

Project Name :NTSN1521

Platform : Haswell + Lynx Point+N16P-GX

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27. LAN RTL8411-CG/CARD READER/15DB

28. CODEC(ALC269Q)/INT MIC/SPKR

29. EXT_MIC/C_PAD/USB/FAN/G-SEN

30. DC IN/TPM/M-sata/D-Resis

31. CPU CORE (OZOZ8127)

32. +1.05V(NB671)/+0.75VS/+1.5V

33. +1.5VS/+5VA (OZ8153)

34. BATT IN/CHARGER(OZ8660)

35. TP/LED/WEBCAM/USB

36. VCC SW/+3.3VA/HIGH-SPEED CAP

37. INTEL LAN(82579LM)

38. Reserved

39. History

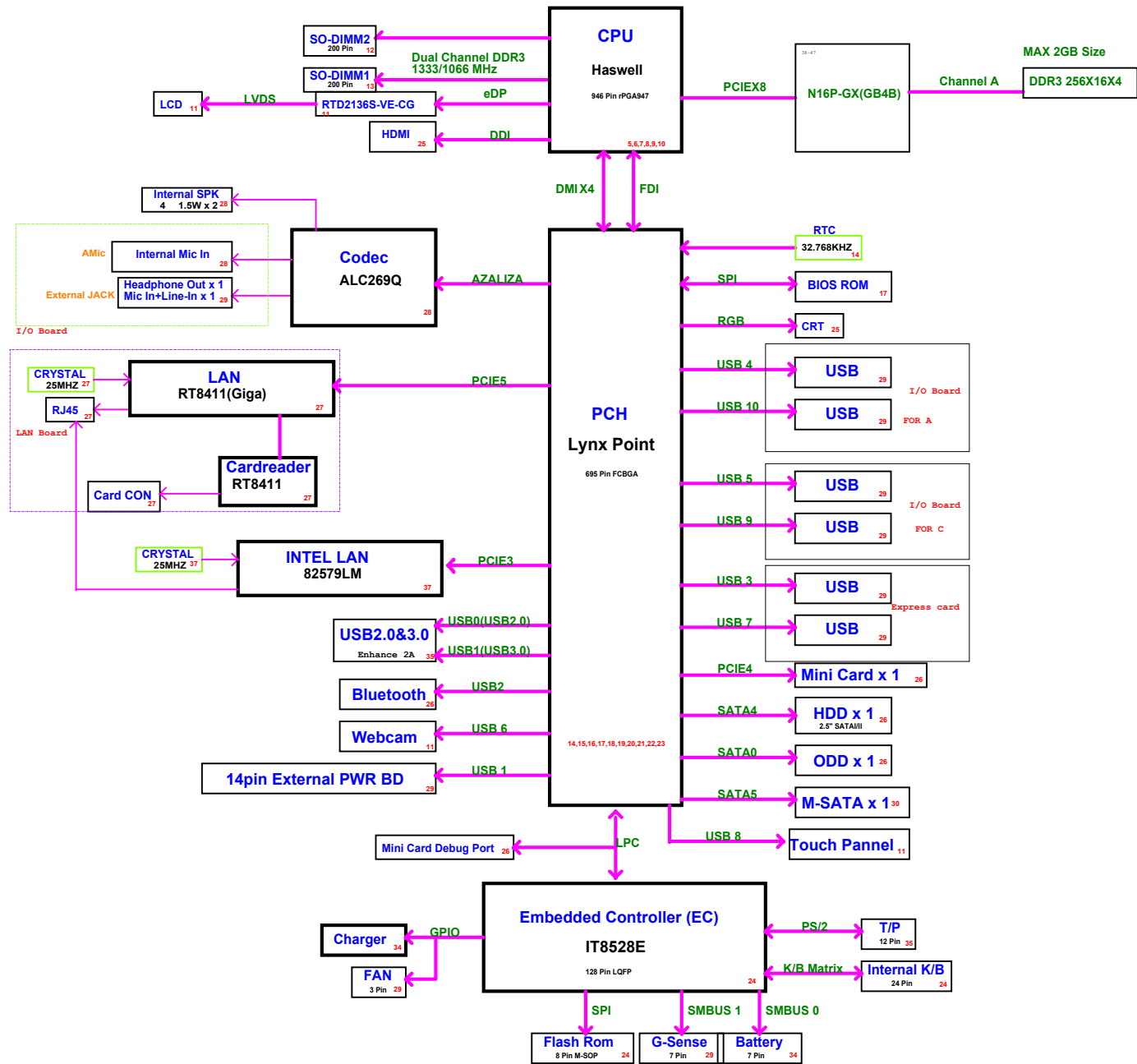
M/B Schematic Version Change List

| Release Date | Version | PCB P/N | PCB Description | PCBA P/N | Note |
|--------------|---------|---------|-----------------|----------|------|
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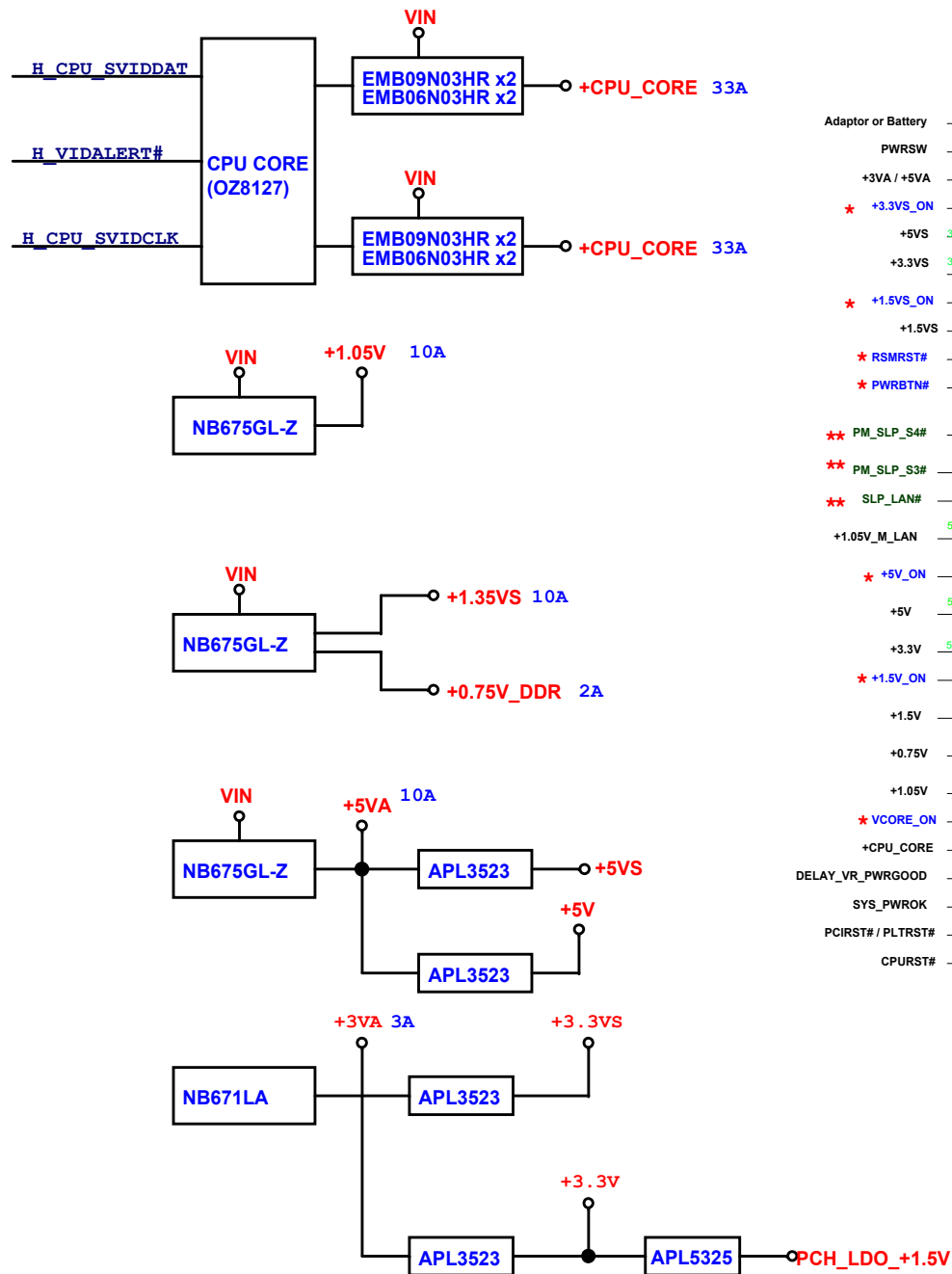
Daughter Board Schematic Version Change List

| Release Date | Version | PCB P/N | PCB Description | PCBA P/N | Note |
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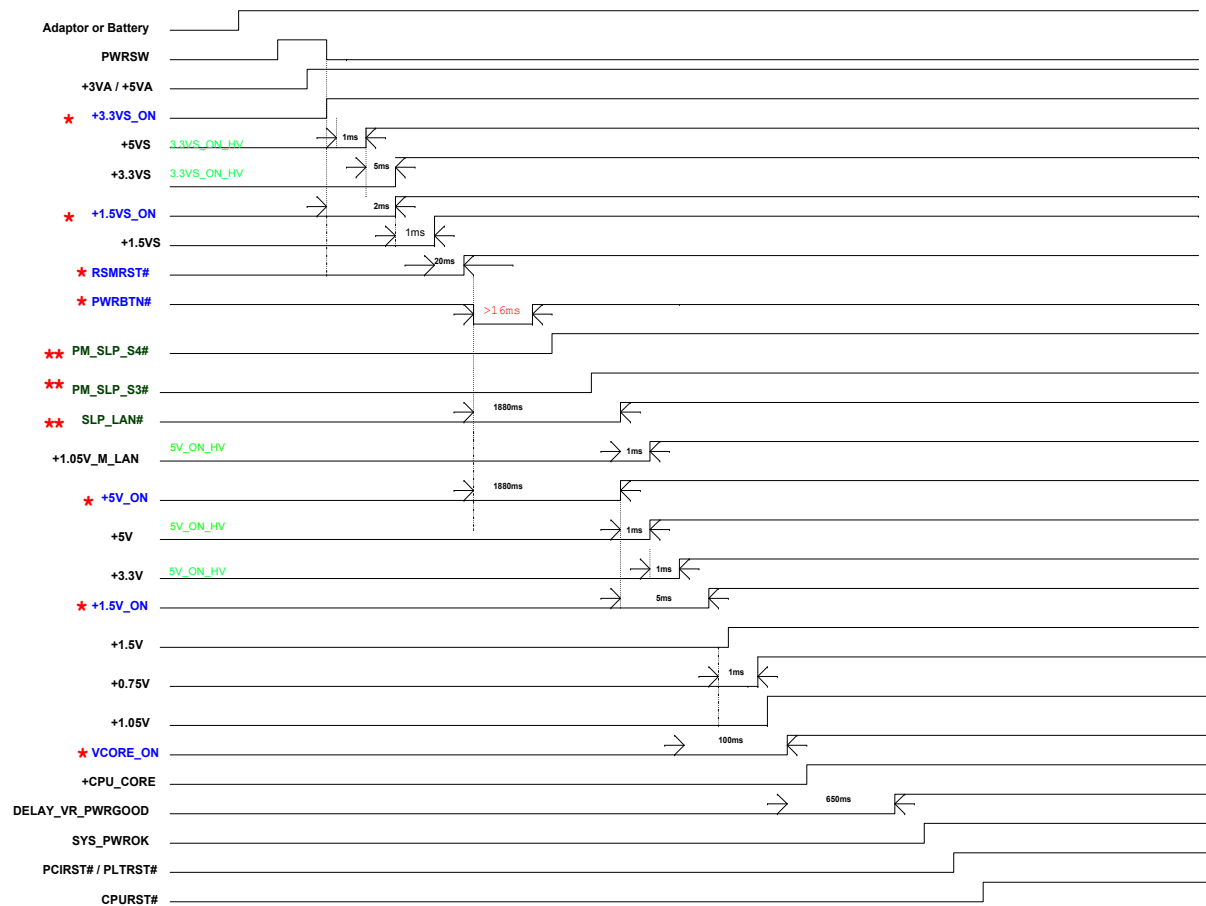
SYSTEM BLOCK DIAGRAM



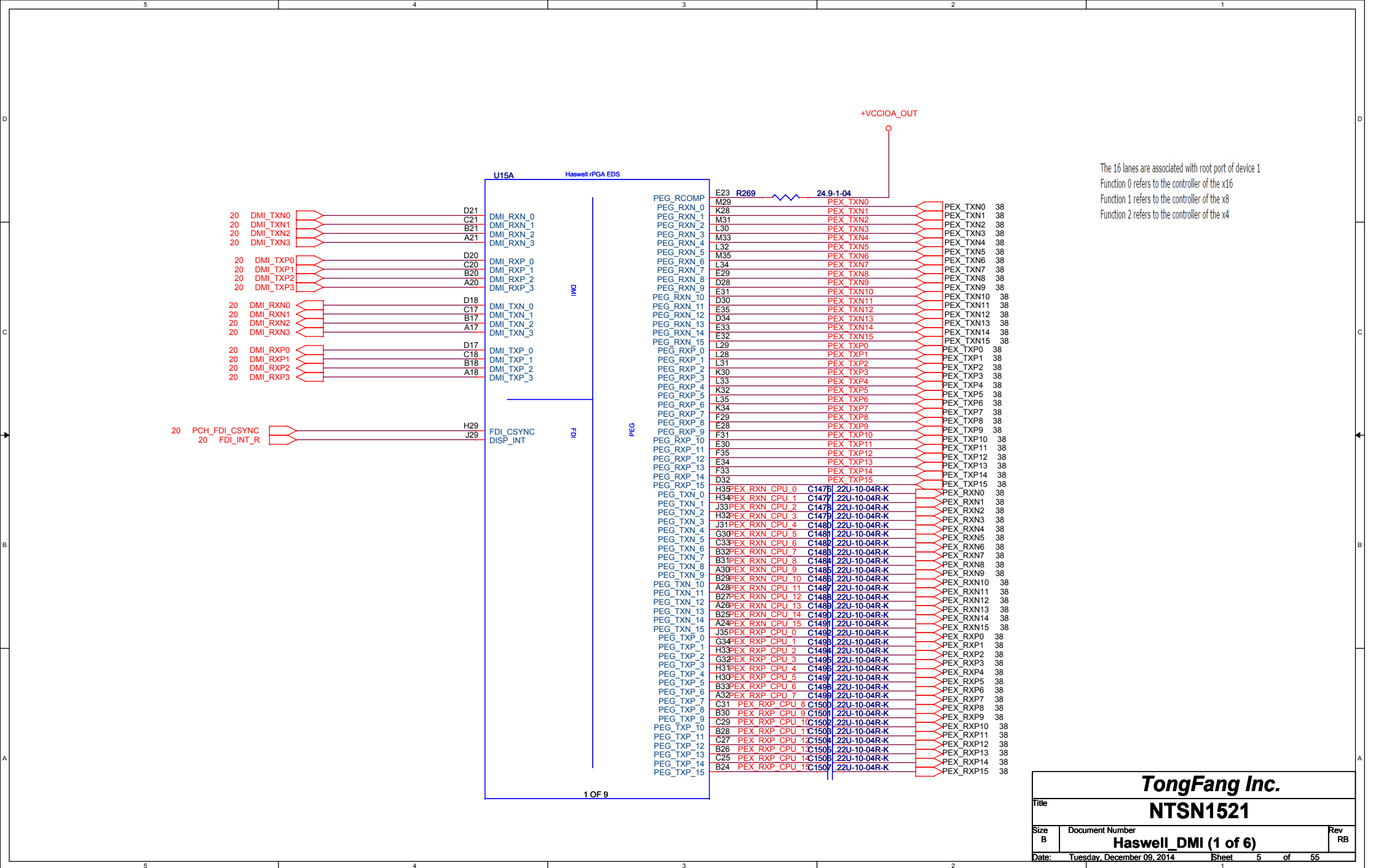
POWER BLOCK DIAGRAM



System Poewr On Sequence

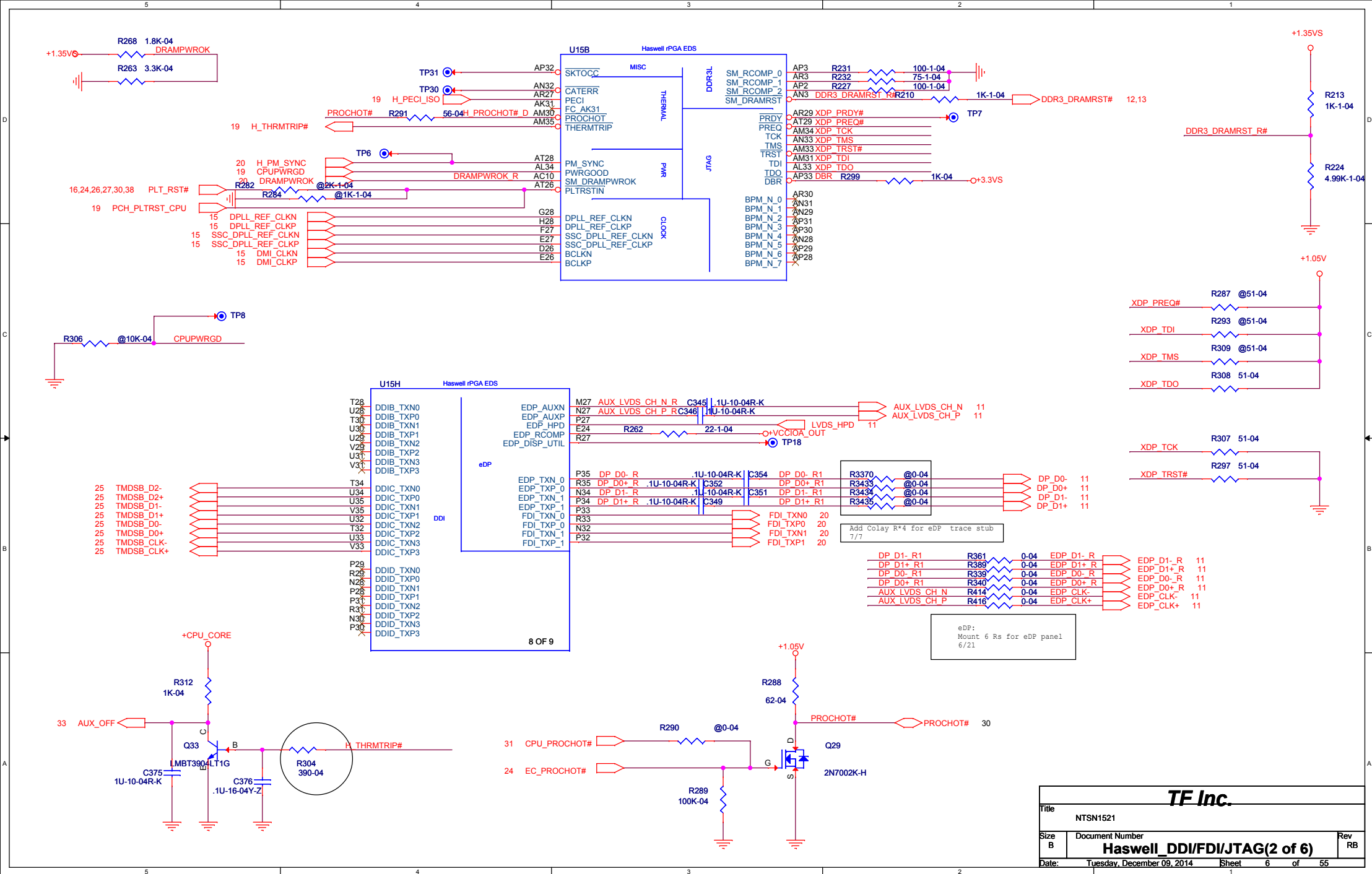


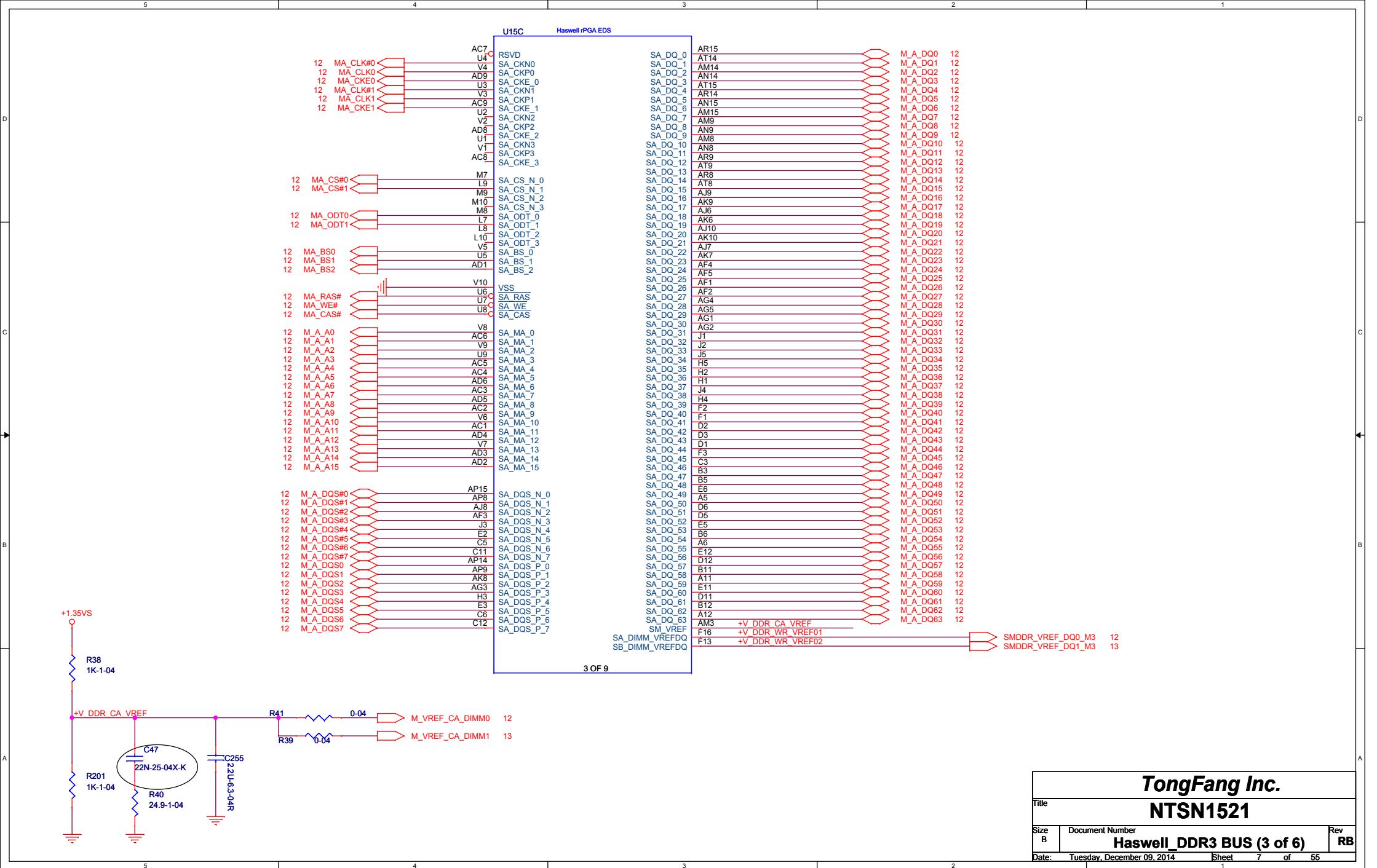
★ EC Control Pin (O/P)
★★ EC Control Pin (I/P)

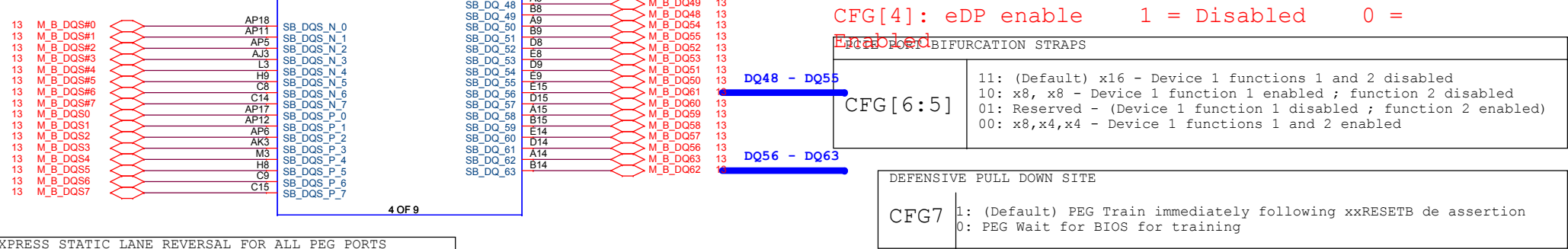


The 16 lanes are associated with root port of device 1
Function 0 refers to the controller of the x16
Function 1 refers to the controller of the x8
Function 2 refers to the controller of the x4

| | | |
|-----------------------------|----------------------------|---------------|
| TongFang Inc. | | |
| NTSN1521 | | |
| Title | | |
| Size B | Document Number | Rev RB |
| Haswell DMI (1 of 6) | | |
| Date: | Tuesday, December 09, 2014 | Sheet 5 of 55 |



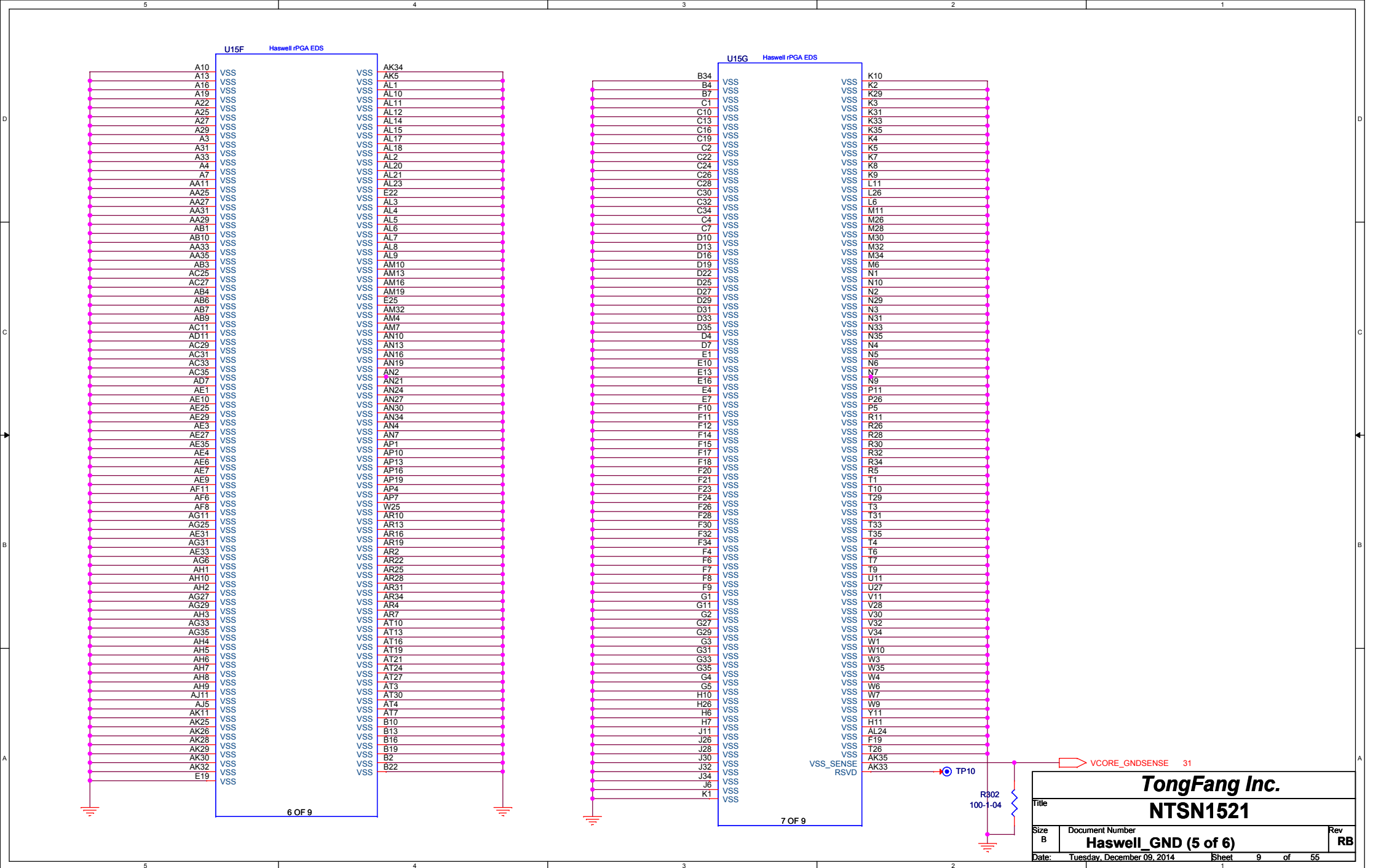




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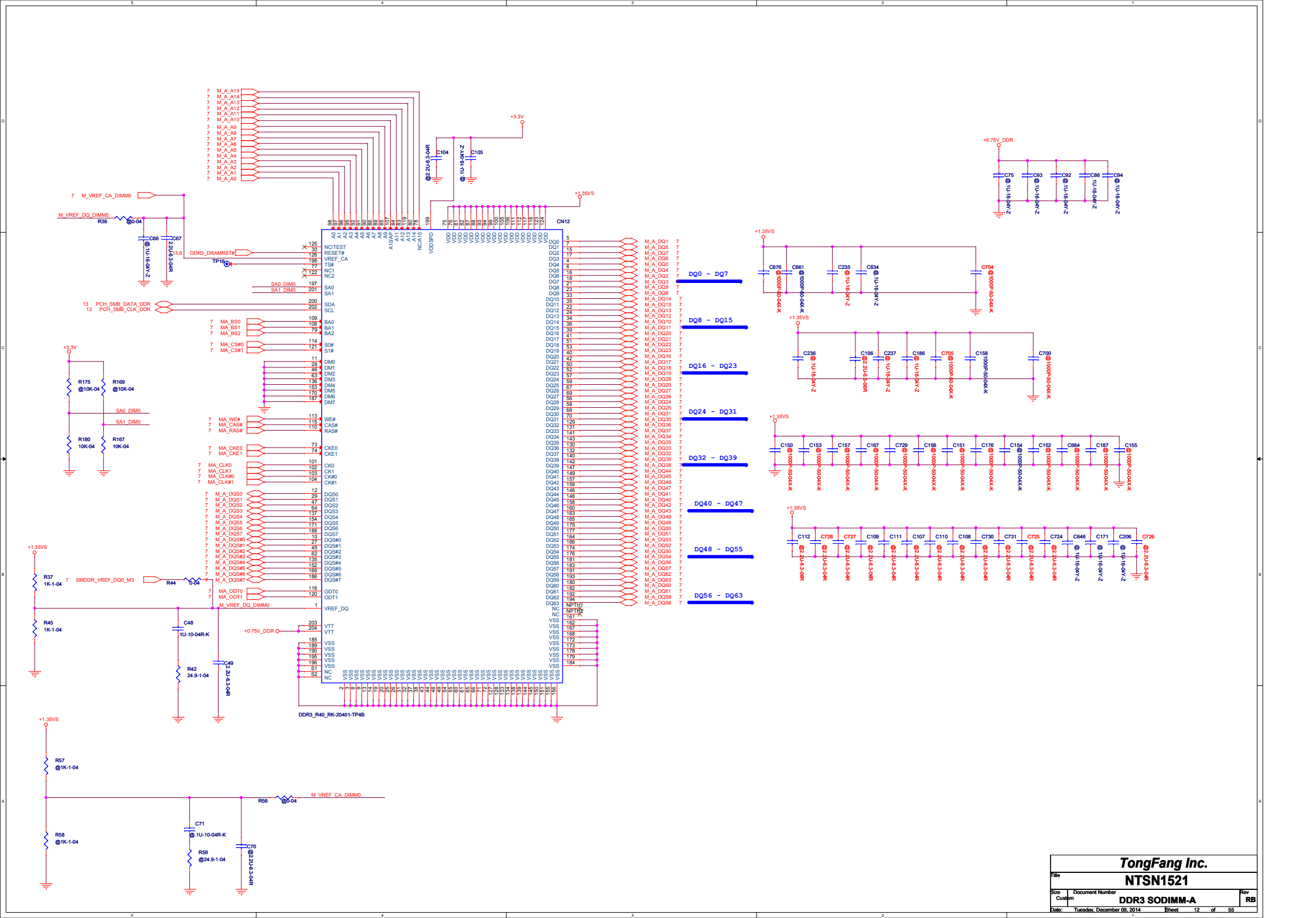
1: (DEFAULT)NORMAL OPERATION;
   LANE# DEFINITION MATCHES
   SOCKET PIN MAP DEFINITION
0: LANE REVERSAL

```

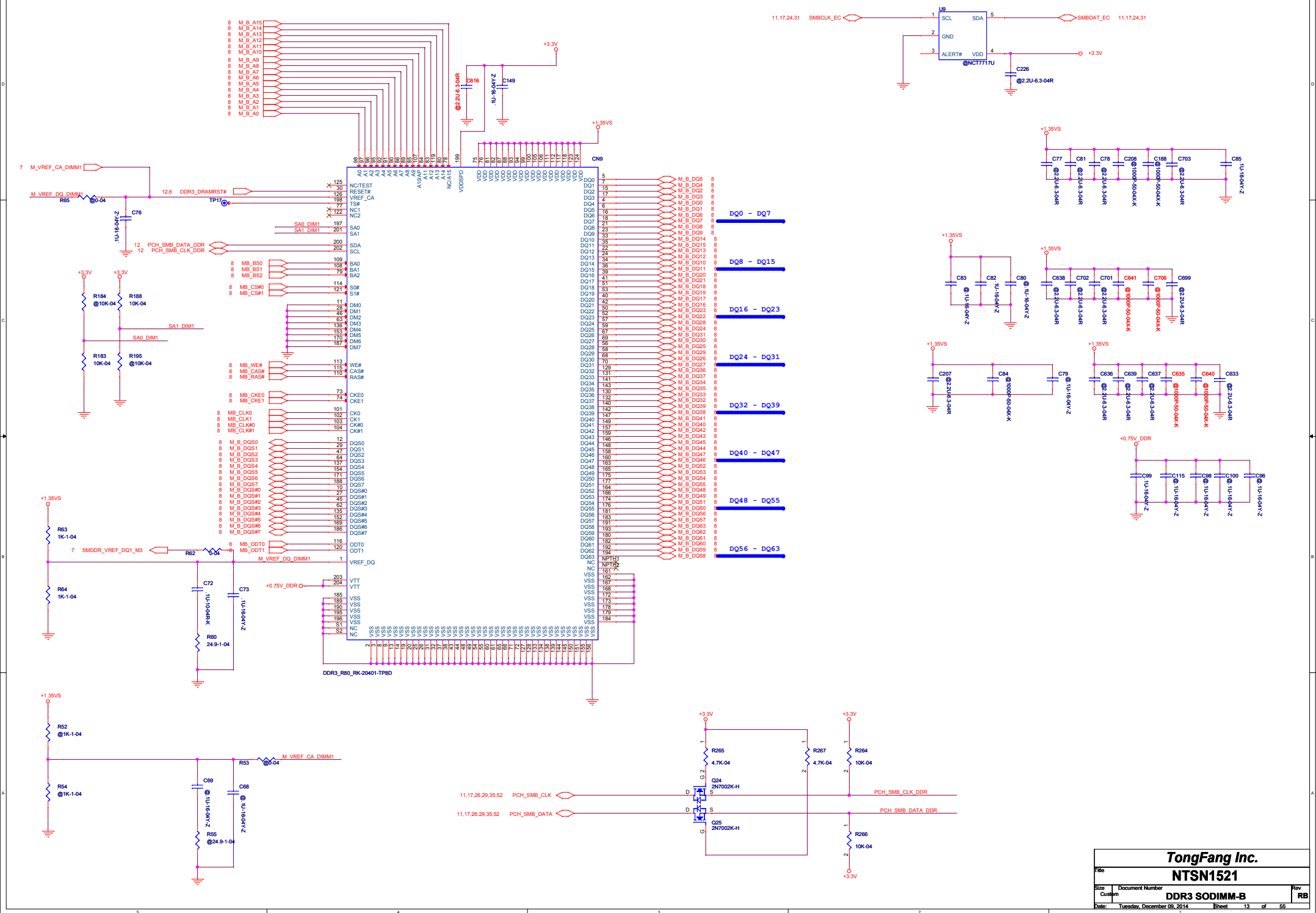



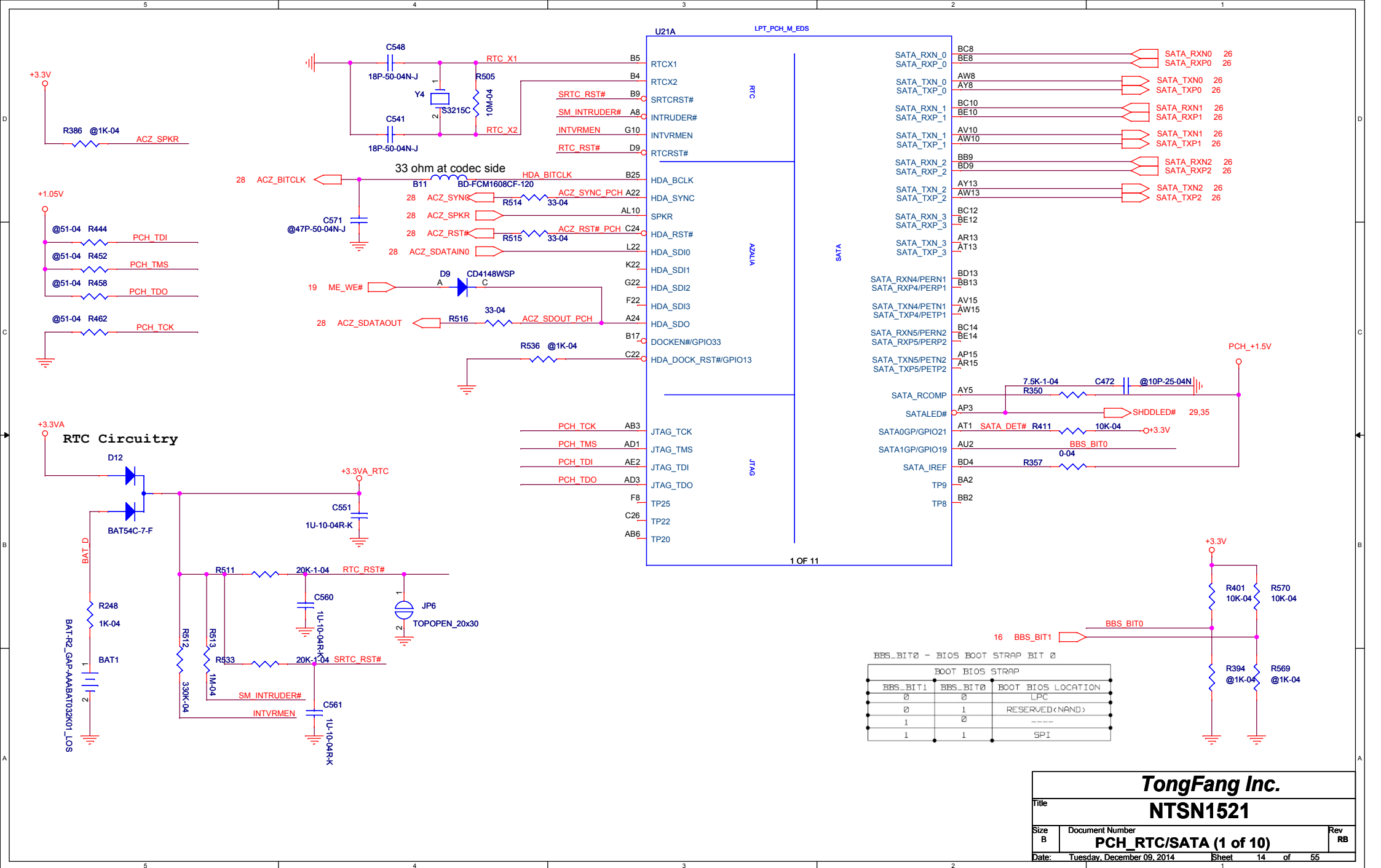
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| Title | | |
| NTSN1521 | | |
| Size | Document Number | Rev |
| B | Haswell GND (5 of 6) | RB |
| Date: | Tuesday, December 09, 2014 | Sheet 9 of 55 |





CPU Thermal Sensor





| PCIE | Location |
|--------|----------------|
| PCIE 0 | LAN+cardreader |
| PCIE 1 | WLAN |
| PCIE 2 | Express Card |
| PCIE 3 | Express Card |
| PCIE 4 | INTEL LAN |
| PCIE 6 | no use |
| PCIE 7 | no use |
| PCIE 8 | no use |

+3.3VS

10K-8P4R-04 RN7

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

USB_OC#_2_3

26 18 26 18 26 18

LAN CLKREQ

10K-04

PCIECLKREQ4#

10K-8P4R-04 RN8

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

SUS_PWR_ACK_R

PM_R#_20

USB_OC#_6_7

USB_OC#_0_1

DEL
2014-4-29

24 CLK_EC_LPC

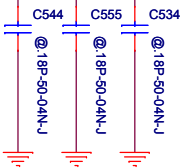
30 CLK_TPM

26 CLK_Debug BD

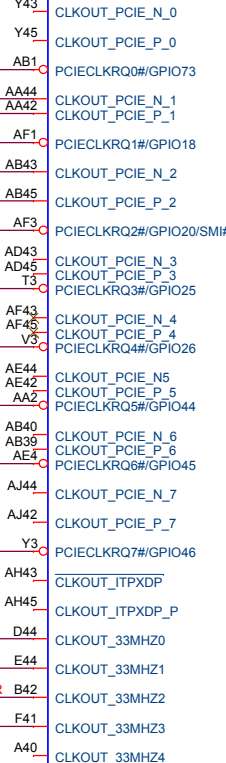
CLK PCI KBC_R

CLK PCI SIO_R

CLK TPM_R

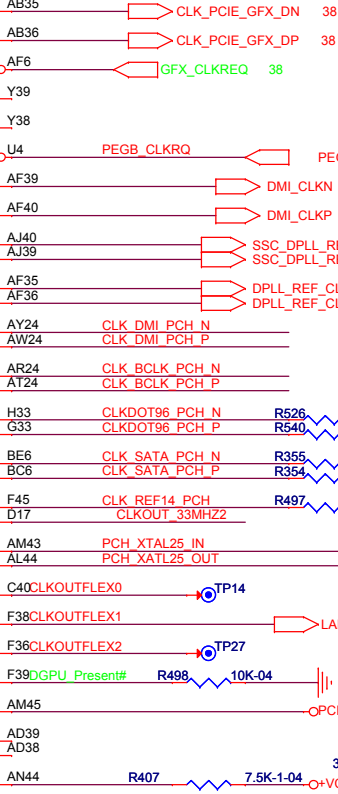
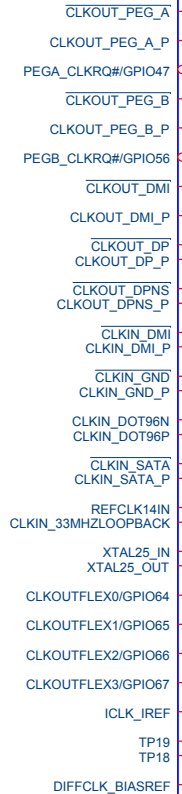


U21C LPT_PCH_M_EDS



CLOCK SIGNAL

2 OF 11



10K-8P4R-04 RN9

CLK_BCLK_PCH_N 5 4 3 2 1
CLK_BCLK_PCH_P 6 5 4 3 2 1
CLK_DMI_PCH_P 7 6 5 4 3 2 1
CLK_DMI_PCH_N 8 7 6 5 4 3 2 1

CLK_PCIE_GFX_DN 38

CLK_PCIE_GFX_DP 38

GFX_CLKREQ 38

PEGB_CLKREQ 18

DMIL_CLKN 6

DMIL_CLKP 6

SSG_DPLL_REF_CLKN 6

SSG_DPLL_REF_CLKP 6

DPLL_REF_CLKN 6

DPLL_REF_CLKP 6

CLK_DMI_PCH_N

CLK_DMI_PCH_P

CLK_BCLK_PCH_N

CLK_BCLK_PCH_P

CLKDOT96_PCH_N

CLKDOT96_PCH_P

CLK_SATA_PCH_N

CLK_SATA_PCH_P

CLK_REF14_PCH

CLKOUT_33MHZ2

PCH_XTAL25_IN

PCH_XATL25_OUT

LAN_XTAL_OUT1

OPCH_+1.5V

VCCAXCK_VRM

TongFang Inc.

NTSN1521

Title

Size

B

Document Number

PCH_CLK(2 of 9)

Date:

Tuesday, December 09, 2014

Sheet

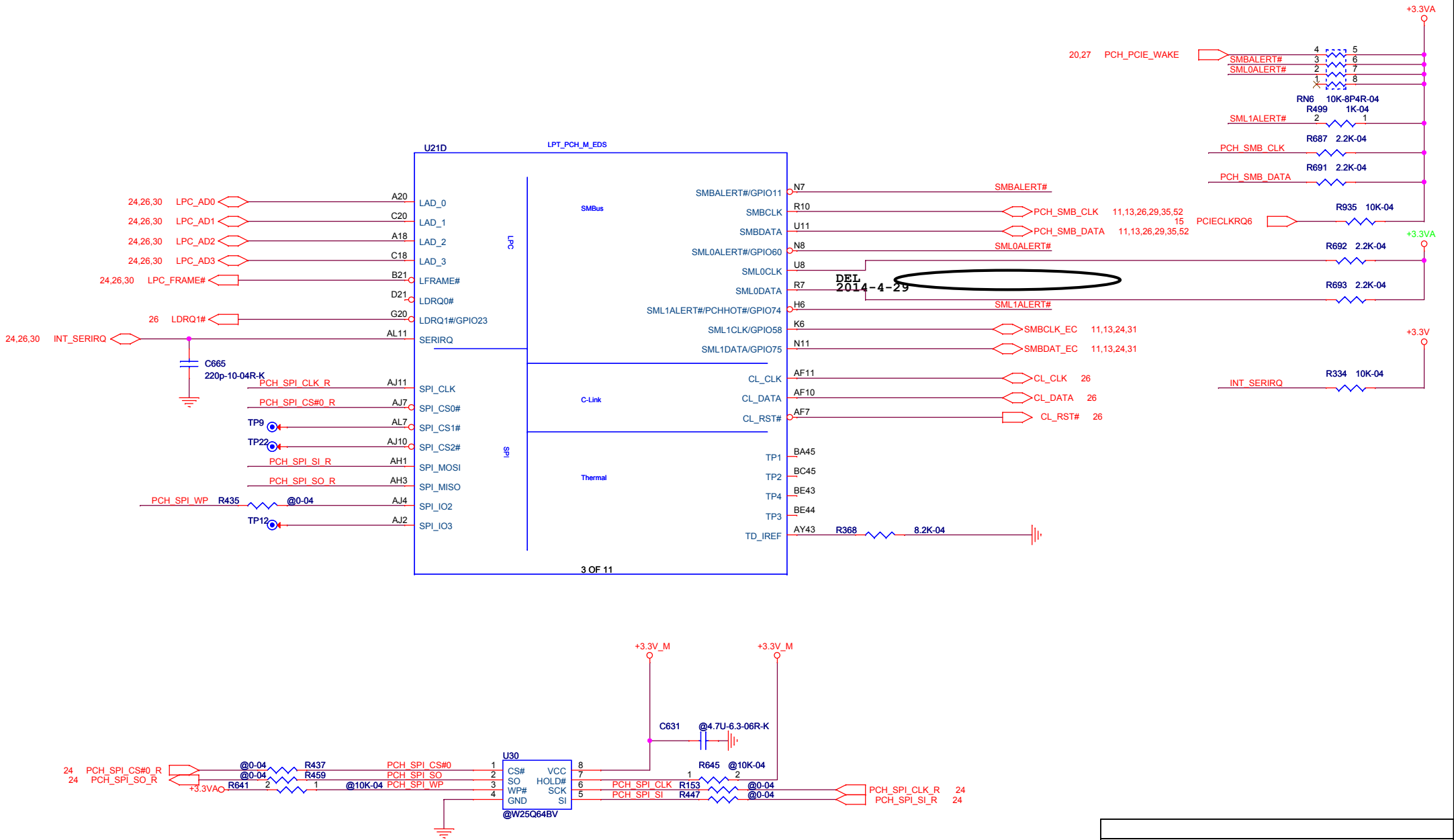
15

of

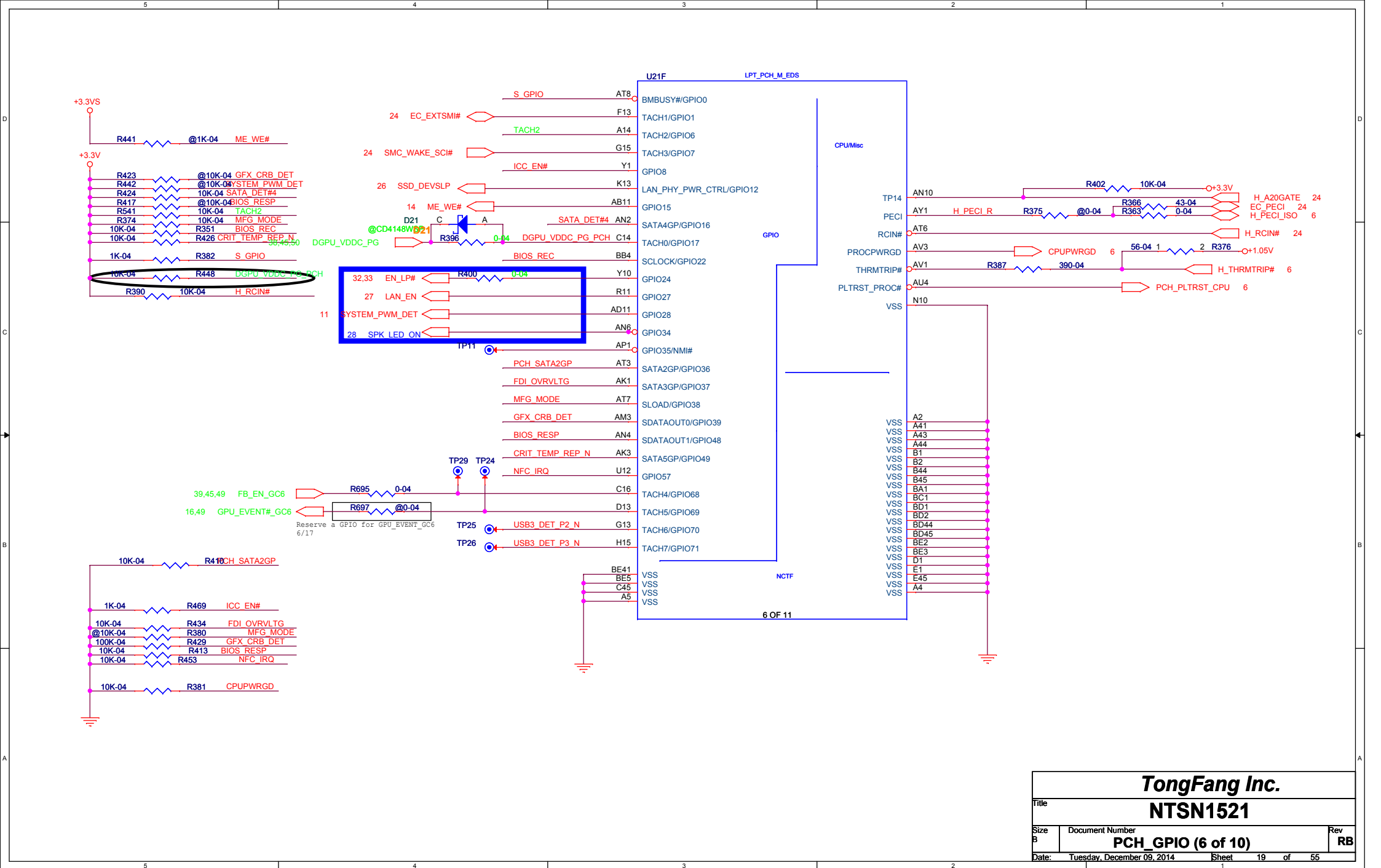
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Rev

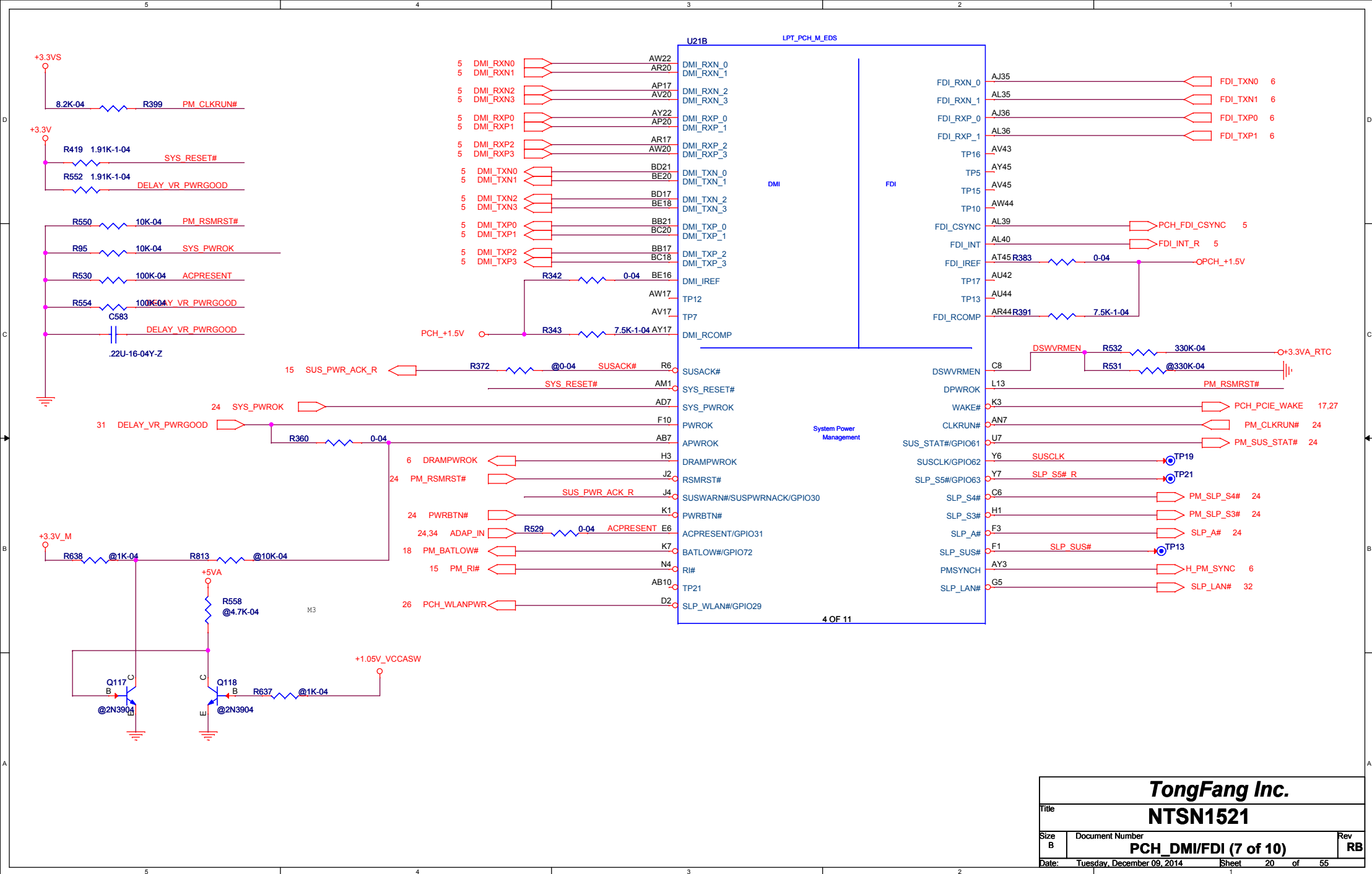
RB



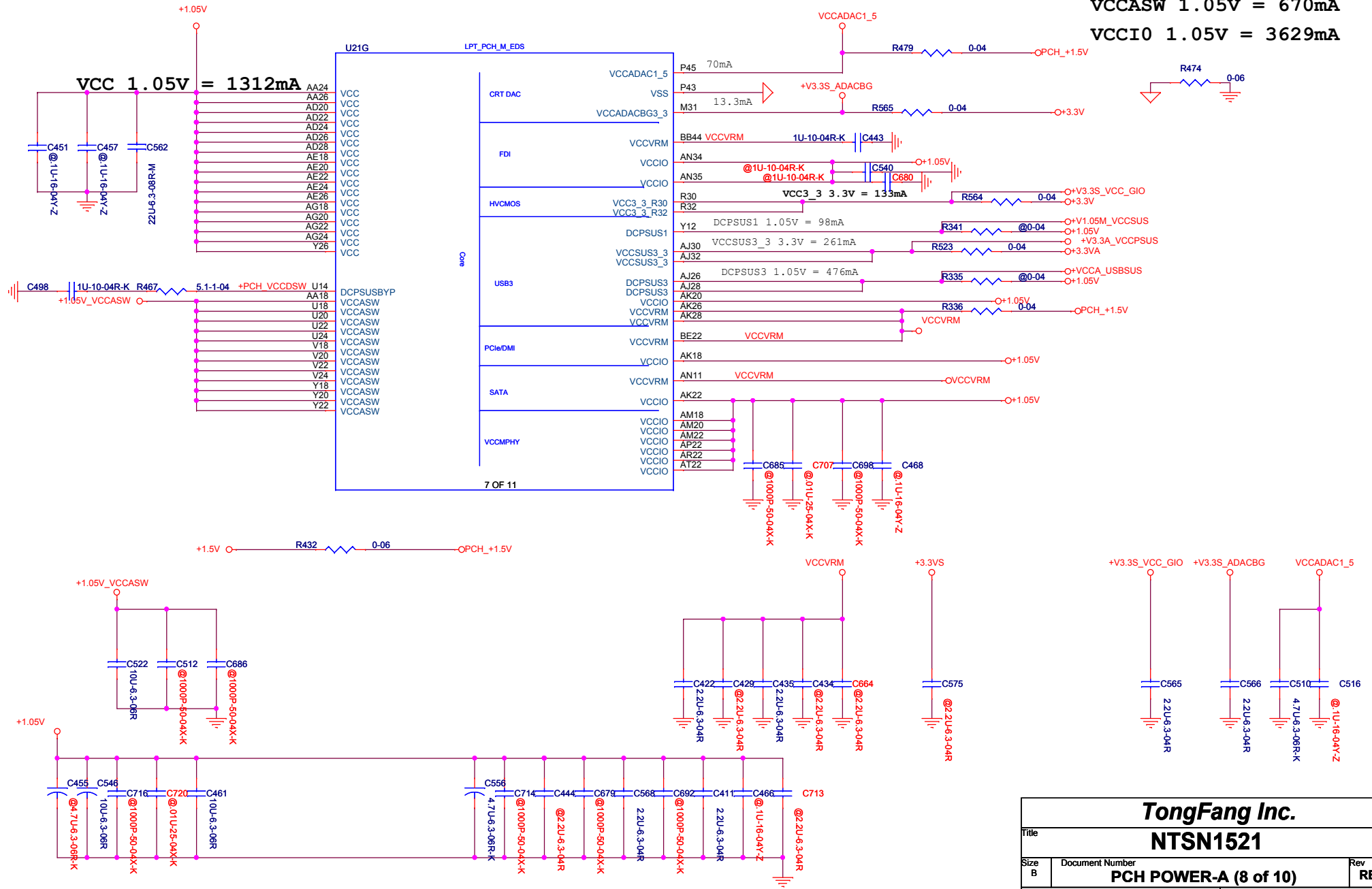
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| Size B | Document Number | | | | | | | | Rev | |
| | PCH_SPI/SMB/LAD(4 of 10) | | | | | | | | RB | |
| Date: | | Tuesday, December 09, 2014 | | | Sheet | | 17 of | | 55 | |

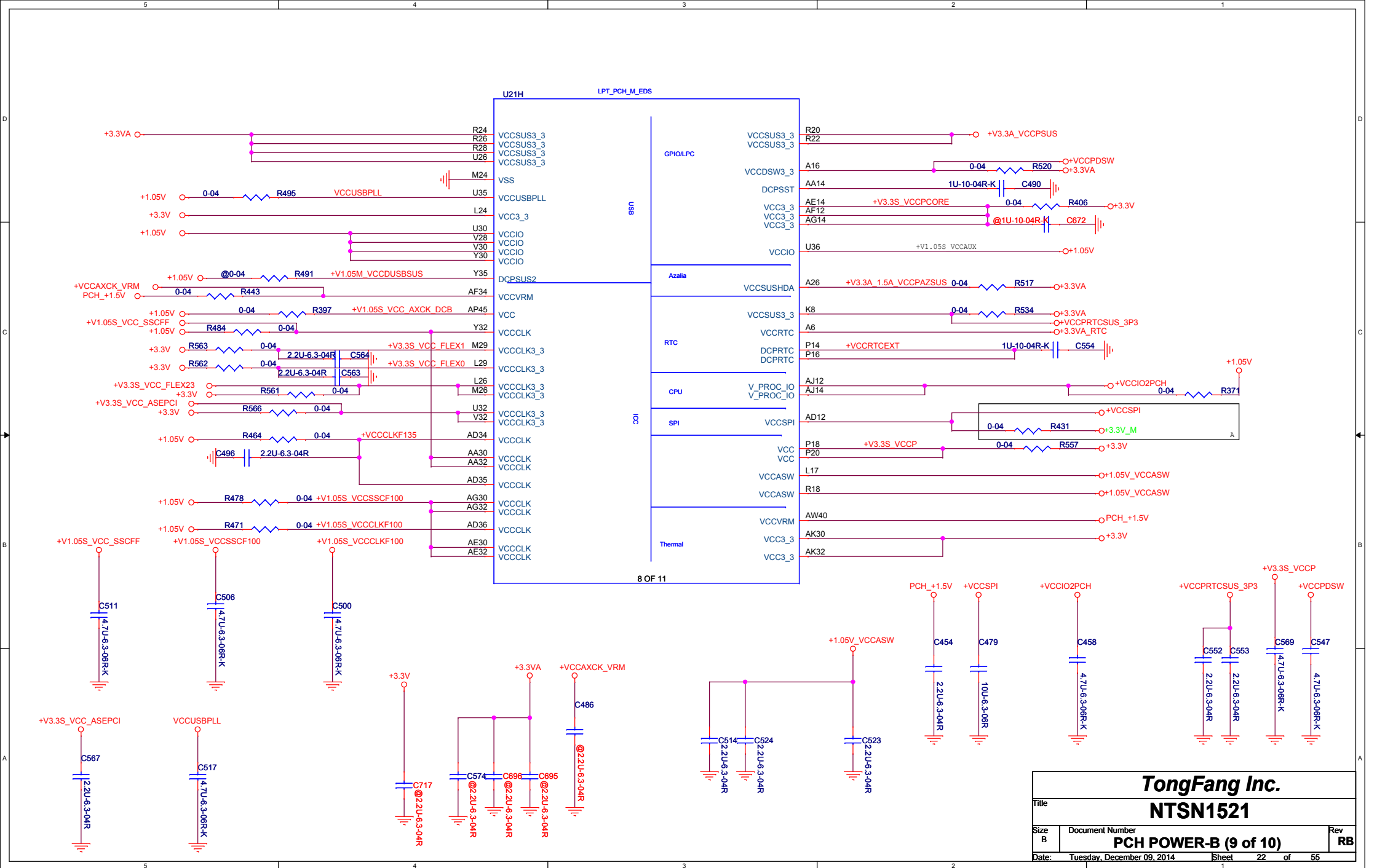


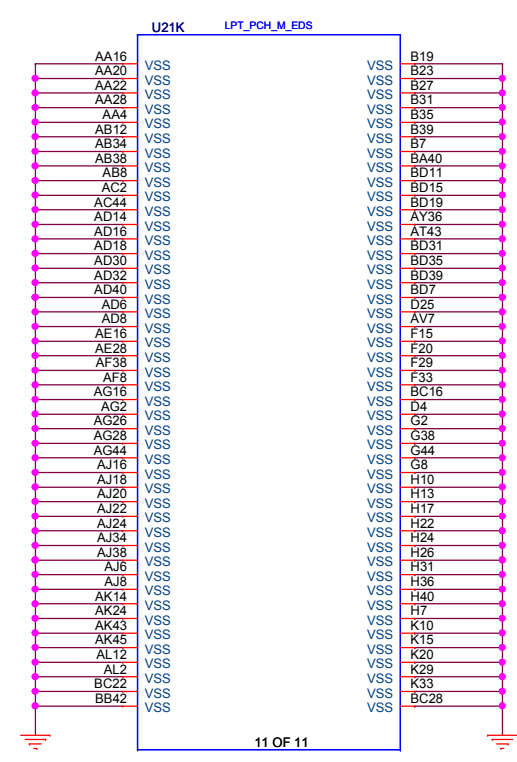
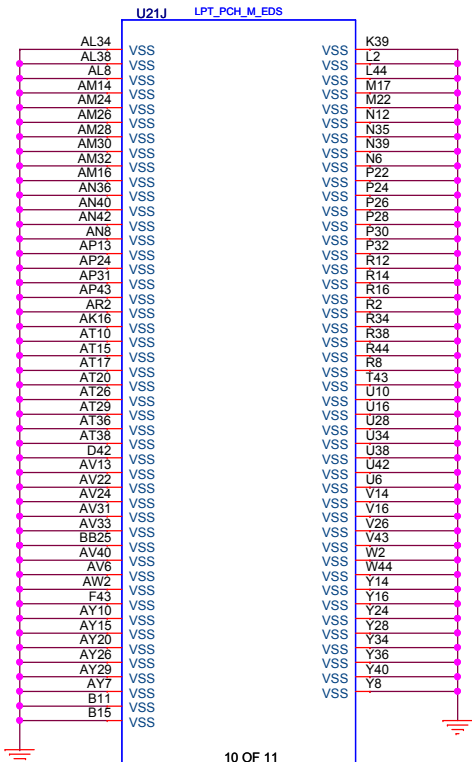
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| TongFang Inc. | | | |
| NTSN1521 | | | |
| Size | Document Number | Rev | |
| B | PCH_GPIO (6 of 10) | RB | |
| Date: | Tuesday, December 09, 2014 | Sheet | 19 of 55 |



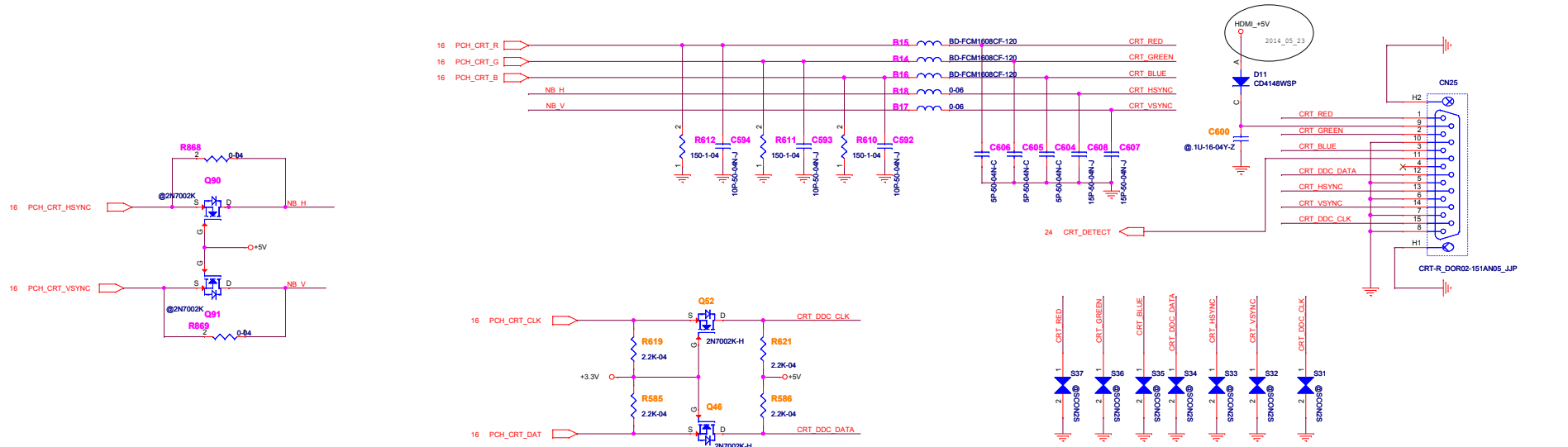
VCCRAM 1.5V = 183mA
VCCASW 1.05V = 670mA
VCCIO 1.05V = 3629mA



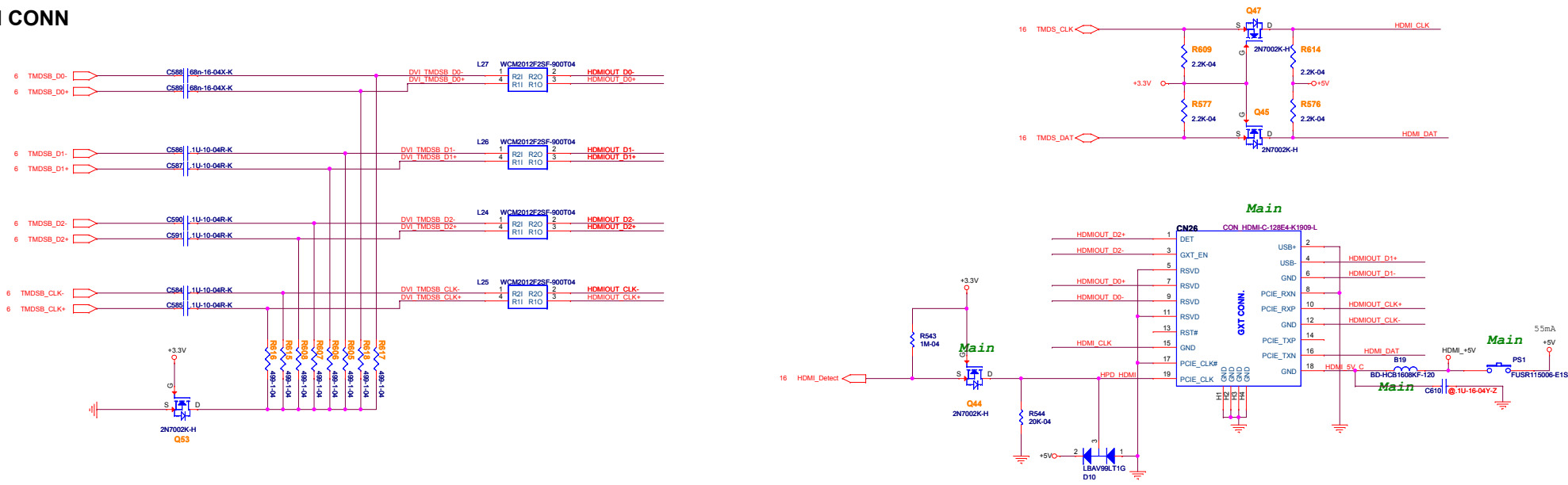




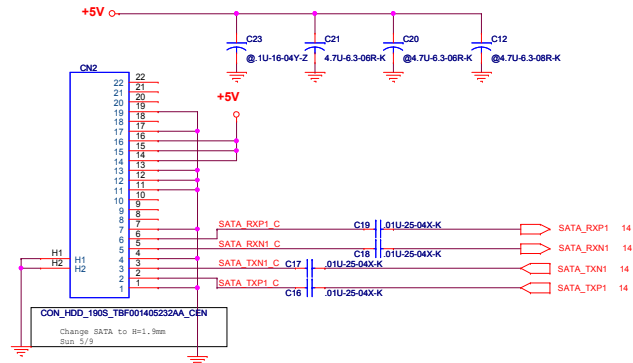
CRT CONN



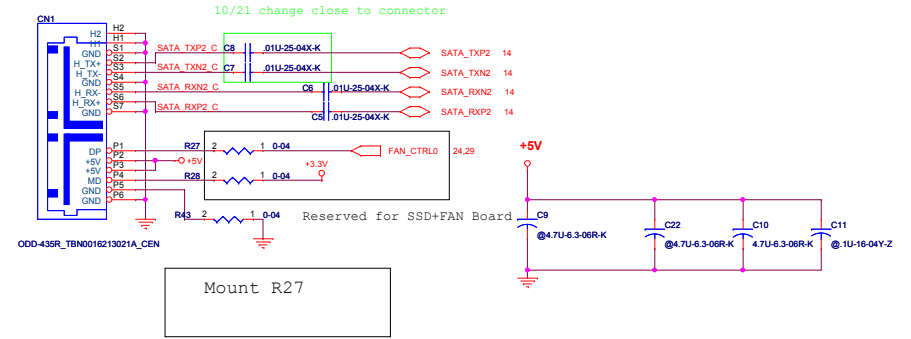
HDMI CONN



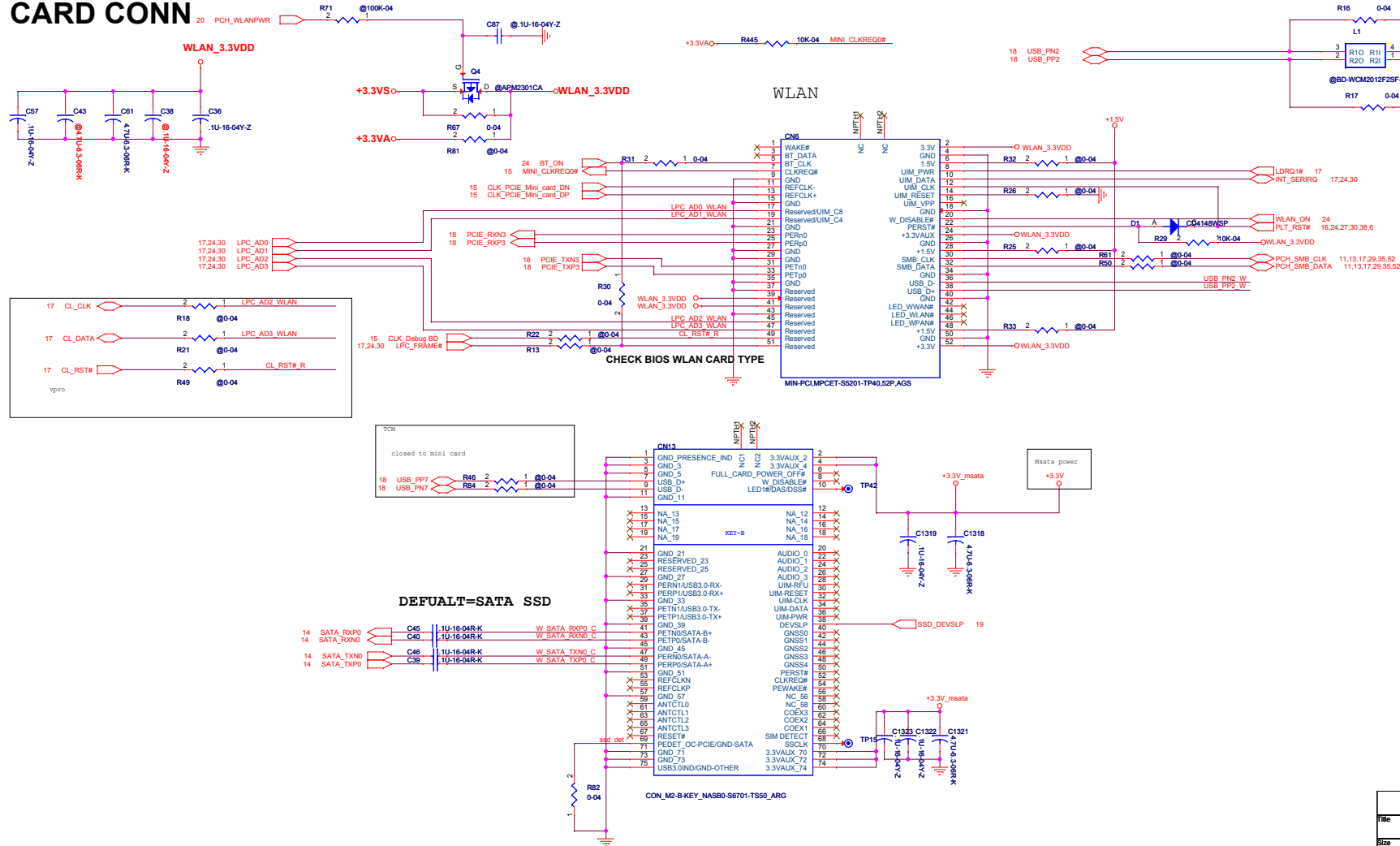
SATA-HDD

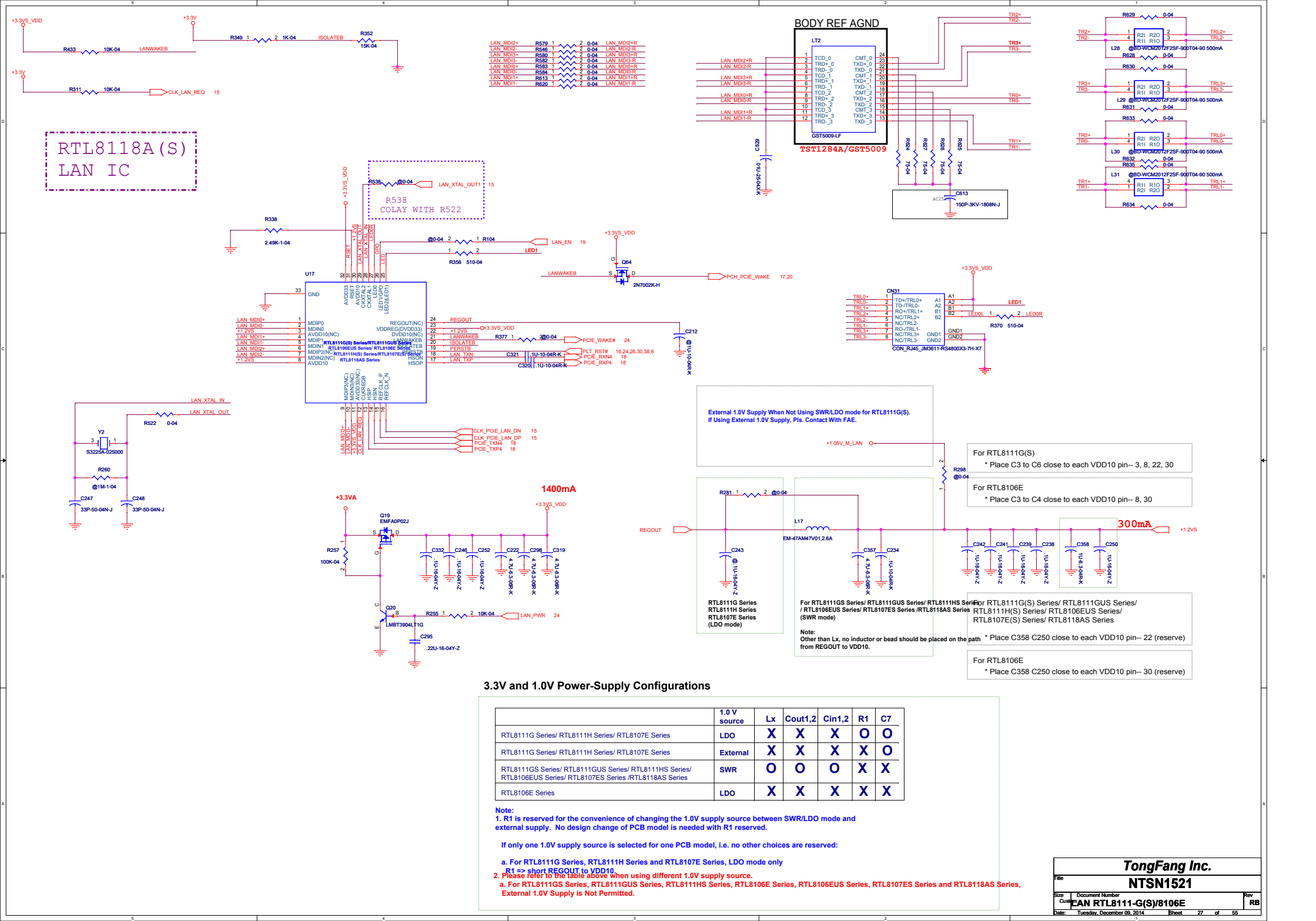


CD-ROM



MINI CARD CONN



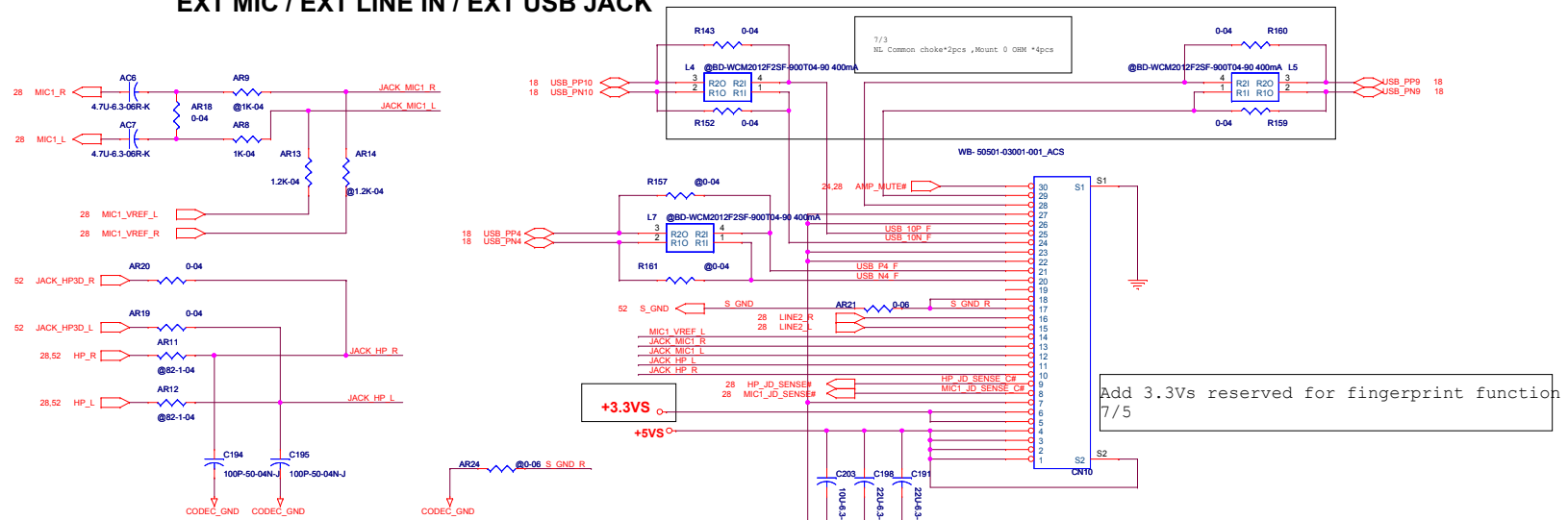


AMP VDD

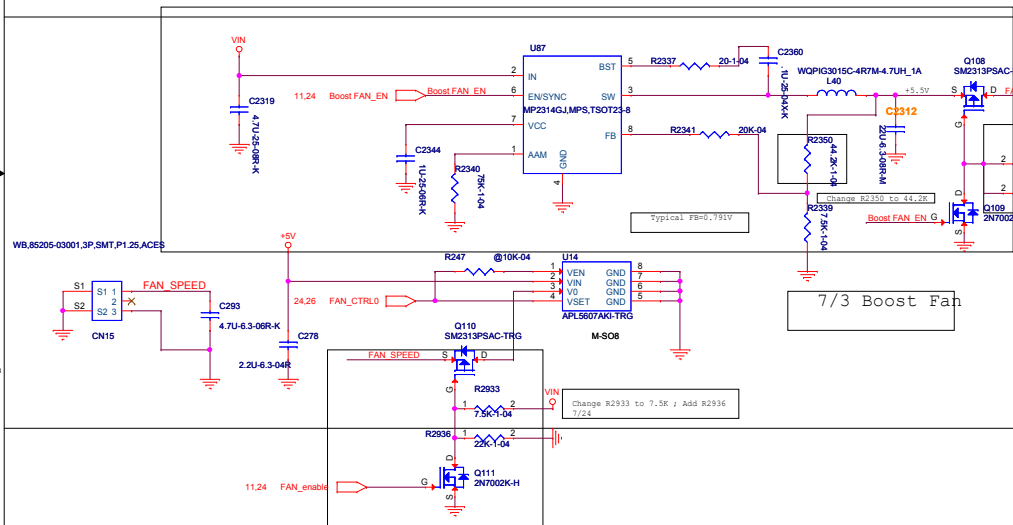


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|-------|----------------------------|-----------------|-----------------------------------|-----------------|----|----|-----|
| Title | | | | NTSN1521 | | | |
| Size | Custom | Document Number | CODEC(ALC269)/INT MIC/SPKR | | | | Rev |
| Date: | Tuesday, December 09, 2014 | | Sheet | 28 | of | 55 | RE |

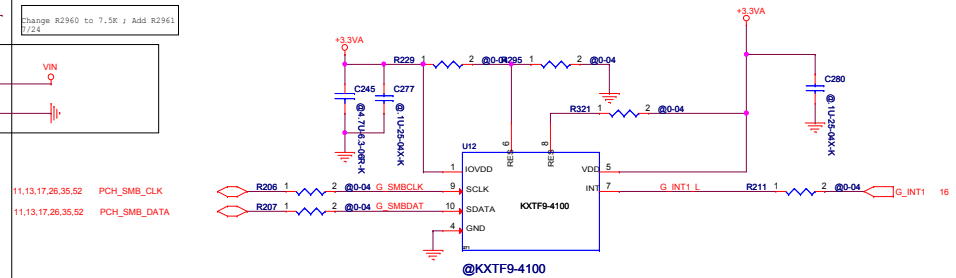
EXT MIC / EXT LINE IN / EXT USB JACK

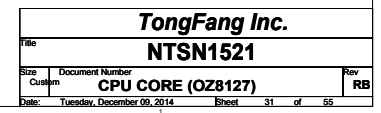


FAN CONTROLLER

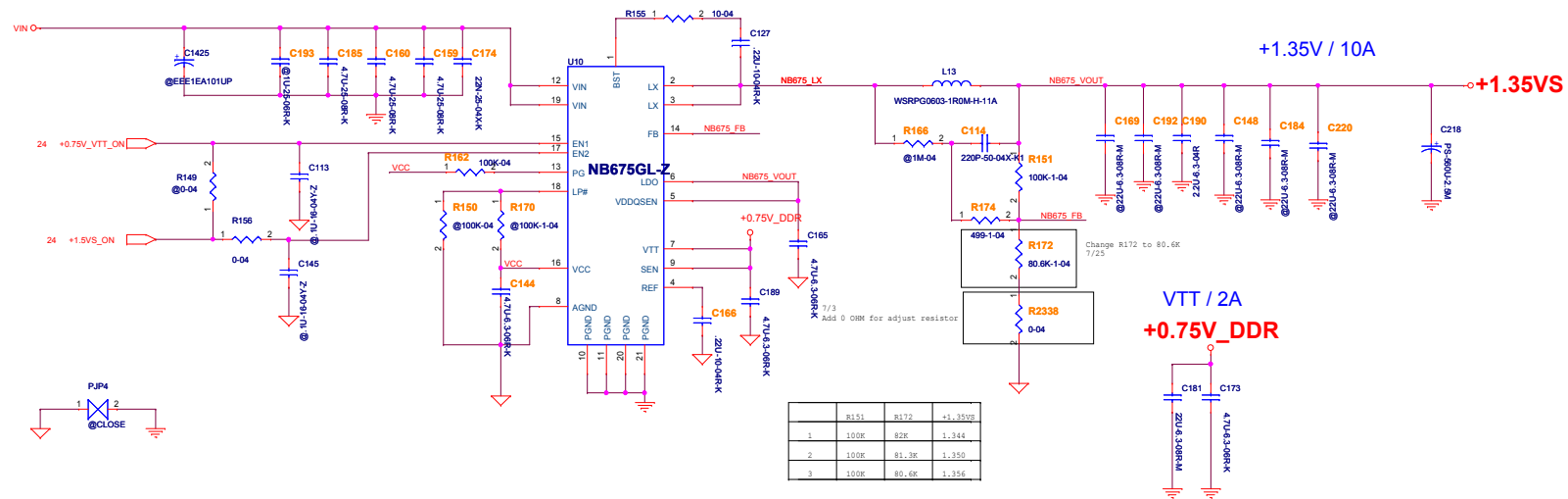


G SENSOR



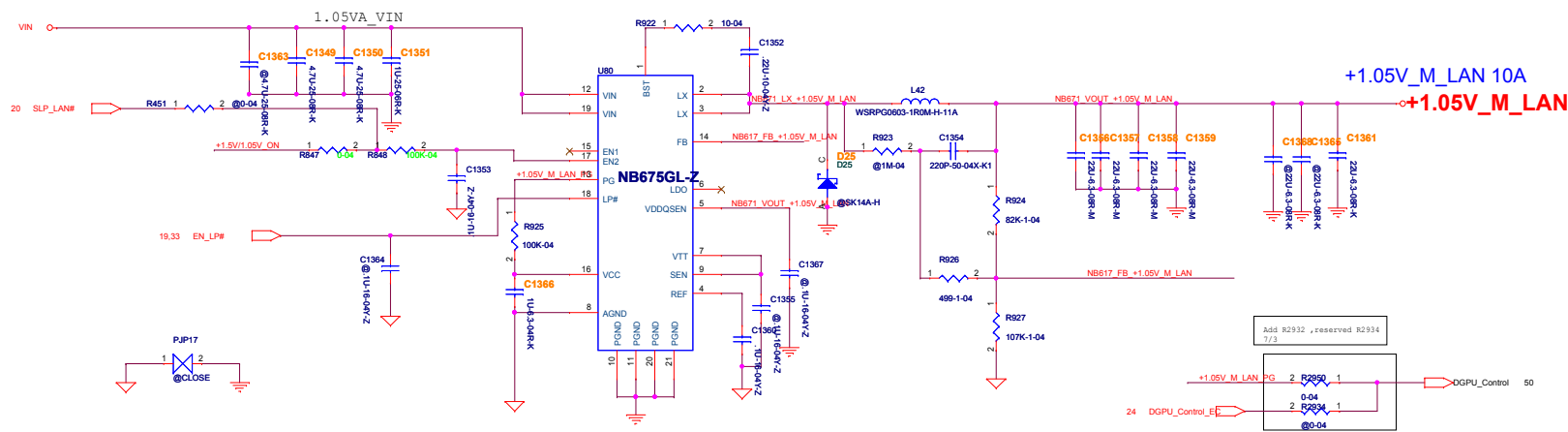
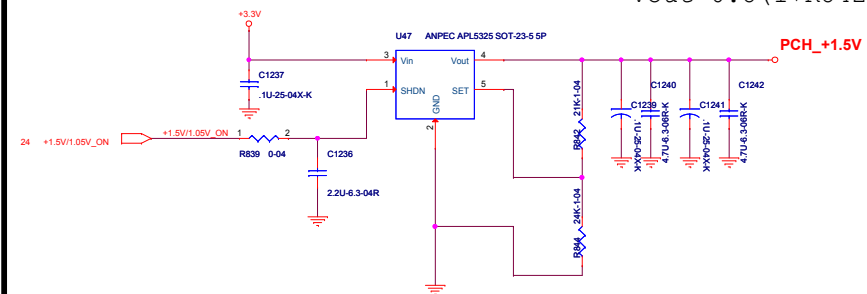


1.35VS/VTT Converter

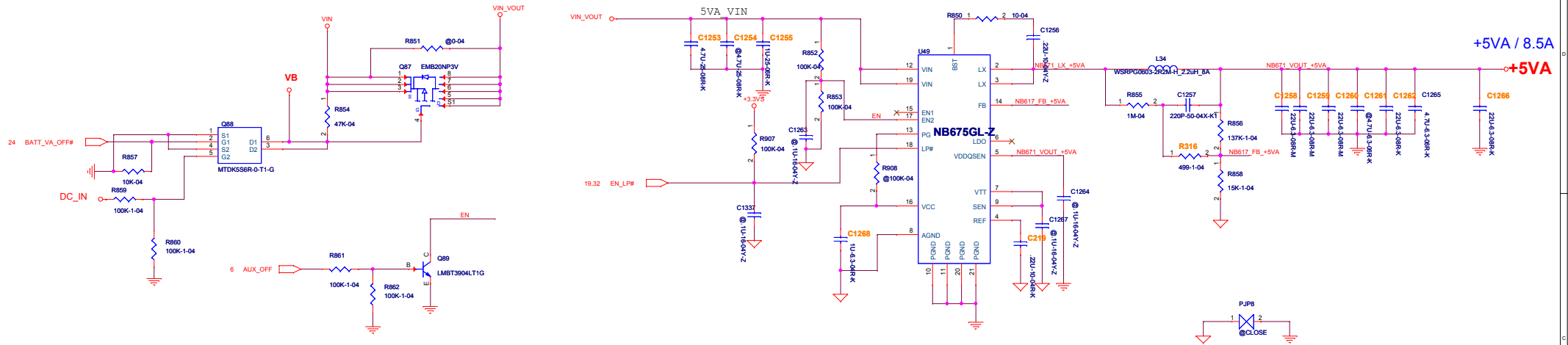


PCH_LDO_+1.5V

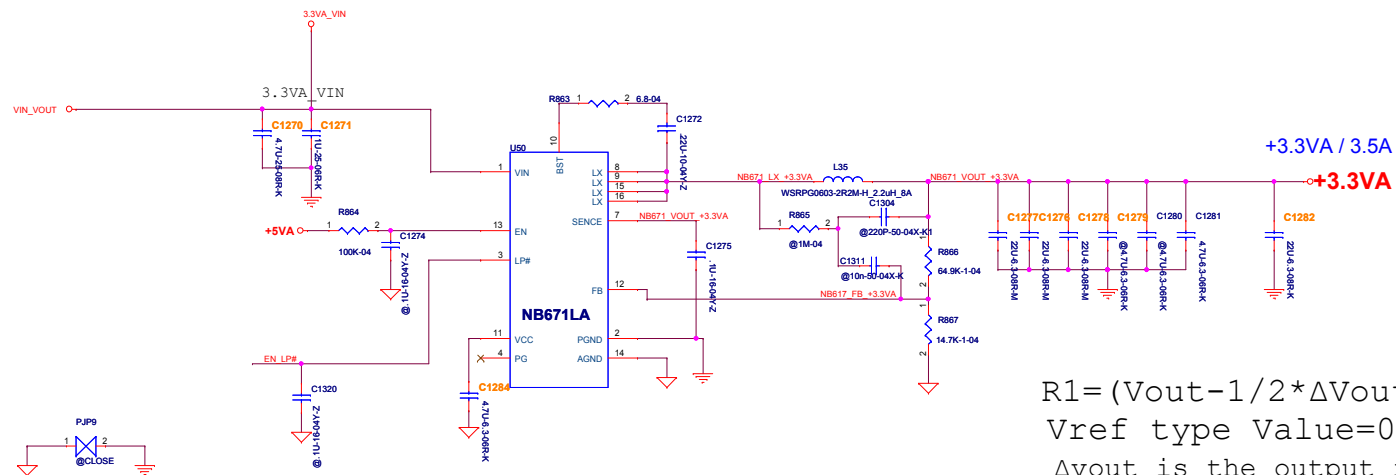
$$V_{out} = 0.8(1 + R_{842}/R_{844})$$



5VA Converter

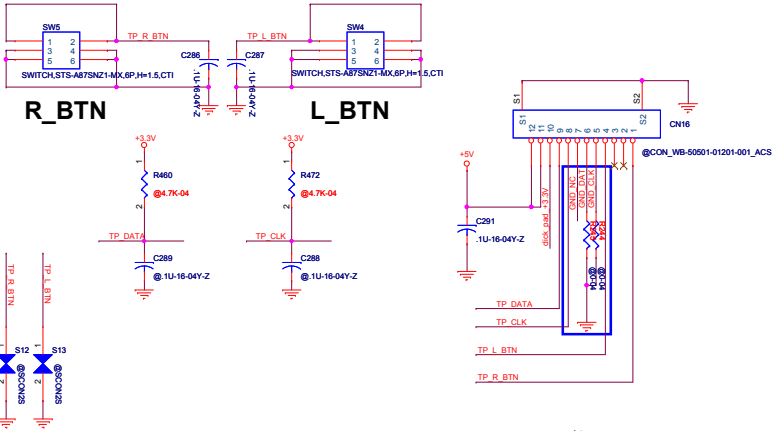


3.3VA Converter

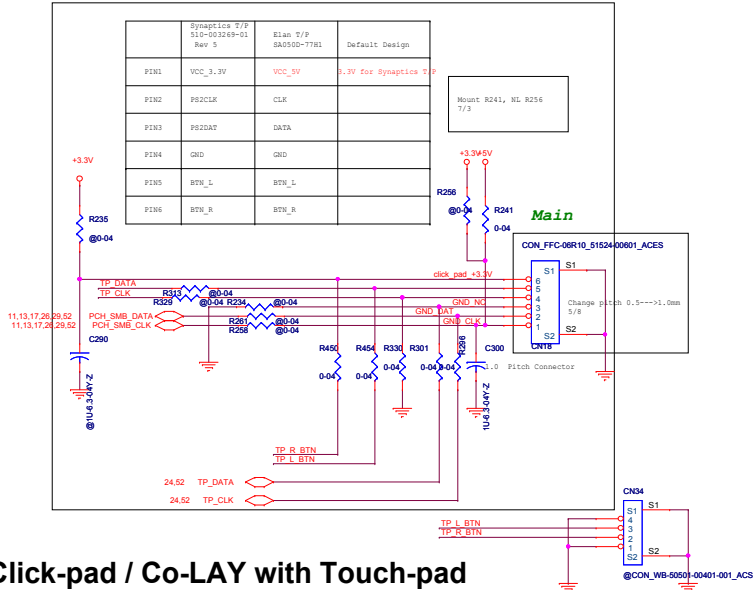

$$R1 = (V_{out} - 1/2 \cdot \Delta V_{out} - V_{ref}) / V_{ref} \cdot R2$$

Vref type Value = 0.604 V
 ΔV_{out} is the output ripple : 5% $\cdot V_{out}$

Touch Pad

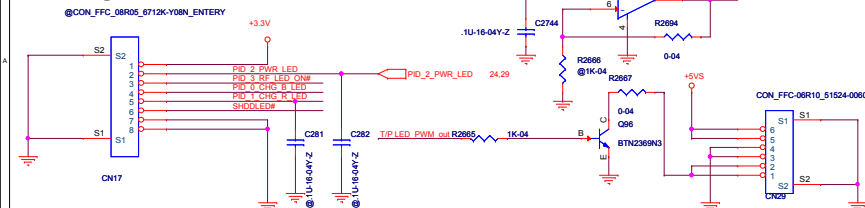


5/8

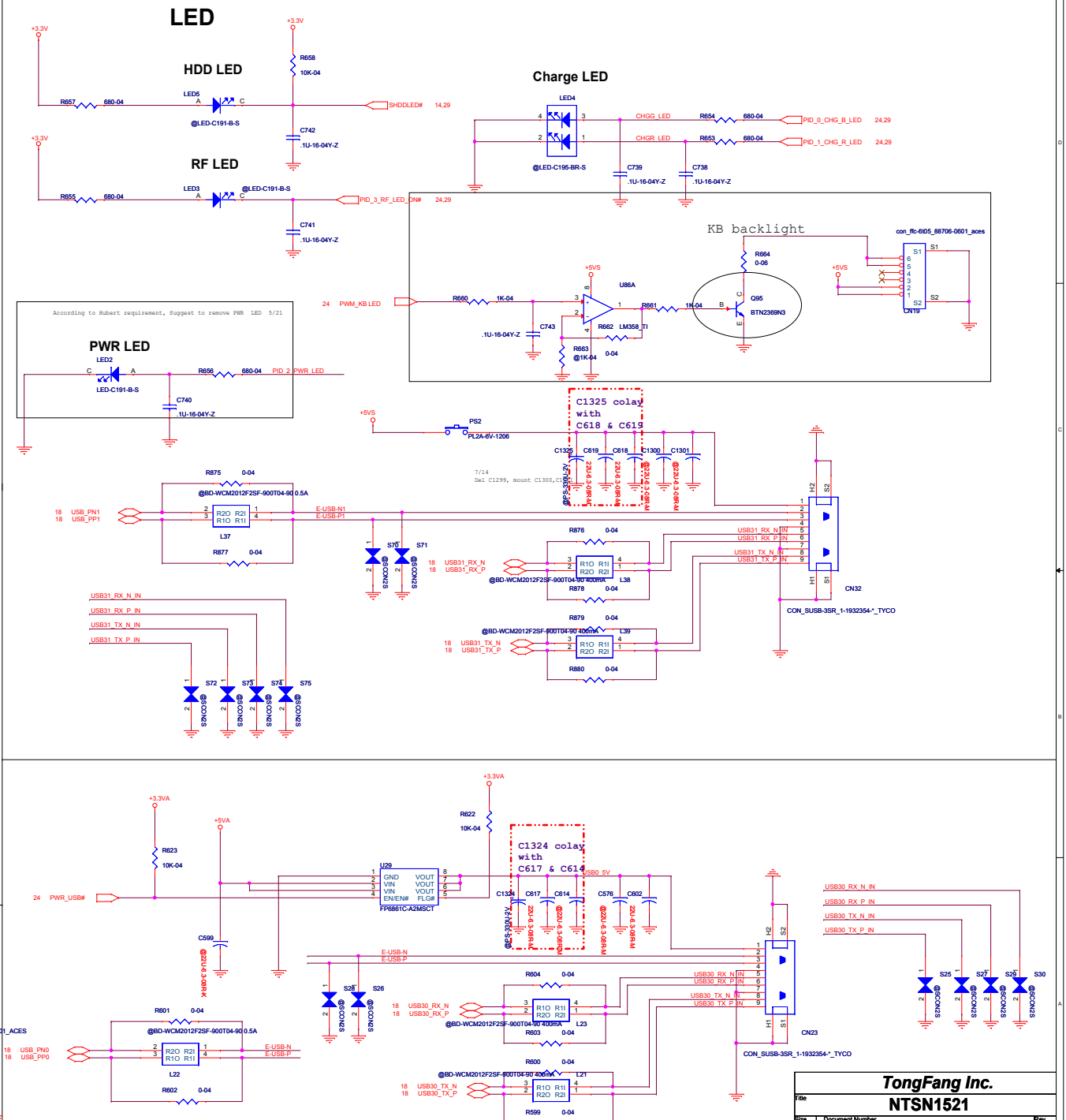


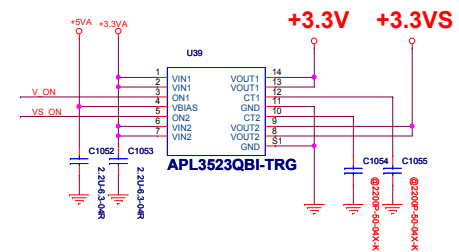
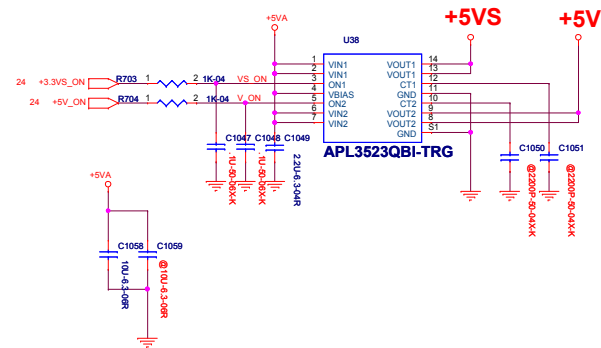
Click-pad / Co-LAY with Touch-pad

LED CONN

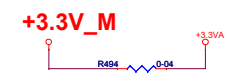
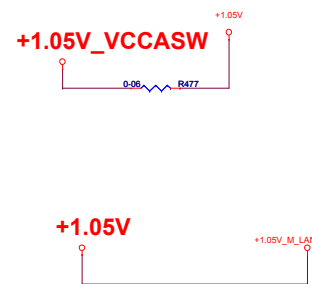
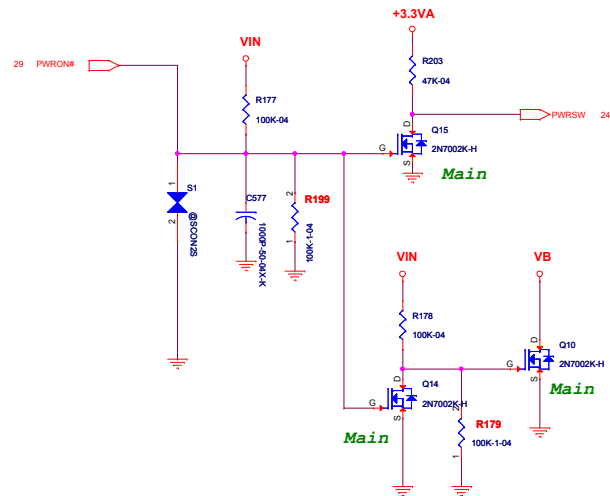


LED





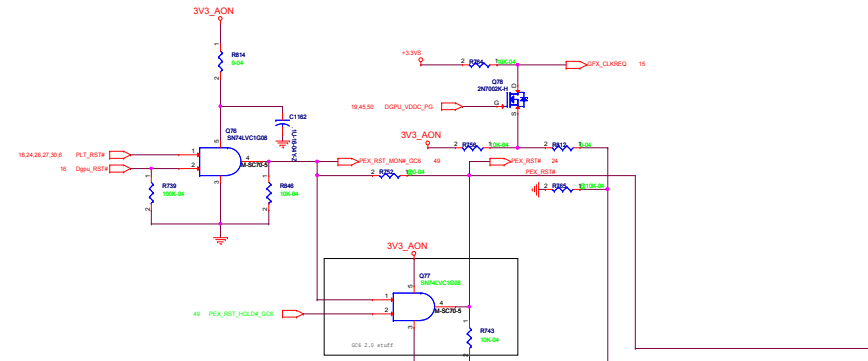
PWR SW



| | |
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| Customer | Customer VCC_PWR 10 |
| Date | Tuesday, December 09, 2014 |
| Sheet | 36 of 55 |
| Rev | RB |

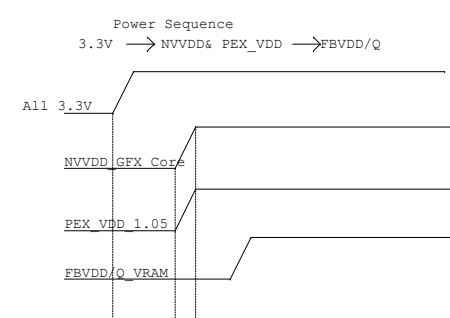
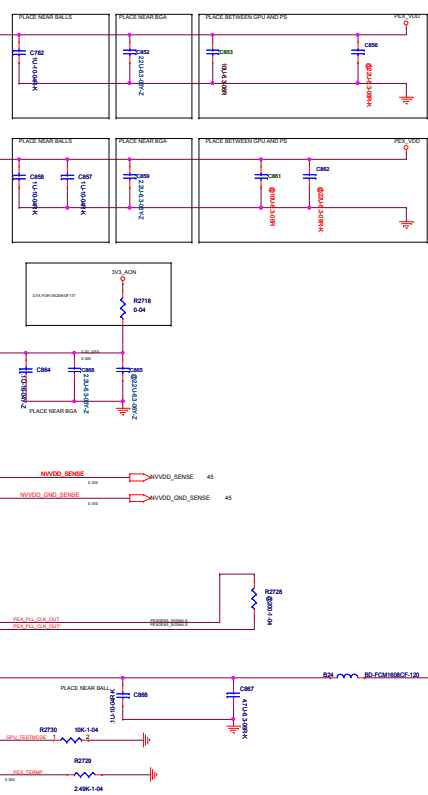
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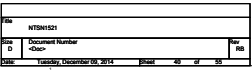
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| TongFang Inc. | | |
| Title | | |
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| Size | Document Number | Rev |
| B | INTEL LAN(82579LM) | RB |
| Date: | Tuesday, December 09, 2014 | Sheet 37 of 55 |

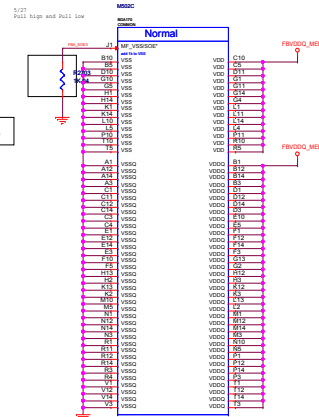
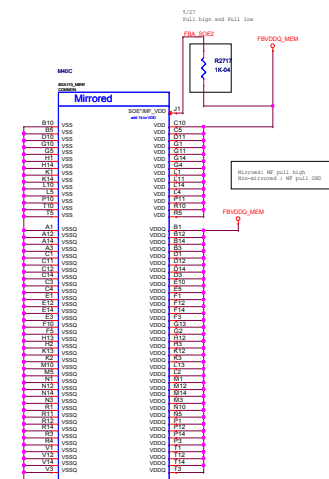
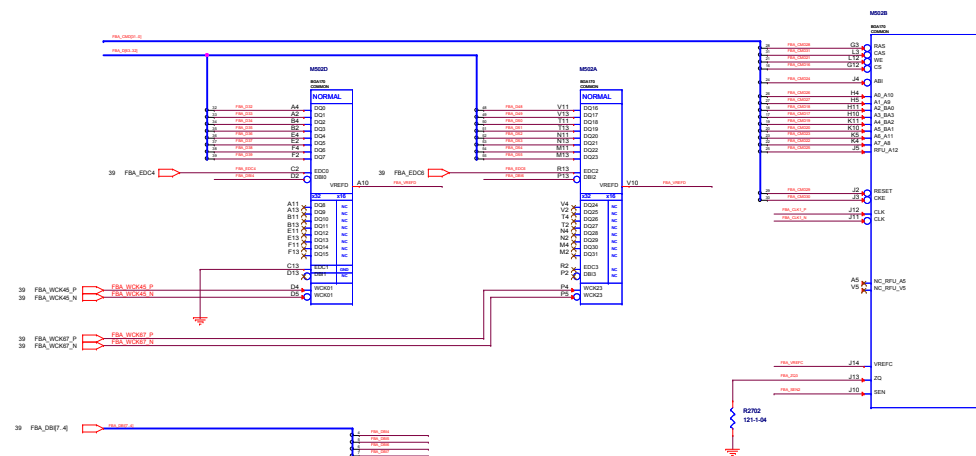
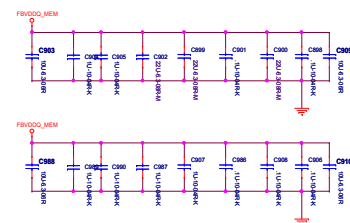
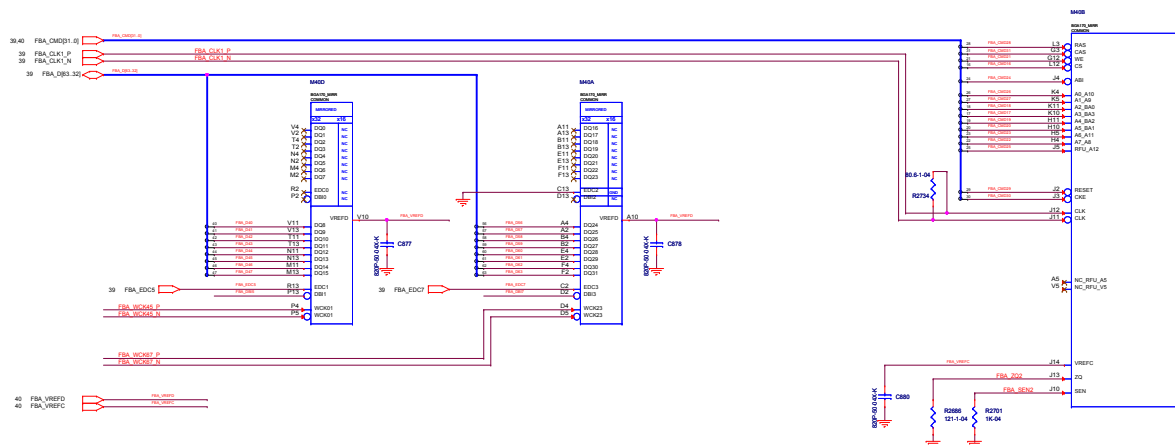


N15P-GX---->GM107

| Pin | Signal | Value |
|-----|------------------|-------|
| 1 | PEX_RST_MOMM_G08 | 100K |
| 2 | PEX_RST_HOLD_G08 | 100K |
| 3 | PEX_RST_MOMM_G08 | 100K |
| 4 | PEX_RST_HOLD_G08 | 100K |
| 5 | PEX_RST_MOMM_G08 | 100K |
| 6 | PEX_RST_HOLD_G08 | 100K |
| 7 | PEX_RST_MOMM_G08 | 100K |
| 8 | PEX_RST_HOLD_G08 | 100K |
| 9 | PEX_RST_MOMM_G08 | 100K |
| 10 | PEX_RST_HOLD_G08 | 100K |
| 11 | PEX_RST_MOMM_G08 | 100K |
| 12 | PEX_RST_HOLD_G08 | 100K |
| 13 | PEX_RST_MOMM_G08 | 100K |
| 14 | PEX_RST_HOLD_G08 | 100K |
| 15 | PEX_RST_MOMM_G08 | 100K |
| 16 | PEX_RST_HOLD_G08 | 100K |
| 17 | PEX_RST_MOMM_G08 | 100K |
| 18 | PEX_RST_HOLD_G08 | 100K |
| 19 | PEX_RST_MOMM_G08 | 100K |
| 20 | PEX_RST_HOLD_G08 | 100K |
| 21 | PEX_RST_MOMM_G08 | 100K |
| 22 | PEX_RST_HOLD_G08 | 100K |
| 23 | PEX_RST_MOMM_G08 | 100K |
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| 25 | PEX_RST_MOMM_G08 | 100K |
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| 29 | PEX_RST_MOMM_G08 | 100K |
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| 34 | PEX_RST_HOLD_G08 | 100K |
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| 37 | PEX_RST_MOMM_G08 | 100K |
| 38 | PEX_RST_HOLD_G08 | 100K |
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| 40 | PEX_RST_HOLD_G08 | 100K |

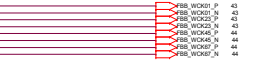
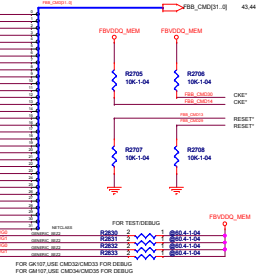


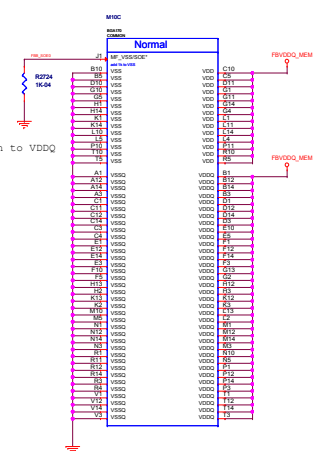
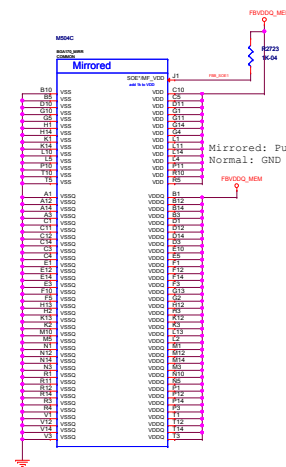
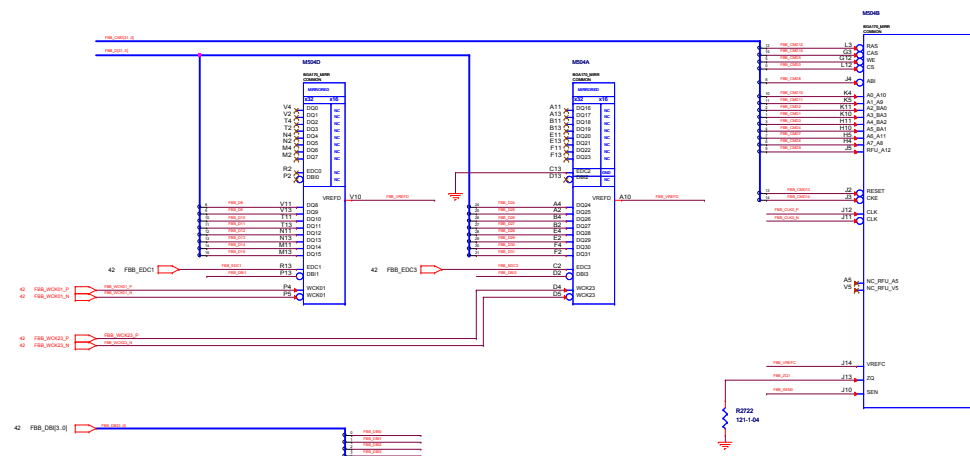
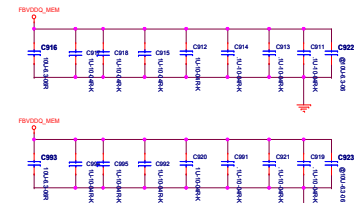
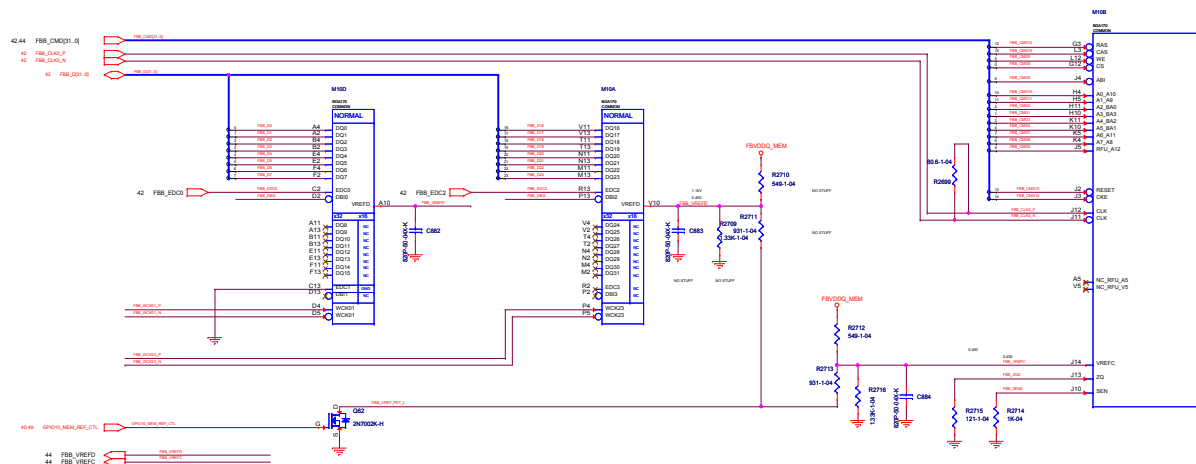


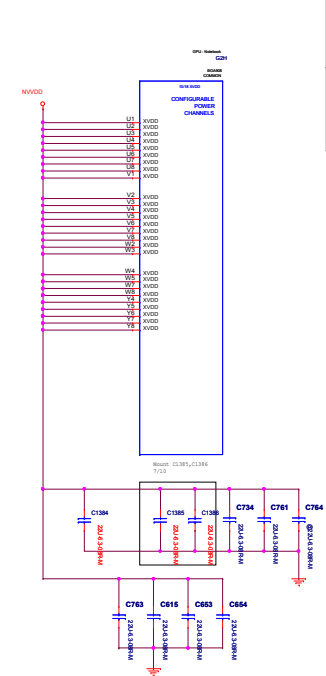
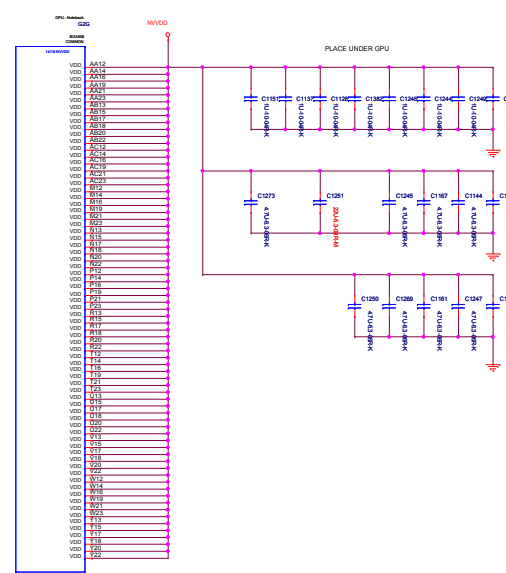
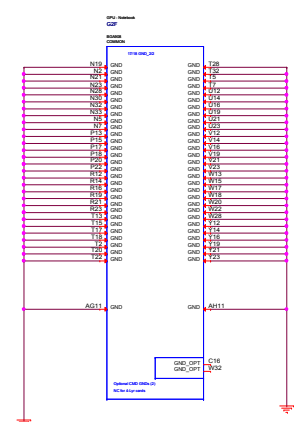
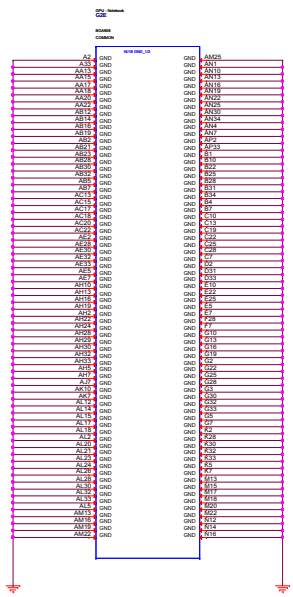


GDPRS CMD Mapping Table

| GDPRS CMD | Mapping |
|-----------|---------|
| 12 | RDY |
| 15 | CS* |
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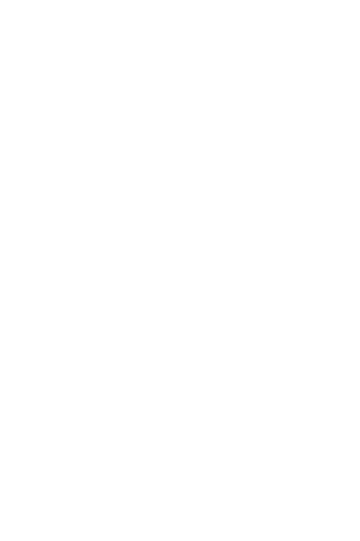
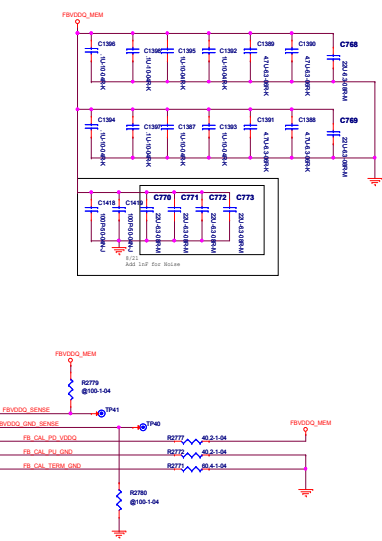
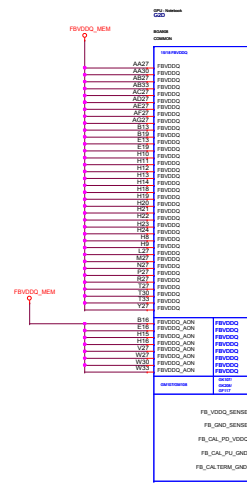


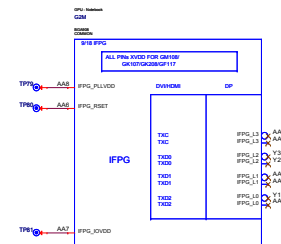
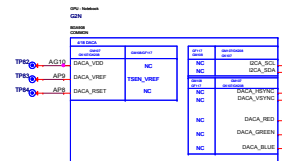
FOR GM107 DECOUPLING CAPS
UNDER GPU

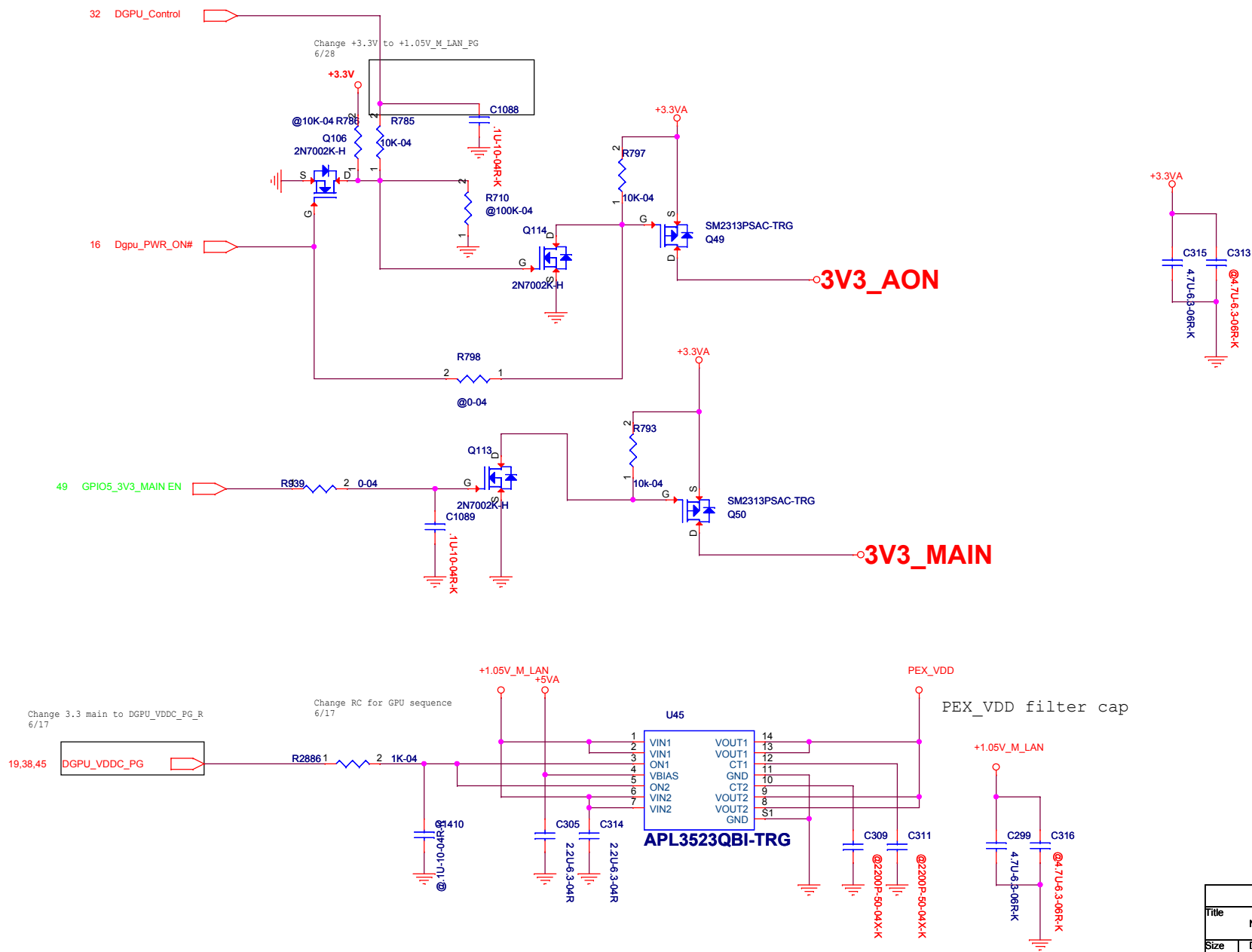
60 0000 1uF
100 0000 4.7uF
NEAR GPU
10 0000 22uF
10 0000 4.7uF
10 0000 4.7uF

FOR GM108 DECOUPLING CAPS
UNDER GPU

60 0000 1uF
100 0000 4.7uF
NEAR GPU
10 0000 22uF
10 0000 4.7uF
10 0000 4.7uF

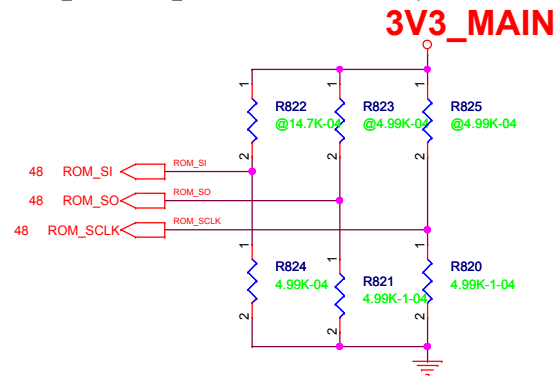






| | | |
|----------|----------------------------|----------------|
| Title | | |
| NTSN1521 | | |
| Size | Document Number | Rev |
| B | <Doc> | RB |
| Date: | Tuesday, December 09, 2014 | Sheet 50 of 55 |

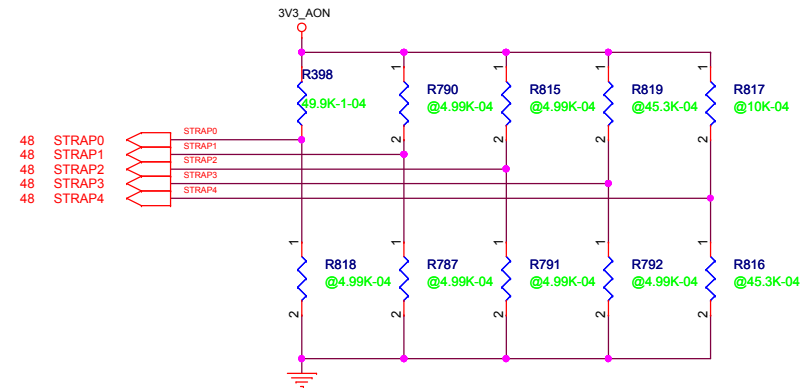
PCI_DEVID5, PCI_DEVID4, & SUBVENDOR Strap Selectable



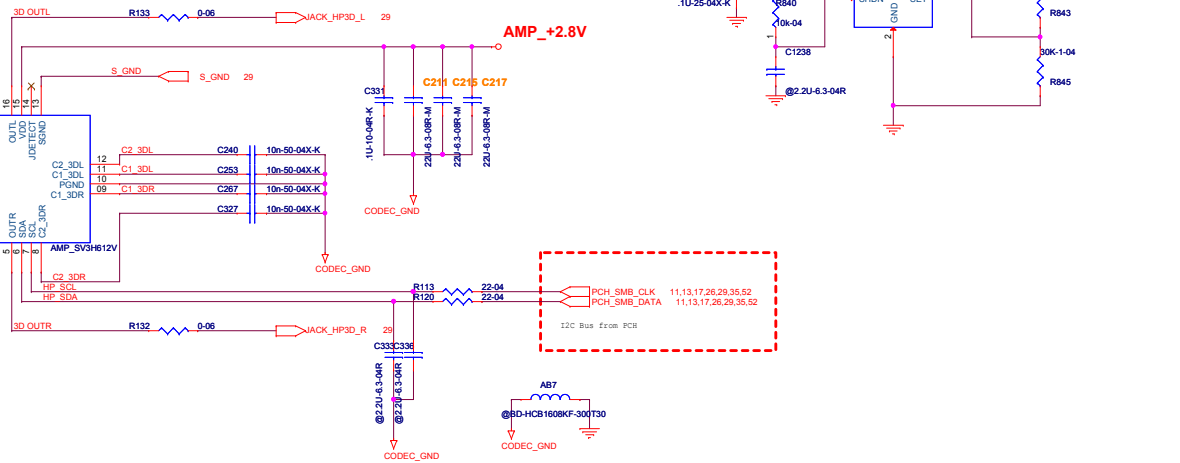
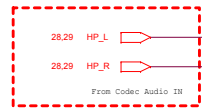
| R824 | | | |
|------------|-----------------|-----|--------------------|
| Samsung 2G | Samsung 128MX16 | 0x0 | 4.99kohm PULL DOWN |
| Hynix 2G | HYNIX 128MX16 | 0x1 | 0kohm PULL DOWN |
| Micron 2G | MICRON 128MX16 | 0x5 | 30.1kohm PULL DOWN |
| Hynix 4G | HYNIX 256MX16 | 0x2 | 15kohm PULL DOWN |
| Samsung 4G | Samsung 256MX16 | 0x3 | 20kohm PULL DOWN |
| Micron 4G | MICRON 256MX16 | 0x4 | 24.9kohm PULL DOWN |

Table 11. N15P-GX/GT GDDR5 Recommended Memories

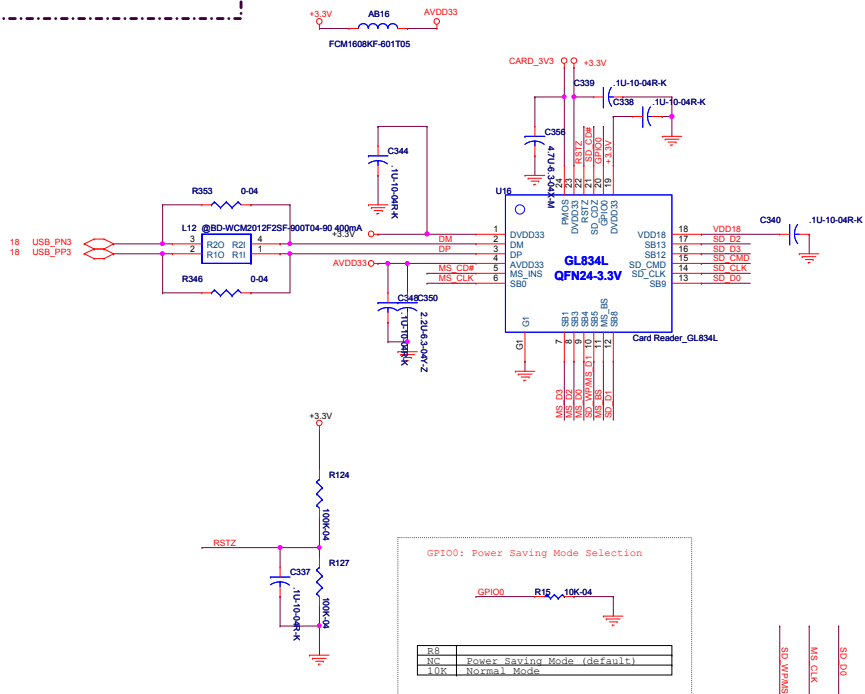
| Memory Type | FBVDD/ FBVDDQ | Memory Density | Vendor | Manufacturer Part Number | Die Revision | Strap | Memory Speed CK Grade(MHz) | Memory Date Code Minimum | Status |
|-------------|------------------|----------------|---------|--------------------------|--------------|-------|----------------------------|--------------------------|------------------|
| GDDR5 | 1.35V/ 1.35V | 128Mx16 | Samsung | K4G20325FD-FC03 | D-die | 0x0 | 2500 | N/A | Production ready |
| | | | Hynix | H5GC2H24BFR-T2C | B-die | 0x1 | 2500 | 1347 | Production ready |
| | | | Micron | EDW2032BBBG-6A-F | B-die | 0x5 | 2500 | N/A | Production ready |
| | | 256Mx16 | Hynix | H5GC4H24MFR-T2C | A-die | 0x2 | 2500 | N/A | Production ready |
| | | | Samsung | K4G41325FC-FC03 | C-die | 0x3 | 2500 | N/A | Production ready |
| | | | Micron | EDW4032BABG-60-F | A-die | 0x4 | 2500 | N/A | Production ready |



SV3H612V
3D Vol Amp

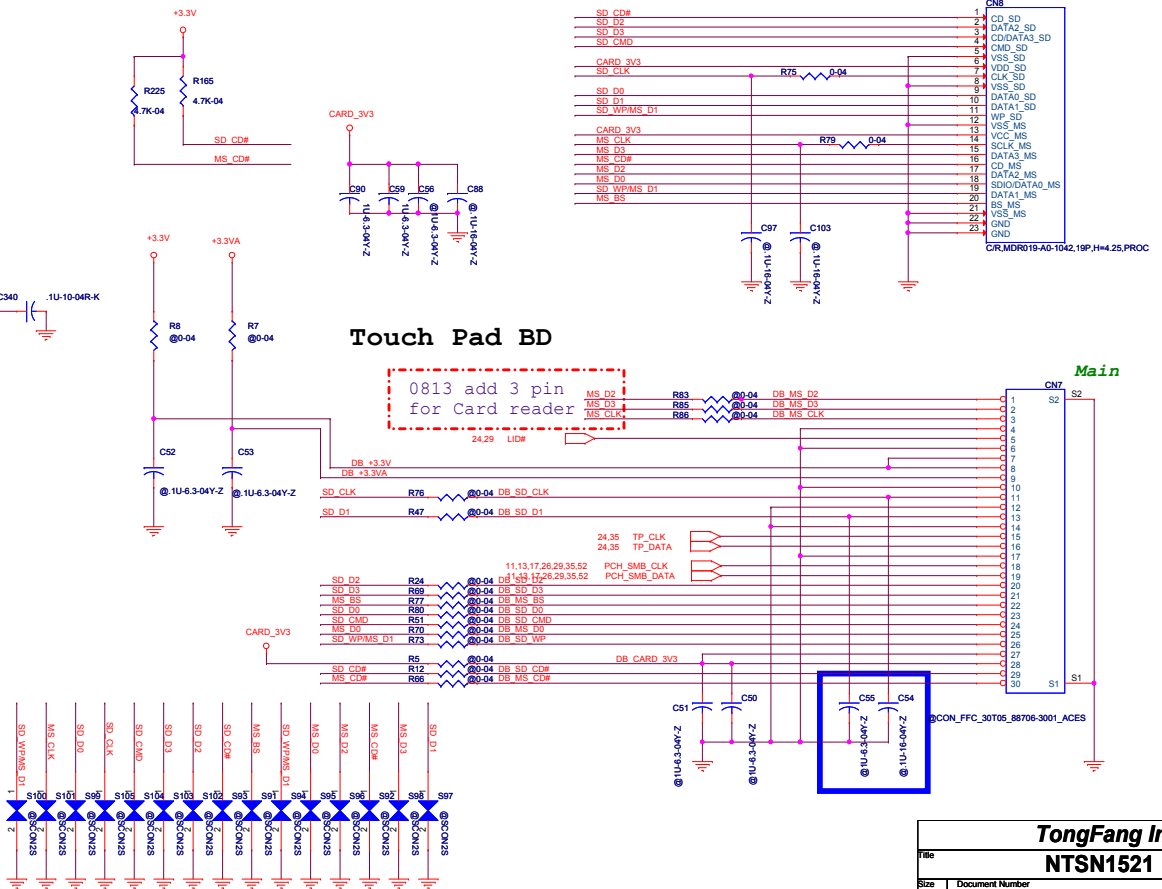


GL834L
Card reader



Touch Pad BD

```
0813 add 3 pin      MS D2
for Card reader    MS D3
                   MS CL
```



| Data | Change Content | |
|------|---|--|
| 5.23 | CRT power shares with HDMI power for safety requirement | |
| 5.26 | NV requirement 1. Delete GC6_FB_EC. 2.EC send adapter in to GPU | |
| 5.27 | NV requirement 1. Delete R706 for removal of GC6_EVENT_EC from EC\ Pin 86. 2. Change Pull high and Pull low for VRAM to match mirror VRAM 3. Mount R333 | |
| 5.28 | Change KB LED TP LED Side LED supply voltage to 5VS Change R659 to 0 OHM | |
| 5.29 | 1. Change Value to match footprint C358,C936,937,C419, C1001, C1002,C1376 2. Change R824 to 15K | |
| 6.10 | Change R344 to 10 mOHM ,NL_R555,NL_B12,Change R842 to 22K, Mount R13,R508,Change R154 to 20K | |
| 6.12 | 1.Change R228 to 2.43K, Change R233 to 1.5K, NL C274 for Vcore Power Test issue | |
| 6.17 | Change GC6 control GPIO connection and GPU power sequence controlled by GPU_Vcore_PG Change C1309 to 1nF | |
| 6.20 | Mount R140, NL R141 for eDP detection | |
| 6.21 | Page 6: Mount 6Rs Page11: Mount eDP components and remove RT2136 and add a R for PWM Page 16: Mount R481 Page 24 :R140,R141 Page35: NL Side LED | |
| 6.22 | 1. Add BAT I schematic ,and delete BAT I Direction | |
| 6.27 | 1. Reserve PG control circuit (mount D21, NL R396) 2. Add EMB dual MOS as 2nd source needing to match OCP resistor | |
| 6.28 | 1.Change +3.3V to 1.05V_LAN_M_PG(1.Add C1088 2.mount R926 1K C1365) 2. NL R456 | |
| 6.30 | 1. Change R233,R228 C274 for CPU core 2.Add text for Imon explanation | |
| 7.3 | 1. Add 0 OHM for adjust +1.35, 1.05V 2. Add Boost fan 3. Add 0 OHM for PSI 4. Add 0.1UF*5pcs for EMI 5. Change CPU R228,R233,C274,C285 for TAT 6. NL C243, R555,C1309 7.NL Common choke*1pcs ,Mount 0 OHM *4pcs 8. DMIC : 2pcs resistor, 9. EC control DGPU_ON timing 10. Mount 6pcs cap to CPU Core 11. Add cap to GPU core and VRAM power | |
| 7.4 | 1.Change U2\vin to 5VA 2. Remove D15 in BAT_I detect circuit 3. Delete Vin AMP,H12 4.Add 0603 CAP to Vcore 5.Reserve POScap to GPU Bottom 6.AC3 PIN2,4 CHANGE NET NAME 7.Change U2 to AZV331 | |
| 7.5 | 1. Mount R27, R28 for mSATA 2. Remove L7 for no Fingerprint 3. Add +3.3Vs on USB board IO for fingerprint 4.Change R337,R319 R value,C274,C258 C value | |
| 7.7 | 1. Page 6: Add colay R*4 for decreasing eDP signal stub 2. Page 34: correct CN9's SW_BAT pin 3.Add C3209 4.Add Q48 for battery Leakage 5.Update KB pin definition | |
| 7.9 | Update Text for VRAM ID R | |

| Data | Change Content | |
|------|---|--|
| 7/10 | Exchange beep and SenBAT_V for EC pin | |
| 7/14 | 1. Cancel R3 2.Update EC GPIO according to Ted's mail PID_0_CHG_B_LED (GPA5) SENBAT_V (GPC3) BTL_BEEP (GPA2) 2.Del C1299, mount C1300,C1301 3.Del C182, mount C576,C602 | |
| 7/16 | Add BAT_I EC table | |
| 7/20 | Mount C1291 C1377 C1413 C1193 for GPU Core,VRAM | |
| 7/24 | Page 29: Change R2960 to 7.5K Add R2961 ; Change R2933 to 7.5K ; Add R2936 for Boost fan Page 11: Change R913 to 0 OHM, Reserve R932 ,Reserved R506 for eDP panel | |
| 7/25 | Change R172, R2906 to 80.6K , R2350 to 44.2K | |
| 8/2 | Page 45: Add text for explanation of voltage loop control | |
| 8/5 | Page 34: Change RCH2 10 mOHM-->25 mOHM | |
| 8/7 | Change RTL8411 to RTL8111G(S) + Card reader | |
| 8/7 | add 3D VOL IC SV3H612V | |
| 8/11 | add RTL8111G(S) VDD10 Power select circuit | |
| 8/11 | colay RTL8111 XTAL to PCH | |
| 8/13 | add 3 pin for Card reader | |
| 8/13 | USB add colay cap(C1325/C1324 colay with C618 & C619/C614 & C617) | |
| 8/19 | PCH +1.5V LDO Change to APL5325 | |
| 8/21 | Page 35: Add GND to T/P LED | |
| 8/21 | Page 46: Add filter cap for VRAM noise :C770 C771 C772 C773 Del: C1283,C1248 change C1138,C1251,C1129 to 22uf Del: C1383, C1381,change C1385,C1384,C1386 to 22uf | |
| 8/21 | Page 34: 1. Q48: exchange S and D, 2. Reserve R255, 3. Change SW6 connection Page 45: Del Vin Jumper , Page31: Del Vin Jumper Page 27: Change LED_CR to LED0 for RJ45 LED | |
| 8/21 | Page 26: Mount R27 for mSATA BD | |
| 8/21 | Page 25:R616 , R615 , R608 , R607 , R606 , R605 , R618 , R617: 680-->499 OHM for HDMI Page 34: Change C442's GND to GND for Adaptor_I detector Page11: Not mount QN20 | |
| 8/21 | Change H14, H15 Footprint | |
| 8/21 | Page 34: Add @R257,Reserved for Battery power on Page 41:Change C900,C899, C902 to 22UF Page 40:Change C891,C892,C894 to 22UF Page 32: Colay C1425 | |
| 8/21 | Page 11:Change B23 to 0805 Fuse,Del C582 Mount C580 Page 24: Add R131 | |
| 8/22 | page 10: CPU CORE, Del: C671, C682, C665, C677, C683; Add: C1326 poscap. C1307, C1308不上件, C204, C306不上件 page 32:1.35Vs, Add: C218 330uf SMD polymer cap co-lay page 36:Del U23,U24 page 32:+1.05V change NB671 to NB675 page 33:+5VA change NB671 to NB675 page 34:C442 move to the right of R572,add 0.1uf Cap C182 close to EC page 27:Del C268,C330,C224,C326,C325,C223,C256;Add C250 | |
| 8/25 | Page 27:LED0 add R370 | |
| 8/27 | Page 29 & 52:SV3H612V change CODEC_GND to S_GND Page 50:3V3_AON change APL3523 to use 4 MOS Page 29:Colay +5V to MIC1_VREF_L Page 32:Del D24 | |
| 8/28 | Page 29:Add +5V 2 0603cap close to AR23 Page 50:Add Q51 | |
| 9/01 | Page 52:change C328,C214 to (R133,R132) 0ohm | |
| 9/02 | Page 45:C1292 change 1U to 2.7nF Page 46:FBVDDQ_SENSE add 100 ohm pull high;FBVDDQ_GND_SENSE add 100 ohm pull down Page 27:add C252 0.1uF Page 24:LED ON colay with CPPE# Page 48:Modify C1406 to 1uf/0603. Modify C1399 to 22uf/0805. delete R784, VID_PLLVDD can be line to SP_PLLVDD directly. Page 30:reserve 放电电阻for FBVDDQ_MEM Page 49:GPIOB_STX_PEX_RST_MON#信号预留10K pull up to 3V3_AON Page 48:XTAL0TB信号预留10K pull up. Page 48:STRAP_REF0信号预留10K pull up. Page 45:C1292 change to 2.7nf. Page 46:FBVDDQ_SENSE reserve 100ohm pull up to VDDQ, FBVDDQ_GND_SENSE pull down to GND. | |
| 9/18 | Page 48:STRAP_REF0 power change from 3V3_MAIN to 3V3_AON | |
| 9/26 | Page 32: 上件R925 Page 52:Del U6 pin13 HP Sensor pin. U16 pin19 connect to +3.3V Page 28:Add Q65,R98,R108 for HP_Sensor | |

