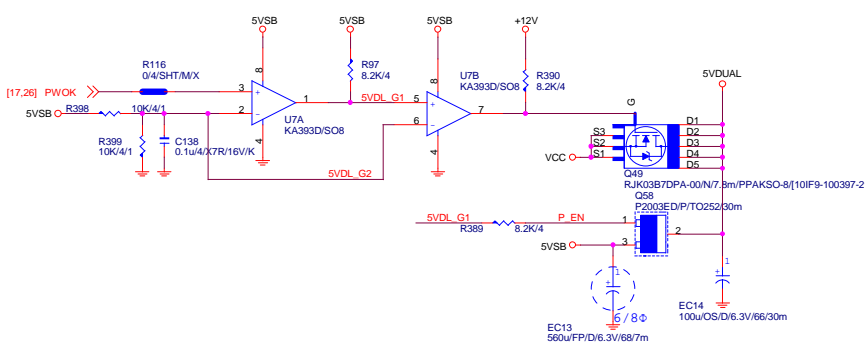
5VSB OVP:7V protection



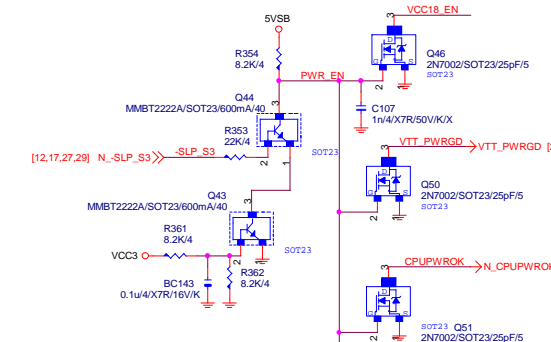
PCH ERP

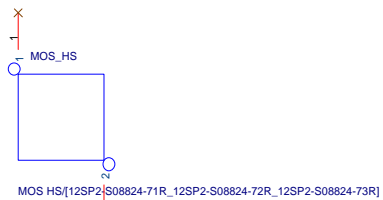
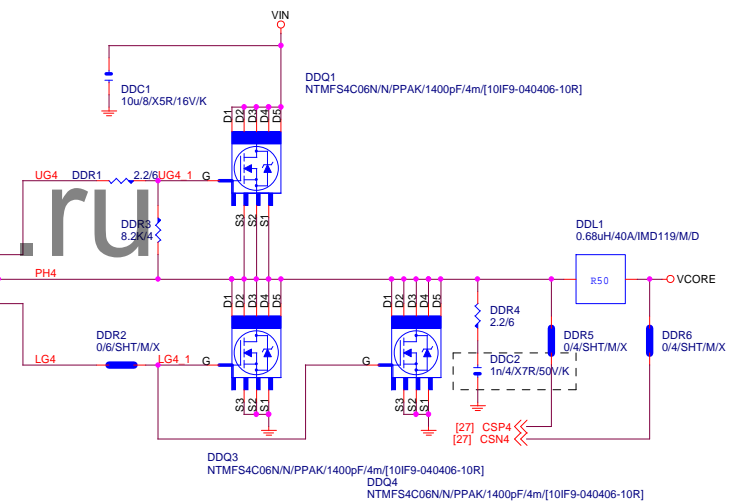
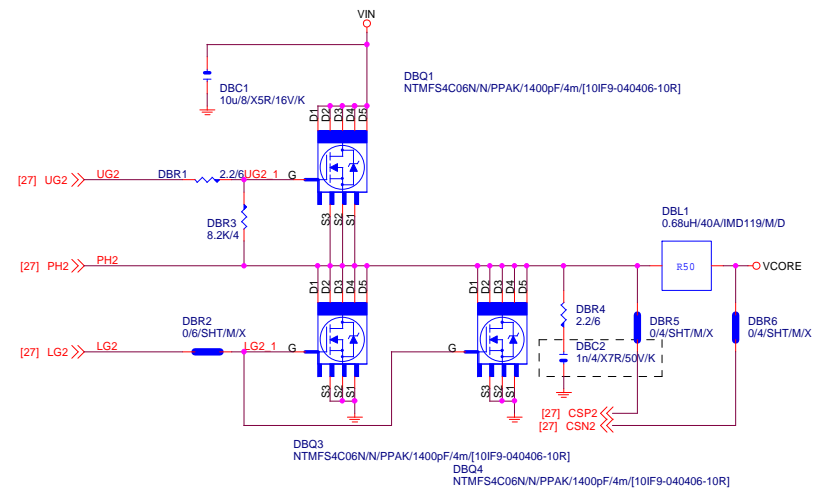
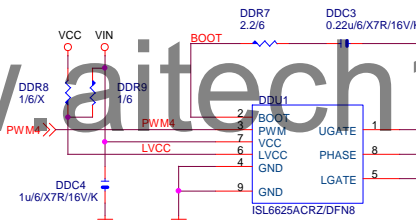
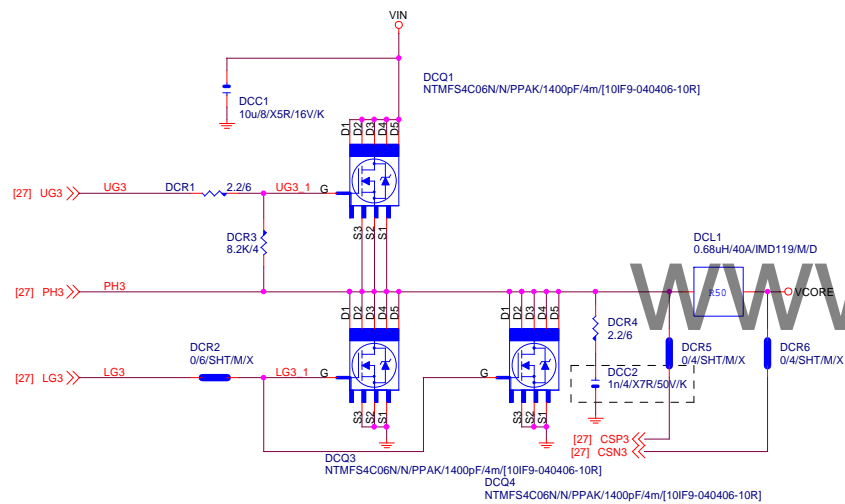
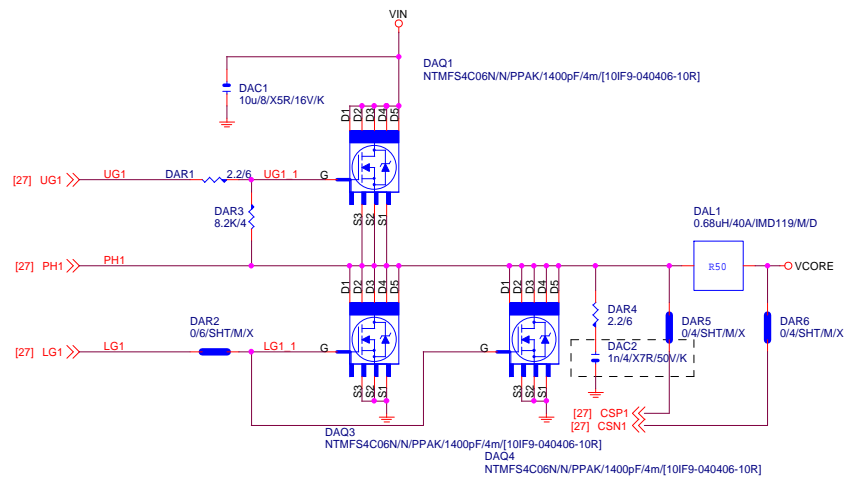


5VDUAL

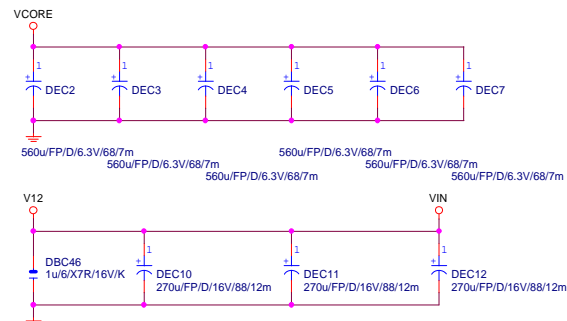


PWR SEQ



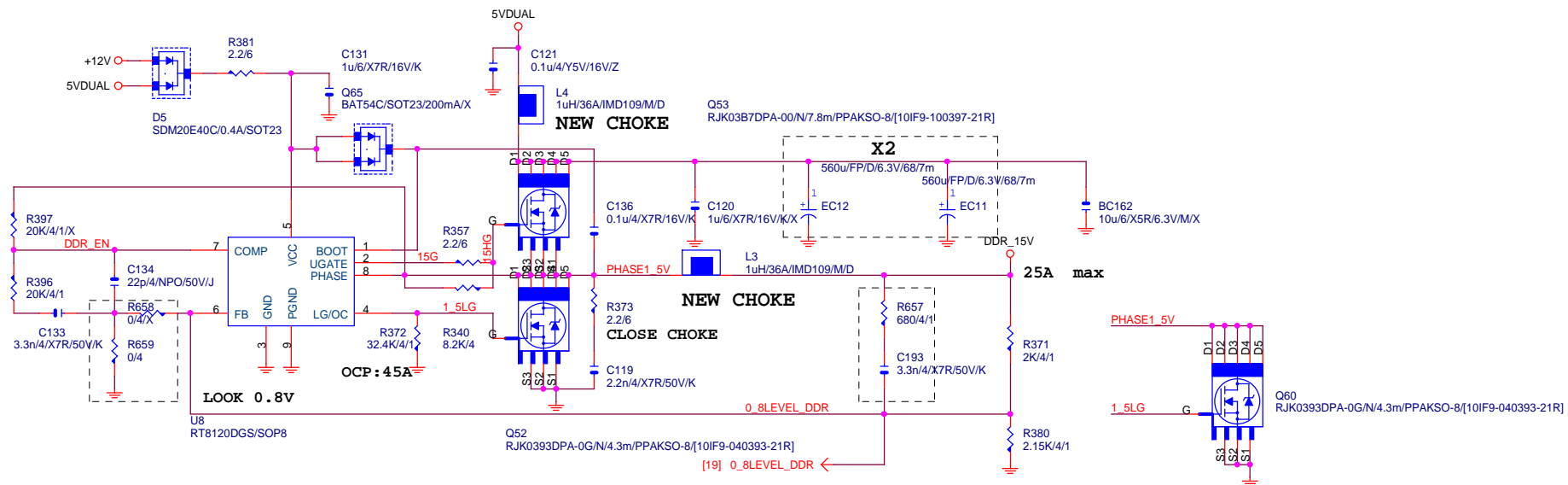


8 Series MOS Heatsink (Screw fix)

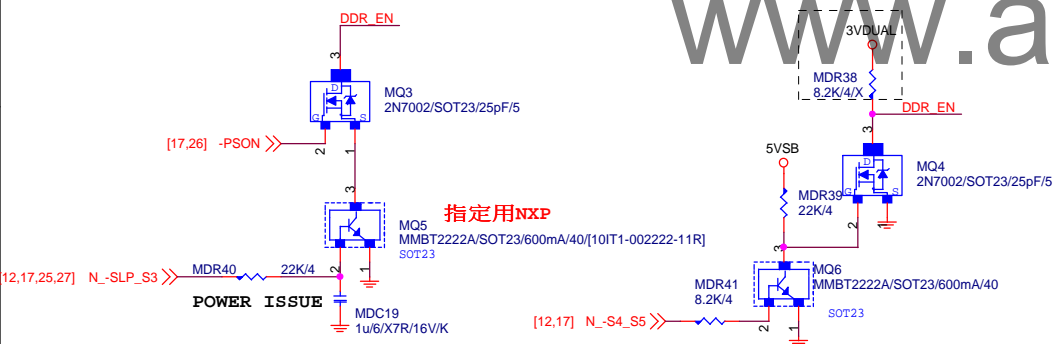


Gigabyte Technology			
Title			
CPU CORE VR-2			
Size			
Custom			
Document Number			
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of			
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Rev			
1.12			

DDR15V




PWR SEQ



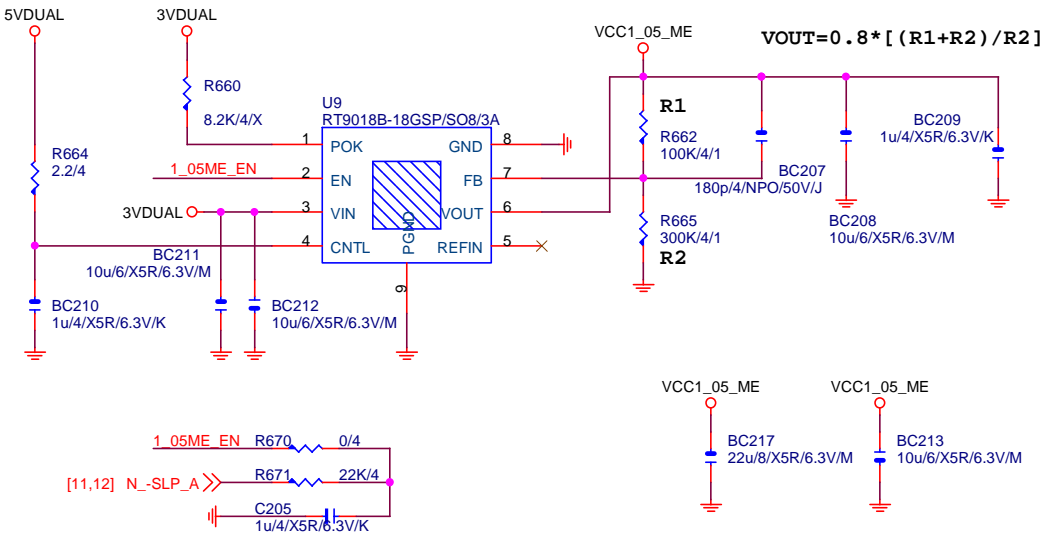
VIN=5V,VOUT=1.5V,IOUT=25A,PHASE=1
IRMS=11.45A
560uF/P/D/6.3V/68/8m RIPPLE CURRENT=4.7A
Coefficient=1.7(85°C),1(105°C)

VIN Ripple current=4.7X1.7=7.99A(85°C)
-->故固態電容須2X7.99=15.98>11.45A

```
Rocset=(Iocp*Lgate,rdson)/Iocset
Rocset=(45A*6.7mOhm)/10uA = 30K
Iocset=10uA
```

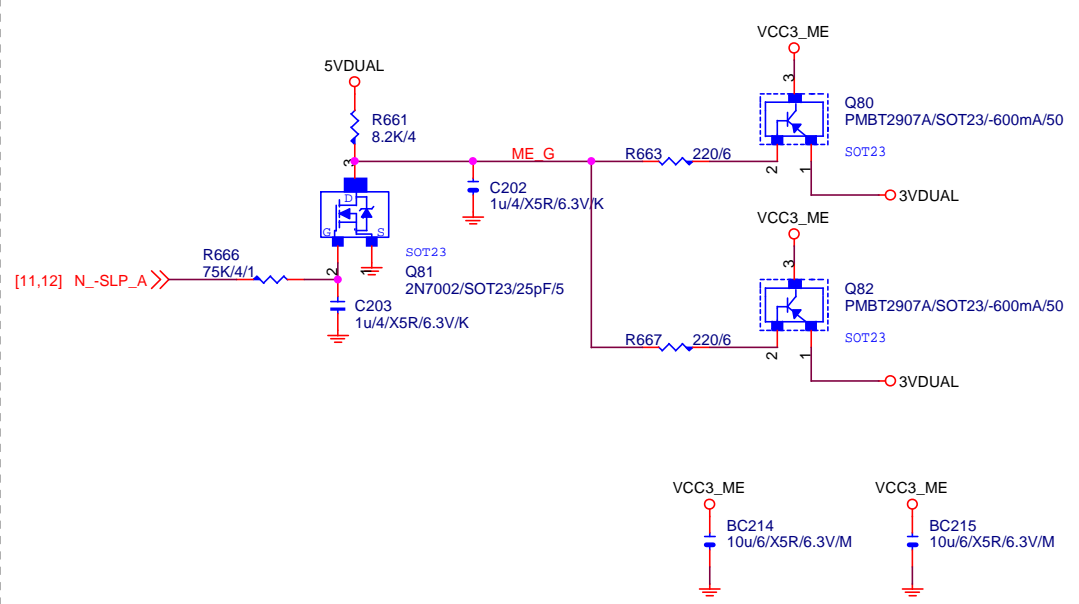
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Title			
DDR POWER			
Size	Document Number	GA-H87M-D3H	Rev
Custom			1.12
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VCC1_05_ME

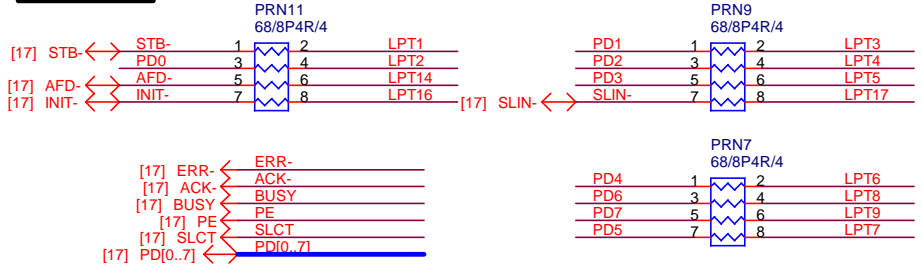


Second source
EM5103 - 10GL2-305103-01R
NCT3730S - 10GL2-303730-01R

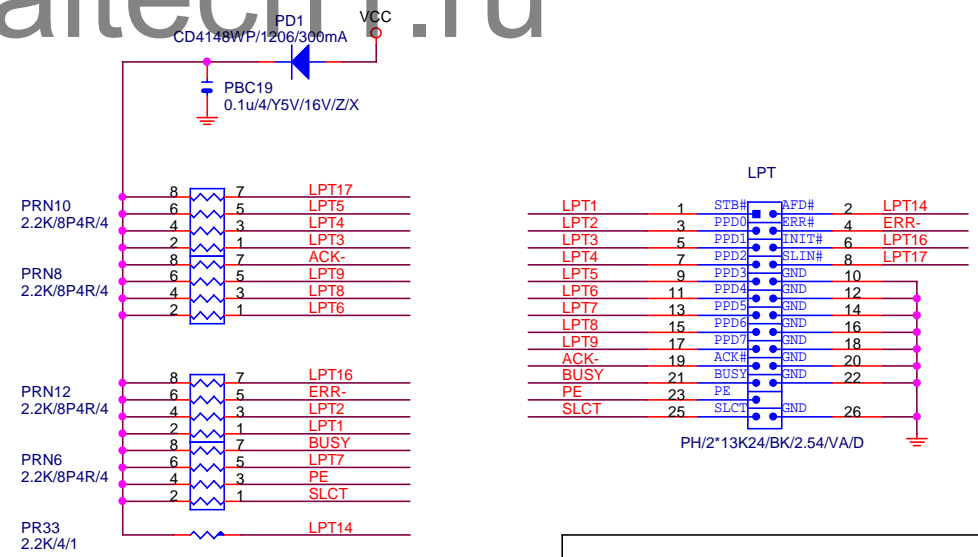
VCC3_ME



LPT PORT



【技術通報R&D技術通報151】
33ohm Change to 68ohm



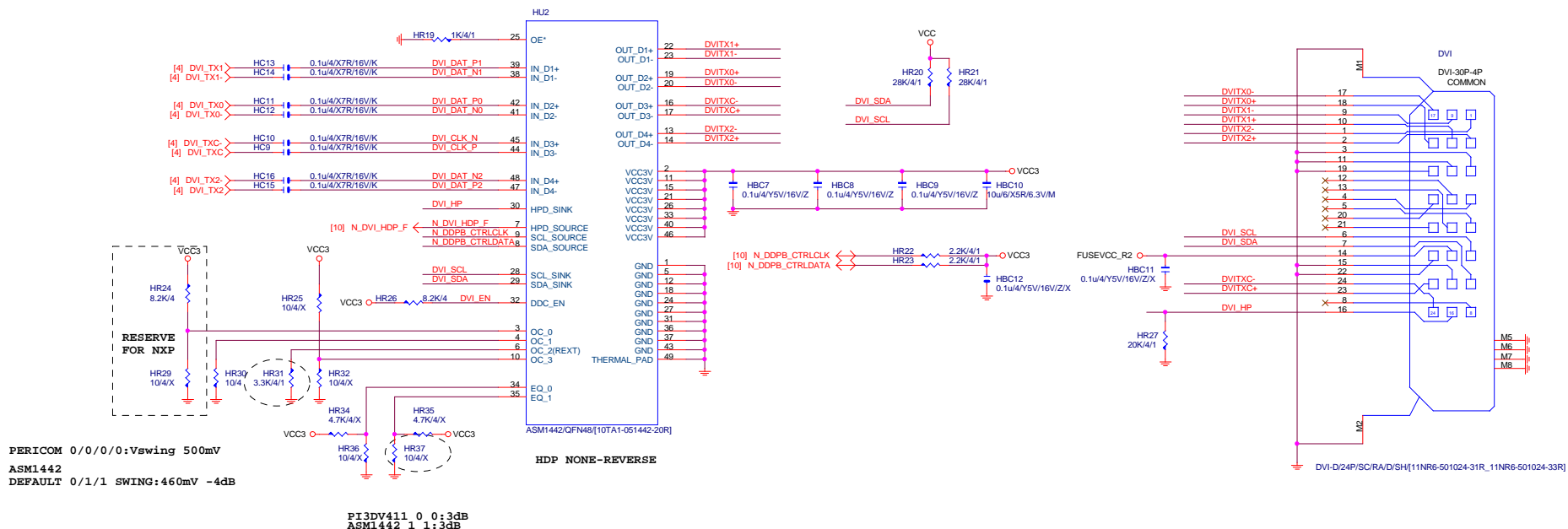
Gigabyte Technology

Title LPT

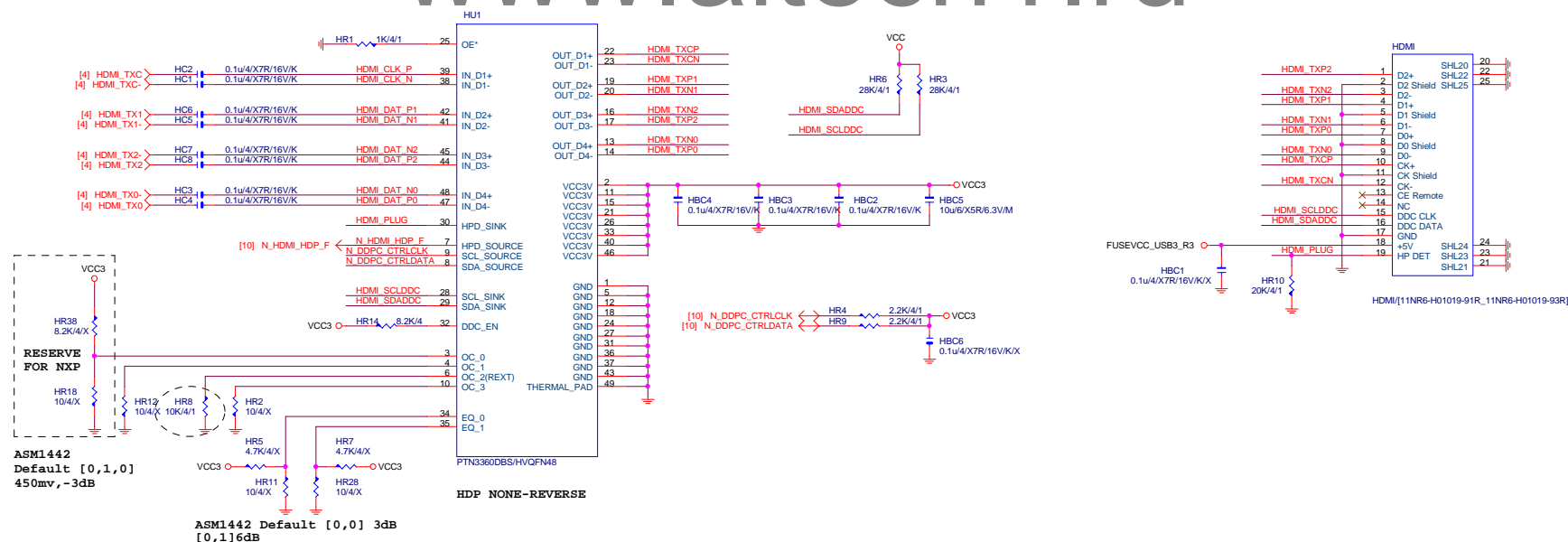
Size Custom Document Number GA-H87M-D3H Rev 1.12

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DVI LEVEL SHIFT

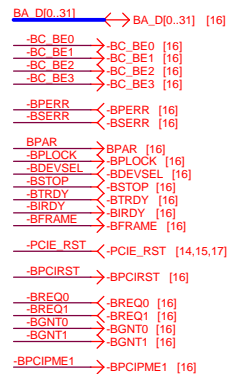


HDMI LEVEL SHIFT



PCIE TO PCI

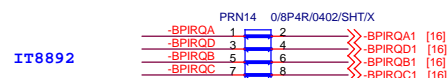
PCI:5/4/5 Impedance=50 +- 15%



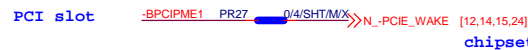
```
High: Enable PCI CLK 66MHz
Low: Disable PCI CLK 66MHz
```



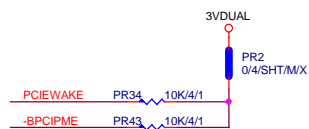
High: PCICLK INPUT form CLK Gen
Low: PCICLK OUTPUT form IT8893 chip



PCI slot

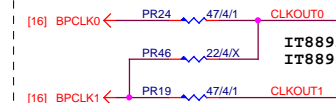


chipset side

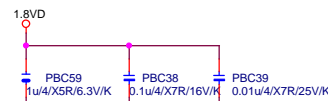
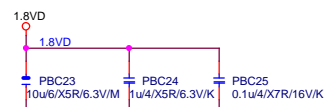
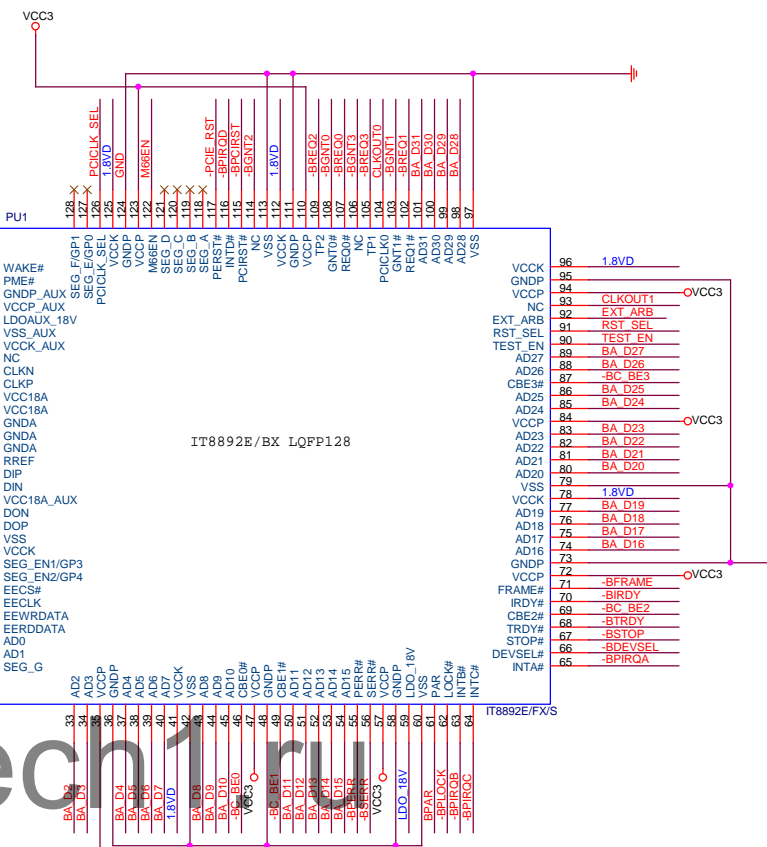
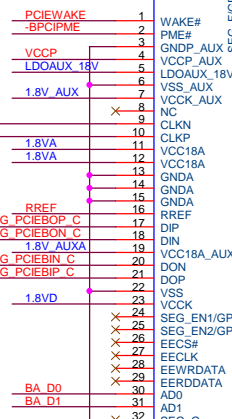
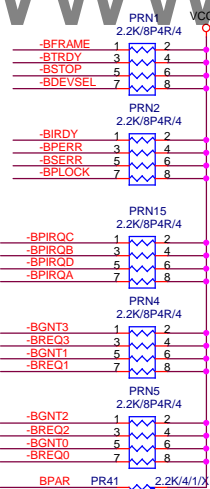
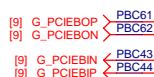
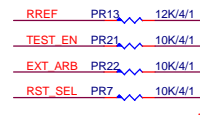


Co-Lay IT8893 (IT8893 CLKOUT1 N/A)

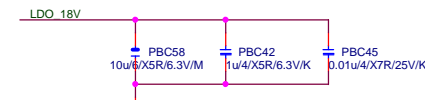
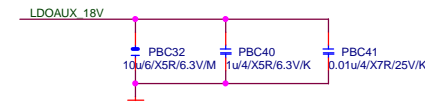
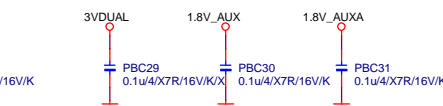
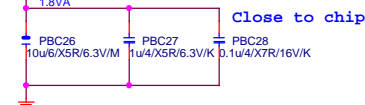
```
IT8892: PR24 -> 47ohm
IT8893: PR24 -> 22ohm
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IT8892: PR19 -> O
IT8893: PR19 -> X



PCB layout note:
Close to chip



PCB layout note:
Close to chip

Gigabyte Technology

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ITE IT8892E			
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