IV@ For UMA
EV@ For Pure Dis.
SP@ For special setting
SPI@ For Optimus & UMA special setting
SPE@ For Pure Dis.special setting
VA@ For Audio version A setting
VB@ For Audio version B setting
@3G For 3G setting
PIV@ For UMA Power
PEV@ For Pure Dis. Power

# FH5 BLOCK DIAGRAM

01

| | |
|---|---|
| GPU CORE PWR RT8204 P45 | CHARGER ISL88731 P53 |
| GPU IO PWR UP6111AQDD P46 | 3/5V SYS PWR RT8206 P52 |
| Discharger/+3V_M P54 | CPU CORE PWR ISL95831 P43~P44 |
| +1.8V UP61111AQDD P51 | CPU +1.05V_VTT UP61111AQDD P47 |
| CPU iGPU_CORE RT8204 P45 | PCH +1.05V UP61111AQDD P49 |
| +0.85V ISL62871 P48 | DDR3 PWR RT8207A P50 |

Fan Driver (PWM Type) P42

ALS (SM/BUS)

intel <MCH Processor>
SandyBridge 0.61
rPGA 988 (37.5mm X 37.5mm)
DDR SYSTEM MEMORY
FDI DMI P4~P7

DDR III
SO-DIMM 0
SO-DIMM 1
P14, 15

Dual Channel 1066/1333 MHz

PCIE X16 5GT/s

X'TAL 27.0MHz

nVIDIA GPU
N12P Fermi
Package GB2-128
Optimus (Muxless) P16~P22

FDI interface 2.7GT/s

X4 DMI interface 5GT/s

CRT R-SW P24 → CRT P24
LVDS Switchable P24 → LVDS P24
HDMI R-SW P24 → HDMI P24

INT_CRT
INT_LVDS
INT_HDMI

HDD (SATA) P25 — SATA0
ODD (SATA) P25 — SATA3

intel <PCH>
FDI DMI
SATA Gen3
SATA Gen2
iGFX Interfaces
RTC P9
X'TAL 32.768KHz
USB
CougarPoint 0.7
HDA
PCI-E
mBGA 989 (25mm X 25mm)
P8~P13
SPI LPC
X'TAL 25MHz

USB8 PCIE4 → NewCard USB8 P33

PCI-Express Gen2 5GT/s

USB CNNs USB0,1,2 P27
Bluetooth USB9 P27
CCD USB6 P24
CardReader RTS5138 USB5 P23
— USB 2.0

Azalia

PCIE6 → Realtek RTL8111E-GR P26 — X'TAL 25MHz
Transformer P26
RJ45 P26

PCIE1 → Mini Card WiFi USB3 P28 — USB3
PCIE2 → Mini Card 3G USB4 P28 — USB4
SIM Card Conn DB P28

Audio CODEC
RTL ALC269VB P30
HP Jack P30
MIC Jack P30
SPK P30
DMIC P24

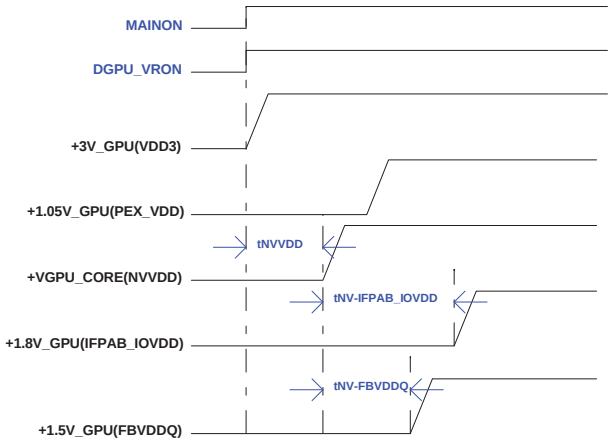
Dual SPI ROM 4MB x1 (Basic ME+Braidwood) P9

WPCE791/FLASH
PECI3.0 P31
SPI ROM P31
Touch Pad P29
Keyboard P29
Light Sensor P33
Button on mechanical key P31

Note:
HM65 does not support USB 6 & 7
HM65 does not support SATA 2 & 3

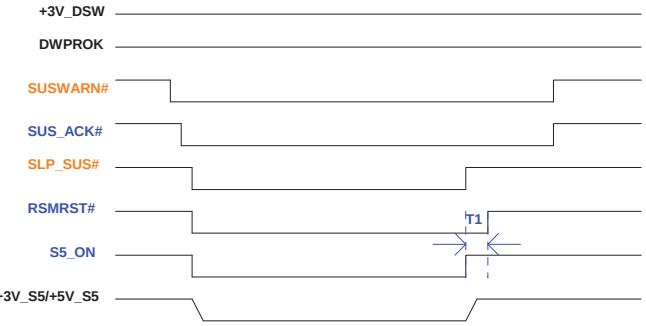
Quanta Computer Inc.
PROJECT : FH5
Size | Document Number: Block Diagram | Rev 1A
Date: Monday, September 27, 2010 | Sheet 1 of 41

## N12P-GE Power Up Sequence



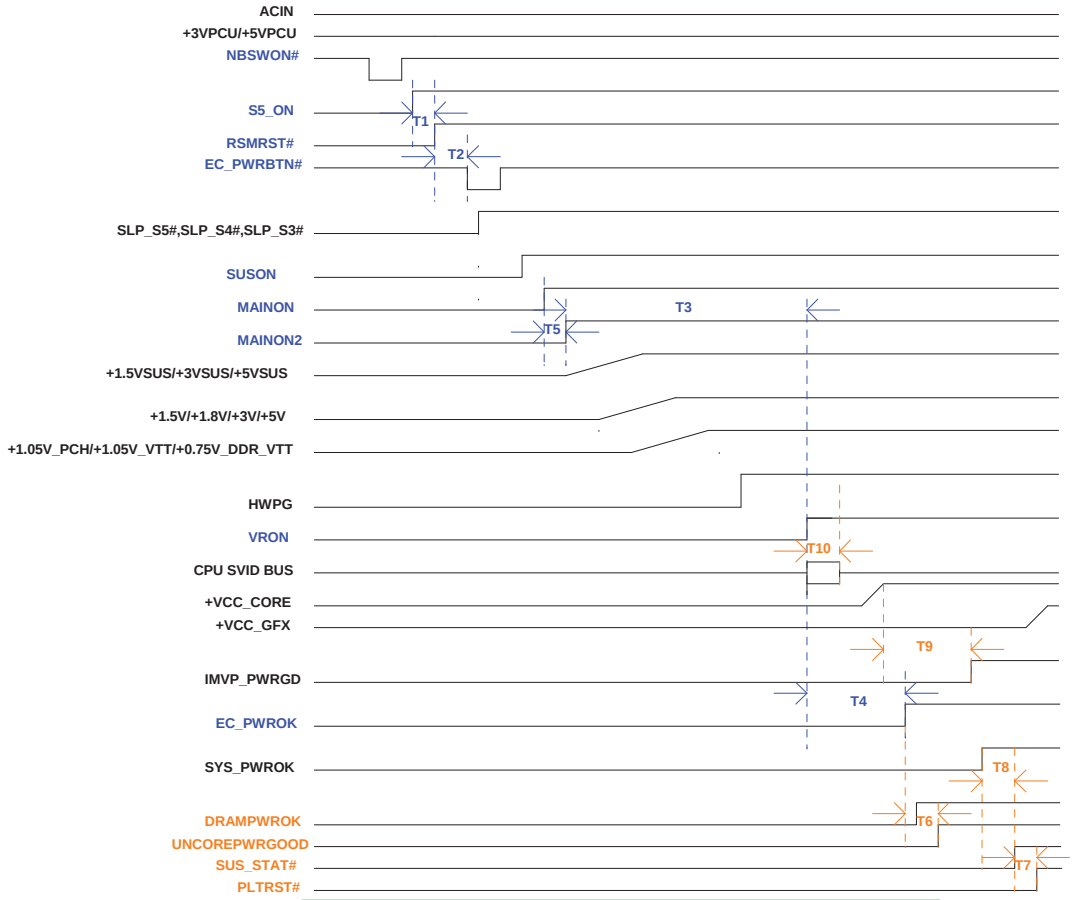

N12P-GE Power up Sequence
tNVVDD>0
tNV-IFPAB_IOVDD>0
tNV-FBVDDQ>0

## Deep S4/S5 off-on Sequence

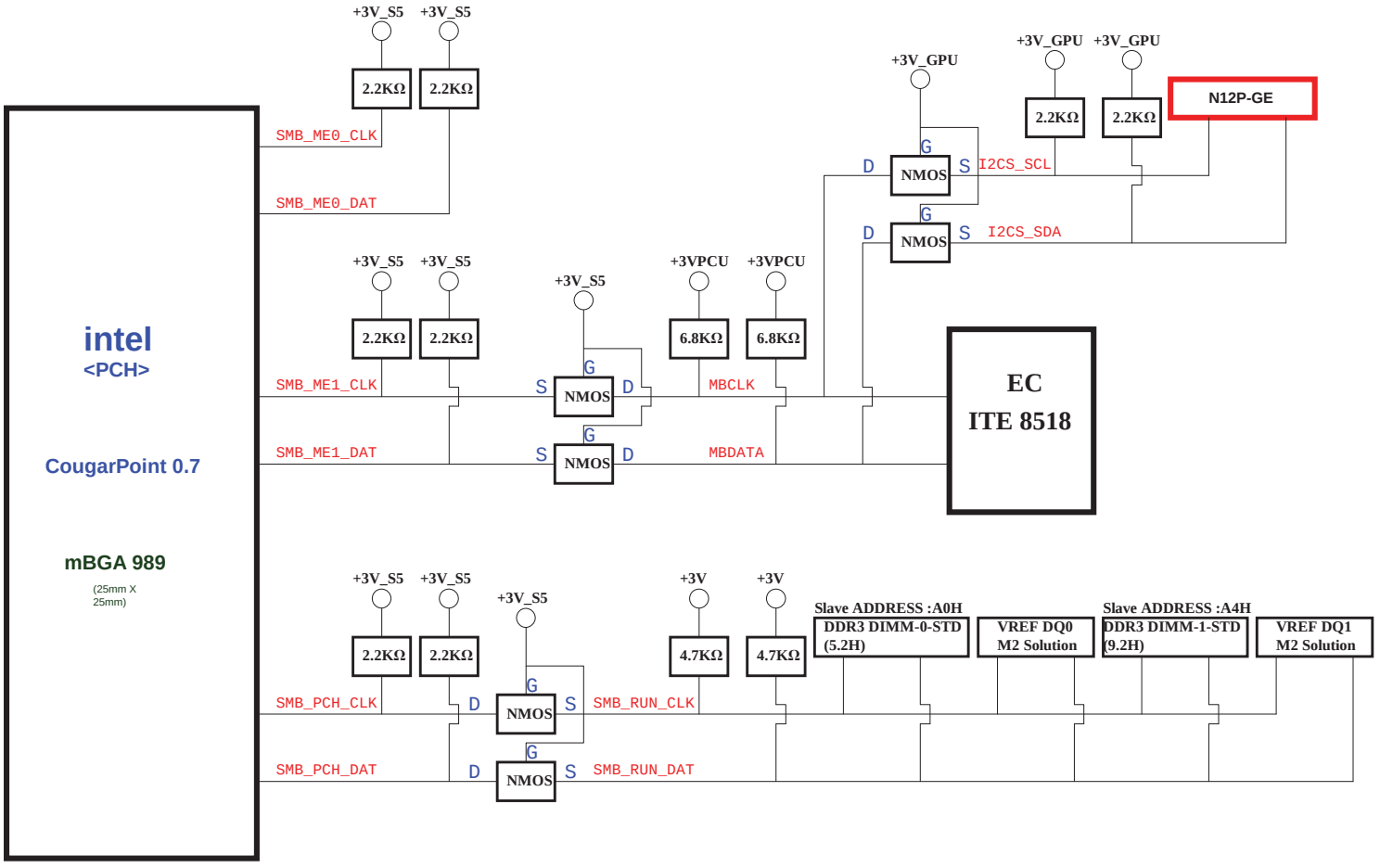



Deep S4/S5 Sequence
T1: S5_ON TO RSMRST# = 30ms (spec:mini 10ms)

## MS15-UMA Power-ON Sequence




System Power Sequence
T1: S5_ON TO RSMRST# = 30ms (spec:mini 10ms)
T2: RSMRST# TO EC_PWRBTN# = 110ms (spec:mini 100ms)
T3: MAINON2 TO VRON = 110ms (spec:mini 99ms)
T4: VRON TO EC_PWROK = 10ms (HWPG NEED TO BE HIGH at that time)
T5: MAINON to MAINON2 =500us
T6: EC_PWROK to UNCOREPWRGOOD =2ms(Min)
T7: SUS_STAT# to PLTRST# =60us(Min)
T8: SYS_PWROK to SUS_STAT# =1ms(Min)
T9: +VCC_CORE to IMVP_PWRGD =5ms(Max)
T10: VRON to accept SVID command. =5ms(Max)




Quanta Computer Inc.
PROJECT : FH5

| Size | Document Number | Rev |
|---|---|---|
| | SMBus Address | 1A |

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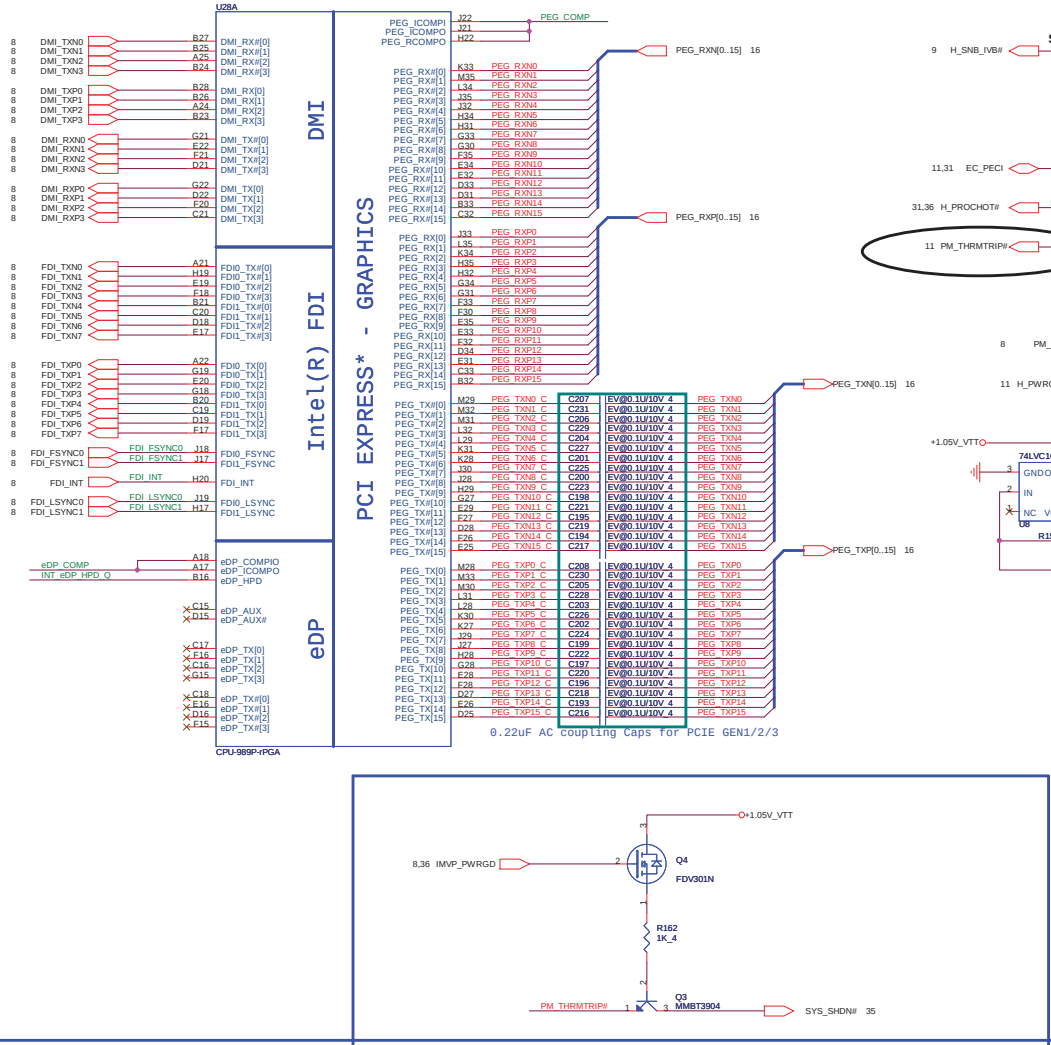
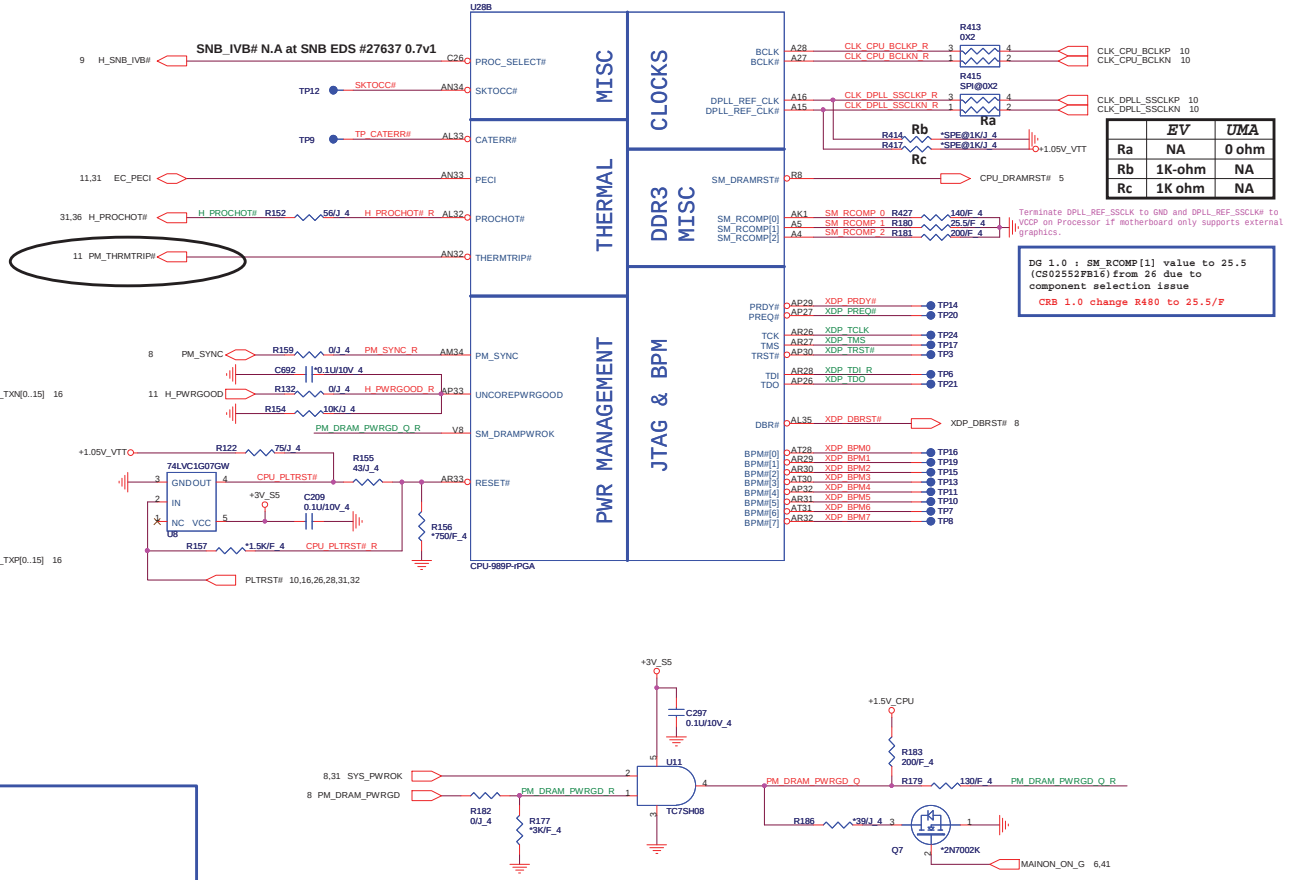
## Sandy Bridge Processor (DMI,PEG,FDI)




## Sandy Bridge Processor (CLK,MISC,JTAG)



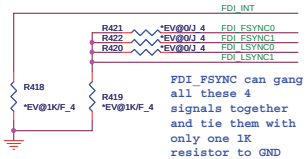

| | EV | UMA |
|---|---|---|
| Ra | NA | 0 ohm |
| Rb | 1K-ohm | NA |
| Rc | 1K ohm | NA |





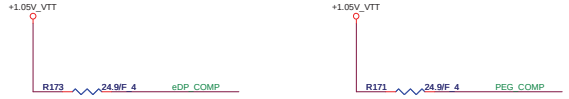


### FDI Disabling (Discrete Only)




FDI_FSYNC can gang all these 4 signals together and tie them with only one 1K resistor to GND (DG V0.5 Ch2.2.9).

### DP & PEG Compensation



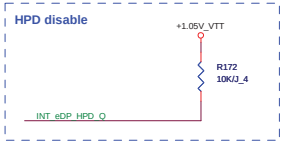

eDP_COMPIO and ICOMPO signals should be shorted near balls and routed with typical impedance <25 mohms

PEG_ICOMPI and RCOMPO signals should be routed within 500 mils typical impedance = 43 mohms

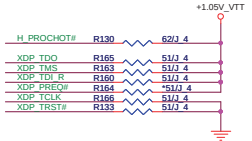
PEG_ICOMPO signals should be routed within 500 mils typical impedance = 14.5 mohms

### eDP Hot-plug

CAD Note: Place PU resistor within 2 inches of CPU




### Processor pull-up(CPU)




Quanta Computer Inc.
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| Size | Document Number | Rev |
|---|---|---|
| | Sandy Bridge 1/4 | 1A |

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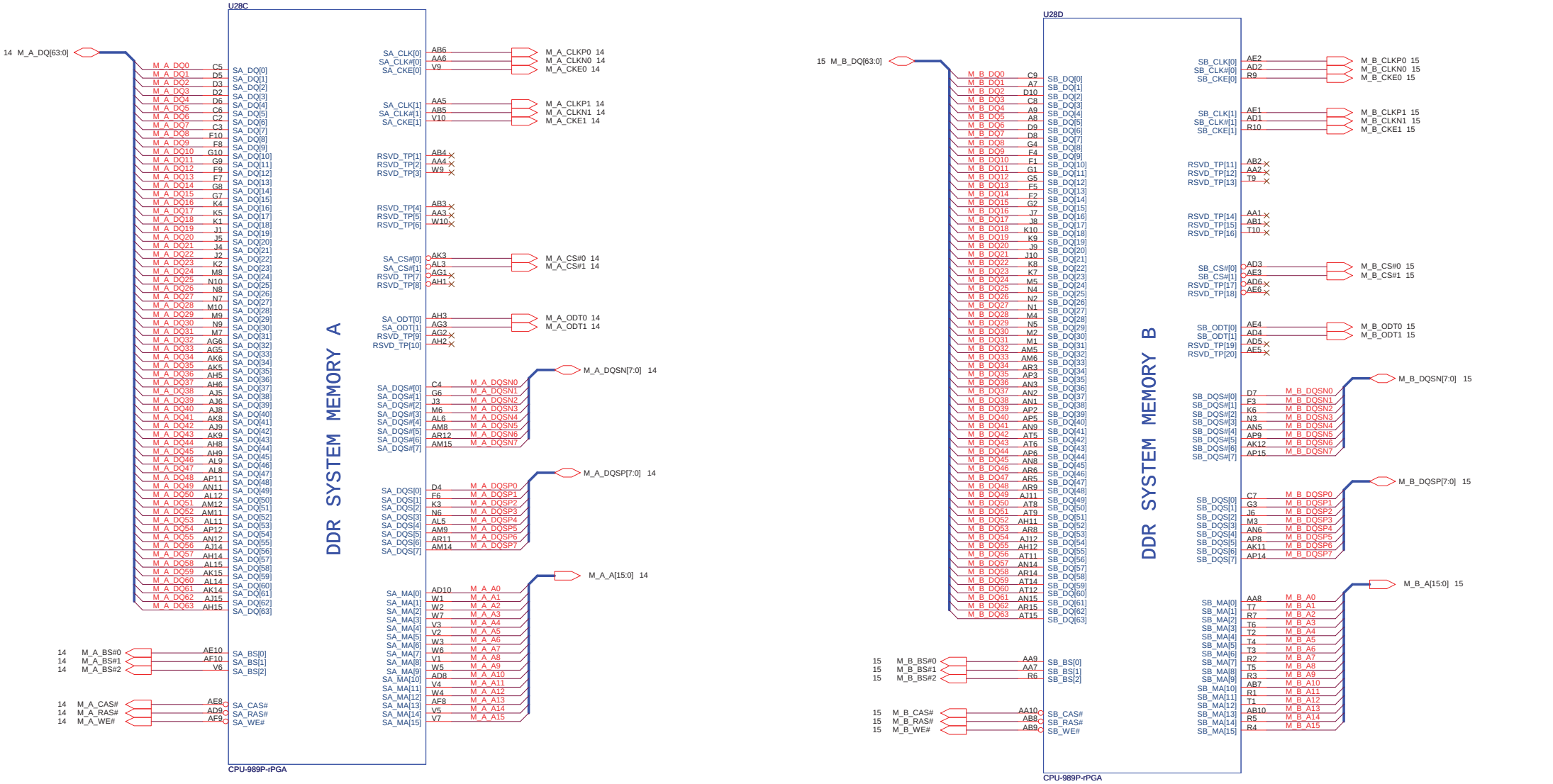
# Sandy Bridge Processor (DDR3)






| | | | |
|---|---|---|---|
| Quanta Computer Inc. | | | |
| PROJECT : FH5 | | | |
| Size | Document Number | | Rev |
| | Sandy Bridge 2/4 | | 1A |
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22uF_8 x7 Socket TOP cavity
22uF_8 x5 Socket BOT cavity
22uF_8 x2 Socket TOP cavity (no stuff)
22uF_8 x5 Socket BOT cavity (no stuff)
330uF_7343 x2

SPI@ For Optimus & UMA
SPE@ For Pure Dis.
SP@ For special setting

# Sandy Bridge Processor (POWER)

POWER

SNB: 55A

+VCC_CORE

U28F

CORE SUPPLY

PEG AND DDR

SVID

SENSE LINES

SNB: 8.5A

+1.05V_VTT

CPU-989P-rPGA

22uF_8 x8 Socket TOP cavity
22uF_8 x10 Socket BOT cavity
22uF_8 x8 Socket TOP edge
470uF_7343 x3

3/26 DB change 10U FP to 0805.

# Sandy Bridge Processor (GRAPHIC POWER)

POWER

CPU VGT
SNB 45W:22A
470uF/4mohm x 2
22uF x 12

U28G

GRAPHICS

22uF (Reserved)

| | EV | UMA |
|---|---|---|
| Ra | 0 ohm | NA |

CPU VCCPL
SNB 45W:3A
330uF/7mohm x 1
10uF x 1
1uF x 2

1.8V RAIL

SENSE LINES

VREF

DDR3 -1.5V RAILS

SA RAIL

MISC

10 mil
CAD Note: +VDDR_REF_CPU should have 10 mil trace width

CPU MCH
SNB 45W: 5A
330uF/6mohm x 1
10uF x 6

CPU SA
SNB 45W: 6A
330uF/7mohm x 1
10uF x 3

Layout note: need routing together and ALERT need between CLK and DATA

SVID CLK
Close to VR

SVID DATA
Close to VR

SVID ALERT

Place PU resistor close to CPU

4.5A

Quanta Computer Inc.
PROJECT : FH5

| Size | Document Number | Rev |
|---|---|---|
| | Sandy Bridge 3/4 | 1A |

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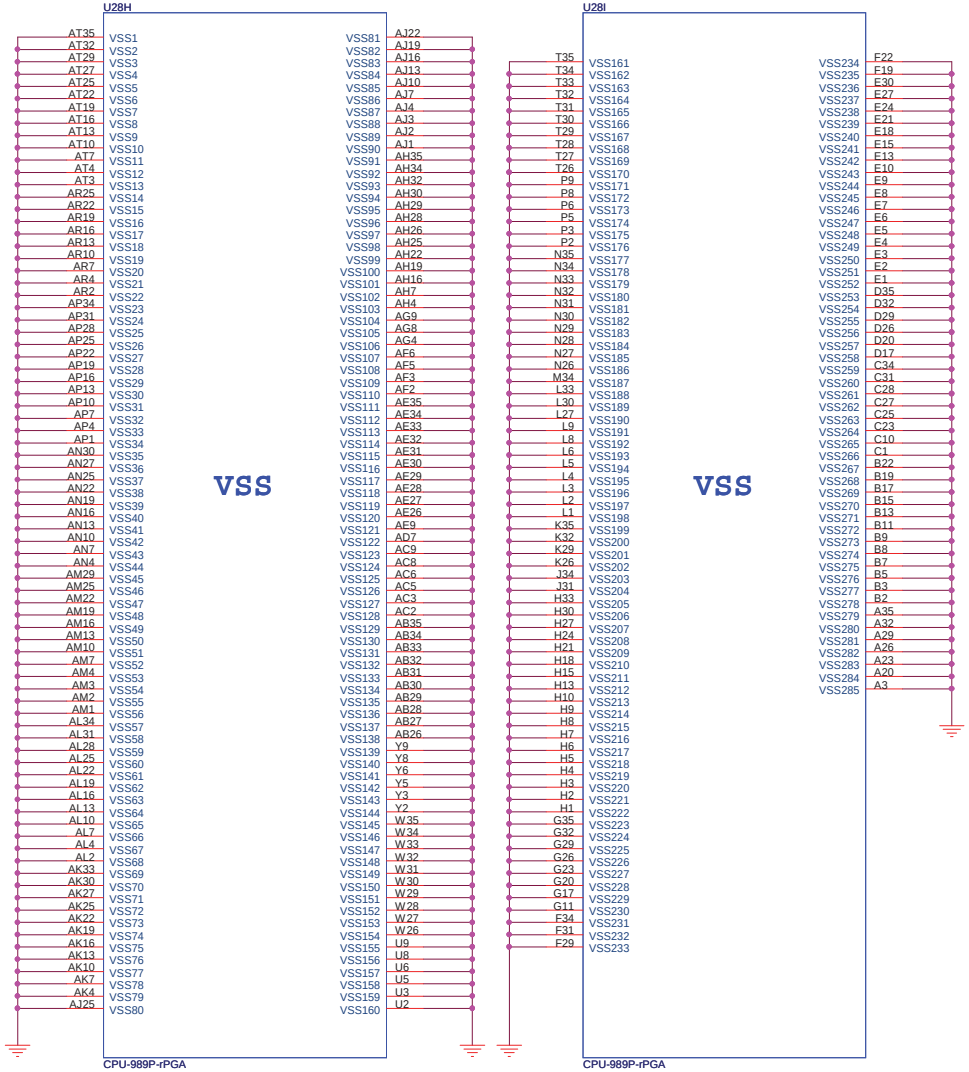
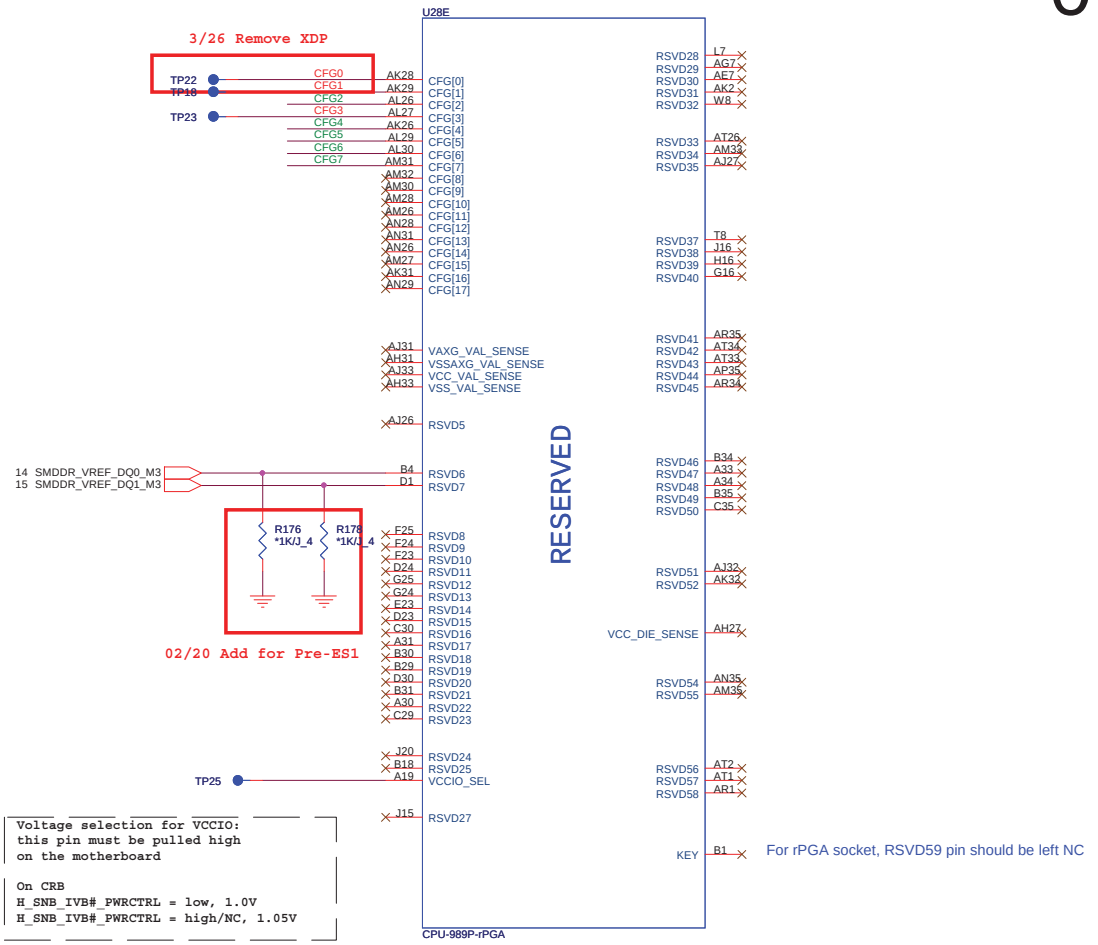
# Sandy Bridge Processor (GND)




# Sandy Bridge Processor (RESERVED, CFG)




For rPGA socket, RSVD59 pin should be left NC

## Processor Strapping

The CFG signals have a default value of '1' if not terminated on the board.

| | 1 | 0 |
|---|---|---|
| CFG2<br>(PEG Static Lane Reversal) | Normal Operation | Lane Reversed |
| CFG3<br>PEG Static x4 Lane | Normal Operation | Lane Reversed |
| CFG4<br>(DP Presence Strap) | Disable; No physical DP attached to eDP | Enable; An ext DP device is connected to eDP |
| CFG7<br>(PEG Defer Training) | PEG train immediately following xxRESETB de assertion | PEG wait for BIOS training |



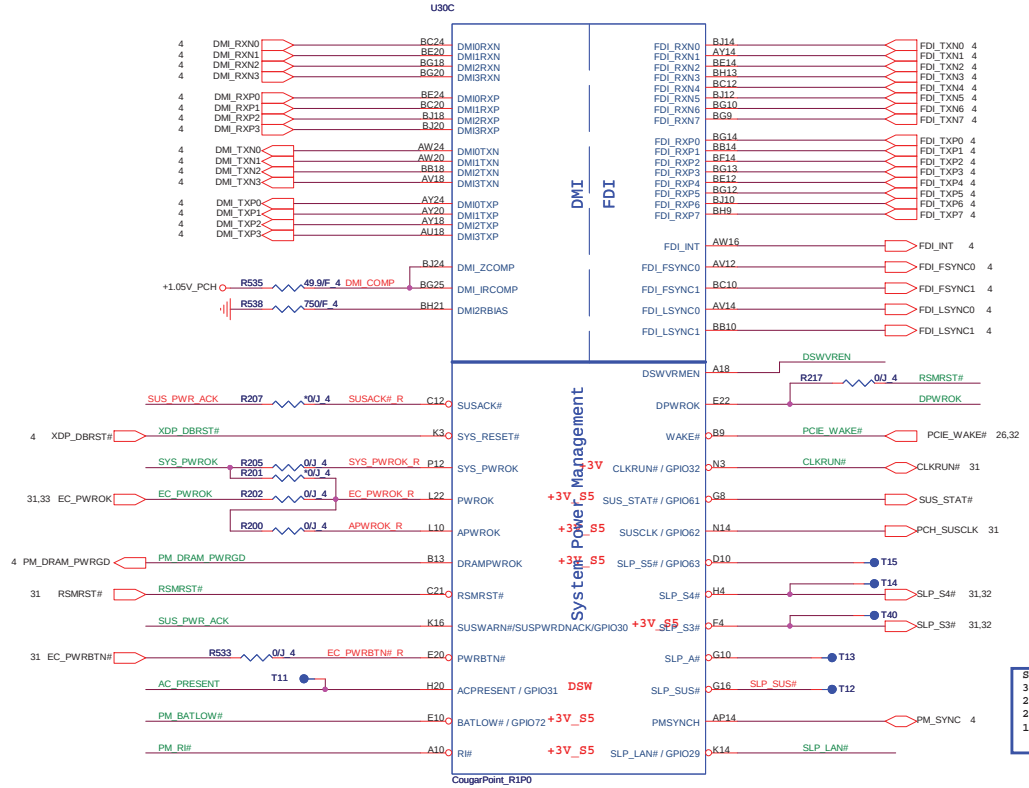
**CFG[6:5] (PCIE Port Bifurcation Straps)**

11: (Default) x16 - Device 1 functions 1 and 2 disabled
10: x8, x8 - Device 1 function 1 enabled ; function 2 disabled
01: Reserved - (Device 1 function 1 disabled ; function 2 enabled)
00: x8,x4,x4 - Device 1 functions 1 and 2 enabled

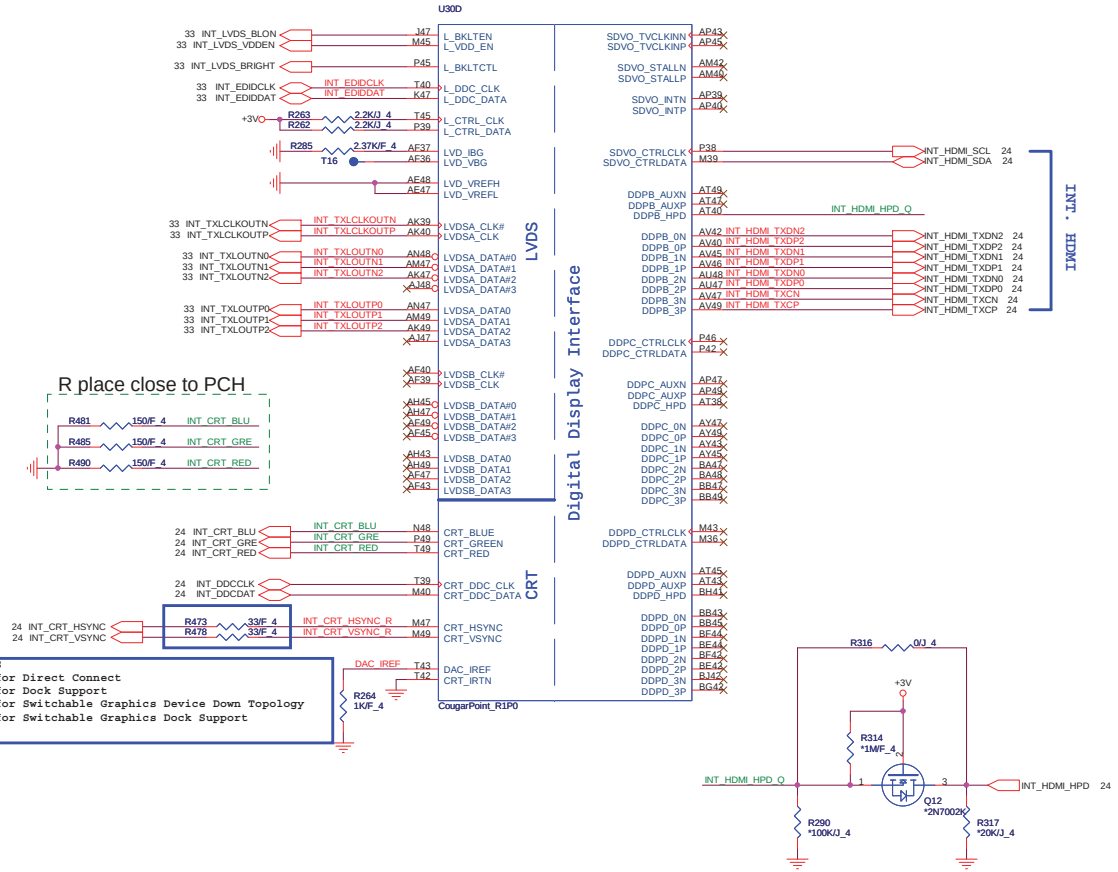
Quanta Computer Inc.
PROJECT : FH5

| Size | Document Number | Rev |
|---|---|---|
| | Sandy Bridge 4/4 | 1A |
| Date: Monday, September 27, 2010 | Sheet 7 of 41 | |

# Cougar Point (DMI,FDI,PM)




# Cougar Point (LVDS,DDI)



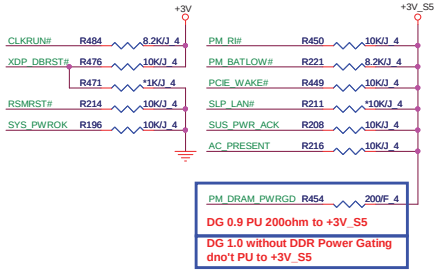

R place close to PCH



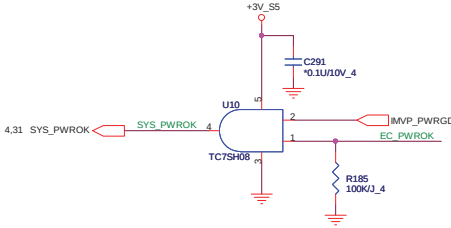

SYNC RS
33ohm for Direct Connect
20ohm for Dock Support
20ohm for Switchable Graphics Device Down Topology
10ohm for Switchable Graphics Dock Support

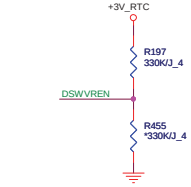



## PCH Pull-high/low(CLG)




## System PWR_OK(CLG)

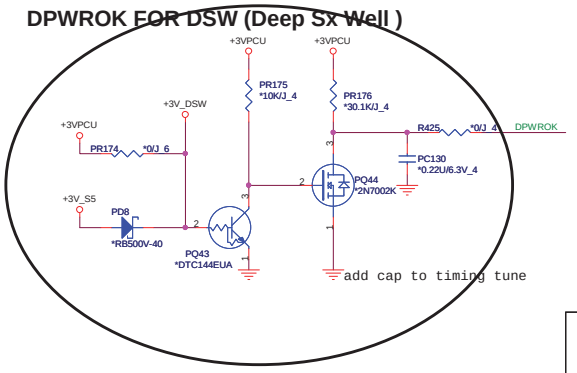



DEEP S4/S5 well
On Die DSW VR Enable

High = Enable (Default)
Low = Disable

## DPWROK FOR DSW (Deep Sx Well )




Quanta Computer Inc.
PROJECT : FH5

| Size | Document Number | Rev |
|---|---|---|
| | Cougar Point 1/6 | 1A |
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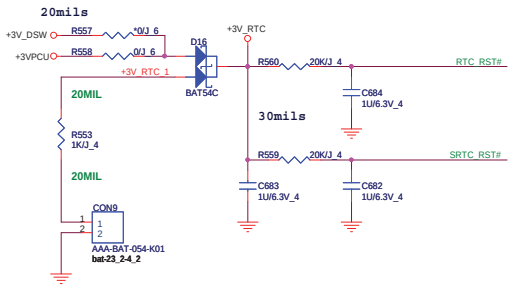
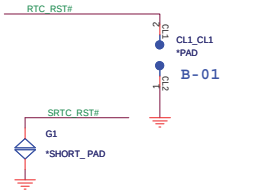
## RTC Circuitry(RTC)

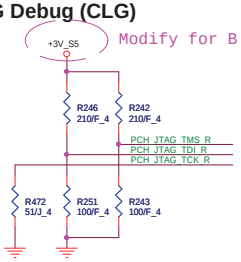



## RESET JUMP (Near ROOM DOOR)

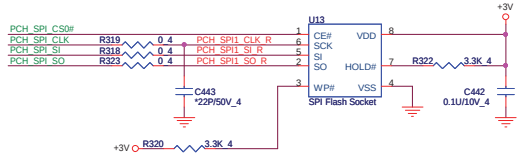



## HDA Bus(CLG)


## PCH JTAG Debug (CLG)




## PCH SPI ROM(CLG)

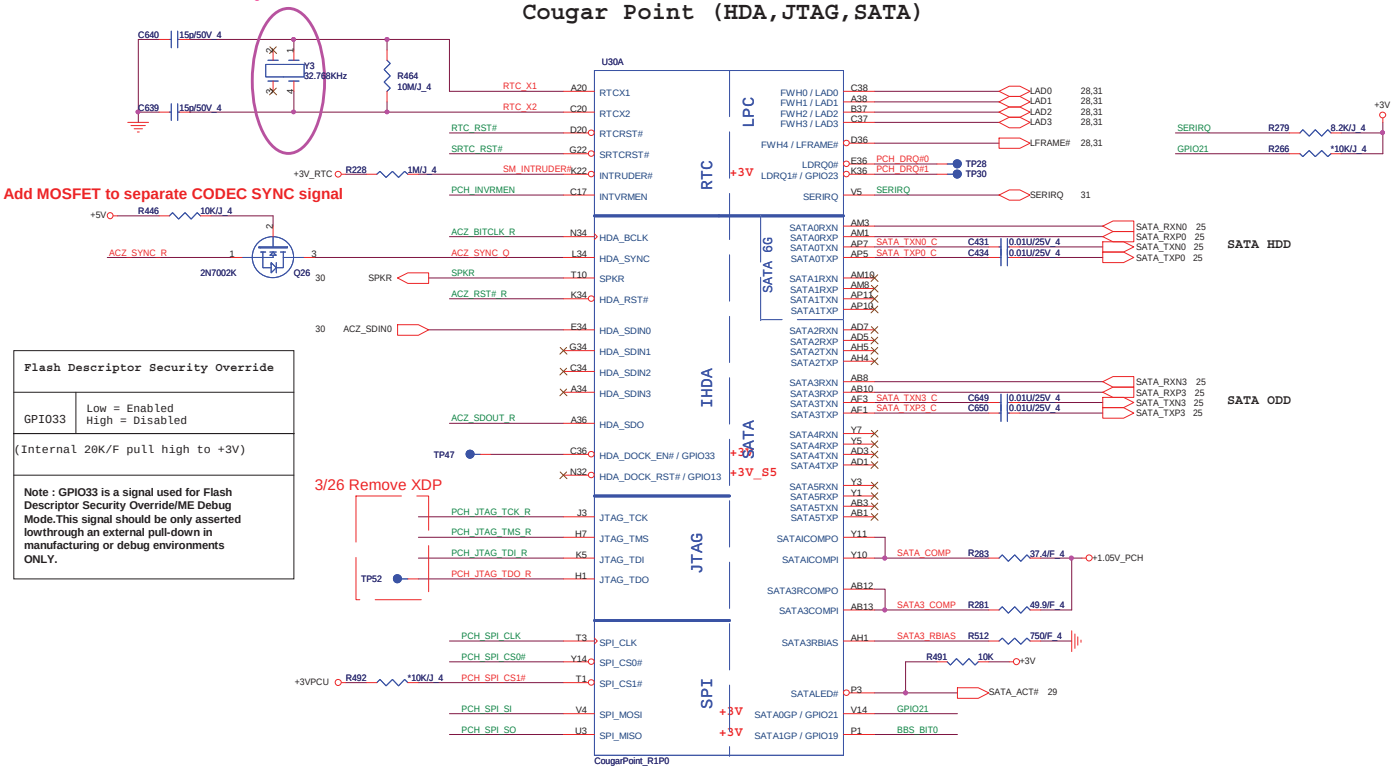



| Vender | Size | P/N |
|---|---|---|
| EON | 4MB | AKE39FN0Q00 (EN25F32-100HIP) |
| Winbond | 4MB | AKE391P0N00 (W25Q32BVSSIG) |
| Socket | | DG008000031 |

## PCH2 (CLG)

Change SIZE 8/24

### Cougar Point (HDA,JTAG,SATA)

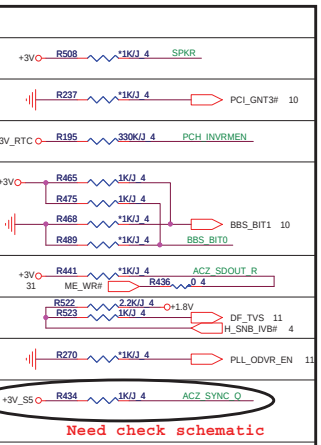



| Flash Descriptor Security Override | |
|---|---|
| GPIO33 | Low = Enabled<br>High = Disabled |
| (Internal 20K/F pull high to +3V) | |

**Note : GPIO33 is a signal used for Flash Descriptor Security Override/ME Debug Mode.This signal should be only asserted lowthrough an external pull-down in manufacturing or debug environments ONLY.**

## PCH Strap Table

| Pin Name | Strap description | Sampled | Configuration |
|---|---|---|---|
| SPKR | No reboot mode setting internal PD | PWROK | **0 = Default (weak pull-down 20K)**<br>1 = Setting to No-Reboot mode |
| GNT3# / GPIO55 | Top-Block Swap Override internal PU | PWROK | 0 = "top-block swap" mode<br>**1 = Default (weak pull-up 20K)** |
| INTVRMEN | Integrated 1.05V VRM enable | ALWAYS | Should be always pull-up |
| GNT1# / GPIO51 | Boot BIOS Selection 1 [bit-1] internal PU | PWROK | GNT1# / GNT0# / Boot Location<br>1 / 1 / SPI *<br>0 / 0 / LPC |
| GPIO19 | Boot BIOS Selection 0 [bit-0] internal PU | PWROK | |
| HDA_SDO | Flash Descriptor Security internal PD | RSMRST | **0 = Default (weak pull-up 20K)**<br>1 = Override |
| DF_TVS | DMI/FDI Termination voltage internal PD | PWROK | **0 = Set to Vss**<br>**1 = Set to Vcc (weak pull-up 20K)** |
| GPIO28 | On-die PLL Voltage Regulator internal PU | RSMRST# | 0 = Disable<br>**1 = Enable (Default)** |
| HDA_SYNC | On-Die PLL VR Voltage Select internal PD | RSMRST | **0 = Support by 1.8V (weak pull-down)**<br>**1 = Support by 1.5V** |
| GPIO15 | Intel ME Crypto Transport Layer Security (TLS) cipher suite internal PD | RSMRST | 0 = Intel ME TLS with no confidentiality<br>1 = Intel ME TLS with confidentiality |




Default weak pull-up on GNT0/1#
[Need external pull-down for LPC BIOS]

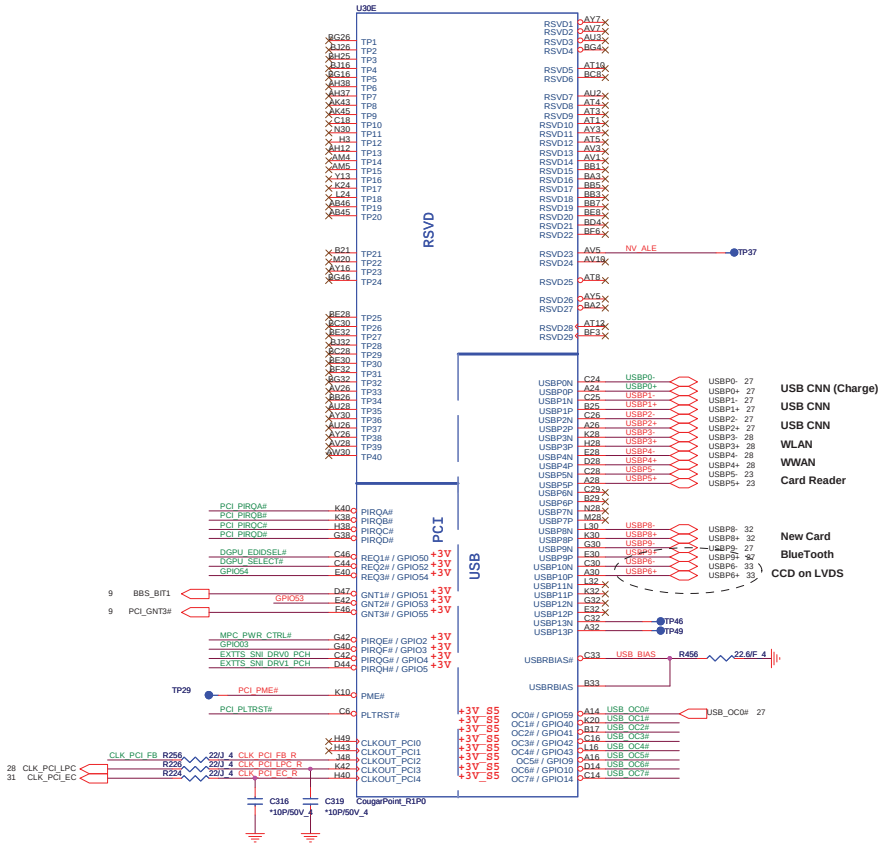
GNT[3:0]# functionality is not available on Mobile. Used as GPIO only.

Default weak pull-up on GNT0/1#
[Need external pull-down for LPC BIOS]

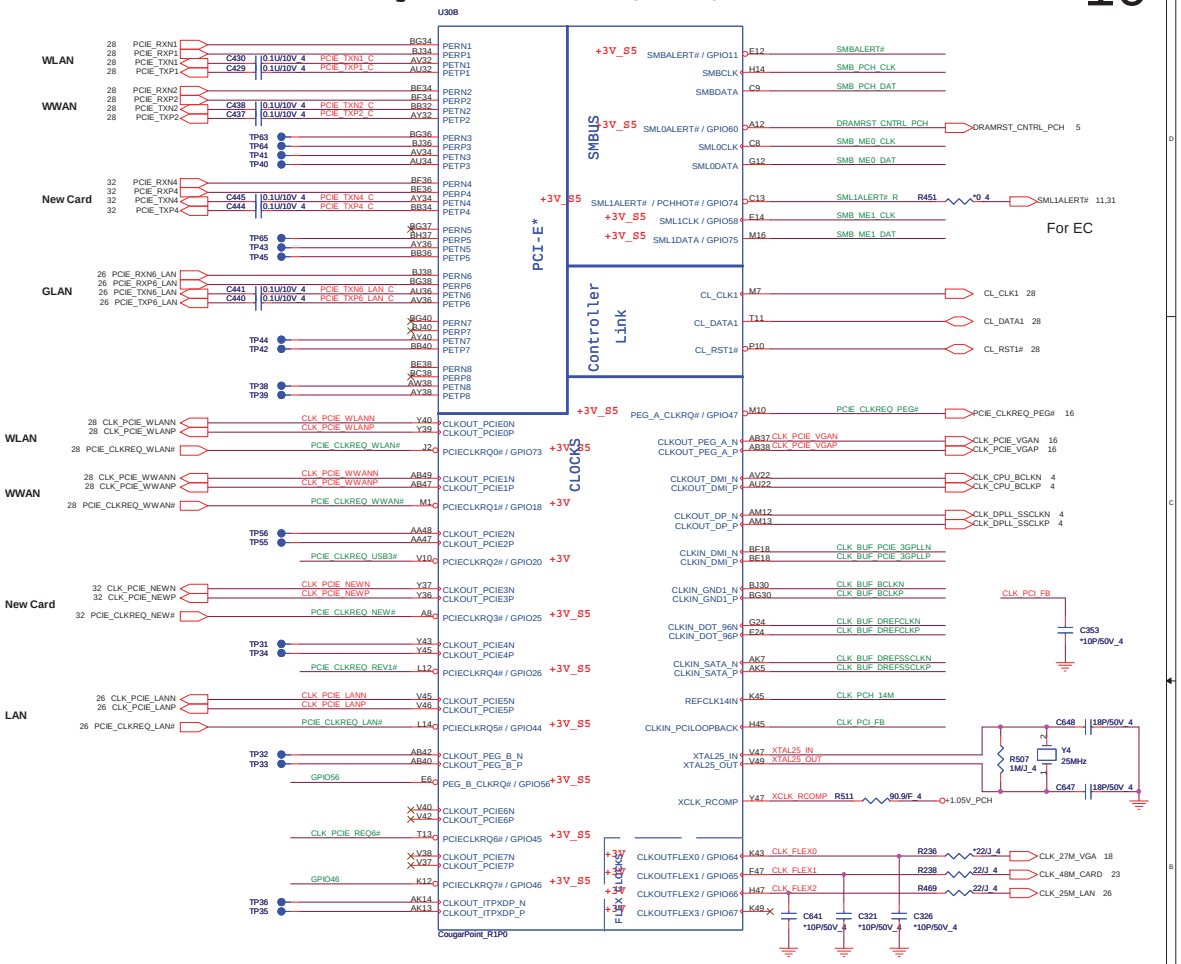
R8361 change to 1K ohm follow DG1.0 and chklist 1.0 It needs to be connected to PROC_SELECT with a 1K±5% pull-up resistor to PCH VCCPNAND rail and a 4.7K±5% series resistor.

New Add in CPT EDS Rev1.0 at 0316 , Needs to be pulled High for Huron River platform.

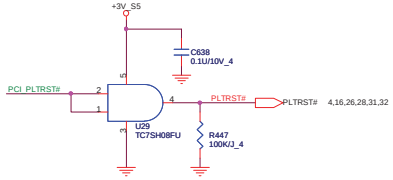
# Cougar Point-M (PCI,USB,NVRAM)



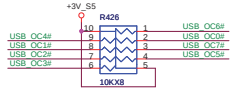

# Cougar Point-M (PCI-E,SMBUS,CLK)

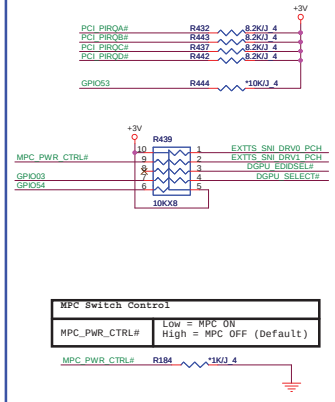



## PLTRST#(CLG)

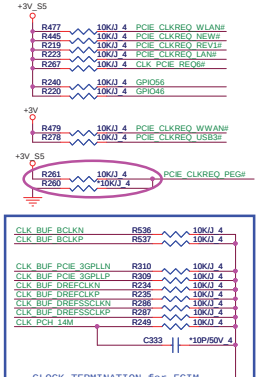



## PCI/USBOC# Pull-up(CLG)

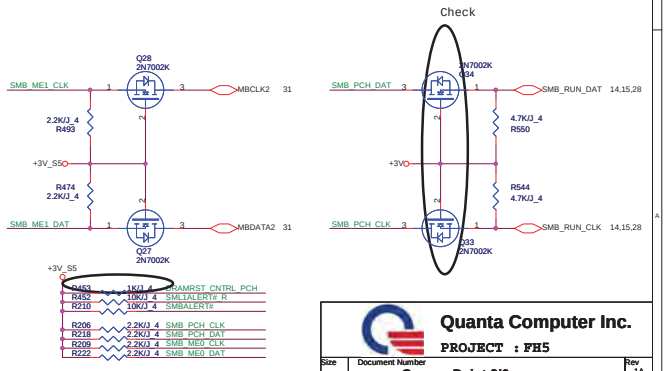



## CLK_REQ/Strap Pin(CLG)




## SMBus/Pull-up(CLG)




Quanta Computer Inc.
PROJECT : FH5

| Size | Document Number | Rev |
|---|---|---|
| | Cougar Point 3/6 | 1A |
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# Cougar Point (GPIO,VSS_NCTF,RSVD)



## SGPIO

S_GPIO — R509 1K/J_4 — R510 *1K/J_4 — +3V

## GPIO15

Intel ME Crypto Transport Layer Security (TLS) cipher suite internal PD

0 = Intel ME TLS with no confidentiality

**1 = Intel ME TLS with confidentiality**

U30F

| | | | | | |
|---|---|---|---|---|---|
| | S_GPIO | T7 | BMBUSY# / GPIO0 +3V | +3V | TACH4 / GPIO68 C40 BOARD_ID2 |
| 31 EC_EXT_SMI# | EC_EXT_SMI# | A42 | TACH1 / GPIO1 +3V | +3V | TACH5 / GPIO69 B41 R461 1.5K/F_4 |
| | BOARD_ID1 | H36 | TACH2 / GPIO6 +3V | +3V | TACH6 / GPIO70 C41 R462 1.5K/F_4 +3V |
| 31 EC_EXT_SCI# | EC_EXT_SCI# | E38 | TACH3 / GPIO7 +3V | +3V | TACH7 / GPIO71 A40 R460 1.5K/F_4 |
| TP48 | ICC_EN# | C10 | GPIO8 +3V_S5 | | |
| TP27 | LAN_DISABLE# | C4 | LAN_PHY_PWR_CTRL / GPIO12 | +3V_S5 | |
| 9 PCH_GPIO15 | | G2 | GPIO15 +3V_S5 | | A20GATE P4 EC_A20GATE — EC_A20GATE 31 |
| 16 DGPU_HOLD_RST# | | U2 | SATA4GP / GPIO16 +3V | | PECI AU16 R294 *0_4 — EC_PECI 4,31 |
| 16,31 GFXPG | GFXPG | D40 | TACH0 / GPIO17 +3V | | RCIN# P5 EC_RCIN# — EC_RCIN# 31 |
| | BIOS_REC | T5 | SCLOCK / GPIO22 +3V | | PROCPWRGD AY11 — H_PWRGOOD 4 |
| 31 BIOS_WP# | +3V_S5 R239 1K/F_4 | E8 | GPIO24 / MEM_LED +3V_S5 | | THRMTRIP# AY10 PCH_THRMTRIP# R292 390/J_4 — PM_THRMTRIP# 4 |
| | GPIO27 | E16 | GPIO27 DSW | | INIT3_3V# T14 |
| 9 PLL_ODVR_EN | | P8 | GPIO28 +3V_S5 | | DF_TVS AY1 — DF_TVS 9 |
| | STP_PCI# | K1 | STP_PCI# / GPIO34 +3V | | TS_VSS1 AH8 |
| GPUCORE_ON | 31,39,41 dGPU_VRON | K4 | GPIO35 +3V | | TS_VSS2 AK11 |
| GPU_PWR_ON | 41 dGPU_PWR_EN — dGPU_PWR_EN R274 EV@0_4 DMI_OVRVLTG | V8 | SATA2GP / GPIO36 +3V | | TS_VSS3 AH10 |
| | dGPU_PRSNT# R501 EV@0_4 FDI_OVRVLTG | M5 | SATA3GP / GPIO37 +3V | | TS_VSS4 AK10 |
| | MFG_MODE | N2 | SLOAD / GPIO38 +3V | | NC_1 P37 |
| | BOARD_ID0 | M3 | SDATAOUT0 / GPIO39 +3V | | |
| | TEST_SET_UP | V13 | SDATAOUT1 / GPIO48 +3V | | VSS_NCTF_15 BG2 |
| 10,31 SML1ALERT# | R498 0_4 CRIT_TEMP_REP# | V3 | SATA5GP / GPIO49 +3V | | VSS_NCTF_16 BG48 |
| | SV_DET | D6 | GPIO57 +3V_S5 | | VSS_NCTF_17 BH3 |
| | | | | | VSS_NCTF_18 BH47 |
| | | A4 | VSS_NCTF_1 | | VSS_NCTF_19 BJ4 |
| | | A44 | VSS_NCTF_2 | | VSS_NCTF_20 BJ44 |
| | | A45 | VSS_NCTF_3 | | VSS_NCTF_21 BJ45 |
| | | A46 | VSS_NCTF_4 | | VSS_NCTF_22 BJ46 |
| | | A5 | VSS_NCTF_5 | | VSS_NCTF_23 BJ5 |
| | | A6 | VSS_NCTF_6 | | VSS_NCTF_24 BJ6 |
| | | B3 | VSS_NCTF_7 | | VSS_NCTF_25 C2 |
| | | B47 | VSS_NCTF_8 | | VSS_NCTF_26 C48 |
| | | BD1 | VSS_NCTF_9 | | VSS_NCTF_27 D1 |
| | | BD49 | VSS_NCTF_10 | | VSS_NCTF_28 D49 |
| | | BE1 | VSS_NCTF_11 | | VSS_NCTF_29 E1 |
| | | BE49 | VSS_NCTF_12 | | VSS_NCTF_30 E49 |
| | | BF1 | VSS_NCTF_13 | | VSS_NCTF_31 F1 |
| | | BF49 | VSS_NCTF_14 | | VSS_NCTF_32 F49 |

GPIO — CPU/MISC — NCTF

CougarPoint_R1P0

Muxed with STP_PCI#
If not used, 8.2-kΩ to 10-kΩ pull-up to +V3.3S.

Un-multiplexed. Can be configured as wake input to allow wakes from Deep Sleep.
If not used then use 8.2-kΩ to 10-kΩ pull-down to GND.

## GPIO Pull-up/Pull-down(CLG)

+3V_S5
- LAN_DISABLE# R229 10K/J_4
- PLL_ODVR_EN R496 10K/J_4
- ICC_EN# R448 *10K/J_4

+3V
- EC_EXT_SMI# R463 10K/J_4
- EC_EXT_SCI# R433 10K/J_4
- STP_PCI# R480 10K/J_4
- EC_A20GATE R259 10K/J_4
- EC_RCIN# R258 10K/J_4
- GFXPG R431 *10K/J_4
- CRIT_TEMP_REP# R497 10K/J_4
- dGPU_PWR_EN R280 10K/J_4

GPIO27 — R225 10K/J_4

SATA[3:2]GP/GPIO[37:36] internal Pull-down 20K
SATA2GP/GPIO36 (FDI_OVRVLTG) & SATA3GP/GPIO37 (DMI_OVRVLTG)
Sampled at Rising edge of PWROK.
Weak internal pull-down. (weak internal pull-down is disabled after PLTRST# de-asserts)
NOTE: This signal should NOT be pulled high when strap is sampled

R506 *100K/J_4 FDI_OVRVLTG R500 *1K/J_4 +3V

| | |
|---|---|
| FDI TERMINATION VOLTAGE OVERRIDE | LOW - Tx, Rx terminated to same voltage |

DMI_OVRVLTG R282 *200K/F_4 +3V

| | |
|---|---|
| DMI TERMINATION VOLTAGE OVERRIDE | Low = Tx, Rx terminated to same voltage (DC Coupling Mode) (DEFAULT) |

BIOS_REC R272 10K/J_4 R271 *1K/J_4 +3V

| | |
|---|---|
| BIOS RECOVERY | High = Disable (Default)<br>Low = Enable |

| SV_SET_UP |
|---|
| High = Strong (Default) |

TEST_SET_UP — R430 10K/J_4 R435 *1K/J_4 +3V

## MFG-TEST

MFG_MODE — R482 10K/J_4 R488 *1K/J_4 +3V

+3V_S5 — R231 *10K/J_4 — SV_DET — R233 100K/J_4

| [ID0:D1] | 0:0 | 0:1 | 1:0 | 1:1 |
|---|---|---|---|---|
| Fuction | UMA | Optimus (Hynix) | Optimus (Samsung) | Rev. |
| Board ID2 | reserve | PD | | |

+3V
- R250 *SP@10K/J_4 BOARD_ID0 R245 SP@10K/J_4
- R190 SP@10K/J_4 BOARD_ID1 R189 *SP@10K/J_4
- R458 SP@10K/J_4 BOARD_ID2 R459 *SP@10K/J_4

| | EV | UMA |
|---|---|---|
| Stuff | Ra | Rb |

+3V — R504 SPE@10K/J_4 — DGPU_PRSNT# — R505 *SPI@100K/J_4

Ra Rb

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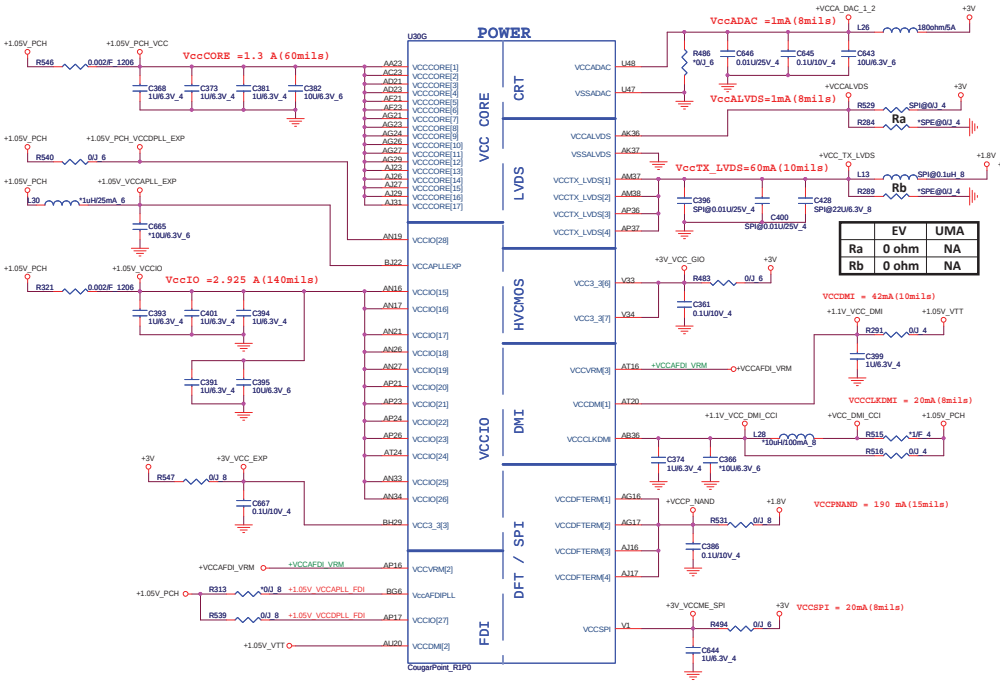
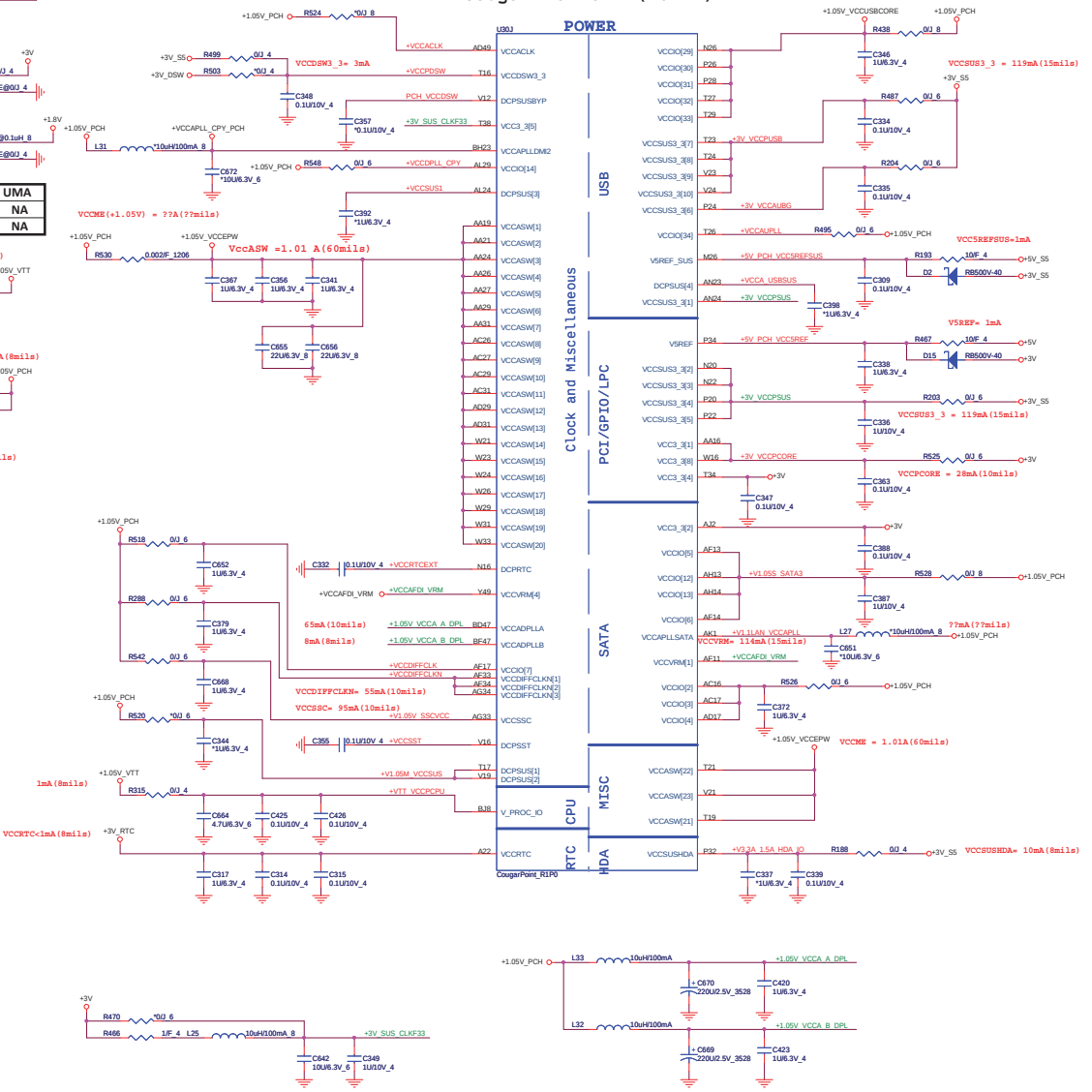
PCH5(CLG)

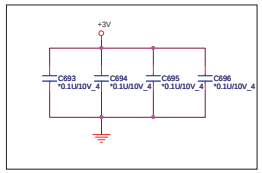
## COUGAR POINT (POWER)




| | EV | UMA |
|---|---|---|
| Ra | 0 ohm | NA |
| Rb | 0 ohm | NA |

## Cougar Point-M (POWER)




| | | | |
|---|---|---|---|
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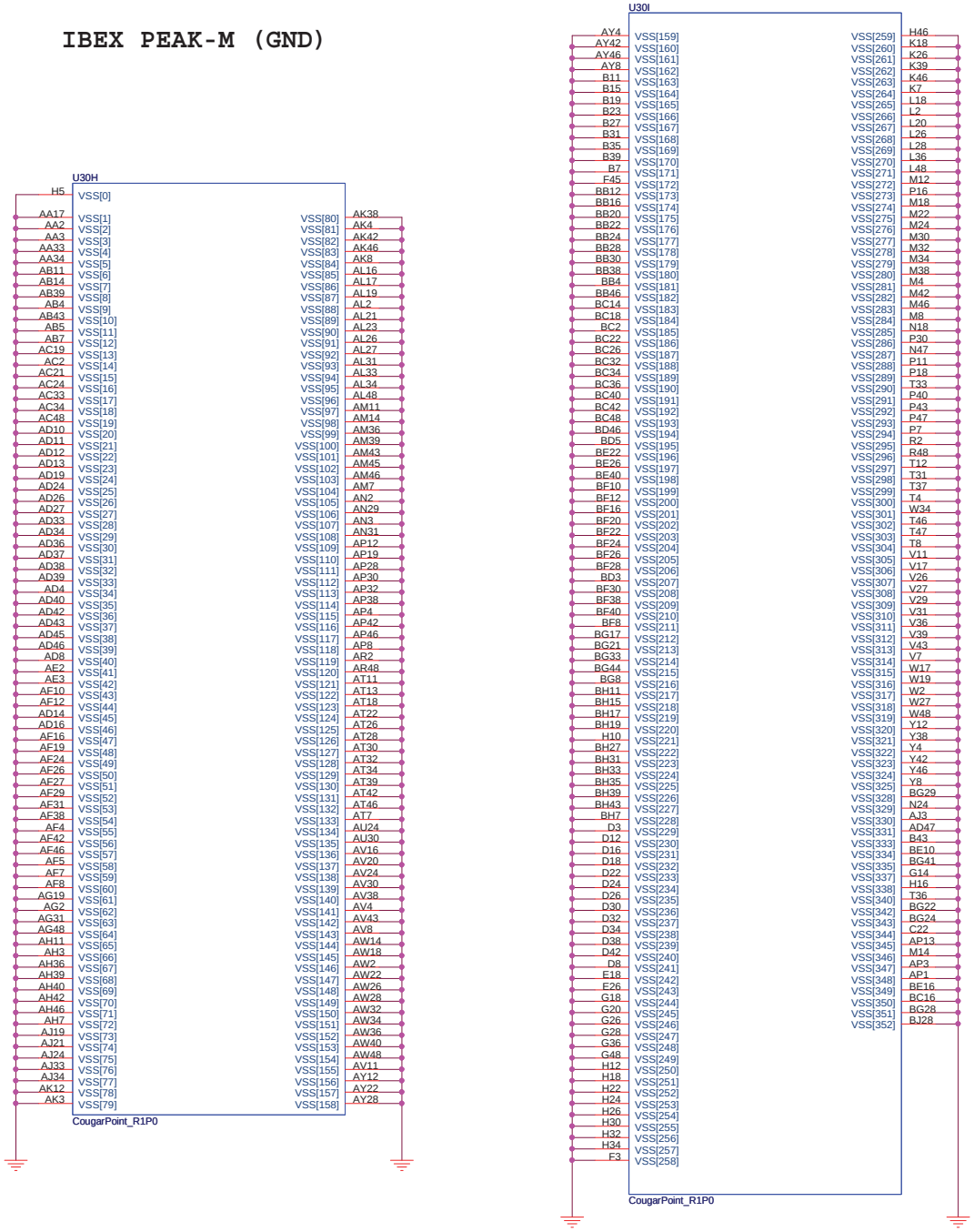
## IBEX PEAK-M (GND)







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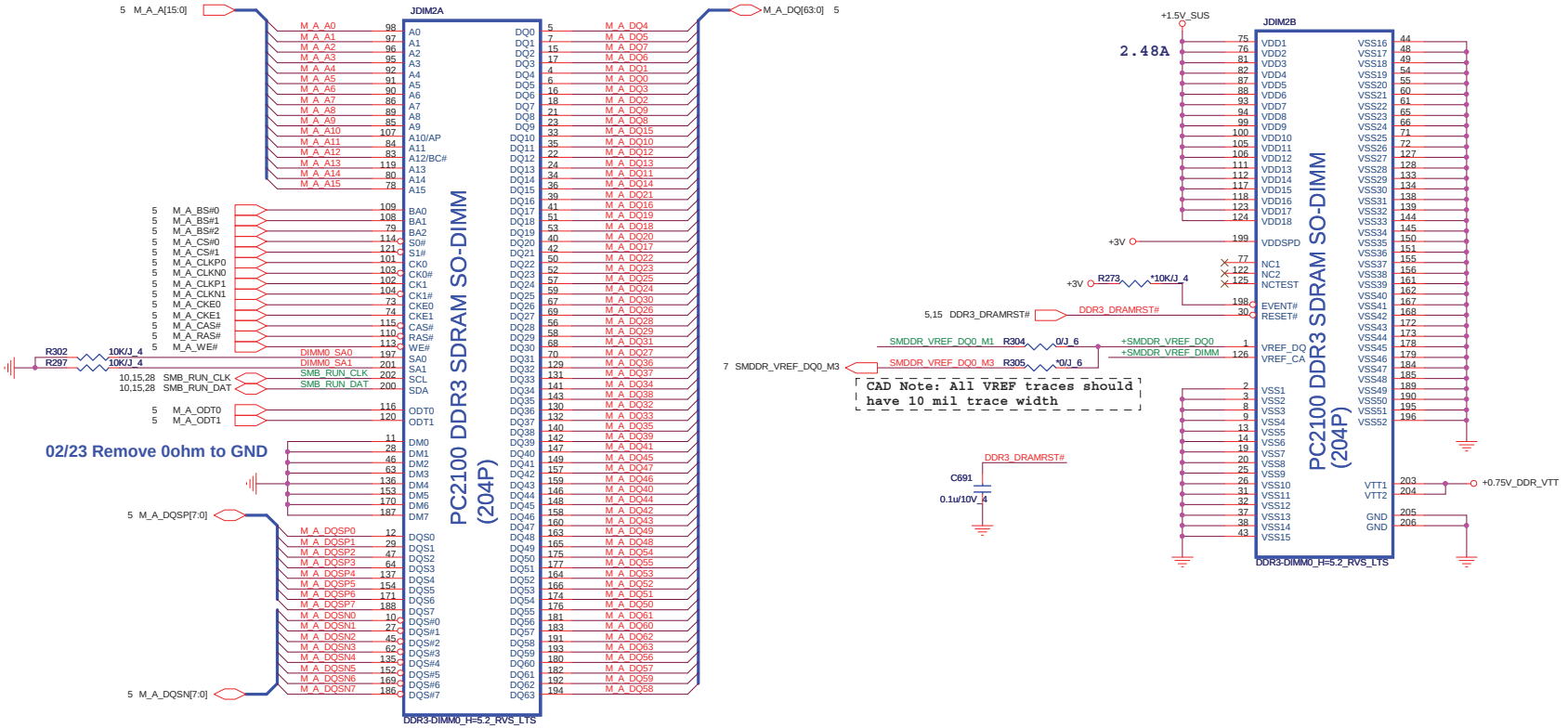
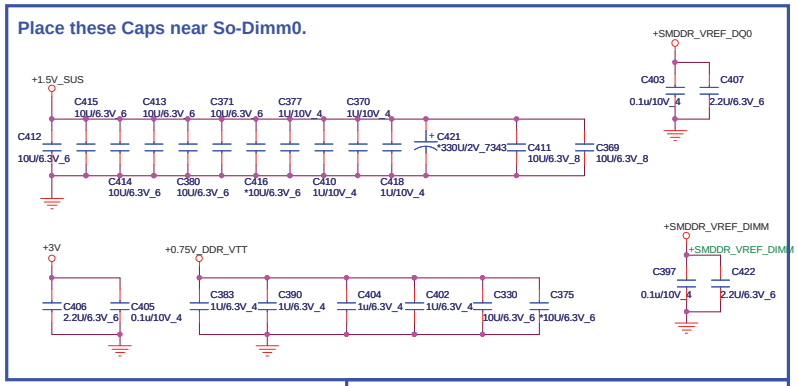
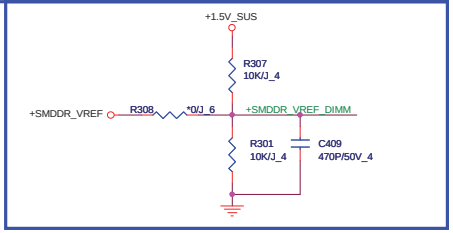
# DDR_STD(DDR)

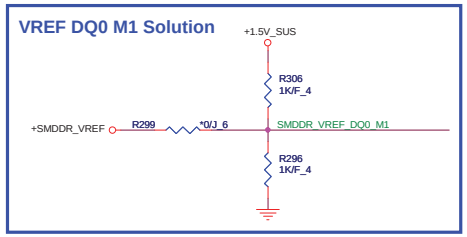








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| | DDRIII SO-DIMM-0 | 1A |

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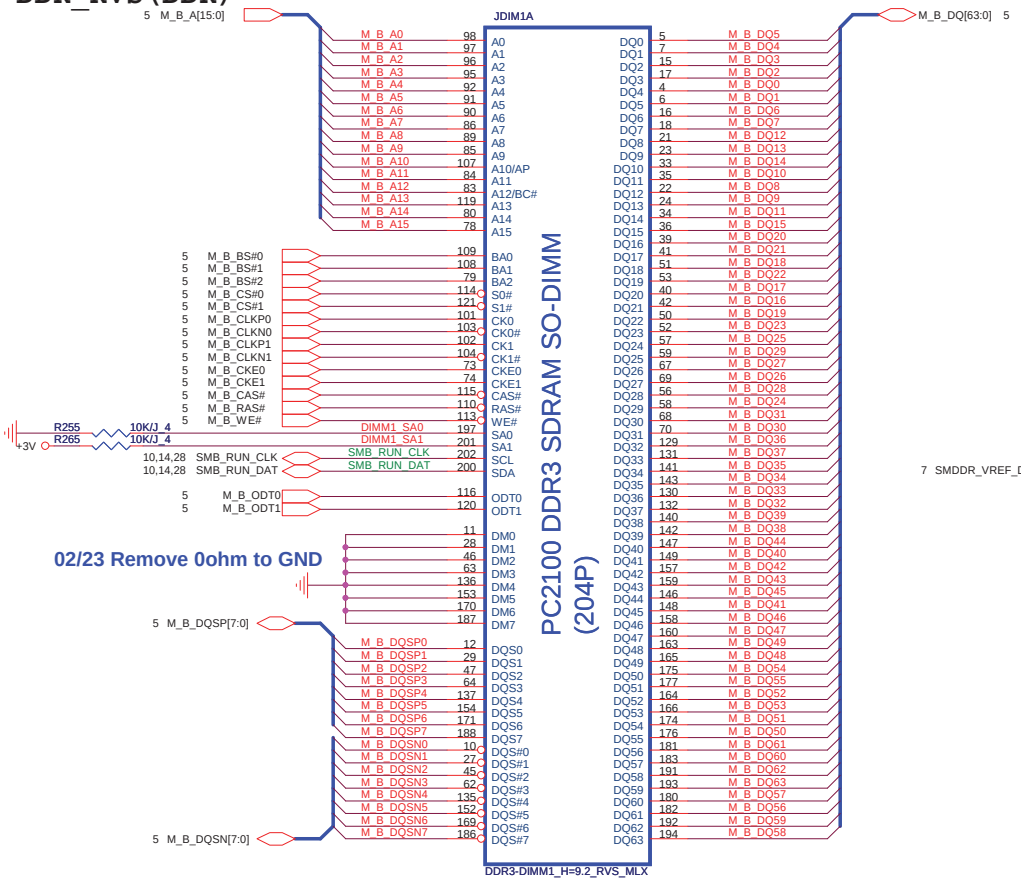
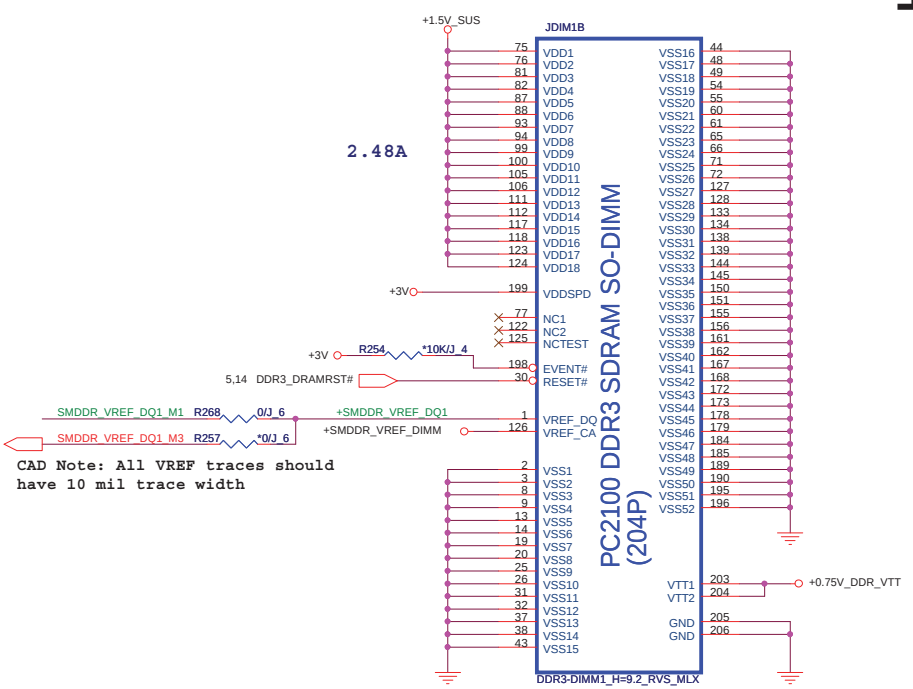
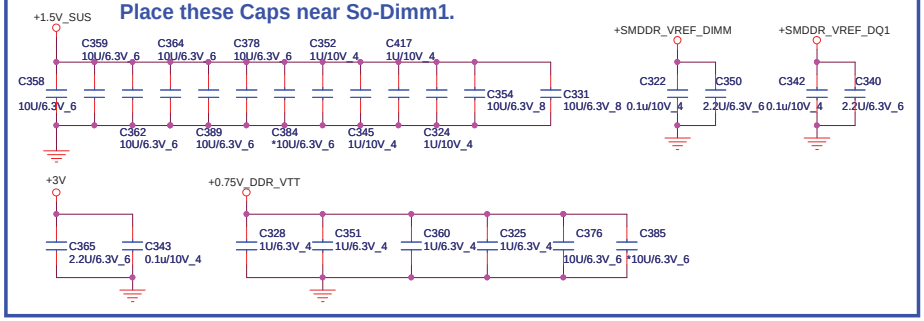
# DDR_RVS (DDR)

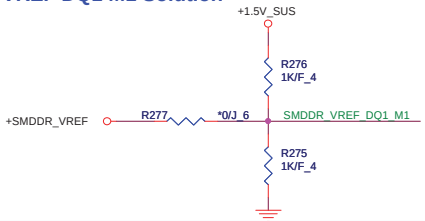



## Place these Caps near So-Dimm1.




## VREF DQ1 M1 Solution




| | STD 4H | STD 8H |
|---|---|---|
| FOX | | |
| LTK | DGMK4000004 | DGMK4000097 |
| SUY | | |
| MLX | DGMK4000011 | DGMK4000080 |

Standard 8H type:DDR-C-2013310-204p-1

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| | DDRIII SO-DIMM-1 | 1A |
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PEX_IOVDD+PEX_IOVDDQ+PEX_PLLVDD >2.2A

2000mA

+1.05V_GPU

PLACE NEAR BALLS

PLACE NEAR BGA

C97 *EV@0.1U/10V_4
C73 EV@0.1U/10V_4
C114 EV@0.1U/10V_4
C122 EV@1U/6.3V_4
C28 EV@1U/6.3V_4
C24 EV@4.7U/6.3V_6
C516 EV@10U/6.3V_8
C17 EV@22U/6.3V_8

C84 *EV@0.1U/10V_4
C23 EV@0.1U/10V_4
C125 EV@0.1U/10V_4
C131 EV@1U/6.3V_4
C134 EV@1U/6.3V_4
C71 EV@4.7U/6.3V_6
C18 EV@10U/6.3V_8
C517 EV@22U/6.3V_8

120mA

+3V_GPU

C95 EV@4.7U/6.3V_6
C81 EV@1U/6.3V_4
C79 EV@0.1U/10V_4
C76 EV@0.1U/10V_4
C98 EV@0.1U/10V_4

39 VGPU_VCC_SENSE
39 VGPU_VSS_SENSE

120mA 120-ohm / ESR=0.18

+1.05V_GPU L9 EV@BLM18AG121SN1D

C61 EV@4.7U/6.3V/X7R_6
C68 EV@1U/6.3V/X7R_4
C75 *EV@1U/6.3V_4
C78 *EV@1U/6.3V_4
C55 EV@0.1U/10V/X7R_4

+PEX_PLLVDD

120mA

+3V_GPU
+1.05V_GPU

L6 EV@0_6
L10 *EV@0_6

+PEX_SVDD_3V3

C56 EV@0.1U/10V_4
C42 EV@4.7U/6.3V_6

U23A
fcbga973-nvidia-n12p-ge
COMMON

PCI EXPRESS

PEX_IOVDD_1
PEX_IOVDD_2
PEX_IOVDD_3
PEX_IOVDD_4
PEX_IOVDD_5

PEX_IOVDDQ_1
PEX_IOVDDQ_2
PEX_IOVDDQ_3
PEX_IOVDDQ_4
PEX_IOVDDQ_5
PEX_IOVDDQ_6
PEX_IOVDDQ_7
PEX_IOVDDQ_8
PEX_IOVDDQ_9
PEX_IOVDDQ_10
PEX_IOVDDQ_11
PEX_IOVDDQ_12
PEX_IOVDDQ_13
PEX_IOVDDQ_14
PEX_IOVDDQ_15
PEX_IOVDDQ_16
PEX_IOVDDQ_17
PEX_IOVDDQ_18
PEX_IOVDDQ_19
PEX_IOVDDQ_20
PEX_IOVDDQ_21
PEX_IOVDDQ_22
PEX_IOVDDQ_23
PEX_IOVDDQ_24
PEX_IOVDDQ_25

VDD33_1
VDD33_2
VDD33_3
VDD33_4
VDD33_5

VDD_SENSE
NC_9/ VDD_SENSE
NC_16/ VDD_SENSE

GND_SENSE
NC_10/ GND_SENSE
NC_17/ GND_SENSE

PEX_PLLVDD

PEX_CAL_PD_VDDQ/ PEX_SVDD_3V3
NC_12/ PEX_SVDD_3V3

PEX_CAL_PU_GND/ NC
NC_1
NC_2
NC_3
NC_4
NC_5
NC_6
NC_7
NC_8
NC_11
NC_13
NC_14
NC_15
NC_18
NC_19

PEX_RX0 PEX_RX0* PEX_RX1 PEX_RX1* PEX_RX2 PEX_RX2* PEX_RX3 PEX_RX3* PEX_RX4 PEX_RX4* PEX_RX5 PEX_RX5* PEX_RX6 PEX_RX6* PEX_RX7 PEX_RX7* PEX_RX8 PEX_RX8* PEX_RX9 PEX_RX9* PEX_RX10 PEX_RX10* PEX_RX11 PEX_RX11* PEX_RX12 PEX_RX12* PEX_RX13 PEX_RX13* PEX_RX14 PEX_RX14* PEX_RX15 PEX_RX15*

PEG_TXP15 4 PEG_TXN15 4 PEG_TXP14 4 PEG_TXN14 4 PEG_TXP13 4 PEG_TXN13 4 PEG_TXP12 4 PEG_TXN12 4 PEG_TXP11 4 PEG_TXN11 4 PEG_TXP10 4 PEG_TXN10 4 PEG_TXP9 4 PEG_TXN9 4 PEG_TXP8 4 PEG_TXN8 4 PEG_TXP7 4 PEG_TXN7 4 PEG_TXP6 4 PEG_TXN6 4 PEG_TXP5 4 PEG_TXN5 4 PEG_TXP4 4 PEG_TXN4 4 PEG_TXP3 4 PEG_TXN3 4 PEG_TXP2 4 PEG_TXN2 4 PEG_TXP1 4 PEG_TXN1 4 PEG_TXP0 4 PEG_TXN0 4

PEX_TX0 PEX_TX0* PEX_TX1 PEX_TX1* PEX_TX2 PEX_TX2* PEX_TX3 PEX_TX3* PEX_TX4 PEX_TX4* PEX_TX5 PEX_TX5* PEX_TX6 PEX_TX6* PEX_TX7 PEX_TX7* PEX_TX8 PEX_TX8* PEX_TX9 PEX_TX9* PEX_TX10 PEX_TX10* PEX_TX11 PEX_TX11* PEX_TX12 PEX_TX12* PEX_TX13 PEX_TX13* PEX_TX14 PEX_TX14* PEX_TX15 PEX_TX15*

PEG_RXP15_C C80 EV@0.1U/10V_4 PEG_RXP15 4
PEG_RXN15_C C89 EV@0.1U/10V_4 PEG_RXN15 4
PEG_RXP14_C C109 EV@0.1U/10V_4 PEG_RXP14 4
PEG_RXN14_C C102 EV@0.1U/10V_4 PEG_RXN14 4
PEG_RXP13_C C113 EV@0.1U/10V_4 PEG_RXP13 4
PEG_RXN13_C C108 EV@0.1U/10V_4 PEG_RXN13 4
PEG_RXP12_C C106 EV@0.1U/10V_4 PEG_RXP12 4
PEG_RXN12_C C112 EV@0.1U/10V_4 PEG_RXN12 4
PEG_RXP11_C C120 EV@0.1U/10V_4 PEG_RXP11 4
PEG_RXN11_C C123 EV@0.1U/10V_4 PEG_RXN11 4
PEG_RXP10_C C124 EV@0.1U/10V_4 PEG_RXP10 4
PEG_RXN10_C C127 EV@0.1U/10V_4 PEG_RXN10 4
PEG_RXP9_C C129 EV@0.1U/10V_4 PEG_RXP9 4
PEG_RXN9_C C137 EV@0.1U/10V_4 PEG_RXN9 4
PEG_RXP8_C C128 EV@0.1U/10V_4 PEG_RXP8 4
PEG_RXN8_C C136 EV@0.1U/10V_4 PEG_RXN8 4
PEG_RXP7_C C130 EV@0.1U/10V_4 PEG_RXP7 4
PEG_RXN7_C C138 EV@0.1U/10V_4 PEG_RXN7 4
PEG_RXP6_C C143 EV@0.1U/10V_4 PEG_RXP6 4
PEG_RXN6_C C145 EV@0.1U/10V_4 PEG_RXN6 4
PEG_RXP5_C C144 EV@0.1U/10V_4 PEG_RXP5 4
PEG_RXN5_C C147 EV@0.1U/10V_4 PEG_RXN5 4
PEG_RXP4_C C160 EV@0.1U/10V_4 PEG_RXP4 4
PEG_RXN4_C C153 EV@0.1U/10V_4 PEG_RXN4 4
PEG_RXP3_C C162 EV@0.1U/10V_4 PEG_RXP3 4
PEG_RXN3_C C157 EV@0.1U/10V_4 PEG_RXN3 4
PEG_RXP2_C C165 EV@0.1U/10V_4 PEG_RXP2 4
PEG_RXN2_C C168 EV@0.1U/10V_4 PEG_RXN2 4
PEG_RXP1_C C167 EV@0.1U/10V_4 PEG_RXP1 4
PEG_RXN1_C C170 EV@0.1U/10V_4 PEG_RXN1 4
PEG_RXP0_C C171 EV@0.1U/10V_4 PEG_RXP0 4
PEG_RXN0_C C173 EV@0.1U/10V_4 PEG_RXN0 4

PEX_REFCLK
PEX_REFCLK*
CLK_PCIE_VGAP 10
CLK_PCIE_VGAN 10

PEX_TSTCLK_OUT
PEX_TSTCLK_OUT*
PEX_TSTCLK R89 *EV@200/J_4 ??
PEX_TSTCLK# R90 1 2 EV@100K/J_4

PEX_RST* VGA_RST# R87 EV@0/J_4 GPU_RST# GPU_RST# 31

PEX_CLKREQ* PEX_CLKREQ# R401 EV@10K/J_4 +3V_GPU

PEX_TERMP PEX_TERMP R94 EV@2.49K/F_4

TESTMODE TESTMODE R110 EV@10K/J_4

R61 EV@10K_4
R60 EV@40.2K/F_4

Ffor N12P-GE, they can be unstuffed by default

GPU RST#

+3V
C59 EV@0.1U/10V_4
4,10,26,28,31,32 PLTRST#
11 DGPU_HOLD_RST#
GPU_RST#
U3 EV@TC7SH08FU
R55 EV@100K/J_4

GPU all PWROK

+3V +3V_GPU
R396 EV@10K_4
R397 EV@10K_4
GFXPG GFXPG 11,31
Q24 EV@MMBT3904
+1.5V_GPU R386 EV@10K_4 Q23 EV@PDTC143TT
*EV@1000P/50V/X7R_4@NC C515

+3V_GPU R385 *EV@10K/J_4 +3V
R383 EV@10K/J_4
PCIE_CLKREQ_PEG# 10
GFXPG R384 *EV@10K/F_4 Q22 EV@DTC144EUA
PEX_CLKREQ# Q21 EV@DTC144EUA

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U23B
fcbga973-nvidia-n12p-ge
COMMON

U23C
fcbga973-nvidia-n12p-ge
COMMON

## MEMORY I/F A

## MEMORY I/F C

5500mA

+1.5V_GPU

POP For Debug only
Place close to ball

30-ohm ESR=0.01-ohm
EV@BLM18AG331SN1D

100mA

+1.05V_GPU

15mils width

Check

PLACE NEAR BGA

PLACE NEAR BALLS

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Size | Document Number: N12P-GE (MEMORY I/F) 2/5 | Rev: 1A

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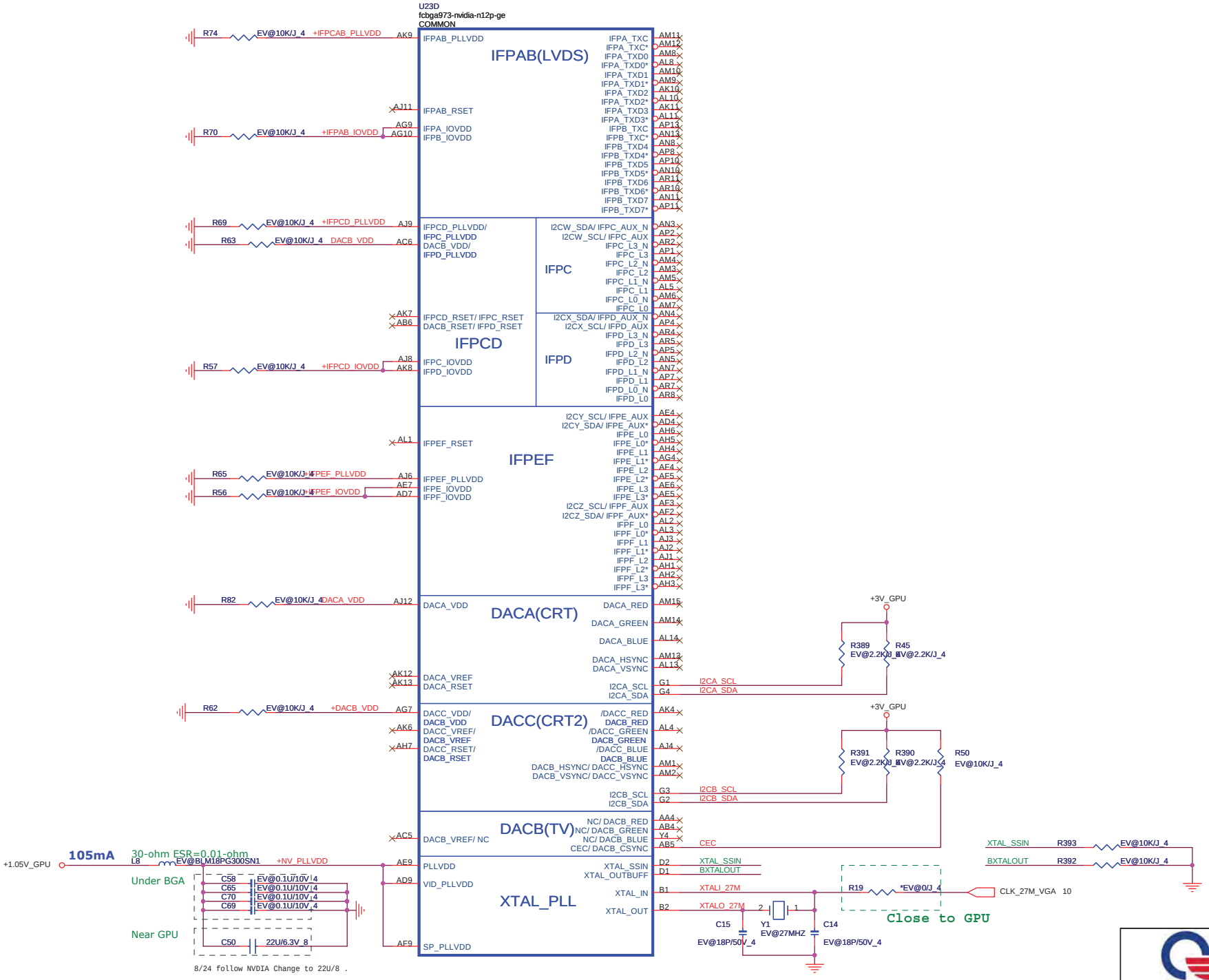
U23D
fcbga973-nvidia-n12p-ge
COMMON
IFPAB(LVDS)
IFPAB_PLLVDD
IFPAB_RSET
IFPA_IOVDD
IFPB_IOVDD
IFPA_TXC
IFPA_TXC*
IFPA_TXD0
IFPA_TXD0*
IFPA_TXD1
IFPA_TXD1*
IFPA_TXD2
IFPA_TXD2*
IFPA_TXD3
IFPA_TXD3*
IFPB_TXC
IFPB_TXC*
IFPB_TXD4
IFPB_TXD4*
IFPB_TXD5
IFPB_TXD5*
IFPB_TXD6
IFPB_TXD6*
IFPB_TXD7
IFPB_TXD7*
IFPCD
IFPCD_PLLVDD/ IFPC_PLLVDD
DACB_VDD/ IFPD_PLLVDD
IFPCD_RSET/ IFPC_RSET
DACB_RSET/ IFPD_RSET
IFPC_IOVDD
IFPD_IOVDD
IFPC
I2CW_SDA/ IFPC_AUX_N
I2CW_SCL/ IFPC_AUX
IFPC_L3_N
IFPC_L3
IFPC_L2_N
IFPC_L2
IFPC_L1_N
IFPC_L1
IFPC_L0_N
IFPC_L0
IFPD
I2CX_SDA/ IFPD_AUX_N
I2CX_SCL/ IFPD_AUX
IFPD_L3_N
IFPD_L3
IFPD_L2_N
IFPD_L2
IFPD_L1_N
IFPD_L1
IFPD_L0_N
IFPD_L0
IFPEF
IFPEF_RSET
IFPEF_PLLVDD
IFPE_IOVDD
IFPF_IOVDD
I2CY_SCL/ IFPE_AUX
I2CY_SDA/ IFPE_AUX*
IFPE_L0
IFPE_L0*
IFPE_L1
IFPE_L1*
IFPE_L2
IFPE_L2*
IFPE_L3
IFPE_L3*
I2CZ_SCL/ IFPF_AUX
I2CZ_SDA/ IFPF_AUX*
IFPF_L0
IFPF_L0*
IFPF_L1
IFPF_L1*
IFPF_L2
IFPF_L2*
IFPF_L3
IFPF_L3*
DACA(CRT)
DACA_VDD
DACA_VREF
DACA_RSET
DACA_RED
DACA_GREEN
DACA_BLUE
DACA_HSYNC
DACA_VSYNC
I2CA_SCL
I2CA_SDA
DACC(CRT2)
DACC_VDD/ DACB_VDD
DACC_VREF/ DACB_VREF
DACC_RSET/ DACB_RSET
/DACC_RED DACB_RED
/DACC_GREEN DACB_GREEN
/DACC_BLUE DACB_BLUE
DACB_HSYNC/ DACC_HSYNC
DACB_VSYNC/ DACC_VSYNC
I2CB_SCL
I2CB_SDA
DACB(TV)
DACB_VREF/ NC
NC/ DACB_RED
NC/ DACB_GREEN
NC/ DACB_BLUE
CEC/ DACB_CSYNC
XTAL_PLL
PLLVDD
VID_PLLVDD
SP_PLLVDD
XTAL_SSIN
XTAL_OUTBUFF
XTAL_IN
XTAL_OUT
R74 EV@10K/J_4 +IFPCAB_PLLVDD
R70 EV@10K/J_4 +IFPAB_IOVDD
R69 EV@10K/J_4 +IFPCD_PLLVDD
R63 EV@10K/J_4 DACB_VDD
R57 EV@10K/J_4 +IFPCD_IOVDD
R65 EV@10K/J_4 +IFPEF_PLLVDD
R56 EV@10K/J_4 +IFPEF_IOVDD
R82 EV@10K/J_4 DACA_VDD
R62 EV@10K/J_4 +DACB_VDD
+1.05V_GPU
105mA
30-ohm ESR=0.01-ohm
L8 EV@BLM18PG300SN1
+NV_PLLVDD
Under BGA
C58 EV@0.1U/10V_4
C65 EV@0.1U/10V_4
C70 EV@0.1U/10V_4
C69 EV@0.1U/10V_4
Near GPU
C50 22U/6.3V_8
8/24 follow NVDIA Change to 22U/8 .
+3V_GPU
R389 EV@2.2K/J_4
R45 EV@2.2K/J_4
R391 EV@2.2K/J_4
R390 EV@2.2K/J_4
R50 EV@10K/J_4
XTAL_SSIN
R393 EV@10K/J_4
BXTALOUT
R392 EV@10K/J_4
R19 *EV@0/J_4
CLK_27M_VGA 10
Close to GPU
C15 EV@18P/50V_4
Y1 EV@27MHZ
C14 EV@18P/50V_4
Quanta Computer Inc.
PROJECT : FH5
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Document Number
N12P-GE (DISPLAY) 3/5
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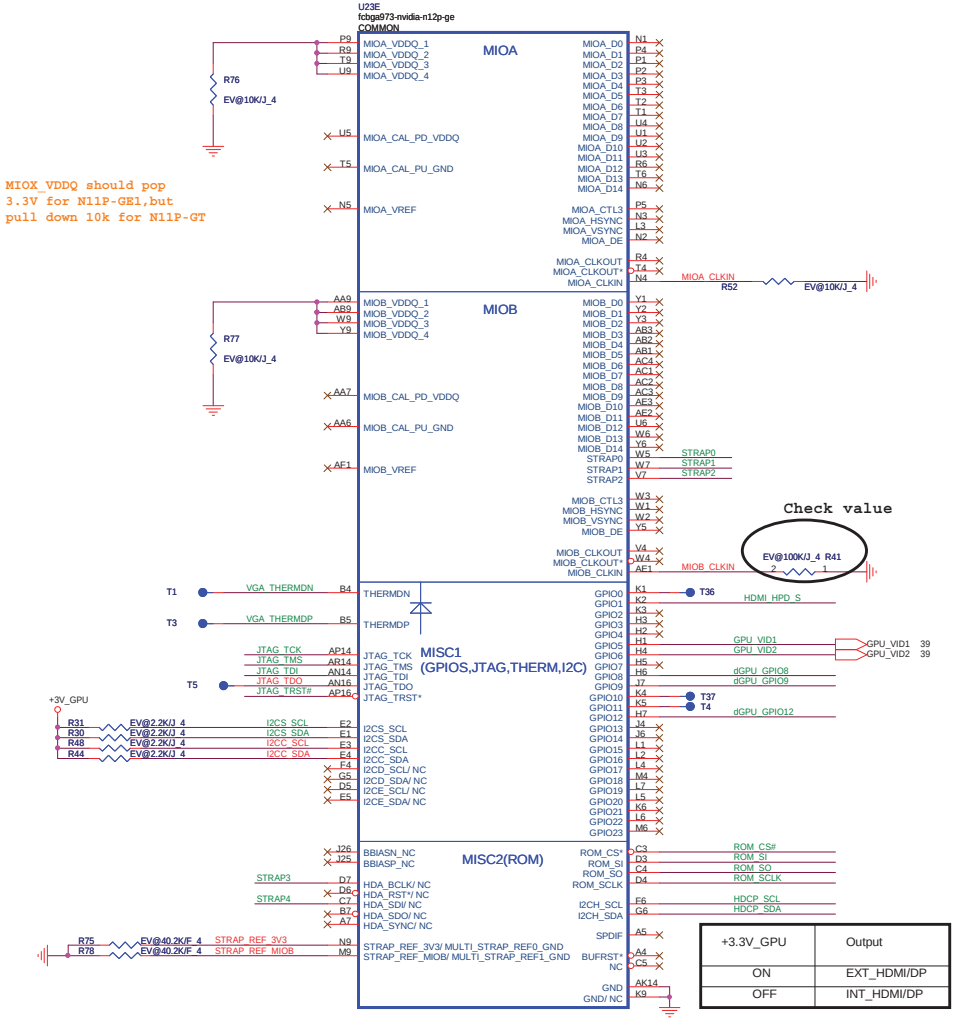
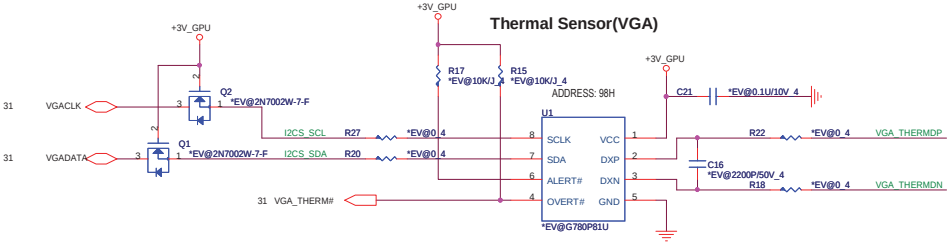



| +3.3V_GPU | Output |
|---|---|
| ON | EXT_HDMI/DP |
| OFF | INT_HDMI/DP |




| | Logical Strapping Bit3 | Logical Strapping Bit2 | Logical Strapping Bit1 | Logical Strapping Bit0 | |
|---|---|---|---|---|---|
| ROM_SO | XCLK_417 | FB_0_BAR_SIZE | SMB_ALT_ADDR | VGA_DEVICE | 0001 |
| ROM_SCLK | PCI_DEVIDE[4] | SUB_VENDOR | SLOT_CLK_CFG | PEX_PLL_EN_TERM | 1010 |
| ROM_SI | RAMCFG[3] | RAMCFG[2] | RAMCFG[1] | RAMCFG[0] | 0011 |
| STRAP0 | USER[3] | USER[2] | USER[1] | USER[0] | 1111 |
| STRAP1 | 3GIO_PADCFG[3] | 3GIO_PADCFG[2] | 3GIO_PADCFG[1] | 3GIO_PADCFG[0] | 0110 |
| STRAP2 | PCI_DEVID[3] | PCI_DEVID[2] | PCI_DEVID[1] | PCI_DEVID[0] | 0101 |
| STRAP3 | SOR_EXPOSED[3] | SOR_EXPOSED[2] | SOR_EXPOSED[1] | SOR_EXPOSED[0] | TBD |
| STRAP4 | Reserve | Reserve | PCI_MAX_SPEED | DP_PLL_VDD3 | TBD |

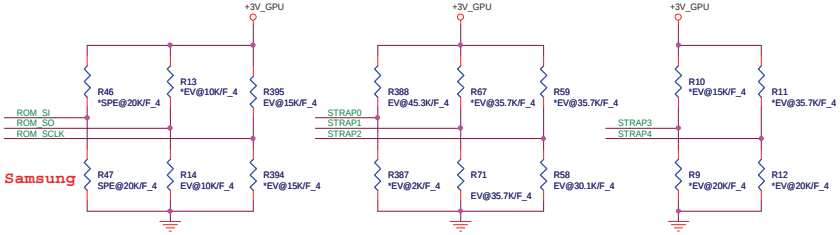
| | PU | PD |
|---|---|---|
| 5K | 1000 | 0000 |
| 10K | 1001 | 0001 |
| 15K | 1010 | 0010 |
| 20K | 1011 | 0011 |
| 25K | 1100 | 0100 |
| 30K | 1101 | 0101 |
| 35K | 1110 | 0110 |
| 45K | 1111 | 0111 |

VRAM Configuration Table

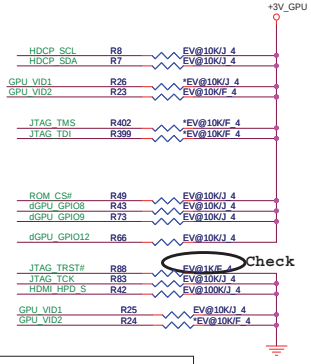
| RAMCFG [3:0] | DESCRIPTION | Quanta PN(Q buy) | Quanta PN(W buy) | Vendor PN |
|---|---|---|---|---|
| * 0x3(0011) | 900MHz 512MB(64M*16) Samsung | AKD5LGHT500 | | K4W1G1646E-HC11 |
| 0x2(0010) | 900MHz 512MB(64M*16) Hynix | AKD5LZWTW01 | AKD5LZWTW00 | H5TQ1G63BFR-11C |
| 0x6(0110) | 800MHz 1GB(128M*16) Hynix | AKD5MGGTW00 | AKD5MGGTW01 | H5TQ2G63BFR-12C |
| 0x7(0111) | 800MHz 1GB(128M*16) Samsung | AKD5MGGT501 | AKD5MGGT502 | K4W2G1646B-HC12 |

4.99K/F_4 ==> CS24992FB26
10K/F_4 ==> CS31002FB26
15K/F_4 ==> CS31502FB24
20K/F_4 ==> CS32002FB29
30.1K/F_4 ==> CS33012FB18
35.7K/F_4 ==> CS33572FB13
45.3K/F_4 ==> CS34532FB18

ROM_SI Strap Bit for RAM Mapping




N11P-GE1 DevID is 0x0DFE, so pull up
ROM_SCLK with 15Kohm and STRAP2
pull up 35Kohm




## GPIO ASSIGNMENTS

| GPIO | I/O | ACTIVE | USAGE |
|---|---|---|---|
| 0 | N/A | N/A | |
| 1 | IN | N/A | Hot plug detect for IFP link C |
| 2 | OUT | N/A | |
| 3 | OUT | N/A | |
| 4 | OUT | N/A | |
| 5 | OUT | N/A | NVVDD VID0 |
| 6 | OUT | N/A | NVVDD VID1 |
| 7 | OUT | N/A | NVVDD VID2 |
| 8 | I/O | LOW | OVERT |
| 9 | I/O | LOW | ALERT |
| 10 | OUT | N/A | FBVREF SELECT |
| 11 | OUT | N/A | SLI SYNC0 |
| 12 | IN | N/A | PWR_LEVEL |
| 13 | OUT | N/A | MEM_VID or power supply control |
| 14 | OUT | N/A | PS CONTROL |

NV VID Table for N12P-GE

| GPU_VID1 | GPU_VID2 | +VGPU_CORE |
|---|---|---|
| 0 | 0 | 0.825V |
| 1 | 0 | 0.9V |
| 0 | 1 | 0.95V |
| 1 | 1 | TBD |

Modify 8/18

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|---|---|---|
| | N12P-GE (GPIO&STRAPS)4/5 | 1A |

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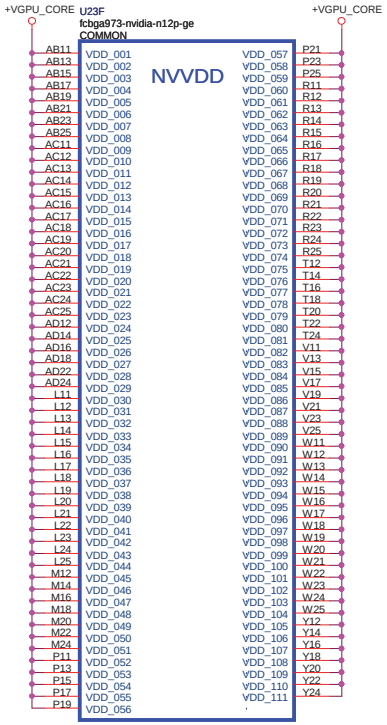


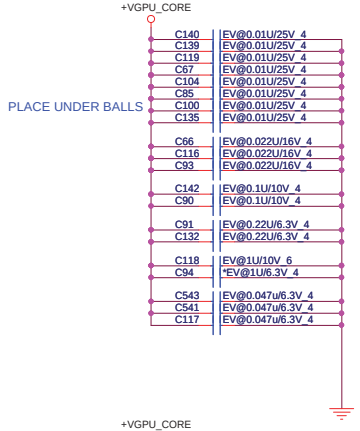


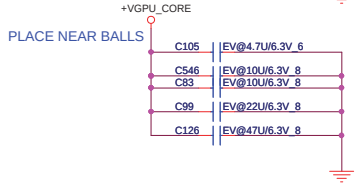


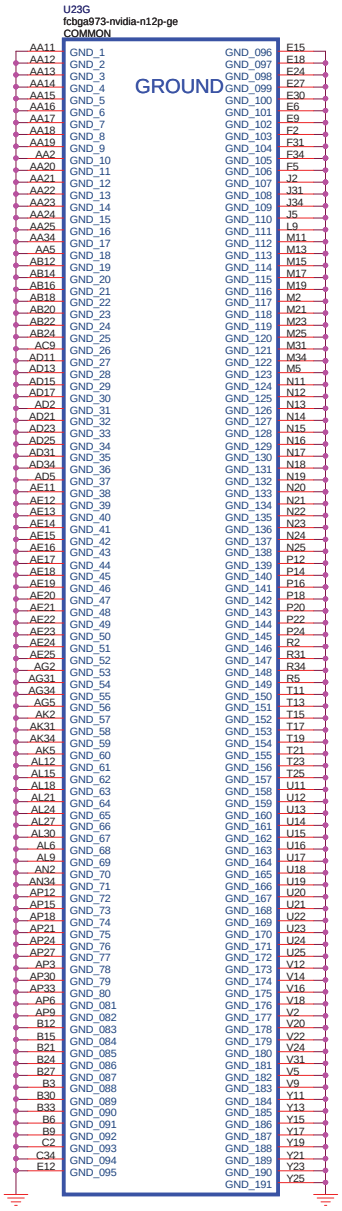


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| Size | Document Number | Rev |
|---|---|---|
| | N12P-GE(POWER&THM)5/5 | 1A |

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17 VMA_DQ[63..0]
17 VMA_DM[7..0]
17 VMA_WDQS[7..0]
17 VMA_RDQS[7..0]

# CHANNEL A: 512MB/1024MB DDR3

U7 / U27 / U6 / U26 — 96-BALL SDRAM DDR3 SPE@K4W1G1646E-HC11

Should be 240 Ohms +-1%

R114 EV@240/F_4 (U7)
R412 EV@240/F_4 (U27)
R138 EV@240/F_4 (U6)
R408 EV@240/F_4 (U26)

+1.5V_GPU

R142 EV@1.33K/F_4 — VREFC_VMA1 — R141 EV@1.33K/F_4 — C240 EV@0.01U/25V_4
R144 EV@1.33K/F_4 — VREFD_VMA1 — R143 EV@1.33K/F_4 — C241 EV@0.01U/25V_4
C594 *EV@10U/6.3V_6
R140 EV@1.33K/F_4 — VREFC_VMA3 — R139 EV@1.33K/F_4 — C237 EV@0.01U/25V_4
R136 EV@1.33K/F_4 — VREFD_VMA3 — R137 EV@1.33K/F_4 — C236 EV@0.01U/25V_4

3/22 Change R1/R2/C values for VREF

Placement has to be close to VRAM

R135 EV@162/F_4 — VMA_CLKP0
R134 EV@162/F_4 — VMA_CLKP1
VMA_CLKN0
VMA_CLKN1

+1.5V_GPU decoupling:
C593 C602 C214 C523 C601 C243 C40 C182 — EV@1U/6.3V_4
C603 C610 C592 C238 — EV@0.1U/10V_4
C599 C596 C595 C181 C212 C588 C35 — EV@1U/6.3V_4
C606 C607 C580 C609 — EV@0.1U/10V_4
C590 C246 C598 C591 C239 C604 C188 — EV@1U/6.3V_4
C210 C245 C600 C608 — EV@0.1U/10V_4
C192 C605 C235 C579 C242 C597 C524 — EV@1U/6.3V_4
C244 C577 C211 C611 — EV@0.1U/10V_4

GE1 FOR 243 BUT GT/E REQUIRE CHECK FAE

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# CHANNEL B: 512MB/1024MB DDR3

17 VMC_DQ[63..0]
17 VMC_DM[7..0]
17 VMC_WDQS[7..0]
17 VMC_RDQS[7..0]

U22 / U4 / U5 / U25 — 96-BALL SDRAM DDR3 SPE@K4W1G1646E-HC11

Should be 240 Ohms +-1%

R398 EV@240/F_4 — R91 EV@240/F_4 — R115 EV@240/F_4 — R100 EV@240/F_4

+1.5V_GPU

15 mil width and <500 mil

R39 EV@1.33K/F_4 — R38 EV@1.33K/F_4 — C36 EV@0.01U/25V_4
R36 EV@1.33K/F_4 — R37 EV@1.33K/F_4 — C34 EV@0.01U/25V_4
C519 *EV@10U/6.3V_6
R113 EV@1.33K/F_4 — R112 EV@1.33K/F_4 — C179 EV@0.01U/25V_4
R117 EV@1.33K/F_4 — R116 EV@1.33K/F_4 — C184 EV@0.01U/25V_4

VREFC_VMC1 / VREFD_VMC1 / VREFC_VMC3 / VREFD_VMC3

3/22 Change R1/R2/C values for VREF

Placement has to be close to VRAM

R40 EV@162/F_4 — VMC_CLKP0 / VMC_CLKN0
R111 EV@162/F_4 — VMC_CLKP1 / VMC_CLKN1

C544 C107 C82 C540 C545 C529 C187 C186 — EV@1U/6.3V_4
C542 C37 C63 C548 C54 C163 C189 — EV@1U/6.3V_4
C101 C177 C39 C174 C557 C166 C586 C191 — EV@1U/6.3V_4
C74 C536 C521 C169 C178 C520 C190 C587 — EV@1U/6.3V_4
C176 C38 C172 C518 — EV@0.1U/10V_4
C531 C180 C556 — EV@0.1U/10V_4
C92 C534 C48 C527 — EV@0.1U/10V_4
C60 C52 C156 — EV@0.1U/10V_4

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|---|---|---|
| | N12P-GE VRAM-2 | 1A |

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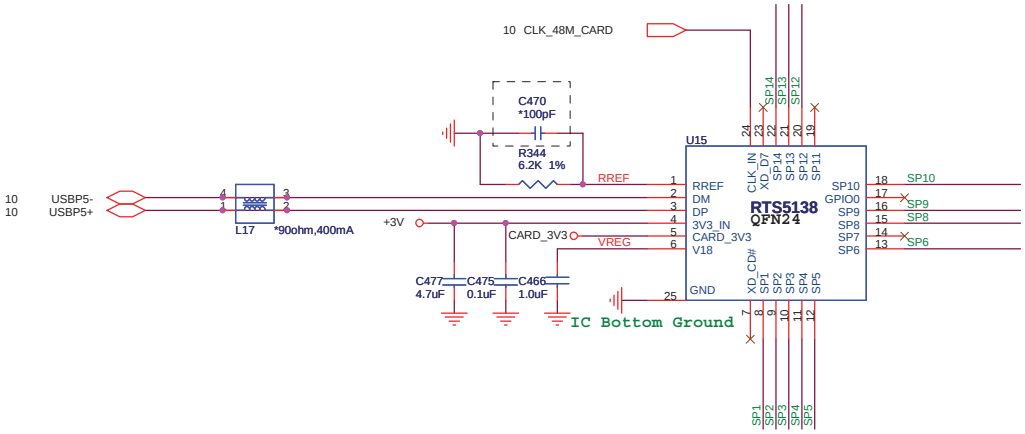
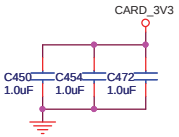
# RST5138 SIDO

## SD/SDHC CARD READER



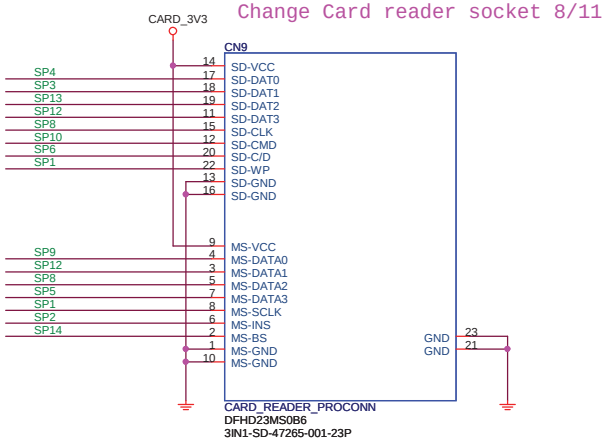



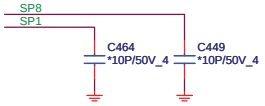

## Share Pin

| Share Pin | XD | MS | SD |
|---|---|---|---|
| SP1 | XDR/B# | MS_CLK | SD_WP |
| SP2 | XD_RE# | MS_INS# | |
| SP3 | XD_CE# | | SD_D1 |
| SP4 | XD_CLE | MS_D7 | SD_D0 |
| SP5 | XD_ALE | MS_D3 | SD_D7 |
| SP6 | XD_WE# | | SD_CD# |
| SP7 | XD_WP | MS_D6 | SD_D6 |
| SP8 | XD_D0 | MS_D2 | SD_CLK |
| SP9 | XD_D1 | MS_D0 | SD_D5 |
| SP10 | XD_D2 | | SD_CMD |
| SP11 | XD_D3 | MS_D4 | SD_D4 |
| SP12 | XD_D4 | MS_D1 | SD_D3 |
| SP13 | XD_D5 | MS_D5 | SD_D2 |
| SP14 | XD_D6 | MS_BS | |

# SD/MS CONNDETOR

Change Card reader socket 8/11

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PROJECT : FH5

| Size | Document Number | Rev |
|---|---|---|
| | Card Reader RST5138 | 3G |

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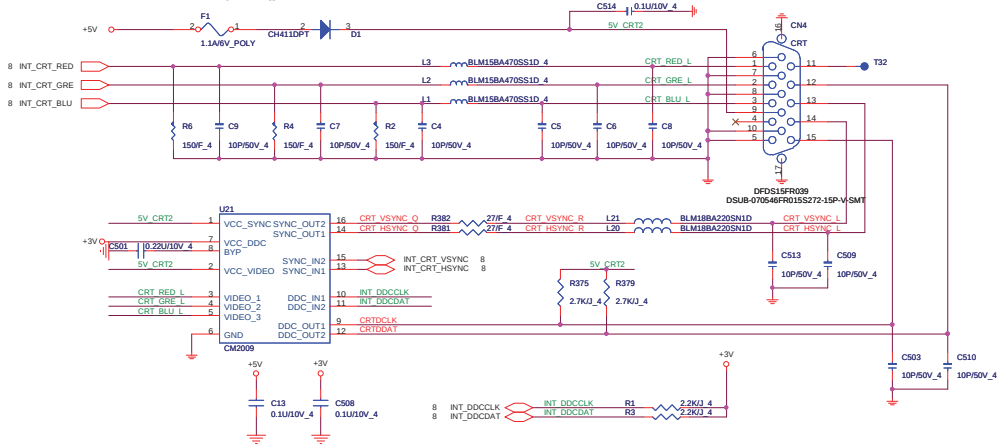
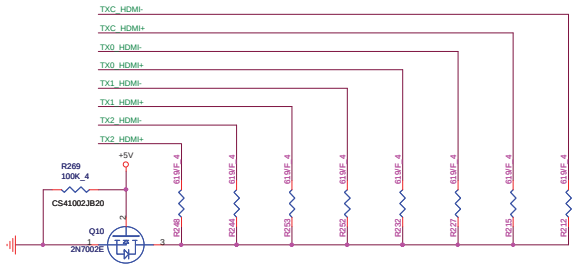
# CRT CONN/DDC LEVEL SHIFT

40mils

TBD CN5500 FOOTPRINT

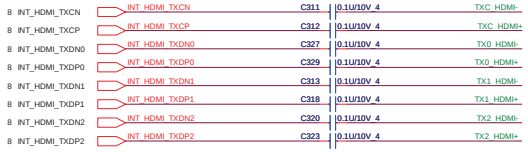


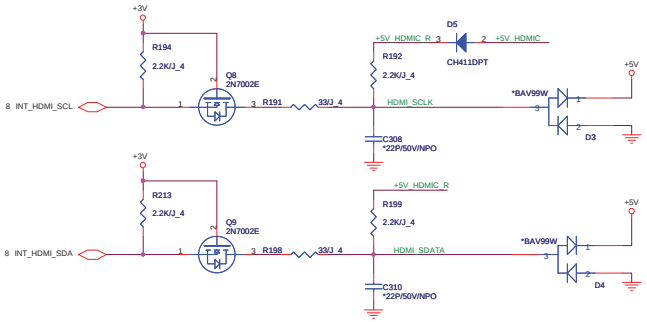




PLACE PULL DOWN RESISTORS CLOSE TO DIFFERENTIAL PAIRS CONNECTED TO SOLID GROUND FLOOD WHICH IS CONTROLLED BY THE FET
AVOID STUBS TO ALL DIFFERENTIAL TRACES

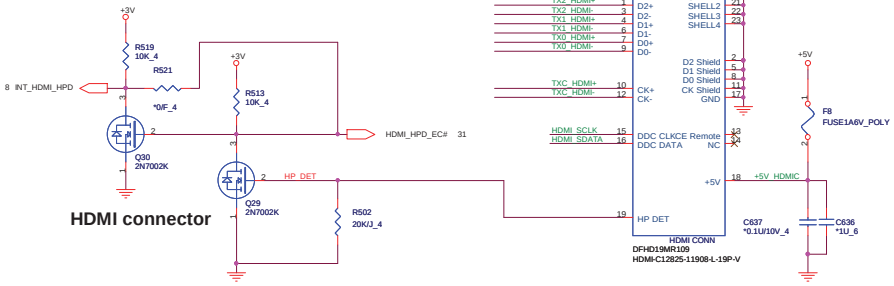
## INT-HDMI

PLACE AC CAP CLOSE TO CONNECTOR




## HDMI CONN




Quanta Computer Inc.

PROJECT : FH5

| Size | Document Number | Rev |
|---|---|---|
| | CRT CONN/HDMI | 1A |

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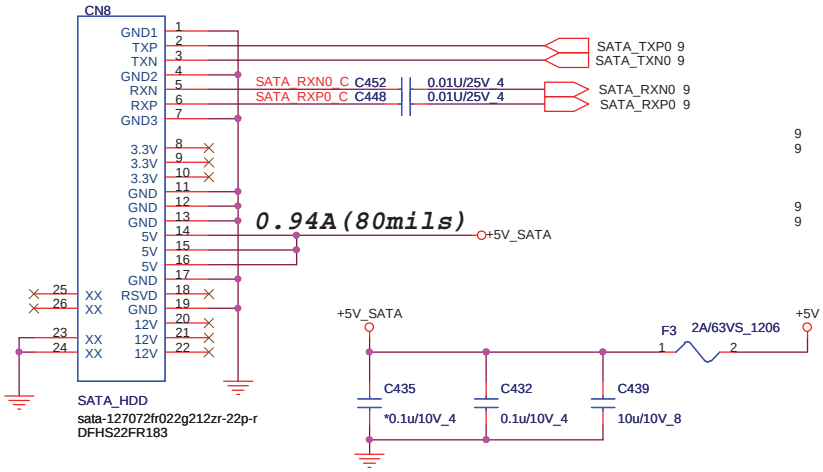
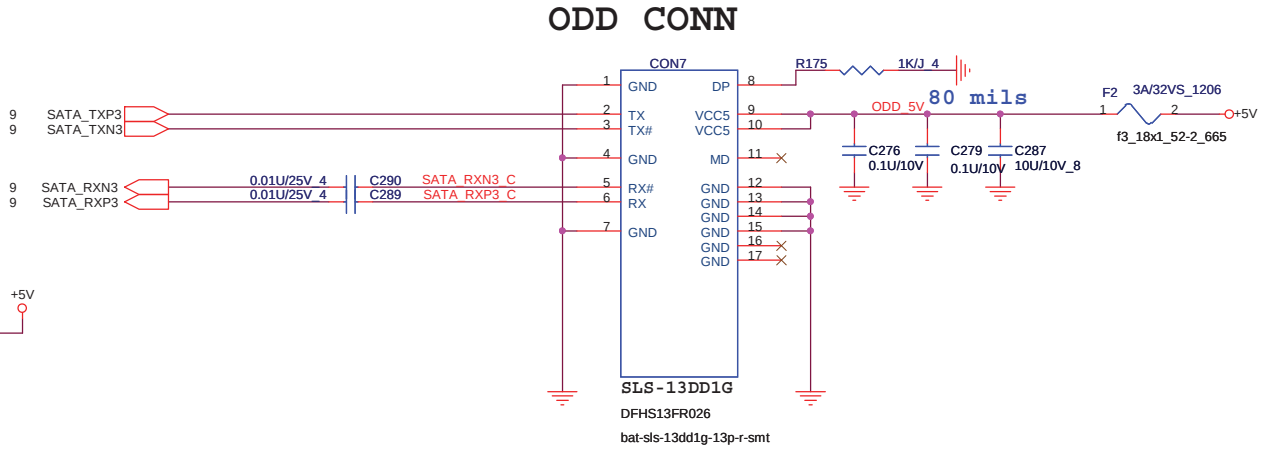
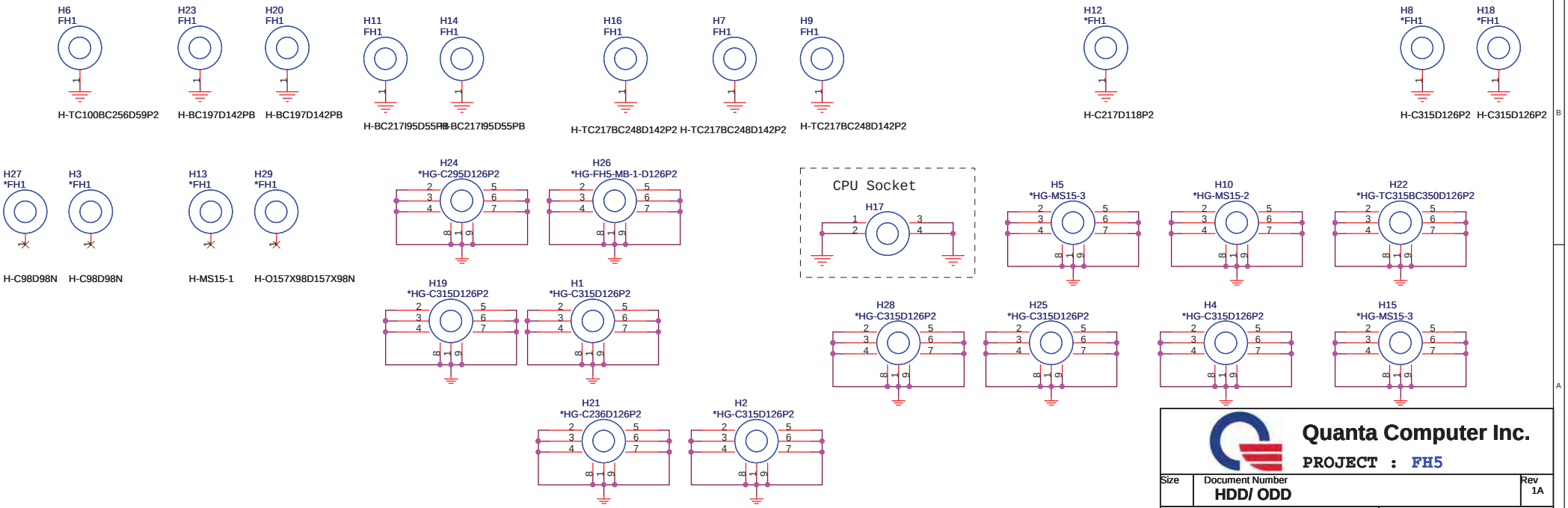
# 2.5" SATA HDD




# SATA ODD






Quanta Computer Inc.

PROJECT : FH5

| Size | Document Number | Rev |
|---|---|---|
| | HDD/ ODD | 1A |
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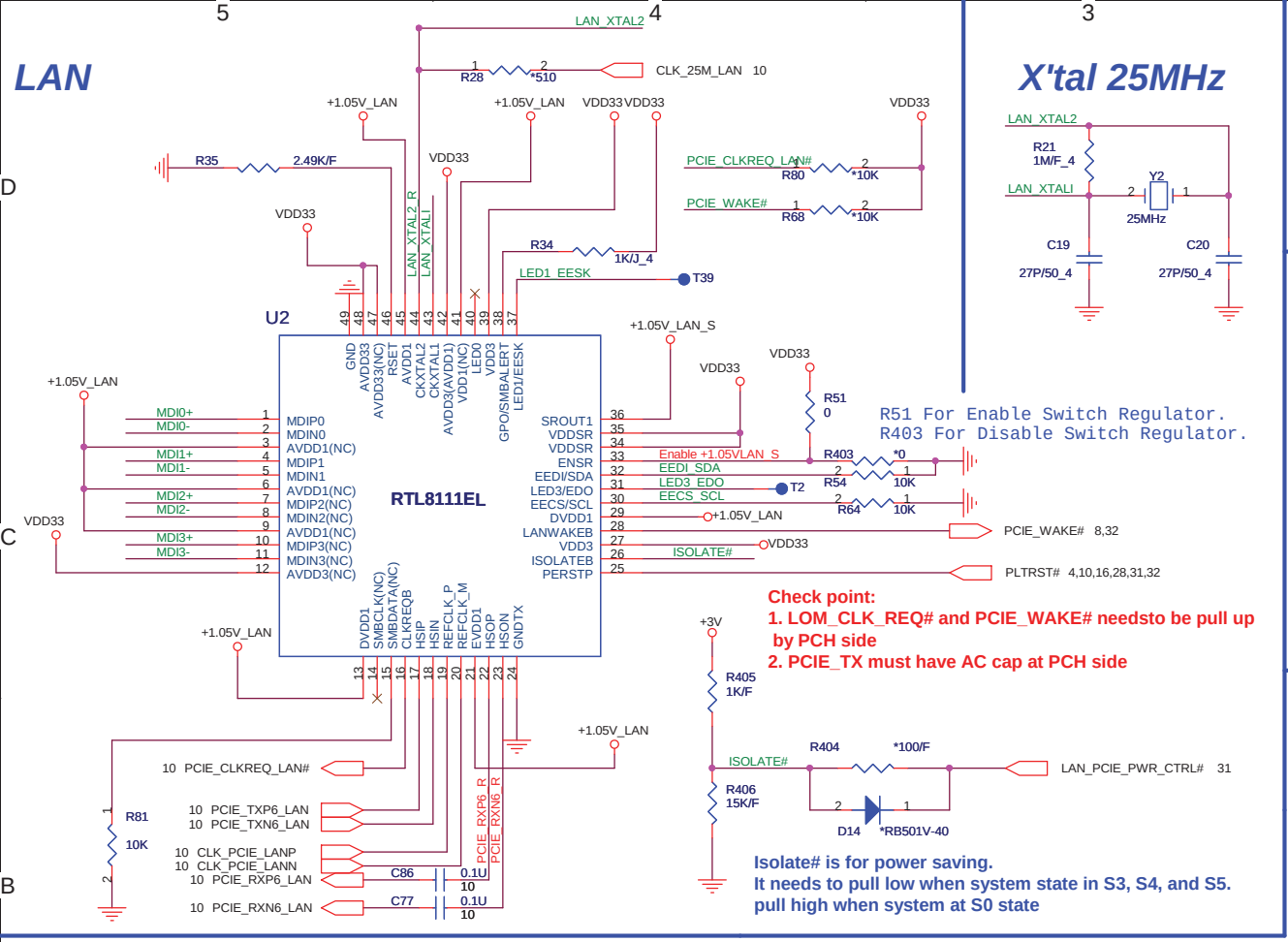
# LAN

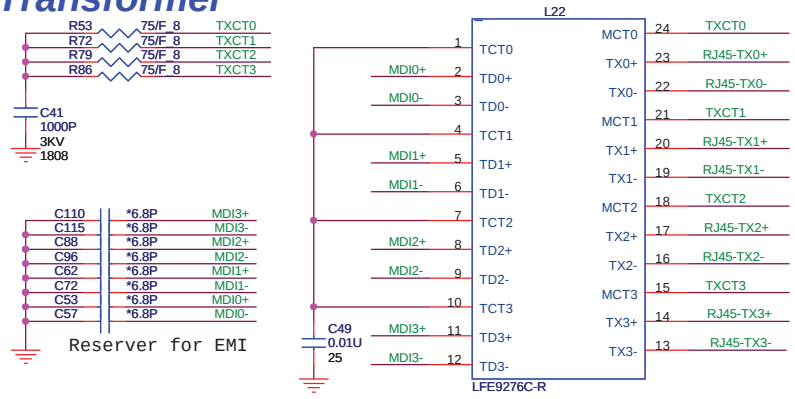



# X'tal 25MHz

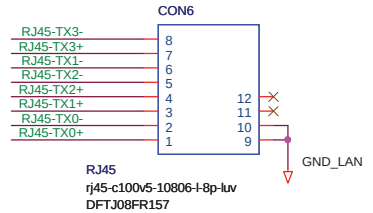


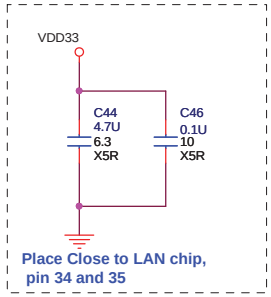

# LAN EEPROM(DEL)

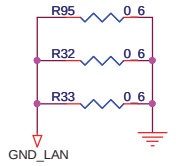
# Transformer



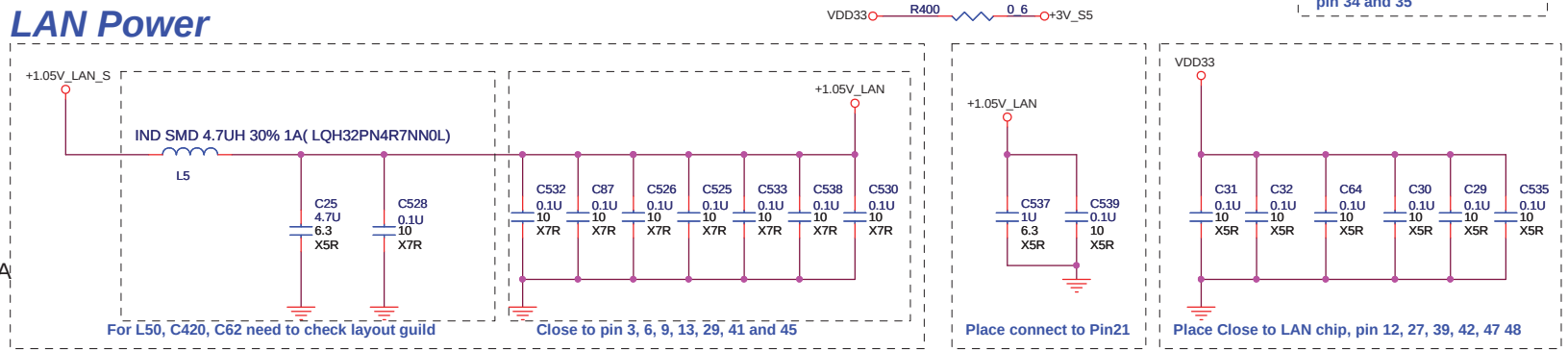

# RJ45




# LAN Power




REQ by layout

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|---|---|---|
| | LAN_RTL8111E-GR/RJ45 | 1A |
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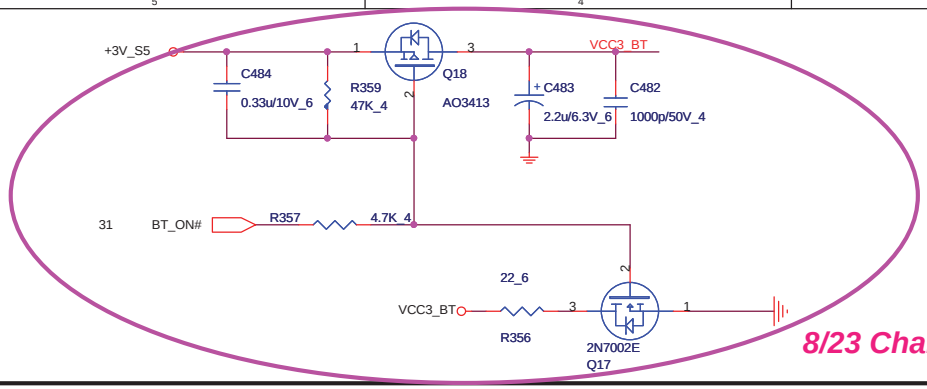
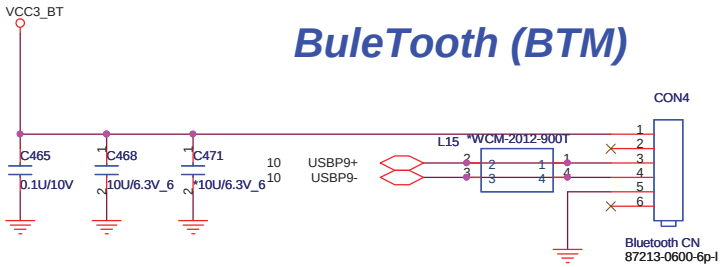
# BuleTooth (BTM)

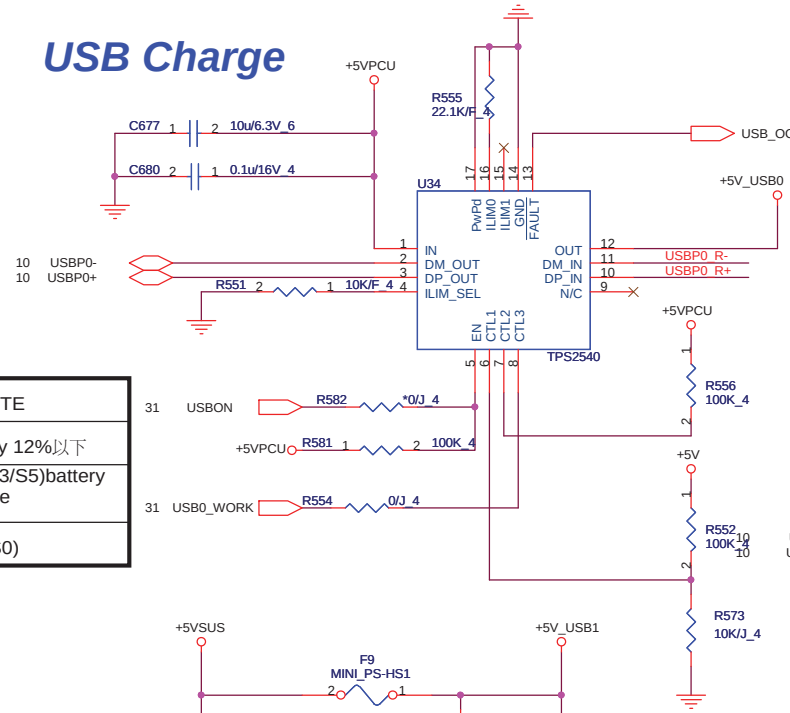


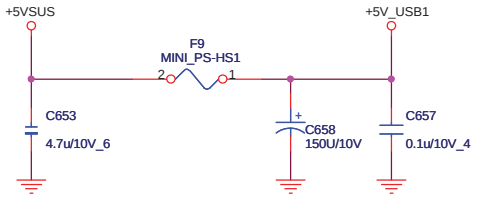

8/23 Change BT on circuit.

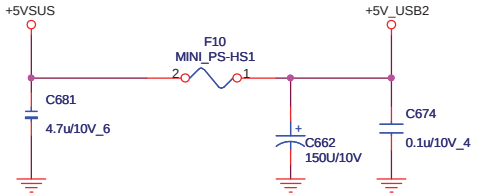


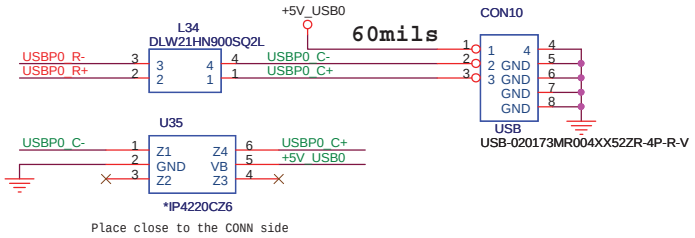

# USB Connector

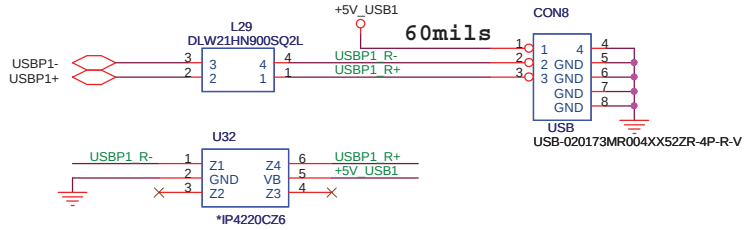
# USB Charge

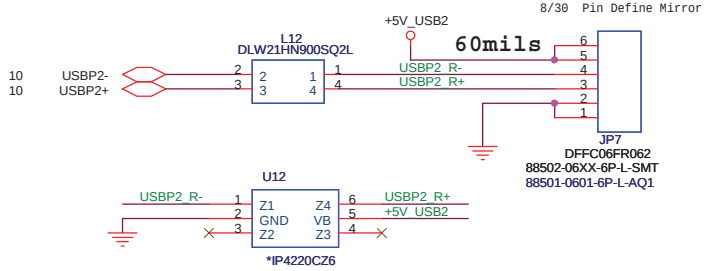



| | CTL1 | CTL2 | CTL3 | NOTE |
|---|---|---|---|---|
| ES(PG1.1) | 0 | 1 | 0 | SDP(S3/S5)battery 12%以下 |
| | 0 | 1 | 1 | DCP, Auto-detect(S3/S5)battery 12%以上 or AC mode |
| | 1 | 1 | 0 | SDP(S0) |

| USB0_WORK | Mode |
|---|---|
| Low - S5 - 1.8A | DCP, Auto-detect |
| High - S0/S3 - 1.5A<br>USB wake up with S3 | CDP, BC Spec 1.1<br>== PCH HOST |

| | R321 | mA | |
|---|---|---|---|
| OC limitation | 100k ohm | 480 | |
| | 22.1k ohm | 2171 | Applied Now |

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|---|---|---|
| | USB/BLUE TOOTH | 1A |
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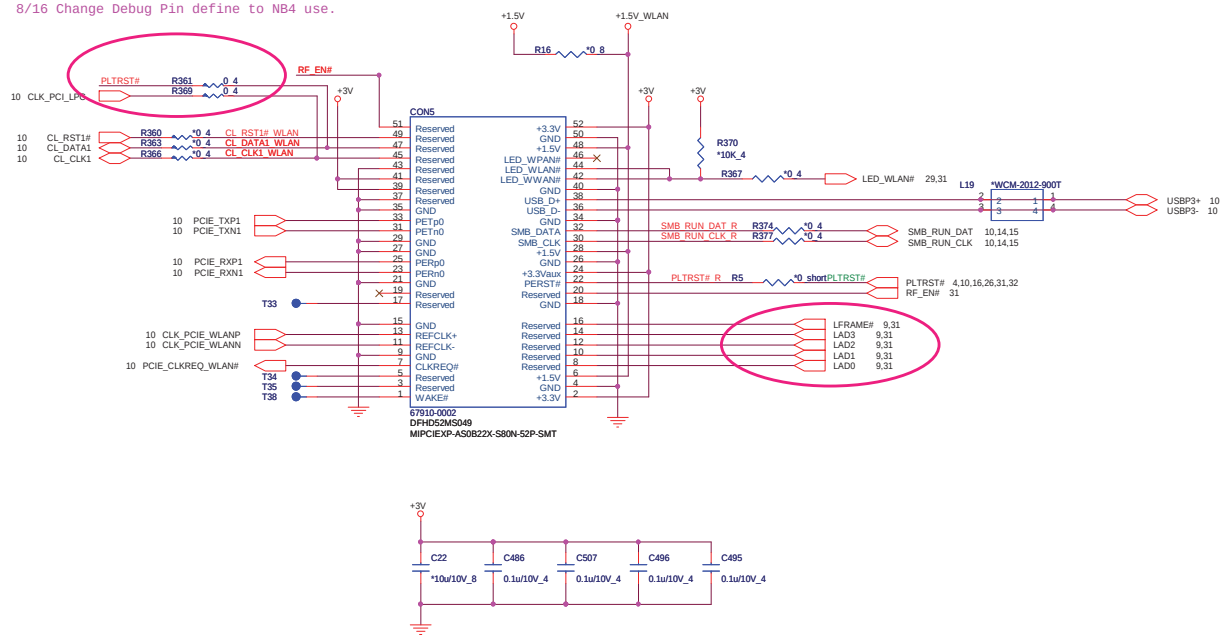
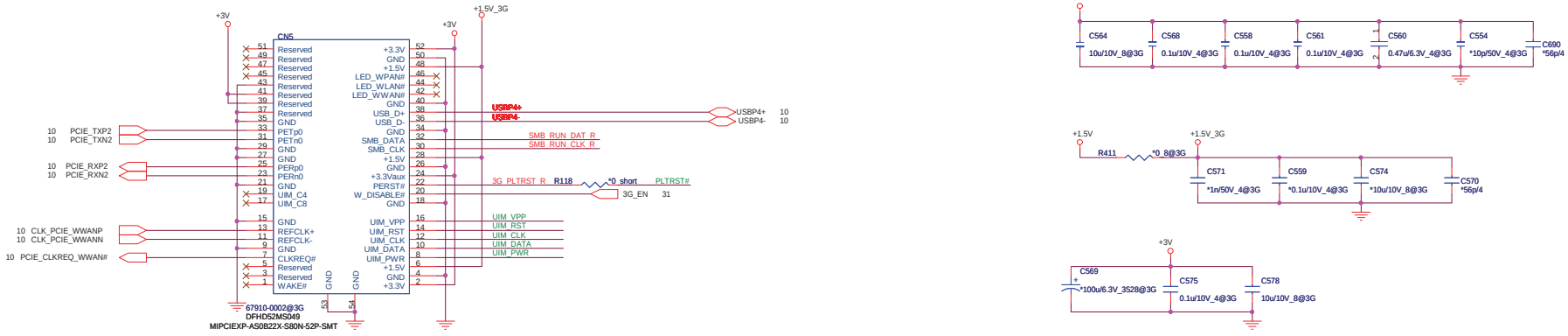
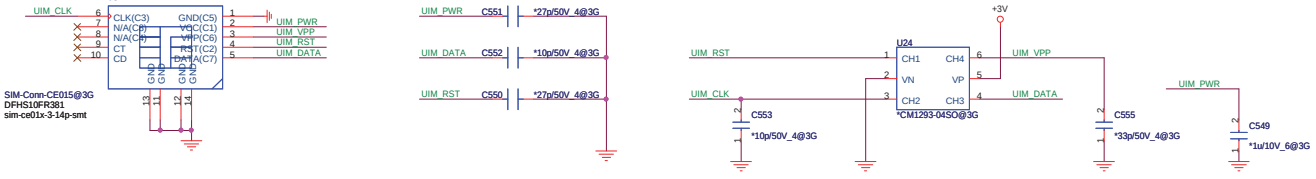
# MINI CARD (WLAN)






# Mini Card2-3G(MNC)




| | | |
|---|---|---|
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| Size | Document Number: MINI CARD(WLAN/3G) | Rev: 1A |
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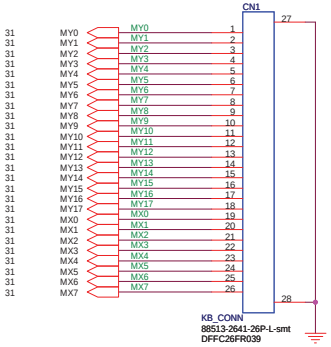
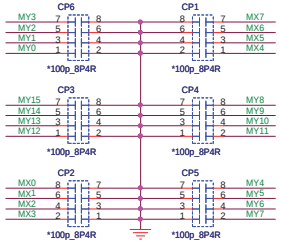
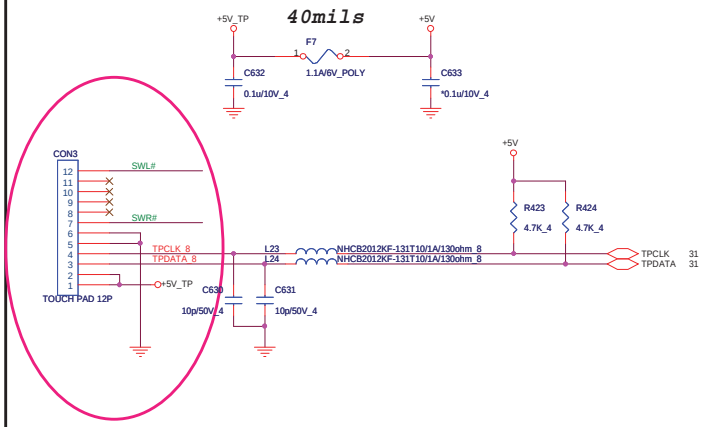
## Keyboard(KBC)



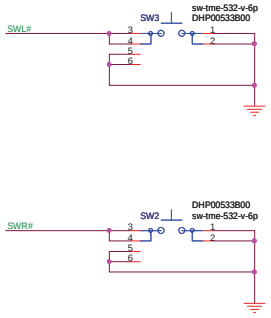

For EMI Reserve Caps for debug



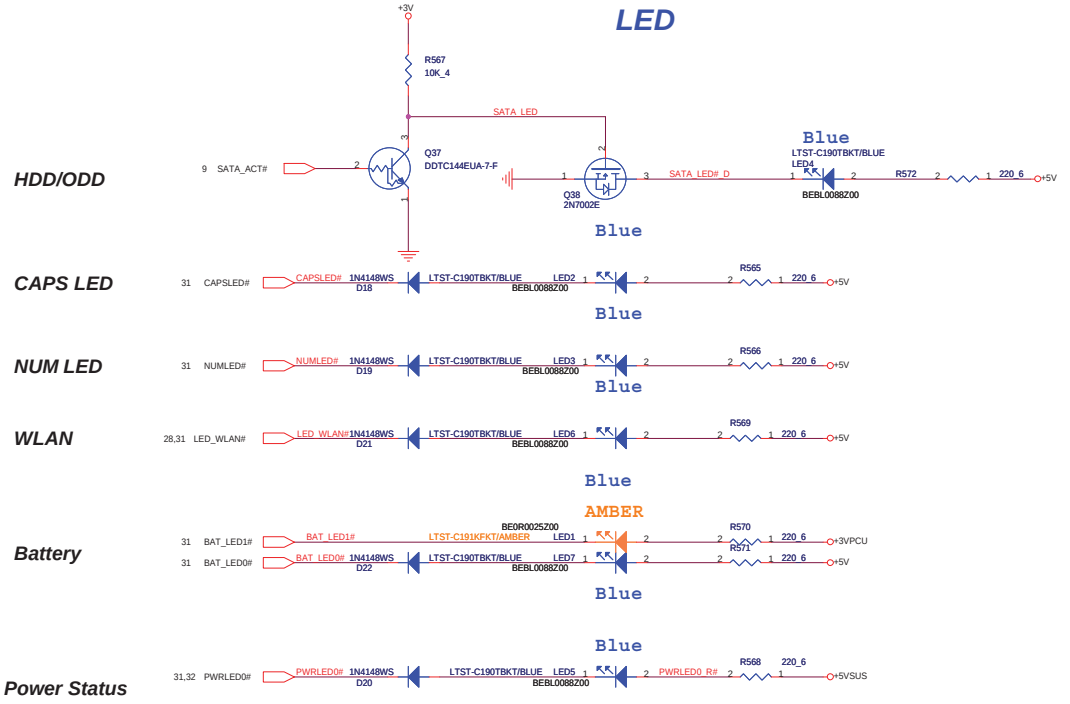

## Touch Pad




8/23 Change TP to 12 pin conn.




## LED

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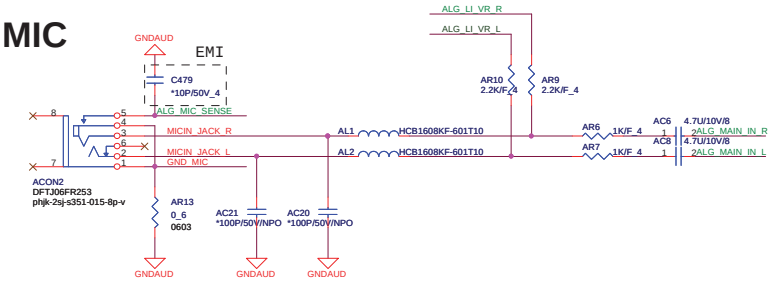
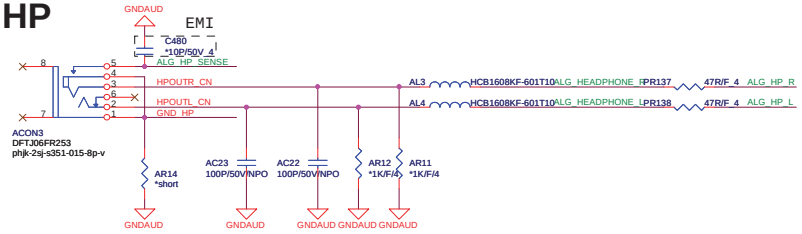
# Codec ALC269-VB

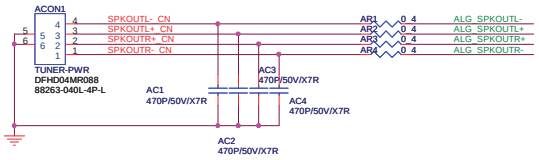
## MIC



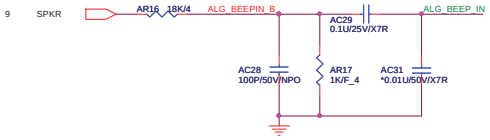

## HP



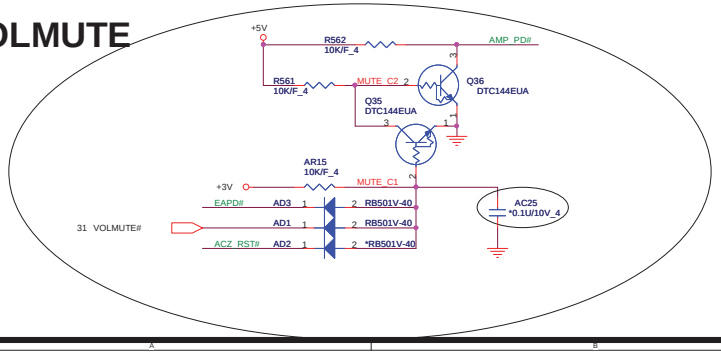

## SPKR



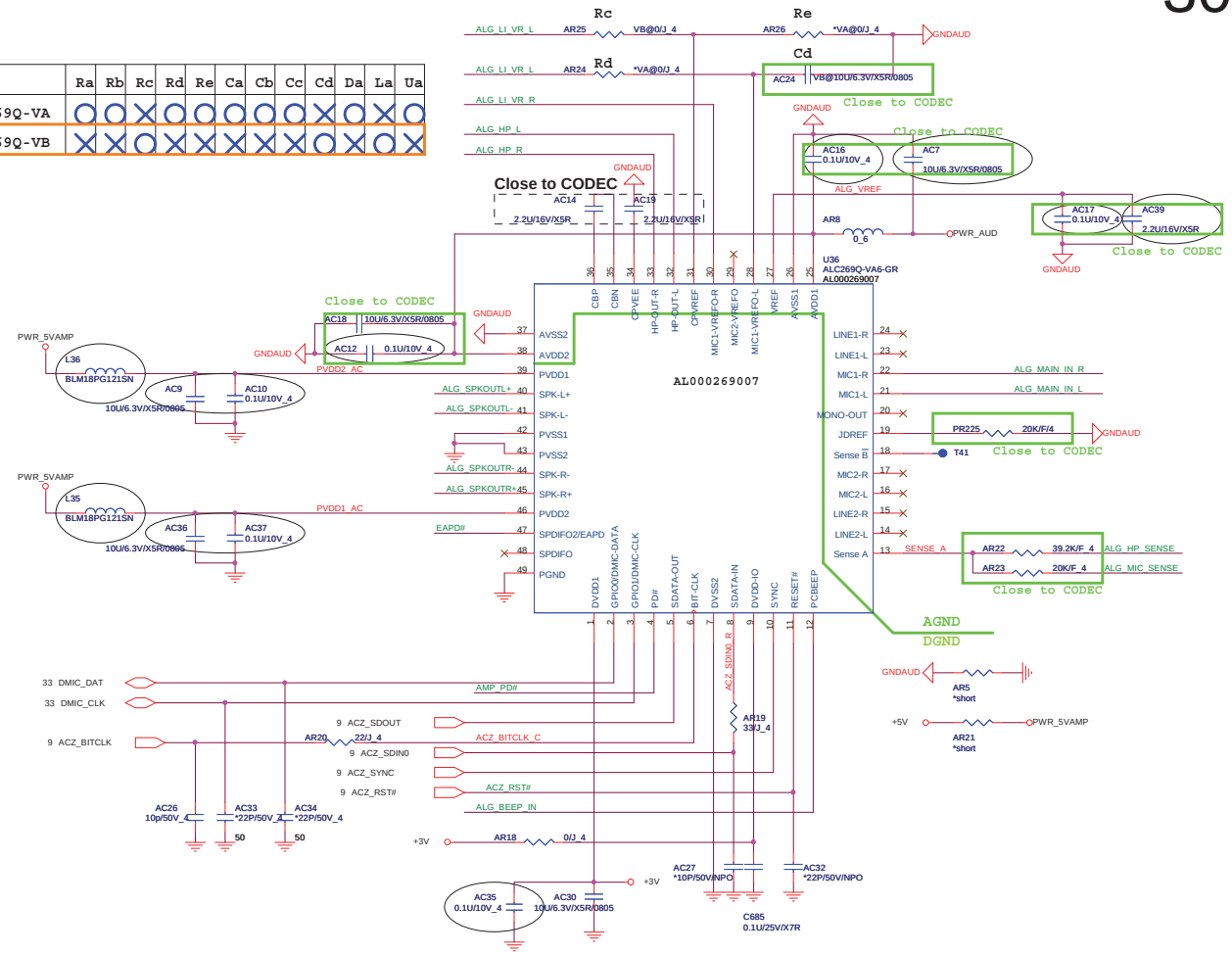

## BEEP

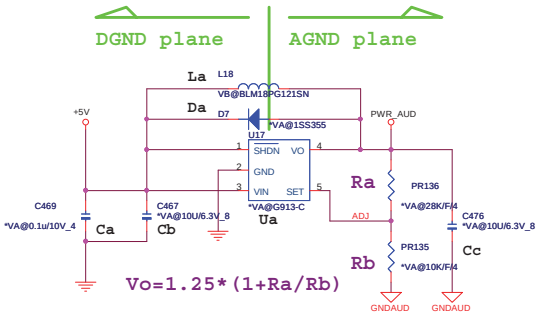


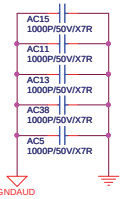

## VOLMUTE




| U23 | Ra | Rb | Rc | Rd | Re | Ca | Cb | Cc | Cd | Da | La | Ua |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ALC269Q-VA | O | O | X | O | O | O | O | O | X | O | X | O |
| ALC269Q-VB | X | X | O | X | X | X | X | X | O | X | O | X |

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|---|---|---|
| | CODEC (ALC269) | 1A |

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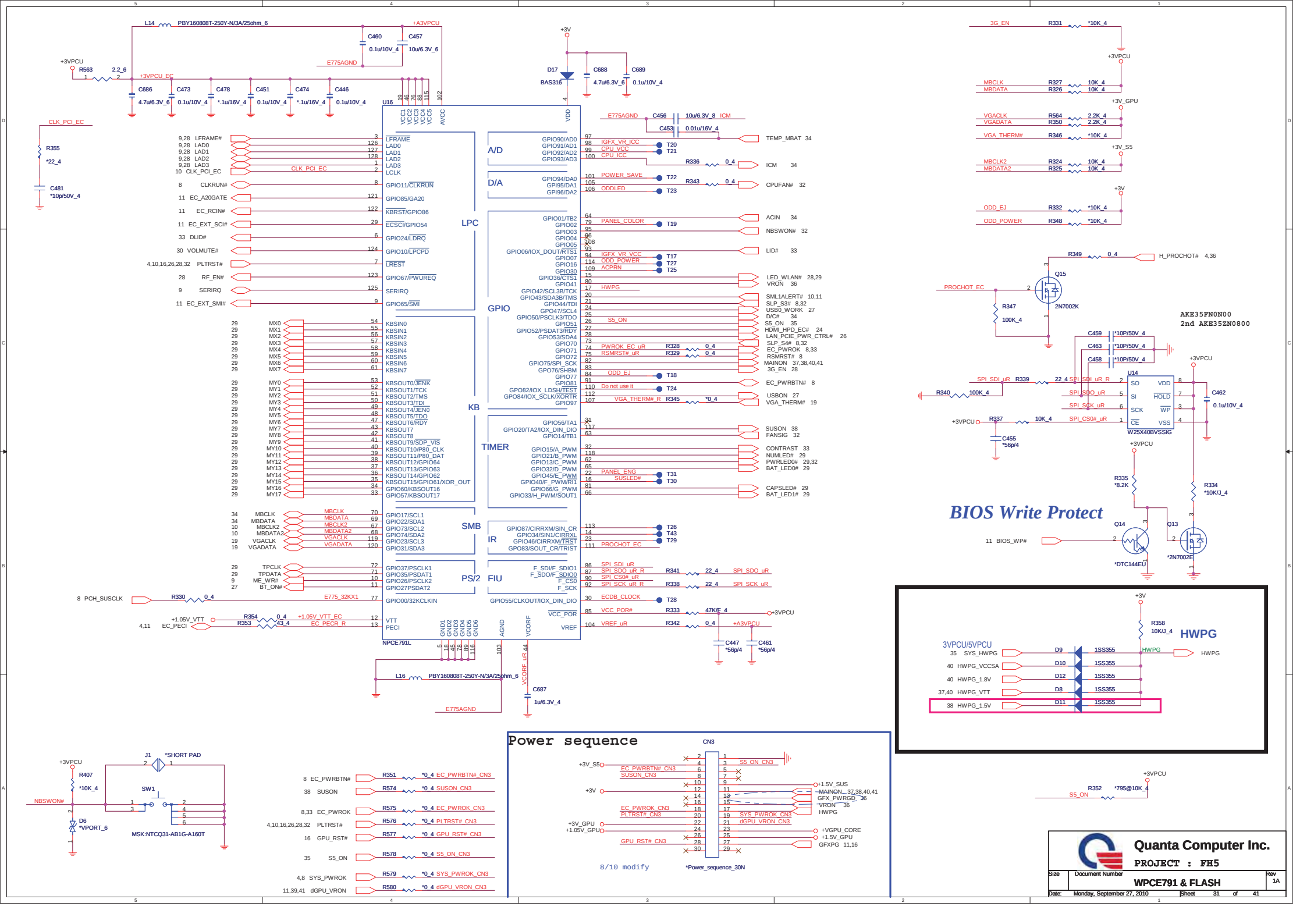
L14 PBY160808T-250Y-N/3A/25ohm_6
+A3VPCU
C460 0.1u/10V_4
C457 10u/6.3V_6
E775AGND
+3VPCU
R563 2.2_6
+3VPCU_EC
C686 4.7u/6.3V_6
C473 0.1u/10V_4
C478 *.1u/16V_4
C451 0.1u/10V_4
C474 *.1u/16V_4
C446 0.1u/10V_4
U16
VCC1 VCC2 VCC3 VCC4 VCC5 AVCC VDD
CLK_PCI_EC
R355 *22_4
C481 *10p/50V_4
9,28 LFRAME#
9,28 LAD0
9,28 LAD1
9,28 LAD2
9,28 LAD3
10 CLK_PCI_EC
8 CLKRUN#
11 EC_A20GATE
11 EC_RCIN#
11 EC_EXT_SCI#
33 DLID#
30 VOLMUTE#
4,10,16,26,28,32 PLTRST#
28 RF_EN#
9 SERIRQ
11 EC_EXT_SMI#
LPC
GPIO
KB
SMB
PS/2
A/D
D/A
FIU
IR
TIMER
MX0 MX1 MX2 MX3 MX4 MX5 MX6 MX7
MY0 MY1 MY2 MY3 MY4 MY5 MY6 MY7 MY8 MY9 MY10 MY11 MY12 MY13 MY14 MY15 MY16 MY17
MBCLK MBDATA MBCLK2 MBDATA2 VGACLK VGADATA
TPCLK TPDATA ME_WR# BT_ON#
8 PCH_SUSCLK
R330 0_4
E775_32KX1
+1.05V_VTT
4,11 EC_PECI
R354 0_4
R353 43_4
+1.05V_VTT_EC
EC_PECR_R
NPCE791L
GND1 GND2 GND3 GND4 GND5 GND6 AGND VCORF
L16 PBY160808T-250Y-N/3A/25ohm_6
VCORF_uR_44
C687 1u/6.3V_4
E775AGND
+3V
D17 BAS316
C688 4.7u/6.3V_6
C689 0.1u/10V_4
E775AGND C456 10u/6.3V_8_ICM
C453 0.01u/16V_4
TEMP_MBAT 34
IGFX_VR_ICC T20
CPU_VCC T21
CPU_ICC
R336 0_4
ICM 34
POWER_SAVE T22
R343 0_4
CPUFAN# 32
ODDLED T23
ACIN 34
PANEL_COLOR T19
NBSWON# 32
LID# 33
IGFX_VR_VCC T17
ODD_POWER T27
ACPRN T25
LED_WLAN# 28,29
VRON 36
HWPG
SML1ALERT# 10,11
SLP_S3# 8,32
USB0_WORK 27
D/C# 34
S5_ON
S5_ON 35
HDMI_HPD_EC# 24
LAN_PCIE_PWR_CTRL# 26
SLP_S4# 8,32
PWROK_EC_uR R328 0_4
EC_PWROK 8,33
RSMRST#_uR R329 0_4
RSMRST# 8
MAINON 37,38,40,41
3G_EN 28
ODD_EJ T18
EC_PWRBTN# 8
Do not use it T24
USBON 27
VGA_THERM# R345 *0_4
VGA_THERM# 19
SUSON 38
FANSIG 32
CONTRAST 33
NUMLED# 29
PWRLED0# 29,32
BAT_LED0# 29
PANEL_ENG T31
SUSLED# T30
CAPSLED# 29
BAT_LED1# 29
SPI_SDI_uR
SPI_SDO_uR R341 22_4 SPI_SDO_uR
SPI_CS0#_uR
SPI_SCK_uR_R R338 22_4 SPI_SCK_uR
ECDB_CLOCK T28
VCC_POR# R333 47K/F_4 +3VPCU
VREF_uR R342 0_4 +A3VPCU
PROCHOT_EC T26 T43 T29
C447 *56p/4
C461 *56p/4
3G_EN R331 *10K_4
+3VPCU
MBCLK R327 10K_4
MBDATA R326 10K_4
+3V_GPU
VGACLK R564 2.2K_4
VGADATA R350 2.2K_4
VGA_THERM# R346 *10K_4
+3V_S5
MBCLK2 R324 10K_4
MBDATA2 R325 10K_4
+3V
ODD_EJ R332 *10K_4
ODD_POWER R348 *10K_4
R349 0_4 H_PROCHOT# 4,36
Q15 2N7002K
PROCHOT_EC
R347 100K_4
AKE35FN0N00
2nd AKE35ZN0800
C459 *10P/50V_4
C463 *10P/50V_4
C458 *10P/50V_4
U14
SPI_SDI_uR R339 22_4 SPI_SDI_uR_R
SPI_SDO_uR
SPI_SCK_uR
SPI_CS0#_uR
R340 100K_4
R337 10K_4
C455 *56p/4
SO SI SCK CE VDD HOLD WP VSS
W25X40BVSSIG
C462 0.1u/10V_4
BIOS Write Protect
11 BIOS_WP#
Q14 Q13 *2N7002E
*DTC144EU
R335 *8.2K
R334 *10K/J_4
+3V
R358 10K/J_4
HWPG
3VPCU/5VPCU
35 SYS_HWPG
40 HWPG_VCCSA
40 HWPG_1.8V
37,40 HWPG_VTT
38 HWPG_1.5V
D9 D10 D12 D8 D11
1SS355
HWPG
J1 *SHORT PAD
R407 *10K_4
NBSWON#
SW1
D6 *VPORT_6
MSK:NTCQ31-AB1G-A160T
8 EC_PWRBTN#
38 SUSON
8,33 EC_PWROK
4,10,16,26,28,32 PLTRST#
16 GPU_RST#
35 S5_ON
4,8 SYS_PWROK
11,39,41 dGPU_VRON
R351 *0_4 EC_PWRBTN#_CN3
R574 *0_4 SUSON_CN3
R575 *0_4 EC_PWROK_CN3
R576 *0_4 PLTRST#_CN3
R577 *0_4 GPU_RST#_CN3
R578 *0_4 S5_ON_CN3
R579 *0_4 SYS_PWROK_CN3
R580 *0_4 dGPU_VRON_CN3
Power sequence
CN3
+3V_S5
EC_PWRBTN#_CN3
SUSON_CN3
+3V
EC_PWROK_CN3
PLTRST#_CN3
+3V_GPU
+1.05V_GPU
GPU_RST#_CN3
S5_ON_CN3
+1.5V_SUS
MAINON 37,38,40,41
GFX_PWRGD 36
VRON 36
HWPG
SYS_PWROK_CN3
dGPU_VRON_CN3
+VGPU_CORE
+1.5V_GPU
GFXPG 11,16
8/10 modify
*Power_sequence_30N
+3VPCU
R352 *795@10K_4
S5_ON
Quanta Computer Inc.
PROJECT : FH5
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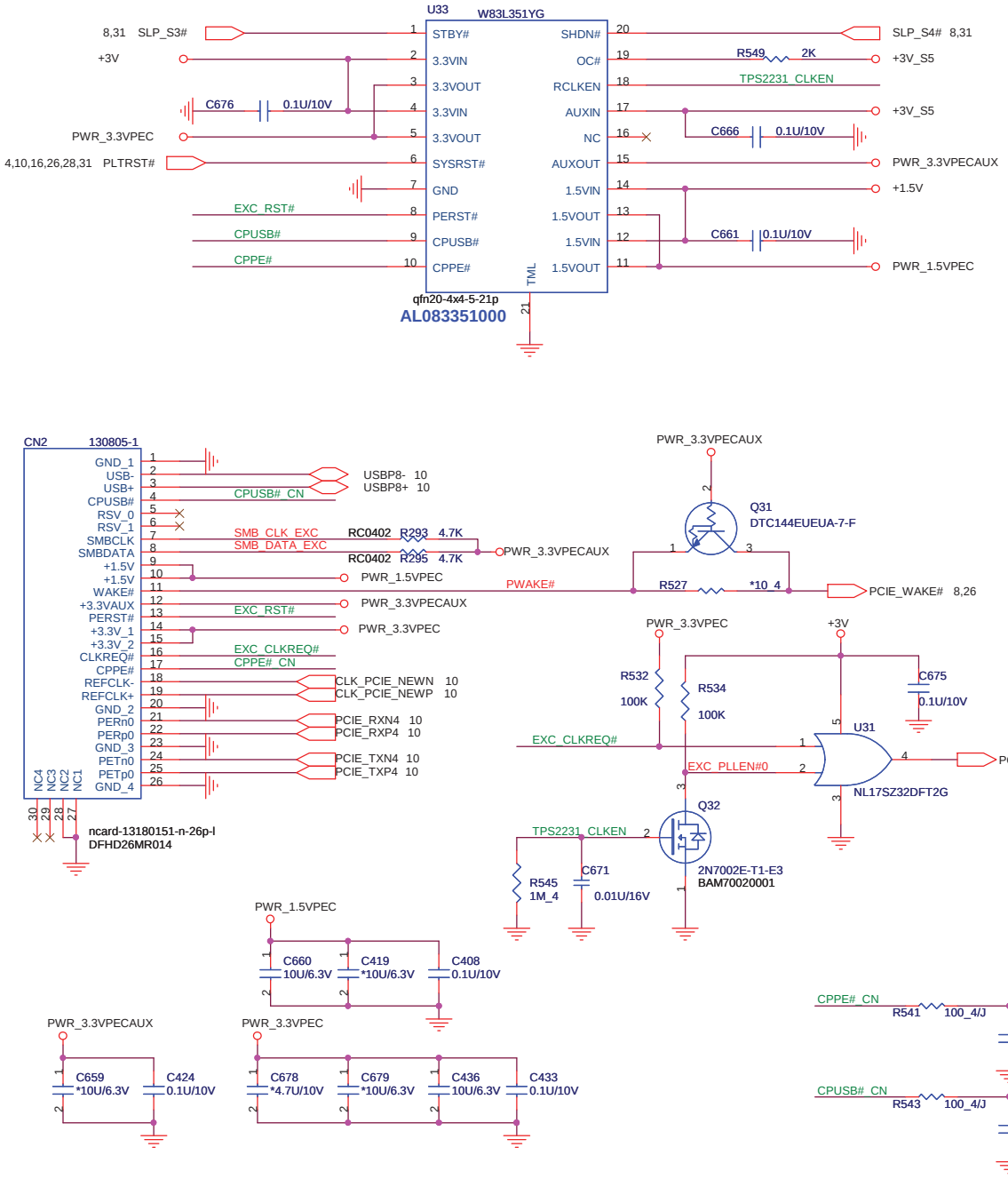
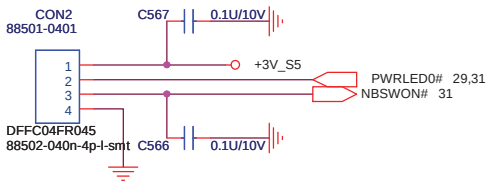
# NEW CARD



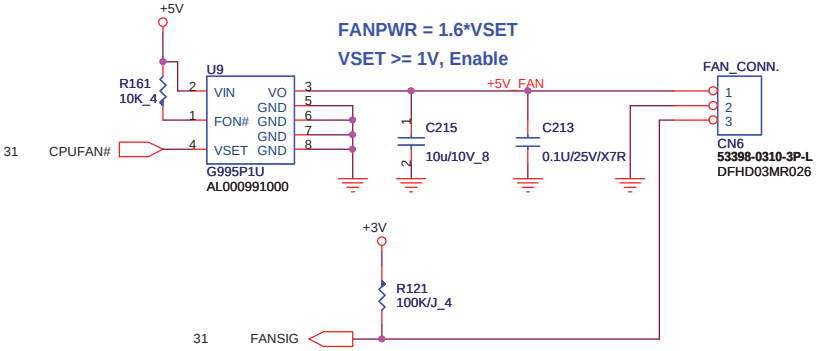




# PW BOARD CON




# CPU FAN CTRL



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| | FAN/SW/NEWCARD | 1A |

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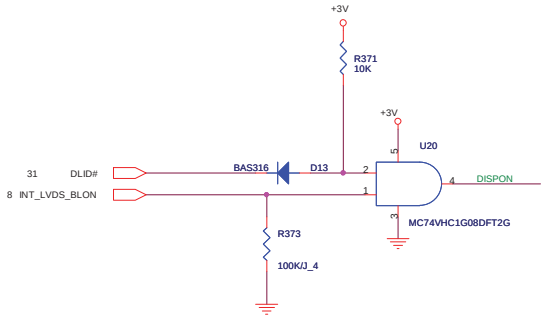
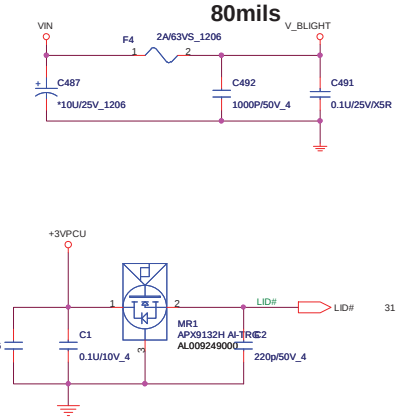
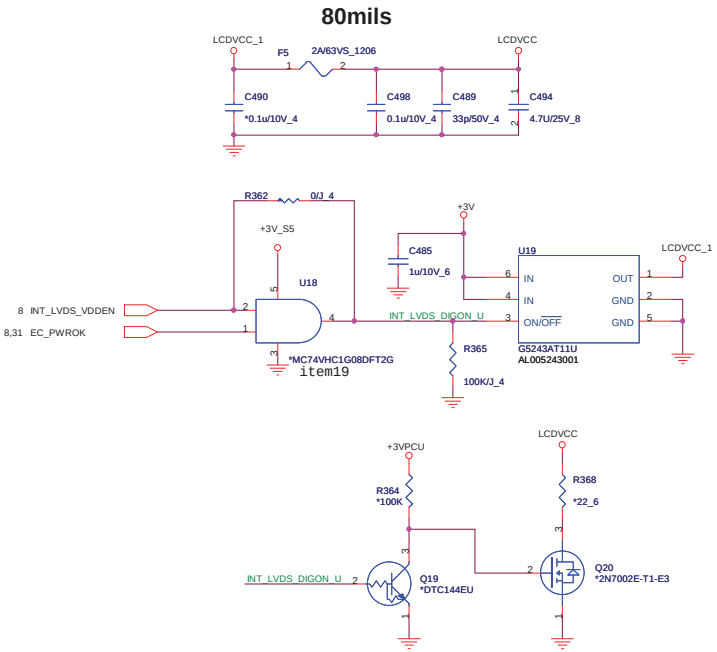
# BACKLIGHT Control(LVDS)



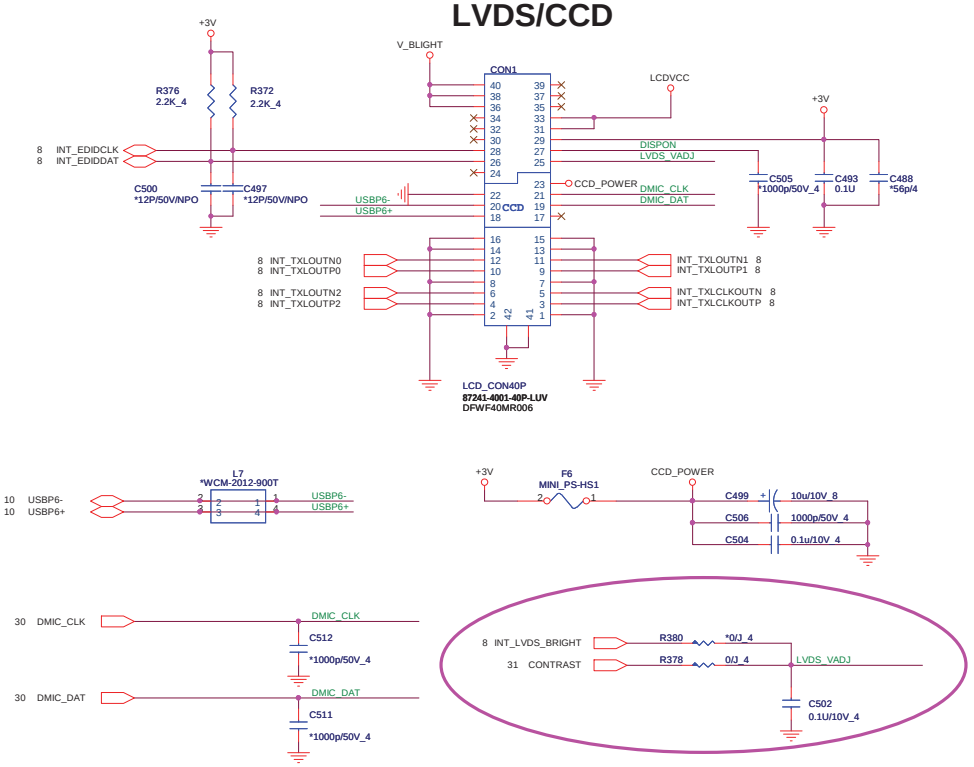

# BACKLIGHT POWER

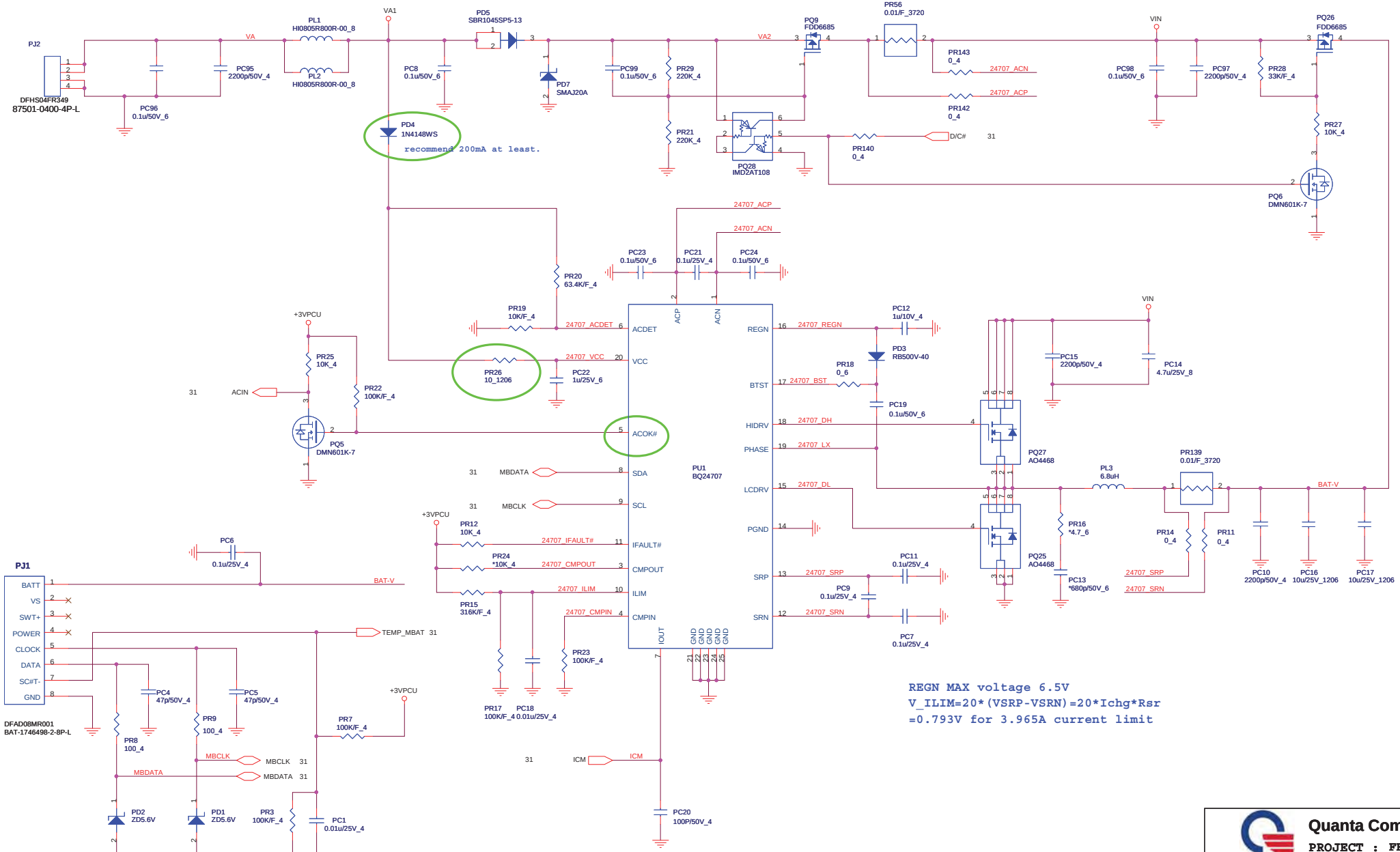



# LED Panel POWER SWITCH(LVDS)

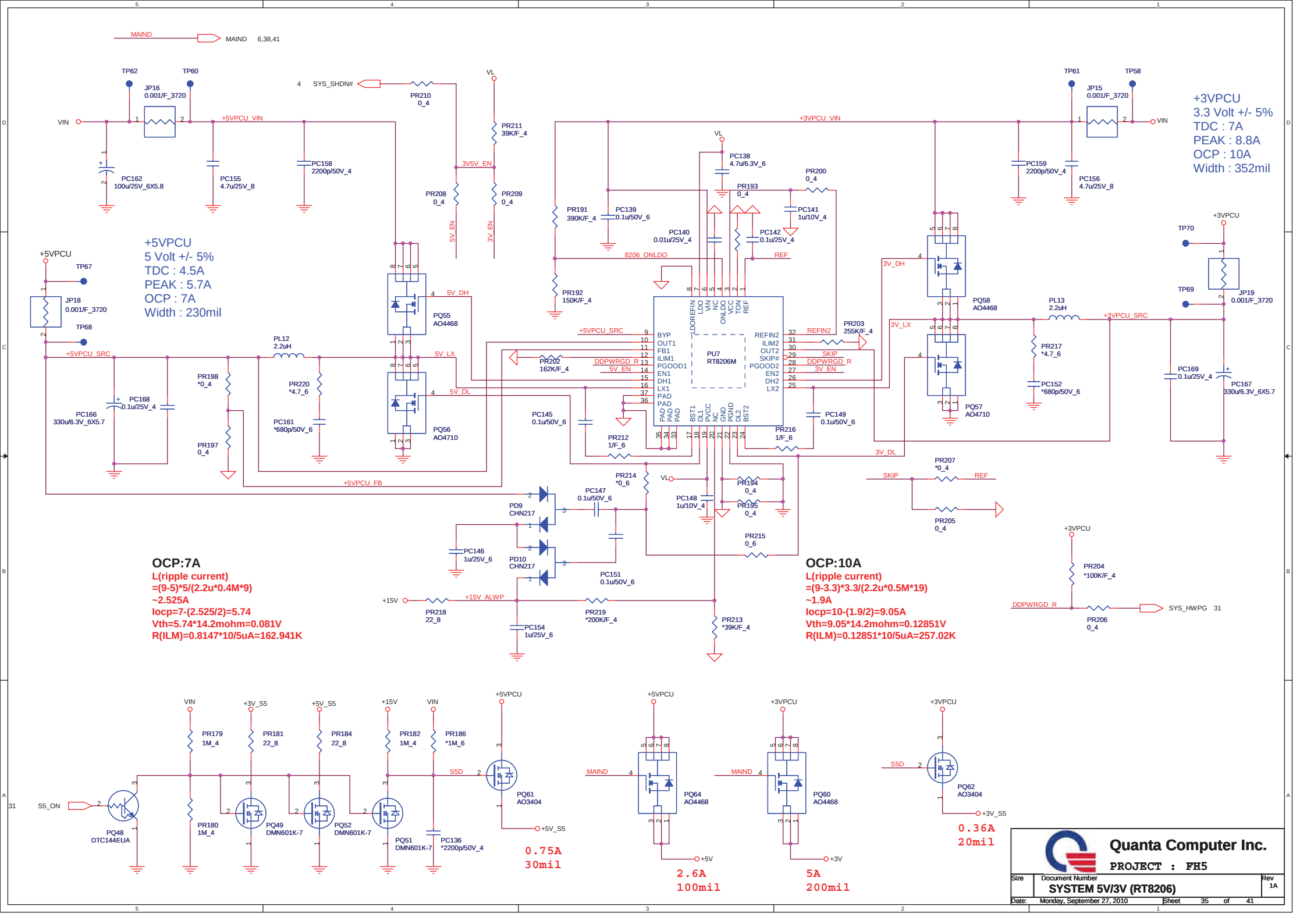



# LVDS/CCD






| | | |
|---|---|---|
| Quanta Computer Inc. | | |
| PROJECT : FH5 | | |
| Size | Document Number: Charger(BQ24703) | Rev: 1A |
| Date: Monday, September 27, 2010 | Sheet 34 of 41 | |


MAIND
MAIND 6,38,41
+5VPCU
5 Volt +/- 5%
TDC : 4.5A
PEAK : 5.7A
OCP : 7A
Width : 230mil
+3VPCU
3.3 Volt +/- 5%
TDC : 7A
PEAK : 8.8A
OCP : 10A
Width : 352mil
PU7
RT8206M
8206_ONLDO
+5VPCU_VIN
+3VPCU_VIN
+5VPCU_SRC
+3VPCU_SRC
+5VPCU_FB
SYS_SHDN#
3V5V_EN
5V_EN
3V_EN
DDPWRGD_R
REFIN2
SKIP
REF
5V_DH
5V_LX
5V_DL
3V_DH
3V_LX
3V_DL
+15V_ALWP
SYS_HWPG 31
OCP:7A
L(ripple current)
=(9-5)*5/(2.2u*0.4M*9)
~2.525A
Iocp=7-(2.525/2)=5.74
Vth=5.74*14.2mohm=0.081V
R(ILM)=0.8147*10/5uA=162.941K
OCP:10A
L(ripple current)
=(9-3.3)*3.3/(2.2u*0.5M*19)
~1.9A
Iocp=10-(1.9/2)=9.05A
Vth=9.05*14.2mohm=0.12851V
R(ILM)=0.12851*10/5uA=257.02K
0.75A
30mil
2.6A
100mil
5A
200mil
0.36A
20mil
Quanta Computer Inc.
PROJECT : FH5
SYSTEM 5V/3V (RT8206)
Size
Document Number
Rev
1A
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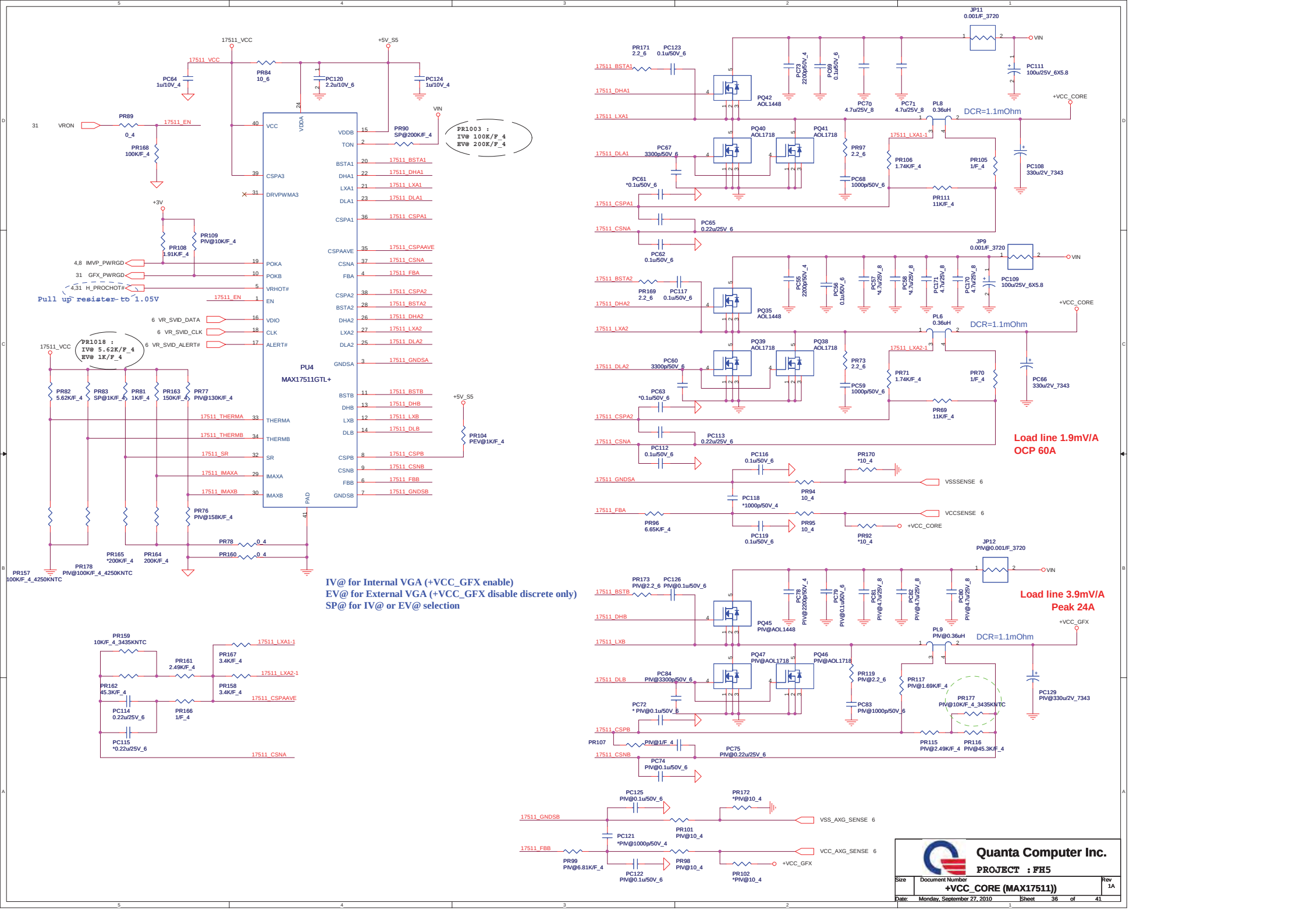
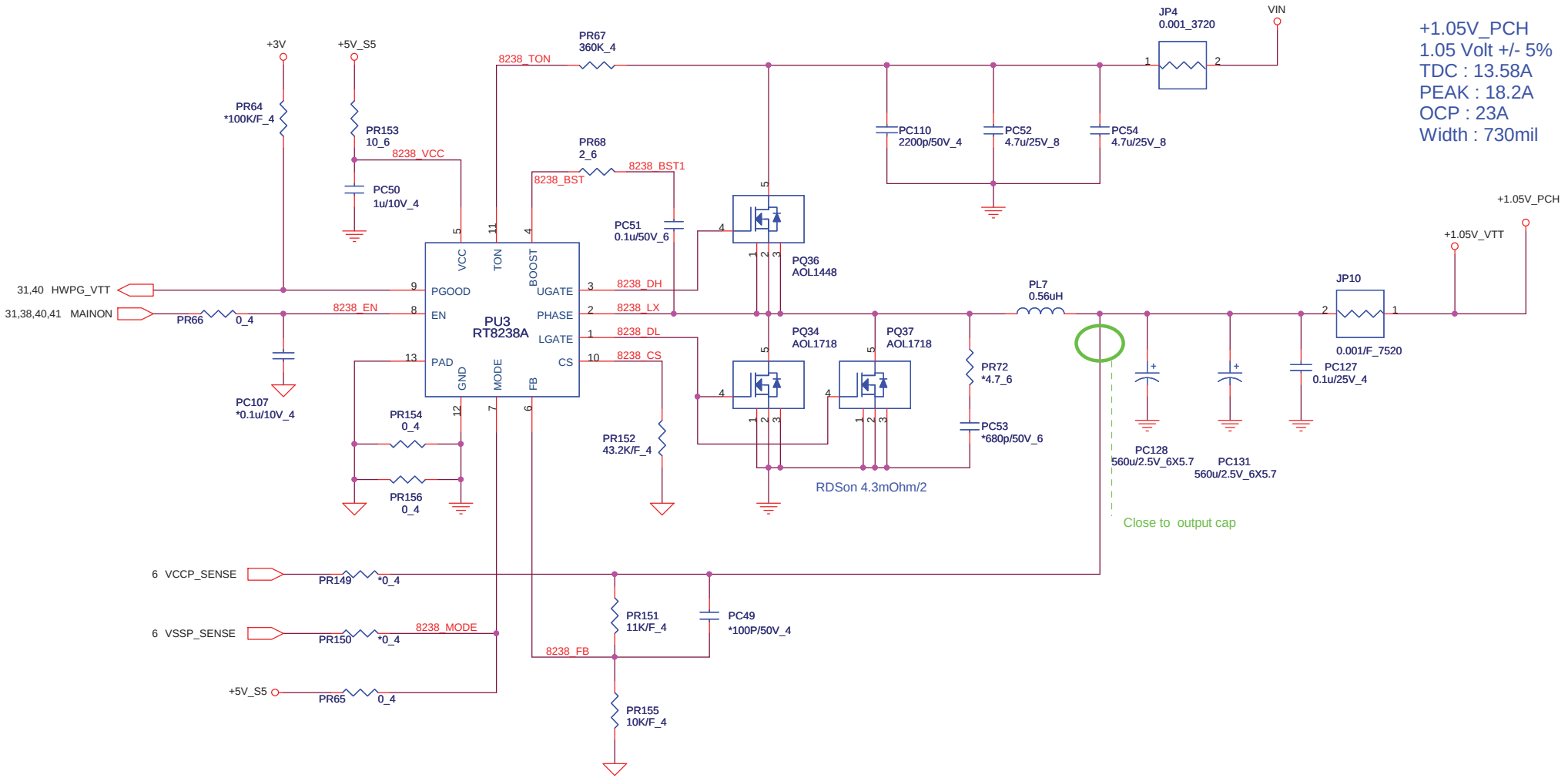

PU4
MAX17511GTL+
17511_VCC
+5V_S5
VIN
PR1018 : IV@ 5.62K/F_4 EV@ 1K/F_4
PR1003 : IV@ 100K/F_4 EV@ 200K/F_4
Pull up resister to 1.05V
IV@ for Internal VGA (+VCC_GFX enable)
EV@ for External VGA (+VCC_GFX disable discrete only)
SP@ for IV@ or EV@ selection
Load line 1.9mV/A
OCP 60A
Load line 3.9mV/A
Peak 24A
DCR=1.1mOhm
Quanta Computer Inc.
PROJECT : FH5
+VCC_CORE (MAX17511))
Monday, September 27, 2010


+1.05V_PCH
1.05 Volt +/- 5%
TDC : 13.58A
PEAK : 18.2A
OCP : 23A
Width : 730mil
JP4
0.001_3720
VIN
+3V
+5V_S5
PR64
*100K/F_4
PR153
10_6
8238_VCC
PC50
1u/10V_4
PR67
360K_4
8238_TON
PR68
2_6
8238_BST
8238_BST1
PC51
0.1u/50V_6
PC110
2200p/50V_4
PC52
4.7u/25V_8
PC54
4.7u/25V_8
PU3
RT8238A
VCC
TON
BOOST
PGOOD
UGATE
EN
PHASE
PAD
LGATE
GND
MODE
FB
CS
31,40 HWPG_VTT
31,38,40,41 MAINON
PR66
0_4
8238_EN
8238_DH
8238_LX
8238_DL
8238_CS
PQ36
AOL1448
PQ34
AOL1718
PQ37
AOL1718
PL7
0.56uH
PR72
*4.7_6
PC53
*680p/50V_6
PC107
*0.1u/10V_4
PR154
0_4
PR156
0_4
PR152
43.2K/F_4
RDSon 4.3mOhm/2
Close to output cap
PC128
560u/2.5V_6X5.7
PC131
560u/2.5V_6X5.7
JP10
0.001/F_7520
PC127
0.1u/25V_4
+1.05V_VTT
+1.05V_PCH
6 VCCP_SENSE
PR149
*0_4
6 VSSP_SENSE
PR150
*0_4
8238_MODE
+5V_S5
PR65
0_4
PR151
11K/F_4
PC49
*100P/50V_4
8238_FB
PR155
10K/F_4
Current limit =10uA*Rth/RDSon
VOUT=(1+R1/R2)*0.5
Quanta Computer Inc.
PROJECT : FH5
Size
Document Number
+PCH&VTT (RT8238A)
Rev
1A
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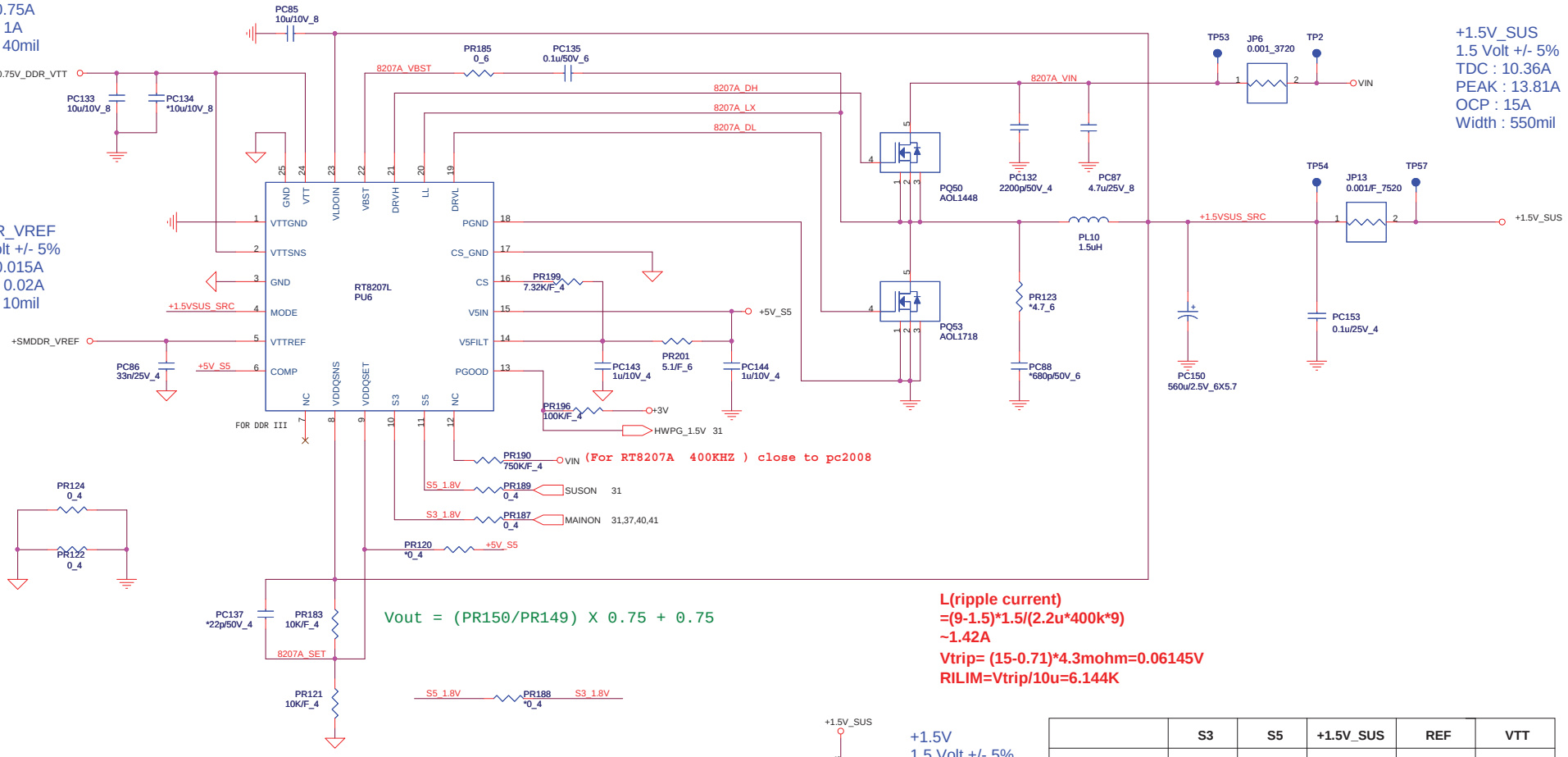
[PWM]

+0.75V_DDR_VTT
0.75 Volt +/- 5%
TDC : 0.75A
PEAK : 1A
Width : 40mil

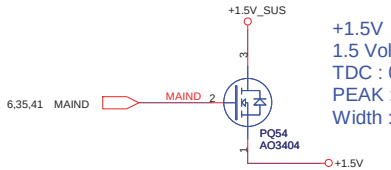
SMDDR_VREF
0.75 Volt +/- 5%
TDC : 0.015A
PEAK : 0.02A
Width : 10mil

+1.5V_SUS
1.5 Volt +/- 5%
TDC : 10.36A
PEAK : 13.81A
OCP : 15A
Width : 550mil



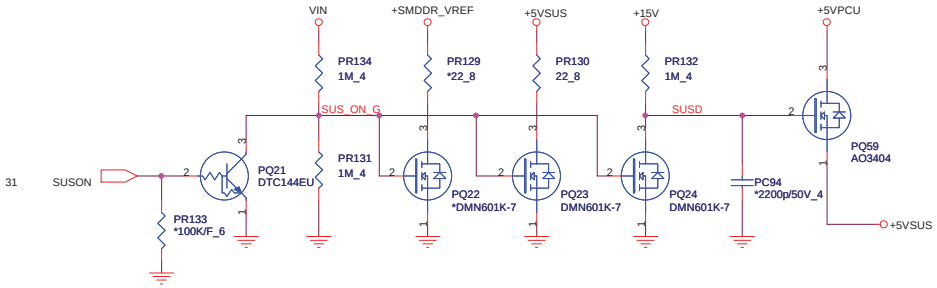

Vout = (PR150/PR149) X 0.75 + 0.75

L(ripple current)
=(9-1.5)*1.5/(2.2u*400k*9)
~1.42A
Vtrip= (15-0.71)*4.3mohm=0.06145V
RILIM=Vtrip/10u=6.144K




+1.5V
1.5 Volt +/- 5%
TDC : 0.5A
PEAK : 0.65A
Width : 25mil

| | S3 | S5 | +1.5V_SUS | REF | VTT |
|---|---|---|---|---|---|
| S0 | 1 | 1 | ON | ON | ON |
| S3 (mainon off) | 0 | 1 | ON | ON | OFF |
| S4/S5 | 0 | 0 | OFF | OFF | OFF |




TDC : 1.125A
PEAK : 1.5A
Width : 60mil

Quanta Computer Inc.
PROJECT : FH5

| Size | Document Number | Rev |
|---|---|---|
| | DDR 1.5V(TPS51116) | 1A |

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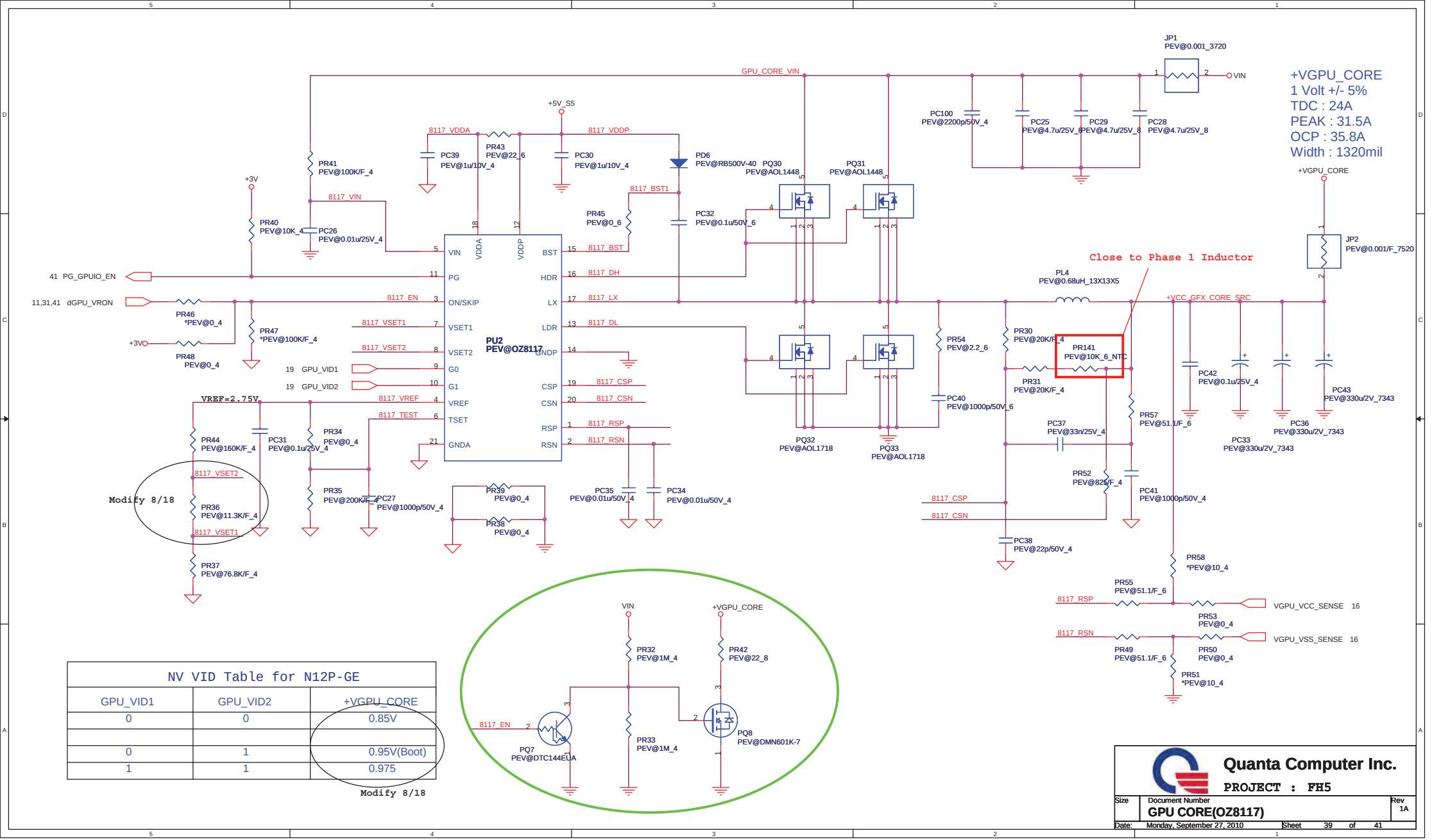


## NV VID Table for N12P-GE

| GPU_VID1 | GPU_VID2 | +VGPU_CORE |
|---|---|---|
| 0 | 0 | 0.85V |
| | | |
| 0 | 1 | 0.95V(Boot) |
| 1 | 1 | 0.975 |

Quanta Computer Inc.

PROJECT : FH5

| Size | Document Number | Rev |
|---|---|---|
| | GPU CORE(OZ8117) | 1A |

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| VID0 | VID1 | VCCSA |
|---|---|---|
| 0 | 0 | 0.9V |
| 0 | 1 | 0.8V |
| 1 | 0 | 0.725V |
| 1 | 1 | 0.675V |

VCCSA
0.9 Volt +/- 5%
TDC : 4.2A
PEAK : 6A
Width : 240mil

JP3 0.001/F_3720
PC44 0.1u/25V_4
PC101 10u/10V_8
PC102 10u/10V_8
PC103 2.2u/10V_6
PC104 1u/10V_4
PR59 0_6
PR144 100K/F_4
PR147 0_4
PC46 *0.1u/25V_4
PR145 1K_4
PR60 0_4
PR61 0_4
PC48 0.1u/50V_6
PL5 1uH_7X7X3
JP8 0.001/F_3720
PC105 560u/2.5V_6X5.7
PC106 0.1u/25V_4
PR148 100_4
PR146 0_4
PR63 *0_4
PC45 0.22u/25V_6
PR62 7.15K/F_4
PC47 0.01u/25V_4

TPS51461
PU5

| VCCSA_SEL | VCCSA |
|---|---|
| 1 | 0.8V |
| 0 | 0.9V |

default 0.9V

+1.8V
1.8 Volt +/- 5%
TDC : 1.34A
PEAK : 1.78A
Width : 71mil

JP17 0.001_3720
PC165 10u/10V_8
PC93 0.1u/10V_4
PR224 0_4
PR127 *100K/F_4
PC91 1000p/50V_4
PR222 8.06K/F_4
PC92 *100P/50V_4
PR125 182K/F_4
PC90 0.01u/25V_4
PC164 2700p/50V_4
PR221 0_6
PC163 0.1u/50V_6
PR223 100K/F_4
PL11 1uH_7X7X3
JP14 0.001_3720
PR126 100K/F_4
PR128 78.7K/F_4
PC160 0.1u/10V_4
PC89 10u/10V_8
PC157 10u/10V_8

PU8 TPS51117RGYR-GP_4

V0=0.8*(R1+R2)/R2

| Quanta Computer Inc. | | |
|---|---|---|
| PROJECT : FH5 | | |
| Size | Document Number: VCCSA(TPS51461)/+1.8V(HPA00835) | Rev 1A |
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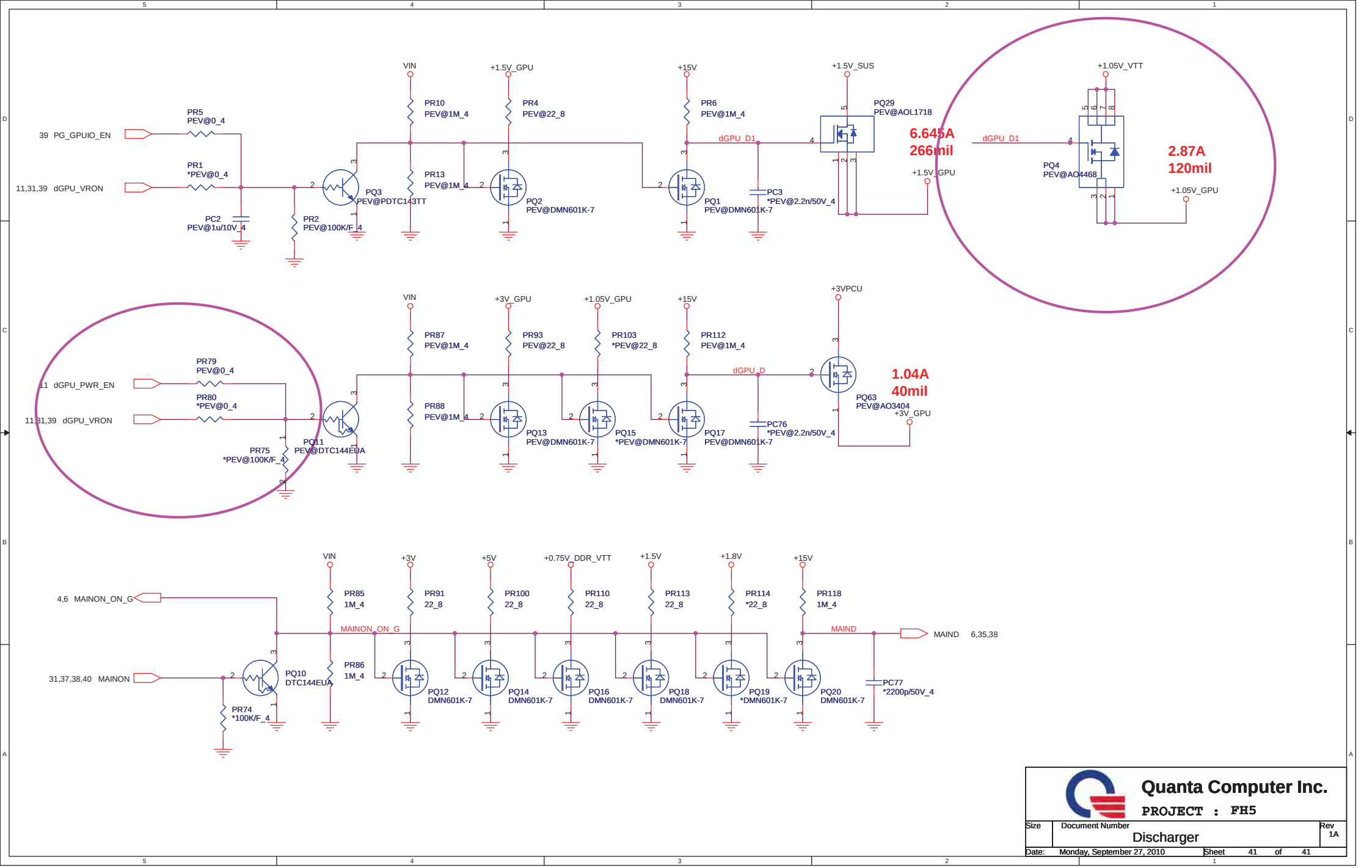


Quanta Computer Inc.

PROJECT : FH5

| Size | Document Number | Rev |
|---|---|---|
| | Discharger | 1A |
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Model

FH5 MB

# CHANGE LIST

| REV | |
|---|---|
| B | page 33: Change +VIN to VIN.<br><br>2010/09/20 page 30 : Del Q16 ,R351.<br><br>page 10 : Add Q27 and Q28.<br><br>page 26 : Change CON6 RJ45 Conn to DFTJ08FR157. |
| | 2010/09/22<br>page 10: Change USB port6 ot port10. |
| | 2010/09/22 page 31 : Del CN3 Netname ,NBSWON#, SLP_S3# ,+VCC_GFX,+VCC_CORE,H_PWRGOOD, RSMRST#, SLP_S4# ,SUS_STAT#.<br><br>page 31 : Reserve R351 ,R574-R580 for Power sequence resistor.<br><br>page 31 : Reserve C692 for H_PWRGOOD.<br>page 9: Change JTAG VCC +3VPCU to +3V_S5. |
| | 2010/09/23 page 31 : Change CON2 VCC from +3V to +3V_S5.<br><br>page 12 : Reserve C693,C694,C695,C696 for ESD.<br>Page36：PC61、PC63 change value from *1000p/50V_4 (CH21006JB10) to *0.1u/50V_6 (CH41006K911)<br>Page36：PC62、PC112、PC116、PC119 change value from 1000p/50V_4 (CH21006JB10) to 0.1u/50V_6 (CH41006K911)<br><br>Page36：PC72 change value from *PIV@1000p/50V_4 (CH21006JB10) to * PIV@0.1u/50V_6 (CH41006K911)<br><br>Page36：PC74、PC122、PC125 change value from PIV@1000p/50V_4 (CH21006JB10) to PIV@0.1u/50V_6 (CH41006K911)<br><br>Page38：PR190 changes value from 620K/F_4 (CS46202FB00) to 750K/F_4 (CS47502FB14)<br><br>Page39：PR44 changes value from PEV@169K/F_4 (CS41692FB12) to PEV@160K/F_4 (CS41602FB00)<br><br>Page39：PR36 changes value from PEV@21.5K/F_4 (CS32152FB17) to PEV@11.3K/F_4 (CS31132FB07)<br><br>Page39：PR37 changes value from PEV@82K/F_4 (CS38202FB14) to PEV@76.8K/F_4 (CS37682FB00)<br><br>page36 :PL6、PL8、PL9 change footprint from CHOKE-ETQP4LR36WFC-4P-SMT to CHOKE-PCMB104T-R45MN-4P-SMT<br>page06 Reserve C697,C698,C699 for VID. |
| | 2010/09/24 page06 Del R28 , add R21,C19,C20,Y2 , use cystal to provide 25M CLK.<br><br>page36 Del PC57,PC58 ,ADD PC170,171,PC78,PC73,PC55 for C state issue.<br><br>page38 CHange PR199 to 7.32K_4(CS27322FB12), change 1.5V_SUS OCP value. |
| | 2010/09/27 Page39：PL4 change P/B from CV+68^0MZ00 to DC+68Z0M001<br><br>Page24：C4,C5,C6,C7,C8,C9 change from2.2P/50V_4 to 10P/50V_4(CH01006JB08).<br><br>page 27 : Change U34 Ctrl 1 ~3 behavior,add R554 , R581,del R582. |
| 3C | |

Quanta Computer Inc.

PROJECT : FH5

| Size | Document Number | Rev |
|---|---|---|
| | Change list | 1A |

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| DOC NO. | PROJECT MODEL : | FH5 | APPROVED BY: | | DATE: | 2010/09/20 |
|---|---|---|---|---|---|---|
| | PART NUMBER: | | DRAWING BY: | | REVISON: | 1A |