

**Model Name: Q87M-D2HM MS****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 EXPRESSX4 / X1 SLOT    |
| 16 | PCI SLOT                   |
| 17 | ITE 8728 LPC IO            |
| 18 | KB_MS, R_USB               |
| 19 | HWM,FAN CTRL,-PROCHOT      |
| 20 | DUAL BIOS,TPM              |
| 21 | FP,FUSB,SPK,SATALED        |
| 22 | Realtek CODEC              |
| 23 | REAR AUDIO JACK            |
| 24 | INTEL i217 PHY             |
| 25 | DISCRETE POWER             |
| 26 | ATX, M3 POWER              |
| 27 | VCORE ISL95820_1           |

**SHEET****TITLE**

|    |                    |
|----|--------------------|
| 28 | VCORE ISL95820_2   |
| 29 | RT8120_DDR POWER   |
| 30 | COM , LPT , 80PORT |
| 31 | DVI, HDMI ,DP      |
| 32 | IT8892E PCI BRIDGE |

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|                            |                               |               |
|----------------------------|-------------------------------|---------------|
| <b>Gigabyte Technology</b> |                               |               |
| Title                      |                               |               |
| Cover Sheet                |                               |               |
| Size                       | Document Number               | Rev           |
| Custom                     | <b>Q87M-D2HM MS</b>           | <b>1.1</b>    |
| Date:                      | Wednesday, September 04, 2013 | Sheet 1 of 32 |

**Model Name: Q87M-D2HM MS**

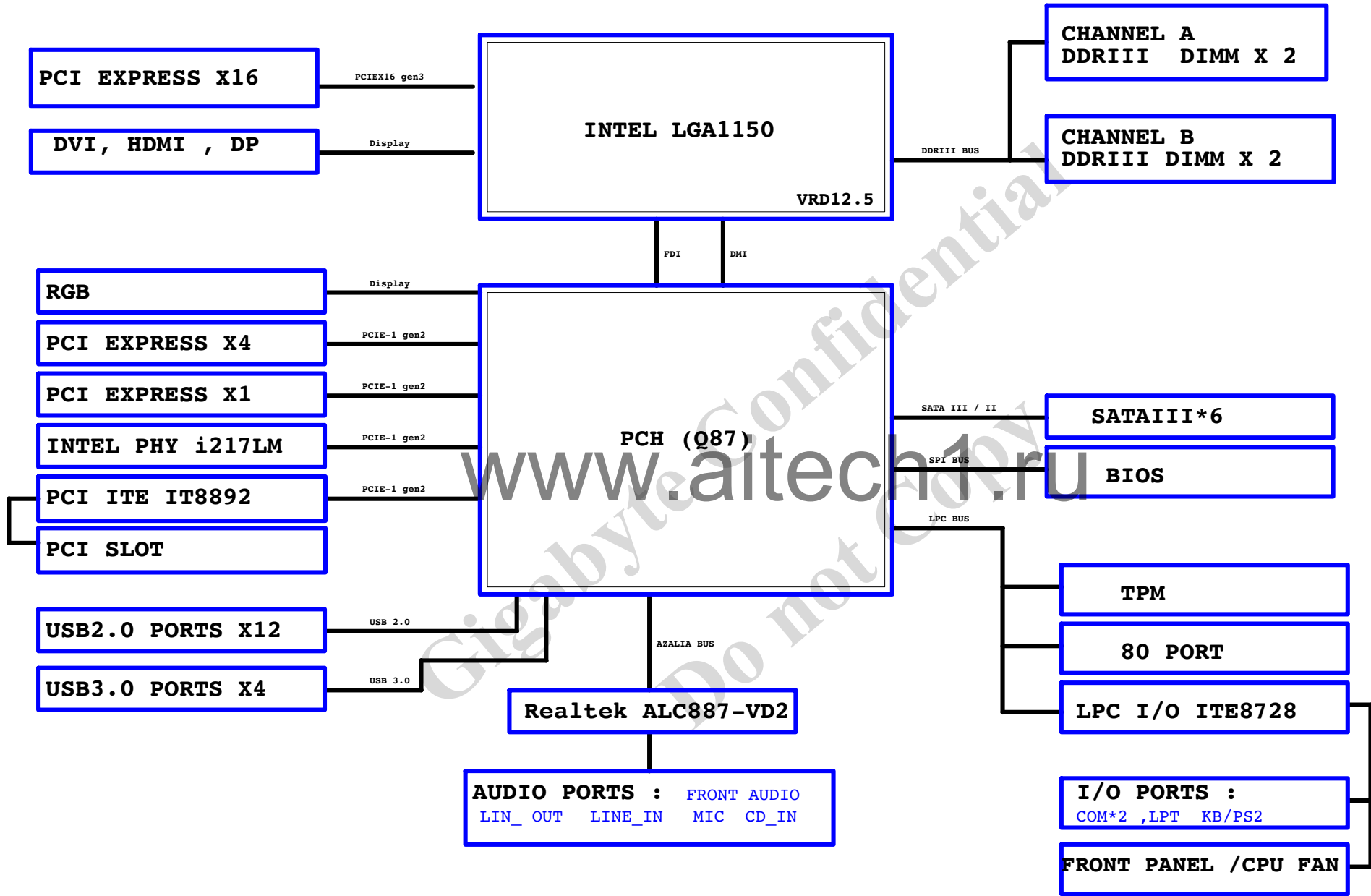
### Component value change history

[illegible]

## Circuit or PCB layout change

[illegible]

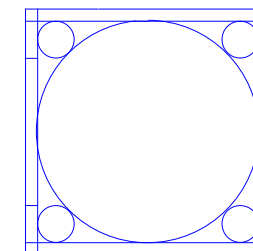
BLOCK DIAGRAM





# LGA1155 (CR)

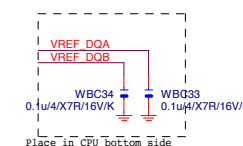
CR  
CPU RETAINTION/X



LGA1150



ILM\_BP/1156/CS/ILM\_BP/1156/CS[12KRC-0F0001-52R\_12KRC-0F0001-51R]



## LGA1150A

|         |      |           |             |      |       |
|---------|------|-----------|-------------|------|-------|
| MAAA0   | AU13 | DDR0_MA0  | DDR0_DQ0    | AD38 | MDA0  |
| MAAA1   | AV16 | DDR0_MA1  | DDR0_DQ1    | AD39 | MDA1  |
| MAAA2   | AU16 | DDR0_MA2  | DDR0_DQ2    | AF38 | MDA2  |
| MAAA3   | AW17 | DDR0_MA3  | DDR0_DQ3    | AF39 | MDA3  |
| MAAA4   | AU17 | DDR0_MA4  | DDR0_DQ4    | AD37 | MDA4  |
| MAAA5   | AW18 | DDR0_MA5  | DDR0_DQ5    | AD40 | MDA5  |
| MAAA6   | AV17 | DDR0_MA6  | DDR0_DQ6    | AF37 | MDA6  |
| MAAA7   | AT18 | DDR0_MA7  | DDR0_DQ7    | AF40 | MDA7  |
| MAAA8   | AU18 | DDR0_MA8  | DDR0_DQ8    | AH39 | MDA9  |
| MAAA9   | AT19 | DDR0_MA9  | DDR0_DQ9    | AH39 | MDA10 |
| MAAA10  | AW11 | DDR0_MA10 | DDR0_DQ10   | AK38 | MDA11 |
| MAAA11  | AV19 | DDR0_MA11 | DDR0_DQ11   | AK39 | MDA12 |
| MAAA12  | AU19 | DDR0_MA12 | DDR0_DQ12   | AH37 | MDA13 |
| MAAA13  | AY10 | DDR0_MA13 | DDR0_DQ13   | AH38 | MDA8  |
| MAAA14  | AT20 | DDR0_MA14 | DDR0_DQ14   | AK37 | MDA14 |
| MAAA15  | AU21 | DDR0_MA15 | DDR0_DQ15   | AK40 | MDA15 |
| MODT_A0 | AW10 | DDR0_ODT0 | DDR0_DQ16   | AM40 | MDA17 |
| MODT_A1 | AY8  | DDR0_ODT1 | DDR0_DQ17   | AM39 | MDA21 |
| MODT_A2 | AW9  | DDR0_ODT2 | DDR0_DQ18   | AP38 | MDA18 |
| MODT_A3 | AU8  | DDR0_ODT3 | DDR0_DQ19   | AP39 | MDA19 |
|         |      |           | DDR0_DQ20   | AM37 | MDA20 |
|         |      |           | DDR0_DQ21   | AM38 | MDA16 |
|         |      |           | DDR0_DQ22   | AP37 | MDA22 |
|         |      |           | DDR0_DQ23   | AP40 | MDA23 |
|         |      |           | DDR0_DQ24   | AV37 | MDA25 |
|         |      |           | DDR0_DQ25   | AW37 | MDA29 |
|         |      |           | DDR0_DQ26   | AU35 | MDA26 |
|         |      |           | DDR0_DQ27   | AV35 | MDA27 |
|         |      |           | DDR0_DQ28   | AT37 | MDA28 |
|         |      |           | DDR0_DQ29   | AU37 | MDA24 |
|         |      |           | DDR0_DQ30   | AT35 | MDA30 |
|         |      |           | DDR0_DQ31   | AW35 | MDA31 |
|         |      |           | DDR0_DQ32   | AY6  | MDA33 |
|         |      |           | DDR0_DQ33   | AU6  | MDA37 |
|         |      |           | DDR0_DQ34   | AY4  | MDA34 |
|         |      |           | DDR0_DQ35   | AU4  | MDA35 |
|         |      |           | DDR0_DQ36   | AW6  | MDA36 |
|         |      |           | DDR0_DQ37   | AV6  | MDA32 |
|         |      |           | DDR0_DQ38   | AW4  | MDA38 |
|         |      |           | DDR0_DQ39   | AY4  | MDA39 |
|         |      |           | DDR0_DQ40   | AR1  | MDA41 |
|         |      |           | DDR0_DQ41   | AR4  | MDA45 |
|         |      |           | DDR0_DQ42   | AN3  | MDA42 |
|         |      |           | DDR0_DQ43   | AN4  | MDA43 |
|         |      |           | DDR0_DQ44   | AR2  | MDA44 |
|         |      |           | DDR0_DQ45   | AR3  | MDA46 |
|         |      |           | DDR0_DQ46   | AN2  | MDA46 |
|         |      |           | DDR0_DQ47   | AN1  | MDA47 |
|         |      |           | DDR0_DQ48   | AL1  | MDA49 |
|         |      |           | DDR0_DQ49   | AL4  | MDA53 |
|         |      |           | DDR0_DQ50   | AJ3  | MDA50 |
|         |      |           | DDR0_DQ51   | AJ4  | MDA51 |
|         |      |           | DDR0_DQ52   | AL2  | MDA52 |
|         |      |           | DDR0_DQ53   | AL3  | MDA48 |
|         |      |           | DDR0_DQ54   | AJ2  | MDA54 |
|         |      |           | DDR0_DQ55   | AJ1  | MDA55 |
|         |      |           | DDR0_DQ56   | AG1  | MDA57 |
|         |      |           | DDR0_DQ57   | AG4  | MDA61 |
|         |      |           | DDR0_DQ58   | AE3  | MDA58 |
|         |      |           | DDR0_DQ59   | AE4  | MDA59 |
|         |      |           | DDR0_DQ60   | AG2  | MDA60 |
|         |      |           | DDR0_DQ61   | AG3  | MDA56 |
|         |      |           | DDR0_DQ62   | AE2  | MDA62 |
|         |      |           | DDR0_DQ63   | AE1  | MDA63 |
|         |      |           | DDR0_DQS_P0 | AE39 | DQSA0 |
|         |      |           | DDR0_DQS_P1 | AJ39 | DQSA1 |
|         |      |           | DDR0_DQS_P2 | AN39 | DQSA2 |
|         |      |           | DDR0_DQS_P3 | AV36 | DQSA3 |
|         |      |           | DDR0_DQS_P4 | AV5  | DQSA4 |
|         |      |           | DDR0_DQS_P5 | AP3  | DQSA5 |
|         |      |           | DDR0_DQS_P6 | AK3  | DQSA6 |
|         |      |           | DDR0_DQS_P7 | AF3  | DQSA7 |
|         |      |           | DDR0_DQS_P8 | AV32 | DQSA0 |
|         |      |           | DDR0_DQS_N0 | AE38 | DQSA1 |
|         |      |           | DDR0_DQS_N1 | AJ38 | DQSA2 |
|         |      |           | DDR0_DQS_N2 | AN38 | DQSA3 |
|         |      |           | DDR0_DQS_N3 | AU36 | DQSA4 |
|         |      |           | DDR0_DQS_N4 | AW5  | DQSA4 |
|         |      |           | DDR0_DQS_N5 | AP2  | DQSA5 |
|         |      |           | DDR0_DQS_N6 | AK2  | DQSA6 |
|         |      |           | DDR0_DQS_N7 | AF2  | DQSA7 |
|         |      |           | DDR0_DQS_N8 | AU32 | DQSA0 |

HASWELL[10SC1-F01150-01R\_10SC1-F01150-03R]

## LGA1150B

|        |      |           |           |      |       |
|--------|------|-----------|-----------|------|-------|
| MAAB0  | AL19 | DDR1_MA0  | DDR1_DQ0  | AE34 | MDB0  |
| MAAB1  | AK23 | DDR1_MA1  | DDR1_DQ1  | AE35 | MDB1  |
| MAAB2  | AM22 | DDR1_MA2  | DDR1_DQ2  | AG35 | MDB2  |
| MAAB3  | AM23 | DDR1_MA3  | DDR1_DQ3  | AH35 | MDB3  |
| MAAB4  | AP23 | DDR1_MA4  | DDR1_DQ4  | AD34 | MDB4  |
| MAAB5  | AL23 | DDR1_MA5  | DDR1_DQ5  | AD35 | MDB5  |
| MAAB6  | AY24 | DDR1_MA6  | DDR1_DQ6  | AG34 | MDB6  |
| MAAB7  | AV25 | DDR1_MA7  | DDR1_DQ7  | AH34 | MDB7  |
| MAAB8  | AU28 | DDR1_MA8  | DDR1_DQ8  | AL34 | MDB8  |
| MAAB9  | AW25 | DDR1_MA9  | DDR1_DQ9  | AL35 | MDB9  |
| MAAB10 | AF18 | DDR1_MA10 | DDR1_DQ10 | AK31 | MDB10 |
| MAAB11 | AY25 | DDR1_MA11 | DDR1_DQ11 | AL31 | MDB11 |
| MAAB12 | AV26 | DDR1_MA12 | DDR1_DQ12 | AK34 | MDB12 |
| MAAB13 | AH15 | DDR1_MA13 | DDR1_DQ13 | AK35 | MDB13 |
| MAAB14 | AV27 | DDR1_MA14 | DDR1_DQ14 | AK32 | MDB14 |
| MAAB15 | AY28 | DDR1_MA15 | DDR1_DQ15 | AL32 | MDB15 |
|        |      |           | DDR1_DQ16 | AN34 | MDB17 |
|        |      |           | DDR1_DQ17 | AP34 | MDB21 |
|        |      |           | DDR1_DQ18 | AN31 | MDB19 |
|        |      |           | DDR1_DQ19 | AP31 | MDB23 |
|        |      |           | DDR1_DQ20 | AN35 | MDB20 |
|        |      |           | DDR1_DQ21 | AP35 | MDB20 |
|        |      |           | DDR1_DQ22 | AN32 | MDB18 |
|        |      |           | DDR1_DQ23 | AP32 | MDB22 |
|        |      |           | DDR1_DQ24 | AM28 | MDB25 |
|        |      |           | DDR1_DQ25 | AM28 | MDB26 |
|        |      |           | DDR1_DQ26 | AR28 | MDB27 |
|        |      |           | DDR1_DQ27 | AR28 | MDB30 |
|        |      |           | DDR1_DQ28 | AL29 | MDB24 |
|        |      |           | DDR1_DQ29 | AL28 | MDB29 |
|        |      |           | DDR1_DQ30 | AP29 | MDB28 |
|        |      |           | DDR1_DQ31 | AP28 | MDB31 |
|        |      |           | DDR1_DQ32 | AR12 | MDB32 |
|        |      |           | DDR1_DQ33 | AP12 | MDB33 |
|        |      |           | DDR1_DQ34 | AL13 | MDB34 |
|        |      |           | DDR1_DQ35 | AL12 | MDB35 |
|        |      |           | DDR1_DQ36 | AM13 | MDB37 |
|        |      |           | DDR1_DQ37 | AM13 | MDB38 |
|        |      |           | DDR1_DQ38 | AM12 | MDB39 |
|        |      |           | DDR1_DQ39 | AP9  | MDB45 |
|        |      |           | DDR1_DQ40 | AP9  | MDB41 |
|        |      |           | DDR1_DQ41 | AR6  | MDB47 |
|        |      |           | DDR1_DQ42 | AR6  | MDB43 |
|        |      |           | DDR1_DQ43 | AR10 | MDB44 |
|        |      |           | DDR1_DQ44 | AP10 | MDB40 |
|        |      |           | DDR1_DQ45 | AR7  | MDB46 |
|        |      |           | DDR1_DQ46 | AP7  | MDB42 |
|        |      |           | DDR1_DQ47 | AL9  | MDB53 |
|        |      |           | DDR1_DQ48 | AL6  | MDB50 |
|        |      |           | DDR1_DQ49 | AL7  | MDB55 |
|        |      |           | DDR1_DQ50 | AM10 | MDB48 |
|        |      |           | DDR1_DQ51 | AM6  | MDB54 |
|        |      |           | DDR1_DQ52 | AM7  | MDB51 |
|        |      |           | DDR1_DQ53 | AM6  | MDB54 |
|        |      |           | DDR1_DQ54 | AM7  | MDB51 |
|        |      |           | DDR1_DQ55 | AH7  | MDB60 |
|        |      |           | DDR1_DQ56 | AE6  | MDB59 |
|        |      |           | DDR1_DQ57 | AE7  | MDB63 |
|        |      |           | DDR1_DQ58 | AJ6  | MDB58 |
|        |      |           | DDR1_DQ59 | AJ7  | MDB57 |
|        |      |           | DDR1_DQ60 | AF6  | MDB59 |
|        |      |           | DDR1_DQ61 | AF7  | MDB62 |
|        |      |           | DDR1_DQ62 | AF35 | DQSB0 |
|        |      |           | DDR1_DQ63 | AL33 | DQSB1 |
|        |      |           | DDR1_DQ64 | AP33 | DQSB2 |
|        |      |           | DDR1_DQ65 | AN28 | DQSB3 |
|        |      |           | DDR1_DQ66 | AN12 | DQSB4 |
|        |      |           | DDR1_DQ67 | AP8  | DQSB5 |
|        |      |           | DDR1_DQ68 | AL8  | DQSB6 |
|        |      |           | DDR1_DQ69 | AG7  | DQSB7 |
|        |      |           | DDR1_DQ70 | AN25 | DQSB0 |
|        |      |           | DDR1_DQ71 | AK33 | DQSB1 |
|        |      |           | DDR1_DQ72 | AN33 | DQSB2 |
|        |      |           | DDR1_DQ73 | AN29 | DQSB3 |
|        |      |           | DDR1_DQ74 | AN13 | DQSB4 |
|        |      |           | DDR1_DQ75 | AE8  | DQSB5 |
|        |      |           | DDR1_DQ76 | AM8  | DQSB6 |
|        |      |           | DDR1_DQ77 | AG6  | DQSB7 |
|        |      |           | DDR1_DQ78 | AN26 | DQSB0 |

HASWELL[10SC1-F01150-01R\_10SC1-F01150-03R]

(7) MODT\_A[0..3] <=> MODT\_A[0..3]

(8) MODT\_B[0..3] <=> MODT\_B[0..3]

(7) MDA[0..63] <=> MDA[0..63]

(8) MDB[0..63] <=> MDB[0..63]

(7) DQSA[0..7] <=> DQSA[0..7]

(7) -DQSA[0..7] <=> -DQSA[0..7]

(7) MAAA[0..15] <=> MAAA[0..15]

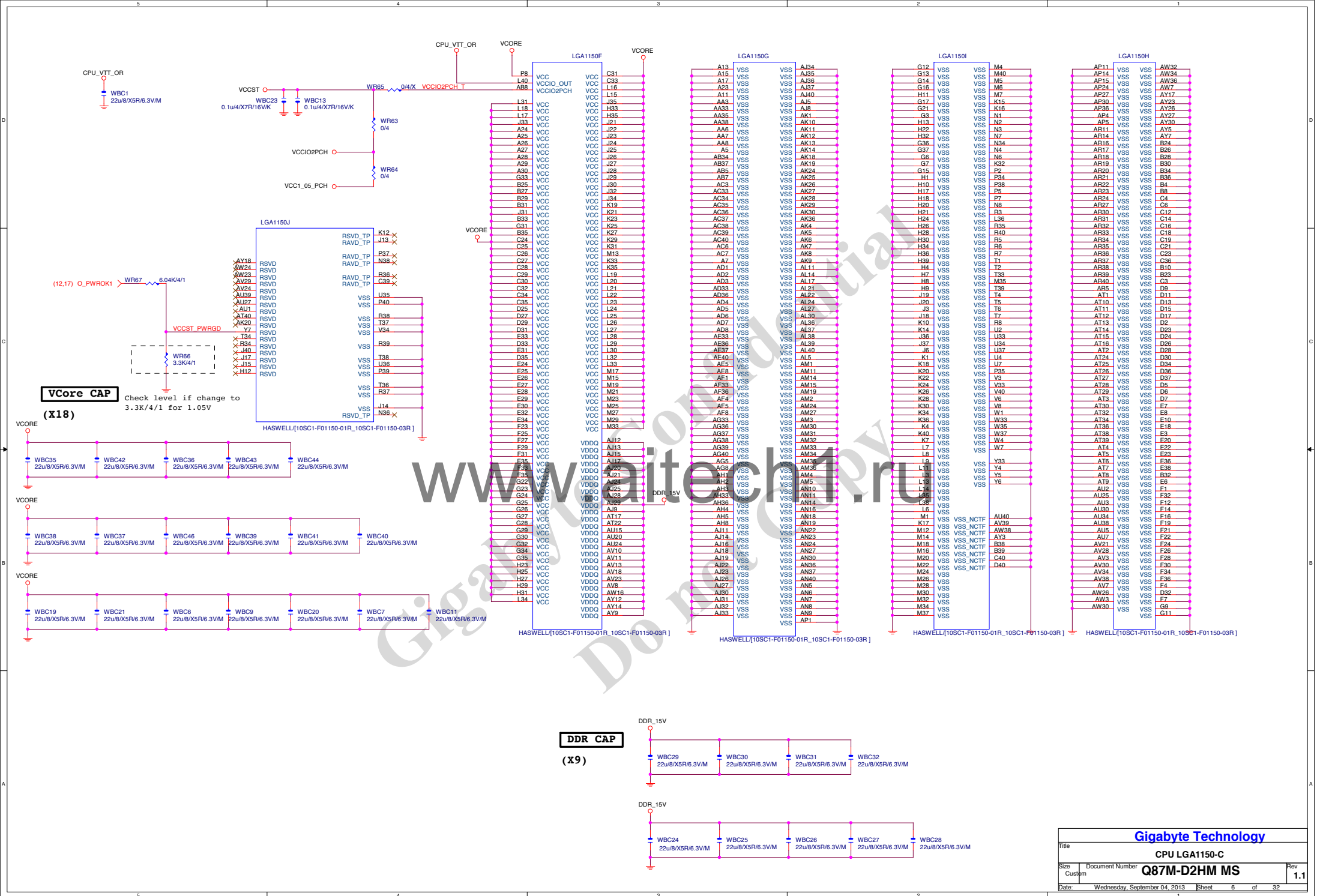
(8) MAAB[0..15] <=> MAAB[0..15]

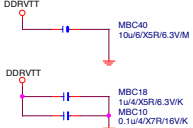
(8) DQSB[0..7] <=> DQSB[0..7]

(8) -DQSB[0..7] <=> -DQSB[0..7]

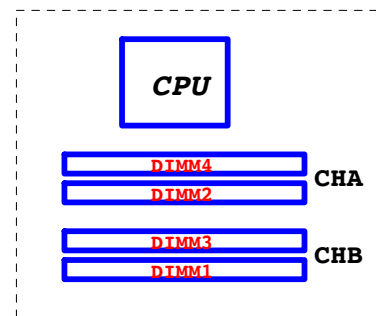
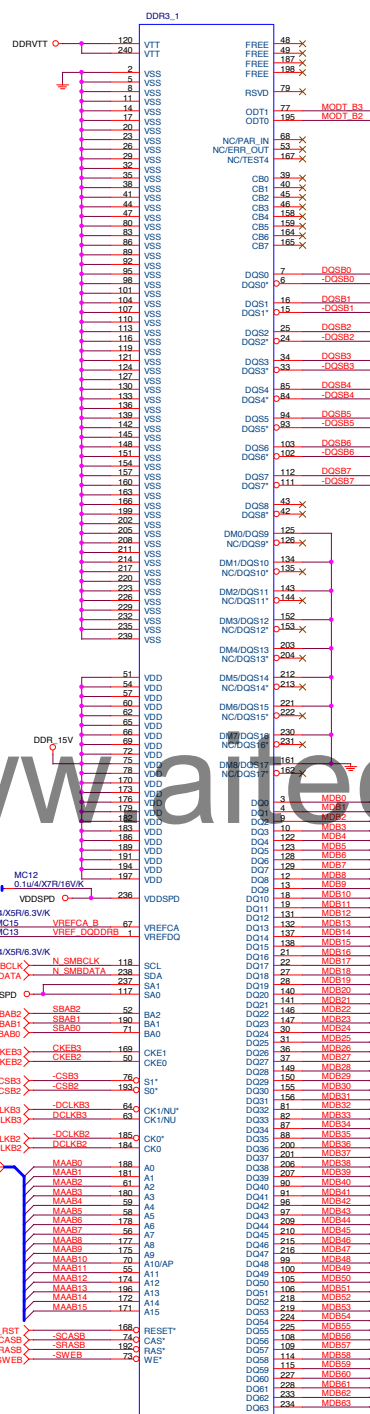
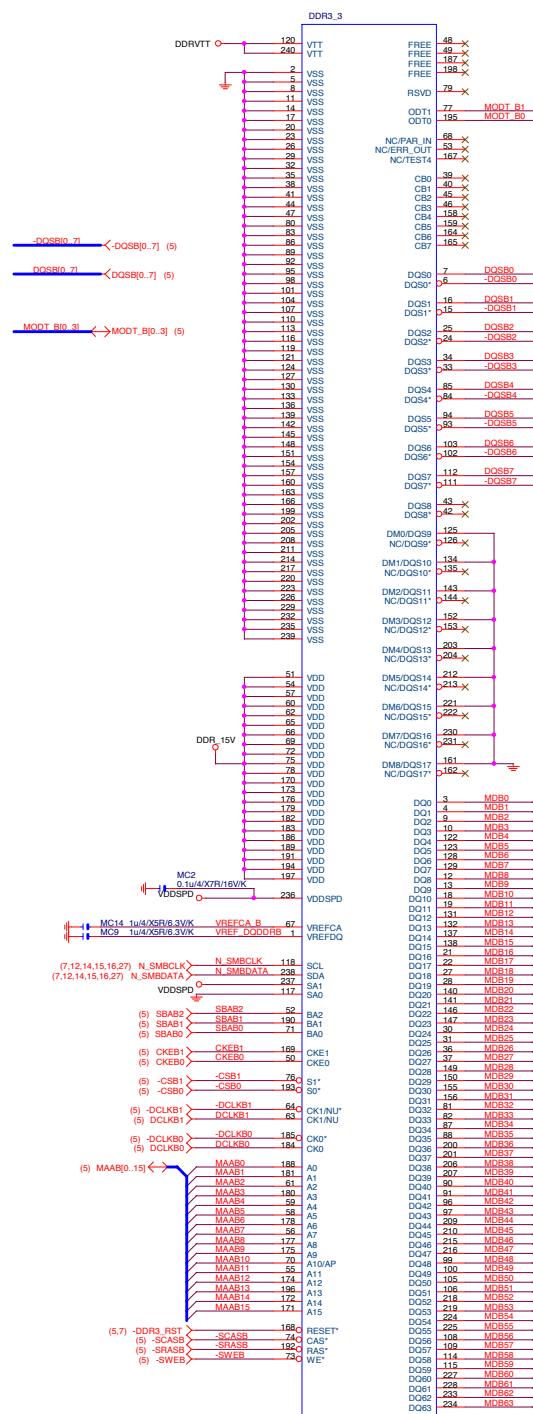
Gigabyte Technology

|       |  |  |  |                               |  |
|-------|--|--|--|-------------------------------|--|
| Title |  |  |  | CPU LGA1150-B                 |  |
| Size  |  |  |  | Q87M-D2HM MS                  |  |
| Date: |  |  |  | Wednesday, September 04, 2013 |  |
| Sheet |  |  |  | 5 of 32                       |  |



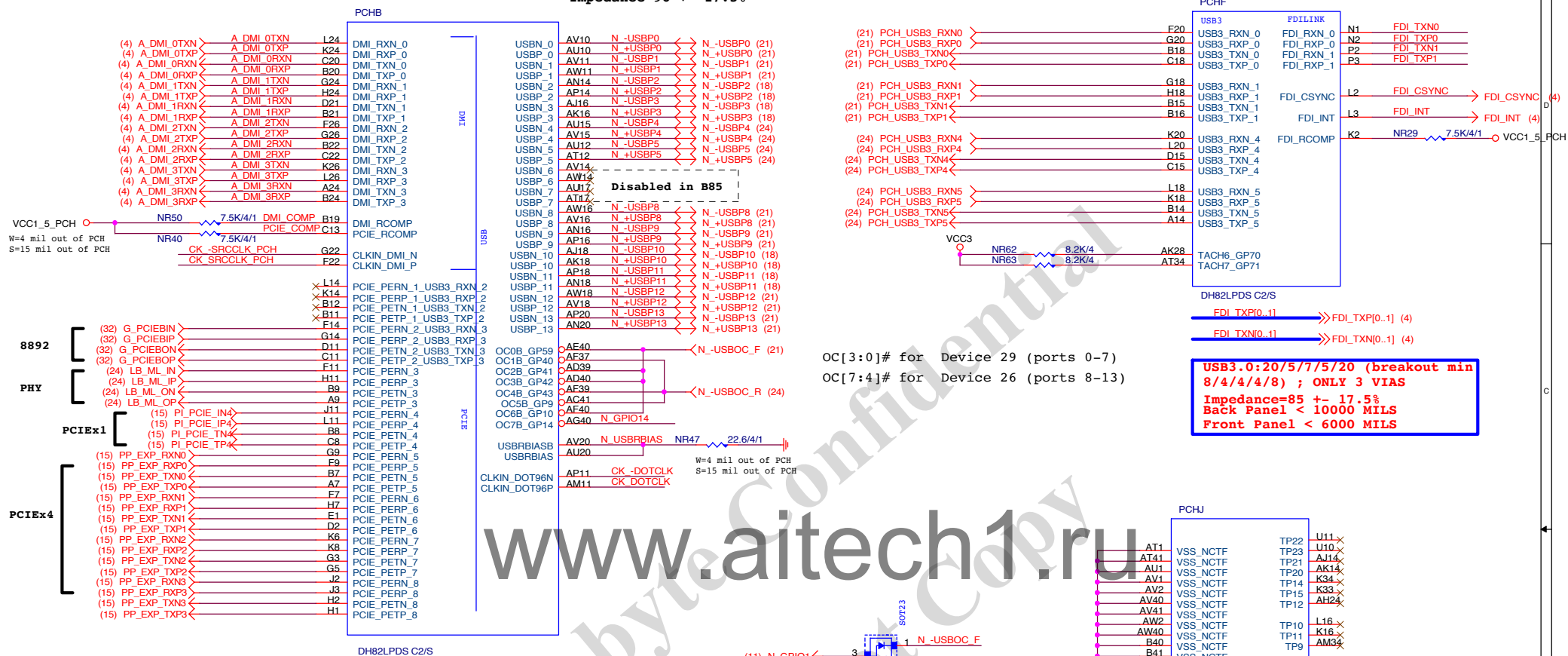




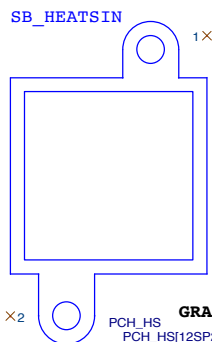




USB2.0 : 12/4.5/7.5/4.5/12 (breakout min 8/4/4/4/8)  
Impedance=90  $\pm$  17.5%



## LOW COST ICH7 HEATSINK



GRAY HS

PCH\_HS  
PCH\_HS[12SP2-S04209-01R 12SP2-S04209-02R 12SP2-S04209-03R]

### Mount for integrated clock Generation Mode

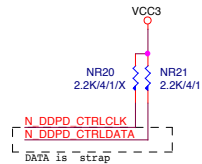
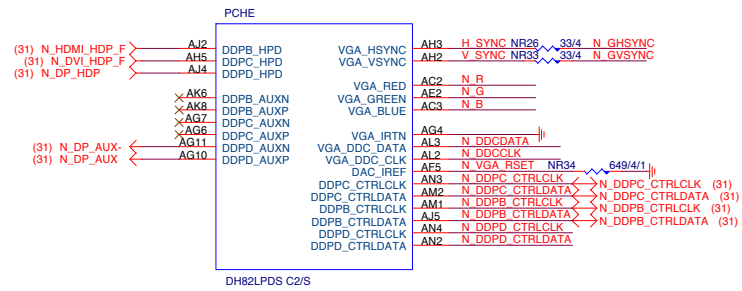
CK\_DOTCLK NR92 8.2K/4  
CK -DOTCLK NR91 8.2K/4  
NR225 short to GND in non  
graphic SKU

## Gigabyte Technology

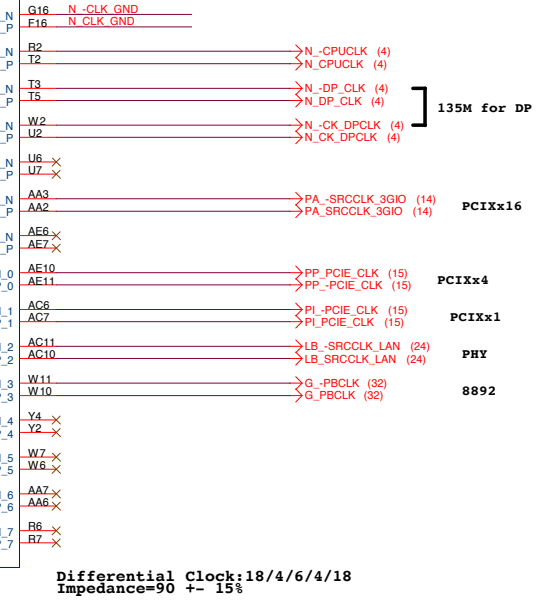
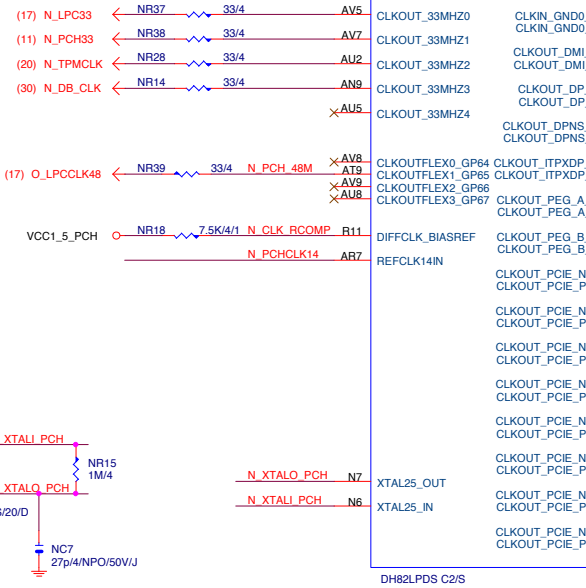
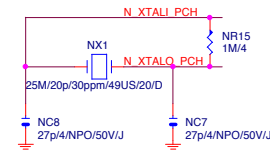
|       |                            |
|-------|----------------------------|
| Title | PCH.FDI.DMI.USB.PCIE.NVRAM |
|-------|----------------------------|

|        |                 |                     |
|--------|-----------------|---------------------|
| Size   | Document Number | <b>Q87M-D2HM MS</b> |
| Custom |                 |                     |

Date: Wednesday, September 04, 2013 Sheet 9 of 32



Flex1,2,3,4 :  
14/24/33/48MHZ

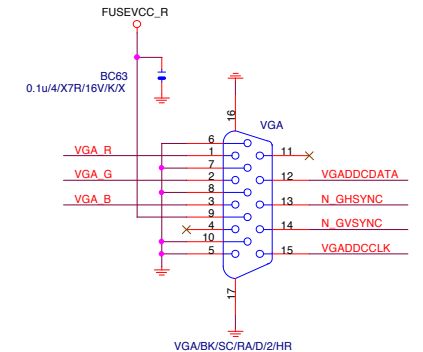
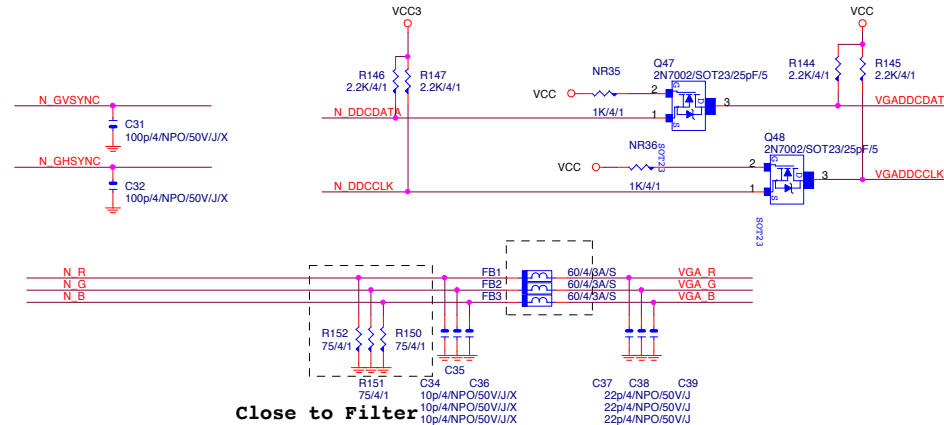
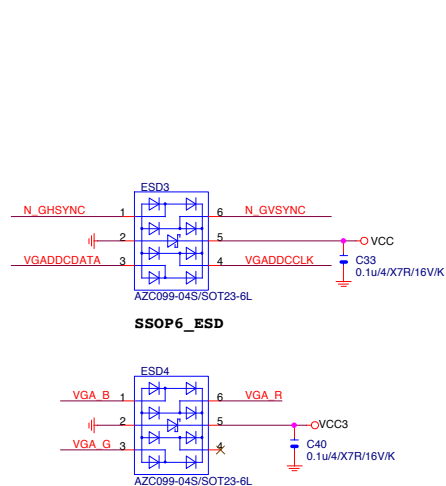


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N\_PCHCLK14 NR116 8.2K/4

Mount for integrated clock Generation Mode

N\_CLK\_GND NR42 8.2K/4  
N\_CLK\_GND NR41 8.2K/4



| Gigabyte Technology     |                               |       |          |
|-------------------------|-------------------------------|-------|----------|
| Title                   |                               |       |          |
| PCH DISPLAY, CLK BUFFER |                               |       |          |
| Size                    | Document Number               | Rev   |          |
| Custom                  | Q87M-D2HM MS                  | 1.1   |          |
| Date:                   | Wednesday, September 04, 2013 | Sheet | 10 of 32 |

3VDDAL\_PCH

NR124 8.2K/4/X N\_P PME AA31

(10) N\_PCH33 N PCH33 AM22

NR30 8.2K/4 TD\_IREF

A2

B2

B1

C3

TD\_IREF

N\_PIRQA AU29

N\_PIROB AU27

N\_PIROC AW28

N\_PIROD AV27

N\_PIROE AR30

N\_PIROF AV28

N\_PIROG AV28

N\_PIROH AT27

PIQOAB

PIQOBB

PIQOCB

PIQOQB

GPIO2

GPIO3

GPIO4

GPIO5

PCHA

PMEB

CLKIN\_33MHZLOOPBACK

PLTRSTB

GP35/NMIB

GP50

GP51

GP52

GP53

GP54

GP55

AA37

N\_PFMIRST (17)

M40 N\_GPIO35

AH26 N\_GPIO50

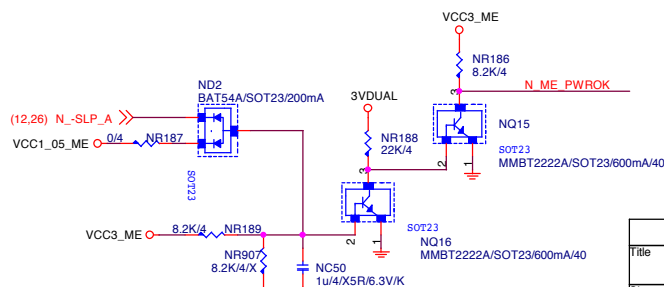
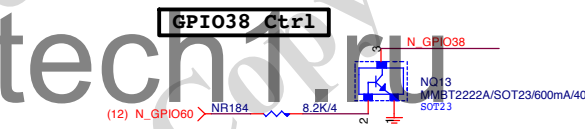
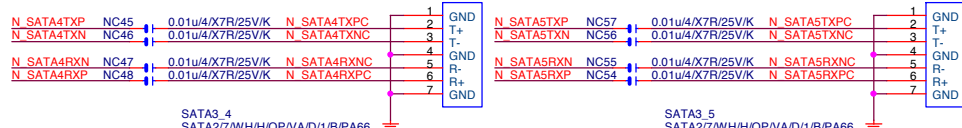
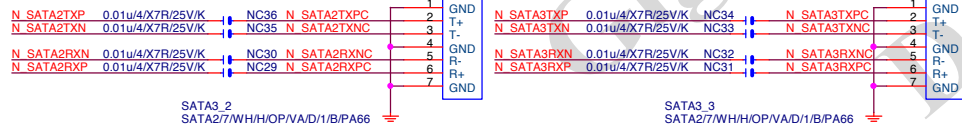
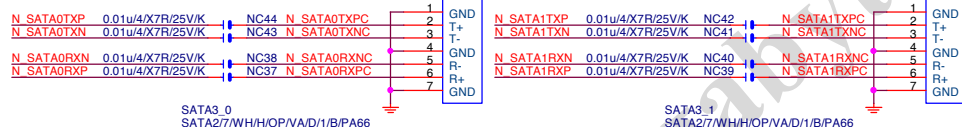
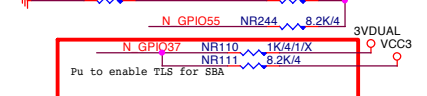
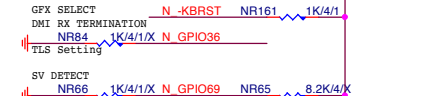
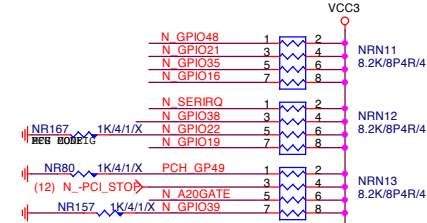
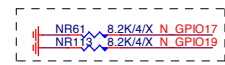
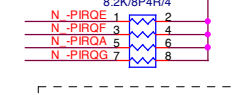
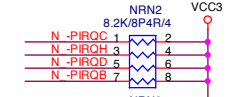
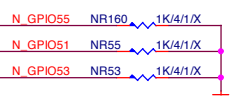
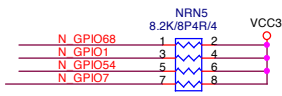
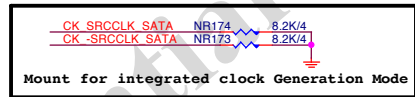
AU31 N\_GPIO51

AI26 N\_GPIO52

AV31 N\_GPIO53

AW33 N\_GPIO54

R30 N\_GPIO55



|                             |                               |                     |            |
|-----------------------------|-------------------------------|---------------------|------------|
| <b>Gigabyte Technology</b>  |                               |                     |            |
| Title                       |                               |                     |            |
| <b>PCH HOST , SATA, PCI</b> |                               |                     |            |
| Size                        | Document Number               | <b>Q87M-D2HM MS</b> | Rev        |
| Custom                      |                               |                     | <b>1.1</b> |
| Date:                       | Wednesday, September 04, 2013 | Sheet               | 11 of 32   |



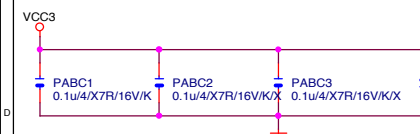




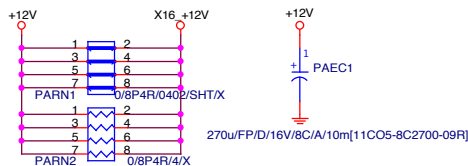
## PCIEX16 CAP

## PCIEX16 SLOT

## PCIESLOT-164DN-P



## PCIEX16 PROTECT SHT



## PCIEX16 AC CAP

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

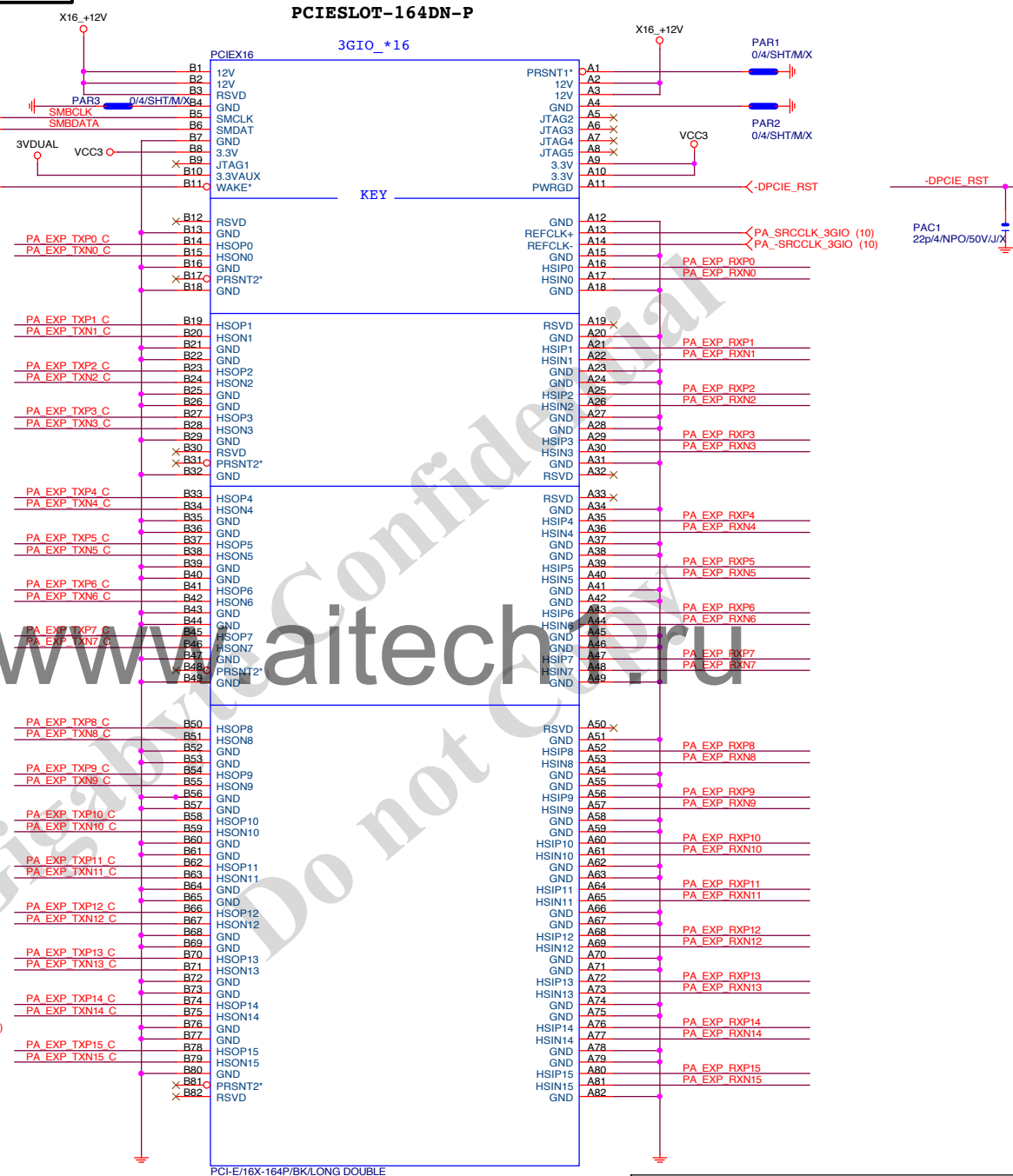
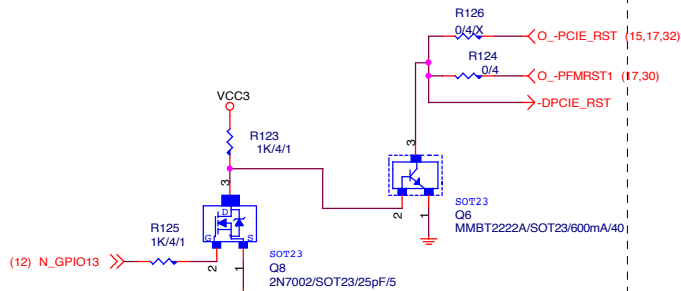
PA EXP RXP10\_15I >>> PA\_EXP\_RXP10[0..15] (4)

PA EXP RXN10\_15I >>> PA\_EXP\_RXN10[0..15] (4)

PA EXP TXP10\_15I >>> PA\_EXP\_TXP10[0..15] (4)

PA EXP TXN10\_15I >>> PA\_EXP\_TXN10[0..15] (4)

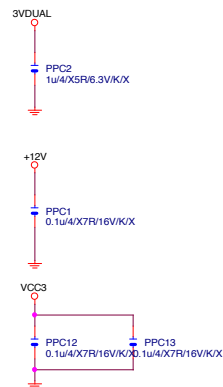
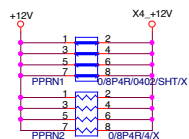
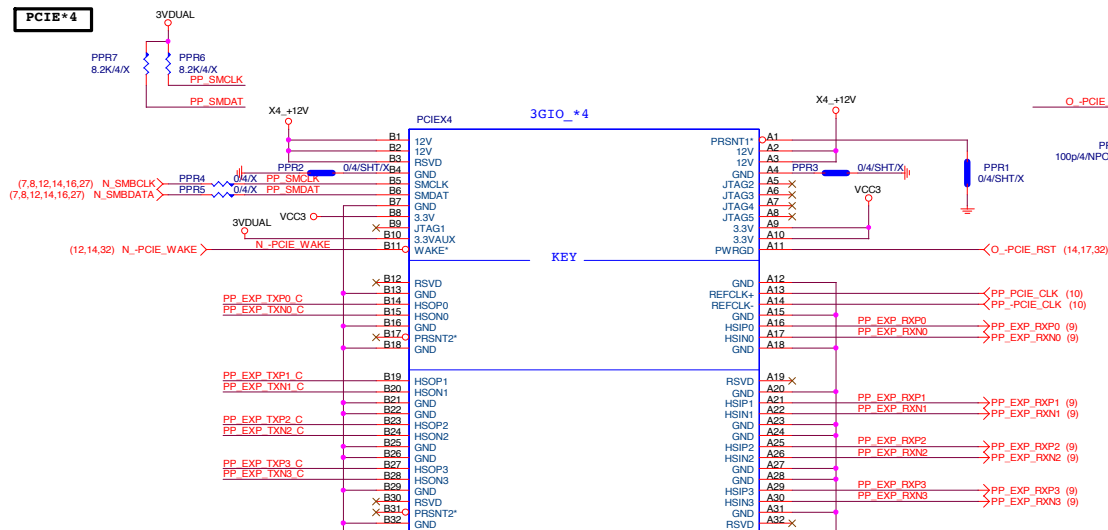
## PCIEX16 SOFT RESET



Gigabyte Technology

|                                     |  |  |                  |  |  |
|-------------------------------------|--|--|------------------|--|--|
| Title                               |  |  | PCI EXPRESS * 16 |  |  |
| Size                                |  |  | Q87M-D2HM MS     |  |  |
| Custom                              |  |  | Rev 1.1          |  |  |
| Date: Wednesday, September 04, 2013 |  |  | Sheet 14 of 32   |  |  |

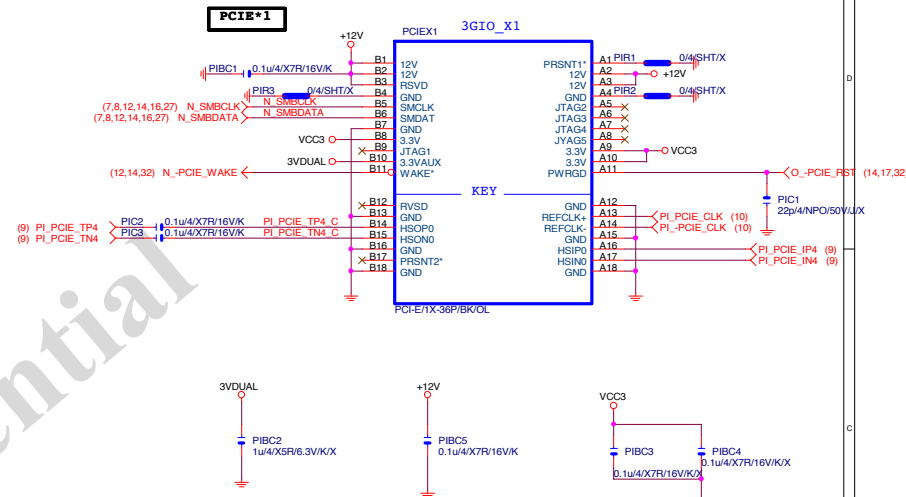
# PCIE\*4



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

|                 |             |       |                   |               |
|-----------------|-------------|-------|-------------------|---------------|
| (9) PP_EXP_TXP0 | PP_EXP_TXP0 | PPC4  | 0.22uF/4X5R6.3V/K | PP_EXP_TXP0_C |
| (9) PP_EXP_TXN0 | PP_EXP_TXN0 | PPC5  | 0.22uF/4X5R6.3V/K | PP_EXP_TXN0_C |
| (9) PP_EXP_TXP1 | PP_EXP_TXP1 | PPC6  | 0.22uF/4X5R6.3V/K | PP_EXP_TXP1_C |
| (9) PP_EXP_TXN1 | PP_EXP_TXN1 | PPC7  | 0.22uF/4X5R6.3V/K | PP_EXP_TXN1_C |
| (9) PP_EXP_TXP2 | PP_EXP_TXP2 | PPC8  | 0.22uF/4X5R6.3V/K | PP_EXP_TXP2_C |
| (9) PP_EXP_TXN2 | PP_EXP_TXN2 | PPC9  | 0.22uF/4X5R6.3V/K | PP_EXP_TXN2_C |
| (9) PP_EXP_TXP3 | PP_EXP_TXP3 | PPC10 | 0.22uF/4X5R6.3V/K | PP_EXP_TXP3_C |
| (9) PP_EXP_TXN3 | PP_EXP_TXN3 | PPC11 | 0.22uF/4X5R6.3V/K | PP_EXP_TXN3_C |

# PCIE\*1

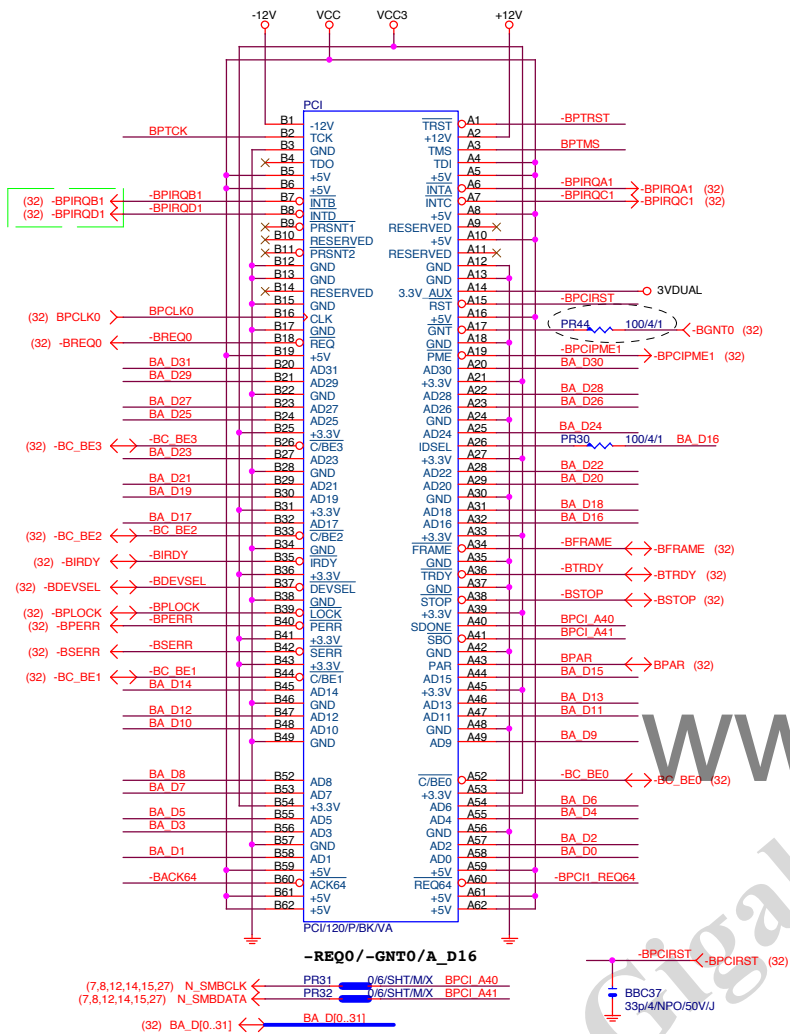


Gigabyte Technology

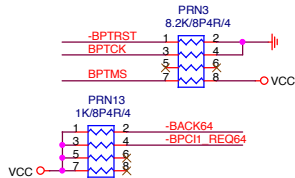
|                      |                               |       |          |
|----------------------|-------------------------------|-------|----------|
| Title                |                               |       |          |
| PCI EXPRESS X 1 PORT |                               |       |          |
| Size                 | Document Number               | Rev   |          |
| Custom               | Q87M-D2HM MS                  | 1.1   |          |
| Date:                | Wednesday, September 04, 2013 | Sheet | 15 of 32 |



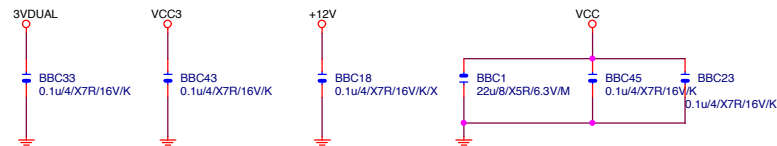
PCI SLOT



PCI PU



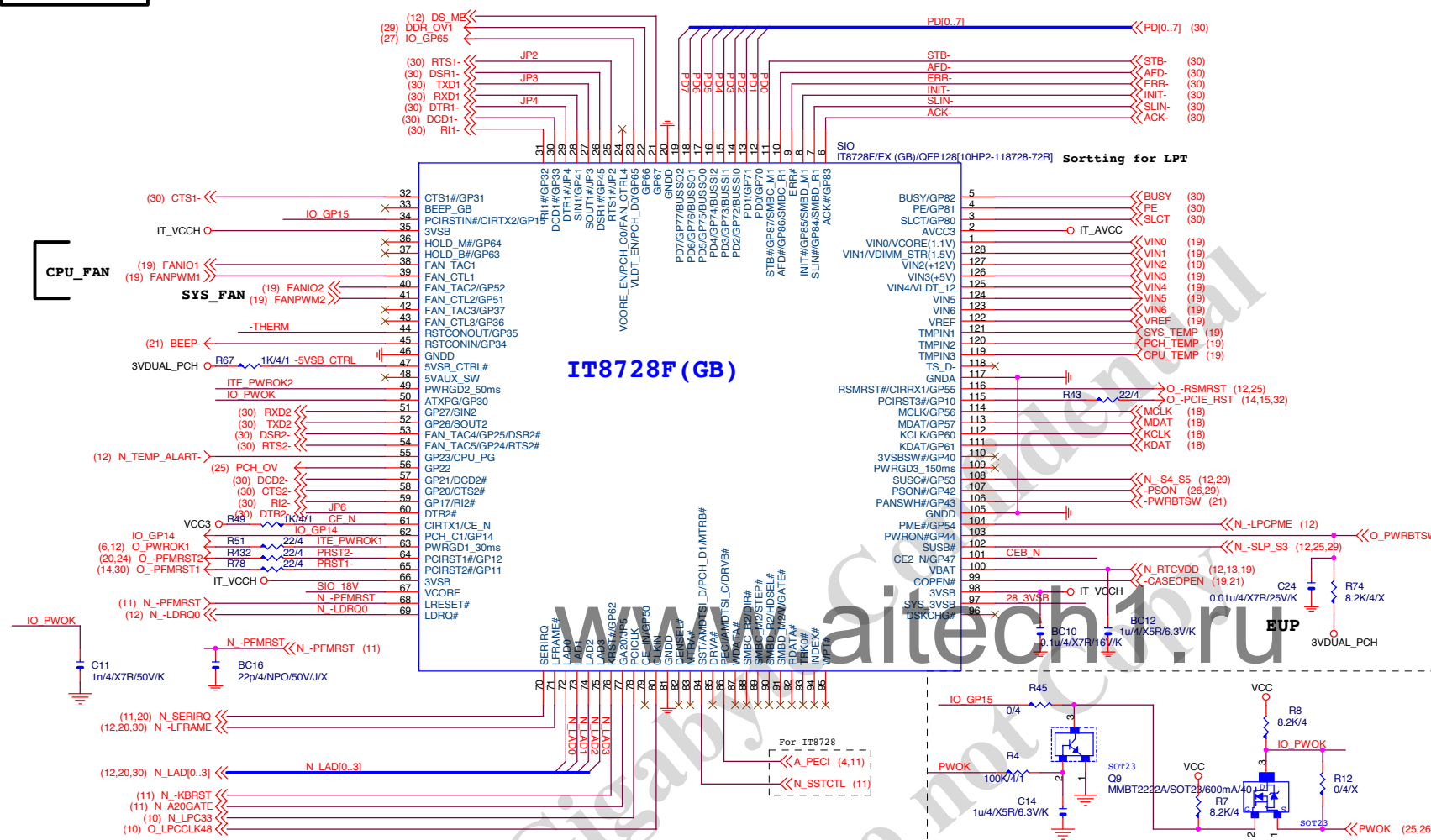
**PCI CAP**



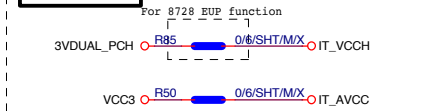
## Gigabyte Technology

|              |                               |           |         |
|--------------|-------------------------------|-----------|---------|
| Title        |                               |           |         |
| PCI SLOT 1&2 |                               |           |         |
| Size Custom  | Document Number               | Q87M-D2HM | Rev 1.1 |
| Date:        | Wednesday, September 04, 2013 | Sheet 16  | of 32   |

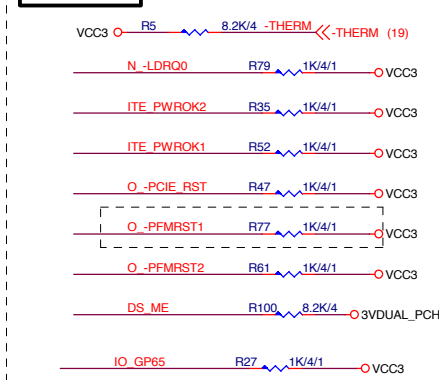
# SIO IT8728F



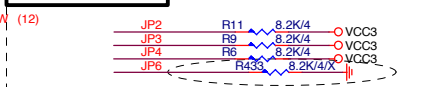
# PWR SHT



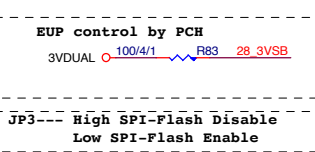
# SIO PU



# SIO STRAP



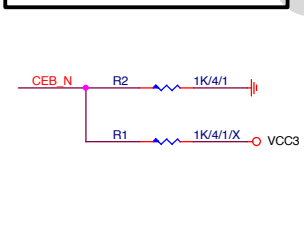
# IT8728-EX PULL DOWN ENABLE FORCE OVP



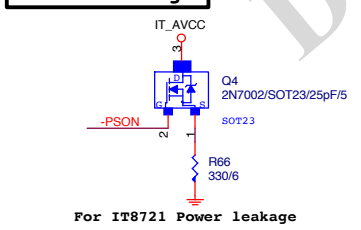
# IT8728F NOTE

| IT8728 |                          |
|--------|--------------------------|
| PIN121 | VCORE_EN/PCH_C0          |
| PIN120 | VLDT_EN/PCH_D0           |
| PIN19  | ATXPG                    |
| PIN31  | PCH_C1                   |
| PIN53  | SST/AMDTSI_D/MTB#/PCH_D1 |
| PIN55  | PECI/AMDTSI_C/DRVB#      |
| PIN66  | SYS_3VSB                 |
| PIN70  | GP47                     |
| PIN95  | VIN2(VCC5)               |
| PIN96  | VIN1(VCC12)              |
| PIN97  | VIN1/VDIMM_STR(1.5V)     |
| PIN98  | VIN0/VCORE(1.1V)/NC      |

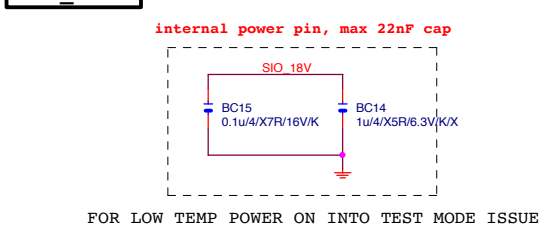
# DUAL BIOS OPT STRAP



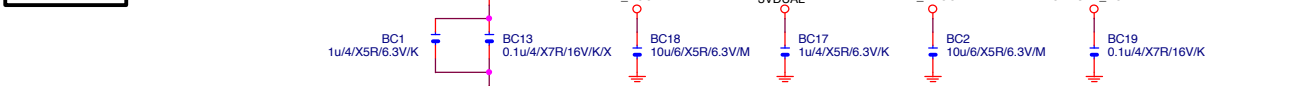
# Power leakage



# SIO\_18V



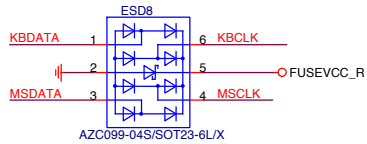
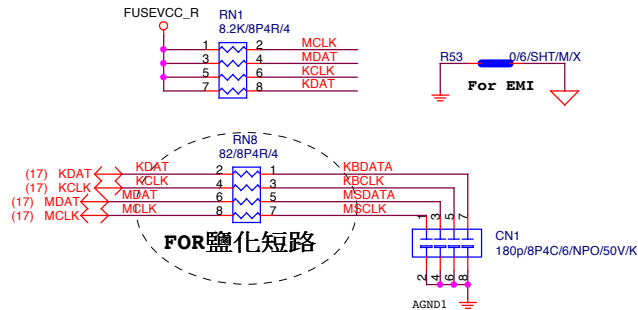
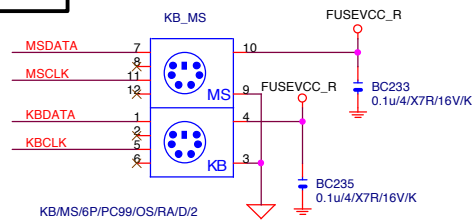
# SIO CAP



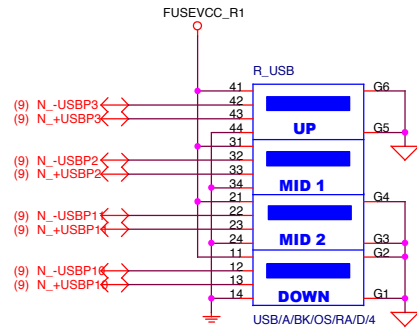
# Gigabyte Technology

| ITE 8728 LPC IO |                               |              |          |
|-----------------|-------------------------------|--------------|----------|
| Size            | Document Number               | Q87M-D2HM MS |          |
| Custom          |                               |              | Rev 1.1  |
| Date:           | Wednesday, September 04, 2013 | Sheet        | 17 of 32 |

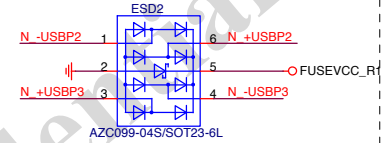
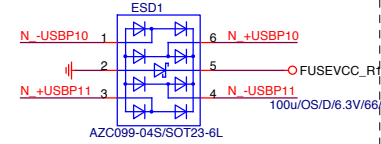
# KB/MS



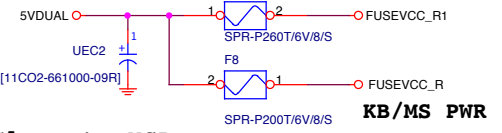
# RUSB20



# USB2.0 ESD



# USB2.0 PWR



Close to USB connector

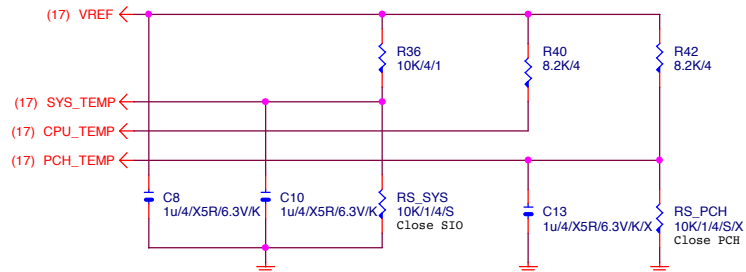
# KB/MS PWR

www.aitech1.ru

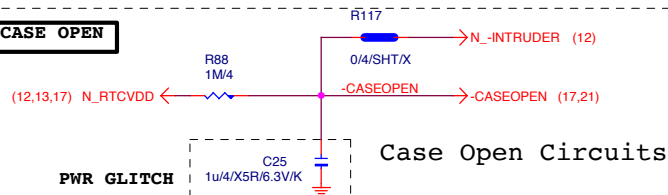
Gigabyte Technology

|            |                               |       |          |
|------------|-------------------------------|-------|----------|
| Title      |                               |       |          |
| KB/MS,RUSB |                               |       |          |
| Size       | Document Number               | Rev   |          |
| Custom     | Q87M-D2HM MS                  | 1.1   |          |
| Date:      | Wednesday, September 04, 2013 | Sheet | 18 of 32 |

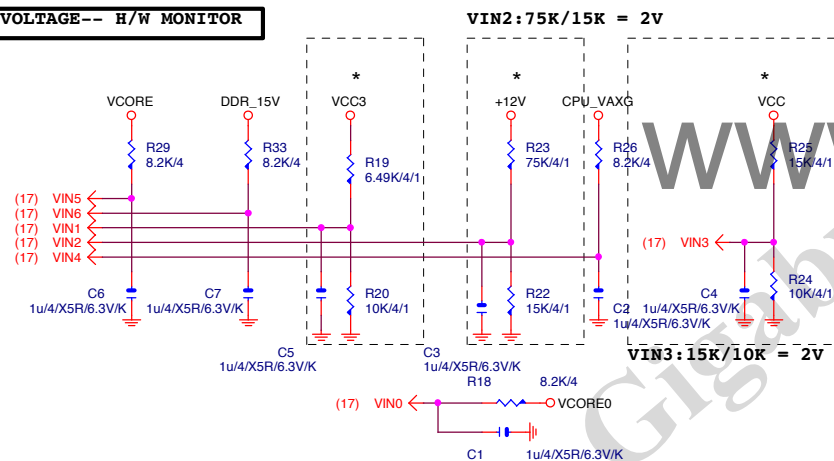
# TEMP H/W MONITOR



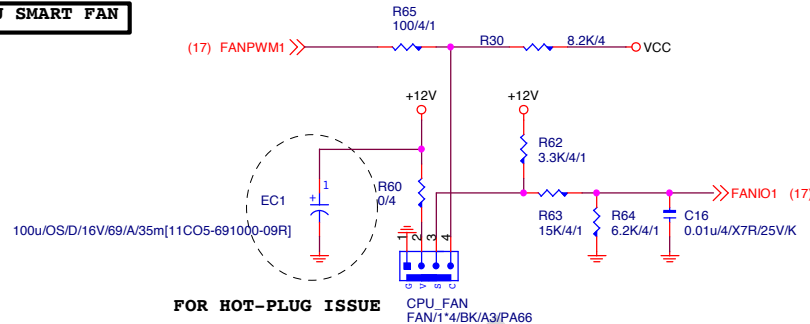
# CASE OPEN



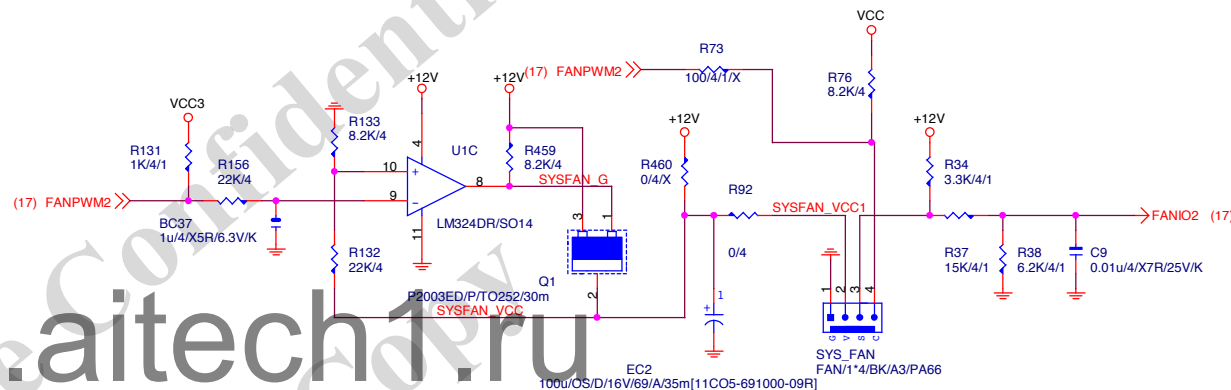
# VOLTAGE-- H/W MONITOR



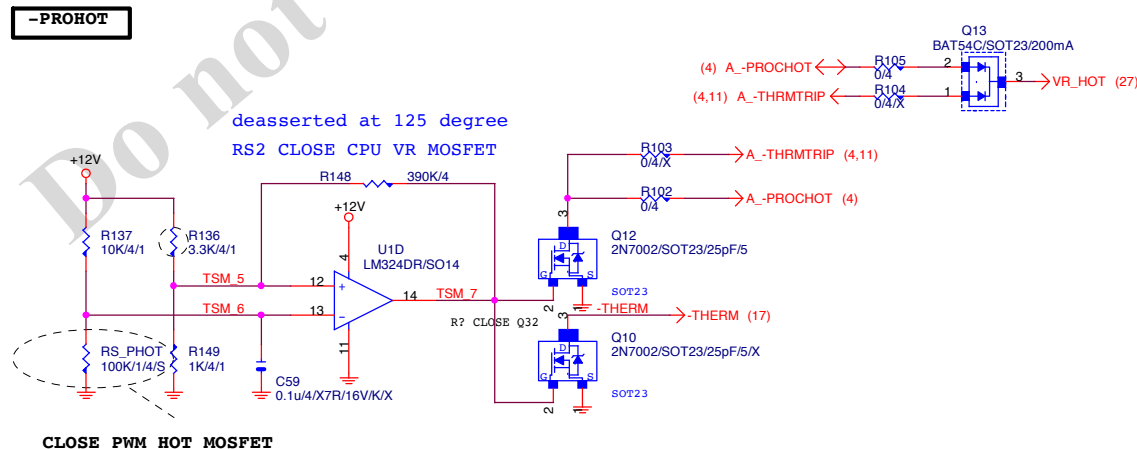
# CPU SMART FAN



# SYS SMART FAN



# -PROHOT

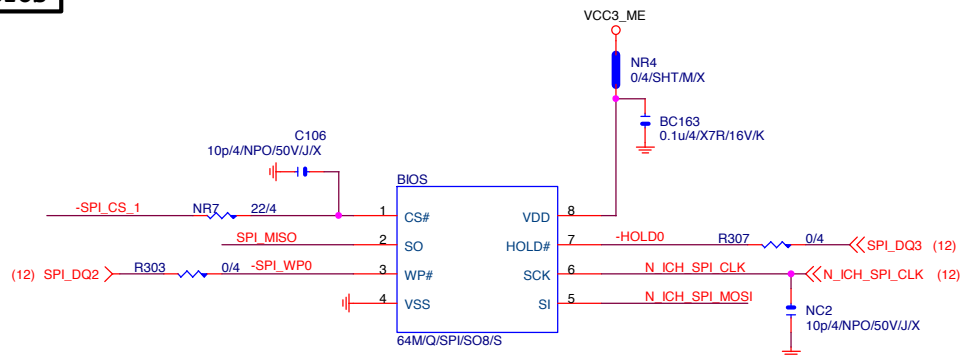


CLOSE PWM HOT MOSFET

Gigabyte Technology

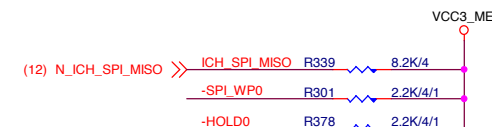
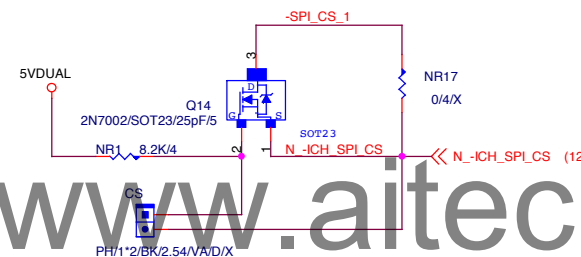
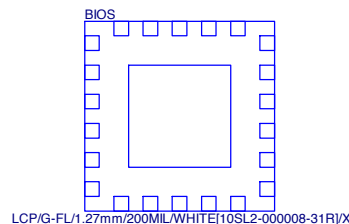
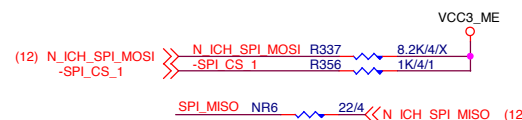
|                 |                               |              |          |     |
|-----------------|-------------------------------|--------------|----------|-----|
| Title           |                               |              |          | Rev |
| HWM,FAN CTRL,OV |                               |              |          |     |
| Size            | Document Number               | Q87M-D2HM MS |          | 1.1 |
| Custom          |                               |              |          |     |
| Date:           | Wednesday, September 04, 2013 | Sheet        | 19 of 32 |     |

# BIOS

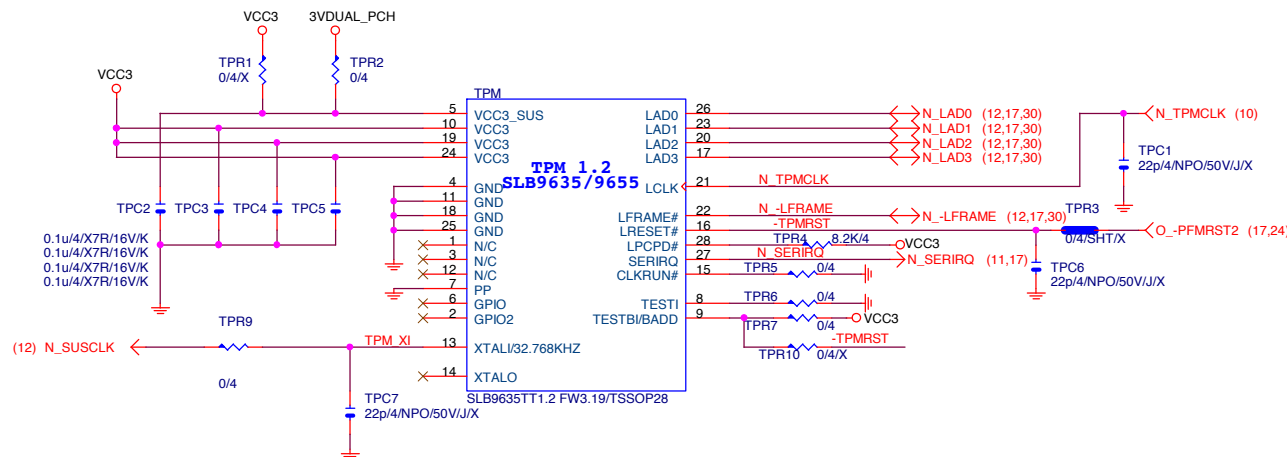


| BOOT<br>DEVICE | GP51 | GP19 |
|----------------|------|------|
| LPC            | 0    | 0    |
| SPI            | 1    | 1    |

1 means internal PU  
0 means PD 1K



# TPM



|                                       | SLB9635 | SLB9655 |
|---------------------------------------|---------|---------|
| TPR2, TPR4, TPR5,<br>TPR6, TPR7, TPR9 | MOUNT   | N/A     |
| TPR1, TPR10                           | N/A     | MOUNT   |

**Gigabyte Technology**

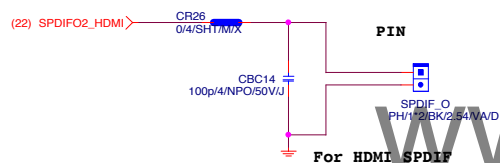
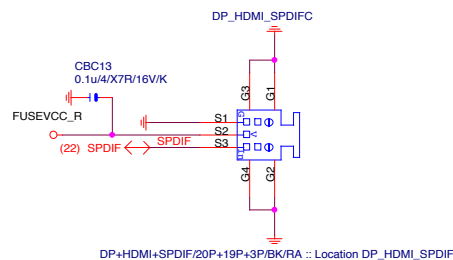
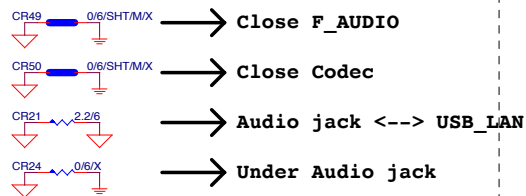
| Title     |                               |                |
|-----------|-------------------------------|----------------|
| BIOS ,TPM |                               |                |
| Size      | Document Number               | Rev            |
| B         | Q87M-D2HM MS                  | 1.1            |
| Date:     | Wednesday, September 04, 2013 | Sheet 20 of 32 |





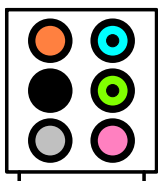


## CODEC POWER/EMI PAD

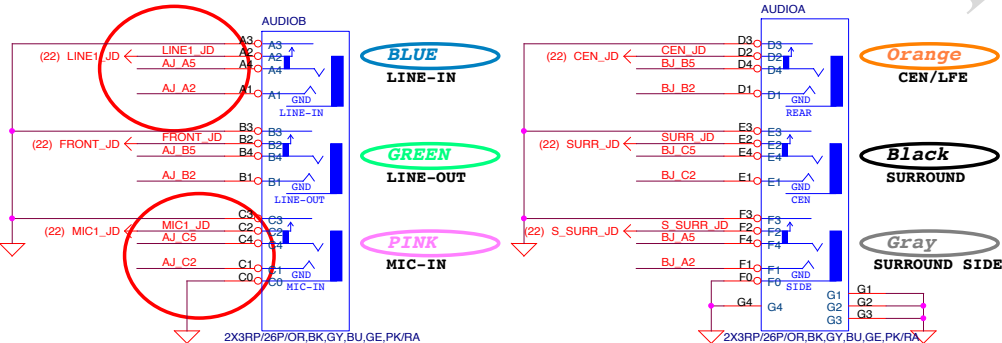


**AZALIA JACK**

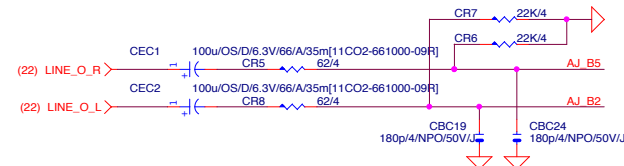
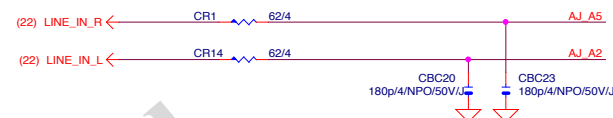
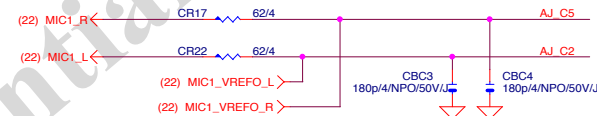
**BTX AZALIA CONNECTOR**



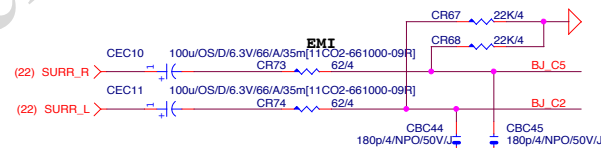
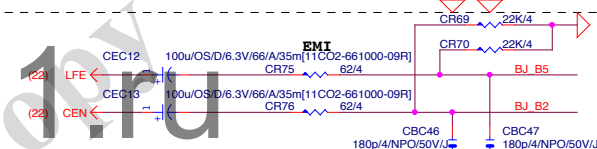
11NR6-403007-21R



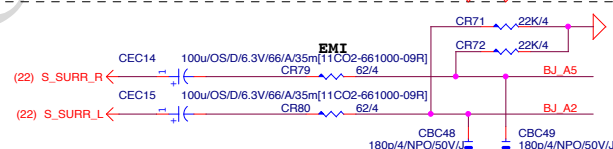
**LINE-OUT**

**LINE-IN****MIC-IN**

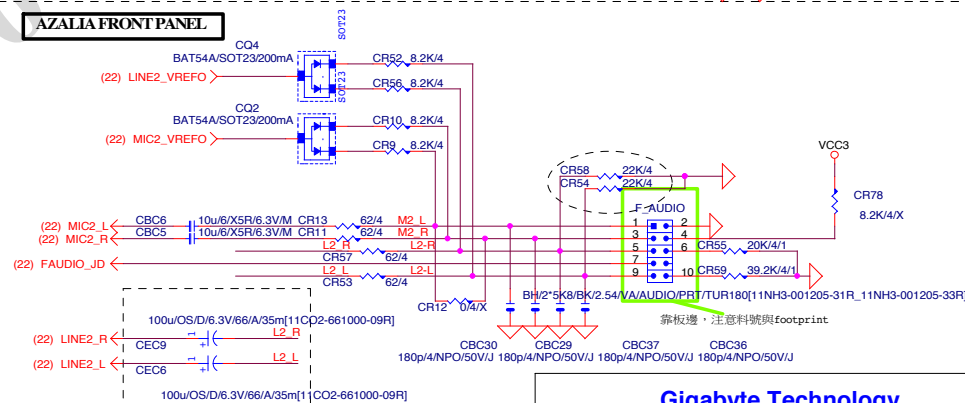
**SURROUND**

**CEN/LFE**

**SURR BACK**

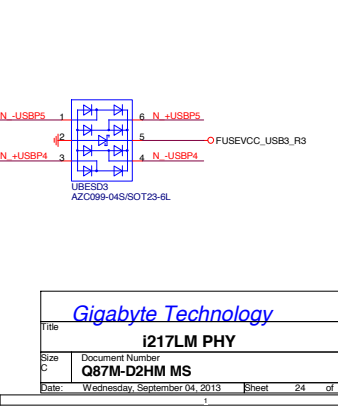
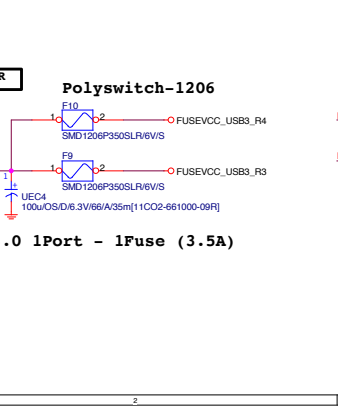
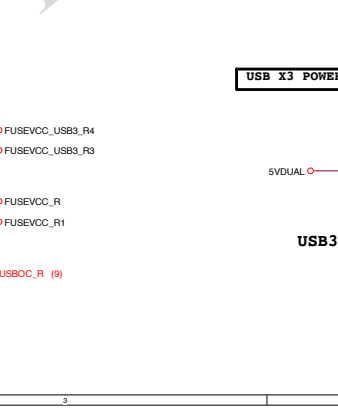
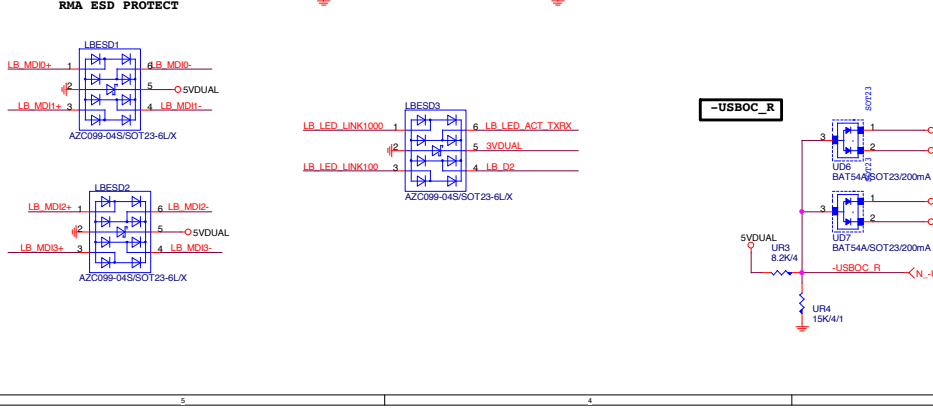
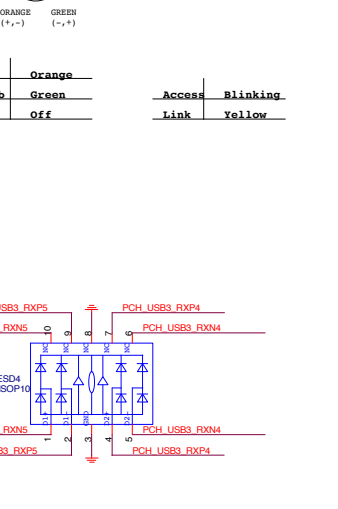
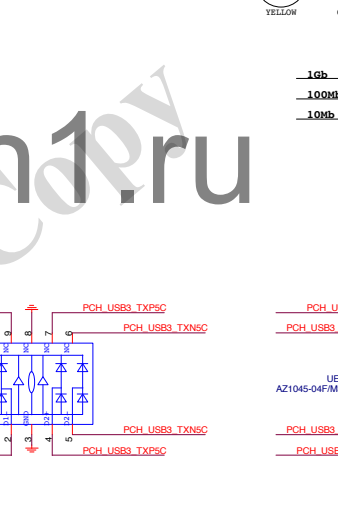
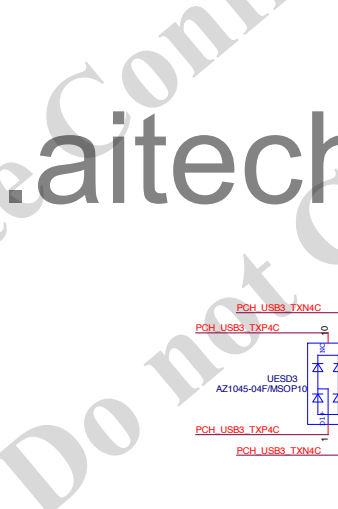
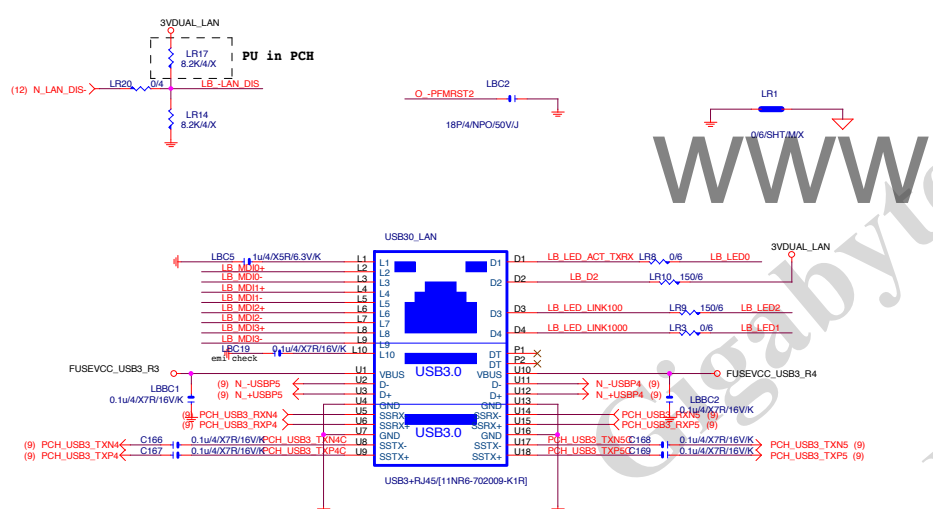
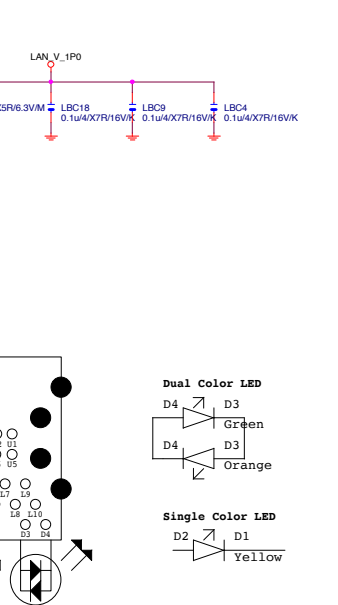
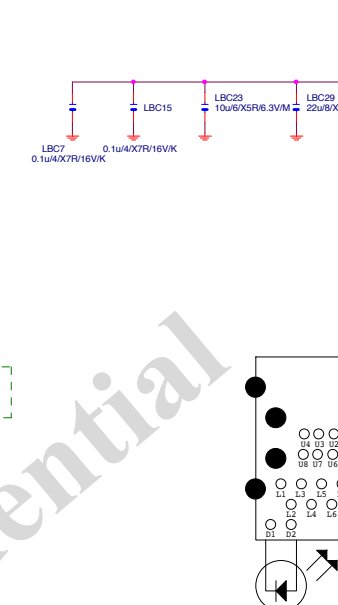
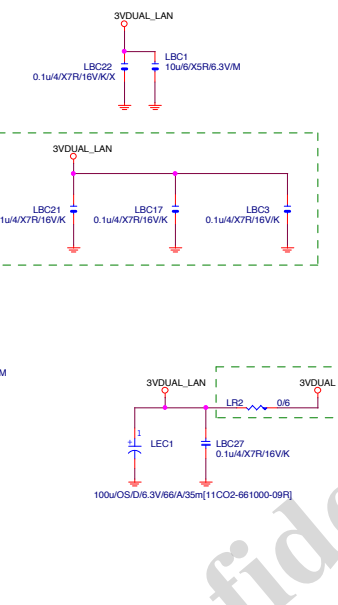
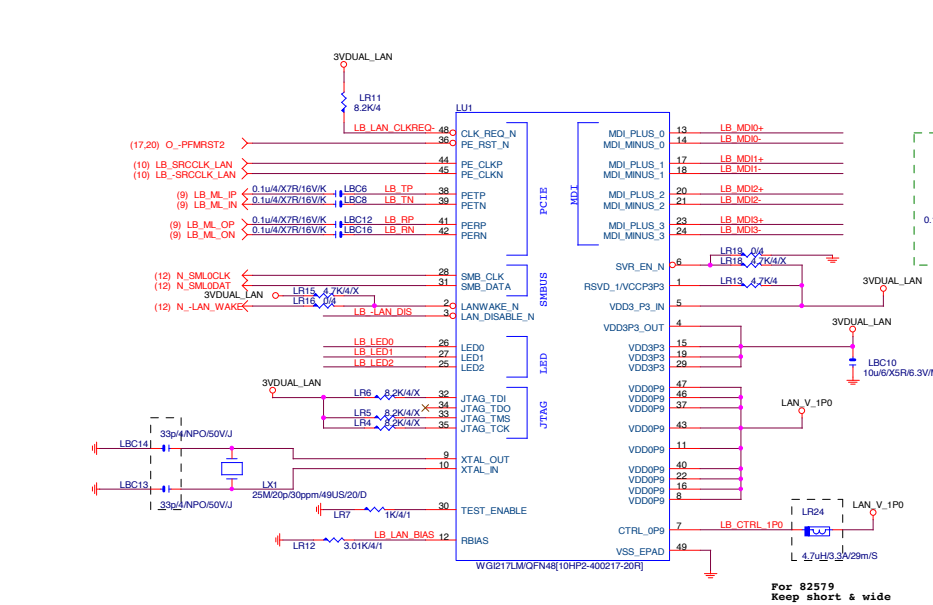


### AZALIA FRONT PANEL



## Gigabyte Technology

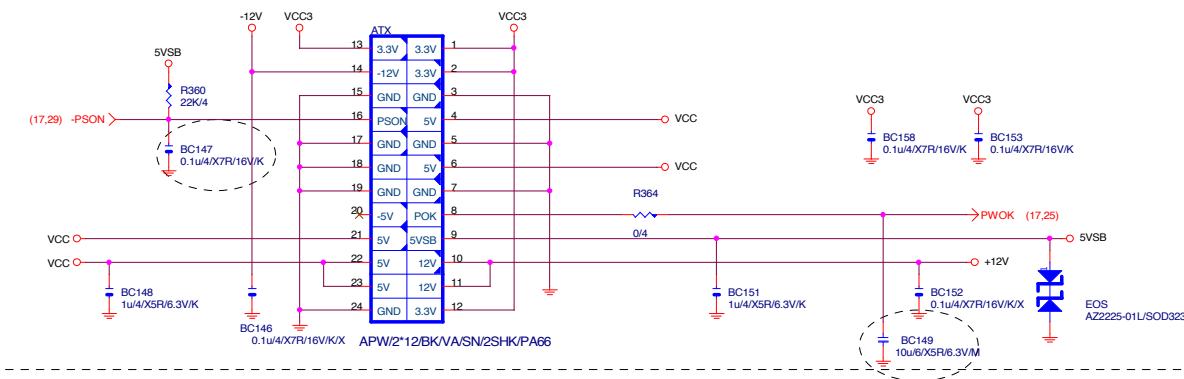
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|-------------|--|-------------------------------|--|--------------|--|----|--|-------|--|
| Title       |  |                               |  | AUDIO JACK   |  |    |  | Rev   |  |
| Size Custom |  | Document Number               |  | Q87M-D2HM MS |  |    |  | 1.1   |  |
| Date:       |  | Wednesday, September 04, 2013 |  | Sheet        |  | 23 |  | of 32 |  |



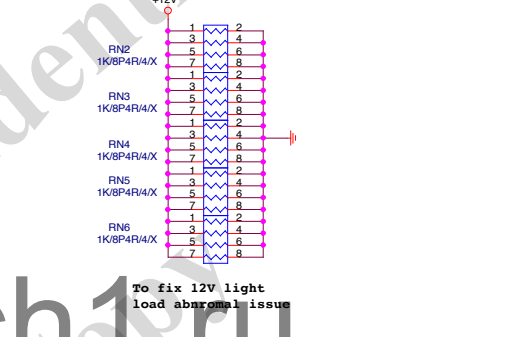
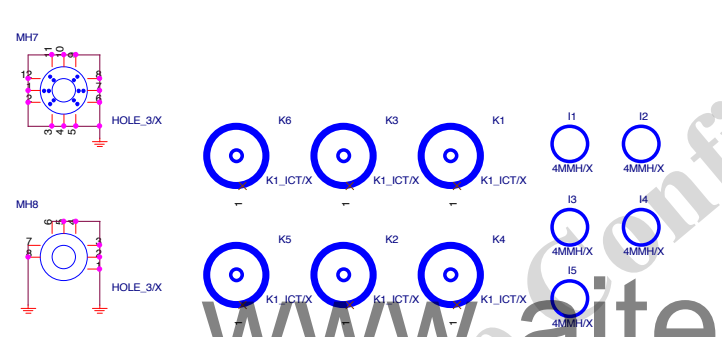
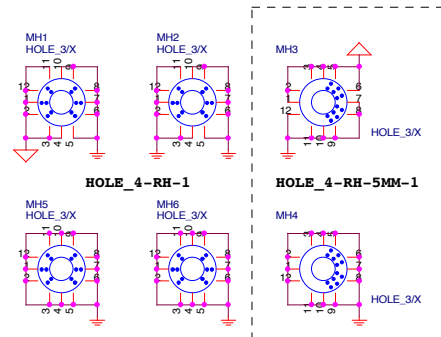
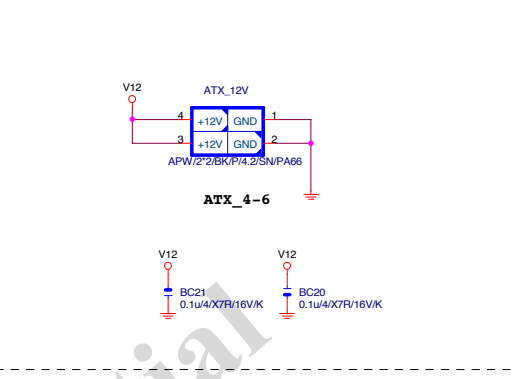
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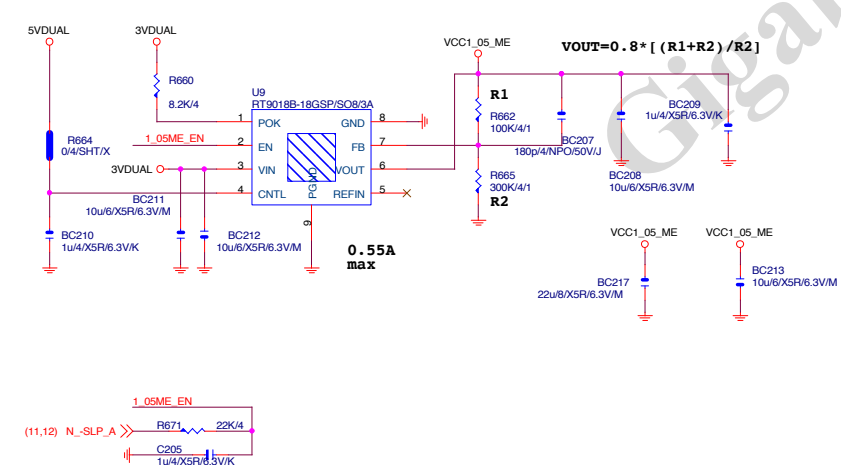
# ATXX24 POWER CONNECTOR



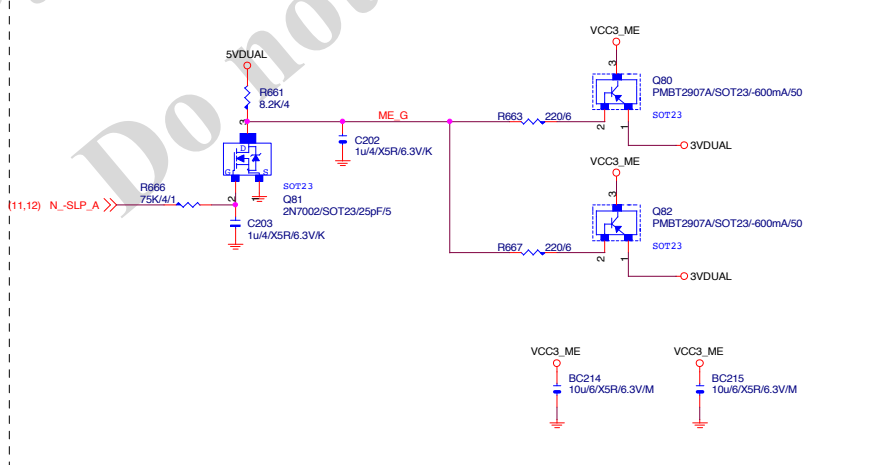
# ATXX4 POWER CONNECTOR



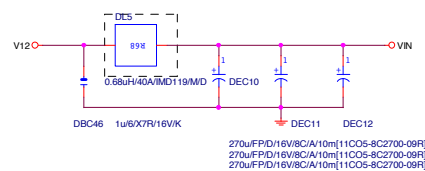
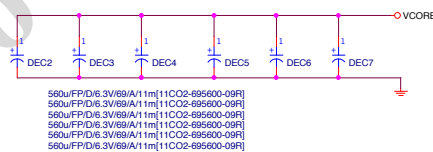
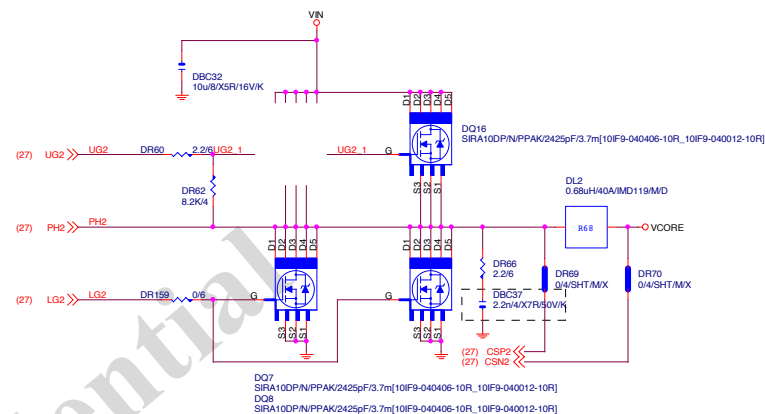
# VCC1\_05\_ME



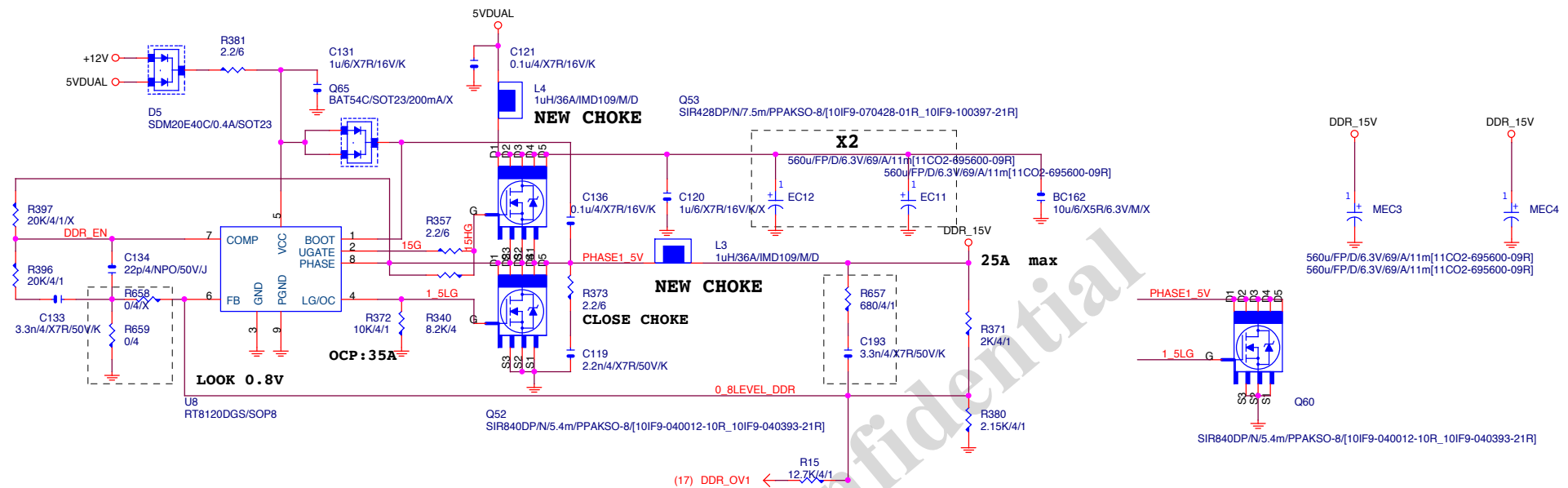
# VCC3\_ME



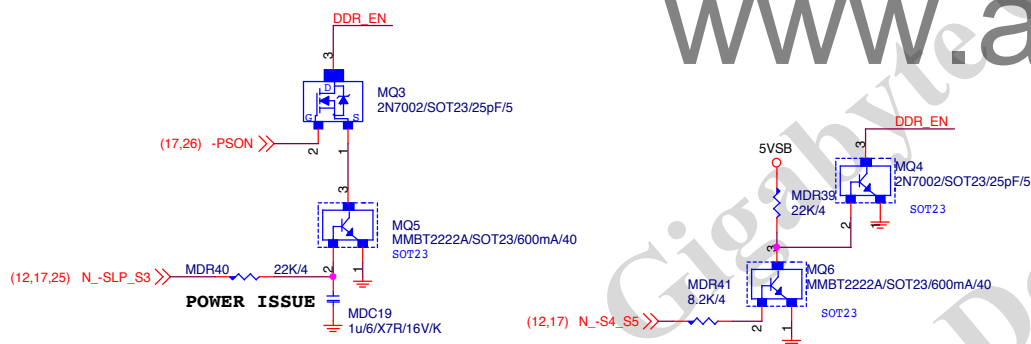




DDR15V



PWR SEQ



IRMS=11.45A

560u/EP/D/6


**Coefficient=1.7 (85°C), 1 (105°C)**

VTN Ripple current =  $4.7 \times 1.7 = 7.9$

-->故固态电容须 $2 \times 7.99 = 15.98 > 11.45A$

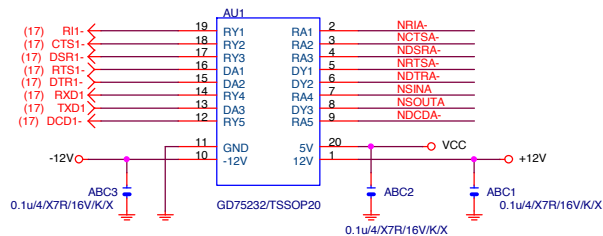
$$R_{ocset} = (45A * 6.7m\Omega) / 10\mu A = 30K$$

Iocset=10uA

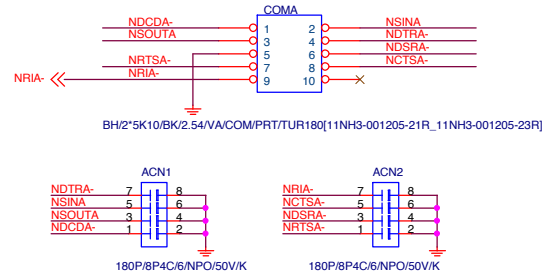
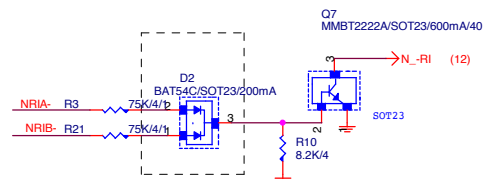
|  |                               |            |          |
|--|-------------------------------|------------|----------|
| <div style="text-align: center;">  </div> |                               |            |          |
| Title  |                               |            |          |
| DDR POWER  |                               |            |          |
| Size   | Document Number               | Rev        |          |
| Custom   | <b>Q87M-D2HM MS</b>           | <b>1.1</b> |          |
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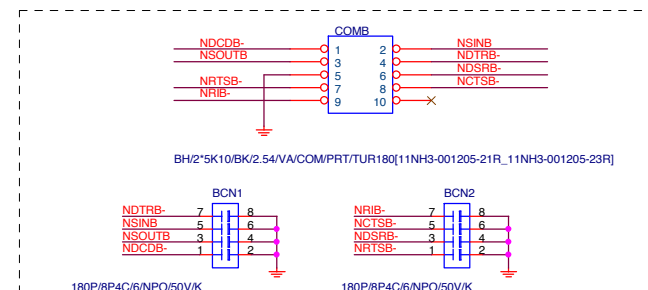
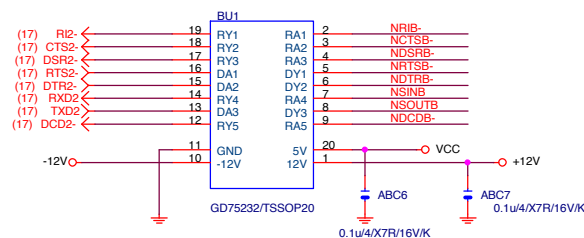
# COMA



# COM RI

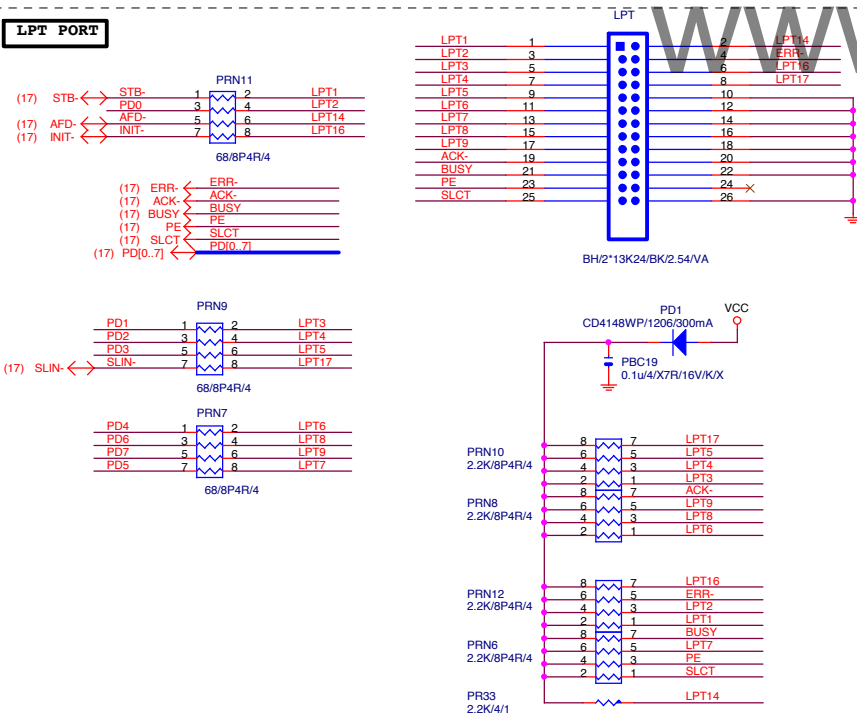


# COMB

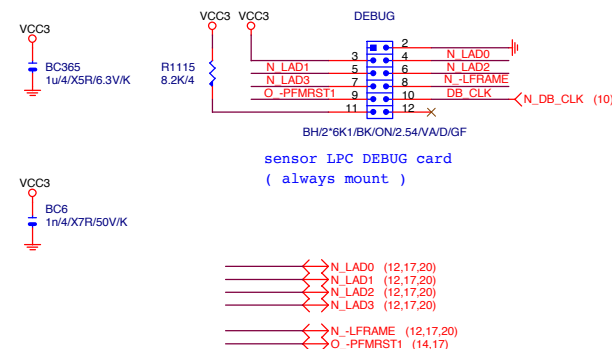


PLACE NEAR COM CONNECTOR

# LPT PORT



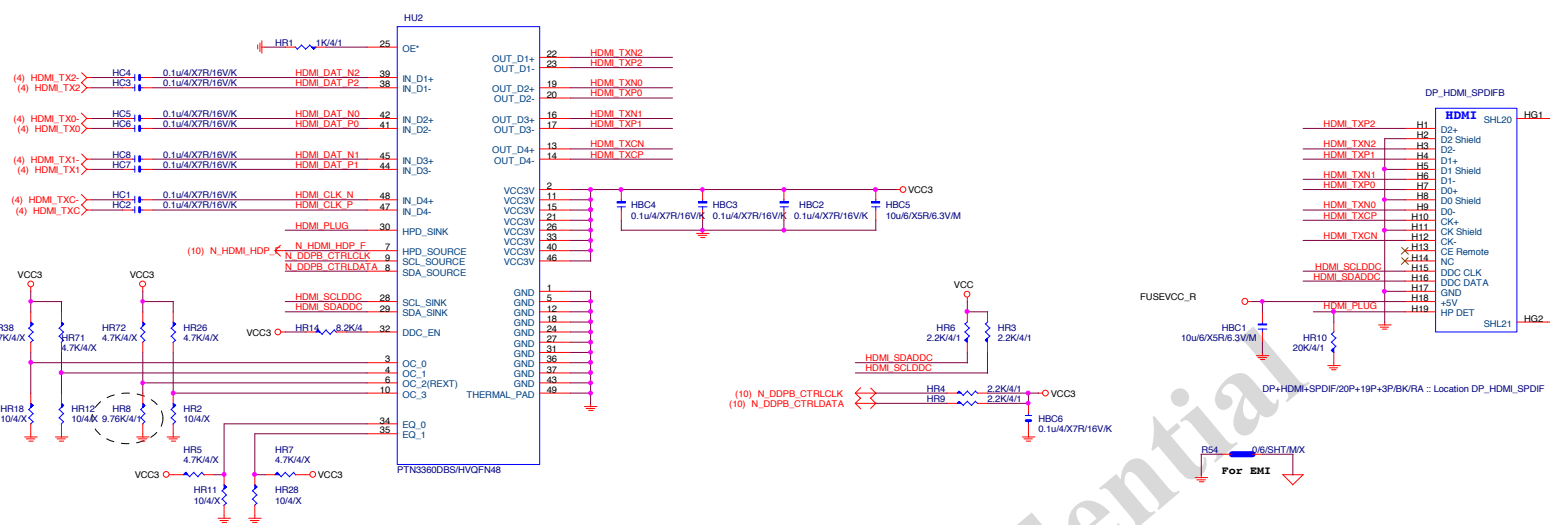
# 80 PORT



Gigabyte Technology

| Title                   |                               |              |          |
|-------------------------|-------------------------------|--------------|----------|
| COM A/B & LPT & 80 PORT |                               |              |          |
| Size                    | Document Number               | Rev          |          |
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|                  |
|------------------|
| HDMI LEVEL SHIFT |
|------------------|



### DVI LEVEL SHIFT

