ZR8 SYSTEM DIAGRAM

AMD Smarter Choice

RAMP

PCB STACK UP

LAYER 1 : TOP
LAYER 2 : GND
LAYER 3 : IN1
LAYER 4 : IN2
LAYER 5 : VCC
LAYER 6 : IN3
LAYER 7 : GND
LAYER 8 : BOT

```
SGN@---->Internal CLK GEN.
GN@  ---->External CLK GEN.
IV@  -----> iGPU
SW@ -----> dGPU
SP@  -----> iGPU & dGPU notice
SPE@  ----->Only for dGPU notice
SIDE@ ----> Side port
```

DDR3-SODIMM1 P5
DDR3-SODIMM2 P6
DDR3 channel A
DDR3 channel B

AMD Champlain
35mm X 35mm
S1G4 Processor
638P (PGA)45W/35W
P2 ~ 4

CPU THERMAL SENSOR P4

CPU_CLK
NBGFX_CLK
NBGPP_CLK
SBLINK_CLK

CLOCK GEN From SB P11

HT3

PCI-E

NORTH BRIDGE
RS880
A12
21mm X 21mm, 528pin BGA
P7 ~ 10

PCI-Express 16X

ATI Madison LP 128-bit M2 Pkg
29mm X 29mm
P16 ~ 20

HDMI P25
CRT P24
LVDS P24

MUXs (S.G) P24

DDR3 800MHz
VRAM
64MX16X4,64 bit
64MX16X8,128 bit
P22,23

SIDE port P7

CRT
LVDS

LAN
Atheros
PCIE-LAN
AR8151
(10/100/1000)
P26

Mini PCI-E Card
(Wireless LAN)
P27

RJ45 P26

ALINK X4

SATA - HDD1 P28
SATA - ODD P28
SATA0 150MB
SATA1 150MB

SOUTH BRIDGE
SB820
21mm X 21mm, 528pin BGA
4.5W(Ext)
4.3W(Int)
P11 ~ 14

BT P31
USB1.1
USB2.0

USB2.0 Ports X1 P31
Webcam P24
CardReader AU6433/AU6437 P30

USB BOARD
USB2.0 Ports x 3
P31

LPC
Azalia

Winbond KBC
NPCE781L
P34

Codec
RTL ALC271X
P29

Keyboard P33
Touch Pad P31
FAN P33
SPI P34
Digital MIC P24
AUDIO CONN (Phone/ MIC) P29
Speaker P29

Charger (ISL88731A) P35
DC/DC (3VPCU / 5VPCU) RT8206B P36
CPU_VCORE (VCORE) ISL6265A P37
DC/DC (+1.1V_S5) UP6111AQD P38
DC/DC (NB_CORE) UP6111AQD P39
DC/DC (+1.5VSUS) RT8207A P40
DC/DC (GPU_CORE) MAX8792ETD+T P41
DC/DC (+1.8V/+1V/+2.5V) HPA00835RTER / RT9018A / RT9025-25PSP P42
DC/DC (CPU_VDDR) RT9025-25PSP P43

PROJECT : ZR8
Quanta Computer Inc.

Size	Document Number	Rev
	Block Diagram	1A
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1.1V@1.5A

P/N: DG0^8000004
DG0^8000005
DG0^8000009
DG0^80000013
DG0^80000014

FOX PZ63826-284R-41F
DG0^8000004 IC SOCKET SMD 638P S1(P1.27,H3.2)
MLX 47296-4131
DG0^8000003 IC SOCKET SMD 638P S1(P1.27,H3.2)
TYC 4-1903401-2
DG0^8000005 IC SOCKET SMD 638P S1(P1.27,H3.2)

The RS880 family does not support CLMC architecture
The LDTREQ# connection from the CPU to ALLOW_LDTSTOP
of the Northbridge is no longer required.

S1g4 does not support MEMHOT#

Serial VID

VFIX MODE	VID Override Circuit	
SVC	SVD	Voltage Output
0	0	1.1V
0	1	1.0V
1	0	0.9V
1	1	0.8V

HDT Connector

Processor Memory Interface

VDDR=>1.75A

VDDR=> 0.9V support 1066 // 800 DDR
VDDR= >1.05V support 1333 // 1066 // 800 DDR

+1.5VSUS
CPU_VDDR
PLACE THEM CLOSE TO CPU WITHIN 1"
R415 0_4
C660 10U/6.3V_8
S1G4
U29B
MEM:CMD/CTRL/CLK
R432 39.2/F_4 M_ZP
R431 39.2/F_4 M_ZN
D01
C18
R189 *0_4
+SMDDR_VREF
R184 *0_4
C15 D01
C347 0.1u/10V_4
C346 1000P/50V_4
SOCKET_638_PIN

Place close to socket

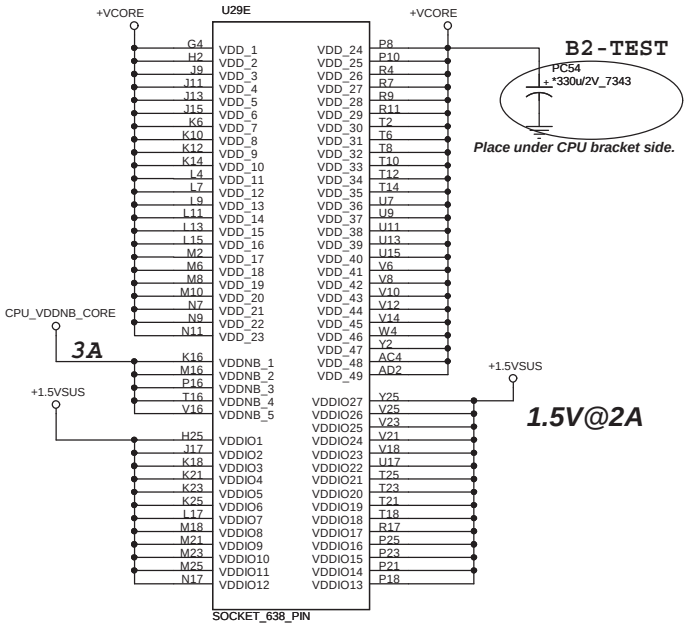
C439 4.7u/6.3V_6
C282 4.7u/6.3V_6
C442 4.7u/6.3V_6
C281 4.7u/6.3V_6
C278 0.22u/6.3V_4
C279 0.22u/6.3V_4
C276 0.22u/6.3V_4
C277 0.22u/6.3V_4
C431 1000P/50V_4
C434 1000P/50V_4
C345 1000P/50V_4
C275 1000P/50V_4
C427 180P/50V_4
C435 180P/50V_4
C437 180P/50V_4
C430 180P/50V_4

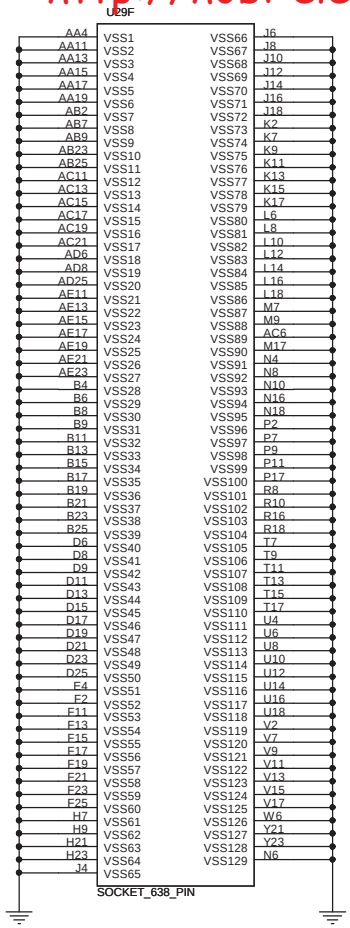
Reserved for AMD suggest

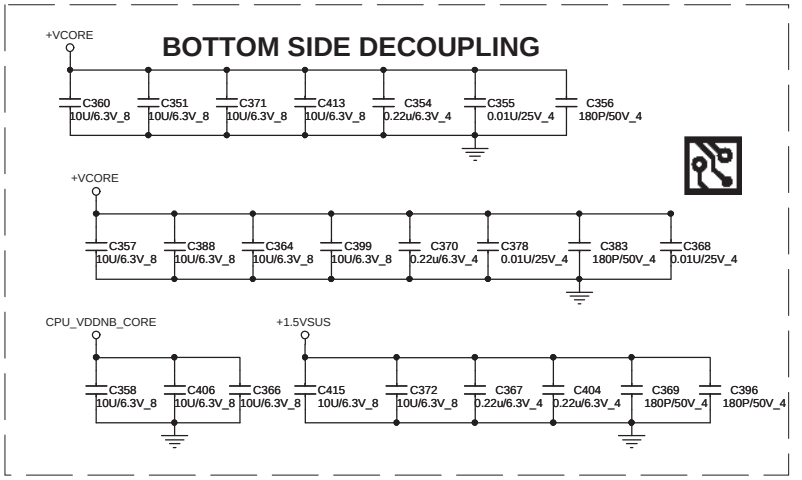
R201 0_4
+3VPCU
C339 *.1u_4
R206 1K/F_4
R204 1K/F_4
C352 *0.47u/10V_4
U14
*OPA343NA/3K
R197 *10_4
MEMVREF_CPU
R182 *10K/F_4
R194 *0_4
R193 *0_4

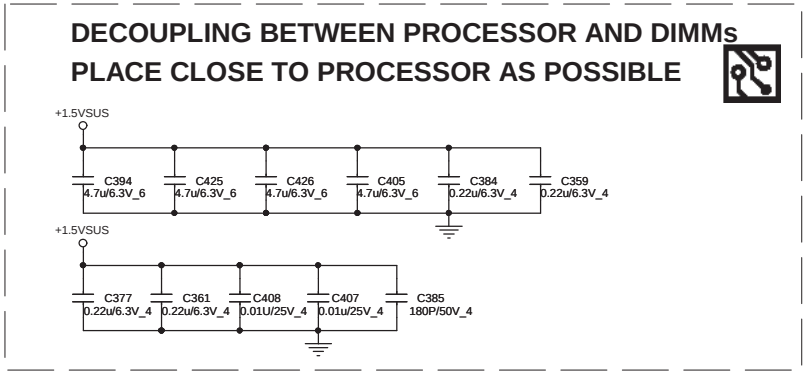
U29C
MEM:DATA
SOCKET_638_PIN

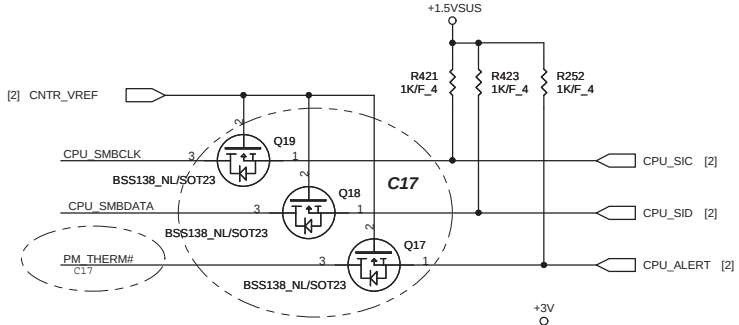
PROCESSOR POWER AND GROUND

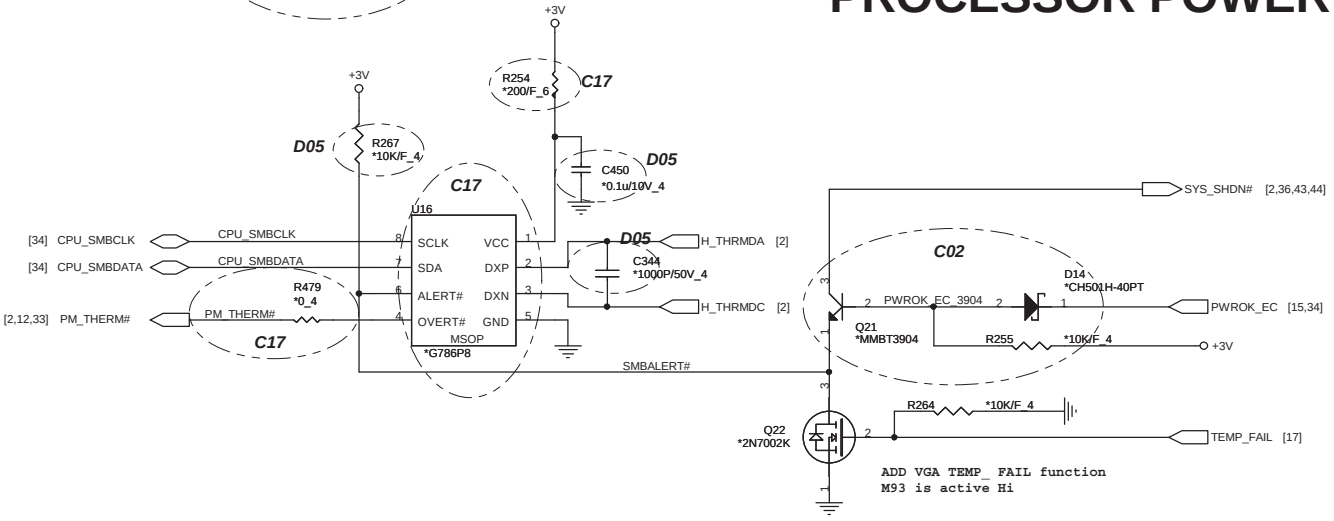




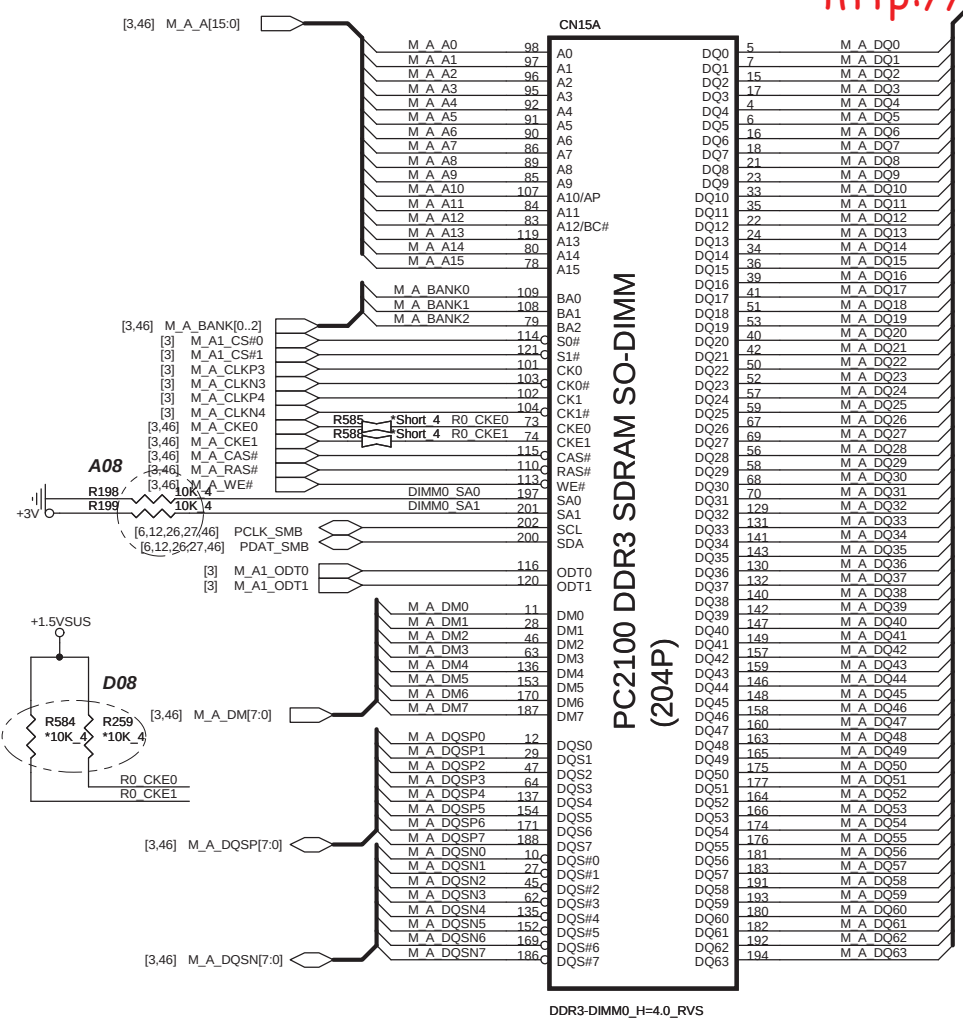


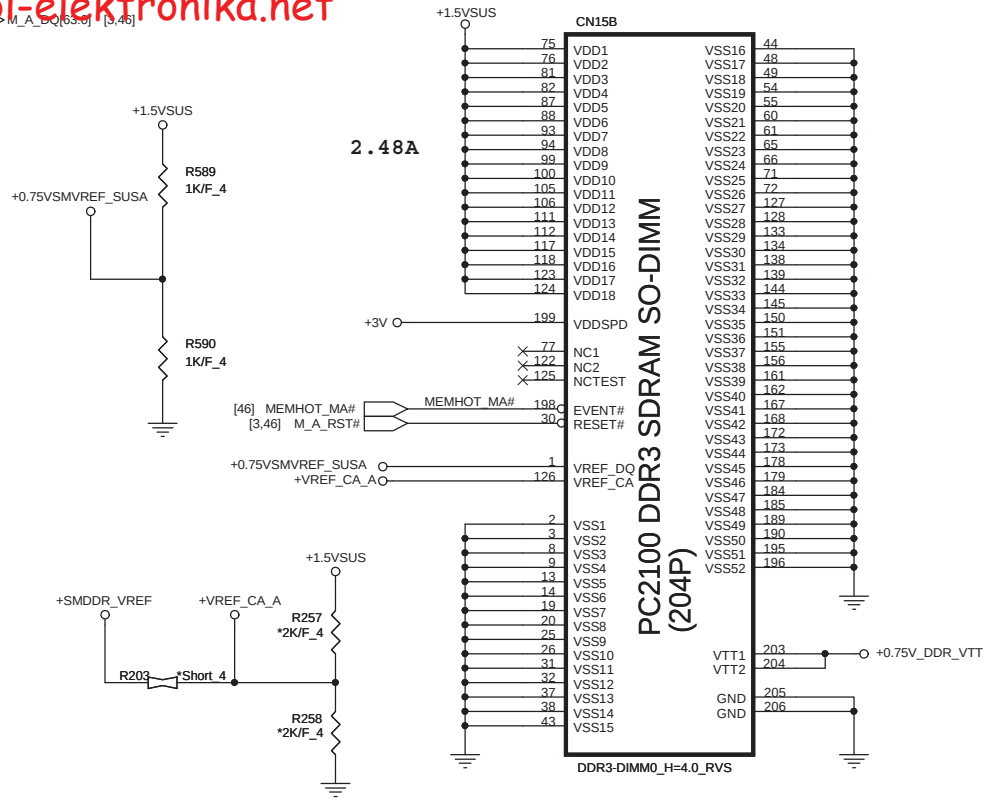




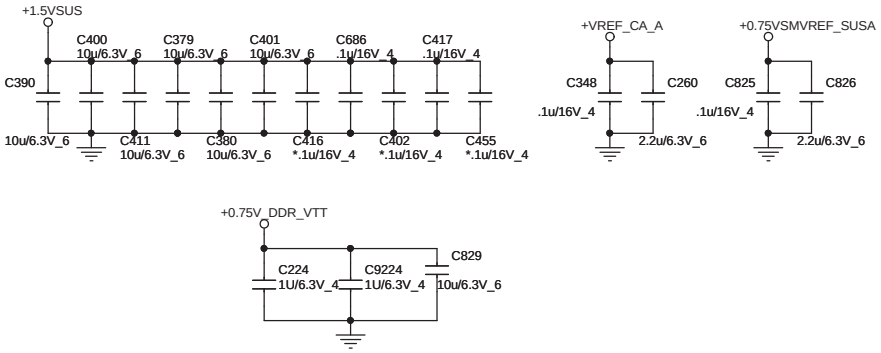


PROJECT : ZR8		
Quanta Computer Inc.		
Size	Document Number: S1G4 PWR & GND 3/3	Rev: 1A
Date: Wednesday, May 27, 2009	Sheet 4 of 49	

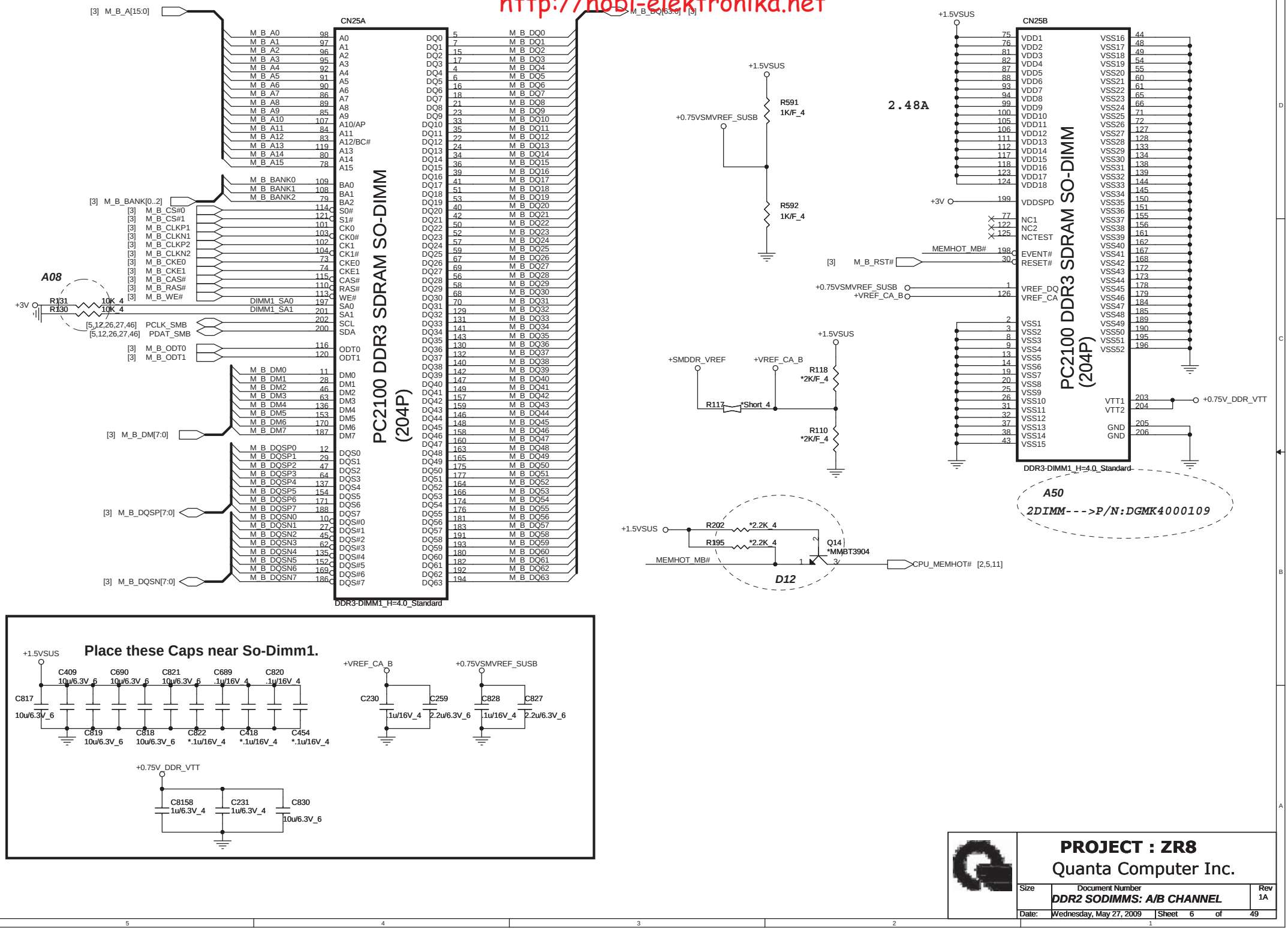




Place these Caps near So-Dimm0.



	PROJECT : ZR8	
	Quanta Computer Inc.	
Size	Document Number: *DDR2 SODIMMS: A/B CHANNEL*	Rev 1A
Date: Wednesday, May 27, 2009	Sheet 5 of 49	



Place these Caps near So-Dimm1.

	PROJECT : ZR8	
	Quanta Computer Inc.	
Size	Document Number: *DDR2 SODIMMS: A/B CHANNEL*	Rev 1A
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SIDE PORT

11/4

+1.5V_MEM_VDDQ

C9788 SIDE@0.1u/10V_4
R599 SIDE@1K/F_4
SPM_VREFDQ
C9790 SIDE@0.1u/10V_4
R601 SIDE@1K/F_4

+1.5V_MEM_VDDQ

C9789 SIDE@0.1u/10V_4
R600 SIDE@1K/F_4
SPM_VREFCA
C9791 SIDE@0.1u/10V_4
R602 SIDE@1K/F_4

U18A

PART 1 OF 6

HYPER TRANSPORT CPU I/F

HT_CADOUTP0	V24	HT_RXCAD0P	HT_TXCAD0P	D24	HT_CADINP0
HT_CADOUTN0	Y24	HT_RXCAD0N	HT_TXCAD0N	D25	HT_CADINN0
HT_CADOUTP1	V22	HT_RXCAD1P	HT_TXCAD1P	E24	HT_CADINP1
HT_CADOUTN1	V23	HT_RXCAD1N	HT_TXCAD1N	E25	HT_CADINN1
HT_CADOUTP2	V25	HT_RXCAD2P	HT_TXCAD2P	F24	HT_CADINP2
HT_CADOUTN2	V24	HT_RXCAD2N	HT_TXCAD2N	F25	HT_CADINN2
HT_CADOUTP3	U24	HT_RXCAD3P	HT_TXCAD3P	F23	HT_CADINP3
HT_CADOUTN3	U25	HT_RXCAD3N	HT_TXCAD3N	F22	HT_CADINN3
HT_CADOUTP4	T25	HT_RXCAD4P	HT_TXCAD4P	H23	HT_CADINP4
HT_CADOUTN4	T24	HT_RXCAD4N	HT_TXCAD4N	H22	HT_CADINN4
HT_CADOUTP5	P22	HT_RXCAD5P	HT_TXCAD5P	J25	HT_CADINP5
HT_CADOUTN5	P23	HT_RXCAD5N	HT_TXCAD5N	J24	HT_CADINN5
HT_CADOUTP6	P25	HT_RXCAD6P	HT_TXCAD6P	K24	HT_CADINP6
HT_CADOUTN6	P24	HT_RXCAD6N	HT_TXCAD6N	K25	HT_CADINN6
HT_CADOUTP7	N24	HT_RXCAD7P	HT_TXCAD7P	K23	HT_CADINP7
HT_CADOUTN7	N25	HT_RXCAD7N	HT_TXCAD7N	K22	HT_CADINN7
HT_CADOUTP8	AC24	HT_RXCAD8P	HT_TXCAD8P	F21	HT_CADINP8
HT_CADOUTN8	AC25	HT_RXCAD8N	HT_TXCAD8N	G21	HT_CADINN8
HT_CADOUTP9	AB25	HT_RXCAD9P	HT_TXCAD9P	G20	HT_CADINP9
HT_CADOUTN9	AB24	HT_RXCAD9N	HT_TXCAD9N	H21	HT_CADINN9
HT_CADOUTP10	AA24	HT_RXCAD10P	HT_TXCAD10P	J20	HT_CADINP10
HT_CADOUTN10	AA25	HT_RXCAD10N	HT_TXCAD10N	J21	HT_CADINN10
HT_CADOUTP11	Y22	HT_RXCAD11P	HT_TXCAD11P	J18	HT_CADINP11
HT_CADOUTN11	Y23	HT_RXCAD11N	HT_TXCAD11N	K17	HT_CADINN11
HT_CADOUTP12	W21	HT_RXCAD12P	HT_TXCAD12P	L19	HT_CADINP12
HT_CADOUTN12	W20	HT_RXCAD12N	HT_TXCAD12N	J19	HT_CADINN12
HT_CADOUTP13	V21	HT_RXCAD13P	HT_TXCAD13P	M19	HT_CADINP13
HT_CADOUTN13	V20	HT_RXCAD13N	HT_TXCAD13N	L18	HT_CADINN13
HT_CADOUTP14	U20	HT_RXCAD14P	HT_TXCAD14P	M21	HT_CADINP14
HT_CADOUTN14	U21	HT_RXCAD14N	HT_TXCAD14N	P21	HT_CADINN14
HT_CADOUTP15	U19	HT_RXCAD15P	HT_TXCAD15P	P18	HT_CADINP15
HT_CADOUTN15	U18	HT_RXCAD15N	HT_TXCAD15N	M18	HT_CADINN15
HT_CLKOUTP0	T22	HT_RXCLK0P	HT_TXCLK0P	H24	HT_CLKINP0
HT_CLKOUTN0	T23	HT_RXCLK0N	HT_TXCLK0N	H25	HT_CLKINN0
HT_CLKOUTP1	AB23	HT_RXCLK1P	HT_TXCLK1P	L21	HT_CLKINP1
HT_CLKOUTN1	AA22	HT_RXCLK1N	HT_TXCLK1N	L20	HT_CLKINN1
HT_CTLOUTP0	M22	HT_RXCTL0P	HT_TXCTL0P	M24	HT_CTLINP0
HT_CTLOUTN0	M23	HT_RXCTL0N	HT_TXCTL0N	M25	HT_CTLINN0
HT_CTLOUTP1	R21	HT_RXCTL1P	HT_TXCTL1P	P19	HT_CTLINP1
HT_CTLOUTN1	R20	HT_RXCTL1N	HT_TXCTL1N	R18	HT_CTLINN1
		HT_RXCALP	HT_TXCALP	B24	HT_TXCALP
		HT_RXCALN	HT_TXCALN	B25	HT_TXCALN

RS880M_A11

Ra: R183 301/F_4 HT_RXCALP C23, HT_RXCALN A24

Rb: R192 301/F_4

HT_CADOUTP[15..0] HT_CADOUTP[15..0] [2]
HT_CADOUTN[15..0] HT_CADOUTN[15..0] [2]
HT_CLKOUTP[1..0] HT_CLKOUTP[1..0] [2]
HT_CLKOUTN[1..0] HT_CLKOUTN[1..0] [2]
HT_CTLOUTP[1..0] HT_CTLOUTP[1..0] [2]
HT_CTLOUTN[1..0] HT_CTLOUTN[1..0] [2]
HT_CADINP[15..0] HT_CADINP[15..0] [2]
HT_CADINN[15..0] HT_CADINN[15..0] [2]
HT_CLKINP[1..0] HT_CLKINP[1..0] [2]
HT_CLKINN[1..0] HT_CLKINN[1..0] [2]
HT_CTLINP[1..0] HT_CTLINP[1..0] [2]
HT_CTLINN[1..0] HT_CTLINN[1..0] [2]

signals	RS880	RX880
HT_TXCALP	Ra 301 ohm 1%	Ra 1.21k ohm 1%
HT_TXCALN		
HT_RXCALP	Rb 301 ohm 1%	Rb 1.21k ohm 1%
HT_RXCALN		

RES CHIP 1.21K 1/16W +-1%(0402)
P/N : CS21212FB18

This block is for UMA only , Discrete can remove all component

[9,10,15,24,37,42,43,44] +1.8V
[2,8,9,10,14,38,44] +1.1V

U39

SPM_VREFCA	M9	VREFCA	DQL0	E4	SPM_DQ5
SPM_VREFDQ	H2	VREFDQ	DQL1	F8	SPM_DQ3
			DQL2	F3	SPM_DQ4
SPM_A0	N4	A0	DQL3	F9	SPM_DQ0
SPM_A1	P8	A1	DQL4	H4	SPM_DQ6
SPM_A2	P4	A2	DQL5	H9	SPM_DQ1
SPM_A3	N3	A3	DQL6	G3	SPM_DQ7
SPM_A4	P9	A4	DQL7	H8	SPM_DQ2
SPM_A5	P3	A5			
SPM_A6	R9	A6			
SPM_A7	R3	A7	DQU0	D8	SPM_DQ14
SPM_A8	T9	A8	DQU1	C4	SPM_DQ9
SPM_A9	R4	A9	DQU2	C9	SPM_DQ15
SPM_A10	L8	A10/AP	DQU3	C3	SPM_DQ8
SPM_A11	R8	A11	DQU4	A8	SPM_DQ10
SPM_A12	N8	A12/BC	DQU5	A3	SPM_DQ11
SPM_A13	T4	A13	DQU6	B9	SPM_DQ13
	T8	A14	DQU7	A4	SPM_DQ12
	M8	A15			
SPM_BA0	M3	BA0	VDD#B3	B3	+1.5V_MEM_VDDQ
SPM_BA1	N9	BA1	VDD#D10	D10	
SPM_BA2	M4	BA2	VDD#G8	G8	
			VDD#K3	K3	
			VDD#K9	K9	
			VDD#N2	N2	
SPM_CLKP	J8	CK	VDD#N10	N10	
R593 *SIDE@100/F_4 SPM_CLKN	K8	CK	VDD#R2	R2	
SPM_CKE	K10	CKE	VDD#R10	R10	+1.5V_MEM_VDDQ
SPM_ODT	K2	ODT	VDDQ#A2	A2	
SPM_CS#	L3	CS	VDDQ#A9	A9	
SPM_RAS#	J4	RAS	VDDQ#C2	C2	
SPM_CAS#	K4	CAS	VDDQ#C10	C10	
SPM_WE#	L4	WE	VDDQ#D3	D3	
			VDDQ#E10	E10	
SPM_DQS0P	F4	DQSL	VDDQ#F2	F2	
SPM_DQS1P	C8	DQSU	VDDQ#H3	H3	
			VDDQ#H10	H10	
SPM_DM0	F8	DML	VSS#A10	A10	
SPM_DM1	D4	DMU	VSS#B4	B4	
			VSS#E2	E2	
			VSS#G9	G9	
+1.5V_MEM_VDDQ			VSS#J3	J3	
SPM_DQS0N	G4	DQSL	VSS#J9	J9	
SPM_DQS1N	B8	DQSU	VSS#M2	M2	
R603 SIDE@10K/F_4			VSS#M10	M10	
[12] SP_DDR3_RST#	T3	RESET	VSS#P2	P2	
			VSS#P10	P10	
VMA_ZQ	L9	ZQ	VSS#T2	T2	
			VSS#T10	T10	
R604 SIDE@240/F_4			VSSQ#B2	B2	
			VSSQ#B10	B10	
			VSSQ#D2	D2	
			VSSQ#D9	D9	
			VSSQ#E3	E3	
			VSSQ#E9	E9	
	J2	NC#J2	VSSQ#F10	F10	
	L2	NC#L2	VSSQ#G2	G2	
	J10	NC#J10	VSSQ#G10	G10	
	L10	NC#L10			

100-BALL SDRAM DDR3
SIDE@H5TQ1G63AFR-14C

A09

U28D

PAR 4 OF 6

SBD_MEM/DVO_I/F

SPM_A0	AB12	MEM_A0(NC)	MEM_DQ0/DVO_VSYNC(NC)	AA18	SPM_DQ0
SPM_A1	AE16	MEM_A1(NC)	MEM_DQ1/DVO_HSYNC(NC)	AA20	SPM_DQ1
SPM_A2	V11	MEM_A2(NC)	MEM_DQ2/DVO_DE(NC)	AA19	SPM_DQ2
SPM_A3	AE15	MEM_A3(NC)	MEM_DQ3/DVO_D0(NC)	Y19	SPM_DQ3
SPM_A4	AA12	MEM_A4(NC)	MEM_DQ4(NC)	V17	SPM_DQ4
SPM_A5	AB16	MEM_A5(NC)	MEM_DQ5/DVO_D1(NC)	AA17	SPM_DQ5
SPM_A6	AB14	MEM_A6(NC)	MEM_DQ6/DVO_D2(NC)	AA15	SPM_DQ6
SPM_A7	AD14	MEM_A7(NC)	MEM_DQ7/DVO_D4(NC)	Y15	SPM_DQ7
SPM_A8	AD13	MEM_A8(NC)	MEM_DQ8/DVO_D3(NC)	AC20	SPM_DQ8
SPM_A9	AD15	MEM_A9(NC)	MEM_DQ9/DVO_D5(NC)	AD19	SPM_DQ9
SPM_A10	AC16	MEM_A10(NC)	MEM_DQ10/DVO_D6(NC)	AE22	SPM_DQ10
SPM_A11	AE13	MEM_A11(NC)	MEM_DQ11/DVO_D7(NC)	AC18	SPM_DQ11
SPM_A12	AC14	MEM_A12(NC)	MEM_DQ12(NC)	AB20	SPM_DQ12
SPM_A13	Y14	MEM_A13(NC)	MEM_DQ13/DVO_D9(NC)	AD22	SPM_DQ13
			MEM_DQ14/DVO_D10(NC)	AC22	SPM_DQ14
SPM_BA0	AD16	MEM_BA0(NC)	MEM_DQ15/DVO_D11(NC)	AD21	SPM_DQ15
SPM_BA1	AE17	MEM_BA1(NC)			
SPM_BA2	AD17	MEM_BA2(NC)	MEM_DQS0P/DVO_IDCKP(NC)	Y17	SPM_DQS0P
			MEM_DQS0N/DVO_IDCKN(NC)	W18	SPM_DQS0N
SPM_RAS#	W12	MEM_RASb(NC)	MEM_DQS1P(NC)	AD20	SPM_DQS1P
SPM_CAS#	Y12	MEM_CASb(NC)	MEM_DQS1N(NC)	AE21	SPM_DQS1N
SPM_WE#	AD18	MEM_WEb(NC)			
SPM_CS#	AB13	MEM_CSb(NC)	MEM_DM0(NC)	W17	SPM_DM0
SPM_CKE	AB18	MEM_CKE(NC)	MEM_DM1/DVO_D8(NC)	AE19	SPM_DM1
SPM_ODT	V14	MEM_ODT(NC)			
			IOPLLVDD18(NC)	AE23	IOPLLVDD18_SIDE_PORT
SPM_CLKP	V15	MEM_CKP(NC)	IOPLLVDD(NC)	AE24	IOPLLVDD_SIDE_PORT
SPM_CLKN	W14	MEM_CKN(NC)			
			IOPLLVSS(NC)	AD23	
SPM_COMPP	AE12	MEM_COMPP(NC)		AE18	SPM_VREF1
SPM_COMPN	AD12	MEM_COMPN(NC)	MEM_VREF(NC)		

RS880M_A11

R597 SIDE@40.2/F_4
R607 SIDE@40.2/F_4
+1.5V_MEM_VDDQ

A41

L75 PBY160808T-221Y-N +1.8V 15mA
L73 PBY160808T-221Y-N +1.1V 26mA

C9781 SIDE@2.2u/6.3V_6
C9794 SIDE@2.2u/6.3V_6

IOPLLVDD18 - memory PLL
not applicable to RX881

+1.5V_MEM_VDDQ

C9792 SIDE@0.1u/10V_4
R605 SIDE@1K/F_4
SPM_VREF1
C9793 SIDE@0.1u/10V_4
R606 SP@1K/F_4

R606
W/O side port
-->change to 0 Ohm
CS00002JB38

40 mil~50 mil

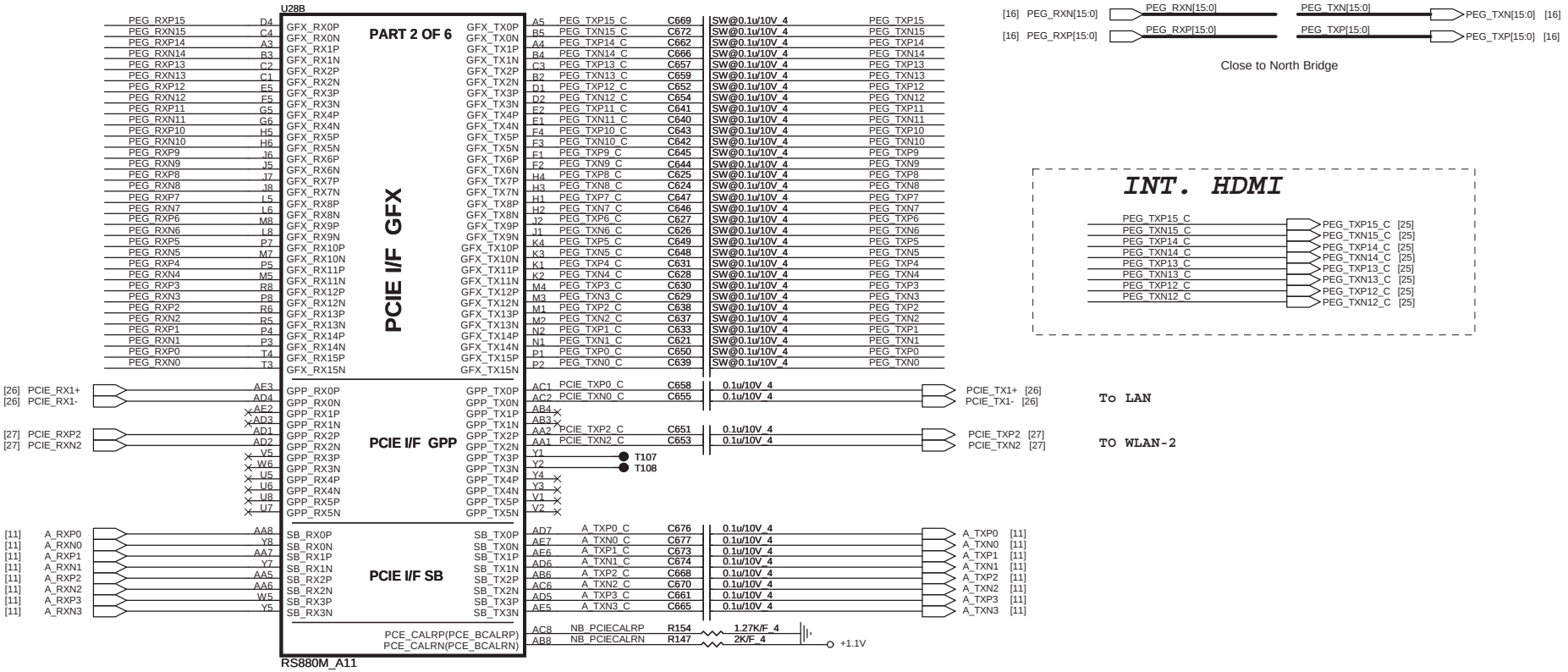
+1.5V_MEM_VDDQ

C9782 SIDE@0.1u/10V_4
C9783 SIDE@10u/6.3V_6
C9784 SIDE@0.1u/10V_4
C9785 SIDE@1u/6.3V_4
C9786 SIDE@1u/6.3V_4
C9787 SIDE@10u/6.3V_6

+1.5V
R598 SIDE@0_6

PROJECT : ZR8
Quanta Computer Inc.

Size	Document Number	Rev
	RS880M-HT LINK I/F 1/5	1A
Date: Wednesday, May 27, 2009	Sheet 7 of 49	



PROJECT : ZR8	
Quanta Computer Inc.	
Size	Document Number: RS880M-PCIE I/F 2/5 — Rev: 1A
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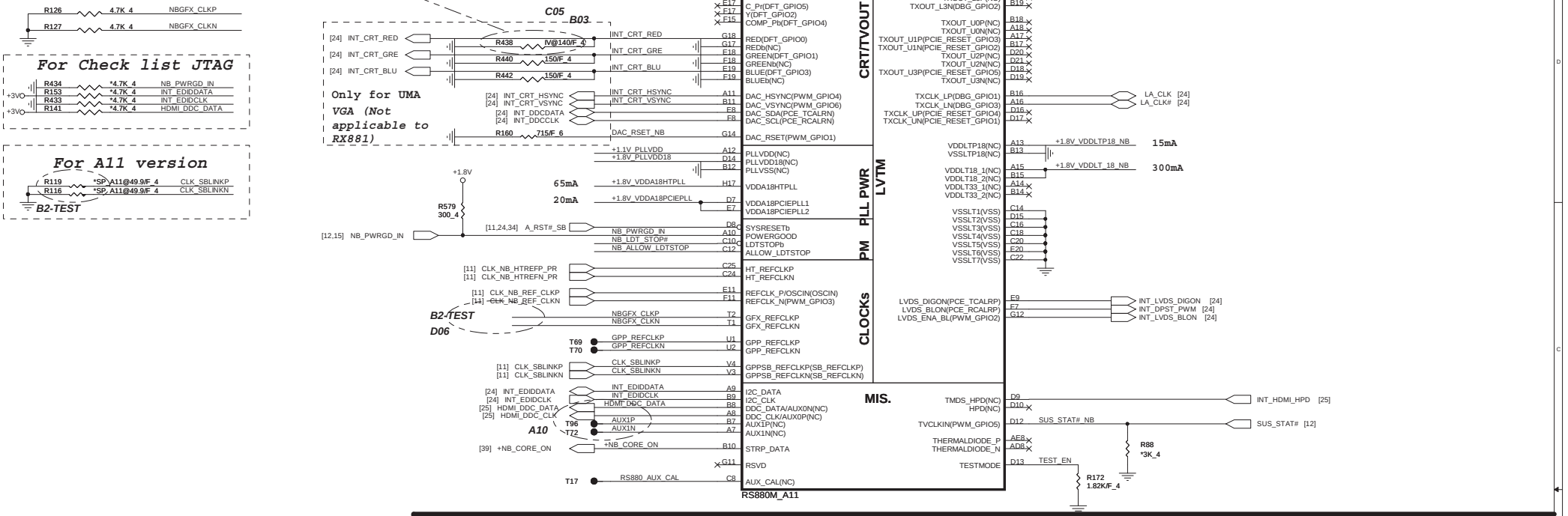
UMA use 140 ohm 1%.
Discrete use 133 ohm 1%.
Note : Only for RS880 series A11 ASIC errata.



STRAP_DEBUG_BUS_GPIO_ENABLEb

Enables the Test Debug Bus using GPIO.

RS880M
1 Disable
0 Enable

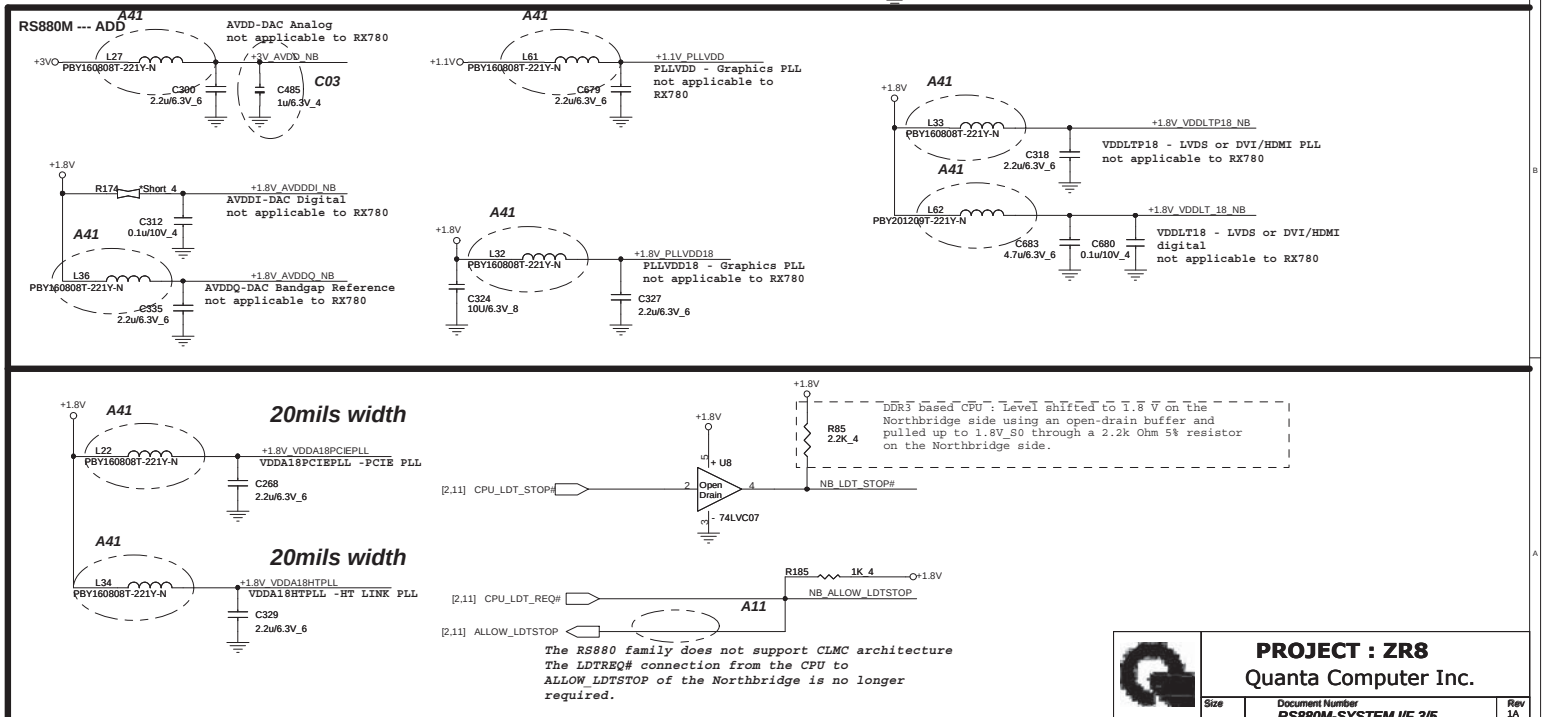
RS880M: Enables Side port memory

RS880M:INT_CRT_HSYNC

Selects if Memory SIDE PORT is available or not
1 = Memory Side port Not available
0 = Memory Side port available
Register Readback of strap: NB_CLKCFG:CLK_TOP_SPARE_D[1]

For extrnal EEPROM Debug only — **RS780/RX780/RS880**

Display Port interface from PCIeGraphics (RS880/rs880M only)



PROJECT : ZR8
Quanta Computer Inc.

Size	Document Number	Rev
	RS880M-SYSTEM I/F 3/5	1A
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U28F

PART 6/6

GROUND

RX881/RS880 POWER DIFFERENCE TABLE

PIN NAME	RX881	RS880	PIN NAME	RX881	RS880
VDDHT	+1.1V	+1.1V	IOPLLVDD	+1.1V	+1.1V
VDDHTRX	+1.1V	+1.1V	AVDD	GND	+3.3V
VDDHTTX	+1.2V	+1.2V	AVDDDI	GND	+1.8V
VDDA18PCIE	+1.8V	+1.8V	AVDDQ	GND	+1.8V
VDDG18	+1.8V	+1.8V	PLLVDD	GND	+1.1V
VDD18_MEM	GND	+1.8V	PLLVDD18	GND	+1.8V
VDDPCIE	+1.1V	+1.1V	VDDA18PCIEPLL	+1.8V	+1.8V
VDDC	+1.1V	+1.1V	VDDA18HTPLL	+1.8V	+1.8V
VDD_MEM	GND	+1.8V/1.5V	VDDLTP18	GND	+1.8V
VDDG33	+3.3V	+3.3V	VDDLT18	GND	+1.8V
IOPLLVDD18	+1.8V	+1.8V	VDDLT33	NC	NC

+1.1V 2A for RS880M
+1.1V 1.3A for RX881

+1.1V

0.6A — L31 *Short_8 — +1.1V_VDDHT — C317 4.7u/6.3V_6, C321 0.1u/10V_4, C322 0.1u/10V_4, C323 0.1u/10V_4

0.7A — L37 *Short_8 — +1.1V_VDDHTRX — C362 4.7u/6.3V_6, C338 0.1u/10V_4, C340 0.1u/10V_4, C334 0.1u/10V_4

+1.1V 2A for RS880M
+1.2V 0.4A for Rx881

+1.1V — L35 *Short_8 — 2A — +1.1V_VDDHTTX — C333 4.7u/6.3V_6, C331 0.1u/10V_4, C337 0.1u/10V_4, C332 0.1u/10V_4, C341 0.1u/10V_4

B2-TEST

+1.8V 1A for RS780M+SB700
+1.8V 1A for RX881

A41

+1.8V — L24 PBY201209T-221Y-N — 0.7A — +1.8V_VDDA18PCIE — C299 4.7u/6.3V_6, C297 4.7u/6.3V_6, C292 0.1u/10V_4, C295 0.1u/10V_4, C287 0.1u/10V_4, C301 0.1u/10V_4

U28E

PART 5/6

POWER

VDDHT_1 J17, VDDHT_2 K16, VDDHT_3 L16, VDDHT_4 M16, VDDHT_5 P16, VDDHT_6 R16, VDDHT_7 T16

VDDHTRX_1 H18, VDDHTRX_2 G19, VDDHTRX_3 F20, VDDHTRX_4 E21, VDDHTRX_5 D22, VDDHTRX_6 B23, VDDHTRX_7 A23

VDDHTTX_1 AE25, VDDHTTX_2 AD24, VDDHTTX_3 AC23, VDDHTTX_4 AB22, VDDHTTX_5 AA21, VDDHTTX_6 Y20, VDDHTTX_7 W19, VDDHTTX_8 V18, VDDHTTX_9 U17, VDDHTTX_10 T17, VDDHTTX_11 R17, VDDHTTX_12 P17, VDDHTTX_13 M17

VDDA18PCIE_1 J10, VDDA18PCIE_2 P10, VDDA18PCIE_3 K10, VDDA18PCIE_4 M10, VDDA18PCIE_5 L10, VDDA18PCIE_6 W9, VDDA18PCIE_7 H9, VDDA18PCIE_8 T10, VDDA18PCIE_9 R10, VDDA18PCIE_10 Y9, VDDA18PCIE_11 AA9, VDDA18PCIE_12 AB9, VDDA18PCIE_13 AD9, VDDA18PCIE_14 AE9, VDDA18PCIE_15 U10

VDDG18_1(VDD18_1) F9, VDDG18_2(VDD18_2) G9, VDD18_MEM1(NC) AE11, VDD18_MEM2(NC) AD11

VDDPCIE_1 A6, VDDPCIE_2 B6, VDDPCIE_3 C6, VDDPCIE_4 D6, VDDPCIE_5 E6, VDDPCIE_6 F6, VDDPCIE_7 G7, VDDPCIE_8 H8, VDDPCIE_9 J9, VDDPCIE_10 K9, VDDPCIE_11 M9, VDDPCIE_12 L9, VDDPCIE_13 P9, VDDPCIE_14 R9, VDDPCIE_15 T9, VDDPCIE_16 V9, VDDPCIE_17 U9

VDDC_1 K12, VDDC_2 J14, VDDC_3 U16, VDDC_4 J11, VDDC_5 K15, VDDC_6 M12, VDDC_7 L14, VDDC_8 L11, VDDC_9 M13, VDDC_10 M15, VDDC_11 N12, VDDC_12 N14, VDDC_13 P11, VDDC_14 P13, VDDC_15 P14, VDDC_16 R12, VDDC_17 R15, VDDC_18 T11, VDDC_19 T15, VDDC_20 U12, VDDC_21 T14, VDDC_22 J16

VDD_MEM1(NC) AE10, VDD_MEM2(NC) AA11, VDD_MEM3(NC) Y11, VDD_MEM4(NC) AD10, VDD_MEM5(NC) AB10, VDD_MEM6(NC) AC10

VDDG33_1(NC) H11, VDDG33_2(NC) H12

RS880M_A11

+1.8V — R136 *Short_6 — 25mA — +1.8V_VDDG18_NB — C286 1U/10V_4

VDD18-RS880 I/O Transform

+1.8V — R171 SIDE@0_6 — 25mA — +1.8V_VDD18_MEM — A09

C835 SP@1U/10V_4

C835
W/O side port
-->stuff 0 Ohm
CS00002JB38

+1.1V_VDD_PCIE — 2.5A — R115 *Short_8 — +1.1V

C243 0.1u/10V_4, C291 0.1u/10V_4, C293 1U/10V_4, C294 1U/10V_4, C290 4.7u/6.3V_6

VDDPCIE - PCIE-E Main power

0.95~1.1V 10A

VDDC - Core Logic power

NB_CORE

C315 0.1u/10V_4, C311 0.1u/10V_4, C310 0.1u/10V_4, C307 0.1u/10V_4, C314 10U/6.3V_8

C316 0.1u/10V_4, C308 0.1u/10V_4, C306 0.1u/10V_4, C305 10U/6.3V_8

A09

C831
W/O side port
-->stuff 0 Ohm
CS00002JB38

+1.5V_VDD_MEM — SIDE@0.1u/10V_4 — C832, C833, C831, C836, C834 SIDE@4.7u/6.3V_6 — L74 SIDE@0_8 — +1.5V

SP@0.1u/10V_4

+3V_VDDG33 — 60mA — R169 *Short_4 — +3V

C302 0.1u/10V_4, C303 0.1u/10V_4

VDD33 - 3.3V I/O
Not applicable to RX780

VDD_MEM For UMA RS780 only
Not applicable to RX780
memory I/O transform

+1.1V
+1.8V
NB_CORE

+1.1V [2,7,8,9,14,38,44]
+1.8V [7,9,15,24,37,42,43,44]
NB_CORE [39,44]

PROJECT : ZR8
Quanta Computer Inc.

Size	Document Number	Rev
	RS880M-POWER5/5	1A
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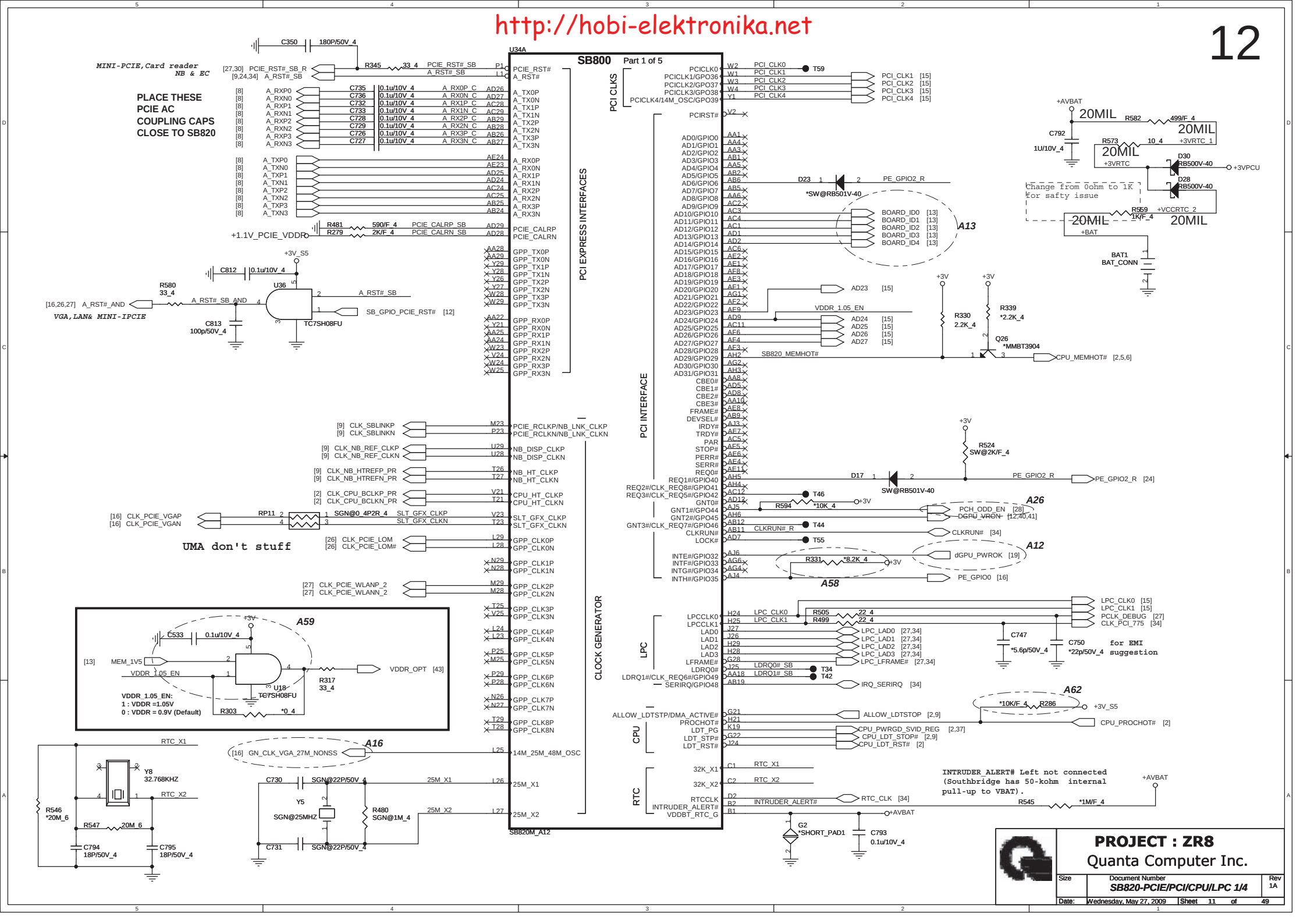

NC only ,Can't be install
R352 *2.2K_4 SB_TEST0
R350 *2.2K_4 SB_TEST1
R347 *2.2K_4 SB_TEST2

SCL0/SDATA0 is 3V tolerance
AMD datasheet define it
R288 2.2K_4 PCLK_SMB
R287 2.2K_4 PDAT_SMB
Clock gen/Robson/TV tuner /DDR2/DDR2 thermal/Accelerometer

SCL1/SDATA1 is 3V/S5 tolerance
AMD datasheet define it
R348 10K_4 SB_SMBCLK1
R346 10K_4 SB_SMBDATA1

SCL2/SDATA2 is 3V/S5 tolerance
AMD datasheet define it
R290 10K_4 SB_SCLK2
R283 10K_4 SB_SDATA2

R338 4.7K_4 SUS_STAT#

B2-TEST
dGPU_VRON 2ms
MXM_PWR_EN
[19] MXM_PWREN
D19 SW@RB501V-40
D18 *SW@RB501V-40
C538 SW@0.1u/10V_4
[11,40,41] DGPU_VRON
R307 SW@4.7K_4
>1mS delay is required between all MXM power rail stable and MXM_PWREN(enables the module internal power)
A14

A61
R474 8.2K_4 CLK_PCIE_LAN_REQ#
R486 8.2K_4 CLK_PCIE_2_REQ#

ACZ_SDOUT R570 33_4 ACZ_SDOUT_AUDIO [29] C815 *10P/50V_4
ACZ_SYNC R552 33_4 ACZ_SYNC_AUDIO [29] C800 *10P/50V_4
ACZ_BCLK R569 33_4 ACZ_BITCLK_AUDIO [29] C814 *10P/50V_4
ACZ_RST# R554 33_4 ACZ_RST#_AUDIO [29]
ACZ_SDIN0 ACZ_SDIN0 [29]
If the VDDIO_AZ_S power rail is configured for 1.5V_S5 then AZ_SDIN[3:0] can not be connected to 3.3-V devices.

[11,13,14,15,24,26,31,32,36,44] [2,4,5,6,9,10,11,13,14,15,19,24,25,27,29,30,32,33,34,36,37,38,39,41,42,43,44,46]
+3V_S5 +3V

USBCLK/41M_25M_48M_OSC pin is CLK input pin when EXT CLKGEN mode.
It is output CLK source when INT CLKGEN mode.

U34D
SB800 Part 4 of 5
SB820M_A12

PCI_PME#/GEVENT4#
RI#/GEVENT22#
SPI_CS3#/GBE_STAT1/GEVENT21#
SLP_S3#
SLP_S5#
PWR_BTN#
PWR_GOOD
SUS_STAT#
TEST0
TEST1/TMS
TEST2
GA20IN/GEVENT0#
KBRST#/GEVENT1#
LPC_PME#/GEVENT3#
LPC_SMI#/GEVENT23#
GEVENT5#
SYS_RESET#/GEVENT19#
WAKE#/GEVENT8#
IR_RX1/GEVENT20#
THRMTRIP#/SMBALERT#/GEVENT2#
NB_PWRGD
RSMRST#
ACPI / WAKE UP EVENTS

[34] SUSB#
[34] SUSC#
[34] DNBSWON#
[15] SB_PWRGD_IN
[9] SUS_STAT#
SB_TEST0
SB_TEST1
SB_TEST2
[34] SIO_A20GATE
[34] SIO_RCIN#
T94 LANLINK_STATE#
[34] SIO_EXT_SMI#
[34] SIO_EXT_SCI#
T95 SYS_RST#
[26] PCIE_WAKE#
T58 IR_RX1
[2] CPU_THERMTRIP#
[9,15] NB_PWRGD_IN
[34] ICH_RSMRST#

USBCLK/14M_25M_48M_OSC A10 T106
USB_RCOMP G19 USB_RCOMP_SB R293 11.8K/F_6

USB 1.1 USB MISC
USB_FSD1P/GPIO186 J10
USB_FSD1N H11
USB_FSD0P/GPIO185 H9 USB_FDS12P
USB_FSD0N J8 USB_FSD12N
T47
T49

USB 2.0
USB_HSD13P B12 USBP13+ [31]
USB_HSD13N A12 USBP13- [31]
USB board
USB_HSD12P F11 USBP12+ [31]
USB_HSD12N E11 USBP12- [31]
USB board
USB_HSD11P E14
USB_HSD11N E12
USB_HSD10P J12 USBP10+ [30]
USB_HSD10N J14 USBP10- [30]
USB card reader
USB_HSD9P A13 USBP9+ [31]
USB_HSD9N B13 USBP9- [31]
BLUETOOTH
USB_HSD8P D13 USBP8+ [31]
USB_HSD8N C13 USBP8- [31]
USB board
USB_HSD7P G12 USBP7+ [27]
USB_HSD7N G14 USBP7- [27]
WLAN MINI CARD
USB_HSD6P G16
USB_HSD6N G18
T61
T105
USB_HSD5P D16
USB_HSD5N C16
USB_HSD4P B14
USB_HSD4N A14
USB_HSD3P E18
USB_HSD3N E16
USB_HSD2P J16
USB_HSD2N J18
USB_HSD1P B17 USBP1+ [24]
USB_HSD1N A17 USBP1- [24]
USB CAMERA
USB_HSD0P A16 USBP0+ [31]
USB_HSD0N B16 USBP0- [31]
On board USB connect
B2-TEST

GPIO
[27] CLK_PCIE_2_REQ#
[17] VGA_REQ#
R306 *0_4 VGA_REQ# GPIO61
C04
[7] SP_DDR3_RST#
T41
[11] SB_GPIO_PCIE_RST#
[26] CLK_PCIE_LAN_REQ#
MXM_PWR_EN
T37 SB_GPIO59
[29] SPKR
[5,6,26,27,46] PCLK_SMB
[5,6,26,27,46] PDAT_SMB
SB_SMBCLK1
SB_SMBDATA1
CLK_REQ4#/SATA_IS0#/GPIO64
CLK_REQ3#/SATA_IS1#/GPIO63
SMARTVOLT1/SATA_IS2#/GPIO50
CLK_REQ0#/SATA_IS3#/GPIO60
SATA_IS4#/FANOUT3/GPIO55
SATA_IS5#/FANIN3/GPIO59
SPKR/GPIO66
SCL0/GPIO43
SDA0/GPIO47
SCL1/GPIO227
SDA1/GPIO228
CLK_REQ2#/FANIN4/GPIO62
CLK_REQ1#/FANOUT4/GPIO61
IR_LED#/LB#/GPIO184
SMARTVOLT2/SHUTDOWN#/GPIO51
DDR3_RST#/GEVENT7#
GBE_LED0/GPIO183
GBE_LED1/GEVENT9#
GBE_LED2/GEVENT10#
GBE_STAT0/GEVENT11#
CLK_REQG#/GPIO65/OSCIN

USB OC
[31] OC_7#
[31] OC_6#
[2,4,33] PM_THERM#
[31] OC_4#
R149 *Short_4
SB_JTAG_TDO
SB_JTAG_TCK
SB_JTAG_TDI
SB_JTAG_RST#
BLINK/USB_OC7#/GEVENT18#
USB_OC6#/IR_TX1/GEVENT6#
USB_OC5#/IR_TX0/GEVENT17#
USB_OC4#/IR_RX0/GEVENT16#
USB_OC3#/AC_PRES/TDO/GEVENT15#
USB_OC2#/TCK/GEVENT14#
USB_OC1#/TDI/GEVENT13#
USB_OC0#/TRST#/GEVENT12#

HD audio interface is +3VS5 voltage
[15] ACZ_SDOUT
R555 *10K/F_4 ACZ_BCLK
ACZ_SDOUT
R337 *10K/F_4 ACZ_SDIN0
R336 *10K/F_4 ACZ_SDIN1
R571 *10K/F_4 ACZ_SDIN2
R327 *10K/F_4 ACZ_SDIN3
ACZ_SYNC
ACZ_RST#
AZ_BITCLK
AZ_SDOUT
AZ_SDIN0/GPIO167
AZ_SDIN1/GPIO168
AZ_SDIN2/GPIO169
AZ_SDIN3/GPIO170
AZ_SYNC
AZ_RST#
HD AUDIO

+3V_S5
D03
R653 10K_4 GBE_COL
R322 10K_4 GBE_CRS
R558 10K_4 GBE_MDIO
R343 10K_4 GBE_RXERR
R344 10K_4 GBE_PHY_INTR
GBE_COL
GBE_CRS
GBE_MDCK
GBE_MDIO
GBE_RXCLK
GBE_RXD3
GBE_RXD2
GBE_RXD1
GBE_RXD0
GBE_RXCTL/RXDV
GBE_RXERR
GBE_TXCLK
GBE_TXD3
GBE_TXD2
GBE_TXD1
GBE_TXD0
GBE_TXCTL/TXEN
GBE_PHY_PD
GBE_PHY_RST#
GBE_PHY_INTR
GBE LAN

T35 ADP_PRES0
PS2_DAT/SDA4/GPIO187
PS2_CLK/SCL4/GPIO188
SPI_CS2#/GBE_STAT2/GPIO166
FC_RST#/GPO160
PS2KB_DAT/GPIO189
PS2KB_CLK/GPIO190
PS2M_DAT/GPIO191
PS2M_CLK/GPIO192
EMBEDDED CTRL

SCL2/GPIO193 D25 SB_SCLK2
SDA2/GPIO194 F23 SB_SDATA2
SCL3_LV/GPIO195 B26 SB_GPIO195
SDA3_LV/GPIO196 F26 SB_GPIO196
EC_PWM0/EC_TIMER0/GPIO197 F25
EC_PWM1/EC_TIMER1/GPIO198 E22
EC_PWM2/EC_TIMER2/GPIO199 F22 GPIO199 [15]
EC_PWM3/EC_TIMER3/GPIO200 F21 GPIO200 [15]
KSI_0/GPIO201 G24
KSI_1/GPIO202 G25
KSI_2/GPIO203 E28
KSI_3/GPIO204 E29
KSI_4/GPIO205 D29
KSI_5/GPIO206 D28
KSI_6/GPIO207 C29
KSI_7/GPIO208 C28
KSO_0/GPIO209 B28
KSO_1/GPIO210 A27
KSO_2/GPIO211 B27
KSO_3/GPIO212 D26
KSO_4/GPIO213 A26
KSO_5/GPIO214 C26
KSO_6/GPIO215 A24
KSO_7/GPIO216 B25
KSO_8/GPIO217 A25
KSO_9/GPIO218 D24
KSO_10/GPIO219 B24
KSO_11/GPIO220 C24
KSO_12/GPIO221 B23
KSO_13/GPIO222 A23
KSO_14/GPIO223 D22
KSO_15/GPIO224 C22
KSO_16/GPIO225 A22
KSO_17/GPIO226 B22
EMBEDDED CTRL

SB_GPIO195 R489 10K_4
SB_GPIO196 R275 10K_4

B2-TEST
DEL C816
CN24
SB_JTAG_TCK
SB_JTAG_TDO
SB_JTAG_TDI
SB_TEST1
SB_JTAG_RST#
*S/W_JTAG_DEBUG
SB JTAG

PROJECT : ZR8
Quanta Computer Inc.
Size | Document Number: SB820-ACPI/GPIO/USB 2/4 | Rev: 1A
Date: Wednesday, May 27, 2009 | Sheet 12 of 49

SATA PORT 0,1,2,3
can support AHCI
mode

SATA1

SATA ODD

U34B

SB800
Part 2 of 5

SERIAL ATA

SATA_TX0P
SATA_TX0N
SATA_RX0N
SATA_RX0P
SATA_TX1P
SATA_TX1N
SATA_RX1N
SATA_RX1P
SATA_TX2P
SATA_TX2N
SATA_RX2N
SATA_RX2P
SATA_TX3P
SATA_TX3N
SATA_RX3N
SATA_RX3P
SATA_TX4P
SATA_TX4N
SATA_RX4N
SATA_RX4P
SATA_TX5P
SATA_TX5N
SATA_RX5N
SATA_RX5P
SATA_CALRP
SATA_CALRN
SATA_ACT#/GPIO67
SATA_X1
SATA_X2

FLASH

FC_CLK
FC_FBCLKOUT
FC_FBCLKIN
FC_OE#/GPIOD145
FC_AVD#/GPIOD146
FC_WE#/GPIOD148
FC_CE1#/GPIOD149
FC_CE2#/GPIOD150
FC_INT1/GPIOD144
FC_INT2/GPIOD147
FC_ADQ0/GPIOD128
FC_ADQ1/GPIOD129
FC_ADQ2/GPIOD130
FC_ADQ3/GPIOD131
FC_ADQ4/GPIOD132
FC_ADQ5/GPIOD133
FC_ADQ6/GPIOD134
FC_ADQ7/GPIOD135
FC_ADQ8/GPIOD136
FC_ADQ9/GPIOD137
FC_ADQ10/GPIOD138
FC_ADQ11/GPIOD139
FC_ADQ12/GPIOD140
FC_ADQ13/GPIOD141
FC_ADQ14/GPIOD142
FC_ADQ15/GPIOD143

HW MONITOR

FANOUT0/GPIO52
FANOUT1/GPIO53
FANOUT2/GPIO54
FANIN0/GPIO56
FANIN1/GPIO57
FANIN2/GPIO58
TEMPIN0/GPIO171
TEMPIN1/GPIO172
TEMPIN2/GPIO173
TEMPIN3/TALERT#/GPIO174
TEMP_COMM
VIN0/GPIO175
VIN1/GPIO176
VIN2/GPIO177
VIN3/GPIO178
VIN4/GPIO179
VIN5/GPIO180
VIN6/GBE_STAT3/GPIO181
VIN7/GBE_LED3/GPIO182

SPI ROM

SPI_DI/GPIO164
SPI_DO/GPIO163
SPI_CLK/GPIO162
SPI_CS1#/GPIO165
ROM_RST#/GPIO161

SB820M_A12

Signal Name	Explanation
SATA_CALRP	SB800 A11: 800 ohm 1% resistor to GND. P/N:CS18062FB00(806 Ohm) SB800 A12: 1k ohm 1% resistor to GND.
SATA_CALRN	SB800 A11: 931-? 1% resistor to VDDAN_11_SATA. SB800 A12: TBD-? 1% resistor to VDDAN_11_SATA.

PLACE SATA_CAL RES VERY CLOSE TO BALL OF SB820

A60

A05

B2-TEST

	ID1	ID0
HYX	0	0
SAM	0	1
ATI	1	0

IF THERE IS NO IDE, TEST POINTS FOR DEBUG BUS IS MANDATORY

A55

A04

DDR3 Sideport Memory Device

Vendor	Vendor P/N	STN B/S P/N	Size	BOARD_ID2 GPIO12	SIDE_PORT_ID1 GPIO178	SIDE_PORT_ID0 GPIO177
Hynix	H5TQ1G63BFR-12C	AKD5LZGTW04 (64M*16)	1GB	0 (WO/Sideport)	0	0
Samsung	K4W1G1646E-HC12	AKD5LGGT506 (64M*16)	1GB	1 (W/Sideport)	0	1

Board ID

	BOARD_ID4 GPIO14	BOARD_ID3 GPIO13	BOARD_ID2 GPIO12	BOARD_ID1 GPIO11	BOARD_ID0 GPIO10
0	N/A (Default)	JV51-DN (3-DIMM) (Default)	WO/Sideport	UMA	14"
1	N/A	JM51-DN (2-DIMM)	W/Sideport (Default)	Discrete (Default)	15.6" (Default)

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Size	Document Number	Rev
	SATA/IDE/HWM/SPI 3/4	1A
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PLACE ALL THE DECOUPLING CAPS ON THIS SHEET CLOSE TO SB AS POSSIBLE.

VDDQ--3.3V I/O power

VDD-- S/B CORE power

U34C

SB800 Part 3 of 5

POWER

SB820M_A12

SB820 without GBE: Connected to GND plane.

If the VDDIO_AZ_S power rail is configured for 1.5V_S5 then AZ_SDIN[3:0] can not be connected to 3.3-V devices.

For support USB wakeup-->3V_S5

U34E

SB800 GROUND Part 5 of 5

SB820M_A12

[2,4,5,6,9,10,11,12,13,15,19,24,25,27,29,30,32,33,34,36,37,38,39,41,42,43,44,46] +3V
[2,7,8,9,10,38,44] +1.1V
[11,12,13,15,24,26,31,32,36,44] +3V_S5
[38] +1.1V_S5

PROJECT : ZR8

Quanta Computer Inc.

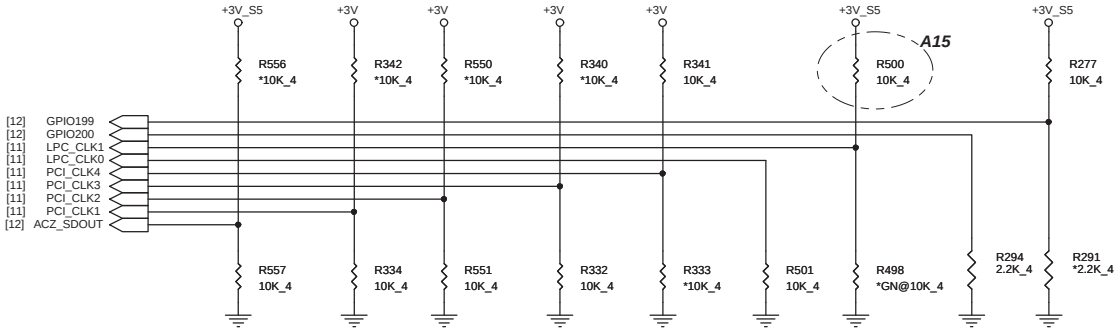
Size	Document Number	Rev
	SB820-PWR/DECOUPLING 4/4	1A
Date: Wednesday, May 27, 2009	Sheet 14 of 49	

OVERLAP COMMON PADS WHERE POSSIBLE FOR DUAL-OP RESISTORS.

REQUIRED STRAPS

SB820M is supported Gen1 mode only.

For internal clock GEN.



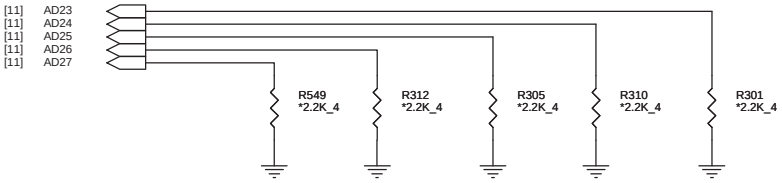
D02	AZ_SDOUT	PCI_CLK1	PCI_CLK2	PCI_CLK3	PCI_CLK4	LPC_CLK0	LPC_CLK1	GPIO200 GPIO199
PULL HIGH	This is required as the low power mode is not supported on the SB8xx	ALLOW PCIE Gen2	Watchdog Timer Enable	USE DEBUG STRAPS	non_Fusion CLOCK MODE DEFAULT	EC ENABLED	INT. CLKGEN ENABLED DEFAULT	H, H=Reserved H, L=SPI ROM
PULL LOW	PERFORMANCE MODE DEFAULT	FORCE PCIE Gen1 DEFAULT	Watchdog Timer Disable DEFAULT	IGNORE DEBUG STRAPS DEFAULT	Fusion CLOCK MODE	EC DISABLED DEFAULT	EXT. CLKGEN ENABLE	L,H=LPC ROM DEFAULT L, L=FWH ROM

internal have pull Hi 10K

[11,12,13,14,24,26,31,32,36,44] +3V_S5
[7,9,10,24,37,42,43,44] +1.8V
+3V_S5
+1.8V

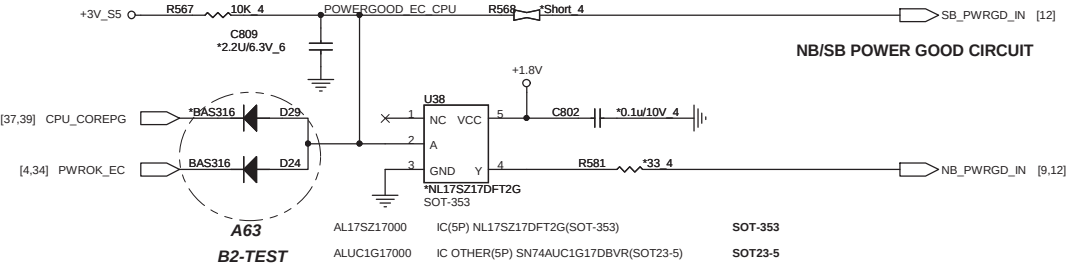
DEBUG STRAPS

SB800 HAS 15K INTERNAL PU FOR PCI_AD[27:23]



	PCI_AD27	PCI_AD26	PCI_AD25	PCI_AD24	PCI_AD23
PULL HIGH	USE PCI PLL DEFAULT	DISABLE ILA AUTORUN DEFAULT	USE FC PLL DEFAULT	DISABLE I2C ROM DEFAULT	DISABLE PCI MEM BOOT DEFAULT
PULL LOW	BYPASS PCI PLL	ENABLE ILA AUTORUN	BYPASS FC PLL	ENABLE I2C ROM use REQ3# as SDA use GNT3# as SCL	ENABLE PCI MEM BOOT

NB_PWRGD_IN:
RS880/RX881 = 1.8V;
Do NOT share it with SB_PWRGD when use Internal Clk Gen (Need SB PLL initialize firstly)



AL17SZ17000	IC(5P) NL17SZ17DFT2G(SOT-353)	SOT-353
ALUC1G17000	IC OTHER(5P) SN74AUC1G17DBVR(SOT23-5)	SOT23-5

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	SB820-STRAPS	1A
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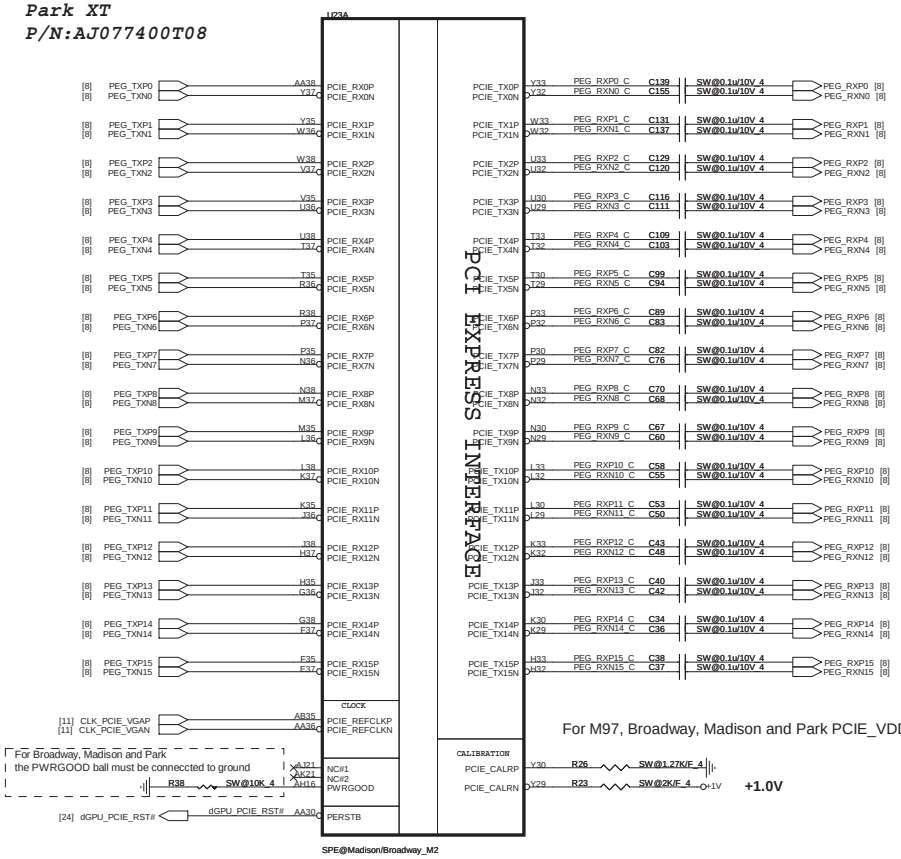
Park XT
P/N:AJ077400T08

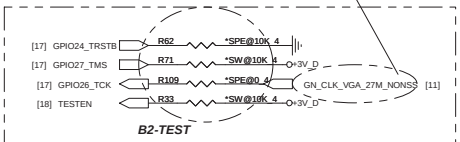


For M97, Broadway, Madison and Park PCIE_VDDC is 1.0V

+1.0V

+3V_D
+1V
+3V_D [17,19,21,24,25]
+1V [17,19,20,42]

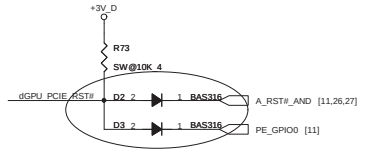
Add extra OSC for use SB clock.



B2-TEST

JTAG SIGNAL STUFF OPTION FOR OPTION2

SIGNALS	NORMAL MODE	JTAG MODE (DEBUG)
GPIO24_TRSTB	"0" (PD)	"1" (PU)
GPIO27_TMS	"1" (PU)	"1" (PU)
GPIO26_TCK	CLK	"1" (PU)
TESTEN	"1" (PU)	"1" (PU)



B2-TEST
FORM RB501 CHANGE TO BAS316

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Quanta Computer Inc.

Size	Document Number	Rev
	Madison/Broadway-PCIE I/F	1A
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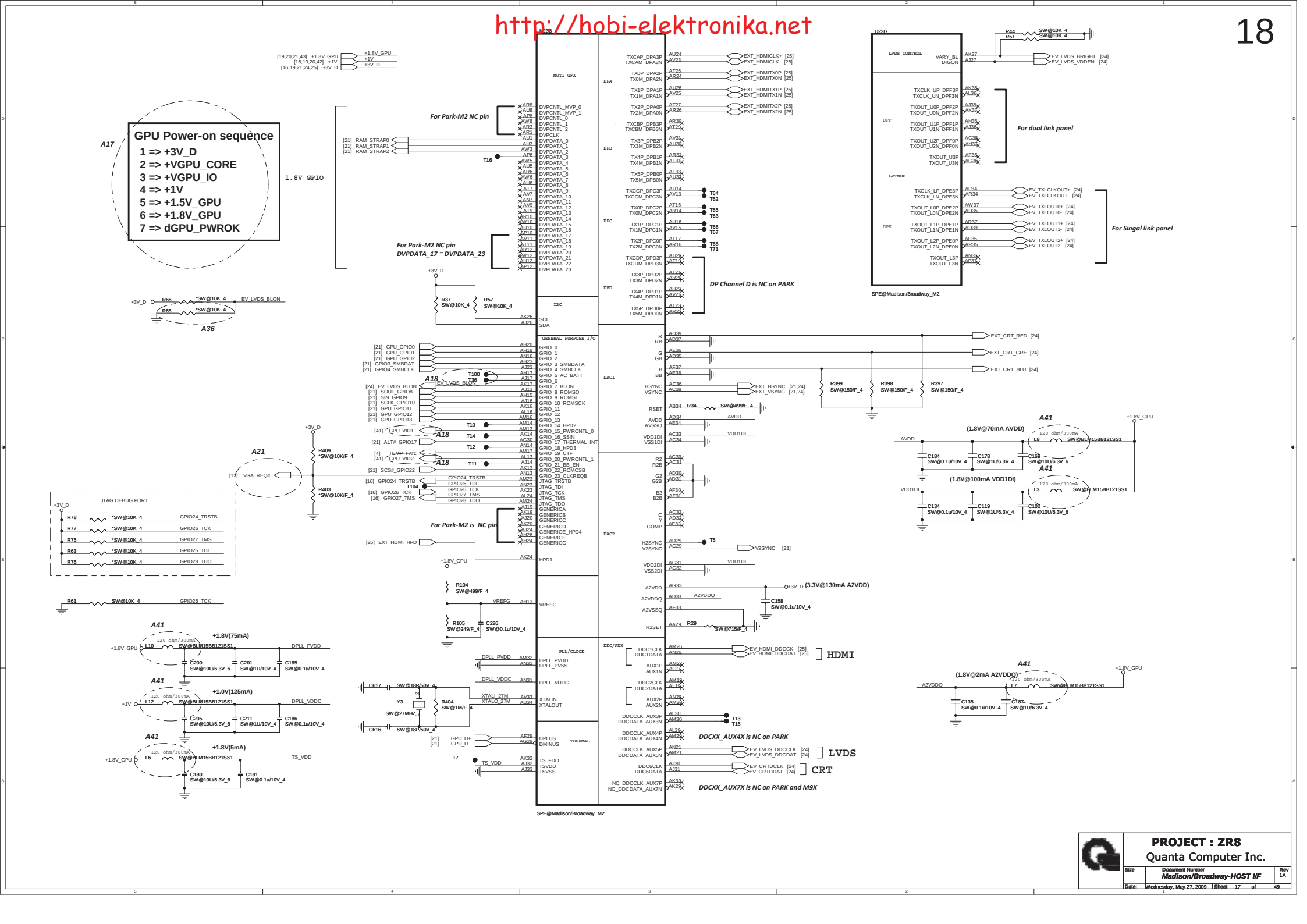

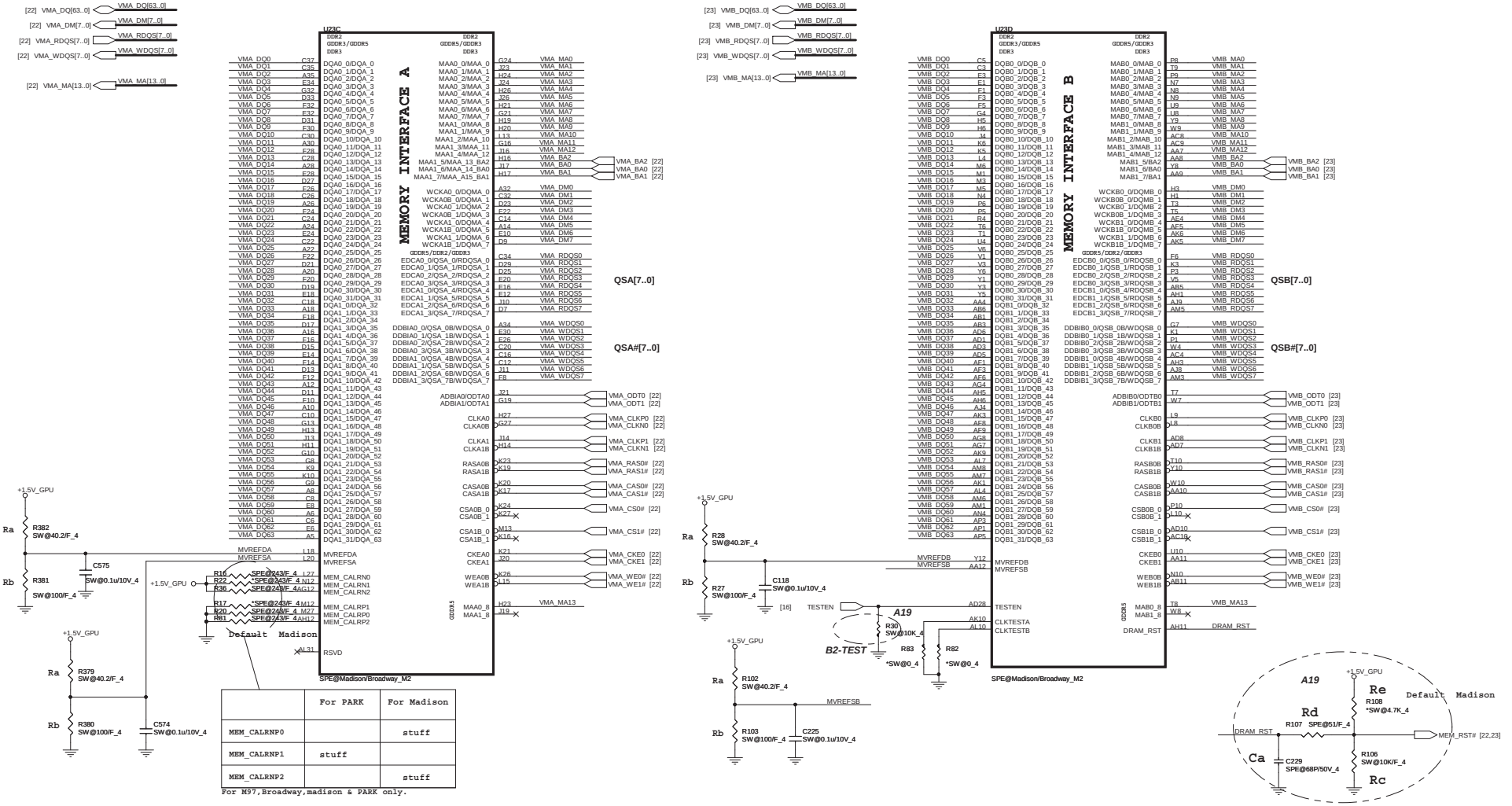

	For PARK	For Madison
MEM_CALRNP0		stuff
MEM_CALRNP1	stuff	
MEM_CALRNP2		stuff

For M97,Broadway,madison & PARK only.

DDR3/GDDR3 Memory Stuff Option

	GDDR5	GDDR3	DDR3(Default)
+1.5V_VGA	1.5V	1.8V/1.5V	1.5V
Ra	40.2R	40.2R	40.2R
Rb	100R	100R	100R

For SSTL-1.8/SSTL-2/DDR1/GDDR1: 0.5 * VDDR1.
For DDR3/GDDR3/GDDR4/GDDR5: 0.7 * VDDR1.

Broadway no daul rank support for GDDR5

Designator	For M97-M2	For Mannhatton
Rc	10K	10K
Rd	0R/Short	51R
Re	DNI	DNI
Ca	2.2nF	68pF

This basic topology should be used for DRAM_RST for DDR3/GDDR3/GDDR5.These Capacitors and Resistor values are an example only. The Series R and || Cap values will depend on the DRAM load and will have to be calculated for different Memory ,DRAM Load and board to pass Reset Signal Spec.

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	Madison/Broadway-MEM I/F	1A

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+1.5V_GPU
+1.8V_GPU
+1V
+1.5V_GPU [18,22,23,40,43]
+1.8V_GPU [17,20,21,43]
+1V [16,17,20,42]

+VGPU_CORE
+3V
+VGPU_CORE [41,44]
+3V [2,4,5,6,9,10,11,12,13,14,15,24,25,27,29,30,32,33,34,36,37,38,39,41,42,43,44,46]

For DDR3, MVDDQ = 1.5V (7.5A)

+1.5V_GPU
C591 SW@10U/6.3V_6 C66 SW@10U/6.3V_6 C590 SW@10U/6.3V_6 C594 SW@10U/6.3V_6 C593 SW@10U/6.3V_6
C56 SW@1U/6.3V_4 C49 SW@1U/6.3V_4 C62 SW@1U/6.3V_4 C165 SW@1U/6.3V_4 C157 SW@1U/6.3V_4 C57 SW@1U/6.3V_4
C54 SW@1U/6.3V_4 C149 SW@1U/6.3V_4 C150 SW@1U/6.3V_4 C25 SW@1U/6.3V_4 C64 SW@1U/6.3V_4 C63 SW@1U/6.3V_4
C136 SW@1U/6.3V_4 C51 SW@0.1u/10V_4 C24 SW@0.1u/10V_4 C81 SW@0.1u/10V_4 C47 SW@0.1u/10V_4

U23E

MEM I/O
AC7 AD11 AF7 AG10 AJ7 AK8 AL9 G11 G14 G17 G20 G23 G26 G29 H10 J7 J9 K11 K13 K8 L12 L16 L21 L23 L26 L7 M11 N11 P7 R11 U11 U7 Y11 Y7
VDDR1#1 VDDR1#2 VDDR1#3 VDDR1#4 VDDR1#5 VDDR1#6 VDDR1#7 VDDR1#8 VDDR1#9 VDDR1#10 VDDR1#11 VDDR1#12 VDDR1#13 VDDR1#14 VDDR1#15 VDDR1#16 VDDR1#17 VDDR1#18 VDDR1#19 VDDR1#20 VDDR1#21 VDDR1#22 VDDR1#23 VDDR1#24 VDDR1#25 VDDR1#26 VDDR1#27 VDDR1#28 VDDR1#29 VDDR1#30 VDDR1#31 VDDR1#32 VDDR1#33 VDDR1#34

LEVEL TRANSLATION
VDD_CT#1 VDD_CT#2 VDD_CT#3 VDD_CT#4

I/O
VDDR3#1 VDDR3#2 VDDR3#3 VDDR3#4

VDDR4#4 VDDR4#5 VDDR4#7 VDDR4#8
VDDR4#1 VDDR4#2 VDDR4#3 VDDR4#6

NC_VDDRHA NC_VSSRHA
NC_VDDRHB NC_VSSRHB

PLL
PCIE_PVDD
MPV18#1 MPV18#2
SPV18
SPV10
SPVSS

VOLTAGE SENSE
FB_VDDC
FB_VDDCI
FB_GND

SPE@Madison/Broadway_M2

A41
(1.8V@110mA VDD_CT)
+1.8V_GPU L58 SW@BLM15BB121SS1 VDDC_CT
C615 SW@10U/6.3V_6 C166 SW@1U/6.3V_4 C153 SW@0.1u/10V_4

(3.3V@60mA))
+3V_DO R609 SW@0_6 +3V_D_VDDR3
C202 SW@10U/6.3V_6 C161 SW@1U/6.3V_4 C191 SW@1U/6.3V_4 C198 SW@1U/6.3V_4

A41
+1.8V_GPU L17 SW@BLM15BB121SS1 VDDR4
C228 SW@1U/6.3V_4 C227 SW@0.1u/10V_4

T2 T1 T4 T3 T9 T6 T8

A41
(1.8V@40mA PCIE_PVDD)
+1.8V_GPU L57 SW@BLM15BB121SS1
C610 SW@10U/6.3V_6 C608 SW@1U/6.3V_4 C606 SW@0.1u/10V_4
PCIE_PVDD MPV18

A41
(1.8V@150mA MPV18)
+1.8V_GPU L1 SW@BLM15BB121SS1
C44 SW@10U/6.3V_6 C52 SW@1U/6.3V_4 C46 SW@0.1u/10V_4
SPV18 SPV10

A41
(1.8V@75mA SPV18)
+1.8V_GPU L13 SW@BLM15BB121SS1
C213 SW@10U/6.3V_6 C208 SW@0.1u/10V_4

A41
(1.0V@120mA SPV10)
+1V L14 SW@BLM15BB121SS1
C214 SW@10U/6.3V_6 C209 SW@0.1u/10V_4

POWER

CORE
VDDC#1 VDDC#2 VDDC#3 VDDC#4 VDDC#5 VDDC#6 VDDC#7 VDDC#8 VDDC#9 VDDC#10 VDDC#11 VDDC#12 VDDC#13 VDDC#14 VDDC#15 VDDC#16 VDDC#17 VDDC#18 VDDC#19 VDDC#20 VDDC#21 VDDC#22 VDDC#23 VDDC#24 VDDC#25 VDDC#26 VDDC#27 VDDC#28 VDDC#29 VDDC#30 VDDC#31 VDDC#32 VDDC#33 VDDC#34 VDDC#35 VDDC#36 VDDC#37 VDDC#38 VDDC#39 VDDC#40 VDDC#41 VDDC#42 VDDC#43 VDDC#44 VDDC#45 VDDC#46 VDDC#47 VDDC#48 VDDC#49 VDDC#50 VDDC#51 VDDC#52 VDDC#53 VDDC#54 VDDC#55 VDDC#56 VDDC#57 VDDC#58

ISOLATED CORE I/O
VDDCI#1 VDDCI#2 VDDCI#3 VDDCI#4 VDDCI#5 VDDCI#6 VDDCI#7 VDDCI#8 VDDCI#9 VDDCI#10 VDDCI#11 VDDCI#12 VDDCI#13 VDDCI#14 VDDCI#15 VDDCI#16 VDDCI#17 VDDCI#18 VDDCI#19 VDDCI#20 VDDCI#21 VDDCI#22

PCIE
PCIE_VDDR#1 PCIE_VDDR#2 PCIE_VDDR#3 PCIE_VDDR#4 PCIE_VDDR#5 PCIE_VDDR#6 PCIE_VDDR#7 PCIE_VDDR#8
PCIE_VDDC#1 PCIE_VDDC#2 PCIE_VDDC#3 PCIE_VDDC#4 PCIE_VDDC#5 PCIE_VDDC#6 PCIE_VDDC#7 PCIE_VDDC#8 PCIE_VDDC#9 PCIE_VDDC#10 PCIE_VDDC#11 PCIE_VDDC#12

+1.8V_GPU
L4 180 ohm/1.5A SW@HCB1608KF-181T15_6
PCIE_VDDR
(1.8V@400mA PCIE_VDDR)
C122 SW@0.1u/10V_4 C97 SW@0.1u/10V_4 C112 SW@1U/6.3V_4 C108 SW@1U/6.3V_4 C133 SW@1U/6.3V_4 C98 SW@1U/6.3V_4 C96 SW@1U/6.3V_4 C121 SW@10U/6.3V_6

+1V
(1.0V@1.1A PCIE_VDDC)
C84 SW@1U/6.3V_4 C194 SW@1U/6.3V_4 C65 SW@1U/6.3V_4 C221 SW@1U/6.3V_4 C95 SW@1U/6.3V_4 C59 SW@1U/6.3V_4 C80 SW@1U/6.3V_4 C199 SW@10U/6.3V_6

+VGPU_CORE
(30A or more)
C87 SW@1U/6.3V_4 C90 SW@1U/6.3V_4 C113 SW@1U/6.3V_4 C115 SW@1U/6.3V_4 C88 SW@1U/6.3V_4 C152 SW@1U/6.3V_4 C138 SW@1U/6.3V_4 C85 SW@1U/6.3V_4 C86 SW@1U/6.3V_4 C128 SW@10U/6.3V_6
C176 SW@1U/6.3V_4 C175 SW@1U/6.3V_4 C140 SW@1U/6.3V_4 C123 SW@1U/6.3V_4 C167 SW@1U/6.3V_4 C159 SW@1U/6.3V_4 C146 SW@1U/6.3V_4 C101 SW@1U/6.3V_4 C145 SW@1U/6.3V_4 C160 SW@10U/6.3V_6
C132 SW@1U/6.3V_4 C154 SW@1U/6.3V_4 C125 SW@1U/6.3V_4 C168 SW@1U/6.3V_4 C144 SW@1U/6.3V_4 C104 SW@1U/6.3V_4 C100 SW@1U/6.3V_4 C127 SW@1U/6.3V_4 C110 SW@1U/6.3V_4 C93 SW@10U/6.3V_6
C126 SW@10U/6.3V_6 C105 SW@10U/6.3V_6 C124 SW@10U/6.3V_6 C106 SW@10U/6.3V_6 C77 SW@10U/6.3V_6 C107 SW@10U/6.3V_6

BIF_VDDC should be connected to VDDC if BACO feature not used.
For BACO, refer to the databook
(Separate Core power for PCIe bus macros
Connector to VDDCin non-ower-Xpress desingns ZR8

PIN different between Broadway and Madison		
Pin	Broadway	Madison
VDDC#32 / BIF_VDDC (N27)	VDDC	BIF_VDDC
VDDC#42 / BIF_VDDC (T27)	VDDC	BIF_VDDC
GND#61 / PX_EN (AL21)	GND	PX_EN
(AL31)	TS_A	NC_TS_A

A34
(GDDR5 1.12V@16A VDDCI)
(DDR3 1.12V@4A VDDCI) or more
+VGPU_CORE
C79 SW@1U/6.3V_4 C114 SW@1U/6.3V_4 C92 SW@1U/6.3V_4 C71 SW@1U/6.3V_4 C148 SW@1U/6.3V_4 C78 SW@0.1u/6.3V_4
C151 SW@10U/6.3V_6 C117 SW@10U/6.3V_6 C130 SW@10U/6.3V_6 C73 SW@1U/6.3V_4 C91 SW@1U/6.3V_4 C75 SW@1U/6.3V_4 C72 SW@1U/6.3V_4

U23F

PCIE_VSS#1 PCIE_VSS#2 PCIE_VSS#3 PCIE_VSS#4 PCIE_VSS#5 PCIE_VSS#6 PCIE_VSS#7 PCIE_VSS#8 PCIE_VSS#9 PCIE_VSS#10 PCIE_VSS#11 PCIE_VSS#12 PCIE_VSS#13 PCIE_VSS#14 PCIE_VSS#15 PCIE_VSS#16 PCIE_VSS#17 PCIE_VSS#18 PCIE_VSS#19 PCIE_VSS#20 PCIE_VSS#21 PCIE_VSS#22 PCIE_VSS#23 PCIE_VSS#24 PCIE_VSS#25 PCIE_VSS#26 PCIE_VSS#27 PCIE_VSS#28 PCIE_VSS#29 PCIE_VSS#30 PCIE_VSS#31 PCIE_VSS#32 PCIE_VSS#33 PCIE_VSS#34 PCIE_VSS#35

GND
GND#100 GND#101 GND#102 GND#103 GND#104 GND#105 GND#106 GND#107 GND#108 GND#109 GND#110 GND#111 GND#112 GND#113 GND#114 GND#115 GND#116 GND#117 GND#118 GND#119 GND#120 GND#121 GND#122 GND#123 GND#124 GND#125 GND#126 GND#127 GND#128 GND#129 GND#130 GND#131 GND#132 GND#133 GND#134 GND#135 GND#136 GND#137 GND#138 GND#139 GND#140 GND#141 GND#142 GND#143 GND#144 GND#145 GND#146 GND#147 GND#148 GND#149 GND#150 GND#151 GND#153 GND#154 GND#155 GND#156 GND#157 GND#158 GND#159 GND#160 GND#161 GND#163 GND#164 GND#165 GND#166 GND#167 GND#168 GND#169 GND#170 GND#171 GND#172 GND#173 GND#174 GND#175 GND#152 GND#162

SPE@Madison/Broadway_M2

GND#1 GND#2 GND#3 GND#4 GND#5 GND#6 GND#7 GND#8 GND#9 GND#10 GND#11 GND#12 GND#13 GND#14 GND#15 GND#16 GND#17 GND#18 GND#19 GND#20 GND#21 GND#22 GND#23 GND#24 GND#25 GND#26 GND#27 GND#28 GND#29 GND#30 GND#31 GND#32 GND#33 GND#34 GND#35 GND#36 GND#37 GND#38 GND#39 GND#40 GND#41 GND#42 GND#43 GND#44 GND#45 GND#46 GND#47 GND#48 GND#49 GND#50 GND#51 GND#52 GND#53 GND#54 GND#55 GND#56 GND#57 GND#58 GND#59 GND#60 GND#61 GND#62 GND#63 GND#64 GND#65 GND#66 GND#67 GND#68 GND#69 GND#70 GND#71 GND#72 GND#73 GND#74 GND#75 GND#76 GND#77 GND#78 GND#79 GND#80 GND#81 GND#82 GND#83 GND#84 GND#85 GND#86 GND#87 GND#88 GND#89 GND#90 GND#91 GND#92 GND#93 GND#94 GND#95 GND#96 GND#97 GND#98 GND#99

VSS_MECH#1 VSS_MECH#2 VSS_MECH#3

R64 SPE@0_4

GND#61/ PX_EN
PowerXpress control signal for Madsion and Park only
If not used, can be disconnected.
PX_EN = LOW, turn on
PX_EN = HIGH, turn off
PX_EN is used to turn ON/OFF some regulators for PowerXpress mode. An output high '3.3V' will turn the regulators OFF. An output low '0V' will turn the regulators ON. PX_EN outputs low (0V) by default.
If this signal is unused, it can be NC (not connected) or connected to ground.

Pin AL21 to Ground for Broadway

GPU all PWROK
+3V
R95 SW@10K_4
R97 SW@10K_4
dGPU_PWROK [11]
Q9 SW@2N7002K
Q7 SW@PDTC143TT
+1.8V_GPU

GPU +3V power
+3V
R133 SW@4.7K_4
Q13 SW@AO3413
R113 *SW@0_6
0.5A
+3V_D
C248 SW@10U/6.3V_6 C261 SW@1U/10V_4 C262 SW@0.1u/10V_4
[12] MXM_PWREN R98 SW@0_4
+1.5V_GPU R111 *SW@0_4
Q11 DTC144EUA
C223 *SW@1U/10V_4
B2-TEST
A20
R595 *SW@0_6
R596 *SW@0_6
SW@AO3413 Q37
0.5A
+3V_D_EXT
C9778 SW@10u/6.3V_6 C9779 SW@1u/10V_4 C9780 SW@.1u/10V_4

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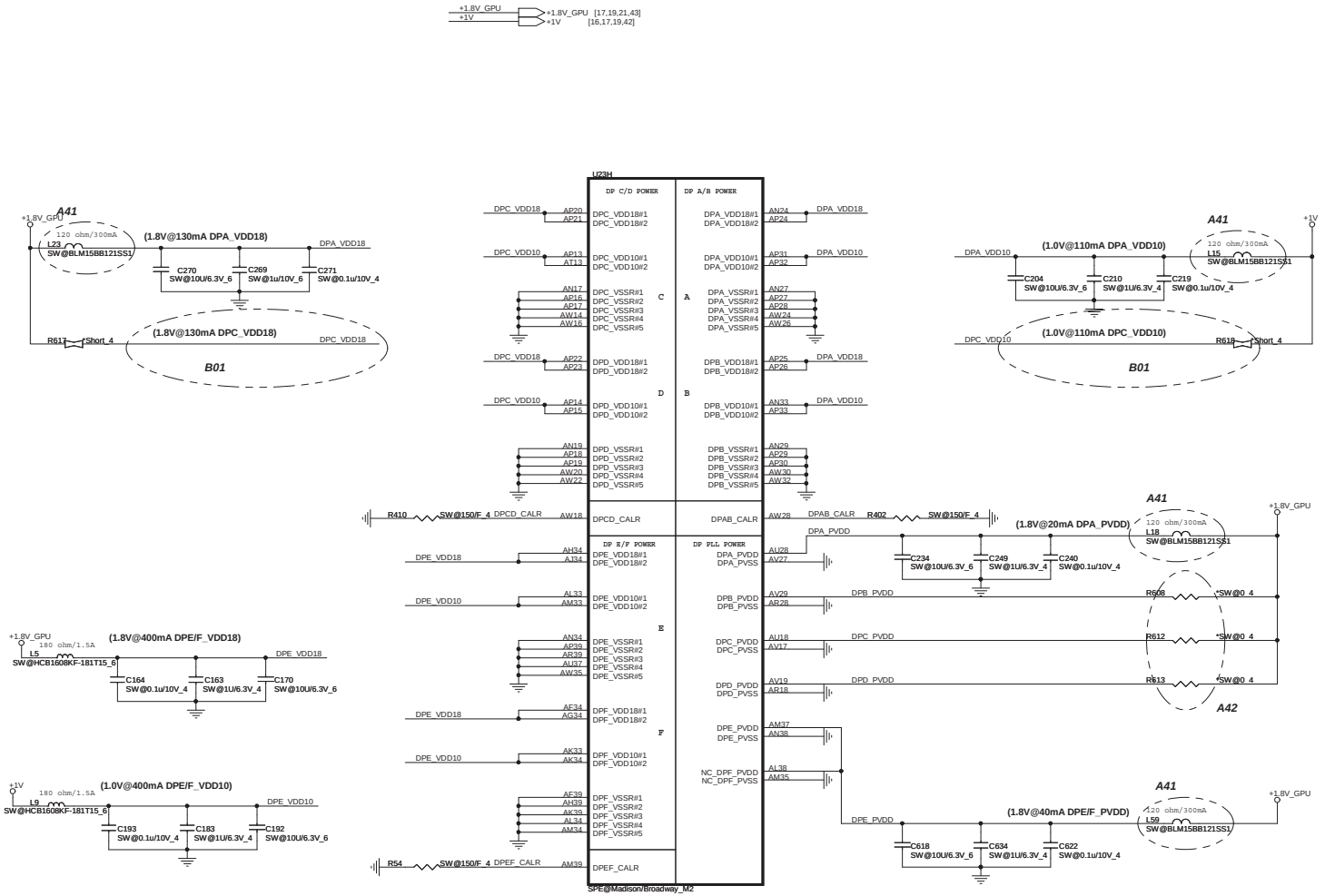

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Quanta Computer Inc.		
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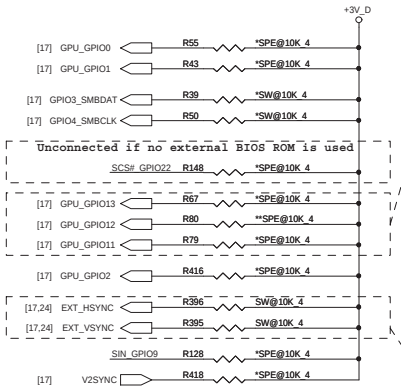
PIN STRAPS



Memory Aperture size	
GPIO[13:11]	Size
000	128MB
001	256MB
010	64MB
011	32MB

Function Table		
EXT_HSYNC	EXT_VSYNC	Discription
0	0	No Audio
0	1	Any one by dectec
1	0	DP only
1	1	Both DP & HDMI

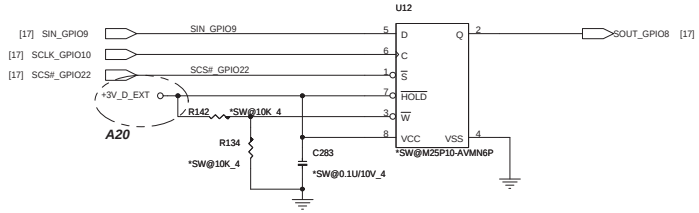
CONFIGURATION STRAPS

ALLOW FOR PULLUP PADS FOR THESE STRAPS AND IF THESE GPIOS ARE USED, THEY MUST NOT CONFLICT DURING RESET

ZR8

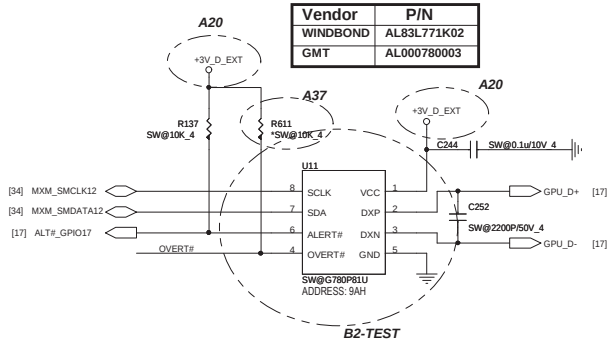
STRAPS	PIN	DESCRIPTION OF DEFAULT SETTINGS	DEFAULT	REMARK
TX_PWRS_ENB	GPIO0	0 = 50% TX OUTPUT SWING 1 = FULL TX OUTPUT SWING	0	
TX_DEEMPH_EN	GPIO1	PCIE TRANSMITTER DE-EMPHASIS ENABLED 0 = TX DE-EMPHASIS DISABLED 1 = TX DE-EMPHASIS ENABLED	0	
BIOS_ROM_EN	GPIO_22_ROMCSB	ENABLE EXTERNAL BIOS ROM 0 = DISABLE 1 = ENABLE	0	
ROMIDCFG(2:0)	GPIO[13:11]	SERIAL ROM TYPE OR MEMORY APERTURE SIZE SELECT NUMONYX M25P10A : 101	000	See ROM table
BIF_GEN2_EN_A	GPIO2	0 = PCIE DEVICE AS 2.5GT/S CAPABLE 1 = PCIE DEVICE AS 5GT/S CAPABLE	0	(Recommended setting as 5.0 GT/s capability will be controlled by software.)
GPIO_8_ROMSO H2SYNC GPIO_21_BB_EN	GPIO8 H2SYNC GPIO21	Reserved Only	0	
AUD[1] AUD[0]	HSYNC VSYNC	AUD[1:0] 00: NO AUDIO FUNCTION. 01: AUDIO FOR DISPLAYPORT AND HDMI IF ADAPTER IS DETECTED. 10: AUDIO FOR DISPLAYPORT ONLY. 11: AUDIO FOR BOTH DISPLAYPORT AND HDMI.	11	See Audio table
GPIO_9_ROMSI	GPIO9	0 = VGA controller capacity enable 1 = VGA controller capacity disenable (The device will not be recognized as the system's VGA controller.)	0	
VIP_DEVICE_STRAP_ENA	V2SYNC	0 = DRIVER would ignore the value sample on VHAD_0 during RESET. 1 = DRIVER would use the value sample on VHAD_0 during RESET.	0	

SERIAL ROM



Thermal Sensor

Vendor	P/N
WINDBOND	AL83L771K02
GMT	AL000780003

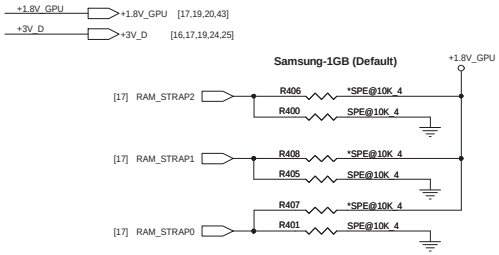


DDR3 Memory Aperture size

DDR3 Memory Aperture size

Vendor	Vendor P/N	STN B/S P/N	GPU	RAM_STRAP2 DVPDATA_2	RAM_STRAP1 DVPDATA_1	RAM_STRAP0 DVPDATA_0
Hynix			Park	1	1	0
	H5TQ1G63BFR-12C	AKD5LZGTW04 (64M*16)	Madison	1	0	0
			2Gb	1	1	1
Samsung			Park	0	1	0
	K4W1G1646E-HC12	AKD5LGGT506 (64M*16)	Madison	0	0	0
	K4W2G1646B-HC12	AKD5MGGT500	2Gb	0	0	1
AMD			Park	0	1	1
	23EY2387MA12-SZ	AKD5LGGT700	Madison	1	0	1

C14
D10



RAM_STRAP2 SET DDR3 Vendor
RAM_STRAP[1:0] SET SIZE.

PROJECT : ZR8
Quanta Computer Inc.

Size	Document Number	Rev
	Strip/Thermal	1A
Date: Wednesday, May 27, 2009	Sheet 21 of 49	

CHANNEL A: 512MB DDR3 (64M*16*4pcs)

[18] VMA_DQ[63..0] — VMA_DQ[63..0]
[18] VMA_DM[7..0] — VMA_DM[7..0]
[18] VMA_RDQS[7..0] — VMA_RDQS[7..0] QSA[7..0]
[18] VMA_WDQS[7..0] — VMA_WDQS[7..0] QSA#[7..0]

TOP Left

BOT Left

BOT Right

TOP Right

Group-A0 VREF

Group-A1 VREF

MEM_A0 CLK

Group-A0 decoupling CAP

Group-A1 decoupling CAP

MEM_A1 CLK

PROJECT : ZR8
Quanta Computer Inc.

Size	Document Number	Rev
	MEMORY 1 channel A	1A
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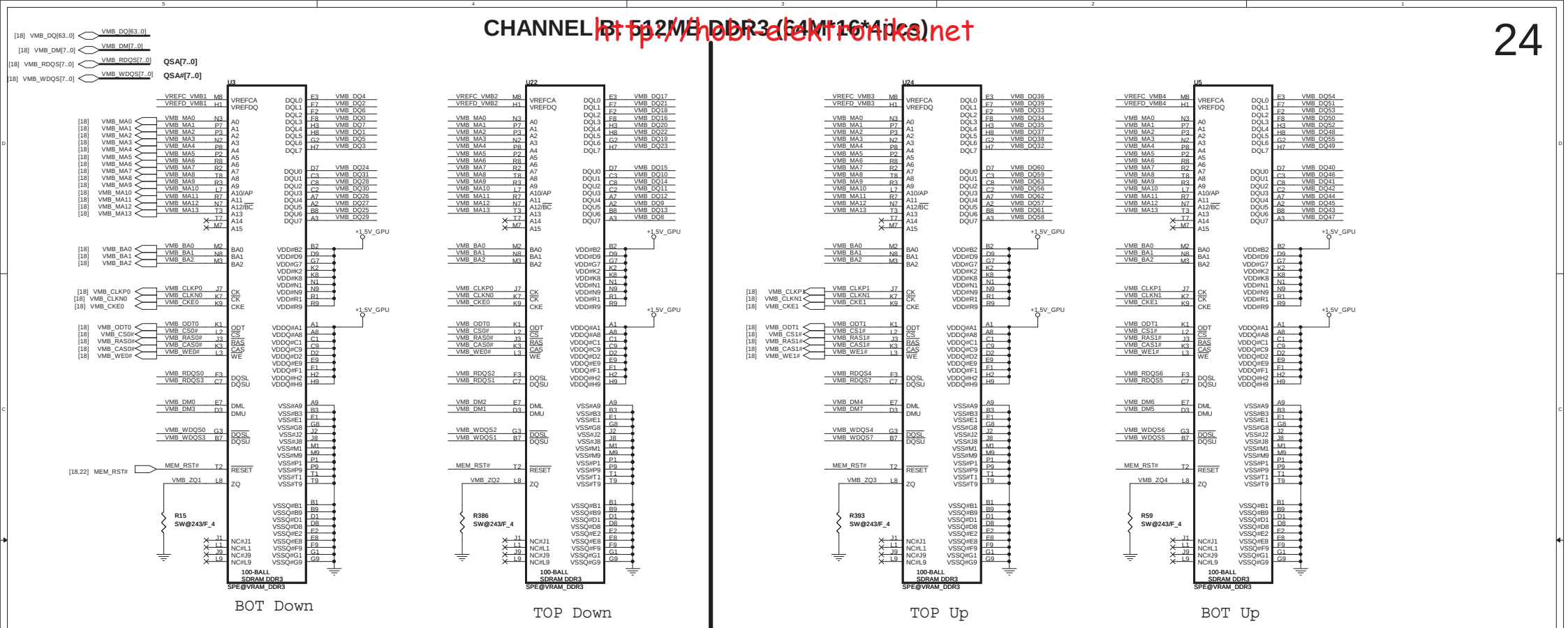
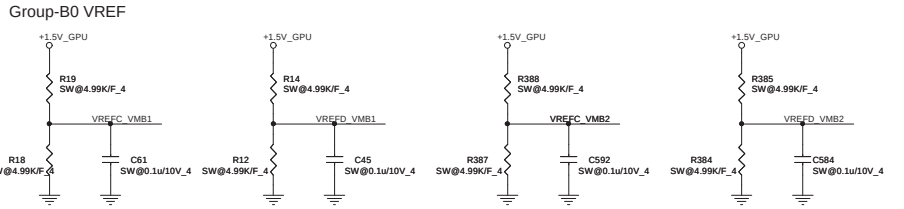
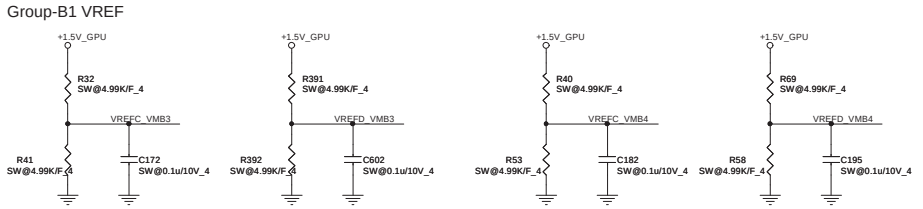
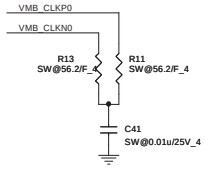
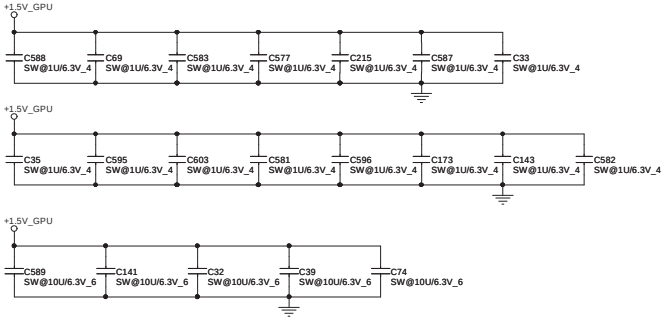
CHANNEL B: 512MB DDR3 (64M*16*4pcs)

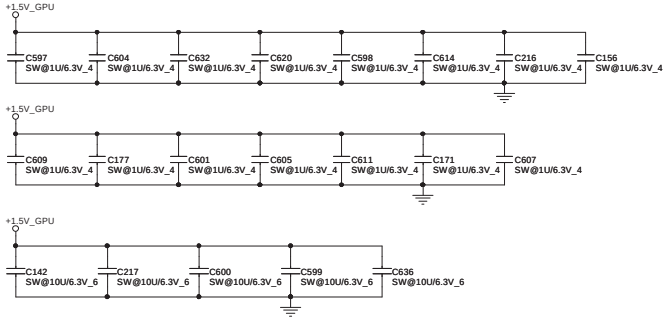


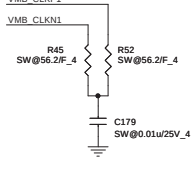












PROJECT : ZR8
Quanta Computer Inc.

Size	Document Number	Rev
	MEMORY 2 channel B	1A
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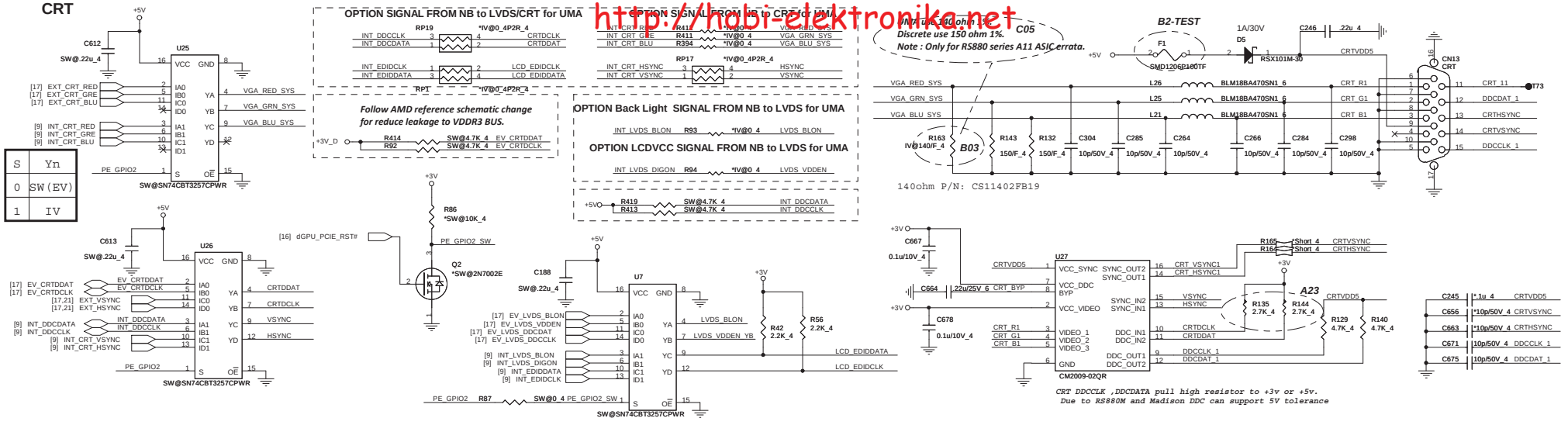
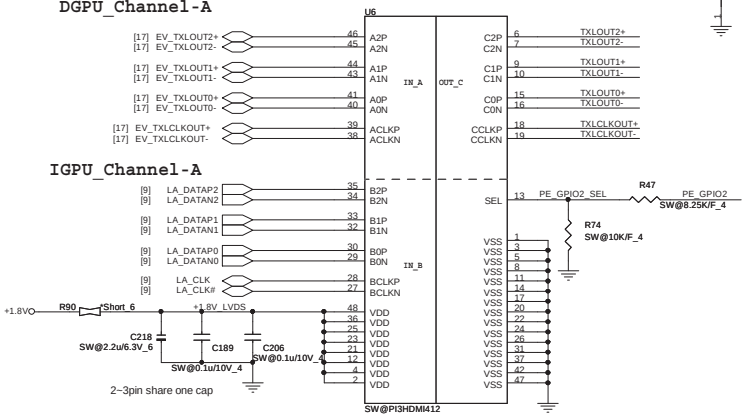
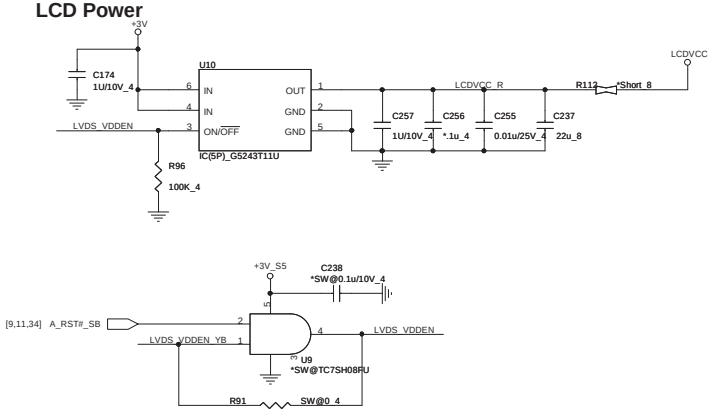
CRT



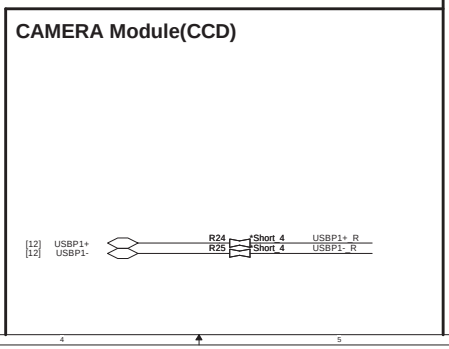
DGPU_Channel-A / IGPU_Channel-A



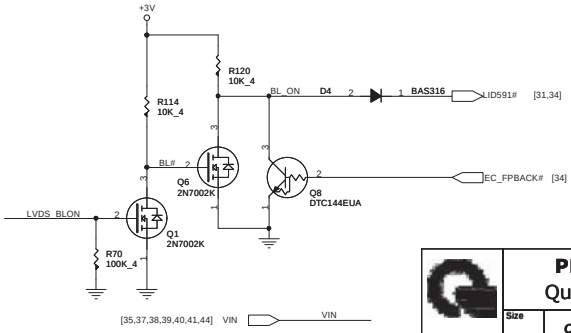
LCD Power



CAMERA Module(CCD)



Backlight Control



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Quanta Computer Inc.
Size | Document Number: CRT/LVDS/LID | Rev 1A
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UMA/DISCRETE select for HDMI

From RS880M

for Layout concern ,placement close north bridge

for Layout concern ,placement close HDMI conn

[8] PEG_TXN15_C / [8] PEG_TXP15_C — C280 *IV@0.1U/10V_4 / C272 *IV@0.1U/10V_4 — TX2_HDMI-L / TX2_HDMI+L — RP10 *IV@0_4P2R_4 — TX2_HDMI- / TX2_HDMI+

[8] PEG_TXN14_C / [8] PEG_TXP14_C — C267 *IV@0.1U/10V_4 / C263 *IV@0.1U/10V_4 — TX1_HDMI-L / TX1_HDMI+L — RP9 *IV@0_4P2R_4 — TX1_HDMI- / TX1_HDMI+

[8] PEG_TXN13_C / [8] PEG_TXP13_C — C253 *IV@0.1U/10V_4 / C247 *IV@0.1U/10V_4 — TX0_HDMI-L / TX0_HDMI+L — RP8 *IV@0_4P2R_4 — TX0_HDMI- / TX0_HDMI+

[8] PEG_TXN12_C / [8] PEG_TXP12_C — C239 *IV@0.1U/10V_4 / C232 *IV@0.1U/10V_4 — TXC_HDMI-L / TXC_HDMI+L — RP7 *IV@0_4P2R_4 — TXC_HDMI- / TXC_HDMI+

From dGPU

[17] EXT_HDMITX2N / [17] EXT_HDMITX2P — C698 SW@0.1u/10V_4 / C697 SW@0.1u/10V_4 — TX2_HDMI- / TX2_HDMI+

[17] EXT_HDMITX1N / [17] EXT_HDMITX1P — C696 SW@0.1u/10V_4 / C695 SW@0.1u/10V_4 — TX1_HDMI- / TX1_HDMI+

[17] EXT_HDMITX0N / [17] EXT_HDMITX0P — C694 SW@0.1u/10V_4 / C693 SW@0.1u/10V_4 — TX0_HDMI- / TX0_HDMI+

[17] EXT_HDMICLK- / [17] EXT_HDMICLK+ — C692 SW@0.1u/10V_4 / C691 SW@0.1u/10V_4 — TXC_HDMI- / TXC_HDMI+

for Layout concern ,placement close HDMI conn

+5V — Q34 2N7002K — R460 100K/F_4

R457 SP_715@499/F_4 TX2_HDMI+
R459 SP_715@499/F_4 TX2_HDMI-
R454 SP_715@499/F_4 TX1_HDMI+
R456 SP_715@499/F_4 TX1_HDMI-
R451 SP_715@499/F_4 TX0_HDMI+
R453 SP_715@499/F_4 TX0_HDMI-
R448 SP_715@499/F_4 TXC_HDMI+
R450 SP_715@499/F_4 TXC_HDMI-

UMA RS880M
715 ohm CS17152FB17

DIS Park-M2
499 ohm CS14992FB24

Close to HDMI Connector

EMI reserve for HDMI(HDM)

Close connector

TX2_HDMI+ — R458 *100/F_4 — TX2_HDMI-
TX1_HDMI+ — R455 *100/F_4 — TX1_HDMI-
TX0_HDMI+ — R452 *100/F_4 — TX0_HDMI-
TXC_HDMI+ — R449 *100/F_4 — TXC_HDMI-

HDMI HPD SENSE

UMA use +3V for the detect pin
Dis use +3V_DELAY for the detect pin

+3V_D — R444 SW@10K_4 — [17] EXT_HDMI_HPD — Q33 SW@2N7002K

+3V — R187 10K/F_4 — Q16 2N7002K — HDMI_DET_R — R177 200K/F_4 — HDMI_DET — R176 200K/F_4

+3V — R186 10K_4 — [9] INT_HDMI_HPD — Q15 2N7002K — HDMI_HPD_EC# [34]

Close to HDMI Connector

[9] HDMI_DDC_DATA / [9] HDMI_DDC_CLK — RP20 *IV@0_4P2R_4 — HDMI_SDATA / HDMI_SCLK

UMA

DIS

+3V — R443 SW@4.7K_4 — [17] EV_HDMI_DDCCK — Q41 SW@2N7002K — HDMI_SCLK — R445 *SW@0_4

+3V — R614 SW@4.7K_4 — [17] EV_HDMI_DDCDAT — Q42 SW@2N7002K — HDMI_SDATA — R534 *SW@0_4

A54

HDMI PORT

CN17 SP@HDMI

TX2_HDMI+ / TX2_HDMI- / TX1_HDMI+ / TX1_HDMI- / TX0_HDMI+ / TX0_HDMI- / TXC_HDMI+ / TXC_HDMI-

D2+ / D2 Shield / D2- / D1+ / D1 Shield / D1- / D0+ / D0 Shield / D0- / CK+ / CK Shield / CK- / CE Remote / NC / DDC CLK / DDC DATA / GND / +5V / HP DET / SHELL1 / SHELL2 / GND

B2-TEST — F2 SMD1206P100TF — +5VO — D6 RSX101M-30 — 1+5V_HDMI — HDMI_SCLK / HDMI_SDATA / HDMI_DET — C363 0.22u/6.3V_4

+5V — D21 CH501H-40PT — R446 2K/F_4 — HDMI_SCLK

+5V — D22 CH501H-40PT — R447 2K/F_4 — HDMI_SDATA

P/N: AOP---->DFHD19MR083
LTS---->DFHD19MR085

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PROJECT : ZR8
Quanta Computer Inc.

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	HDMI	1A
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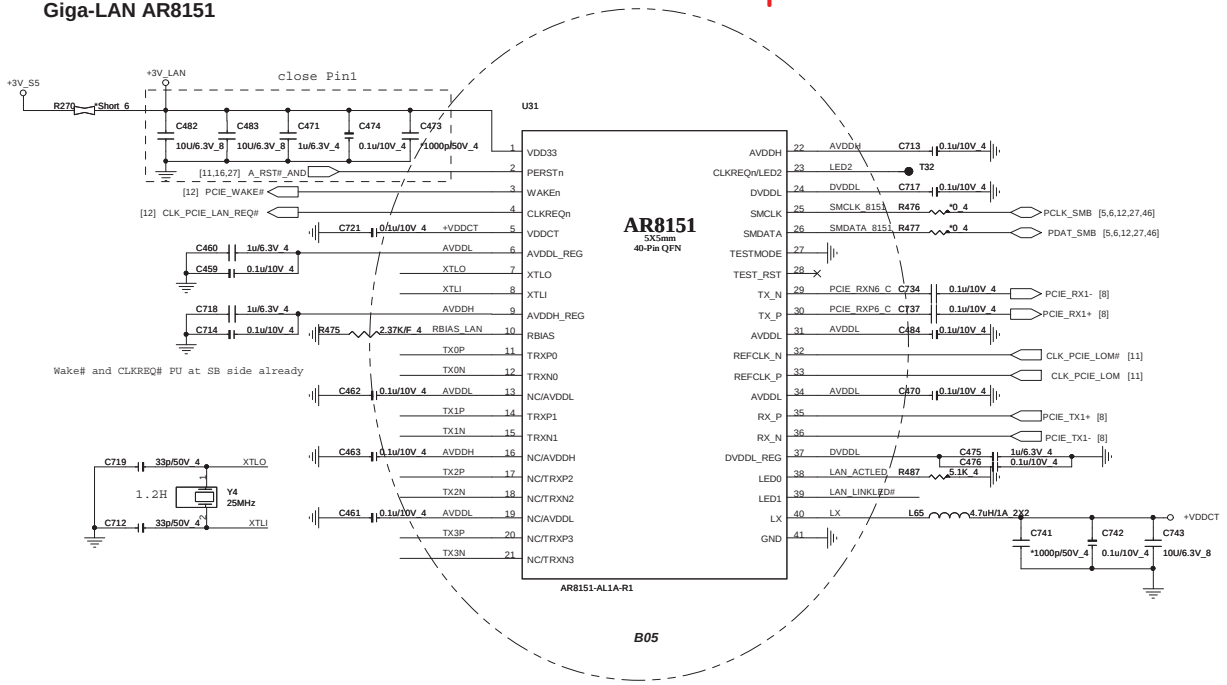
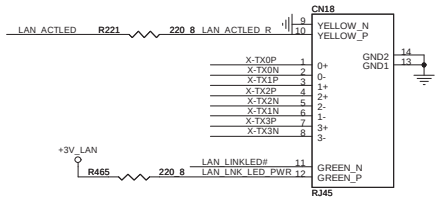
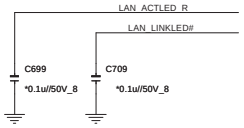
Giga-LAN AR8151

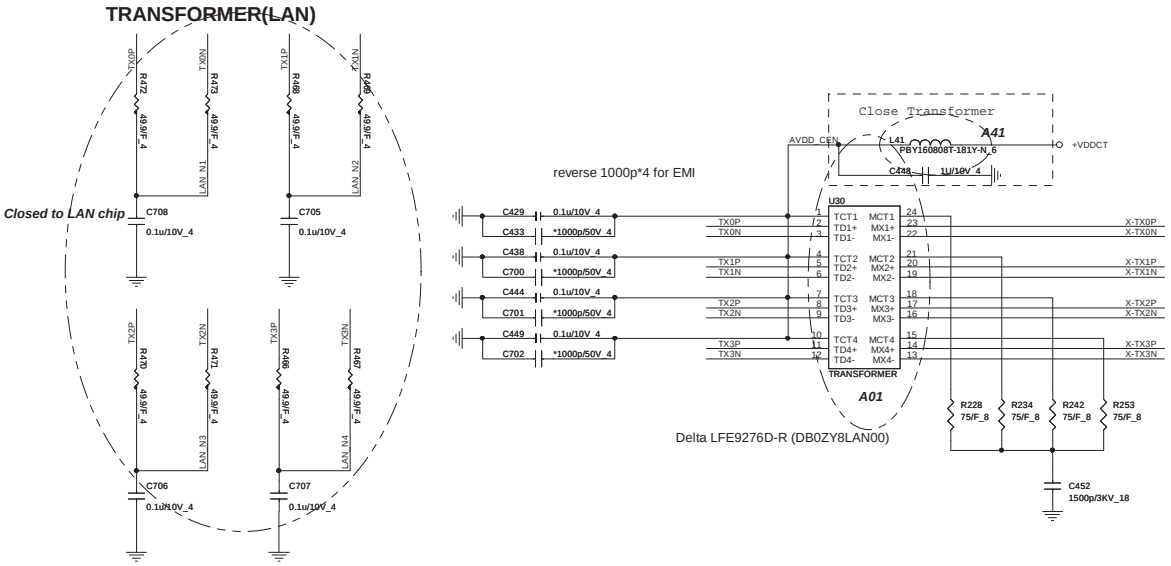


RJ45(LAN)





TRANSFORMER(LAN)



PROJECT : ZR8		
Quanta Computer Inc.		
Size	Document Number: LAN (AR8151)	Rev: 1A
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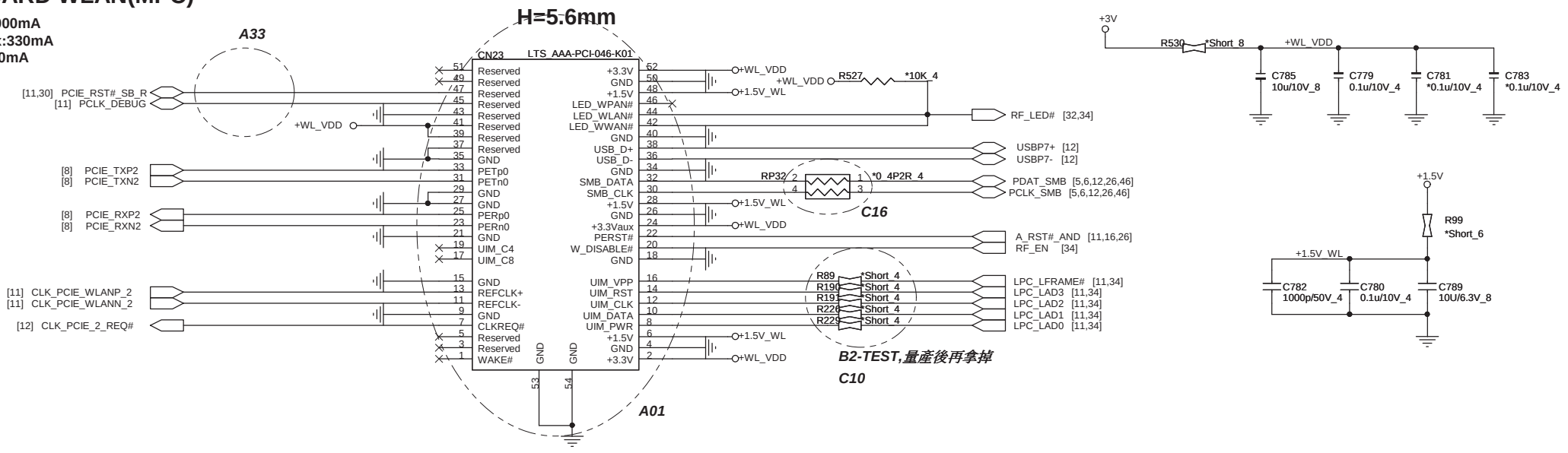
MINI-CARD WLAN(MPC)

+3.3V: 1000mA
+3.3Vaux:330mA
+1.5V:500mA



PROJECT : ZR8		
Quanta Computer Inc.		
Size	Document Number: *Mini-Card/WL/3G/SIM*	Rev 1A
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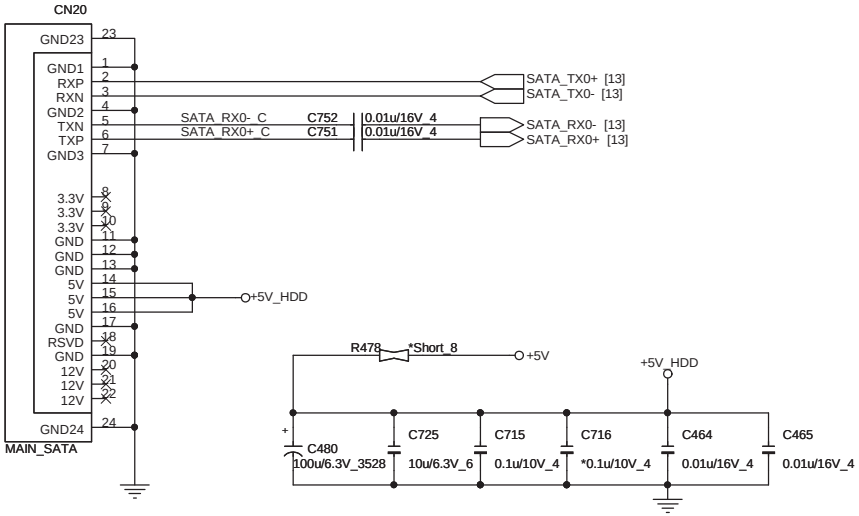
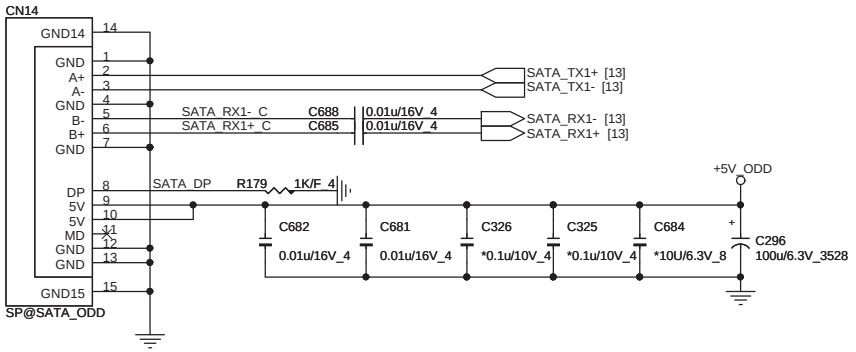
SATA HDD(HDD)



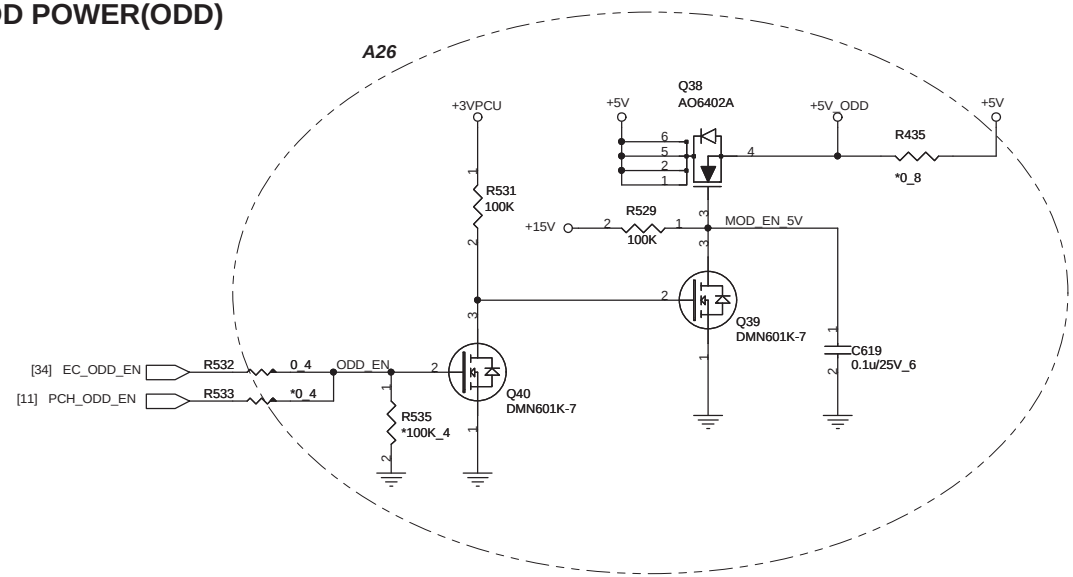
SATA ODD(ODD)



JM51(2-DIMM)-->CN14 P/N:DFHS13FR075
JV51(3-DIMM)-->CN14 P/N:DFHS13FR017
DFHS13FR022
DFHS13FR005
DFHS13FR006

HOLE(OTH)

ODD POWER(ODD)



PROJECT : ZR8
Quanta Computer Inc.

Size	Document Number	Rev
	SATA-HDD/ODD	1A
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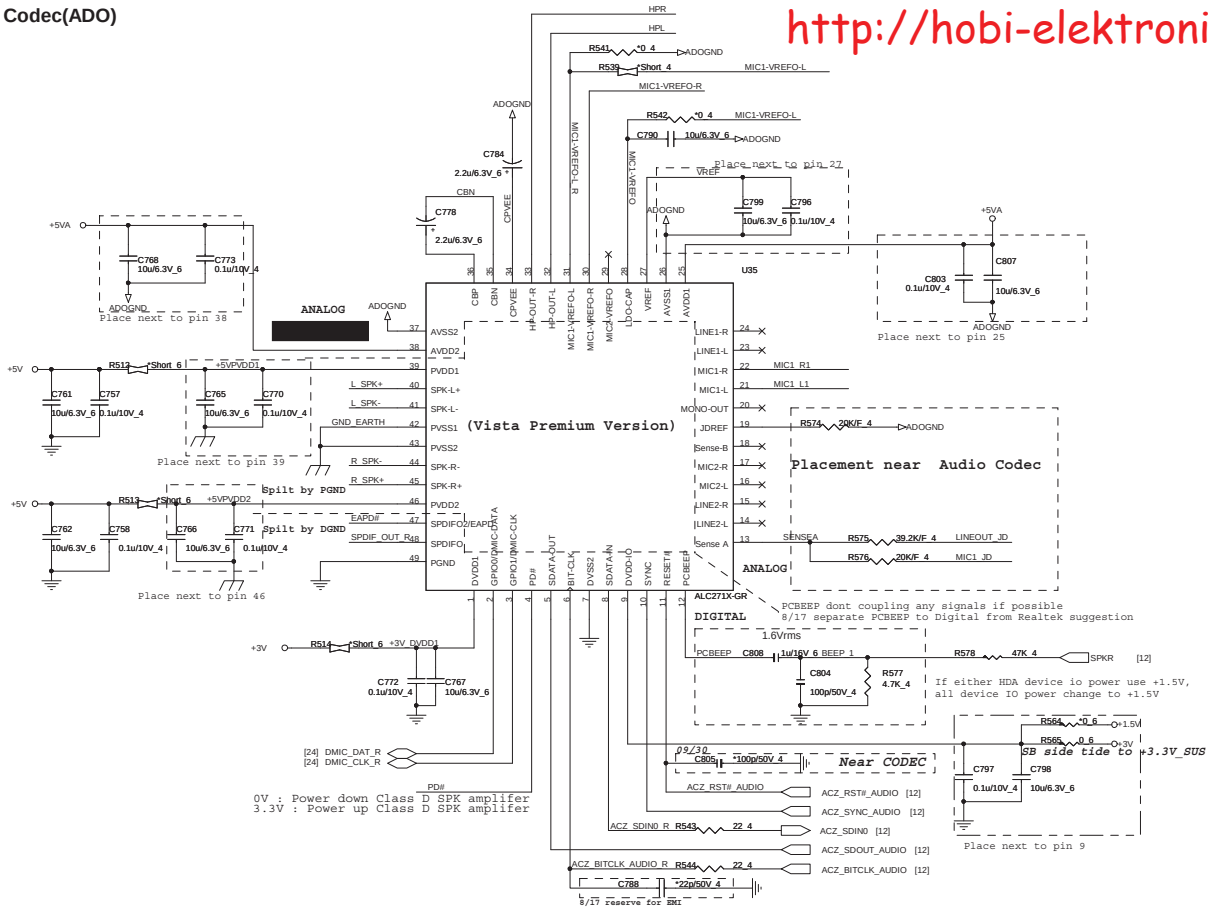
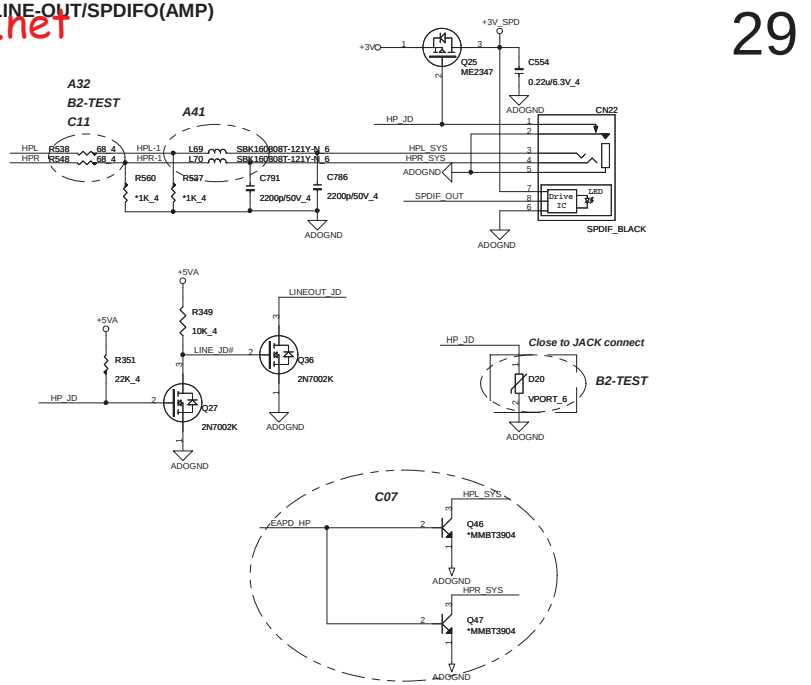
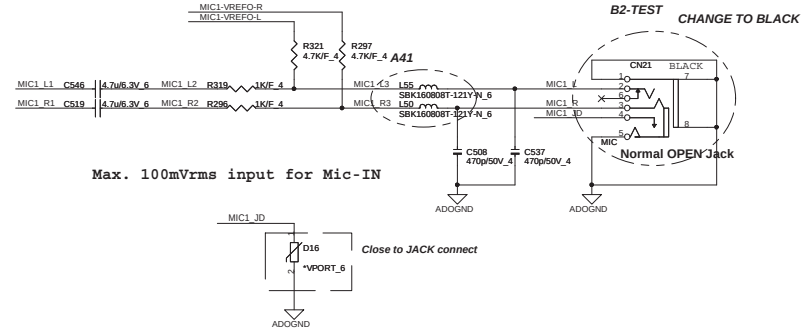
Codec(ADO)



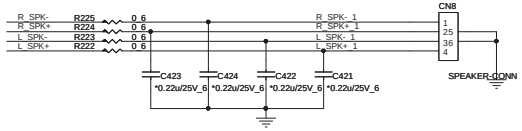
LINE-OUT/SPDIFO(AMP)



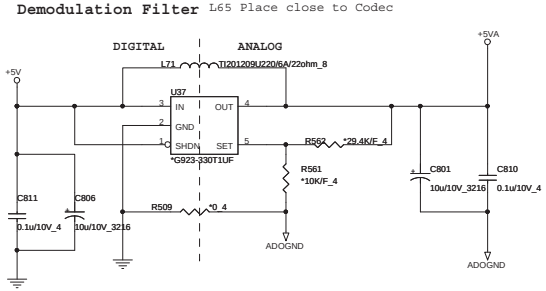
MIC(AMP)



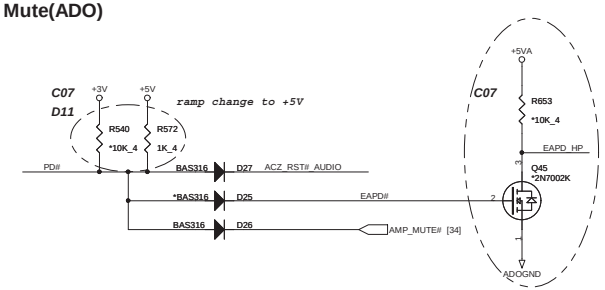
Internal Speaker(AMP)



Power (ADO)



Mute(ADO)



PROJECT : ZR8
Quanta Computer Inc.

Size	Document Number	Rev
	ALC271X / AMP / SPK	1A
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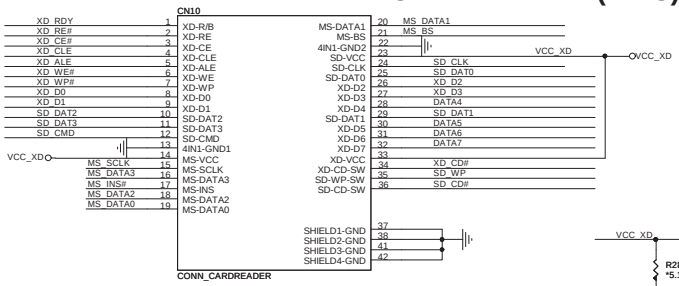
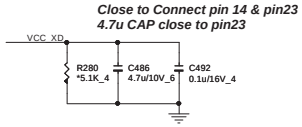
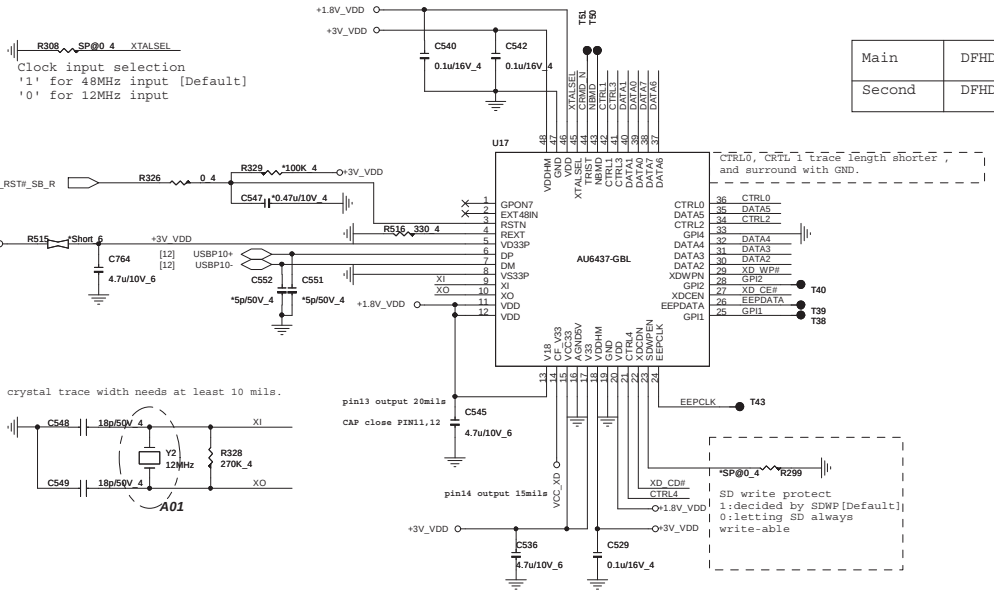
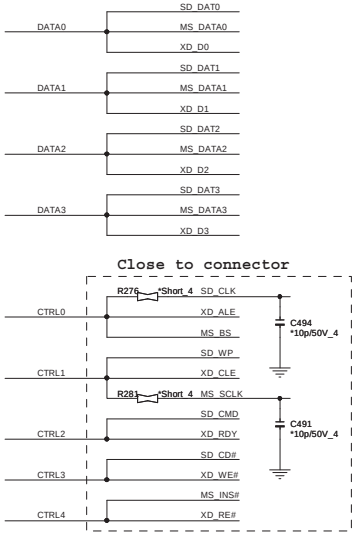
4 IN 1 CARD READER (MMC)





Main	DFHD36MS006
Second	DFHD36MS012





PROJECT : ZR8			
Quanta Computer Inc.			
Size	Document Number		Rev
	AU6437 CardReader		1A
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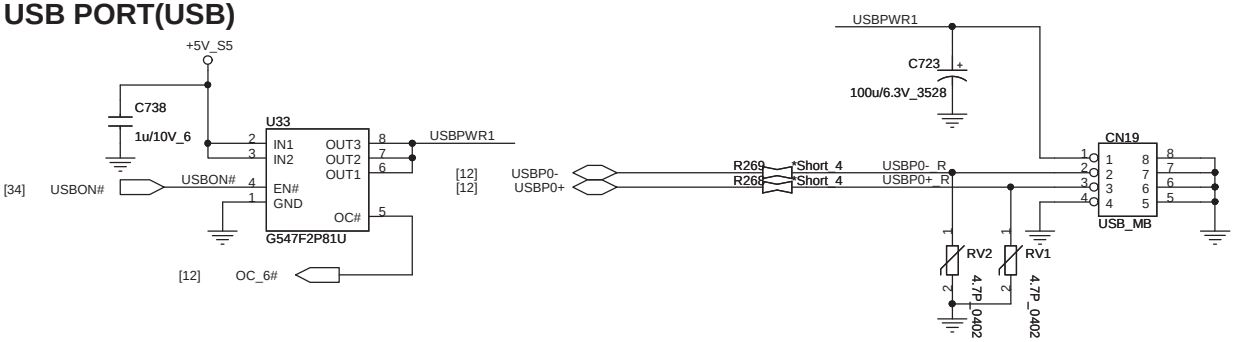
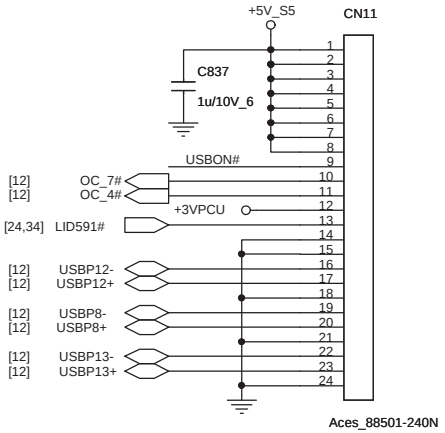
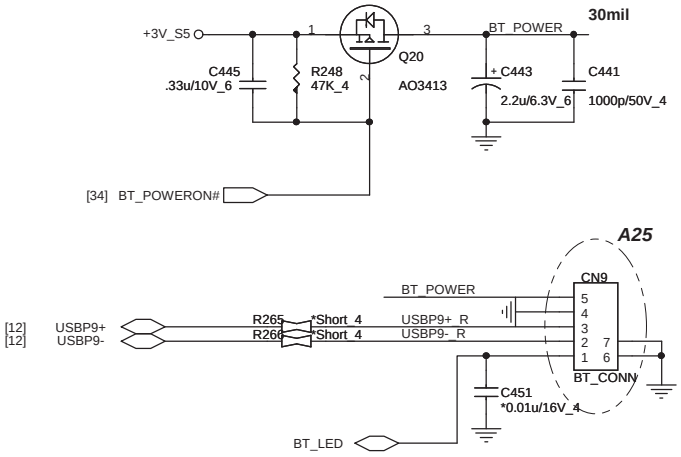
USB PORT(USB)



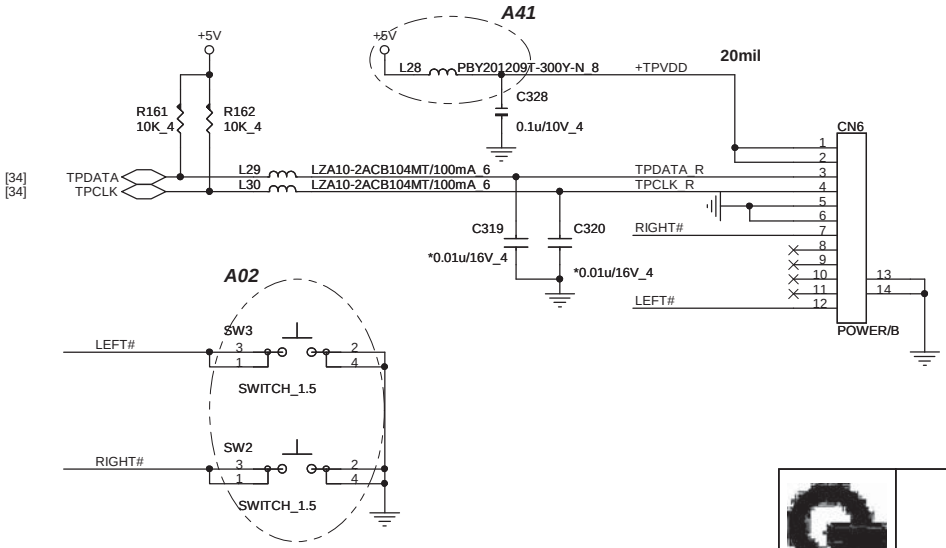
USB BOARD CONN(USB)



BLUETOOTH CONN(BTM)



TOUCHPAD BOARD CONN(TPD)

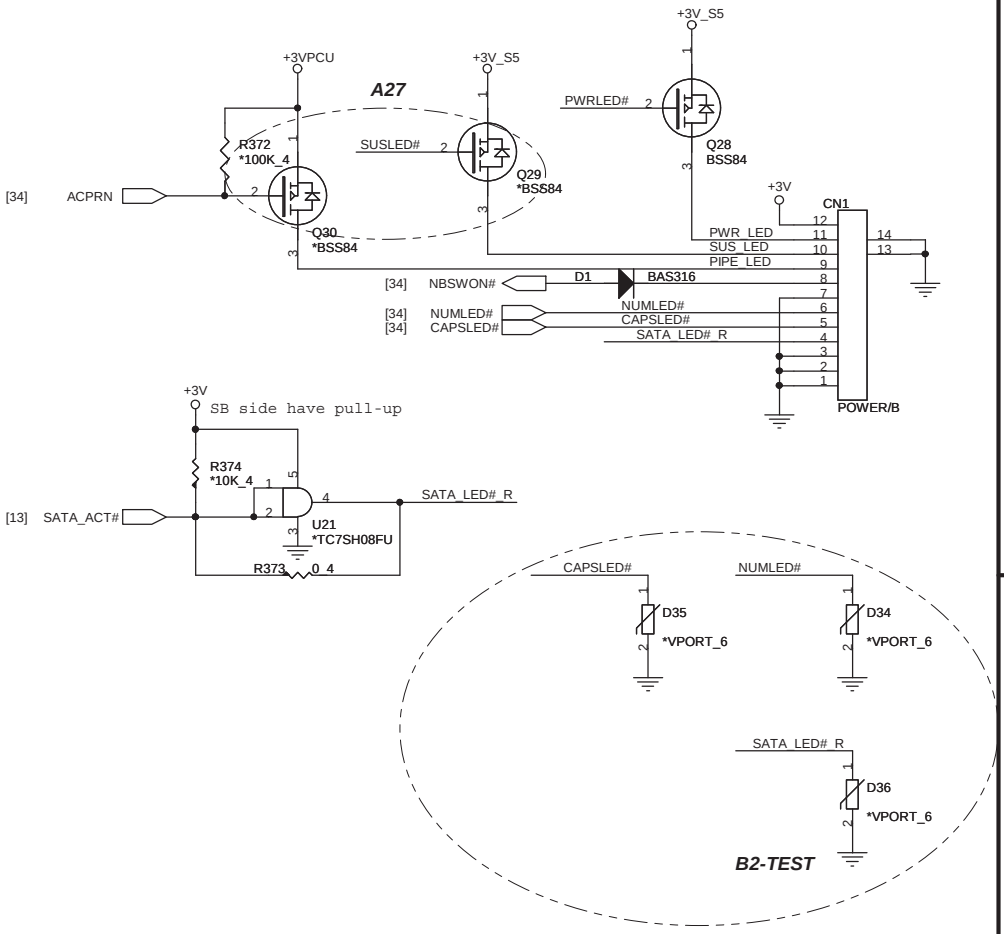


PROJECT : ZR8

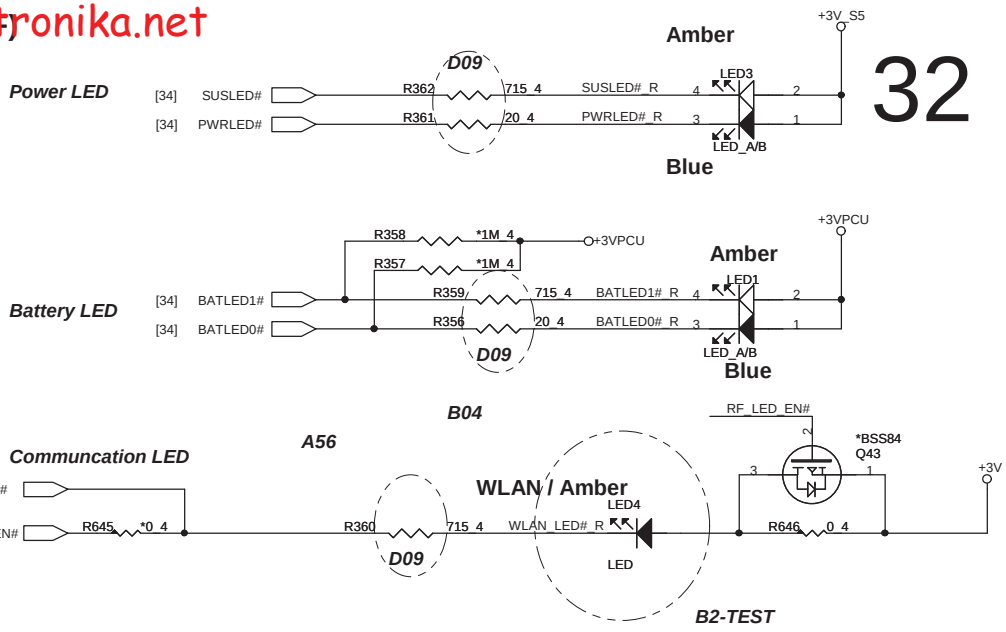
Quanta Computer Inc.

Size	Document Number	Rev
	eSATA/USB	1A
Date: Wednesday, May 27, 2009	Sheet 31 of 49	

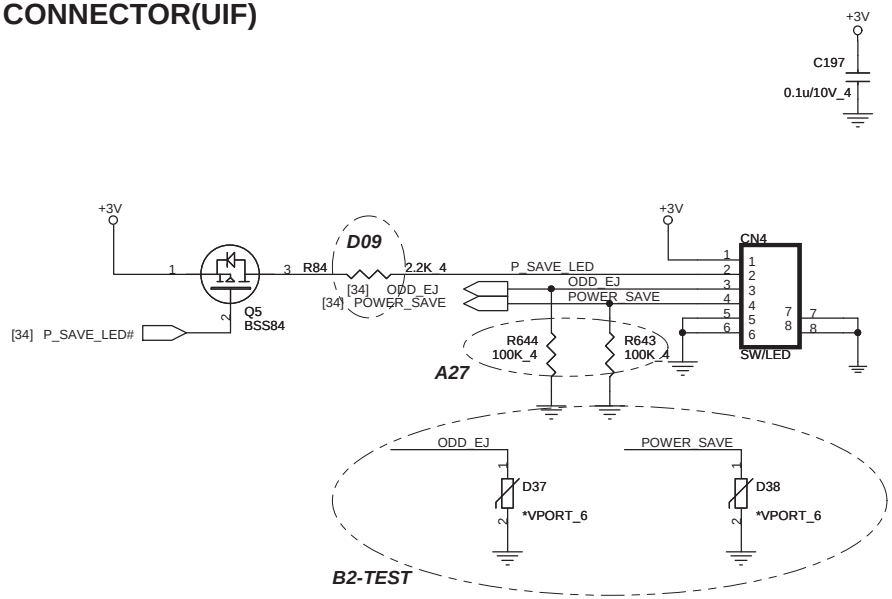
POWER BOARD CONN(UIF)



LED(UIF)



LED BOARD CONNECTOR(UIF)

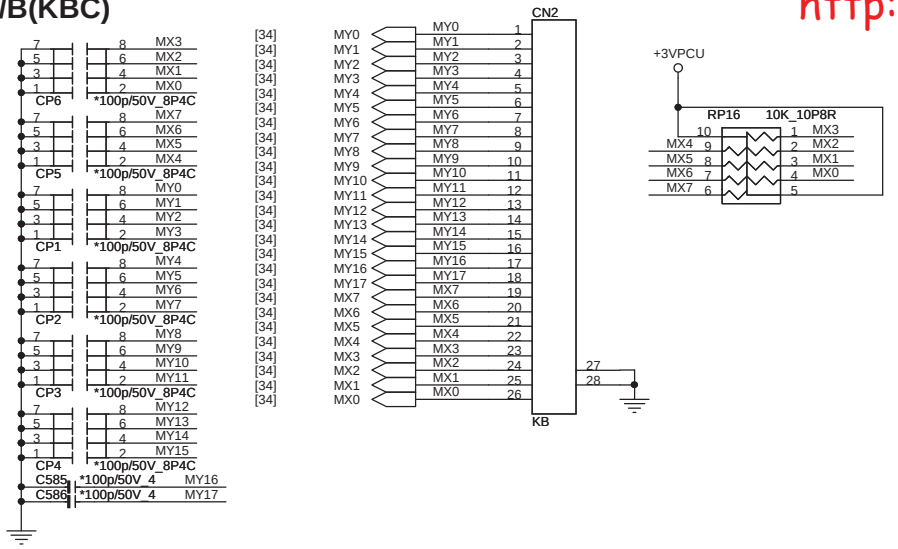


PROJECT : ZR8

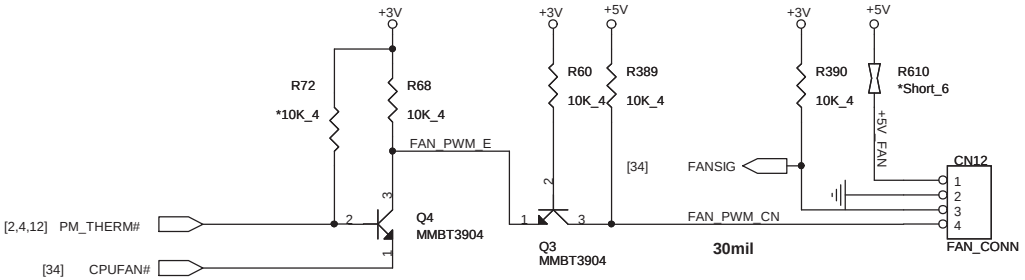
Quanta Computer Inc.

Size	Document Number	Rev
	POWER/USB/BT/TP/MDC	1A
Date: Wednesday, May 27, 2009	Sheet 32 of 49	

K/B(KBC)

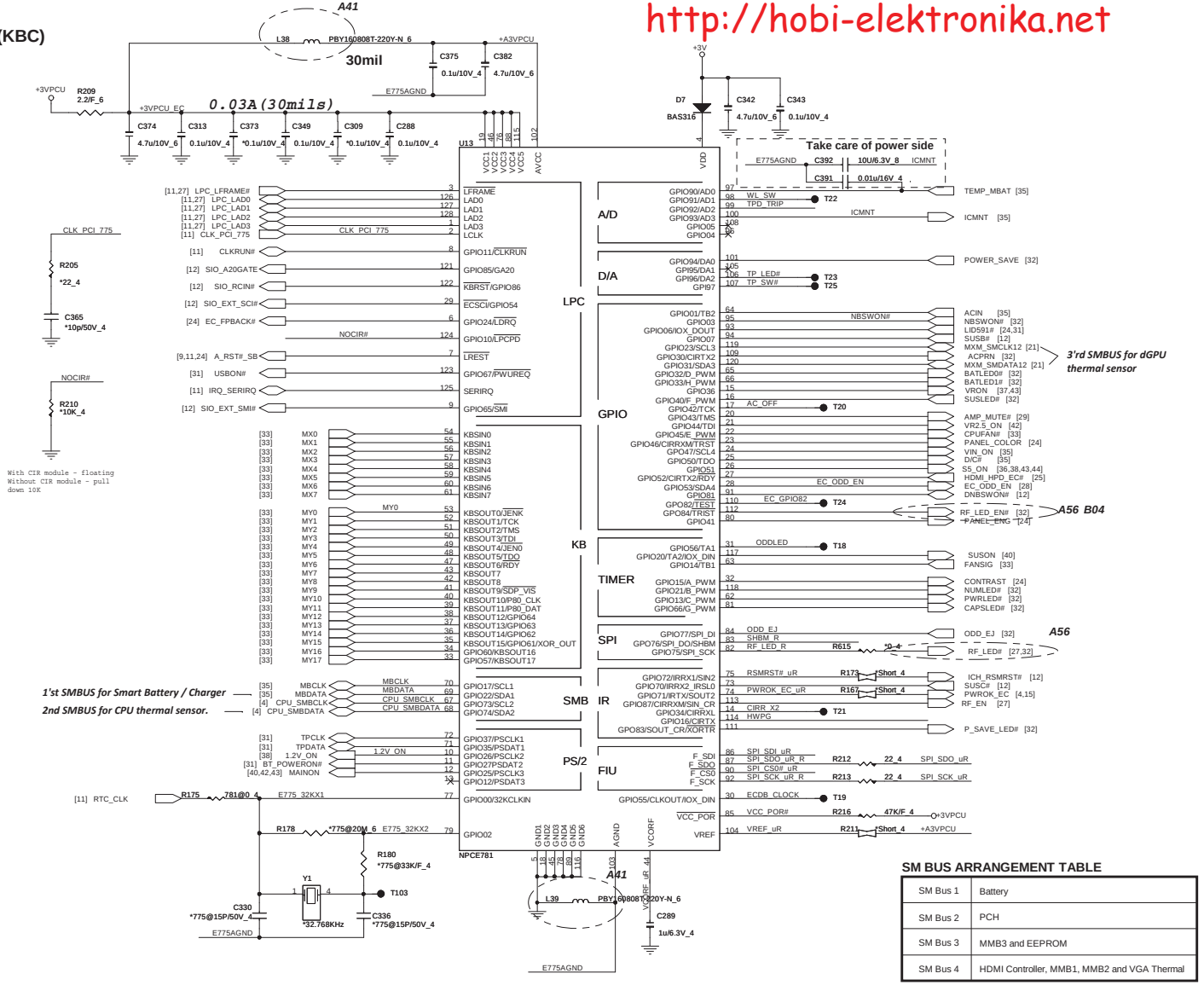


CPU FAN(THM)



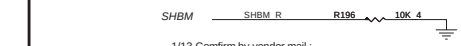
PROJECT : ZR8		
Quanta Computer Inc.		
Size	Document Number: KB/FAN/EE RETURN CAP	Rev 1A
Date: Wednesday, May 27, 2009	Sheet 33 of 49	

EC(KBC)



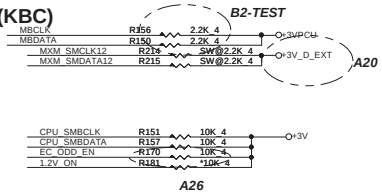
I/O ADDRESS SETTING(KBC)

SHBM=0: Enable shared memory with host BIOS



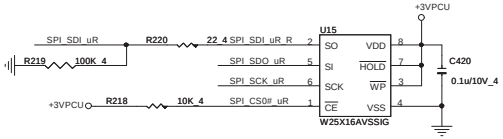
1/13 Comfirm by vendor mail :
Disabled ('1') if using FWH device on LPC.
Enabled ('0') if using SPI flash for both system BIOS and EC firmware

SM BUS PU(KBC)



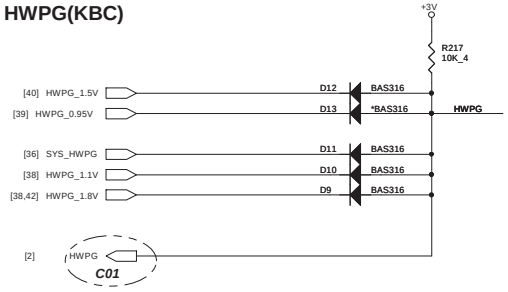
SPI FLASH(KBC)

U15 Change to 1M ==>AKE5GFK0Z09 / AKE3GZN0N00 / AKE3GZP0801



1/13 Comfirm by vendor mail :
If the Southbridge enables 'Long Wait Abort' by
default, the flash device should be 50MHz (or faster)

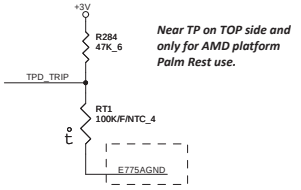
HWPG(KBC)



SM BUS ARRANGEMENT TABLE

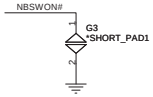
SM Bus 1	Battery
SM Bus 2	PCH
SM Bus 3	MMB3 and EEPROM
SM Bus 4	HDMI Controller, MMB1, MMB2 and VGA Thermal

Palm Rest Thermal Sensor(THM)

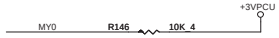


Near TP on TOP side and only for AMD platform Palm Rest use.

POWER-ON Switch(KBC)

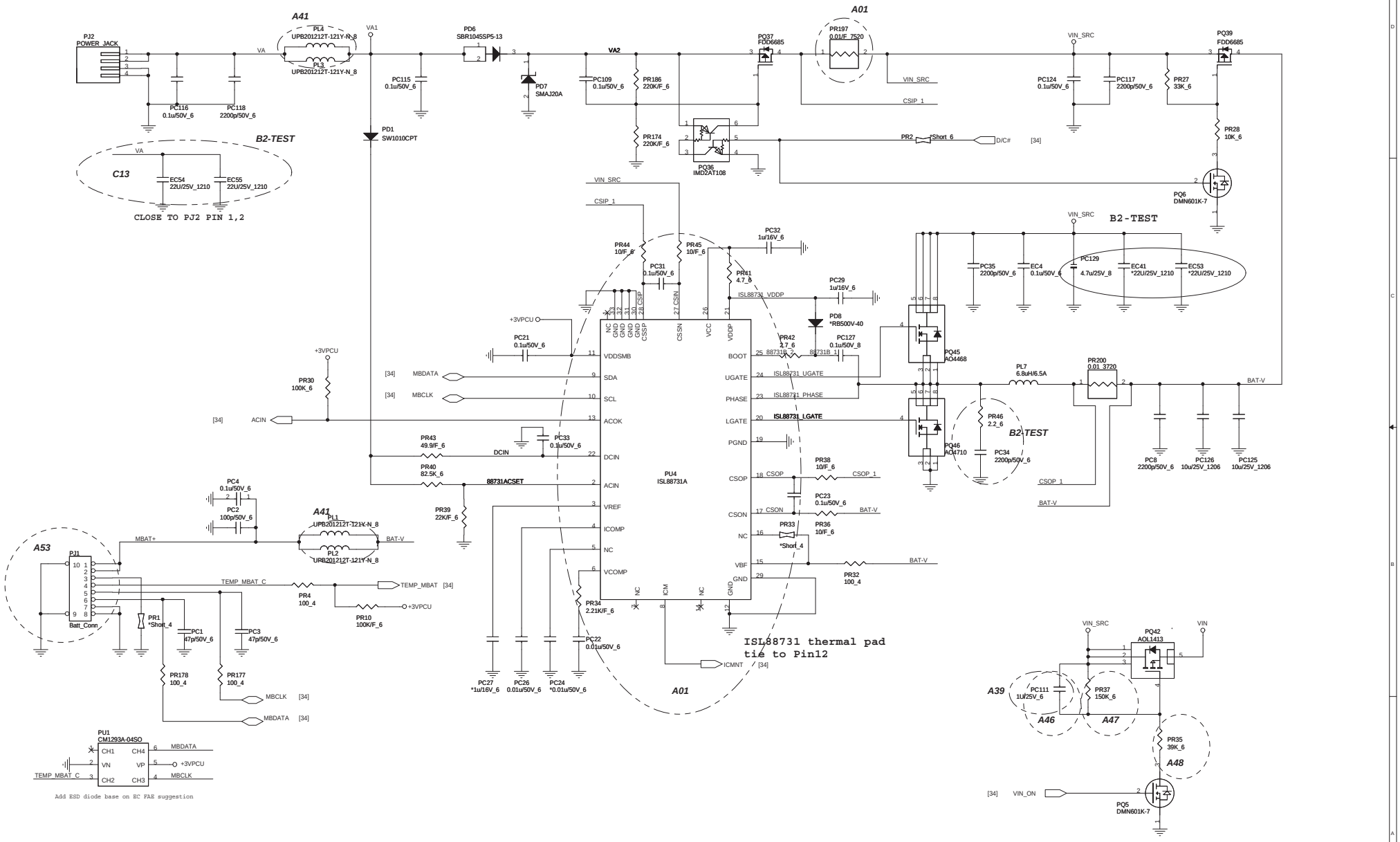


INTERNAL KEYBOARD STRIP SET(KBC)



PROJECT : ZR8
Quanta Computer Inc.

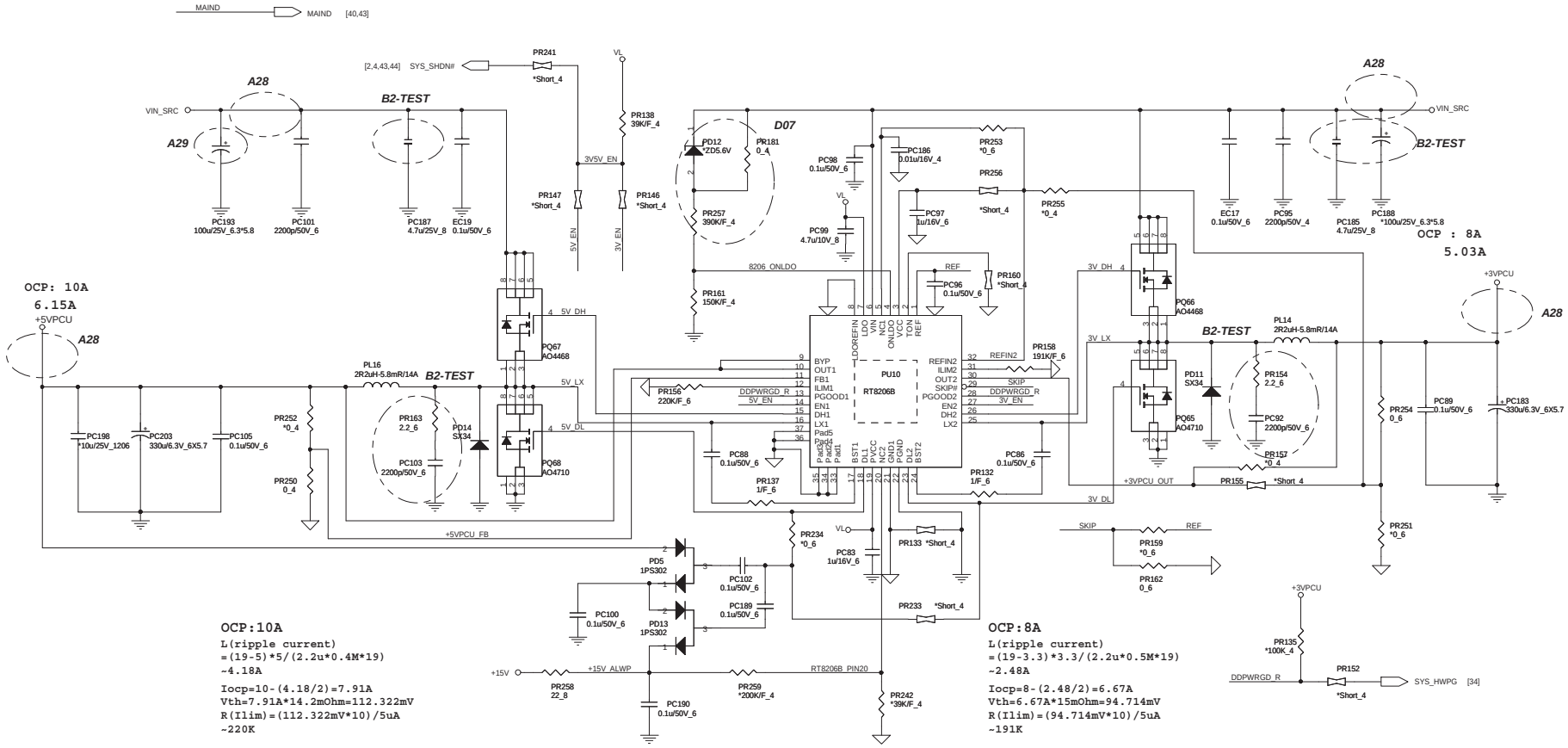
Size	Document Number	Rev
	WPCE775C_0DG & FLASH	1A
Date: Wednesday, May 27, 2009	Sheet 34 of 49	

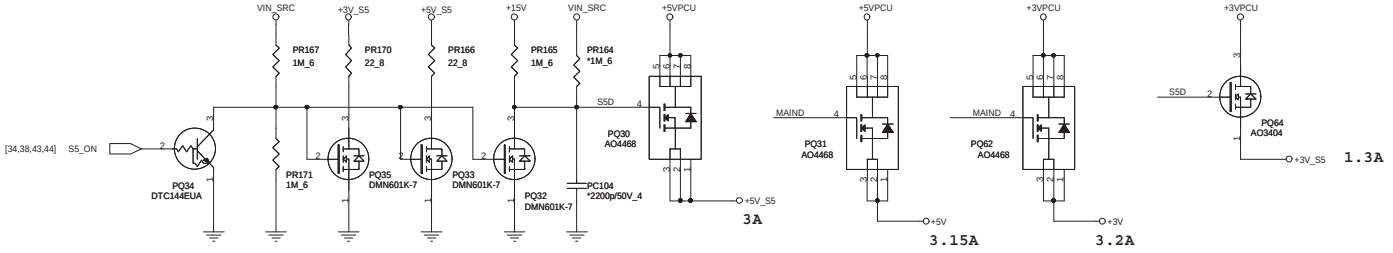


PROJECT : ZR8

Quanta Computer Inc.

Size	Document Number	Rev
	CHARGER (ISL88731)	1A
Date: Wednesday, May 27, 2009	Sheet 35 of 49	





PROJECT : ZR8
Quanta Computer Inc.

Size	Document Number	Rev
	SYSTEM 5V/3V (RT8206)	1A
Date: Wednesday, May 27, 2009	Sheet 36 of 49	

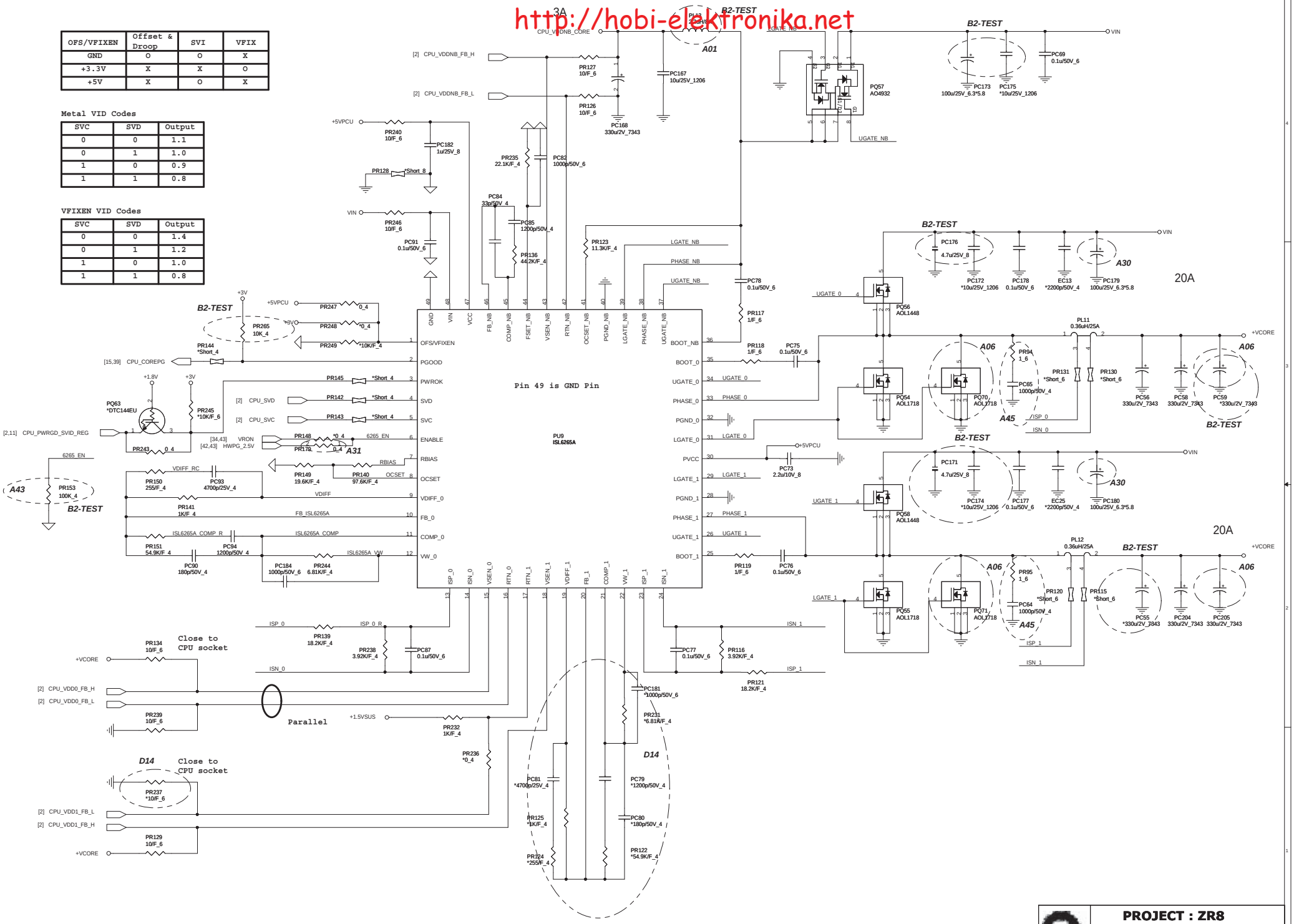
OFS/VFIXEN	Offset & Droop	SVI	VFIX
GND	O	O	X
+3.3V	X	X	O
+5V	X	O	X

Metal VID Codes

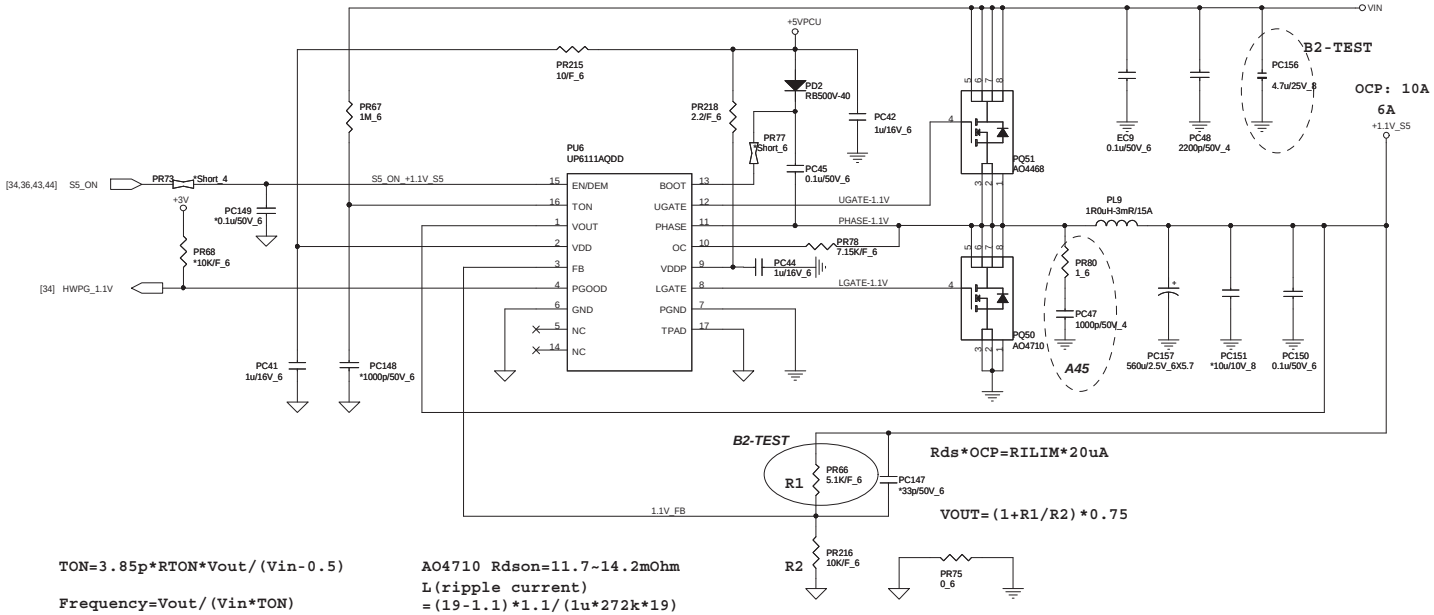
SVC	SVD	Output
0	0	1.1
0	1	1.0
1	0	0.9
1	1	0.8

VFIXEN VID Codes

SVC	SVD	Output
0	0	1.4
0	1	1.2
1	0	1.0
1	1	0.8



	PROJECT : ZR8		
	Quanta Computer Inc.		
Size	Document Number		Rev
	CPU_CORE		1A
Date:	Wednesday, May 27, 2009	Sheet 37 of 49	



TON=3.85p*RTON*Vout/(Vin-0.5)

Frequency=Vout/(Vin*TON)

TON=3.85p*1M*1/(Vin-0.5)

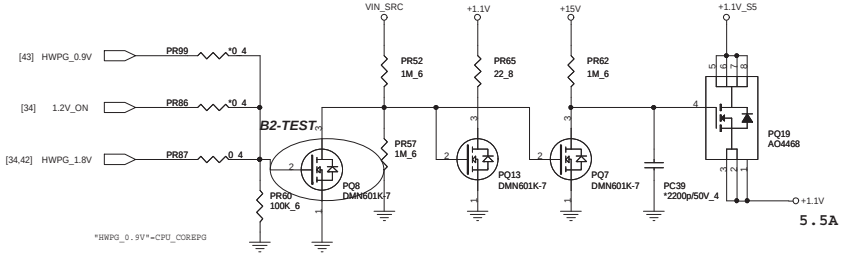
Frequency=1/(0.0036767)=272K

AO4710 Rdson=11.7~14.2mOhm

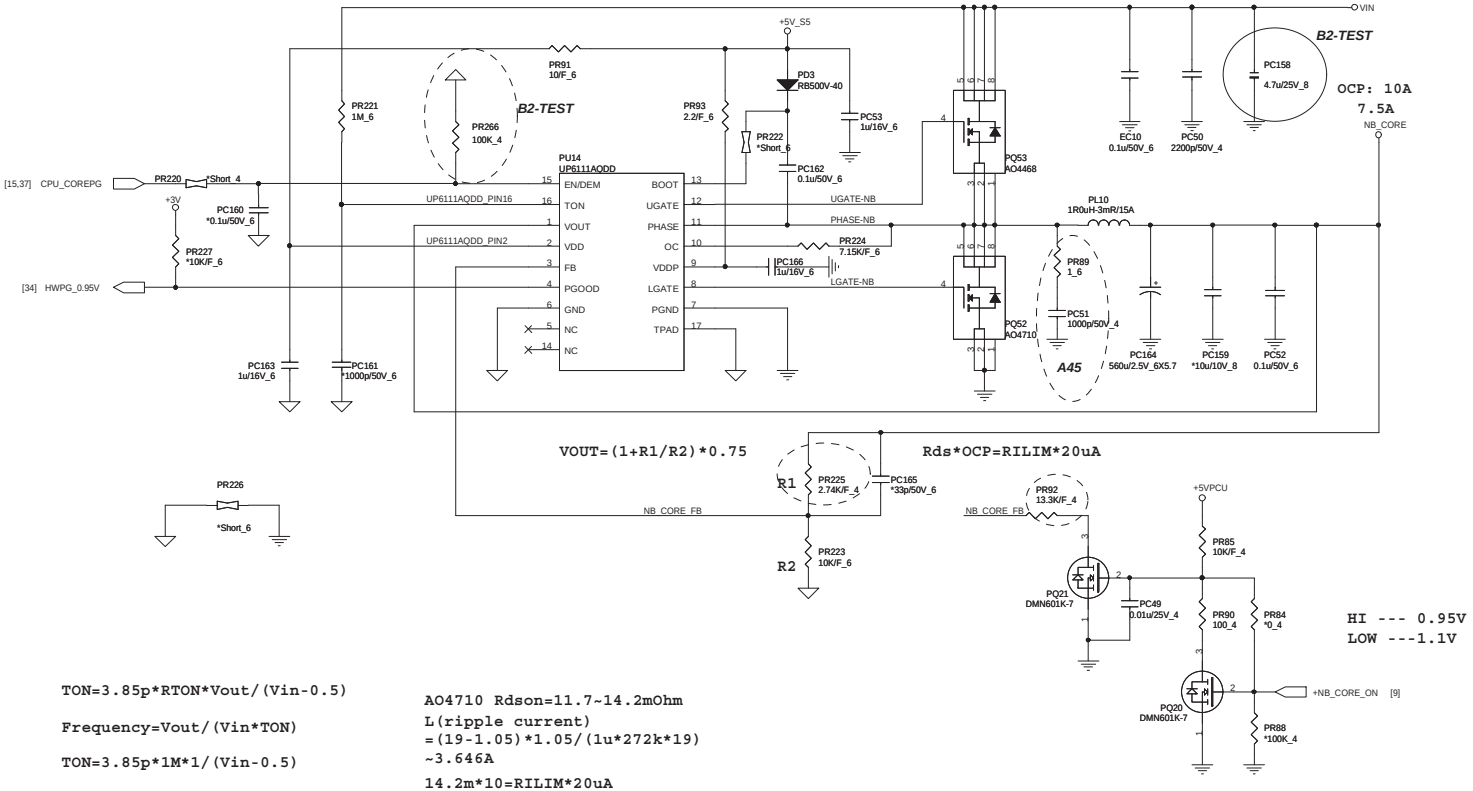
L(ripple current)
=(19-1.1)*1.1/(1u*272k*19)
~3.81A

14.2m*10=RILIM*20uA

RILIM=7.1K--- 7.15K



PROJECT : ZR8	
Quanta Computer Inc.	
Size	Document Number: VCCP 1.1V(UP6111A) — Rev: 1A
Date: Wednesday, May 27, 2009	Sheet 38 of 49



HI --- 0.95V
LOW ---1.1V

TON=3.85p*RTON*Vout/(Vin-0.5)

Frequency=Vout/(Vin*TON)

TON=3.85p*1M*1/(Vin-0.5)

Frequency=1/(0.0036767)=272K

AO4710 Rdson=11.7~14.2mOhm
L(ripple current)
=(19-1.05)*1.05/(1u*272k*19)
~3.646A

14.2m*10=RILIM*20uA
RILIM=7.1K--- 7.15K

PROJECT : ZR8
Quanta Computer Inc.

Size	Document Number	Rev
	NB_CORE(UP6111A)	1A
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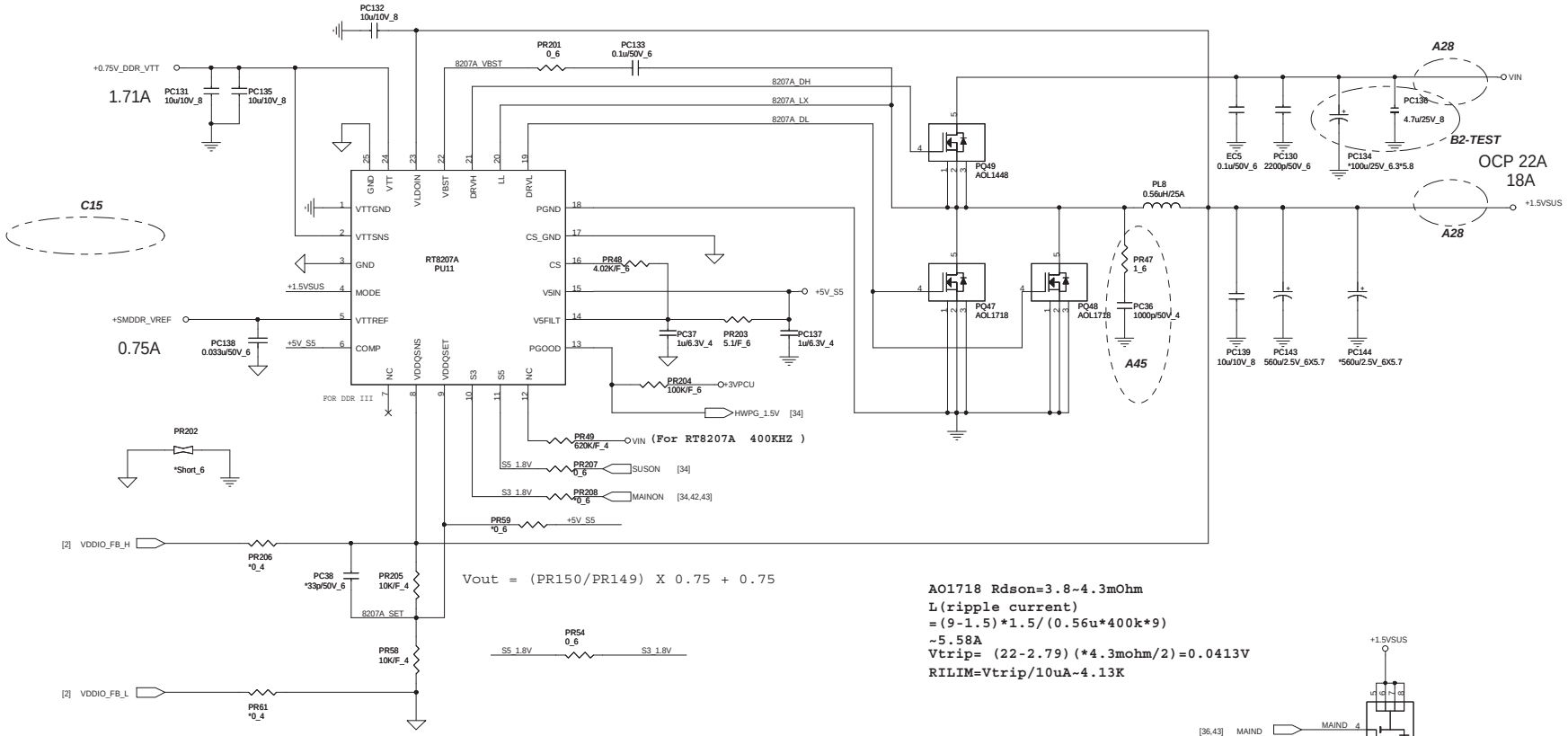
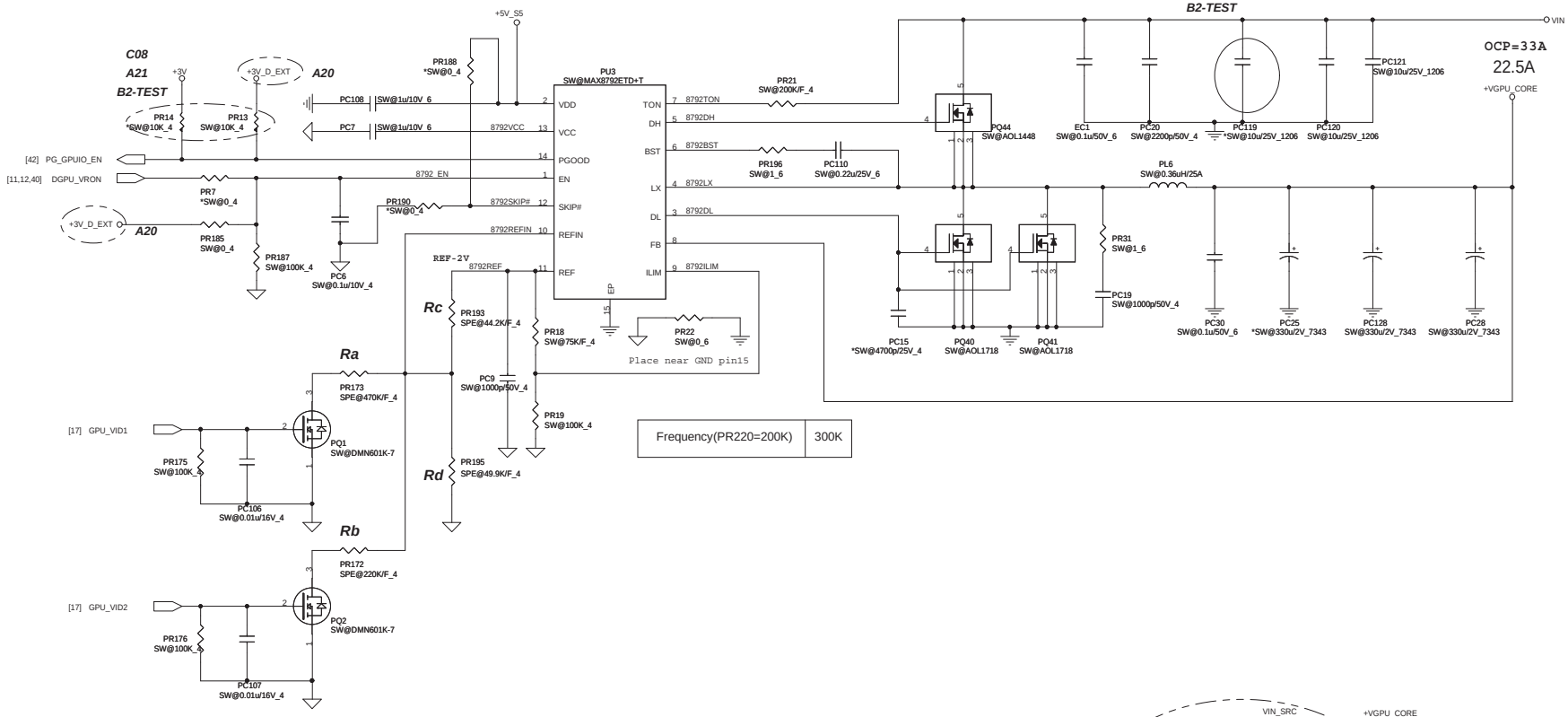
[PWM]

http://hobi-elektronika.net



PROJECT : ZR8	
Quanta Computer Inc.	
Size	Document Number: DDR 1.5V(TPS51116) — Rev: 1A
Date: Wednesday, May 27, 2009	Sheet 40 of 49



Frequency(PR220=200K)	300K

Madison -Pro

GPU_VID1 (GPIO15)	GPU_VID2 (GPIO20)	+VGPU_CORE
0	0	1.05V
1	0	1.0V
0	1	0.95V
1	1	0.9V

Ra	Rb	Rc	Rd	VREF
470K	220K	44.2K	49.9K	2V

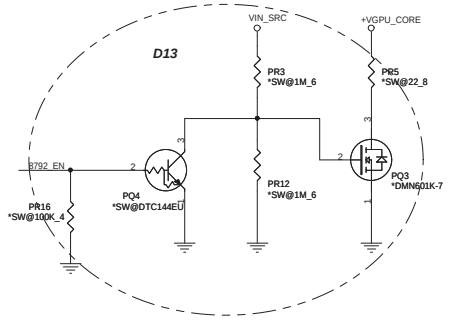
Park -XT

GPU_VID1 (GPIO15)	GPU_VID2 (GPIO20)	+VGPU_CORE
0	0	1.12V
1	0	1.05V
0	1	0.95V
1	1	0.9V

Ra	Rb	Rc	Rd	VREF
332K	130K	39.2K	49.9K	2V

A03

Rc --> 39.2K/F_4 (CS33922FB15)
Ra --> 332K/F_4 (CS43322FB15)
Rb --> 130K/F_4 (CS41302FB00)



PROJECT : ZR8
Quanta Computer Inc.

Size	Document Number	Rev
	GPU CORE(MAX8792)	1A
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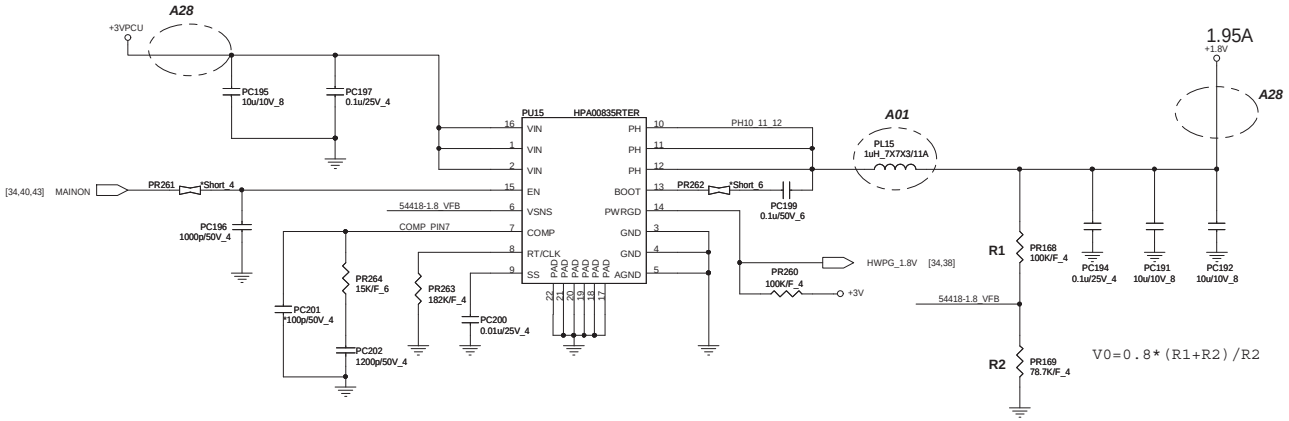

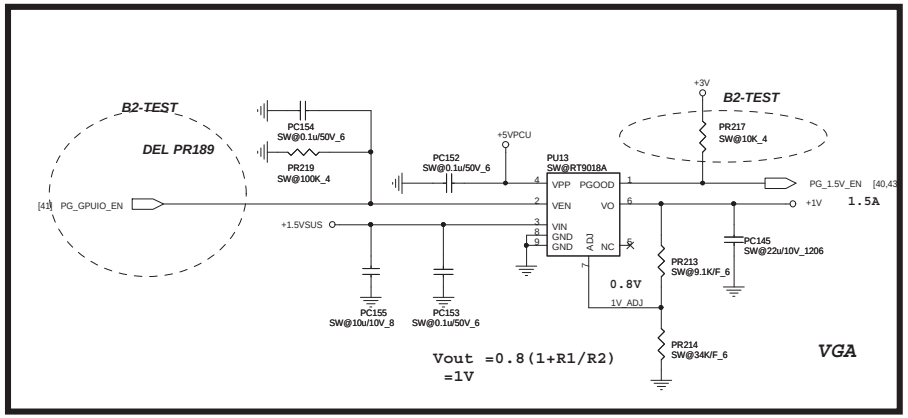

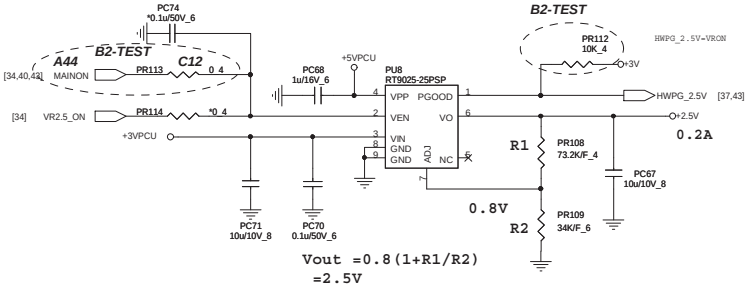

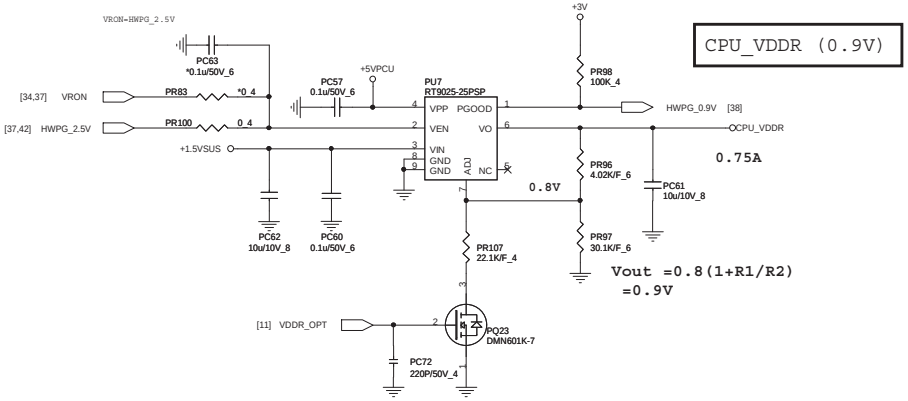

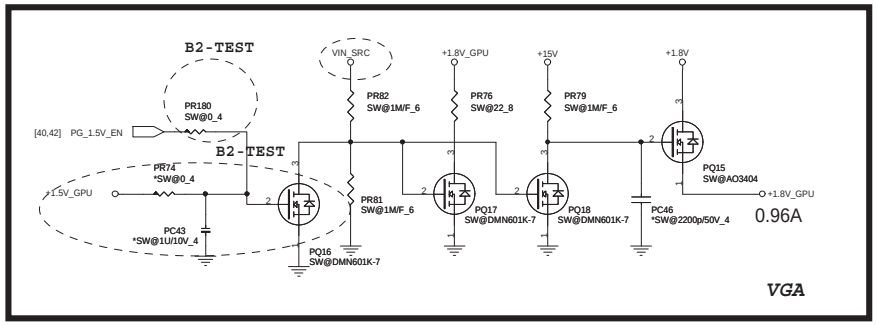

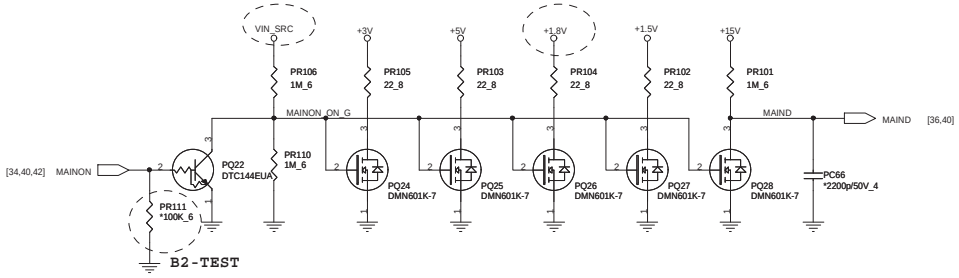

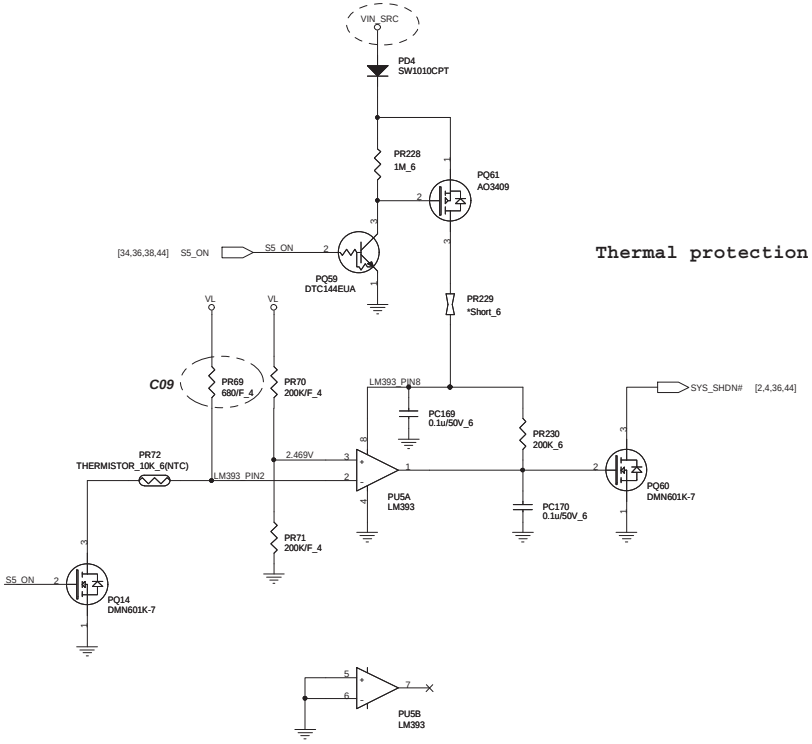

Thermal protection

For EC control thermal protection (output 3.3V)

PROJECT : ZR8			
Quanta Computer Inc.			
Size	Document Number		Rev
	Discharge /Thermal protection		1A
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HOLE26 *H-C276D110P2-8
HOLE21 *H-CT236B315D110P2
HOLE7 *O-ZR8-10
HOLE17 *H-C276D110P2-8
HOLE1 *H-C276D110P2-8
HOLE27 *HG-C315D110P2

CPU
HOLE11 *H-C236D142PB
HOLE12 *H-C236D142PB
HOLE15 *H-C236D142PB
HOLE16 *H-C236D142PB

HOLE3 *H-C276D110P2-8
HOLE2 *HG-C315D110P2
HOLE22 *H-C91D91N

HOLE25 * H-C276D110P2-8
HOLE19 *H-C236D161PB
HOLE13 *H-C236D161PB
HOLE18 *H-C236D161PB

HOLE14 *hg-c355d110p2
HOLE28 *hg-c394d110p2
HOLE30 *hg-c236d110p2

VGA
HOLE9 *H-C236D157P2
HOLE10 *H-TC197BC122D122P2
HOLE4 *H-C197D122PB
HOLE5 *H-TC197BC122D122P2

HOLE23 *H-C236D161PB
HOLE8 *H-C236D157P2
HOLE20 *H-C91D91N
HOLE6 * H-C236D142P2

HOLE29 *H-C157D79PT
HOLE24 *H-C157D102PT

HOLE31 *H-TC236BC161D161P2
HOLE32 *H-C276D110P2-8

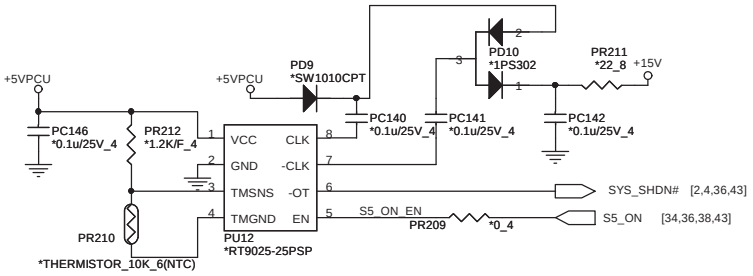
B2-TEST
VIN EC52 0.1u/25V_4
VIN EC51 0.1u/25V_4

B2-TEST
+5V EC50 0.1u/10V_4
+5V EC49 0.1u/10V_4
+5V EC48 0.1u/10V_4
+5V EC47 0.1u/10V_4
+5V EC46 0.1u/10V_4
+5V EC45 0.1u/10V_4
+5V EC44 0.1u/10V_4

For EMI
NB_CORE EC11 *0.1u/25V_4
+VGPU_CORE EC3 *0.1u/25V_4
+5VA EC32 *0.1u/25V_4
+5VPCU EC18 *0.1u/25V_4

VIN_SRC EC26 *0.1u/25V_4 EC20 *0.1u/25V_4
+1.8V EC12 *0.1u/25V_4 EC31 *0.1u/25V_4
+3V_S5 EC21 *0.1u/10V_4
+3V_S5 EC22 *0.1u/10V_4
+3V EC6 *0.1u/10V_4
+3V EC43 *0.1u/10V_4
+3V EC42 *0.1u/10V_4
+1.1V EC8 *0.1u/25V_4 EC23 *0.1u/25V_4
+1.5VSUS EC14 *0.1u/25V_4 EC7 *0.1u/25V_4
+5V EC40 *0.1u/25V_4 EC30 *0.1u/25V_4 EC24 *0.1u/25V_4
+3VPCU EC28 *0.1u/25V_4 EC35 *0.1u/25V_4 EC39 *0.1u/25V_4 EC29 *0.1u/25V_4
+3V EC16 *0.1u/25V_4 EC15 *0.1u/25V_4 EC38 *0.1u/25V_4 EC36 *0.1u/25V_4 EC34 *0.1u/25V_4 EC27 *0.1u/25V_4 EC37 *0.1u/25V_4 EC33 *0.1u/25V_4

POWER TEST



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Quanta Computer Inc.

Size	Document Number	Rev
	Hole, Nuts	1A
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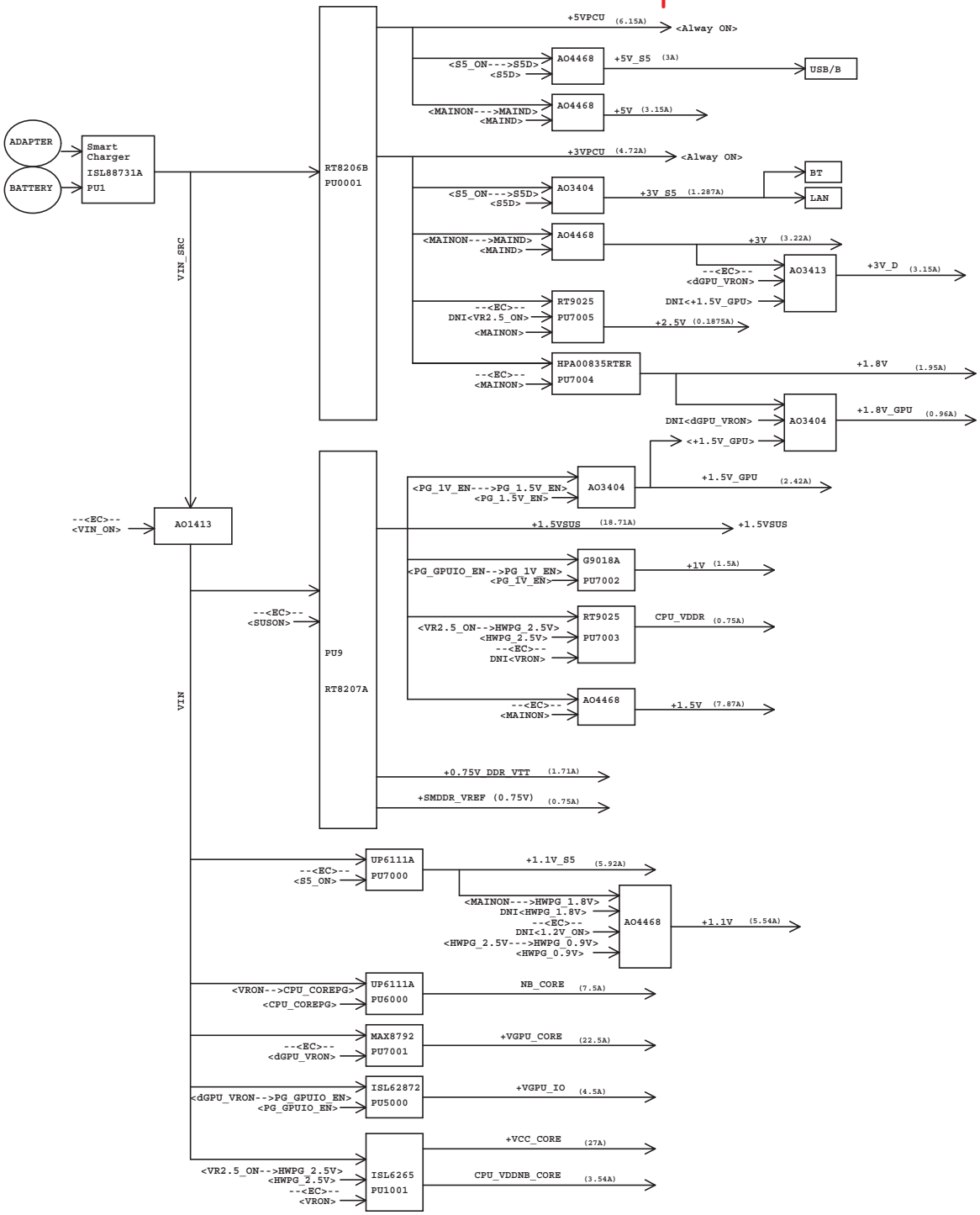
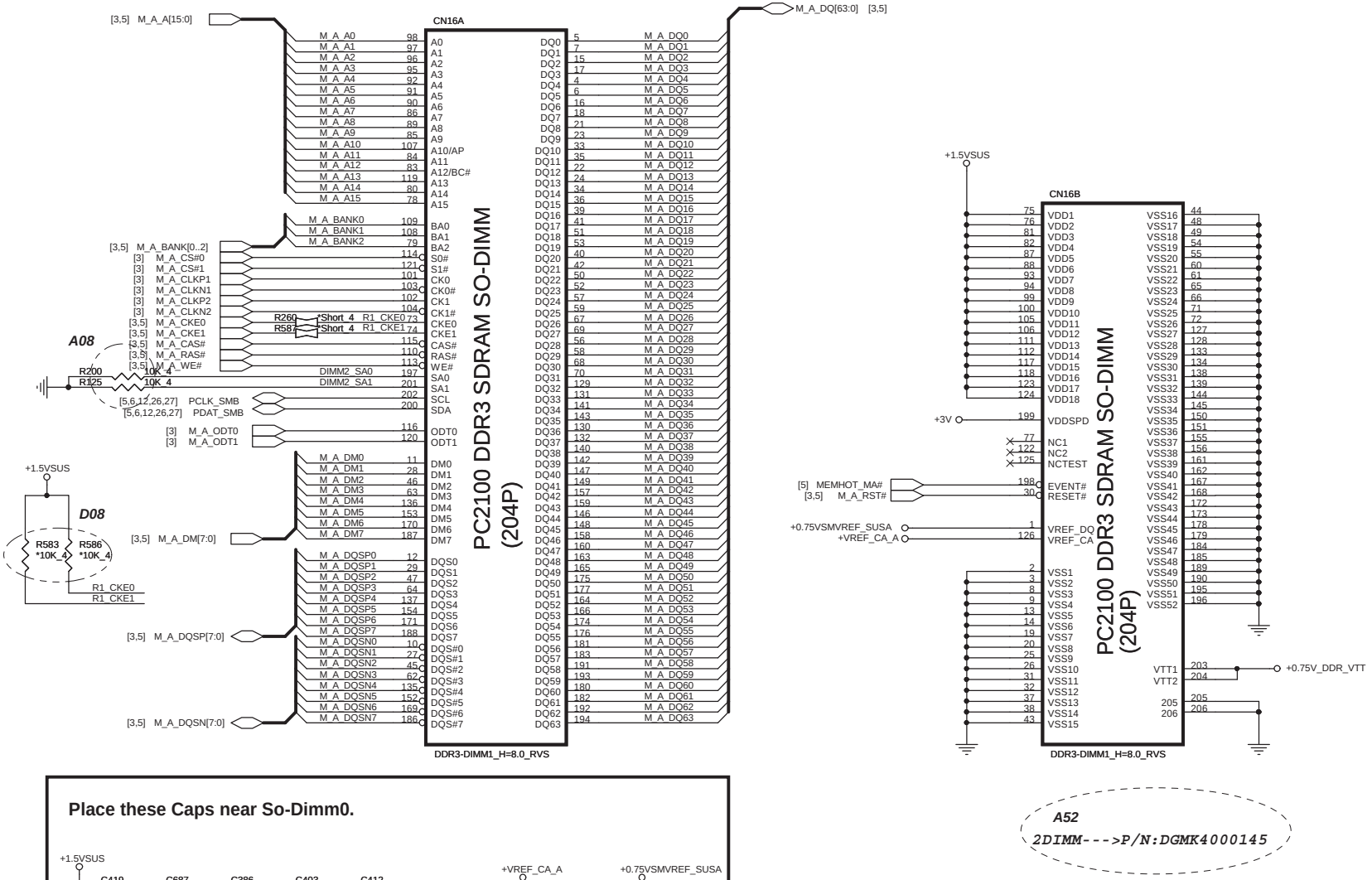
ZR8 Power tree



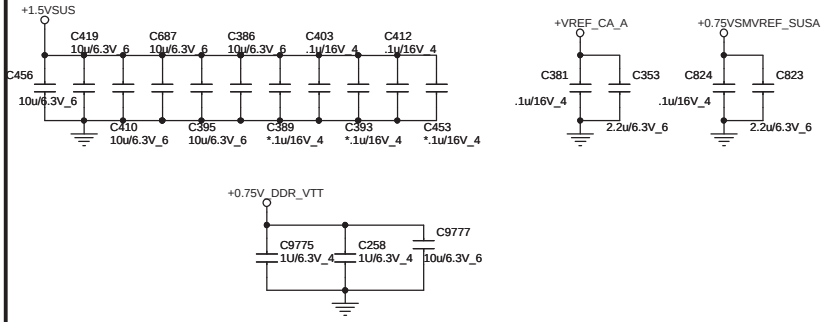
PROJECT : ZR8
Quanta Computer Inc.
Power Tree



A52

2DIMM--->P/N:DGMK4000145

Place these Caps near So-Dimm0.



PROJECT : ZR8

Quanta Computer Inc.

Size	Document Number	Rev
	DDR3 DIMM-1(H=9.2)	1A
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A01 Page25/27/28/31/32/36/38/44 Change footprint , due to SMT open issue highlight.
A02 Page32 Change T/P switch P/N, due to SMT open issue highlight.
A03 Page42 Modify Madison-Pro & Park-XT VID table.
A04 Page14 Modify board ID table and R517,R304 support Side-port function.
A05 Page14 Add R528 support different Side-port VRAM type.
A06 Page44 Support CPU 45W solution.
A07 Page02 Change clock gen to no stuff, due to use internal clock source.
A08 Page06/07/48 Change SO-DIMM SMBUS address.
A09 Page08/10/11 Add Side-port function.
A10 Page10 Chane HDMI DDC CLK/DATA port.
A11 Page10 Stuff R190.
A12 Page12 Change dGPU_PWROK from GPIO1 to GPIO32.
A13 Page12 Change board ID GPIO pin.
A14 Page13 1. Stuff D19,R307,C538 and no stuff D18. 2. Change pull high power rail from +3V_D to +3V.
A15 Page16 Change R500 from 0ohm to 10k.
A16 Page12 Connect 25Mhz for GPU workaround design.
A17 Page18 Modify GPU Power-on sequence table.
A18 Page18 Remove GPU_IO VID contron pin and change GPU_CORE GPIO pin to GPIO15/20.
A19 Page19 Change R107 from 680ohm to 51 ohm and modify design of MEM_RST#. Also change R30 to no stuff.
A20 Page20/22/35/42 Reserve +3V_D_ZR8 power rail for GPU leakage issue.
A21 Page18 Reserve VGA_REQ# pin.
A22 Page25 Delete brightness switch IC control and change to 0ohm solution.
A23 Page25 Stuff R135,R144 ,due to some CRT monitor can't display.
A24 Page25 Stuff C776,C787 for EMI request.
A25 Page25/32 Change connect footprint and P/N.
A26 Page29/35 Add ODD power switch design and stuff R170.
A27 Page33 Change Q29,Q30 to no stuff.
A28 Page37/41/44 Remove jmuper.
A29 Page37 Change PC193 P/N to low highlimit, due to ME thermal door impact.
A30 Page38 Change PC179,PC180 from 22uF/25V to 100uF/25V.
A31 Page38 Change CPU_CORE enable from VRON to HWPG_2.5V.
A32 Page30 Change R538,R548 from 48ohm to 68ohm for audio performance.
A33 Page28 Change R572,R563 to short pad for debug use.
A34 Page20 Change +VGPU_IO power rail to +VGPU_CORE.
A35 Page25 Connect CN5 LCD connect shielding pin to GND for ESD issue.
A36 Page18 Change R65 to no stuff.
A37 Page22 Reserve OVERT# pull high resistor prevent noise.
A38 Page33 Add pull low 100k ohm for ODD_EJ,POWER_SAVE signal.
A39 Page36 Reserve cap for power team request.
A40 Page30 Stuff 0 ohm resistor for ESD protect use.
A41 Page02/03/10/11/15/18/20/21/27/30/32/35/36 Change bead P/N for EMI request, the reason is cost down and not STD parts.
A42 Page21 Reserve 0 ohm for PLL power use.
A43 Page38 Remove PR153 & change to 0402 package
A44 Page44 Change PR113 from 0 to 10K Ohm & Change enable source to +3V
A45 Page38/39/40/41 Stuff PR80,PR89,PR94,PR95,PR47 to 1 Ohm & PC47,PC51,PC64,PC65,PC36 of value to 1000p for EMI request
A46 Page36 Change PC111 of value to 1U/25V
A47 Page36 Change PR37 of value, from 33K to 150K
A48 Page36 Change PR35 of value, from 10K to 39K
A49 Page26 Change HDMI connector PN
A50 Page7 Change P/N for 3-DIMM H=4.0 STD
A51 Page6 Change P/N for 3-DIMM H=4.0 RVS
A52 Page48 Change P/N for 3-DIMM H=8.0 RVS
A53 Page36 Change battery connector P/N to DFHD08MR099
A54 Page26 Modify HDMI's I2C for DIS.

ZR8 Schematic EC Tracking Record A (For A TEST) Nov.17 , 2009
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A55 Page14 Change board ID power rail from +3V_S5 to +3V.
A56 Page33/35 Modify WLAN RF_LED control design.
A57
A58 Page12 Remove R331 only for A11 version.
A59 Page12 Add U18,C533 & remove R303 for power sequence.
A60 Page14 Remove C760,C754,R507& Y7, due to it's for external clock use.
A61 Page2 Stuff R474,R486 for LAN & WLAN of REQ#.
A62 Page3/12 Stuff R424 and no stuff R286, due to CPU_PRPCHOT# is +1.5VSUS level.
A63 Page16 Change D29 package & Add D24.

Note : Change 0ohm to short pad
R276,R281,R415,R443,R445,R531,R532,R533,R534,R535,R539,R566,R174,R512,R513,R263,R437,R439,R441,R99

ZR8 Schematic EC Tracking Record B1 (For B1 TEST) Dec.09 , 2009
EC / Page / Item / Description

B01 Page21 Remove DP/TMDS Output Driver Analog Supply from port C&D. Due to it's don't to use.
B02 Page25 Stuff R48 for Discrete platform use.
B03 Page/10/25 Modify R signal pull low resistor value to 140ohm, due to keep 70 ohm trace impedance.
B04 Page33 Modify WLAN LED design and change from GPIO82 to GPIO84.
B05 Page27 Change LAN layout footprint for "SAW" new package.
B06 Page13/25 Reserve CCD USB host from for Port2, due to CCD issue.
B07 Page33 Reserve blue LED power source to 5V, due to White/Blue LED max Vf is more than Green/Orange LED.

ZR8 Schematic EC Tracking Record C (For C TEST) Jan.28 , 2010
EC / Page / Item / Description

C01 Page02/34 Remove "CPU_THERMTRIP#" control from SB820, due to BIOS don't support this function. Add another "SYS_SHDN#" for H/W shutdown function and add HWPG shutdown design.
C02 Page04 No stuff Q21,D14,R255 for thermal sensor Alert fnction and change to EC or H/W shutdown function.
C03 Page09 Add 1uF for monitor test noise issue.
C04 Page12 Add 0ohm to separate VGA_REQ function, due to it's don't support the function and cause by leakage current concern.
C05 Page24 Modify VGA note text for R signal impedance control.
C06 Page24 Add brightness switch control by iGPU switch mode. Due to BIOS for C test already support.
C07 Page29 Reserve EAPD# audio design for "Bo" sound.
C08 Page41 Change PG_GPUIO_EN pull high power rail from +3V to +3V_D_EXT. For Park GPU SG mode hang up issue.
C09 Page43 Change PR69 FROM 1.2K to 680ohm , the reason is for SDA high temperature (40 degree/20% humidity) auto shutdown issue.
C10 Page27 Short LPC signal for debug card use.
C11 Page29 Change R538,R548 from 56ohm to 68ohm for audio performance test FSOV spec requirement.
C12 Page42 Change PR113 from 10k to 0ohm.
C13 Page35 Change EC54,EC55 to stuff for ISN issue.
C14 Page21 Modify DDR3 Memory Aperture size table.
C15 Page03/40 Reserve VDDR_SENSE signal to controller IC.
C16 Page27 Change RP32 to no stuff.
C17 Page04 Modify CPU thermal control design from EC or BIOS control and change U16,R254 to no stuff ,Q17,Q18,Q19 to stuff.
C18 Page03 No stuff R189.

Note : Change 0ohm to short pad
R124,R121,R174,L31,L37,L35,R136,R115,R169,R325,R315,R295,R292,R278,R31,R90,R21,R112,R24,R25,R270,R530,R99,R478,R512,R513,R514,R326,R269,R268,R265,R266,R610,PR73,PR220,PR261
,PR229

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ZR8 Schematic EC Tracking Record A (For Ramp) Feb.25 , 2010

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D01 Page03 Change CPU VDDR_SENSE pull high power rail to CPU_VDDR and remove trace connect to controller IC.
D02 Page15 Modify text note.
D03 Page12 Change "GBE_COL" ,"GBE_CRS" ,"GBE_RXERR" to GND follow SCL V1.04 version.
D04 Page14 Change USB PLL power rail source to separate VDDPL_33_USB_S follow SCL V1.04 version.
D05 Page04 No stuff R267,C450,C344.
D06 Page09 Delete R149,R152 layout pad.
D07 Page36 No stuff PD12 and add PR181, change PR257 from 1k to 390k. The purpose is for panasonic battery low power protect issue.
D08 Page05/46 No stuff R584,R259,R583,R586 for CKE signal.
D09 Page32 Change LED current sense resistor value for LED light measure requirement. (Follow ZR7B)
D10 Page21 Modify VRAM table.
D11 Page05/06 Change R123,R122,Q10,R202,R195,Q14 to no stuff, due to S1g4 don't support MEMHOT function.
D12 Page02 Reserve prochot# for FAN control.
D13 Page41 No stuff PR16,PQ4,PR3,PR12,PR5,PQ3. Due to MAX8792 had integrate discharge design.
D14 Page37 Change some component to no stuff, dut to for S1g4 use the same VDD power don't need to compensation difference voltage.

Note : Change 0ohm to hort pad.
R203,117,R585,R588,R260,R587,PR1,PR2,PR33,PR241,PR147,PR146,PR160,PR256,PR133,PR233,PR152,PR155,PR128,PR142,PR143,PR144,PR145,PR130,PR131,PR115,PR120,PR77,PR226,PR222,PR202,PR262.

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