

LCFC Confidential


DS321 MB Schematics Document

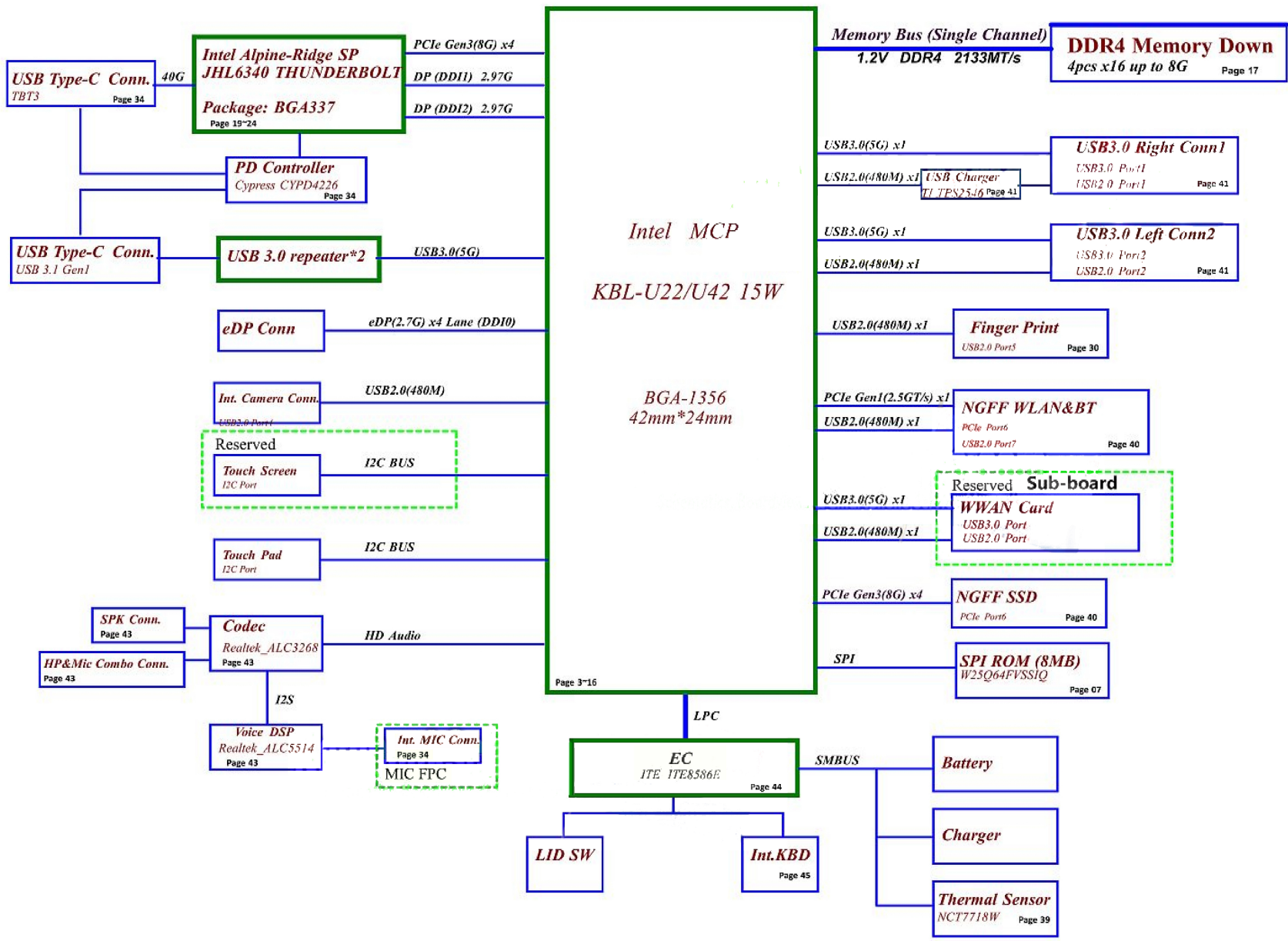
Intel Kabylake-U22&U42 with DDR4

2016-12-05

REV: 0.2

Intel Kabylake-U22&U42 with DDR4

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Voltage Rails (O --> Means ON , X --> Means OFF)

Power Plane / State		+3VALW +5VALW +3VALW_PCH +1.8VALW +1.0VALW	+1.2V +2.5V_DDR +VCCST	+5VS +3VS +VCCIO +VCCSTG +VCCSA +VCC_GT +CPU_CORE +0.6VS
	V20B+			
S0	O	O	O	O
S3	O	O	O	X
S3 Battery only	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

SMBUS Control Table

	SOURCE	BATT	Charger	DGPU	IT8586E	Memory Down	PCH	PMIC	SODIMM	Thermal Sensor	WLAN WiMAX
EC_SMB_CK1 EC_SMB_DA1	IT8586E +3VL_EC	V	V	X	V +3VL_EC	X	X	X	X	X	X
EC_SMB_CK2 EC_SMB_DA2	IT8586E +3VS	X	X	V +3VG_AON	V +3VS	X	V +3VALW_PCH	X	X	V	X
EC_SMB_CK3 EC_SMB_DA3	IT8586E +3VL_EC	X	X	X	V +3VL_EC	X	X	V	X	X	X
PCH_SMB_CLK PCH_SMB_DATA	PCH +3VALW_PCH	X	X	X	X	X	V +3VALW_PCH	X	V +3VS	X	V +3VS

EC SMBus1 address

Device	Address
Smart Battery	need to update
Charger	0001 0010 b

EC SMBus2 address

Device	Address
Thermal Sensor(NCT7718W)	1001_100xb
PCH	need to update
DGPU	need to update

EC SMBus3 address

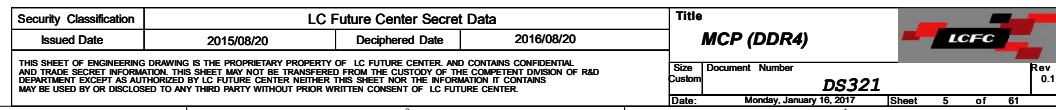
Device	Address
PMIC	need to update

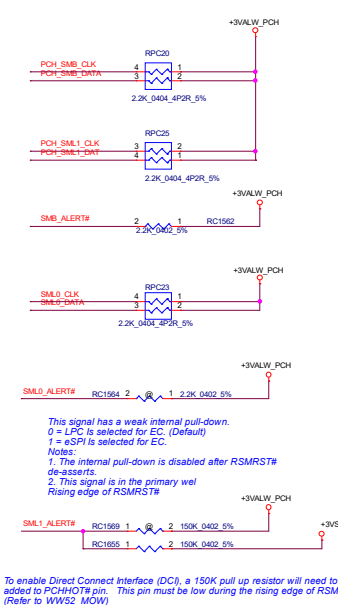
PCH SM Bus address


Device	Address
DDR4 SODIMM	need to update
Wlan	Reserved

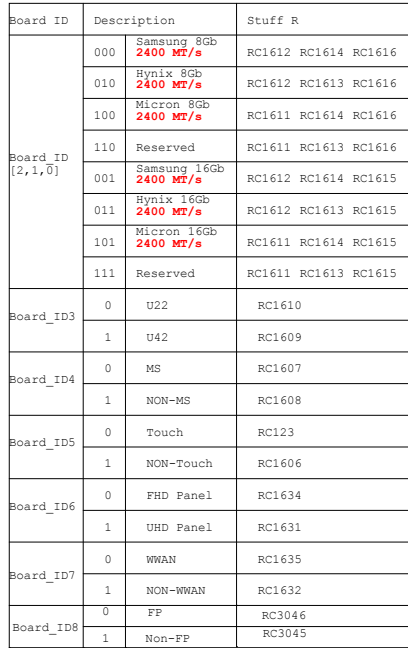
STATE / SIGNAL	SLP_S3#	SLP_S4#	SLP_S5#	+VALW	+V	+VS	Clock
Full ON	HIGH	HIGH	HIGH	ON	ON	ON	ON
S3 (Suspend to RAM)	LOW	HIGH	HIGH	ON	ON	OFF	OFF
S4 (Suspend to Disk)	LOW	LOW	LOW	ON	OFF	OFF	OFF
S5 (Soft OFF)	LOW	LOW	LOW	ON	OFF	OFF	OFF

HSIO PORT	Function	BOM Structure	BTO Item
USB3.0	1 USB3.0 Conn Left	@	Not stuff
	2 USB3.0 Conn Right(optional)	14@	For 14" part
	3 3D Camera(optional)	15@	For 15" part
	4 NC	14or15@	For 14" or 15" part
	5 NC	14or17@	For 14" or 17" part
	6 NC		
USB2.0	1 USB3.0 Conn Left	Cannonlake@	For Cannonlake part
	2 USB2.0 Conn1 Right	CD@	For C cost down
	3 USB2.0 Conn2 Right	DUALMIC@	For Dual MIC part
	4 Camera	EMC@	For EMC part
	5 Cardreader	EMC_15@	For EMC 15" part
	6 Touch Panel	EMC_NS@	For EMC nu-stuff part
	7 Bluetooth	EMC_PX@	For EMC PX part
	8 TBT	EMC_PXNS@	For EMC PX nu-stuff part
	9 NC	ES@	For ES CPU
	10 NC	EXO@	For EXO GPU
PCIE	1 NC		
	2 NC		
	3 NC	ME@	For ME part
	4 NC	NTS@	For nu-touch part
	5 LAN		
	6 WLAN		
	7 used as SATA		
	8 used as SATA		
SATA	9~12 X4 PCIE	PX@	For PX part
	0 HDD	RANKA@	For VRAM rank A part
	1A ODD	RANKB@	For VRAM rank B part
	1B used as PCIE	Realtek SD@	For Realtek SD part
	2 used as PCIE	SINGLEMIC@	For single MIC part
		SINGLERANK@	For single VRAM rank part
		DUALRANK@	For dual VRAM rank part
		TS@	For touch screen part
		TPM@	For TPM part
		UMA@	For UMA part






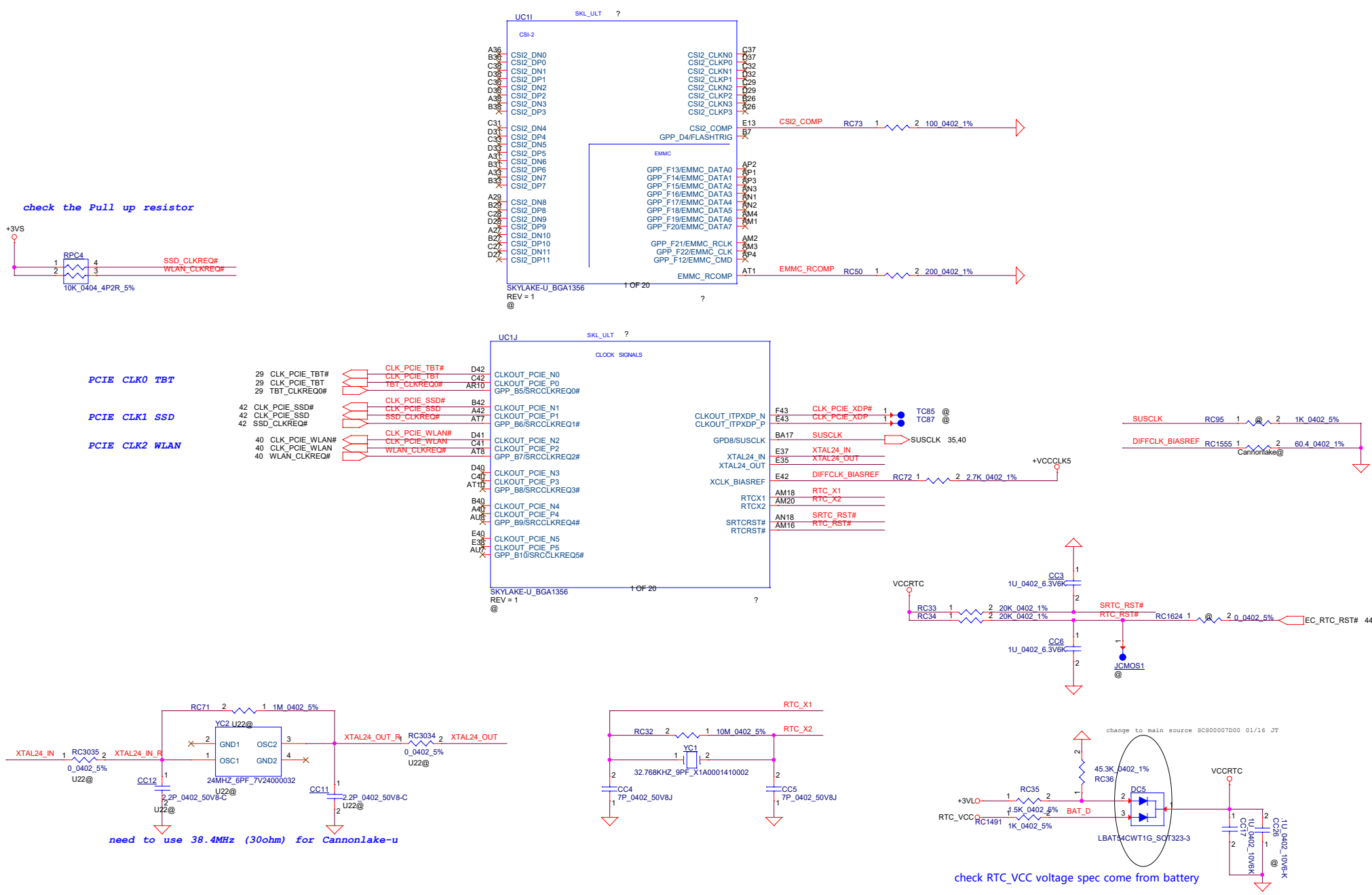
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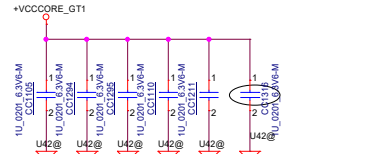
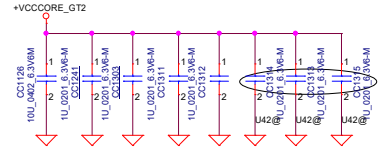
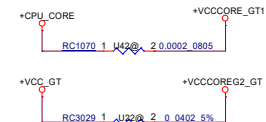
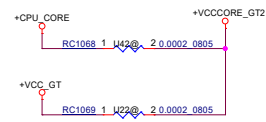
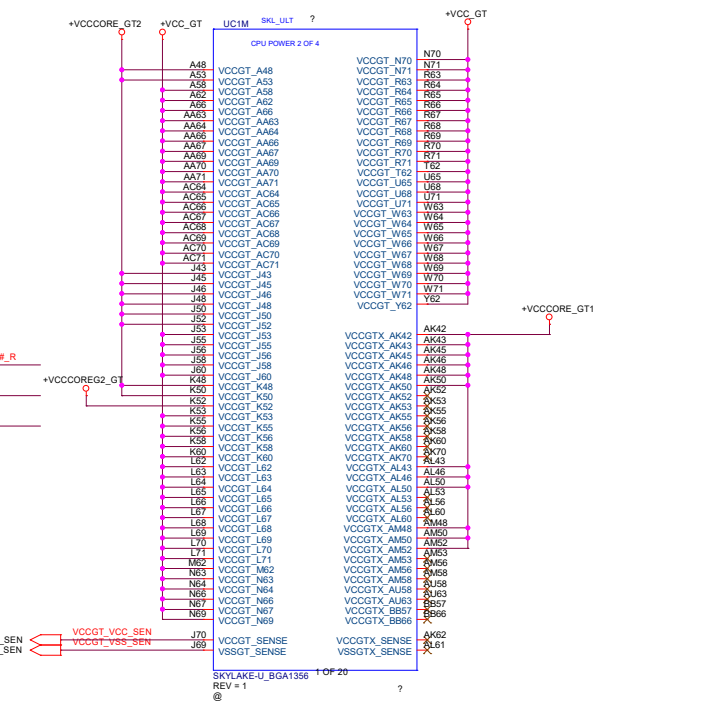
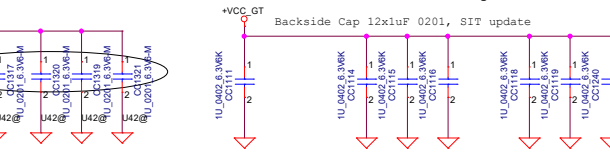
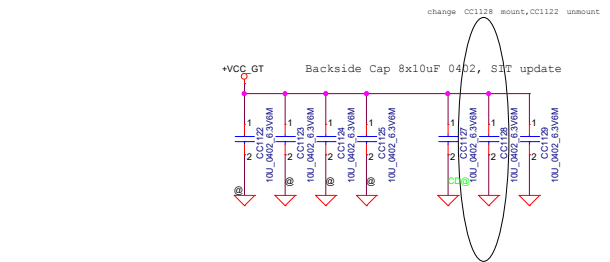
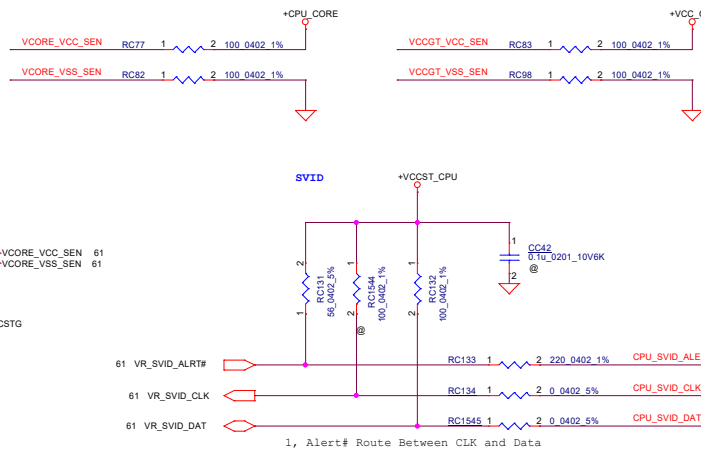
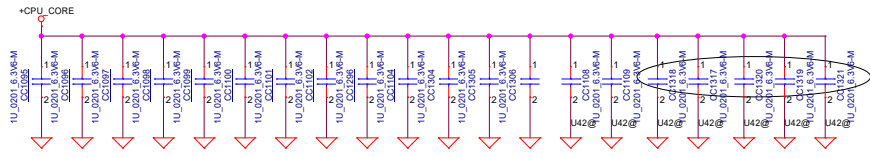
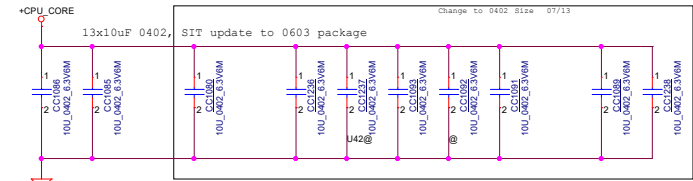
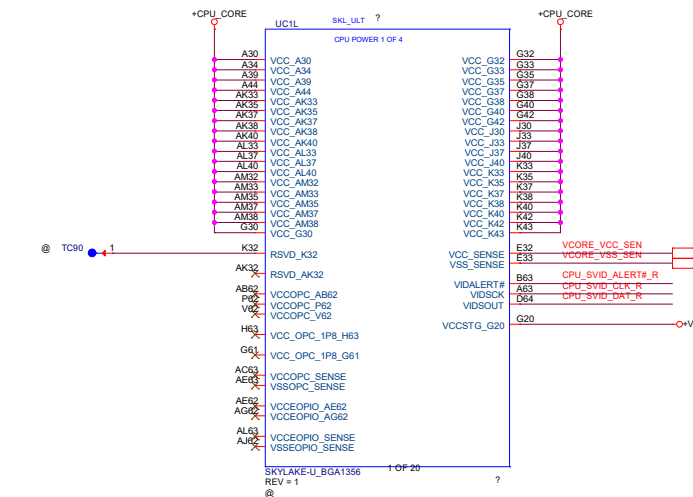


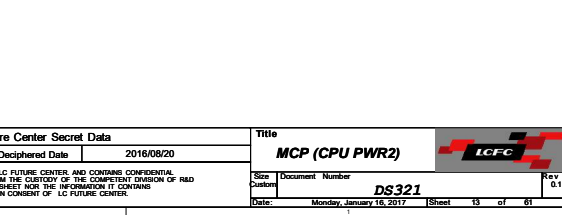
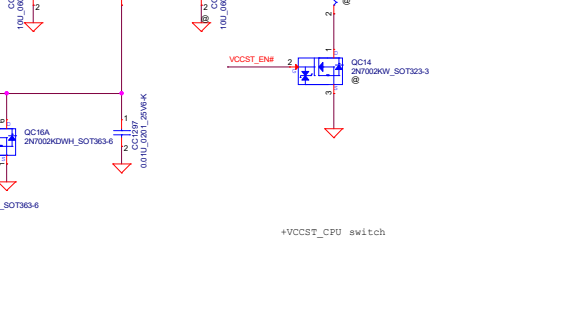
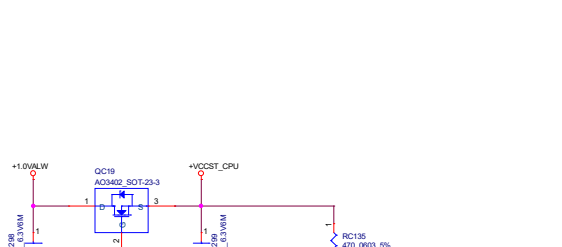
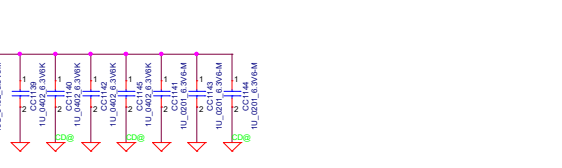
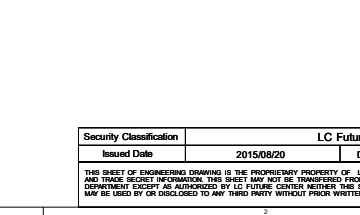
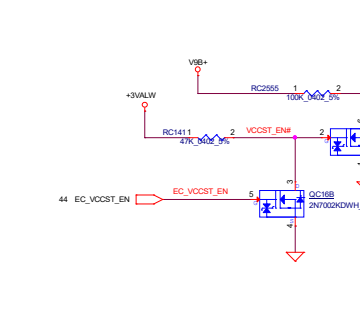
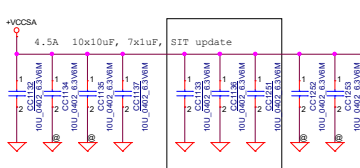
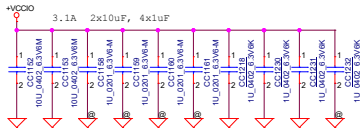
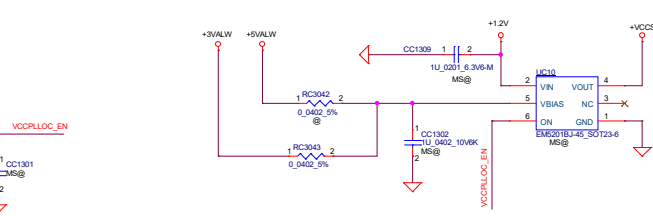
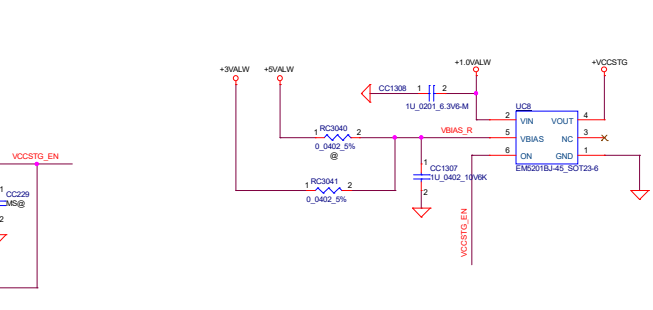
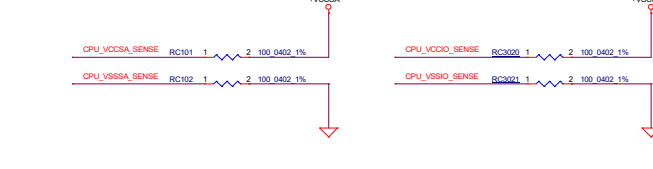
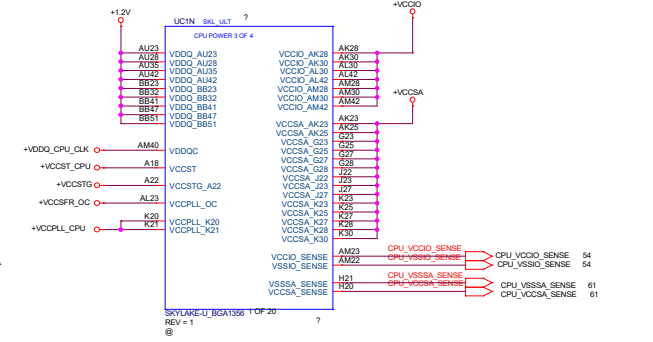
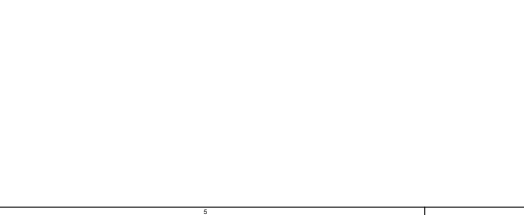
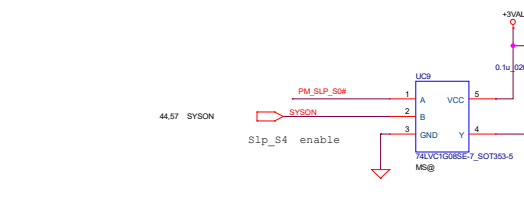
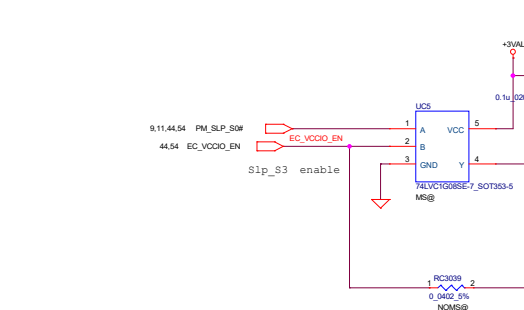
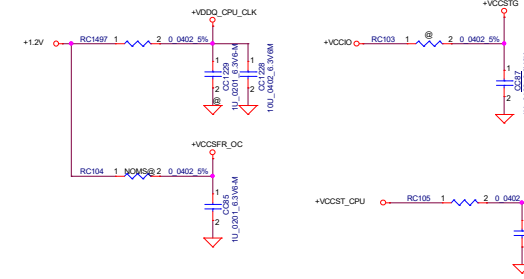
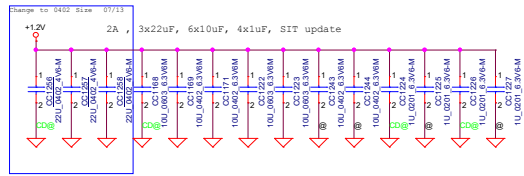
Pin Name	Strap Description	Configuration	Default Value	When Sampled
SPKR / GPP_B14	Top Swap Override	Internal PD 0 = Disable "Top Swap" mode. (Default) ★ 1 = Enable "Top Swap" mode.	0	Rising edge of PCH_PWROK
SSPI0 MOSI / GPP_E18	No Reboot	Internal PD 0 = Disable "No Reboot" mode. (Default) ★ 1 = Enable "No Reboot" mode	0	Rising edge of PCH_PWROK
SSPI1 MOSI / GPP_B22	Boot BIOS Strap Bit BBS	Internal PD 0 = SPI (Default) ★ 1 = LPC	0	Rising edge of PCH_PWROK


Need change to SB000019A00
S TR DMN5L06DWK-7 2N SOT363-6
Vgs(th) max1.0V

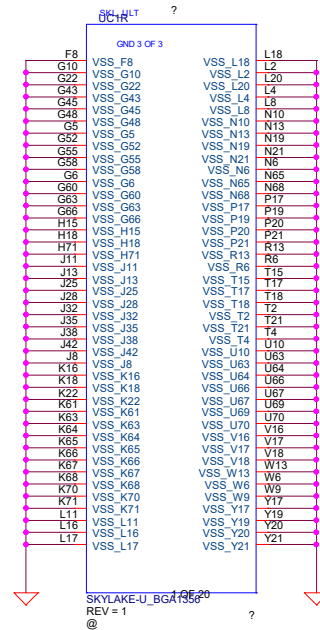
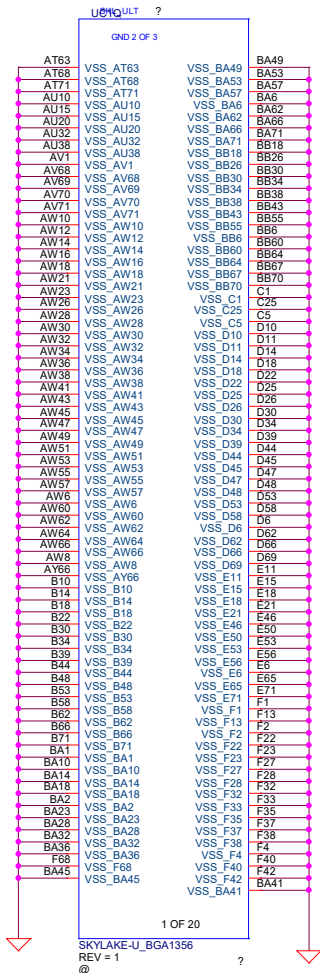
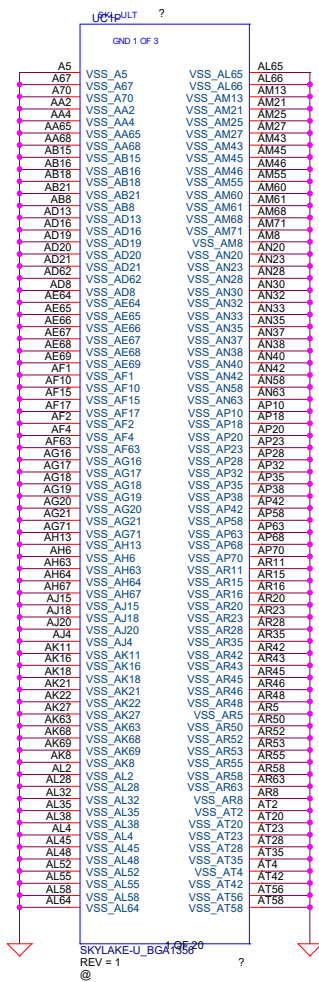
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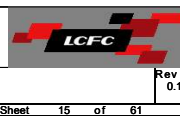


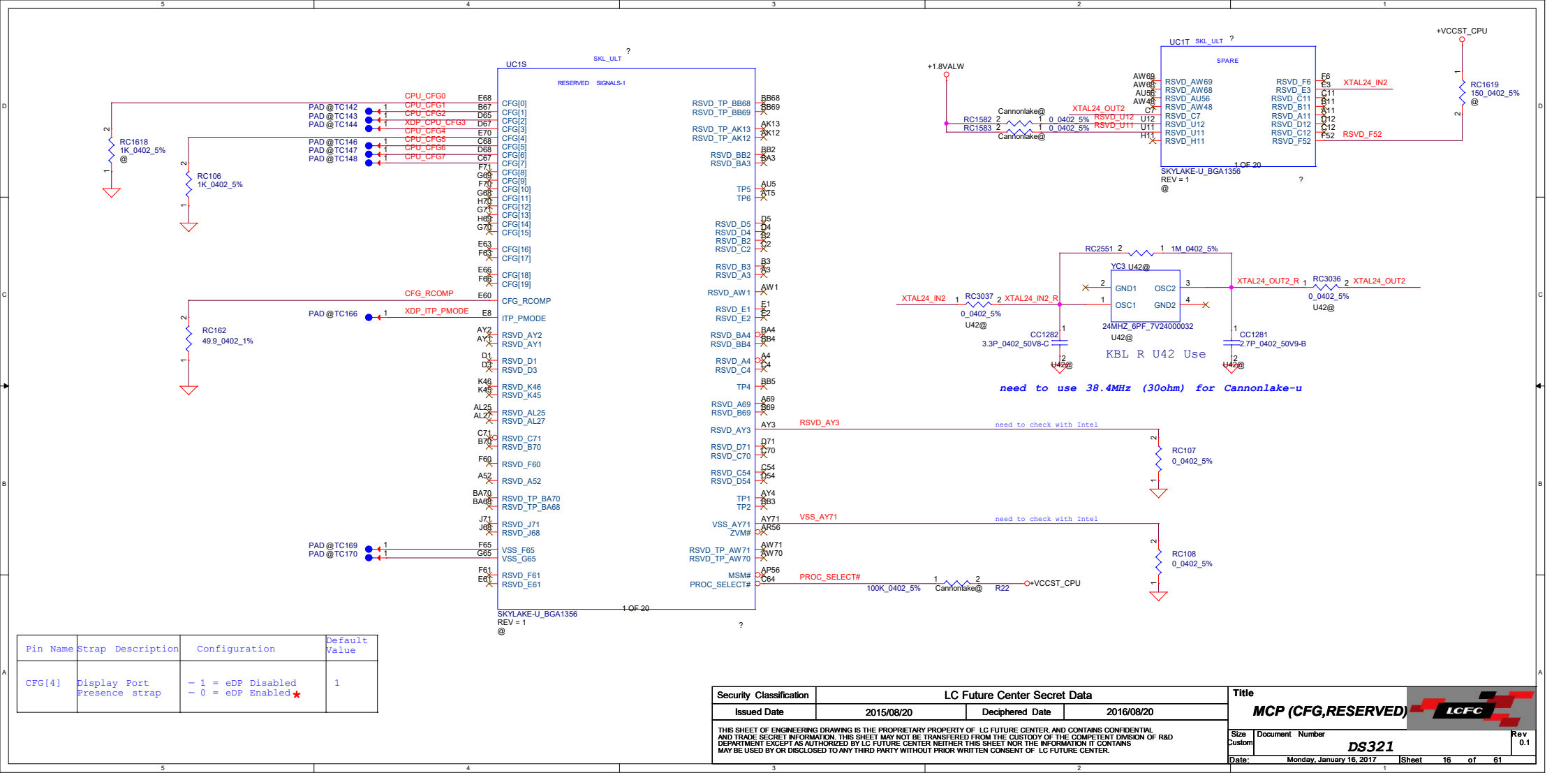


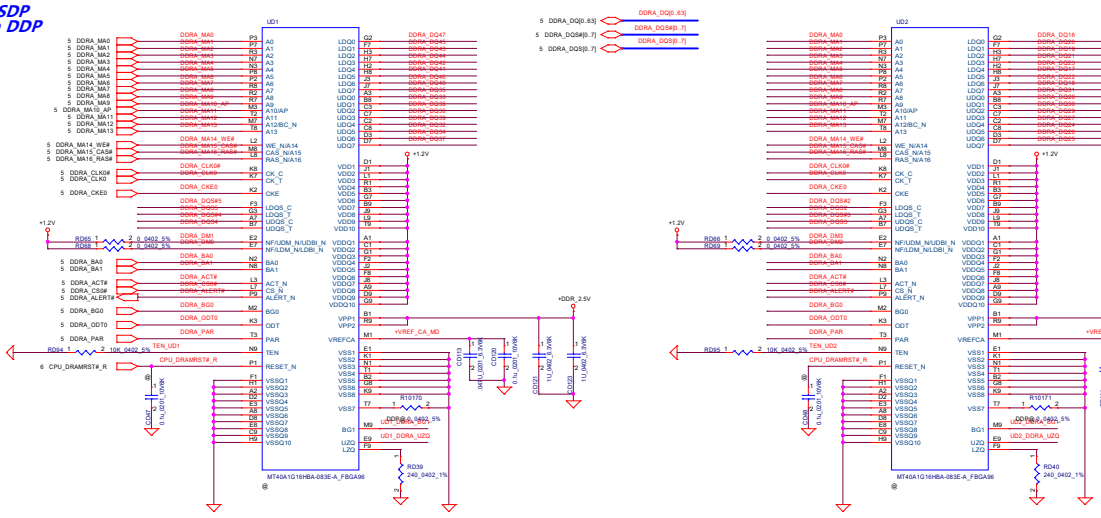
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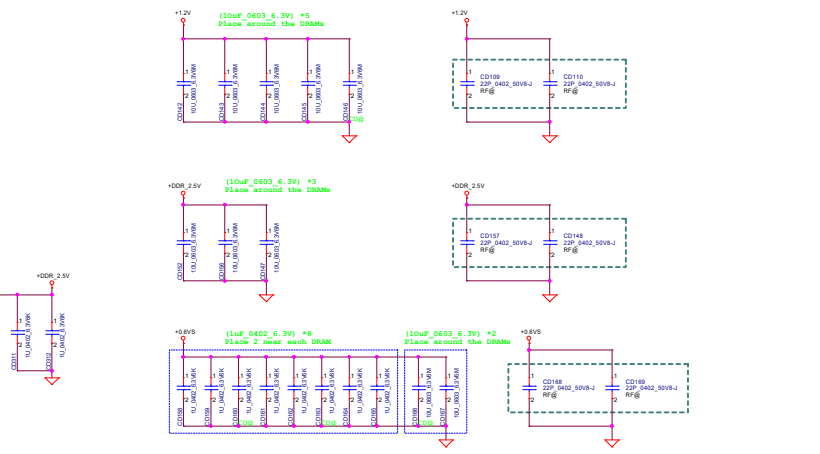
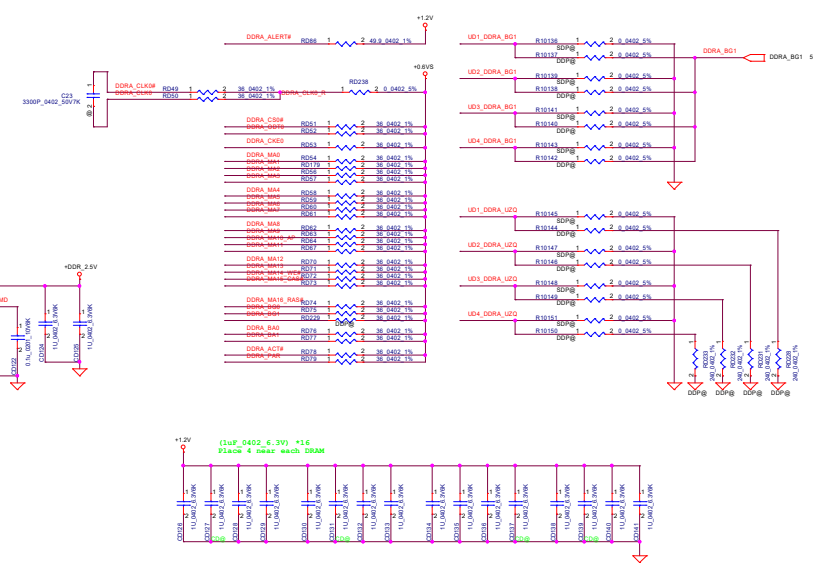
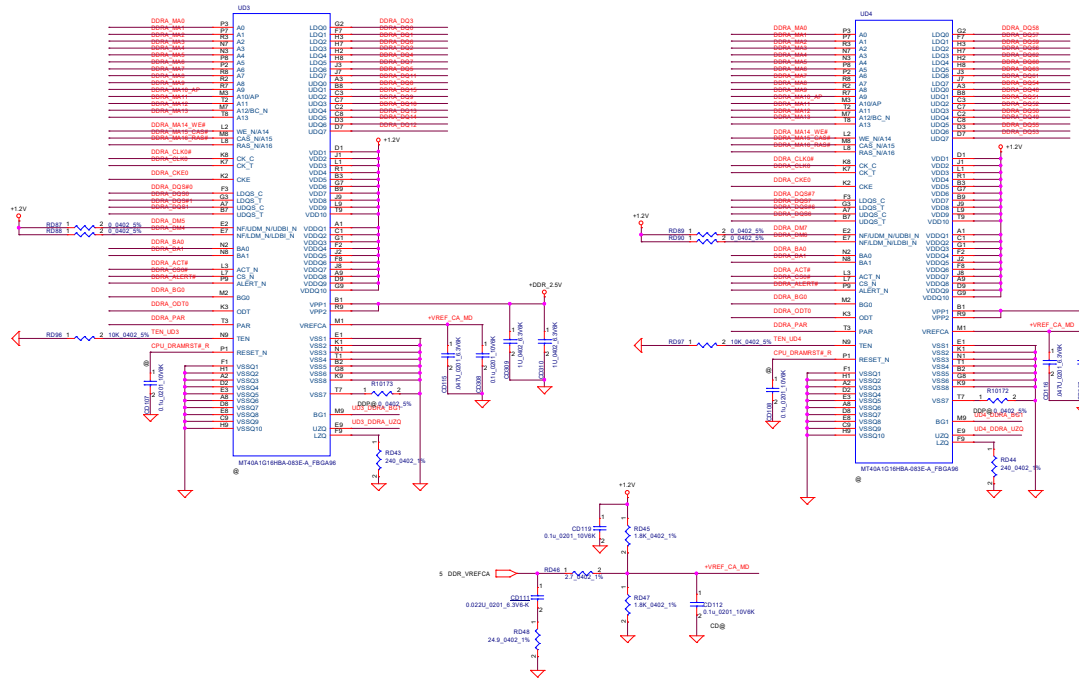
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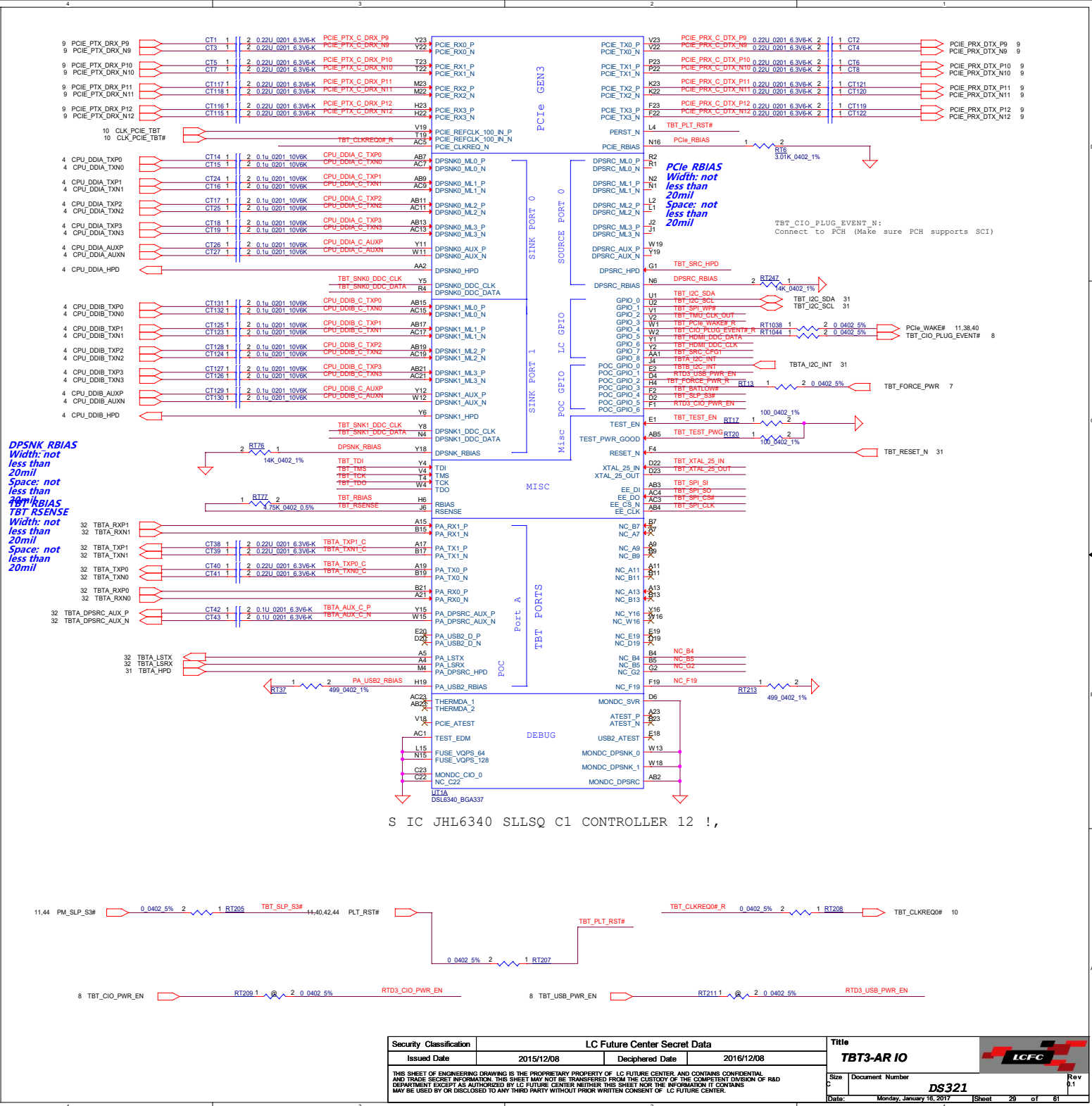
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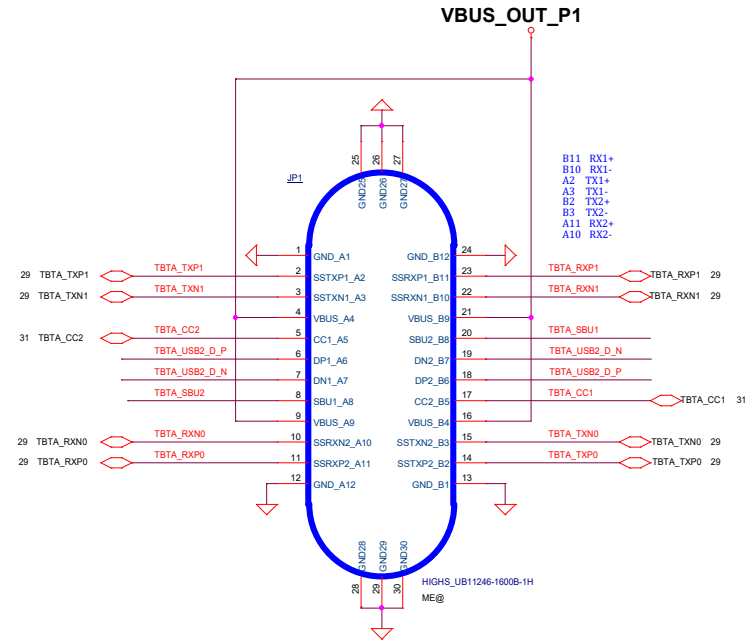
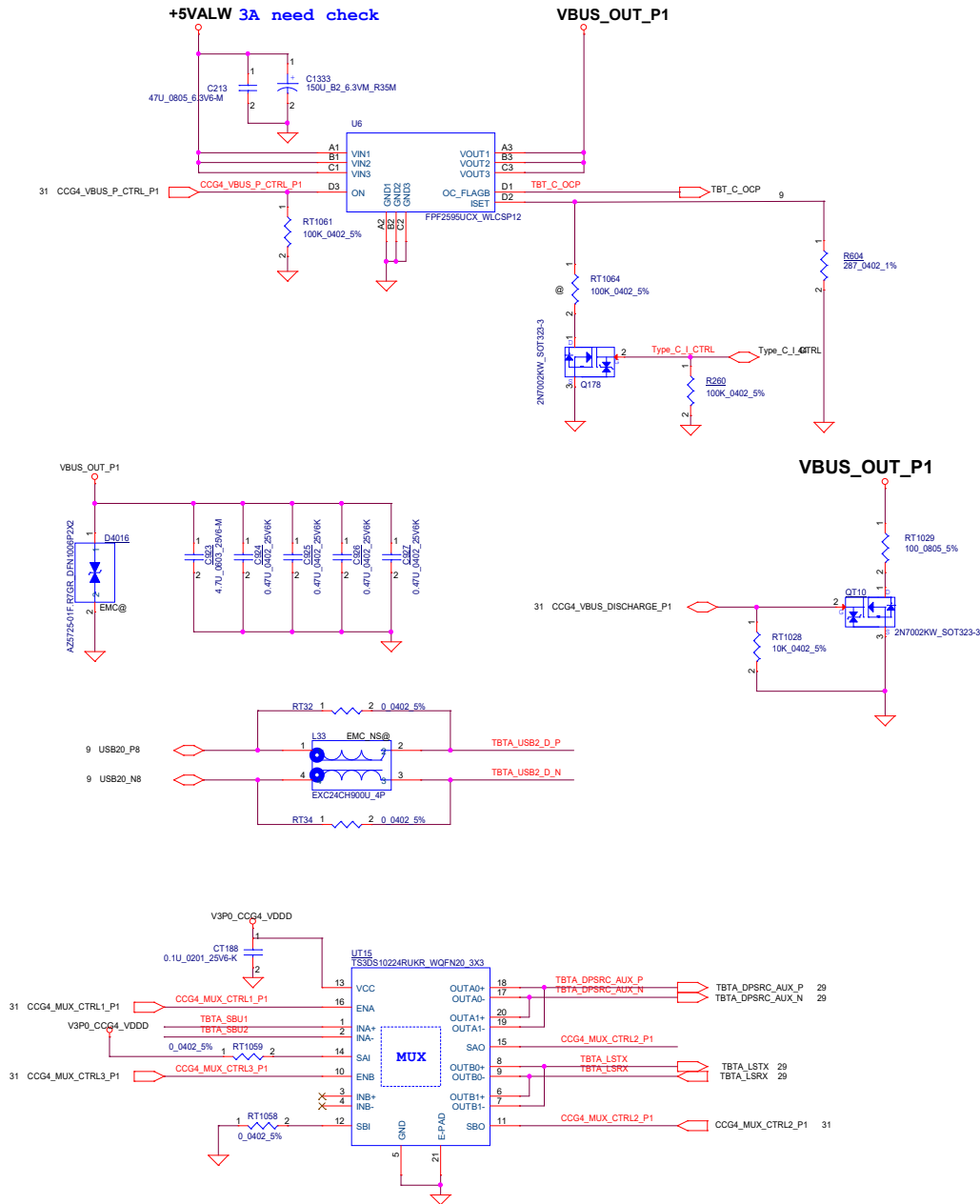
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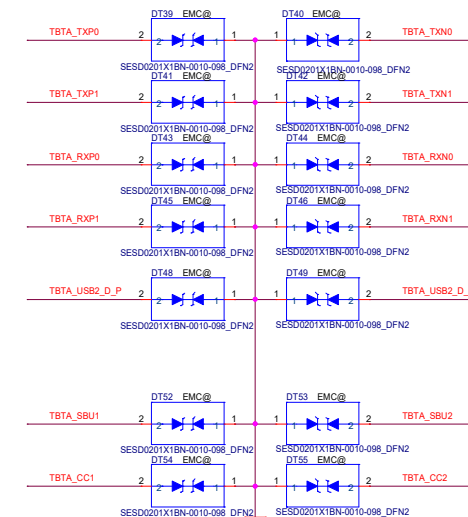
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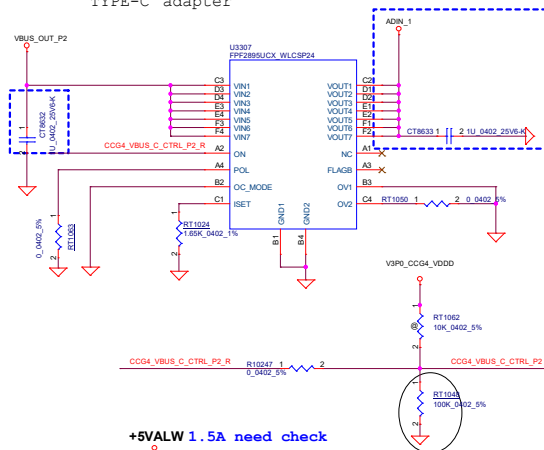
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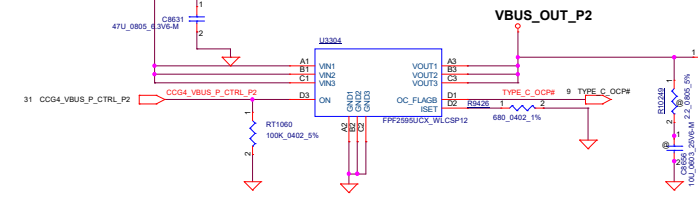


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				Date: Monday, January 16, 2017 Sheet 32 of 81

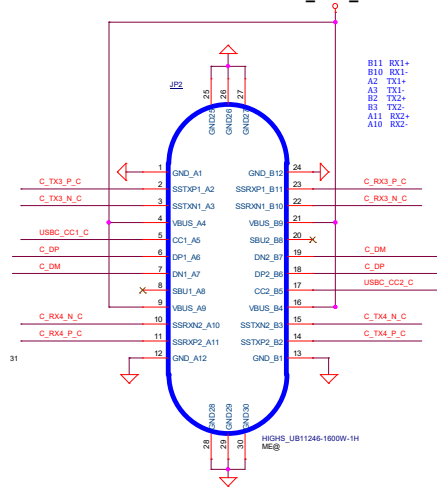
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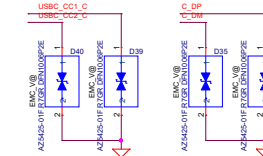
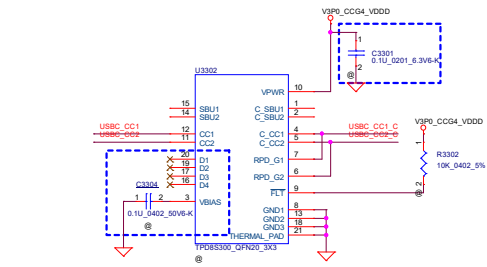
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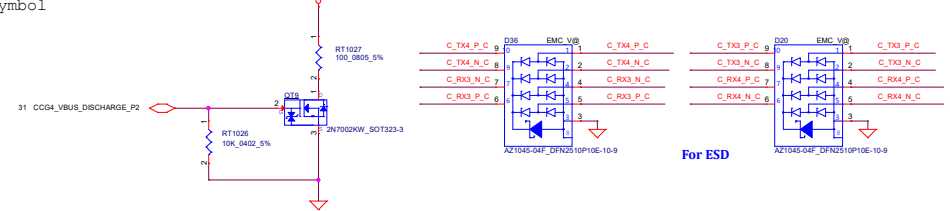
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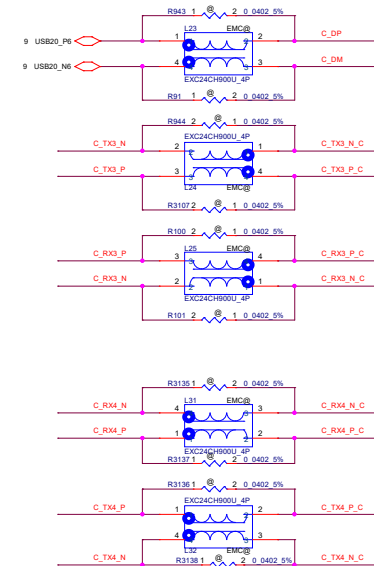
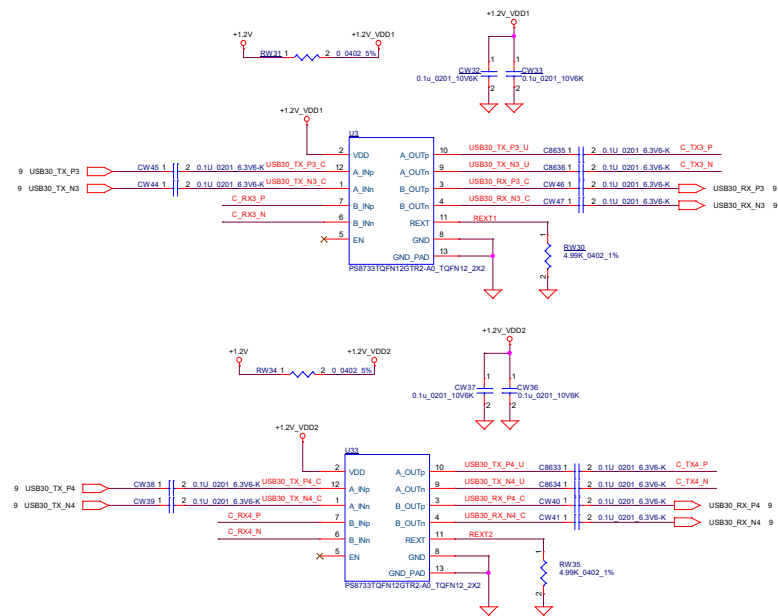
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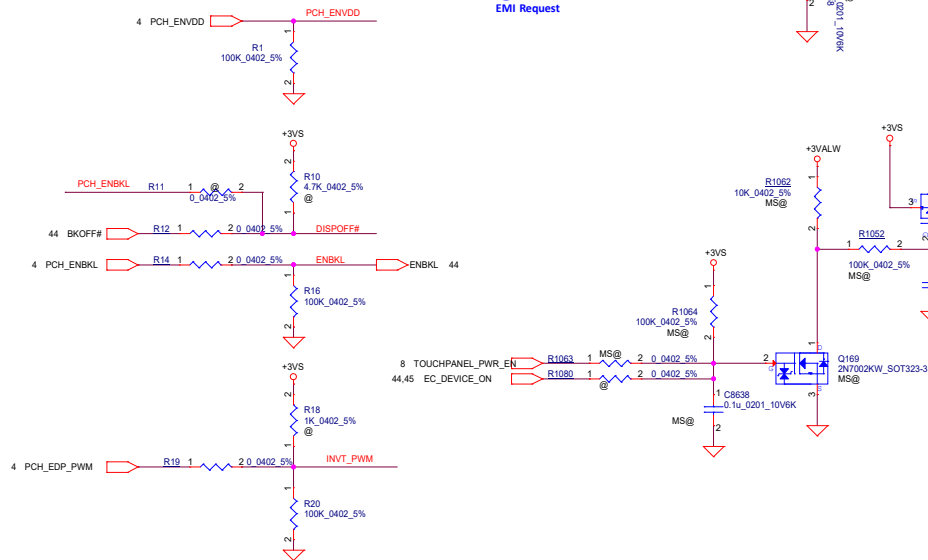
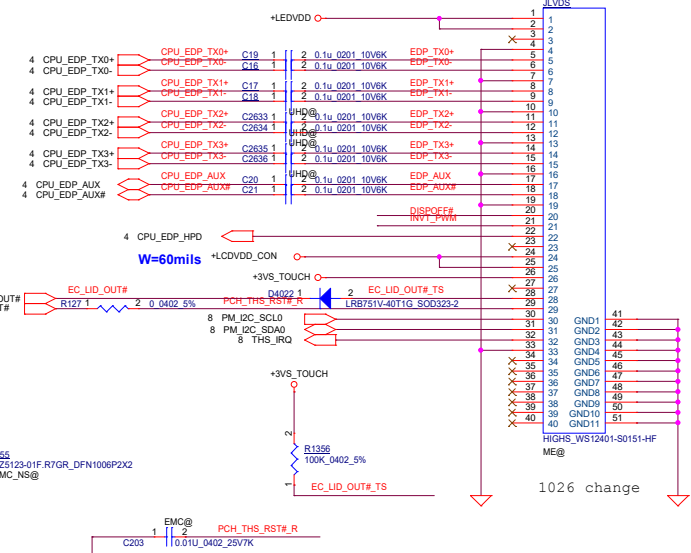
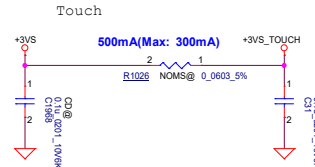
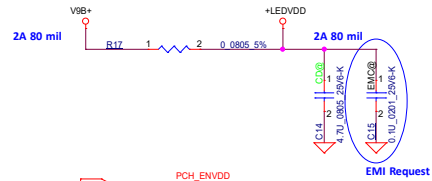
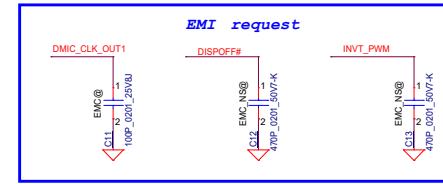
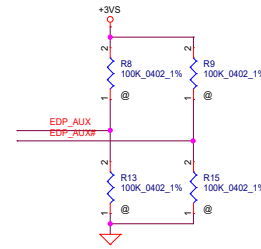
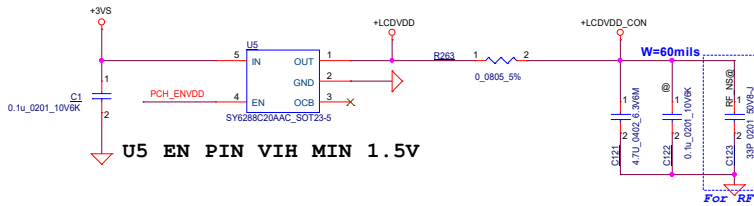
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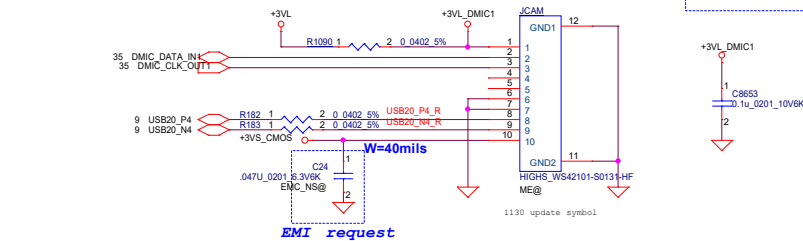
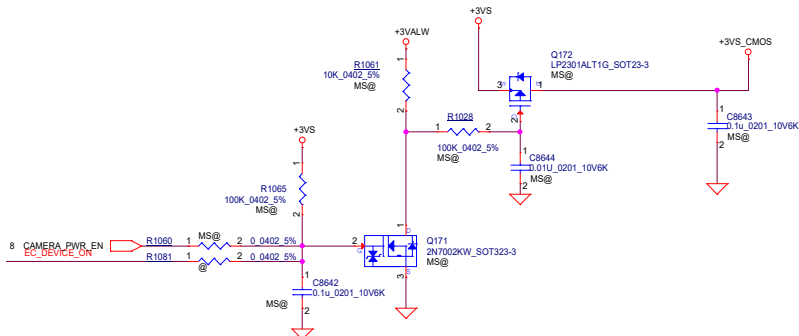
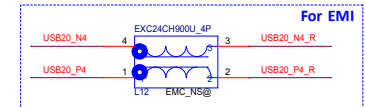
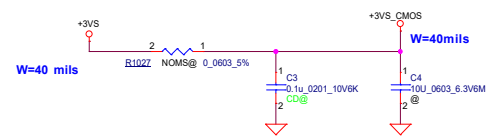
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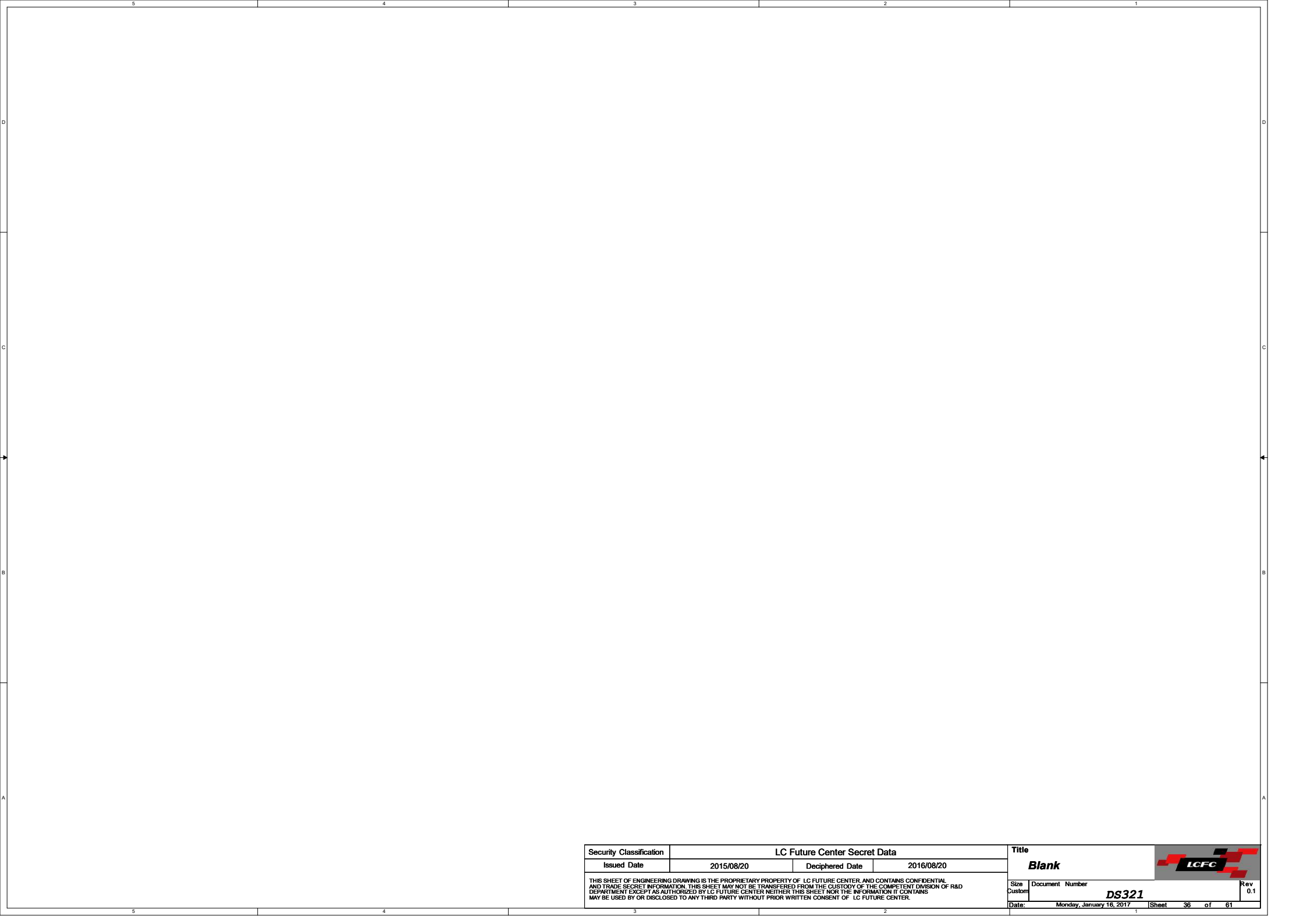
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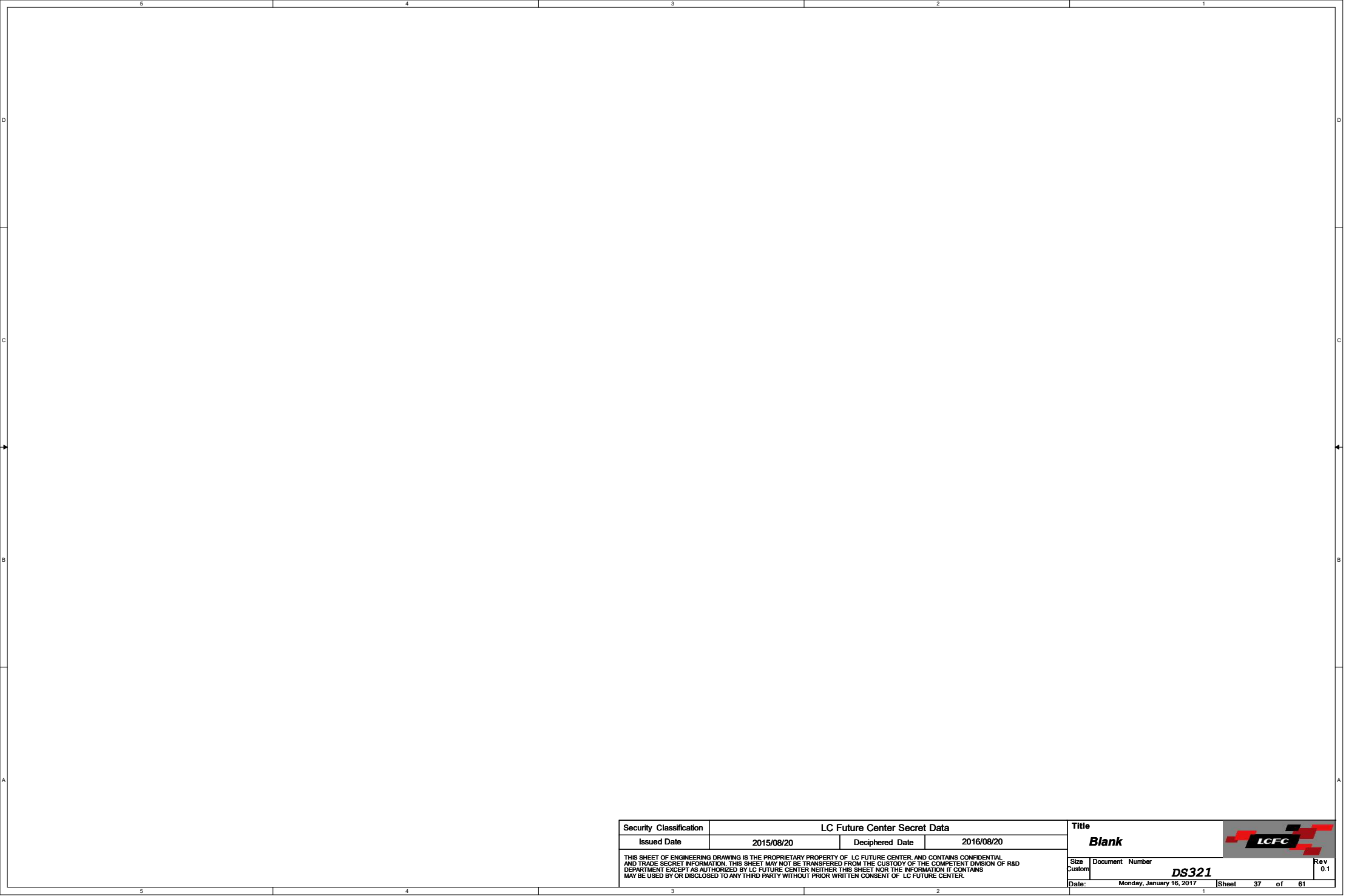
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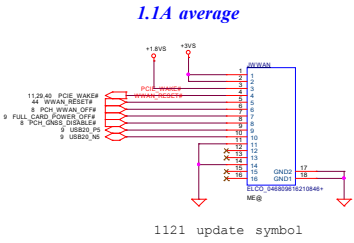
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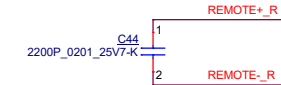
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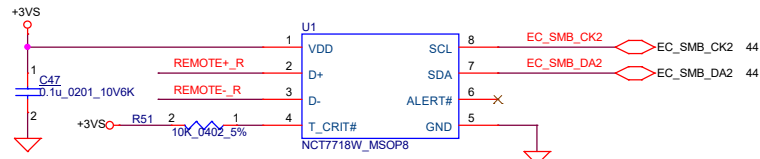


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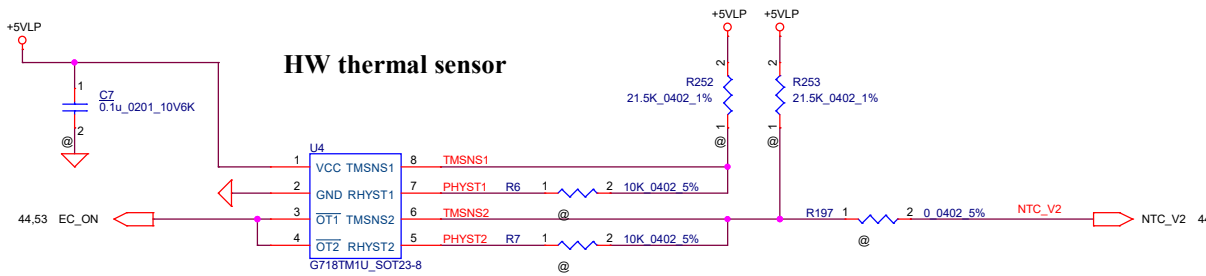
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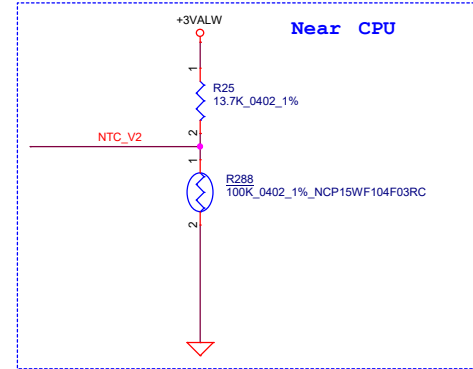
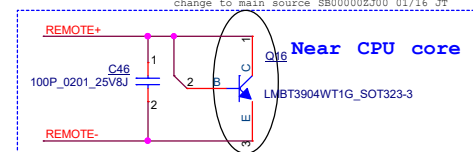


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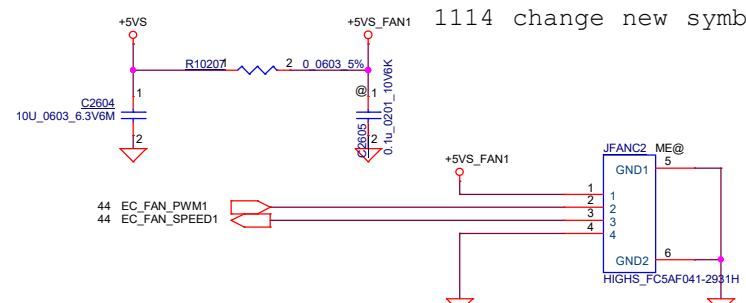
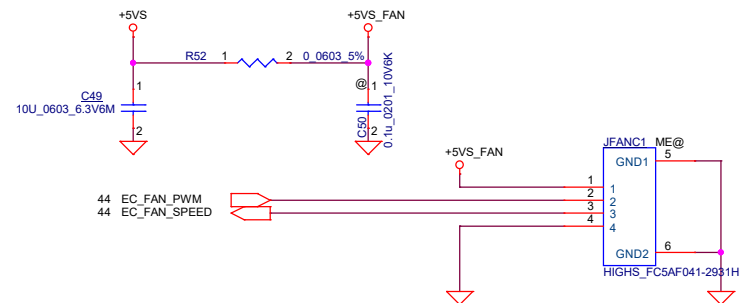
HW thermal sensor



over temperature threshold:
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 $56 + / - 30C$



for layout optimized, change the EC_AGND to GND

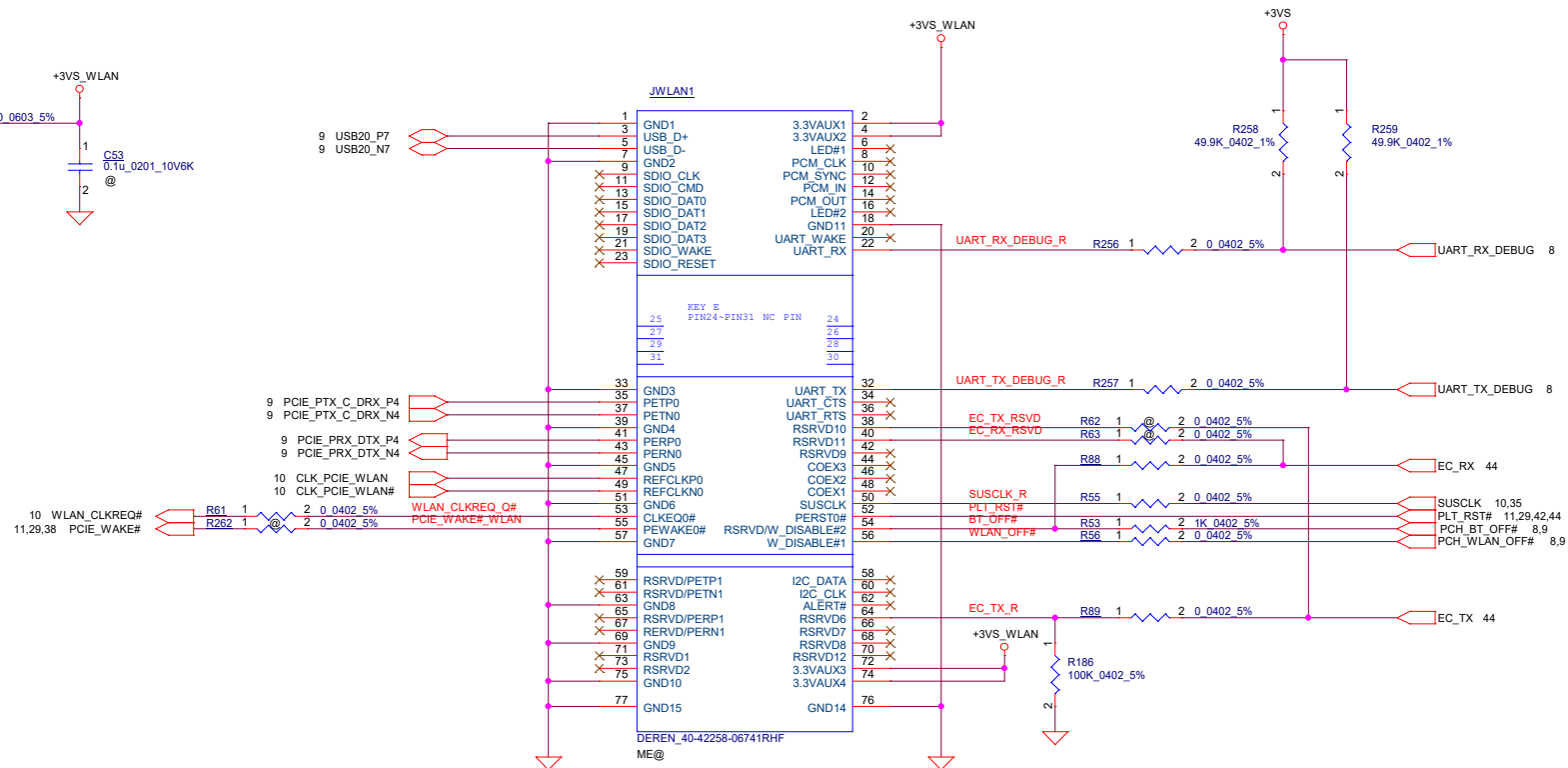


1114 change new symbol


1114 change new symbol

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Issued Date	2015/08/20	Deciphered Date	2016/08/20	Thermal sensor/FAN CONN	
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				Date: Monday, January 16, 2017	Sheet 39 of 61
				Rev 0.1	

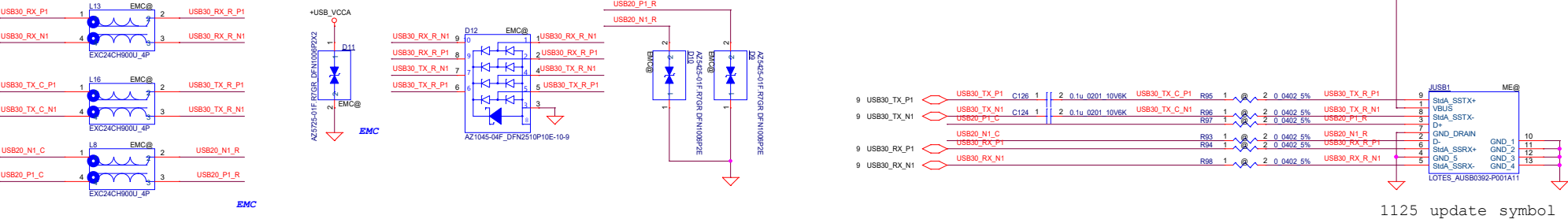
Mini-Express Card(WLAN/WiMAX)



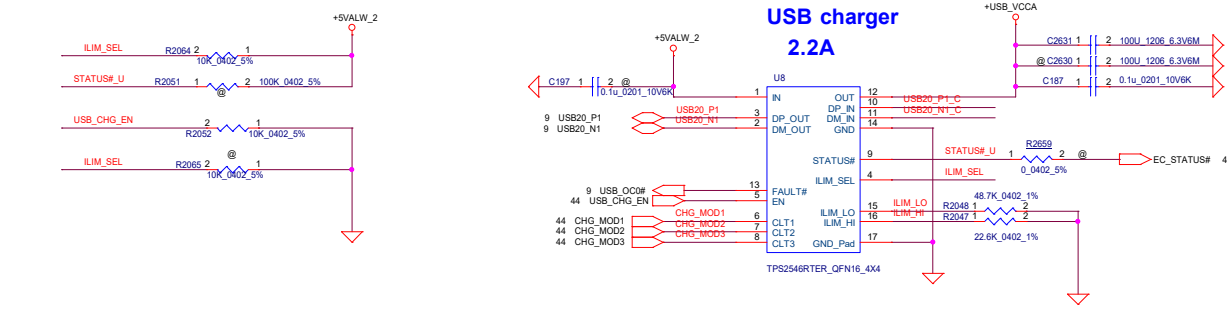
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Issued Date	2015/08/20	Deciphered Date	2016/08/20	NGFF WLAN		
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				Custom	DS321	
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RIGHT SIDE USB3.0 PORT x1

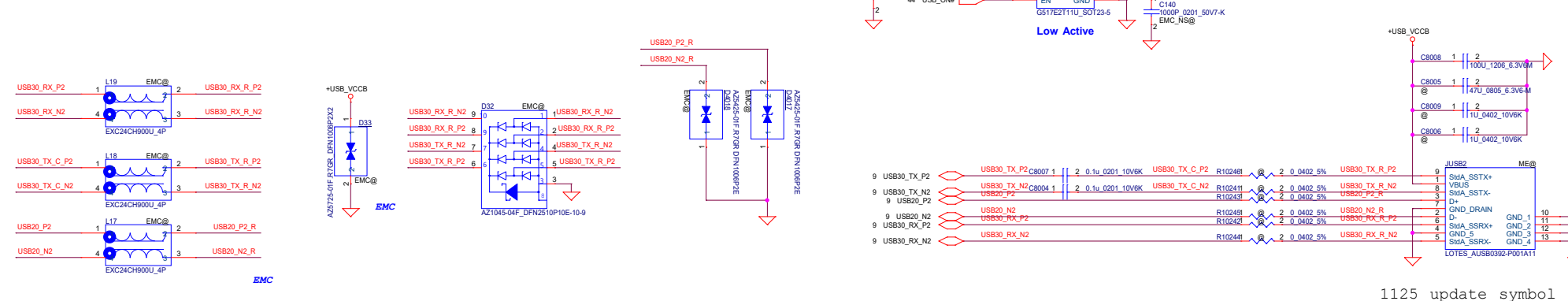


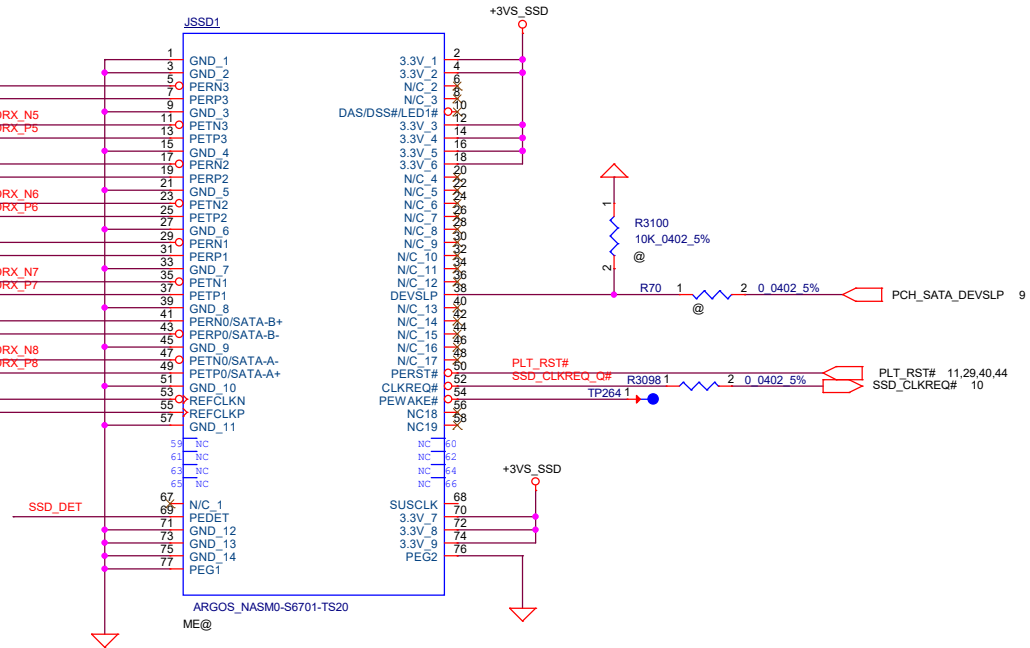
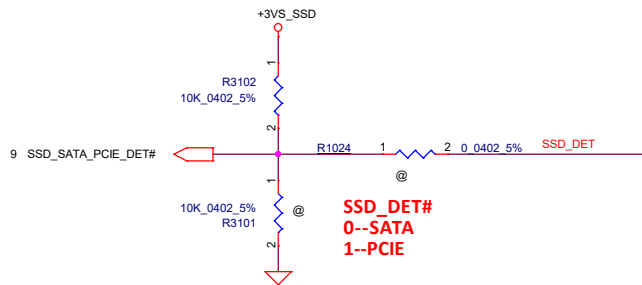
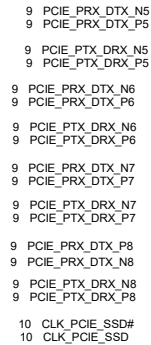
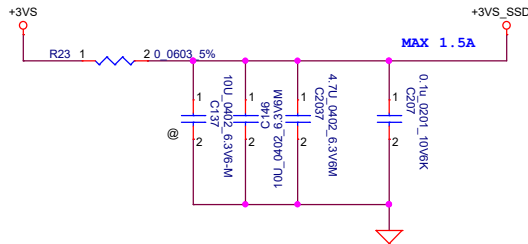
USB charger 2.2A




	pin number	6	7	8	4
	pin name	Ctl1	Ctl2	Ctl3	ILM_SEL
Charge port Pin5 Enable H for all	S0 CDP	1	1	1	1
	S3 DCP	0	1	1	0/1
	S4/S5 DCP	0	0	1	0/1
Normal port Pin5 Enable H for S0/S3 L for S4/S5	S0 SDP1	1	1	0	0/1
	S3 SDP1	0	1	0	0/1
	S4/S5 Disable	0	0	0	0/1

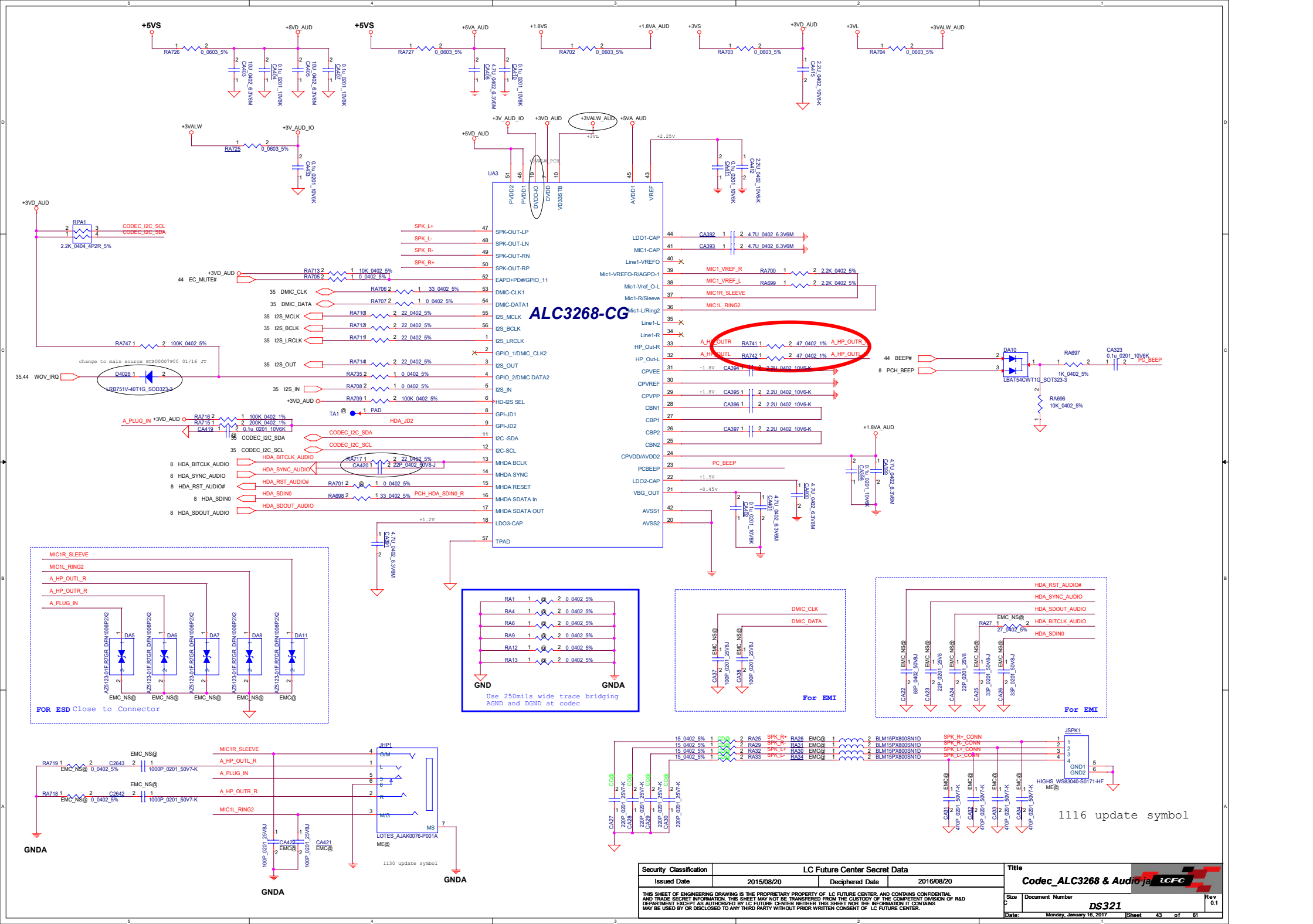
LEFT SIDE USB3.0 PORT x1

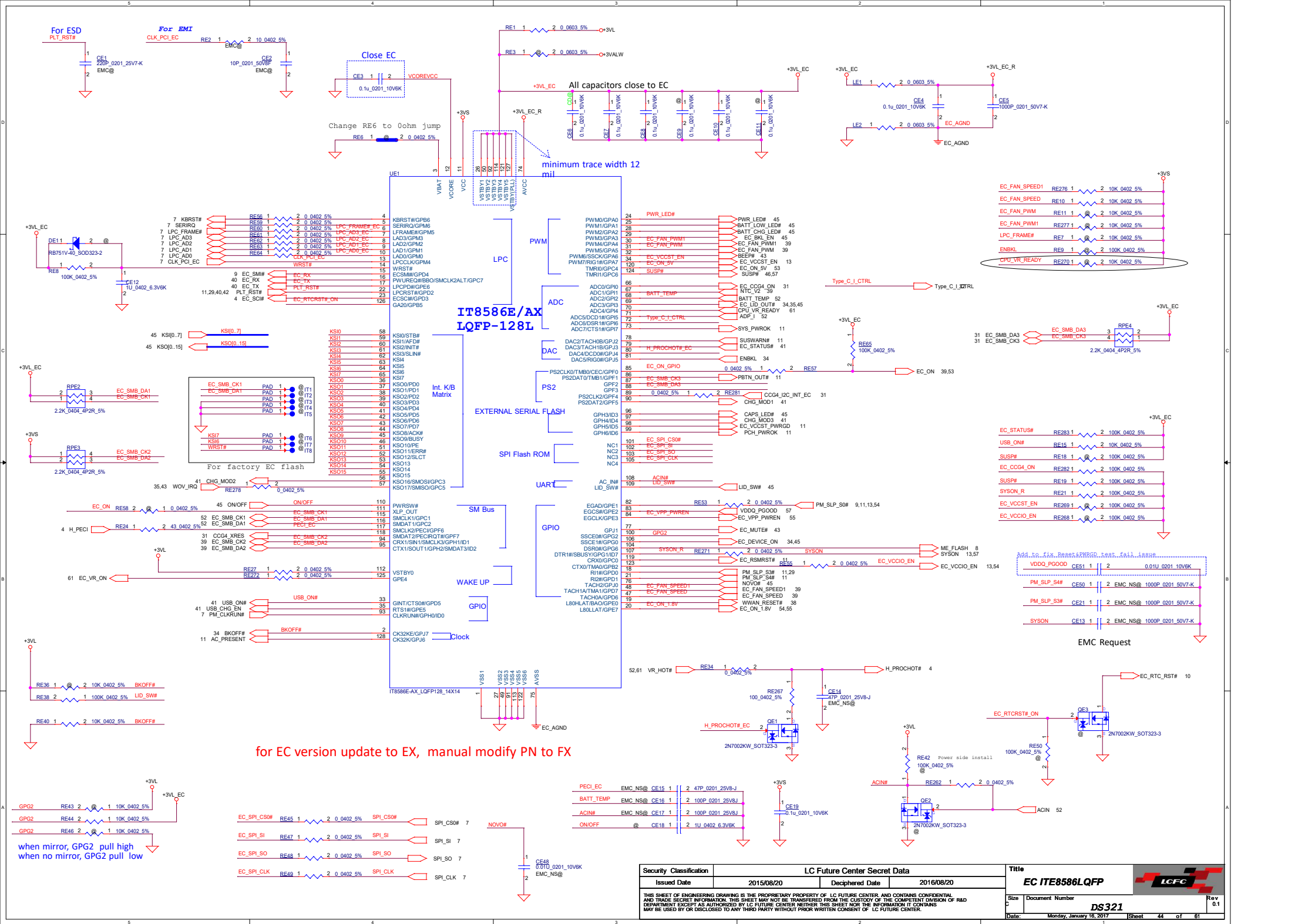




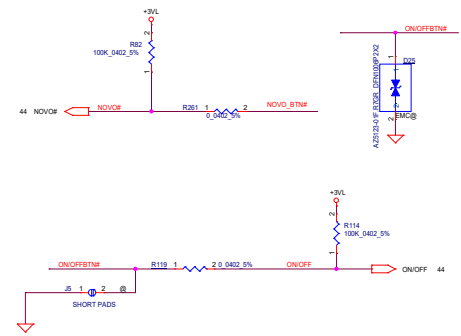
1110 change

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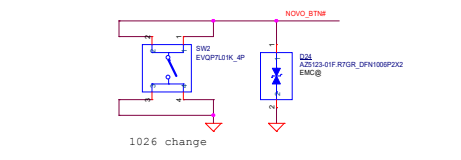




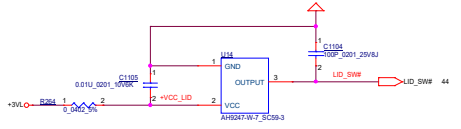
ON/OFF switch



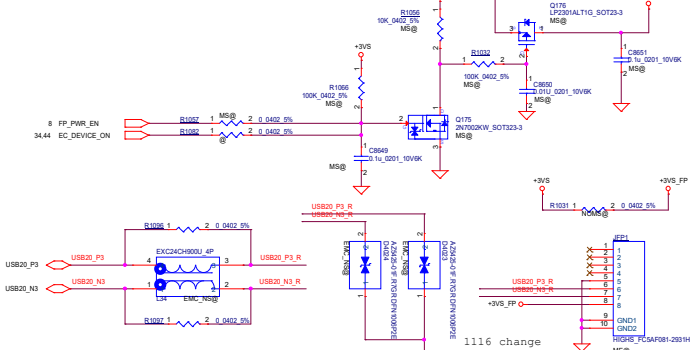
Novo button



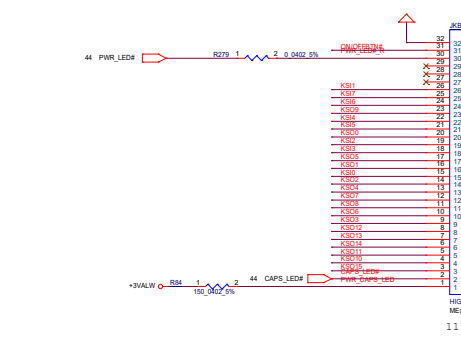
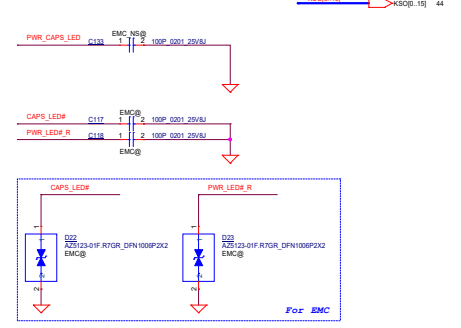
LID switch



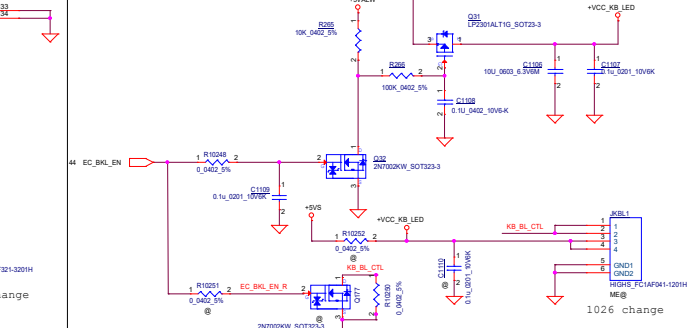
Finger Print Connector



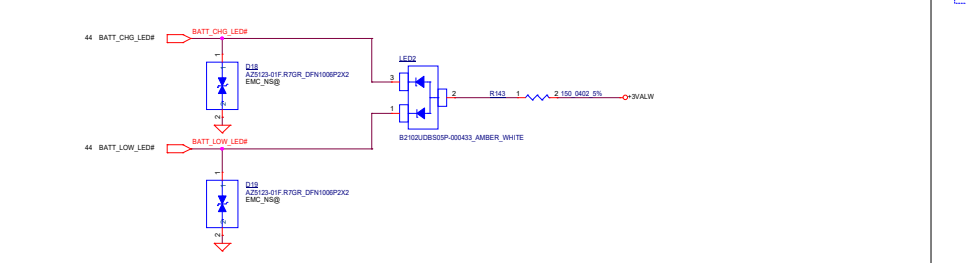
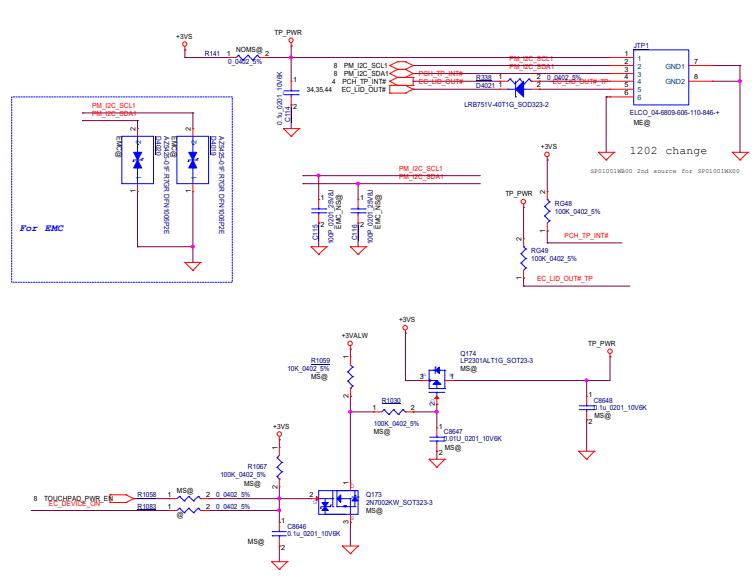
K/B Connector

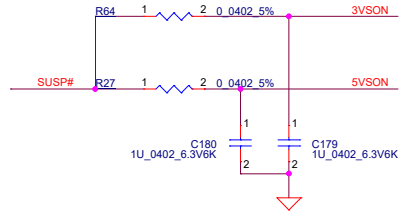


KB Backlight Connector



TP/B Connector

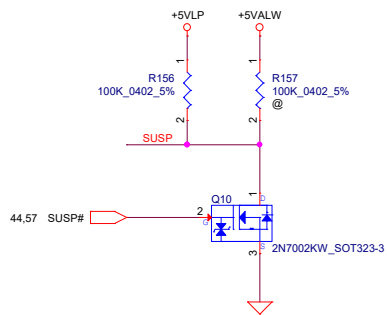
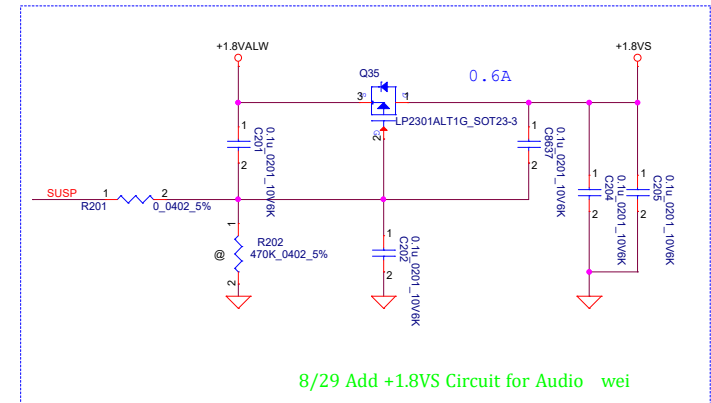
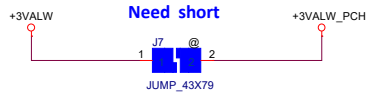
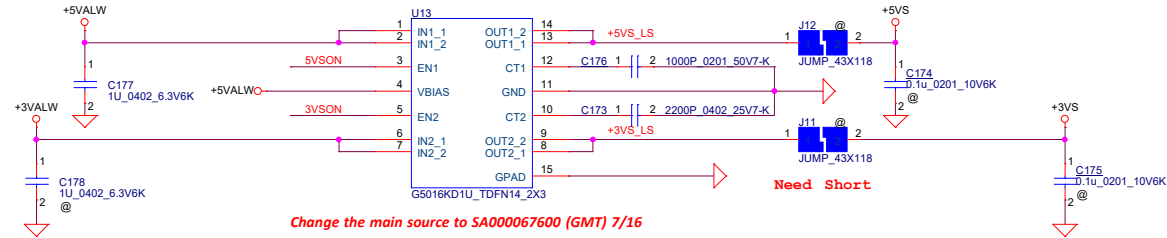




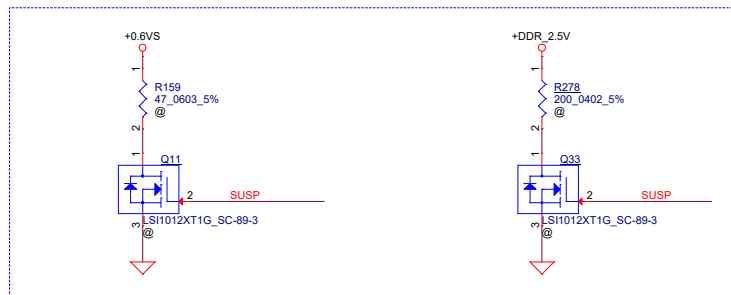
Load Switch
+5VALW To +5VS
+3VALW To +3VS

+3VS, C173 --> 2.74ms
+5VS, C176 --> 2.03ms

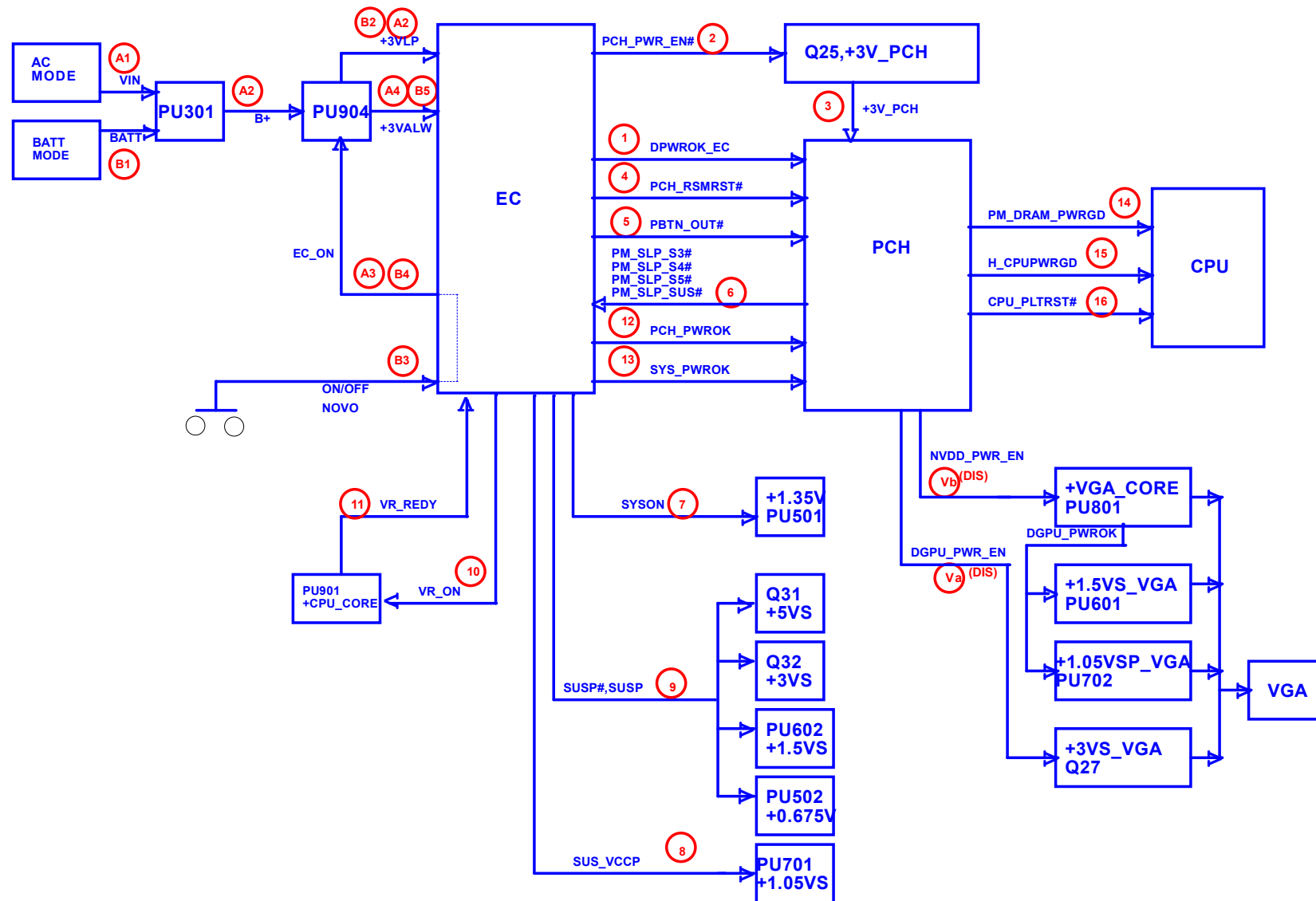
VIN 5V and 3.3V (VBIAS=5V), IMAX(per channel)=6A, Rds=16mohm



For DisCharge



08/29: Need double check enable signal and the resistance



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Power sequence block		0.1	
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PCB And LOGO Config

PCB	<div> <div> <div>ZZZ1</div> <div>DA8@</div> </div> <div> <div>PCB 149 NM-B331 REV0.MB</div> <div>ZZZ2 17@</div> </div> <div> <div>ZZZ10 15@</div> </div> <div> <div>ZZZ11 13@</div> </div> </div>	LOGO
CPU	<div> <div>Intel i7-7500U 2.7G/2C/4MH</div> <div>Intel i5-7200U 2.5G/2C/3MH</div> <div>Intel i3-7100U 2.4G/2C/3MH</div> </div>	
VRAM	<div> <div>ZZZ4 MICR8@</div> <div>ZZZ5 MIC4G@</div> <div>ZZZ6 SAM8G@</div> <div>ZZZ7 SAM4G@</div> <div>ZZZ9 HYN4G@</div> <div>MICRON8G</div> <div>MICRON 4G</div> <div>SAMSUNG 8G</div> <div>SAMSUNG 4G</div> <div>HYNIX 4G</div> </div>	

PCB Federal Mark PAD

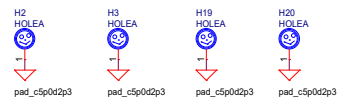


Pad_o2p0x2p2d2p0x2p2n



Pad_o2p0x2p2d2p0x2p2n

pad_c5p0d2p3



pad_c5p0d3p2



pad_c4p5d2p3



pad_o1p2x2p8d1p2x2p8n



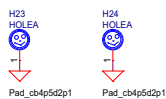
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pad_o4p0x2p0d4p0x2p0n



pad_o4p0x2p0d4p0x2p0n

Pad_cb4p5d2p1



Pad_ct4p0b4p5d2p1



Pad_ct4p0b4p5d2p1

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PAD_C2P3D2P3N

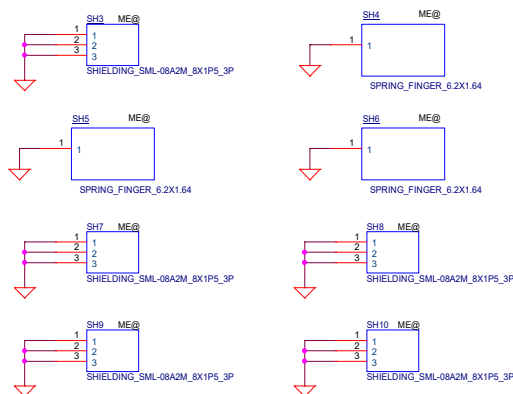



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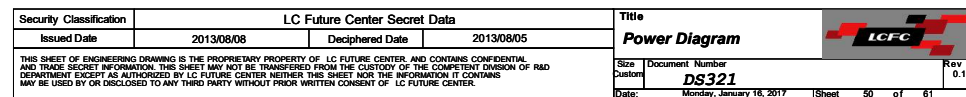
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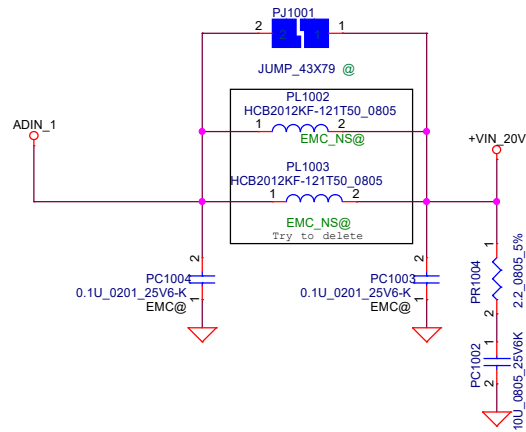


EMI-STOP_SML-08A2M



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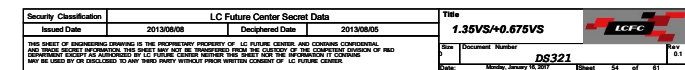


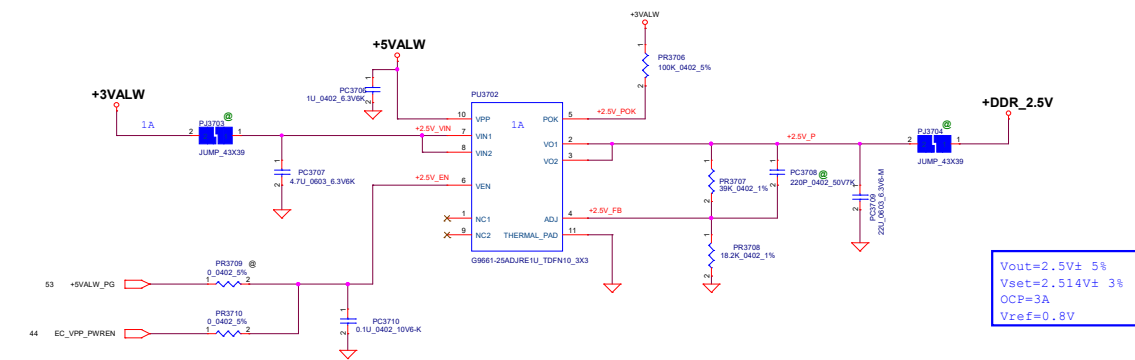
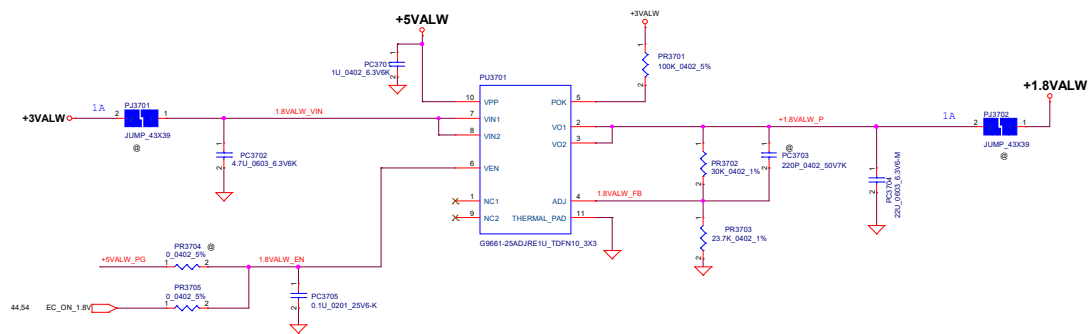


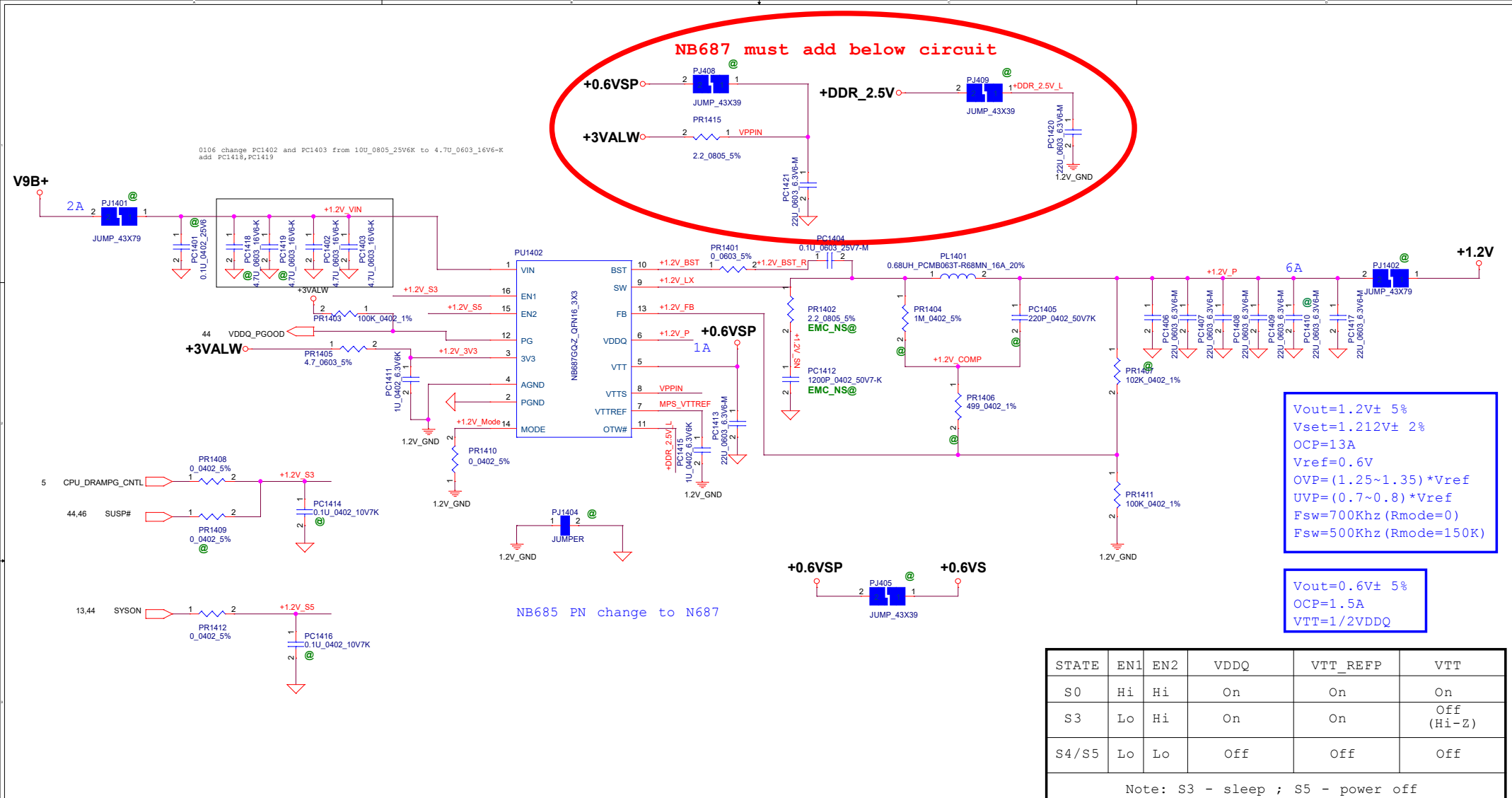
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C				C																										
B				B																										
A				A																										
<div><table><tr><td>Security Classification</td><td colspan="3">LC Future Center Secret Data</td><td>Title</td></tr><tr><td>Issued Date</td><td>2015/08/20</td><td>Deciphered Date</td><td>2016/08/20</td><td>Blank</td></tr><tr><td colspan="4">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.</td><td><table><tr><td>Size</td><td>Document Number</td><td>Rev</td></tr><tr><td>C</td><td>DS321</td><td>0.1</td></tr></table></td></tr><tr><td colspan="4">Date: Monday, January 16, 2017</td><td>Sheet 58 of 61</td></tr></table></div>					Security Classification	LC Future Center Secret Data			Title	Issued Date	2015/08/20	Deciphered Date	2016/08/20	Blank	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.				<table><tr><td>Size</td><td>Document Number</td><td>Rev</td></tr><tr><td>C</td><td>DS321</td><td>0.1</td></tr></table>	Size	Document Number	Rev	C	DS321	0.1	Date: Monday, January 16, 2017				Sheet 58 of 61
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Size	Document Number	Rev																												
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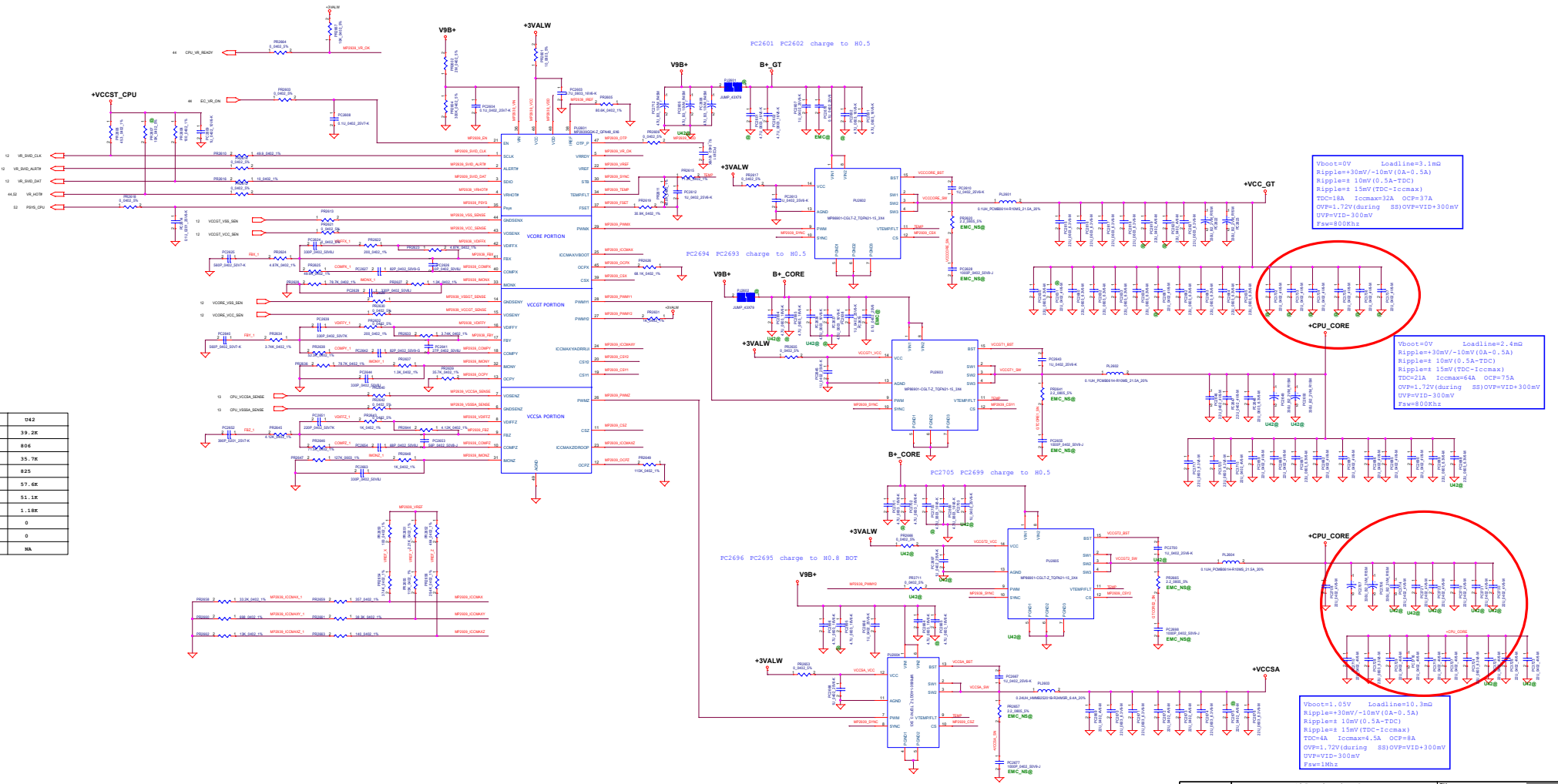
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	Q22	Q42
PR2634	78.7K	39.2K
PR2637	1.3K	90K
PR2639	35.7K	35.7K
PR2651	182	825
PR2655	37.4K	57.6K
PR2660	12.4K	55.1K
PR2661	150	1.18K
PR2668	NA	0
PR2669	NA	0
PR2631	1K	NA



Vboot=0V Loadline=3.1mS
 Ripple=30mV/-10mV(0A-0.5A)
 Ripple= 10mV(0.5A-TDC)
 Ripple= 15mV(TDC-Iccmax)
 TDC=18A Iccmax=32A OCP=37A
 OVP=1.72V(during SS)OVP=VID+300mV
 OVP=VID-300mV
 Fsw=800KHz

Vboot=0V Loadline=2.4mS
 Ripple=30mV/-10mV(0A-0.5A)
 Ripple= 10mV(0.5A-TDC)
 Ripple= 15mV(TDC-Iccmax)
 TDC=21A Iccmax=64A OCP=75A
 OVP=1.72V(during SS)OVP=VID+300mV
 OVP=VID-300mV
 Fsw=800KHz

Vboot=1.05V Loadline=0.3mS
 Ripple=30mV/-10mV(0A-0.5A)
 Ripple= 10mV(0.5A-TDC)
 Ripple= 15mV(TDC-Iccmax)
 TDC=4A Iccmax=4.5A OCP=8A
 OVP=1.72V(during SS)OVP=VID+300mV
 OVP=VID-300mV
 Fsw=1MHz