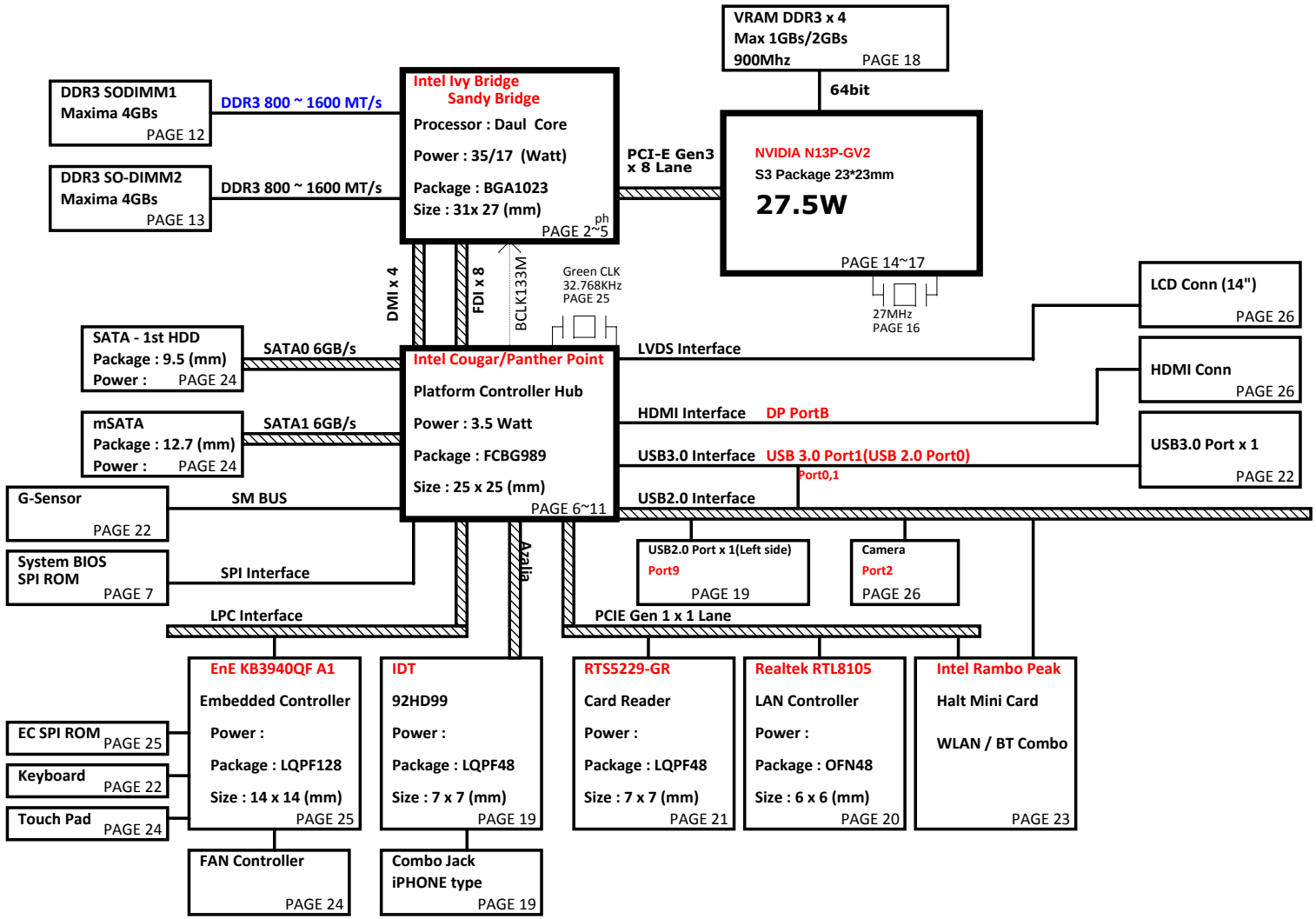
Volks DIS/UMA (14"/15.6") Ultra/Slim
Intel Chief River Platform Block Diagram

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: Custom	Document Number: Block Diagram	Rev: 1A
Date: Wednesday, May 23, 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
PWR MANAGEMENT
JTAG & BPM

IC,IVB_2CBGA,0P7

PEG x8

CPU RESET#

DDR3 DRAM RESET

for DS3

SM_DRAMPWROK Processor Input.

Placement close to EC.

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

Processor pull-up (CPU)

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

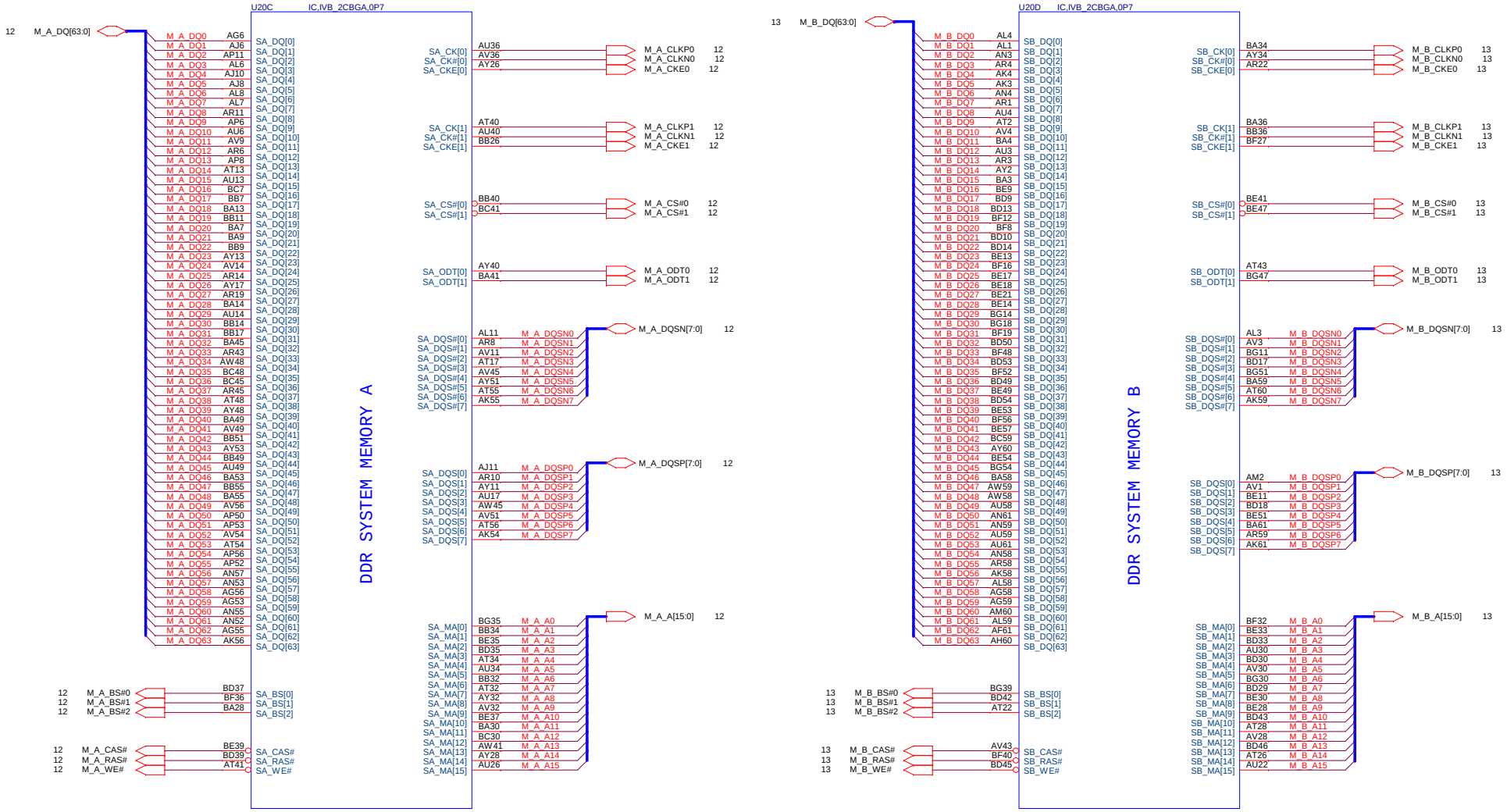
For iFDIM Trigger Point

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: 1A
Date: Wednesday, May 23, 2012	Sheet 2 of 37

Ivy Bridge Processor (DDR3)



PROJECT :	VOLKS
	Quanta Computer Inc.
Size: Custom	Document Number: Processor 2/5 (DDR3 I/F) — Rev: 1A
Date: Wednesday, May 23, 2012	Sheet 3 of 37

NB5

POWER

POWER

09

U20F

U20G

IC,IVB_2CBGA,0P7

IC,IVB_2CBGA,0P7

CORE SUPPLY

PEG IO AND DDR IO

QUIET RAILS

SVID

SENSE LINES

GRAPHICS

VREF

DDR3 - 1.5V RAILS

SENSE LINES

1.8V RAIL

QUIET RAILS

SENSE LINES

SA RAIL

VCCSA VID lines

IVB:8.5A

330uFx2pcs bulk BOT
22uFx12pcs cavity BOT
1uFx12pcs BGA TOP

330uFx2pcs bulk BOT
22uFx10pcs cavity BOT
2.2uFx13pcs BGA TOP

330uFx3pcs bulk BOT
22uFx14pcs cavity BOT
2.2uFx16pcs BGA TOP

IVB: 1.5A

330uF x1, 10uF_8 x1, 1uF_4 x2

IVB: 6A

330uFx1, 10uFx4

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

Zo impedance: 27.4ohm

Zo impedance: 27.4ohm

R close to CPU

IVB: 5A

CAD Note: +VDDR_REF_CPU should have 10 mil trace width

20mils width

+VDDR_REF_CPU and DDR_VTTREF must use 10mils width

CPU center

CRB: 1uf*1

Zo:55 ohm

CPU VDDQ

PROJECT : VOLKS
Quanta Computer Inc.
Size: Custom
Document Number: Processor 3/4 (POWER)
Rev: 1A
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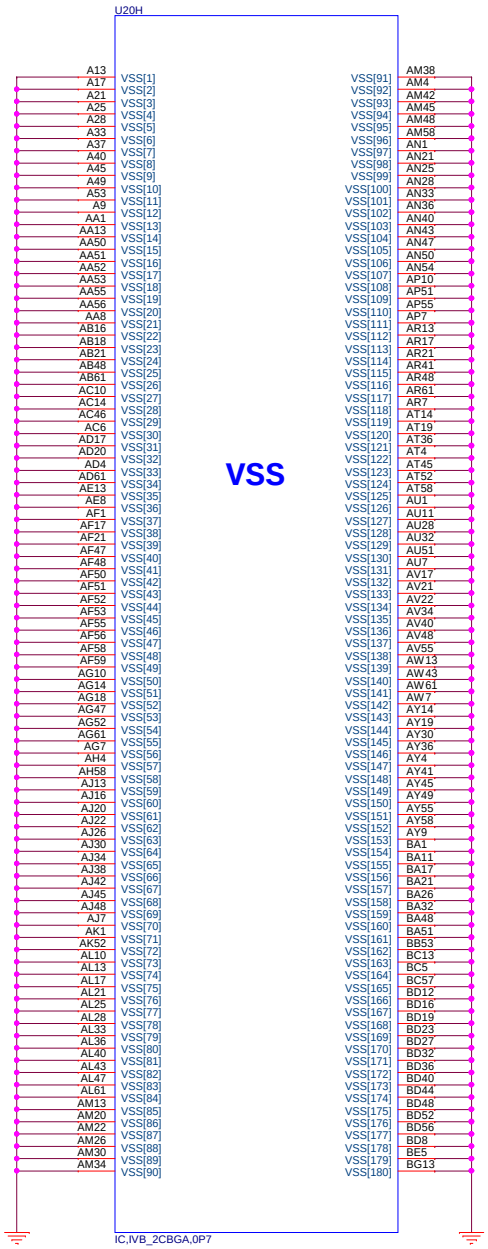
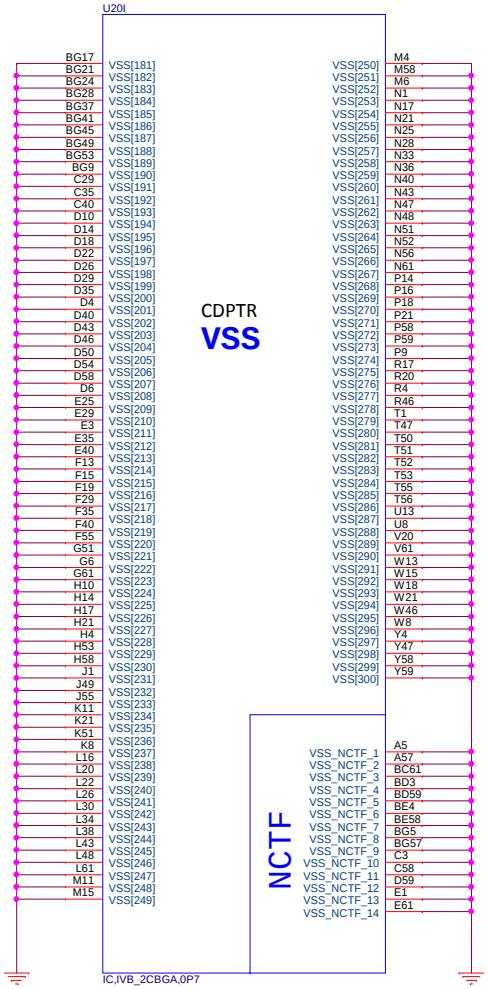
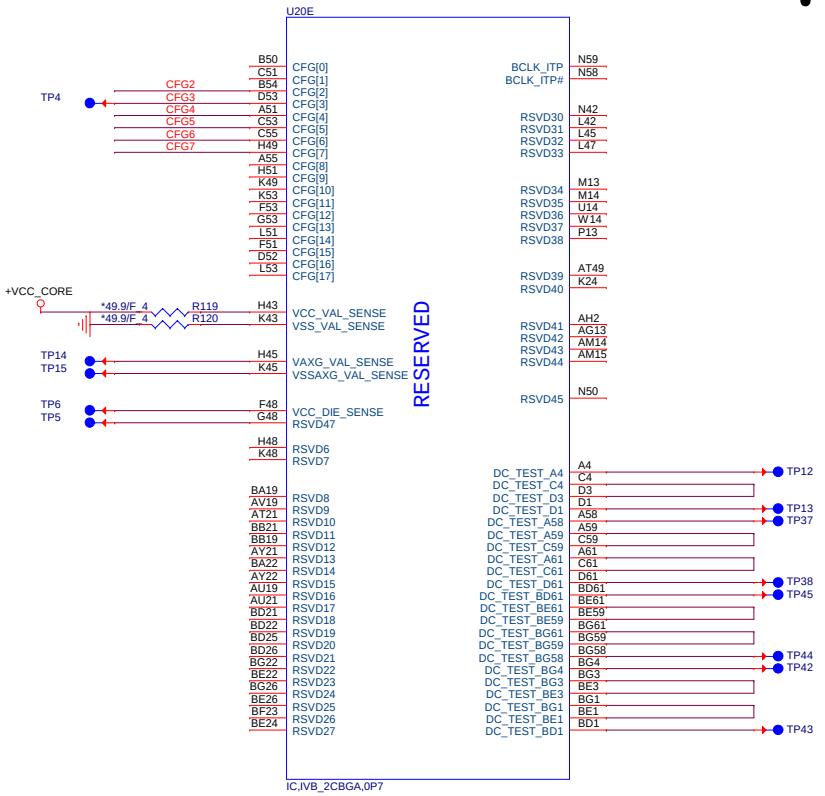
NB5







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: Wednesday, May 23, 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

DMI

FDI

System Power Management

LVDS

Digital Display Interface

CRT

INTHDMI

for DS3

PCH Pull-high/low(CLG)

for DS3

for DS3

System PWR_OK(CLG)

On Die DSW VR Enable

High = Enable (Default)
Low = Disable

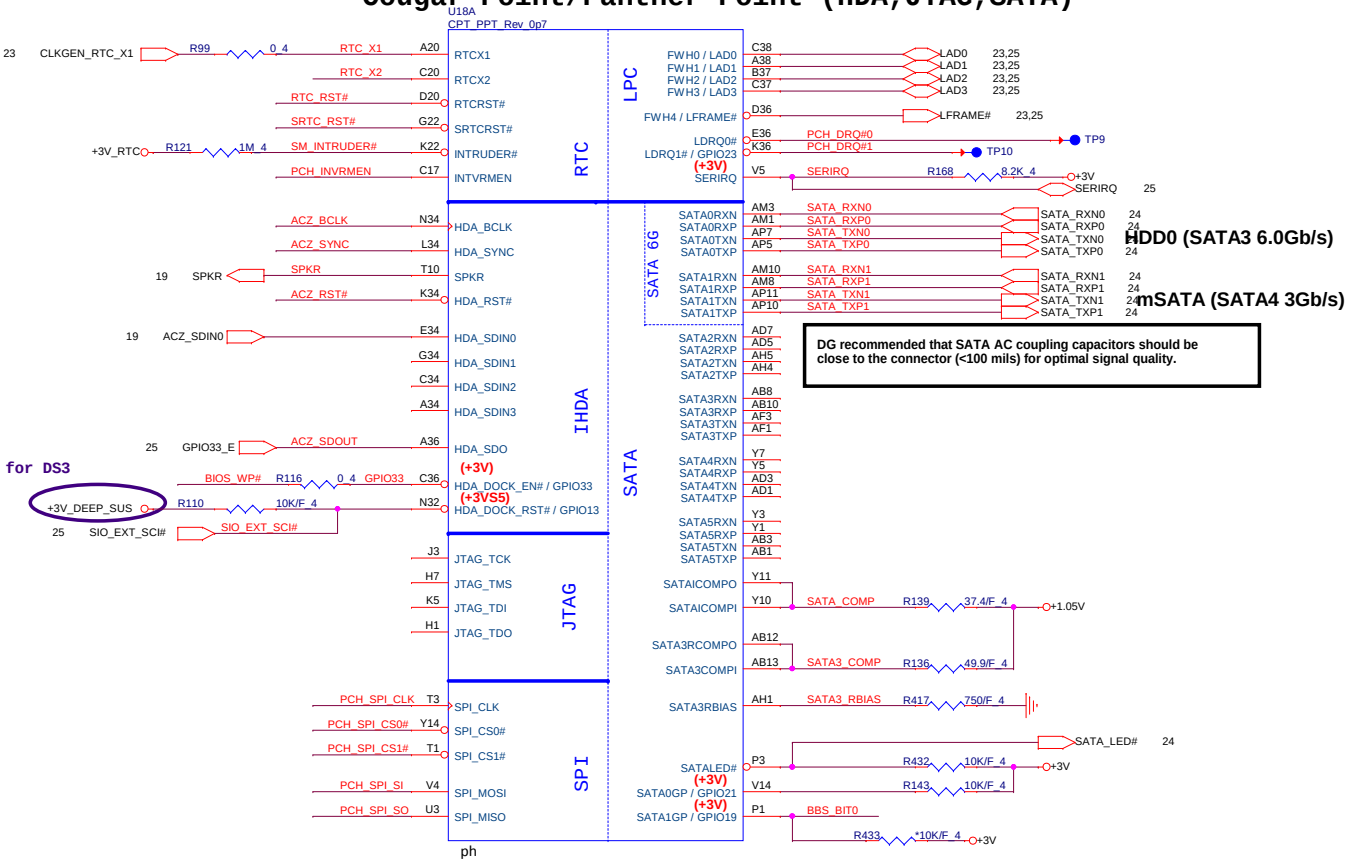
PROJECT : VOLKS
Quanta Computer Inc.

NB5

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

Date: Wednesday, May 23, 2012 | Sheet 6 of 37

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



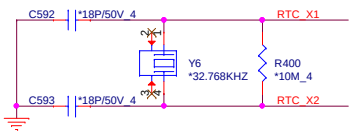
DG recommended that SATA AC coupling capacitors should be close to the connector (<100 mils) for optimal signal quality.

ph

PCH Strap Table

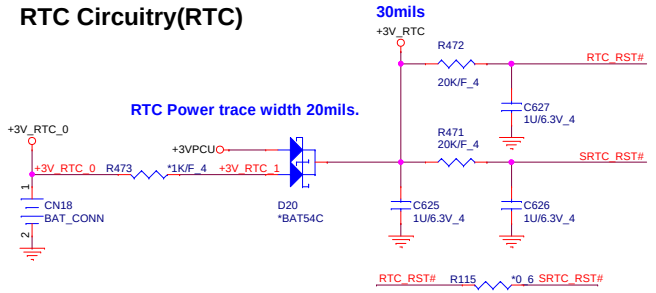
Pin Name	Strap description	Sampled	Configuration	Circuit
SPKR	No reboot mode setting	PWROK	0 = Default (weak pull-down 20K) 1 = Setting to No-Reboot mode	+3V R152 *1K/F_4 SPKR
GNT3# / GPIO55	Top-Block Swap Override	PWROK	0 = "top-block swap" mode 1 = Default (weak pull-up 20K)	+3V R363 *1K/F_4, +3V R364 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# 1, GNT0# 0 = Boot Location SPI	[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	GNT1# 0, GNT0# 0 = Boot Location LPC	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	

RTC Clock 32.768KHz

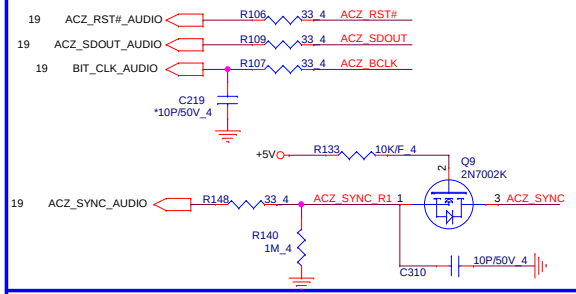


no stuff If use green Clock

RTC Circuitry(RTC)

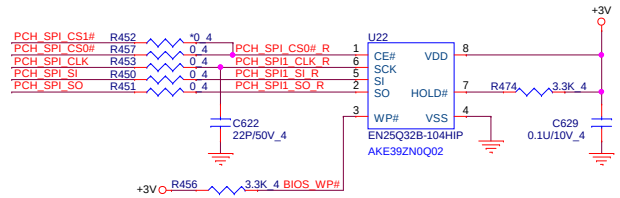


HDA Bus(CLG)



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
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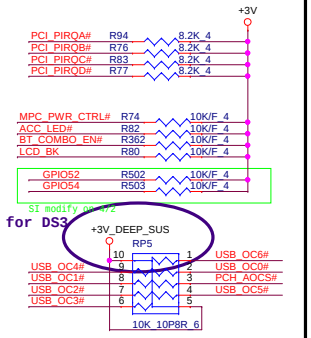
07

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

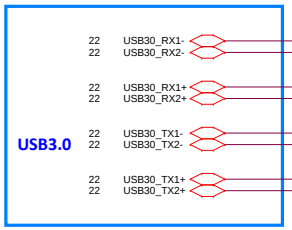
Cougar Point-M/Panther Point (PCI-E,SMBUS,CLK)

08

PCI/USBOC# Pull-up(CLG)

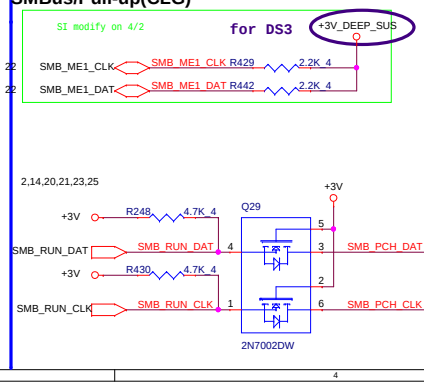


USB3.0

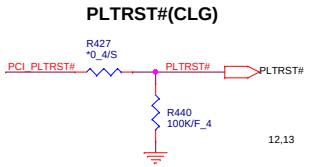


20111130 Modify USB3.0 for HM70

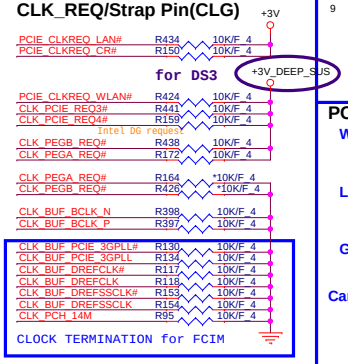
SMBus/Pull-up(CLG)



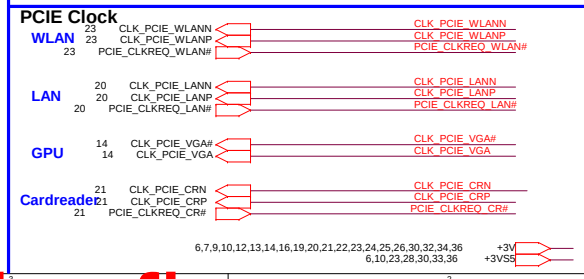
PLTRST#(CLG)



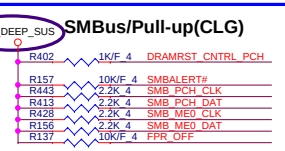
CLK_REQ/Strap Pin(CLG)



PCIE Clock



SMBus/Pull-up(CLG)



PV , HP request Image sensor
SMBUS reserve to PCH

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

PROJECT : VOLKS		
Quanta Computer Inc.		
Size: Custom	Document Number: PCH 3/6 (Clock/PCI/PCIE/USB)	Rev: 1A
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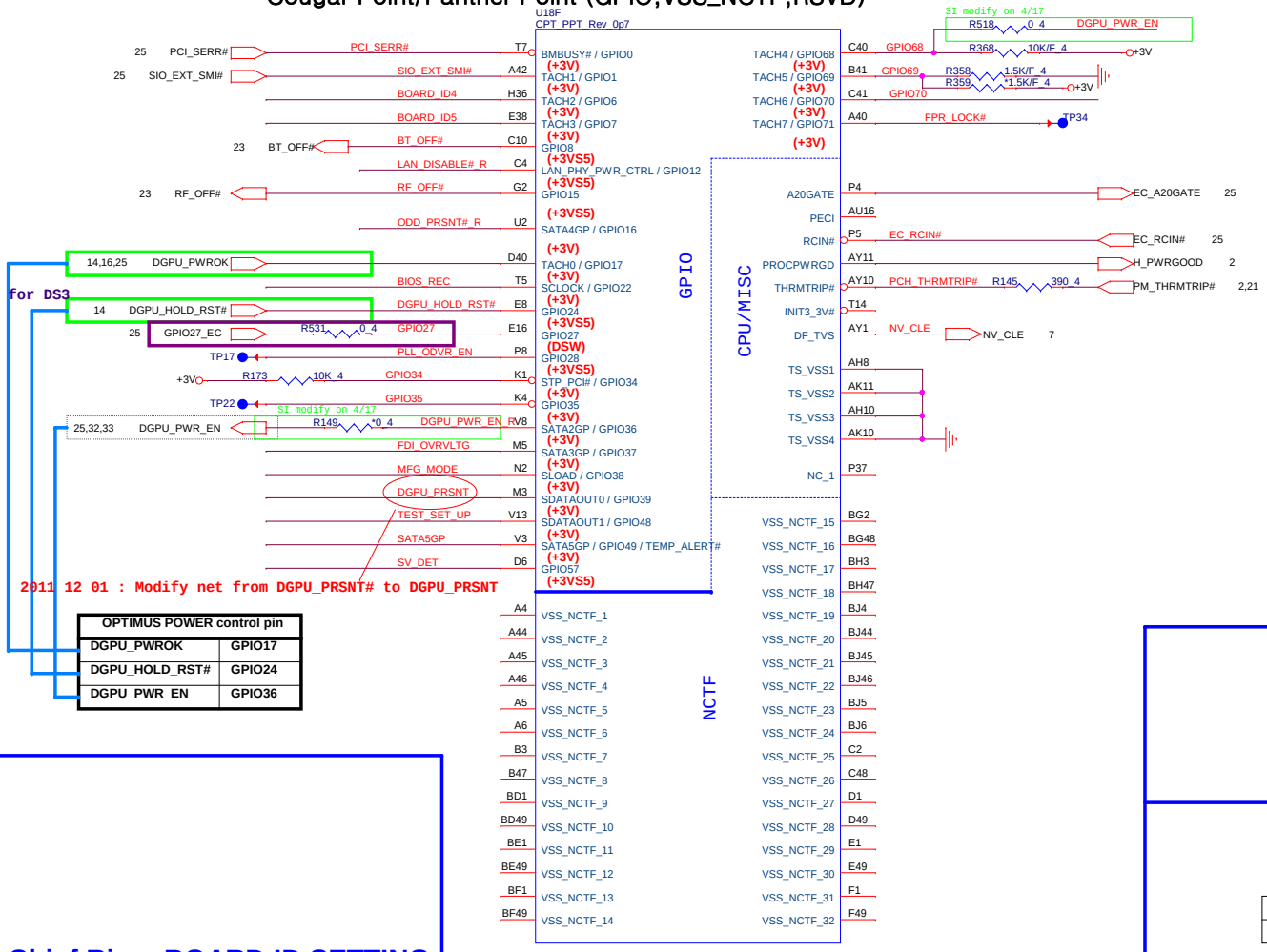
NB5

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

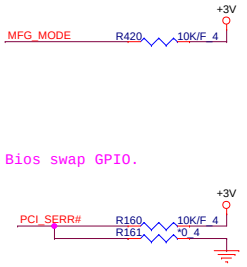
09



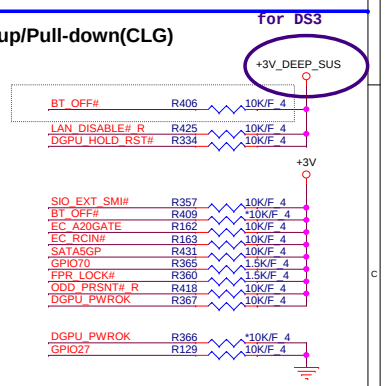
2011 12 01 : Modify net from DGPU_PRSNT# to DGPU_PRSNT

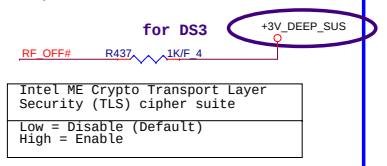
OPTIMUS POWER control pin	
DGPU_PWROK	GPIO17
DGPU_HOLD_RST#	GPIO24
DGPU_PWR_EN	GPIO36

MFG-TEST



GPIO Pull-up/Pull-down(CLG)

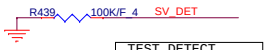




Intel ME Crypto Transport Layer Security (TLS) cipher suite
Low = Disable (Default) High = Enable

BIOS RECOVERY	High = Disable (Default) Low = Enable

SV_SET_UP
High = Strong (Default)



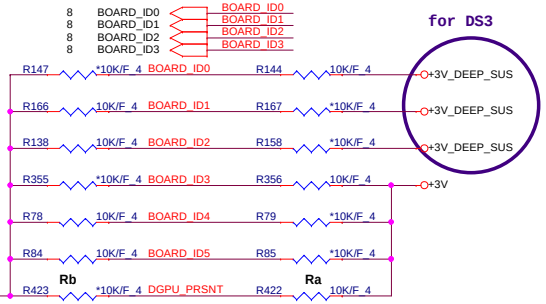
TEST DETECT
Low = Default

SATA2GP/GPIO36	Reserved only

FDI TERMINATION VOLTAGE OVERRIDE	Reserved only

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



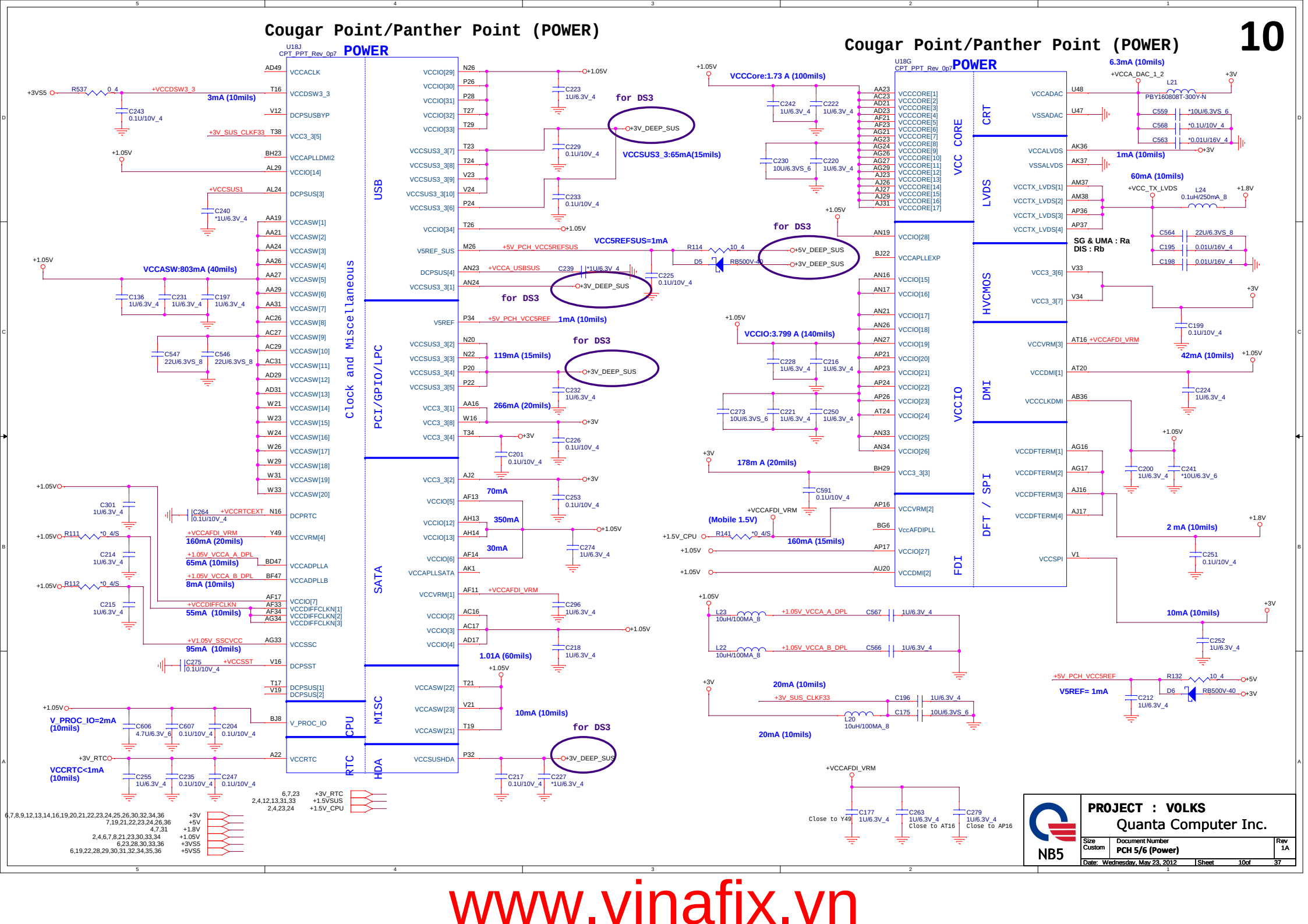
	SG	UMA
Stuff	Ra	Rb
NC	Rb	Ra

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: Custom Document Number: PCH 4/6 (GPIO)	Rev: 1A
	Date: Wednesday, May 23, 2012	Sheet 9 of 37

Cougar Point/Panther Point (POWER)

Cougar Point/Panther Point (POWER)



PROJECT :	VOLKS
	Quanta Computer Inc.
Size: Custom	Document Number: PCH 5/6 (Power)
Rev:	1A
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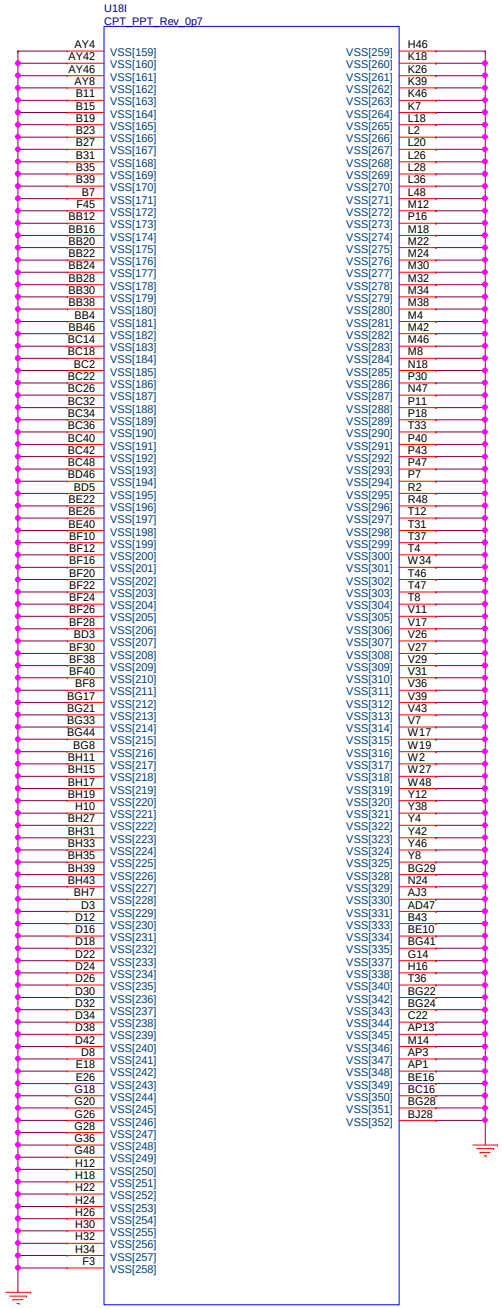
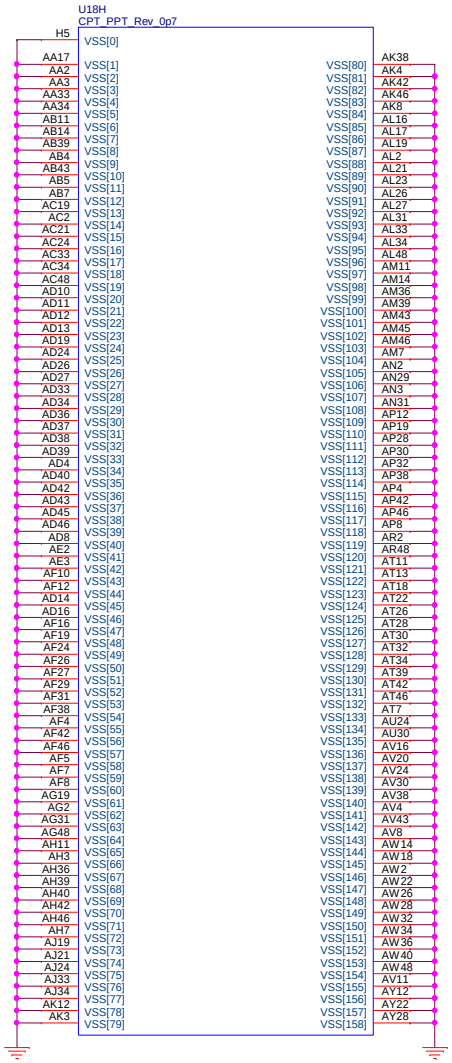
Cougar Point/Panther Point (GND)



Cougar Point/Panther Point (GND)

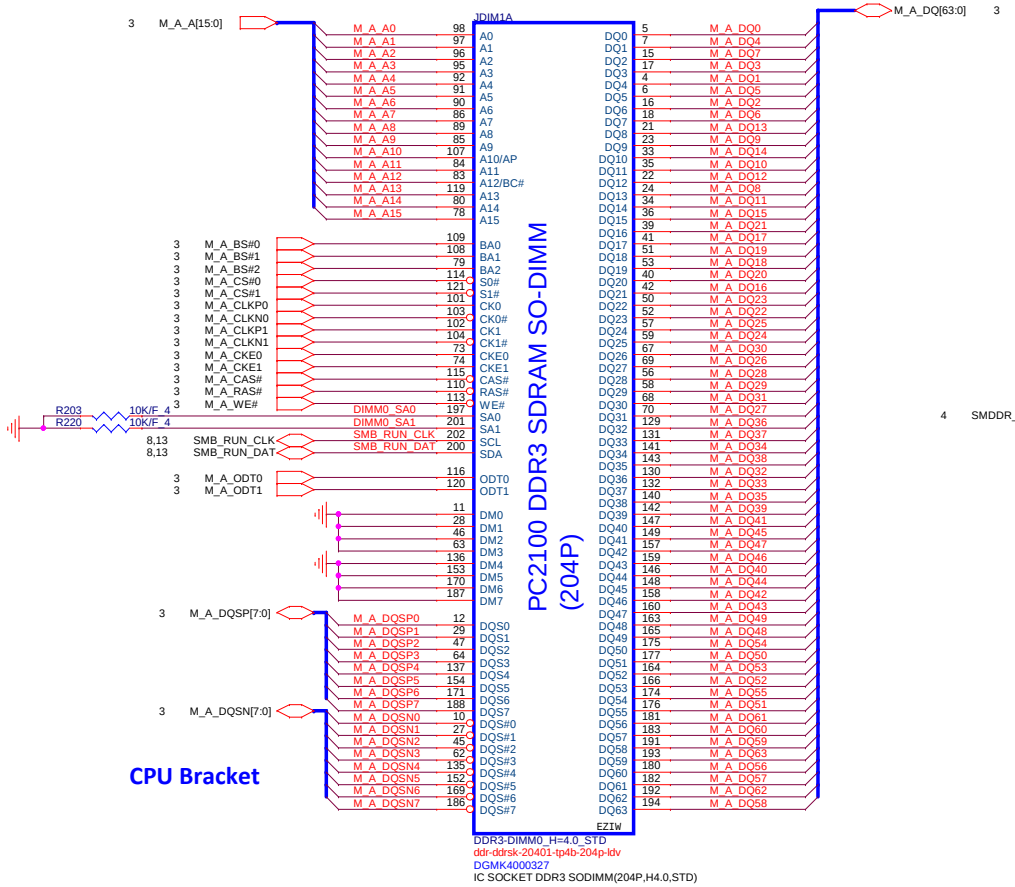


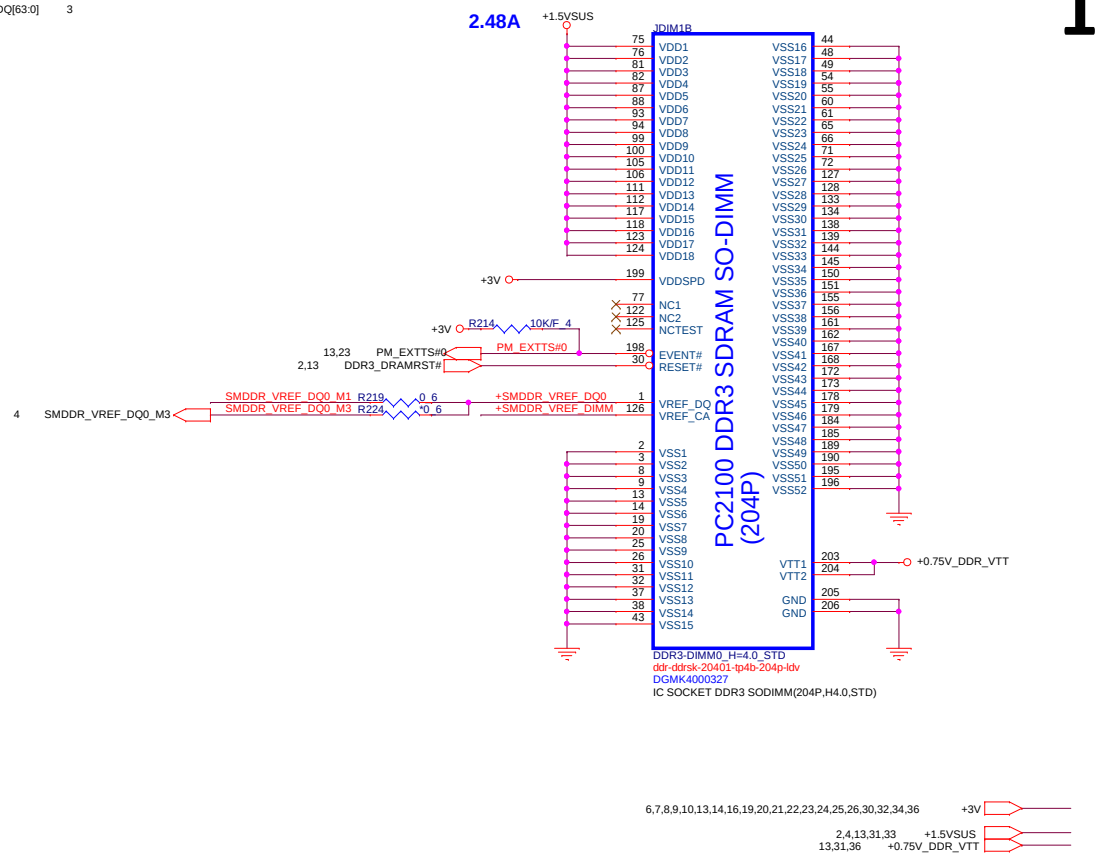
PROJECT : VOLKS
Quanta Computer Inc.

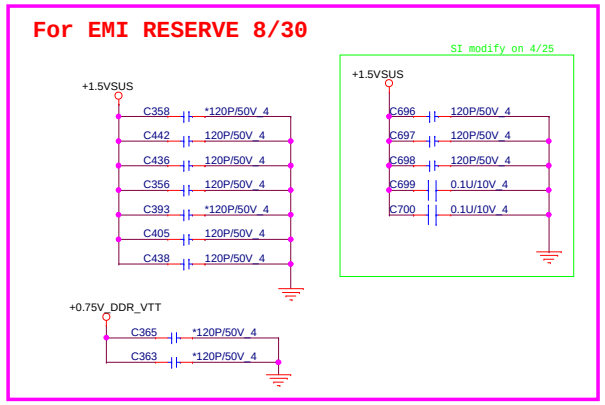
Size	Document Number	Rev
Custom	PCH 6/6 (Ground)	1A

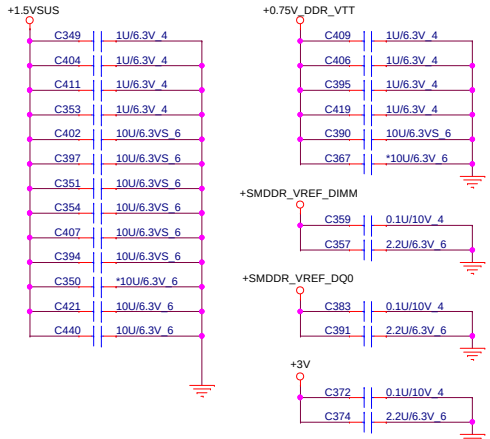
NB5

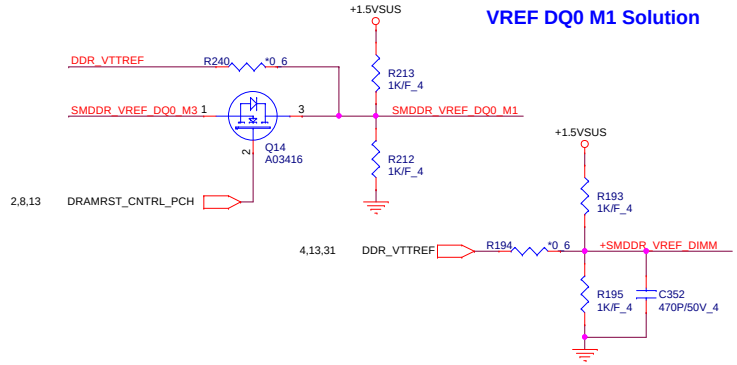
Date: Wednesday, May 23, 2012 | Sheet 11of 37









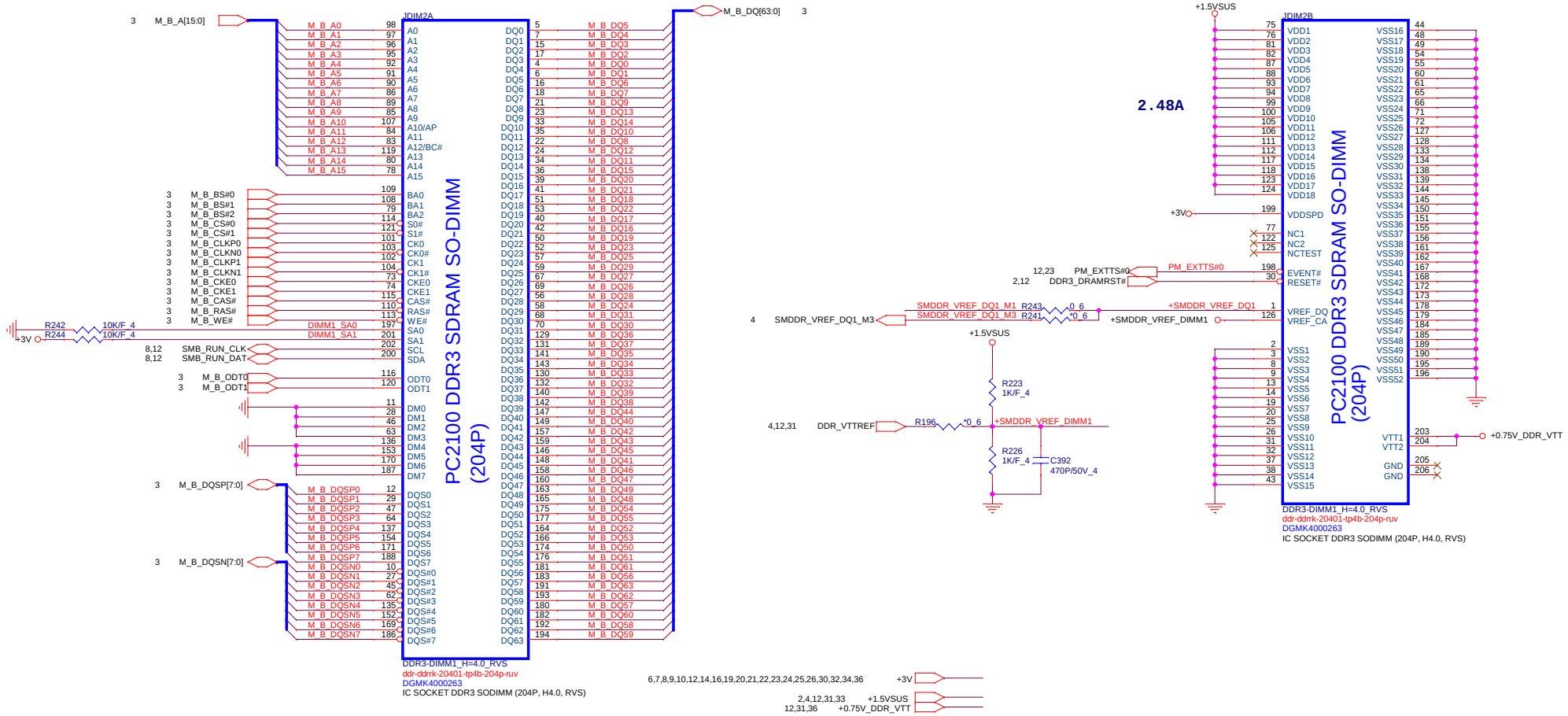


NB5

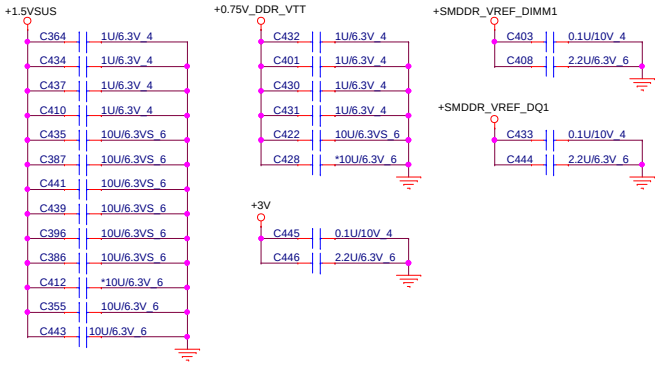
PROJECT : VOLKS

Quanta Computer Inc.

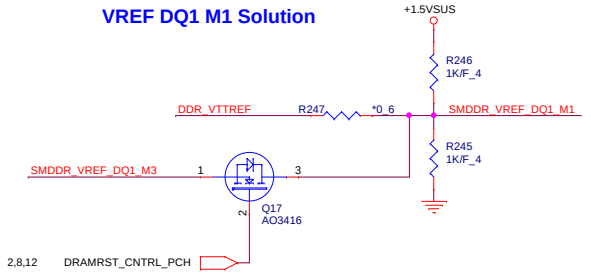
Size	Document Number	Rev
Custom	System Memory 1/2 (5.2H)	1A
Date: Wednesday, May 23, 2012	Sheet 12of 37	



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: Wednesday, May 23, 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

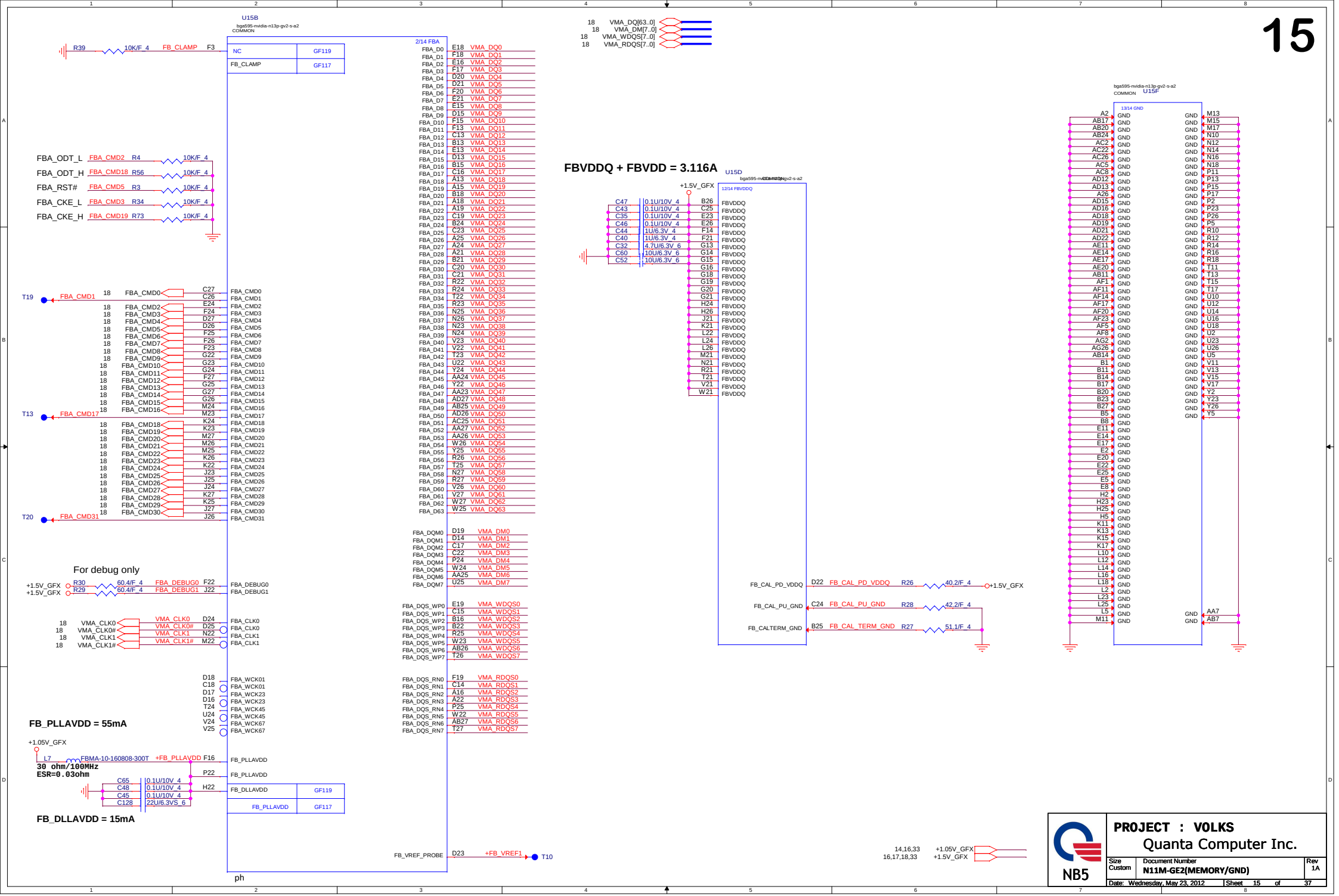
power down sequence

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: Wednesday, May 23, 2012 | Sheet 14of 37



Optimus:
All unstuff , one Cap stuff 10K ohm

U15G
bga595-nvidia-n13p-gv2-s-a2
COMMON

4/14 IFPAB

IFPAB_RSET — NC
IFPAB_PLLVDD — NC
IFPAB_PLLVDD — NC
IFPA_IOVDD — NC
IFPB_IOVDD — NC

IFPA_TXC, IFPA_TXC — AC4, AC3
IFPA_TXD0, IFPA_TXD0 — Y3, Y4
IFPA_TXD1, IFPA_TXD1 — AA2, AA3
IFPA_TXD2, IFPA_TXD2 — AA1, AB1
IFPA_TXD3, IFPA_TXD3 — AA5, AA4
IFPB_TXC, IFPB_TXC — AB4, AB5
IFPB_TXD4, IFPB_TXD4 — AB2, AB3
IFPB_TXD5, IFPB_TXD5 — AD2, AD3
IFPB_TXD6, IFPB_TXD6 — AD1, AE1
IFPB_TXD7, IFPB_TXD7 — AD5, AD4
GPIO14 — B3

IFPAB

T16 — AA6
R319 10K/F_4 +IFPAB_PLLVDD — V7, W7
R321 10K/F_4 +IFPAB_IOVDD — W6, Y6

U15I
bga595-nvidia-n13p-gv2-s-a2
COMMON

6/14 IFPD

IFPD_RSET — NC
IFPD_PLLVDD — NC
IFPD_PLLVDD — NC
IFPD_IOVDD — NC

IFPD_AUX, IFPD_AUX — P4, P3
IFPD_L3, IFPD_L3 — R5, R4
IFPD_L2, IFPD_L2 — T5, T4
IFPD_L1, IFPD_L1 — U4, U3
IFPD_L0, IFPD_L0 — V4, V3
GPIO17 — D4

IFPD

T15 — U6
+IFPD_PLLVDD — T7, R7
R315 10K/F_4
+IFPD_IOVDD — R6
R318 10K/F_4

U15K
bga595-nvidia-n13p-gv2-s-a2
COMMON

3/14 DACA

DACA_VDD — NC
DACA_VREF — TSEN_VREF
DACA_RSET — NC

I2CA_SCL, I2CA_SDA — B7, A7
DACA_HSYNC, DACA_VSYNC — AE3, AE4
DACA_RED — AG3
DACA_GREEN — AF4
DACA_BLUE — AF3

R323 10K/F_4 +DACA_VDD — W5
C528 *0.1U/10V_4 DACA_VREF — AE2
R335 *124/F_4 DACA_RSET — AF2

U15H
bga595-nvidia-n13p-gv2-s-a2
COMMON

5/14 IFPC

IFPC_RSET — NC
IFPC_PLLVDD — NC
IFPC_PLLVDD — NC
IFPC_IOVDD — NC

IFPC_AUX, IFPC_AUX — N5, N4
IFPC_L3, IFPC_L3 — N3, N2
IFPC_L2, IFPC_L2 — R3, R2
IFPC_L1, IFPC_L1 — R1, T1
IFPC_L0, IFPC_L0 — T3, T2
GPIO15 — C3

IFPC

T14 — T6
R314 10K/F_4 +IFPC_PLLVDD — M7, N7
R316 10K/F_4 +IFPC_IOVDD — P6

U15J
bga595-nvidia-n13p-gv2-s-a2
COMMON

7/14 IFPEF

IFPEF_PLLVDD — NC
IFPEF_PLLVDD — NC
IFPEF_RSET — NC
IFPE_IOVDD — NC
IFPF_IOVDD — NC

I2CY_SDA, I2CY_SDA — J3, J2
IFPE_L3, IFPE_L3 — J1, K1
IFPE_L2, IFPE_L2 — K3, K2
IFPE_L1, IFPE_L1 — M3, M2
IFPE_L0, IFPE_L0 — M1, N1
HPD_E — GPIO18 — C2

IFPE

IFPE_PLLVDD — J7, K7
R310 10K/F_4
T12 — K6
+IFPE_IOVDD — H6, J6
R313 10K/F_4

I2CZ_SDA, I2CZ_SDA — H4, H3
IFPF_L3, IFPF_L3 — J5, J4
IFPF_L2, IFPF_L2 — K5, K4
IFPF_L1, IFPF_L1 — L4, L3
IFPF_L0, IFPF_L0 — M5, M4
HPD_F — GPIO19 — F7

IFPF

PLLVDD = 38mA

+1.05V_GFX — L1 FBMA-10-160808-300T — +NV_PLLVDD
C63 22U/6.3VS_6
C59 0.1U/10V_4

SP_PLLVDD = 17mA

+1.05V_GFX — L2 HCB1608KF-181T15 — +SP_PLLVDD
C68 0.1U/10V_4
C70 0.1U/10V_4
C76 22U/6.3VS_6
C71 4.7U/6.3V_6

VID_PLLVDD = 41mA

U15M
bga595-nvidia-n13p-gv2-s-a2
COMMON

9/14 XTAL_PLL

PLLVDD — L6
SP_PLLVDD — M6
VID_PLLVDD — N6

R273 10K/F_4 XTAL_SSIN — A10
XTALIN — C11
XTALOUTBUFF — C10 BXTALOUT
XTALOUT — B10 XTALOUT
R15 10K/F_4
Y1 27MHZ
C24 27P/50V_4
C25 27P/50V_4

+3V_GFX
R344 *4.7K_4
DGPU_PWROK — 9,14,25
+3V
R324 4.7K_4
Q27
R345 100K/F_4
DGPU_PGOK-1
DTC144EUA
+1.05V_GFX — R325 4.7K_4 — DGPU_POK4 — Q22 MMBT3904-7-F — C516 1000P/50V_4 — C515 *1000P/50V_4
+1.5V_GFX — R336 4.7K_4 — DGPU_POK2 — Q23 MMBT3904-7-F — C530 *1000P/50V_4

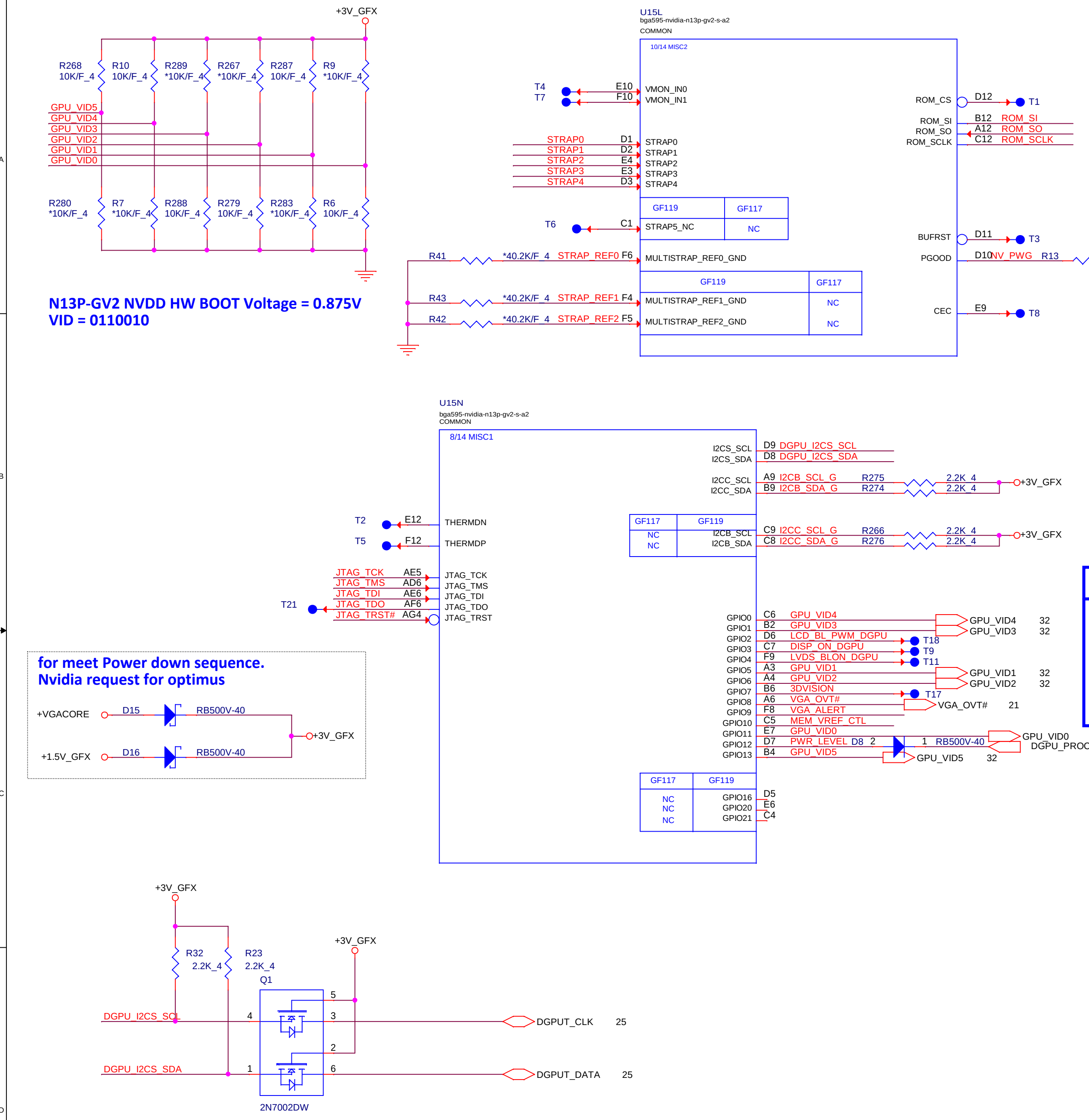
14,15,33 +1.05V_GFX
14,17,32,33 +3V_GFX
6,7,8,9,10,12,13,14,19,20,21,22,23,24,25,26,30,32,34,36 +3V

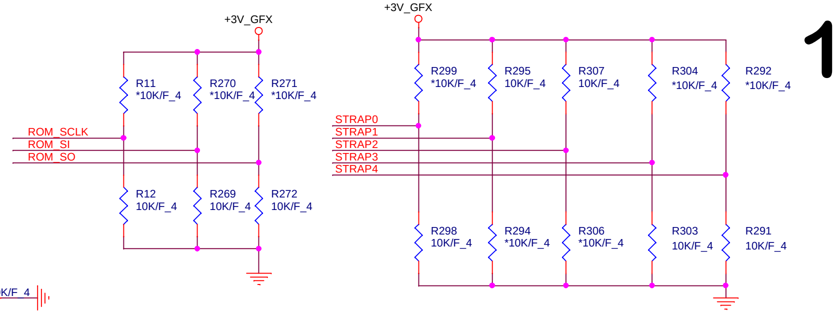
NB5

PROJECT : VOLKS
Quanta Computer Inc.

Size	Document Number	Rev
Custom	N12P-GV(DISPLAY)	1A

Date: Wednesday, May 23, 2012 Sheet 16 of 37





Binary Strap Mode Mapping

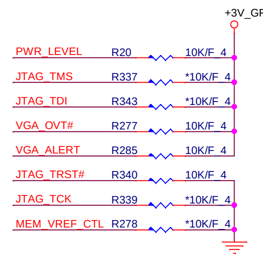
Strap Pin name	Strap Mapping	Resistance	Polarity
ROM_SCLK	SMB_ALT_ADDR	10Kohm	Pull-down to GND
ROM_SI	SUB_VENDOR	10Kohm	Pull-UP to 3V3 if VBIOS ROM Exists Pull-down to GND if no VBIO ROM
ROM_SO	VGA_DEVICE	10Kohm	Pull-down to GND (no dispaly)
STRAP0	RAMCFG[0]	10Kohm	USER defined
STRAP1	RAMCFG1]	10Kohm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

PROJECT : VOLKS
Quanta Computer Inc.
NB5

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

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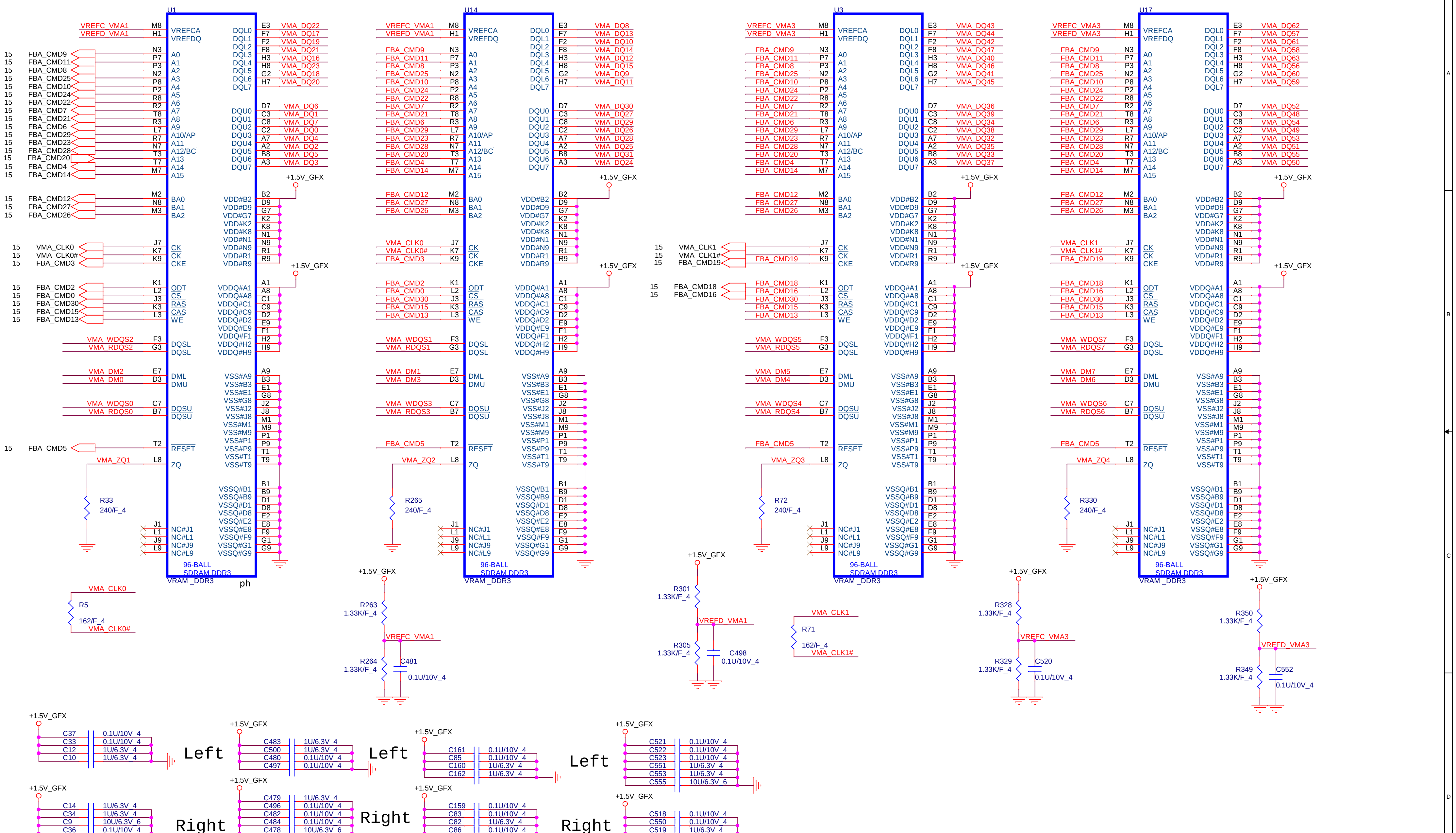
CHANNEL A: 256MB/512MB DDR3

18



15 VMA_DQ[63..0]
15 VMA_DM[7..0]
15 VMA_WDQS[7..0]
15 VMA_RDQS[7..0]
U1
U14
U3
U17
VREFCA
VREFDQ
A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10/AP A11 A12/BC A13 A14 A15
BA0 BA1 BA2
CK CK CKE
ODT CS RAS CAS WE
DQSL DQSL
DML DMU
DQSU DQSU
RESET
ZQ
NC#J1 NC#L1 NC#J9 NC#L9
DQL0 DQL1 DQL2 DQL3 DQL4 DQL5 DQL6 DQL7
DQU0 DQU1 DQU2 DQU3 DQU4 DQU5 DQU6 DQU7
VDD#B2 VDD#D9 VDD#G7 VDD#K2 VDD#K8 VDD#N1 VDD#N9 VDD#R1 VDD#R9
VDDQ#A1 VDDQ#A8 VDDQ#C1 VDDQ#C9 VDDQ#D2 VDDQ#E9 VDDQ#F1 VDDQ#H2 VDDQ#H9
VSS#A9 VSS#B3 VSS#E1 VSS#G8 VSS#J2 VSS#J8 VSS#M1 VSS#M9 VSS#P1 VSS#P9 VSS#T1 VSS#T9
VSSQ#B1 VSSQ#B9 VSSQ#D1 VSSQ#D8 VSSQ#E2 VSSQ#E8 VSSQ#F9 VSSQ#G1 VSSQ#G9
96-BALL
SDRAM DDR3
VRAM _DDR3
+1.5V_GFX
FBA_CMD9 FBA_CMD11 FBA_CMD8 FBA_CMD25 FBA_CMD10 FBA_CMD24 FBA_CMD22 FBA_CMD7 FBA_CMD21 FBA_CMD6 FBA_CMD29 FBA_CMD23 FBA_CMD28 FBA_CMD20 FBA_CMD4 FBA_CMD14
FBA_CMD12 FBA_CMD27 FBA_CMD26
VMA_CLK0 VMA_CLK0# FBA_CMD3
VMA_CLK1 VMA_CLK1# FBA_CMD19
FBA_CMD2 FBA_CMD0 FBA_CMD30 FBA_CMD15 FBA_CMD13
FBA_CMD18 FBA_CMD16
VMA_WDQS2 VMA_RDQS2 VMA_DM2 VMA_DM0 VMA_WDQS0 VMA_RDQS0
VMA_WDQS1 VMA_RDQS1 VMA_DM1 VMA_DM3 VMA_WDQS3 VMA_RDQS3
VMA_WDQS5 VMA_RDQS5 VMA_DM5 VMA_DM4 VMA_WDQS4 VMA_RDQS4
VMA_WDQS7 VMA_RDQS7 VMA_DM7 VMA_DM6 VMA_WDQS6 VMA_RDQS6
FBA_CMD5
VMA_ZQ1 VMA_ZQ2 VMA_ZQ3 VMA_ZQ4
R33 240/F_4
R265 240/F_4
R72 240/F_4
R330 240/F_4
VREFC_VMA1 VREFD_VMA1 VREFC_VMA3 VREFD_VMA3
R5 162/F_4
R71 162/F_4
R263 1.33K/F_4
R264 1.33K/F_4
C481 0.1U/10V_4
R301 1.33K/F_4
R305 1.33K/F_4
C498 0.1U/10V_4
R328 1.33K/F_4
R329 1.33K/F_4
C520 0.1U/10V_4
R350 1.33K/F_4
R349 1.33K/F_4
C552 0.1U/10V_4
Left
Right
C37 0.1U/10V_4
C33 0.1U/10V_4
C12 1U/6.3V_4
C10 1U/6.3V_4
C14 1U/6.3V_4
C34 1U/6.3V_4
C9 10U/6.3V_6
C36 0.1U/10V_4
C13 0.1U/10V_4
C11 0.1U/10V_4
C483 1U/6.3V_4
C500 1U/6.3V_4
C480 0.1U/10V_4
C497 0.1U/10V_4
C479 1U/6.3V_4
C496 0.1U/10V_4
C482 0.1U/10V_4
C484 0.1U/10V_4
C478 10U/6.3V_6
C499 1U/6.3V_4
C161 0.1U/10V_4
C85 0.1U/10V_4
C160 1U/6.3V_4
C162 1U/6.3V_4
C159 0.1U/10V_4
C83 0.1U/10V_4
C82 1U/6.3V_4
C86 0.1U/10V_4
C84 1U/6.3V_4
C163 10U/6.3V_6
C521 0.1U/10V_4
C522 0.1U/10V_4
C523 0.1U/10V_4
C551 1U/6.3V_4
C553 1U/6.3V_4
C555 10U/6.3V_6
C518 0.1U/10V_4
C550 0.1U/10V_4
C519 1U/6.3V_4
C554 1U/6.3V_4
15,16,17,33 +1.5V_GFX

NB5

PROJECT : VOLKS

Quanta Computer Inc.

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

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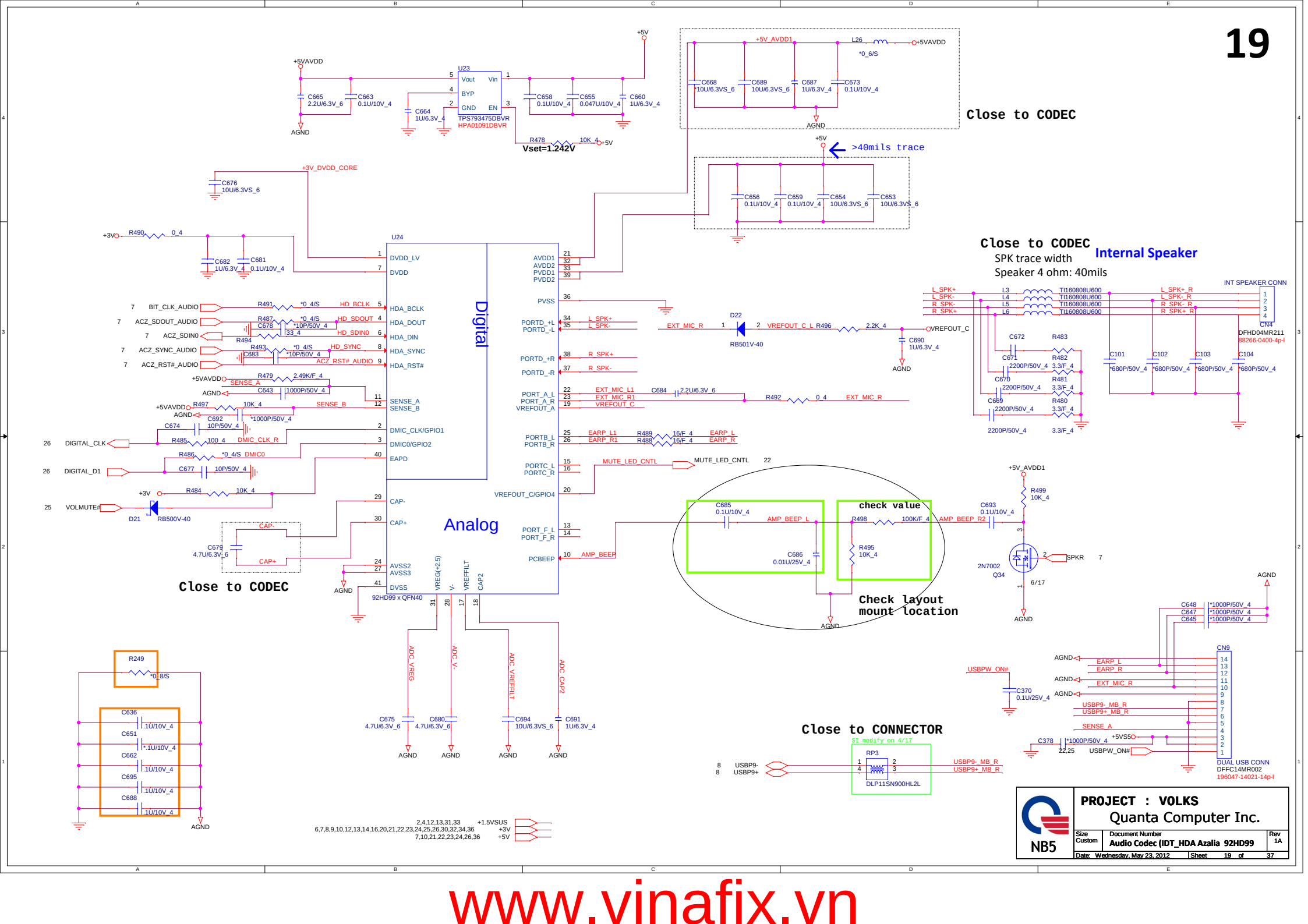
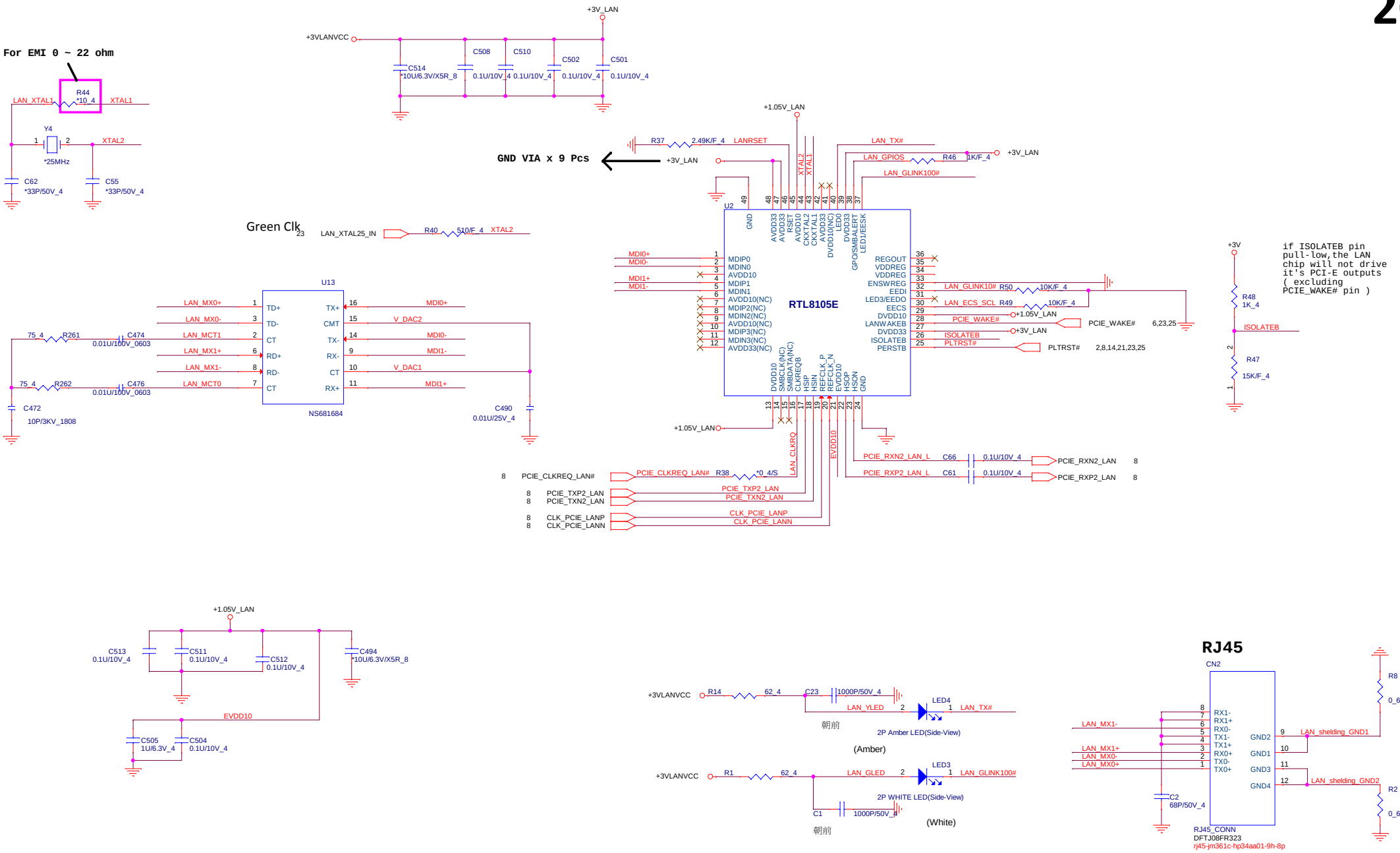


For EMI 0 ~ 22 ohm

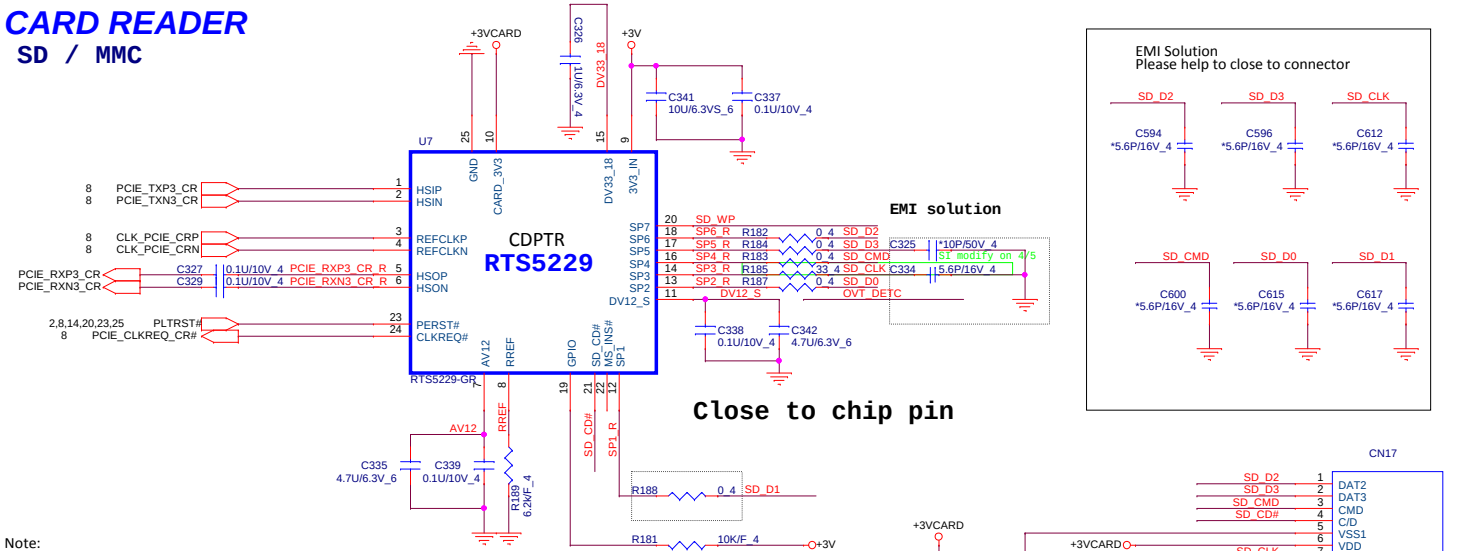
GND VIA x 9 Pcs

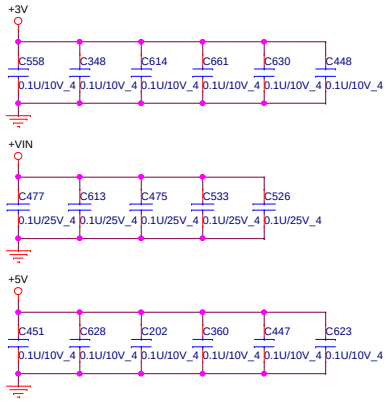
Green Clk

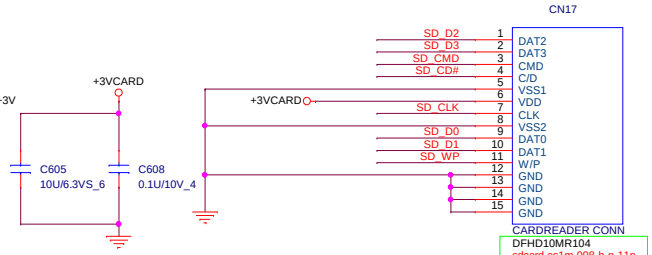


NB5	PROJECT : VOLKS Quanta Computer Inc.		
	Size: Custom	Document Number: LAN RTL8105/RJ45	Rev: 1A
	Date: Wednesday, May 23, 2012	Sheet: 20of	37

CARD READER
SD / MMC

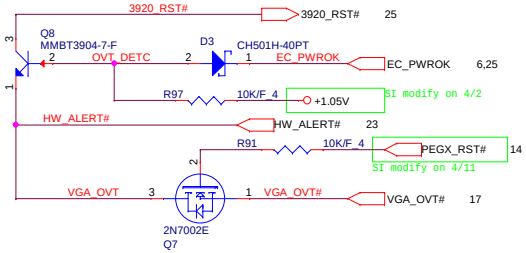


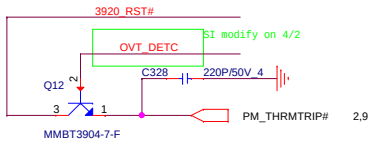


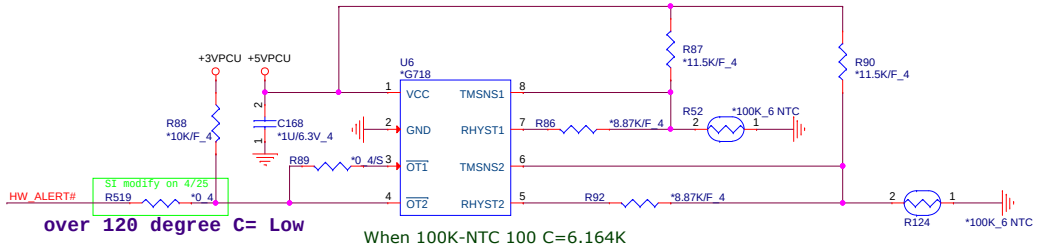


Note:
1. R5194, R5196, R5197, R5198, R5199, R5200 close to U37 pin
2. C5265, C5202 close to U37 pin7
3. C1021, C1022 close to U37 pin11
4. C1089, C1090 close to U37 pin9
5. C1019 close to U37 pin15
6. C1026, C1027 close to CN27 pin11
7. C1025 close to CN27 pin4

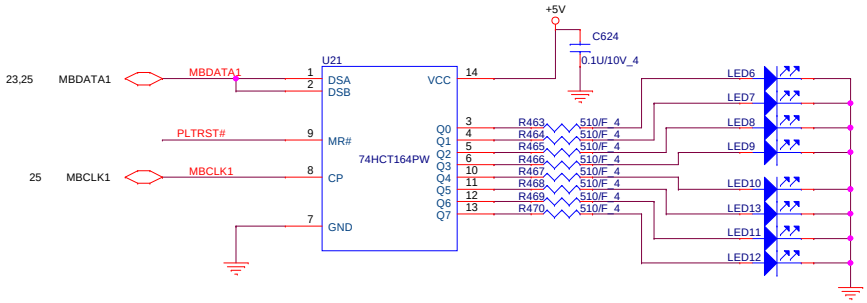
Thermal HW protect







80 port



NB5

PROJECT : VOLKS
Quanta Computer Inc.

Size	Document Number	Rev
Custom	Card Reader control (RTS5229-GR)	1A
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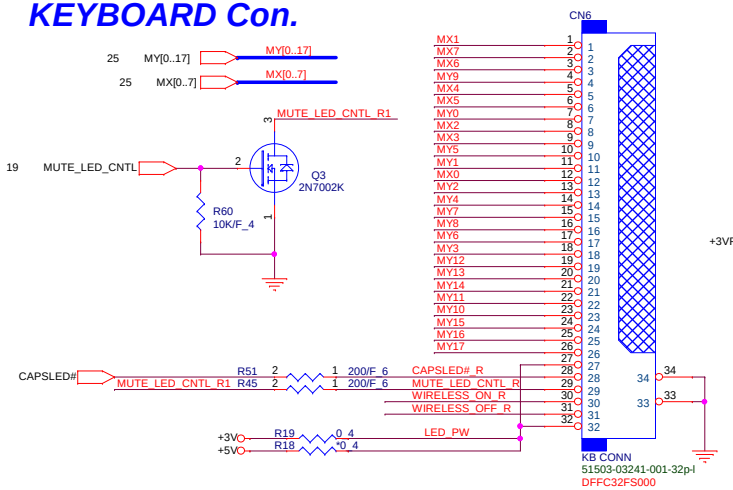
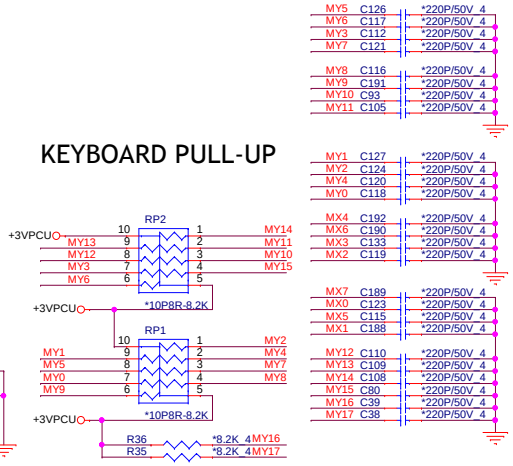
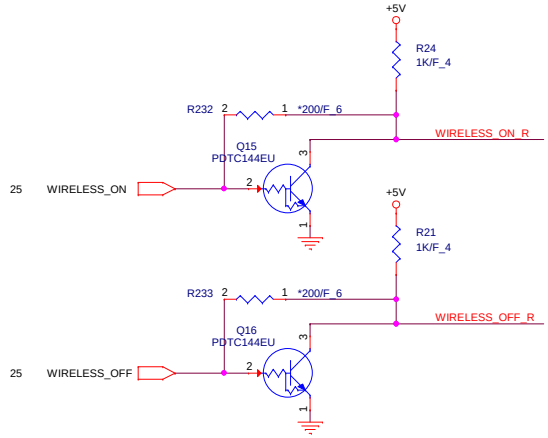
KEYBOARD Con.

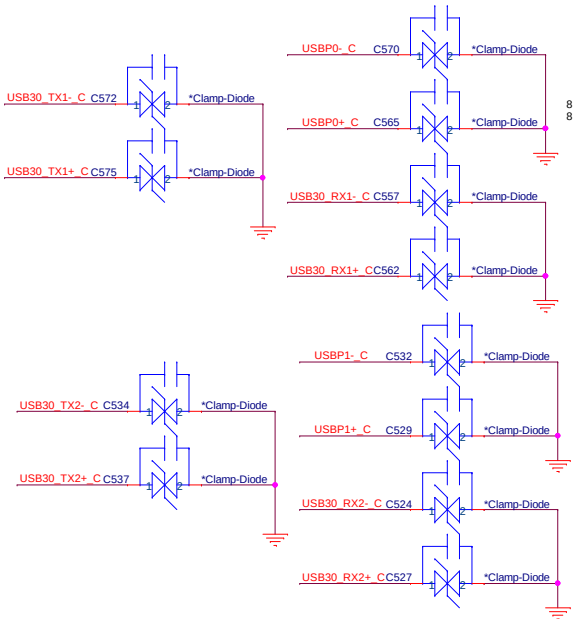


KEYBOARD PULL-UP

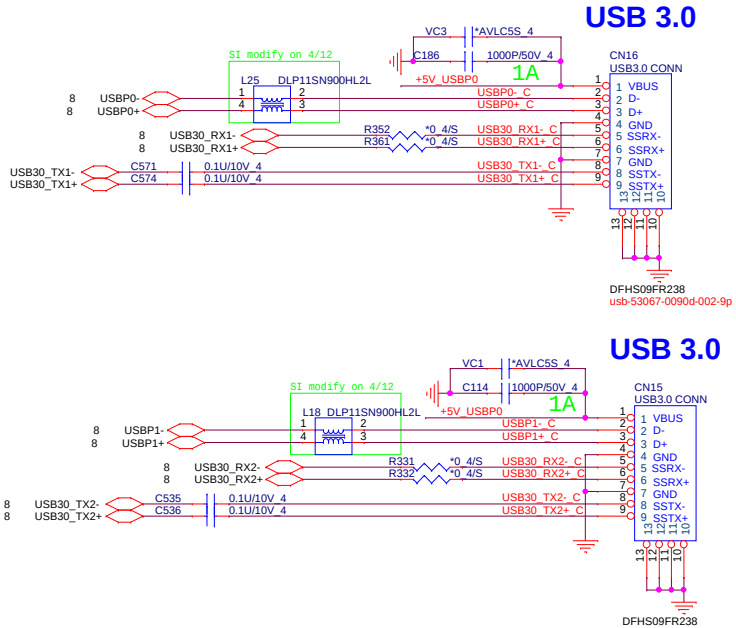


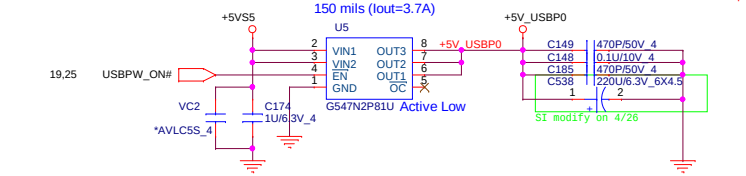


USB 2.0/3.0 Combo

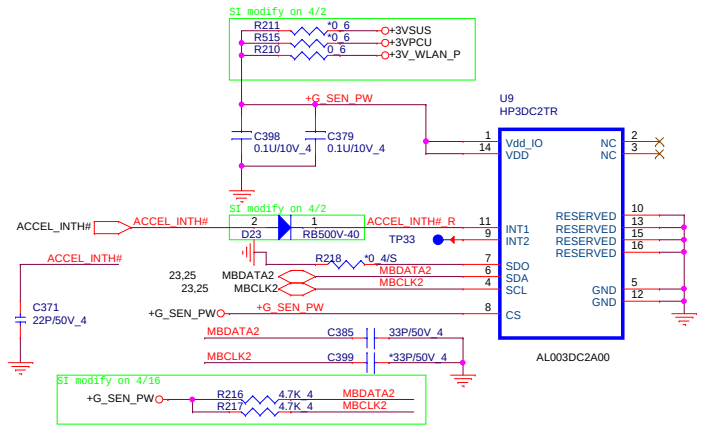


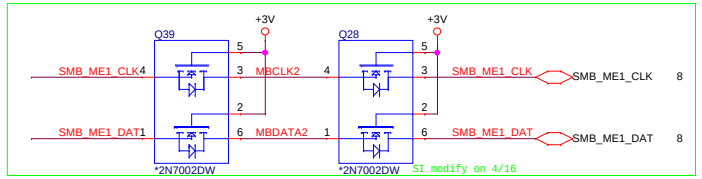
USB 3.0





Accelerometer Sensor





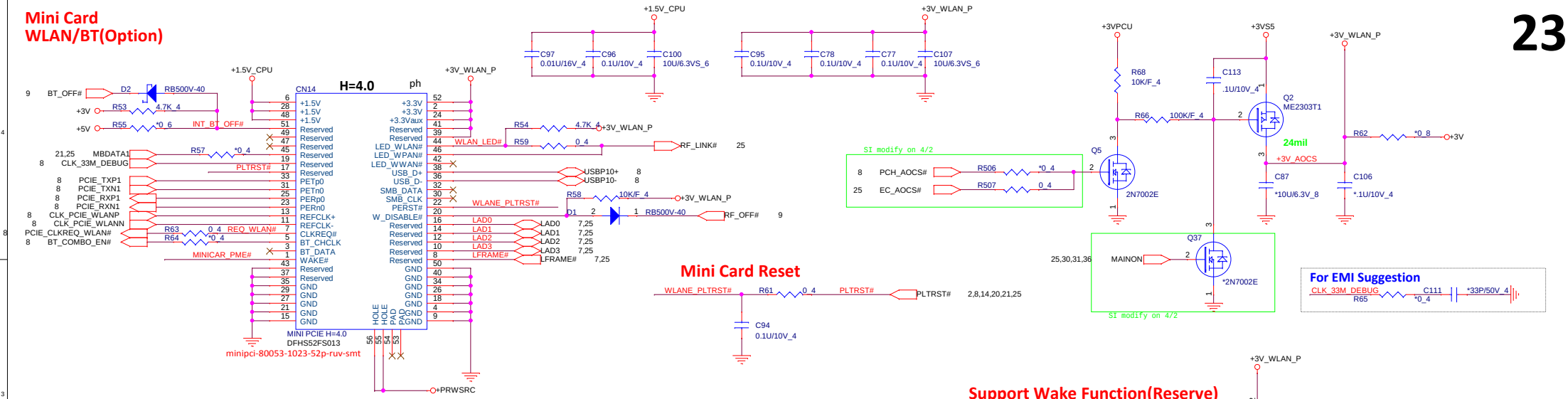
6,19,28,29,30,31,32,34,35,36
7,21,23,24,25,26,27,28
+5VS5
+3VPCU

NB5

PROJECT : VOLKS
Quanta Computer Inc.

Size	Document Number	Rev
Custom	USB 3.0/KB/Green CLK	1A
Date: Wednesday, May 23, 2012	Sheet 22of 37	

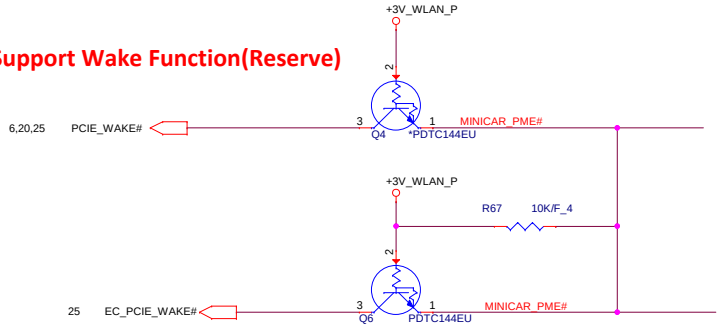
Mini Card WLAN/BT(Option)



Mini Card Reset

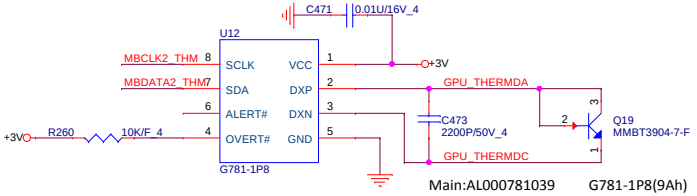
For EMI Suggestion

Support Wake Function(Reserve)



Local Thermal Sensor

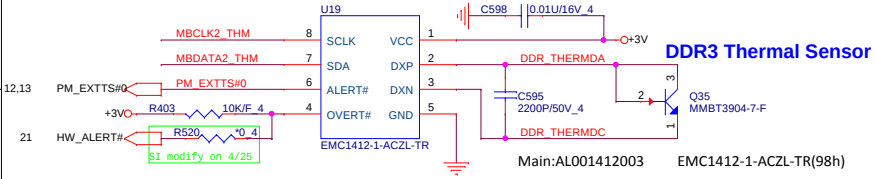
GPU Thermal Sensor



Main:AL000781039 G781-1P8(9Ah)

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

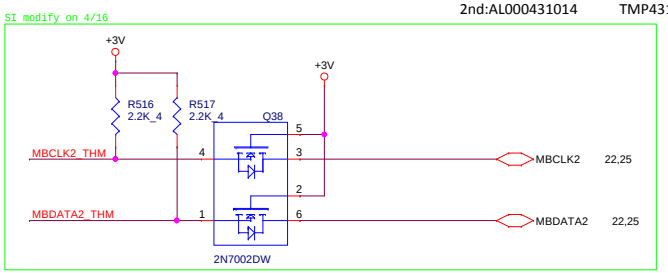
CPU Thermal Sensor



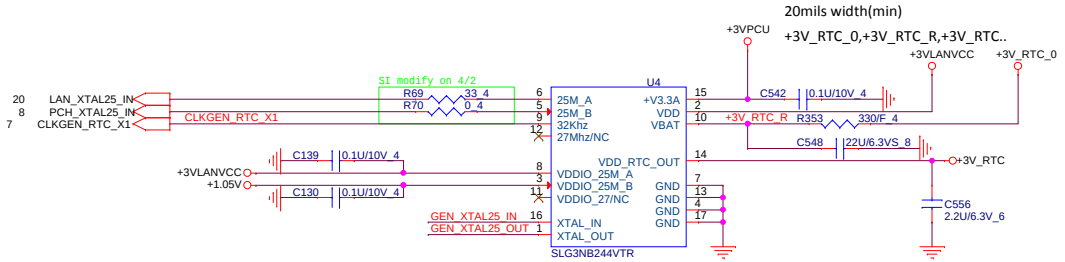
DDR3 Thermal Sensor

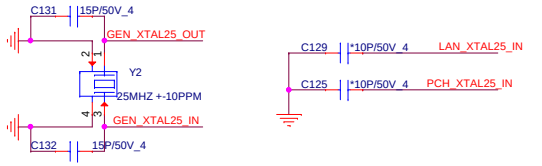
Main:AL001412003 EMC1412-1-ACZL-TR(98h)

2nd:AL000431014 TMP431ADGKR(98h)



Green CLK Circuitry





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

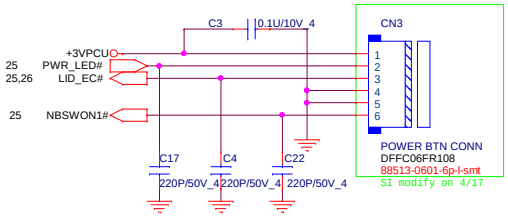
Quanta Computer Inc.

Size	Document Number	Rev
Custom	MINI-PCIE/LED	1A

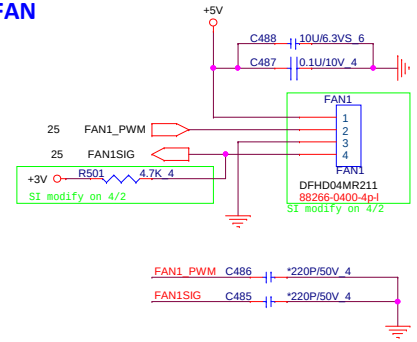
Date: Wednesday, May 23, 2012 Sheet 23of 37

Power Botton Connector

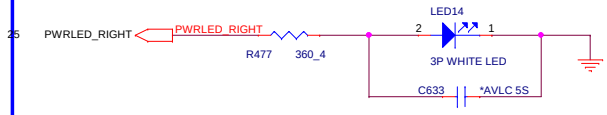
Pin1 : +3VPCU(LIDSWITCH PWR)
Pin2 : POWER LED
Pin3 : LIDSWITCH
Pin4 : GND
Pin5 : GND
Pin6 : POWERON#



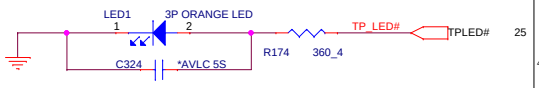
FAN



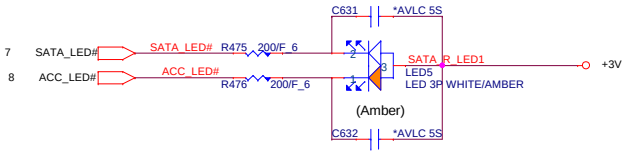
PWR LED



14" TP LED

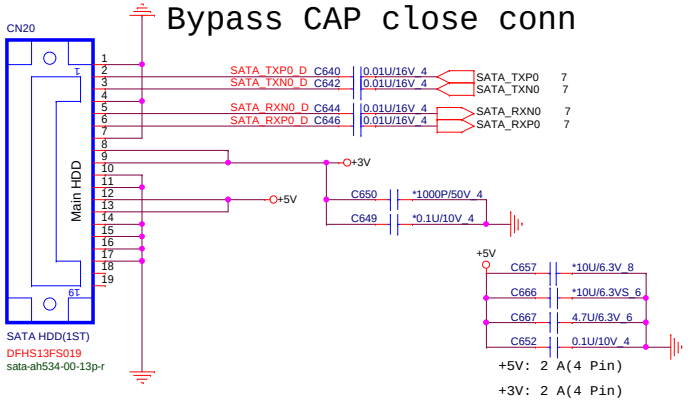


SATA LED



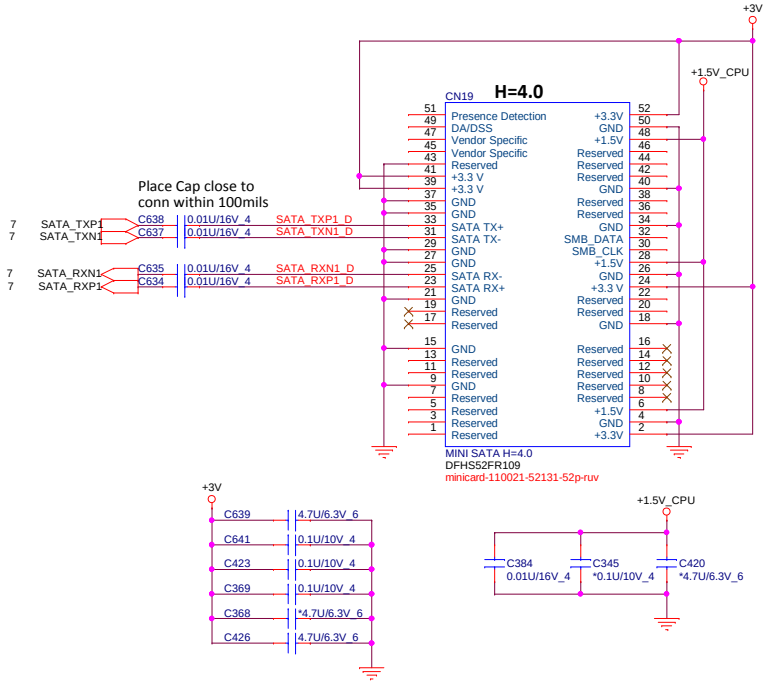
SATA HDD Connector(Cable type)

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

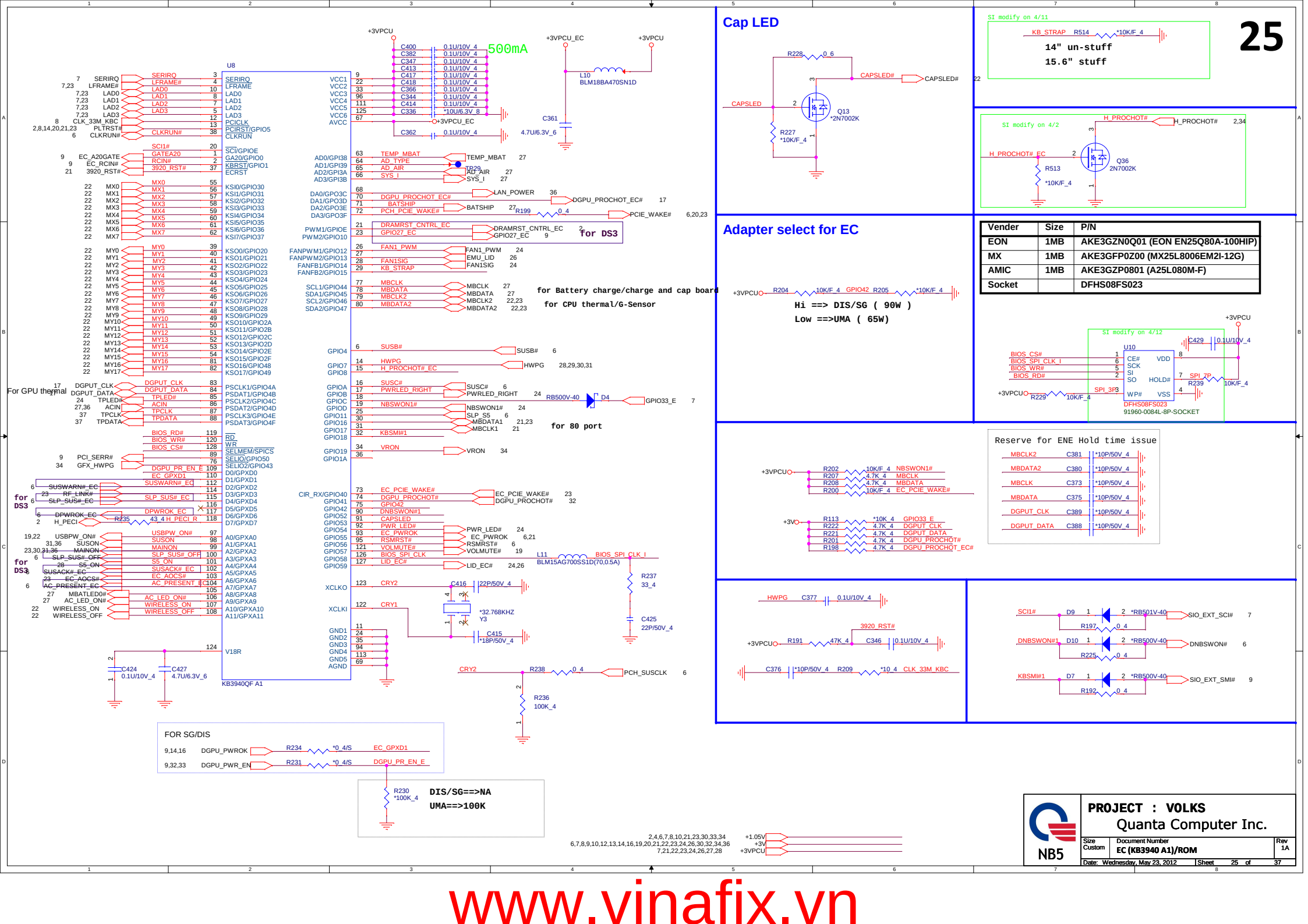


6,7,8,9,10,12,13,14,16,19,20,21,22,23,25,26,30,32,34,36 +3V
7,10,19,21,22,23,26,36 +5V
7,21,22,23,25,26,27,28 +3VPCU
2,4,10,23 +1.5V_CPU
27,33,36 +12VALW

NB5

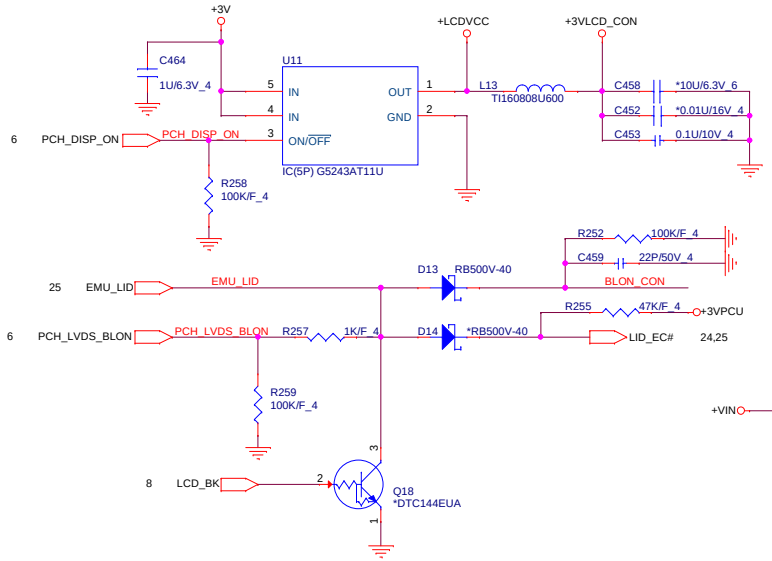
PROJECT : VOLKS
Quanta Computer Inc.

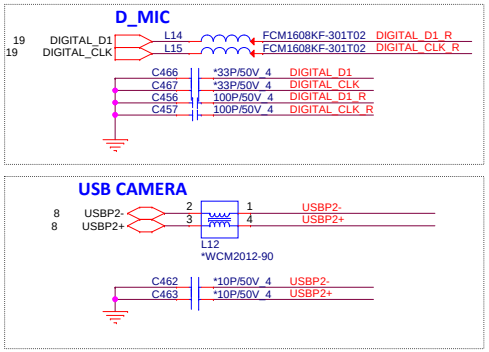
Size	Document Number	Rev
Custom	SATA HDD/ODD/MSATA CONN	1A
Date: Wednesday, May 23, 2012	Sheet 24of 37	

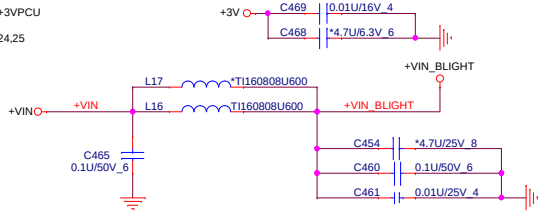


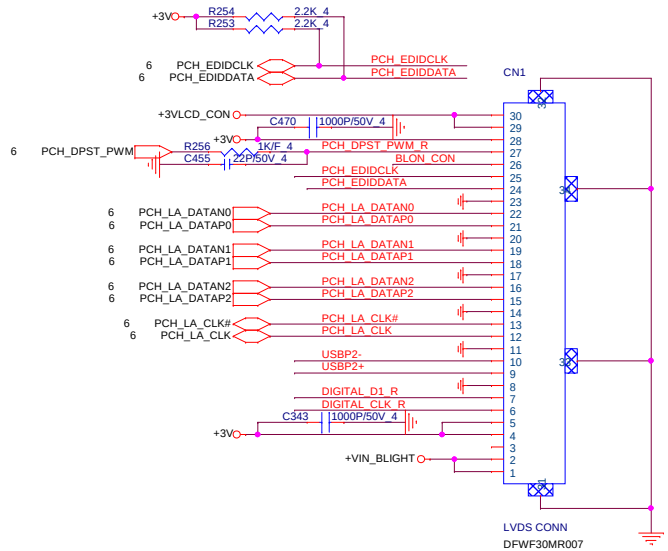
Vender	Size	P/N
EON	1MB	AKE3GZN0Q01 (EON EN25Q80A-100HIP)
MX	1MB	AKE3GFP0Z00 (MX25L8006EM2I-12G)
AMIC	1MB	AKE3GZP0801 (A25L080M-F)
Socket		DFHS08FS023

LVDS Conn.

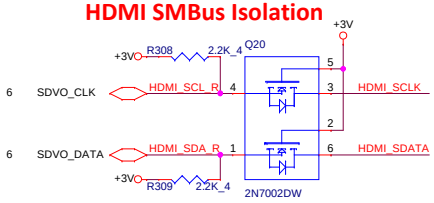


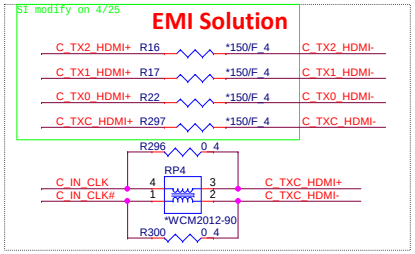


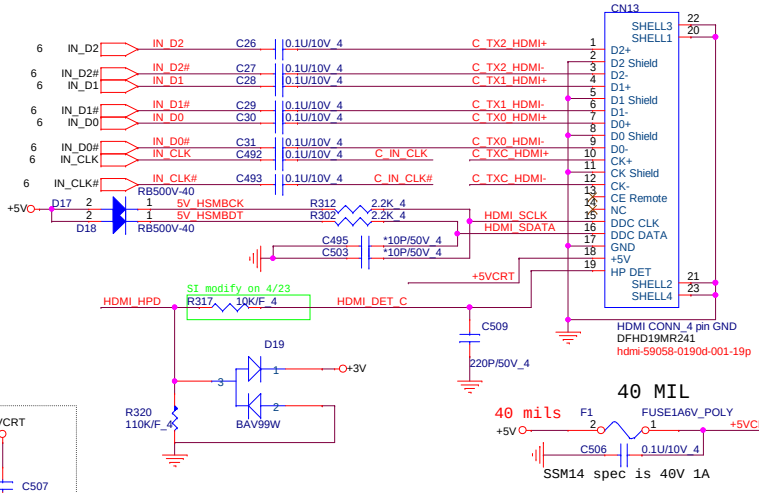


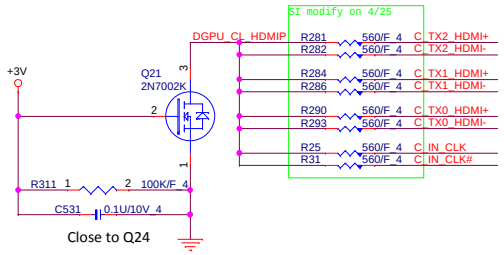


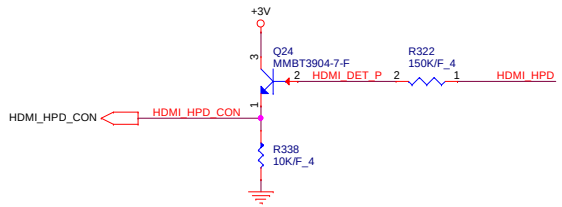
HDMI Conn.

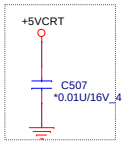












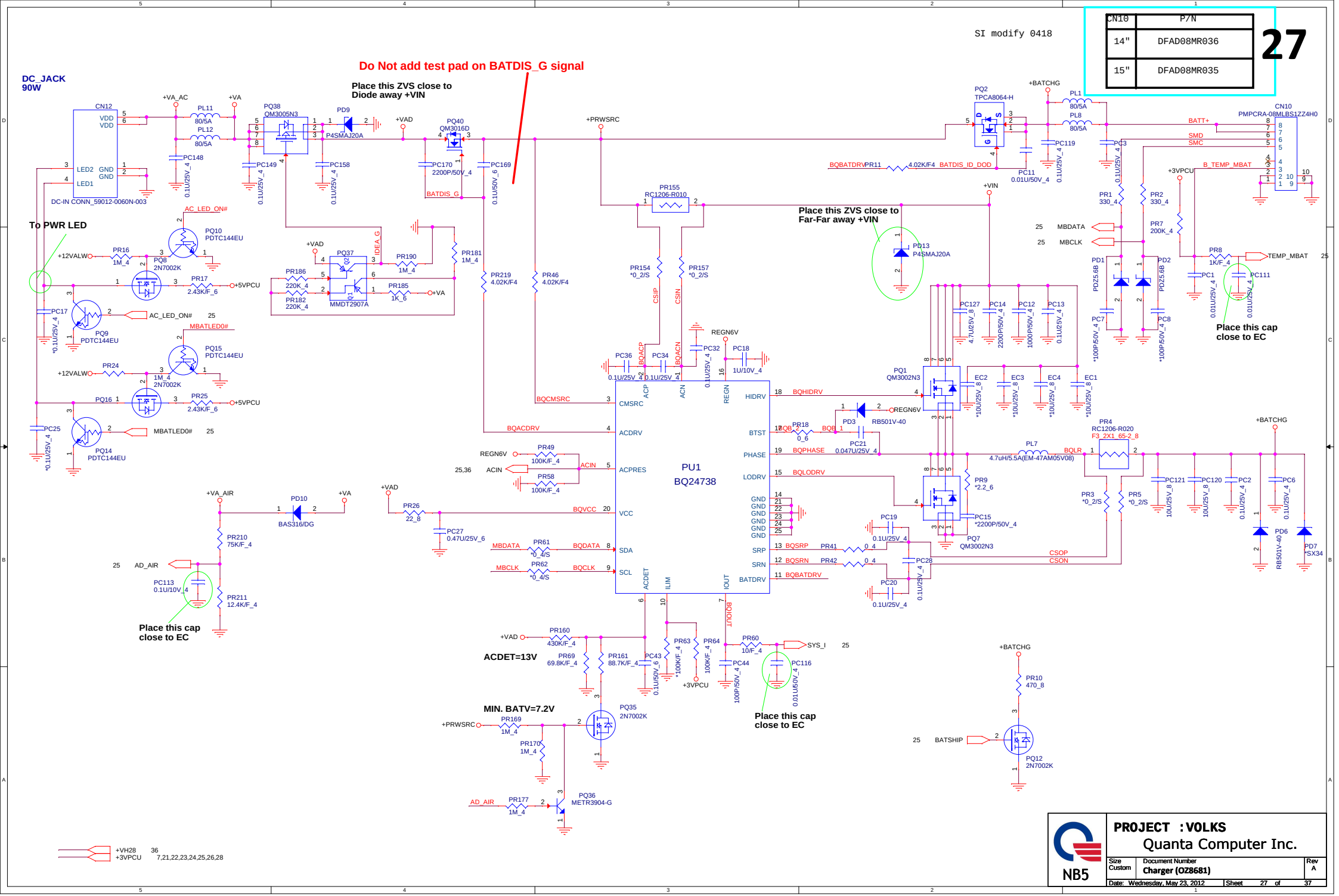
for EMI request

NB5

PROJECT : VOLKS

Quanta Computer Inc.

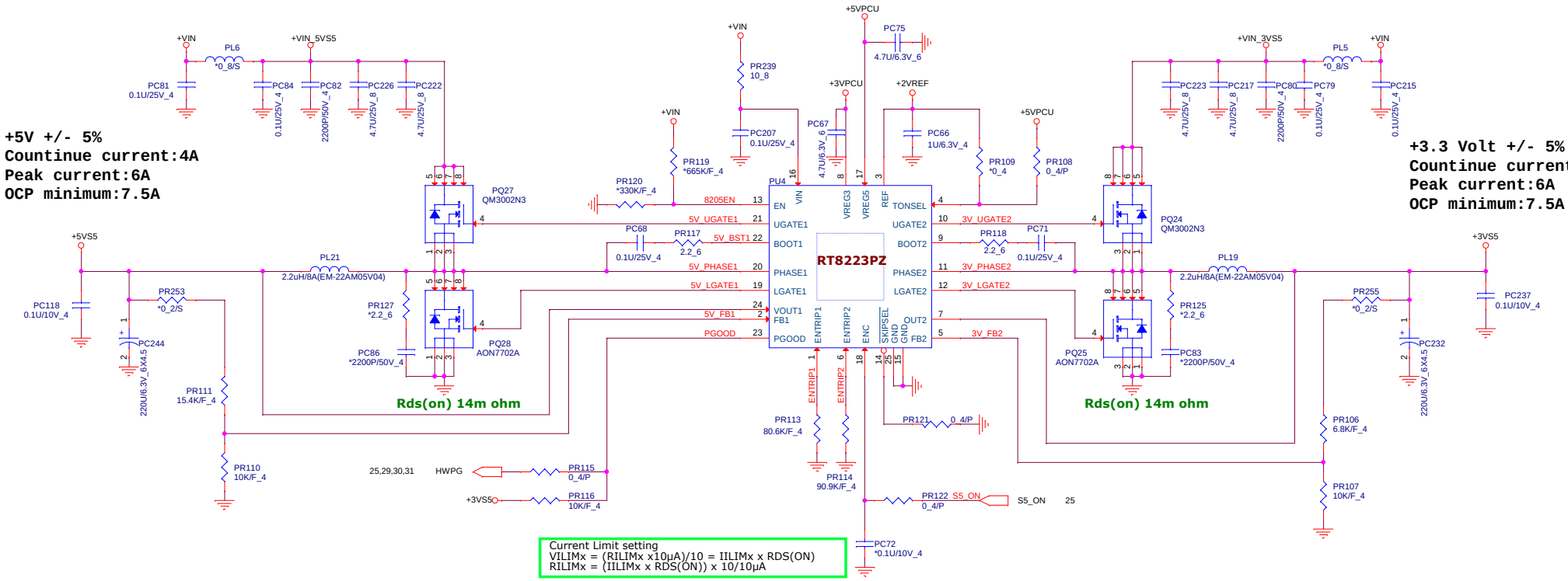
Size	Document Number	Rev
Custom	LCD Connector (LVDS)	1A
Date: Wednesday, May 23, 2012	Sheet 26of 37	


SI modify 0418
CN10 | P/N
14" | DFAD08MR036
15" | DFAD08MR035
27
Do Not add test pad on BATDIS_G signal
DC_JACK
90W
Place this ZVS close to Diode away +VIN
Place this ZVS close to Far-Far away +VIN
To PWR LED
PU1
BQ24738
ACDET=13V
MIN. BATV=7.2V
Place this cap close to EC
Place this cap close to EC
Place this cap close to EC
Quanta Computer Inc.
PROJECT : VOLKS
NB5
Charger (OZ8681)
Wednesday, May 23, 2012
www.vinafix.vn

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: Custom	Document Number: 3/5VS5 (RT8223P)	Rev: A
Date: Wednesday, May 23, 2012	Sheet 28 of 37	

TPS51462RGER/AL051462000

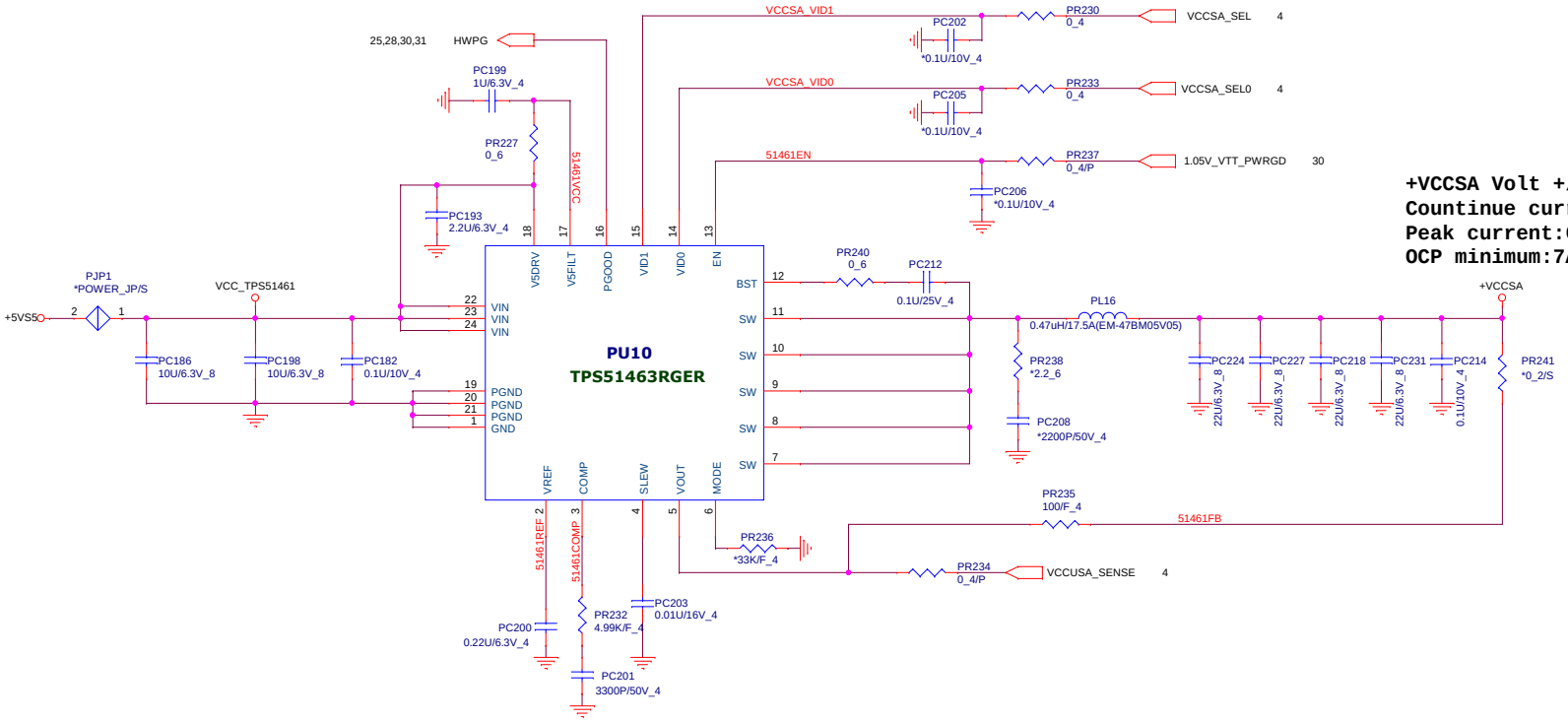
For CPU SV system agent voltage slew rate of 0.5 -10 mV/µs

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



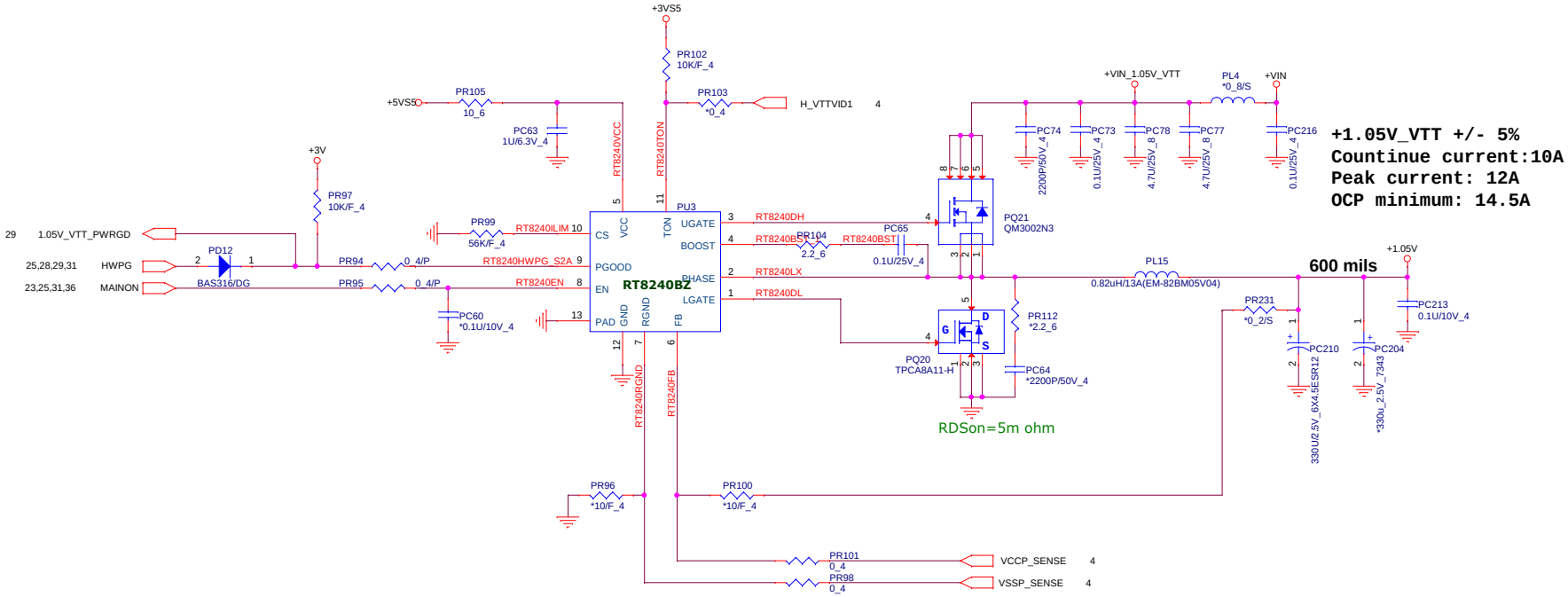
+VCCSA Volt +/- 5%
Countinue current:4A
Peak current:6A
OCP minimum:7A

PROJECT : VOLKS
Quanta Computer Inc.

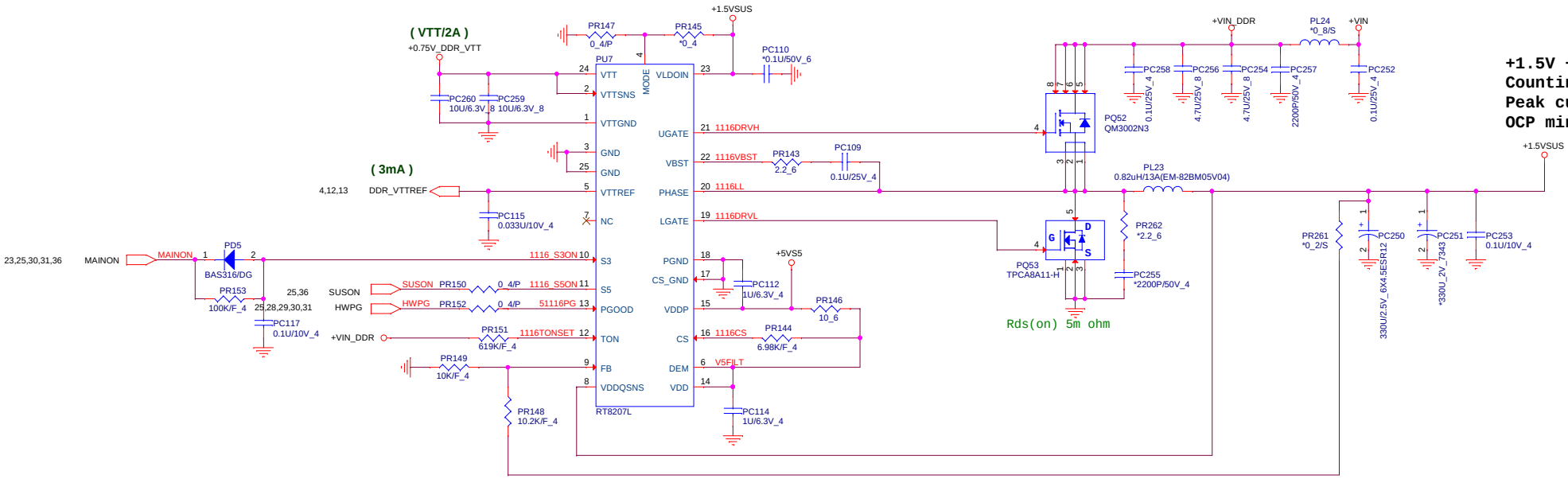
Size	Document Number	Rev
Custom	+VCCSA (TPS51462RGER)	A

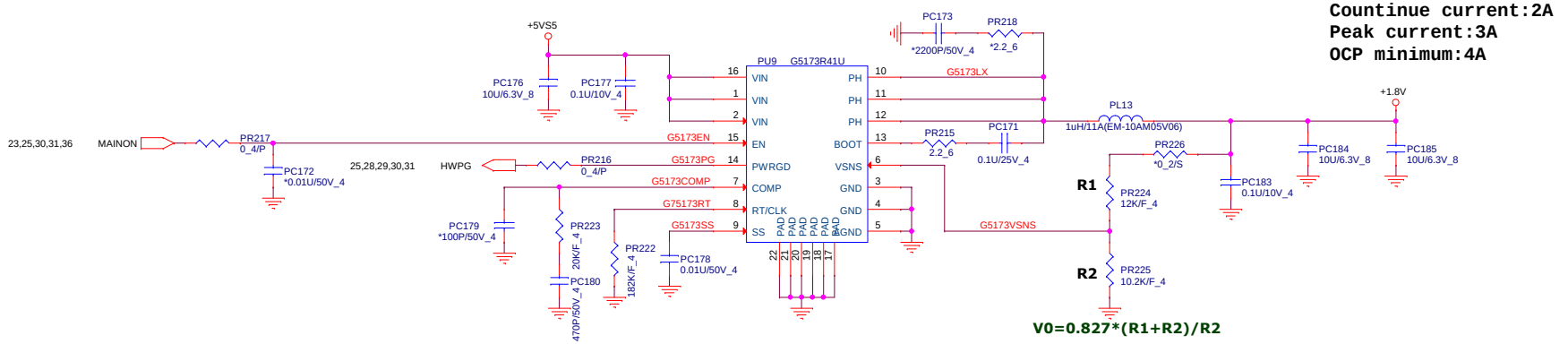
Date: Wednesday, May 23, 2012 | Sheet 29of 37

NB5

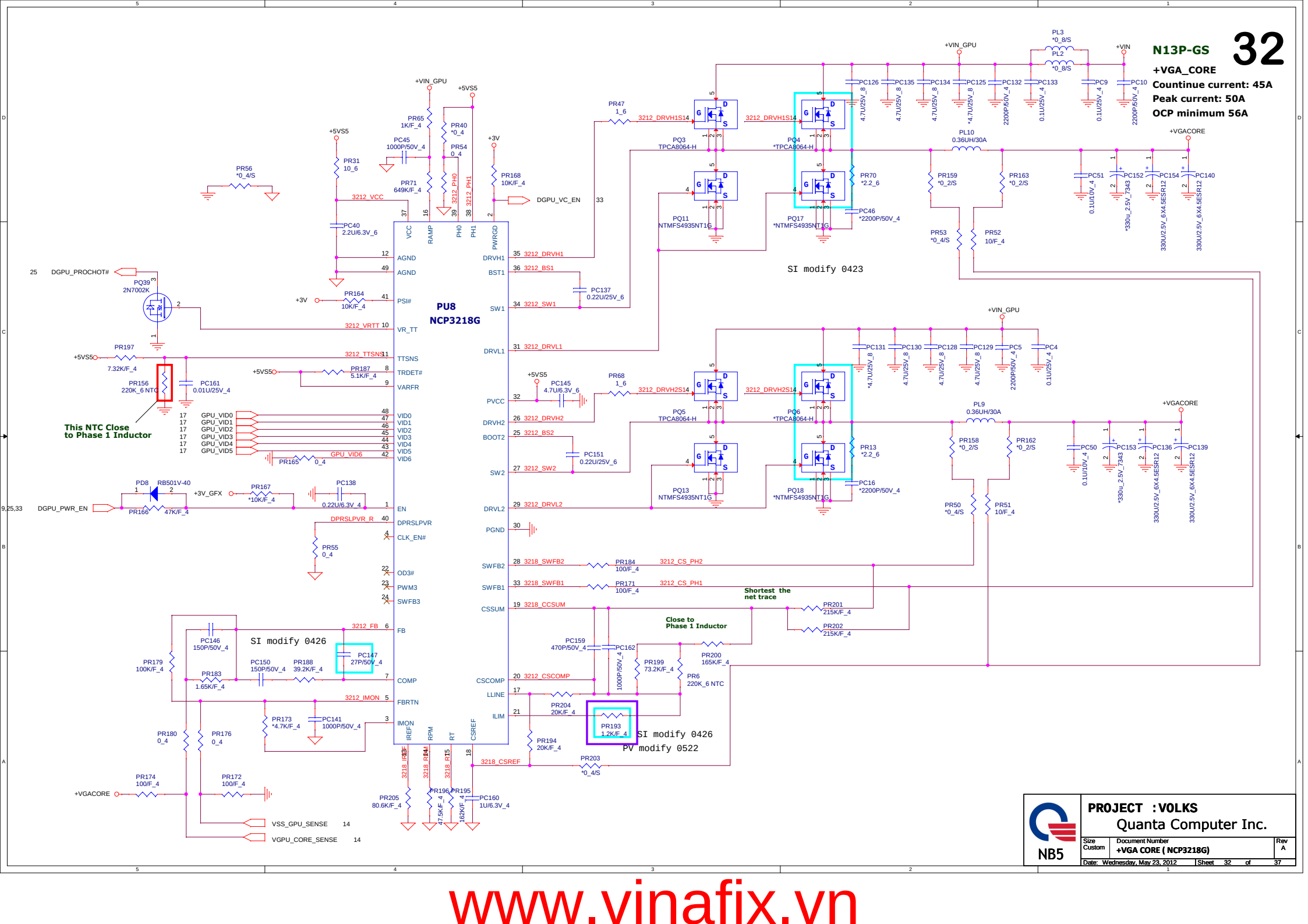


PROJECT : VOLKS	
Quanta Computer Inc.	
NB5	Size: Custom; Document Number: +1.05V (RT8240B); Rev: A
Date: Wednesday, May 23, 2012	Sheet 30of 37





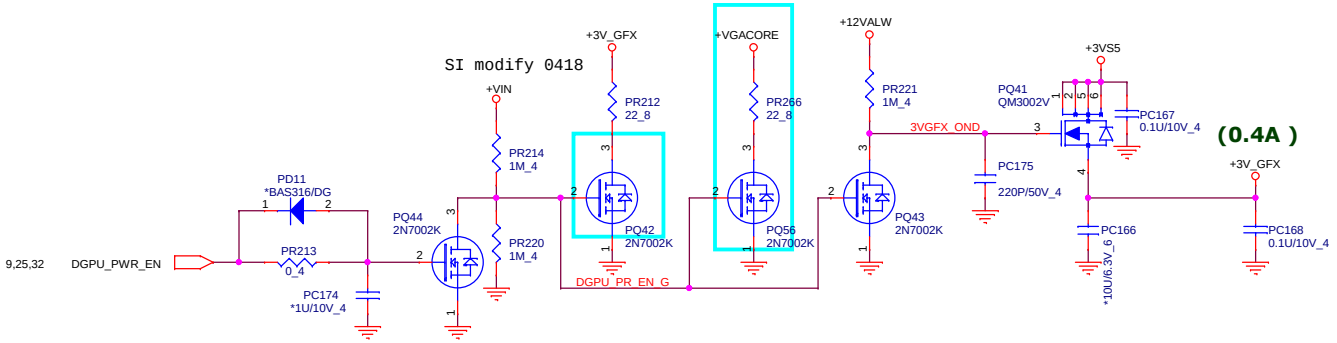
NB5	PROJECT : VOLKS Quanta Computer Inc.	
Size: Custom	Document Number: DDR3 (RT8207)	Rev: A
Date: Wednesday, May 23, 2012	Sheet 31 of 37	

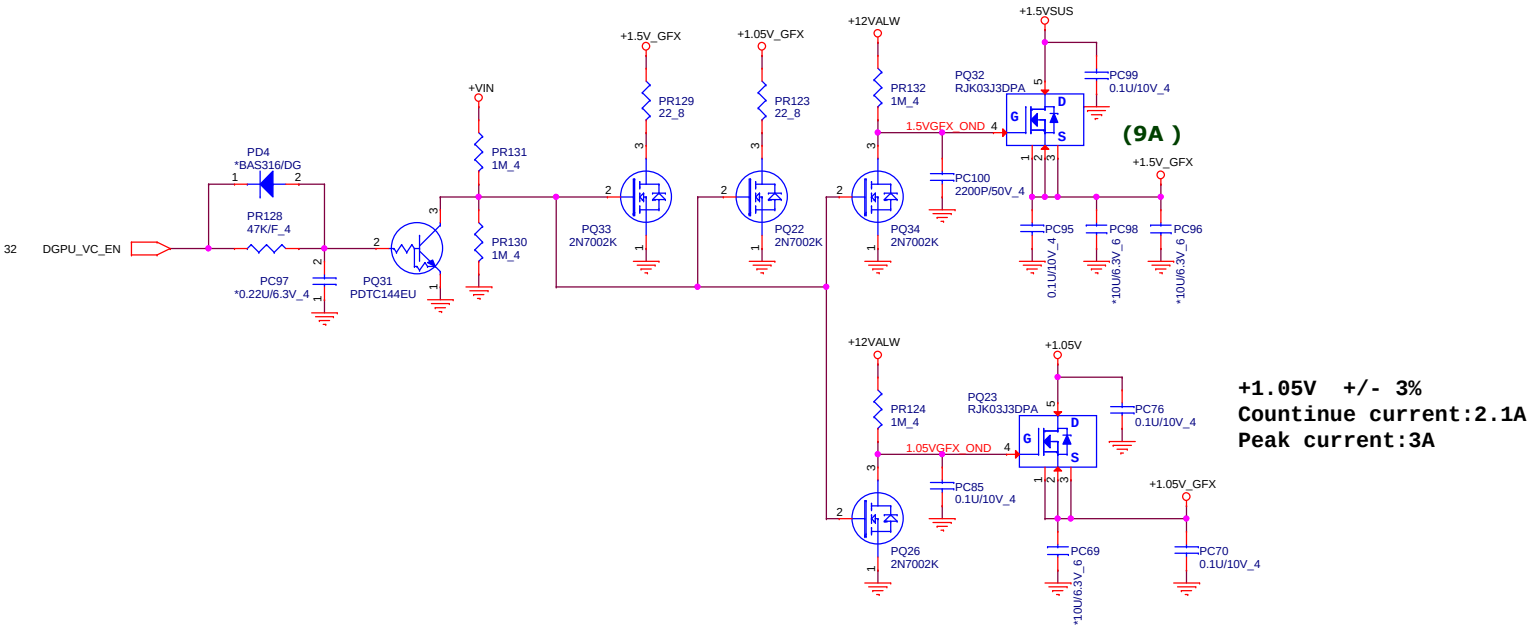

N13P-GS
32
+VGA_CORE
Countinue current: 45A
Peak current: 50A
OCP minimum 56A
PU8
NCP3218G
SI modify 0423
SI modify 0426
SI modify 0426
PV modify 0522
This NTC Close
to Phase 1 Inductor
Close to
Phase 1 Inductor
Shortest the
net trace
PROJECT : VOLKS
Quanta Computer Inc.
NB5
+VGA_CORE (NCP3218G)
Wednesday, May 23, 2012
www.vinafix.vn

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

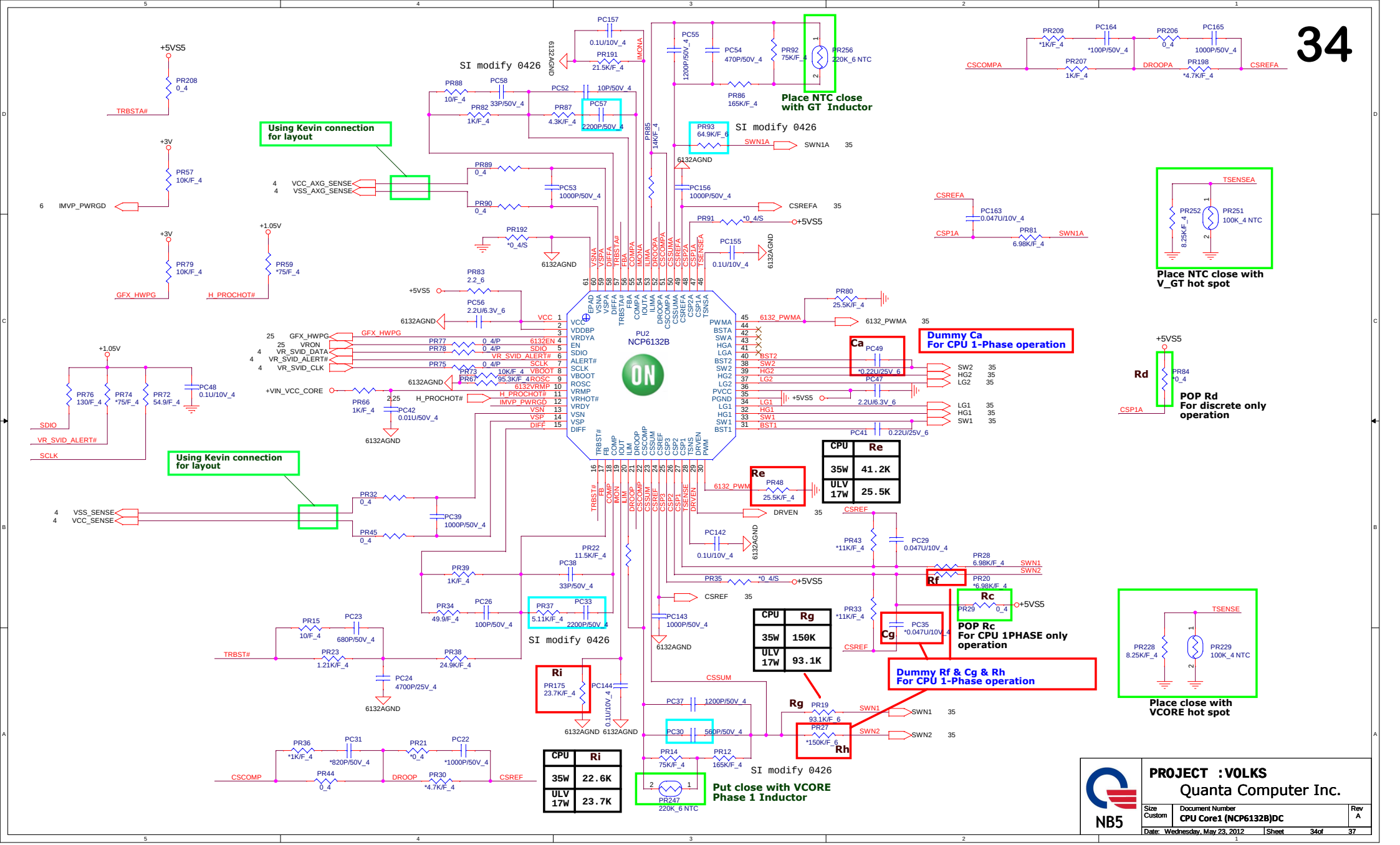
SI modify 0418

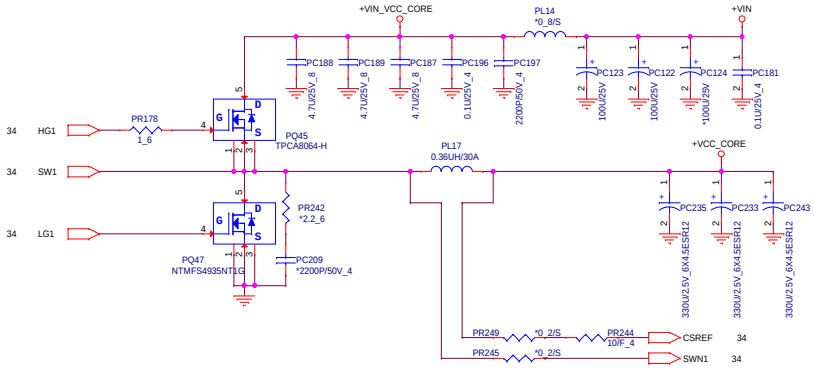




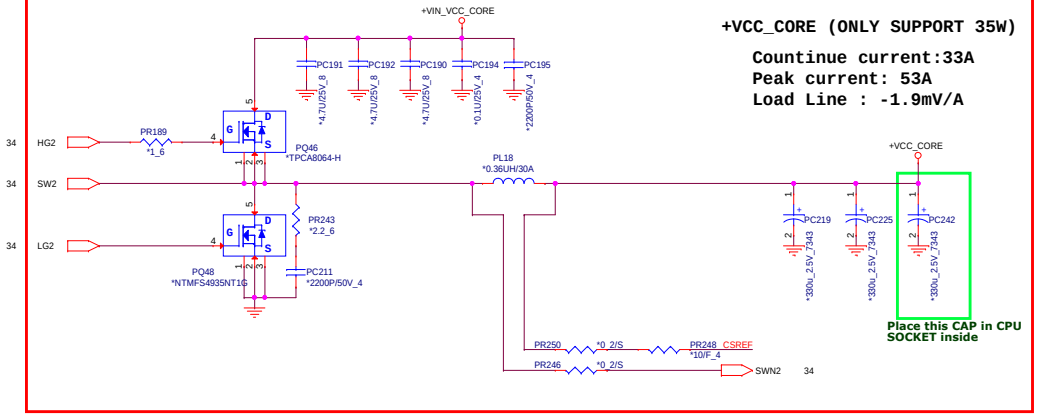
+1.05V +/- 3%
Countinue current:2.1A
Peak current:3A

NB5	PROJECT : VOLKS Quanta Computer Inc.	
Size: Custom	Document Number: +VGA POWER	Rev: A
Date: Wednesday, May 23, 2012	Sheet 33 of 37	





Dummy This Schematic
For CPU 1-Phase operation



+VCC_CORE (ONLY SUPPORT 35W)

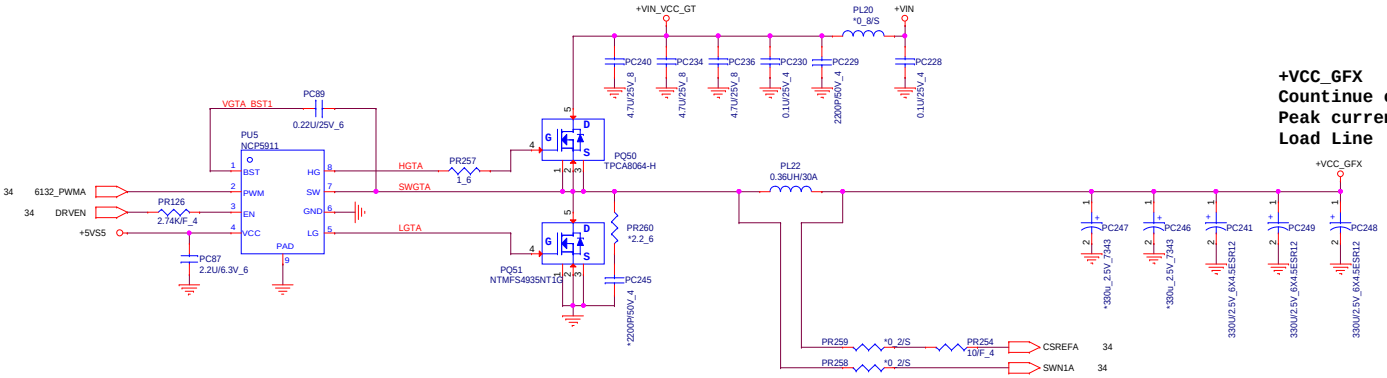
Countinue current:33A
Peak current: 53A
Load Line : -1.9mV/A

+VCC_CORE (ONLY SUPPORT 35W)

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

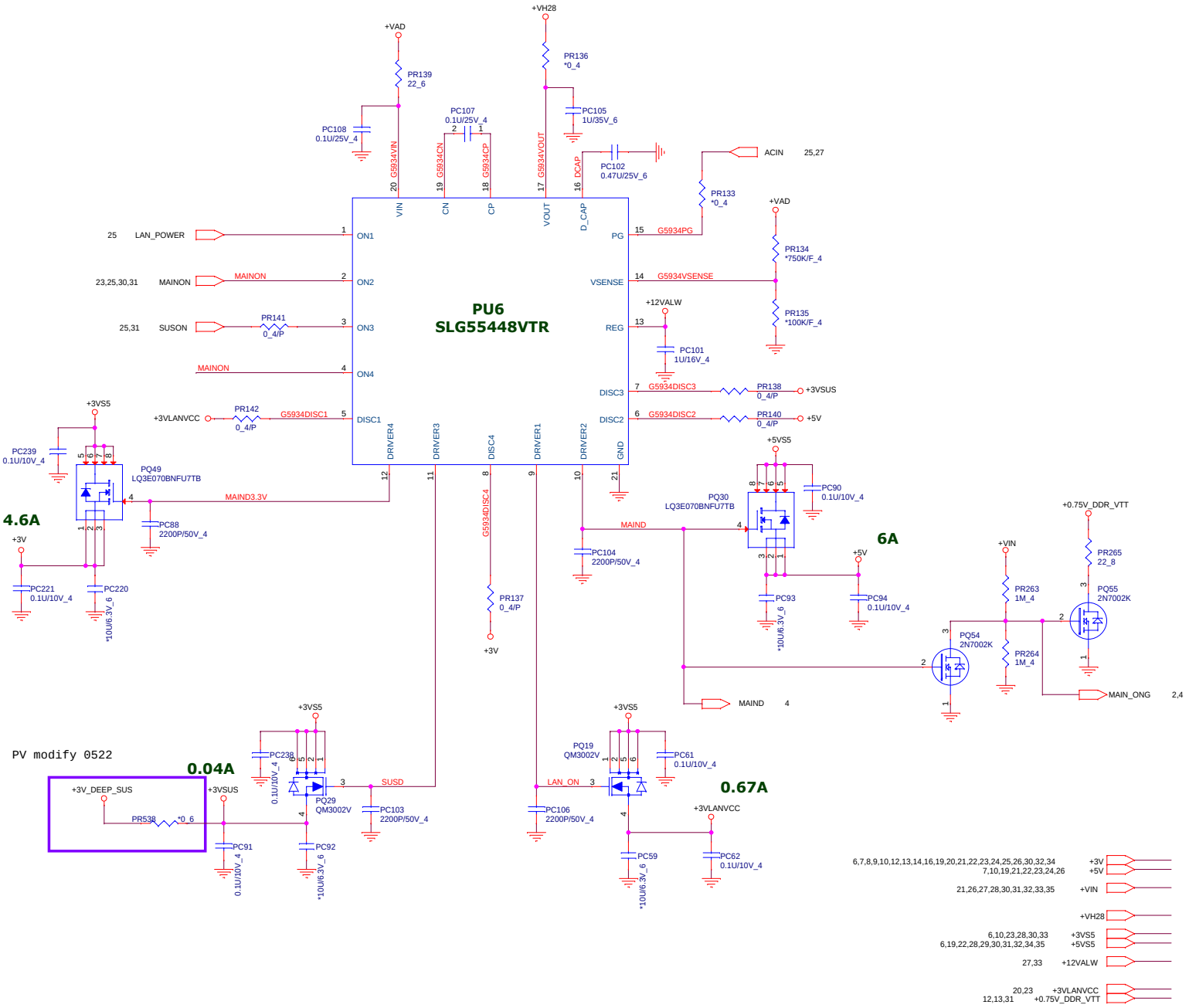
+VCC_CORE (ULV 17W)

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



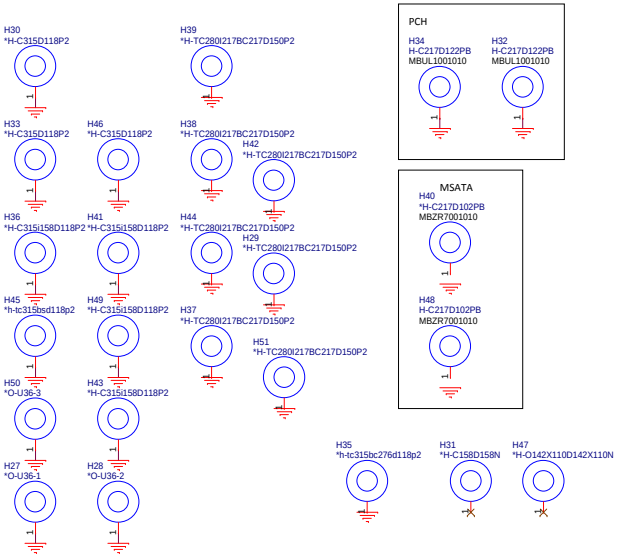
+VCC_GFX
Countinue current:21.5A
Peak current: 33A
Load Line : -3.9mV/A

NB5	PROJECT : VOLKS Quanta Computer Inc.	
Size: C	Document Number: CPU Core2 (NCP5911)DC	Rev: A
Date: Wednesday, May 23, 2012	Sheet: 35of 37	

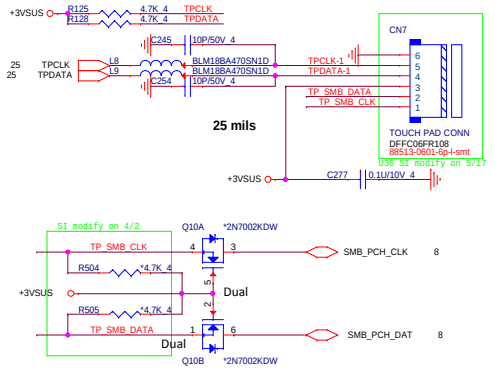


NB5	PROJECT : VOLKS Quanta Computer Inc.	
Size: Custom	Document Number: Dis-charge IC (SLG55448V)	Rev: A
Date: Wednesday, May 23, 2012	Sheet 36 of 37	

15" Hole



Touch Pad Connector



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