


LCFC Confidential

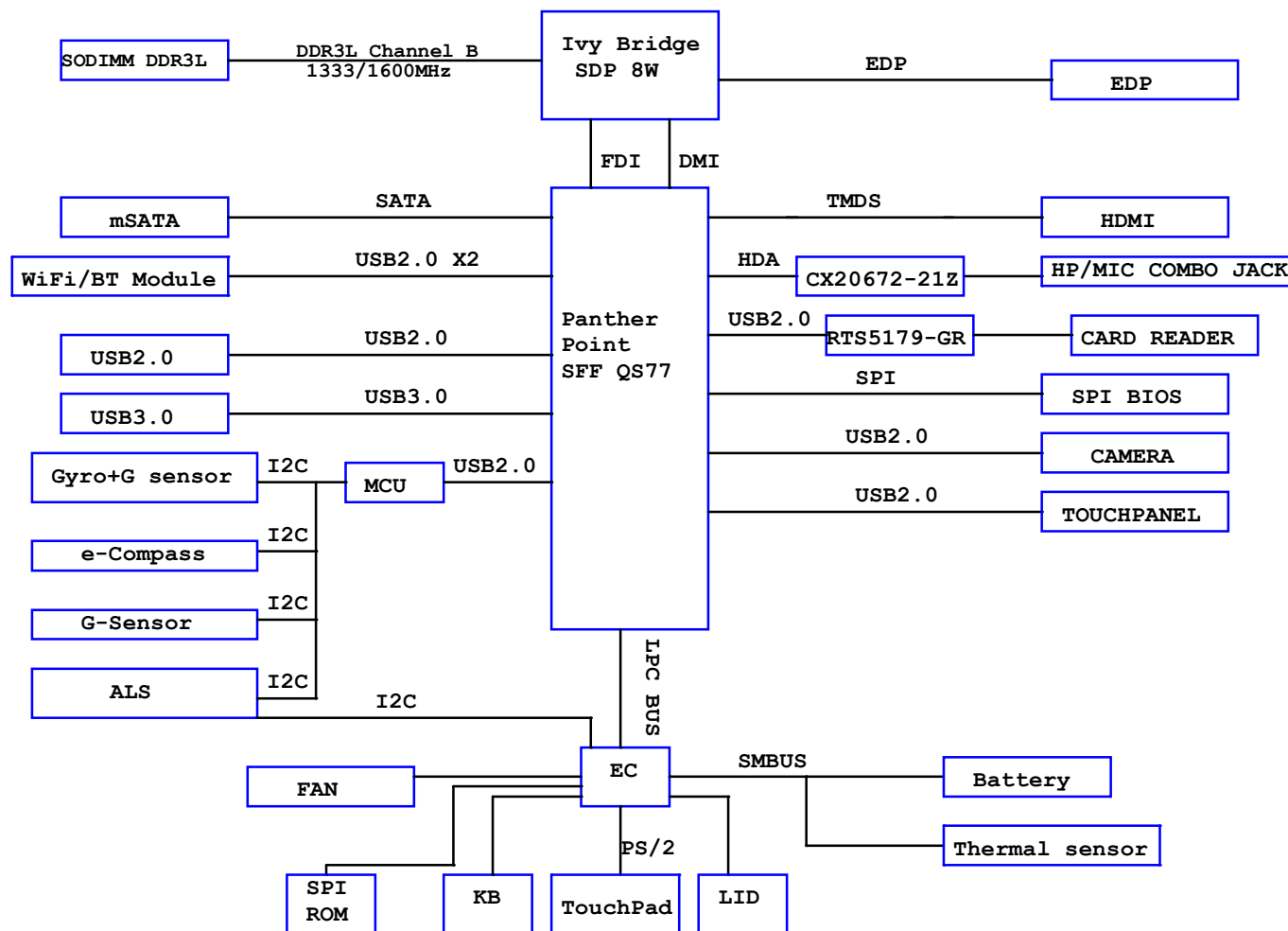
VENUS2 M/B Schematics Document

INTEL Ivy Bridge Processor with DDRIII + QS77 PCH

2012-12-24

REV : 0 . 2

| | | | | | | |
|--|------------------------------|-----------------|------------|-------------------------------------|----------------------------------|---|
| Security Classification | LC Future Center Secret Data | | | Title | |  |
| Issued Date | 2012/09/03 | Deciphered Date | 2012/09/03 | Cover Page | | |
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| | | | | Date: Saturday, January 26, 2013 | Sheet 1 | of 46 |



| <div>Power Plane</div> <div>State</div> | B+ | <div>+3VALW</div> <div>+5VALW</div> | +1.5V | <div>+5VS</div> <div>+3VS</div> <div>+1.5VS</div> <div>+VCCSA</div> <div>+V1.5S_VCCP</div> <div>+CPU_CORE</div> <div>+GFX_CORE</div> <div>+1.8VS</div> <div>+1.05VS</div> <div>+0.75VS</div> <div>+3.3VS_VGA</div> <div>+1.5VS_VGA</div> <div>+1.05VS_VGA</div> |
|---|----|-------------------------------------|-------|---|
| S0 | O | O | O | O |
| S3 | O | O | O | X |
| S5 S4/AC Only | O | O | X | X |
| S5 S4 Battery only | O | X | X | X |
| S5 S4 AC & Battery don't exist | X | X | X | X |

USB Port Table

BOM Structure Table

SMBUS Control Table

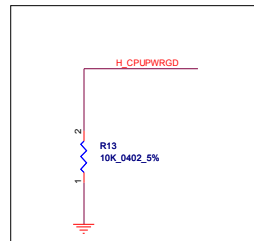
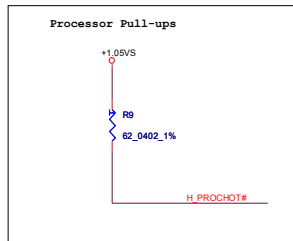
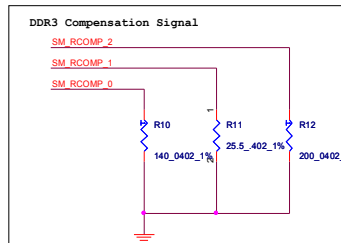
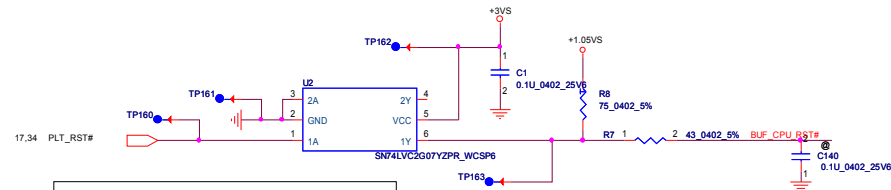
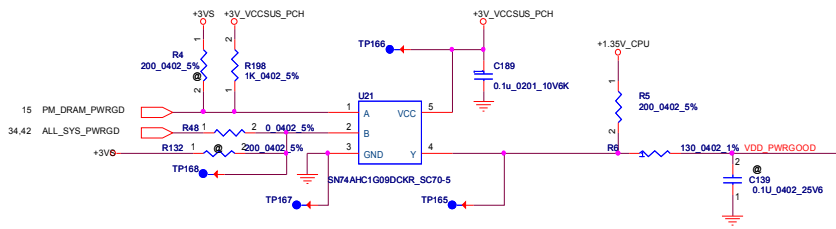
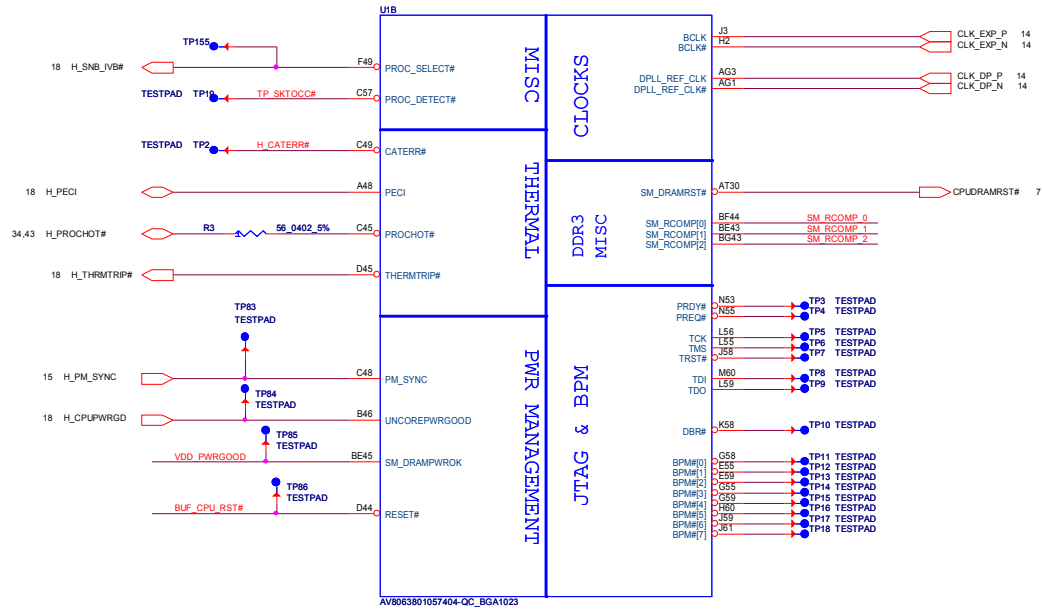
PCIE PORT LIST

| | | | |
|-------------------|------------------|---|---------|
| Title | |  | |
| Notes List | | | |
| Size Custom | Document Number | Rev | |
| | VENUS2 | 0.1 | |
| Date: | Sat Jan 26, 2013 | Sheet | 3 of 46 |



| | | | | |
|---|---|---|---|---|
| 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|

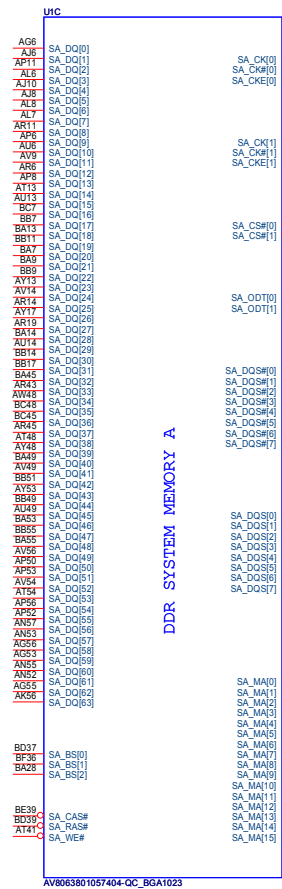
IVYBRIDGE PROCESSOR (CLK,MISC,JTAG)



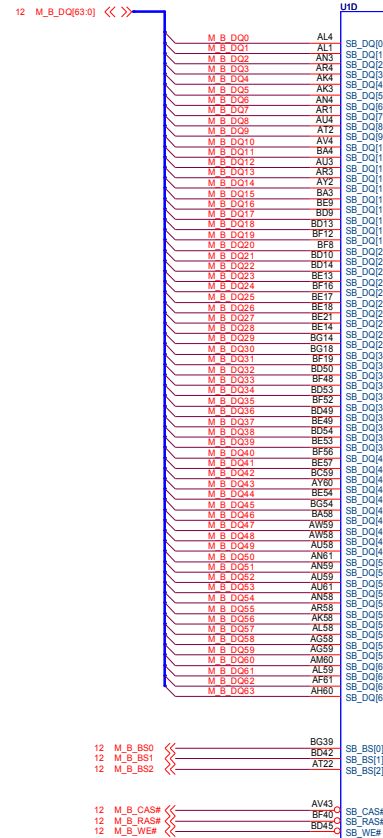
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| | | | |
|------------------------|----------------------------|---|--|
| Title | |  | |
| CPU (2/7) PM, XDP, CLK | | | |
| Size | Document Number | Rev | |
| | VENUS2 | 0.1 | |
| Date | Saturday, January 26, 2013 | Sheet A of 26 | |

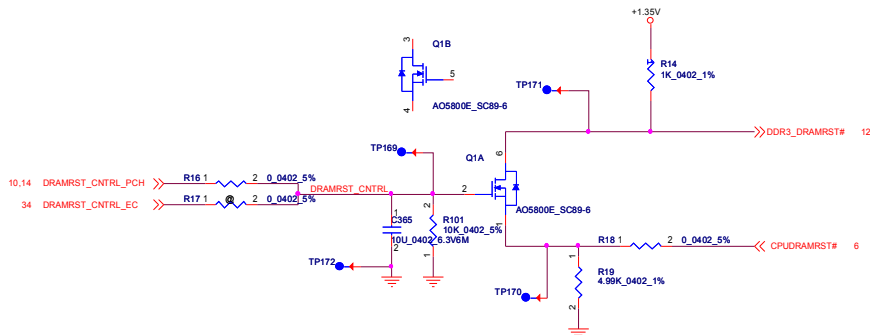
IVYBRIDGE PROCESSOR (DDR3)




AV8063801057404-QC_BGA1023



AV8063801057404-QC_BGA1023



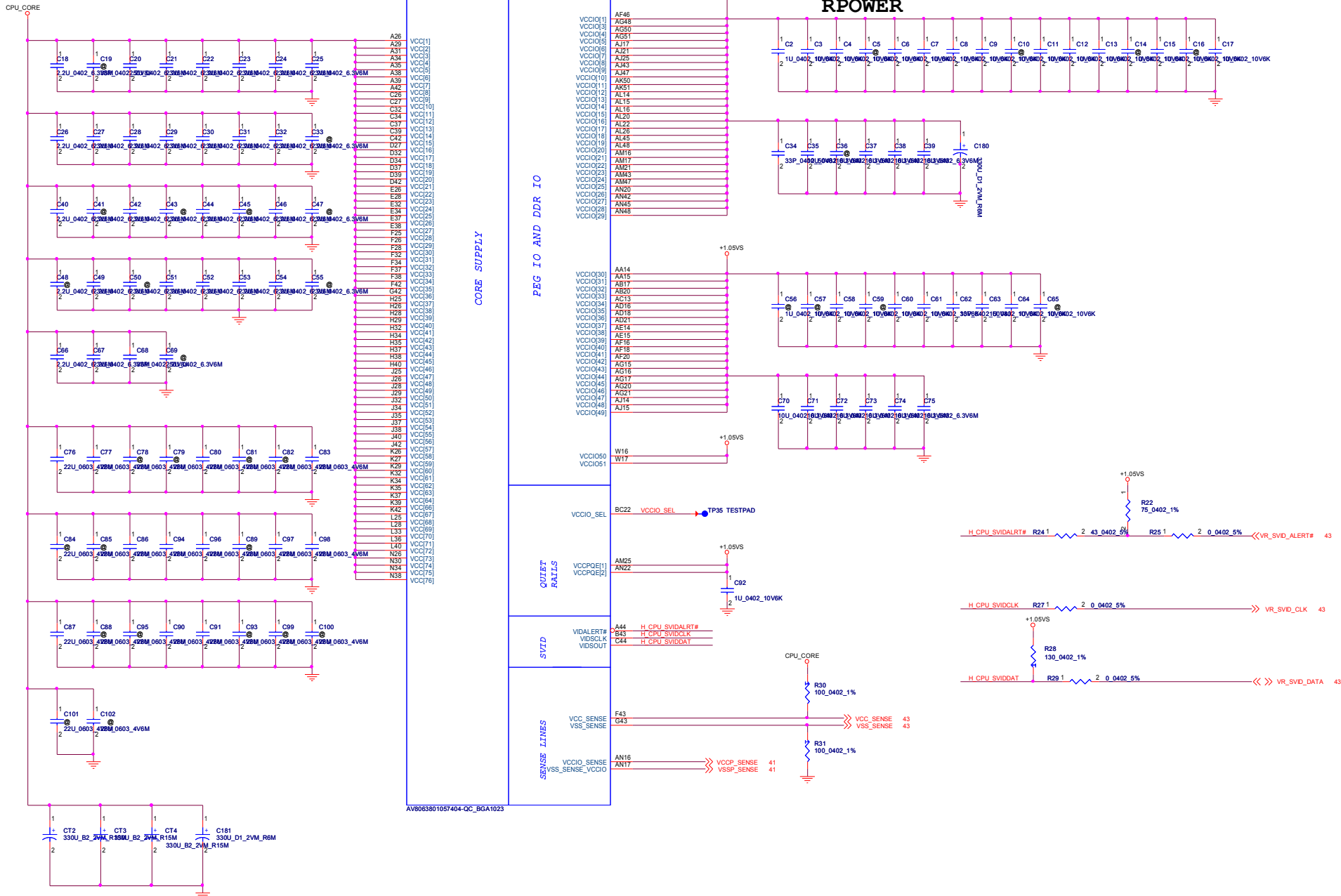
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IVYBRIDGE PROCESSOR (POWER)

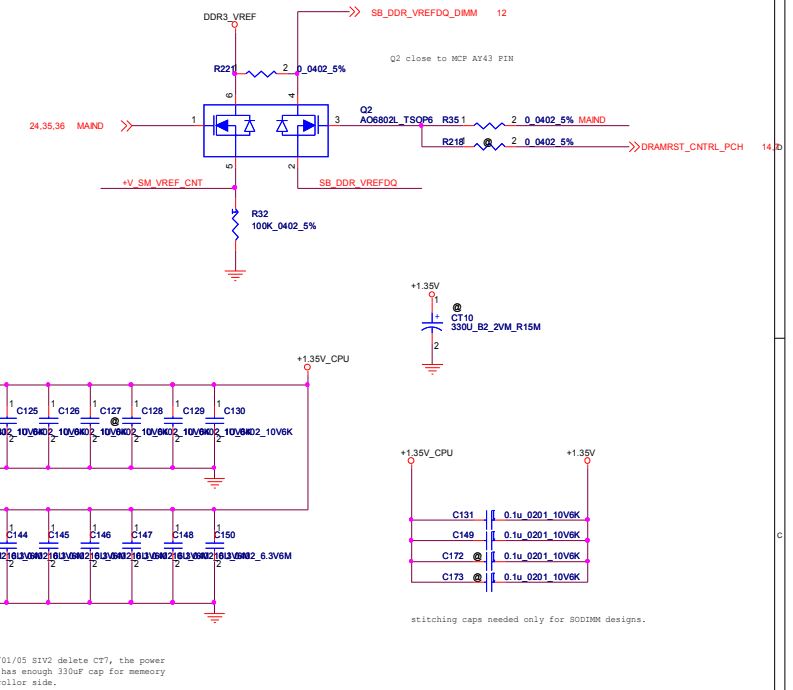
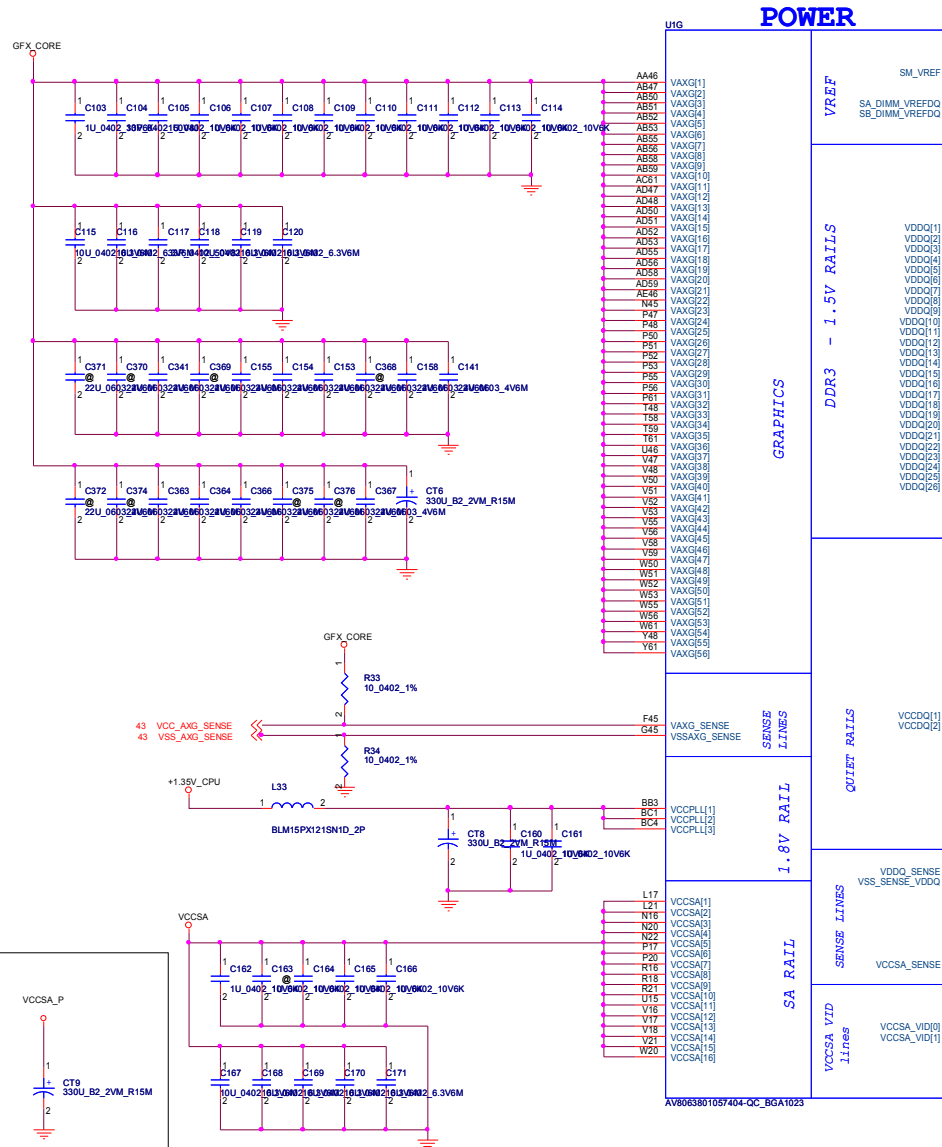
POWER

PROCESSOR UNCORE

RPOWER



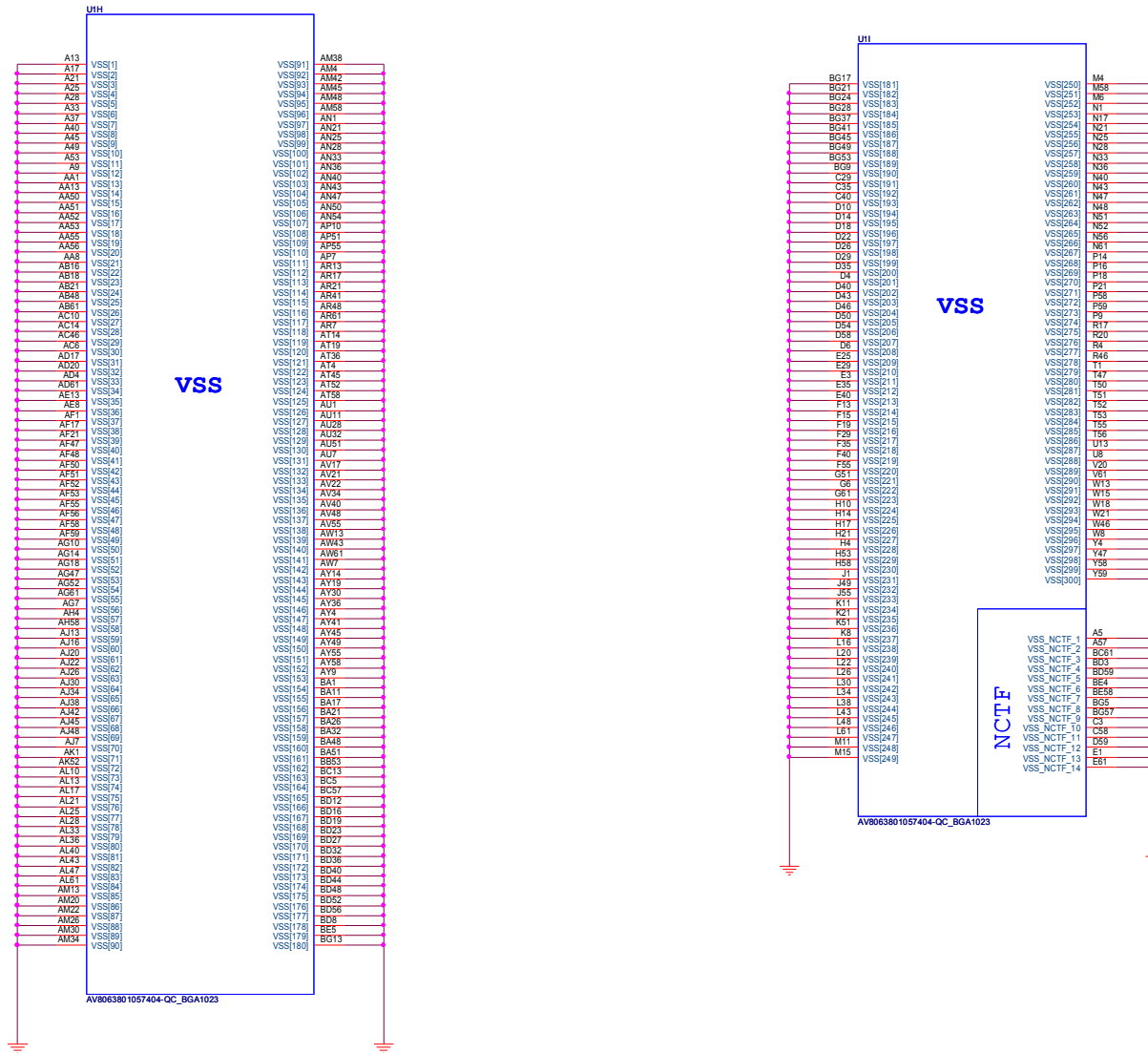
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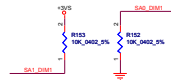


| VCCSA VID0 | VCCSA VID1 | VCCSA |
|------------|------------|---------------|
| 0 | 0 | 0.9v |
| 0 | 1 | 0.85v for ulv |
| | | 0.8v others |
| 1 | 0 | 0.725v |
| 1 | 1 | 0.675v |

SIT Phase change back to VCCSA

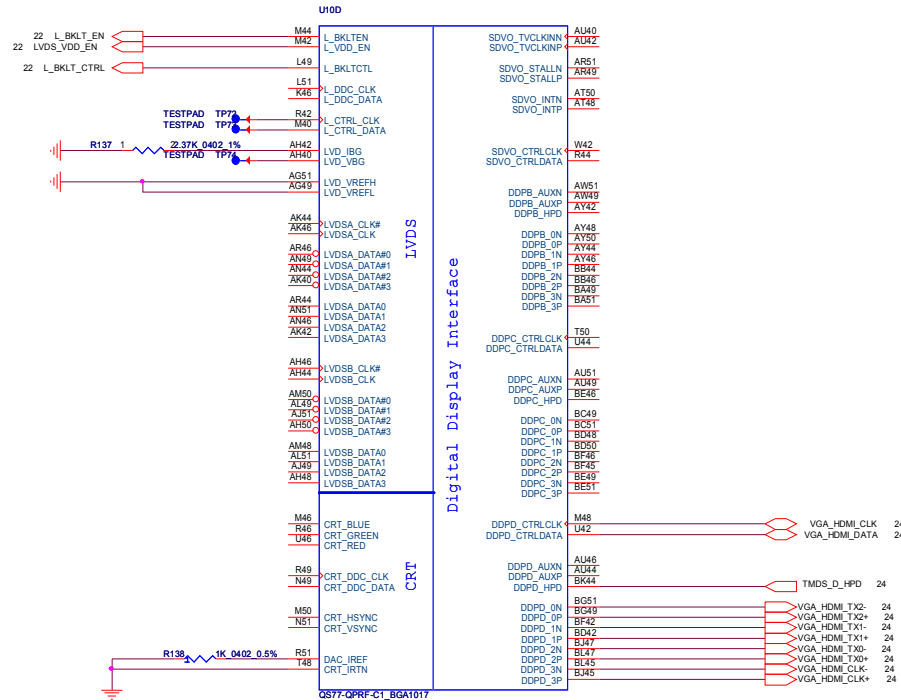
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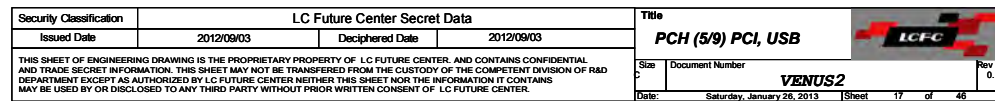


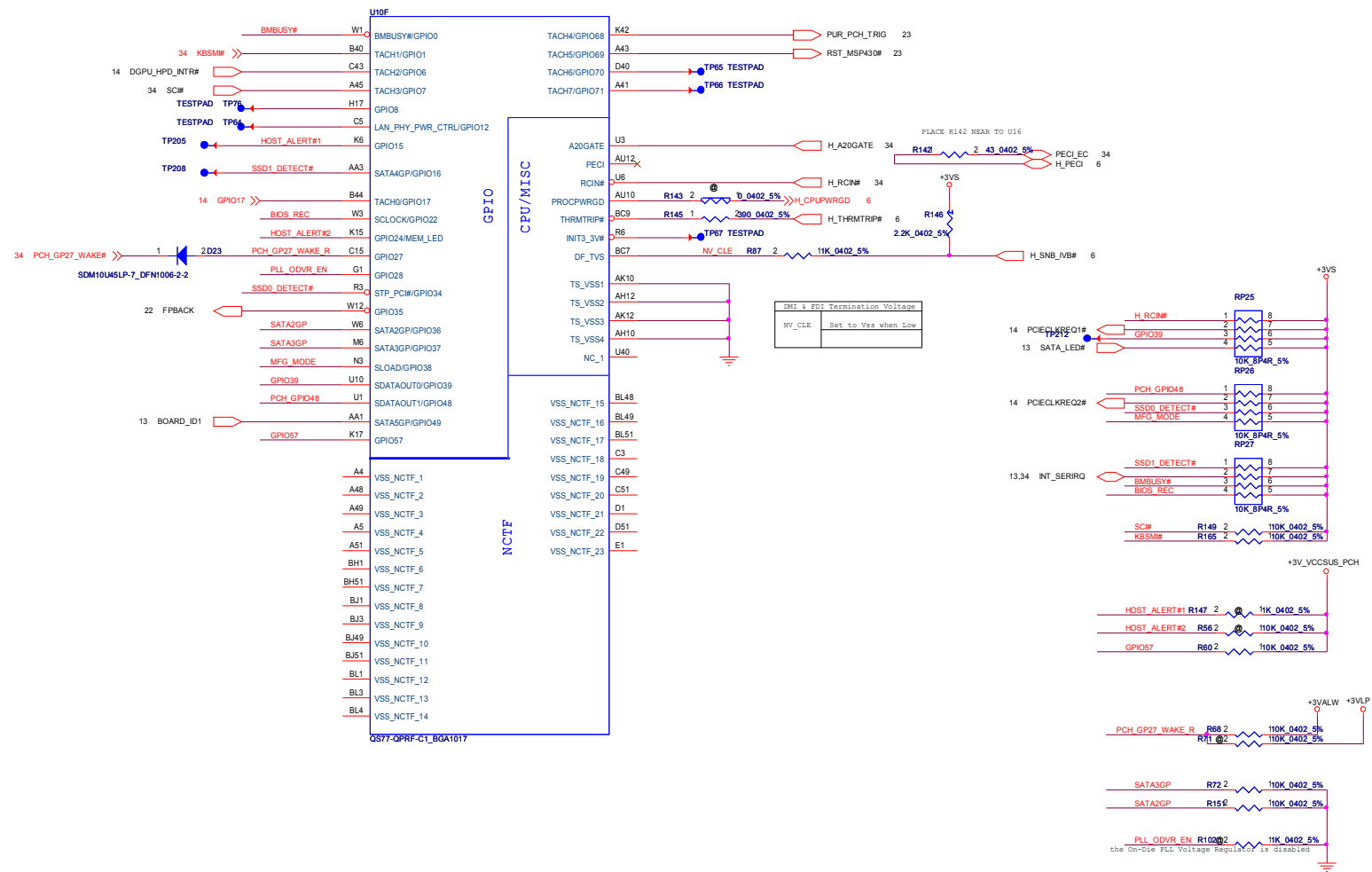


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|---|------------------------------|-----------------|---|---|-----------------|
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route LVD IBG as close as possible
to the PCH and away from any toggling
signals (minimum spacing of 20 mils or 0.508 mm).





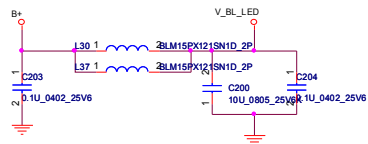
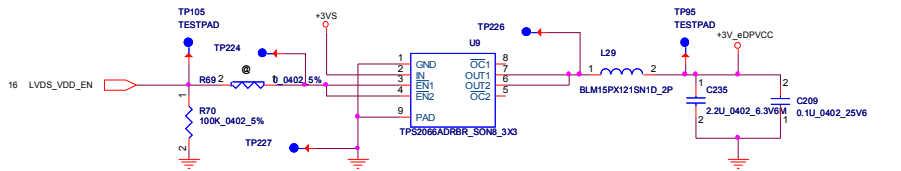
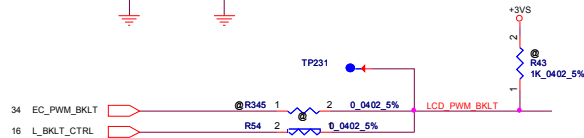
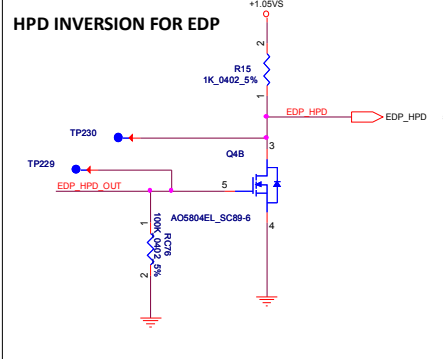
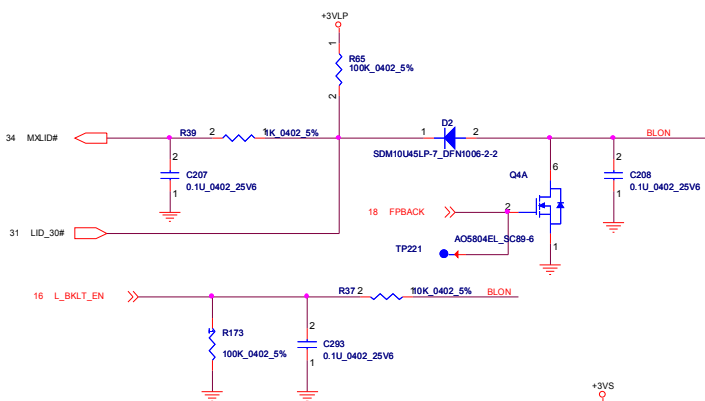


| U0H | | | |
|------|---------|----------|------|
| G7 | VSS[0] | | |
| AA11 | VSS[1] | VSS[80] | AL41 |
| AA39 | VSS[2] | VSS[81] | AL43 |
| AA41 | VSS[3] | VSS[82] | AL45 |
| AA43 | VSS[4] | VSS[83] | AL7 |
| AA45 | VSS[5] | VSS[84] | AL9 |
| AA7 | VSS[6] | VSS[85] | AM15 |
| AA9 | VSS[7] | VSS[86] | AM19 |
| AB17 | VSS[8] | VSS[87] | AM25 |
| AB2 | VSS[9] | VSS[88] | AM29 |
| AB25 | VSS[10] | VSS[89] | AM31 |
| AB33 | VSS[11] | VSS[90] | AM37 |
| AB35 | VSS[12] | VSS[91] | AP11 |
| AB37 | VSS[13] | VSS[92] | AP17 |
| AB4 | VSS[14] | VSS[93] | AP2 |
| AB48 | VSS[15] | VSS[94] | AP21 |
| AB50 | VSS[16] | VSS[95] | AP23 |
| AC11 | VSS[17] | VSS[96] | AP25 |
| AC17 | VSS[18] | VSS[97] | AP29 |
| AC25 | VSS[19] | VSS[98] | AP31 |
| AC41 | VSS[20] | VSS[99] | AP33 |
| AC43 | VSS[21] | VSS[100] | AP35 |
| AC45 | VSS[22] | VSS[101] | AP37 |
| AC7 | VSS[23] | VSS[102] | AP4 |
| AE13 | VSS[24] | VSS[103] | AP41 |
| AE15 | VSS[25] | VSS[104] | AP43 |
| AE17 | VSS[26] | VSS[105] | AP45 |
| AE25 | VSS[27] | VSS[106] | AP48 |
| AE35 | VSS[28] | VSS[107] | AP50 |
| AE41 | VSS[29] | VSS[108] | AP7 |
| AE43 | VSS[30] | VSS[109] | AP9 |
| AE45 | VSS[31] | VSS[110] | AR19 |
| AE7 | VSS[32] | VSS[111] | AR21 |
| AE9 | VSS[33] | VSS[112] | AR31 |
| AF19 | VSS[34] | VSS[113] | AR35 |
| AF2 | VSS[35] | VSS[114] | AR37 |
| AF25 | VSS[36] | VSS[115] | AT11 |
| AF27 | VSS[37] | VSS[116] | AT39 |
| AF29 | VSS[38] | VSS[117] | AT41 |
| AF31 | VSS[39] | VSS[118] | AT43 |
| AF4 | VSS[40] | VSS[119] | AT45 |
| AF48 | VSS[41] | VSS[120] | AT7 |
| AF50 | VSS[42] | VSS[121] | AT9 |
| AG11 | VSS[43] | VSS[122] | AU17 |
| AG17 | VSS[44] | VSS[123] | AU37 |
| AG3 | VSS[45] | VSS[124] | AV2 |
| AG19 | VSS[46] | VSS[125] | AV4 |
| AG25 | VSS[47] | VSS[126] | AV48 |
| AG31 | VSS[48] | VSS[127] | AV50 |
| AG35 | VSS[49] | VSS[128] | AW11 |
| AG41 | VSS[50] | VSS[129] | AW13 |
| AG43 | VSS[51] | VSS[130] | AW23 |
| AG45 | VSS[52] | VSS[131] | AW25 |
| AG7 | VSS[53] | VSS[132] | AW27 |
| AG9 | VSS[54] | VSS[133] | AW29 |
| AH2 | VSS[55] | VSS[134] | AW36 |
| AJ11 | VSS[56] | VSS[135] | AW39 |
| AJ19 | VSS[57] | VSS[136] | AW43 |
| AJ33 | VSS[58] | VSS[137] | AW45 |
| AJ35 | VSS[59] | VSS[138] | AW7 |
| AJ39 | VSS[60] | VSS[139] | AW9 |
| AJ41 | VSS[61] | VSS[140] | AY10 |
| AJ43 | VSS[62] | VSS[141] | B10 |
| AJ45 | VSS[63] | VSS[142] | B14 |
| AJ7 | VSS[64] | VSS[143] | B18 |
| AJ9 | VSS[65] | VSS[144] | B2 |
| AK17 | VSS[66] | VSS[145] | B26 |
| AK19 | VSS[67] | VSS[146] | B30 |
| AK2 | VSS[68] | VSS[147] | B34 |
| AK23 | VSS[69] | VSS[148] | B38 |
| AK25 | VSS[70] | VSS[149] | B42 |
| AK27 | VSS[71] | VSS[150] | B46 |
| AK35 | VSS[72] | VSS[151] | B6 |
| AK37 | VSS[73] | VSS[152] | BA11 |
| AK4 | VSS[74] | VSS[153] | BA13 |
| AK48 | VSS[75] | VSS[154] | BA16 |
| AK50 | VSS[76] | VSS[155] | BA18 |
| AL11 | VSS[77] | VSS[156] | BA21 |
| AL39 | VSS[78] | VSS[157] | BA23 |
| | VSS[79] | VSS[158] | |

QS77-QPRF-C1_BGA1017

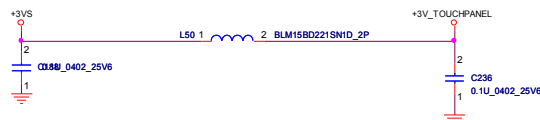
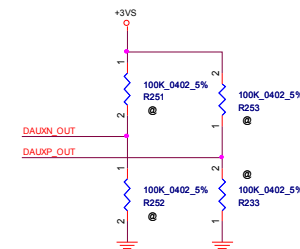
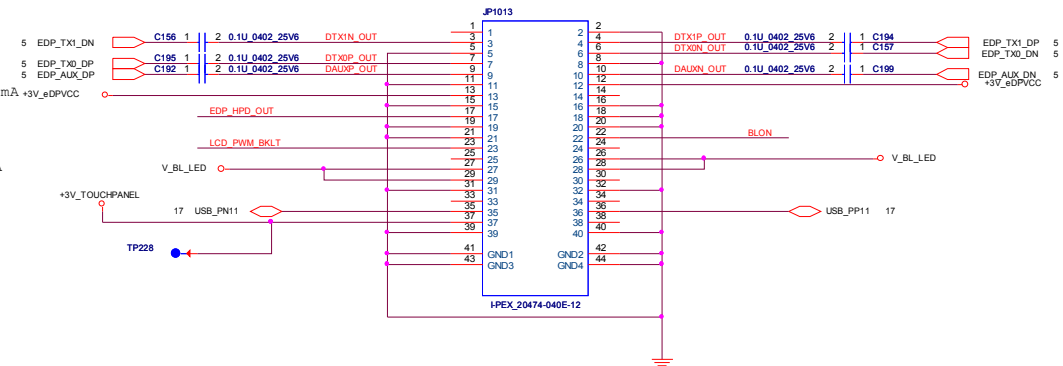
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|-------|----------|----------|------|
| BA25 | VSS[159] | J18 | |
| BA27 | VSS[160] | VSS[264] | J21 |
| BA29 | VSS[161] | VSS[265] | J23 |
| BA31 | VSS[162] | VSS[266] | J25 |
| BA33 | VSS[163] | VSS[267] | J27 |
| BA35 | VSS[164] | VSS[268] | J29 |
| BA39 | VSS[165] | VSS[269] | J31 |
| BA41 | VSS[166] | VSS[270] | J34 |
| BA43 | VSS[167] | VSS[271] | J36 |
| BA45 | VSS[168] | VSS[272] | J38 |
| BA7 | VSS[169] | VSS[273] | J41 |
| BA9 | VSS[170] | VSS[274] | J45 |
| BB4 | VSS[171] | VSS[275] | J7 |
| BB48 | VSS[172] | VSS[276] | J9 |
| BB50 | VSS[173] | VSS[277] | K2 |
| BB51 | VSS[174] | VSS[278] | K4 |
| BB53 | VSS[175] | VSS[279] | K48 |
| BB55 | VSS[176] | VSS[280] | K90 |
| BB57 | VSS[177] | VSS[281] | L11 |
| BB59 | VSS[178] | VSS[282] | L13 |
| BB61 | VSS[179] | VSS[283] | L16 |
| BB63 | VSS[180] | VSS[284] | L18 |
| BB65 | VSS[181] | VSS[285] | L29 |
| BB67 | VSS[182] | VSS[286] | L21 |
| BB69 | VSS[183] | VSS[287] | L23 |
| BB71 | VSS[184] | VSS[288] | L27 |
| BB73 | VSS[185] | VSS[289] | L9 |
| BB75 | VSS[186] | VSS[290] | L31 |
| BB77 | VSS[187] | VSS[291] | L34 |
| BB79 | VSS[188] | VSS[292] | L36 |
| BB81 | VSS[189] | VSS[293] | L39 |
| BB83 | VSS[190] | VSS[294] | L41 |
| BB85 | VSS[191] | VSS[295] | L43 |
| BB87 | VSS[192] | VSS[296] | L45 |
| BB89 | VSS[193] | VSS[297] | L7 |
| BB91 | VSS[194] | VSS[298] | N13 |
| BB93 | VSS[195] | VSS[299] | N21 |
| BB95 | VSS[196] | VSS[300] | R37 |
| BB97 | VSS[197] | VSS[301] | N23 |
| BB99 | VSS[198] | VSS[302] | N25 |
| BB101 | VSS[199] | VSS[303] | N31 |
| BB103 | VSS[200] | VSS[304] | N34 |
| BB105 | VSS[201] | VSS[305] | N39 |
| BB107 | VSS[202] | VSS[306] | N41 |
| BB109 | VSS[203] | VSS[307] | N43 |
| BB111 | VSS[204] | VSS[308] | N45 |
| BB113 | VSS[205] | VSS[309] | N7 |
| BB115 | VSS[206] | VSS[310] | N9 |
| BB117 | VSS[207] | VSS[311] | P2 |
| BB119 | VSS[208] | VSS[312] | P4 |
| BB121 | VSS[209] | VSS[313] | P48 |
| BB123 | VSS[210] | VSS[314] | P50 |
| BB125 | VSS[211] | VSS[315] | R17 |
| BB127 | VSS[212] | VSS[316] | R21 |
| BB129 | VSS[213] | VSS[317] | R31 |
| BB131 | VSS[214] | VSS[318] | R11 |
| BB133 | VSS[215] | VSS[319] | T15 |
| BB135 | VSS[216] | VSS[320] | T41 |
| BB137 | VSS[217] | VSS[321] | T43 |
| BB139 | VSS[218] | VSS[322] | T45 |
| BB141 | VSS[219] | VSS[323] | T7 |
| BB143 | VSS[220] | VSS[324] | T9 |
| BB145 | VSS[221] | VSS[325] | BH28 |
| BB147 | VSS[222] | VSS[326] | N25 |
| BB149 | VSS[223] | VSS[327] | AF8 |
| BB151 | VSS[224] | VSS[328] | AF9 |
| BB153 | VSS[225] | VSS[329] | BE2 |
| BB155 | VSS[226] | VSS[330] | BE26 |
| BB157 | VSS[227] | VSS[331] | BE28 |
| BB159 | VSS[228] | VSS[332] | F4 |
| BB161 | VSS[229] | VSS[333] | Q25 |
| BB163 | VSS[230] | VSS[334] | N11 |
| BB165 | VSS[231] | VSS[335] | BH18 |
| BB167 | VSS[232] | VSS[336] | BH22 |
| BB169 | VSS[233] | VSS[337] | BK30 |
| BB171 | VSS[234] | VSS[338] | AR17 |
| BB173 | VSS[235] | VSS[339] | J29 |
| BB175 | VSS[236] | VSS[340] | U31 |
| BB177 | VSS[237] | VSS[341] | U49 |
| BB179 | VSS[238] | VSS[342] | Y11 |
| BB181 | VSS[239] | VSS[343] | V15 |
| BB183 | VSS[240] | VSS[344] | V17 |
| BB185 | VSS[241] | VSS[345] | Y2 |
| BB187 | VSS[242] | VSS[346] | V27 |
| BB189 | VSS[243] | VSS[347] | V29 |
| BB191 | VSS[244] | VSS[348] | Y33 |
| BB193 | VSS[245] | VSS[349] | V35 |
| BB195 | VSS[246] | VSS[350] | V4 |
| BB197 | VSS[247] | VSS[351] | V41 |
| BB199 | VSS[248] | VSS[352] | V43 |
| BB201 | VSS[249] | VSS[353] | V45 |
| BB203 | VSS[250] | VSS[354] | V48 |
| BB205 | VSS[251] | VSS[355] | V7 |
| BB207 | VSS[252] | VSS[356] | Y9 |
| BB209 | VSS[253] | VSS[357] | Y15 |
| BB211 | VSS[254] | VSS[358] | Y17 |
| BB213 | VSS[255] | VSS[359] | Y33 |
| BB215 | VSS[256] | VSS[360] | Y35 |
| BB217 | VSS[257] | VSS[361] | Y37 |
| BB219 | VSS[258] | VSS[362] | AR8 |
| BB221 | VSS[259] | VSS[363] | AR8 |
| BB223 | VSS[260] | VSS[364] | BF15 |
| BB225 | VSS[261] | VSS[365] | BD15 |
| BB227 | VSS[262] | VSS[366] | BF24 |
| BB229 | VSS[263] | VSS[367] | BD24 |

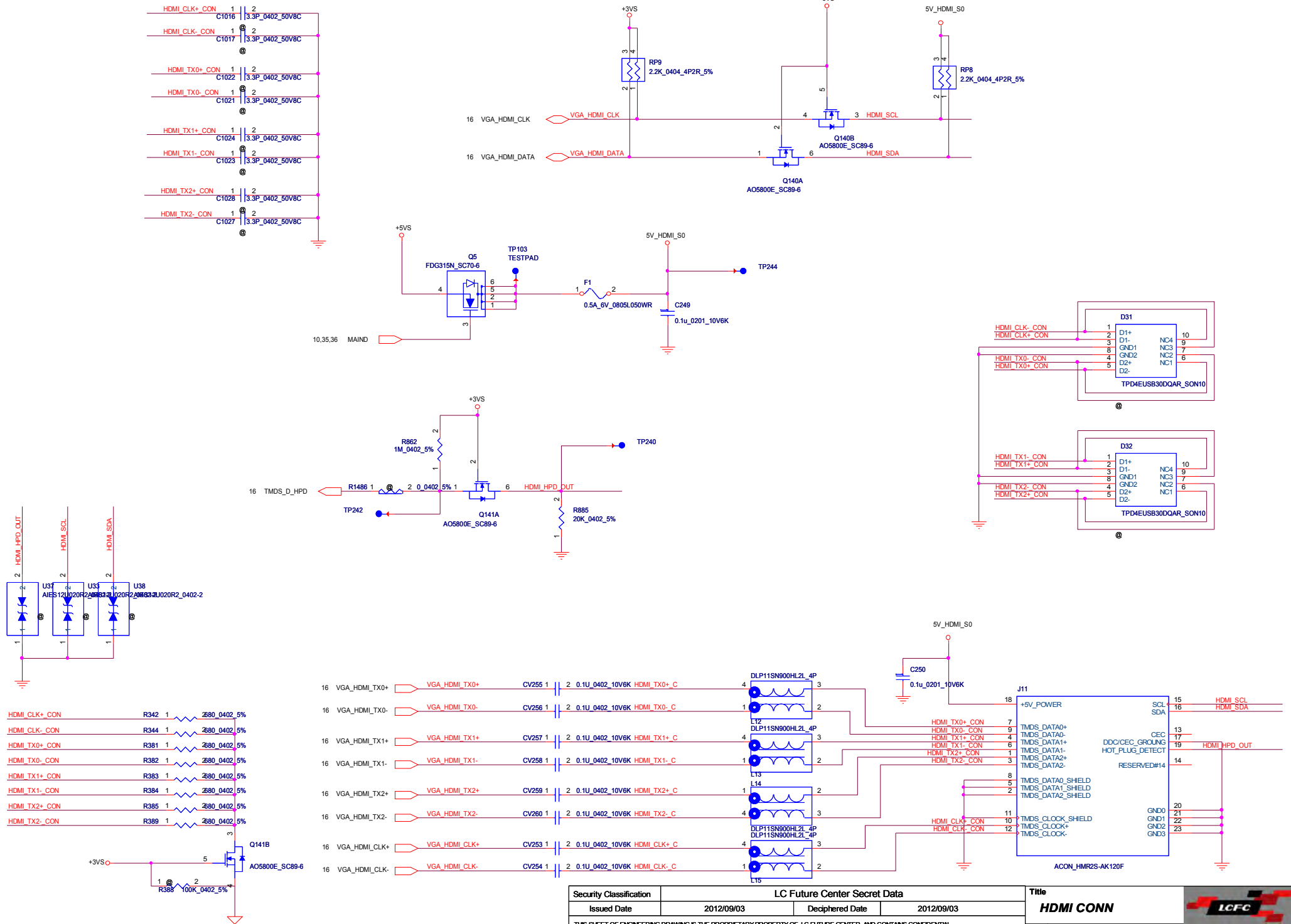
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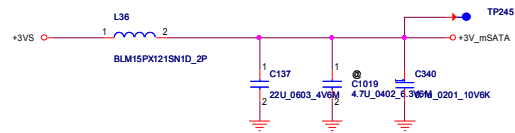


Max Current: 300mA +3V_eDPVCC

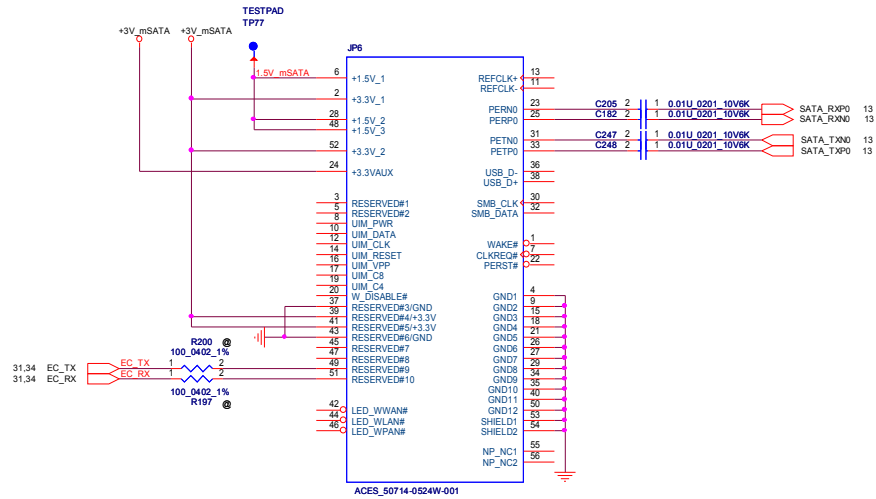
Max Current: 2A

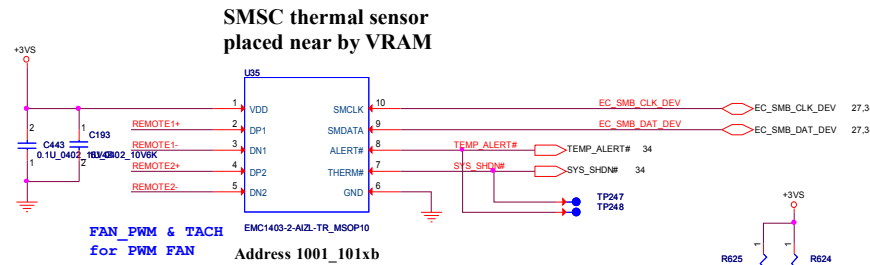
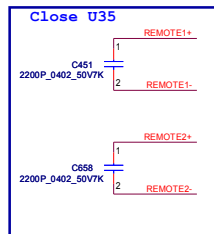
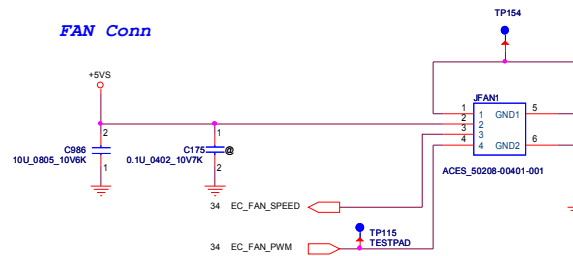




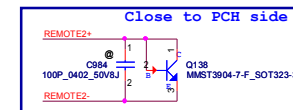
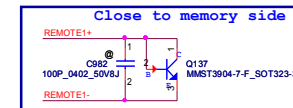


MINI PCIE CON FOR mSATA (Full Card)

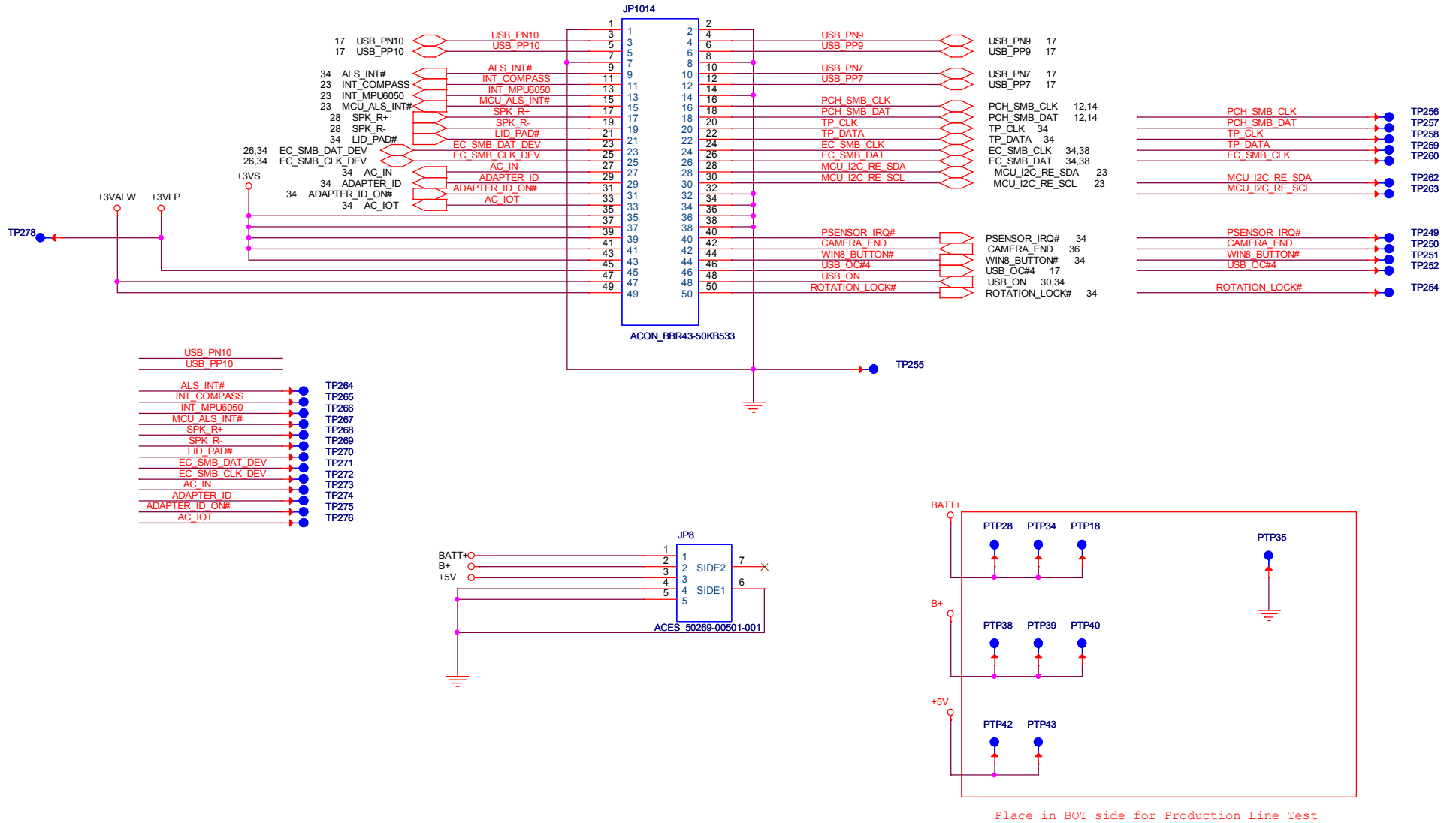





internal pull up 1.2K to 1.5V
R for initial thermal
shutdown temp



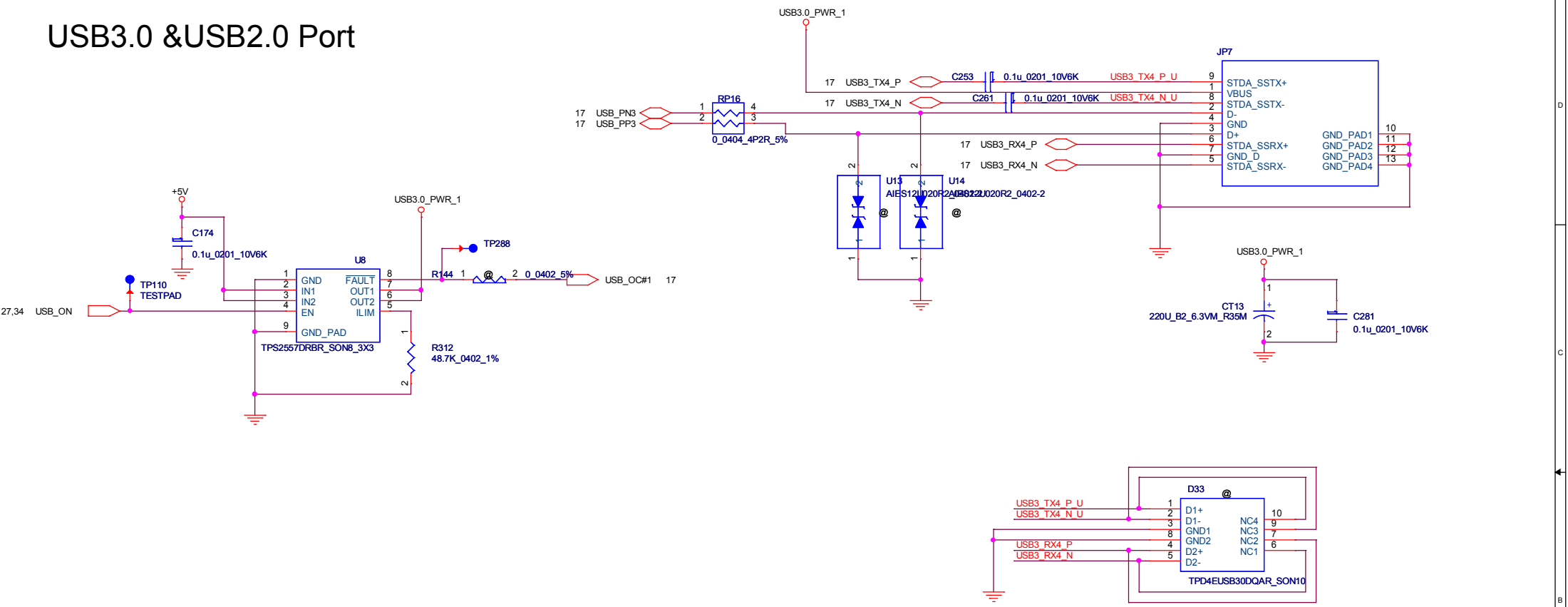
REMOTE2+/-:
Trace width/space:10/10 mil
Trace length:<8"




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| Security Classification | LC Future Center Secret Data | | | Title |  | |
| Issued Date | 2012/09/03 | Deciphered Date | 2012/09/03 | Cardreader | | |
| THIS SHEET OF ENGINEERING DRAWING IS THE PROPRIETARY PROPERTY OF LC FUTURE CENTER. AND CONTAINS CONFIDENTIAL AND TRADE SECRET INFORMATION. THIS SHEET MAY NOT BE TRANSFERRED FROM THE CUSTODY OF THE COMPETENT DIVISION OF DEPARTMENT EXCEPT AS AUTHORIZED BY LC FUTURE CENTER NEITHER THIS SHEET NOR THE INFORMATION IT CONTAINS MAY BE USED BY OR DISCLOSED TO ANY THIRD PARTY WITHOUT PRIOR WRITTEN CONSENT OF LC FUTURE CENTER. | | | | | Size B27 | Document Number VENUS2 |
| | | | | | Date: Saturday, January 26, 2013 | Rev 0.1 |
| | | | | | Sheet 27 | of 46 |

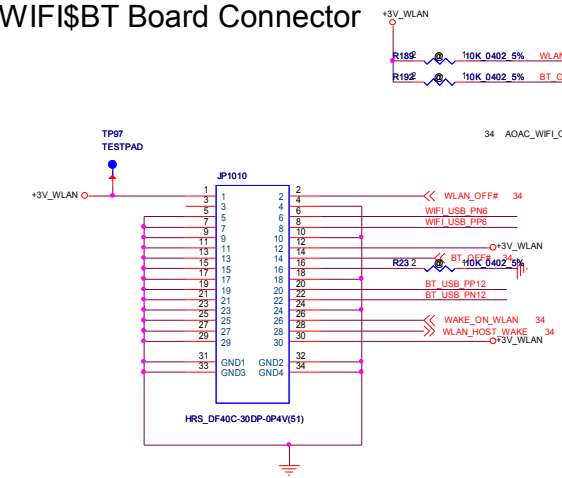
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USB3.0 & USB2.0 Port

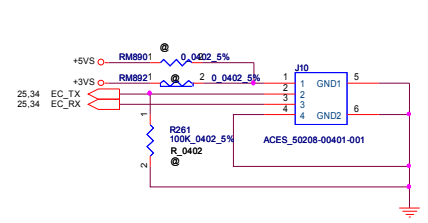


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| Security Classification | | LC Future Center Secret Data | | | | Title | |  | | | | | | | | | | | | | |
| Issued Date | | 2012/09/03 | | Deciphered Date | | 2012/09/03 | | | | | | USB2.0/ USB3.0 | | | | | | | | | |
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| | | | | | | | | | | Date: | | Saturday, January 26, 2013 | | | | Sheet | | 30 | | of 46 | |

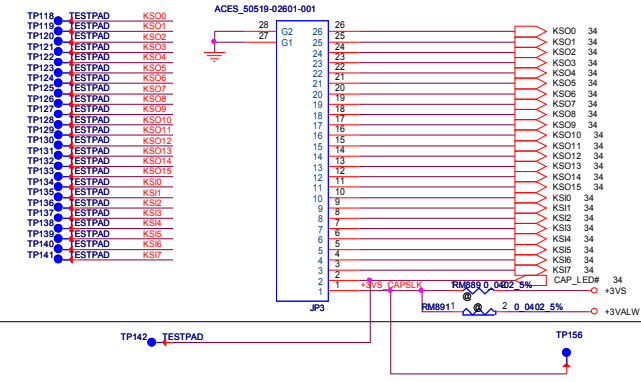
WIFI\$BT Board Connector



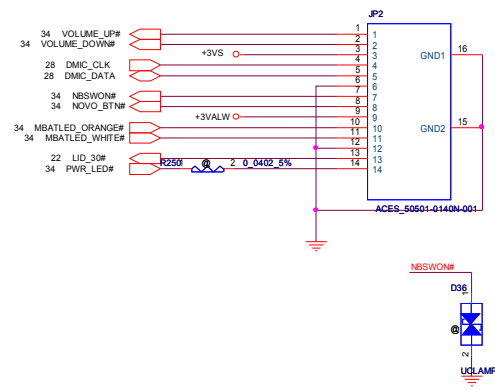
UART Debug Connector



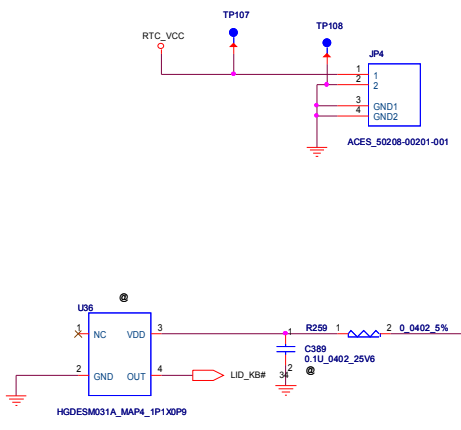
Keyboard Connector

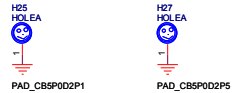
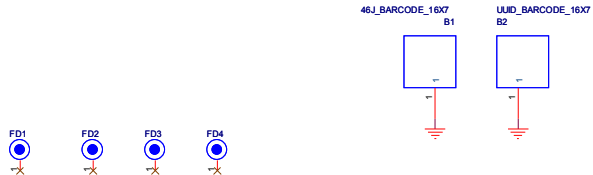


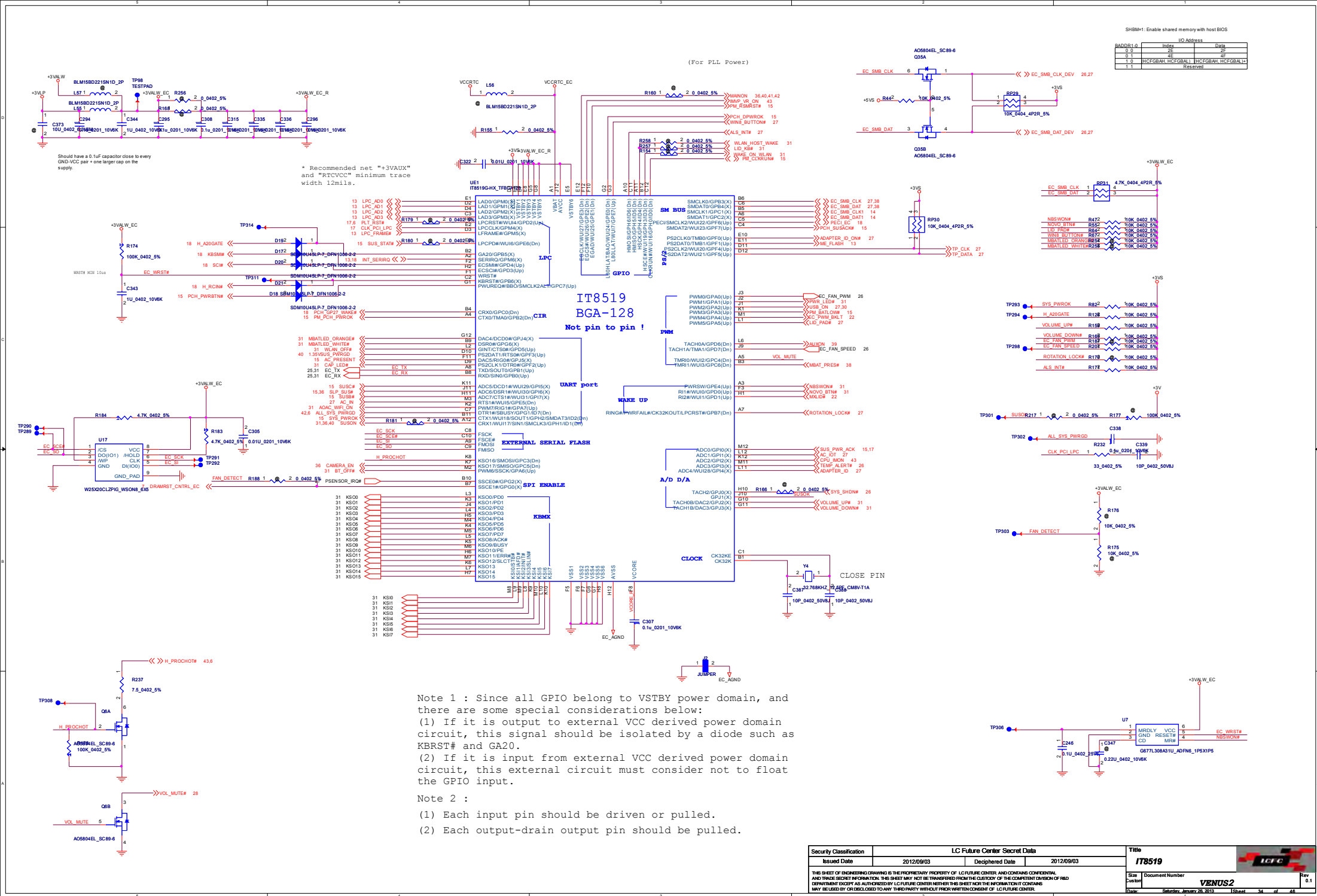
Power&Volume Board Connector



RTC Connector








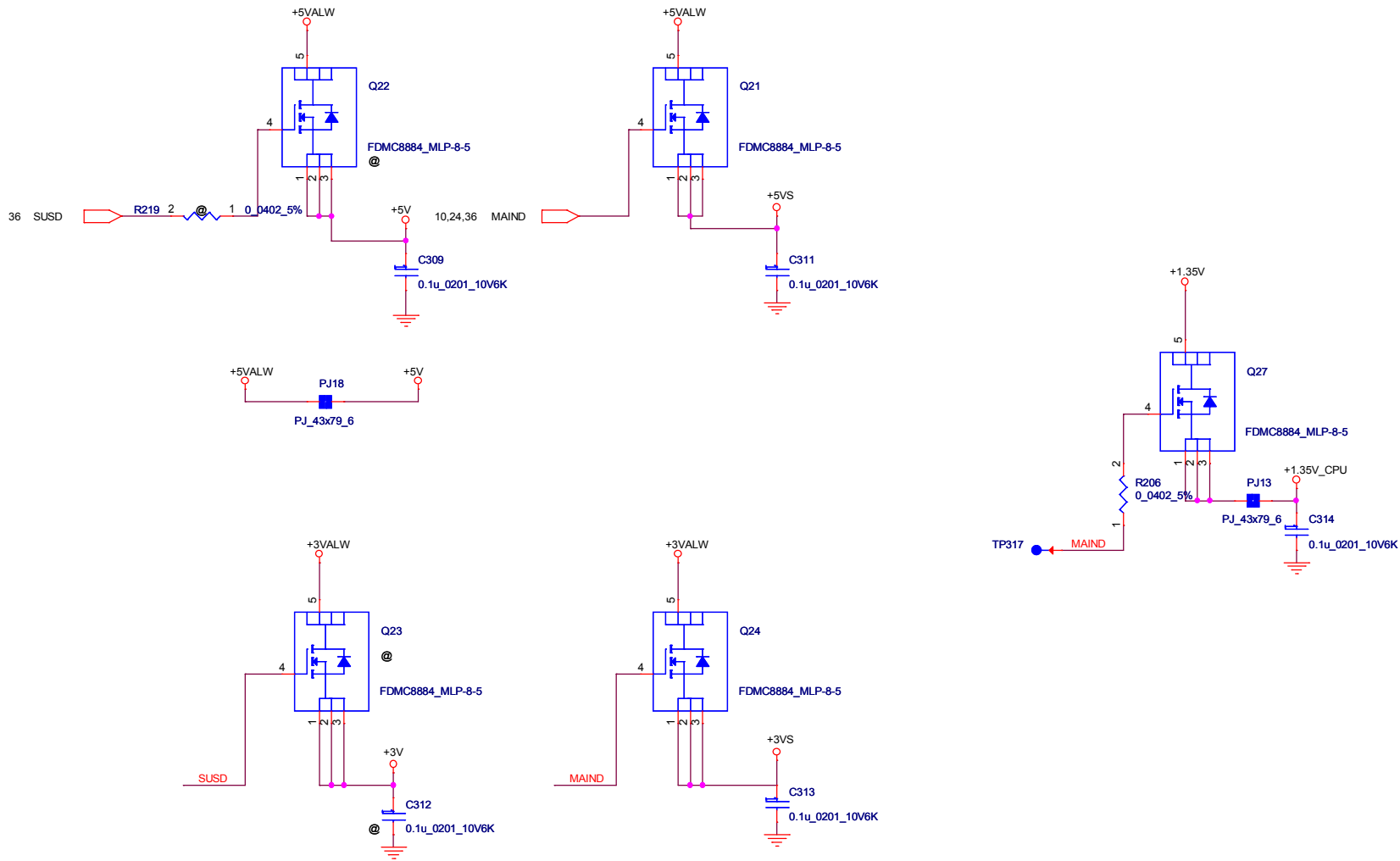
Note 1 : Since all GPIO belong to VSTBY power domain, and there are some special considerations below:


- (1) If it is output to external VCC derived power domain circuit, this signal should be isolated by a diode such as KBRST# and GA20.
- (2) If it is input from external VCC derived power domain circuit, this external circuit must consider not to float the GPIO input.

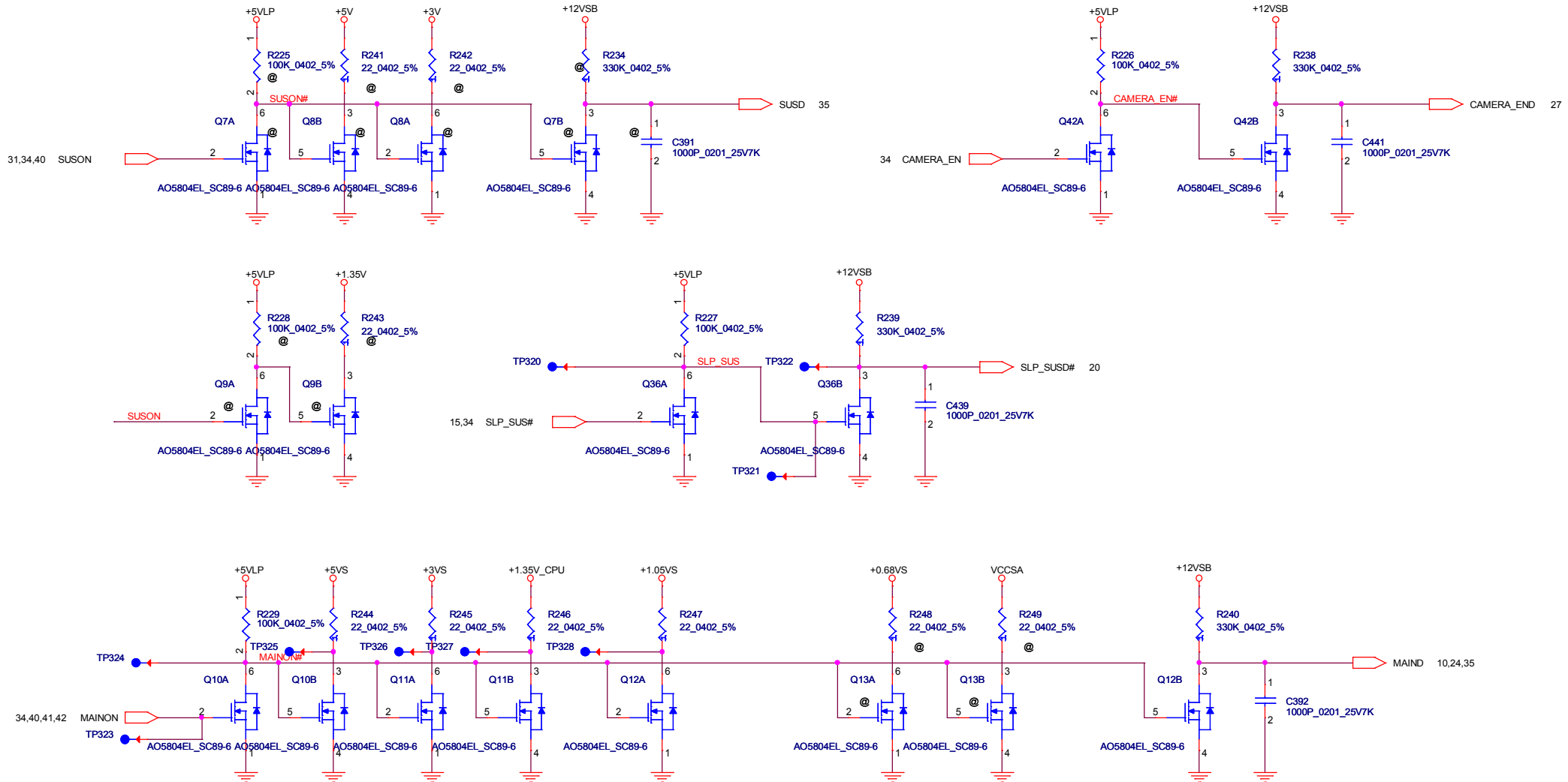
Note 2 :

- (1) Each input pin should be driven or pulled.
- (2) Each output-drain output pin should be pulled.

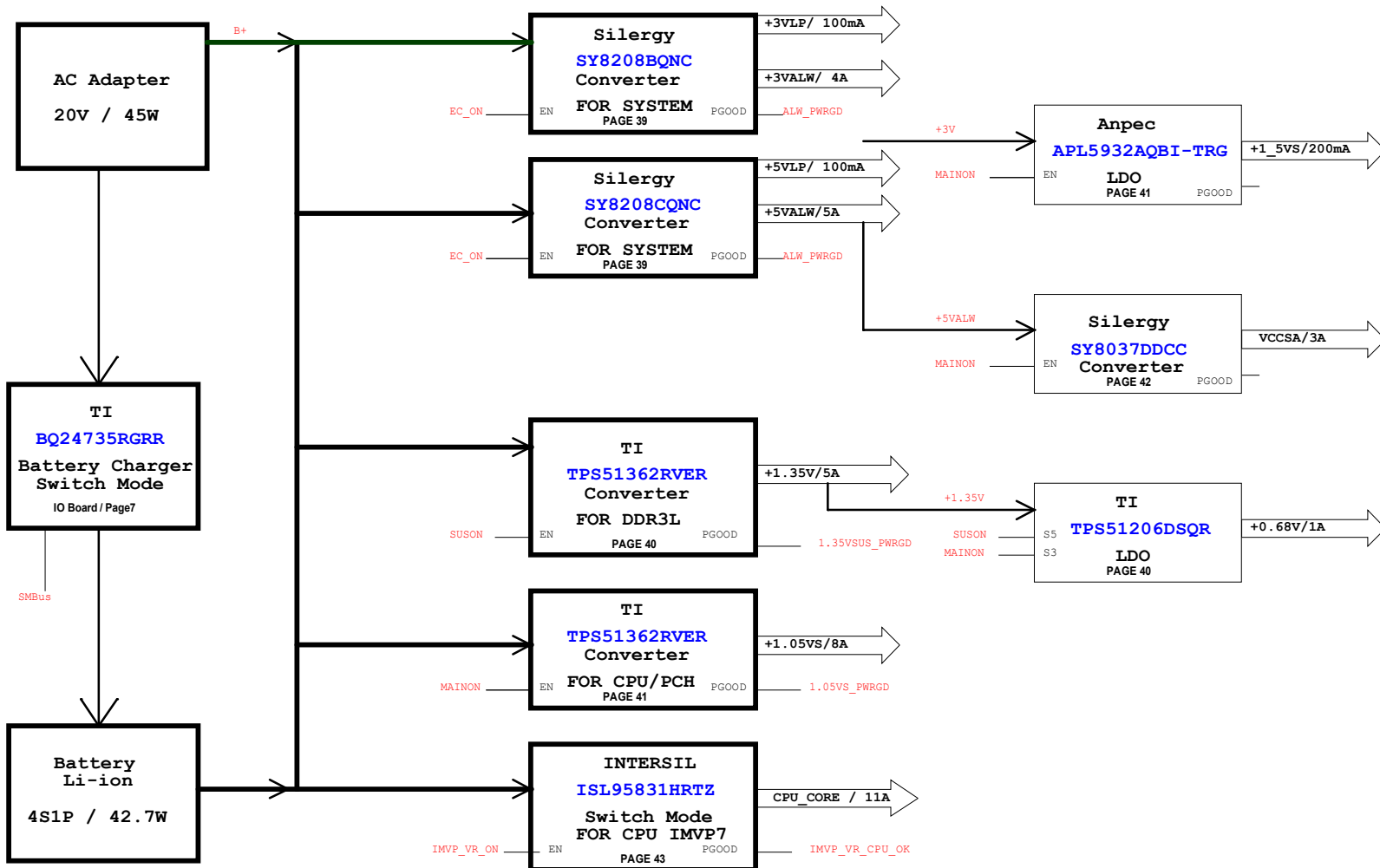
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| Security Classification | | LC Future Center Secret Data | | Title | |  | |
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| 2012/09/03 | | | | | | | |
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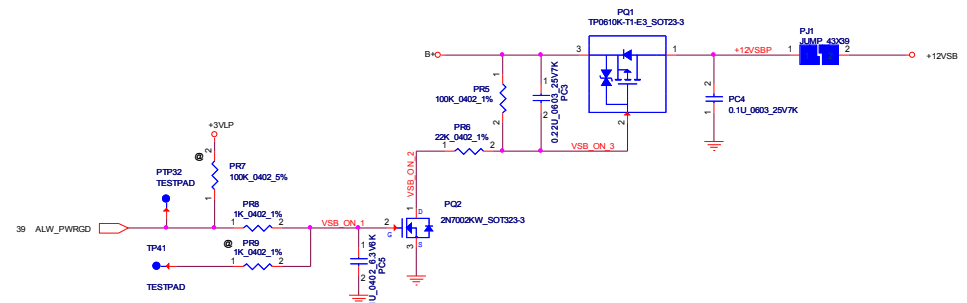
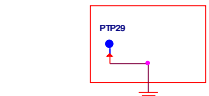
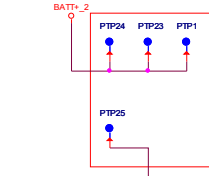
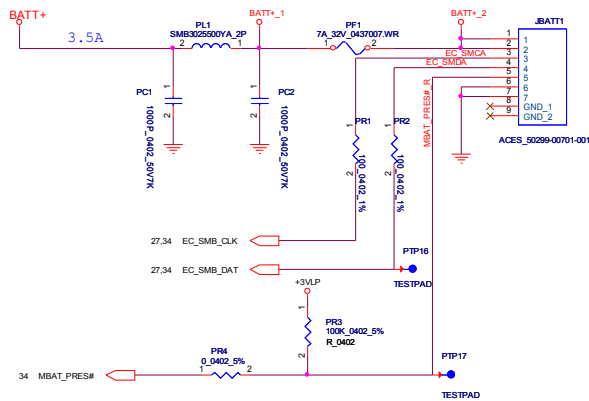


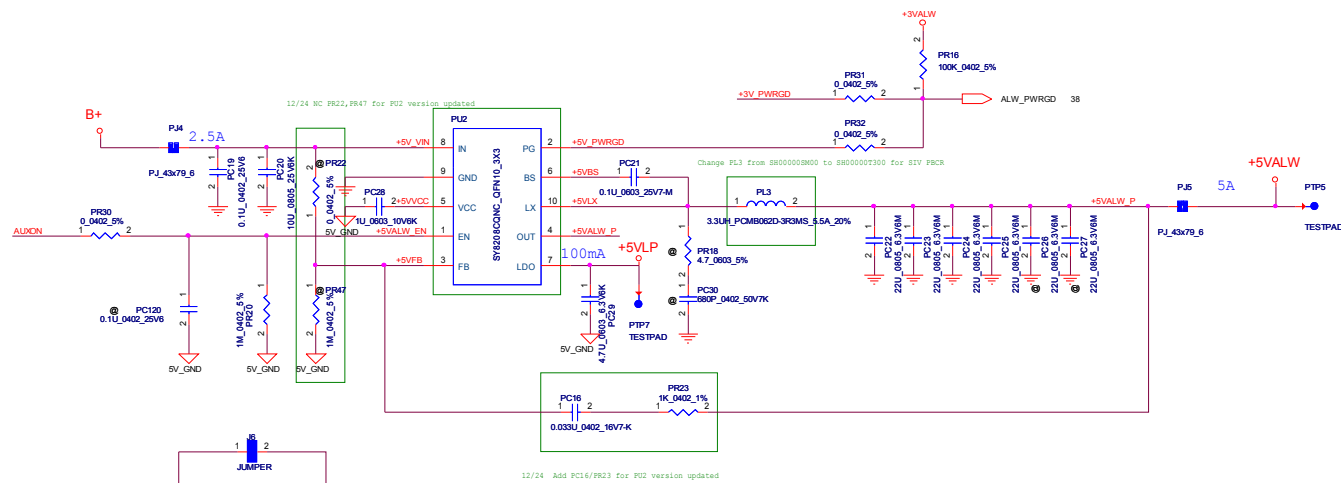
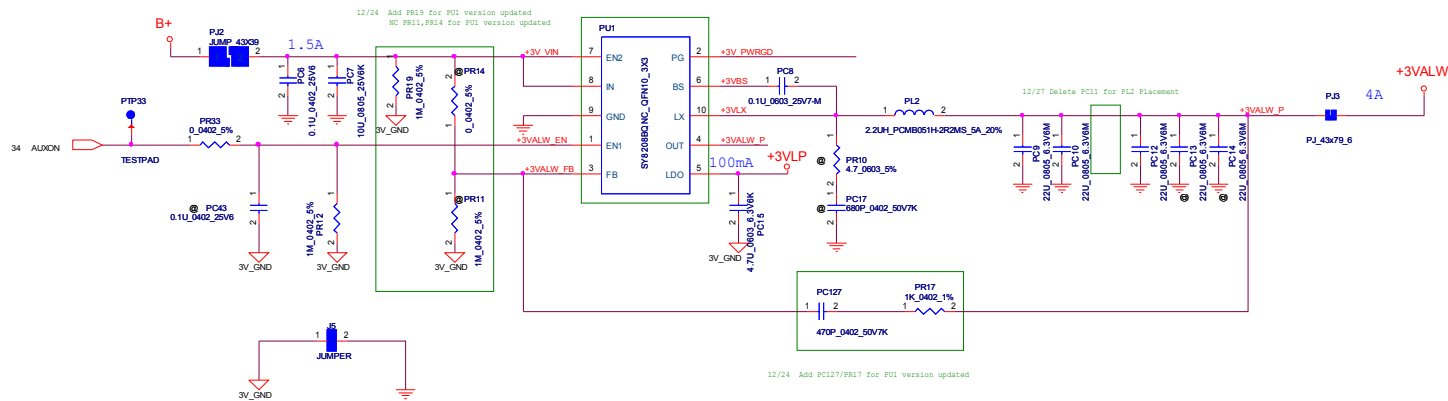
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| Security Classification | | LC Future Center Secret Data | | | | Title | |  | |
| Issued Date | | 2012/09/03 | | Deciphered Date | | 2012/09/03 | | | |
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| Size | | Document Number | | | | Rev | | 0.1 | |
| B217 | | VENUS2 | | | | Date: | | Saturday, January 26, 2013 | |
| | | | | | | Sheet | | 35 of 46 | |

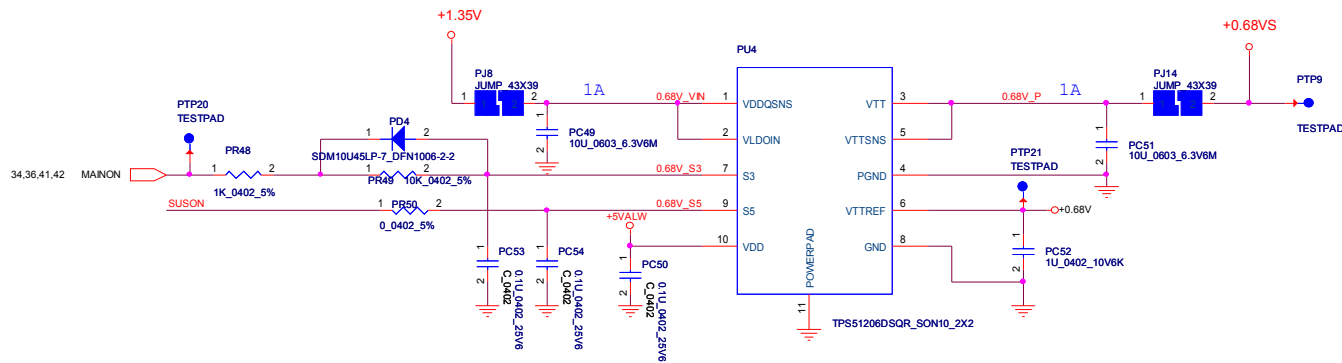
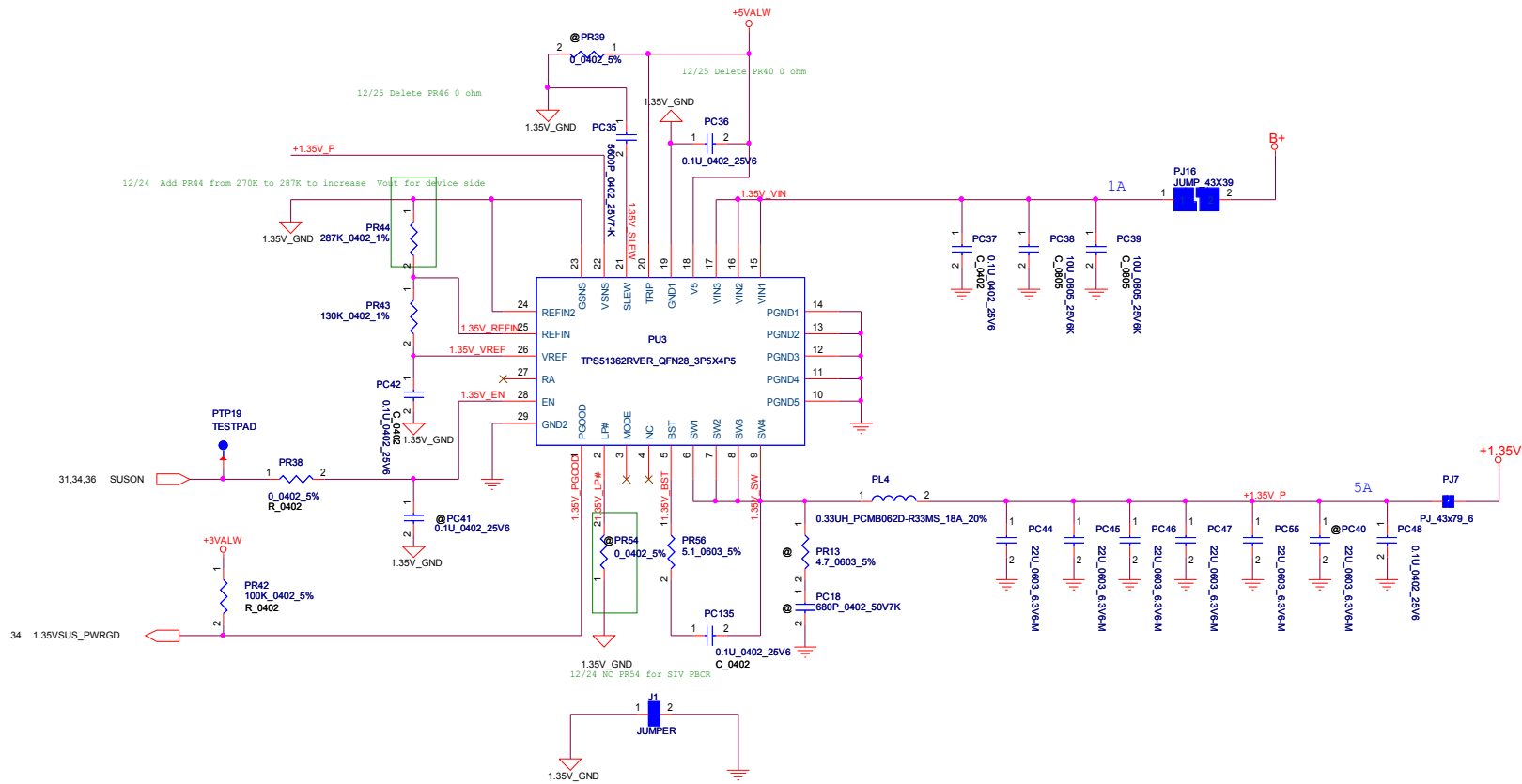


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| Security Classification | | LC Future Center Secret Data | | Title | |
| Issued Date | 2012/09/03 | Deciphered Date | 2012/09/03 | CPU (1/7) DMI, FDI, PEG | |
| THIS SHEET OF ENGINEERING DRAWING IS THE PROPRIETARY PROPERTY OF LC FUTURE CENTER. AND CONTAINS CONFIDENTIAL AND TRADE SECRET INFORMATION. THIS SHEET MAY NOT BE TRANSFERRED FROM THE CUSTODY OF THE COMPETENT DIVISION OF DEPARTMENT EXCEPT AS AUTHORIZED BY LC FUTURE CENTER NEITHER THIS SHEET NOR THE INFORMATION IT CONTAINS MAY BE USED BY OR DISCLOSED TO ANY THIRD PARTY WITHOUT PRIOR WRITTEN CONSENT OF LC FUTURE CENTER. | | | | Size B217 | Document Number VENUS2 |
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| | | | | Sheet 36 | of 46 |





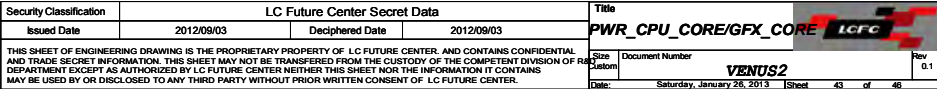




| Security Classification | | | |
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| LC Future Center Secret Data | | | |
| Issued Date | 2012/09/03 | Deciphered Date | 2012/09/03 |
| THIS SHEET OF ENGINEERING DRAWING IS THE PROPRIETARY PROPERTY OF LC FUTURE CENTER, AND CONTAINS CONFIDENTIAL AND TRADE SECRET INFORMATION. THIS SHEET MAY NOT BE TRANSFERRED FROM THE CUSTODY OF THE COMPETENT DIVISION OF R&D DEPARTMENT EXCEPT AS AUTHORIZED BY LC FUTURE CENTER. NEITHER THIS SHEET NOR THE INFORMATION IT CONTAINS MAY BE USED BY OR DISCLOSED TO ANY THIRD PARTY WITHOUT PRIOR WRITTEN CONSENT OF LC FUTURE CENTER. | | | |

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| <h3>SIT Change List</h3> <ol style="list-style-type: none"> replace 0ohm to R-Short to cost down change R51 from 100ohm to 33ohm,and add 47pf on the trace of DMIC_CLK to lower the MIC record noise remove reserved 5vs for touchpanel, and remove reserved 3vs power switch for touchpanel replace the 0ohm to common choke for USB2.0 Port replace the 0ohm to common choke for HDMI Port add fuse for HDMI 5v power to satisfy the saft test requirement combine some mosfet in discharge schematic for cost down remove 5v,3v discharge remove the win8_button# pull up to +3vs in I/O board remove mic in power board and rotation board, and add one connector in power board for mic module solution remove reserved PECl to PCH change J9 to R_Short for layout | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <h3>SIT2 Change List</h3> <ol style="list-style-type: none"> Add the test point change the F1 size from 0402 to 0805 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | <table border="1"> <tr> <td colspan="2">Security Classification</td><td colspan="2">LC Future Center Secret Data</td><td colspan="2">Title</td><td colspan="2" rowspan="2">  </td></tr> <tr> <td>Issued Date</td><td>2012/09/03</td><td>Deciphered Date</td><td>2012/09/03</td><td colspan="4">HW change list</td></tr> <tr> <td colspan="5" rowspan="2"> THIS SHEET OF ENGINEERING DRAWING IS THE PROPRIETARY PROPERTY OF LC FUTURE CENTER. AND CONTAINS CONFIDENTIAL AND TRADE SECRET INFORMATION. THIS SHEET MAY NOT BE TRANSFERED FROM THE CUSTODY OF THE COMPETENT DIVISION OF R&D DEPARTMENT EXCEPT AS AUTHORIZED BY LC FUTURE CENTER NEITHER THIS SHEET NOR THE INFORMATION IT CONTAINS MAY BE USED BY OR DISCLOSED TO ANY THIRD PARTY WITHOUT PRIOR WRITTEN CONSENT OF LC FUTURE CENTER. </td><td>Size</td><td>Document Number</td><td>Rev</td></tr> <tr> <td>B</td><td>VENUS2</td><td>0.1</td></tr> <tr> <td colspan="5"></td><td>Date:</td><td>Saturday, January 26, 2013</td><td>Sheet 46 of 46</td></tr> </table> | | | | | Security Classification | | LC Future Center Secret Data | | Title | |  | | Issued Date | 2012/09/03 | Deciphered Date | 2012/09/03 | HW change list | | | | THIS SHEET OF ENGINEERING DRAWING IS THE PROPRIETARY PROPERTY OF LC FUTURE CENTER. AND CONTAINS CONFIDENTIAL AND TRADE SECRET INFORMATION. THIS SHEET MAY NOT BE TRANSFERED FROM THE CUSTODY OF THE COMPETENT DIVISION OF R&D DEPARTMENT EXCEPT AS AUTHORIZED BY LC FUTURE CENTER NEITHER THIS SHEET NOR THE INFORMATION IT CONTAINS MAY BE USED BY OR DISCLOSED TO ANY THIRD PARTY WITHOUT PRIOR WRITTEN CONSENT OF LC FUTURE CENTER. | | | | | Size | Document Number | Rev | B | VENUS2 | 0.1 | | | | | | Date: | Saturday, January 26, 2013 | Sheet 46 of 46 |
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| | | | | | Date: | Saturday, January 26, 2013 | Sheet 46 of 46 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |