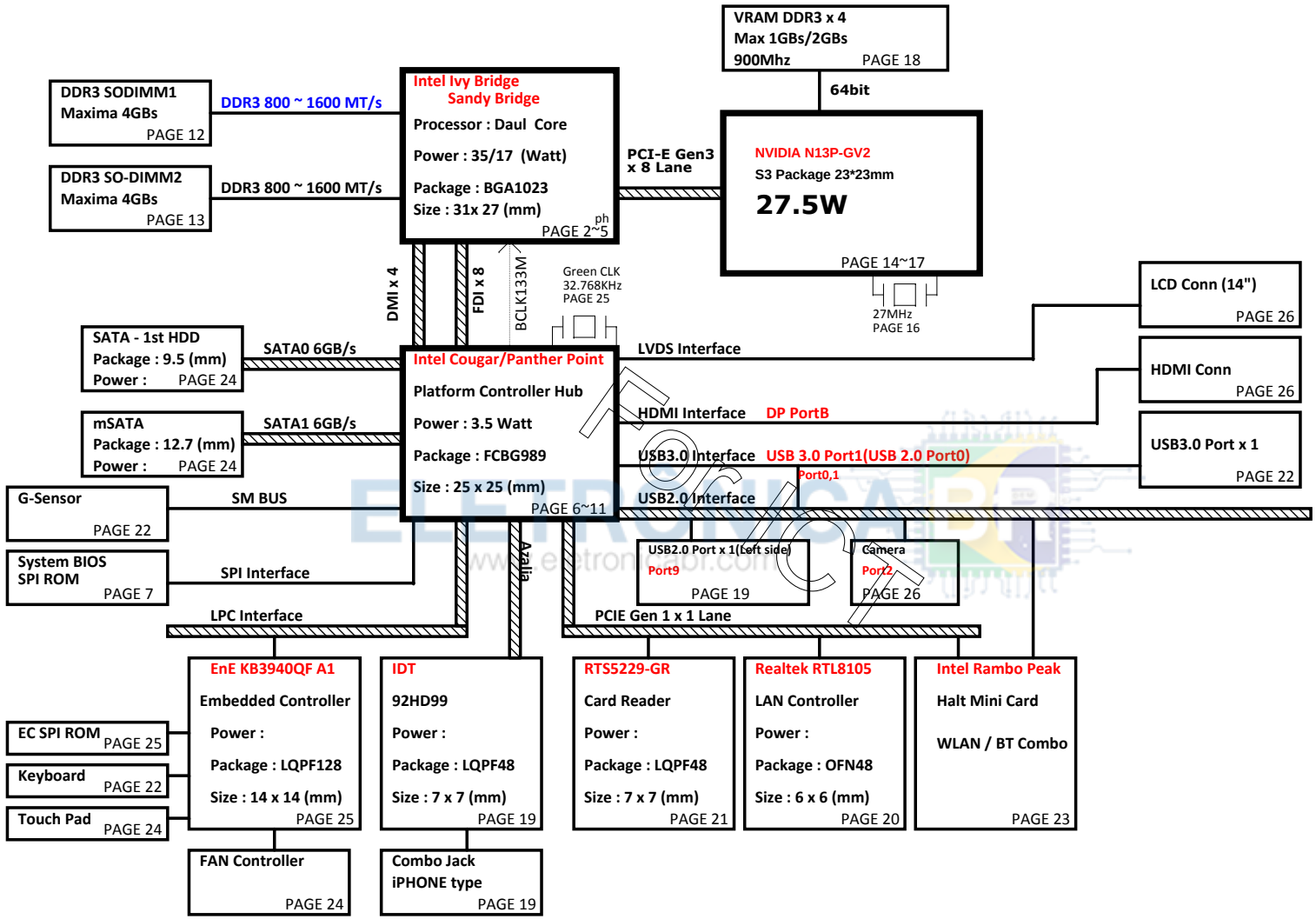
# Volks DIS/UMA (14"/15.6") Ultra/Slim
# Intel Chief River Platform Block Diagram

01




**PCB 6L STACK UP**

LAYER 1 : TOP
LAYER 2 : SGND
LAYER 3 : IN1(High)
LAYER 4 : IN2(Low)
LAYER 5 : SVCC
LAYER 6 : BOT

**Power Source**

BQ24738
System Charge Power (+BATCHG)

Ricktek RT8223P
System Power (+3VPCU/+5VPCU/ +3VS5/+5VS5)

NCP6132/NCP5911/RT8240P/ TPS51462RGER
Processor Power (+VCC_CORE/ +1.05_VTT/+VCCSA)

SLG55448V
System Discharge Power (+1.5V/+3V/+5V)

Richtek RT8207
System Memory Power (+1.5VSUS/ +0.75V_DDR_VTT)

NCP3218G
GPU core power(+VGACORE)

NB5

PROJECT : VOLKS
Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | Block Diagram | 1A |
| Date: Thursday, June 07, 2012 | Sheet 1 of 37 | |

# Ivy Bridge Processor (DMI,PEG,FDI)

02

PEG_COMP connect to PIN G3&G4 W:4mils/S:15mils/L: 500mils.
PEG_COMP connect to PIN G1 W:12mils/S:15mils/L: 500mils.

U20A

DMI
Intel(R) FDI
PCI EXPRESS - GRAPHICS
eDP

IC,IVB_2CBGA,0P7

U20B

MISC
CLOCKS
THERMAL
DDR3 MISC
JTAG & BPM
PWR MANAGEMENT

IC,IVB_2CBGA,0P7

Placement close to EC.

SI modify on 4/2

SM_RCOMP[0] W:20mils/S:20mils/L: 500mils,
SM_RCOMP[1] W:20mils/S:20mils/L: 500mils,
SM_RCOMP[2] W:15mils/S:20mils/L: 500mils,

CPU XDP

PEG x8

CPU RESET#

Intel DG request

DDR3 DRAM RESET

for DS3

PV modify on 5/24

SM_DRAMPWROK
Processor Input.

Processor pull-up (CPD)

eDP_COMPIO and ICOMPO signals should be shorted near balls and routed with typical impedance <25 mohms

For iFDIM
Trigger Point

Connect a Test Point on BPM# 6 signal, very close to processor.

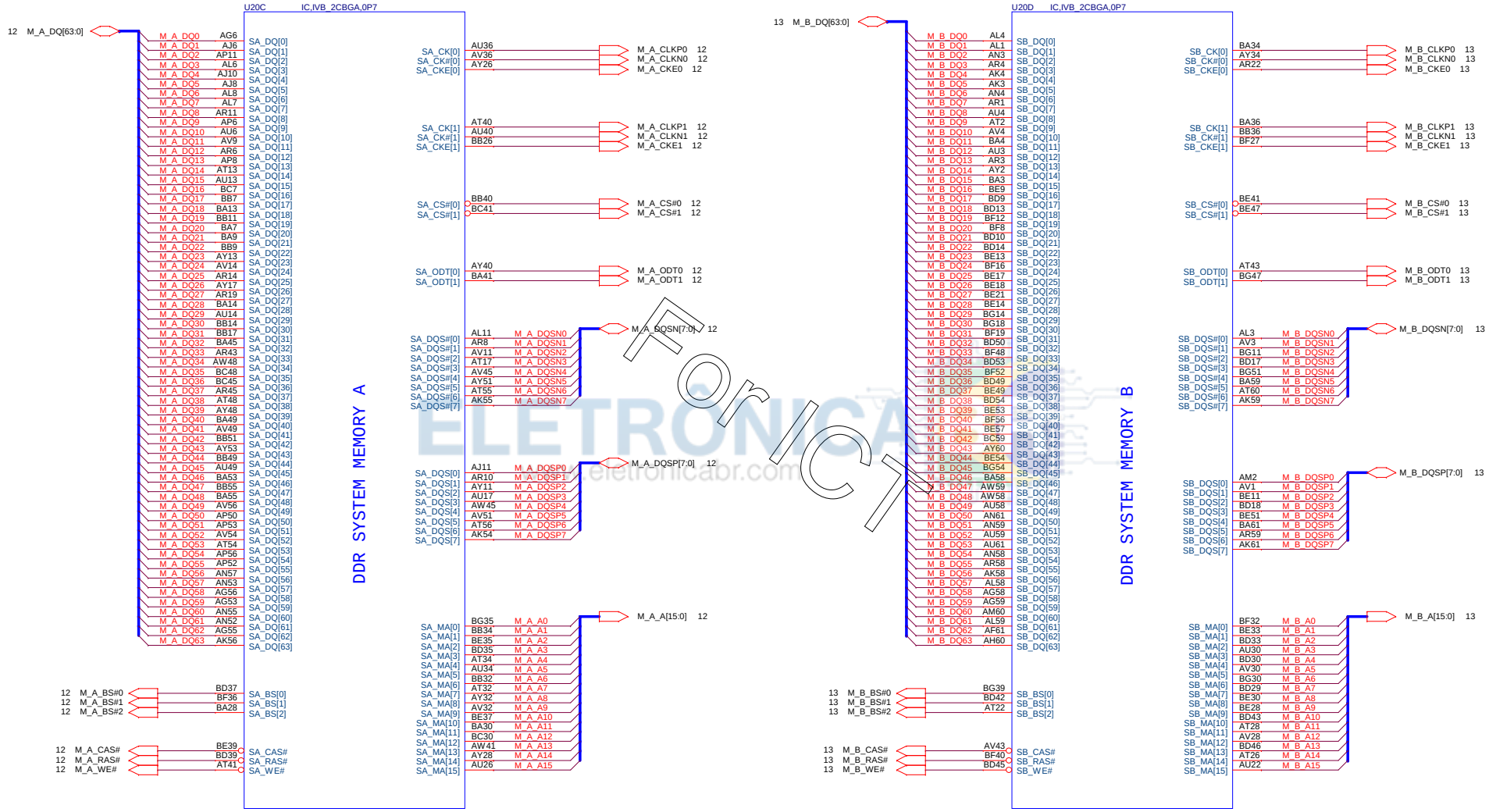
Connect a Test Point on BPM# 7 signal, very close to processor.





PROJECT : VOLKS
Quanta Computer Inc.
NB5
Size: Custom
Document Number: Processor 1/4 (Host/GPU)
Rev: 1.0
Date: Thursday, June 07, 2012
Sheet 2 of 37

# Ivy Bridge Processor (DDR3)

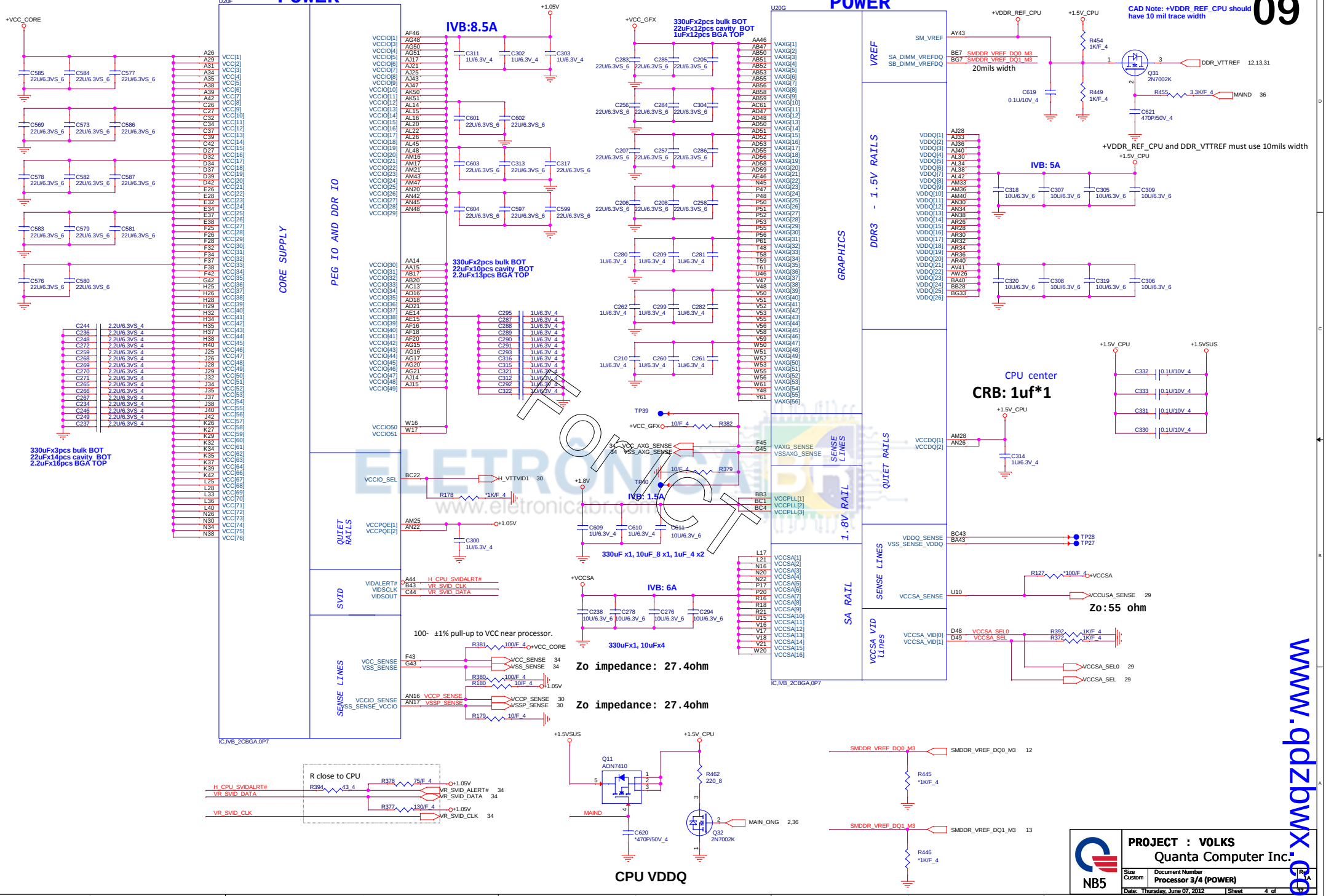


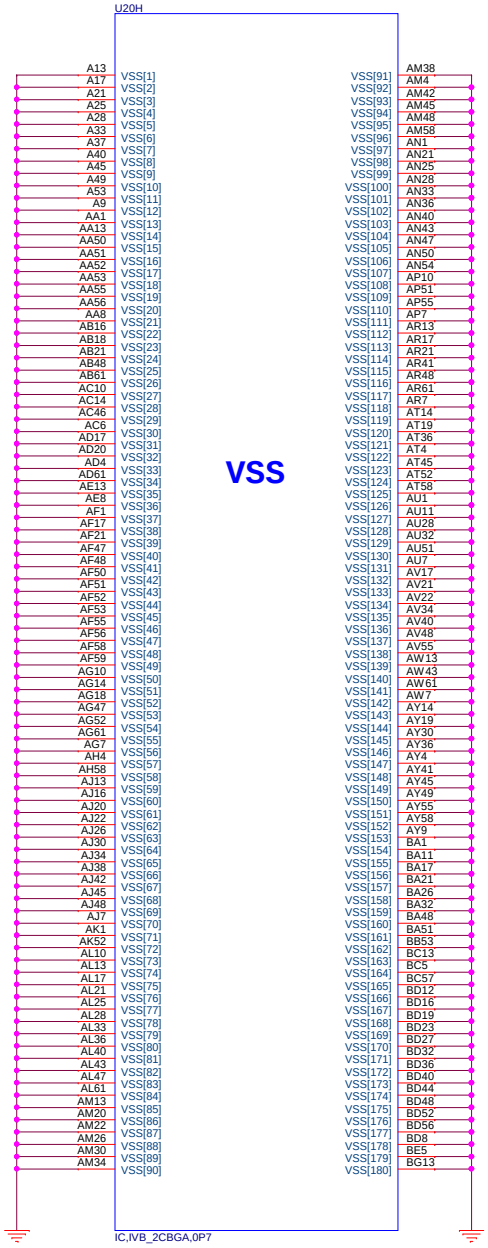


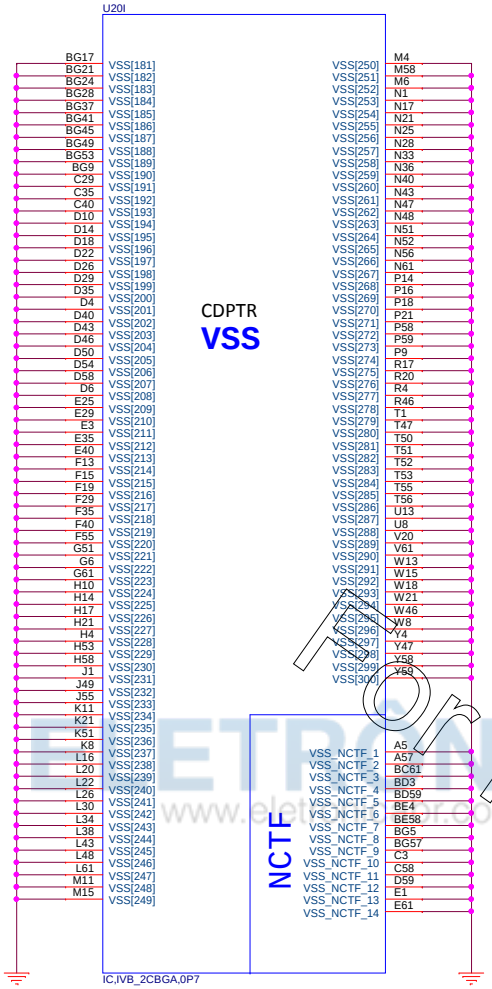

| | | |
|---|---|---|
| NB5 | PROJECT : VOLKS<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: Processor 2/5 (DDR3 I/F) | Rev: 1A |
| Date: Thursday, June 07, 2012 | Sheet 3 of 37 | |

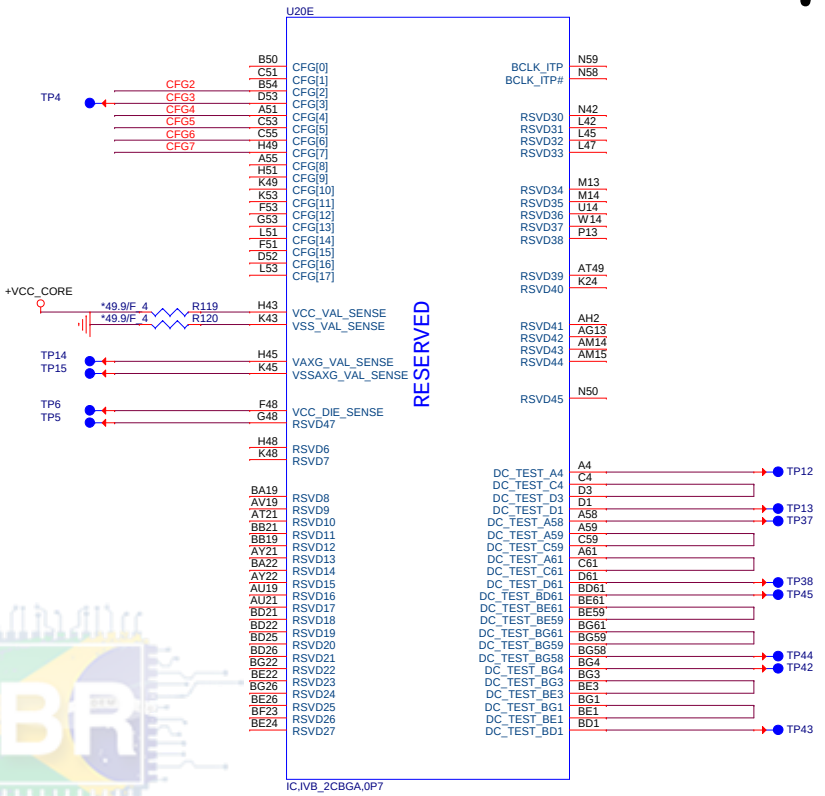
# POWER





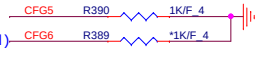



**CFG[6:5] (PCIE Port Bifurcation Straps)**

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.

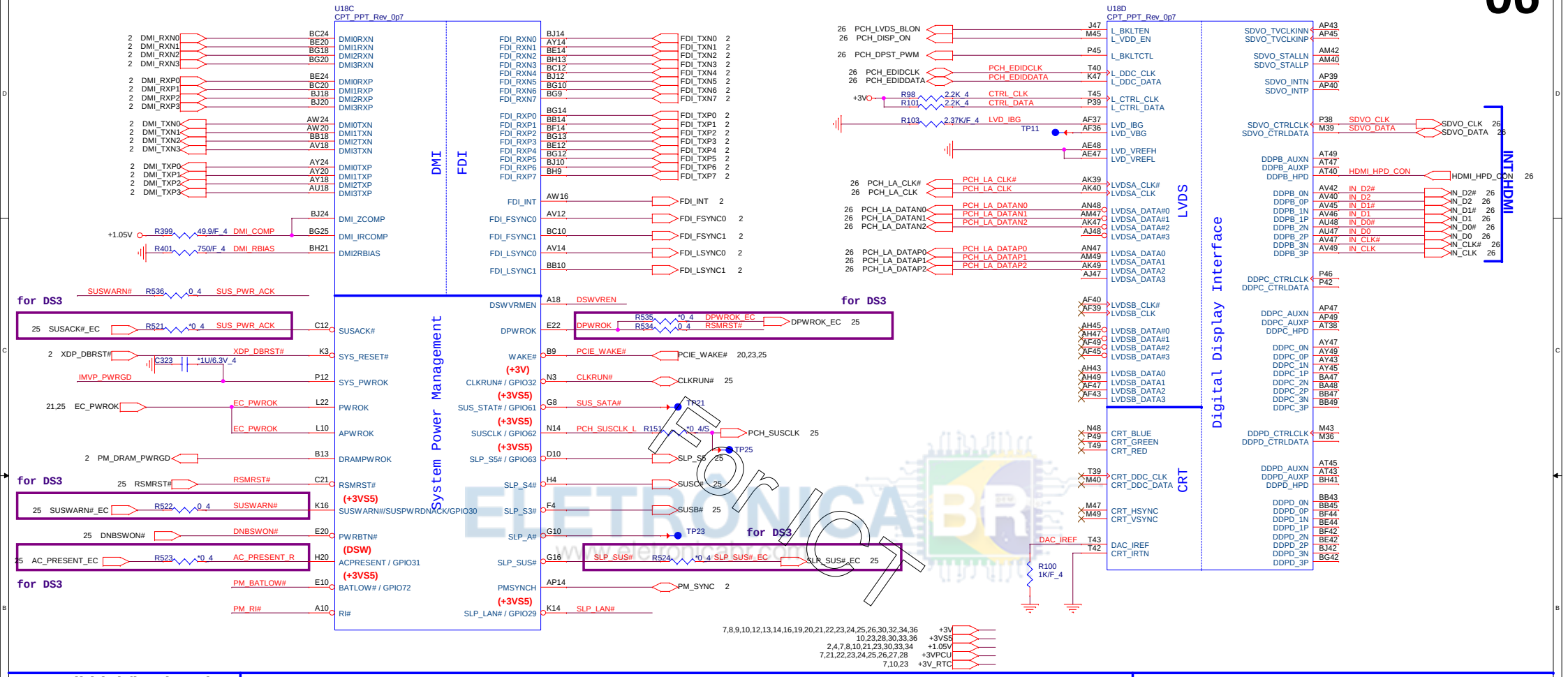
| | 1 | 0 |
|---|---|---|
| CFG2 (PCIe Static x16 Lane Numbering Reversal) | Normal Operation(Default) | Lane Reversed |
| CFG4 (DP Presence Strap) | Disable; No physical DP attached to eDP | Enable; An ext DP device is connected to eDP |
| CFG7 (PEG Defer Training) | PEG train immediately following xxRESETB de assertion | PEG wait for BIOS training |


| | | |
|---|---|---|
| NB5 | PROJECT : VOLKS<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: Processor 4/4 (RSV,Ground) | Rev: 1A |
| Date: Thursday, June 07, 2012 | Sheet 5 of 37 | |

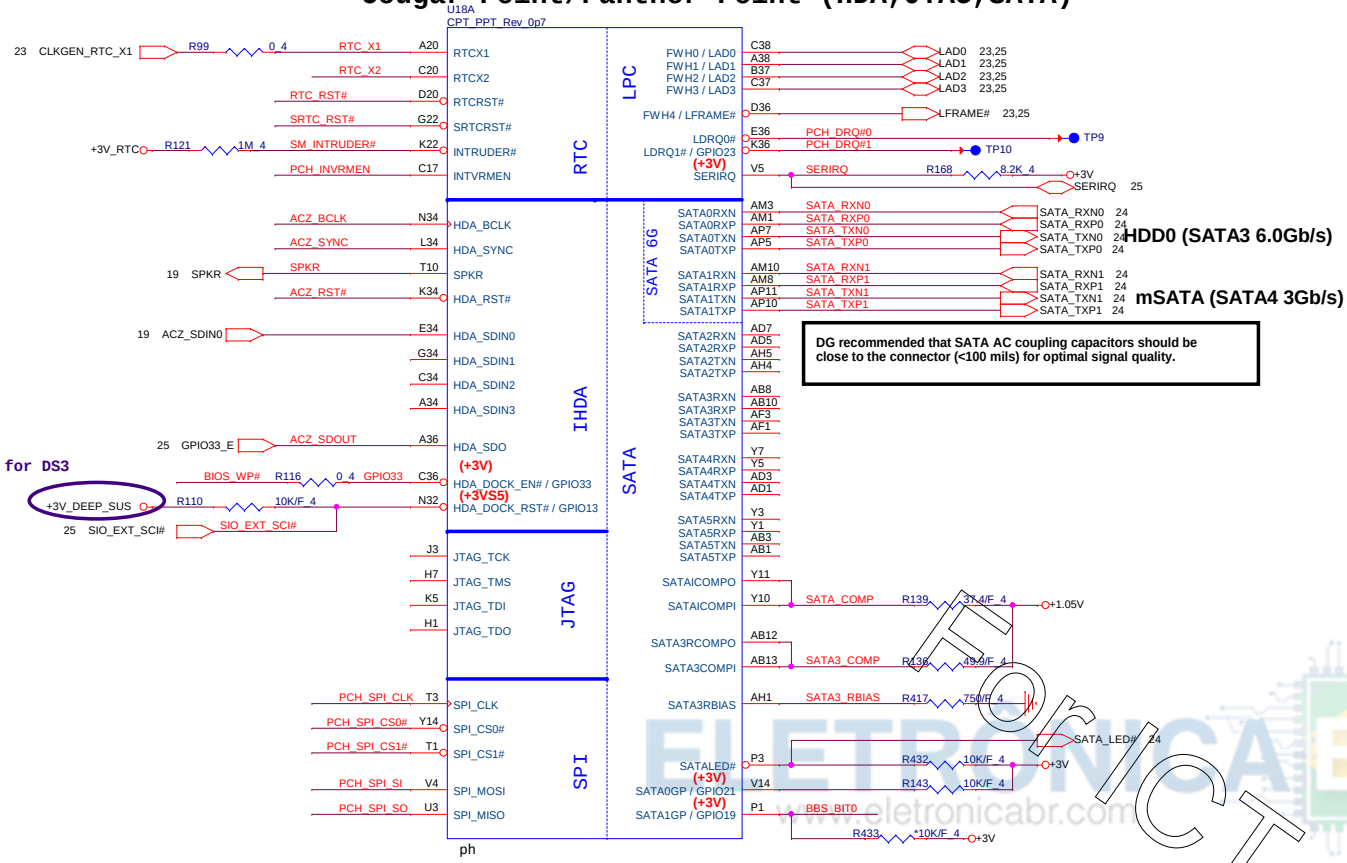
# Cougar Point/Panther Point (DMI,FDI,PM)

# Cougar Point/Panther Point (LVDS,DDI)

06



# Cougar Point/Panther Point (HDA,JTAG,SATA)

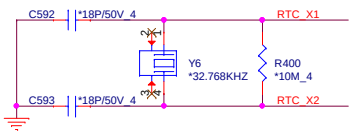



## PCH Strap Table

| 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 | +3V R152 *1K/F_4 SPKR |
| GNT3# / GPIO55 | Top-Block Swap Override | PWROK | 0 = "top-block swap" mode<br>1 = Default (weak pull-up 20K) | +3V R363 *1K/F_4 R364 10K/F_4 PCI_GNT3# 8 |
| INTVRMEN | Integrated 1.05V VRM enable | ALWAYS | Should be always pull-up | +3V_RTC R122 330K_4 PCH_INVRMEN |
| HDA_DOCK_EN#/GPIO33 | Flash Descriptor Security<br>Only for Interposer | PWROK | 0 = Override<br>1 = Default (weak pull-up 20K) | GPIO33 R104 *1K/F_4 ACZ_SDOUT ACZ_SDOUT 25 |
| GNT1# / GPIO51 | Boot BIOS Selection 1 [bit-1] | PWROK | GNT1# GNT0# Boot Location<br>1 1 SPI<br>0 0 LPC | [Need external pull-down for LPC BIOS]<br>Default weak pull-up on GNT0/1# |
| GPIO19 Different from Calpella | Boot BIOS Selection 0 [bit-0] | PWROK | | R419 *1K/F_4 BBS_BIT0<br>R354 *1K/F_4 BBS_BIT1 8 |
| GNT2# / GPIO53 | ESI strap (Server only) | PWROK | Should not be pull-down (weak pull-up 20K) | USE GPIO PIN |
| NV_ALE | Intel Anti-Theft HDD protection<br>Only for Interposer | PWROK | 0 = Disable (Internal pull-down 20kohm) | +1.8V R416 *1K/F_4 NV_ALE 8 |
| NV_CLE | DMI Termination voltage | PWROK | weak pull-down 20kohm | +1.8V R415 2.2K_4 R414 1K/F_4 NV_CLE 9 H_SNB_IVB# 2 |
| HDA_SYNC | On-Die PLL VR Voltage Select | RSMRST | 0 = Support by 1.8V (weak pull-down)<br>1 = Support by 1.5V | for DS3 +3V_DEEP_SUS R135 1K/F_4 ACZ_SYNC |
| HDA_SDO | Flash Descriptor Security | PWROK | 0 = Override<br>1 = Default (weak pull-up 20K) | +3V_DEEP_SUS R105 *1K/F_4 ACZ_SDOUT |
| GPIO8 | Integrated Clock Chip Enable | RSMRST# | Should be pull-down (weak pull-up 20K) | |
| GPIO28 Different from Calpella | On-die PLL Voltage Regulator | RSMRST# | 0 = Disable<br>1 = Enable (Default) | |
| SPI_MOSI | iTPM function Disable | APWROK | 0 = Default (weak pull-down 20K)<br>1 = Enable | |

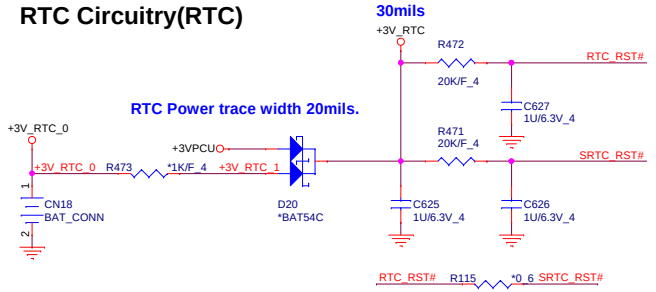


## RTC Clock 32.768KHz

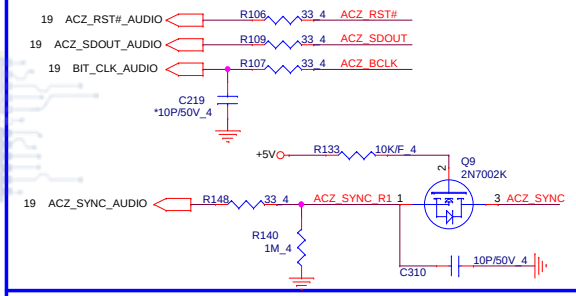



no stuff If use green Clock

## RTC Circuitry(RTC)

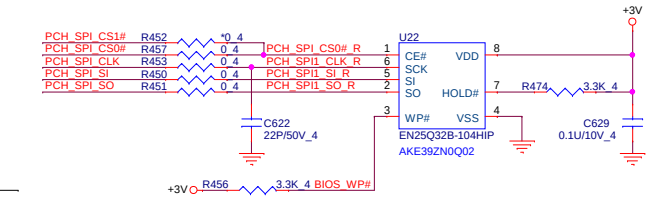



## HDA Bus(CLG)




## PCH SPI ROM(CLG)

| Vender | Size | P/N |
|---|---|---|
| EON | 4MB | AKE39ZN0Q02 (EN25Q32B-104HIP) |
| MX | 4MB | AKE39FP0Z02 (MX25L3206EM2I-12G) |
| AMIC | 4MB | AKE39F-0800 (A25LQ32AM-F/Q) |
| Socket | | DFHS08FS023 |




+3V 6,8,9,10,12,13,14,16,19,20,21,22,23,24,25,26,30,32,34,36
+5V 10,19,21,22,23,24,26,36
+1.8V 4,10,31
+1.05V 2,4,6,8,10,21,23,30,33,34
+3VS5 6,10,23,28,30,33,36
+3VPCU 21,22,23,24,25,26,27,28
+3V_RTC 6,10,23

NB5

**PROJECT : VOLKS**
Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | PCH 2/6 (HDA/RTC/SATA/SPI) | 1A |
| Date: Thursday, June 07, 2012 | Sheet 7 of 37 | |

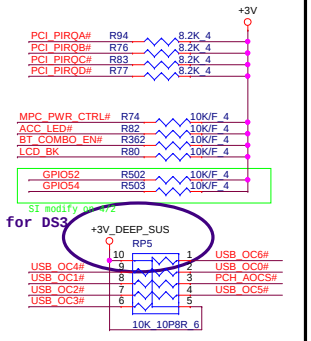
07

# Cougar Point-M/Panther Point (PCI,USB,NVRAM)

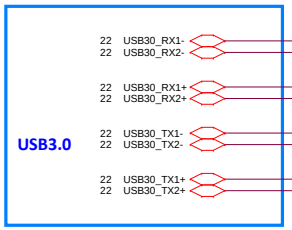
# Cougar Point-M/Panther Point (PCI-E,SMBUS,CLK)

08

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

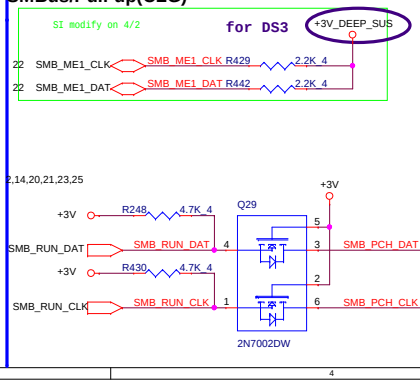



## USB3.0

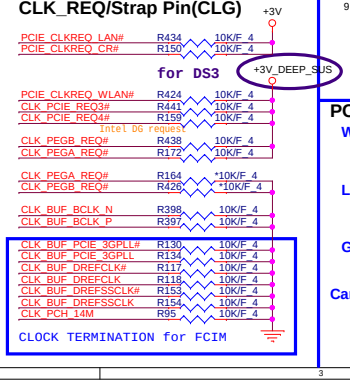



20111130 Modify USB3.0 for HM70

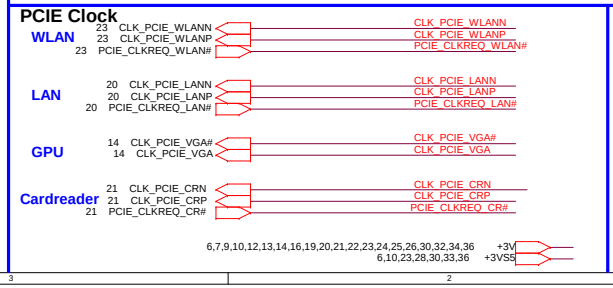
## SMBus/Pull-up(CLG)



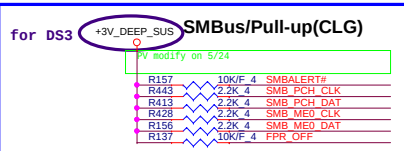

## CLK_REQ/Strap Pin(CLG)




## PCIE Clock




## SMBus/Pull-up(CLG)




PV , HP request Image sensor
SMBUS reserve to PCH

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

MPC_PWR_CTRL# R75 *1K/F_4

NV_ALE 7

USB2.0 USB2.0/USB3.0 COMBO 1st
USB2.0 USB2.0/USB3.0 COMBO 2nd
Camera
WLAN
LAN
Cardreader
USB2.0 Right
WLAN

USBRBIAS# C33 USB_BIAS R395 22.6/F_4
USBRBIAS B33

EMI(near PCH)

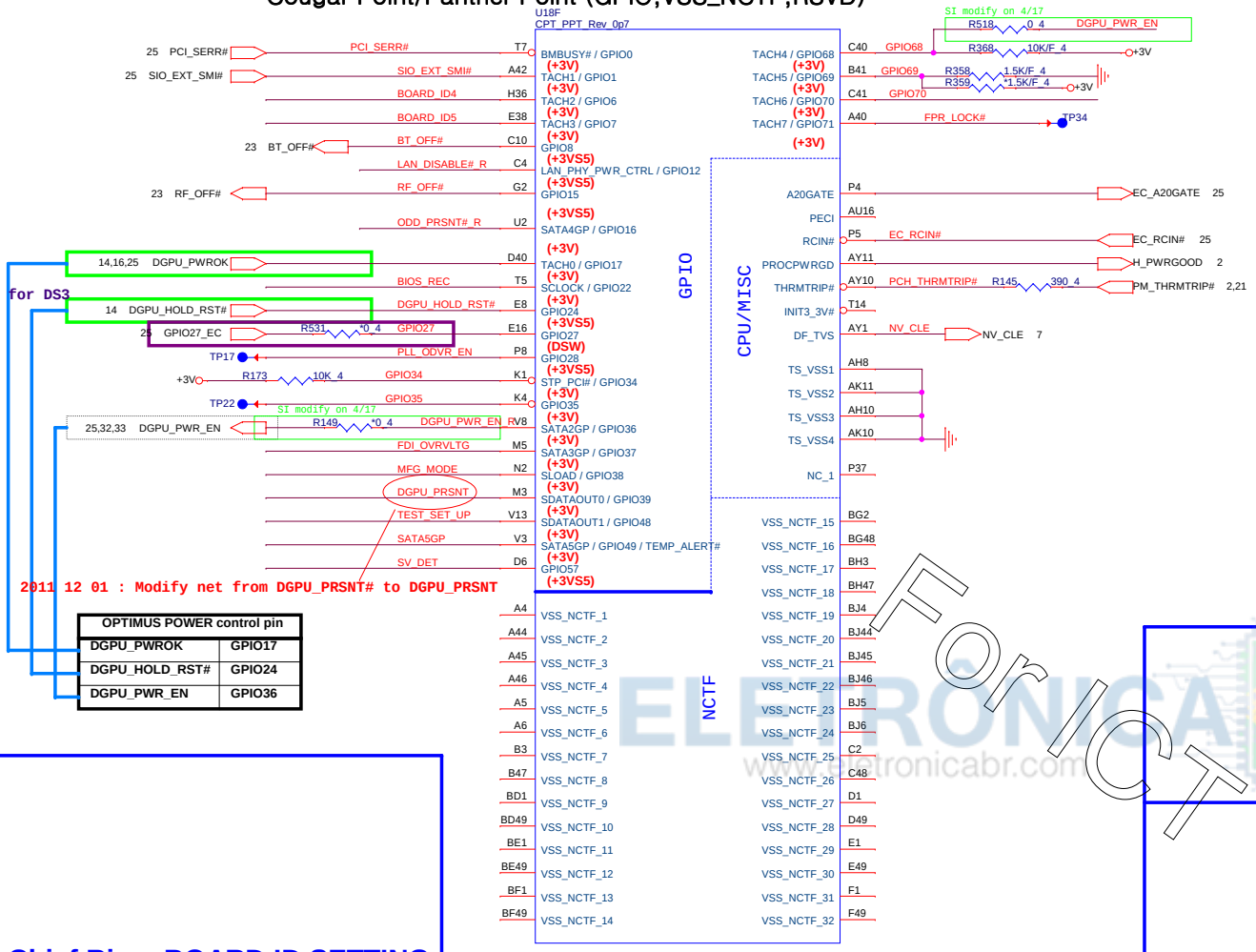




PROJECT : VOLKS
Quanta Computer Inc.
NB5
Size: Custom
Document Number: PCH 3/6 (Clock/PCI/PCIE/USB)
Rev: 1
Date: Thursday, June 07, 2012
Sheet 8 of 37

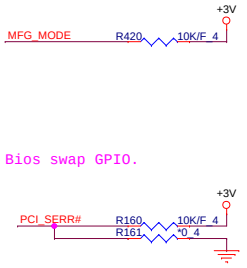
# Cougar Point/Panther Point (GPIO,VSS_NCTF,RSVD)

09

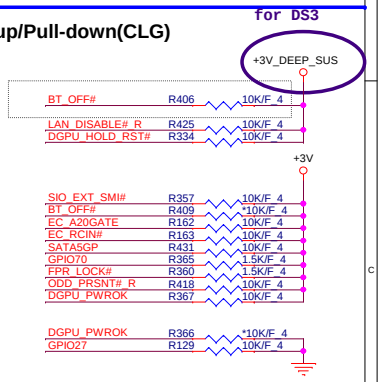


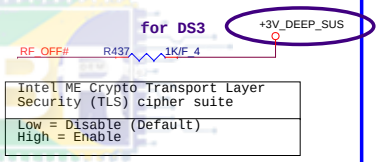

| OPTIMUS POWER control pin | |
|---|---|
| DGPU_PWROK | GPIO17 |
| DGPU_HOLD_RST# | GPIO24 |
| DGPU_PWR_EN | GPIO36 |

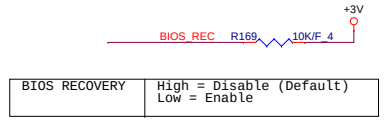
## MFG-TEST

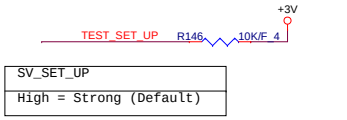


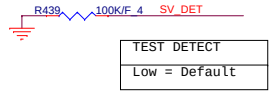

## GPIO Pull-up/Pull-down(CLG)



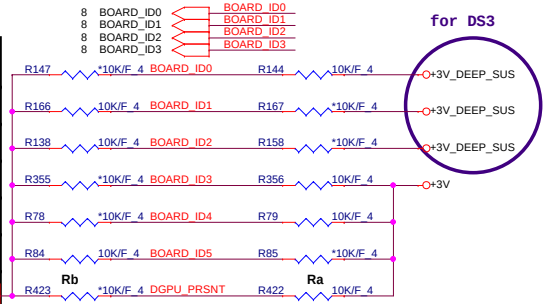



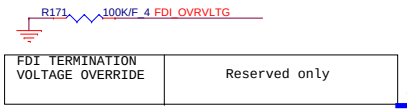

## Chief River BOARD ID SETTING

| Model | BOARD_ID5 | BOARD_ID4 14": 0 15": 1 | BOARD_ID3 HM70: 0 HM77: 1 | BOARD_ID2 | BOARD_ID1 1G: 0 2G: 1 | BOARD_ID0 UMA: 0 DIS: 1 |
|---|---|---|---|---|---|---|
| U33 UMA | 0 | 0 | 0 | 0 | 0 | 0 |
| U33 DIS 128*16 VRAM | 0 | 0 | 0 | 0 | 0 | 1 |
| U33 DIS 256X16 VRAM | 0 | 0 | 0 | 0 | 1 | 1 |
| | 0 | 0 | 0 | 1 | 1 | 1 |
| U33 HM77 | 0 | 0 | 1 | X | X | X |
| U33 HM70 | 0 | 0 | 0 | X | X | X |




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

| SATA2GP/GPIO36 | Reserved only |
|---|---|



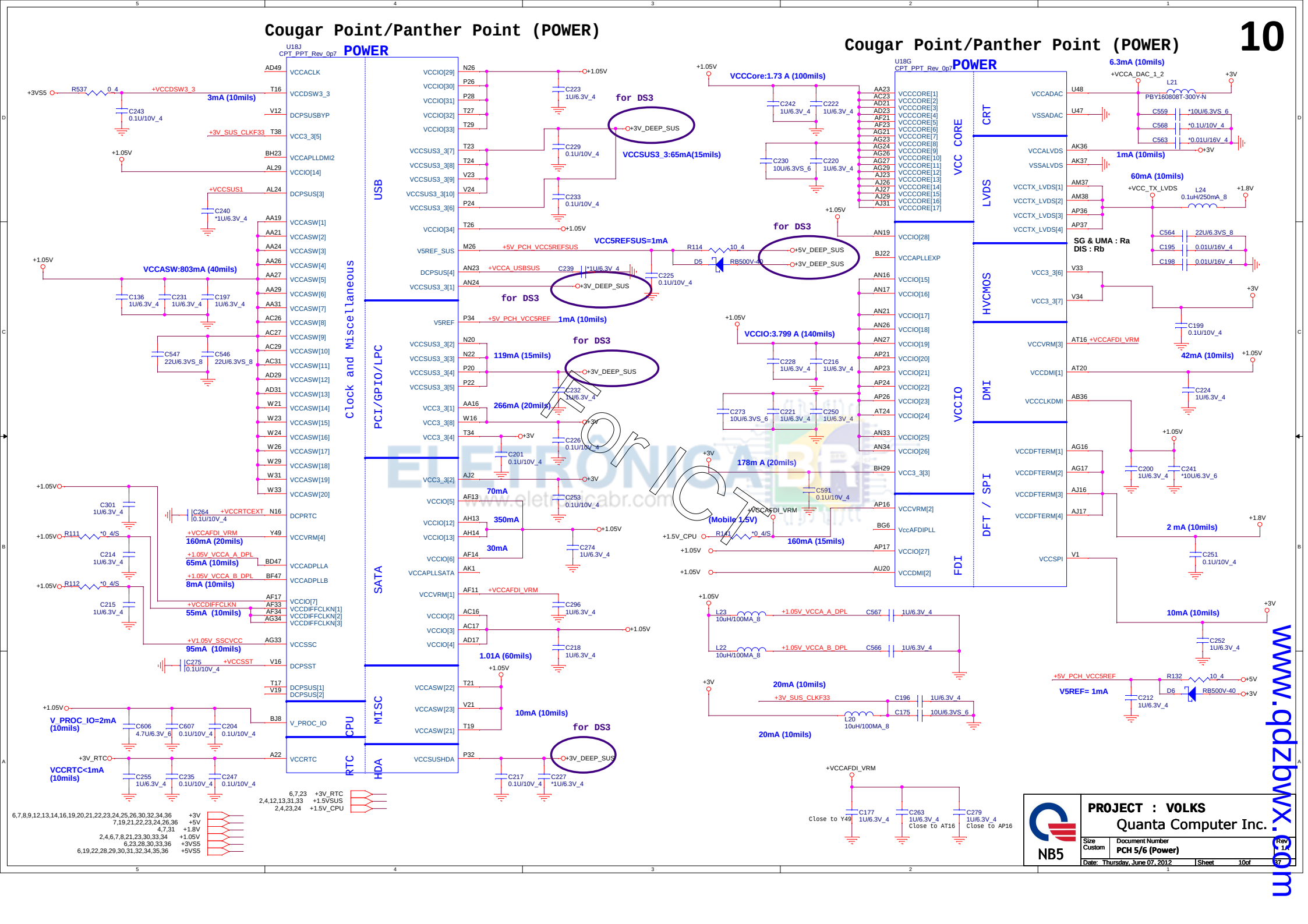

6,7,8,10,12,13,14,16,19,20,21,22,23,24,25,26,30,32,34,36 +3V
6,10,23,28,30,33,36 +3VS5

| | | |
|---|---|---|
| NB5 | PROJECT : VOLKS<br>Quanta Computer Inc. | |
| | Size: Custom | Document Number: PCH 4/6 (GPIO) |
| | Date: Thursday, June 07, 2012 | Sheet 9 of 37 |

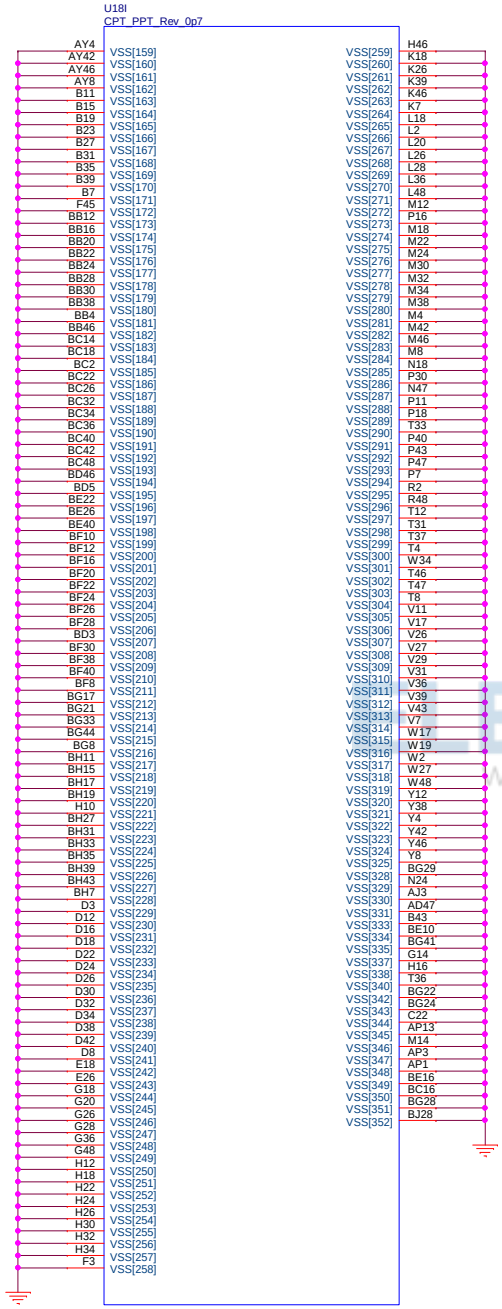
# Cougar Point/Panther Point (POWER)

Cougar Point/Panther Point (POWER)

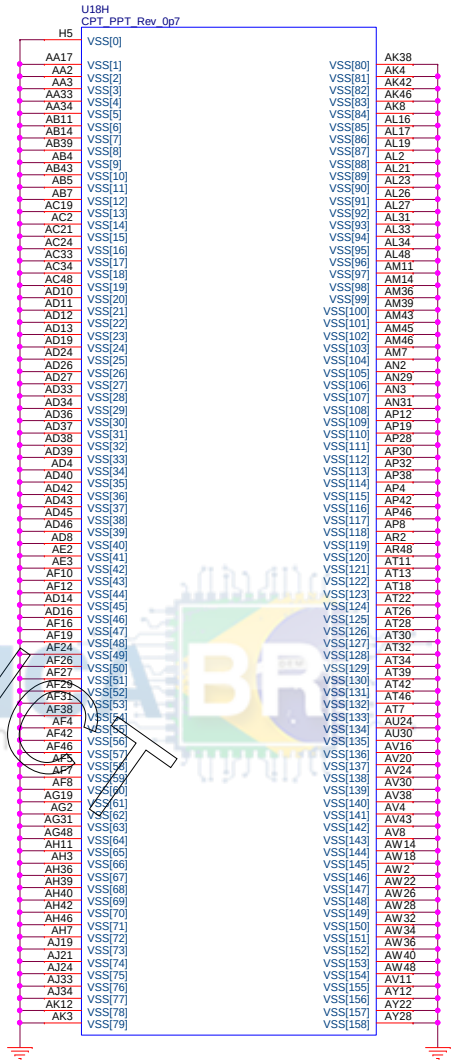




## Cougar Point/Panther Point (GND)



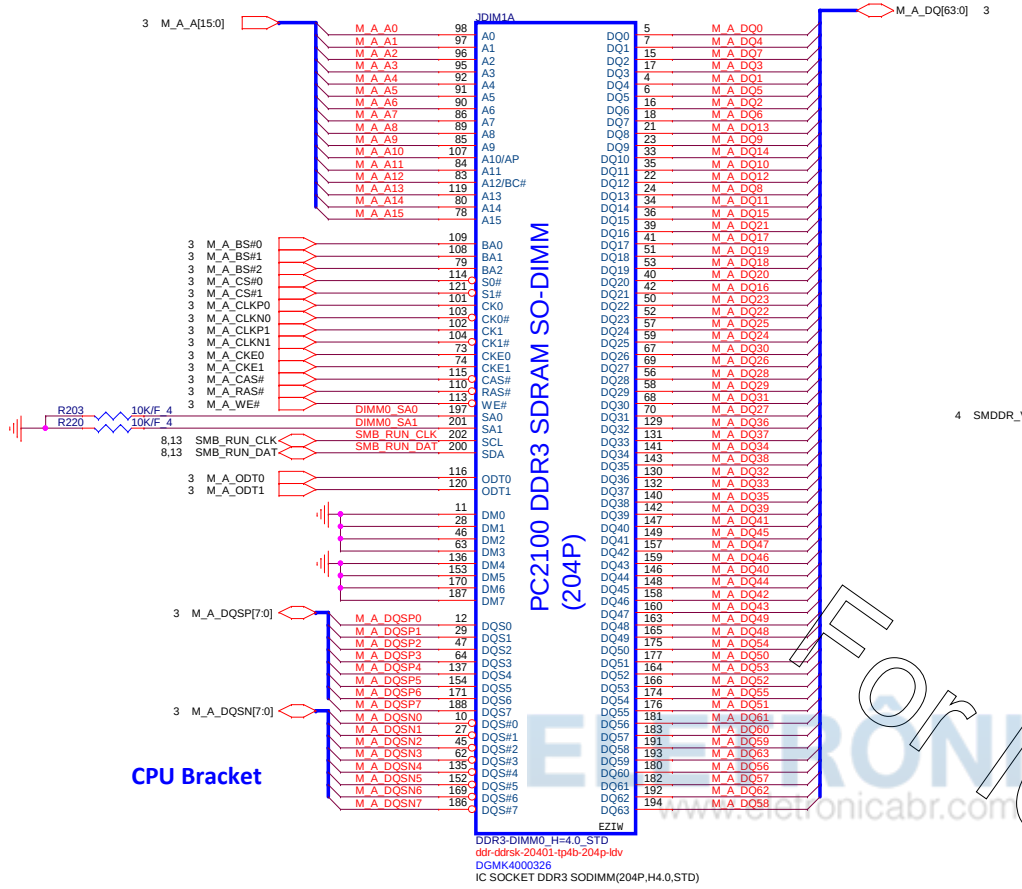

## Cougar Point/Panther Point (GND)

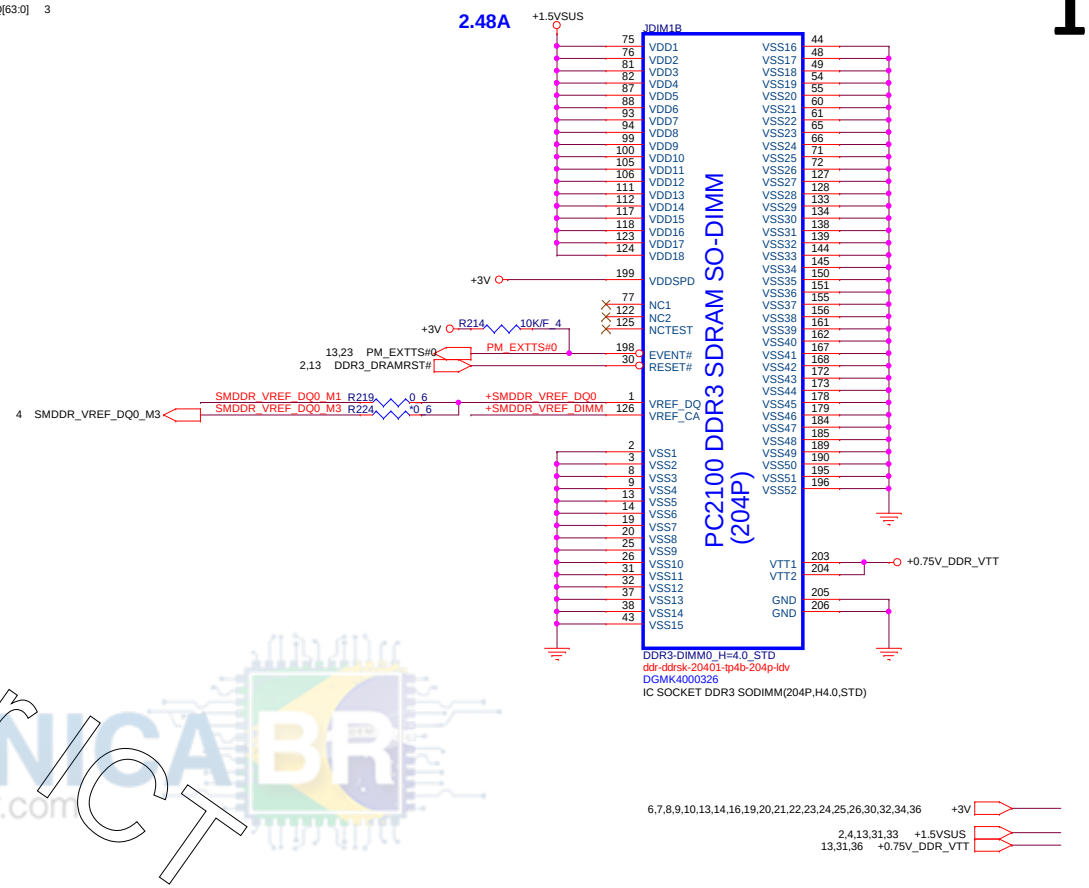






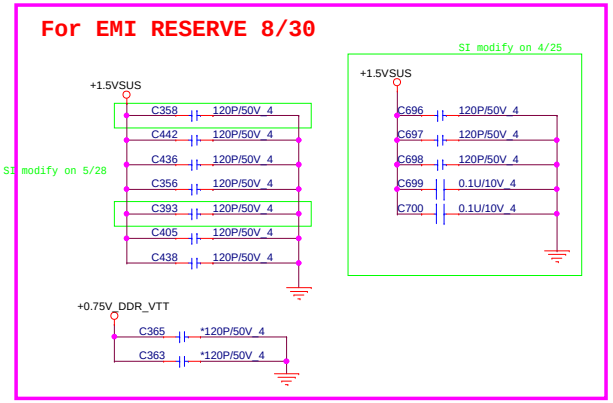

| | | |
|---|---|---|
| NB5 | PROJECT : VOLKS<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: PCH 6/6 (Ground) | Rev: 1A |
| Date: Thursday, June 07, 2012 | Sheet: 11of | 37 |

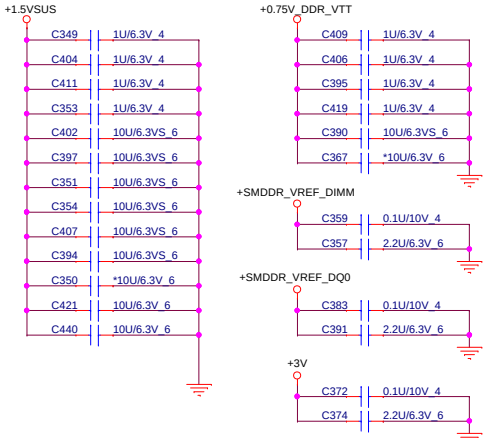


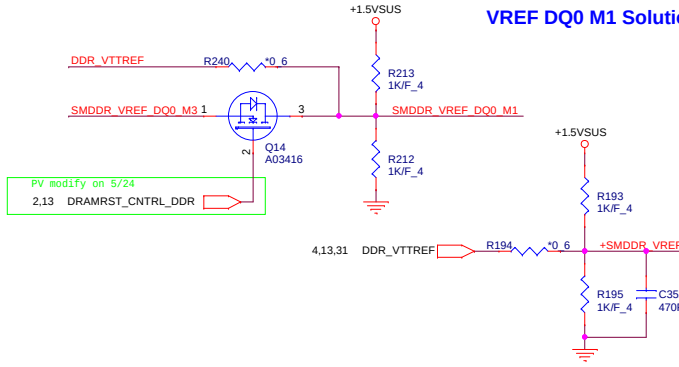







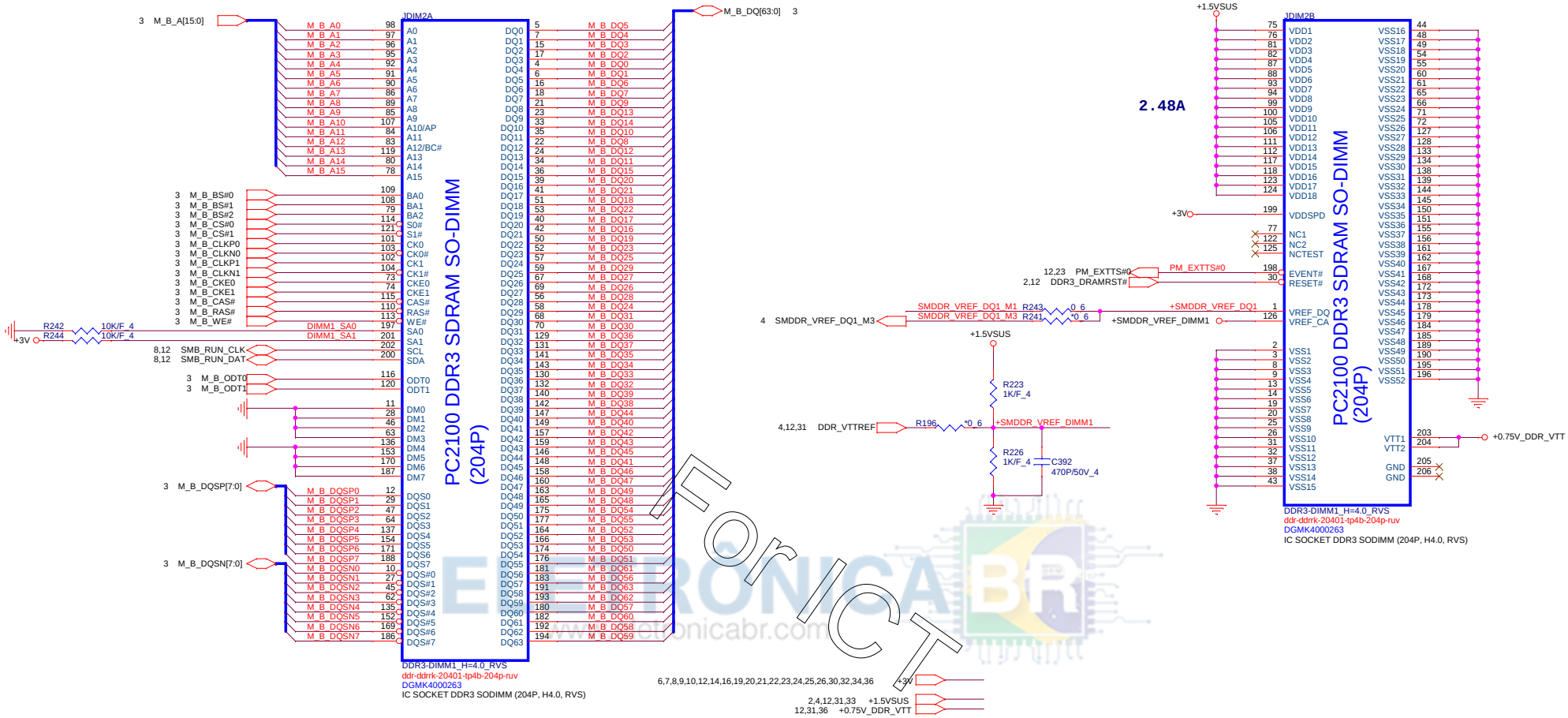




PROJECT : VOLKS
Quanta Computer Inc.

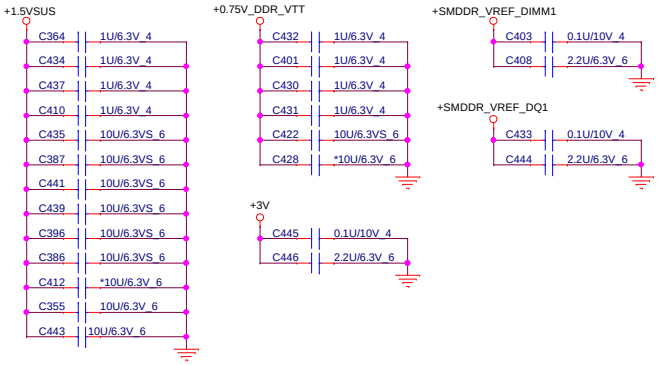
| Size | Document Number | Rev |
|---|---|---|
| Custom | System Memory 1/2 (5.2H) | 1A |
| Date: Thursday, June 07, 2012 | Sheet 12of 37 | |

NB5

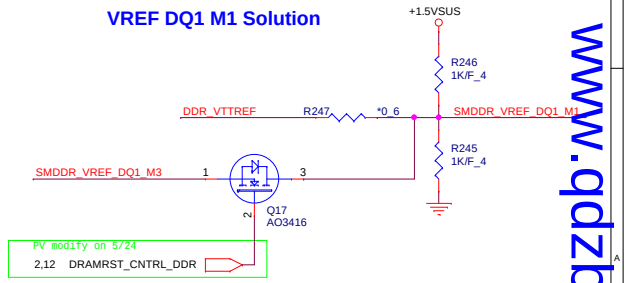





## Place these Caps near So-Dimm1.




## VREF DQ1 M1 Solution




| | | |
|---|---|---|
| NB5 | PROJECT : VOLKS<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: System Memory 2/2 (9.2H) | Rev: 1A |
| Date: Thursday, June 07, 2012 | Sheet 13of 37 | |

N13P-GV2-S-A2 ( GB2-64 )
Max point NVCLK = 937.5 , MCLK = 900
TDP point NVCLK = 800 , MCLK = 900

**PEX_IOVDD + PEX_IOVDDQ = 1.042A**

**PEX_PLL_HVDD + PEX_SVDD_3V3 = 143mA**

**PEX_PLLVDD = 130mA**

NVDD = 32.22 ~ 26.66 A

VDD33 = 56mA

power up sequence

power down sequence

First Rail to Power Down

Last Rail to Power Down

tPower_OFF < 10 ms



PROJECT : VOLKS
Quanta Computer Inc.
NB5
Size: Custom | Document Number: N13P-GV2(PCIE/F) | Rev: 1A
Date: Thursday, June 07, 2012 | Sheet 14of 37

U15B
bga595-nvidia-n13p-gv2-s-a2
COMMON

R39 10K/F_4 FB_CLAMP F3

| NC | GF119 |
|---|---|
| FB_CLAMP | GF117 |

2/14 FBA

FBA_ODT_L FBA_CMD2 R4 10K/F_4
FBA_ODT_H FBA_CMD18 R56 10K/F_4
FBA_RST# FBA_CMD5 R3 10K/F_4
FBA_CKE_L FBA_CMD3 R34 10K/F_4
FBA_CKE_H FBA_CMD19 R73 10K/F_4

T19 FBA_CMD1
T13 FBA_CMD17
T20 FBA_CMD31

For debug only

+1.5V_GFX R30 60.4/F_4 FBA_DEBUG0
+1.5V_GFX R29 60.4/F_4 FBA_DEBUG1

18 VMA_CLK0 VMA_CLK0 D24 FBA_CLK0
18 VMA_CLK0# VMA_CLK0# D25 FBA_CLK0
18 VMA_CLK1 VMA_CLK1 N22 FBA_CLK1
18 VMA_CLK1# VMA_CLK1# M22 FBA_CLK1

FB_PLLAVDD = 55mA

+1.05V_GFX
L7 FBMA-10-160808-300T +FB_PLLAVDD
30 ohm/100MHz
ESR=0.03ohm
C65 0.1U/10V_4
C48 0.1U/10V_4
C45 0.1U/10V_4
C128 22U/6.3VS_6

FB_DLLAVDD = 15mA

| FB_DLLAVDD | GF119 |
|---|---|
| FB_PLLAVDD | GF117 |

ph

18 VMA_DQ[63..0]
18 VMA_DM[7..0]
18 VMA_WDQS[7..0]
18 VMA_RDQS[7..0]

FBVDDQ + FBVDD = 3.116A

U15D
bga595-nvidia-n13p-gv2-s-a2
12/14 FBVDDQ

+1.5V_GFX
C47 0.1U/10V_4
C43 0.1U/10V_4
C35 0.1U/10V_4
C46 0.1U/10V_4
C44 1U/6.3V_4
C40 1U/6.3V_4
C32 4.7U/6.3V_6
C60 10U/6.3V_6
C52 10U/6.3V_6

FB_CAL_PD_VDDQ D22 FB_CAL_PD_VDDQ R26 40.2/F_4 +1.5V_GFX
FB_CAL_PU_GND C24 FB_CAL_PU_GND R28 42.2/F_4
FB_CALTERM_GND B25 FB_CAL_TERM_GND R27 51.1/F_4

FB_VREF_PROBE D23 +FB_VREF1 T10

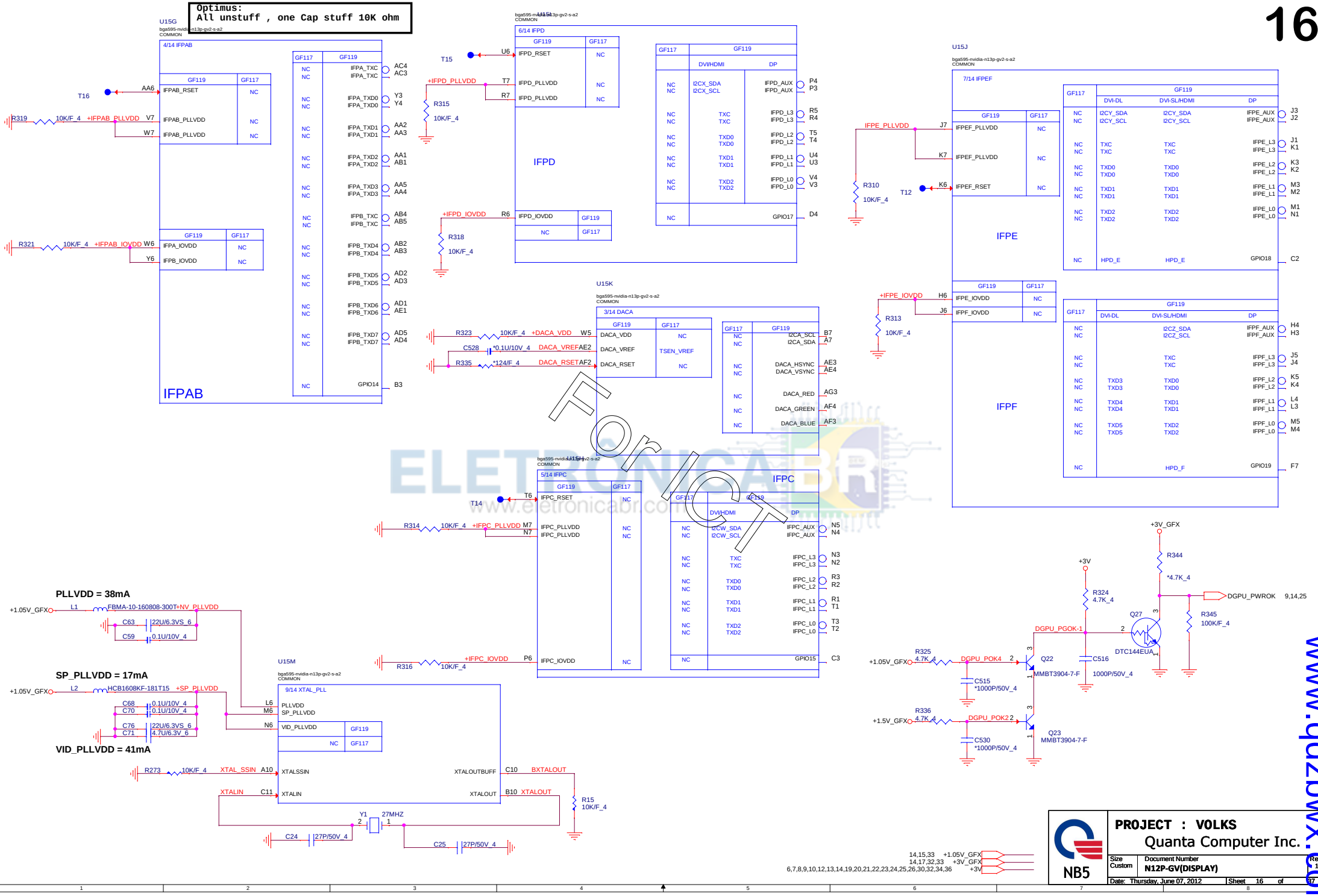
U15F
bga595-nvidia-n13p-gv2-s-a2
COMMON
13/14 GND

14,16,33 +1.05V_GFX
16,17,18,33 +1.5V_GFX



PROJECT : VOLKS
Quanta Computer Inc.
NB5
Size Custom | Document Number N11M-GE2(MEMORY/GND) | Rev 1A
Date: Thursday, June 07, 2012 | Sheet 15 of 37

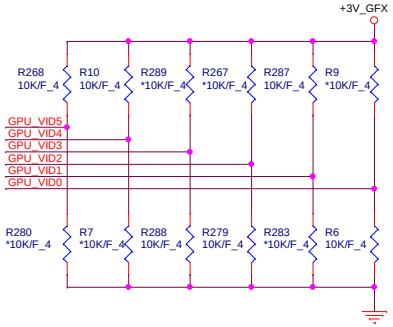
**Optimus:**
**All unstuff , one Cap stuff 10K ohm**



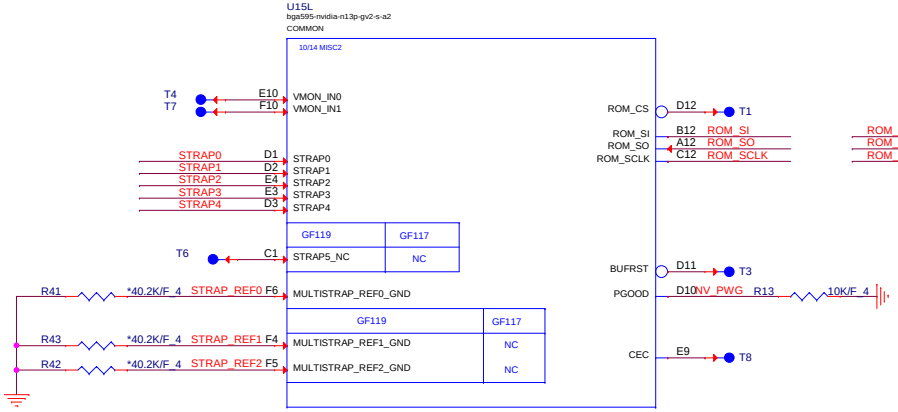


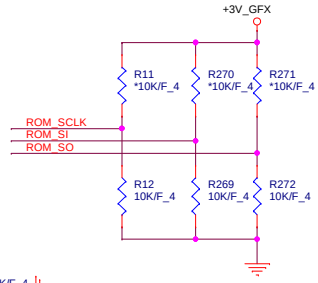


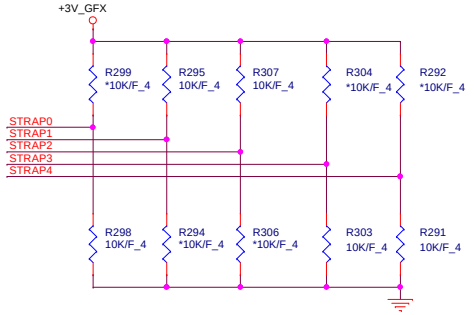

| | | |
|---|---|---|
| NB5 | PROJECT : VOLKS<br>Quanta Computer Inc. | |
| Size Custom | Document Number N12P-GV(DISPLAY) | Rev 1A |
| Date: Thursday, June 07, 2012 | Sheet 16 of 37 | |




N13P-GV2 NVDD HW BOOT Voltage = 0.875V
VID = 0110010

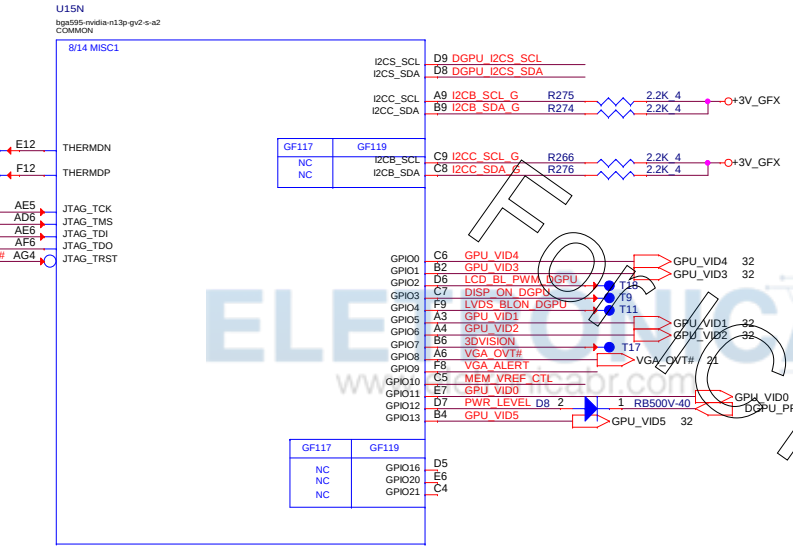


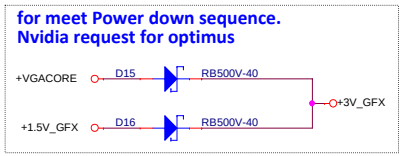



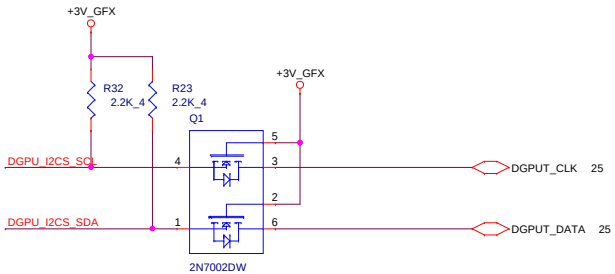

## Binary Strap Mode Mapping

| Strap Pin name | Strap Mapping | Resistance | Polarity |
|---|---|---|---|
| ROM_SCLK | SMB_ALT_ADDR | 10Kohm | Pull-down to GND |
| ROM_SI | SUB_VENDOR | 10Kohm | Pull-UP to 3V3 if VBIOS ROM Exists<br>Pull-down to GND if no VBIO ROM |
| ROM_SO | VGA_DEVICE | 10Kohm | Pull-down to GND ( no dispaly ) |
| STRAP0 | RAMCFG[0] | 10Kohm | USER defined |
| STRAP1 | RAMCFG1] | 10Kohm | USER defined |
| STRAP2 | RAMCFG[2] | 10Kohm | USER defined |
| STRAP3 | RAMCFG[3] | 10Kohm | USER defined |
| STRAP4 | PCIE_MAX_SPEED | 10Kohm | Pull-down to GND |




for meet Power down sequence.
Nvidia request for optimus



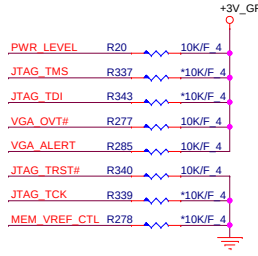




### VRAM Configuration Table

| RAMCFG [3:0] | DESCRIPTION | Vendor | Vendor P/N | QBCON P/N | HP P/N |
|---|---|---|---|---|---|
| | | Reserved | | | |
| | (MP) | | | | |
| 0011 | DDR3 256Mx16x4, 64bit, 2Gb,900MHz | Hynix | H5TQ4G63MFR-11C | AKD5PGWTW00 | AKD5PGWTW01 |
| 0101 | DDR3 256Mx16x4, 64bit, 2Gb,900MHz | Micron | MT41K256M16HA-107G:E | AKD5PGSTL01 | AKD5PGSTL02 |
| 1100 | DDR3 128Mx16x4, 64bit, 1Gb,900MHz | Hynix | H5TQ2G63DFR-11C | AKD5MGWTW12 | AKD5MGWTW13 |
| 0101 | DDR3 128Mx16x4, 64bit, 1Gb,900MHz | Samsung | K4W2G1646C-HC11 | AKD5MGWT513 | AKD5MGWT508 |
| | (OOC) | | | | |
| 0001 | DDR3 256Mx16x4, 64bit, 2Gb,900MHz | Samsung | K4W4G1646B-HC11 | AKD5MGWT518 | AKD5MGWT517 |
| 0100 | DDR3 256Mx16x4, 64bit, 2Gb,900MHz | Hynix | H5TQ4G63AFR-11C | applying | applying |
| 1011 | DDR3 128Mx16x4, 64bit, 1Gb,900MHz | Samsung | K4W2G1646E-BC11 | AKD5MGGT521 | AKD5MGGT522 |

## GB2-64 and GB4-128 GPIO Desdription

| GPIO pin Name | Normal Function | I/O | Functional Description | Recommended Default Pull-up or Pull-down |
|---|---|---|---|---|
| GPIO0 | GPU_VID4 | O | GPU Core VDD VID4 | Strap to boot NVVDD |
| GPIO1 | GPU_VID3 | O | GPU Core VDD VID3 | Strap to boot NVVDD |
| GPIO2 | LCD_BL_PWM | O | Panel Backlight PWM Brightness Control | 100 K pull-down |
| GPIO3 | LCD_VCC or PSI | O | Panel Power Enable or Phase Shedding | LCD_VCC: 100k pull-down<br>PSI: 10k pull-up or pull-down; stuff as needed to disable phase shedding by default |
| GPIO4 | LCD_BLEN | O | Panel Backlight Enable | 100 K pull-down |
| GPIO5 | GPU_VID1 | O | GPU Core VDD VID1 | Strap to boot NVVDD |
| GPIO6 | GPU_VID2 | O | GPU Core VDD VID2 | Strap to boot NVVDD |
| GPIO7 | 3DVision | O | 3D Vision Left/Right signal | 100 K pull-down |
| GPIO8 | OVERT | I/O | Active Low Thermal Catastrophic Over Temperature | 100 K pull-up |
| GPIO9 | ALERT | I/O | Active Low Thermal Alert | 100 K pull-up |
| GPIO10 | MEM_VREF_CTL | O | Memory VREF Control | 100 K pull-down |
| GPIO11 | GPU_VID0 | O | GPU Core VDD VID0 | Strap to boot NVVDD |
| GPIO12 | PWR_LEVEL | I | AC power detect or power supply overdraw input | 100 K pull-up |
| GPIO13 | GPU_VID5 | O | GPU Core VDD VID5 | Strap to boot NVVDD |
| GPIO14 | HPD_AB | I | Hot Plug Detect for IFPAB | See Figure 76 |
| GPIO15 | HPD_C | I | Hot Plug Detect for IFPC | See Figure 76 |
| GPIO16 | PSI or MEM_VDD_CTL | O | Phase Shedding or Memory VDD VID | PSI: 10k pull-up or pull-down; stuff as needed to disable phase shedding by default<br>MEM_VDD_CTL: Strap to boot FBVDD/Q |
| GPIO17 | HPD_D | I | Hot Plug Detect for IFPD | See Figure 76 |
| GPIO18 | HPD_E | I | Hot Plug Detect for IFPE | See Figure 76 |
| GPIO19 | HPD_F | I | Hot Plug Detect for IFPF | See Figure 76 |
| GPIO20 | Reserved | | | |
| GPIO21 | Reserved | | | |




14,16,32,33 +3V_GFX

NB5

PROJECT : VOLKS
Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | N12P-GV(GPIO/STRAPS) | 1A |

Date: Thursday, June 07, 2012 Sheet 17 of 37

# CHANNEL A: 256MB/512MB DDR3



15 VMA_DQ[63..0]
15 VMA_DM[7..0]
15 VMA_WDQS[7..0]
15 VMA_RDQS[7..0]

U1 — VRAM _DDR3 — 96-BALL SDRAM DDR3 — ph
U14 — VRAM _DDR3 — 96-BALL SDRAM DDR3
U3 — VRAM _DDR3 — 96-BALL SDRAM DDR3
U17 — VRAM _DDR3 — 96-BALL SDRAM DDR3

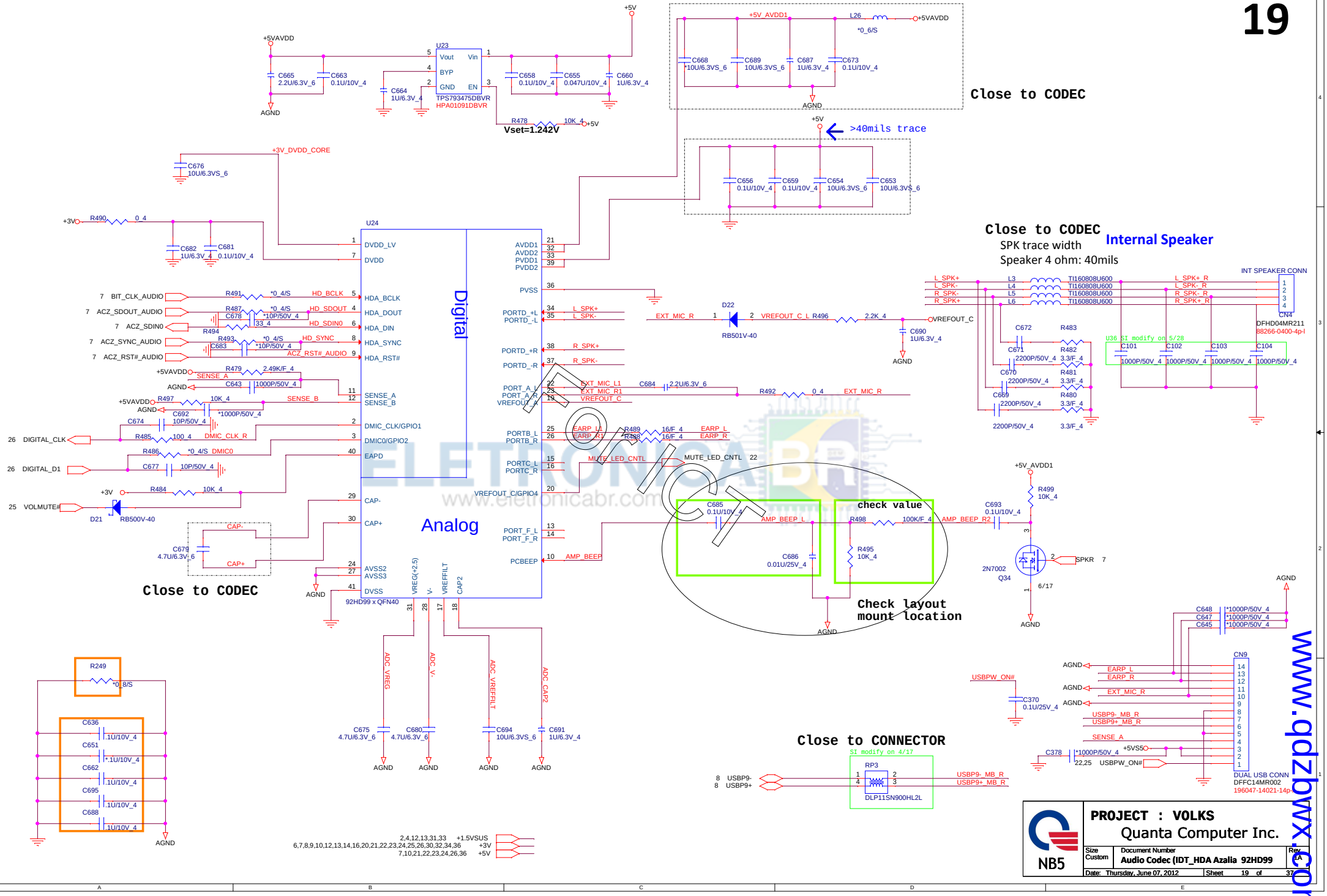
+1.5V_GFX

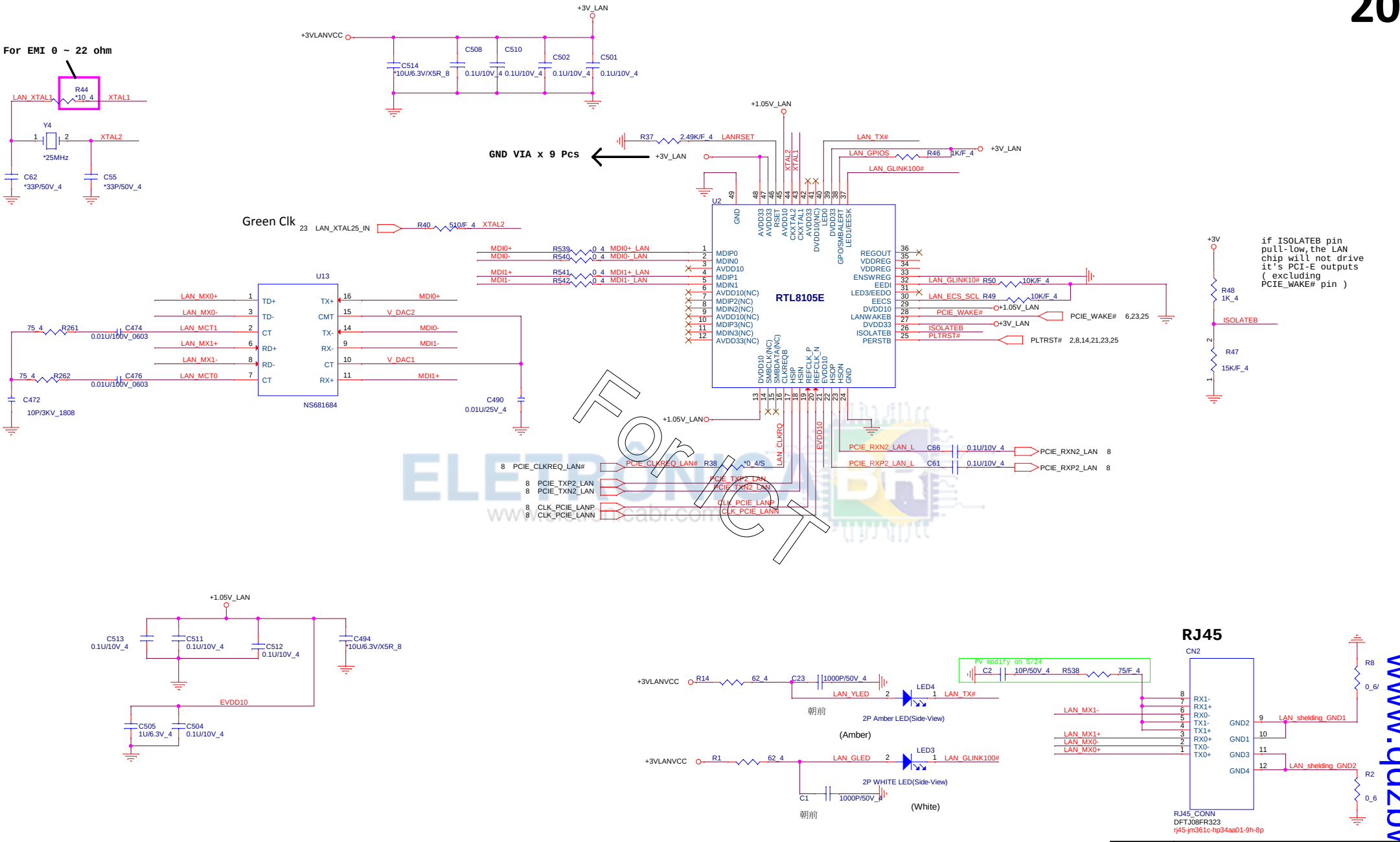
Left
Right
Left
Right
Left
Right

15,16,17,33 +1.5V_GFX



| | |
|---|---|
| NB5 | PROJECT : VOLKS<br>Quanta Computer Inc. |
| Size: Custom | Document Number: DDR3 VRAM(BGA96) Rev: 1A |
| Date: Thursday, June 07, 2012 | Sheet 18 of 37 |

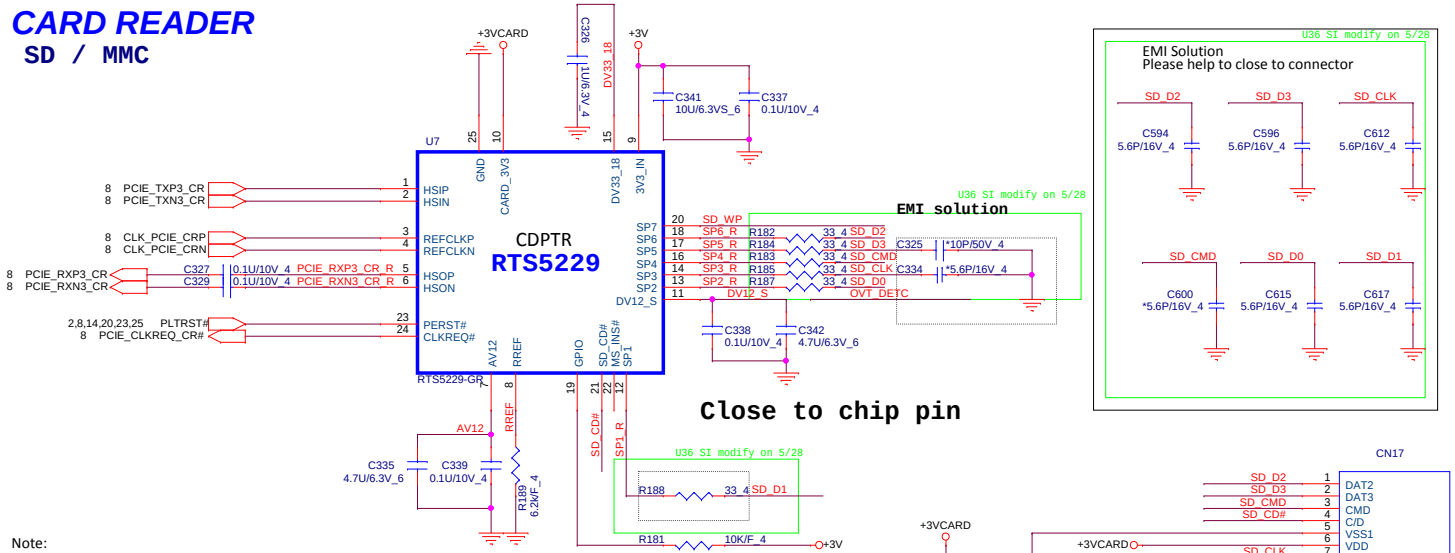






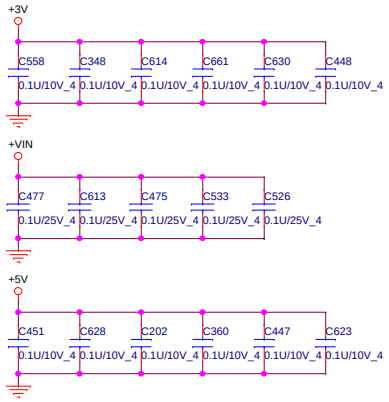

| | | |
|---|---|---|
| NB5 | PROJECT : VOLKS<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: LAN RTL8105/RJ45 | Rev: 1A |
| Date: Thursday, June 07, 2012 | Sheet: 20of | 37 |

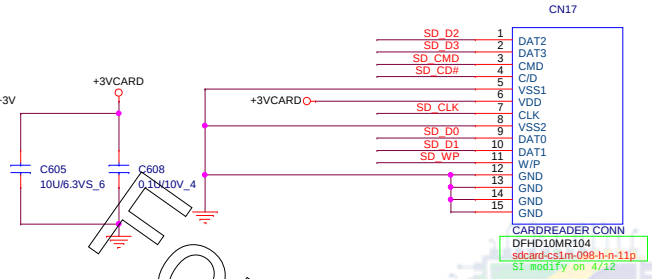
# CARD READER
## SD / MMC





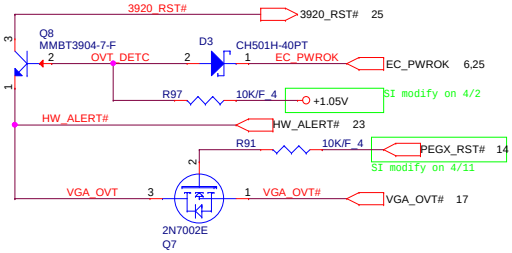


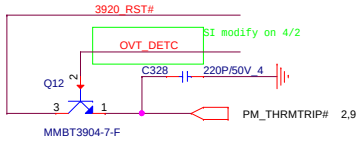


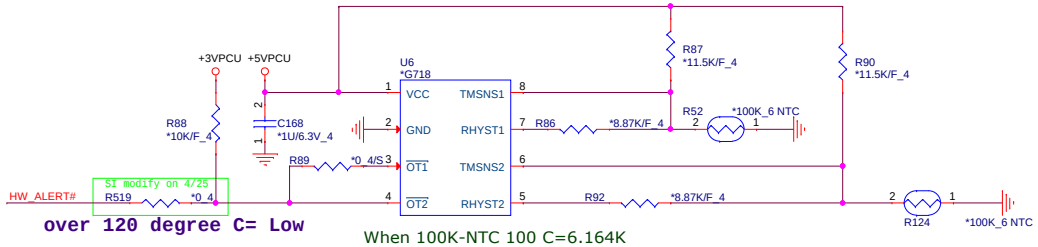




Note:
1. R5194, R5196, R5197, R5198, R5199, R5200 close to U37 pin
2. C5265, C5202 close to U37 pin7
3. C1021, C1022 close to U37 pin11
4. C1089, C1090 close to U37 pin9
5. C1019 close to U37 pin15
6. C1026, C1027 close to CN27 pin11
7. C1025 close to CN27 pin4

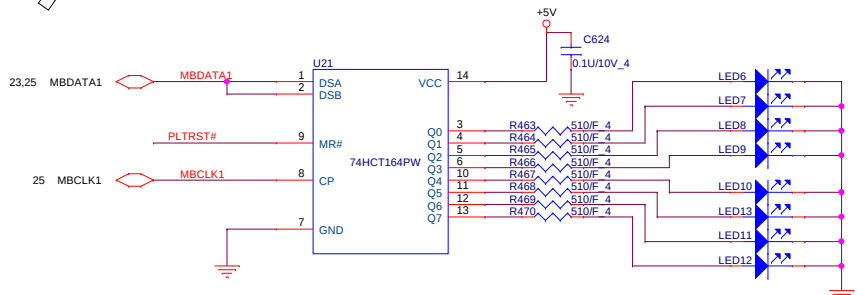
# Thermal HW protect




# 80 port

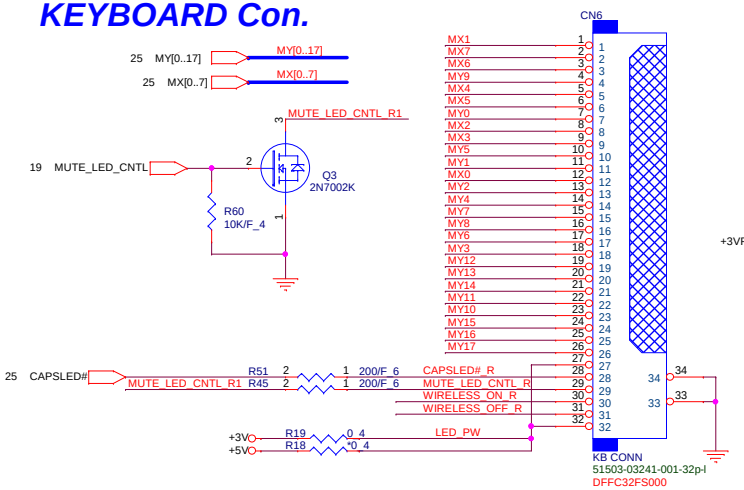




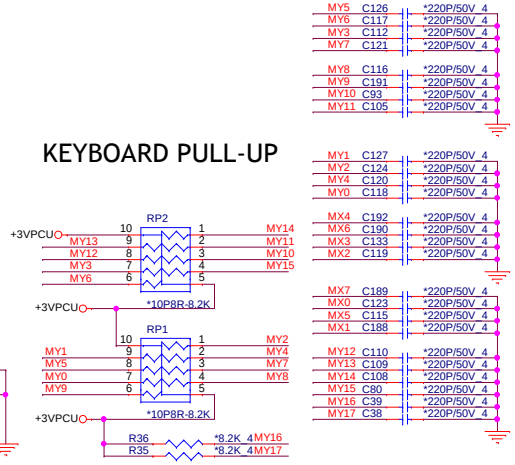



| | | |
|---|---|---|
| NB5 | PROJECT : VOLKS<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: Card Reader control (RTS5229-GR) | Rev: 1A |
| Date: Thursday, June 07, 2012 | Sheet: 21of | 37 |

# KEYBOARD Con.

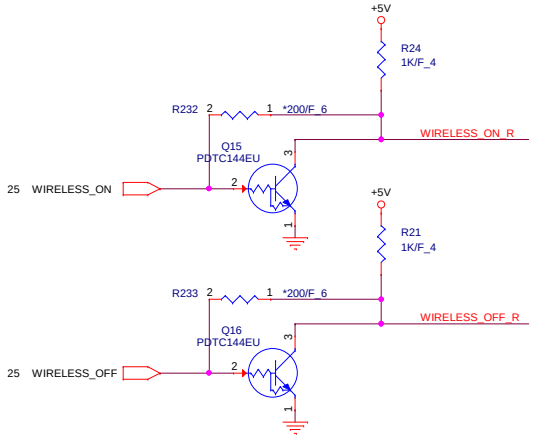



# KEYBOARD PULL-UP

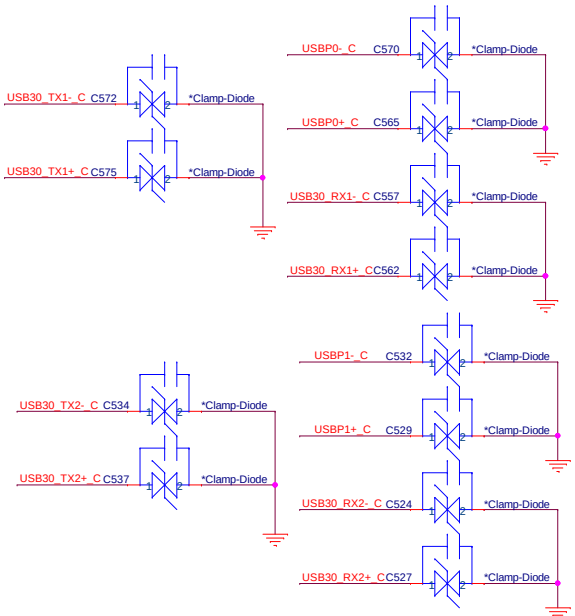




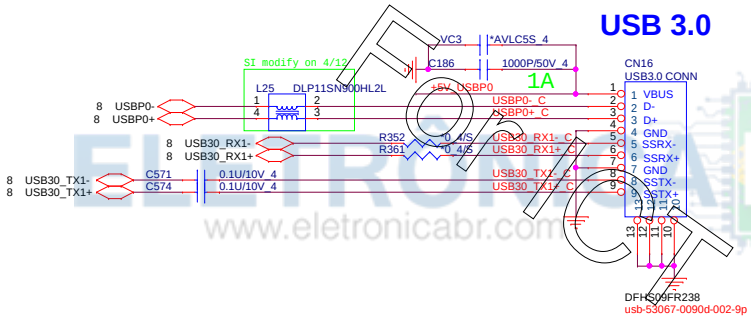




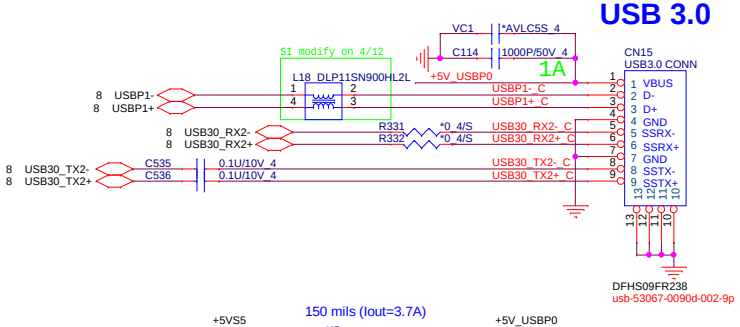

# USB 2.0/3.0 Combo

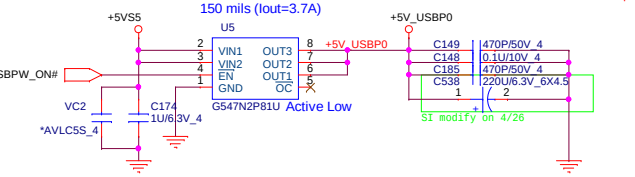



# USB 3.0

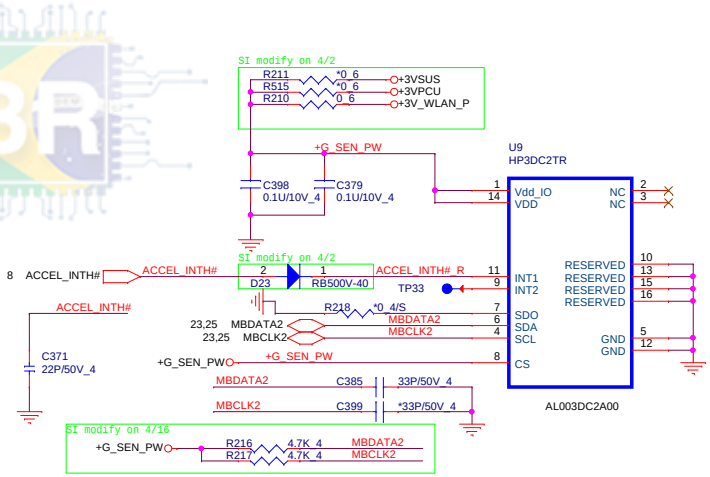


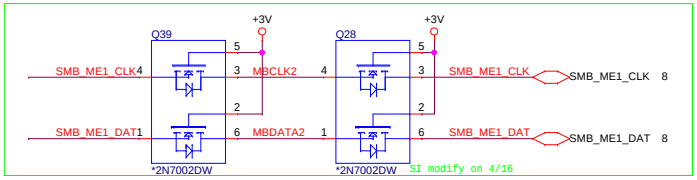

# USB 3.0




# Accelerometer Sensor

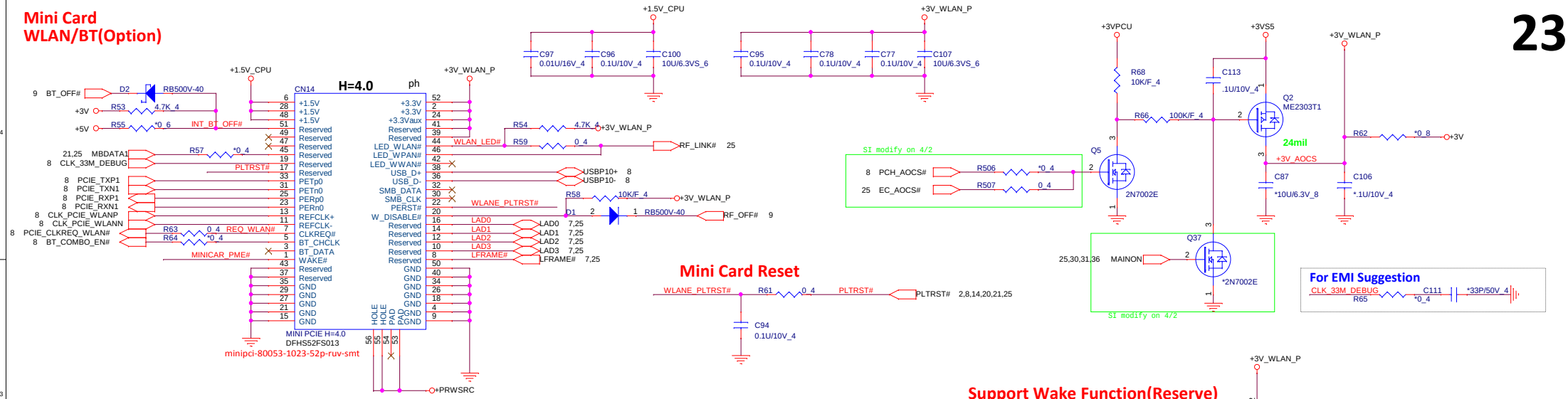



6,19,28,29,30,31,32,34,35,36 +5VS5
7,21,23,24,25,26,27,28 +3VPCU

| | | | |
|---|---|---|---|
| NB5 | PROJECT : VOLKS<br>Quanta Computer Inc. | | |
| | Size: Custom | Document Number: USB 3.0/KB/Green CLK | Rev: 1A |
| | Date: Thursday, June 07, 2012 | Sheet: 22of | 37 |

## Mini Card WLAN/BT(Option)




## Mini Card Reset





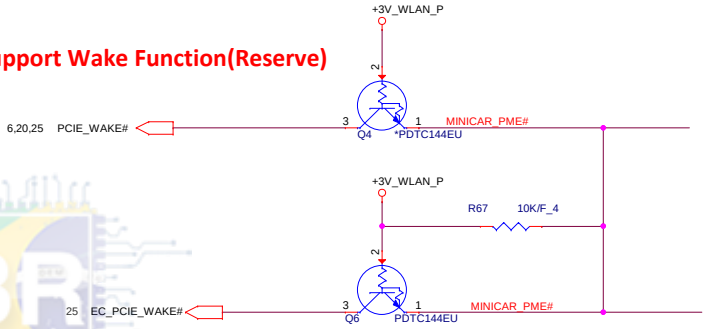





## For EMI Suggestion

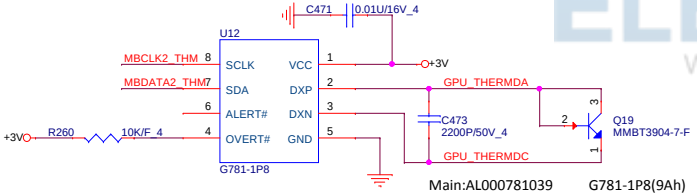



## Support Wake Function(Reserve)




## Local Thermal Sensor

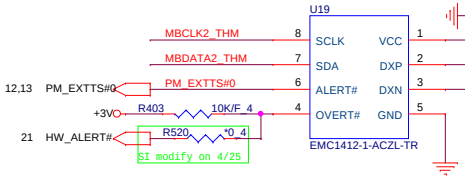
### GPU Thermal Sensor




Main:AL000781039 G781-1P8(9Ah)

2nd:AL001412005 EMC1412-2-ACZL-TR(9Ah)

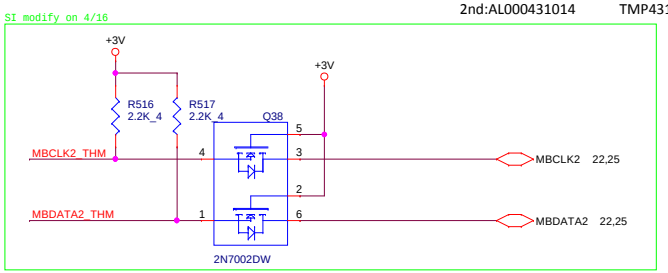
### CPU Thermal Sensor




### DDR3 Thermal Sensor


Main:AL001412003 EMC1412-1-ACZL-TR(98h)

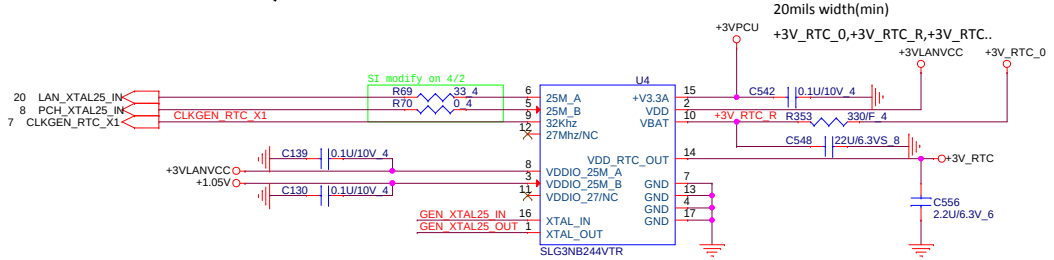
2nd:AL000431014 TMP431ADGKR(98h)

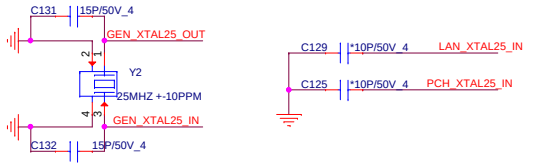



## Green CLK Circuitry

20mils width(min)

+3V_RTC_0,+3V_RTC_R,+3V_RTC..




27 +PRWSRC

6,7,8,9,10,12,13,14,16,19,20,21,22,24,25,26,30,32,34,36 +3V

7,10,19,21,22,24,26,36 +5V

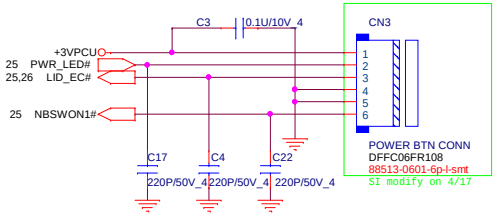
7,21,22,24,25,26,27,28 +3VPCU

2,4,10,24 +1.5V_CPU

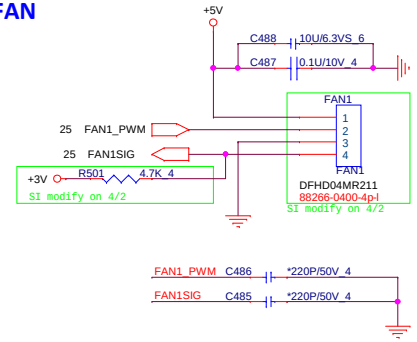
| | | |
|---|---|---|
| NB5 | PROJECT : VOLKS<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: MINI-PCIE/LED | Rev: 1A |
| Date: Thursday, June 07, 2012 | Sheet: 23of | 37 |

## Power Botton Connector

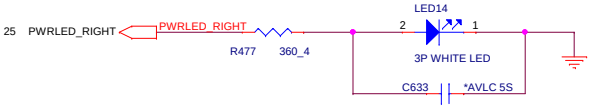
Pin1 : +3VPCU(LIDSWITCH PWR)
Pin2 : POWER LED
Pin3 : LIDSWITCH
Pin4 : GND
Pin5 : GND
Pin6 : POWERON#



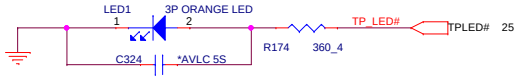

## FAN



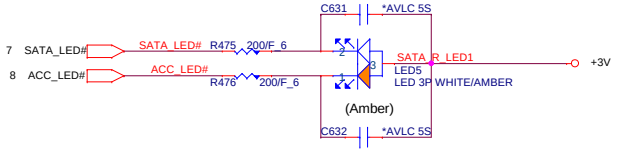

## PWR LED




## 14" TP LED

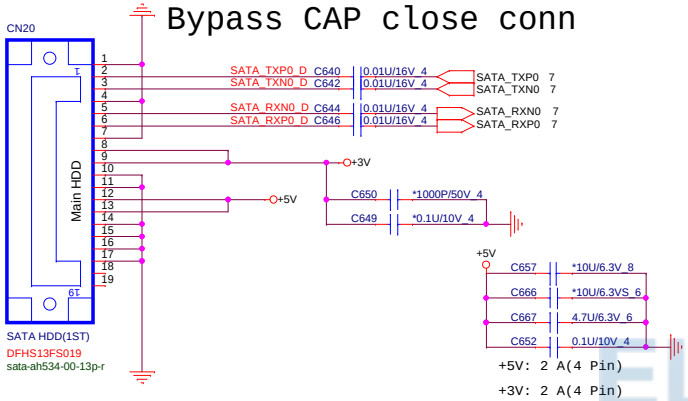



## SATA LED



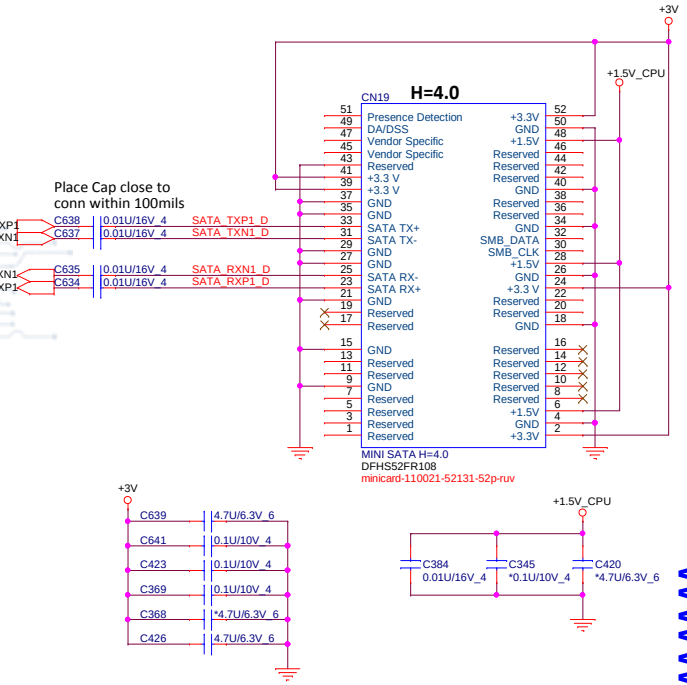

## SATA HDD Connector(Cable type)

Bypass CAP close conn




+5V: 2 A(4 Pin)
+3V: 2 A(4 Pin)
Gnd : (5 Pin)

## Mini PCI-E Card 2- Full size mSATA









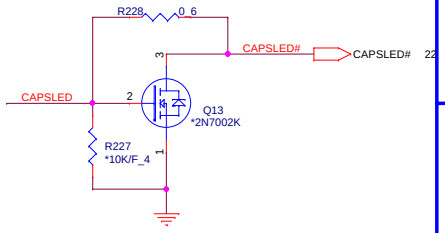

6,7,8,9,10,12,13,14,16,19,20,21,22,23,25,26,30,32,34,36 +3V
7,10,19,21,22,23,26,36 +5V
7,21,22,23,25,26,27,28 +3VPCU
2,4,10,23 +1.5V_CPU
27,33,36 +12VALW

**PROJECT : VOLKS**
Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | SATA HDD/ODD/MSATA CONN | 1A |
| Date: Thursday, June 07, 2012 | Sheet 24of 37 | |

NB5

## Cap LED




SI modify on 4/11

KB_STRAP R514 *10K/F_4

14" un-stuff

15.6" stuff

SI modify on 4/2

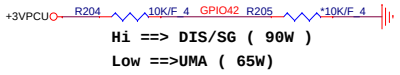
H_PROCHOT# H_PROCHOT# 2,34

H_PROCHOT#_EC

Q36
2N7002K

R513
*10K/F_4

## Adapter select for EC




Hi ==> DIS/SG ( 90W )

Low ==>UMA ( 65W)

| Vender | Size | P/N |
|---|---|---|
| EON | 1MB | AKE3GZN0Q01 (EON EN25Q80A-100HIP) |
| MX | 1MB | AKE3GFP0Z00 (MX25L8006EM2I-12G) |
| AMIC | 1MB | AKE3GZP0801 (A25L080M-F) |
| Socket | | DFHS08FS023 |

SI modify on 4/12

U10

BIOS_CS#
BIOS_SPI_CLK_I
BIOS_WR#
BIOS_RD#
SPI_3P3

CE# VDD
SCK
SI
SO HOLD#
WP# VSS

C429 0.1U/10V_4
R239 10K/F_4
R229 10K/F_4

AKE3GZN0Q01
91960-0084L-8P-SOCKET

Reserve for ENE Hold time issue

| | | |
|---|---|---|
| MBCLK2 | C381 | *10P/50V_4 |
| MBDATA2 | C380 | *10P/50V_4 |
| MBCLK | C373 | *10P/50V_4 |
| MBDATA | C375 | *10P/50V_4 |
| DGPUT_CLK | C389 | *10P/50V_4 |
| DGPUT_DATA | C388 | *10P/50V_4 |

+3VPCU

R202 10K/F_4 NBSWON1#
R207 4.7K_4 MBCLK
R208 4.7K_4 MBDATA
R200 10K/F_4 EC_PCIE_WAKE#

+3V

R113 *10K_4 GPIO33_E
R222 4.7K_4 DGPUT_CLK
R221 4.7K_4 DGPUT_DATA
R201 4.7K_4 DGPU_PROCHOT#
R198 4.7K_4 DGPU_PROCHOT_EC#

HWPG C377 0.1U/10V_4

3920_RST#

+3VPCU R191 47K_4 C346 0.1U/10V_4

C376 *10P/50V_4 R209 *10_4 CLK_33M_KBC

SCI1# D9 *RB501V-40 SIO_EXT_SCI# 7

R197 0_4

DNBSWON#1 D10 *RB500V-40 DNBSWON# 6

R225 0_4

KBSMI#1 D7 *RB500V-40 SIO_EXT_SMI# 9

R192 0_4

U8

SERIRQ
LFRAME#
LAD0
LAD1
LAD2
LAD3
PCICLK
PCIRST#/GPIO5
CLKRUN

SCI/GPIOE
GA20/GPIO0
KBRST/GPIO1
ECRST

KSI0/GPIO30
KSI1/GPIO31
KSI2/GPIO32
KSI3/GPIO33
KSI4/GPIO34
KSI5/GPIO35
KSI6/GPIO36
KSI7/GPIO37

KSO0/GPIO20
KSO1/GPIO21
KSO2/GPIO22
KSO3/GPIO23
KSO4/GPIO24
KSO5/GPIO25
KSO6/GPIO26
KSO7/GPIO27
KSO8/GPIO28
KSO9/GPIO29
KSO10/GPIO2A
KSO11/GPIO2B
KSO12/GPIO2C
KSO13/GPIO2D
KSO14/GPIO2E
KSO15/GPIO2F
KSO16/GPIO48
KSO17/GPIO49

PSCLK1/GPIO4A
PSDAT1/GPIO4B
PSCLK2/GPIO4C
PSDAT2/GPIO4D
PSCLK3/GPIO4E
PSDAT3/GPIO4F

RD
WR
SELMEM/SPICS
SELIO/GPIO50
SELIO2/GPIO43

D0/GPXD0
D1/GPXD1
D2/GPXD2
D3/GPXD3
D4/GPXD4
D5/GPXD5
D6/GPXD6
D7/GPXD7

A0/GPXA0
A1/GPXA1
A2/GPXA2
A3/GPXA3
A4/GPXA4
A5/GPXA5
A6/GPXA6
A7/GPXA7
A8/GPXA8
A9/GPXA9
A10/GPXA10
A11/GPXA11

V18R

KB3940QF A1

VCC1 VCC2 VCC3 VCC4 VCC5 VCC6 AVCC

C400 0.1U/10V_4 500mA
C382 0.1U/10V_4
C347 0.1U/10V_4
C413 0.1U/10V_4
C417 0.1U/10V_4
C418 0.1U/10V_4
C366 0.1U/10V_4
C344 0.1U/10V_4
C414 0.1U/10V_4
C336 *10U/6.3V_8
+3VPCU_EC
C362 0.1U/10V_4

+3VPCU_EC +3VPCU
L10 BLM18BA470SN1D
C361 4.7U/6.3V_6

AD0/GPI38 TEMP_MBAT TEMP_MBAT 27
AD1/GPI39 AD_TYPE
AD2/GPI3A AD_AIR TR29 AD_AIR 27
AD3/GPI3B SYS_I SYS_I 27

DA0/GPO3C LAN_POWER 36
DA1/GPO3D DGPU_PROCHOT_EC# DGPU_PROCHOT_EC# 17
DA2/GPO3E BATSHIP BATSHIP 27
DA3/GPO3F PCH_PCIE_WAKE# R199 0_4 PCIE_WAKE# 6,20,23

PWM1/GPIOE DRAMRST_CNTRL_EC DRAMRST_CNTRL_EC 2
PWM2/GPIO10 GPIO27_EC GPIO27_EC 9

for DS3

FANPWM1/GPIO12 FAN1_PWM FAN1_PWM 24
FANPWM2/GPIO13 EMU_LID EMU_LID 26
FANFB1/GPIO14 FAN1SIG FAN1SIG 24
FANFB2/GPIO15 KB_STRAP

SCL1/GPIO44 MBCLK MBCLK 27
SDA1/GPIO45 MBDATA MBDATA 27
SCL2/GPIO46 MBCLK2 MBCLK2 22,23
SDA2/GPIO47 MBDATA2 MBDATA2 22,23

for Battery charge/charge and cap board

for CPU thermal/G-Sensor

GPIO4 SUSB# SUSB# 6
GPIO7 HWPG HWPG 28,29,30,31
GPIO8 H_PROCHOT# EC

GPIOA SUSC# SUSC# 6
GPIOB PWRLED_RIGHT PWRLED_RIGHT 24
GPIOC R2500V-40 D4 GPIO33_E 7
GPIOD NBSWON1# NBSWON1# 24
GPIO11 SLP_S5 6
GPIO16 MBDATA1 21,23
GPIO17 MBCLK1 21
GPIO18 KBSMI#1

for 80 port

GPIO19 VRON VRON 34
GPIO1A

CIR_RX/GPIO40 EC_PCIE_WAKE# EC_PCIE_WAKE# 23
GPIO41 DGPU_PROCHOT# DGPU_PROCHOT# 32
GPIO42 GPIO42
GPIO52 DNBSWON#1
GPIO53 CAPSLED
GPIO54 PWR_LED# PWR_LED# 24
GPIO55 EC_PWROK EC_PWROK 6,21
GPIO56 RSMRST# RSMRST# 6
GPIO57 VOLMUTE# VOLMUTE# 19
GPIO58 BIOS_SPI_CLK L11 BLM15AG700SS1D(70,0.5A) BIOS_SPI_CLK_I
GPIO59 LID_EC# LID_EC# 24,26

XCLKO CRY2 C416 22P/50V_4
XCLKI CRY1 *32.768KHZ Y3 C415 *18P/50V_4

R237 33_4
C425 22P/50V_4

GND1 GND2 GND3 GND4 GND5 AGND

C424 0.1U/10V_4
C427 4.7U/6.3V_6

CRY2 R238 0_4 PCH_SUSCLK 6
R236 100K_4

For GPU thermal

for DS3

9 PCI_SERR#
34 GFX_HWPG
DGPU_PR_EN_E
EC_GPXD1
SUSWARN#_EC
RF_LINK#
SLP_SUS#_EC
DPWROK_EC
R235 43_4 H_PECI_R
H_PECI
USBPW_ON#
SUSON
MAINON
SLP_SUS#_OFF
S5_ON
SUSACK#_EC
EC_AOCS#
AC_PRESENT_EC
MBATLED0#
AC_LED_ON#
WIRELESS_ON
WIRELESS_OFF

FOR SG/DIS

9,14,16 DGPU_PWROK R234 *0_4/S EC_GPXD1
9,32,33 DGPU_PWR_EN R231 *0_4/S DGPU_PR_EN_E

R230 *100K_4

DIS/SG==NA

UMA==>100K

2,4,6,7,8,10,21,23,30,33,34 +1.05V
6,7,8,9,10,12,13,14,16,19,20,21,22,23,24,26,30,32,34,36 +3V
7,21,22,23,24,26,27,28 +3VPCU

PROJECT : VOLKS

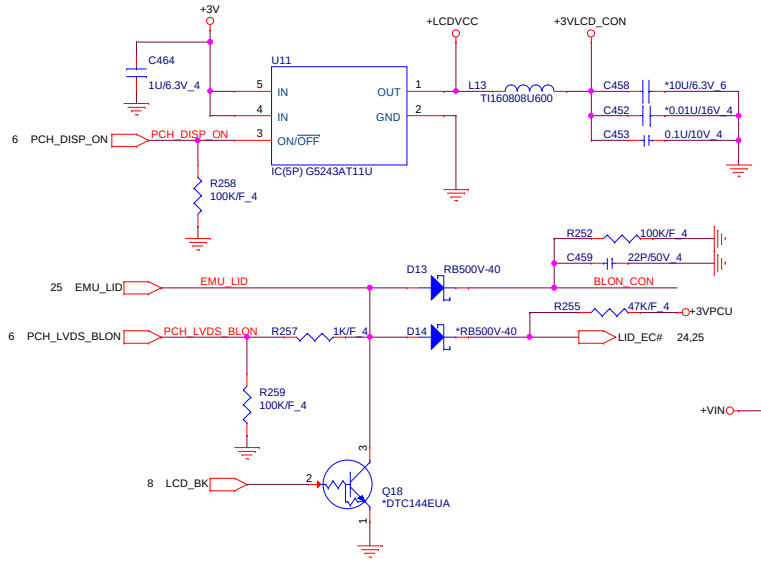
Quanta Computer Inc.

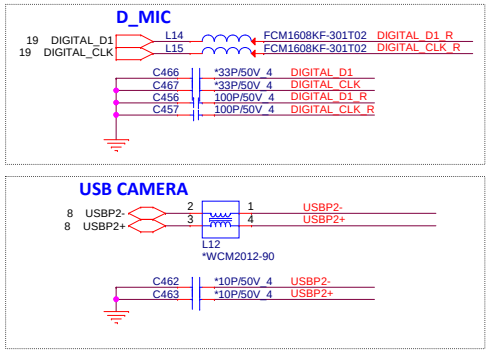
NB5

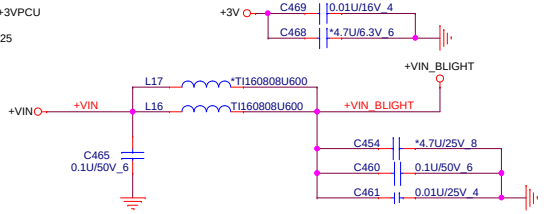
Size Custom | Document Number EC (KB3940 A1)/ROM | Rev 1A

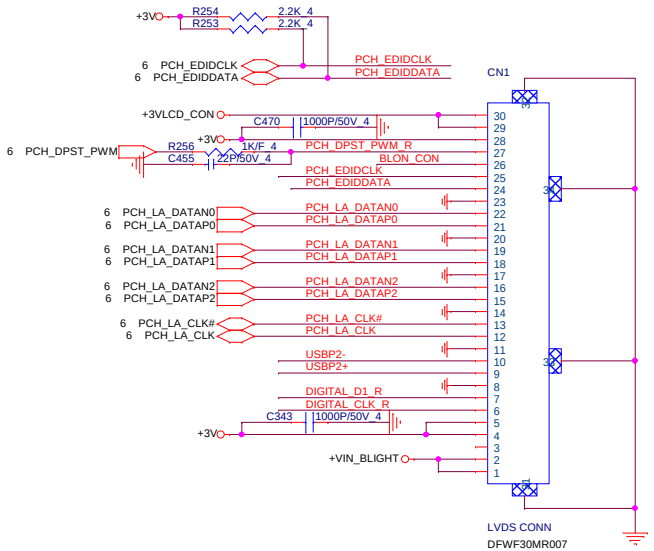
Date: Thursday, June 07, 2012 | Sheet 25 of 37

# LVDS Conn.



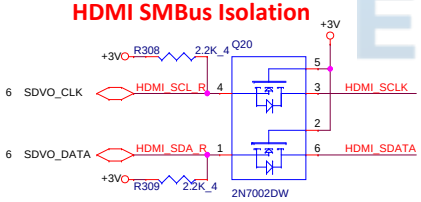





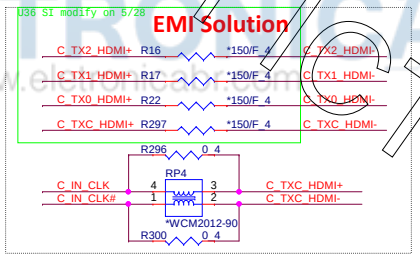

# HDMI Conn.

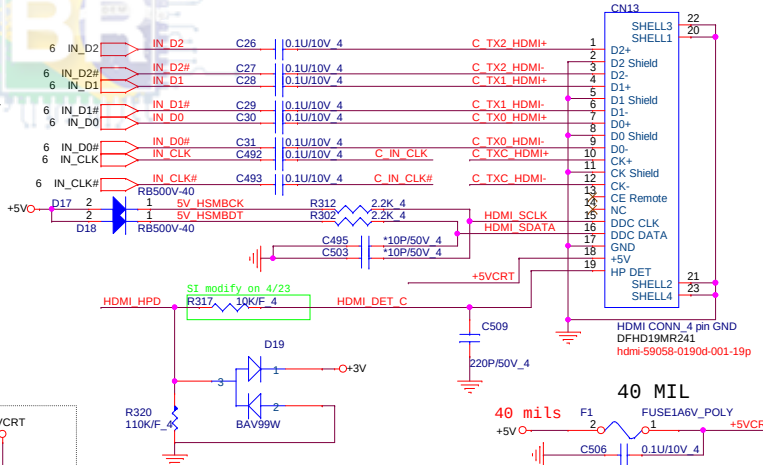
## HDMI SMBus Isolation

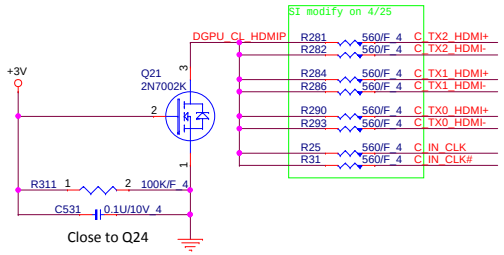



Close to HDMI connector

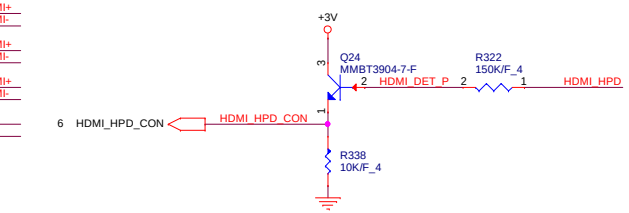
## EMI Solution

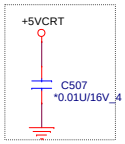


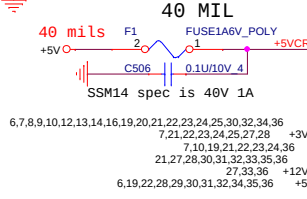




Close to Q24




for EMI request








NB5

**PROJECT : VOLKS**

Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | LCD Connector (LVDS) | 1A |
| Date: Thursday, June 07, 2012 | Sheet 26of 37 | |

DC_JACK
90W

Do Not add test pad on BATDIS_G signal

Place this ZVS close to Diode away +VIN

PV modify 0605

PV modify 0607

To PWR LED

Place this ZVS close to Far-Far away +VIN

Place this cap close to EC

Place this cap close to EC

ACDET=13V

MIN. BATV=7.2V

PU1
BQ24738

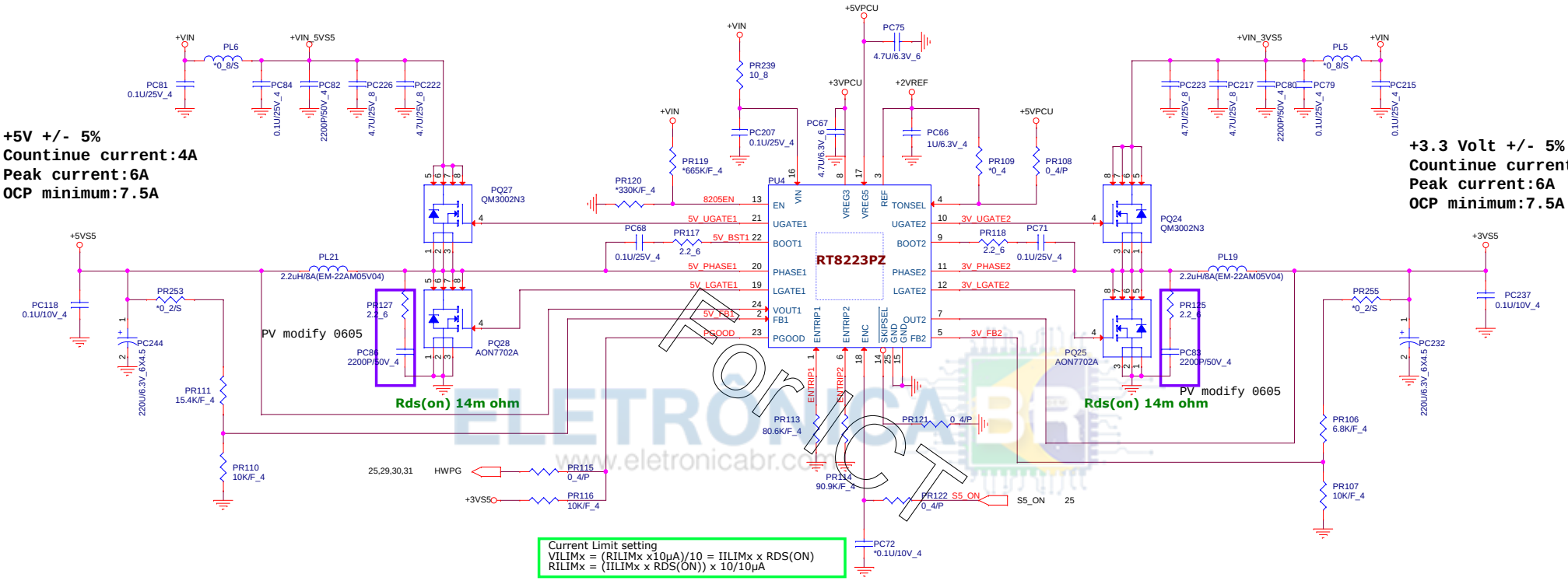
PROJECT : VOLKS
Quanta Computer Inc.
NB5
Size: Custom
Document Number: Charger (OZ8681)
Rev: 1A
Date: Thursday, June 07, 2012
Sheet 27 of 37

# DC/DC +3V_ALW/+5V_ALW/+5V_ALW2 /+15V_ALW



**+5V +/- 5%**
**Countinue current:4A**
**Peak current:6A**
**OCP minimum:7.5A**

**+3.3 Volt +/- 5%**
**Countinue current:4A**
**Peak current:6A**
**OCP minimum:7.5A**




Current Limit setting
VILIMx = (RILIMx x10μA)/10 = IILIMx x RDS(ON)
RILIMx = (IILIMx x RDS(ON)) x 10/10μA

TONSEL= VREG5
Vout1=400kHz/Vout2=500kHz

21,26,27,30,31,32,33,35,36 +VIN
6,10,23,30,33,36 +3VS5
6,19,22,29,30,31,32,34,35,36 +5VS5
7,21,22,23,24,25,26,27 +3VPCU

NB5

**PROJECT : VOLKS**
Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | 3/5VS5 (RT8223P) | A4 |
| Date: Thursday, June 07, 2012 | Sheet 28 of 37 | |

**TPS51462RGER/AL051462000**

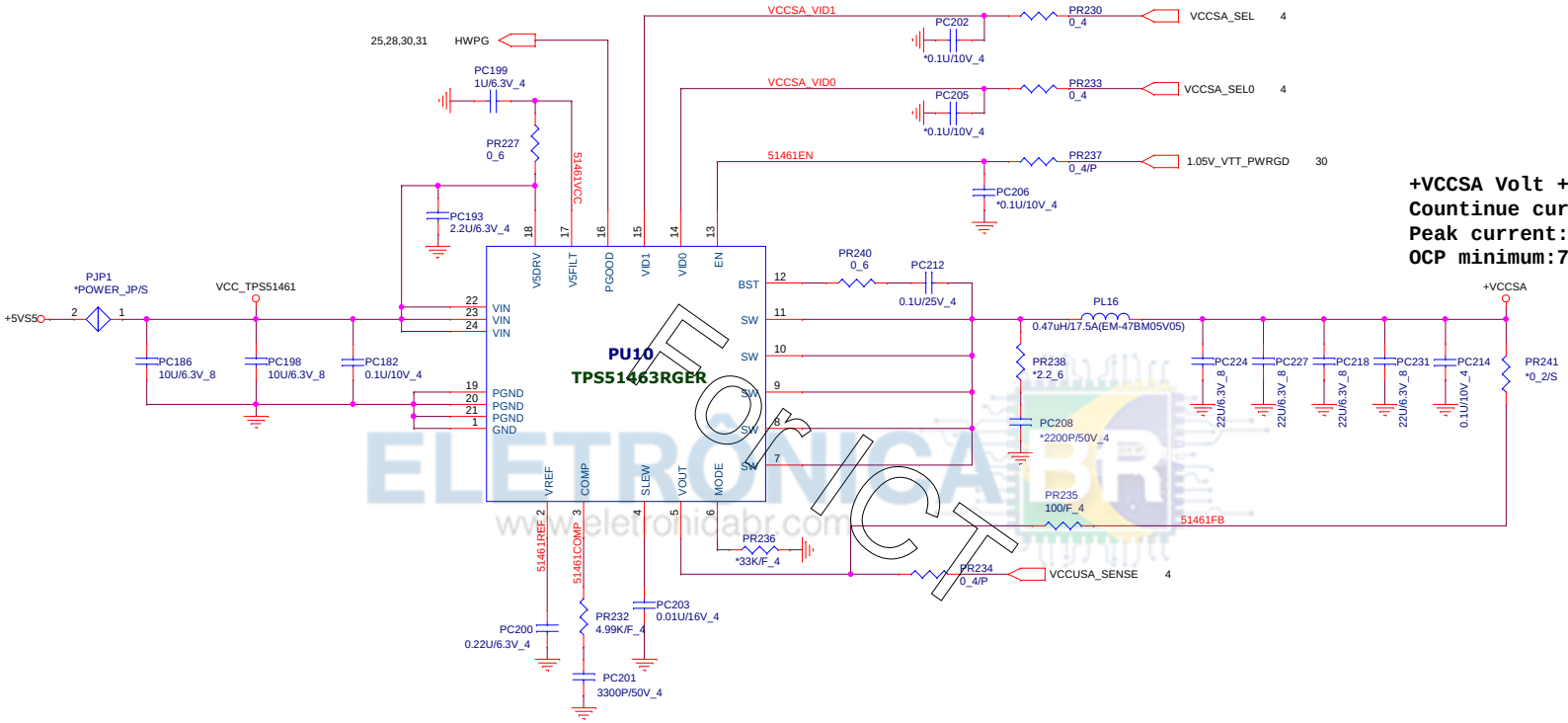
**For CPU SV system agent voltage slew rate of 0.5 -10 mV/µs**

| SEL0 | SEL1 | +VCCSA |
|---|---|---|
| 0 | 0 | 0.9V |
| 0 | 1 | 0.8V |
| 1 | 0 | 0.725V |
| 1 | 1 | 0.675V |

**TPS51463RGER/AL051463000**

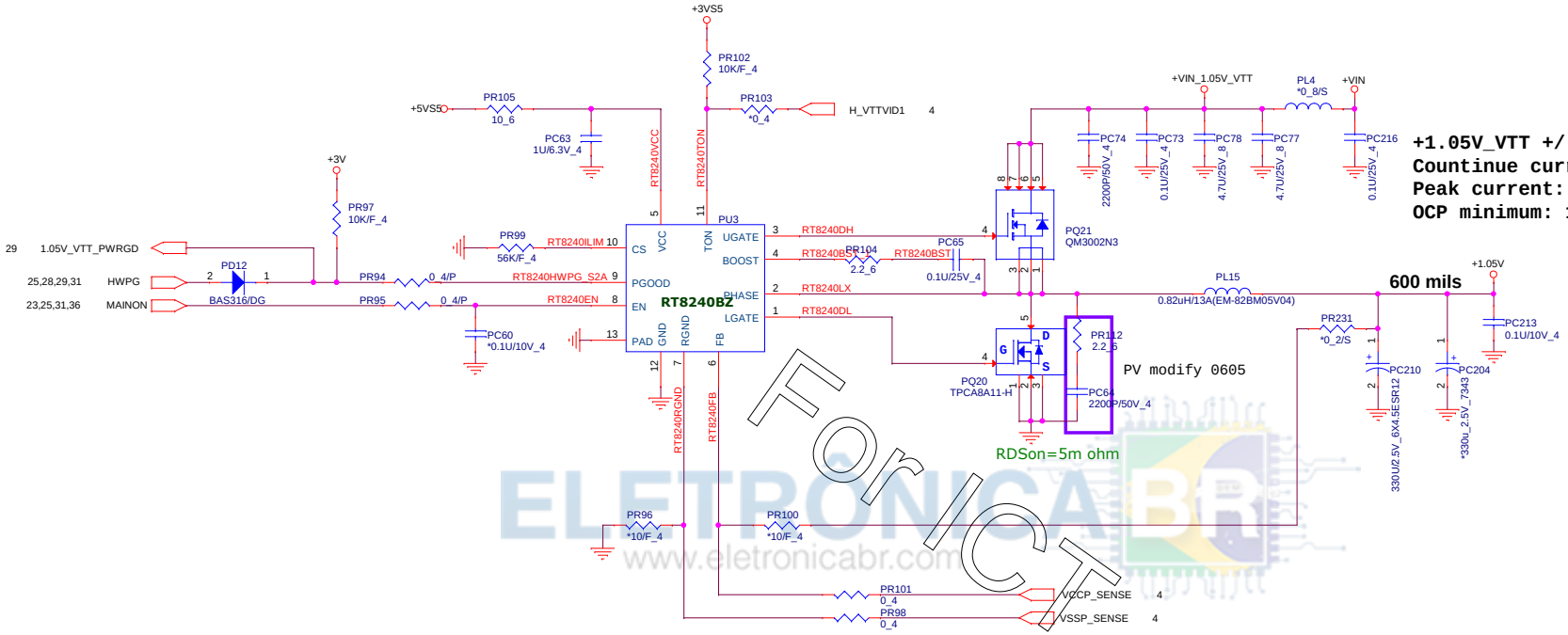
**For CPU ULV system agent voltage slew rate of 0.5 -10 mV/µs**

| SEL0 | SEL1 | +VCCSA |
|---|---|---|
| 0 | 0 | 0.9V |
| 0 | 1 | 0.85V |
| 1 | 0 | 0.775V |
| 1 | 1 | 0.75V |





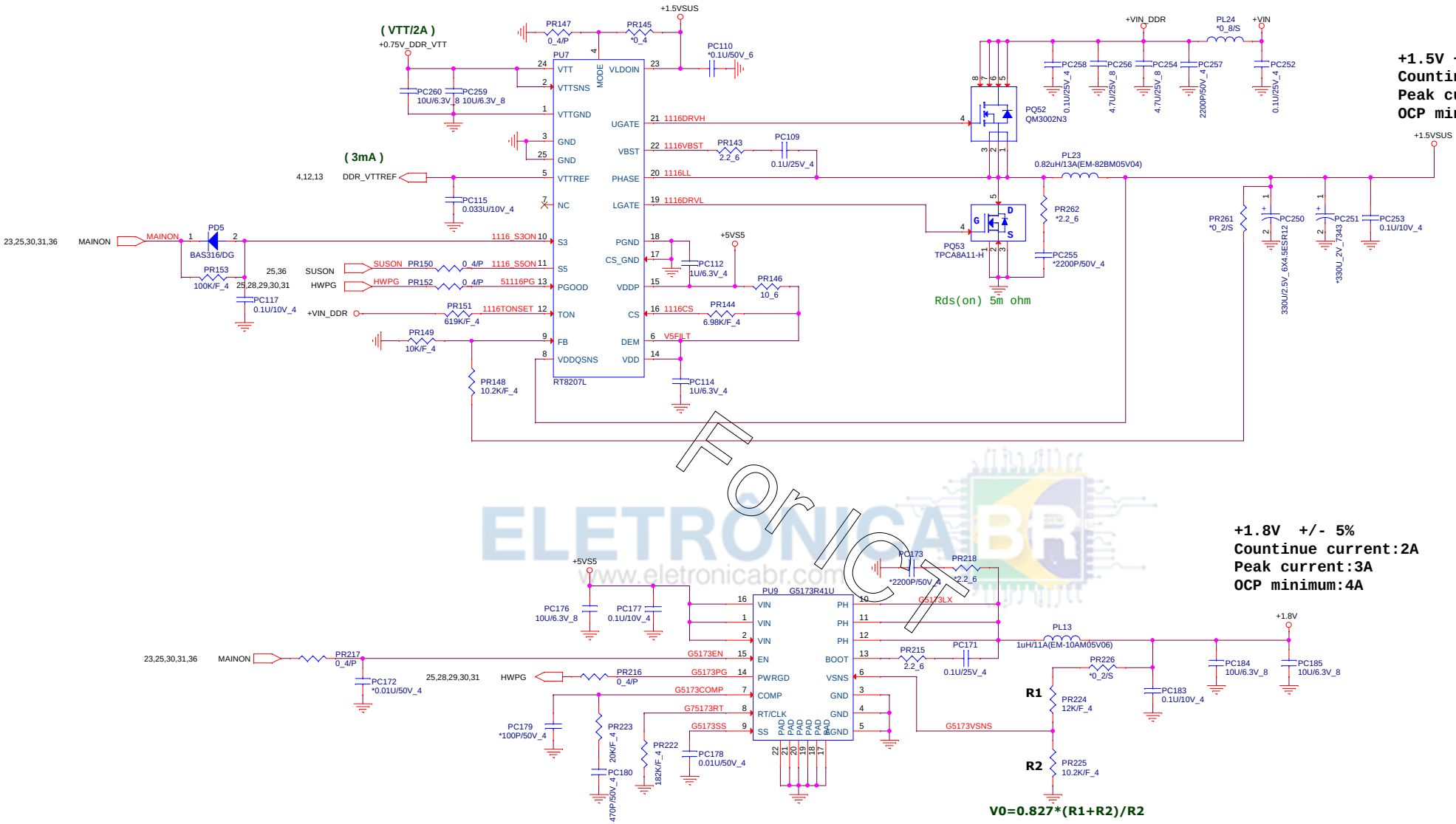

| | | |
|---|---|---|
| NB5 | PROJECT : VOLKS<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: +VCCSA (TPS51462RGER) | Rev: A* |
| Date: Thursday, June 07, 2012 | Sheet: 29of | 37 |




**+1.05V_VTT +/- 5%**
**Countinue current:10A**
**Peak current: 12A**
**OCP minimum: 14.5A**



| | | |
|---|---|---|
| NB5 | PROJECT : VOLKS<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: +1.05V (RT8240B) | Rev: A* |
| Date: Thursday, June 07, 2012 | Sheet: 30of | 37 |









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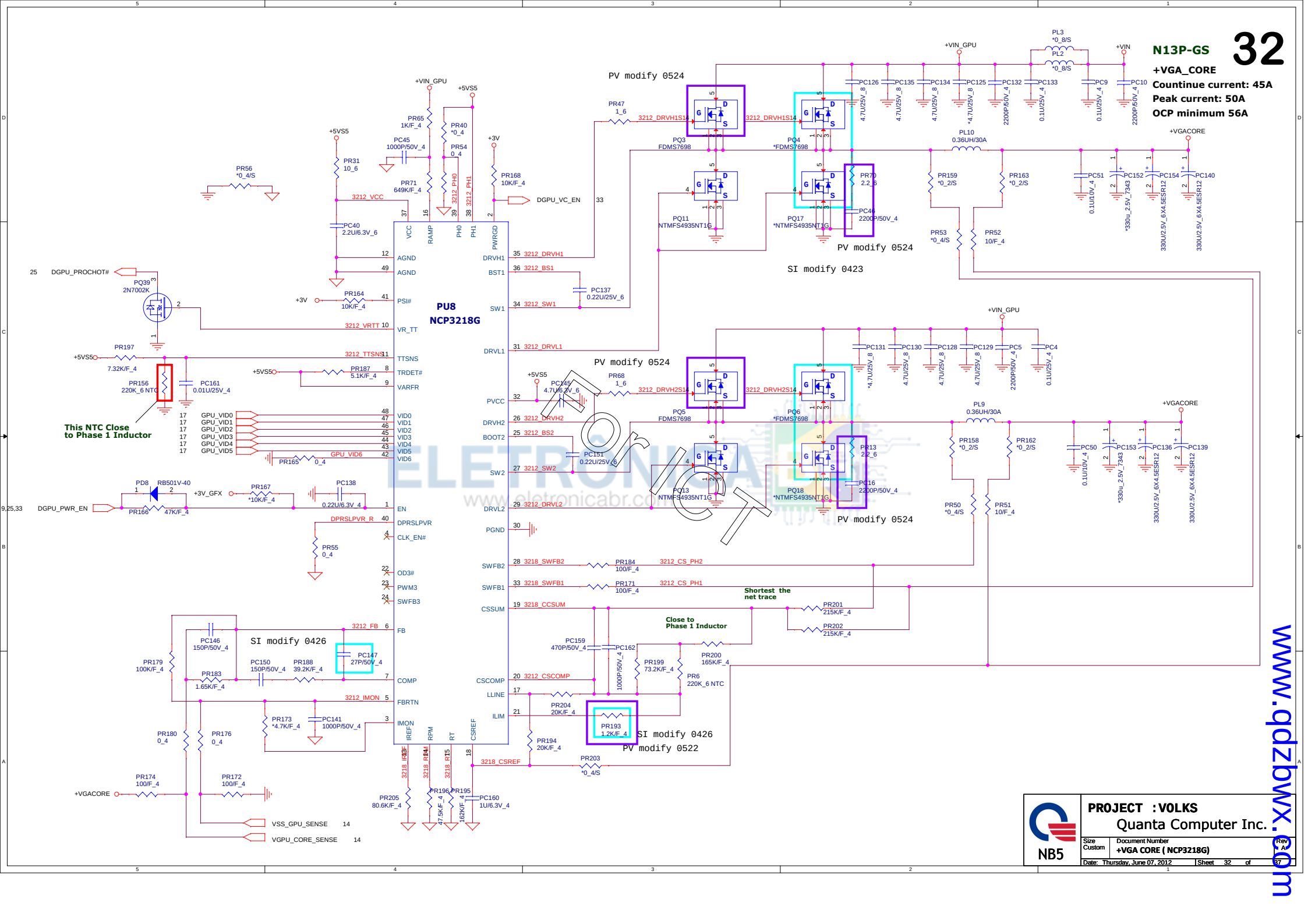
|---|---|---|
| NB5 | PROJECT : VOLKS<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: DDR3 (RT8207) | Rev: 1A |
| Date: Thursday, June 07, 2012 | Sheet 31 of 37 | |

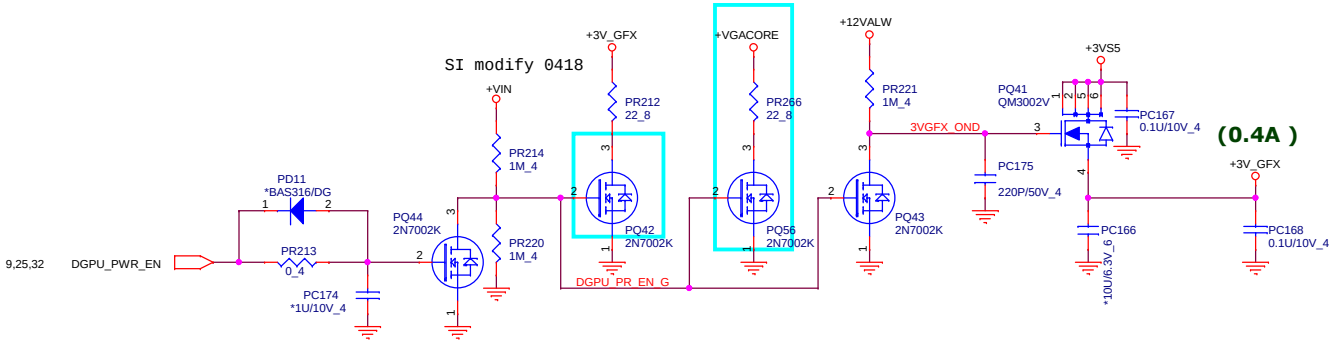

32
N13P-GS
+VGA_CORE
Countinue current: 45A
Peak current: 50A
OCP minimum 56A
PU8
NCP3218G
PV modify 0524
SI modify 0423
SI modify 0426
PV modify 0522
This NTC Close to Phase 1 Inductor
Close to Phase 1 Inductor
Shortest the net trace
PROJECT : VOLKS
Quanta Computer Inc.
NB5
+VGA CORE ( NCP3218G)
Thursday, June 07, 2012
www.qdzbwx.com

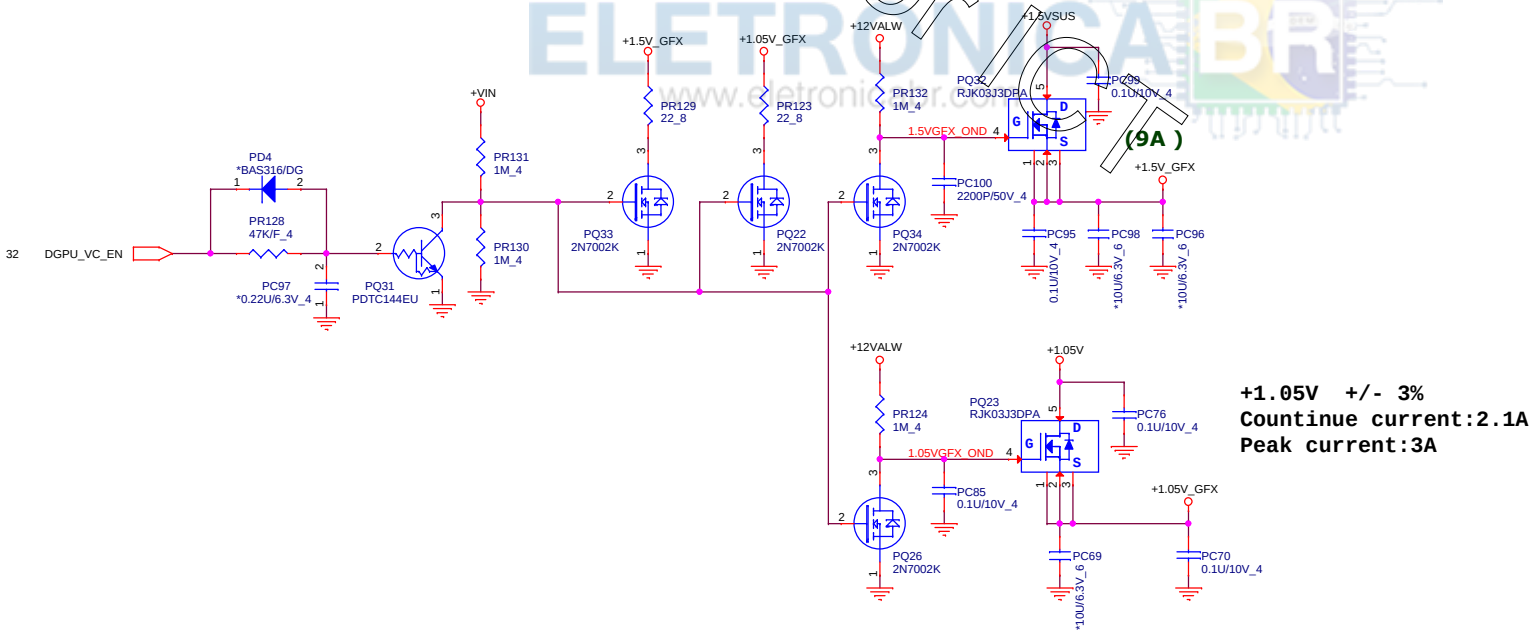
# VGA



2,4,12,13,31 +1.5VSUS
6,10,23,28,30,36 +3VS5
14,16,17,32 +3V_GFX
15,16,17,18 +1.5V_GFX
14,15,16 +1.05V_GFX
27,36 +12VALW
2,4,6,7,8,10,21,23,30,34 +1.05V

SI modify 0418




**+1.05V +/- 3%**
**Countinue current:2.1A**
**Peak current:3A**

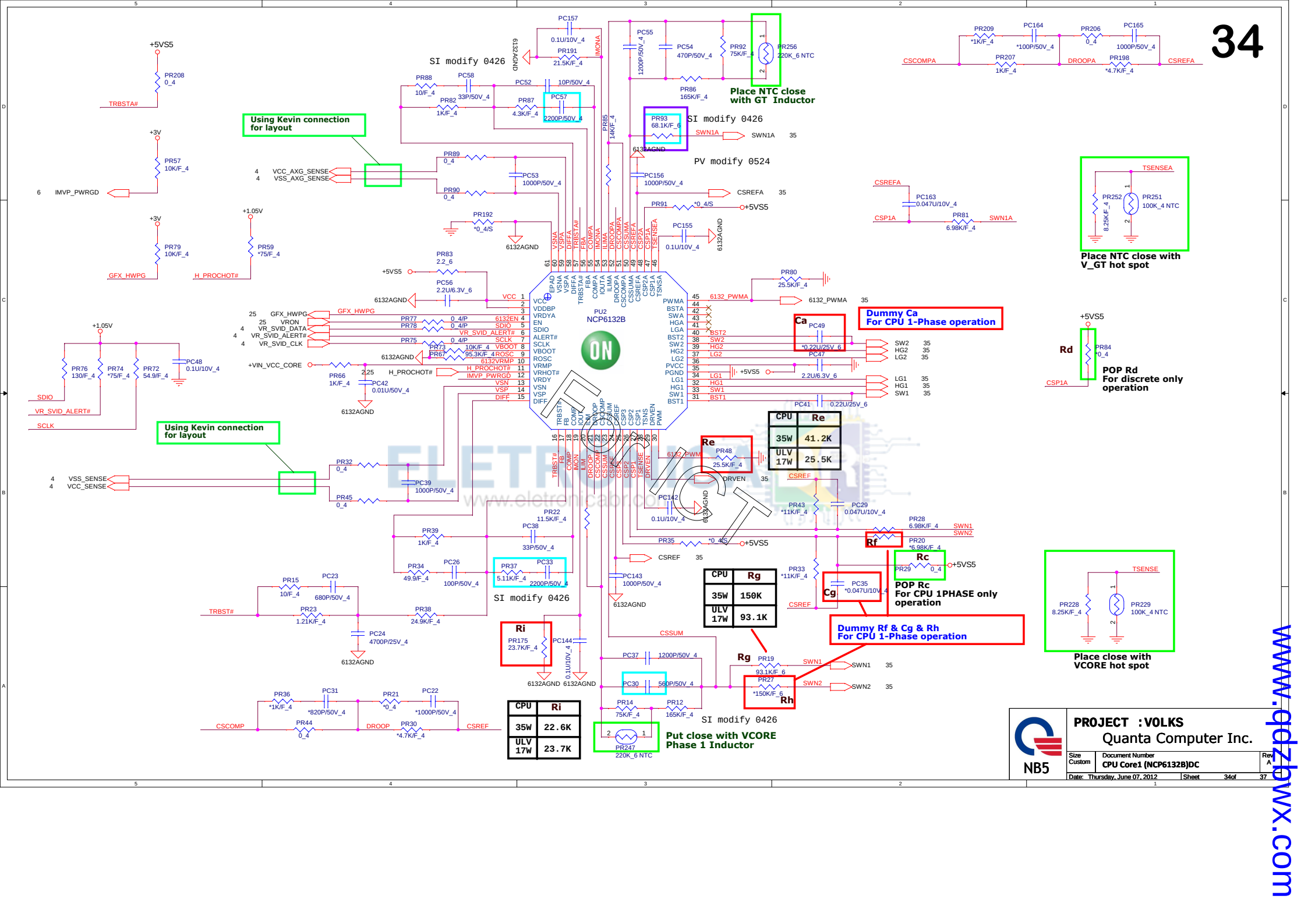


NB5

**PROJECT : VOLKS**
Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | +VGA POWER | A |

Date: Thursday, June 07, 2012 Sheet 33 of 37


34
SI modify 0426
Place NTC close with GT Inductor
Using Kevin connection for layout
PV modify 0524
Dummy Ca For CPU 1-Phase operation
Place NTC close with V_GT hot spot
Rd
POP Rd For discrete only operation
Using Kevin connection for layout
Re
Rf
Rc
POP Rc For CPU 1PHASE only operation
Cg
Dummy Rf & Cg & Rh For CPU 1-Phase operation
Ri
Rg
Rh
Put close with VCORE Phase 1 Inductor
Place close with VCORE hot spot
PU2
NCP6132B
CPU Re
35W 41.2K
ULV 17W 25.5K
CPU Rg
35W 150K
ULV 17W 93.1K
CPU Ri
35W 22.6K
ULV 17W 23.7K
PROJECT : VOLKS
Quanta Computer Inc.
NB5
CPU Core1 (NCP6132B)DC
Thursday, June 07, 2012
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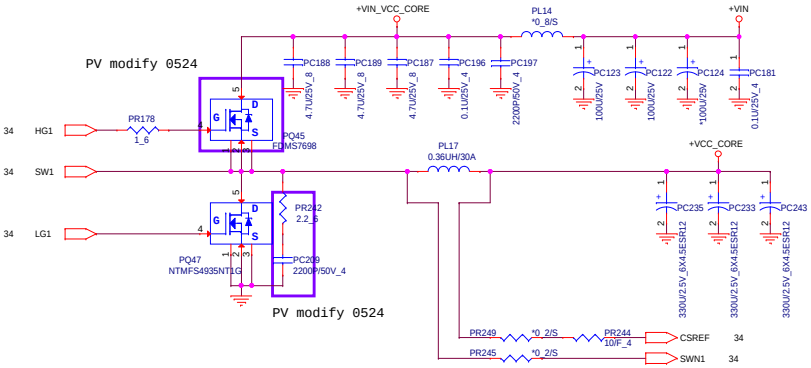
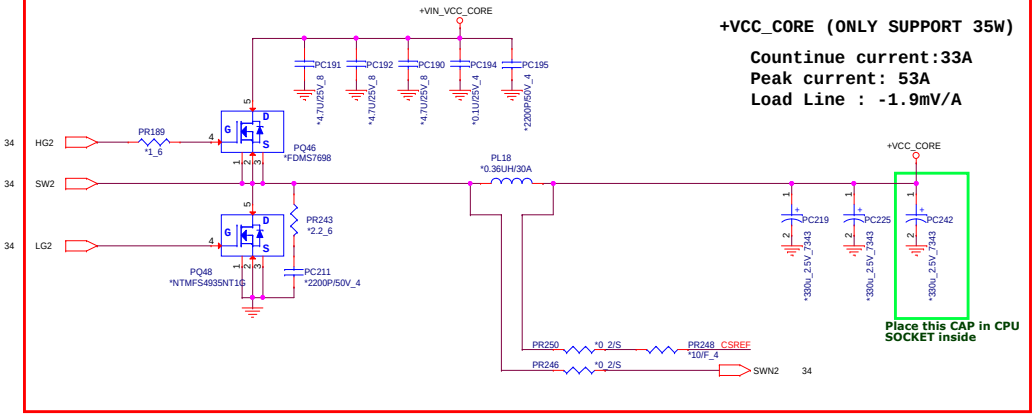



**Dummy This Schematic**
**For CPU 1-Phase operation**




**+VCC_CORE (ONLY SUPPORT 35W)**

Countinue current:33A
Peak current: 53A
Load Line : -1.9mV/A

**+VCC_CORE (ONLY SUPPORT 35W)**

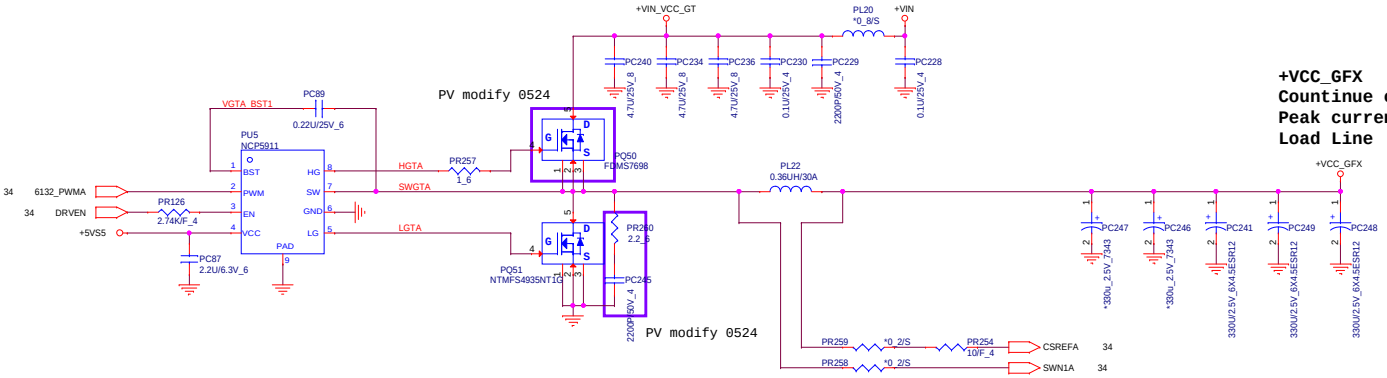
Countinue current:32A
Peak current: 53A
Load Line : -1.9mV/A

**+VCC_CORE (ULV 17W)**

Countinue current:16A
Peak current: 33A
Load Line : -2.9mV/A








**+VCC_GFX**
Countinue current:21.5A
Peak current: 33A
Load Line : -3.9mV/A

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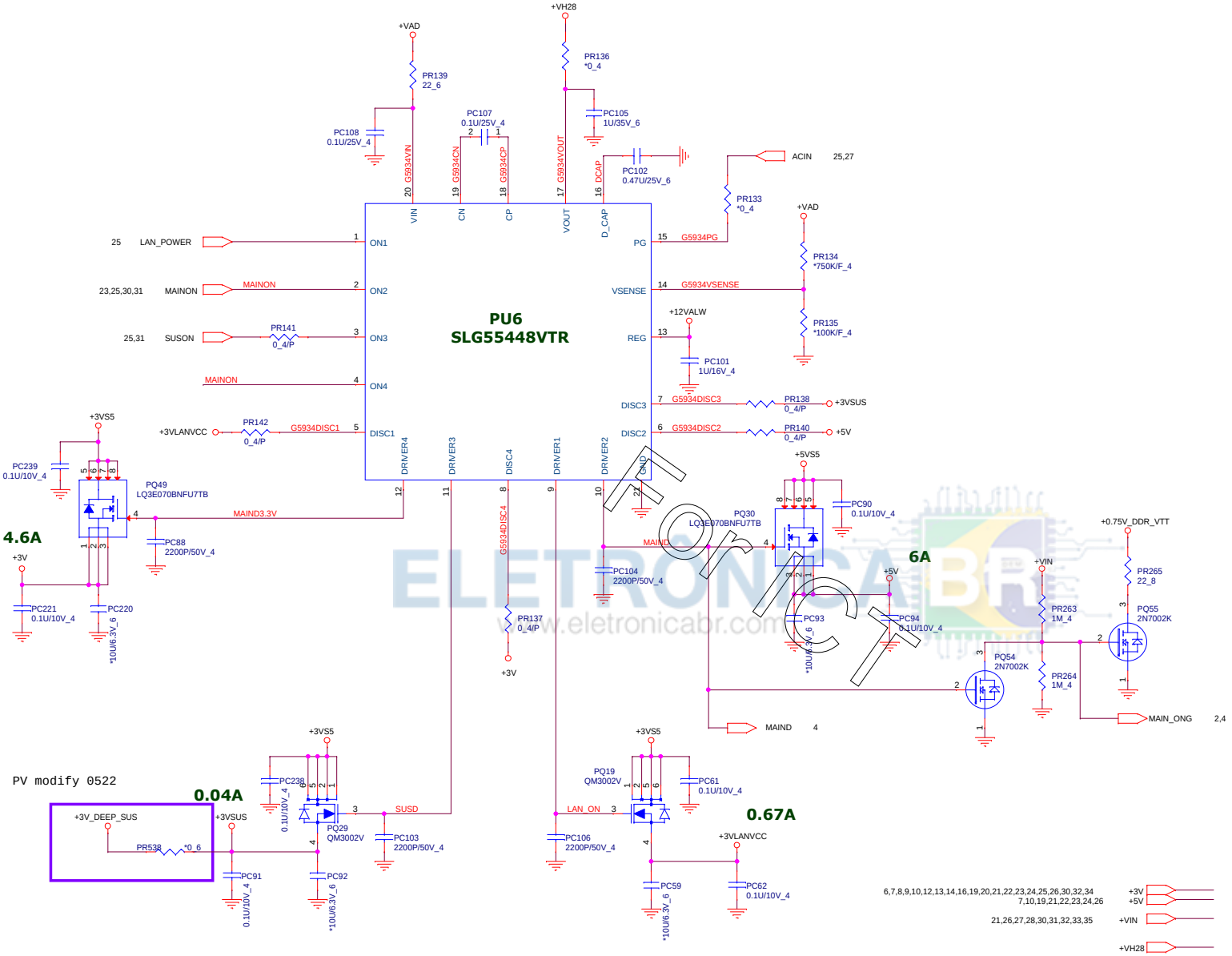
|---|---|---|
| NB5 | PROJECT : VOLKS<br>Quanta Computer Inc. | |
| Size C | Document Number<br>CPU Core2 (NCP5911)DC | Rev A |
| Date: Thursday, June 07, 2012 | Sheet 35of 37 | |



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|---|---|---|
| NB5 | PROJECT : VOLKS<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: Dis-charge IC (SLG55448V) | Rev: A |
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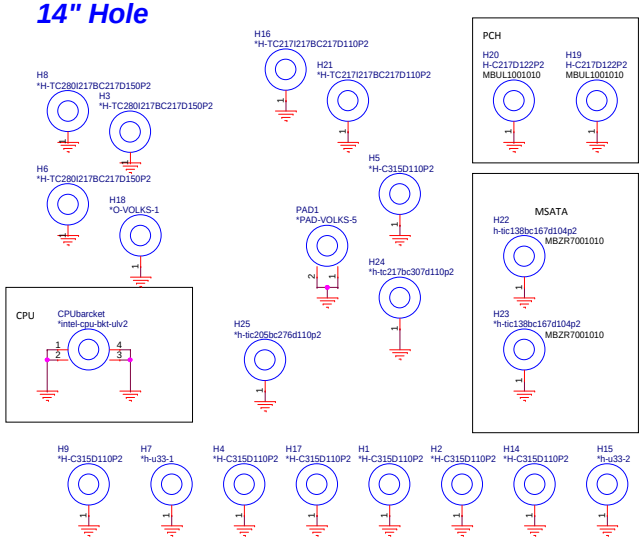
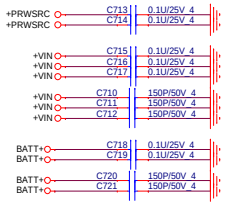
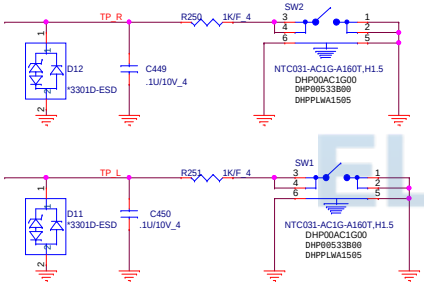
## 14" Hole

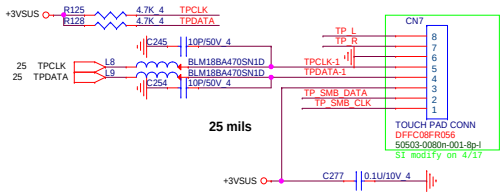


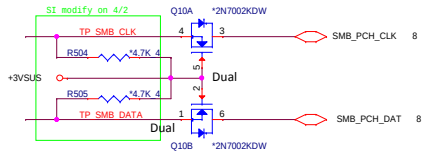

## EMI CAP for 14"




## Touch Pad Connector



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|---|---|---|
| NB5 | PROJECT : VOLKS<br>Quanta Computer Inc. | |
| Size C | Document Number: Hole | Rev A |
| Date: Thursday, June 07, 2012 | Sheet 37 of 37 | |