

Compal Confidential

KAWF0/KAWH0 M/B Schematics Document Intel Penryn Processor with Cantiga + DDRII + ICH9M

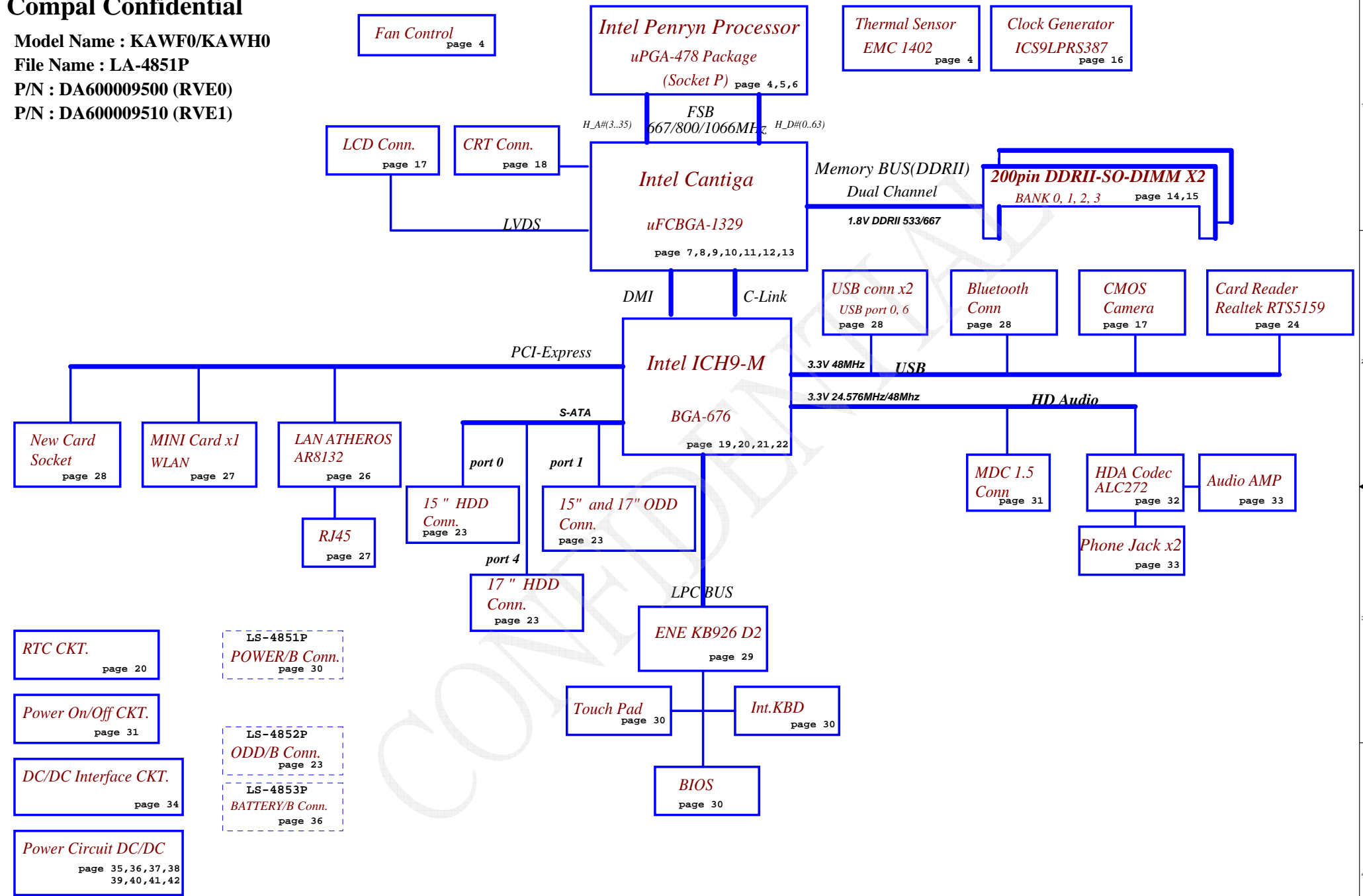
2009-01-21

REV:1.0

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| | | | | Date: | Monday, February 09, 2009 | Sheet 1 of 45 |

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Model Name : KAWF0/KAWH0
File Name : LA-4851P
P/N : DA600009500 (RVE0)
P/N : DA600009510 (RVE1)



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Voltage Rails

| Power Plane | Description | S1 | S3 | S5 |
|-------------|---|-----|-----|-----|
| VIN | Adapter power supply (19V) | N/A | N/A | N/A |
| B+ | AC or battery power rail for power circuit. | N/A | N/A | N/A |
| +CPU_CORE | Core voltage for CPU | ON | OFF | OFF |
| +0.9VS | 0.9V switched power rail for DDR terminator | ON | OFF | OFF |
| +1.05VS | 1.05V switched power rail | ON | OFF | OFF |
| +1.5V | 1.5V power rail for HDA | ON | ON | OFF |
| +1.5VS | 1.5V switched power rail | ON | OFF | OFF |
| +1.8V | 1.8V power rail for DDR | ON | ON | OFF |
| +2.5VS | 2.5V switched power rail | ON | OFF | OFF |
| +3VALW | 3.3V always on power rail | ON | ON | ON* |
| +3V | 3.3V power rail for SB | ON | ON | OFF |
| +3V_LAN | 3.3V power rail for LAN | 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.

External PCI Devices

| Device | IDSEL# | REQ#/GNT# | Interrupts |
|--------|--------|-----------|------------|
| | | | |

EC SM Bus1 address

| Device | Address | Device | Address |
|------------------|-------------|-------------|-------------|
| Smart Battery | 0001 011X b | ADI ADT7421 | 1001 100X b |
| EEPROM(24C16/02) | 1010 000X b | | |
| GMT G781-1 | 1001 101X b | | |

EC SM Bus2 address

ICH9M SM Bus address

| Device | Address |
|---|------------|
| Clock Generator (ICS9LPRS367, SLG8SP556V) | 1101 001Xb |
| DDR DIMM0 | 1001 000Xb |
| DDR DIMM2 | 1001 010Xb |

| STATE | SIGNAL | SLP_S1# | SLP_S3# | SLP_S4# | SLP_S5# | +VALW | +V | +VS | Clock |
|----------------------|--------|---------|---------|---------|---------|-------|-----|-----|-------|
| Full ON | | HIGH | HIGH | HIGH | HIGH | ON | ON | ON | ON |
| S1(Power On Suspend) | | LOW | HIGH | HIGH | HIGH | ON | ON | ON | LOW |
| S3 (Suspend to RAM) | | LOW | LOW | HIGH | HIGH | ON | ON | OFF | OFF |
| S4 (Suspend to Disk) | | LOW | LOW | LOW | HIGH | ON | OFF | OFF | OFF |
| S5 (Soft OFF) | | LOW | LOW | LOW | LOW | ON | OFF | OFF | OFF |

Board ID / SKU ID Table for AD channel

| Vcc | 3.3V +/- 5% | | | |
|----------|--------------|-------------|-------------|-------------|
| Ra/Rc/Re | 100K +/- 5% | | | |
| Board ID | Rb / Rd / Rf | VAD_BID min | VAD_BID typ | VAD_BID max |
| 0 | 0 | 0 V | 0 V | 0 V |
| 1 | 8.2K +/- 5% | 0.216 V | 0.250 V | 0.289 V |
| 2 | 18K +/- 5% | 0.436 V | 0.503 V | 0.538 V |
| 3 | 33K +/- 5% | 0.712 V | 0.819 V | 0.875 V |
| 4 | 56K +/- 5% | 1.036 V | 1.185 V | 1.264 V |
| 5 | 100K +/- 5% | 1.453 V | 1.650 V | 1.759 V |
| 6 | 200K +/- 5% | 1.935 V | 2.200 V | 2.341 V |
| 7 | NC | 2.500 V | 3.300 V | 3.300 V |

BOARD ID Table

| Board ID | PCB Revision |
|----------|--------------|
| 0 | 0.1 |
| 1 | 0.2 |
| 2 | 0.3 |
| 3 | 1.0 |
| 4 | 1A |
| 5 | |
| 6 | |
| 7 | |

BTO Option Table

| BTO Item | BOM Structure |
|----------|---------------|
| GM45 | GM@ |
| GL40 | GL@ |
| 15" | 15@ |
| 17" | 17@ |
| 8114 | 8114@ |
| 8132 | 8132@ |

PCIE table

| PCIE port1 | Express Card(Reserved) |
|------------|------------------------|
| PCIE port2 | Wireless Card |
| PCIE port3 | PCIE LAN |
| PCIE port4 | |
| PCIE port5 | |
| PCIE port6 | |

USB table

| | UHCI1 | Port0 | MB USB Conn. |
|-------|-------|--------|--------------------|
| EHCI1 | UHCI2 | Port1 | |
| | UHCI3 | Port2 | |
| | | Port3 | CMOS Camera |
| EHCI2 | UHCI4 | Port4 | Card Reader |
| | | Port5 | New Card(Reserved) |
| | UHCI5 | Port6 | MB USB Conn. |
| | | Port7 | |
| | UHCI6 | Port8 | Blue Tooth |
| | | Port9 | |
| | | Port10 | Wireless Card |
| | | | Port11 |

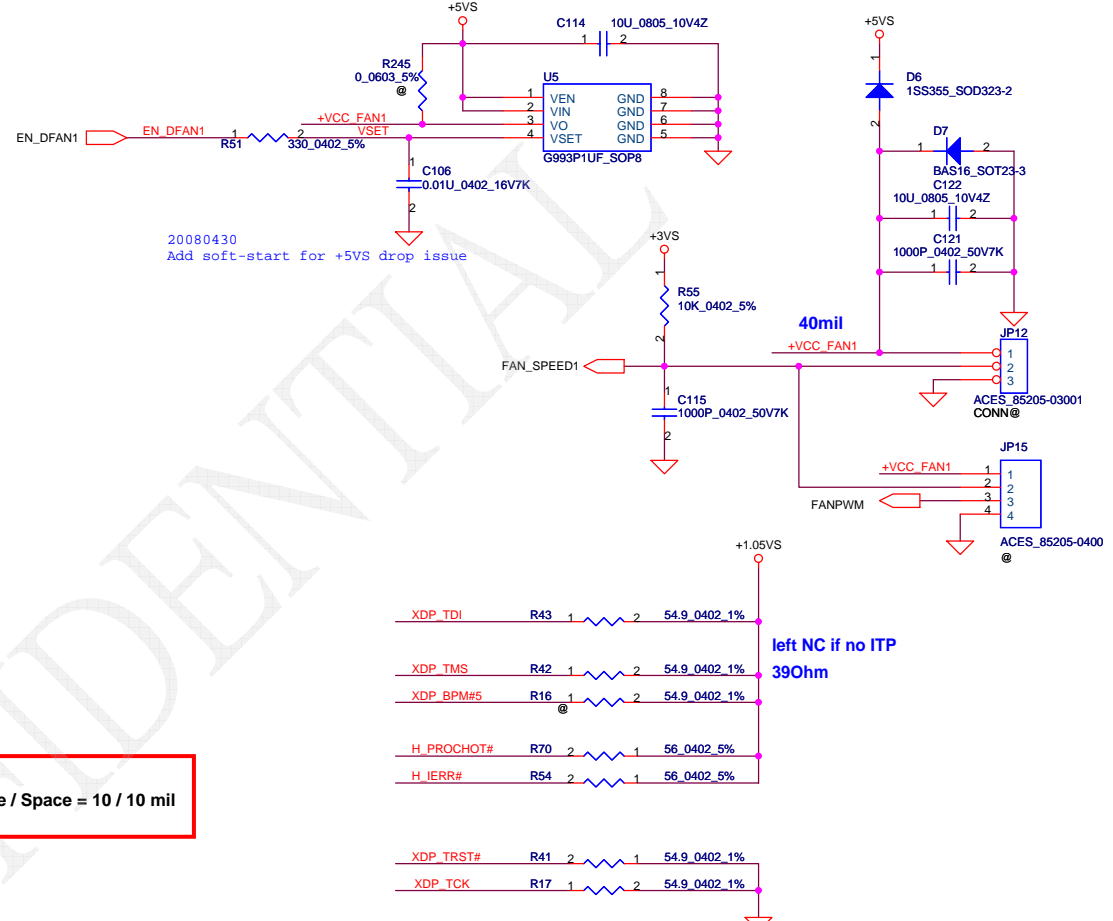
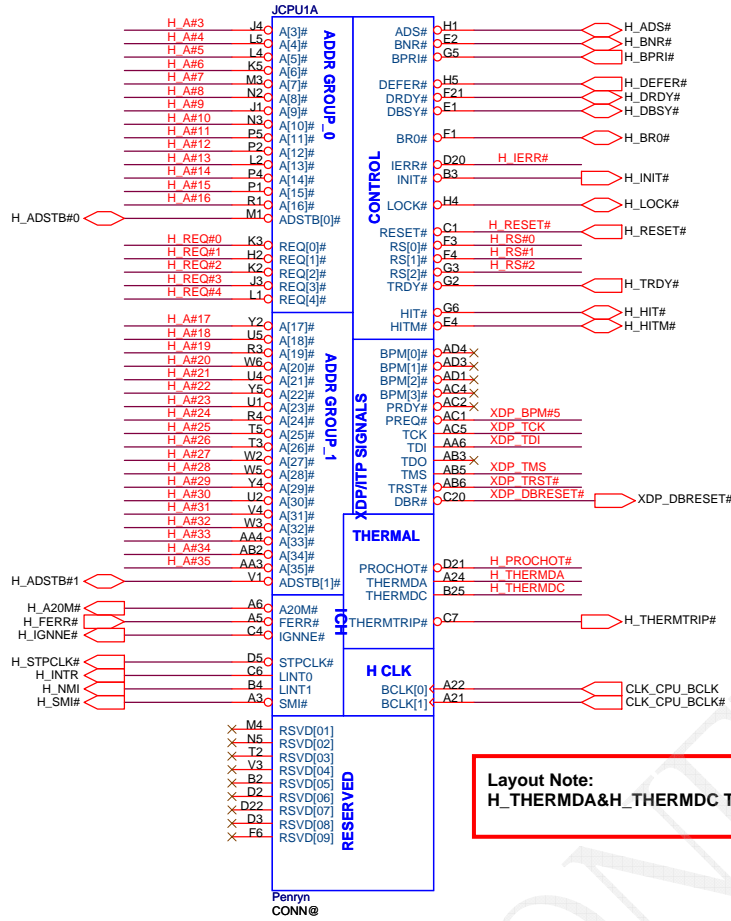
SATA table

| SATA port0 | HDD |
|------------|-----------------|
| SATA port1 | ODD |
| SATA port2 | |
| SATA port3 | |
| SATA port4 | for 17" 2nd HDD |
| SATA port5 | |

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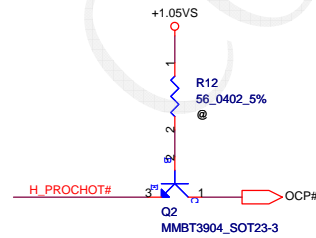
H_A#[3..35] H_A#[3..35]
 H_REQ#[0..4] H_REQ#[0..4]
 H_RS#[0..2] H_RS#[0..2]

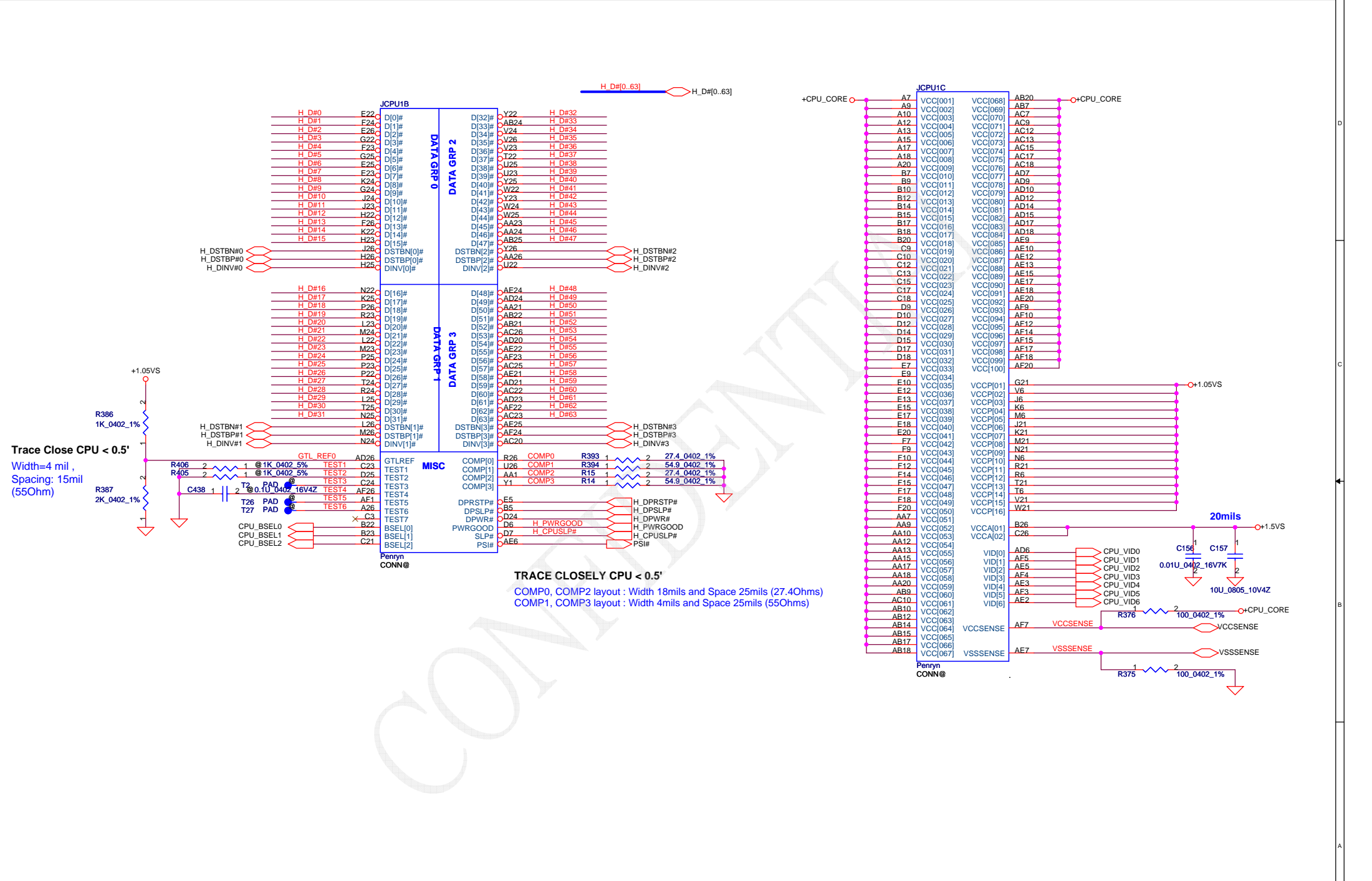
FAN1 Conn



Layout Note:
 H_THERMDA&H_THERMDC Trace / Space = 10 / 10 mil

| BSEL2 | BSEL1 | BSEL0 | BCLK |
|-------|-------|-------|------|
| 0 | 0 | 0 | 266 |
| 0 | 1 | 0 | 200 |
| 0 | 1 | 1 | 166 |





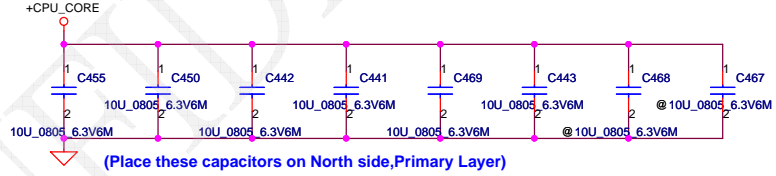
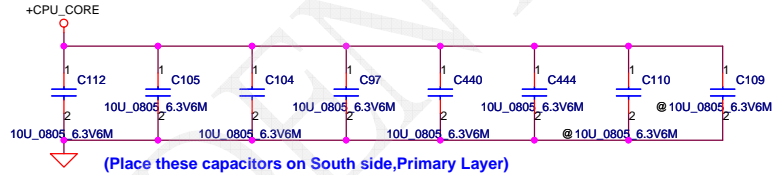
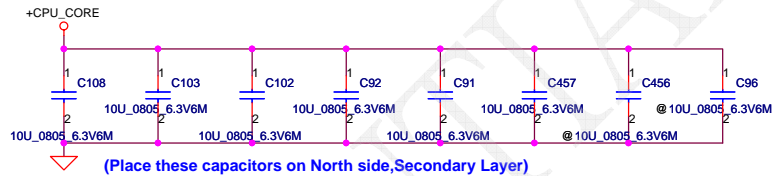
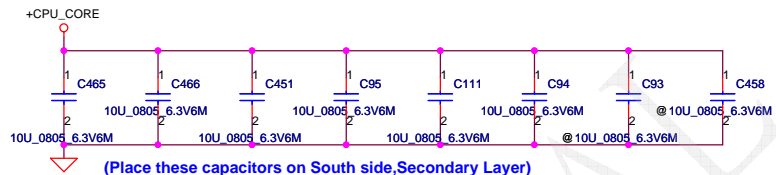
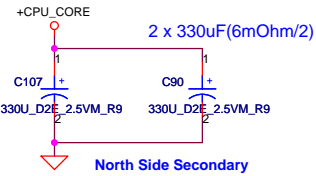
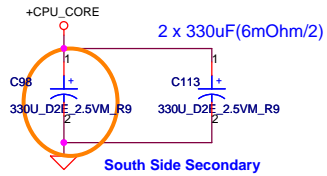
Trace Close CPU < 0.5'
 Width=4 mil,
 Spacing: 15mil
 (55Ohm)

TRACE CLOSELY CPU < 0.5'
 COMP0, COMP2 layout : Width 18mils and Space 25mils (27.4Ohms)
 COMP1, COMP3 layout : Width 4mils and Space 25mils (55Ohms)

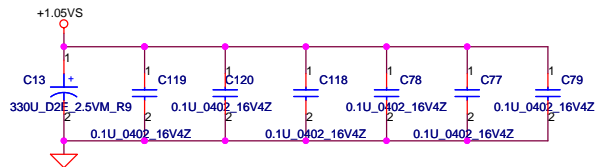
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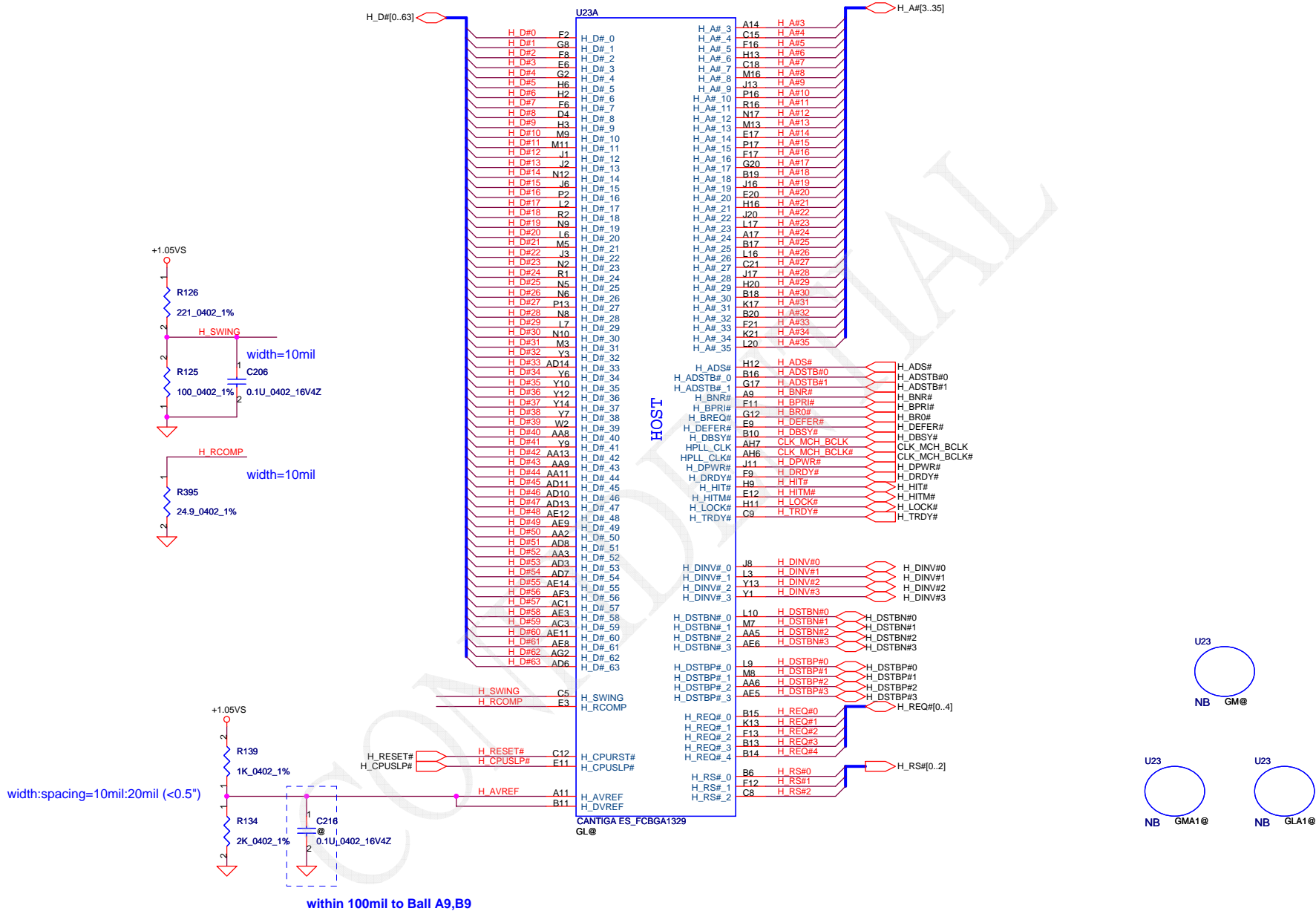
| JCPU1D | |
|--------|----------|
| A4 | VSS[001] |
| A8 | VSS[002] |
| A11 | VSS[003] |
| A14 | VSS[004] |
| A16 | VSS[005] |
| A19 | VSS[006] |
| A23 | VSS[007] |
| AF2 | VSS[008] |
| B6 | VSS[009] |
| B8 | VSS[010] |
| B11 | VSS[011] |
| B13 | VSS[012] |
| B16 | VSS[013] |
| B19 | VSS[014] |
| B21 | VSS[015] |
| B24 | VSS[016] |
| C5 | VSS[017] |
| C8 | VSS[018] |
| C11 | VSS[019] |
| C14 | VSS[020] |
| C16 | VSS[021] |
| C19 | VSS[022] |
| C2 | VSS[023] |
| C22 | VSS[024] |
| C25 | VSS[025] |
| D1 | VSS[026] |
| D4 | VSS[027] |
| D8 | VSS[028] |
| D11 | VSS[029] |
| D13 | VSS[030] |
| D16 | VSS[031] |
| D19 | VSS[032] |
| D23 | VSS[033] |
| D26 | VSS[034] |
| E3 | VSS[035] |
| E6 | VSS[036] |
| E8 | VSS[037] |
| E11 | VSS[038] |
| E14 | VSS[039] |
| E16 | VSS[040] |
| E19 | VSS[041] |
| E21 | VSS[042] |
| E24 | VSS[043] |
| F5 | VSS[044] |
| F8 | VSS[045] |
| F11 | VSS[046] |
| F13 | VSS[047] |
| F16 | VSS[048] |
| F19 | VSS[049] |
| F2 | VSS[050] |
| F22 | VSS[051] |
| F25 | VSS[052] |
| G4 | VSS[053] |
| G1 | VSS[054] |
| G23 | VSS[055] |
| G26 | VSS[056] |
| H3 | VSS[057] |
| H6 | VSS[058] |
| H21 | VSS[059] |
| H24 | VSS[060] |
| J2 | VSS[061] |
| J22 | VSS[062] |
| J25 | VSS[063] |
| K1 | VSS[064] |
| K4 | VSS[065] |
| K23 | VSS[066] |
| K26 | VSS[067] |
| L3 | VSS[068] |
| L6 | VSS[069] |
| L21 | VSS[070] |
| L24 | VSS[071] |
| M2 | VSS[072] |
| M5 | VSS[073] |
| M22 | VSS[074] |
| M25 | VSS[075] |
| N1 | VSS[076] |
| N4 | VSS[077] |
| N23 | VSS[078] |
| N26 | VSS[079] |
| P3 | VSS[080] |
| | VSS[081] |
| | VSS[162] |
| | VSS[163] |

Pennyn
CONN@



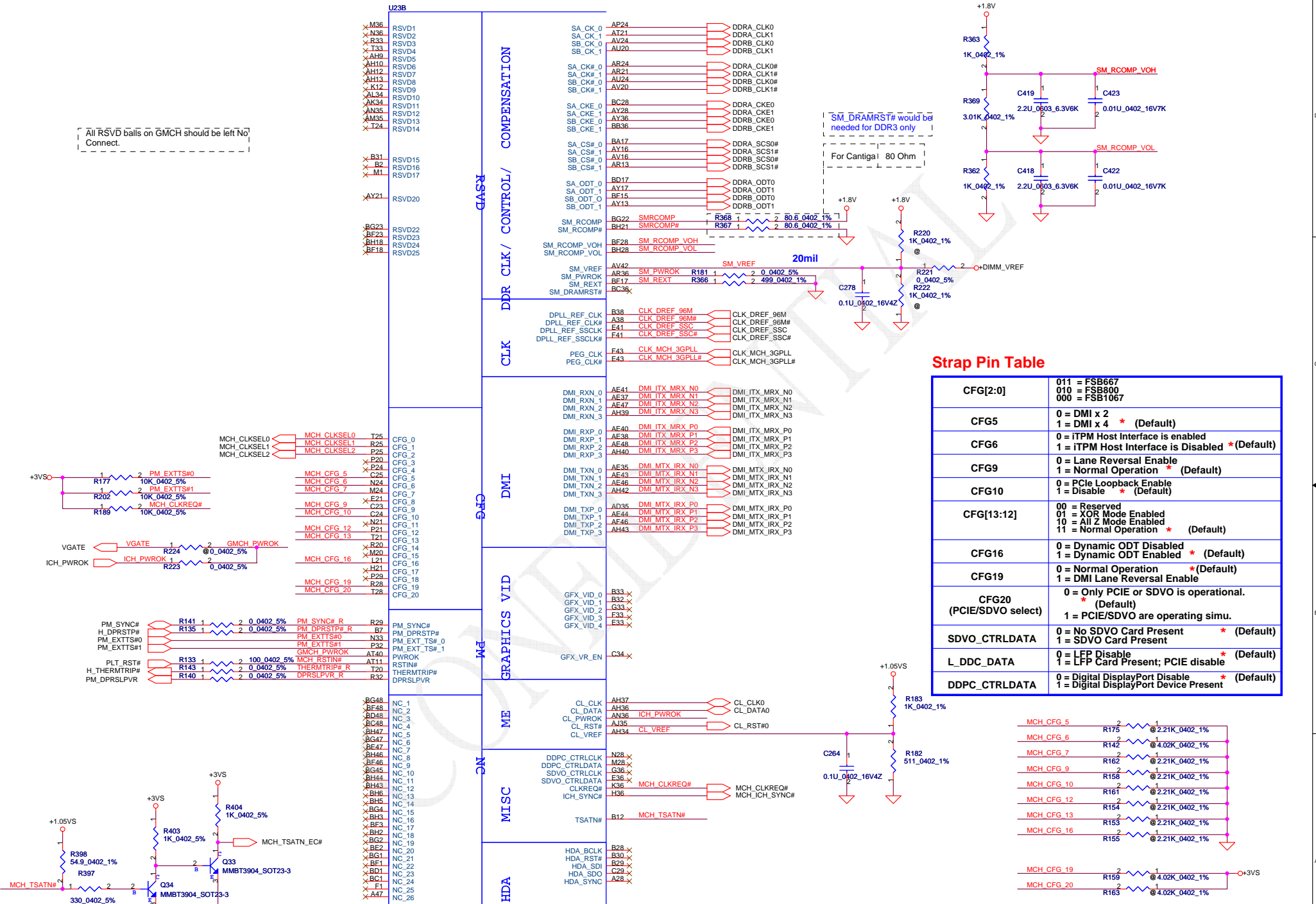
| +CPU-CORE Decoupling | C,uF | ESR, mohm | ESL,nH |
|----------------------|---------|-----------|----------|
| SPCAP, Polymer | 4X330uF | 6m ohm/4 | 1.8nH/6 |
| MLCC 0805 X5R | 32X22uF | 3m ohm/32 | 0.6nH/32 |
| | 32X10uF | 3m ohm/32 | 0.6nH/32 |





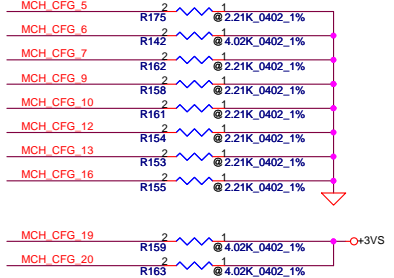
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All RSVD balls on GMCH should be left No Connect.



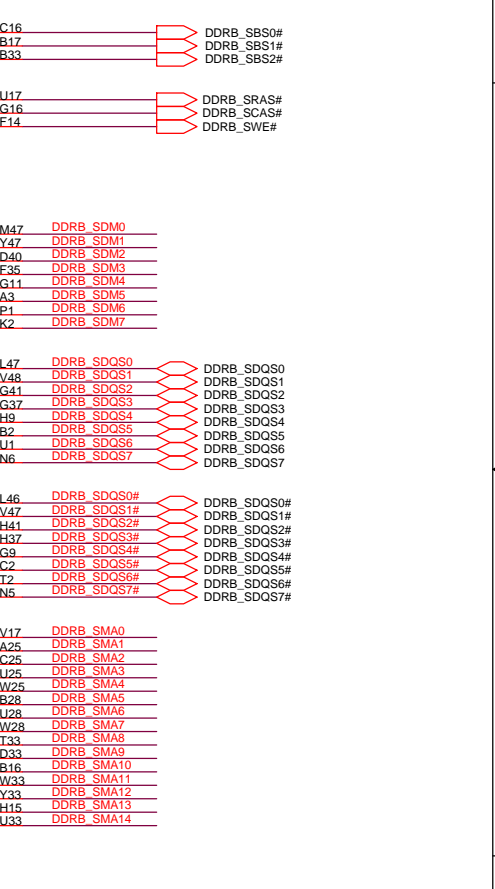
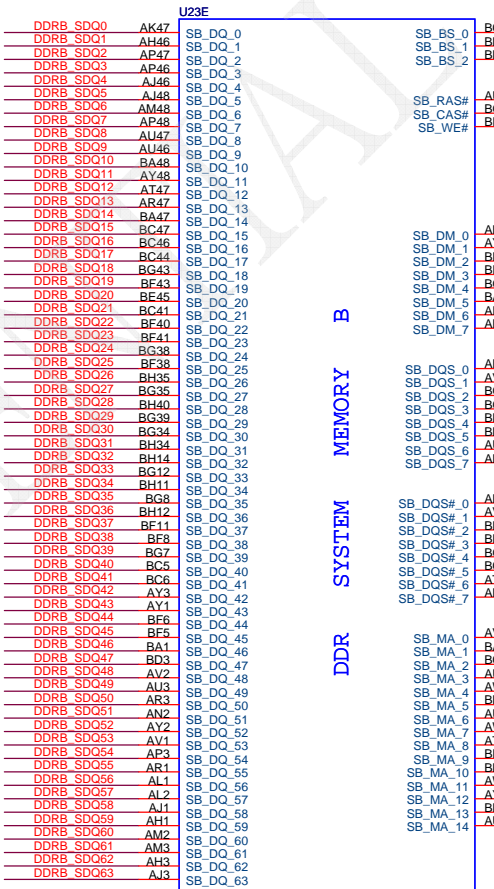
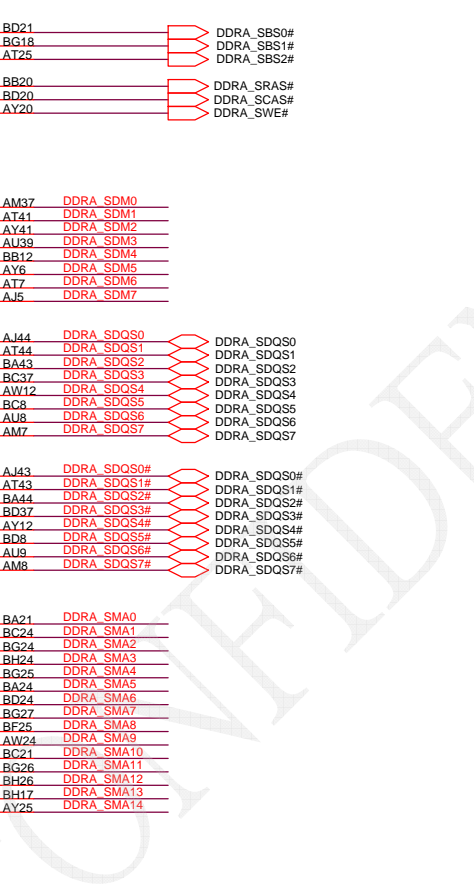
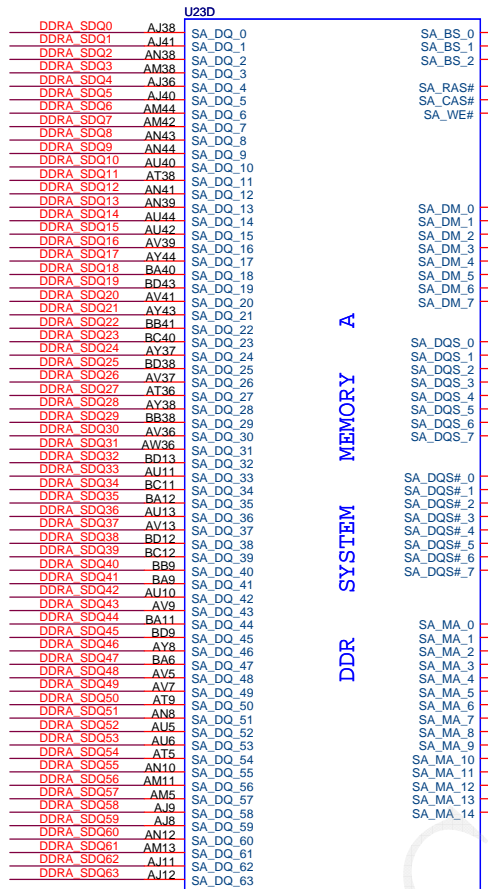
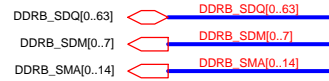
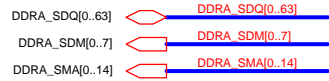
Strap Pin Table

| | |
|--------------------------|--|
| CFG[2:0] | 011 = FSB667 010 = FSB800 000 = FSB1067 |
| CFG5 | 0 = DMI x 2 1 = DMI x 4 * (Default) |
| CFG6 | 0 = iTPM Host Interface is enabled 1 = iTPM Host Interface is Disabled * (Default) |
| CFG9 | 0 = Lane Reversal Enable 1 = Normal Operation * (Default) |
| CFG10 | 0 = PCIe Loopback Enable 1 = Disable * (Default) |
| CFG[13:12] | 00 = Reserved 01 = XOR Mode Enabled 10 = All Z Mode Enabled 11 = Normal Operation * (Default) |
| CFG16 | 0 = Dynamic ODT Disabled 1 = Dynamic ODT Enabled * (Default) |
| CFG19 | 0 = Normal Operation * (Default) 1 = DMI Lane Reversal Enable |
| CFG20 (PCIe/SDVO select) | 0 = Only PCIe or SDVO is operational. (Default) 1 = PCIe/SDVO are operating simu. |
| SDVO_CTRLDATA | 0 = No SDVO Card Present * (Default) 1 = SDVO Card Present |
| L_DDC_DATA | 0 = LFP Disable * (Default) 1 = LFP Card Present; PCIe disable |
| DDPC_CTRLDATA | 0 = Digital DisplayPort Disable * (Default) 1 = Digital DisplayPort Device Present |

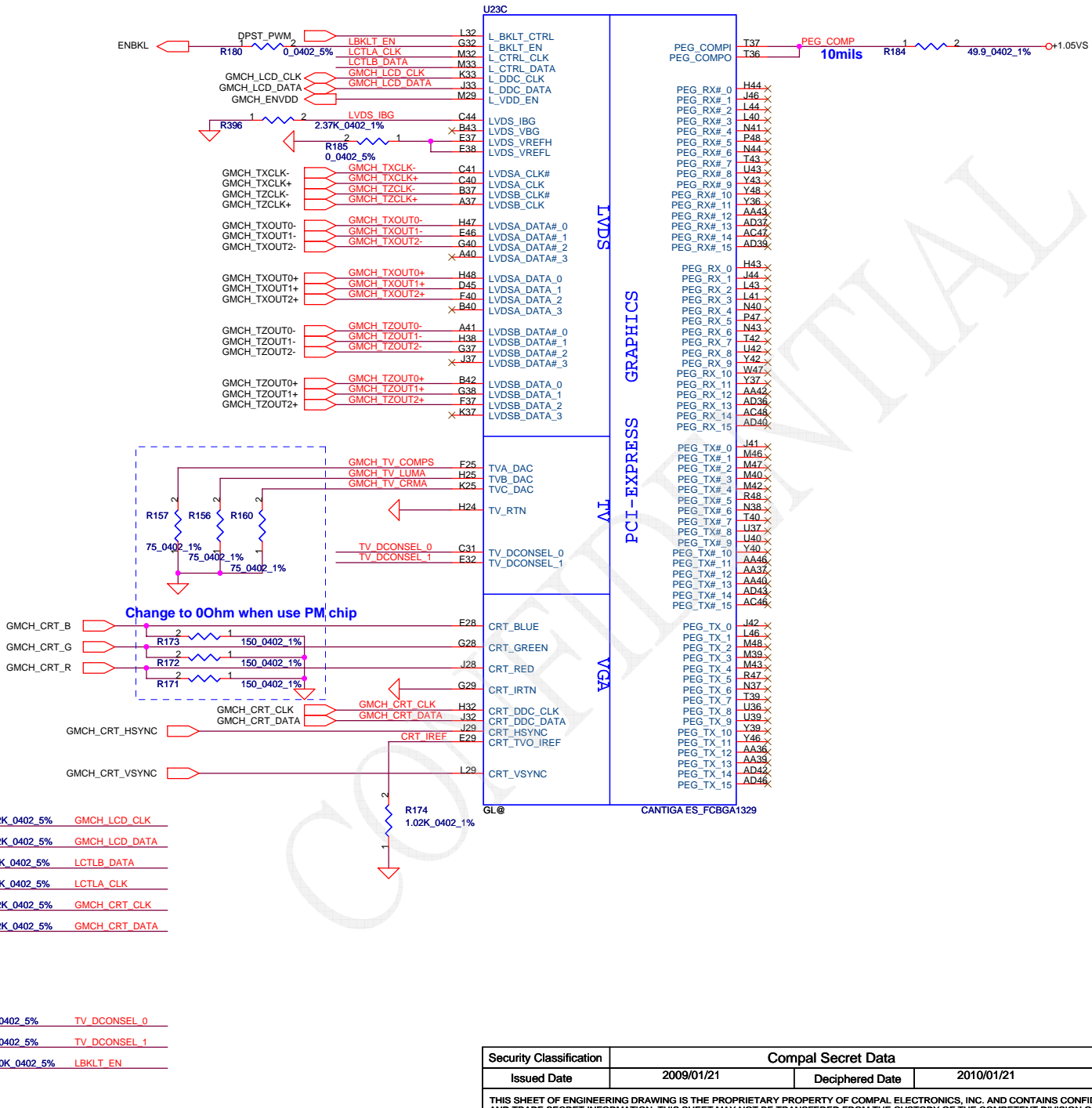


CANTIGA ES_FCBGA1329
GL

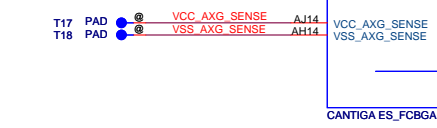
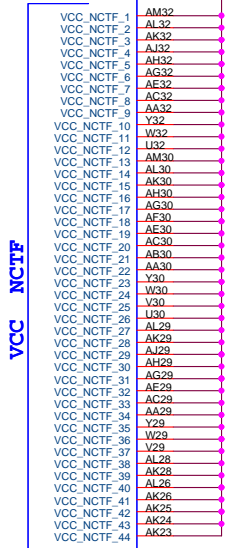
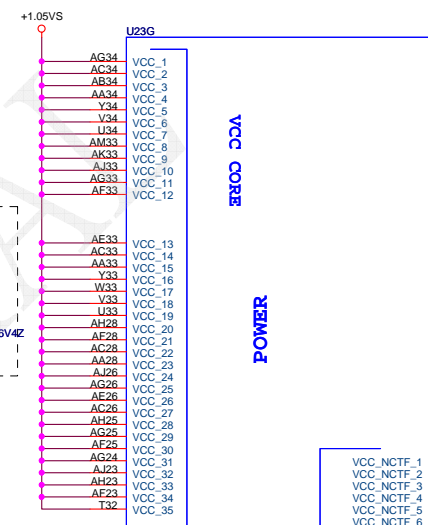
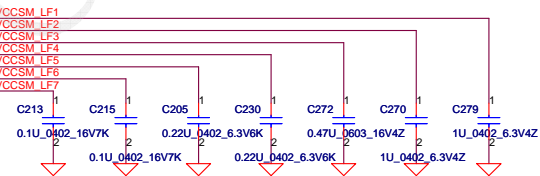
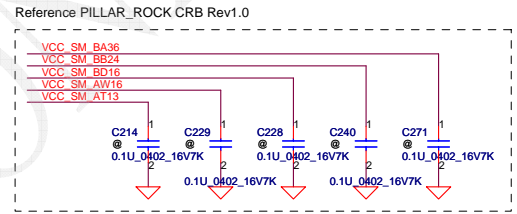
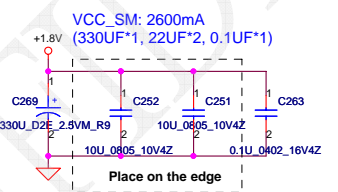
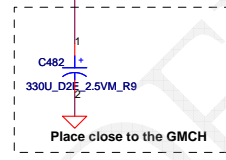
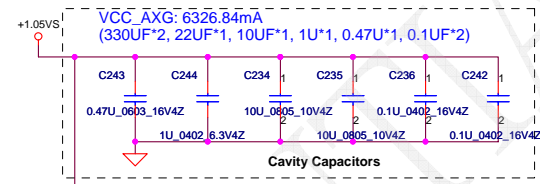
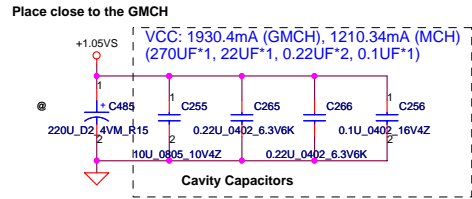
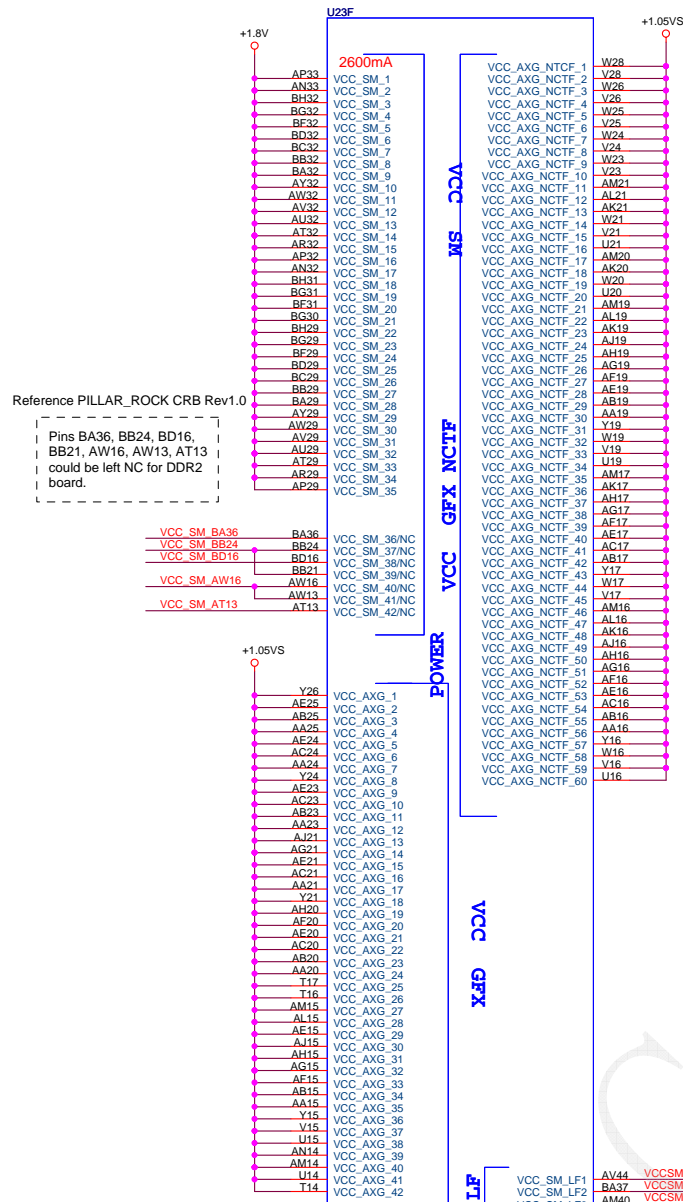
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| Size | B | Document Number | 401636 | Rev | D |
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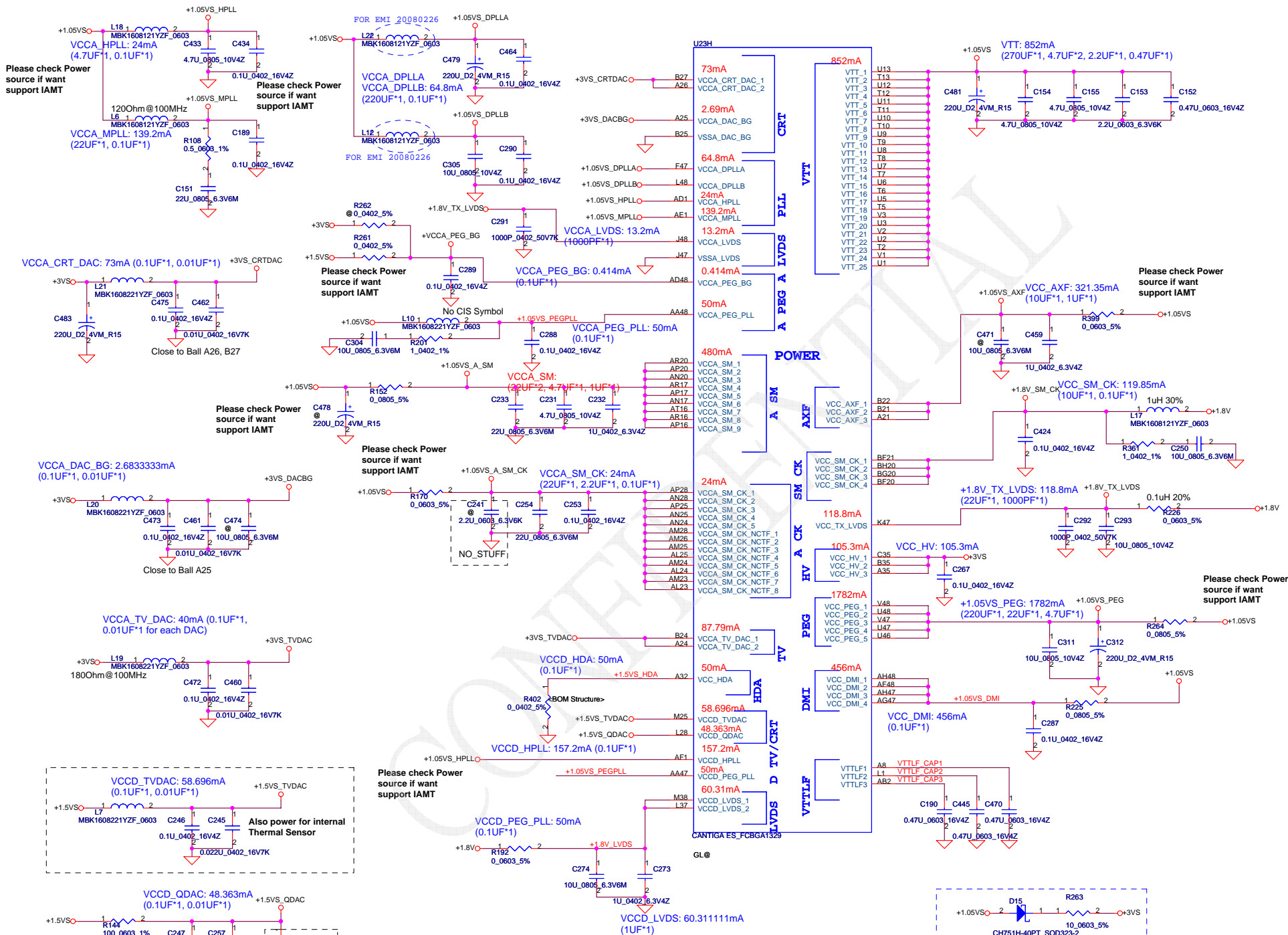
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|---|------------|--------------------|------------|--------------------------|---------------------------|
| Security Classification | | Compal Secret Data | | Compal Electronics, Inc. | |
| Issued Date | 2009/01/21 | Deciphered Date | 2010/01/21 | Title | |
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| | | | | Customer | 401636 |
| | | | | Date: | Monday, February 09, 2009 |
| | | | | Sheet | 10 of 45 |



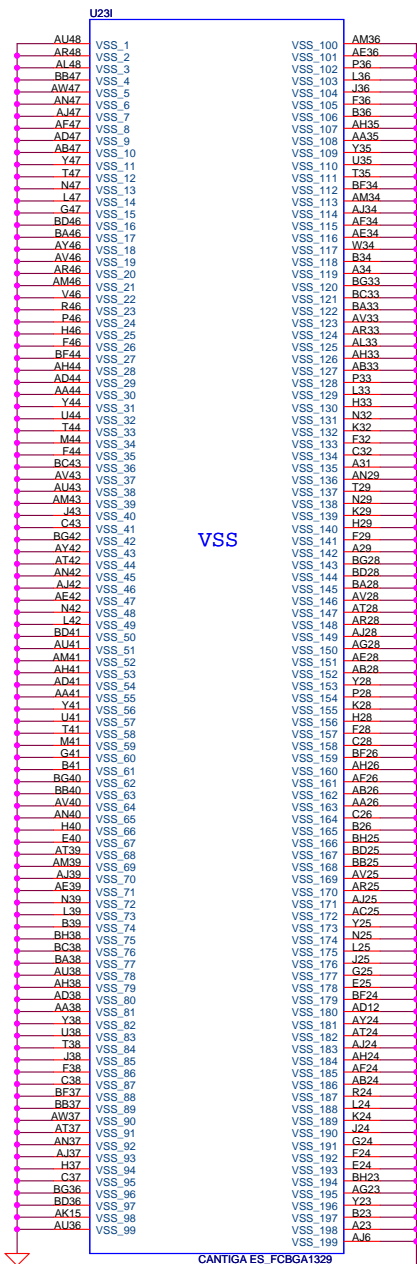
CANTIGA ES_FCBGA1329
 GL@

CANTIGA ES_FCBGA1329
 GL@

| | | | | | |
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| Security Classification | Compal Secret Data | | Title | Compal Electronics, Inc. | |
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| Rev | D | Document Number | 401636 | Date | Monday, February 09, 2009 |
| Sheet | 11 | of | 45 | | |



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| Document Number | 401636 | Customer | | Rev | D |
| Date | Monday, February 09, 2009 | Sheet | 12 | of | 45 |

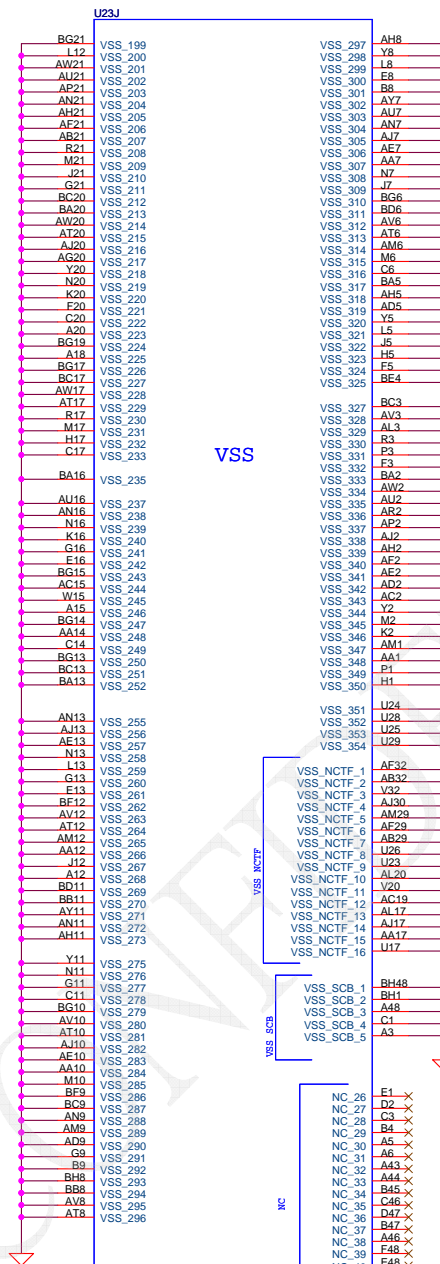


U23I

VSS

CANTIGA ES, FCBG1329

GL®

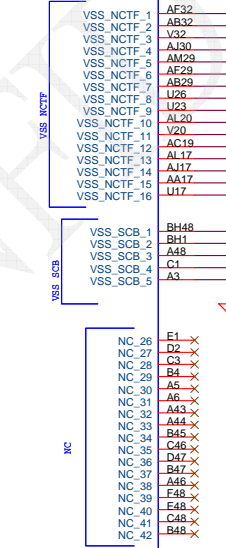


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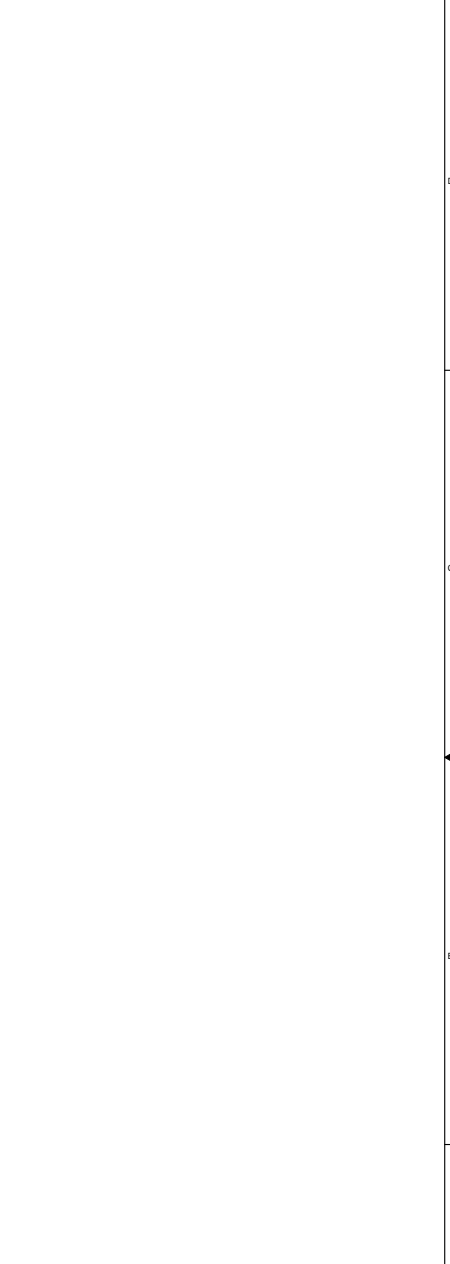
CANTIGA ES, FCBG1329

GL®



VSS

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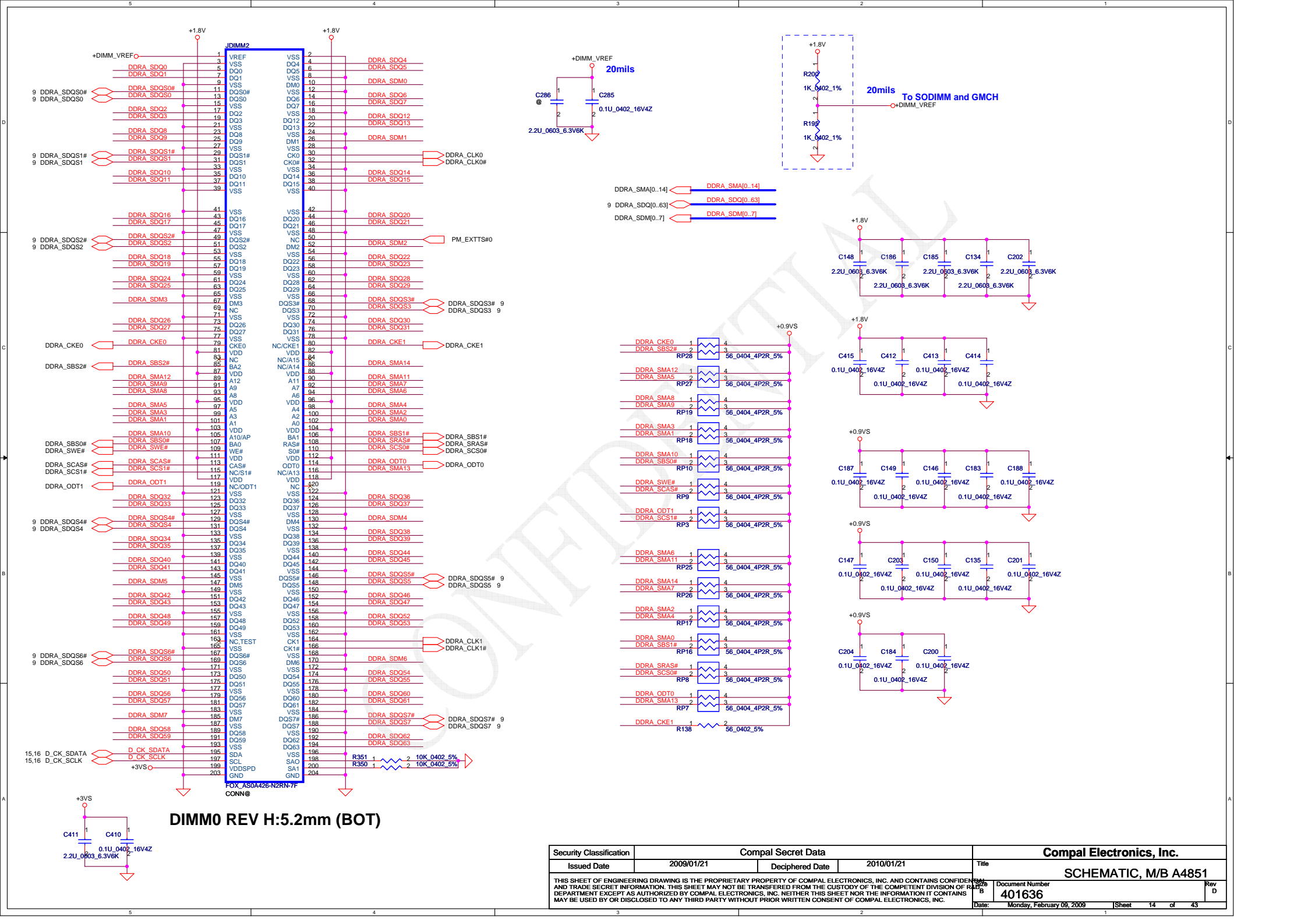


U23K

CANTIGA ES, FCBG1329

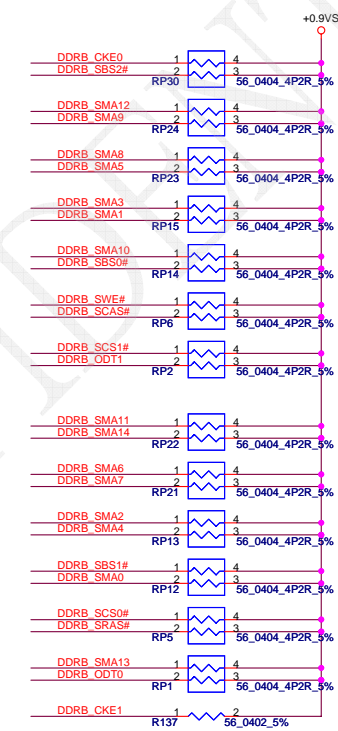
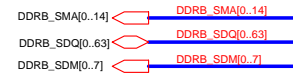
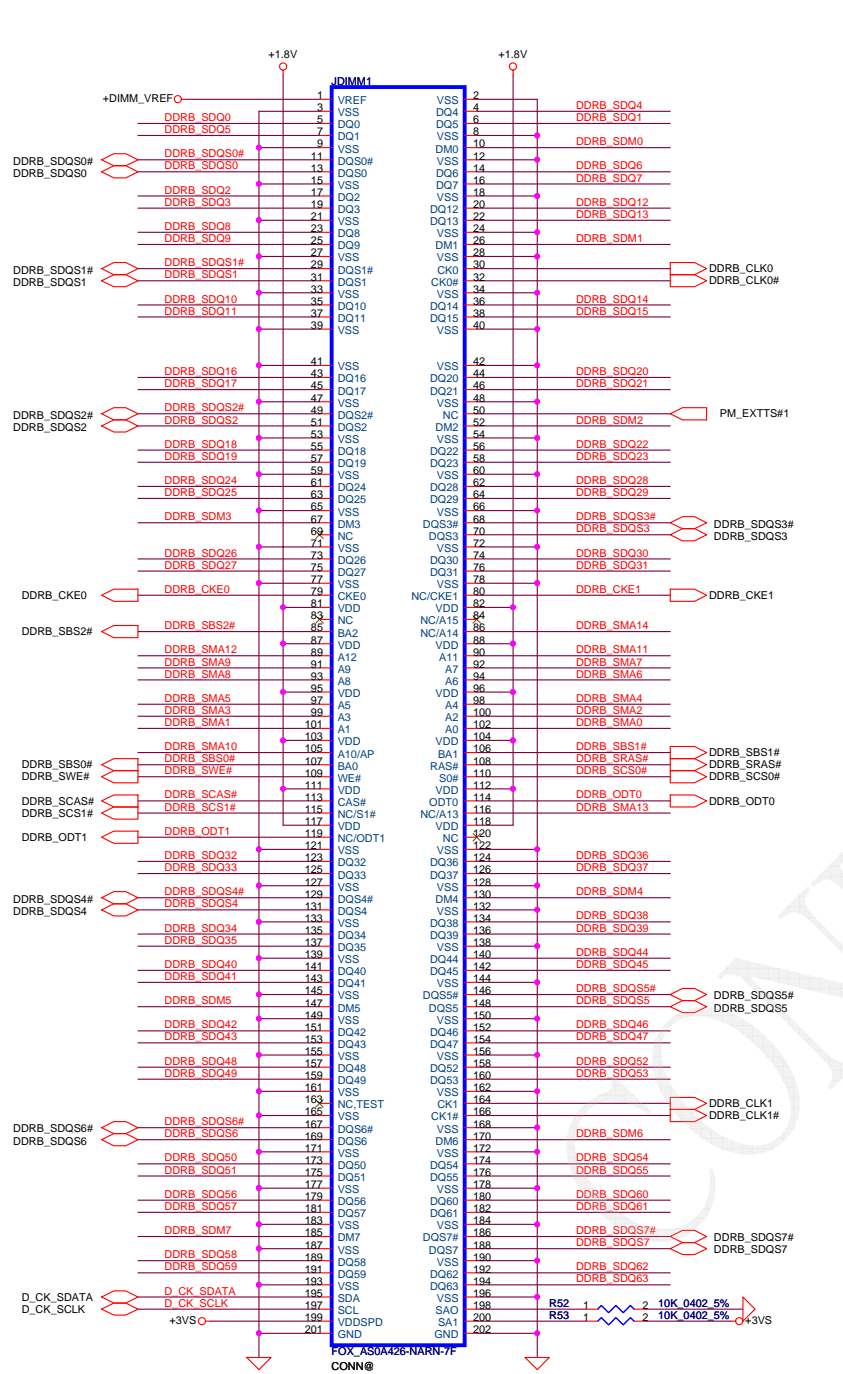
GL®

| Compal Electronics, Inc. | | | |
|--------------------------|---------------------------|-------|---------------------|
| Title | | | SCHMATIC, M/B A4851 |
| Document Number | 401636 | Rev | D |
| Date: | Monday, February 09, 2009 | Sheet | 13 of 45 |



DIMM0 REV H:5.2mm (BOT)

| | | | | | |
|---|------------|--------------------|------------|--------------------------|---------------------------|
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| Document Number | 401636 | Rev | D | Date: | Monday, February 09, 2009 |
| | | | | Sheet | 14 of 43 |



DIMM1 REV H:9.2mm (BOT)

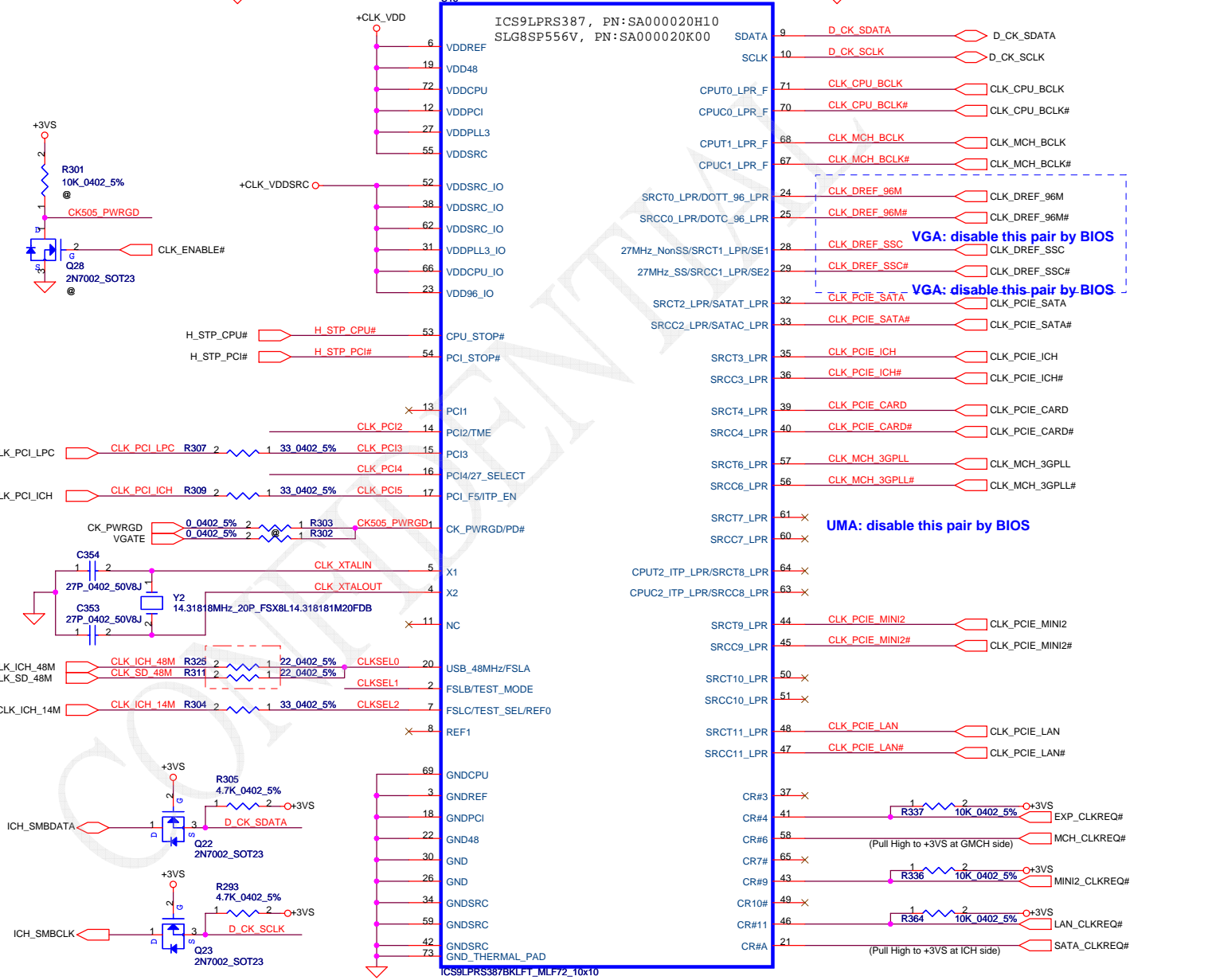
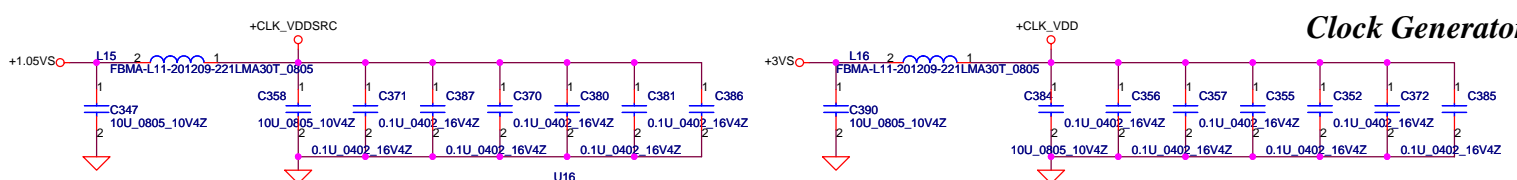
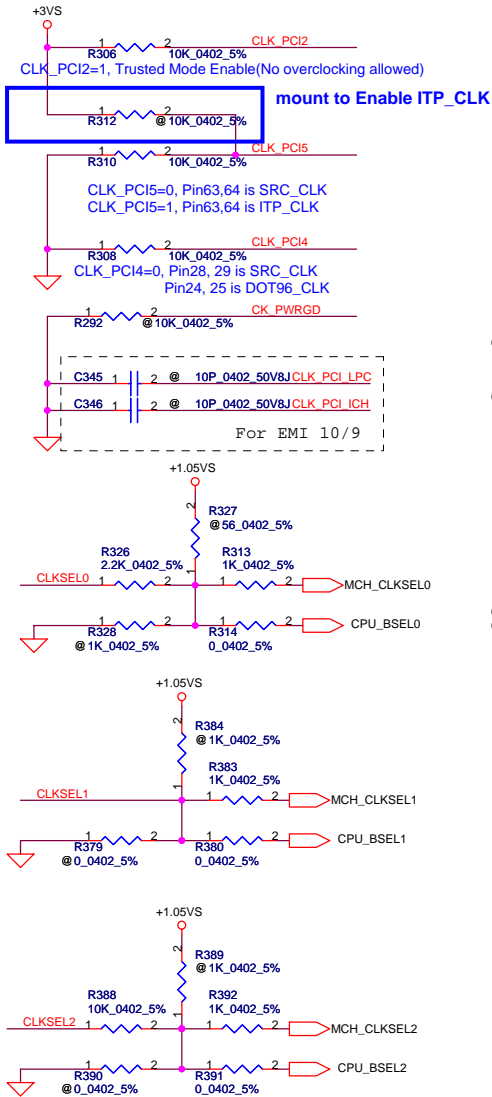
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|---|------------|--------------------|------------|---------------------------------|----------------|
| Security Classification | | Compal Secret Data | | Title | |
| Issued Date | 2009/01/21 | Deciphered Date | 2010/01/21 | Compal Electronics, Inc. | |
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| | | | | 401636 | |
| | | | | Date: Monday, February 09, 2009 | Sheet 15 of 45 |

| FSLC | FSLB | FSLA | CPU | SRC | PCI |
|---------|---------|---------|-----|-----|------|
| CLKSEL2 | CLKSEL1 | CLKSEL0 | MHz | MHz | MHz |
| 0 | 0 | 0 | 266 | 100 | 33.3 |
| 0 | 1 | 0 | 200 | 100 | 33.3 |
| 0 | 1 | 1 | 166 | 100 | 33.3 |

Table : ICS9LPRS387

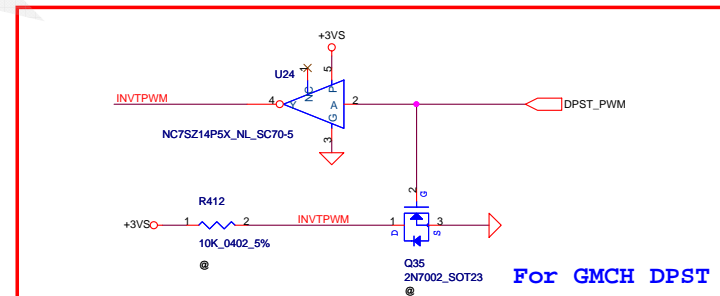
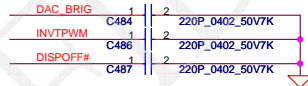
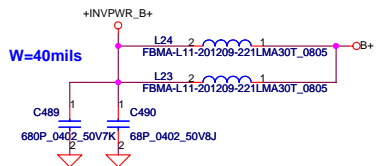
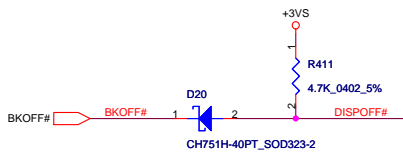
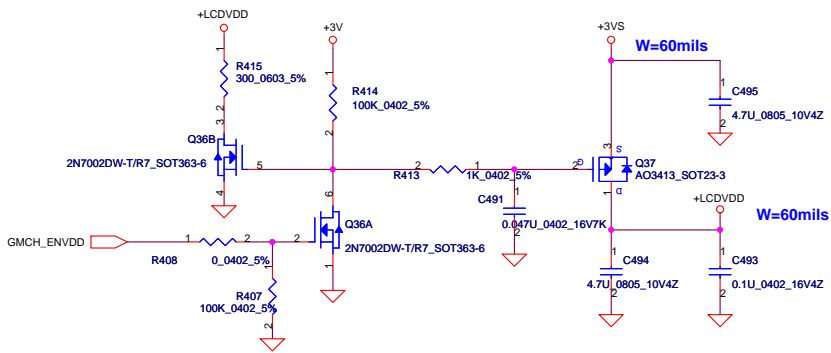
| CLK_REQ# | Control | Free-Run |
|--------------------|---------|----------|
| CR#_10(WLAN) | PCIEX10 | PCIEX0 |
| CR#_6(MCH) | PCIEX6 | PCIEX1 |
| CR#_4(NEW CARD) | PCIEX4 | |
| CR#_9(MINI CARDII) | PCIEX9 | |

SRC7(VGA_CLK): Discrete VGA[Enable] UMA[Disable]

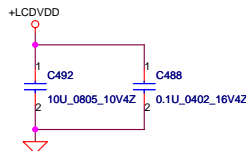
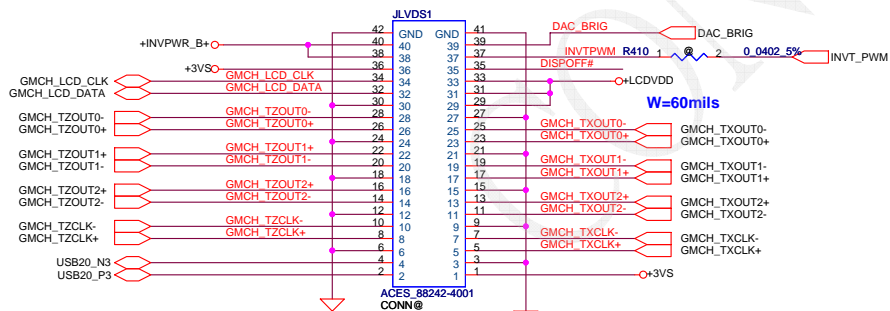


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| | | | | Customer | 401636 |
| | | | | Date | Monday, February 09, 2009 |
| | | | | Sheet | 16 of 45 |

LCD POWER CIRCUIT

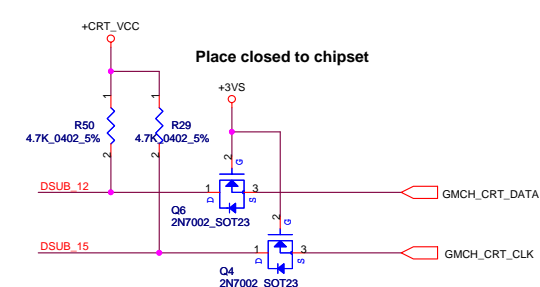
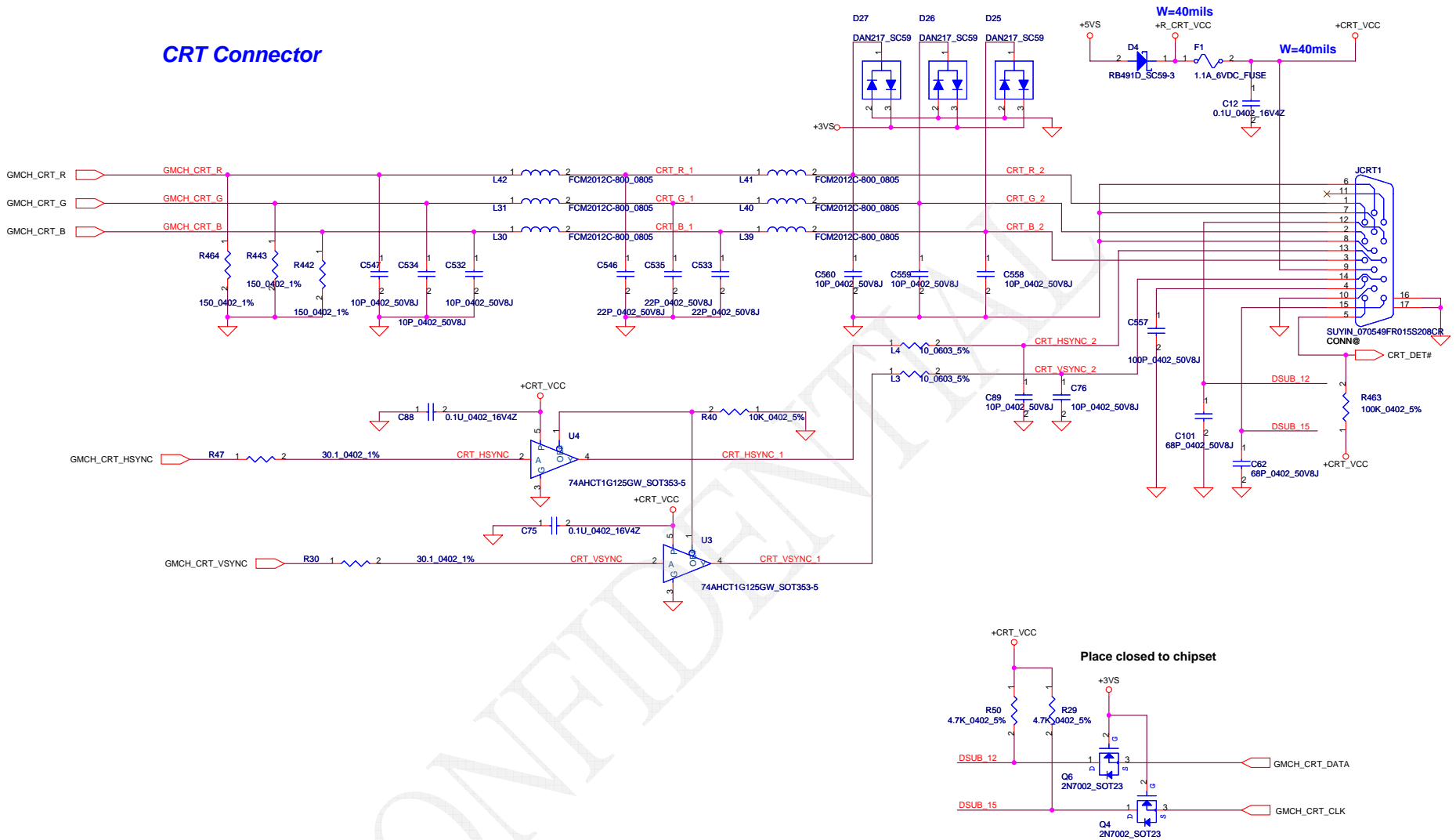


LCD/PANEL BD. Conn.

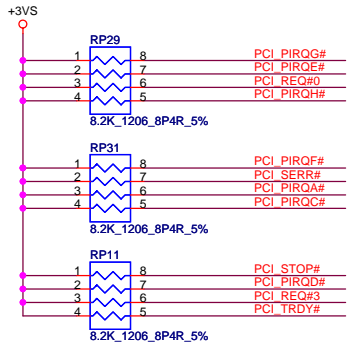
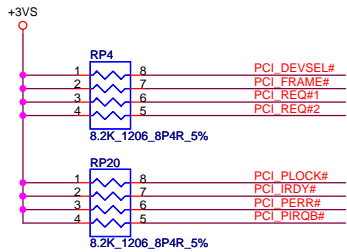


| | | | | | |
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| Customer | 401636 | Rev | D | Date: | Monday, February 09, 2009 |
| Sheet | 17 | of | 45 | | |

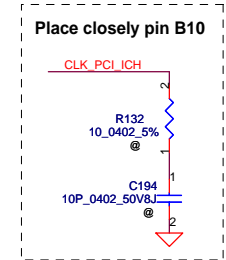
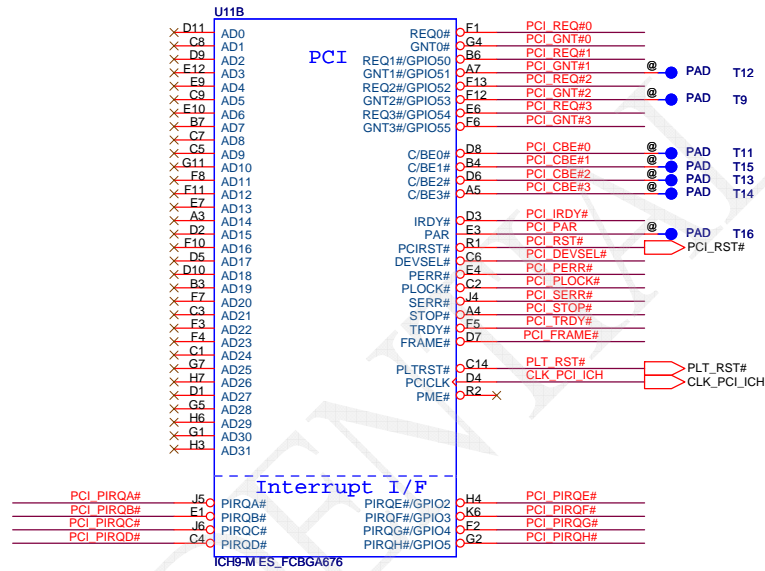
CRT Connector



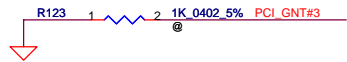
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| Date: Monday, February 09, 2009 | | | | Sheet 18 | of 45 |



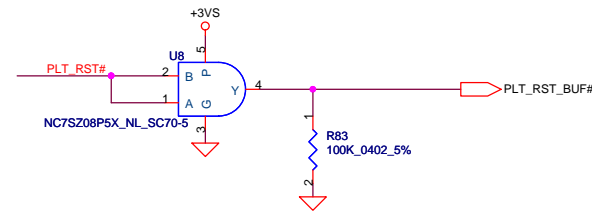
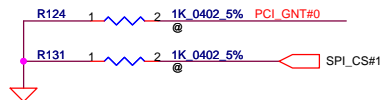
DMI for ESI-compatible operation
PCI_GNT#1 Low= DMI for ESI-compatible operation
 High= Default* (Internal pull-up)

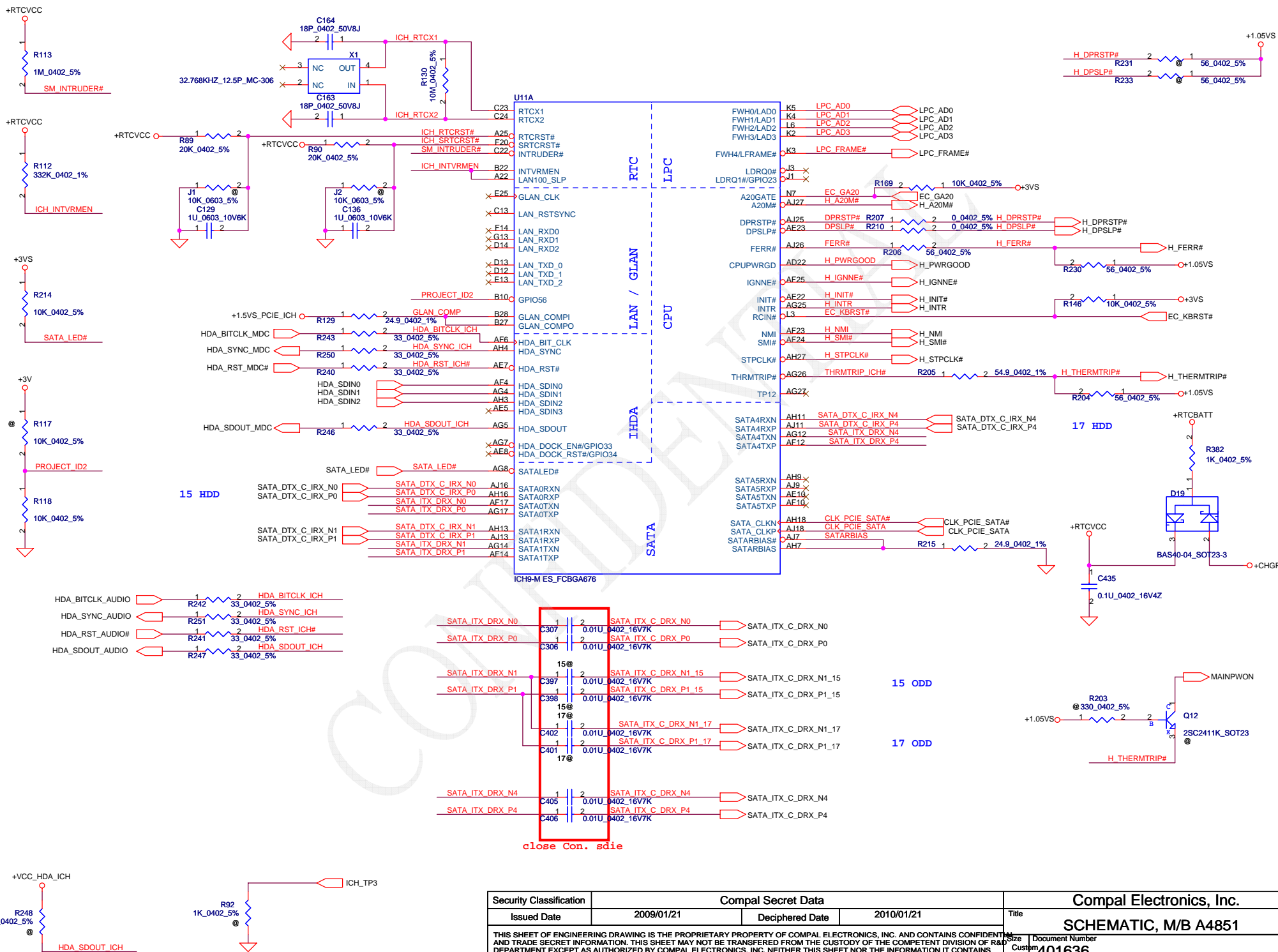


A16 Swap Override Strap
PCI_GNT#3 Low= A16 swap override Enable
 High= Default*

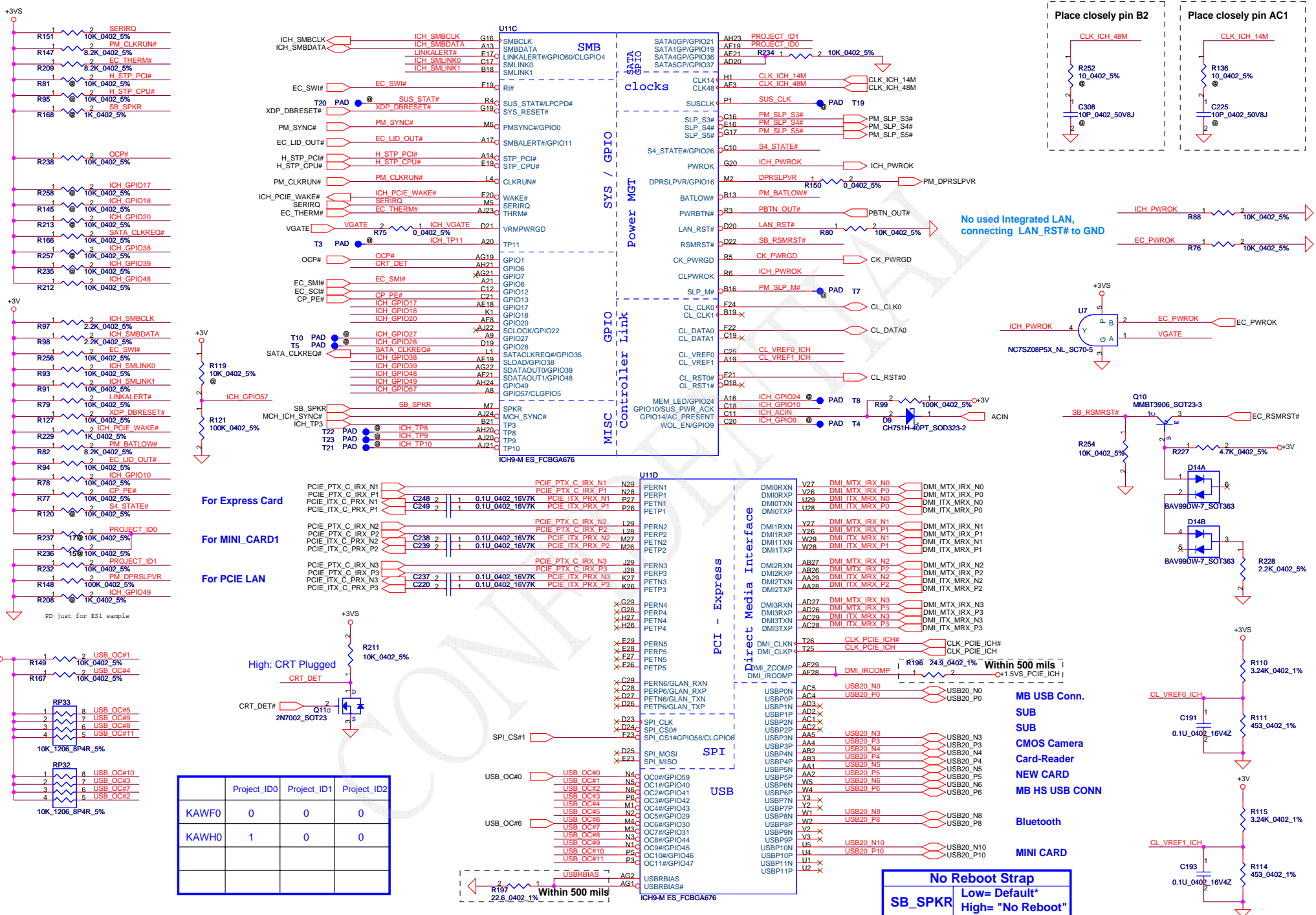


| Boot BIOS Strap | | |
|-----------------|----------|--------------------|
| PCI_GNT#0 | SPI_CS#1 | Boot BIOS Location |
| 0 | 1 | SPI |
| 1 | 0 | PCI |
| 1 | 1 | LPC* |





| | | | | | |
|---|------------|--------------------|------------|--------------------------|---------------------------|
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| | | | | Customer | 401636 |
| | | | | Date: | Monday, February 09, 2009 |
| | | | | Sheet | 20 of 45 |



| | Project_ID0 | Project_ID1 | Project_ID2 |
|-------|-------------|-------------|-------------|
| KAWF0 | 0 | 0 | 0 |
| KAWH0 | 1 | 0 | 0 |
| | | | |
| | | | |

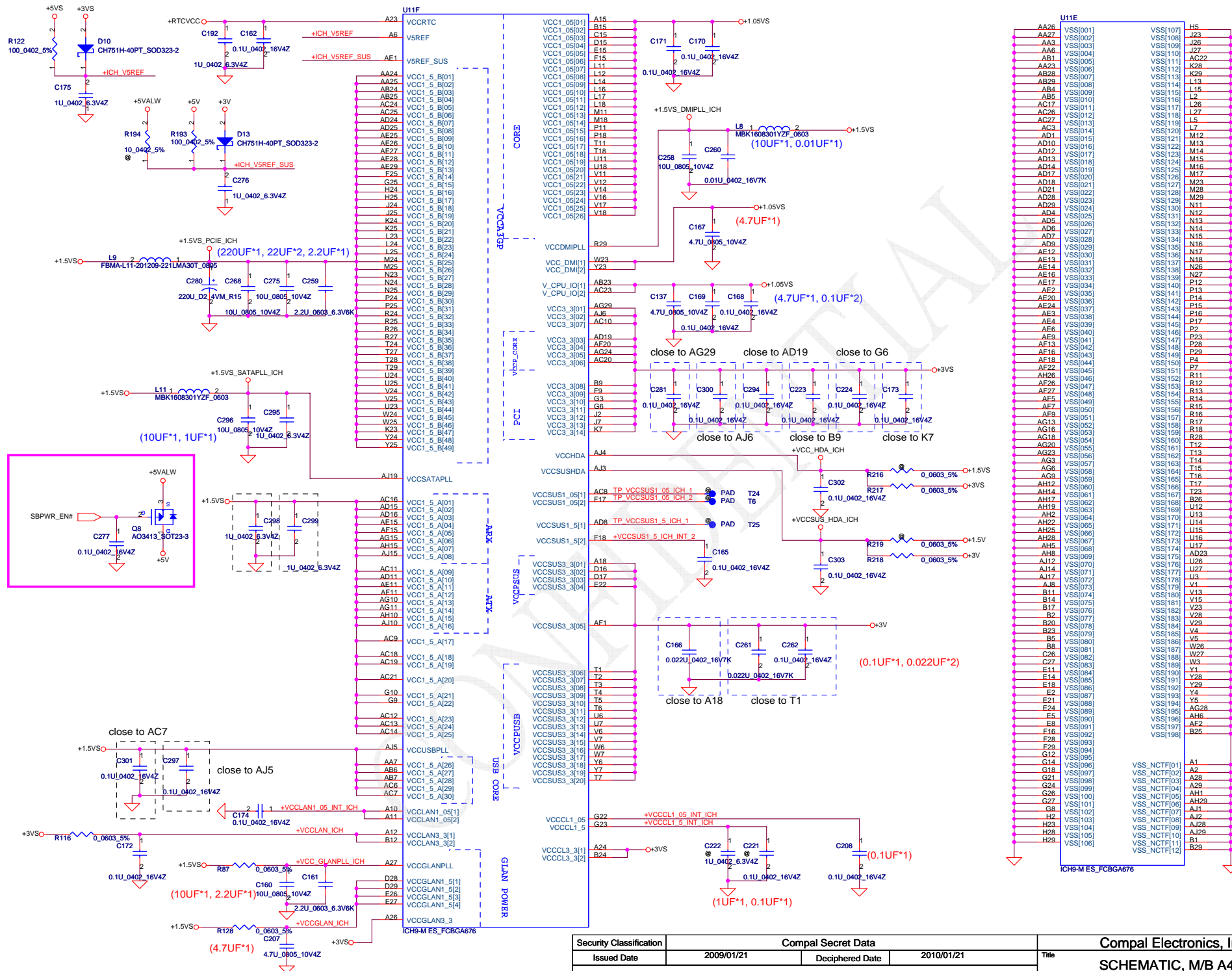
Internal TPM Strap
 Low= Disable*
 High= iTPM enable by MCH strap

DMI Termination Voltage
 Low= Desktop used
 High= Mobile* (Internal pull-up)

No Reboot Strap
 Low= "Default"
 High= "No Reboot!"

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| Document Number 401636 | | Rev D |
| Date: Monday, February 09, 2009 Sheet 21 of 45 | | |

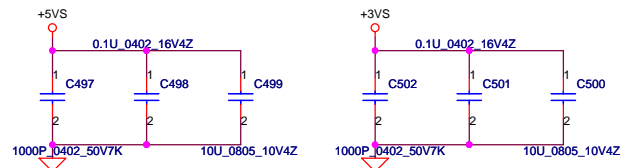
Compal Electronics, Inc.
SCHEMATIC, M/B A4851



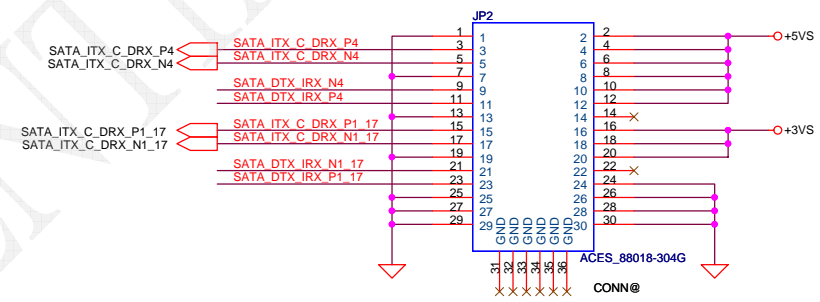
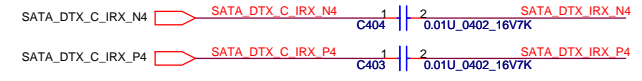
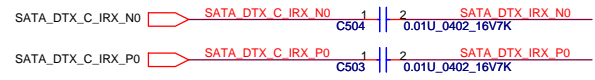
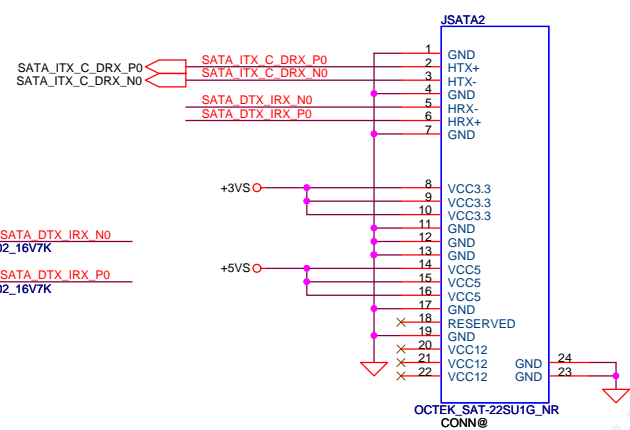
| U11F | VSS | H5 |
|--------------|----------|----------|
| AA26 | VSS[001] | VSS[107] |
| AA27 | VSS[002] | VSS[108] |
| AA3 | VSS[003] | VSS[109] |
| AA6 | VSS[004] | VSS[110] |
| AB1 | VSS[005] | VSS[111] |
| AA23 | VSS[006] | VSS[112] |
| AB28 | VSS[007] | VSS[113] |
| AB29 | VSS[008] | VSS[114] |
| AB4 | VSS[009] | VSS[115] |
| AB5 | VSS[010] | VSS[116] |
| AC17 | VSS[011] | VSS[117] |
| AC26 | VSS[012] | VSS[118] |
| AC27 | VSS[013] | VSS[119] |
| AC3 | VSS[014] | VSS[120] |
| AD1 | VSS[015] | VSS[121] |
| AD10 | VSS[016] | VSS[122] |
| AD12 | VSS[017] | VSS[123] |
| AD13 | VSS[018] | VSS[124] |
| AD14 | VSS[019] | VSS[125] |
| AD17 | VSS[020] | VSS[126] |
| AD18 | VSS[021] | VSS[127] |
| AD21 | VSS[022] | VSS[128] |
| AD28 | VSS[023] | VSS[129] |
| AD29 | VSS[024] | VSS[130] |
| AD4 | VSS[025] | VSS[131] |
| AD5 | VSS[026] | VSS[132] |
| AD6 | VSS[027] | VSS[133] |
| AD7 | VSS[028] | VSS[134] |
| AD9 | VSS[029] | VSS[135] |
| AE12 | VSS[030] | VSS[136] |
| AE13 | VSS[031] | VSS[137] |
| AE14 | VSS[032] | VSS[138] |
| AE16 | VSS[033] | VSS[139] |
| AE17 | VSS[034] | VSS[140] |
| AE2 | VSS[035] | VSS[141] |
| AE20 | VSS[036] | VSS[142] |
| AE24 | VSS[037] | VSS[143] |
| AE3 | VSS[038] | VSS[144] |
| AE4 | VSS[039] | VSS[145] |
| AE6 | VSS[040] | VSS[146] |
| AE9 | VSS[041] | VSS[147] |
| AF13 | VSS[042] | VSS[148] |
| AF18 | VSS[043] | VSS[149] |
| AF22 | VSS[044] | VSS[150] |
| AF22 | VSS[045] | VSS[151] |
| AH26 | VSS[046] | VSS[152] |
| AF28 | VSS[047] | VSS[153] |
| AF27 | VSS[048] | VSS[154] |
| AF5 | VSS[049] | VSS[155] |
| AF7 | VSS[050] | VSS[156] |
| AG13 | VSS[051] | VSS[157] |
| AG16 | VSS[052] | VSS[158] |
| AG18 | VSS[053] | VSS[159] |
| AG20 | VSS[054] | VSS[160] |
| AG23 | VSS[055] | VSS[161] |
| AG3 | VSS[056] | VSS[162] |
| AG6 | VSS[057] | VSS[163] |
| AG9 | VSS[058] | VSS[164] |
| AH12 | VSS[059] | VSS[165] |
| AH14 | VSS[060] | VSS[166] |
| AH17 | VSS[061] | VSS[167] |
| AH2 | VSS[062] | VSS[168] |
| AH2 | VSS[063] | VSS[169] |
| AH2 | VSS[064] | VSS[170] |
| AH22 | VSS[065] | VSS[171] |
| AH25 | VSS[066] | VSS[172] |
| AH28 | VSS[067] | VSS[173] |
| AH5 | VSS[068] | VSS[174] |
| AH8 | VSS[069] | VSS[175] |
| AI12 | VSS[070] | VSS[176] |
| AI14 | VSS[071] | VSS[177] |
| AI17 | VSS[072] | VSS[178] |
| AI8 | VSS[073] | VSS[179] |
| B11 | VSS[074] | VSS[180] |
| B17 | VSS[075] | VSS[181] |
| B14 | VSS[076] | VSS[182] |
| B2 | VSS[077] | VSS[183] |
| B20 | VSS[078] | VSS[184] |
| B2 | VSS[079] | VSS[185] |
| B8 | VSS[080] | VSS[186] |
| B8 | VSS[081] | VSS[187] |
| C26 | VSS[082] | VSS[188] |
| C27 | VSS[083] | VSS[189] |
| E1 | VSS[084] | VSS[190] |
| E14 | VSS[085] | VSS[191] |
| E18 | VSS[086] | VSS[192] |
| E2 | VSS[087] | VSS[193] |
| E24 | VSS[088] | VSS[194] |
| E5 | VSS[089] | VSS[195] |
| E8 | VSS[090] | VSS[196] |
| F16 | VSS[091] | VSS[197] |
| F28 | VSS[092] | VSS[198] |
| F29 | VSS[093] | VSS[199] |
| G12 | VSS[094] | VSS[200] |
| G14 | VSS[095] | VSS[201] |
| G18 | VSS[096] | VSS[202] |
| G21 | VSS[097] | VSS[203] |
| G21 | VSS[098] | VSS[204] |
| G26 | VSS[099] | VSS[205] |
| G27 | VSS[100] | VSS[206] |
| G8 | VSS[101] | VSS[207] |
| H2 | VSS[102] | VSS[208] |
| H23 | VSS[103] | VSS[209] |
| H28 | VSS[104] | VSS[210] |
| H28 | VSS[105] | VSS[211] |
| H29 | VSS[106] | VSS[212] |
| VSS_NCTF[01] | A1 | |
| VSS_NCTF[02] | A2 | |
| VSS_NCTF[03] | A28 | |
| VSS_NCTF[04] | AH1 | |
| VSS_NCTF[05] | AH29 | |
| VSS_NCTF[06] | AJ1 | |
| VSS_NCTF[07] | AJ2 | |
| VSS_NCTF[08] | AJ28 | |
| VSS_NCTF[09] | AJ29 | |
| VSS_NCTF[10] | B1 | |
| VSS_NCTF[11] | B29 | |
| VSS_NCTF[12] | B29 | |

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| Custom | 401636 | Sheet 22 of 45 | | |

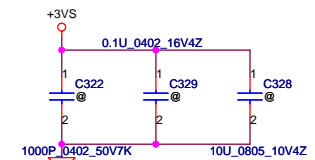
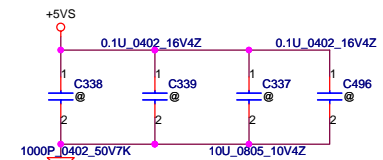
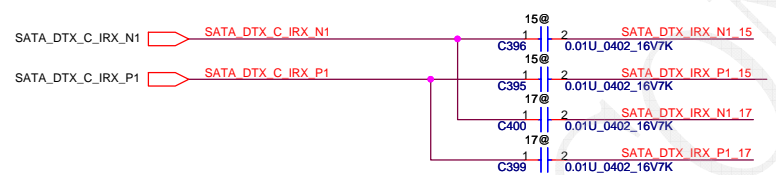
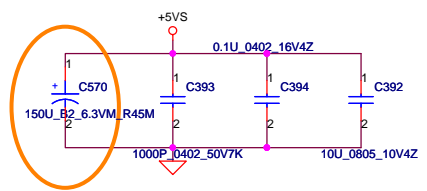
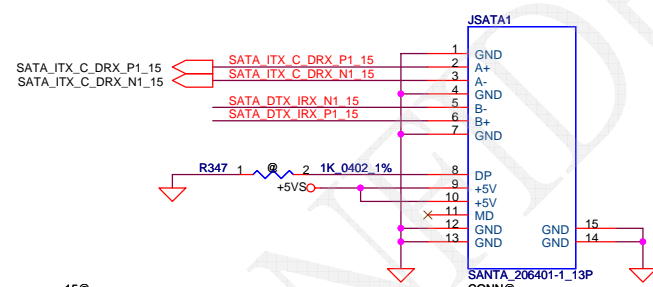
Compal Electronics, Inc.
SCHEMATIC, M/B A4851



SATA HDD Conn.

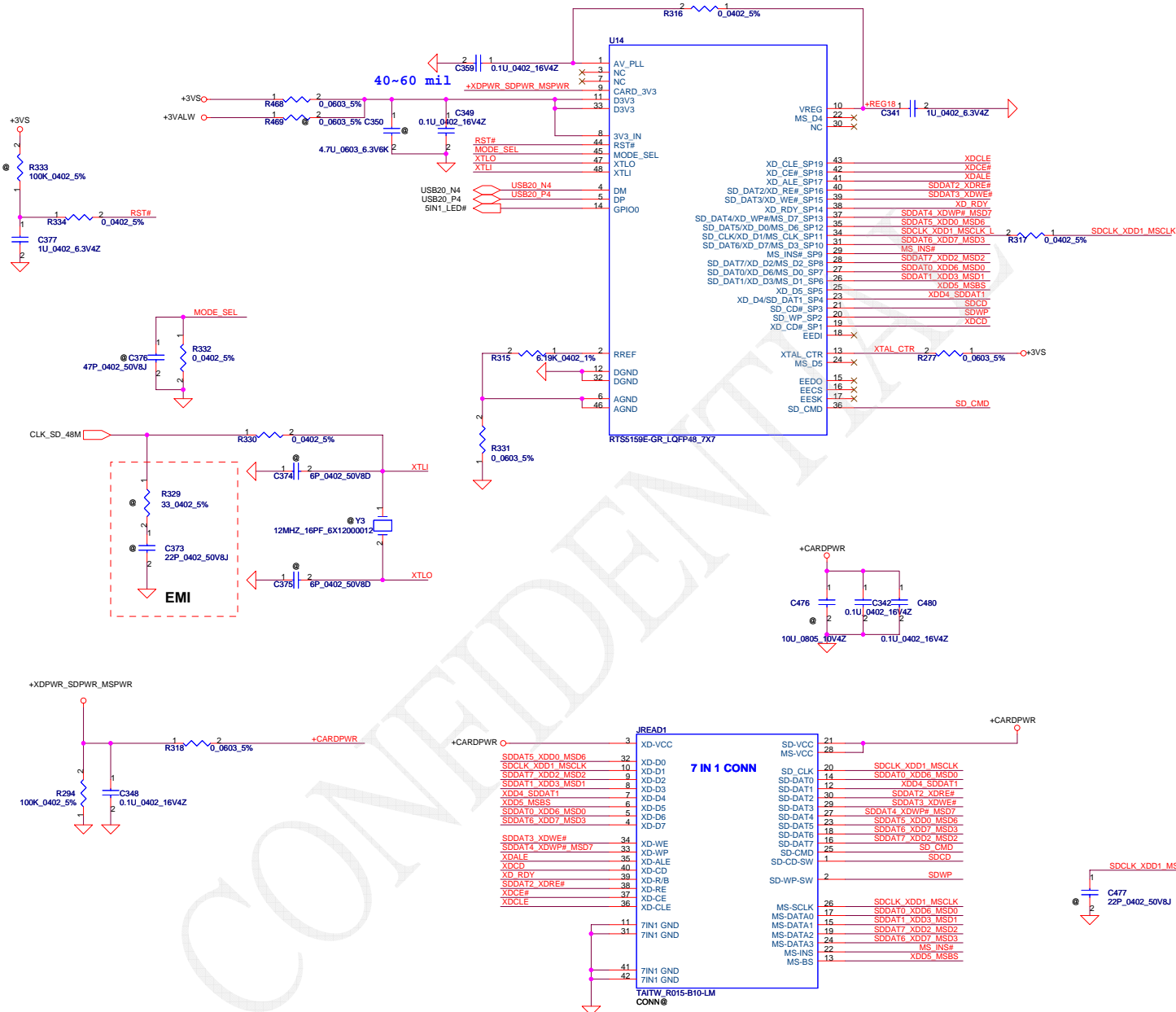


SATA ODD Conn.

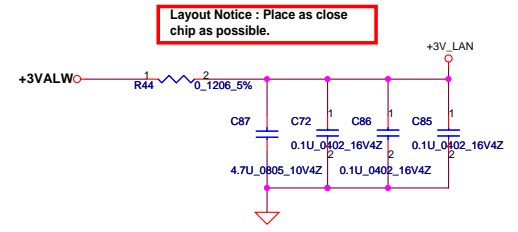
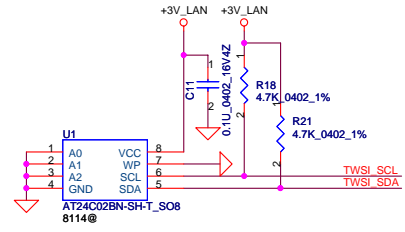
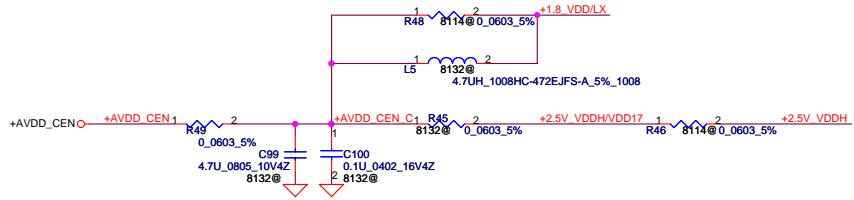


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| | | | | Customer | 401636 |
| | | | | Date: | Monday, February 09, 2009 |
| | | | | Sheet | 23 of 45 |

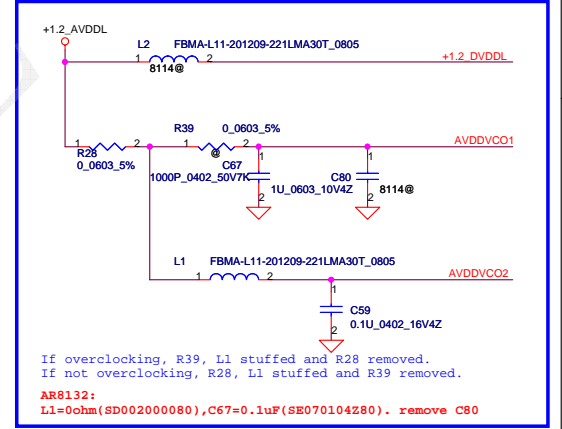
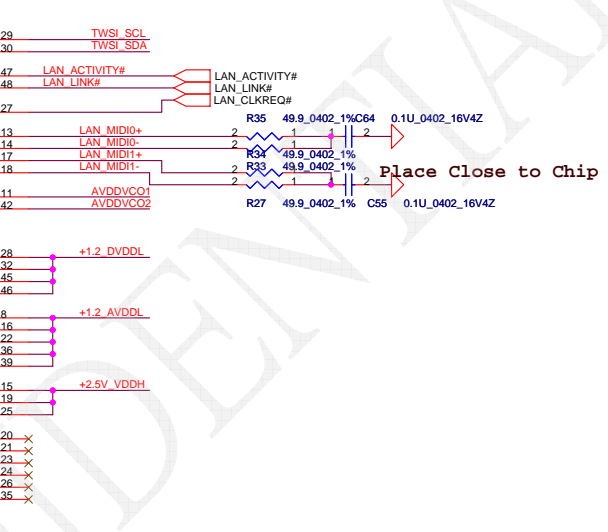
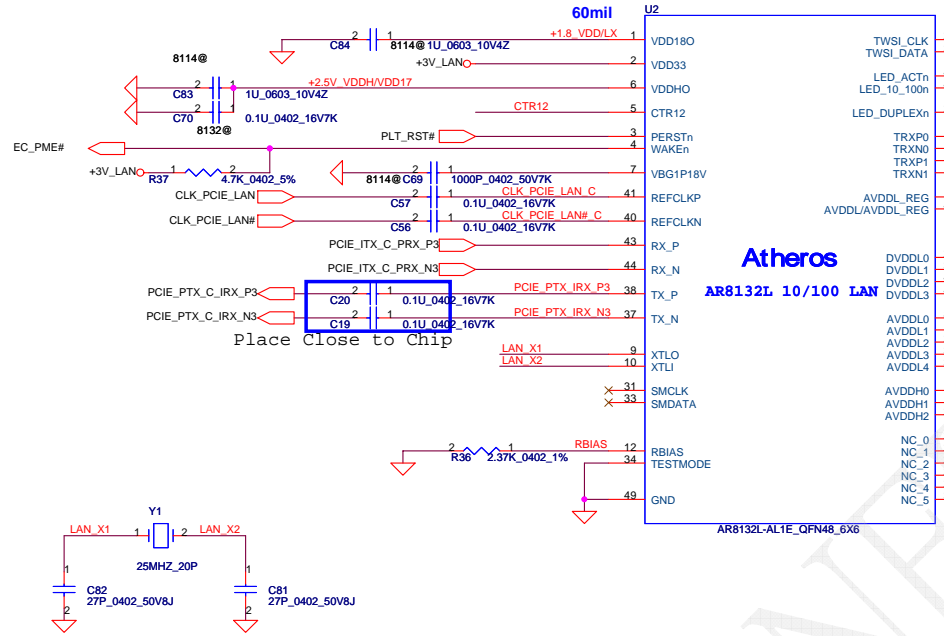
Vender suggestion



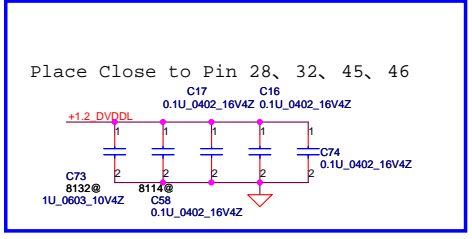
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| Issued Date | 2009/01/21 | Deciphered Date | 2010/01/21 | Compal Electronics, Inc. | |
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| | | | | Customer | D |
| | | | | Document Number | |
| | | | | 401636 | |
| Date: | Monday, February 09, 2009 | Sheet | 24 | of | 45 |



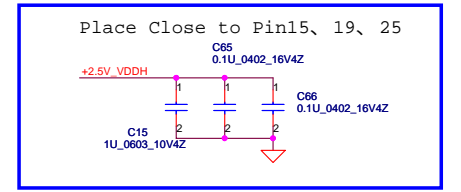
Layout Notice : Place as close chip as possible.



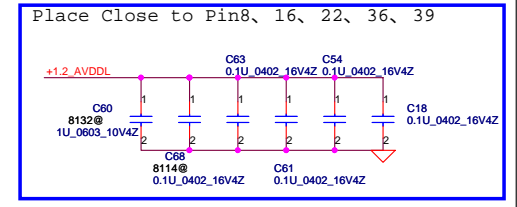
If overclocking, R39, L1 stuffed and R28 removed.
If not overclocking, R28, L1 stuffed and R39 removed.
AR8132:
L1=0ohm(SD00200080), C67=0.1uF(SE070104Z80) . remove C80



Place Close to Pin 28, 32, 45, 46

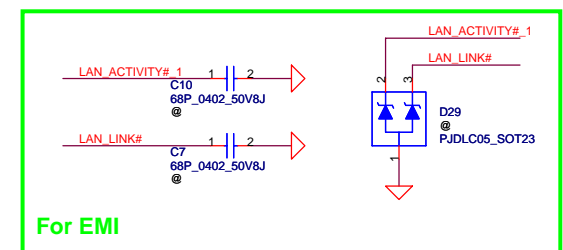
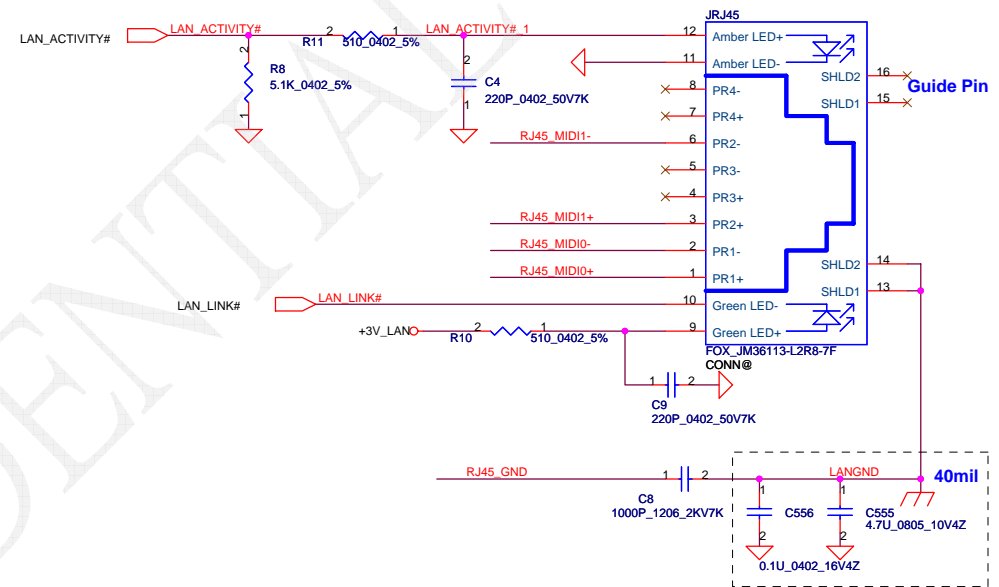
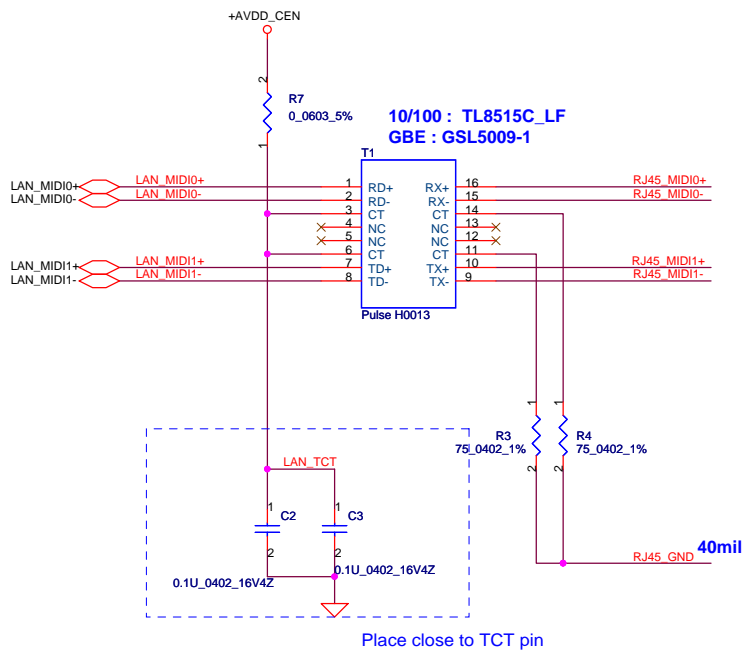


Place Close to Pin15, 19, 25



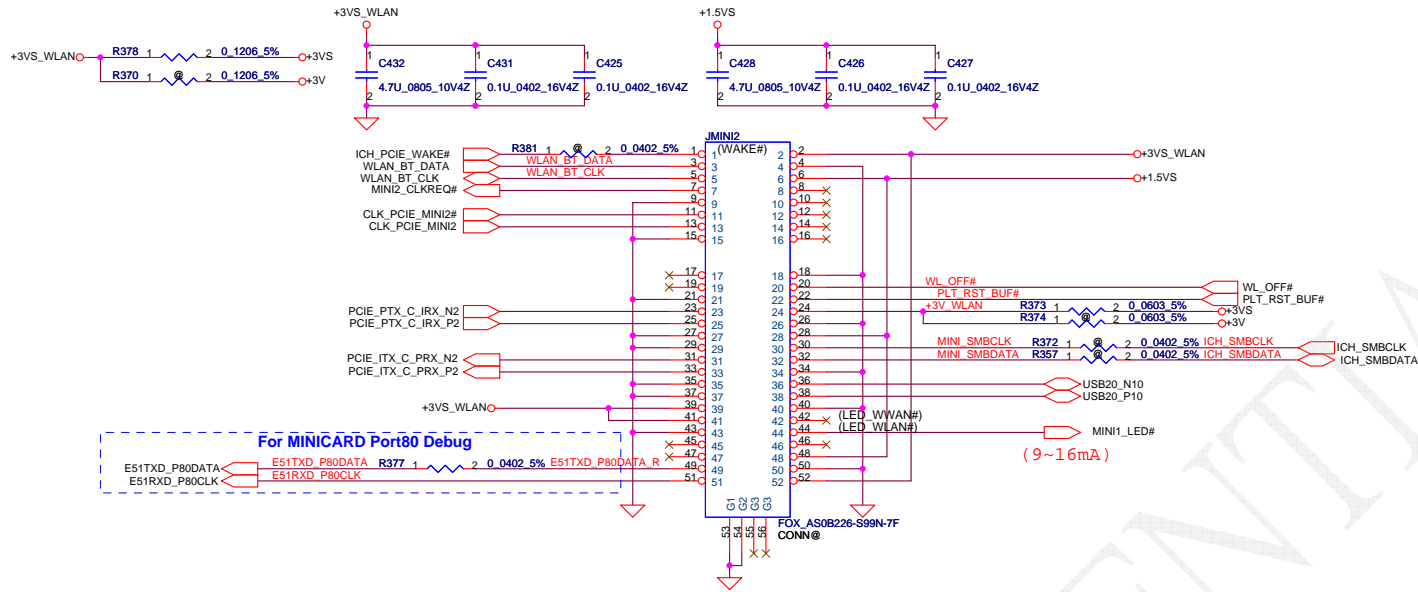
Place Close to Pin8, 16, 22, 36, 39

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|---|--------------------|-----------------|------------|----------------------|---------------------------|----------------|
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| | | | | Date: | Monday, February 09, 2009 | Sheet 25 of 45 |

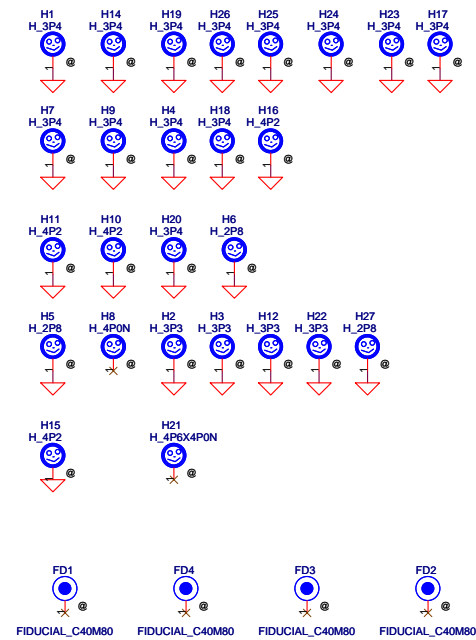


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| | | | | 401636 | |
| Date: Monday, February 09, 2009 | | | | Sheet | 26 of 45 |

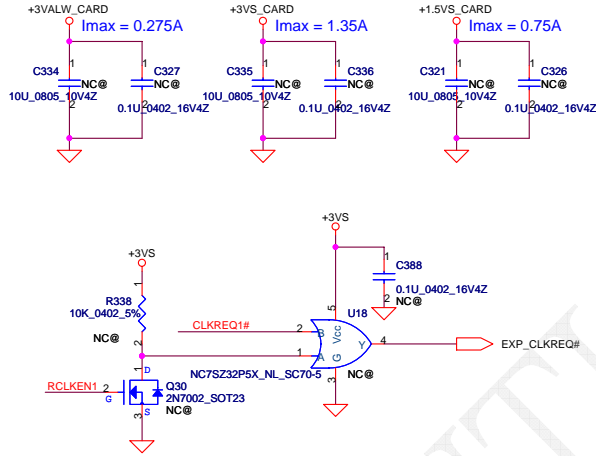
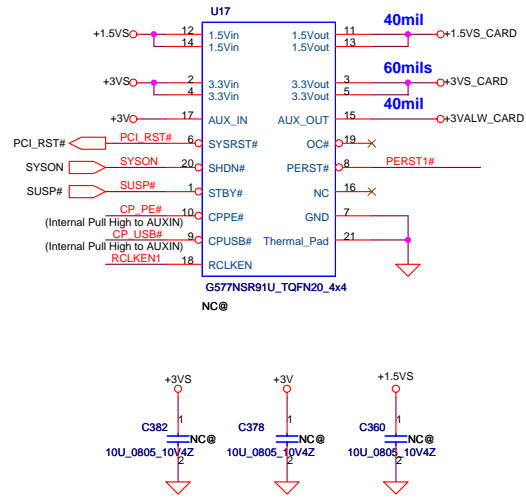
For Wireless LAN



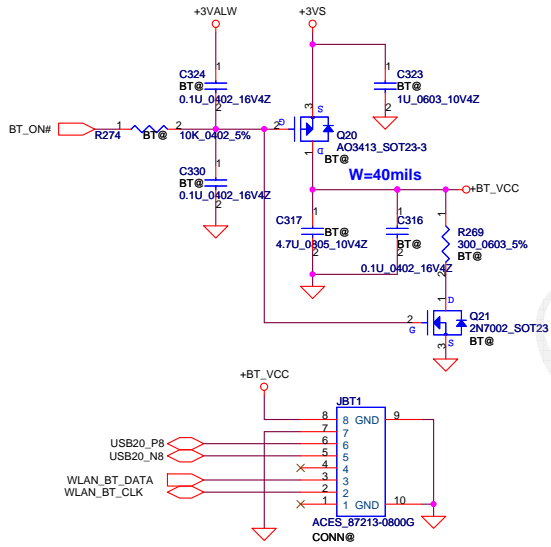
| Mini Card Power Rating | | | |
|------------------------|--------------------|--------|----------------------|
| Power | Primary Power (mA) | | Auxiliary Power (mA) |
| | Peak | Normal | Normal |
| +3VS | 1000 | 750 | |
| +3V | 330 | 250 | 250 (wake enable) |
| +1.5VS | 500 | 375 | 5 (Not wake enable) |



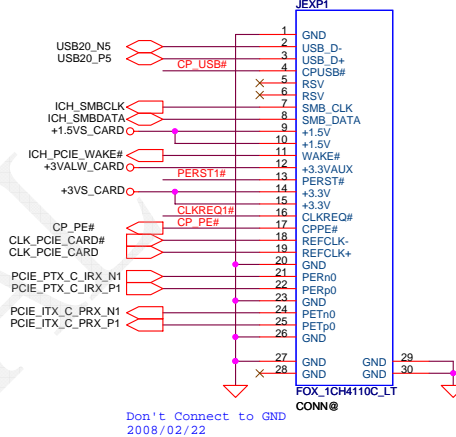
New Card Power Switch



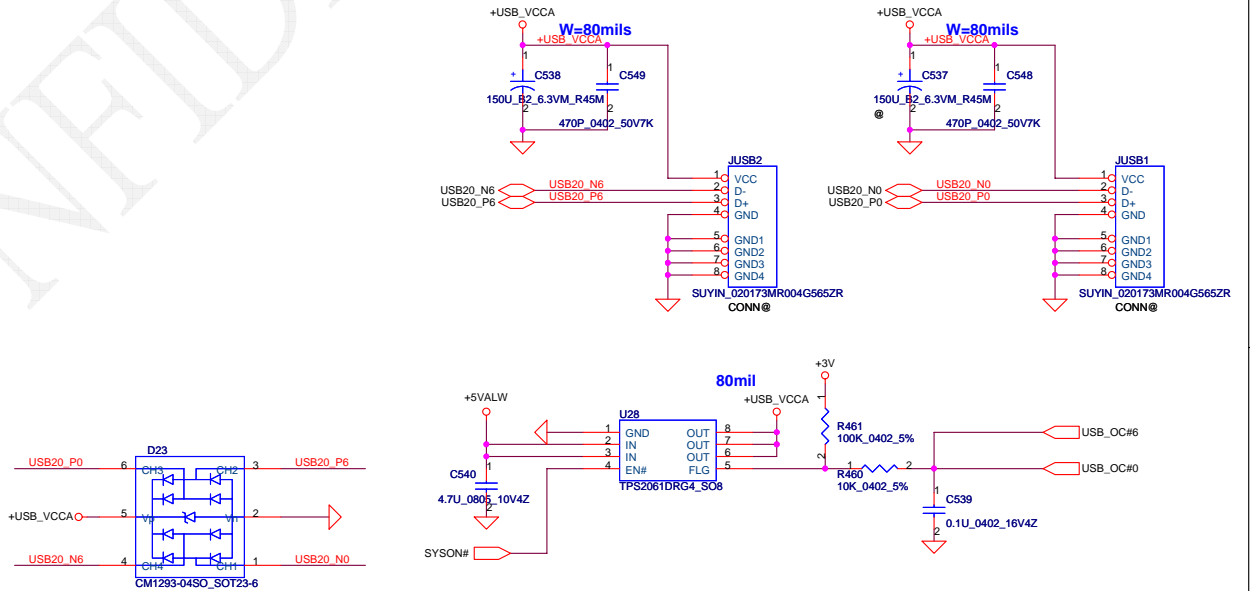
Bluetooth Conn.



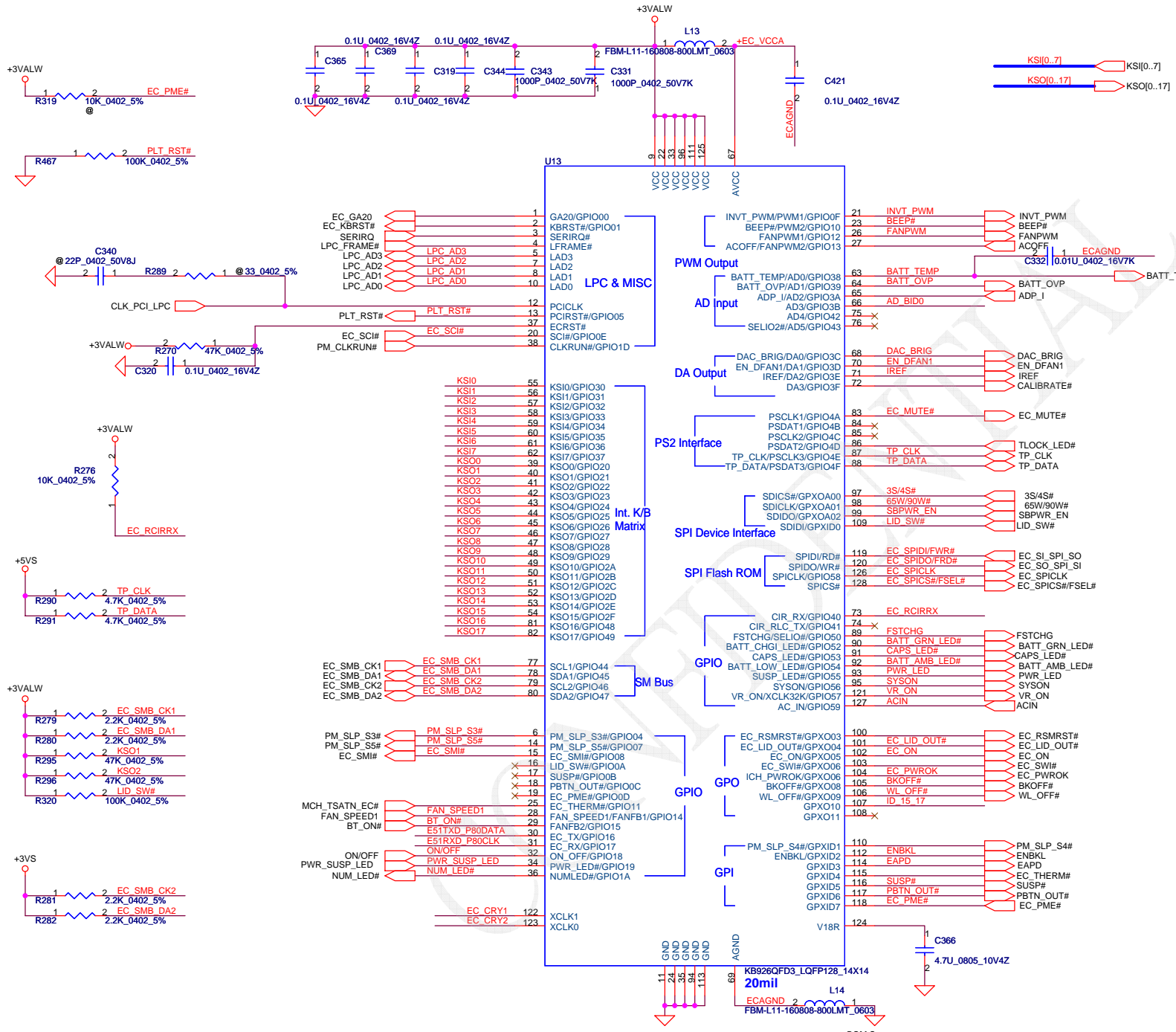
New Card Socket (Left/TOP)



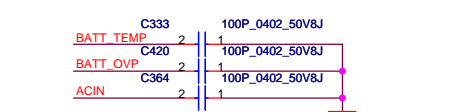
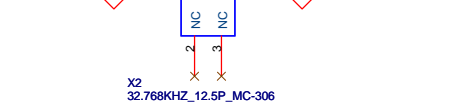
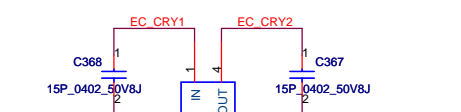
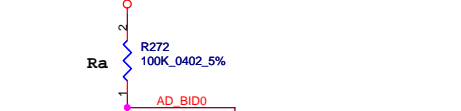
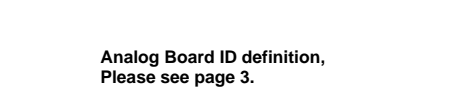
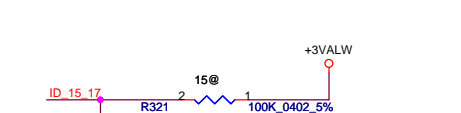
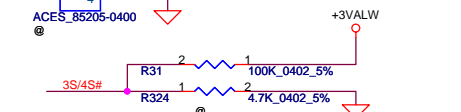
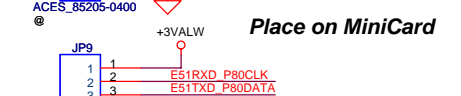
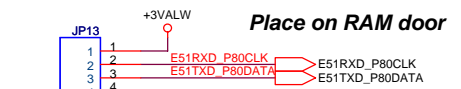
USB CONN.



| | | | | | |
|---|---------------------------|------------------------|------------|--|-----------------------|
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| | | | | 401636 | |
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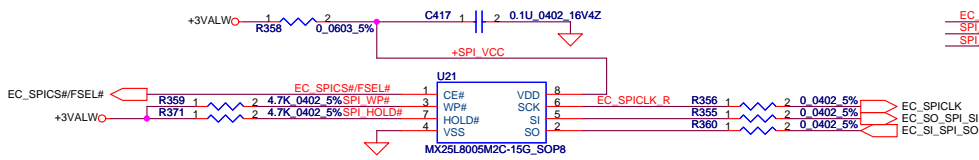
For EC Tools



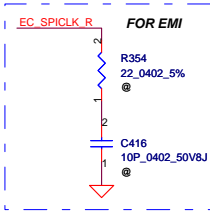
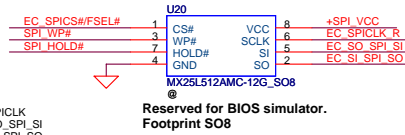
Analog Board ID definition, Please see page 3.

<BOM Structure>

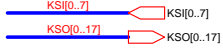
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| Date: | Monday, February 09, 2009 | Sheet | 29 | of | 45 |



ENE suggestion SPI Frequency over 66MHz
 SST: 50MHz
 MXIC: 70MHz
 ST: 40MHz

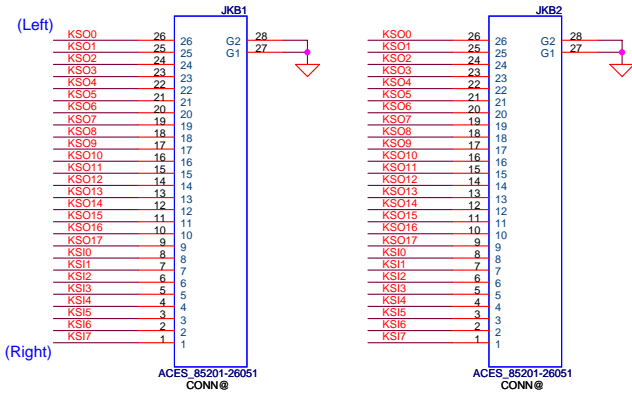


INT_KBD Conn.

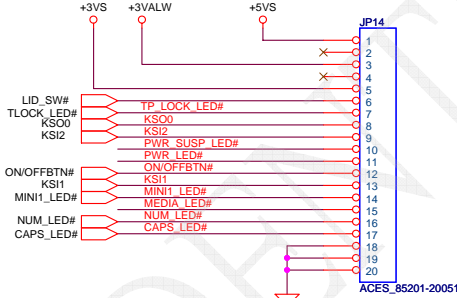


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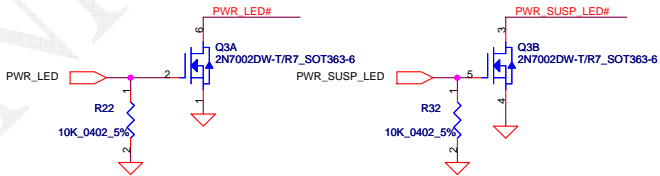
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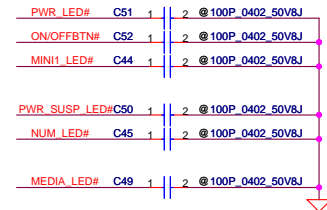
To POWER/B



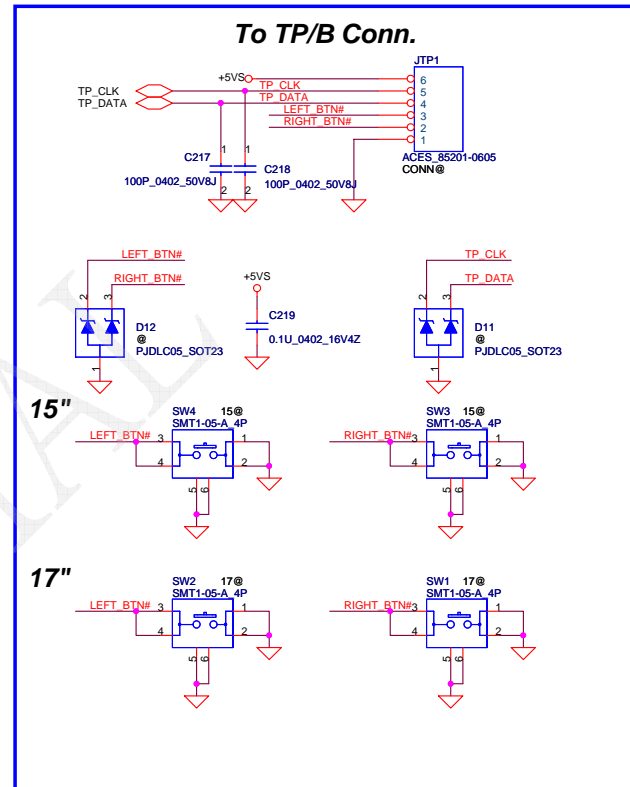
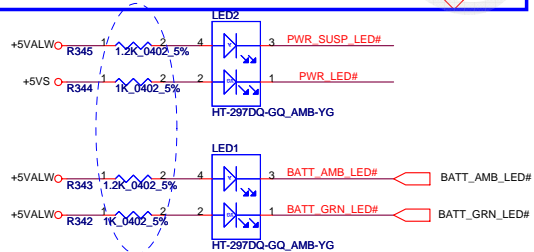
| | KSO0 |
|------|------------|
| KSI1 | WL_BTN# |
| KSI2 | TLOCK_BTN# |
| KSI3 | |
| KSI4 | |
| KSI5 | |



FOR EMI



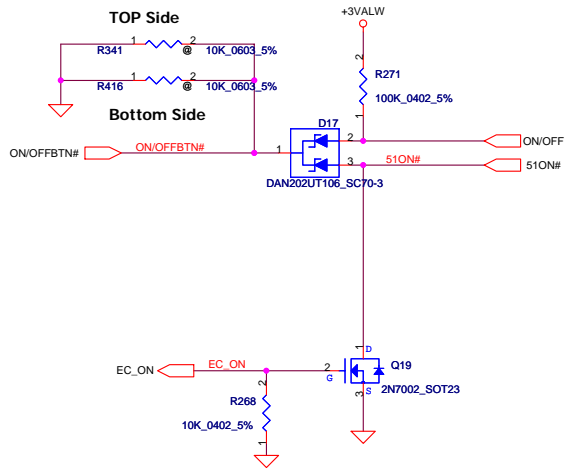
Compal Footprint



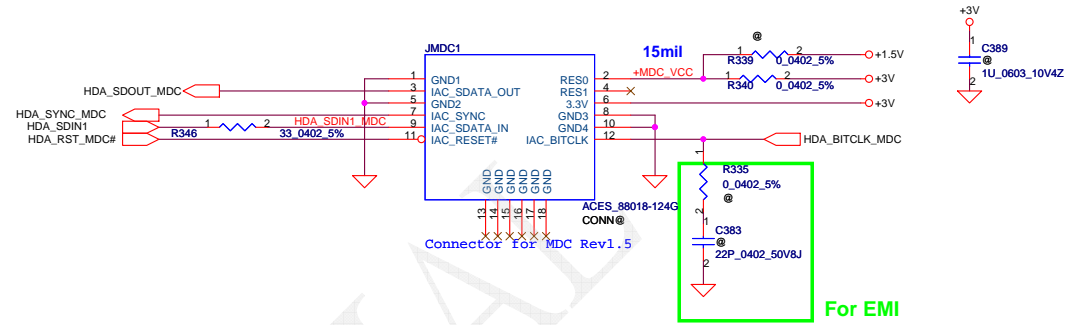
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| Date: Monday, February 09, 2009 | | | | Sheet 30 of 45 |

Power Button

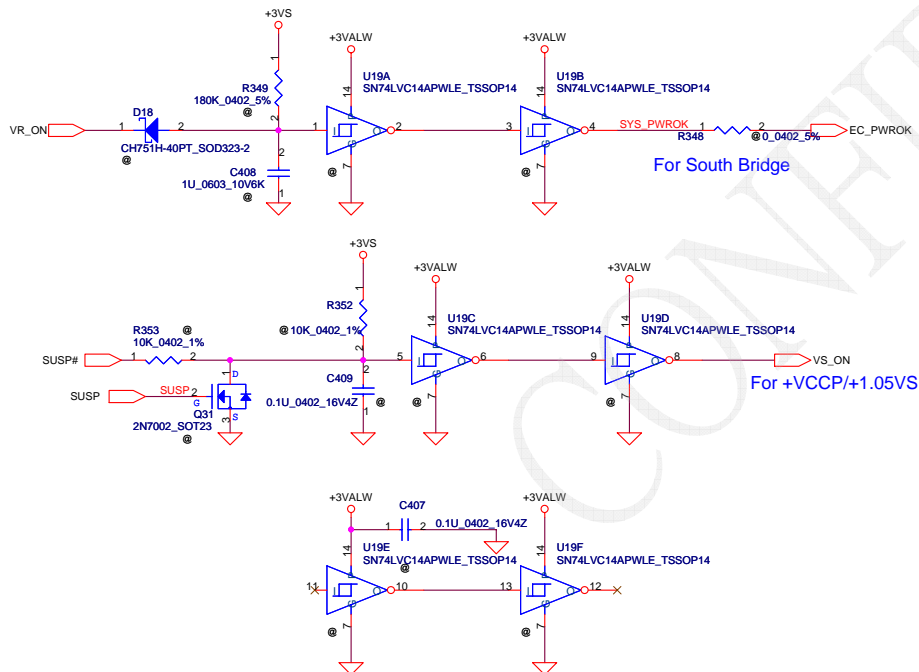
ON/OFF switch



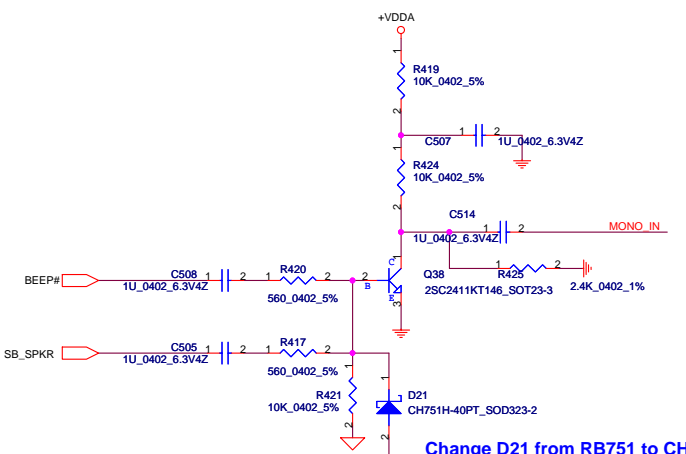
HDA MDC Conn.



Power ON Circuit

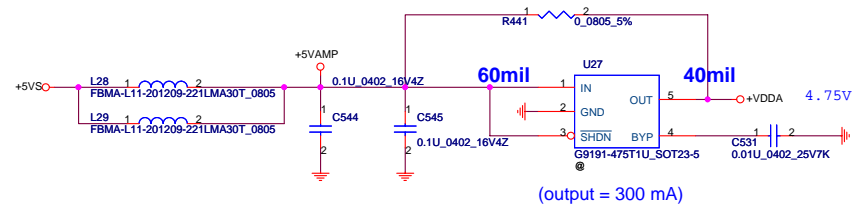


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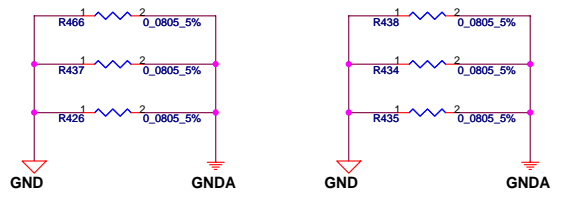
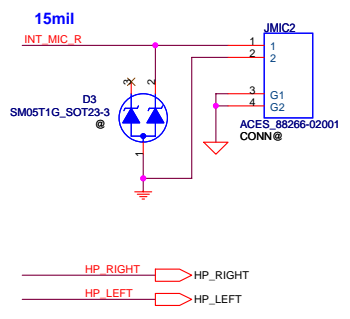
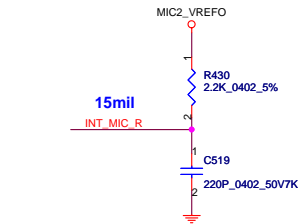
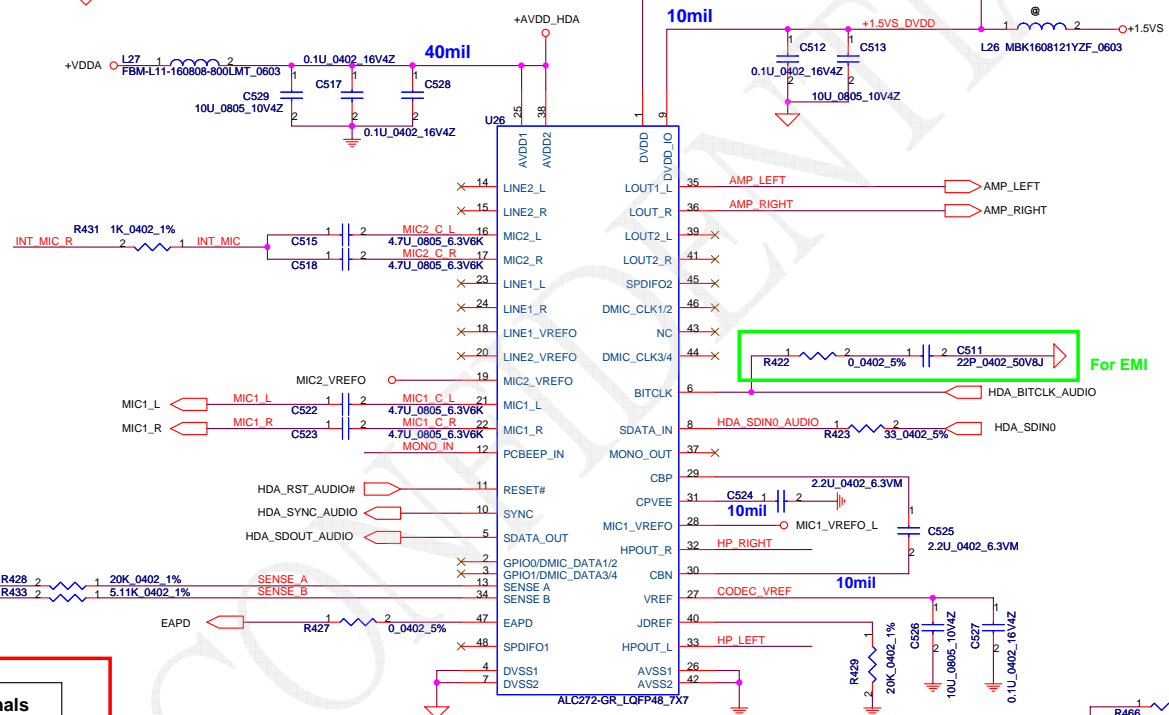


Change D21 from RB751 to CH751

HD Audio Codec

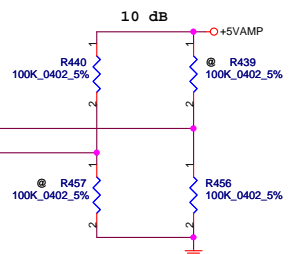
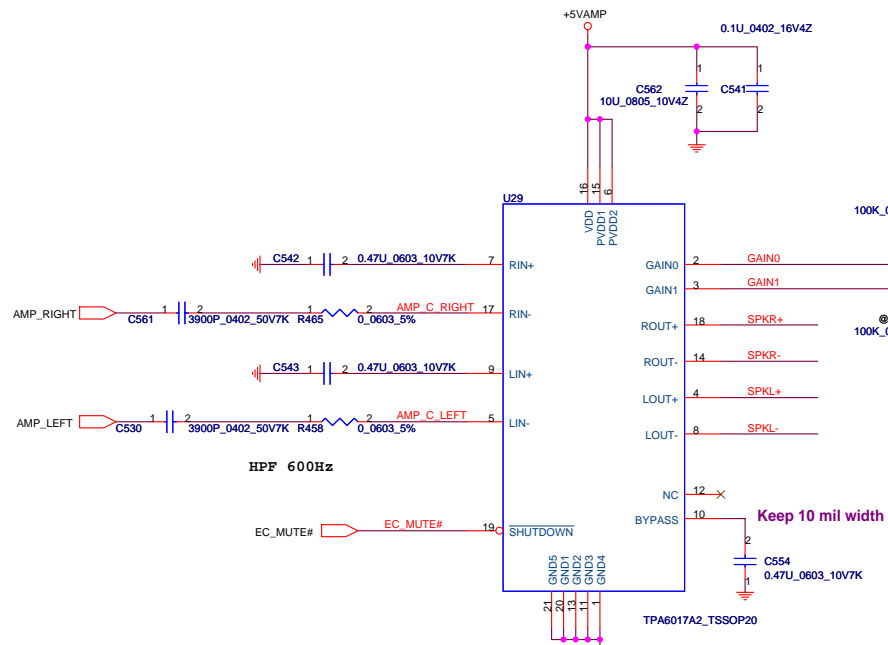


(output = 300 mA)

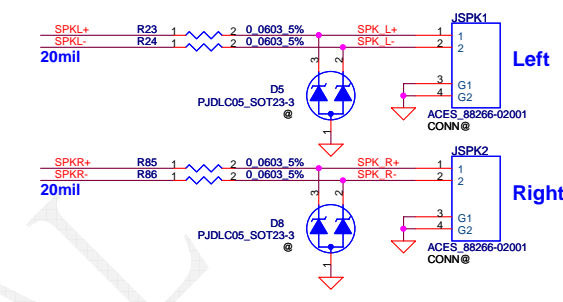


| Sense Pin | Impedance | Codec Signals |
|-----------|-----------|---------------------|
| SENSE A | 39.2K | |
| | 20K | PORT-B (PIN 21, 22) |
| | 10K | |
| | 5.1K | |
| SENSE B | 39.2K | |
| | 20K | |
| | 10K | |
| | 5.1K | PORT-H (PIN 32,33) |

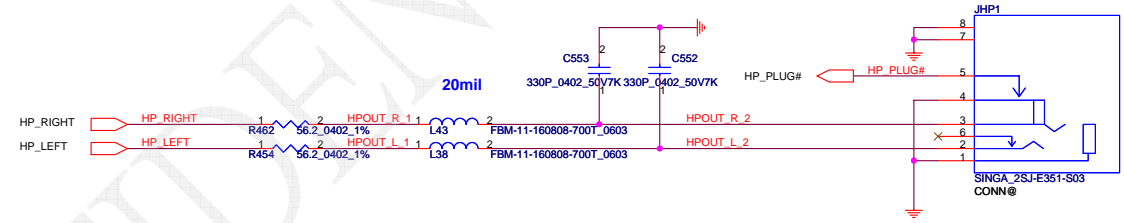
| | | | | | | |
|---|--------------------|-----------------|------------|--------------------------|---------------------------|----------------|
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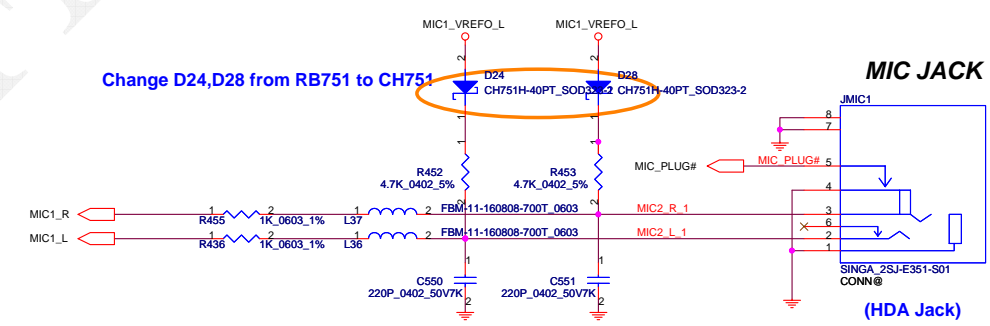
Int. Speaker Conn.



LINE Out/Headphone Out

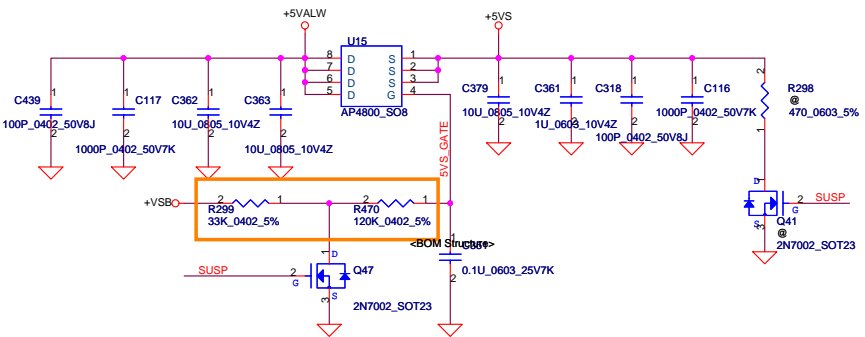


Change D24, D28 from RB751 to CH751

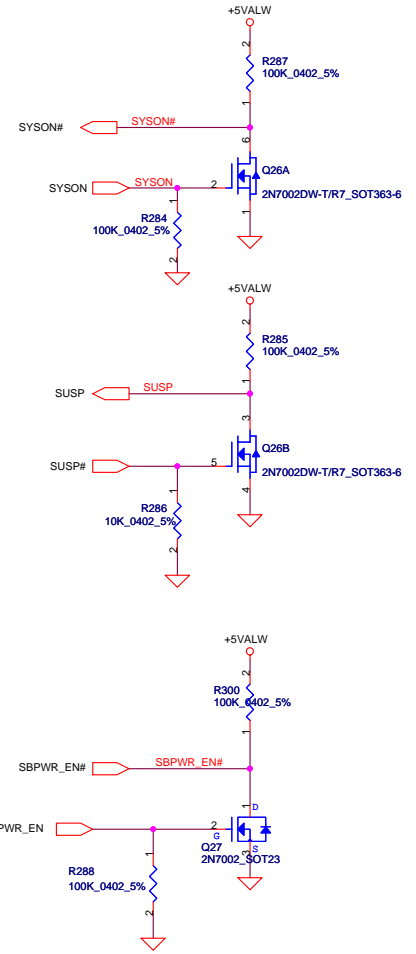
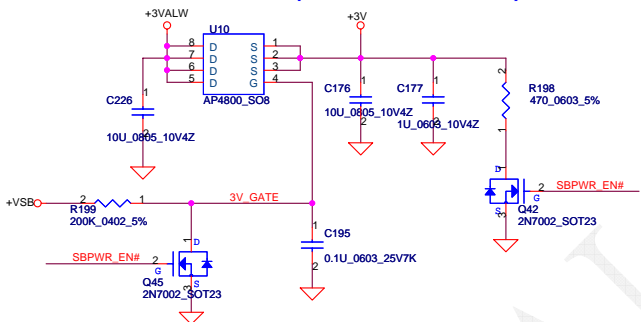


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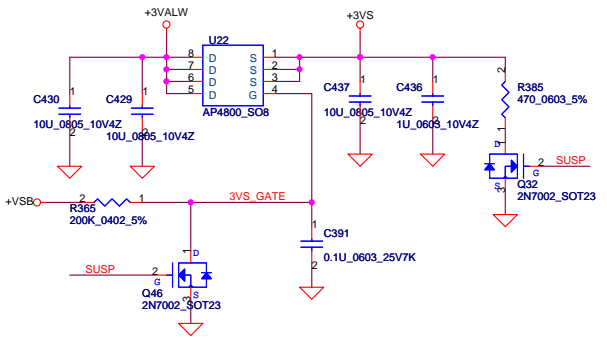
+5VALW TO +5VS



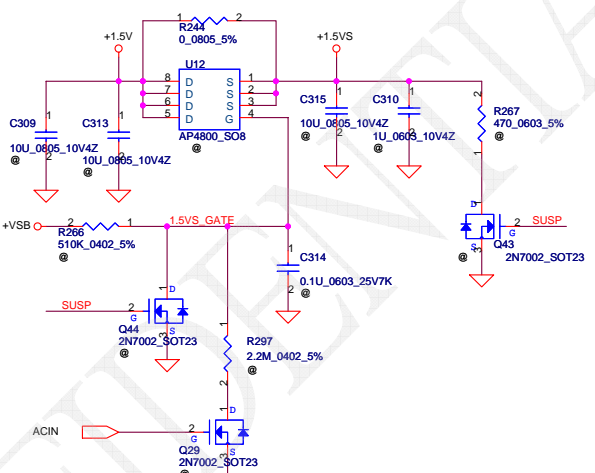
+3VALW TO +3V_SB(ICH8M AUX Power)



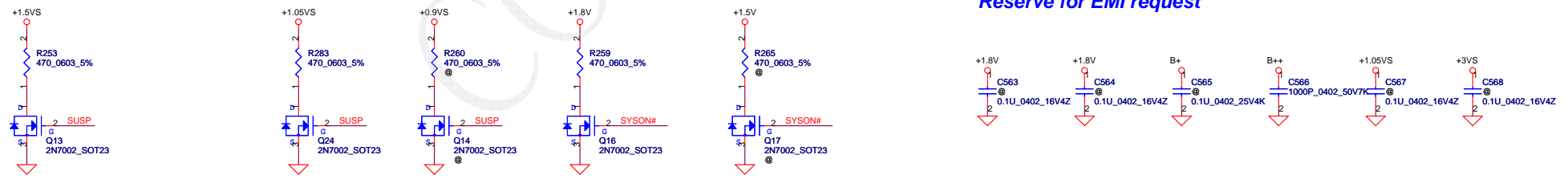
+3VALW TO +3VS



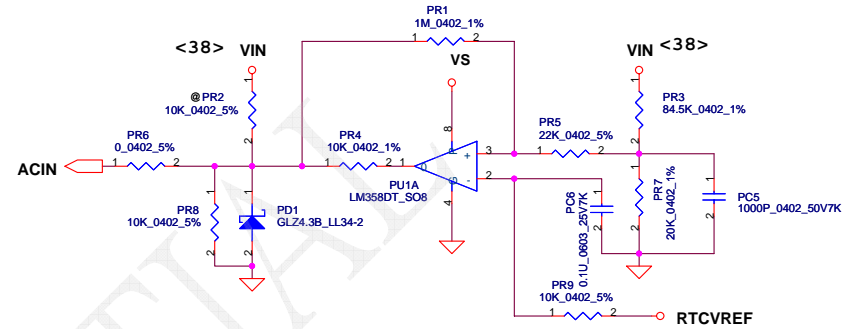
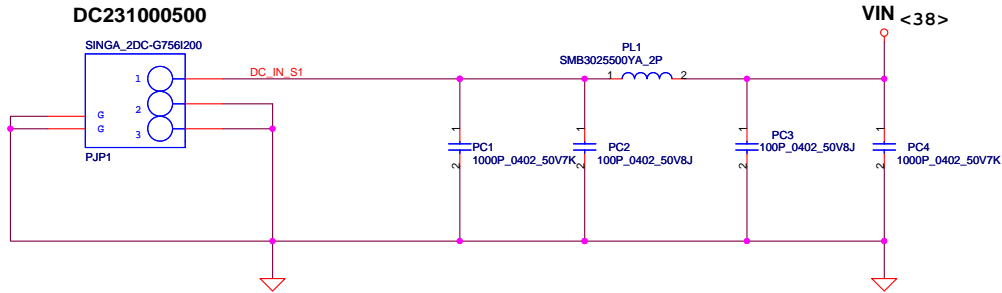
+1.5V to +1.5VS



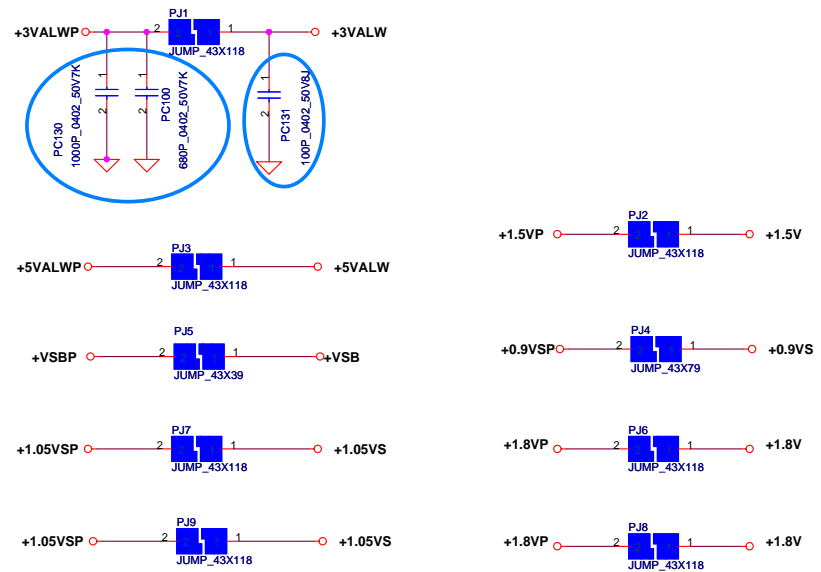
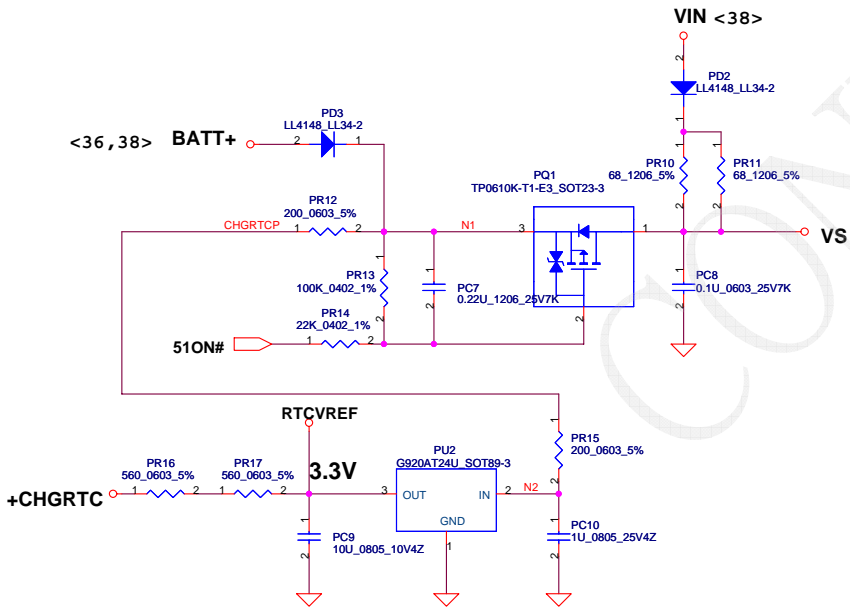
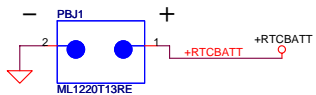
Reserve for EMI request



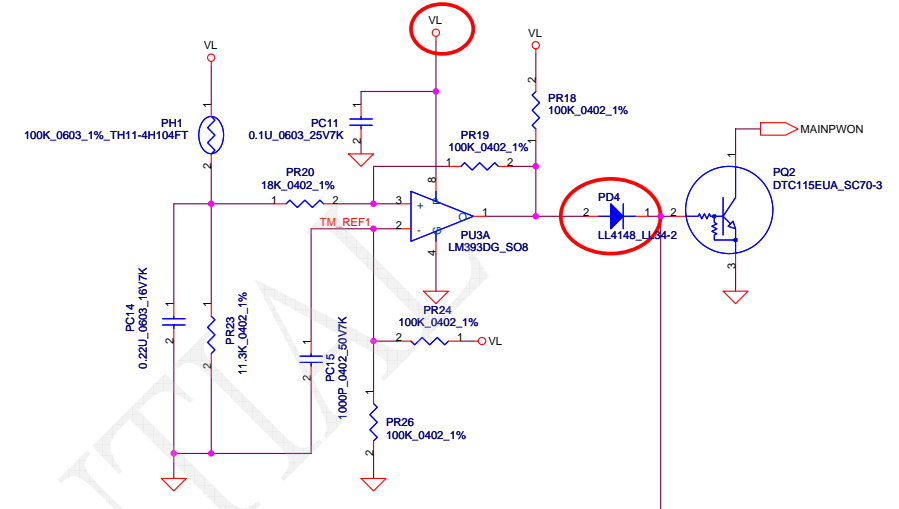
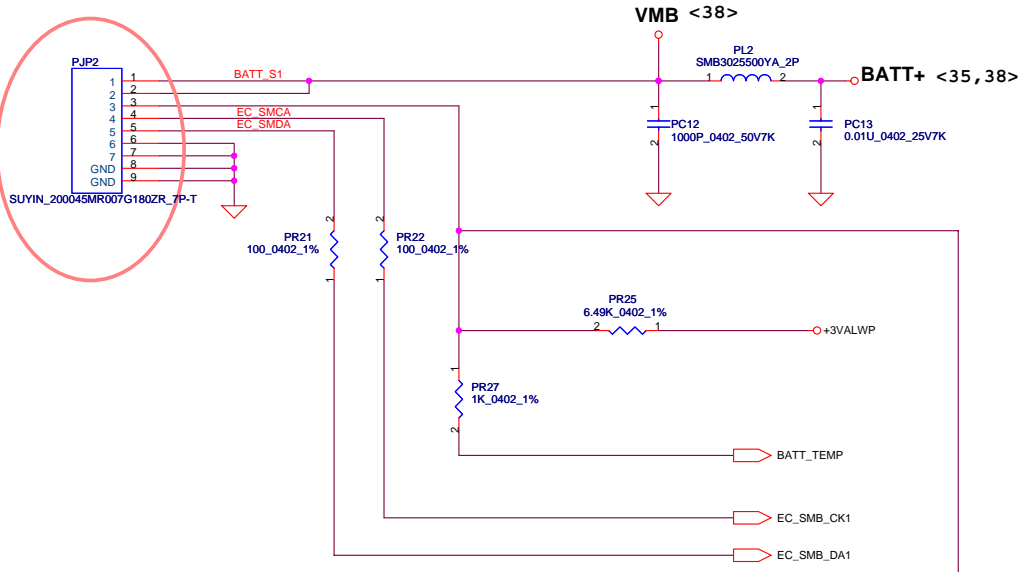
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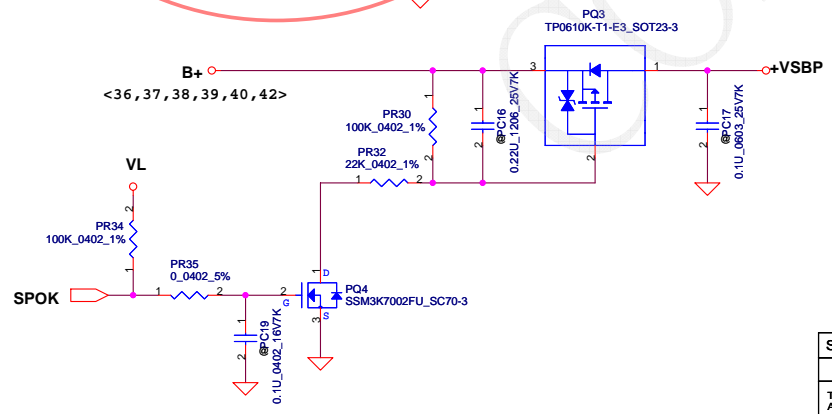
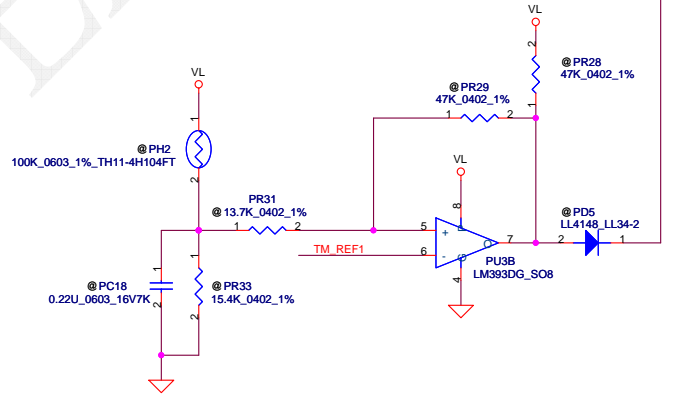
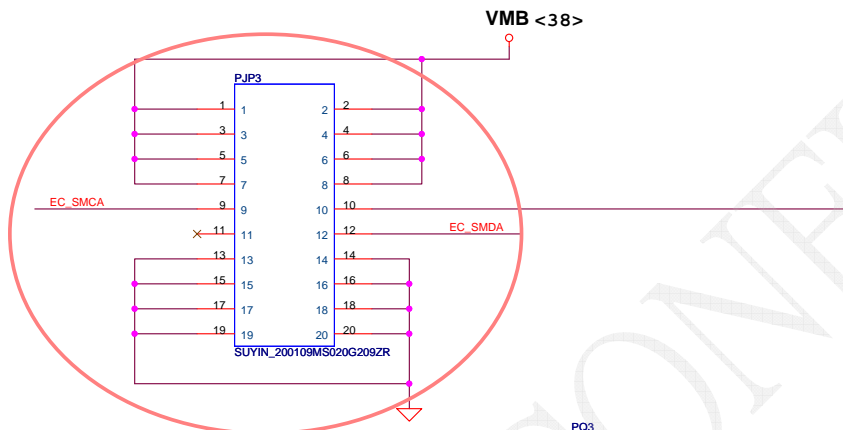
| Vin Detector | | | |
|--------------|---------|---------|---------|
| | Min. | Typ | Max. |
| H-->L | 16.976V | 17.525V | 17.728V |
| L-->H | 17.430V | 17.901V | 18.384V |



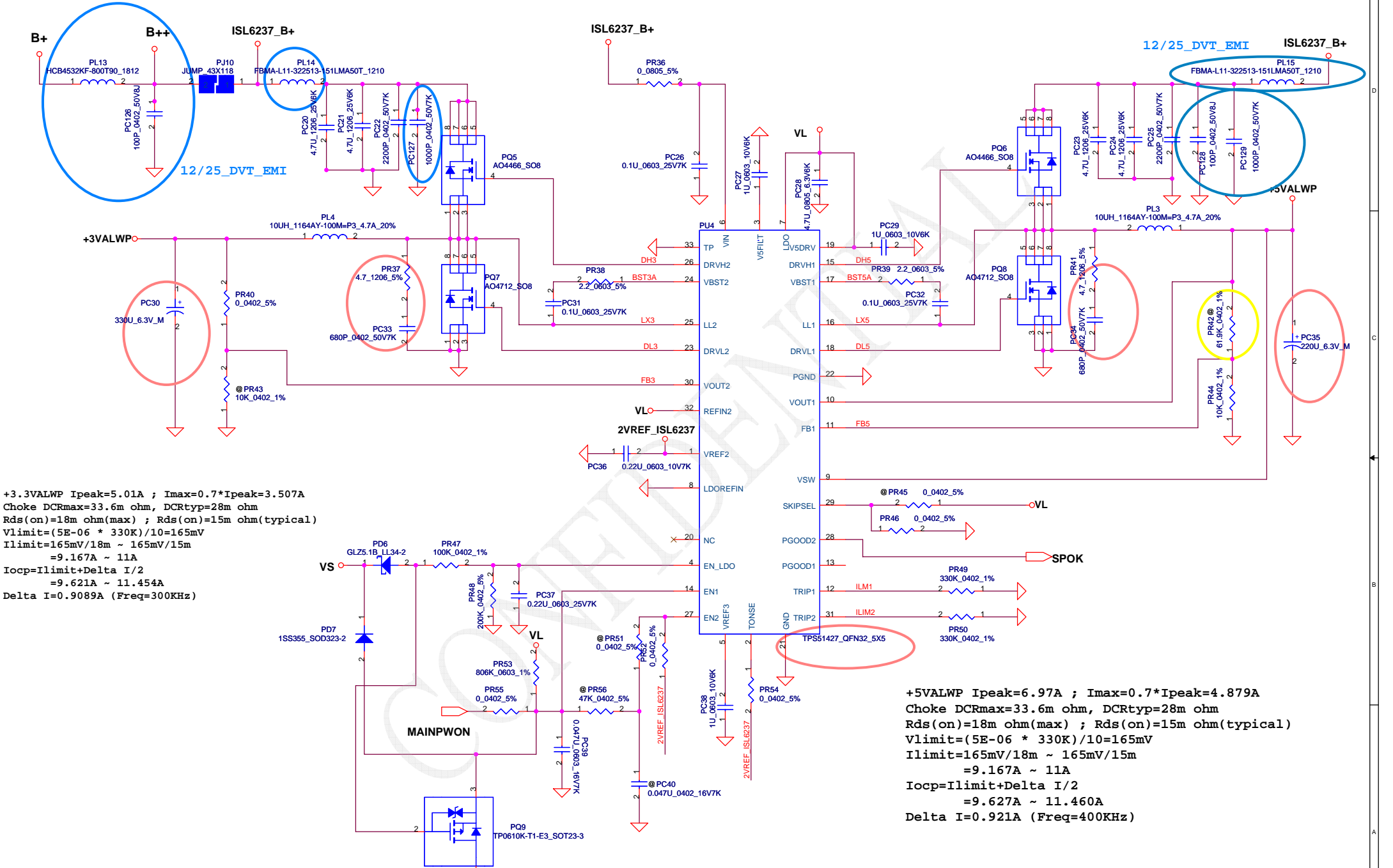
PH1 under CPU botten side :
 CPU thermal protection at 90 degree C
 Recovery at 70 degree C



PH2 near main Battery CONN :
 BAT. thermal protection at 90 degree C
 Recovery at 70 degree C



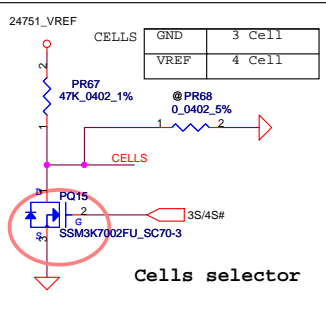
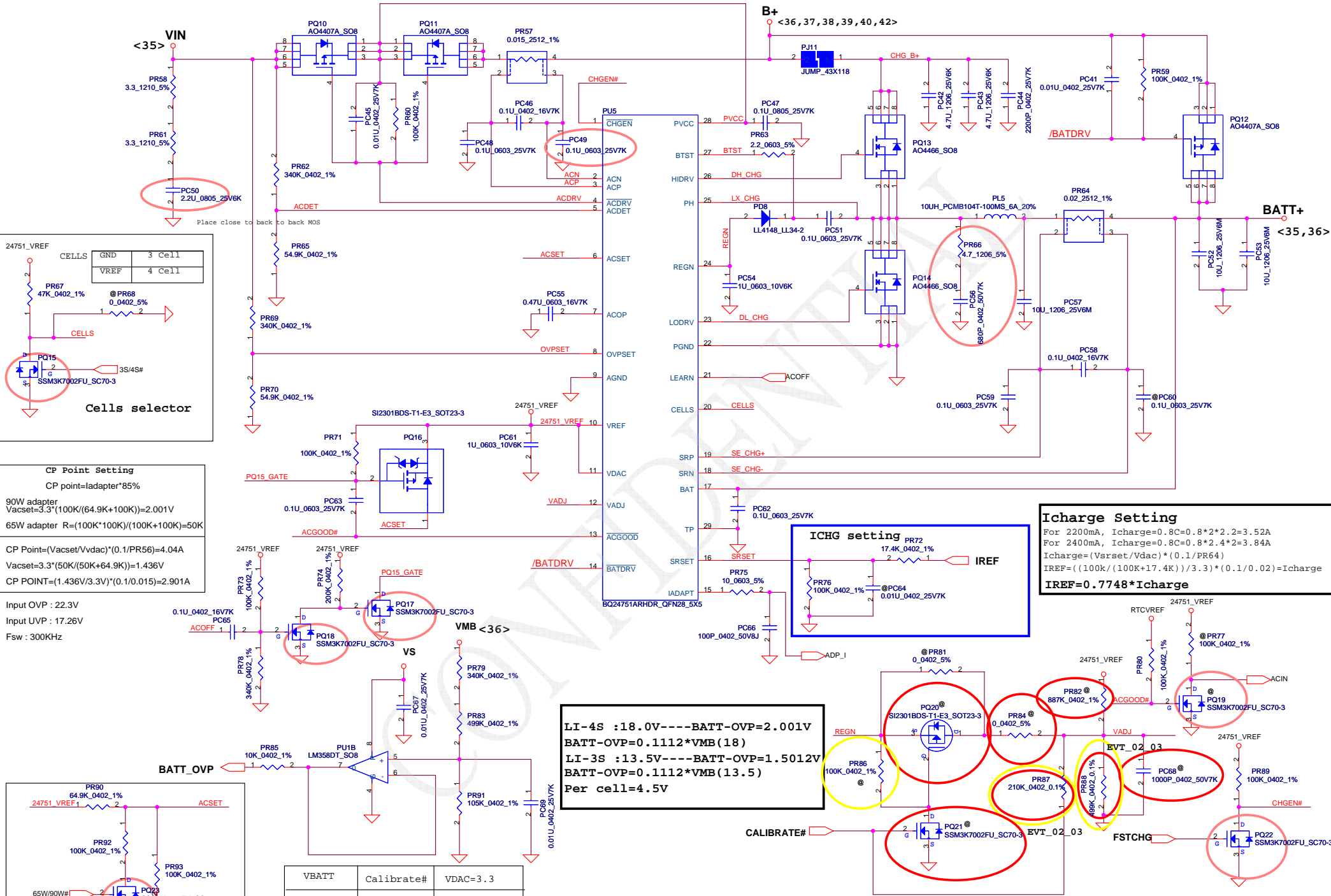
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+3.3VALWP Ipeak=5.01A ; Imax=0.7*Ipeak=3.507A
 Choke DCRmax=33.6m ohm, DCRtyp=28m ohm
 Rds(on)=18m ohm(max) ; Rds(on)=15m ohm(typical)
 Vlimit=(5E-06 * 330K)/10=165mV
 Ilimit=165mV/18m ~ 165mV/15m
 =9.167A ~ 11A
 Iocp=Ilimit+Delta I/2
 =9.621A ~ 11.454A
 Delta I=0.9089A (Freq=300KHz)

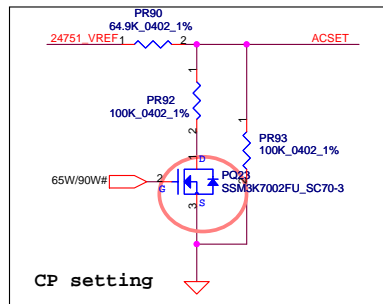
+5VALWP Ipeak=6.97A ; Imax=0.7*Ipeak=4.879A
 Choke DCRmax=33.6m ohm, DCRtyp=28m ohm
 Rds(on)=18m ohm(max) ; Rds(on)=15m ohm(typical)
 Vlimit=(5E-06 * 330K)/10=165mV
 Ilimit=165mV/18m ~ 165mV/15m
 =9.167A ~ 11A
 Iocp=Ilimit+Delta I/2
 =9.627A ~ 11.460A
 Delta I=0.921A (Freq=400KHz)

| | | | | | |
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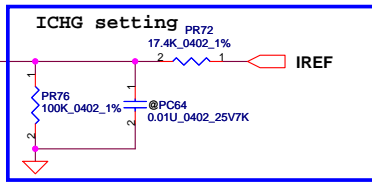
CP Point Setting
 CP point=ladapter*85%
 90W adapter
 $V_{acset}=3.3 \cdot (100K / (64.9K + 100K)) = 2.001V$
 65W adapter $R = (100K \cdot 100K) / (100K + 100K) = 50K$
 $CP\ Point = (V_{acset} / V_{dacc}) \cdot (0.1 / PR56) = 4.04A$
 $V_{acset} = 3.3 \cdot (50K / (50K + 64.9K)) = 1.436V$
 $CP\ POINT = (1.436V / 3.3V) \cdot (0.1 / 0.015) = 2.901A$

Input OVP : 22.3V
 Input UVP : 17.26V
 Fsw : 300KHz



| VBATT | Calibrate# | VDAC=3.3 |
|-------|------------|----------|
| 4.0V | L=0 | |
| 4.2V | 1.8755V | |
| 4.3V | 2.8132V | |
| 4.35V | H=3.3 | |

LI-4S : 18.0V---BATT-OVP=2.001V
BATT-OVP=0.1112 * VMB (18)
LI-3S : 13.5V---BATT-OVP=1.5012V
BATT-OVP=0.1112 * VMB (13.5)
Per cell=4.5V



Icharge Setting
 For 2200mA, $I_{charge} = 0.8C = 0.8 \cdot 2.2 = 3.52A$
 For 2400mA, $I_{charge} = 0.8C = 0.8 \cdot 2.4 = 3.84A$
 $I_{charge} = (V_{srset} / V_{dacc}) \cdot (0.1 / PR64)$
 $IREF = ((100k / (100k + 17.4k)) / 3.3) \cdot (0.1 / 0.02) = I_{charge}$
IREF=0.7748 * Icharge

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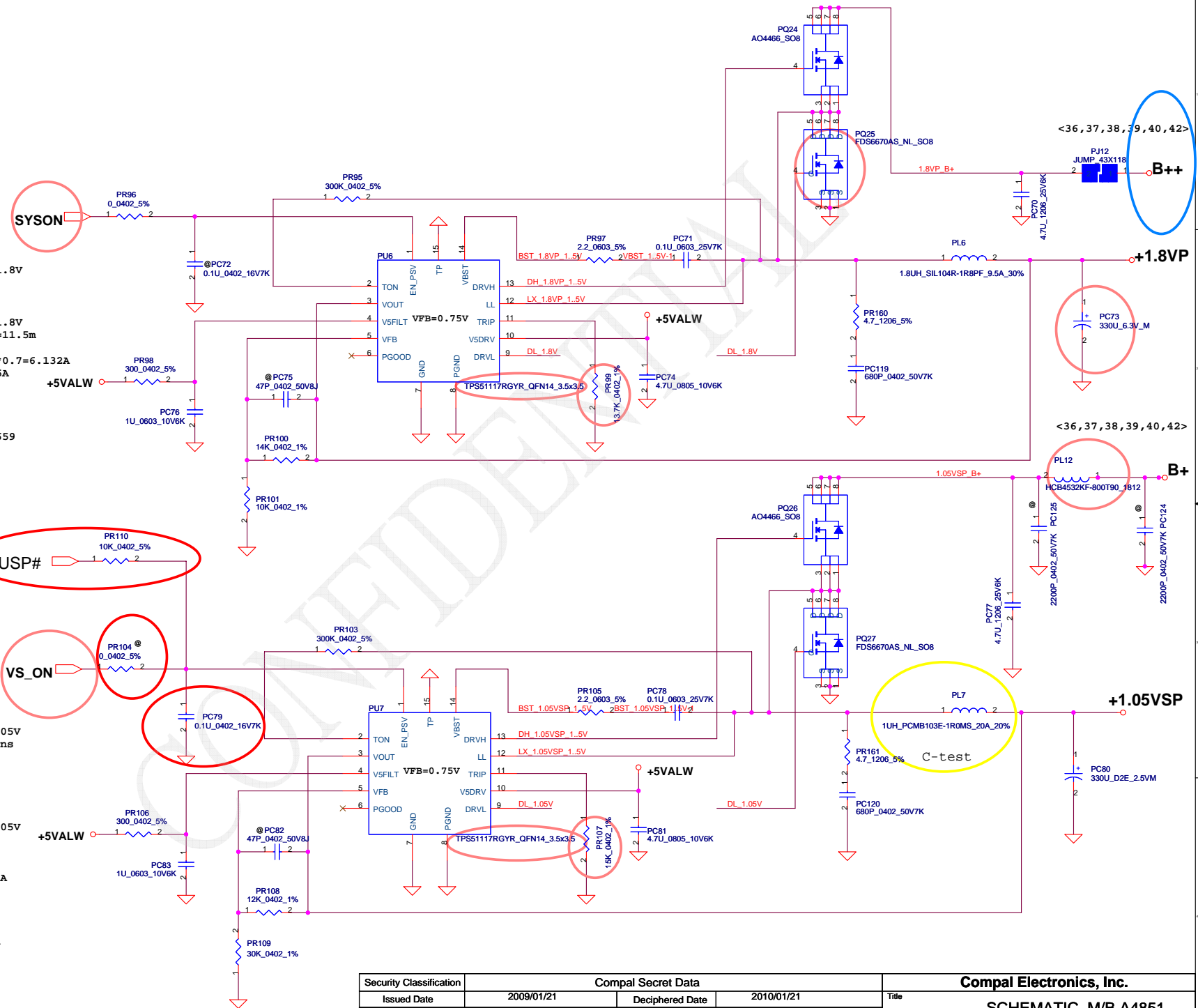
$V_{FB}=0.75V$
 $V_o=V_{FB} \cdot (1+PR100/PR101)=0.75 \cdot (1+14K/10K)=1.8V$
 $F_{sw}=262KHz$ (by Calculation Tool)

$<V_o=1.8V>$ $V_{FB}=0.75V$
 $V_o=V_{FB} \cdot (1+PR100/PR101)=0.75 \cdot (1+14K/10K)=1.8V$
 $F_{sw}=262KHz$ $C_{out} ESR=15m\ ohm$ $R_{dson(max)}=11.5m$
 $R_{dson(min)}=9m$
 $I_{peak}=8.76A$ (by power budget), $I_{max}=I_{peak} \cdot 0.7=6.132A$
 $\Delta I = ((19-1.8) \cdot (1.8/19)) / (L \cdot F_{sw})=3.455A$
 $\Rightarrow 1/2 \Delta I=1.7275A$
 $V_{trip}=R_{trip} \cdot I_{0uA}=13.7K \cdot 10uA=0.137V$
 $I_{ocpmin}=V_{trip}/R_{dsonmax} \cdot 1.3+1.7275$
 $=0.137 / (0.0115 \cdot 1.3) + 1.7275=10.8914A$
 $I_{ocpmax}=(0.137 / (0.009 \cdot 1.1)) + 1.7275A=15.5659$
 $I_{ocp}=10.8914-15.5659A$

note: Reference AO4712&TPS51117 spec

$V_{FB}=0.75V$
 $V_o=V_{FB} \cdot (1+PR108/PR109)=0.75 \cdot (1+12K/30K)=1.05V$
 $T_{on}=19 \cdot e^{-12 \cdot 143000 \cdot ((2/3) \cdot V_o + 10mV) / 19} + 50ns$
 $=2.645e-7\ us$
 $\Rightarrow V_o/V_{in}=D=T_{on}/T_s \Rightarrow T_s=3.35us$
 $F_{sw}=261KHz$ (by calculation tool)

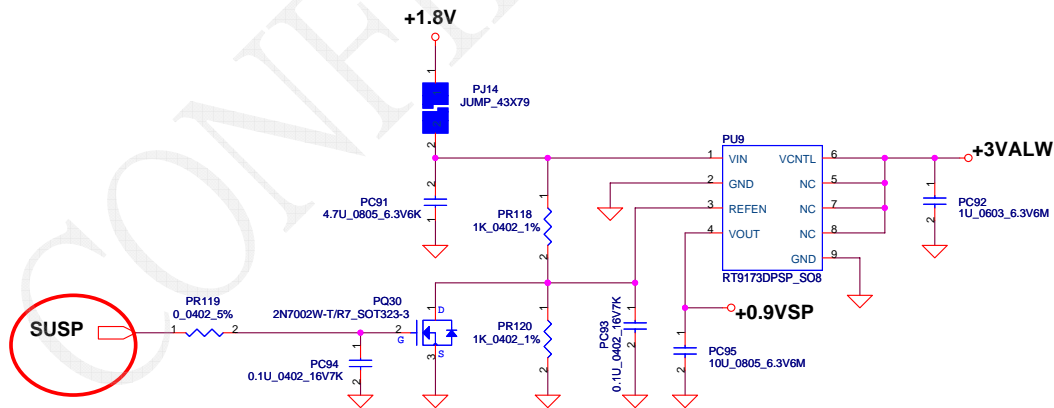
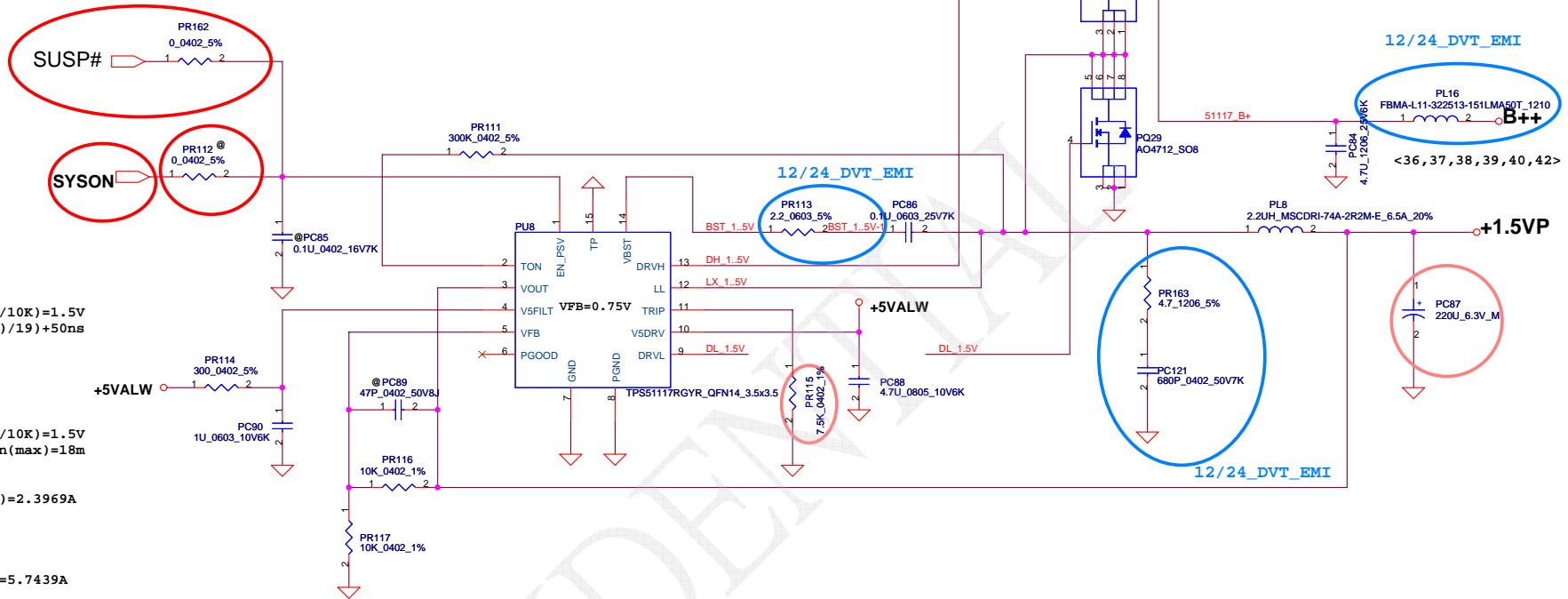
$<V_o=1.05V>$ $V_{FB}=0.75V$
 $V_o=V_{FB} \cdot (1+PR108/PR109)=0.75 \cdot (1+12K/30K)=1.05V$
 $F_{sw}=261KHz$ $C_{out} ESR=15m\ ohm$
 $R_{dson(max)}=11.5m$ $R_{dson(min)}=9m$
 $I_{peak}=9A$, $I_{max}=I_{peak} \cdot 0.7=6.3A$
 $\Delta I = ((19-1.05) \cdot (1.05/19)) / (L \cdot F_{sw})=2.11A$
 $\Rightarrow 1/2 \Delta I=1.055A$
 $V_{trip}=R_{trip} \cdot I_{0uA}=15K \cdot 10uA=0.15V$
 $I_{ocpmin}=V_{trip}/R_{dsonmax} \cdot 1.3+1.055$
 $=0.15 / (0.011 \cdot 1.3) + 1.055=11.0892A$
 $I_{ocpmax}=(0.15 / (0.009 \cdot 1.1)) + 1.055A=16.2073A$
 $I_{ocp}=11.0892A-16.2073A$



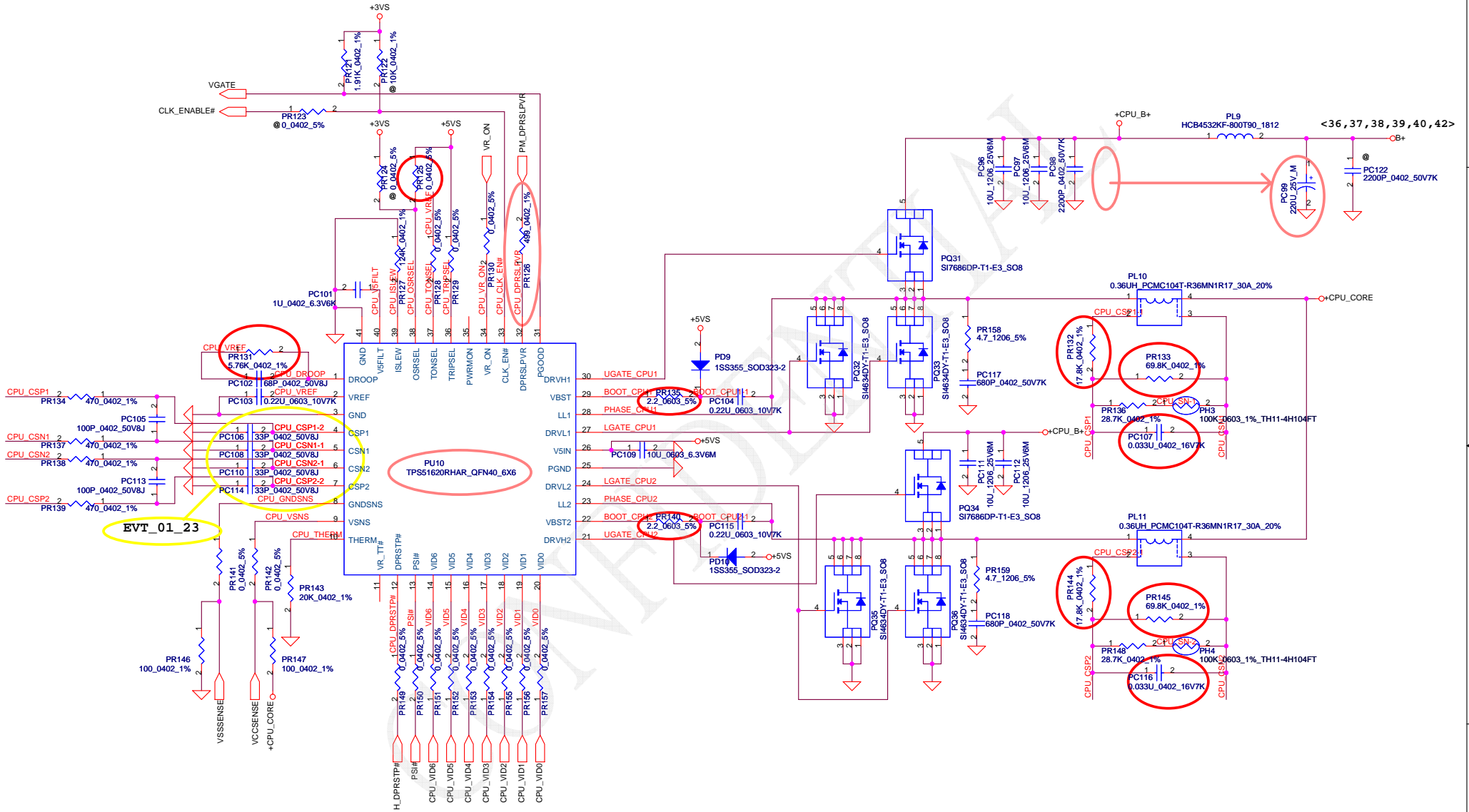
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$V_{FB} = 0.75V$
 $V_o = V_{FB} * (1 + PR116 / PR117) = 0.75 * (1 + 10K / 10K) = 1.5V$
 $T_{on} = 19 * e^{-12 * 143000} * ((2/3) * V_o + 100mV) / 19 + 50ns$
 $= 2.645e-7 us$
 $=> V_o / V_{in} = D = T_{on} / T_s => T_s = 3.35us$
 $F_{sw} = 262KHz$

$<V_o = 1.5V> V_{FB} = 0.75V$
 $V_o = V_{FB} * (1 + PR116 / PR117) = 0.75 * (1 + 10K / 10K) = 1.5V$
 $F_{sw} = 262KHz$ Cout ESR=15m ohm Rdson(max)=18m
Rdson(min)=15m
Ipeak=3.51A, Imax=2.457A
 $\Delta I = ((19 - 1.5) * (1.5 / 19)) / (L * F_{sw}) = 2.3969A$
 $=> 1 / 2 \Delta I = 1.198A$
 $V_{trip} = R_{trip} * I_{0uA} = 7.5K * 10uA = 0.075V$
 $I_{ocpmin} = V_{trip} / R_{dsonmax} * 1.2 + 1.198$
 $= 0.075 / (0.018 * 1.3) + 1.198 = 4.4035A$
 $I_{ocpmax} = (0.075 / (0.015 * 1.1)) + 1.198 = 5.7439A$
 $I_{ocp} = 4.4035A - 5.7439A$



| | | | | |
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Version change list (P.I.R. List)

| Item | Fixed Issue | Reason for change | Rev. | PG# | Modify List | Date | Phase |
|------|---------------------------------|--|------|-----|--|----------|-------|
| 1 | | Add PC57 :10U_1206_25V_6M | 0.1 | 38 | Add PC57 :10U_1206_25V_6M | 20080902 | EVT |
| 2 | | Add snubber for EMI | 0.1 | 42 | Add snubber for EMI | 20080915 | EVT |
| 3 | | Shift PC99 from +cpu_B+ to B+ | 0.1 | 42 | Shift PC99 from +cpu_B+ to B+ | 20080915 | EVT |
| 4 | | Add PJ15 to B+ | 0.1 | 39 | Add PJ15 to B+ | 20080915 | EVT |
| 5 | | PR135 and PR140 change to 0_0603_5% | 0.1 | 42 | PR135 and PR140 change to 0_0603_5% | 20080915 | EVT |
| 6 | Charger feedback trace too long | ADD PC49 | 0.2 | 38 | ADD PC49 | 20081124 | DVT |
| 7 | Power sequence error | +1.5VP: enable pin change from SUSP# to SYSON +0.9VSP: enable pin change from SUSP# to SUSP | 0.2 | 40 | +1.5VP: enable pin change from SUSP# to SYSON +0.9VSP: enable pin change from SUSP# to SUSP | 20081124 | DVT |
| 8 | Load line over spec | PR131: change to 5.76K_0402_1% | 0.2 | 42 | PR131: change to 5.76K_0402_1% | 20081124 | DVT |
| 9 | 3D hang | Charger PR63:change to 2.2_0603_5% PR66:Add 4.7_1206_5% PC56:Add 680P_0402_50V7K | 0.2 | 38 | Charger PR63:change to 2.2_0603_5% PR66:Add 4.7_1206_5% PC56:Add 680P_0402_50V7K | 20081124 | DVT |
| 10 | 3D hang | +1.8VP PR97:change to 2.2_0603_5% PR160:Add 4.7_1206_5% PC119:Add 680P_0402_50V7K | 0.2 | 39 | +1.8VP PR97:change to 2.2_0603_5% PR160:Add 4.7_1206_5% PC119:Add 680P_0402_50V7K | 20081124 | DVT |
| 11 | 3D hang | +1.05VSP PR105:change to 2.2_0603_5% PR161:Add 4.7_1206_5% PC120:Add 680P_0402_50V7K Add bead between B+ and 1.05VSP_B+ | 0.2 | 39 | +1.05VSP PR105:change to 2.2_0603_5% PR161:Add 4.7_1206_5% PC120:Add 680P_0402_50V7K Add bead between B+ and 1.05VSP_B+ | 20081124 | DVT |
| 12 | EMI solution | +5VALW/+3VALW PR37: Add 4.7_1206_5% PR41: Add 4.7_1206_5% PC33: Add 680P_0402_50V7K PC34: Add 680P_0402_50V7K PR38: change to 2.2_0603_5% PR39: change to 2.2_0603_5% | 0.2 | 37 | +5VALW/+3VALW PR37: Add 4.7_1206_5% PR41: Add 4.7_1206_5% PC33: Add 680P_0402_50V7K PC34: Add 680P_0402_50V7K PR38: change to 2.2_0603_5% PR39: change to 2.2_0603_5% | 20081124 | DVT |
| 13 | EMI solution | +CPU CORE PR158: Add 4.7_1206_5% PR159: Add 4.7_1206_5% PC117: Add 680P_0402_50V7K PC118: Add 680P_0402_50V7K PR135: change to 2.2_0603_5% PR140: change to 2.2_0603_5% | 0.2 | 42 | +CPU CORE PR158: Add 4.7_1206_5% PR159: Add 4.7_1206_5% PC117: Add 680P_0402_50V7K PC118: Add 680P_0402_50V7K PR135: change to 2.2_0603_5% PR140: change to 2.2_0603_5% | 20081124 | DVT |
| 16 | EMI solution | +CPU CORE PC122: Reserve 2200P_0402_50V7K on B+ | 0.2 | 42 | +CPU CORE PC122: Reserve 2200P_0402_50V7K on B+ | 20081124 | DVT |
| 17 | EMI solution | +1.05VSP PR105 : change to 2.2_0603_5% PL12 : Add HCB4532KF-800T90_1812 PC124: Reserve 2200P_0402_50V7K on B+ PC125: Reserve 2200P_0402_50V7K on B+ | 0.2 | 39 | +1.05VSP PR105 : change to 2.2_0603_5% PL12 : Add HCB4532KF-800T90_1812 PC124: Reserve 2200P_0402_50V7K on B+ PC125: Reserve 2200P_0402_50V7K on B+ | 20081124 | DVT |

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| Item | Fixed Issue | Reason for change | Rev. | PG# | Modify List | Date | Phase |
|------|-----------------------|---|------|----------------|---|----------|-------|
| 18 | Battery & HW solution | Charger PQ20:Reserve(@)SI2301BDS-T1-E3_SOT23-3 PQ21:Reserve(@)SSM3K7002FU_SC70-3 PR82:Reserve(@)887K_0402_1% PR84:Reserve(@)0_0402_5% PC68:Reserve(@)1000P_0402_50V7K PR87:change to 210K_0402_1% PR88:change to 499K_0402_1% +1.05VSP PR104: Reserve(@)0_0402_5% PR110: change to 10K_0402_5% PR79 : Add 0.1U_0402_16V7K +1.5VP PR112: Reserve(@) 0_0402_5% | 0.2 | 38 39 40 | Charger PQ20:Reserve(@)SI2301BDS-T1-E3_SOT23-3 PQ21:Reserve(@)SSM3K7002FU_SC70-3 PR82:Reserve(@)887K_0402_1% PR84:Reserve(@)0_0402_5% PC68:Reserve(@)1000P_0402_50V7K PR87:change to 210K_0402_1% PR88:change to 499K_0402_1% +1.05VSP PR104: Reserve(@)0_0402_5% PR110: change to 10K_0402_5% PR79 : Add 0.1U_0402_16V7K +1.5VP PR112: Reserve(@) 0_0402_5% | 20081124 | DVT |
| 19 | EMI soultion | +3VALWP/+3VALW PC100: 680P_0402_50V7K PC130: 1000P_0402_50V_7K PC131: 1000P_0402_50V_8J +1.5VP ADD PR113: 2.2_0603_5% ADD PR163: 4.7_1206_5% ADD PC121: 680P_0402_50V7K ADD PL16 :FBMA-L11-322513-151LMA50T_1210 | 0.3 | 35 40 | +3VALWP/+3VALW PC100: 680P_0402_50V7K PC130: 1000P_0402_50V_7K PC131: 1000P_0402_50V_8J +1.5VP ADD PR113: 2.2_0603_5% ADD PR163: 4.7_1206_5% ADD PC121: 680P_0402_50V7K ADD PL16 :FBMA-L11-322513-151LMA50T_1210 | 20081224 | PVT |
| 20 | POWER Solution | +3VALWP/+5VALWP RT8206- Fix output 5V for HW no HDMI | 0.3 | 37 | +3VALWP/+5VALWP PR42: Reserve 61.9K_0402_1% | 20090111 | PVT |

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| Item | Fixed Issue | Reason for change | Rev. | PG# | Modify List | Date | Phase |
|------|--------------------|---|------|-----|---|----------|-------|
| 21 | EMI solution | Reduce the Noise | 0.3 | 37 | Add PL 13 (HCB4532KF-800T90_1812) Add PL 14 (FBMA-L11-322513-151LMA50T_1210) Add PL 15 (FBMA-L11-322513-151LMA50T_1210) Add PC126 (100P_0402_50V8J) Add PC128 (100P_0402_50V8J) Add PC129 (1000P_0402_50V7K) | 20090112 | PVT |
| 22 | Battery solution | Adjust battery voltage | 0.3 | 38 | Reserve PR86 (100K_0402_1%) | 20090112 | PVT |
| 23 | Saturation current | 1.8u choke saturation current too small | 0.3 | 39 | change PL7 to 1UH_PCMB103E-1R0MS_20A_20% | 20090113 | PVT |
| 24 | GP BOM | Tolerance: K:+-10% ; J:+-5% | 0.4 | 42 | Change PC106 to 33P_0402_50V8J Change PC108 to 33P_0402_50V8J Change PC110 to 33P_0402_50V8J Change PC114 to 33P_0402_50V8J | 20090123 | PVT |

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11/11

- 1. Page 17;Un-POP R412,Q35
- 2. Page 32;Un-POP R340,POP R339
- 3. Page 32;Un-POP D3
- 4. Change C13,C269,C282,C482 P/N to SGA1933D10 (ESR From 15 to 9 ohm)
- 5. DEL HDMI Schematic (del HDMI@/NHDMI@)

11/19

- 1. Change C538,C539 to B size 150U
- 2. POP D11,D12,D29 and change P/N to SCA00000A00

11/24

- 1.Add LAN_CLKREQ# on CLK Gen and AR8132

11/25

- 1.Add C563~C568 for EMI request
- 2.Add L44 for EMI request
- 3.Add +3VS and +3V for SB HDA bus
- 4.Add 0 ohm resistor for Audio DVDD_IO bus
- 5.Add 0 ohm between +1.5V and +1.5VS
- 6.Add 3VS_GATE schematic on +3VALW to +3VS
- 7.remove c318 and D16
- 8.add R400 and C439 for soft-off
- 9.add R244 to connect +1.5v to +1.5vs

11/25

- 1. Change R325,R311 Form 11ohm to 22 ohm
- 2. Change D21,D24,D28 from RB751 to CH751
- 3. Reserve C485,C282

12/18

- 1. Change R299 to 47K,ADD R470 (100K)

1/20

- 1. Change R299 to 22K and R470 to 120K
- 2. Add R570 (150U) in pgae 23
- 3.change board ID R273 to 33K

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