

Compal Confidential

Tablet 10" M/B Schematics Document Intel Pineview-M Processor with DDRIII + Tigerpoint

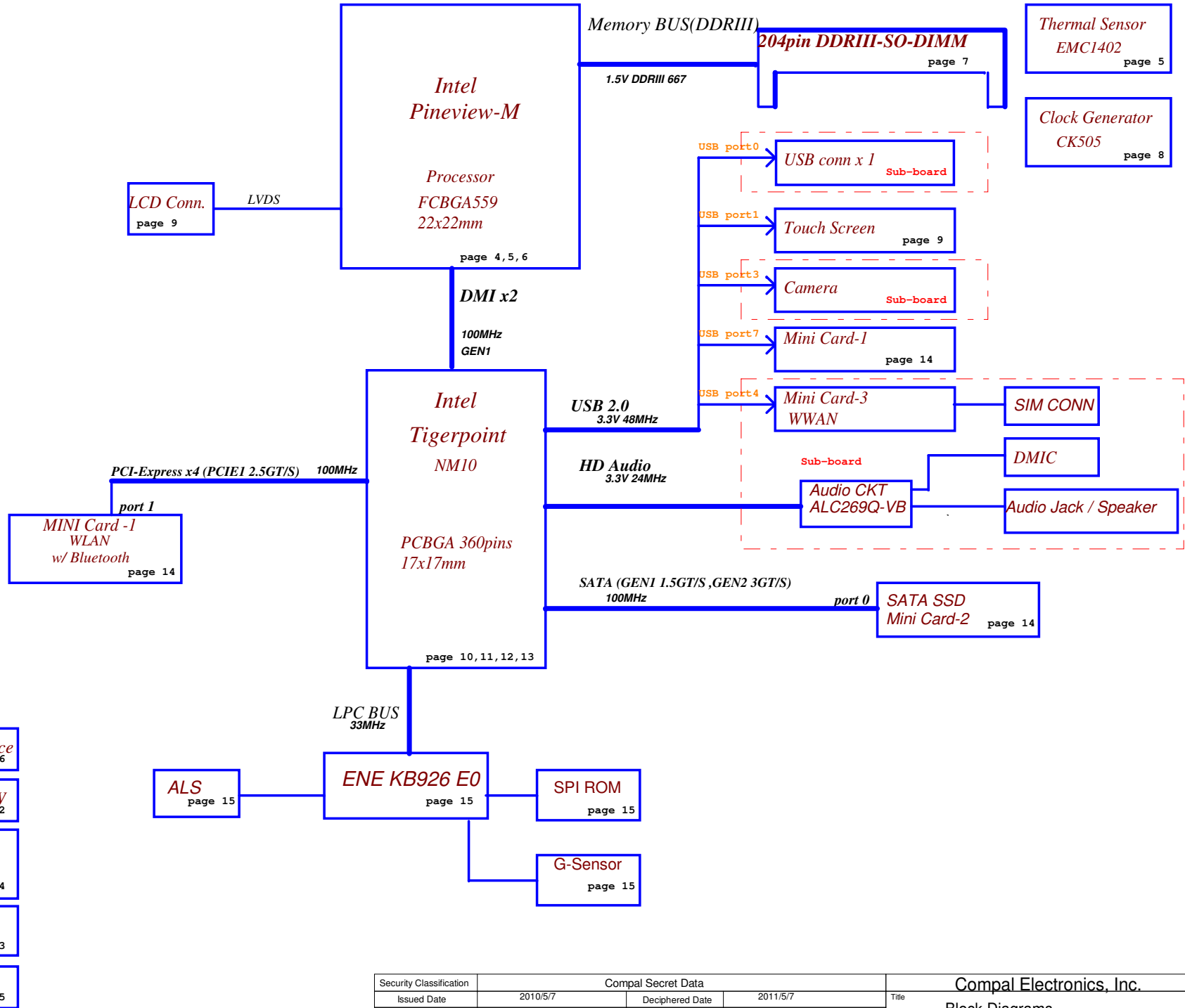
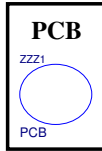
2010-05-07

REV : 0 . 1

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|--|--------------------|-----------------|----------|----------------------------|---------------|
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Model Name : PAU00
File Name : LA-6371P



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| | | | | | |
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Voltage Rails

| Power Plane | Description | S1 | S3 | S5 |
|-------------|---|----|-----|-----|
| VIN | Adapter power supply (19V) | ON | ON | ON |
| B+ | AC or battery power rail for power circuit. | ON | ON | ON |
| +CPU_CORE | Core voltage for CPU | ON | OFF | OFF |
| +0.9VS | 0.9V switched power rail for DDR terminator | ON | OFF | OFF |
| +VCCP | VCCP switched power rail | ON | OFF | OFF |
| +1.5VS | 1.5V switched power rail | ON | OFF | OFF |
| +1.8V | 1.8V power rail for DDR | ON | ON | OFF |
| +0.89V | Graphic core power rail | ON | OFF | OFF |
| +3VALW | 3.3V always on power rail | ON | ON | ON* |
| +3VS | 3.3V switched power rail | ON | OFF | OFF |
| +5VALW | 5V always on power rail | ON | ON | ON* |
| +5VS | 5V switched power rail | ON | OFF | OFF |
| +VSB | VSB always on power rail | ON | ON | ON* |
| +RTCVCC | RTC power | ON | ON | ON |

Note : ON* means that this power plane is ON only with AC power available, otherwise it is OFF.

| STATE \ SIGNAL | SLP_S3# | SLP_S4# | SLP_S5# | +VALW | +V | +VS | Clock |
|-----------------------|---------|---------|---------|-------|-----|-----|-------|
| Full ON | HIGH | HIGH | HIGH | ON | ON | ON | ON |
| S1 (Power On Suspend) | HIGH | HIGH | HIGH | ON | ON | ON | LOW |
| S3 (Suspend to RAM) | LOW | HIGH | HIGH | ON | ON | OFF | OFF |
| S4 (Suspend to Disk) | LOW | LOW | HIGH | ON | OFF | OFF | OFF |
| S5 (Soft OFF) | LOW | LOW | LOW | ON | OFF | OFF | OFF |

External PCI Devices

| DEVICE | IDSEL # | REQ/GNT # | PIRQ |
|--------|---------|-----------|------|
|--------|---------|-----------|------|

No PCI Device

EC SM Bus1 address

| Device | Address |
|---------------|-------------|
| Smart Battery | 0001 011X b |

EC SM Bus2 address

| Device | Address |
|---------|----------|
| EMC1402 | 100_1100 |

Tiger Point SM Bus address

| Device | Address |
|--------------------------------|------------|
| Clock Generator (SLG8SP556VTR) | 1101 001Xb |
| DDR DIMMA | 1010 000Xb |

USB table

| | | Port | Ext USB Conn. |
|-------|-------|--------|---------------|
| EHCI1 | UHCI1 | Port0 | Ext USB Conn. |
| | | Port1 | Touch Screen |
| | | Port2 | |
| EHCI2 | UHCI2 | Port3 | Camera |
| | | Port4 | WWAN |
| | | Port5 | |
| EHCI2 | UHCI3 | Port6 | |
| | | Port7 | WLAN |
| | | Port8 | |
| | | Port9 | |
| | | Port10 | |
| | | Port11 | |

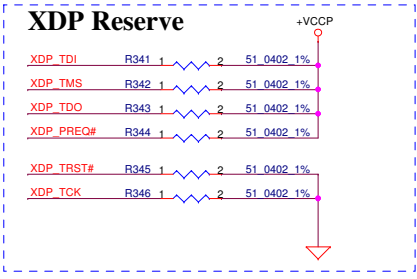
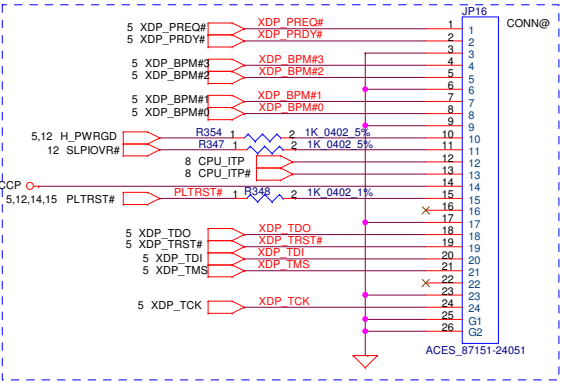
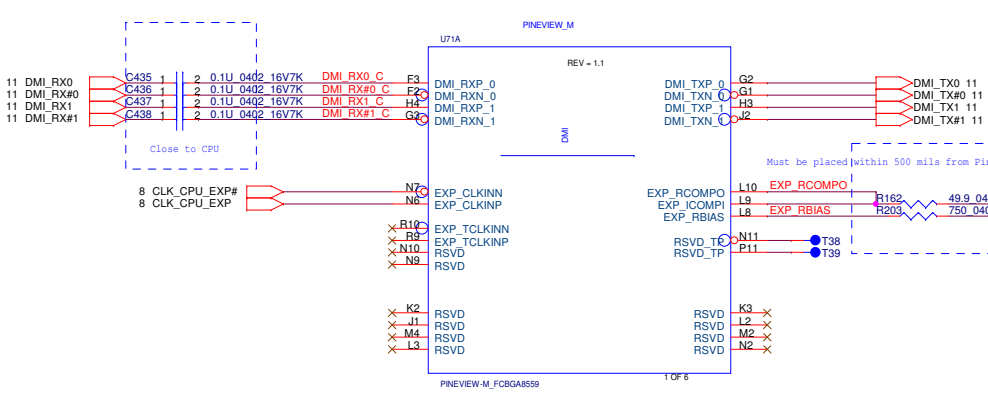
PCIE table

| PCIE port | |
|------------|------|
| PCIE port1 | |
| PCIE port2 | WLAN |
| PCIE port3 | |
| PCIE port4 | |
| PCIE port5 | |
| PCIE port6 | |

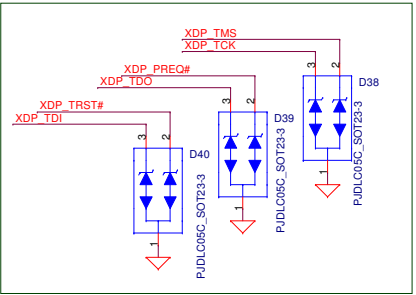
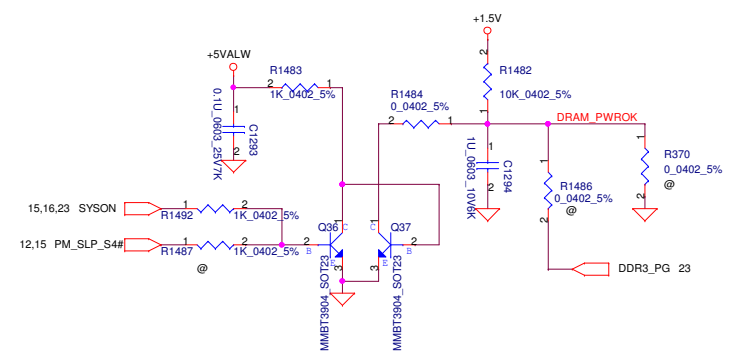
SATA table

| SATA port | |
|------------|-----|
| SATA port0 | SSD |
| SATA port1 | |
| SATA port2 | |
| SATA port3 | |
| SATA port4 | |
| SATA port5 | |

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DRAM POWER OK Logic

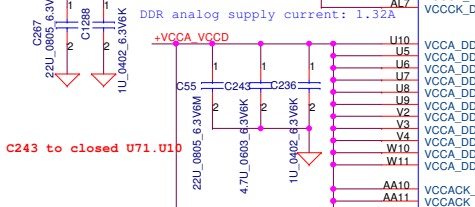
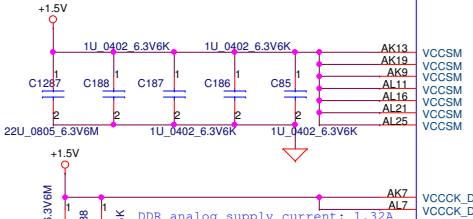


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GFX supply current: 1.38A
Sustained GFX supply current: 1.05A

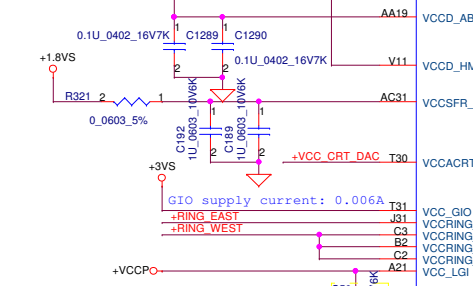


DDR supply current 2.27A

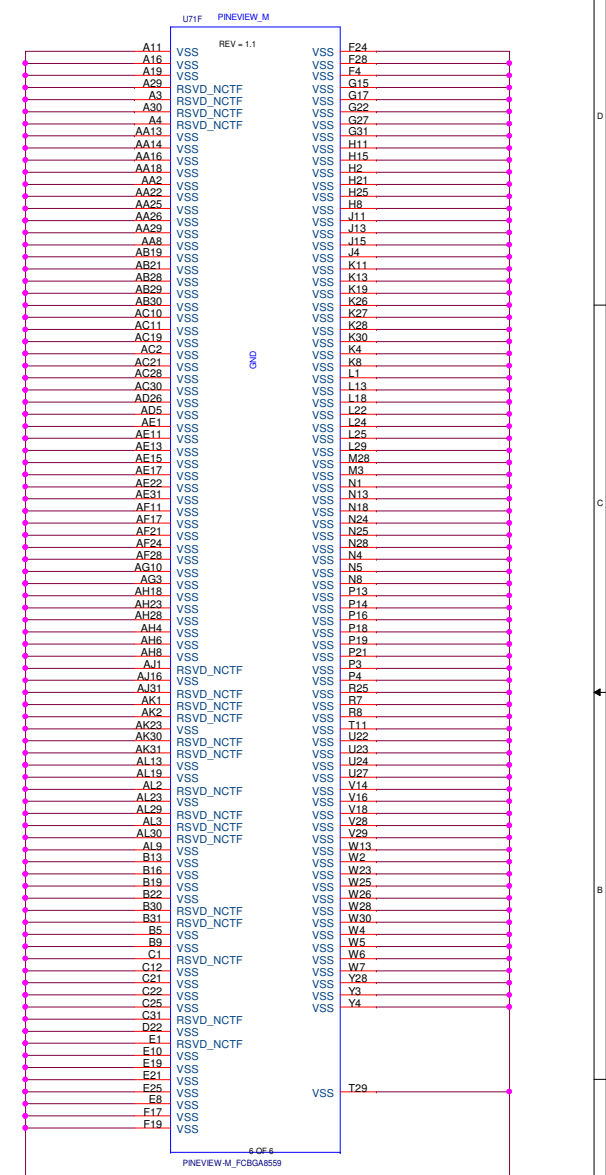
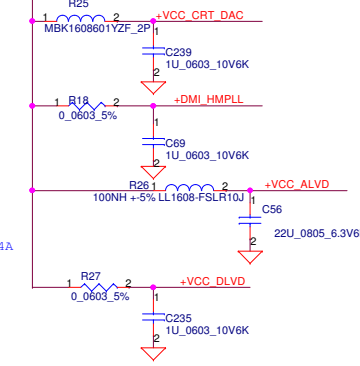
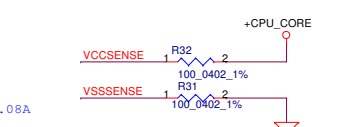
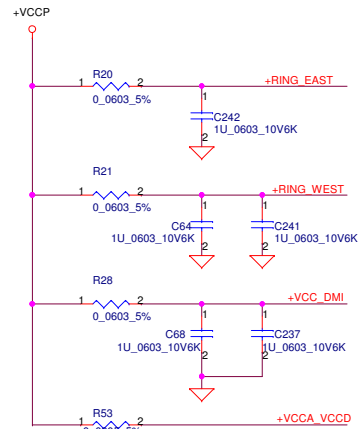
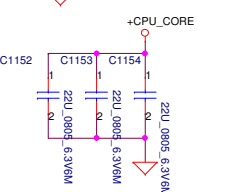
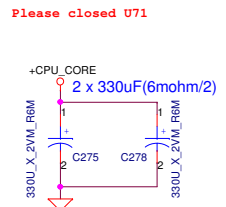
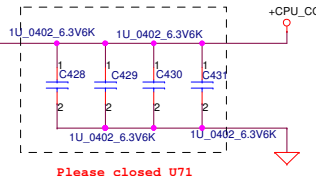
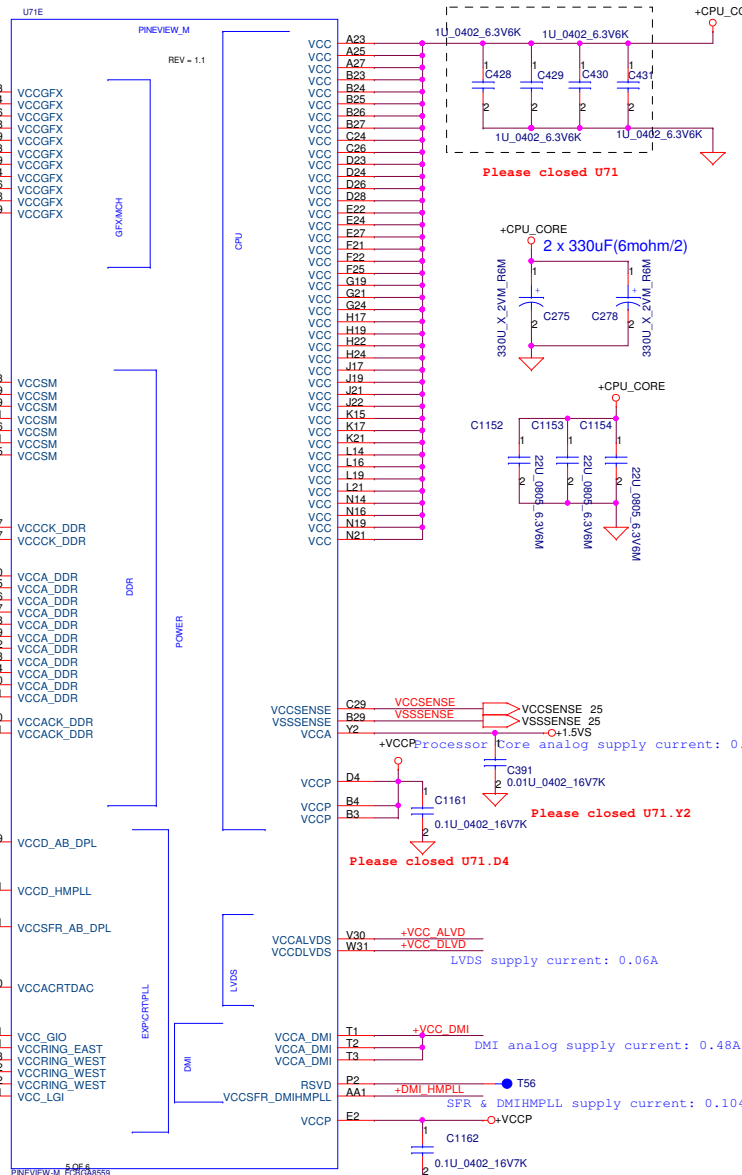
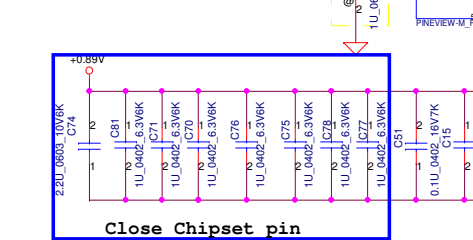


Display PLL SFR and CRT DAC supply current: 0.154A

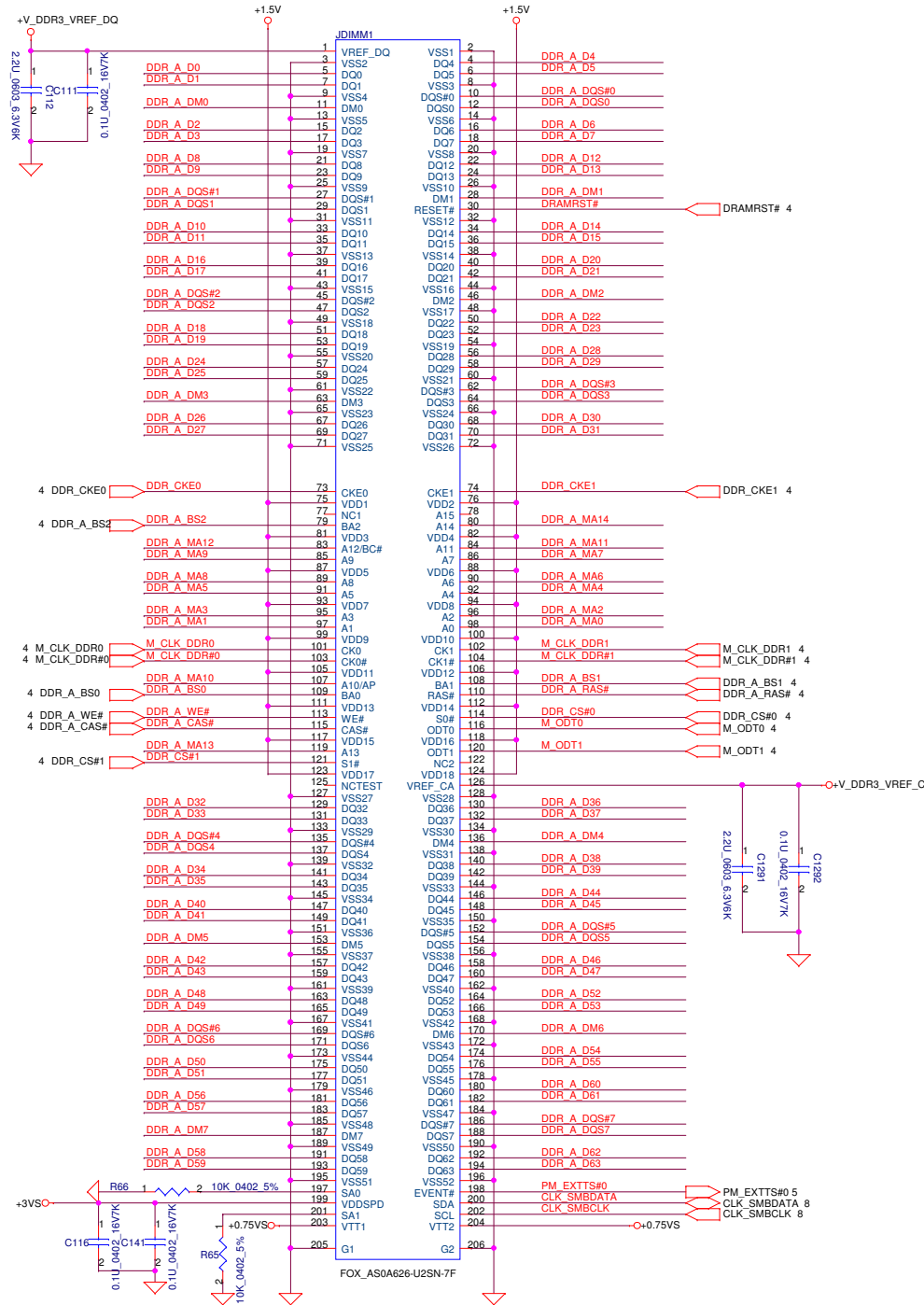
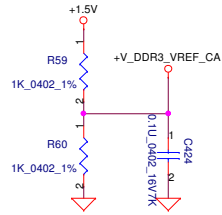
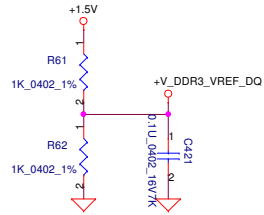
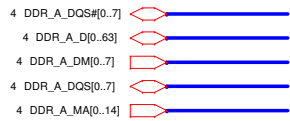
Place closed U71.AA19



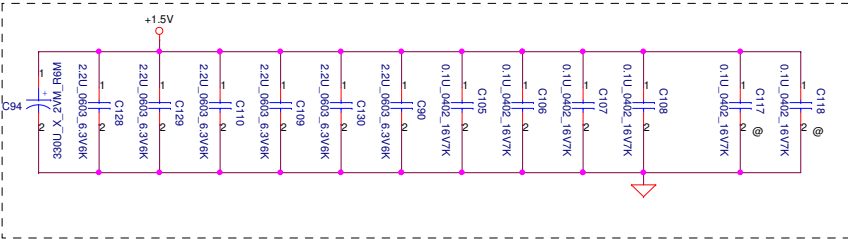
DAC, GIO, LVDS, & LGIO, DPLL, HMPLL supply current: 0.33A



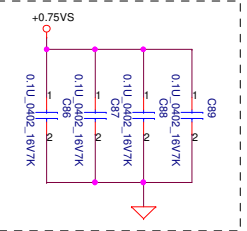
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Layout Note:
Place near JDIMM1



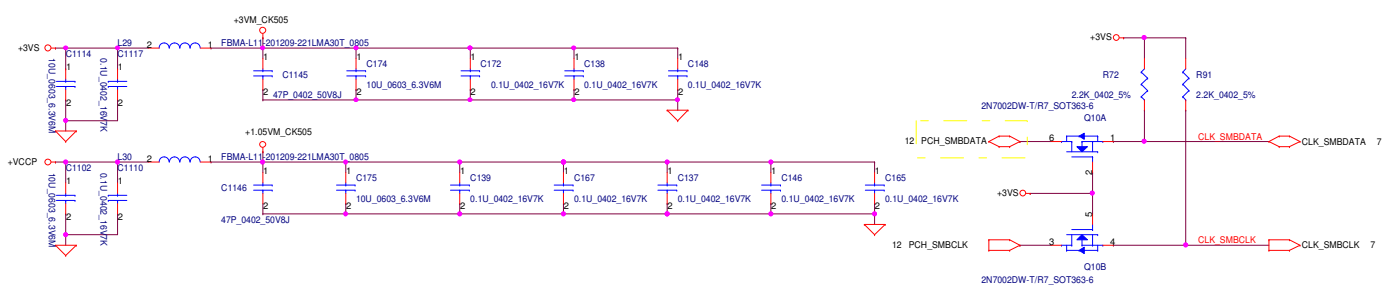
Layout Note:
Place near JDIMM1.203 & JDIMM1.204



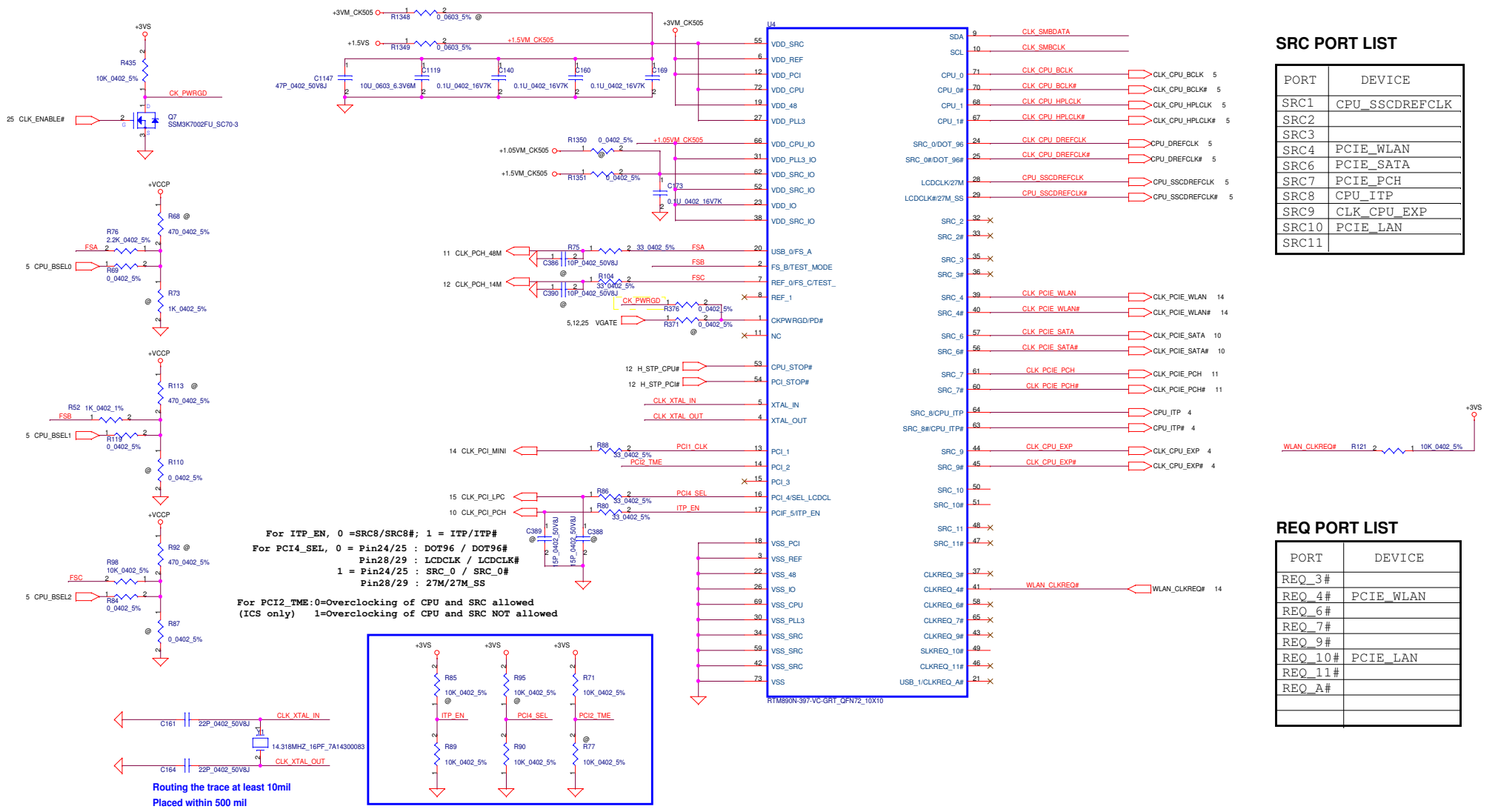
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Compal Electronics, Inc.
DDRIII SO-DIMM A

| FSC | FSB | FSA | CPU | SRC | PCI | REF | DOT_96 | USB | |
|---------|---------|---------|-----------------|-----|------|--------|--------|------|--|
| CLKSEL2 | CLKSEL1 | CLKSEL0 | MHz | MHz | MHz | MHz | MHz | MHz | |
| 0 | 0 | 0 | 266 | 100 | 33.3 | 14.318 | 96.0 | 48.0 | |
| 0 | 0 | 1 | 133 | 100 | 33.3 | 14.318 | 96.0 | 48.0 | |
| 0 | 1 | 0 | 200 | 100 | 33.3 | 14.318 | 96.0 | 48.0 | |
| 0 | 1 | 1 | 166 | 100 | 33.3 | 14.318 | 96.0 | 48.0 | |
| 1 | 0 | 0 | 333 | 100 | 33.3 | 14.318 | 96.0 | 48.0 | |
| 1 | 0 | 1 | 100 | 100 | 33.3 | 14.318 | 96.0 | 48.0 | |
| 1 | 1 | 0 | 400 | 100 | 33.3 | 14.318 | 96.0 | 48.0 | |
| 1 | 1 | 1 | Reserved | | | | | | |

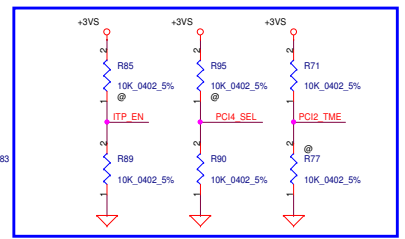


SA00003H730 (Realtek :RTM890N-397-VC-GRT)



For ITP_EN, 0 =SRC8/SRC8#; 1 = ITP/ITP#
 For PCIA_SEL, 0 = Pin24/25 : DOT96 / DOT96#
 Pin28/29 : LCDCCLK / LCDCCLK#
 1 = Pin24/25 : SRC_0 / SRC_0#
 Pin28/29 : 27M/27M_SS

For PCI2_TME:0=Overclocking of CPU and SRC allowed
 (ICS only) 1=Overclocking of CPU and SRC NOT allowed



Routing the trace at least 10mil
 Placed within 500 mil

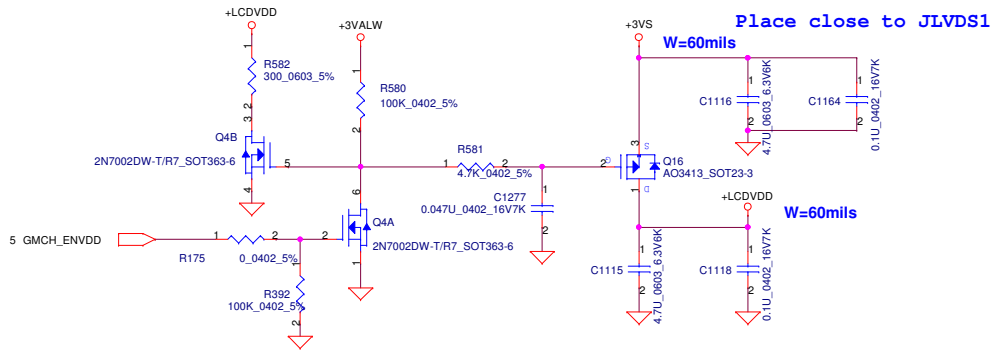
SRC PORT LIST

| PORT | DEVICE |
|-------|----------------|
| SRC1 | CPU_SSCDREFCLK |
| SRC2 | |
| SRC3 | |
| SRC4 | PCIE_WLAN |
| SRC6 | PCIE_SATA |
| SRC7 | PCIE_PCH |
| SRC8 | CPU_ITP |
| SRC9 | CLK_CPU_EXP |
| SRC10 | PCIE_LAN |
| SRC11 | |

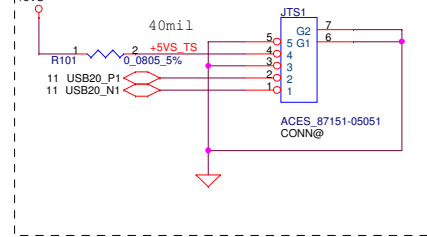
REQ PORT LIST

| PORT | DEVICE |
|---------|-----------|
| REQ_3# | |
| REQ_4# | PCIE_WLAN |
| REQ_6# | |
| REQ_7# | |
| REQ_9# | |
| REQ_10# | PCIE_LAN |
| REQ_11# | |
| REQ_A# | |

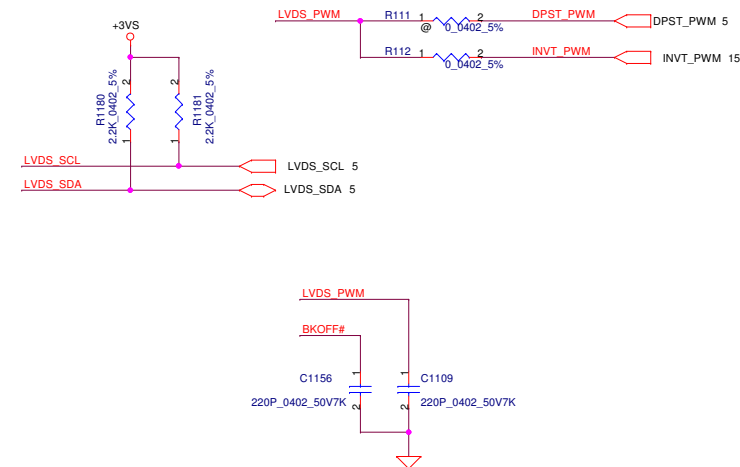
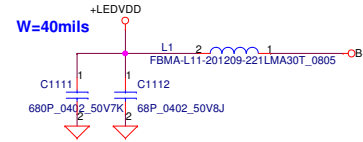
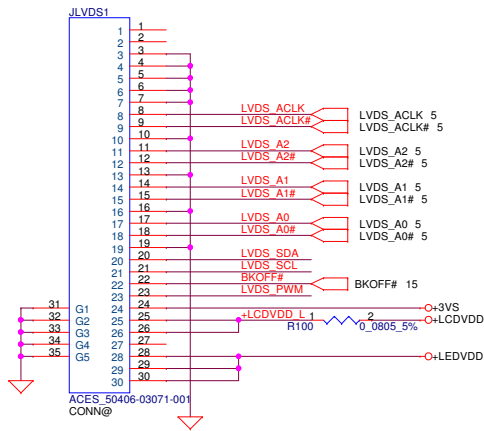
LCD POWER CIRCUIT



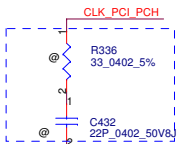
Touch Screen Conn.



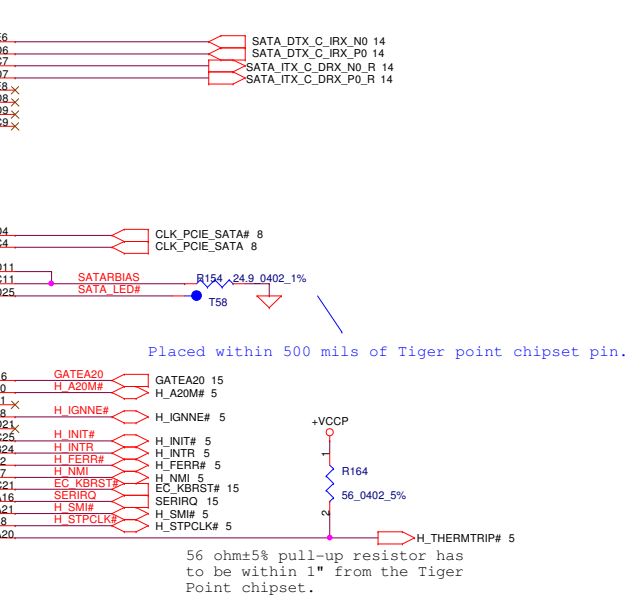
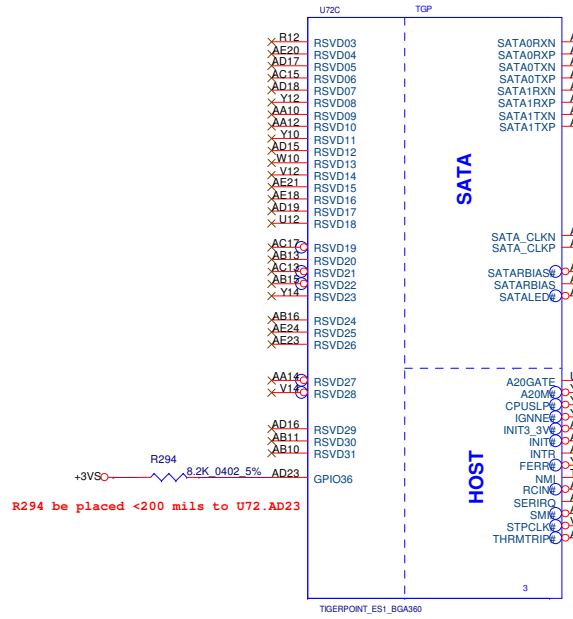
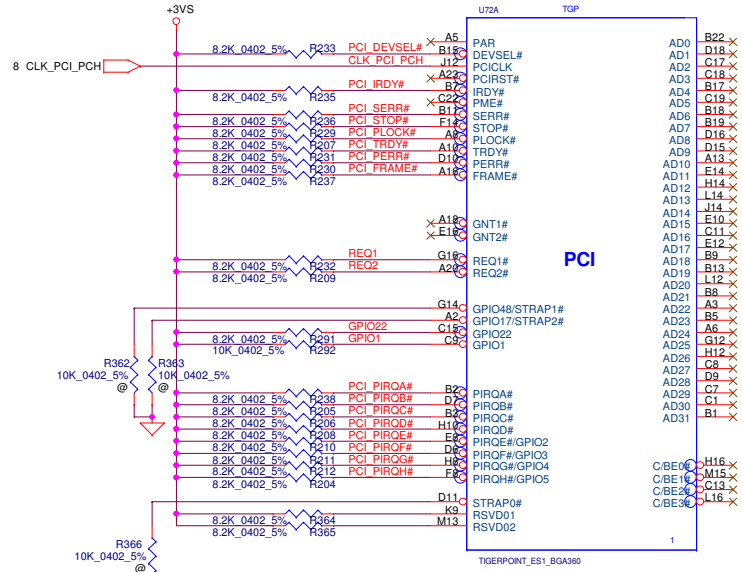
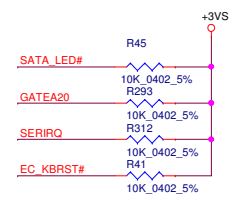
LCD/PANEL Conn.



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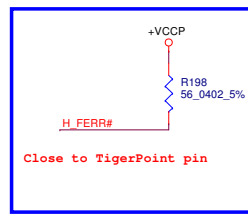


For EMI, close to TigerPoint

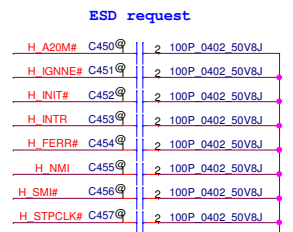


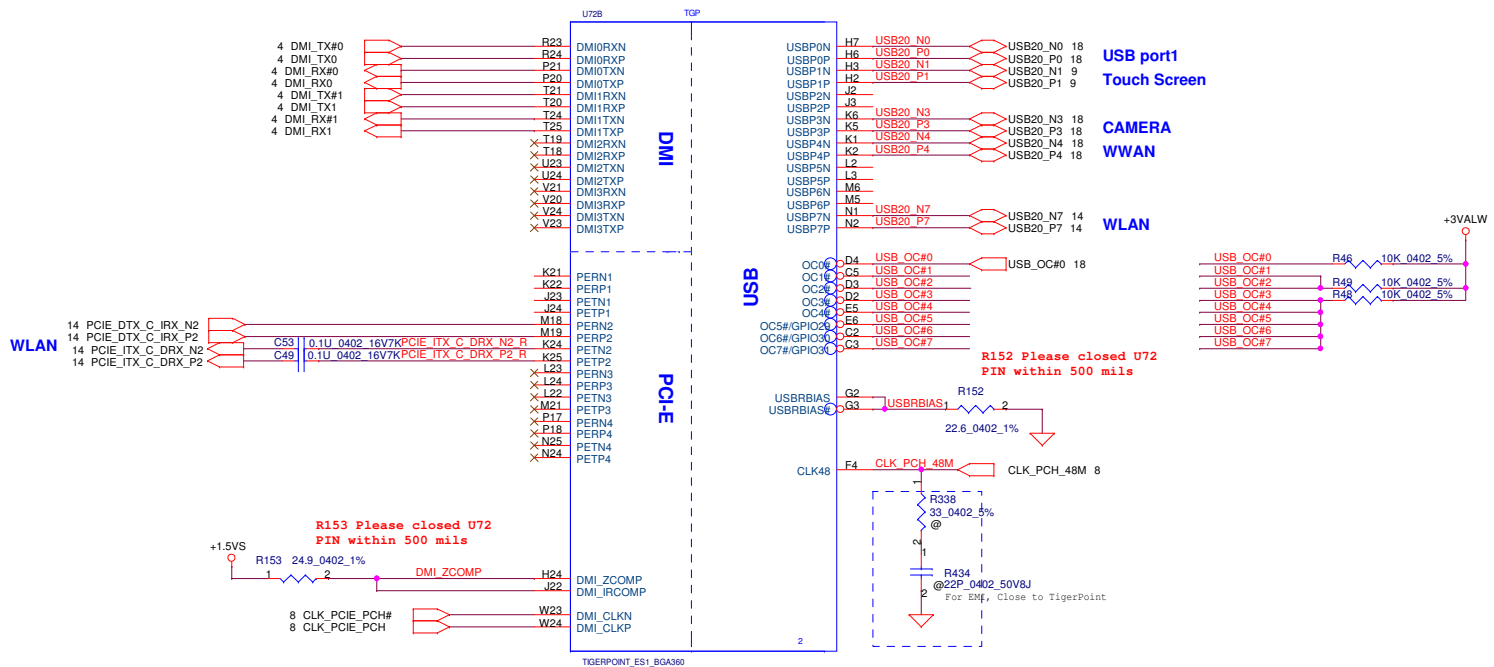
56 ohm±5% pull-up resistor has to be within 1" from the Tiger Point chipset.

| STRAP2# GPIO17 | STRAP1# GPIO48 | Boot BIOS |
|-------------------|-------------------|-----------|
| 0 | 1 | SPI |
| 1 | 0 | PCI |
| 1 | 1 | LPC |

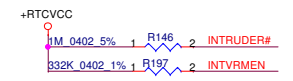
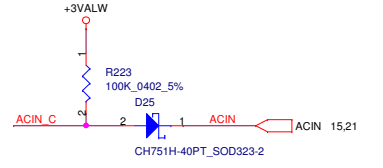
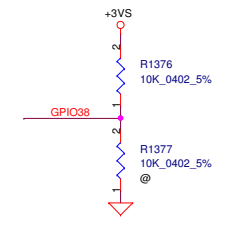
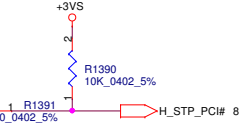
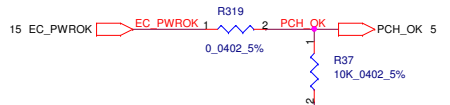
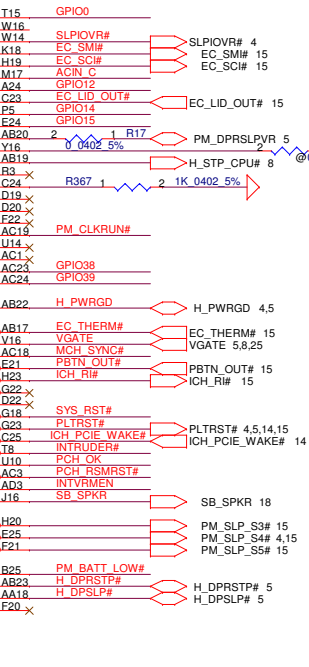
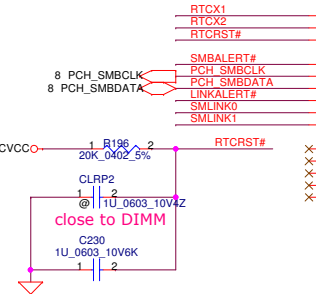
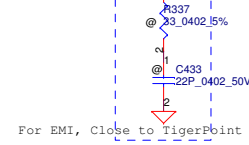
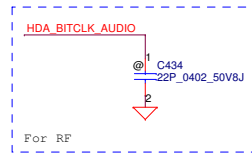
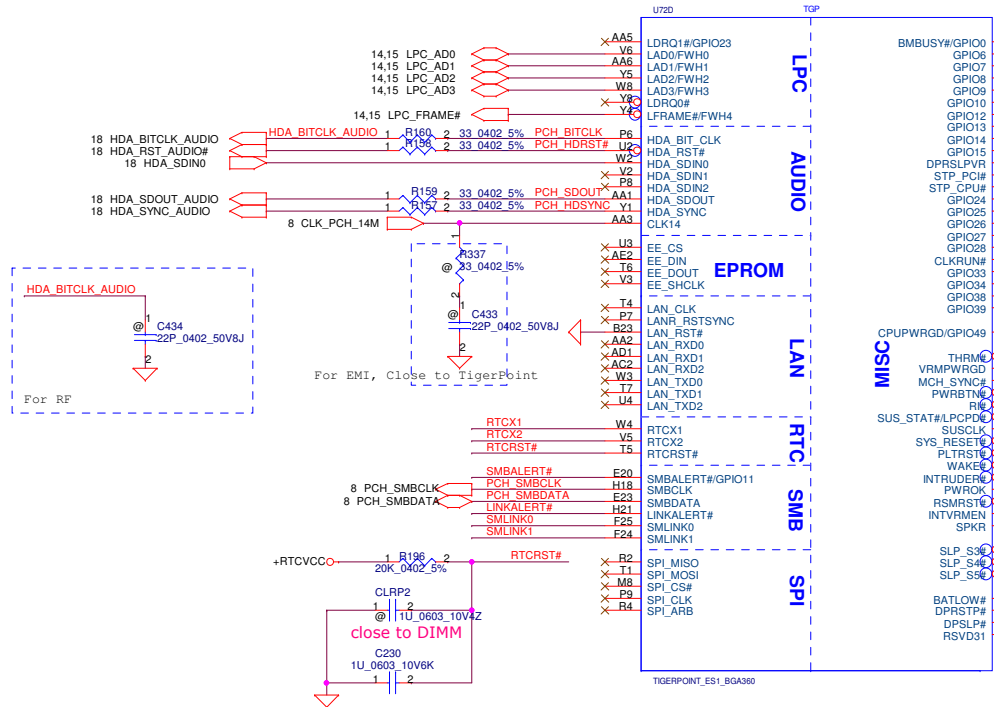
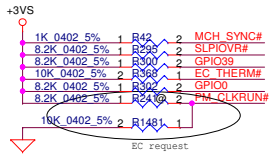
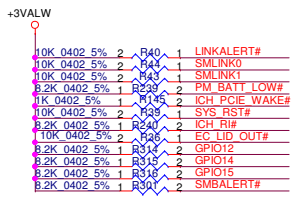


Close to TigerPoint pin

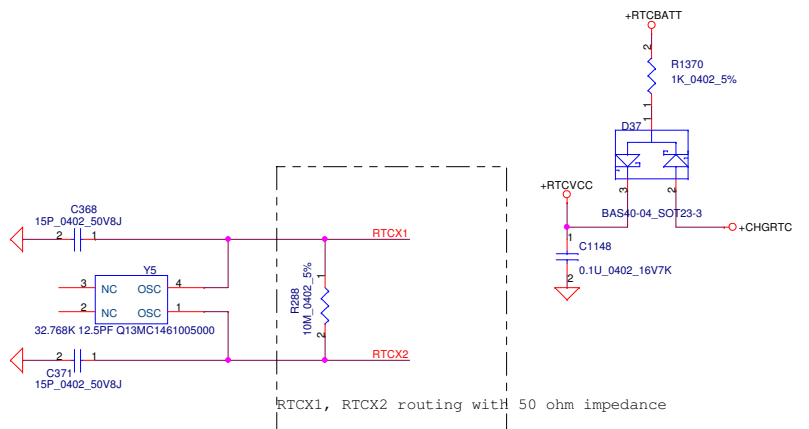
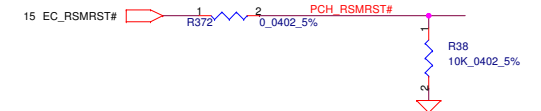




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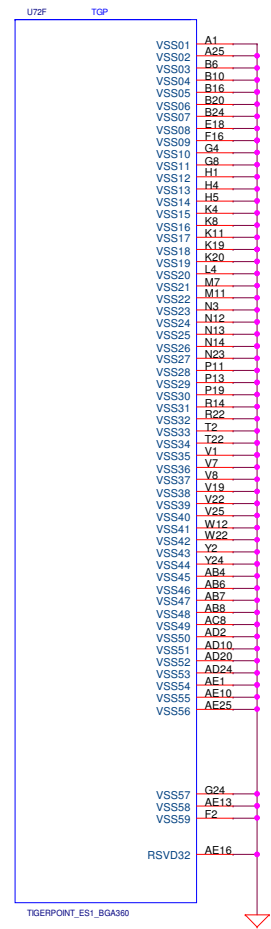
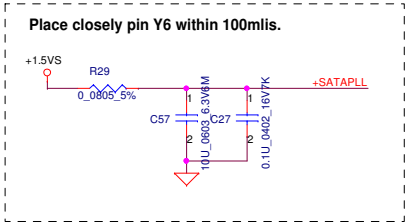
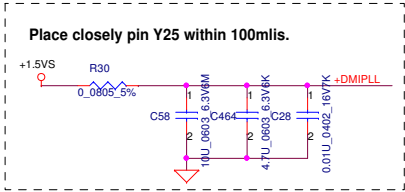
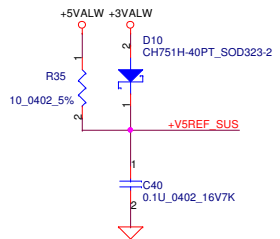
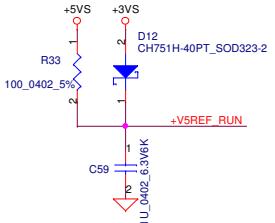
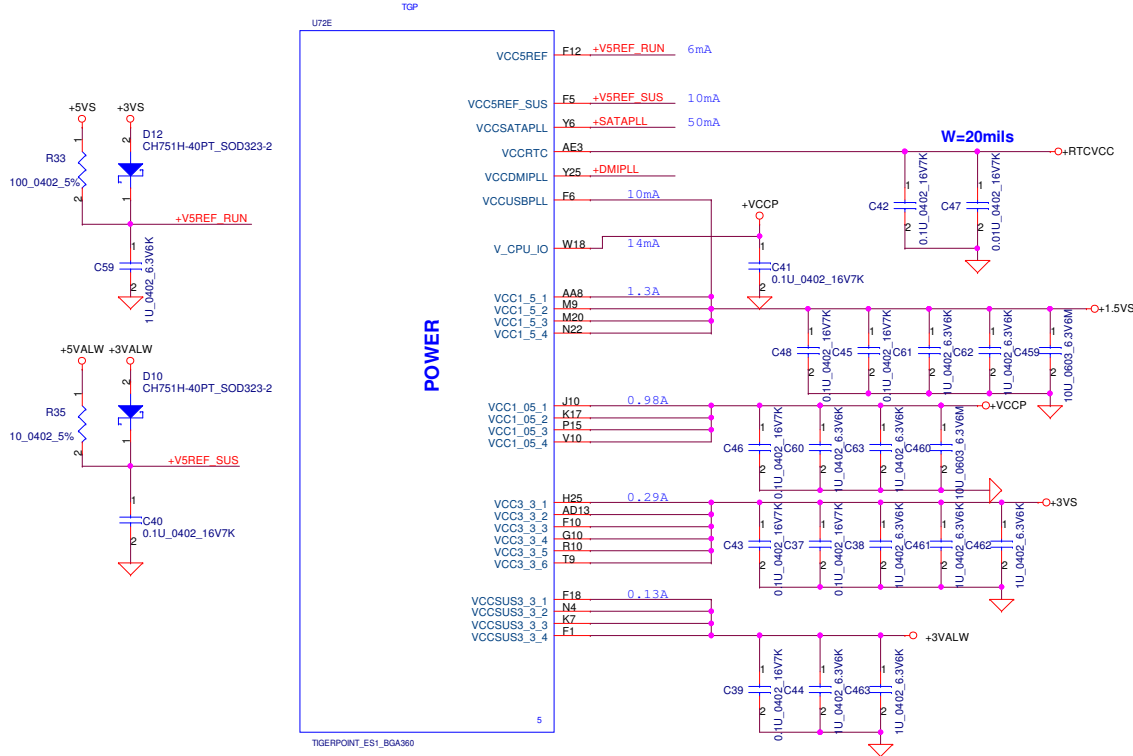
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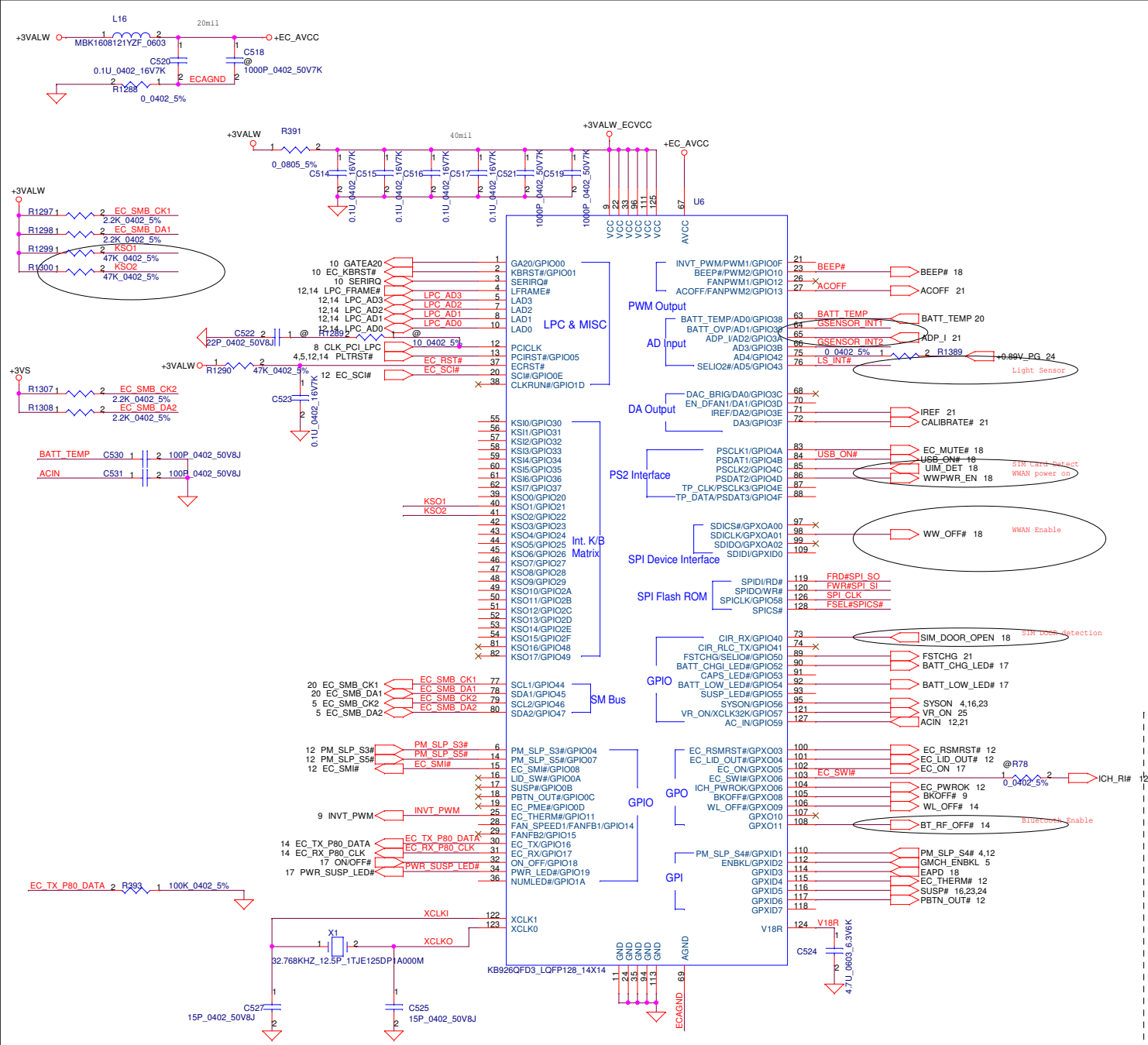
| Security Classification | Compal Secret Data | |
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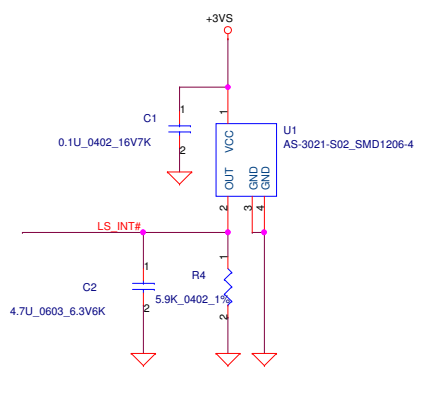
| Compal Electronics, Inc. | |
|-----------------------------------|----------------|
| Title: Tigerpoint(3/4)-LPC,HD,LAN | |
| Document Number: LA-6371P | Rev: 0.1 |
| Date: Friday, May 07, 2010 | Sheet 12 of 27 |



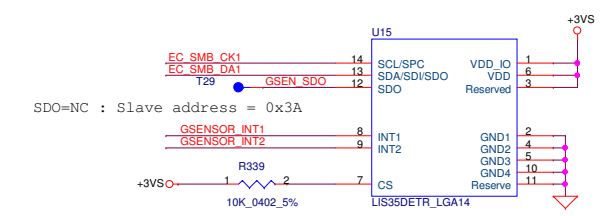
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| Security Classification | Compal Secret Data | | Title | Compal Electronics, Inc. | |
| Issued Date | 2010/5/7 | Deciphered Date | 2011/5/7 | Tigerpoint(4/4)-Power.GND | |
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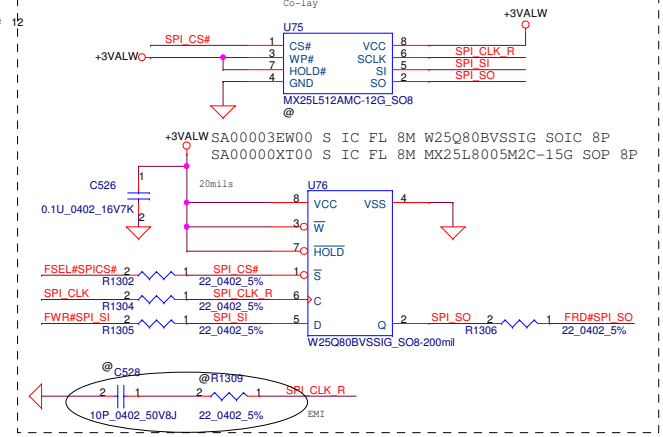
Light Sensor



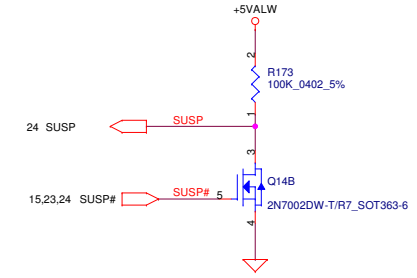
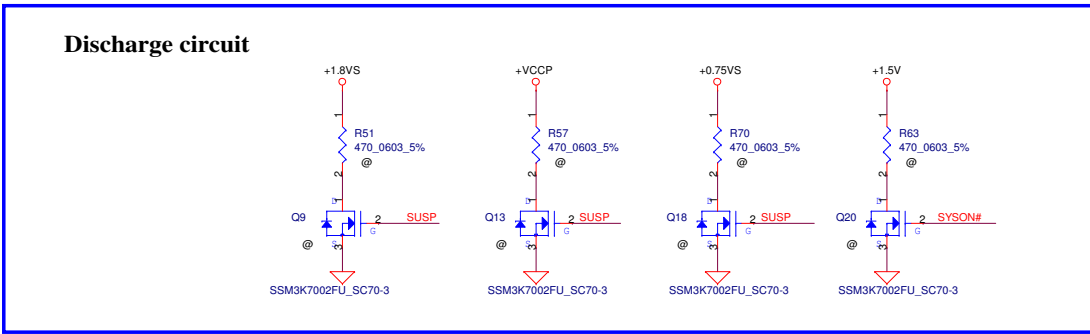
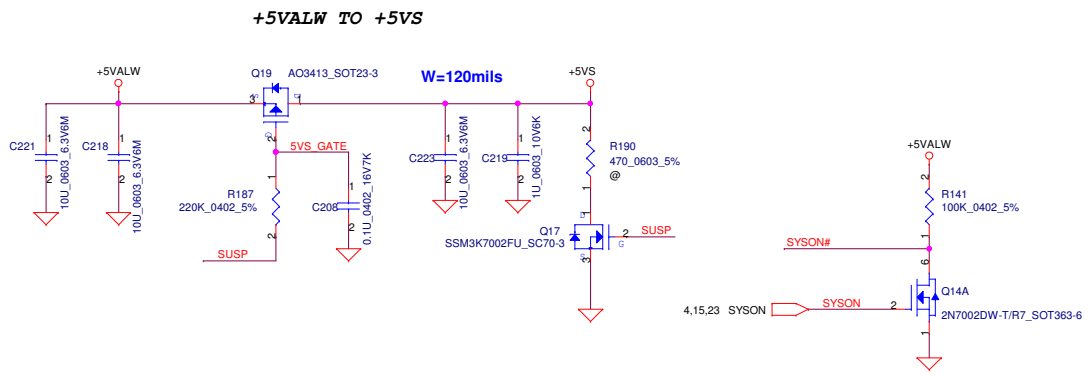
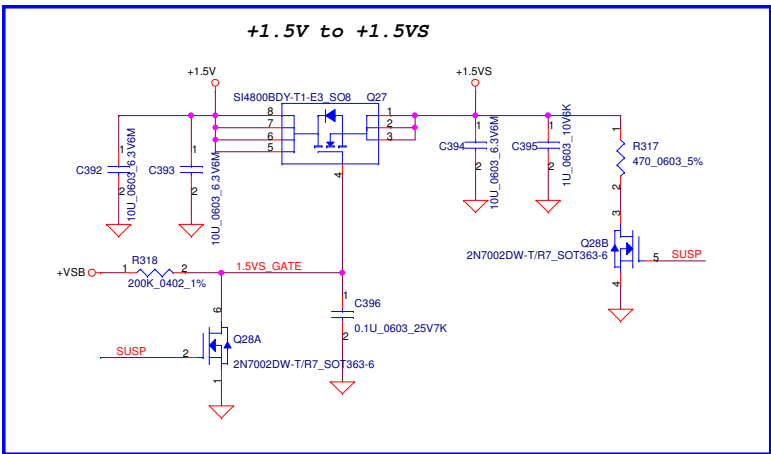
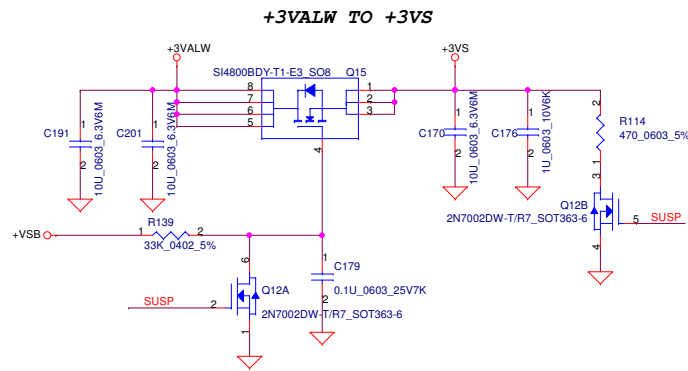
APS G-Sensor



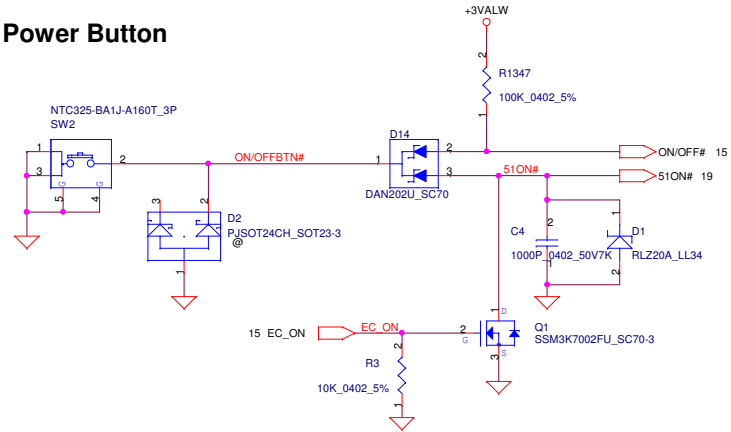
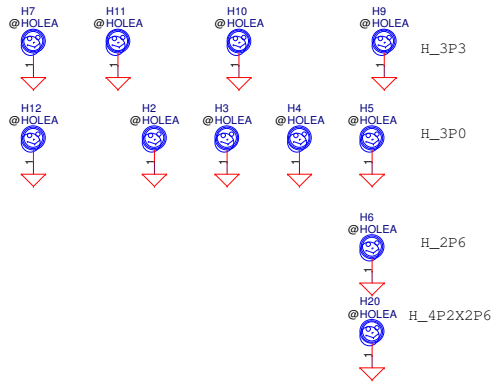
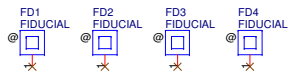
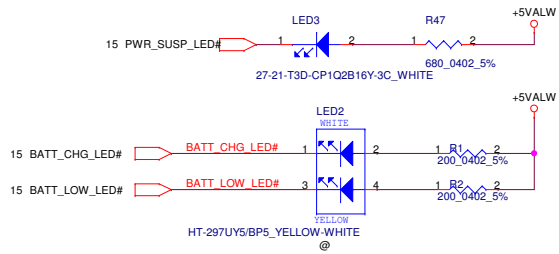
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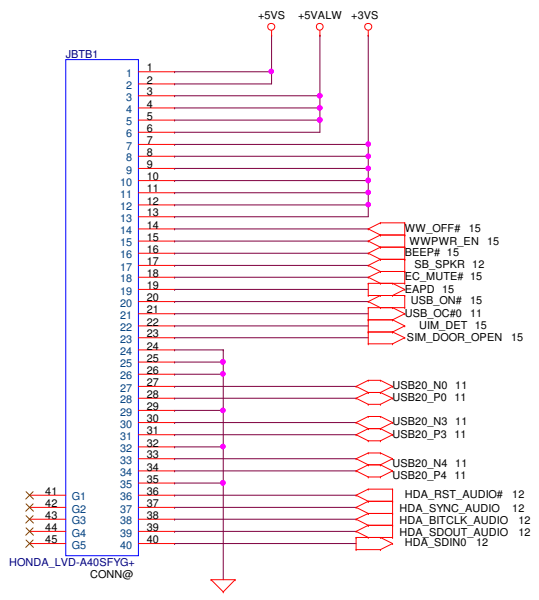
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| | LA-6371P | | | 0.1 |
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Power Button

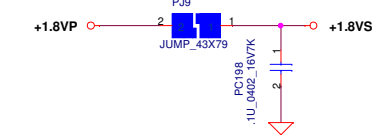
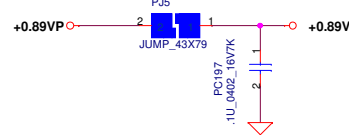
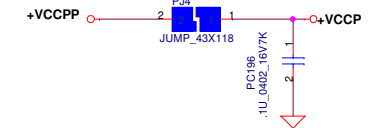
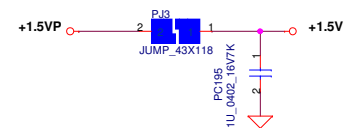
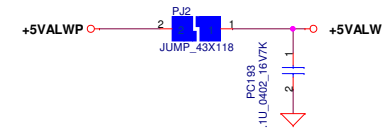
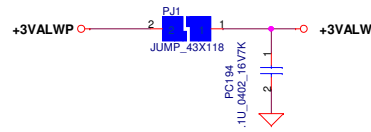
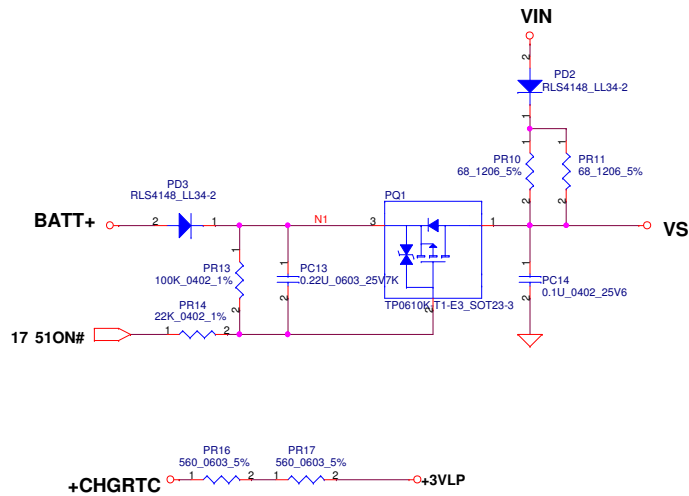
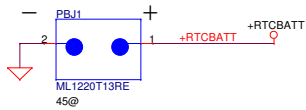
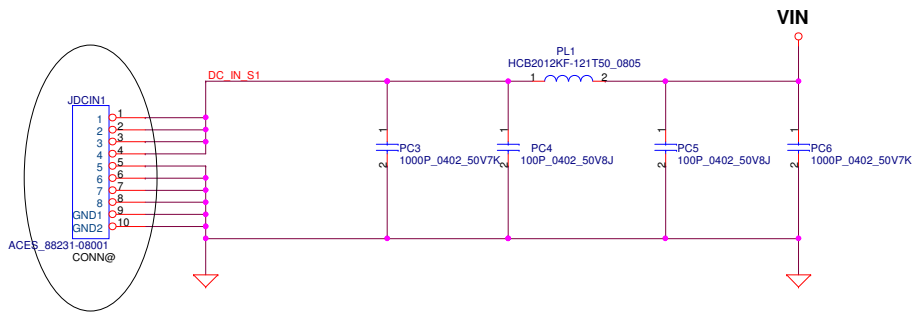


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| Date: | Friday, May 07, 2010 | Sheet | 17 | of | 27 |

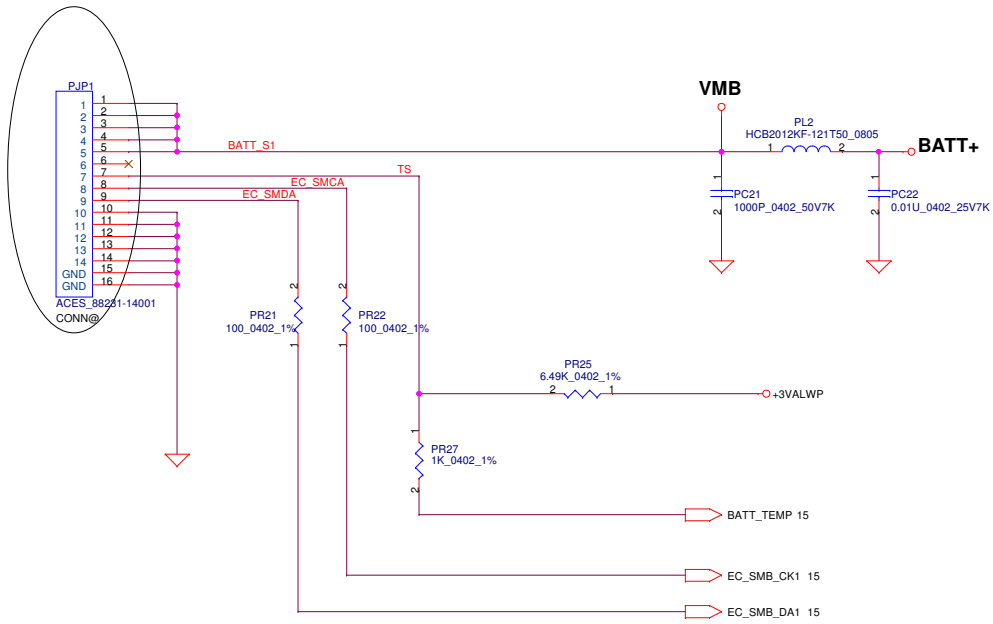


USB CONN
 CAM
 WWAN

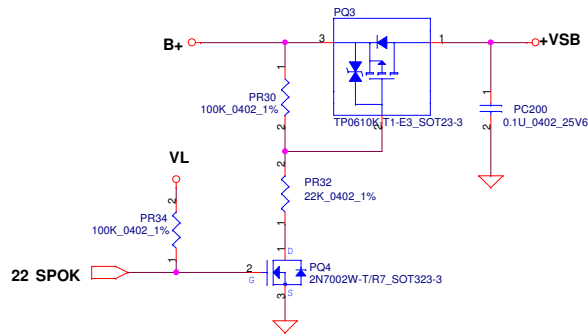
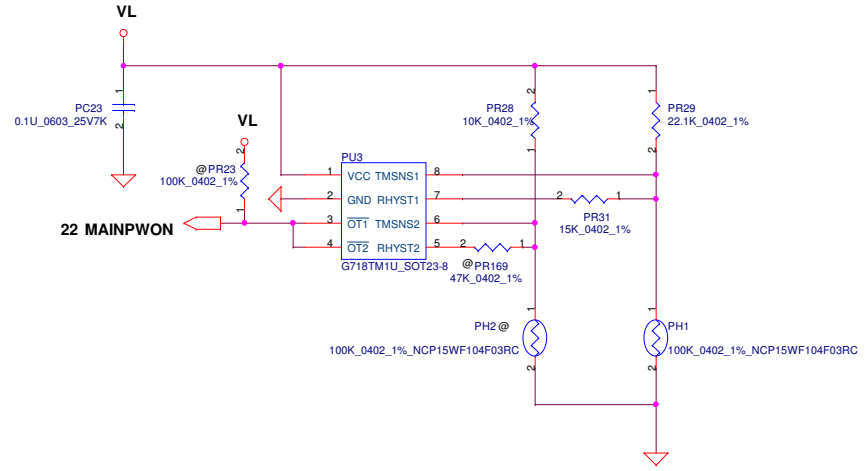
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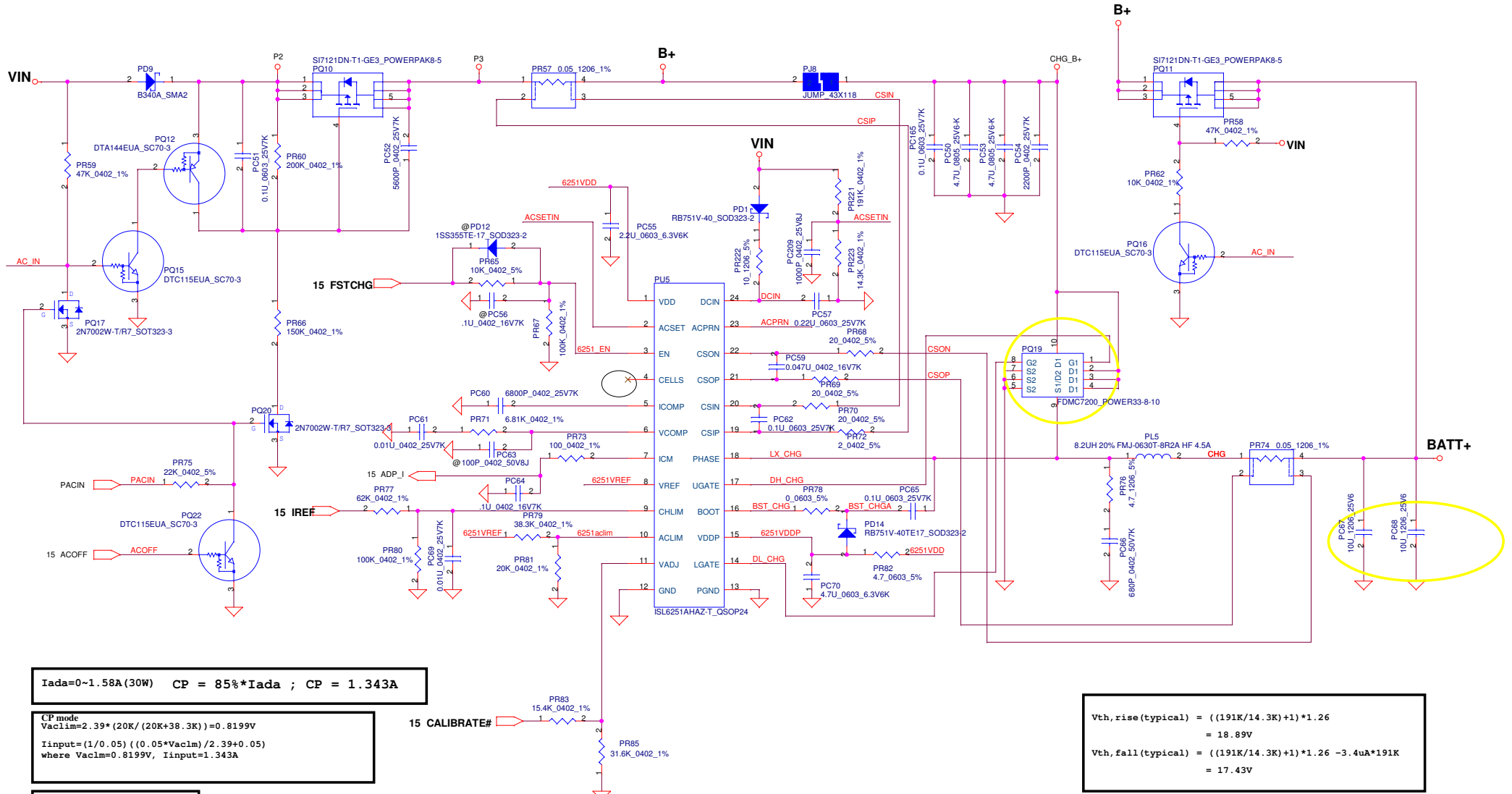
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PH1 under CPU botten side :
 CPU thermal protection at 92 degree C
 Recovery at 72 degree C



| | | | | |
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$I_{ada} = 0 \sim 1.58A (30W)$ $CP = 85\% \cdot I_{ada}$; $CP = 1.343A$

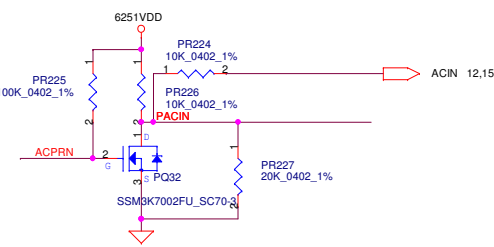
CP mode
 $V_{aclm} = 2.39 \cdot (20K / (20K + 38.3K)) = 0.8199V$
 $I_{input} = (1/0.05) \cdot ((0.05 \cdot V_{aclm}) / 2.39 + 0.05)$
 where $V_{aclm} = 0.8199V$, $I_{input} = 1.343A$

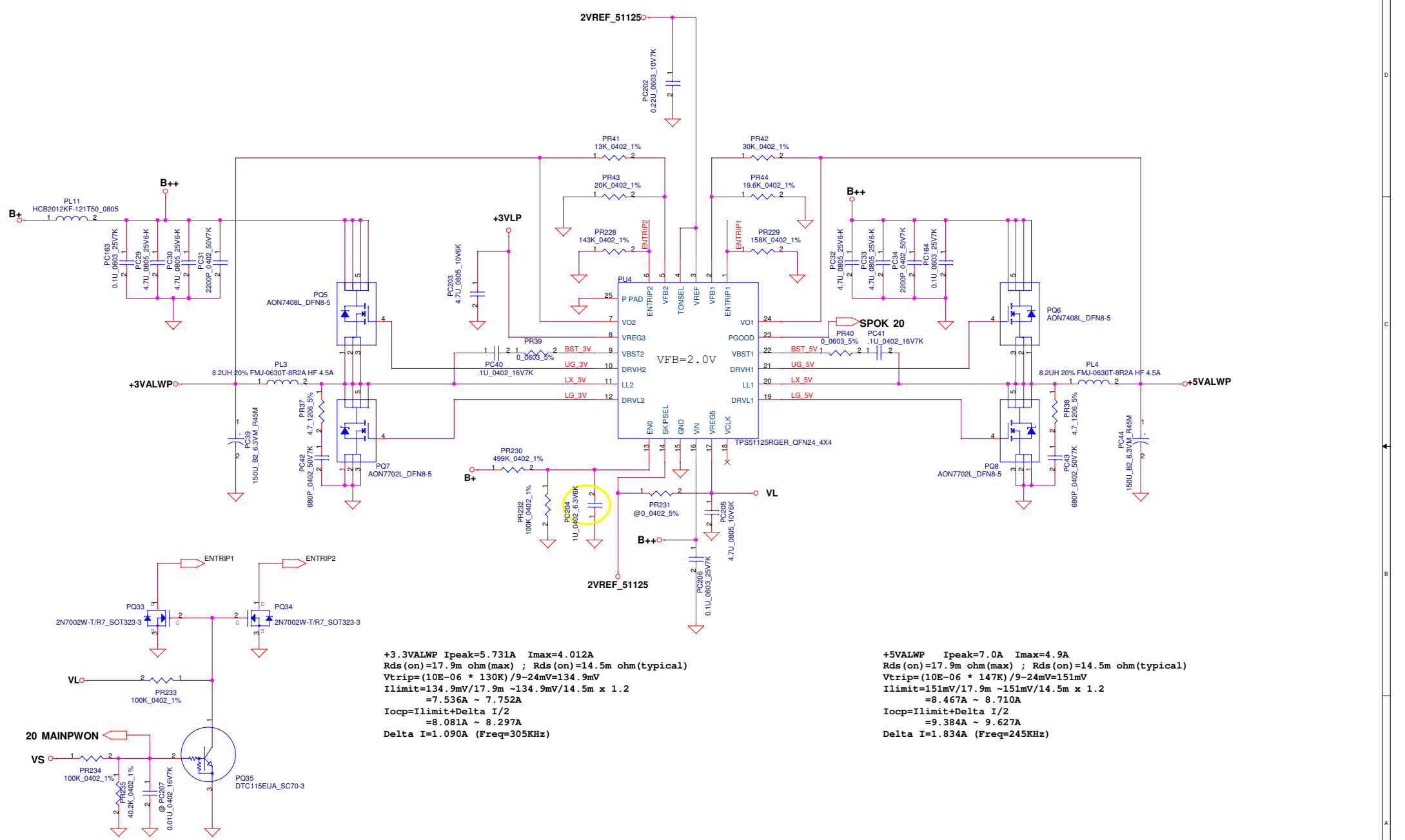
$CC = 0.3 \sim 1.76A$
 $I_{REF} = 1.62 \cdot I_{charge}$
 $I_{REF} = 0.486V \sim 2.85V$
 $3.24V \implies 2A$

| BATT Type | Charging Voltage (0x15) | CV mode |
|-----------------------|-------------------------|---------|
| Normal 3S LI-ON Cells | 12600mV | 12.60V |

$V_{ADJ} \rightarrow V_{REF} \rightarrow 4.41V$
 $V_{ADJ} \rightarrow \text{Ground} \rightarrow 3.39V$
 $V_{cell} = (0.175 \cdot V_{ADJ} + 3.99)$

$V_{th, rise (typical)} = ((191K / 14.3K) + 1) \cdot 1.26$
 $= 18.89V$
 $V_{th, fall (typical)} = ((191K / 14.3K) + 1) \cdot 1.26 - 3.4\mu A \cdot 191K$
 $= 17.43V$

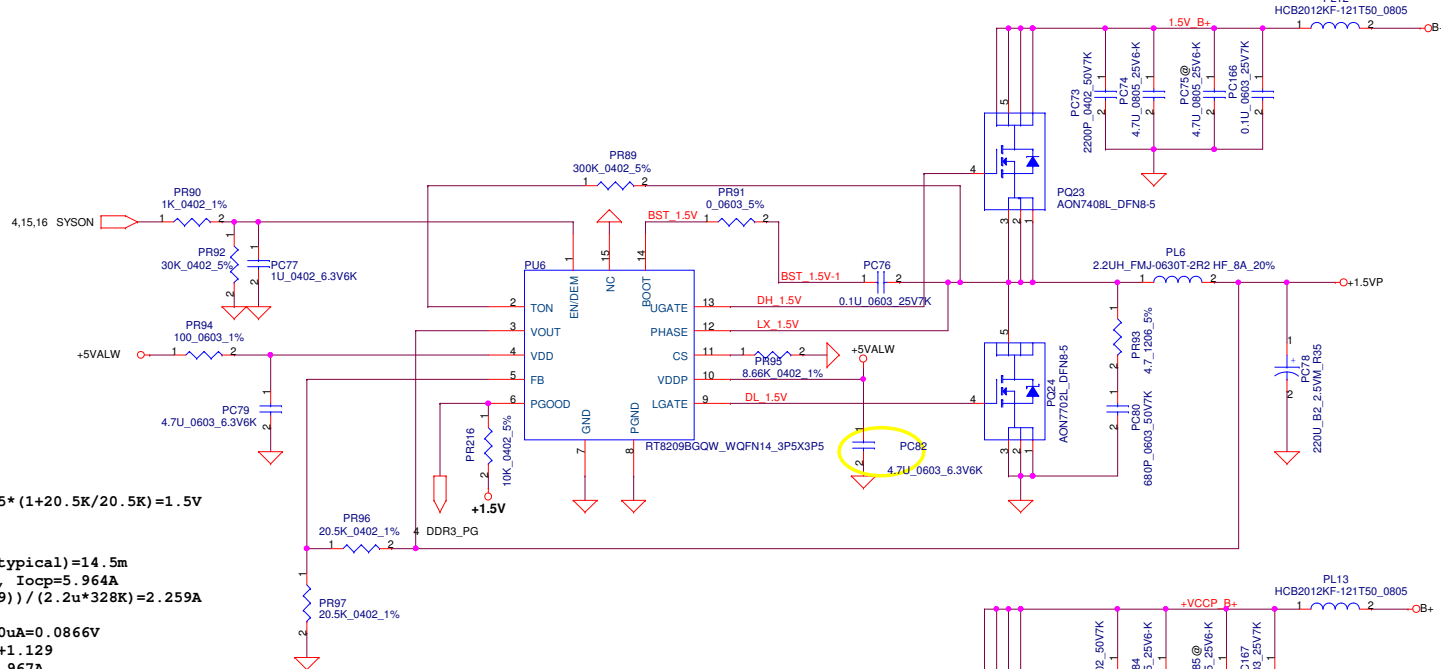




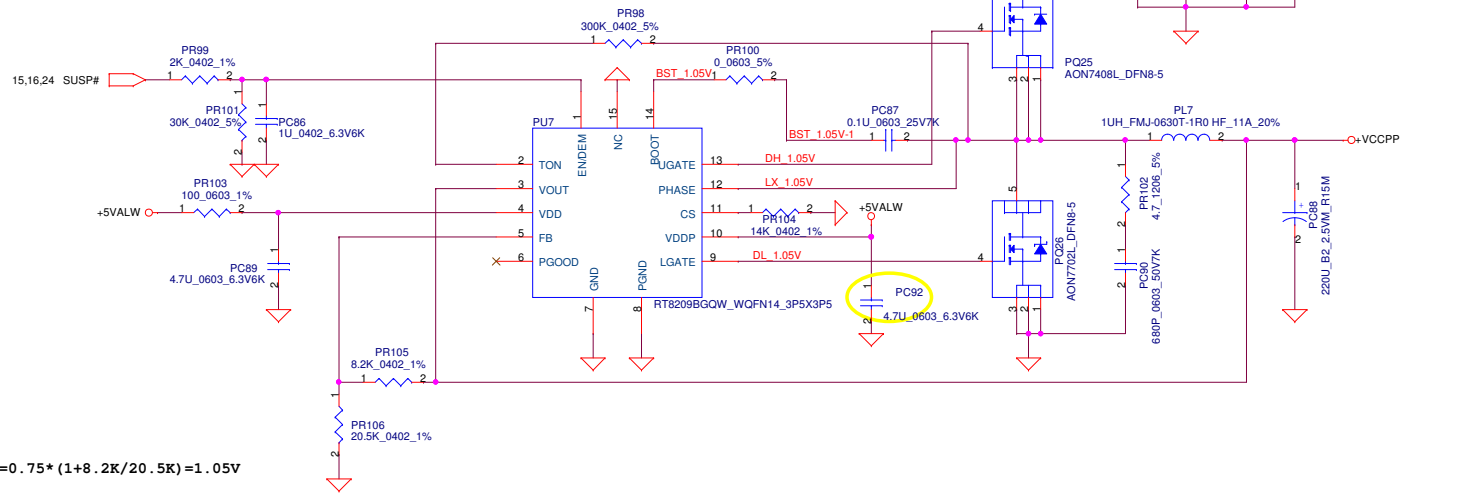
+3.3VALWP Ipeak=5.731A I_{max}=4.012A
 R_{ds(on)}=17.9m ohm(max) ; R_{ds(on)}=14.5m ohm(typical)
 V_{trip}=(10E-06 * 130K)/9-24mV=134.9mV
 I_{limit}=134.9mV/17.9m ~134.9mV/14.5m x 1.2
 =7.536A ~ 7.752A
 I_{ocp}=I_{limit}+Delta I/2
 =8.081A ~ 8.297A
 Delta I=1.090A (Freq=305KHz)

+5VALWP Ipeak=7.0A I_{max}=4.9A
 R_{ds(on)}=17.9m ohm(max) ; R_{ds(on)}=14.5m ohm(typical)
 V_{trip}=(10E-06 * 147K)/9-24mV=151mV
 I_{limit}=151mV/17.9m ~151mV/14.5m x 1.2
 =8.467A ~ 8.710A
 I_{ocp}=I_{limit}+Delta I/2
 =9.384A ~ 9.627A
 Delta I=1.834A (Freq=245KHz)

| | | | | | |
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| | | | LA-6371P | 0.1 | |
| | | | Date: Friday, May 07, 2010 | Sheet | 22 of 27 |

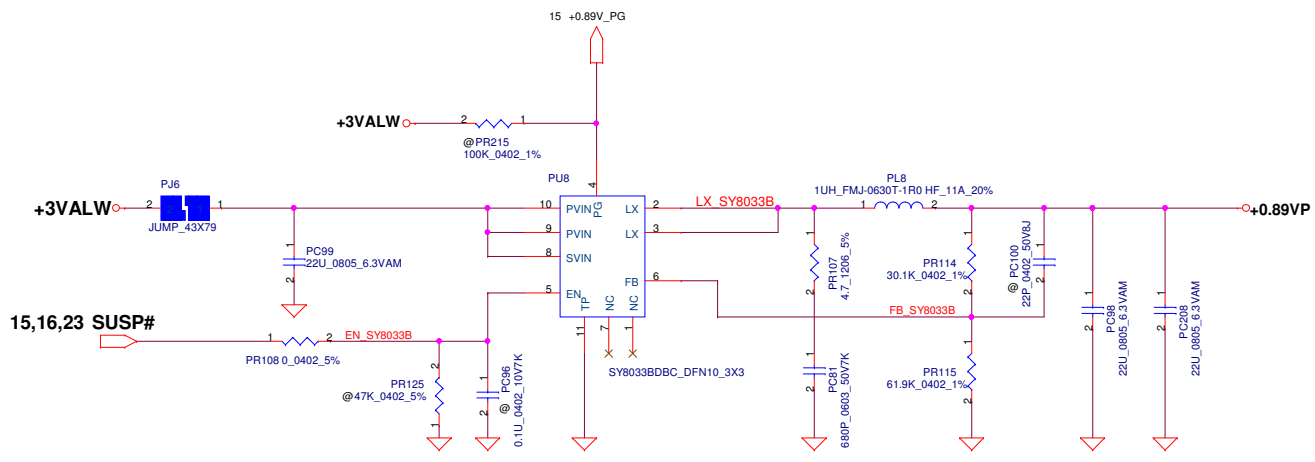


$V_o = 1.5V$ $V_{FB} = 0.75V$
 $V_o = V_{FB} * (1 + PR96/PR97) = 0.75 * (1 + 20.5K/20.5K) = 1.5V$
 $f_{sw} = 328KHz$
 $C_{out} ESR = 15m\ ohm$
 $R_{dson(max)} = 17.9m$ $R_{dson(typical)} = 14.5m$
 $I_{peak} = 4.97A$, $I_{max} = 3.479A$, $I_{ocp} = 5.964A$
 $\Delta I = ((19-1.8) * (1.8/19)) / (2.2u * 328K) = 2.259A$
 $\Rightarrow 1/2 \Delta I = 1.129A$
 $V_{trip} = R_{trip} * 10uA = 8.66K * 10uA = 0.0866V$
 $I_{ocpmin} = V_{trip} / (R_{dsonmax}) + 1.129$
 $= 0.0866 / (0.0179) + 1.129 = 5.967A$
 $I_{ocpmax} = (0.0866 / (0.0145 * 1.2)) + 1.129A = 6.106A$
 $I_{ocp} = 5.967A \sim 6.106A$

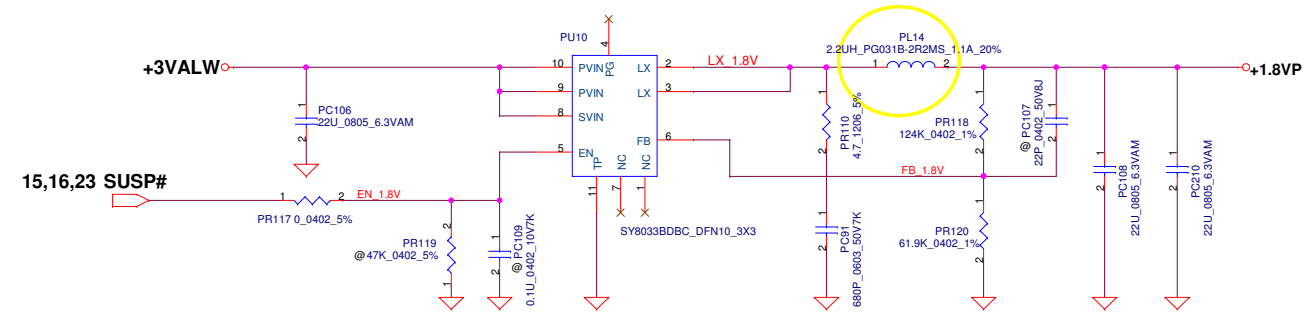


$V_o = 1.05V$ $V_{FB} = 0.75V$
 $V_o = V_{FB} * (1 + PR105/PR106) = 0.75 * (1 + 8.2K/20.5K) = 1.05V$
 $f_{sw} = 280KHz$
 $C_{out} ESR = 15m\ ohm$ $R_{dson(max)} = 17.9m$ $R_{dson(typical)} = 14.5m$
 $I_{peak} = 3.124A$, $I_{max} = 2.187A$, $I_{ocp} = 3.749A$
 $\Delta I = ((19-1.05) * (1.05/19)) / (1.5u * 280K) = 3.549A$
 $\Rightarrow 1/2 \Delta I = 1.774A$
 $V_{trip} = R_{trip} * 10uA = 14K * 10uA = 0.14V$
 $I_{ocpmin} = V_{trip} / (R_{dsonmax}) + 1.774$
 $= 0.14 / (0.0179) + 1.774 = 9.596A$
 $I_{ocpmax} = (0.14 / (0.0145 * 1.2)) + 1.774A = 9.820A$
 $I_{ocp} = 9.596A \sim 9.820A$

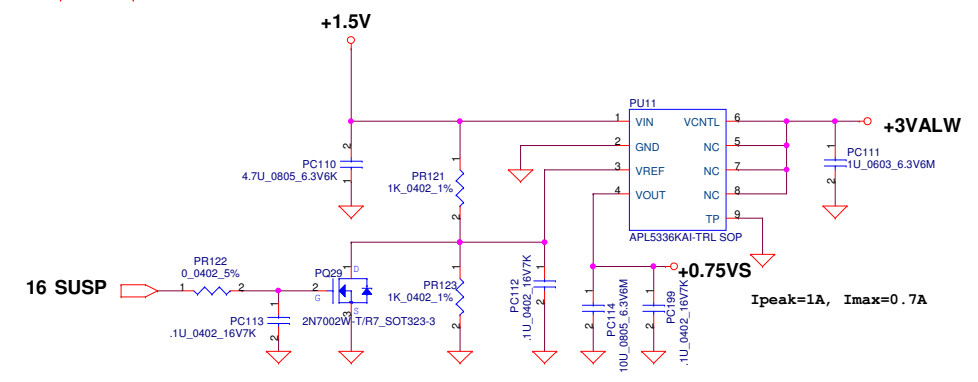
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| Security Classification | Compal Secret Data | | Title VCCPP/1.5VP |
| Issued Date | 2010/5/7 | Deciphered Date | |
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$\langle V_o = 0.89V \rangle$ $V_{FB} = 0.6V$
 $V_o = V_{FB} * (1 + PR114 / PR115) = 0.6 * (1 + 30.1K / 61.9) = 0.89V$
 $I_{peak} = 2.64A$, $I_{max} = 1.848A$



$\langle V_o = 1.8VP \rangle$ $V_{FB} = 0.6V$
 $V_o = V_{FB} * (1 + PR118 / PR120) = 0.6 * (1 + 124K / 61.9) = 1.8VP$
 $I_{peak} = 0.318A$, $I_{max} = 0.223A$

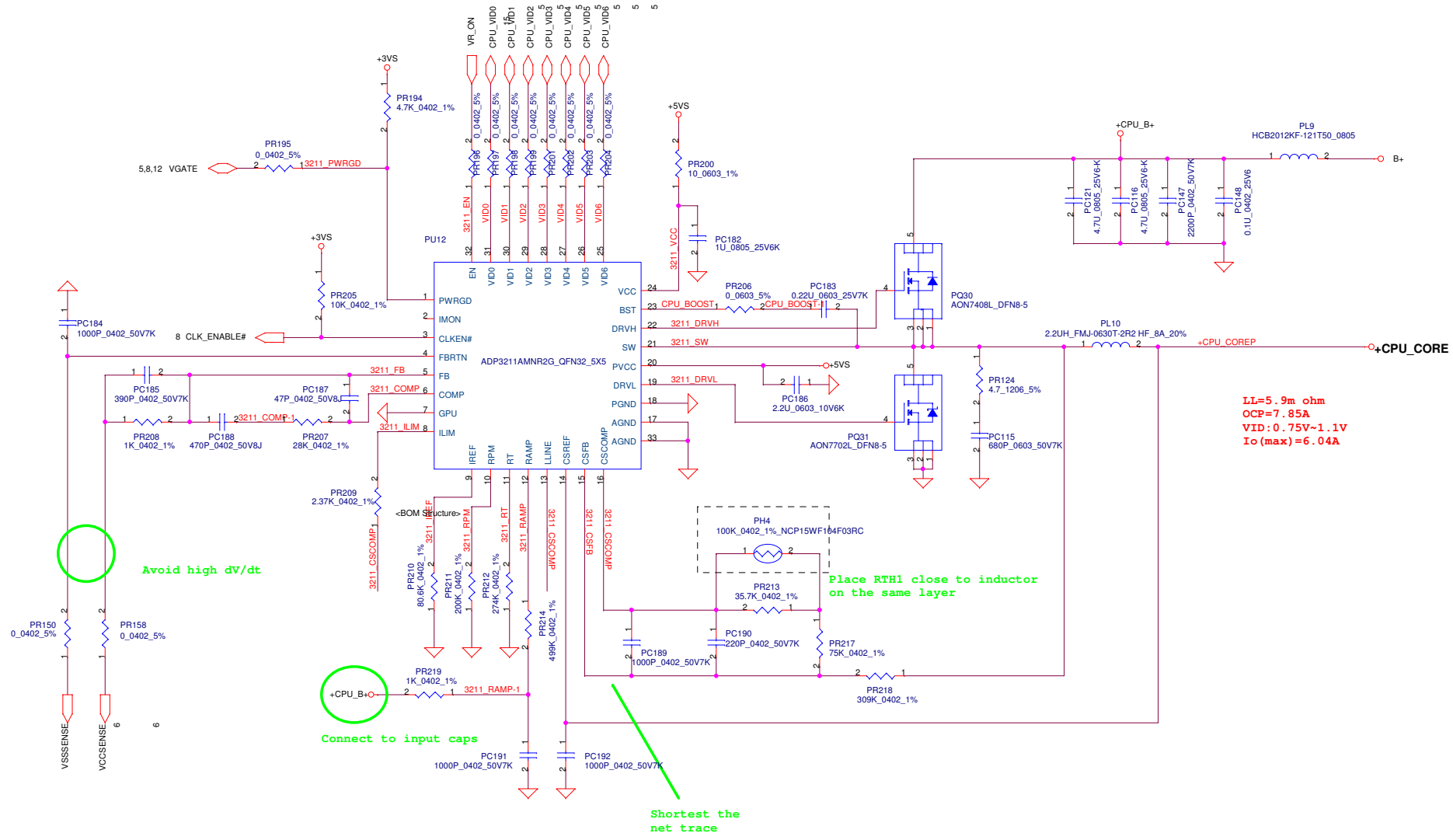


$I_{peak} = 1A$, $I_{max} = 0.7A$

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| Issued Date | 2010/5/7 | Deciphered Date | 2011/5/7 | 808 |
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Compal Electronics, Inc.
0.89VP/1.8VP/0.75VS

Rev 0.1



LI=5.9m ohm
 OCP=7.85A
 VID:0.75V~1.1V
 Io(max)=6.04A

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| Item | Fixed Issue | Reason for change | Rev. | PG# | Modify List | Date | Phase |
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