

Model Name: GA-H81M-HD3

Revision 1.05

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 X16 SLOT |
| 15 | PCI EXPRESS X1 SLOT |
| 16 | PCI SLOT 1,2 |
| 17 | ITE 8620 LPC IO |
| 18 | COM,LPT,KB_MS |
| 19 | HWM,FAN CTRL,OV,-PROCHOT |
| 20 | DUAL BIOS |
| 21 | R_USB30,FP,FUSB,SPK,SATALED |
| 22 | CODEC ALC892 |
| 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 | DVI |
| 31 | ITE IT8892E |
| 32 | USB3 VL805 |
| 33 | HDMI/DP |
| 34 | F_USB30 |

Gigabyte Technology

Cover Sheet

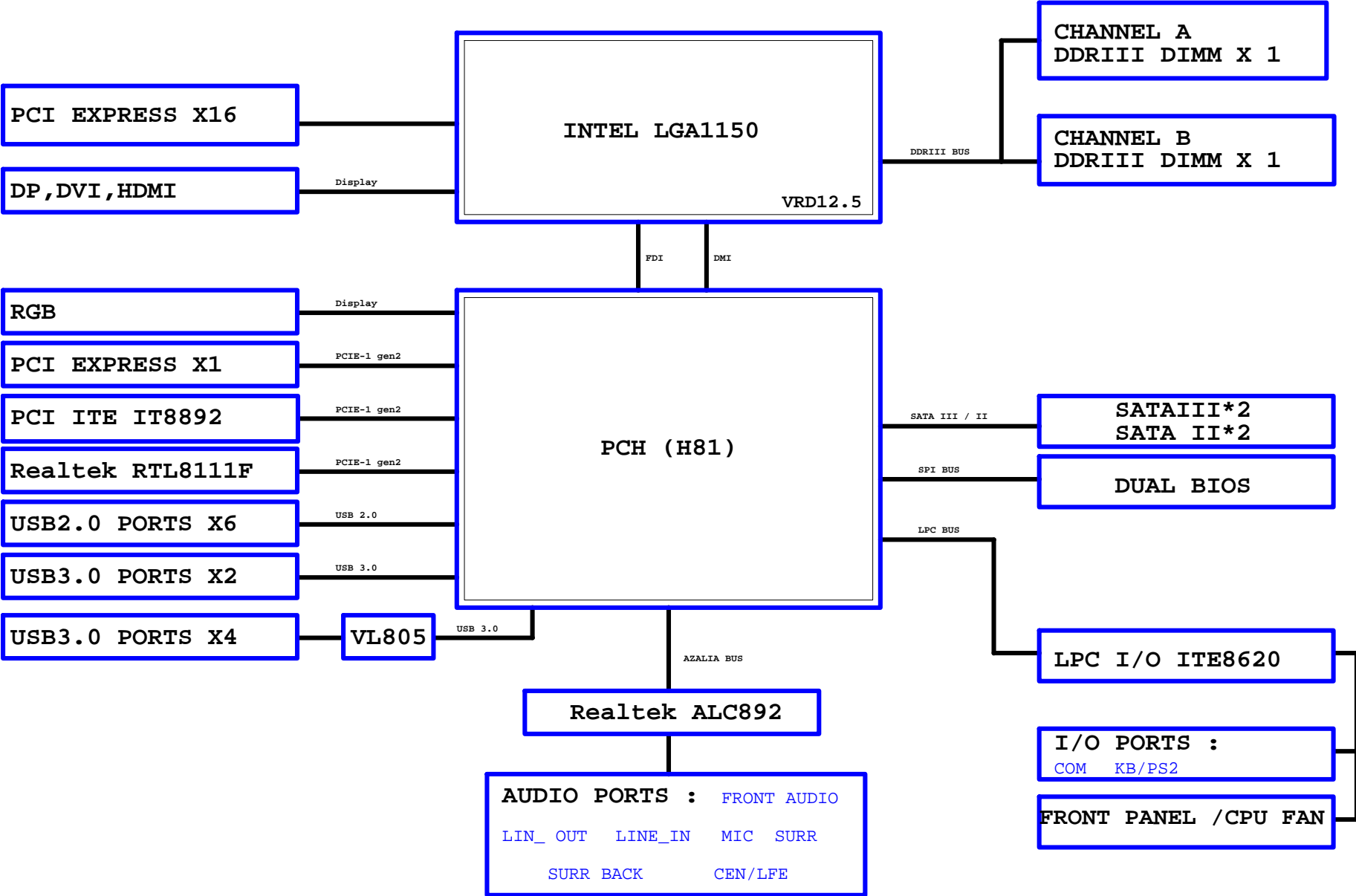
| | | |
|-----------------------------------|---------------------------------------|--------------------|
| Size Custom | Document Number GA-H81M-HD3 | Rev 1.05 |
| Date: Thursday, November 21, 2013 | Sheet 1 of 33 | |

Circuit or PCB layout change

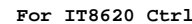
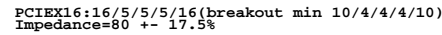
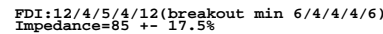
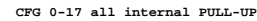
2013/04/22

[illegible][illegible]

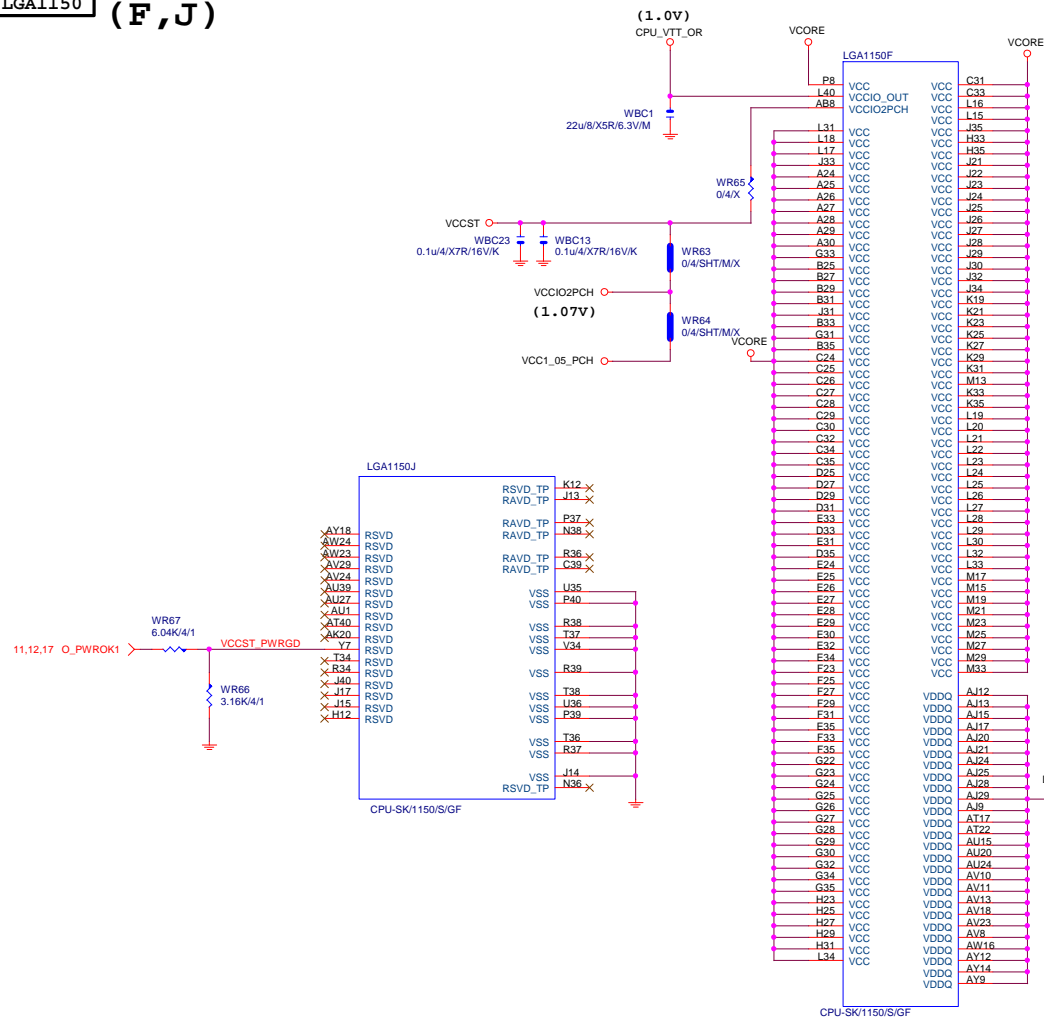
BLOCK DIAGRAM



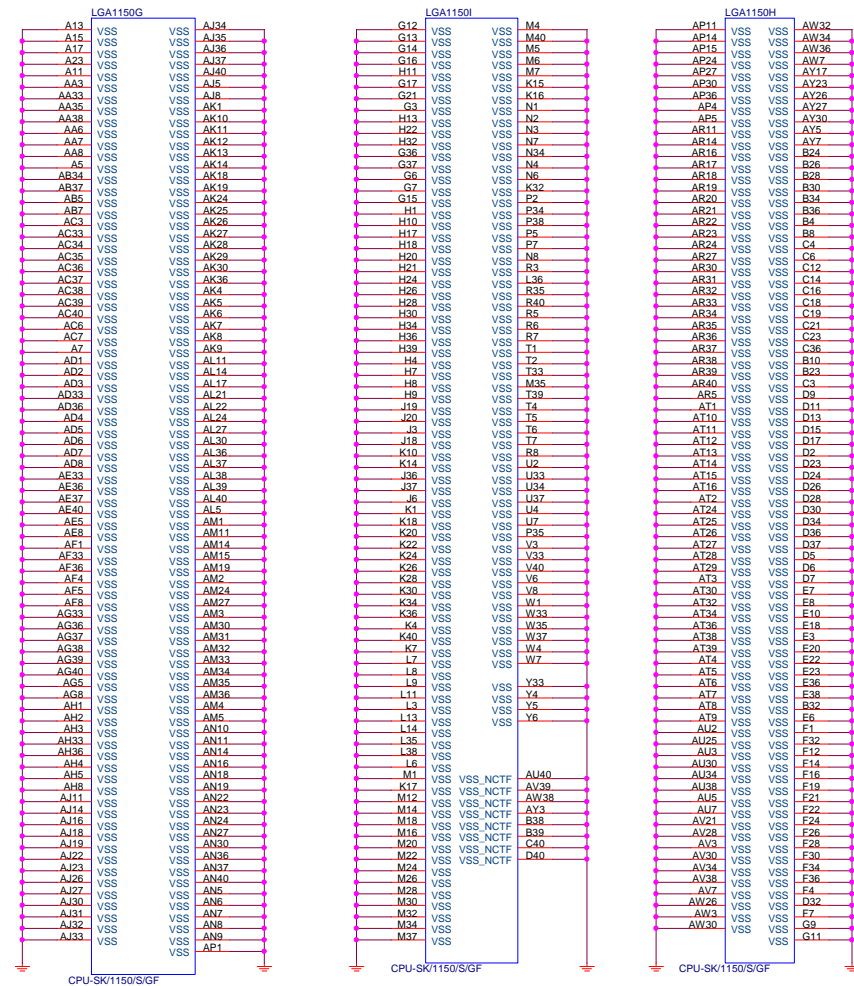
LGA1150 (D)



LGA1150 (F,J)

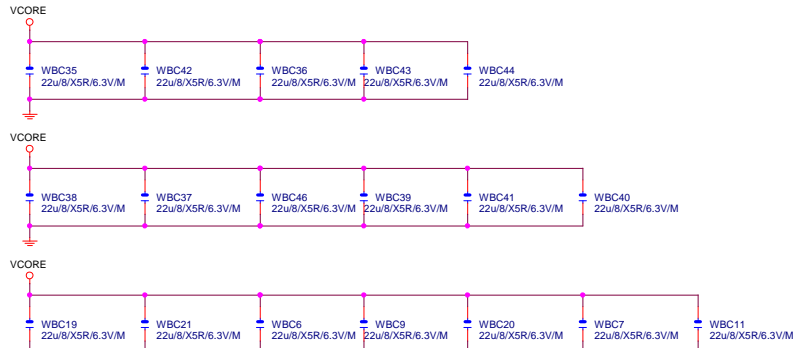


LGA1155 (G,H,I)



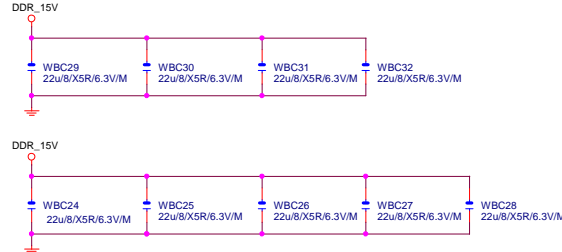
VCore CAP

(x18)



DDR CAP

(x9)



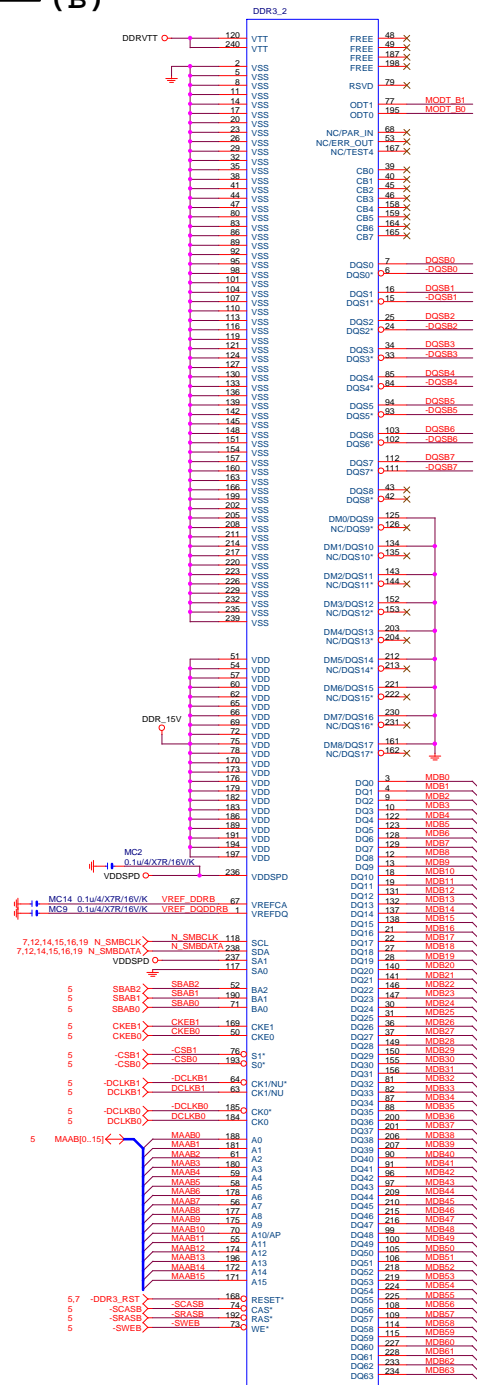
Gigabyte Technology

| | |
|-------|---------------|
| Title | CDLL CA1150.0 |
|-------|---------------|

| | | |
|--------|-----------------|-----|
| Size | Document Number | Rev |
| Custom | GA-H81M-HD3 | 1.0 |

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(B)



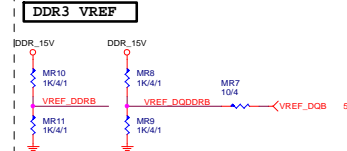
DDR3/240/BK/VA/D

BLACK CONNECTOR

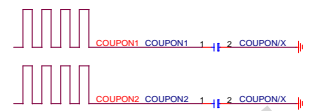
-DQSB[0..7]  **-DQSB[0..7]** 5

DQSB[0..7] < DQSB[0..7] 5

MODT_B[0..1] \longleftrightarrow MODT_B[0..1] 5



COUPON



CPU

DIMM2

CHA

DIMMI

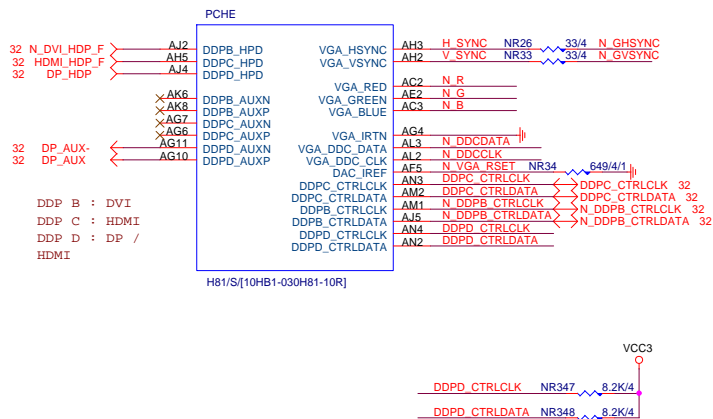
CHB

Gigabyte Technology

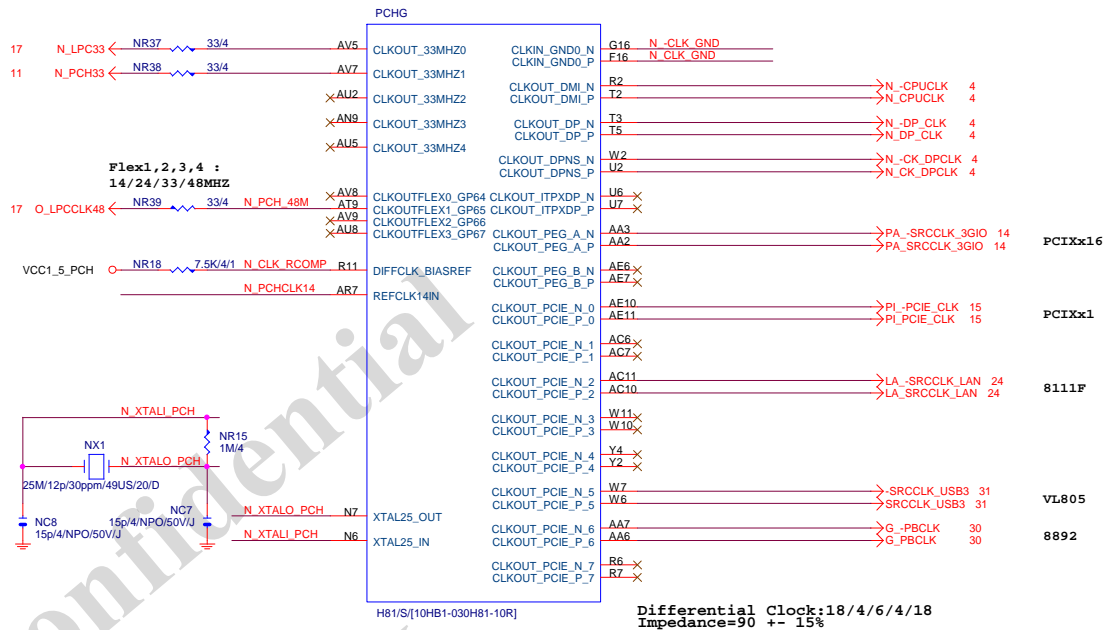
| | |
|------------------|-----------------|
| DDRIII CHANNEL 1 | |
| Size | Document Number |
| Custom | GA-H81M-HD3 |

| | |
|-----|------|
| Rev | 1.05 |
|-----|------|

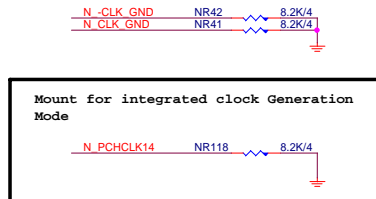
PCH (E)



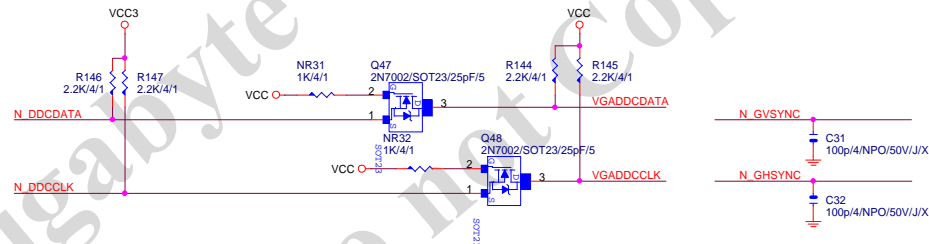
PCH (G)



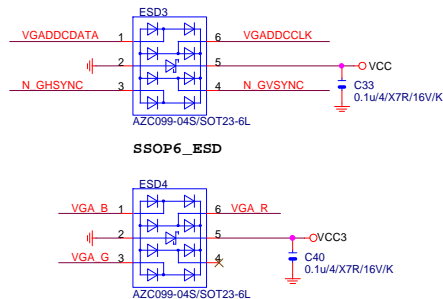
PCH CLK PD



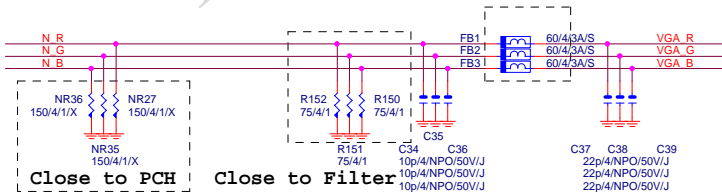
VGA DDC



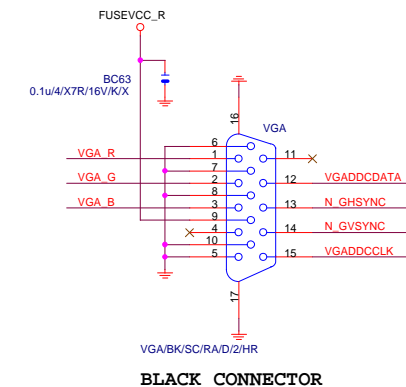
VGA ESD



VGA DDC

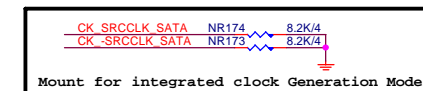
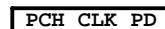


VGA CONNECTOR

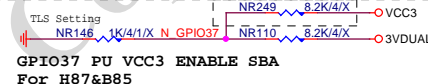


| Gigabyte Technology | | | |
|------------------------|-----------------|-----------------------------|----------------|
| Title | | | |
| PCH DISPLAY_CLK BUFFER | | | |
| Size | | | |
| Custom | Document Number | Rev | |
| | | GA-H81M-HD3 | |
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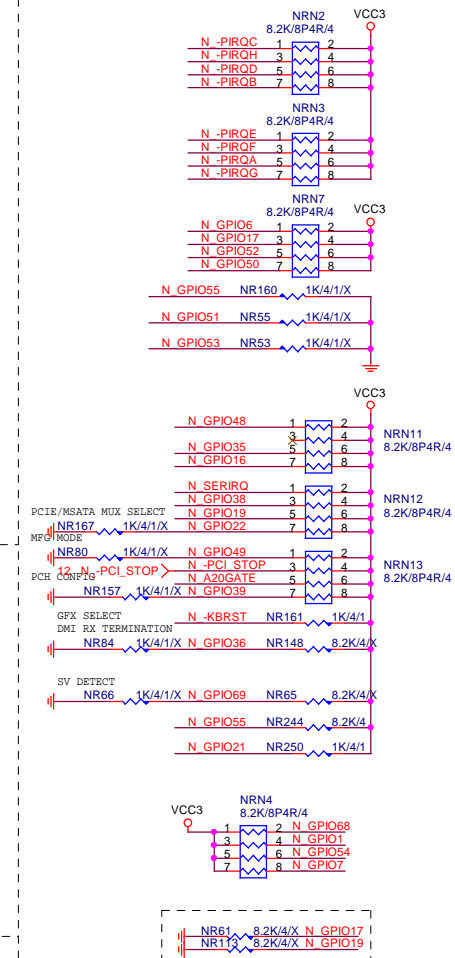
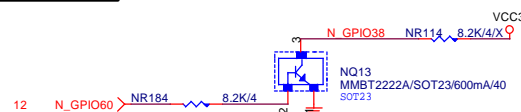
SATA3 : 20/7.5/4.5/7.5/20 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%
SATA2 : 15/7.5/4.5/7.5/15 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%



SATA CONNECTOR



GPIO38 Ctrl



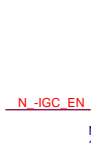
Gigabyte Technology

| | | | |
|----------------------|-----------------------------|-------|----------|
| Title | | | |
| PCH HOST , SATA, PCI | | | |
| Size | Document Number | | Rev |
| Custom | GA-H81M-HD3 | | 1.05 |
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(D)



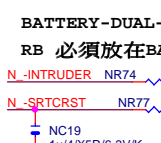
HSW_STRAP13



32.768KHZ



CLR_CMOS



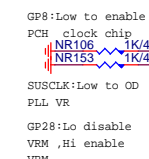
ACZ_SDOUT



PCH_DPWROK



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

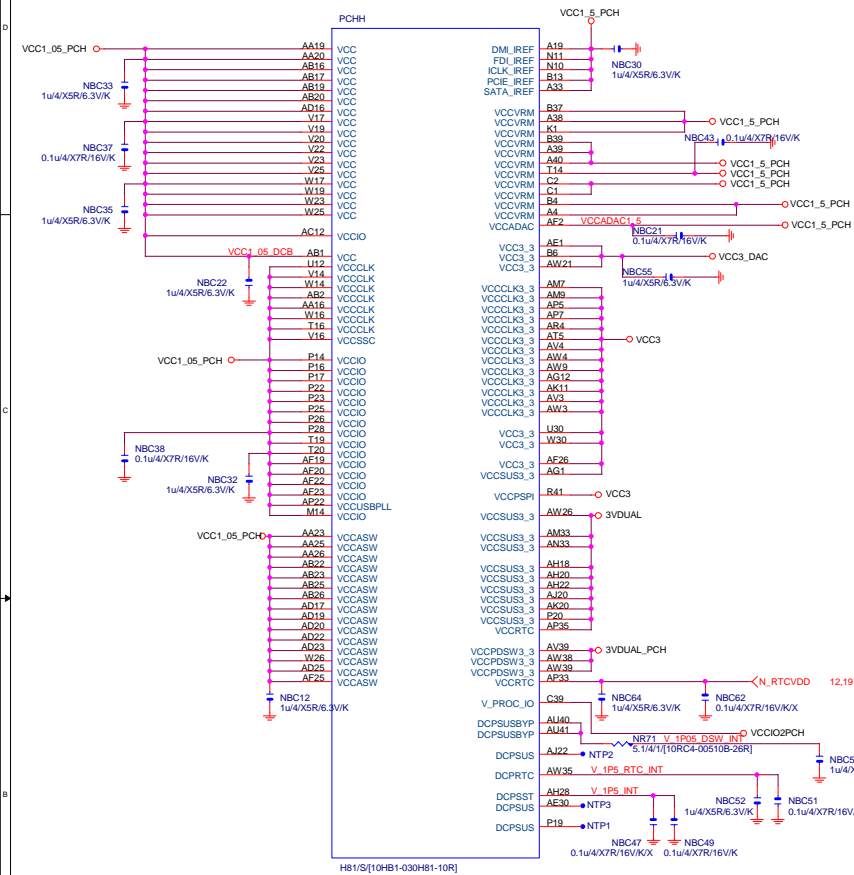


Gigabyte Technology

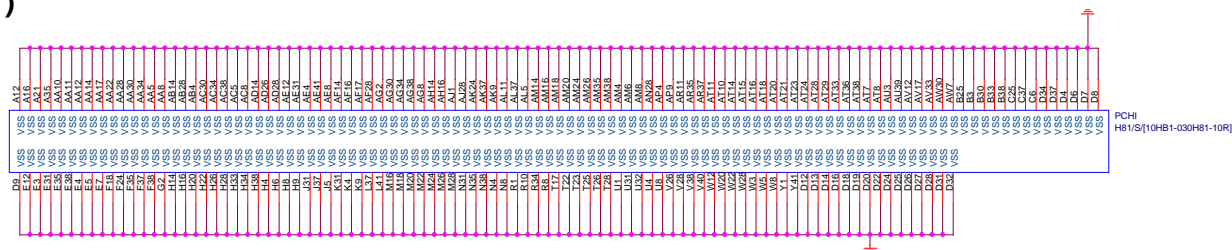
PCH GPIO , CTRL , AUDIO

er **GA-H81M-HD3**Rev
1.05

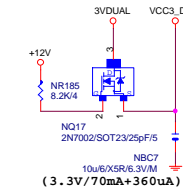
PCH (H)



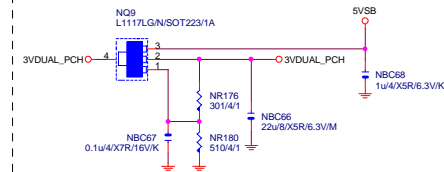
PCH (I)



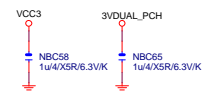
VCC3_DAC



3VDUAL_PCH

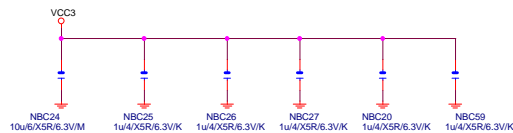


SHT PWR

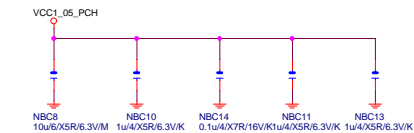


CAP

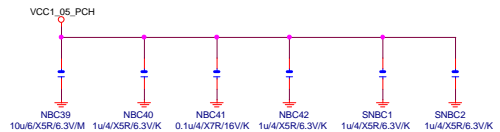
(3.3V) (X6)



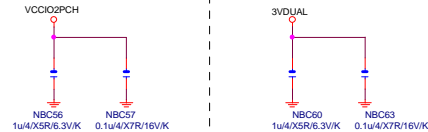
(1.05V) (x5)



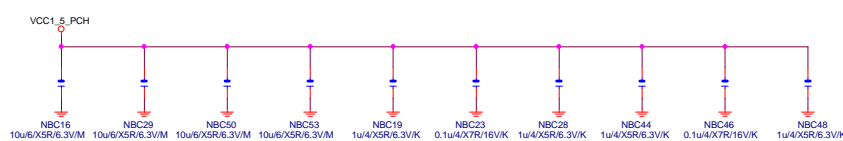
(1.05V) (X6)



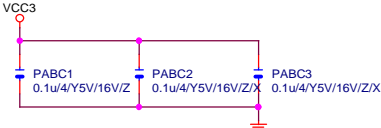
$$(1.05V)(x2) + (3.3V)(x2)$$



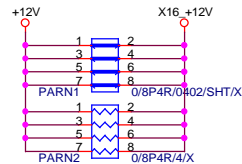
(1.05V) (x10)



PCIEX16 CAP



PCIEX16 PROTECT SHT

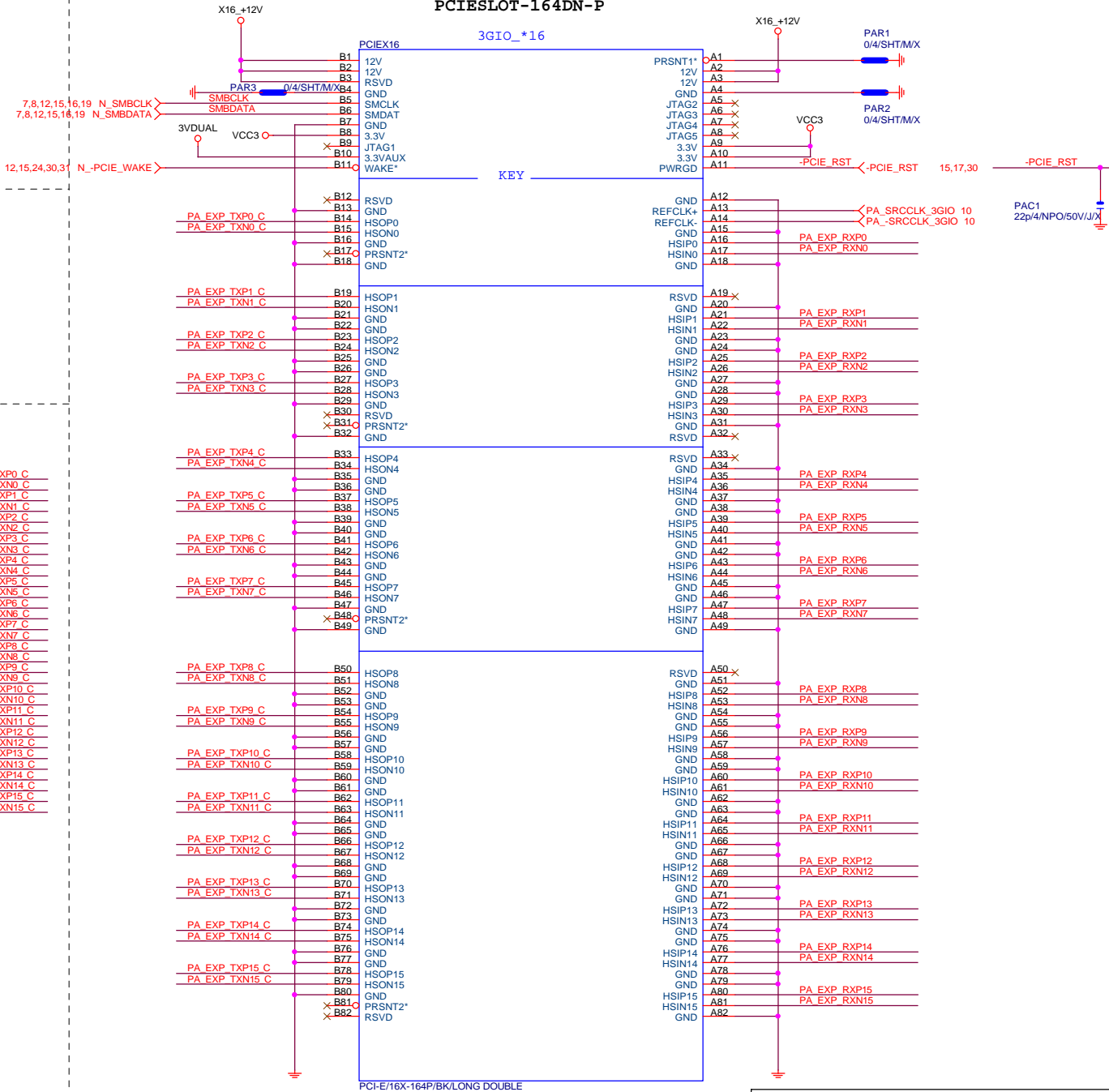


PCIEX16 AC CAP

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

PA EXP RXP0.[15] >>>PA_EXP_RXP[0..15] 4
PA EXP RXN0.[15] >>>PA_EXP_RXN[0..15] 4
PA EXP TXP0.[15] >>>PA_EXP_TXP[0..15] 4
PA EXP TXN0.[15] >>>PA_EXP_TXN[0..15] 4

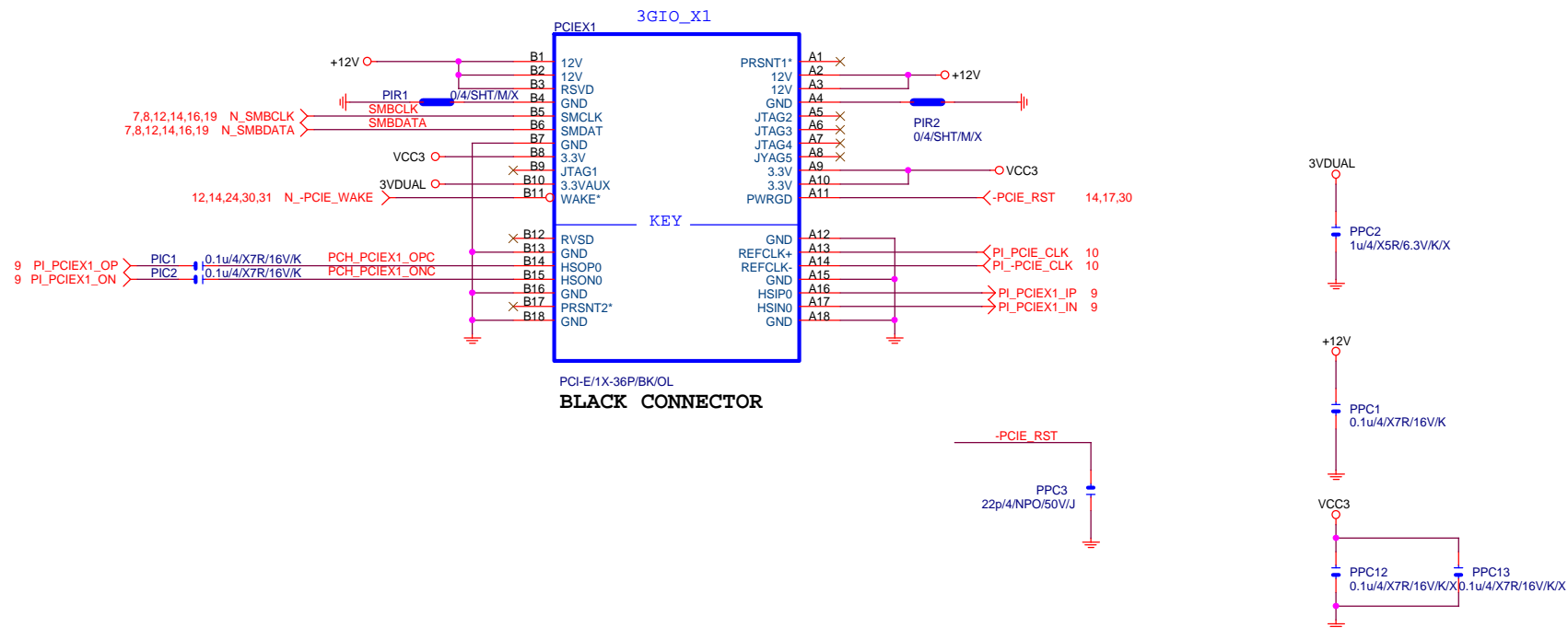
PCIEX16 SLOT



BLACK CONNECTOR

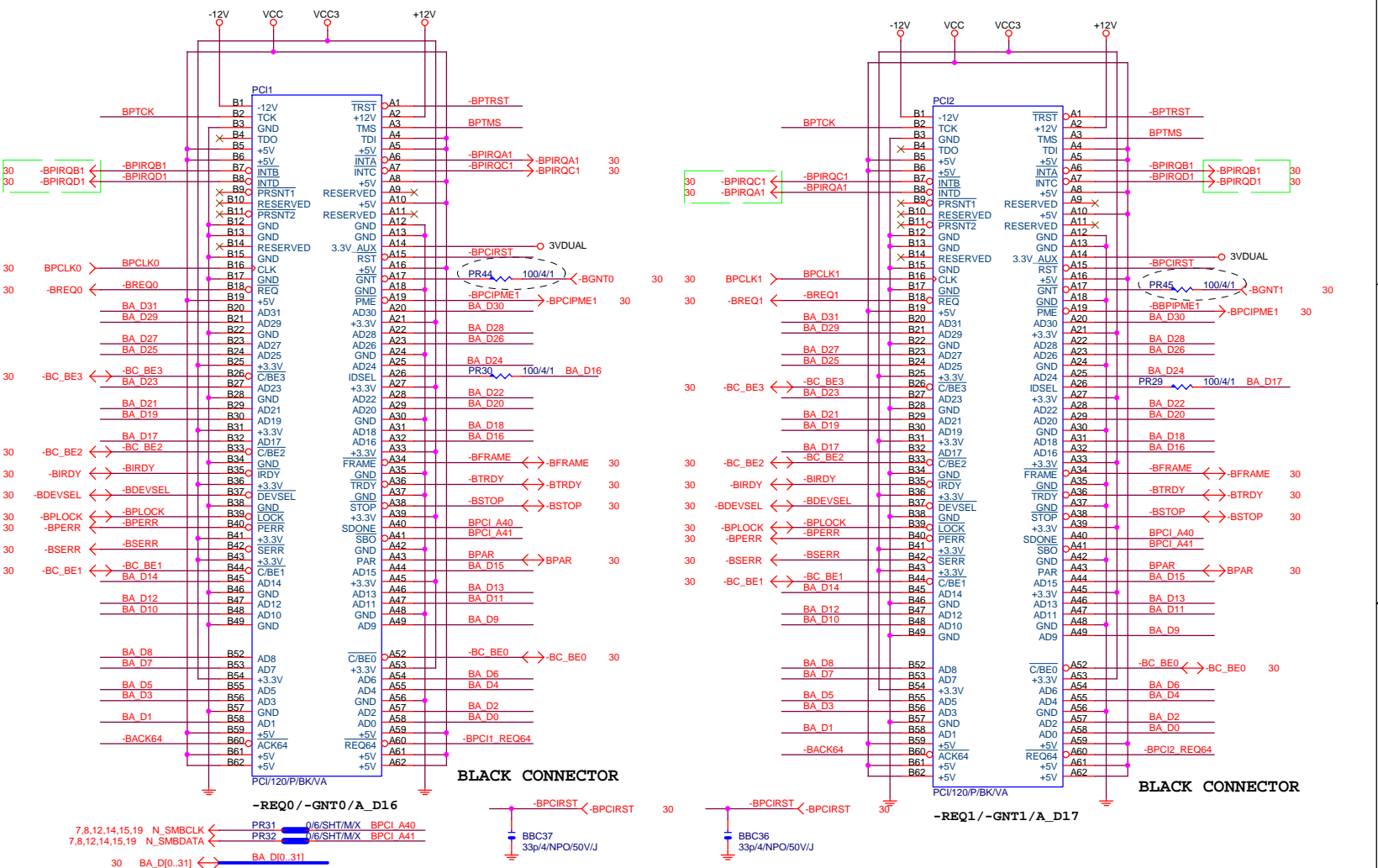
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| Gigabyte Technology | | |
| Title | | |
| PCI EXPRESS * 16 | | |
| Size | Document Number | Rev |
| Custom | GA-H81M-HD3 | 1.05 |
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PCIEX1 SLOT



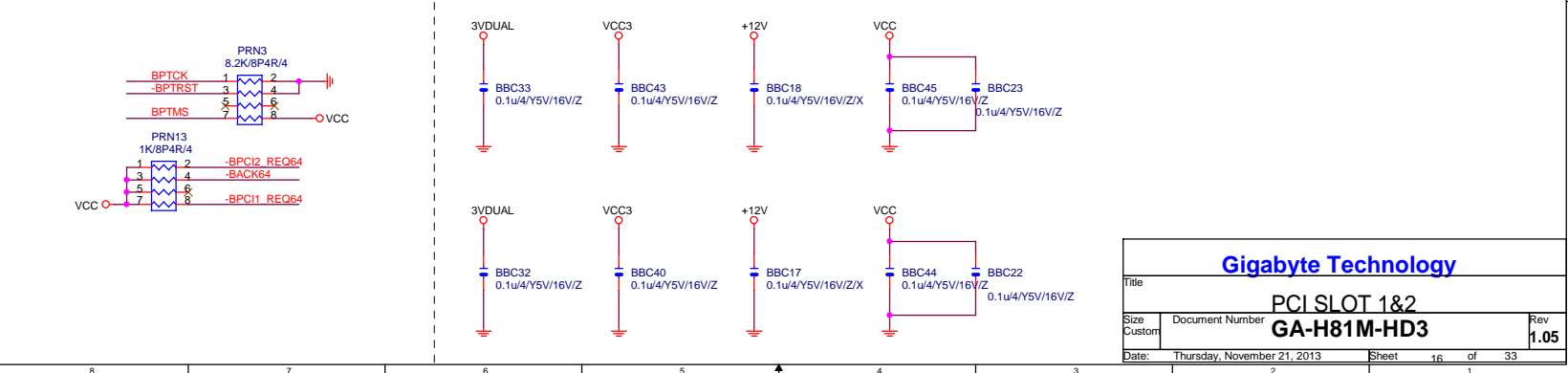
PCI SLOT 1

PCI SLOT 2

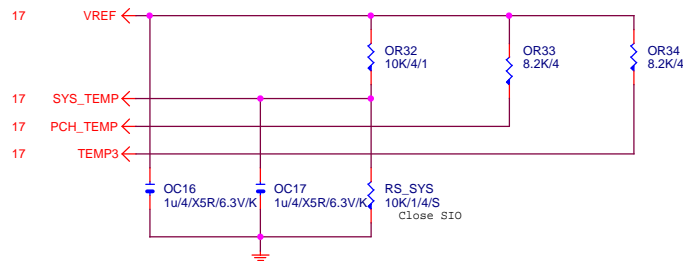


PCI PU

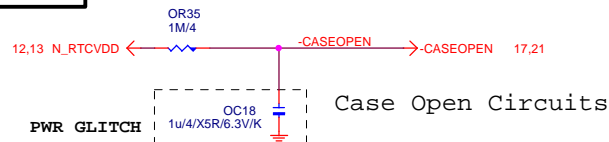
PCI CAP



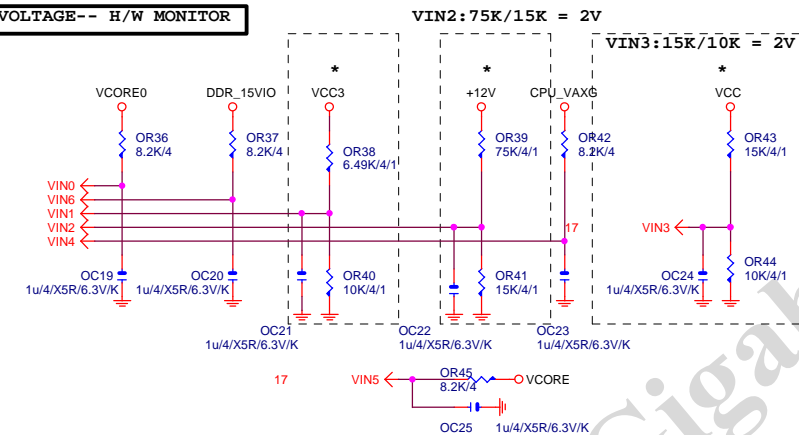
TEMP H/W MONITOR



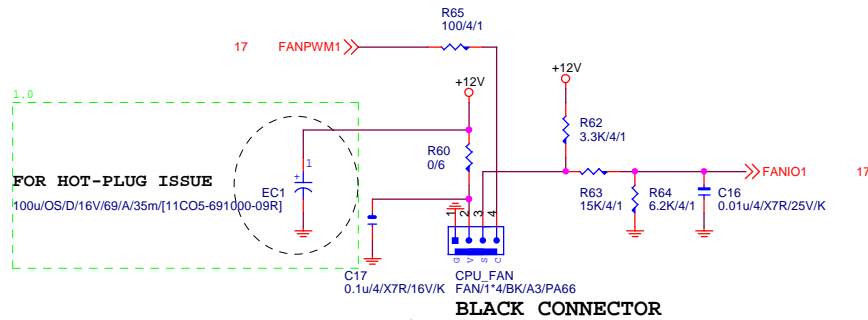
CASE OPEN



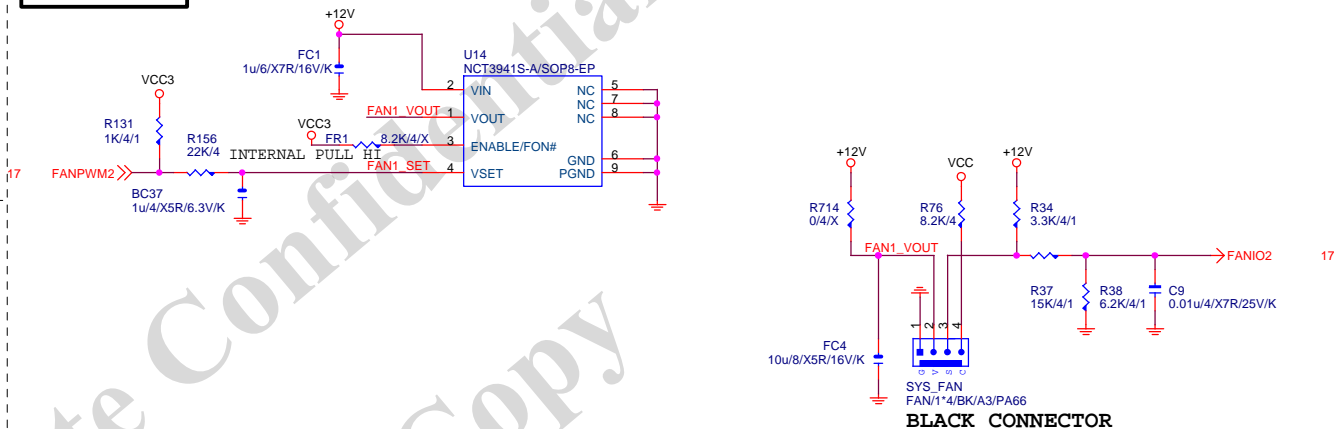
VOLTAGE-- H/W MONITOR



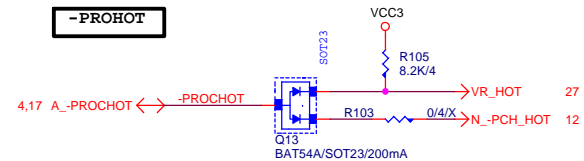
CPU SMART FAN



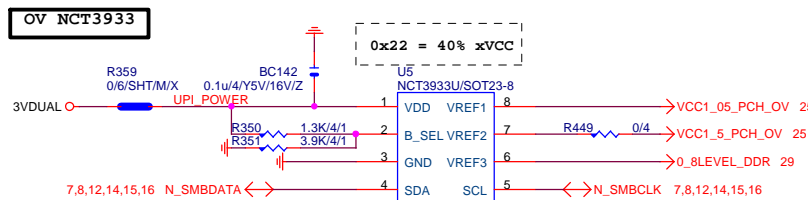
SYS SMART FAN



-PROHOT

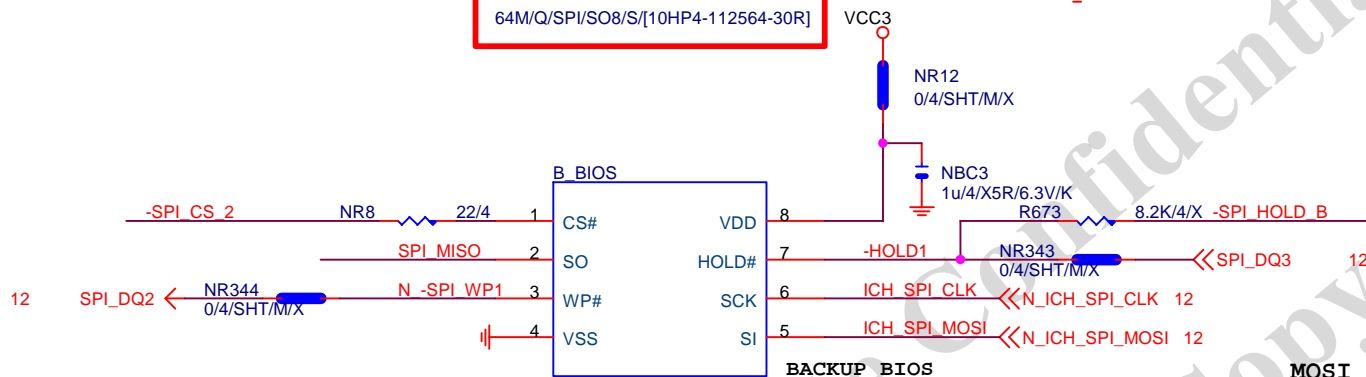
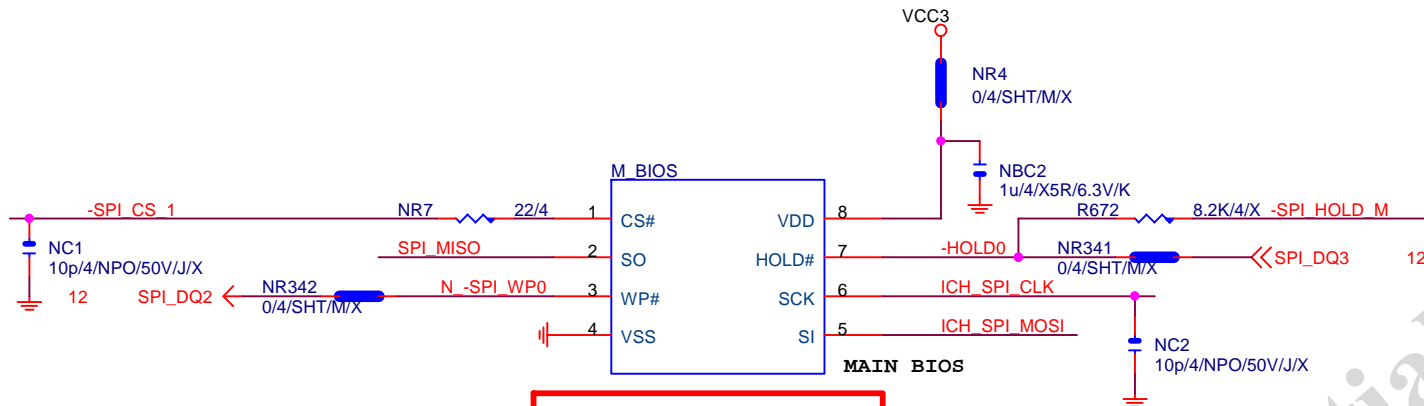


接pwm feedback pin



Gigabyte Technology

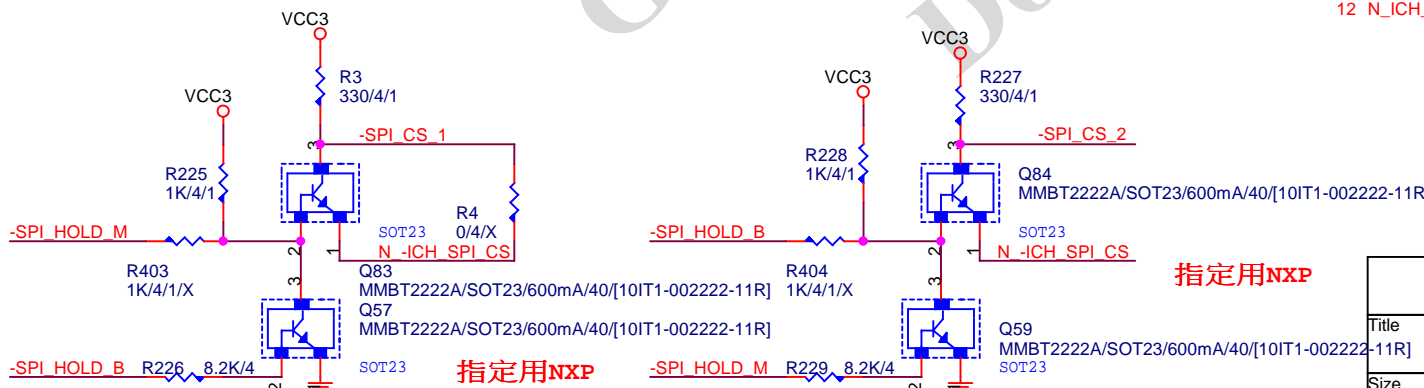
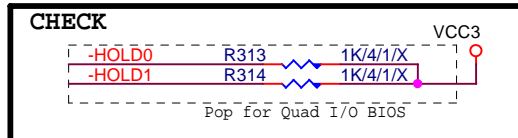
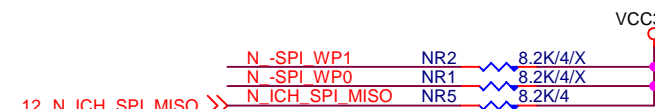
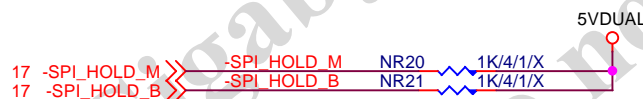
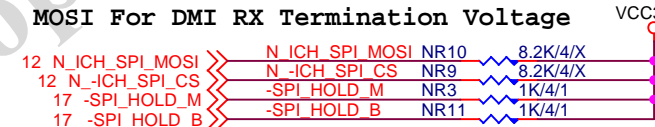
| | | | | |
|---------------------|-----------------------------|--|-------|----------|
| Gigabyte Technology | | | | |
| Title | | | | |
| HWM,FAN CTRL_OV | | | | |
| Size | Document Number | | | Rev |
| Custom | GA-H81M-HD3 | | | 1.05 |
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| BOOT DEVICE | GNT0 | GNT1 |
|-------------|------|------|
| LPC | 0 | 0 |
| PCI | 0 | 1 |
| NAND | 1 | 0 |
| SPI | 1 | 1 |

1 means floating
0 means PD 1K

MOSI For DMI RX Termination Voltage



指定用NXP

Gigabyte Technology

DUAL BIOS

GA-H81M-HD3

Rev
1.05

Title

Size

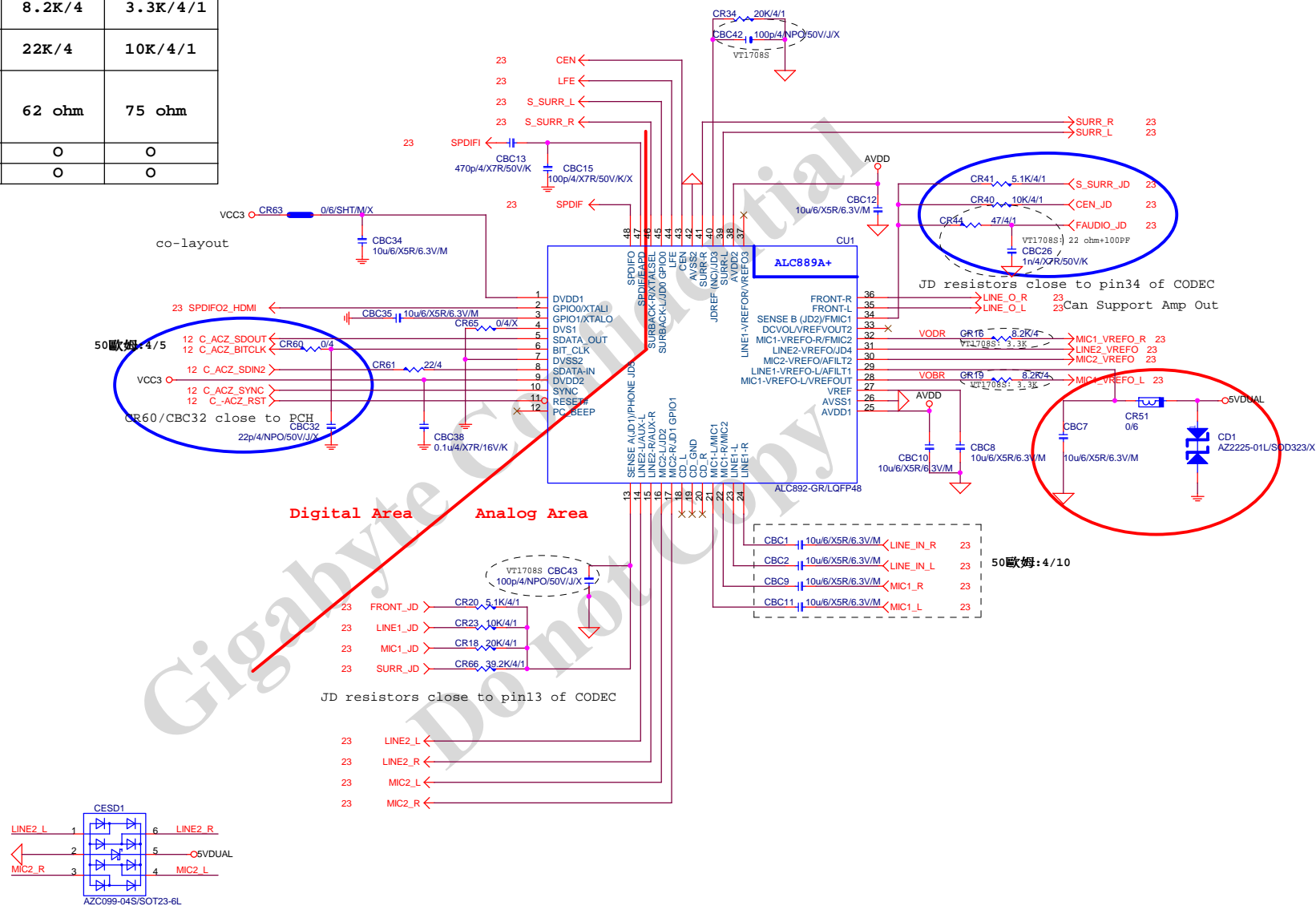
Custom

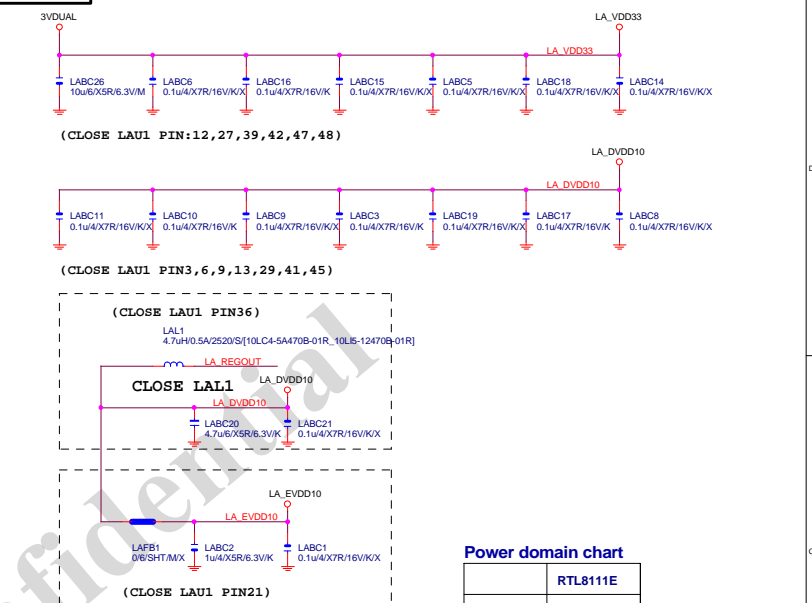
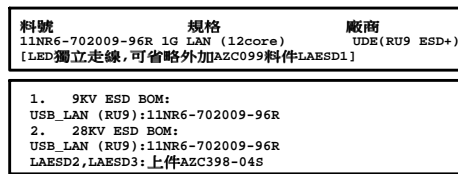
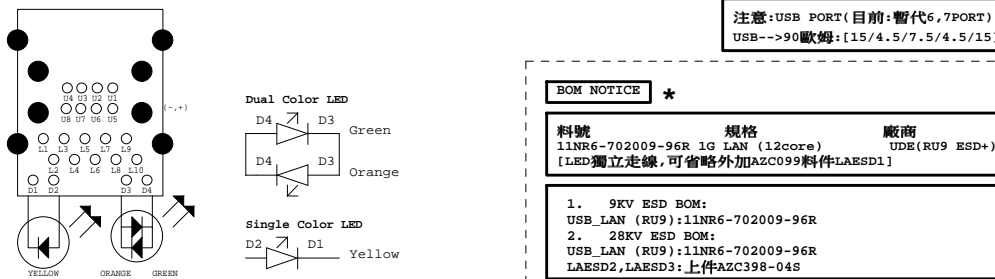
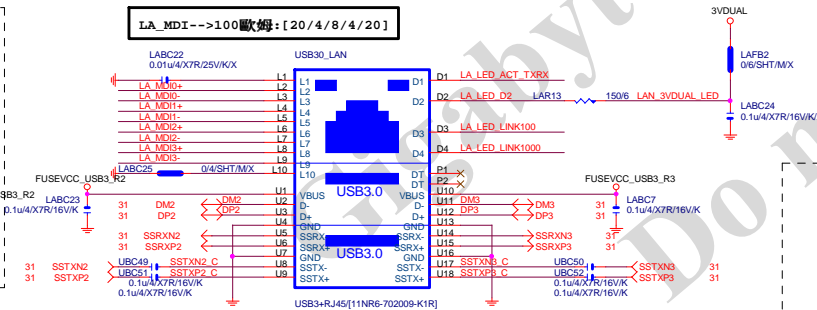
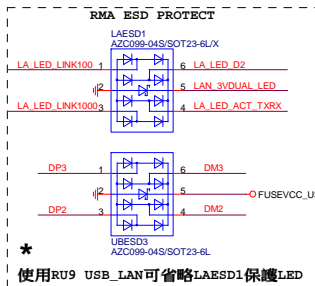
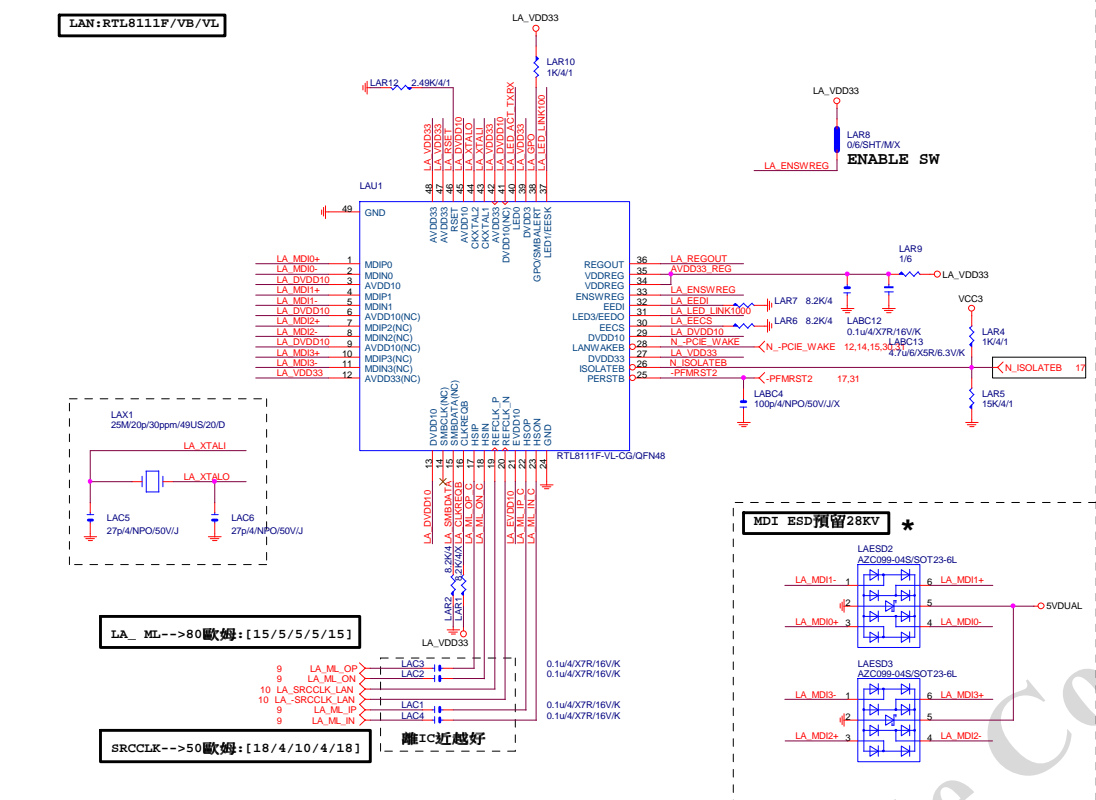
Document Number

Date: Thursday, November 21, 2013

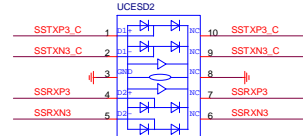
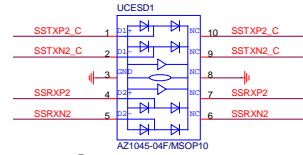
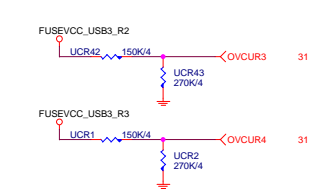
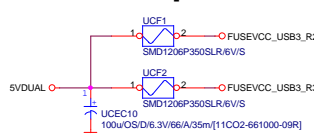
Sheet 20 of 33

| | | | |
|--|-----------|------------|------------|
| | ALC892 | ALC887-VD2 | VT1708S-CE |
| CR44/CBC26 | 47ohm+1nF | 47ohm+1nF | 22ohm+100P |
| CBC42/CBC43 | X | X | 100P/4 |
| CR16/CR19 CR52/CR56/CR10/CR9 | 8.2K/4 | 8.2K/4 | 3.3K/4/1 |
| 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 | O | O | O |
| CESD1 | O | O | O |

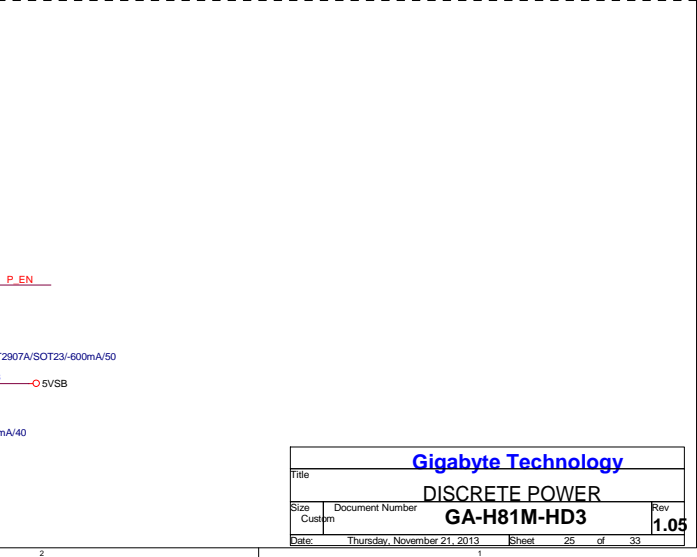
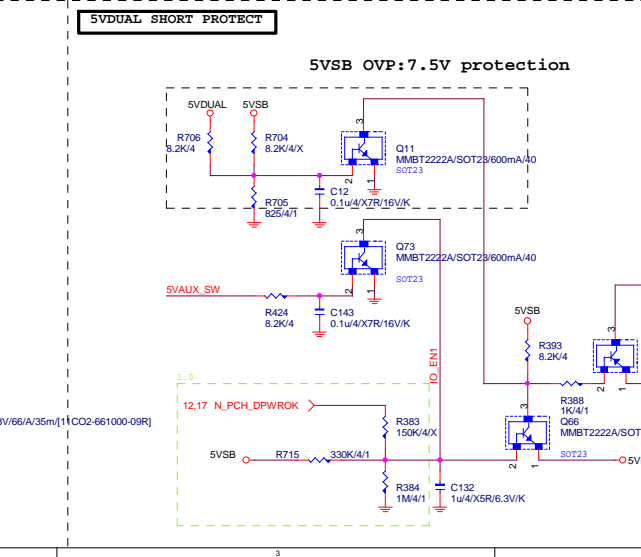
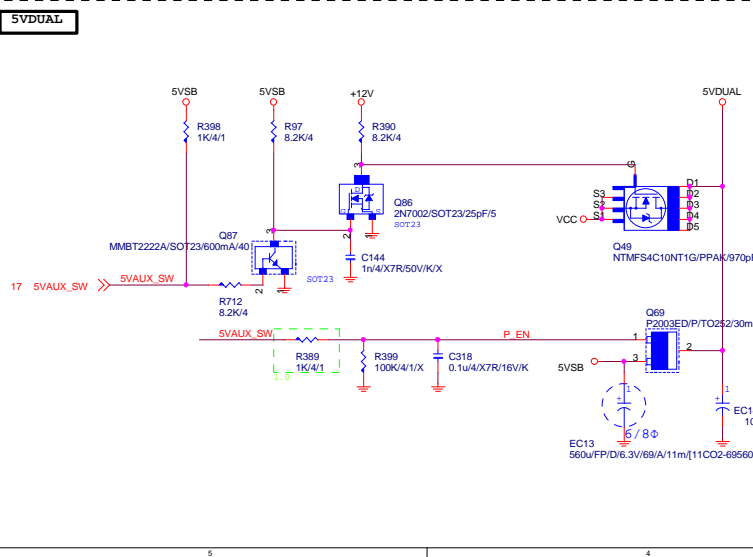
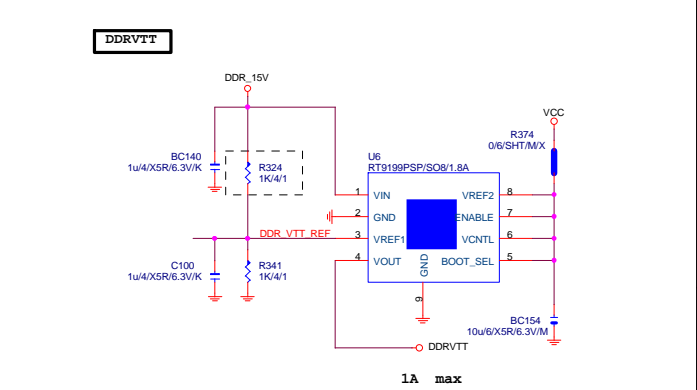
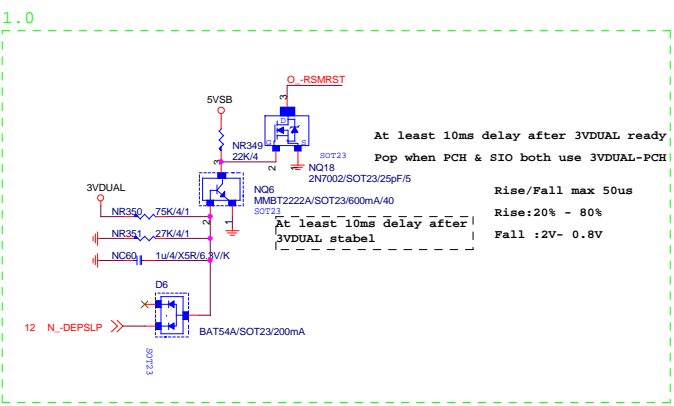
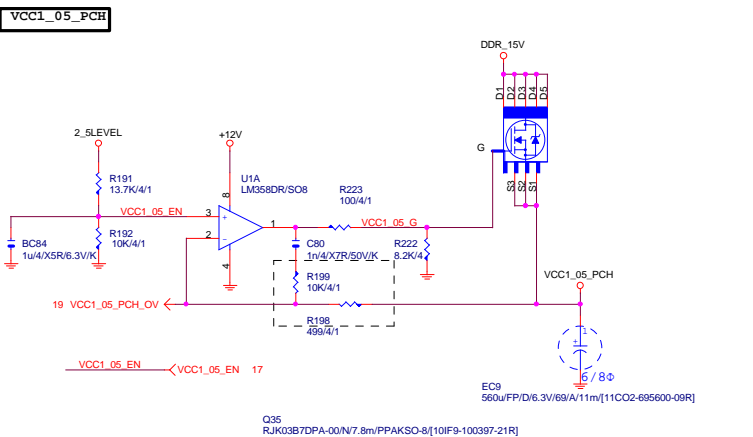
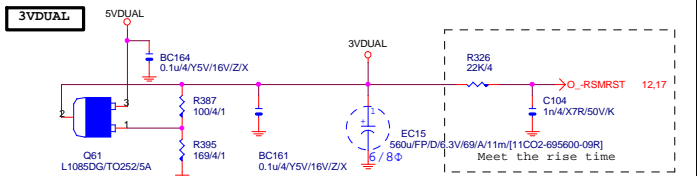
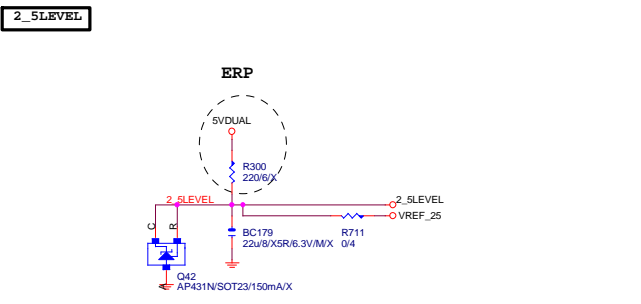
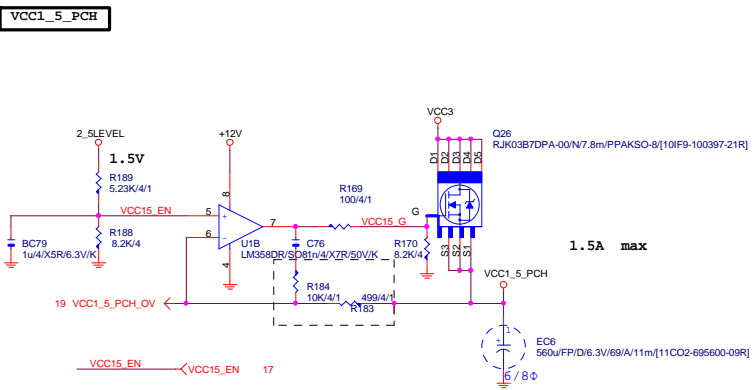




| | |
|--------|----------|
| | RTL8111E |
| AVDD33 | 3.3V |
| DVDD33 | 3.3V |
| VDDREG | 3.3V |
| DVDD10 | 1.05V |

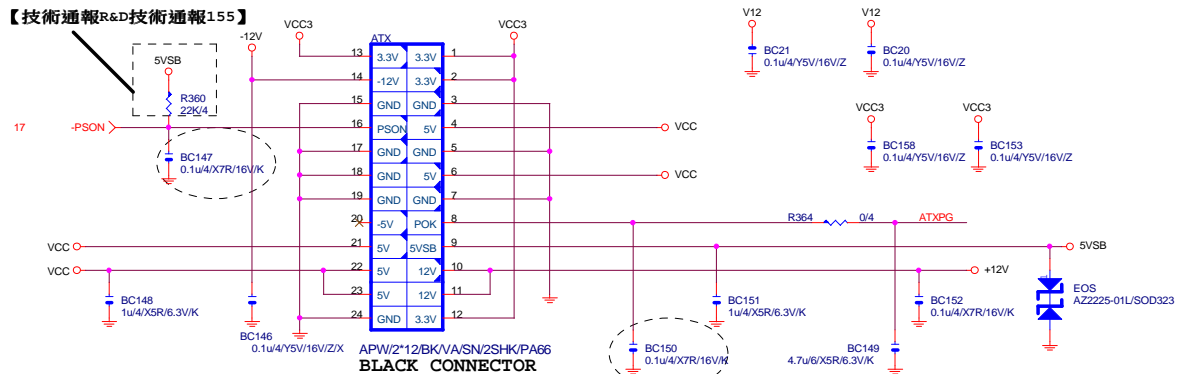


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| Gigabyte Technology | | | |
| Title: Realtek RTL8111G | | | |
| Size: Custom | Document Number: GA-H81M-HD3 | | Rev: 1.0 |
| Date: Thursday, November 21, 2013 | Sheet | 24 of 33 | |

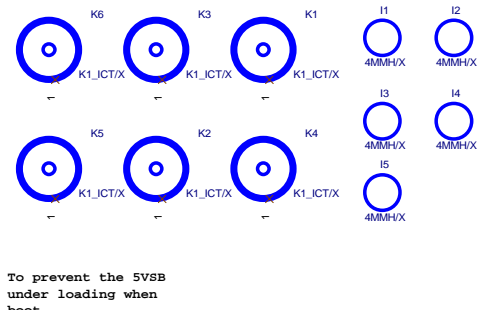
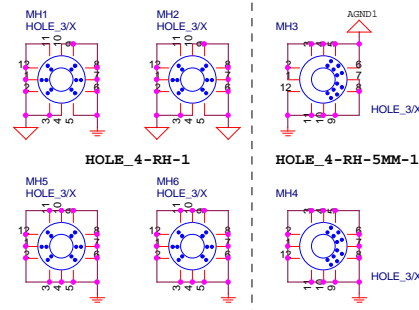
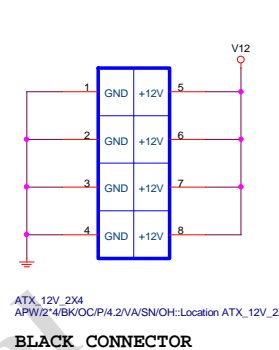


ATXX24 POWER CONNECTOR

【技術通報R&D技術通報155】



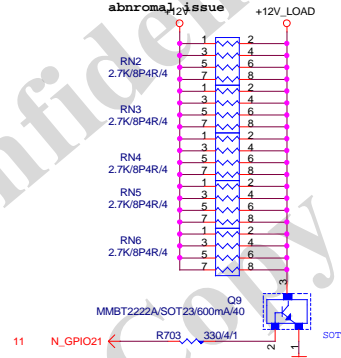
ATXX4 POWER CONNECTOR



To prevent the 5VSB under loading when boot

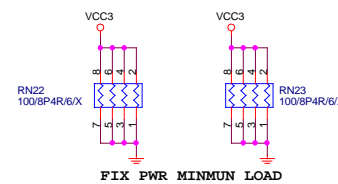
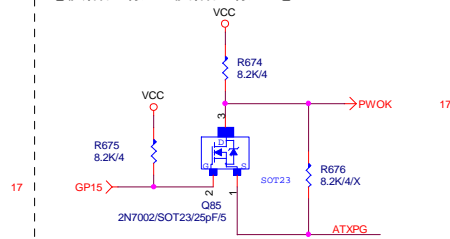
【技術通報R&D技術通報153】

To fix 12V light load abnormal issue



PWOK PATCH

【技術通報R&D技術通報154】



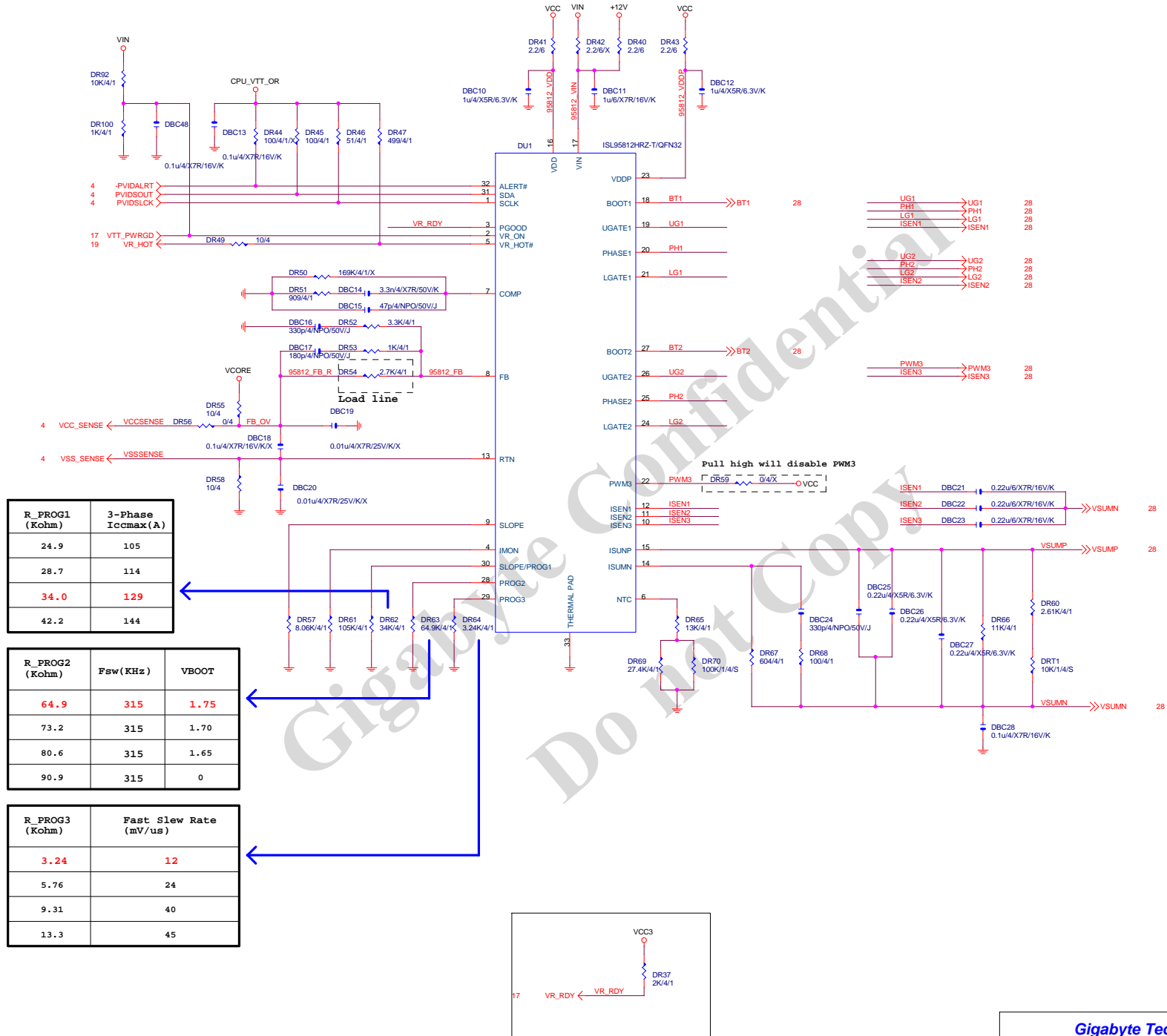
Gigabyte Technology

ATX CONNECTOR

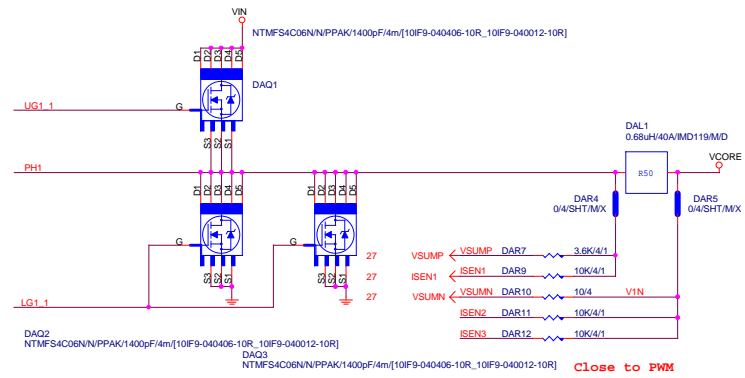
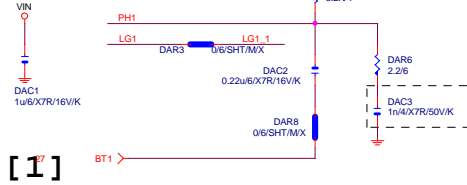
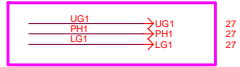
GA-H81M-HD3

Rev 1.05

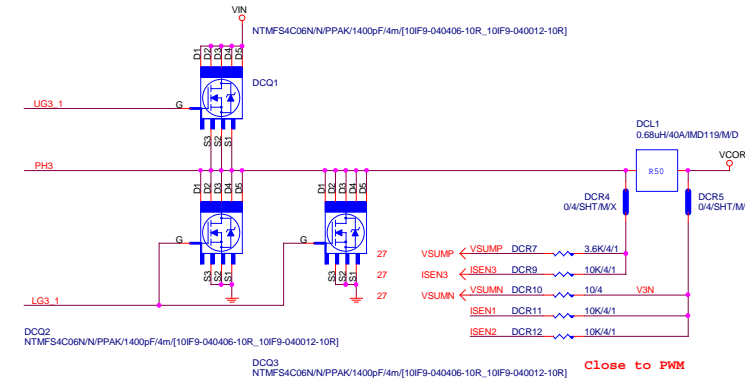
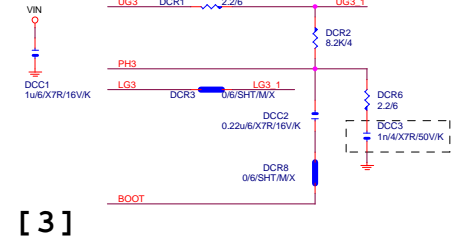
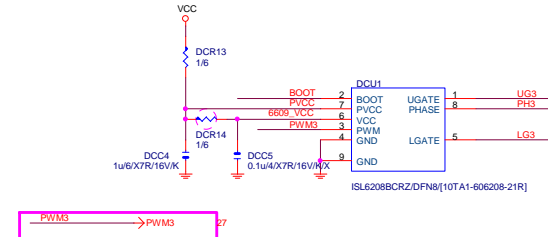
Date: Thursday, November 21, 2013 Sheet 26 of 33



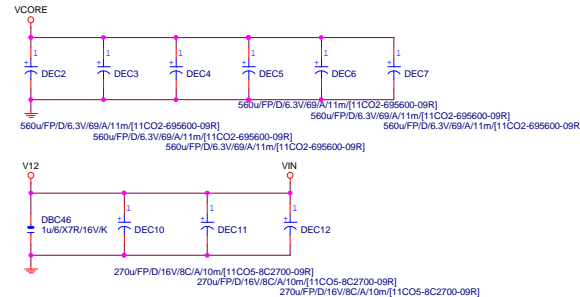
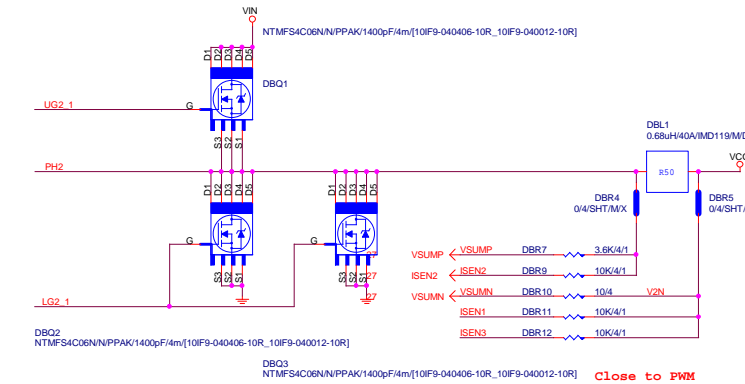
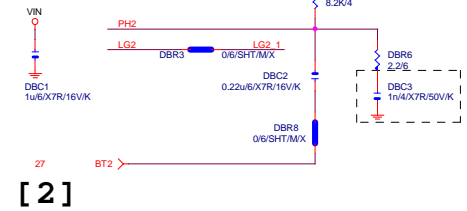
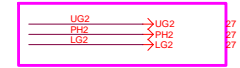
PHASE 1



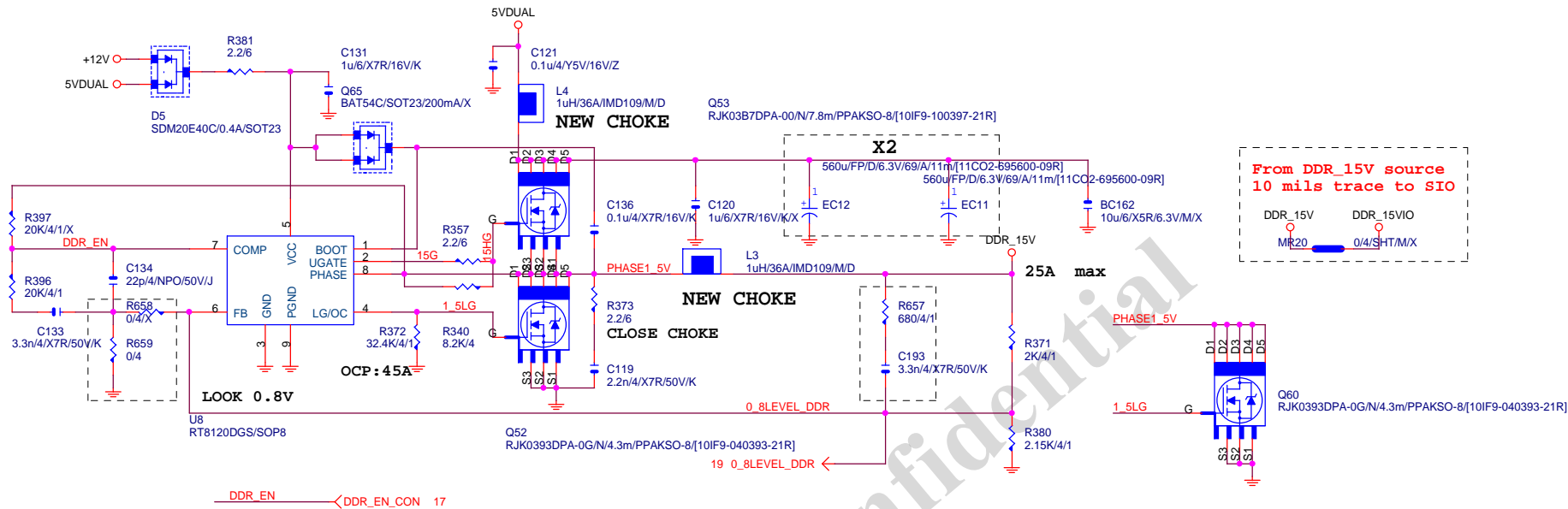
PHASE 3



PHASE 2



DDR15V



PWR_SEQ

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°C), 1(105°C)
 VIN Ripple current=4.7X1.7=7.99A(85°C)
 -->故固態電容須2X7.99=15.98>11.45A

$$Rocset = (Iocp * Lgate, rdson) / Iocset$$

$$Rocset = (45A * 6.7mOhm) / 10uA = 30K$$

$$Iocset = 10uA$$

Gigabyte Technology

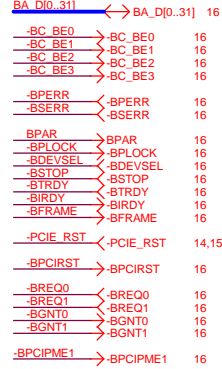
RT8120_DDR POWER

| Size | Document Number | Rev |
|--------|-----------------|------|
| Custom | GA-H81M-HD3 | 1.05 |

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PCIE TO PCI

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



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

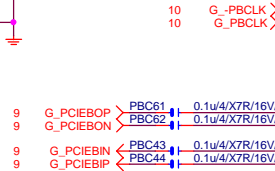
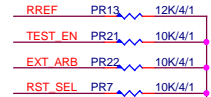
High: PCICLK INPUT form CLK Gen
Low: PCICLK OUTPUT form IT8893 chip

Co-Lay IT8893 (IT8893 CLKOUT1 N/A)

IT8892: PR24 -> 47ohm
IT8893: PR24 -> 22ohm

IT8892: PR46 -> X
IT8893: PR46 -> O

IT8892: PR19 -> O
IT8893: PR19 -> X

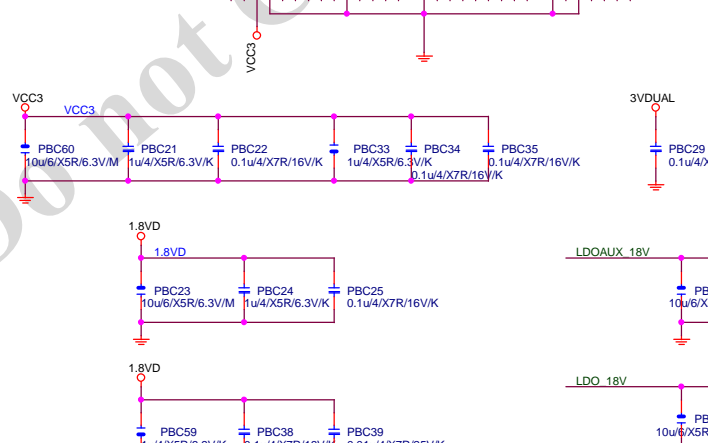
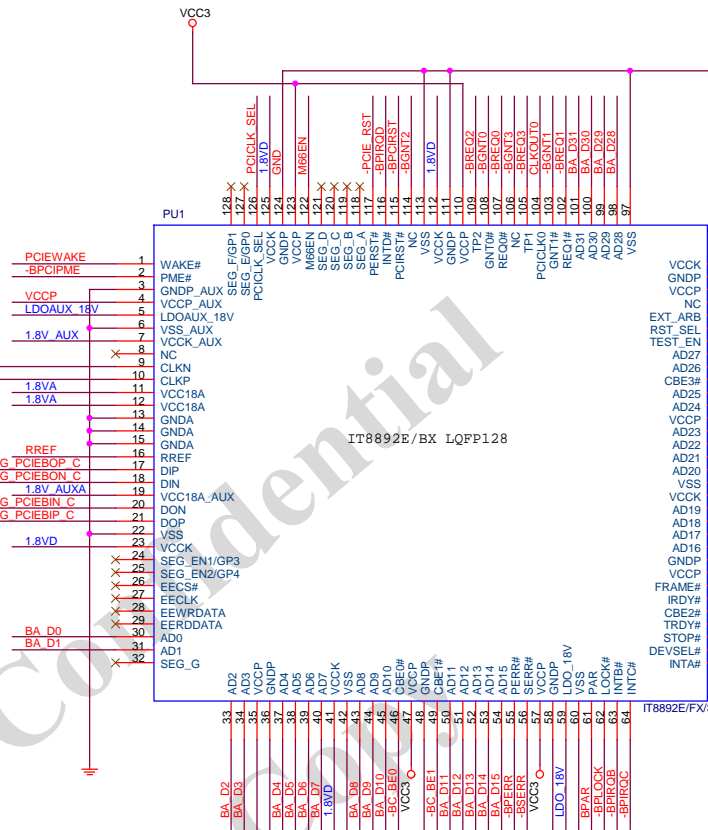
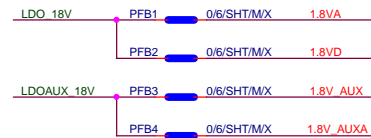
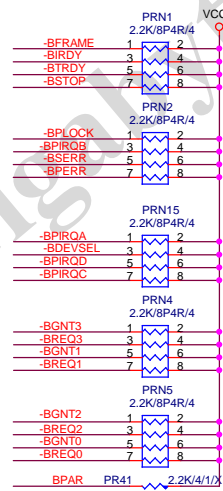
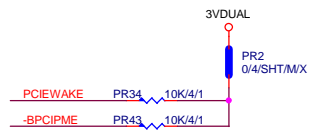


IT8892

PCI slot

PCI slot

chipset side



PCB layout note:
Close to chip

PCB layout note:
Close to chip

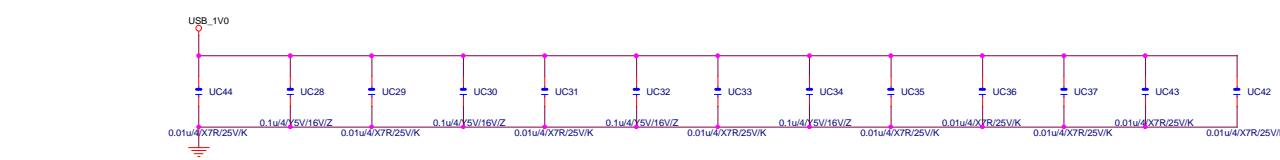
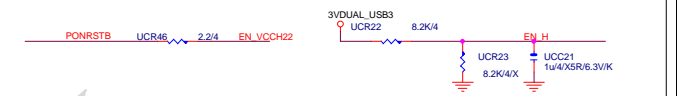
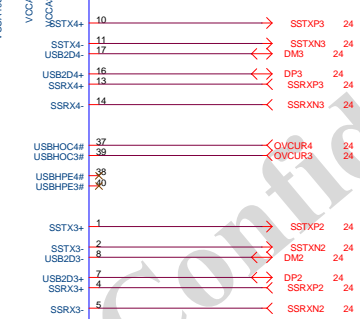
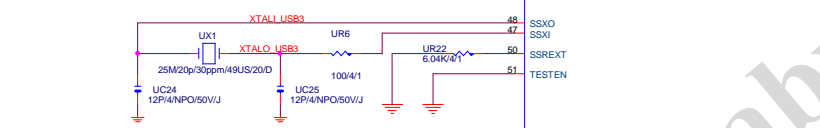
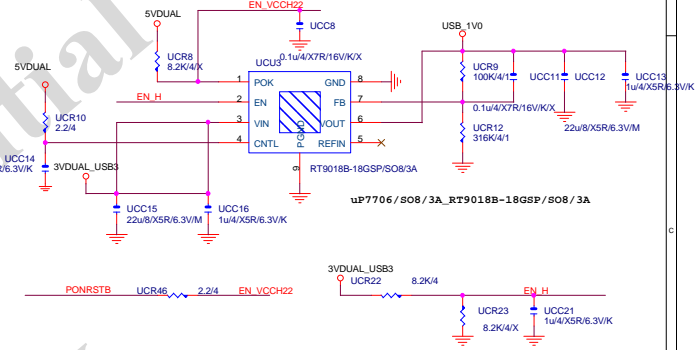
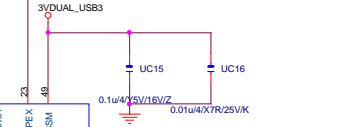
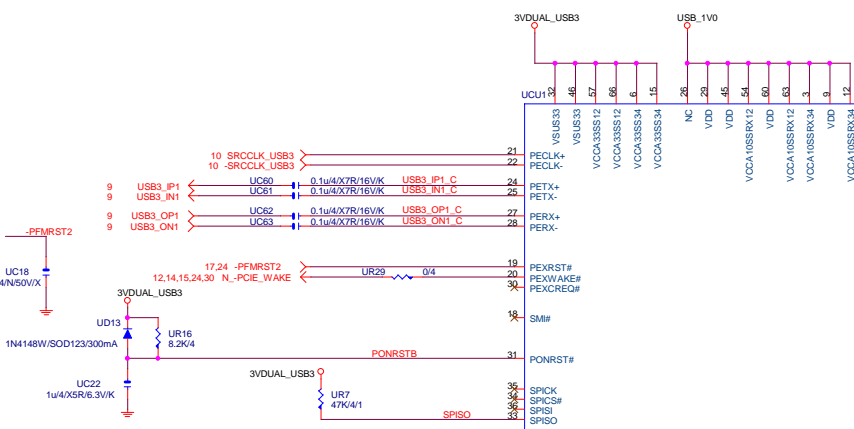
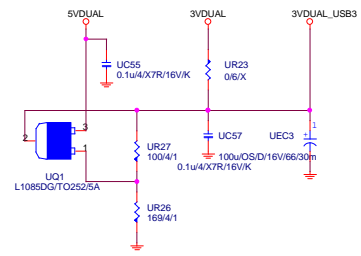
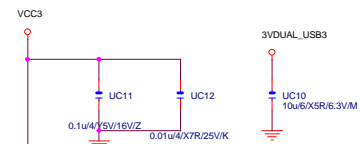
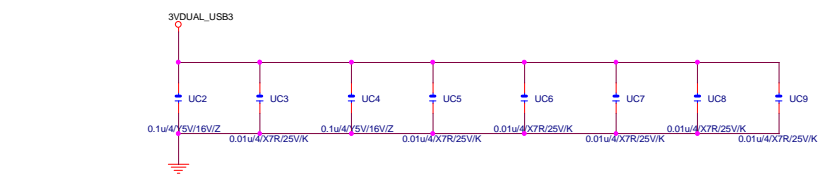
Gigabyte Technology

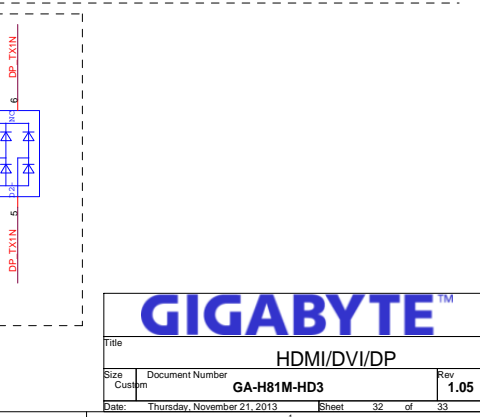
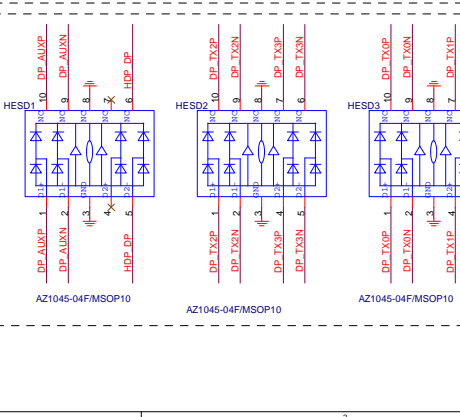
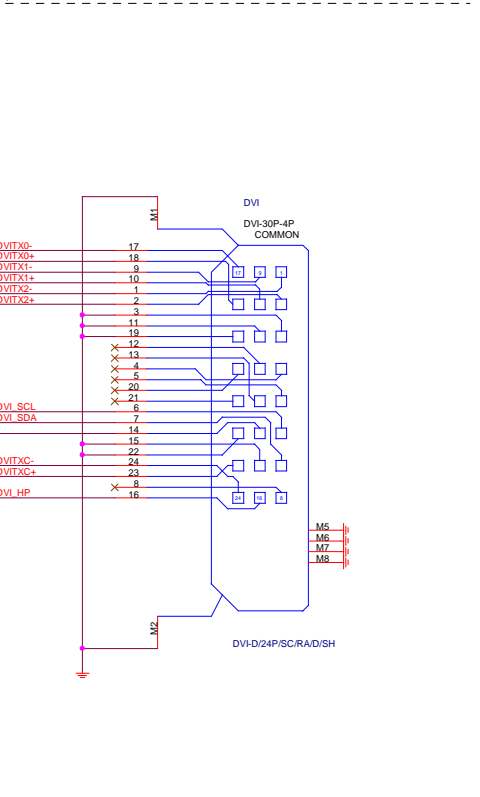
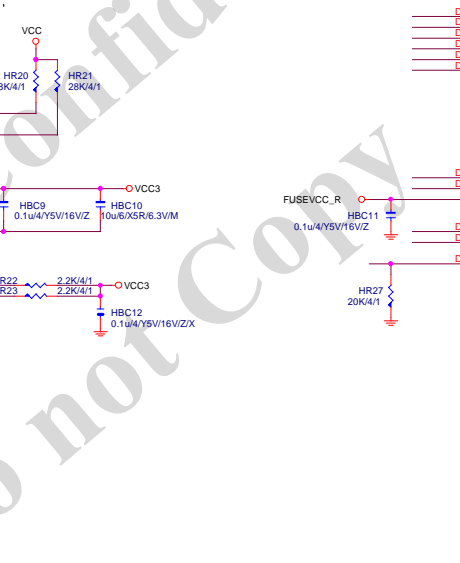
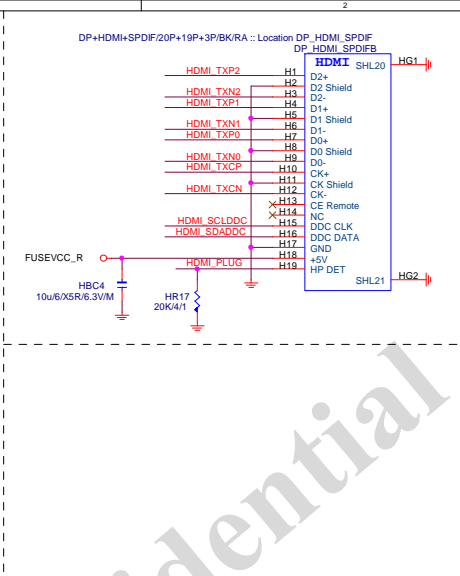
ITE IT8892E

GA-H81M-HD3

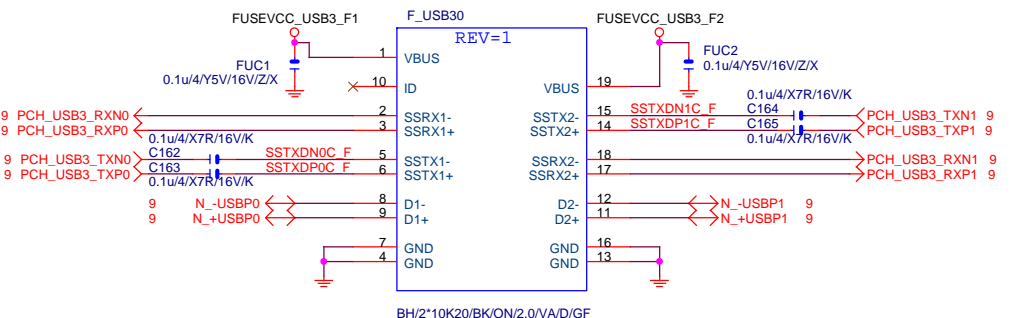
1.05

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|--------|-----------------------------|-------|----------|
| Title | ITE IT8892E | Rev | 1.05 |
| Size | Document Number | Sheet | 30 of 33 |
| Custom | | | |
| Date: | Thursday, November 21, 2013 | Sheet | 30 of 33 |

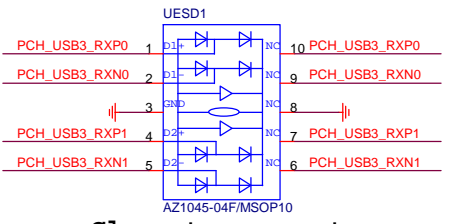




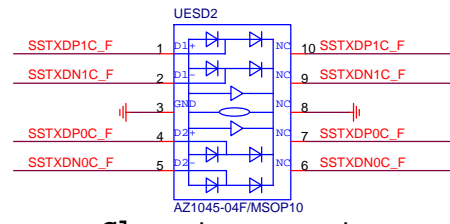
F_USB30



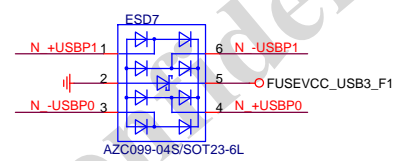
BLACK CONNECTOR



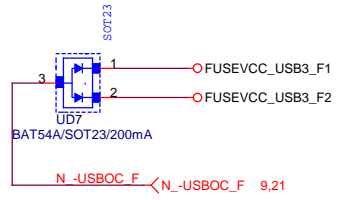
Close to connector



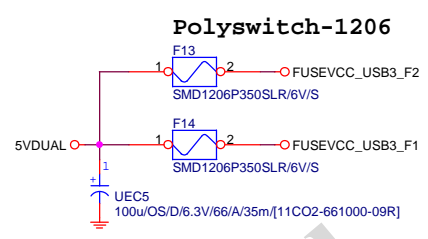
Close to connector



Close to connector



F_USB30 PWR



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