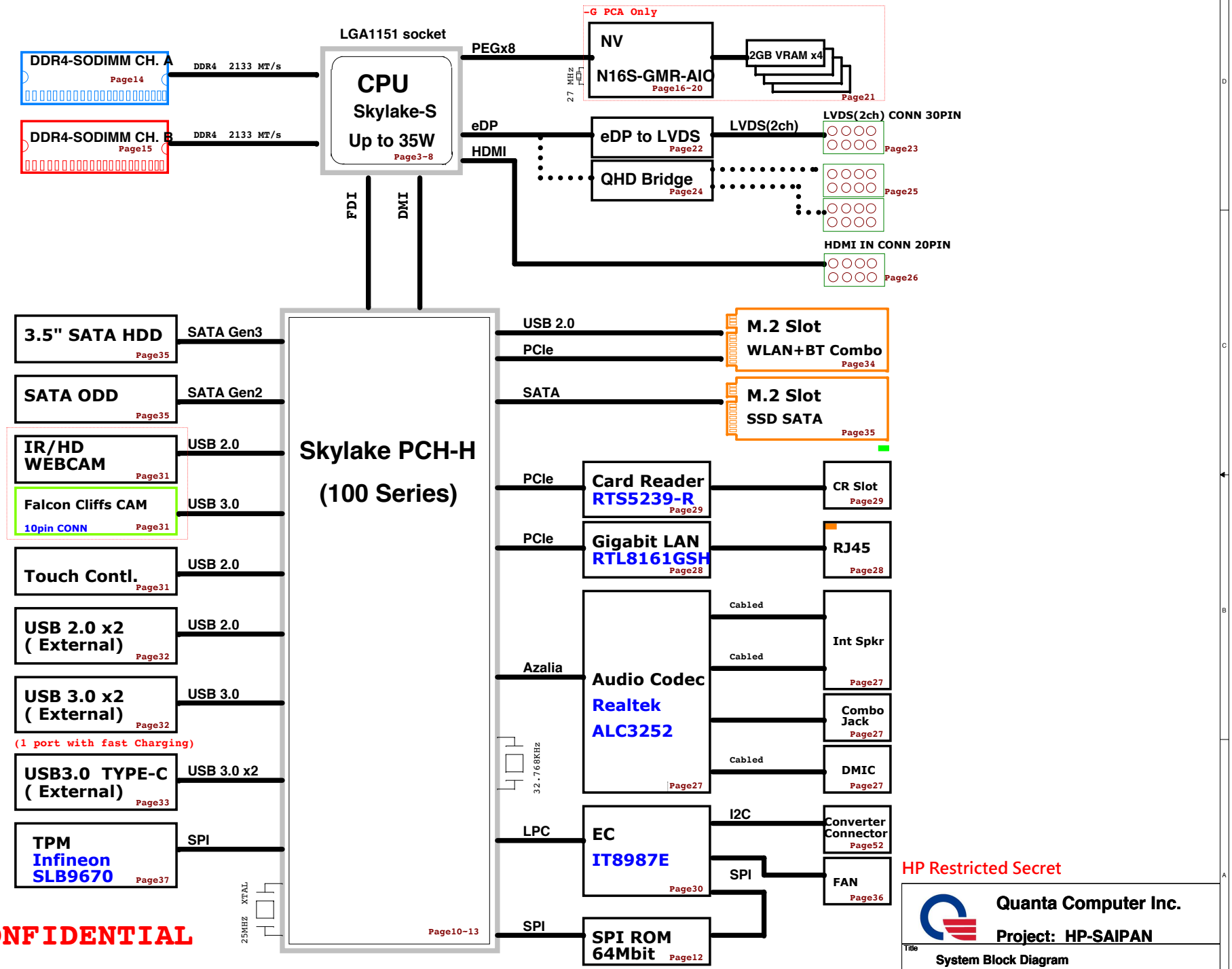
# HP Saipan System Block Diagram

01




CONFIDENTIAL

HP Restricted Secret

Quanta Computer Inc.

Project: HP-SAIPAN

| | | |
|---|---|---|
| Title: System Block Diagram | | |
| Size | Document Number: – | Rev: A |
| Page Modified: Thursday, December 17, 2015 | Sheet 1 of 61 | |

## Voltage Rails

| Power Rail | Voltage | S0 | S3 | S4 | S5 | PCU | G3 | Ctl Signal | |
|---|---|---|---|---|---|---|---|---|---|
| +RTC_VCC | 3V | ON | ON | ON | ON | ON | ON | | RTC Batt, PCH , EC |
| +VIN | 19V | ON | ON | ON | ON | ON | ON | Adapter in | |
| +5V_ALW | 5V | ON | ON | ON | ON | ON | ON | Int. LDO | LED |
| +3V_ALW | 3.3V | ON | ON | ON | ON | ON | ON | Int. LDO | EC |
| +3V_AUX | 3.3V | ON | ON | ON | ON | ON | OFF | LDO | System |
| +5V_S5 | 5V | ON | ON | ON | ON | OFF | OFF | S5_ON | PCH, USB, 3D WebCAM, Touch Panel, USB Charger |
| +3V_S5 | 3.3V | ON | ON | ON | ON | OFF | OFF | S5_ON | PCH, XDP, SPI flash ROM,NGFF LAN |
| +1.8V_S5 | 1.8V | ON | ON | ON | ON | OFF | OFF | S5_ON | PCH, XDP, NGFF LAN |
| +1V_S5 | 1.0V | ON | ON | ON | ON | OFF | OFF | PG_+1.8V_S5 | PCH |
| +VCCST_VCCPLL | 1.0V | ON | ON | OFF | OFF | OFF | OFF | S3_ON | CPU, PCH, XDP |
| +VDDQ | 1.35V | ON | ON | OFF | OFF | OFF | OFF | S3_ON | DDR4, CPU DDR4 I/O |
| SMDDR_VTERM | 0.75V | ON | ON | OFF | OFF | OFF | OFF | DDR_VTT_CNTL | DDR4 |
| +5V | 5V | ON | OFF | OFF | OFF | OFF | OFF | MAIN_ON1 | HDD, ODD,Audio AMP,Panel VCC,FAN |
| +3V | 3V | ON | OFF | OFF | OFF | OFF | OFF | MAIN_ON1 | PCH, Audio, Card Reader, TPM, FHD CAM |
| +12V | 12V | ON | OFF | OFF | OFF | OFF | OFF | MAIN_ON1 | 3.5" HDD |
| +VCCIO | 0.95V | ON | OFF | OFF | OFF | OFF | OFF | PG_MAIN | CPU |
| +VCCSA | 1.05V | ON | OFF | OFF | OFF | OFF | OFF | PG_+VCCIO | CPU |
| +VCCGT | 0.65~1.3V | ON | OFF | OFF | OFF | OFF | OFF | VR_ON | CPU |
| +3.3V_VGA | 3.3V | ON | OFF | OFF | OFF | OFF | OFF | EN_+3.3V_VGA | dGPU |
| +1.05V_VGA | 1.05V | ON | OFF | OFF | OFF | OFF | OFF | PG_+3.3V_MAIN | dCPU |
| +VGA_CORE | 0.8~1.15V | ON | OFF | OFF | OFF | OFF | OFF | PG_+3.3V_MAIN | dGPU |
| +1.35V_VGA | 1.35V | ON | OFF | OFF | OFF | OFF | OFF | EN_+1.35V_VGA | dGPU, VRAM |
| +VCCCORE | 0.65~1.3V | ON | OFF | OFF | OFF | OFF | OFF | VR_ON | CPU |

## Schematic "Value" Definition

| Intel Platform Saipan-G and Saipan-U | | | DB/SI/PV Stage | | MP | | ALL STAGE | |
|---|---|---|---|---|---|---|---|---|
| By Value format | Description | Auto BOM Control | UMA | Discrete N16S GPU | UMA | Discrete N16S GPU | QHD PANEL | FHD PANEL |
| XX | Install | V | V | V | V | V | | |
| *XX | Non-Install | V | | | | | | |
| PROTO@XX | Install in Pre-production only | V | V | V | | | | |
| MP@XX | Install in MP only | V | | | V | V | | |
| DIS@xx | Install Discrete (DGPU) only | V | | V | | V | | |
| UMA@xx | Install UMA | V | V | | V | | | |
| QHD@xx | QHD panel | V | V | V | V | V | V | |
| FHD@xx | FHD panel | V | V | V | V | V | | V |

* *Board ID and VRAM ID by manual control







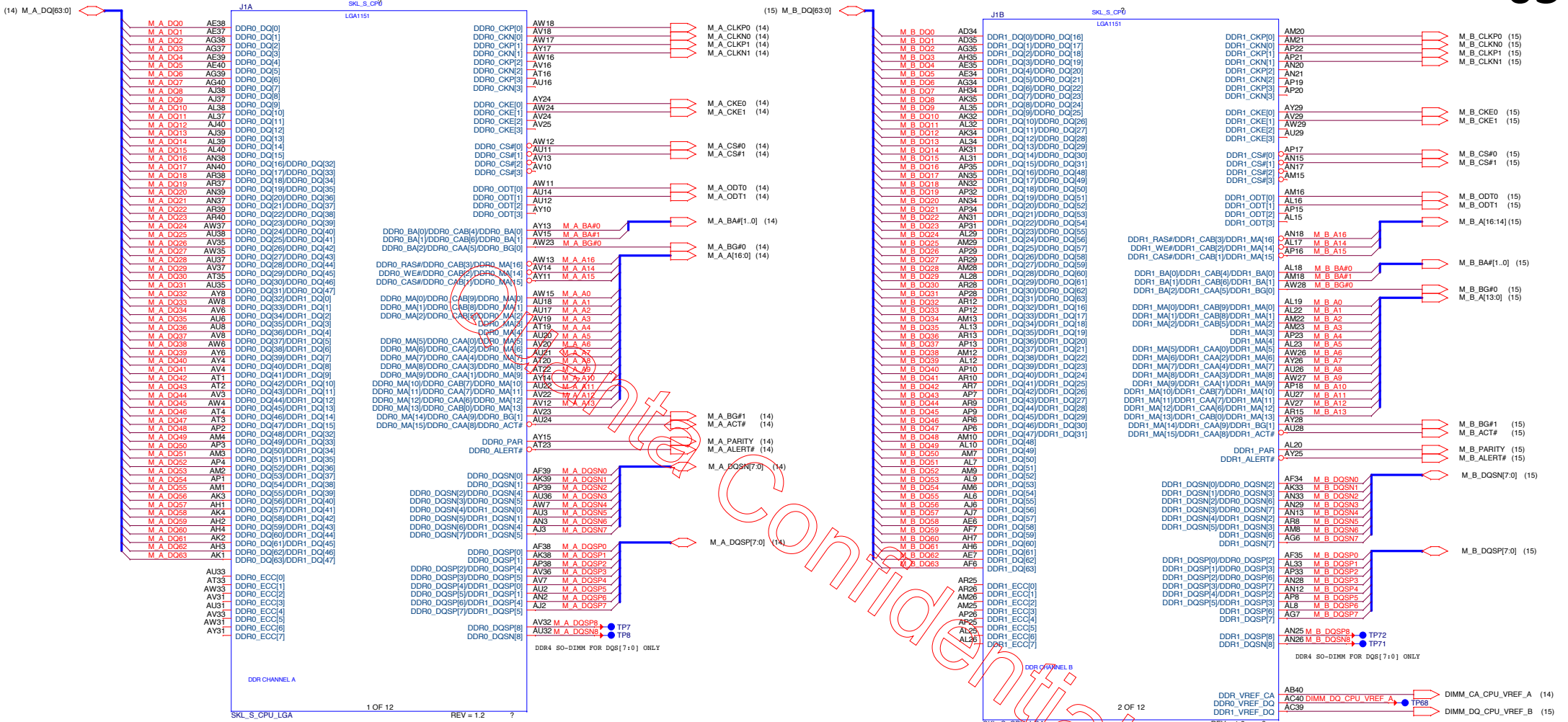
Quanta Computer Inc.

Project: HP-SAIPAN

Title: Power States & Value Definition

Size: | Document Number: -- | Rev: A

Page Modified: Thursday, December 17, 2015 | Sheet 2 of 61



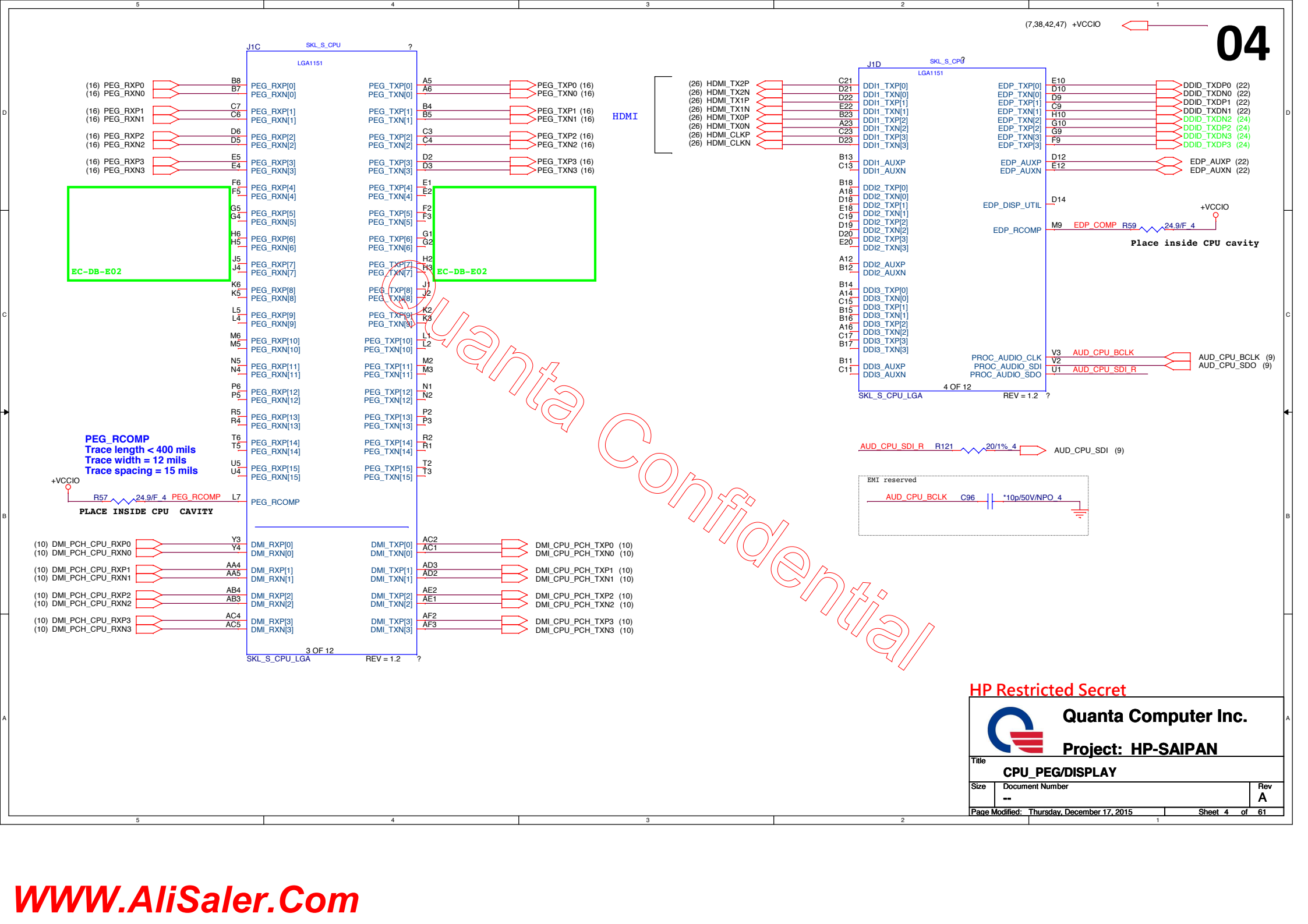


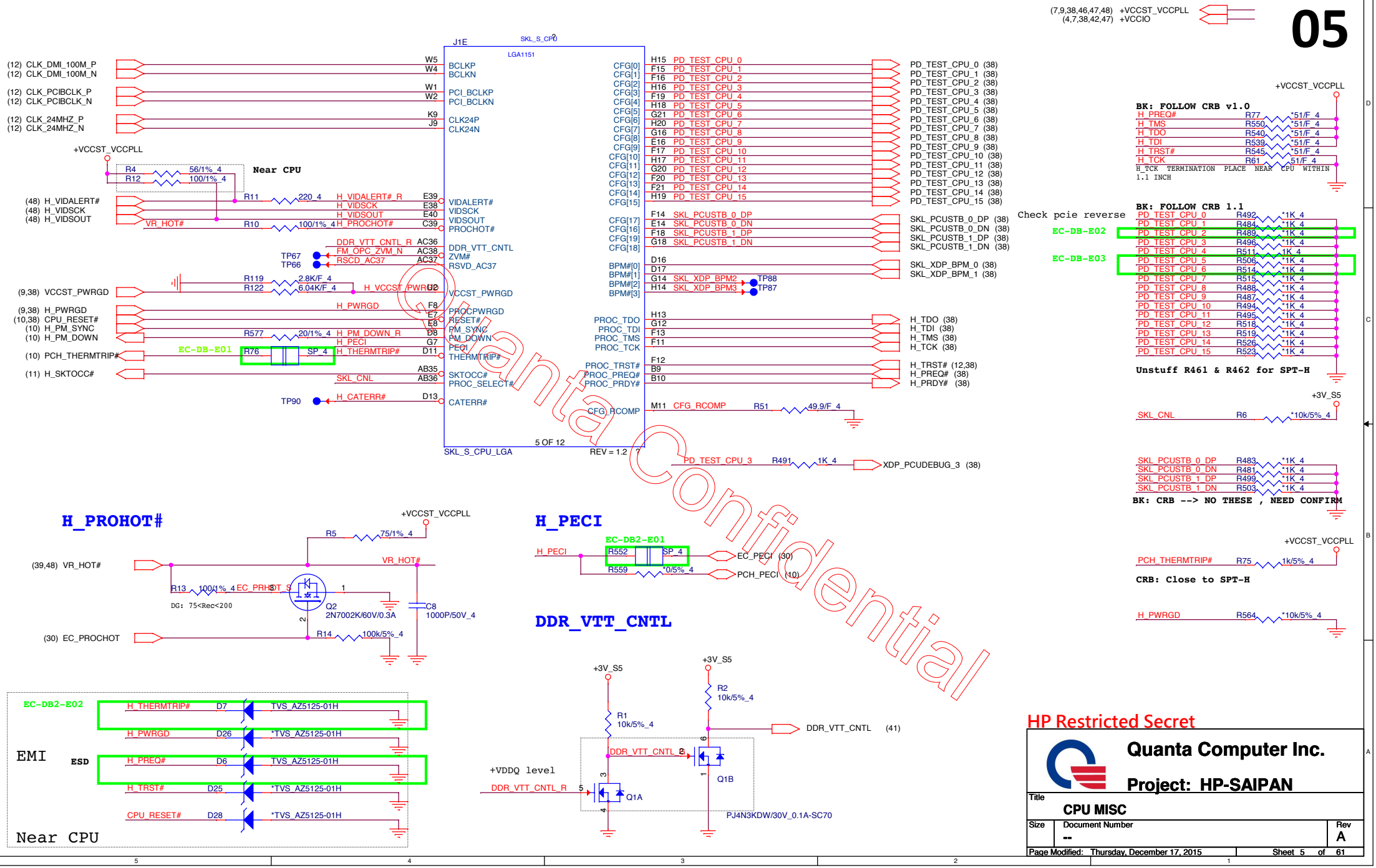



Quanta Computer Inc.

Project: HP-SAIPAN

| Title | | |
|---|---|---|
| CPU_PEG/DISPLAY | | |
| Size | Document Number | Rev |
| – | | A |
| Page Modified: Thursday, December 17, 2015 | | Sheet 3 of 61 |










Quanta Computer Inc.

Project: HP-SAIPAN

| | | |
|---|---|---|
| Title: CPU MISC | | |
| Size | Document Number: -- | Rev: A |
| Page Modified: Thursday, December 17, 2015 | | Sheet 5 of 61 |

+VCCCPRE:
Icc ( max ) : 66A
Icc ( PS2) : 35A

## Decoupling Capacitors

+VCCCORE

EC-DB2-E03

PC329 DIS@330u/2V_7343
PC330 *DIS@330u/2V_7343

Place caps at top socket edge

+VCCCORE

C45 22U 6.3V X5R 0603
C323 22U 6.3V X5R 0603
C50 22U 6.3V X5R 0603
C329 22U 6.3V X5R 0603
C51 22U 6.3V X5R 0603
C360 22U 6.3V X5R 0603
C44 22U 6.3V X5R 0603
C362 22U 6.3V X5R 0603
C56 22U 6.3V X5R 0603
C42 22U 6.3V X5R 0603
C61 22U 6.3V X5R 0603
C58 22U 6.3V X5R 0603

Place all above caps on top side of CPU cavity

+VCCCORE

C43 22U 6.3V X5R 0603
C68 22U 6.3V X5R 0603
C57 22U 6.3V X5R 0603
C63 22U 6.3V X5R 0603
C59 22U 6.3V X5R 0603
C350 22U 6.3V X5R 0603
C46 22U 6.3V X5R 0603
C341 22U 6.3V X5R 0603
C60 22U 6.3V X5R 0603
C371 22U 6.3V X5R 0603

Place all below caps on bottom side near CPU socket

+VCCCORE

J1G SKL_S_CPU LGA1151

A25 A26 A27 A28 A29 A30 B25 B27 B29 B31 B32 B33 B34 B35 B36 B37 C25 C26 C27 C28 C29 C30 C32 C34 C36 D25 D27 D29 D31 D32 D33 D34 D35 D36 E24 E25 E26 E27 E28 E29 E30 E32 E34 E36 F23 F24 F25 F27 F29 F31 G30 G32 H22 H23 H25 H27 H29 H31 AJ11 AJ13 AJ15 AJ17 AJ19 AJ21 — VCC

H32 J21 F32 F33 F34 G23 G24 G25 G26 G27 G28 G29 J22 J23 J24 J25 J26 J27 J28 J29 J30 J31 K16 K18 K20 K21 K23 K25 K27 K29 K31 L14 L15 L16 L17 L18 L19 L20 L21 L22 L23 L24 L25 L26 L27 L28 L29 L30 M13 M14 M16 M18 M20 M22 M24 M26 M28 M30 AJ12 AJ14 AJ16 AJ18 AJ20 AJ22 — VCC

VCC_SENSE C38
VSS_SENSE D38

VCCCORE_SENSE (48)
VSSCORE_SENSE (48)

7 OF 12
SKL_S_CPU_LGA REV = 1.2 ?

+VCCCPRE:
Icc ( max ) : 40A
Icc ( PS2) : 32A

+VCCCORE

VCCCORE_SENSE R8 *0/5%_4 VSSCORE_SENSE

+VCCCORE

VCCCORE_SENSE R7 100/1%_4
VSSCORE_SENSE R9 100/1%_4

DG: Near CPU

+VCCGT

J1H SKL_S_CPU LGA1151

AA34 AA35 AA36 AA37 AA38 AB33 AB34 G36 G37 G38 G39 G40 H36 H38 H40 J36 J37 J38 J39 J40 K36 K38 K40 L34 L35 L36 L37 L38 L39 L40 M33 M34 M36 M38 M40 N34 N35 N36 N37 N38 N39 N40 P33 P34 P36 P38 P40 R34 R35 R36 R37 R38 R39 R40 T33 T34 T36 T38 T40 U34 U35 U36 U37 U38 U39 U40 V33 V34 V36 V38 V40 W34 W35 W36 W37 W38 Y33 Y34 Y36 Y38 — VCCGT

VCCGTX F35 G34 G35 H33 H34 J33 J35 K32 K34 L31 L33 M32 — VCCGTX

VCCGT_SENSE F39
VSSGT_SENSE F38

VCCGT_SENSE (48)
VSSGT_SENSE (48)

VCCGTX_SENSE F37
VSSGTX_SENSE F36

8 OF 12
SKL_S_CPU_LGA REV = 1.2 ?

(7,47,48,49) +VCCCORE
(47,48,50) +VCCGT

## Decoupling Capacitors

+VCCGT

C327 47u/6.3V_8
C26 47u/6.3V_8
C36 47u/6.3V_8
C347 47u/6.3V_8
C318 47u/6.3V_8
C35 47u/6.3V_8
C336 47u/6.3V_8

Place caps on top side socket cavity

+VCCGT

C335 47u/6.3V_8
C348 47u/6.3V_8
C32 47u/6.3V_8
C337 47u/6.3V_8
C326 47u/6.3V_8
C325 47u/6.3V_8
C27 47u/6.3V_8
C28 47u/6.3V_8
C37 47u/6.3V_8

Place caps on backside under socket cavity

+VCCGT

C30 47u/6.3V_8
C31 47u/6.3V_8
C320 47u/6.3V_8
C319 47u/6.3V_8

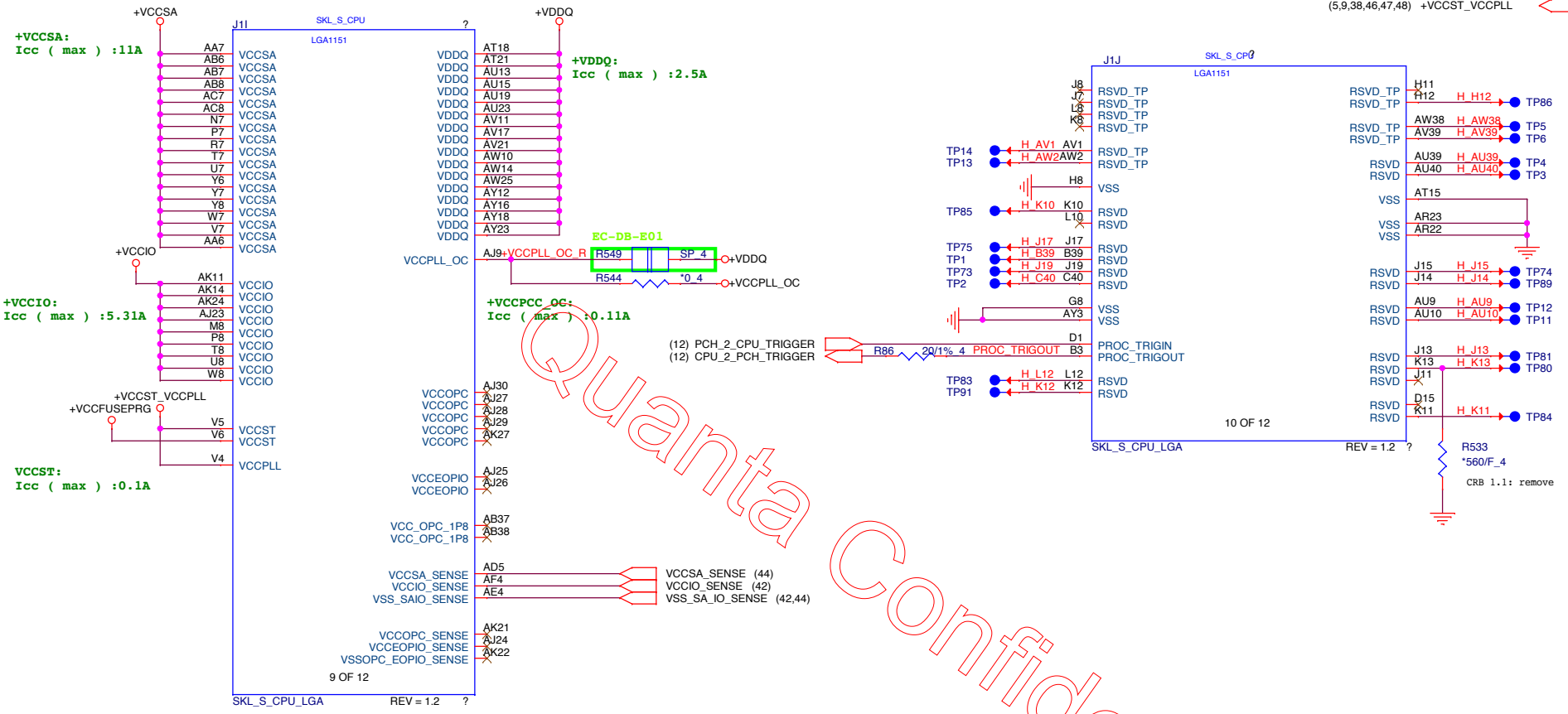




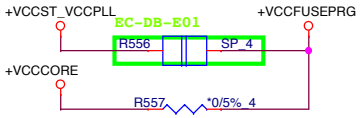
Quanta Computer Inc.
Project: HP-SAIPAN

Title: CPU POWER
Size: Document Number: -- Rev: A
Page Modified: Thursday, December 17, 2015 Sheet 6 of 61

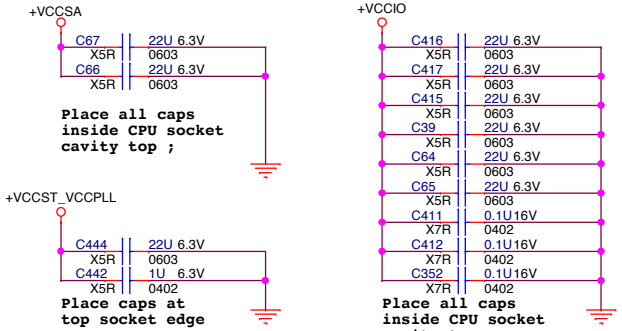
(44,47) +VCCSA
(9,14,15,41,46,47,55) +VDDQ
(4,38,42,47) +VCCIO
(5,9,38,46,47,48) +VCCST_VCCPLL



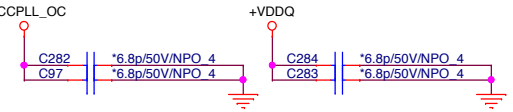



## Decoupling Capacitors




RF

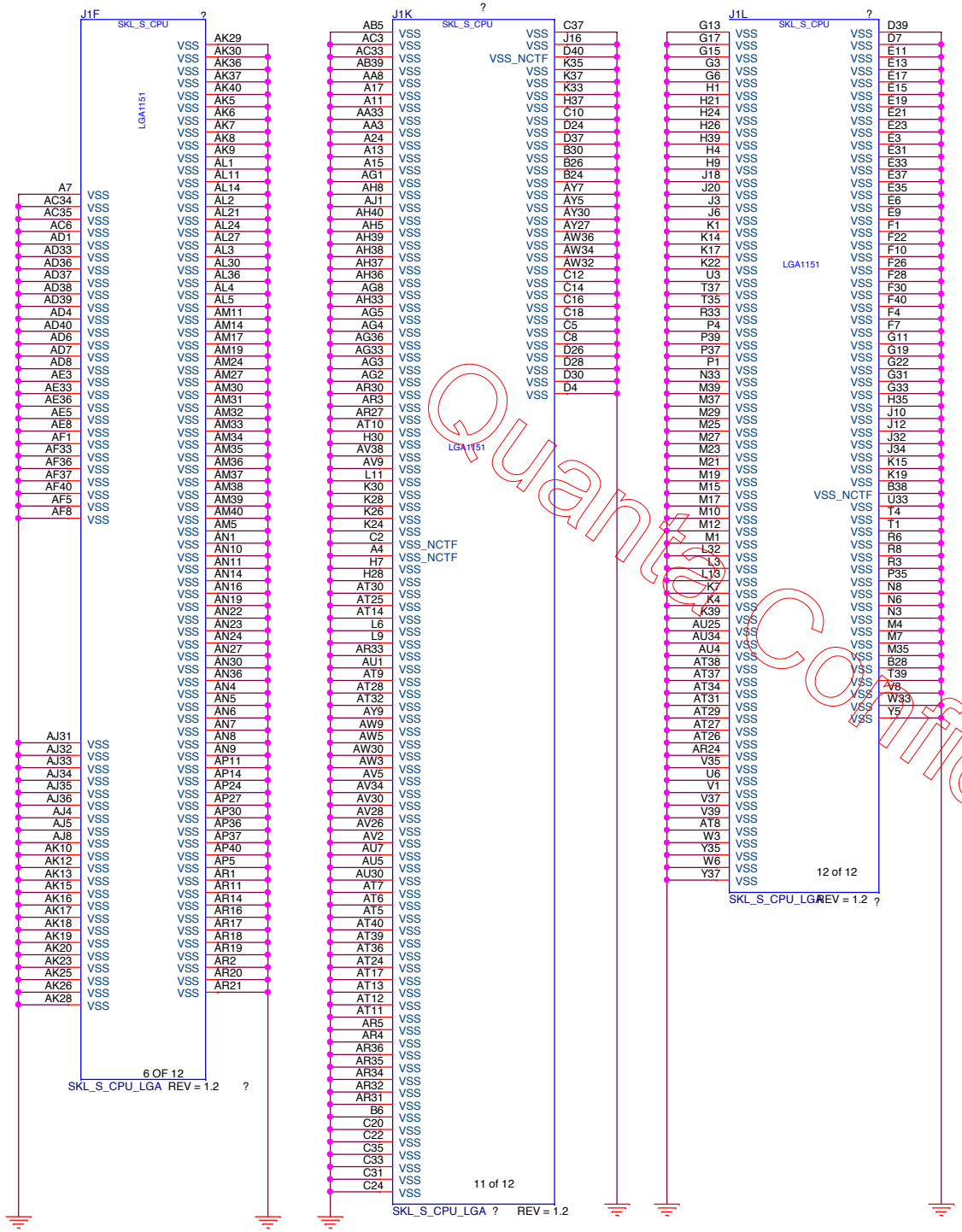



HP Restricted Secret

Quanta Computer Inc.

Project: HP-SAIPAN

| Title | | |
|---|---|---|
| CPU POWER/RSVD | | |
| Size | Document Number | Rev |
| | -- | A |
| Page Modified: Thursday, December 17, 2015 | Sheet 7 of 61 | |





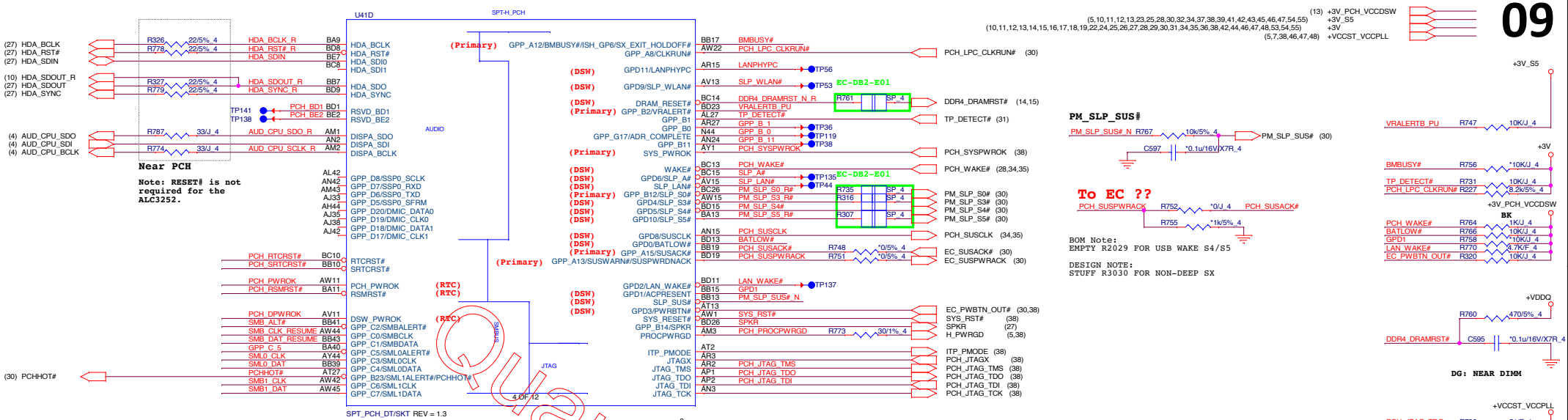





Quanta Computer Inc.

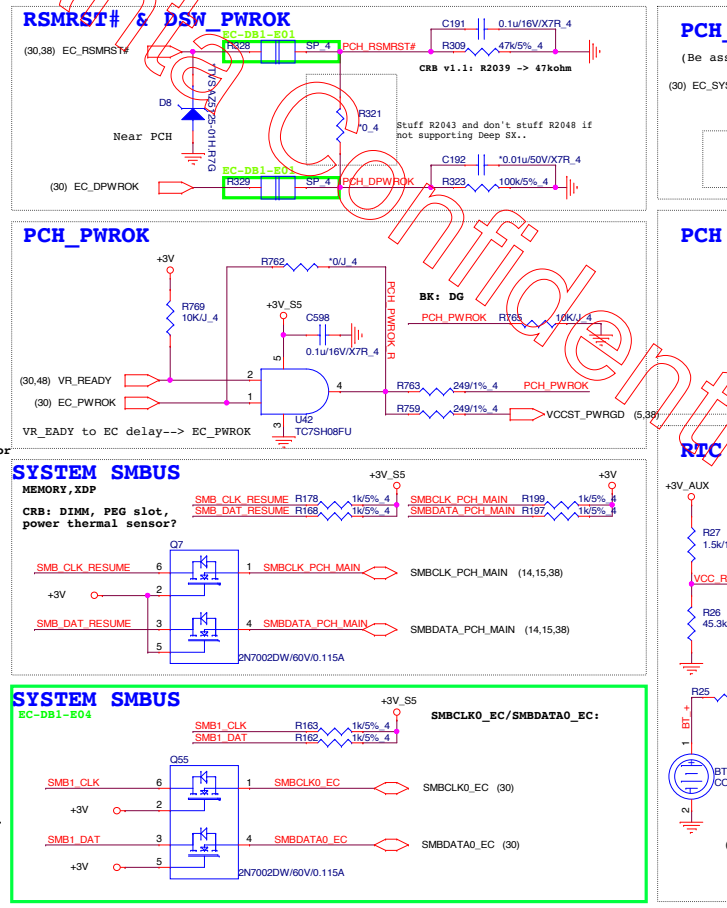
Project: HP-SAIPAN

| Title | | |
|---|---|---|
| CPU GND | | |
| Size | Document Number | Rev |
| | -- | A |
| Page Modified: Thursday, December 17, 2015 | | Sheet 8 of 61 |



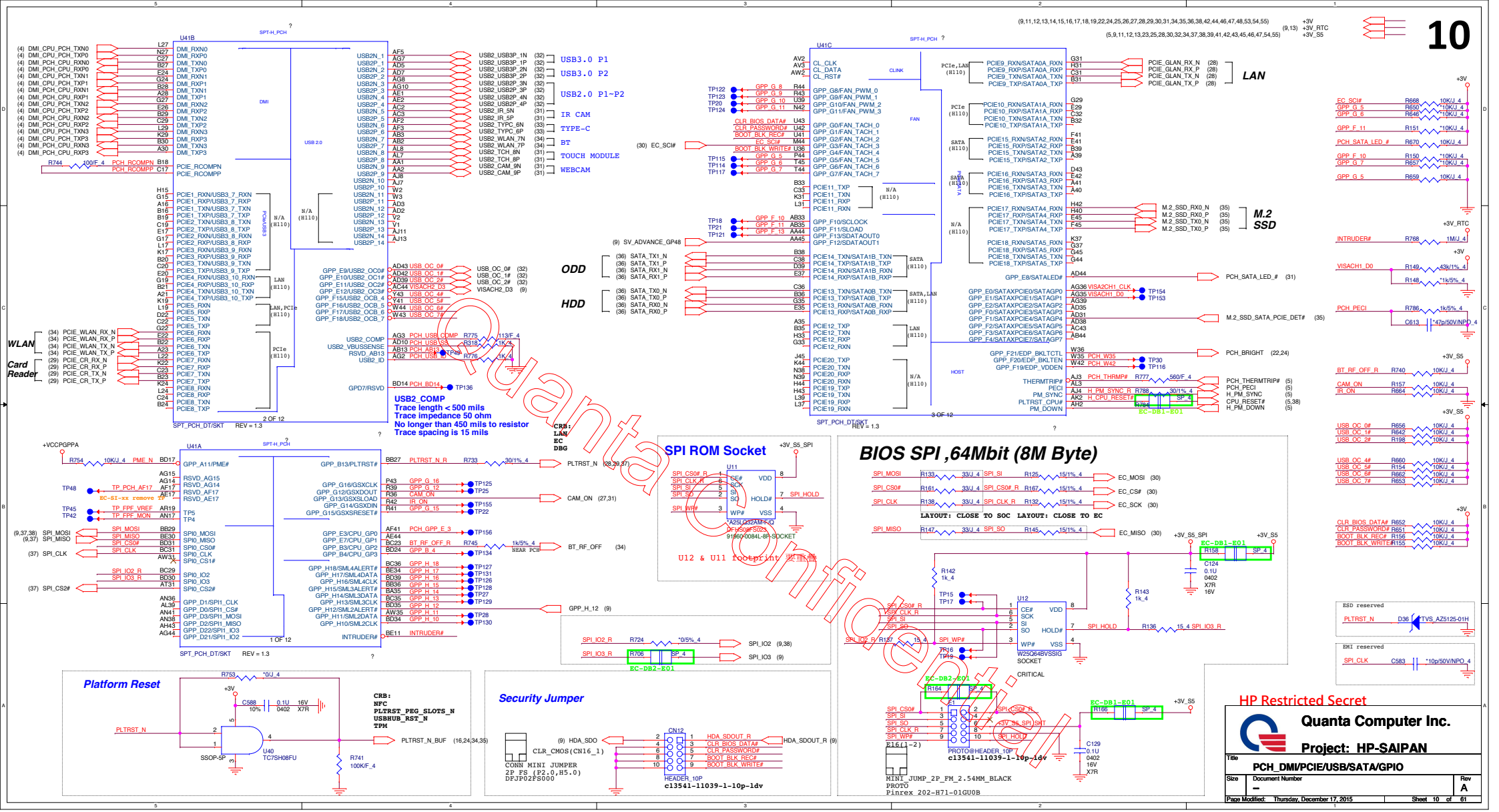

## Strap Pin Table

| Configuration | Note |
|---|---|
| "Top swap" mode<br>0 = Disable, Default (Internal pull-down)<br>1 = Enable | SPKR R729 *4.7K/F_4, R736 *20k/5%_4 +3V |
| "No-Reboot" mode<br>0 = Disable, Default (Internal pull-down)<br>1 = Enable | (12) LPSS_GSPI0_MOSI R726 *4.7K/F_4, R725 *1k/5%_4 +3V<br>CRB 1.0 |
| Intel ME Crypto TLS cipher suite.<br>0 = Disable, Default (Internal pull-down)<br>1 = Enable | SMB_ALT# R176 *4.7K/F_4, R175 *20k/5%_4 +3V_S5 |
| BOOT SELECT STRAP<br>0 = SPI, Default (Internal pull-down)<br>1 = LPC | (12) LPSS_GSPI1_MOSI R222 *4.7K/F_4, R223 *20k/5%_4 +3V_S5 |
| ESPI/LPC SELECT STRAP ( for EC )<br>0 = LPC ( Default, int. pull-down )<br>1 = ESPI | GPP_C_5 R676 *4.7K/F_4, R675 20k/5%_4 +3V_S5 |
| BOOT HALT<br>0 = Enable<br>1 = PCH has Internal weak pull-up | (10,37,38) SPI_MOSI R720 1k/5%_4, R721 *4.7K/F_4 +3V_S5_SPI |
| JTAG ODT<br>0 = Enable<br>1 = PCH has Internal weak pull-up | (10,37) SPI_MISO R719 *20k/5%_4, R718 *4.7K/F_4 +3V_S5_SPI |
| CONSENT STRAP<br>0 = Consent strap is enabled<br>1 = PCH has Internal weak pull-up | (10,38) SPI_IO2 R730 *20k/5%_4, R727 *1.2k/5%_4 +3V_S5_SPI |
| PERSONALITY STRAP<br>0 = Enable<br>1 = PCH has Internal weak pull-up | (10) SPI_IO3 R701 *20k/5%_4, R694 *4.7k/5%_4 +3V_S5_SPI<br>pull down is needed for pre-ES1/ES1 samples. |
| 0 = PCH has Internal weak pull-down<br>1 = EXI boot stall bypass is enabled | 150K PU NEEDED TO DISABLE EXI BOOT STALL BYPASS<br>PCHHOT# R224 150k/1%_4, R225 *20k/5%_4 +3V_S5 |
| SECRUITY MEASURES.<br>0 = Enable, Defualt (Internal weak pull-down)<br>1 = Disable. Flash Descriptor Security overrided, pull up for debug only. | +DVDDIO_AUDIO<br>(10) HDA_SDO HDA_SDO R319 1K/J_4<br>HDA_SDOUT_R R586 1K/J_4 EN_OVERRIDE (30) |
| ESPI FLASH SHARING MODE<br>0 = Master (Internal weak pull-down)<br>1 = Slave | (10) GPP_H_12 R685 *4.7K/F_4, R684 *20k/5%_4 +3V_S5 |
| DFX TEST MODE<br>XTAL input is single ended if sampled low else differential | (10) VISACH2_D3 R655 *4.7K/F_4, R669 *20k/5%_4 +3V_S5 |
| TEST SETUP MENU<br>0 = Test setup menu enabled<br>1 = Disabled (Default) | (11) TEST_SETUP_MENU R146 10K/J_4, R159 *0/5%_4 +3V |
| SV ADVANCE MENU TABLE<br>0 = SV ADVANCE MENU<br>1 = Normal Menu (Default) | (10) SV_ADVANCE_GP48 R645 20k/5%_4, R644 *0/5%_4 +3V |

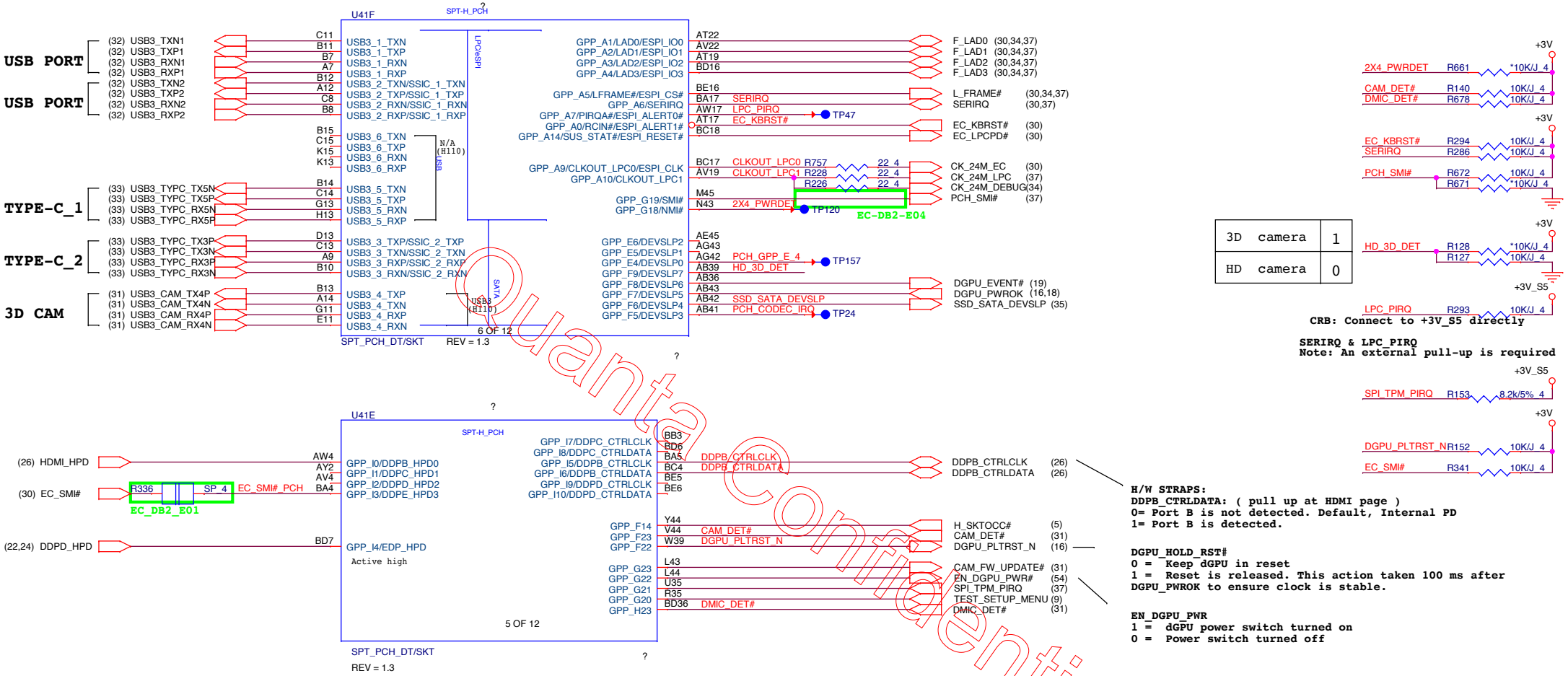





Quanta Computer Inc.
Project: HP-SAIPAN
Title: PCH_HDA/SMBUS/MISC
Size: Document Number: -- Rev: A
Page Modified: Thursday, December 17, 2015 Sheet 9 of 61


10
USB3.0 P1
USB3.0 P2
USB2.0 P1~P2
IR CAM
TYPE-C
BT
TOUCH MODULE
WEBCAM
LAN
M.2 SSD
ODD
HDD
WLAN
Card Reader
USB2_COMP
Trace length < 500 mils
Trace impedance 50 ohm
No longer than 450 mils to resistor
Trace spacing is 15 mils
SPI ROM Socket
BIOS SPI ,64Mbit (8M Byte)
LAYOUT: CLOSE TO SOC LAYOUT: CLOSE TO EC
Platform Reset
Security Jumper
Quanta Confidential
HP Restricted Secret
Quanta Computer Inc.
Project: HP-SAIPAN
PCH_DMI/PCIE/USB/SATA/GPIO
WWW.AliSaler.Com

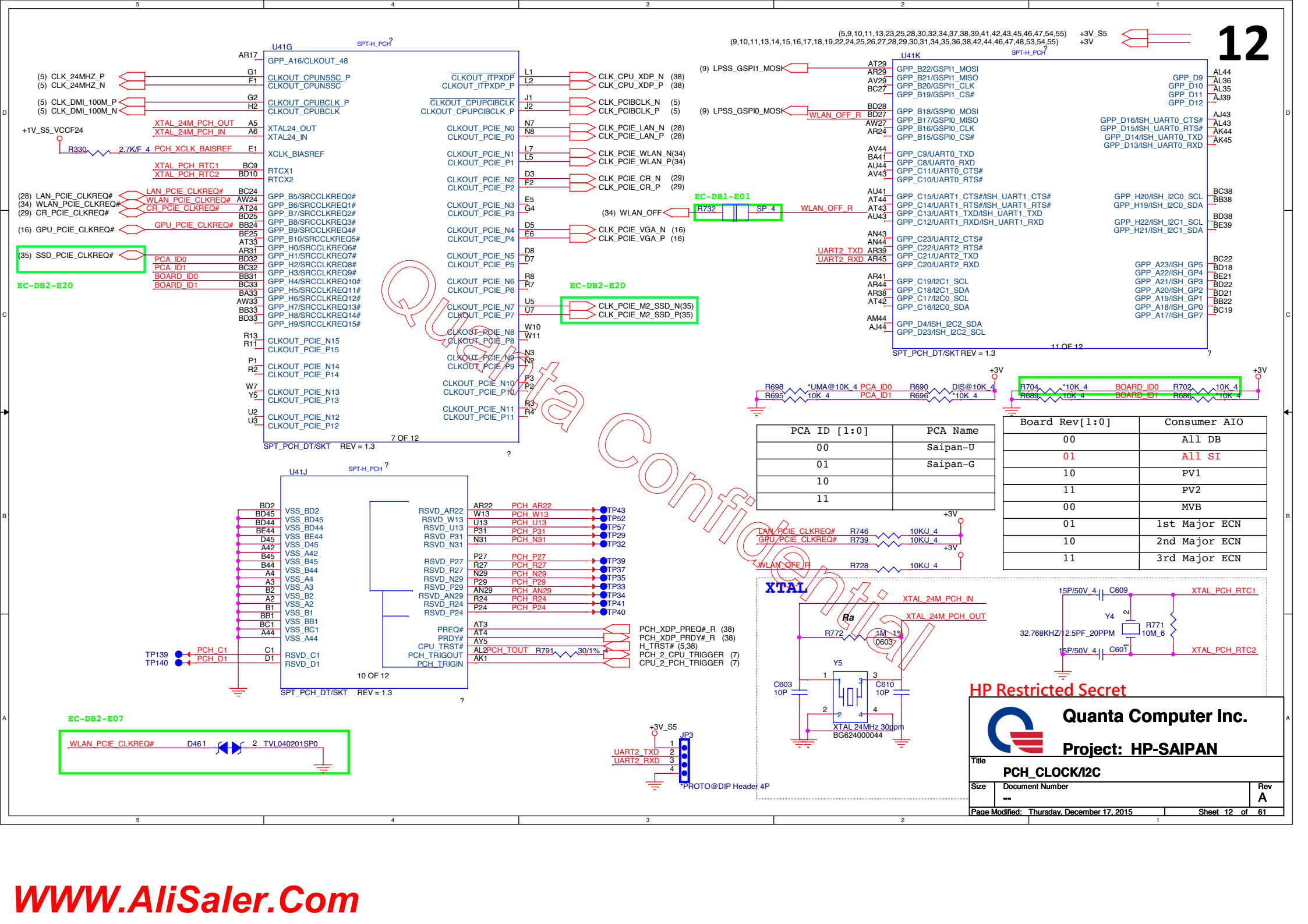
(9,10,12,13,14,15,16,17,18,19,22,24,25,26,27,28,29,30,31,34,35,36,38,42,44,46,47,48,53,54,55) +3V
(5,9,10,12,13,23,25,28,30,32,34,37,38,39,41,42,43,45,46,47,54,55) +3V_S5

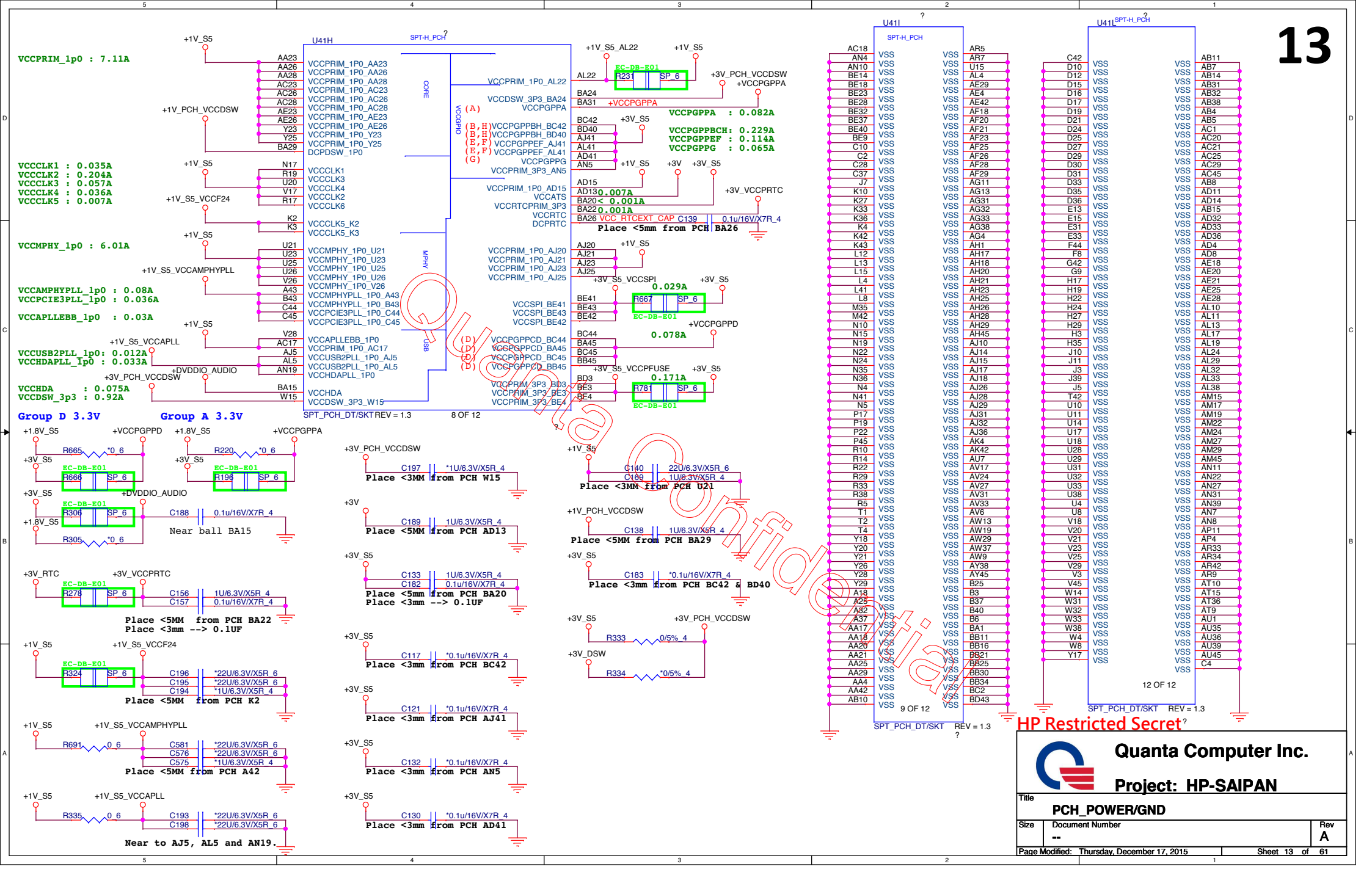


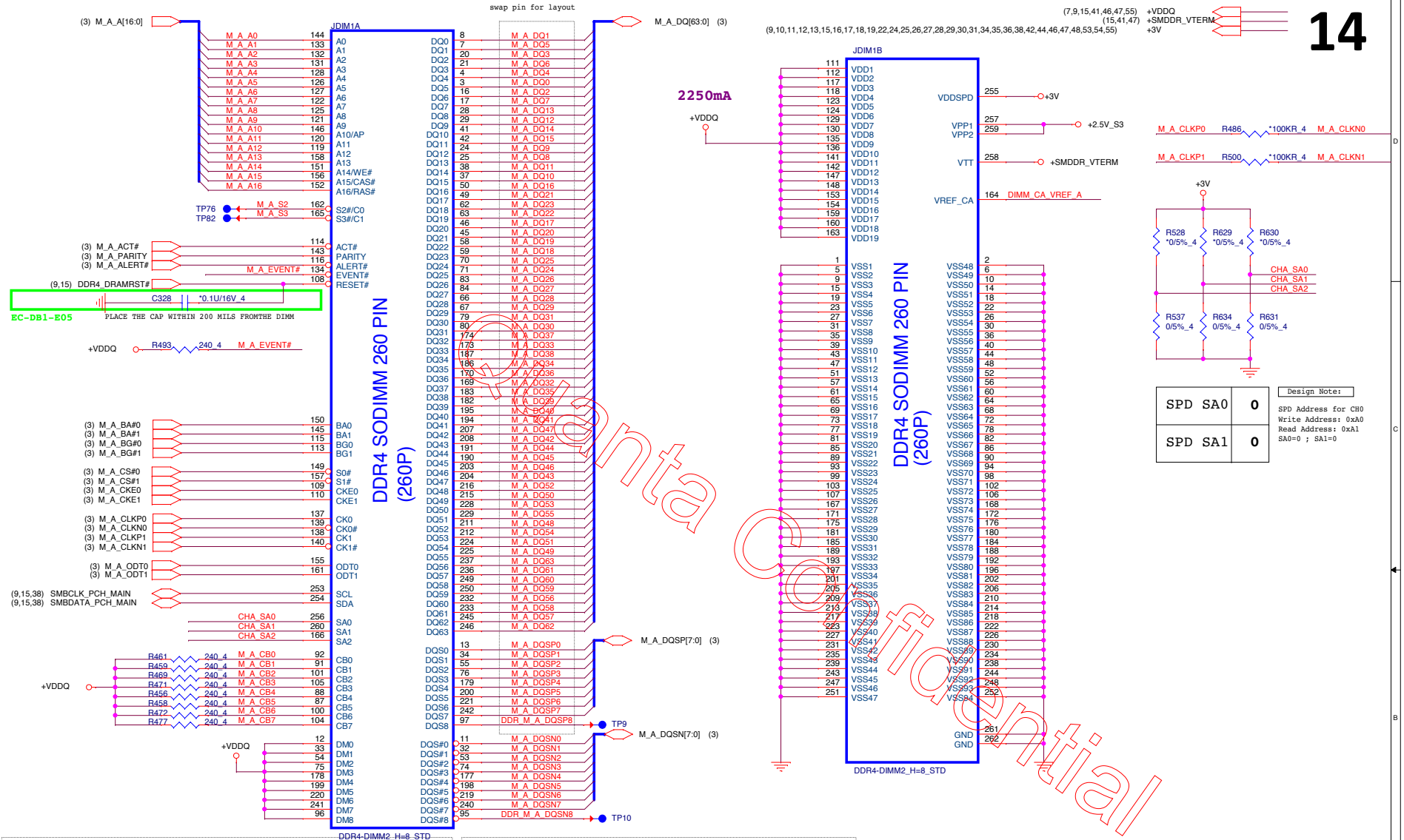



Quanta Computer Inc.
Project: HP-SAIPAN

Title: PCH_USB3/LPC
Size: Document Number: -- Rev: A
Page Modified: Thursday, December 17, 2015 Sheet 11 of 61


12
U41G
SPT-H_PCH
GPP_A16/CLKOUT_48
CLKOUT_CPUNSSC_P
CLKOUT_CPUNSSC
CLKOUT_CPUBCLK_P
CLKOUT_CPUBCLK
XTAL24_OUT
XTAL24_IN
XCLK_BIASREF
RTCX1
RTCX2
GPP_B5/SRCCLKREQ0#
GPP_B6/SRCCLKREQ1#
GPP_B7/SRCCLKREQ2#
GPP_B8/SRCCLKREQ3#
GPP_B9/SRCCLKREQ4#
GPP_B10/SRCCLKREQ5#
GPP_H0/SRCCLKREQ6#
GPP_H1/SRCCLKREQ7#
GPP_H2/SRCCLKREQ8#
GPP_H3/SRCCLKREQ9#
GPP_H4/SRCCLKREQ10#
GPP_H5/SRCCLKREQ11#
GPP_H6/SRCCLKREQ12#
GPP_H7/SRCCLKREQ13#
GPP_H8/SRCCLKREQ14#
GPP_H9/SRCCLKREQ15#
CLKOUT_PCIE_N15
CLKOUT_PCIE_P15
CLKOUT_PCIE_N14
CLKOUT_PCIE_P14
CLKOUT_PCIE_N13
CLKOUT_PCIE_P13
CLKOUT_PCIE_N12
CLKOUT_PCIE_P12
CLKOUT_ITPXDP
CLKOUT_ITPXDP_P
CLKOUT_PCIBCLK_N
CLKOUT_PCIBCLK_P
CLKOUT_PCIE_N0
CLKOUT_PCIE_P0
CLKOUT_PCIE_N1
CLKOUT_PCIE_P1
CLKOUT_PCIE_N2
CLKOUT_PCIE_P2
CLKOUT_PCIE_N3
CLKOUT_PCIE_P3
CLKOUT_PCIE_N4
CLKOUT_PCIE_P4
CLKOUT_PCIE_N5
CLKOUT_PCIE_P5
CLKOUT_PCIE_N6
CLKOUT_PCIE_P6
CLKOUT_PCIE_N7
CLKOUT_PCIE_P7
CLKOUT_PCIE_N8
CLKOUT_PCIE_P8
CLKOUT_PCIE_N9
CLKOUT_PCIE_P9
CLKOUT_PCIE_N10
CLKOUT_PCIE_P10
CLKOUT_PCIE_N11
CLKOUT_PCIE_P11
7 OF 12
SPT_PCH_DT/SKT REV = 1.3
U41K
GPP_B22/GSPI1_MOSI
GPP_B21/GSPI1_MISO
GPP_B20/GSPI1_CLK
GPP_B19/GSPI1_CS#
GPP_B18/GSPI0_MOSI
GPP_B17/GSPI0_MISO
GPP_B16/GSPI0_CLK
GPP_B15/GSPI0_CS#
GPP_C9/UART0_TXD
GPP_C8/UART0_RXD
GPP_C11/UART0_CTS#
GPP_C10/UART0_RTS#
GPP_C15/UART1_CTS#/ISH_UART1_CTS#
GPP_C14/UART1_RTS#/ISH_UART1_RTS#
GPP_C13/UART1_TXD/ISH_UART1_TXD
GPP_C12/UART1_RXD/ISH_UART1_RXD
GPP_C23/UART2_CTS#
GPP_C22/UART2_RTS#
GPP_C21/UART2_TXD
GPP_C20/UART2_RXD
GPP_C19/I2C1_SCL
GPP_C18/I2C1_SDA
GPP_C17/I2C0_SCL
GPP_C16/I2C0_SDA
GPP_D4/ISH_I2C2_SDA
GPP_D23/ISH_I2C2_SCL
GPP_D9
GPP_D10
GPP_D11
GPP_D12
GPP_D16/ISH_UART0_CTS#
GPP_D15/ISH_UART0_RTS#
GPP_D14/ISH_UART0_TXD
GPP_D13/ISH_UART0_RXD
GPP_H20/ISH_I2C0_SCL
GPP_H19/ISH_I2C0_SDA
GPP_H22/ISH_I2C1_SCL
GPP_H21/ISH_I2C1_SDA
GPP_A23/ISH_GP5
GPP_A22/ISH_GP4
GPP_A21/ISH_GP3
GPP_A20/ISH_GP2
GPP_A19/ISH_GP1
GPP_A18/ISH_GP0
GPP_A17/ISH_GP7
11 OF 12
SPT_PCH_DT/SKT REV = 1.3
U41J
VSS_BD2
VSS_BD45
VSS_BD44
VSS_BE44
VSS_D45
VSS_A42
VSS_B45
VSS_B44
VSS_A4
VSS_A3
VSS_B2
VSS_A2
VSS_B1
VSS_BB1
VSS_BC1
VSS_A44
RSVD_C1
RSVD_D1
RSVD_AR22
RSVD_W13
RSVD_U13
RSVD_P31
RSVD_N31
RSVD_P27
RSVD_R27
RSVD_N29
RSVD_P29
RSVD_AN29
RSVD_R24
RSVD_P24
PREQ#
PRDY#
CPU_TRST#
PCH_TRIGOUT
PCH_TRIGIN
PCH_TOUT
10 OF 12
SPT_PCH_DT/SKT REV = 1.3
XTAL
XTAL_24M_PCH_IN
XTAL_24M_PCH_OUT
XTAL 24MHz 30ppm
BG624000044
PCA ID [1:0]
PCA Name
Saipan-U
Saipan-G
Board Rev[1:0]
Consumer AIO
All DB
All SI
PV1
PV2
MVB
1st Major ECN
2nd Major ECN
3rd Major ECN
EC-DB2-E20
EC-DB1-E01
EC-DB2-E07
HP Restricted Secret
Quanta Computer Inc.
Project: HP-SAIPAN
PCH_CLOCK/I2C
Size
Document Number
Rev
A
Page Modified: Thursday, December 17, 2015
Sheet 12 of 61
Quanta Confidential
WWW.AliSaler.Com


13
VCCPRIM_1p0 : 7.11A
VCCCLK1 : 0.035A
VCCCLK2 : 0.204A
VCCCLK3 : 0.057A
VCCCLK4 : 0.036A
VCCCLK5 : 0.007A
VCCMPHY_1p0 : 6.01A
VCCAMPHYPLL_1p0 : 0.08A
VCCPCIE3PLL_1p0 : 0.036A
VCCAPLLEBB_1p0 : 0.03A
VCCUSB2PLL_1p0: 0.012A
VCCHDAPLL_1p0 : 0.033A
VCCHDA : 0.075A
VCCDSW_3p3 : 0.92A
Group D 3.3V
Group A 3.3V
U41H
SPT-H_PCH
SPT_PCH_DT/SKT REV = 1.3
8 OF 12
U41I
9 OF 12
U41L
12 OF 12
VCCPGPPA : 0.082A
VCCPGPPBCH: 0.229A
VCCPGPPEF : 0.114A
VCCPGPPG : 0.065A
Place <5mm from PCH BA26
Place <3MM from PCH W15
Place <3MM from PCH U21
Place <3MM from PCH AD13
Place <5MM from PCH BA29
Place <5mm from PCH BA20
Place <3mm --> 0.1UF
Place <3mm from PCH BC42 & BD40
Place <3mm from PCH BC42
Place <3mm from PCH AJ41
Place <3mm from PCH AN5
Place <3mm from PCH AD41
Place <5MM from PCH BA22
Place <3mm --> 0.1UF
Place <5MM from PCH K2
Place <5MM from PCH A42
Near to AJ5, AL5 and AN19.
Near ball BA15
Quanta Confidential
HP Restricted Secret
Quanta Computer Inc.
Project: HP-SAIPAN
PCH_POWER/GND
Size
Document Number
--
Rev
A
Page Modified: Thursday, December 17, 2015
Sheet 13 of 61







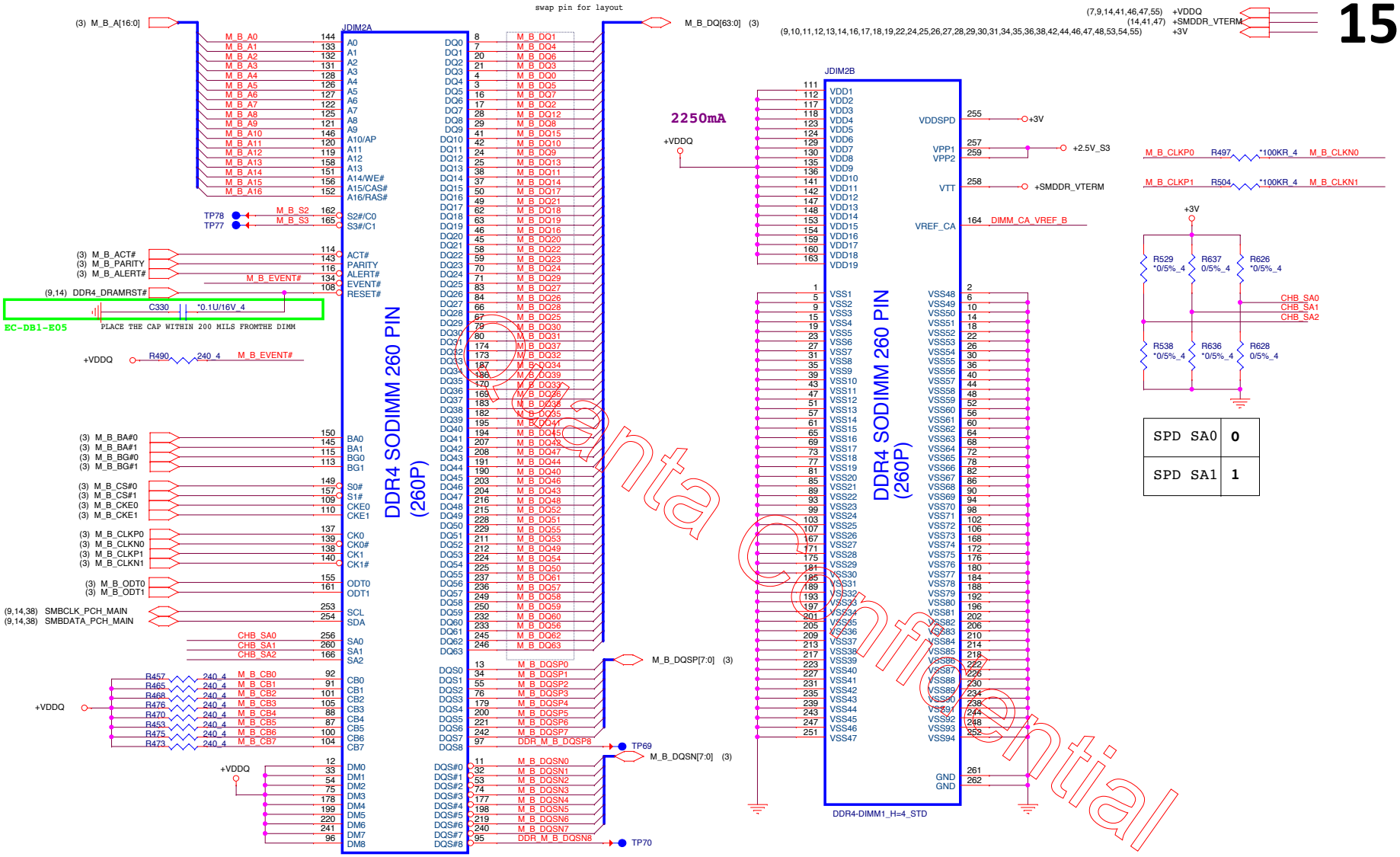

Quanta Computer Inc.

Project: HP-SAIPAN

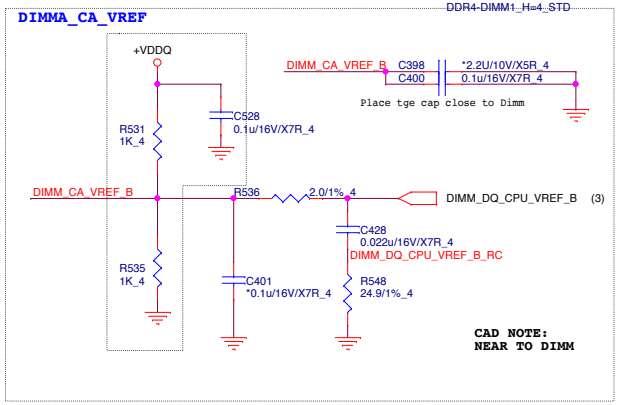
Title: DDR4 CHA DIMM 0

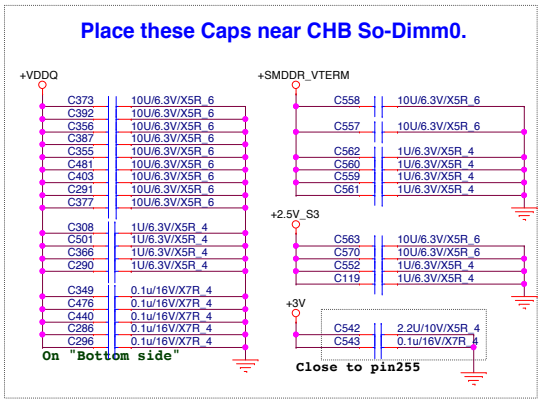
| Size | Document Number | Rev |
|---|---|---|
| | – | A |

Page Modified: Thursday, December 17, 2015 | Sheet 14 of 61






HP Restricted Secret

Quanta Computer Inc.

Project: HP-SAIPAN

| Title | | | |
|---|---|---|---|
| DDR4 CHB DIMM 1 | | | |
| Size | Document Number | | Rev |
| | -- | | A |
| Page Modified: | Thursday, December 17, 2015 | Sheet 15 of 61 | |

(17,18,54) +1.05V_VGA
(18,19,20,53,54) +3.3V_VGA
(9,10,11,12,13,14,15,17,18,19,22,24,25,26,27,28,29,30,31,34,35,36,38,42,44,46,47,48,53,54,55) +3V
(20,53,54) +VGA_CORE

## PEX_IOVDD + PEX_IOVDDQ = 1.042A

+1.05V_VGA

Near GPU
C393 DIS@22u/6.3V/X5R_6
C375 *DIS@22u/6.3V/X5R_6
C376 DIS@10u/6.3V/X5R_6
C433 *DIS@10u/6.3V/X5R_6
C474 DIS@4.7u/6.3V/X5R_4

Under GPU
C408 DIS@1u/6.3V/X5R_4
C462 *DIS@1u/6.3V/X5R_4

AA22 PEX_IOVDD
AB23 PEX_IOVDD
AC24 PEX_IOVDD
AD25 PEX_IOVDD
AE26 PEX_IOVDD
AE27 PEX_IOVDD

+1.05V_VGA

Near GPU
C396 DIS@22u/6.3V/X5R_6
C374 *DIS@22u/6.3V/X5R_6
C395 DIS@10u/6.3V/X5R_6
C386 *DIS@10u/6.3V/X5R_6
C432 DIS@4.7u/6.3V/X5R_6

Under GPU
C438 DIS@1u/6.3V/X5R_4
C427 *DIS@1u/6.3V/X5R_4

AA10 PEX_IOVDDQ
AA12 PEX_IOVDDQ
AA13 PEX_IOVDDQ
AA16 PEX_IOVDDQ
AA18 PEX_IOVDDQ
AA19 PEX_IOVDDQ
AA20 PEX_IOVDDQ
AA21 PEX_IOVDDQ
AB22 PEX_IOVDDQ
AC23 PEX_IOVDDQ
AD24 PEX_IOVDDQ
AE25 PEX_IOVDDQ
AF26 PEX_IOVDDQ
AF27 PEX_IOVDDQ

## PEX_PLL_HVDD + PEX_SVDD_3V3 = 143mA

**Place all above caps on top side of CPU cavity**

+3.3V_VGA

Near GPU
C519 DIS@4.7u/6.3V/X5R_6
C510 DIS@4.7u/6.3V/X5R_6
C493 DIS@0.1u/16V/X7R_4

AA8 PEX_PLL_HVDD
AA9 PEX_PLL_HVDD
AB8 PEX_SVDD_3V3

(53) VGA_VDD_SEN F2 VDD_SENSE
(53) VGA_GND_SEN F1 GND_SENSE

## PEX_PLLVDD = 130mA

+1.05V_VGA
R527 *DIS@200/1% PEX_TSTCLK AF22 PEX_TSTCLK_OUT
PEX_TSTCLK# AE22 PEX_TSTCLK_OUT
CX300730001 Change to 0ohm
R543 DIS@0/5%_6

Near GPU
C441 DIS@4.7u/6.3V/X5R_6
C447 DIS@1u/6.3V/X5R_4
PEX_PLLVDD AA14 PEX_PLLVDD
AA15 PEX_PLLVDD

Under GPU
C456 DIS@0.1u/16V/X7R_4

R579 DIS@10k/5%_4 TESTMODE AD9 TESTMODE

R49 DIS@2.49k/1%_4 PEX_TERMP AF25 PEX_TERMP

bga595-nvidia-n13p-gv2-s-a2

U7A
1/14 PCI_EXPRESS

PEX_WAKE# AB6
PEX_RST# AC7 VGA_RST# R611 DIS@0/5%_4 PEGX_RST# (19)
PEX_CLKREQ# AC6 PEG_CLKREQ# R590 DIS@10k/5%_4 +3.3V_VGA
PEX_REFCLK AE8 PEG_REFCLK R589 DIS@0/5%_4 CLK_PCIE_VGA_P (12)
PEX_REFCLK# AD8 PEG_REFCLK# R587 DIS@0/5%_4 CLK_PCIE_VGA_N (12)

C513 *DIS@0.1u/16V/X7R_4

| | | | | | |
|---|---|---|---|---|---|
| PEX_TX0 | AC9 | C_PEG_RXP0 | C541 | DIS@0.22u/10V/X5R_4 | PEG_RXP0 (4) |
| PEX_TX0# | AB9 | C_PEG_RXN0 | C536 | DIS@0.22u/10V/X5R_4 | PEG_RXN0 (4) |
| PEX_RX0 | AG6 | C_PEG_TXP0 | C89 | DIS@0.22u/10V/X5R_4 | PEG_TXP0 (4) |
| PEX_RX0# | AG7 | C_PEG_TXN0 | C88 | DIS@0.22u/10V/X5R_4 | PEG_TXN0 (4) |
| PEX_TX1 | AB10 | C_PEG_RXP1 | C531 | DIS@0.22u/10V/X5R_4 | PEG_RXP1 (4) |
| PEX_TX1# | AC10 | C_PEG_RXN1 | C534 | DIS@0.22u/10V/X5R_4 | PEG_RXN1 (4) |
| PEX_RX1 | AF7 | C_PEG_TXP1 | C87 | DIS@0.22u/10V/X5R_4 | PEG_TXP1 (4) |
| PEX_RX1# | AE7 | C_PEG_TXN1 | C85 | DIS@0.22u/10V/X5R_4 | PEG_TXN1 (4) |
| PEX_TX2 | AD11 | C_PEG_RXP2 | C525 | DIS@0.22u/10V/X5R_4 | PEG_RXP2 (4) |
| PEX_TX2# | AC11 | C_PEG_RXN2 | C529 | DIS@0.22u/10V/X5R_4 | PEG_RXN2 (4) |
| PEX_RX2 | AE9 | C_PEG_TXP2 | C84 | DIS@0.22u/10V/X5R_4 | PEG_TXP2 (4) |
| PEX_RX2# | AF9 | C_PEG_TXN2 | C83 | DIS@0.22u/10V/X5R_4 | PEG_TXN2 (4) |
| PEX_TX3 | AG12 | C_PEG_RXP3 | C516 | DIS@0.22u/10V/X5R_4 | PEG_RXP3 (4) |
| PEX_TX3# | AB12 | C_PEG_RXN3 | C522 | DIS@0.22u/10V/X5R_4 | PEG_RXN3 (4) |
| PEX_RX3 | AG9 | C_PEG_TXP3 | C82 | DIS@0.22u/10V/X5R_4 | PEG_TXP3 (4) |
| PEX_RX3# | AG10 | C_PEG_TXN3 | C81 | DIS@0.22u/10V/X5R_4 | PEG_TXN3 (4) |

PEX_TX4 AB13
PEX_TX4# AC13
PEX_RX4 AF10
PEX_RX4# AE10
PEX_TX5 AD14
PEX_TX5# AC14
PEX_RX5 AE12
PEX_RX5# AF12
PEX_TX6 AC15
PEX_TX6# AB15
PEX_RX6 AG12
PEX_RX6# AG13
PEX_TX7 AB16
PEX_TX7# AC16
PEX_RX7 AF13
PEX_RX7# AE13

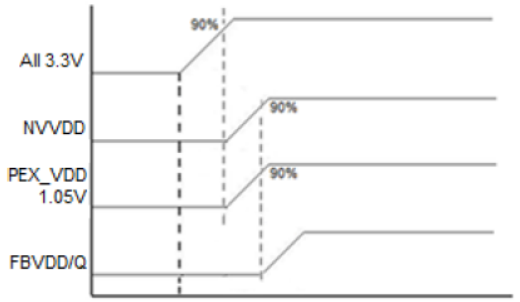
EC-DB-E03

NC AD17 PEX_TX8
NC AC17 PEX_TX8#
NC AE15 PEX_RX8
NC AF15 PEX_RX8#
NC AC18 PEX_TX9
NC AB18 PEX_TX9#
NC AG15 PEX_RX9
NC AG16 PEX_RX9#
NC AB19 PEX_TX10
NC AC19 PEX_TX10#
NC AF16 PEX_RX10
NC AE16 PEX_RX10#
NC AD20 PEX_TX11
NC AC20 PEX_TX11#
NC AE18 PEX_RX11
NC AF18 PEX_RX11#
NC AC21 PEX_TX12
NC AB21 PEX_TX12#
NC AG18 PEX_RX12
NC AG19 PEX_RX12#
NC AD23 PEX_TX13
NC AE23 PEX_TX13#
NC AF19 PEX_RX13
NC AE19 PEX_RX13#
NC AF24 PEX_TX14
NC AE24 PEX_TX14#
NC AE21 PEX_RX14
NC AF21 PEX_RX14#
NC AG24 PEX_TX15
NC AG25 PEX_TX15#
NC AG21 PEX_RX15
NC AG22 PEX_RX15#

GF117 GF119

COMMON

swap pin for layout




PEG_RST#

NV SUGGEST ( for ADP only)
No stuff: U62,
stuff:R614

+3V
C535 DIS@0.1u/16V/X5R_4
(10,24,34,35) PLTRST_N_BUF
(11) DGPU_PLTRST_N
R618 SP_4 DGPU_PLTRST
EC-DB1-E01
U35 DIS@TC7SH08FU
SYS_PEX_RST_MON# R604 *DIS@100K/F_4
EC-DB1-E02
4SYS_PEX_RST R612 *DIS@0/5%_42
(19) GPU_PEX_RST_HOLD#
SYS_PEX_RST_MON# (19)
+3V
C546 DIS@0.1u/16V/X5R_4
U36 *DIS@TC7SH08FU
PEGX_RST#
R624 DIS@100K/F_4
R614 DIS@0/5%_4

PEG_RST#

(11,18) DGPU_PWROK
+3.3V_VGA
EC-DB1-E07
R126 *DIS@10k/5%_4
+3V
EC-DB1-E07
R118 *DIS@10k/5%_4
PEG_CLKREQ#
Q6 DIS@PJA138K/50V_0.5A
GPU_PCIE_CLKREQ# (12)

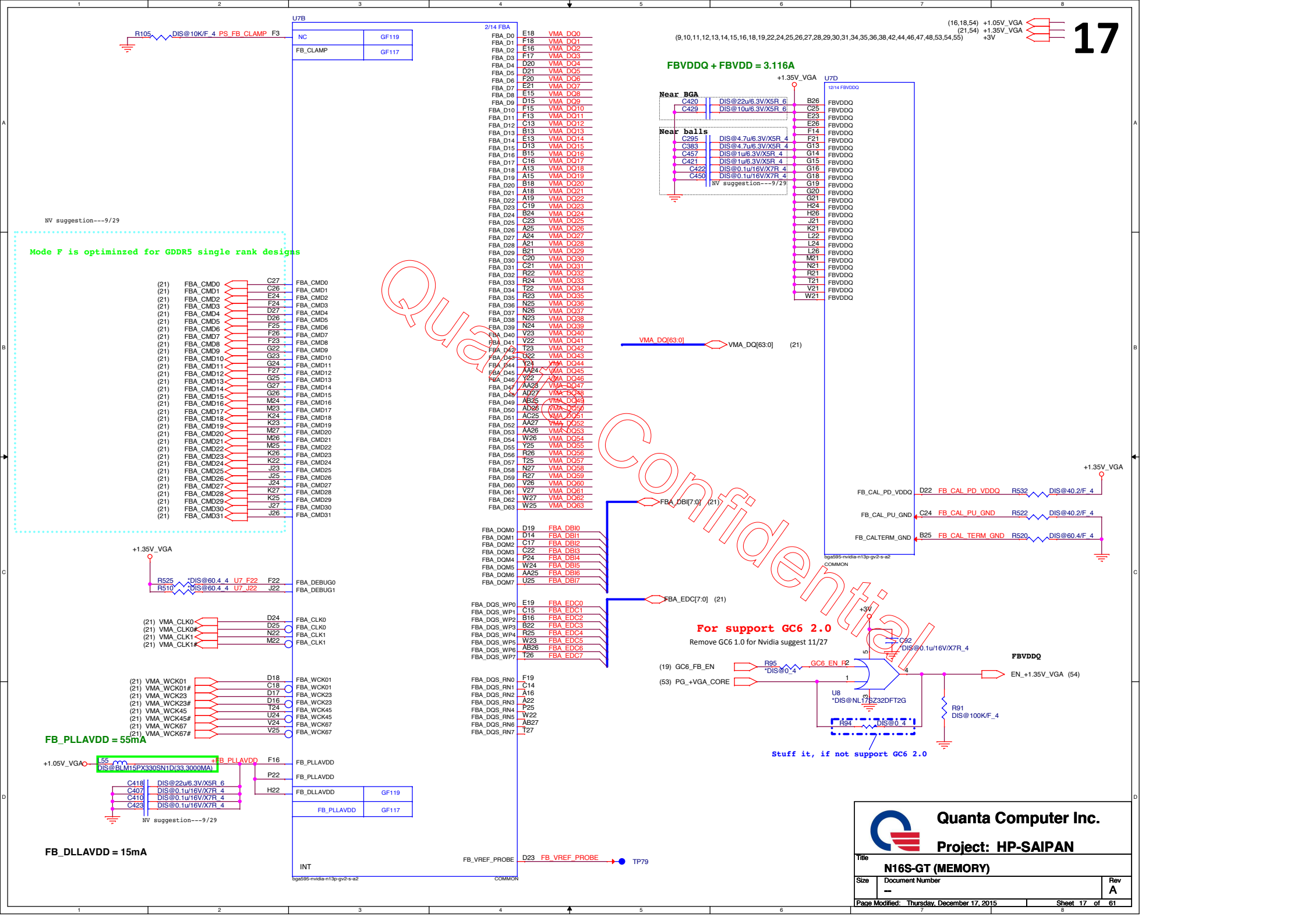
Quanta Computer Inc.

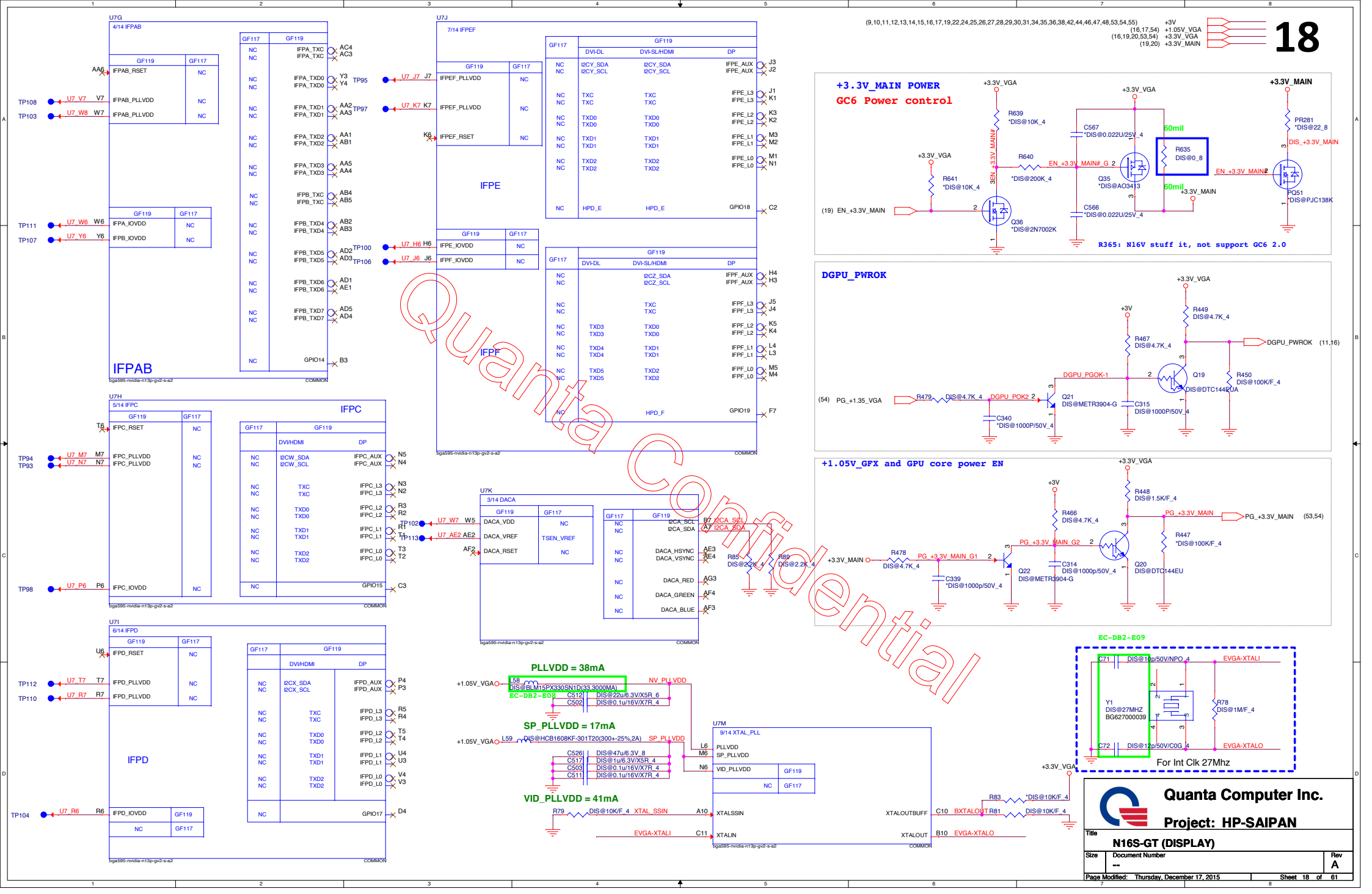
Project: HP-SAIPAN

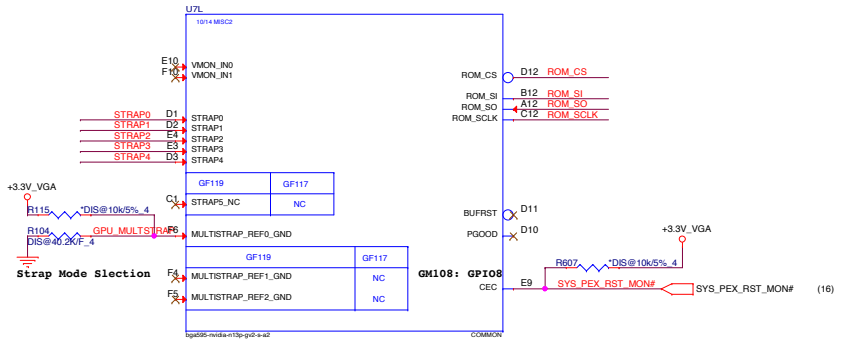
Title: N16S-GM_PCIE_Interface

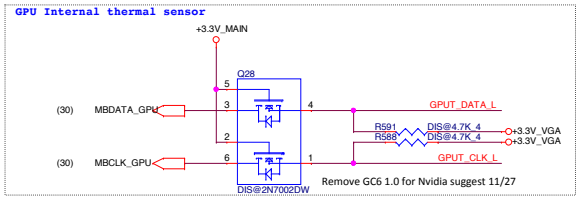
Size | Document Number -- | Rev A

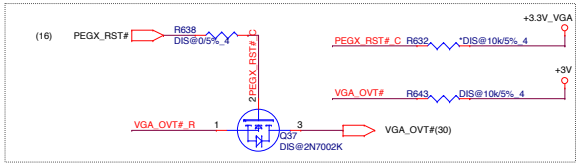
Page Modified: Thursday, December 17, 2015 | Sheet 16 of 61

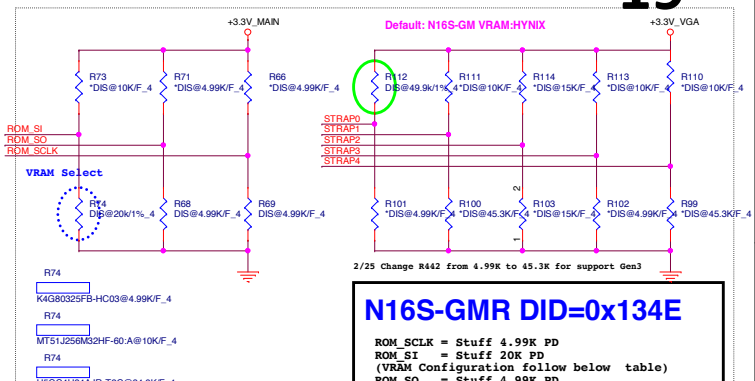

U7B
2/14 FBA
R105 DIS@10K/F_4 PS_FB_CLAMP F3
NC GF119
FB_CLAMP GF117
NV suggestion---9/29
Mode F is optiminzed for GDDR5 single rank designs
FBA_CMD0 C27
FBA_CMD1 C26
FBA_CMD2 E24
FBA_CMD3 F24
FBA_CMD4 D27
FBA_CMD5 D26
FBA_CMD6 F25
FBA_CMD7 F26
FBA_CMD8 F23
FBA_CMD9 G22
FBA_CMD10 G23
FBA_CMD11 G24
FBA_CMD12 F27
FBA_CMD13 G25
FBA_CMD14 G27
FBA_CMD15 G26
FBA_CMD16 M24
FBA_CMD17 M23
FBA_CMD18 K24
FBA_CMD19 K23
FBA_CMD20 M27
FBA_CMD21 M26
FBA_CMD22 M25
FBA_CMD23 K26
FBA_CMD24 K22
FBA_CMD25 J23
FBA_CMD26 J25
FBA_CMD27 J24
FBA_CMD28 K27
FBA_CMD29 K25
FBA_CMD30 J27
FBA_CMD31 J26
+1.35V_VGA
R525 *DIS@60.4_4 U7_F22 F22 FBA_DEBUG0
R510 DIS@60.4_4 U7_J22 J22 FBA_DEBUG1
VMA_CLK0 D24 FBA_CLK0
VMA_CLK0# D25 FBA_CLK0
VMA_CLK1 N22 FBA_CLK1
VMA_CLK1# M22 FBA_CLK1
VMA_WCK01 D18 FBA_WCK01
VMA_WCK01# C18 FBA_WCK01
VMA_WCK23 D17 FBA_WCK23
VMA_WCK23# D16 FBA_WCK23
VMA_WCK45 T24 FBA_WCK45
VMA_WCK45# U24 FBA_WCK45
VMA_WCK67 V24 FBA_WCK67
VMA_WCK67# V25 FBA_WCK67
FB_PLLAVDD = 55mA
+1.05V_VGA
L55 DIS@BLM15PX330SN1D(33,3000MA) +FB_PLLAVDD F16 FB_PLLAVDD
P22 FB_PLLAVDD
H22 FB_DLLAVDD GF119
FB_PLLAVDD GF117
C418 DIS@22u/6.3V/X5R_6
C407 DIS@0.1u/16V/X7R_4
C410 DIS@0.1u/16V/X7R_4
C423 DIS@0.1u/16V/X7R_4
NV suggestion---9/29
FB_DLLAVDD = 15mA
INT
bga595-nvidia-n13p-gv2-s-a2
COMMON
FBA_D0 E18 VMA_DQ0
FBA_D1 F18 VMA_DQ1
FBA_D2 E16 VMA_DQ2
FBA_D3 F17 VMA_DQ3
FBA_D4 D20 VMA_DQ4
FBA_D5 D21 VMA_DQ5
FBA_D6 F20 VMA_DQ6
FBA_D7 E21 VMA_DQ7
FBA_D8 E15 VMA_DQ8
FBA_D9 D15 VMA_DQ9
FBA_D10 F15 VMA_DQ10
FBA_D11 F13 VMA_DQ11
FBA_D12 C13 VMA_DQ12
FBA_D13 B13 VMA_DQ13
FBA_D14 E13 VMA_DQ14
FBA_D15 D13 VMA_DQ15
FBA_D16 B15 VMA_DQ16
FBA_D17 C16 VMA_DQ17
FBA_D18 A13 VMA_DQ18
FBA_D19 A15 VMA_DQ19
FBA_D20 B18 VMA_DQ20
FBA_D21 A18 VMA_DQ21
FBA_D22 A19 VMA_DQ22
FBA_D23 C19 VMA_DQ23
FBA_D24 B24 VMA_DQ24
FBA_D25 C23 VMA_DQ25
FBA_D26 A25 VMA_DQ26
FBA_D27 A24 VMA_DQ27
FBA_D28 A21 VMA_DQ28
FBA_D29 B21 VMA_DQ29
FBA_D30 C20 VMA_DQ30
FBA_D31 C21 VMA_DQ31
FBA_D32 R22 VMA_DQ32
FBA_D33 R24 VMA_DQ33
FBA_D34 T22 VMA_DQ34
FBA_D35 R23 VMA_DQ35
FBA_D36 N25 VMA_DQ36
FBA_D37 N26 VMA_DQ37
FBA_D38 N23 VMA_DQ38
FBA_D39 N24 VMA_DQ39
FBA_D40 V23 VMA_DQ40
FBA_D41 V22 VMA_DQ41
FBA_D42 T23 VMA_DQ42
FBA_D43 U22 VMA_DQ43
FBA_D44 Y24 VMA_DQ44
FBA_D45 AA24 VMA_DQ45
FBA_D46 Y22 VMA_DQ46
FBA_D47 AA23 VMA_DQ47
FBA_D48 AD27 VMA_DQ48
FBA_D49 AB25 VMA_DQ49
FBA_D50 AD26 VMA_DQ50
FBA_D51 AC25 VMA_DQ51
FBA_D52 AA27 VMA_DQ52
FBA_D53 AA26 VMA_DQ53
FBA_D54 W26 VMA_DQ54
FBA_D55 Y25 VMA_DQ55
FBA_D56 R26 VMA_DQ56
FBA_D57 T25 VMA_DQ57
FBA_D58 N27 VMA_DQ58
FBA_D59 R27 VMA_DQ59
FBA_D60 V26 VMA_DQ60
FBA_D61 V27 VMA_DQ61
FBA_D62 W27 VMA_DQ62
FBA_D63 W25 VMA_DQ63
VMA_DQ[63:0] VMA_DQ[63:0] (21)
FBA_DQM0 D19 FBA_DBI0
FBA_DQM1 D14 FBA_DBI1
FBA_DQM2 C17 FBA_DBI2
FBA_DQM3 C22 FBA_DBI3
FBA_DQM4 P24 FBA_DBI4
FBA_DQM5 W24 FBA_DBI5
FBA_DQM6 AA25 FBA_DBI6
FBA_DQM7 U25 FBA_DBI7
FBA_DBI[7:0] (21)
FBA_DQS_WP0 E19 FBA_EDC0
FBA_DQS_WP1 C15 FBA_EDC1
FBA_DQS_WP2 B16 FBA_EDC2
FBA_DQS_WP3 B22 FBA_EDC3
FBA_DQS_WP4 R25 FBA_EDC4
FBA_DQS_WP5 W23 FBA_EDC5
FBA_DQS_WP6 AB26 FBA_EDC6
FBA_DQS_WP7 T26 FBA_EDC7
FBA_EDC[7:0] (21)
FBA_DQS_RN0 F19
FBA_DQS_RN1 C14
FBA_DQS_RN2 A16
FBA_DQS_RN3 A22
FBA_DQS_RN4 P25
FBA_DQS_RN5 W22
FBA_DQS_RN6 AB27
FBA_DQS_RN7 T27
FB_VREF_PROBE D23 FB_VREF_PROBE TP79
(16,18,54) +1.05V_VGA
(21,54) +1.35V_VGA
(9,10,11,12,13,14,15,16,18,19,22,24,25,26,27,28,29,30,31,34,35,36,38,42,44,46,47,48,53,54,55) +3V
17
FBVDDQ + FBVDD = 3.116A
+1.35V_VGA
U7D
12/14 FBVDDQ
Near BGA
C420 DIS@22u/6.3V/X5R_6
C429 DIS@10u/6.3V/X5R_6
Near balls
C295 DIS@4.7u/6.3V/X5R_4
C383 DIS@4.7u/6.3V/X5R_4
C457 DIS@1u/6.3V/X5R_4
C421 DIS@1u/6.3V/X5R_4
C422 DIS@0.1u/16V/X7R_4
C450 DIS@0.1u/16V/X7R_4
NV suggestion---9/29
B26 C25 E23 E26 F14 F21 G13 G14 G15 G16 G18 G19 G20 G21 H24 H26 J21 K21 L22 L24 L26 M21 N21 R21 T21 V21 W21 FBVDDQ
FB_CAL_PD_VDDQ D22 FB_CAL_PD_VDDQ R532 DIS@40.2/F_4
FB_CAL_PU_GND C24 FB_CAL_PU_GND R522 DIS@40.2/F_4
FB_CALTERM_GND B25 FB_CAL_TERM_GND R520 DIS@60.4/F_4
bga595-nvidia-n13p-gv2-s-a2
COMMON
For support GC6 2.0
Remove GC6 1.0 for Nvidia suggest 11/27
(19) GC6_FB_EN
(53) PG_+VGA_CORE
R95 *DIS@0_4
GC6_EN_R2
U8 *DIS@NL17SZ32DFT2G
C92 DIS@0.1u/16V/X7R_4
R94 DIS@0_4
R91 DIS@100K/F_4
FBVDDQ
EN_+1.35V_VGA (54)
Stuff it, if not support GC6 2.0
Quanta Confidential
Quanta Computer Inc.
Project: HP-SAIPAN
Title
N16S-GT (MEMORY)
Size
Document Number
–
Rev
A
Page Modified: Thursday, December 17, 2015
Sheet 17 of 61





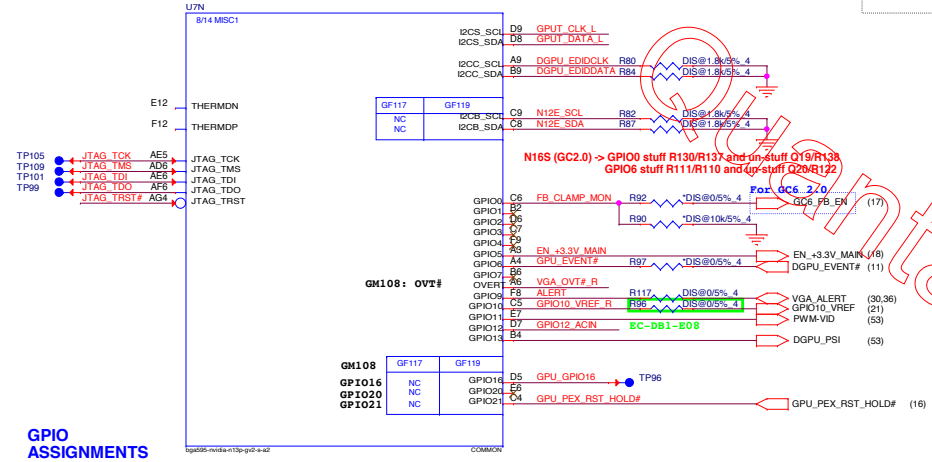




## N16S-GMR DID=0x134E

ROM_SCLK = Stuff 4.99K PD
ROM_SI = Stuff 20K PD
(VRAM Configuration follow below table)
ROM_SO = Stuff 4.99K PD
STRAP0 = Stuff 49.9K PU
STRAP1 = NC
STRAP2 = NC
STRAP3 = NC
STRAP4 = NC

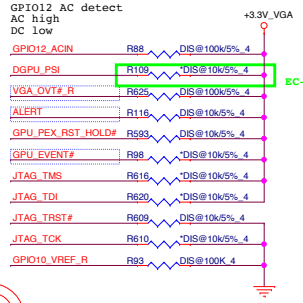
GB2B-64




OVT: Active low OD output
Alert: OD Input
For GC6 2.0

## HW STRAPS:

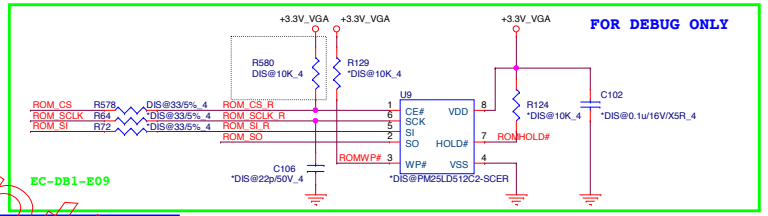
GPIO12 AC detect
AC high
DC low




Note: GC6 2.0 is supported by N16x GPU in the GB2B ,GB4B-128,and GB3B-256 packages.

## Logical Strap Bit Mapping

| | PU-VDD | PD | QCI P/N |
|---|---|---|---|
| 4.99K | 1000 | 0000 | CS24992FB26 |
| 10K | 1001 | 0001 | CS31002FB26 |
| 15K | 1010 | 0010 | CS31502FB24 |
| 20K | 1011 | 0011 | CS32002FB29 |
| 24.9K | 1100 | 0100 | CS32492FB16 |
| 30.1K | 1101 | 0101 | CS33012FB18 |
| 34.8K | 1110 | 0110 | CS33482FB06 |
| 45.3K | 1111 | 0111 | CS34532FB18 |




## GPIO ASSIGNMENTS

| GPIO | I/O | PIN | USAGE |
|---|---|---|---|
| 0 | IN | FB_CLAMP_MON | FB Clamp monitor (GC6 1.0) |
| 0 | OUT | GC6_FB_EN | GC6 FB Enable (GC6 2.0) |
| 5 | OUT | +3V_MAIN_EN | Enable GC6 +3V_MAIN |
| 6 | OUT | FB_CLAMP_REQ# | Active low FB Clamp toggle request (GC6 1.0) |
| 6 | IN | DGPU_EVENT# | DGPU EVENT from CPU (GC6 2.0) |
| 8 | OUT | VGA_OVT# | ACTIVE LOW THERMAL OVER TEMP |
| 9 | OUT | ALERT | ACTIVE LOW THERMAL ALERT |
| 11 | OUT | PWR_VID | GPU CORE_VDD PWM Control signal |
| 12 | IN | PWR_LEVEL | AC Power detect or power supply overdraw input |
| 13 | OUT | PSI | Phase Shedding |

N16S-GM/-GT/-LP VRAM Configuration Table

ROM_SI

| RAMCFG [3:0] | DESCRIPTION 1.35V gDDR5 | Vendor | Vendor P/N | ROM_SI (R74) | STN B/S | Configuration |
|---|---|---|---|---|---|---|
| 0000<br>0001 | 512Mx16 | SAMSUNG<br>Micron | K4G80325FB-HC03<br>MT51J256M32HF-60:A | PD 4.99K ohm<br>PD 10K ohm | | |
| 0011<br>0110 | 256Mx16 | SAMSUNG<br>HYNIX | K4G41325FC-HC03<br>H5GC4H24AJR-T2C | PD 20K ohm<br>PD 34.8K ohm | | |





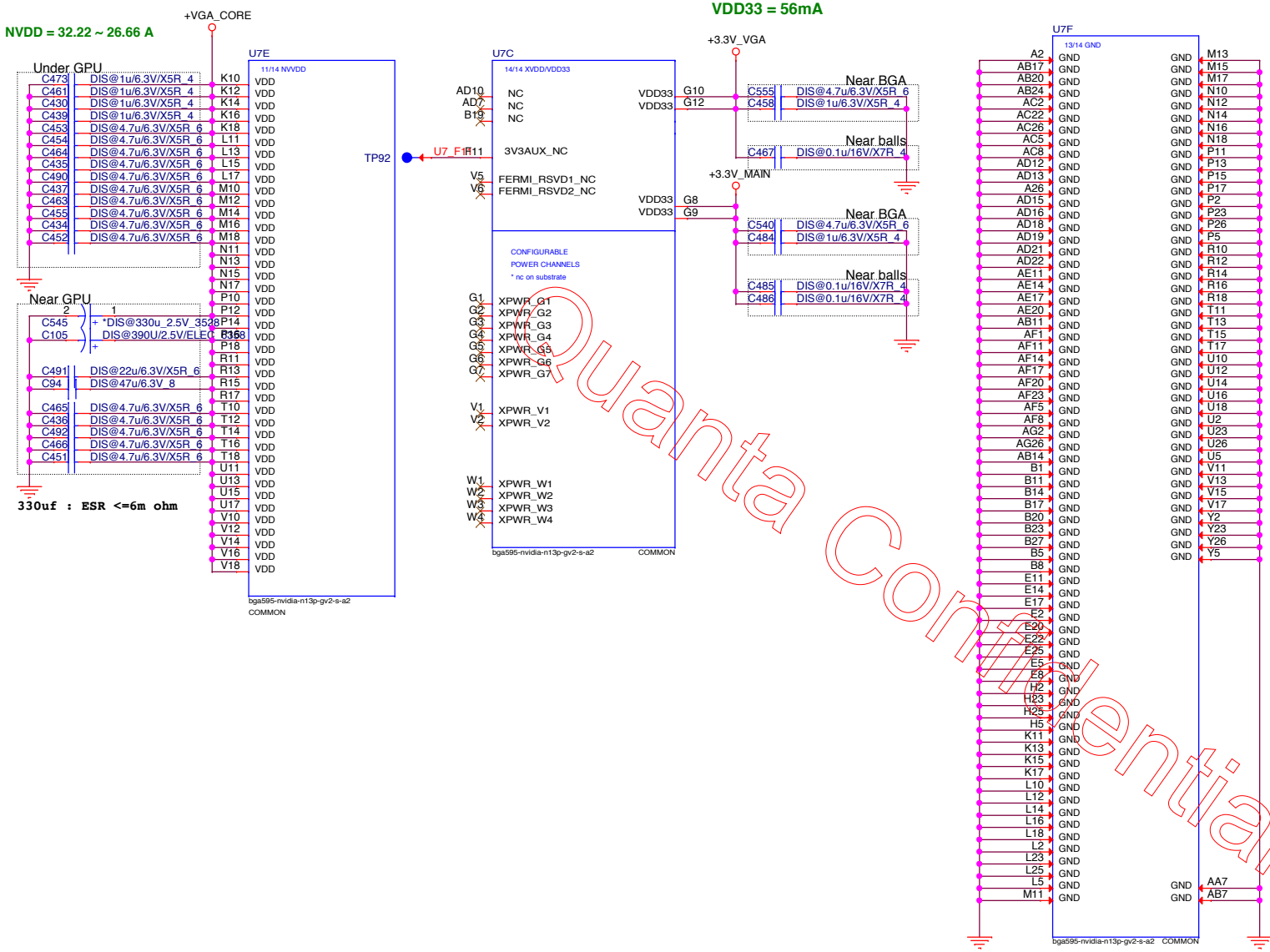
Quanta Computer Inc.
Project: HP-SAIPAN

Title: N16S-GT (GPIO/STRAPS)
Size: Document Number: --
Rev: A
Page Modified: Thursday, December 17, 2015
Sheet 19 of 61

(18,19) +3.3V_MAIN
(16,18,19,53,54) +3.3V_VGA
(53,54) +VGA_CORE

NVDD = 32.22 ~ 26.66 A

VDD33 = 56mA






HP Restricted Secret

Quanta Computer Inc.

Project: HP-SAIPAN

| | | |
|---|---|---|
| Title: NV16S-GM_Power/GND | | |
| Size | Document Number: -- | Rev: A |
| Page Modified: Thursday, December 17, 2015 | | Sheet 20 of 61 |

# 2GB gDDR5



## Channel A0

### MF=0 Non-mirrored

QD16~23 / QD0~7

### MF=1 Mirrored

QD8~15 / QD24~31

## Channel A1

### MF=0 Non-mirrored

QD48~55 / QD32~39

### MF=1 Mirrored

QD40~47 / QD56~63



NV suggestion---9/29
Place near memory side

CKE* is strap pin to set ODT value of memory chip

RST PD place @ the end of daisy-chain.

Layout:
0.1uf to close memory device
Larger caps slightly farther away

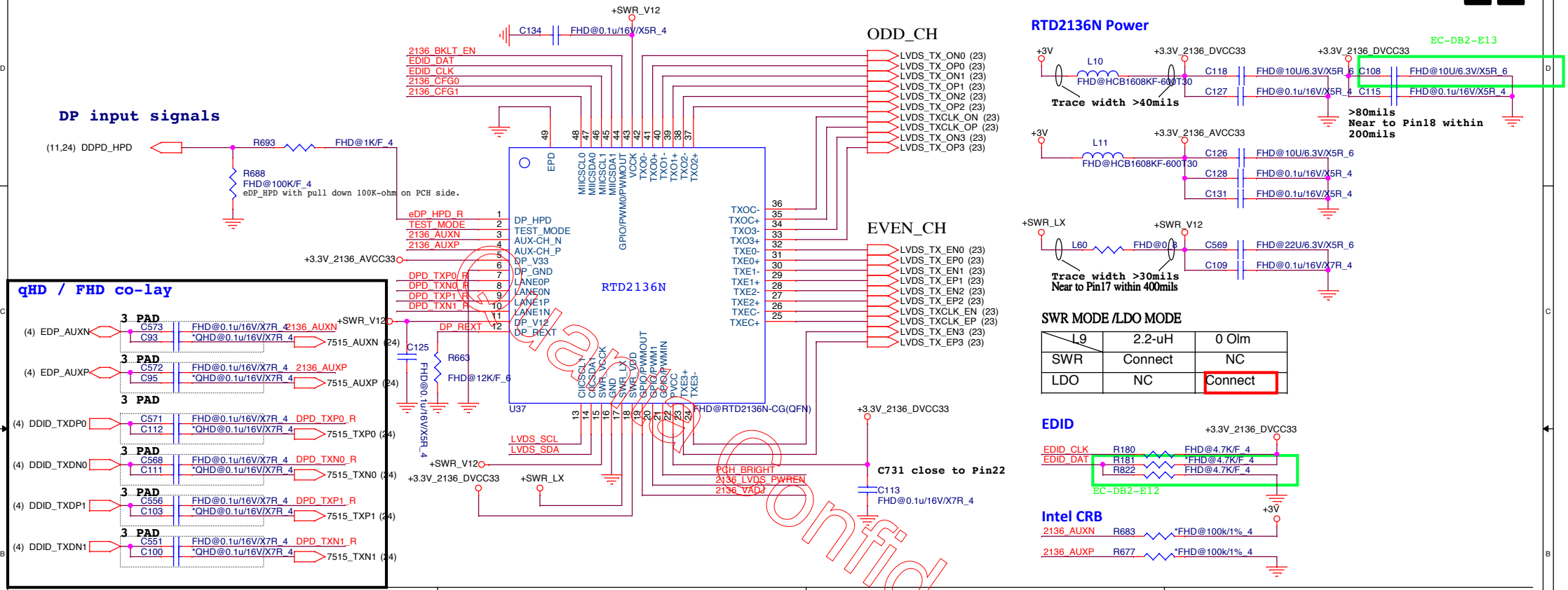
| GDDR5 Mode H Mapping | | |
|---|---|---|
| < 0-31 > | < 32-63 > | Memory |
| CMD0 | CMD16 | CS* |
| CMD1 | CMD17 | A3_BA3 |
| CMD2 | CMD18 | A2_BA0 |
| CMD3 | CMD19 | A4_BA2 |
| CMD4 | CMD20 | A5_BA1 |
| CMD5 | CMD21 | WE* |
| CMD6 | CMD22 | A7_A8 |
| CMD7 | CMD23 | A6_A11 |
| CMD8 | CMD24 | ABI* |
| CMD9 | CMD25 | A12_RFU |
| CMD10 | CMD26 | A0_A10 |
| CMD11 | CMD27 | A1_A9 |
| CMD12 | CMD28 | RAS* |
| CMD13 | CMD29 | RST* |
| CMD14 | CMD30 | CKE* |
| CMD15 | CMD31 | CAS* |

Quanta Computer Inc.
Project: HP-SAIPAN
Title: VRAM_DDR3 BGA96
Size: Document Number: --
Rev: A
Page Modified: Thursday, December 17, 2015
Sheet 21 of 61

# eDP to LVDS (RTD2136N-CG)

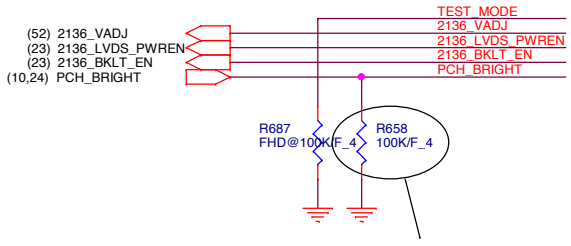
(9,10,11,12,13,14,15,16,17,18,19,24,25,26,27,28,29,30,31,34,35,36,38,42,44,46,47,48,53,54,55) +3V

**22**




| L9 | 2.2-uH | 0 Olm |
|---|---|---|
| SWR | Connect | NC |
| LDO | NC | Connect |

## GPIO & TESTing signals

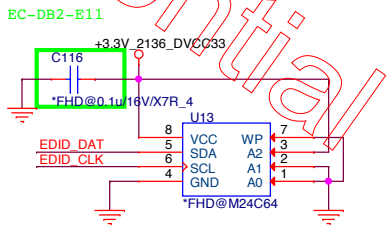



**NEED STUFF FOR FHD/QHD**

## Mode select


| 2136_CFG1 (PIN48) | 2136_CFG0 (PIN47) = 0 | 2136_CFG0 (PIN47) = 1 |
|---|---|---|
| 0 | X | EP MODE |
| 1 | ROM ONLY MODE | EEPROM MODE |

## EEPROM

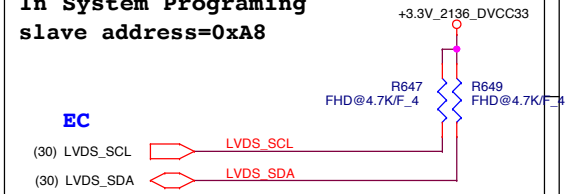



1- EEPROM with a size 8K-Byte

2- EEPROM device should be 2-byte addressing device

3- Slave address should configure as 0xA8

## In System Programing slave address=0xA8




HP Restricted Secret

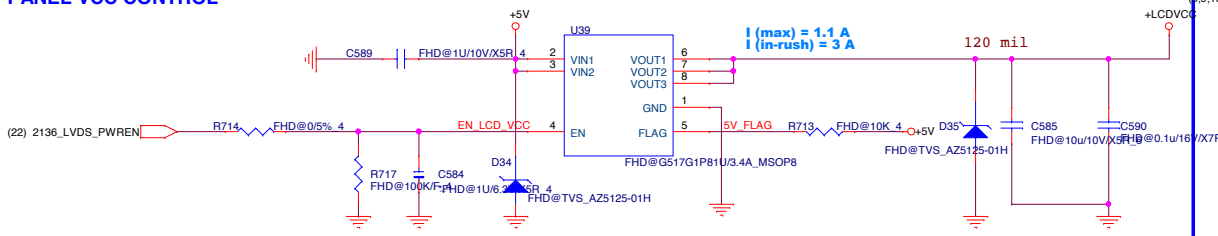
**Quanta Computer Inc.**

**Project: HP-SAIPAN**

| Title | | |
|---|---|---|
| eDP-LVDS_RTD2136N | | |
| Size | Document Number | Rev |
| | -- | A |
| Page Modified: Thursday, December 17, 2015 | | Sheet 22 of 61 |

# LED PANEL

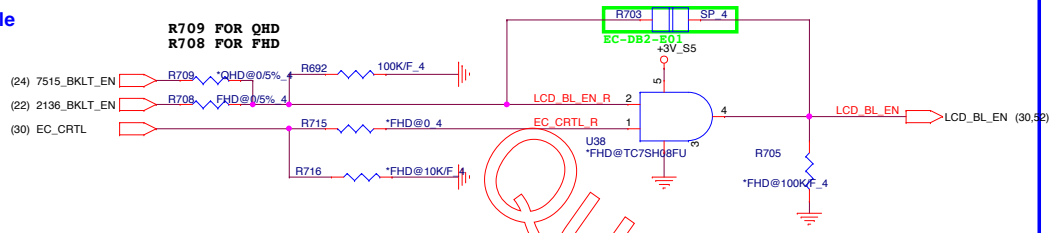
## PANEL VCC CONTROL



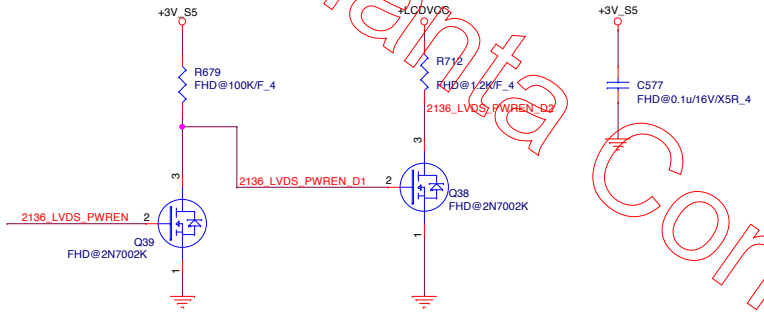

(31,39,40,41,42,43,44,46,47,49,50,51,52,53,54,55) +VIN
(5,9,10,11,12,13,25,28,30,32,34,37,38,39,41,42,43,45,46,47,54,55) +3V_S5
(26,27,31,36,39,46,47,48,49,50,53,55) +5V

23

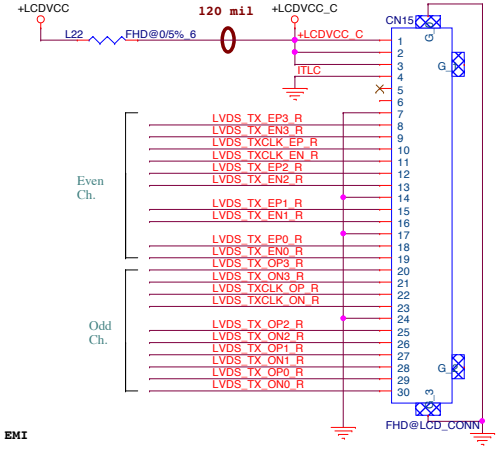
## BackLight Enable



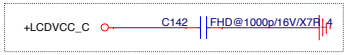

## LCDVCC Discharge Circuit



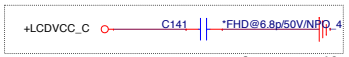

## LVDS Conn




**EMI**

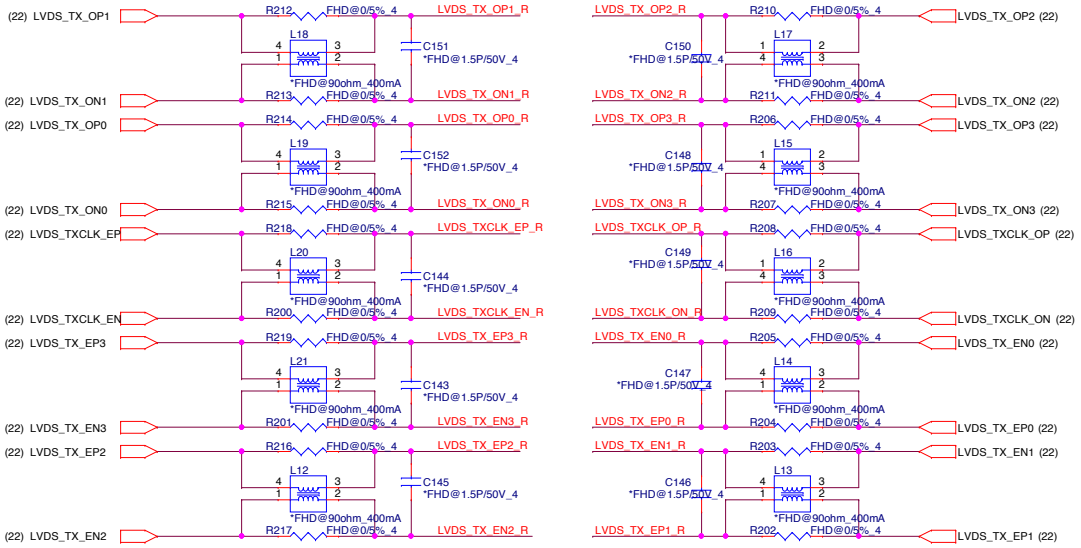



**RF**




Close to CN18

## EMI







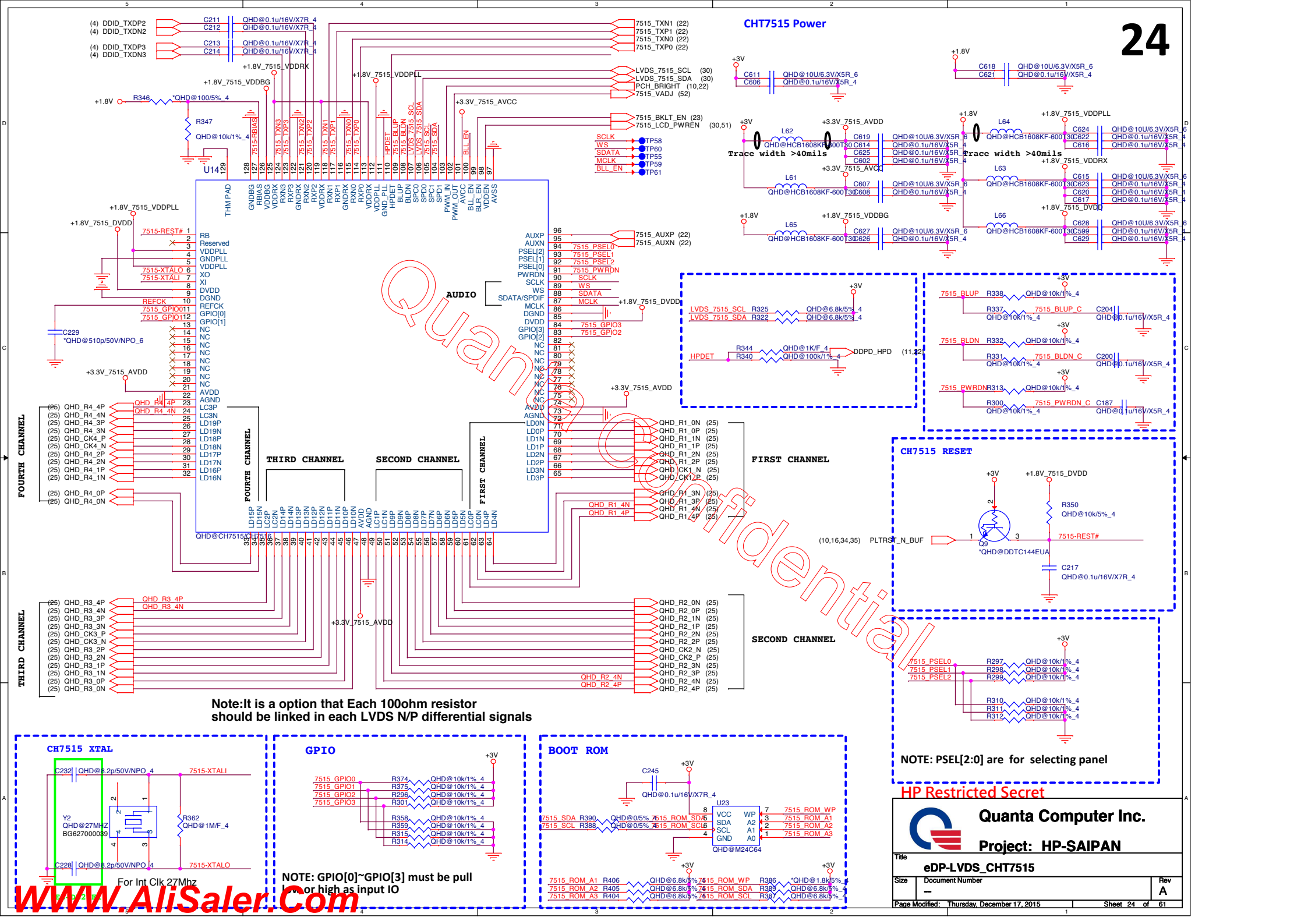

Quanta Computer Inc.

Project: HP-SAIPAN

Title: Panel (Control).LCD-Conn.

Size: | Document Number: -- | Rev: A

Page Modified: Thursday, December 17, 2015 | Sheet 23 of 61

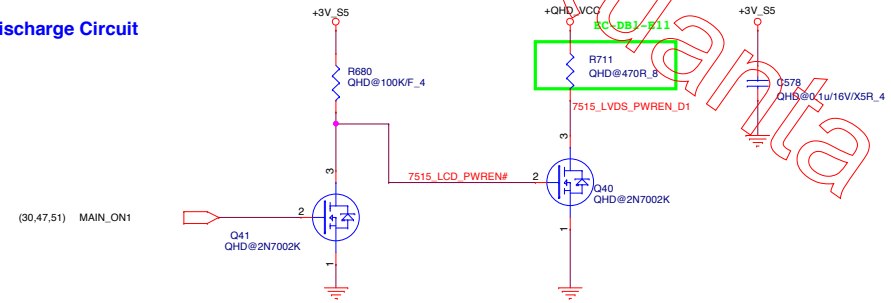

24
CHT7515 Power
FOURTH CHANNEL
THIRD CHANNEL
SECOND CHANNEL
FIRST CHANNEL
AUDIO
CH7515 RESET
CH7515 XTAL
GPIO
BOOT ROM
Note:It is a option that Each 100ohm resistor should be linked in each LVDS N/P differential signals
NOTE: GPIO[0]~GPIO[3] must be pull low or high as input IO
NOTE: PSEL[2:0] are for selecting panel
For Int Clk 27Mhz
Trace width >40mils
Trace width >40mils
HP Restricted Secret
Quanta Computer Inc.
Project: HP-SAIPAN
eDP-LVDS_CHT7515
Size
Document Number
Rev
A
Page Modified: Thursday, December 17, 2015
Sheet 24 of 61
Quanta Confidential
WWW.AliSaler.Com

# LED PANEL

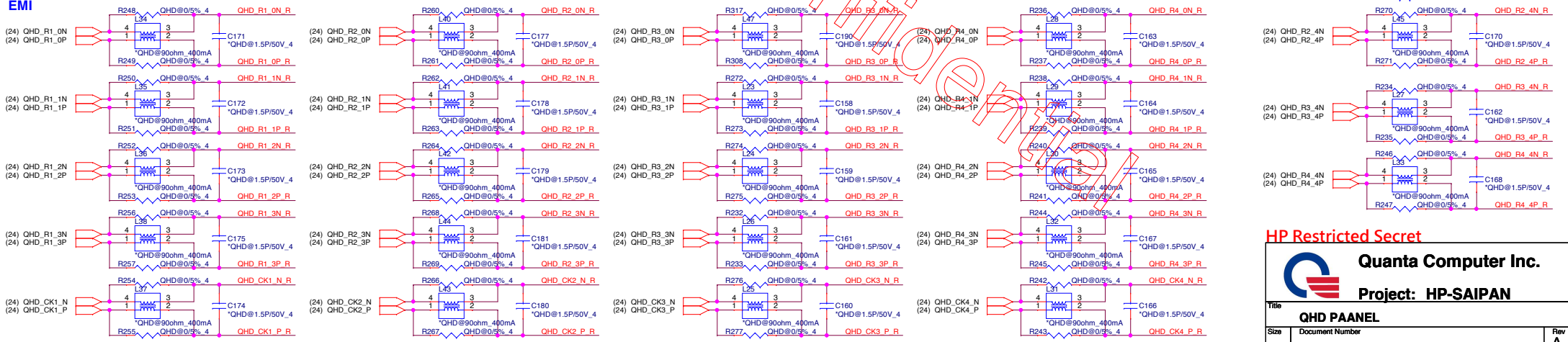
## PANEL VCC CONTROL

EC-DB1-E10

## LCDVCC Discharge Circuit




## EMI

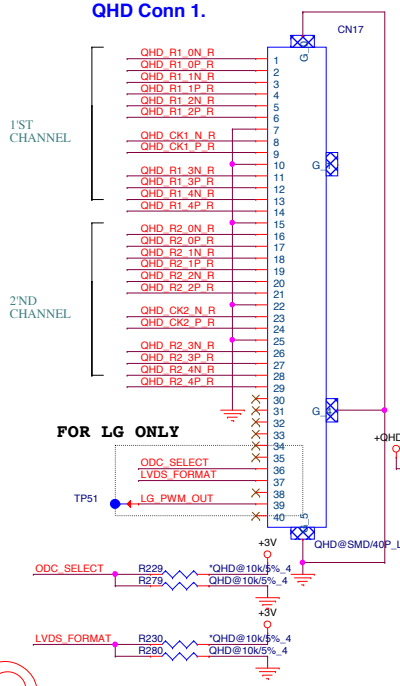



(31,39,40,41,42,43,44,46,47,49,50,51,52,53,54,55) +VIN
(5,9,10,11,12,13,23,28,30,32,34,37,38,39,41,42,43,45,46,47,54,55) +3V_S5
(23,26,27,31,36,39,46,47,48,49,50,53,55) +5V

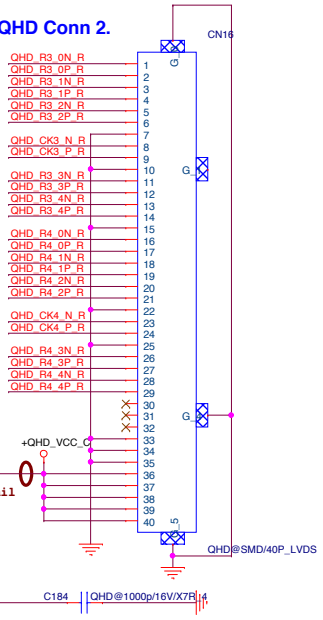
25

AUO ( default pin to pin )

## QHD Conn 1.




## QHD Conn 2.






HP Restricted Secret

Quanta Computer Inc.

Project: HP-SAIPAN

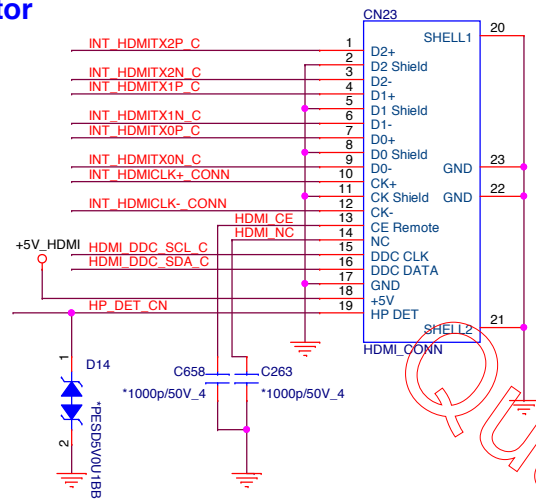
| | | |
|---|---|---|
| Title | QHD PAANEL | |
| Size | Document Number | Rev |
| | – | A |
| Page Modified: Thursday, December 17, 2015 | Sheet 25 of 61 | |

# HDMI

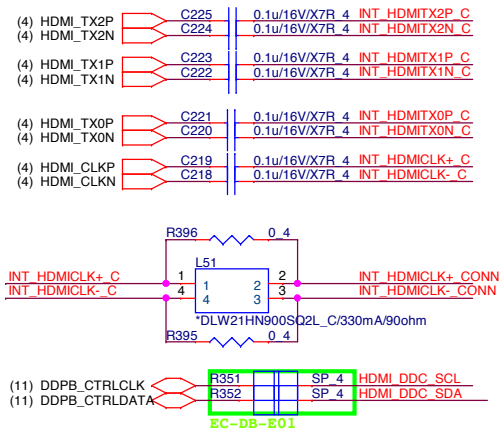
(9,10,11,12,13,14,15,16,17,18,19,22,24,25,27,28,29,30,31,34,35,36,38,42,44,46,47,48,53,54,55) +3V
(23,27,31,36,39,46,47,48,49,50,53,55) +5V



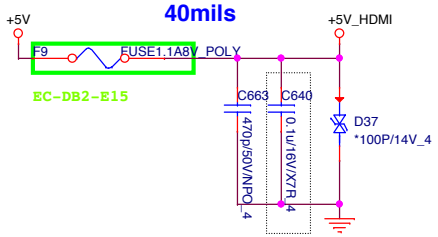
## HDMI connector



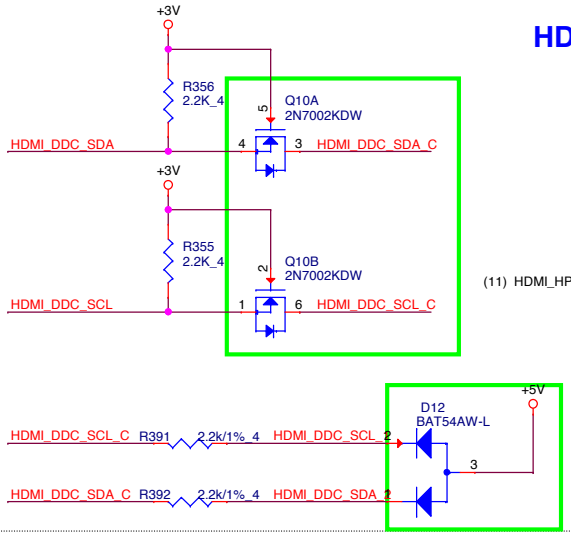

## HDMI INTERFACE



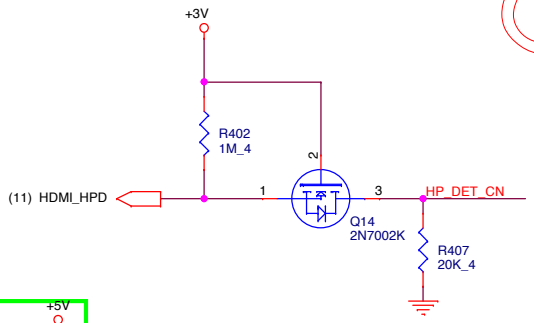

## HDMI POWER SUPPLY



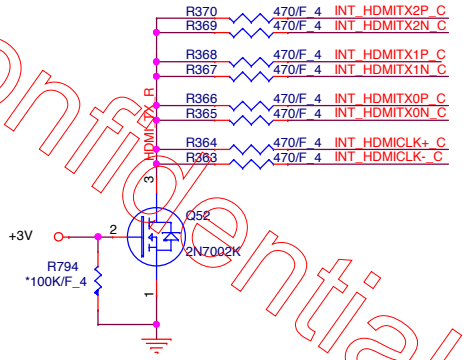

## HDMI DDC



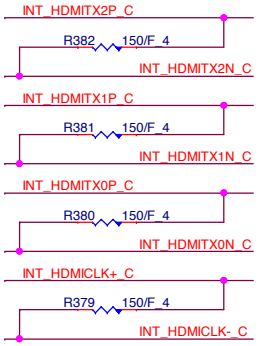

## HDMI-detect




## HDMI LEVEL SHIFT

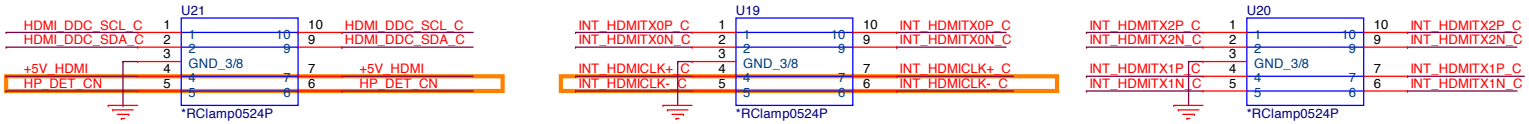



## HDMI EMI (EMC)




## ESD reserve for HDMI

Layout Notes:
Place decoupling CAPs close to Connector






HP Restricted Secret

Quanta Computer Inc.

Project: HP-SAIPAN

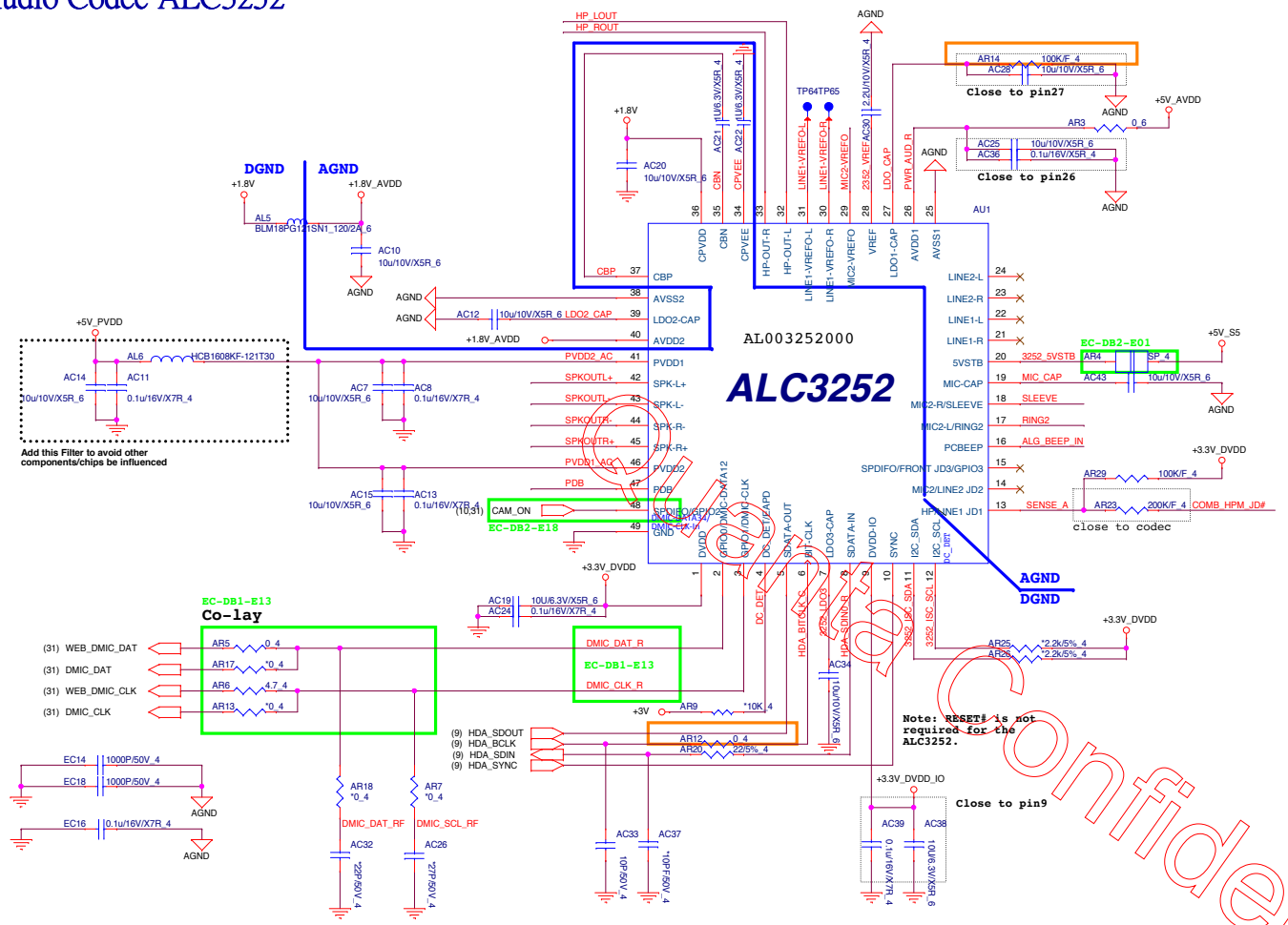
Title: HDMI

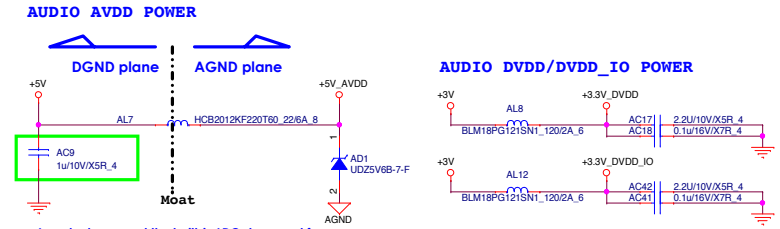
Size: | Document Number: -- | Rev: A

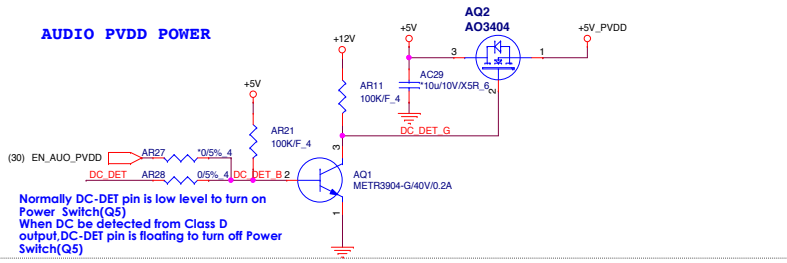
Page Modified: Thursday, December 17, 2015 | Sheet 26 of 61

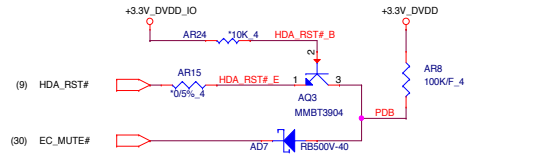
# Audio Codec ALC3252

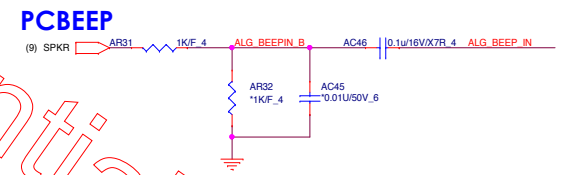


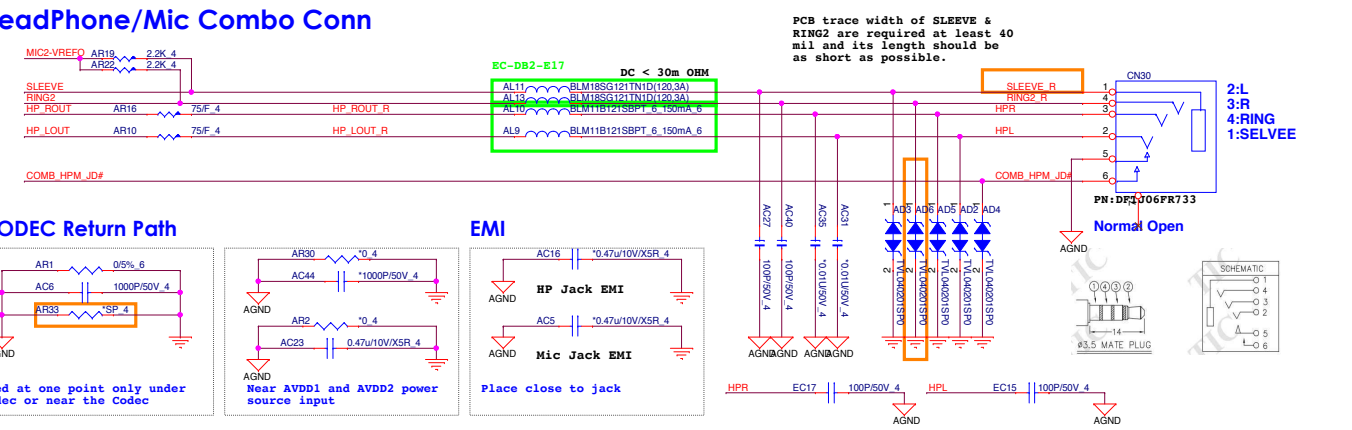


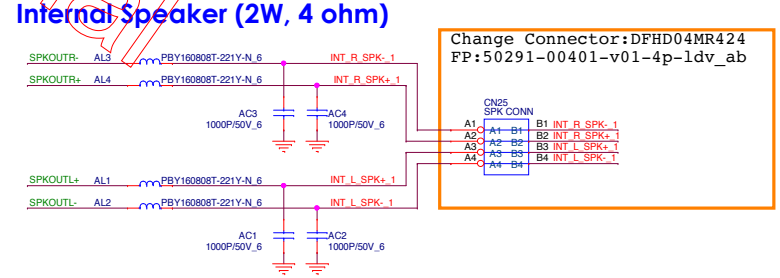






Quanta Computer Inc.

Project: HP-SAIPAN

| | | |
|---|---|---|
| Title | Audio ALC3228-CG | |
| Size | Document Number | Rev |
| | -- | A |
| Page Modified: Thursday, December 17, 2015 | | Sheet 27 of 61 |

# LAN (RTL8161GSH) 10/100/1000



(9,10,11,12,13,14,15,16,17,18,19,22,24,25,26,27,29,30,31,34,35,36,38,42,44,46,47,48,53,54,55) +3V
(5,9,10,11,12,13,23,25,30,32,34,37,38,39,41,42,43,45,46,47,54,55) +3V_S5

R412 value should be 2.49K (1%) for all application.

R804 2.49K/F_4 RSET

VDD10
25MCLKX2
25MCLKX1
LAN_LED0#
LED1/EEDO
LED2/EESK

PCIE_WAKE# _LAN R397 1K/F_4 +3.3V_LAN
EC-DB2-E19
CLKREQB R802 *10K/F_4 +3V

LAN_LED0# C656 *220P/50V/X7R_4
LED1/EEDO C650 *220P/50V/X7R_4
LED2/EESK C649 *220P/50V/X7R_4
EMI Suggest

U46
GND
AVDD33 RSET AVDD10_2 CKXTAL2 CKXTAL1 LED0 LED1/GPO LED2(LED1)

MDI0+ MDI0- VDD10 MDI1+ MDI1- MDI2+ MDI2- VDD10
MDIP0 MDIN0 AVDD10(NC) MDIP1 MDIN1 MDIP2(NC) MDIN2(NC) AVDD10_1
REGOUT(NC) VDDREG(VDD33) DVDD10(NC) LANWAKEB ISOLATEB PERSTB HSON HSOP
REGOUT VDD33_REG VDD10 PCIE_WAKE# _LAN ISOLATEB LAN_RST# HSON HSOP

+3V R798 1K/F_4
R799 *15K/F_4

C647 0.1u/16V/X7R_4
C648 0.1u/16V/X7R_4
PCIE_GLAN_RX_N (10)
PCIE_GLAN_RX_P (10)

MDI3+ MDI3- +3.3V_LAN CLKREQB
MDI3(NC) MDIN3(NC) AVDD33(NC) CKXTAL1 CLKREQB HSIP HSIN REFCLK_P REFCLK_N

HSIN C651 0.1u/16V/X7R_4
HSIP C657 0.1u/16V/X7R_4
CLK_PCIE_LAN_N (12)
CLK_PCIE_LAN_P (12)
PCIE_GLAN_TX_N (10)
PCIE_GLAN_TX_P (10)

RTL8161GSH-CG

(12) LAN_PCIE_CLKREQ# R803 0/5%_4 CLKREQB
BK: reserve
EC-DB2-E19

## X'tal 25MHz

C255 10P/50V_4 25MCLKX1
Y3
XTAL_25MHz_30ppm
BG625000085
C259 10P/50V_4 25M_R R403 0/5%_4 25MCLKX2

+3.3V_LAN C237 0.1u/16V/X7R_4
LAN_RST# U17 TC7SH08FU PLTRST_N (10,29,37)

+3.3V_LAN Q13 DDTC144EUA
PCIE_WAKE# _LAN R399 *0_4 PCH_WAKE# (9,34,35)

## 3V_LAN

+3V_S5 R378 *10K/F_4
(30) LAN_PWR_ON
Q12 G5243AT11U
IN_1 IN_2 ON/OFF OUT GND
C231 *0.1u/16V/X7R_4
C234 0.1u/16V/X7R_4
+3.3V_LAN 120mil R394 *0_6
C242 *0.1u/16V/X7R_4

## EVDD10/AVDD33_REG trace width >40mils

+3.3V_LAN R398 0_6 VDD33_REG
C262 *4.7U/6.3V/X5R_4 C258 0.1u/16V/X7R_4 Close to Pin32
C257 *4.7U/6.3V/X5R_4 C254 0.1u/16V/X7R_4 Close to Pin11
C249 0.1u/16V/X7R_4 C250 4.7U/6.3V/X5R_4 Close to Pin23

## EVDD10/N780946/REGOUT trace width >60mils

VDD10
C261 C260 C253 C256 0.1u/16V/X7R_4 Close to PIN3, 8, 22, 30
C645 0.1u/16V/X7R_4 C646 1U/6.3V/X5R_4
C252 4.7U/6.3V/X5R_4 C251 0.1u/16V/X7R_4
L67 4.7uH REGOUT
C367,C368 Close to PIN22

## LAN Conn

U25
NS892407_TCT
MDI0+ R423 1/F_6 MDI0+_R
MDI0- R421 1/F_6 MDI0-_R
MDI1+ R417 1/F_6 MDI1+_R
MDI1- R416 1/F_6 MDI1-_R
MDI2+ R413 1/F_6 MDI2+_R
MDI2- R410 1/F_6 MDI2-_R
MDI3+ R409 1/F_6 MDI3+_R
MDI3- R408 1/F_6 MDI3-_R
TCT0 TD0+ TD0- TCT1 TD1+ TD1- TCT2 TD2+ TD2- TCT3 TD3+ TD3-
NS892407
MCT0 TX0+ TX0- MCT1 TX1+ TX1- MCT2 TX2+ TX2- MCT3 TX3+ TX3-
TXCT0 10MIL R815 75/F_8 NS892407_MCT
RJ45-TX0+ IN0 10MIL
RJ45-TX0-
TXCT1 10MIL R814 75/F_8
RJ45-TX1+ IN1 10MIL
RJ45-TX1-
TXCT2 10MIL R812 75/F_8
RJ45-TX2+ IN2 10MIL
RJ45-TX2-
TXCT3 10MIL R811 75/F_8
RJ45-TX3+ IN3 10MIL 10MIL
RJ45-TX3-
15MIL
C670 10P/3KV_1808 15MIL LANGND

C671 0.1U/50V/X7R_6

U24 TVL ST23 04 AD0
MDI2+1 MDI3+3 CH1 CH2 CH3 CH4 Vn Vp MDI2- MDI3- +3.3V_LAN
Q54 BS4202N-C TXCT1 TXCT0 LANGND
Q53 BS4202N-C TXCT3 TXCT2 LANGND

U26 TVL ST23 04 AD0
MDI0+ MDI1+ CH1 CH2 CH3 CH4 Vn Vp MDI0- MDI1- +3.3V_LAN

+3.3V_LAN R801 332/F_4
C654 1000P/50V_4 C655 1000P/50V_4 D39 TVL040201SP0 D40 TVL040201SP0 LANGND
LED2/EESK 1000M_LED_R
LED1/EEDO R800 332/F_4 LED1_R
LAN_LED0# D38 TVL040201SP0
C653 1000P/50V_4 C652 1000P/50V_4

CN24 RJ45-CONN
Y- Y+ NC/3- NC/3+ NC/2- NC/2+ RX+/1+ RX-/1- TX+/0+ TX-/0- G- G+ GND1 GND1 GND1
RJ45-TX3- RJ45-TX3+ RJ45-TX1- RJ45-TX2- RJ45-TX2+ RJ45-TX1+ RJ45-TX0- RJ45-TX0+ LED1_R
EC-DB2-E21

R419 0/5%_8
R813 0/5%_8
L68 HCB1608KF-221T20
C265 0.1U/50V/X7R_6
C264 *0.1u/16V/X7R_4
C269 *0.1u/16V/X7R_4
LANGND

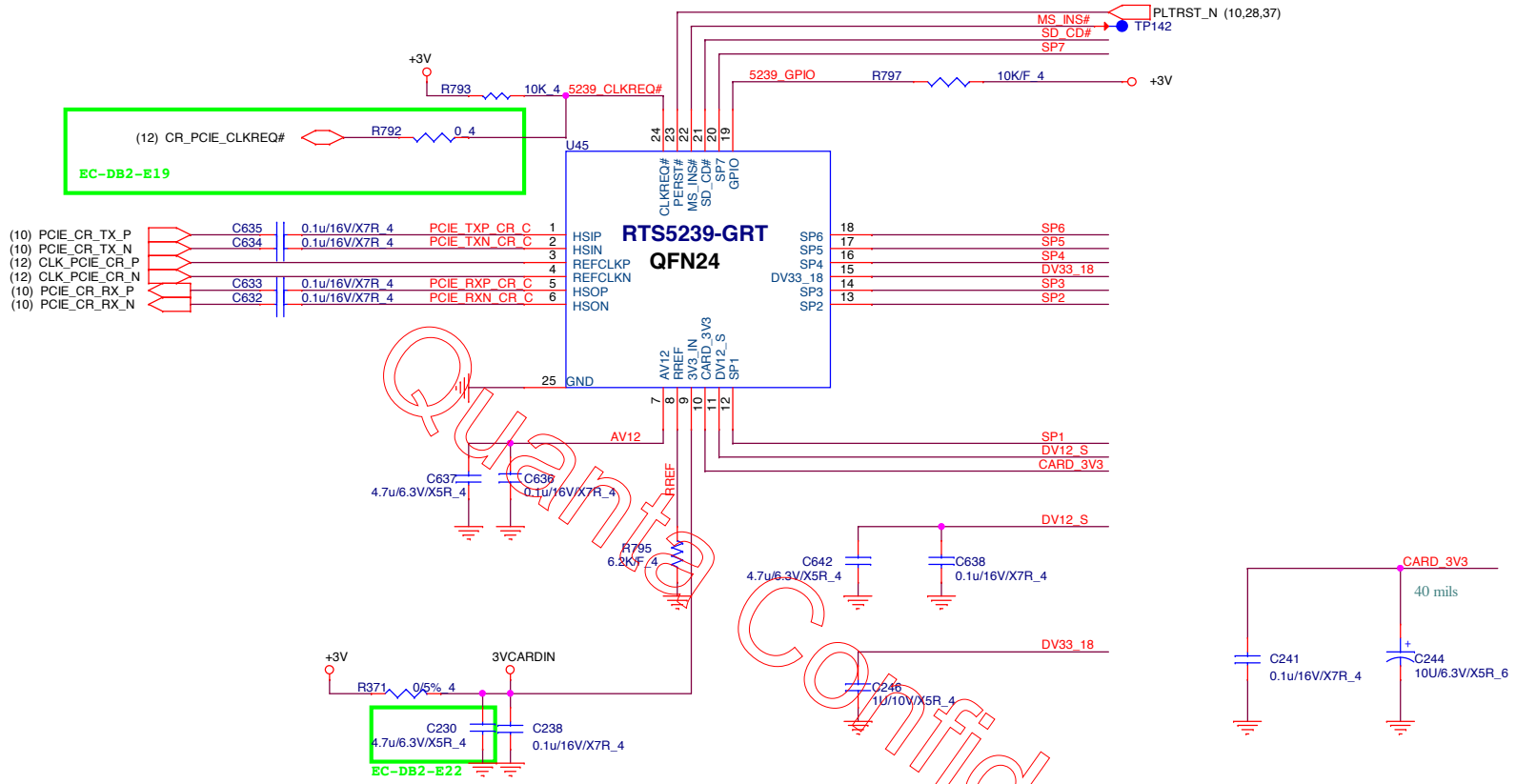
HP Restricted Secret

Quanta Computer Inc.
Project: HP-SAIPAN
Title: RTL8161/RJ45
Size: Document Number: – Rev: A
Page Modified: Thursday, December 17, 2015 Sheet 28 of 61

# CARD READER RTD5239-GRT

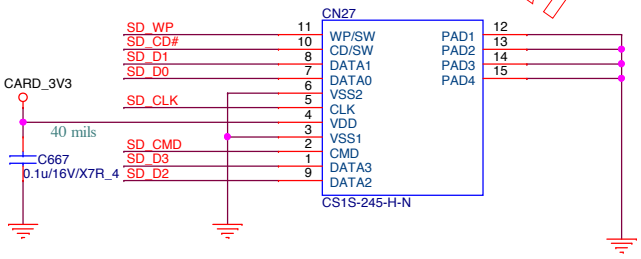


(9,10,11,12,13,14,15,16,17,18,19,22,24,25,26,27,28,30,31,34,35,36,38,42,44,46,47,48,53,54,55) +3V

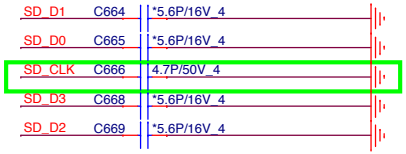




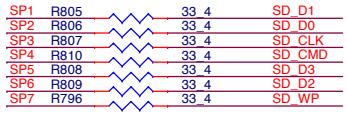

## SD connector




## EMI EC-DB2-E23




## SD damping resistor




HP Restricted Secret

Quanta Computer Inc.

Project: HP-SAIPAN

| | | |
|---|---|---|
| Title: Card Reader (RTS5239) | | |
| Size | Document Number: -- | Rev: A |
| Page Modified: Thursday, December 17, 2015 | | Sheet 29 of 61 |

# EC ITE 8987



(For PLL Power)

IT8987 LQFP



## EC Debug

CN26
*EC_88502-2401-24P-L

U34
IT8987E/BX(LQFP)_128OP

## EC STRAPS

EC-DB1-E14

| | | |
|---|---|---|
| BOX_BUTTON# | R509 | 10K/F_4 |
| PANEL_SIZE0 | R524 | 10K_4 |
| PANEL_SIZE1 | R485 | 10K_4 |
| PANEL_ID0 | R546 | 10K_4 |
| PANEL_ID1 | R530 | 10K_4 |
| PANEL_ID2 | R541 | 10K_4 |
| SMBDATA0_EC | R572 | 4.7K/F_4 |
| SMBCLK0_EC | R571 | 4.7K/F_4 |
| DDC_SCL_EC | R573 | 4.7K/F_4 |
| DDC_SDA_EC | R574 | 4.7K/F_4 |
| PANEL_ID3 | R41 | 10K_4 |
| EC_LPCPD# | R513 | *10K/F_4 |
| EN_OVERRIDE | R585 | 100k/5%_4 |
| EC_MOSI | R568 | *1M/5%_4 |
| EC_MISO | R569 | *1M/5%_4 |

EC-DB2-E26: EC_PWBTN_OUT# R584 *4.7K/F_4; EC_SMI#_R R517 *10K_4

EC-DB2-E27: IRMT# R843 *10K_4; S5_ON R566 10k/5%_4, R567 *10k/5%_4

## EC_PECI

H_EC_PECI R575 43.2/1%_4; C470 *47p/50V/NPO_4 → EC_PECI (5)

## Thermal SMBUS

Q31 DMN601K-7: SMBCLK0_EC → R623 2.2K/F_4 → SMBCLK0_EC_R R401 0/5%_4 → THERM_HDD_SCL (36); R615 DIS@0/5%_4 → MBCLK_GPU (19)

Q30 DMN601K-7: SMBDATA0_EC → R621 2.2K/F_4 → SMBDATA0_EC_R R400 0/5%_4 → THERM_HDD_SDA (36); R613 DIS@0/5%_4 → MBDATA_GPU (19)

## Converter SMBUS

Q24 *2N7002K: DDC_SDA_EC → R562 *2.2K/F_4 → DDC_SDA (52); R553 0/5%_4

Q25 *2N7002K: DDC_SCL_EC → R561 *2.2K/F_4 → DDC_SCL (52); R554 0/5%_4

To Converter

## Board ID

| EC_BOARD_ID | Consumer AiO |
|---|---|
| 0 | SAIPAN-UMA |
| 1 | SAIPAN-dGPU |

| EC_FUNCTION_ID | VRAM |
|---|---|
| 0 | 4G |
| 1 | 2G |

## To CHT7515

Q26 2N7002K: DDC_SDA_EC → R582 *2.2K/F_4 → LVDS_SDA_S R648 FHD@0/5%_4, R633 *QHD@0/5%_4 → LVDS_SDA (22), LVDS_7515_SDA (24)

EC-DB2-E28

## To RT2136

Q27 2N7002K: DDC_SCL_EC → R581 *2.2K/F_4 → DDC_SCL_EC_S R654 FHD@0/5%_4, R627 QHD@0/5%_4 → LVDS_SCL (22), LVDS_7515_SCL (24)

EC-DB2-E28

## ALL_SYS_PWRGD circuit

EC-DB2-E29

R480 10K/F_4 → ALL_SYS_PG

D19 *1N4148WS, D17 *1N4148WS ← (41,46) PG_+VDDQ, (42) PG_MAIN

D16 1N4148WS ← (42,48) PG_+VCCIO

D18 *1N4148WS-7-F ← (54) PG_+1.05V_VGA

BK: ALL_SYS_PG--> EC --> VR_ON

## For EC E-flash(embedded flash) auto load code.

EC-DB1-E02

S5_ON → S5_ON (40,45,47)

## Power button

PWRBTN# → R570 8.2k/5%_4; C468 0.01u/50V/X7R_4

Near connector

## ESD

VGA_ALERT → D20 *TVS_AZ5125-01H

EC_RSMRST# → D29 *TVS_AZ5125-01H

Near EC

HP Restricted Secret

Quanta Computer Inc.

Project: HP-SAIPAN

Title: EC ITE 8528/ FlashROM

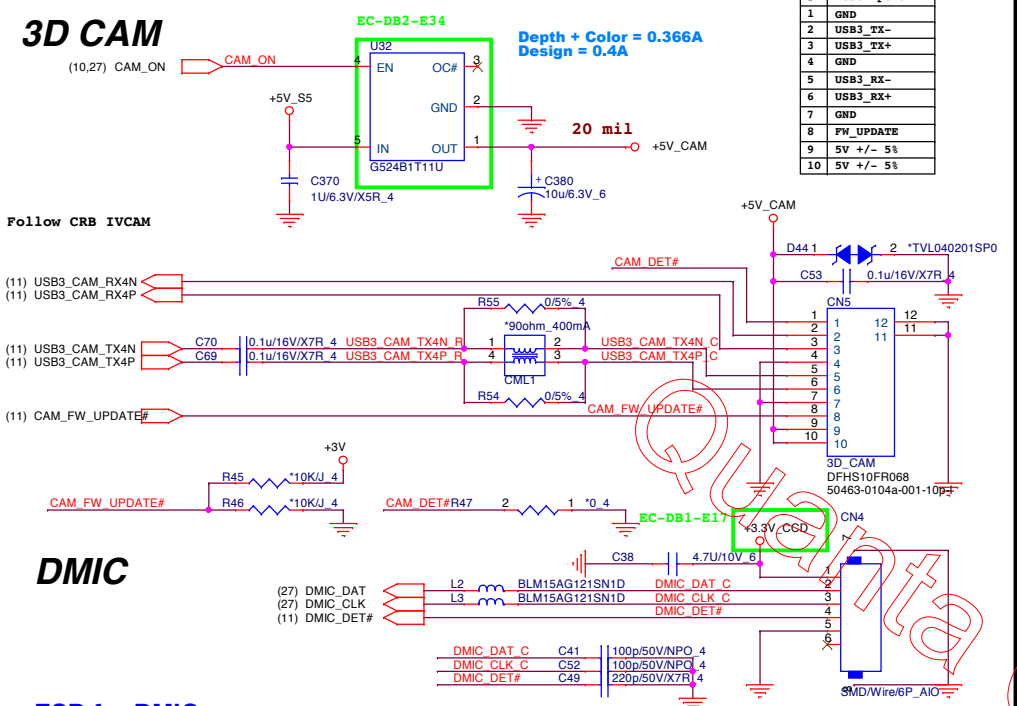
Size: -- | Document Number: -- | Rev: A

Page Modified: Thursday, December 17, 2015 | Sheet 30 of 61

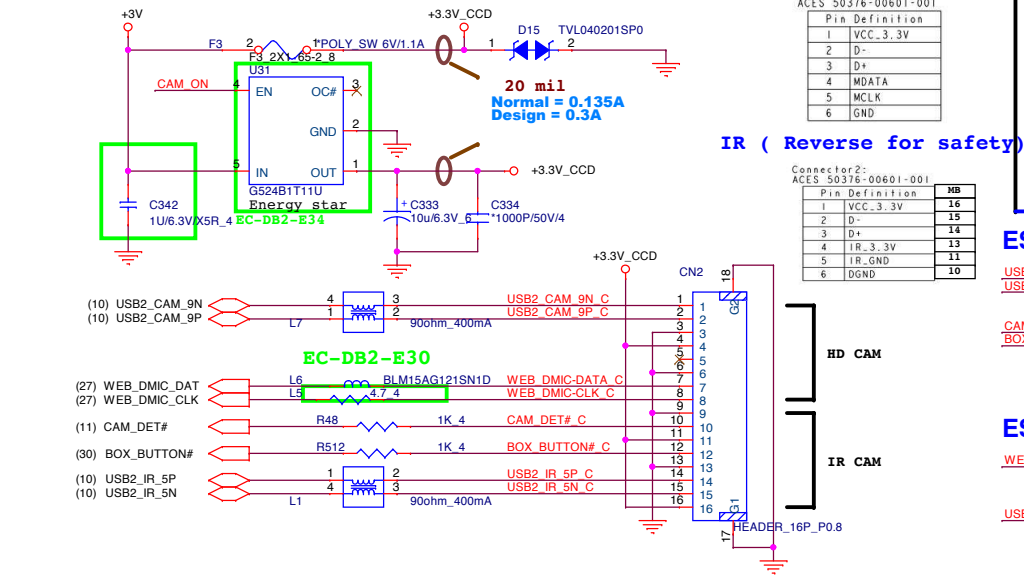
# (Optional 1: 3DCAM+DMIC)

## 3D CAM

| 3D CAM Module | |
|---|---|
| # | Description |
| 1 | GND |
| 2 | USB3_TX- |
| 3 | USB3_TX+ |
| 4 | GND |
| 5 | USB3_RX- |
| 6 | USB3_RX+ |
| 7 | GND |
| 8 | FW_UPDATE |
| 9 | 5V +/- 5% |
| 10 | 5V +/- 5% |




# (Optional 2: WEBCAM+DMIC)




### HD

Connector1:
ACES 50376-00601-001

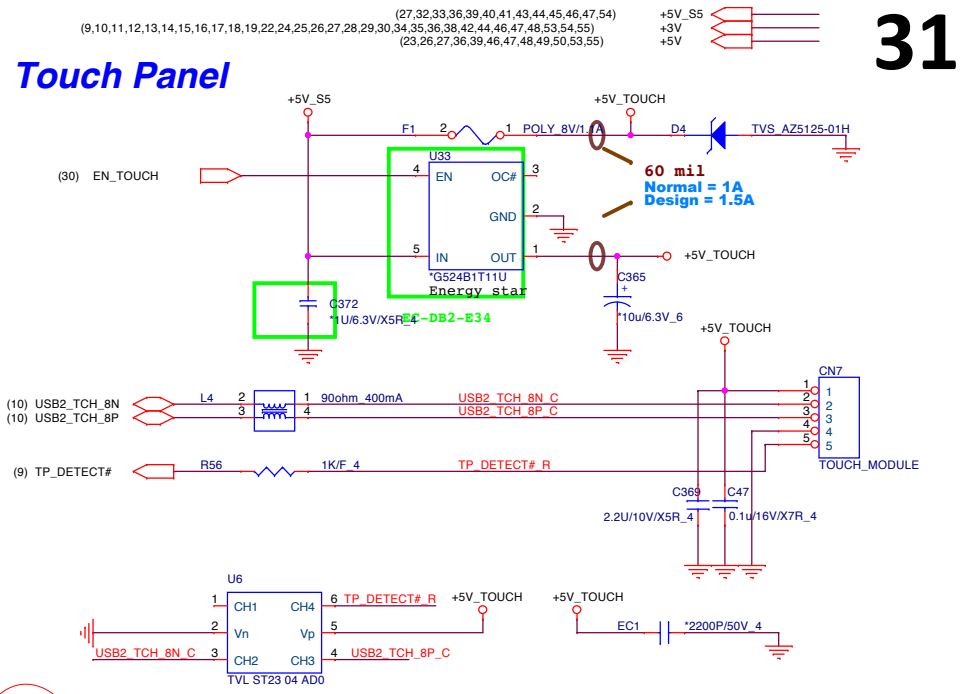
| Pin | Definition |
|---|---|
| 1 | VCC_3.3V |
| 2 | D- |
| 3 | D+ |
| 4 | MDATA |
| 5 | MCLK |
| 6 | GND |

### IR ( Reverse for safety)

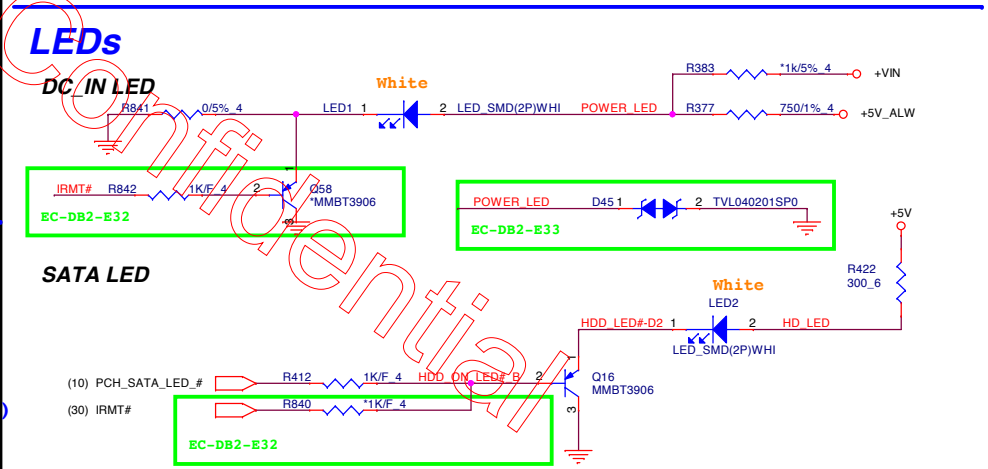
Connector2:
ACES 50376-00601-001

| Pin | Definition | MB |
|---|---|---|
| 1 | VCC_3.3V | 16 |
| 2 | D- | 15 |
| 3 | D+ | 14 |
| 4 | IR_3.3V | 13 |
| 5 | IR_GND | 11 |
| 6 | DGND | 10 |

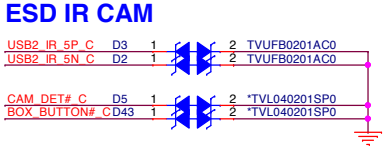
## Touch Panel



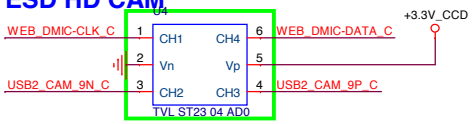

## LEDs



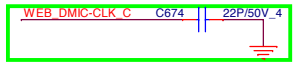

## ESD IR CAM




## ESD HD CAM




## EA




HP Restricted Secret

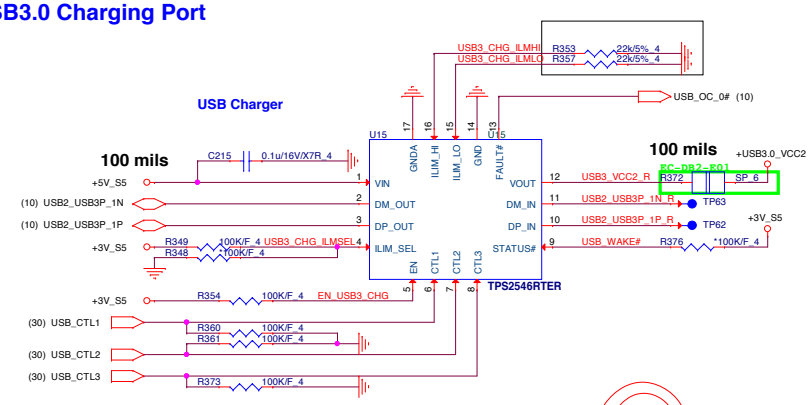
Quanta Computer Inc.

Project: HP-SAIPAN

| Title | | |
|---|---|---|
| eDP-LVDS_RTD2136N | | |
| Size | Document Number | Rev |
| | – | A |
| Page Modified: Thursday, December 17, 2015 | Sheet 31 of 61 | |

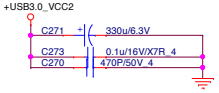
# USB PORT

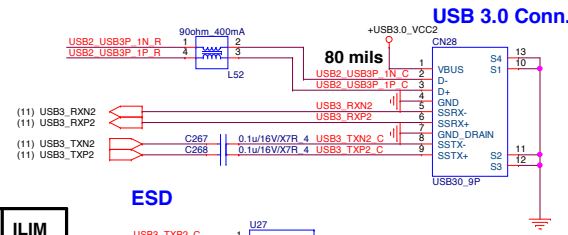
## USB3.0 Charging Port

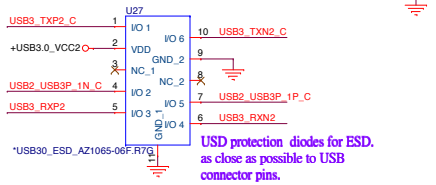



SDP : Standard Downstream Port
CDP : Charging downstream port
DCP : Dedicated Charging Port
Enable/Disable : setting by BIOS

| POWER STATE | TPS2546 CHARGING MODE | CTRL1 | CTRL2 | CTRL3 | ILIM |
|---|---|---|---|---|---|
| S0 | CDP LOAD DETECTION WITH ILIM_LO +60MA THRESHOLDS OR IF A BC1.2 PRIMARY DETECTION OCCURS | 1 | 1 | 1 | 1 |
| S3 | AUTO MODE, LOAD DETECTION WITH POWER WAKE THRESHOLDS | 0 | 1 | 1 | 1 |
| S4/S5 | AUTO MODE, KEYBOARD/ MOUSE WAKE-UP, LOAD DETECTION WITH ILIM_LO +60MA THRESHOLDS | 0 | 0 | 1 | 1 |

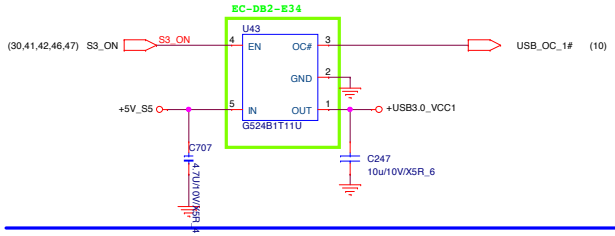


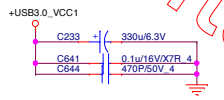



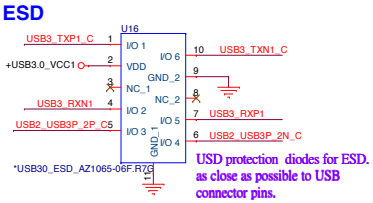



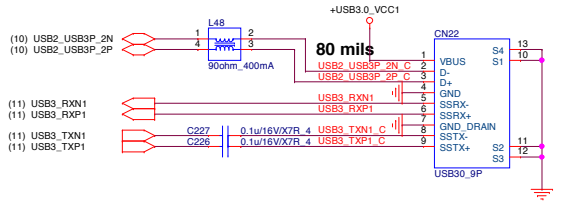

## USB3.0 PORT

### USB3.0 Power Switch



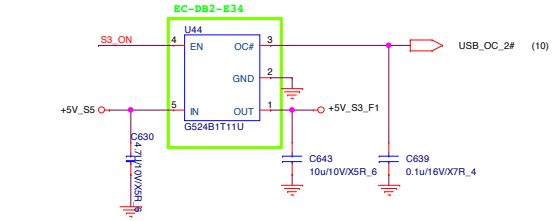



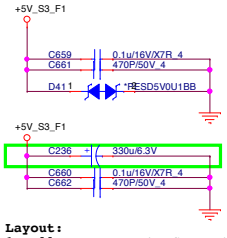



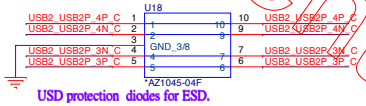

## USB2.0 X 2

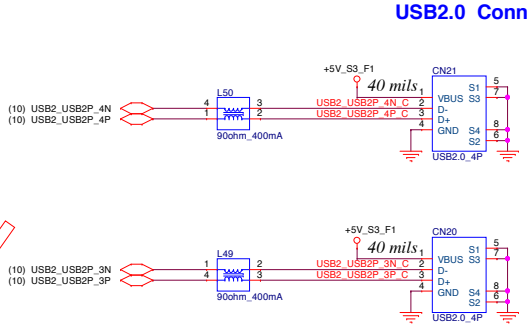
### USB3.0 Power Switch




Layout:
1. All caps Near to Connector
2. Place D40 near CN21 and CN22








Quanta Computer Inc.
Project: HP-SAIPAN

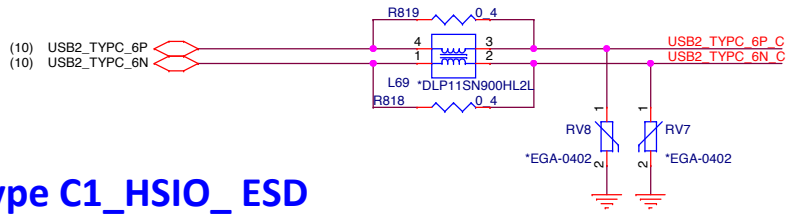
Title: USB2.0/USB3.0 Conn
Size: Document Number: --
Rev: A
Page Modified: Thursday, December 17, 2015
Sheet 32 of 61

# USB TYPE-C

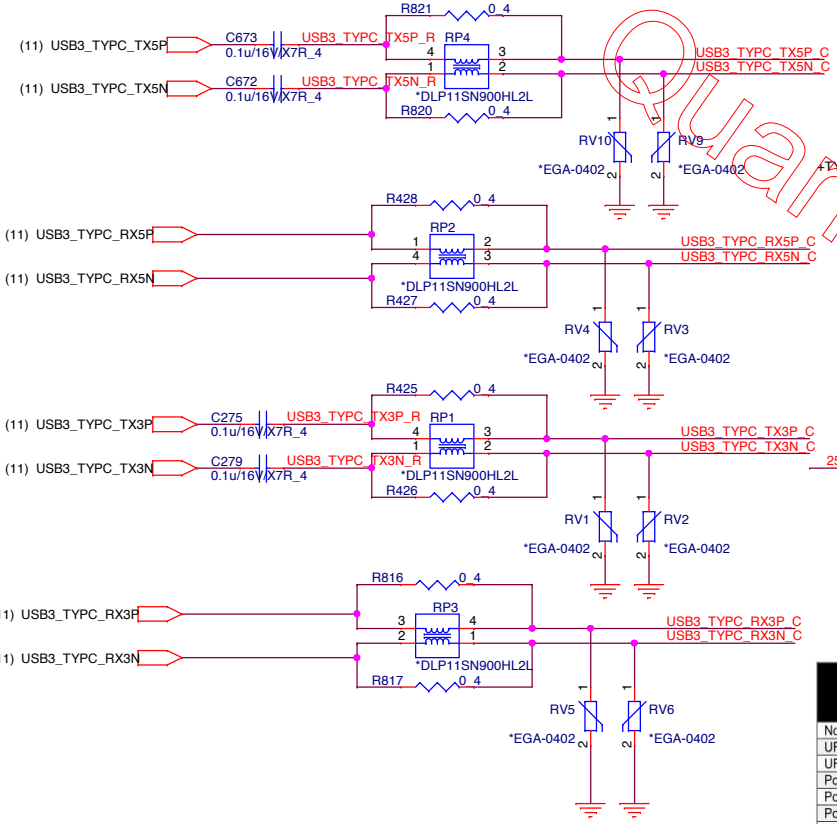
(5,9,10,11,12,13,23,25,28,30,32,34,37,38,39,41,42,43,45,46,47,54,55) +3V_S5
(27,31,32,36,39,40,41,43,44,45,46,47,54) +5V_S5

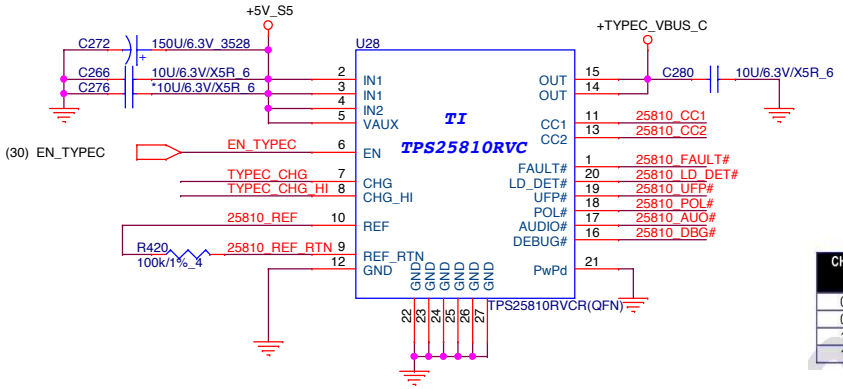
33

## USB2.0 ESD

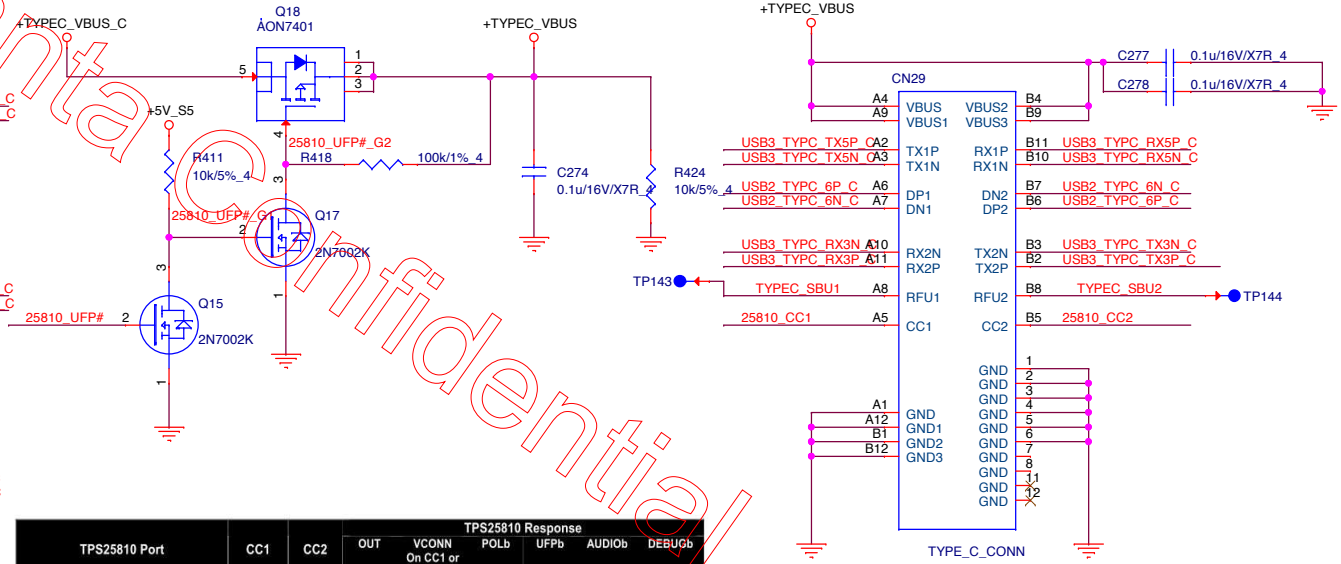



## Type C1_HSIO_ ESD




| CHG | CHG_HI | CC Capability Broadcast | Current Limit | Load Detect Threshold |
|---|---|---|---|---|
| 0 | 0 | STD | 1.67 A | NA |
| 0 | 1 | STD | 1.67 A | NA |
| 1 | 0 | 1.5 A | 1.67 A | NA |
| 1 | 1 | 3.0 A | 3.34 A | 1.77 A |




| TPS25810 Port | CC1 | CC2 | TPS25810 Response | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | OUT | VCONN On CC1 or CC2 | POLb | UFPb | AUDIOb | DEBUGb |
| Nothing Attached | OPEN | OPEN | OPEN | NO | Hi-Z | Hi-Z | Hi-Z | Hi-Z |
| UFP Connected | Rd | OPEN | IN1 | NO | Hi-Z | LOW | Hi-Z | Hi-Z |
| UFP Connected | OPEN | Rd | IN1 | NO | LOW | LOW | Hi-Z | Hi-Z |
| Powered Cable/No UFP Connected | OPEN | Ra | OPEN | NO | Hi-Z | Hi-Z | Hi-Z | Hi-Z |
| Powered Cable/No UFP Connected | Ra | OPEN | OPEN | NO | Hi-Z | Hi-Z | Hi-Z | Hi-Z |
| Powered Cable/UFP Connected | Rd | Ra | IN1 | CC2 | Hi-Z | LOW | Hi-Z | Hi-Z |
| Powered Cable/UFP Connected | Ra | Rd | IN1 | CC1 | LOW | LOW | Hi-Z | Hi-Z |
| Debug Accessory Connected | Rd | Rd | OPEN | NO | Hi-Z | Hi-Z | Hi-Z | LOW |
| Audio Adapter Accessory Connected | Ra | Ra | OPEN | NO | Hi-Z | Hi-Z | LOW | Hi-Z |



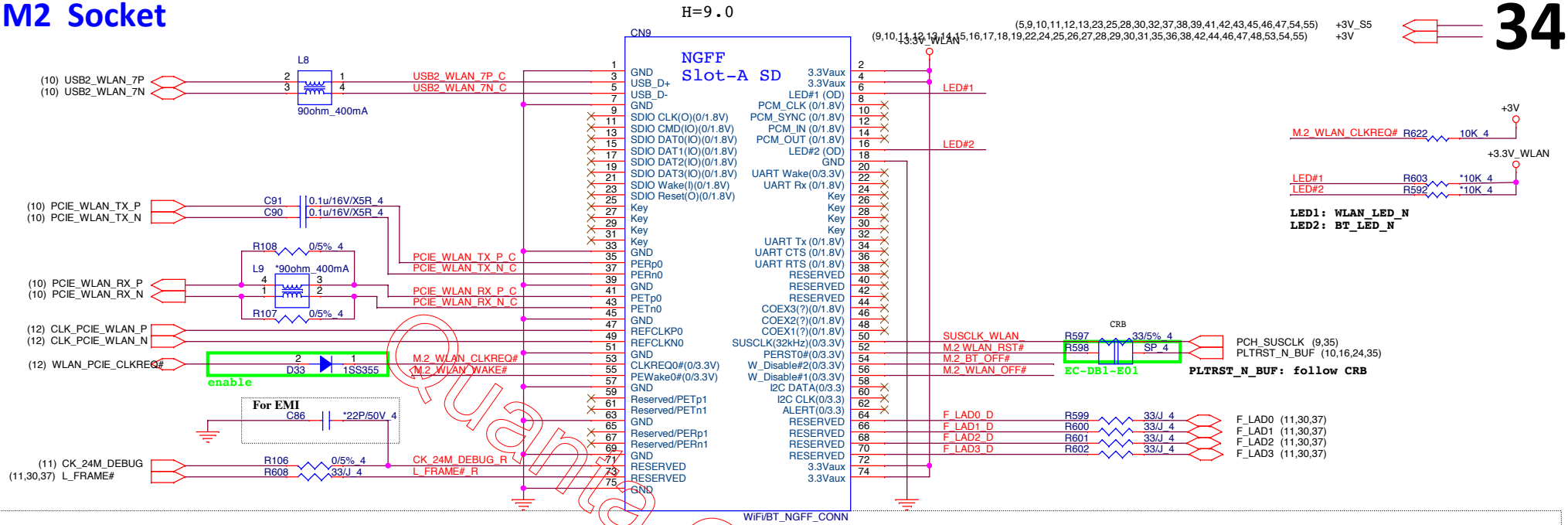


Quanta Computer Inc.

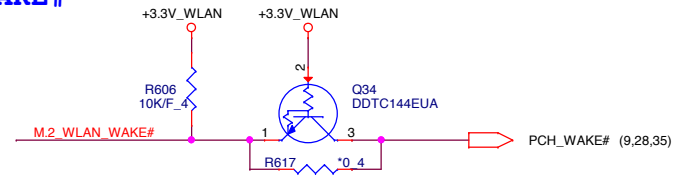
Project: HP-SAIPAN

| Title | | |
|---|---|---|
| USB TYPE-C | | |
| Size | Document Number | Rev |
| | -- | A |
| Page Modified: Thursday, December 17, 2015 | | Sheet 33 of 61 |

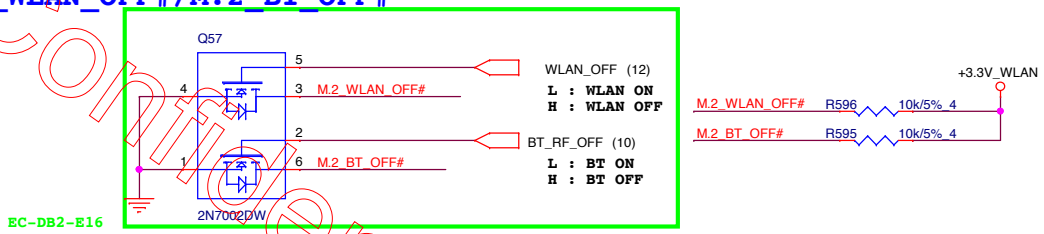
# NGFF M2 Socket



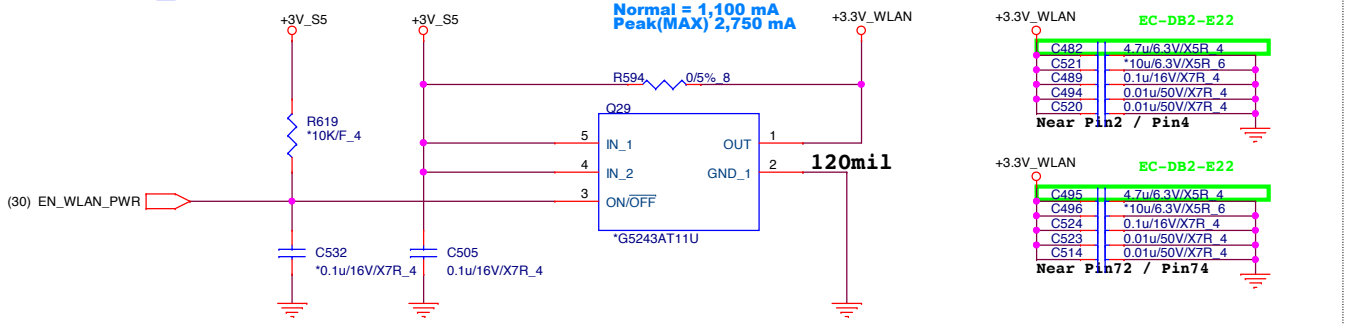

## M.2 WLAN WAKE#




## M.2_WLAN_OFF#/M.2_BT_OFF#




## NGFF M2_power(S5)






HP Restricted Secret

Quanta Computer Inc.

Project: HP-SAIPAN

| | | |
|---|---|---|
| Title: NGFF M.2 WLAN | | |
| Size | Document Number: -- | Rev: B |
| Page Modified: Thursday, December 17, 2015 | | Sheet 34 of 61 |

# NGFF M2 Socket

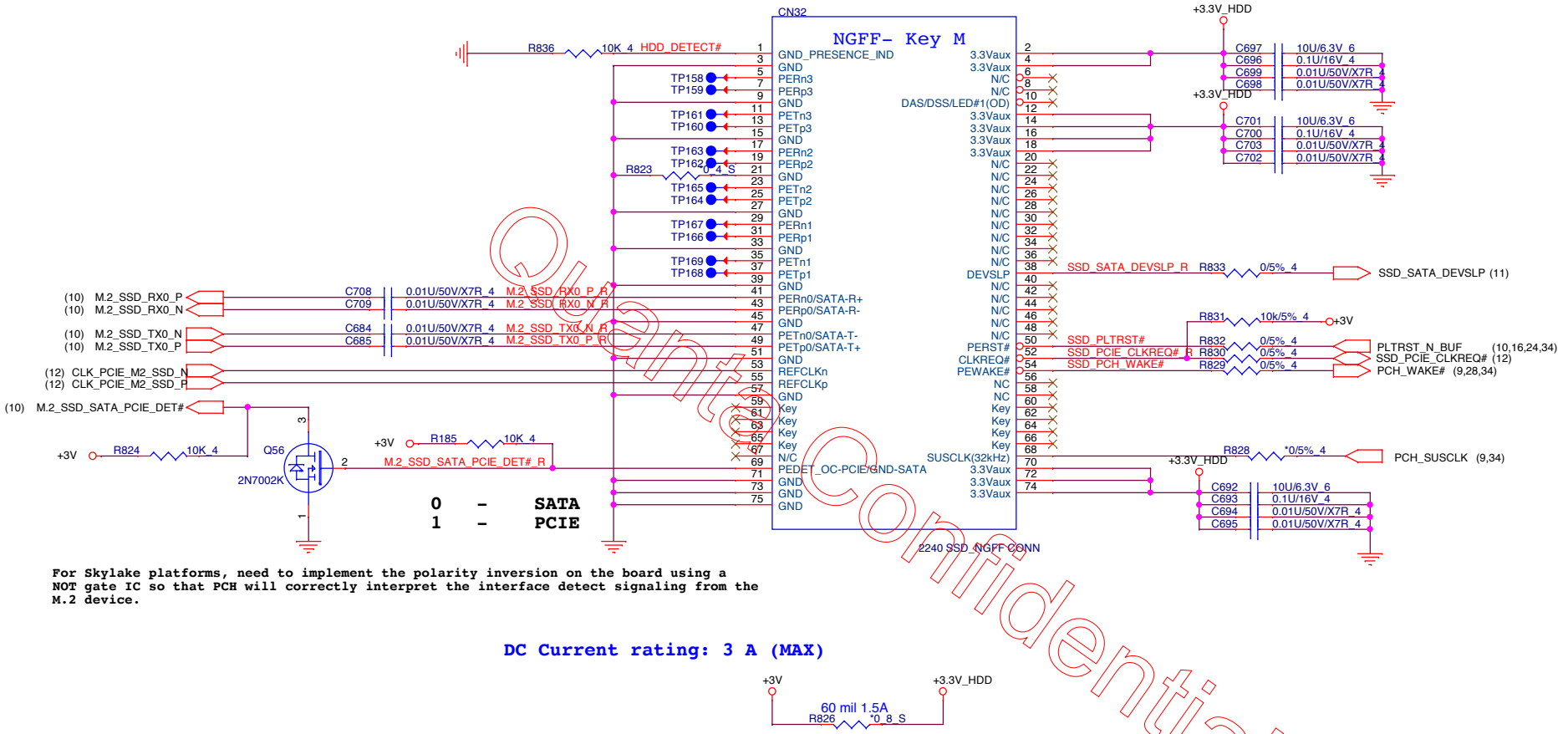
(5,9,10,11,12,13,23,25,28,30,32,34,37,38,39,41,42,43,45,46,47,54,55) +3V_S5
(9,10,11,12,13,14,15,16,17,18,19,22,24,25,26,27,28,29,30,31,34,36,38,42,44,46,47,48,53,54,55) +3V

35

60 mil 1.5A

EC-DB2-E36

H=9.0




**For Skylake platforms, need to implement the polarity inversion on the board using a NOT gate IC so that PCH will correctly interpret the interface detect signaling from the M.2 device.**

**DC Current rating: 3 A (MAX)**



HP Restricted Secret

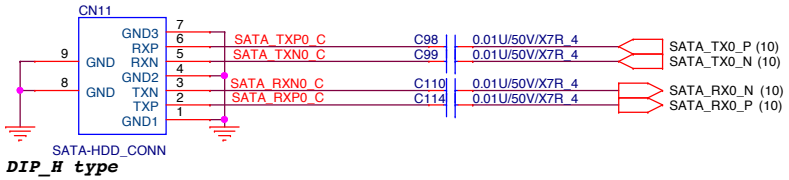
Quanta Computer Inc.

Project: HP-SAIPAN

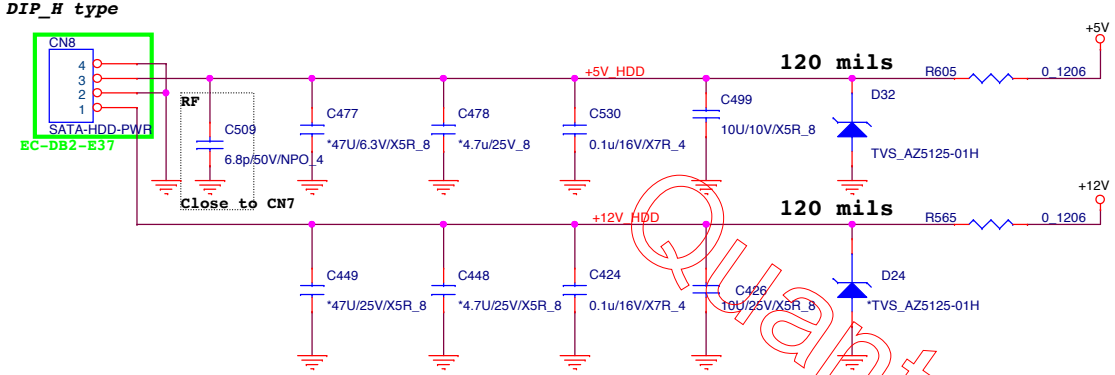
| Title | | |
|---|---|---|
| NGFF M.2 WLAN | | |
| Size | Document Number | Rev |
| | -- | B |
| Page Modified: Thursday, December 17, 2015 | | Sheet 35 of 61 |

# SATA HDD

## HDD SATA Conn.

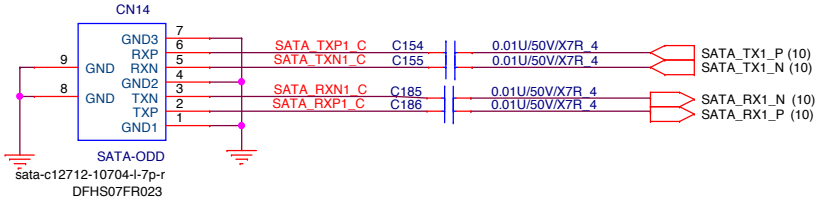


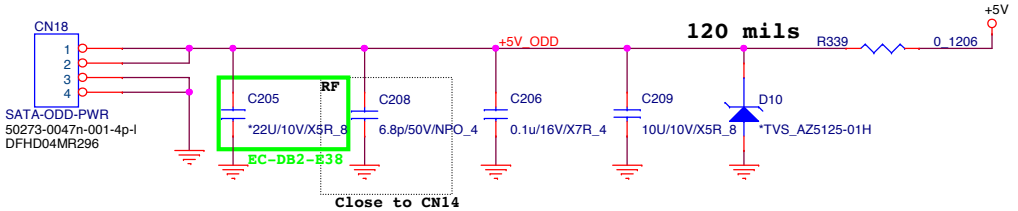

***DIP_H type***




# SATA ODD

## ODD SATA Conn.



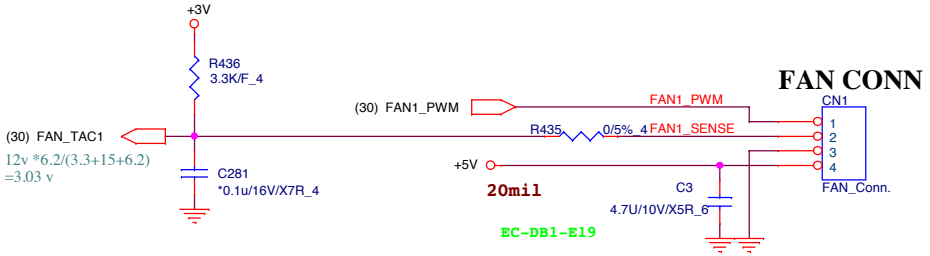






# SYSTEM FAN

(9,10,11,12,13,14,15,16,17,18,19,22,24,25,26,27,28,29,30,31,34,35,38,42,44,46,47,48,53,54,55) +3V
(27,31,32,33,39,40,41,43,44,45,46,47,54) +5V_S5
(23,26,27,31,39,46,47,48,49,50,53,55) +5V
(27,47,51,55) +12V



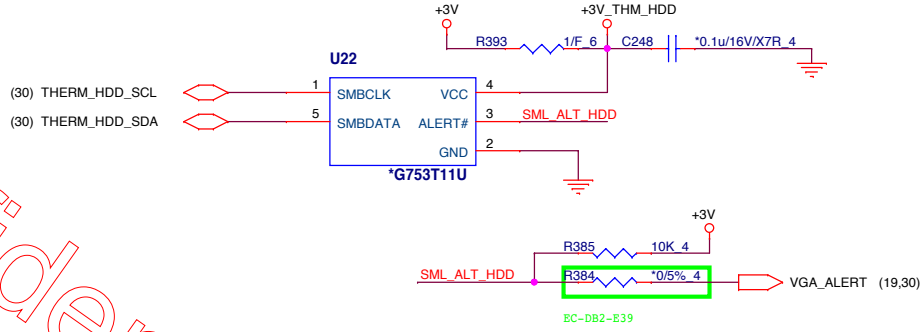



# Ambient SENSOR

## Reserved

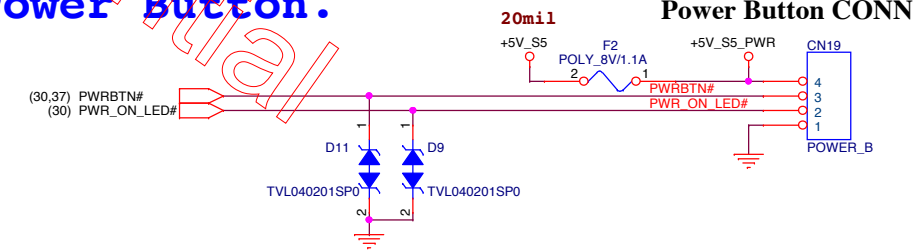
Slave Adress

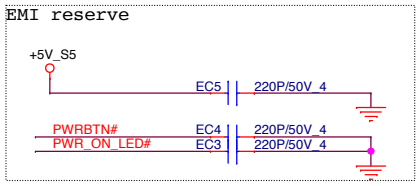
| A6 | A5 | A4 | A3 | A2 | A1 | A0 |
|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 1 | 0 | 0 | 0 |




# Power Button.

## Power Button CONN




HP Restricted Secret

Quanta Computer Inc.

Project: HP-SAIPAN

Title: FAN/HDD/ODD/HDD CONN.

| Size | Document Number | Rev |
|---|---|---|
| | -- | A |

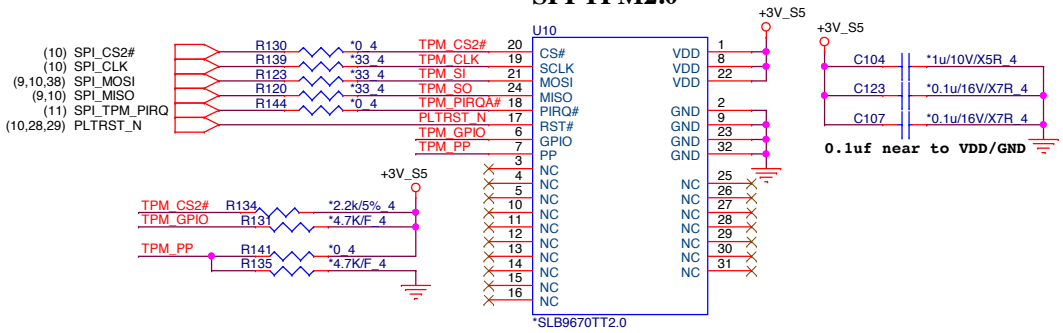
Page Modified: Thursday, December 17, 2015 | Sheet 36 of 61

# TPM2.0

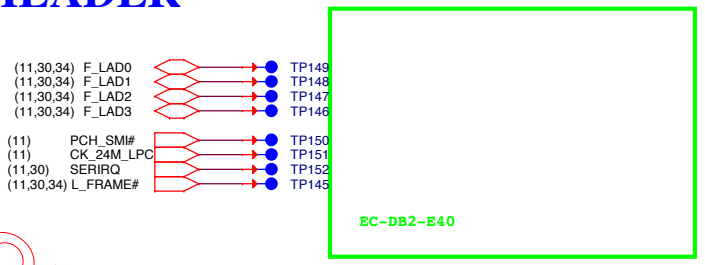
(5,9,10,11,12,13,23,25,28,30,32,34,38,39,41,42,43,45,46,47,54,55) +3V_S5
(9,10,11,12,13,14,15,16,17,18,19,22,24,25,26,27,28,29,30,31,34,35,36,38,42,44,46,47,48,53,54,55) +3V
(23,26,27,31,36,39,46,47,48,49,50,53,55) +5V
(5,7,9,38,46,47,48) +VCCST_VCCPLL



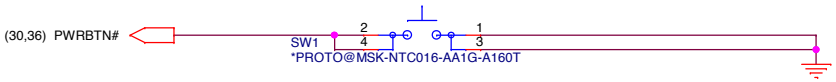
## SPI TPM2.0




# LPC HEADER




## SW1 For Debug.MP will remove it.






HP Restricted Secret

Quanta Computer Inc.

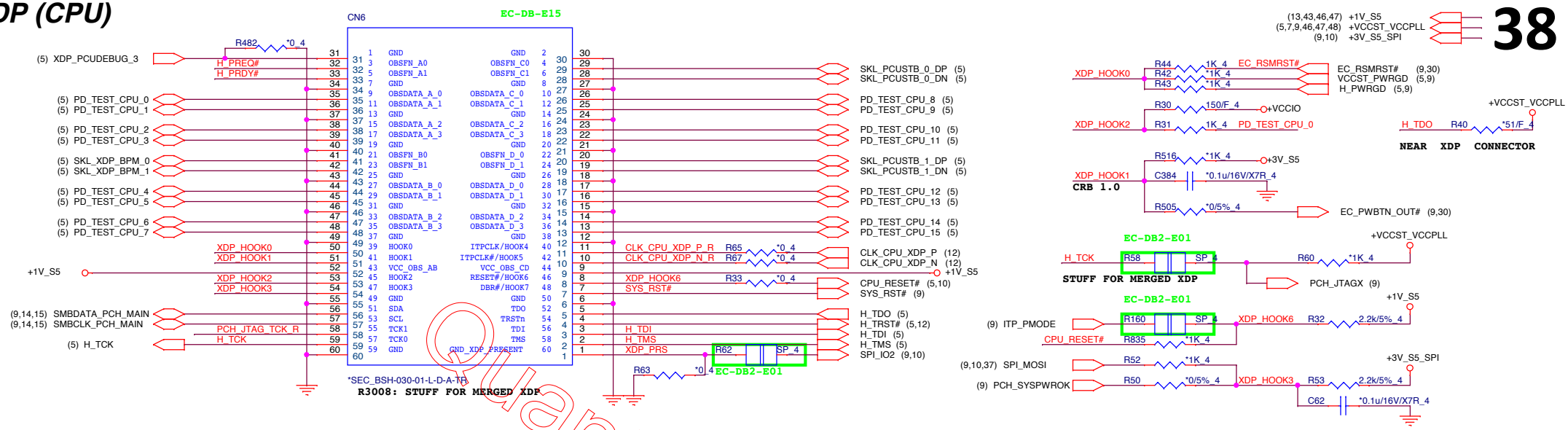
Project: HP-SAIPAN

Title: Debug /LPC Header/TPM

| Size | Document Number | Rev |
|---|---|---|
| | -- | A |

Page Modified: Thursday, December 17, 2015 | Sheet 37 of 61

# XDP (CPU)



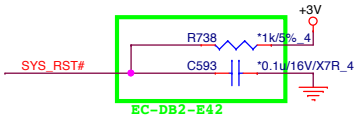

(13,43,46,47) +1V_S5
(5,7,9,46,47,48) +VCCST_VCCPLL
(9,10) +3V_S5_SPI

38

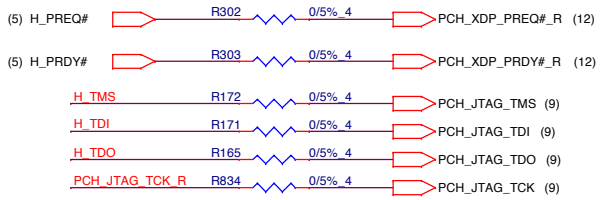



# XDP (PCH)

EC-DB2-E41




MERGED XDP

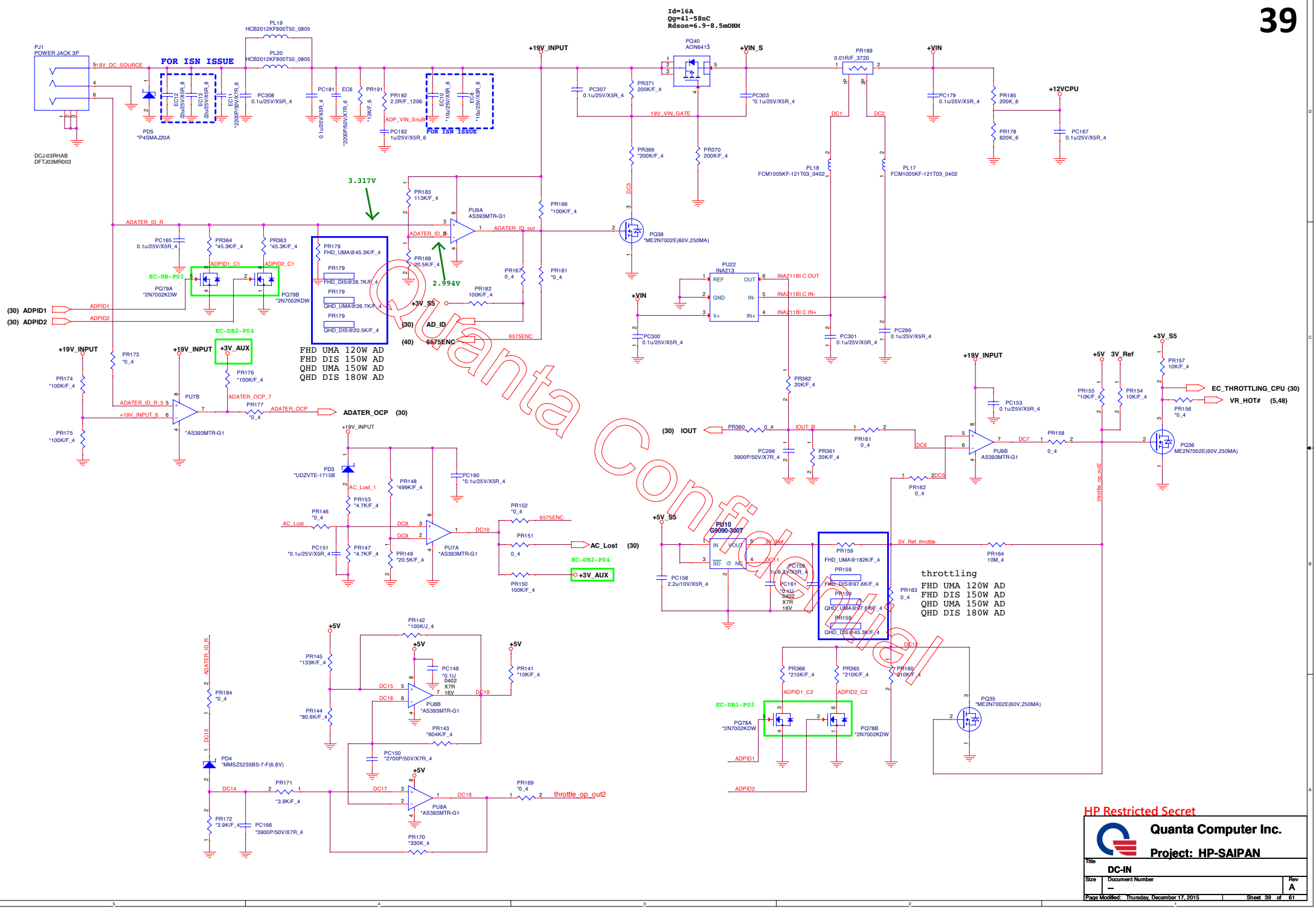


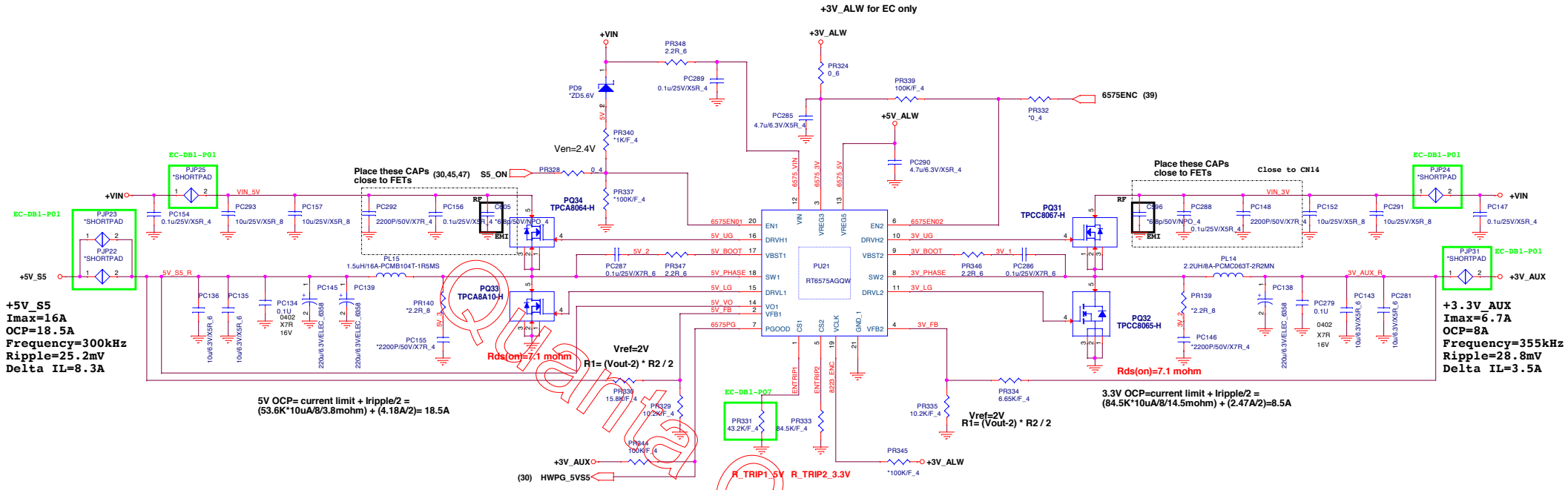

stuff for merged XDP



Quanta Computer Inc.
Project: HP-SAIPAN

| Title | | |
|---|---|---|
| XDP DEBUG | | |
| Size | Document Number | Rev |
| | -- | A |
| Page Modified: Thursday, December 17, 2015 | | Sheet 38 of 61 |


Id=16A
Qg=41-58nC
Rdson=6.9-8.5mOHM
PJ1
POWER JACK 3P
DCJ-03RHAB
DFTJ03MR003
19V_DC_SOURCE
FOR ISN ISSUE
PD5
*P4SMAJ20A
PL19
HCB2012KF800T50_0805
PL20
HCB2012KF800T50_0805
PC308
0.1u/25V/X5R_4
PC181
0.1u/25V/X5R_4
EC6
*2200P/50V/X7R_6
PR191
*13K/F_6
PR192
2.2R/F_1206
ADP_VIN_SnuB
PC182
1u/25V/X5R_6
EC10
*10u/25V/X5R_8
EC8
*10u/25V/X5R_8
+19V_INPUT
PQ40
AON6413
+VIN_S
PR189
0.01R/F_3720
+VIN
PC307
0.1u/25V/X5R_4
PR371
200K/F_4
19V_VIN_GATE
PC303
*0.1u/25V/X5R_4
PR369
*200K/F_4
PR370
200K/F_4
PC179
0.1u/25V/X5R_4
PR185
200K_6
PR178
820K_6
+12VCPU
PC167
0.1u/25V/X5R_4
PL18
FCM1005KF-121T03_0402
PL17
FCM1005KF-121T03_0402
DC1
DC2
DC3
3.317V
2.994V
PR183
113K/F_4
PR168
20.5K/F_4
PU9A
AS393MTR-G1
ADATER_ID_R
ADATER_ID_B
ADATER_ID_out
PR166
*100K/F_4
PR181
*0_4
PR167
0_4
PR182
100K/F_4
PQ38
*ME2N7002E(60V,250MA)
PC165
0.1u/25V/X5R_4
PR364
*45.3K/F_4
PR363
*45.3K/F_4
ADPID1_C1
ADPID2_C1
EC-DB-P03
PQ79A
*2N7002KDW
PQ79B
*2N7002KDW
(30) ADPID1
(30) ADPID2
ADPID1
ADPID2
PR179
FHD_UMA@45.3K/F_4
PR179
FHD_DIS@26.7K/F_4
PR179
QHD_UMA@26.7K/F_4
PR179
QHD_DIS@20.5K/F_4
+3V_S5
(30) AD_ID
(40) 6575ENC
6575ENC
FHD UMA 120W AD
FHD DIS 150W AD
QHD UMA 150W AD
QHD DIS 180W AD
PU22
INA213
REF
GND
V+
OUT
IN-
IN+
INA211BI C OUT
INA211BI C IN-
INA211BI C IN+
PC300
0.1u/25V/X5R_4
PC301
0.1u/25V/X5R_4
PC299
0.1u/25V/X5R_4
PR362
20K/F_4
PR360
0_4
IOUT_B
(30) IOUT
PR161
0_4
PC296
3900P/50V/X7R_4
PR361
20K/F_4
DC6
DC7
PU9B
AS393MTR-G1
PR158
0_4
PC153
0.1u/25V/X5R_4
PR162
0_4
DC5
PR155
*10K/F_4
PR154
10K/F_4
3V_Ref
PR157
10K/F_4
PR156
*0_4
EC_THROTTLING_CPU (30)
VR_HOT# (5,48)
PQ36
ME2N7002E(60V,250MA)
throttle_op_out2
PR173
*0_4
PR174
*100K/F_4
PR175
*100K/F_4
PU7B
*AS393MTR-G1
ADATER_ID_R_5
+19V_INPUT_6
PR176
*100K/F_4
PR177
*0_4
ADATER_OCP_7
ADATER_OCP
ADATER_OCP (30)
EC-DB2-P04
+3V_AUX
PD3
*UDZVTE-1715B
AC_Lost_1
PR148
*499K/F_4
PR153
*4.7K/F_4
PC160
*0.1u/25V/X5R_4
PR146
*0_4
AC_Lost
PC151
*0.1u/25V/X5R_4
PR147
*4.7K/F_4
PR149
*20.5K/F_4
DC8
DC9
DC10
PU7A
*AS393MTR-G1
PR152
*0_4
6575ENC
PR151
0_4
PR150
100K/F_4
AC_Lost (30)
EC-DB2-P04
+3V_AUX
+5V_S5
PU10
G9090-300T
IN
VOUT
SD
G
NC
3V_Ref
DC11
PC158
2.2u/10V/X5R_4
PC159
1u/6.3V/X5R_4
PC161
0.1U
0402
X7R
16V
3V_Ref_throttle
PR164
10M_4
PR159
FHD_UMA@182K/F_4
PR159
FHD_DIS@97.6K/F_4
PR159
QHD_UMA@97.6K/F_4
PR159
QHD_DIS@45.3K/F_4
PR163
0_4
throttling
FHD UMA 120W AD
FHD DIS 150W AD
QHD UMA 150W AD
QHD DIS 180W AD
DC12
PR366
*210K/F_4
PR365
*210K/F_4
PR160
*210K/F_4
ADPID1_C2
ADPID2_C2
EC-DB1-P03
PQ78A
*2N7002KDW
PQ78B
*2N7002KDW
ADPID1
ADPID2
PQ35
*ME2N7002E(60V,250MA)
PR142
*100K/J_4
PR145
*133K/F_4
PR144
*80.6K/F_4
PR143
*604K/F_4
PC149
*0.1U
0402
X7R
16V
PR141
*10K/F_4
PU8B
*AS393MTR-G1
DC15
DC16
DC19
PC150
*2700P/50V/X7R_4
PU8A
*AS393MTR-G1
DC17
DC18
PR169
*0_4
throttle_op_out2
PR170
*330K_4
PR184
*0_4
DC13
DC14
PD4
*MMSZ5235BS-7-F(6.8V)
PR171
*3.9K/F_4
PR172
*3.9K/F_4
PC166
*3900P/50V/X7R_4
+5V
+19V_INPUT
+3V_AUX
+3V_S5
+5V
3V_Ref
(30) ADPID1
(30) ADPID2
(30) IOUT
ADATER_OCP (30)
AC_Lost (30)
EC_THROTTLING_CPU (30)
VR_HOT# (5,48)
throttle_op_out2
Quanta Confidential
HP Restricted Secret
Quanta Computer Inc.
Project: HP-SAIPAN
Title
DC-IN
Size
Document Number
--
Rev
A
Page Modified: Thursday, December 17, 2015
Sheet 39 of 61






**L/S Mosfet parameter**

| MOSFET | Package | ID (Ta=25C) | Rds_on_max |
|---|---|---|---|
| TPCC8065-H | DFN3x3 | 13A | 14.5m |
| TPCA8A10-H | DFN5x6 | 40A | 3.8m |

**Power On sequencing**

| EN0 | ENC | REF | VREG3 | VREG5 | SMPS1 | SMPS2 |
|---|---|---|---|---|---|---|
| LOW | LOW | OFF | OFF | OFF | OFF | OFF |
| > 2.4V | LOW | ON | ON | ON | OFF | OFF |
| > 2.4V | > 2.4V | ON | ON | ON | ON | ON |



Quanta Computer Inc.

Project: HP-SAIPAN

Title: 3V_AUX/5V_S5(RT6575AGQW)

Size: | Document Number: -- | Rev: A

Page Modified: Thursday, December 17, 2015 | Sheet 40 of 61

(31,39,40,42,43,44,46,47,49,50,51,52,53,54,55) +VIN
(7,9,14,15,46,47,55) +VDDQ
(5,9,10,11,12,13,23,25,28,30,32,34,37,38,39,42,43,45,46,47,54,55) +3V_S5
(27,31,32,33,36,39,40,43,44,45,46,47,54) +5V_S5
(14,15,47) +SMDDR_VTERM

+3V_S5 PR29 100K/F_4

(30,46) PG_+VDDQ

+VDDQ asserted after +VCCST_PLL asserted

(30,32,42,46,47) S3_ON

PR23 10k/1%_4
PC22 1u/10V/X5R_4

+0.6V_DDR_VTT
PEAK :0.9A

(5) DDR_VTT_CNTL PR207 0_4
(30,47) MAIN_ON2 PR206 *0_4
PC23 *1u/6.3V/X5R_4
PR205 0_4
(47) DIS_SMDDR_VTERM

PR50 105K/F_4

TPCA8059-H Rdson = 4.8m Ohms
OCP=Current limit + Iripple/2=(105K*5uA/10/4.8mohm)+ (4.18A/2)=13A

Place these CAPs close to FETs

VIN_8231 EC-DB1-P01 PJP2 *SHORTPAD +VIN

PC19 2200P/50V/X7R_4
PC190 0.1u/25V/X5R_4
PC13 10u/25V/X5R_8
PC186 10u/25V/X5R_8
PC5 0.1u/25V/X5R_4

PR26 620K/F_4

PQ4 TPCA8064-H
PQ8 TPCA8059-H

PU1 RT8231BGQW

| | | | |
|---|---|---|---|
| 7 | S3 | UGATE | 17 1P35V_UGATE |
| 8 | S5 | BOOT1 | 18 1P35V_BOOT |
| 10 | PGOOD | PHASE | 16 1P35V_PHASE |
| 13 | CS | LGATE | 15 1P35V_LGATE |
| 9 | TON | VDD | 12 1P35V_VDD |
| 20 | VTT | | |
| 2 | VTTSNS | | |
| 1 | VTTGND | | |
| 4 | VTTREF | | |
| 19 | VLDOIN | | |
| 3 | LPMB | | |
| 11 | VID | | |
| 14 | PGND | | |
| 6 | FB | | |
| 5 | VDDQ | | |
| 21 | PAD | | |

1P35V_TON
PR59 0_6 DDR1 PC47 0.1u/25V/X7R_6
PR41 0_4
PC39 1u/6.3V/X5R_4
+5V_S5

PL5 1.0uH/18A-PCMC104T-1R0MN

1.35V_S3_R

PJP8 *SHORTPAD +VDDQ
PJP7 *SHORTPAD
EC-DB1-P01

PR49 *2.2R_8
DDR2
PC30 *2200P/50V/X7R_4
PC53 *390U/2.5V/ELEC_6358
PC54 390U/2.5V/ELEC_6358
PC60 10u/6.3V/X5R_6
PC64 0.1U 0402 X7R 16V

DDR_VTTREF
PR39 100/F_4
1P35V_VTTREF
PC29 0.1U 0402 X7R 16V
PC38 0.033u/50V/X7R_6
1.35V_S3_R
PC48 10u/6.3V/X5R_6
PR51 0_4
+5V_S5
PR38 0_4
1P35V_VDDQ
PR30 7.68K/F_4
PR25 0_4
PR24 10K/F_4

EC-DB1-P01 PJP5 *SHORTPAD VTT
+SMDDR_VTERM
PC49 10u/6.3V/X5R_6

+VDDQ
Imax=9A
OCP=11A
Frequency=400kHz
Ripple=21mV
Delta IL=2.8A

Imax= 0.5A
Pd: 0.4W

PR304 10K_4
+3V_S5
+5V_S5

EC-DB1-P01 PJP30 *SHORTPAD
+3V_S5
+2.5V_VIN
PC272 10u/6.3V/X5R_6

PC277 1u/6.3V/X5R_4
(30) EN_+2.5V_S3

PU19 G9661-25ADJF12U

| | | | |
|---|---|---|---|
| 4 | VPP | PGOOD | 1 |
| 2 | VEN | VO | 6 |
| 3 | VIN | | |
| 8 | GND | | |
| 9 | GND | ADJ | NC 5 |
| 7 | | | |

PG_+2.5V_S3
PC273 0.1U 0402 X7R 16V
R1
+2.5V_ADJ
R2
PR307 21.5K/F_4
PR305 10K/F_4

Vout =0.8(1+R1/R2)

+2.5V_S3_P
PC275 0.1U 0402 X7R 16V
PC269 10U/6.3V/X5R_6
PC271 10U/6.3V/X5R_6

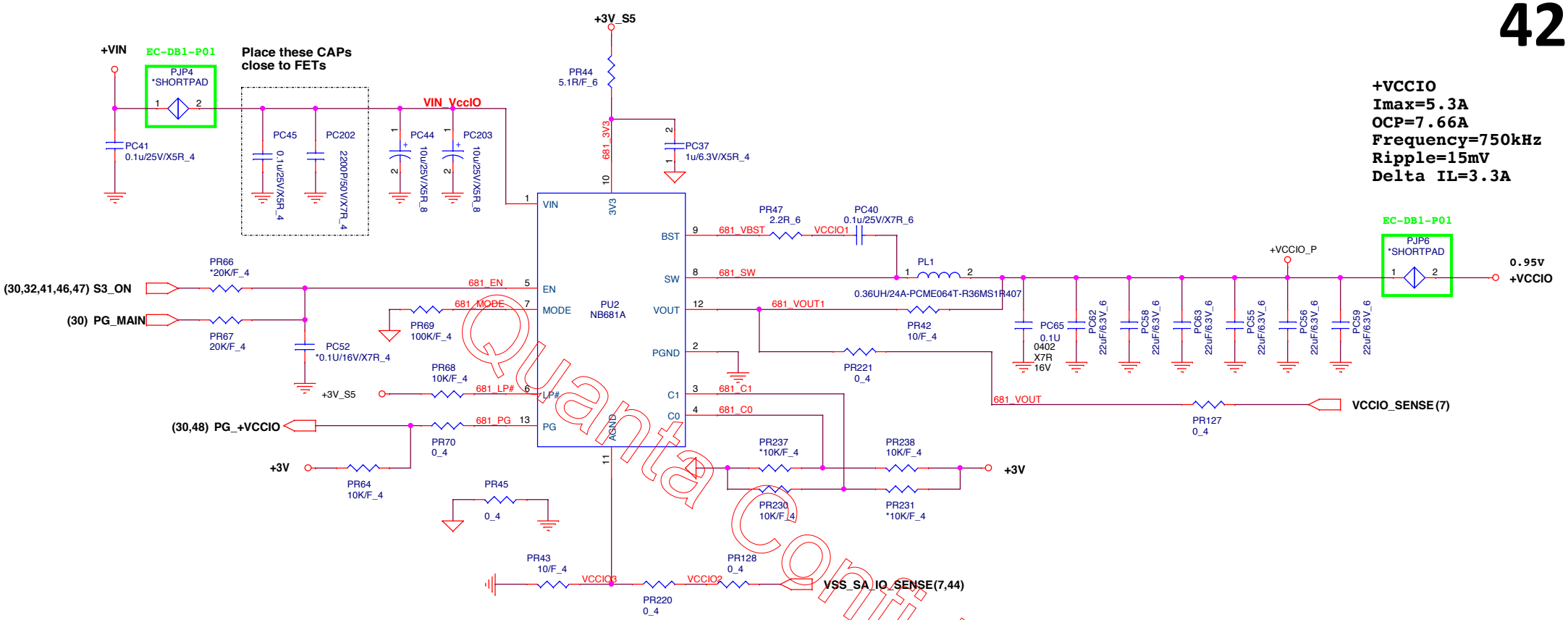
EC-DB1-P01 PJP20 *SHORTPAD
+2.5V_S3



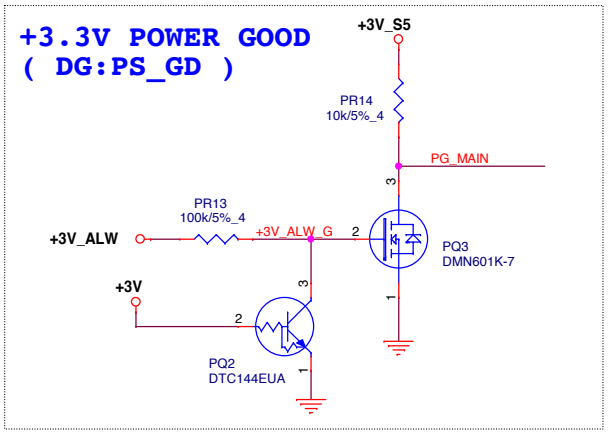


Quanta Computer Inc.
Project: HP-SAIPAN

Title: +VDDQ /SMDDR_VTERM (RT8231BGQW)
Size: Document Number: – Rev: A
Page Modified: Thursday, December 17, 2015 Sheet 41 of 61




+VCCIO
Imax=5.3A
OCP=7.66A
Frequency=750kHz
Ripple=15mV
Delta IL=3.3A




MODE M2 (100K to GND)

| LP# | C1 | C0 | Vout |
|---|---|---|---|
| 0 | X | X | 0V |
| 1 | 0 | 0 | 0.8V |
| 1 | 0 | 1 | 0.95V |
| 1 | 1 | 0 | 1V |
| 1 | 1 | 1 | 1.05V |





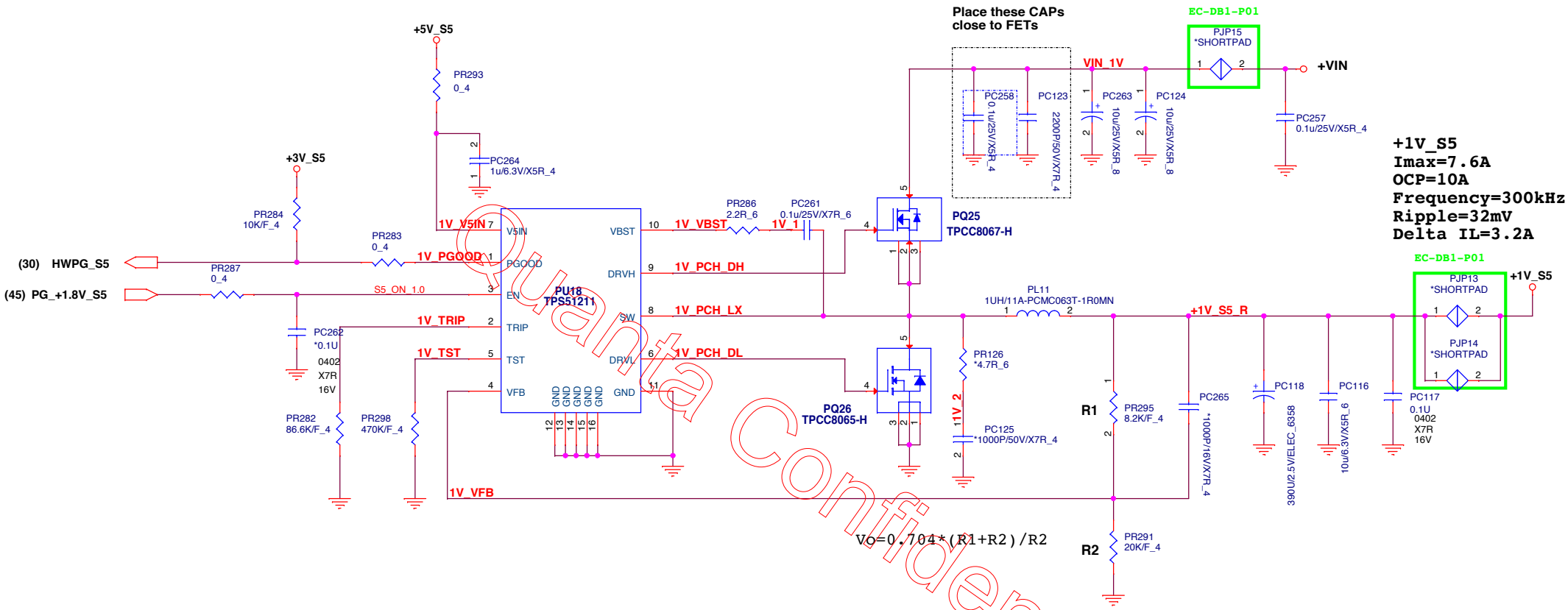
Quanta Computer Inc.

Project: HP-SAIPAN

Title: +VCCIO(NB681)

Size | Document Number: -- | Rev: A

Page Modified: Thursday, December 17, 2015 | Sheet 42 of 61



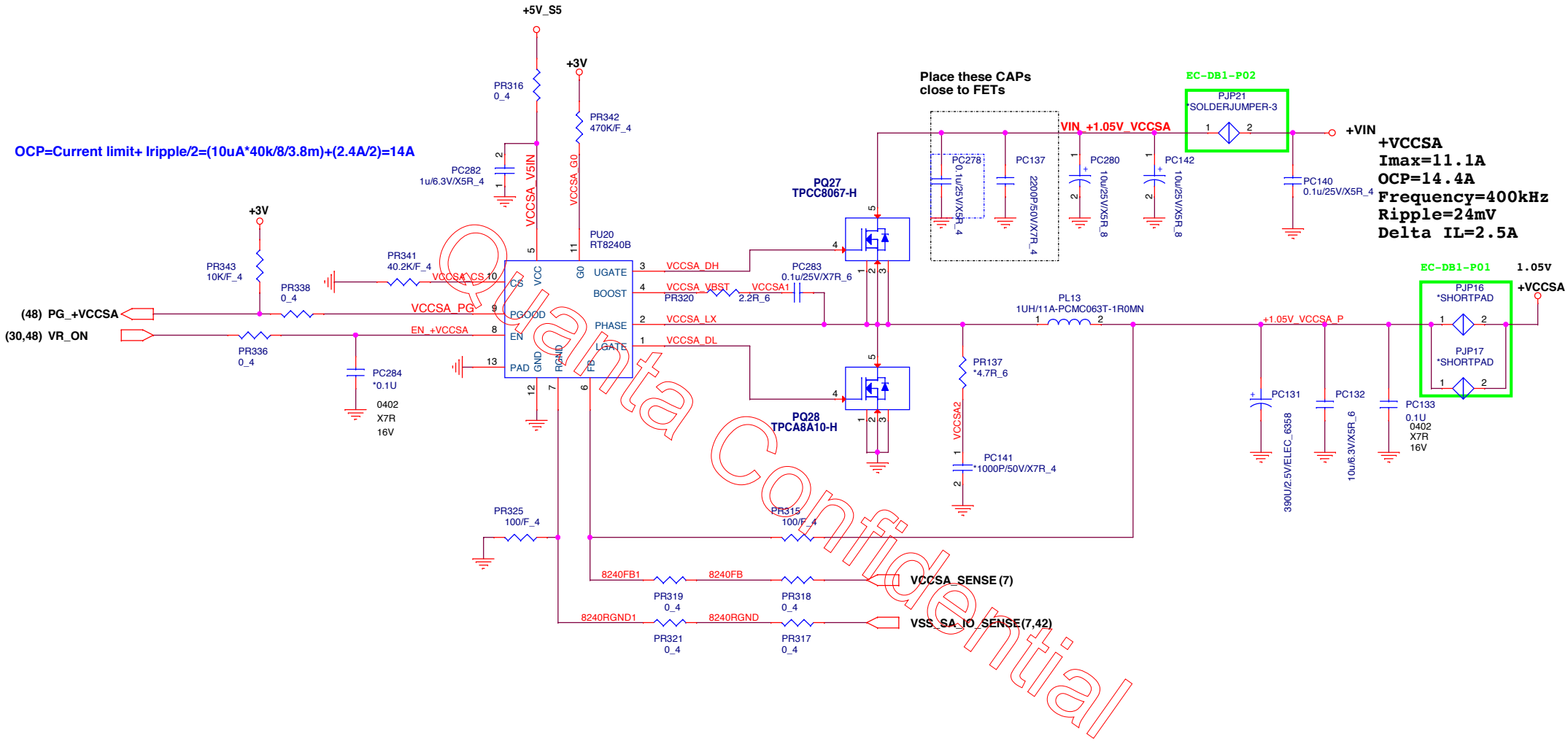





Quanta Computer Inc.

Project: HP-SAIPAN

| | | |
|---|---|---|
| Title: +1V_S5(TPS51211) | | |
| Size | Document Number: -- | Rev: A |
| Page Modified: Thursday, December 17, 2015 | | Sheet 43 of 61 |







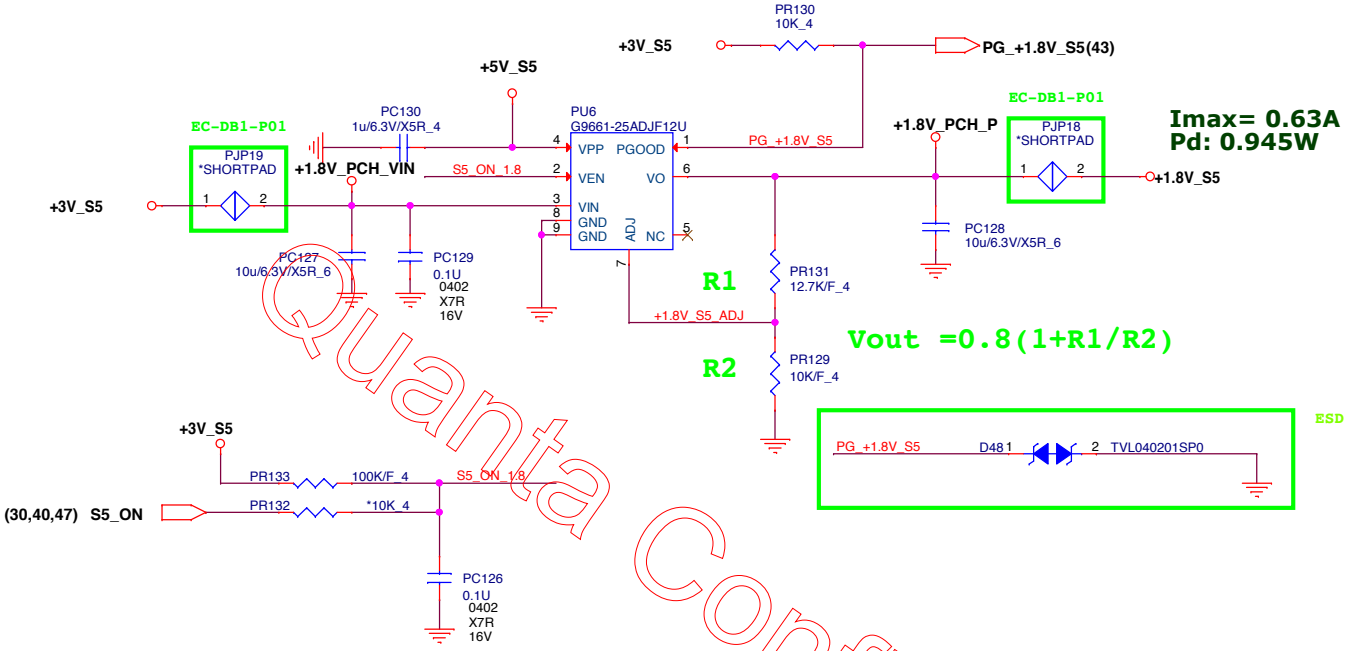

Quanta Computer Inc.

Project: HP-SAIPAN

Title: +VCCSA(RT8240B)

| Size | Document Number | Rev |
|---|---|---|
| | -- | A |

Page Modified: Thursday, December 17, 2015 | Sheet 44 of 61








Quanta Computer Inc.

Project: HP-SAIPAN

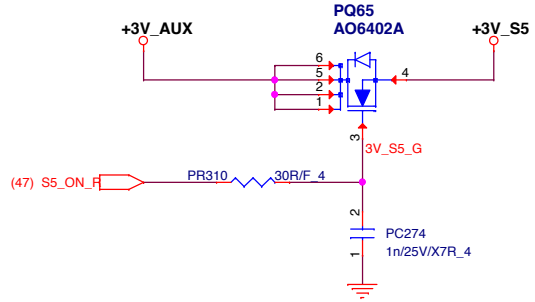
Title: +1.8V_S5 (G9661)

| Size | Document Number | Rev |
|---|---|---|
| | -- | A |

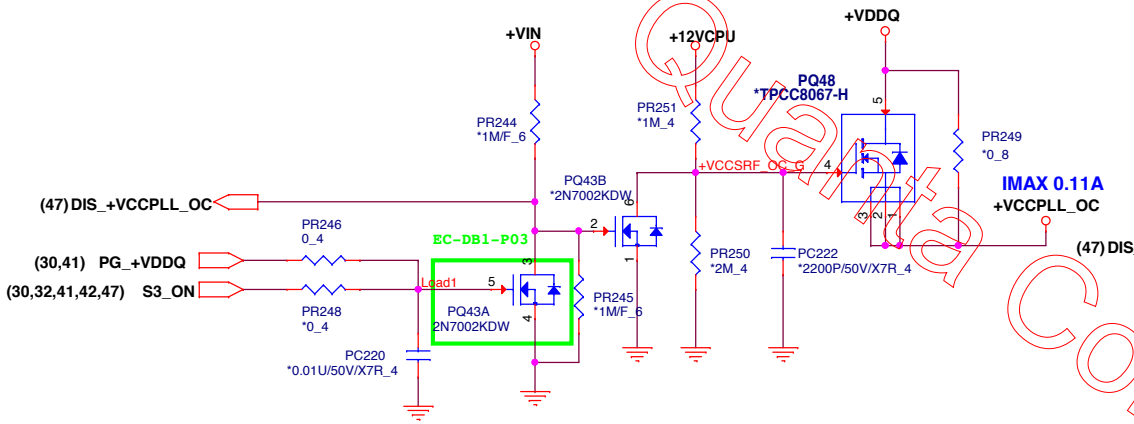
Page Modified: Thursday, December 17, 2015 | Sheet 45 of 61

## S5 ON Load SW

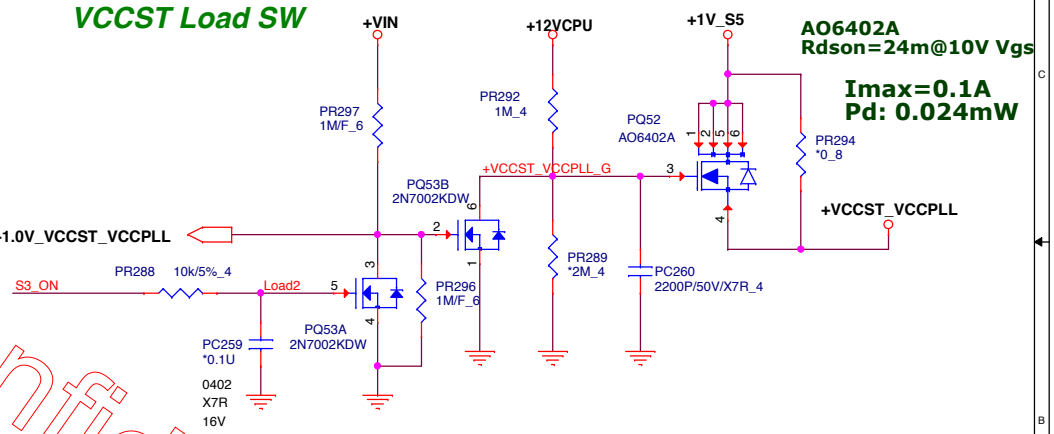
AO6402A
Rdson=24m@10V Vgs
Imax=5.5A
Pd: 0.726W



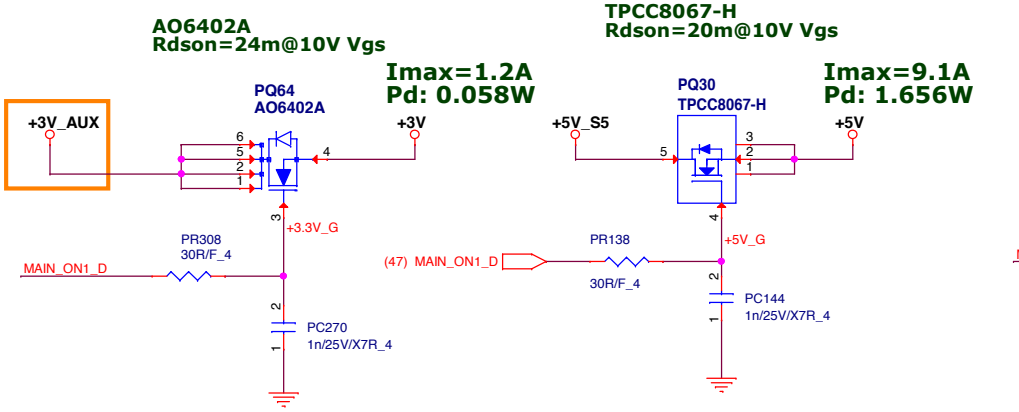

## VCCST Load SW




## VCCST Load SW




## MAIN ON_1 Load SW




### Mosfet parameter

| Mosfet | Package | ID(Ta=25C) | Rds_on_max | Vgs_max |
|---|---|---|---|---|
| ME3424D-G | TSOP-6 | 5.0A/6.7A | 42m | +/- 20V |
| TPCC8067-H | 3x3 | 9A | 26m | +/- 20V |
| TPCA8064-H | SO-8 | 20A | 7.9m | +/- 20V |

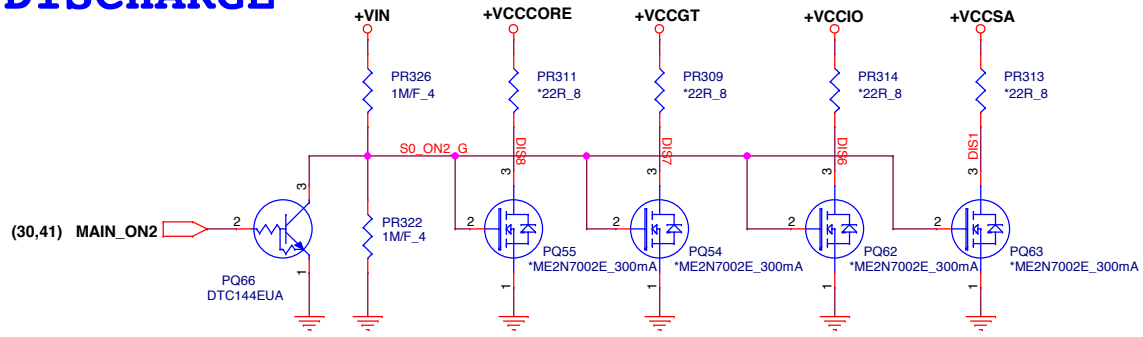


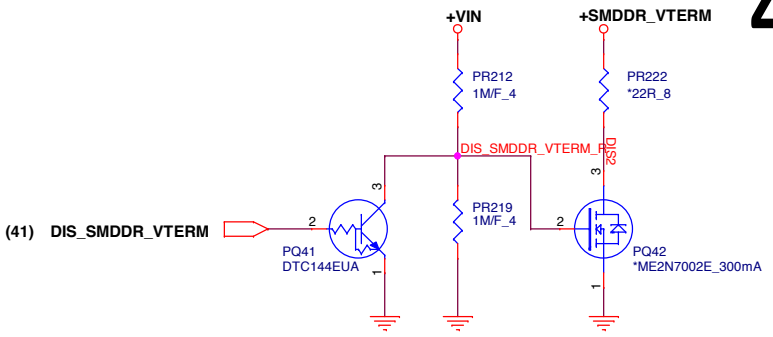
Quanta Computer Inc.
Project: HP-SAIPAN

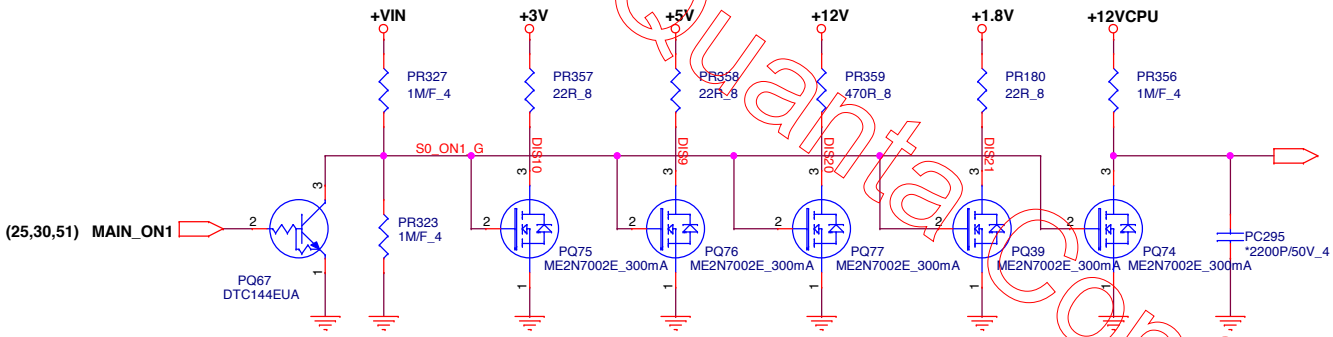
Title: Load Switch
Size: | Document Number: -- | Rev: A
Page Modified: Thursday, December 17, 2015 | Sheet 46 of 61

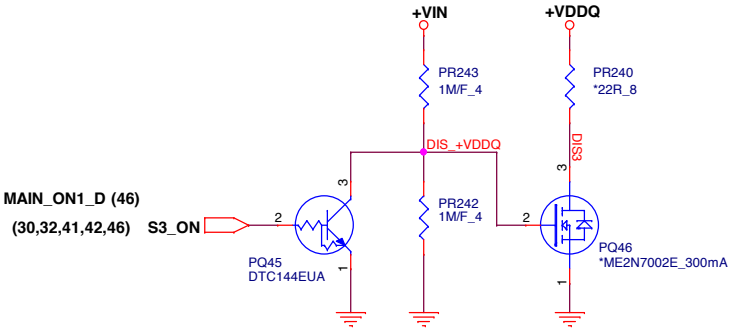
# DISCHARGE

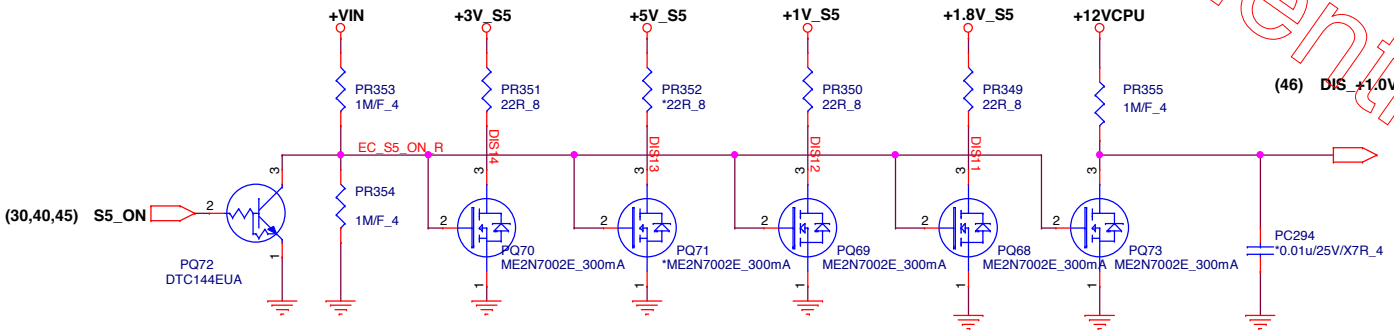


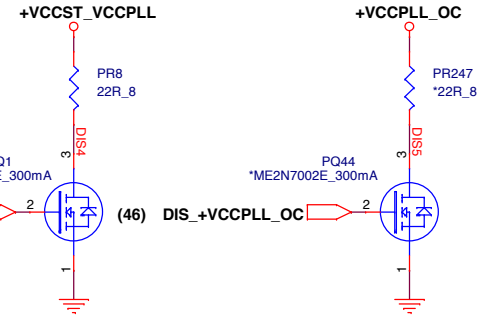






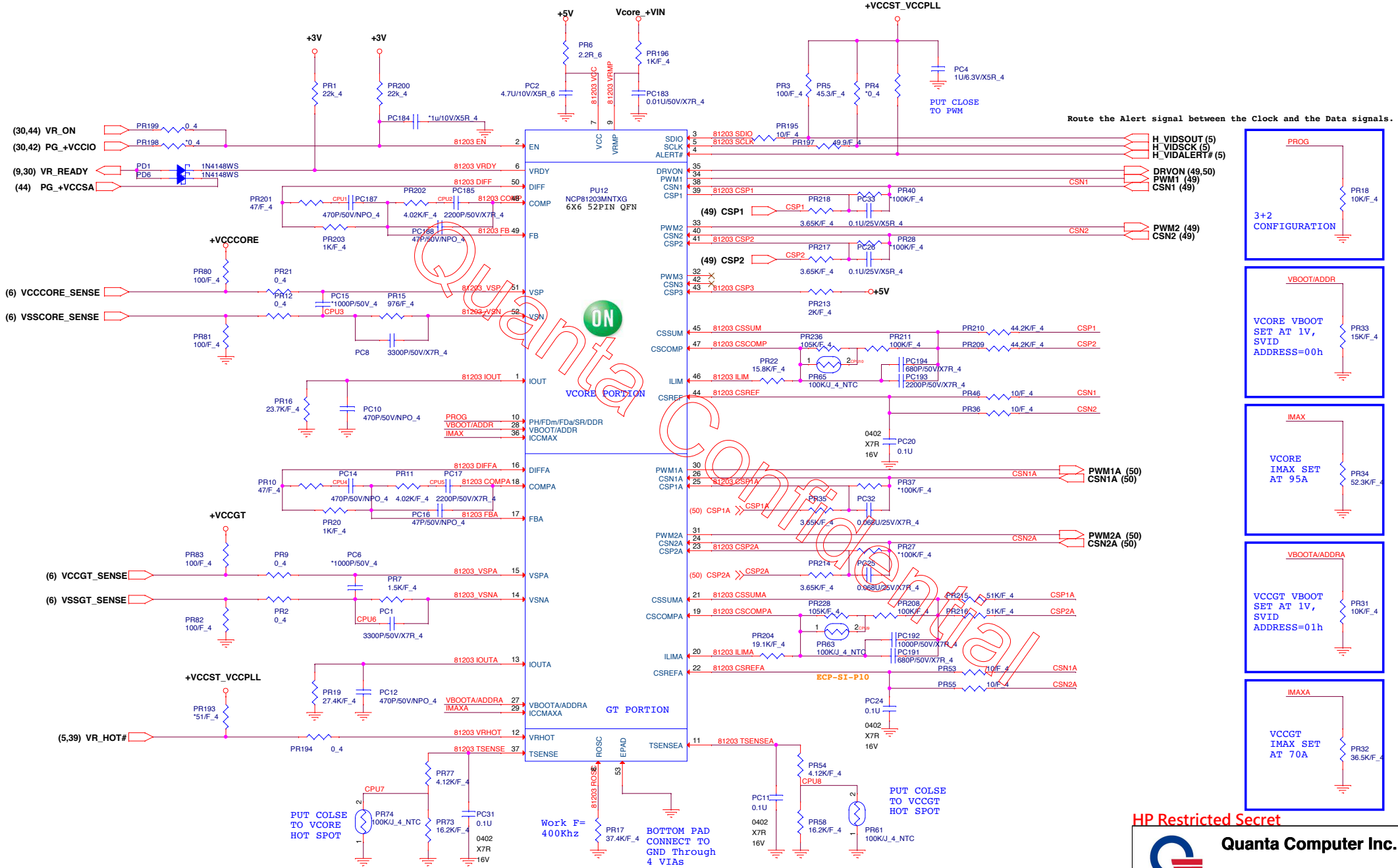

Quanta Computer Inc.

Project: HP-SAIPAN

| Title | | |
|---|---|---|
| Discharge | | |
| Size | Document Number | Rev |
| | -- | A |
| Page Modified: Thursday, December 17, 2015 | | Sheet 47 of 61 |

# Intel SKYLAKE IMVP8 POWER CKT - 3+2 PHASE









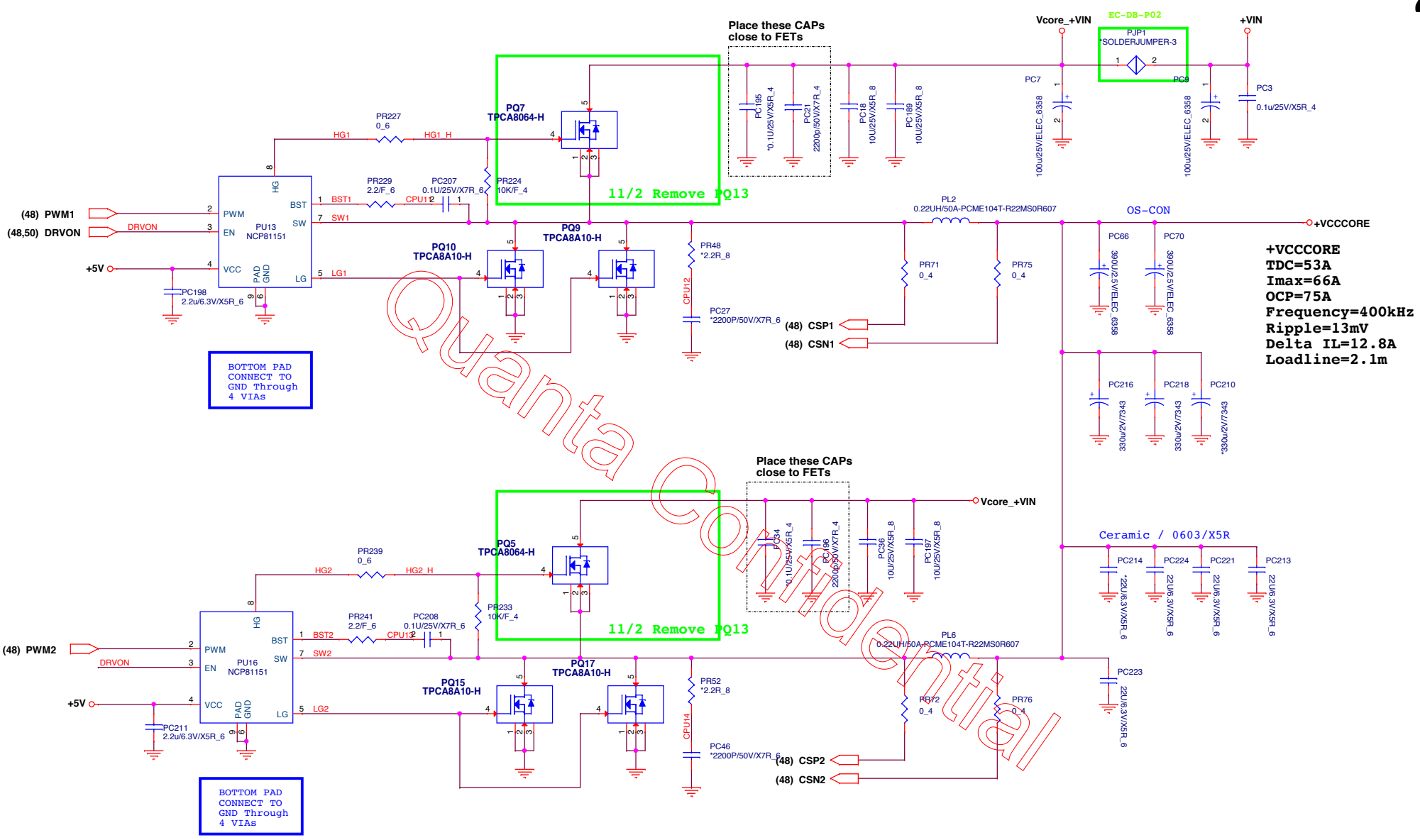

Quanta Computer Inc.

Project: HP-SAIPAN

Title: VCC_CORE & VCC_GT

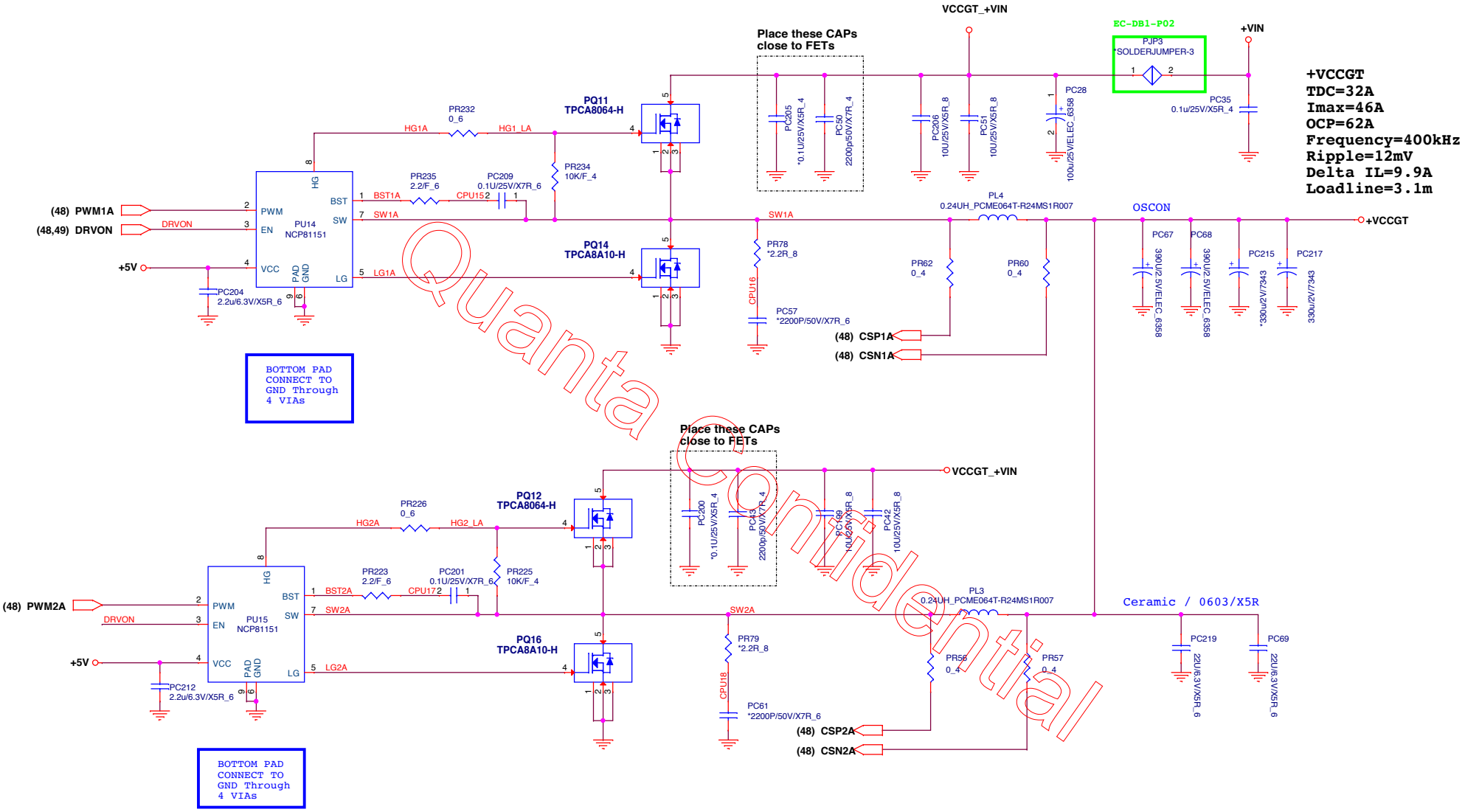
Size: | Document Number: -- | Rev: A

Page Modified: Thursday, December 17, 2015 | Sheet 48 of 61




HP Restricted Secret

| | |
|---|---|
| Quanta Computer Inc. | |
| Project: HP-SAIPAN | |
| Title: VCORE OUT STAGE | |
| Size: | Document Number: -- Rev: A |
| Page Modified: Thursday, December 17, 2015 | Sheet 49 of 61 |








Quanta Computer Inc.

Project: HP-SAIPAN

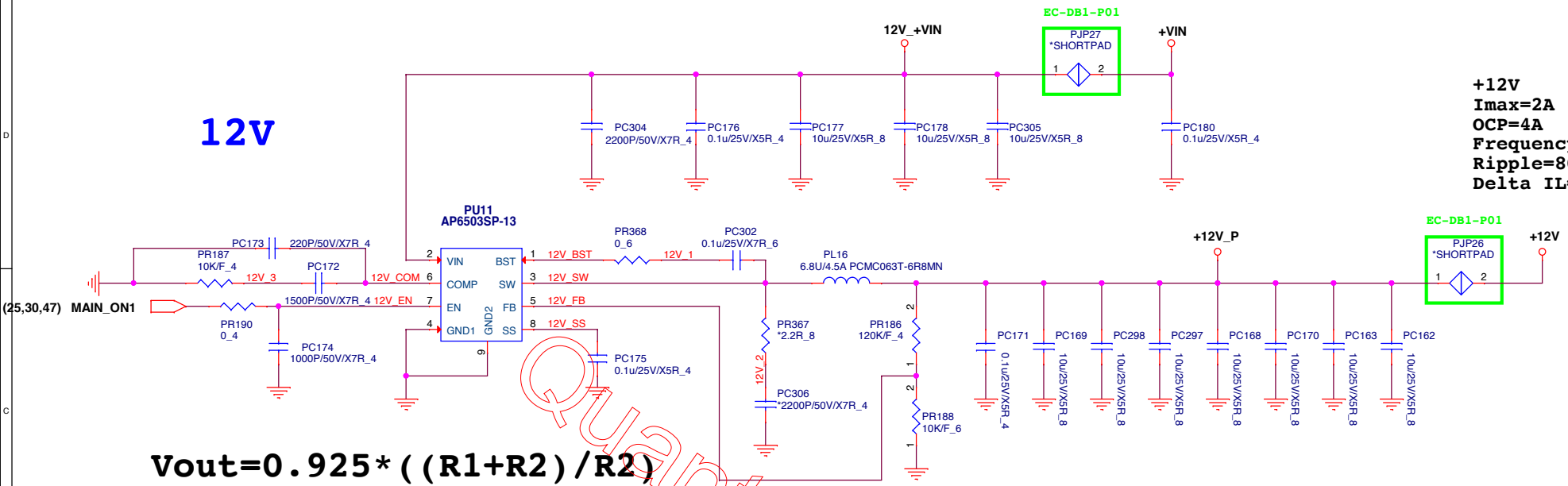
Title: VCCGT OUTPUT STAGE

Size: Document Number: -- Rev: A

Page Modified: Thursday, December 17, 2015 Sheet 50 of 61

# 12V

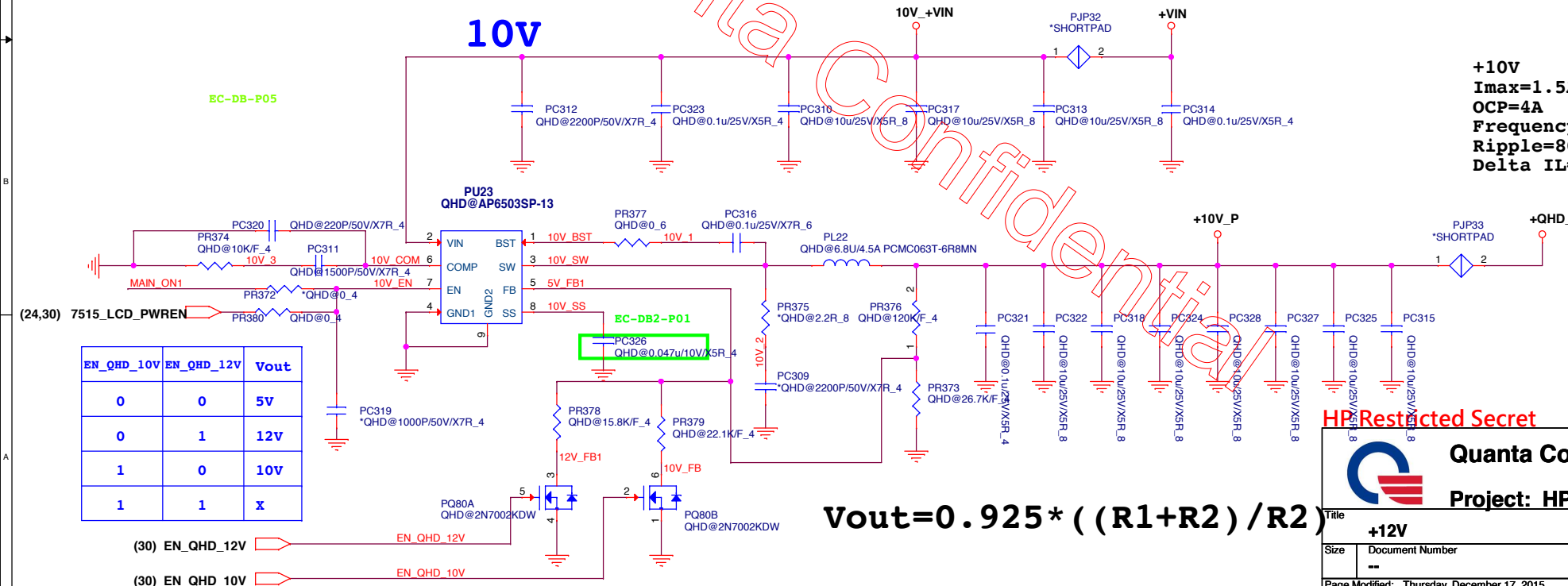
+12V
Imax=2A
OCP=4A
Frequency=340kHz
Ripple=80mV
Delta IL=2A




Vout=0.925*((R1+R2)/R2)

# 10V

+10V
Imax=1.5A
OCP=4A
Frequency=340kHz
Ripple=80mV
Delta IL=2A

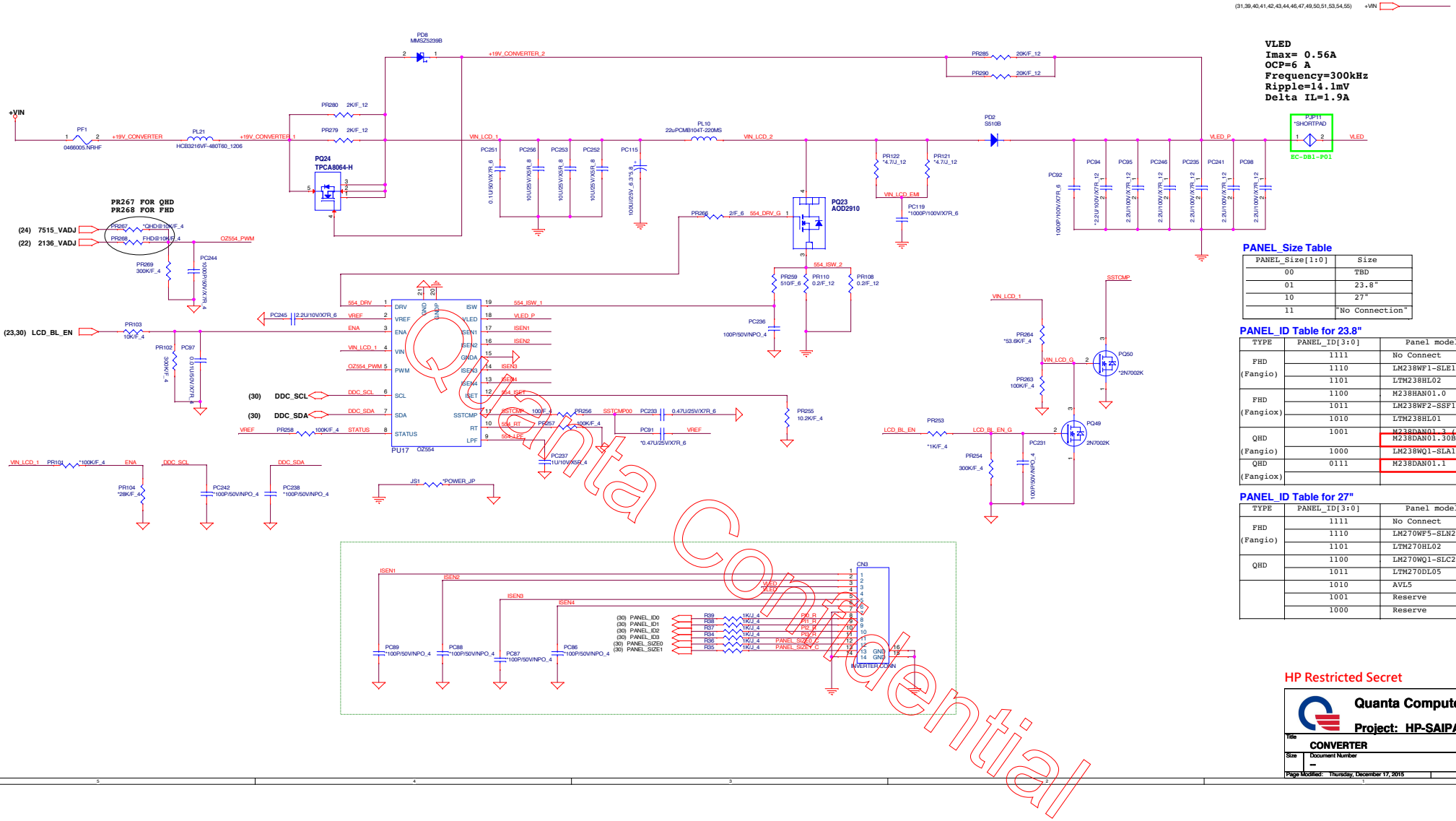


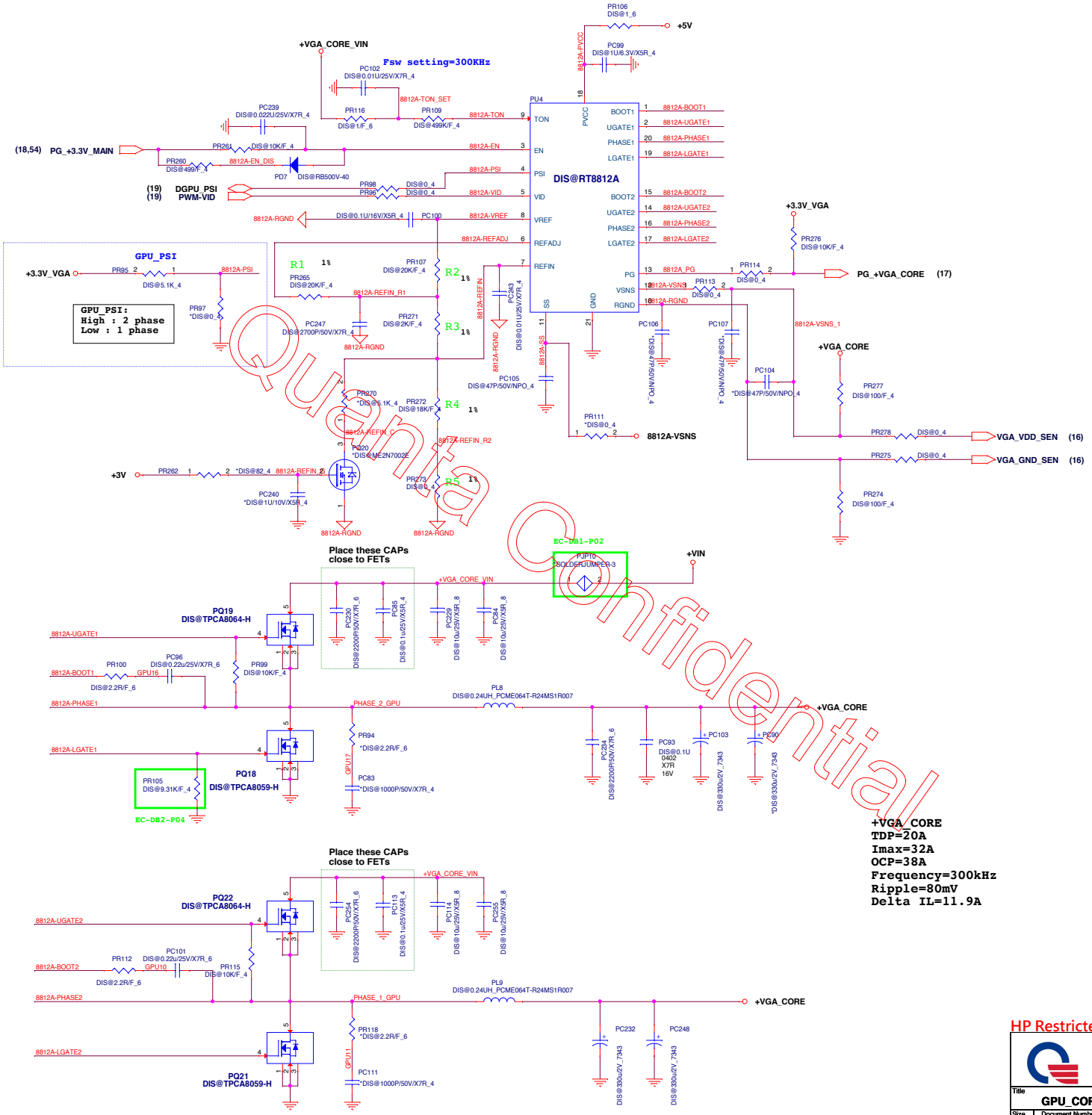

| EN_QHD_10V | EN_QHD_12V | Vout |
|---|---|---|
| 0 | 0 | 5V |
| 0 | 1 | 12V |
| 1 | 0 | 10V |
| 1 | 1 | X |

Vout=0.925*((R1+R2)/R2)



Quanta Computer Inc.
Project: HP-SAIPAN
Title: +12V
Size: --
Document Number: --
Rev: A
Page Modified: Thursday, December 17, 2015
Sheet 51 of 61








Quanta Computer Inc.

Project: HP-SAIPAN

Title: GPU_CORE (ISL62771)

| Size | Document Number | Rev |
|---|---|---|
| | -- | A |

Page Modified: Thursday, December 17, 2015 | Sheet 53 of 61

# VGA POWER



(17,21) +1.35V_VGA
(16,18,19,20,53) +3.3V_VGA
(16,17,18) +1.05V_VGA

## 3.3V VGA

+3V_S5 R221 DIS@10k/5%_4
+3V_S5 R674 DIS@10k/5%_4
+3V_S5 PR134 DIS@1M_4
PR135 *DIS@1M_4
(11) EN_DGPU_PWR# PR312 DIS@0_4
EN_+3V_VGA#_G1
3EN_+3V_VGA#_G2
PQ29A *2N7002KDW
PQ29B *2N7002KDW
EC-DB1-P04

+3.3V_VGA PR299 DIS@22R_8 PQ59 DIS@2N7002K_300MA
+VGA_CORE PR303 DIS@22R_8 PQ61 DIS@2N7002K_300MA
+1.05V_VGA PR300 DIS@22R_8 PQ57 DIS@2N7002K_300MA
+1.35V_VGA PR302 DIS@22R_8 PQ60 DIS@2N7002K_300MA
+12VCPU PR301 DIS@1M_4 PQ58 DIS@2N7002K_300MA
3VGFX_ONG
PC266 DIS@1000P/10V/X7R_4

+3V PR306 *DIS@0_6
PQ56 DIS@AO6402A
PC276 DIS@0.1U 0402 X7R 16V
PC268 DIS@0.1U 0402 X7R 16V
PC267 DIS@10u/6.3V/X5R_6
+3.3V_VGA

AO6402A
Rdson=24m@10V Vgs
Imax=0.06A
Pd: 0.086mW

3VGFX_ONG D491 TVL040201SP0 ESD

EC-DB1-P01 PJP28 *SHORTPAD 1 2 +VIN
1.35VGFX_VIN

PC77 DIS@2200p/50V_6
PC226 DIS@0.1u/50V_6
PC78 DIS@10u/25V_8
PC227 DIS@10u/25V_8
PC76 DIS@0.1u/50V_6

VCC
PR88 *DIS@499K/F_4
PR85 DIS@1/F_6
1.35VGFX_BST 1.35VGFX_BST1
PR91 DIS@100K/F_4
PR90 DIS@0_4
(18) PG_+1.35_VGA
PR92 DIS@200K/F_4
(17) EN_+1.35V_VGA
PR84 DIS@0_4
PC72 *DIS@0.1U/16V/X5R_4
PR89 DIS@0_4
PR252 DIS@0_6

PU3 DIS@NB671GQ-Z
EN PG LP# NC1 NC2 AGND VIN BST SW1 SW2 SW3 SW4 VOUT PGND VCC FB

PC71 DIS@0.1u/50V_6
PL7 DIS@1UH/11A-PCMC063T-1R0MN
1.35VGFX_SW
1.35VGFX_SW_EMI
PR93 *DIS@4.7_6
PC81 *DIS@680p/50V_6
PC80 DIS@0.1u/16V_4
PC73 DIS@1u/6.3V_4
1.35VGFX_FB
PR86 DIS@68.1K/F_4
PR87 DIS@54.9K/F_4
VREF=0.604V

+1.35V_VGA_P
PC74 DIS@60.1u/50V_6
PC228 DIS@22u/6.3V_6
PC225 DIS@22u/6.3V_6
PC79 DIS@22u/6.3V_6
PC75 DIS@22u/6.3V_6

EC-DB1-P01 PJP9 *SHORTPAD 1 2 +1.35V_VGA
PC82 *DIS@390U/2.5V/ELEC_6358

+1.35V_VGA
Imax=4.5A
OCP=8A
Frequency=500kHz
Ripple=20mV
Delta IL=2.5A

## +1.05V VGA

+3.3V_VGA PR125 DIS@100K_4
PR124 DIS@0_4
(30) PG_+1.05V_VGA
40mil
EC-DB1-P01
+5V_S5 PJP29 *SHORTPAD
PR117 DIS@10_6

PU5 DIS@RT8068A
EC2 *DIS@1000P/50V/X7R_4
ER1 *DIS@4.7_6
PG PVIN PVIN SVIN GND NC LX LX NC FB EN
8060_1.0V 8060PVIN_1.0V 8060SVIN_1.0V
8060LX_1.0V 8060NC_1.0V 8060FB_1.0V 8060EN_1.0V

PL12 DIS@1UH/11A-PCMC063T-1R0MN
PC108 *DIS@68P/50V/COG_4
PR119 DIS@11.3K/F_4
R1
PC109 *DIS@22P/50V/NPO_4
R2
PR120 DIS@15K/F_4
PR123 DIS@10K/F_4
PC112 DIS@0.22u/10V/X5R_4
EC-DB1-P06

+1.05V_VGA_P
PC122 DIS@0.1U 0402 X7R 16V
PC121 DIS@22u/6.3V/X5R_6

EC-DB1-P01 PJP12 *SHORTPAD 1 2 +1.05V_VGA
PC120 *DIS@390U/2.5V/ELEC_6358

PC250 DIS@0.01U/50V/X7R_4
PC249 DIS@10U/6.3V/X5R_6
PC110 DIS@1U/6.3V/X5R_4

PG_+3.3V_MAIN (18,53)

+1.05V_VGA
Imax=2.1A
OCP=4A
Frequency=1MHz
Ripple=12mV
Delta IL=0.8A

V0=0.6*(R1+R2)/R2





Quanta Computer Inc.
Project: HP-SAIPAN

| Title | | |
|---|---|---|
| GPU-1.05V / 1.35V | | |
| Size | Document Number | Rev |
| | -- | A |
| Page Modified: Thursday, December 17, 2015 | | Sheet 54 of 61 |

## CPU HOLE

H7 H-C197D150P2 *Hole
H8 H-C197D150P2 *Hole
H11 H-C197D150P2 *Hole

H17 *Hole — HG-SAIPAN-1-N83
H4 *Hole — HG-SAIPAN-33-N83
H10 *Hole — HG-SAIPAN-11-N83
H18 *Hole — hg-saipan-1-N83
H20 *Hole — hg-saipan-3-N83
H19 *Hole — hg-c315d185p2-N83

H16 *Hole — hg-saipan-9-N83
H3 *Hole — hg-c315d138p2-N83
H15 *Hole — hg-saipan-1-N83

H13 *Hole — hg-c276d197p2
H6 *Hole — hg-c276d197p2
H12 *Hole — hg-c276d197p2
H5 *Hole — hg-c276d197p2

EC-DB2-E41

## EMI PAD

H22 SPAD-RE158X1181NP PAD
H14 SPAD-RE495X98NP PAD
H21 SPAD-RE197X197NP PAD
H1 SPAD-RE236X79NP PAD
H2 SPAD-RE236X118NP PAD

## VGA HOLE

HOLE1 H-C146D146N
HOLE3 H-C146D146N

## WLAN HOLE

HOLE2 H-TC236IC126BC126D126PT Hole

EC-DB2-E42

## SSD HOLE

HOLE4 H-TC236IC126BC126D126PT Hole

EC-DB2-E42

RF

+VDDQ — C287 *15p/50V/C0G_4
+VDDQ — C359 100p/50V/NPO_4
+VDDQ — C363 100p/50V/NPO_4
+VDDQ — C445 *15p/50V/C0G_4
+VDDQ — C391 *15p/50V/C0G_4
+VDDQ — C361 *15p/50V/C0G_4
RF
+VDDQ — C489 100p/50V/NPO_4

RF
+VDDQ — C466 100p/50V/NPO_4
+VDDQ — C313 *15p/50V/C0G_4
RF
+VDDQ — C55 100p/50V/NPO_4
+VDDQ — C498 100p/50V/NPO_4
+VDDQ — C364 100p/50V/NPO_4
+VDDQ — C382 100p/50V/NPO_4

+VIN — C604 *15p/50V/C0G_4
+VIN — C600 *15p/50V/C0G_4
+VIN — C239 *15p/50V/C0G_4
+VIN — C136 *15p/50V/C0G_4
+VIN — C201 *15p/50V/C0G_4
+VIN — C7 *15p/50V/C0G_4
+VIN — C203 *15p/50V/C0G_4
+VIN — C592 *15p/50V/C0G_4

+12V — C475 *15p/50V/C0G_4
+12V — C612 *15p/50V/C0G_4
+12V — C480 *15p/50V/C0G_4
+3V_S5 — C122 *15p/50V/C0G_4
+3V_S5 — C243 *15p/50V/C0G_4
+3V_S5 — C574 *15p/50V/C0G_4

+3V — C537 *15p/50V/C0G_4
+5V — C582 *15p/50V/C0G_4
+5V — C518 *15p/50V/C0G_4
+5V — C202 *15p/50V/C0G_4

+3V — C101 1000p/16V/X7R_4
+3V — C504 1000p/16V/X7R_4
For SPI_CLK

Place around +VIN trace

+VIN — C240 *0.1U/25V_4_X7R
+VIN — C33 *0.1U/25V_4_X7R
+VIN — C4 *0.1U/25V_4_X7R
+VIN — C5 *0.1U/25V_4_X7R
+VIN — C1 *0.1U/25V_4_X7R

+VIN — C527 *0.1U/25V_4_X7R
+VIN — C135 *0.1U/25V_4_X7R
+VIN — C2 *0.1U/25V_4_X7R
+VIN — C34 *0.1U/25V_4_X7R
+VIN — C199 *0.1U/25V_4_X7R

+VIN — C6 *0.1U/25V_4_X7R
+VIN — C289 *0.1U/25V_4_X7R
+VIN — C288 *0.1U/25V_4_X7R
+VIN — C216 *0.1U/25V_4_X7R



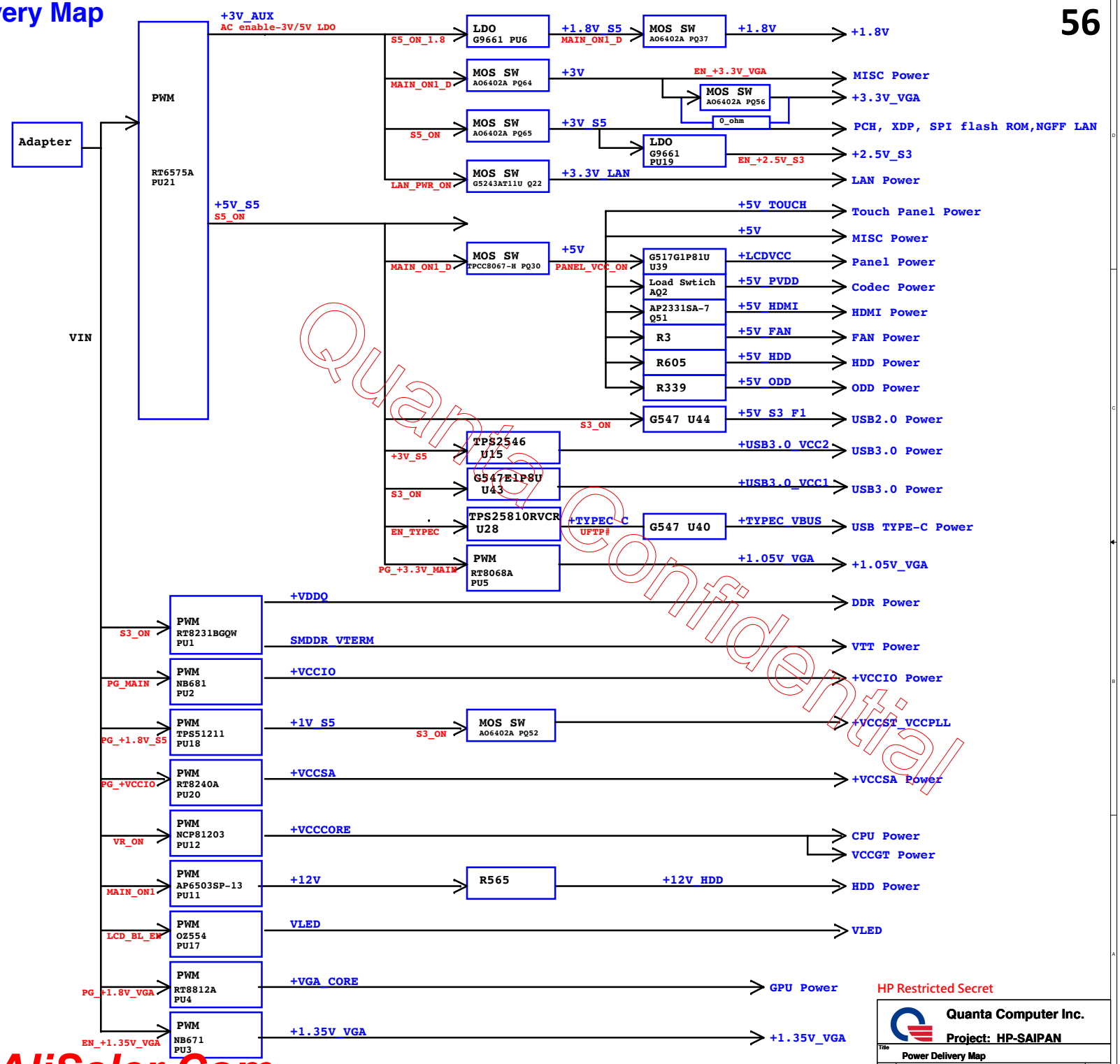


Quanta Computer Inc.
Project: HP-SAIPAN

Title: HOLE/VIN CAP/RF CAP
Size: Document Number: -- Rev: B
Page Modified: Thursday, December 17, 2015 Sheet 55 of 61

# Power Delivery Map





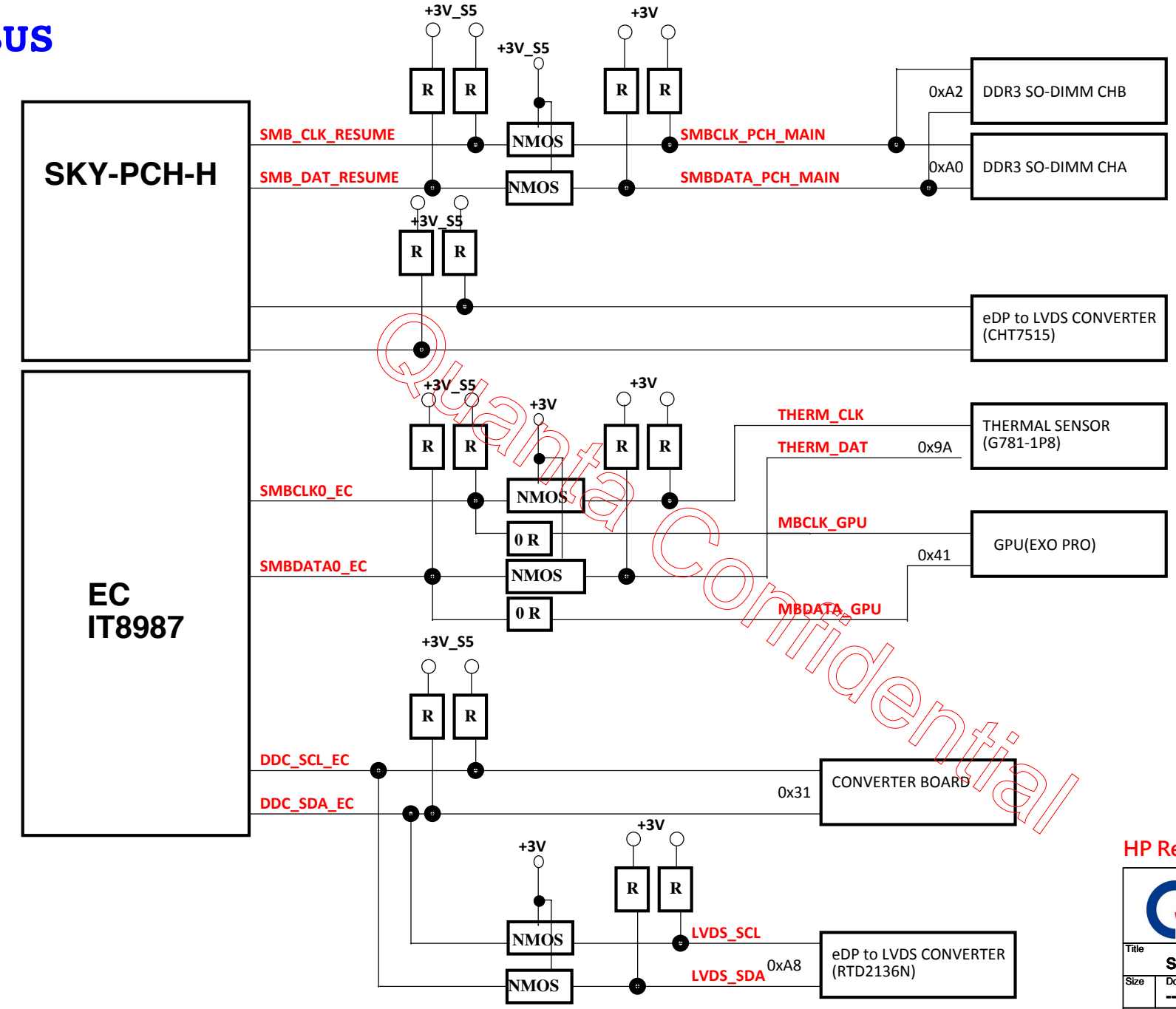





Quanta Computer Inc.
Project: HP-SAIPAN
Title: Power Delivery Map
Size: Document Number: — Rev: A
Page Modified: Thursday, December 17, 2015
Sheet 56 of 61

# SMBUS







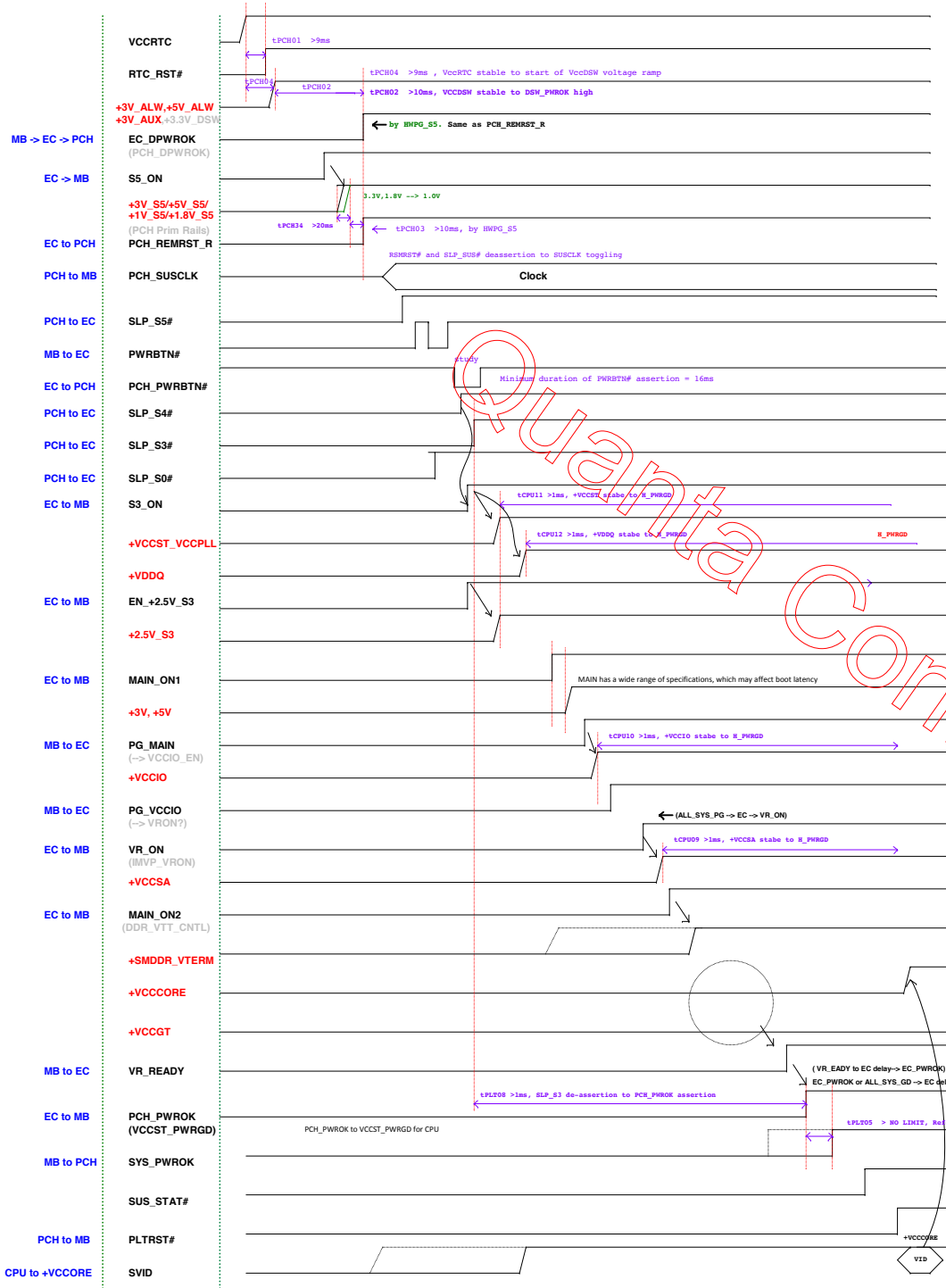



Quanta Computer Inc.

Project: HP-SAIPAN

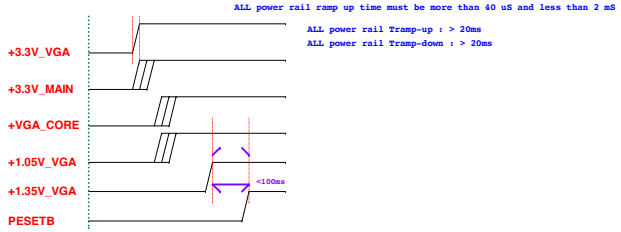
| | | |
|---|---|---|
| Title: SMBus | | |
| Size | Document Number: -- | Rev: A |
| Page Modified: Thursday, December 17, 2015 | | Sheet 57 of 61 |

# SKY-S POWER SEQUENCE

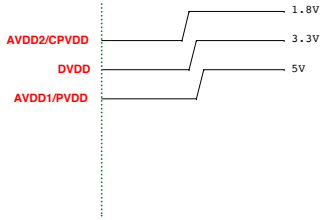



# Nvidia dGPU POWER SEQUENCE






# AUDIO POWER SEQUENCE





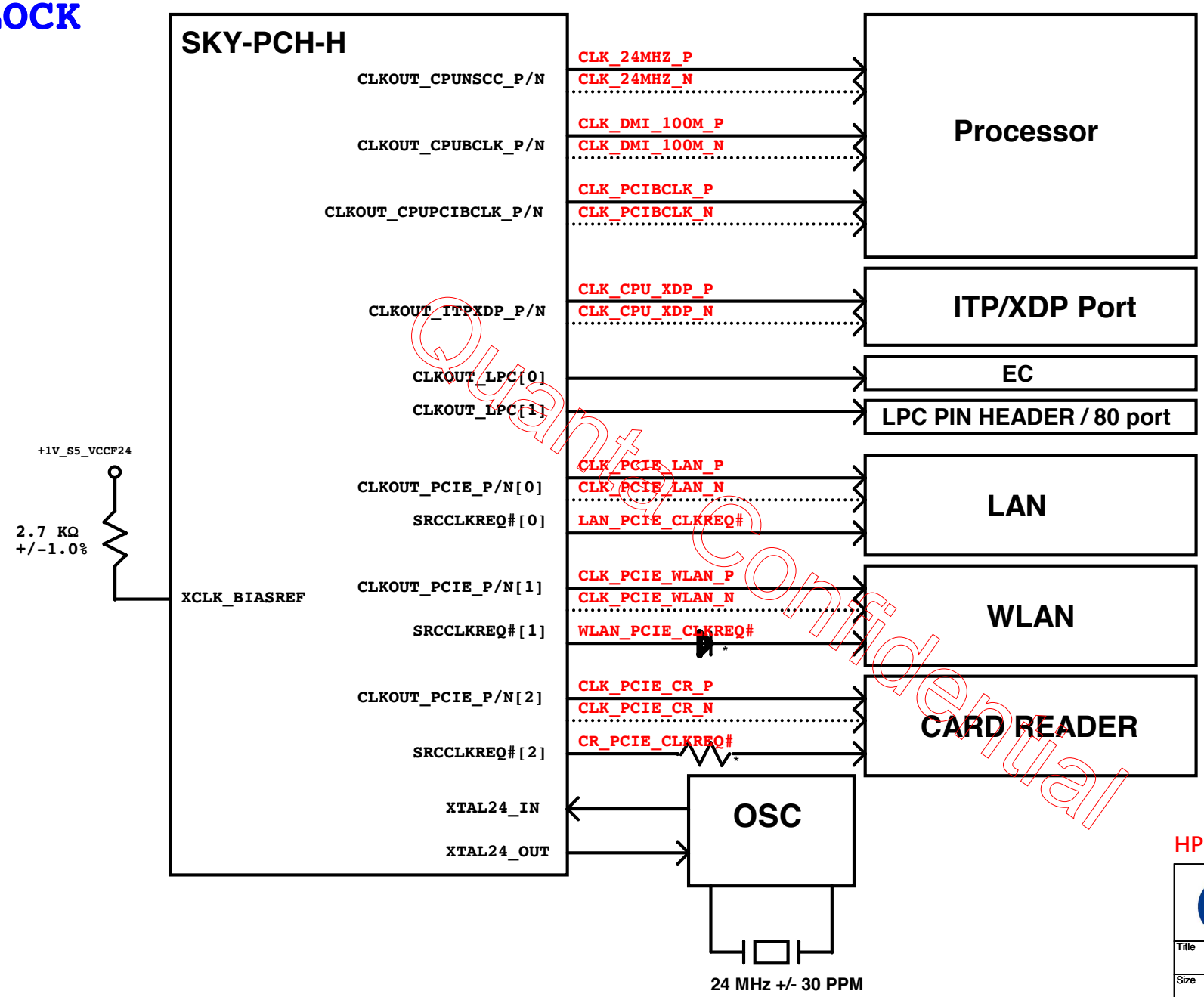



Quanta Computer Inc.
Project: HP-SAIPAN

| | | |
|---|---|---|
| Title | Power Sequence | |
| Size | Document Number | Rev |
| | – | A |
| Page Modified: Thursday, December 17, 2015 | | Sheet 58 of 61 |

# CLOCK









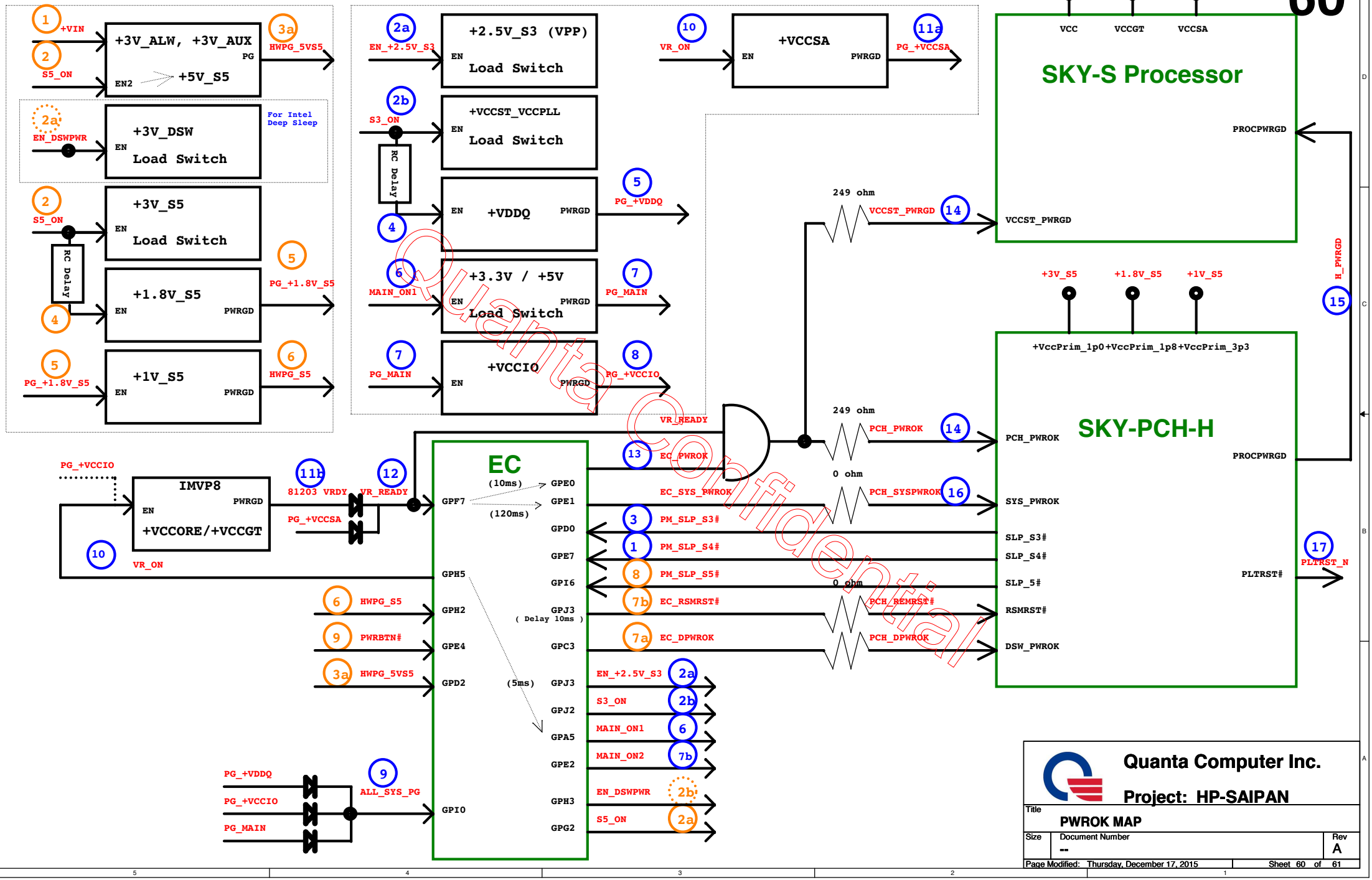

Quanta Computer Inc.

Project: HP-SAIPAN

| | | |
|---|---|---|
| Title: CLOCK MAP | | |
| Size | Document Number: -- | Rev: A |
| Page Modified: Thursday, December 17, 2015 | | Sheet 59 of 61 |

# PWROK MAP / RSMRST_PWRGD#








| | |
|---|---|
| Quanta Computer Inc. | |
| Project: HP-SAIPAN | |
| Title: PWROK MAP | |
| Size | Document Number: -- / Rev: A |
| Page Modified: Thursday, December 17, 2015 | Sheet 60 of 61 |

# DB1 Change List

| No. | Change details | Location/Description | Page | Change Reason |
|---|---|---|---|---|
| EC-DB1-E01 | Change 0 ohm to shortpad | R76,R328,R329,R785,R166,R158,R732,R618,R351, R352,R598 | 5,9,10,12,16,26,34 | Reduce 0 ohm usage for SMT. |
| EC-DB1-E02 | Modify PEG HW straps | R489,R5106,R514 | 5 | For PEG PCIe x4 Gen3 setting. |
| EC-DB1-E03 | Remove AC caps on PEG [4:7] for N16S | C74,C73,C483,C479,C75,C76,C488,C497,C77,C78,C500 ,C506,C79,C80,C507,C515 | 16 | N16S-GMR support PEG x3 only. |
| EC-DB1-E04 | Add dual mosfet on SMBl_CLK/DAT | Q55 | 9 | I2C power domain. |
| EC-DB1-E05 | Remove C328 | C328,C330 | 14,15 | for DDR4 reset timing |
| EC-DB1-E06 | Remove R612 | R612 | 16 | Don't support GC6.0 |
| EC-DB1-E07 | Remove R126,R118,R109 | R126,R118,109 | 16,19 | unnecessary |
| EC-DB1-E08 | stuff R96 | R96 | 9 | NV suggest |
| EC-DB1-E09 | De-populate SPI ROM | R64,R72,R129,U9,R124C102 | 19 | De-populate SPI ROM |
| EC-DB1-E10 | Change QHD panel circuit | all page | 25 | Chage QHD VCC control circuit |
| EC-DB1-E11 | Chage R711 to 470 ohm | R711 | 25 | QHD VCC discharge resistor |
| EC-DB1-E12 | Change part | F9 | 26 | common part |
| EC-DB1-E13 | DMIC I2C circuit wrong | AR5/AR17/AR6/AR13 | 27 | DMIC I2C circuit wrong |
| EC-DB1-E14 | Change EC HW straps power domain to +3V_ALW | '-- | 30 | timing issue |
| EC-DB1-E15 | Stuff R571/R572 | R571/R572 | 30 | I2C power domain. |
| EC-DB1-E16 | Remove R70 | R70 | 30 | Reduce 0 ohm usage for SMT. |
| EC-DB1-E17 | Change +3.3V to +3.3V_CCD on CN4.1 & U3.5 | CN4.1 & U3.5 | 31 | To disable DMIC device in Fangio-x |
| EC-DB1-E18 | Stuff U5,U4 | U5,U4 | 31 | ESD |
| EC-DB1-E19 | Remove R3 | R3 | 30 | unnecessary |

| | | | | |
|---|---|---|---|---|
| EC-DB-P01 | change footprint to short pad. | PJP2,4~9,11~20,22~31 | 50~54 | change footprint to short pad. |
| EC-DB-P02 | change footprint to short pad. | PJP1,3,10,21 | 50~54 | change footprint to short pad. |
| EC-DB-P03 | change part reference for schematic error | PQ43A,PQ78A,PQ78B,PQ79A,PQ79B | 50~55 | change part reference for schematic error |
| EC-DB-P04 | For Common parts | PQ29A,PQ29B | | For Common parts |

# DB2 Change List

| No. | Change details | Location/Description | Page | Change Reason |
|---|---|---|---|---|
| EC-DB2-E01 | Change 0 ohm to shortpad | R552,R761,R735,R316,R307,R706,R164,R336 ,R666,R306,R278,R324,196,R781,R667,R231,R703,R372 | 5,9,10,11,12 ,13,14,38 | Reduce 0 ohm usage for SMT. |
| EC-DB2-E02 | Adding TVS DIODE | D6,D7 | 5 | ESD request |
| EC-DB2-E03 | Change location C378/C379 to PC329/PC330 | C378,C379 | 6 | power parts. |
| EC-DB2-E04 | Remove R673 | R673 | 11 | simple circuit |
| EC-DB2-E05 | Stuff C594 10pf | C594 | 11 | for CK_24M_EC timing |
| EC-DB2-E06 | Change Board ID to SI ( STUFF R702) | R702 | 12 | BOARD ID |
| EC-DB2-E07 | ADD TVS on WLAN_PCIE_CLKREQ# | D46 | 12 | ESD request |
| EC-DB2-E08 | Change part | L58 | 18 | For common part |
| EC-DB2-E09 | Chage c71 to 10pf and C72 to 12pf | C71,C72 | 18 | Xtal accuracy |
| EC-DB2-E10 | Don't stuff R18/R20 | R18,R20 | 21 | unnecessary |
| EC-DB2-E11 | Don't stuff C116 | C116 | 22 | unnecessary |
| EC-DB2-E12 | Don't stuff R181 and add R822 pull down | R181,R822 | 22 | Reatek recommand |
| EC-DB2-E13 | Chage caps power rating from 16v to 10v | C108,AC9 | 22 | Chage caps power rating |
| EC-DB2-E14 | Chage c232 to and C228 to 8.2pf | C232/C228 | 24 | Xtal accuracy |
| EC-DB2-E15 | Change part | F9 | 26 | For common part |
| EC-DB2-E16 | Change Q10 to dual MOSFET. Q32/33 to Q57 | Q10/Q11/Q10, Q32/Q33/Q57 | 26,34 | Simple layout |
| EC-DB2-E17 | Change part | AL9,AL10,AL11,AL13 | 27 | For common part |
| EC-DB2-E18 | adding disable DMIC icon | Au1.48 | 28 | HP request |
| EC-DB2-E19 | Stuff R803/R792/D33, don't stuff R802 | R803,R802,R792,D33 | 12,28,29,34 | enable PCie clock request function |
| EC-DB2-E20 | Adding M.2 SSD function | All page | 35 | HP request |
| EC-DB2-E21 | Change RJ45 part | CN24 | 28 | SMT request |
| EC-DB2-E22 | Chage caps power rating from 10v to 6.3v | C230,C482,C495 | 29,34 | Chage caps power rating |
| EC-DB2-E23 | Stuff C666 | C666 | 29 | EMI request |
| EC-DB2-E24 | Change GPIO table in EC | EN_TYPEC,CLR_CMOS,EN_AUO_PVDD,BOX_BUTTON #,PCHHOT#,EC_MUTE#,HWPG_5VS5 | 30 | common design |
| EC-DB2-E25 | Change diode to 0 ohm | R837,R838,R839 | 30 | common design |
| EC-DB2-E26 | Change SMI circuit | R517 | 30 | unnecessary |
| EC-DB2-E27 | Adding iRMT control pin | R843 | 30 | iRMT |
| EC-DB2-E28 | Change QHD I2C control circuit | R627/R633 | 30 | Leakage. |
| EC-DB2-E29 | Remove D17/D19 | D17/D19 | 30 | unnecessary |
| EC-DB2-E30 | Change L5 to 4.7ohm. Adding C674 | L58,C674 | 31 | DMIC EA timing |
| EC-DB2-E31 | Stuff U5,U4 | U5,U4 | 31 | ESD |
| EC-DB2-E32 | Add iRMT control circuit | R842,Q58,R840 | 31 | iRMT |
| EC-DB2-E33 | Reserve D45 | D45 | 31 | ESD |
| EC-DB2-E34 | Change USB power switch | U43,U44,U33,U32,C342,C372 | 31,32 | For common part |
| EC-DB2-E35 | Change C235/C236 from 150uf to one 390uf (C236) | C235,C236 | 32 | simple layout |
| EC-DB2-E36 | Add M.2 SSD function | '-- | 35 | HP request |
| EC-DB2-E37 | Change Part | CN8 | 36 | common design |
| EC-DB2-E38 | Reserve C205 | C205 | 36 | Reserve only |
| EC-DB2-E39 | Don't populate R384 | R384 | 36 | Leakage. |
| EC-DB2-E40 | Remove LPC pin header | CN10 | 37 | no enough layout space. |

| | | | | |
|---|---|---|---|---|
| EC-DB-P01 | change footprint to short pad. | PJP2,4~9,11~20,22~31 | 50~54 | change footprint to short pad. |
| EC-DB-P02 | change footprint to short pad. | PJP1,3,10,21 | 50~54 | change footprint to short pad. |
| EC-DB-P03 | change part reference for schematic error | PQ43A,PQ78A,PQ78B,PQ79A,PQ79B | 50~55 | change part reference for schematic error |
| EC-DB-P04 | For Common parts | PQ29A,PQ29B | | For Common parts |





Quanta Computer Inc.

Project: HP-SAIPAN

Title: Cange List

Size: | Document Number: -- | Rev: A

Page Modified: Thursday, December 17, 2015 | Sheet 61 of 61