Model Name: GA-H81M-DS2V

Revision 1.02

SHEET	TITLE
01	COVER SHEET
02	BOM & PCB MODIFY HISTORY
03	BLOCK DIAGRAM
04	CPU_LGA1150-A
05	CPU_LGA1150-B
06	CPU_LGA1150-C
07	DDR III CHANNEL A
08	DDR III CHANNEL B
09	PCH_FDI,DMI,USB,PCIE,NVRAM
10	PCH_DP,CLK BUFFER
11	PCH_HOST,SATA,PCI
12	PCH_GPIO,CTRL,AUDIO
13	PCH_PWR,GND
14	PCI EXPRESS*16 SLOT
15	PCI EXPRESS X1 *3 SLOT
16	PCI SLOT (NA)
17	ITE 8620 LPC IO
18	COM,KB_MS_USB,USB30_20
19	HWM,FAN CTRL,OV
20	DUAL BIOS
21	FP,FUSB,SPK,SATALED
22	Realtek ALC887-VD2
23	REAR AUDIO JACK
24	REALTEK RTL8111F
25	DISCRETE POWER
26	ATX
27	VCORE ISL95812_1

SHEET	TITLE
28	VCORE ISL95812_2
29	RT8120_DDR POWER
30	LPT
31	DVI
32	IT8892E (NA)
33	USB3 VL805

Gigabyte Technology

Title: Cover Sheet

Size: Custom | Document Number: GA-H81M-DS2V | Rev: 1.02

Date: Thursday, December 19, 2013 | Sheet 1 of 33

Model Name:
GA-H81M-DS2V

Component value change history

2013/05/17

Data	Change Item	Reason
2013/05/15	New BOM	9MH81MD2V-00-01

Circuit or PCB layout change

DATE	Change Item	Reason
2013/04/22	1.由B85M-HD3 Rev 1.0來修改 2.SIO change to IT8620 3.PWM change to ISL95812+6208 4.Delete 2 port SATA3 5.Add VL805 6.Delete HDMI 7.COM port change to rear 8.Delete PCI IT8892E 9.Fan control change to NCT3941S 10.SIO 統一命名O開頭	Rev 0.1
2013/05/17	H81M-D2V_R01_0514A-BOM.DSN 1. 由H81M-D2V Rev 0.1 來修改 2. COM port change to pin header 3. VGA connect 改為不架高 4. Add PCIEX1 slot 3 5. U1 改LM358	Rev 0.1
2013/05/17	1.由H81M-D3V-JP Rev 1.0改文字面	Rev 1.0
2013/09/13	1.修改PCH 25MHz走線,跟旁邊所有走線40 mils以上 2.R60 change to 0603 3.PPAK footprint change to Q_TDSON8-GDS-T 4.1206 fuse change to POLYSWITCH-1206-1 5.MR17 change to 0603 6.NCT3941S footprint 改為SOP8-NCT3941S 7.PCIEX16 footprint change to PCIESLOT-164DN-Q-1	Rev 1.01
2013/12/19	1. 修改DDR VDDSPD為0805 Fuse	Rev 1.02

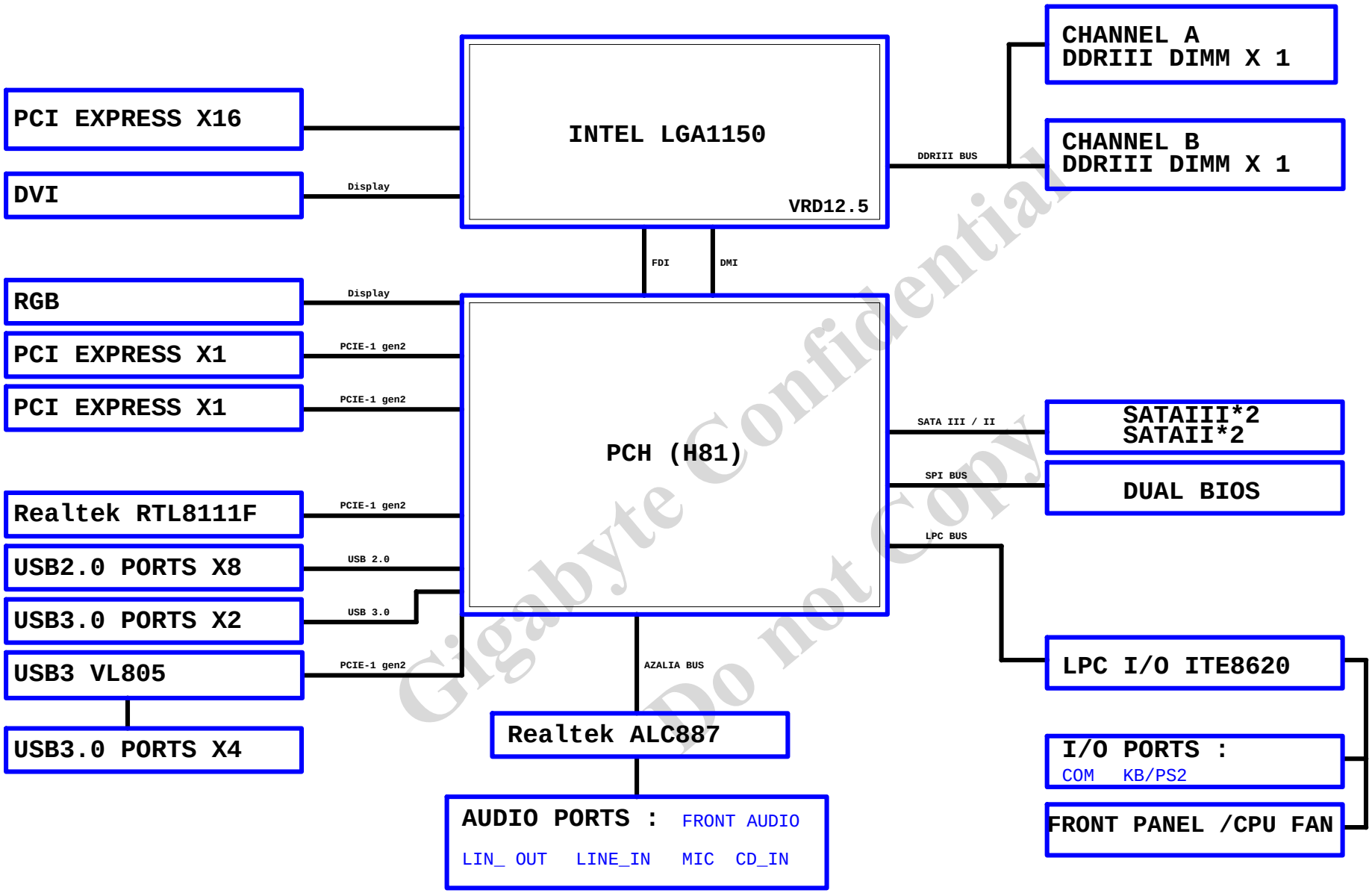
Gigabyte Technology

Title: BOM & PCB MODIFY HISTORY

Size: Custom | Document Number: GA-H81M-DS2V | Rev: 1.02

Date: Thursday, December 19, 2013 | Sheet 2 of 33

BLOCK DIAGRAM



Gigabyte Technology		
Title: BLOCK DIAGRAM		
Size: C	Document Number: GA-H81M-DS2V	Rev: 1.02
Date: Thursday, December 19, 2013	Sheet 3 of 33	

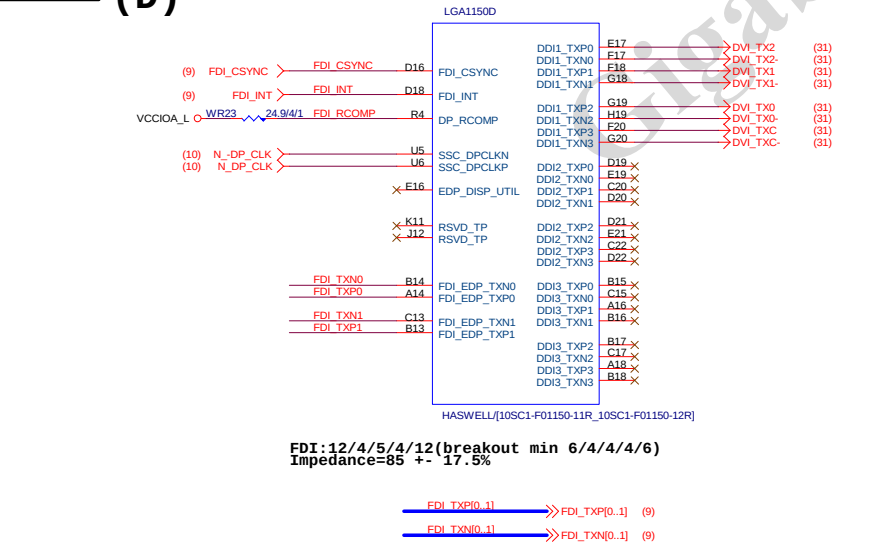
LGA1150 (E)

CFG	H	L	NOTE
0	RSVD	RSVD	RSVD
1	RSVD	RSVD	RSVD
2	**NORM**	**Reverse**	LANE REVERSAL[0],x16
3	RSVD	RSVD	RSVD
4	**Disable**	**Enable**	eDP Enable
7	RSVD	RSVD	RSVD
8	RSVD	RSVD	RSVD
9	RSVD	RSVD	RSVD
10	RSVD	RSVD	RSVD
11	RSVD	RSVD	RSVD
12	RSVD	RSVD	RSVD
13	RSVD	RSVD	RSVD
14	RSVD	RSVD	RSVD
15	RSVD	RSVD	RSVD
16	RSVD	RSVD	RSVD
17	RSVD	RSVD	RSVD

CFG6	CFG5	PCIE CONFIG
1	1	1X16 , Default
1	0	2X8
0	1	RSVD
0	0	X8,X4,X4

CFG 0-17 all internal PULL-UP

LGA1150 (D)

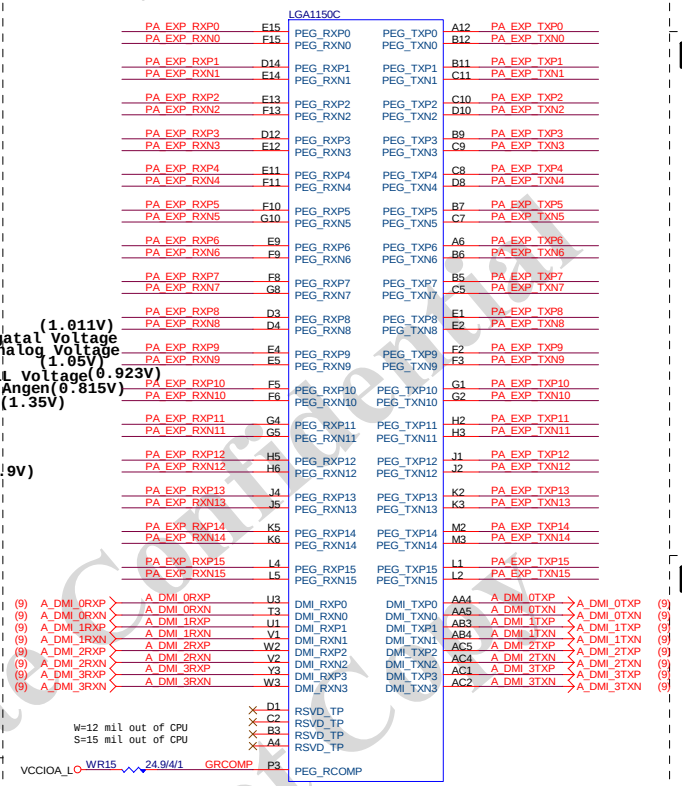


FDI:12/4/5/4/12(breakout min 6/4/4/4/6)
Impedance=85 +- 17.5%

FDI_TXP[0..1] FDI_TXP[0..1] (9)
FDI_TXN[0..1] FDI_TXN[0..1] (9)

LGA1155 (C)

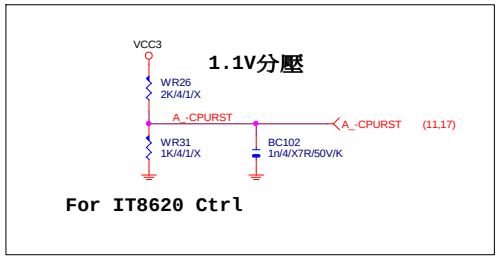
PCIEX16:16/5/5/5/16(breakout min 10/4/4/4/10)
Impedance=80 +- 17.5%



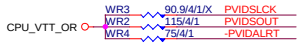
DMI:12/4/4/4/12(breakout min 8/4/4/4/8)
Impedance=85 +- 17.5%

PA_EXP_TXP[0..15] PA_EXP_TXP[0..15] (14)
PA_EXP_TXN[0..15] PA_EXP_TXN[0..15] (14)
PA_EXP_RXP[0..15] PA_EXP_RXP[0..15] (14)
PA_EXP_RXN[0..15] PA_EXP_RXN[0..15] (14)

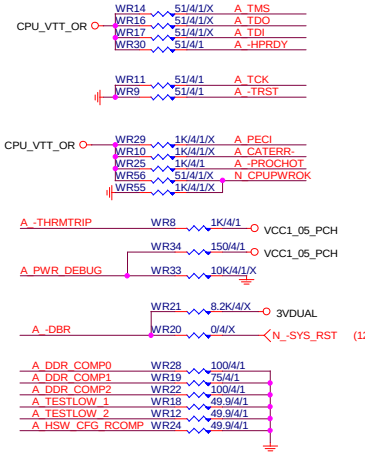
-CPURST



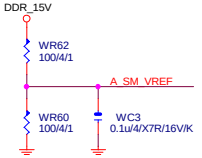
CPU SVID



CPU PU/PD

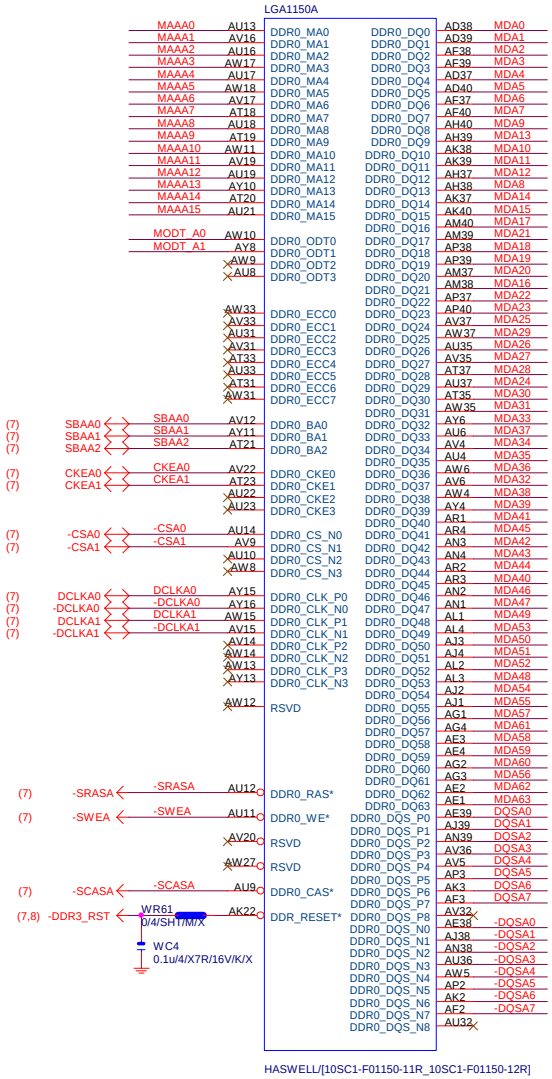


SM REF

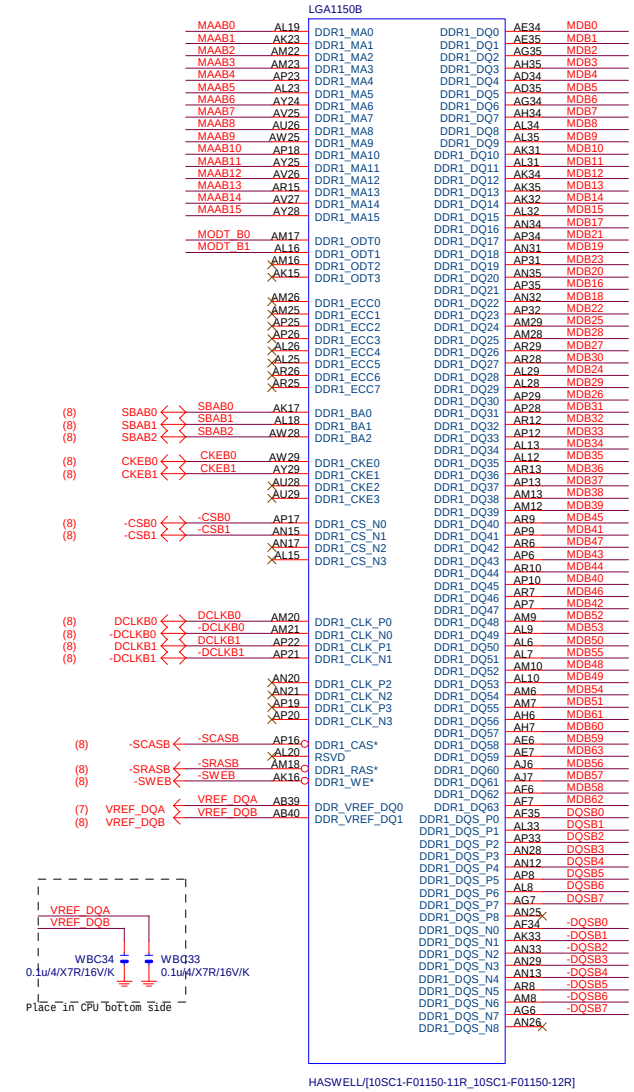


Gigabyte Technology			
Title: CPU LGA1150-A			
Size: Custom	Document Number: GA-H81M-DS2V		Rev: 1.02
Date: Thursday, December 19, 2013	Sheet 4 of 33		

LGA1150 (A)

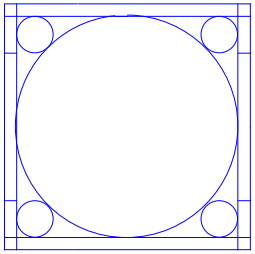


LGA1150 (B)



LGA1150 (CR)

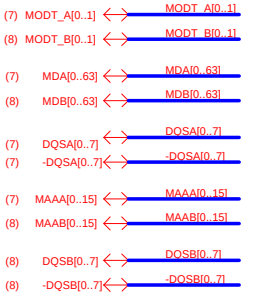
CR
CPU RETAINTION/X



LGA1150

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

DDR BUS



Gigabyte Technology			
Title: CPU LGA1150-B			
Size: Custom	Document Number: GA-H81M-DS2V		Rev: 1.02
Date: Thursday, December 19, 2013	Sheet 5 of 33		

LGA1150 (F,J)

(1.0V)
CPU_VTT_OR
WBC1
22u/8/X5R/6.3V/M
VCORE
LGA1150F
P8 VCC
L40 VCCIO_OUT
AB8 VCCIO2PCH
WR65
0/4/X
VCCST
WBC23
0.1u/4/X7R/16V/K
WBC13
0.1u/4/X7R/16V/K
WR63
0/4/SHT/M/X
VCCIO2PCH
(1.07V)
WR64
0/4/SHT/M/X
VCC1_05_PCH
VCORE
DDR_15V
HASWELL/[10SC1-F01150-11R_10SC1-F01150-12R]
LGA1150J
RSVD_TP K12
RAVD_TP J13
RAVD_TP P37
RAVD_TP N38
RAVD_TP R36
RAVD_TP C39
AY18 RSVD
AW24 RSVD
AW23 RSVD
AV29 RSVD
AV24 RSVD
AU39 RSVD
AU27 RSVD
AU1 RSVD
AT40 RSVD
AK20 RSVD
Y7 RSVD
T34 RSVD
R34 RSVD
J40 RSVD
J17 RSVD
J15 RSVD
H12 RSVD
VSS U35
VSS P40
VSS R38
VSS T37
VSS V34
VSS R39
VSS T38
VSS U36
VSS P39
VSS T36
VSS R37
VSS J14
RSVD_TP N36
WR67
6.04K/4/1
(11,12,17) O_PWROK1
VCCST_PWRGD
WR66
3.16K/4/1
HASWELL/[10SC1-F01150-11R_10SC1-F01150-12R]

LGA1155 (G,H,I)

LGA1150G
LGA1150I
LGA1150H
HASWELL/[10SC1-F01150-11R_10SC1-F01150-12R]

VCore CAP (X18)

VCORE
WBC35 22u/8/X5R/6.3V/M
WBC42 22u/8/X5R/6.3V/M
WBC36 22u/8/X5R/6.3V/M
WBC43 22u/8/X5R/6.3V/M
WBC44 22u/8/X5R/6.3V/M
WBC38 22u/8/X5R/6.3V/M
WBC37 22u/8/X5R/6.3V/M
WBC46 22u/8/X5R/6.3V/M
WBC39 22u/8/X5R/6.3V/M
WBC41 22u/8/X5R/6.3V/M
WBC40 22u/8/X5R/6.3V/M
WBC19 22u/8/X5R/6.3V/M
WBC21 22u/8/X5R/6.3V/M
WBC6 22u/8/X5R/6.3V/M
WBC9 22u/8/X5R/6.3V/M
WBC20 22u/8/X5R/6.3V/M
WBC7 22u/8/X5R/6.3V/M
WBC11 22u/8/X5R/6.3V/M

DDR CAP (X9)

DDR_15V
WBC29 22u/8/X5R/6.3V/M
WBC30 22u/8/X5R/6.3V/M
WBC31 22u/8/X5R/6.3V/M
WBC32 22u/8/X5R/6.3V/M
WBC24 22u/8/X5R/6.3V/M
WBC25 22u/8/X5R/6.3V/M
WBC26 22u/8/X5R/6.3V/M
WBC27 22u/8/X5R/6.3V/M
WBC28 22u/8/X5R/6.3V/M

Gigabyte Technology		
Title	CPU LGA1150-C	
Size: Custom	Document Number: GA-H81M-DS2V	Rev: 1.02
Date: Thursday, December 19, 2013	Sheet 6 of 33	

DDR3 (A)

DDR3_1

DDRVTT

DDR_15V

N_SMBDATA
N_SMBCLK

MC10 100p/4/NPO/50V/J/X
MC11 100p/4/NPO/50V/J/X

MAF1 SPR-P200T/6V/8/S
VCC3
VDDSPD

MC4 0.1u/4/X7R/16V/K
MC5 VREF_DDRA
MC1 VREF_DQDDRA
0.1u/4/X7R/16V/K

(8,12,14,15,19,21) N_SMBCLK
(8,12,14,15,19,21) N_SMBDATA

(5) SBAA2
(5) SBAA1
(5) SBAA0

(5) CKEA1
(5) CKEA0

(5) -CSA1
(5) -CSA0

(5) -DCLKA1
(5) DCLKA1

(5) -DCLKA0
(5) DCLKA0

(5) MAAA[0..15]

(5,8) -DDR3_RST
(5) -SCASA
(5) -SRASA
(5) -SWEA

-DDR3_RST
MC6 100p/4/NPO/50V/J

DDR3/240/BK/VA/D

BLACK CONNECTOR

MDQT_A[0..1] MDQT_A[0..1] (5)
-DQSA[0..7] -DQSA[0..7] (5)
DQSA[0..7] DQSA[0..7] (5)

MDA[0..63] (5)

DDR3 VREF

DDR_15V
MR15 1K/4/1
MR14 1K/4/1
VREF_DDRA

DDR_15V
MR4 1K/4/1
MR5 1K/4/1
MR1 10/4
VREF_DDDDRA
VREF_DQA (5)

DDR15V Decouple

DDR_15V
MEC1 560u/FP/D/6.3V/69/A/11m/[11CO2-695600-09R]
MEC2 560u/FP/D/6.3V/69/A/11m/[11CO2-695600-09R]

DDR_15V
MBC1 0.1u/4/X7R/16V/K
MBC2 0.1u/4/X7R/16V/K
MBC3 0.1u/4/X7R/16V/K
MBC24 0.1u/4/X7R/16V/K
MBC12 0.1u/4/X7R/16V/K
MBC14 0.1u/4/X7R/16V/K

DDR_15V
MBC15 1u/4/X5R/6.3V/K
MBC17 1u/4/X5R/6.3V/K
MBC27 1u/4/X5R/6.3V/K
MBC29 1u/4/X5R/6.3V/K
MBC35 1u/4/X5R/6.3V/K
MBC36 1u/4/X5R/6.3V/K
MBC37 1u/4/X5R/6.3V/K
MBC47 1u/4/X5R/6.3V/K
MBC9 1u/4/X5R/6.3V/K

DDRVTT Decouple

DDRVTT
MBC40 10u/6/X5R/6.3V/M

DDRVTT
MBC18 1u/4/X5R/6.3V/K
MBC10 0.1u/4/X7R/16V/K

Gigabyte Technology

Title: DDRIII CHANNEL A

Size: Custom | Document Number: GA-H81M-DS2V | Rev: 1.02

Date: | Sheet 7 of 33

DDR3 (B)

DDR3_2

DDRVTT

DDR_15V

VDDSPD

MC2 0.1u/4/X7R/16V/K

MC14 0.1u/4/X7R/16V/K VREF_DDRB

MC9 0.1u/4/X7R/16V/K VREF_DQDDRB

VREFCA
VREFDQ

N_SMBCLK
N_SMBDATA
SCL
SDA
SA1
SA0

SBAB2
SBAB1
SBAB0
BA2
BA1
BA0

CKEB1
CKEB0
CKE1
CKE0

-CSB1
-CSB0
S1*
S0*

-DCLKB1
DCLKB1
CK1/NU*
CK1/NU

-DCLKB0
DCLKB0
CK0*
CK0

MAAB[0..15]
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10/AP
A11
A12
A13
A14
A15

-DDR3_RST
RESET*

-SCASB
CAS*

-SRASB
RAS*

-SWEB
WE*

VTT
FREE
RSVD
ODT1
ODT0
NC/PAR_IN
NC/ERR_OUT
NC/TEST4
CB0
CB1
CB2
CB3
CB4
CB5
CB6
CB7
DQS0
DQS0*
DQS1
DQS1*
DQS2
DQS2*
DQS3
DQS3*
DQS4
DQS4*
DQS5
DQS5*
DQS6
DQS6*
DQS7
DQS7*
DQS8
DQS8*
DM0/DQS9
NC/DQS9*
DM1/DQS10
NC/DQS10*
DM2/DQS11
NC/DQS11*
DM3/DQS12
NC/DQS12*
DM4/DQS13
NC/DQS13*
DM5/DQS14
NC/DQS14*
DM6/DQS15
NC/DQS15*
DM7/DQS16
NC/DQS16*
DM8/DQS17
NC/DQS17*
VDD
DQ0
DQ1
DQ2
DQ3
DQ4
DQ5
DQ6
DQ7
DQ8
DQ9
DQ10
DQ11
DQ12
DQ13
DQ14
DQ15
DQ16
DQ17
DQ18
DQ19
DQ20
DQ21
DQ22
DQ23
DQ24
DQ25
DQ26
DQ27
DQ28
DQ29
DQ30
DQ31
DQ32
DQ33
DQ34
DQ35
DQ36
DQ37
DQ38
DQ39
DQ40
DQ41
DQ42
DQ43
DQ44
DQ45
DQ46
DQ47
DQ48
DQ49
DQ50
DQ51
DQ52
DQ53
DQ54
DQ55
DQ56
DQ57
DQ58
DQ59
DQ60
DQ61
DQ62
DQ63

MDB[0..63] (5)

DDR3/240/BK/VA/D

BLACK CONNECTOR

-DQSB[0..7] -DQSB[0..7] (5)
DQSB[0..7] DQSB[0..7] (5)
MODT_B[0..1] MODT_B[0..1] (5)

DDR3 VREF

DDR_15V
MR10 1K/4/1
MR11 1K/4/1
VREF_DDRB
MR8 1K/4/1
MR9 1K/4/1
MR7 10/4
VREF_DQDDRB
VREF_DQB (5)

COUPON

COUPON1 COUPON1 1 2 COUPON/X
COUPON2 COUPON2 1 2 COUPON/X
VCC3

CPU

DIMM4
DIMM2
CHA
DIMM3
DIMM1
CHB

Gigabyte Technology

Title: DDRIII CHANNEL B

Size: Custom | Document Number: GA-H81M-DS2V | Rev: 1.02

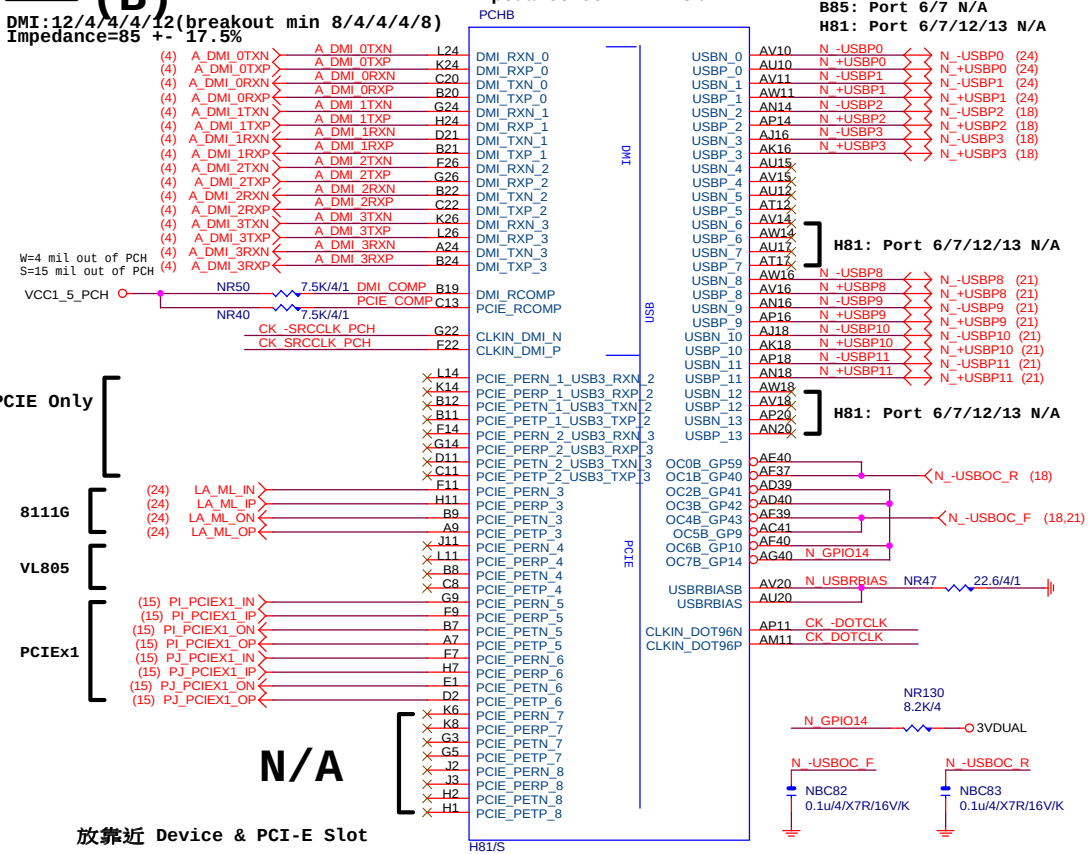
Date: | Sheet 8 of 33

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



PCIE Only

8111G

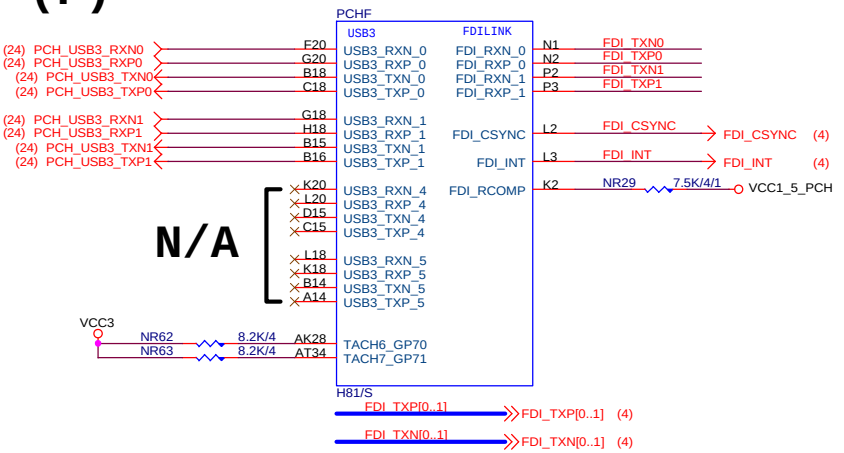
VL805

PCIEx1

N/A

放靠近 Device & PCI-E Slot
Impedance=80 +- 17.5%
PCIEX1:16/5/5/5/16 (breakout min 8/4/4/4/8)

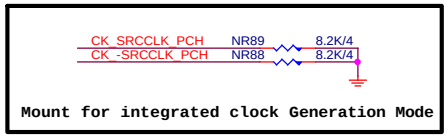
PCH (F)

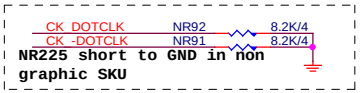


N/A

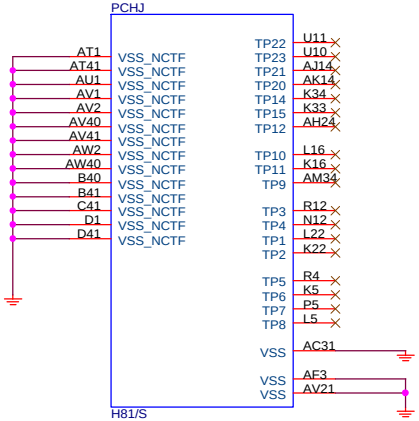
USB3.0:20/5/7/5/20 (breakout min 8/4/4/4/8) ; ONLY 3 VIAS
Impedance=85 +- 17.5%
Back Panel < 10000 MILS
Front Panel < 6000 MILS

PCH CLK PD



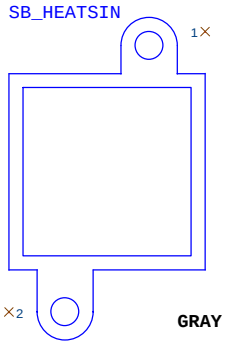


PCH (J)



PCH H/S

LOW COST ICH7 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#	USB_LAN
OC2#	R_USB30
OC3#	N/A
OC4#	F_USB1
OC5#	F_USB2
OC6#	KB_MS_USB
OC7#	Not Use

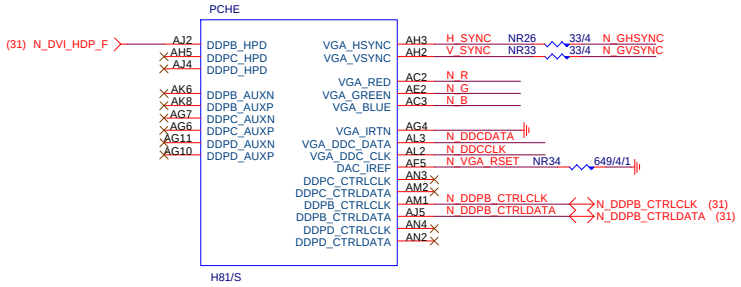
Gigabyte Technology

Title: PCH FDI,DMI,USB ,PCIE,NVRAM

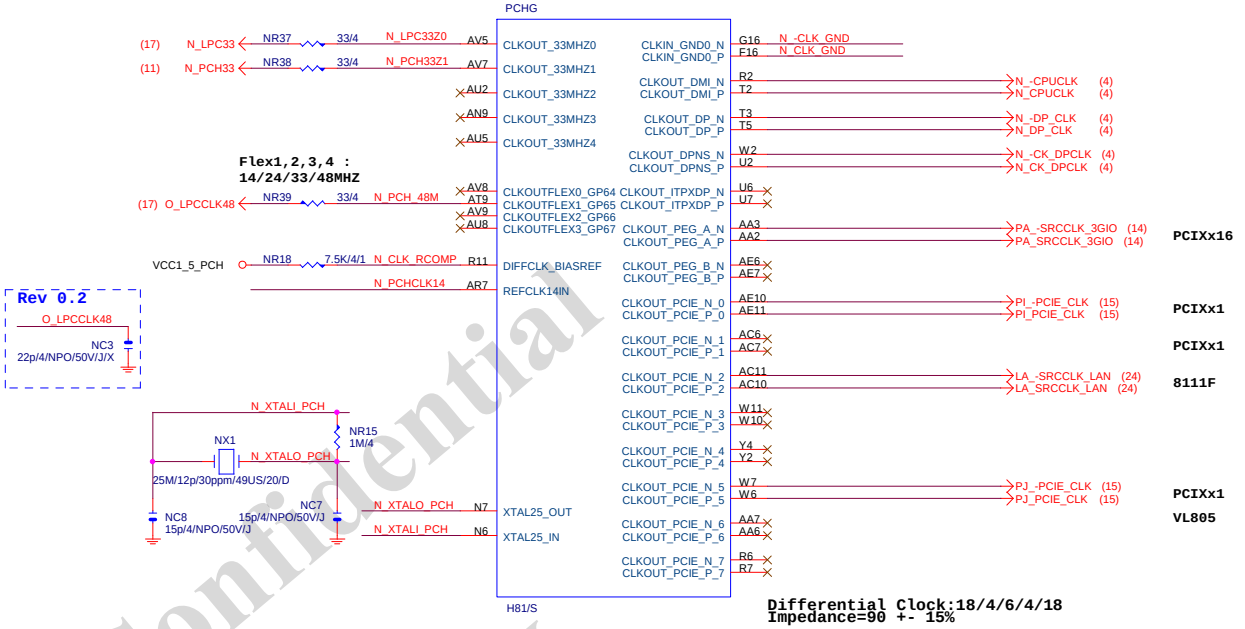
Size: Custom | Document Number: GA-H81M-DS2V | Rev: 1.02

Date: Thursday, December 19, 2013 | Sheet 9 of 33

PCH (E)

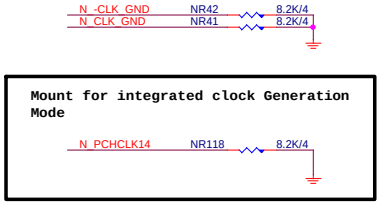


PCH (G)

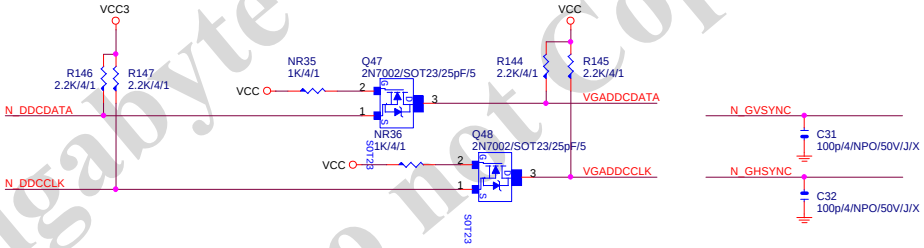


Differential Clock:18/4/6/4/18
Impedance=90 +- 15%

PCH CLK PD

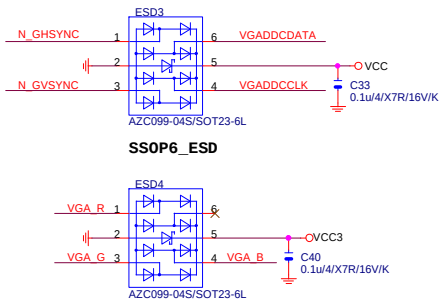


VGA DDC

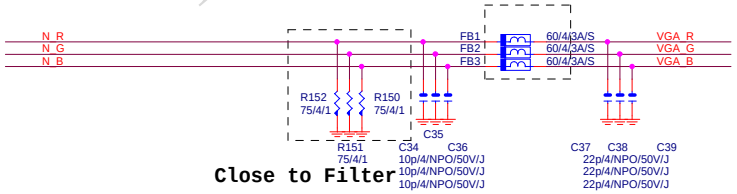


VGA CONNECTOR

VGA ESD

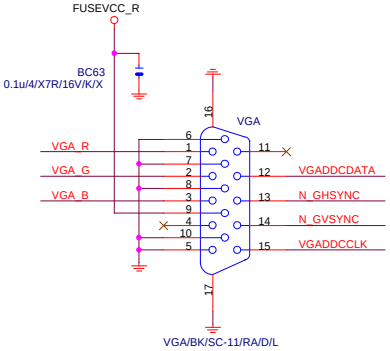


VGA DDC



Close to Filter

VGA CONNECTOR

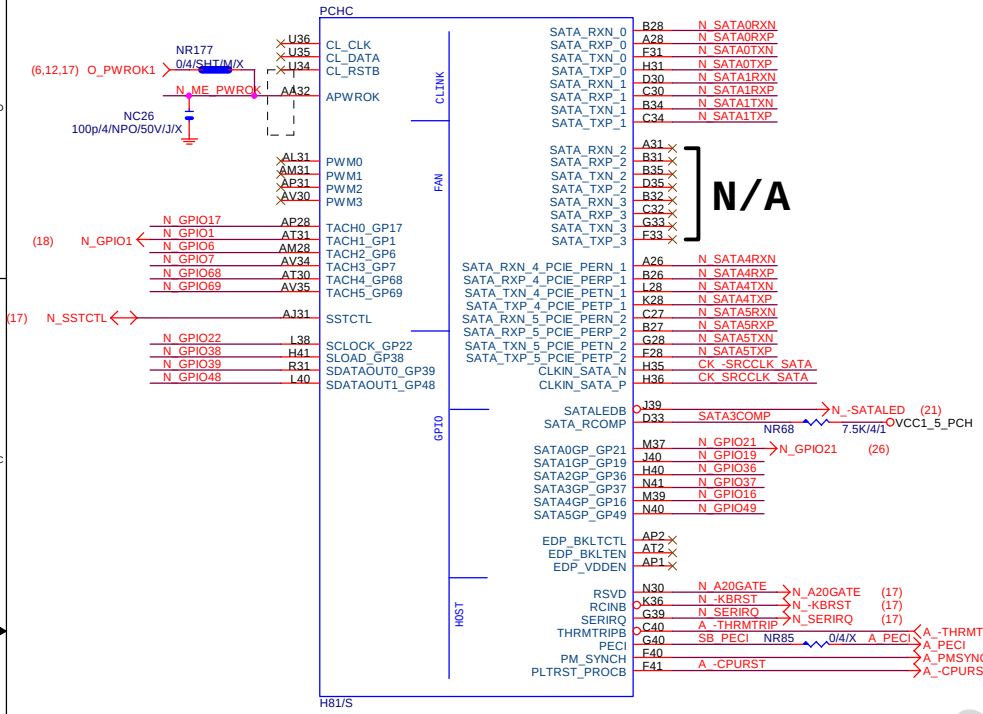


BLACK CONNECTOR

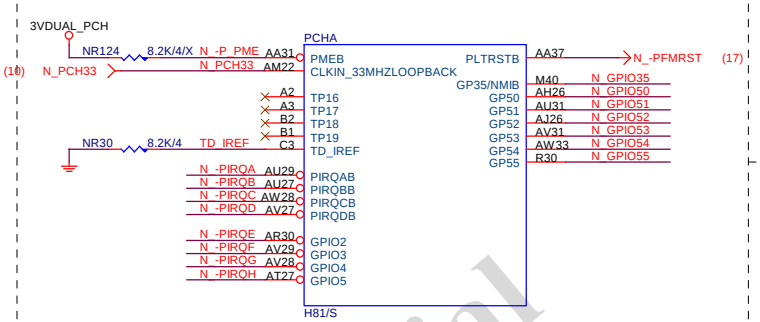
Gigabyte Technology			
Title	PCH DISPLAY ,CLK BUFFER		
Size: Custom	Document Number: GA-H81M-DS2V		Rev: 1.02
Date: Thursday, December 19, 2013	Sheet 10 of 33		

PCH (C)

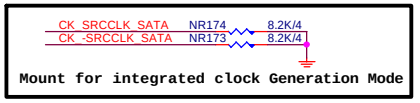
SATA3 : 20/7.5/4.5/7.5/20 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%
SATA2 : 15/7.5/4.5/7.5/15 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%



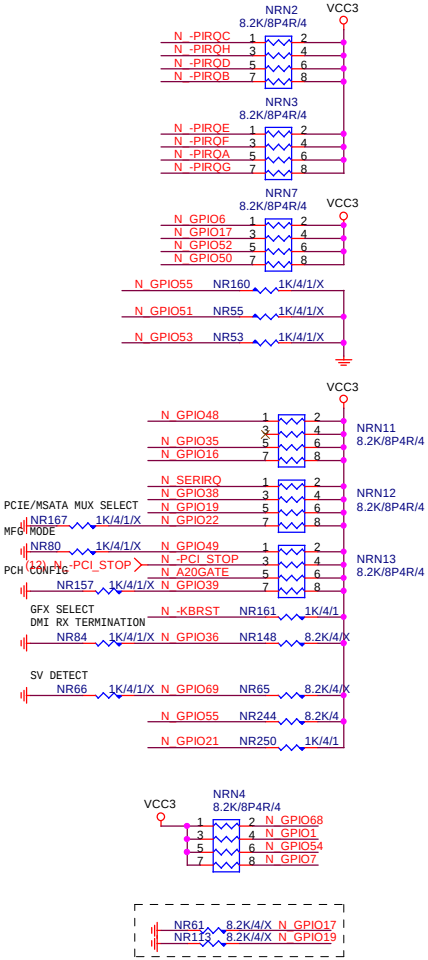
PCH (A)



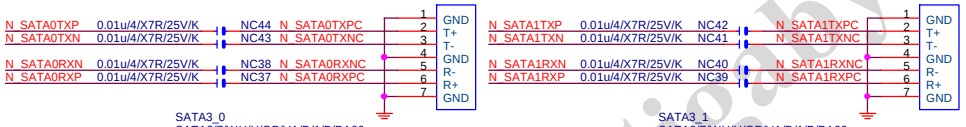
PCH CLK PD



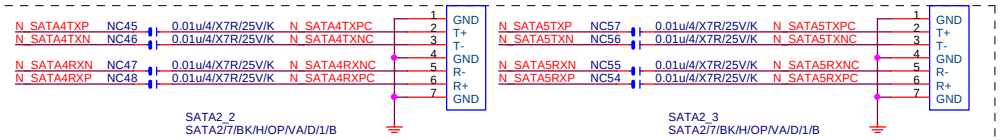
PCH PU/PD



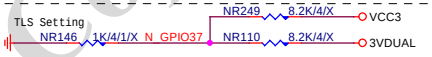
SATA CONNECTOR



** Z87/H87 Port 4&5 SATA3.0
** B85 Port 4&5 SATA2.0

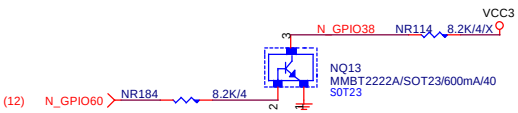


ME PWROK



GPIO37 PU VCC3 ENABLE SBA
For H87&B85

GPIO38 Ctrl



Gigabyte Technology

Title: PCH HOST , SATA, PCI

Size: Custom | Document Number: GA-H81M-DS2V | Rev: 1.02

Date: Thursday, December 19, 2013 | Sheet 11 of 33

PCH (D)

PCHD

H81/S

ACZ_SDOUT

SPI OVERRIDE PROTECTION

PCH_DPWROK

for IT8620 Ctrl

At least 40ns lead fall to 0V before 3VDUAL_PCH fall to 2V

At least 10ms delay after 3VDUAL_PCH stabel

PCH PU/PD

GP8:Low to enable PCH clock chip

SUSCLK:Low to OD PLL VR

GP28:Lo disable VRM ,Hi enable VRM

HSW_STRAP13

32.768KHZ

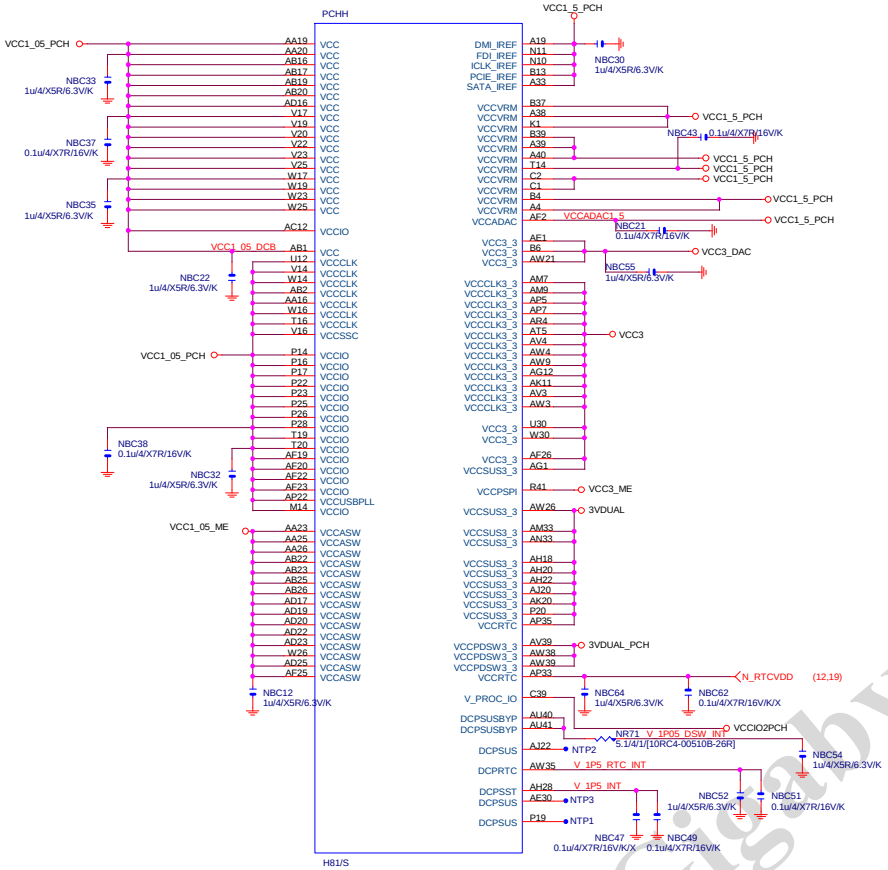
CLR_CMOS

BATTERY-DUAL-4

RB 必须放在BAT外

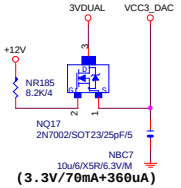
Gigabyte Technology			
Title: PCH GPIO , CTRL , AUDIO			
Size: Custom	Document Number: GA-H81M-DS2V		Rev: 1.02
Date: Thursday, December 19, 2013	Sheet 12 of 33		

PCH (H)

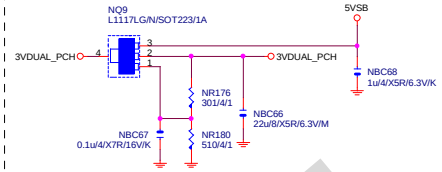


VCC3_DAC

CLOSE北橋(注意震盪水波紋)

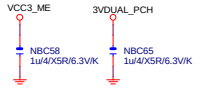


3VDUAL_PCH

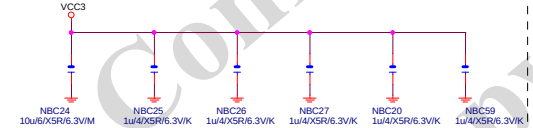


SHT PWR

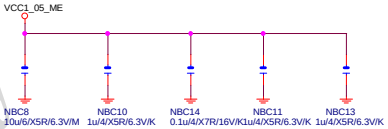
CAP



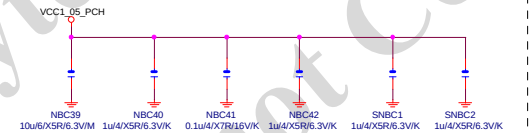
(3.3V)(X6)



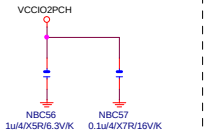
(1.05V)(X5)



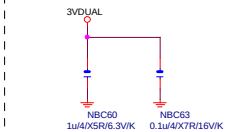
(1.05V)(X6)



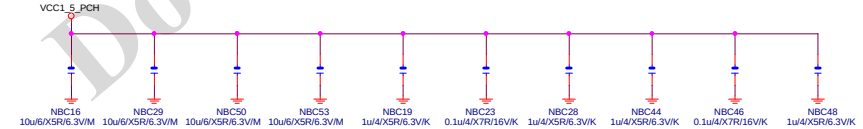
(1.05V)(X2)



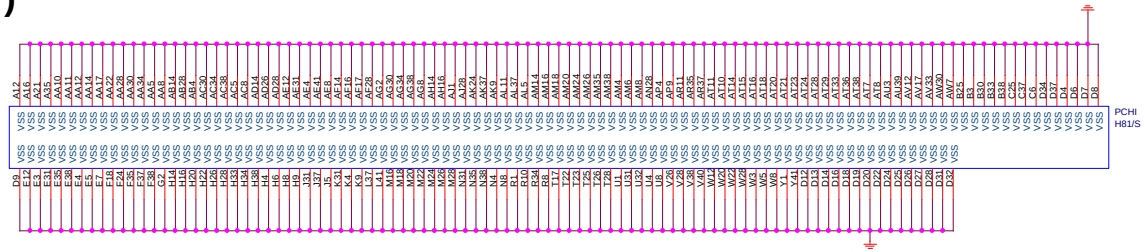
(3.3V)(X2)



(1.05V)(X10)

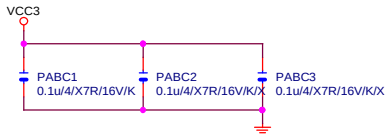


PCH (I)

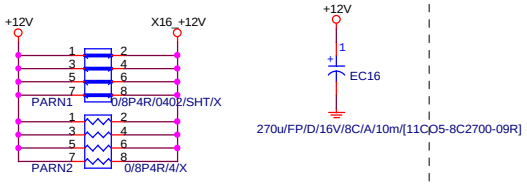


Gigabyte Technology			
Title: PCH PWR ,GND			
Size: Custom	Document Number: GA-H81M-DS2V		Rev: 1.02
Date: Thursday, December 19, 2013	Sheet 13 of 33		

PCIEX16 CAP



PCIEX16 PROTECT SHT



PCIEX16 AC CAP

PA_EXP_TXP0	PAC5	0.22u/4/X5R/6.3V/K	PA_EXP_TXP0_C
PA_EXP_TXN0	PAC4	0.22u/4/X5R/6.3V/K	PA_EXP_TXN0_C
PA_EXP_TXP1	PAC6	0.22u/4/X5R/6.3V/K	PA_EXP_TXP1_C
PA_EXP_TXN1	PAC7	0.22u/4/X5R/6.3V/K	PA_EXP_TXN1_C
PA_EXP_TXP2	PAC8	0.22u/4/X5R/6.3V/K	PA_EXP_TXP2_C
PA_EXP_TXN2	PAC9	0.22u/4/X5R/6.3V/K	PA_EXP_TXN2_C
PA_EXP_TXP3	PAC10	0.22u/4/X5R/6.3V/K	PA_EXP_TXP3_C
PA_EXP_TXN3	PAC11	0.22u/4/X5R/6.3V/K	PA_EXP_TXN3_C
PA_EXP_TXP4	PAC12	0.22u/4/X5R/6.3V/K	PA_EXP_TXP4_C
PA_EXP_TXN4	PAC13	0.22u/4/X5R/6.3V/K	PA_EXP_TXN4_C
PA_EXP_TXP5	PAC14	0.22u/4/X5R/6.3V/K	PA_EXP_TXP5_C
PA_EXP_TXN5	PAC15	0.22u/4/X5R/6.3V/K	PA_EXP_TXN5_C
PA_EXP_TXP6	PAC16	0.22u/4/X5R/6.3V/K	PA_EXP_TXP6_C
PA_EXP_TXN6	PAC17	0.22u/4/X5R/6.3V/K	PA_EXP_TXN6_C
PA_EXP_TXP7	PAC19	0.22u/4/X5R/6.3V/K	PA_EXP_TXP7_C
PA_EXP_TXN7	PAC18	0.22u/4/X5R/6.3V/K	PA_EXP_TXN7_C
PA_EXP_TXP8	PAC20	0.22u/4/X5R/6.3V/K	PA_EXP_TXP8_C
PA_EXP_TXN8	PAC21	0.22u/4/X5R/6.3V/K	PA_EXP_TXN8_C
PA_EXP_TXP9	PAC22	0.22u/4/X5R/6.3V/K	PA_EXP_TXP9_C
PA_EXP_TXN9	PAC23	0.22u/4/X5R/6.3V/K	PA_EXP_TXN9_C
PA_EXP_TXP10	PAC24	0.22u/4/X5R/6.3V/K	PA_EXP_TXP10_C
PA_EXP_TXN10	PAC25	0.22u/4/X5R/6.3V/K	PA_EXP_TXN10_C
PA_EXP_TXP11	PAC26	0.22u/4/X5R/6.3V/K	PA_EXP_TXP11_C
PA_EXP_TXN11	PAC27	0.22u/4/X5R/6.3V/K	PA_EXP_TXN11_C
PA_EXP_TXP12	PAC28	0.22u/4/X5R/6.3V/K	PA_EXP_TXP12_C
PA_EXP_TXN12	PAC29	0.22u/4/X5R/6.3V/K	PA_EXP_TXN12_C
PA_EXP_TXP13	PAC30	0.22u/4/X5R/6.3V/K	PA_EXP_TXP13_C
PA_EXP_TXN13	PAC31	0.22u/4/X5R/6.3V/K	PA_EXP_TXN13_C
PA_EXP_TXP14	PAC32	0.22u/4/X5R/6.3V/K	PA_EXP_TXP14_C
PA_EXP_TXN14	PAC33	0.22u/4/X5R/6.3V/K	PA_EXP_TXN14_C
PA_EXP_TXP15	PAC34	0.22u/4/X5R/6.3V/K	PA_EXP_TXP15_C
PA_EXP_TXN15	PAC35	0.22u/4/X5R/6.3V/K	PA_EXP_TXN15_C

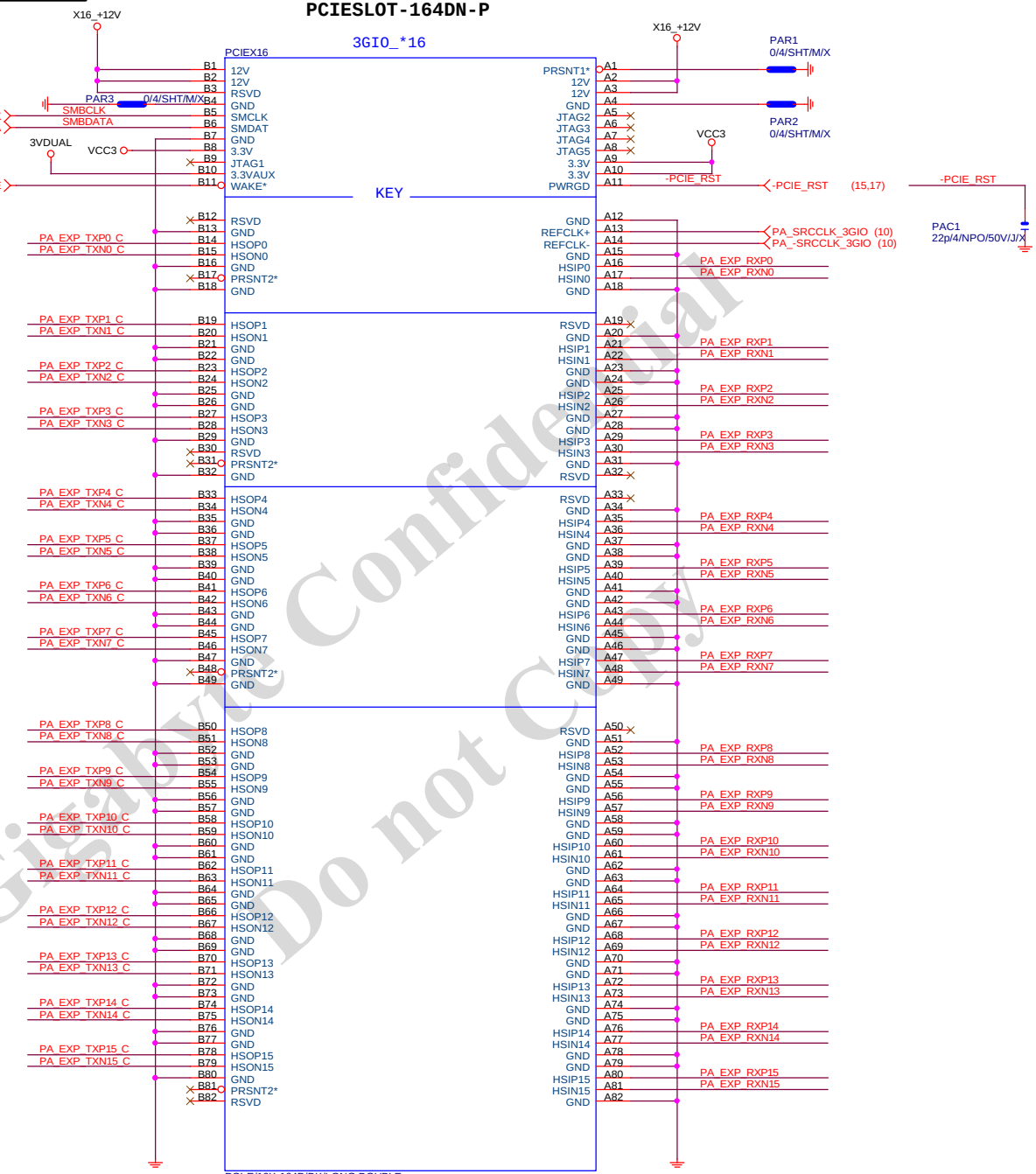
PA_EXP_RXP[0..15] >> PA_EXP_RXP[0..15] (4)
PA_EXP_RXN[0..15] >> PA_EXP_RXN[0..15] (4)
PA_EXP_TXP[0..15] >> PA_EXP_TXP[0..15] (4)
PA_EXP_TXN[0..15] >> PA_EXP_TXN[0..15] (4)

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

PCIEX16 SLOT

PCIESLOT-164DN-P

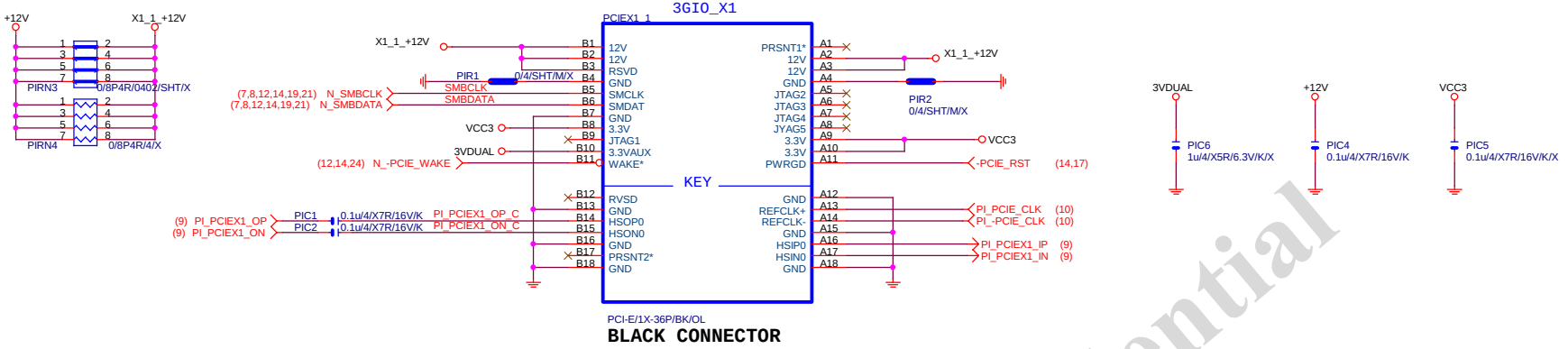
3GIO_*16

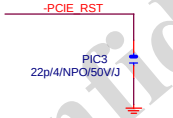


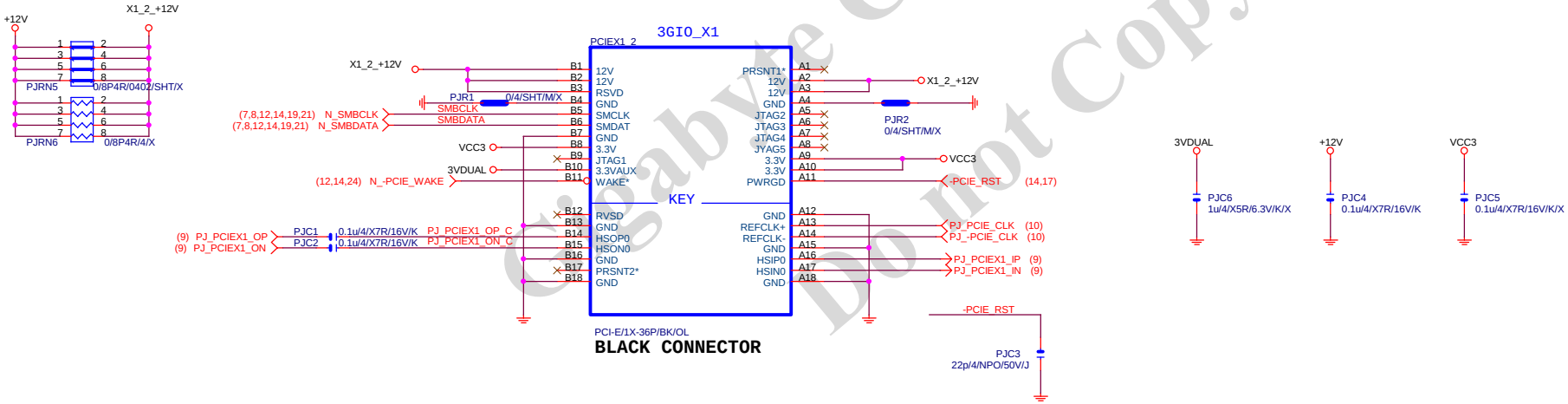
BLACK CONNECTOR

Gigabyte Technology		
Title: PCI EXPRESS * 16		
Size: Custom	Document Number: GA-H81M-DS2V	Rev: 1.02
Date: Thursday, December 19, 2013	Sheet 14 of 33	

PCIEX1 SLOT







Gigabyte Technology		
Title: PCI EXPRESS X 1 PORT		
Size: Custom	Document Number: GA-H81M-DS2V	Rev: 1.02
Date: Thursday, December 19, 2013	Sheet 15 of 33	

Gigabyte Technology			
Title: PCI SLOT 1&2			
Size: Custom	Document Number: GA-H81M-DS2V		Rev: 1.02
Date: Thursday, December 19, 2013		Sheet 16 of 33	

SIO IT8620

IT8620E_BX

IT8620E/BX/S

PWR SHT

For 8728 EUP function

SIO PU

SIO STRAP

H61M-S2 1.1 JP6 stuff pull down

ITE recommand

EUP control by PCH

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

Power leakage

For IT8721 Power leakage

DUAL BIOS OPT STRAP

SIO_18V

internal power pin, max 22nF cap

MB ID

SIO CAP

Gigabyte Technology		
Title: PCH GPIO , CTRL , AUDIO		
Size: C	Document Number: GA-H81M-DS2V	Rev: 1.02
Date: Thursday, December 19, 2013	Sheet 17 of 33	

COM

COM RI

KB/MS

FUSEVCC_R
UBC7
0.1u/4/X7R/16V/K
KB_MS_USB
U5
U6
U7
U8
(9) N_-USBP2
(9) N_+USBP2
AGND1
KBDATA
MSDATA
KBCLK
MSCLK
KB
USB
U1
U2
U3
U4
N_-USBP3 (9)
N_+USBP3 (9)
UBC8
0.1u/4/X7R/16V/K
G1
G2
G3
G4
KB/USB/A/PC99(DUAL)/GF/2/RA/D
R707
0/6/SHT/M/X
For EMI

RN1
8.2K/8P4R/4
KCLK
KDAT
MDAT
MCLK

FOR鹽化短路
(17) KCLK R58 82/4 KBCLK
(17) KDAT R59 82/4 KBDATA
(17) MDAT R57 82/4 MSDATA
(17) MCLK R56 82/4 MSCLK
CN1
180p/8P4C/6/NPO/50V/K

USB2.0 PWR

FUSE-0805
KB_MS_USB 2-Port 2.0A

5VDUAL_USB
FR1
SMD1206P350SLR/6V/S
FUSEVCC_R
EC3
100u/OS/D/6.3V/66/A/35m/[11CO2-661000-09R]

Close to connector

KB/MS ESD

ESD8
KBCLK
KBDATA
MSDATA
MSCLK
FUSEVCC_R
AZC099-04S/SOT23-6L

USB2.0 ESD

ESD2
N_+USBP3
N_-USBP3
N_-USBP2
N_+USBP2
FUSEVCC_R
AZC099-04S/SOT23-6L

USB30_20

USB30_20 PWR

-USBOC_R

UD7
BAT54A/SOT23/200mA
SOT23
5VDUAL_USB
UR3
8.2K/4
FUSEVCC_R
N_-USBOC_R
(9)
UR4
15K/4/1

USB30_20 ESD PROCTECT

USB3.0 ESD

USB2.0 ESD

USB POWER PROTECT

SOT23
(11) N_GPIO1
N_-USBOC_F
N_-USBOC_F (9,21)
N_-USBOC_R
N_-USBOC_R (9)
UAD5
BAT54A/SOT23/200mA

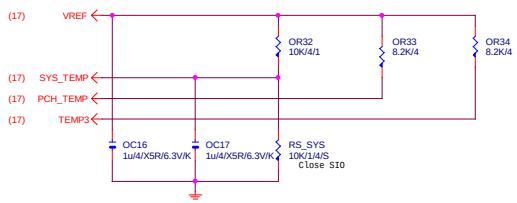
Gigabyte Technology

Title: COM,-RI,KB_USB,USB_ESATA,-PROCHOT

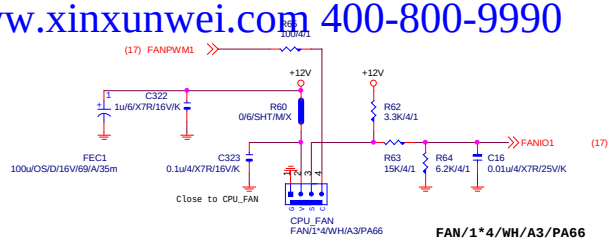
Size: Custom | Document Number: GA-H81M-DS2V | Rev: 1.02

Date: Thursday, December 19, 2013 | Sheet 18 of 33

TEMP H/W MONITOR



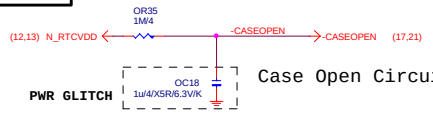
CPU SMART FAN



FAN/1*4/WH/A3/PA66

White Connect

CASE OPEN

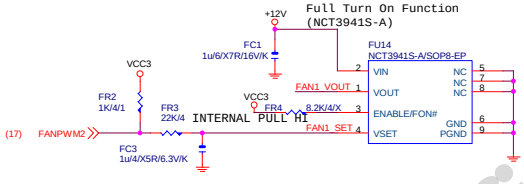


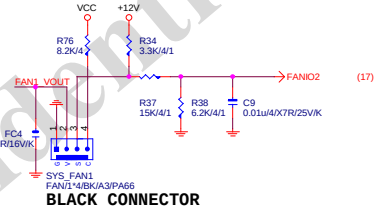
Case Open Circuits

SYS SMART FAN

Linear SYS_FAN

Enable Function (NCT3941S)
Full Turn On Function
(NCT3941S-A)



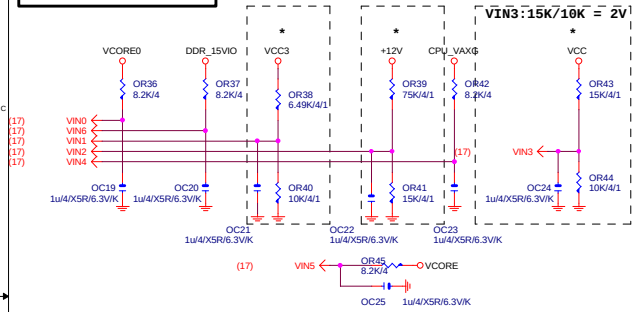


BLACK CONNECTOR

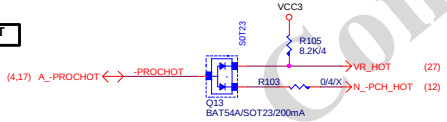
VOLTAGE-- H/W MONITOR

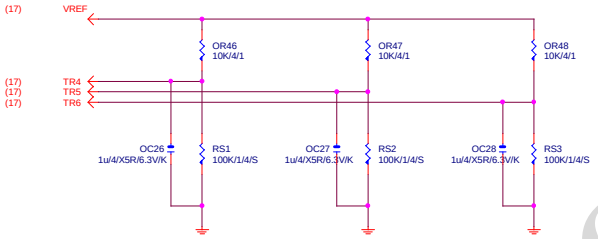
VIN2:75K/15K = 2V

VIN3:15K/10K = 2V



-PROHOT

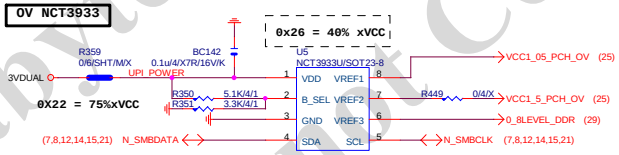




RS1、RS2、RS3 CLOSE CPU
VR MOSFET

接pwm feedback pin

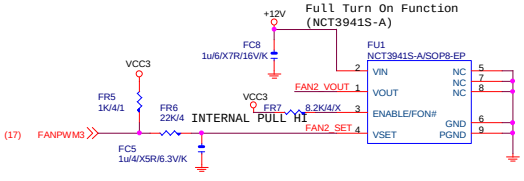
OV NCT3933

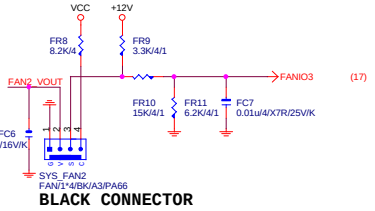


NCT3933	0X2A	0X20	0X22
VREF1	DDRVTT	VREF_DDRA_DQ	PCH Core
VREF2	VREF_DDRA_CA	N/A	VCC1_5_PCH
VREF3	VREF_DDRA_CA	VREF_DDRB_DQ	SMREF

Linear SYS_FAN

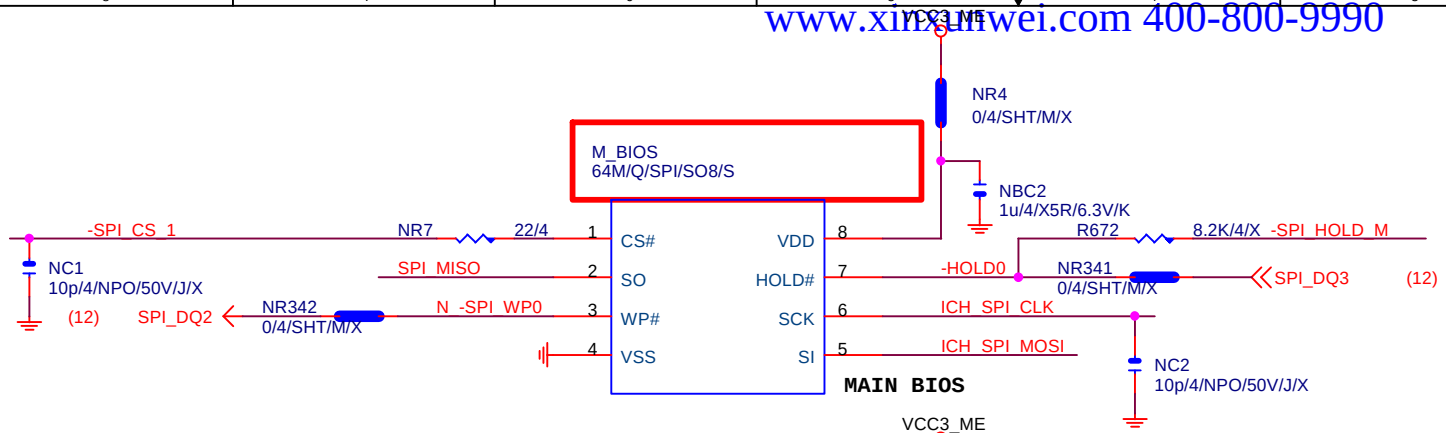
Enable Function (NCT3941S)
Full Turn On Function
(NCT3941S-A)

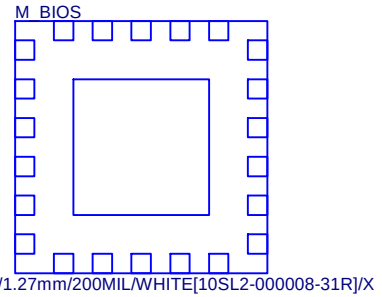


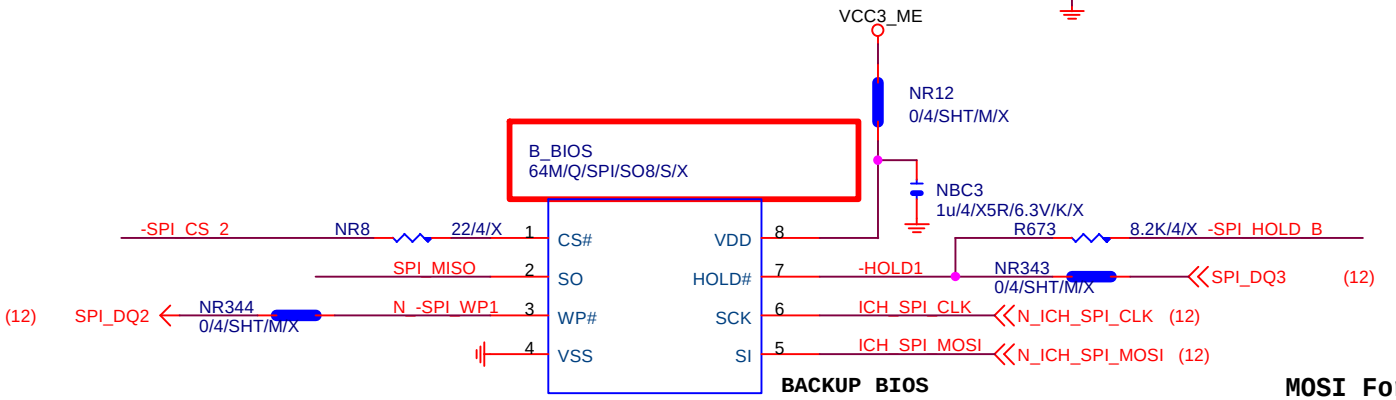


BLACK CONNECTOR

Gigabyte Technology			
Title	HWM,FAN CTRL,OV		
Size: Custom	Document Number: GA-H81M-DS2V		Rev: 1.02
Date: Thursday, December 19, 2013	Sheet 19 of 33		

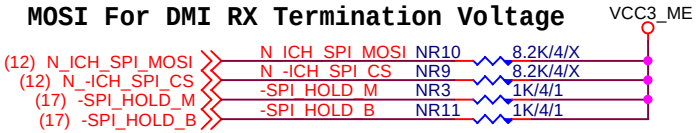


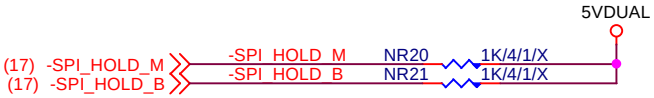


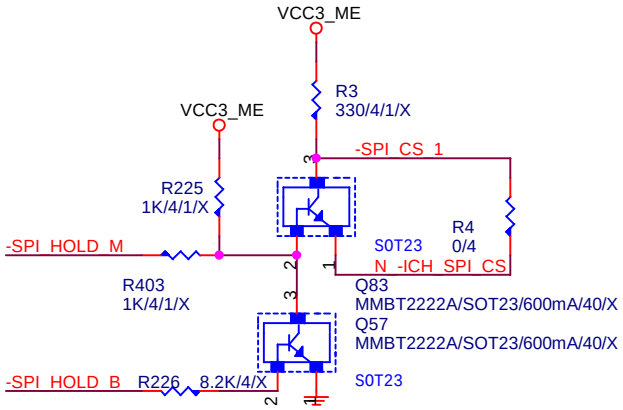


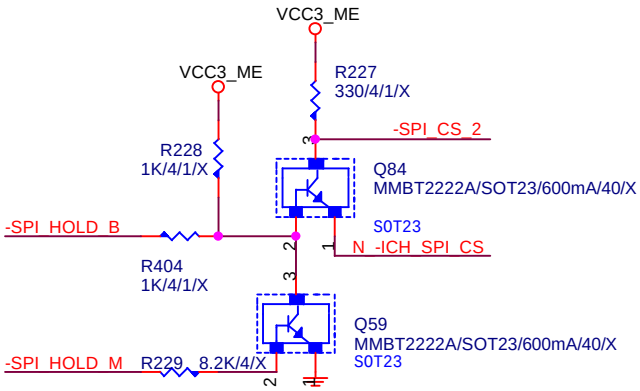
BOOT DEVICE	GNT0	GNT1
LPC	0	0
PCI	0	1
NAND	1	0
SPI	1	1

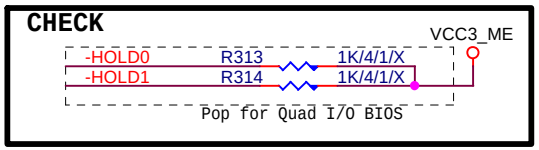
1 means floating
0 means PD 1K











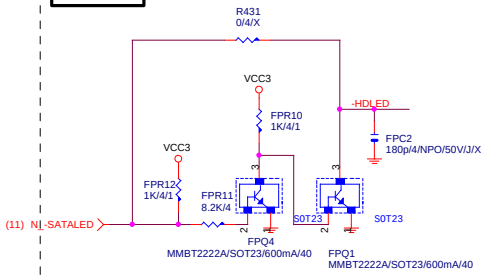
Gigabyte Technology

Title	DUAL BIOS		
Size: Custom	Document Number: GA-H81M-DS2V		Rev: 1.02
Date: Thursday, December 19, 2013	Sheet 20 of 33		

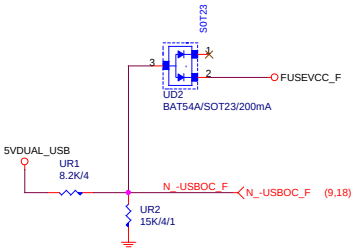
F_USB30

F_USB30 PWR

SATA LED

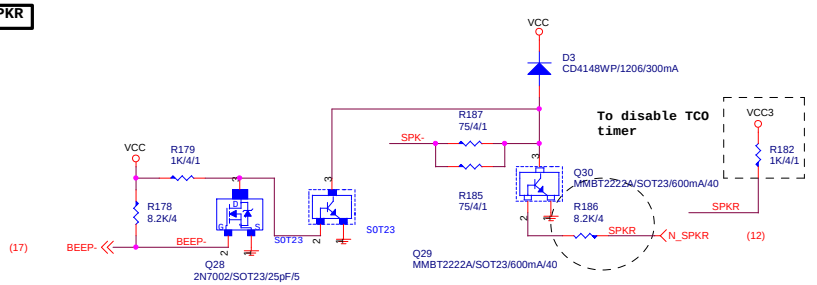


-USBOC_F

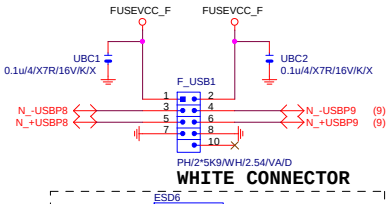


F_USB30 ESD PROTECT

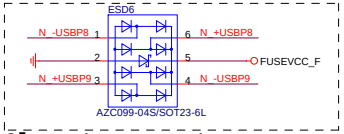
SPKR



FRONT USB1

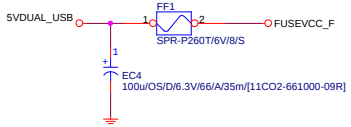


WHITE CONNECTOR

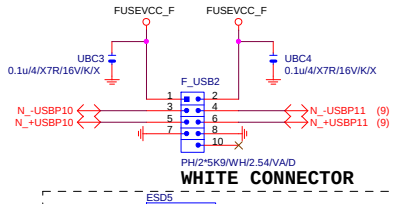


Close to connector

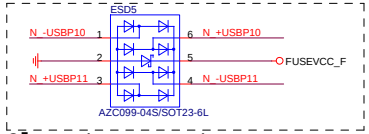
FUSE-0805
F_USB1, F_USB2 4-Port 2.6A



FRONT USB2

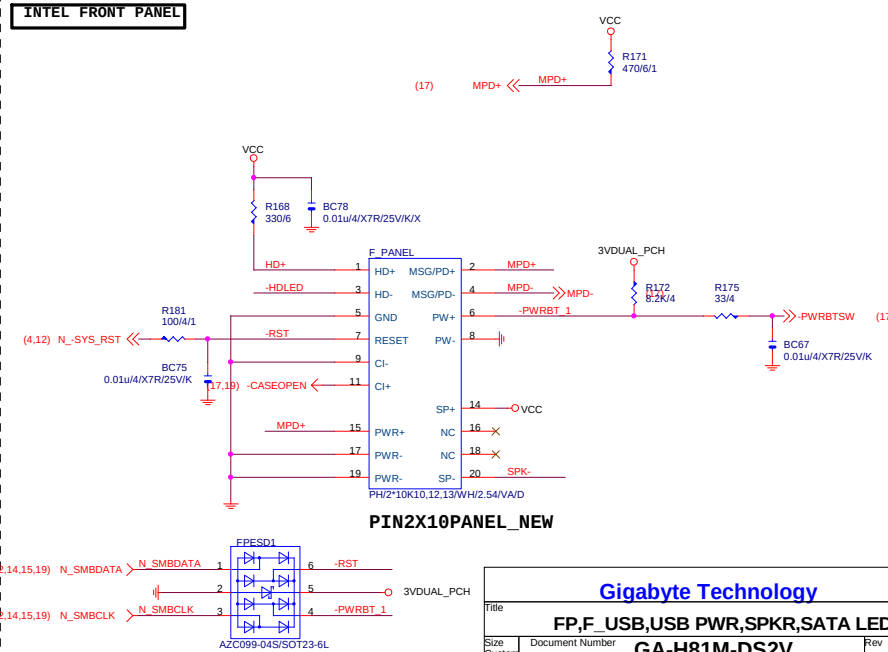


WHITE CONNECTOR



Close to connector

INTEL FRONT PANEL

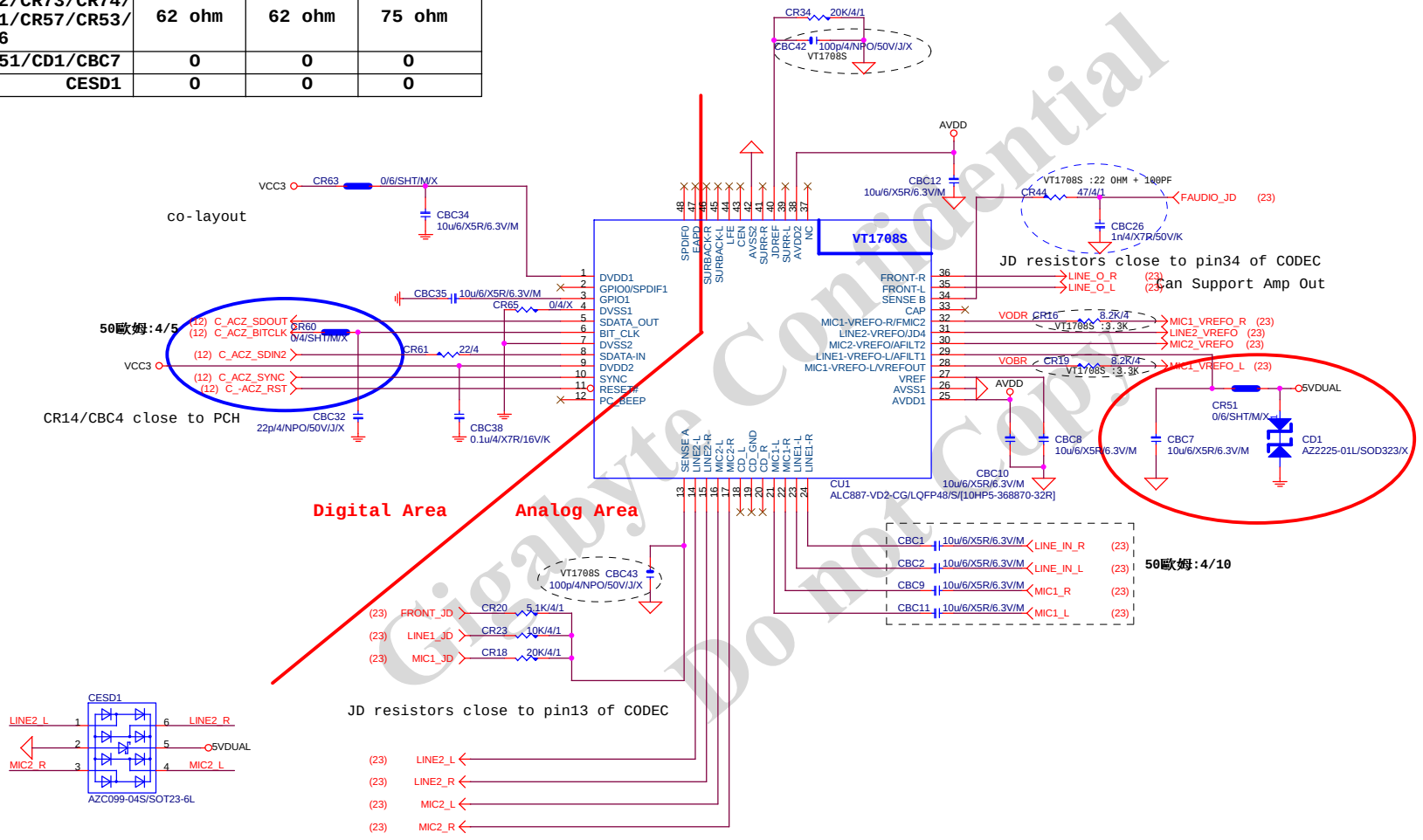


PIN2X10PANEL_NEW

Gigabyte Technology		
Title: FP,F_USB,USB PWR,SPKR,SATA LED		
Size: Custom	Document Number: GA-H81M-DS2V	Rev: 1.02
Date: Thursday, December 19, 2013	Sheet 21 of 33	

AZALIA CODEC *ALC892/ALC887-VD2/VT1708-CE Colay*

	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	22K/4	22K/4	10K/4/1
CR5/CR8/CR1/CR14/ CR17/CR22/CR73/CR74/ CR13/CR11/CR57/CR53/ CR75/CR76	62 ohm	62 ohm	75 ohm
CR51/CD1/CBC7	0	0	0
CESD1	0	0	0



Gigabyte Technology

Title: HD AUDIO ALC887B-VD2/VT1708S/VT2021

Size: Custom | Document Number: GA-H81M-DS2V | Rev: 1.02

Date: Thursday, December 19, 2013 | Sheet 22 of 33

CR49 0/6/X/MV
CR50 0/6/X
CR21 2.2/6
CR24 0/4/SHT/M/X

LINE-OUT

(22) LINE_O_R — CEC1 100u/OS/D/6.3V/66/A/35m/[11CO2-661000-09R] — CR5 62/4 — AJ_B5
(22) LINE_O_L — CEC2 100u/OS/D/6.3V/66/A/35m/[11CO2-661000-09R] — CR8 62/4 — AJ_B2
CR7 22K/4
CR6 22K/4
CBC19 180p/4/NPO/50V/J
CBC24 180p/4/NPO/50V/J

Only reserved for ALC888

LINE-IN

(22) LINE_IN_R — CR1 62/4 — AJ_A5
(22) LINE_IN_L — CR14 62/4 — AJ_A2
CBC20 180p/4/NPO/50V/J
CBC23 180p/4/NPO/50V/J

Verify MIC function in LINE-in

For 889A/888

MIC-IN

(22) MIC1_R — CR17 62/4 — AJ_C5
(22) MIC1_L — CR22 62/4 — AJ_C2
(22) MIC1_VREFO_L
(22) MIC1_VREFO_R
CBC3 180p/4/NPO/50V/J
CBC4 180p/4/NPO/50V/J

SPDIF_OUT

AUDIO

(22) LINE1_JD — LINE1_JD — AJ_A5 — AJ_A2 — C4 C3 C5 C2 — GND — BLUE LINE-IN
(22) FRONT_JD — FRONT_JD — AJ_B5 — AJ_B2 — B4 B3 B5 B2 — GND — GREEN LINE-OUT
(22) MIC1_JD — MIC1_JD — AJ_C5 — AJ_C2 — A4 A3 A5 A2 A1 — GND — PINK MIC-IN
MH1 MH2 MH3 MH4 MH5

A3RP/13P/BL,LI,PK/RA/D/1/B

AZALIA FRONT PANEL

CQ4 BAT54A/SOT23/200mA — (22) LINE2_VREFO — SOT23
CQ2 BAT54A/SOT23/200mA — (22) MIC2_VREFO — SOT23
VT1708S :3.3K
CR52 8.2K/4
CR56 8.2K/4
CR10 8.2K/4
CR9 8.2K/4

(22) MIC2_L — CBC6 10u/6/X5R/6.3V/M — CR13 62/4 — M2_L
(22) MIC2_R — CBC5 10u/6/X5R/6.3V/M — CR11 62/4 — M2_R
L2_R — CR57 62/4 — L2-R
(22) FAUDIO_JD
L2_L — CR53 62/4 — L2-L
CR12 0/4/X

(22) LINE2_R — CEC9 100u/OS/D/6.3V/66/A/35m/[11CO2-661000-09R] — L2_R
(22) LINE2_L — CEC6 100u/OS/D/6.3V/66/A/35m/[11CO2-661000-09R] — L2_L

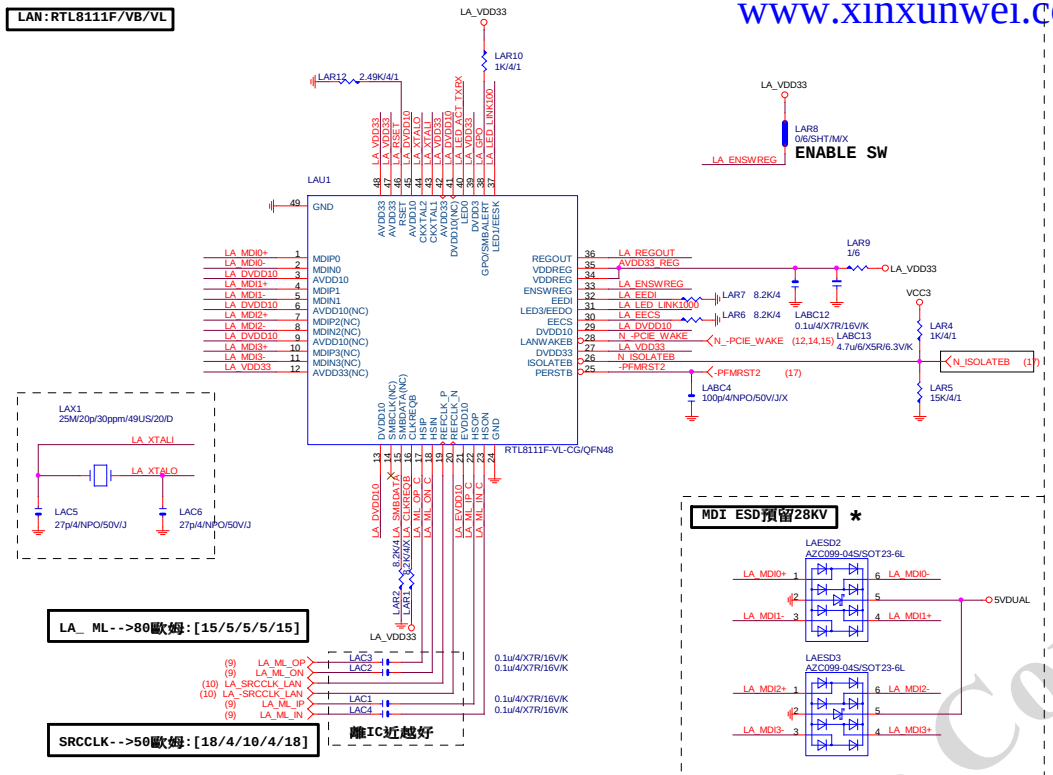
CR58 22K/4
CR54 22K/4
F_AUDIO
CR55 20K/4/1
CR59 39.2K/4/1
VCC3
CR78 8.2K/4/X
PH/2*5K8/BK/2.54/VA/D
BLACK CONNECTOR

CBC30 CBC29 CBC37 CBC36
180p/4/NPO/50V/J 180p/4/NPO/50V/J 180p/4/NPO/50V/J 180p/4/NPO/50V/J

Gigabyte Technology

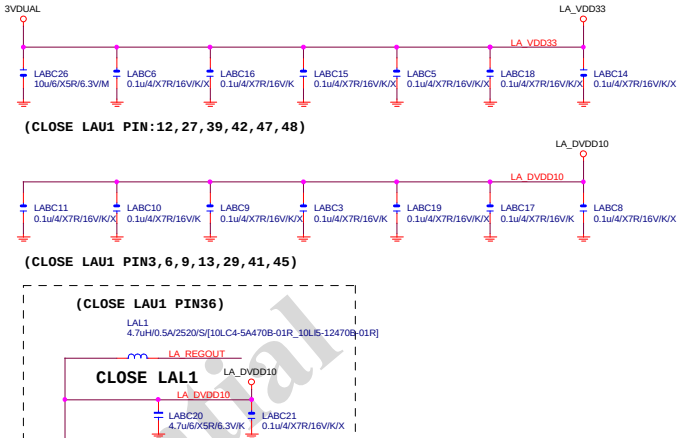
Title	AUDIO JACK	
Size: Custom	Document Number: GA-H81M-DS2V	Rev: 1.02
Date: Thursday, December 19, 2013	Sheet 23 of 33	

LAN:RTL8111F/VB/VL



MDI ESD預留28KV *

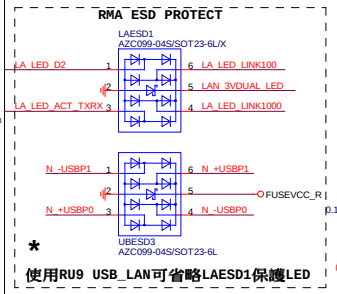
LAN POWER

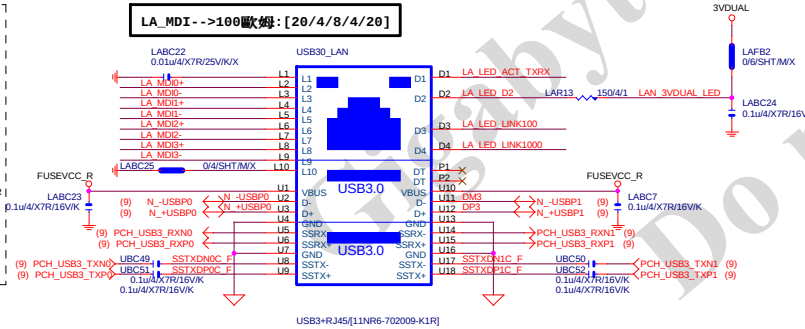


Power domain chart

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

USB_LAN CONNECTOR



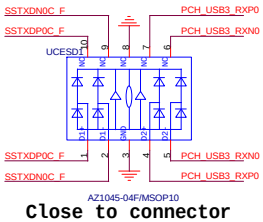


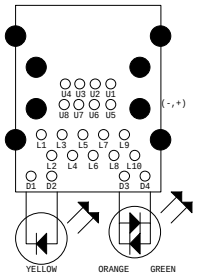
注意:USB PORT(目前:暫代6,7PORT)
USB-->90歐姆:[15/4.5/7.5/4.5/15]

USB X3 POWER

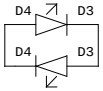
EMI SHORT PAD

PS:視EMI需求

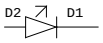




Dual Color LED



Single Color LED



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]

1. 9KV ESD BOM:
   USB_LAN (RU9):11NR6-702009-96R
2. 28KV ESD BOM:
   USB_LAN (RU9):11NR6-702009-96R
   LAESD2,LAESD3:上件AZC398-04S

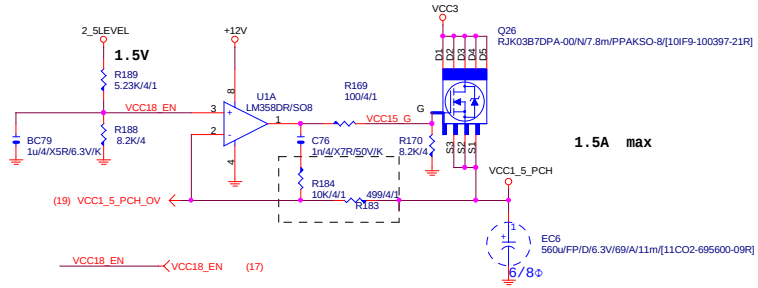
Gigabyte Technology

Title: Realtek RTL8111G

Size: Custom | Document Number: GA-H81M-DS2V | Rev: 1.02

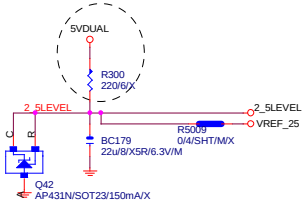
Date: Thursday, December 19, 2013 | Sheet 24 of 33

VCC1_8_PCH

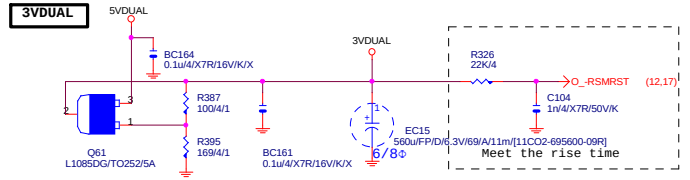


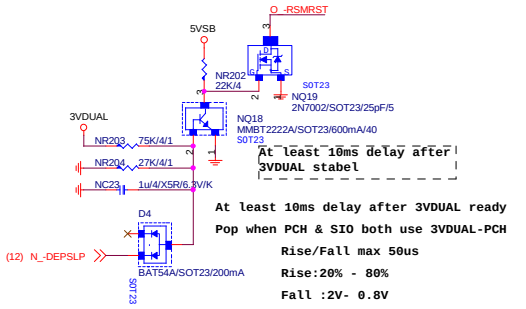
2_5LEVEL

ERP

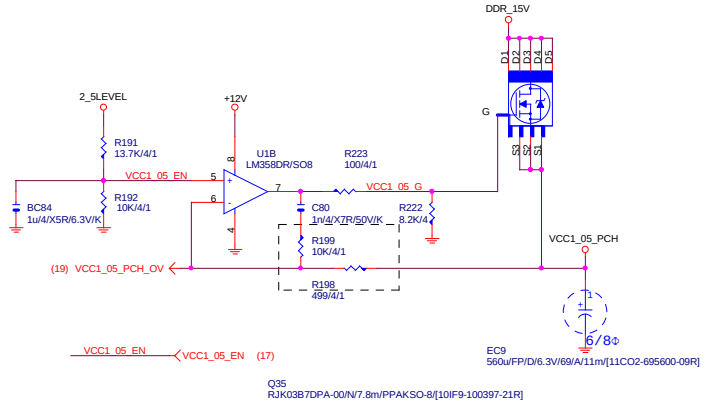


3VDUAL



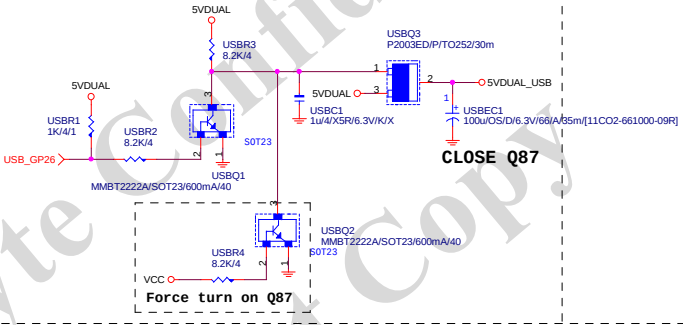


VCC1_05_PCH

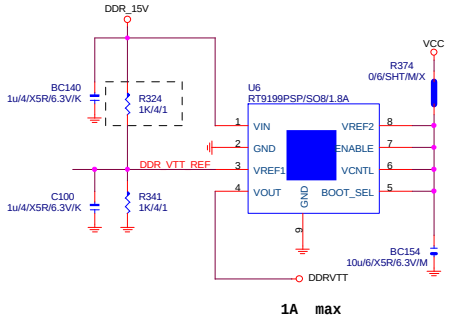


5VDUAL_USB Ctrl
KB_USB, R_USB30,
USB_LAN_F_USB30,
F_USB2 Power

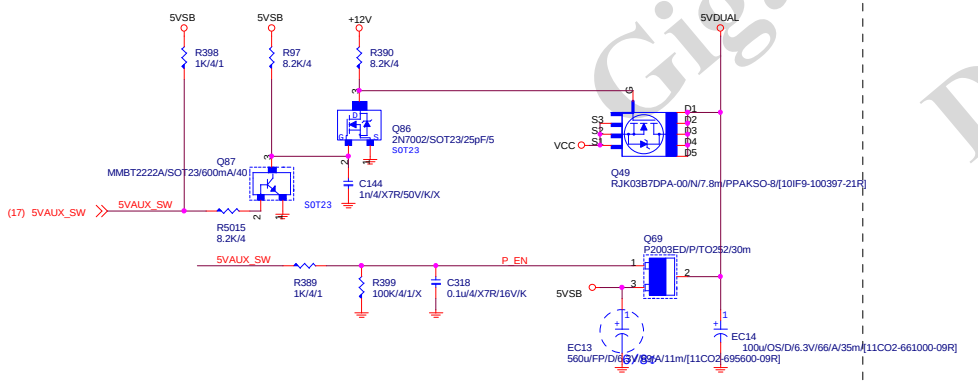
GPIO	5VDUAL_USB
High	Power ON
Low	Power OFF



DDRVTT

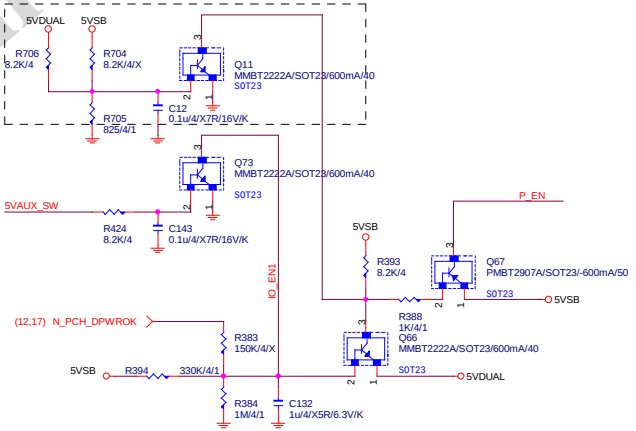


5VDUAL



5VDUAL SHORT PROTECT

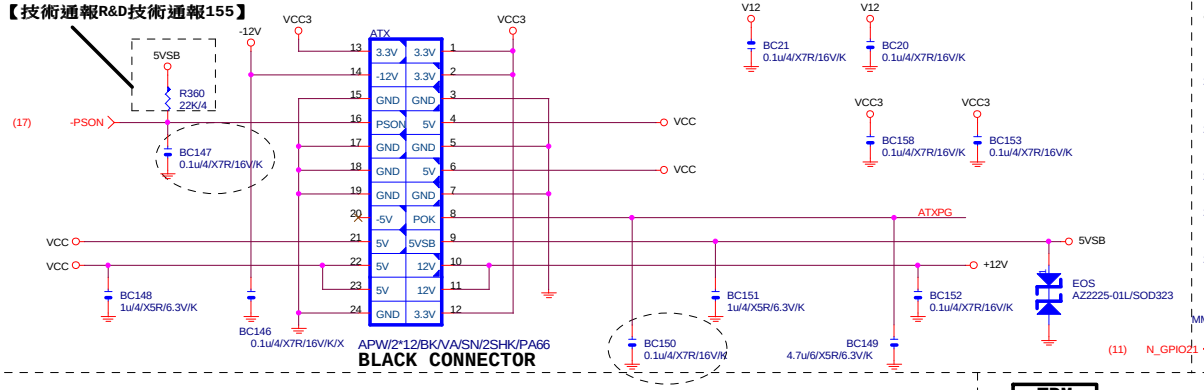
5VSB OVP:7.5V protection



Title	Gigabyte Technology DISCRETE POWER	
Size: Custom	Document Number: GA-H81M-DS2V	Rev: 1.02
Date: Thursday, December 19, 2013	Sheet 25 of 33	

ATXX24 POWER CONNECTOR

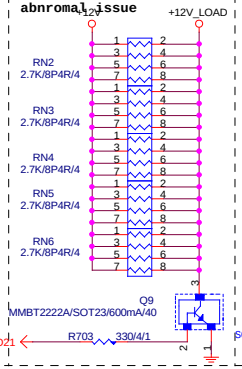
【技術通報R&D技術通報155】



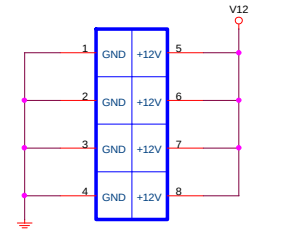
BLACK CONNECTOR

【技術通報R&D技術通報158】

To fix 12V light load abnroma l issue



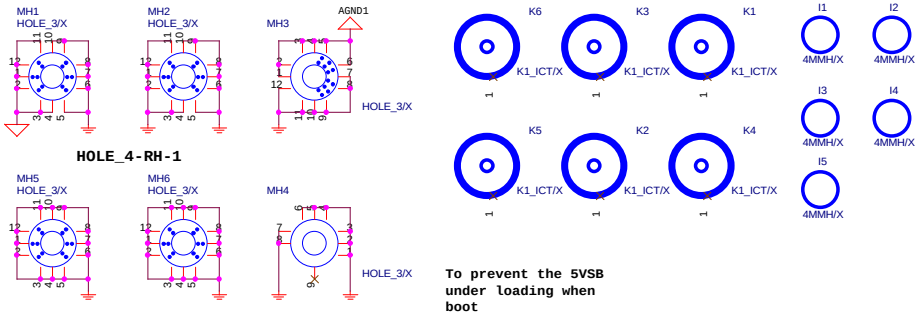
ATXX4 POWER CONNECTOR



BLACK CONNECTOR

ATX_12V_2X4
APW/2*4/BK/OC/P/4.2/VA/SN/OH::Location ATX_12V_2X4

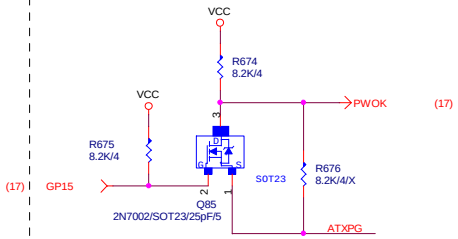
TPM

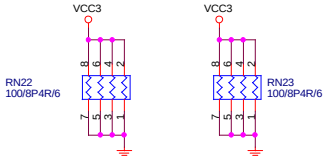


To prevent the 5VSB under loading when boot

PWOK PATCH

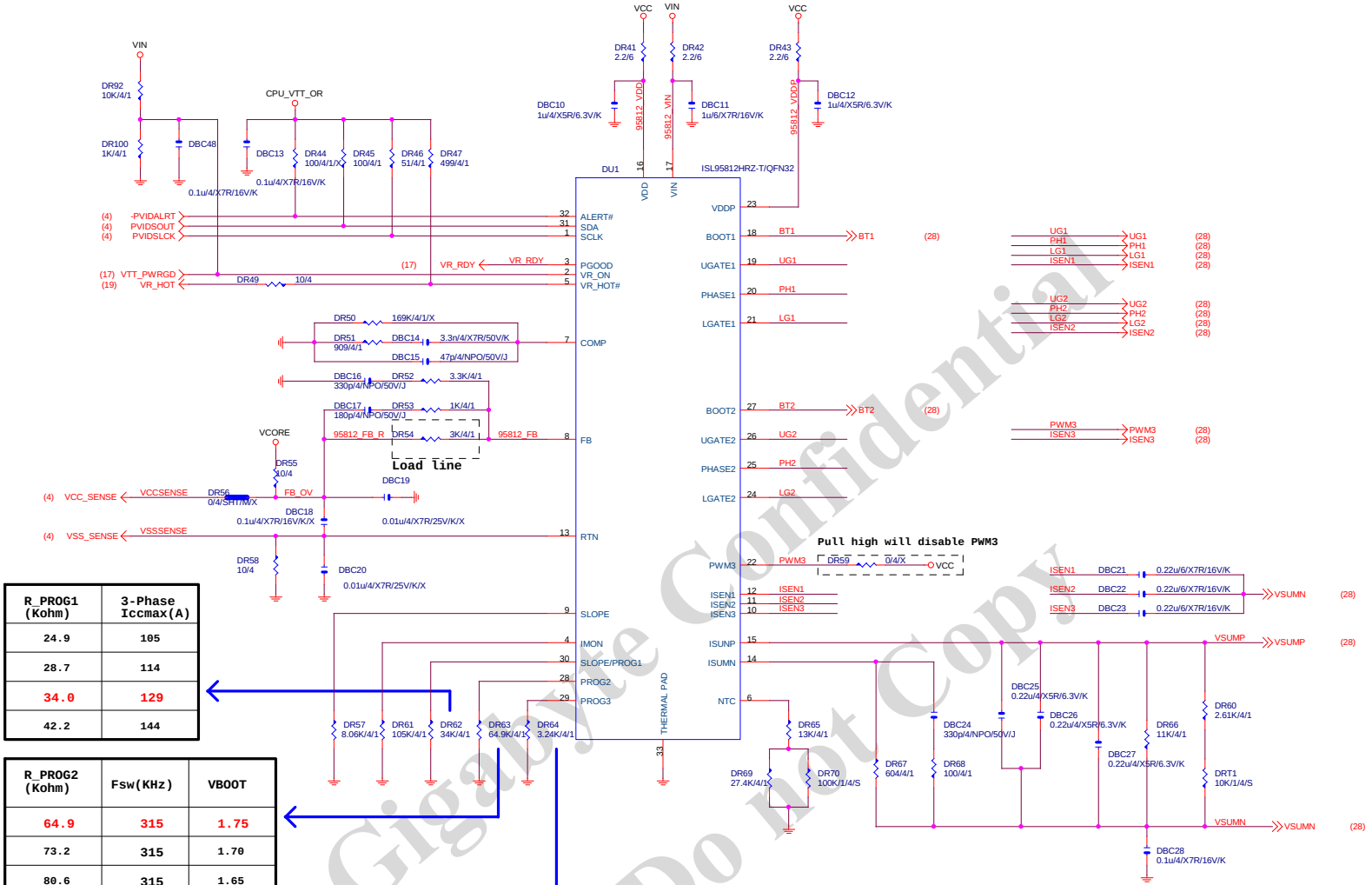
【技術通報R&D技術通報154】





FIX PWR MINMUN LOAD

Gigabyte Technology		
Title: ATX CONNECTOR		
Size: Custom	Document Number: GA-H81M-DS2V	Rev: 1.02
Date: Thursday, December 19, 2013	Sheet 26 of 33	



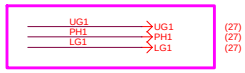
R_PROG1 (Kohm)	3-Phase Iccmax(A)
24.9	105
28.7	114
34.0	129
42.2	144

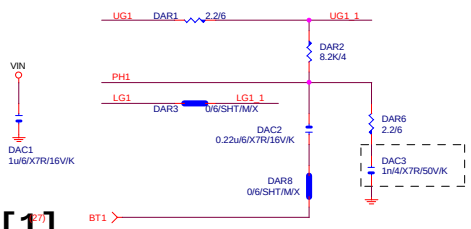
R_PROG2 (Kohm)	Fsw(KHz)	VBOOT
64.9	315	1.75
73.2	315	1.70
80.6	315	1.65
90.9	315	0

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

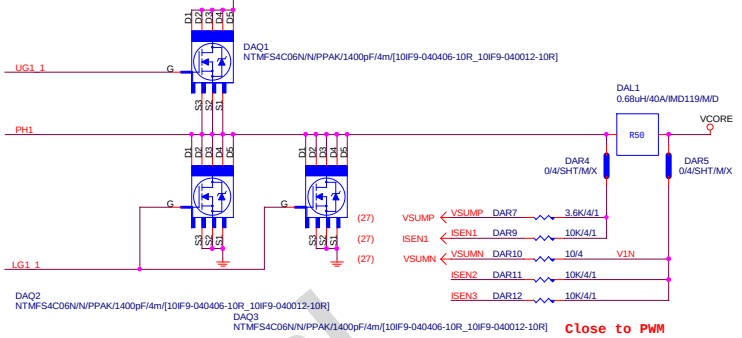
Gigabyte Technology		
Title: CPU CORE VR-1		
Size: Custom	Document Number: GA-H81M-DS2V	Rev: 1.02
Date: Thursday, December 19, 2013	Sheet 27 of 33	

PHASE 1



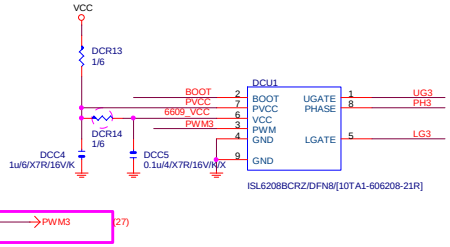


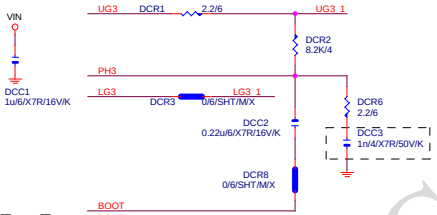
[1]



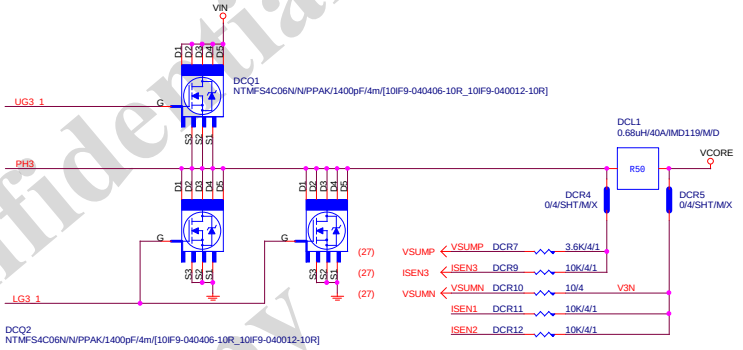
Close to PWM

PHASE 3



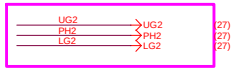


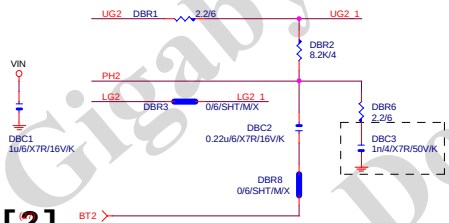
[3]



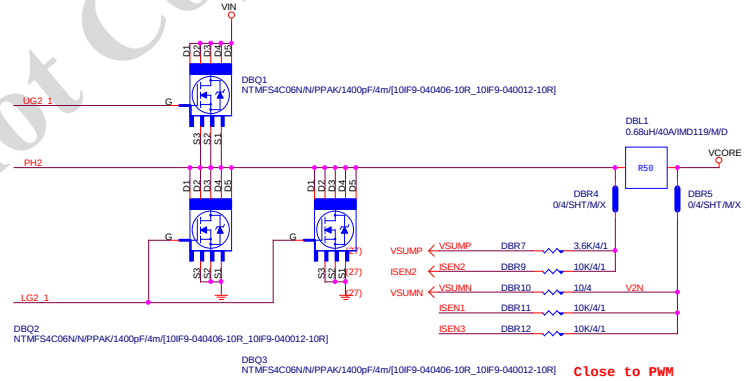
Close to PWM

PHASE 2

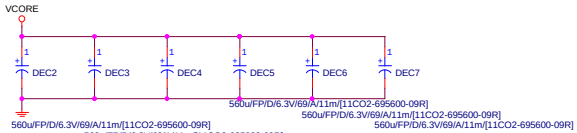


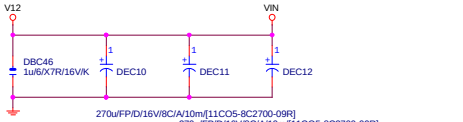


[2]



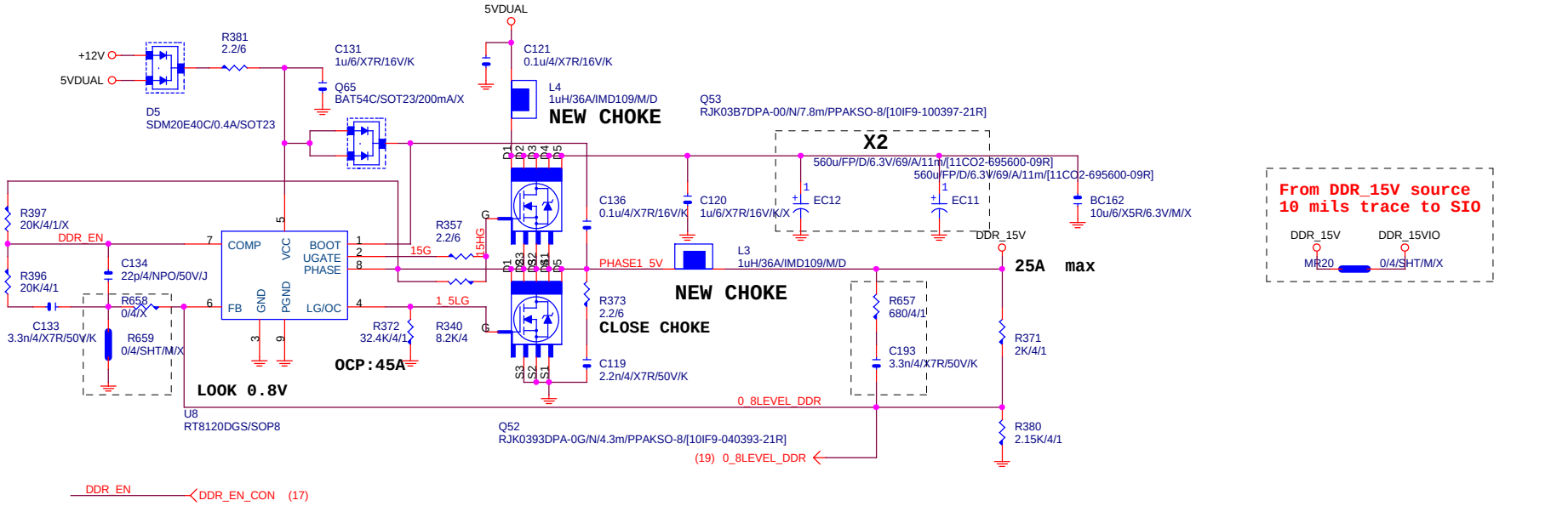
Close to PWM





Gigabyte Technology			
Title: CPU CORE VR-2			
Size: Custom	Document Number: GA-H81M-DS2V		Rev: 1.02
Date: Thursday, December 19, 2013	Sheet 28 of 33		

DDR15V



VIN=5V,VOUT=1.5V,IOUT=25A,PHASE=1
IRMS=11.45A

560u/FP/D/6.3V/68/8m RIPPLE CURRENT=4.7A
Coefficient=1.7(85℃),1(105℃)

VIN Ripple current=4.7X1.7=7.99A(85℃)
-->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

Gigabyte Technology			
Title: DDR POWER			
Size: Custom	Document Number: GA-H81M-DS2V		Rev: 1.02
Date: Thursday, December 19, 2013	Sheet 29 of 33		

VCC1_05_ME

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

VCC3_ME

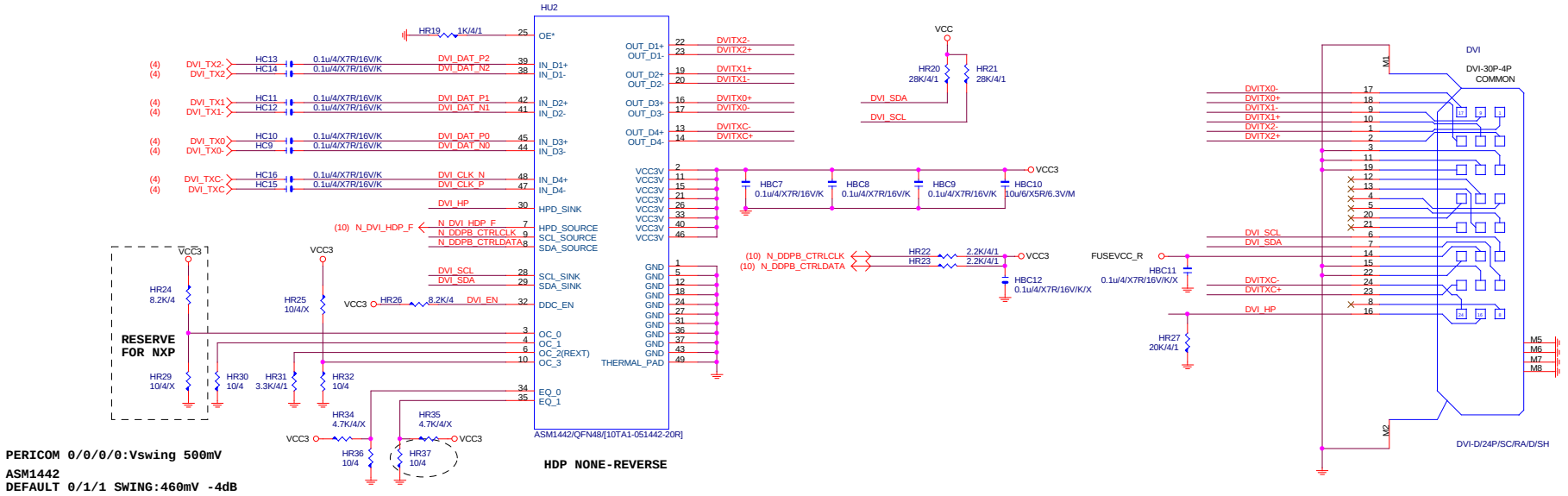
Gigabyte Technology

Title: LPT

Size: Custom | Document Number: GA-H81M-DS2V | Rev: 1.02

Date: Thursday, December 19, 2013 | Sheet 30 of 33

DVI LEVEL SHIFT



PERICOM 0/0/0/0:Vswing 500mV

ASM1442
DEFAULT 0/1/1 SWING:460mV -4dB

HDP NONE-REVERSE

PI3DV411 0 0:3dB
ASM1442 1 1:3dB

HDMI LEVEL SHIFT

Gigabyte Technology			
Title: DVI			
Size: Custom	Document Number: GA-H81M-DS2V		Rev: 1.02
Date: Thursday, December 19, 2013		Sheet 31 of 33	

Gigabyte Technology			
Title: ITE IT8892E			
Size: Custom	Document Number: GA-H81M-DS2V		Rev: 1.02
Date: Thursday, December 19, 2013	Sheet 32 of 33		

Gigabyte Technology		
Title: USB3 EJ188		
Size: C	Document Number: GA-H81M-DS2V	Rev: 1.02
Date: Thursday, December 19, 2013	Sheet 33 of 33	