

Model Name: GA-PH67A-UD3 1.0

SHEET

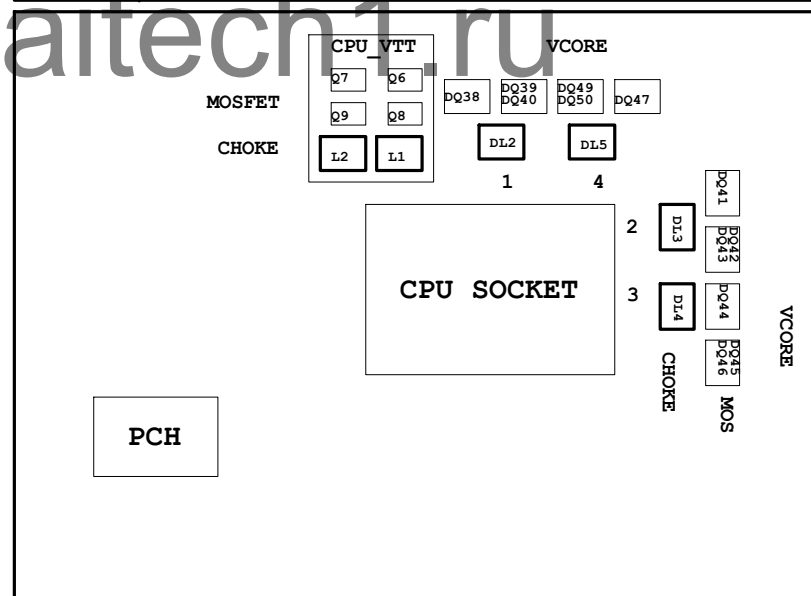
TITLE

SHEET

TITLE

01	COVER SHEET
02	BOM & PCB MODIFY HISTORY
03	BLOCK DIAGRAM
04	CPU LGA1155-A
05	CPU LGA1155-B
06	CPU LGA1155-C
07	DDR III CHANNEL A
08	DDR III CHANNEL B
09	PCH FDI,DMI,USB,PCIE,NVRAM
10	PCH DP,CLK BUFFER
11	PCH HOST,SATA,PCI
12	PCH GPIO,CTRL,AUDIO
13	PCH PWR,GND
14	PCI EXPRESS*16 SLOT
15	PCI EXPRESS*4 SLOT
16	PCI EXPRESS*1 SLOTS X3
17	IT8892E
18	N\A
19	PCI SLOT 1&2
20	I/O ITE8728
21	COM, -PROHOT, ESATA CONNECT
22	Dual BIOS
23	ALC892
24	REAR AUDIO JACK
25	VCORE PWM ISL6364CRZ-1
26	VCORE PWM ISL6364CRZ-2
27	DISCRETE POWER

28	DDR 15V & VCC1 05 PCH PWM ISL6545CBZ
29	CPU VTT PWM ISL6322G
30	VCCSA POWER
31	F PANEL , F USB
32	ATX POWER, CLOCK GEN
33	HWM,KB/MS , FAN CTRL
34	REALTEK RTL8111E
35	NEC USB3.0
36	TABLE LIST
37	
38	
39	
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Gigabyte Technology			
Title	Cover Sheet		
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GA-PH67A-UD3

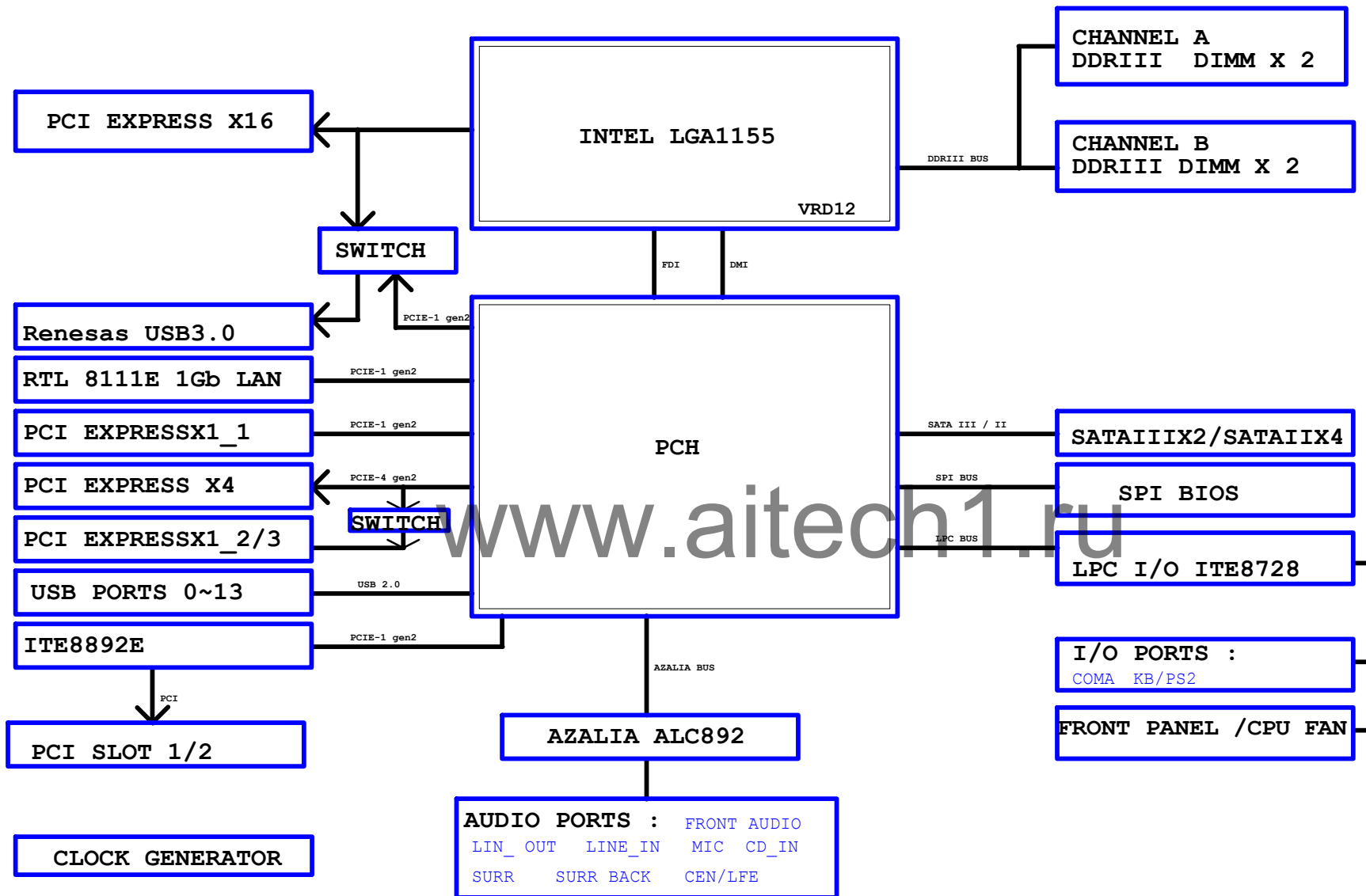
Component value change history

[illegible]

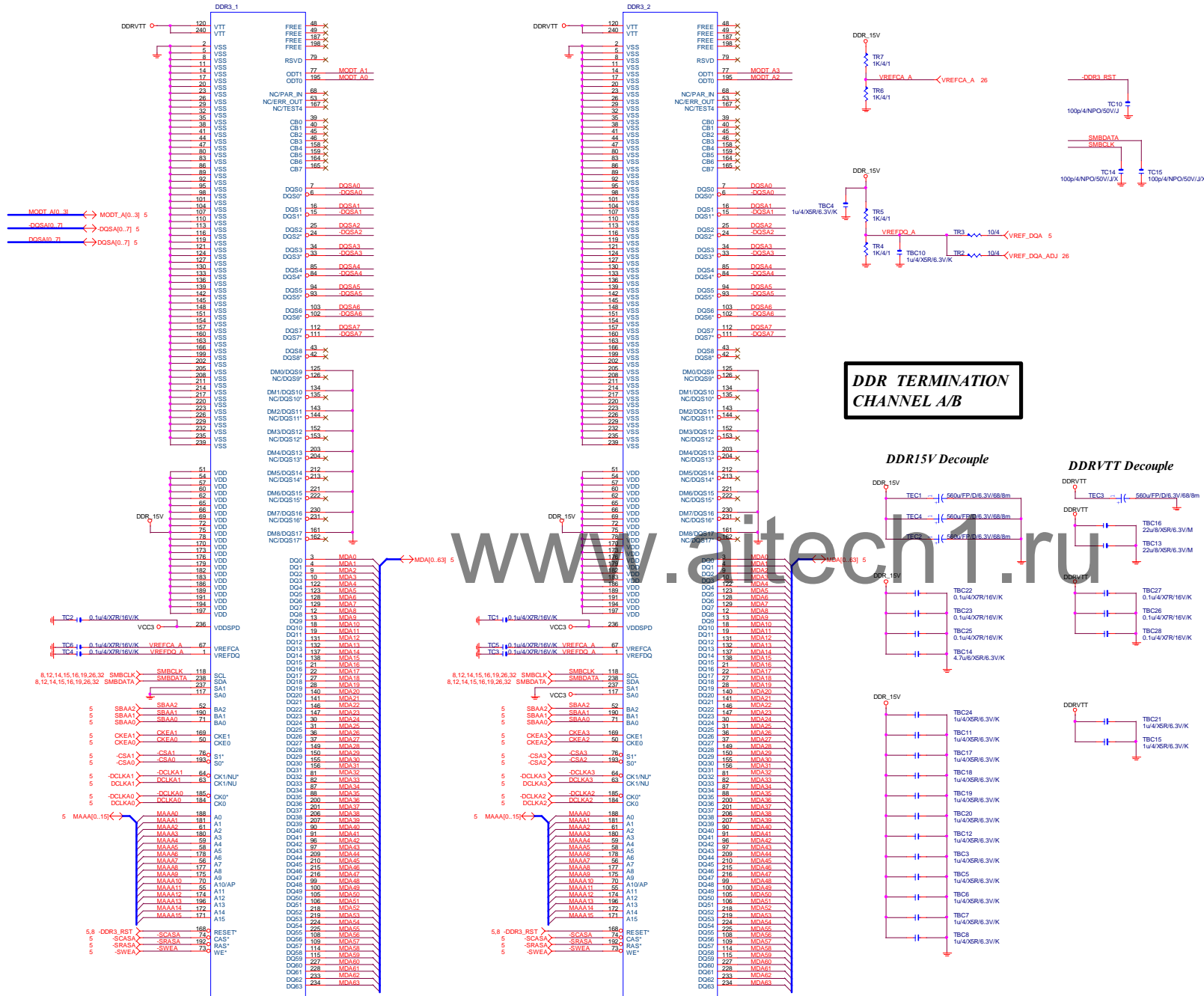
Circuit or PCB layout change

[illegible]

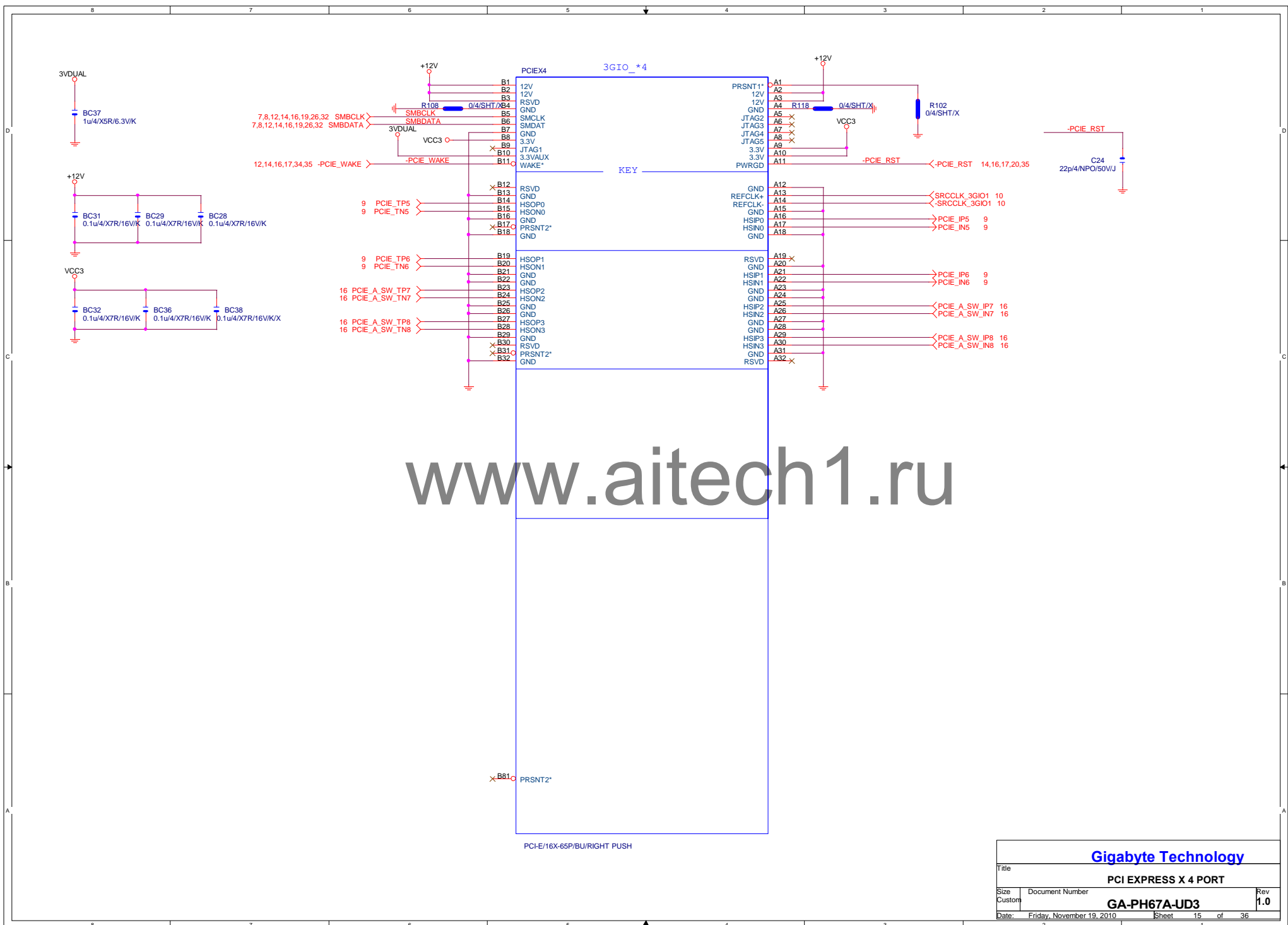
BLOCK DIAGRAM



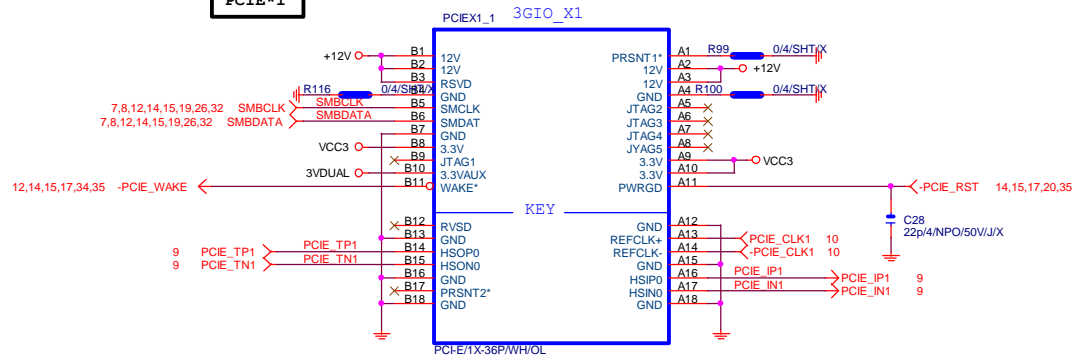
Gigabyte Technology			
Title	BLOCK DIAGRAM		
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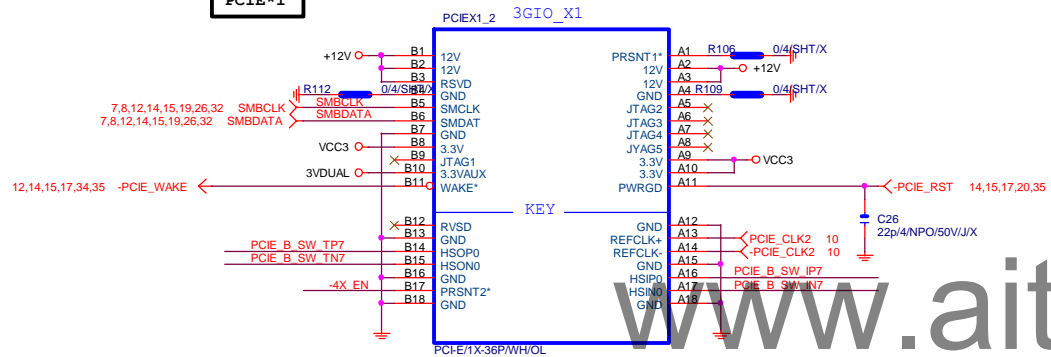
Gigabyte Technology			
DDR3 CHANNEL A			
File	Document Number	Rev	1.0
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Column			
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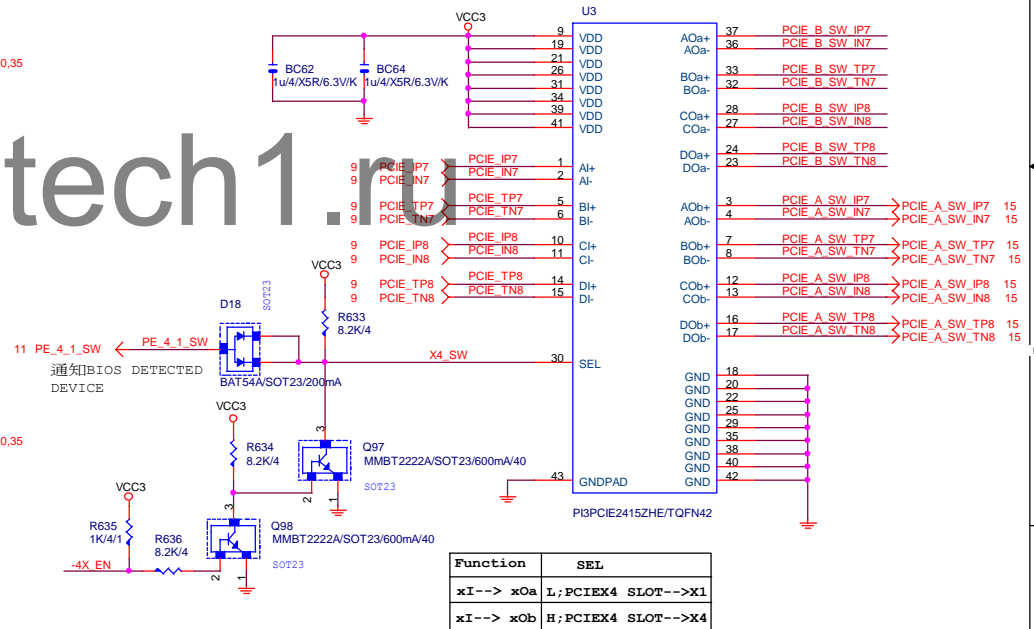
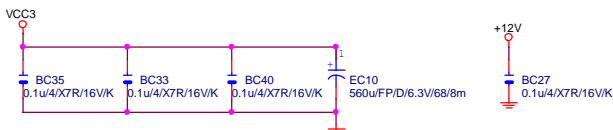
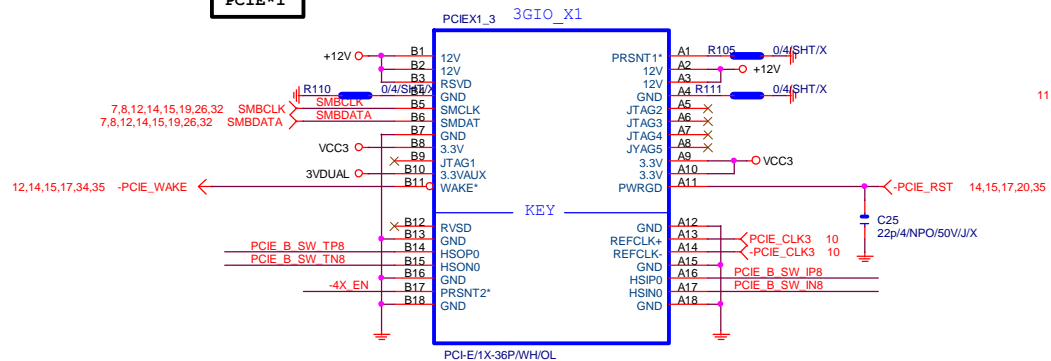
PCIE*1



PCIE*1



PCIE*1



Gigabyte Technology

Title			PCIEX1 1,2,3
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PCI:5/4/5 Impedance=50 +- 15%

BA D[0..31] 19
 -BC BE0 19
 -BC BE1 19
 -BC BE2 19
 -BC BE3 19

-BPERR 19
 -BSERR 19

BPAR 19
 -BPLOCK 19
 -BDEVSEL 19
 -BSTOP 19
 -BTRDY 19
 -BIRDY 19
 -BFRAME 19

-PCIE_RST 14,15,16,20,35

-BPCIRST 19

-BREQ0 19
 -BREQ1 19
 -BGNT0 19
 -BGNT1 19

19 BPCLK0 PR11 47/4/1 CLKOUT0
 19 BPCLK1 PR12 47/4/1 CLKOUT1

RREF PR13 12K/4/1
 TEST_EN PR21 10K/4/1
 EXT_ARB PR22 10K/4/1
 RST_SEL PR7 10K/4/1

VCC3
 PR14 1K/4/1X M86EN
 PR29 1K/4/1
 VCC3
 PR20 8.2K/4/1X
 PCICLK_SEL
 PR30 10K/4/1

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

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

IT8893

PRN8 0/8P4R/4
 -BPIROA 1 2
 -BPIROD 3 4
 -BPIROC 5 6
 -BPIROB 7 8

-BPCIPME PR24 0/4/X
 -BPCIPME1 19
 PCIEWAKE PR25 0/4/X
 -PCIE_WAKE 12,14,15,16,34,35
 VCCP PR26 0/4
 3VDUAL

For BX legacy mode

PCI slot

PRN9 0/8P4R/4X
 -BPIROA1 1 2
 -BPIROD1 3 4
 -BPIROC1 5 6
 -BPIROB1 7 8

-BPCIPME1 PR27 0/4
 -PCIE_WAKE 12,14,15,16,34,35
 VCCP PR28 0/4/X
 VCC3

Legacy Mode : remove PRN12,PR42,PR43,PR40
 add PRN11,PR38,PR39

chipset side

PRN7 2.7K/8P4R/4
 -BFRAME 1 2
 -BTRDY 3 4
 -BSTOP 5 6
 -BDEVSEL 7 8

PRN6 2.7K/8P4R/4
 -BPLOCK 1 2
 -BIRDY 3 4
 -BPERR 5 6
 -BSERR 7 8

PRN4 2.7K/8P4R/4
 -BPIROA 1 2
 -BPIROD 3 4
 -BPIROC 5 6
 -BPIROB 7 8

PRN5 2.7K/8P4R/4
 -BGNT2 1 2
 -BREQ2 3 4
 -BGNT1 5 6
 -BREQ1 7 8

PRN3 2.7K/8P4R/4
 -BGNT0 1 2
 -BREQ0 3 4
 -BGNT3 5 6
 -BREQ3 7 8

BPAR PR19 2.7K/4/1X

LDO_18V PFB1 30/6/4A/S 1.8V

LDO_18V PFB2 30/6/4A/S 1.8V

LDOAUX_18V PFB3 30/6/4A/S 1.8V_AUX

LDO_18V PFB4 30/6/4A/S 1.8V_AUXA

VCC3

PBC20 10u/8/X5R/6.3V/K
 PBC21 1u/4/X5R/6.3V/K
 PBC22 0.1u/4/X7R/16V/K
 PBC33 1u/4/X5R/6.3V/K
 PBC34 0.1u/4/X7R/16V/K
 PBC35 0.1u/4/X7R/16V/K

1.8V
 PBC23 10u/8/X5R/6.3V/K
 PBC24 1u/4/X5R/6.3V/K
 PBC25 0.1u/4/X7R/16V/K

1.8V
 PBC37 1u/4/X5R/6.3V/K
 PBC38 0.1u/4/X7R/16V/K
 PBC39 0.01u/4/X7R/25V/K

1.8V
 PBC26 10u/8/X5R/6.3V/K
 PBC27 1u/4/X5R/6.3V/K
 PBC28 0.1u/4/X7R/16V/K

PCB layout note:
 Close to chip

1.8V
 PBC26 10u/8/X5R/6.3V/K
 PBC27 1u/4/X5R/6.3V/K
 PBC28 0.1u/4/X7R/16V/K

1.8V
 PBC26 10u/8/X5R/6.3V/K
 PBC27 1u/4/X5R/6.3V/K
 PBC28 0.1u/4/X7R/16V/K

1.8V
 PBC26 10u/8/X5R/6.3V/K
 PBC27 1u/4/X5R/6.3V/K
 PBC28 0.1u/4/X7R/16V/K

1.8V
 PBC26 10u/8/X5R/6.3V/K
 PBC27 1u/4/X5R/6.3V/K
 PBC28 0.1u/4/X7R/16V/K

1.8V
 PBC26 10u/8/X5R/6.3V/K
 PBC27 1u/4/X5R/6.3V/K
 PBC28 0.1u/4/X7R/16V/K

1.8V
 PBC26 10u/8/X5R/6.3V/K
 PBC27 1u/4/X5R/6.3V/K
 PBC28 0.1u/4/X7R/16V/K

IT8892E/BX LQFP128

IT8892E/LQFP128/[10HP2-698892-20R]

3VDUAL
 PBC29 0.1u/4/X7R/16V/K/X
 PBC30 0.1u/4/X7R/16V/K
 PBC31 0.1u/4/X7R/16V/K

LDOAUX_18V
 PBC32 10u/8/X5R/6.3V/K
 PBC40 1u/4/X5R/6.3V/K
 PBC41 0.01u/4/X7R/25V/K

LDO_18V
 PBC36 10u/8/X5R/6.3V/K
 PBC42 1u/4/X5R/6.3V/K
 PBC45 0.01u/4/X7R/25V/K

PCB layout note:
 Close to chip

Gigabyte Technology

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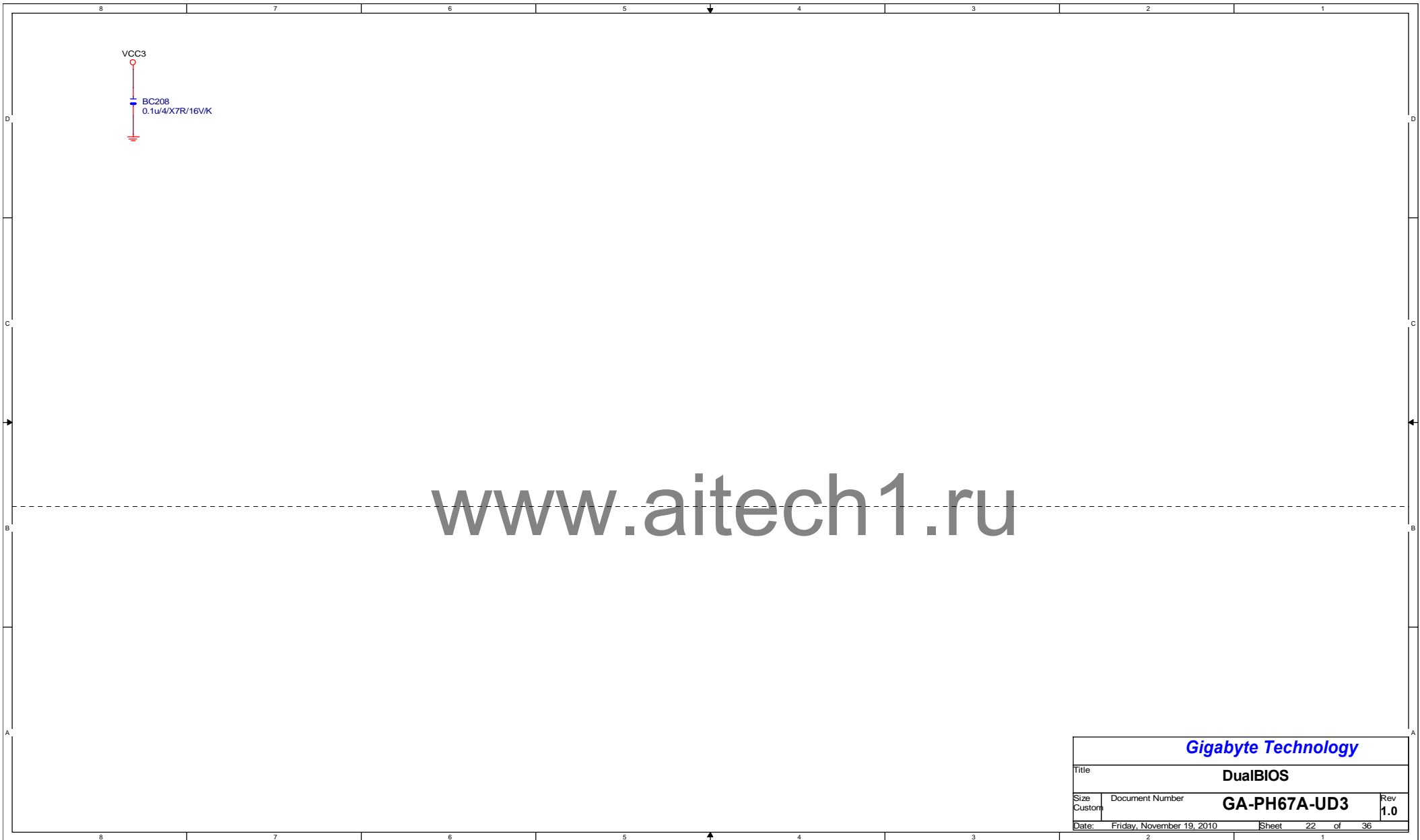
Gigabyte Technology

Title **PI7C9X113SLFDE POWER**

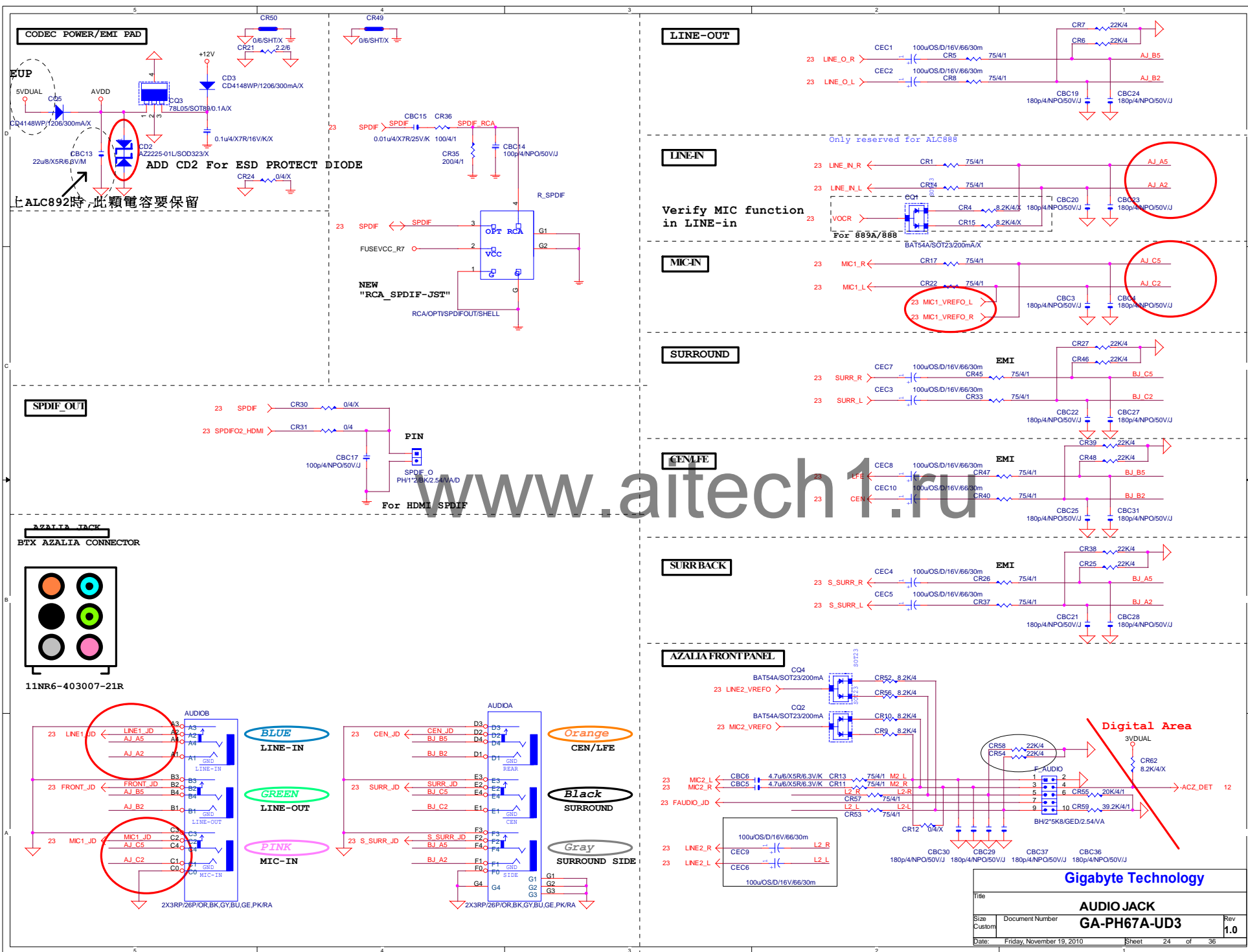
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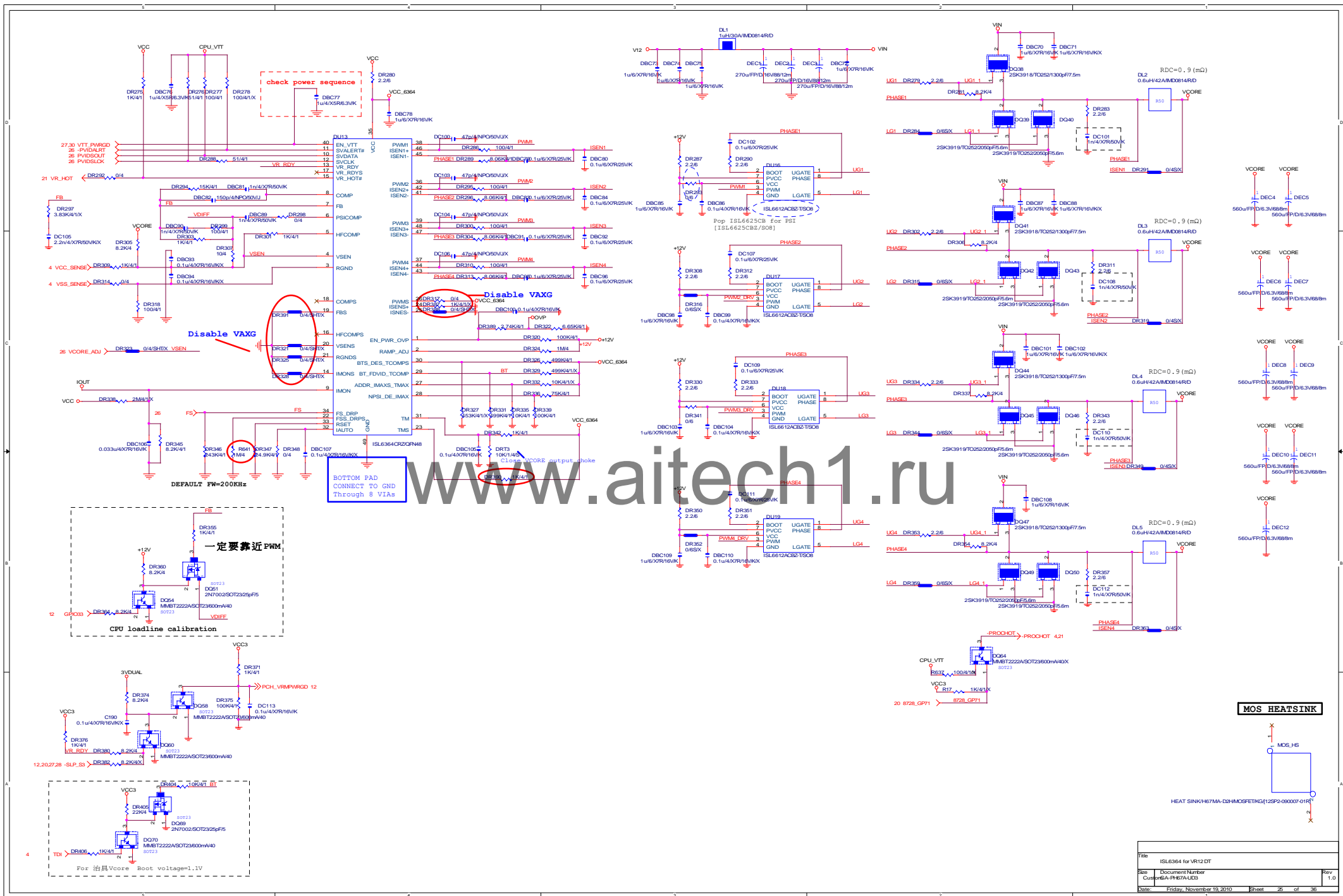
Rev
1.0

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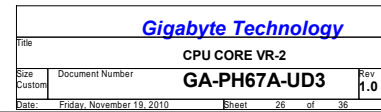
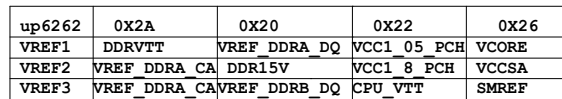


Gigabyte Technology			
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Size	Document Number	GA-PH67A-UD3	Rev
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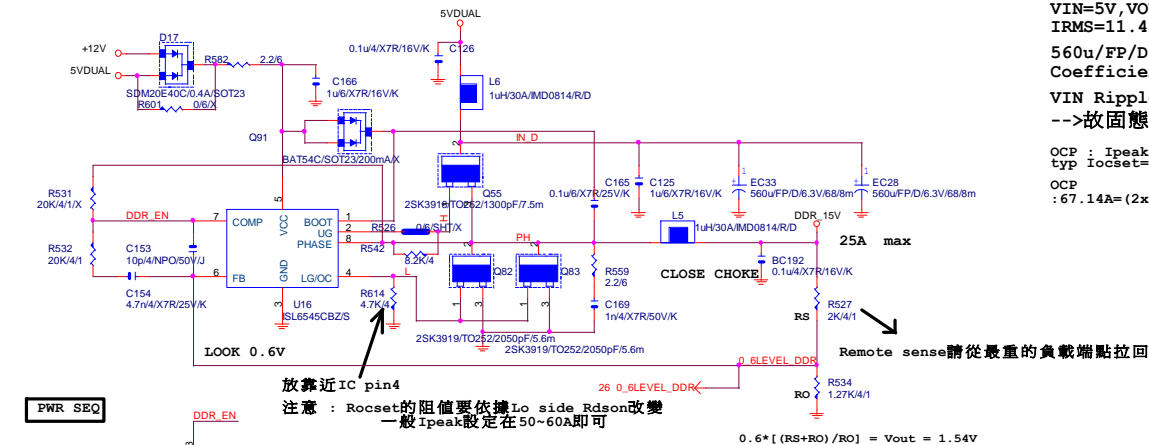




Title	ISL6364 for VR12 DT
Size	Document Number
Customer	Customer A-1457A-103
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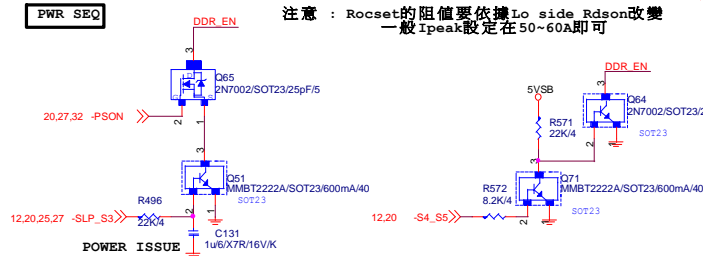
DDR18V



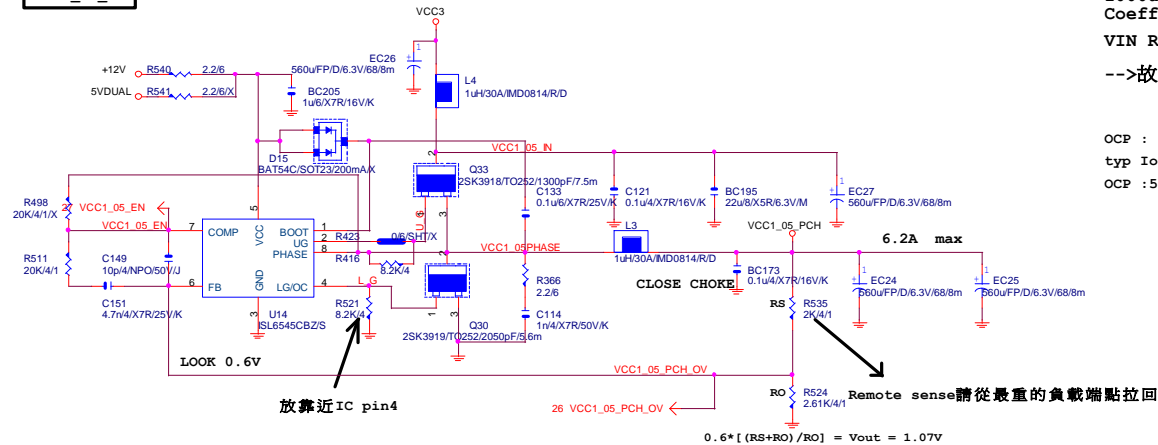
VIN=5V, VOUT=1.5V, IOUT=25A, PHASE=1
IRMS=11.45A
560uF/D/6.3V/68/8m RIPPLE CURRENT=4.7A
Coefficient=1.7 (85°C), 1 (105°C)
VIN Ripple current=4.7X1.7=7.99A (85°C)
-->故固態電容須2X7.99=15.98>11.45A

OC_P : I_{peak}=(2xI_{ocset}xR_{ocset})/R_{dson}
typ I_{ocset}=20uA , R_{ocset}=4.7k
OC_P : 67.14A=(2x20uax4.7k)/(5.6m/5.6m)

PWR SEQ



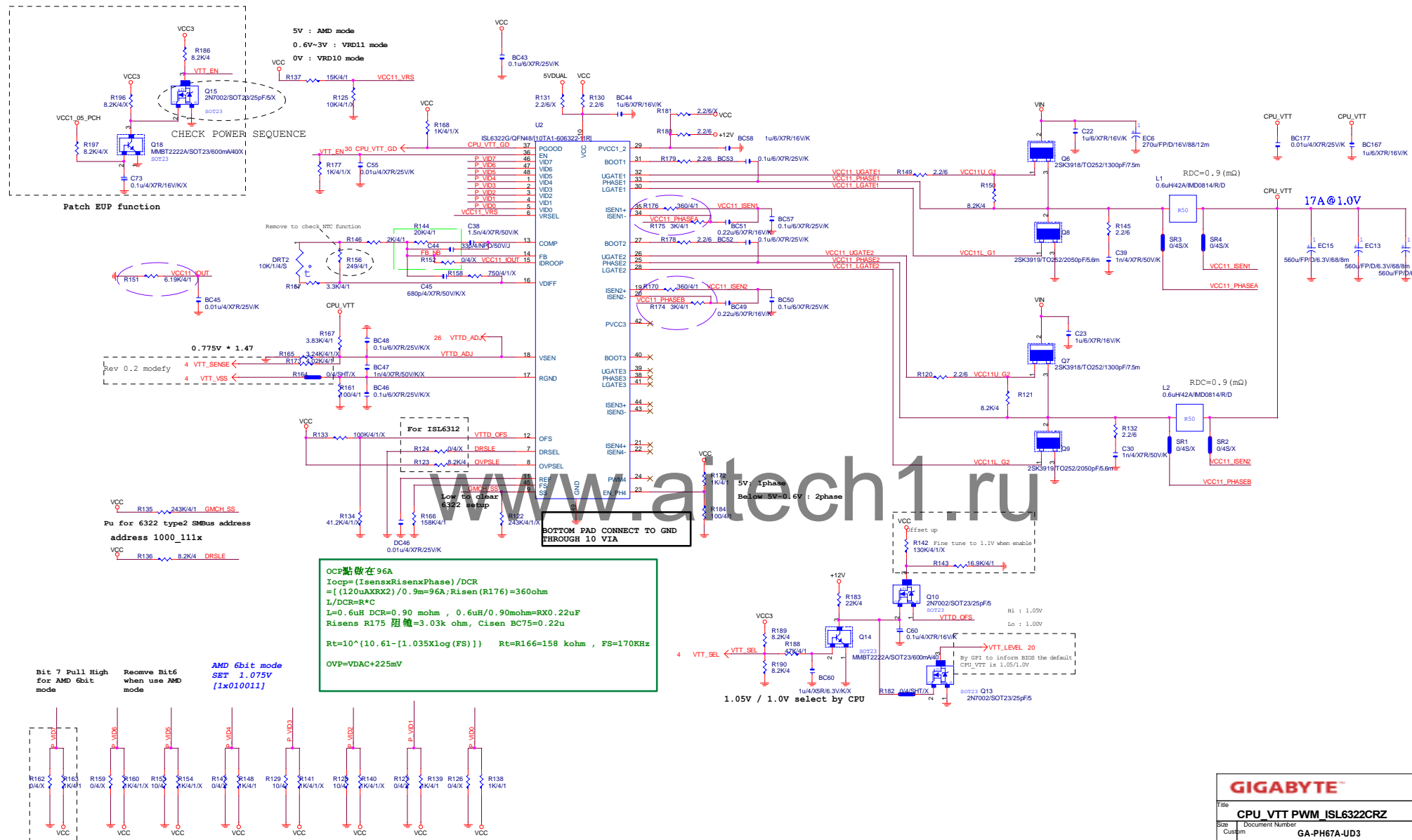
VCC1_05_PCH



VIN=3.3V, VOUT=1.05V, IOUT=7.5A, PHASE=1
IRMS=3.4875A
1000uF/D/6.3V/8C/30m RIPPLE CURRENT=1.14A
Coefficient=1.7 (85°C), 1 (105°C)
VIN Ripple current=1.14X1.7=1.938A (85°C)
-->故電解電容須2X1.938=3.876>3.4875A

OC_P : I_{peak}=(2xI_{ocset}xR_{ocset})/R_{dson}
typ I_{ocset}=20uA , R_{ocset}=8.2k
OC_P : 58.57A=(2x20uax8.2k)/5.6m

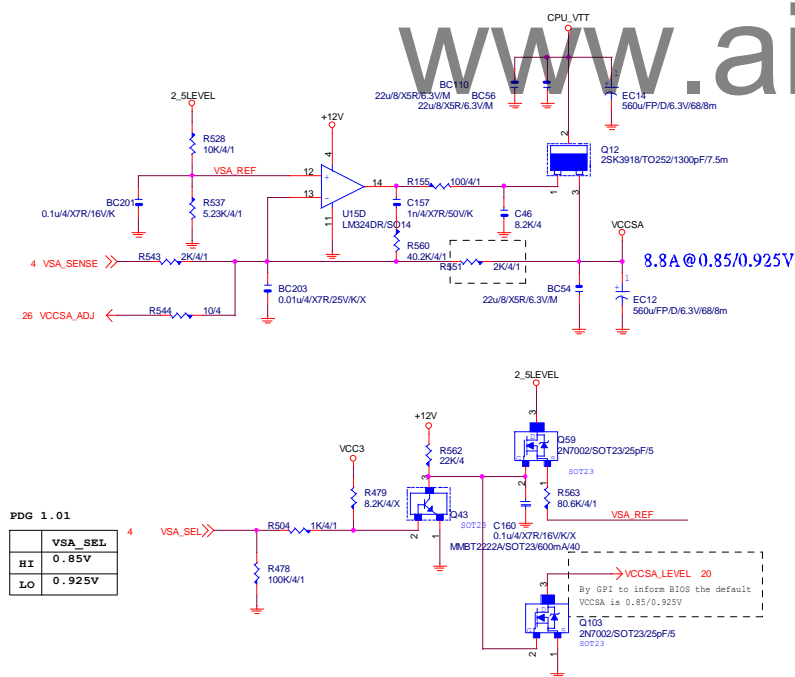
Gigabyte Technology			
Title	DDR_15V		
Size	Document Number	Rev	
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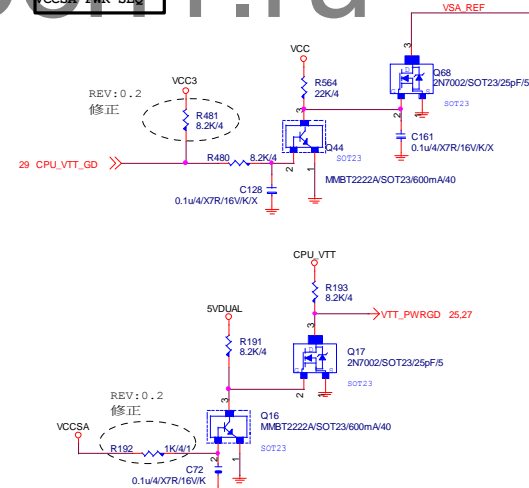
5VDUAL1(USB PORT/DDRIII POWER)
5VDUAL(3VDUAL/OTHER)

-S_WARN-->5VDUAL1-->-S_ACK(PCH)-->-DEPSLP/-RSMRST-->5VDUAL-->3VDUAL

VCC_SA



VCCSA_PWR_SEQ



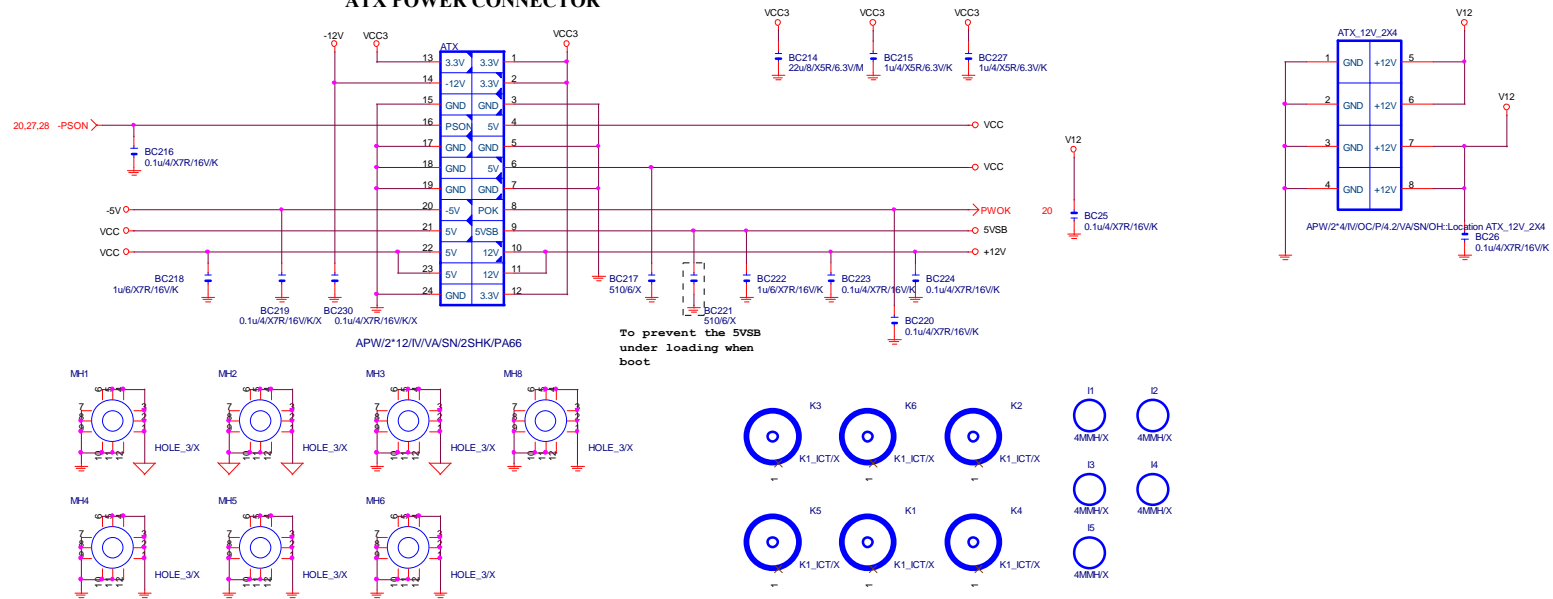
Gigabyte Technology

CPU VTT PWM_ISL6312

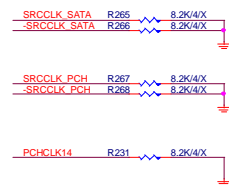
Size Custom GA-PH67A-UD3 Rev 1.0

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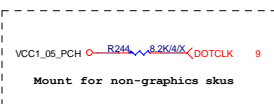
ATX POWER CONNECTOR



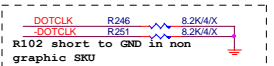
CLK GEN CK505



Mount for integrated clock Generation Mode



Mount for non-graphics skus



Graphic SKU



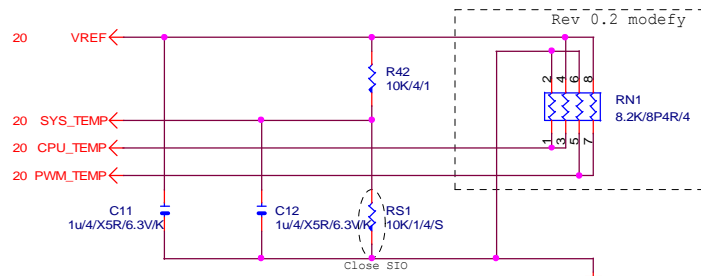
CPU Frequency Selection

FS	CPU
1	100M <Default>
0	133M

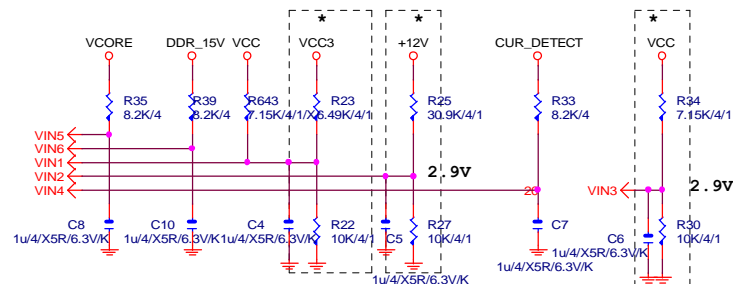
Gigabyte Technology

Title			
ATX POWER CONNECTOR			
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TEMP H/W MONITOR

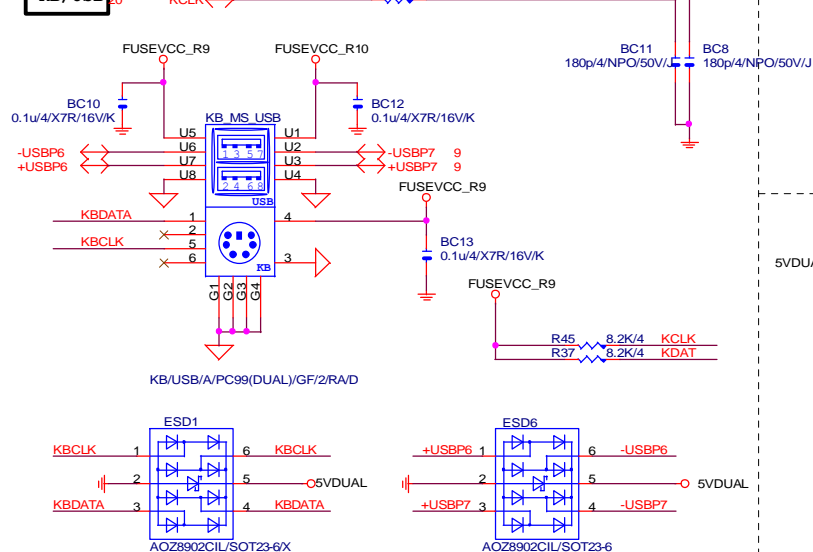


VOLTAGE-- H/W MONITOR

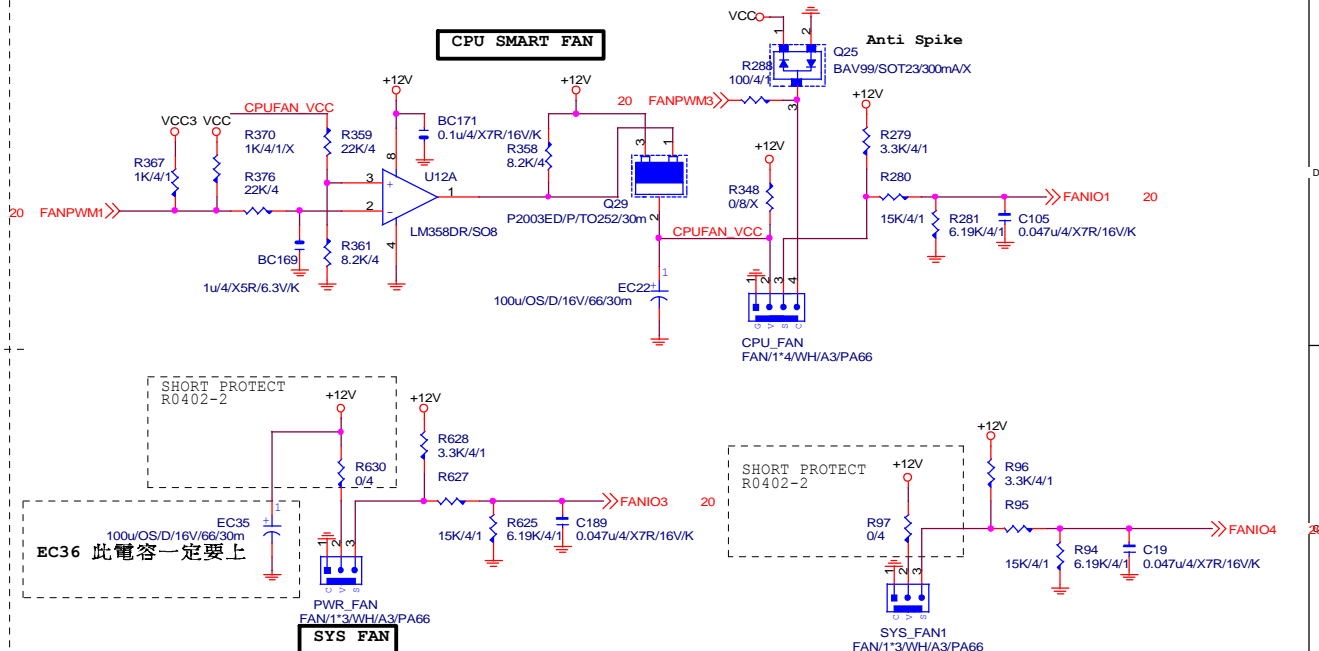


The division voltage of VIN2 & VIN3 must be around 2.9V

KB/USB



CPU SMART FAN



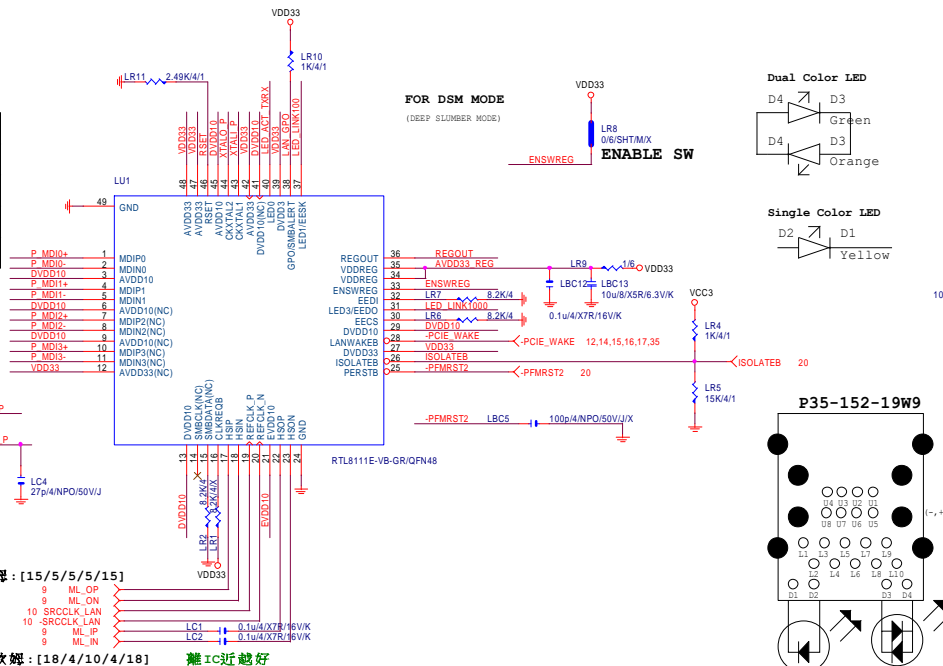
Gigabyte Technology

Title			HWM,KB/MS, FAN CTRL
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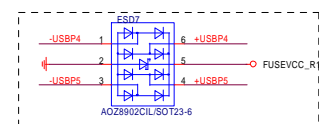
PCIE-1G LAN

Power domain chart

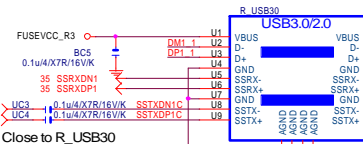
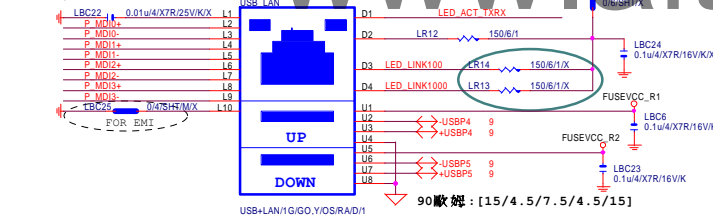
AVDD33	3.3V
DVDD33	3.3V
VDDREG	3.3V
DVDD10	1.05V



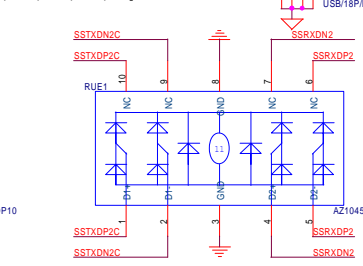
USB30 LAN CONNECTOR



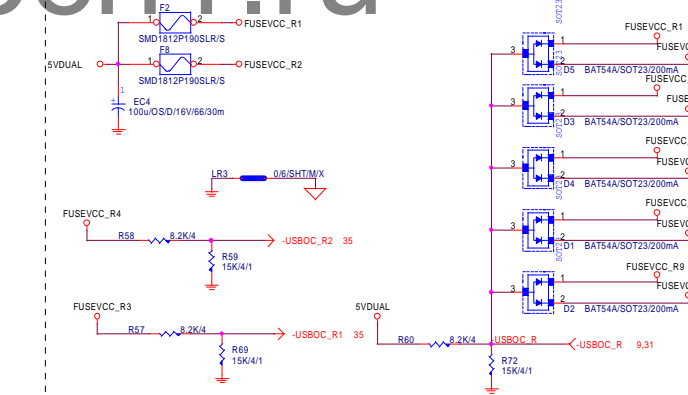
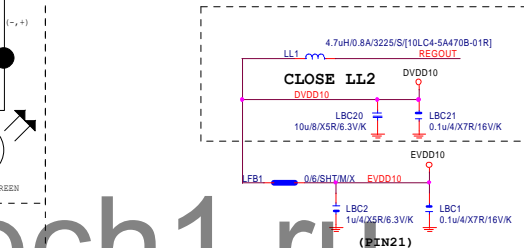
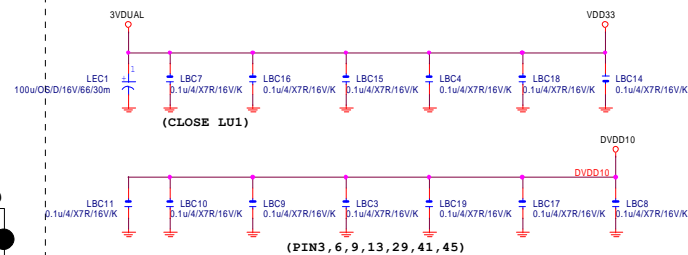
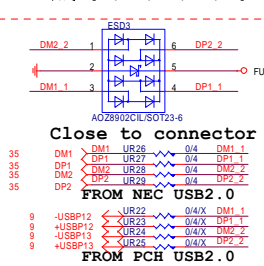
100歐姆: [20/4/8/4/20]



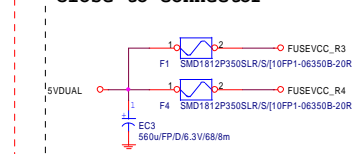
90歐姆: [20/4.5/7.5/4.5/20]



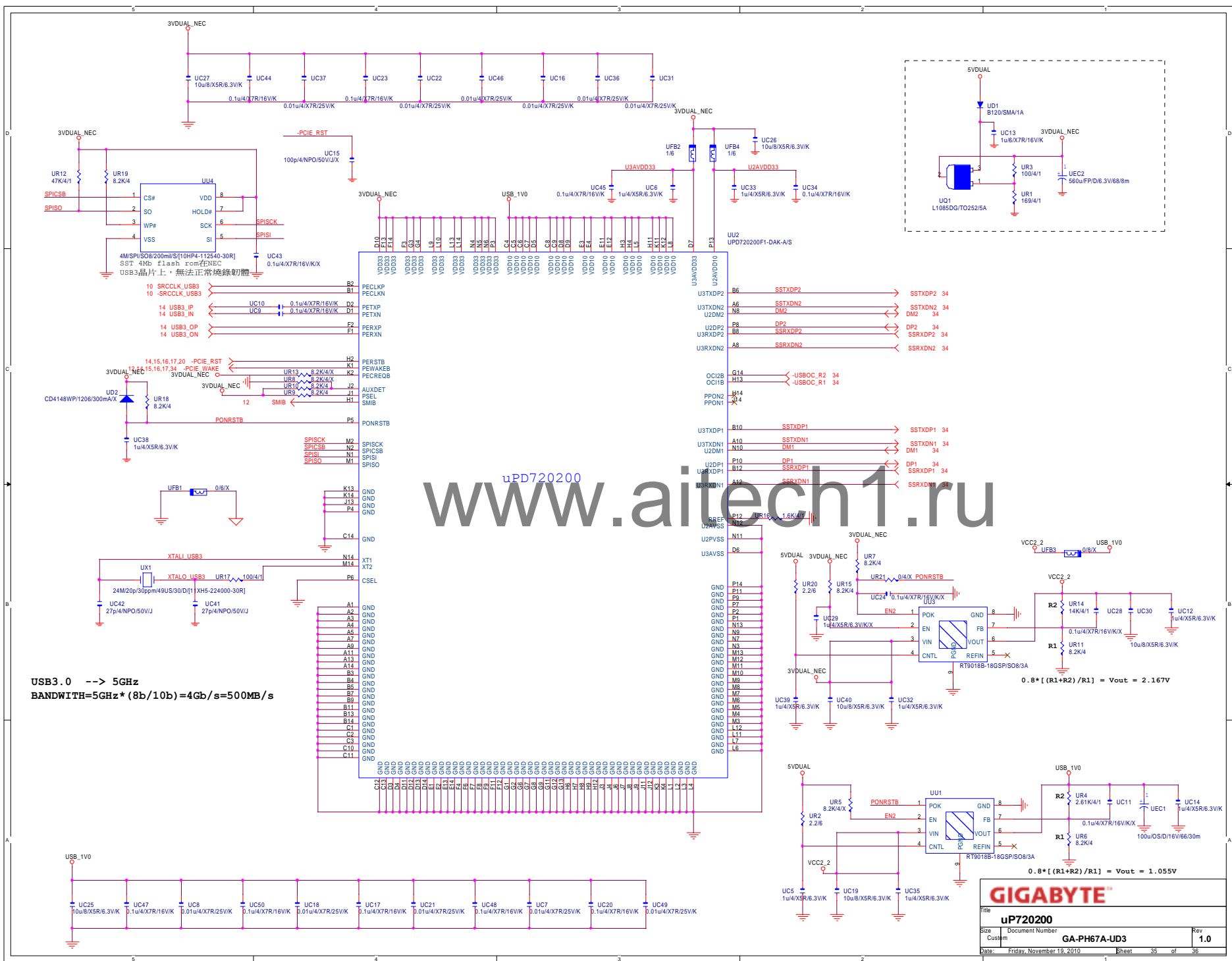
90歐姆: [20/4.5/7.5/4.5/20]



Close to connector



Gigabyte Technology			
REALTEK RTL8111D_1			
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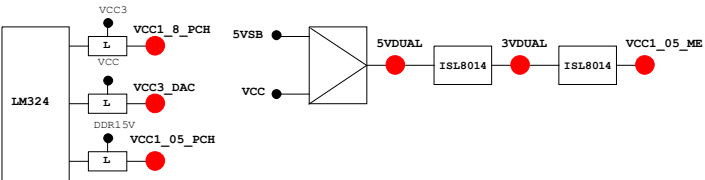
PCH GPIO LIST TABLE

PIN NAME	PWR	Default	USAG	NOTE
GP0	MAIN	H-Z	GPI -PECI_REQ	N/A
GP1/TACH1	MAIN		GPI ICH_FAN_TACH1	N/A
GP2/PIRQE#	MAIN		GPI -PIRQE	P/U 8.2K VCC3
GP3/PIRQF#	MAIN		GPI -PIRQF	P/U 8.2K VCC3
GP4/PIRQG#	MAIN		GPI -PIRQG	P/U 8.2K VCC3
GP5/PIRQH#	MAIN		GPI -PIRQH	P/U 8.2K VCC3
GP6/TACH2	MAIN		GPI ICH_FAN_TACH2	N/A
GP7/TACH3	MAIN		GPI ICH_FAN_TACH3	N/A
GP8	STBY	H	GPO GPIO8	P/U 8.2K 3VDUAL
GP9/OC5#	STBY		NATIVE OC5#	N/A
GP10/OC6#	STBY		NATIVE OC6#	N/A
GP11/SMBALERT#	STBY		NATIVE -SMBALERT	P/U 8.2K 3VDUAL
GP12	STBY	L	GPI LAN_PHY_PWR_CTRL	P/U 8.2K 3VDUAL
GP13	STBY	L	GPI GPIO13	P/U 8.2K 3VDUAL
GP14/OC7#	STBY		NATIVE OC7#	N/A
GP15	STBY	L	GPO GPIO15	N/A
GP16	MAIN		GPI -SKTOCC	P/U 8.2K VCC3
GP17/TACH0	MAIN		GPI ICH_FAN_TACH0	N/A
GP18	MAIN		NATIVE MB_ID0	P/D 8.2K GND
GP19	MAIN		GPI -LAN1_ISO	P/U 8.2K VCC3
GP20	MAIN		NATIVE LED_CTL	P/U 1K VCC3
GP21	MAIN		GPI VCC18_PCH_OV2	P/U 8.2K VCC3
GP22	MAIN	H-Z	GPI VCORE_OV3	P/U 8.2K VCC3
GP23	MAIN		NATIVE -LDRQ1	P/U 8.2K VCC3
GP24	STBY	L	GPO TLS	P/U 8.2K 3VDUAL
GP25	STBY		NATIVE -CPU_STOP	P/U 8.2K 3VDUAL
GP26	STBY		NATIVE -ACZ_DET	P/U 8.2K 3VDUAL
GP27	STBY	H	GPO GPIO27	P/U 8.2K 3VDUAL
GP28	STBY	H	GPO GPIO28	P/U 8.2K 3VDUAL
GP29	STBY	L	GPI GPIO29	N/A
GP30	STBY	H-Z	GPI S_PWR_ACK	P/U 100K 3VDUAL
GP31	STBY	H-Z	GPI N/A(Reverse)	P/U 8.2K VCC3
GP32	MAIN	H	GPO MB_ID1	P/D 8.2K GND
GP33	MAIN	H	GPO LOAD-LINE	P/U 1K VCC3
GP34	MAIN	H-Z	GPI -PCI_STOP	P/U 8.2K VCC3
GP35	MAIN	L	GPO GPIO35	P/U 8.2K VCC3
GP36	MAIN		GPI -LAN1_DSM	P/U 8.2K VCC3
GP37	MAIN		GPI N/A	P/U 8.2K VCC3
GP38	MAIN	H-Z	GPI VCORE_OV2	P/U 8.2K VCC3
GP39	MAIN	H-Z	GPI -LAN_DSM	P/U 8.2K VCC3
GP40	STBY		NATIVE OCL#	N/A
GP41	STBY		NATIVE OC2#	N/A
GP42	STBY		NATIVE OC3#	N/A
GP43	STBY		NATIVE OC4#	N/A
GP44	STBY	L	NATIVE N/A	P/U 8.2K 3VDUAL
GP45	STBY		NATIVE -LPCPME	P/U 8.2K 3VDUAL
GP46	STBY	L	NATIVE PWR_LED	P/U 8.2K 3VDUAL
GP47	STBY		NATIVE PSI_LED	P/U 8.2K 3VDUAL
GP48	MAIN	H-Z	IN EN_PWM	P/U 8.2K VCC3
GP49	MAIN	H-Z	IN VCC18_OV1	P/U 8.2K VCC3
GP50	MAIN		NATIVE -REQ1	P/U 2.2K VCC
GP51	MAIN	H	NATIVE -GNT1	N/A
GP52	MAIN		NATIVE -REQ2	P/U 2.2K VCC
GP53	MAIN	H	NATIVE -GNT2	N/A
GP54	MAIN		NATIVE -REQ3	P/U 2.2K VCC
GP55	MAIN	H	NATIVE -GNT3	N/A
GP56	STBY		NATIVE N/A(Reverse)	P/U 8.2K 3VDUAL
GP57	STBY	H-Z	IN VCORE_OV1	P/U 8.2K 3VDUAL
GP58	STBY	H-Z	NATIVE F_USB_OC	P/U 8.2K 3VDUAL
GP59	STBY		NATIVE USB_OCO#	N/A
GP60	STBY	H-Z	NATIVE N/A(Reverse)	P/U 8.2K 3VDUAL
GP61	STBY	L	NATIVE -SUSTAT	N/A
GP62	STBY	L	NATIVE SUSCLK	N/A
GP63	STBY	L	NATIVE GPIO63	N/A
GP64	MAIN	L	NATIVE CLKOUTFLEX0	N/A
GP65	MAIN	L	NATIVE CLKOUTFLEX1	N/A
GP66	MAIN	L	NATIVE CLKOUTFLEX2	N/A
GP67	MAIN	L	NATIVE CLKOUTFLEX3	N/A
GP72	STBY	H-Z	NATIVE VCORE_OV4	P/U 8.2K 3VDUAL
GP73	STBY		NATIVE 1_05V_OV1	P/U 8.2K 3VDUAL
GP74	STBY	H-Z	NATIVE 1_05V_OV2	P/U 8.2K 3VDUAL
GP75	STBY	H-Z	NATIVE N/A(Reverse)	P/U 8.2K 3VDUAL

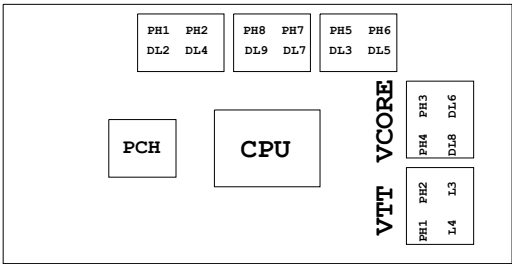
Super I/O ITE8720 GPIO Table

PIN NAME	USAG	NOTE
SVC/PECI_RQT/GP14	-PECI_REQ	
PWROK1/GP13	PWROK1/ITE_PWROK	
KRST#/GP62	-KBRST	
SO/GP50	-ICH_SPI_CS	
IRTX/GP47/CE2_N/JP7	CEB_N	
GP46/IRRX	-LAN2_DSM	
PSION#/GP42	-PSON	
PWROK2#/GP41	PECI_CTL	
PCIRST3#/GP10/VDIMM_STR_EN	-PCIE_RST	
RSMRST#CIRRX1/GP55	-RSMRST	
PME#/GP54	-LPCPME	
PD5/GP75/BUSSO0	N/A	

PIN NAME	USAG	NOTE
FAN_TAC2/GP52	FANIO2	
FAN_TAC3/GP37	FANIO3	
VIDO3/FAN_TAC4/GP25/DSR2#	FANIO4	
FAN_CTL2/GP51	FANPWM2	
FAN_CTL3/GP36	FANPWM3	
VID4/GP34	BEEP-	
VID3/GP33	TURBO1	
VID2/GP32	TURBO0	
VCORE_GOOD/VID6/GP63	CPUT_LED1_C	
VID5/GP35	CPUT_LED2_C	
VID1/GP31	CPUT_LED3_C	
VID0/GP30	-LAN1_DSM	NBT_LED1_C
SLCT/GP80	CPU_LED1_C	
PE/GP81	CPU_LED2_C	
BUSY/GP82	CPU_LED3_C	
PD3/GP73/BUSSI1	SB_LED1_C	
PD4/GP74/BUSSI2	SB_LED2_C	
VCORE_EN/VID7/GP64	IT_GP64	SB_LED3_C
PD0/GP70	NB_LED1_C	
PD1/GP71	NB_LED2_C	
PD2/GP72/BUSSI0	NB_LED3_C	
GP22/SCK	LOW_PWR_1	
VIDO5/GP27/SIN2	LOW_PWR_2	
PCIRST2#/GP11	-PFMRST1	
PCIRST1#/GP12	-PFMRST2	
3VSB5W#/GP40	CSI_F0	BSEL166_1
SUSCH/GP53	CSI_F1	BSEL166_2
GP23/SI	BSEL166_3/CSISBSL	
VIDO0/GP20/CTS2#	CPUT_LED1_C	BSEL166_4
GP65/VDDA_EN/GB_01	MB_ID2	
PD6/GP76/BUSSO1	MB_ID3	
PD7/GP77/BUSSO2	MB_ID4	
AFD#/GP86/SMB_C_R	SEC_PIN	FST_2X8
INIT#/GP85/SMBD_M	SEC_2x8	GTLREF_AD2
ACK#/GP83	DDR_LED1_C	
VIDO1/GP21/DCD2#	DDR_LED2_C	
STB#/GP87/SMB_C_M	DDR_LED3_C	
PWROK#/GP44	VCORE_OV1	
PANSWH#/GP43	PWRBT5W	
KDAT/GP61	-PWRBT5W	
KCLK/GP60	KDAT	
MDAT/GP57	KCLK	
MACL/GP56	MDAT	
GP66/VLDT_EN/GB_02	NBT_LED1_C	MCLK
SVD/PCIRSTIN#/CIRRX/GP15	PWM2_CR	
KDAT/GP61	PWM2_CR	
GP67/CPU_PG/GB_03	EN_LOADLINE	IT_GP67/-EN_PWM2
SLIN#/GP84/SMBD_R	-EN_PWM2	
PSI_L/FAN_CLT5/CIRRX2/GP16	-THERM	
VIDO4/GP26/SOUT2	DDR18V_PH2_EN	
VIDO2/FAN_TAC5/GP24/DSR2#	DDR18V_LED	
VIDO6/GP17/RI2#	1_1V_PH_EN	
VIDO7/JP6/DTR2#	JP6	
PD5/GP75/BUSSO0	SB_LED3_C	



PWM各相位的擺法如下：



BIOS超電壓對應表：

線路圖名稱	BIOS選項
Vcore	CPU Vcore
CPU_VTT	CPU Termination
CPU_VAXG	CPU Graphic Core
VCC1_8_PCH	CPU PLL
VCC1_05_PCH	PCH core
3VDUAL	3VDUAL
DDR15V	DRAM voltage
DDRVTT	DRAM Termination
VREF_CA_A/VREF_CA_B	DRAM Address Ref
VREF_DQ_A/VREF_DQ_B	DRAM Data Ref

散熱模組料號：

8IBP:
1.12SP2-01A001-Y1R/Y2R
2.12SP2-01A001-Z1R/Z2R
(HIBRID模組)包材階

	3 pin FAN control	4 pin FAN control	FAN speed	Controller
CPU FAN	FANPWM1 ICH_FAN_PWM2	FANPWM3 ICH_FAN_PWM0	FANIO1 ICH_FAN_TACH0	IT8720 PCH
SYS FAN	FANPWM2 ICH_FAN_PWM1	N/A N/A	FANIO2 ICH_FAN_TACH1	IT8720 PCH
PWR FAN	N/A	N/A	FANIO3 ICH_FAN_TACH2	IT8720 PCH

Gigabyte Technology			
TABLE LIST			
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