

Model Name: GA-Q87M-D3PH PH

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,Reserved
10	PCH_DP,CLK BUFFER
11	PCH_HOST,SATA,PCI
12	PCH_GPIO,CTRL,AUDIO
13	PCH_PWR,GND
14	PCI EXPRESS X16 SLOT
15	PCI EXPRESS X4 / X1 SLOT
16	PCI SLOT
17	ITE 8728 LPC IO
18	KB_MS_USB, R_USB3.0
19	HWM,FAN CTRL,-PROCHOT
20	BIOS,TPM
21	FP,FUSB,SPK,SATALED
22	REALTEK CODEC ALC887
23	REAR AUDIO JACK
24	Realtek LAN RTL8111EP/8111F-VL
25	DISCRETE POWER
26	ATX, M3 POWER
27	VCORE ISL95812_1

SHEET TITLE

28	VCORE ISL95812_2
29	RT8120_DDR POWER
30	COM A , LPT
31	DVI, HDMI ,DP
32	IT8892E PCI BRIDGE
33	INTEL i217LM PHY

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Gigabyte Technology			
Title			
Cover Sheet			
Size	Document Number	GA-Q87M-D3PH PH	Rev
Custom			1.1
Date:	Thursday, November 14, 2013	Sheet	1 of 33

Model Name: GA-B85M-D3PH PH

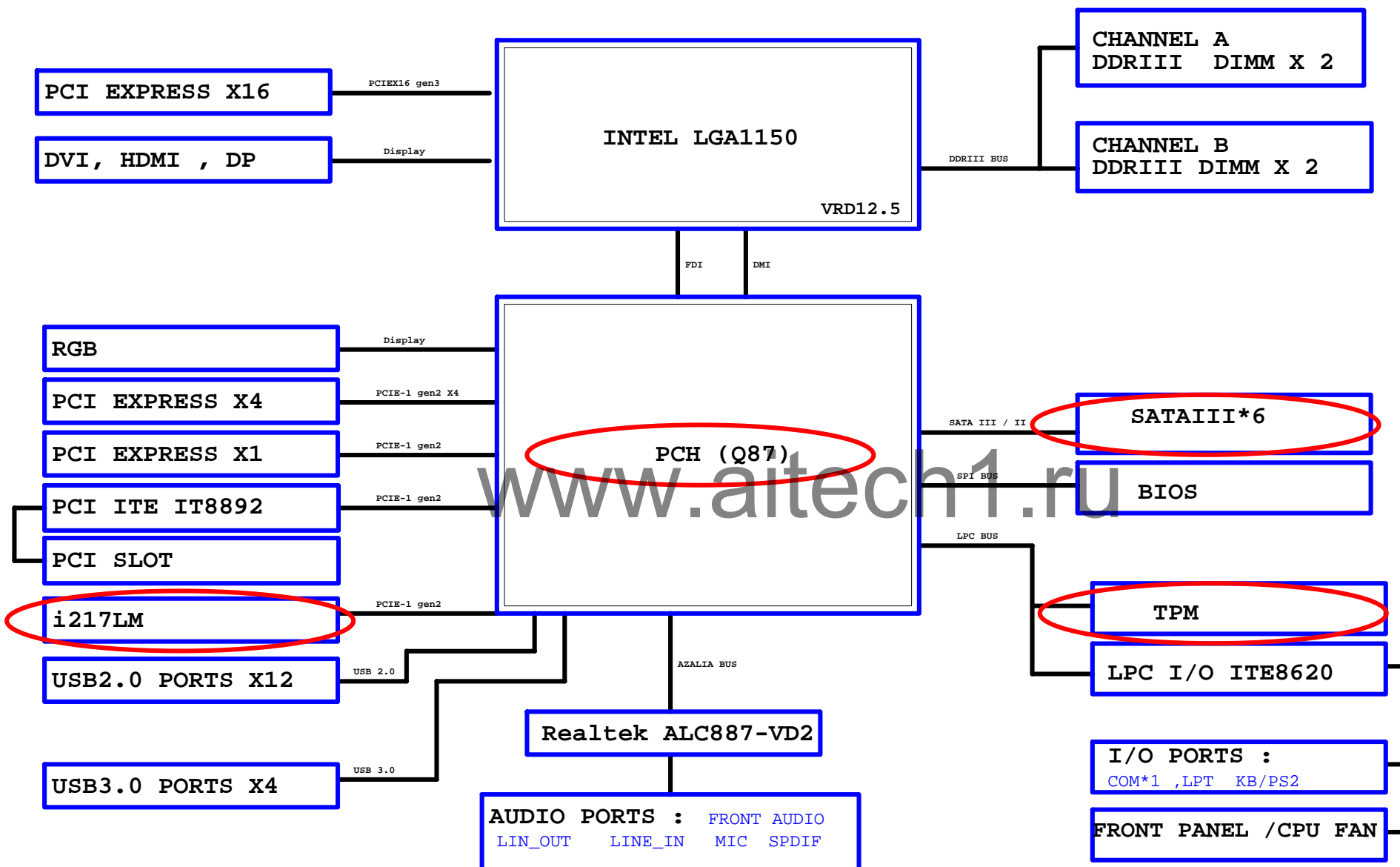
Component value change history

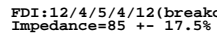
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Circuit or PCB layout change

[illegible]

BLOCK DIAGRAM





(9) A DMI_0RXP	A DMI_0RXP	U3	DMI_RXP0	DMI_TXP0	A4A	A DMI_0TXP	A DMI_0TXP	(9)
(9) A DMI_1RXP	A DMI_1RXP	U3	DMI_RXN0	DMI_TXN0	A5A	A DMI_1TXP	A DMI_1TXP	(9)
(9) A DMI_1RXP	A DMI_1RXP	U1	DMI_RXP1	DMI_TXP1	A8B	A DMI_1TXP	A DMI_1TXP	(9)
(9) A DMI_1RXN	A DMI_1RXN	U2	DMI_RXN1	DMI_TXN1	AB4	A DMI_1TXN	A DMI_1TXN	(9)
(9) A DMI_2RXP	A DMI_2RXP	W1	DMI_RXP2	DMI_TXP2	AC5	A DMI_2TXP	A DMI_2TXP	(9)
(9) A DMI_2RXN	A DMI_2RXN	Y3	DMI_RXN2	DMI_TXN2	AC4	A DMI_2TXN	A DMI_2TXN	(9)
(9) A DMI_3RXP	A DMI_3RXP	V2	DMI_RXP3	DMI_TXP3	AC1	A DMI_3TXP	A DMI_3TXP	(9)
(9) A DMI_3RXN	A DMI_3RXN	W3	DMI_RXN3	DMI_TXN3	AC2	A DMI_3TXN	A DMI_3TXN	(9)
<p>(breakout min 8/4/4/4/8)</p> <p>17.5%</p> <p> </p> <p> VCCIOA_LO WR15 24.9/n1 GRCOMP PEG_RCOMP </p>								
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Title			
CPU LGA1150-A			
Size	Document Number		Rev
Custom	GA-Q87M-D3PH PH		1.1
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LGA1150A

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MAAA1	AV16	DDR0_MA1	DDR0_DQ1	AD39	MDA1
MAAA2	AU16	DDR0_MA2	DDR0_DQ2	AF38	MDA2
MAAA3	AW17	DDR0_MA3	DDR0_DQ3	AF39	MDA3
MAAA4	AU17	DDR0_MA4	DDR0_DQ4	AD37	MDA4
MAAA5	AW18	DDR0_MA5	DDR0_DQ5	AD40	MDA5
MAAA6	AV17	DDR0_MA6	DDR0_DQ6	AF37	MDA6
MAAA7	AT18	DDR0_MA7	DDR0_DQ7	AF40	MDA7
MAAA8	AU18	DDR0_MA8	DDR0_DQ8	AH39	MDA9
MAAA9	AT19	DDR0_MA9	DDR0_DQ9	AH39	MDA13
MAAA10	AW11	DDR0_MA10	DDR0_DQ10	AK38	MDA10
MAAA11	AV19	DDR0_MA11	DDR0_DQ11	AK39	MDA11
MAAA12	AU19	DDR0_MA12	DDR0_DQ12	AH37	MDA12
MAAA13	AY10	DDR0_MA13	DDR0_DQ13	AH38	MDA8
MAAA14	AT20	DDR0_MA14	DDR0_DQ14	AK37	MDA14
MAAA15	AU21	DDR0_MA15	DDR0_DQ15	AK40	MDA15
MODT_A0	AW10	DDR0_ODT0	DDR0_DQ16	AM39	MDA17
MODT_A1	AY8	DDR0_ODT1	DDR0_DQ17	AP38	MDA18
MODT_A2	AW9	DDR0_ODT2	DDR0_DQ18	AP39	MDA19
MODT_A3	AU8	DDR0_ODT3	DDR0_DQ19	AM37	MDA20
			DDR0_DQ20	AM38	MDA16
			DDR0_DQ21	AP37	MDA22
			DDR0_DQ22	AP40	MDA23
			DDR0_DQ23	AV37	MDA25
			DDR0_DQ24	AW37	MDA29
			DDR0_DQ25	AU35	MDA26
			DDR0_DQ26	AV35	MDA27
			DDR0_DQ27	AT37	MDA28
			DDR0_DQ28	U37	MDA24
			DDR0_DQ29	AT35	MDA30
			DDR0_DQ30	AW35	MDA31
			DDR0_DQ31	AY6	MDA33
			DDR0_DQ32	AU6	MDA37
			DDR0_DQ33	AY4	MDA34
			DDR0_DQ34	AU4	MDA35
			DDR0_DQ35	AW6	MDA36
			DDR0_DQ36	AV6	MDA32
			DDR0_DQ37	AV4	MDA38
			DDR0_DQ38	AY4	MDA39
			DDR0_DQ39	AR1	MDA41
			DDR0_DQ40	AR4	MDA45
			DDR0_DQ41	AN3	MDA42
			DDR0_DQ42	AN4	MDA43
			DDR0_DQ43	AR2	MDA44
			DDR0_DQ44	AR3	MDA46
			DDR0_DQ45	AN2	MDA47
			DDR0_DQ46	AL1	MDA49
			DDR0_DQ47	AL4	MDA53
			DDR0_DQ48	AJ3	MDA50
			DDR0_DQ49	AJ4	MDA51
			DDR0_DQ50	AL2	MDA52
			DDR0_DQ51	AL3	MDA48
			DDR0_DQ52	AJ2	MDA54
			DDR0_DQ53	AJ1	MDA55
			DDR0_DQ54	AG4	MDA57
			DDR0_DQ55	AG1	MDA61
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			DDR0_DQ58	AG2	MDA60
			DDR0_DQ59	AG3	MDA56
			DDR0_DQ60	AE2	MDA62
			DDR0_DQ61	AE1	MDA63
			DDR0_DQ62	AE39	DQSA0
			DDR0_DQ63	AJ39	DQSA1
			DDR0_DQ64	AN39	DQSA2
			DDR0_DQ65	AV36	DQSA3
			DDR0_DQ66	AV5	DQSA4
			DDR0_DQ67	AP3	DQSA5
			DDR0_DQ68	AK3	DQSA6
			DDR0_DQ69	AF3	DQSA7
			DDR0_DQ70	AV32	DQSA8
			DDR0_DQ71	AE38	DQSA1
			DDR0_DQ72	AJ38	DQSA2
			DDR0_DQ73	AN38	DQSA3
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			DDR0_DQ75	AW5	DQSA5
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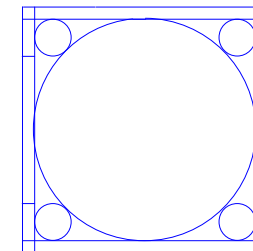
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LGA1150B

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MAAB1	AK23	DDR1_MA1	DDR1_DQ1	AE35	MDB1
MAAB2	AM22	DDR1_MA2	DDR1_DQ2	AG35	MDB2
MAAB3	AM23	DDR1_MA3	DDR1_DQ3	AH35	MDB3
MAAB4	AP23	DDR1_MA4	DDR1_DQ4	AD34	MDB4
MAAB5	AL23	DDR1_MA5	DDR1_DQ5	AD35	MDB5
MAAB6	AY24	DDR1_MA6	DDR1_DQ6	AG34	MDB6
MAAB7	AV25	DDR1_MA7	DDR1_DQ7	AH34	MDB7
MAAB8	AU26	DDR1_MA8	DDR1_DQ8	AL34	MDB8
MAAB9	AW26	DDR1_MA9	DDR1_DQ9	AL35	MDB9
MAAB10	AP18	DDR1_MA10	DDR1_DQ10	AK31	MDB10
MAAB11	AY25	DDR1_MA11	DDR1_DQ11	AL31	MDB11
MAAB12	AV26	DDR1_MA12	DDR1_DQ12	AK34	MDB12
MAAB13	AR15	DDR1_MA13	DDR1_DQ13	AK35	MDB13
MAAB14	AV27	DDR1_MA14	DDR1_DQ14	AK32	MDB14
MAAB15	AY28	DDR1_MA15	DDR1_DQ15	AL32	MDB15
			DDR1_DQ16	AK34	MDB17
			DDR1_DQ17	AP34	MDB21
			DDR1_DQ18	AN31	MDB19
			DDR1_DQ19	AP31	MDB23
			DDR1_DQ20	AN35	MDB20
			DDR1_DQ21	AP35	MDB16
			DDR1_DQ22	AN32	MDB18
			DDR1_DQ23	AP32	MDB22
			DDR1_DQ24	AM29	MDB25
			DDR1_DQ25	AM28	MDB26
			DDR1_DQ26	AR29	MDB27
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			DDR1_DQ30	AP29	MDB28
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			DDR1_DQ45	AP10	MDB40
			DDR1_DQ46	AR7	MDB46
			DDR1_DQ47	AP7	MDB42
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			DDR1_DQ49	AL9	MDB53
			DDR1_DQ50	AL6	MDB50
			DDR1_DQ51	AL7	MDB55
			DDR1_DQ52	AM10	MDB48
			DDR1_DQ53	AL10	MDB49
			DDR1_DQ54	AM6	MDB54
			DDR1_DQ55	AM7	MDB51
			DDR1_DQ56	AH7	MDB60
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			DDR1_DQ59	AJ6	MDB58
			DDR1_DQ60	AE7	MDB57
			DDR1_DQ61	AF6	MDB58
			DDR1_DQ62	AF7	MDB62
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			DDR1_DQ64	AL33	DQSB1
			DDR1_DQ65	AP33	DQSB2
			DDR1_DQ66	AN28	DQSB3
			DDR1_DQ67	AN12	DQSB4
			DDR1_DQ68	AP8	DQSB5
			DDR1_DQ69	AL8	DQSB6
			DDR1_DQ70	AG7	DQSB7
			DDR1_DQ71	AN25	
			DDR1_DQ72	AF34	DQSB0
			DDR1_DQ73	AK33	DQSB1
			DDR1_DQ74	AN33	DQSB2
			DDR1_DQ75	AN29	DQSB3
			DDR1_DQ76	AN13	DQSB4
			DDR1_DQ77	AR8	DQSB5
			DDR1_DQ78	AM8	DQSB6
			DDR1_DQ79	AG6	DQSB7
			DDR1_DQ80	AN26	

MODT_B0	AM17	DDR1_ODT0
MODT_B1	AL16	DDR1_ODT1
MODT_B2	AM16	DDR1_ODT2
MODT_B3	AK15	DDR1_ODT3

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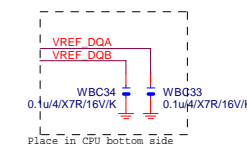
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CPU RETAINTION/X

LGA1150



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

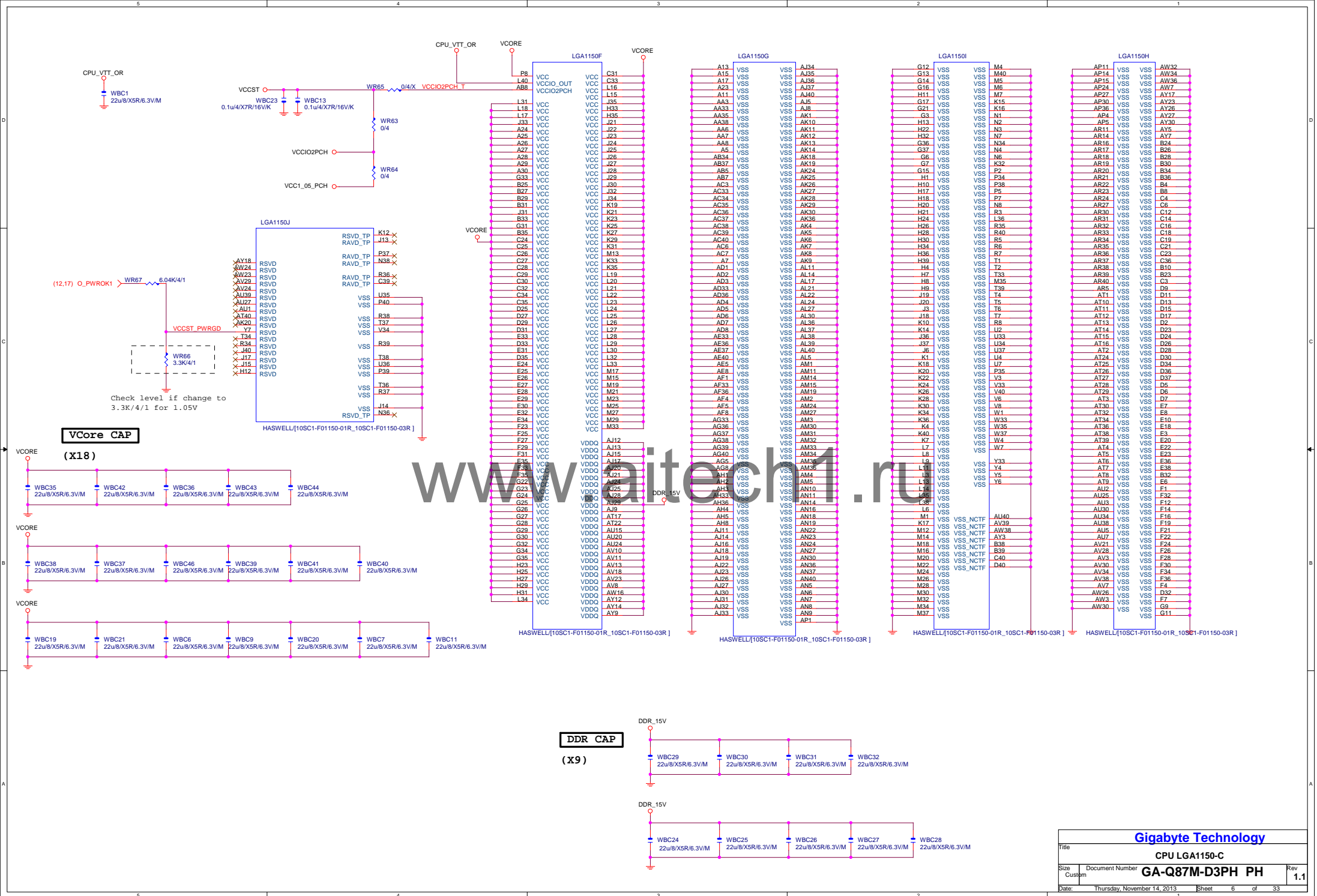
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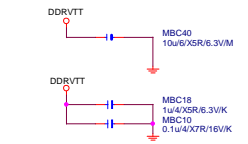


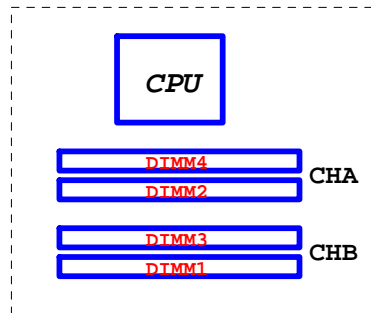
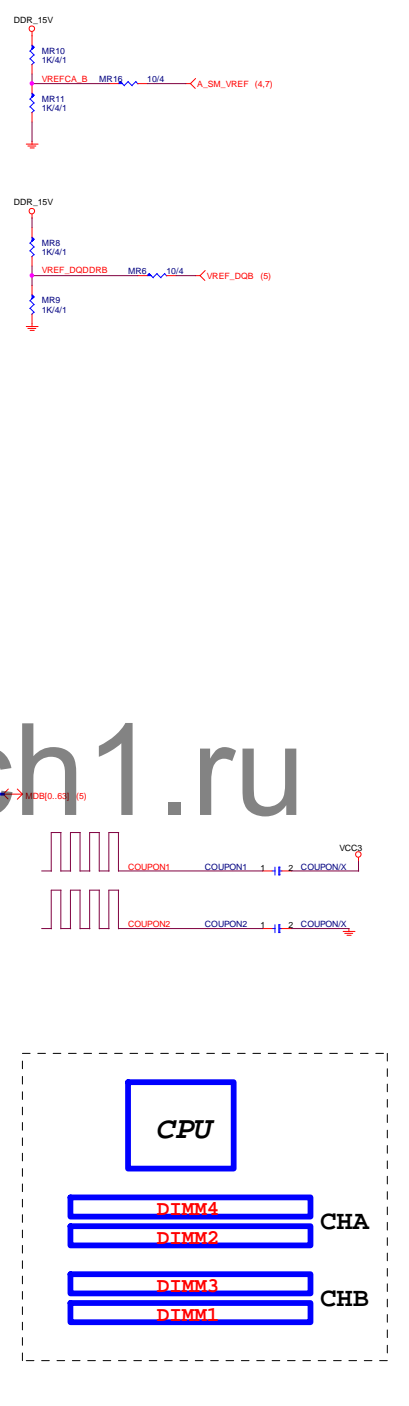
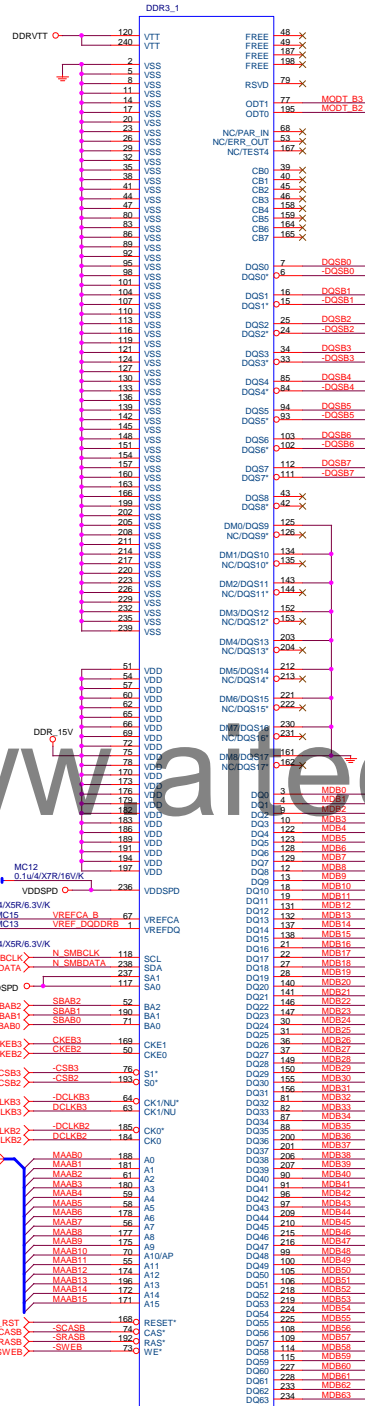
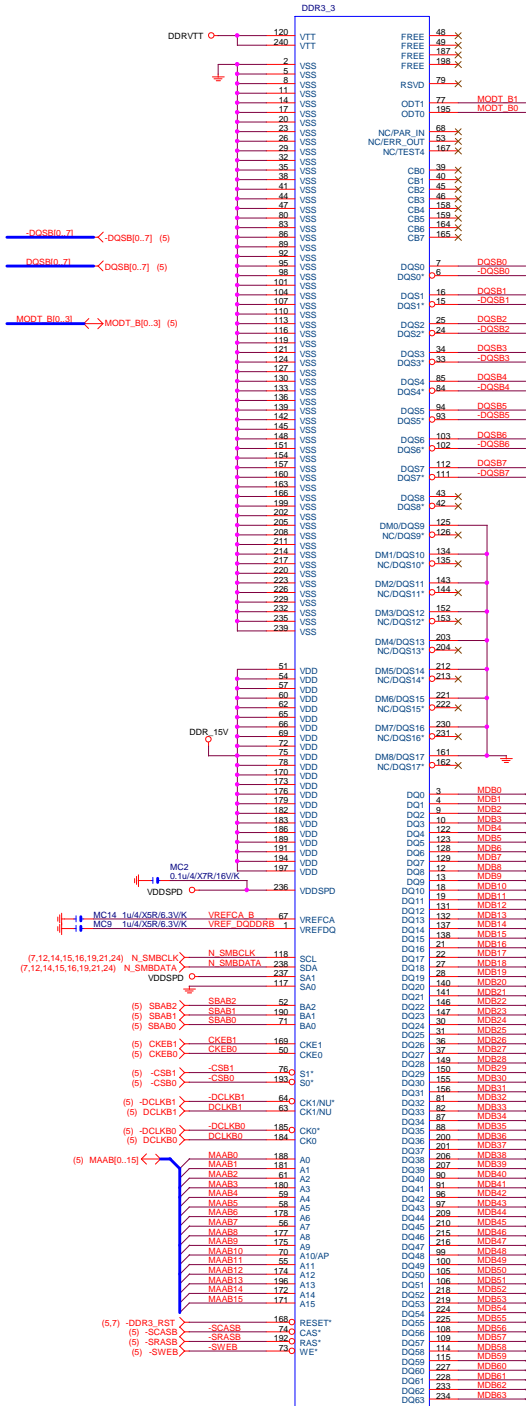
Gigabyte Technology

CPU LGA1150-B

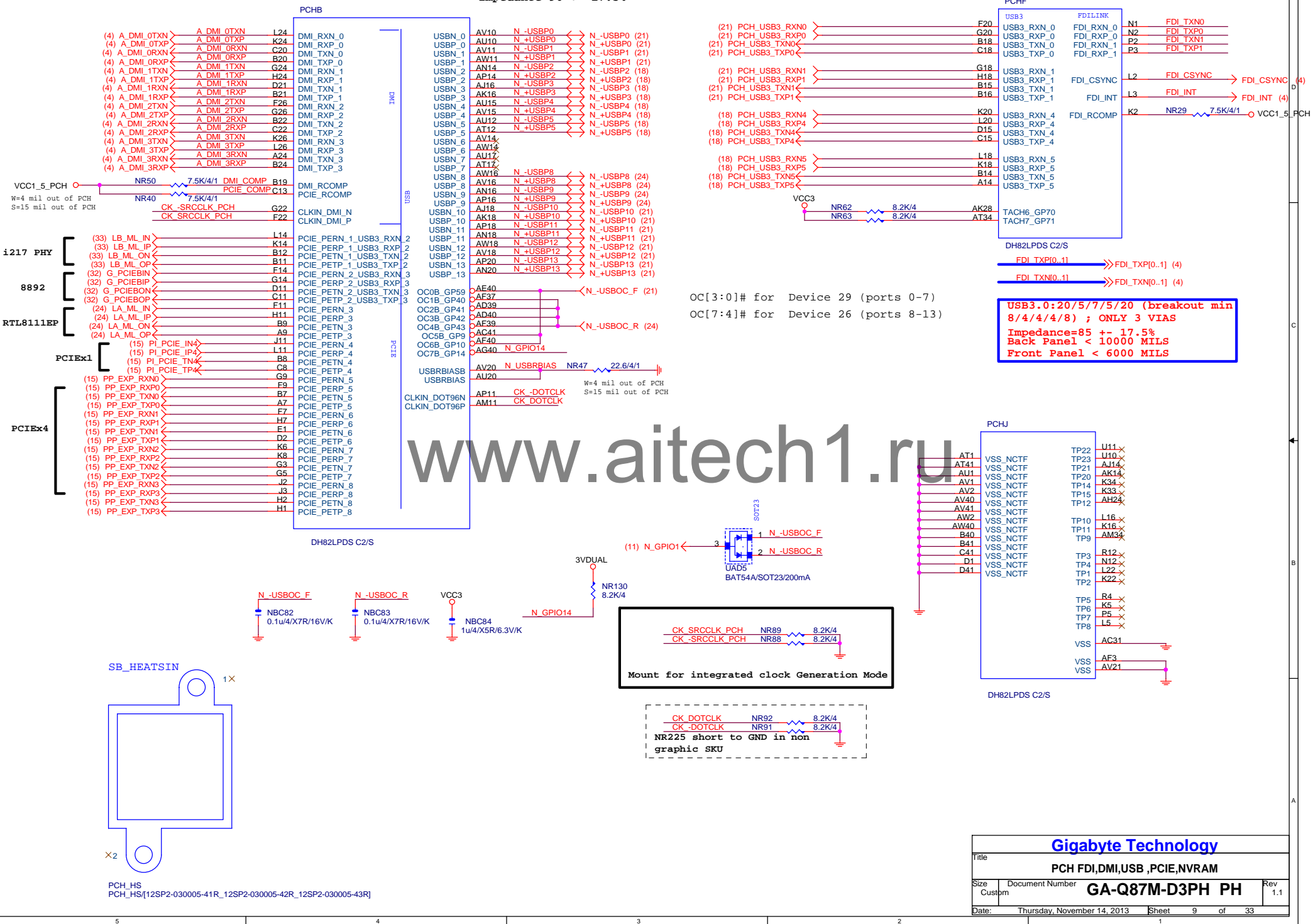
Title	CPU LGA1150-B		
Size	Document Number	GA-Q87M-D3PH PH	Rev 1.1
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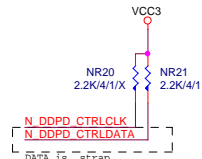
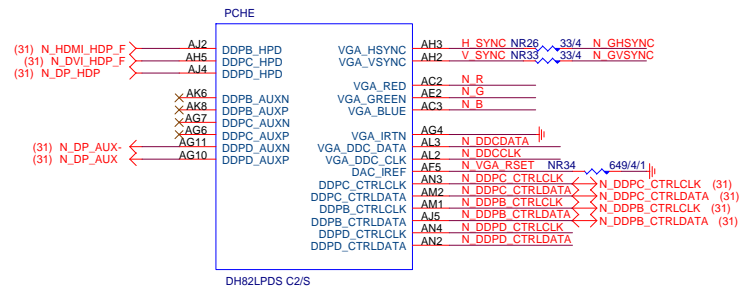




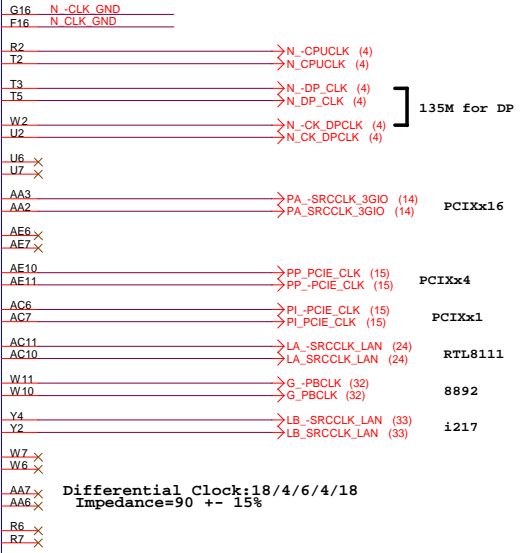
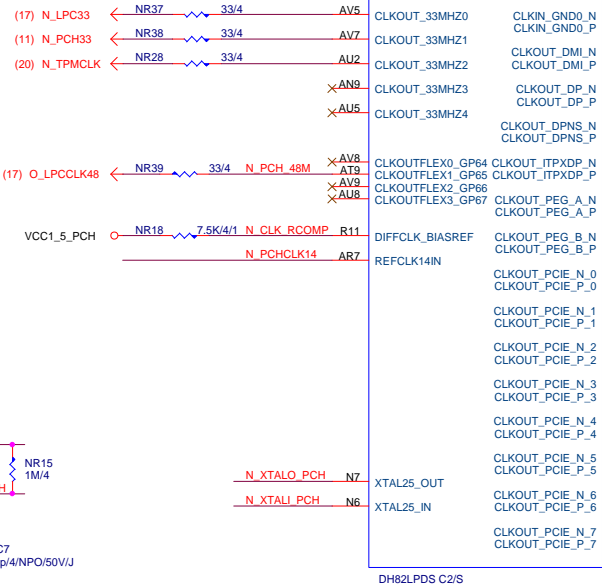
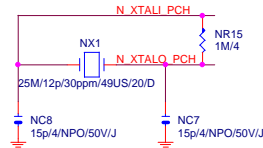


USB2.0 : 12/4.5/7.5/4.5/12 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%



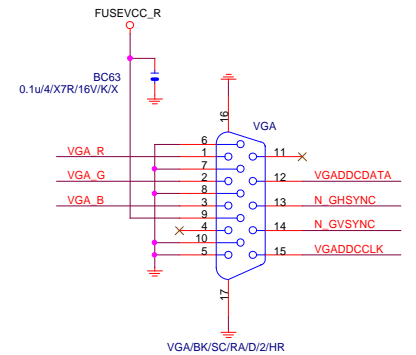
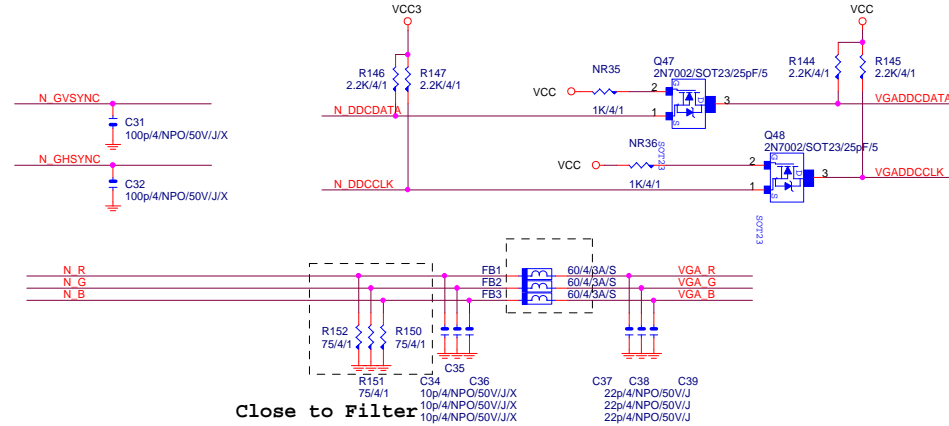
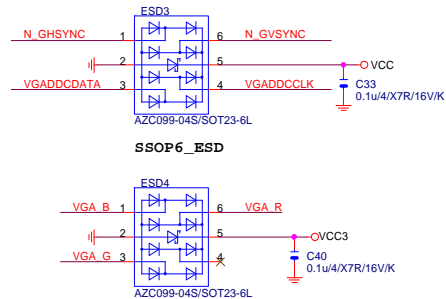


Flex1,2,3,4 : (17) O_LPCCLK48
14/24/33/48MHZ



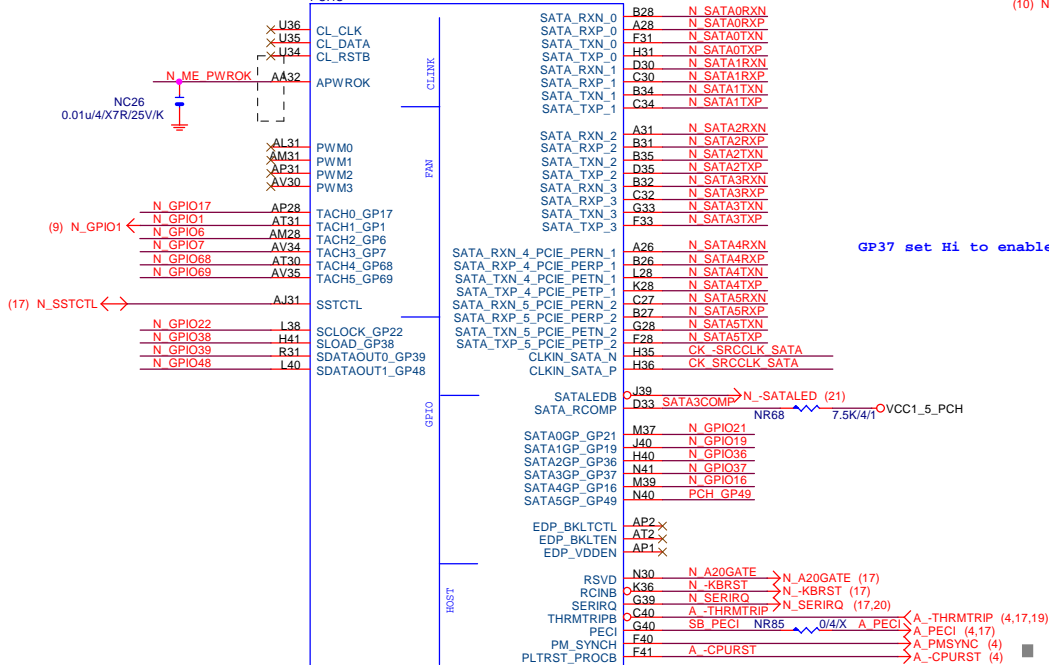
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Mount for integrated clock Generation Mode

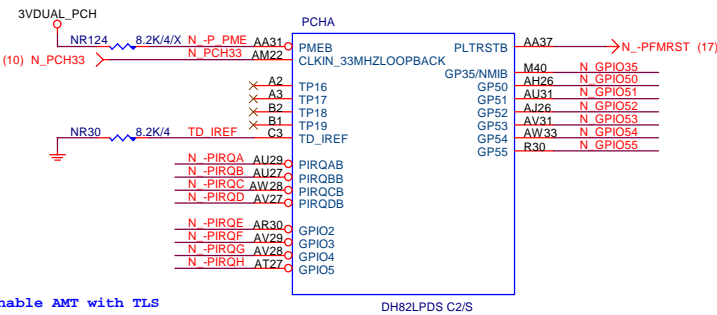
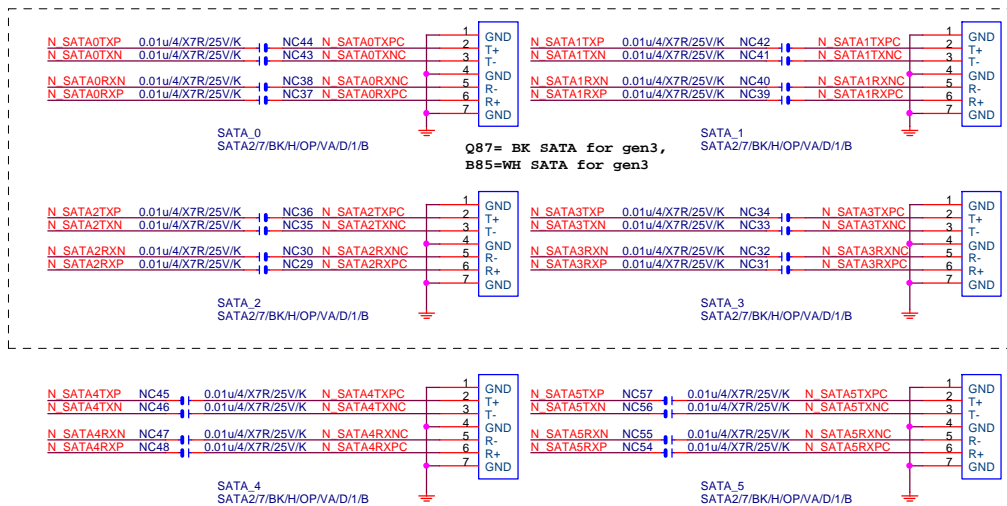


Gigabyte Technology			
Title PCH DISPLAY_CLK BUFFER			
Size Custom	Document Number	GA-Q87M-D3PH PH	
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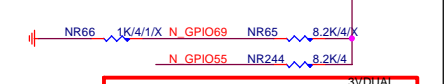
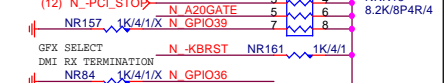
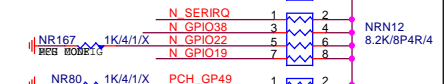
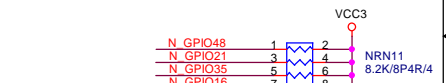
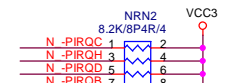
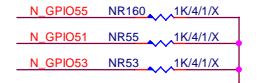
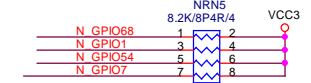
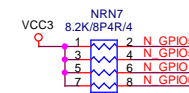
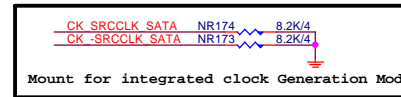
```
SATA3 : 20/7.5/4.5/7.5/20 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%
SATA2 : 15/7.5/4.5/7.5/15 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%
```



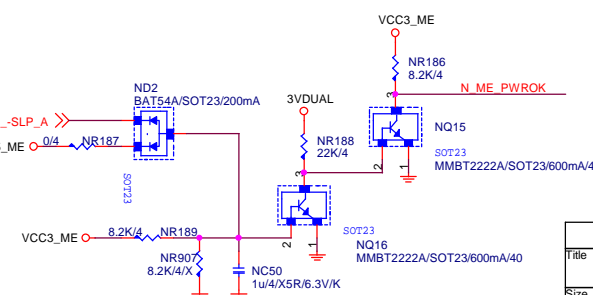
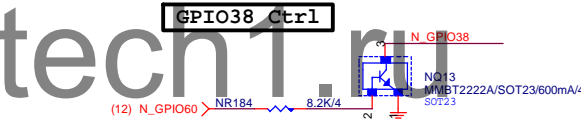
Final need change to
B85 real P/N



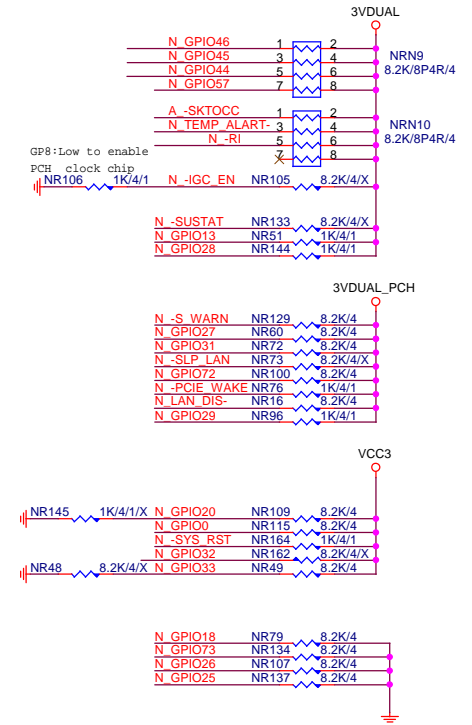
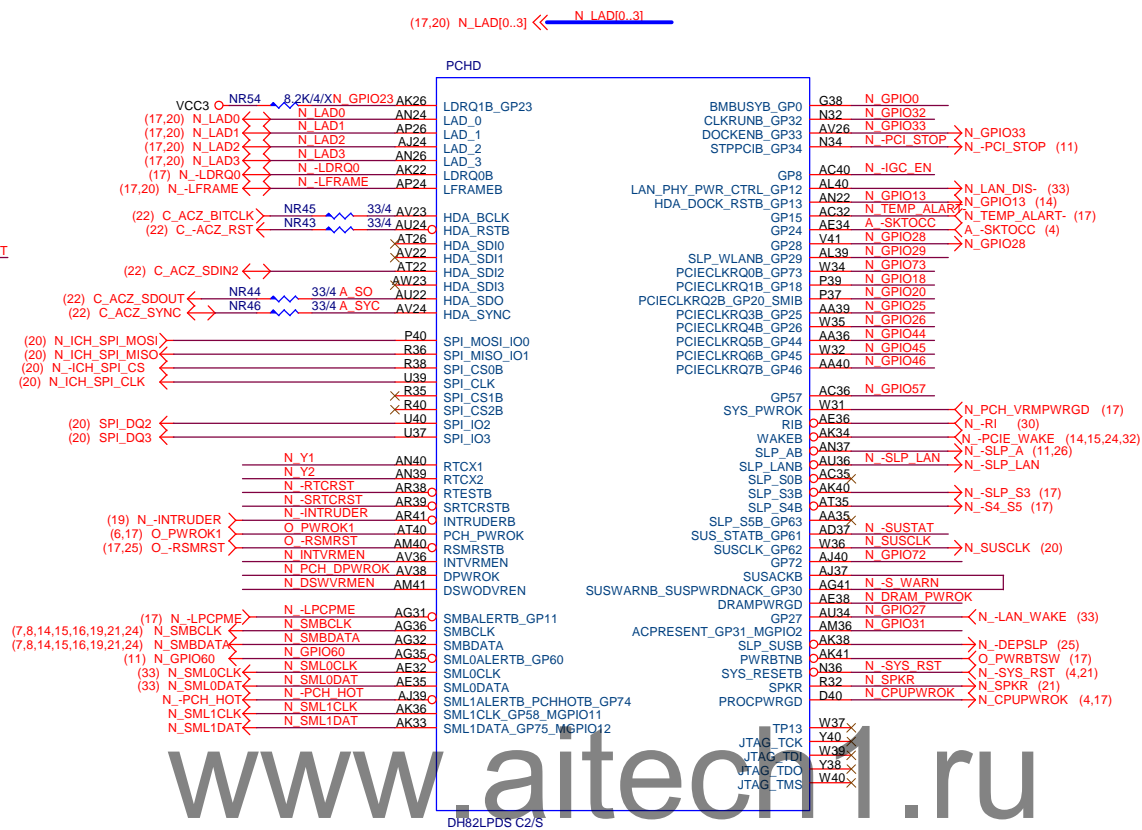
GP37 set Hi to enable AMT with TLS



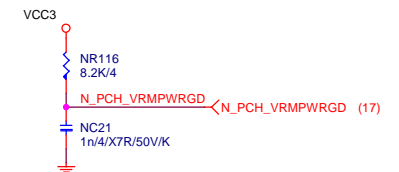
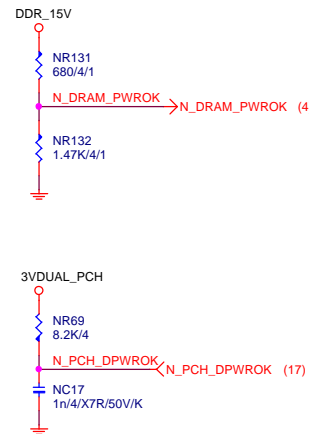
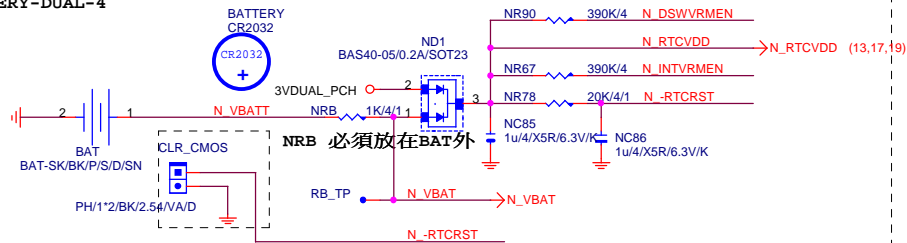
Pu to enable TLS for SBA

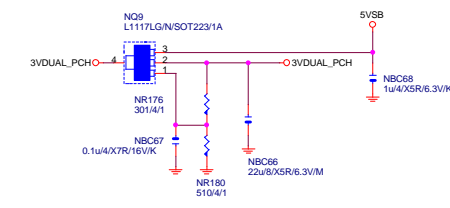
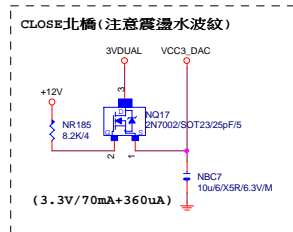
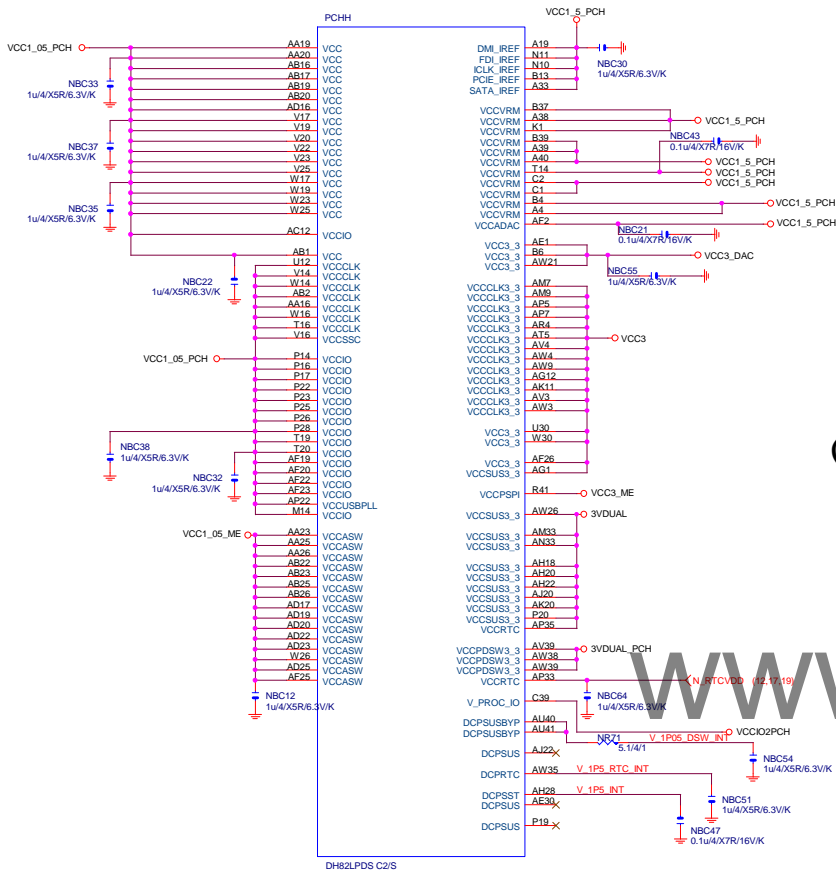


Gigabyte Technology				
Title				
PCH HOST , SATA, PCI				
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(3.3V) (X6)

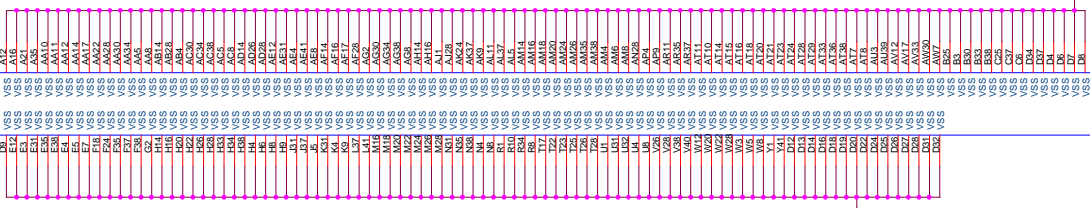
(1.05V) (X5)

(1.05V) (X6)

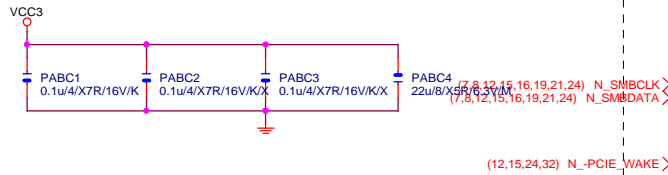
(1.5V) (X10)

(1.05V) (X2)

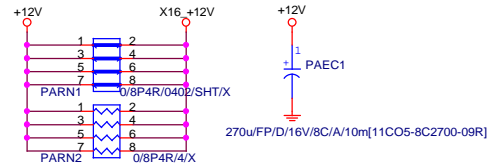
(3.3V) (X2)



PCIEX16 CAP



PCIEX16 PROTECT SHT



PCIEX16 AC CAP

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

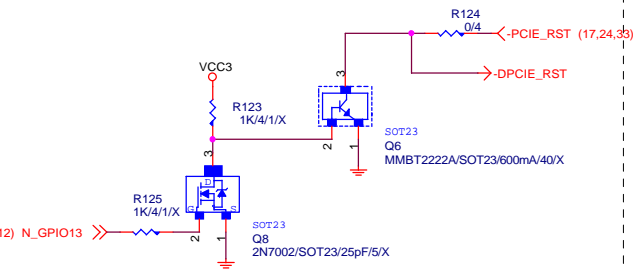
PA EXP RXP10_15I >>> PA_EXP_RXP[0..15] (4)

PA EXP RXN10_15I >>> PA_EXP_RXN[0..15] (4)

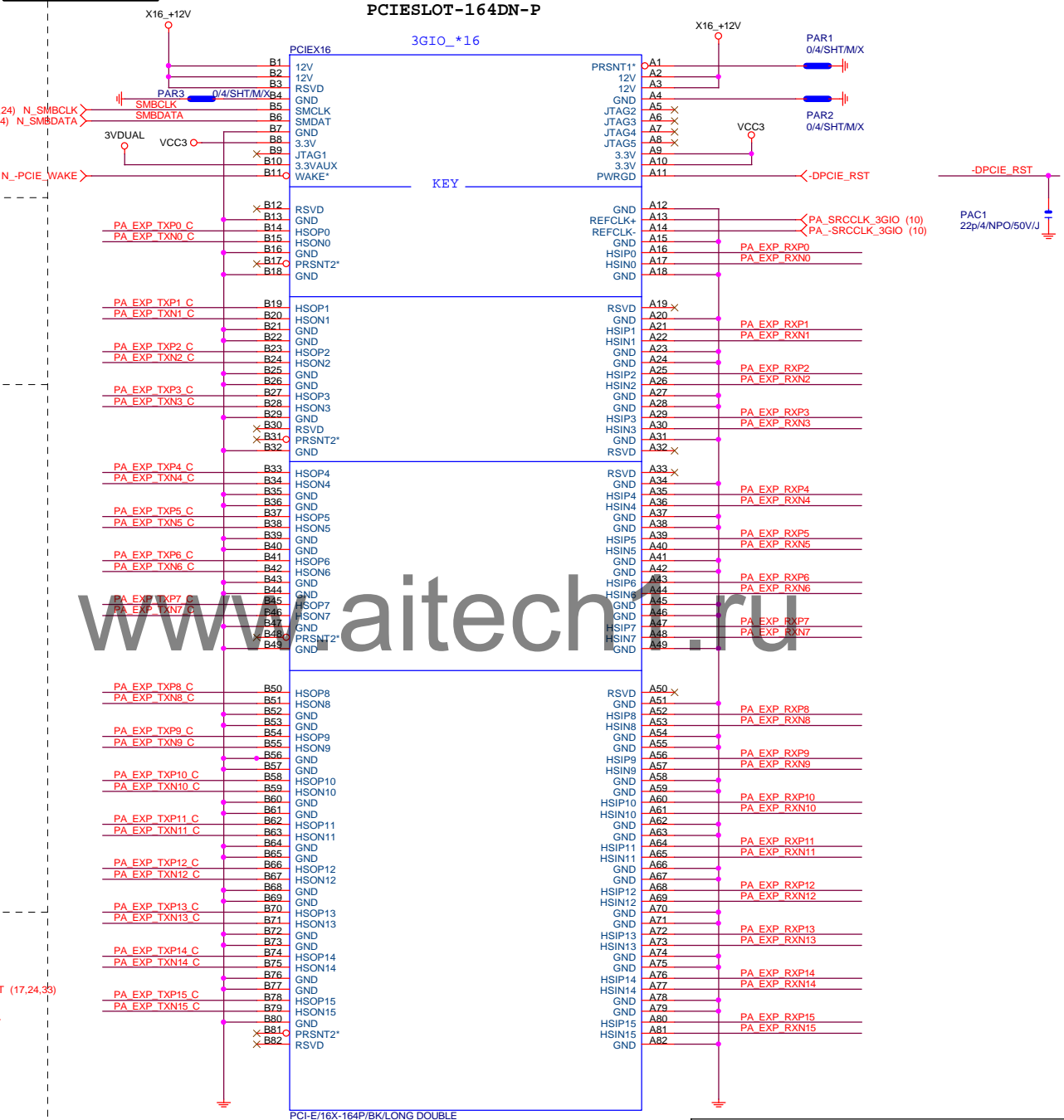
PA EXP TXP10_15I >>> PA_EXP_TXP[0..15] (4)

PA EXP TXN10_15I >>> PA_EXP_TXN[0..15] (4)

PCIEX16 SOFT RESET



PCIEX16 SLOT

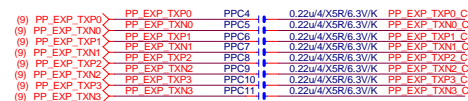
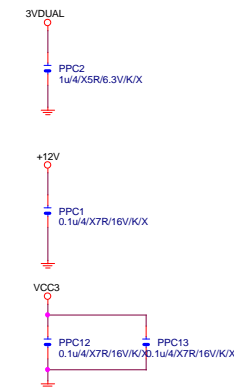
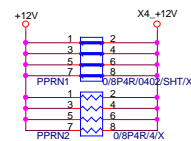
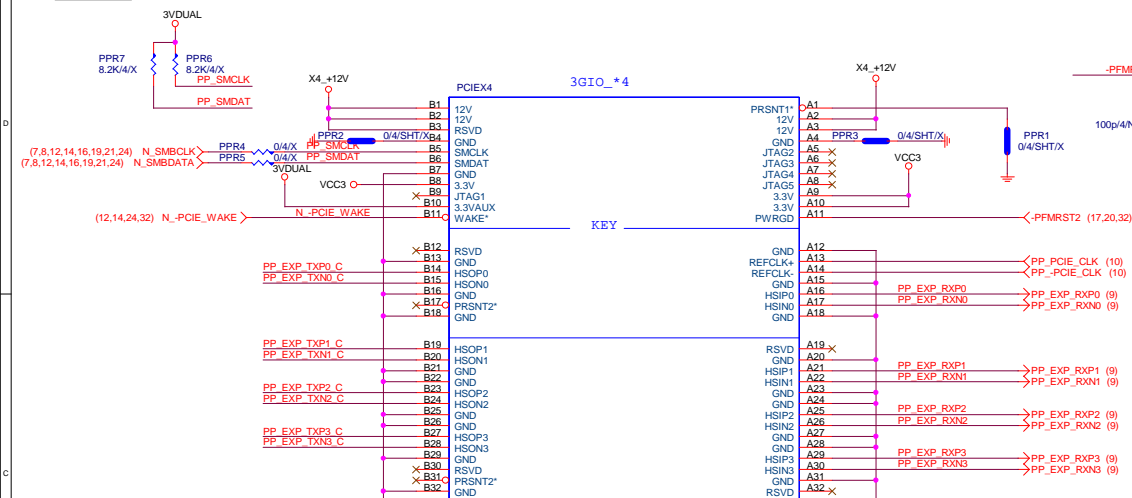


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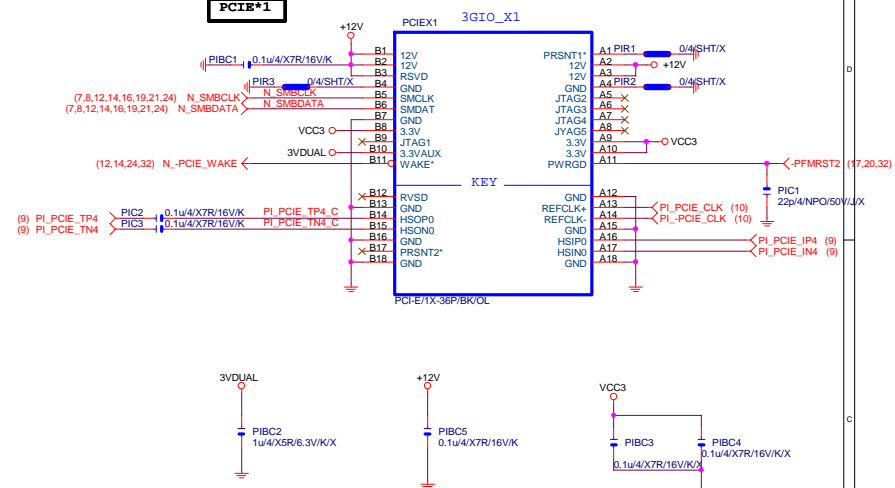
PCI EXPRESS * 16

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Size		
Custom		
Document Number		
GA-Q87M-D3PH PH		
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PCIE*4



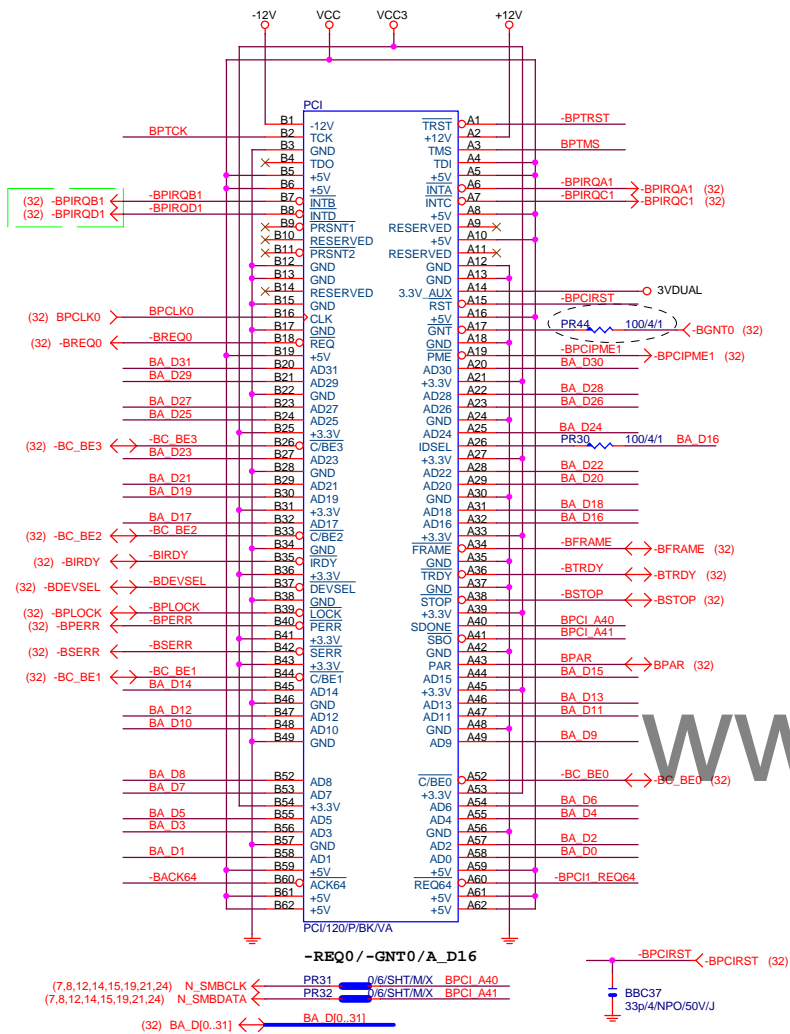
PCIE*1



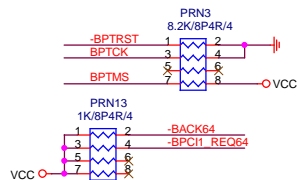
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PCI EXPRESS X 1 PORT			
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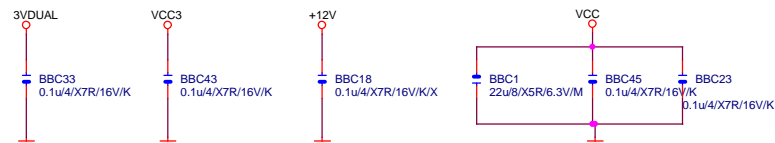
PCI SLOT



PCI	PU
-----	----



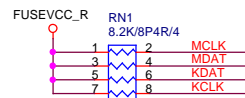
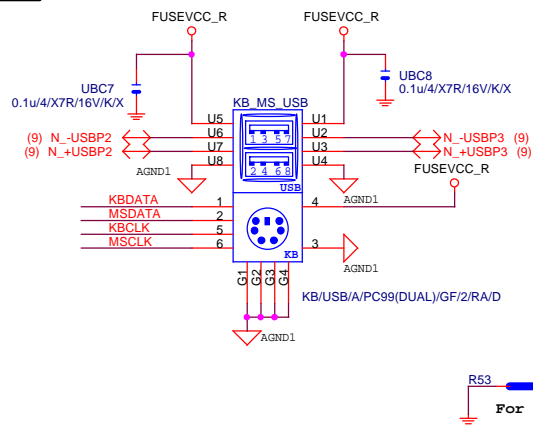
PCI CAP



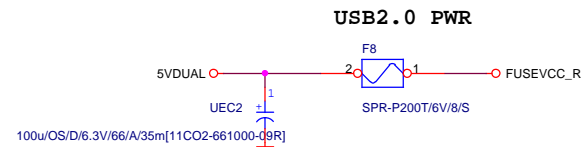
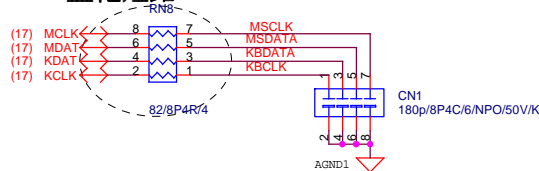
Gigabyte Technology

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PCI SLOT 1&2			
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KB/MS



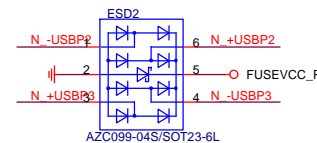
FOR 鹽化短路



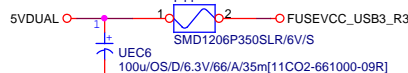
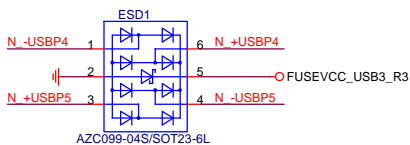
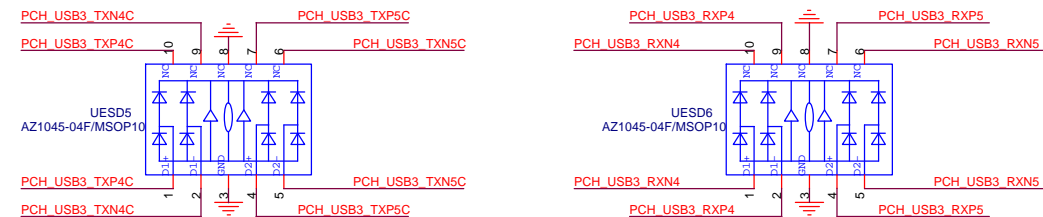
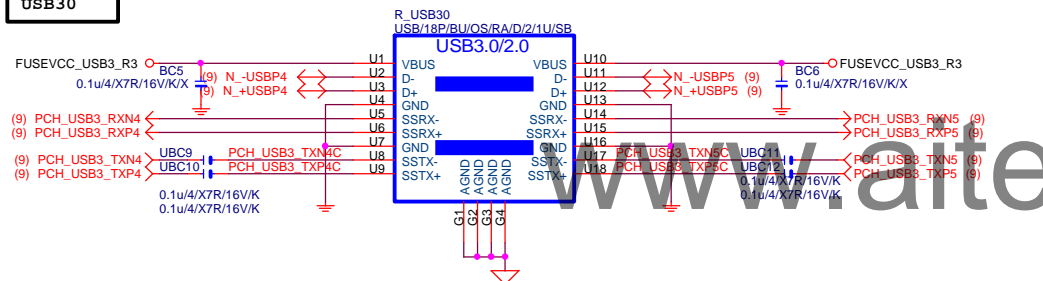
Close to USB connector

KB/MS PWR

USB2.0 ESD



USB30

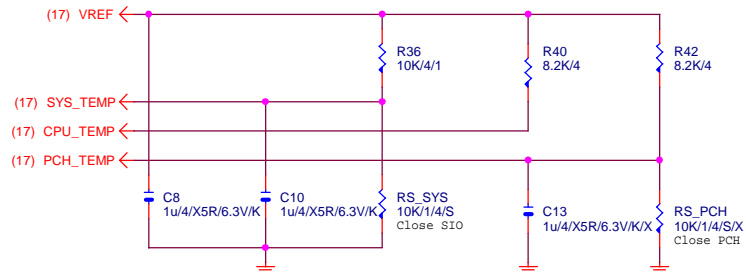


Polyswitch-1206 USB3.0 1Port - 1Fuse (3.5A)

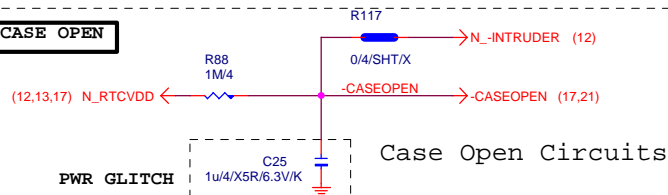
Gigabyte Technology

Title			
KB/MS,RUSB			
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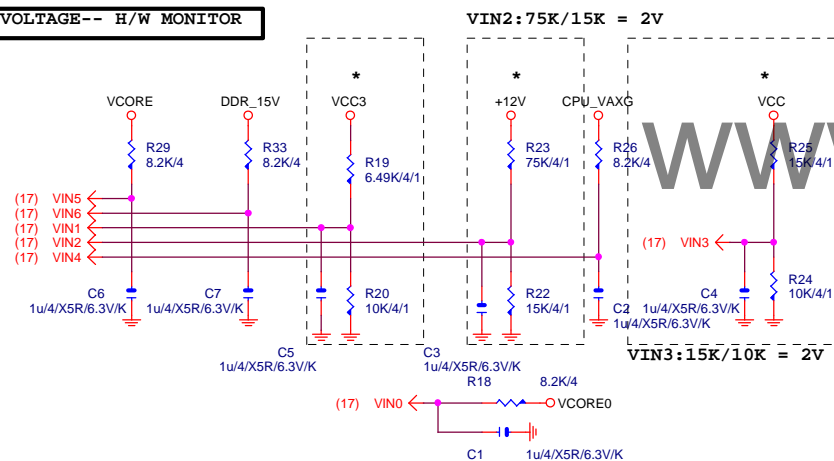
TEMP H/W MONITOR



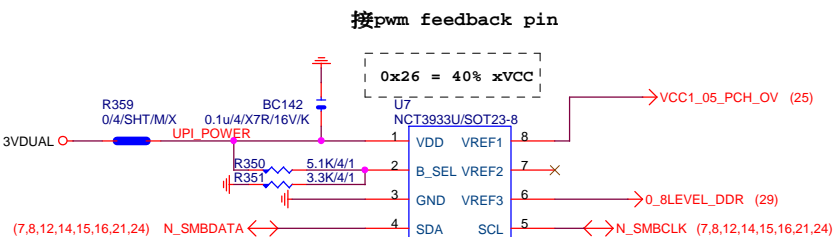
CASE OPEN



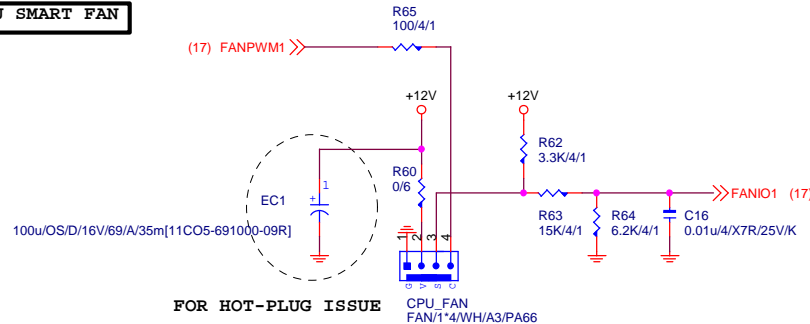
VOLTAGE-- H/W MONITOR



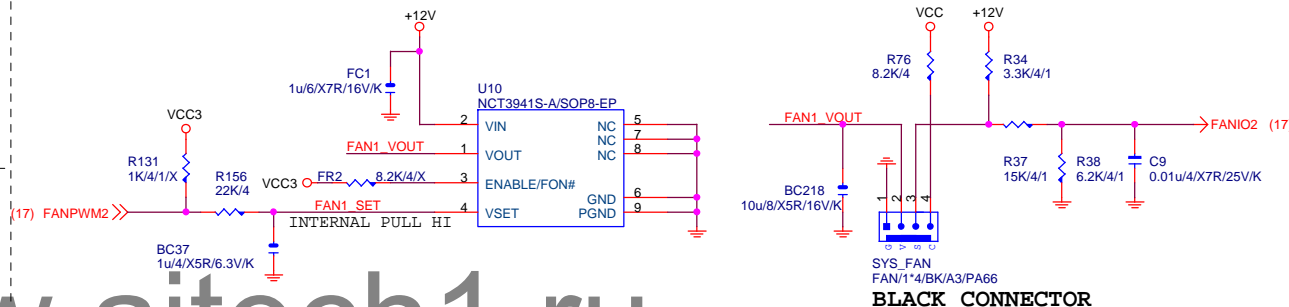
OV NCT3933



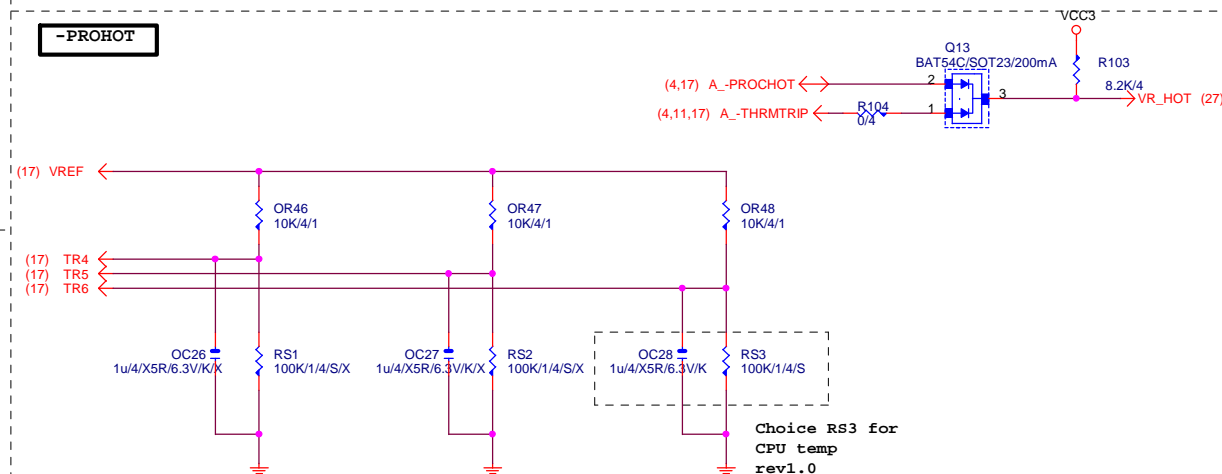
CPU SMART FAN



SYS SMART FAN



-PROHOT

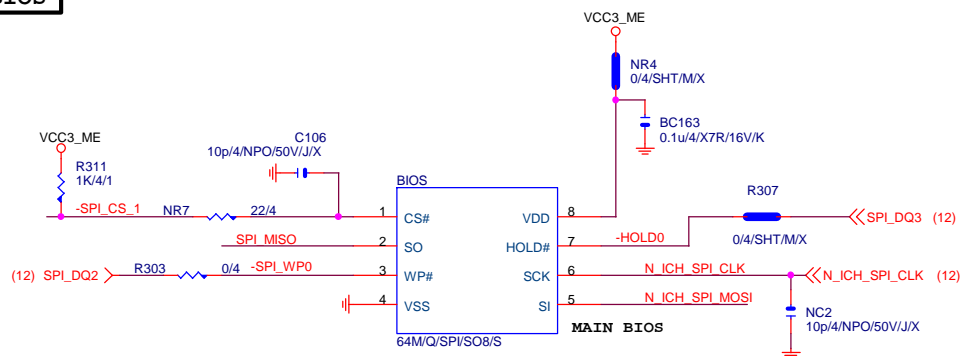


RS1、RS2、RS3 CLOSE CPU VR MOSFET
Select the Hottest point to setup

Gigabyte Technology

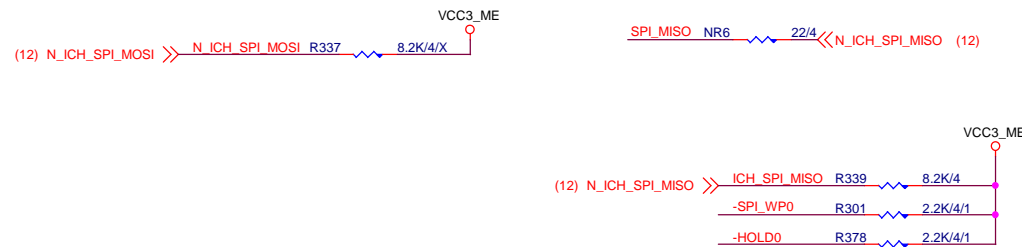
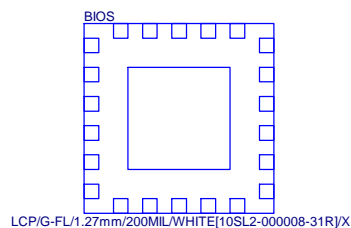
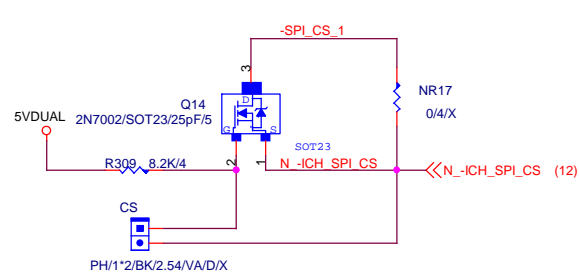
Title			
HWM,FAN CTRL,OV			
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BIOS



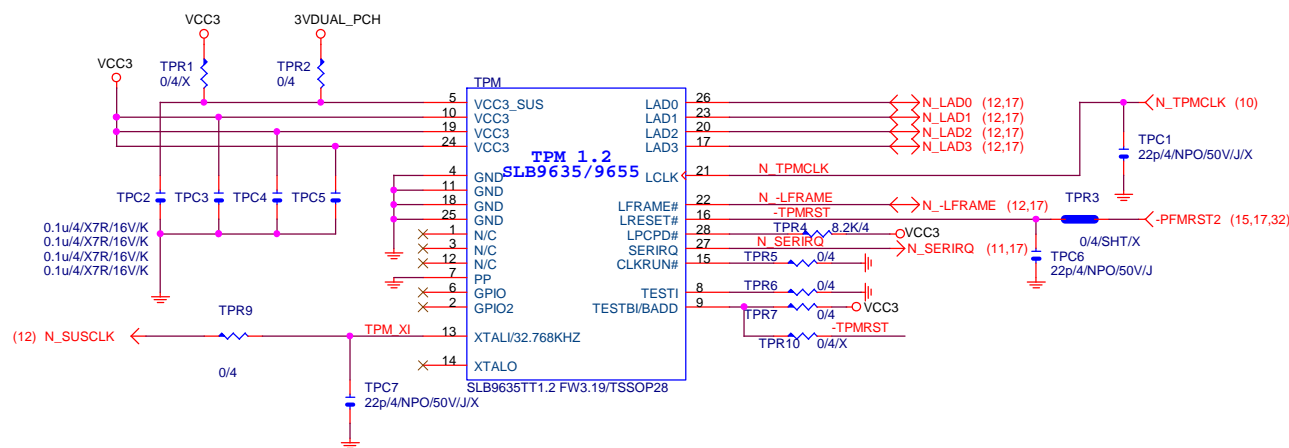
BOOT DEVICE	GP51	GP19
LPC	0	0
SPI	1	1

1 means internal PU
0 means PD 1k



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TPM

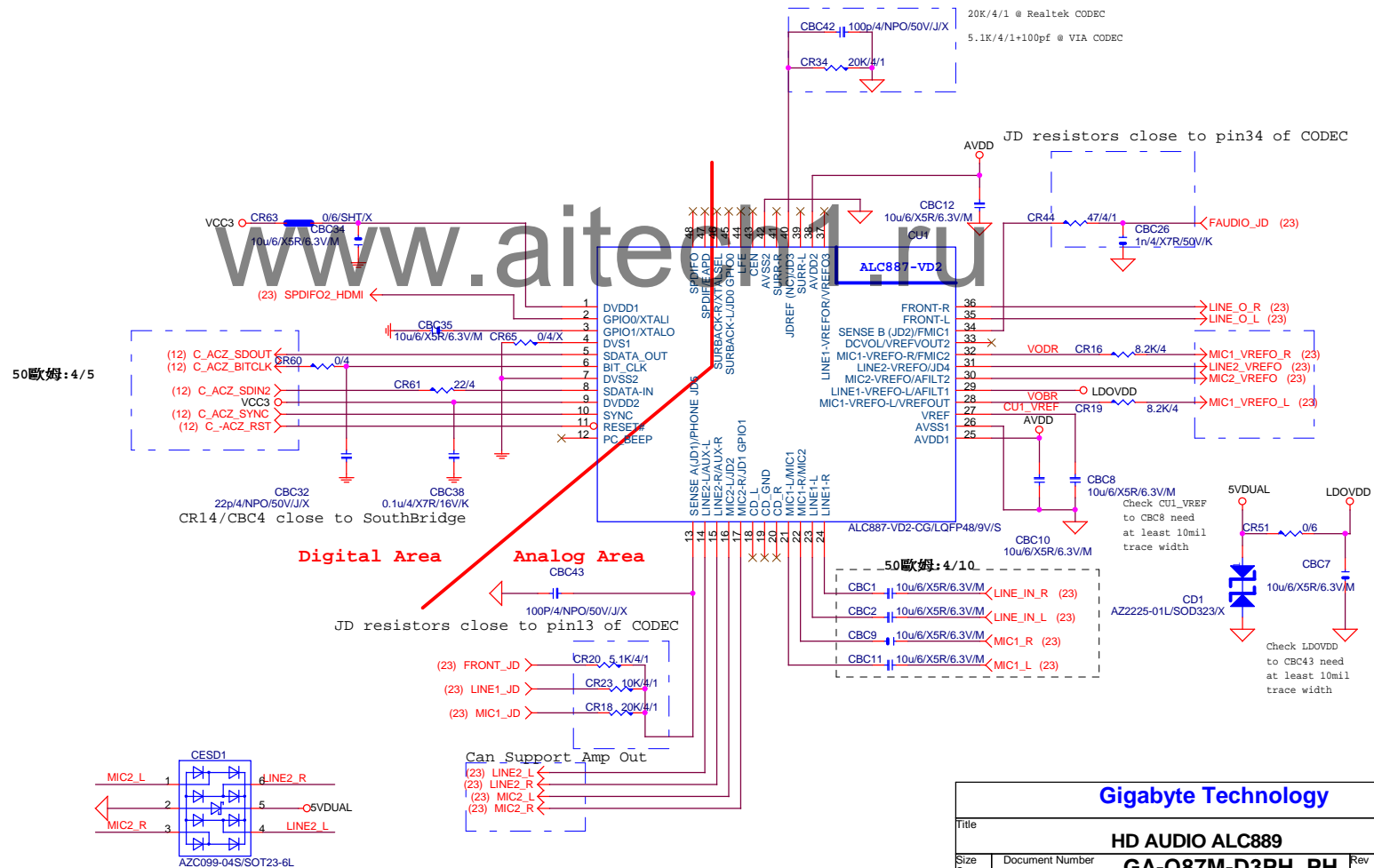


	SLB9635	SLB9655
TPR2, TPR4, TPR5, TPR6, TPR7, TPR9	MOUNT	N/A
TPR1, TPR10	N/A	MOUNT

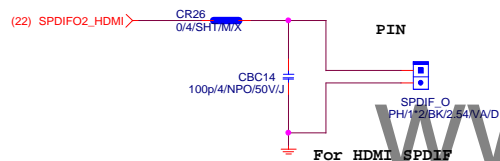
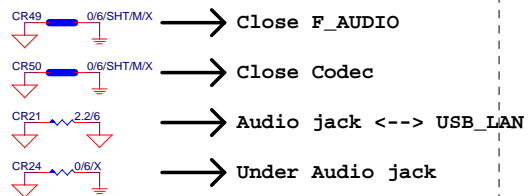
Gigabyte Technology

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DUAL BIOS			
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	ALC892	ALC887-VD2	VT1708S-CE
CR44/CBC26	47ohm+1nF	47ohm+1nF	22ohm+100P
CBC42/CBC43	X	X	100P/4
CR6/CR7/CR58/CR54/ CR67/CR68/CR69/CR70/ CR2/CR4	22K/4	22K/4	10K/4/1
CR5/CR8/CR1/CR14/ CR17/CR22/CR73/CR74/ CR13/CR11/CR57/CR53/ CR75/CR76/CR27/CR29	62 ohm	62 ohm	75 ohm
CR16/CR19	8.2K/4	8.2K/4	3.3K/4
CESD1	O	O	O

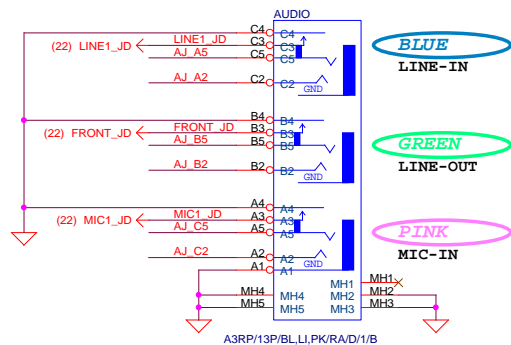


CODEC POWER/EMI PAD

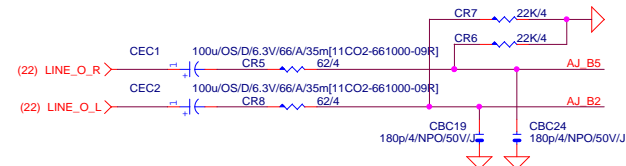


AZALIA JACK

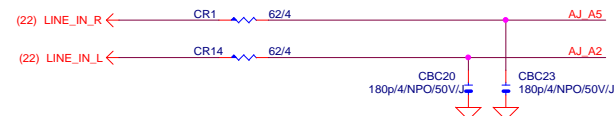
BTX AZALIA CONNECTOR



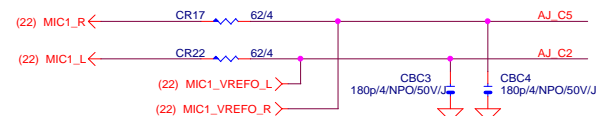
LINE-OUT



LINE-IN



MIC-IN

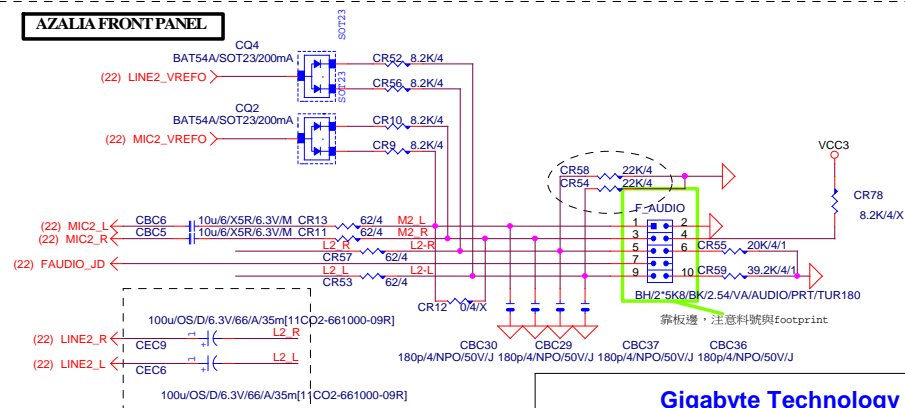


SURROUND

CEN/LFE

SURRBACK

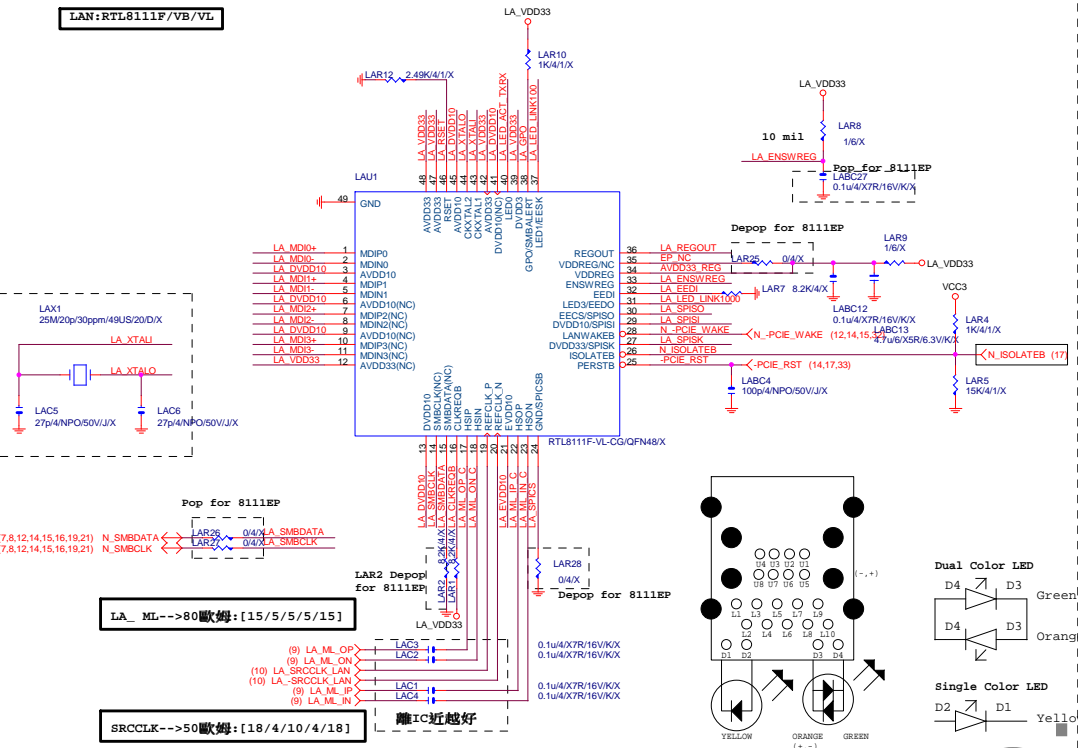
AZALIA FRONT PANEL



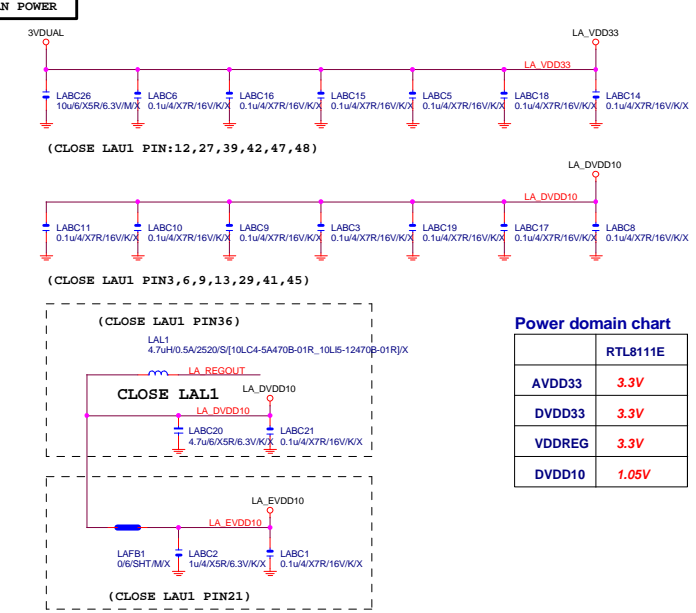
Gigabyte Technology

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AUDIO JACK			
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LAN:RTL8111F/VB/VL



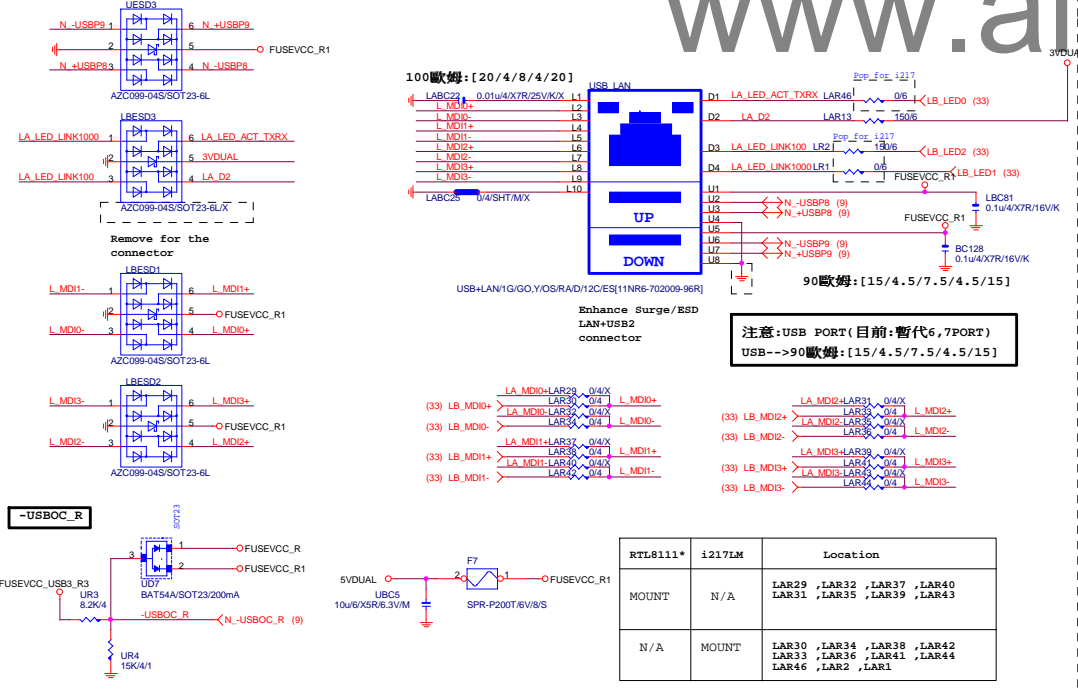
LAN POWER



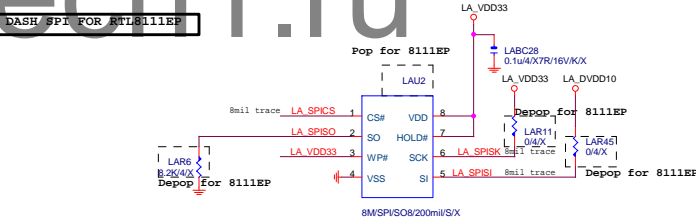
Power domain chart

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

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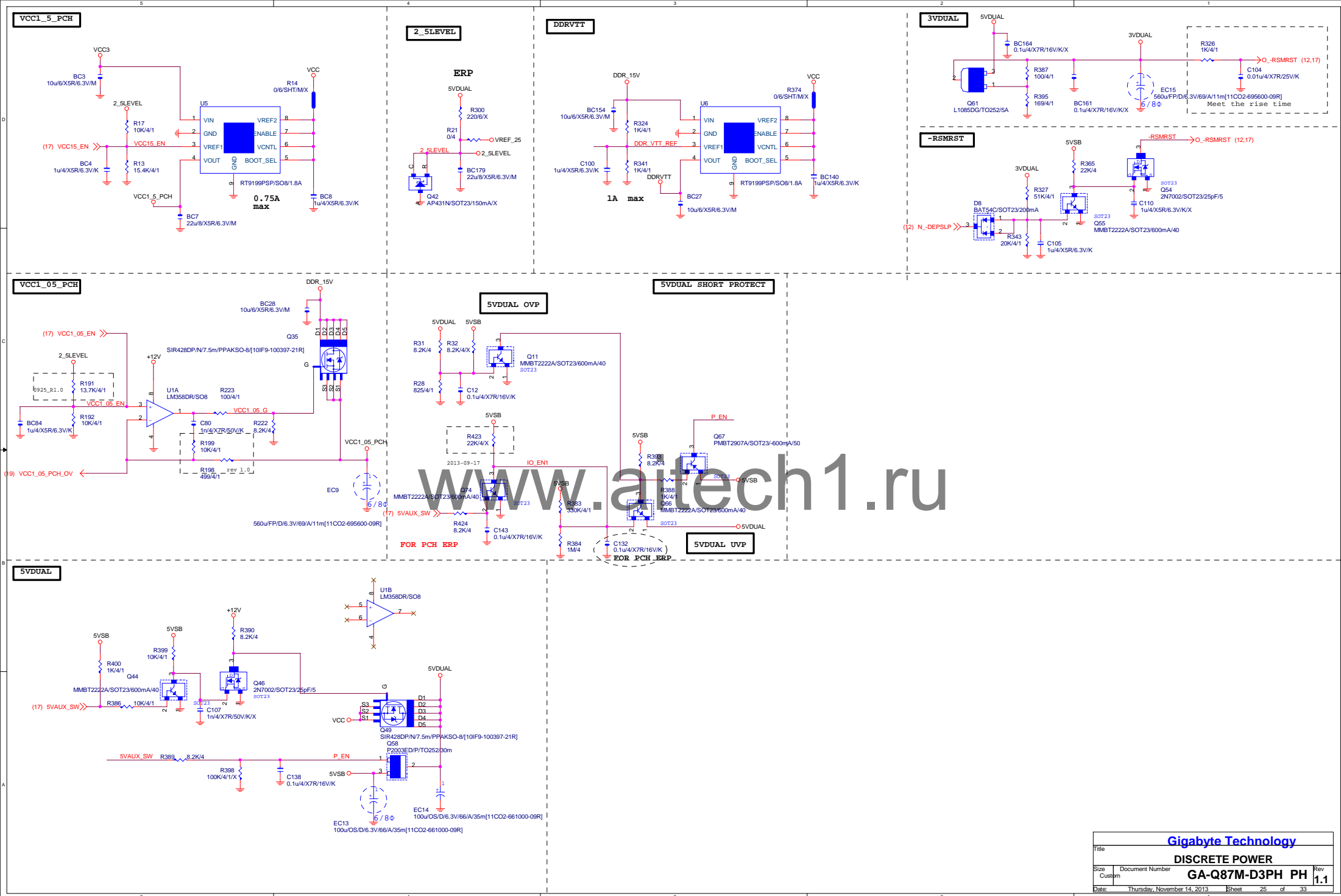


DASH SPI FOR RTL8111EP



RTL8111EP	RTL8111F-VL	Location
MOUNT	N/A	LAR26, LAR27, LAR28, LAR29, LAR30, LAR31, LAR32, LAR33, LAR34, LAR35, LAR36, LAR37, LAR38, LAR39, LAR40, LAR41, LAR42, LAR43, LAR44, LAR45, LAR46, LAR47, LAR48, LAR49, LAR50, LAR51, LAR52, LAR53, LAR54, LAR55, LAR56, LAR57, LAR58, LAR59, LAR60, LAR61, LAR62, LAR63, LAR64, LAR65, LAR66, LAR67, LAR68, LAR69, LAR70, LAR71, LAR72, LAR73, LAR74, LAR75, LAR76, LAR77, LAR78, LAR79, LAR80, LAR81, LAR82, LAR83, LAR84, LAR85, LAR86, LAR87, LAR88, LAR89, LAR90, LAR91, LAR92, LAR93, LAR94, LAR95, LAR96, LAR97, LAR98, LAR99, LAR100
N/A	MOUNT	LAR25, LAR6, LAR11, LAR45, LAR28

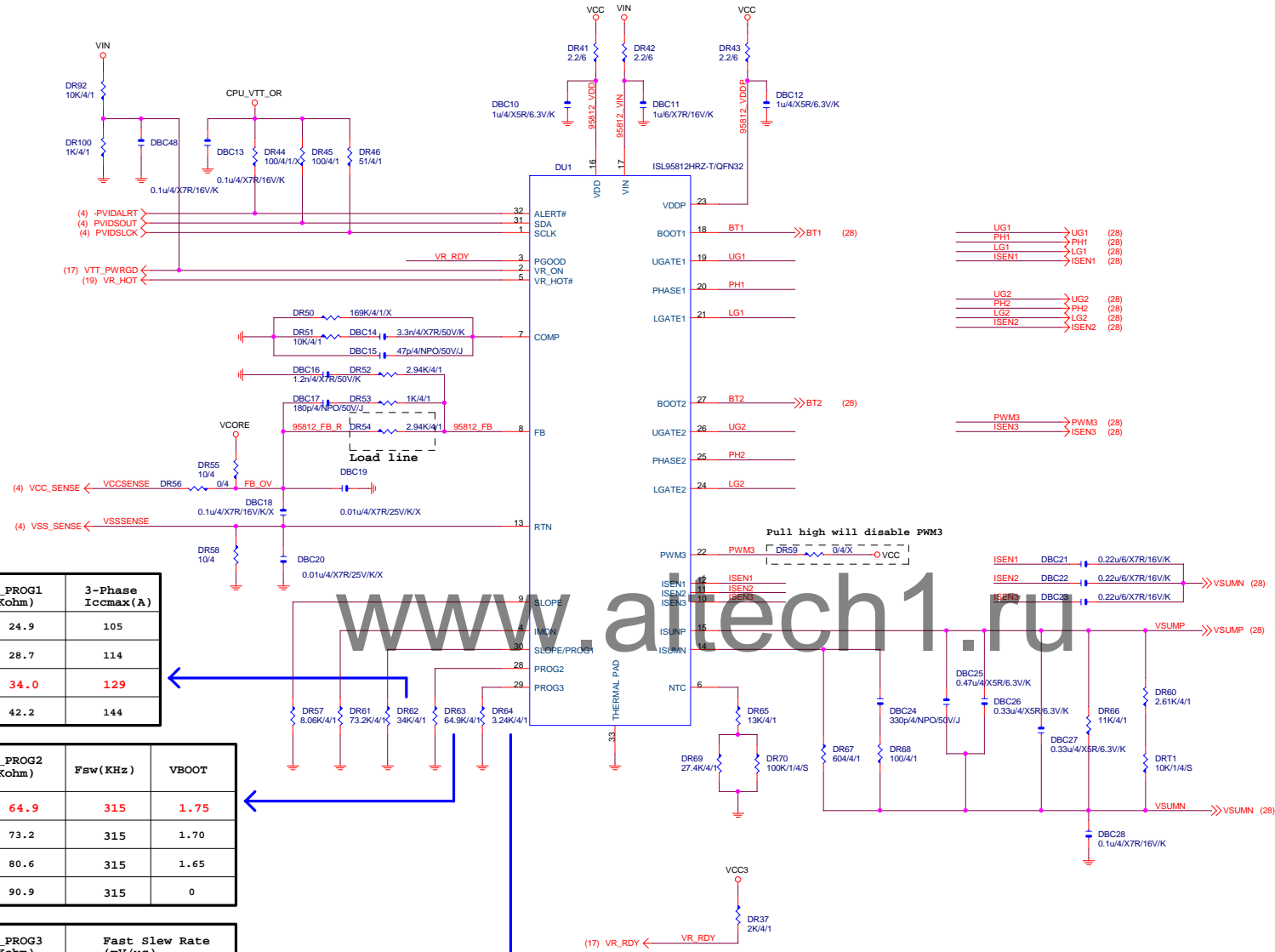
RTL8111*	i217LM	Location
MOUNT	N/A	LAR29, LAR32, LAR37, LAR40, LAR31, LAR35, LAR39, LAR43
N/A	MOUNT	LAR30, LAR34, LAR38, LAR42, LAR33, LAR36, LAR41, LAR44, LAR46, LAR2, LAR1



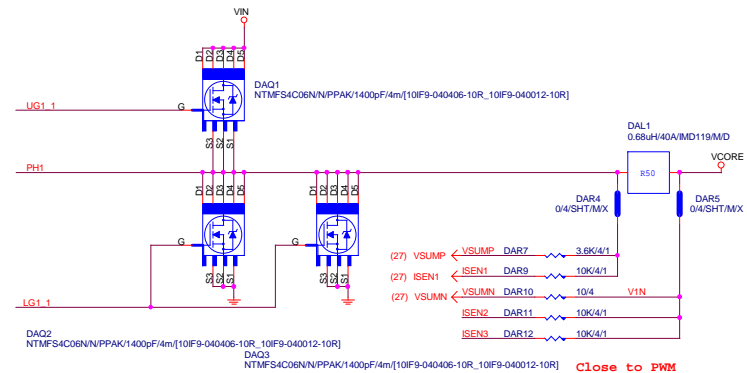
R_PROG1 (Kohm)	3-Phase Iccmax(A)
24.9	105
28.7	114
34.0	129
42.2	144

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

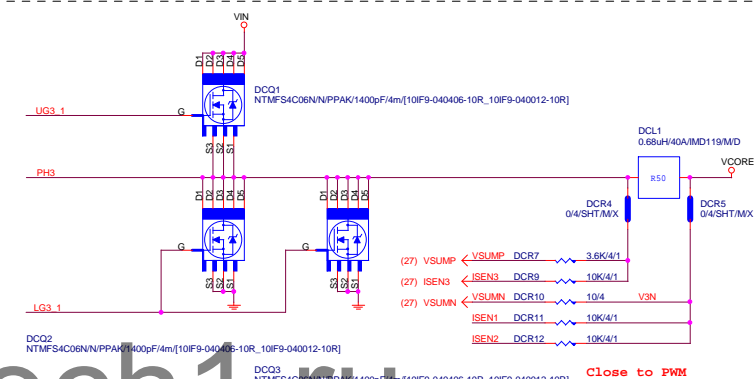
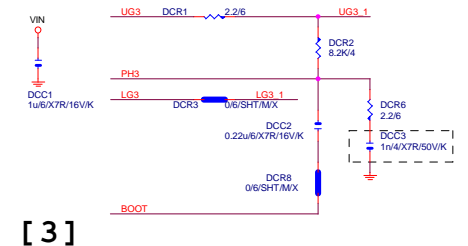
R_PROG3 (Kohm)	Fast Slew Rate (mV/us)
3.24	12
5.76	24
9.31	40
13.3	45



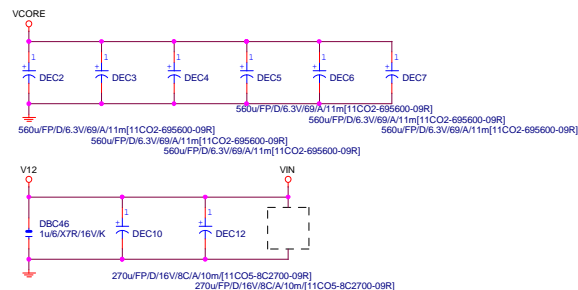
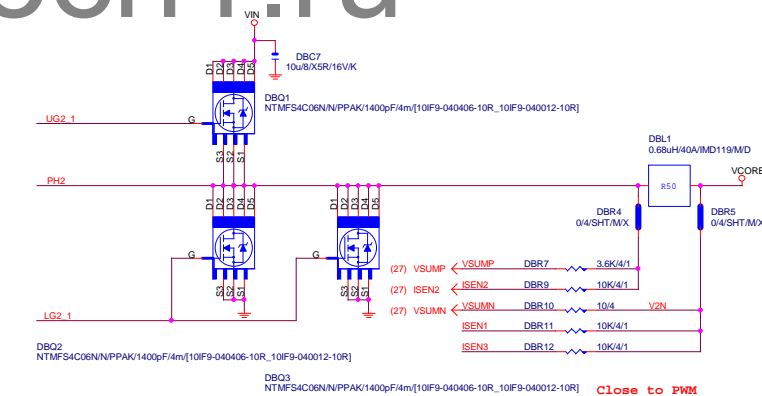
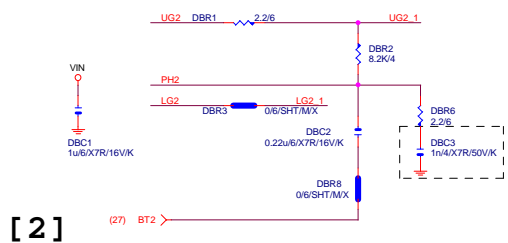
UG1 (27)
PH1 (27)
LG1 (27)



PWM3 → PWM3 (27)



UG2	UG2	(27)
PH2	PH2	(27)
LG2	LG2	(27)

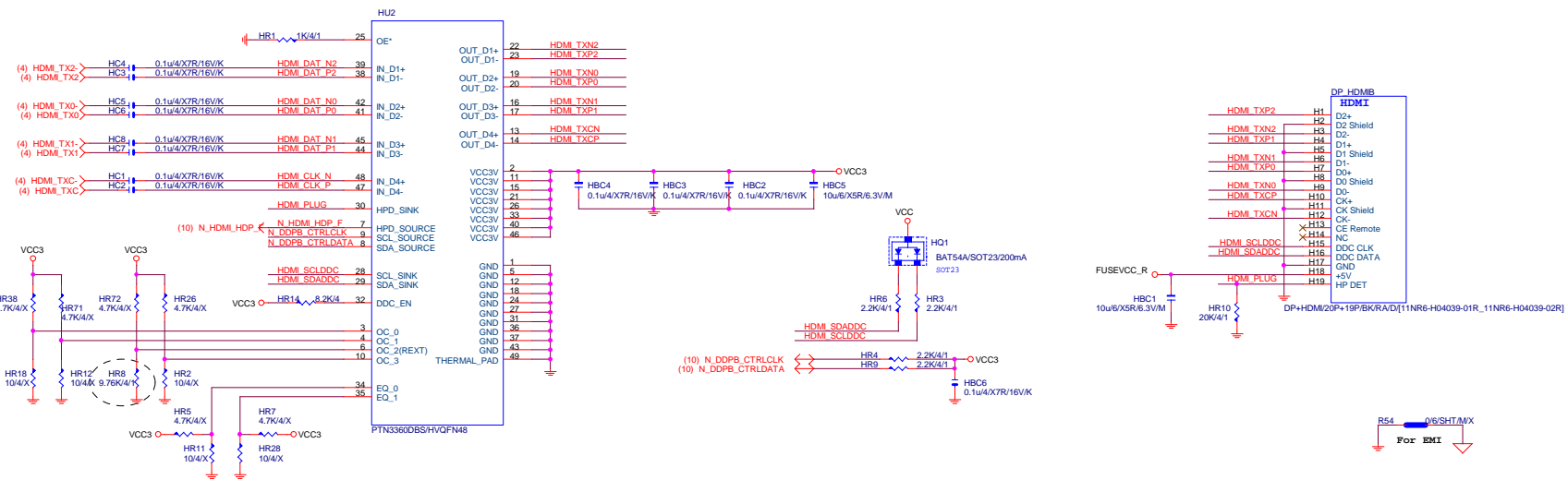




```
Rocset=(Iocp*Lgate,rdson)/Iocset
Rocset=(45A*6.7mOhm)/10uA = 30K
Iocset=10uA
```

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HDMI LEVEL SHIFT



DVI LEVEL SHIFT

