

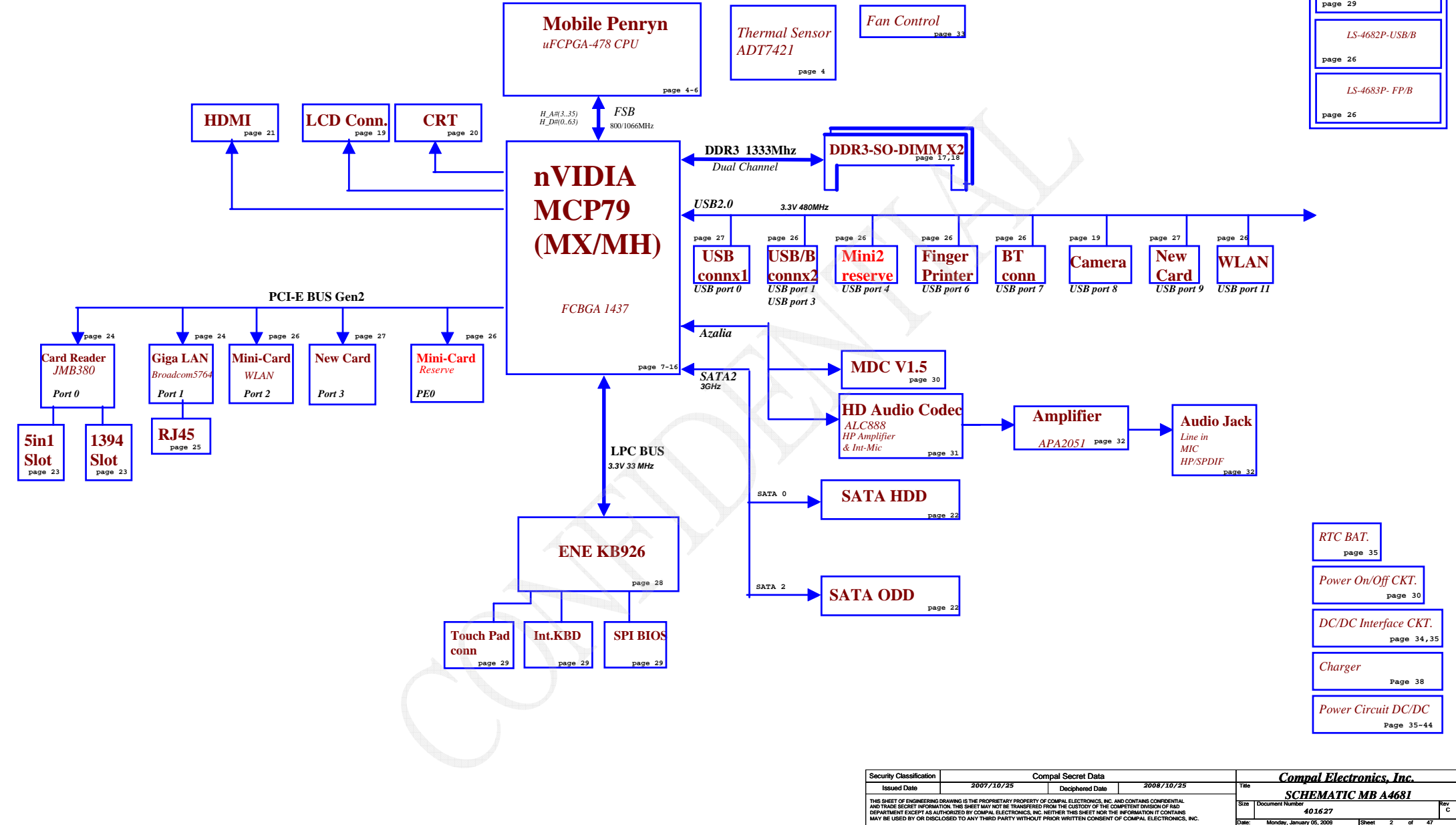
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KALA0 Schematics Document Intel Processor with MCP79

2008-11-25

REV: 1.0

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Sub-board

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LS-4682P-USB/B	page 26
LS-4683P- FP/B	page 26

RTC BAT.	page 35
Power On/Off CKT.	page 30
DC/DC Interface CKT.	page 34, 35
Charger	Page 38
Power Circuit DC/DC	Page 35-44

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Voltage Rails

Power Plane	Description	S0	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
+MCP_CORE	Core voltage for MCP79	ON	OFF	OFF
+1.05VS	1.05V switched power rail	ON	OFF	OFF
+1.1Valways	1.1Valways switched power rail	ON	ON	ON
+1.1VS	1.1Valways switched power rail	ON	OFF	OFF
+1.5V	1.5V switched power rail	ON	ON	OFF
+1.5VS	1.5V power rail for DDR3	ON	OFF	OFF
+0.75VS	0.75VS switched power rail	ON	OFF	OFF
+1.8VS	1.8VS 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	X
+3V_LAN	3.3V power rail for LAN	ON	ON	X
+3VS	3.3V switched power rail	ON	OFF	OFF
+5VALW	5V always on power rail	ON	ON	ON*
+5VS	5V switched power rail	ON	OFF	OFF
+VSB	VSB always on power rail	ON	ON	ON*
+RTCVCC	RTC power	ON	ON	ON

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

STATE	SIGNAL	SLP_S3#	SLP_S4#	SLP_S5#	+VALW	+V	+VS	Clock
Full ON	HIGH	HIGH	HIGH	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	100K +/- 5%			
Board ID	Rb	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, 0.3
2	
3	
4	
5	
6	
7	1.0

BTO Option Table

Default Item	BOM Structure
	A01@
	mini2@
	385@
v	1394@
	Amic@
v	Dmic@

EC SM Bus1 address

Device	Address
Smart Battery	0001 011X b

EC SM Bus2 address

Device	Address
BMC1402	1001 100X b

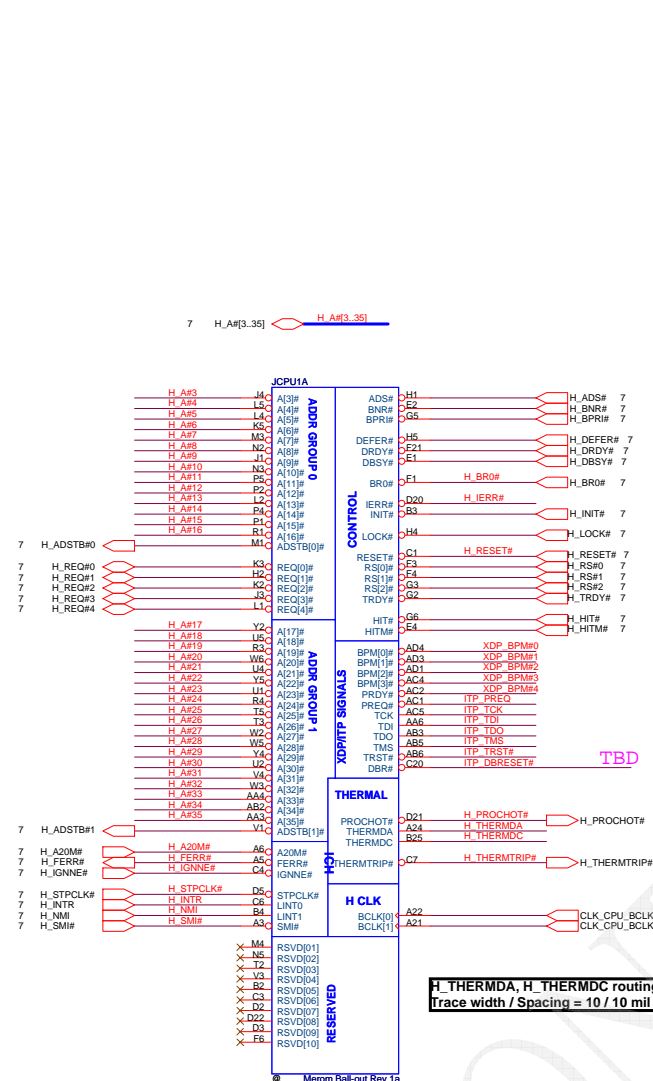
MCP79 SM Bus 0 address

Device	Address
New card	1010 0000
Lan	
Minicard	
Minicard	

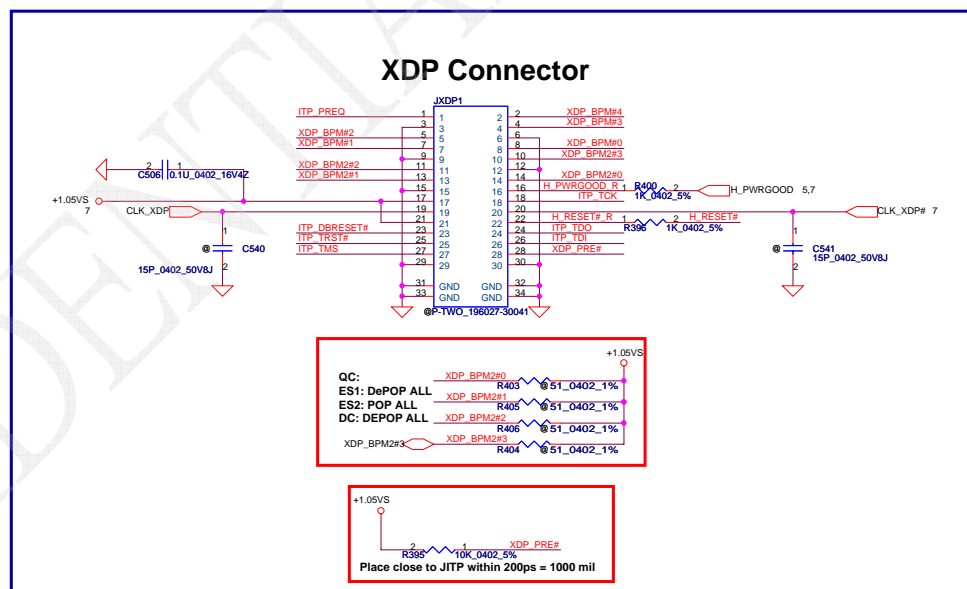
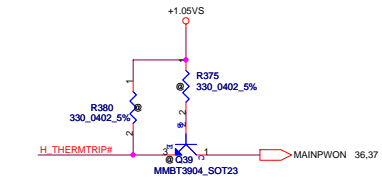
MCP79 SM Bus 1 address

Device	Address
DDR DIMM0	1010 0000
DDR DIMM1	1010 0010

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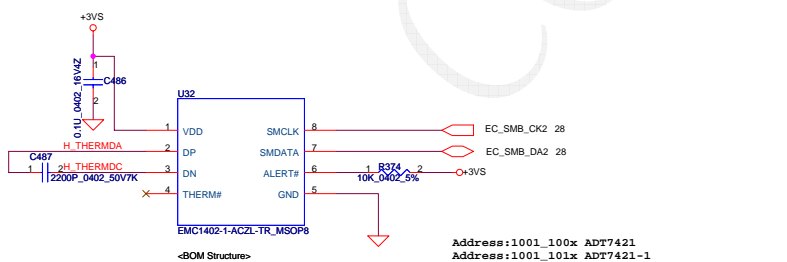


Place close to CPU within 500mil



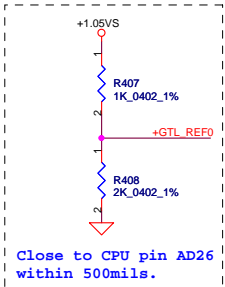
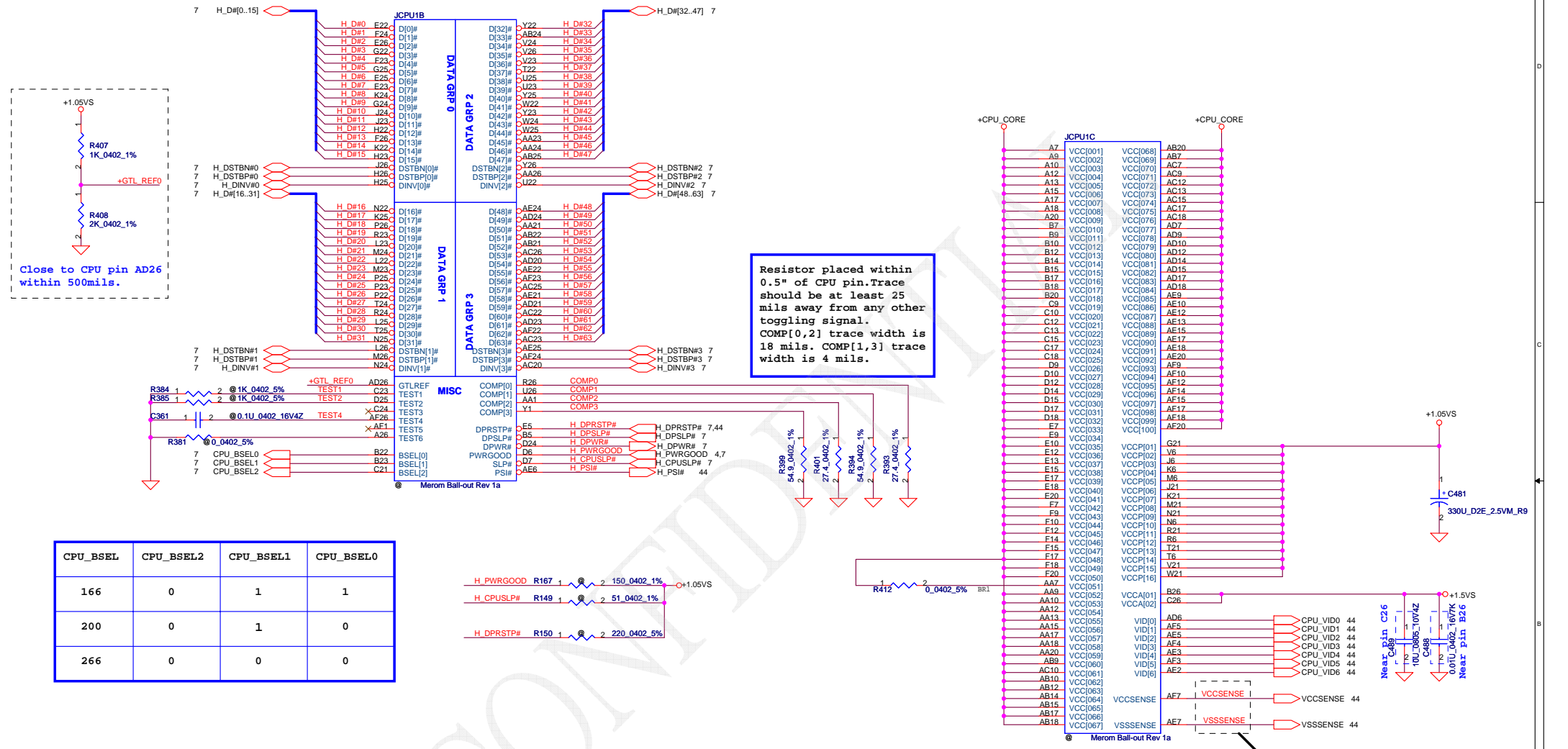
H_THERMDA, H_THERMDC routing together, Trace width / Spacing = 10 / 10 mil

Thermal Sensor SMSC EMC1402(Main)



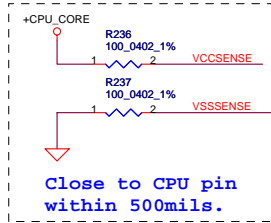
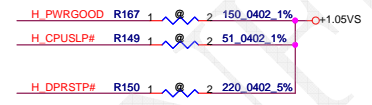
Address:1001_100x ADT7421
Address:1001_101x ADT7421-1

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Resistor placed within 0.5" of CPU pin. Trace should be at least 25 mils away from any other toggling signal. COMP[0,2] trace width is 18 mils. COMP[1,3] trace width is 4 mils.

CPU_BSEL	CPU_BSEL2	CPU_BSEL1	CPU_BSEL0
166	0	1	1
200	0	1	0
266	0	0	0



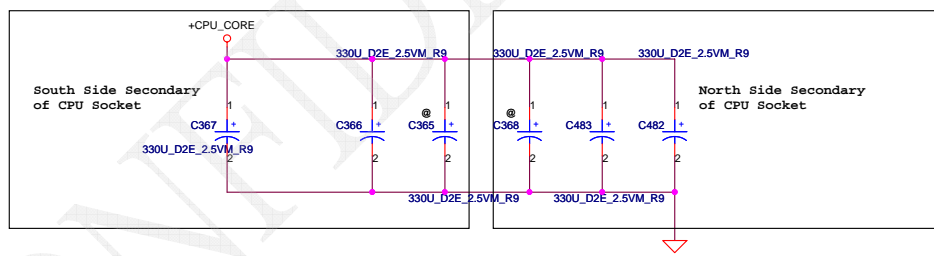
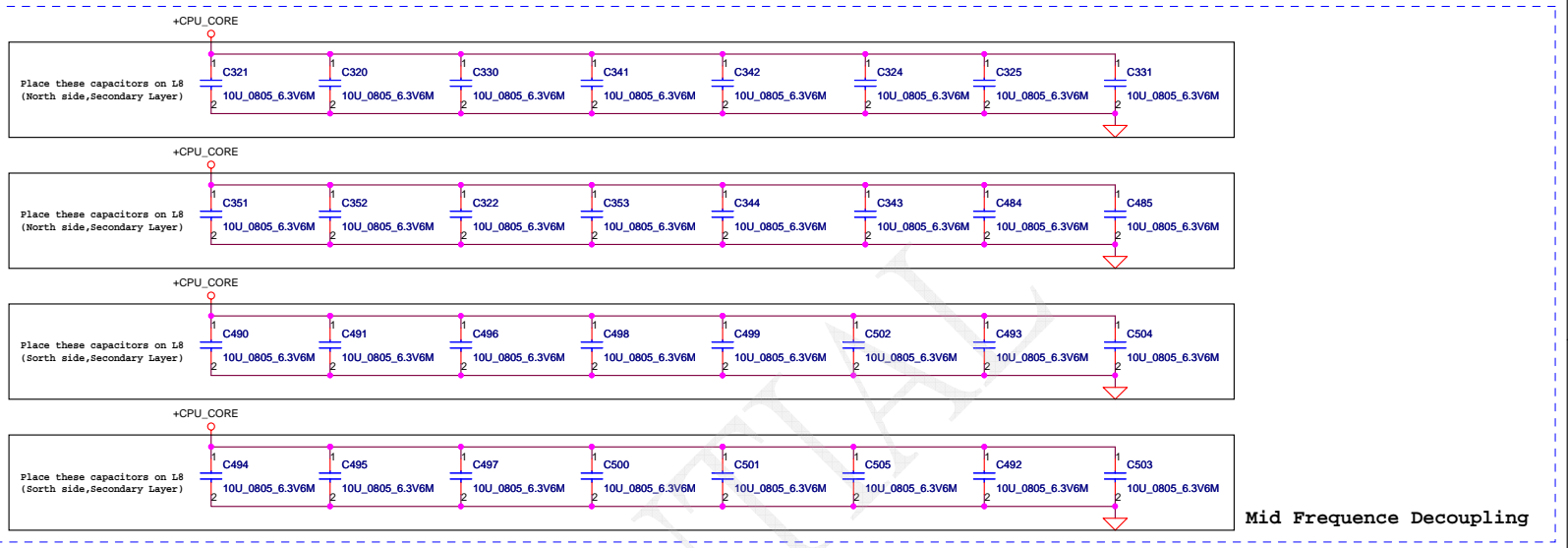
Length match within 25 mils. The trace width/space/other is 20/7/25.

JCPU1D		
A4	VSS[001]	VSS[082]
A8	VSS[002]	VSS[083]
A11	VSS[003]	VSS[084]
A14	VSS[004]	VSS[085]
A16	VSS[005]	VSS[086]
A19	VSS[006]	VSS[087]
A23	VSS[007]	VSS[088]
AF2	VSS[008]	VSS[089]
B6	VSS[009]	VSS[090]
B8	VSS[010]	VSS[091]
B11	VSS[011]	VSS[092]
B13	VSS[012]	VSS[093]
B16	VSS[013]	VSS[094]
B19	VSS[014]	VSS[095]
B21	VSS[015]	VSS[096]
C5	VSS[016]	VSS[097]
C8	VSS[017]	VSS[098]
C11	VSS[018]	VSS[099]
C14	VSS[019]	VSS[100]
C16	VSS[020]	VSS[101]
C19	VSS[021]	VSS[102]
C22	VSS[022]	VSS[103]
C25	VSS[023]	VSS[104]
D1	VSS[024]	VSS[105]
D4	VSS[025]	VSS[106]
D8	VSS[026]	VSS[107]
D11	VSS[027]	VSS[108]
D13	VSS[028]	VSS[109]
D16	VSS[029]	VSS[110]
D23	VSS[030]	VSS[111]
D26	VSS[031]	VSS[112]
E3	VSS[032]	VSS[113]
E6	VSS[033]	VSS[114]
E9	VSS[034]	VSS[115]
E11	VSS[035]	VSS[116]
E14	VSS[036]	VSS[117]
E16	VSS[037]	VSS[118]
E19	VSS[038]	VSS[119]
E21	VSS[039]	VSS[120]
E24	VSS[040]	VSS[121]
F5	VSS[041]	VSS[122]
F8	VSS[042]	VSS[123]
F11	VSS[043]	VSS[124]
F13	VSS[044]	VSS[125]
F16	VSS[045]	VSS[126]
F19	VSS[046]	VSS[127]
F22	VSS[047]	VSS[128]
F25	VSS[048]	VSS[129]
G4	VSS[049]	VSS[130]
G11	VSS[050]	VSS[131]
G23	VSS[051]	VSS[132]
G26	VSS[052]	VSS[133]
H3	VSS[053]	VSS[134]
H6	VSS[054]	VSS[135]
H21	VSS[055]	VSS[136]
H24	VSS[056]	VSS[137]
J2	VSS[057]	VSS[138]
J5	VSS[058]	VSS[139]
J22	VSS[059]	VSS[140]
J25	VSS[060]	VSS[141]
K1	VSS[061]	VSS[142]
K4	VSS[062]	VSS[143]
K23	VSS[063]	VSS[144]
K26	VSS[064]	VSS[145]
L3	VSS[065]	VSS[146]
L6	VSS[066]	VSS[147]
L21	VSS[067]	VSS[148]
L24	VSS[068]	VSS[149]
M2	VSS[069]	VSS[150]
M5	VSS[070]	VSS[151]
M22	VSS[071]	VSS[152]
M25	VSS[072]	VSS[153]
N1	VSS[073]	VSS[154]
N4	VSS[074]	VSS[155]
N23	VSS[075]	VSS[156]
N26	VSS[076]	VSS[157]
P3	VSS[077]	VSS[158]
	VSS[078]	VSS[159]
	VSS[079]	VSS[160]
	VSS[080]	VSS[161]
	VSS[081]	VSS[162]
	VSS[081]	VSS[163]

Pin F8
Dual Core: GND (internal)
Quad Core: Floating (internal)

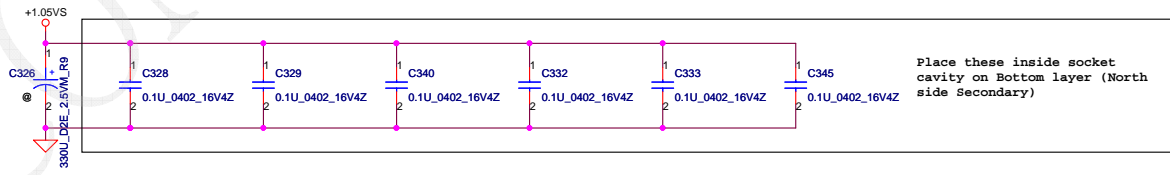
Pin D8,AA8,AC8 and AE8
Reserved for QC

conn@ Merom Ball-out Rev 1a

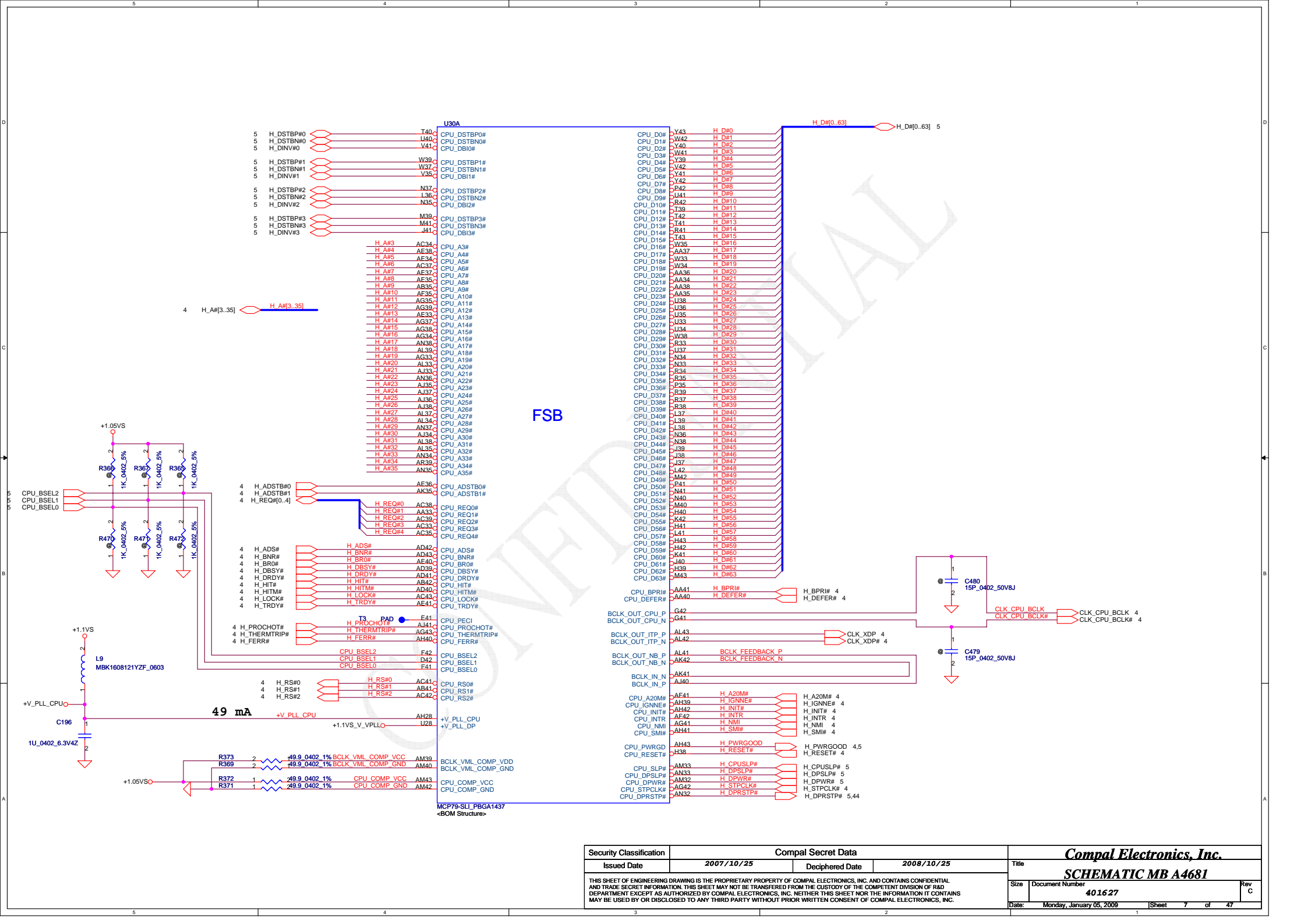


ESR <= 1.5m ohm
Capacitor > 1980uF

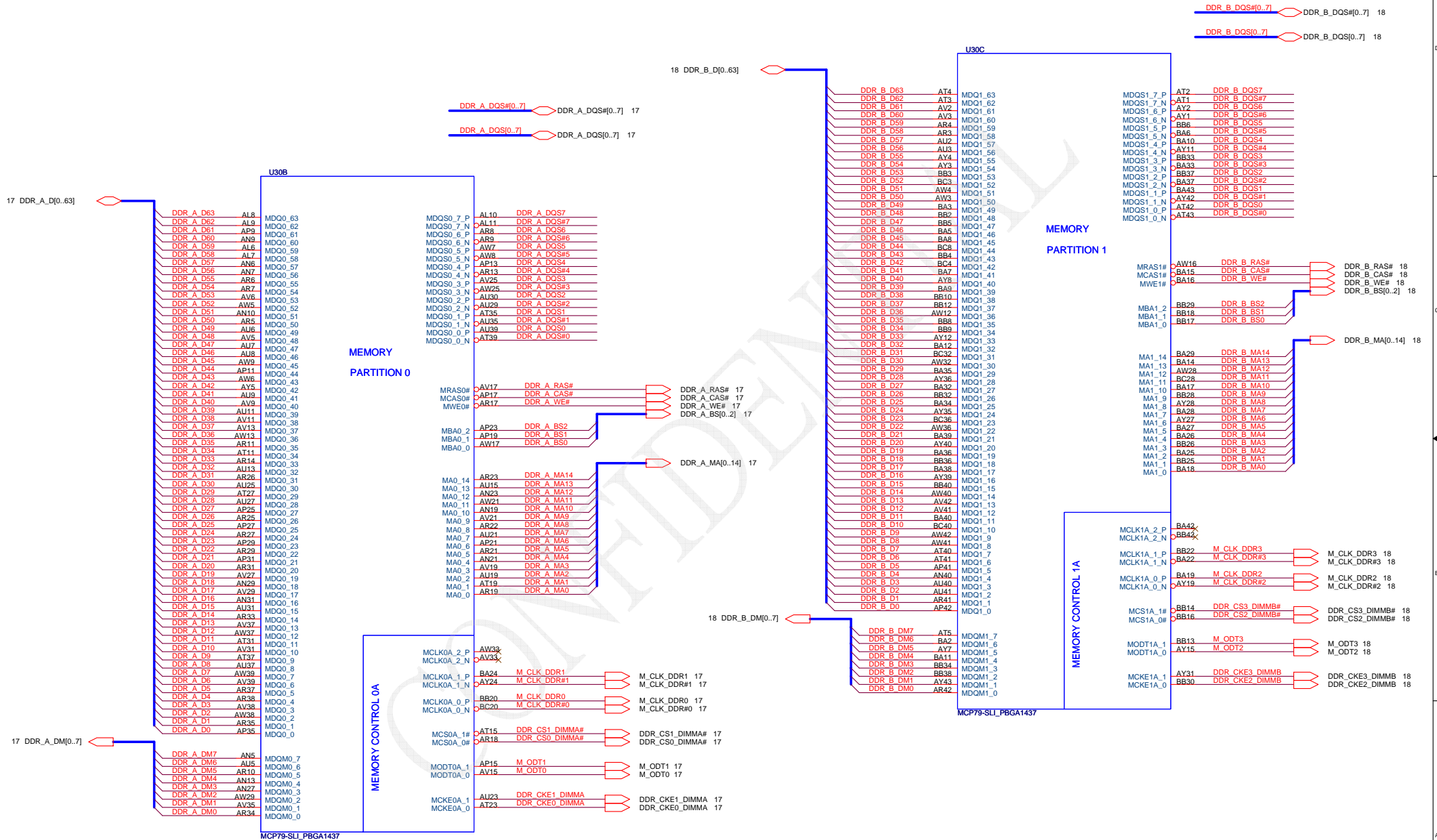
330uF ESR 7m ohm X 6 PCS



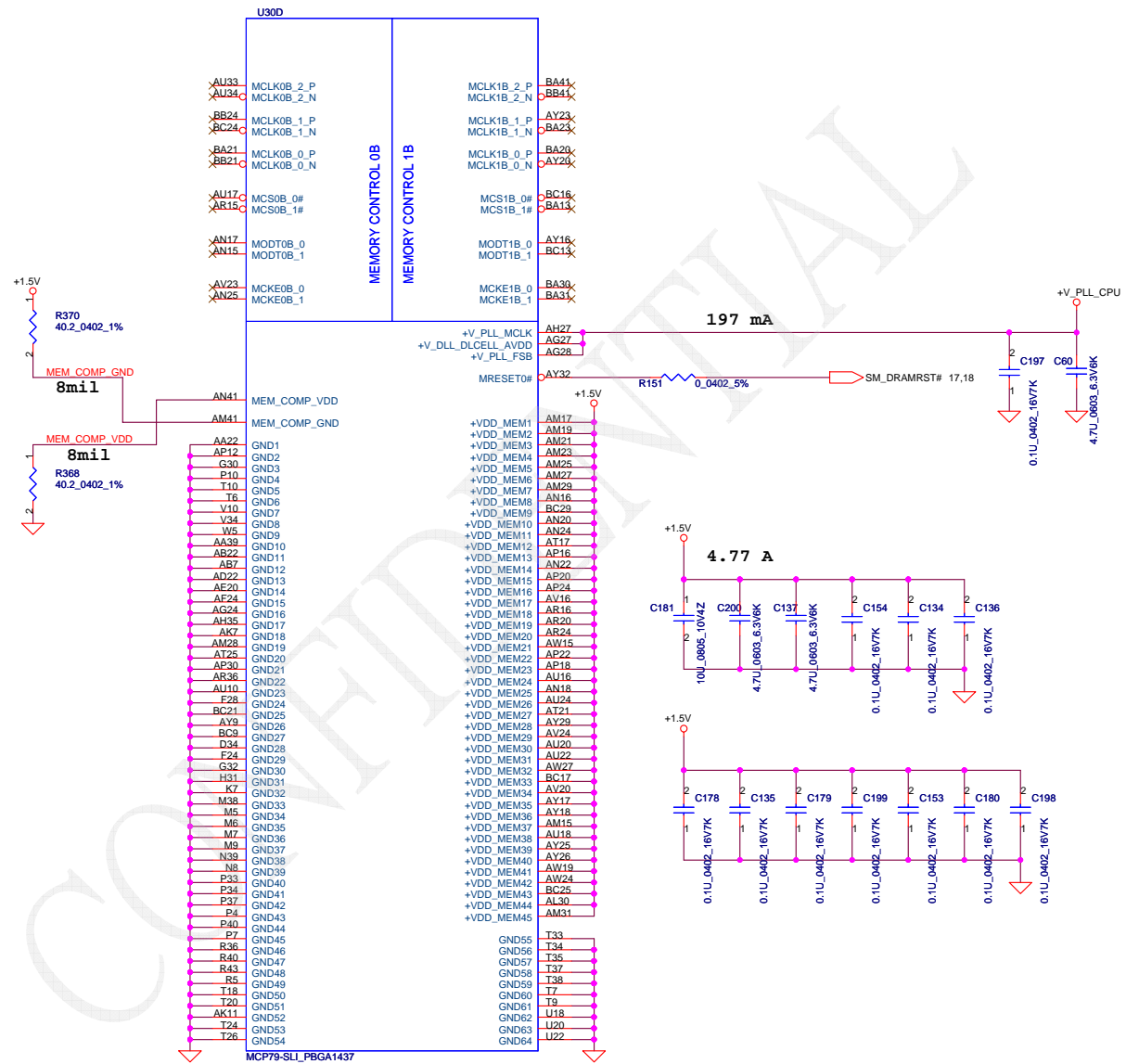
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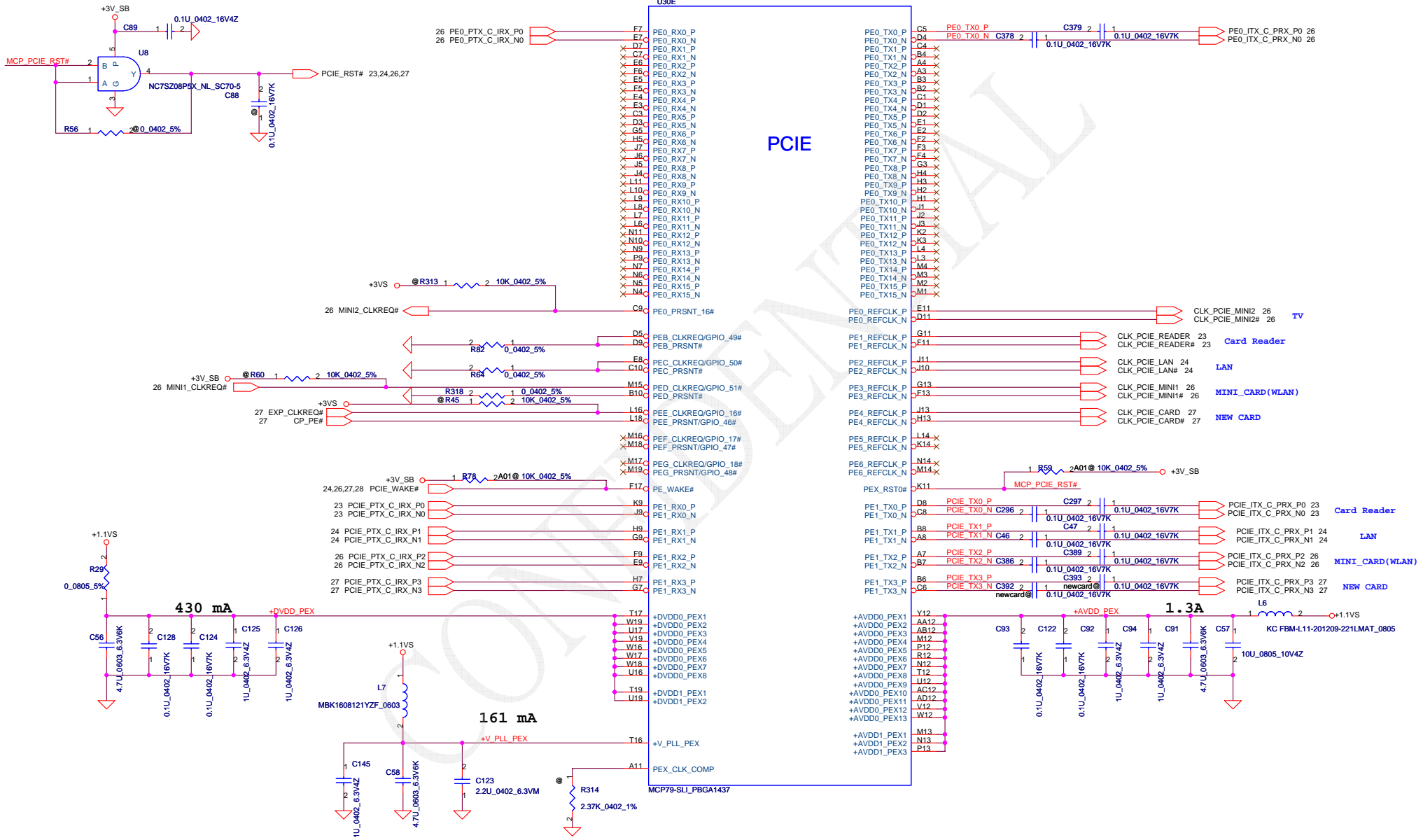


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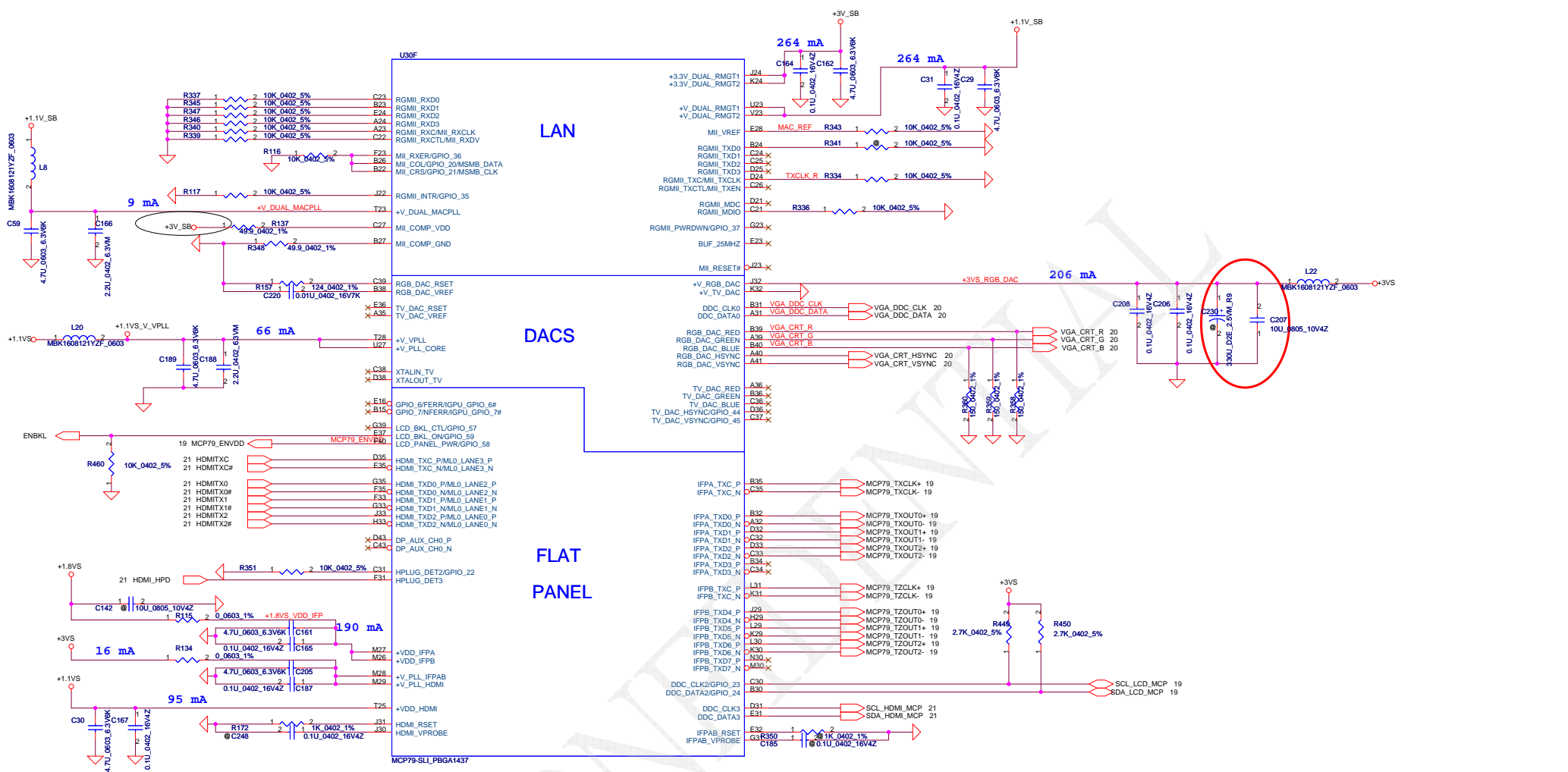


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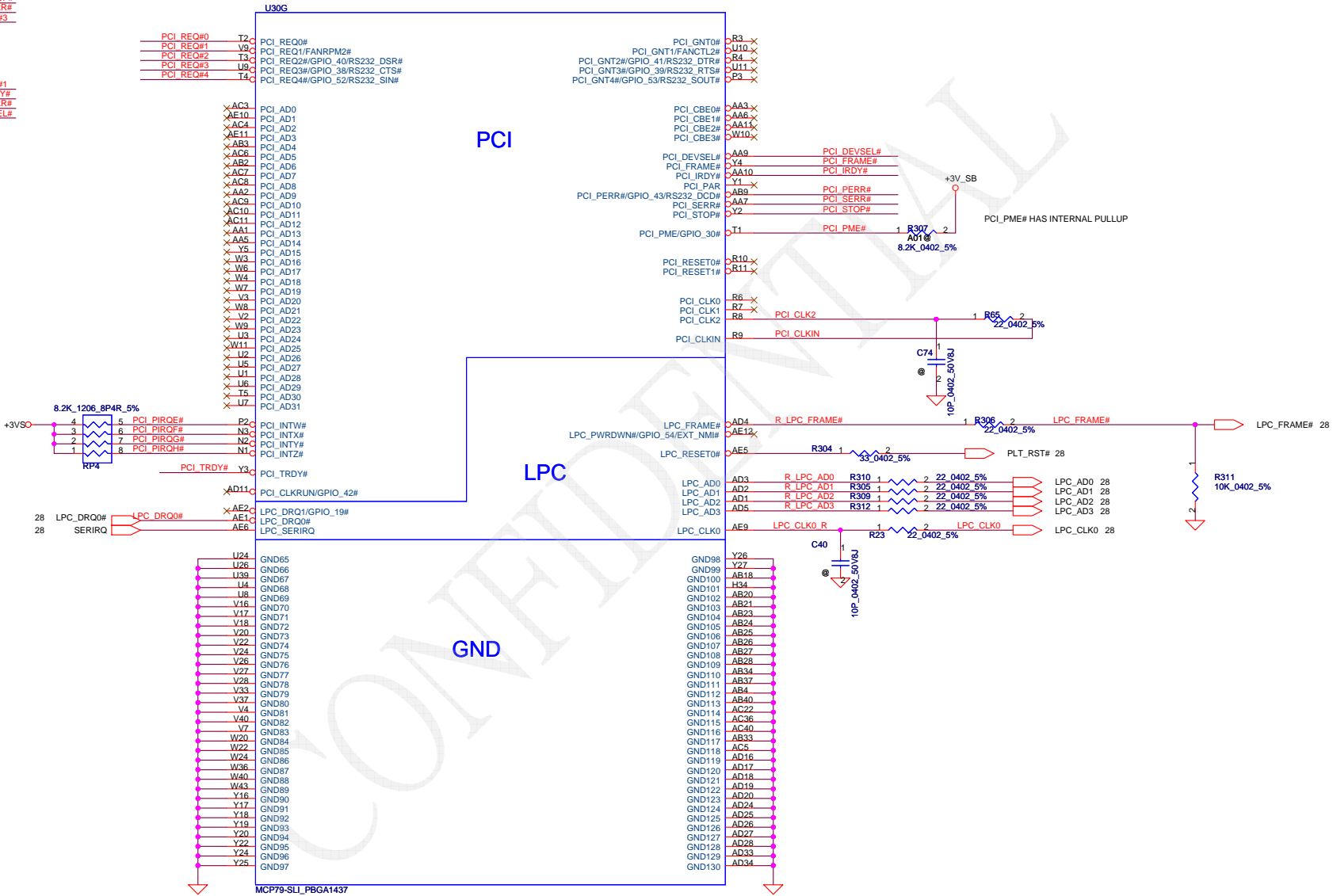
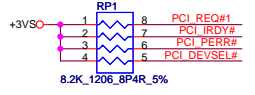
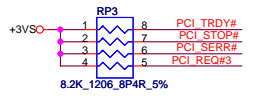
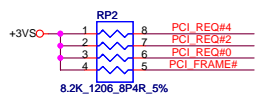
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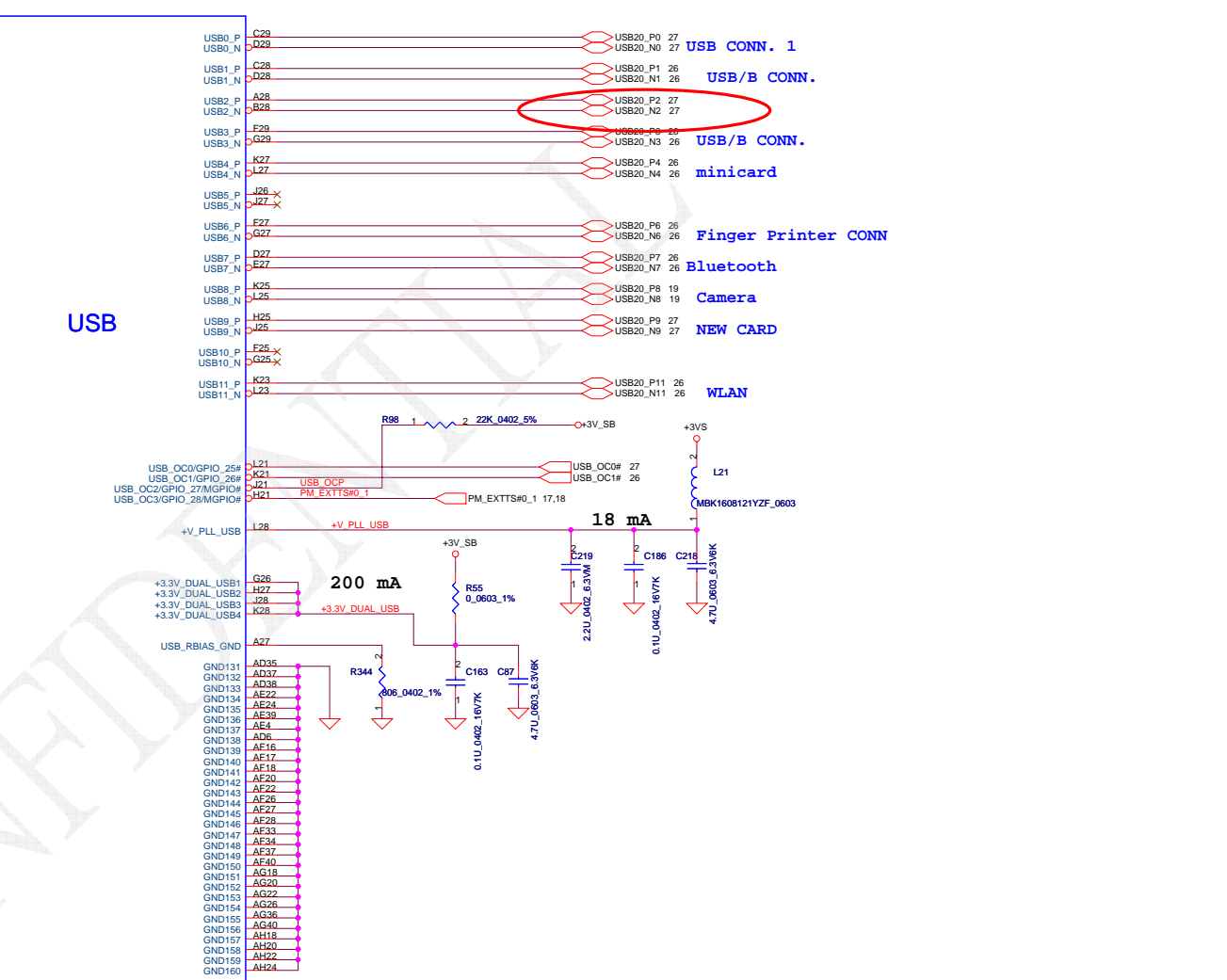
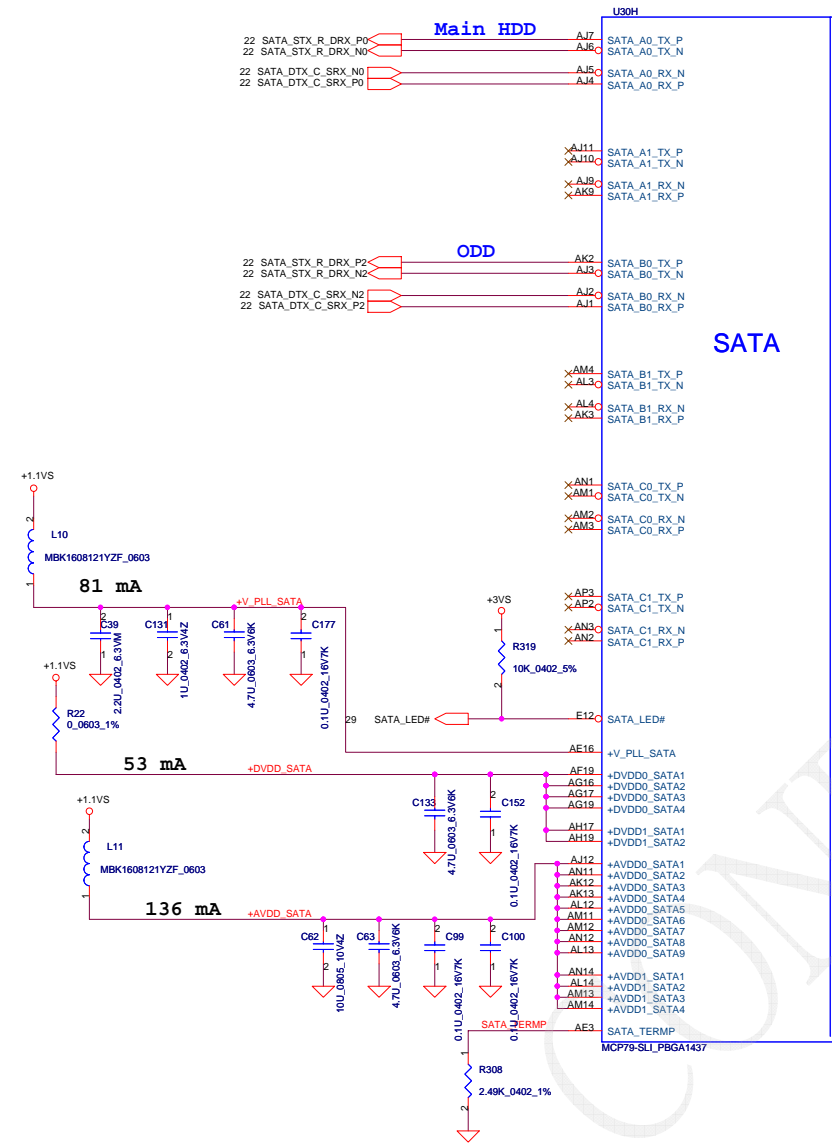
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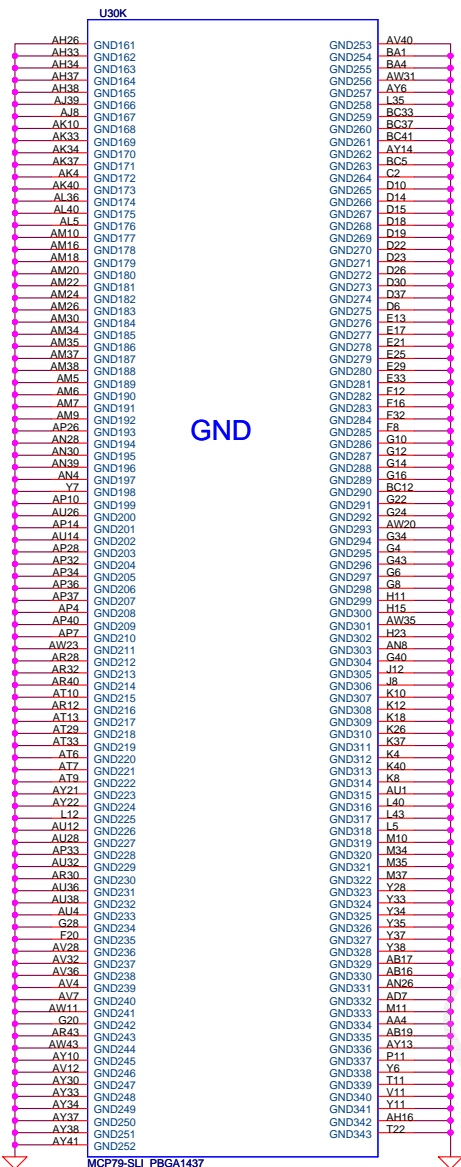
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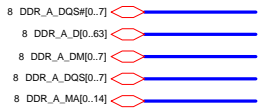


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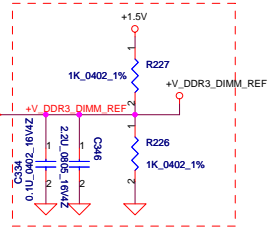


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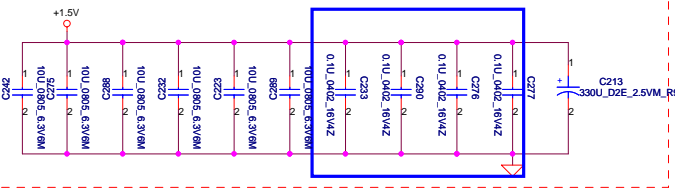


18 +V_DDR3_DIMM_REF

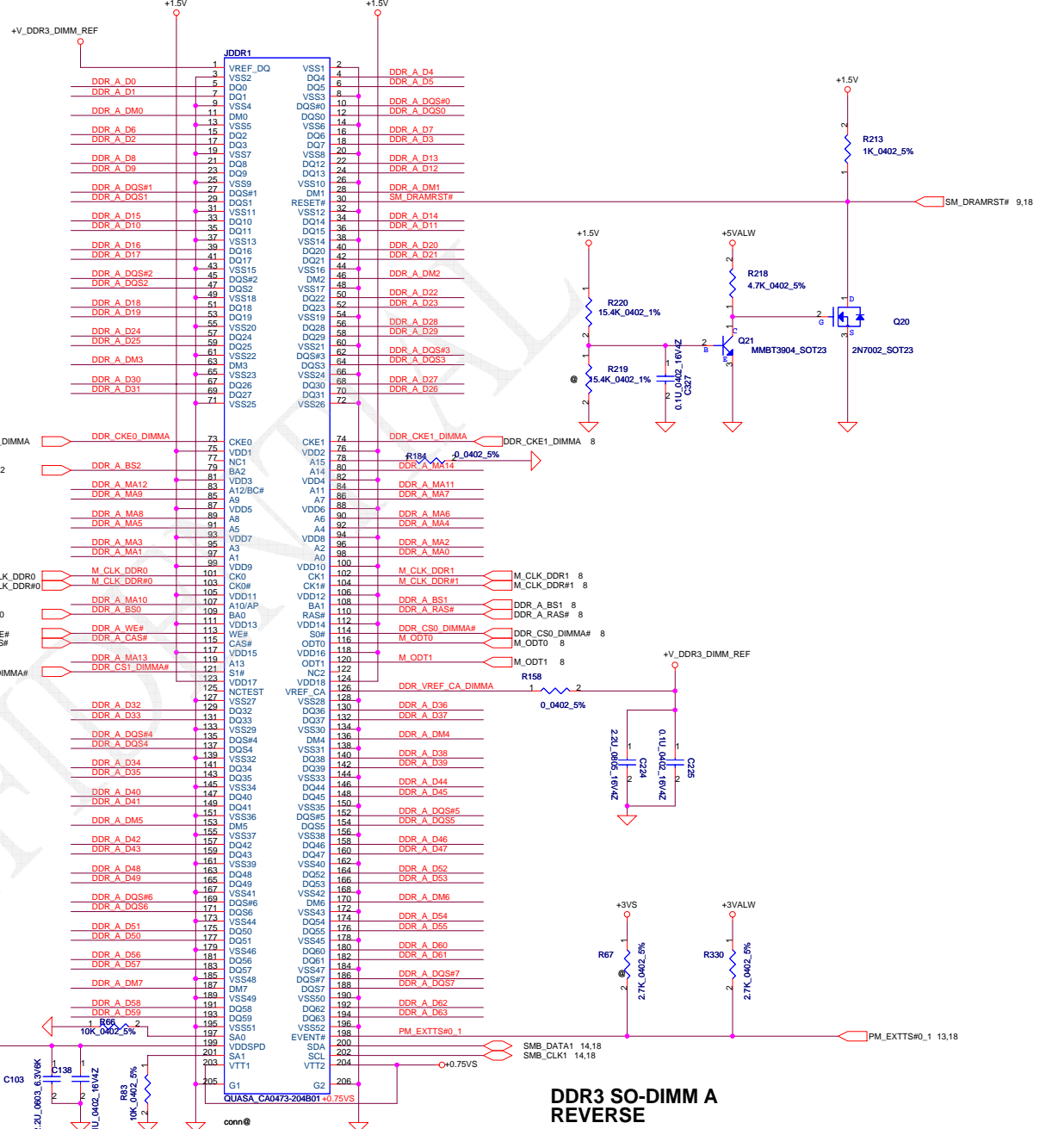
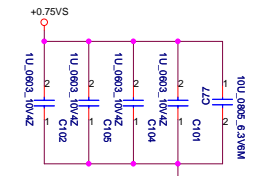


Layout Note:
Place near JDDR1

Layout Note: Place these 4 Caps near Command and Control signals of DIMM



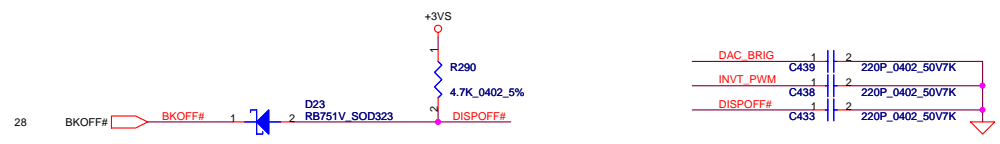
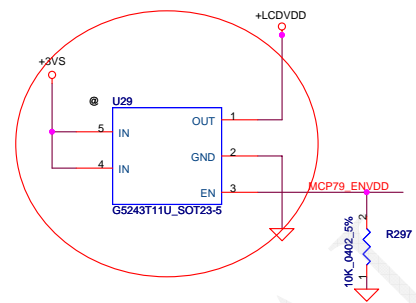
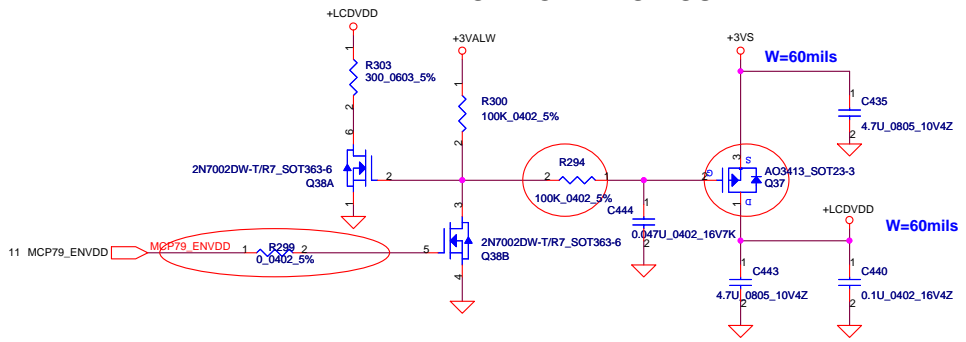
Layout Note:
Place near JDDR1 pin203\204



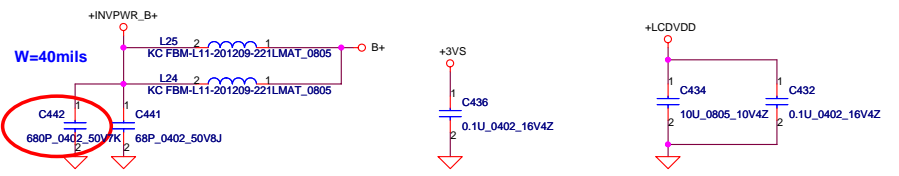
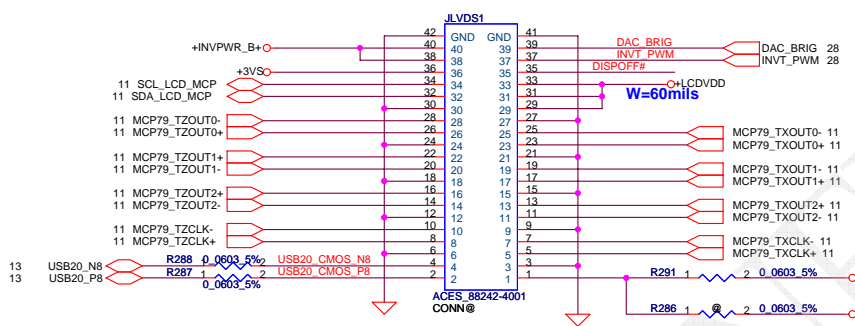
DDR3 SO-DIMM A REVERSE

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LCD POWER CIRCUIT



LCD/PANEL BD. Conn.

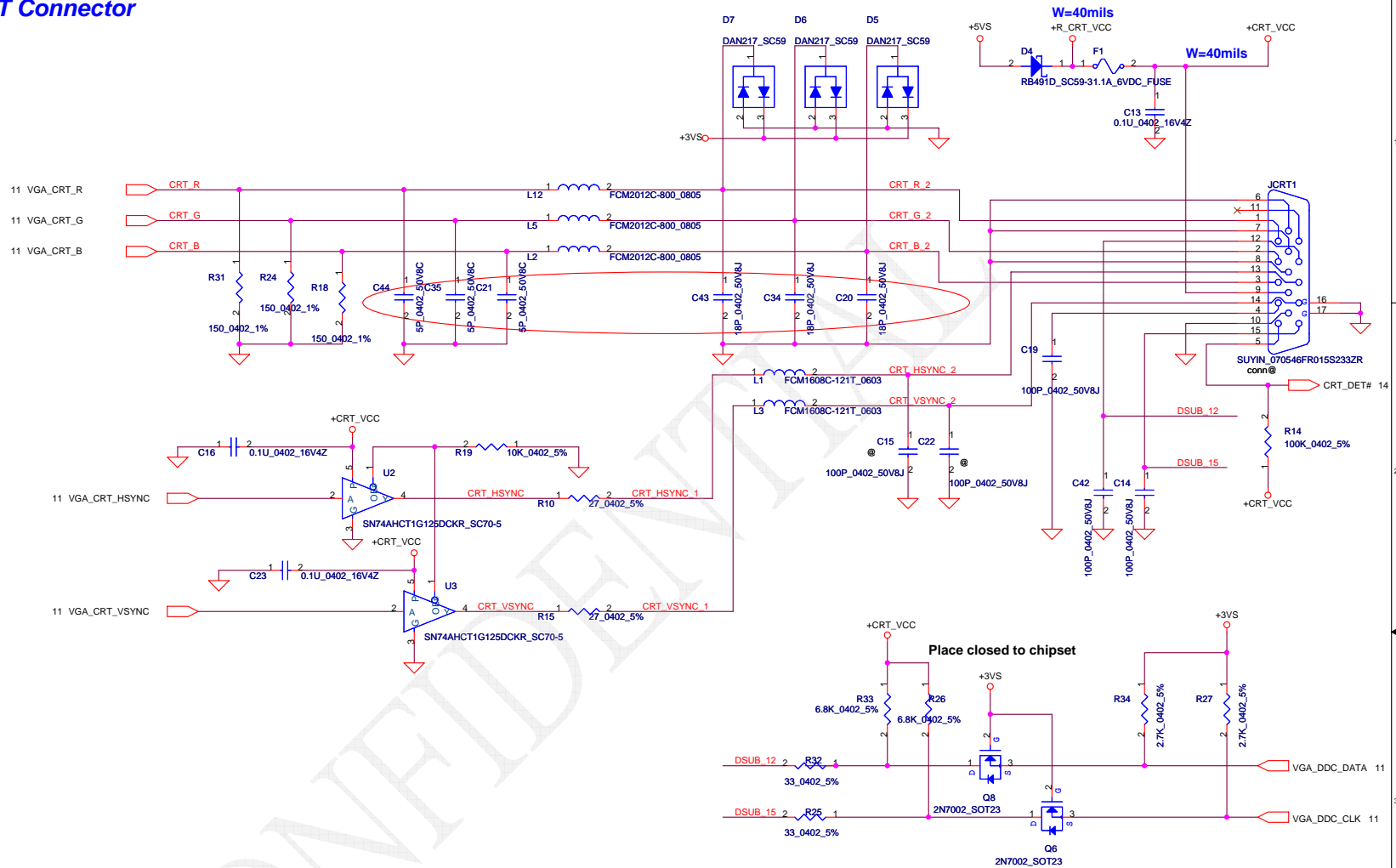


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		2007/12/25

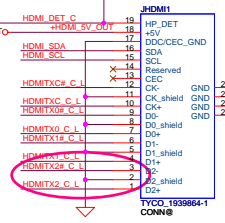
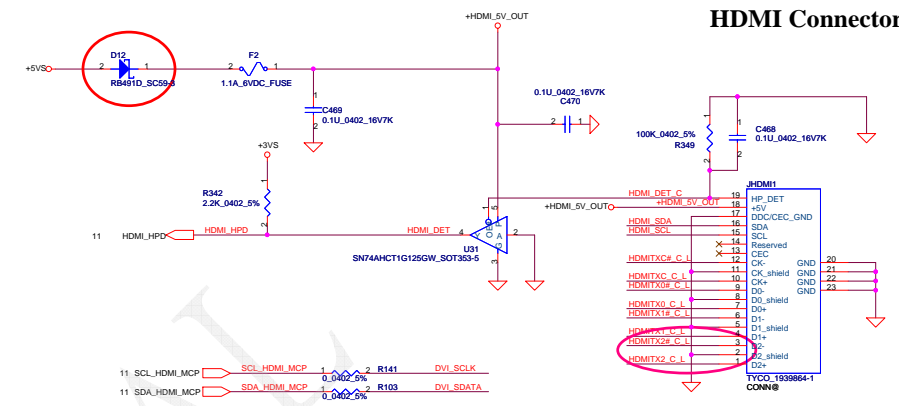
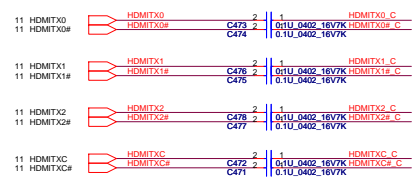
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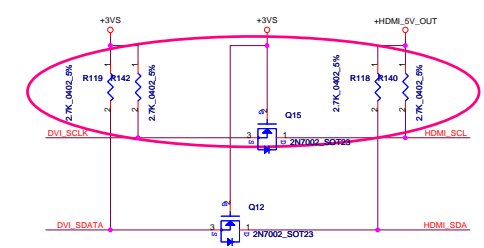
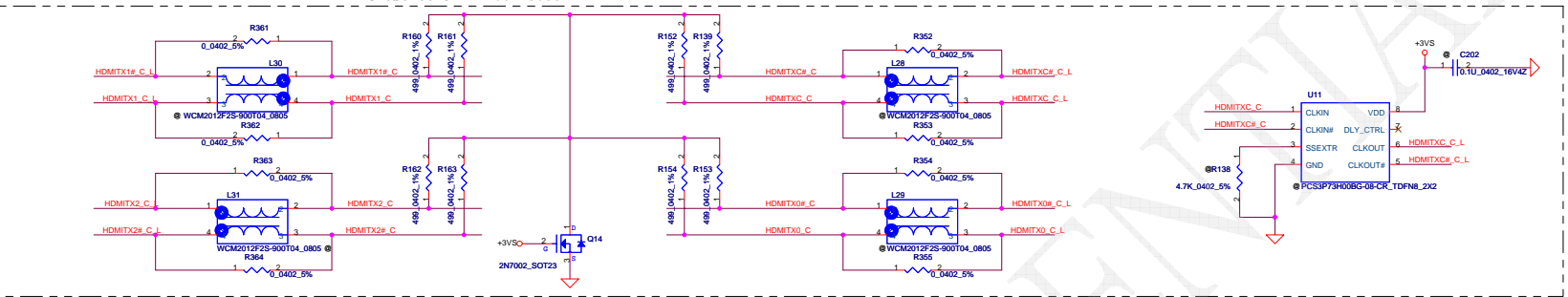
CRT Connector



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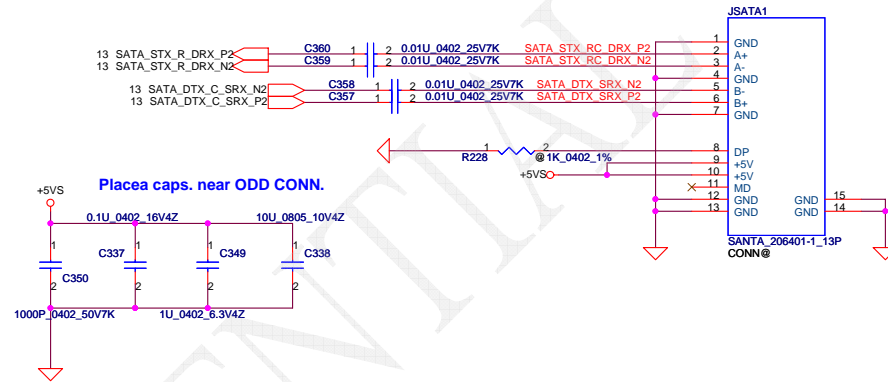
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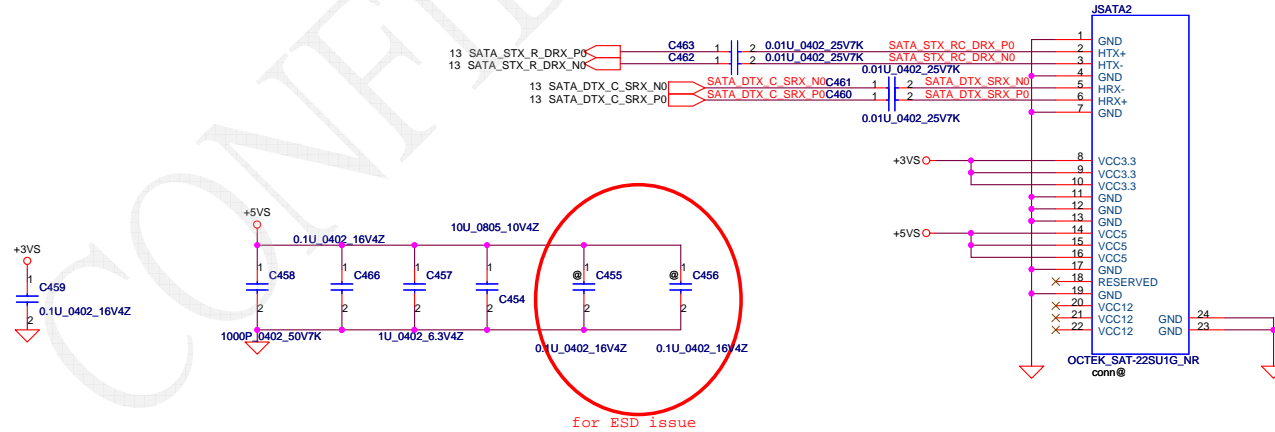
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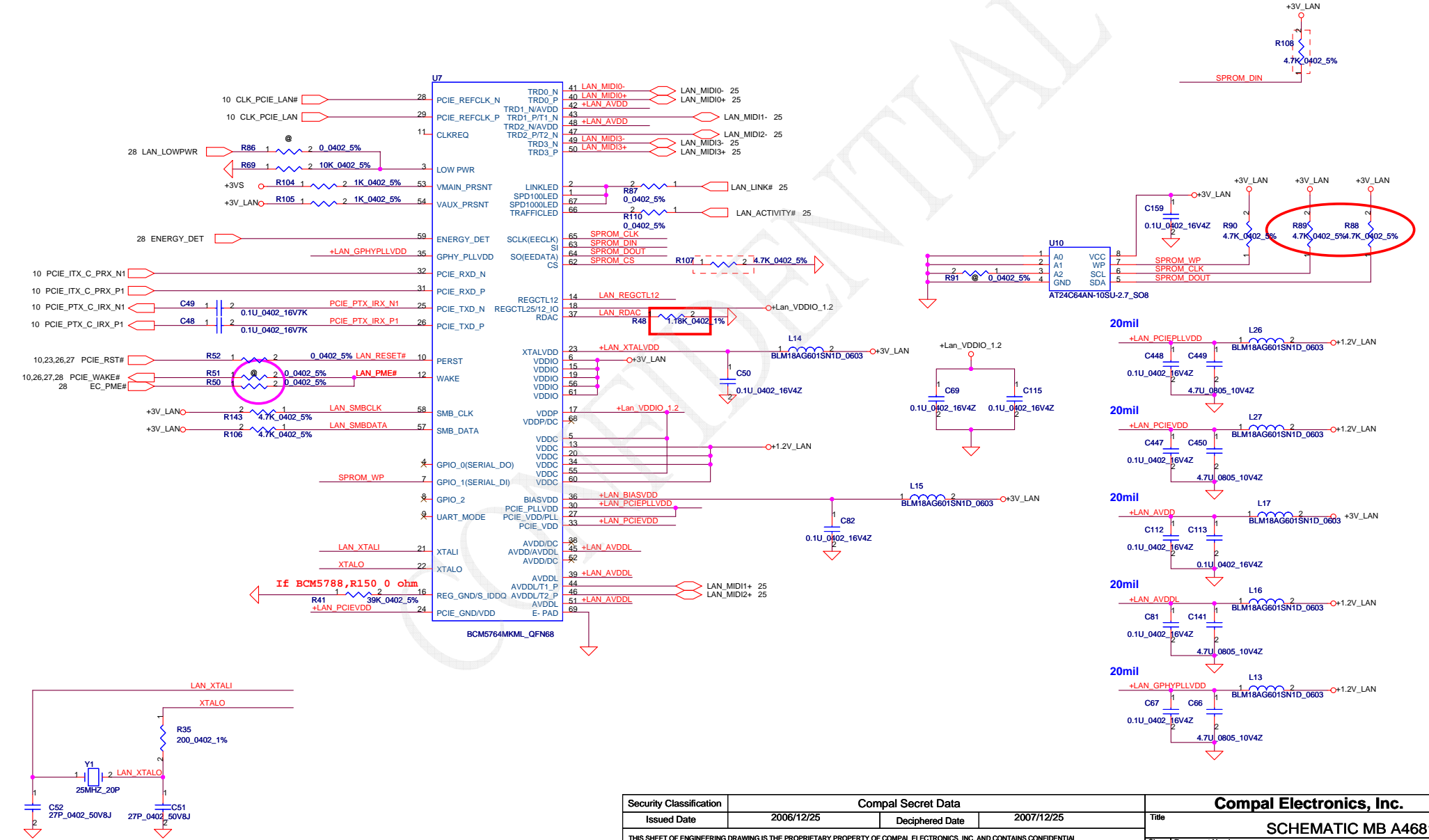
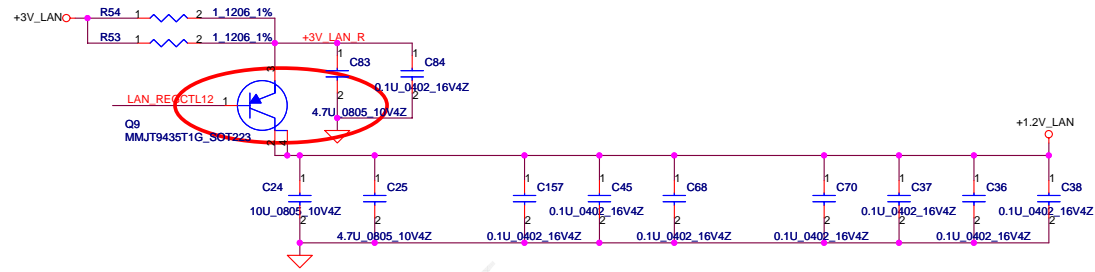
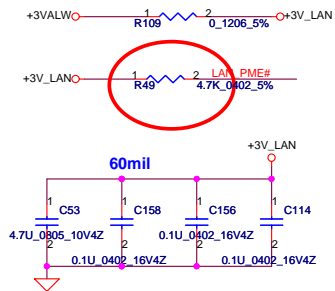
SATA ODD Conn.



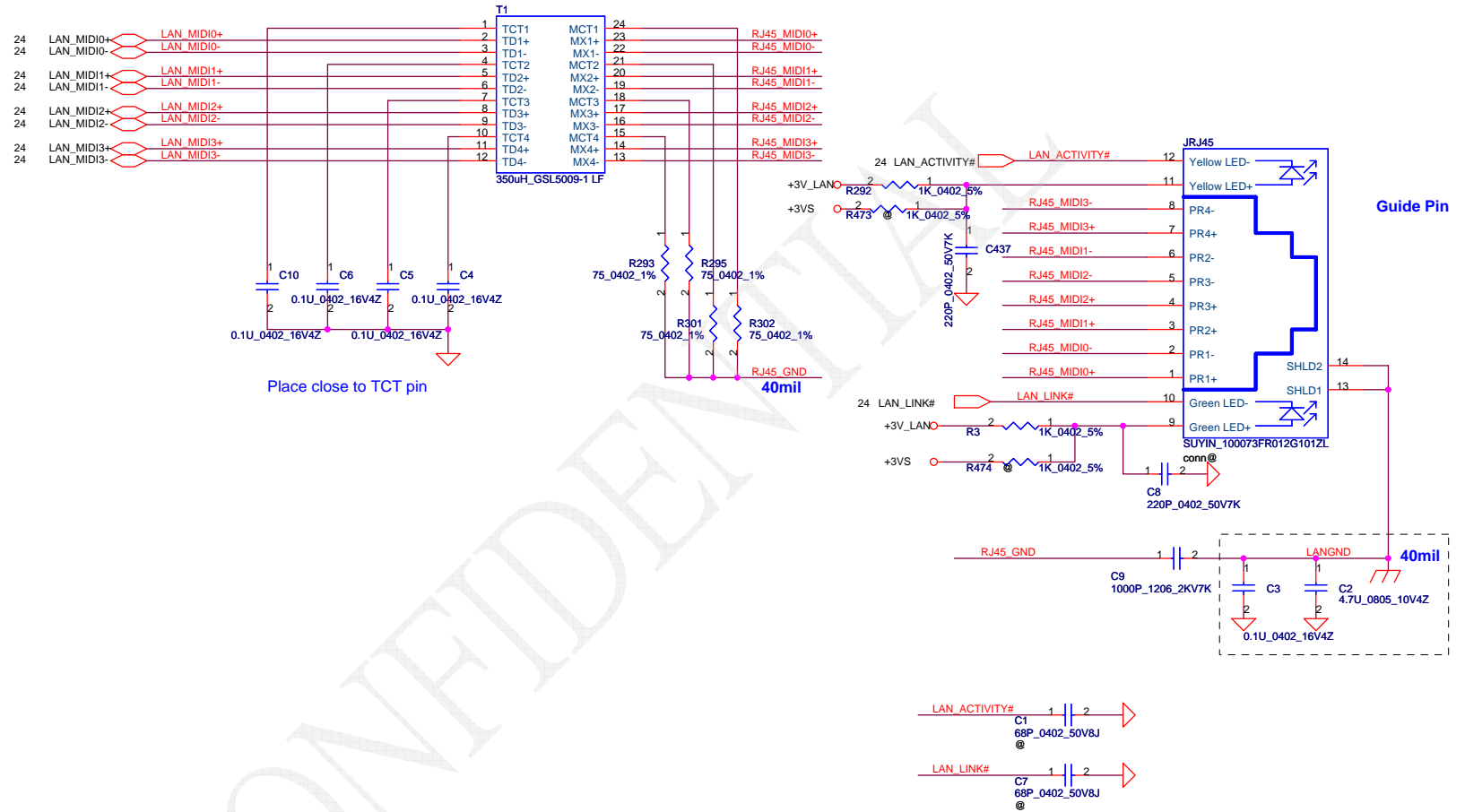
SATA HDD Conn.



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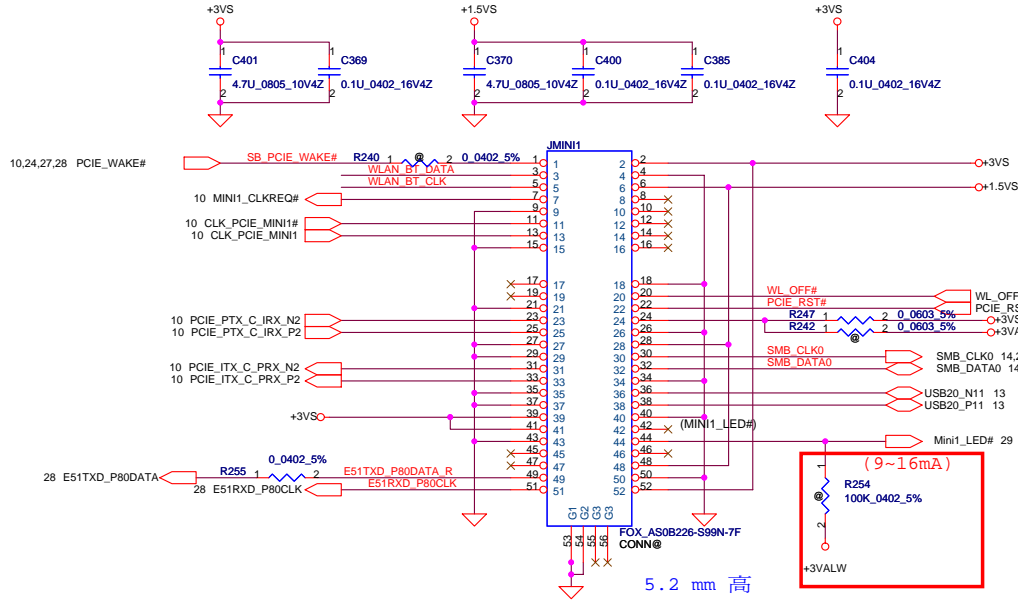


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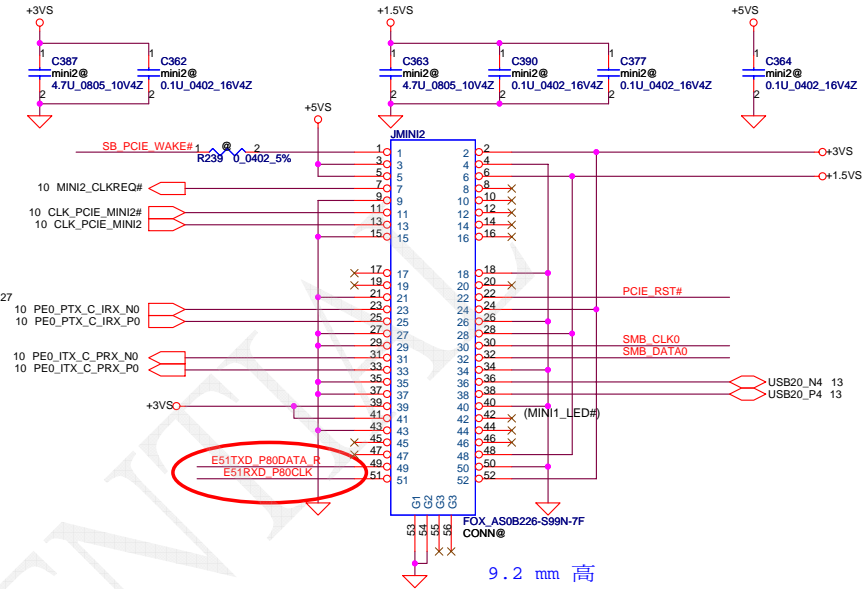


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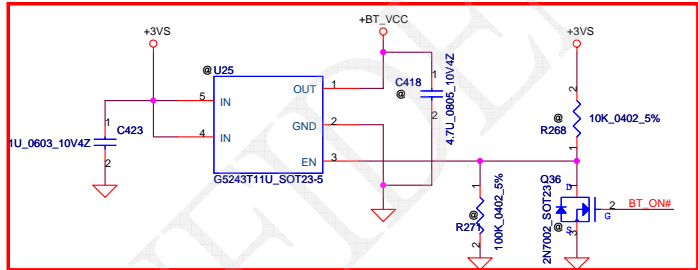
For Wireless LAN



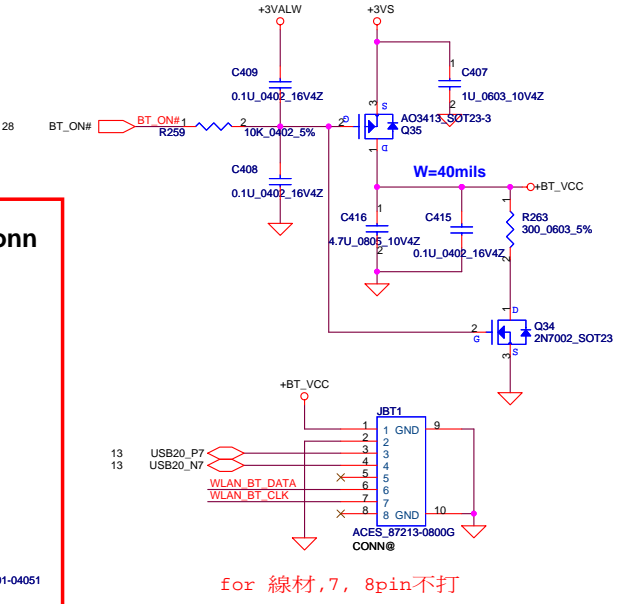
For TV-Tuner/HW MPEG



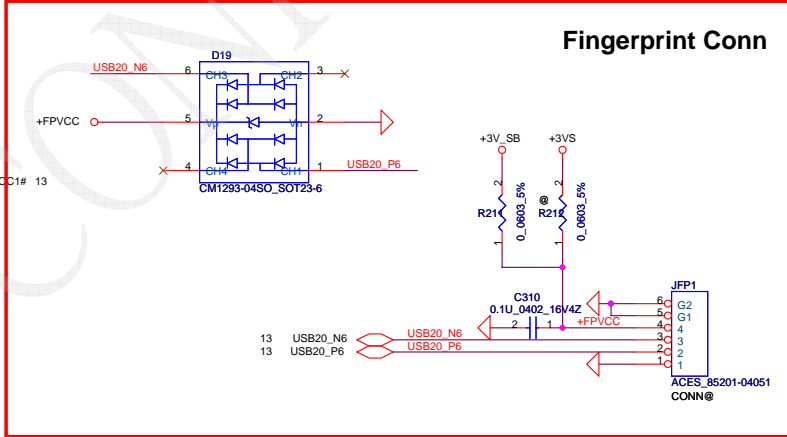
Power	Primary Power (mA)		Auxiliary Power (mA)
	Peak	Normal	Normal
+3VS	1000	750	Normal
+3V	330	250	250 (wake enable)
+1.5VS	500	375	5 (Not wake enable)



Bluetooth Conn.

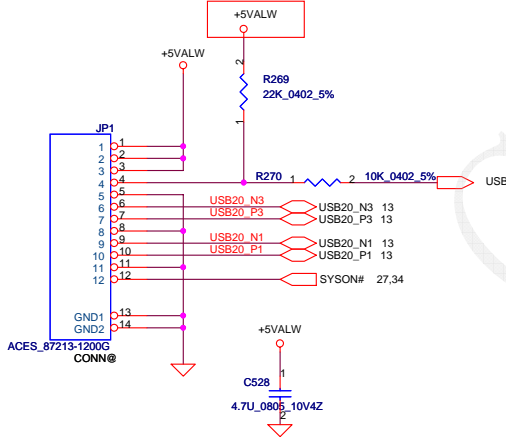


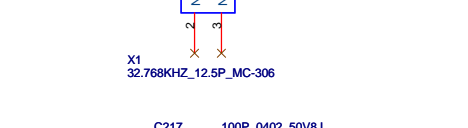
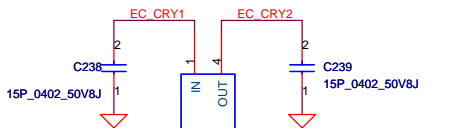
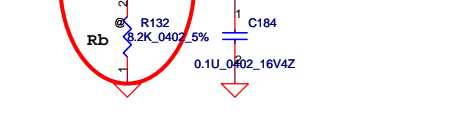
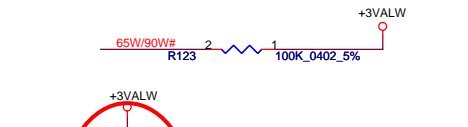
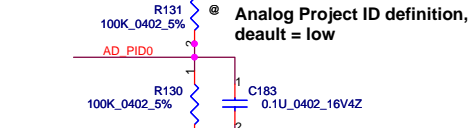
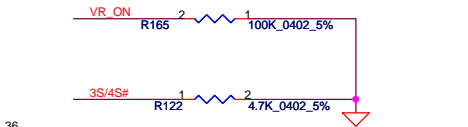
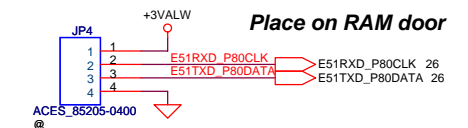
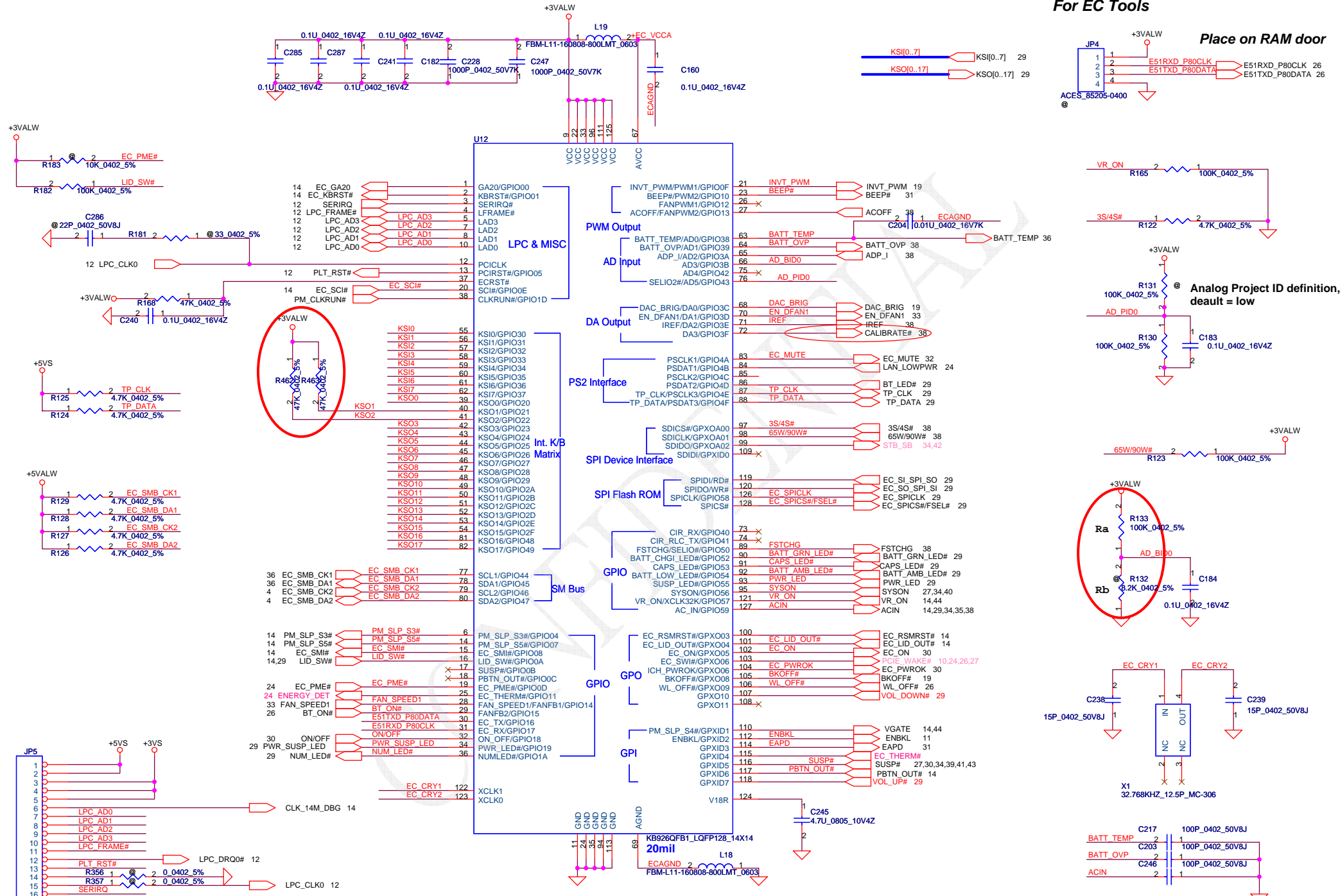
for 線材, 7, 8pin不打



Fingerprint Conn

To USB/B Connector

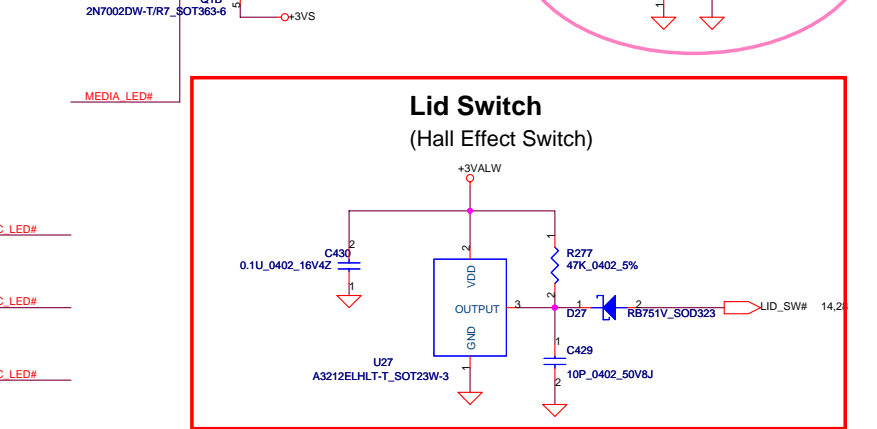
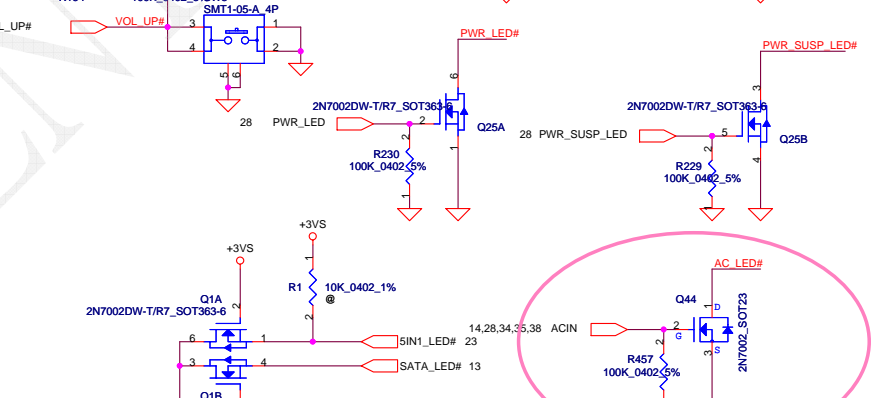
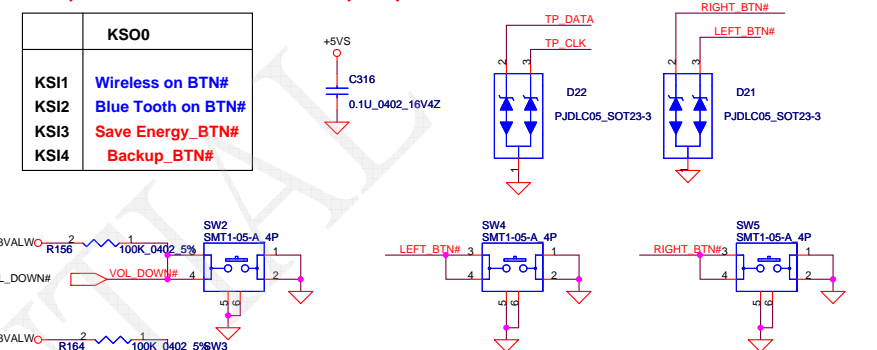
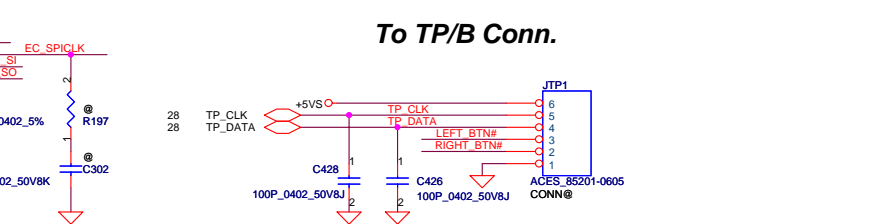
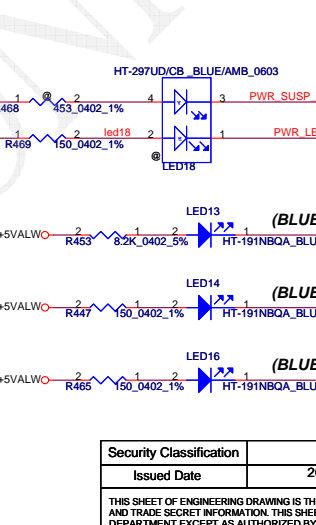
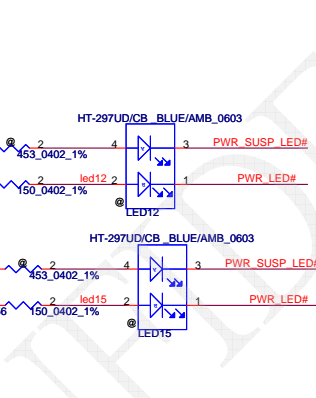
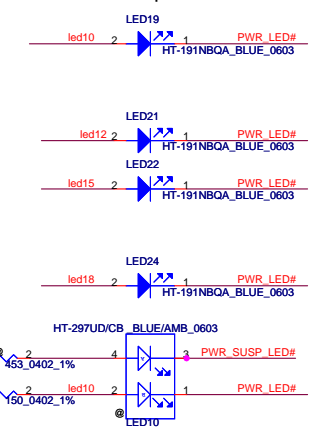
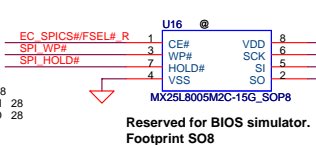
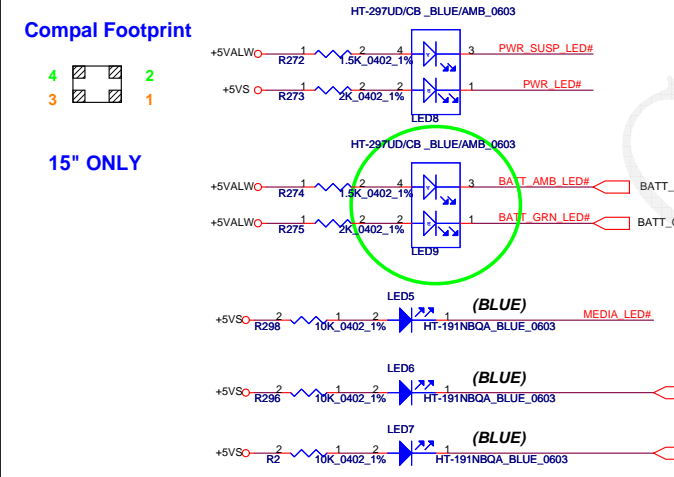
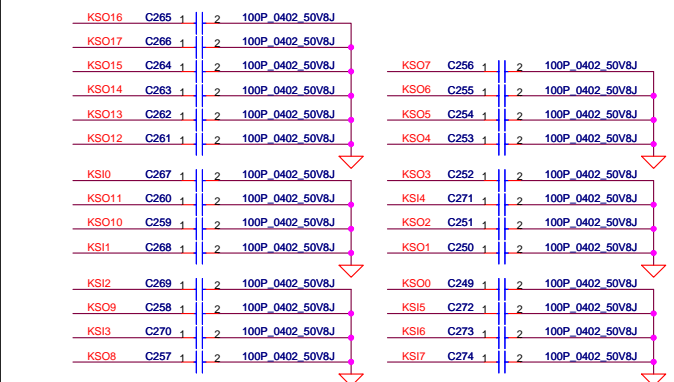
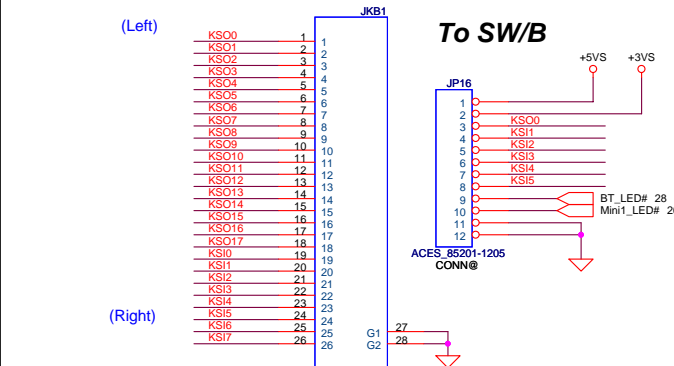




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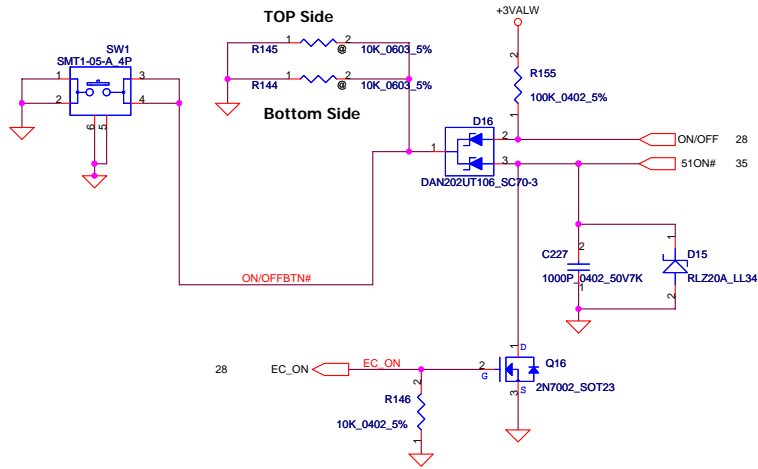
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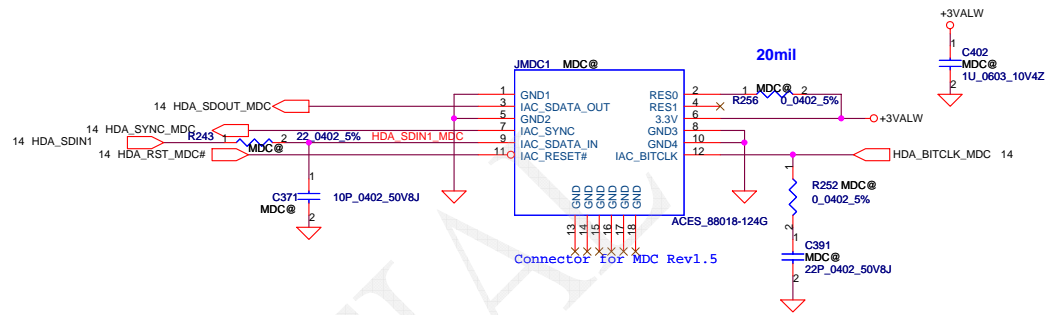
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Power Button

ON/OFF switch

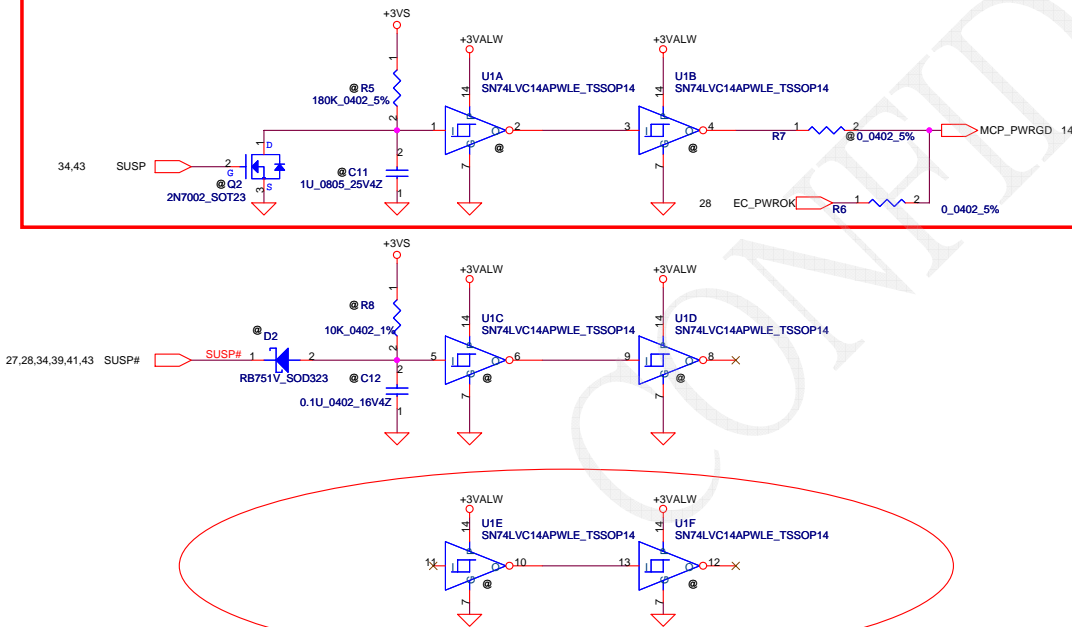


HDA MDC Conn.

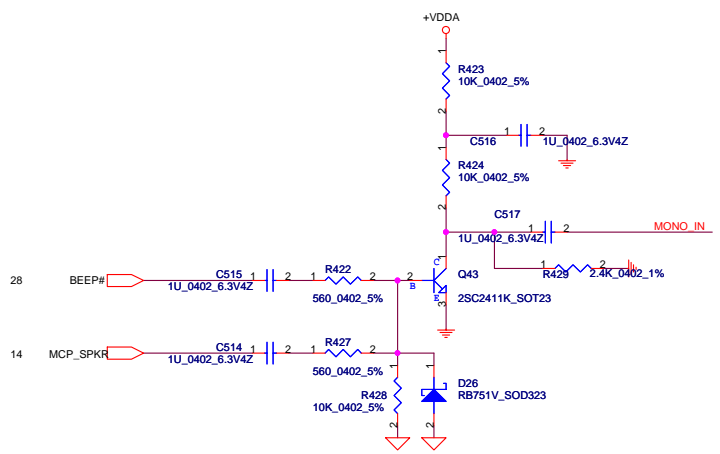


Power ON Circuit

For South Bridge



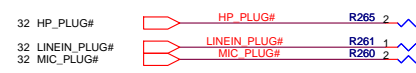
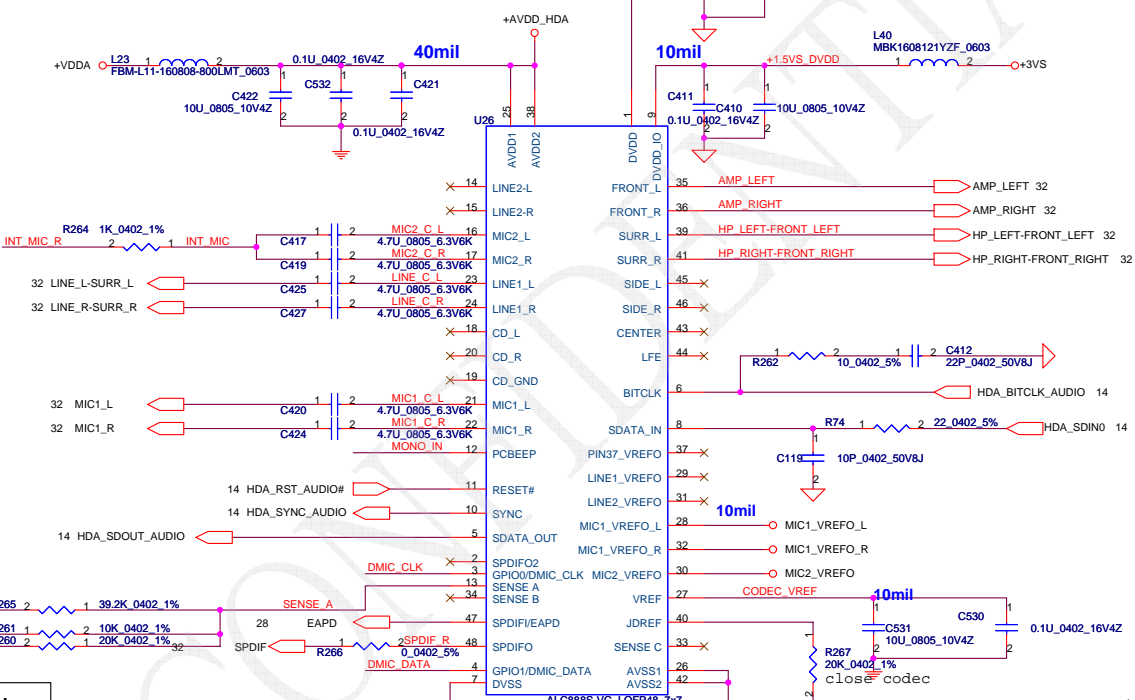
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BOM Option

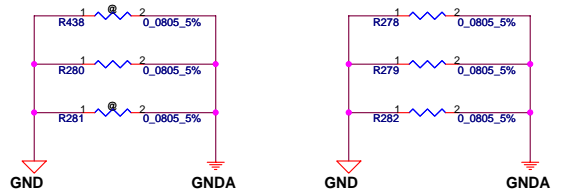
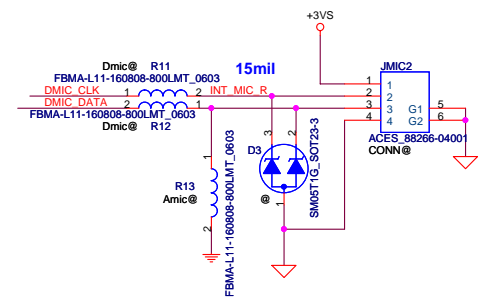
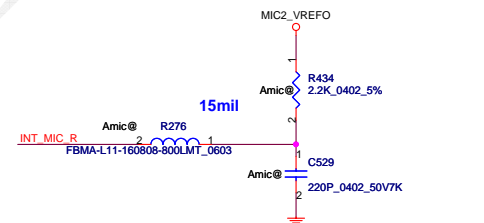
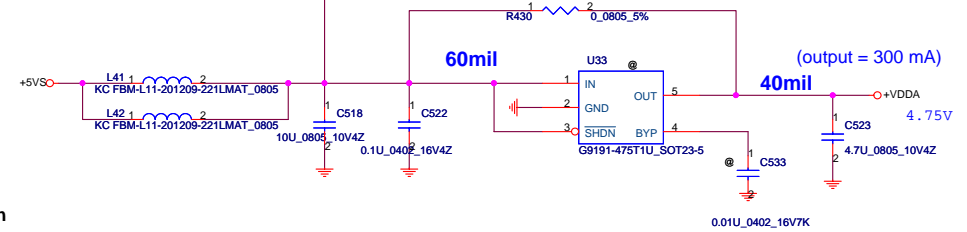
ALC268	268@
ALC888S-VC	888VC@

HD Audio Codec

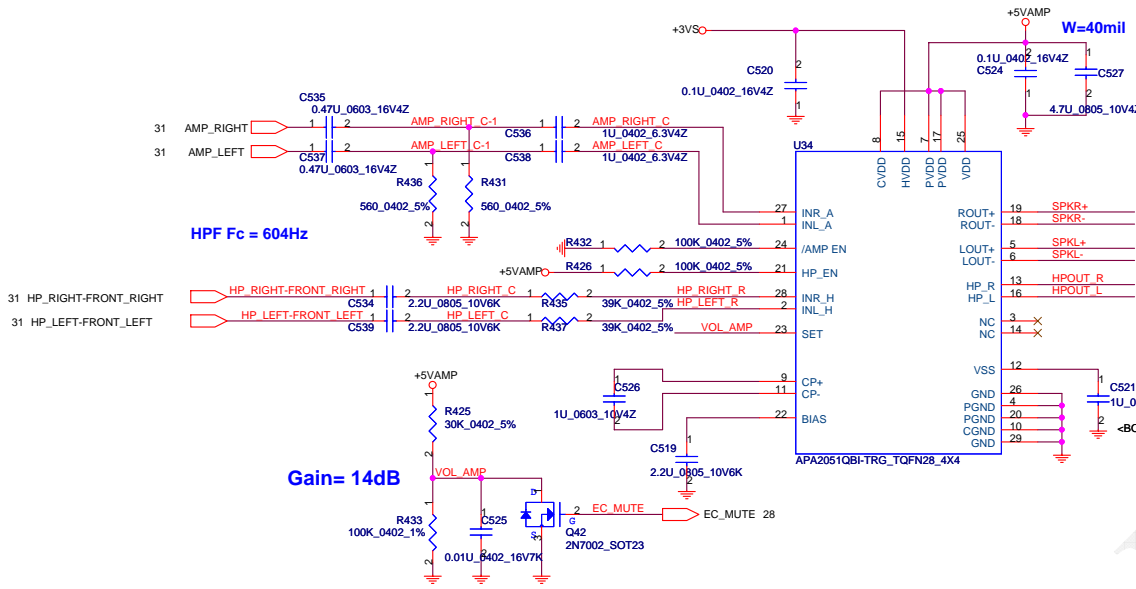


Sense Pin	Impedance	Codec Signals
SENSE A	39.2K	PORT-A (PIN 39, 41)
	20K	PORT-B (PIN 21, 22)
	10K	PORT-C (PIN 23, 24)
	5.1K	PORT-D (PIN 35, 36)
SENSE B	39.2K	PORT-E (PIN 14, 15)
	20K	PORT-F (PIN 16, 17)
	10K	PORT-G (PIN 43, 44)
	5.1K	PORT-H (PIN 45, 46)

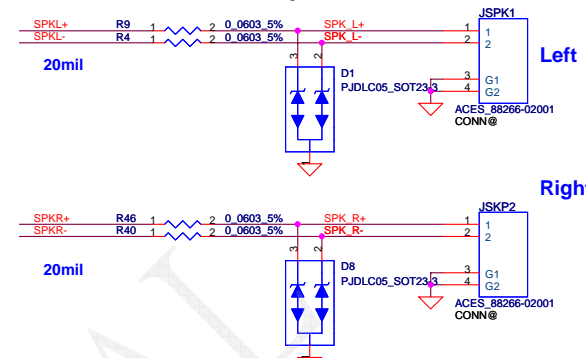
DGND AGND



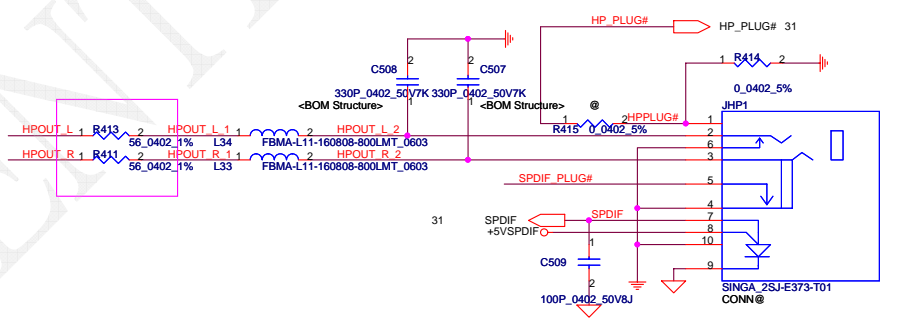
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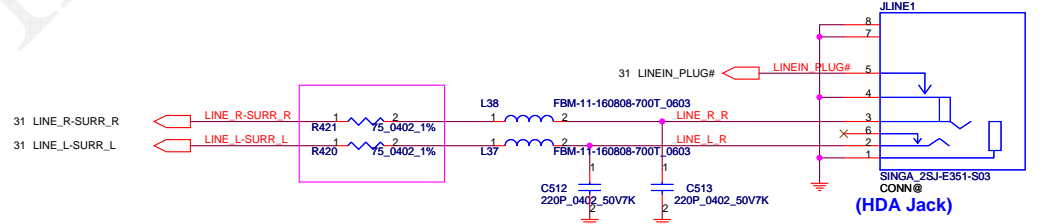
Int. Speaker Conn.



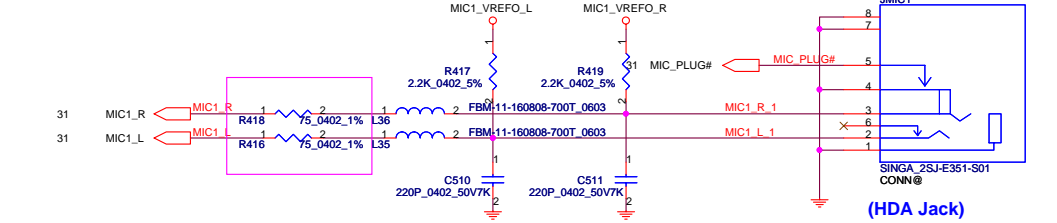
**S/PDIF Out JACK
LINE Out/Headphone Out**



LINE-IN JACK

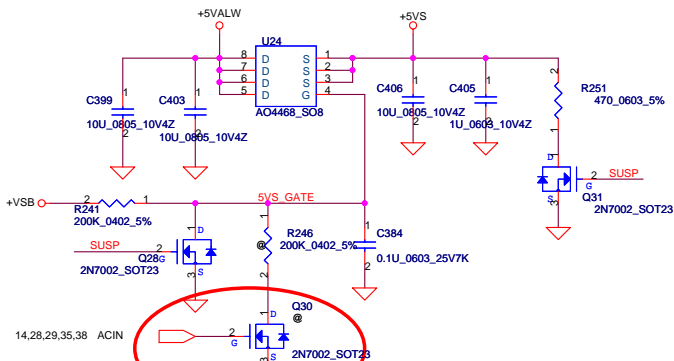


MIC JACK

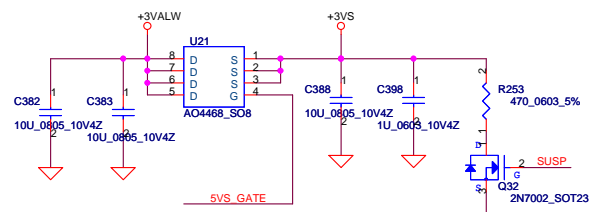


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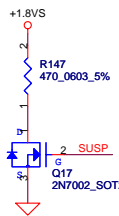
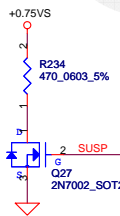
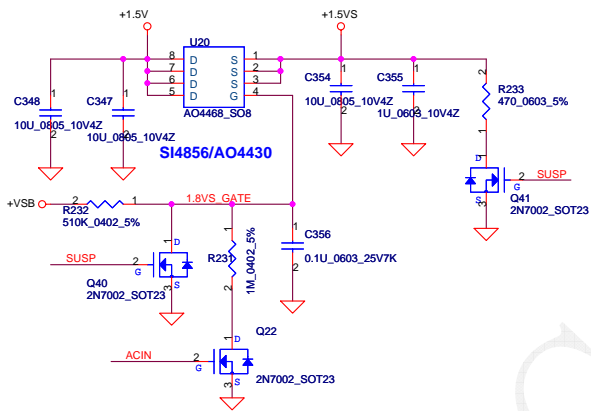
+5VALW TO +5VS



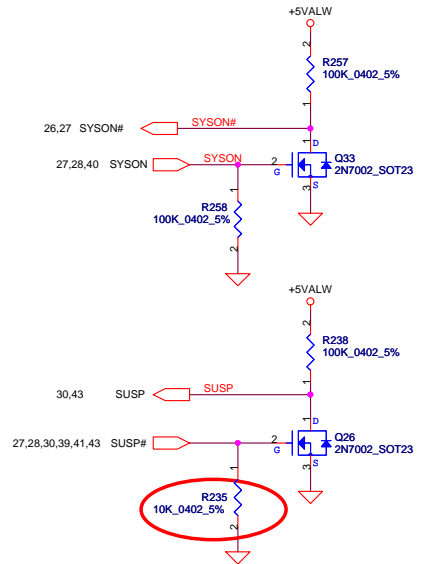
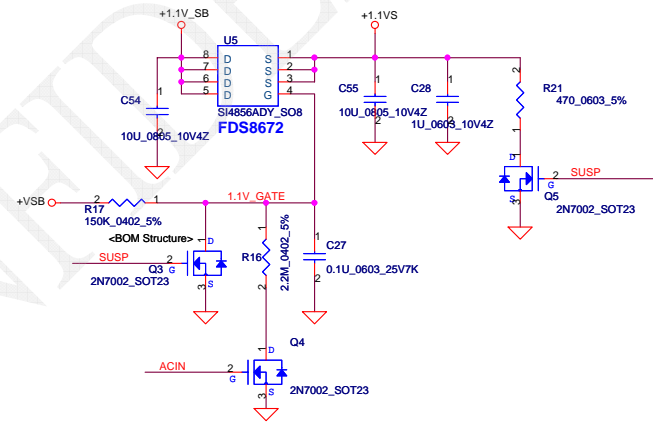
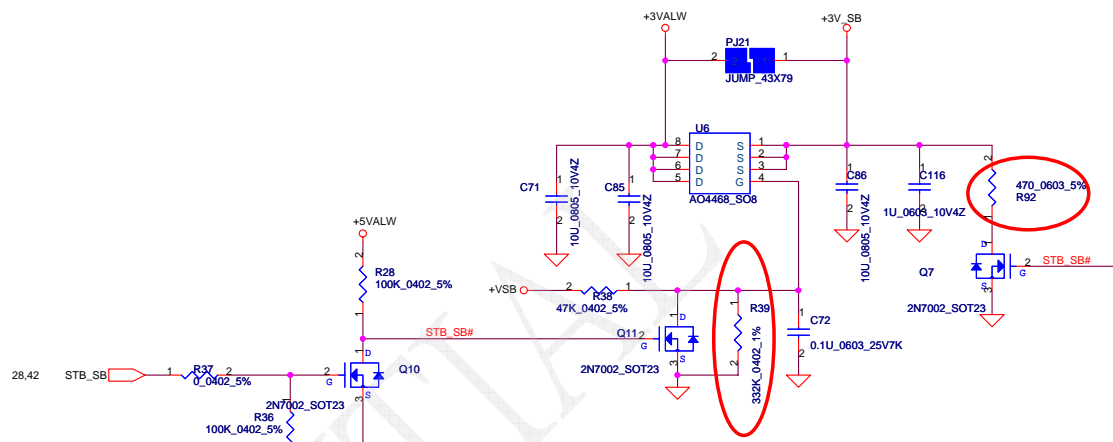
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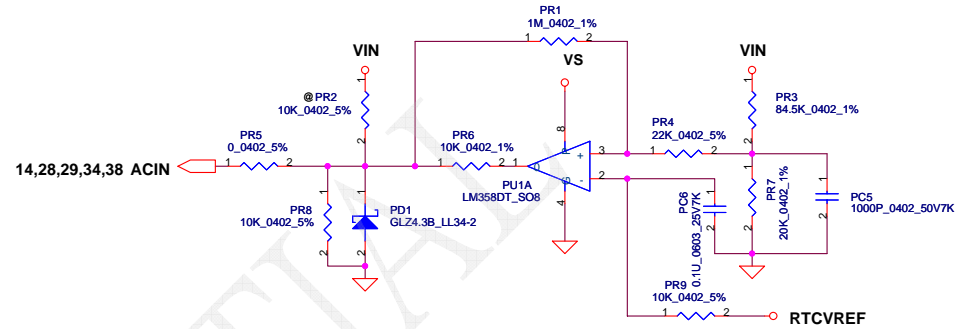
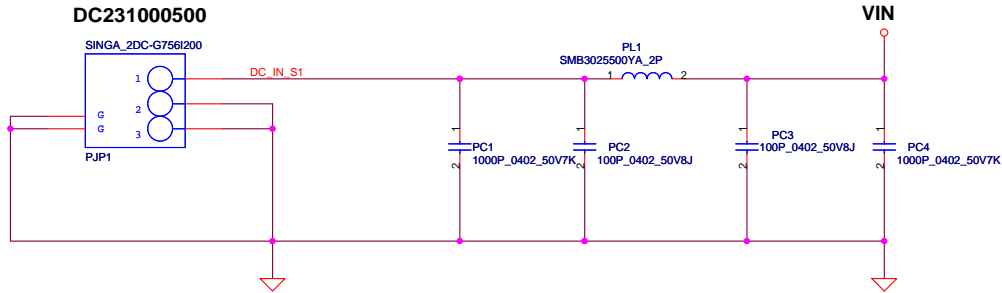
+1.5V to +1.5VS



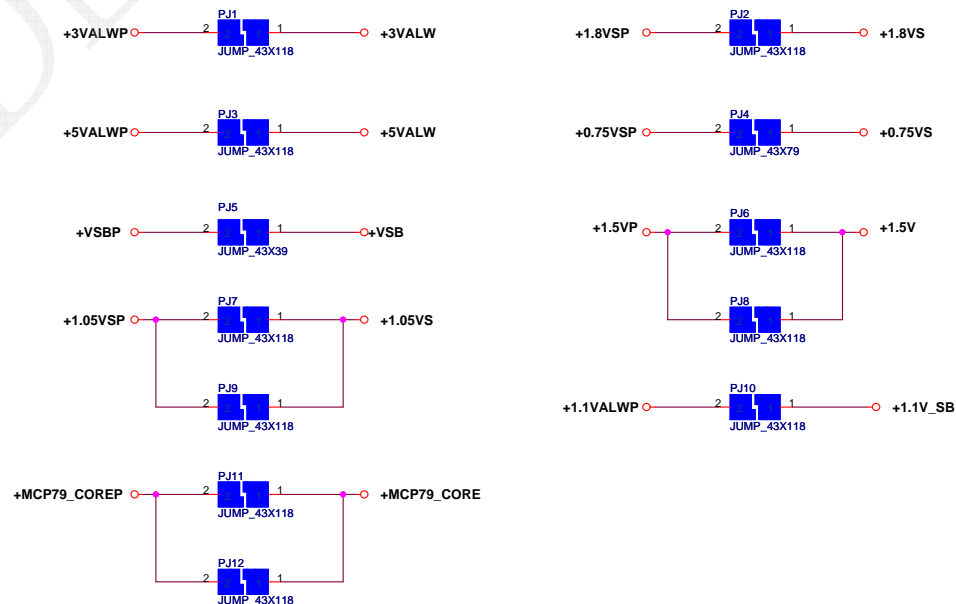
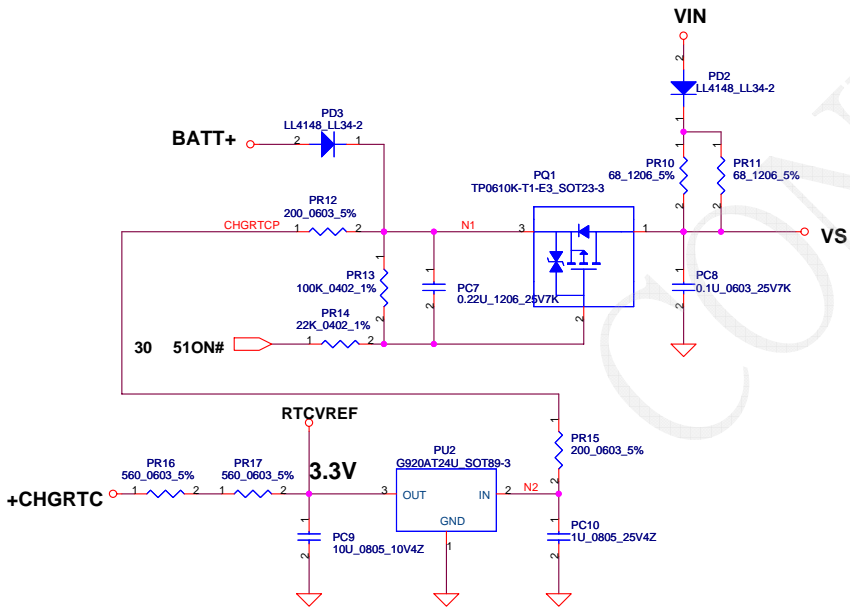
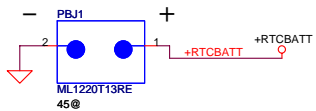
+3VALW TO +3V_SB



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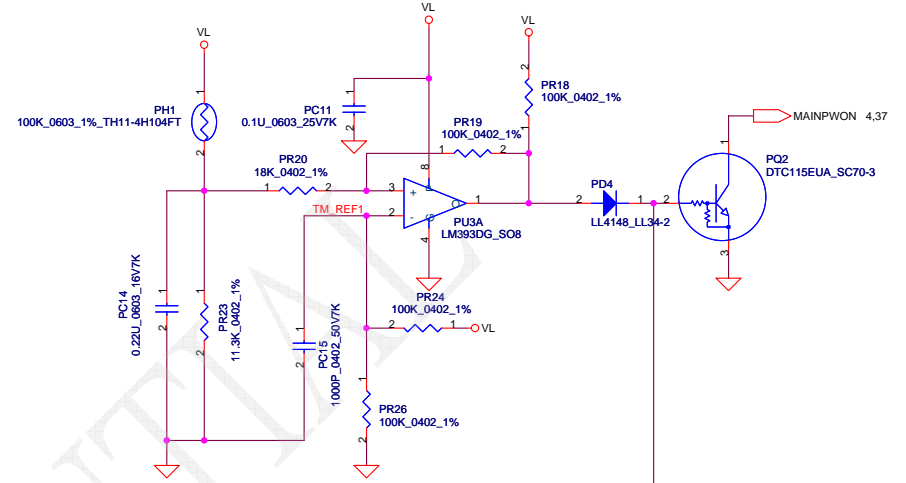
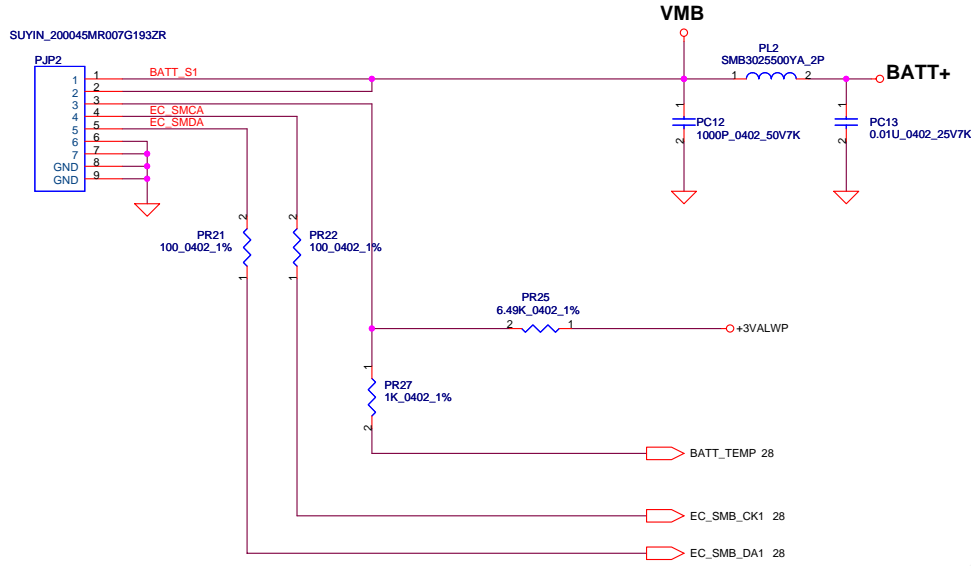
Vin Detector			
	Min.	Typ	Max.
H-->L	16.976V	17.525V	17.728V
L-->H	17.430V	17.901V	18.384V



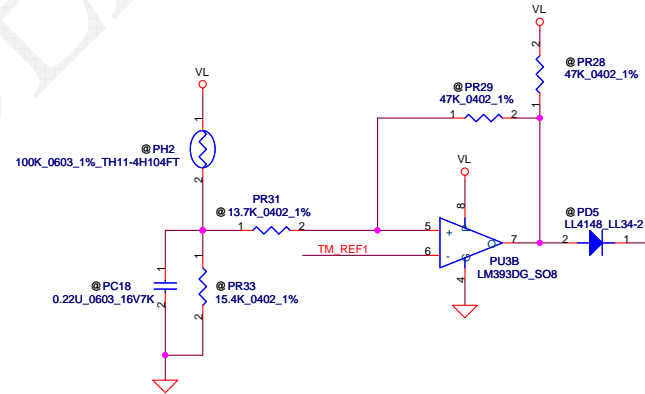
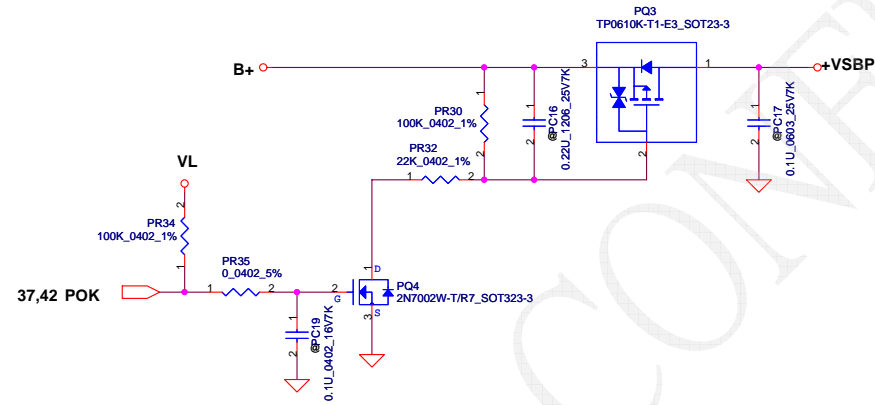
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PH1 under CPU botten side :
 CPU thermal protection at 92 degree C
 Recovery at 70 degree C

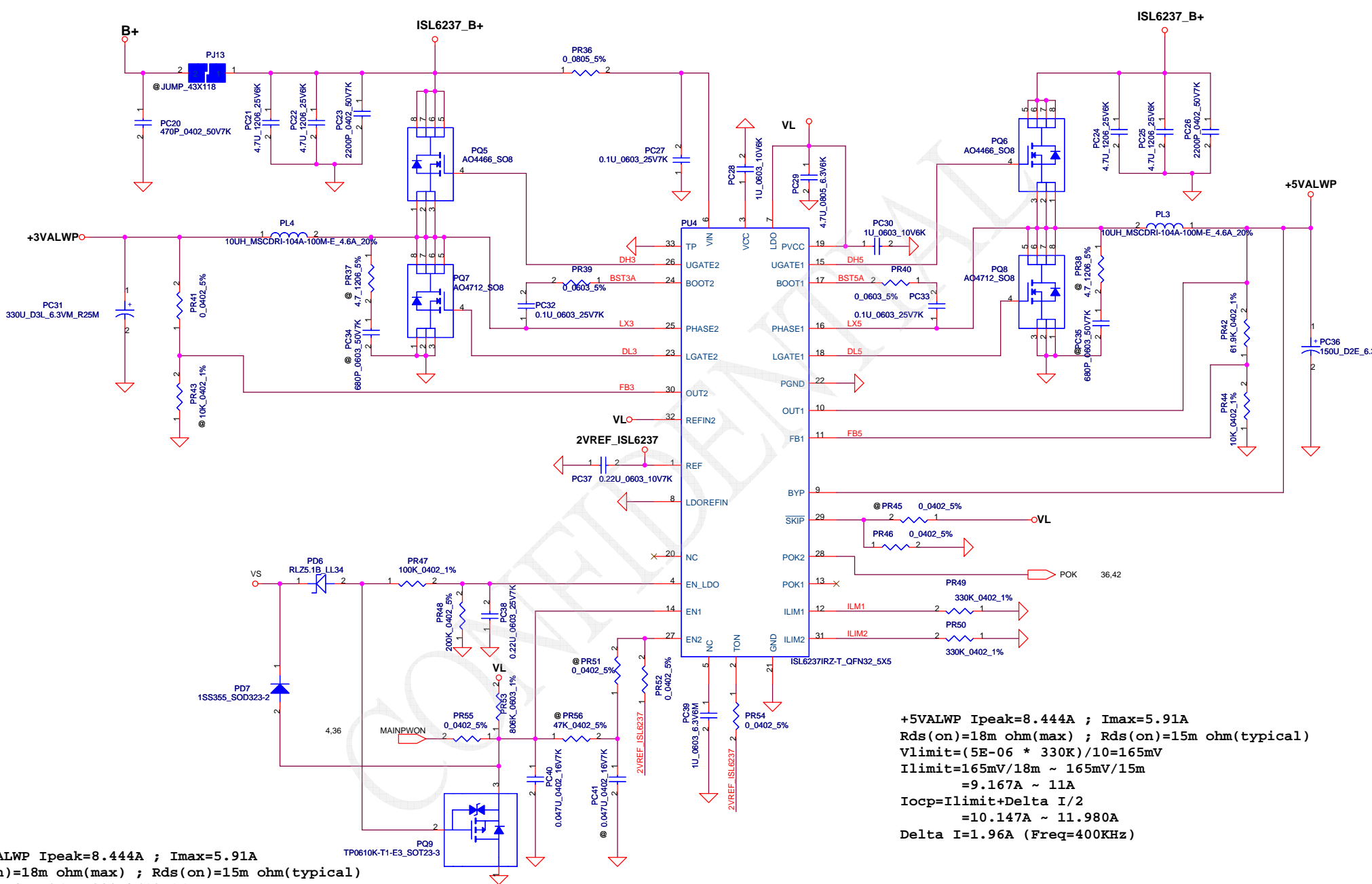
SUYIN_200045MR007G193ZR



PH2 near main Battery CONN :
 BAT. thermal protection at 92 degree C
 Recovery at 56 degree C



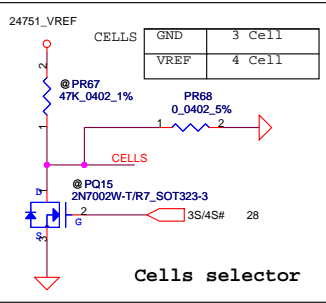
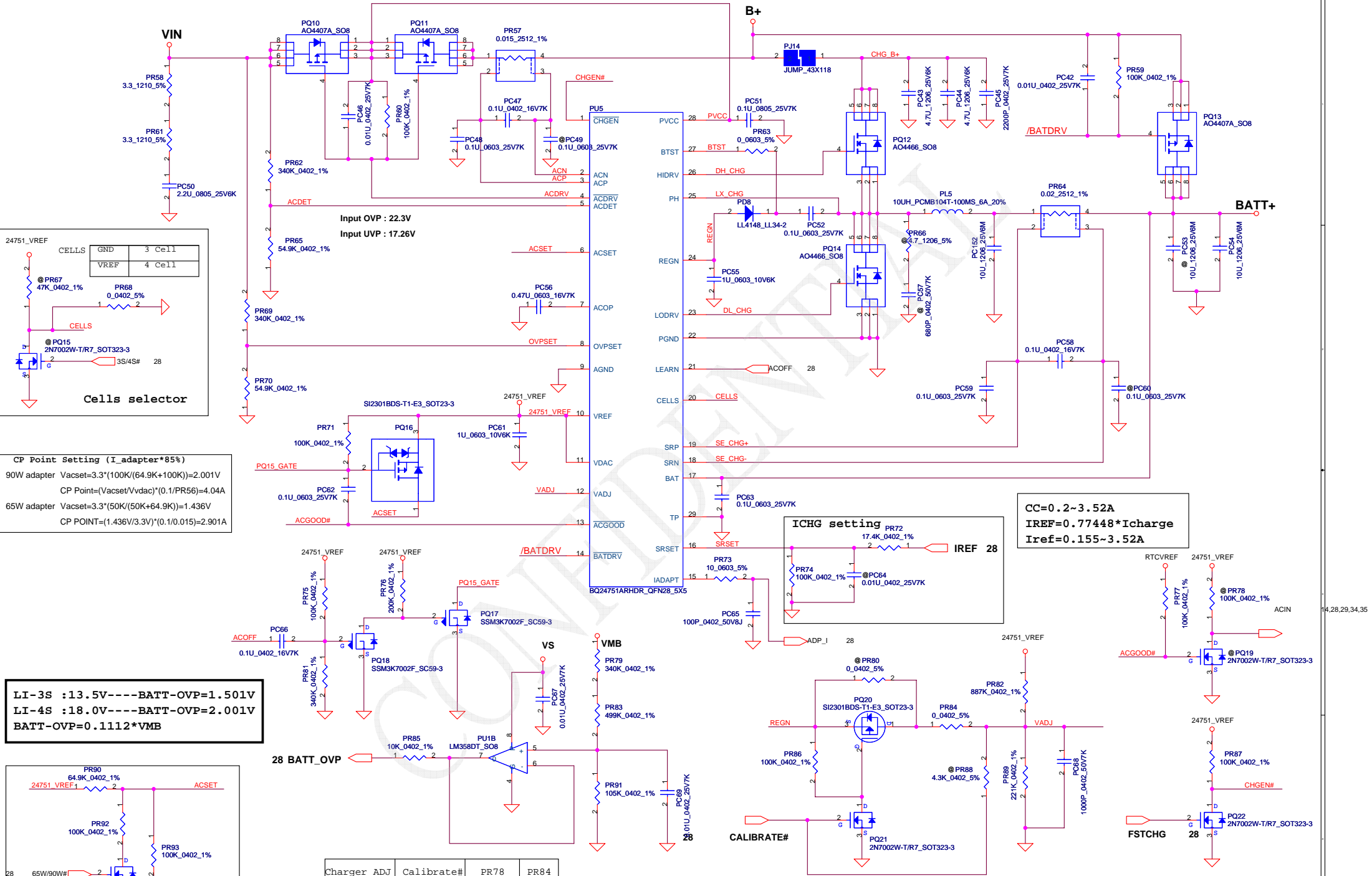
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+3.3VALWP Ipeak=8.444A ; Imax=5.91A
 Rds(on)=18m ohm(max) ; Rds(on)=15m ohm(typical)
 Vlimit=(5E-06 * 330K)/10=165mV
 Ilimit=165mV/18m ~ 165mV/15m
 =9.167A ~ 11A
 Iocp=Ilimit+Delta I/2
 =10.134A ~ 11.967A
 Delta I=1.934A (Freq=300KHz)

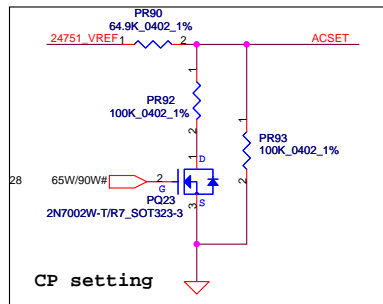
+5VALWP Ipeak=8.444A ; Imax=5.91A
 Rds(on)=18m ohm(max) ; Rds(on)=15m ohm(typical)
 Vlimit=(5E-06 * 330K)/10=165mV
 Ilimit=165mV/18m ~ 165mV/15m
 =9.167A ~ 11A
 Iocp=Ilimit+Delta I/2
 =10.147A ~ 11.980A
 Delta I=1.96A (Freq=400KHz)

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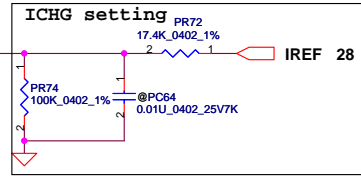


CP Point Setting (I_adapter*85%)
 90W adapter Vacset=3.3*(100K/(64.9K+100K))=2.001V
 CP Point=(Vacset/Vvdac)*(0.1/PR56)=4.04A
 65W adapter Vacset=3.3*(50K/(50K+64.9K))=1.436V
 CP POINT=(1.436V/3.3V)*(0.1/0.015)=2.901A

LI-3S : 13.5V---BATT-OVP=1.501V
LI-4S : 18.0V---BATT-OVP=2.001V
BATT-OVP=0.1112*VMB



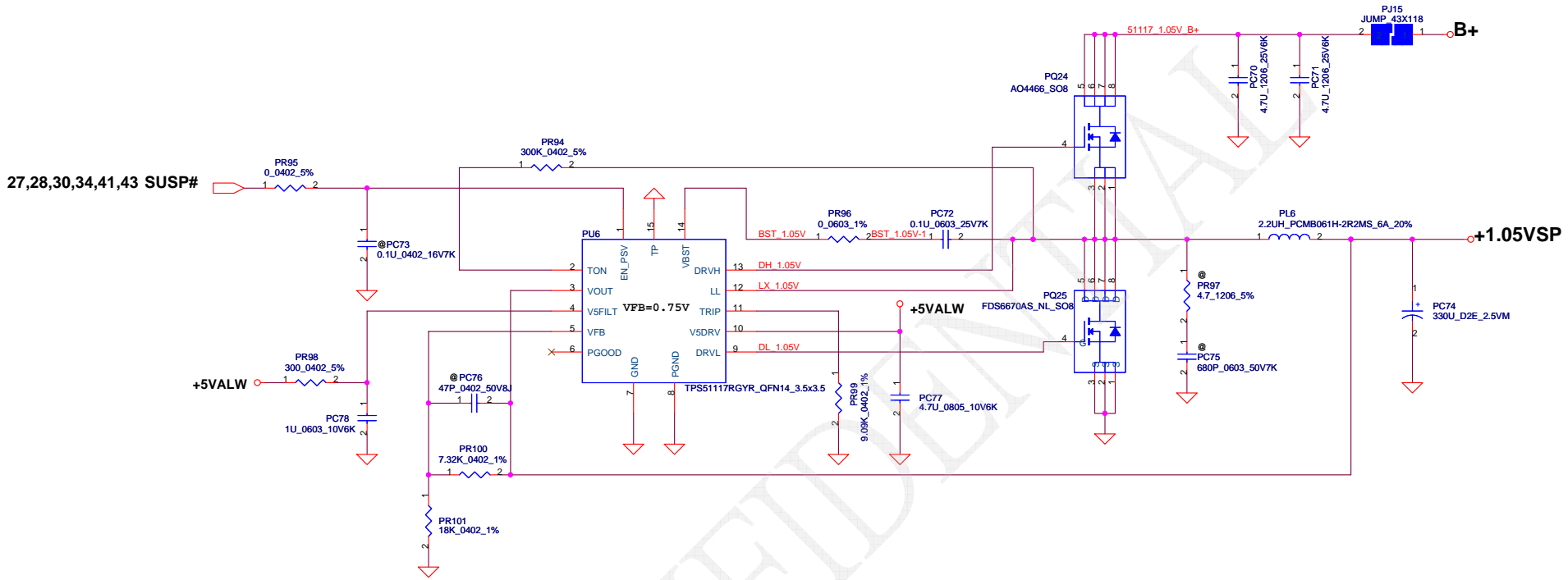
Charger ADJ	Calibrate#	PR78	PR84
4.0V	L	@	@
4.1V	L	887K	221K
4.2V	H	@	@



CC=0.2~3.52A
IREF=0.77448*Icharge
Iref=0.155~3.52A

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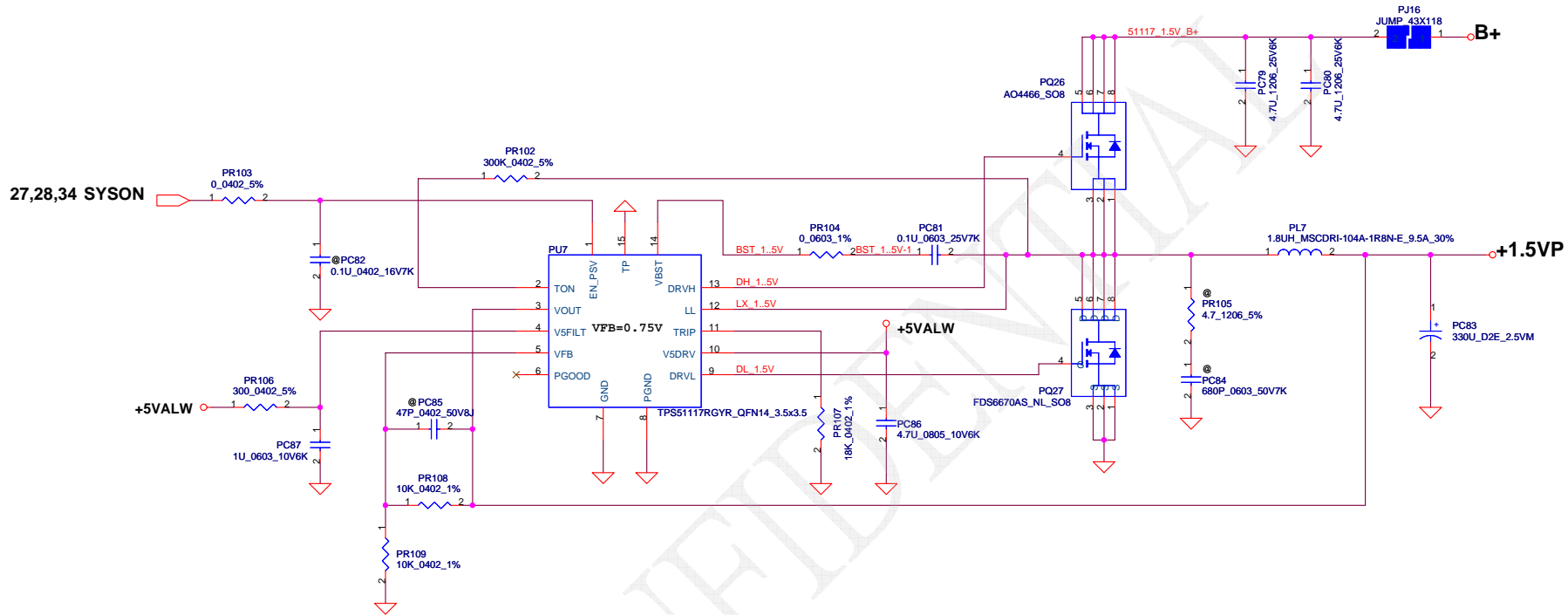
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VFB=0.75V
 $V_o = VFB * (1 + PR100 / PR101) = 1.055V$
 $F_{sw} = 262KHz$

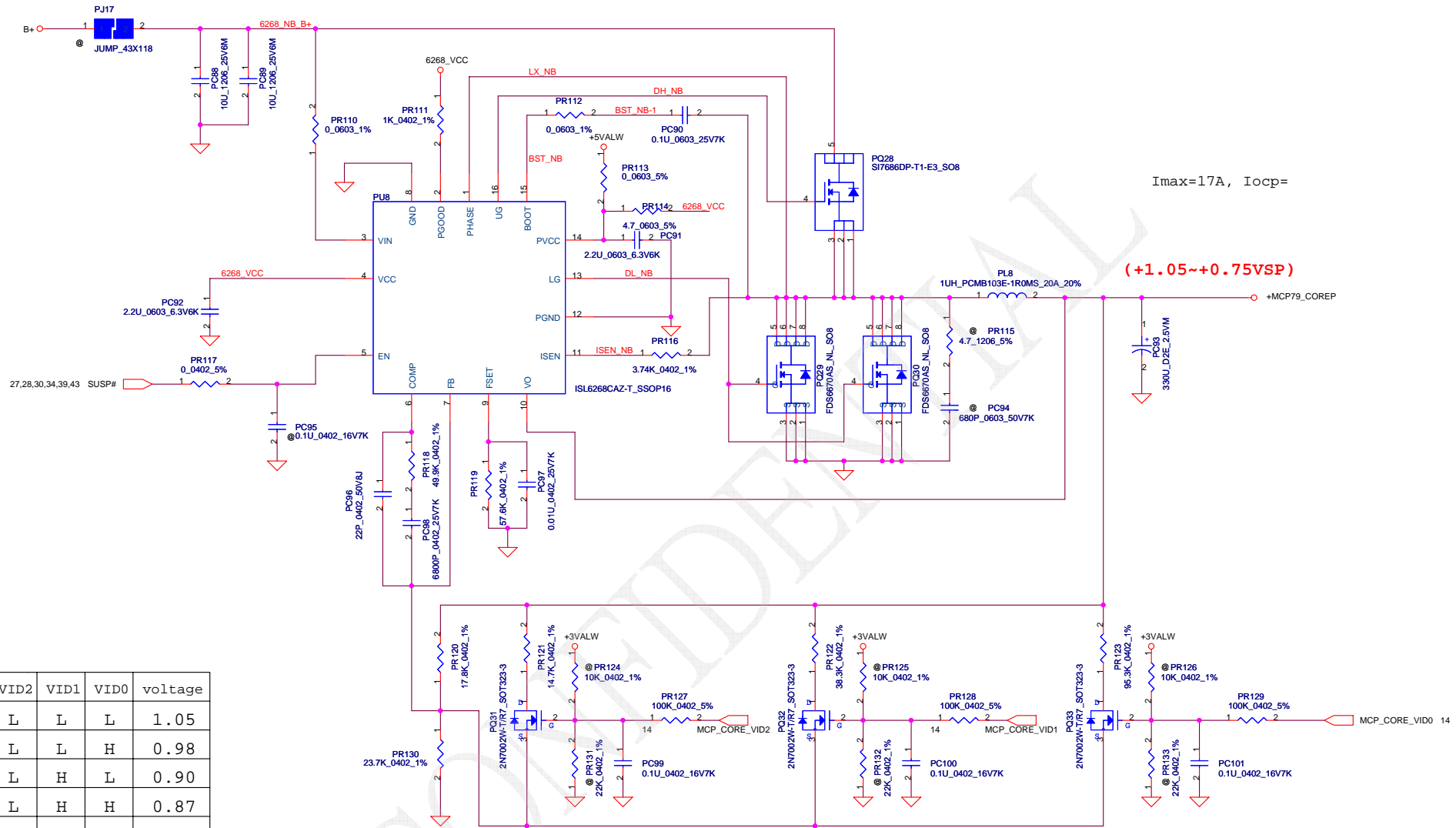
Cout ESR=15m ohm
 $R_{dsonmax} = 11.5m\ ohm, R_{dson\ typ} = 9m\ ohm$
 $I_{peak} = 7.15A, I_{max} = 3.5A$
 $\Delta I = ((19 - 1.05) * (1.05 / 19)) / (L * F_{sw}) = 2.103A$
 $\Rightarrow 1/2 \Delta I = 1.052A$
 $V_{trip} = R_{trip} * I_{0uA} = 9.09K * 10uA = 0.0909V$
 $I_{ocpmin} = V_{trip} / R_{dsonmax} * 1.3 + 1.052A = 7.132A$
 $I_{ocpmax} = V_{trip} / R_{dson\ typ} * 1.1 + 1.052A = 10.233A$
 $I_{ocp} = 7.132A - 10.233A$

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$V_{FB} = 0.75V$
 $V_o = V_{FB} * (1 + PR108 / PR109) = 1.5V$
 $F_{sw} = 262KHz$
 $C_{out} ESR = 15m\ ohm$
 $R_{dsonmax} = 11.5m\ ohm, R_{dson typ} = 9m\ ohm$
 $I_{peak} = 13.67A, I_{max} = 8A$
 $\Delta I = ((19 - 1.5) * (1.5 / 19)) / (L * F_{sw}) = 2.930A$
 $\Rightarrow 1/2 \Delta I = 1.465A$
 $V_{trip} = R_{trip} * I_{out} = 18K * 10uA = 0.180V$
 $I_{ocpmin} = V_{trip} / R_{dsonmax} * 1.4 + 1.465A = 12.645A$
 $I_{ocpmax} = V_{trip} / R_{dson typ} * 1.2 + 1.465A = 18.131A$
 $I_{ocp} = 12.645A - 18.131A$

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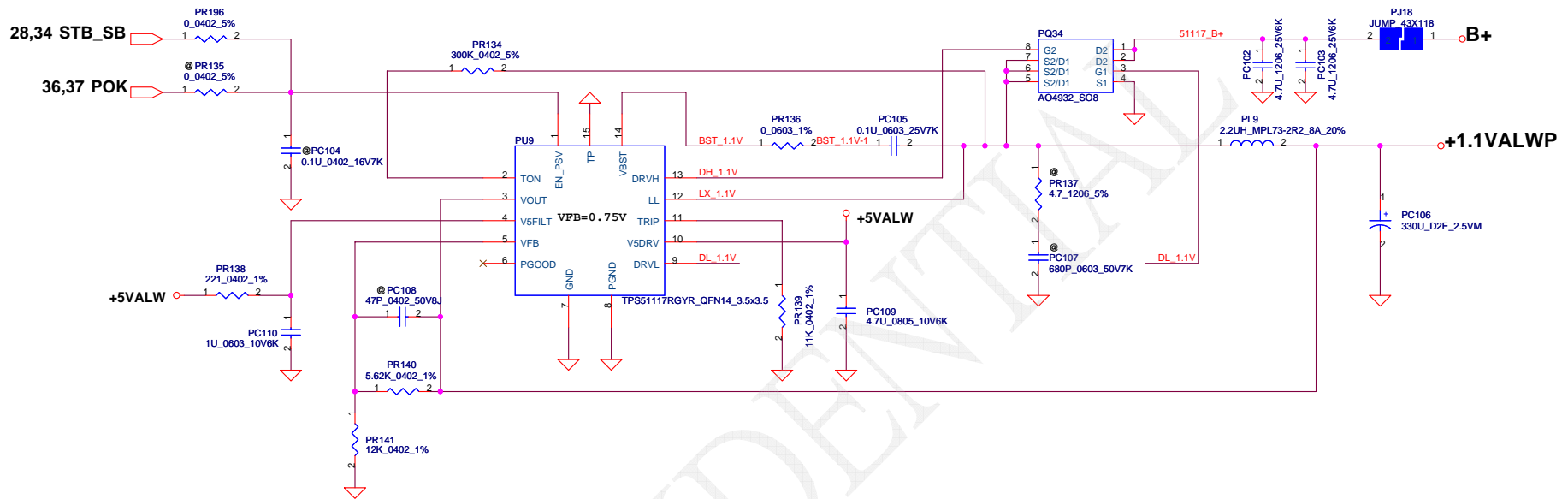


I_{max}=17A, I_{ocp}=

(+1.05~+0.75VSP)

VID2	VID1	VID0	voltage
L	L	L	1.05
L	L	H	0.98
L	H	L	0.90
L	H	H	0.87
H	L	L	0.80
H	L	H	0.79
H	H	L	0.77
H	H	H	0.75

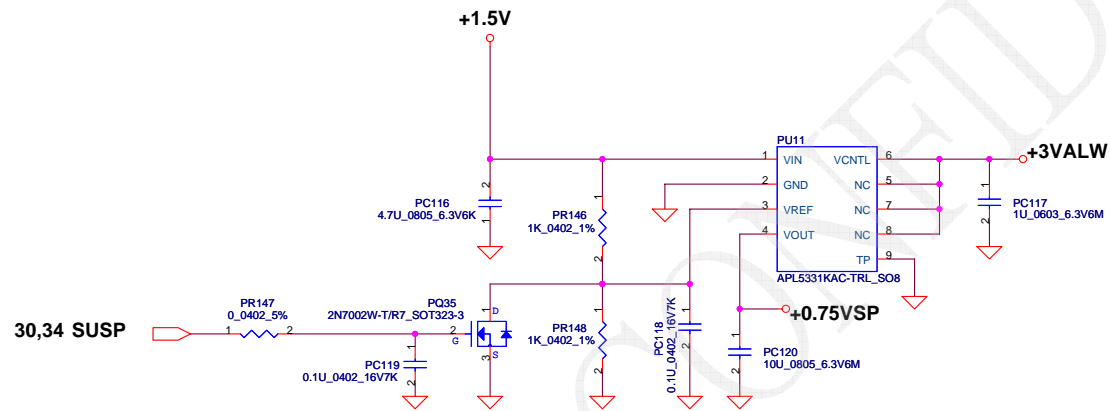
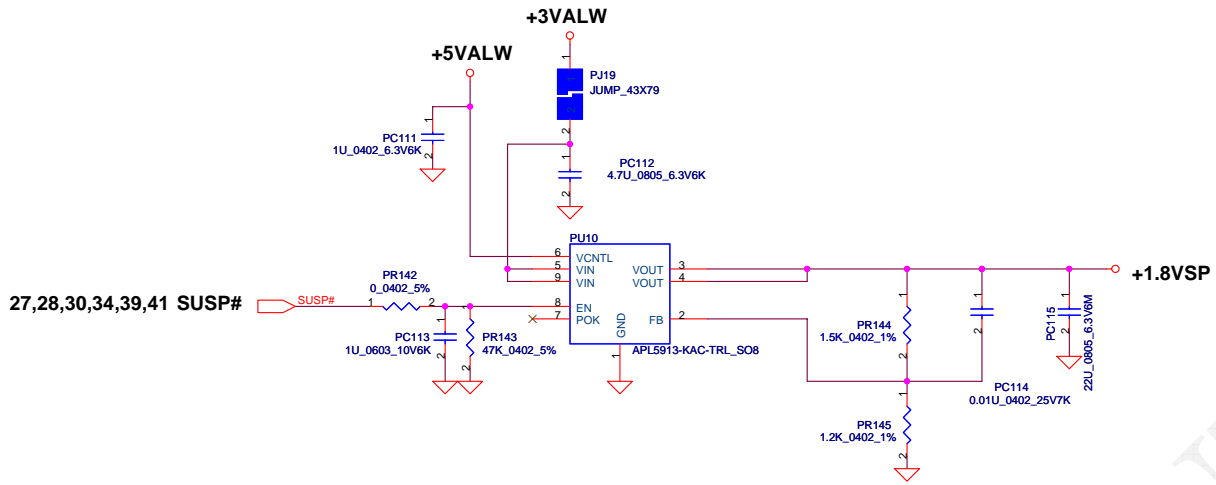
for layout convenience,
do not change net name



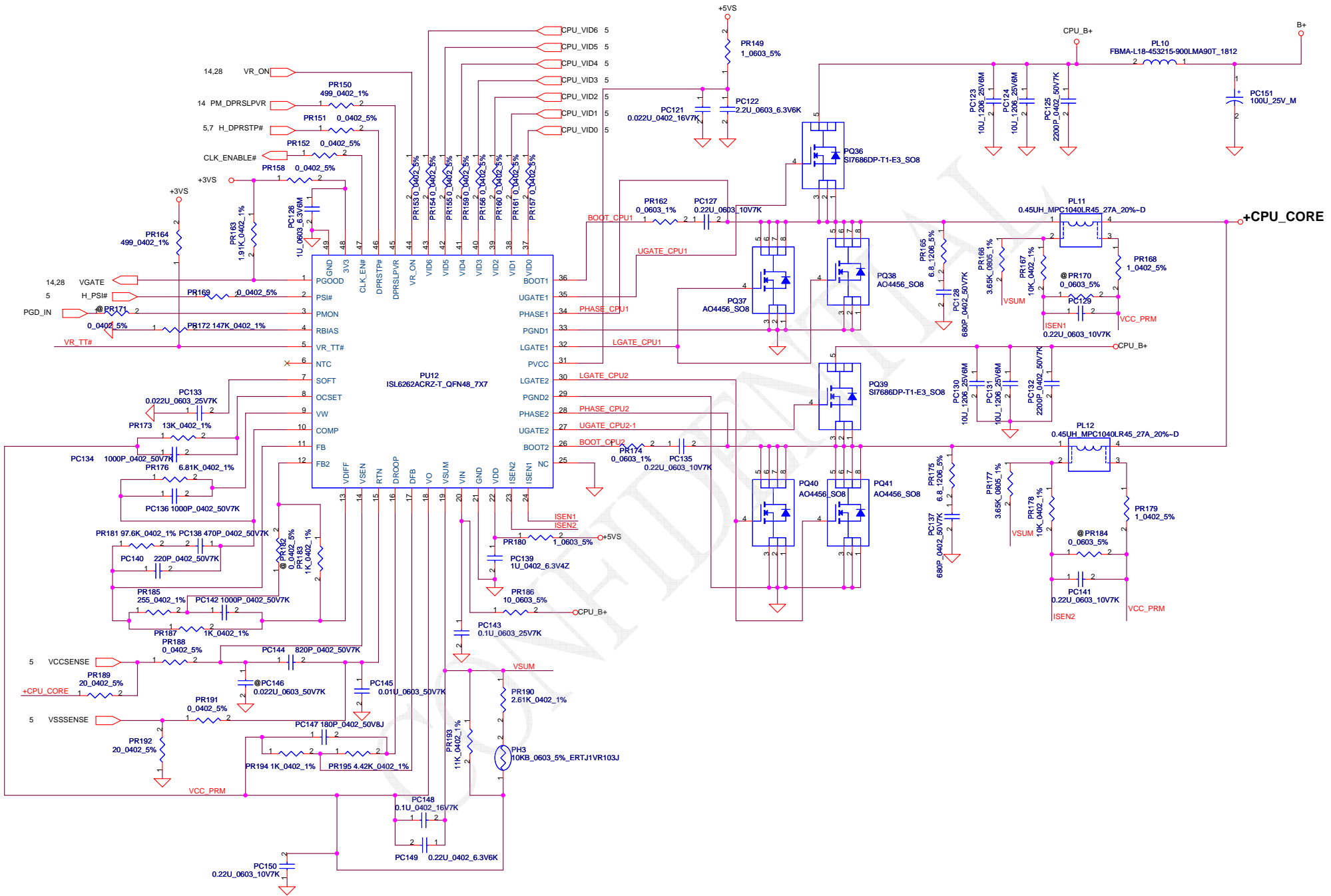
VFB=0.75V
 $V_o = VFB * (1 + PR140 / PR141) = 1.101V$
 $F_{sw} = 262KHz$

$C_{out} ESR = 15m \text{ ohm}$
 $R_{dsonmax} = 27m \text{ ohm}$, $R_{dson typ} = 21m \text{ ohm}$
 $I_{peak} = 3.3A$, $I_{max} = 2.31A$, $I_{ocp} = 3.96A$
 $\Delta I = ((19 - 1.1) * (1.1 / 19)) / (L * F_{sw}) = 1.798A$
 $\Rightarrow 1 / 2 \Delta I = 0.899A$
 $V_{trip} = R_{trip} * I_{ocp} = 11K * 10uA = 0.11V$
 $I_{ocpmin} = V_{trip} / R_{dsonmax} * 1.3 + 0.899A = 4.033A$
 $I_{ocpmax} = V_{trip} / R_{dson typ} * 1.1 + 0.899A = 5.661A$
 $I_{ocp} = 4.033A - 5.661A$

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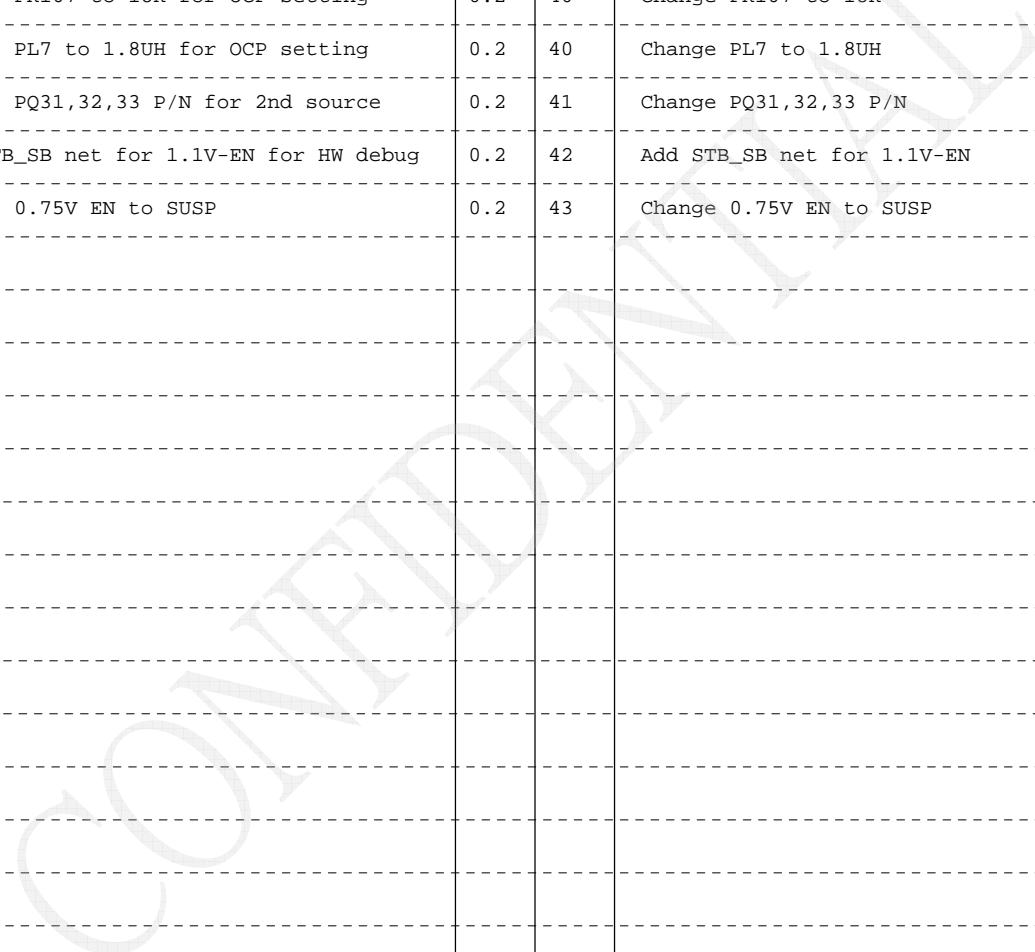


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Item	Fixed Issue	Reason for change	Rev.	PG#	Modify List	Date	Phase
1	Add PC152	Add PC152 for BQ24751 OVP issue	0.2	38	Add PC152	09/24	DVT
2	Change PQ25 to FDS6670	Change PQ25 to FDS6670 for efficiency	0.2	39	Change PQ25 to FDS6670	09/24	DVT
3	Change PR107 to 18K	Change PR107 to 18K for OCP setting	0.2	40	Change PR107 to 18K	09/24	DVT
4	Change PL7 to 1.8UH	Change PL7 to 1.8UH for OCP setting	0.2	40	Change PL7 to 1.8UH	09/24	DVT
5	Change PQ31,32,33 P/N	Change PQ31,32,33 P/N for 2nd source	0.2	41	Change PQ31,32,33 P/N	09/24	DVT
6	Add STB_SB net for 1.1V-EN	Add STB_SB net for 1.1V-EN for HW debug	0.2	42	Add STB_SB net for 1.1V-EN	09/24	DVT
7	Change 0.75V EN to SUSP	Change 0.75V EN to SUSP	0.2	43	Change 0.75V EN to SUSP	09/24	DVT
8							
9							
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Item	Fixed Issue	Reason for change	Rev.	PG#	Modify List	Date	Phase
1		MEMO		20	add Q6 Q8	9/15	0.1
2		MEMO		32	change R416, R418, R420, R421 to 75 ohm	9/15	0.1
3		MEMO		06	del C368	9/15	0.1
4		MEMO		06	add C483	9/15	0.1
5				11	change R137.1 to +3V_SB	9/15	0.2
6				25	swap JRJ45.11 and JRJ45.12	9/15	0.2
7				21	swap JHDMI.1 and JHDMI.3	9/15	0.2
8				26	add 80 port signal to Jmini2	9/15	0.2
9				34	R92 change from 0805 to 0603	9/15	0.2
10				21	change D12 p/n	9/15	0.2
11				14	pop D13	9/15	0.2
12				11	enbkl add pull low resistor	9/15	0.2
13				26	R211.1 change form +3Valw to +3V_SB	9/15	0.2
14				14	add pull low resistor R461 on ec_rsmrst# signal	9/15	0.2
15				29	change LED behavior for I D spec	9/15	0.2
16				23	change U14 JMB380 to JMB385	9/15	0.2
17				27	add JUSB2 port	9/15	0.2
18				28	add R462,R463 KSO1 / KSO2 pull high 47k	9/15	0.2
19				19	LVDS, del U29, pop Q37,R299,C443	9/15	0.2
20				33	fan controller, change U9 to APL5607 , R85 to 0 ohm, del D9,D10	9/15	0.2
21				32	del amplifire LDO, change R413,R411 o 56 ohm	10/9	0.2
22				29	pop D1,D8,D21,D22 for ESD	10/9	0.2
23				14	pop U13, R166,R169,C229 for HDCP	10/9	0.2

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Item	Fixed Issue	Reason for change	Rev.	PG#	Modify List	Date	Phase
1				20	add C44,C35,C21, change C43,C34,C20 to 18p	9/15	0.2
2				23	change D17 p/n	10/9	0.2
3				32	change L33,L34 p/n	10/9	0.2
4				31	change R11,R12,R13,R276 p/n	10/9	0.2
5				21	change F2 p/n	10/9	0.2
6				7	reserve BSEL pull low resistor R470,R471,R472	10/9	0.2
7				14	change SMBus pull high value,R73,R96,R93,R94 to 2.2k	10/9	0.2
8				15	del C319	10/9	0.2
9				33	del U19,U28,R221,R289,C323,C431,R223,R285	10/9	0.2
10				21	change HDMI R119,R142,R118,R140 pull high to 2.7k	10/9	0.2
11				19	change R294 to 100k	10/9	0.2
12				29	del LED(10,11,12,15,17,18) , add LED(19,20,21,22,23,24)		0.2
13				34	pop R231,Q22,R16,Q4		0.2
14				28	pop R133, change R132 to 8.2k		0.2
15				29	change LED9 p/n	MEMO	0.2
16				24	change Q9 p/n	11/6	0.3
17				23	del R451, Q18, D17	11/6	0.3
18				25	reserve R473, R474	11/6	0.3
19				29	del LED11,17,20,23 ,pop LED14,LED16.R447,R465	11/6	0.3
20				31	pop D3	11/6	0.3
21				22	unpop C455,C456	11/6	0.3
22				14	change R73,R96 to 1.8k	11/6	0.3
23				14	del R136 add R475, del R132, unpop D3, All LED resistor	11/25	1.0

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