

COMPAL CONFIDENTIAL

MODEL NAME : CAZ10

PCB NO : LA-E121P

BOM P/N : 431A4231L01

Steamboat 12" AR

Kabylake U

2016-04-25

REV : 0.1 (X00)

@ : Nopop Component

EMI@ : EMI Component

@EMI@ : EMI Nopop Component

ESD@ : ESDComponent

@ESD@ : ESD Nopop Component

RF@ : RF Component

@RF@ : RF Nopop Component

CXDP@ : XDP Component

CONN@ : Connector Component

ESPI@ : ESPI interface Component

LPC@ : External ESPI Component (SHD)

MB PCB	
Part Number	Description
DAB00186000	PCB 1S5 LA-E121P REV0 MB AR 1

Layout Dell logo



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REV:X00
PWB:

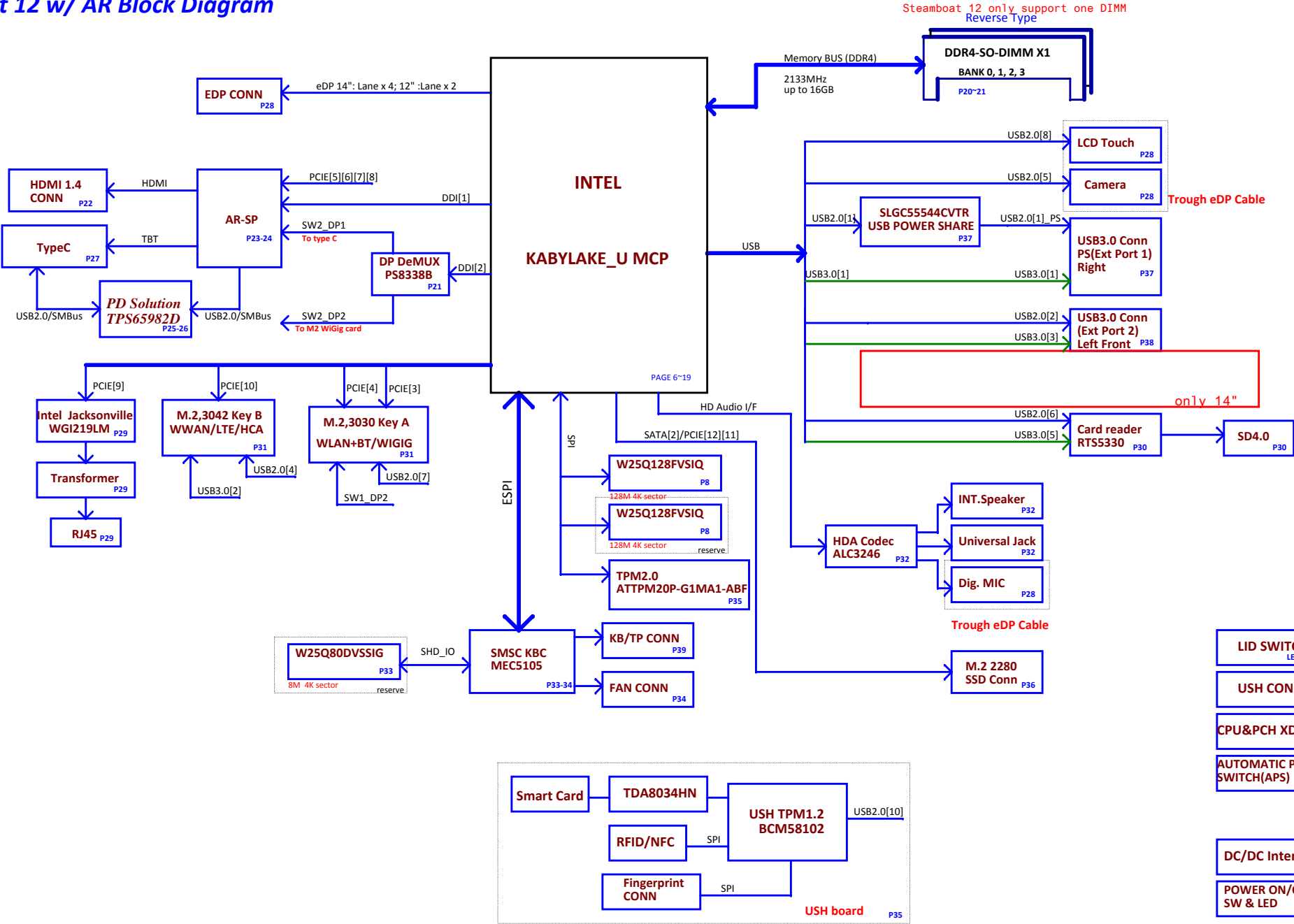
Power CKT : 0425

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Steamboat 12 w/ AR Block Diagram



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POWER STATES

Signal State	SLP S3#	SLP S4#	SLP S5#	SLP A#	ALWAYS PLANE	M PLANE	SUS PLANE	RUN PLANE	CLOCKS
S0 (Full ON) / M0	HIGH	HIGH	HIGH	HIGH	ON	ON	ON	ON	ON
S3 (Suspend to RAM) / M3	LOW	HIGH	HIGH	HIGH	ON	ON	ON	OFF	OFF
S4 (Suspend to DISK) / M3	LOW	LOW	HIGH	HIGH	ON	ON	OFF	OFF	OFF
S5 (SOFT OFF) / M3	LOW	LOW	LOW	HIGH	ON	ON	OFF	OFF	OFF
S3 (Suspend to RAM) / M-OFF	LOW	HIGH	HIGH	LOW	ON	OFF	ON	OFF	OFF
S4 (Suspend to DISK) / M-OFF	LOW	LOW	HIGH	LOW	ON	OFF	OFF	OFF	OFF
S5 (SOFT OFF) / M-OFF	LOW	LOW	LOW	LOW	ON	OFF	OFF	OFF	OFF

PM TABLE

State	power plane	+5V_ALW +3.3V_ALW +3.3V_ALW_DSW +3.3V_ALW_PCH +RTC_CELL +1.8V_PRIM +1.0V_PRIM +1.0V_PRIM_CORE +5V_ALW2 +3.3V_ALW2 +3.3V_RTC_LDO +1.0V_MPHYGT	+3.3V_CV2 +1.2V_MEM +2.5V_MEM +1.0V_VCCST	+5V_RUN +3.3V_RUN +0.6V_DDR_VTT +1.8V_RUN +VCC_CORE +VCC_GT +VCC_SA +1.0VS_VCCIO
S0	ON	ON	ON	ON
S3	ON	ON	OFF	OFF
S5 S4/AC	ON	OFF	OFF	OFF
S5 S4/AC doesn't exist	OFF	OFF	OFF	OFF

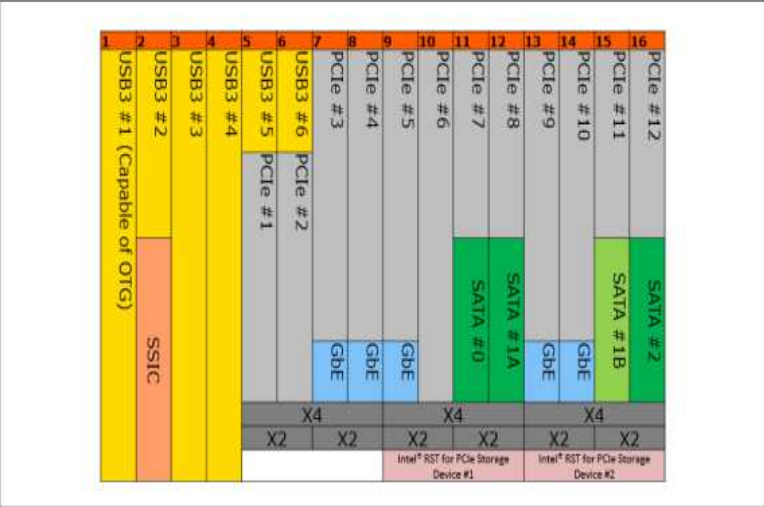
AR config

USB3.0	SSIC	PCIE	SATA	DESTINATION
USB3.0-1				JUSB1-->Right
USB3.0-2	SSIC			M.2 3042(LTE)
USB3.0-3				JUSB2-->Left Front
USB3.0-4				JUSB3-->Left Rear (SB14 only)
USB3.0-5		PCIE-1		Card Reader
USB3.0-6		PCIE-2		NA
		PCIE-3		M.2 3030(WLAN)
		PCIE-4		M.2 3030(WIGIG)
		PCIE-5		Alpine Ridge - SP
		PCIE-6		
		PCIE-7	SATA-0	
		PCIE-8	SATA-1	
		PCIE-9		LOM
		PCIE-10		M.2 3042(HCA)
		PCIE-11	SATA-1*	M.2 2280 SSD (PCIex2 or SATA)
		PCIE-12	SATA-2	

12" not support USB3

USB PORT#	DESTINATION
1	JUSB1-->Right
2	JUSB2-->Left Front
3	JUSB3-->Left Rear (SB14 only)
4	M2 3042(WWAN)
5	Camera
6	Card Reader
7	M.2 3030(BT)
8	Touch Screen
9	NA
10	USH

High Speed I/O (HSIO) Lane Multiplexing in KBL U



Layer No.	Name	Er	Material	Thickness (Material SPEC.) Unit : mil	Thickness (Actuality) Unit : mil
			SolderMask	GA-150LL	0.50
			Add Plating		0.95
1	Top		Copper foil	0.5oz	0.65
		3.7	Prepreg	1080 or1086	2.75
2	GND/PWR		Copper foil	0.5oz	0.60
		4	Core	4mil	4.00
3	Sig 1		Copper foil	0.5oz	0.60
		4.1	Prepreg	7628HRC	7.70
4	GND/PWR		Copper foil	1.0oz	1.25
		3.8	Core	4mil	4.00
5	Sig2		Copper foil	1.0oz	1.25
		4	Prepreg	7628	7.10
6	Sig3		Copper foil	0.5oz	0.60
		3.8	Core	4mil	4.00
7	GND/PWR		Copper foil	0.5oz	0.60
		3.7	Prepreg	1080 or1086	2.75
8	Bottom		Copper foil	0.5oz	0.65
			Add Plating		0.95
			SolderMask		0.50
Overall Thickness (1.0mm ± 10%)				39.4	41.40000

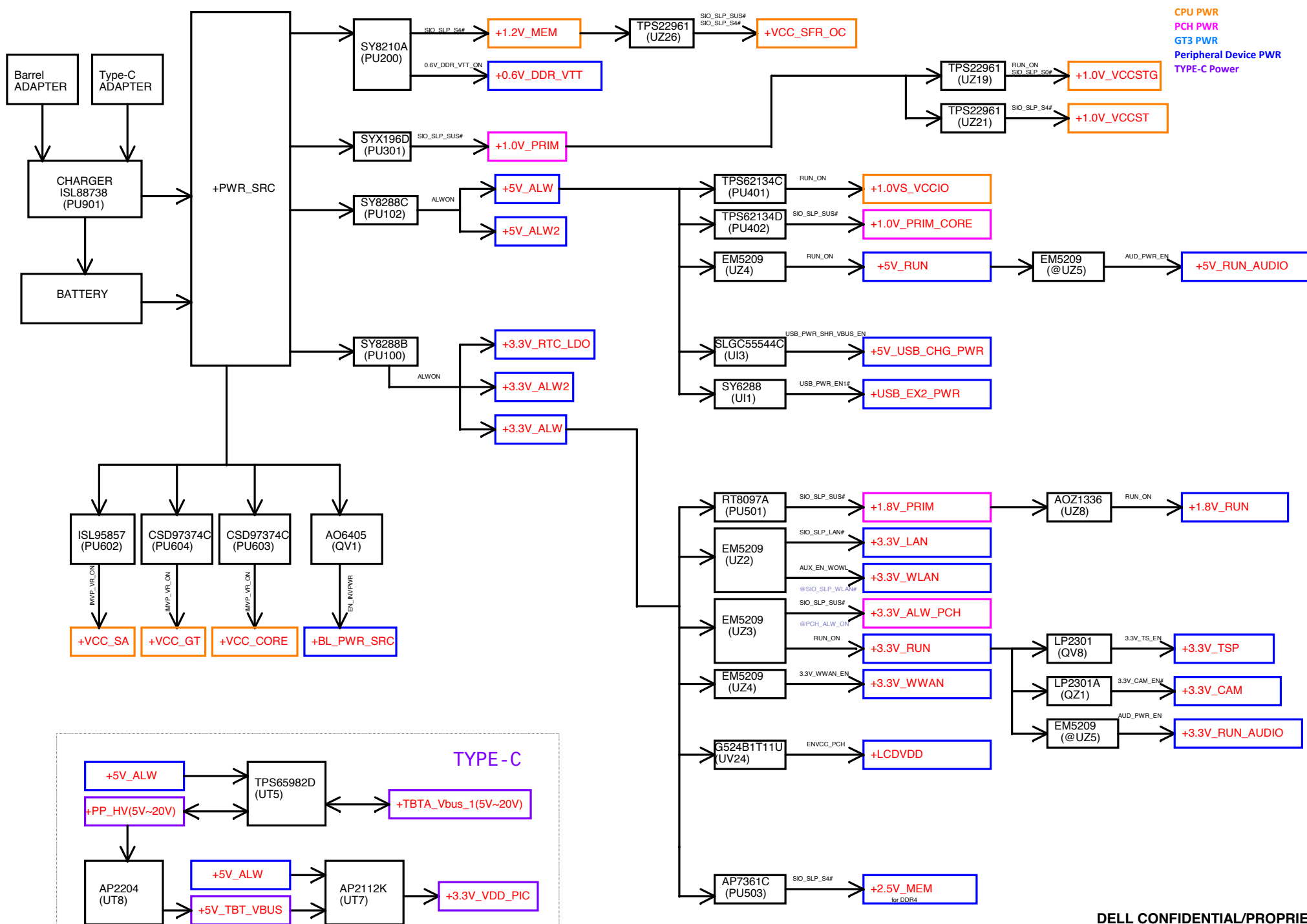
1.05156

AR use 1086PP
Non AR use 1080PP

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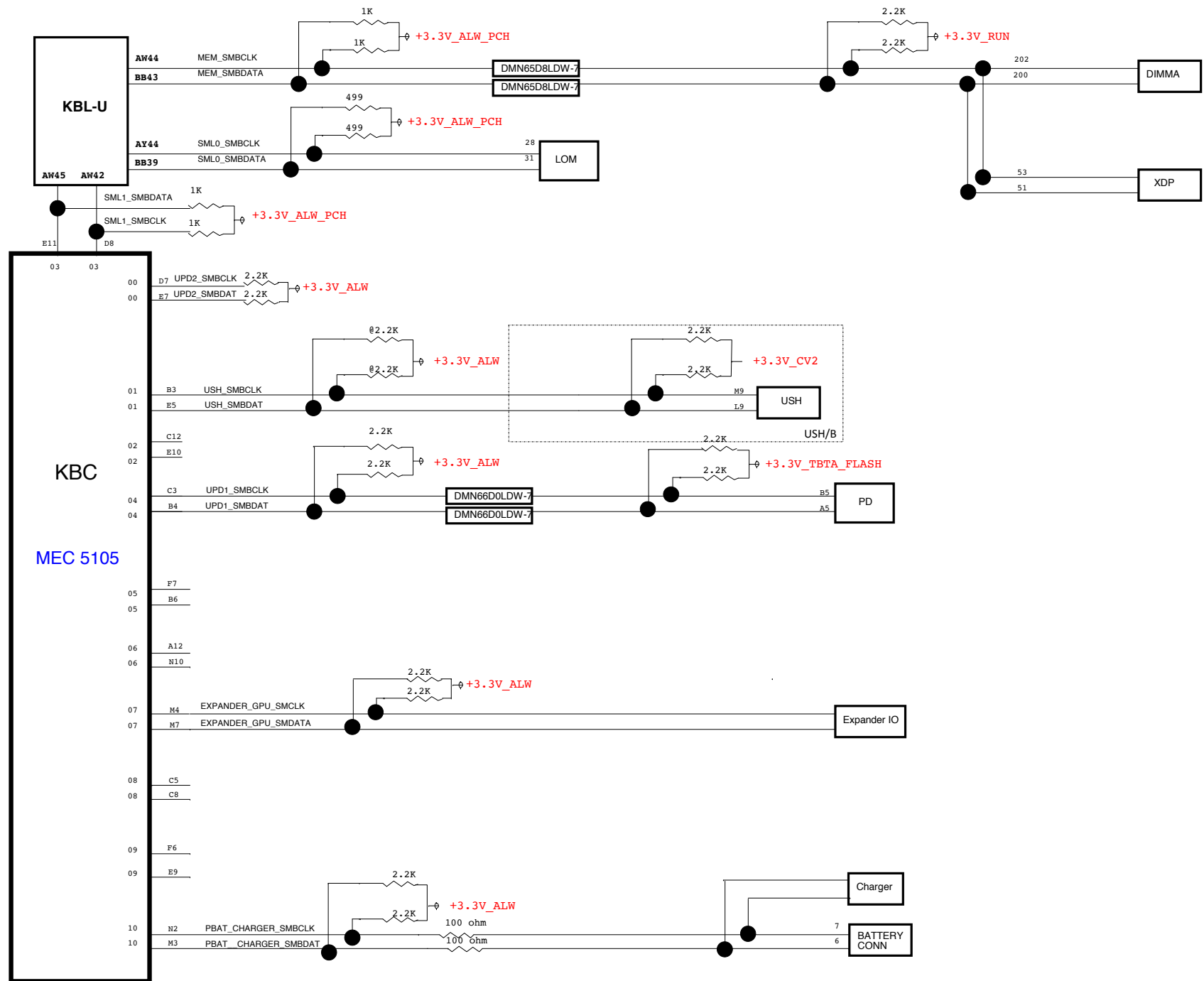
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CPU PWR
PCH PWR
GT3 PWR
Peripheral Device PWR
TYPE-C Power

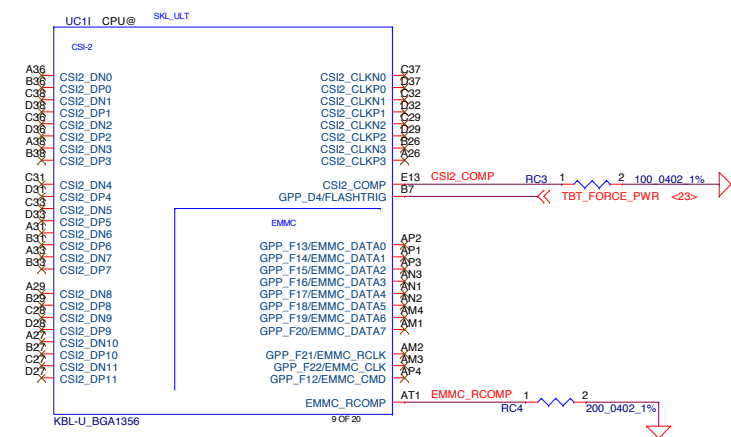
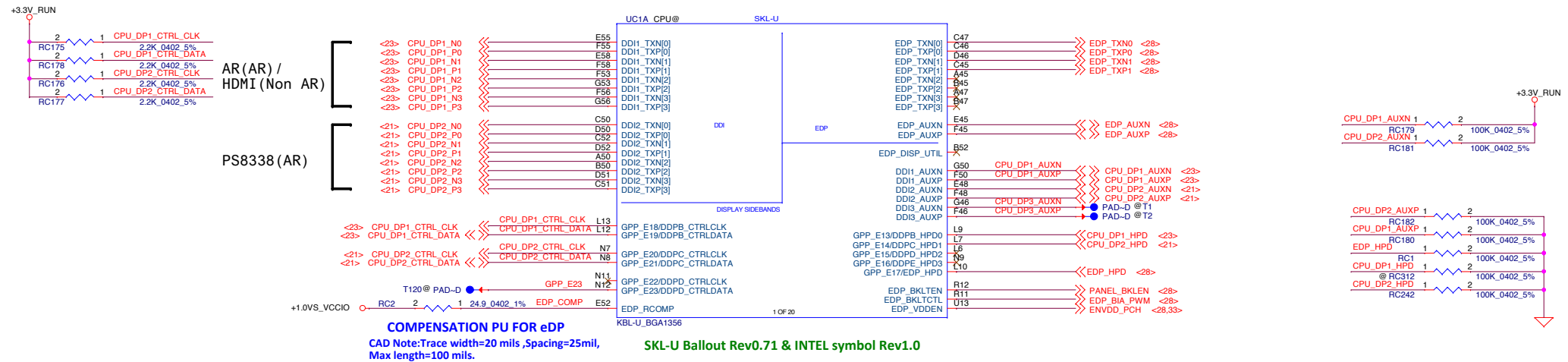
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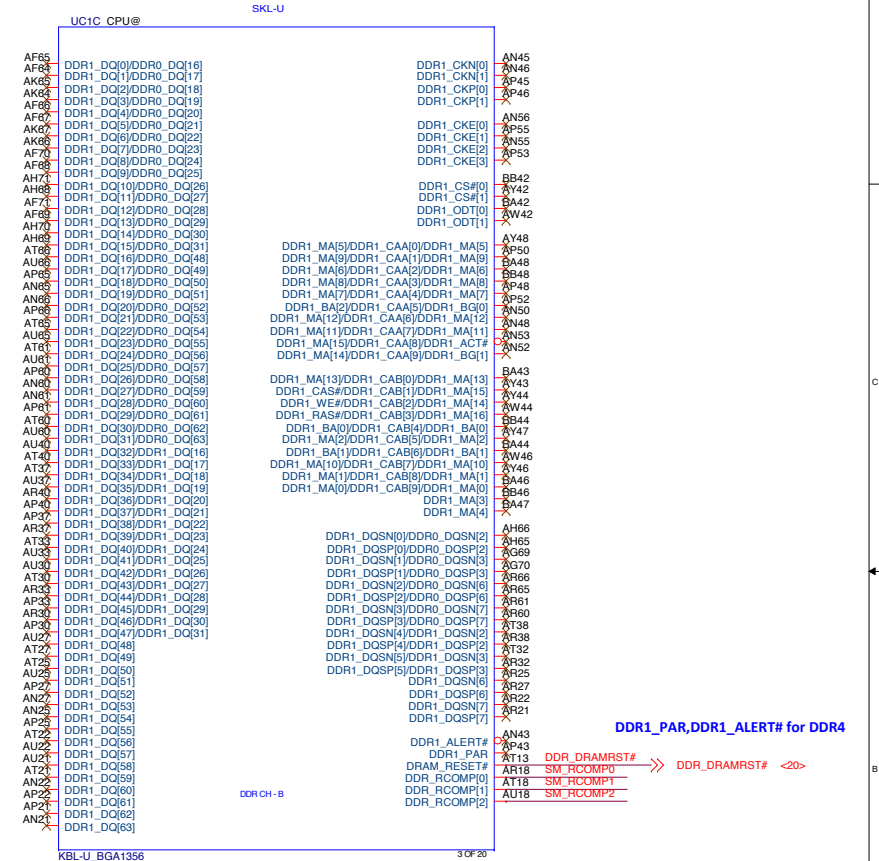
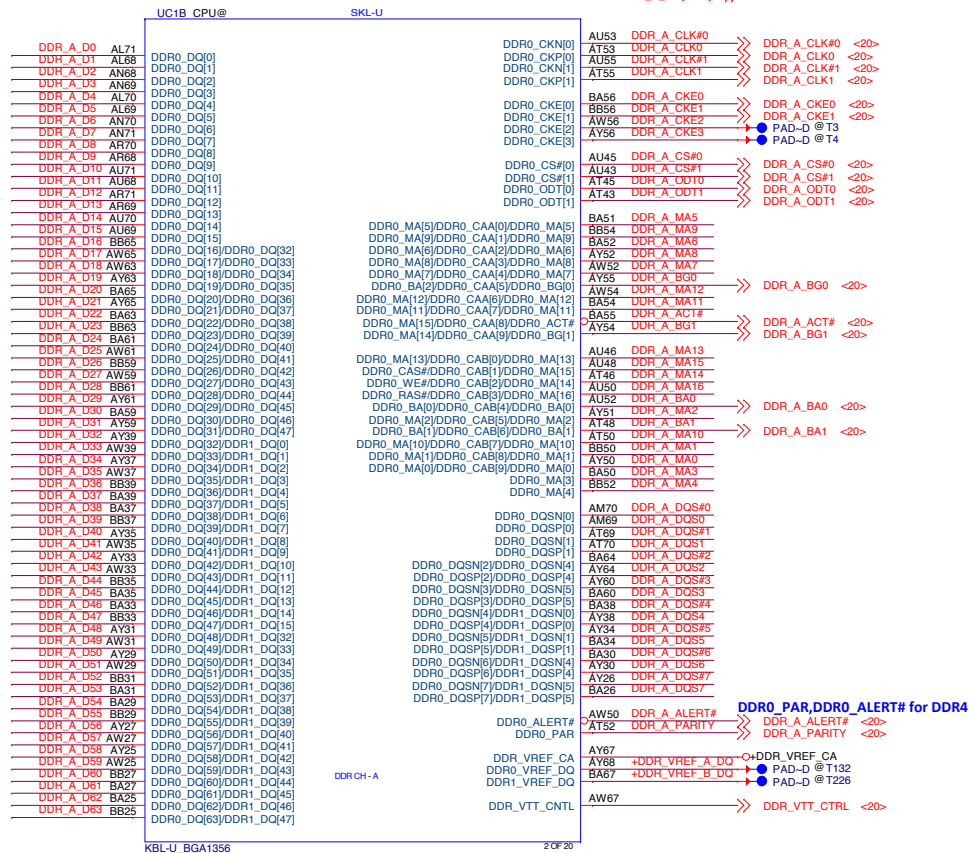
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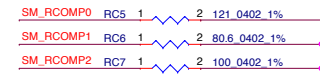


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DDR4, Ballout for side by side(Interleave)



DDR4 COMPENSATION SIGNALS



CAD Note:
Trace width=12~15 mil, Spacing=20 mils
Max trace length= 500 mil

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SPI_MOSI= SPI_IO0
SPI_MISO= SPI_IO1
PCH EDS R0.7 p.235~236

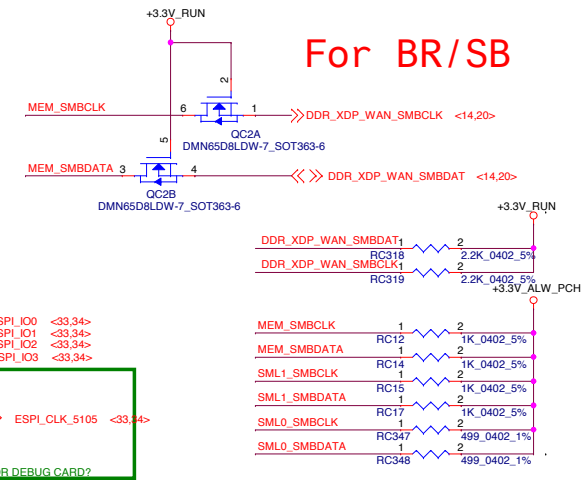
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<14> PCH_SPI_D02_XDP
<35> PCH_SPI_CS#2

PCH_SPI_CLK AV2
PCH_SPI_D1 AW3
PCH_SPI_D0 AW3
PCH_SPI_D2 AW2
PCH_SPI_D3 AU4
PCH_SPI_CS#0 AU3
PCH_SPI_CS#1 AU2
PCH_SPI_CS#2 AU1

UC1E CPU@ SKL-U
SPI - FLASH
SMBUS, SMLINK
SPI - TOUCH
LPC
CLINK
KBL-U, BGA1356

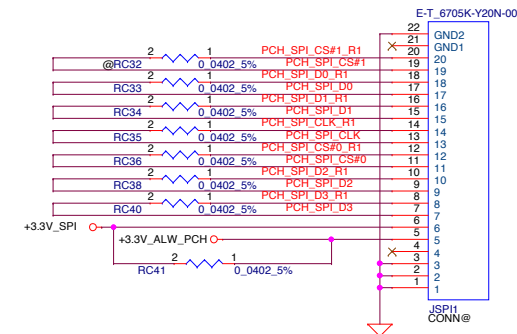
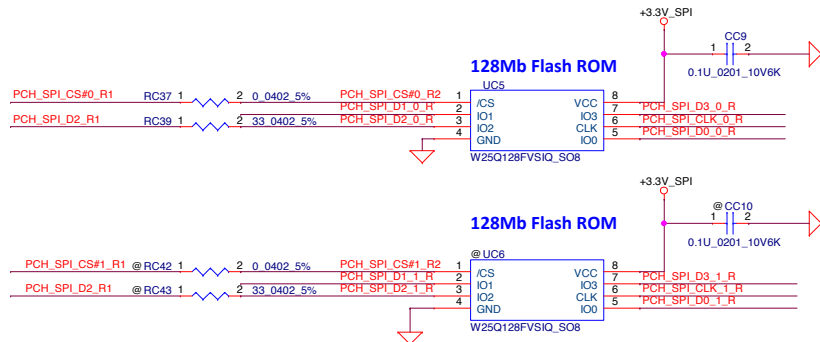
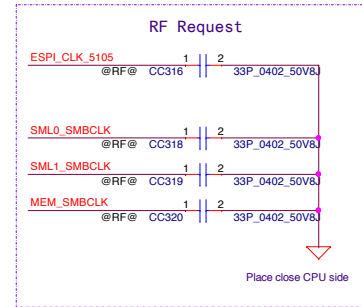
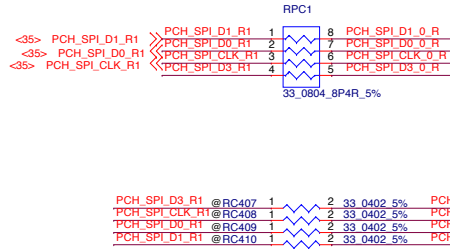
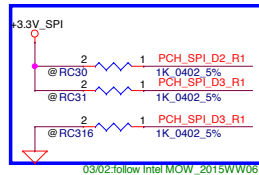
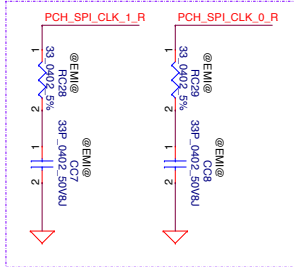
GPP_C0/SMBCLK
GPP_C1/SMBDATA
GPP_C2/SMBALERT#
GPP_C3/SMBCLK
GPP_C4/SMBDATA
GPP_C5/SMBALERT#
GPP_C6/SMBCLK
GPP_C7/SMBDATA
GPP_B23/SMBALERT#/PCHHOT#
GPP_A1/LAD0/ESPI_IO0
GPP_A2/LAD1/ESPI_IO1
GPP_A3/LAD2/ESPI_IO2
GPP_A4/LAD3/ESPI_IO3
GPP_A5/LFRAME#/ESPI_CS#
GPP_A14/SUS_STAT#/ESPI_RESET#
GPP_A9/CLKOUT_LPC0/ESPI_CLK
GPP_A10/CLKOUT_LPC1
GPP_A8/CLKRUN#

MEM_SMBCLK
MEM_SMBDATA
PCH_SMB_ALERT#
SML0_SMBCLK
SML0_SMBDATA
GPP_C5
SML1_SMBCLK
SML1_SMBDATA
GPP_B23
ESPI_IO0_R
ESPI_IO1_R
ESPI_IO2_R
ESPI_IO3_R
ESPI_CS#0
ESPI_RESET#
ESPI_CLK
PCH_CLK_LPC1
CLKRUN#
CHECK LPC_CLK FOR DEBUG CARD?



SOFTWARE TAA

RF Request



TLS CONFIDENTIALITY	
HIGH	ENABLE
LOW(DEFAULT)	DISABLE
WEAK INTERNAL 20K PD	

EC interface	
HIGH	ESPI
LOW(DEFAULT)	LPC
WEAK INTERNAL 20K PD	

EXI BOOT STALL BYPASS	
HIGH	ENABLED
LOW(DEFAULT)	DISABLED
WEAK INTERNAL PD	

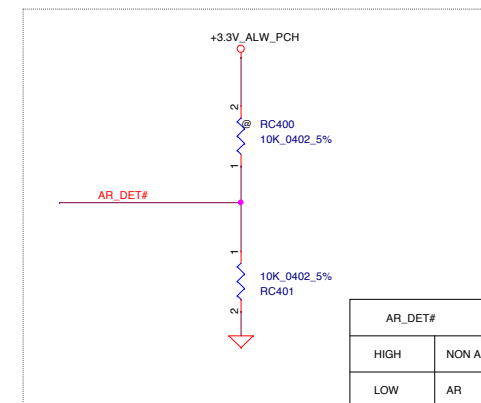
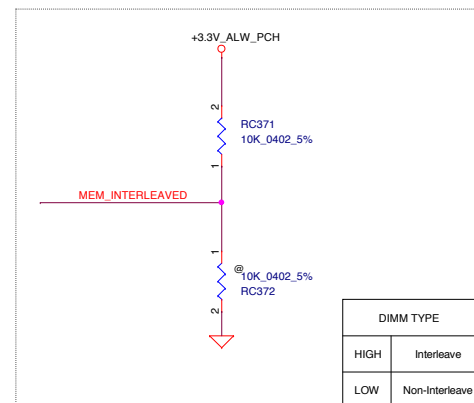
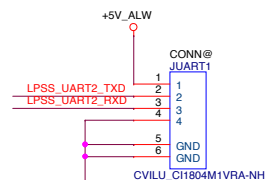
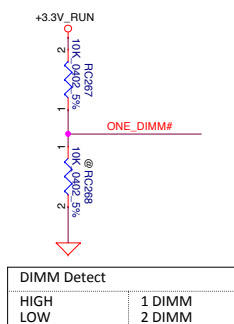
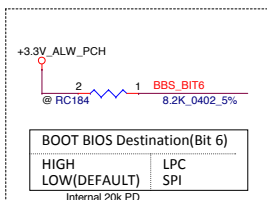
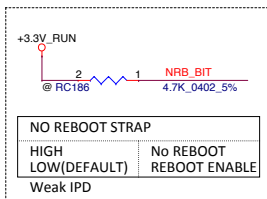
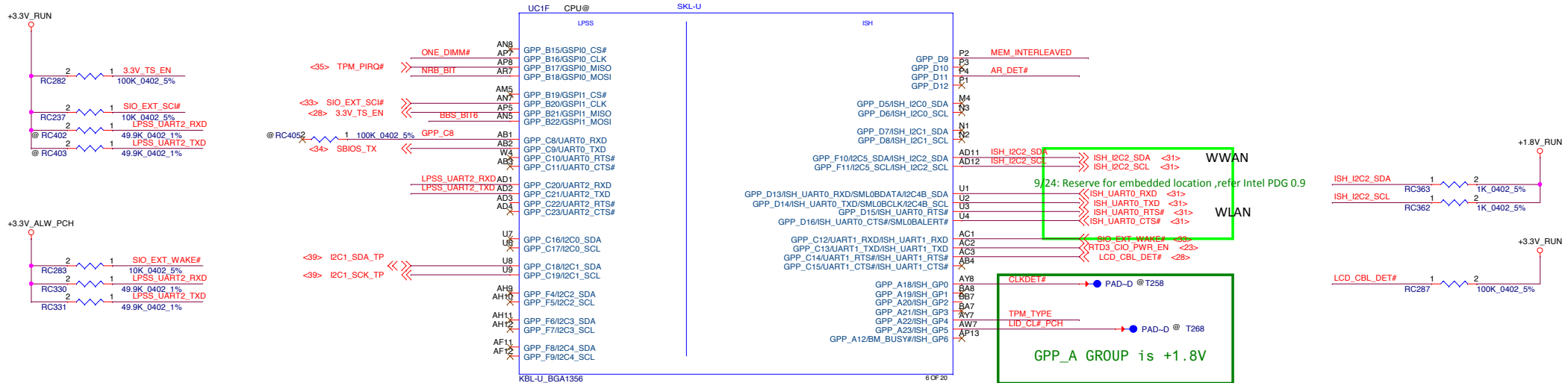
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For BR/SB



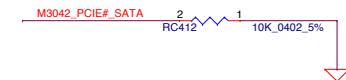
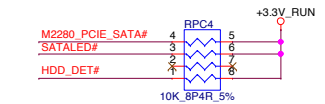
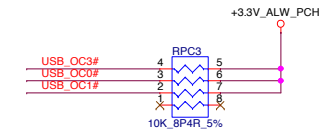
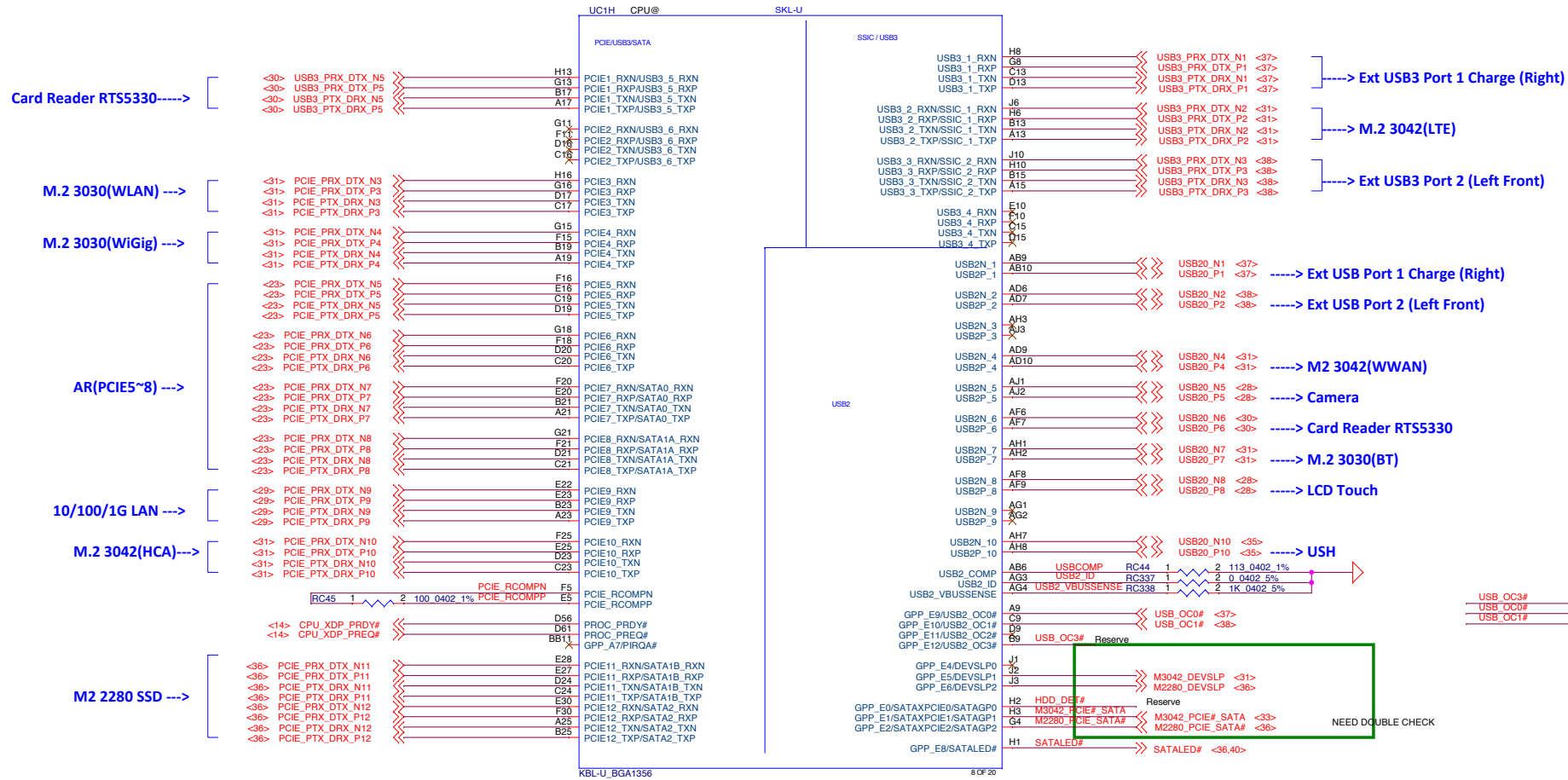
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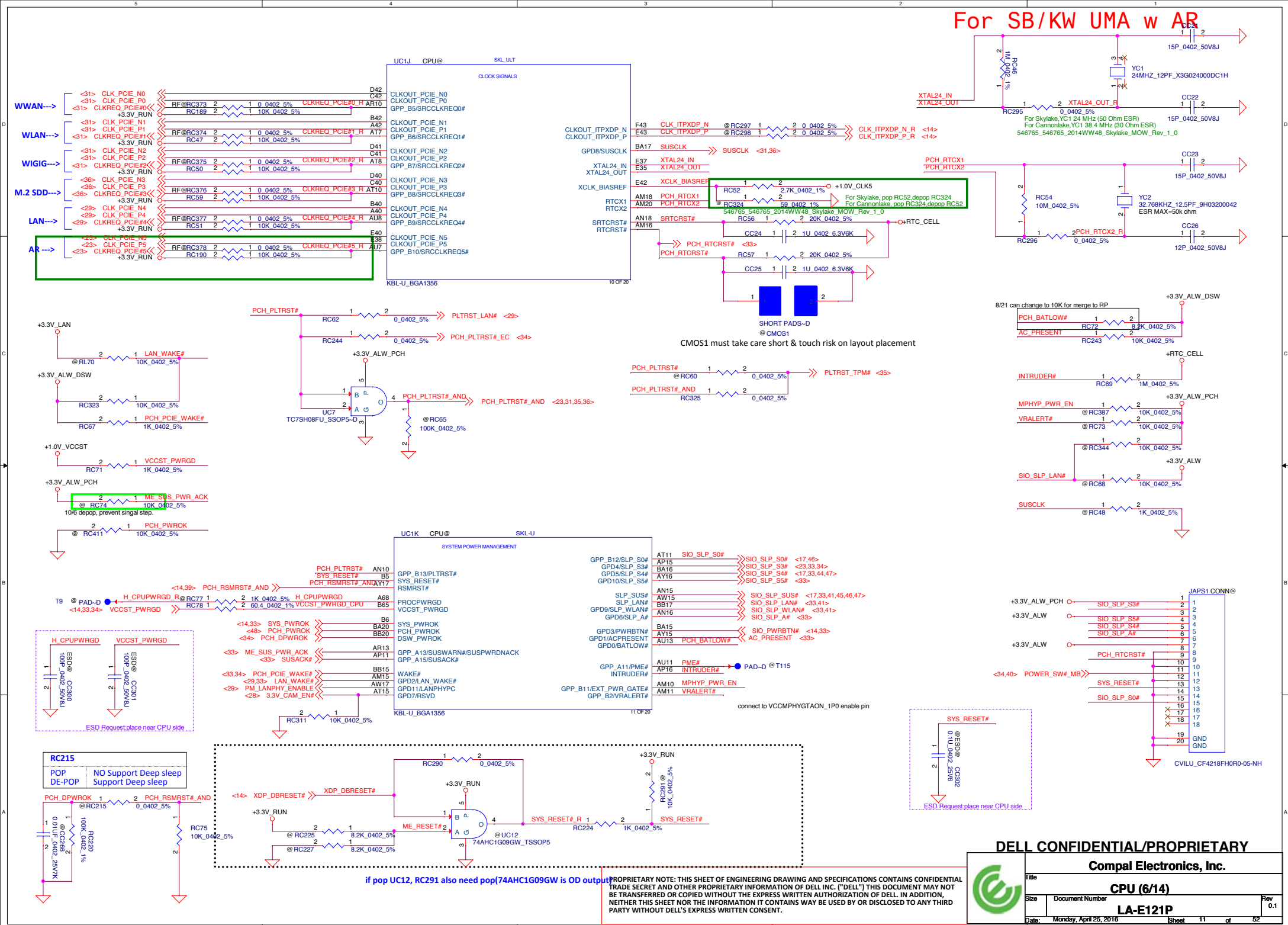
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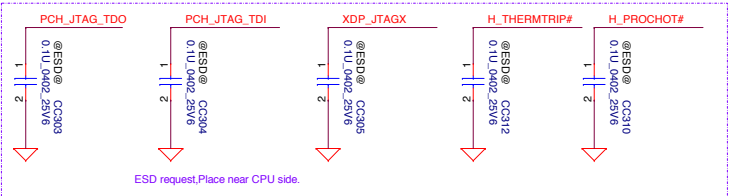
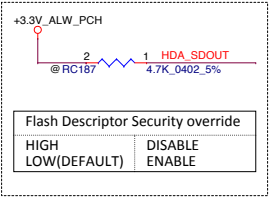
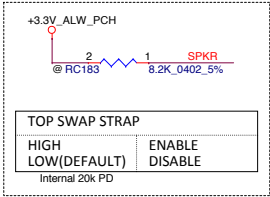
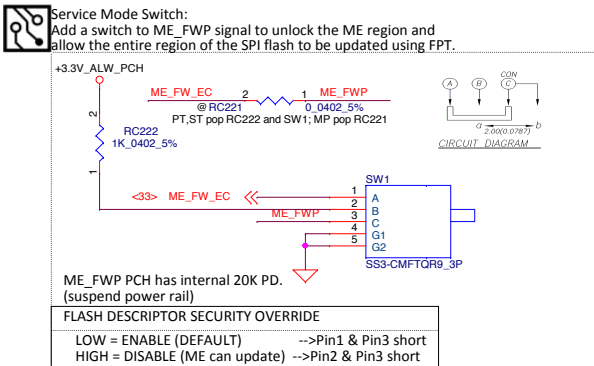
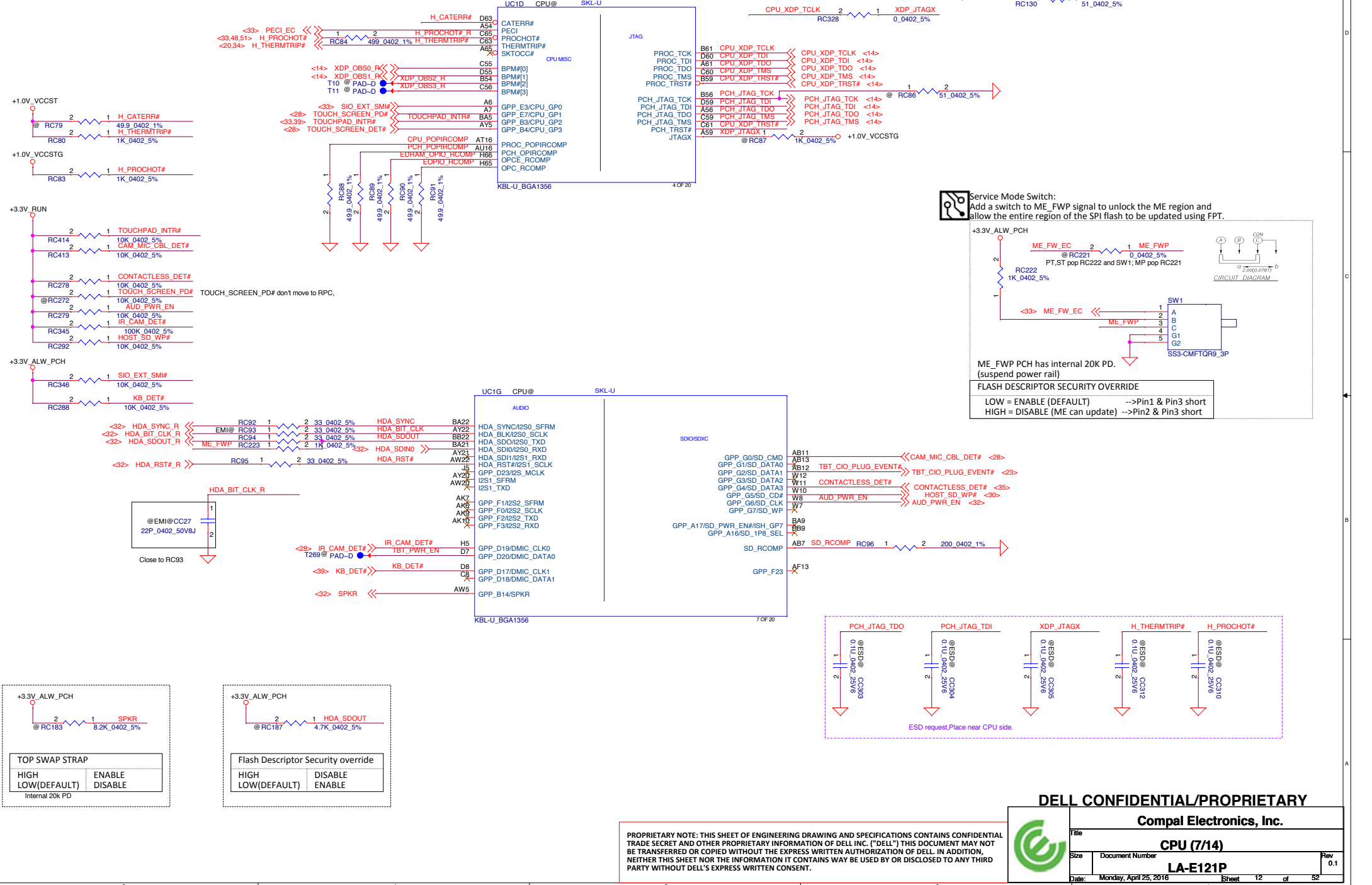
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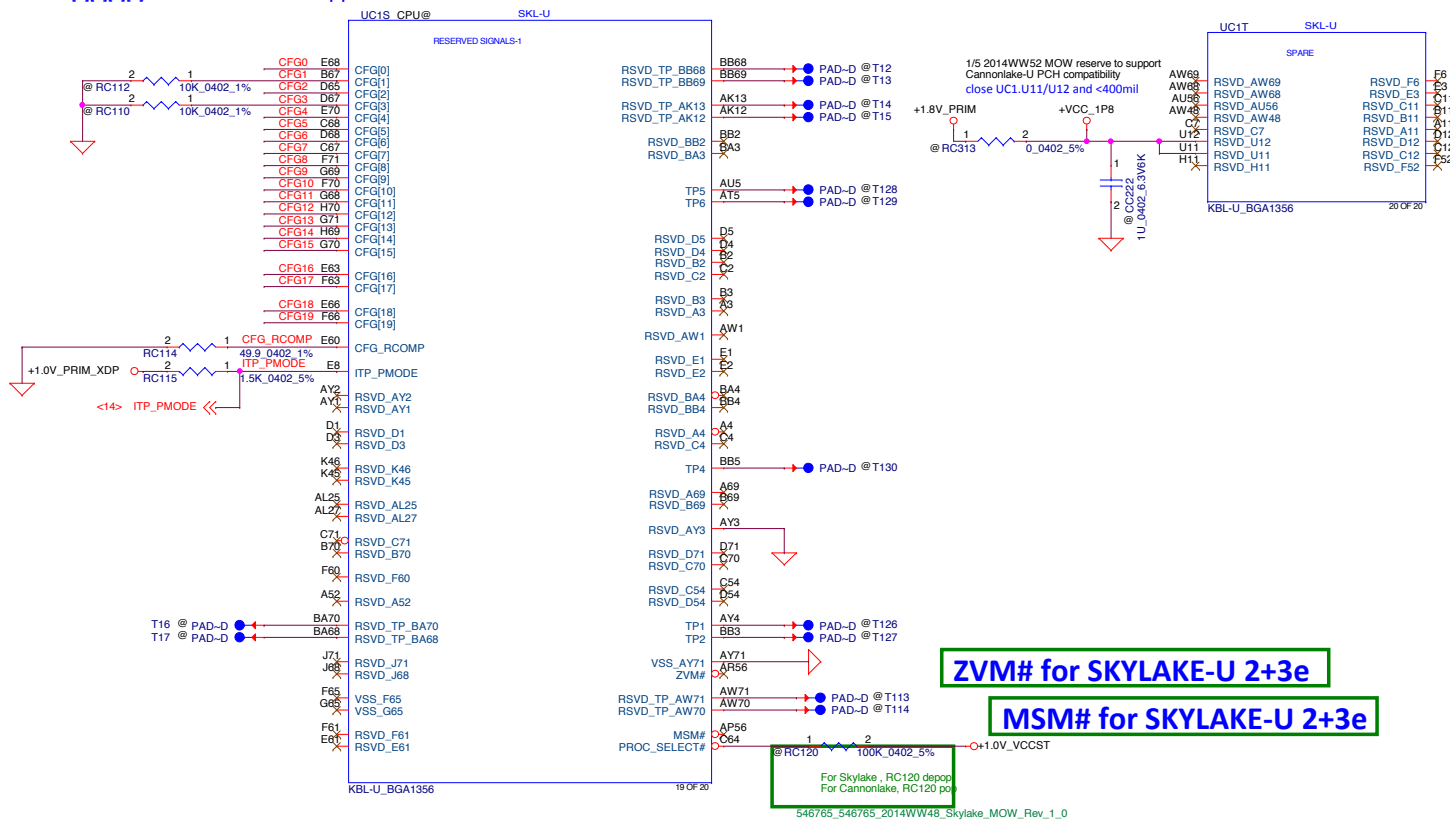
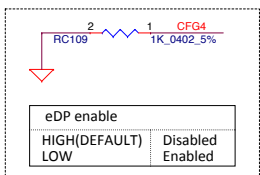
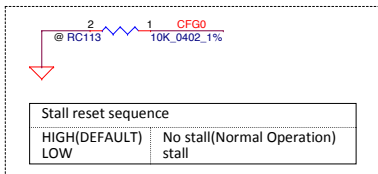
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CFG[2][5][6][7] for SKYLAKE-H CPU CFG strap pin



ZVM# for SKYLAKE-U 2+3e

MSM# for SKYLAKE-U 2+3e

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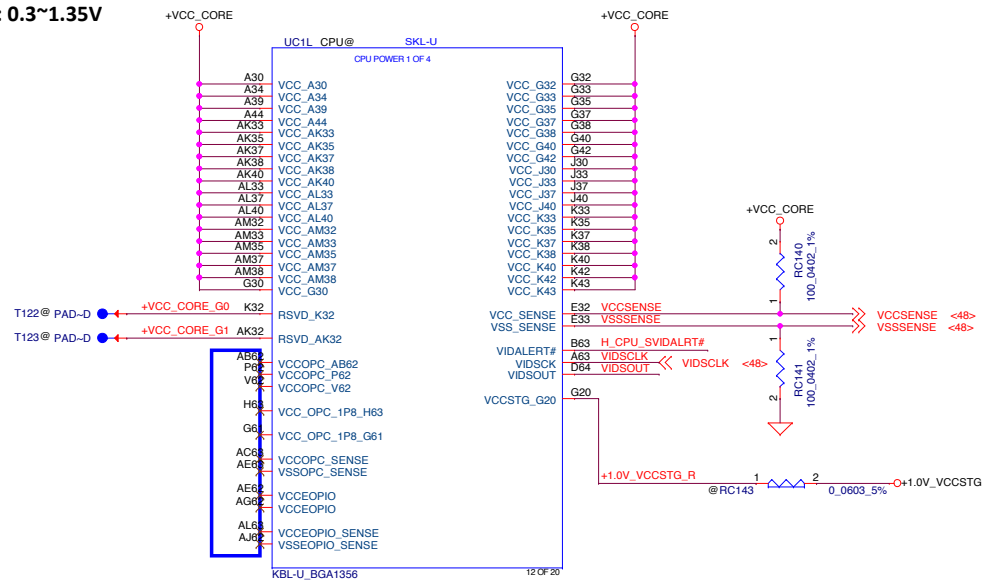
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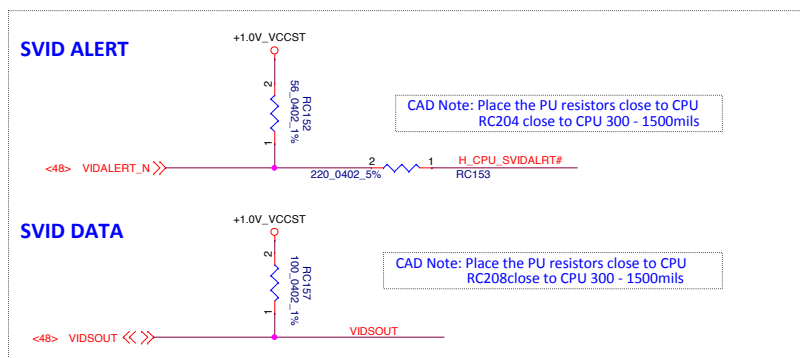
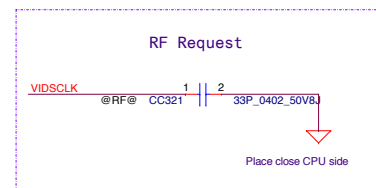
+VCC_CORE: 0.3~1.35V



VCCOPC,VCCOPC_1P8,VCCEOPIO for SKYLake-U 2+3e
(w/ on package cache)

PSC(Primary side cap) : Place as close to the package as possible
BSC(Backside cap) : Place on secondary side, underneath the package

Component placement order:
Package edge > 0402 caps > 0805 caps > Bulk caps > Power source



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CPU (10/14)

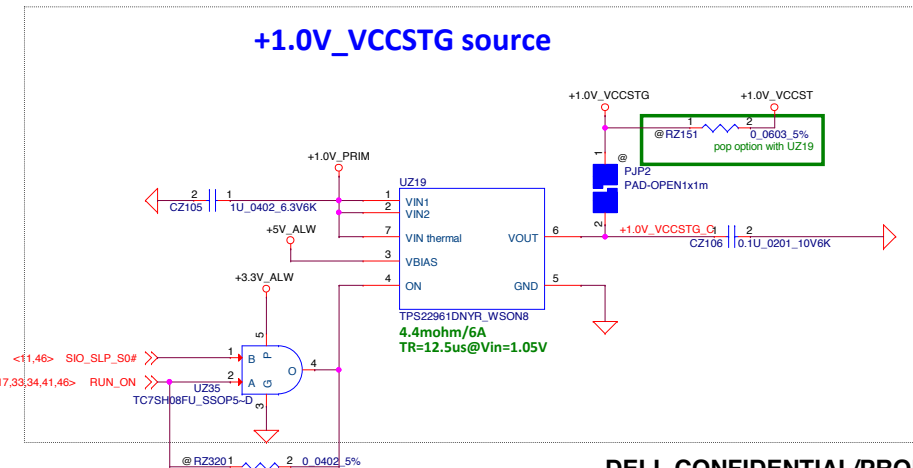
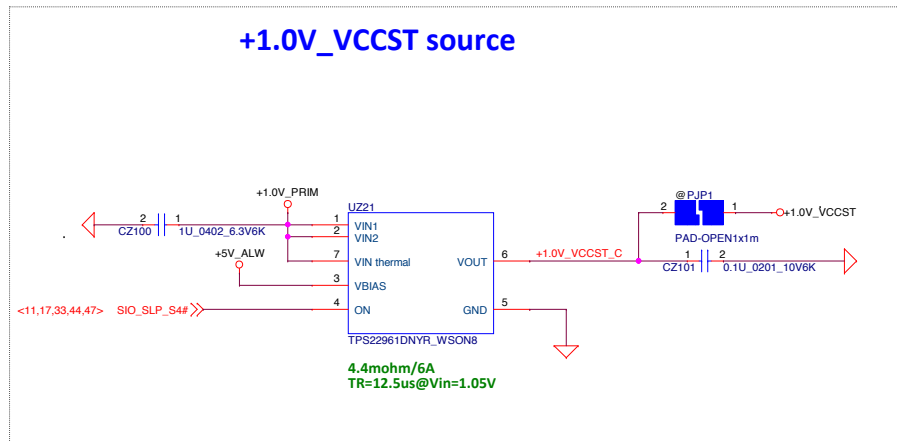
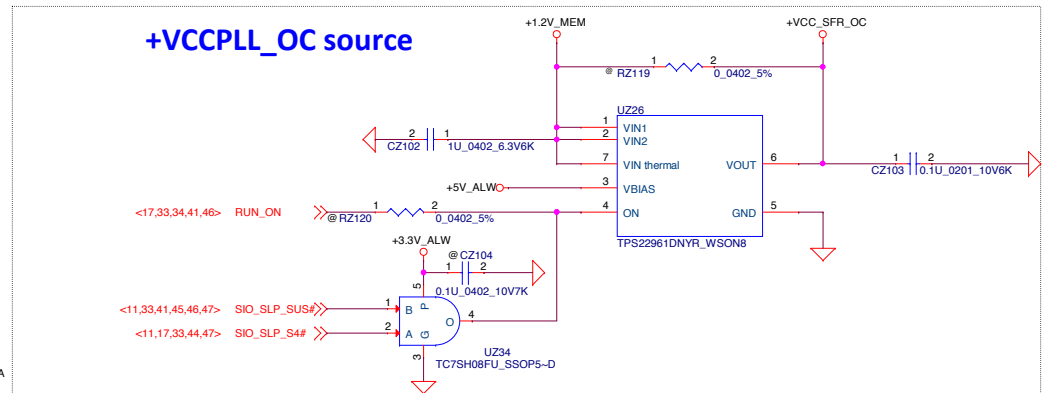
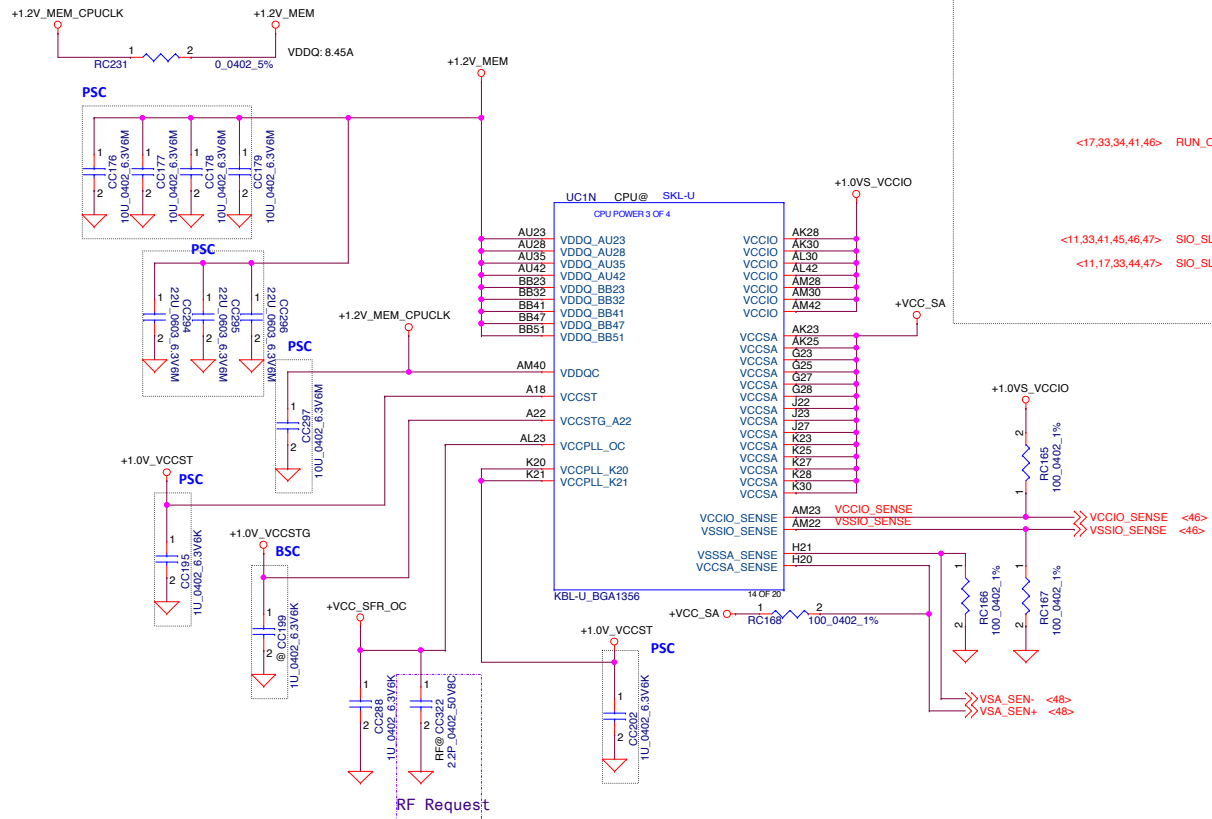
LA-E121P

Title		Rev
Size	Document Number	0.1
Date:	Monday, April 25, 2016	Sheet 15 of 52

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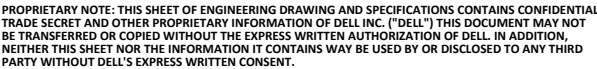


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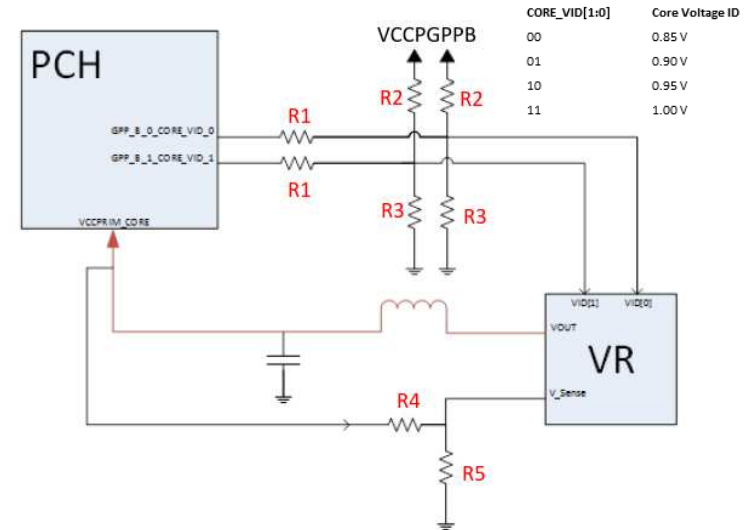
	S0	S0k	S3
SIO_SLP_S0#	HIGH	LOW	LOW
SIO_SLP_S3#	HIGH	HIGH	LOW
AND	HIGH	LOW	LOW

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Note1: VCCPRIM_CORE Implementation with PCH CORE_VID Recommendation

R1: PR408,PR411 ; R2: PR417,PR418 ; R3,PR419,PR420 ; R4: PR423 ; R5: PR424



For Pre-ES Parts: Disconnect PCH CORE_VID[1:0] to the VR and fix PCH VCCPRIM_CORE voltage at 1.00 V.

- R1: not populated
- R2, R3: populated to set VCCPRIM_CORE to 1.00V. Consult with VR vendor for appropriate values.
- R4, R5 (feedback resistor): populated if needed. Some VRs only support up to 0.95V natively with VID options. 1.00 V should be created by selecting 0.95V option and using feedback resistors to shift voltage up 50 mV. Consult with VR vendor for appropriate values for proper VR operation while minimizing power consumption

For ES and Later Parts: Connect PCH CORE_VID[1:0] to the VR.

- R1: populated
- R2, R3: not populated
- R4, R5 (feedback resistors): populated if needed to obtain appropriate voltage per the updated PCH VID encoding table above. Consult with VR vendor for appropriate values

For VRs that only support up to 0.95V natively with VID options, using R4 and R5 to shift the voltage table up 50mV will result in the LPM voltage output being shifted up slightly. If the VR supports LPM voltage, the specified, lowest supportable voltage is 0.70V for optimized power consumption. With R4, R5 configured to shift from 0.95V to 1.00V, the LPM voltage will effectively be shifted from 0.70V to ~0.75V. This will not be a functional issue for the platforms, but will slightly de-optimize power consumption. It is recommended that customers work with their VR vendors to adjust to the new voltage table.

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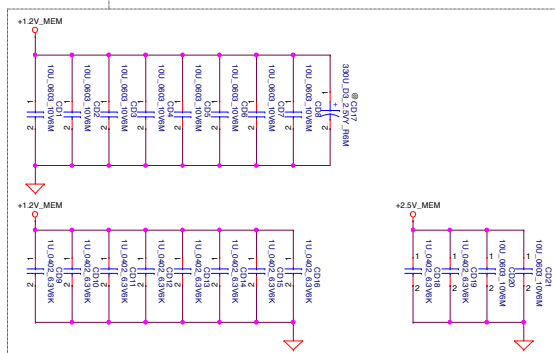
CPU (14/14)				Rev
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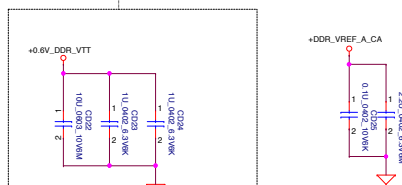
JDIMM1 REV Type H=9.2

<-> DDR_A_DQS[0..7] <->
 <-> DDR_A_DQ[0..63] <->
 <-> DDR_A_DQS[0..7] <->
 <-> DDR_A_MA[0..16] <->

Layout Note:
Place near JDIMM1

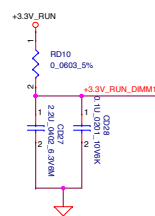
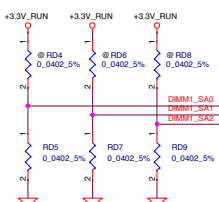


Layout Note:
Place near JDIMM1.258

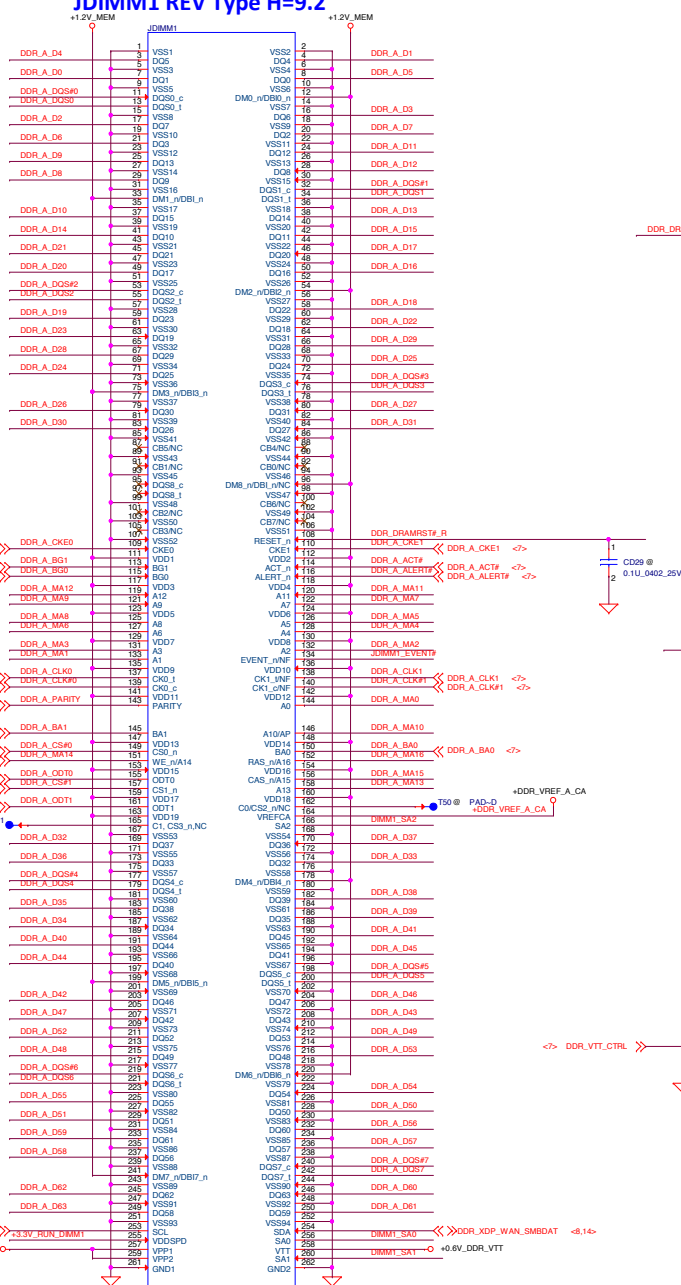


DIMM Select

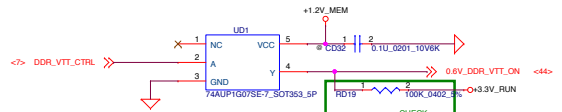
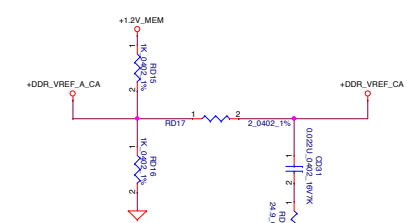
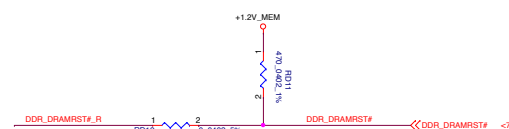
	SA0	SA1	SA2
DIMM1	0	0	0
DIMM2	1	0	0
DIMM3	0	1	0
DIMM4	1	1	0



<-> DDR_XDP_WAN_SMBCLK <->
 <-> DDR_XDP_WAN_SMBDAT <->



LINK SP07001D200 DONE



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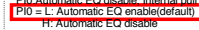
DDR4

LA-E121P

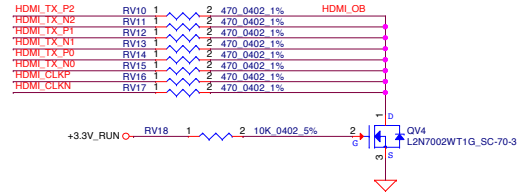
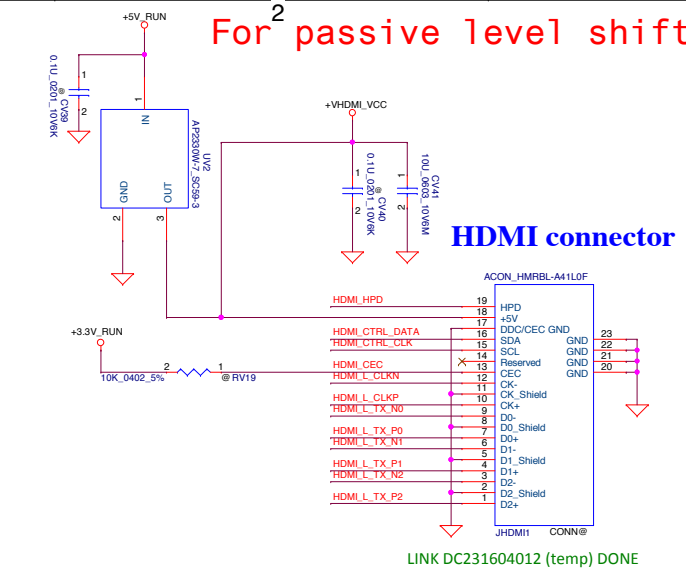
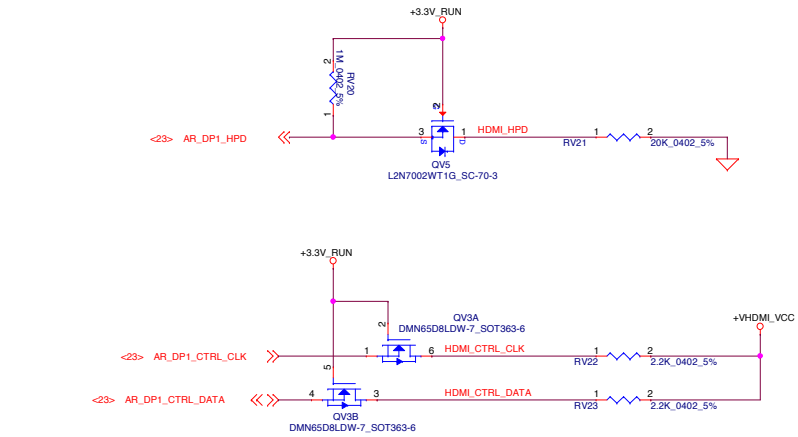
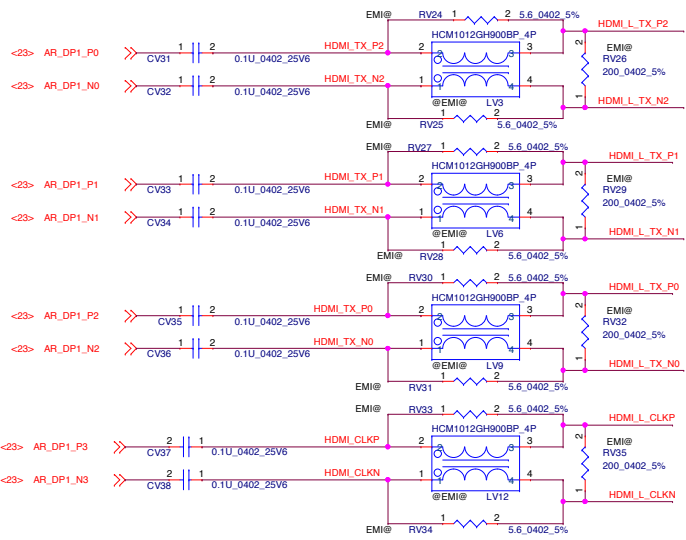
Date: Monday, April 25, 2016

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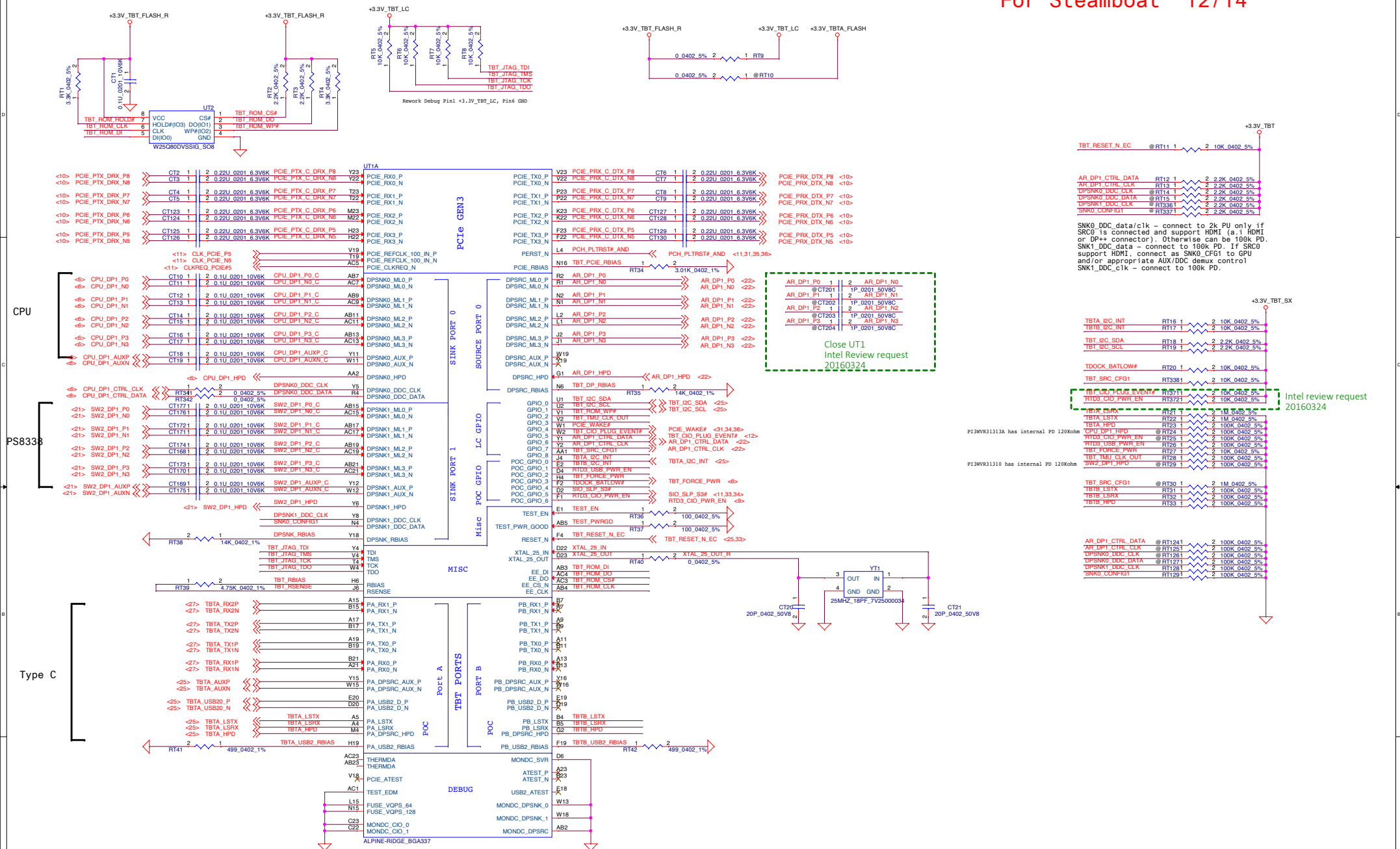
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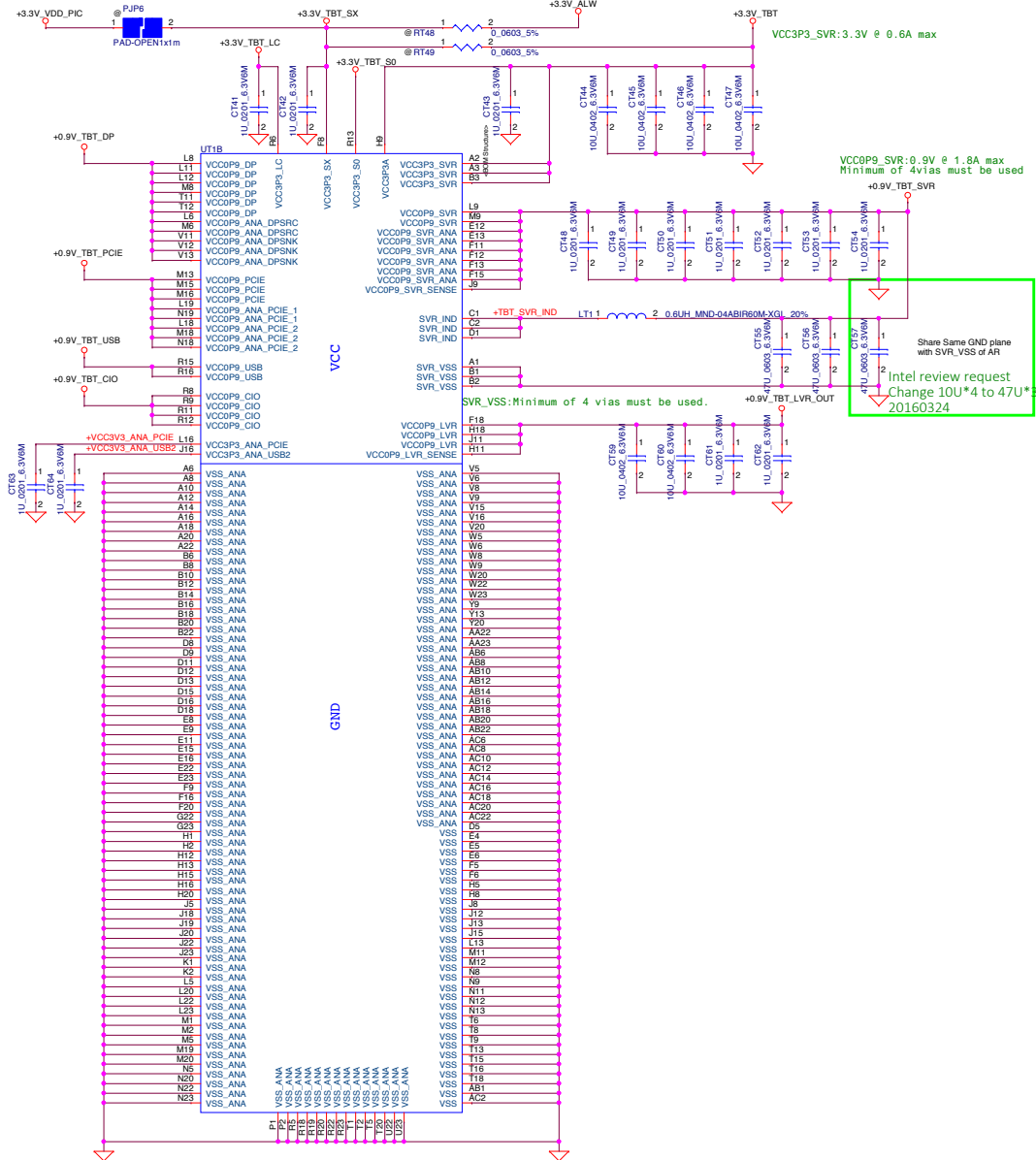
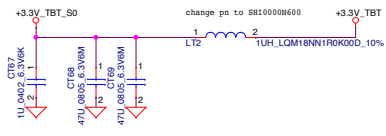
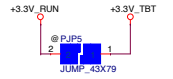
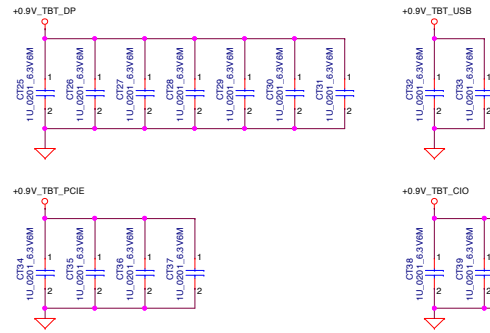
TBT-AR-SP(1/2) DP, PCIe

LA-E121P

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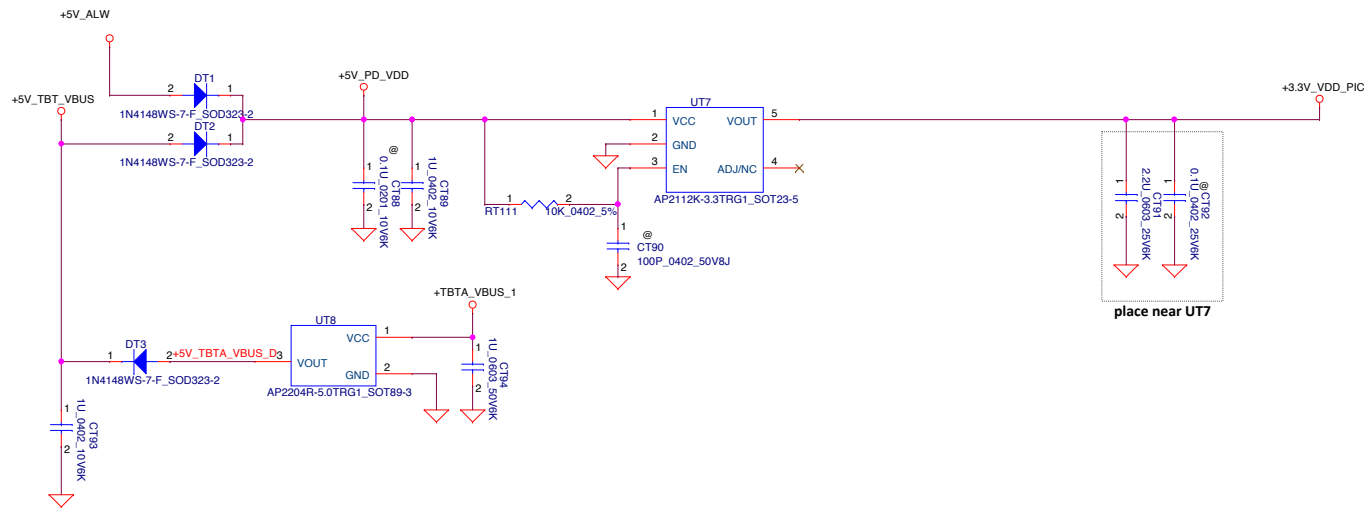
Compal Electronics, Inc.

TBT-AR-SP(2/2) PWR,VSS

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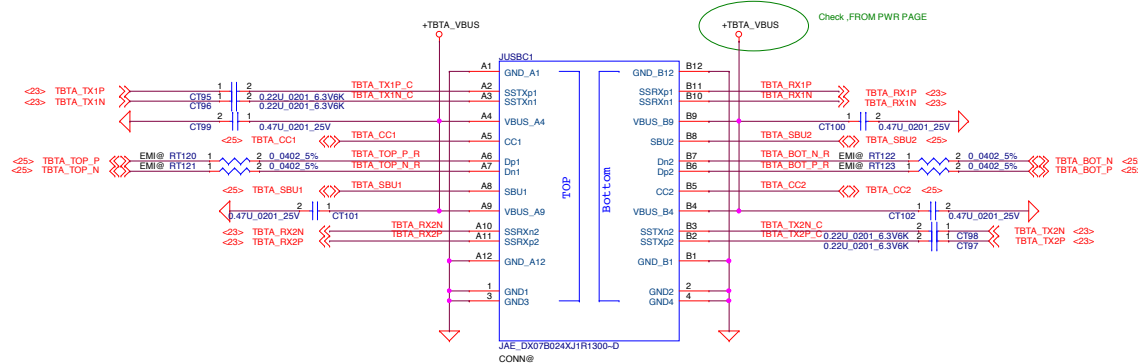
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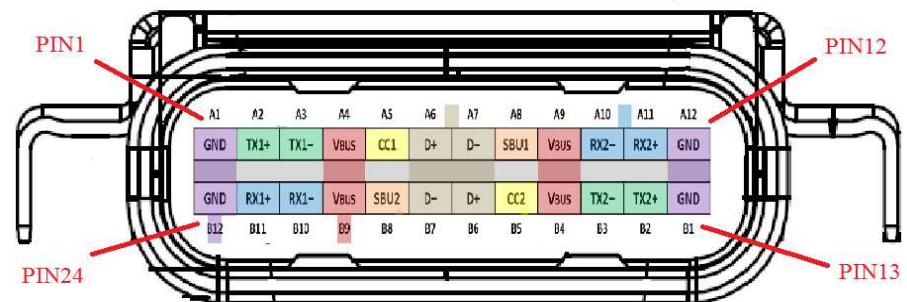
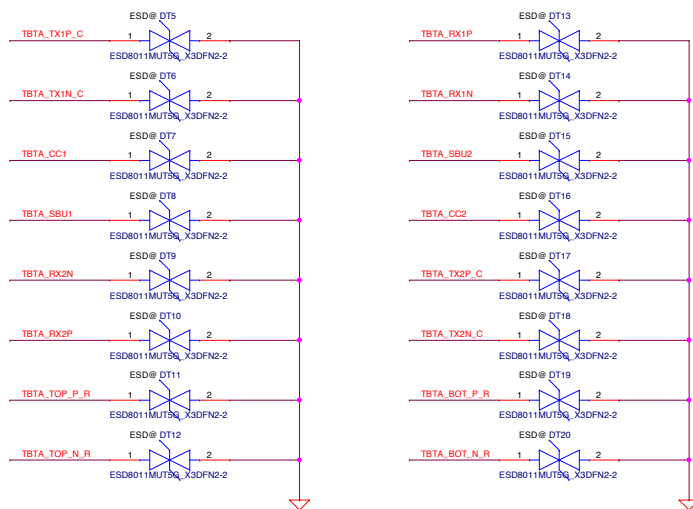
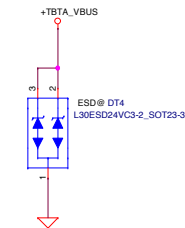
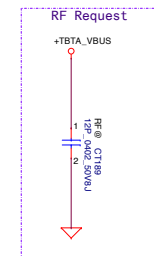
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Title		
[Type C]PD Power		
LA-E121P		
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Date: Monday, April 25, 2016	Sheet 26 of 52	0.1

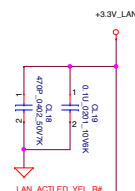
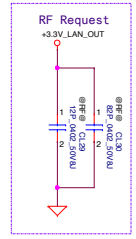
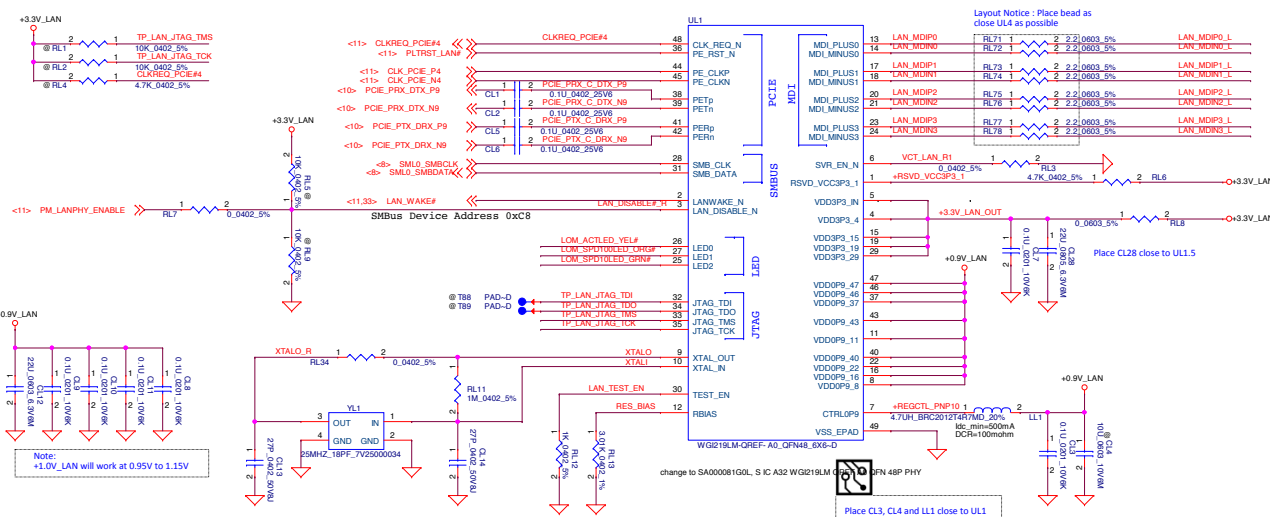


Premium 12/14/15 UMA: Check SBU1/SBU2 connect to PD or PS8740B
Link DC23300MEBL Done

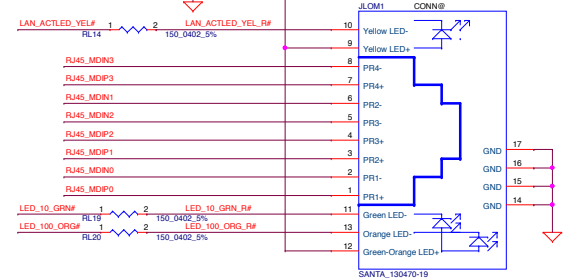


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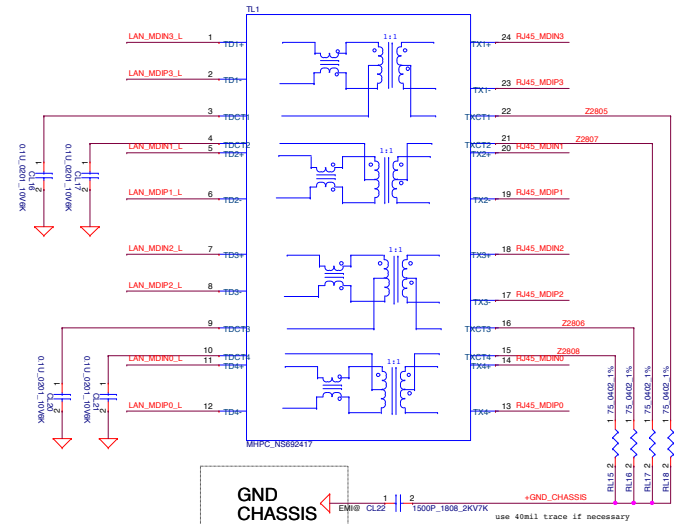
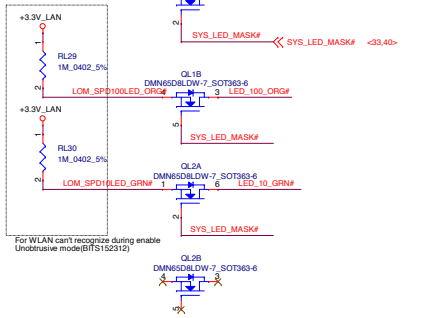
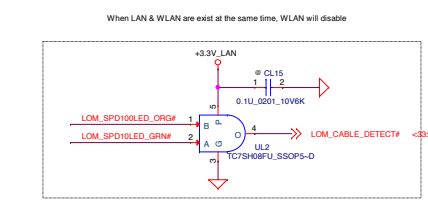
	Compal Electronics, Inc.		
	Title		
	eDP CONN & Touch screen		
	Size	Document Number	Rev
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RJ45 LOM circuit +3.3V_LAN:20mils



Link DC231603220 (temp) DONE



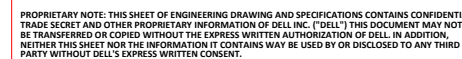
GND CHASSIS

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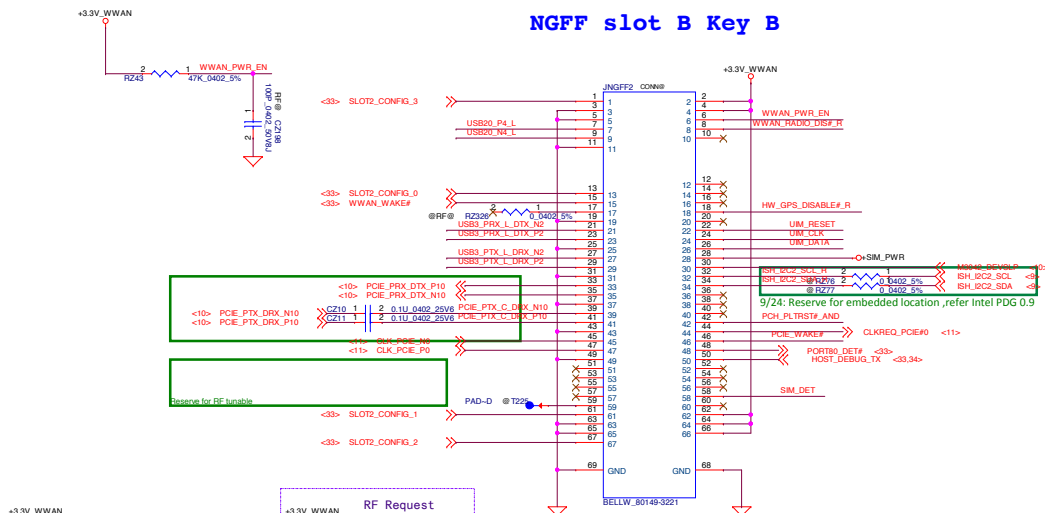
Compal Electronics, Inc.		
LAN Clarkville & RJ45		
LA-E121P		
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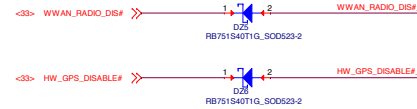
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Compal Electronics, Inc.			
	Title		
	Card Reader RTS5330		
	Size	Document Number	Rev
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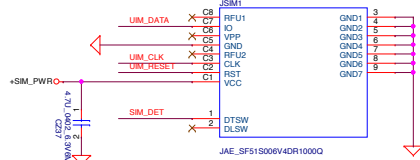
NGFF slot B Key B



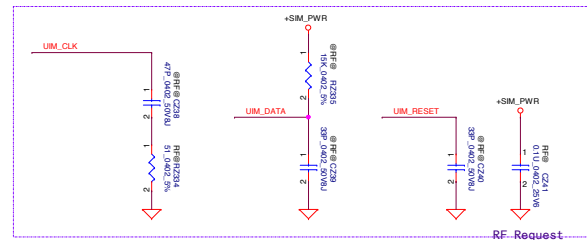
80149-3221 LINK DONE



SIM Card Push-Push



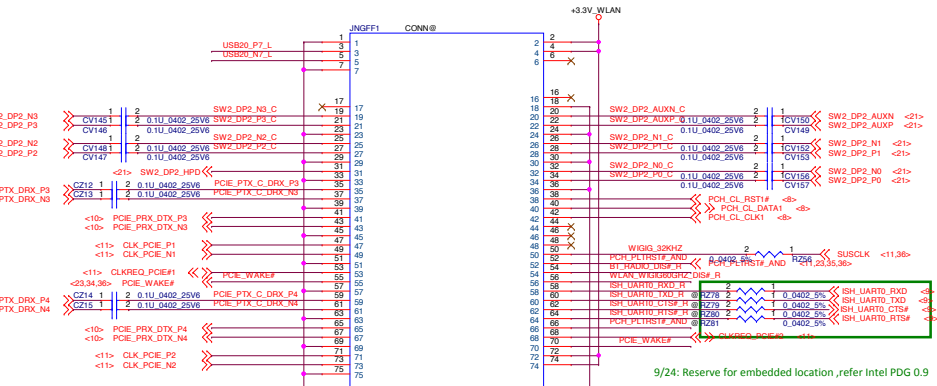
SP070017100 LINK DONE



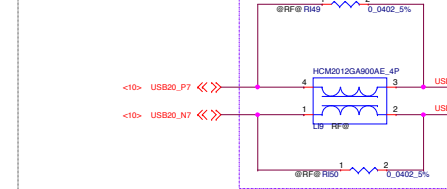
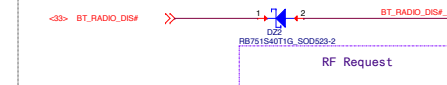
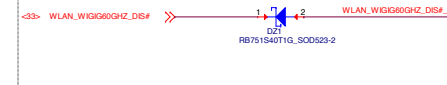
STATE #	CONFIG_0	CONFIG_1	CONFIG_2	CONFIG_3	Module Type
0	GND	GND	GND	GND	SSD-SATA
1	GND	HIGH	GND	GND	SSD-PCIe(2 lane)
8	HIGH	GND	GND	GND	WWAN
14	HIGH	GND	HIGH	HIGH	HCA-PCIe(1 lane)
15	HIGH	HIGH	HIGH	HIGH	NA

for AR Steamboat

NGFF slot A Key A



SP070019F00 LINK DONE



Power Rating TBD

PWR Rail	Voltage Tolerance	Primary Power	Aux Power
+3.3V		Peak	Normal

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NGFF Card

LA-E121P

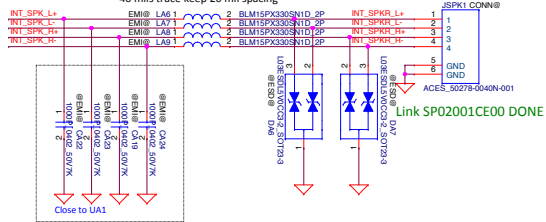
Monday, April 25, 2016 Sheet 31 of 52

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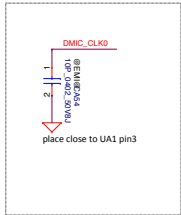
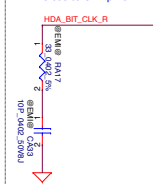
1W x 1ch, 4ohm (Transducer spec is 80hm/0.5Watt per unit, there are two transducer units in one speaker box)

Internal Speakers Header

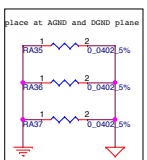
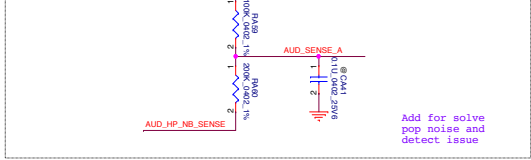
40 mils trace keep 20 mil spacing



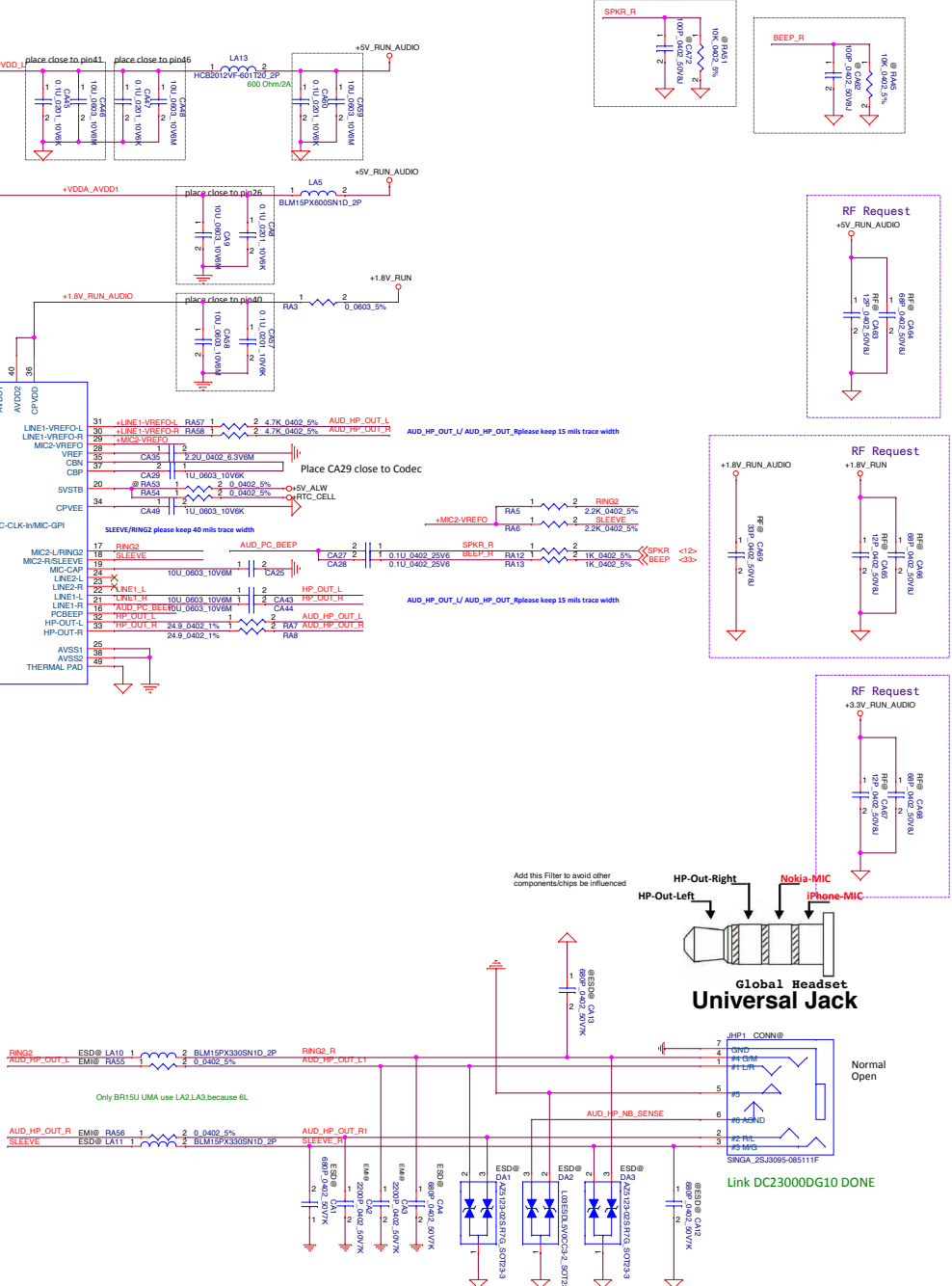
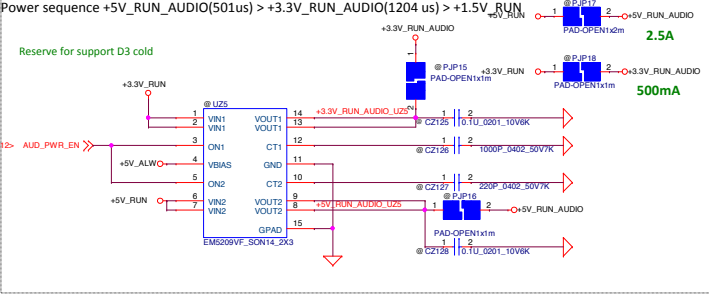
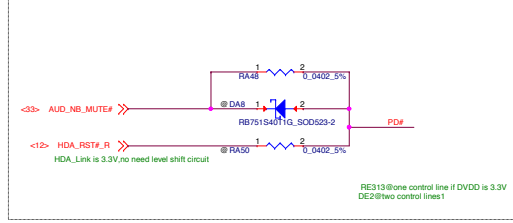
Close to UA1 pin6



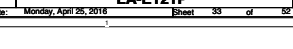
Place closely to Pin 13.



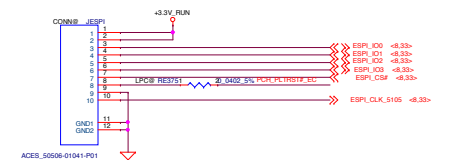
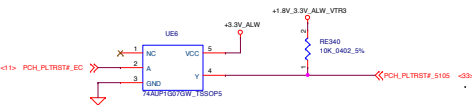
CLASS-D POWER DOWN CONTROL CIRCUIT



Security Classification		Compal Secret Data			Compal Electronics, Inc.	
Issued Date	2016/01/01	Deciphered Date	2017/01/01		Title	
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					LA-E121P	
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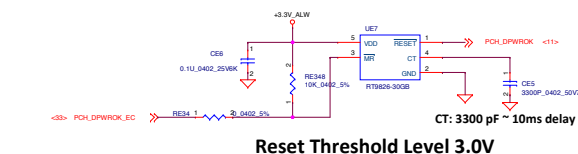
For SB



ACES_50506-01041-P01

LPC 80Port Debug	LPC	ESPI
1	+3.3V_RUN	+3.3V_RUN
2	+3.3V_RUN	+3.3V_RUN
3	LPC_LAD0	ESPI_I00
4	LPC_LAD1	ESPI_I01
5	LPC_LAD2	ESPI_I02
6	LPC_LAD3	ESPI_I03
7	LPC_FRAME#	ESPI_CS#
8	PCH_PLTRST#	NA
9	GND	GND
10	LPC_CLOCK	ESPI_CLK

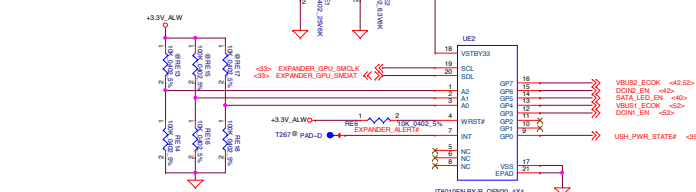
PAGE	ESPI	LPC
8	RC25_10K	RC8_15ohm RC13/RC27_8.2K
18	RC212_0ohm 0603	RC211_0ohm 0603
31		RE337,RE338 RE339,RE340, RE341 0_ohm
32	RE2 / RE3 0_ohm	



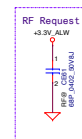
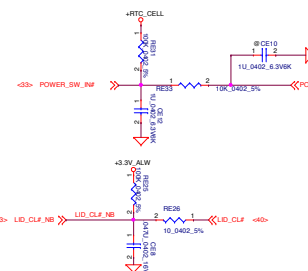
Reset Threshold Level 3.0V

Control Byte
0 1 0 0 A2 A1 A0 R/W
R/W = 0 = Write
R/W = 1 = Read

SMBus address 0x40

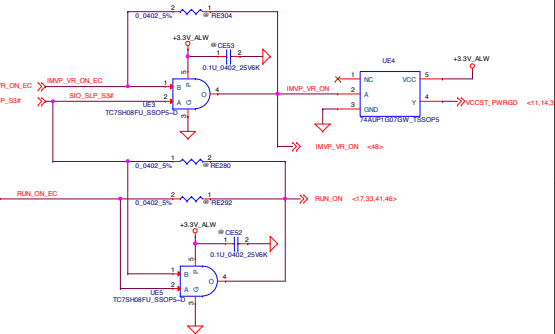


Link ITE IT8010 SA00009VL00 OK



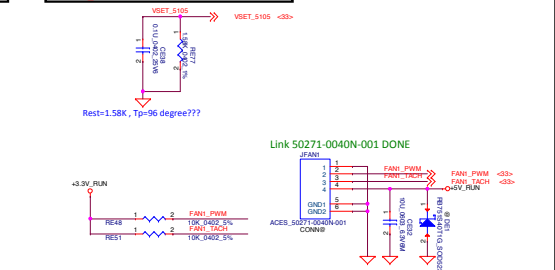
RE343	CE62	REV
240K	4700p	Single Port ACE w/o AR
130K	4700p	Single Port ACE w/AR
62K	4700p	Dual Port ACE w/o AR
33K	4700p	Dual Port ACE w/AR
8.2K	4700p	Dual Port ACE (w/AR +w/o AR)
4.3K	4700p	.
2K	4700p	.
1K	4700p	.

PD ACE_DET# rise time is measured from 5%~68%

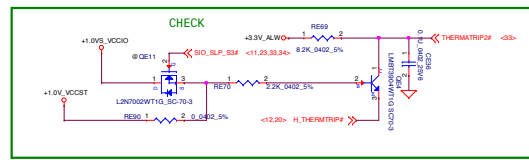
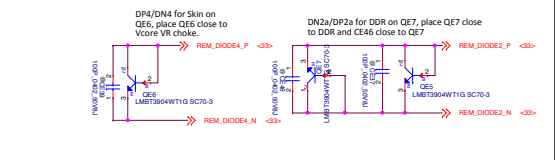


RE79	CE40	REV
240K	4700p	X00
130K	4700p	.
62K	4700p	.
33K	4700p	.
8.2K	4700p	.
4.3K	4700p	.
2K	4700p	.
1K	4700p	.

BOARD_ID rise time is measured from 5%~68%



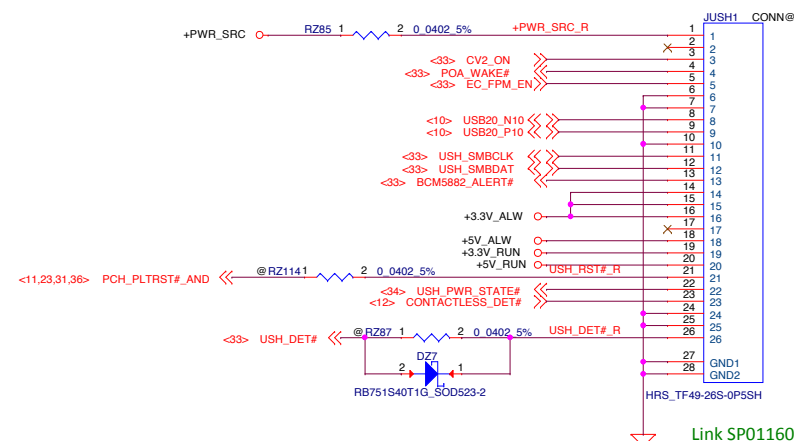
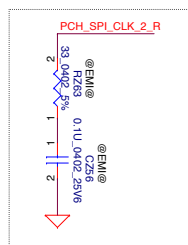
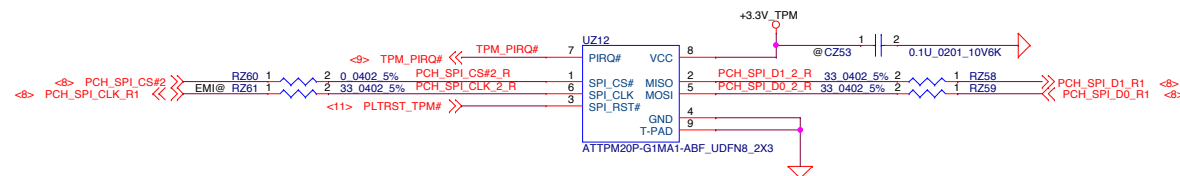
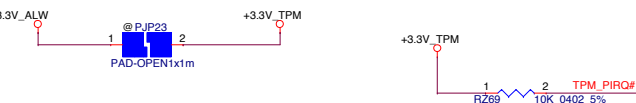
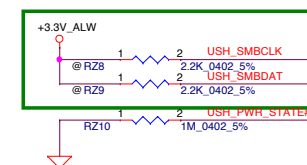
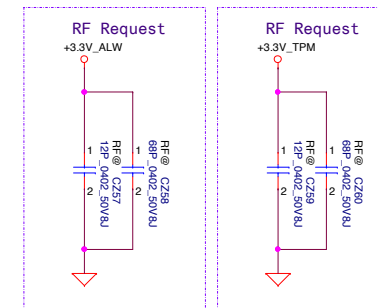
5105 Channel	Location
DP1/DN1	CPU (QE3)
DP2/DN2	WiGig (QE5)
DN2a/DP2a	DDR (QE7)
DP3/DN3	NA
DP4/DN4	CPU VR (QE6)



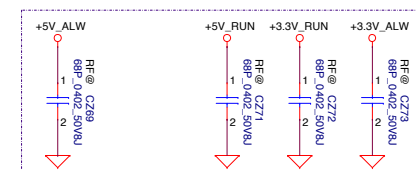
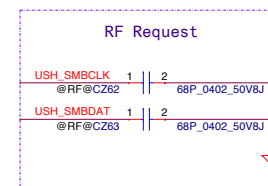
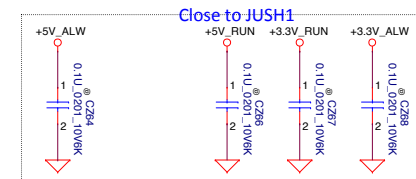
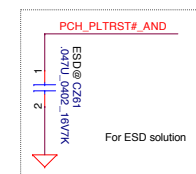
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Rev	000000_000000_000000	Rev	0.1

For ATMEL TPM



Link SP01604080(temp) DONE



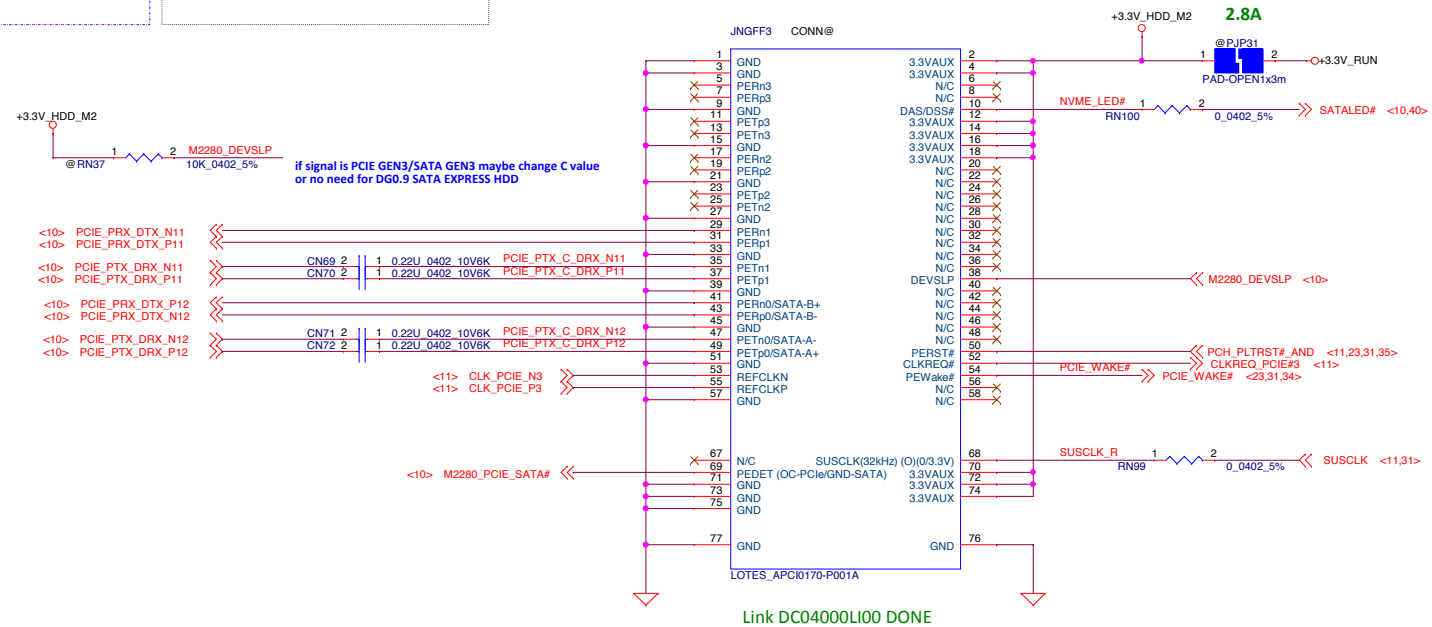
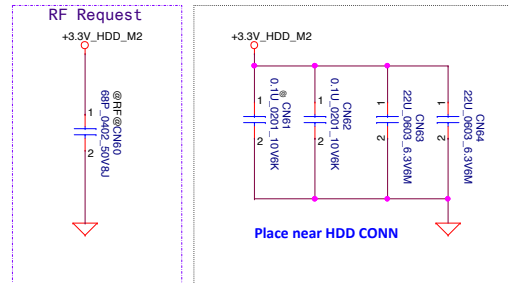
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Title			
USH & TPM			
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2280 SSD

NGFF slot C Key M



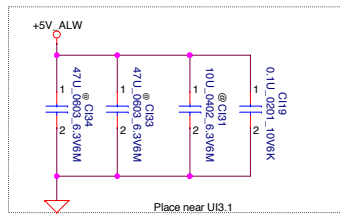
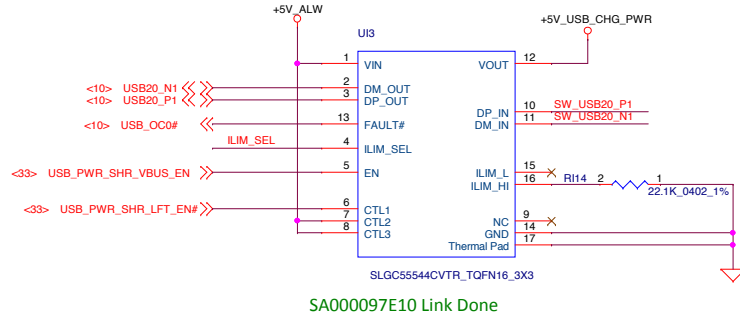
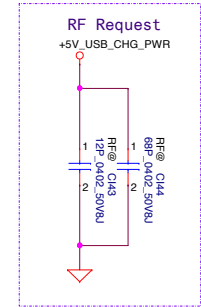
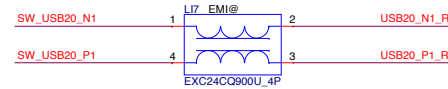
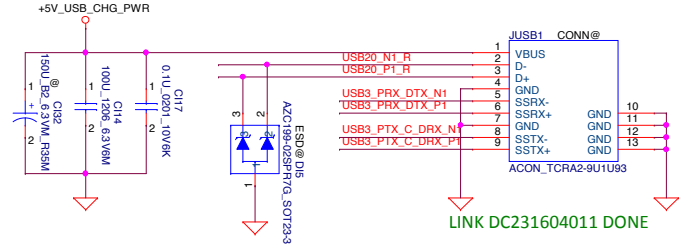
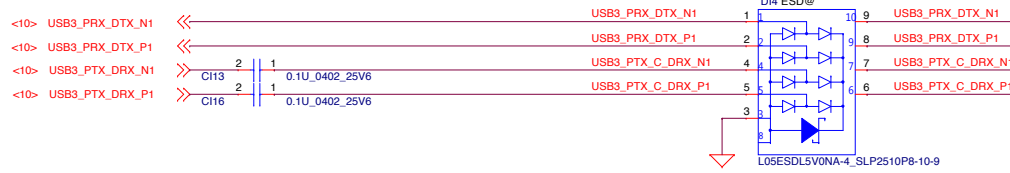
Link DC04000LI00 DONE

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Title			
M2 2280 Socket			
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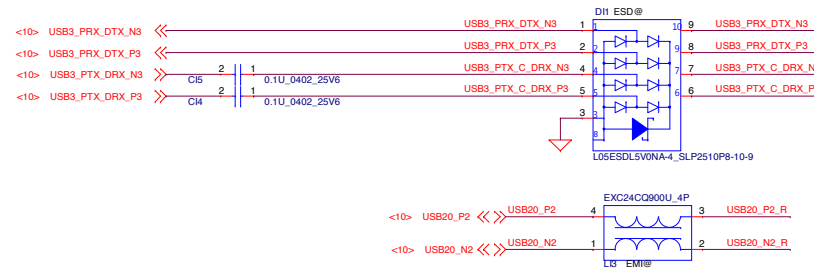


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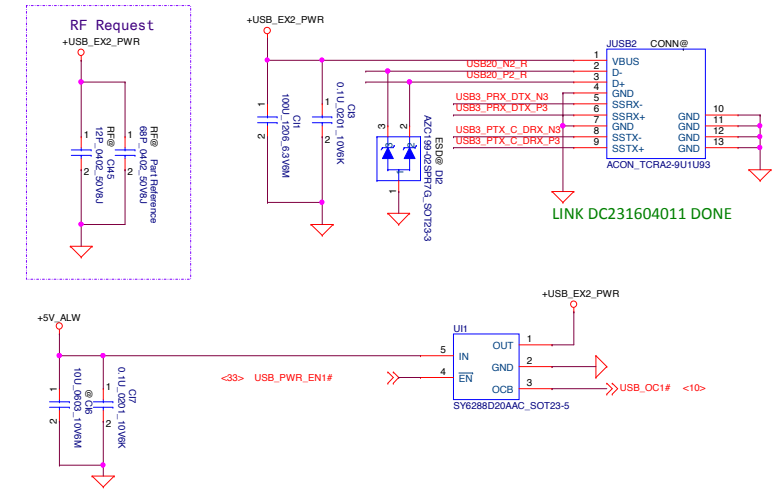
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JUSB1+PS			
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DFB request:
main SM070003Z00 (INPAQ_MCM1012B900F06BP_4P)
Footprint use 2nd source SM070004400 (PANAS_EXC24CQ900U_4P)
Pitch change from 0.5mm to 0.55mm

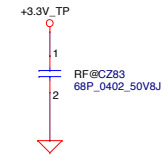
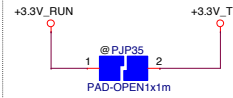
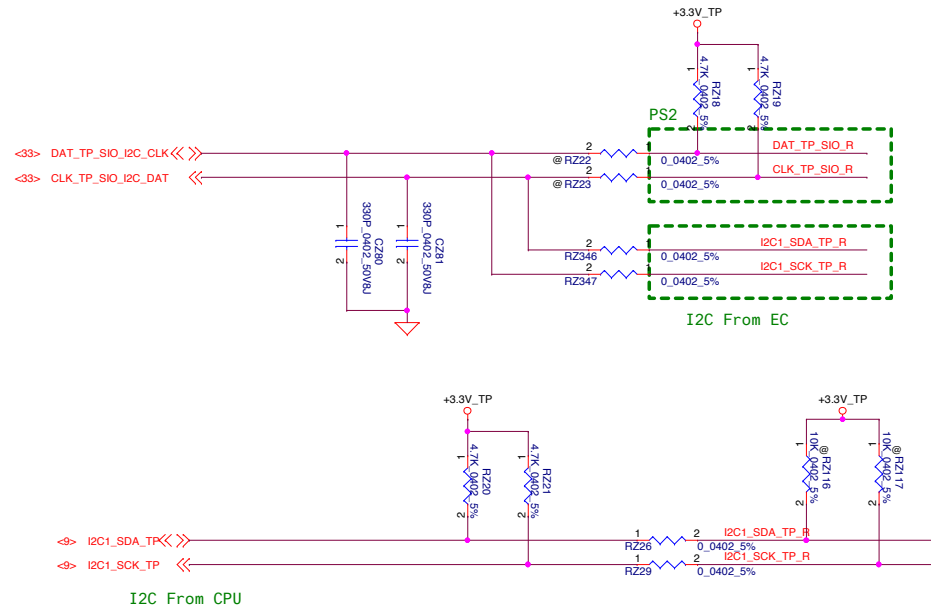


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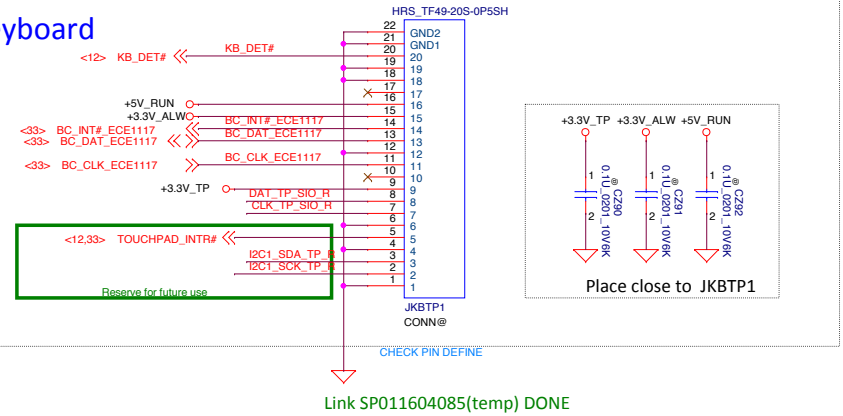
Compal Electronics, Inc.	
Title	JUSB2
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Touch Pad



Keyboard



@ EDP Cable nonTS_HD/FHD-HD Cam

Part Number	Description
DC02C00E000	H-COIN SET 185 MB-LCD-CAMERA NTS FHD

@ EDP Cable nonTS_FHD-IR

Part Number	Description
DC02C00E100	H-COIN SET 185 MB-LCD-CAMERA-IR NTS FHD

@ EDP Cable TS_TS-FHD-HD Cam

Part Number	Description
DC02C00E200	H-COIN SET 185 MB-LCD-CAMERA-TS FHD

@ LED Cable

Part Number	Description
DC02002LT00	H-COIN SET 185 MB-LCD/H

@ FP FFC

Part Number	Description
NBX00023000	FFC 12P F P0.5 PAD=0.3 56MM MB-FP 1S5

@ TP FFC

Part Number	Description
NBX00022Y00	FFC 20P F P0.5 PAD=0.3 92MM MB-TP 1S5

@ USH Board FFC

Part Number	Description
NBX00022Z00	FFC 26P F P0.5 PAD=0.3 81.6MM MB-USH 1S5

@ RTC BATT

Part Number	Description
GC02001DS00	BATT CR2032 3V 225MAH PA 5 W/C 30MM

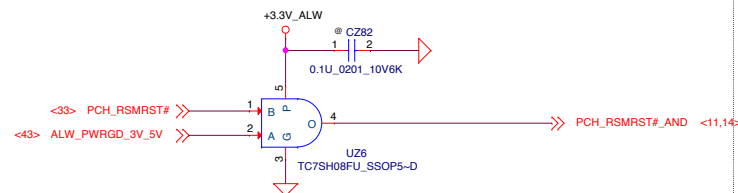
@ FAN

Part Number	Description
DC28A000800	FAN SET DAQ20 DC5V AB7405HB-BB3 ADDA

@ Speak

Part Number	Description
PK230003Q0L	SPK PACK ZJX 2.0W 4 OHM FG

RSMRST circuit



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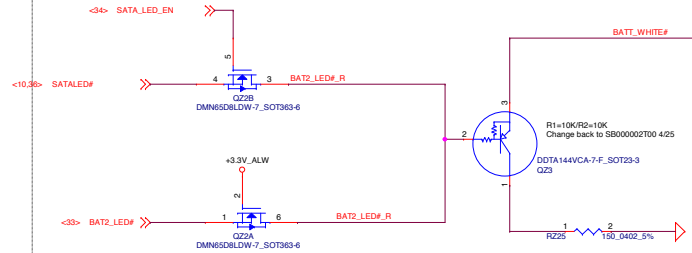


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Title		
Keyboard		
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HDD LED MUX

means EC can switch battery white led and HDD LED by hot key "Fn+H"

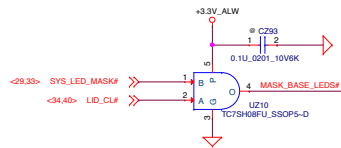
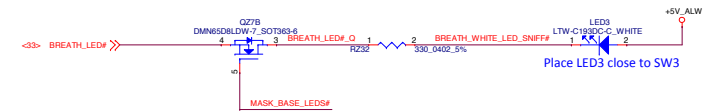


Battery LED

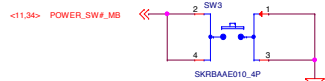


Breath LED

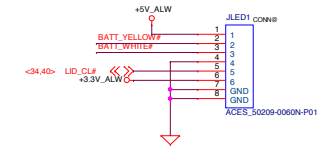
LED PIN change to SC50000FL00 from SC50000BA00



POWER & INSTANT ON SWITCH



LED board CONN

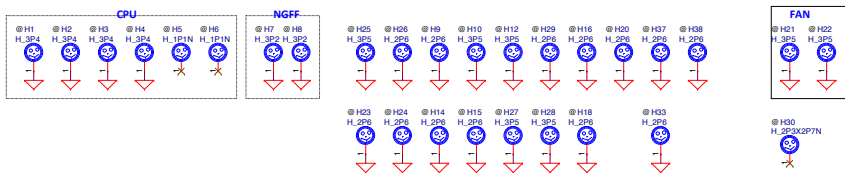


Fiducial Mark



LED Circuit Control Table

	SYS_LED_MASK#	LID_CL#
Mask All LEDs (Unobtrusive mode)	0	X
Mask Base MB LEDs (Lid Closed)	1	0
Do not Mask LEDs (Lid Opened)	1	1



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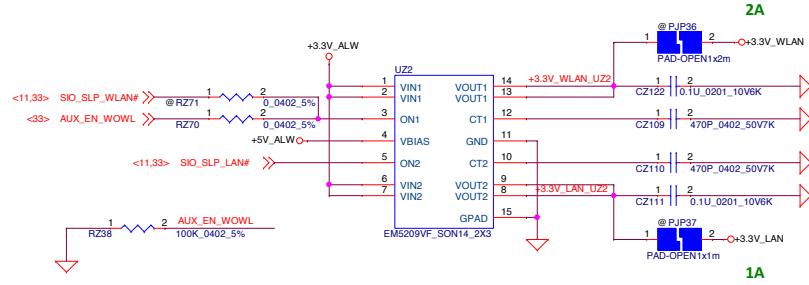
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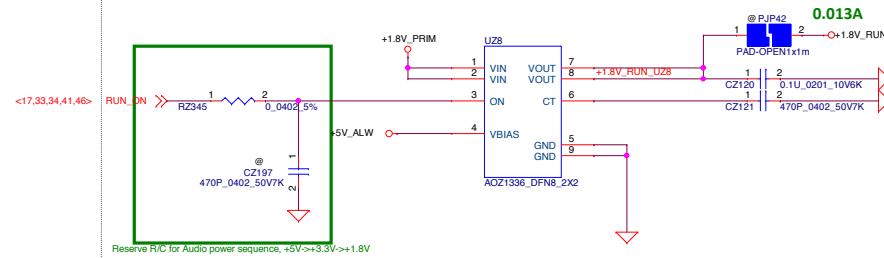
Title	PAD, LED	Rev	0.1
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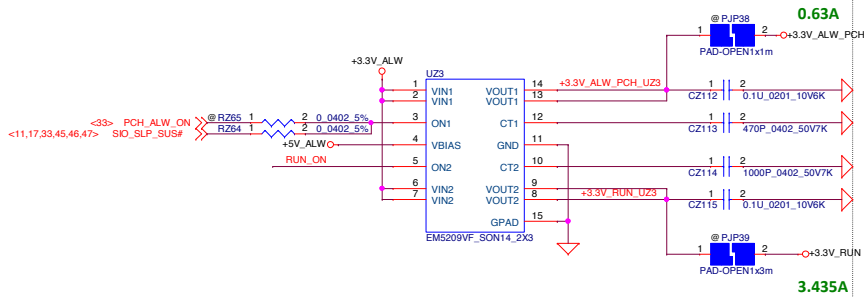
+3.3V_WLAN/+3.3V_LAN source



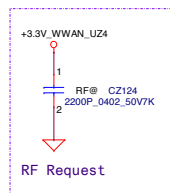
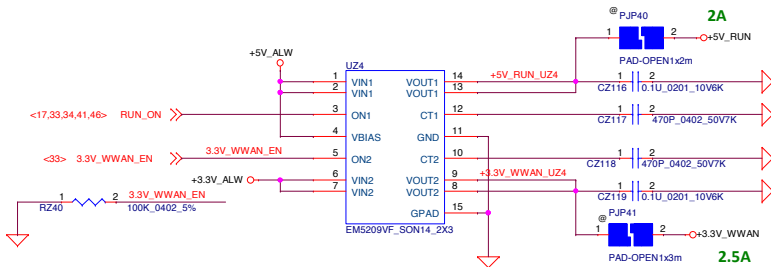
+1.8V_RUN source



+3.3V_ALW_PCH/+3.3V_RUN source



+5V_RUN/+3.3V_WWAN source



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Power control

LA-E121P

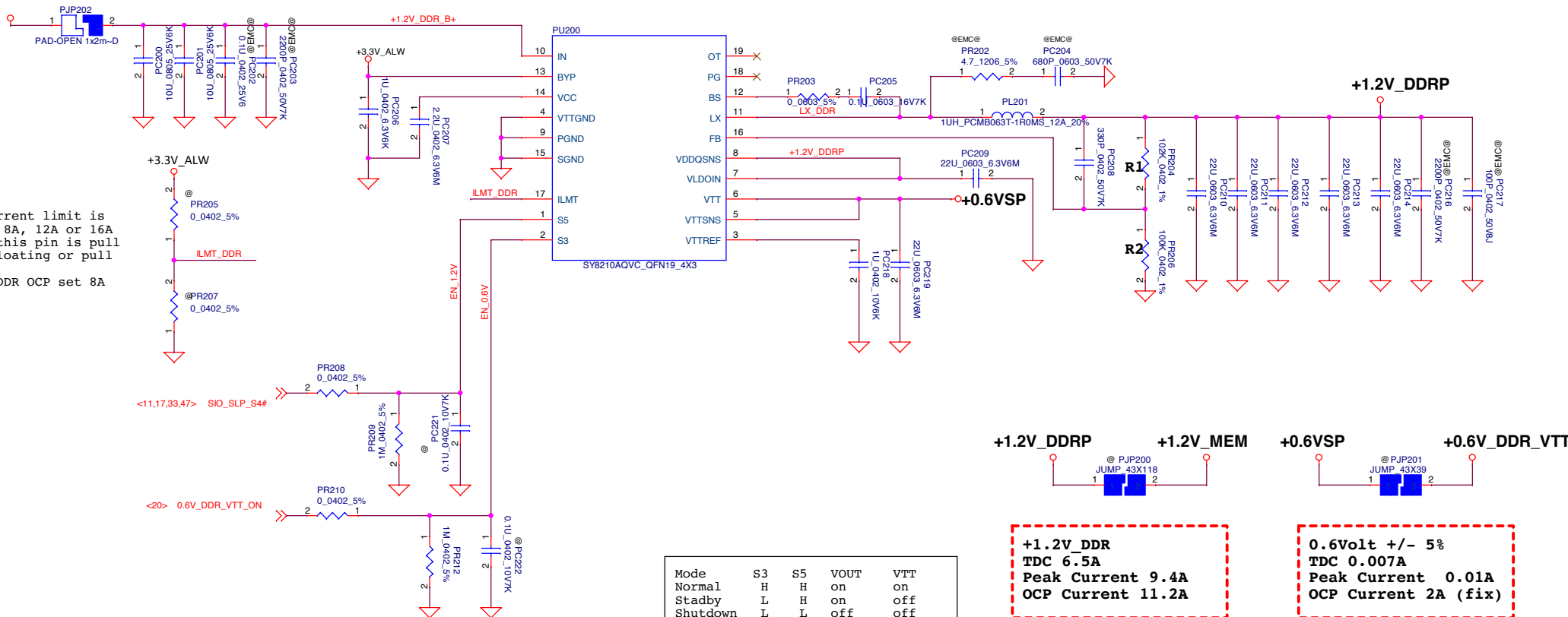


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+PWR_SRC



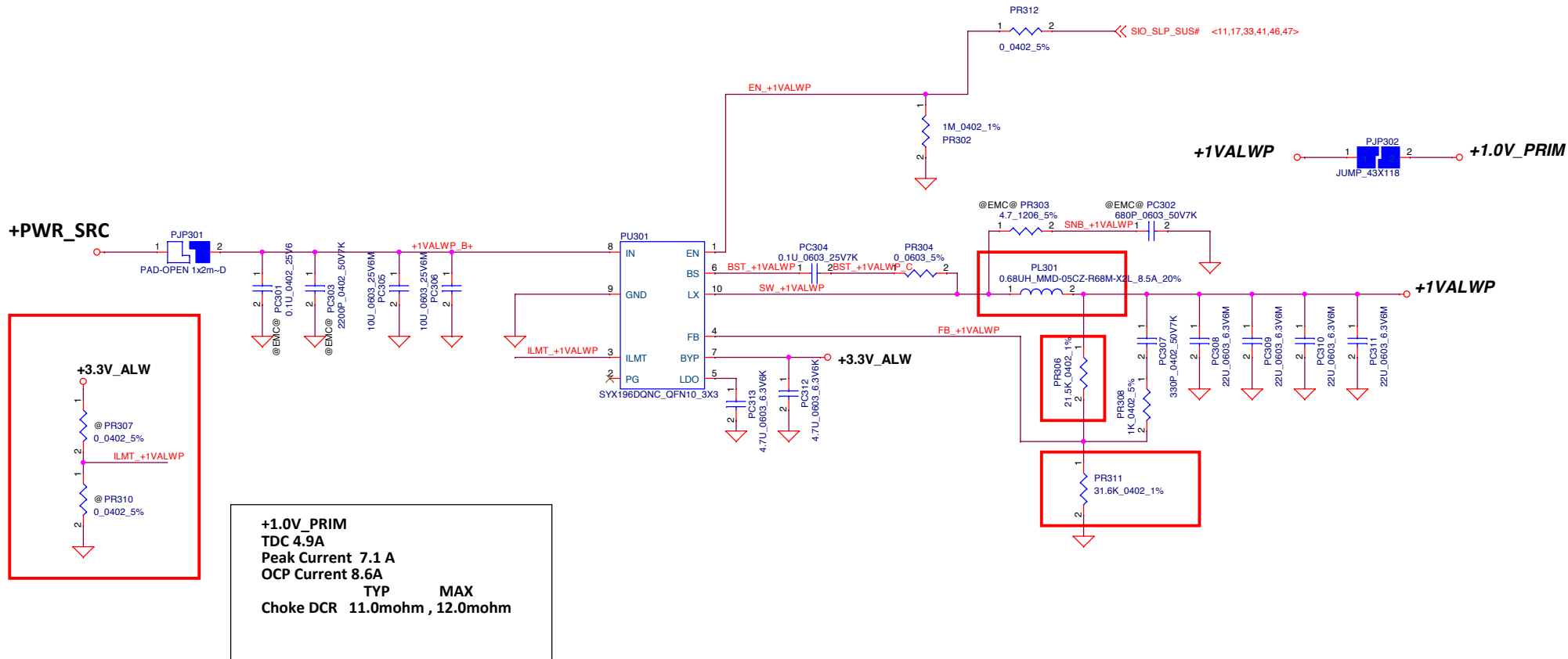
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+1.2V_MEN/+0.6V_DDR_VTT

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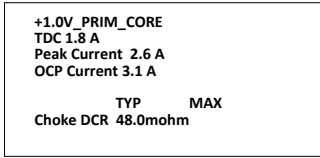
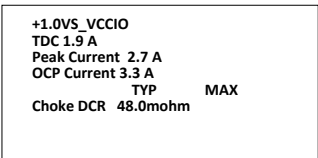
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Title				
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Local sense put on HW site

+1.0V_VCCST

VCC_SA
TDC 4 A
Peak Current 4.5A
OCP current 5.4A
Choke DCR 13 m ohm

VCCSA_B+ CPU_B+
PAD-OPEN1x1m

VCCSA_B+

+3.3V_RUN

+5V_ALW

+5V_ALW

+5V_ALW

+VCC_SA

Local sense put on HW site

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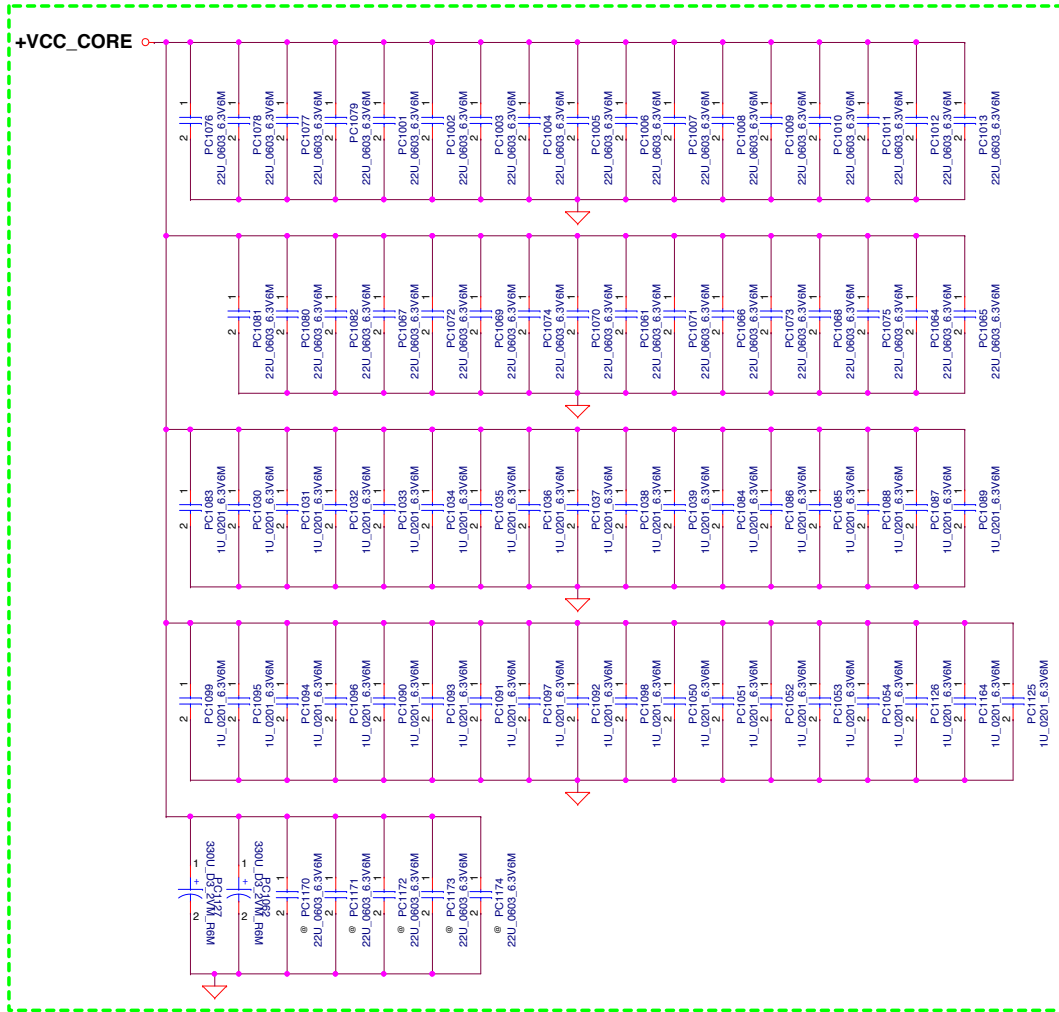
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PWR_VCORE_ISL95857

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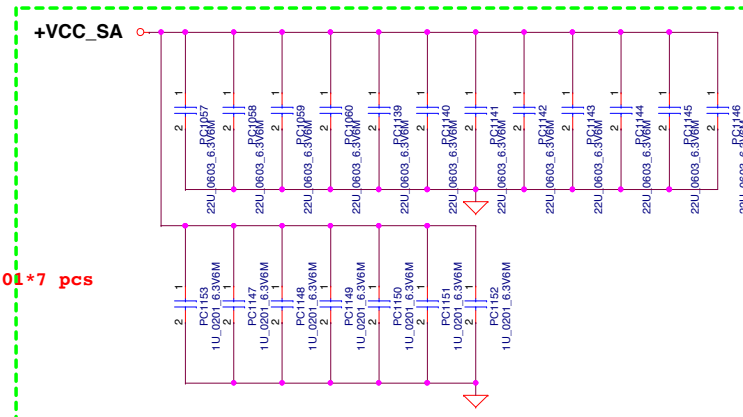
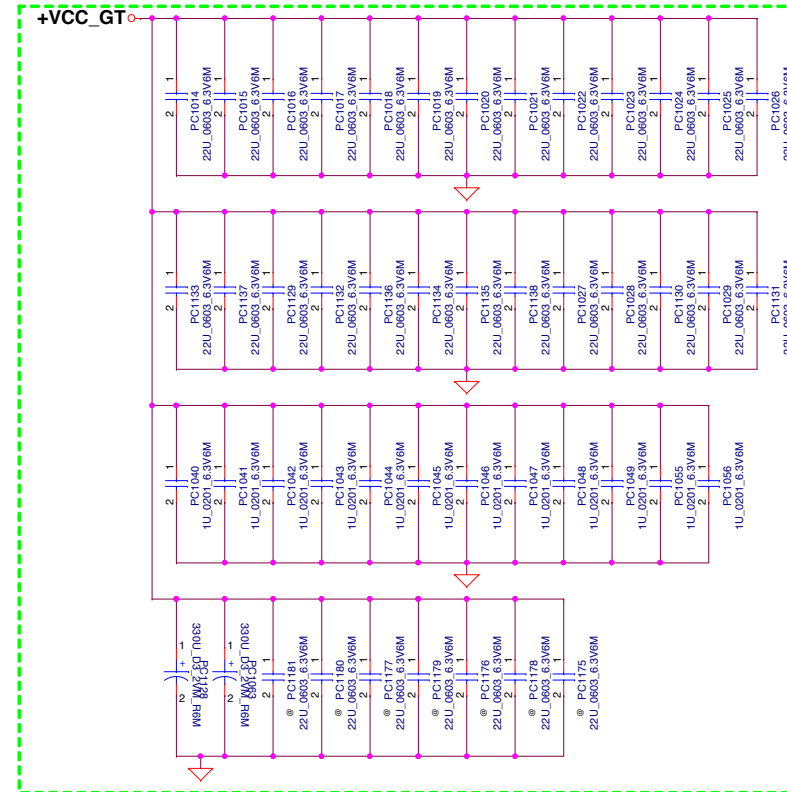
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VCC_CORE Place on CPU
22U_0603 * 33 pcs +1U_0201*35 pcs
+330u_D2*2 pcs



VCC_SA Place on CPU
22U_0603 * 12 pcs + 1U_0201*7 pcs

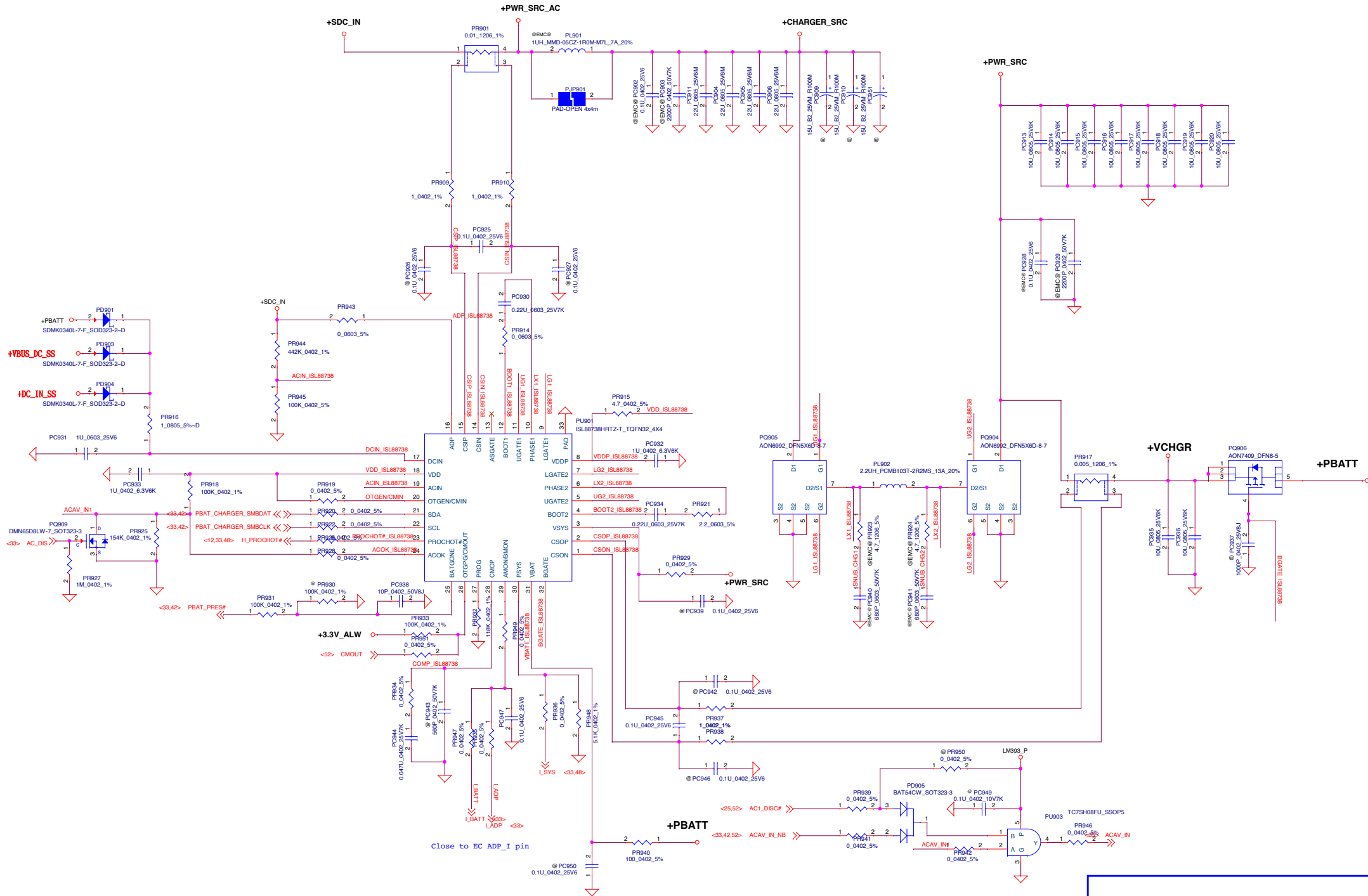
VCC_GT Place on CPU (U22)
22U_0603 * 26 pcs +1U_0201*12 pcs
+330u_D2*2 pcs



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