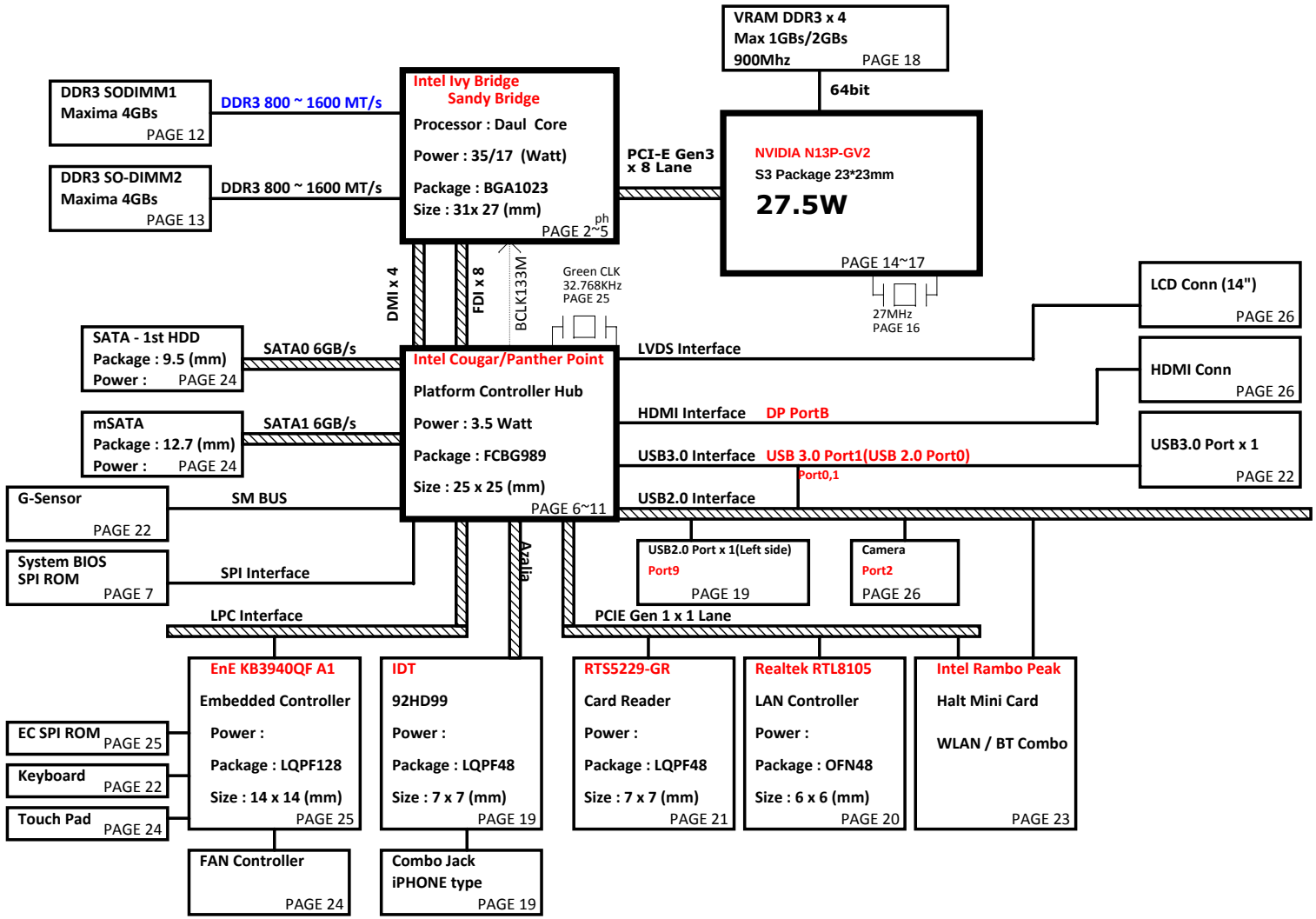
Volks DIS/UMA (14"/15.6") Ultra/Slim
Intel Chief River Platform Block Diagram



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: Custom	Document Number: Block Diagram	Rev: 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

PEG x8

CPU RESET#

Placement close to EC.

SM_DRAMPWROK Processor Input.

DDR3 DRAM RESET

for DS3

PV modify on 5/24

SI modify on 4/2

Intel DG request

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

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

Processor pull-up (CPU)

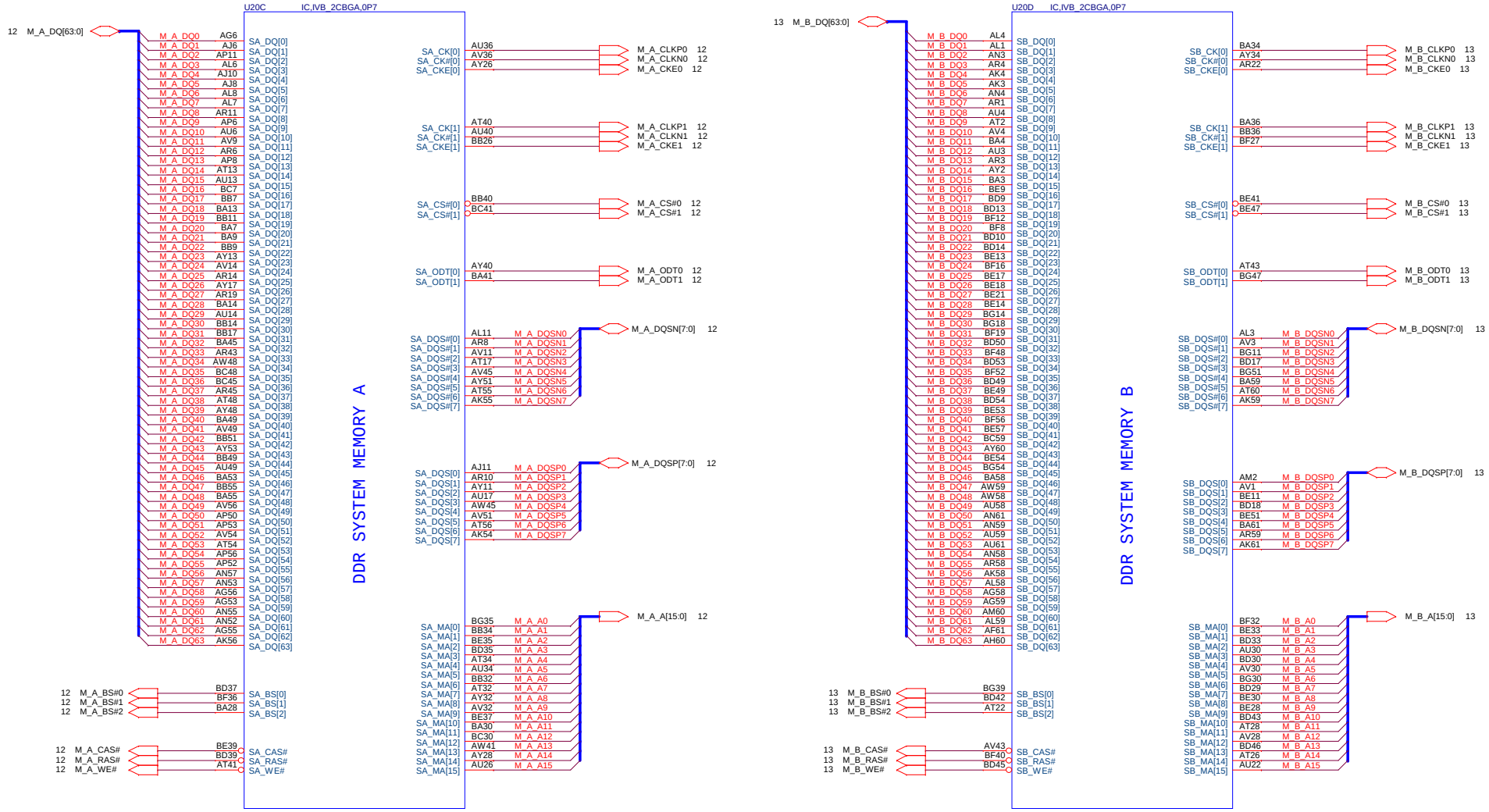
For iFDIM Trigger Point

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: 1A
	Date: Thursday, June 07, 2012	Sheet 2 of 37

Ivy Bridge Processor (DDR3)



PROJECT : VOLKS

Quanta Computer Inc.

NB5

Size	Document Number	Rev
Custom	Processor 2/5 (DDR3 I/F)	1A

Date: Thursday, June 07, 2012 Sheet 3 of 37

POWER

CAD Note: +VDDR_REF_CPU should have 10 mil trace width

+VDDR_REF_CPU and DDR_VTTREF must use 10mils width

CPU center

CRB: 1uf*1

Zo:55 ohm

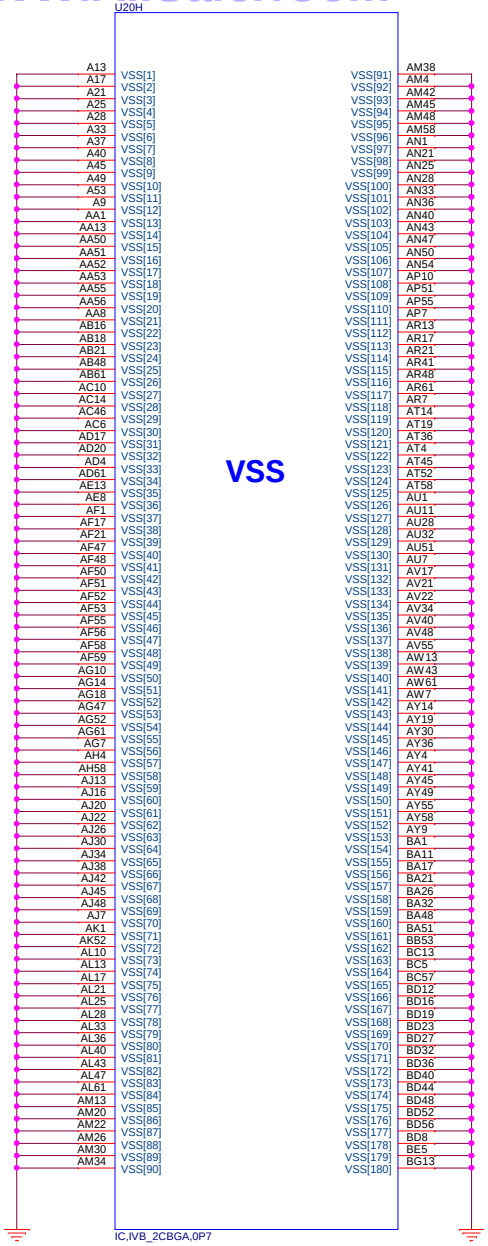
Zo impedance: 27.4ohm

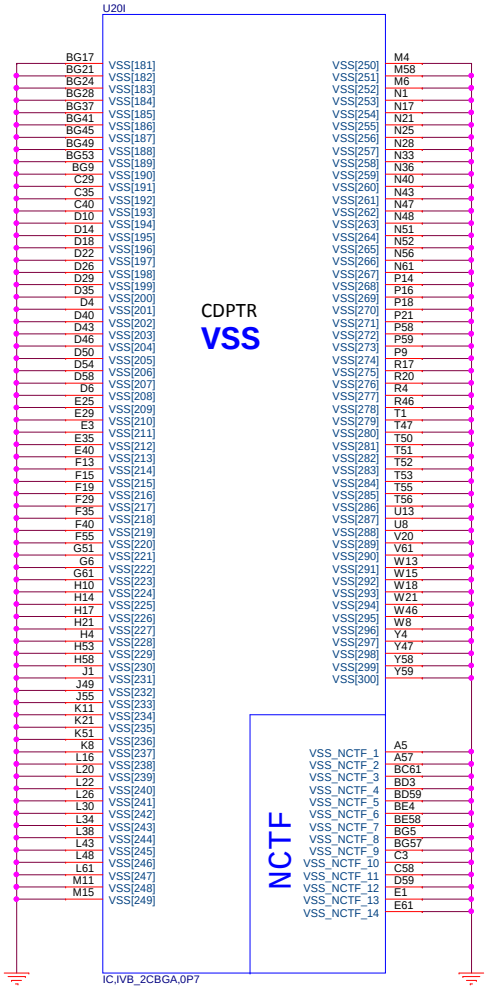
Zo impedance: 27.4ohm

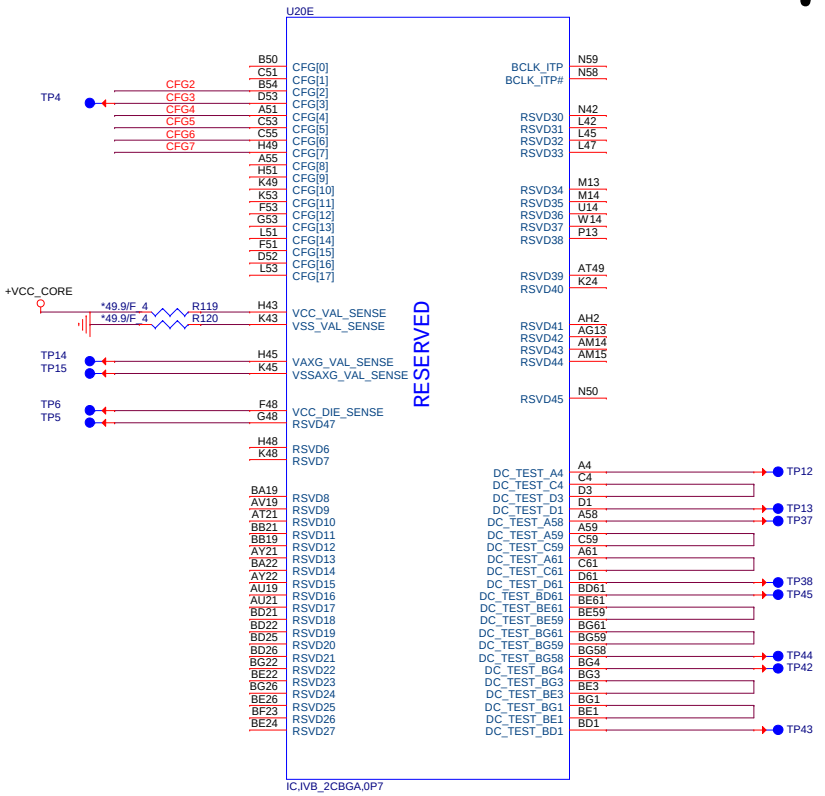
100- ±1% pull-up to VCC near processor.

R close to CPU

CPU VDDQ

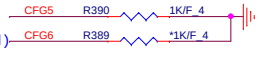






CFG[6:5] (PCIE Port Bifurcation Straps)

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

Quanta Computer Inc.

Size	Document Number	Rev
Custom	Processor 4/4 (RSV,Ground)	1A

Date: Thursday, June 07, 2012 | Sheet 5 of 37

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

Cougar Point/Panther Point (LVDS,DDI)

06

U18C CPT_PPT_Rev_0p7

U18D CPT_PPT_Rev_0p7

PCH Pull-high/low(CLG)

for DS3

System PWR_OK(CLG)

On Die DSW VR Enable

High = Enable (Default)
Low = Disable

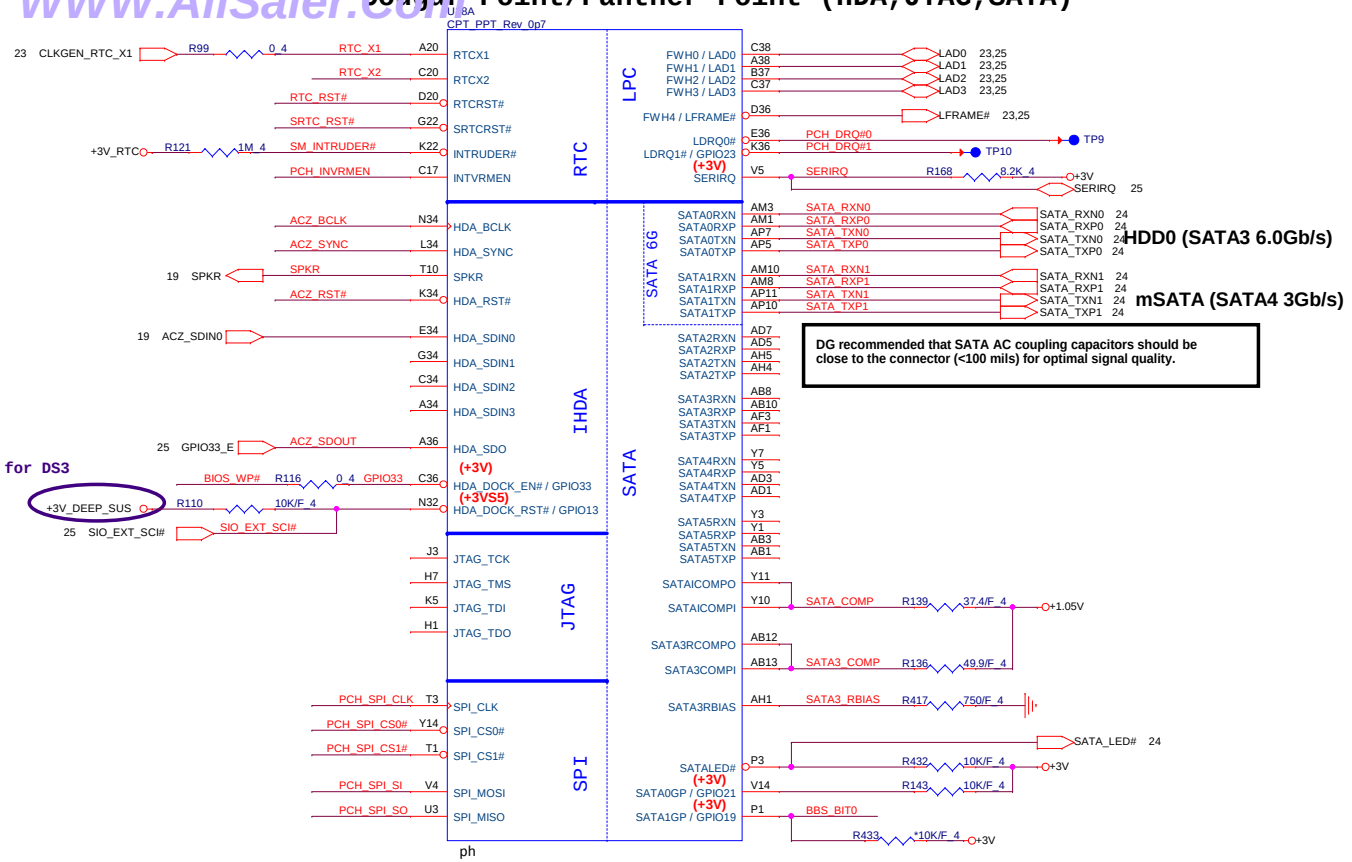
PROJECT : VOLKS
Quanta Computer Inc.

NB5

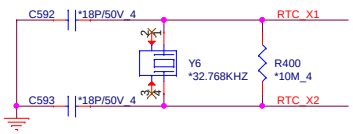
Size: Custom | Document Number: PCH 1/6 (Host/Display) | Rev: 1A

Date: Thursday, June 07, 2012 | Sheet 6 of 37

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



RTC Clock 32.768KHz

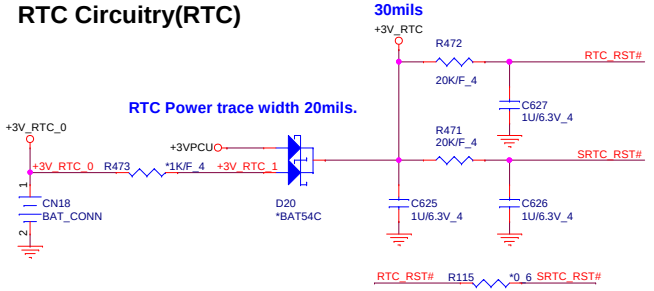


no stuff If use green Clock

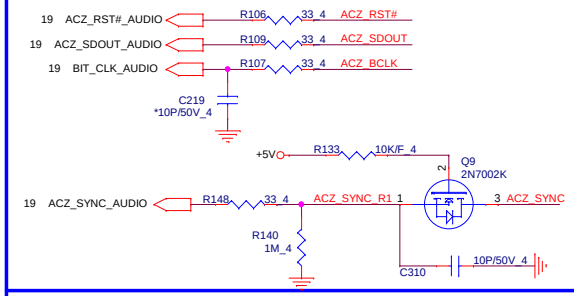
RTC Circuitry(RTC)

30mils

RTC Power trace width 20mils.



HDA Bus(CLG)

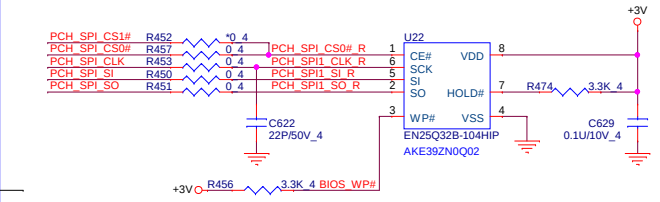


PCH Strap Table

Pin Name	Strap description	Sampled	Configuration	Circuit
SPKR	No reboot mode setting	PWROK	0 = Default (weak pull-down 20K) 1 = Setting to No-Reboot mode	+3V R152 *1K/F_4 SPKR
GNT3# / GPIO55	Top-Block Swap Override	PWROK	0 = "top-block swap" mode 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 Only for Interposer	PWROK	0 = Override 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: 1 1 SPI; 1 0 LPC	[Need external pull-down for LPC BIOS] Default weak pull-up on GNT0/1#
GPIO19 Different from Calpella	Boot BIOS Selection 0 [bit-0]	PWROK		R419 *1K/F_4 BBS_BIT0 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 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) 1 = Support by 1.5V	for DS3 +3V_DEEP_SUS R135 1K/F_4 ACZ_SYNC
HDA_SDO	Flash Descriptor Security	PWROK	0 = Override 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 1 = Enable (Default)	
SPI_MOSI	iTPM function Disable	APWROK	0 = Default (weak pull-down 20K) 1 = Enable	

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	

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

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

PCI/USB30CF Pull up(CLG)

PCI_PIRQA# R94 8.2K_4
PCI_PIRQB# R76 8.2K_4
PCI_PIRQC# R83 8.2K_4
PCI_PIRQD# R77 8.2K_4

MPC_PWR_CTRL# R74 10K/F_4
ACC_LED# R82 10K/F_4
BT_COMBO_EN# R362 10K/F_4
LCD_BK R80 10K/F_4

GPIO52 R502 10K/F_4
GPIO54 R503 10K/F_4

SI modify on 4/2
for DS3
+3V_DEEP_SUS
RP5
10K_10P8R_6

USB_OC4# USB_OC6#
USB_OC1# USB_OC0#
USB_OC2# PCH_AOCS#
USB_OC3# USB_OC5#

USB3.0

22 USB30_RX1- / 22 USB30_RX2-
22 USB30_RX1+ / 22 USB30_RX2+
22 USB30_TX1- / 22 USB30_TX2-
22 USB30_TX1+ / 22 USB30_TX2+

20111130 Modify USB3.0 for HM70

U18E CPT_PPT_Rev_0p7

RSVD

USB3Rn1 USB3Rn2 USB3Rn3 USB3Rn4
USB3Rp1 USB3Rp2 USB3Rp3 USB3Rp4
USB3Tn1 USB3Tn2 USB3Tn3 USB3Tn4
USB3Tp1 USB3Tp2 USB3Tp3 USB3Tp4

PCI

PIRQA# PIRQB# PIRQC# PIRQD#
BT_COMBO_EN# GPIO52 GPIO54
REQ1# / GPIO50 (+3V)
REQ2# / GPIO52 (+3V)
REQ3# / GPIO54 (+3V)
BBS_BIT1 ACC_LED# PCI_GNT3#
GNT1# / GPIO51 (+3V)
GNT2# / GPIO53 (+3V)
GNT3# / GPIO55 (+3V)
MPC_PWR_CTRL# LCD_BK
PIRQE# / GPIO2 (+3V)
PIRQF# / GPIO3 (+3V)
PIRQG# / GPIO4 (+3V)
PIRQH# / GPIO5 (+3V)
ACCEL_INTH#
PME#
PCI_PLTRST#
CLKOUT_PCI0
CLKOUT_PCI1
CLKOUT_PCI2
CLKOUT_PCI3
CLKOUT_PCI4

CLK_PCI_FB R93 22_4 CLK_PCI_FB_R
CLK_33M_DEBUG R96 22_4 CLK_PCI_LPC_R
CLK_33M_KBC R108 22_4 CLK_PCI_EC_R
C176 18P/50V_4
C211 18P/50V_4

EMI(near PCH)

USB

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

USBRBIAS# USB_BIAS R395 22.6/F_4
USBRBIAS

(+3VS5) OC0# / GPIO59 USB_OC0#
(+3VS5) OC1# / GPIO40 USB_OC1#
(+3VS5) OC2# / GPIO41 USB_OC2#
(+3VS5) OC3# / GPIO42 USB_OC3#
(+3VS5) OC4# / GPIO43 USB_OC4#
(+3VS5) OC5# / GPIO9 USB_OC5#
(+3VS5) OC6# / GPIO10 USB_OC6#
(+3VS5) OC7# / GPIO14 PCH_AOCS#

SMBus/Pull-up(CLG)

SI modify on 4/2
for DS3
+3V_DEEP_SUS
22 SMB_ME1_CLK SMB_ME1_CLK R429 2.2K_4
22 SMB_ME1_DAT SMB_ME1_DAT R442 2.2K_4

PLTRST#(CLG)

PCI_PLTRST# R427 *0_4/S PLTRST# PLTRST#
R440 100K/F_4

2,14,20,21,23,25

+3V R248 4.7K_4 SMB_RUN_DAT 12,13 SMB_PCH_DAT
+3V R430 4.7K_4 SMB_RUN_CLK 12,13 SMB_PCH_CLK
Q29 2N7002DW

CLK_REQ/Strap Pin(CLG)

PCIE_CLKREQ_LAN# R434 10K/F_4
PCIE_CLKREQ_CR# R150 10K/F_4
for DS3
+3V_DEEP_SUS
PCIE_CLKREQ_WLAN# R424 10K/F_4
CLK_PCIE_REQ3# R441 10K/F_4
CLK_PCIE_REQ4# R159 10K/F_4
Intel DG request
CLK_PEGB_REQ# R438 10K/F_4
CLK_PEGA_REQ# R172 10K/F_4
CLK_PEGA_REQ# R164 *10K/F_4
CLK_PEGB_REQ# R426 *10K/F_4
CLK_BUF_BCLK_N R398 10K/F_4
CLK_BUF_BCLK_P R397 10K/F_4
CLK_BUF_PCIE_3GPLL# R130 10K/F_4
CLK_BUF_PCIE_3GPLL R134 10K/F_4
CLK_BUF_DREFCLK# R117 10K/F_4
CLK_BUF_DREFCLK R118 10K/F_4
CLK_BUF_DREFSSCLK# R153 10K/F_4
CLK_BUF_DREFSSCLK R154 10K/F_4
CLK_PCH_14M R95 10K/F_4

CLOCK TERMINATION for FCIM

WLAN / LAN / Cardreader

WLAN
23 PCIE_RXN1 / 23 PCIE_RXP1 / 23 PCIE_TXN1 / 23 PCIE_TXP1
C194 0.1U/10V_4 PCIE_TXN1_C
C193 0.1U/10V_4 PCIE_TXP1_C

LAN
20 PCIE_RXN2_LAN / 20 PCIE_RXP2_LAN / 20 PCIE_TXN2_LAN / 20 PCIE_TXP2_LAN
C213 0.1U/10V_4 PCIE_TXN2_LAN_C
C203 0.1U/10V_4 PCIE_TXP2_LAN_C

Cardreader
21 PCIE_RXN3_CR / 21 PCIE_RXP3_CR / 21 PCIE_TXN3_CR / 21 PCIE_TXP3_CR
C187 0.1U/10V_4 PCIE_TXN3_CR_C
C184 0.1U/10V_4 PCIE_TXP3_CR_C

MPC Switch Control	
MPC_PWR_CTRL#	Low = MPC ON High = MPC OFF (Default)

MPC_PWR_CTRL# R75 *1K/F_4

NV_ALE NV_ALE 7

U18B CPT_PPT_Rev_0p7

PCI-E*

PERN1 PERP1 PETN1 PETP1
PERN2 PERP2 PETN2 PETP2
PERN3 PERP3 PETN3 PETP3
PERN4 PERP4 PETN4 PETP4
PERN5 PERP5 PETN5 PETP5
PERN6 PERP6 PETN6 PETP6
PERN7 PERP7 PETN7 PETP7
PERN8 PERP8 PETN8 PETP8

SMBUS

(+3VS5) SMBALERT# / GPIO11 E12 SMBALERT#
SMBCLK H14 SMB_PCH_CLK
SMBDATA C9 SMB_PCH_DAT
(+3VS5) SML0ALERT# / GPIO60 A12 DRAMRST_CNTRL_PCH
SML0CLK C8 SMB_ME0_CLK
SML0DATA G12 SMB_ME0_DAT
(+3VS5) SML1ALERT# / PCHHOT# / GPIO74 C13 FPR_OFF
(+3VS5) SML1CLK / GPIO58 E14 SMB_ME1_CLK
(+3VS5) SML1DATA / GPIO75 M16 SMB_ME1_DAT

PV , HP request Image sensor
SMBUS reserve to PCH

Controller Link

CL_CLK1 M7
CL_DATA1 T11
CL_RST1# P10

CLOCKS

CLK_PCIE_WLANN Y40 / CLK_PCIE_WLANP Y39 → CLKOUT_PCIE0N / CLKOUT_PCIE0P
PCIE_CLKREQ_WLAN# J2 → PCIECLKRQ0# / GPIO73
(+3VS5)
CLK_PCIE_LANN AB49 / CLK_PCIE_LANP AB47 → CLKOUT_PCIE1N / CLKOUT_PCIE1P
PCIE_CLKREQ_LAN# M1 → PCIECLKRQ1# / GPIO18
(+3V)
CLK_PCIE_CRN AA48 / CLK_PCIE_CRP AA47 → CLKOUT_PCIE2N / CLKOUT_PCIE2P
PCIE_CLKREQ_CR# V10 → PCIECLKRQ2# / GPIO20
(+3V)
Y37 / Y36 → CLKOUT_PCIE3N / CLKOUT_PCIE3P
CLK_PCIE_REQ3# A8 → PCIECLKRQ3# / GPIO25
(+3VS5)
Y43 / Y45 → CLKOUT_PCIE4N / CLKOUT_PCIE4P
CLK_PCIE_REQ4# L12 → PCIECLKRQ4# / GPIO26
(+3VS5)
V45 / V46 → CLKOUT_PCIE5N / CLKOUT_PCIE5P
9 BOARD_ID0 L14 → PCIECLKRQ5# / GPIO44
(+3VS5)
AB42 / AB40 → CLKOUT_PEG_B_N / CLKOUT_PEG_B_P
CLK_PEGB_REQ# E6 → PEG_B_CLKRQ# / GPIO56
(+3VS5)
V40 / V42 → CLKOUT_PCIE6N / CLKOUT_PCIE6P
9 BOARD_ID1 T13 → PCIECLKRQ6# / GPIO45
(+3VS5)
V38 / V37 → CLKOUT_PCIE7N / CLKOUT_PCIE7P
9 BOARD_ID2 K12 → PCIECLKRQ7# / GPIO46
(+3VS5)
AK14 / AK13 → CLKOUT_ITPXDP_N / CLKOUT_ITPXDP_P

(+3VS5) PEG_A_CLKRQ# / GPIO47 M10 CLK_PEGA_REQ# → CLK_PEGA_REQ# 14
CLKOUT_PEG_A_N AB37 CLK_PCIE_VGA#
CLKOUT_PEG_A_P AB38 CLK_PCIE_VGA
CLKOUT_DMI_N AV22 CLK_CPU_BCLKN 2
CLKOUT_DMI_P AU22 CLK_CPU_BCLKP 2
CLKOUT_DP_N AM12 CLK_DPLL_SSCLKN_R TP19
CLKOUT_DP_P AM13 CLK_DPLL_SSCLKP_R TP20
CLKIN_DMI_N BF18 CLK_BUF_PCIE_3GPLL#
CLKIN_DMI_P BE18 CLK_BUF_PCIE_3GPLL
CLKIN_GND1_N BJ30 CLK_BUF_BCLK_N
CLKIN_GND1_P BG30 CLK_BUF_BCLK_P
CLKIN_DOT_96N G24 CLK_BUF_DREFCLK#
CLKIN_DOT_96P E24 CLK_BUF_DREFCLK
CLKIN_SATA_N AK7 CLK_BUF_DREFSSCLK#
CLKIN_SATA_P AK5 CLK_BUF_DREFSSCLK
REFCLK14IN K45 CLK_PCH_14M
CLKIN_PCILOOPBACK H45 CLK_PCI_FB
XTAL25_IN V47 XTAL25_IN R351 0_4 PCH_XTAL25_IN 23
XTAL25_OUT V49 XTAL25_OUT
XCLK_RCOMP Y47 XCLK_RCOMP R102 90.9/F_4 +1.05V

FLEX CLOCKS

(+3V) CLKOUTFLEX0 / GPIO64 K43
(+3V) CLKOUTFLEX1 / GPIO65 F47
(+3V) CLKOUTFLEX2 / GPIO66 H47
(+3V) CLKOUTFLEX3 / GPIO67 K49

TP36 C561 *33P/50V_4
R369 *1M_4 Y5 *25MHZ
C560 *27P/50V_4 TP35

PCIE Clock

WLAN
23 CLK_PCIE_WLANN / 23 CLK_PCIE_WLANP / 23 PCIE_CLKREQ_WLAN# → CLK_PCIE_WLANN / CLK_PCIE_WLANP / PCIE_CLKREQ_WLAN#

LAN
20 CLK_PCIE_LANN / 20 CLK_PCIE_LANP / 20 PCIE_CLKREQ_LAN# → CLK_PCIE_LANN / CLK_PCIE_LANP / PCIE_CLKREQ_LAN#

GPU
14 CLK_PCIE_VGA# / 14 CLK_PCIE_VGA → CLK_PCIE_VGA# / CLK_PCIE_VGA

Cardreader
21 CLK_PCIE_CRN / 21 CLK_PCIE_CRP / 21 PCIE_CLKREQ_CR# → CLK_PCIE_CRN / CLK_PCIE_CRP / PCIE_CLKREQ_CR#

6,7,9,10,12,13,14,16,19,20,21,22,23,24,25,26,30,32,34,36 +3V
6,10,23,28,30,33,36 +3VS5

SMBus/Pull-up(CLG)

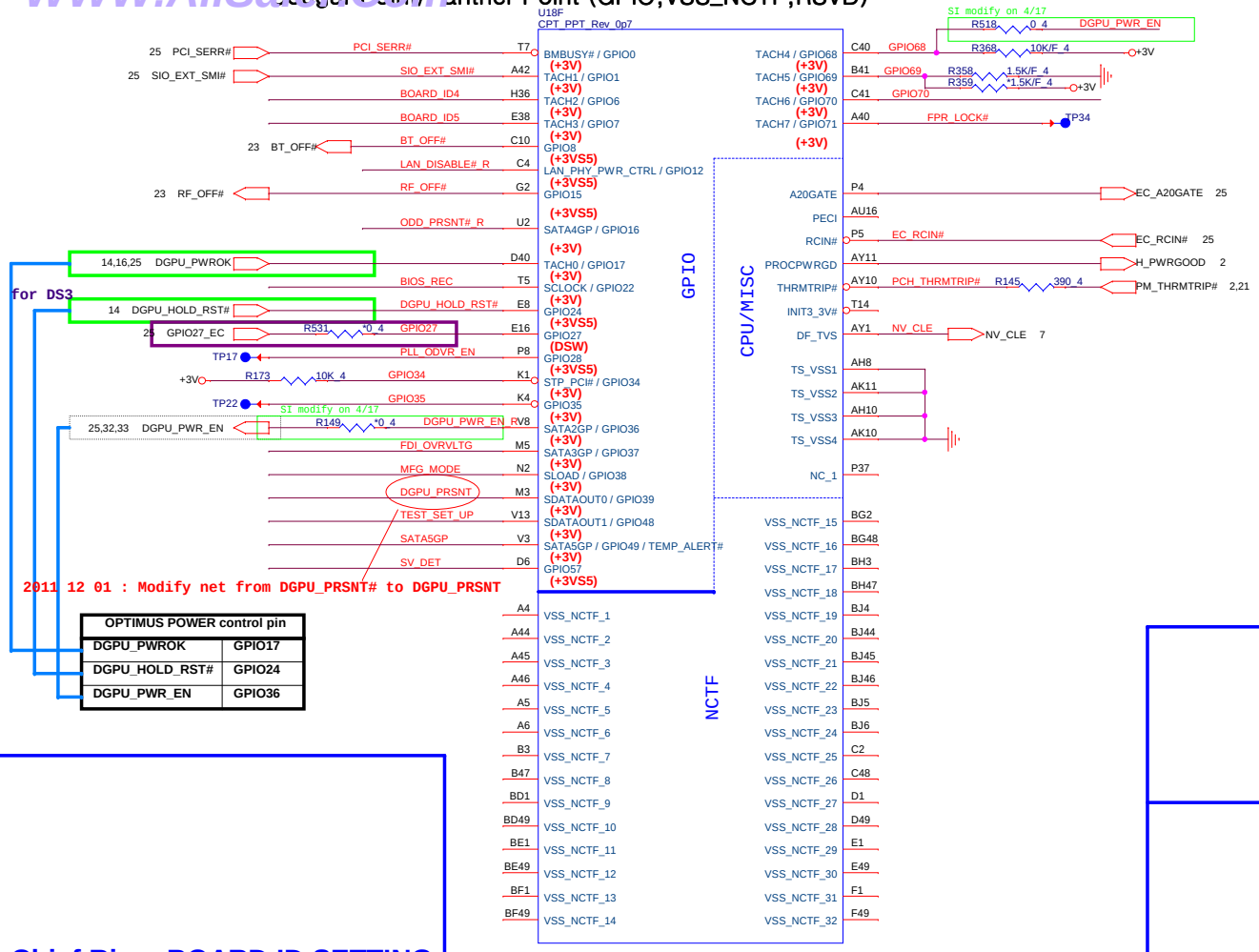
for DS3
+3V_DEEP_SUS
PV modify on 5/24
R157 10K/F_4 SMBALERT#
R443 2.2K_4 SMB_PCH_CLK
R413 2.2K_4 SMB_PCH_DAT
R428 2.2K_4 SMB_ME0_CLK
R156 2.2K_4 SMB_ME0_DAT
R137 10K/F_4 FPR_OFF

NB5

PROJECT : VOLKS
Quanta Computer Inc.

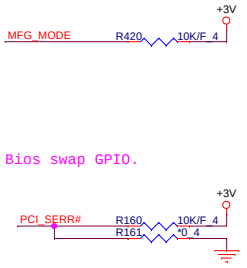
Size	Document Number	Rev
Custom	PCH 3/6 (Clock/PCI/PCIE/USB)	1A
Date: Thursday, June 07, 2012	Sheet 8 of 37	

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

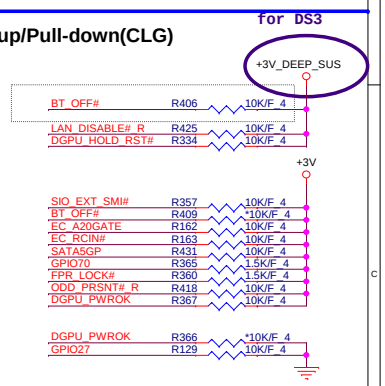


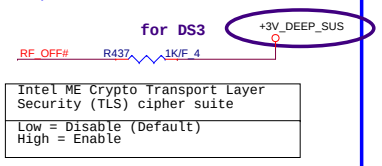
OPTIMUS POWER control pin	
DGPU_PWROK	GPIO17
DGPU_HOLD_RST#	GPIO24
DGPU_PWR_EN	GPIO36

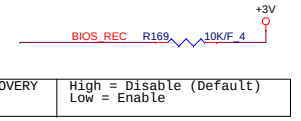
MFG-TEST

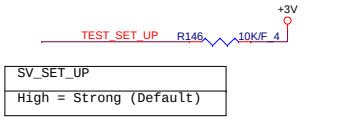


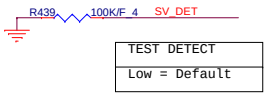
GPIO Pull-up/Pull-down(CLG)

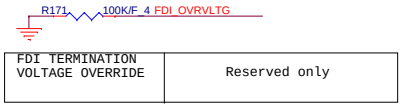






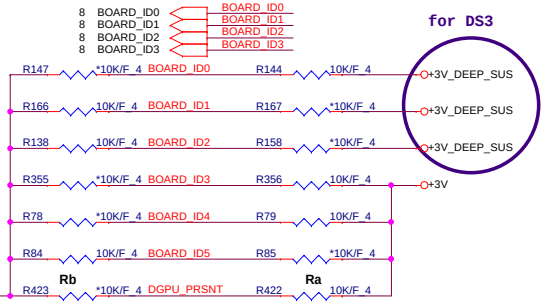






Chief River BOARD ID SETTING

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

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
Quanta Computer Inc.

Size	Document Number	Rev
Custom	PCH 4/6 (GPIO)	1A
Date: Thursday, June 07, 2012	Sheet 9 of 37	

Cougar Point/Panther Point (POWER)

Cougar Point/Panther Point (POWER)

U18J CPT_PPT_Rev_0p7 POWER

U18G CPT_PPT_Rev_0p7 POWER

Clock and Miscellaneous | USB | PCI/GPIO/LPC | SATA | MISC | CPU | RTC | HDA

VCC CORE | LVDS | CRT | HVCMOS | DMI | VCCIO | DFT / SPI | FDI

VCCACLK VCCDSW3_3 DCPSUSBYP VCC3_3[5] VCAPLLDMI2 VCCIO[14] DCPSUS[3] VCCASW[1] VCCASW[2] VCCASW[3] VCCASW[4] VCCASW[5] VCCASW[6] VCCASW[7] VCCASW[8] VCCASW[9] VCCASW[10] VCCASW[11] VCCASW[12] VCCASW[13] VCCASW[14] VCCASW[15] VCCASW[16] VCCASW[17] VCCASW[18] VCCASW[19] VCCASW[20] DCPRTC VCCVRM[4] VCCADPLLA VCCADPLLB VCCIO[7] VCCDIFFCLKN[1] VCCDIFFCLKN[2] VCCDIFFCLKN[3] VCCSSC DCPSST DCPSUS[1] DCPSUS[2] V_PROC_IO VCCRTC

VCCIO[29] VCCIO[30] VCCIO[31] VCCIO[32] VCCIO[33] VCCSUS3_3[7] VCCSUS3_3[8] VCCSUS3_3[9] VCCSUS3_3[10] VCCSUS3_3[6] VCCIO[34] V5REF_SUS DCPSUS[4] VCCSUS3_3[1] V5REF VCCSUS3_3[2] VCCSUS3_3[3] VCCSUS3_3[4] VCCSUS3_3[5] VCC3_3[1] VCC3_3[8] VCC3_3[4] VCC3_3[2] VCCIO[5] VCCIO[12] VCCIO[13] VCCIO[6] VCCAPLLSATA VCCVRM[1] VCCIO[2] VCCIO[3] VCCIO[4] VCCASW[22] VCCASW[23] VCCASW[21] VCCSUSHDA

VCCIO[28] VCCAPLLEXP VCCIO[15] VCCIO[16] VCCIO[17] VCCIO[18] VCCIO[19] VCCIO[20] VCCIO[21] VCCIO[22] VCCIO[23] VCCIO[24] VCCIO[25] VCCIO[26] VCC3_3[3] VCCVRM[2] VccAFDIPLL VCCIO[27] VCCDMI[2]

VCCADAC VSSADAC VCCALVDS VSSALVDS VCCTX_LVDS[1] VCCTX_LVDS[2] VCCTX_LVDS[3] VCCTX_LVDS[4] VCC3_3[6] VCC3_3[7] VCCVRM[3] VCCDMI[1] VCCCLKDMI VCCDFTERM[1] VCCDFTERM[2] VCCDFTERM[3] VCCDFTERM[4] VCCSPI

R537 0_4 +VCCDSW3_3 3mA (10mils) C243 0.1U/10V_4

+3V_SUS_CLKF33 +1.05V

+VCCSUS1 C240 *1U/6.3V_4

VCCASW:803mA (40mils) C136 1U/6.3V_4 C231 1U/6.3V_4 C197 1U/6.3V_4 C547 22U/6.3VS_8 C546 22U/6.3VS_8

C301 1U/6.3V_4 C264 +VCCRTCEXT 0.1U/10V_4 R111 *0_4/S +VCCAFDI_VRM 160mA (20mils) C214 1U/6.3V_4 +1.05V_VCCA_A_DPL 65mA (10mils) R112 *0_4/S +1.05V_VCCA_B_DPL 8mA (10mils) C215 1U/6.3V_4 +VCCDIFFCLKN 55mA (10mils) +V1.05V_SSCVCC 95mA (10mils) C275 +VCCSST 0.1U/10V_4

V_PROC_IO=2mA (10mils) C606 4.7U/6.3V_6 C607 0.1U/10V_4 C204 0.1U/10V_4

+3V_RTC VCCRTC<1mA (10mils) C255 1U/6.3V_4 C235 0.1U/10V_4 C247 0.1U/10V_4

C223 1U/6.3V_4 for DS3 +3V_DEEP_SUS VCCSUS3_3:65mA(15mils) C229 0.1U/10V_4 C233 0.1U/10V_4

VCC5REFSUS=1mA +5V_PCH_VCC5REFSUS R114 10_4 D5 RB500V-40 +5V_DEEP_SUS +3V_DEEP_SUS for DS3 +VCCA_USBSUS C239 *1U/6.3V_4 C225 0.1U/10V_4

V5REF P34 +5V_PCH_VCC5REF 1mA (10mils) for DS3

119mA (15mils) +3V_DEEP_SUS C232 1U/6.3V_4

266mA (20mils) +3V C226 0.1U/10V_4 C201 0.1U/10V_4

70mA C253 0.1U/10V_4

350mA +1.05V C274 1U/6.3V_4

30mA

+VCCAFDI_VRM C296 1U/6.3V_4 C218 1U/6.3V_4

1.01A (60mils)

10mA (10mils) for DS3 +3V_DEEP_SUS C217 0.1U/10V_4 C227 *1U/6.3V_4

6,7,23 +3V_RTC
2,4,12,13,31,33 +1.5VSUS
2,4,23,24 +1.5V_CPU

6,7,8,9,12,13,14,16,19,20,21,22,23,24,25,26,30,32,34,36 +3V
7,19,21,22,23,24,26,36 +5V
4,7,31 +1.8V
2,4,6,7,8,21,23,30,33,34 +1.05V
6,23,28,30,33,36 +3VS5
6,19,22,28,29,30,31,32,34,35,36 +5VS5

VCCCore:1.73 A (100mils) C242 1U/6.3V_4 C222 1U/6.3V_4 C230 10U/6.3VS_6 C220 1U/6.3V_4

for DS3 +5V_DEEP_SUS +3V_DEEP_SUS

VCCIO:3.799 A (140mils) C228 1U/6.3V_4 C216 1U/6.3V_4 C273 10U/6.3VS_6 C221 1U/6.3V_4 C250 1U/6.3V_4

178m A (20mils) C591 0.1U/10V_4

(Mobile 1.5V) +VCCAFDI_VRM +1.5V_CPU R141 *0_4/S 160mA (15mils)

L23 10uH/100MA_8 +1.05V_VCCA_A_DPL C567 1U/6.3V_4

L22 10uH/100MA_8 +1.05V_VCCA_B_DPL C566 1U/6.3V_4

20mA (10mils) +3V_SUS_CLKF33 C196 1U/6.3V_4 C175 10U/6.3VS_6 L20 10uH/100MA_8

20mA (10mils)

+VCCAFDI_VRM C177 1U/6.3V_4 Close to Y49 C263 1U/6.3V_4 Close to AT16 C279 1U/6.3V_4 Close to AP16

6.3mA (10mils) +VCCA_DAC_1_2 L21 PBY160808T-300Y-N C559 *10U/6.3VS_6 C568 *0.1U/10V_4 C563 *0.01U/16V_4

1mA (10mils)

60mA (10mils) +VCC_TX_LVDS L24 0.1uH/250mA_8 C564 22U/6.3VS_8 C195 0.01U/16V_4 C198 0.01U/16V_4

SG & UMA : Ra
DIS : Rb

42mA (10mils) C199 0.1U/10V_4 C224 1U/6.3V_4

C200 1U/6.3V_4 C241 *10U/6.3V_6

2 mA (10mils) C251 0.1U/10V_4

10mA (10mils) C252 1U/6.3V_4

+5V_PCH_VCC5REF R132 10_4 D6 RB500V-40 C212 1U/6.3V_4
V5REF= 1mA

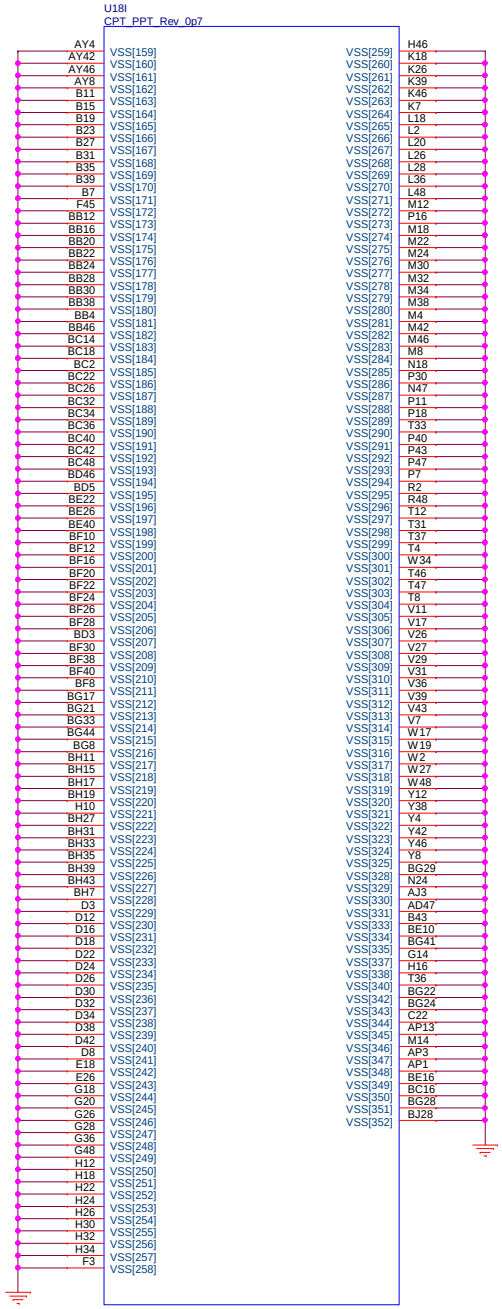
NB5

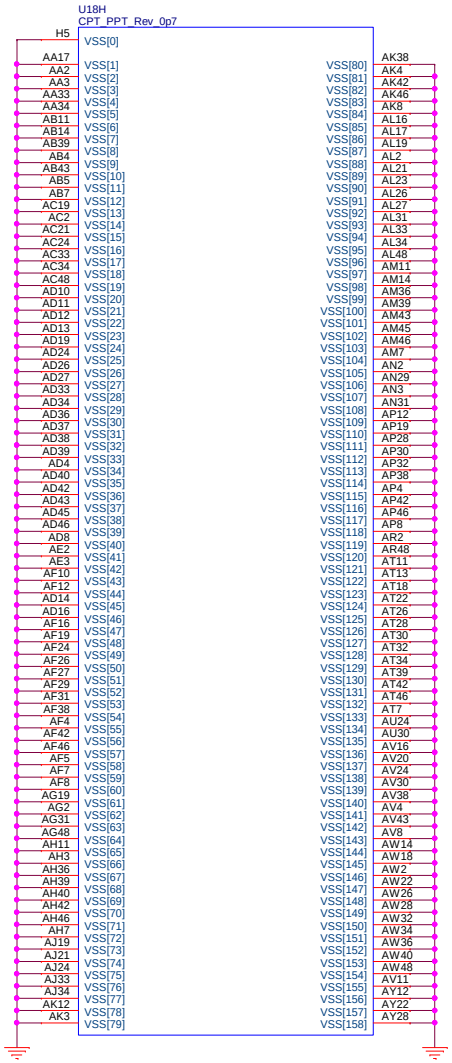
PROJECT : VOLKS
Quanta Computer Inc.

Size	Document Number	Rev
Custom	PCH 5/6 (Power)	1A
Date: Thursday, June 07, 2012	Sheet 10of 37	

Cougar Point/Panther Point (GND)

Cougar Point/Panther Point (GND)





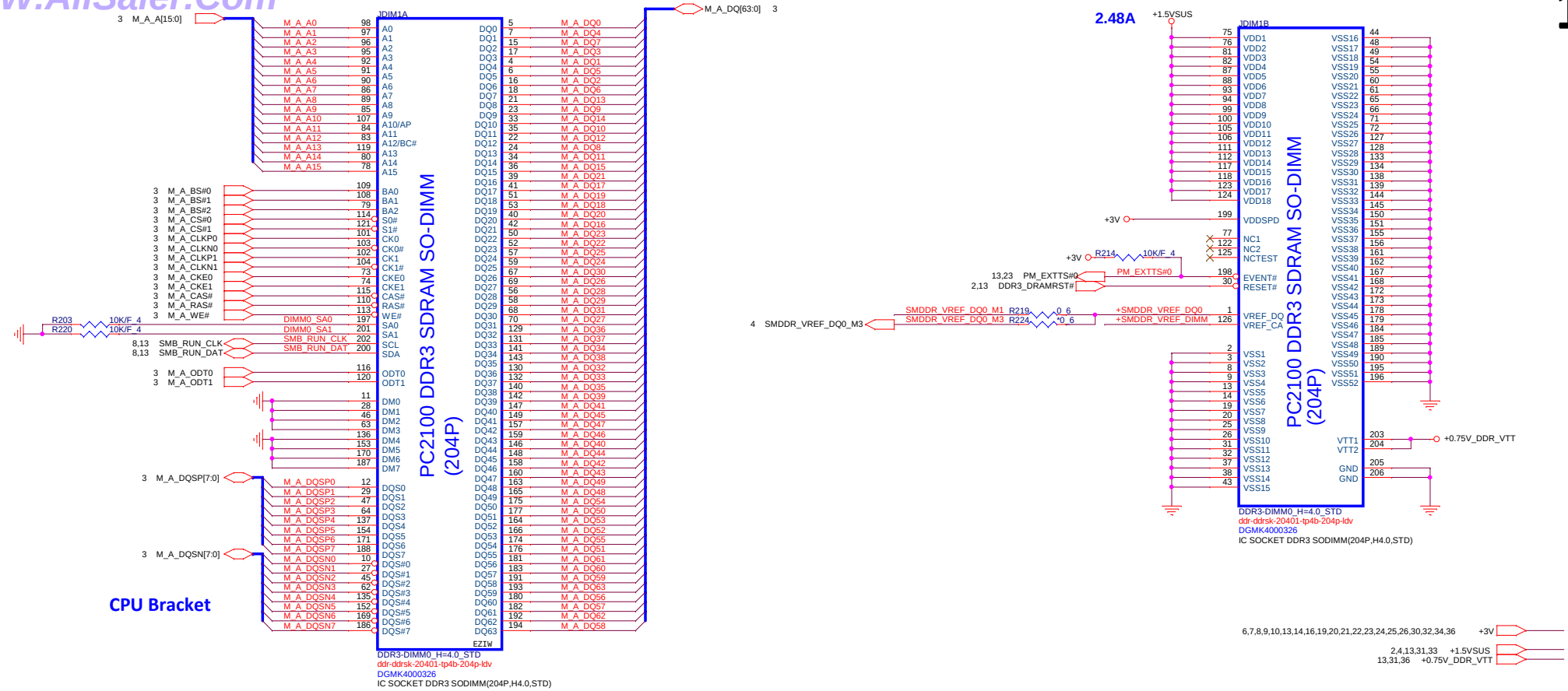
PROJECT : VOLKS

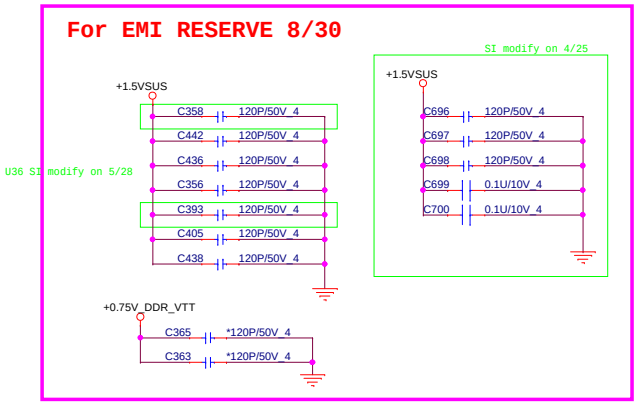
Quanta Computer Inc.

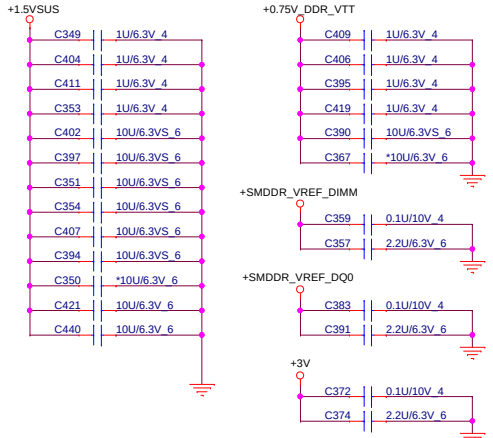
Size	Document Number	Rev
Custom	PCH 6/6 (Ground)	1A

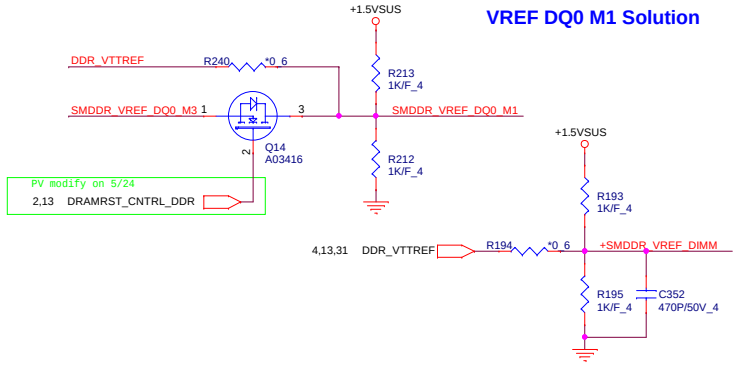
NB5

Date: Thursday, June 07, 2012 | Sheet 11of 37

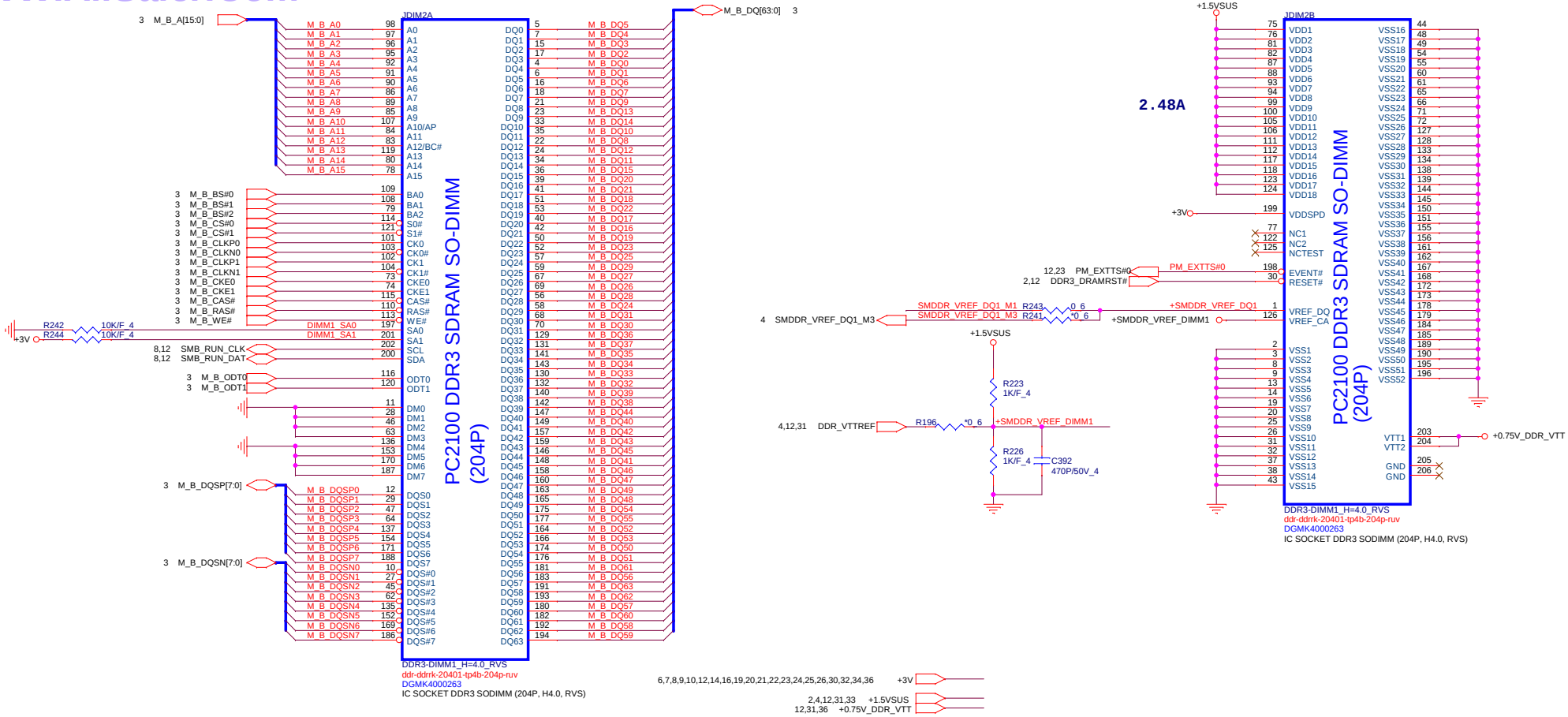




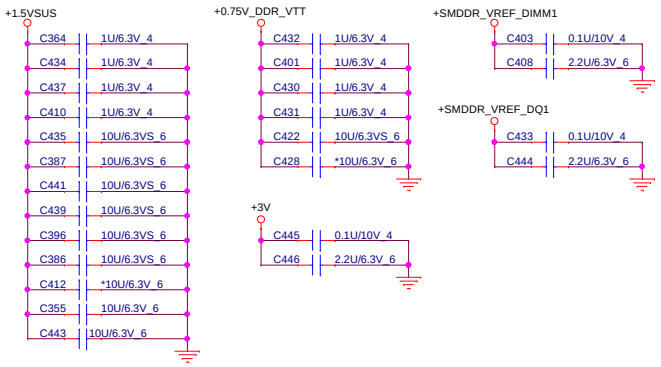




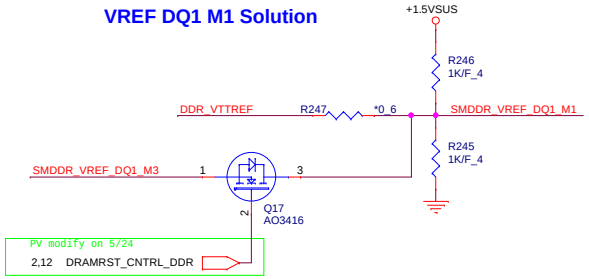
NB5	PROJECT : VOLKS Quanta Computer Inc.	
Size: Custom	Document Number: System Memory 1/2 (5.2H)	Rev: 1A
Date: Thursday, June 07, 2012	Sheet 12of 37	



Place these Caps near So-Dimm1.



VREF DQ1 M1 Solution



NB5	PROJECT : VOLKS 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(PCIEI/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

FBA_CMD0	C27	FBA_CMD0	
FBA_CMD1	C26	FBA_CMD1	
FBA_CMD2	E24	FBA_CMD2	
FBA_CMD3	F24	FBA_CMD3	
FBA_CMD4	D27	FBA_CMD4	
FBA_CMD5	D26	FBA_CMD5	
FBA_CMD6	F25	FBA_CMD6	
FBA_CMD7	F26	FBA_CMD7	
FBA_CMD8	F23	FBA_CMD8	
FBA_CMD9	G22	FBA_CMD9	
FBA_CMD10	G23	FBA_CMD10	
FBA_CMD11	G24	FBA_CMD11	
FBA_CMD12	F27	FBA_CMD12	
FBA_CMD13	G25	FBA_CMD13	
FBA_CMD14	G27	FBA_CMD14	
FBA_CMD15	G26	FBA_CMD15	
FBA_CMD16	M24	FBA_CMD16	
FBA_CMD17	M23	FBA_CMD17	
FBA_CMD18	K24	FBA_CMD18	
FBA_CMD19	K23	FBA_CMD19	
FBA_CMD20	M27	FBA_CMD20	
FBA_CMD21	M26	FBA_CMD21	
FBA_CMD22	M25	FBA_CMD22	
FBA_CMD23	K26	FBA_CMD23	
FBA_CMD24	K22	FBA_CMD24	
FBA_CMD25	J23	FBA_CMD25	
FBA_CMD26	J25	FBA_CMD26	
FBA_CMD27	J24	FBA_CMD27	
FBA_CMD28	K27	FBA_CMD28	
FBA_CMD29	K25	FBA_CMD29	
FBA_CMD30	J27	FBA_CMD30	
FBA_CMD31	J26	FBA_CMD31	

For debug only

+1.5V_GFX R30 60.4/F_4 FB_DEBUG0 F22 FBA_DEBUG0
+1.5V_GFX R29 60.4/F_4 FB_DEBUG1 J22 FBA_DEBUG1

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

D18	FBA_WCK01	
C18	FBA_WCK01	
D17	FBA_WCK23	
D16	FBA_WCK23	
T24	FBA_WCK45	
U24	FBA_WCK45	
V24	FBA_WCK67	
V25	FBA_WCK67	

FB_PLLAVDD = 55mA

+1.05V_GFX
L7 FBMA-10-160808-300T +FB_PLLAVDD F16 FB_PLLAVDD
30 ohm/100MHz
ESR=0.03ohm
P22 FB_PLLAVDD
H22

C65 0.1U/10V_4
C48 0.1U/10V_4
C45 0.1U/10V_4
C128 22U/6.3VS_6

FB_DLLAVDD	GF119
FB_PLLAVDD	GF117

FB_DLLAVDD = 15mA

ph

FBA_D0	E18	VMA_DQ0	
FBA_D1	F18	VMA_DQ1	
FBA_D2	E16	VMA_DQ2	
FBA_D3	F17	VMA_DQ3	
FBA_D4	D20	VMA_DQ4	
FBA_D5	D21	VMA_DQ5	
FBA_D6	F20	VMA_DQ6	
FBA_D7	E21	VMA_DQ7	
FBA_D8	E15	VMA_DQ8	
FBA_D9	D15	VMA_DQ9	
FBA_D10	F15	VMA_DQ10	
FBA_D11	F13	VMA_DQ11	
FBA_D12	C13	VMA_DQ12	
FBA_D13	B13	VMA_DQ13	
FBA_D14	E13	VMA_DQ14	
FBA_D15	D13	VMA_DQ15	
FBA_D16	B15	VMA_DQ16	
FBA_D17	C16	VMA_DQ17	
FBA_D18	A13	VMA_DQ18	
FBA_D19	A15	VMA_DQ19	
FBA_D20	B18	VMA_DQ20	
FBA_D21	A18	VMA_DQ21	
FBA_D22	A19	VMA_DQ22	
FBA_D23	C19	VMA_DQ23	
FBA_D24	B24	VMA_DQ24	
FBA_D25	C23	VMA_DQ25	
FBA_D26	A25	VMA_DQ26	
FBA_D27	A24	VMA_DQ27	
FBA_D28	A21	VMA_DQ28	
FBA_D29	B21	VMA_DQ29	
FBA_D30	C20	VMA_DQ30	
FBA_D31	C21	VMA_DQ31	
FBA_D32	R22	VMA_DQ32	
FBA_D33	R24	VMA_DQ33	
FBA_D34	T22	VMA_DQ34	
FBA_D35	R23	VMA_DQ35	
FBA_D36	N25	VMA_DQ36	
FBA_D37	N26	VMA_DQ37	
FBA_D38	N23	VMA_DQ38	
FBA_D39	N24	VMA_DQ39	
FBA_D40	V23	VMA_DQ40	
FBA_D41	V22	VMA_DQ41	
FBA_D42	T23	VMA_DQ42	
FBA_D43	U22	VMA_DQ43	
FBA_D44	Y24	VMA_DQ44	
FBA_D45	AA24	VMA_DQ45	
FBA_D46	Y22	VMA_DQ46	
FBA_D47	AA23	VMA_DQ47	
FBA_D48	AD27	VMA_DQ48	
FBA_D49	AB25	VMA_DQ49	
FBA_D50	AD26	VMA_DQ50	
FBA_D51	AC25	VMA_DQ51	
FBA_D52	AA27	VMA_DQ52	
FBA_D53	AA26	VMA_DQ53	
FBA_D54	W26	VMA_DQ54	
FBA_D55	Y25	VMA_DQ55	
FBA_D56	R26	VMA_DQ56	
FBA_D57	T25	VMA_DQ57	
FBA_D58	N27	VMA_DQ58	
FBA_D59	R27	VMA_DQ59	
FBA_D60	V26	VMA_DQ60	
FBA_D61	V27	VMA_DQ61	
FBA_D62	W27	VMA_DQ62	
FBA_D63	W25	VMA_DQ63	

FBA_DQM0	D19	VMA_DM0	
FBA_DQM1	D14	VMA_DM1	
FBA_DQM2	C17	VMA_DM2	
FBA_DQM3	C22	VMA_DM3	
FBA_DQM4	P24	VMA_DM4	
FBA_DQM5	W24	VMA_DM5	
FBA_DQM6	AA25	VMA_DM6	
FBA_DQM7	U25	VMA_DM7	

FBA_DQS_WP0	E19	VMA_WDQS0	
FBA_DQS_WP1	C15	VMA_WDQS1	
FBA_DQS_WP2	B16	VMA_WDQS2	
FBA_DQS_WP3	B22	VMA_WDQS3	
FBA_DQS_WP4	R25	VMA_WDQS4	
FBA_DQS_WP5	W23	VMA_WDQS5	
FBA_DQS_WP6	AB26	VMA_WDQS6	
FBA_DQS_WP7	T26	VMA_WDQS7	

FBA_DQS_RN0	F19	VMA_RDQS0	
FBA_DQS_RN1	C14	VMA_RDQS1	
FBA_DQS_RN2	A16	VMA_RDQS2	
FBA_DQS_RN3	A22	VMA_RDQS3	
FBA_DQS_RN4	P25	VMA_RDQS4	
FBA_DQS_RN5	W22	VMA_RDQS5	
FBA_DQS_RN6	AB27	VMA_RDQS6	
FBA_DQS_RN7	T27	VMA_RDQS7	

FB_VREF_PROBE D23 +FB_VREF1 T10

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

B26	FBVDDQ
C25	FBVDDQ
E23	FBVDDQ
E26	FBVDDQ
F14	FBVDDQ
F21	FBVDDQ
G13	FBVDDQ
G14	FBVDDQ
G15	FBVDDQ
G16	FBVDDQ
G18	FBVDDQ
G19	FBVDDQ
G20	FBVDDQ
G21	FBVDDQ
H24	FBVDDQ
H26	FBVDDQ
J21	FBVDDQ
K21	FBVDDQ
L22	FBVDDQ
L24	FBVDDQ
L26	FBVDDQ
M21	FBVDDQ
N21	FBVDDQ
R21	FBVDDQ
T21	FBVDDQ
V21	FBVDDQ
W21	FBVDDQ

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

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

A2	GND	GND	M13
AB17	GND	GND	M15
AB20	GND	GND	M17
AB24	GND	GND	N10
AC2	GND	GND	N12
AC22	GND	GND	N14
AC26	GND	GND	N16
AC5	GND	GND	N18
AC8	GND	GND	P11
AD12	GND	GND	P13
AD13	GND	GND	P15
A26	GND	GND	P17
AD15	GND	GND	P2
AD16	GND	GND	P23
AD18	GND	GND	P26
AD19	GND	GND	P5
AD21	GND	GND	R10
AD22	GND	GND	R12
AE11	GND	GND	R14
AE14	GND	GND	R16
AE17	GND	GND	R18
AE20	GND	GND	T11
AB11	GND	GND	T13
AF1	GND	GND	T15
AF11	GND	GND	T17
AF14	GND	GND	U10
AF17	GND	GND	U12
AF20	GND	GND	U14
AF23	GND	GND	U16
AF5	GND	GND	U18
AF8	GND	GND	U2
AG2	GND	GND	U23
AG26	GND	GND	U26
AB14	GND	GND	U5
B1	GND	GND	V11
B11	GND	GND	V13
B14	GND	GND	V15
B17	GND	GND	V17
B20	GND	GND	V2
B23	GND	GND	Y23
B27	GND	GND	Y26
B5	GND	GND	Y5
B8	GND		
E11	GND		
E14	GND		
E17	GND		
E2	GND		
E20	GND		
E22	GND		
E25	GND		
E5	GND		
E8	GND		
H2	GND		
H23	GND		
H25	GND		
H5	GND		
K11	GND		
K13	GND		
K15	GND		
K17	GND		
L10	GND		
L12	GND		
L14	GND		
L16	GND		
L18	GND		
L2	GND		
L23	GND		
L25	GND		
L5	GND	GND	AA7
M11	GND	GND	AB7

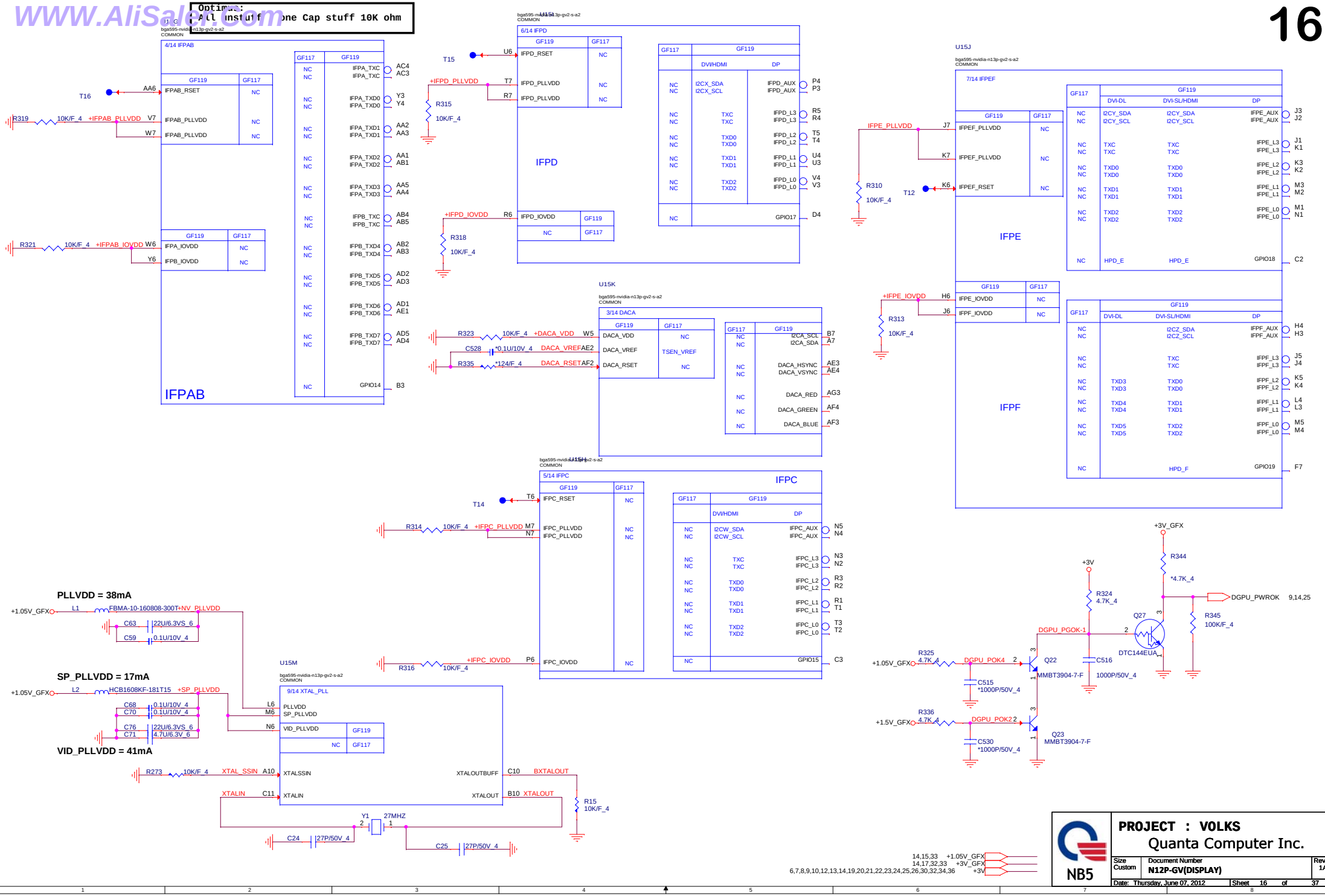
14,16,33 +1.05V_GFX
16,17,18,33 +1.5V_GFX

NB5

PROJECT : VOLKS
Quanta Computer Inc.

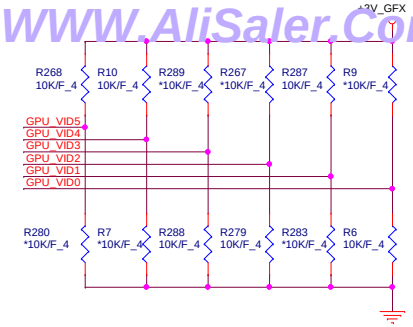
Size	Document Number	Rev
Custom	N11M-GE2(MEMORY/GND)	1A
Date: Thursday, June 07, 2012	Sheet 15 of 37	

Optimus:
All instuff one Cap stuff 10K ohm

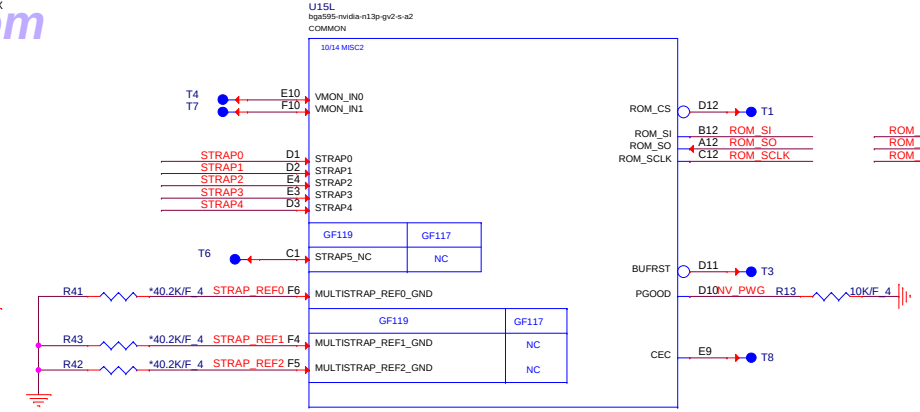


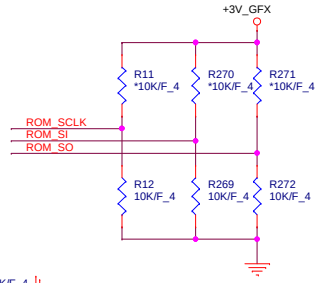
PROJECT : VOLKS		
Quanta Computer Inc.		
Size: Custom	Document Number: N12P-GV(DISPLAY)	Rev: 1A
Date: Thursday, June 07, 2012	Sheet 16 of 37	

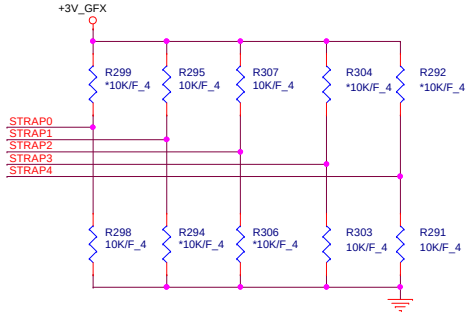
NB5



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





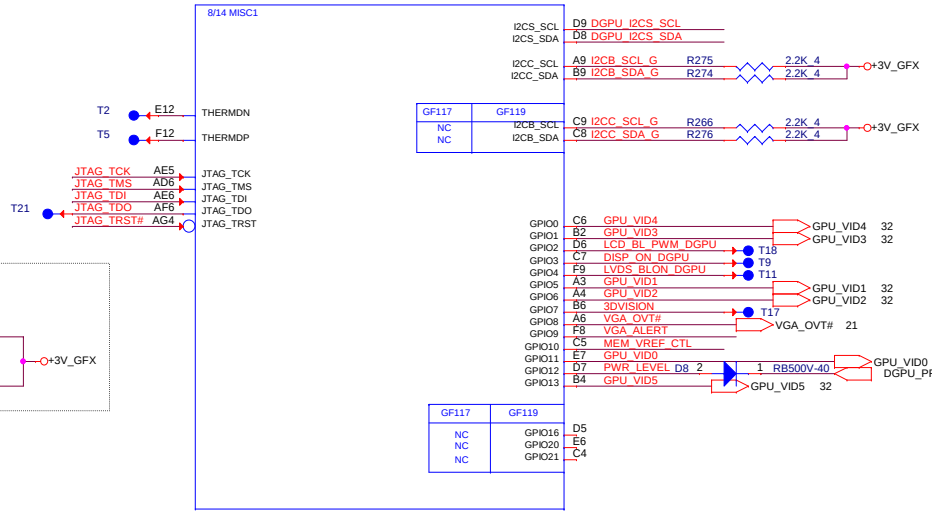


Binary Strap Mode Mapping

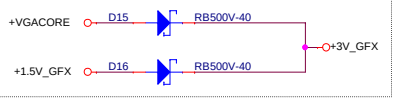
Strap Pin name	Strap Mapping	Resistance	Polarity
ROM_SCLK	SMB_ALT_ADDR	10Kohm	Pull-down to GND
ROM_SI	SUB_VENDOR	10Kohm	Pull-UP to 3V3 if VBIOS ROM Exists Pull-down to GND if no VBIO ROM
ROM_SO	VGA_DEVICE	10Kohm	Pull-down to GND (no dispaly)
STRAP0	RAMCFG[0]	10Kohm	USER defined
STRAP1	RAMCFG1]	10Kohm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

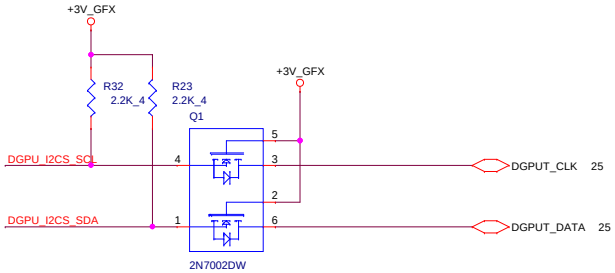
VRAM Configuration Table

RAMCFG [3:0]	DESCRIPTION	Vendor	Vendor P/N	QBCON P/N	HP P/N
	(MP)	Reserved			
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



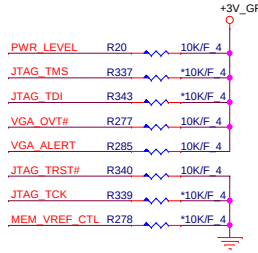
for meet Power down sequence.
Nvidia request for optimus





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 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 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

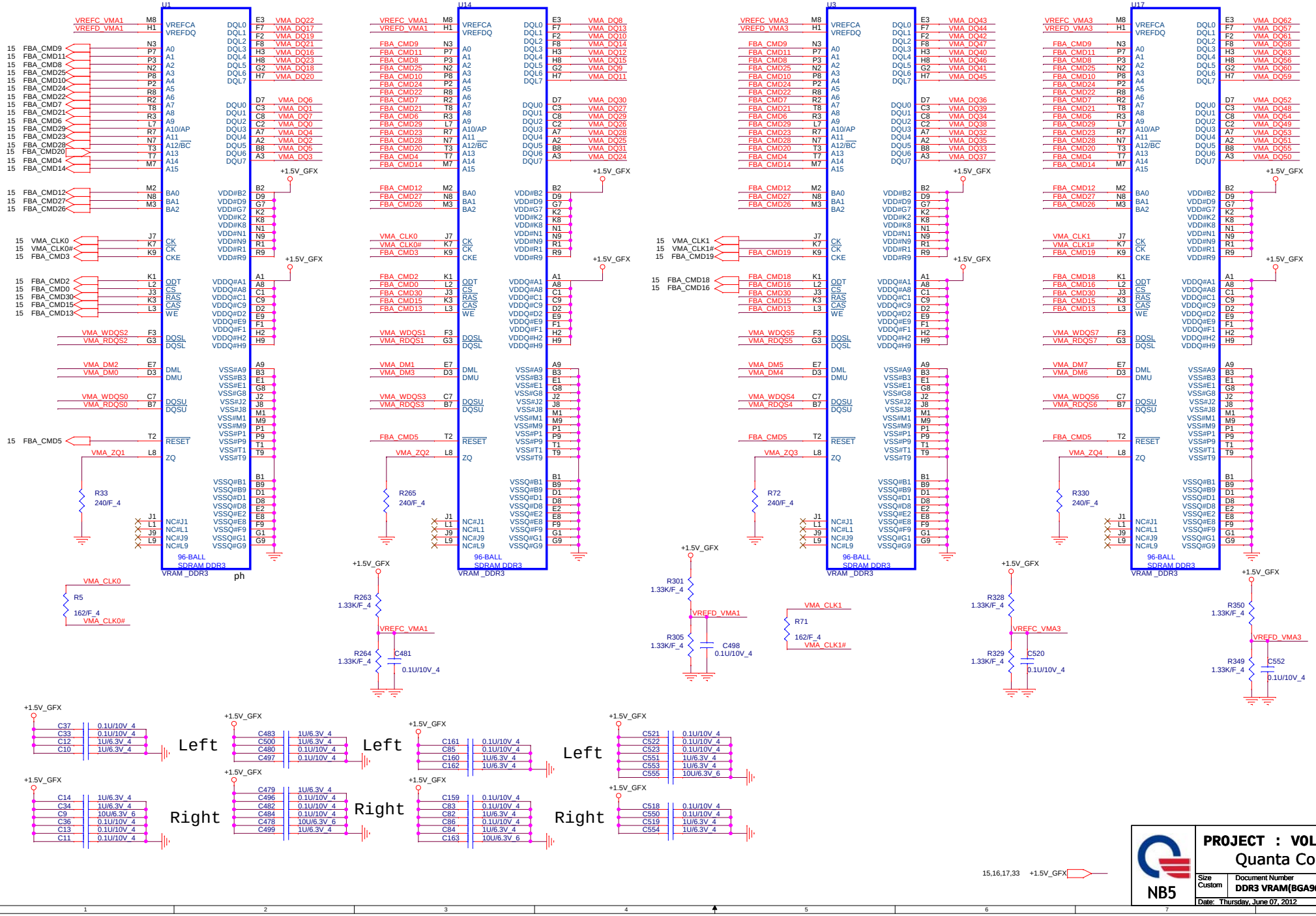
NB5

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]



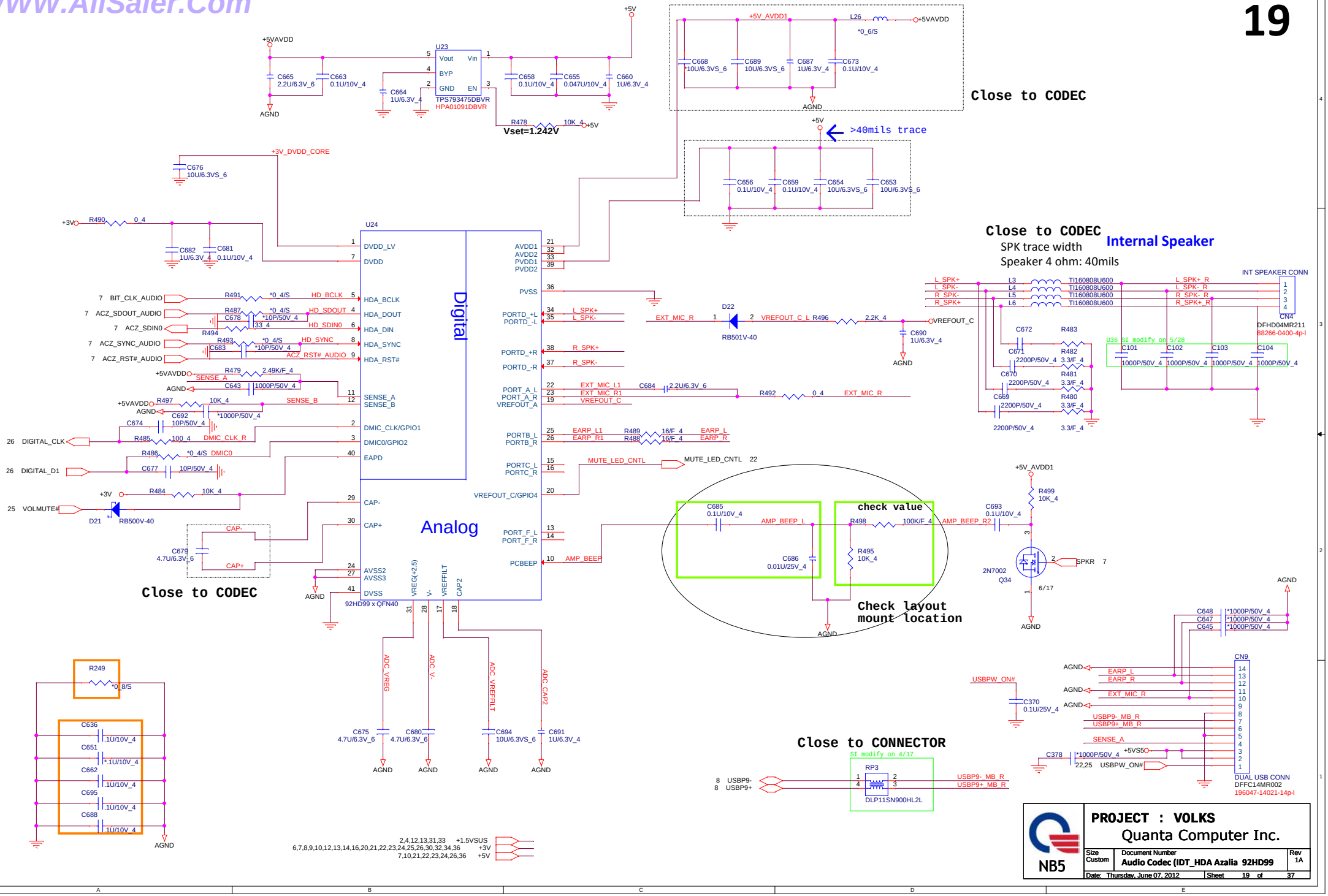
15,16,17,33 +1.5V_GFX

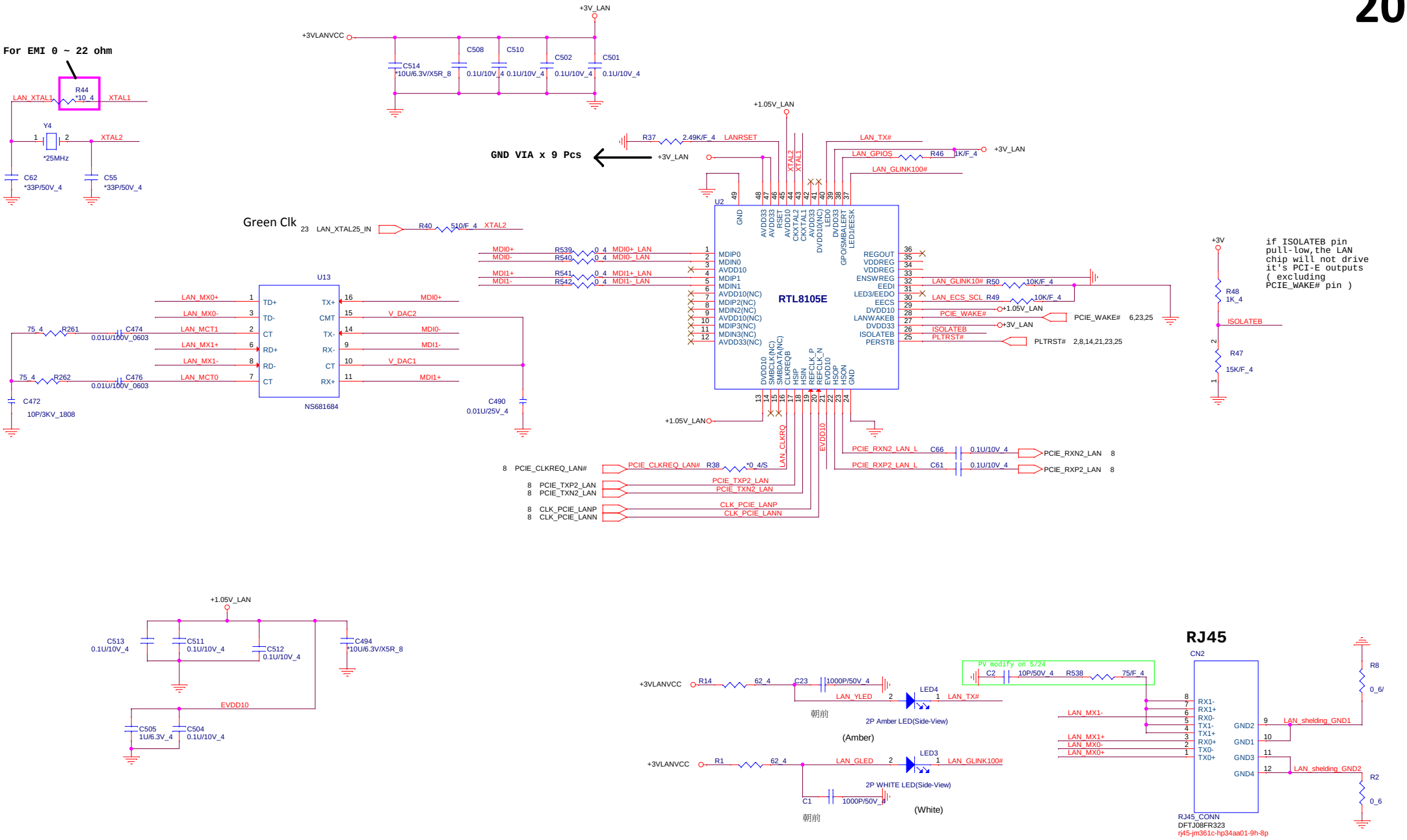
PROJECT : VOLKS
Quanta Computer Inc.

Size	Document Number	Rev
Custom	DDR3 VRAM(BGA96)	1A

NB5

Date: Thursday, June 07, 2012 Sheet 18 of 37





PROJECT : VOLKS

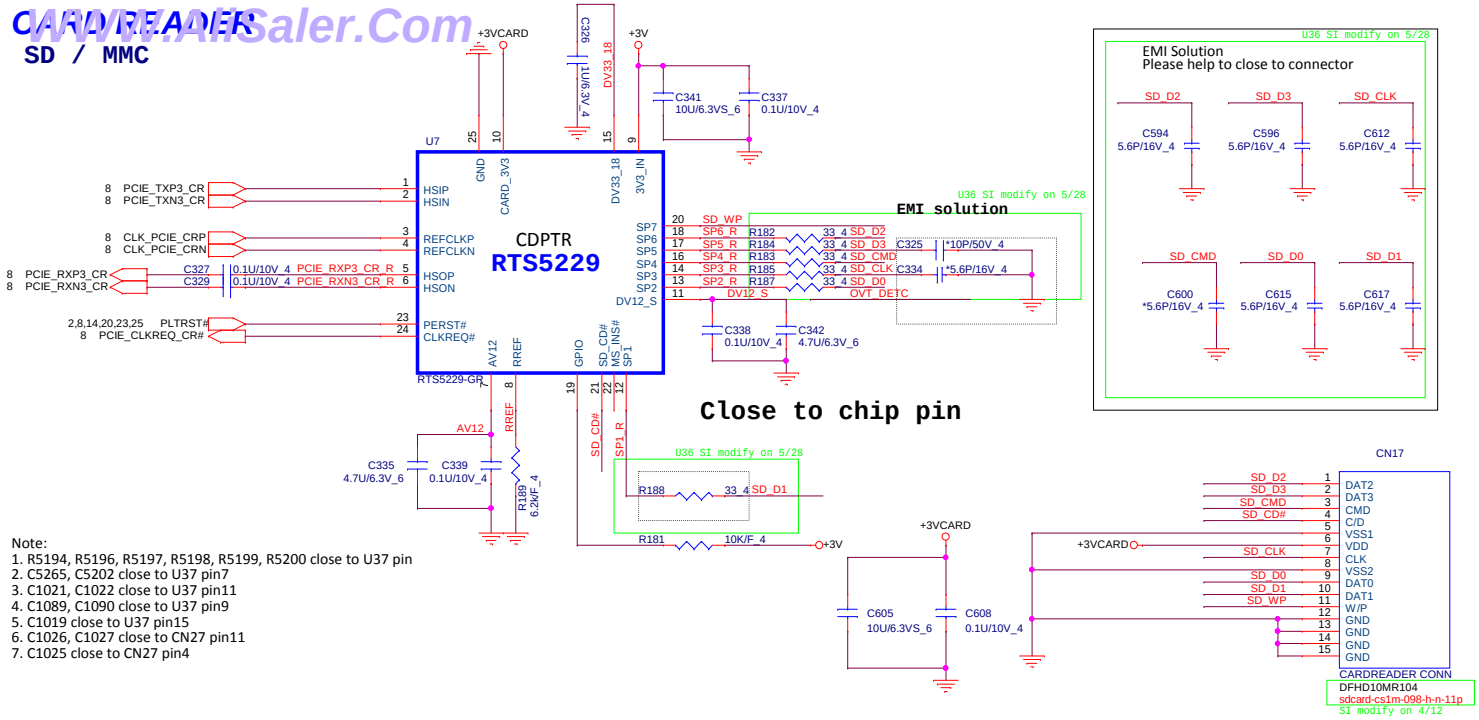
Quanta Computer Inc.

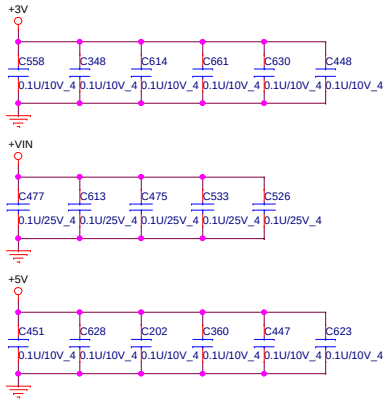
NB5

Size	Document Number	Rev
Custom	LAN RTL8105/RJ45	1A

Date: Thursday, June 07, 2012 | Sheet 20of 37

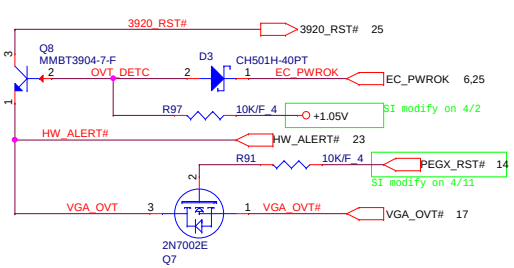
CARD READER
SD / MMC

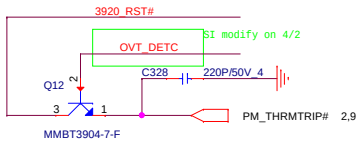


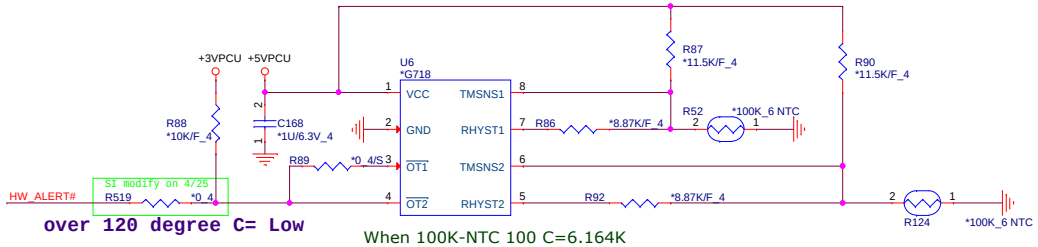


Note:
1. R5194, R5196, R5197, R5198, R5199, R5200 close to U37 pin
2. C5265, C5202 close to U37 pin7
3. C1021, C1022 close to U37 pin11
4. C1089, C1090 close to U37 pin9
5. C1019 close to U37 pin15
6. C1026, C1027 close to CN27 pin11
7. C1025 close to CN27 pin4

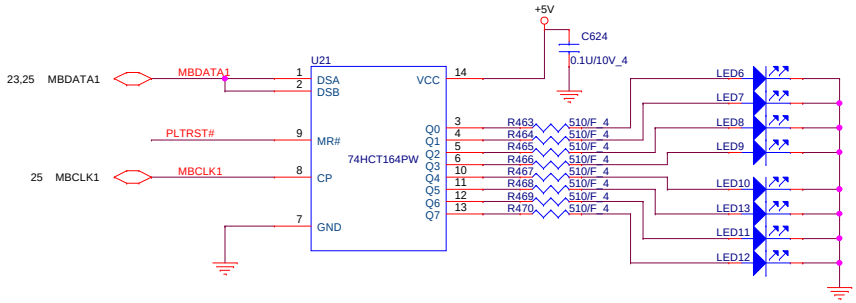
Thermal HW protect





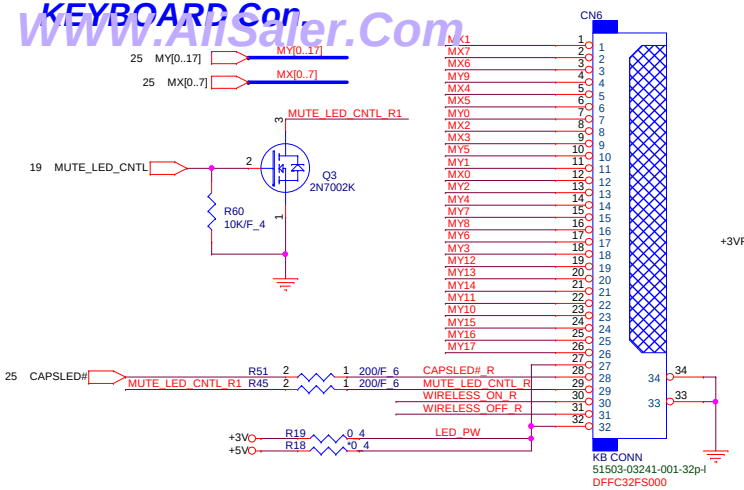


80 port

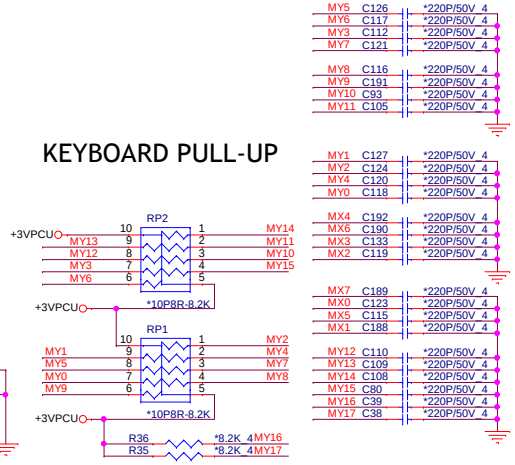


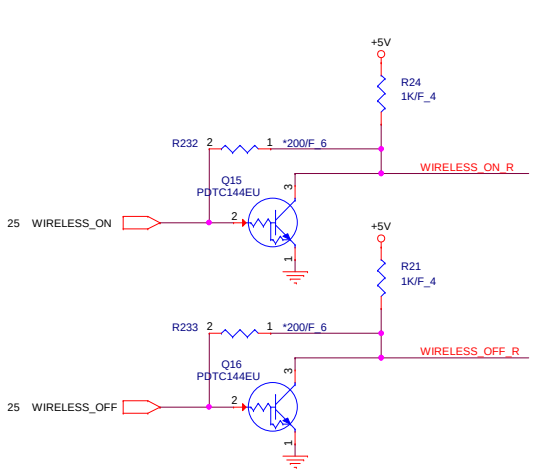
NB5	PROJECT : VOLKS Quanta Computer Inc.	
Size: Custom	Document Number: Card Reader control (RTS5229-GR)	Rev: 1A
Date: Thursday, June 07, 2012	Sheet: 21of	37

KEYBOARD Con.

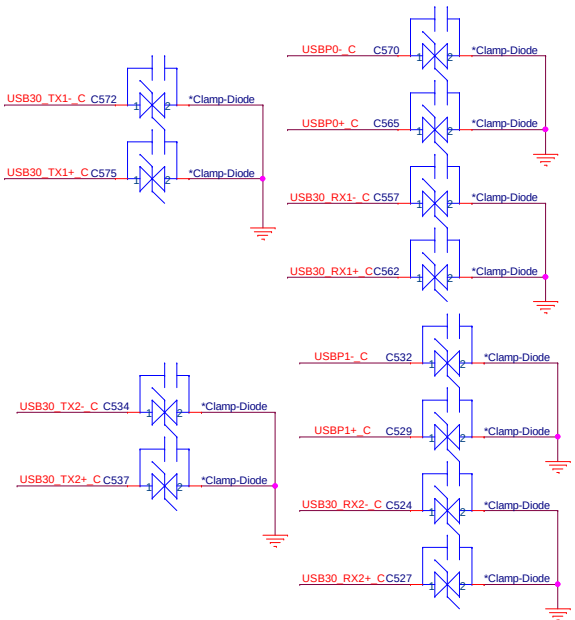


KEYBOARD PULL-UP

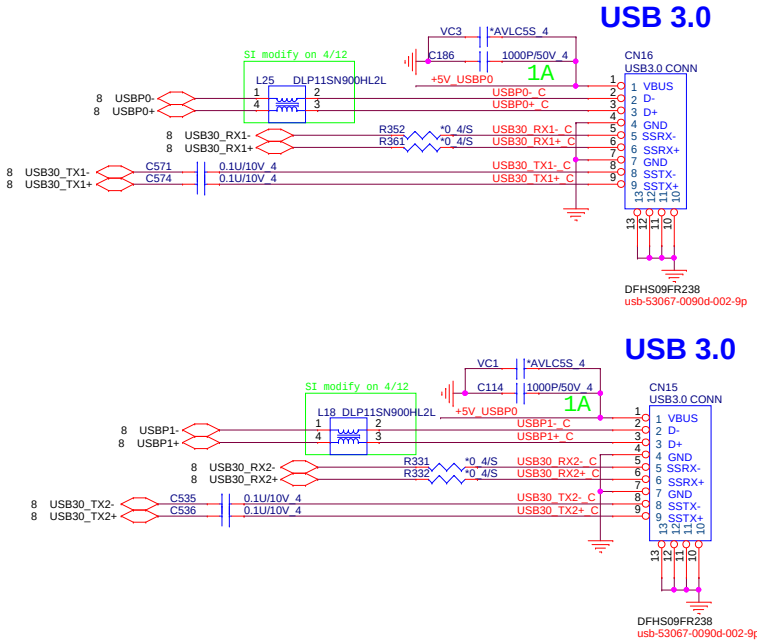




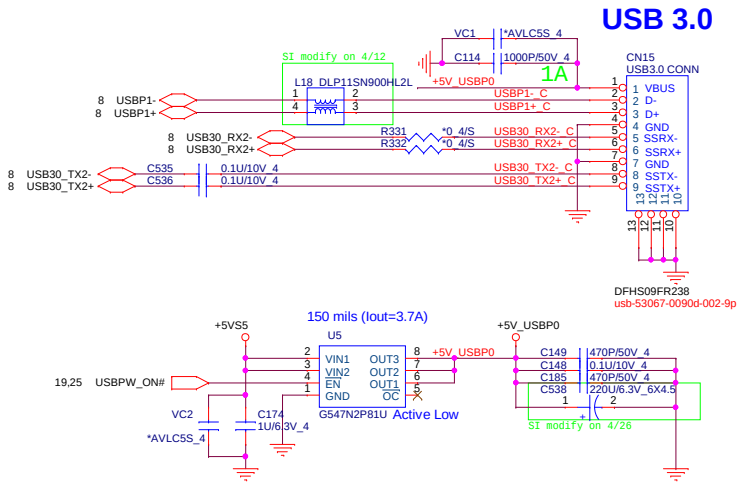
USB 2.0/3.0 Combo



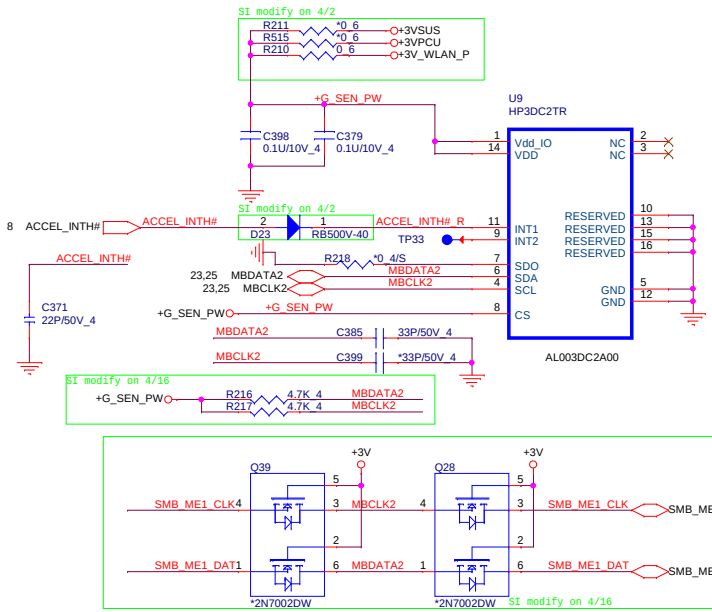
USB 3.0



USB 3.0

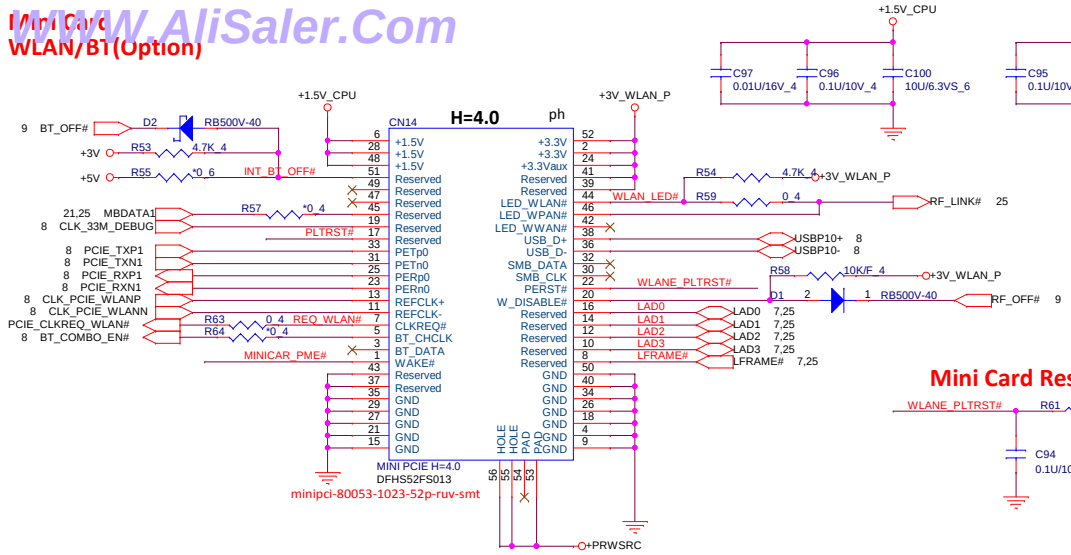


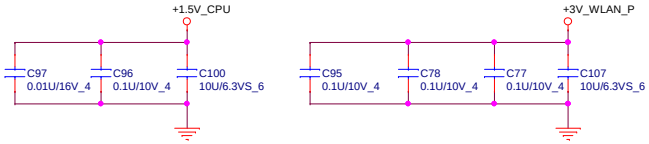
Accelerometer Sensor

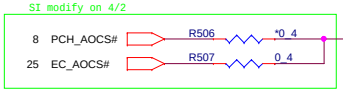


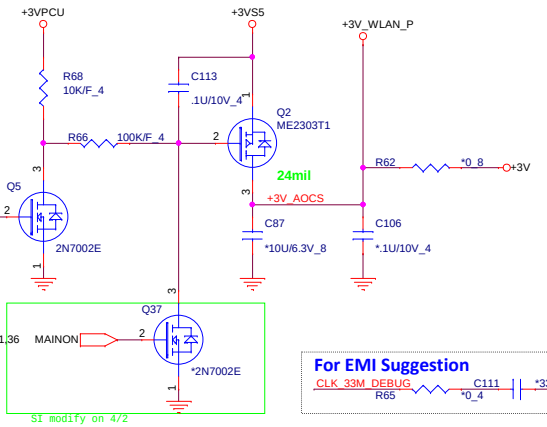
NB5	PROJECT : VOLKS Quanta Computer Inc.	
Size: Custom	Document Number: USB 3.0/KB/Green CLK	Rev: 1A
Date: Thursday, June 07, 2012	Sheet: 22of 37	

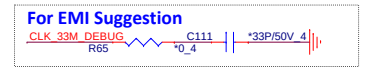
Mini Card
WLAN/BT(Option)



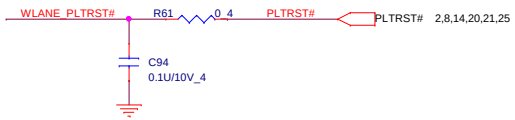




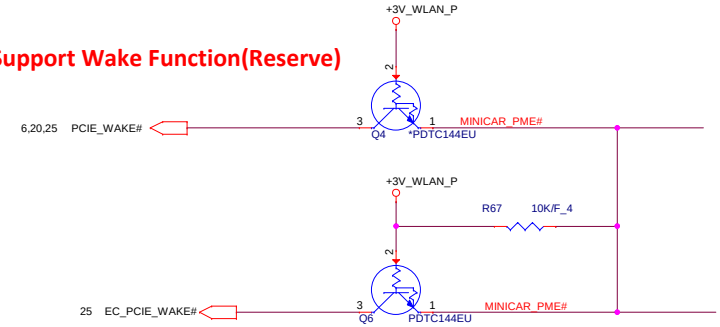




Mini Card Reset

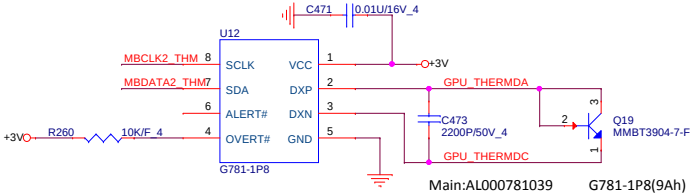


Support Wake Function(Reserve)



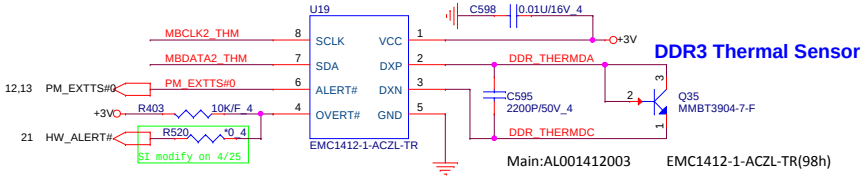
Local Thermal Sensor

GPU Thermal Sensor



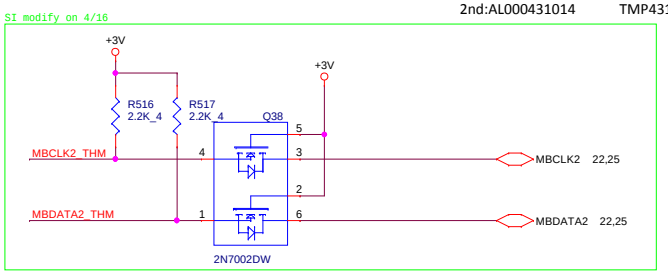
Main:AL000781039 G781-1P8(9Ah)
2nd:AL001412005 EMC1412-2-ACZL-TR(9Ah)

CPU Thermal Sensor



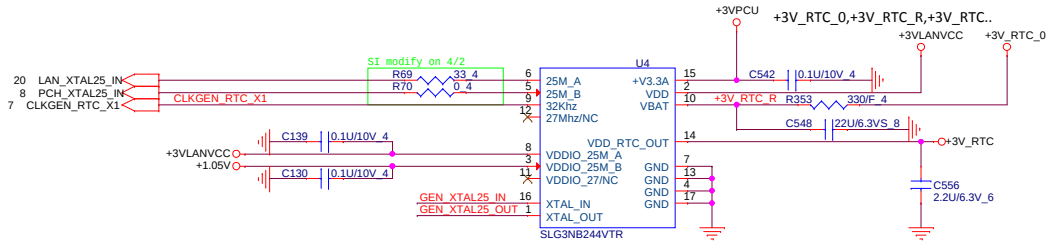
DDR3 Thermal Sensor

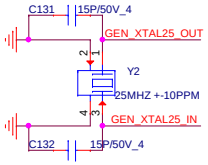
Main:AL001412003 EMC1412-1-ACZL-TR(98h)
2nd:AL000431014 TMP431ADGKR(98h)

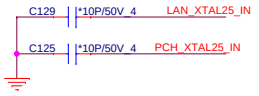


Green CLK Circuitry

20mils width(min)
+3V_RTC_0,+3V_RTC_R,+3V_RTC..





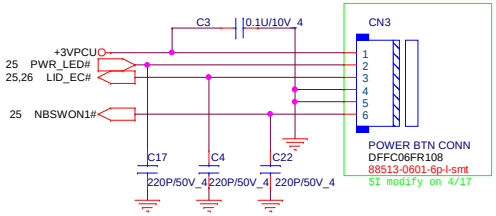


27 +PRWSRC
6,7,8,9,10,12,13,14,16,19,20,21,22,24,25,26,30,32,34,36 +3V
7,10,19,21,22,24,26,36 +5V
7,21,22,24,25,26,27,28 +3VPCU
2,4,10,24 +1.5V_CPU

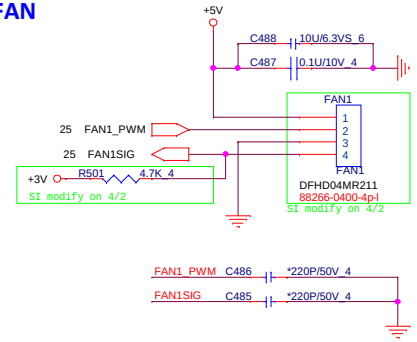
PROJECT : VOLKS Quanta Computer Inc.		
Size: Custom	Document Number: MINI-PCIE/LED	Rev: 1A
NB5	Date: Thursday, June 07, 2012	Sheet 23of 37

Power Button Connector

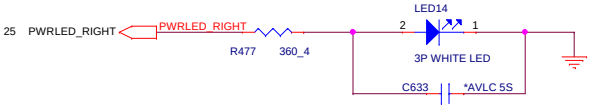
Pin1 : +3VPCU(IDSWITCH PWR)
Pin2 : POWER LE
Pin3 : LID_SW#
Pin4 : GND
Pin5 : GND
Pin6 : POWERON#



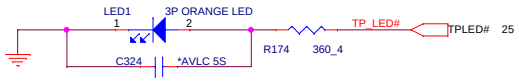
FAN



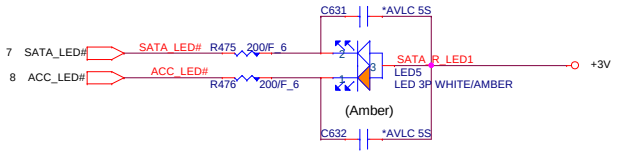
PWR LED



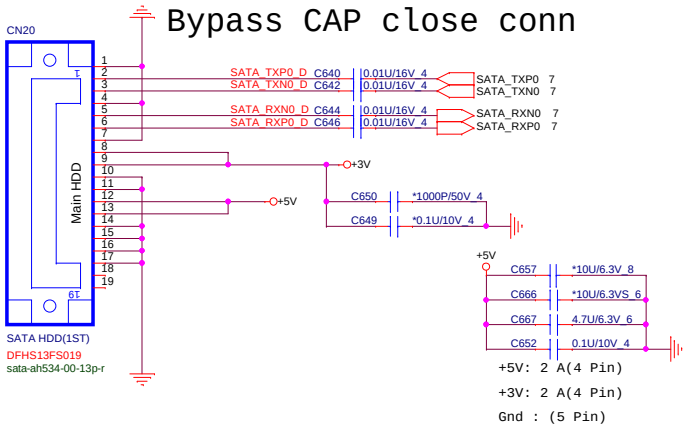
14" TP LED



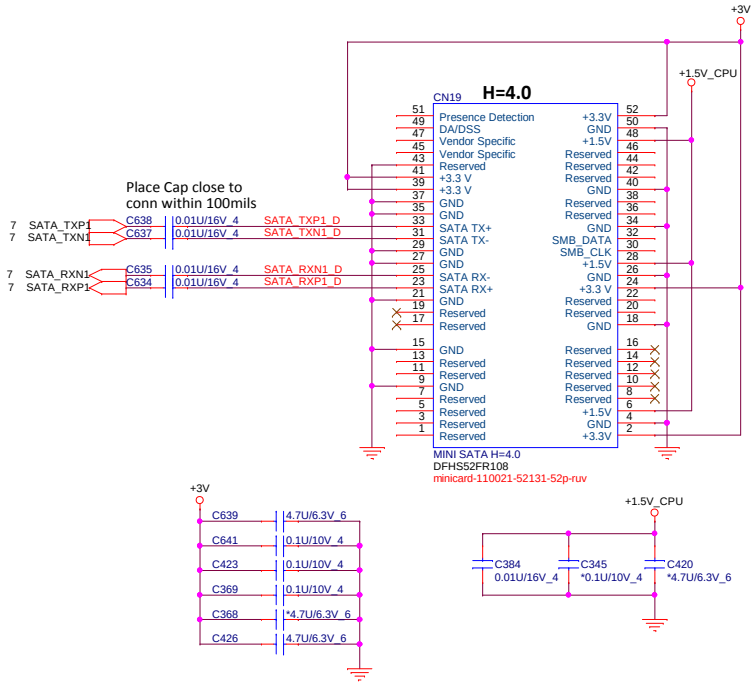
SATA LED



SATA HDD Connector(Cable type)



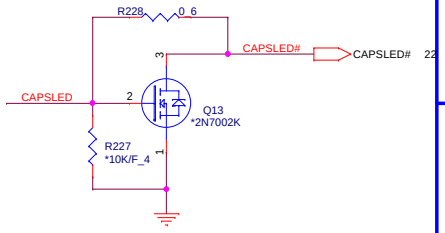
Mini PCI-E Card 2- Full size mSATA



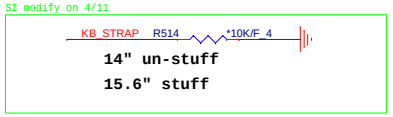
6,7,8,9,10,12,13,14,16,19,20,21,22,23,25,26,30,32,34,36 +3V
7,10,19,21,22,23,26,36 +5V
7,21,22,23,25,26,27,28 +3VPCU
2,4,10,23 +1.5V_CPU
27,33,36 +12VALW

NB5	PROJECT : VOLKS Quanta Computer Inc.	
Size: Custom	Document Number: SATA HDD/ODD/MSATA CONN	Rev: 1A
Date: Thursday, June 07, 2012	Sheet: 24of 37	

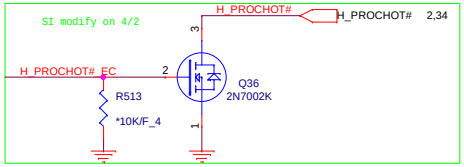
Cap LED



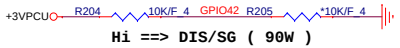
SI modify on 4/11



SI modify on 4/2

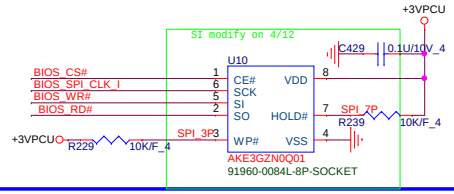


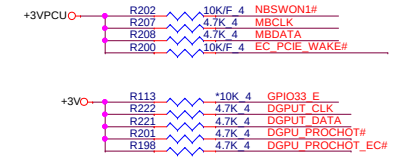
Adapter select for EC



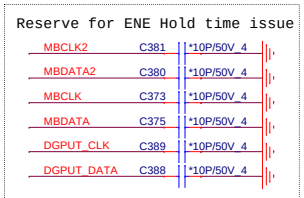
Hi ==> DIS/SG (90W)
Low ==>UMA (65W)

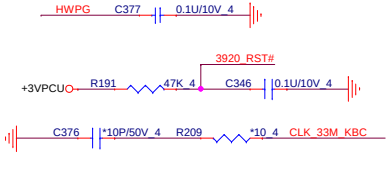
Vender	Size	P/N
EON	1MB	AKE3GZN0Q01 (EON EN25Q80A-100HIP)
MX	1MB	AKE3GFP0Z00 (MX25L8006EM2I-12G)
AMIC	1MB	AKE3GZP0801 (A25L080M-F)
Socket		DFHS08FS023

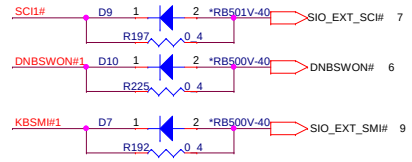


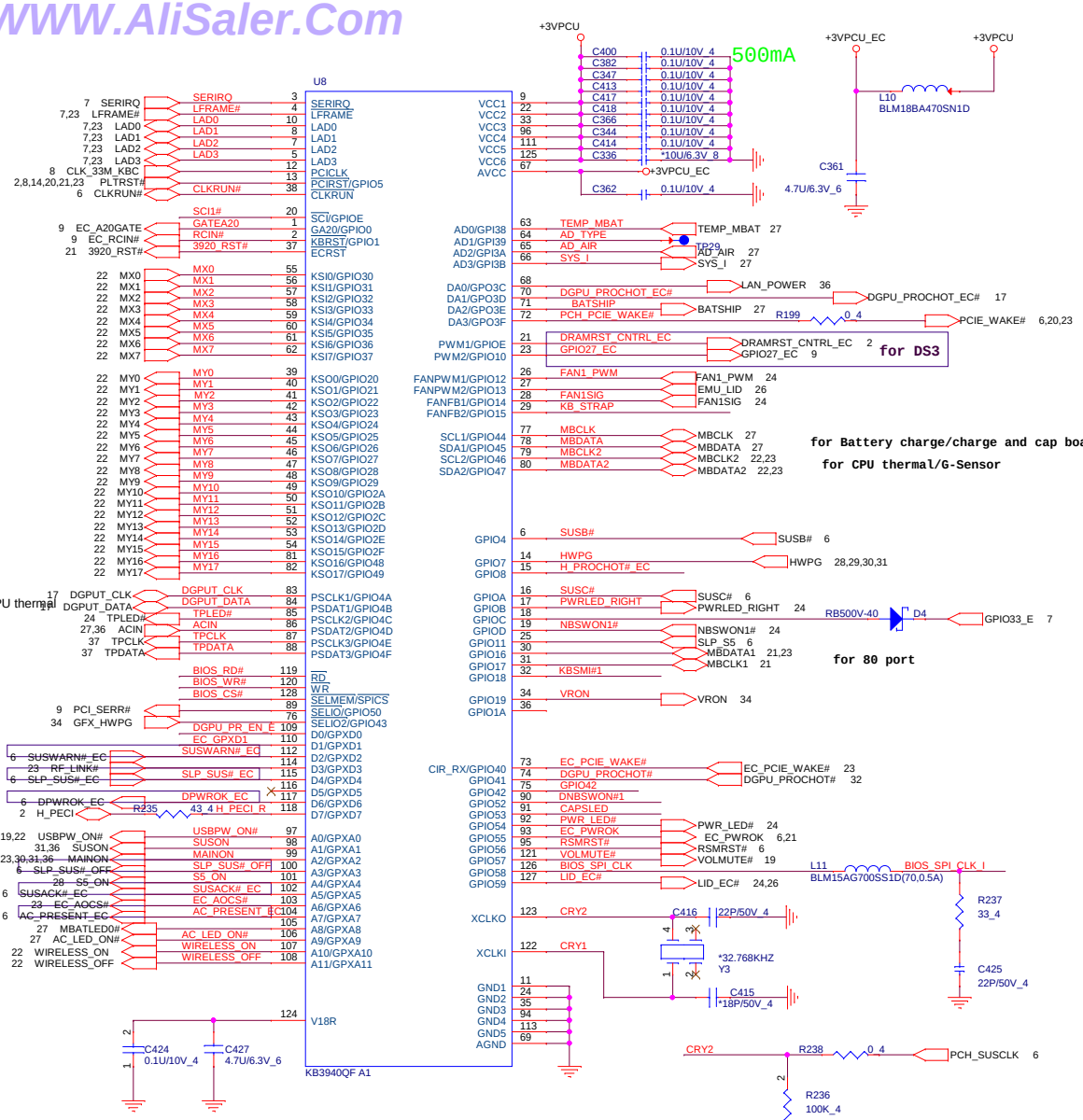


Reserve for ENE Hold time issue









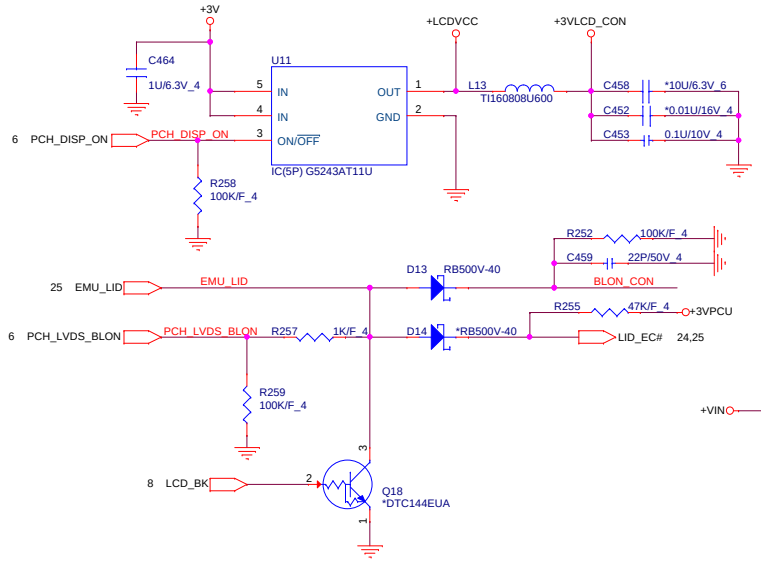
2,4,6,7,8,10,21,23,30,33,34 +1.05V
6,7,8,9,10,12,13,14,16,19,20,21,22,23,24,26,30,32,34,36 +3V
7,21,22,23,24,26,27,28 +3VPCU

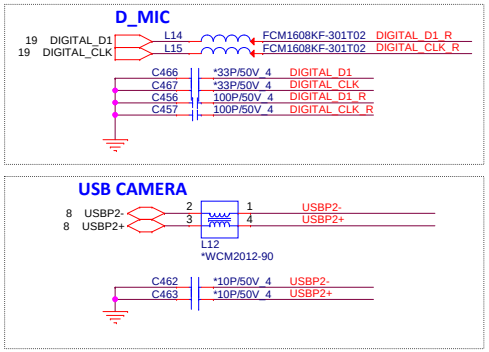
NB5

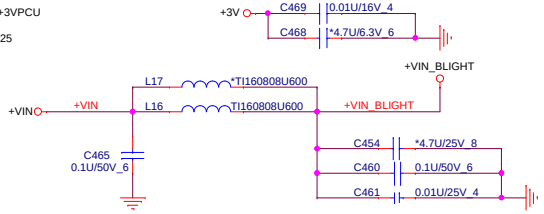
PROJECT : VOLKS
Quanta Computer Inc.

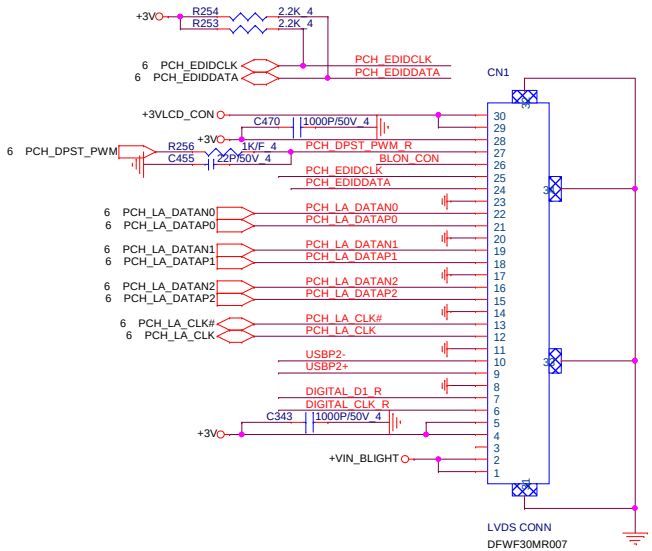
Size	Document Number	Rev
Custom	EC (KB3940 A1)/ROM	1A
Date: Thursday, June 07, 2012	Sheet 25 of 37	

LVDS Conn.



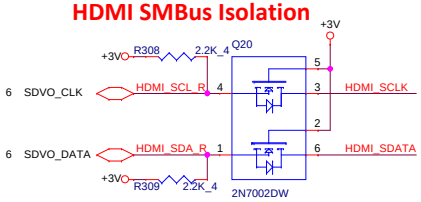






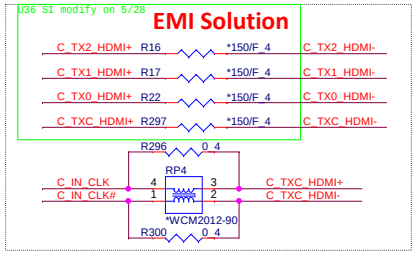
HDMI Conn.

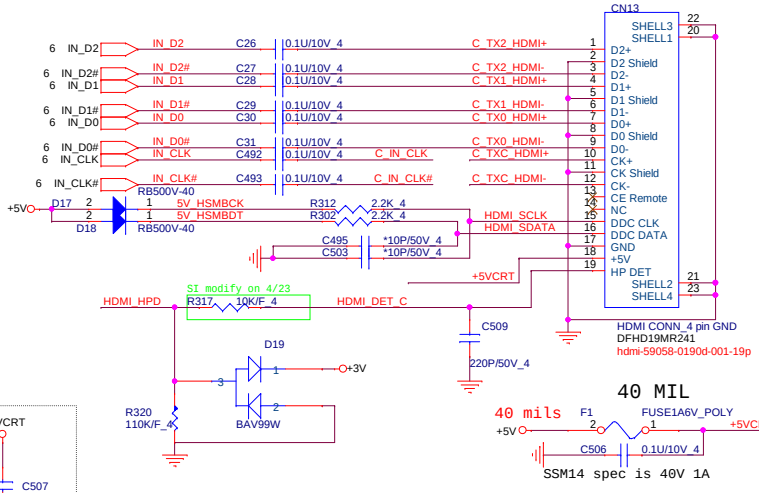
HDMI SMBus Isolation

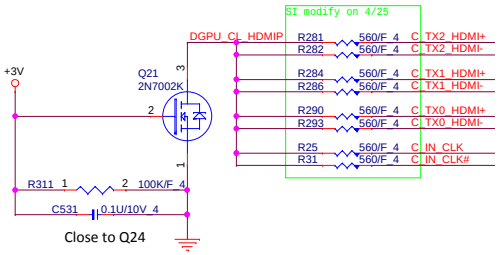


Close to HDMI connector

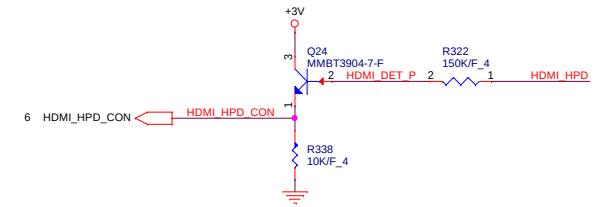
EMI Solution

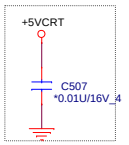






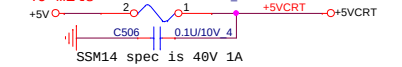
Close to Q24





for EMI request

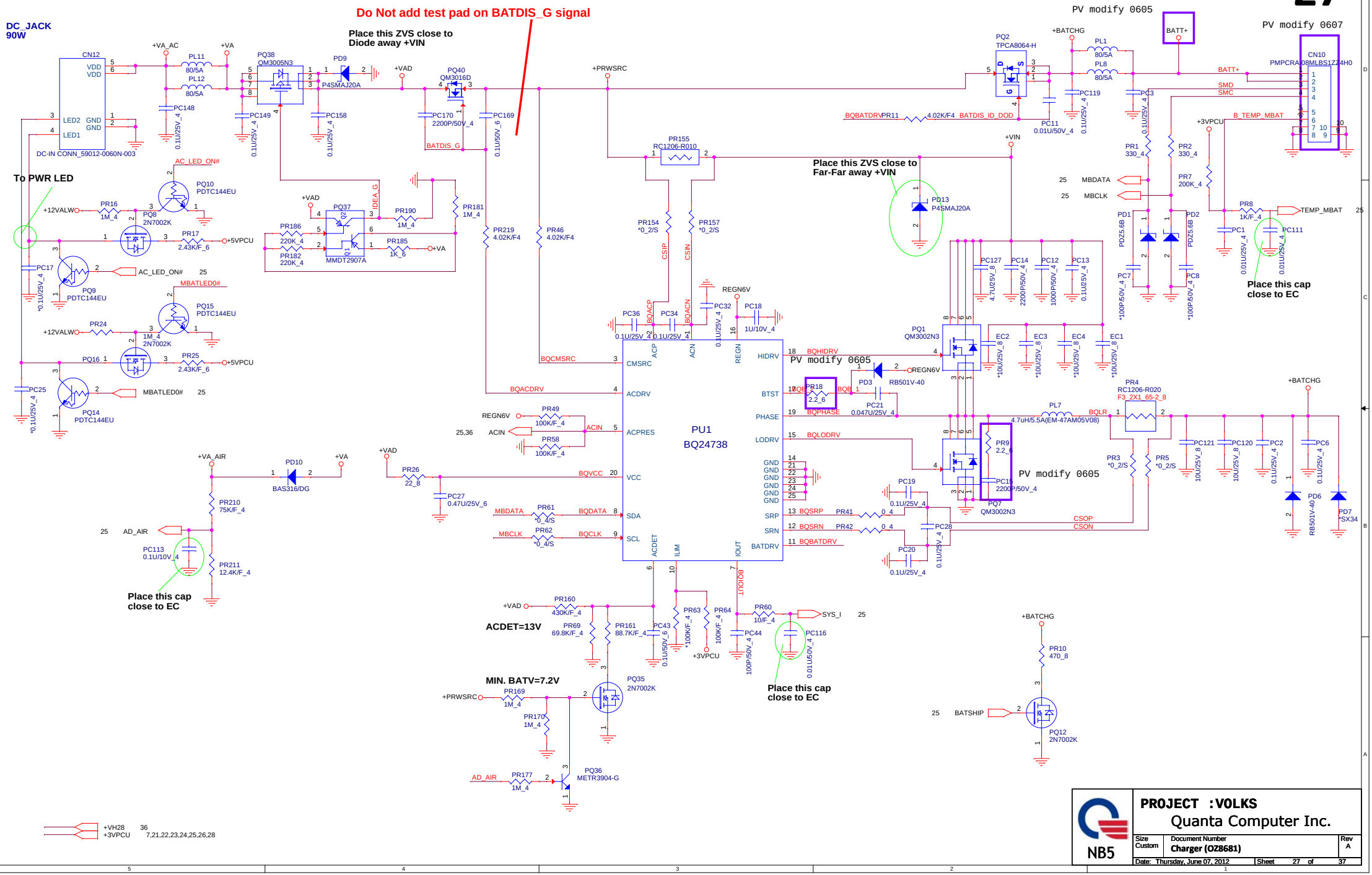
40 MIL



SSM14 spec is 40V 1A

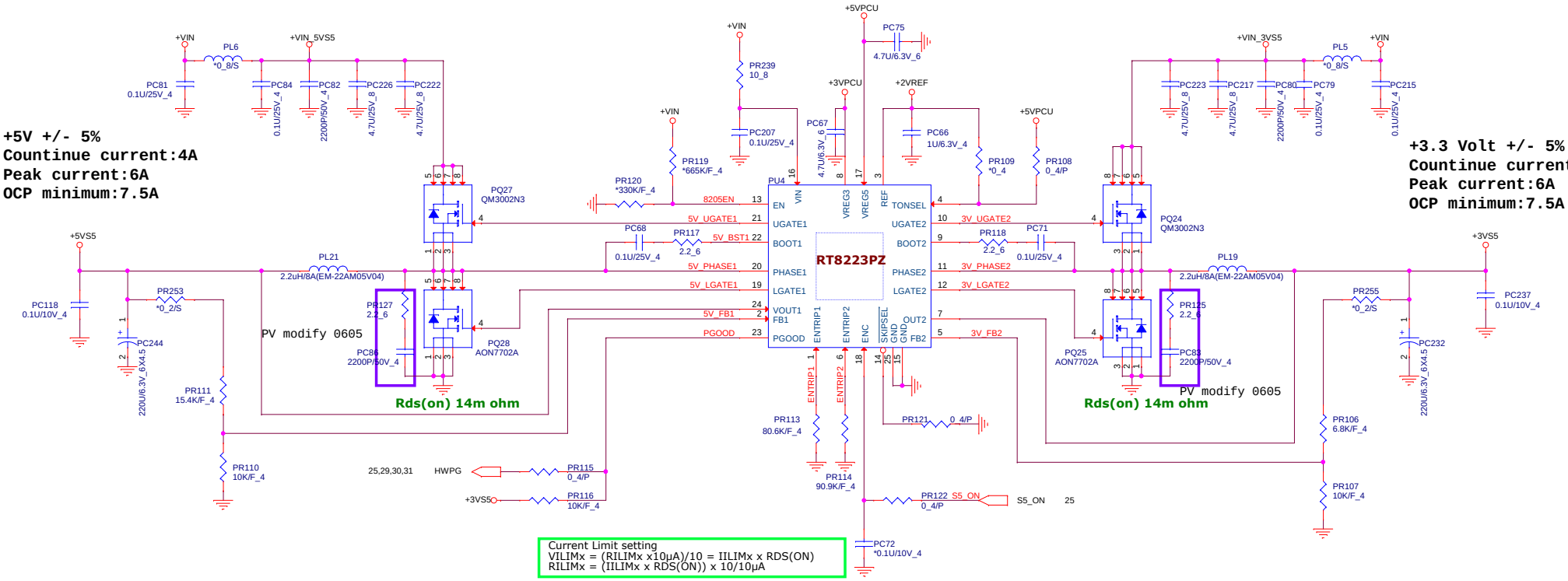
6,7,8,9,10,12,13,14,16,19,20,21,22,23,24,25,30,32,34,36 +3V
7,21,22,23,24,25,27,28 +3VPCU
7,10,19,21,22,23,24,36 +5V
21,27,28,30,31,32,33,35,36 +VIN
27,33,36 +12VALW
6,19,22,28,29,30,31,32,34,35,36 +5VS5

NB5	PROJECT : VOLKS Quanta Computer Inc.	
Size: Custom	Document Number: LCD Connector (LVDS)	Rev: 1A
Date: Thursday, June 07, 2012	Sheet: 26of 37	



+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



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

PROJECT : VOLKS			
Quanta Computer Inc.			
NB5	Size: Custom	Document Number: 3/5VS5 (RT8223P)	Rev: A
	Date: Thursday, June 07, 2012	Sheet 28 of 37	

TPS51462RGER/AL051462000

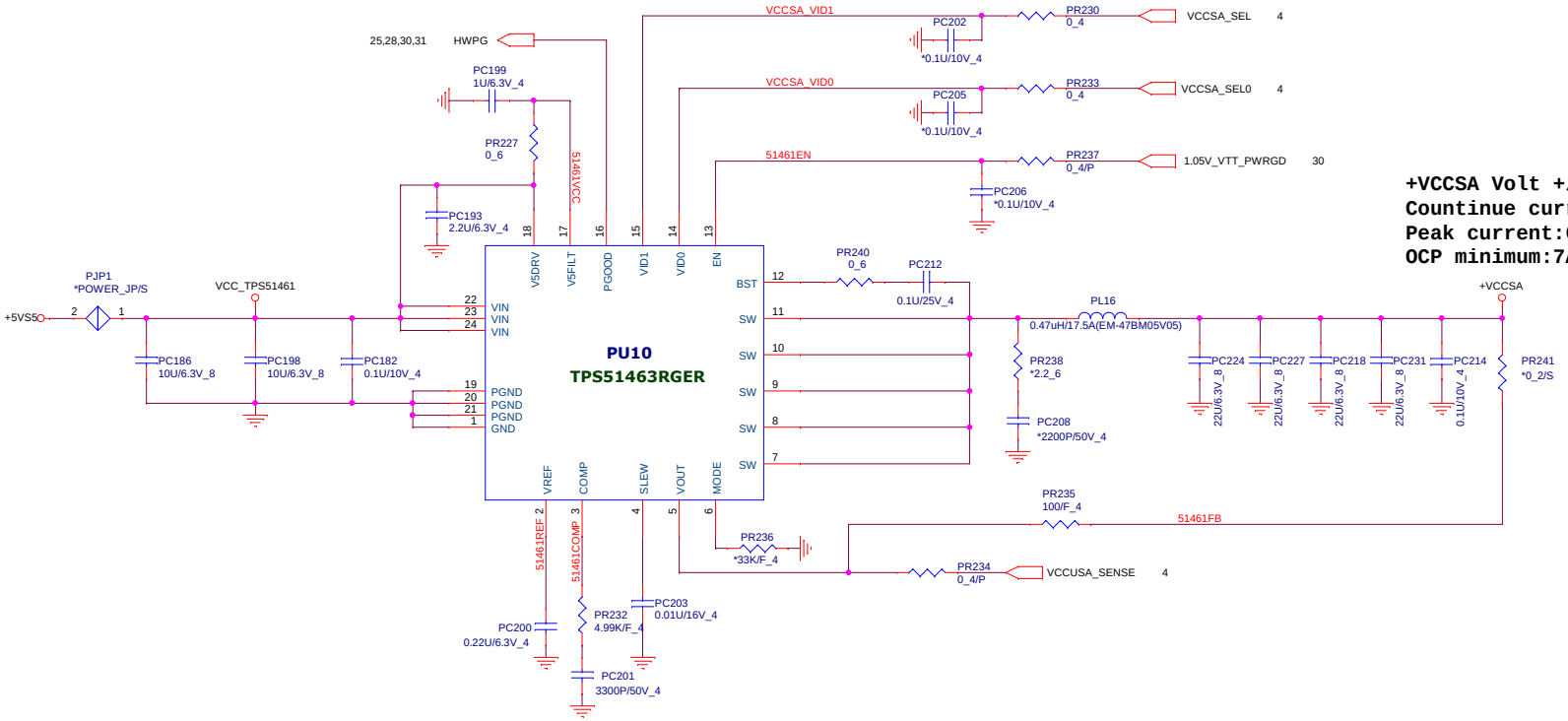
For CPU SV system agent voltage slew rate of 0.5 -10 mV/µs

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

TPS51463RGER/AL051463000

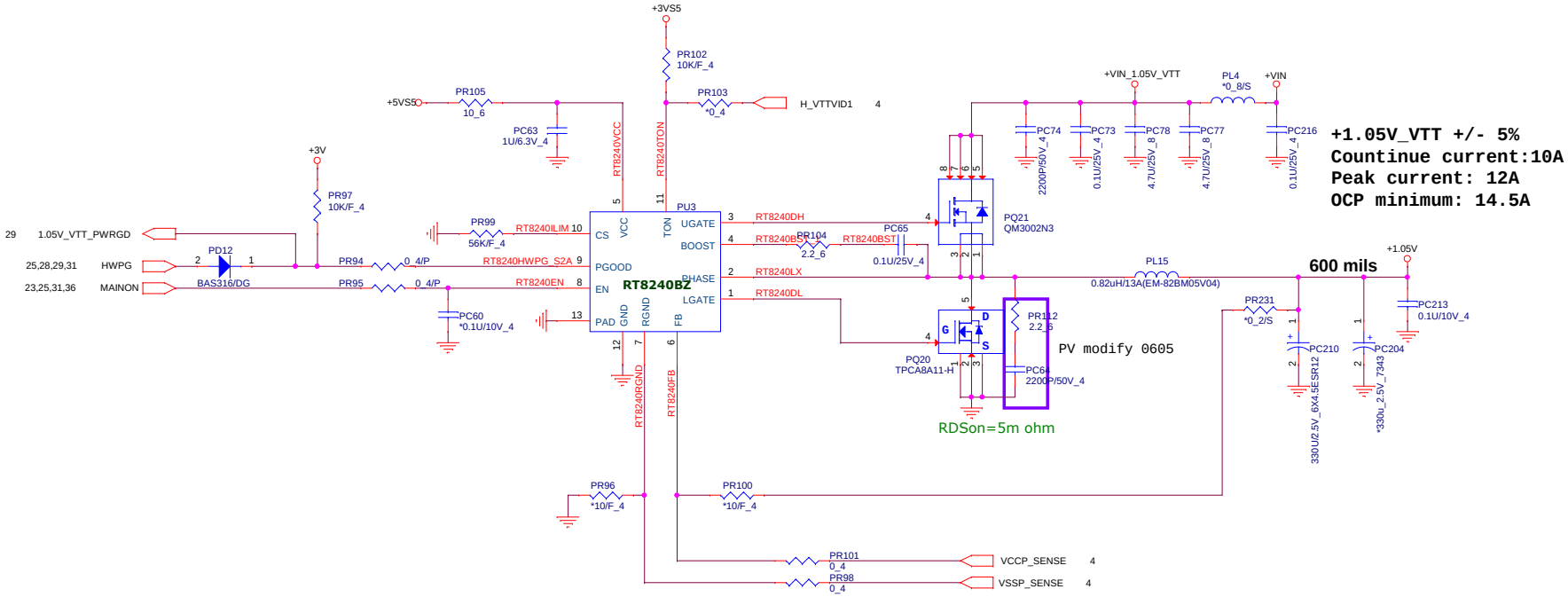
For CPU ULV system agent voltage slew rate of 0.5 -10 mV/µs

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



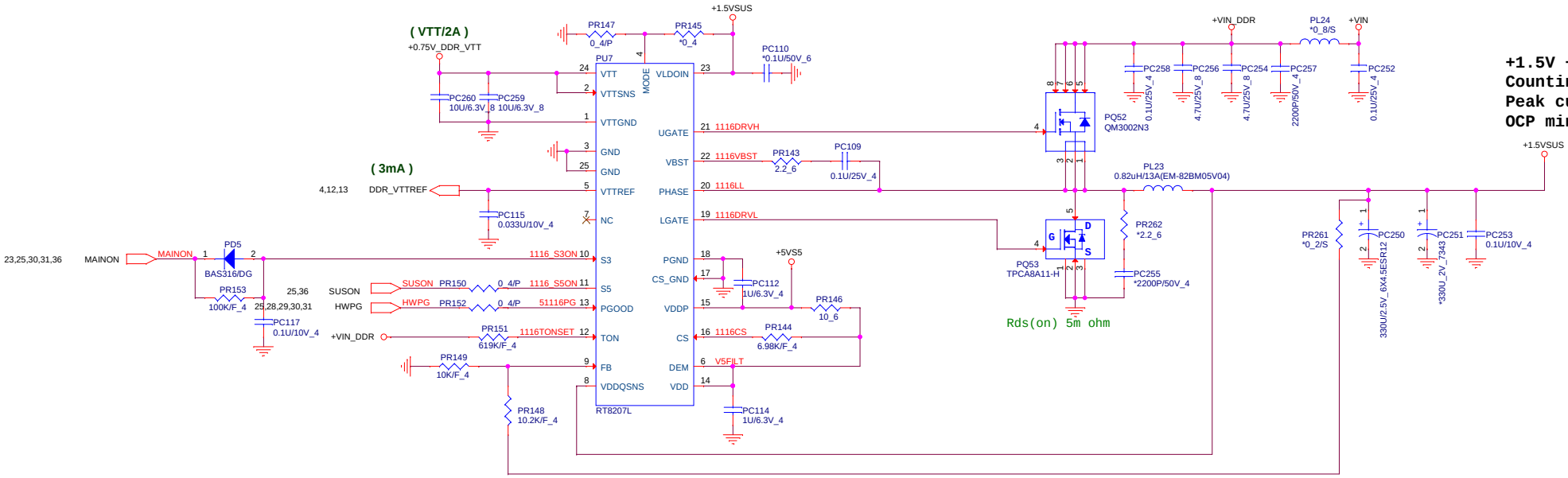
+VCCSA Volt +/- 5%
Countinue current:4A
Peak current:6A
OCP minimum:7A

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

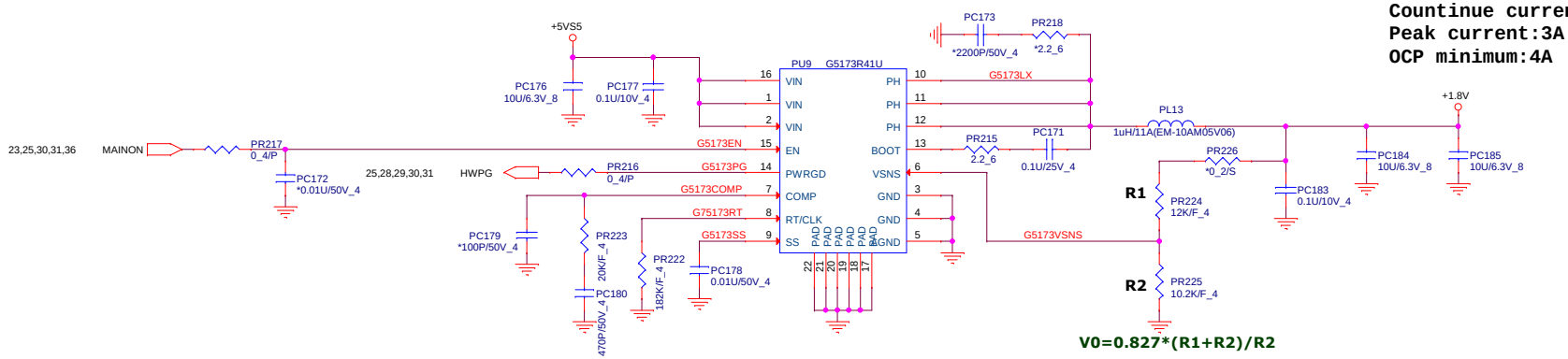


+1.05V_VTT +/- 5%
Countinue current:10A
Peak current: 12A
OCP minimum: 14.5A

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



+1.5V +/- 5%
Countinue current:10A
Peak current:12A
OCP minimum 15A



+1.8V +/- 5%
Countinue current:2A
Peak current:3A
OCP minimum:4A

V0=0.827*(R1+R2)/R2

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

N13P-GS

+VGA_CORE

Countinue current: 45A

Peak current: 50A

OCP minimum 56A

PU8
NCP3218G

PV modify 0524

PV modify 0524

PV modify 0524

PV modify 0524

SI modify 0423

SI modify 0426

SI modify 0426

PV modify 0522

This NTC Close to Phase 1 Inductor

Shortest the net trace

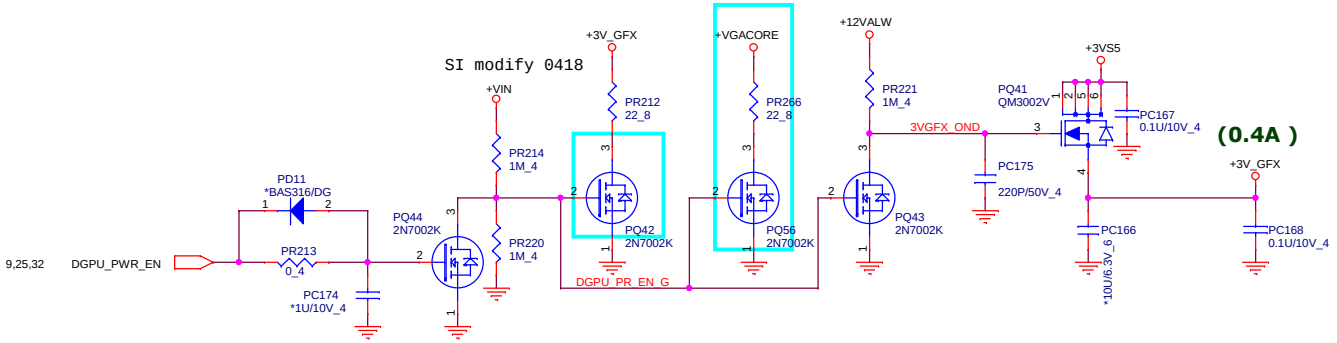
Close to Phase 1 Inductor

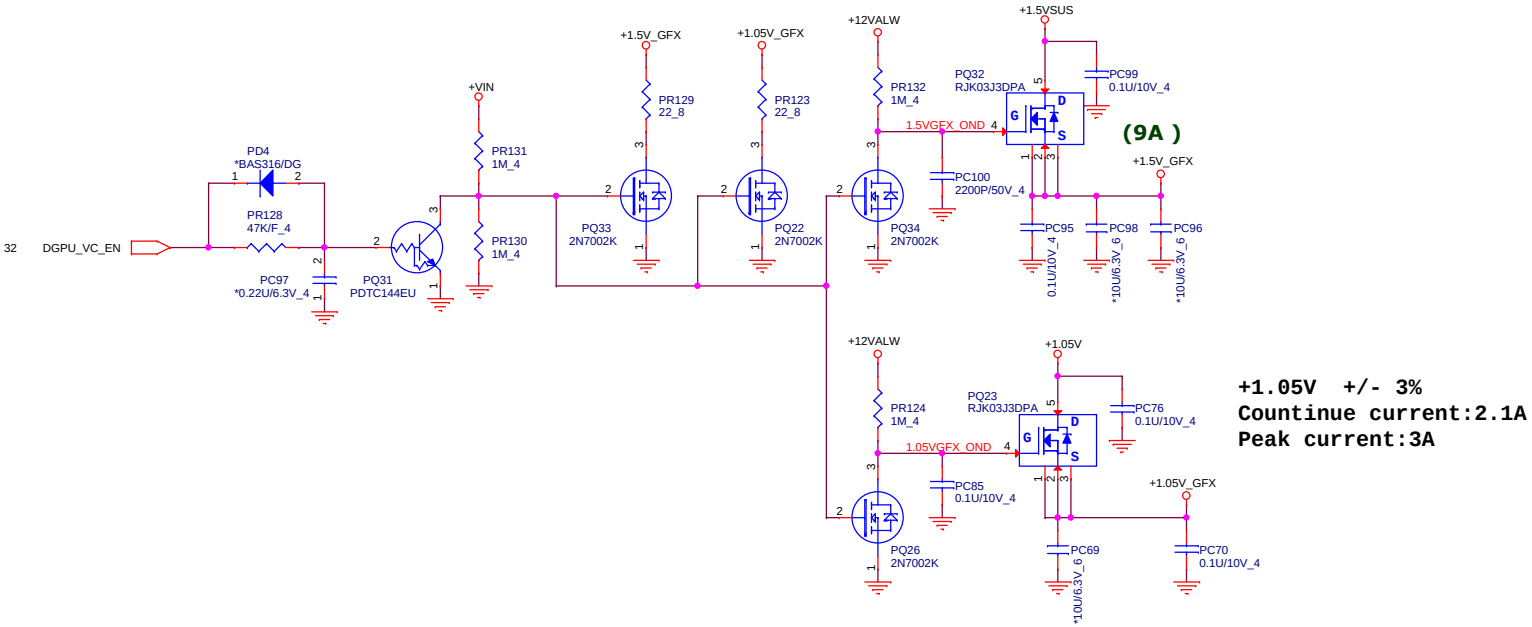
PROJECT	:VOLKS
	Quanta Computer Inc.
Size: Custom	Document Number: +VGA CORE (NCP3218G)
Rev: A	
NB5	Date: Thursday, June 07, 2012 Sheet 32 of 37

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





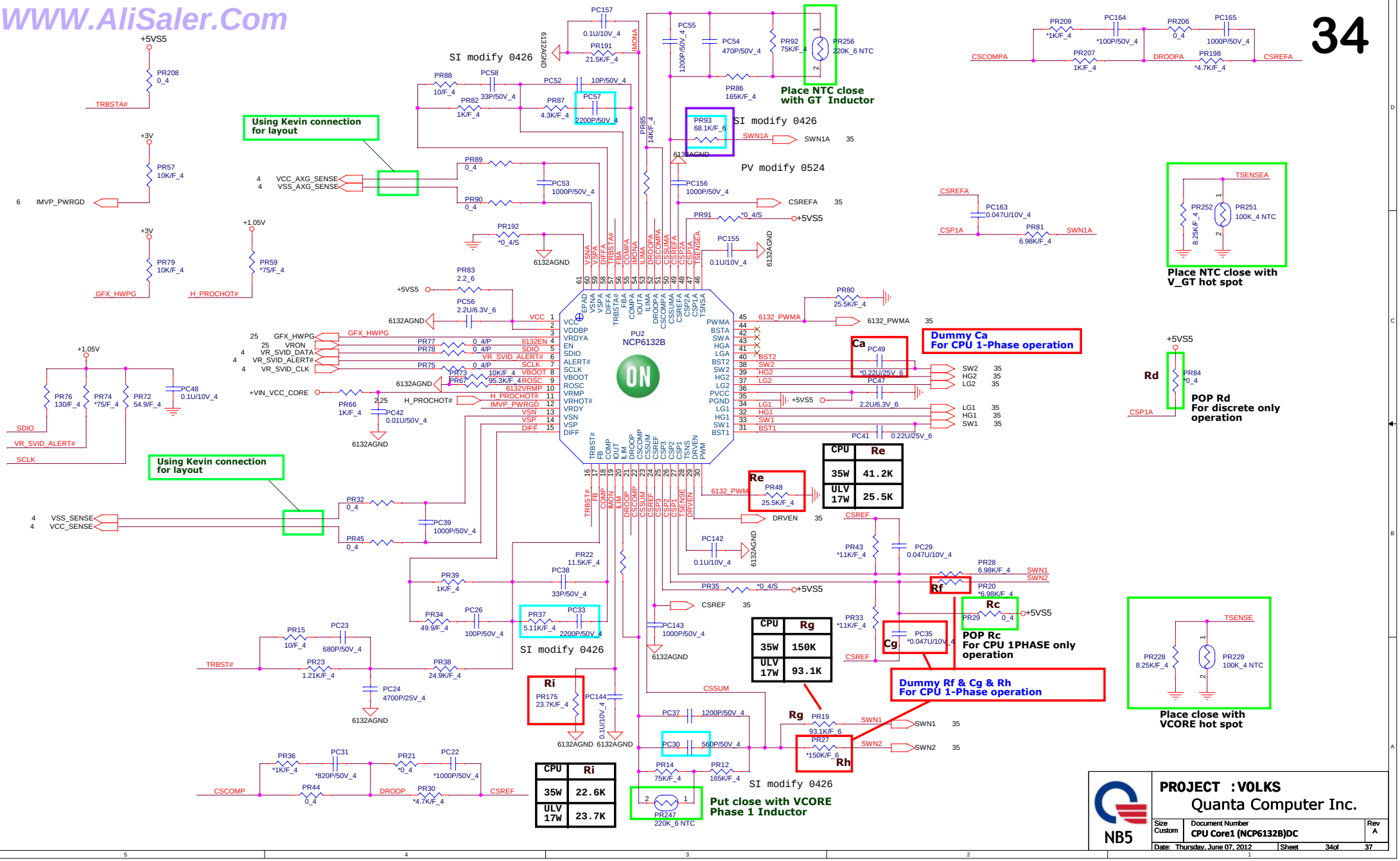
+1.05V +/- 3%
Countinue current:2.1A
Peak current:3A

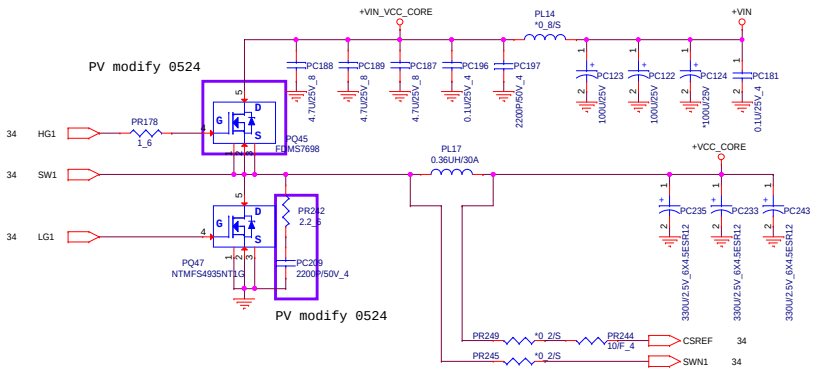
NB5

PROJECT : VOLKS
Quanta Computer Inc.

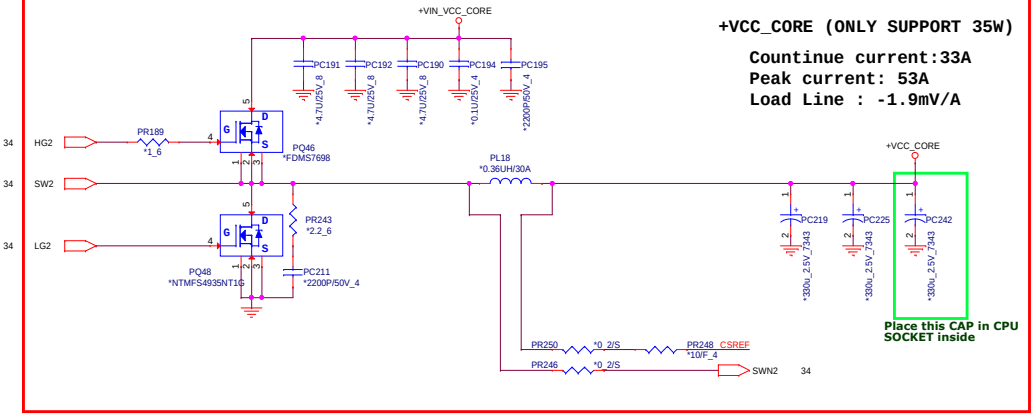
Size	Document Number	Rev
Custom	+VGA POWER	A

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





Dummy This Schematic
For CPU 1-Phase operation



+VCC_CORE (ONLY SUPPORT 35W)

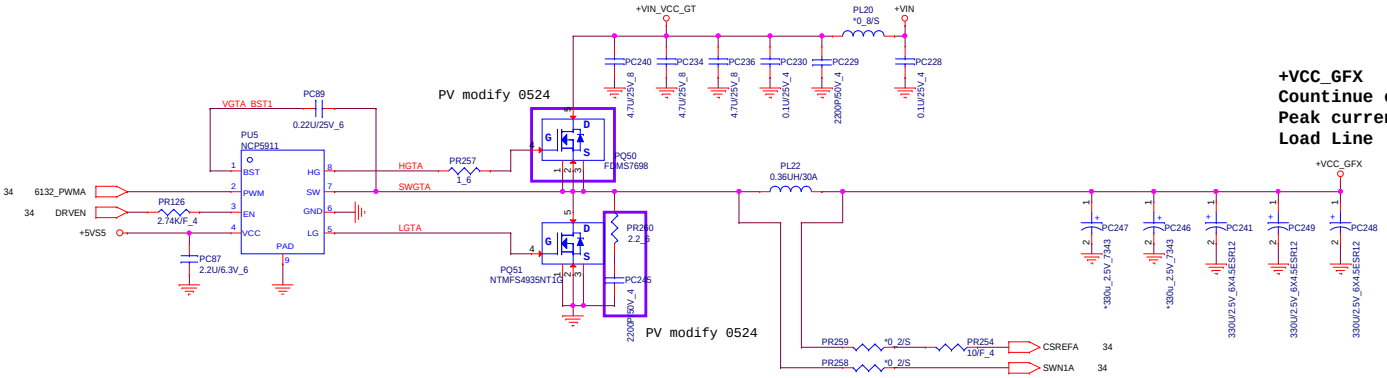
Countinue current:33A
Peak current: 53A
Load Line : -1.9mV/A

+VCC_CORE (ONLY SUPPORT 35W)

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

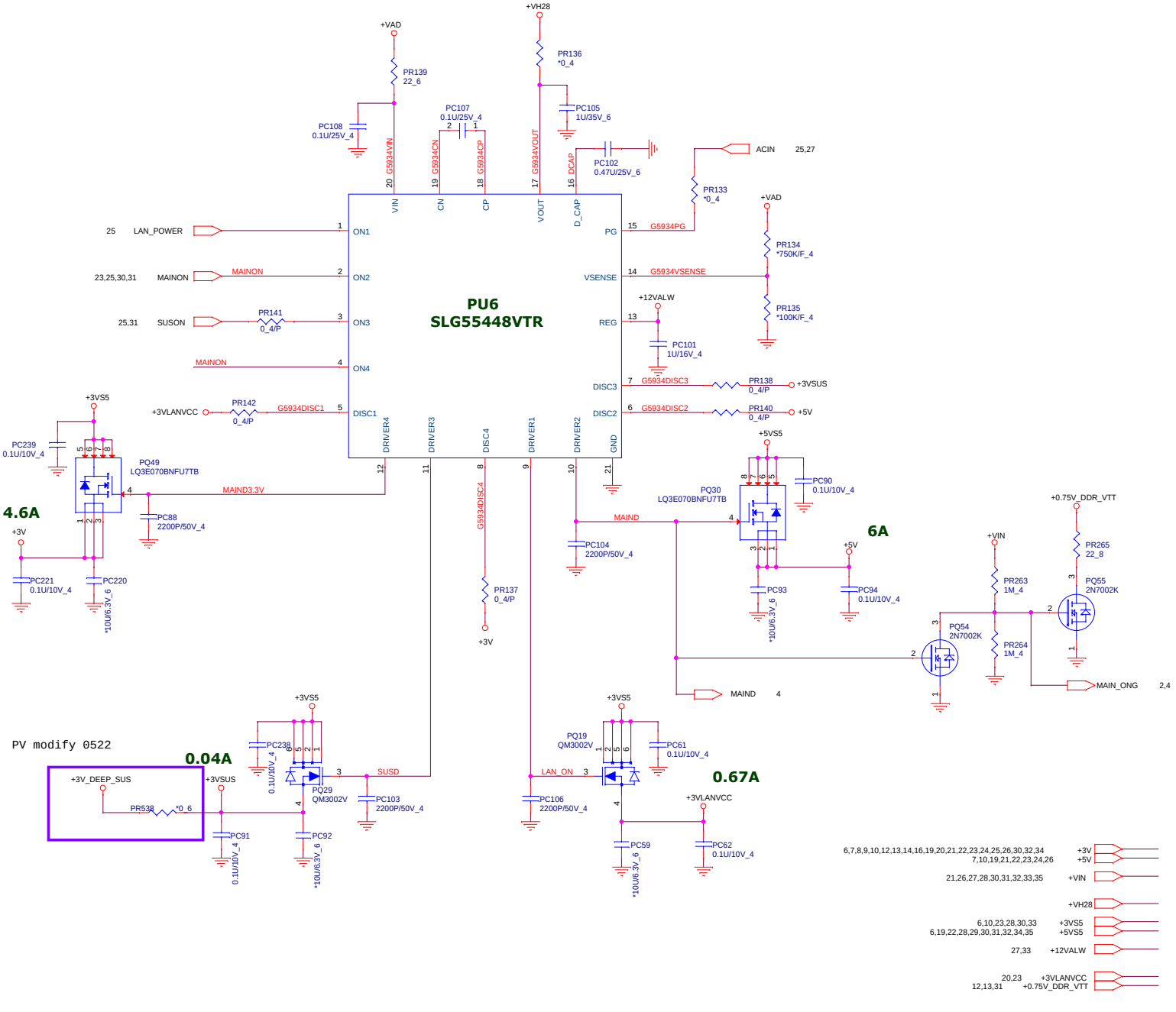
+VCC_CORE (ULV 17W)

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



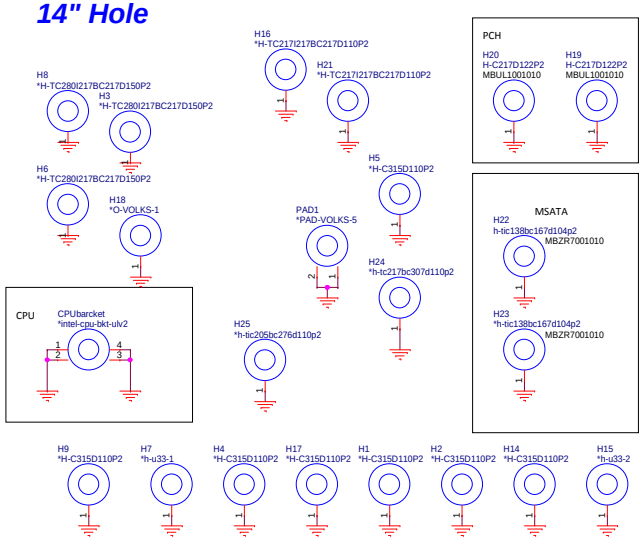
+VCC_GFX
Countinue current:21.5A
Peak current: 33A
Load Line : -3.9mV/A

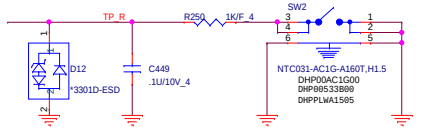
NB5	PROJECT : VOLKS Quanta Computer Inc.	
Size: C	Document Number: CPU Core2 (NCP5911)DC	Rev: A
Date: Thursday, June 07, 2012	Sheet: 35of 37	

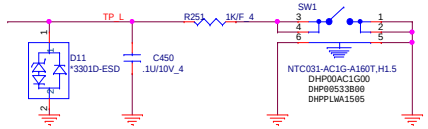


NB5	PROJECT : VOLKS Quanta Computer Inc.		
Size: Custom	Document Number: Dis-charge IC (SLG55448V)		Rev: A
Date: Thursday, June 07, 2012	Sheet 36 of 37		

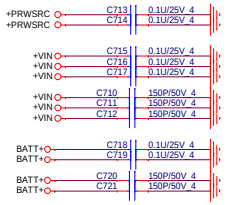
14" Hole



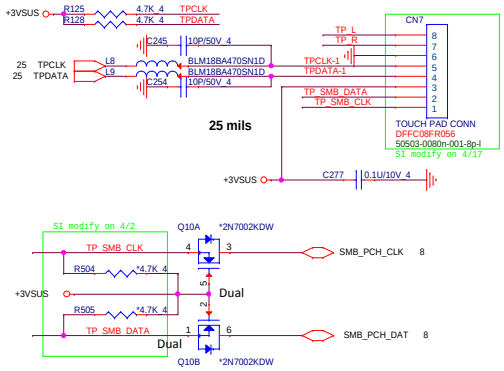




EMI CAP for 14"



Touch Pad Connector



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