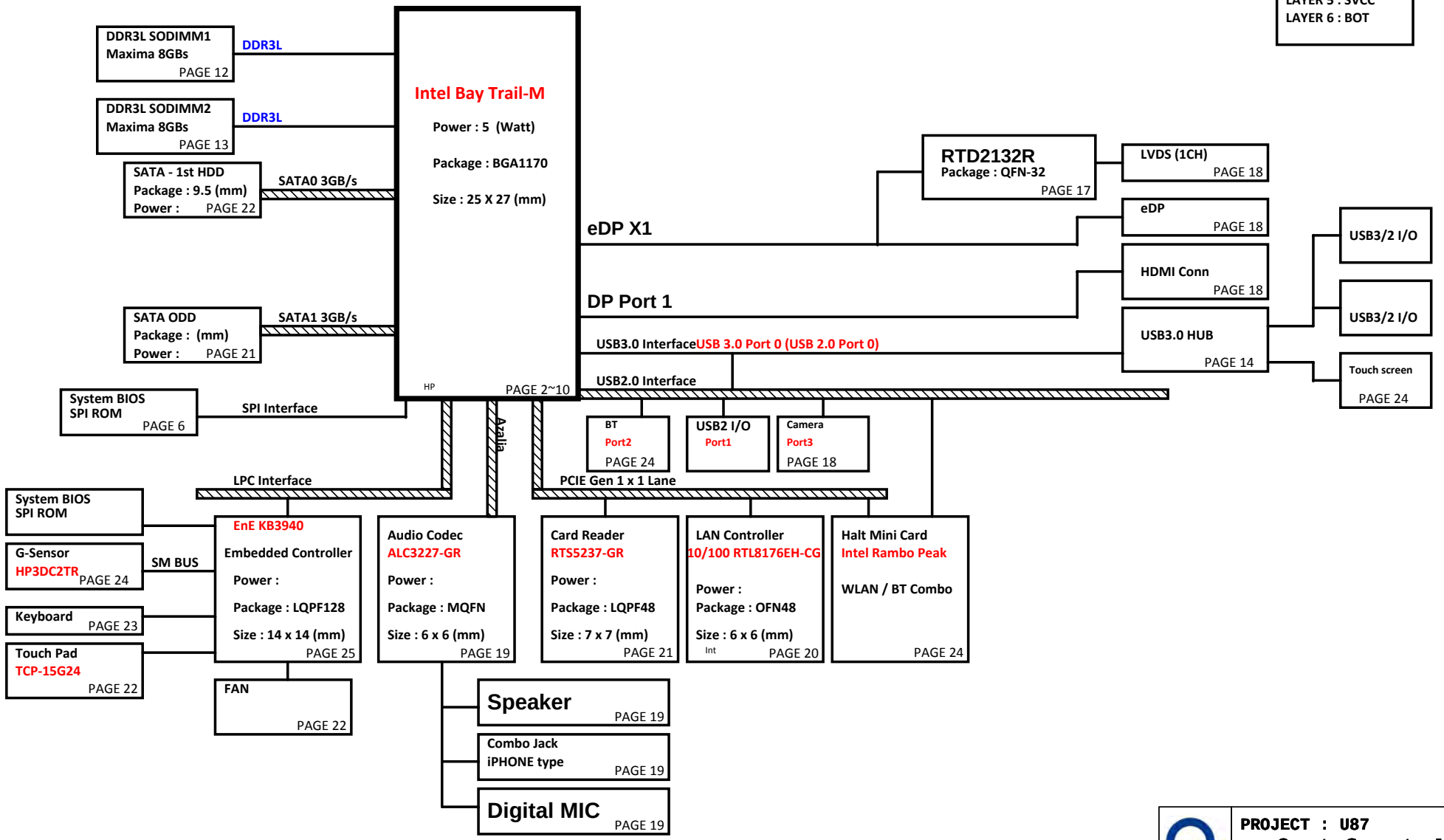
# U87/U88 UMA (14"/15.6") Ultra/Slim
# Intel Bay trail-M Platform Block Diagram

PCB 6L STACK UP

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

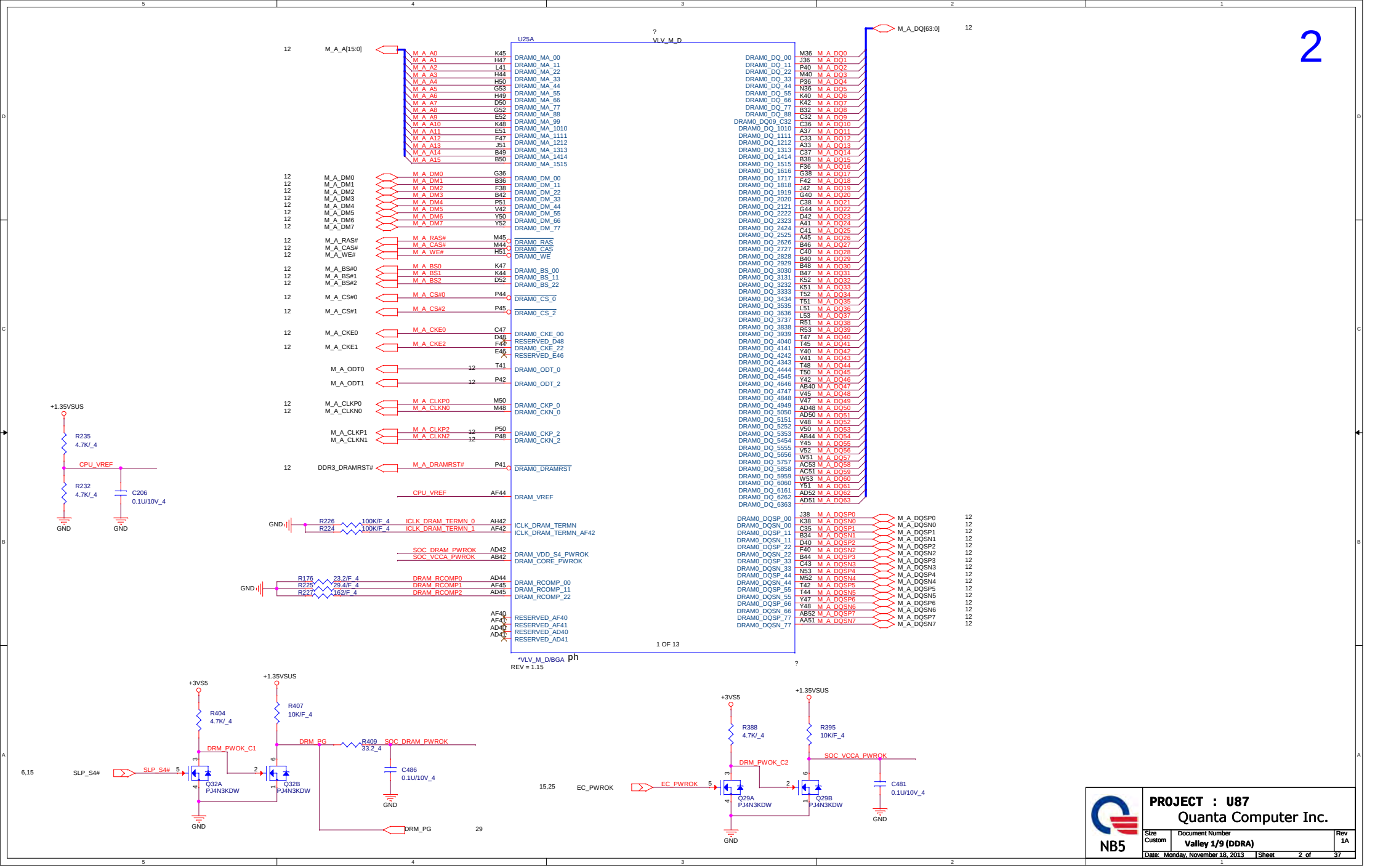


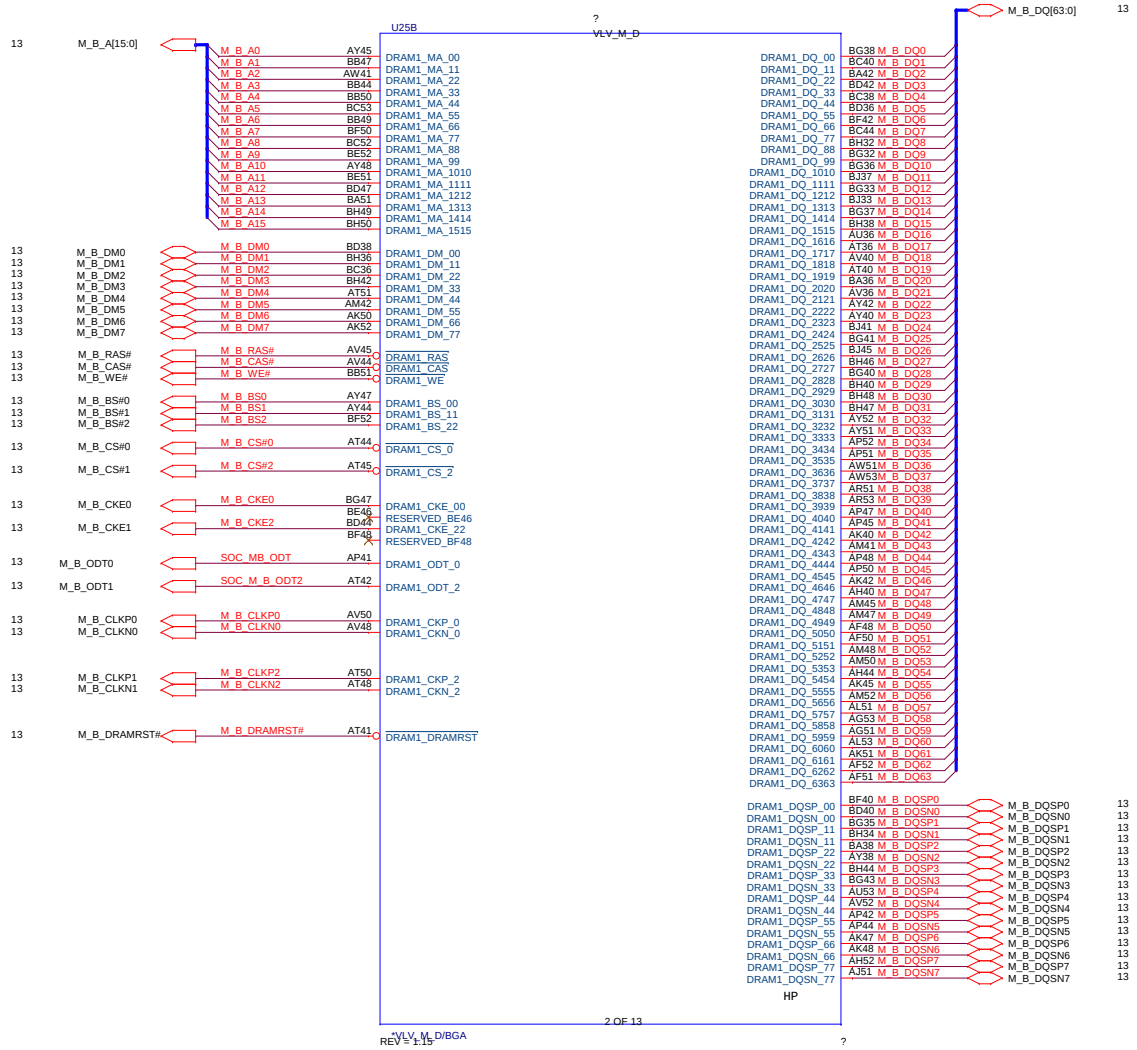

NB5

PROJECT : U87
Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | Block Diagram | 1A |

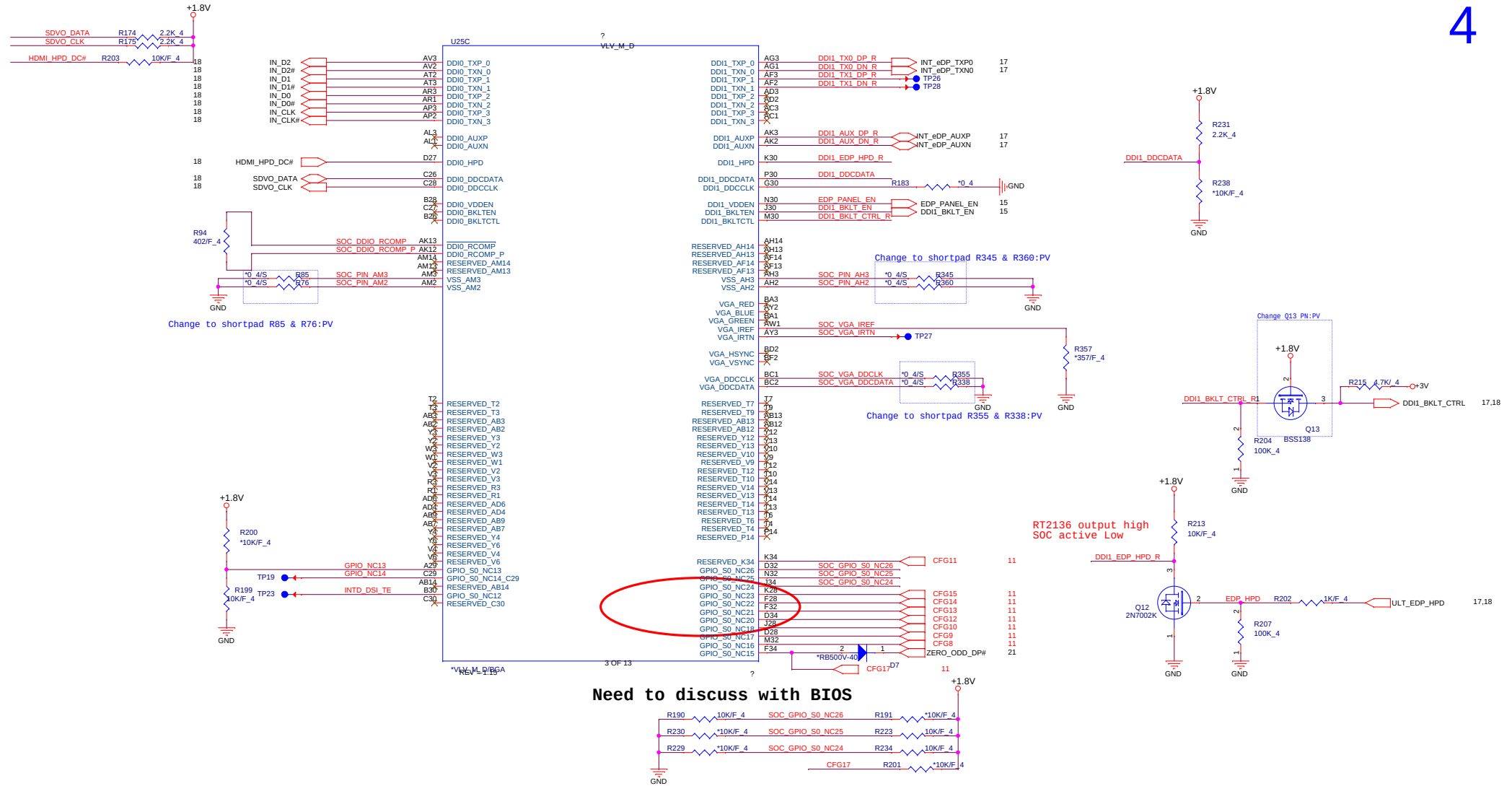
Date: Monday, November 18, 2013 | Sheet 1 of 37


2
U25A
VLV_M_D
M_A_A[15:0]
M_A_DQ[63:0]
M_A_DM0
M_A_DM1
M_A_DM2
M_A_DM3
M_A_DM4
M_A_DM5
M_A_DM6
M_A_DM7
M_A_RAS#
M_A_CAS#
M_A_WE#
M_A_BS#0
M_A_BS#1
M_A_BS#2
M_A_CS#0
M_A_CS#1
M_A_CKE0
M_A_CKE1
M_A_ODT0
M_A_ODT1
M_A_CLKP0
M_A_CLKN0
M_A_CLKP1
M_A_CLKN1
DDR3_DRAMRST#
M_A_DQSP0
M_A_DQSN0
M_A_DQSP1
M_A_DQSN1
M_A_DQSP2
M_A_DQSN2
M_A_DQSP3
M_A_DQSN3
M_A_DQSP4
M_A_DQSN4
M_A_DQSP5
M_A_DQSN5
M_A_DQSP6
M_A_DQSN6
M_A_DQSP7
M_A_DQSN7
1 OF 13
*VLV_M_D/BGA
REV = 1.15
+1.35VSUS
R235
4.7K/_4
CPU_VREF
R232
4.7K/_4
C206
0.1U/10V_4
GND
R226
R224
100K/F_4
ICLK_DRAM_TERMN_0
ICLK_DRAM_TERMN_1
R176
R225
R227
23.2/F_4
29.4/F_4
16.2/F_4
DRAM_RCOMP0
DRAM_RCOMP1
DRAM_RCOMP2
SOC_DRAM_PWROK
SOC_VCCA_PWROK
DRAM_VREF
RESERVED_AF40
RESERVED_AF41
RESERVED_AD40
RESERVED_AD41
+3VS5
R404
4.7K/_4
R407
10K/F_4
DRM_PWOK_C1
DRM_PG
R409
33.2_4
SOC_DRAM_PWROK
C486
0.1U/10V_4
SLP_S4#
Q32A
PJ4N3KDW
Q32B
PJ4N3KDW
6,15
DRM_PG
29
R388
4.7K/_4
R395
10K/F_4
DRM_PWOK_C2
SOC_VCCA_PWROK
EC_PWROK
Q29A
PJ4N3KDW
Q29B
PJ4N3KDW
C481
0.1U/10V_4
15,25
PROJECT : U87
Quanta Computer Inc.
NB5
Size
Custom
Document Number
Valley 1/9 (DDRA)
Rev
1A
Date: Monday, November 18, 2013
Sheet 2 of 37




| | |
|---|---|
| PROJECT : U87 | |
| Quanta Computer Inc. | |
| Size: Custom | Document Number: Valley 2/9 (DDR3) |
| Rev: 1A | |
| Date: Monday, November 18, 2013 | Sheet 3 of 37 |

NB5




| | | | |
|---|---|---|---|
| GPIO26 | 0 | 0 | |
| GPIO25 | 0 | 0 | 0=HDD+ODD, 1= eMMC only |
| GPIO24 | 0 | 1 | 0=14", 1=15" |

NB5

**PROJECT : U87**

Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | Valley 3/9 (Display) | 1A |

Date: Tuesday, April 15, 2014 Sheet 4 of 37

HDD

ODD

Card reader

WIFI

LAN

Change to shortpad:PV

Change R343 & R358 to shortpad:MV

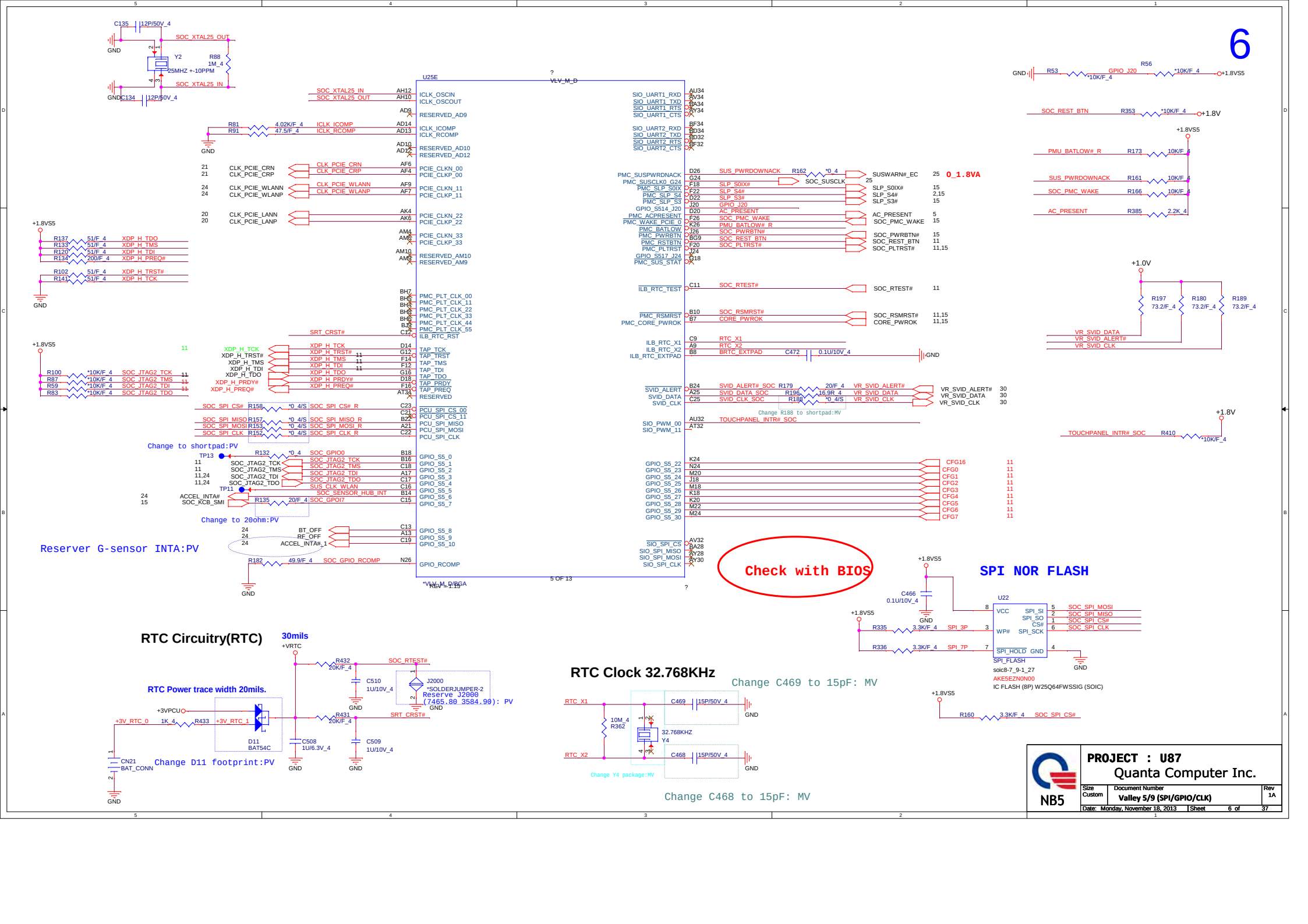
Change to shortpad R344 & R354:PV

Change R168 to shortpad:MV

Change Q25 PN:PV

AC Present: This input pin indicates when the platform is plugged into AC power.

0 = LPC
1 = SPI


6
U25E
VLV_M_D
5 OF 13
*VLV_M_D/BGA
REV=1.15
SOC_XTAL25_OUT
SOC_XTAL25_IN
Y2
25MHZ +-10PPM
R88
1M_4
C135
C134
12P/50V_4
ICLK_OSCIN
ICLK_OSCOUT
RESERVED_AD9
ICLK_ICOMP
ICLK_RCOMP
RESERVED_AD10
RESERVED_AD12
R81
R91
4.02K/F_4
47.5/F_4
CLK_PCIE_CRN
CLK_PCIE_CRP
CLK_PCIE_WLANN
CLK_PCIE_WLANP
CLK_PCIE_LANN
CLK_PCIE_LANP
PCIE_CLKN_00
PCIE_CLKP_00
PCIE_CLKN_11
PCIE_CLKP_11
PCIE_CLKN_22
PCIE_CLKP_22
PCIE_CLKN_33
PCIE_CLKP_33
RESERVED_AM10
RESERVED_AM9
PMC_PLT_CLK_00
PMC_PLT_CLK_11
PMC_PLT_CLK_22
PMC_PLT_CLK_33
PMC_PLT_CLK_44
PMC_PLT_CLK_55
ILB_RTC_RST
SRT_CRST#
TAP_TCK
TAP_TRST
TAP_TMS
TAP_TDI
TAP_TDO
TAP_PRDY
TAP_PREQ
RESERVED
PCU_SPI_CS_00
PCU_SPI_CS_11
PCU_SPI_MISO
PCU_SPI_MOSI
PCU_SPI_CLK
GPIO_S5_0
GPIO_S5_1
GPIO_S5_2
GPIO_S5_3
GPIO_S5_4
GPIO_S5_5
GPIO_S5_6
GPIO_S5_7
GPIO_S5_8
GPIO_S5_9
GPIO_S5_10
GPIO_RCOMP
SIO_UART1_RXD
SIO_UART1_TXD
SIO_UART1_RTS
SIO_UART1_CTS
SIO_UART2_RXD
SIO_UART2_TXD
SIO_UART2_RTS
SIO_UART2_CTS
SUS_PWRDOWNACK
SOC_SUSCLK
SLP_S0IX#
SLP_S4#
SLP_S3#
GPIO_J20
AC_PRESENT
SOC_PMC_WAKE
PMU_BATLOW# R
SOC_PWRBTN#
SOC_REST_BTN
SOC_PLTRST#
ILB_RTC_TEST
SOC_RTEST#
PMC_RSMRST
PMC_CORE_PWROK
SOC_RSMRST#
CORE_PWROK
RTC_X1
RTC_X2
BRTC_EXTPAD
SVID_ALERT
SVID_DATA
SVID_CLK
SVID_ALERT# SOC
SVID_DATA SOC
SVID_CLK SOC
VR_SVID_ALERT#
VR_SVID_DATA
VR_SVID_CLK
SIO_PWM_00
SIO_PWM_11
TOUCHPANEL_INTR# SOC
SIO_SPI_CS
SIO_SPI_MISO
SIO_SPI_MOSI
SIO_SPI_CLK
CFG16
CFG0
CFG1
CFG2
CFG3
CFG4
CFG5
CFG6
CFG7
XDP_H_TCK
XDP_H_TRST#
XDP_H_TMS
XDP_H_TDI
XDP_H_TDO
XDP_H_PRDY#
XDP_H_PREQ#
SOC_JTAG2_TCK
SOC_JTAG2_TMS
SOC_JTAG2_TDI
SOC_JTAG2_TDO
SUS_CLK_WLAN
SOC_SENSOR_HUB_INT
SOC_GPIO7
SOC_GPIO0
SOC_SPI_CS#
SOC_SPI_MISO
SOC_SPI_MOSI
SOC_SPI_CLK
SOC_GPIO_RCOMP
ACCEL_INTA#
SOC_KCB_SMI
BT_OFF
RF_OFF
ACCEL_INTA#_1
+1.8VS5
+1.0V
+1.8V
+VRTC
+3VPCU
GND
Change to shortpad:PV
Change to 20ohm:PV
Change R188 to shortpad:MV
Reserver G-sensor INTA:PV
Check with BIOS
SPI NOR FLASH
U22
SPI_FLASH
soic8-7_9-1_27
AKE5EZN00N00
IC FLASH (8P) W25Q64FWSSIG (SOIC)
RTC Circuitry(RTC)
30mils
RTC Power trace width 20mils.
Change D11 footprint:PV
RTC Clock 32.768KHz
Change C469 to 15pF: MV
Change C468 to 15pF: MV
Change Y4 package:MV
Reserve J2000 (7465.80 3584.90): PV
0_1.8VA
PROJECT : U87
Quanta Computer Inc.
NB5
Valley 5/9 (SPI/GPIO/CLK)
Date: Monday, November 18, 2013
Sheet 6 of 37

+1.8VS5

R337 *10K/F_4 SOC_VOL_UP
R346 *10K/F_4 SOC_VOL_DOWN
R340 *10K/F_4 SOC_HOME_BUT
R341 *10K/F_4 SOC_ROTATE
R342 *10K/F_4 SOC_PWR_BUT

Add HUB power detect circuit: PV

14 HUB_PWR_DET

## Change USB port define: PV

**USB 3.0/2.0 HUB**

**USB2.0 CONN**

**BT**

**Camera**

U25F

*VLV_M_D/BGA

REV = 1.15

6 OF 13

GPIO_S5_31 G2
GPIO_S5_32 M3
GPIO_S5_33 L1
GPIO_S5_34 K2
GPIO_S5_35 K3
GPIO_S5_36 M2
GPIO_S5_37 N3
GPIO_S5_38 P2
GPIO_S5_39 L3
GPIO_S5_40 J3
GPIO_S5_41 P3
GPIO_S5_42 H3
GPIO_S5_43 B12

SOC_VOL_UP
SOC_VOL_DOWN
SOC_HOME_BUT
SOC_ROTATE
SOC_PWR_BUT

USB30_D+ 14 M16 USB_DP0
USB30_D- 14 K16 USB_DN0
19 USB_H2_P J14 USB_DP1
19 USB_H2_N G14 USB_DN1
24 USBP_BT+ K12 USB_DP2
24 USBP_BT- J12 USB_DN2
18 USBP_CAM+ K10 USB_DP3
18 USBP_CAM- H10 USB_DN3

1K_4 R92 ICLK_USB_TERMN_0 D10 ICLK_USB_TERMN_D10
1K_4 R93 ICLK_USB_TERMN_1 F10 ICLK_USB_TERMN
GND
R144 10K/F_4 SOC_USB_OC0 C20 USB_OC_00
+1.8VS5 R145 10K/F_4 SOC_USB_OC1 B20 USB_OC_11

R89 45.3/F_4 USB_RCOMP D6 USB_RCOMPO
GND C7 USB_RCOMPI
M13 USB_PLL_MON

B4 USB_HSIC0_DATA
B5 USB_HSIC0_STROBE

GND
E2 USB_HSIC1_DATA
D2 USB_HSIC1_STROBE
R356 45.3/F_4 USB_HSIC_RCOMP A7 USB_HSIC_RCOMP
R138 49.9/F_4
LPC_RCOMP BF18 LPC_RCOMP

22,24,25 LAD0 BH16 ILB_LPC_AD_00
22,24,25 LAD1 BJ17 ILB_LPC_AD_11
22,24,25 LAD2 BJ13 ILB_LPC_AD_22
22,24,25 LAD3 BG14 ILB_LPC_AD_33
22,24,25 LFRAME# BG17 ILB_LPC_FRAME
25 L_CLKOUT_0 R350 22_6 SOC_CLKOUT_0 BG15 ILB_LPC_CLK_00
22,24 L_CLKOUT_1 R430 22_6 SOC_CLKOUT_1 BH14 ILB_LPC_CLK_11
22,25 L_CLKRUN# R351 22_6 SOC_CLKRUN# BG16 ILB_LPC_CLKRUN
15 SOC_SERIRQ SOC_SERIRQ BG13 ILB_LPC_SERIRQ

+1.8V
R104 2.2K_4 SMB_SOC_DATA BG12 PCU_SMB_DATA
R106 2.2K_4 SMB_SOC_CLK BH10 PCU_SMB_CLK
R339 10K/F_4 SMB_SOC_ALERTB BG11 PCU_SMB_ALERT

15 SMB_SOC_DATA SMB_SOC_DATA
15 SMB_SOC_CLK SMB_SOC_CLK

VLV_M_D

RESERVED_M10 M10
RESERVED_M9 M9
RESERVED_P7 P7
RESERVED_P6 P6
RESERVED_M7 M7
USB3_REXT0 M12 USB3_P0_REXT R97 1.24K/F_4
RESERVED_P10 P10
RESERVED_P12 P12
GND
RESERVED_M4 M4
RESERVED_M6 M6
USB3_RXP0 D4 USB30_RX+ USB30_RX+ 14
USB3_RXN0 E3 USB30_RX- USB30_RX- 14
USB3_TXP0 K6 USB30_TX+ USB30_TX+ 14
USB3_TXN0 K7 USB30_TX- USB30_TX- 14
RESERVED_H8 H8
RESERVED_H7 G7
RESERVED_H5 H5
RESERVED_H4 G4

GPIO_S0_SC_55 BD12 BT_COMBO_EN# R
GPIO_S0_SC_56 BC12 TOP_SWAP
GPIO_S0_SC_57 BD14 SOC_UART_TX
GPIO_S0_SC_58 BC14
GPIO_S0_SC_59 BF14 SOC_SENSOR_HUB_WAKE
GPIO_S0_SC_60 BD16 TOUCH_PANEL_SOC_RST#
GPIO_S0_SC_61 BC16 SOC_UART_RX
ILB_8254_SPKR BH12 ACZ_SPKR 19

SIO_I2C0_DATA BH22 I2C_0_SDA
SIO_I2C0_CLK BG23 I2C_0_SCL
SIO_I2C1_DATA BG24 I2C_1_SDA
SIO_I2C1_CLK BH24 I2C_1_SCL
SIO_I2C2_DATA BG25 I2C_2_SDA_R
SIO_I2C2_CLK BJ25 I2C_2_SCL_R
SIO_I2C3_DATA BG26 I2C_3_SDA
SIO_I2C3_CLK BH26 I2C_3_SCL
SIO_I2C4_DATA BF27 I2C_4_SDA
SIO_I2C4_CLK BG27 I2C_4_SCL
SIO_I2C5_DATA BH28 I2C_5_SDA
SIO_I2C5_CLK BG28 I2C_5_SCL
SIO_I2C6_DATA BJ29 I2C_6_SDA
SIO_I2C6_CLK BG29 I2C_6_SCL
GPIO_S0_SC_092 BH30 I2C_NFC_SOC_SDA
GPIO_S0_SC_093 BG30 I2C_NFC_SOC_SCL

GPS, BT & WIFI CODEC

GND R45 10K/F_4 TOP_SWAP R46 *10K/F_4 +1.8V

**USB 3.0/2.0 HUB**

Q30 BSS138 Change Q30 PN:PV
GND 1 3 ACC_LED# 19
TOUCH_PANEL_SOC_RST#

Change R128 to 2.2K ohm: PV
+1.8V
TOUCH_PANEL_SOC_RST# R128 2.2K_4
SOC_SENSOR_HUB_WAKE R366 10K/F_4

SOC_UART_TX R131 *0_4 SOC_UART_RX

**Un-Stuff for Test Only**

+1.8V
I2C_0_SDA R377 2.2K_4
I2C_0_SCL R378 2.2K_4
I2C_1_SDA R381 2.2K_4
I2C_1_SCL R382 2.2K_4
I2C_2_SDA_R R384 2.2K_4
I2C_2_SCL_R R386 2.2K_4
I2C_3_SDA R390 2.2K_4
I2C_3_SCL R391 2.2K_4
I2C_4_SDA R394 2.2K_4
I2C_4_SCL R393 2.2K_4
I2C_5_SDA R396 2.2K_4
I2C_5_SCL R397 2.2K_4
I2C_6_SDA R399 2.2K_4
I2C_6_SCL R400 2.2K_4
I2C_NFC_SOC_SDA R401 2.2K_4
I2C_NFC_SOC_SCL R403 2.2K_4
BT_COMBO_EN#_R R2021 *2.2K_4
Reserve R2021:PV

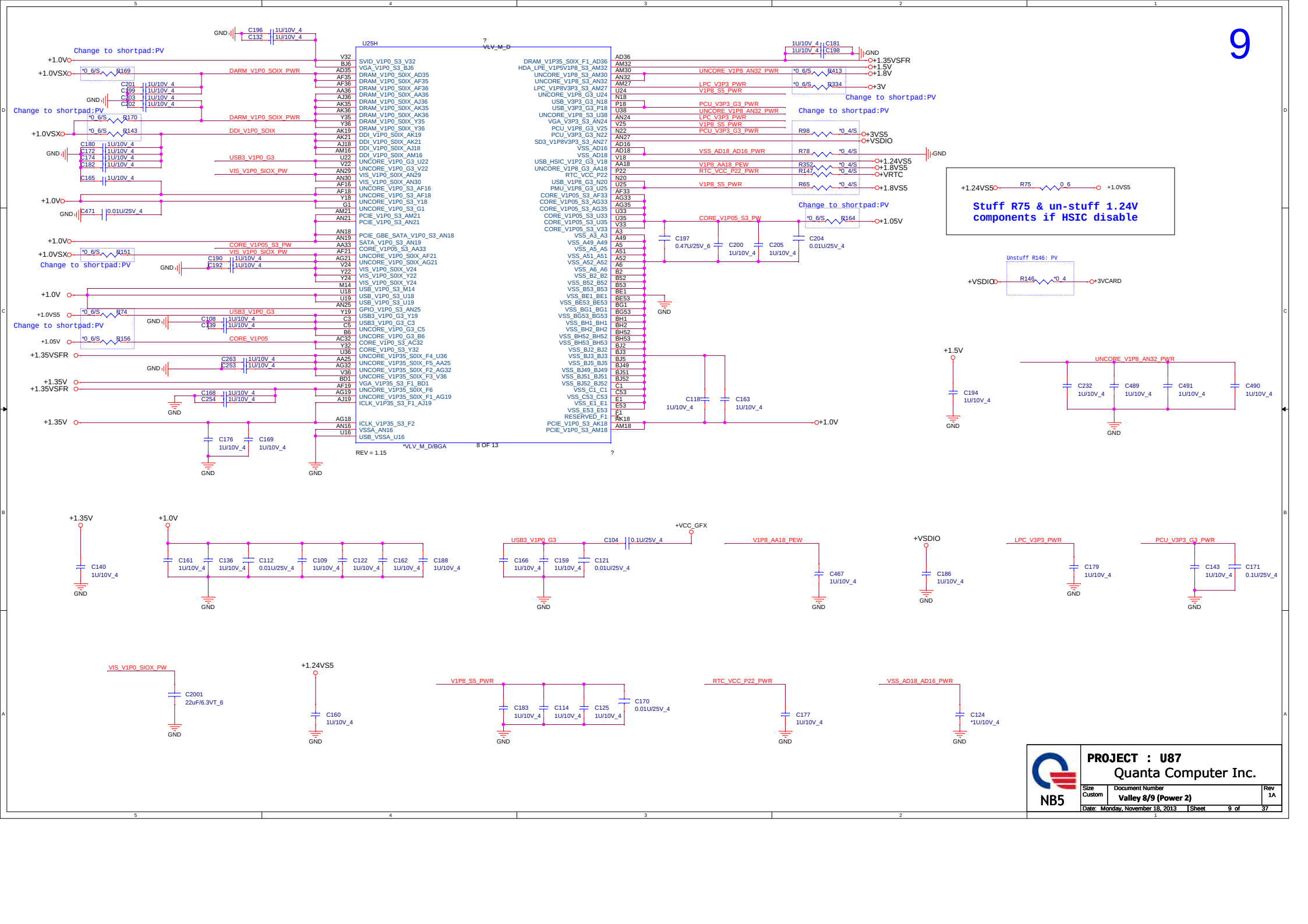
Q26 *BSS138
BT_COMBO_EN# R 1 3 BT_COMBO_EN# 24
+1.8V

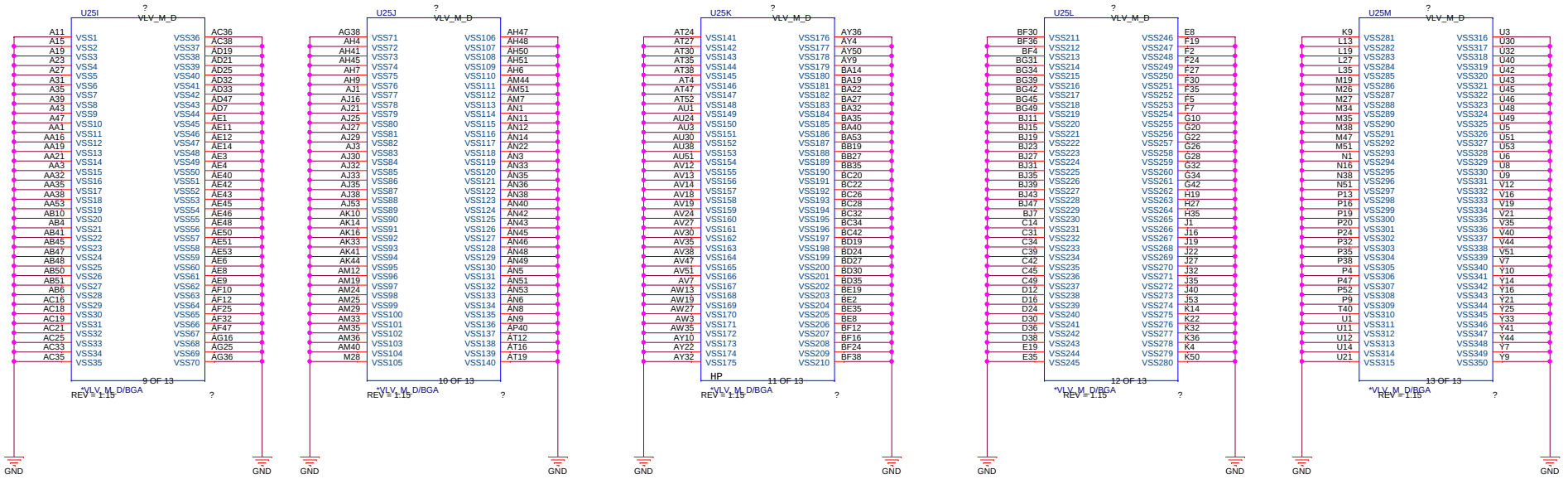
NB5

**PROJECT : U87**
Quanta Computer Inc.

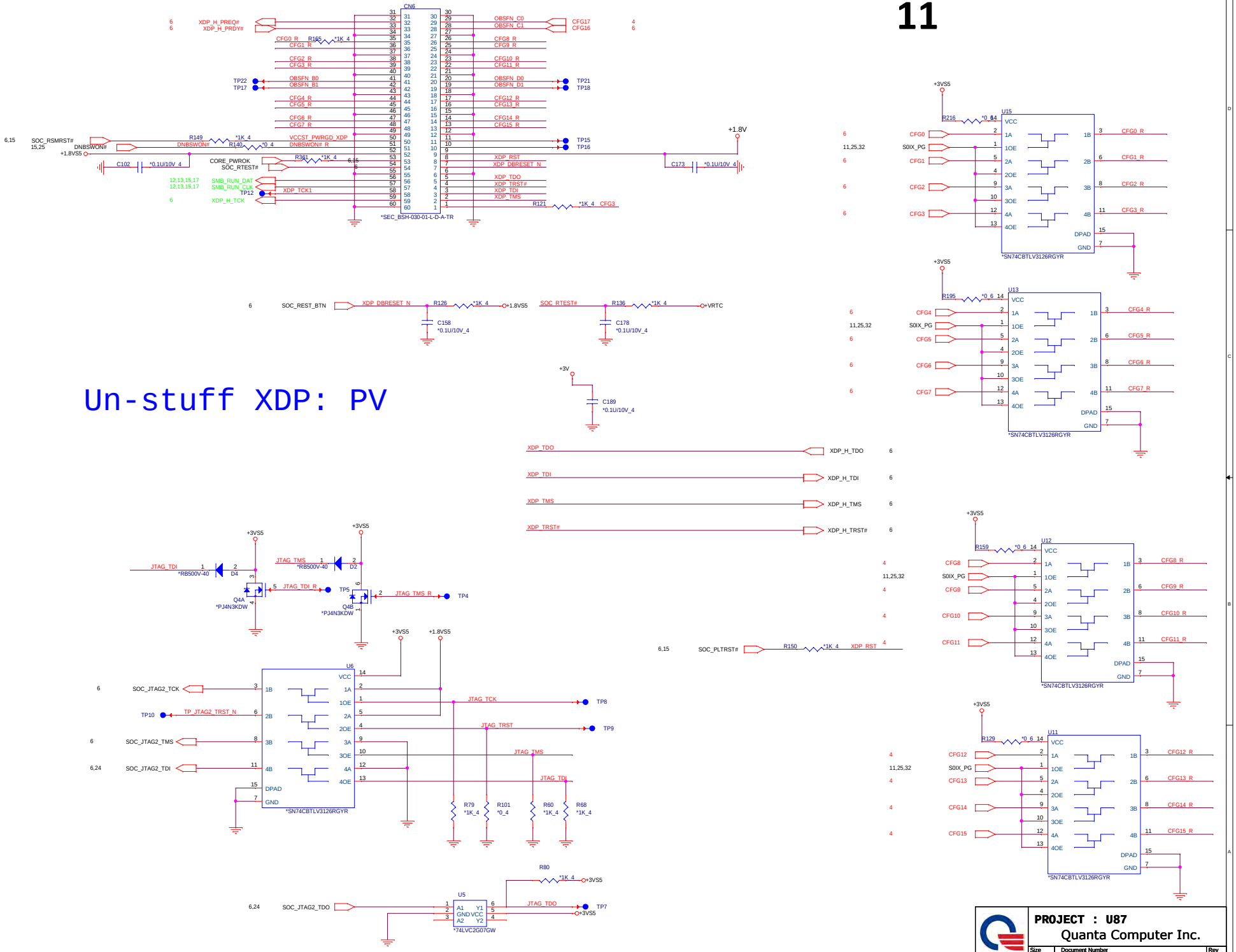
| Size | Document Number | Rev |
|---|---|---|
| Custom | Valley 6/9 (USB/LPC/I2C) | 1A |
| Date: Monday, November 18, 2013 | Sheet 7 of 37 | |

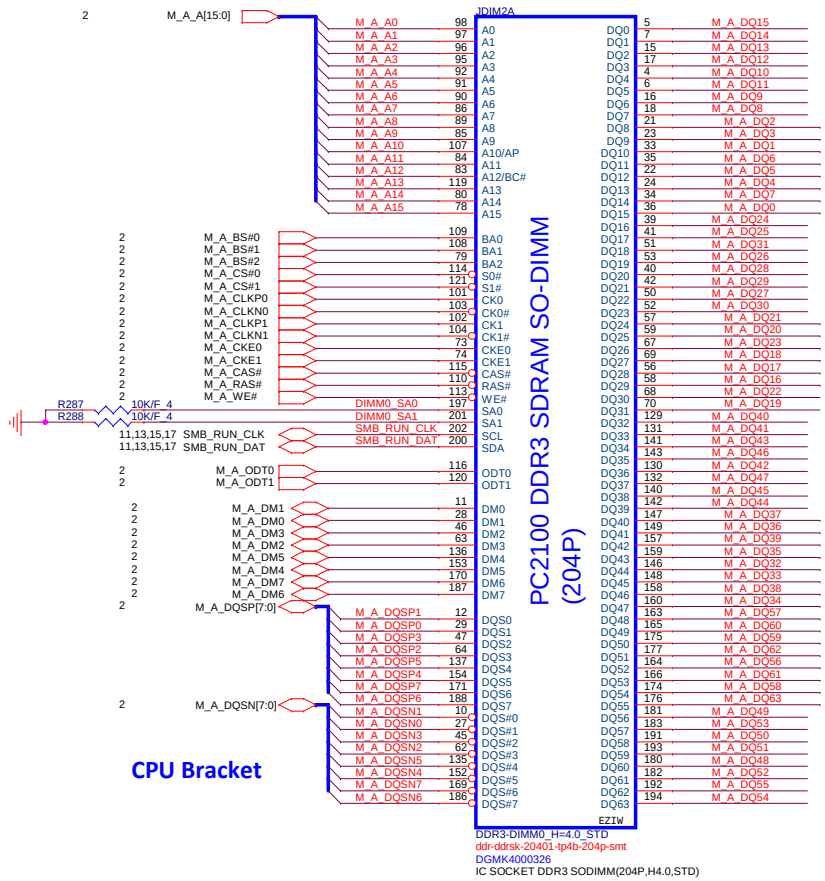

| | | |
|---|---|---|
| NB5 | PROJECT : U87<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: Valley 7/9 (Power 1) | Rev: 1A |
| Date: Monday, November 18, 2013 | Sheet: 8 of 37 | |

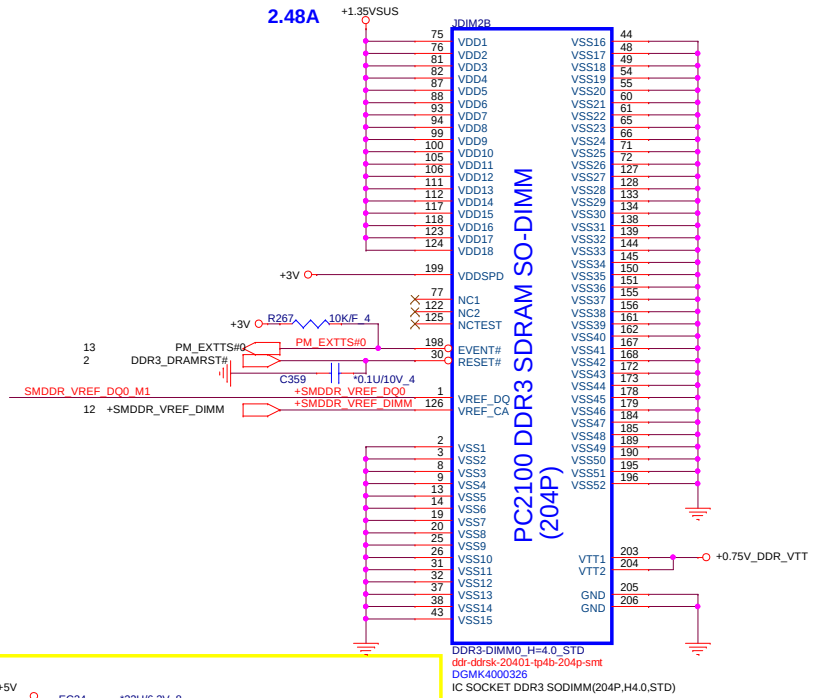

U25H
VLV_M_D
8 OF 13
REV = 1.15
*VLV_M_D/BGA
Change to shortpad:PV
Stuff R75 & un-stuff 1.24V components if HSIC disable
Unstuff R146: PV
+1.0V
+1.0VSX
+1.0VS5
+1.05V
+1.35VSFR
+1.35V
+1.5V
+1.8V
+3V
+3VS5
+VSDIO
+1.24VS5
+1.8VS5
+VRTC
+3VCARD
+VCC_GFX
GND
DARM_V1P0_SOIX_PWR
DDI_V1P0_SOIX
USB3_V1P0_G3
VIS_V1P0_SIOX_PW
CORE_V1P05_S3_PW
CORE_V1P05
UNCORE_V1P8_AN32_PWR
LPC_V3P3_PWR
V1P8_S5_PWR
PCU_V3P3_G3_PWR
VSS_AD18_AD16_PWR
V1P8_AA18_PEW
RTC_VCC_P22_PWR
NB5
PROJECT : U87
Quanta Computer Inc.
Valley 8/9 (Power 2)
Rev 1A
Date: Monday, November 18, 2013
Sheet 9 of 37

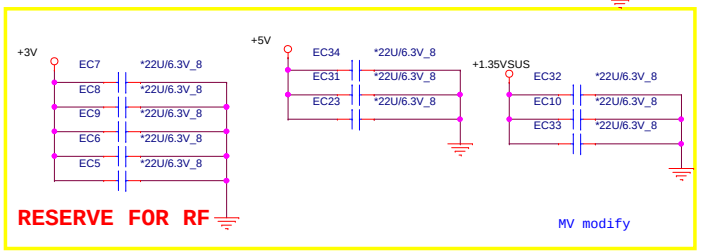


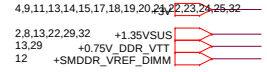

| | |
|---|---|
| PROJECT : | U87 |
| | Quanta Computer Inc. |
| NB5 | |
| Size: Custom | Document Number: Valley 9/9 (GND) |
| Rev: 1A | |
| Date: Monday, November 18, 2013 | Sheet 10 of 37 |

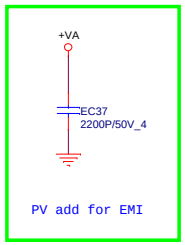

Un-stuff XDP: PV
CN6
*SEC_BSH-030-01-L-D-A-TR
XDP_H_PREQ#
XDP_H_PRDY#
OBSFN_C0
OBSFN_C1
OBSFN_B0
OBSFN_B1
OBSFN_D0
OBSFN_D1
CFG0_R
CFG1_R
CFG2_R
CFG3_R
CFG4_R
CFG5_R
CFG6_R
CFG7_R
CFG8_R
CFG9_R
CFG10_R
CFG11_R
CFG12_R
CFG13_R
CFG14_R
CFG15_R
SOC_RSMRST#
DNBSWON#
VCCST_PWRGD_XDP
DNBSWON#_R
CORE_PWROK
SOC_RTEST#
XDP_RST
XDP_DBRESET_N
XDP_TDO
XDP_TRST#
XDP_TDI
XDP_TMS
SMB_RUN_DAT
SMB_RUN_CLK
XDP_TCK1
XDP_H_TCK
+1.8V
+1.8VS5
+3VS5
+3V
+VRTC
SOC_REST_BTN
SOC_PLTRST#
XDP_H_TDO
XDP_H_TDI
XDP_H_TMS
XDP_H_TRST#
JTAG_TDI
JTAG_TMS
JTAG_TDI_R
JTAG_TMS_R
JTAG_TCK
JTAG_TRST
SOC_JTAG2_TCK
SOC_JTAG2_TMS
SOC_JTAG2_TDI
SOC_JTAG2_TDO
TP_JTAG2_TRST_N
S0IX_PG
U15
U13
U12
U11
U6
U5
*SN74CBTLV3126RGYR
*74LVC2G07GW
*RB500V-40
*PJ4N3KDW
*1K_4
*0_4
*0.1U/10V_4
PROJECT : U87
Quanta Computer Inc.
NB5
HSW XDP & APS
Monday, November 18, 2013
Sheet 11 of 37

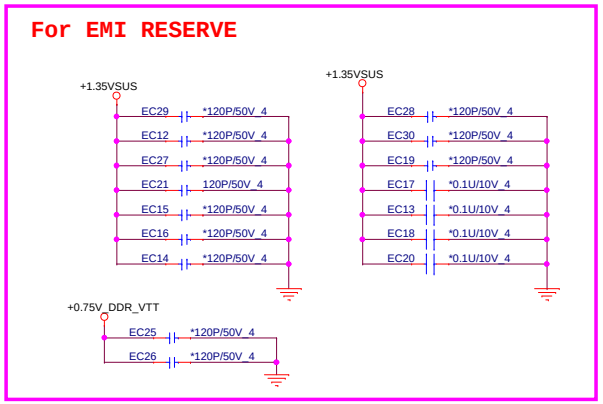


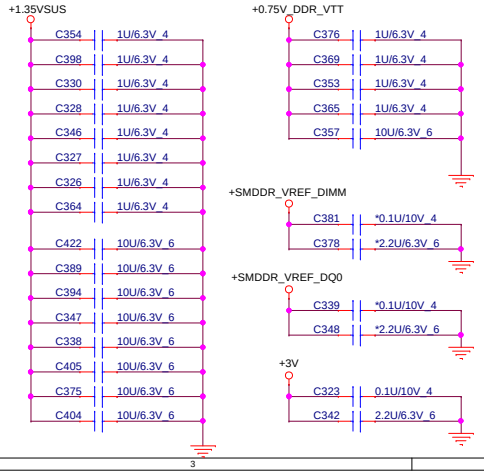



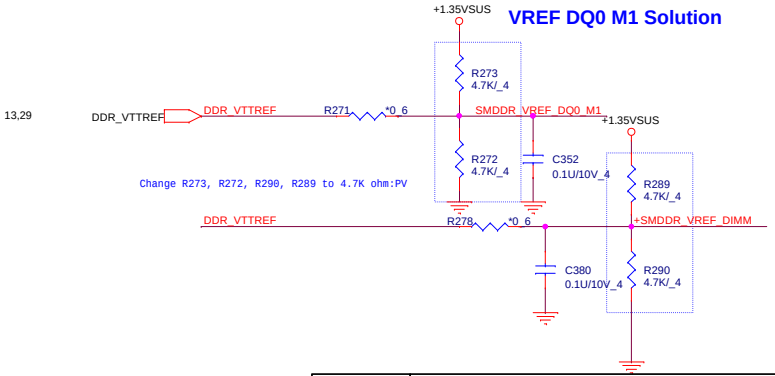



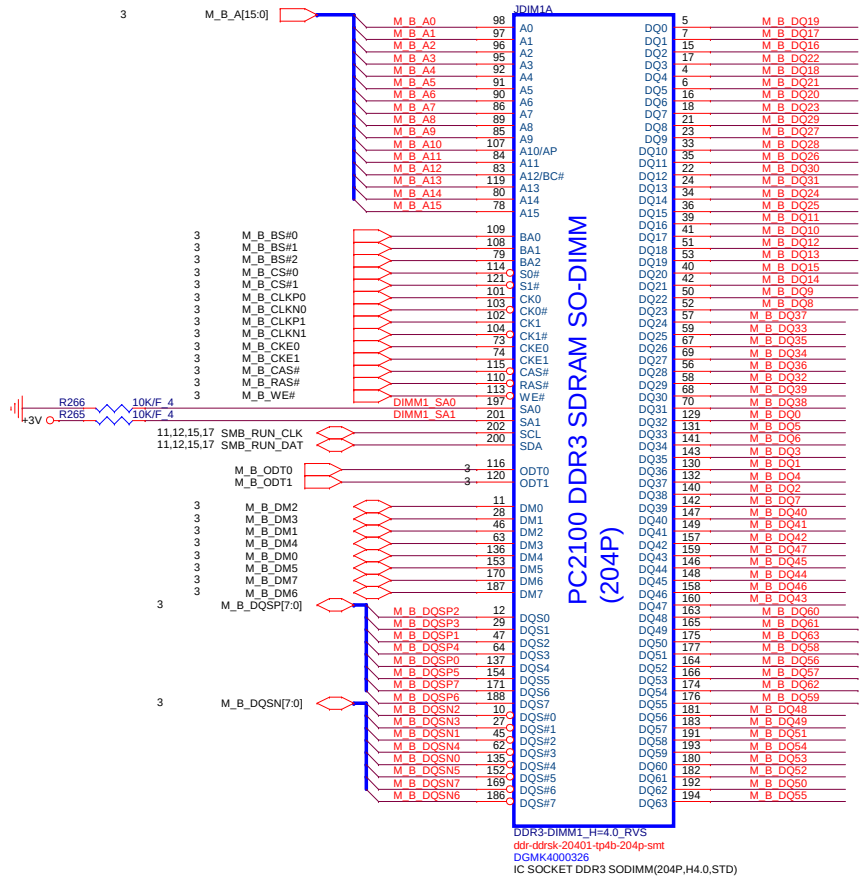



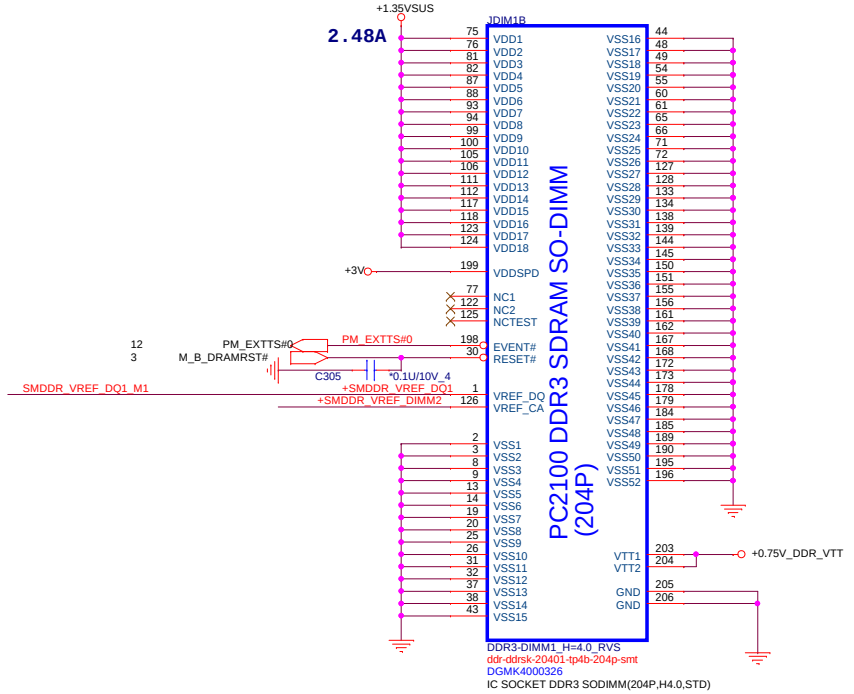



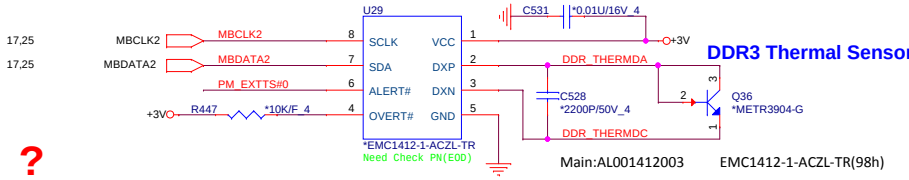




| | | |
|---|---|---|
| NB5 | PROJECT : U87<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: DDR3 DIMM0-STD(4.0H) | Rev: 1A |
| Date: Monday, November 18, 2013 | Sheet 12 of 37 | |




## Local Thermal Sensor



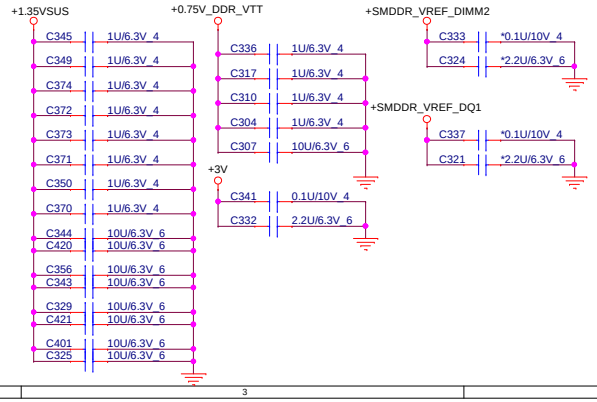

?

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

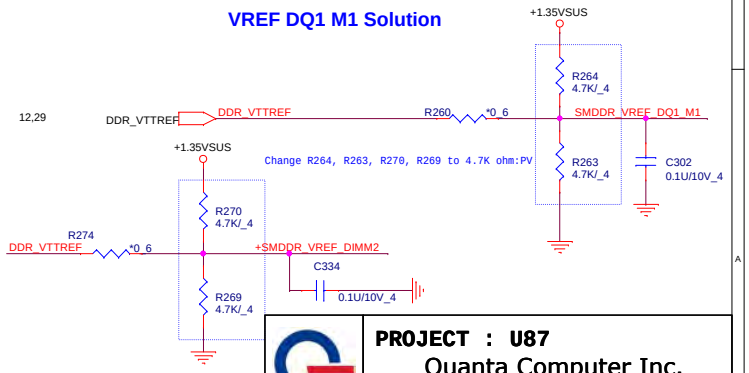
2nd:AL000431014 TMP431ADGKR(98h)

## Place these Caps near So-Dimm1.

1uF/10uF 4pcs on each side of connector




## VREF DQ1 M1 Solution




2,8,12,22,29,32 +1.35VSUS

12,29 +0.75V_DDR_VTT

4,9,11,12,14,15,17,18,19,20,21,22,23,24,25,32 +3V

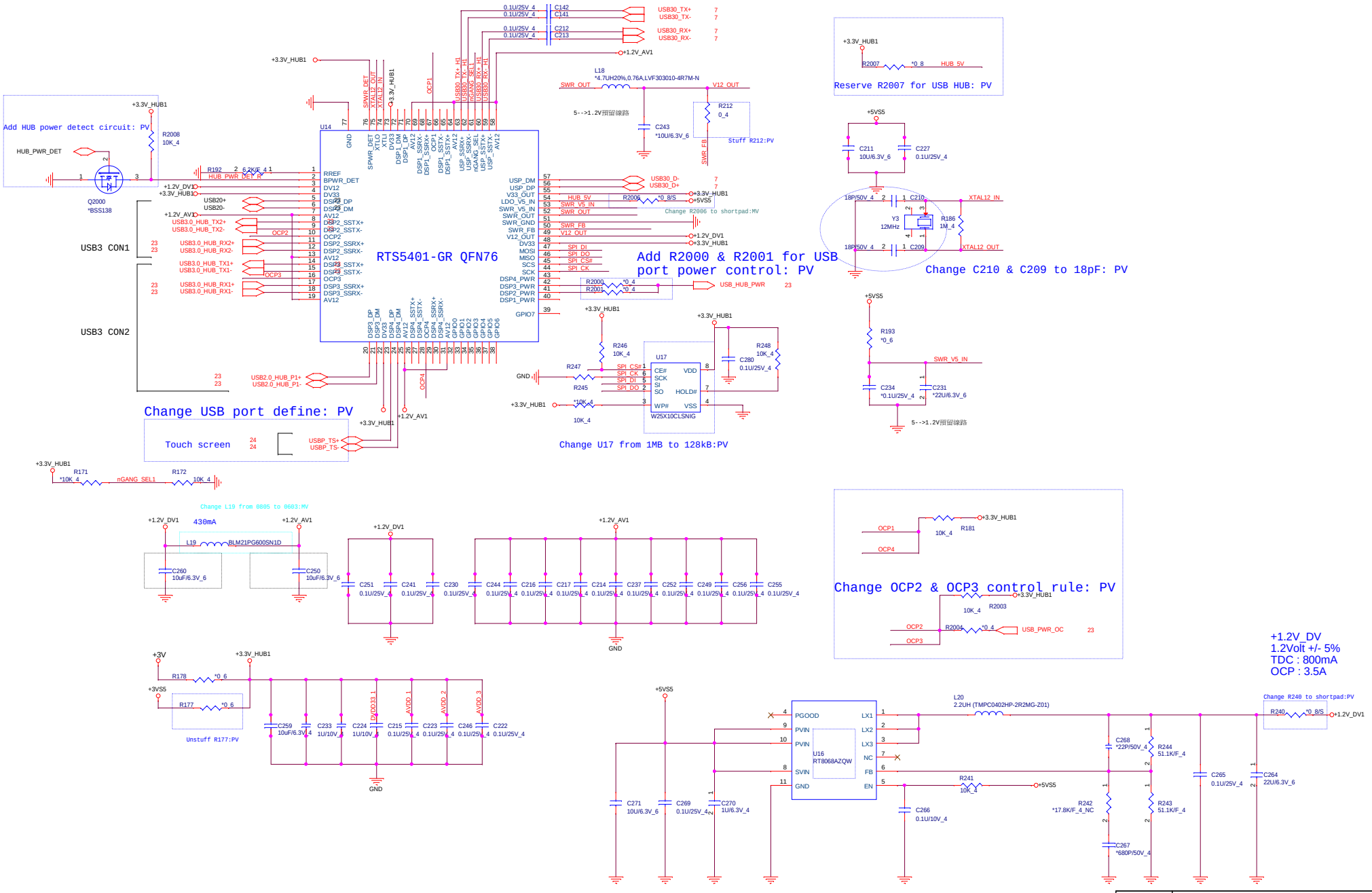
NB5

**PROJECT : U87**

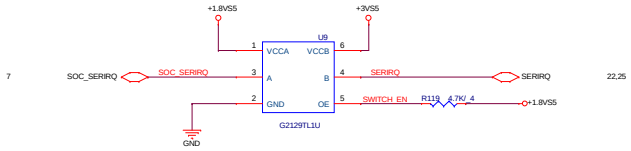
Quanta Computer Inc.

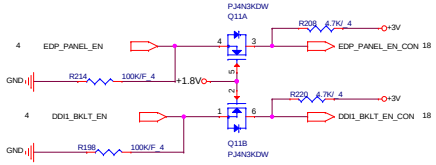
| Size | Document Number | Rev |
|---|---|---|
| Custom | DDR3 DIMM1-STD(4.0H) | 1A |

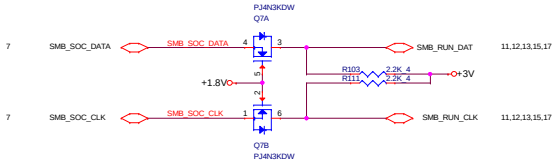
Date: Monday, November 18, 2013 Sheet 13 of 37

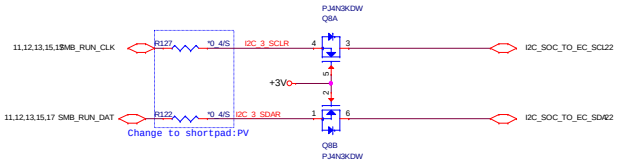


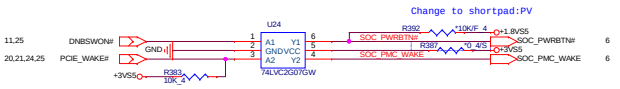

| | |
|---|---|
| PROJECT : | U87 |
| | Quanta Computer Inc. |
| Size C | Document Number: USB30 HUB RTS5401-GR |
| Rev | 1A |
| Date: Monday, November 18, 2013 | Sheet 14 of 37 |
| NB5 | |

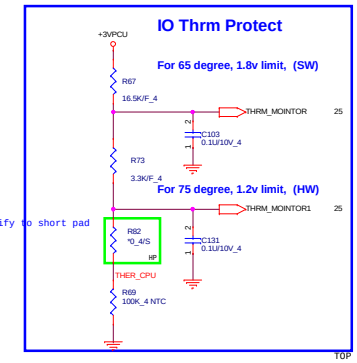


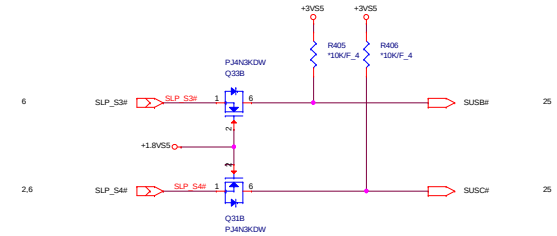



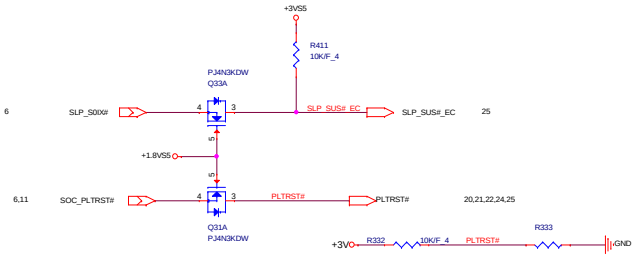



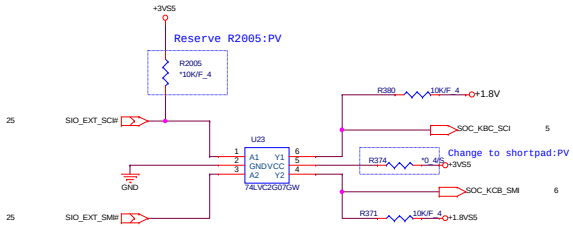



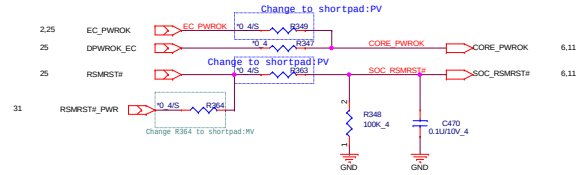



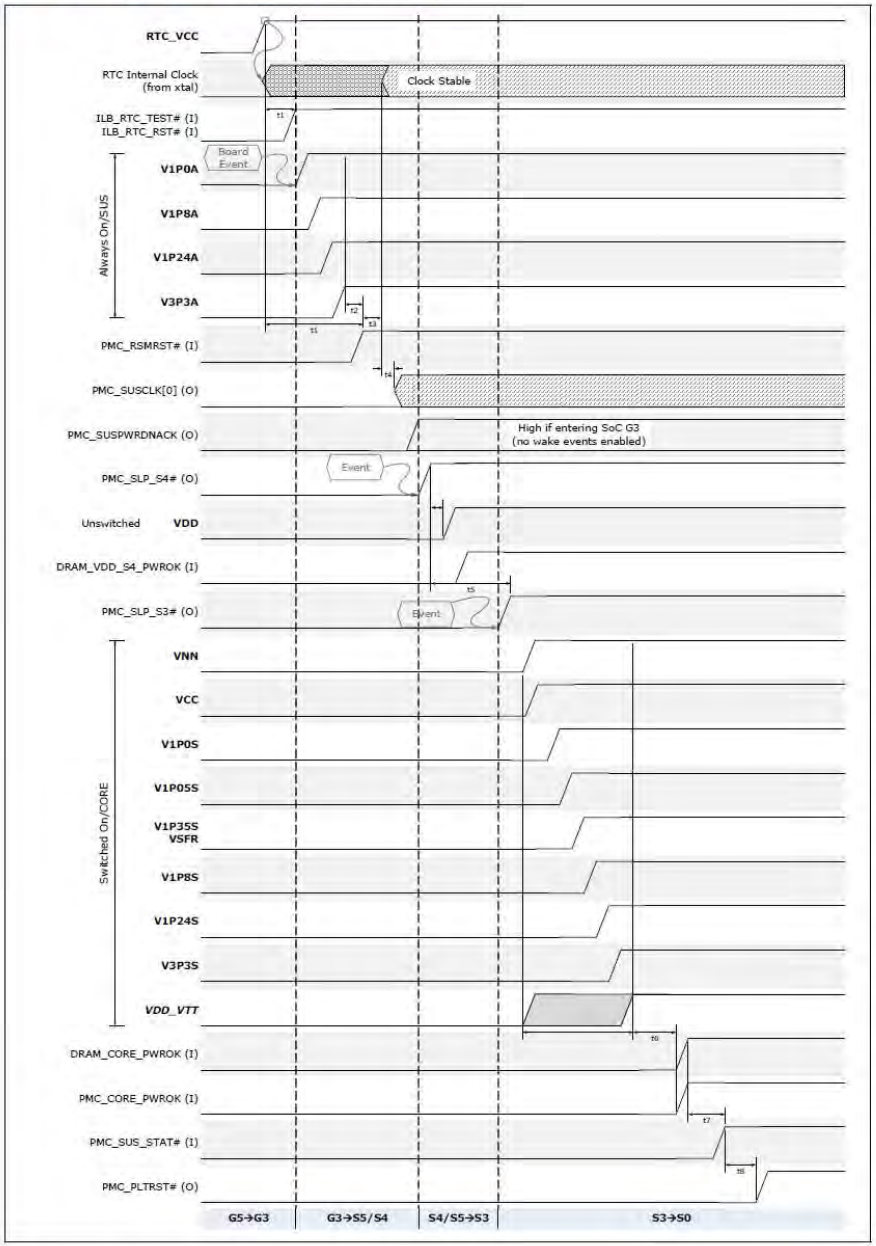




| | | |
|---|---|---|
| NB5 | PROJECT : U87<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: Level shift/Thermistor | Rev: 1A |
| Date: Monday, November 18, 2013 | Sheet 15 of 37 | |

## S5 to S0 Cold Boot Sequence without S0ix

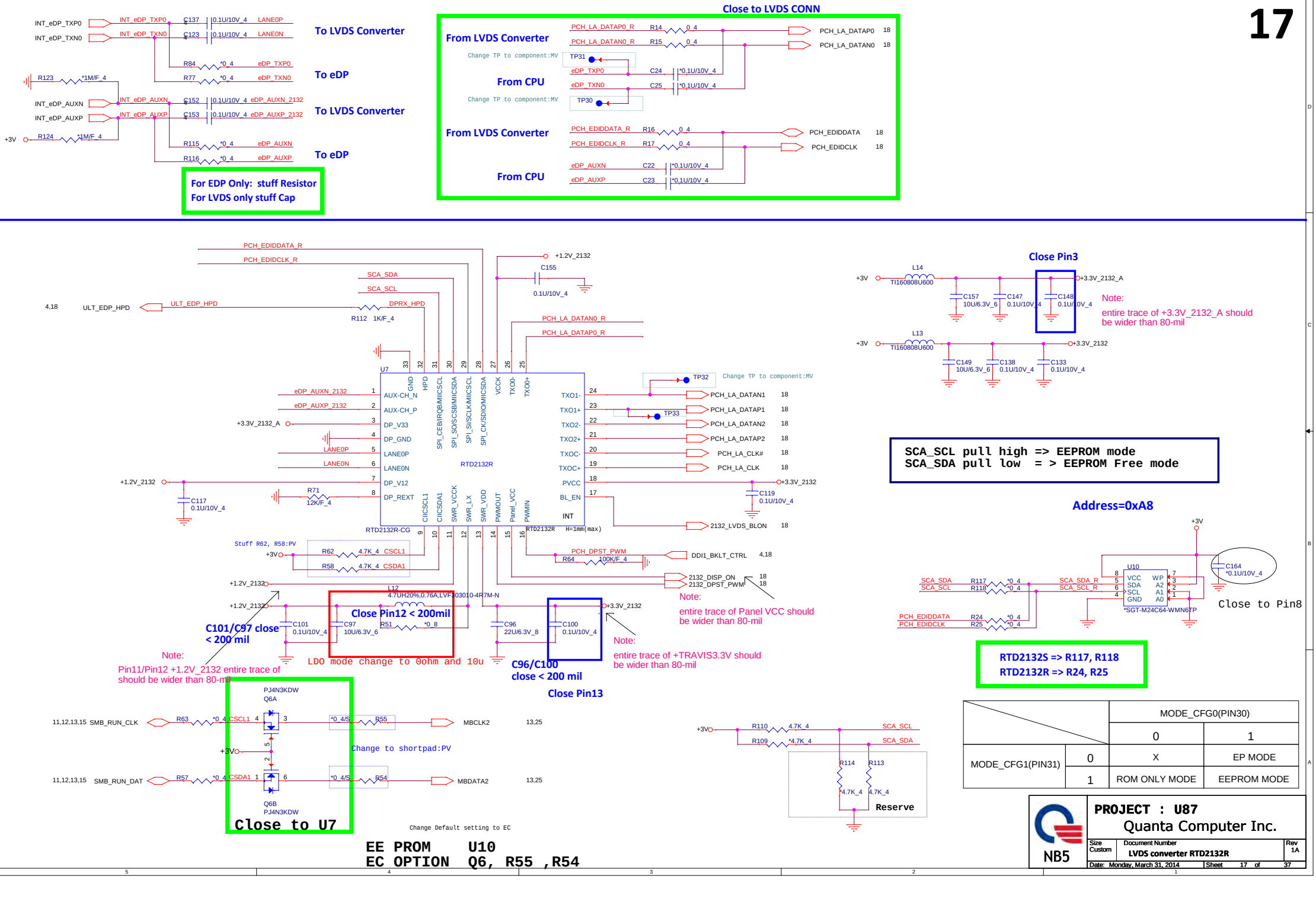



### Table 4-12. Cold Boot Timing Spec

| Parameter | Description | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| T0 | RTC_VCC stable to ILB_RTC_TEST# high | 9 | | | ms |
| T1 | VR ramp up time from 10% to 90% voltage level | | | 2 | ms |
| T2 | Rail to subsequent rail turn on delay | 10 | | 2000 | us |
| T3 | VSUS stable to PMC_RSMRST# high | 10 | | | ms |
| T4 | S and SX rails stable to PMC_CORE_PWROK | 100 | | | ms |

**NOTES:**

1. T1 and T2 are recommended time for all the VR rails unless specified otherwise. The VR ramp up time T2 and subsequent rail delay T3 are put in place to avoid inrush current which may be caused by multiple loads turning on simultaneously or fast charging of VR output decoupling.
2. Violation of rail-to-rail sequencing may cause the SoC part long term reliability issue.
3. Platform devices other than SoC sequencing are not explicitly shown as they are not limited by the SoC sequencing requirement.




| | MODE_CFG0(PIN30) | |
|---|---|---|
| | 0 | 1 |
| MODE_CFG1(PIN31) 0 | X | EP MODE |
| MODE_CFG1(PIN31) 1 | ROM ONLY MODE | EEPROM MODE |

NB5

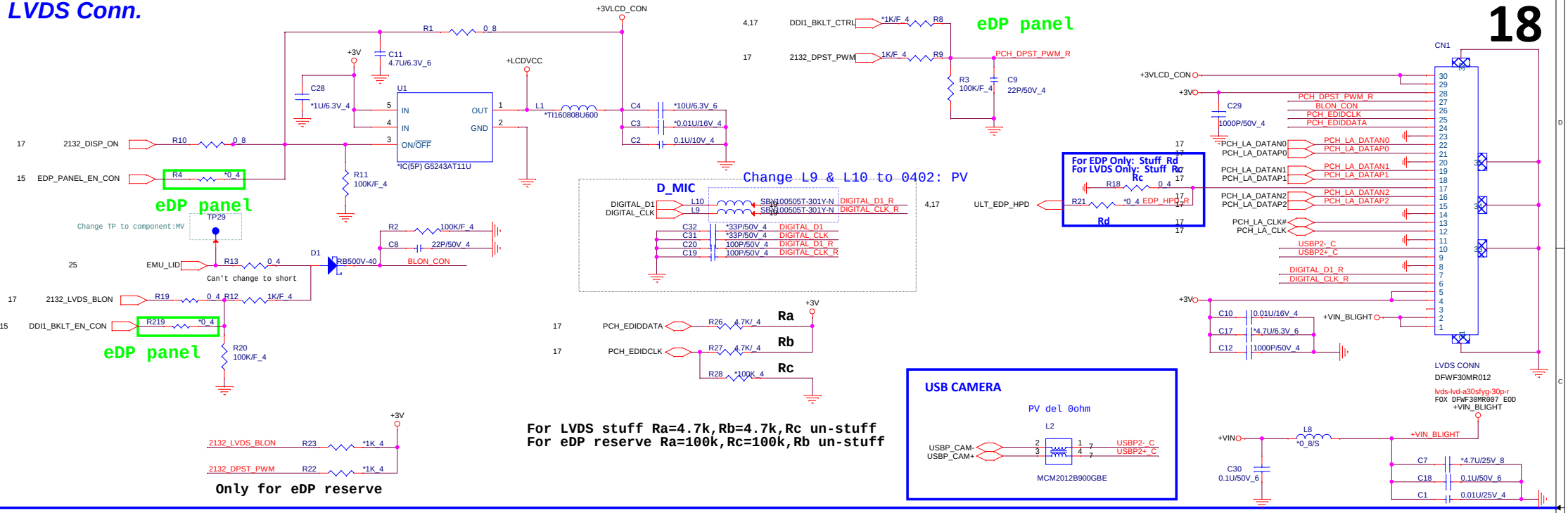
**PROJECT : U87**

Quanta Computer Inc.

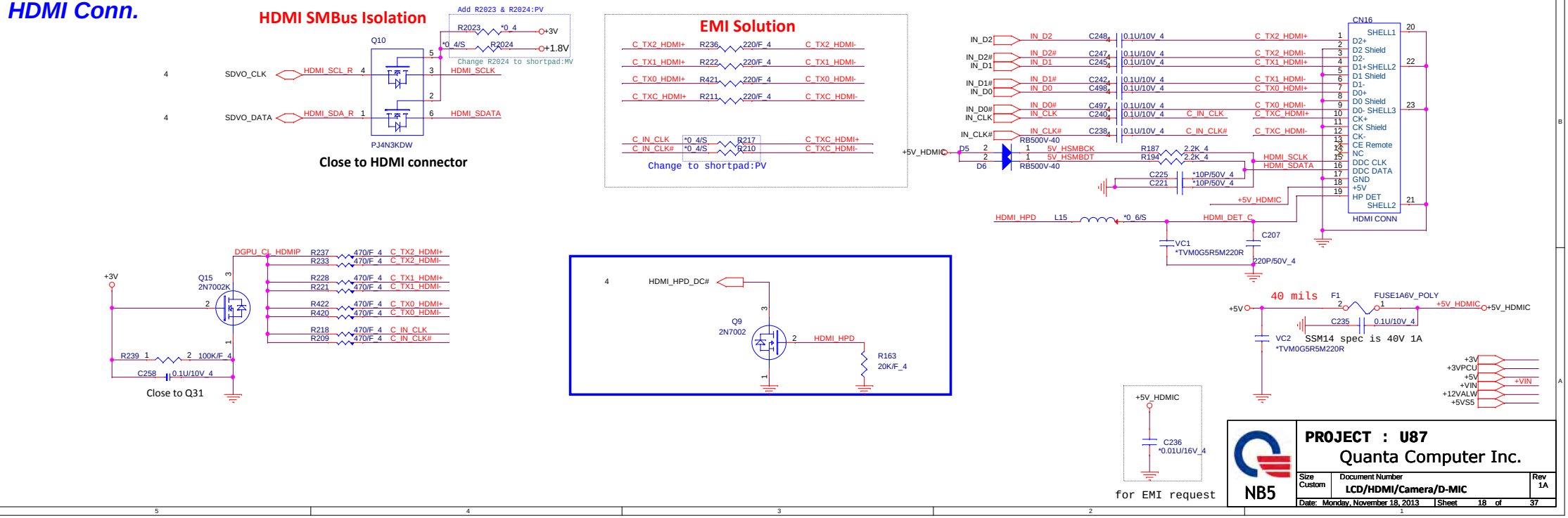
| Size | Document Number | Rev |
|---|---|---|
| Custom | LVDS converter RTD2132R | 1A |

Date: Monday, March 31, 2014 Sheet 17 of 37

# LVDS Conn.




# HDMI Conn.



Change L29 to 0402: PV
Close to PIN1
Change L25 to 0402: PV
>40mils trace
Change L26 to 0402: PV
Close to PIN26
Change L29 to 0402: PV
Close to PIN40
Close to PIN7
Close to PIN28
TO Digital MIC
Change R436 to shortpad:MV
Close to Pin 34,35,36
TO Internal Speakers
Change L29 to 0402: PV
Close to Pin 41
Close to Pin 46
Close to codec
Close to Speaker
Speaker 4 ohm: 40mils
check value
Check layout mount location
Close to CODEC
place to near U28 or under U28
for intel HSW ULT
USB 2.0 AND AUDIO COMBO JACK
Place close to CN9
Stuff 1000pF on C351 for EMI: PV
PV del 0ohm
FOR EMI
Change Q35 PN:PV
AGND SHIELD
AGND SHIELD
AGND SHIELD
Vset=1.242V
ALC3227 x QFN48

| | |
|---|---|
| PROJECT : | U87 |
| | Quanta Computer Inc. |
| Size: Custom | Document Number: Azalia ALC3227 |
| Rev: | 1A |
| Date: Monday, November 18, 2013 | Sheet 19 of 37 |

NB5

For EMI 0 ~ 22 ohm

R39 10/F_4

LAN_XTAL1 — XTAL1

Change Y1 PN to BG625000121: PV

Y1 25MHZ +-10PPM

XTAL2

C55 10P/50V_4

C52 10P/50V_4

Switch Mode:Stuff L11 For RTL 8176
LDO Mode:Stuff R40 For RTL8166

Trace<30 mil
Width > 60 mil

Power trace Layout 寬度> 60mil

>60mil

+1.05V_LAN_REGOUT — R40 *0_8 — L11 4.7UH,+-20%,650MA_1210 — >60mil

C67 4.7U/6.3V_6 (Cz) C64 0.1U/10V_4

Close to Choke L23

SWR mode need stuff C622 & Cz

Place Cc,Cd,Ce,Cf
close to each VDD10 pin-- 3, 8, 22, 30

+1.05V_LAN

Cc C49 0.1U/10V_4
Cd C48 0.1U/10V_4
Ce C71 0.1U/10V_4
Cf C40 0.1U/10V_4
Cg C78 1U/6.3V_4
C80 0.1U/10V_4

Place Cg & C80 close to each VDD10 pin22

*RTL8166EH Cg & C80 close pin30

U2

MDI1+_1 — TD+ — TX+ — MDI1+
MDI1-_1 — TD- — CMT — TRA_V_DAC
R29 75/F_4 LAN_MCTG1 — CT — TX- — MDI1-
MDI0+_1 — RD+ — RX- — MDI0-
MDI0-_1 — RD- — CT — TRA_V_DAC
R30 75/F_4 LAN_MCTG0 — CT — RX+ — MDI0+

NS681684

C427 10P/3KV_1808

C34 0.01U/25V_4

BOT: TST1284R LF DB0EL5LAN00

Stuff Ca and Cb only, close to each VDD33 pin-- 11, 32

+3V_LAN

+3VLANVCC

C53 0.1U/10V_4 (Ca)
C41 0.1U/10V_4 (Cb)
C68 4.7U/6.3V_6
C47 4.7U/6.3V_6

Place Cc and Cd close to each VDD33 pin-- 23

C76 4.7U/6.3V_6 (Cc)
C65 0.1U/10V_4 (Cd)

Remove For Not Using SWR mode

4,9,11,12,13,14,15,17,18,19,21,22,23,24,25,32
32 +3VLANVCC

+1.05V_LAN

R32 2.49K/F_4 LANRSET

+3V_LAN

TP1 LAN_AMBLED#
TP2
TP3 LAN_WLED#

U4

RSET VDD10 XTAL2 XTAL1 LED0

33 GND

AVDD33 RSET AVDD10 CKXTAL2 CKXTAL1 LED1/GPO LED2(LED1)

Please add 9 GND VIAs
connection with thermal PAD

MDI0+ 1 — MDIP0
MDI0- 2 — MDIN0
+1.05V_LAN — VDD10 3 — AVDD10(NC)
MDI1+ 4 — MDIP1
MDI1- 5 — MDIN1
6 — MDIP2(NC)
7 — MDIN2(NC)
+1.05V_LAN — VDD10 8 — AVDD10

RTL8176EH

24 REGOUT(NC) — +1.05V_LAN_REGOUT
23 VDDREG(VDD33) — DVDDL — +3V_LAN
22 DVDD10(NC) — VDD10 — +1.05V_LAN
21 LANWAKEB — PCIE_WAKE# — PCIE_WAKE# 15,21,24,25
20 ISOLATEB
19 PERSTB
18 HSON — PCIE_RXN3_LAN_L — C70 0.1U/10V_4 — PCIE_RXN3_LAN 5
17 HSOP — PCIE_RXP3_LAN_L — C69 0.1U/10V_4 — PCIE_RXP3_LAN 5

PLTRST# 15,21,22,24,25

MDIP3(NC) MDIN3(NC) AVDD33(NC) CLKREQB HSIP HSIN REFCLK_P REFCLK_N

RTL8176EH-CG

9 10 11 12 13 14 15 16

+3V_LAN

5 PCIE_CLKREQ_LAN# — PCIE_CLKREQ_LAN# — R36 *0_4/S — LAN_CLKRQ

CLK_PCIE_LANN — CLK_PCIE_LANN 6
CLK_PCIE_LANP — CLK_PCIE_LANP 6
PCIE_TXN3_LAN — PCIE_TXN3_LAN 5
PCIE_TXP3_LAN — PCIE_TXP3_LAN 5

+3V

R41 1K_4

ISOLATEB

R42 15K/F_4

if ISOLATEB pin
pull-low,the LAN
chip will not drive
it's PCI-E outputs
( excluding
PCIE_WAKE# pin )

## LAN conn

### RJ45

(White) CN14

LAN_WLED 9 — LED_AMB_P A1
LAN_WLED# 10 — LED_AMB_N A2

8 RX1-
7 RX1+
MDI1-_1 6 RX0-
5 TX1-
4 TX1+
MDI1+_1 3 RX0+
MDI0-_1 2 TX0-
MDI0+_1 1 TX0+

GND1 14
GND 13

LAN_AMBLED 11 — LED_GRE_P B1
LAN_AMBLED# 12 — LED_GRE_N B2

(Amber)

RJ45_CONN

R7 *0_6/S
R31 *0_6/S

C430 68P/50V_4

+3VLANVCC — R299 330_4 — C428 1000P/50V_4 — LAN_AMBLED

+3VLANVCC — R300 330_4 — LAN_WLED — C433 1000P/50V_4

NB5

**PROJECT : U87**
Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | LAN RTL8176EH/RJ45 | 1A |

Date: Monday, November 18, 2013 Sheet 20 of 37

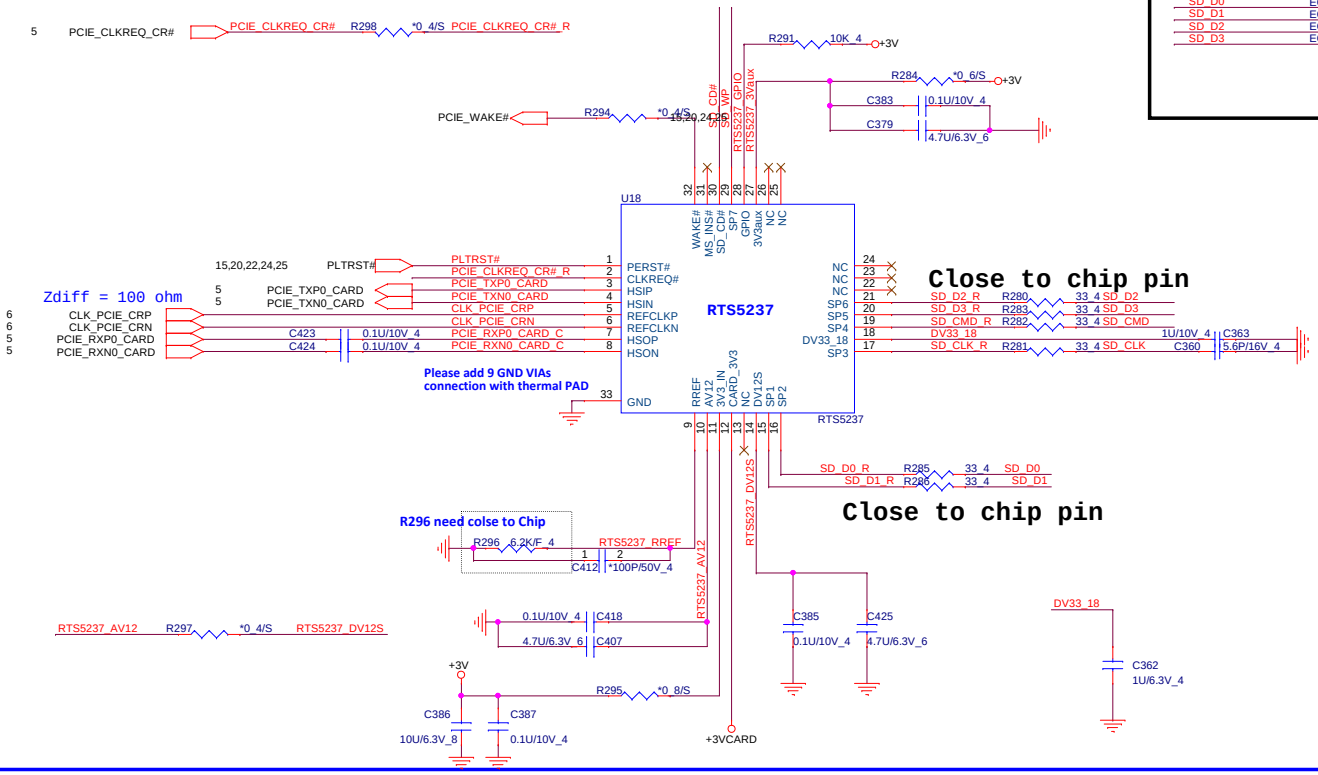
Reserve for EMI

SD_D0 EC24 5.6P/16V_4
SD_D1 EC22 5.6P/16V_4
SD_D2 EC36 5.6P/16V_4
SD_D3 EC35 5.6P/16V_4

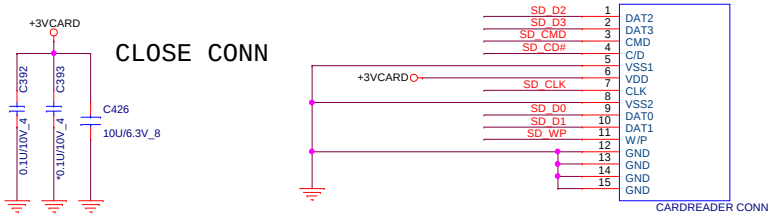
| | | |
|---|---|---|
| SP1 | SD_D1 | |
| SP2 | SD_D0 | MS_D1 |
| SP3 | SD_CLK | MS_D0 |
| SP4 | SD_CMD | MS_D2 |
| SP5 | SD_D3 | MS_D3 |
| SP6 | SD_D2 | MS_CLK |
| SP7 | SD_WP | MS_BS |

## Share Pin

**SD / MMC**




## CARD READER

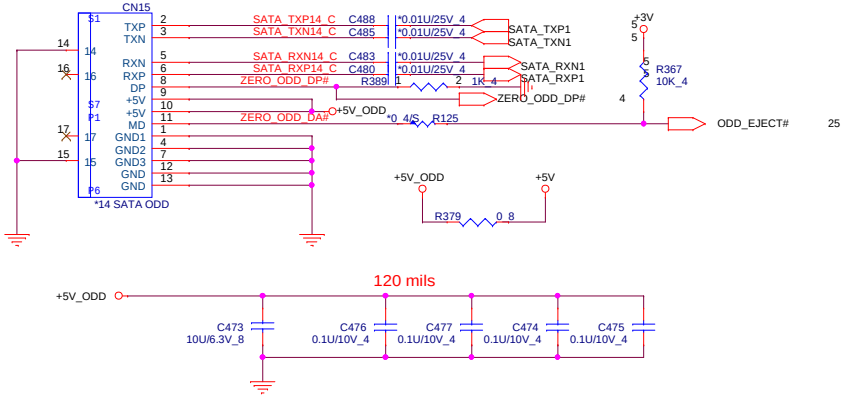



R3X Type

# SATA ODD CONNECTOR

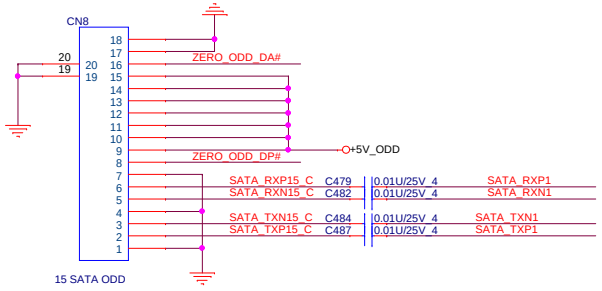
## 14" SATA ODD

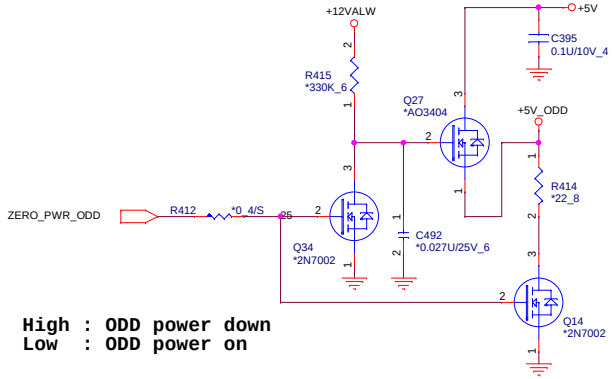
Bypass CAP close conn




## 15" SATA ODD

New Type

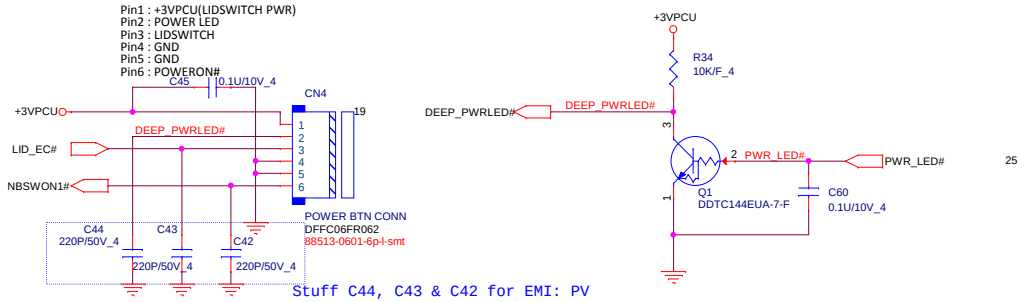



High : ODD power down
Low : ODD power on

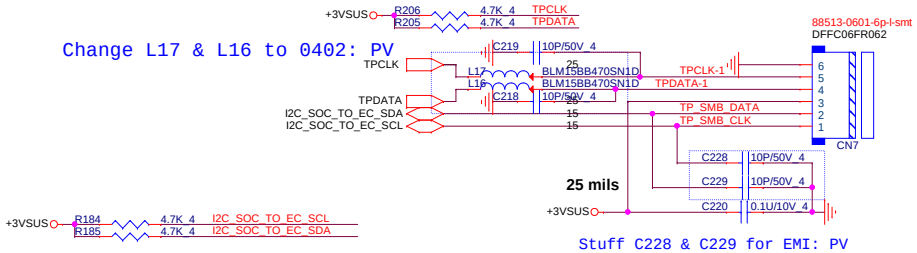
| | | |
|---|---|---|
| NB5 | PROJECT : U87<br>Quanta Computer Inc. | |
| Size Custom | Document Number<br>CR RTS5237 & CR SOCKET | Rev 1A |
| Date: Tuesday, April 15, 2014 | Sheet 21 of 37 | |

## Power Botton Connector



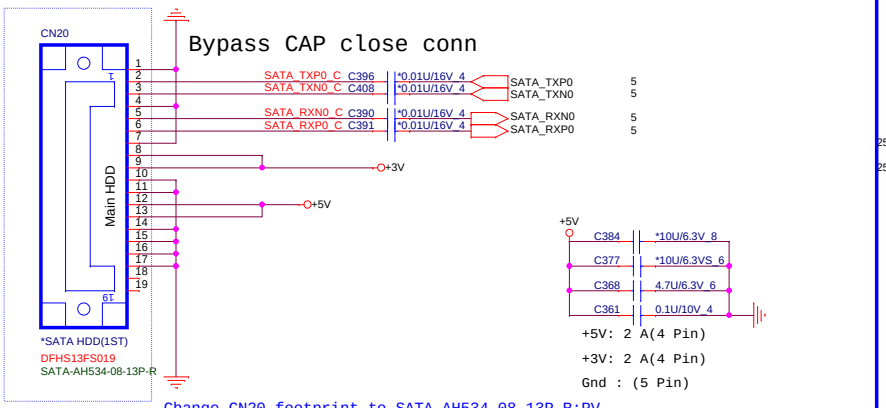

Stuff C44, C43 & C42 for EMI: PV

## Touch Pad Connector



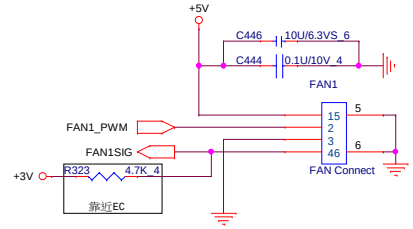

Stuff C228 & C229 for EMI: PV

## SATA HDD Connector(Cable type)




Change CN20 footprint to SATA-AH534-08-13P-R:PV

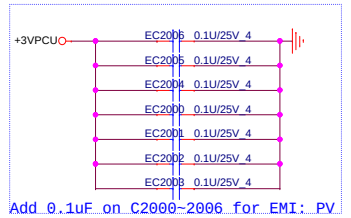
## FAN



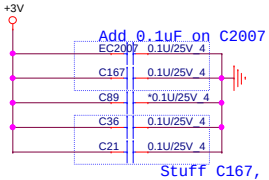

Stuff 100pF on C452 & C453 for EMI: PV

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

### Removed mSATA 6/19

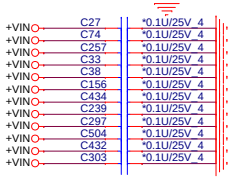


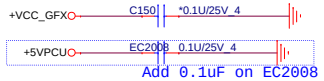

Add 0.1uF on C2000-2006 for EMI: PV



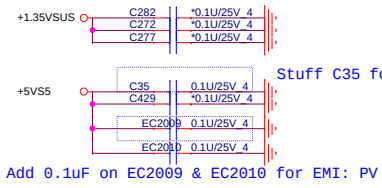

Add 0.1uF on C2007 for EMI: PV

Stuff C167, C36 & C21 for EMI: PV



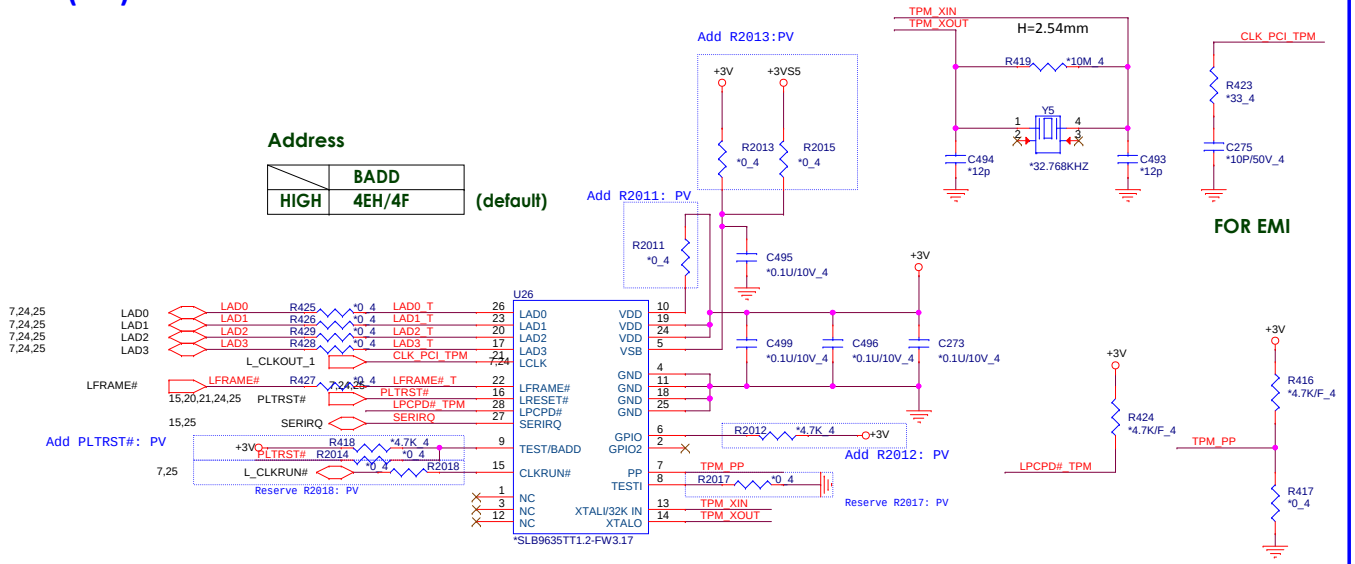

Add 0.1uF on EC2008 for EMI: PV

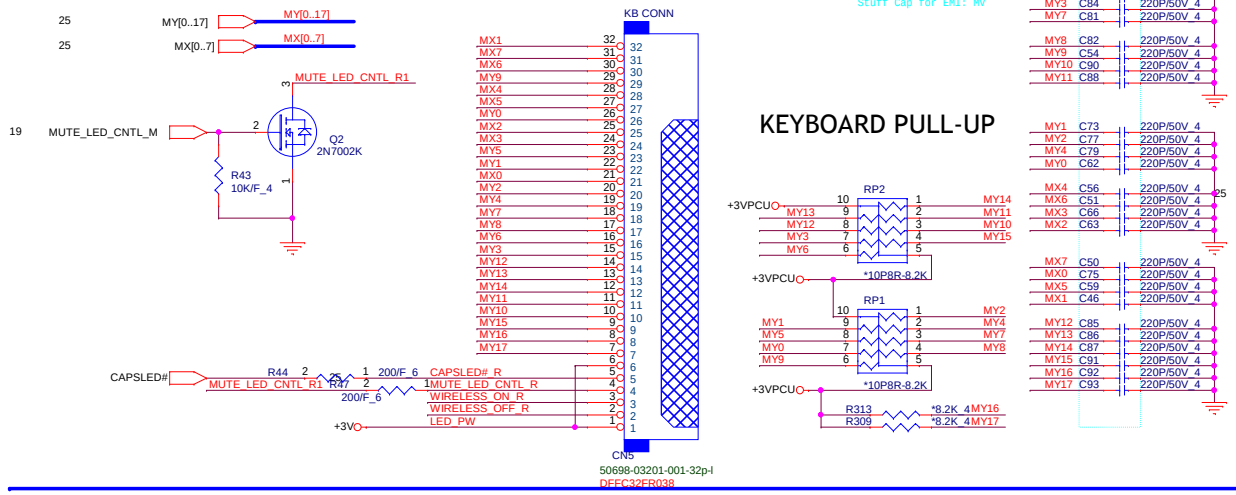

Stuff C35 for EMI: PV

Add 0.1uF on EC2009 & EC2010 for EMI: PV

## TPM (1.2)

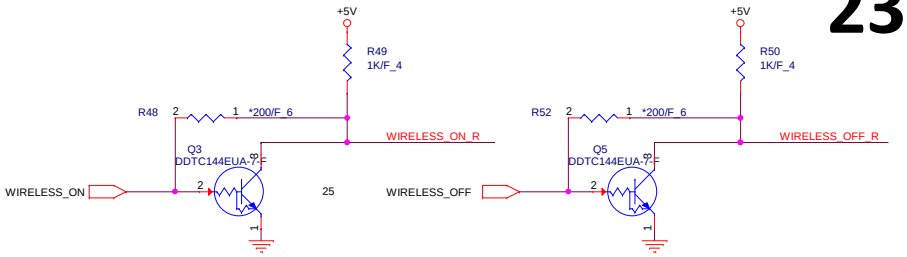


# KEYBOARD Con.

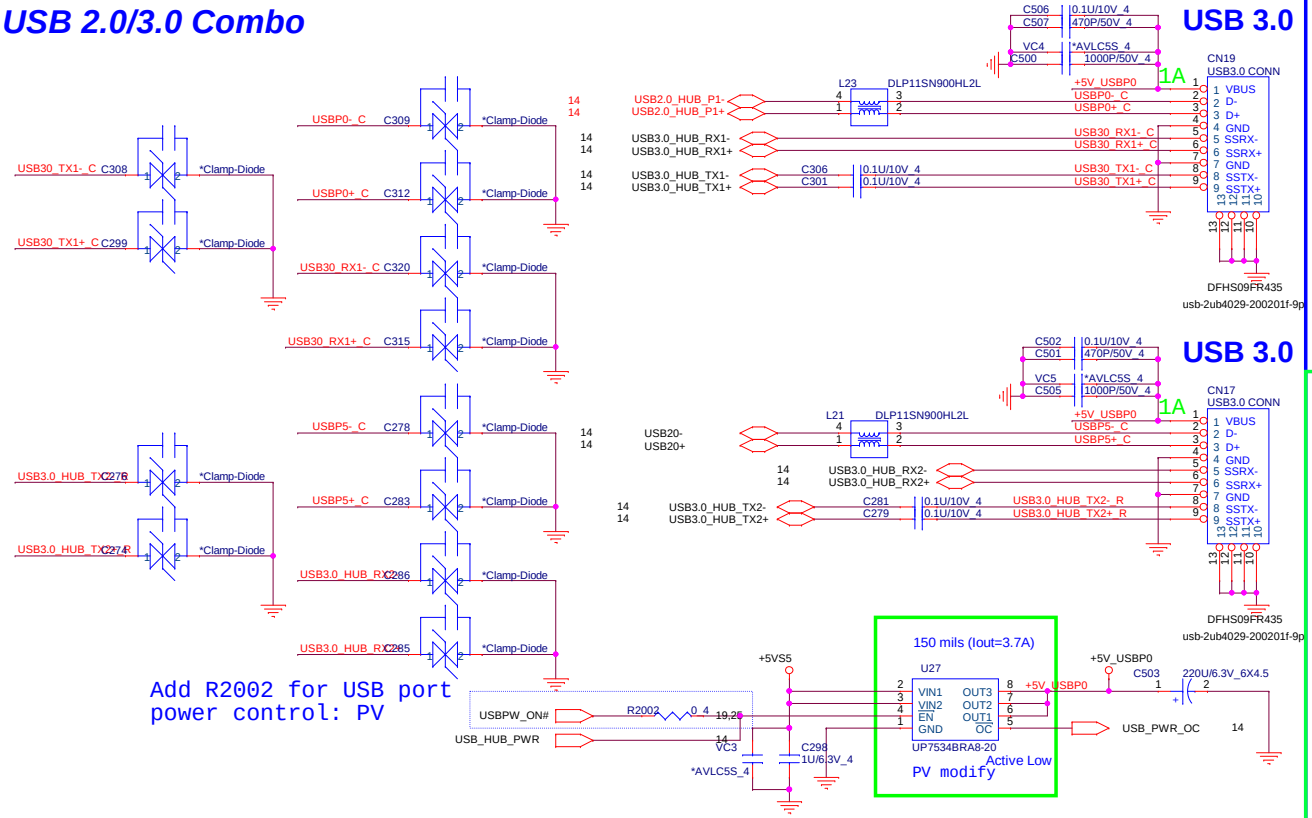



## KEYBOARD PULL-UP



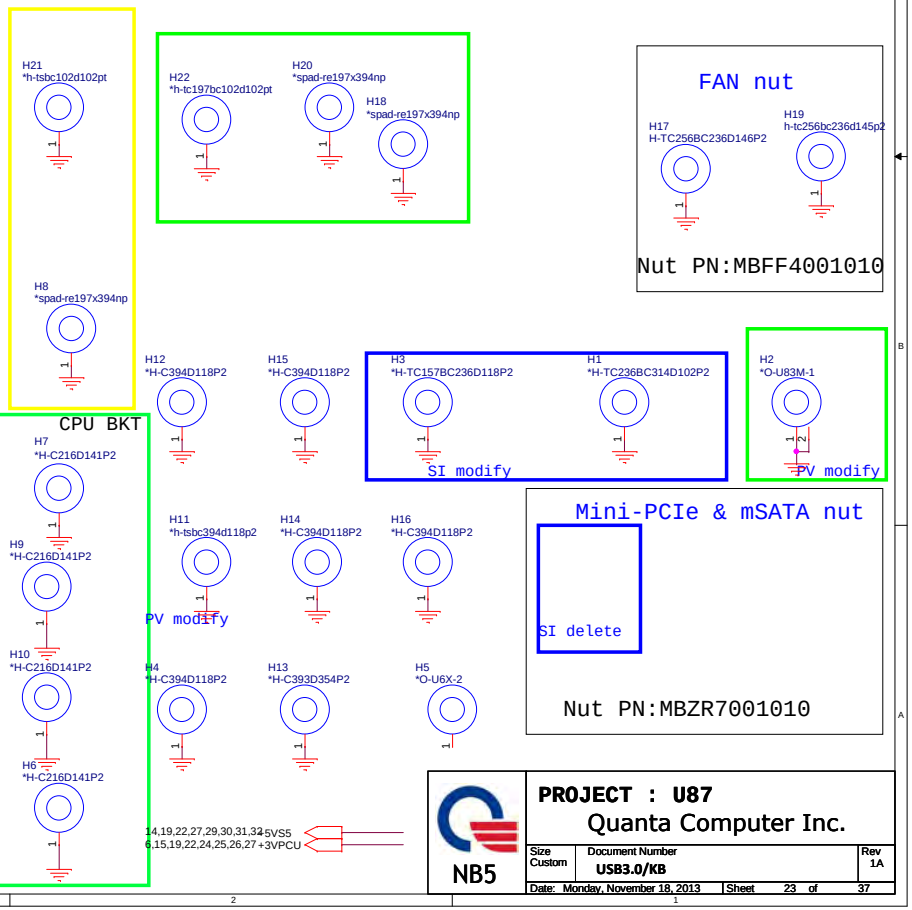




# USB 2.0/3.0 Combo




Add R2002 for USB port power control: PV

# Hole



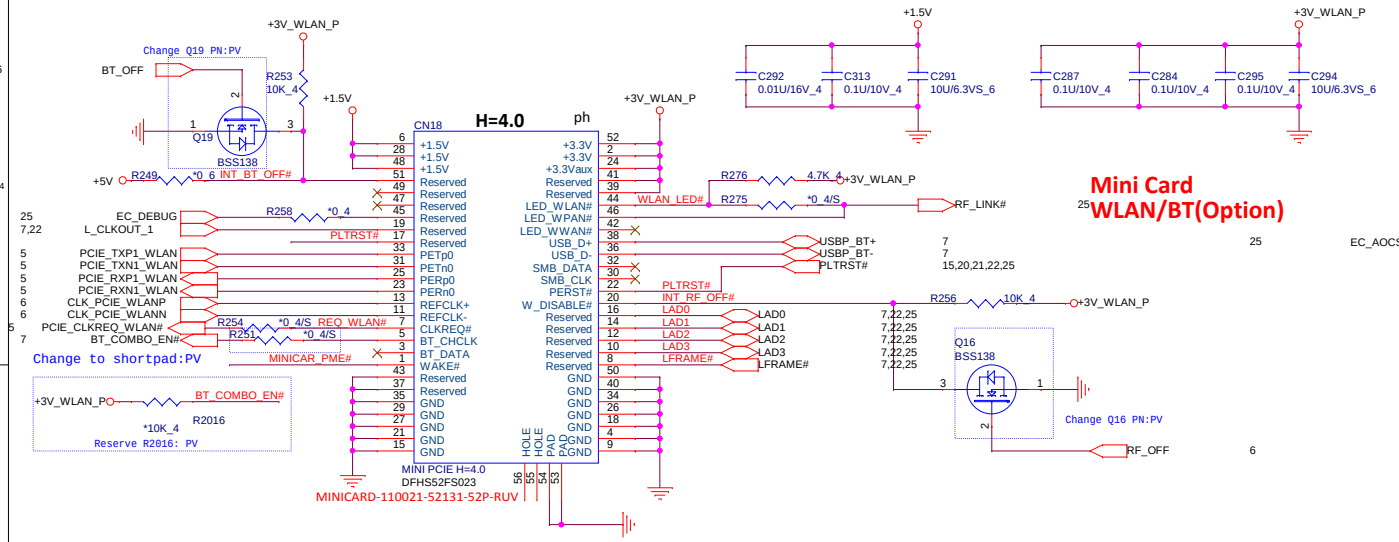

NB5

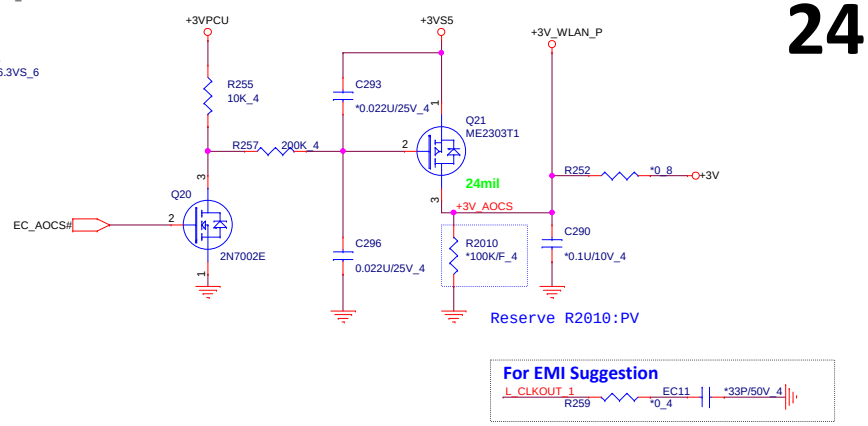
**PROJECT : U87**

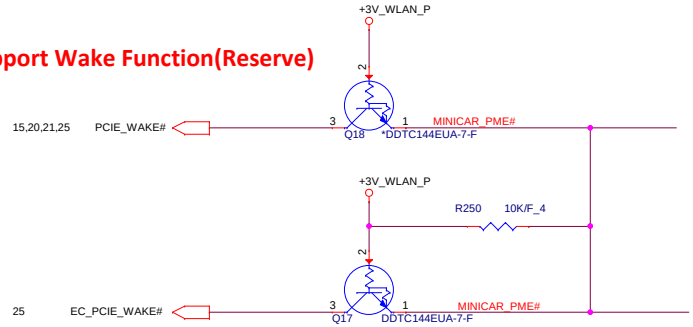
Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | USB3.0/KB | 1A |

Date: Monday, November 18, 2013 | Sheet 23 of 37

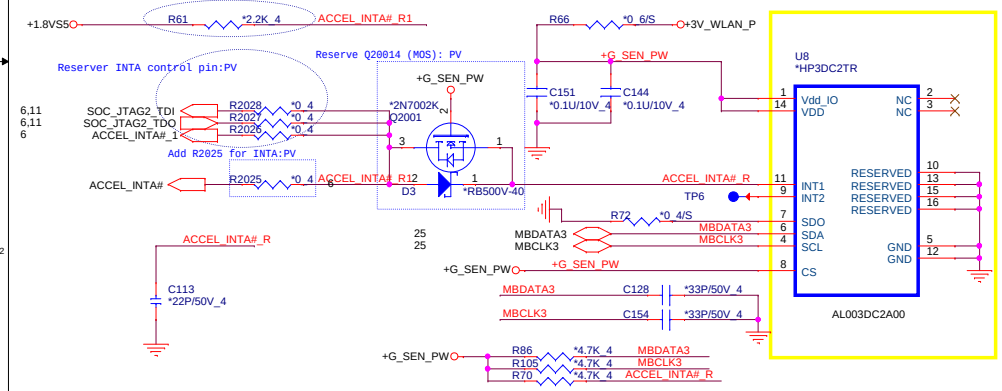


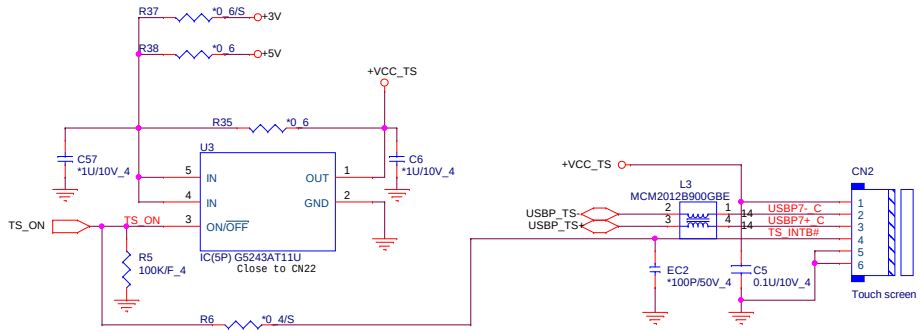

## Accelerometer Sensor

Stuff 2.2K on R61: PV




## Green CLK Circuitry

## Touch screen




| | |
|---|---|
| +3V | 4,9,11,12,13,14,15,17,18,19,20,21,22,23,25,32 |
| +5V | 12,18,19,21,22,23,32 |
| +3VPCU | 6,15,19,22,23,25,26,27 |

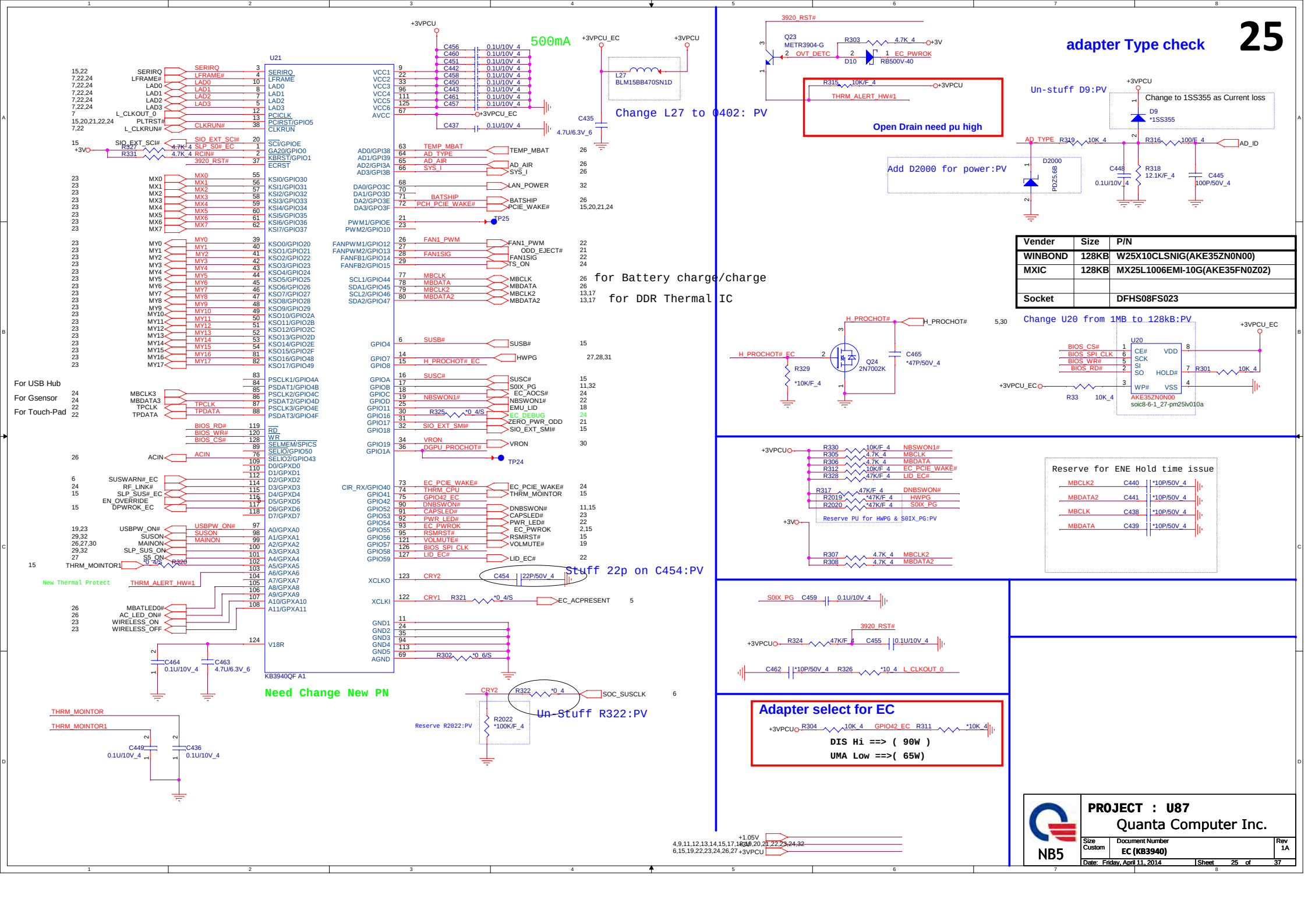
NB5

**PROJECT : U87**

Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | WLAN/G-Sensor/G-CLK/TS | 1A |

Date: Wednesday, March 26, 2014 | Sheet 24 of 37




| Vender | Size | P/N |
|---|---|---|
| WINBOND | 128KB | W25X10CLSNIG(AKE35ZN0N00) |
| MXIC | 128KB | MX25L1006EMI-10G(AKE35FN0Z02) |
| | | |
| Socket | | DFHS08FS023 |

| | | |
|---|---|---|
| PROJECT : U87 | | |
| Quanta Computer Inc. | | |
| Size: Custom | Document Number: EC (KB3940) | Rev: 1A |
| Date: Friday, April 11, 2014 | Sheet 25 of 37 | |

PV modify 0905

PV modify 0905

PV modify 0902

PV modify 0902

PV modify 0902

PV modify 0902

PV modify 0902

PV modify 0902

DC_JACK 90W

DC-IN CONN

CN13

Place this ZVS close to INPUT

Place this ZVS close to Far-Far away +VIN

Place this Rsense close to Battery connect

To PWR LED

OZ8691ALN

For ISN

VAC= AC Adapter detection

ACAV = To indicate the adapter status.

Pin ACAV goes high when Vvac > 8.7V/13.2V & Vvac > Vichm + 0.8V the Vvac = 8,7 or 13.2V threshold can be chosen via SMbus commend

Place this cap close to EC

Place this cap close to EC

Place this cap close to EC

CN12 *PMPCRA-08MLBK2ZZ4H4

14"

CN11 PMPCRF-08MLBK2ZZ4H0

15"

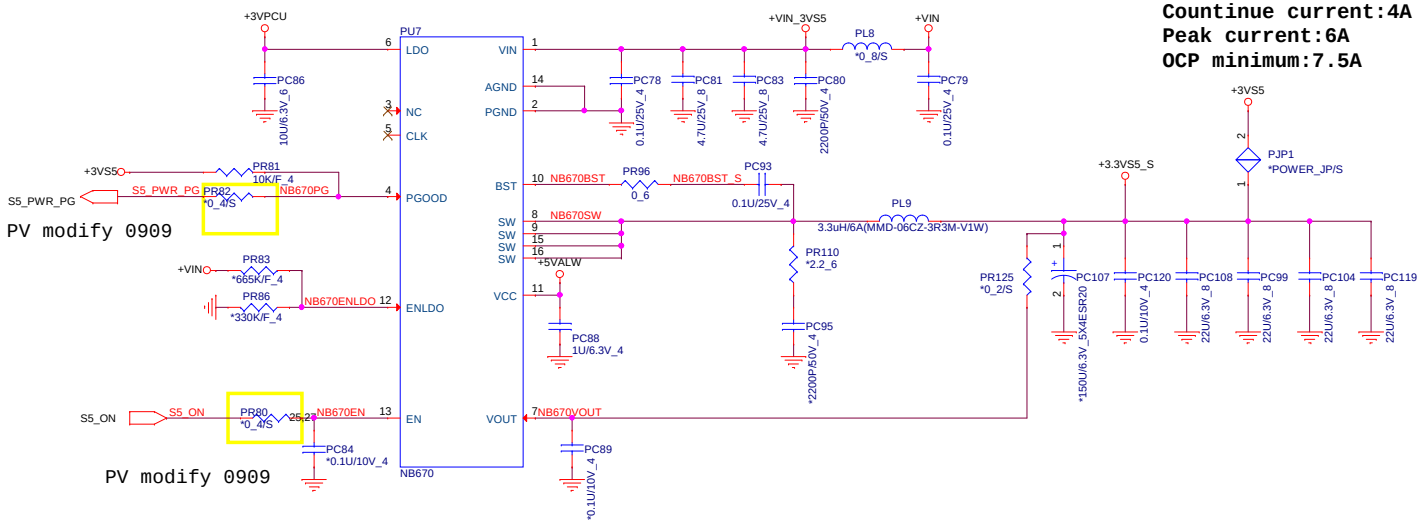
| | | |
|---|---|---|
| NB5 | PROJECT : U87<br>Quanta Computer Inc. | |
| Size Custom | Document Number<br>Charger (OZ8691) | Rev 1A |
| Date: Wednesday, March 26, 2014 | Sheet 26 of 37 | |

# DC/DC +3VS5/+5VS5

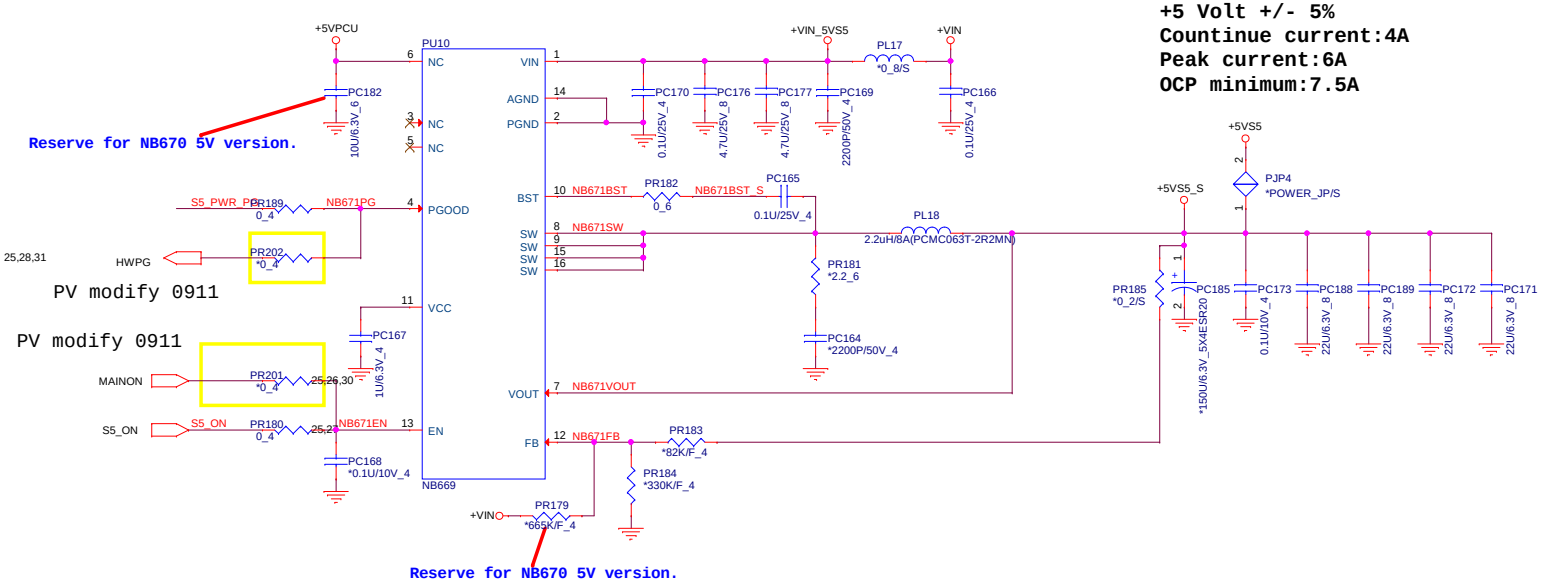


**+3.3 Volt +/- 5%**
**Countinue current:4A**
**Peak current:6A**
**OCP minimum:7.5A**

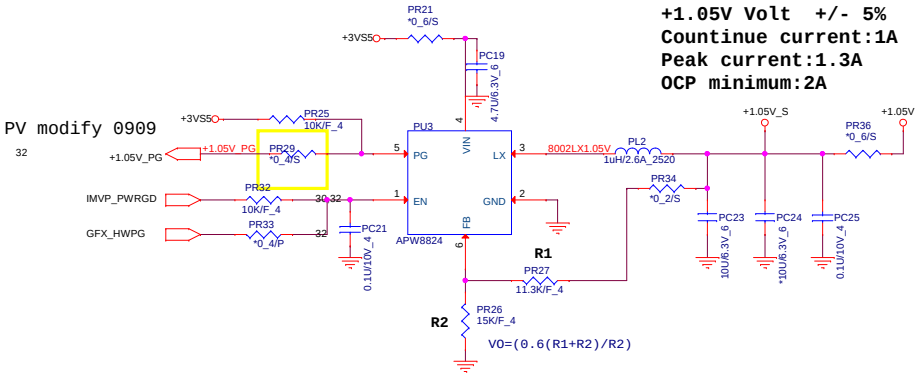
+3VS5
+5VS5
2,9,11,14,15,22,24,28,30,31,32
14,19,22,23,29,30,31,32

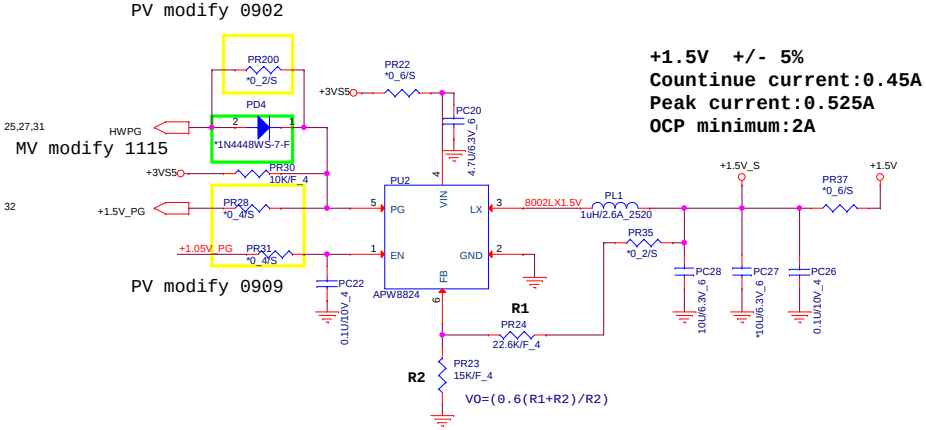



**+5 Volt +/- 5%**
**Countinue current:4A**
**Peak current:6A**
**OCP minimum:7.5A**




| | | |
|---|---|---|
| NB5 | PROJECT : U87<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: 3/5VPCU(NB670/NB669) | Rev: 1A |
| Date: Monday, November 18, 2013 | Sheet 27 of 37 | |



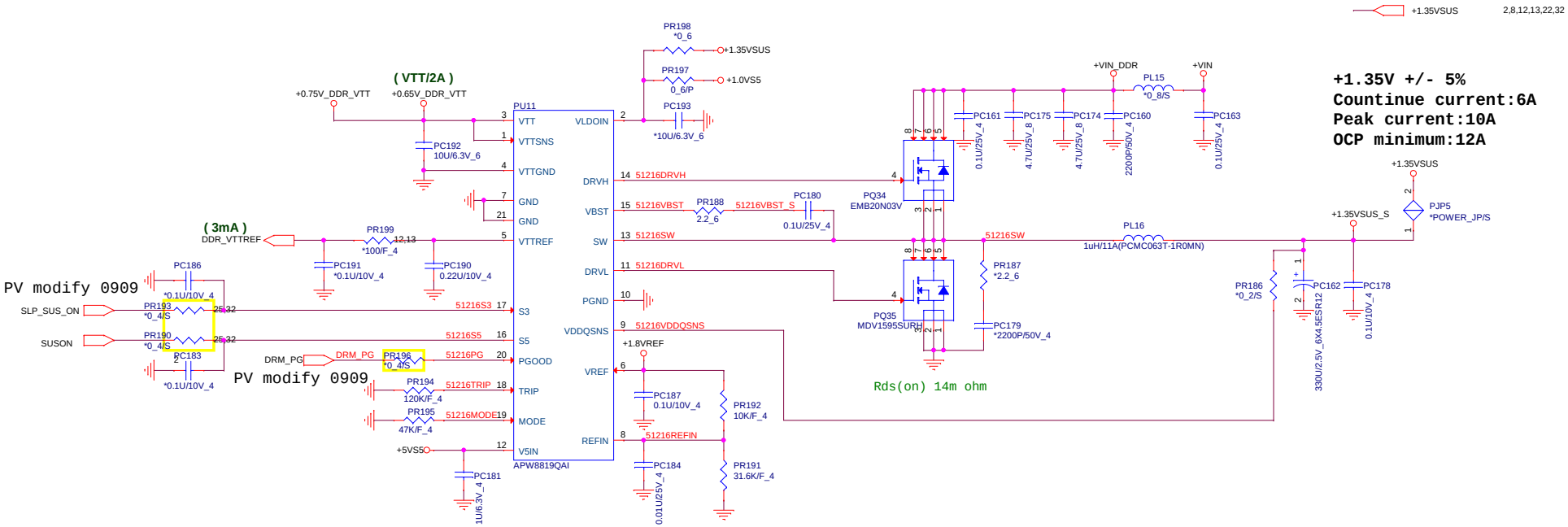




NB5

**PROJECT : U87**
Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | +1.05V/+1.5V (SY8002) | 1A |

Date: Monday, November 18, 2013 | Sheet 28 of 37




| | | | |
|---|---|---|---|
| NB5 | PROJECT : U87<br>Quanta Computer Inc. | | |
| | Size: Custom | Document Number: DDR3 (APW8819) | Rev: 1A |
| | Date: Monday, November 18, 2013 | Sheet 29 of 37 | |

**+GFXORE Volt +/- 5%**
**Countinue current:6A**
**Peak current:14A**
**OCP minimum:16.5A**

**+CPUVORE Volt +/- 5%**
**Countinue current:6A**
**Peak current:12A**
**OCP minimum:14A**

PV modify 0905
PV modify 0905
PV modify 0911
PV modify 0905
PV modify 0905
PV modify 0905
PV modify 0909
PV modify 0909

PU8 RT8172AGQW

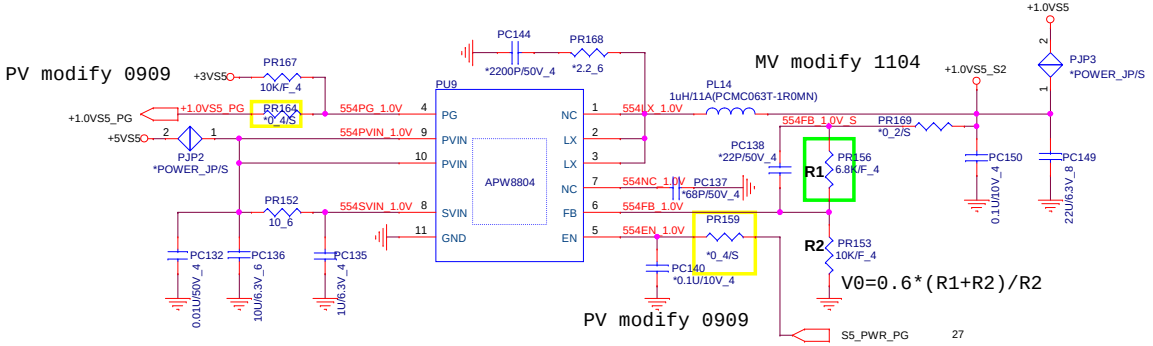
Place those components close to Inductor

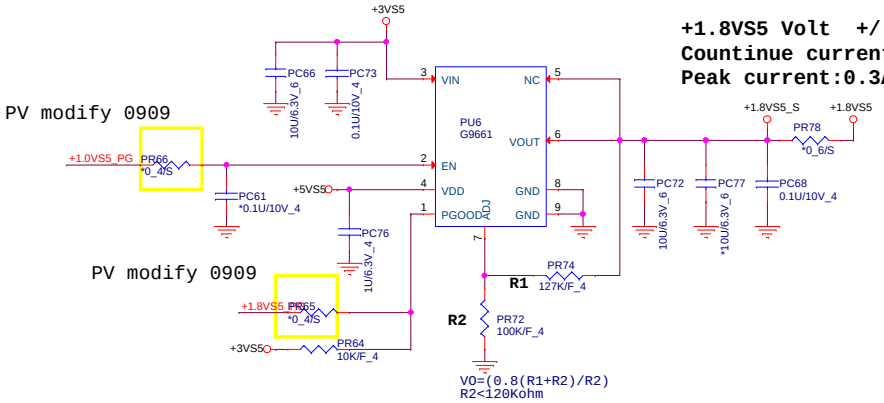
PUT COLSE TO V_GT HOT SPOT

PUT COLSE TO V_CORE HOT SPOT

| | |
|---|---|
| PROJECT : U87 | |
| Quanta Computer Inc. | |
| NB5 | Size: Custom; Document Number: Vcore( RT8172A); Rev: 1A |
| Date: Monday, November 18, 2013 | Sheet 30 of 37 |

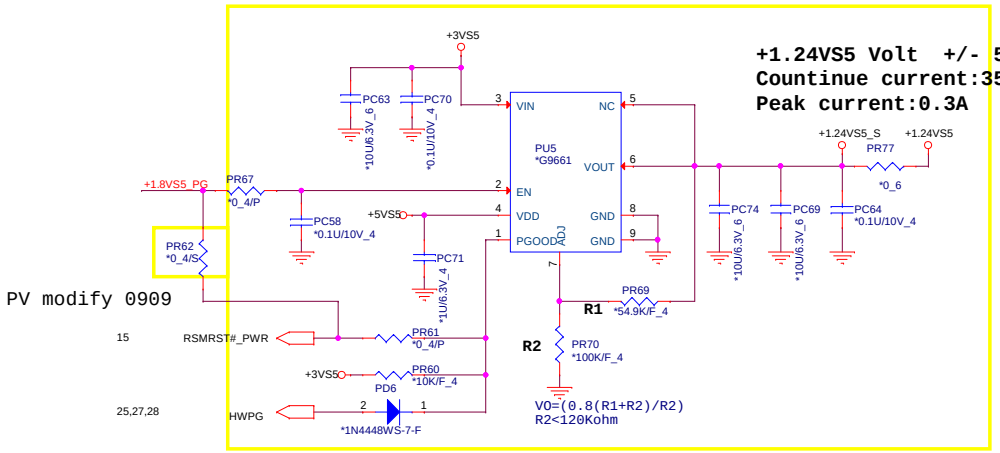
**+1.0VS5 Volt +/- 5%**
**Countinue current:2A**
**Peak current:3A**
**OCP minimum:4.5A**



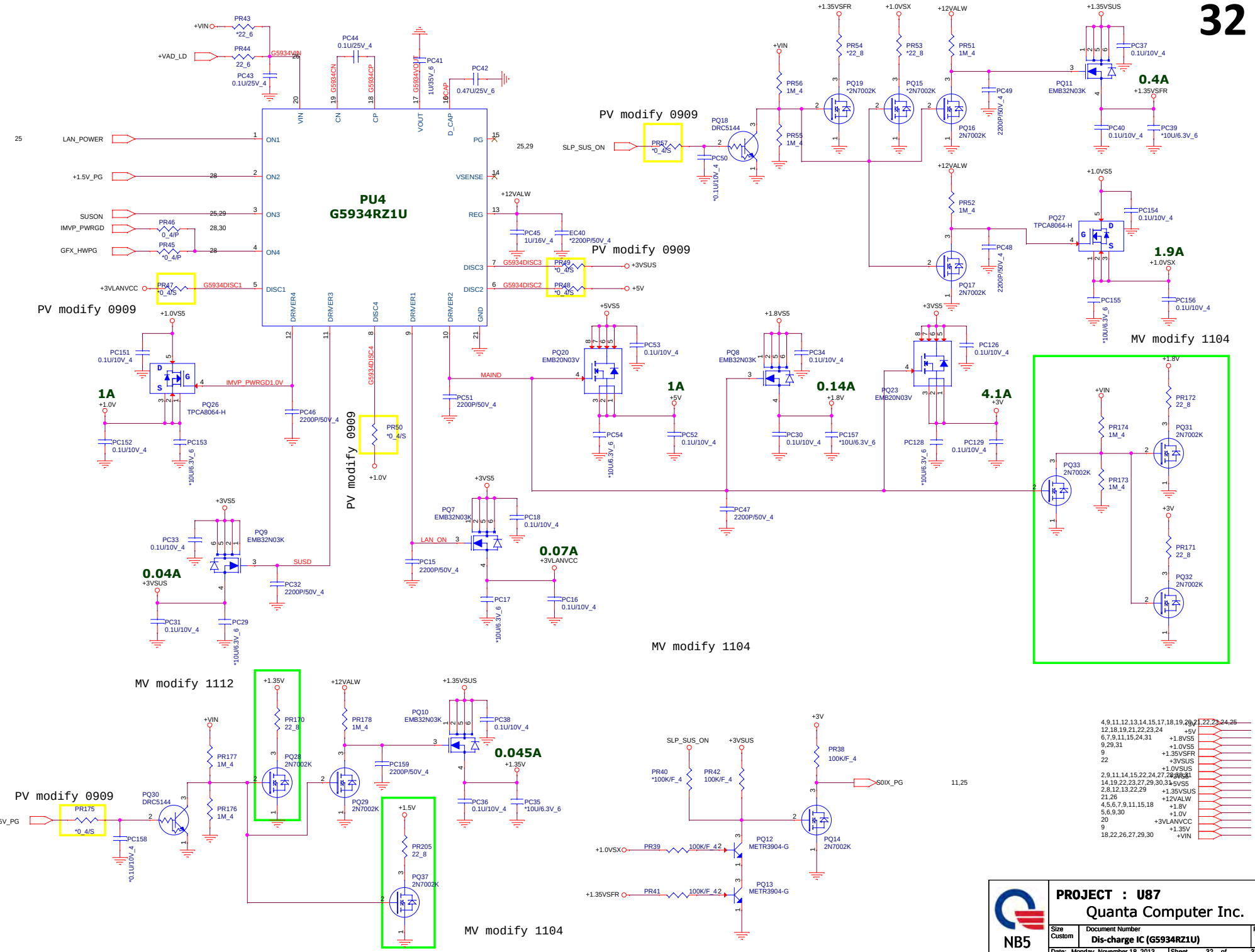

**+1.8VS5 Volt +/- 5%**
**Countinue current:0.105mA**
**Peak current:0.3A**

PV modify 0902




**+1.24VS5 Volt +/- 5%**
**Countinue current:35mA**
**Peak current:0.3A**

| | | |
|---|---|---|
| NB5 | **PROJECT : U87**<br>Quanta Computer Inc. | |
| Size: Custom | Document Number: 1.0VS5/1.8VS5/1.24VS5 | Rev: 1A |
| Date: Monday, November 18, 2013 | Sheet 31 of 37 | |


PU4
G5934RZ1U
PV modify 0909
PV modify 0909
PV modify 0909
PV modify 0909
PV modify 0909
MV modify 1104
MV modify 1104
MV modify 1112
MV modify 1104
0.4A
1.9A
1A
1A
0.14A
4.1A
0.04A
0.07A
0.045A
PROJECT : U87
Quanta Computer Inc.
NB5
Dis-charge IC (G5934RZ1U)
Monday, November 18, 2013

| USB3.0 | Port Assignment | Power control pin |
|---|---|---|
| PORT0 | USB HUB | |

| USB2.0 | Port Assignment | Power control pin |
|---|---|---|
| PORT0 | USB HUB | N/A |
| PORT1 | Right side USB Daughter BD | USBPW_ON#(from EC) |
| PORT2 | BT | N/A |
| PORT3 | Camera | N/A |
| | | |
| | | |
| | | |
| | | |

| USB HUB | Port Assignment | Power control pin |
|---|---|---|
| USB30 PORT1 | USB2.0/USB3.0 COMBO 1ST | USBPW_ON#(from EC) |
| USB30 PORT2 | USB2.0/USB3.0 COMBO 2nd | USBPW_ON#(from EC) |
| USB30 PORT3 | N/A | |
| USB30 PORT4 | N/A | |
| USB20 PORT1 | USB2.0/USB3.0 COMBO 1ST | USBPW_ON#(from EC) |
| USB20 PORT2 | USB2.0/USB3.0 COMBO 2nd | USBPW_ON#(from EC) |
| USB20 PORT3 | TS | TS_ON |
| USB20 PORT4 | | |

| SATA Master | Port Assignment | Power control pin |
|---|---|---|
| SATA0 | HDD | N/A |
| SATA1 | ODD | ZERO_PWR_ODD |
| | | |
| | | |

| PCIE | Port Assignment | Control pin |
|---|---|---|
| PCIE 0 | Card reader | |
| PCIE 1 | WLAN | |
| PCIE 2 | LAN | |
| PCIE 3 | NC | |
| | | |
| | | |
| | | |
| | | |

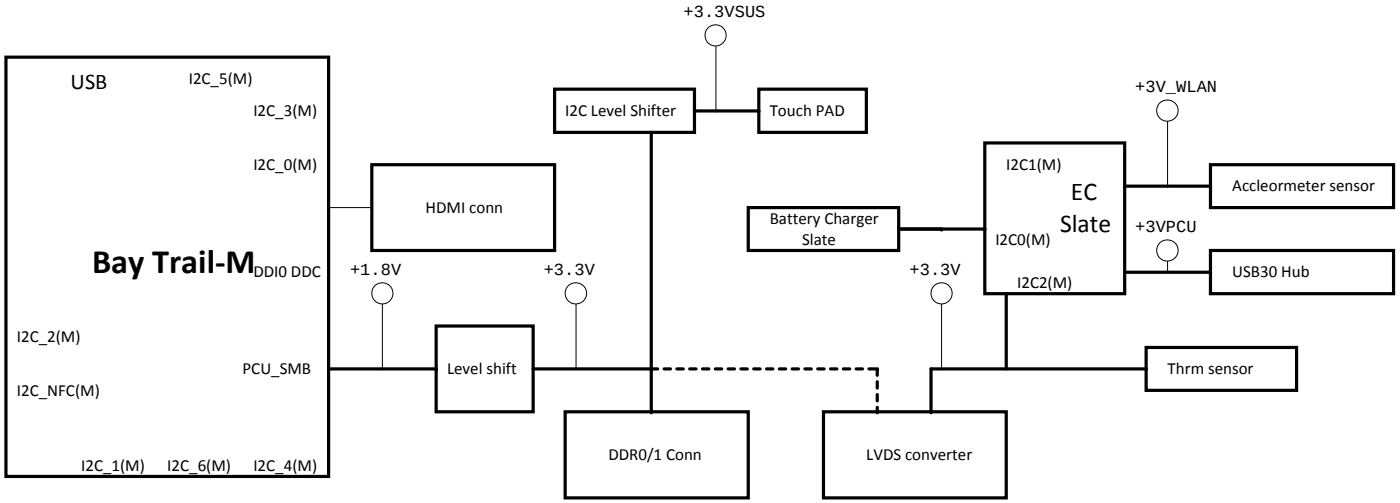
NB5

PROJECT : U87

Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | Data port assignment | 1A |

Date: Monday, November 18, 2013 | Sheet 33 of 37



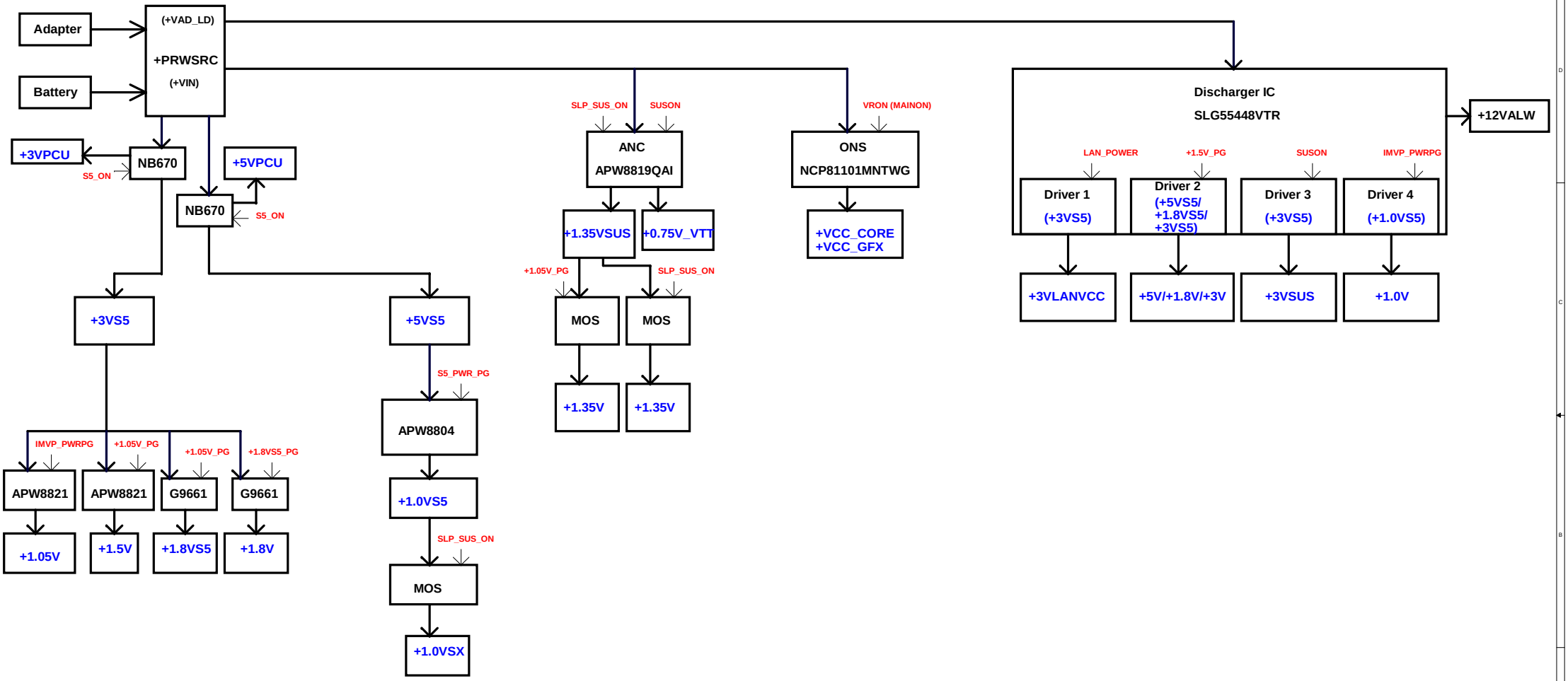

NB5

**PROJECT : U87**

Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | SMBUS & I2C | 1A |

Date: Monday, November 18, 2013 | Sheet 34 of 37



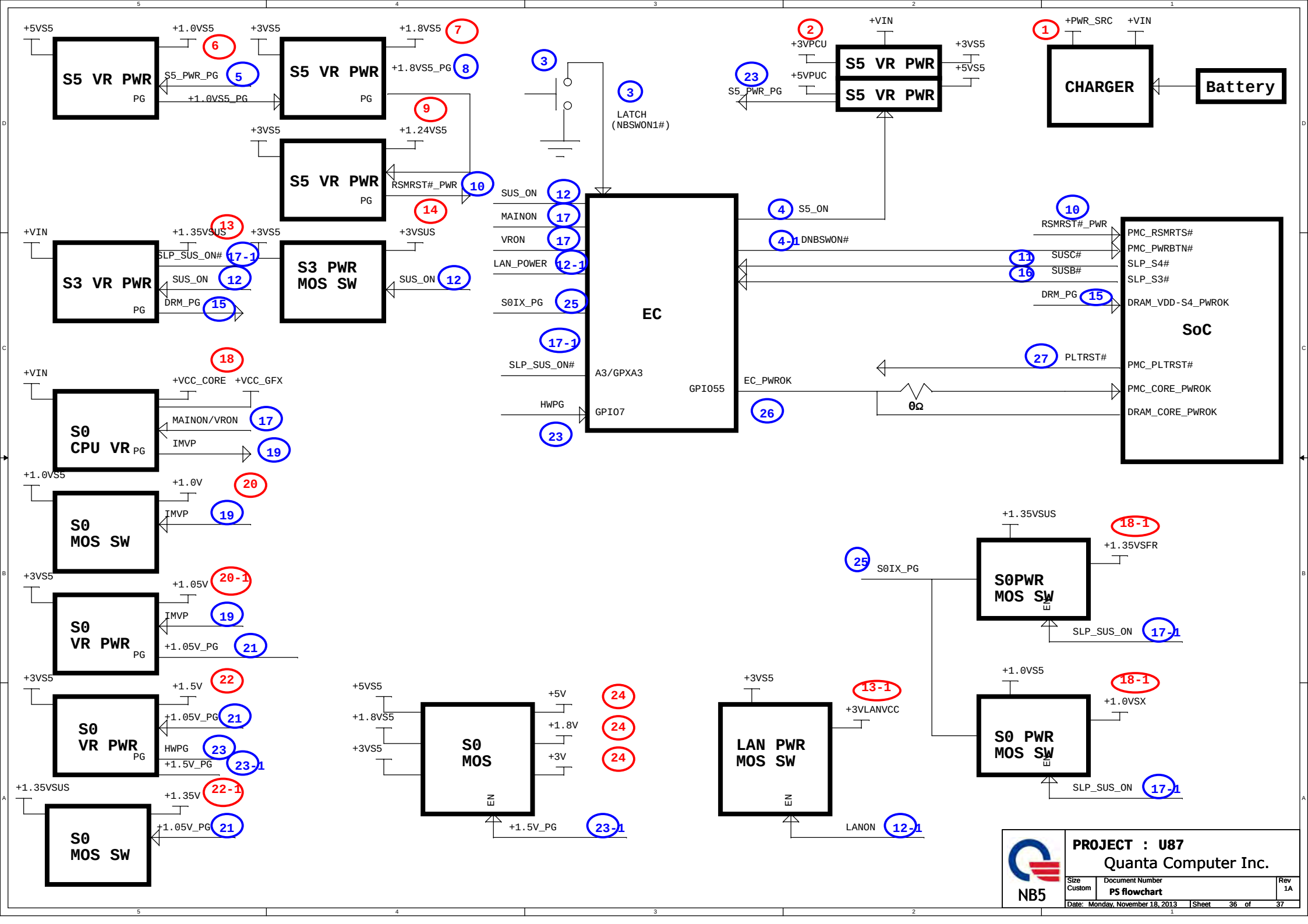

NB5

**PROJECT : U87**

Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | **Power Block Diagram** | 1A |

Date: Monday, November 18, 2013 | Sheet 35 of 37




| | |
|---|---|
| PROJECT : U87 | |
| Quanta Computer Inc. | |
| Size: Custom | Document Number: PS flowchart |
| Rev: 1A | |
| Date: Monday, November 18, 2013 | Sheet 36 of 37 |
| NB5 | |

NB5

**PROJECT : U87**

Quanta Computer Inc.

| Size | Document Number | Rev |
|---|---|---|
| Custom | Note | 1A |

Date: Monday, November 18, 2013 | Sheet 37 of 37