

Model Name: GA-Z87-D3HP

1.0

SHEET

TITLE

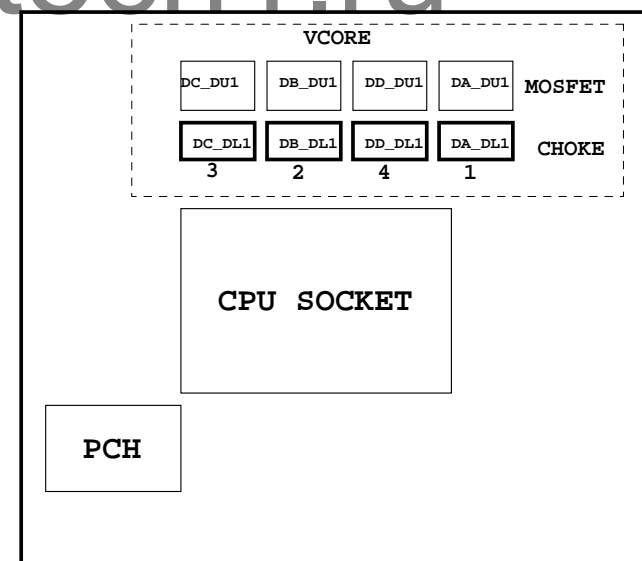
| | |
|----|-----------------------------|
| 01 | COVER SHEET |
| 02 | BOM & PCB MODIFY HISTORY |
| 03 | BLOCK DIAGRAM |
| 04 | CPU_LGA1150-A |
| 05 | CPU_LGA1150-B |
| 06 | CPU_LGA1150-C |
| 07 | DDR III CHANNEL A |
| 08 | DDR III CHANNEL B |
| 09 | PCH_FDI,DMI,USB,PCIE |
| 10 | PCH_RGB,CLK BUFFER |
| 11 | PCH_HOST,SATA,PCI |
| 12 | PCH_GPIO,CTRL,AUDIO |
| 13 | PCH_PWR,GND |
| 14 | PCI EXPRESS*16 SLOT |
| 15 | PCIEX1*2 , PCIEX4 SLOT |
| 16 | ITE8892 PCI BRIDGE |
| 17 | PCI SLOT 1&2 |
| 18 | I/O ITE8728 |
| 19 | COM, -PROHOT, R_USB |
| 20 | Dual BIOS , TPM SLB9635TT |
| 21 | ALC892 CODEC |
| 22 | REAR AUDIO JACK |
| 23 | VCORE PWM_IR3564a |
| 24 | VCORE+DDR PWM IR3553+IR3598 |
| 25 | ME POWER |
| 26 | NCP3933 OVER VOLTAGE |
| 27 | DISCRETE POWER |

SHEET

TITLE

| | |
|----|------------------------|
| 28 | F_PANEL , F_USB2.0/3.0 |
| 29 | ATX POWER, CLOCK GEN |
| 30 | HWM , KB/MS , FAN CTRL |
| 31 | LAN INTEL i217 |
| 32 | DVI |
| 33 | HDMI , R_USB30 |
| 34 | TABLE LIST |
| 35 | |
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| 39 | |
| 40 | |

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Gigabyte Technology

| | | | |
|-------------|-------------------------|-------------|---------|
| Title | | | |
| Cover Sheet | | | |
| Size | Document Number | GA-Z87-D3HP | Rev |
| Custom | | | 1.0 |
| Date: | Tuesday, March 26, 2013 | Sheet | 1 of 38 |

GA-Z87-D3HP

Component value change history

| Data | Change Item | Reason |
|----------|---|--------|
| 0.1-0925 | E-BOM | |
| | 1. Z77-D3H改為削光黑PCB, slots同原本削光黑機種配色, CPU socket鍍黑 | |
| | 2. 8 series IR digital power PWM因Intel spec change, 須改用b版 (必須發行Firmware) | |
| | 3. H77-D3H 注意上H87 chips, 上ME power, 咖啡黑機種配色 | |
| | 3. H77-D3H GPIO37 需Pull up to 3VDUAL | |
| 0.2 | 1. Load-line DAR47 2.06K --> 2.37K , DAR46/50 1.4K --> 1.6K , DAC17 150P --> 100P | |
| | 2. N_-LAN_WAKE NR60 8.2K/4 --> 1K/4/1 | |
| | 3. DA_DUI1,DB_DUI1,DD_DUI1,DC_DUI1 10IFB-403553-01R --> 0TA1-603551-00R | |
| | 4. DDR CHOKER阻值調整 | |
| | 5. CPU SOCKET + RM 要用新料號? | |
| 0.2B | 1. 確定Power stage用料:IR3553 or IR3550 or 3551? | |
| | 2. GPIO8 "NR136"不上 | |
| | 3. Add +12V排阻 RN2-RN6 | |
| 0.2C | 1. HU1 , HU2 level shifter change to NXP | |
| 0.3 | 1. PWM MOSFET修改 IR3564B + power stage 改成 IR3564B + IR3535 + power pak (Cancel) | |
| | 3. PWM MOSFET修改 IR3564B + power stage 改成 IR3564B + IR3535 + power pak | |
| 1.0 | 1. PCIE16 patch reset circuit 怎麼上? | |
| | 2. Prochot是否只上一組 | |
| | 3. PCH_HS & MOS_HS change new 料號 | |
| | 4. 因DII 2222禁用, 注意Z87-D3H試產時用Panjit 2222是否可用(BOM已內建) | |
| | 5. HDMI/DVI change to NXP level shifter | |
| | 6. CHECK 5VSB保護線路是否上件 | |
| Z87-D3HP | | |
| 1.0A | 1. 5VDUAL OVP --> 5VSB OVP | |
| | 2. Remove 全成信PCB | |
| 1.0B | 1. Remove DAJP1 | |
| | 2. HR29 3.09K --> 3.3K | |
| | 3. USB3.0 HUB add RT9018 | |
| 10C | 1. MOS_HS 12SP2-S08824-21R/22R/23R --> 12SP2-S08824-51R/52R/53R | |

Circuit or PCB layout change

| DATE | Change Item | Reason |
|--------------|---|--------|
| 0.1 | E-BOM | |
| 0.2 | 1. U8 pin3加粗40mils 2. Update LAYOUT NEW RULE for四層板 3. MDA6線長T型要繞等長 4. N_GPIO37 pull up VCC3 --> 3VDUAL 5. CPU Thertrip CPU_VTT --> VCC1_05_PCH 6. 確認 R/G/B ESD擺放位置 7. Add PCIE16 reset patch circuit 8. PCIE signal by group 成對走 9. VIN0 --> VCORE0 , VIN5 --> VCORE 10. CS 1pin --> 2pin 11. 後窗部份鋪銅會挖 + 字處理 12. Add MA_DR8 , MA_DC8單獨下地 13. add VTT_PWRGD control circit 14. Update F_PANEL footprint "H2X10PANEL-3" 15. NR132跟NC59 layout位置交換 16. Add DS_ME GP67 control 17. Q6位置靠近 PWM power control pin 18. WR59 change to "R0204-2" 19. 文字面 "DualBIOS" , 改為" Dual UEFI BIOS" , Add "Intel GbE LAN" 20. MAU2 REF "GND" 21. DDR Choke ML1,ML2 1.2uH/20A --> 0.8uH/35A | |
| 0.21 | 1. AUDIO SPDIF-IN CR77 "0402-2" FOR short protection 2. add AUDIO ON/OFF PLAYER 3. Change PCIE1/PCIX4 CLK 4. Update F_PANEL footprint 5. CPU VRIN OV IO_GP81 --> IO_GP21 | |
| 0.3 | 1. PWM MOSFET修改 IR3564B + power stage 改成 IR3564B + IR3535 + power pak (Cancel) | |
| 1.0 | 1. 0 ohm --> short pad 2. 簡化CPU Config setting 3. Remove "BIOS_PH" & "M_BIOS socket" & "CS" pin 4. 注意Slot和後窗正面有做十字Thermal處理 5. NBC65移靠近PCH 6. Add R700-R702 for FAN short protection 7. PWR_LED 改為IO_GP65 8. VTT_PWRGD Update 9. N_GPIO37 pull-up to VCC3 10. +12V RN2-RN6 & VCC/VCC3/5VSB dummy load 排阻 11. DDR_15V H/W monitor detect 改從 DDR slot 拉回 12. 5VSB AD1要過 NET 13. DDR VIN 間隔拉開 , 背板GATE往上移 14. Add DDR_15V dummy load 15. 5VSB/5VDUAL OVP protection 16. 預留N_PCH_DPWROK 控制線路 | |
| Z87-D3HP-0.1 | 1. add USB3.0 Hub | |

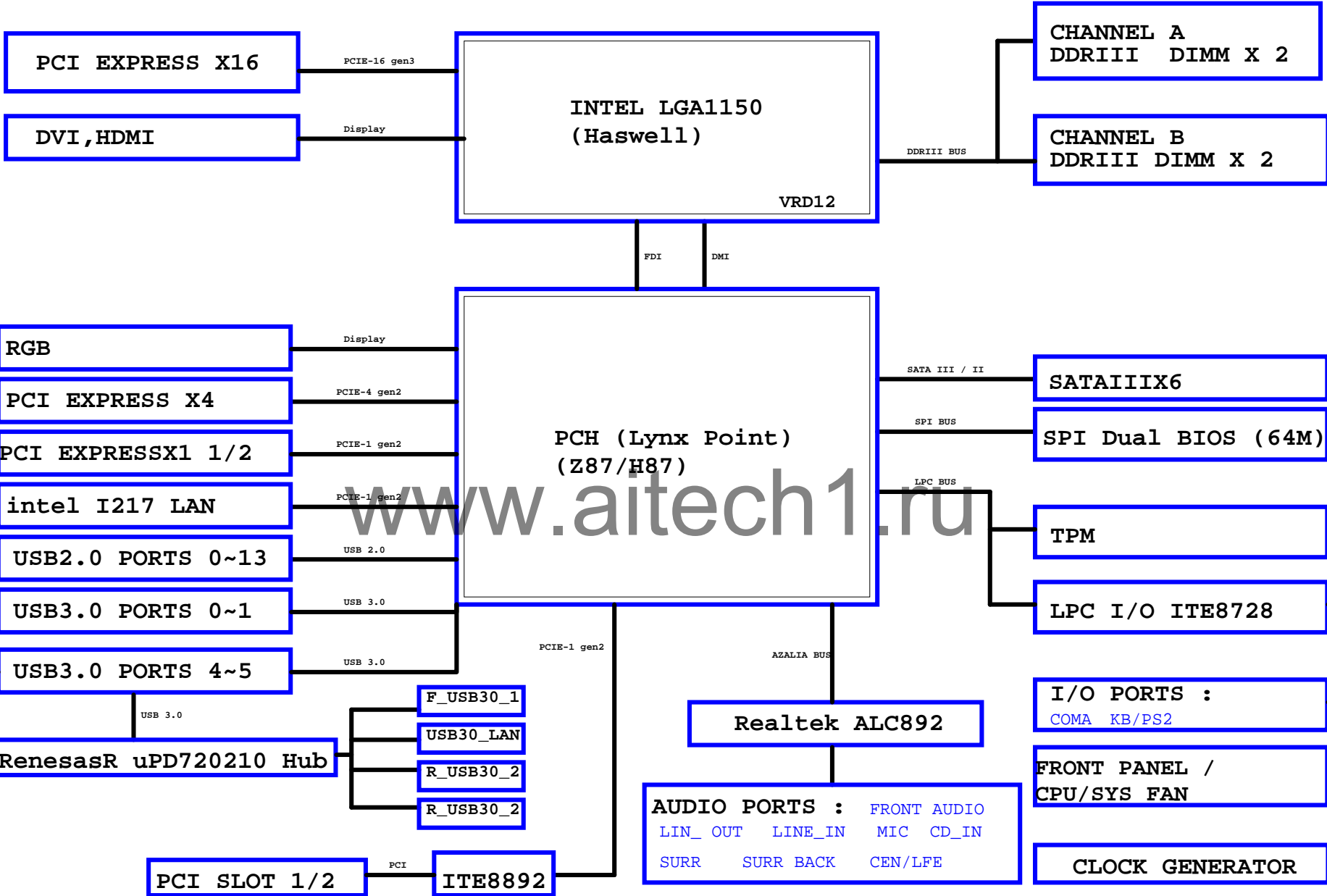
Z87-D3HP-1.0 1. DART2改成R0402-2(靠近DD_DUI1) , DART4改成R0603-RH(放在DART2左邊) , RS1改成R0402-2

2. Add DAR82 For MOSFET "PHSFLT-" protect

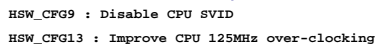
Z87-D3HP-1.01 1. HDMI update "HDMI-3"

| Gigabyte Technology | | | |
|--------------------------|-----------------------|-------------|---------|
| BOM & PCB MODIFY HISTORY | | | |
| Title | | | |
| Size | Document Number | GA-Z87-D3HP | Rev |
| Custom | | | 1.0 |
| Date: | Tuesday, May 14, 2013 | Sheet | 2 of 38 |

BLOCK DIAGRAM



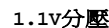
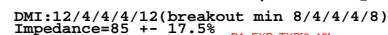
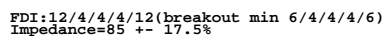
(E)



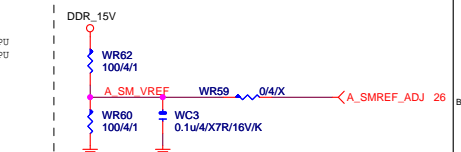
| OPG | H | L | NOTE |
|-----|----------------|----------------|-----------------------|
| 1 | RSVD | RSVD | RSVD |
| 2 | RSVD | RSVD | RSVD |
| 3 | NRGN | Reverse | LANE REVERSAL[0..x16] |
| 4 | RSVD | RSVD | RSVD |
| 7 | Disable | Enable | eDP Enable |
| 8 | RSVD | RSVD | RSVD |
| 9 | RSVD | RSVD | 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 |

| CF06 | CF05 | PCIe CONFIG |
|------|------|--------------|
| 1 | 1 | x16, Default |
| 3 | 0 | x8 |
| 1 | 0 | x4 |
| 0 | 0 | x8, x4, x4 |

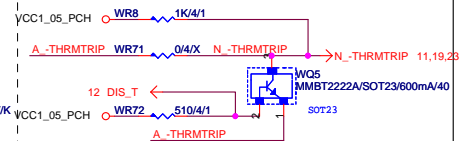
(D)



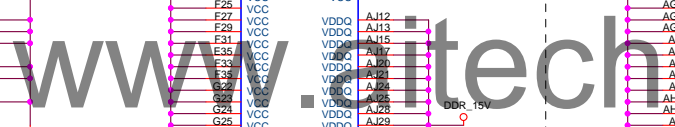
U SVID



THRMTRIP DISABLE



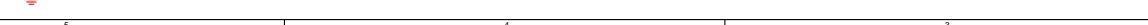
(F, J)



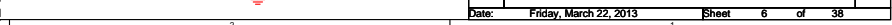
(G,H,I)

| | | | | | | | | |
|------|-----|-----|------|-----|-----|-----|-----|-----|
| AG38 | VSS | VSS | AM32 | L7 | VSS | VSS | W4 | AT3 |
| AG39 | VSS | VSS | AM33 | L7 | VSS | VSS | W7 | AT3 |
| AG40 | VSS | VSS | AM34 | K8 | VSS | VSS | W7 | AT3 |
| AG6 | VSS | VSS | AM35 | L8 | VSS | VSS | Y3 | AT3 |
| AG8 | VSS | VSS | AM36 | L11 | VSS | VSS | Y33 | AT3 |
| AH1 | VSS | VSS | AM4 | L13 | VSS | VSS | Y6 | AT3 |
| AH2 | VSS | VSS | AM5 | L13 | VSS | VSS | Y6 | AT3 |
| AH3 | VSS | VSS | AM6 | L14 | VSS | VSS | | AT3 |
| AH33 | VSS | VSS | AN10 | L35 | VSS | VSS | | AU3 |
| AH36 | VSS | VSS | AN14 | L38 | VSS | VSS | | AU3 |
| AH4 | VSS | VSS | AN16 | L6 | VSS | VSS | | AU3 |

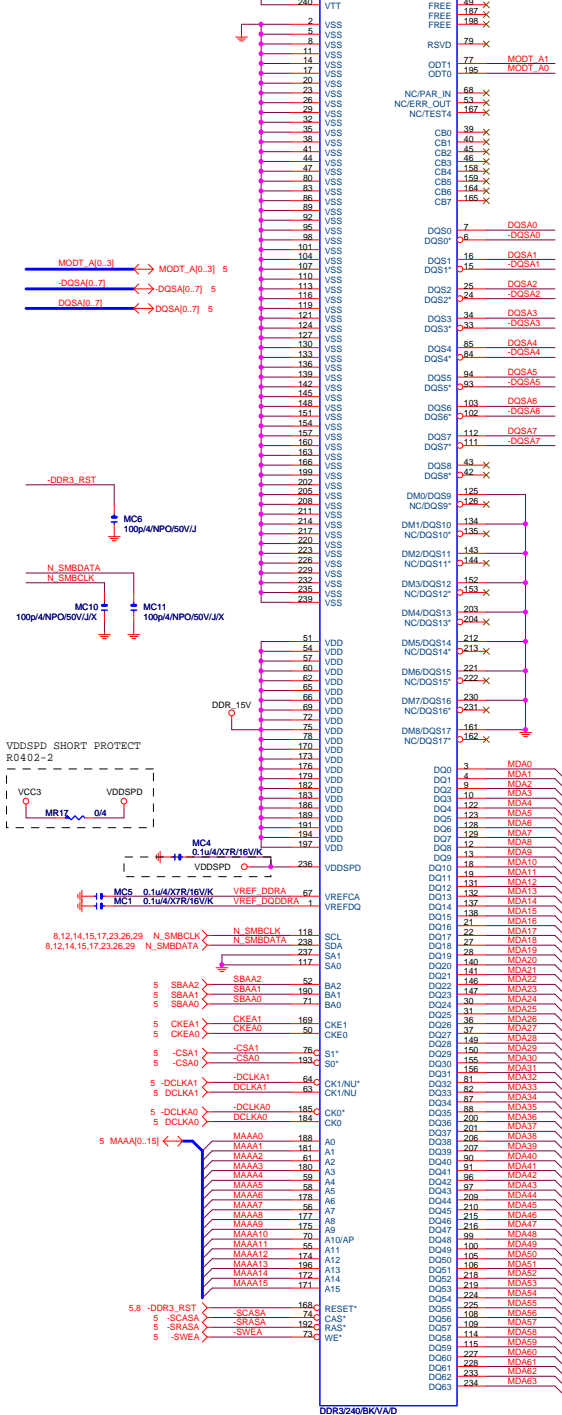
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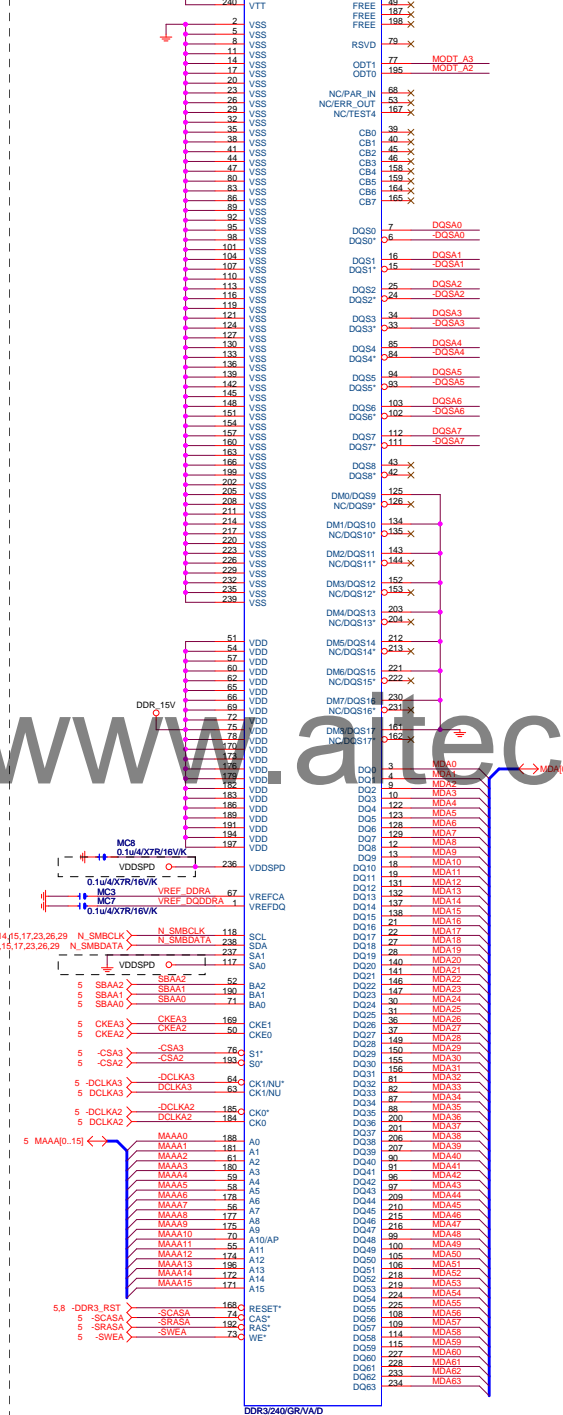
(X15)



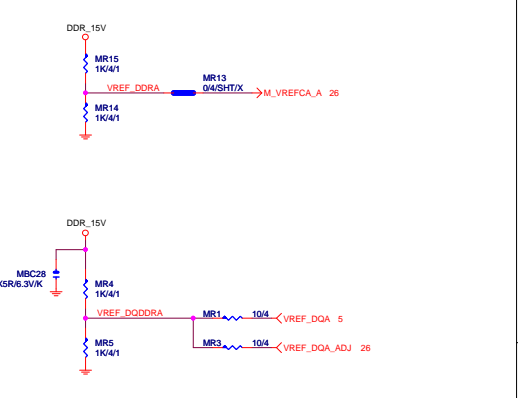
DDR3 (A)



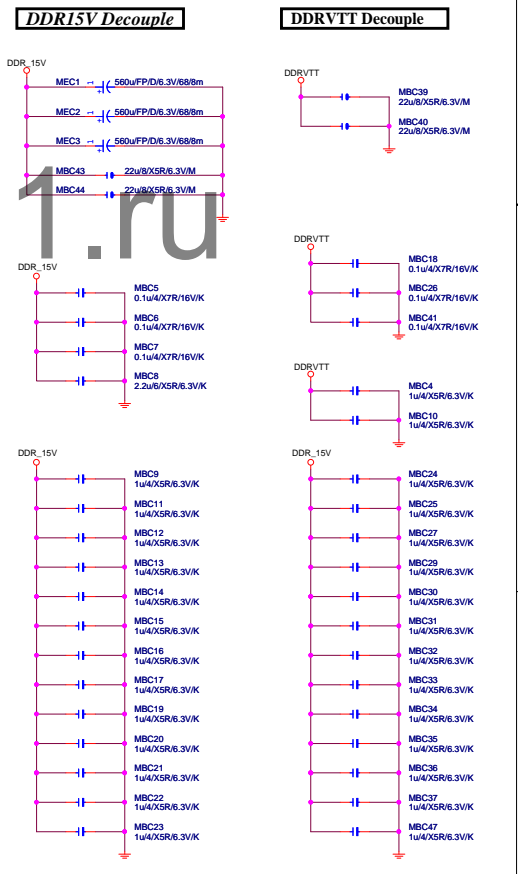
DDR3



DDR3 VREF

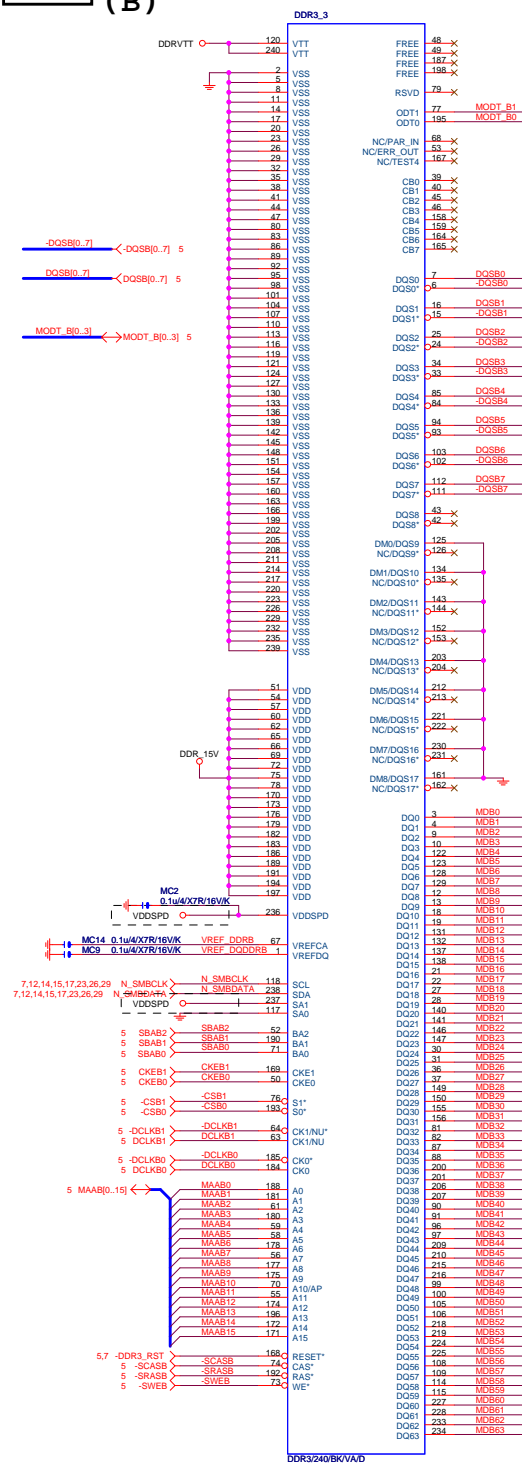


DDR TERMINATION CHANNEL A/B



DDR3

(B)



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

USB2.0 : 12/5/7/5/12 (breakout min 8/4/4/4/8)
Impedance=85 +- 17.5%



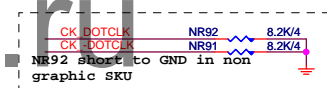
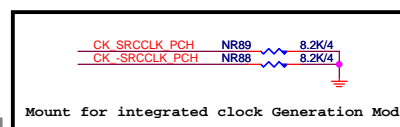
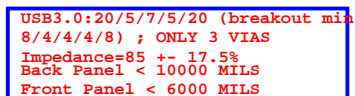
PCIEEX1:15/4/4/4/15 (breakout min 8/4/4/4/8)
Impedance=85 +/- 17.5%

PCH PCIE ,DMI 15/4/4/4//15

usb2.0 12/5/7/5//12

usb3.0 20/5/7/5//20

28 PCH_USB3_RXN0 F20 USB3 USB3_RXN_0 FDILINK FDI_RXN_0 N1

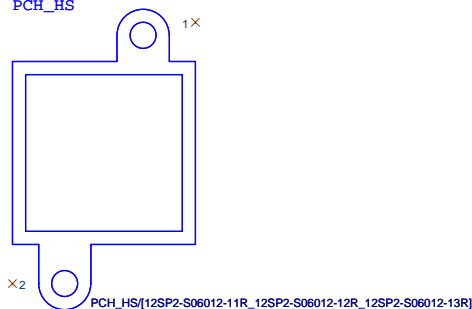


The schematic shows the following connections:

| Package Pin | PCUJ Connector Pin |
|-------------|--------------------|
| AT1 | VSS_NCTF |
| AT41 | T |
| AU1 | T |
| AV1 | T |
| AV2 | T |
| AV40 | T |
| AV41 | T |
| AW2 | T |
| AW40 | T |
| B40 | T |
| B41 | T |
| C41 | T |
| D1 | T |
| D41 | T |

The package pin D1 is also connected to ground.

PCH HS



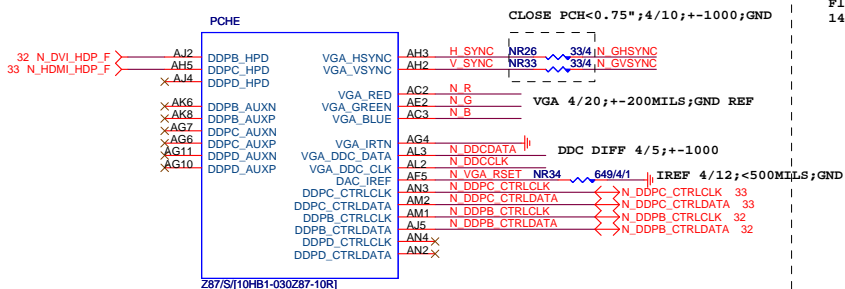
```
OC[3:0]# for Device 29 (ports 0-7)
OC[7:4]# for Device 26 (ports 8-13)
```

| USB OC# | Configure |
|---------|-----------|
| OC0# | USB0,1 |
| OC1# | USB2,3 |
| OC2# | USB4,5 |
| OC3# | USB6,7 |
| OC4# | USB8,9 |
| OC5# | USB10,11 |
| OC6# | USB12,13 |
| OC7# | Not Use |

Gigabyte Technology

| | | | | | | | |
|--------|------------------------|--|--|-----------------------|---|----|-----|
| Title | | | | PCH FDI,DMI,USB ,PCIE | | | |
| Size | Document Number | | | | | | Rev |
| Custom | GA-Z87-D3HP | | | | | | 1 |
| Date: | Friday, March 22, 2013 | | | Sheet | 9 | of | 38 |

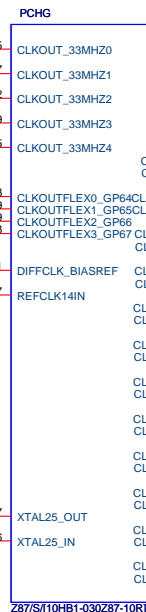
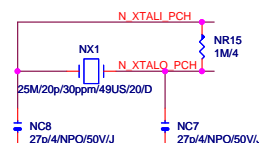
PCH (E)



| | |
|---|-----------|
| VGA DISABLE | |
| R,G,B | NC OR GND |
| IRTN / IREF | GND |
| VGA_HSYNC, VGA_VSYNC, DDC_CLK, DDC_DATA | NC |
| POWER VCCADAC(AF2), VCCADACBG(AE1) | GND |

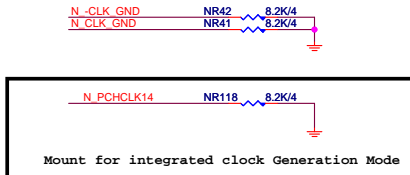
PCH (G)

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



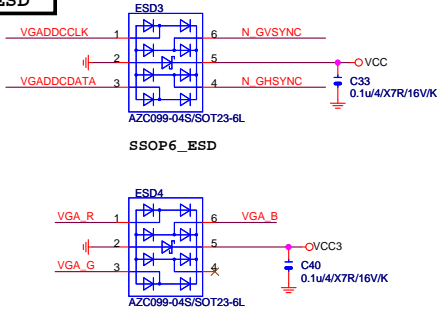
Differential Clock:15/4/6/4/15 Impedance=90 +- 15%

PCH CLK PD

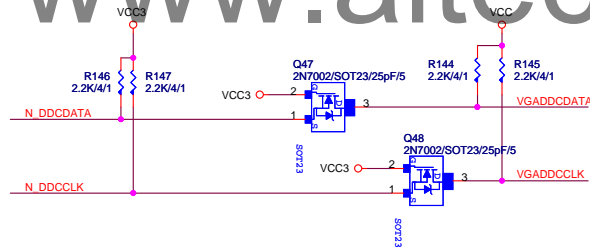


Mount for integrated clock Generation Mode

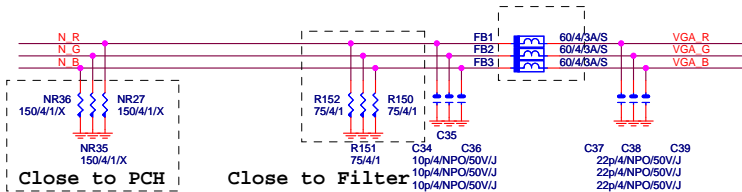
VGA ESD



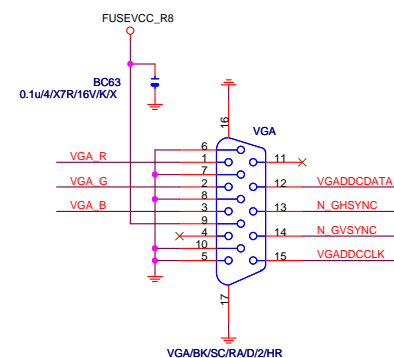
VGA DDC



VGA DDC



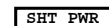
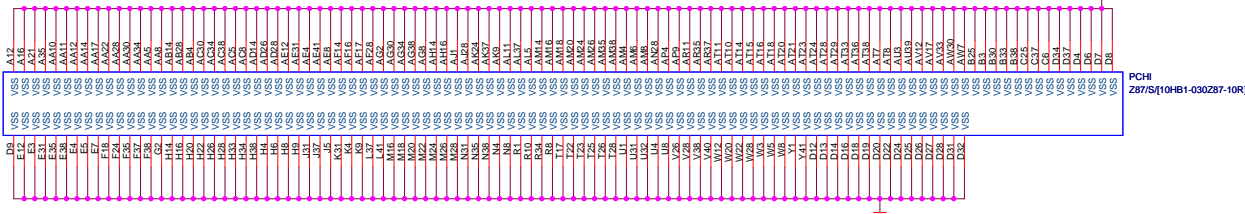
VGA CONNECTOR



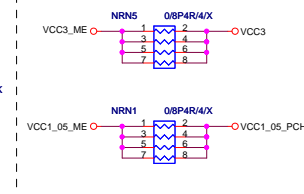
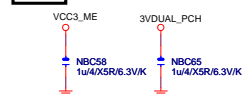
Gigabyte Technology

| | | |
|-------------------------|-------------------------|----------------|
| Title | | |
| PCH DISPLAY ,CLK BUFFER | | |
| Size | Document Number | Rev |
| Custom | GA-Z87-D3HP | 1.0 |
| Date: | Tuesday, March 26, 2013 | Sheet 10 of 38 |

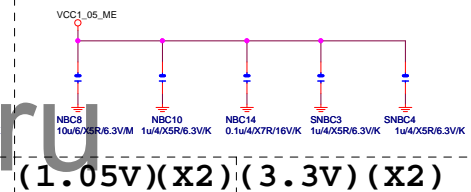
PCH (I)



CAP



(1.05V) (x5)



VCCIO2PCH

3VDUAL



VCC1_5_PCH

NBC16 10u/X5R6.3V/K

NBC20 10u/X5R6.3V/K

NBC30 10u/X5R6.3V/K

NBC33 10u/X5R6.3V/K

NBC18 1u/X5R6.3V/K

NBC23 0.1u/4X7R16V/K

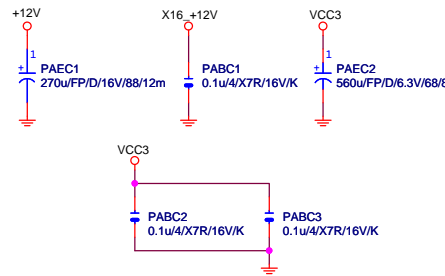
NBC28 1u/X5R6.3V/K

NBC44 1u/X5R6.3V/K

NBC45 0.1u/4X7R16V/K

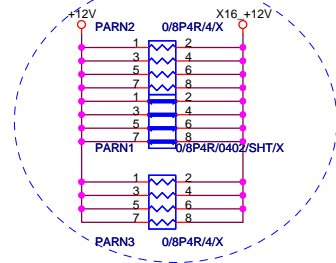
NBC48 1u/X5R6.3V/K

PCIEEX16 CAP



PCIEX16 PROTECT SHT

```
+12  protect
short-wire test
```



| | | |
|---------|----|-----|
| PCIEX16 | AC | CAP |
|---------|----|-----|

| | | | |
|--------------|-------|------------------|----------------|
| PA EXP TXP0 | PAC5 | 0.22u4/X5R6.3V/K | PA EXP TXP0 C |
| PA EXP TXN0 | PAC4 | 0.22u4/X5R6.3V/K | PA EXP TXN0 C |
| PA EXP TXP1 | PAC6 | 0.22u4/X5R6.3V/K | PA EXP TXP1 C |
| PA EXP TXN1 | PAC7 | 0.22u4/X5R6.3V/K | PA EXP TXN1 C |
| PA EXP TXP2 | PAC8 | 0.22u4/X5R6.3V/K | PA EXP TXP2 C |
| PA EXP TXN2 | PAC9 | 0.22u4/X5R6.3V/K | PA EXP TXN2 C |
| PA EXP TXP3 | PAC10 | 0.22u4/X5R6.3V/K | PA EXP TXP3 C |
| PA EXP TXN3 | PAC11 | 0.22u4/X5R6.3V/K | PA EXP TXN3 C |
| PA EXP TXP4 | PAC12 | 0.22u4/X5R6.3V/K | PA EXP TXP4 C |
| PA EXP TXN4 | PAC13 | 0.22u4/X5R6.3V/K | PA EXP TXN4 C |
| PA EXP TXP5 | PAC14 | 0.22u4/X5R6.3V/K | PA EXP TXP5 C |
| PA EXP TXN5 | PAC15 | 0.22u4/X5R6.3V/K | PA EXP TXN5 C |
| PA EXP TXP6 | PAC16 | 0.22u4/X5R6.3V/K | PA EXP TXP6 C |
| PA EXP TXN6 | PAC17 | 0.22u4/X5R6.3V/K | PA EXP TXN6 C |
| PA EXP TXP7 | PAC19 | 0.22u4/X5R6.3V/K | PA EXP TXP7 C |
| PA EXP TXN7 | PAC18 | 0.22u4/X5R6.3V/K | PA EXP TXN7 C |
| PA EXP TXP8 | PAC20 | 0.22u4/X5R6.3V/K | PA EXP TXP8 C |
| PA EXP TXN8 | PAC21 | 0.22u4/X5R6.3V/K | PA EXP TXN8 C |
| PA EXP TXP9 | PAC22 | 0.22u4/X5R6.3V/K | PA EXP TXP9 C |
| PA EXP TXN9 | PAC23 | 0.22u4/X5R6.3V/K | PA EXP TXN9 C |
| PA EXP TXP10 | PAC24 | 0.22u4/X5R6.3V/K | PA EXP TXP10 C |
| PA EXP TXN10 | PAC25 | 0.22u4/X5R6.3V/K | PA EXP TXN10 C |
| PA EXP TXP11 | PAC26 | 0.22u4/X5R6.3V/K | PA EXP TXP11 C |
| PA EXP TXN11 | PAC27 | 0.22u4/X5R6.3V/K | PA EXP TXN11 C |
| PA EXP TXP12 | PAC28 | 0.22u4/X5R6.3V/K | PA EXP TXP12 C |
| PA EXP TXN12 | PAC29 | 0.22u4/X5R6.3V/K | PA EXP TXN12 C |
| PA EXP TXP13 | PAC30 | 0.22u4/X5R6.3V/K | PA EXP TXP13 C |
| PA EXP TXN13 | PAC31 | 0.22u4/X5R6.3V/K | PA EXP TXN13 C |
| PA EXP TXP14 | PAC32 | 0.22u4/X5R6.3V/K | PA EXP TXP14 C |
| PA EXP TXN14 | PAC33 | 0.22u4/X5R6.3V/K | PA EXP TXN14 C |
| PA EXP TXP15 | PAC34 | 0.22u4/X5R6.3V/K | PA EXP TXP15 C |
| PA EXP TXN15 | PAC35 | 0.22u4/X5R6.3V/K | PA EXP TXN15 C |

PCI-E REV:1.1--> 2.5GHZ

PCE-E X1(單向) BANDWIDTH=2.5GHz*(8b/10b)=2Gb/s=250MB/s

PCE-E X1(雙向) BANDWIDTH=2.5GHz*(8b/10b)X2=4Gb/s=500MB/s

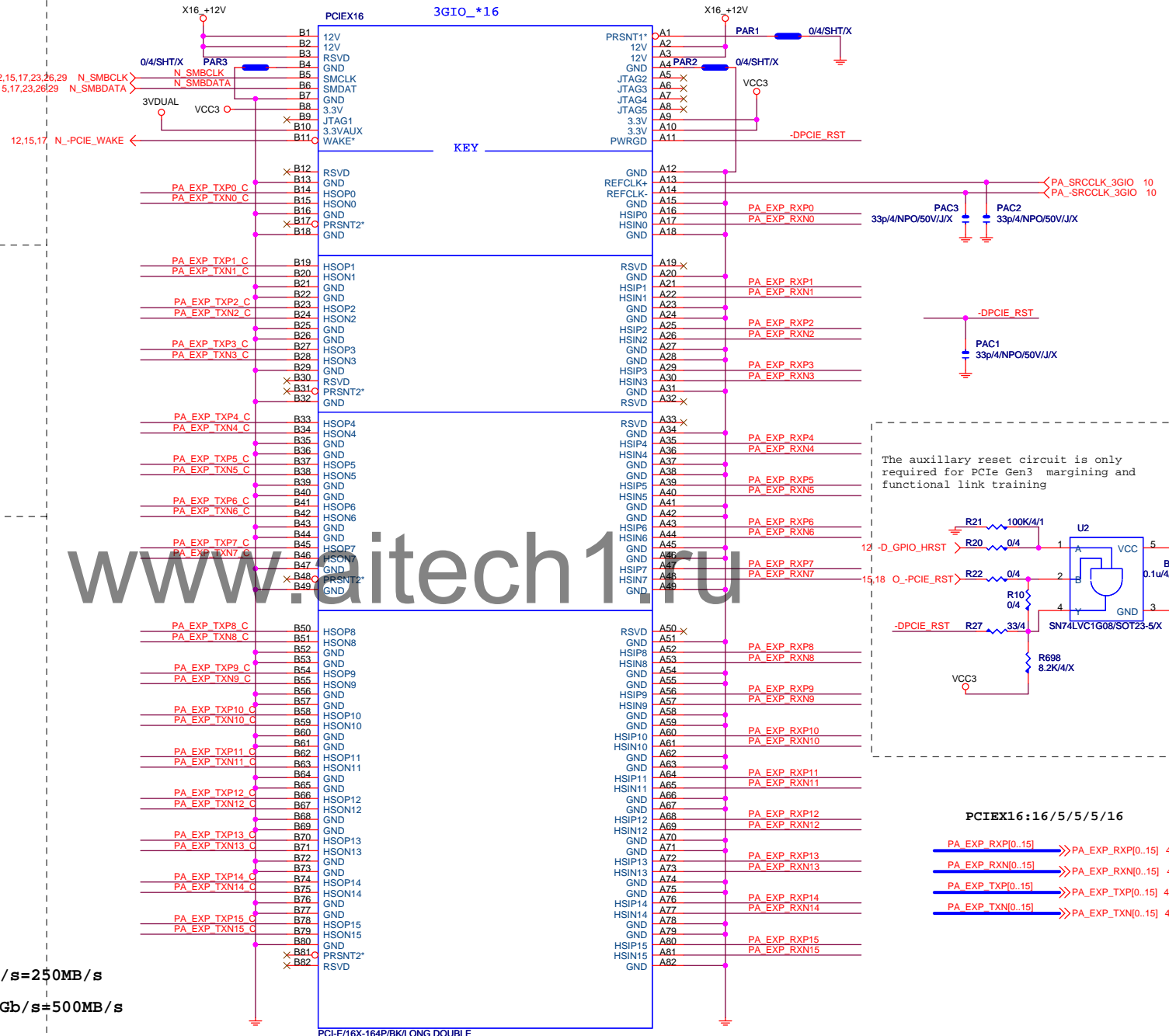
PCE-E X16(單向) BANDWIDTH=2.5GHz*(8b/10b)X16=32Gb/s=4GB/s

PCE-E X16(雙向) BANDWIDTH=2.5GHz*(8b/10b)X16X2=64Gb/s=8GB/s

PCI-E REV:2.0--> 5GHZ

PCIEX16 SLOT

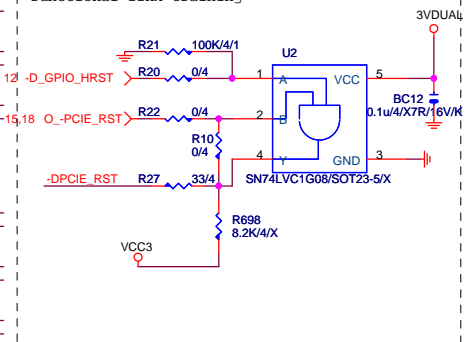
PCIESLOT-164DN-Q



```

- | The auxillary reset circuit is only
- | required for PCIe Gen3  margining and
- | functional link training

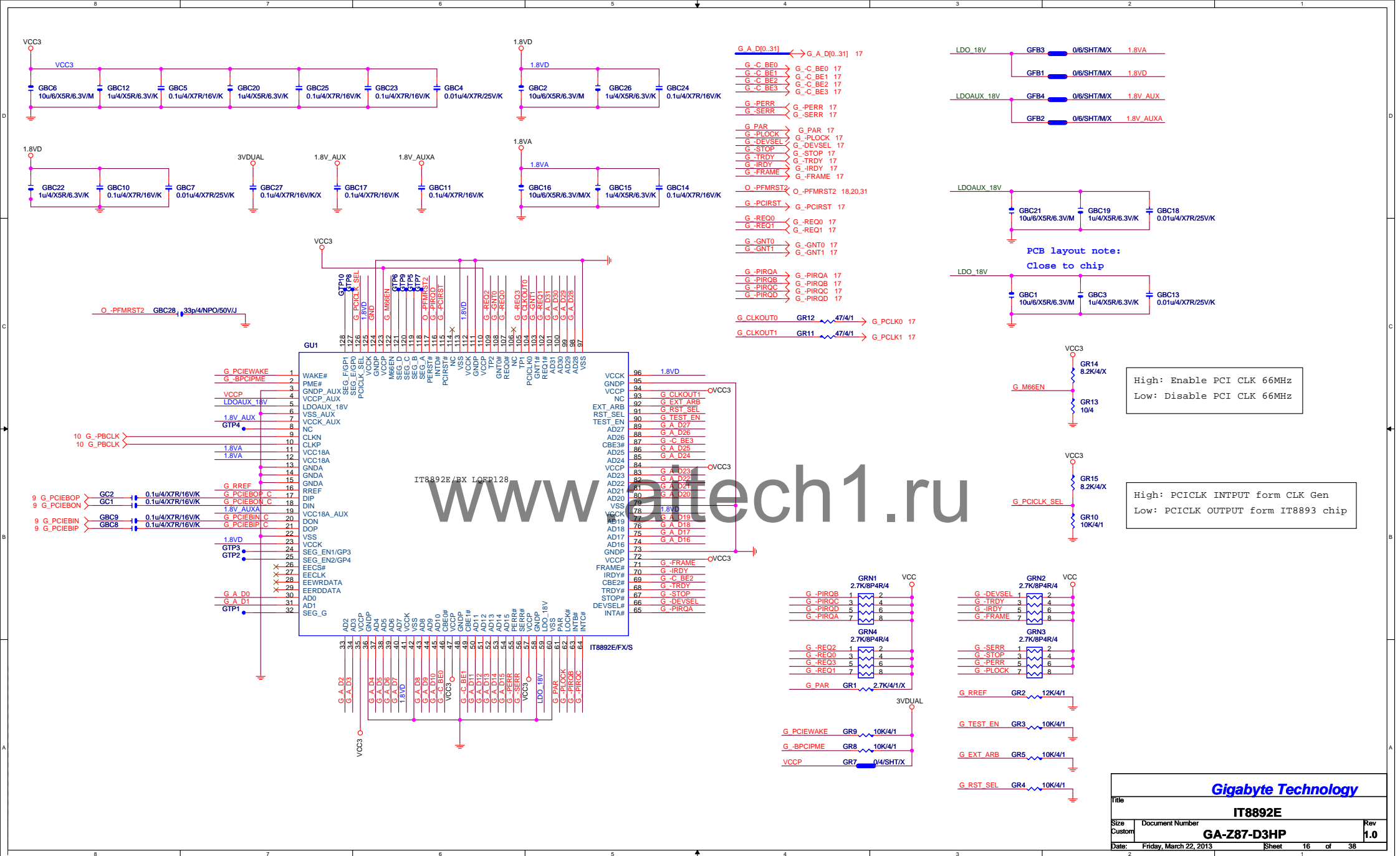
```



PCIEX16:16/5/5/5/16

```
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
```

[illegible][illegible]



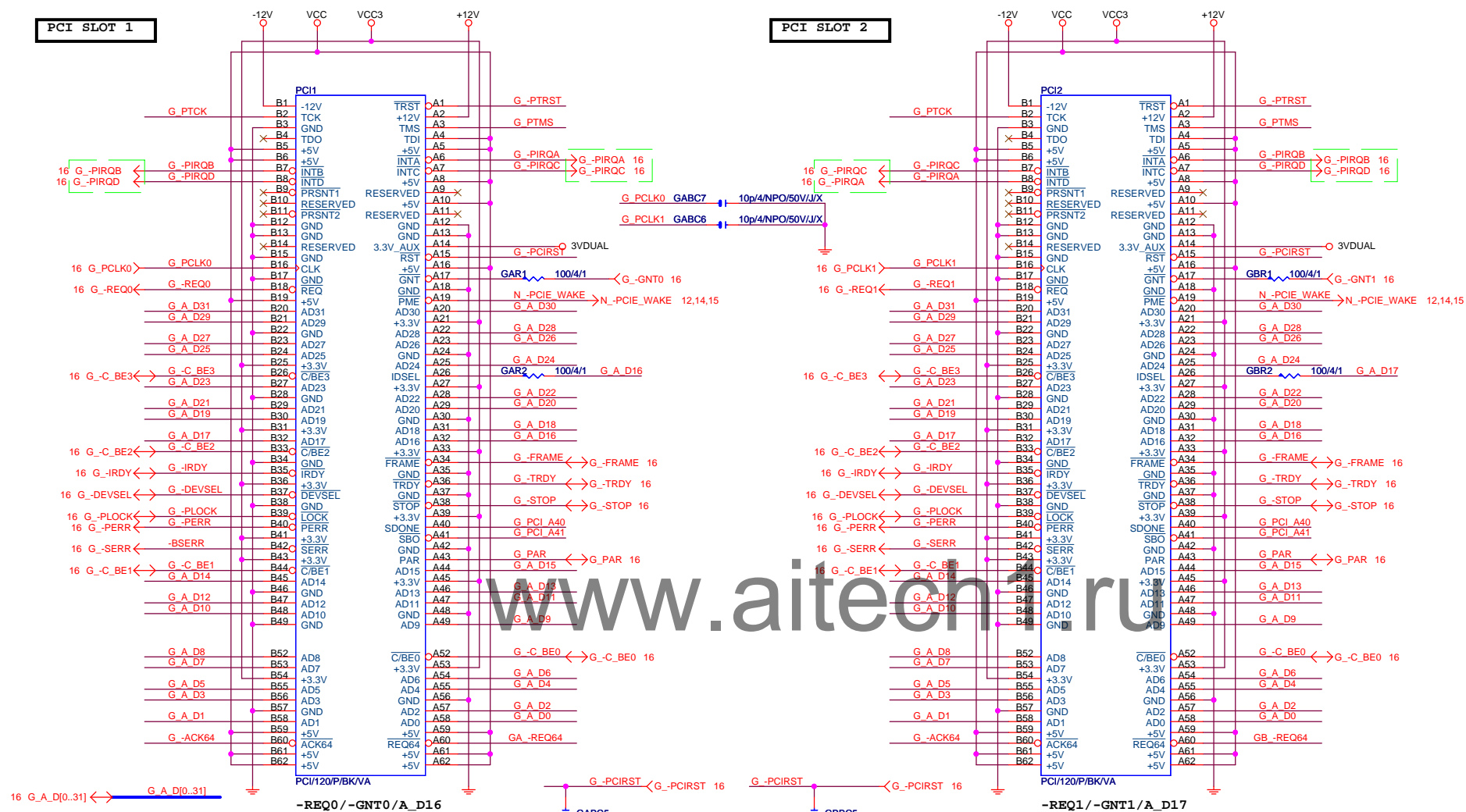
High: Enable PCI CLK 66MHz
Low: Disable PCI CLK 66MHz

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

| | | | |
|----------------------------|------------------------|----------------|-----|
| Gigabyte Technology | | | |
| Title | | | |
| IT8892E | | | |
| Size | Document Number | | Rev |
| Custom | GA-Z87-D3HP | | 1.0 |
| Date: | Friday, March 22, 2013 | Sheet 16 of 38 | |

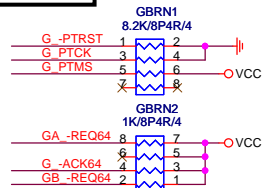
PCI SLOT 1

PCI SLOT 2

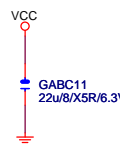


PCI PU

PCI CAP



PCI CAP

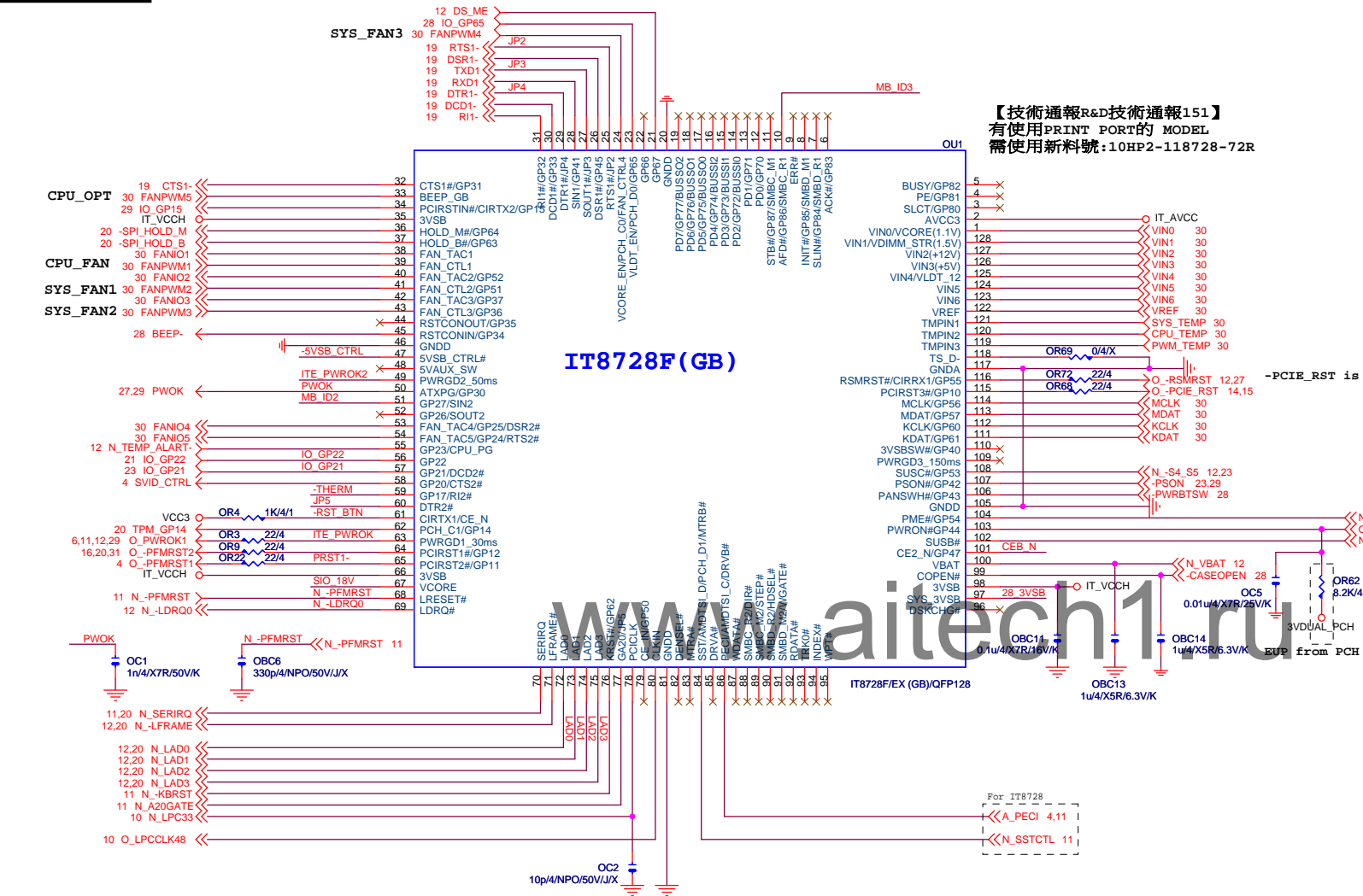


GIGABYTE

PCI SLOT 1&2

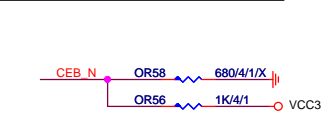
| Size | Document Number | Rev |
|--------|------------------------|----------------|
| Custom | GA-Z87-D3HP | 1.0 |
| Date: | Friday, March 22, 2013 | Sheet 17 of 38 |

SIO IT8728F

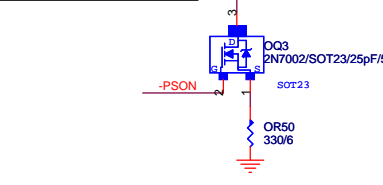


| IT8728F NOTE | |
|--------------|---------------------------|
| PIN121 | VCORE_EN/PCH_C0 |
| PIN120 | VLDT_EN/PCH_D0 |
| PIN19 | ATXPG |
| PIN31 | PCH_C1 |
| PIN53 | SST/AMDTSL_D/MTRB#/PCH_D1 |
| PIN55 | PCI/AMDTSL_C/DRV# |
| PIN66 | SYS_3VSB |
| PIN70 | GP47 |
| PIN95 | VIN2(VCC5) |
| PIN96 | VIN1(VCC12) |
| PIN97 | VIN1/VDIMM_STR(1.5V) |
| PIN98 | VIN0/VCORE(1.1V)/NC |

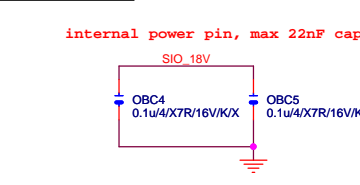
DUAL BIOS OPT STRAP



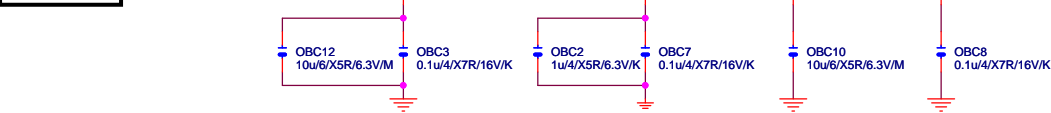
Power leakage



SIO_18V



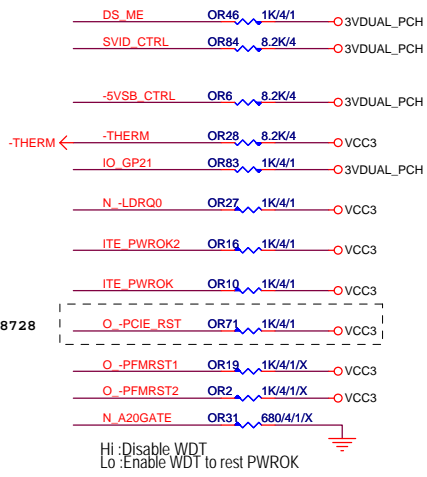
SIO CAP



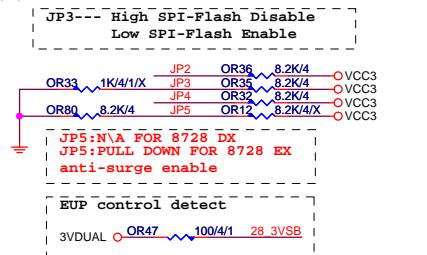
PWR SHT



SIO PU

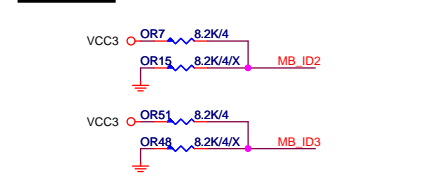


SIO STRAP



| | | |
|-----|-----|---|
| JP4 | 1 | k8 power sequency function is Disable |
| JP4 | 0 | k8 power sequency function is Enable |
| JP3 | 1 1 | The default value of EC Index 63h/6Bh/73h is 80h. |
| JP3 | 1 0 | The default value of EC Index 63h/6Bh/73h is FFh |
| JP5 | 0 1 | The default value of EC Index 63h/6Bh/73h is 00h. |
| JP5 | 0 0 | The default value of EC Index 63h/6Bh/73h is 40h. |

MB ID



Gigabyte Technology

Title

ITE 8728 LPC IO

Size B

Document Number

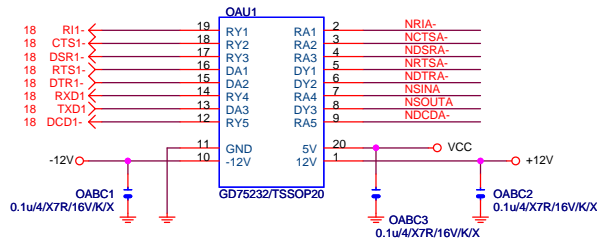
GA-Z87-D3HP

Date: Friday, April 19, 2013

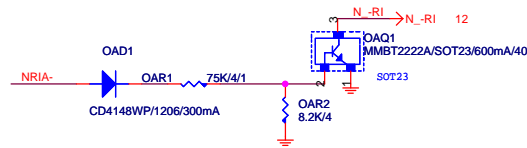
Sheet 18 of 38

Rev 1.0

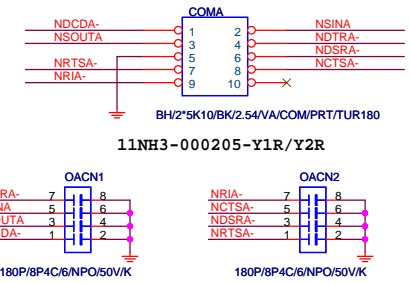
COMA



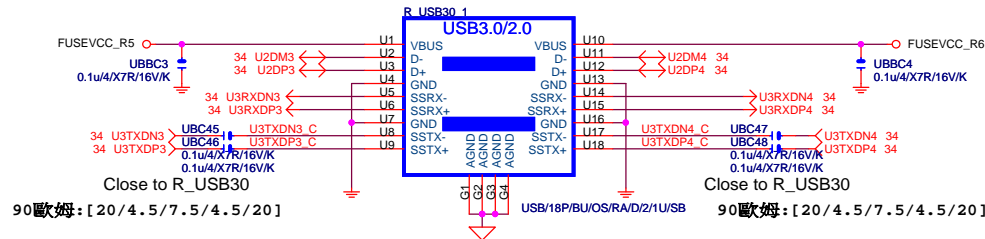
COM RI



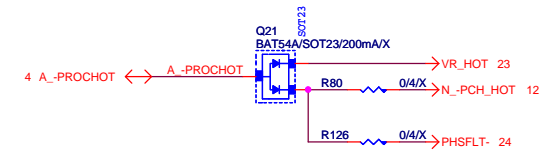
COM BUFFER



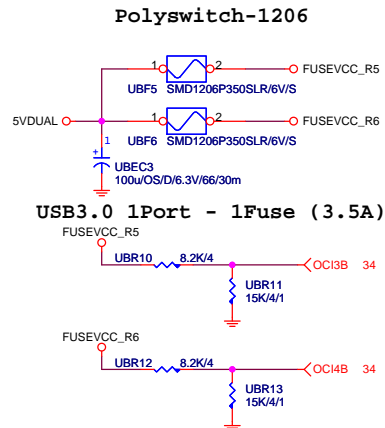
USB30_20 CONNECT



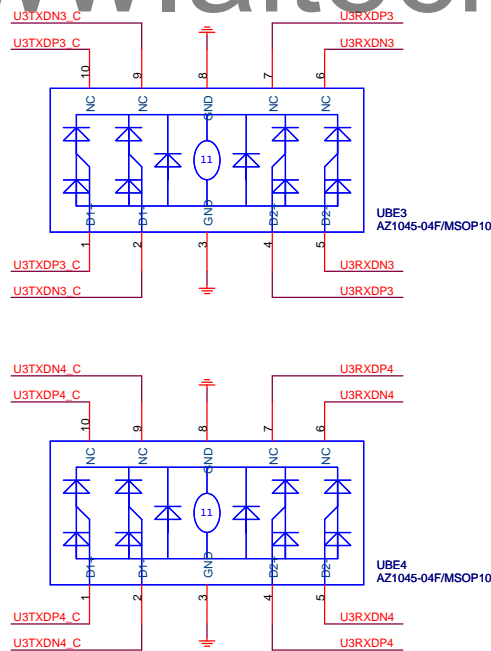
-PROHOT



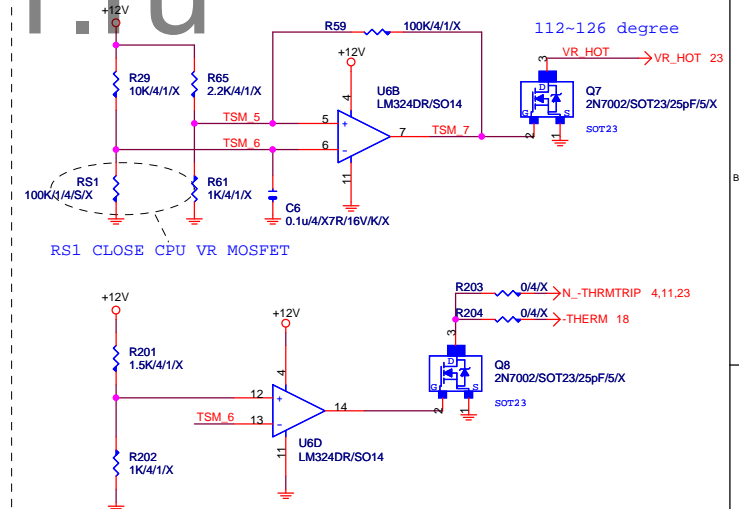
USB30 PWR



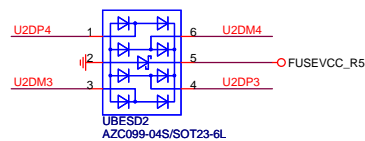
USB30 ESD PROTECT



-PROHOT



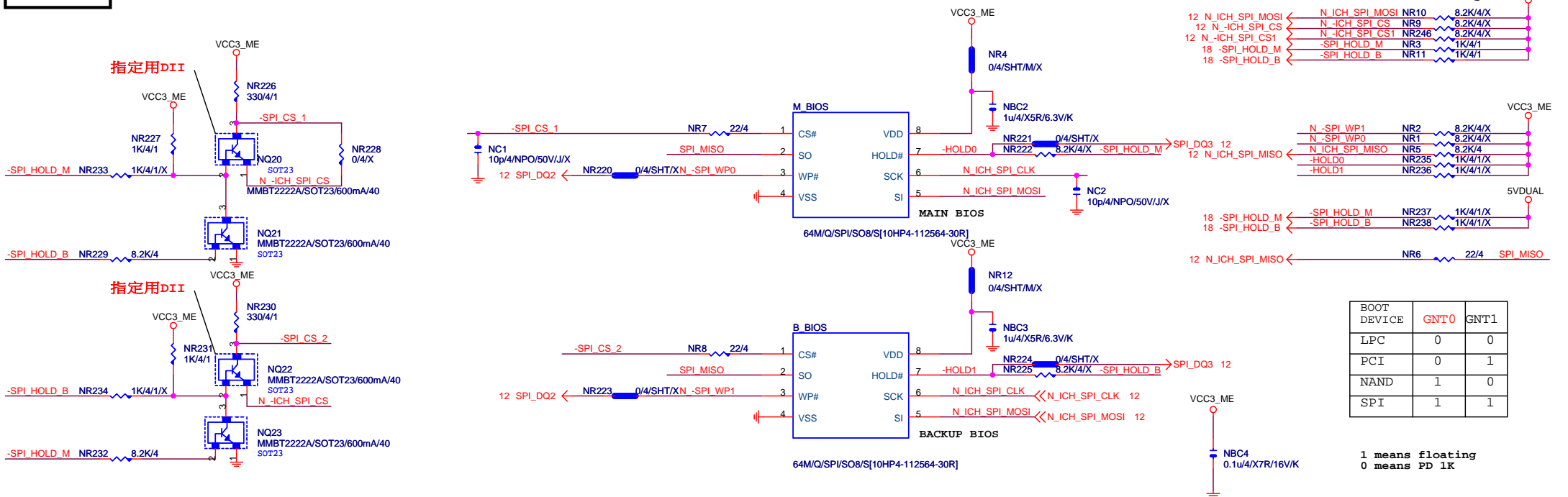
USB20 ESD PROTECT



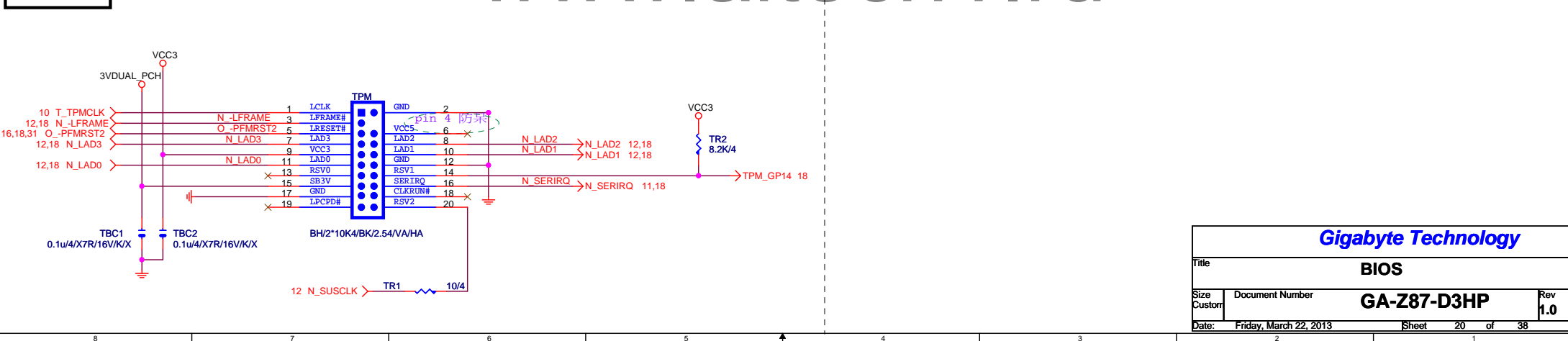
Gigabyte Technology

| | | | |
|---------------------------|------------------------|-------------|----------|
| Title | | | |
| COM & PROHOT/Dynamic O.C. | | | |
| Size | Document Number | Rev | |
| Custom | | GA-Z87-D3HP | |
| Date: | Friday, March 22, 2013 | Sheet | 19 of 38 |

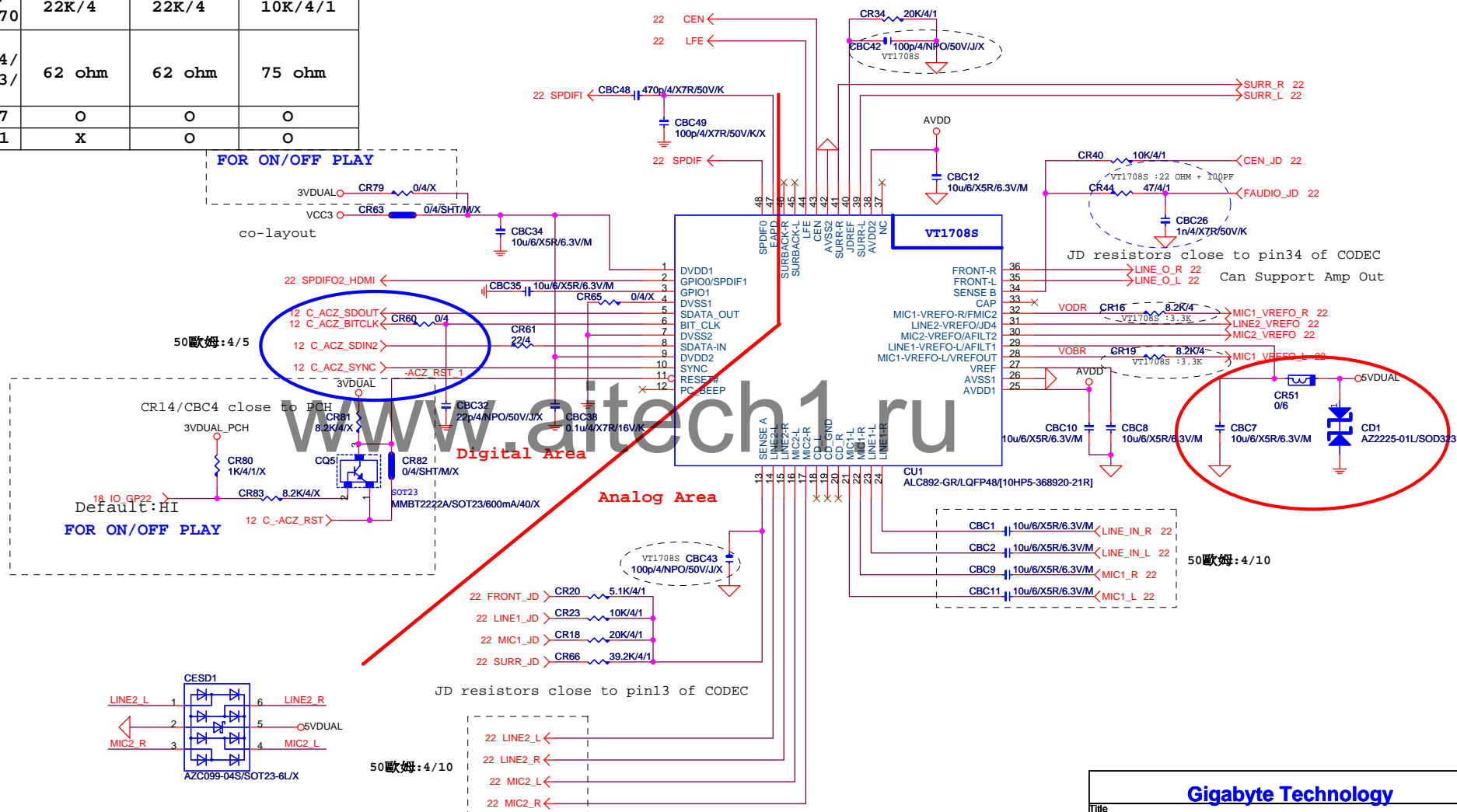
DUAL BIOS

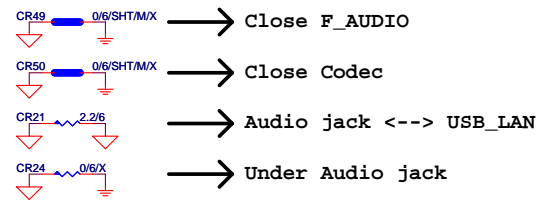


TPM CONNECT

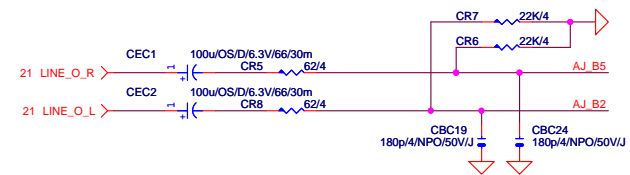


| | | | |
|--|-----------|------------|------------|
| | ALC892 | ALC887-VD2 | VT1708S-CE |
| CR44/CBC26 | 47ohm+1nF | 47ohm+1nF | 22ohm+100P |
| CBC42/CBC43 | X | X | 100P/4 |
| CR16/CR19 CR52/CR56/CR10/CR9 | 8.2K/4 | 8.2K/4 | 3.3K/4/1 |
| CR6/CR7/CR58/CR54/ CR67/CR68/CR69/CR70 | 22K/4 | 22K/4 | 10K/4/1 |
| 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 | X | O | O |



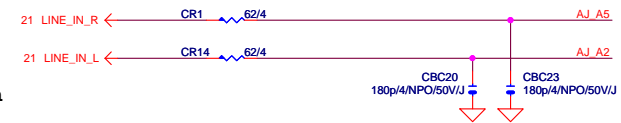


LINE-OUT



LINE-IN

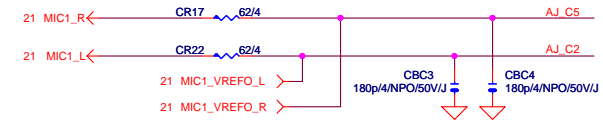
Only reserved for ALC888



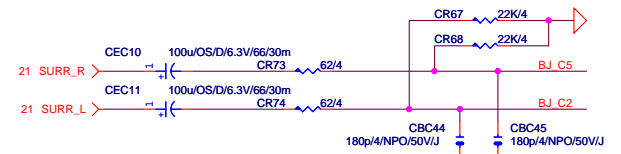
Verify MIC function
in LINE-in

For 889A/888

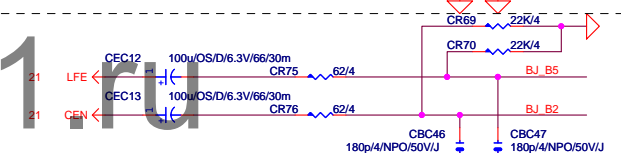
MIC-IN



SURROUND

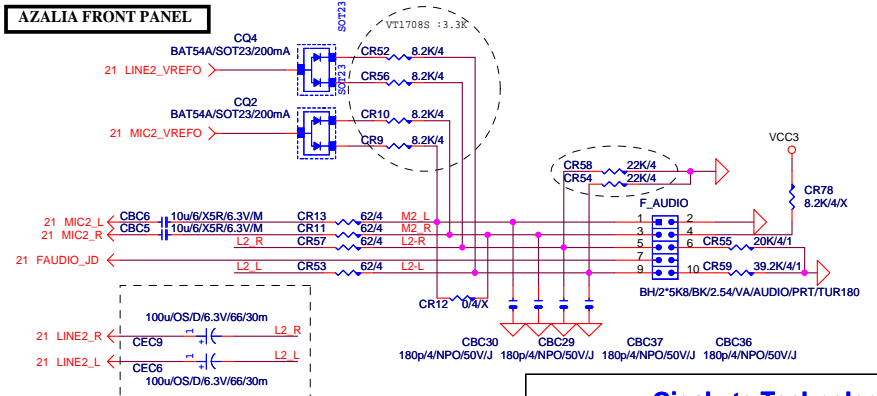


CEN/LFE



SURR BACK

AZALIA FRONT PANEL



Gigabyte Technology

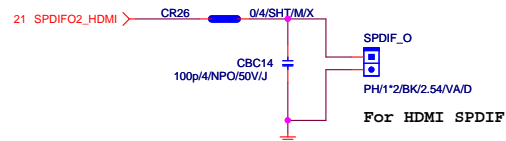
AUDIO JACK

GA-Z87-D3HP

Rev 1.0

Date: Friday, March 22, 2013 Sheet 22 of 38

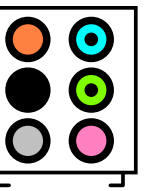
SPDIF_OUT



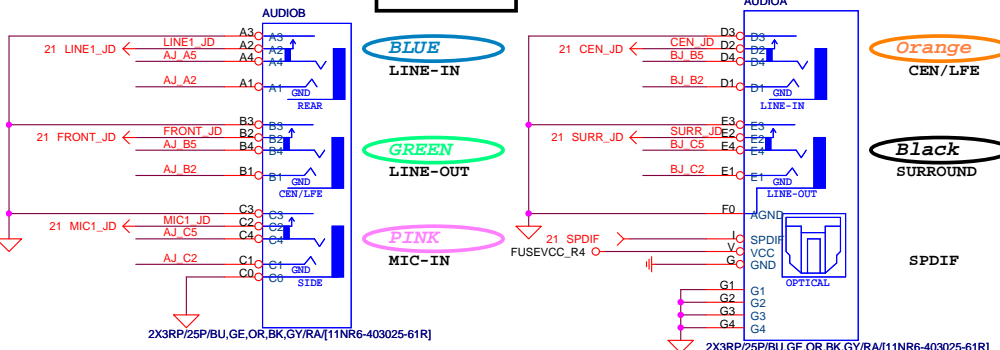
SPDIF_IN

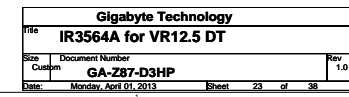


AZALIA JACK



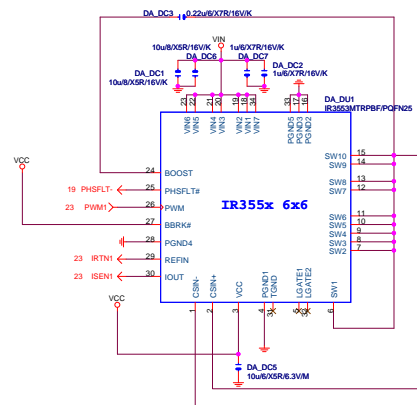
AZALIA JACK



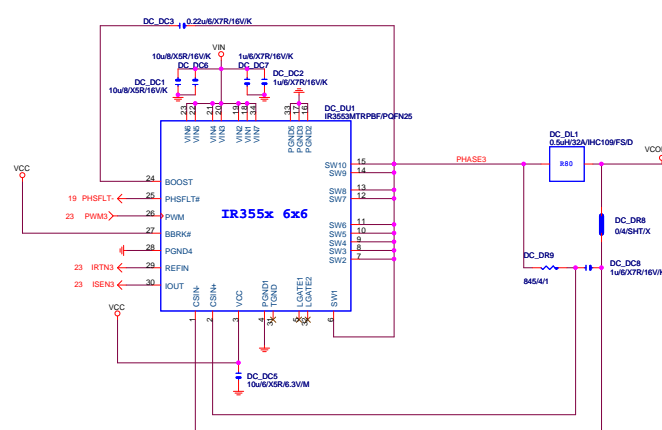


VCORE

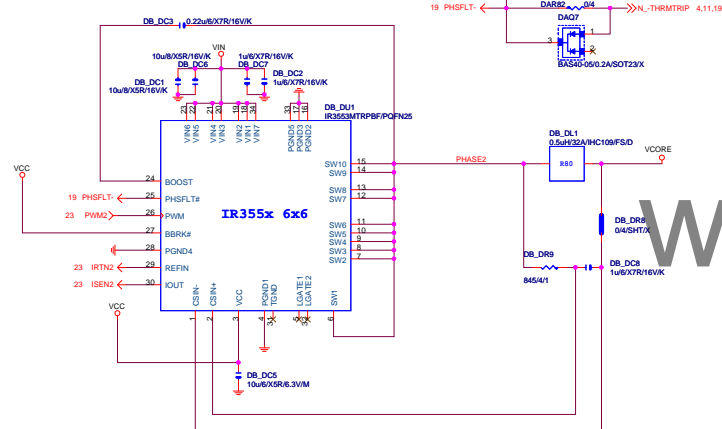
VCORE-PHASE1



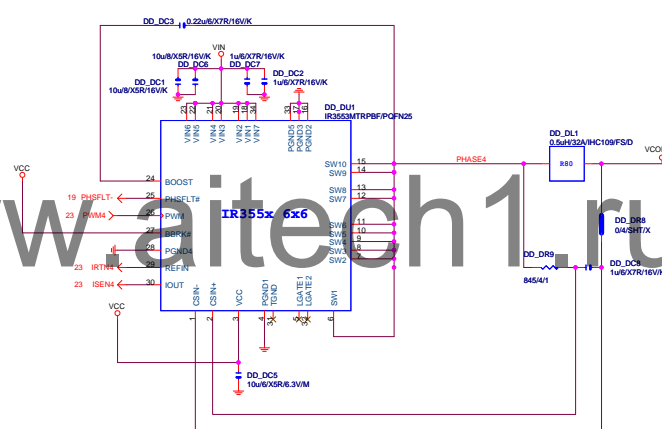
VCORE-PHASE3



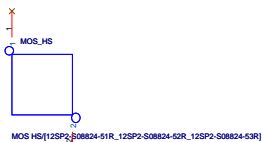
VCORE-PHASE2



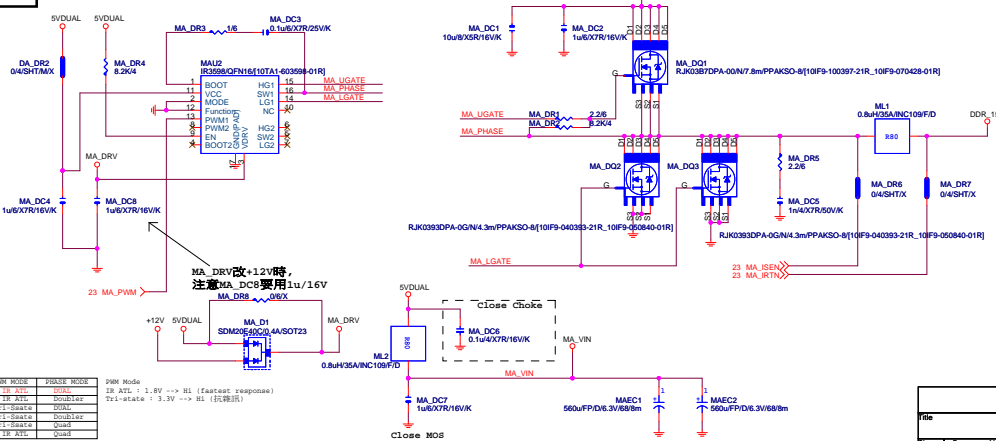
VCORE-PHASE4



MOSFET HEATSINK

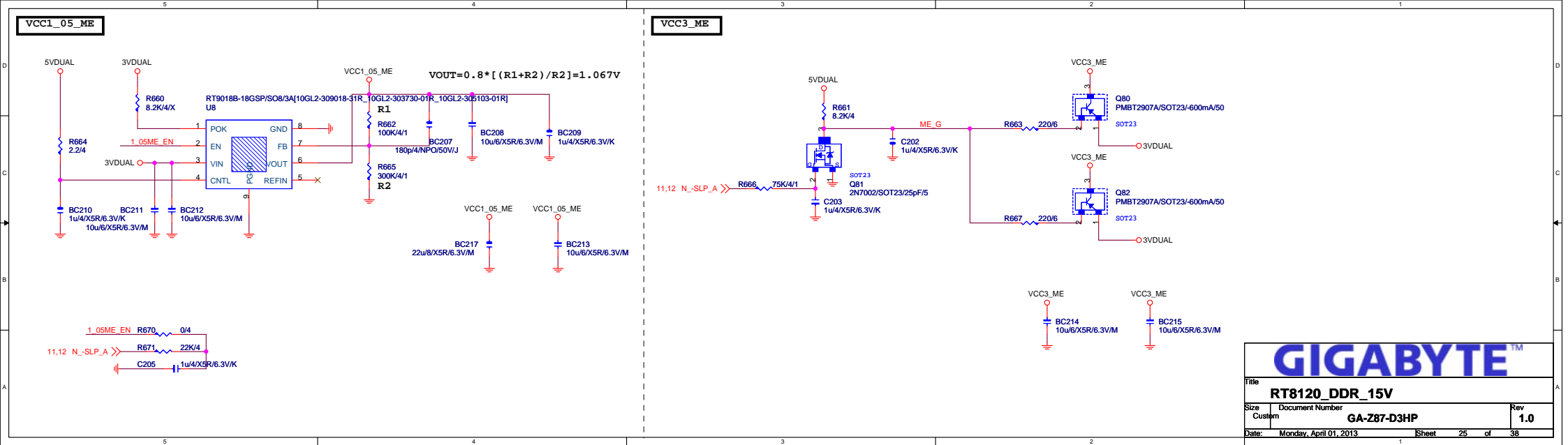


DDR_15V



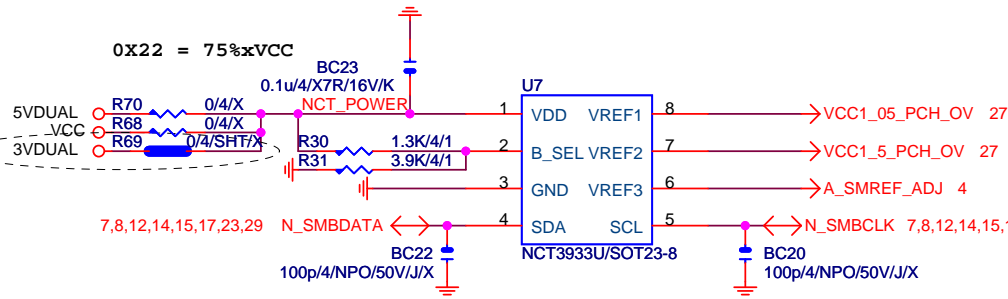
| PHASE | MODE | PHASE | MODE | PHASE | MODE |
|-------|------|-------|------|-------|------|
| 0 | 1 | 10 | 20 | 30 | 40 |
| 1 | 1 | 10 | 20 | 30 | 40 |
| 0 | 0 | 10 | 20 | 30 | 40 |
| 0 | 0 | 10 | 20 | 30 | 40 |
| 0 | 0 | 10 | 20 | 30 | 40 |
| 0 | 0 | 10 | 20 | 30 | 40 |
| 0 | 0 | 10 | 20 | 30 | 40 |
| 0 | 0 | 10 | 20 | 30 | 40 |
| 0 | 0 | 10 | 20 | 30 | 40 |
| 0 | 0 | 10 | 20 | 30 | 40 |

In Quad mode, IC1 pin19 link to IC2 pin19
IC1 pin9 link to IC2 pin9 without PJ

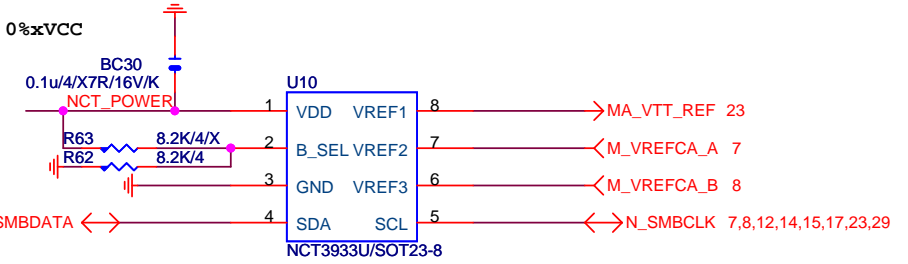


www.aitech1.ru

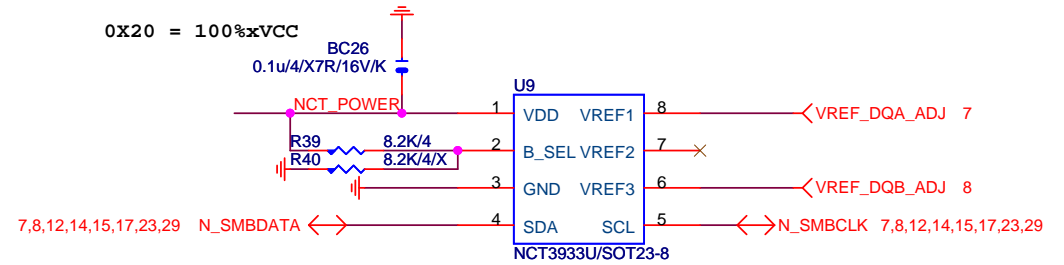
OVER VOLTAGE



0X2A = 0%xVCC



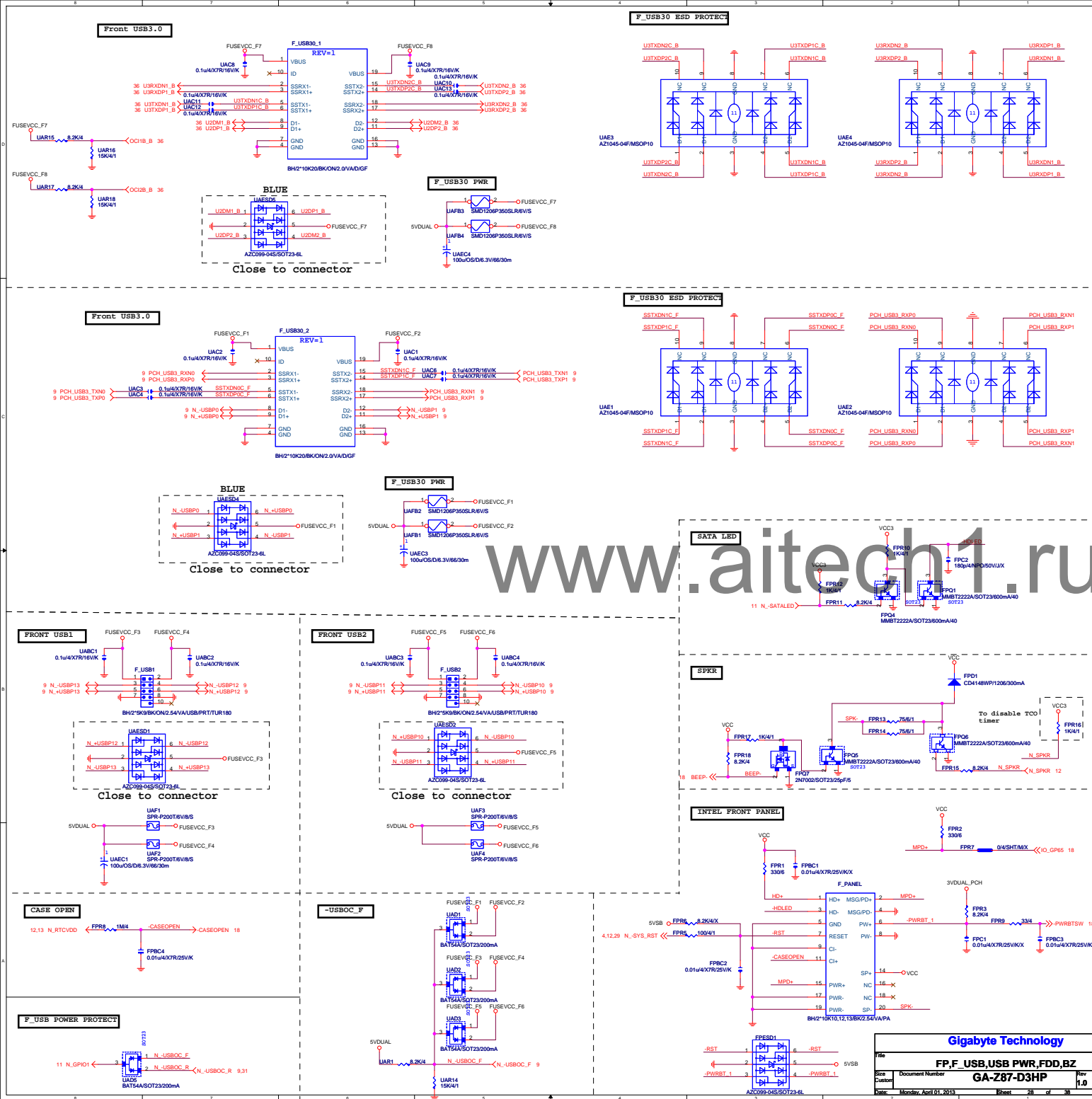
0X20 = 100%xVCC



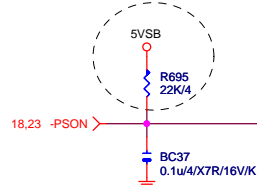
| NCT3933 | 0X2A | 0X20 | 0X22 |
|---------|--------------|--------------|------------|
| VREF1 | DDRVTT | VREF_DDRA_DQ | PCH Core |
| VREF2 | VREF_DDRA_CA | N/A | VCC1_5_PCH |
| VREF3 | VREF_DDRA_CA | VREF_DDRB_DQ | SMREF |

Gigabyte Technology

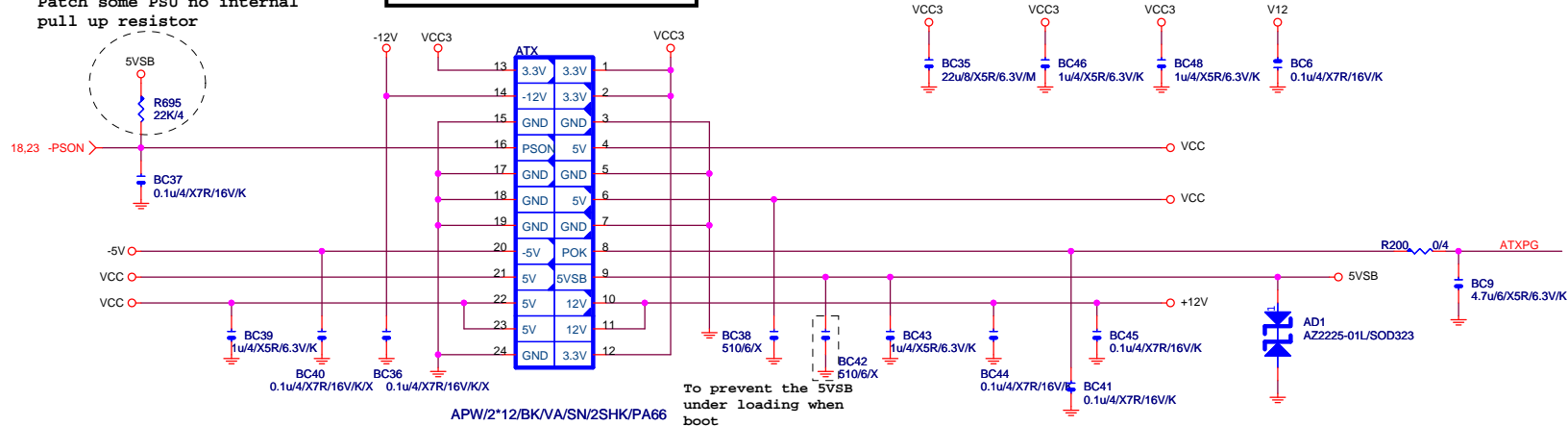
| | | |
|---------------|------------------------|----------------|
| Title | | |
| CPU CORE VR-2 | | |
| Size | Document Number | Rev |
| Custom | GA-Z87-D3HP | 1.0 |
| Date: | Friday, March 22, 2013 | Sheet 26 of 38 |



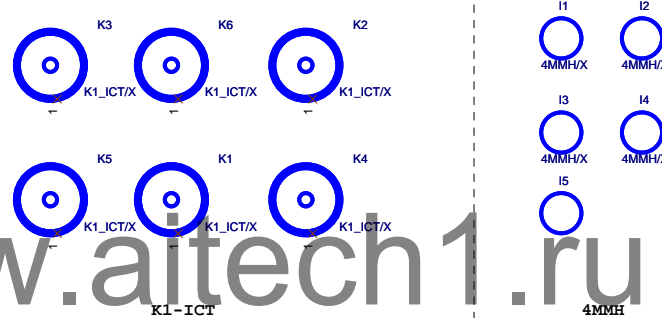
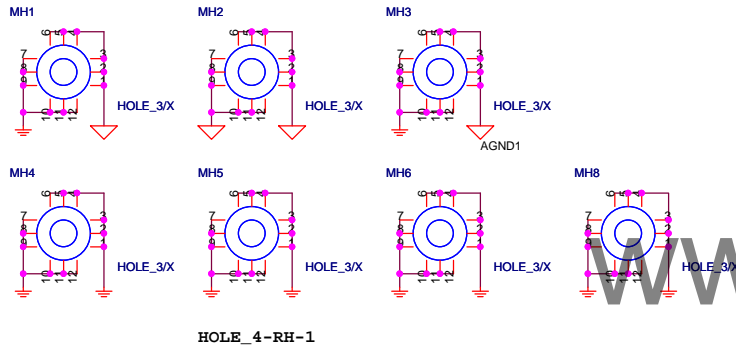
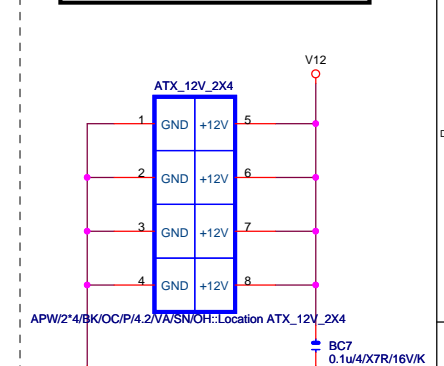
Patch some PSU no internal pull up resistor



ATXX24 POWER CONNECTOR

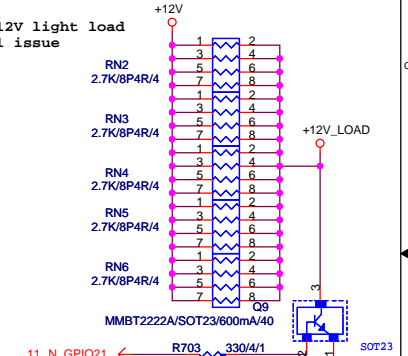


ATXX4 POWER CONNECTOR



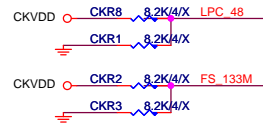
【技術通報R&D技術通報153】

To fix 12V light load abnormal issue

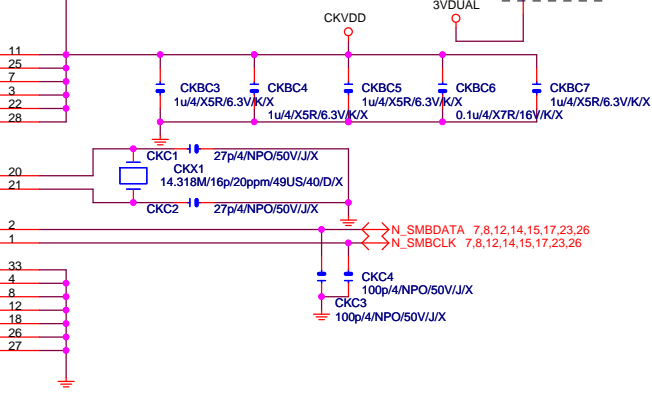
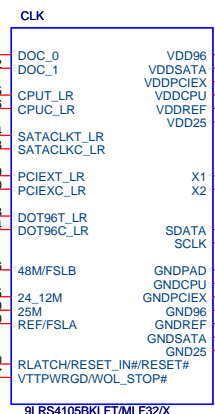
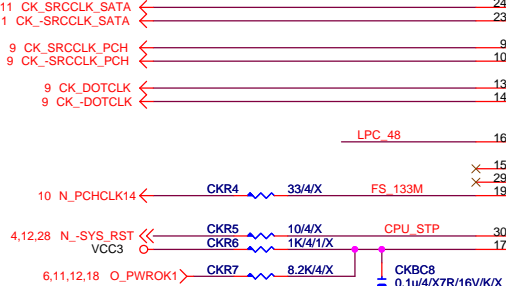


CLK GEN

CPU Frequency Selection

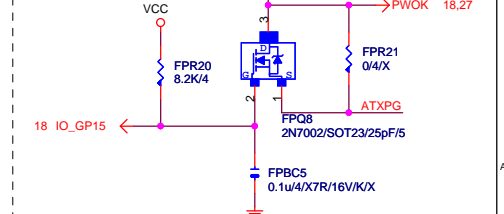


| FSLB | FSLA | CPU |
|------|------|----------------|
| 0 | 0 | 100M <Default> |
| 0 | 1 | 133M |
| 1 | 0 | 200M |
| 1 | 1 | 166M |



PWOK PATCH

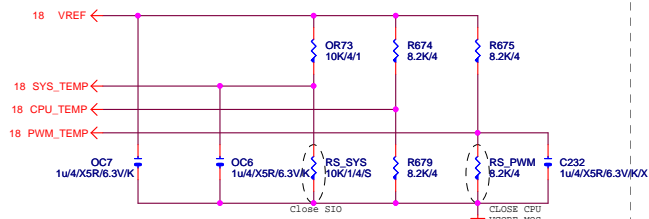
【技術通報R&D技術通報154】



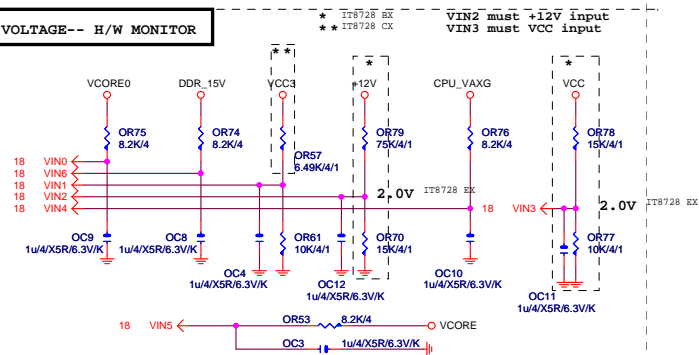
Gigabyte Technology

| | | | |
|--------|------------------------|-------------|---------------------|
| Title | | | ATX POWER CONNECTOR |
| Size | Document Number | GA-Z87-D3HP | |
| Custom | | | |
| Date | Friday, March 22, 2013 | Sheet | 29 of 38 |
| | | Rev | 1.0 |

TEMP H/W MONITOR

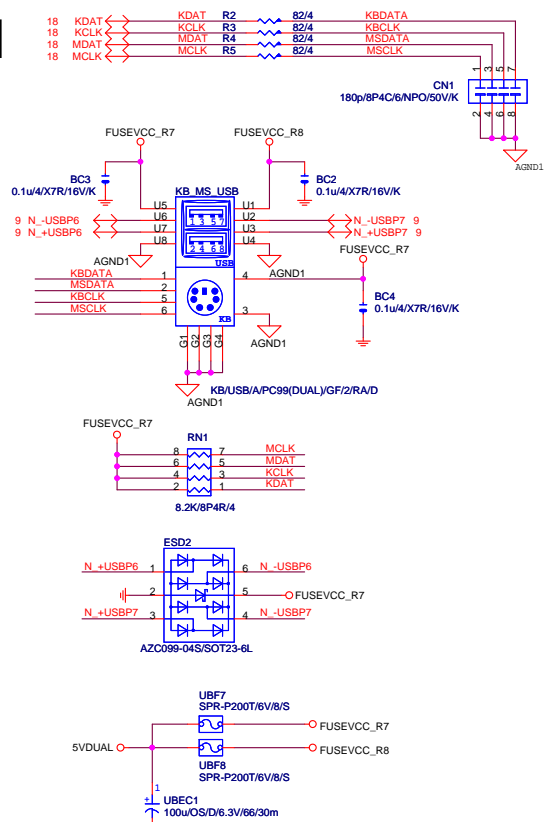


VOLTAGE-- H/W MONITOR

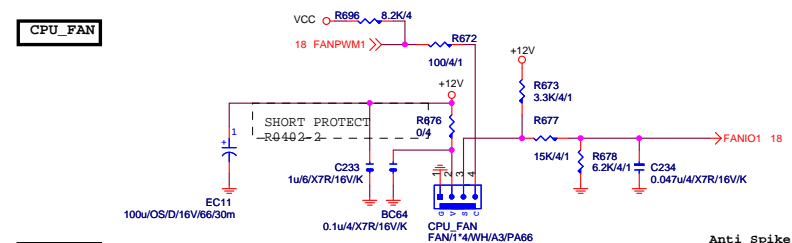


The division voltage of VIN2 & VIN3 must be around 2.9V

KB/USB

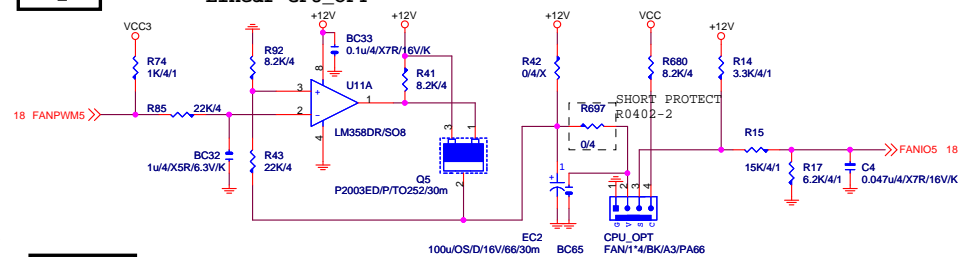


CPU_FAN



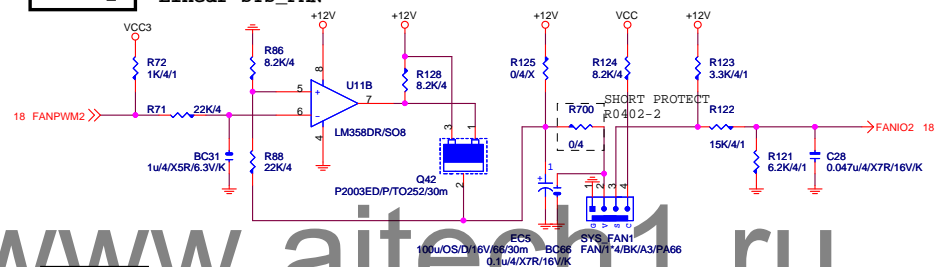
CPU_OPT

Linear CPU OPT



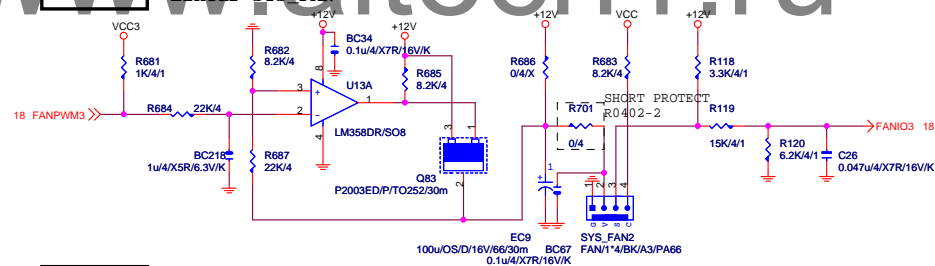
| | |
|-----------|----------------|
| SYS FAN_1 | Linear SYS FAN |
|-----------|----------------|

Linear SYS FAN



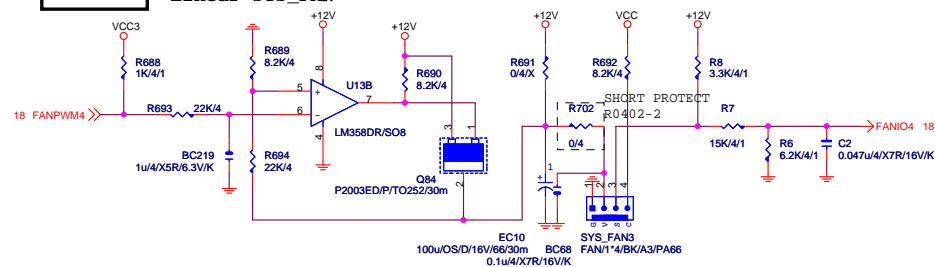
SYS FAN_2 Linear SYS FAN

Linear SYS FAN



SYS_FAN_3 Linear SYS_FAN

Linear SYS_FAN



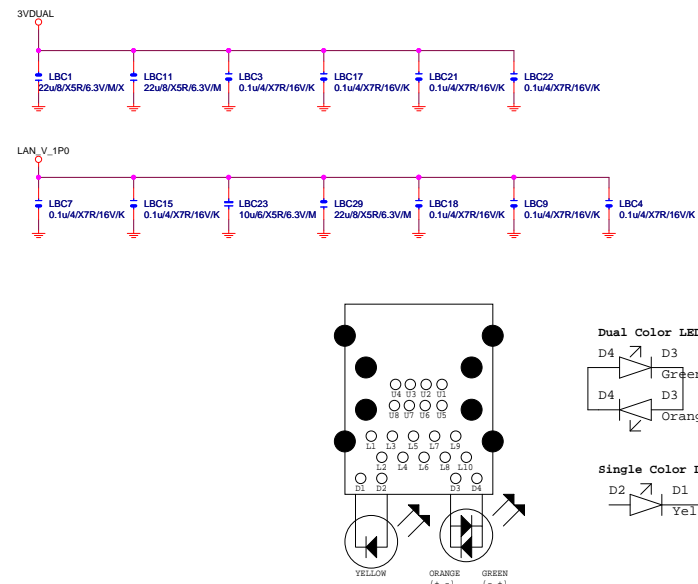
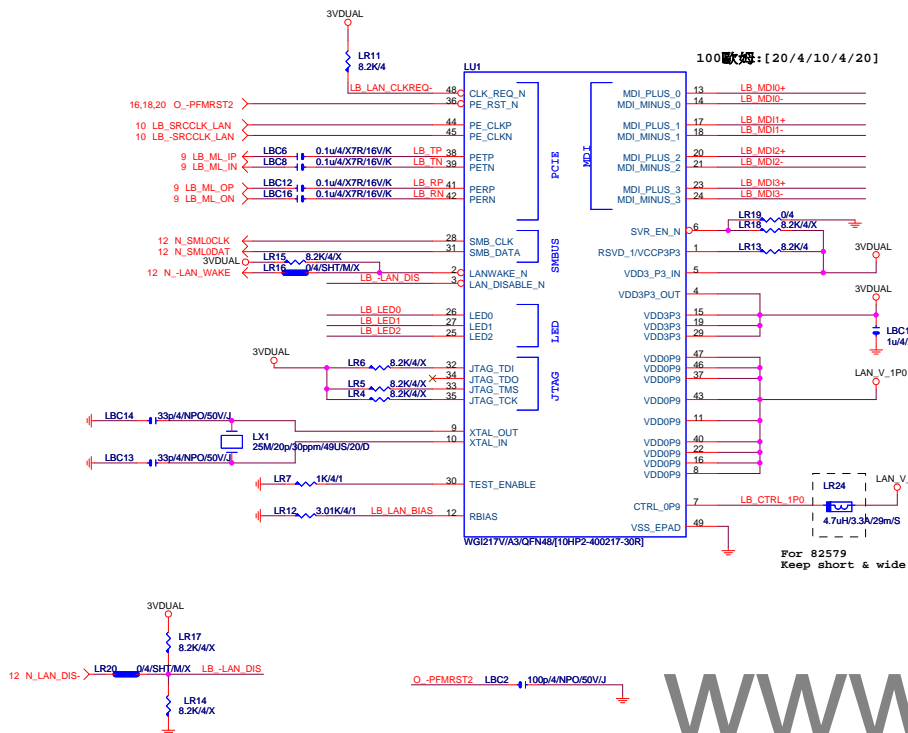
Gigabyte Technology

| | |
|-------|---------------------|
| Title | HWM,KB/MS, FAN CTRL |
|-------|---------------------|

| | |
|--------|--------------------|
| Size | Document Number |
| Custom | GA-Z87-D3HP |

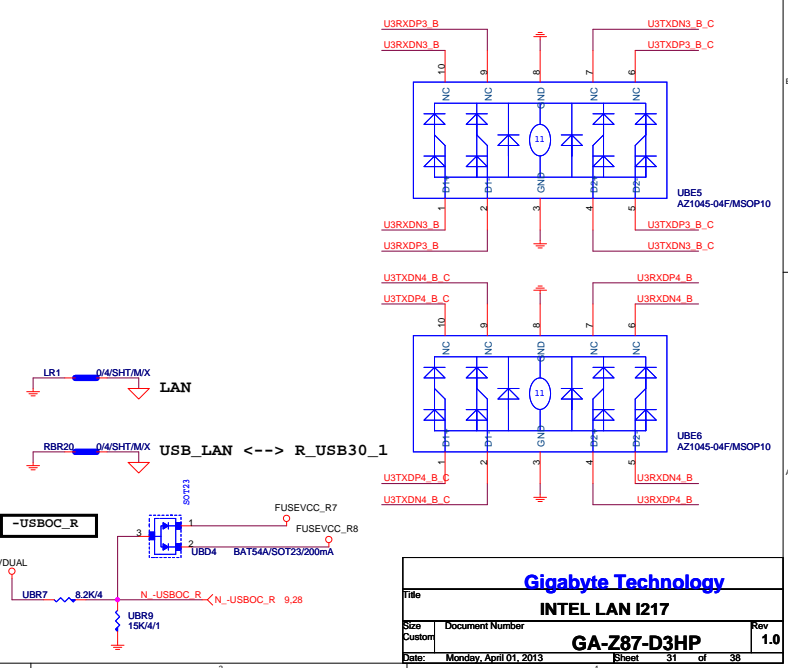
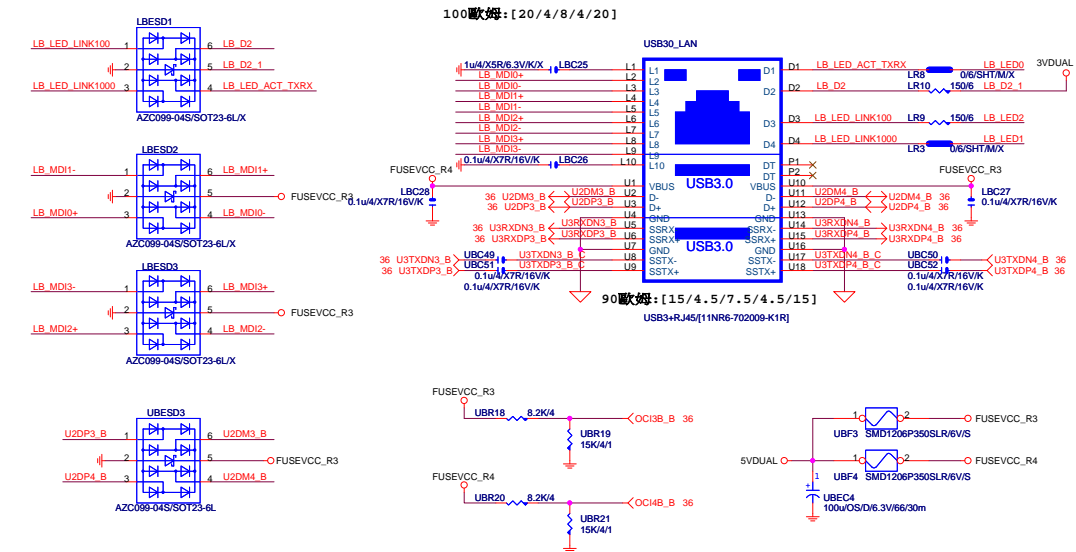
1.0

LAN: INTEL I217



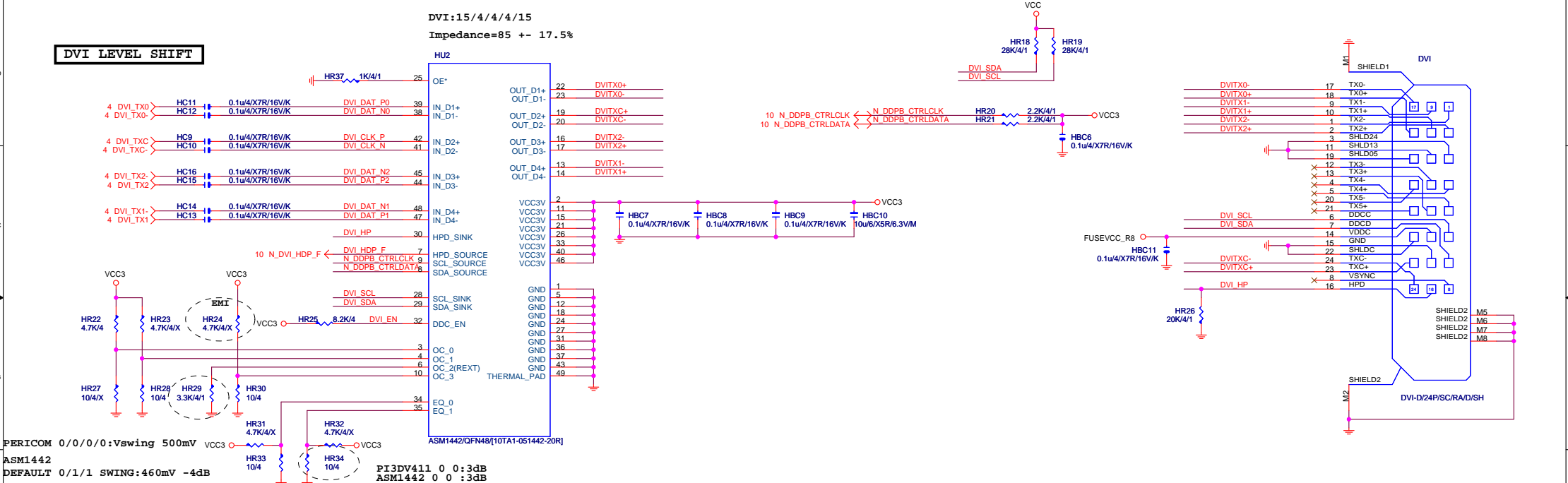
www.aitech1.ru

USB30 LAN CONNECTOR



DVI LEVEL SHIFT

DVI:15/4/4/15
Impedance=85 +- 17.5%



www.aitech1.ru

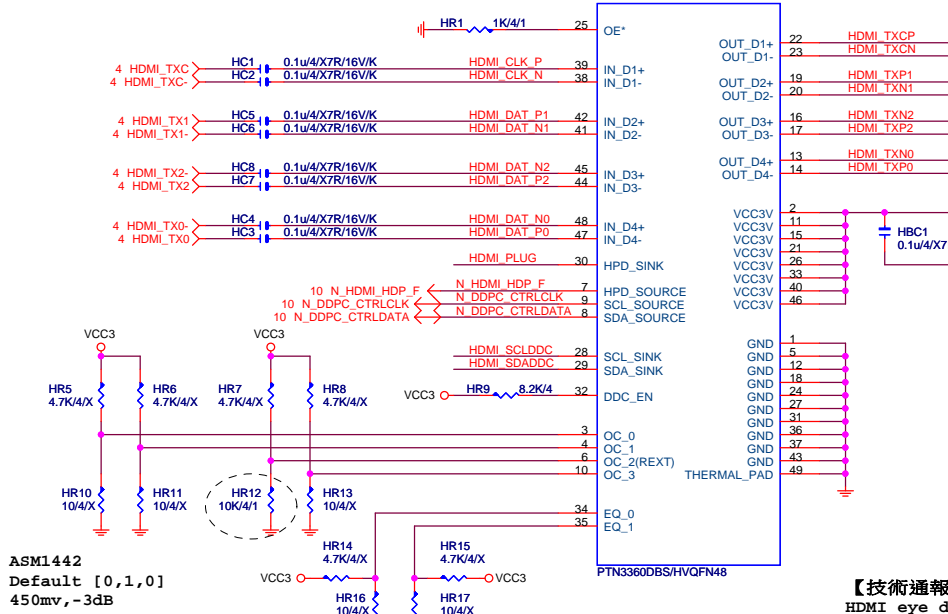
| Gigabyte Technology | | | |
|--------------------------------|-----------------|-------------|-------|
| TI TSB43AB23 1394 | | | |
| Size Custom | Document Number | GA-Z87-D3HP | |
| Date: Thursday, March 28, 2013 | Sheet | 32 | of 38 |
| | Rev | 1.0 | |

HDMI LEVEL SHIFT

HDMI:15/4/4/15

Impedance=85 +- 17.5%

HU1



ASM1442
Default [0,1,0]
450mv, -3dB

ASM1442 Default [0,0] 3dB
[0,1]6dB

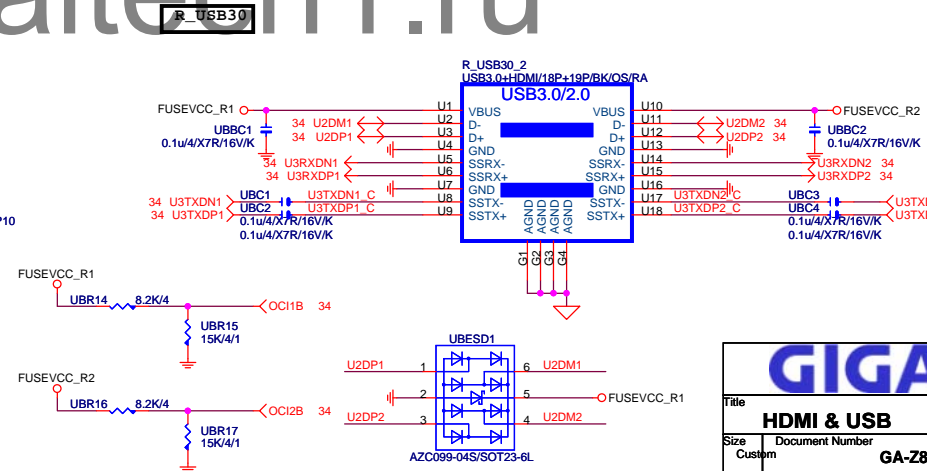
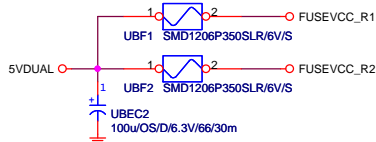
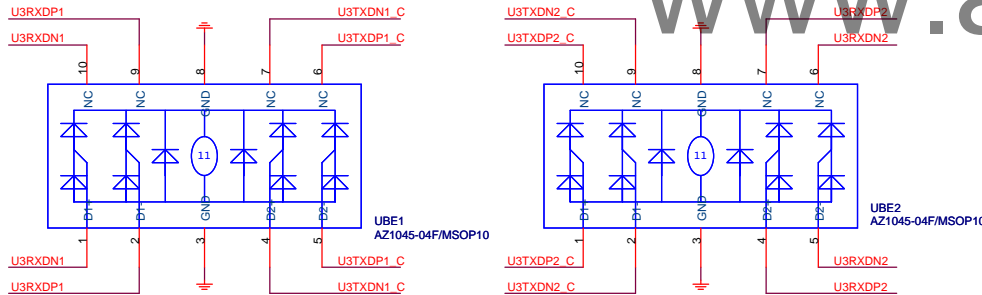
【技術通報R&D技術通報150】

HDMI eye diagram 1.4版(deep color)會fail

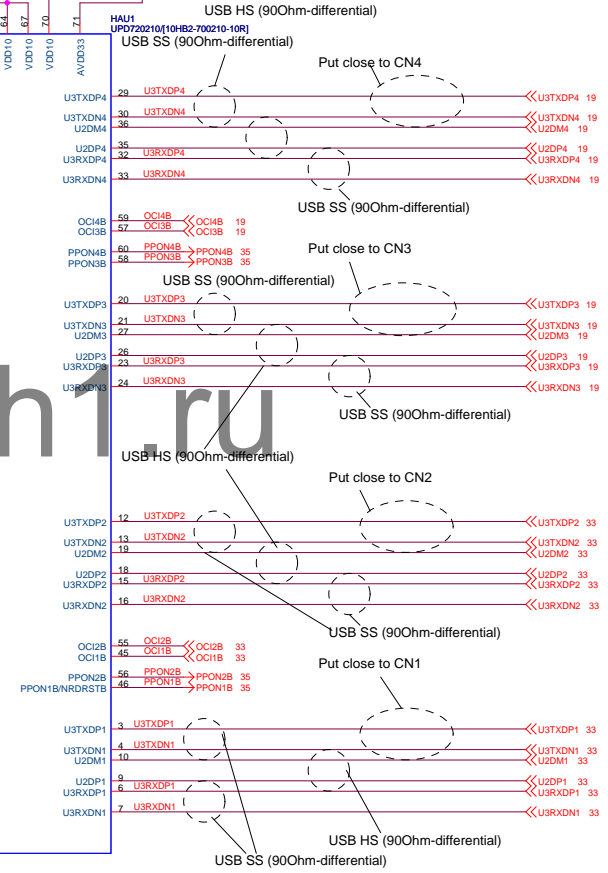
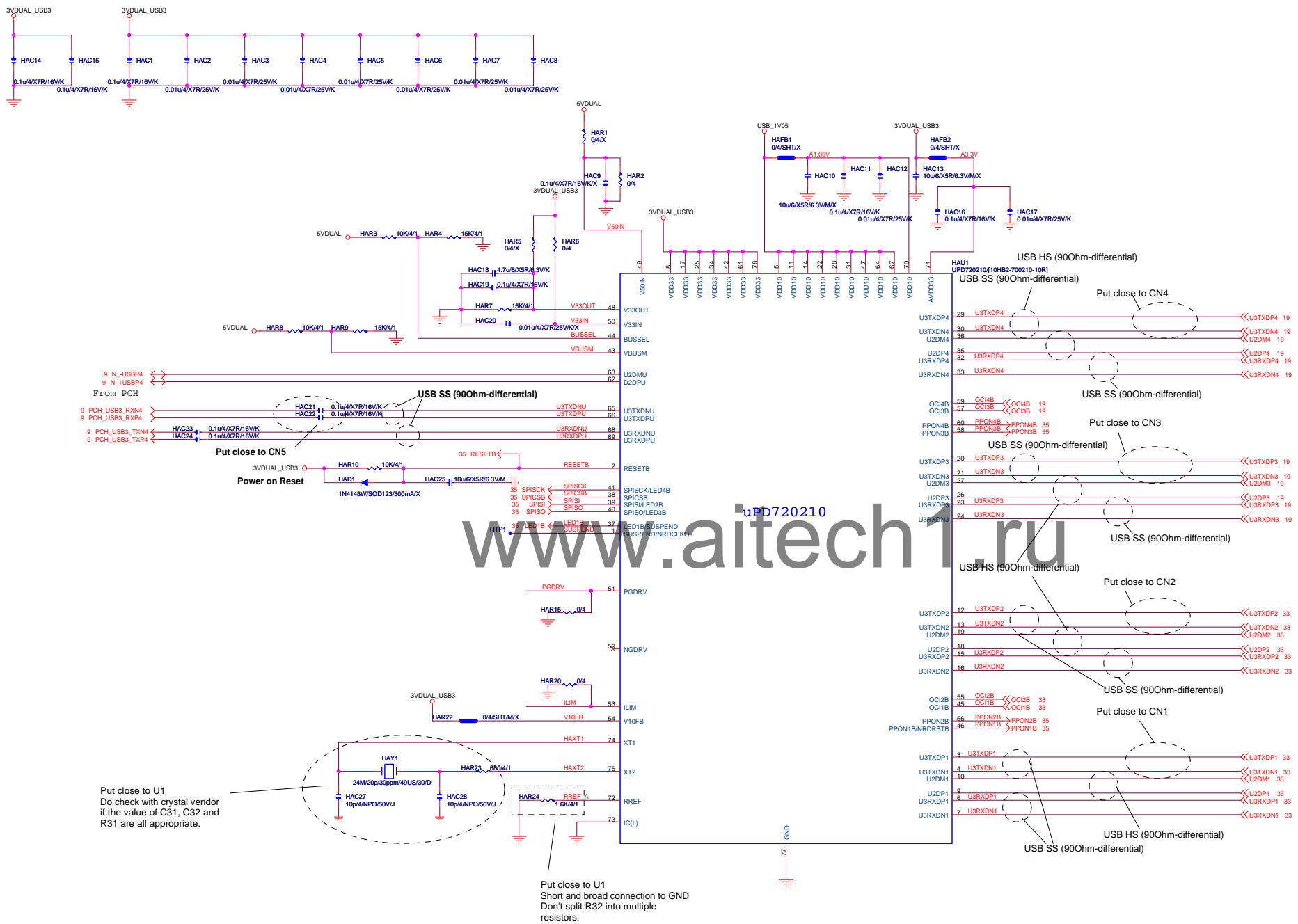
原因: 因目前的HDMI訊號過長,造成RISING TIME過慢,而會壓到eye diagram

改善: ASMEDIA ASM1442 : 3.16K(PIN6 PULL DOWN電阻) 10ohm(PIN4 PULL DOWN電阻)

www.aitech1.ru

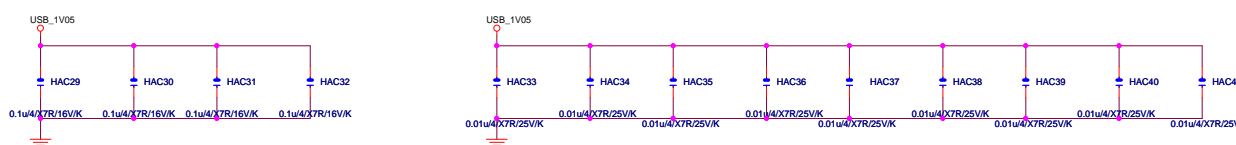


| GIGABYTE™ | | | |
|------------|------------------------|-------|----------|
| HDMI & USB | | | |
| File | Document Number | Rev | |
| | GA-Z87-D3HP | 1.0 | |
| Date | Monday, April 01, 2013 | Sheet | 33 of 38 |

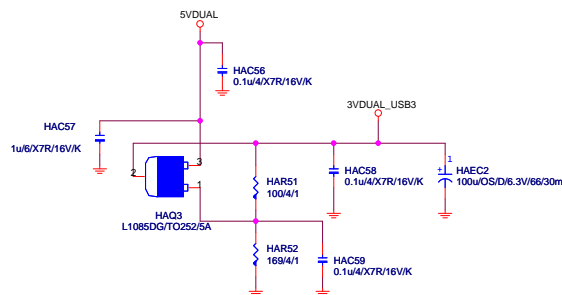


Put close to U1
Do check with crystal vendor
if the value of C31, C32 and
R31 are all appropriate.

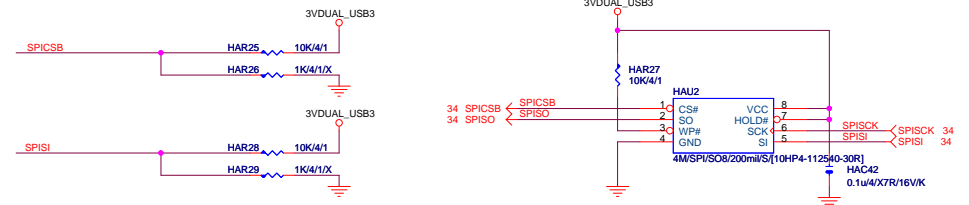
Put close to U1
Short and broad connection to GND
Don't split R32 into multiple
resistors.



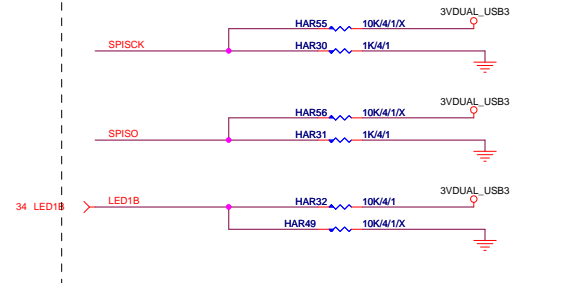
3VDUAL_USB_1



External SPI ROM ; SPI ROM attached mode

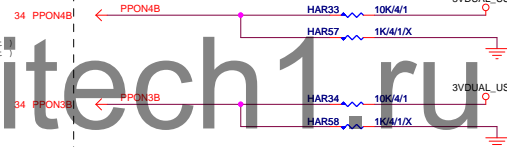


Battery Charging

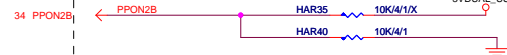


Number of Ports ; 4Ports mode

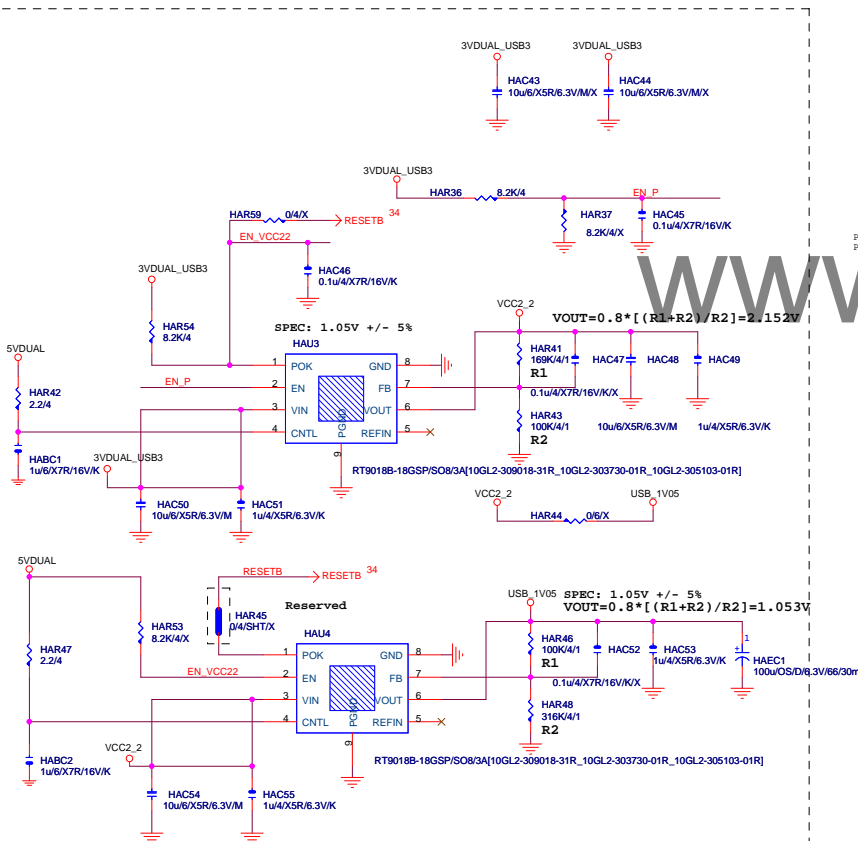
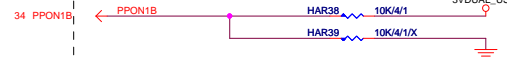
PPON3B / PPON4B : H / H (4 port)
PPON3B / PPON4B : L / L (2 port)

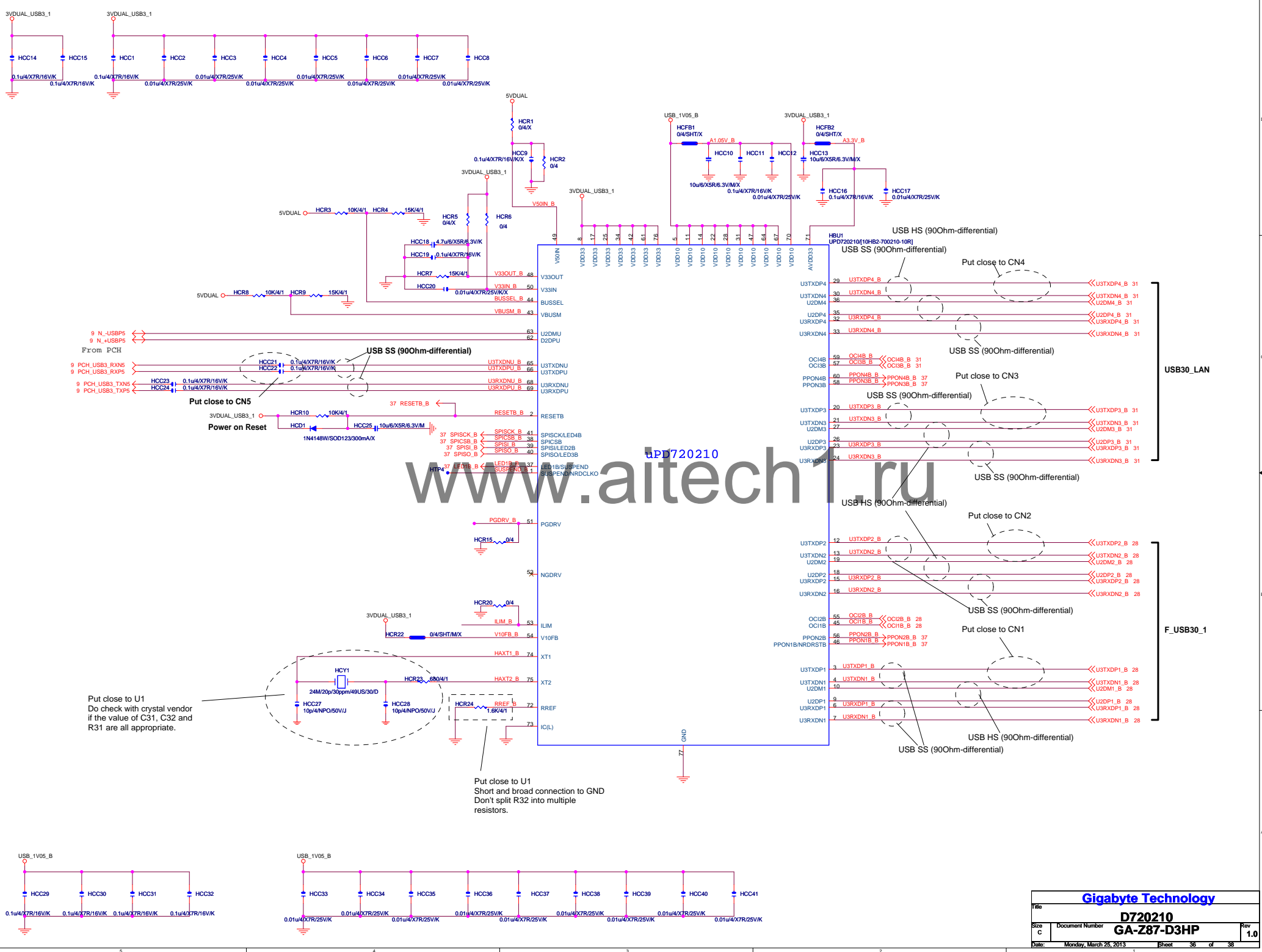


#5 VBUS Power Control ; Individual mode



PPON1B Pin Function ; Port1 PPONB mode

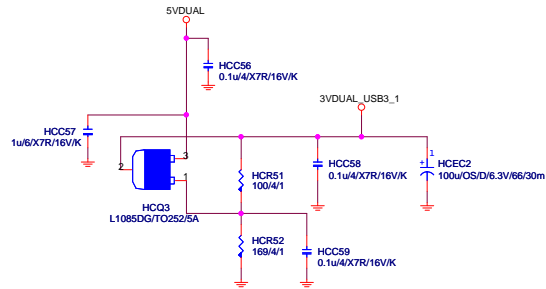




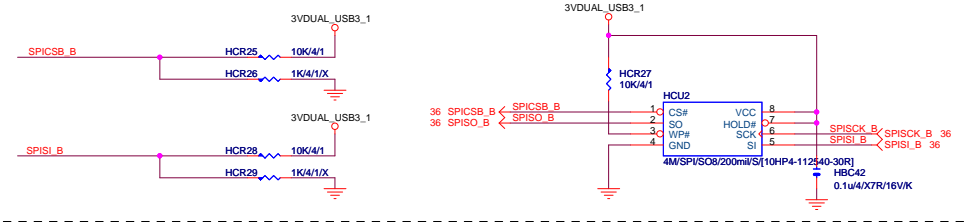
Put close to U1
Do check with crystal vendor
if the value of C31, C32 and
R31 are all appropriate.

Put close to U1
Short and broad connection to GND
Don't split R32 into multiple
resistors.

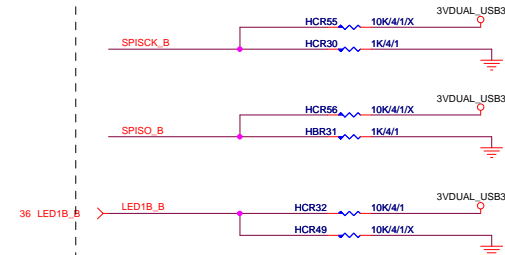
3VDUAL_USB_2



External SPI ROM ; SPI ROM attached mode

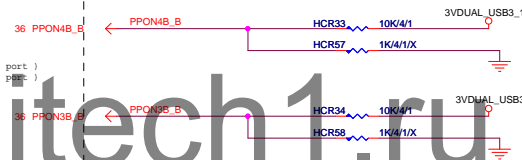


Battery Charging

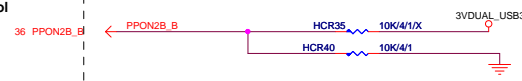


Number of Ports ; 4Ports mode

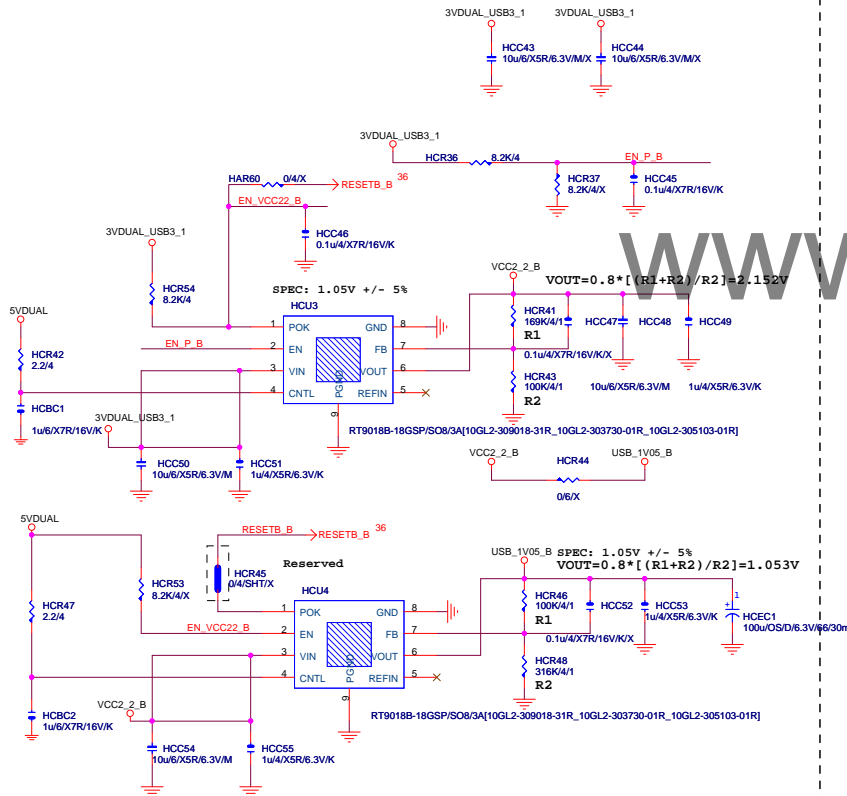
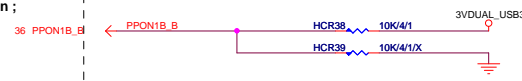
PPON3B / PPON4B : H / H (4 port)
PPON3B / PPON4B : L / L (2 port)



#5 VBUS Power Control ; Individual mode



PPON1B Pin Function ; Port1 PPONB mode



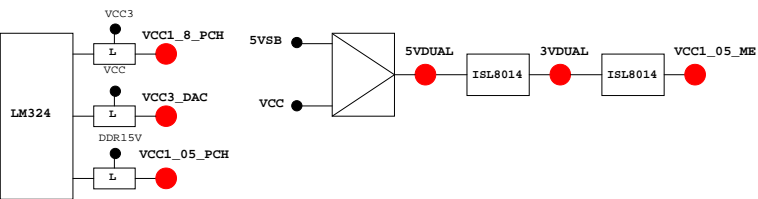
PCB GPIO LIST TABLE

| PIN NAME | PWR | Default | USAGS | NOTE |
|----------------|------|---------|---------------------|-----------------|
| GP0 | MAIN | H-Z | GPI0 | N/A |
| GP1/TACH1 | MAIN | GPI | GPI01 | N/A |
| GP2/PIRQE# | MAIN | GPI | ~PIRQE | P/U 8.2K VCC3 |
| GP3/PIRQF# | MAIN | GPI | ~PIRQF | P/U 8.2K VCC3 |
| GP4/PIRQG# | MAIN | GPI | ~PIRQG | P/U 8.2K VCC3 |
| GP5/PIRQH# | MAIN | GPI | ~PIRQH | P/U 8.2K VCC3 |
| GP6/TACH2 | MAIN | GPI | PCIEX1 Detect | P/U 8.2K VCC3 |
| GP7/TACH3 | MAIN | GPI | GPI07 | P/U 8.2K VCC3 |
| GP8 | STBY | H | GPI08 | N/A |
| GP9/OC5# | STBY | NATIVE | USB OC5# | N/A |
| GP10/OC6# | STBY | NATIVE | USB OC6# | N/A |
| GP11/SMBALERT# | STBY | NATIVE | USB PWR protect | P/U 8.2K 3VDUAL |
| GP12 | STBY | L | GPI012 | N/A |
| GP13 | STBY | L | LPCPME# | P/U 8.2K 3VDUAL |
| GP14/OC7# | STBY | NATIVE | USB OC7# | N/A |
| GP15 | STBY | L | GPI015(TLS Enable) | P/U 8.2K 3VDUAL |
| GP16 | MAIN | GPI | GPI016 | P/U 8.2K VCC3 |
| GP17/TACH0 | MAIN | GPI | GPI017 | P/U 8.2K VCC3 |
| GP18 | MAIN | GPI | Mobile Only | N/A |
| GP19 | MAIN | GPI | GPI019 | P/U 8.2K VCC3 |
| GP20 | MAIN | GPI | GPI020 | P/U 8.2K VCC3 |
| GP21 | MAIN | GPI | GPI021 | P/U 8.2K VCC3 |
| GP22 | MAIN | H-Z | GPI022 | P/U 8.2K VCC3 |
| GP23 | MAIN | GPI | GPI023 | N/A |
| GP24 | STBY | L | SKTOCC# | N/A |
| GP25 | STBY | | Mobile Only | N/A |
| GP26 | STBY | | Mobile Only | N/A |
| GP27 | STBY | H | GPI027 | P/U 8.2K 3VDUAL |
| GP28 | STBY | H | GPO PWR LED | P/U 8.2K 3VDUAL |
| GP29 | STBY | L | GPI029 | N/A |
| GP30 | STBY | H-Z | GPI Mobile Only | N/A |
| GP31 | STBY | H-Z | GPI Mobile Only | N/A |
| GP32 | MAIN | H | GPO N/A | N/A |
| GP33 | MAIN | H | GPO N/A | N/A |
| GP34 | MAIN | H-Z | GPI ~PCI_STOP | P/U 8.2K VCC3 |
| GP35 | MAIN | L | GPO ~ACZ_DET | P/U 8.2K VCC3 |
| GP36 | MAIN | GPI | N/A | N/A |
| GP37 | MAIN | GPI | N/A | N/A |
| GP38 | MAIN | H-Z | GPI PCIEX4 Detect | P/U 8.2K VCC3 |
| GP39 | MAIN | H-Z | GPI GPIO39 | P/U 8.2K VCC3 |
| GP40 | STBY | NATIVE | USB OC1# | N/A |
| GP41 | STBY | NATIVE | USB OC2# | N/A |
| GP42 | STBY | NATIVE | USB OC3# | N/A |
| GP43 | STBY | NATIVE | USB OC4# | N/A |
| GP44 | STBY | L | NATIVE GPIO44 | P/U 8.2K 3VDUAL |
| GP45 | STBY | NATIVE | GPIO45 | P/U 8.2K 3VDUAL |
| GP46 | STBY | L | NATIVE GPIO46 | P/U 8.2K 3VDUAL |
| GP47 | STBY | | Mobile Only | N/A |
| GP48 | MAIN | H-Z | IN GPIO48 | P/U 8.2K 3VDUAL |
| GP49 | MAIN | H-Z | IN GPIO49 | P/U 8.2K 3VDUAL |
| GP50 | MAIN | NATIVE | ~REQ1 | P/U 2.2K VCC |
| GP51 | MAIN | H | NATIVE ~GNT1 | N/A |
| GP52 | MAIN | NATIVE | ~REQ2 | P/U 2.2K VCC |
| GP53 | MAIN | H | NATIVE ~GNT2 | N/A |
| GP54 | MAIN | NATIVE | ~REQ3 | P/U 2.2K VCC |
| GP55 | MAIN | H | NATIVE ~GNT3 | N/A |
| GP56 | STBY | NATIVE | Mobile Only | N/A |
| GP57 | STBY | H-Z | IN VCORE_OV1 | P/U 8.2K 3VDUAL |
| GP58 | STBY | H-Z | NATIVE F_USB_OC | P/U 8.2K 3VDUAL |
| GP59 | STBY | NATIVE | USB_OC0# | N/A |
| GP60 | STBY | H-Z | NATIVE N/A(Reverse) | P/U 8.2K 3VDUAL |
| GP61 | STBY | L | NATIVE ~SUSTAT | N/A |
| GP62 | STBY | L | NATIVE SUSCLK | N/A |
| GP63 | STBY | L | NATIVE GPIO63 | N/A |
| GP64 | MAIN | L | NATIVE CLKOUTFLEX0 | N/A |
| GP65 | MAIN | L | NATIVE CLKOUTFLEX1 | N/A |
| GP66 | MAIN | L | NATIVE CLKOUTFLEX2 | N/A |
| GP67 | MAIN | L | NATIVE CLKOUTFLEX3 | N/A |
| GP72 | STBY | H-Z | NATIVE VCORE_OV4 | P/U 8.2K 3VDUAL |
| GP73 | STBY | | Mobile Only | N/A |
| GP74 | STBY | H-Z | NATIVE 1_05V_OV2 | P/U 8.2K 3VDUAL |
| GP75 | STBY | H-Z | NATIVE N/A(Reverse) | P/U 8.2K 3VDUAL |

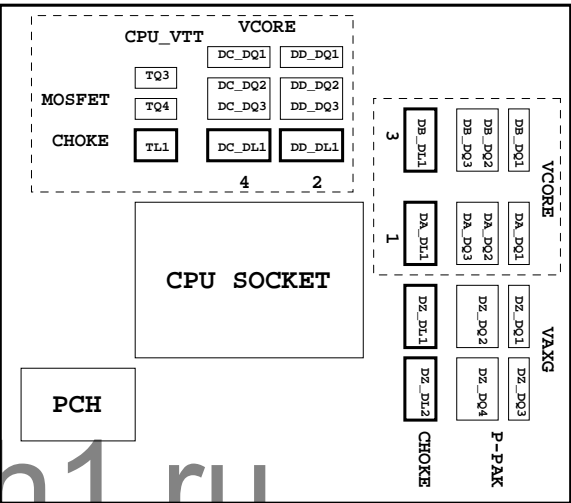
Super I/O ITE8720 GPIO Table

| PIN NAME | USAGS | NOTE |
|----------------------------|------------------|------|
| SVC/PECI_RQT/GP14 | -PECI_REQ | |
| PWROK1/GP13 | PWROK1/ITE_PWROK | |
| KRST#/GP62 | -KBRST | |
| SO/GP50 | -ICH_SPI_CS | |
| IRTX/GP47/CE2_N/JP7 | CEB_N | |
| GP46/IRRX | -LAN2_DSM | |
| PSION#/GP42 | -PSON | |
| PWROK2#/GP41 | PECI_CTL | |
| PCIRST3#/GP10/VDIMM_STR_EN | -PCIE_RST | |
| RSMRST#CIRRX1/GP55 | -RSMRST | |
| PME#/GP54 | -LPCPME | |
| PD5/GP75/BUSS00 | N/A | |

| PIN NAME | USAGS | NOTE |
|----------------------------|-------------------|------------------|
| FAN_TAC2/GP52 | FANIO2 | |
| FAN_TAC3/GP37 | FANIO3 | |
| VIDO3/FAN_TAC4/GP25/DSR2# | FANIO4 | |
| FAN_CTL2/GP51 | FANPWM2 | |
| FAN_CTL3/GP36 | FANPWM3 | |
| VID4/GP34 | BEEP- | |
| VID3/GP33 | TURBO1 | |
| VID2/GP32 | TURBO0 | |
| VCORE_GOOD/VID6/GP63 | CPUT_LED1_C | |
| VID5/GP35 | CPUT_LED2_C | |
| VID1/GP31 | CPUT_LED3_C | |
| VID0/GP30 | -LAN1_DSM | NBT_LED1_C |
| SLCT/GP80 | CPU_LED1_C | |
| PE/GP81 | CPU_LED2_C | |
| BUSY/GP82 | CPU_LED3_C | |
| PD3/GP73/BUSSI1 | SB_LED1_C | |
| PD4/GP74/BUSSI2 | SB_LED2_C | |
| VCORE_EN/VID7/GP64 | IT_GP64 | SB_LED3_C |
| PD0/GP70 | NB_LED1_C | |
| PD1/GP71 | NB_LED2_C | |
| PD2/GP72/BUSSI0 | NB_LED3_C | |
| GP22/SEN | LOW_PWR_1 | |
| VIDO5/GP27/SEN2 | LOW_PWR_2 | |
| PCIRST2#/GP11 | -PFMRST1 | |
| PCIRST1#/GP12 | -PFMRST2 | |
| 3VSB5W#/GP40 | CSI_F0 | BSEL166_1 |
| SUSC#/GP53 | CSI_F1 | BSEL166_2 |
| GP23/SI | BSEL166_3/CSISBSL | |
| VIDO0/GP20/CTS2# | CPUT_LED1_C | BSEL166_4 |
| GP65/VDDA_EN/GB_01 | MB_ID2 | |
| PD6/GP76/BUSS01 | MB_ID3 | |
| PD7/GP77/BUSS02 | MB_ID4 | |
| AFD#/GP86/SMBC_R | SEN_PIN | FST_2X8 |
| INIT#/GP85/SMBC_M | SEC_2x8 | GTLREF_AD2 |
| ACK#/GP83 | DDR_LED1_C | |
| VIDO1/GP21/DCD2# | DDR_LED2_C | |
| STB#/GP87/SMBC_M | DDR_LED3_C | |
| PWRON#/GP44 | VCORE_OV1 | |
| PANSWH#/GP43 | PWRBTSW | |
| KDAT/GP61 | -PWRBTSW | |
| KCLK/GP60 | KDAT | |
| MDAT/GP57 | KCLK | |
| MACL/GP56 | MDAT | |
| GP66/VLDT_EN/GB_02 | NBT_LED1_C | MCLK |
| SVD/PCIRSTIN#/CIRTX2/GP15 | PWM2_CR | |
| KDAT/GP61 | PWM2_CR | |
| GP67/CPU_PG/GB_03 | EN_LOADLINE | IT_GP67/-EN_PWM2 |
| SLIN#/GP84/SMBC_R | -EN_PWM2 | |
| PSI_L/FAN_CLT5/CIRRX2/GP16 | -THERM | |
| VIDO4/GP26/SOUT2 | DDR18V_PH2_EN | |
| VIDO2/FAN_TAC5/GP24/DSR2# | DDR18V_LED | |
| VIDO6/GP17/RI2# | 1_1V_PH_EN | |
| VIDO7/JP6/DTR2# | JP6 | |
| PD5/GP75/BUSS00 | SB_LED3_C | |



PWM各相位的擺法如下:



BIOS超電壓對應表:

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

散熱模組料號:

Z77-D3H :
PCH :
12SP2-S05511-01R/02R/03R
MOSFET :
12SP2-S08924-01R/02R/03R

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