# R63 INTEL SYSTEM DIAGRAM

01

+3V/+5V S5 PG.36
+1.05V PG.37
CPU Core PG.40~41
DDR3L PG.38
Charge PG.35
Dis-Charge PG.39
+VGACORE PG.42
+1.5 VGA PG.43
+1.0V/+1.8/ +3 VGA PG.44

SODIMM1 Max. 4GB PG.12 — 1600MT/s DDR3 L Channel A
SODIMM2 Max. 4GB PG.13 — 1600MT/s DDR3 L Channel B

INTEL Haswell
Processor : Daul / Quad Core
Power : 37 / 47 (Watt)
Package : rPGA947
Size : 37.5 x 37.5 (mm)
PG.2~5

PCI-E x8
eDP (5.4Gb/s)
DDI (5.4Gb/s)

AMD
Mars / SUN XT
29mm X 29mm
TDP 35W / 25W
PG.14~20
DDR3 900MHz
VRAM
128Mx16x8,128bit PG.21~22

FDI DMI

HDD PG.33 — SATA0
ODD PG.33 — SATA1

INTEL PCH
Lynx Point
Power : 3.5 Watt
Package : FCBGA695
Size : 20 x 20 (mm)
PG.6~11

eDP → RTD 2136 S/R DP to LVDS Converter PAGE 23 → LVDS Interface PG.25 → LVDS
DP Port B → HDMI PG.26
CRT → CRT PG.25

PCI-E x 1 LANE2 LANE1
LAN RTL8166EH 10/100 PG.30
WLAN BT COMBO PG.34 — USB 2.0 PORT10

PCI-E x 1 LANE3
Accelerometer PG.34 — SMBUS
Card Reader RTS5237 PG.27

KBC EnE KB3940QF A1 PG.31 — LPC
KB PG.32 | TP PG.32 | ROM PG.31 | FAN PG.32

USB 3.0 → USB3.0 Ports X2 PG.29 (PORT1,2) | Webcam PG.25 (PORT4)
USB 2.0 (PORT0,1) → USB2.0 Ports PG.29

AUDIO CODEC
ALC 3227
PG.28
Speaker PG.28
HP/MIC PG.29
Analog MIC PG.29

| Stackup |
|---|
| TOP |
| GND |
| IN1 |
| IN2 |
| VCC |
| BOT |

NB5

PROJECT : R63
Quanta Computer Inc.

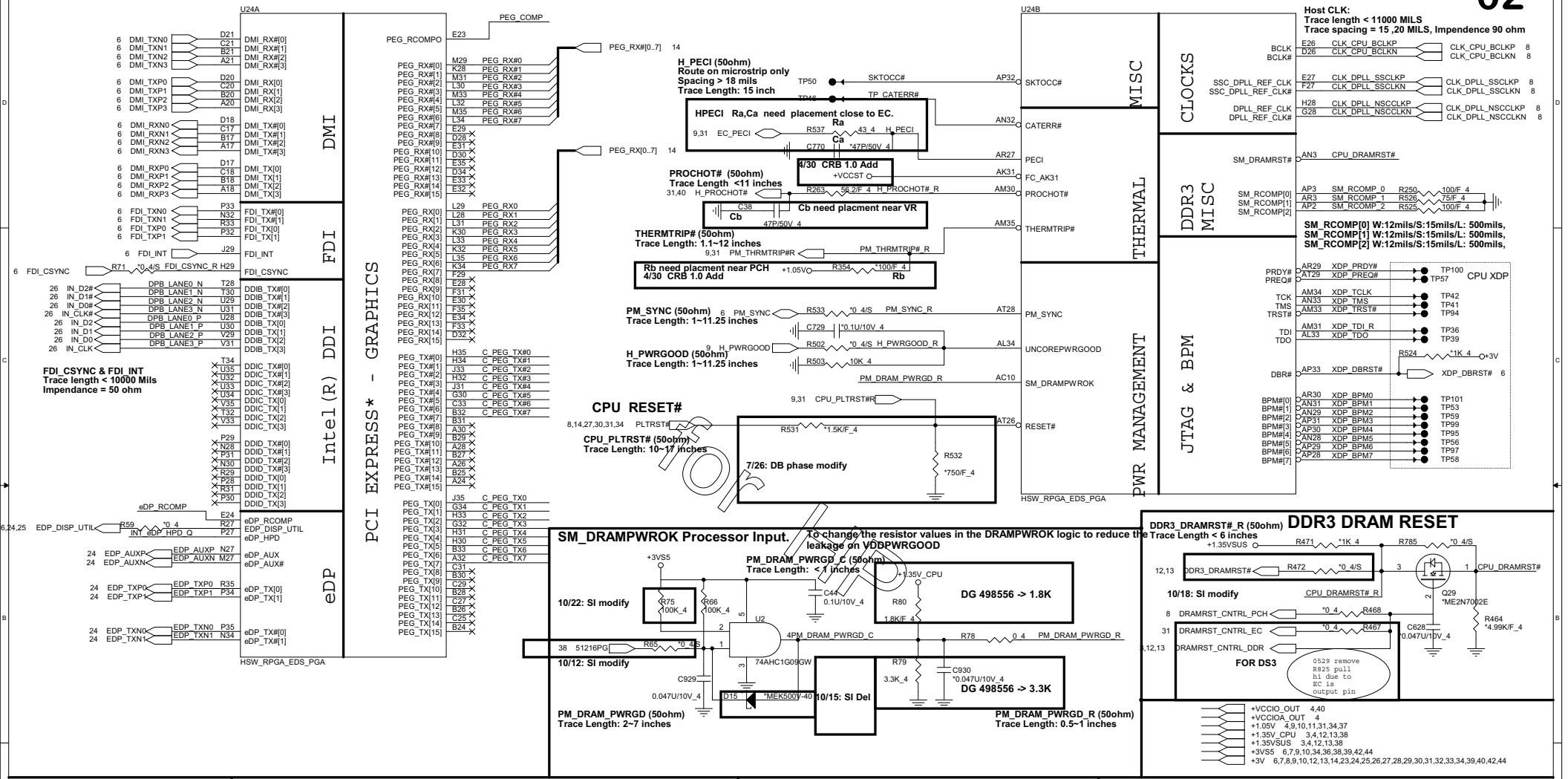
| Size | Document Number | Rev |
|---|---|---|
| Custom | BLOCK DIAGRAM | 1A |

Date: Friday, December 21, 2012 Sheet 1 of 44

# Haswell Processor (DMI,PEG,FDI)

# Haswell Processor (CLK,MISC,JTAG)

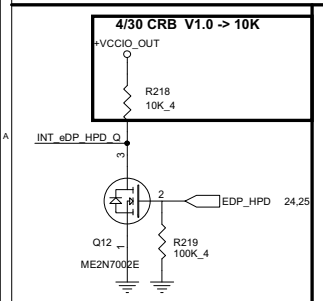
**02**

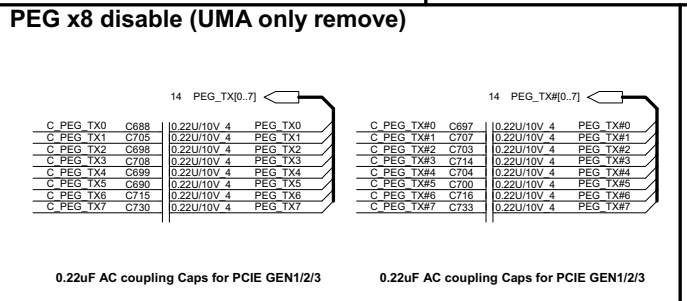


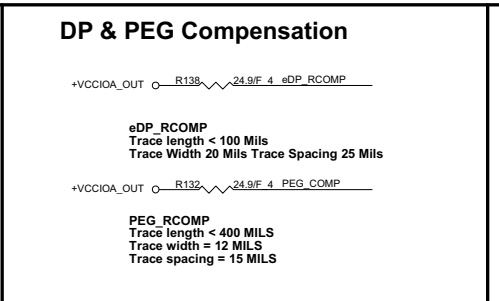


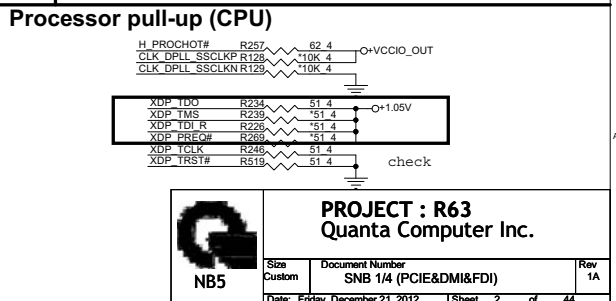





**PROJECT : R63**
Quanta Computer Inc.

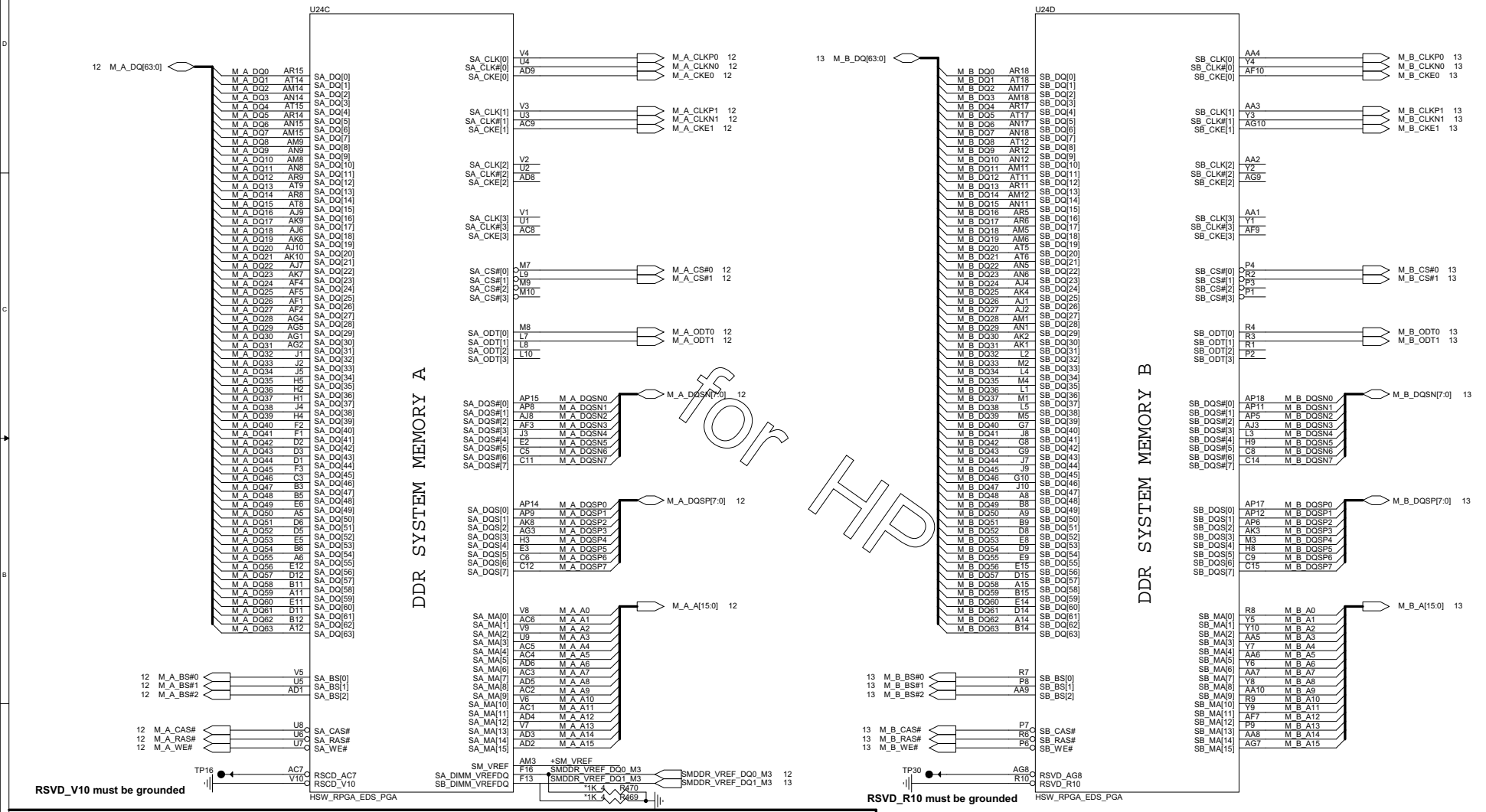
NB5

| Size | Document Number | Rev |
|---|---|---|
| Custom | SNB 1/4 (PCIE&DMI&FDI) | 1A |

Date: Friday, December 21, 2012 Sheet 2 of 44

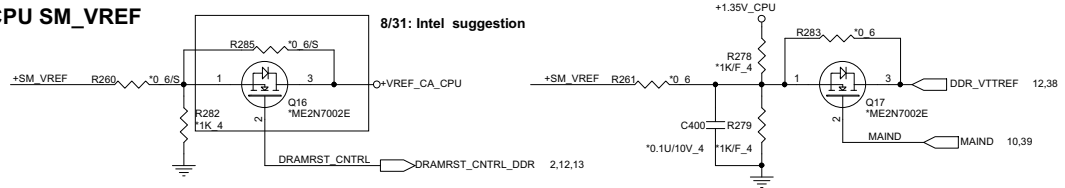
# Haswell Processor (DDR3)

03




## CPU SM_VREF

8/31: Intel suggestion




+1.35V_CPU 2,4,12,13,38
+VREF_CA_CPU 12

| | | |
|---|---|---|
| PROJECT : R63<br>Quanta Computer Inc. | | |
| NB5 | Size: Custom<br>Document Number: SNB 2/4 (DDR3 I/F) | Rev: 1A |
| | Date: Friday, December 21, 2012 | Sheet 3 of 44 |

# Haswell Processor (POWER)

04

## POWER

+VCCIN 95A

U24F

+VCC_CORE

+1.35V_CPU 4.2A

+1.35V_CPU

PEG AND DDR

CORE SUPPLY

SVID

SENSE LINES

HSW_RPGA_EDS_PGA

| VCC Output Decoupling Recommendations | | |
|---|---|---|
| 470uFx4 | 7343 | TOP socket side |
| 22uFx8 | 0805 | 4 on TOP, 4 on BOT near socket edge |
| 22uFx11 | 0805 | TOP, inside socket cavity |
| 10uFx11 | 0805 | BOT, inside socket cavity |

| VDDQ Output Decoupling Recommendations | | |
|---|---|---|
| 330uFx2 | 7343 | BOT socket side |
| 22uFx11 | 0805 | 5 onTOP, 6 on BOT inside socket cavity |
| 10uFx10 | 0805 | 5 onTOP, 5 on BOT inside socket cavity |

+VCCIOA_OUT 2
+VCCIO_OUT 2,40
+VCCIO_PCH 10
+1.5V 6,7,8,10,28,34,38,44
+1.35V_CPU 2,3,12,13,38
+1.05V 2,9,10,11,31,34,37
+VCC_CORE 40,41
+VCCST 2
+1.35VSUS 2,3,12,13,38

### IO Thrm Protect

+3VPCU

For 65 degree, 1.8v limit, (SW)

R774 16.5K/F_4

THRM_MOINTOR 31

C62 0.1U/10V_4

R775 3.3K/F_4

For 75 degree, 1.2v limit, (HW)

THRM_MOINTOR1 31

R776 100K_4 NTC

C54 0.1U/10V_4

4/30: CRB 1.0 add

+1.05V +VCCST R256 *0_8 C392 *22U/6.3VS_8 C381 *22U/6.3VS_8

### Power Test Propose

+1.05V R60 150/F_4 PWR_DEBUG_R R62 *10K_4

+1.05V +VCCIO_OUT R510 *0_8 C753 10U/6.3V_6

+1.05V +VCCIO_PCH R462 0_6 CRB 1.0 stuff C631 *4.7U/6.3V_6

4/30: DG 498550

Haswell PWR_DEBUG requires a 150-Ohm pull-up resistor to PCH 1.05-V VCC Core when routed to XDP

Layout note: It is recommended to shield VIDSOUT signal by routing it in between the VIDSCLK and VIDALERT# signals.

### SVID CLK

H_CPU_SVIDCLK VR_SVID_CLK 40

### SVID DATA

7/26: DB sch modify, Del R23

+VCCIO_OUT R253 130/F_4

Place PU resistor close to CPU

Place PU resistor close to VR

DG V0.7 -> 110 Ohm
SCH V0.7 -> 130 Ohm

H_CPU_SVIDDAT VR_SVID_DATA 40

### SVID ALERT

Place PU resistor close to CPU
The VIDALERT# signal must have a damping resistor to prevent overshoot

C337 0.1U/10V_4 +VCCIO_OUT R247 75/F_4 H_CPU_SVIDALRT# R248 43_4 VR_SVID_ALERT# 40

DG V0.7 -> 44 Ohm
SCH V0.7 -> 43 Ohm

Sense resistor should be placed within 2 inches (50.8 mm) of the processor socket

Trace Impendence 50 ohm

### CPU VDDQ

+1.35V_CPU +1.35VSUS

Placement close to CPU.

C235 0.1U/10V_4

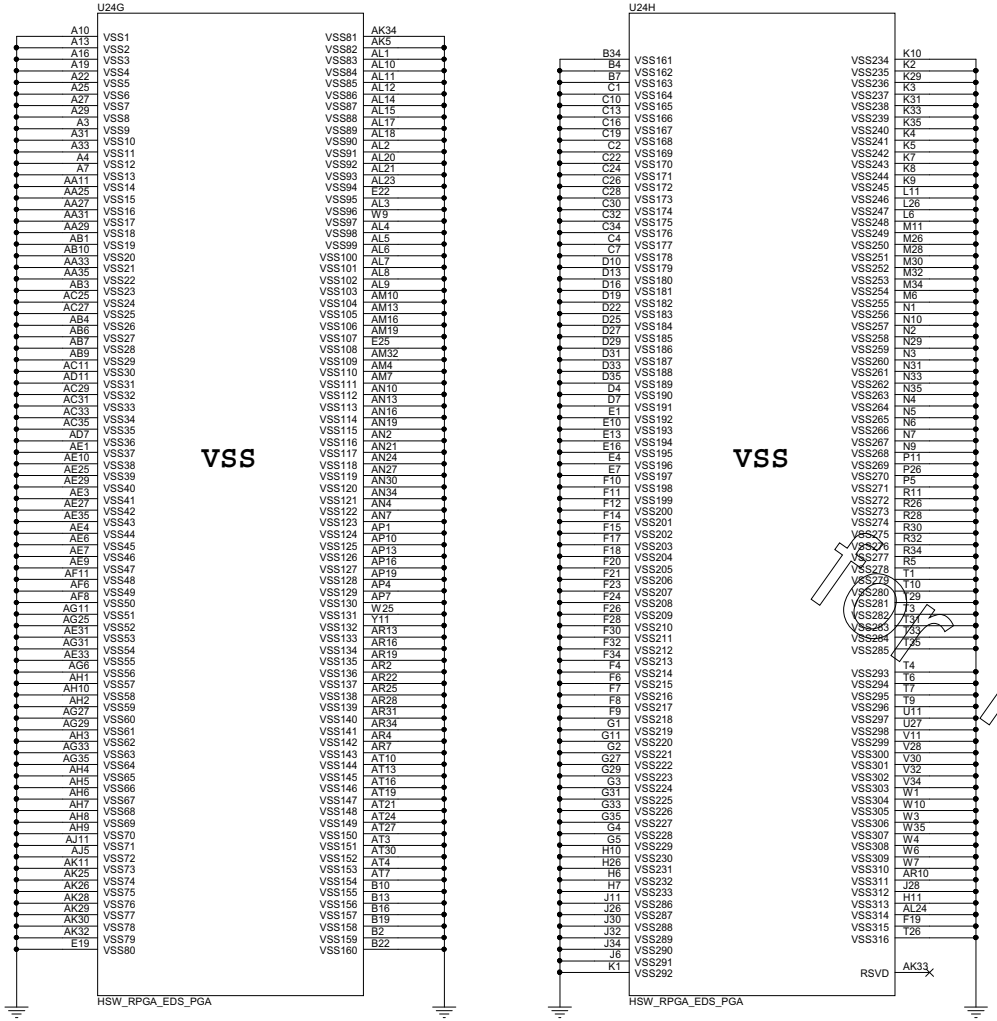
C225 *0.1U/10V_4

Note: please keep plane is enough for VDDQ 4.2A

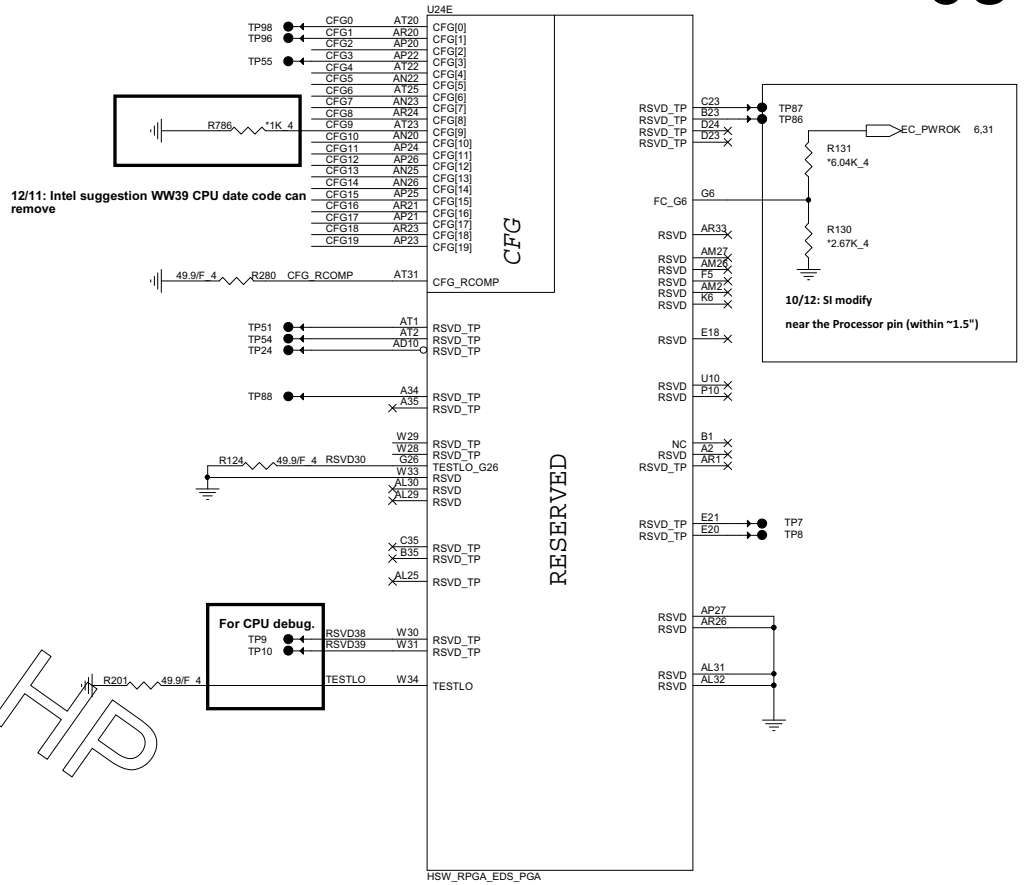
For HP

| | | |
|---|---|---|
| NB5 | PROJECT : R63<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: SNB 3/4 (POWER) | Rev: 1A |
| Date: Friday, December 21, 2012 | Sheet 4 of 44 | |

# Haswell Processor (GND)




# Haswell Processor (RESERVED, CFG)




**CFG[3] (PHYSICAL_DEBUG_ENABLED (DFX PRIVACY))**

0 Enable; SET DFX ENABLED BIT IN DEBUG

1 , Disable;

CFG3 R272 *1K_4

**CFG[6:5] (PCIE Port Bifurcation Straps)**

11: (Default) x16 - Device 1 functions 1 and 2 disabled
10: x8, x8 - Device 1 function 1 enabled ; function 2 disabled
01: Reserved - (Device 1 function 1 disabled ; function 2 enabled)
00: x8,x4,x4 - Device 1 functions 1 and 2 enabled

## Processor Strapping

The CFG signals have a default value of '1' if not terminated on the board.

| | 1 | 0 |
|---|---|---|
| CFG2 (PEG Static Lane Reversal) | Normal Operation | Lane Reversed |
| CFG4 (DP Presence Strap) | Disable; No physical DP attached to eDP | Enable; An ext DP device is connected to eDP |
| CFG7 (PEG Defer Training) | PEG train immediately following xxRESETB de assertion | PEG wait for BIOS training |

CFG2 R275 *1K_4
CFG4 R271 1K_4
CFG7 R273 *1K_4
CFG5 R274 1K_4
CFG6 R270 *1K_4

PROJECT : R63
Quanta Computer Inc.

NB5

| Size | Document Number | Rev |
|---|---|---|
| Custom | SNB 4/4 (GND) | 1A |

Date: Friday, December 21, 2012 Sheet 5 of 44

Hp

# Lynx Point (DMI,FDI,PM)

U33C

# Lynx Point ( DDI)

U33D

06

DMI

FDI

System Power Management

LVDS

CRT

Digital Display Interface

PD Res place close to PCH

PCH to Res routeing 37.5 ohm Impedance.
Res to connector filter routeing 50ohm Impedance.

DG V0.7 -> 33 ohm
SCH V0.7 -> 0 ohm

DAC_IREF (50ohm)
Trace length < 500 MILS
Trace spacing = 30 MILS

5/16 for DS3

12/17 PV modify

Reserve for power on sequence

Reserve from EMI request

INT. HDMI

LPT_PCH_M_EDS/BGA

+3V_DEEP_SUS 7,8,9,10,39
+3V_RTC 7,10,11
+1.05V 2,4,9,10,11,31,34,37
+3VPCU 4,7,9,11,25,31,32,34,35,36
+3VS5 2,7,9,10,34,36,38,39,42,44
+3V 2,7,8,9,10,12,13,14,23,24,25,26,27,28,29,30,31,32,33,34,39,40,42,44
+5V 7,23,26,28,29,32,33,34,39

## PCH Pull-high/low(CLG)

for DS3

10/14: SI phase modify

10/12: SI phase modify

## INT HDMI Detect Function

## 7/26 DB Modify

On Die DSW VR Enable
High = Enable (Default)
Low = Disable

## System PWR_OK(CLG)

7/26 DB Modify

10/17: SI Modify change to 10 Kohm

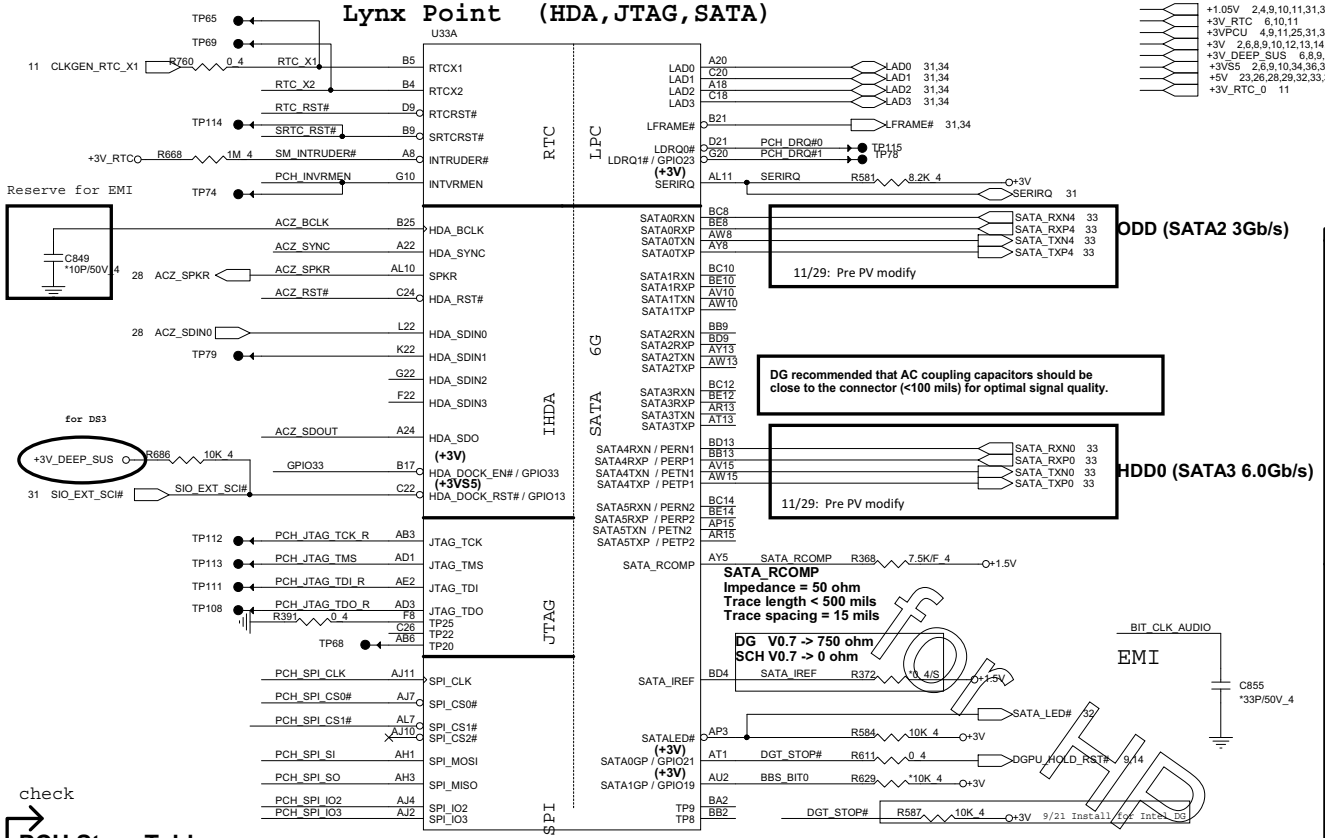
PROJECT : R63
Quanta Computer Inc.

NB5

Size: Custom | Document Number: PCH 1/6 (DMI/FDI/VIDEO) | Rev: 1A

Date: Monday, December 24, 2012 | Sheet 6 of 44

# Lynx Point (HDA,JTAG,SATA)

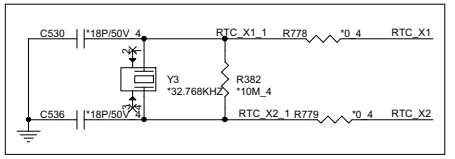



+1.05V 2,4,9,10,11,31,34,37
+3V_RTC 6,10,11
+3VPCU 4,9,11,25,31,32,34,35,36
+3V 2,6,8,9,10,12,13,14,23,24,25,26,27,28,29,30,31,32,33,34,39,40,42,44
+3V_DEEP_SUS 6,8,9,10,39
+3VS5 2,6,9,10,34,36,38,39,42,44
+5V 23,26,28,29,32,33,34,39
+3V_RTC_0 11

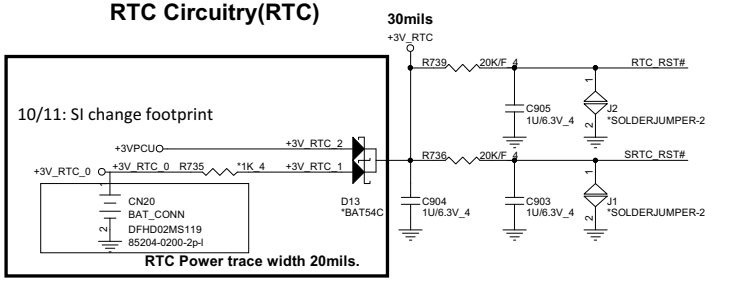
10/18: SI Modify

## RTC Clock 32.768KHz

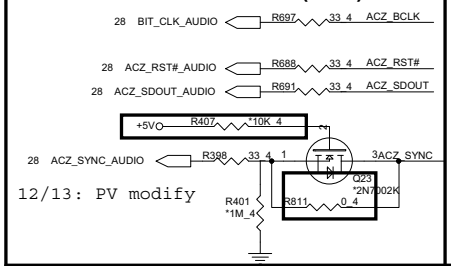
07



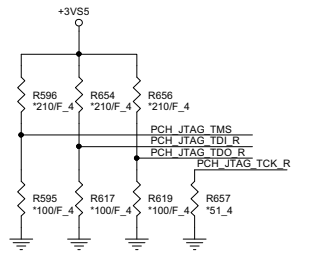

## RTC Circuitry(RTC)



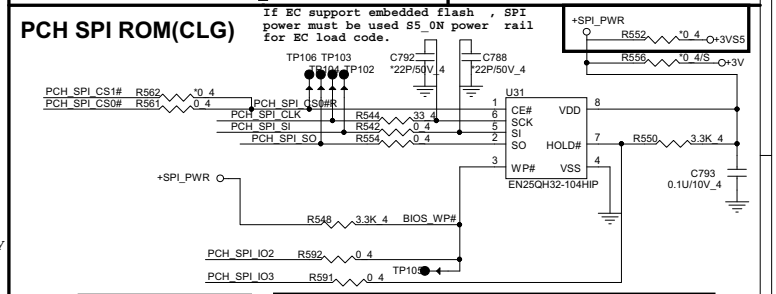

## HDA Bus(CLG)




## PCH JTAG Debug(CLG)




## PCH SPI ROM(CLG)



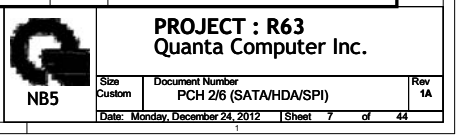

10/18: Del R350 , R344

| Vender | Size | P/N |
|---|---|---|
| EON | 4MB | AKE39ZN0Q03 EON EN25QH32-104HIP |
| AMIC | 4MB | AKE39ZN0800 AMIC A25QE32M-F (QE) |
| Socket | | DFHS08FS023 |

check

## PCH Strap Table

| Pin Name | Strap description | Sampled | Configuration | Circuit |
|---|---|---|---|---|
| SPKR | No reboot mode setting | PWROK | 0 = Default (weak pull-down 20K)<br>1 = Setting to No-Reboot mode | ACZ_SPKR R569 *1K_4 +3V |
| GNT3# / GPIO55 | Top-Block Swap Override | PWROK | 0 = "top-block swap" mode<br>1 = Default (Int PU) | R563 *1K_4 PCI_GNT3# 8 |
| INTVRMEN | Integrated 1.05V VRM enable | ALWAYS | 0 = Disable<br>1 = Enable | PCH_INVRMEN R389 330K_4 +3V_RTC |
| HDA_DOCK_EN#/GPIO33 | Flash Descriptor Security Only for Interposer | PWROK | 0 = Override<br>1 = Default (weak pull-up 20K) | GPIO33 R680 *0_4 +3V 10/18: SI Modify |
| GNT1# / GPIO51 | Boot BIOS Selection 1 [bit-1] | PWROK | GNT1# / GNT0# / Boot Location: 1 1 SPI; 0 0 LPC | [Need external pull-down for LPC BIOS] Default weak pull-up on GNT0/1# |
| GPIO19 | Boot BIOS Selection 0 [bit-0] | PWROK | | R613 *1K_4 BBS_BIT0<br>R390 *1K_4 BBS_BIT1 8 |
| HDA_SYNC | On-Die PLL VR Voltage Select | RSMRST | 0 = Support by 1.8V (weak pull-down)<br>1 = Support by 1.5V | +VCC_HDA_IO R684 *1K_4 ACZ_SYNC 12/13: PV modify |
| HDA_SDO | Flash Descriptor Security | PWROK | 0 = Security Effect (Int PD)<br>1 = Can be Overridden | 31 GPIO33_E ACZ_SDOUT R693 *1K_4 +VCC_HDA_IO |
| GPIO8 | RSVD | RSMRST# | Internel PU | R621 *1K_4 BT_OFF# 9,34 |
| GPIO28 | On-die PLL Voltage Regulator | RSMRST# | 0 = Disable<br>1 = Enable (Int PU) | R571 *1K_4 PLL_ODVR_EN 9 |
| SPI_MOSI | iTPM function Disable | APWROK | 0 = Default (weak pull-down 20K)<br>1 = Enable | PCH_SPI_SI R374 *1K_4 +3V |
| GPIO62 / SUSCLK | PLL On-Die Voltage Regulator Enable | RSMRST# | 0 = Disable<br>1 = Enable (Int PU) | R564 *1K_4 PCH_SUSCLK 6,31 |
| | | | | |
| | | | | |



# 08

## Lynx Point (PCI,USB,NVRAM)

## Lynx Point (PCI-E,SMBUS,CLK)

### PCI/USBOC# Pull-up(CLG)

### USB3.0

### PCI

### USB

### Thermal

### C- Link

### SMBUS

### CLOCKS

### PCI-E*

### FLEX CLOCKS

**WLAN**

**LAN**

**Cardreader**

**USB2.0** USB2.0/USB3.0 COMBO 1st

**USB2.0** USB2.0/USB3.0 COMBO 2nd

**Webcam**

**Touch screen**

**Right_USB**

**WLAN**

12/11: PV modify

10/12: SI modify

10/18: SI modify

change 25M to small size

check

| MPC Switch Control | |
|---|---|
| MPC_PWR_CTRL# | Low = MPC ON<br>High = MPC OFF (Default) |

### PLTRST#(CLG)

7/26 DB modify

### SMBus/Pull-up(CLG)

12/18 PV modify

### CLK_REQ/Strap Pin(CLG)

7/26 DB modify

SG : Rb ; UMA : Ra

### PCIE Clock

**WLAN**

**LAN**

**GPU**

Remove for UMA only.

### PEG Clock detect (SG only)

7/26 DB modify

### SMBus/Pull-up(CLG)

| | |
|---|---|
| +1.05V | 2,4,9,10,11,31,34,37 |
| +1.5V | 6,7,10,28,34,38,44 |
| +3VS5 | 2,6,7,9,10,34,36,38,39,42,44 |
| +3V | 2,6,7,9,10,12,13,14,23,24,25,26,27,28,29,30,31,32,33,34,39,40,42,44 |
| +3V_DEEP_SUS | 6,7,9,10,39 |

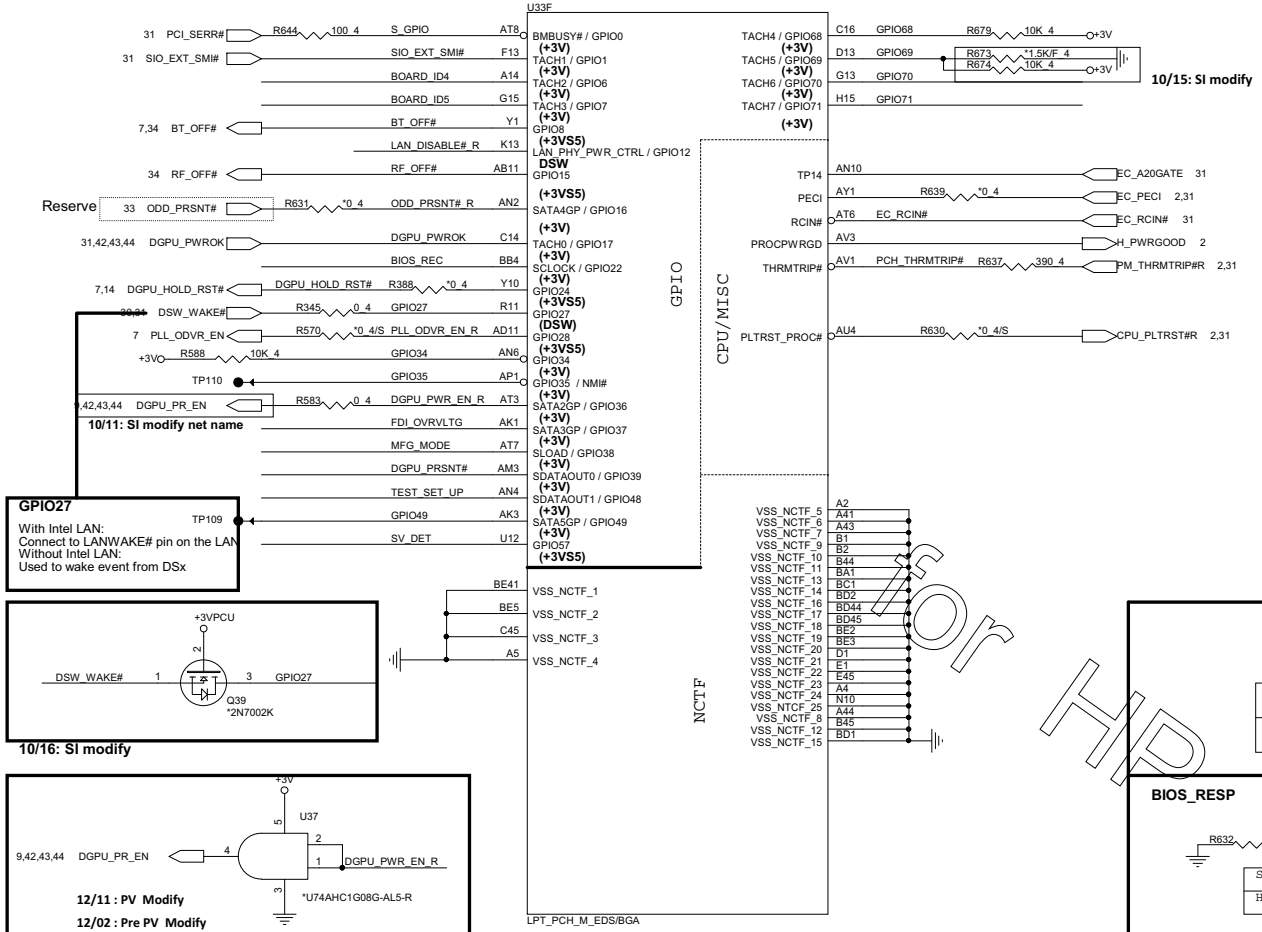
**PROJECT : R63**
**Quanta Computer Inc.**

NB5

| Size | Document Number | Rev |
|---|---|---|
| Custom | PCH 3/6 (PCIE/USB/CLK) | 1A |

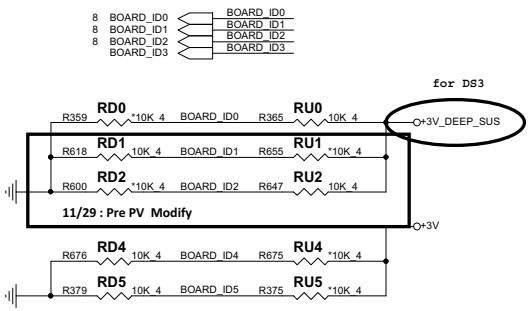
Date: Monday, December 24, 2012 | Sheet 8 of 44

# Lynx Point (GPIO,VSS_NCTF,RSVD)

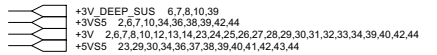



## BOARD ID SETTING

| Model | BOARD_ID5 | BOARD_ID4 | | BOARD_ID2 | BOARD_ID1 | BOARD_ID0 |
|---|---|---|---|---|---|---|
| DB R63 UMA | | | | 0 | 0 | 0 |
| DB R63 DIS | | | | 0 | 0 | 1 |
| SI R63 UMA | | | | 0 | 0 | 0 |
| SI R63 DIS | | | | 0 | 0 | 1 |
| PV R63 UMA | | | | 1 | 0 | 0 |
| PV R63 DIS | | | | 1 | 0 | 1 |
| | | | | | | |



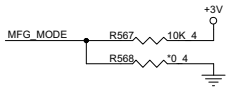

## Clock Gen Power OK (CLG)



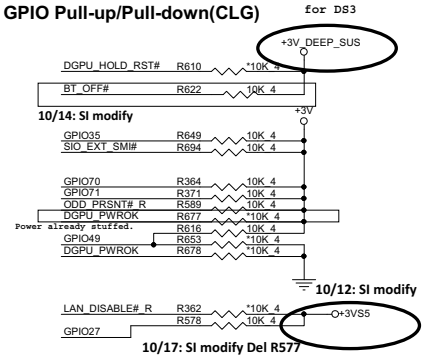

## 09

## PCH MISC PU /PD


## MFG-TEST

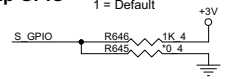



## GPIO Pull-up/Pull-down(CLG)

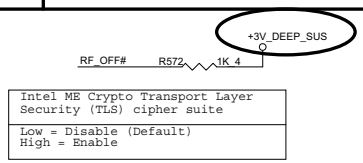


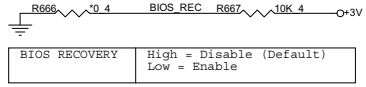

## Swap GPIO

0 = SGPIO
1 = Default

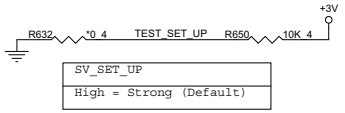



for DS3



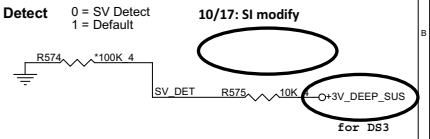

## BIOS_RESP



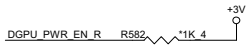

## SV Detect

0 = SV Detect
1 = Default

10/17: SI modify



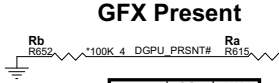

## GPIO36 Internal PD




## SATA3GP/GPIO37 TLS Confidentiality

0 = TLS no confidentiality (Int PD)
1 = TLS with confidentiality


## GFX Present




| | SG | UMA |
|---|---|---|
| Stuff | Ra | Rb |
| NC | Rb | Ra |

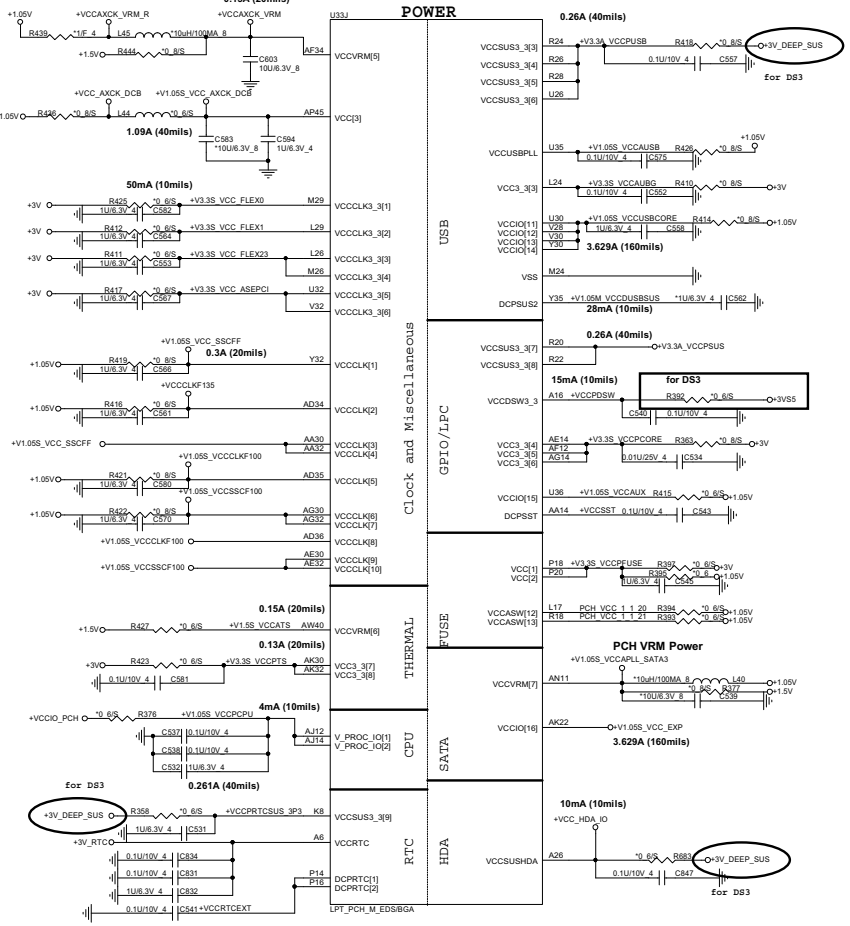
NB5

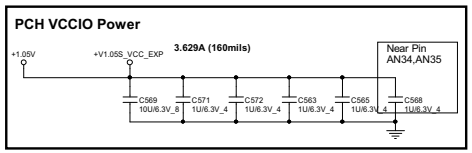
**PROJECT : R63**
Quanta Computer Inc.

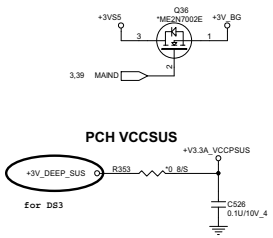
| Size | Document Number | Rev |
|---|---|---|
| Custom | PCH 4/6 (GPIO/MISC) | 1A |

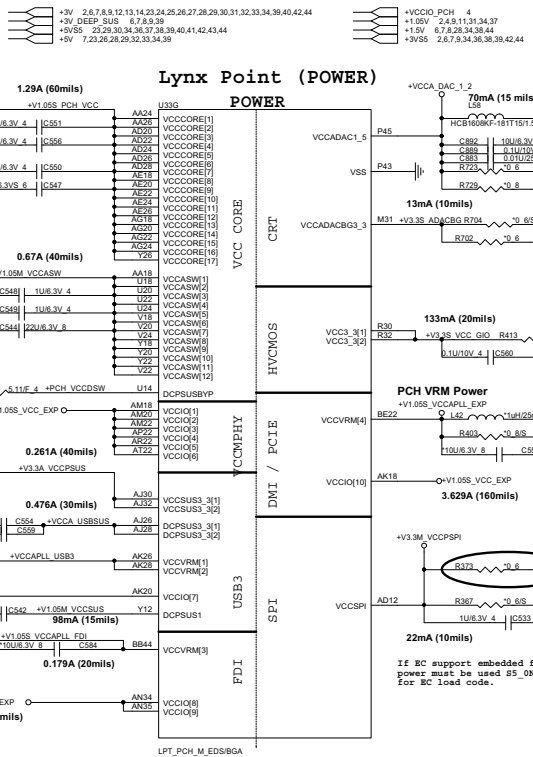
Date: Monday, December 24, 2012 | Sheet 9 of 44

# Lynx Point (POWER)



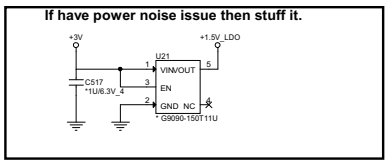



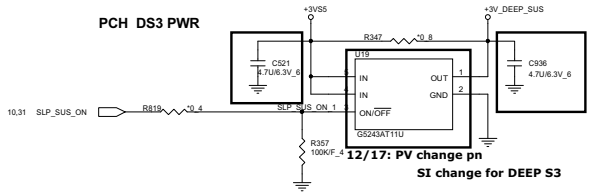



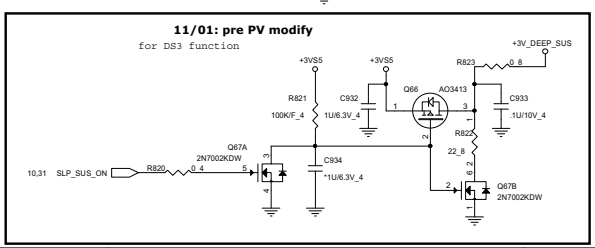










for HP

**PROJECT : R63**
Quanta Computer Inc.

NB5

| Size | Document Number | Rev |
|---|---|---|
| Custom | PCH 5/6 (POWER) | 1A |

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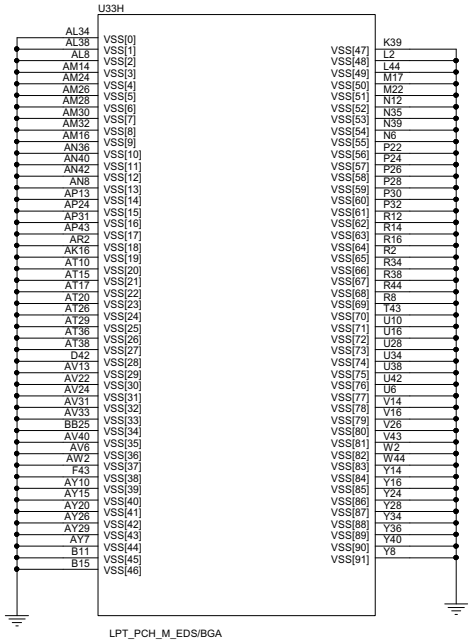
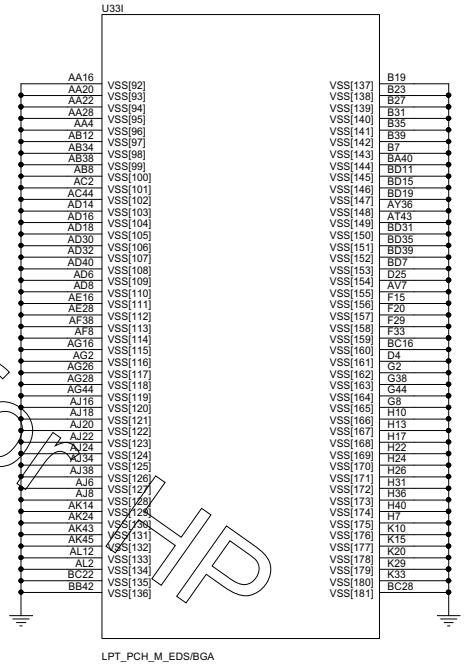
## Lynx Point (GND)

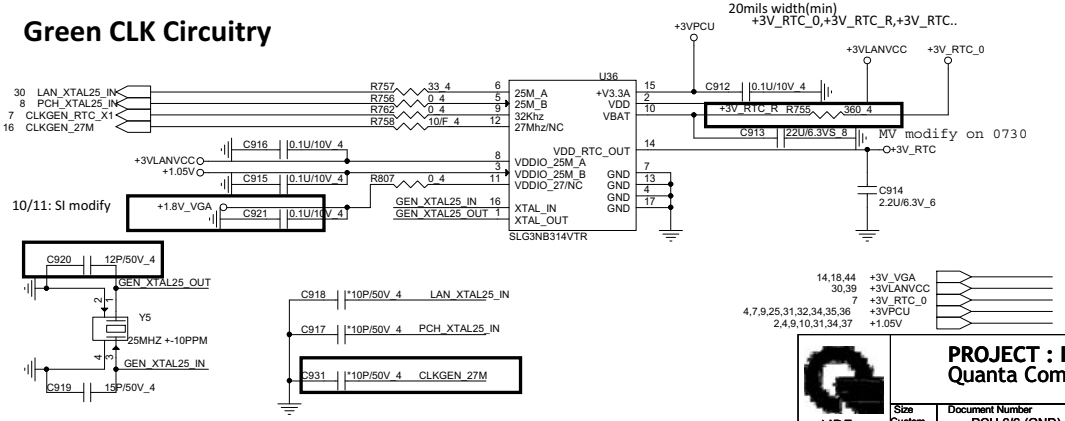



## Lynx Point (GND)




| | U36 P/N |
|---|---|
| UMA | AL3NB244000 |
| DIS | AL000314000 |

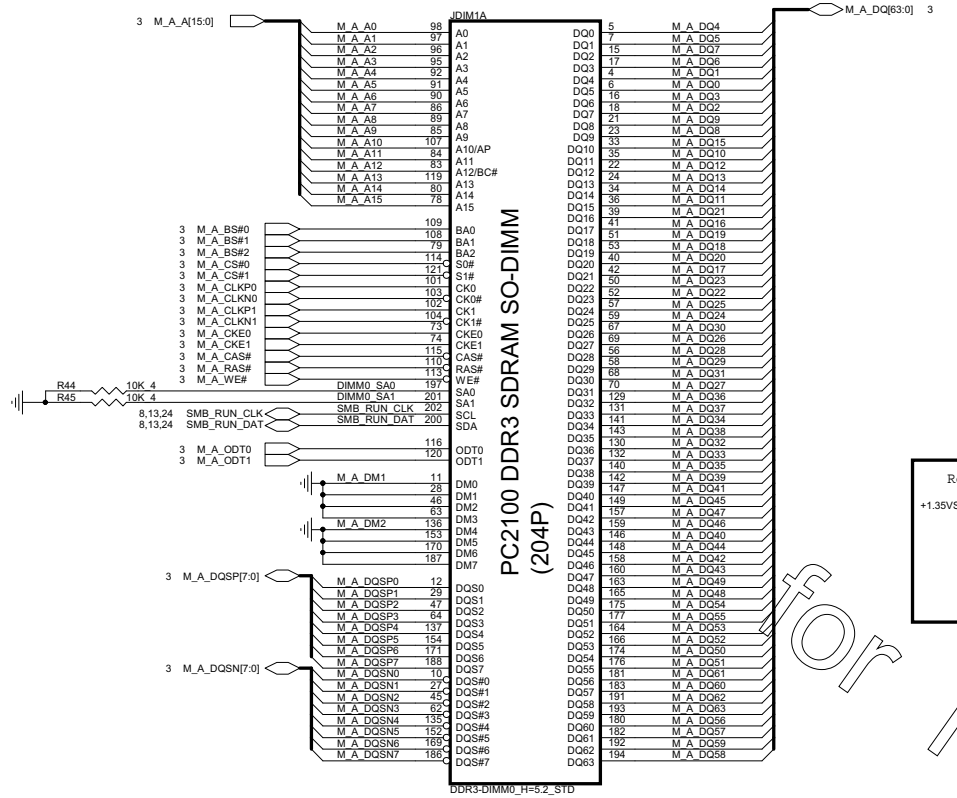
## Green CLK Circuitry

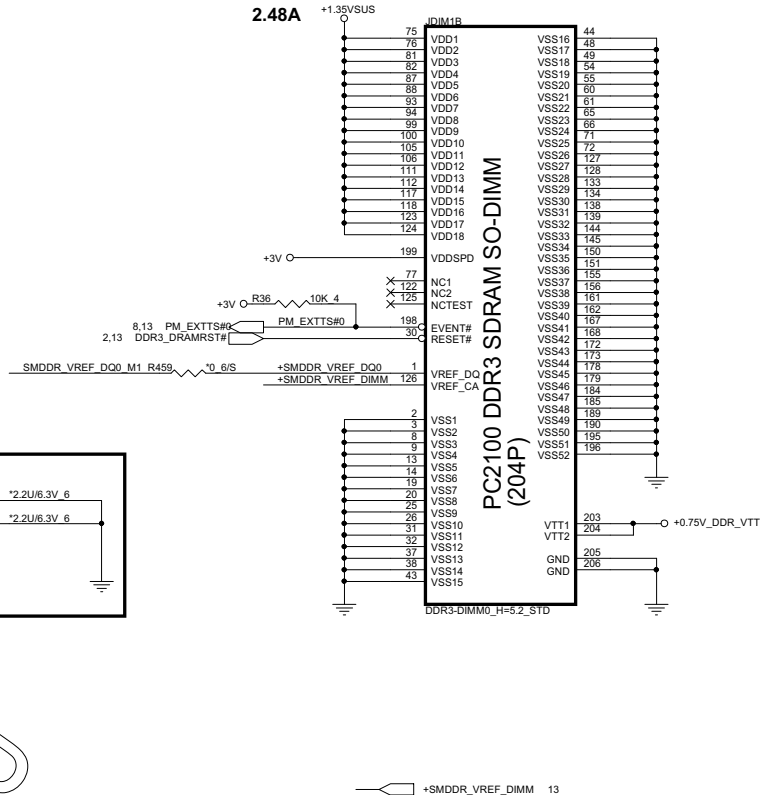


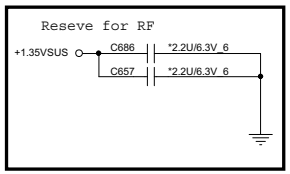

**PROJECT : R63**
Quanta Computer Inc.

NB5

| Size | Document Number | Rev |
|---|---|---|
| Custom | PCH 6/6 (GND) | 1A |
| Date: Monday, December 24, 2012 | Sheet 11 of 44 | |

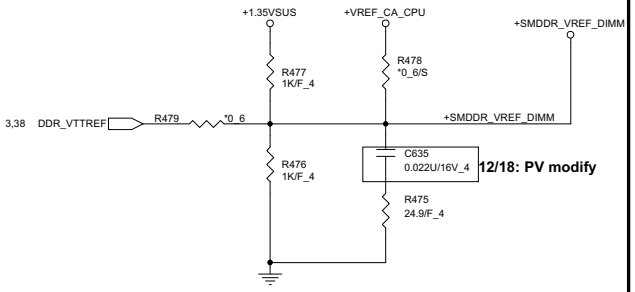


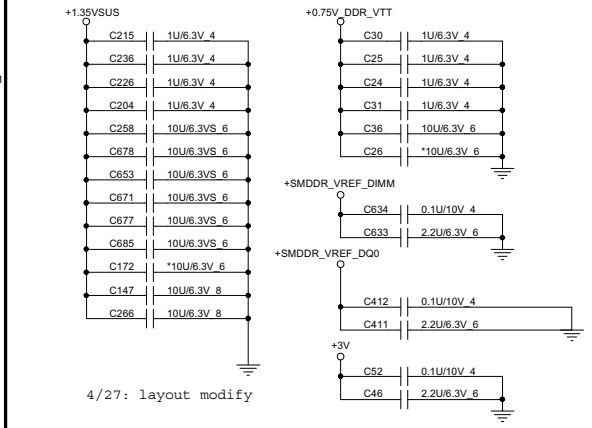



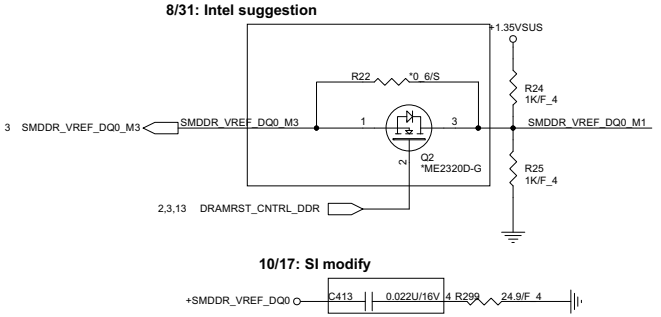




for HP

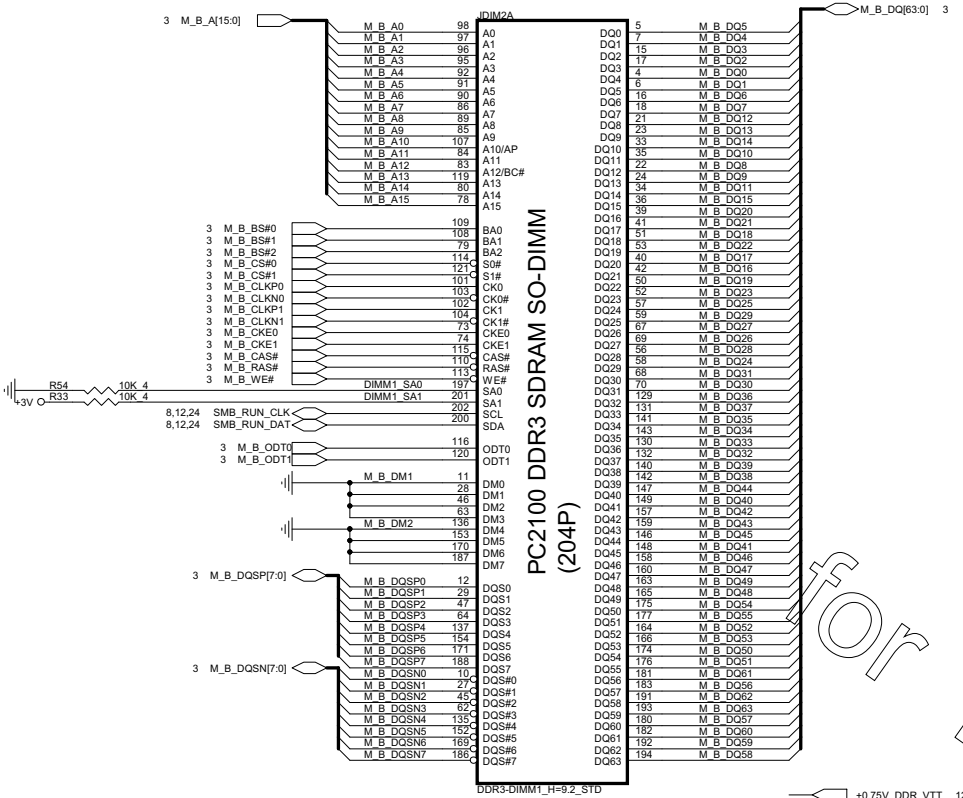
+SMDDR_VREF_DIMM 13
+VREF_CA_CPU 3
+0.75V_DDR_VTT 13,38,39
+1.35VSUS 2,3,4,13,38
+3V 2,6,7,8,9,10,13,14,23,24,25,26,27,28,29,30,31,32,33,34,39,40,42,44

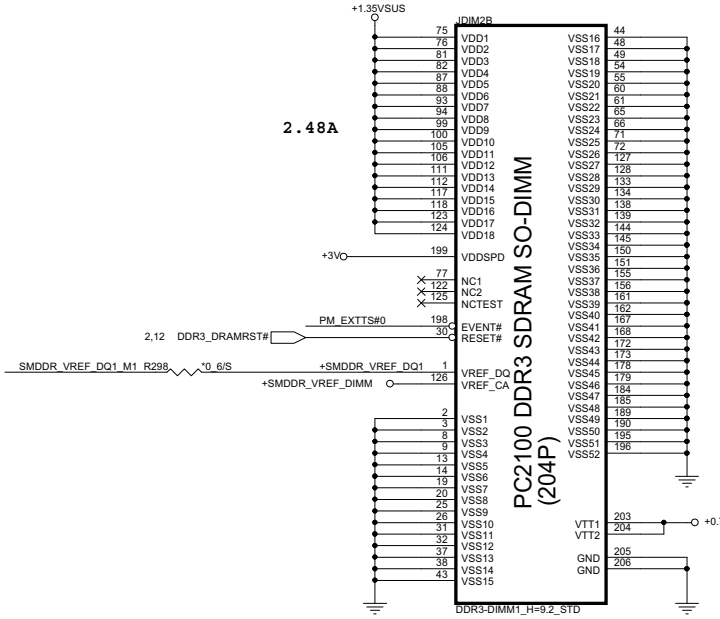



| | | |
|---|---|---|
| NB5 | PROJECT : R63<br>Quanta Computer Inc. | |
| | Size: Custom<br>Document Number: DDR3 DIMM0-RVS (5.2H) | Rev: 1A |
| | Date: Friday, December 21, 2012 | Sheet 12 of 44 |



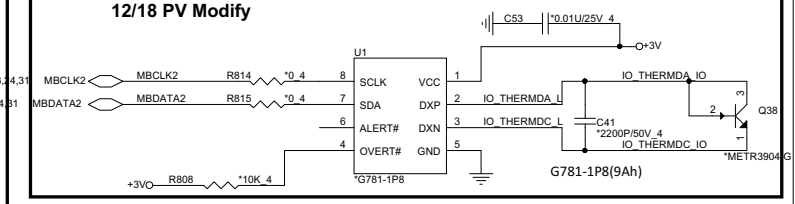




for HP

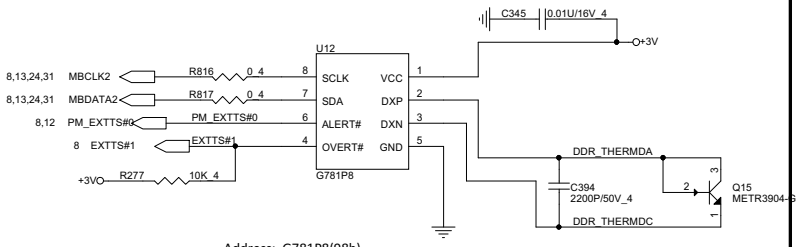
+0.75V_DDR_VTT 12,38,39
+1.35VSUS 2,3,4,12,38
+3V 2,6,7,8,9,10,12,14,23,24,25,26,27,28,29,30,31,32,33,34,39,40,42,44
+SMDDR_VREF_DIMM 12

## Local Thermal Sensor

**12/18 PV Modify**

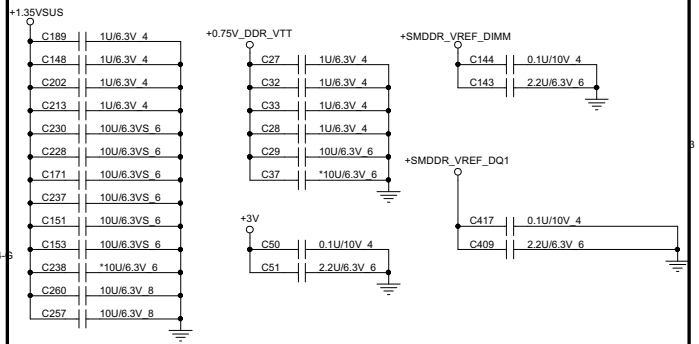



## DDR Thermal Sensor



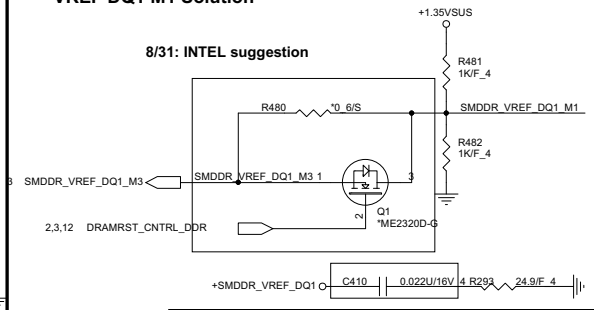

Address: G781P8(98h)

## Place these Caps near So-Dimm1.



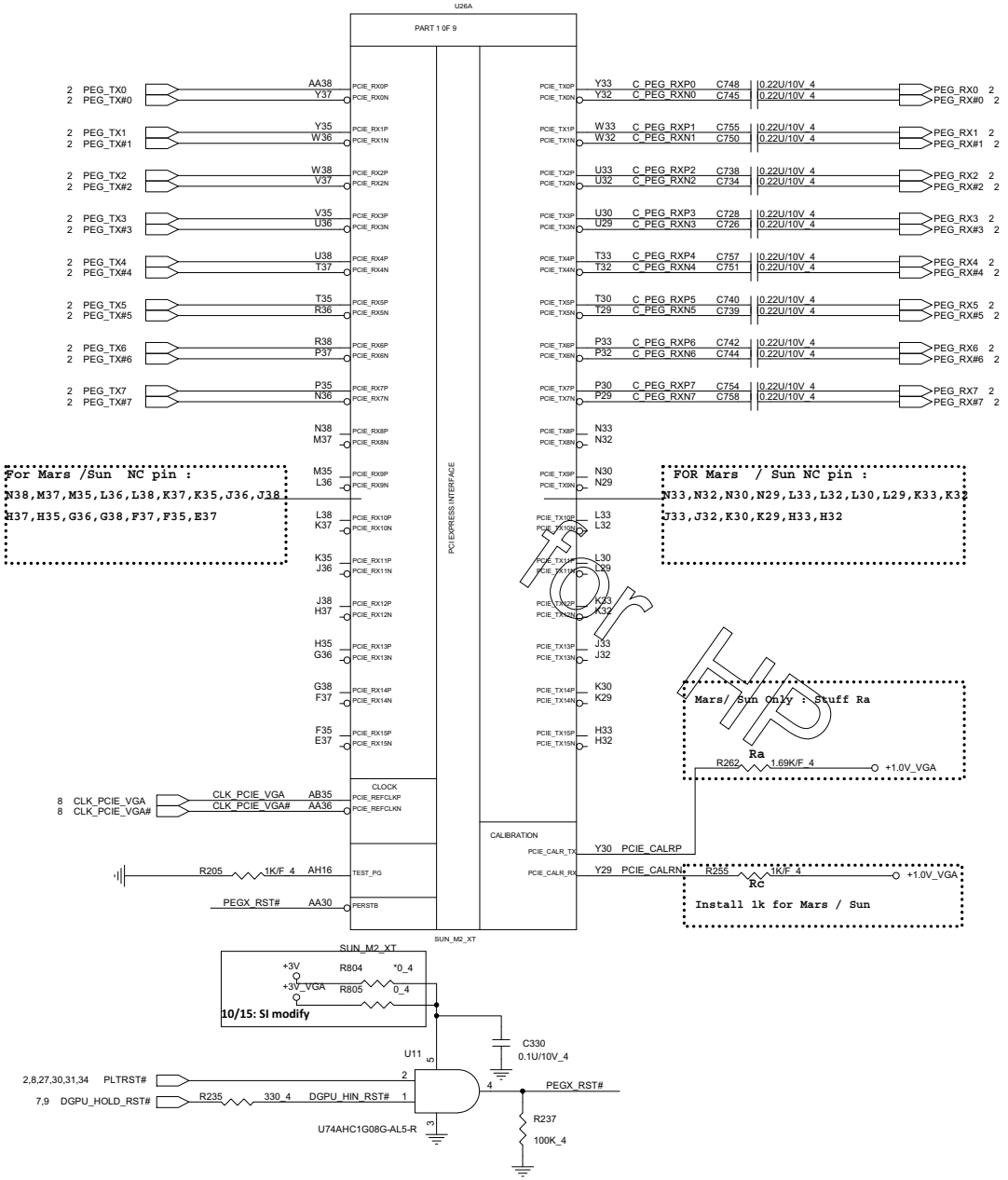

## VREF DQ1 M1 Solution

**8/31: INTEL suggestion**




**PROJECT : R63**
**Quanta Computer Inc.**

| Size | Document Number | Rev |
|---|---|---|
| Custom | DDR3 DIMM1-RVS (9.2H) | 1A |
| NB5 | Date: Friday, December 21, 2012 | Sheet 13 of 44 |




for HP

NB5

**PROJECT : R63**
Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | THAMES_PCIE_Interface | 1A |

Date: Friday, December 21, 2012 Sheet 14 of 44

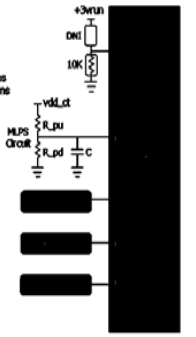
For Mars / Sun : AR1/AW8/AR3/AR8/AU8: NC pin

For Sun only : AD29 /AC29 /AJ21 /AK21: NC pin

For Mars / Sun : DP A to D Port: all NC pin

For Sun only :
AP10 /AV11 /AT11 /AR12 /AW12 / AU12 /AP12 : NC pin

**MLPS Implementation**
- Connect GPIO_28 to 10K pulldown to enable MLPS
- If any of PS_0/1/2/3 is not used, leave "no connect"
- R_pu, R_pd and C must be properly populated per tables below
- Place MLPS circuit components as close to the ASIC as possible
- Total DC resistance of trace between PS pin and C should be less than 2 ohms
- Total DC resistance of trace between C and ground should be less than 2 ohms
- Trace capacitance should be less than 100pF. Resistors should be of +/-1% tolerance




**Capacitor Lookup Table**

| C (nF) | Bits(5,4) |
|---|---|
| 680 | 00 |
| 82 | 01 |
| 10 | 10 |
| NC | 11 |
| | |
| | |
| | |
| | |

**Resistor Divider Lookup Table:**

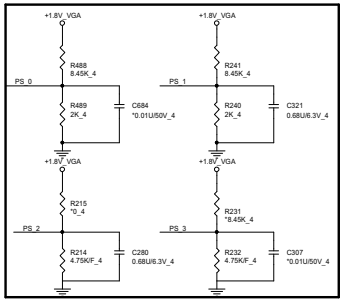
| R_pu (Ohm) | R_pd (Ohm) | Bits(3,2,1) |
|---|---|---|
| NC | 4750 | 000 |
| 8450 | 2000 | 001 |
| 4530 | 2000 | 010 |
| 6980 | 4990 | 011 |
| 4530 | 4990 | 100 |
| 3240 | 5620 | 101 |
| 3400 | 10000 | 110 |
| 4750 | NC | 111 |

| PS_0[3:1] | romiddfg[2:0] | Memory aperture size or ROM type select: If bios_rom_en = 0, romiddfg[2:0] define memory aperture size If bios_rom_en = 1, romiddfg[2:0] define ROM type | xxx | gpio_13 gpio_12 gpio_11 |
|---|---|---|---|---|
| PS_0[4] | n/a | Reserved | 1 | genlk_vsync |
| PS_1[1] | bif_gen3_en_a | PCIe Gen3 capability: 1=Gen3 supported, 0=Gen3 not supported | x | gpio_2 |
| PS_1[2] | bif_clk_pm_en | PCIe Clk PM capability: 1 = CLKREQB supported | x | gpio_8 |
| PS_1[3] | n/a | Reserved | | genlk_clk |
| PS_1[4] | tx_pwrs_enb | PCIe Tx power savings: 0=50% swing, 1=full swing | x | gpio_0 |
| PS_1[5] | tx_deemph_en | PCIe Tx de-emphasis: 1=Tx de-emphasis enabled | x | gpio_1 |
| PS_2[1] | n/a | Reserved | | n/a |
| PS_2[2] | n/a | Reserved | | n/a |
| PS_2[3] | bios_rom_en | Enable external BIOS ROM: 1=External ROM connected | x | gpio_22 |
| PS_2[4] | vga_dis | VGA disable: 1=Disable this GPU as the system's VGA controller | 0 | gpio_9 |
| PS_2[5] | n/a | Reserved | | n/a |
| PS_3[1] | MEM Vendor ID | MEM Vendor ID | 0 | n/a |
| PS_3[2] | MEM Vendor ID | MEM Vendor ID | 0 | n/a |
| PS_3[3] | MEM Vendor ID | MEM Vendor ID | 0 | n/a |
| PS_3[5] PS_3[4] PS_3[5] | aud_port_cp[2] aud_port_cp[1] aud_port_cp[0] | 3-bit field indicating number of audio-capable display outputs | xxx | n/a |

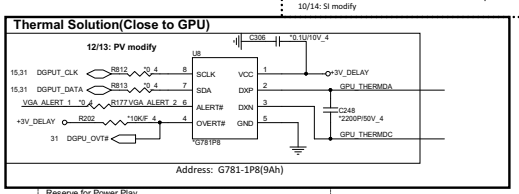
BIT5 => BIT1

| | | |
|---|---|---|
| PS0 | => | 11001 |
| PS1 | => | 00001 |
| PS2 | => | 00000 |
| PS3 | => | 11000 |

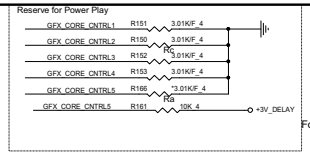
| VENDOR | R231 | R232 |
|---|---|---|
| HYNIX 2G | NA | 4.75K |
| MICRON 2G | 8.45K | 2K |
| SAM 2G | 4.53K | 2K |
| HYNIX 1G | 6.98K | 4.99K |
| MICRON 1G | 4.53K | 4.99K |
| SAM 1G | 3.24K | 5.62K |

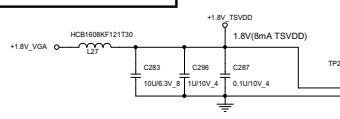



**Thermal Solution(Close to GPU)**

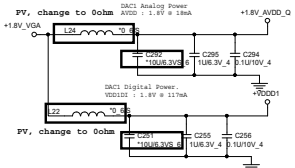



Reserve for Power Play




For Mars: Stuff Ra, Rc=> VDDC 1.1V




| PS3 BIT3->BIT1 | ID |
|---|---|
| 000 | 0 |
| 001 | 1 |
| 010 | 2 |
| 011 | 3 |
| 100 | 4 |
| 101 | 5 |

| Memory Type | Configuration | PN | Channel Size |
|---|---|---|---|
| | | | |

For Mars / Sun:NC pin
AL30, AM30, AL29, AM29, AN21, AM21, AK30, AK29

For Sun Only :NC pin
AL27, AM27, AM20, AN20, AN26, AM26, AL19, ,
AM19, AJ30, AJ31

for ES

| | | |
|---|---|---|
| 14,16,18,19,44 | +1.0V_VGA | +1.0V_VGA |
| 11,16,18,19,44 | +1.8V_VGA | +1.8V_VGA |
| 17,18 | +3V_DELAY | +3V_DELAY |

NB5

**PROJECT : R63**
Quanta Computer Inc.

Size: Custom | Document Number: THAMES_Main & GND | Rev: 1A

Date: Friday, December 21, 2012 | Sheet 15 of 44

Fo Mars/ Sun
Change La, Lb
Bead to 0 ohm

| Memory Type | |
|---|---|
| DDR3 | 27-MHz (± 30 ppm) crystal connected to XTALIN/XTALOUT, or 27-MHz (1.8 V) oscillator connected to XTALIN. |
| GDDR5 | 27-MHz (3.3 V) oscillator connected to XO_IN, and 100-MHz (3.3 V) oscillator connected to XO_IN2. (By default, this clock should not be spread since internal spreading is used.) |

La
+1.8V_VGA L23 *0_6/S +1.8V_DPLL_PVDD
C259 10U/6.3V_8 C264 1U/6.3V_4 C265 0.1U/10V_4
Display Phase Lock Loop Power
DPLL_PVDD : 1.8V @ 75mA

Lb
+1.8V_VGA L21 *0_6/S +1.0V_DPLL_VDDC
1.0V(125mA DPLL_VDDC)
C253 10U/6.3V_8 C269 1U/6.3V_4 C267 0.1U/10V_4
DPLL_PVSS
+1.0V_DPLL_VDDC
DPLL_VDDC : 0.935V @ 140mA

+1.8V_VGA L35 HCB1608KF-471T10 +1.8V_MPLL_PVDD
C441 10U/6.3V_8 C437 1U/6.3V_4 C438 0.1U/10V_4
+1.8V_MPLL_PVDD
MPLL_PVDD : 1.8V @ 150mA

+1.8V_VGA L16 FCM1005KF-121T03 +1.8V_SPLL_PVDD
C167 10U/6.3V_8 C176 1U/6.3V_4 C191 0.1U/10V_4
+1.8V_SPLL_PVDD
SPLL_PVDD : 1.8V @ 75mA

+1.0V_VGA L19 HCB1608KF-471T10 +1.0V_SPLL_VDDC
1.0V(125mA DPLL_VDDC)
C181 10U/6.3V_8 C222 1U/6.3V_4 C216 0.1U/10V_4
SPLL_PVSS
+1.0V_SPLL_VDDC
SPLL_VDDC : 0.935V @ 150mA

DPEF_VDD18
R212 Ra *0_4
R249 Rb *0_4
reserve Ra, Rb for future ASIC

10/14: SI modify

U26I
PART 9 OF 9
AM32 DPLL_PVDD
AN31 DPLL_VDDC
AN32 DPLL_PVSS
H7 MPLL_PVDD
H8 MPLL_PVDD
AM10 SPLL_PVDD
AN9 SPLL_VDDC
AN10 SPLL_PVSS
AF30 NC_XTAL_PVDD
AF31 NC_XTAL_PVSS
PLLS/XTAL
SUN_M2_XT

XTALIN AV33 *0_4 R792 EVGA-XTALI
XTALOUT AU34 *0_4 R793 EVGA-XTALO
0_4 R759 CLKGEN_27M 11
R207 *10M_6 Y2 *7A27000010
*22P/50V_4 C244
*22P/50V_4 C245
11/29: Pre PV modify

XO_IN AW34 TP129
12/13: PV modify del

XO_IN2 AW35 R487 *0_4

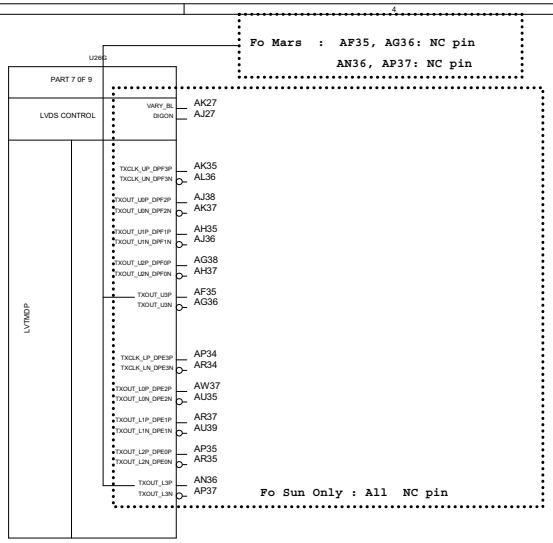
CLKTESTA AK10 CLKTESTA
CLKTESTB AL10 CLKTESTB
C193 *0.1U/10V_4 C227 *0.1U/10V_4
R171 *51.1/F_4 R181 *51.1/F_4
Debug only
for clock observation,
if not needed, DNI
route 50ohms
single-ended/
100ohms diff and keep short

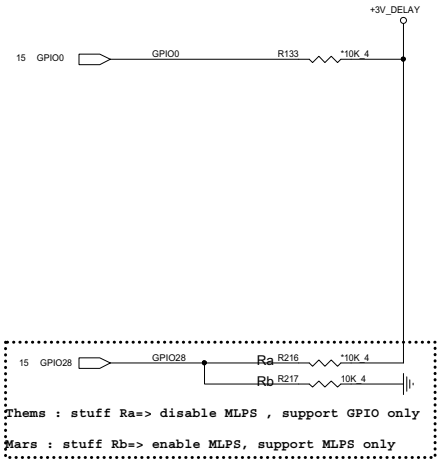
U26F
PART 6 OF 9
AB39 E39 F34 F39 G33 G34 H31 H34 H39 J31 J34 K31 K34 K39 L31 L34 M34 M39 N31 N34 P31 P34 P39 R34 T31 T34 T39 U31 U34 V34 V39 W31 W34 Y34 Y39 PCIE_VSS
F15 F17 F19 F21 F23 F25 F27 F29 F31 F33 F7 F9 G2 G6 H9 J2 J27 J6 J8 K14 K7 L11 L17 L2 L22 L24 L6 M17 M22 M24 N16 N18 N2 N21 N23 N26 N6 R15 R17 R2 R20 R22 R24 R27 R6 T11 T13 T16 T18 T21 T23 T26 U15 U17 U2 U20 U22 U24 U27 U6 V11 V16 V18 V21 V23 V26 W2 W6 Y15 Y17 Y20 Y22 Y24 Y27 GND
A3 A37 AA16 AA18 AA2 AA21 AA23 AA26 AA28 AA6 AB12 AB15 AB17 AB20 AB22 AB24 AB27 AC11 AC13 AC16 AC18 AC2 AC21 AC23 AC26 AC28 AC5 AD15 AD17 AD20 AD22 AD24 AD27 AD9 AE2 AE6 AF10 AF16 AF18 AF21 AG17 AG2 AG20 AG22 AG6 AG9 AH21 AJ10 AJ11 AJ2 AJ28 AJ6 AK11 AK31 AK7 AL11 AL14 AL17 AL2 AL20 AL23 AL26 AL32 AL6 AL8 AM11 AM31 AM9 AN11 AN2 AN30 AN6 AN8 AP11 AP7 AP9 AR5 B11 B13 B15 B17 B19 B21 B23 B25 B27 B29 B31 B33 B7 B9 C1 C39 E35 E5 F11 F13 GND
A39 AW1 AW39 VSS_MECH
SUN_M2_XT

AG22 is nc pin

14,18,19,44 +1.0V_VGA +1.0V_VGA
11,15,18,19,44 +1.8V_VGA +1.8V_VGA

PROJECT : R63
Quanta Computer Inc.
NB5
Size: Custom | Document Number: THAMES_XTAL | Rev: 1A
Date: Friday, December 21, 2012 | Sheet 16 of 44




| CONFIGURATION STRAPS -- SEE EACH DATABOOK FOR STRAP DETAILS<br>ALLOW FOR PULLUP PADS FOR THESE STRAPS AND IF THESE GPIOS ARE USED,<br>THEY MUST NOT CONFLICT DURING RESET | | | | |
|---|---|---|---|---|
| STRAPS | MLPS | GPIO PIN | DESCRIPTION OF DEFAULT SETTINGS | Default Setting |
| MLPS_DISABLE | NA | GPIO_28_FDO | Enable MLPS, NA for Thames/Whistler/Seymour<br>0: Enable MLPS, disable GPIO PINSTRAP<br>1: Disable MLPS, enable GPIO PINSTRAP | X |
| TX_PWRS_ENB | PS_1[4] | GPIO0 | Transmitter Power Savings Enable<br>0: 50% Tx output swing<br>1: Full Tx output swing | X |
| TX_DEEMPH_EN | PS_1[5] | GPIO1 | PCIE Transmitter De-emphasis Enable<br>0: Tx de-emphasis disabled<br>1: Tx de-emphasis enabled | X |
| BIF_GEN3_EN_A | PS_1[1] | GPIO2 | PCIE Gen3 Enable (NOTE: RESERVED for Thames/Whistler/Seymour)<br>0: GEN3 not supported at power-on<br>1: GEN3 supported at power-on | 1 |
| BIF_VGA DIS | PS_2[4] | GPIO9 | VGA Control<br>0: VGA controller capacity enabled<br>1: VGA controller capacity disabled (for multi-GPU) | 0 |
| ROMIDCFG[2:0] | PS_0[3..1] | GPIO[13:11] | Serial ROM type or Memory Aperture Size Select<br><br>If GPIO22 = 0, defines memory aperture size<br>If GPIO22 = 1, defines ROM type<br>100 - 512Kbit M25P05A (ST)<br>101 - 1Mbit M25P10A (ST)<br>101 - 2Mbit M25P20 (ST)<br>101 - 4Mbit M25P40 (ST)<br>101 - 8Mbit M25P80 (ST)<br>100 - 512Kbit Pm25LV512 (Chingis)<br>101 - 1Mbit Pm25LV010 (Chingis) | XXX |
| BIOS_ROM_EN | PS_2[3] | GPIO22 | Enable external BIOS ROM device<br>0: Disabled<br>1: Enabled | X |
| AUD[1]<br>AUD[0] | NA<br>NA | HSYNC<br>VSYNC | 00 - No audio function<br>01 - Audio for DP only<br>10 - Audio for DP and HDMI if dongle is detected<br>11 - Audio for both DP and HDMI<br>HDMI must only be enabled on systems that are legally entitled, It is the responsibility of the system designer to ensure that the system is entitled to support this feature. | XX |
| CEC_DIS | PS_0[4] | GENLK_VSYNC | Enable CEC function. Reserved for Thames/Whistler/Seymour<br>0: Disabled<br>1: Enabled | X |
| | | | NOTE: ALLOW FOR PULLUP PADS FOR THE RESERVED STRAPS BUT DO NOT INSTALL RESISTOR IF THESE GPIOS ARE USEED, THEY MUST KEEP LOW AND NOT CONFLICT DURING RESET | |
| RESERVED<br>RESERVED<br>RESERVED<br>RESERVED | PS_1[3]<br>PS_1[2]<br>NA<br>NA | GENLK_CLK<br>GPIO8<br>GPIO21<br>GENERICC | Reserved<br>Reserved<br>Reserved<br>Reserved (for Thames/Whistler/Seymour only) | 0<br>0<br>0<br>0 |
| AUD_PORT_CONN_PINSTRAP[2]<br>AUD_PORT_CONN_PINSTRAP[1]<br>AUD_PORT_CONN_PINSTRAP[0] | PS_3[5]<br>PS_3[4]<br>PS_0[5] | NA<br>NA<br>NA | STRAPS TO INDICATE THE NUMBER OF AUDIO CAPABLE DISPLAY OUTPUTS<br>111 = 0 usable endpoints<br>110 = 1 usable endpoints<br>101 = 2 usable endpoints<br>100 = 3 usable endpoints<br>011 = 4 usable endpoints<br>010 = 5 usable endpoints<br>001 = 6 usable endpoints<br>000 = all endpoints are usable | XXX |

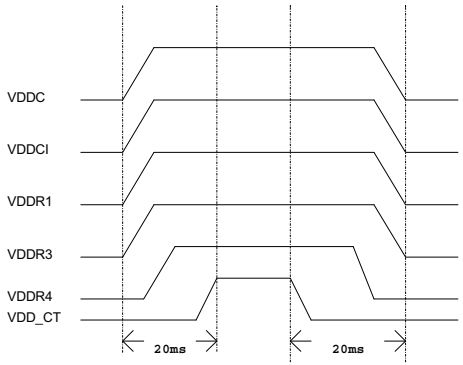
for HD

## Memory Aperture size

| GPIO9 BIOSROM | | GPIO13 ROMIDCFG2 | GPIO12 ROMIDCFG1 | GPIO11 ROMIDCFG0 | |
|---|---|---|---|---|---|
| 0 | 128M | 0 | 0 | 0 | +VGA_CORE |
| 0 | 256M | 0 | 0 | 1 | +VGA_CORE |
| 0 | 64M | 0 | 1 | 0 | +1.5V_VGA |
| 0 | 32M | 0 | 1 | 1 | +3.3V_Delay |
| 0 | 512M | 1 | 0 | 0 | +1.8V_VGA |
| 0 | 1G | 1 | 0 | 1 | +1.8V_VGA |
| 0 | 2G | 1 | 1 | 0 | |
| 0 | 4G | 1 | 1 | 1 | |

It is a shared pin strap with CONFIG[2:0] if BIOS_ROM_EN is set to 0.

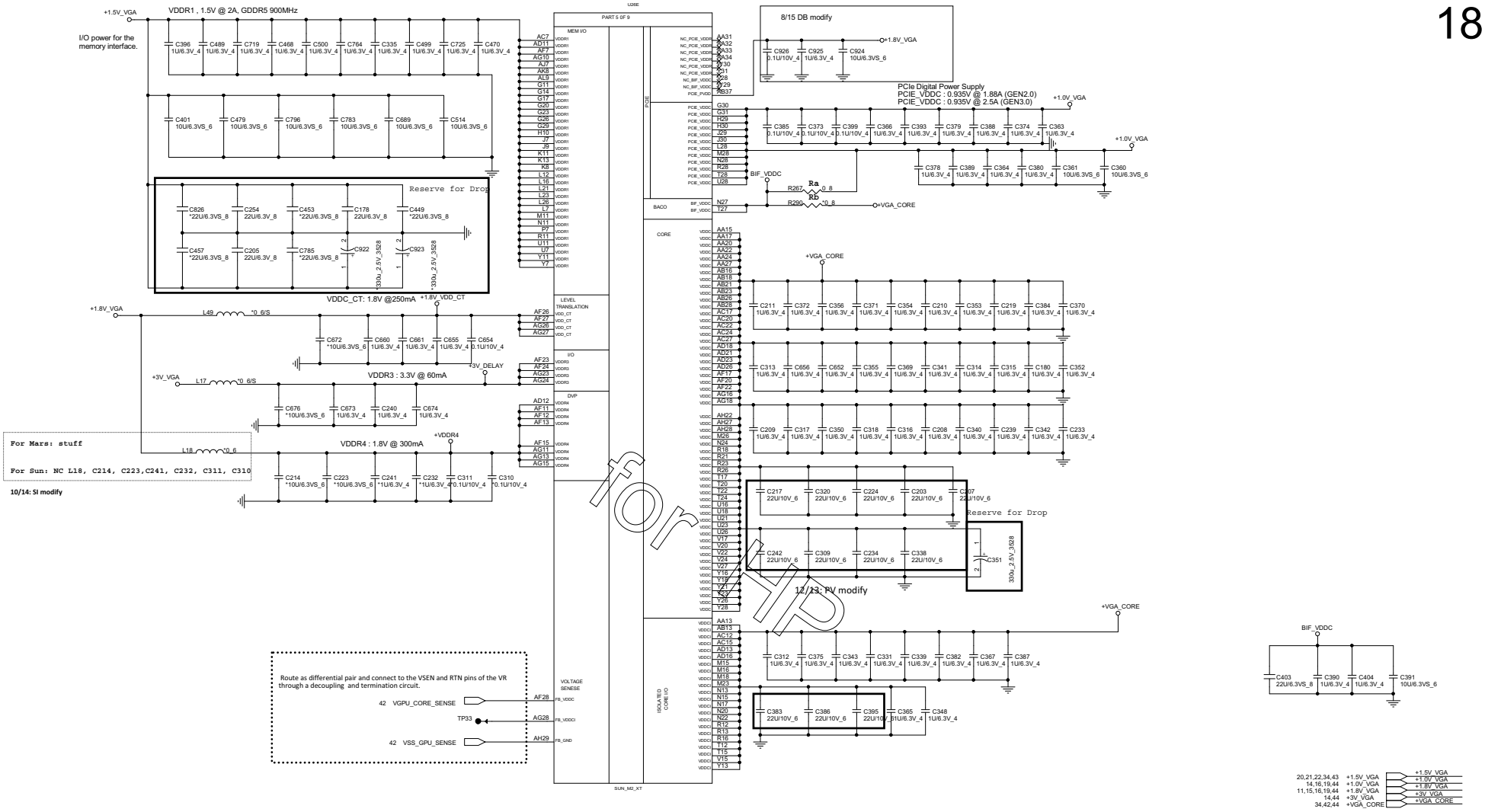
## Power Up/Down Sequence




NB5

**PROJECT : R63**
Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | THAMES_LVDS / STRAP | 1A |
| Date: Friday, December 21, 2012 | Sheet 17 of 44 | |




Support BACO Mode

Notel. 1. No BACO Support :BIF_VDDC shorts with VDDC (Install Ra)

2. BACO Support: Refer to the BACO reference schematics/Application note for detail about BIF_VDDC Rail if BACO is Supported (Uninstall Ra)

PX_EN = 0, for Normal Operation
PX_EN = 1, for BACO MODE

| | |
|---|---|
| PROJECT : R63 | |
| Quanta Computer Inc. | |
| NB5 | Size: Custom; Document Number: THAMES_Power & BACO; Rev: 1A |
| Date: Friday, December 21, 2012 | Sheet 18 of 44 |

For Mars : L20 sutff

For Sun: L20 , C247 , C246 , C252 NC

+1.0V_VGA

DPAB_VDD10

L20 *0_6

C247 *0.1U/10V_4

C246 *1U/6.3V_4

C252 *10U/6.3VS_6

10/14: SI modify

U26H

PART 8 0F 9

DP_VDDR

DP_VDDC

DP_VDDC AP31
DP_VDDC AP32
DP_VDDC AN33
DP_VDDC AP33

DP_VDDC AP13
DP_VDDC AT13
DP_VDDC AP14
DP_VDDC AP15

DP_VDDC AL33
DP_VDDC AM33
DP_VDDC AK33
DP_VDDC AK34

AN24 DP_VDDR
AP24 DP_VDDR
AP25 DP_VDDR
AP26 DP_VDDR
AU28 DP_VDDR
AV29 DP_VDDR

AP20 DP_VDDR
AP21 DP_VDDR
AP22 DP_VDDR
AP23 DP_VDDR
AU18 DP_VDDR
AV19 DP_VDDR

10/14: SI modify

For Mars : L26 sutff

For Sun: L26 , C279 , C281 , C282 NC

+1.8V_VGA

L26 *0_6

DPEF_VDD18

C279 *10U/6.3VS_6

C281 *1U/6.3V_4

C282 *0.1U/10V_4

AH34 DP_VDDR
AJ34 DP_VDDR
AF34 DP_VDDR
AG34 DP_VDDR
AM37 DP_VDDR
AL38 DP_VDDR

10/14: SI modify

DPEF_VDD10

C291 *0.1U/10V_4

C290 *1U/6.3V_4

C293 *10U/6.3VS_6

+1.0V_VGA

L25 *0_6

For Mars : L25 sutff

For Sun : L25/ C293/C290/C291 NC

DP GND

DP_VSSR AN27
DP_VSSR AP27
DP_VSSR AP28
DP_VSSR AW24
DP_VSSR AW26
DP_VSSR AN29
DP_VSSR AP29
DP_VSSR AP30
DP_VSSR AW30
DP_VSSR AW32
DP_VSSR AN17
DP_VSSR AP16
DP_VSSR AP17
DP_VSSR AW14
DP_VSSR AW16
DP_VSSR AN19
DP_VSSR AP18
DP_VSSR AP19
DP_VSSR AW20
DP_VSSR AW22
DP_VSSR AN34
DP_VSSR AP39
DP_VSSR AR39
DP_VSSR AU37
DP_VSSR AF39
DP_VSSR AH39
DP_VSSR AK39
DP_VSSR AL34
DP_VSSR AV27
DP_VSSR AR28
DP_VSSR AV17
DP_VSSR AR18
DP_VSSR AN38
DP_VSSR AM35

CALIBRATION

AW28 DPAB_CALR

AW18 DPCD_CALR

AM39 DPEF_CALR

10/14: SI modify

R495 *150/F_4

For Mars : R495 sutff

For Sun : R495 NC

10/14: SI modify DEL R754

For Mars : R754 sutff

For Sun : R754 NC

SUN_M2_XT

14,16,18,44 +1.0V_VGA
11,15,16,18,44 +1.8V_VGA

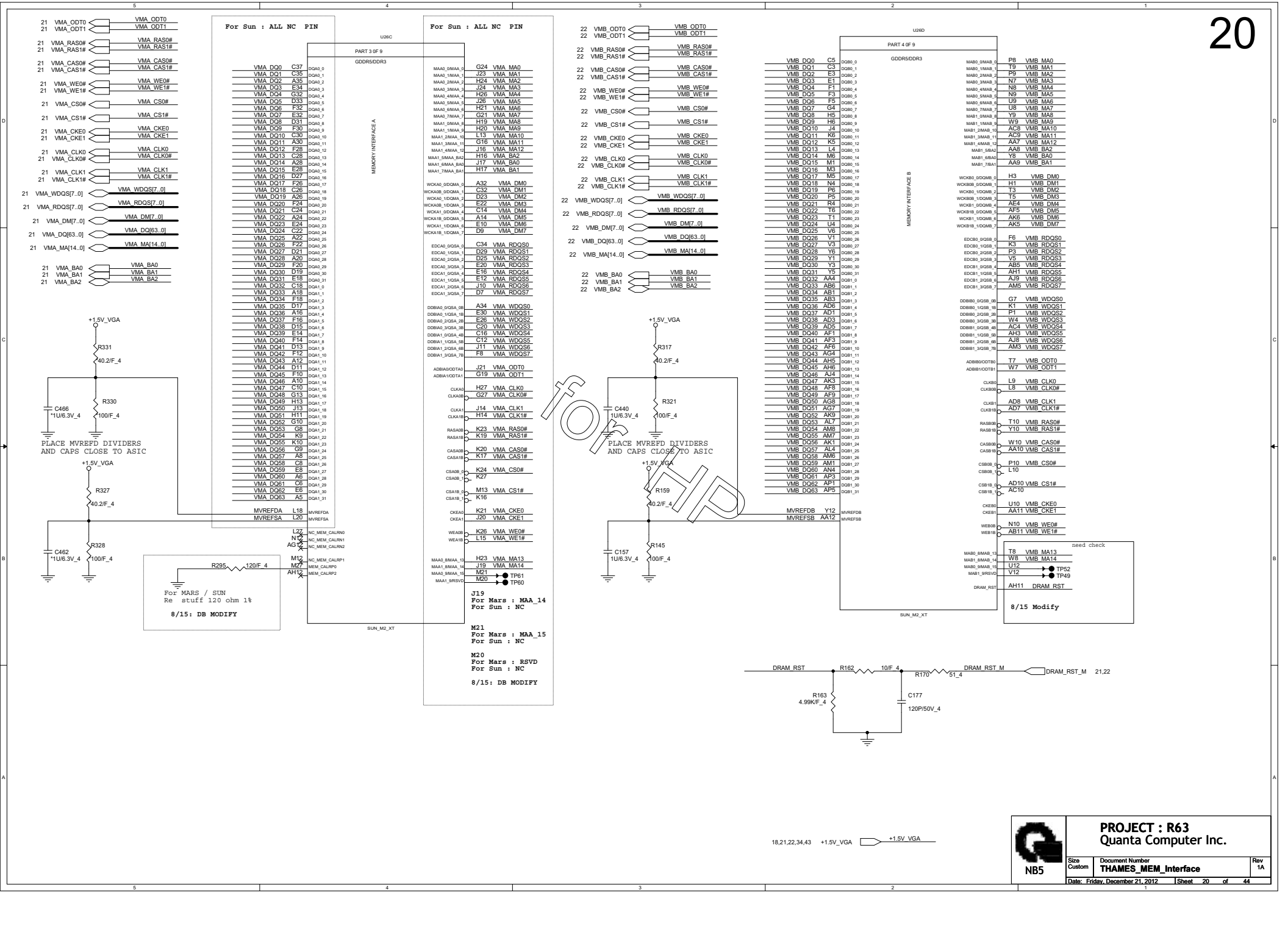
+1.0V_VGA
+1.8V_VGA

for PDR

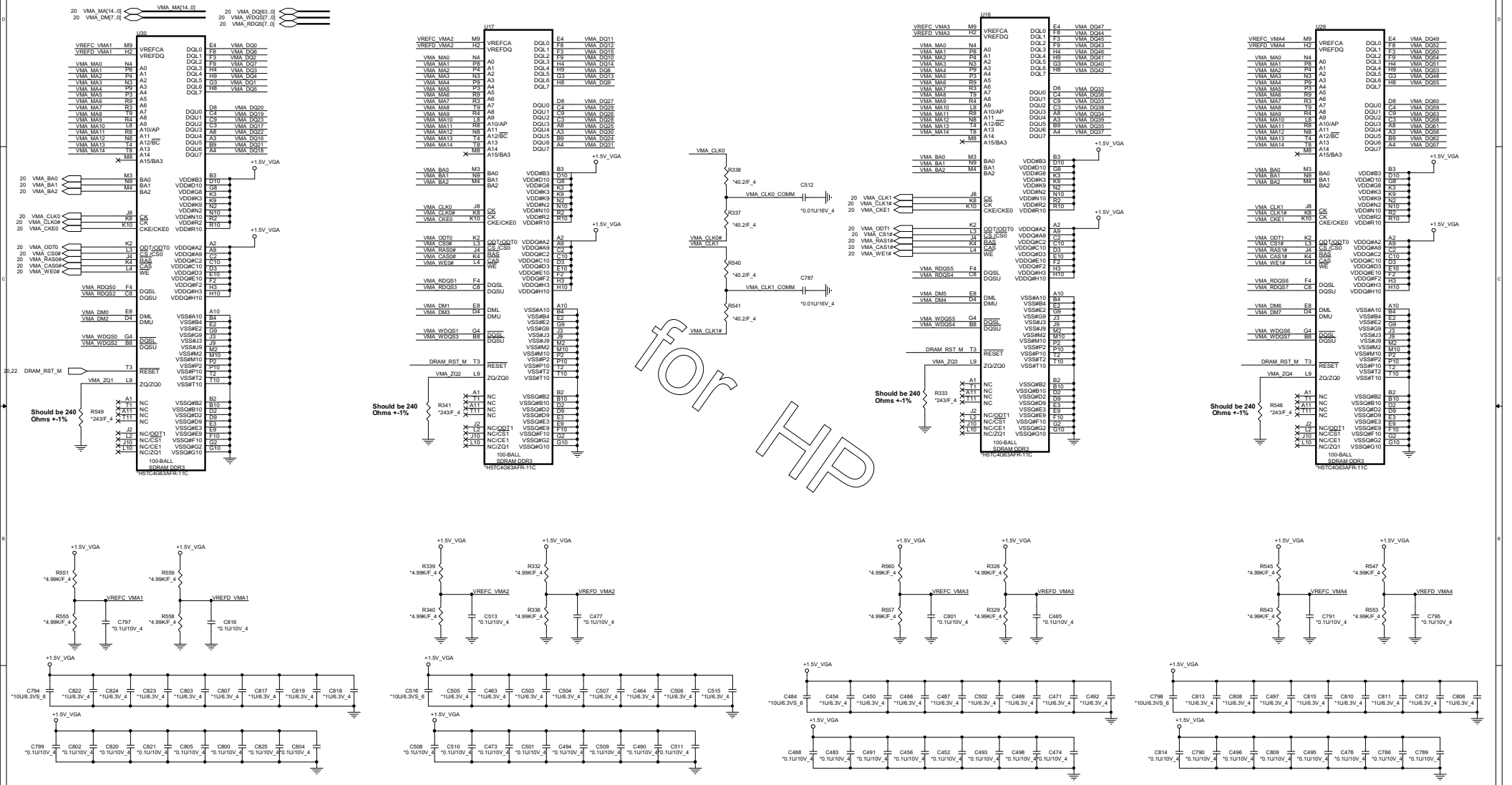
NB5

**PROJECT : R63**
Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | THAMES_DP Powers | 1A |
| Date: Friday, December 21, 2012 | Sheet 19 of 44 | |


For Sun : ALL NC PIN
U26C
PART 3 OF 9
GDDR5/DDR3
MEMORY INTERFACE A
For Sun : ALL NC PIN
U26D
PART 4 OF 9
GDDR5/DDR3
MEMORY INTERFACE B
SUN_M2_XT
PLACE MVREFD DIVIDERS AND CAPS CLOSE TO ASIC
For MARS / SUN
Re stuff 120 ohm 1%
8/15: DB MODIFY
J19
For Mars : MAA_14
For Sun : NC
M21
For Mars : MAA_15
For Sun : NC
M20
For Mars : RSVD
For Sun : NC
8/15: DB MODIFY
need check
8/15 Modify
NB5
PROJECT : R63
Quanta Computer Inc.
THAMES_MEM_Interface
Date: Friday, December 21, 2012
Sheet 20 of 44

# CHANNEL A: 256MB/512MB DDR3





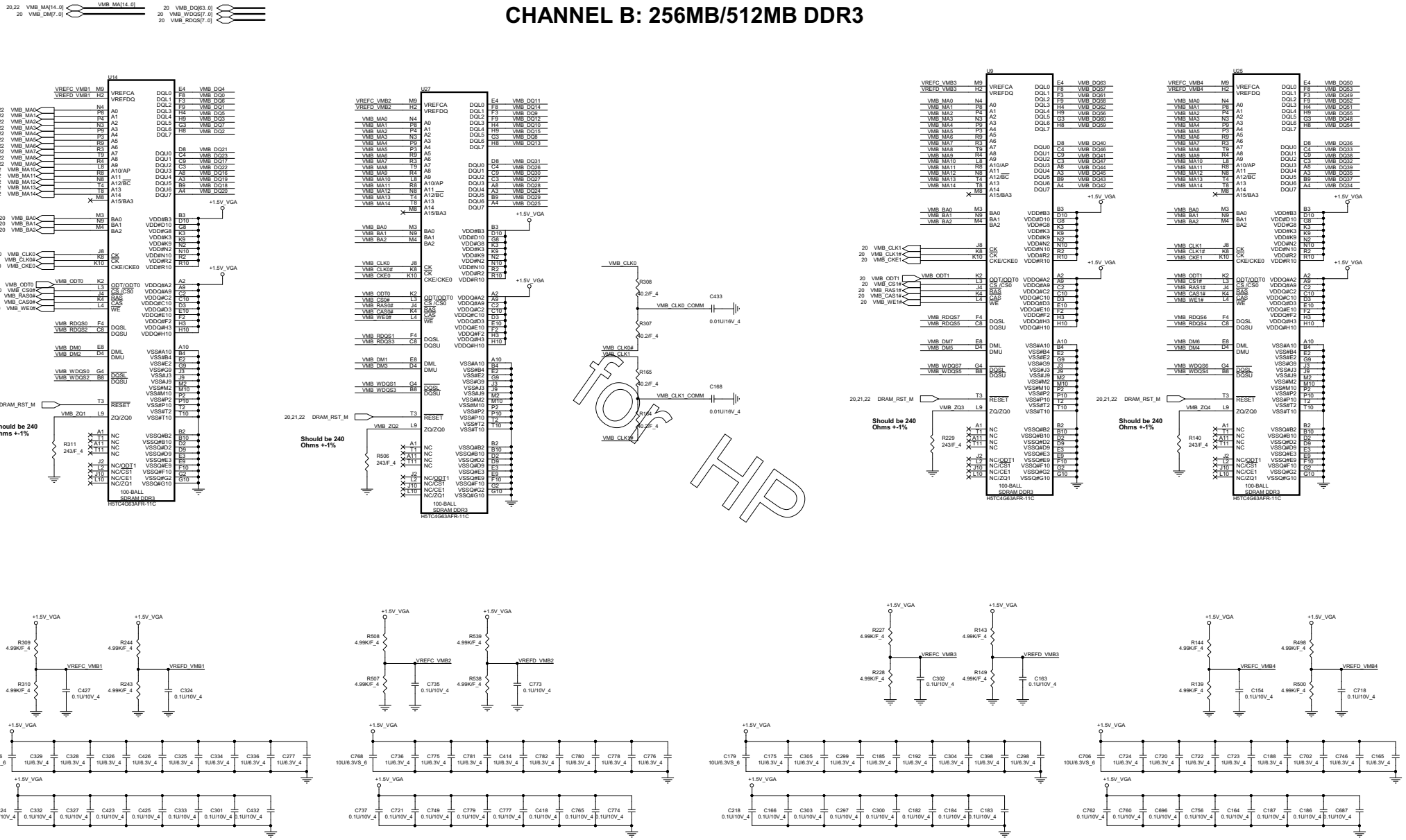





18,20,22,34,43 +1.5V_VGA → +1.5V_VGA

| | |
|---|---|
| PROJECT : R63 | |
| Quanta Computer Inc. | |
| NB5 | |
| Size: Custom | Document Number: VRAM-A (DDR3 BGA96) Rev: 3A |
| Date: Friday, December 21, 2012 | Sheet 21 of 44 |

# CHANNEL B: 256MB/512MB DDR3



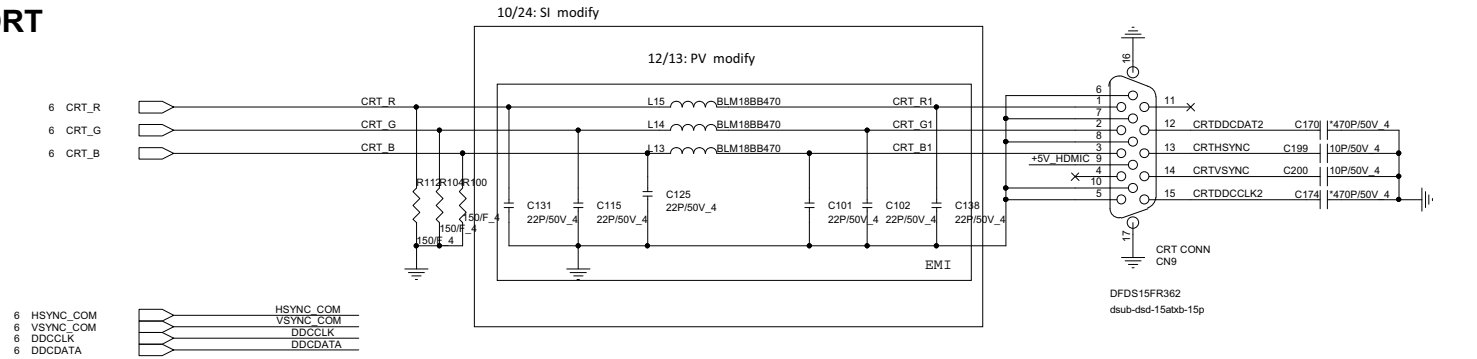

for HP

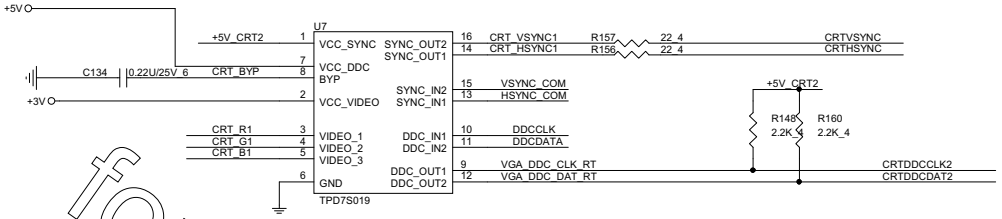
18,20,21,22,34,43 +1.5V_VGA +1.5V_VGA

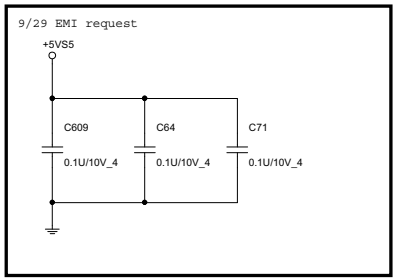
18,20,21,22,34,43 +1.5V_VGA +1.5V_VGA

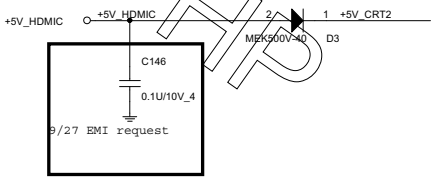
| | | |
|---|---|---|
| NB5 | PROJECT : R63<br>Quanta Computer Inc. | |
| | Size: Custom<br>Document Number: VRAM-B (DDR3 BGA96) | Rev: 1A |
| | Date: Friday, December 21, 2012 Sheet 22 of 44 | |

# CRT PORT



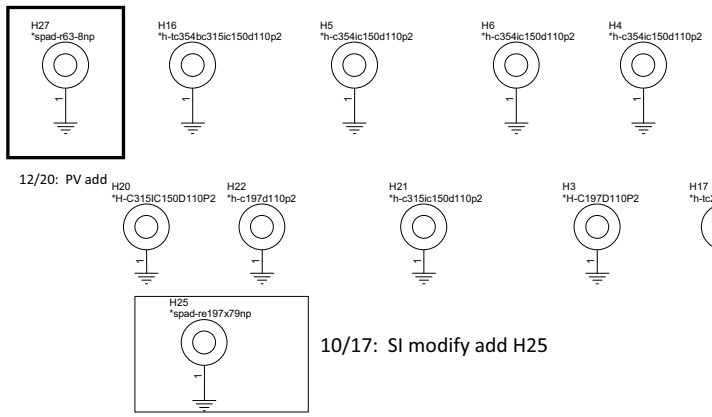



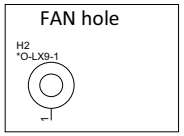



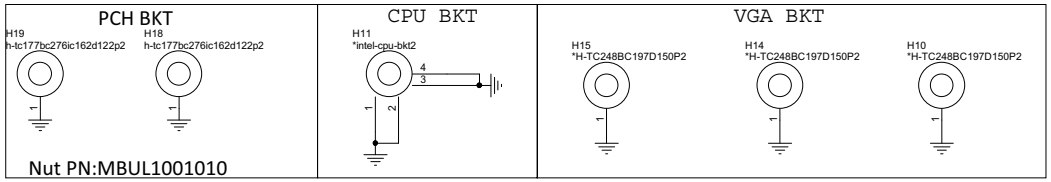



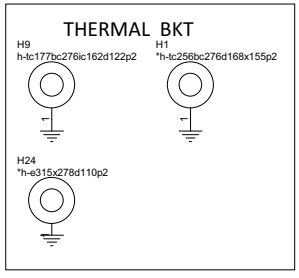

for EVB

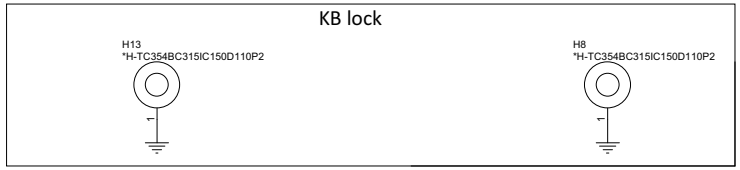
# HOLE



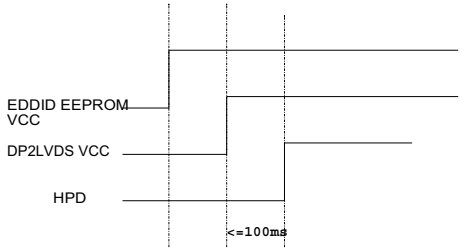




NB5

**PROJECT : R63**
Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | CRT,Hole | 1A |
| Date: Friday, December 21, 2012 | Sheet 23 of 44 | |

# RTD2136S Power Up Sequence 24




Reserve for co layout EDP CON, EDP only please stuff

RTD2136 Dual Channel only

Pine 18: keep 80 Mile Trace

RTD2136R

Reserve

Default

Reserve

12/13: PV modify

IC底部需接GND

Use 1% Res on R2178

L8: need use CV-4709MN00 for Vendor suggestion

keep 80 Mile Trace

Close to Pin22

Close to Pin18
C2142 close to IC side

Close to Pin5

Close to Pin17

Close to Pin43

Close to Pin11

| SWR MODE | LDO MODE |
|---|---|
| Stuff L8 | Stuff R86 |

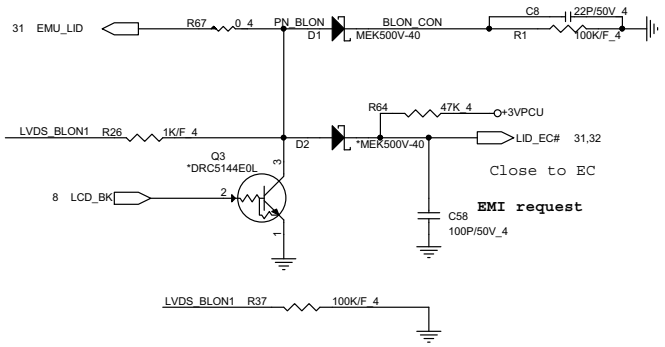
**PROJECT : R63**
Quanta Computer Inc.

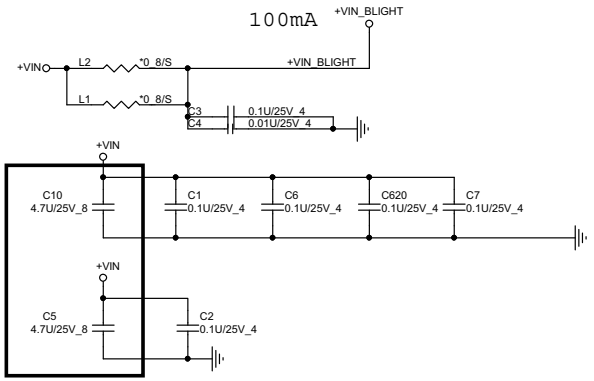
NB5

| Size | Document Number | Rev |
|---|---|---|
| Custom | RTD2136 | 1A |

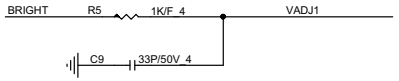
Date: Friday, December 21, 2012 Sheet 24 of 44

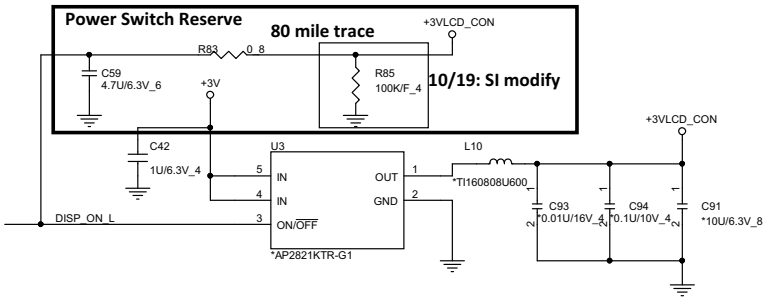
# LID Switch

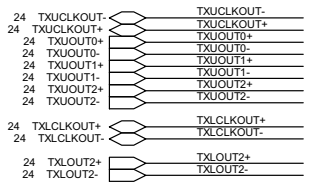


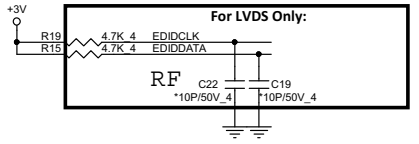



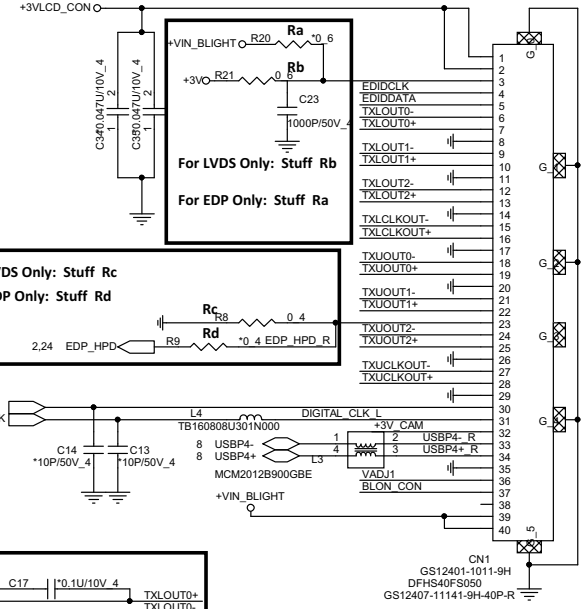

12/17: PV modify pn for 0.85 height

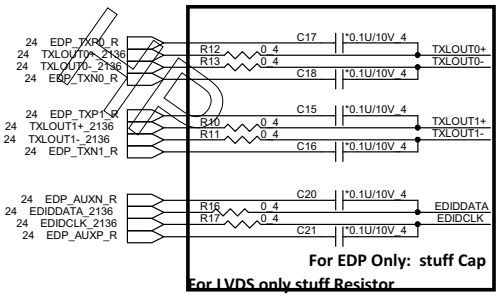


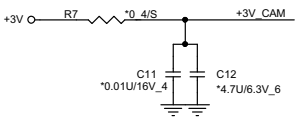



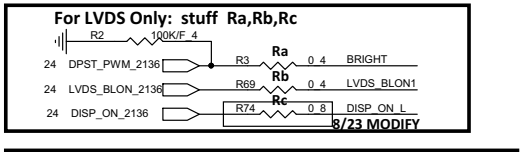



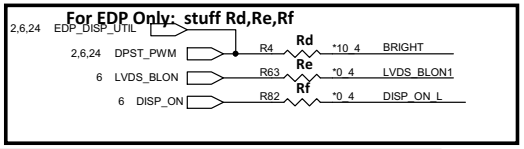



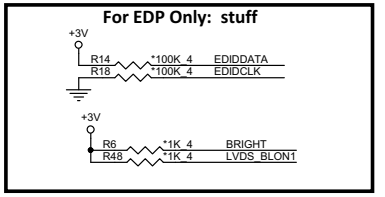



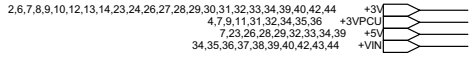




for Review

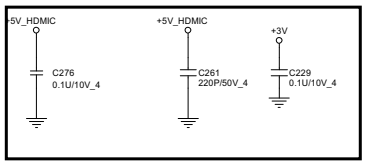
NB5

**PROJECT : R63**
Quanta Computer Inc.

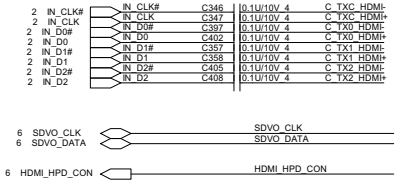
| Size | Document Number | Rev |
|---|---|---|
| Custom | LCD CONN/LID/CAM | 1A |
| Date: Friday, December 21, 2012 | Sheet 25 of 44 | |

7,23,28,29,32,33,34,39 +5V
23 +5V_HDMIC
2,6,7,8,9,10,12,13,14,23,24,25,27,28,29,30,31,32,33,34,39,40,42,44 +3V

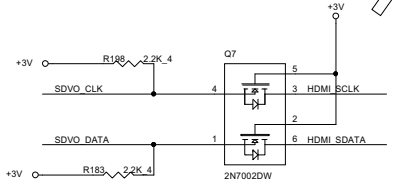
**EMI request**



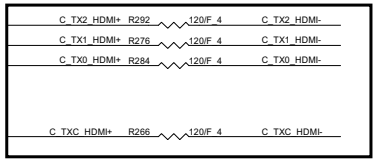

close to HDMI conn

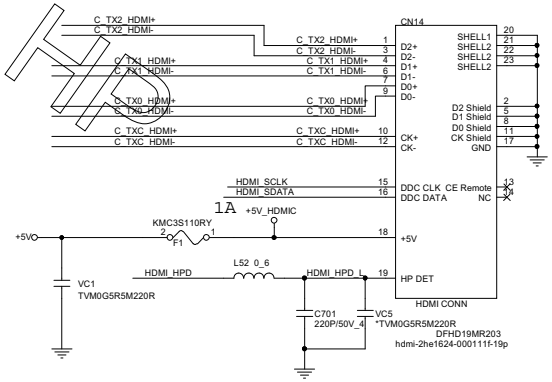


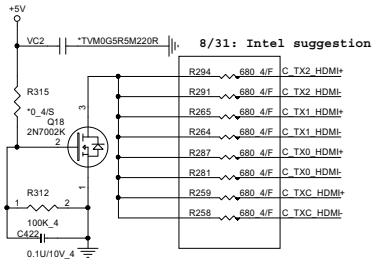

**Close to HDMI Connector**

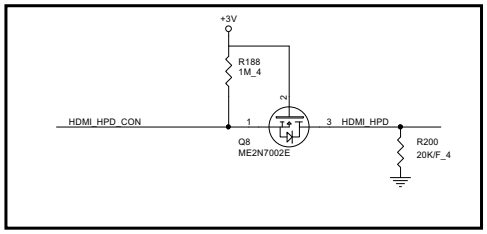


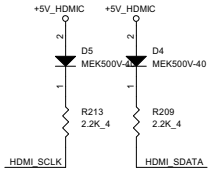

**10/14: SI for EMI request**



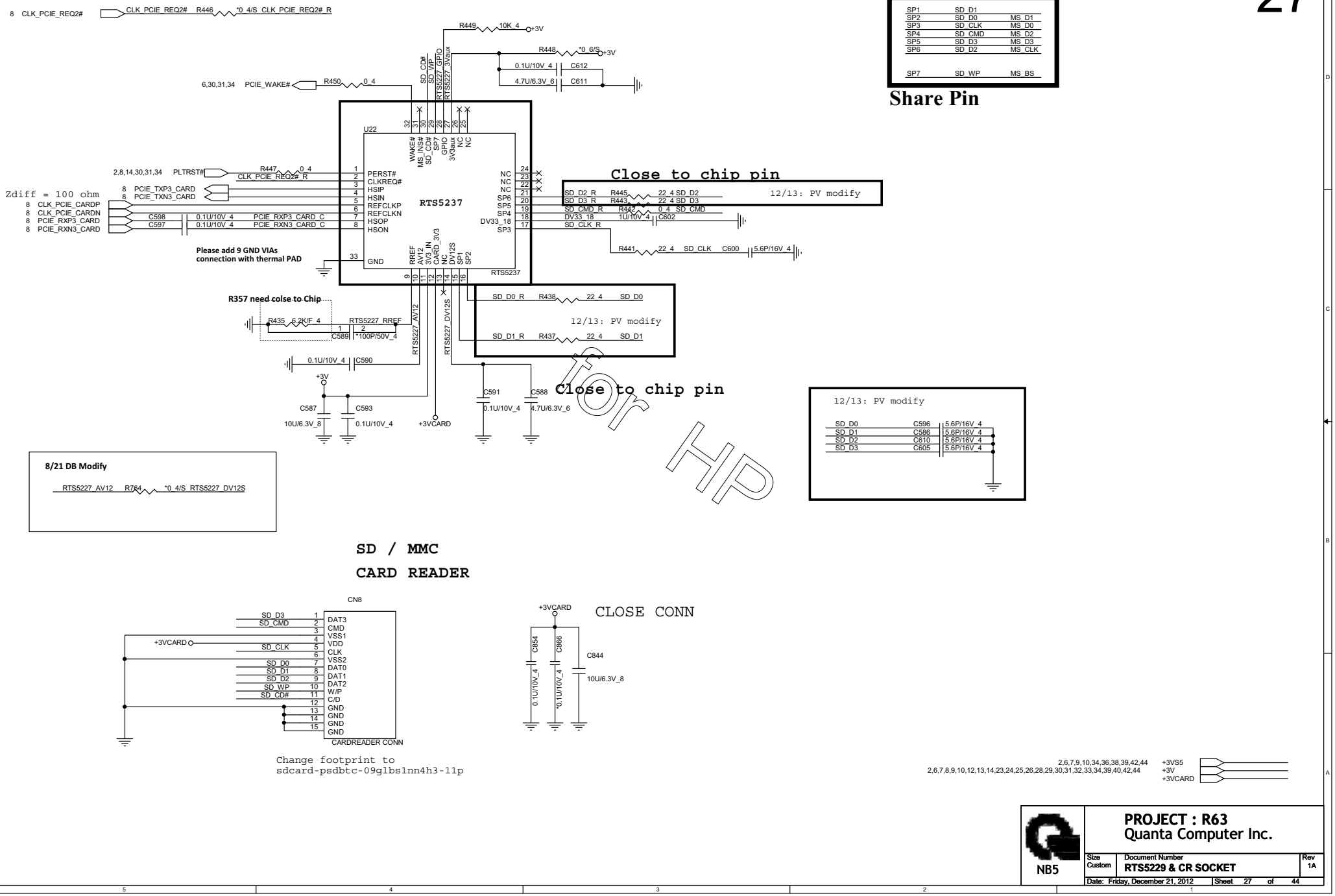




| | | |
|---|---|---|
| NB5 | **PROJECT : R63**<br>Quanta Computer Inc. | |
| | Size: Custom<br>Document Number: **HDMI CONN** | Rev: 1A |
| | Date: Friday, December 21, 2012 | Sheet 26 of 44 |




## SD / MMC
## CARD READER

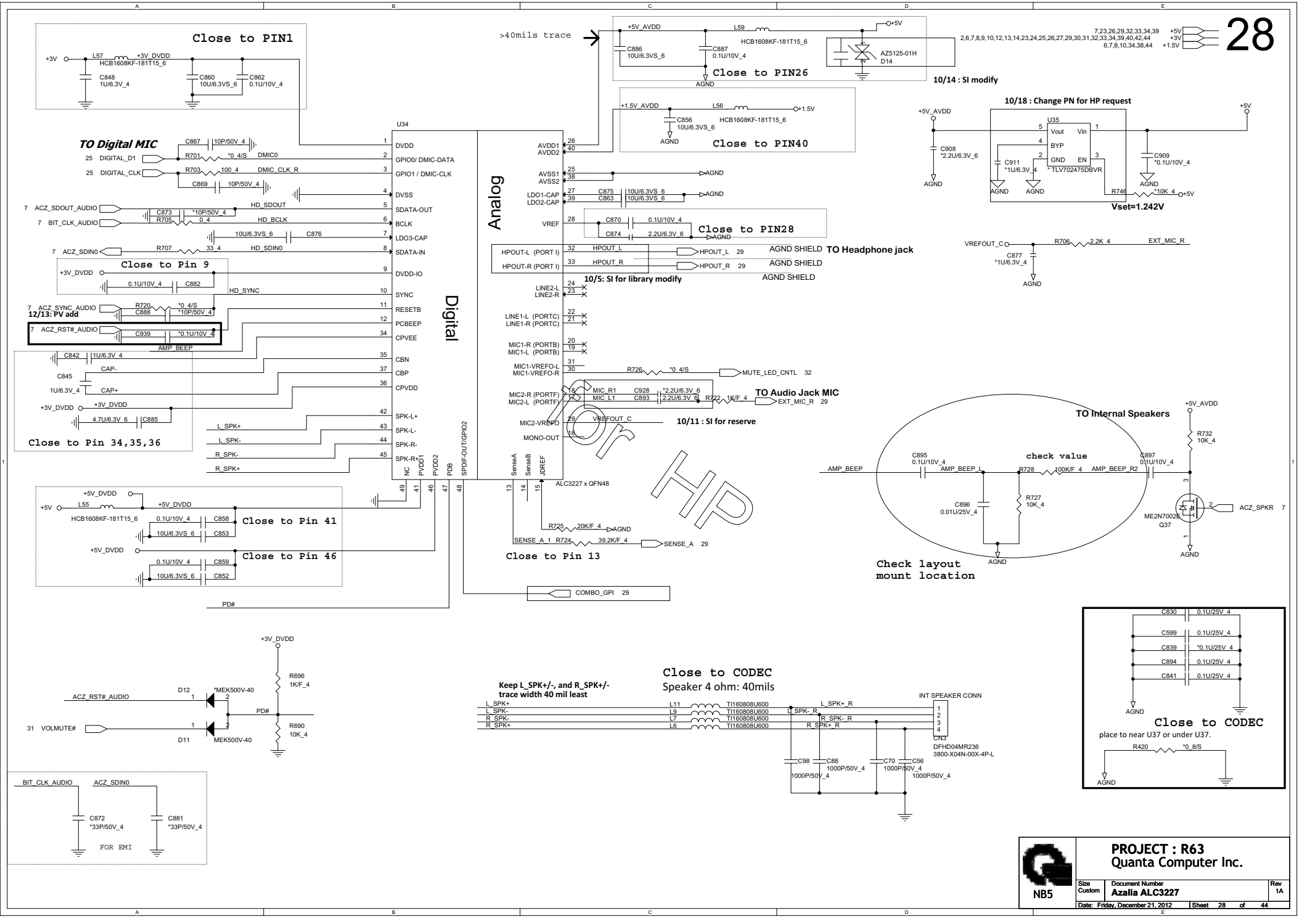



Change footprint to
sdcard-psdbtc-09glbs1nn4h3-11p

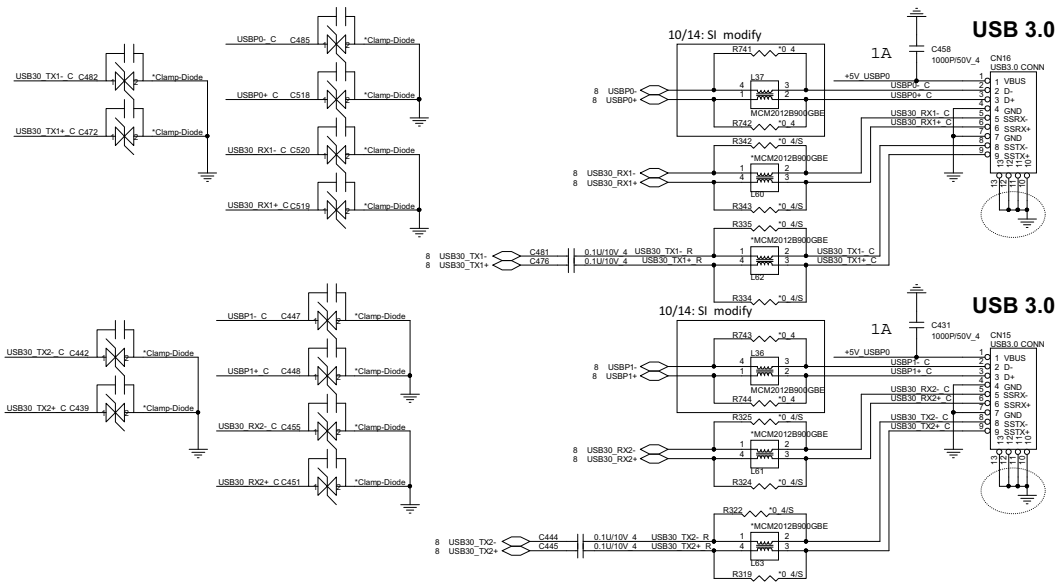



2,6,7,9,10,34,36,38,39,42,44 +3VS5
2,6,7,8,9,10,12,13,14,23,24,25,26,28,29,30,31,32,33,34,39,40,42,44 +3V
+3VCARD

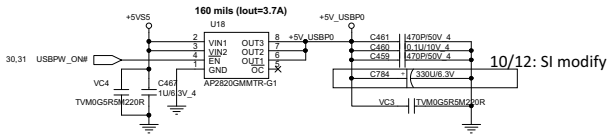
| | | |
|---|---|---|
| NB5 | PROJECT : R63<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: RTS5229 & CR SOCKET | Rev: 1A |
| Date: Friday, December 21, 2012 | Sheet 27 of 44 | |



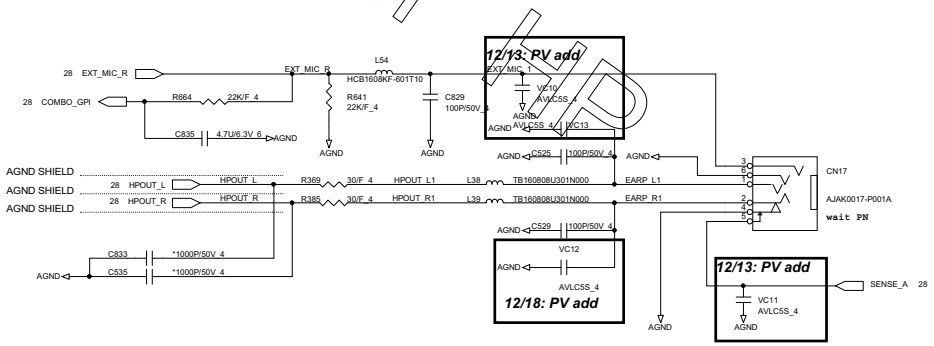

| | | |
|---|---|---|
| NB5 | PROJECT : R63<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: Azalia ALC3227 | Rev: 1A |
| Date: Friday, December 21, 2012 | Sheet 28 of 44 | |




## USB3.0 X 2/USB2.0 COMBO

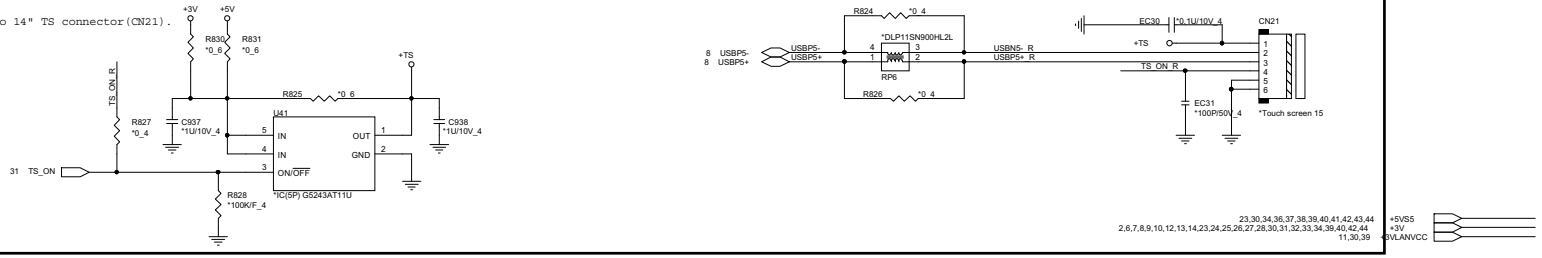



## for COMBO JACK



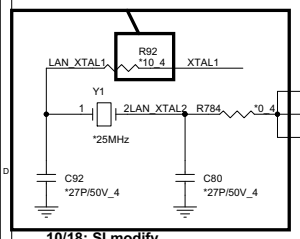

## 12/11: PV add

### Touch Screen Connector




| | | |
|---|---|---|
| NB5 | PROJECT : R63<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: USB/BT/Audio JacK | Rev: 1A |
| Date: Friday, December 21, 2012 | Sheet 29 of 44 | |

For EMI 0 ~ 22 ohm




10/18: SI modify

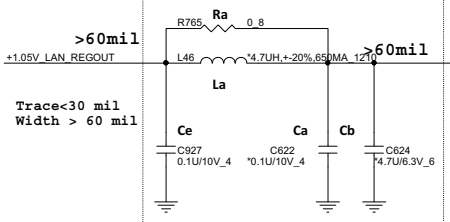
Green Clk

R53 0_4 LAN_XTAL25_IN 11

R89 *22_4 CLK_FLEX1_48M 8

XTAL2

Power trace Layout 寬度> 60mil

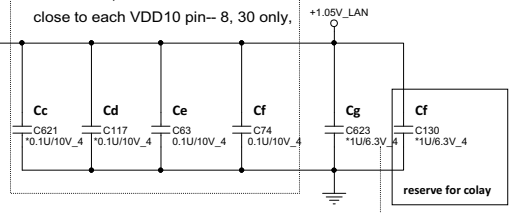



For GbE
Stuff La, Ca ,Cb

For 10/100
NA: La, Ca ,Cb
STUFF : Ra, Ce

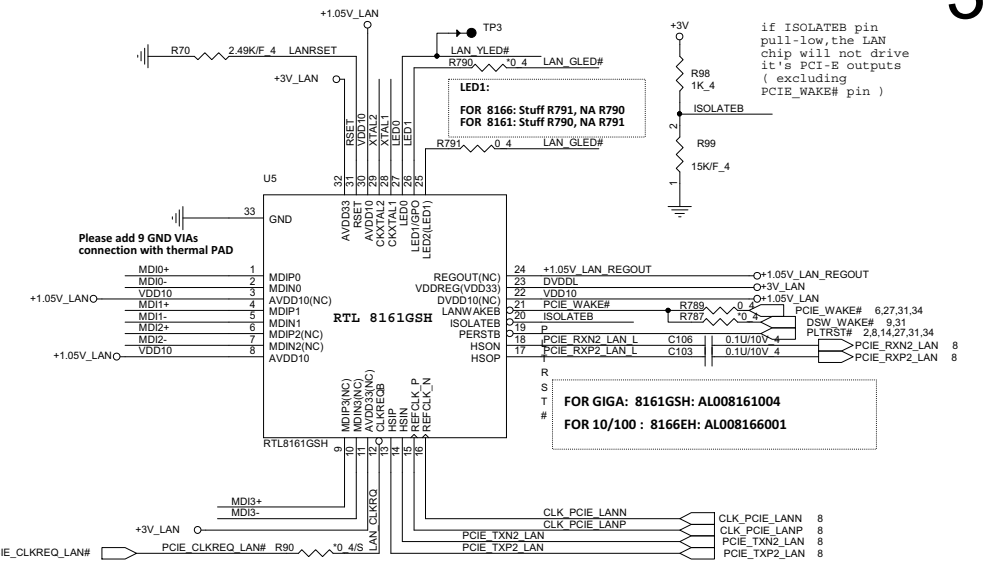
For GbE
* Place Cc,Cd,Ce,Cf
close to each VDD10 pin-- 3, 22, 8 , 30

For 10/100 NA Ce,Cf
* Place Ce , Cf
close to each VDD10 pin-- 8, 30 only,



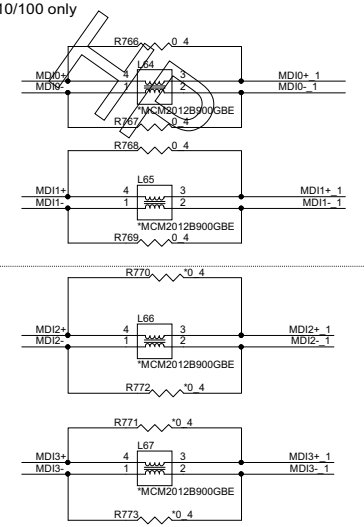

For GbE
* Place Cf close to each VDD10 pin-- 22 (reserve)

For 10/100
* Place Cg close to each VDD10 pin-- 30 (reserve)



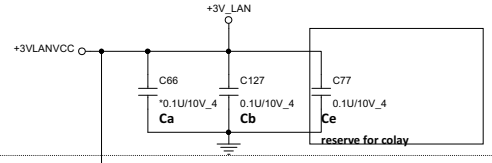

for

For 10/100 only

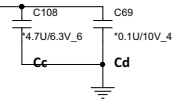



For 10/100
* Stuff Cb and Ce only, close to each VDD33 pin-- 23, 32

For GIGA
* Stuff Ca and Cb only, close to each VDD33 pin-- 11, 32




* Place Cc and Cd close to each VDD33 pin-- 23

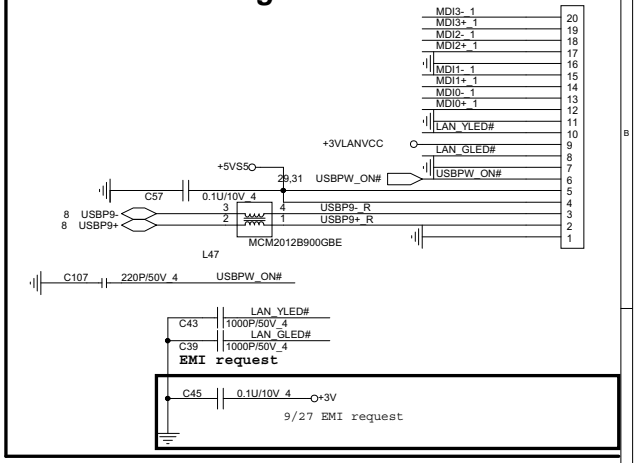



Remove For Not Using SWR mode

For GIGA
Stuff Cc ,Cd

For 10/100
NA: Cc, Cd

## LAN conn Right SIDE USBX1




For GiGA

BOT:GST5009B LF,DB0Z06LAN00

FCE :NS892407 ,DB0LL1LAN00

For 10/100

BOT: TST1284R LF DB0EL5LAN00

FCE :NS892408 ,DB0EF7LAN01

2,6,7,8,9,10,12,13,14,23,24,25,26,27,28,29,31,32,33,34,39,40,42,44 +3V
11,39 +3VLANVCC

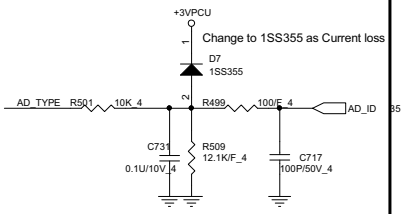
NB5

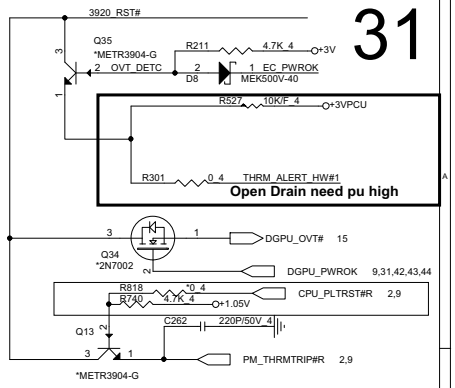
**PROJECT : R63**
**Quanta Computer Inc.**

| Size | Document Number | Rev |
|---|---|---|
| Custom | RTL 8105E/RJ45 | 1A |

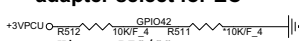
Date: Friday, December 21, 2012 Sheet 30 of 44

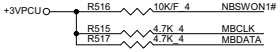
## adapter Type check




## adapter select for EC



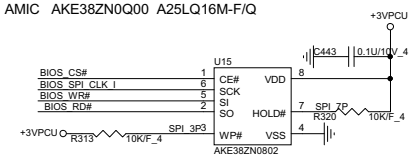




## 2M byte SPI EC ROM

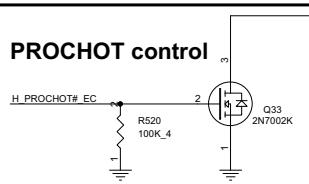
Socket: DFHS08FS023

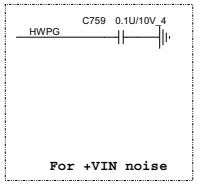
EON AKE38ZN0802 EN25QH16-104HIP

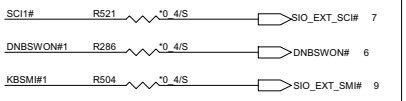
AMIC AKE38ZN0Q00 A25LQ16M-F/Q

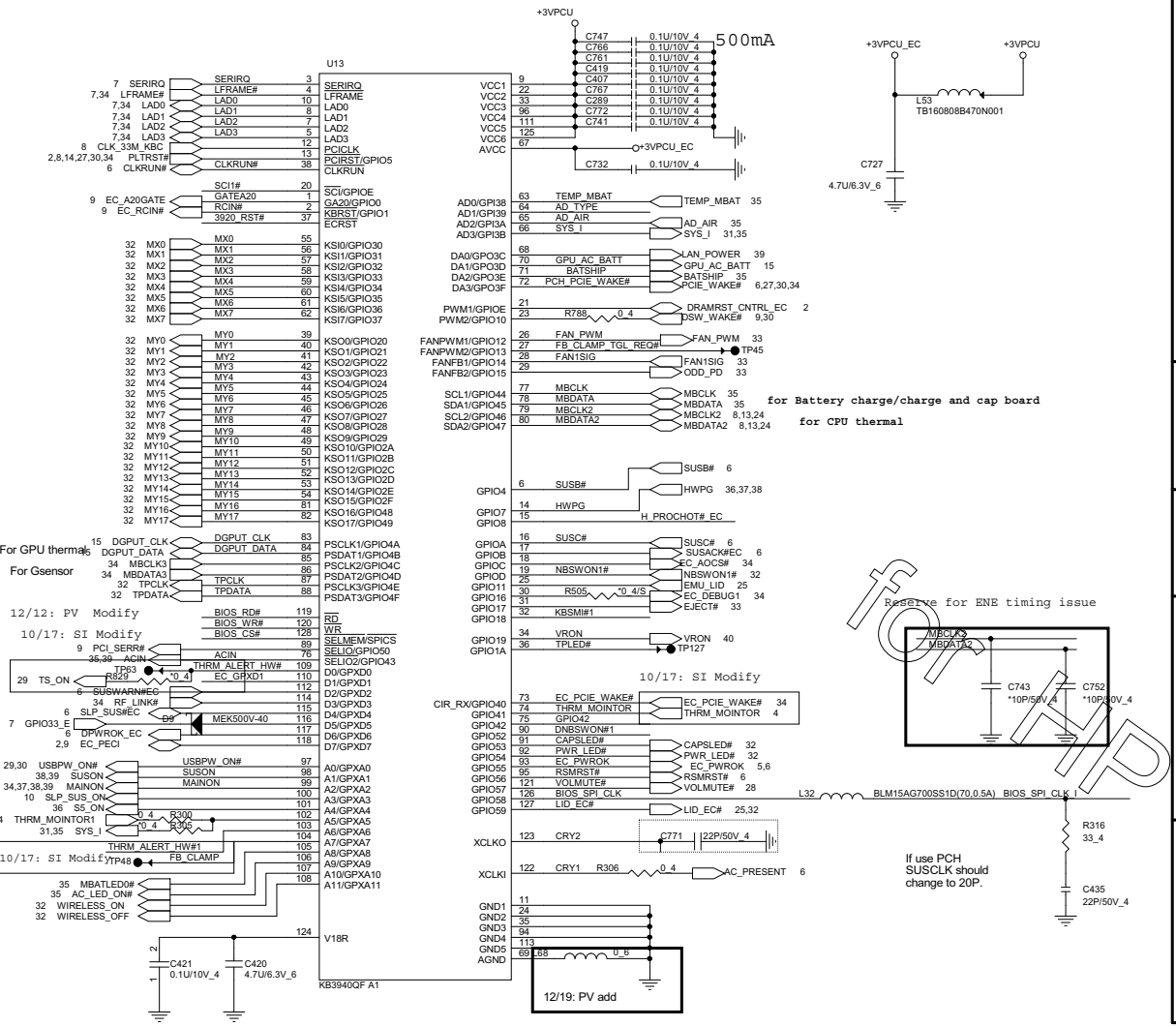


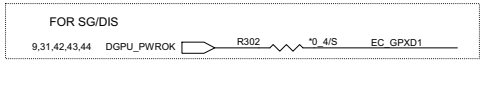

## PROCHOT control

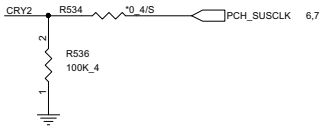


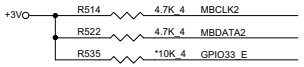



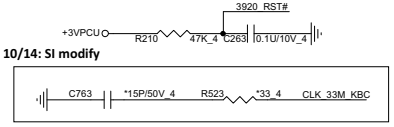



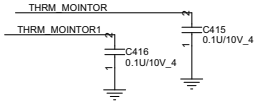



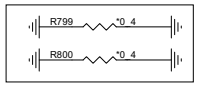



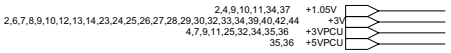



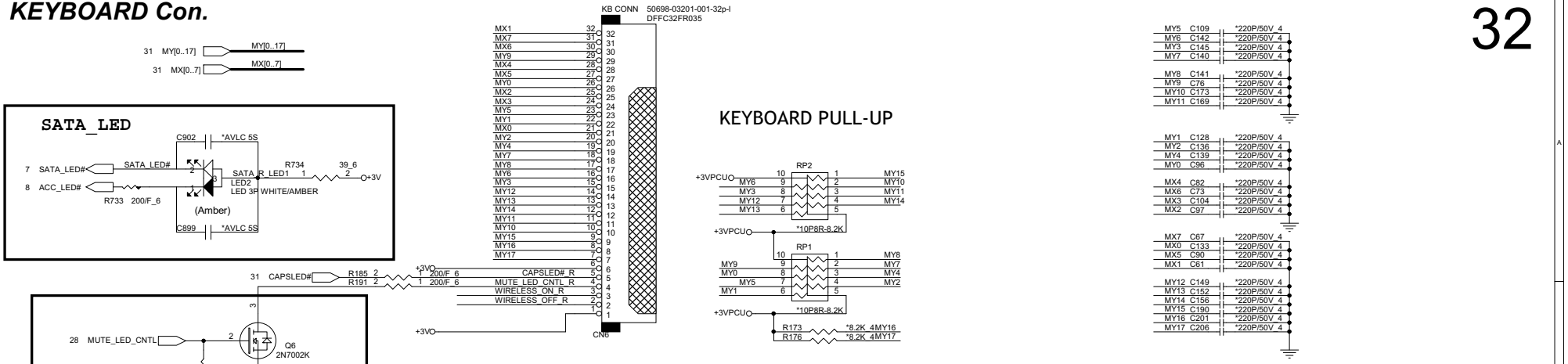



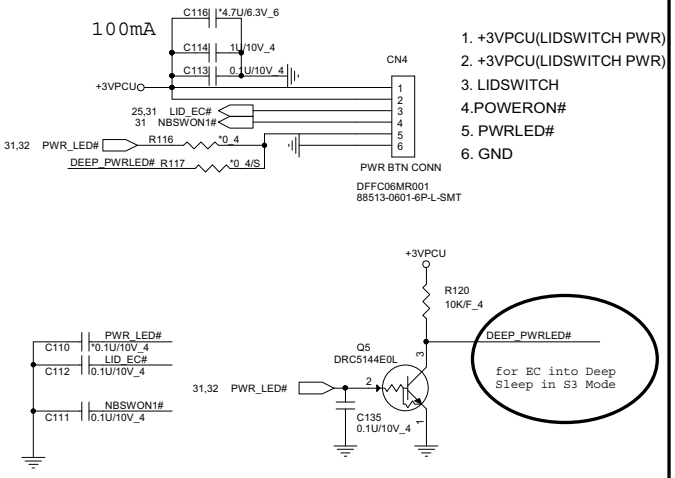




| | |
|---|---|
| NB5 | PROJECT : R63<br>Quanta Computer Inc. |
| Size: Custom | Document Number: EC (KB3940 A1)/ROM |
| Rev: 1A | |
| Date: Friday, December 21, 2012 | Sheet 31 of 44 |

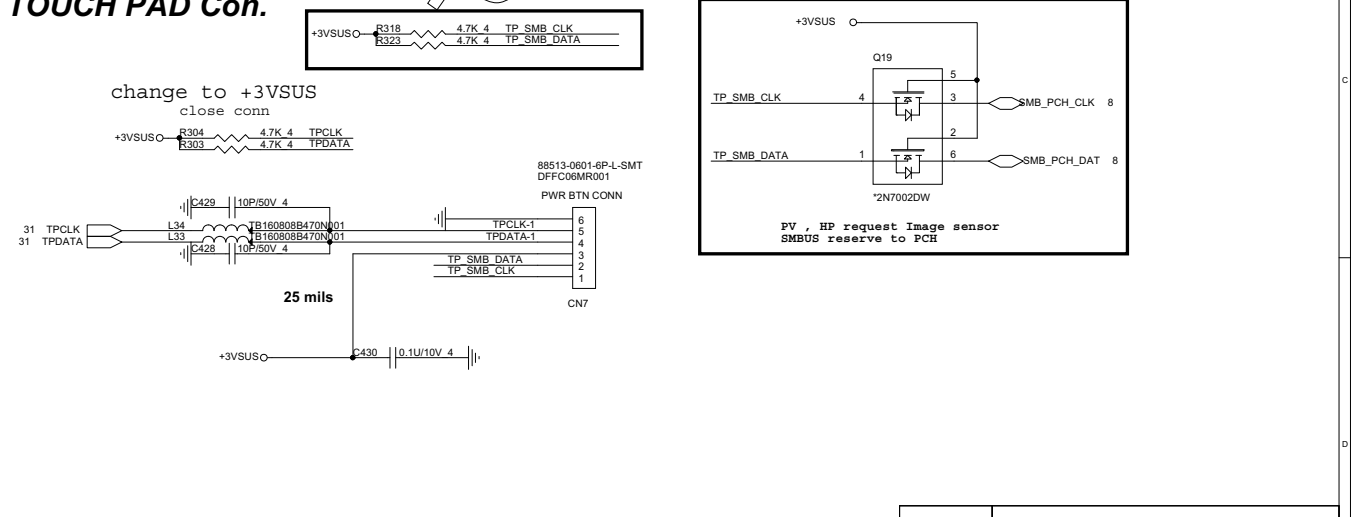
# KEYBOARD Con.




# POWER BOTTON CONNECT




# TOUCH PAD Con.




4,7,9,11,25,31,34,35,36 +3VPCU
7,23,26,28,29,33,34,39 +5V
39 +3VSUS
2,6,7,8,9,10,12,13,14,23,24,25,26,27,28,29,30,31,33,34,39,40,42,44 +3V

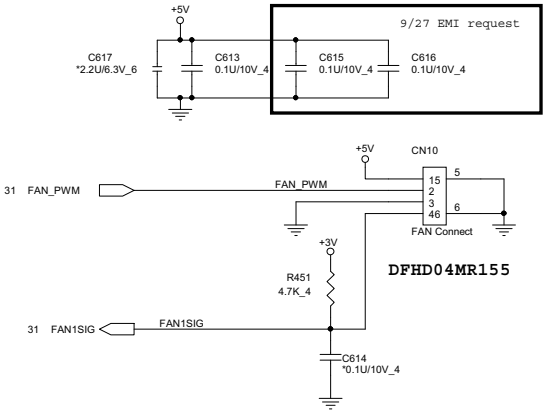
NB5

**PROJECT : R63**
Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | LED/KB/SW/TP | 1A |

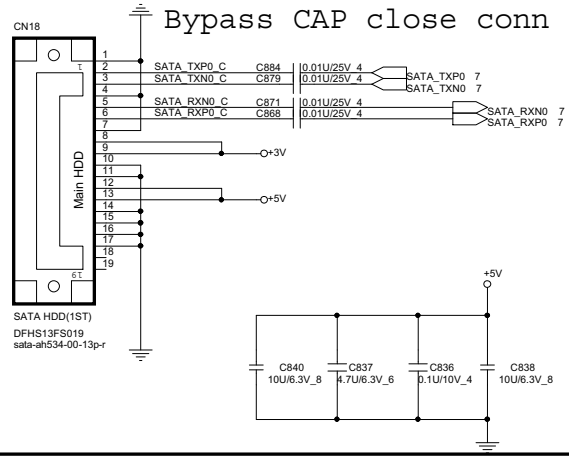
Date: Friday, December 21, 2012 Sheet 32 of 44

## CPU FAN

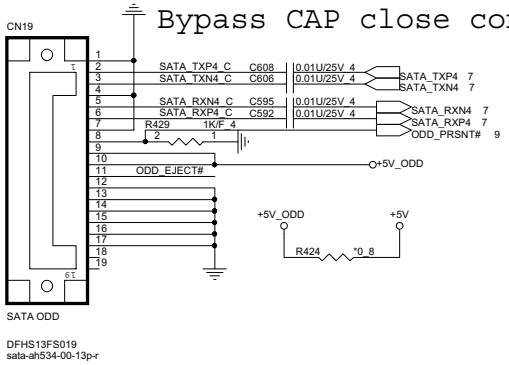


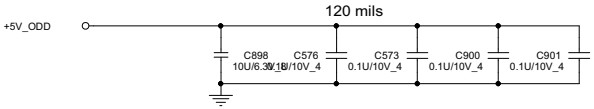

**DFHD04MR155**

## SATA HDD CONNECTOR



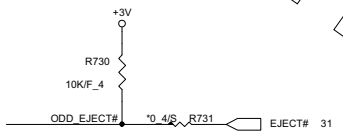

## SATA ODD CONNECTOR



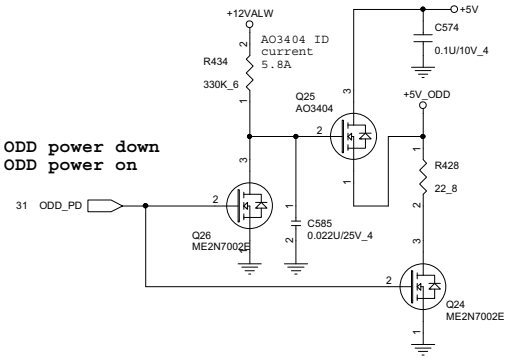




for HP

follow INTEL DG change eject PU to +3V.




**High : ODD power down**
**Low : ODD power on**




2,6,7,8,9,10,12,13,14,23,24,25,26,27,28,29,30,31,32,34,39,40,42,44 +3V
4,7,9,11,25,31,32,34,35,36 +3VPCU
7,23,26,28,29,32,34,39 +5V
35,39,44 +12VALW

| | | |
|---|---|---|
| NB5 | PROJECT : R63<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: HDD/ODD/FAN | Rev: 1A |
| Date: Friday, December 21, 2012 | Sheet 33 of 44 | |

# Mini PCI-E Card 1
# WLAN



7,9 BT_OFF# D6 MEK500V-40

7/26 DB modify +3V_AOAC R465 4.7K_4 FOR KBC DEBUG

+5V R463 *0_6 +MINIEC_5V

EC debug pin

31 EC_DEBUG1

CN13

| | | | |
|---|---|---|---|
| 51 | Reserved | +3.3V | 52 |
| 49 | Reserved | GND | 50 |
| 47 | Reserved | +1.5V | 48 |
| 45 | Reserved | LED_WPAN# | 46 |
| 43 | Reserved | LED_WLAN# | 44 |
| 41 | Reserved | LED_WWAN# | 42 |
| 39 | Reserved | GND | 40 |
| 37 | Reserved | USB_D+ | 38 |
| 35 | GND | USB_D- | 36 |
| 33 | PETp0 | GND | 34 |
| 31 | PETn0 | SMB_DATA | 32 |
| 29 | GND | SMB_CLK | 30 |
| 27 | GND | +1.5V | 28 |
| 25 | PERp0 | GND | 26 |
| 23 | PERn0 | +3.3Vaux | 24 |
| 21 | GND | PERST# | 22 |
| 19 | Reserved | W_DISABLE# | 20 |
| 17 | Reserved | GND | 18 |
| 15 | GND | Reserved | 16 |
| 13 | REFCLK+ | Reserved | 14 |
| 11 | REFCLK- | Reserved | 12 |
| 9 | GND | Reserved | 10 |
| 7 | CLKREQ# | Reserved | 8 |
| 5 | BT_CHCLK | +1.5V | 6 |
| 3 | BT_DATA | GND | 4 |
| 1 | WAKE# | +3.3V | 2 |

MINI PCIE H=11
DFHS52FR097
MIPCI-C-1759513-52P-LDV-SMT

8 PCIE_TXP1 PCIE_TXP1
8 PCIE_TXN1 PCIE_TXN1
8 PCIE_RXP1 PCIE_RXP1
8 PCIE_RXN1 PCIE_RXN1
8 CLK_33M_DEBUG PLTRST#
8 CLK_PCIE_WLAN CLK_PCIE_WLAN
8 CLK_PCIE_WLAN# CLK_PCIE_WLAN#
8 PCIE_CLKREQ_WLAN# R461 *0_4 BT_COMBO_EN_R#
8 BT_COMBO_EN#
MINICAR_PME#

BT_DATA,BT_CHCLK,CLKREQ#
internal pull-DOWN 100k ohm

MINI_BLED R96 *4.7K_4 +3V_AOAC
RF_LINK# R111 0_4 RF_LINK#
R801 0_4 RF_LINK# 31
R97 4.7K_4 +3V_AOAC
USBP10+ 8
USBP10- 8

7/26 DB modify
10/12: SI reserve
7/26 DB modify

10/12: SI reserve
R802 0_4 PLTRST# 2,8,14,27,30,31 RF_OFF# 9

LAD0 LAD0 7,31
LAD1 LAD1 7,31
LAD2 LAD2 7,31
LAD3 LAD3 7,31
LFRAME# LFRAME# 7,31

INTEL WLAN CARD PIN 20 W_DISABLE# have internal pull-up 110k ohm

+1.5V
C126 0.01U/16V_4 C129 0.1U/10V_4 C132 10U/6.3VS_6

R473 0_8 +3V
+3V_AOAC
C86 0.1U/10V_4 C632 0.1U/10V_4 C639 0.1U/10V_4 C638 10U/6.3VS_6

+3V_AOAC
6,27,30,31 PCIE_WAKE# 3 2 1 MINICAR_PME#
*DRC5144E0L
Q31

+3V_AOAC R474 *10K/F_4
31 EC_PCIE_WAKE# 3 2 1
*DRC5144E0L
Q30

12/21: PV modify

Reserve for AOAC function

+3VPCU +3VS5 +3V_AOAC
R68 *10K/F_4 C935 *0.022U/25V_4
R456 *100K/F_4 Q28 *ME2303T1
24mil
Q27 *ME2N7002E
8 PCH_AOCS# R457 *0_4
31 EC_AOCS# R458 *0_4
C81 *10U/6.3V_8 C87 *.1U/10V_4
Q68 *2N7002E
31,37,38,39 MAINON

CLK_33M_DEBUG R84 *51_4 C78 *15P/50V_4

10/14: SI for EMI request

6,7,8,10,28,34,38,44 +1.5V
2,6,7,8,9,10,12,13,14,23,24,25,26,27,28,29,30,31,32,33,34,39,40,42,44 +3V
4,7,9,11,25,31,32,35,36 +3VPCU
7,23,26,28,29,32,33,39 +5V
2,6,7,9,10,36,38,39,42,44 +3VS5

## Accelerometer Sensor

R245 *0_6/S +3V
R225 *0_6 +3V_AOAC
+G_SEN_PW
C319 0.1U/10V_4 C308 0.1U/10V_4

U10
HP3DC2TR
Vdd_IO 1
VDD 14
NC 2
NC 3
INT1 11
INT2 9
RESERVED 10
RESERVED 13
RESERVED 15
RESERVED 16
SDO 7
SDA 6
SCL 4
GND 5
GND 12
CS 8

8 ACCEL_INTH# D10 MEK500V-4 ACCEL_INTH#1 TP22
R224 *0_4/S
31 MBDATA3
31 MBCLK3
+G_SEN_PW R221 *0_4/S

AL003DC2A00

+G_SEN_PW R496 4.7K_4 R497 4.7K_4
ACCEL_INTH#1
MBDATA3 C323 33P/50V_4
MBCLK3 C322 *33P/50V_4
C288 22P/50V_4

9/27 EMI request

+3VS5
C524 0.1U/10V_4 C640 0.1U/10V_4 C522 0.1U/10V_4 C641 0.1U/10V_4

+3V
C625 0.1U/10V_4 C83 0.1U/10V_4 C84 0.1U/10V_4 C630 0.1U/10V_4 C626 0.1U/10V_4 C527 0.1U/10V_4 C636 0.1U/10V_4 C637 0.1U/10V_4 C627 0.1U/10V_4 C629 0.1U/10V_4

SI for +VIN noise issue

+5VS5 EC4 0.01U/50V_4 +VIN
EC2 0.01U/50V_4
EC3 0.01U/50V_4
EC5 0.01U/50V_4
+3V EC18 0.01U/50V_4 +VIN
EC1 0.01U/50V_4 +VIN
EC13 0.01U/50V_4

10.14: SI modify.

+5VS5 EC23
+VIN
+3VPCU C446 *0.1U/10V_4
EC24 *0.01U/25V_4
EC25 *0.01U/25V_4
EC26 *0.01U/25V_4
EC28 *0.1U/25V_4
EC29 *0.1U/25V_4
+5V C49 0.1U/10V_4 C48 0.1U/10V_4

+5V EC7 0.01U/50V_4 +3V
+3V EC22 0.01U/50V_4 +1.5V_VGA
+5V EC6 0.01U/50V_4 +5VS5
+1.05V EC9 0.01U/50V_4 +5VS5
+3V EC8 0.01U/50V_4 +1.05V

+5VS5 C475 0.1U/10V_4 C480 0.1U/10V_4
+VGA_CORE C406 0.1U/10V_4

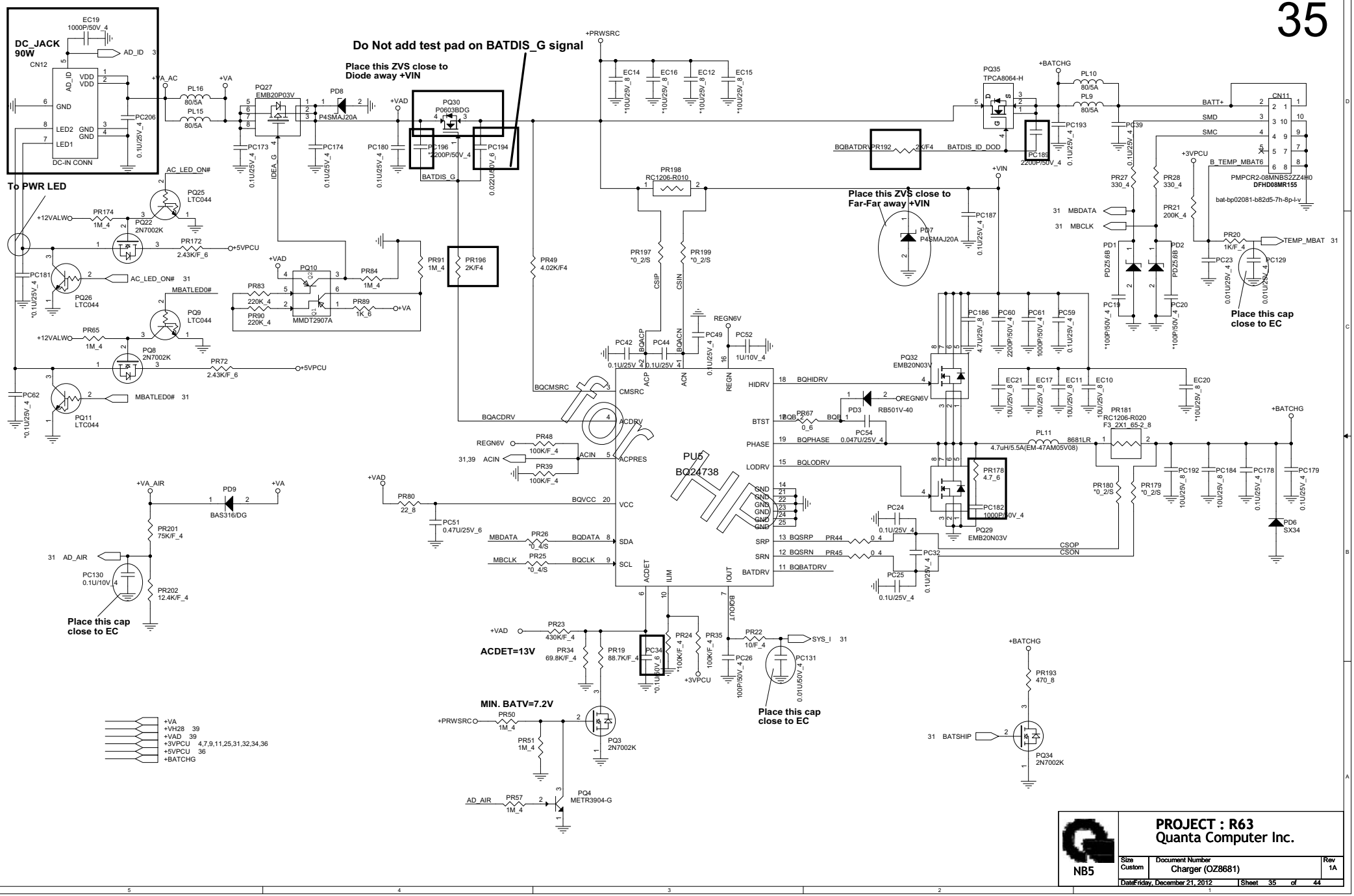
2,6,7,8,9,10,12,13,14,23,24,25,26,27,28,29,30,31,32,33,34,39,40,42,44 +3V
32,39 +3VSUS
6,7,8,10,28,34,38,44 +1.5V
23,29,30,36,37,38,39,40,41,42,43,44 +5VS5

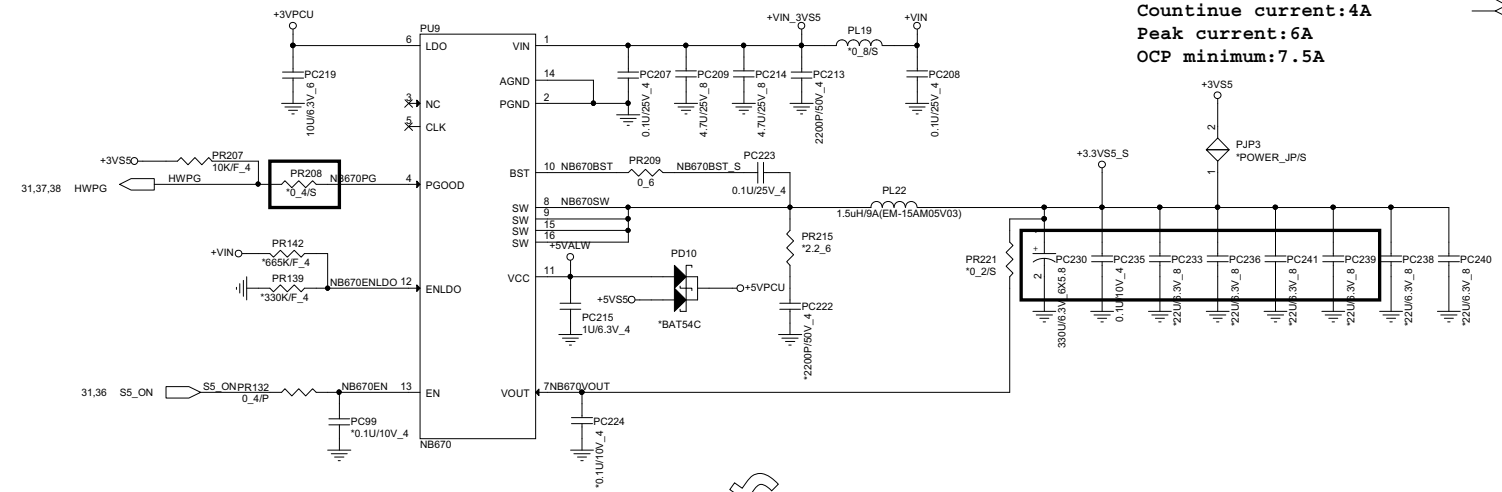
NB5

**PROJECT : R63**
Quanta Computer Inc.

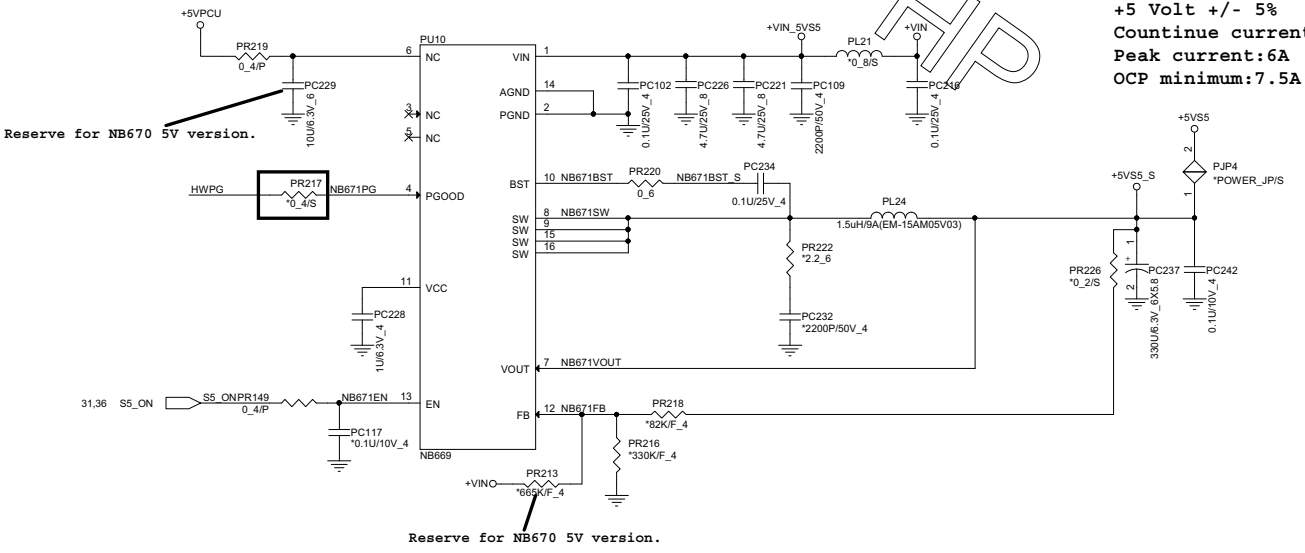
| Size | Document Number | Rev |
|---|---|---|
| Custom | MINI PCIE CONN & G-sensor | 1A |

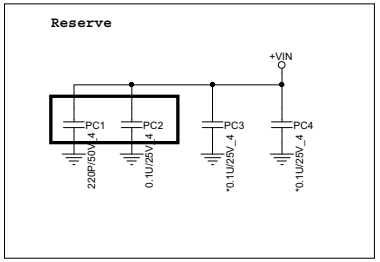
Date: Friday, December 21, 2012 Sheet 34 of 44


DC_JACK 90W
DC-IN CONN
To PWR LED
Do Not add test pad on BATDIS_G signal
Place this ZVS close to Diode away +VIN
Place this ZVS close to Far-Far away +VIN
Place this cap close to EC
PU5 BQ24738
ACDET=13V
MIN. BATV=7.2V
+PRWSRC
+VIN
+BATCHG
+VAD
+VA
+5VPCU
+3VPCU
BATDIS_G
BQBATDRV
BATDIS_ID_DOD
AC_LED_ON#
MBATLED0#
AD_AIR
BATSHIP
TEMP_MBAT
PROJECT : R63
Quanta Computer Inc.
NB5
Charger (OZ8681)
Friday, December 21, 2012
Sheet 35 of 44

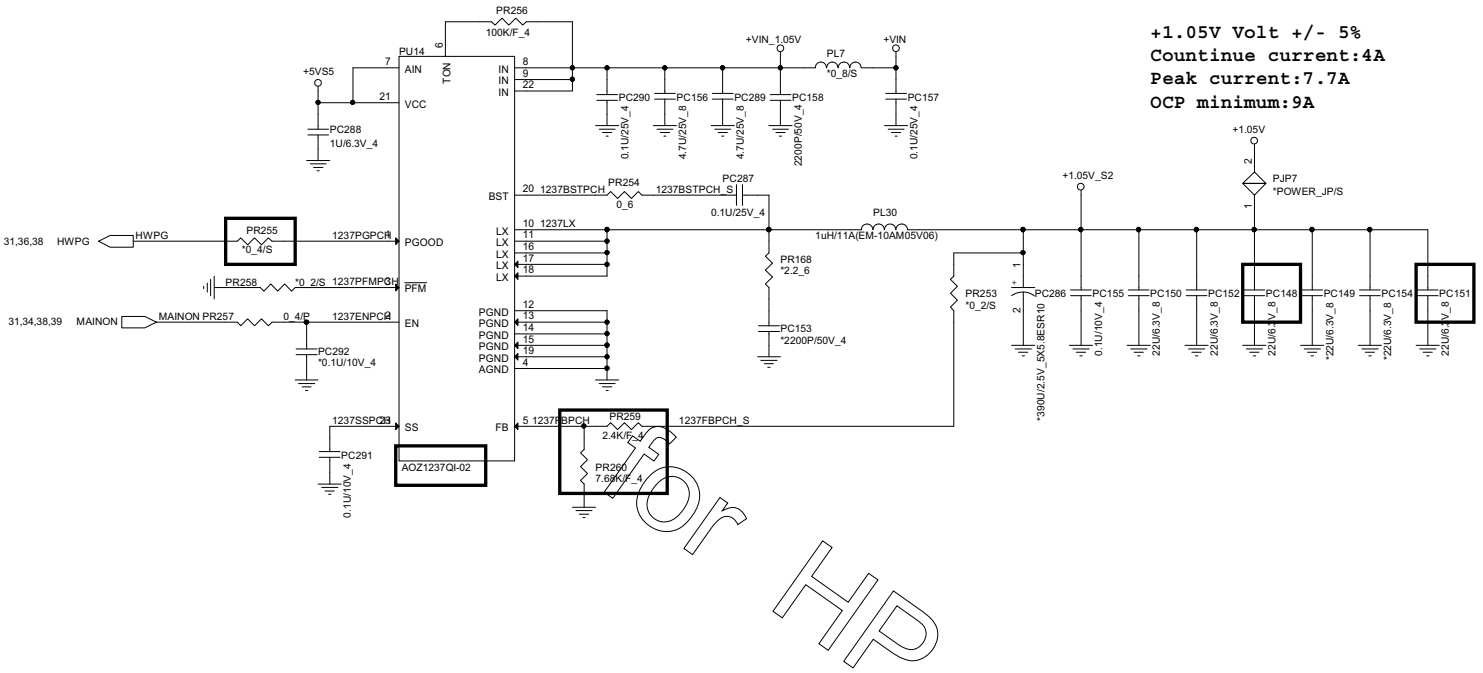



for HP



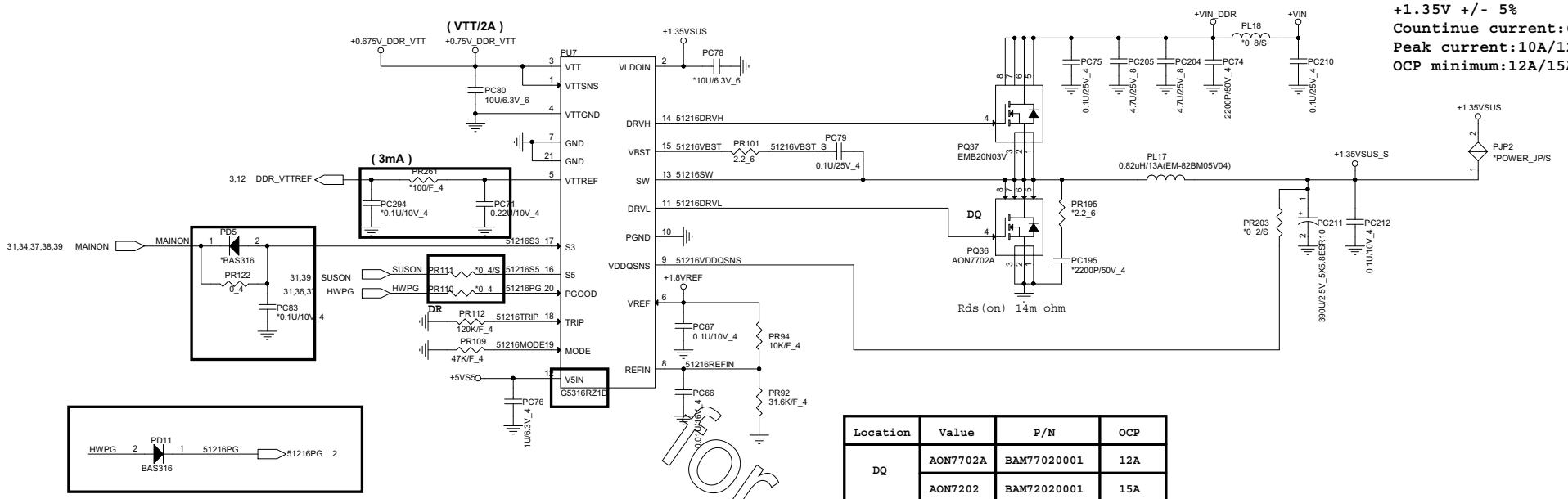

| | | |
|---|---|---|
| NB5 | PROJECT : R63<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: 3/5VPCU(RT8243A) | Rev: 1A |
| Date: Friday, December 21, 2012 | Sheet 36 of 44 | |




+1.05V 2,4,9,10,11,31,34

| | | |
|---|---|---|
| NB5 | PROJECT : R63<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: 1.05V(RT8228BZ) | Rev: 1A |
| Date: Friday, December 21, 2012 | Sheet 37 of 44 | |

+1.35VSUS 2,3,4,12,13
+1.5V 6,7,8,10,28,34,44



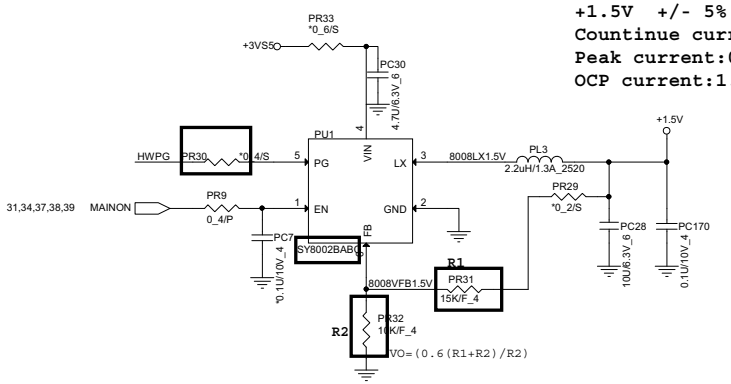




+1.35V +/- 5%
Countinue current:6A/8A
Peak current:10A/12A
OCP minimum:12A/15A

| Location | Value | P/N | OCP |
|---|---|---|---|
| DQ | AON7702A | BAM77020001 | 12A |
| | AON7202 | BAM72020001 | 15A |

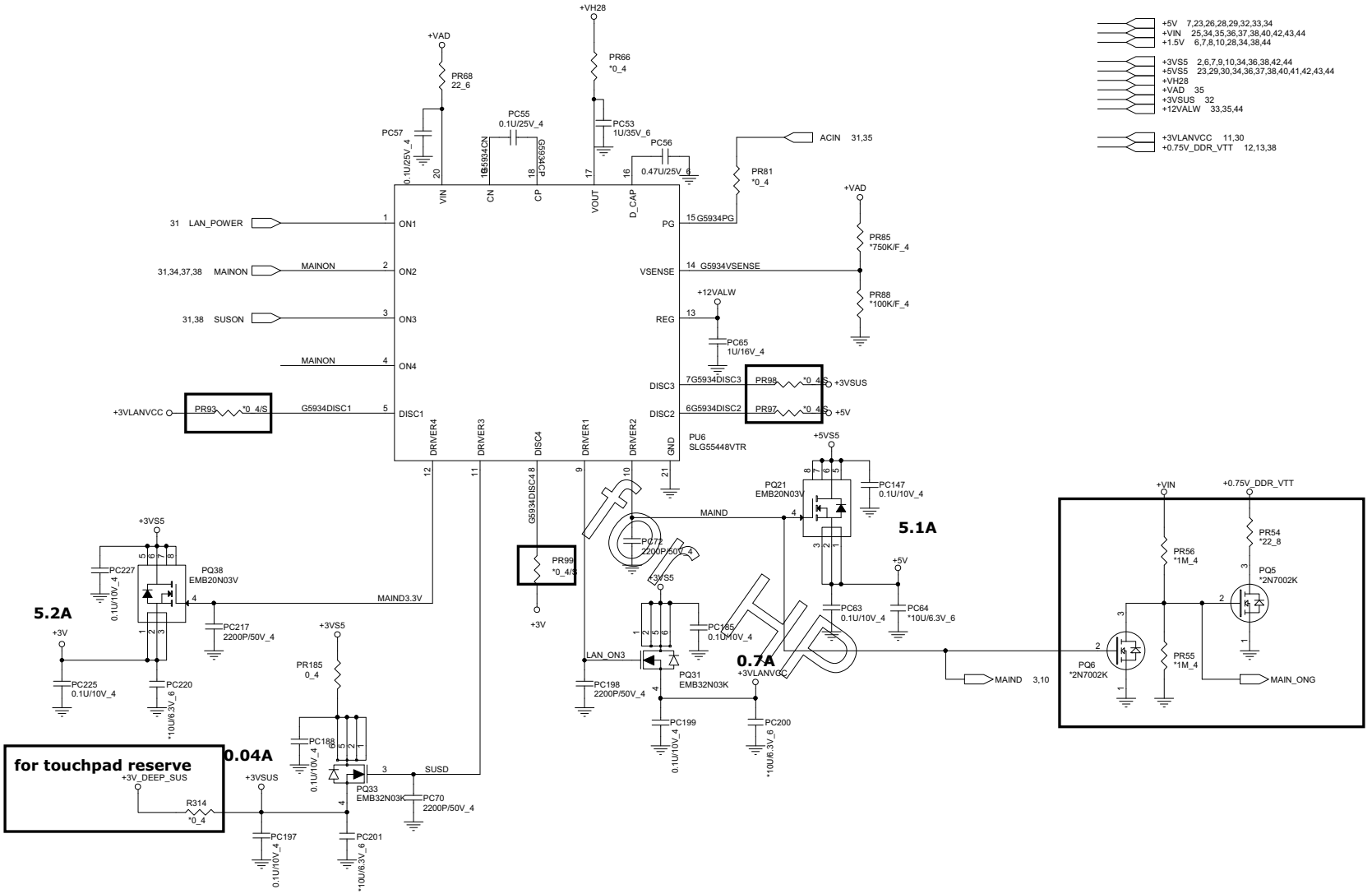
| Location | Value | P/N | OCP |
|---|---|---|---|
| DR | 120K | CS41202FB17 | 12A |
| | 76.8K | CS37682FB00 | 15A |




+1.5V +/- 5%
Countinue current:0.3A
Peak current:0.75A
OCP current:1.2A

For FAE

| | | | |
|---|---|---|---|
| PROJECT : R63 | Quanta Computer Inc. | | |
| NB5 | Size: Custom | Document Number: DDR3L(APW8819) | Rev: 1A |
| | Date: Friday, December 21, 2012 | Sheet 38 of 44 | |




+5V 7,23,26,28,29,32,33,34
+VIN 25,34,35,36,37,38,40,42,43,44
+1.5V 6,7,8,10,28,34,38,44

+3VS5 2,6,7,9,10,34,36,38,42,44
+5VS5 23,29,30,34,36,37,38,40,41,42,43,44
+VH28
+VAD 35
+3VSUS 32
+12VALW 33,35,44

+3VLANVCC 11,30
+0.75V_DDR_VTT 12,13,38

**PROJECT : R63**
Quanta Computer Inc.

NB5

| Size | Document Number | Rev |
|---|---|---|
| Custom | Dis-charge IC (G5934) | 1A |
| Date: Friday, December 21, 2012 | Sheet 39 of 44 | |

| CPU | Re | PR18 |
|---|---|---|
| 37W | 9.09K | CS29092FB27 |
| 47W | 14.7K | CS31472FB14 |

PUT COLSE TO VCORE Phase 1 Inductor

Dummy Rc For 2 phase

| CPU | Rd | PR14 |
|---|---|---|
| 37W | 43.2K | CS34322FB00 |
| 47W | 66.5K | CS36652FB16 |

Dummy Ra and Ca For 2 phase

POP Rb for 2 phase

SV 37W CPU
VID1=1.8V
IccMax=55A
Icc_Dyn=35A
Icc_TDC=26A
R_LL=1.5m ohm
OCP~60A

| CPU | Ra | Ca | Rb | Rc | Rd | Re | | |
|---|---|---|---|---|---|---|---|---|
| 37W | Dummy | Dummy | POP | Dummy | CS34322FB00 | CS29092FB27 | CH733RY8802 | Dummy Page 41 |
| 47W | POP | POP | Dummy | POP | CS36652FB16 | CS31472FB14 | CH756RM8802 | POP Page 41 |
| R63 Location | PR10 | PC6 | PR4 | PR8 | PR14 | PR18 | PC128 | |

PUT COLSE TO VCORE HOT SPOT

For 37W CPU ; PC128 Placed 330uF_9 mohm
For 47W CPU ; PC128 Placed 560uF_4.5 mohm

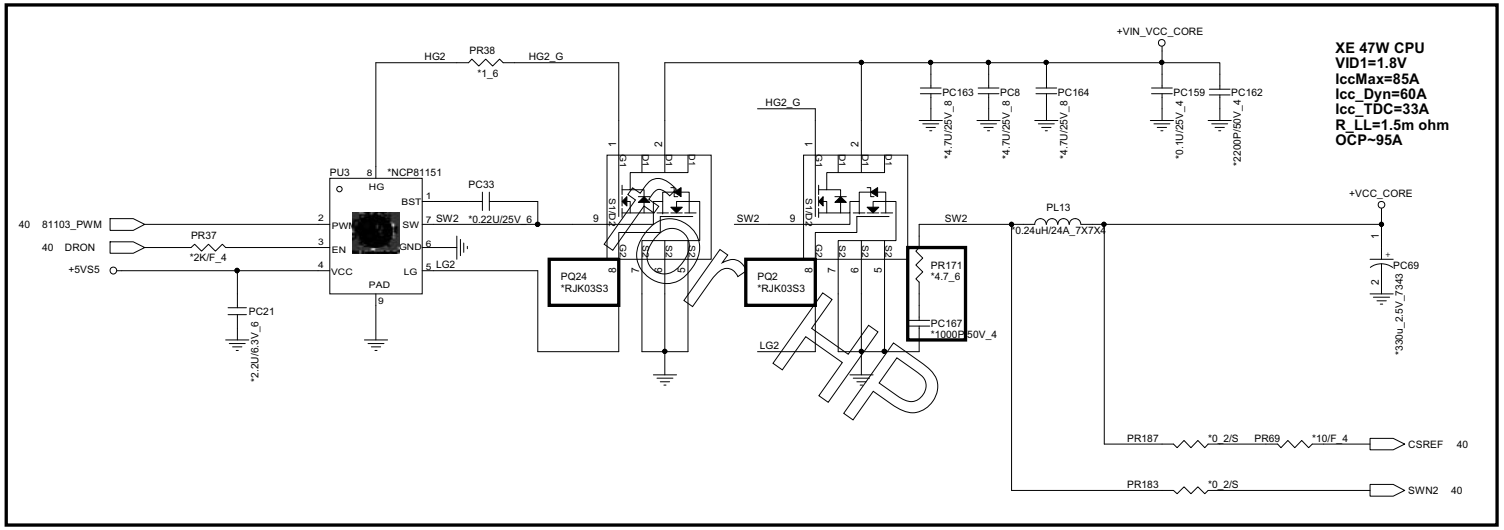
| CPU | PC128 |
|---|---|
| 37W | CH733RY8802 |
| 47W | CH756RM8802 |

NB5

PROJECT : R63
Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | CPUCORE (NCP81103) | 1A |

Date: Friday, December 21, 2012 Sheet 40 of 44




For 37W CPU
Dummy these components

+VCC_CORE 4,40

NB5

PROJECT : R63
Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | NCP81151 | 1A |

Date: Friday, December 21, 2012 | Sheet 41 of 44

# VGA Core

+VGA_CORE 18,34,44



GPIO10 GPIO12 GPIO16 GPIO20 GPIO15 Mars XT

| PWRCNTL5 | PWRCNTL4 | PWRCNTL3 | PWRCNTL2 | PWRCNTL1 | V-CORE | |
|---|---|---|---|---|---|---|
| 0 | 1 | 1 | 1 | 1 | 1.125V | |
| 1 | 0 | 0 | 0 | 0 | 1.100V | Default |
| 1 | 0 | 0 | 0 | 1 | 1.075V | |
| 1 | 0 | 0 | 1 | 0 | 1.050V | |
| 1 | 0 | 0 | 1 | 1 | 1.025V | |
| 1 | 0 | 1 | 0 | 0 | 1.000V | |
| 1 | 0 | 1 | 0 | 1 | 0.975V | |
| 1 | 0 | 1 | 1 | 0 | 0.950V | |
| 1 | 0 | 1 | 1 | 1 | 0.925V | |
| 1 | 1 | 0 | 0 | 0 | 0.900V | |
| 1 | 1 | 0 | 0 | 1 | 0.875V | |
| 1 | 1 | 0 | 1 | 0 | 0.850V | |
| 1 | 1 | 0 | 1 | 1 | 0.825V | |
| 1 | 1 | 1 | 0 | 0 | 0.800V | |

GPIO12 GPIO16 GPIO15 Thames XT

| PWRCNTL4 | PWRCNTL3 | PWRCNTL1 | V-CORE | |
|---|---|---|---|---|
| 0 | 1 | 0 | 1.0V | Default |
| 1 | 0 | 0 | 0.9V | |
| 1 | 0 | 1 | 0.875V | |
| | | | | |
| | | | | |
| | | | | |

**Mars (25W)**

**+VGA_CORE**
**Countinue current: 25A**
**Peak current: 30A**
**OCP minimum: 33A**
**L-L=0mV/A**

**DCR_1.4m ohm**

**DCR_1.4m ohm**

**PU8**
**NCP3218G**

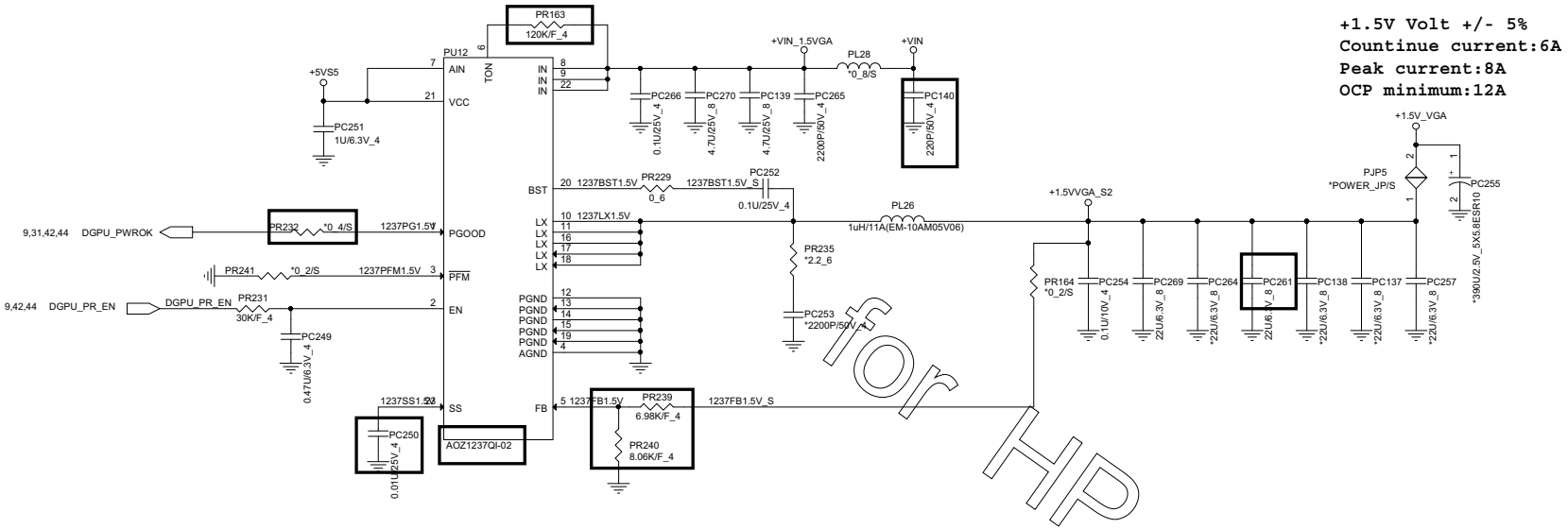
**This NTC Close to Phase 1 MOSFET**

**Shortest the net trace**

**Close to Phase 1 Inductor**

for FAE

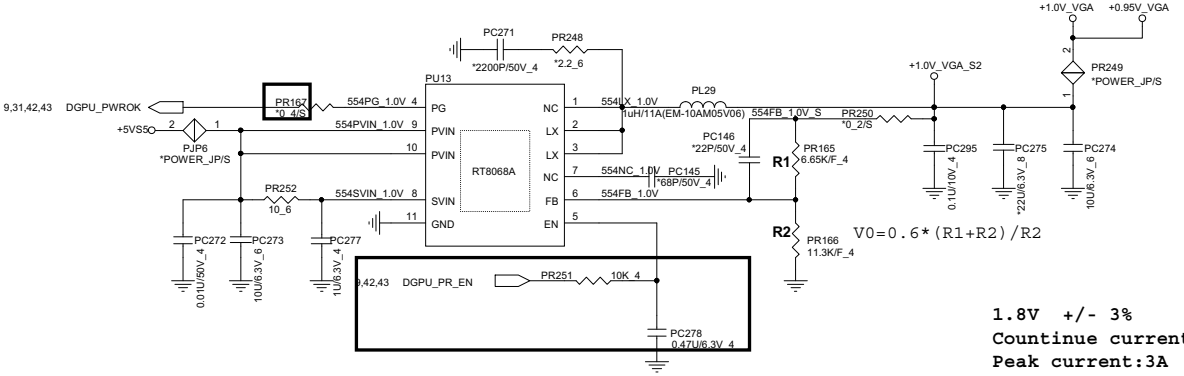
| | | |
|---|---|---|
| NB5 | PROJECT : R63<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: +VGACORE NCP3218G) | Rev: 1A |
| Date: Friday, December 21, 2012 | Sheet 42 of 44 | |



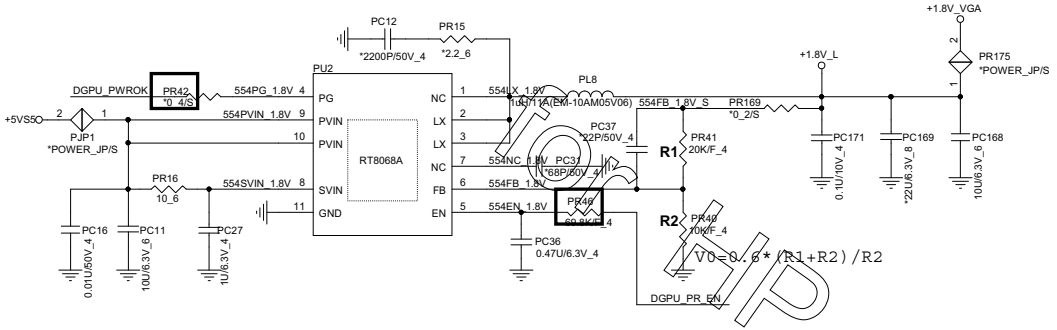

| | | |
|---|---|---|
| NB5 | PROJECT : R63<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: +VGA POWER | Rev: A |
| Date: Friday, December 21, 2012 | Sheet 43 of 44 | |

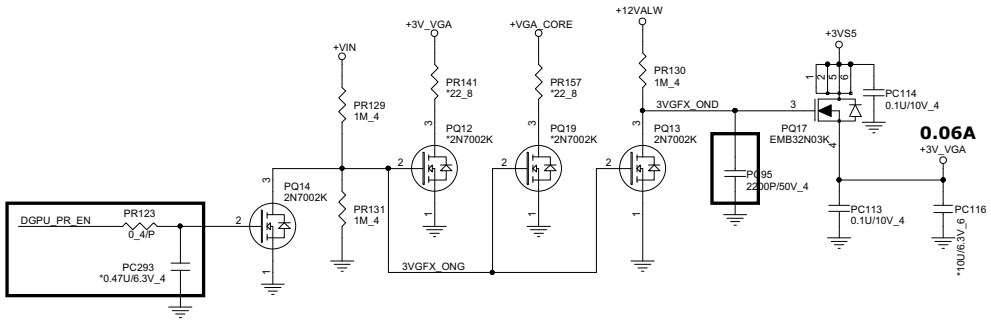
| VGA TYPE | R2 Value | P/N | 1.0V_VGA |
|---|---|---|---|
| Thems | 10K | CS31002FB26 | 1.0V |
| MARS | 11.3K | CS31132FB07 | 0.95V |

**+0.95V +/- 3%**
**Countinue current:2A**
**Peak current:3A**
**OCP minimum:4A**

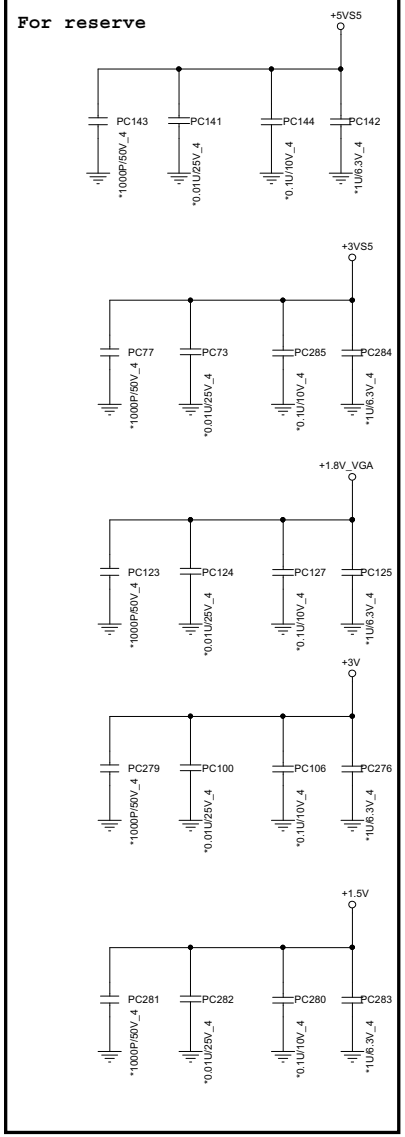



**1.8V +/- 3%**
**Countinue current:2A**
**Peak current:3A**
**OCP minimum:4A**




**For reserve**




+1.8V_VGA 11,15,16,18,19
+1.0V_VGA 14,16,18,19
+3V_VGA 14,18

NB5

**PROJECT : R63**
Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | +VGACORE (RT8208/1.8V) | 1A |
| Date: Friday, December 21, 2012 | Sheet 44 of 44 | |