

Compal Confidential

Intel M/B Schematics Document

Kabylake-U(2+2)-DDR4 SODIMMx2 (1.2mm_6L)

~~nVidia N16 gDDR5-2GB~~

~~(N16S-67R GM108-679/779 GeForce MX130)~~

~~(N16U-6WR1 GM108-625/725 GeForce MX10)~~

Date :2018-01-08

Version :v0.3

Project :20180PP_Harry Potter(15.6")

EPK50 :LA-G07DP

(EPK52 :LA-G07EP=>v0.2 for PV)

~~(EPK50 :KBLU_2G:LA-G07AP)~~

~~(EPK52 :KBLR_2G:LA-G07BP)~~

~~(EPK52 :KBLR_2G:LA-G07CP)~~

(EPK50 :KBLU:LA-G07DP)

(EPK52 :KBLR:LA-G07EP)

DIS

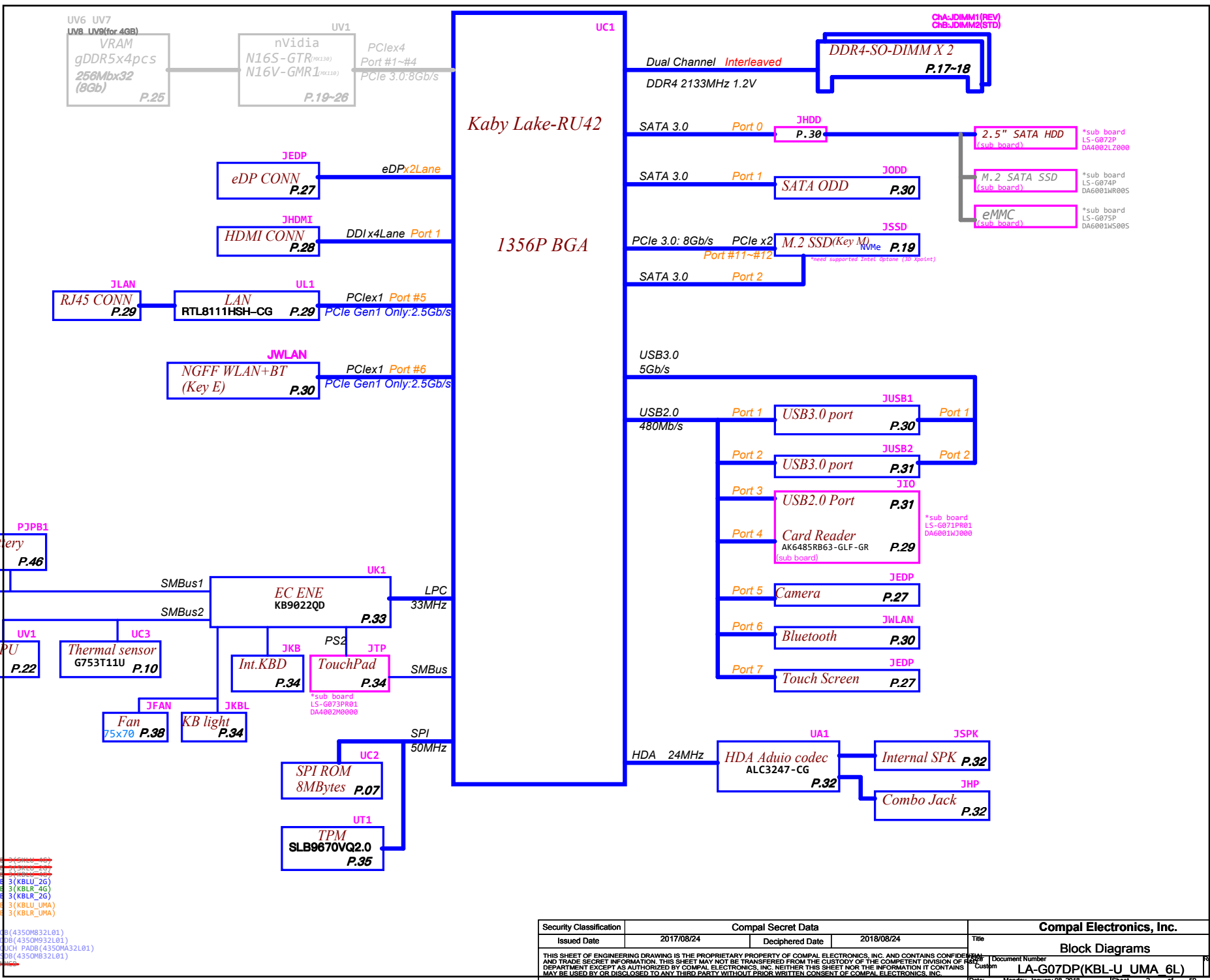
UMA

(Modified&Ref from: 01. "NFLC_KBLR_LAE802PR10_MV_FINAL")

(02. "Canadiens_LA-F035P-R10_KBL-UR_2017-06-23_CPU")

(02. "CNL-U ORB_DDX02_LA-F152PR01_0822B")

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Issued Date	2015/10/22	Deciphered Date	2017/10/22	Title	Cover Page	
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				Date	Monday, January 08, 2018	Sheet 1 of 59



MB Board Information:
01.DA6001W000, PCB 29M LA-G071P REV0 ME 3(KBLU_26)
02.DA6001W000, PCB 29M LA-G072P REV0 ME 3(KBLU_26)
03.DA6001W000, PCB 29M LA-G073P REV0 ME 3(KBLU_26)
04.DA6001W000, PCB 29M LA-G074P REV0 ME 3(KBLU_26)
05.DA8001E1000, PCB 29L LA-G078P REV0 ME 3(KBLR_4G)
06.DA6001W1000, PCB 29L LA-G07CP REV0 ME 3(KBLR_2G)
07.DA6001Y0000, PCB 29M LA-G07DP REV0 ME 3(KBLU_UMA)
08.DA6001Y0000, PCB 29L LA-G07EP REV0 ME 3(KBLR_UMA)

Sub Board Information:(EPK52)
01.DA6001W000, PCB 29L LA-G071P REV0 ME 3(KBLU_26)
02.DA6001W000, PCB 29L LA-G072P REV0 ME 3(KBLU_26)
03.DA6001W000, PCB 29L LA-G073P REV0 ME 3(KBLU_26)
04.DA6001W000, PCB 29L LA-G074P REV0 ME 3(KBLU_26)
05.DA6001W000, PCB 29L LA-G075P REV0 ME 3(KBLU_26)
06.DA6001W000, PCB 29L LA-G076P REV0 ME 3(KBLU_26)
07.DA6001W000, PCB 29L LA-G077P REV0 ME 3(KBLU_26)
08.DA6001W000, PCB 29L LA-G078P REV0 ME 3(KBLU_26)

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Power rail	Control (EC)	Source (CPLI)
+RTCVCC	X	X
VIN	X	X
BATT+	X	X
B+	X	X
+VL	X	X
+3VL	X	X
+5VALW	EC_ON	X
+3VALW	EC_ON	X
+3VALW_EC	EC_ON	X
+3V_PCH	PCH_PWR_EN	X
+1.2V_VDDQ	SYSON	PM_SLP_S5#/PM_SLP_S4#
+5VS	SUSP#	PM_SLP_S3#
+3VS	SUSP#	PM_SLP_S3#
+1.5VS	SUSP#	PM_SLP_S3#
+1.05VS	SUSP#	PM_SLP_S3#
+0.6V_0.6VS	SUSP#	
+VCC_CORE	X	VR2.5_VR_ON

SOC SMBUS Address Table

SOC_SMBUS Net Name	Power Rail	Device	Address (7 bit)		Address (8bit)	
			Write	Read		
SMBCLK SMBDATA	+3V_PRIM	DIMM1	0x50	0xA0	0xA1	
		DIMM2	0x52	0xA4	0xA5	
		Touch PAD	0x2C	0x58	0x59	

EC SMBUS Address Table (TBC)

EC_SMBUS Port	Power Rail	Device	Address (7 bit)
SMBUS Port 1	+3VL_EC	BAT	0x16
		CHGR	0x12
SMBUS Port 2	+3VS	dGPU	
		Thermal Sensor	0x90
		PCH	

BOM Structure Table (1/2)

Function	Stuff	Un-Stuff
DGPU SKU	PX@	
UMA SKU	UMA@	
TPM	TPM@	

Power State

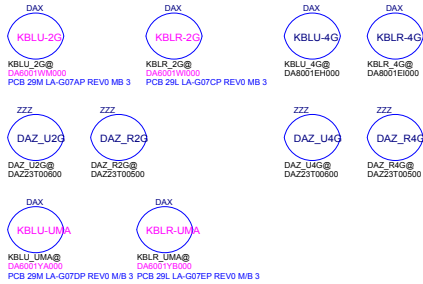
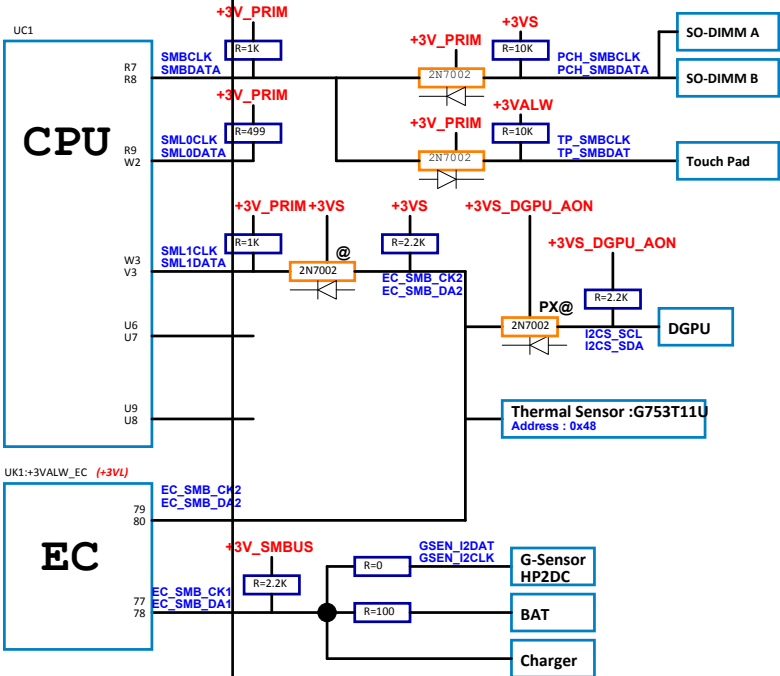
STATE	SIGNAL	SLP_S3#	SLP_S4#	SLP_S5#	+VALW	+V	+VS	Clock
S0 (Full ON)		HIGH	HIGH	HIGH	ON	ON	ON	ON
S3 (Suspend to RAM)		LOW	HIGH	HIGH	ON	ON	OFF	OFF
S4 (Suspend to Disk)		LOW	LOW	HIGH	ON	OFF	OFF	OFF
S5 (Soft OFF)		LOW	LOW	LOW	ON	OFF	OFF	OFF

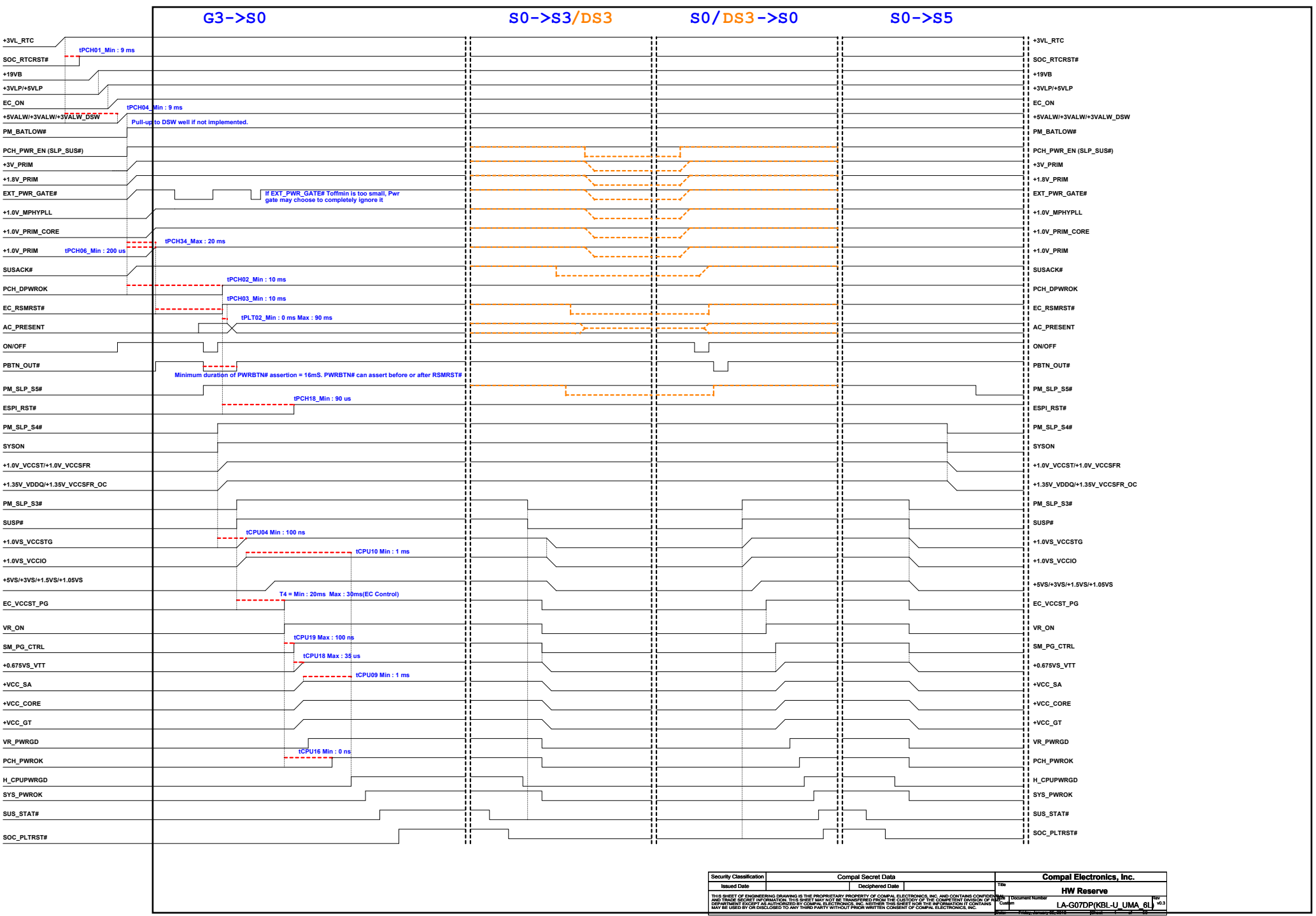
<USB2.0 port>

USB2.0 port	DESTINATION
1	USB3.0 Type-C
2	USB2.0/USB3.0
3	USB2.0/USB3.0
4	BT
5	HD/IR 1/IR 2 Camera
6	IR 2 Camera
7	Card Reader
8	X
9	X
10	X

<PCI-E,SATA,USB3.0/CLK>

Lane#	PCI-E	SATA	USB3.0	DESTINATION	CLK
1			1	USB3.0 Type-C	X
2			2	USB3.0 Type-C	X
3			3	USB2.0/USB3.0	X
4			4	USB2.0/USB3.0	X
5	1		5	GPU(DIS only)	CLK0
6	2		6	GPU(DIS only)	
7	3			GPU(DIS only)	
8	4			GPU(DIS only)	
9	5			LAN	CLK1
10	6			WLAN	CLK2
11	7	0		HDD	X
12	8	1a		ODD	CLK3
13	9			X	X
14	10			X	X
15	11	1b+		X	CLK4
16	12	2		NVMe x2	X
				SATA SSD	X



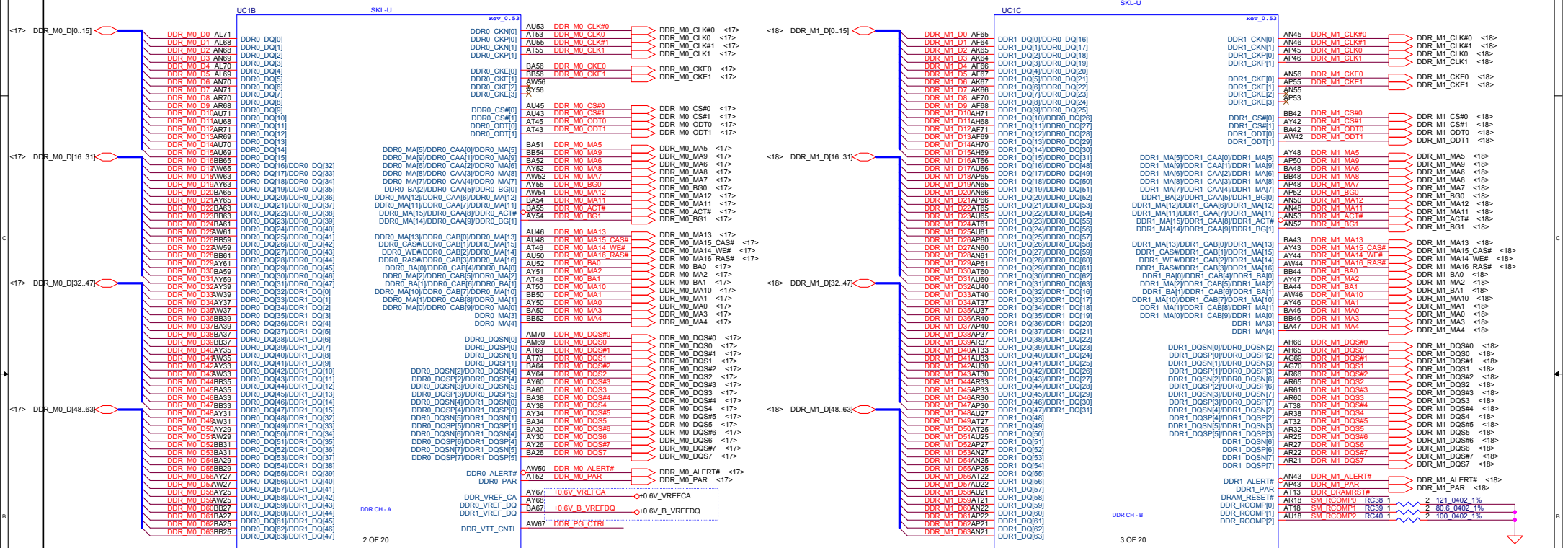


Interleaved Memory

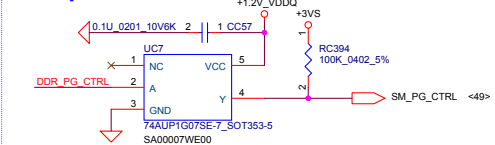
Interleaved Memory

<Cocoa 1020>

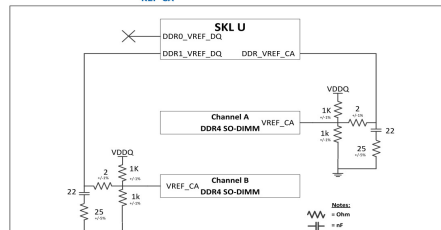
PDG#543016, ODT: CPU side no connect, DRAM side connect to VDDQ(Memory down); FET+R(SO-DIMM)



For VTT power control



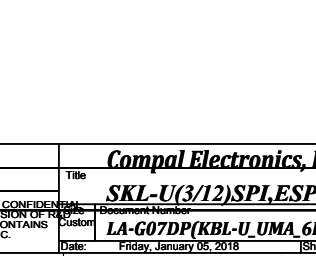
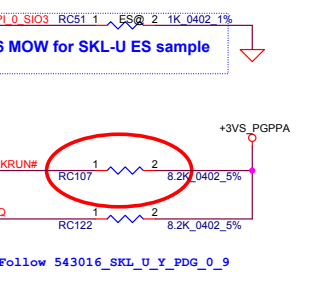
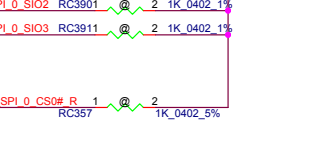
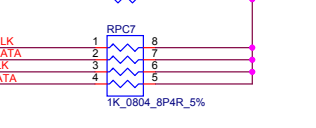
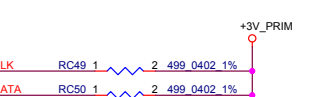
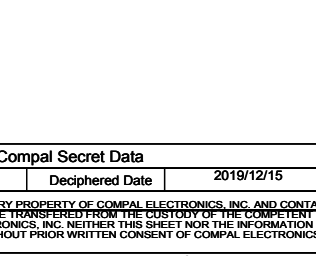
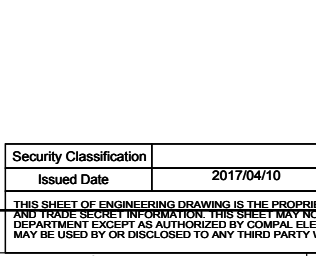
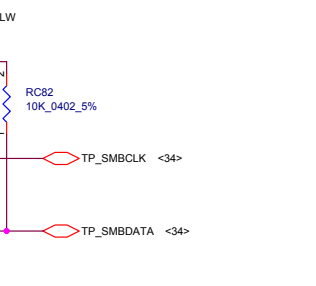
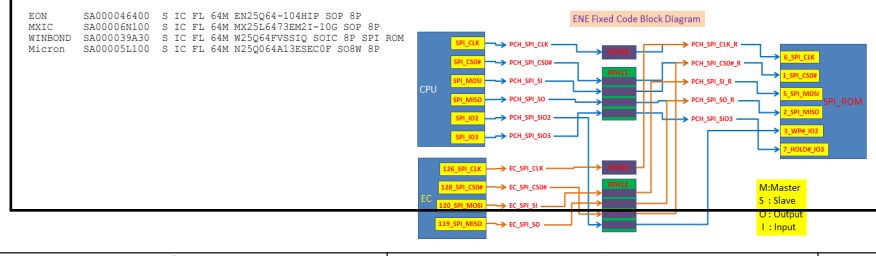
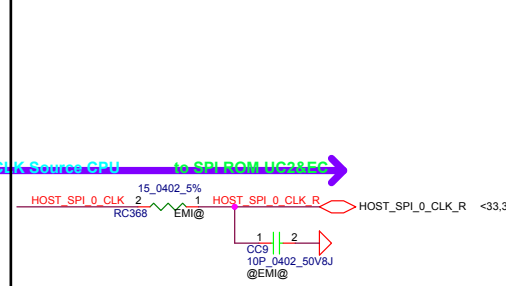
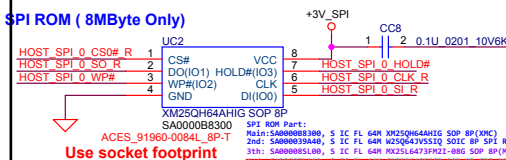
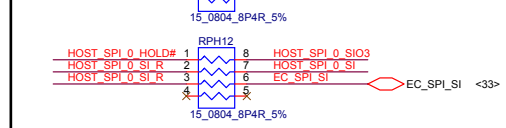
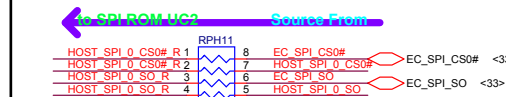
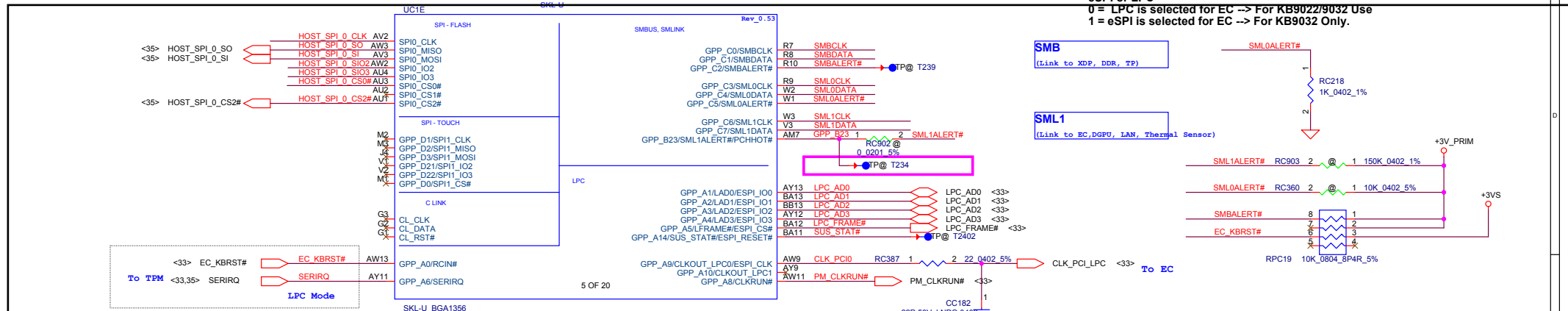
SKL U DDR4 SODIMM VREF-CA Overview



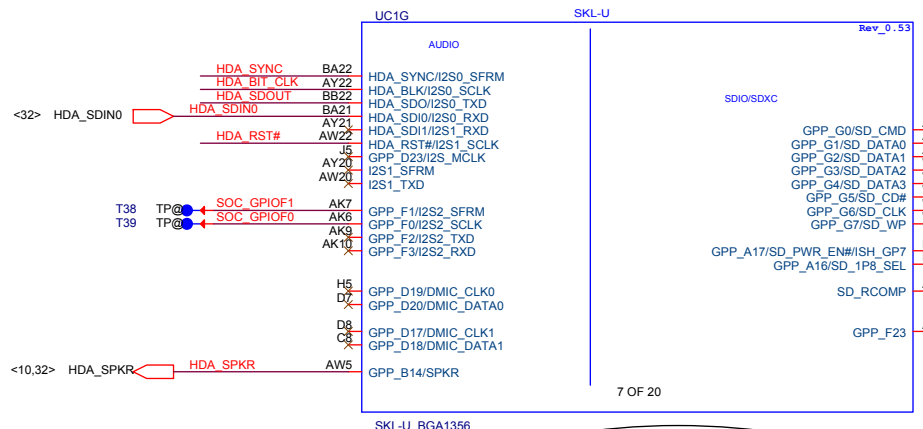
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SML0ALERT# (Internal Pull Down):
eSPI or LPC

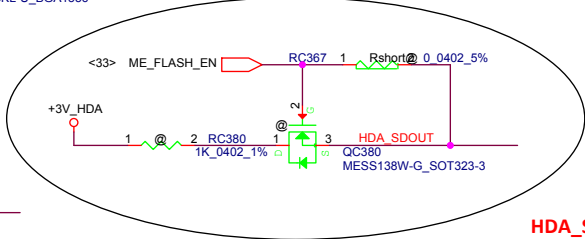
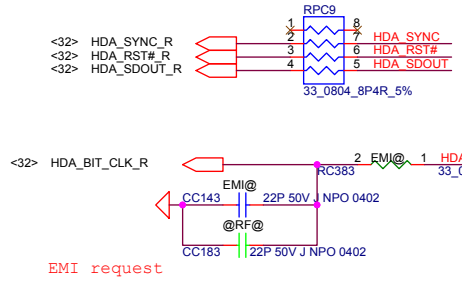
0 = LPC is selected for EC --> For KB9022/9032 Use
1 = eSPI is selected for EC --> For KB9032 Only.



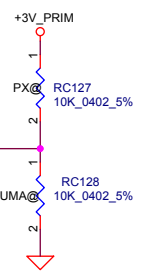
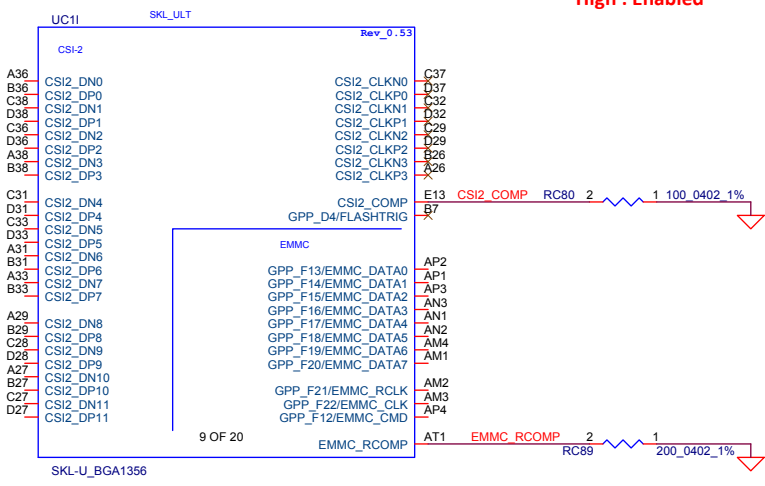
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Title		SKL-U(3/12)SPI,ESPI,SMB,LPC
Customer		LA-G07DP(KBL-U_UMA_6L)
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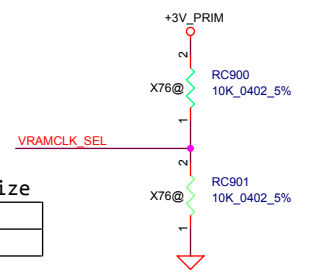
HDA for AUDIO



HDA_SDOUT:
ME Flash Descriptor Security Override
Low : Disabled(Default)
High : Enabled

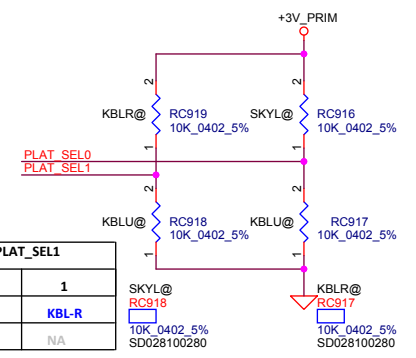


PROJECT_ID	UMA	DIS
0	0	1
VRAM Clock	2G VRAM	4G VRAM
0	0	1

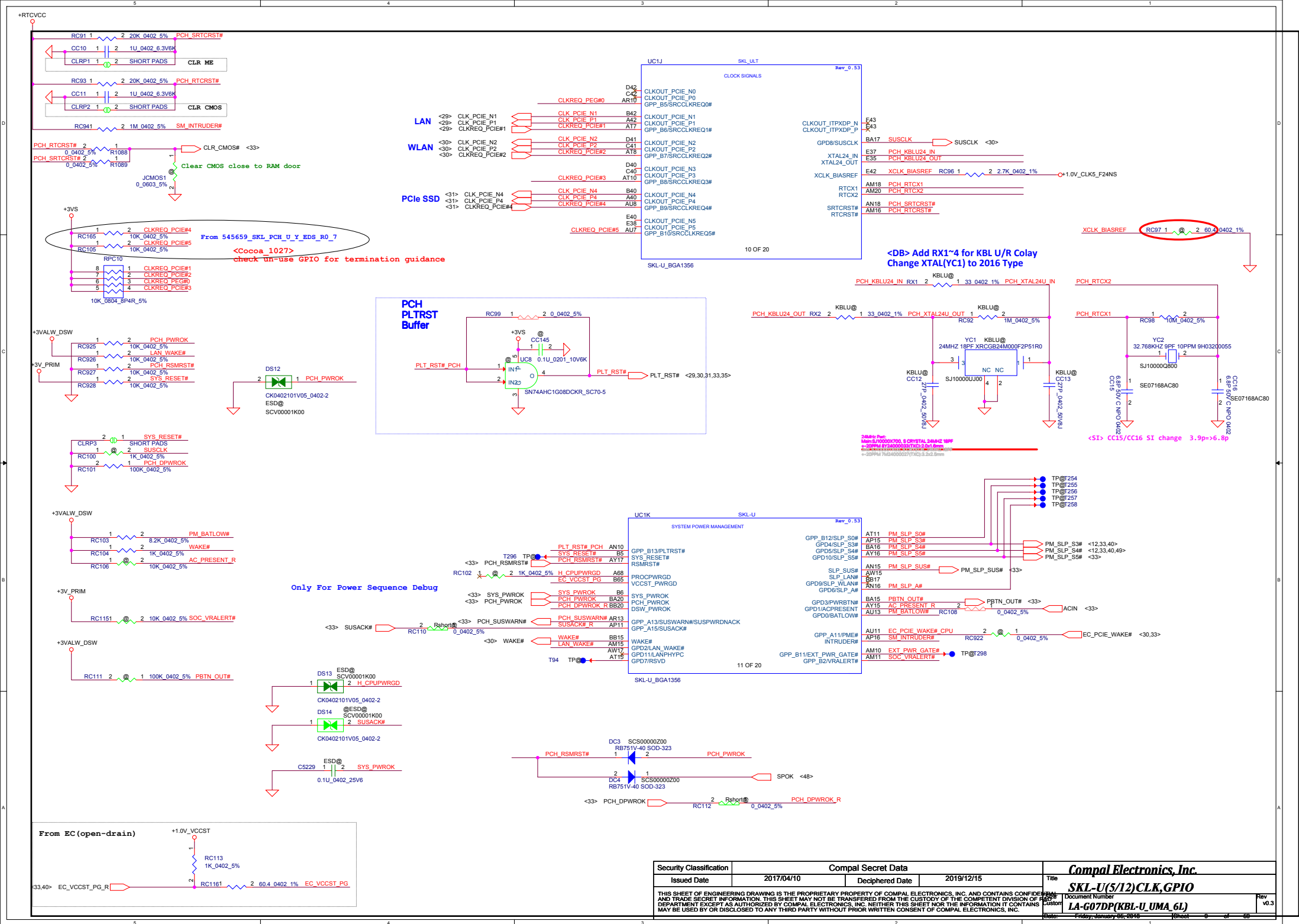


X76 BOM control RAM size

Net Name	4G	2G
VRAMCLK_SEL	1	0



		PLAT_SEL1	
		0	1
PLAT_SEL0	0	KBL-U	KBL-R
	1	SKL-U	NA



Functional Strap Definitions

SPKR (Internal Pull Down):

TOP Swap Override

0 = Disable TOP Swap mode.----> AAX05 Use

1 = Enable TOP Swap Mode.

GSPI0_MOSI (Internal Pull Down):

No Reboot

0 = Disable No Reboot mode. --> AAX05 Use

1 = Enable No Reboot Mode. (PCH will disable the TCO Timer system reboot feature). This function is useful when running ITP/XDP.

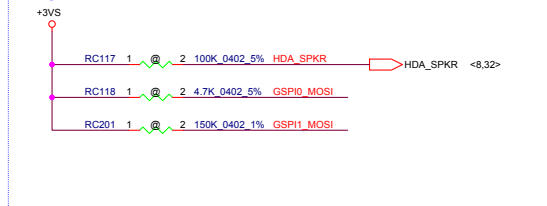
GSPI1_MOSI (Internal Pull Down):

Boot BIOS Strap Bit

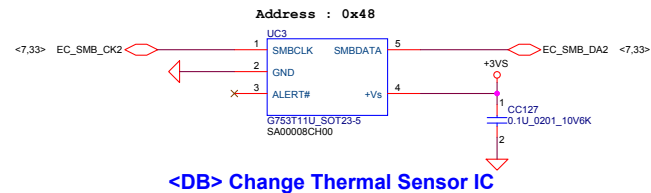
0 = SPI Mode --> AAX05 Use

1 = LPC Mode

Strap Pin



CPU THERMAL SENSOR



<DB> Change Thermal Sensor IC

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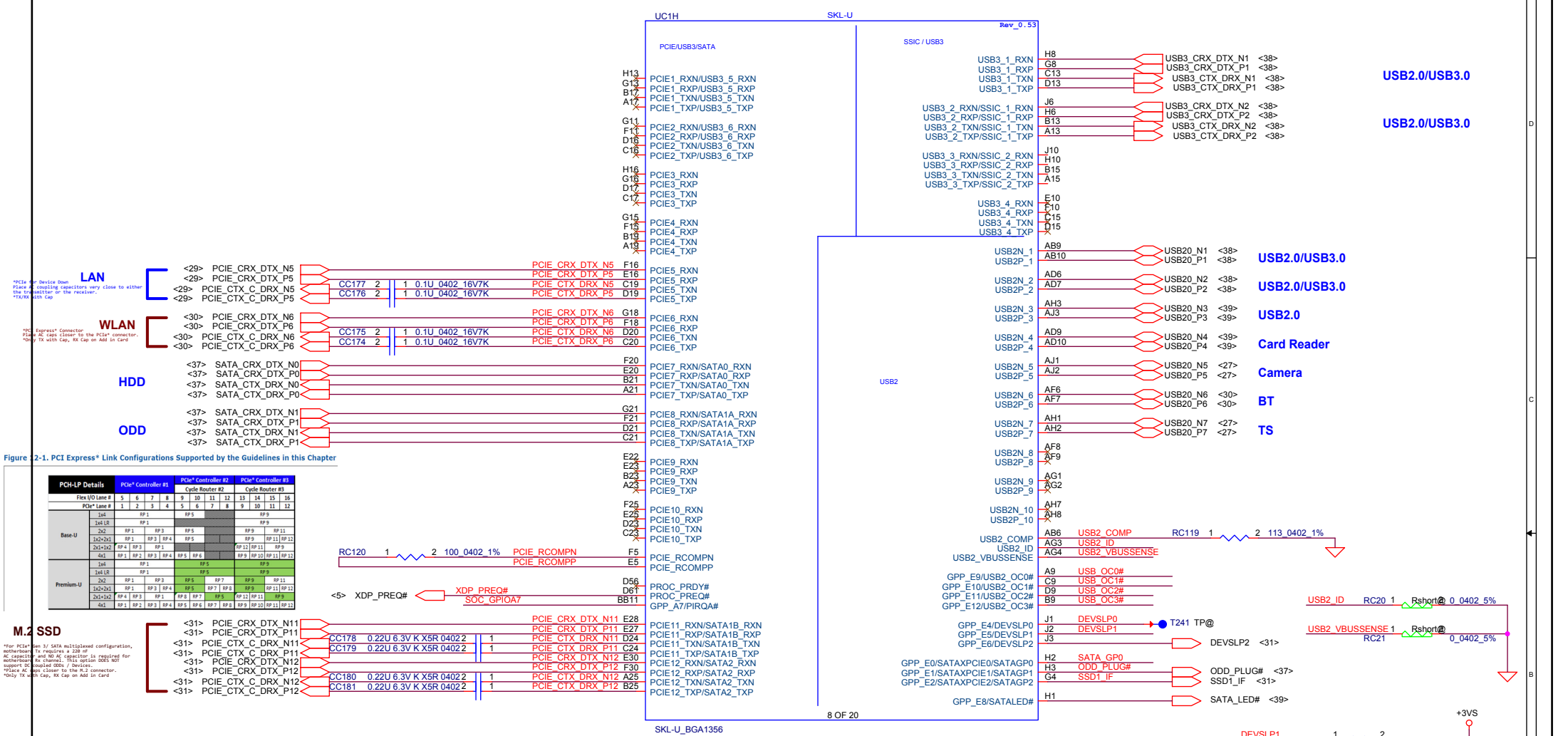
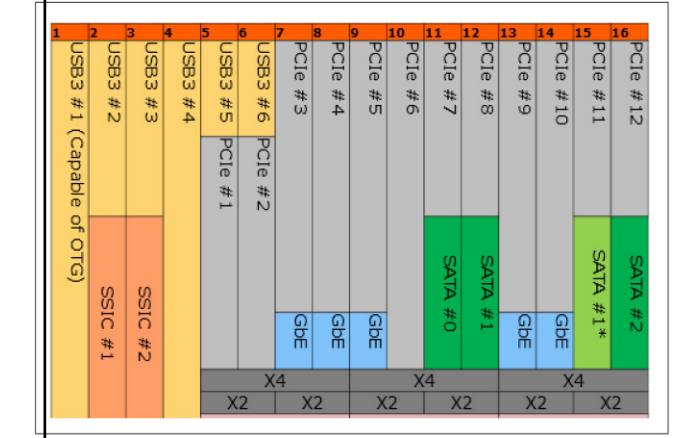


Figure 2-1. PCI Express® Link Configurations Supported by the Guidelines in this Chapter

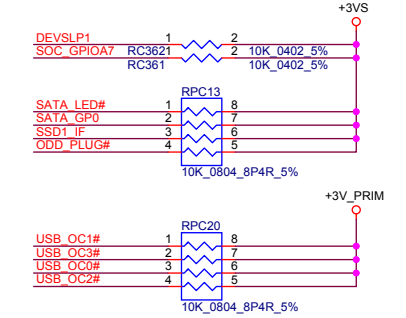
*For PCIe Gen 3 / SATA multiplexed configuration, motherboard requires a 220pF AC capacitor and NO AC capacitor is required for motherboard (as claimed). This option DOES NOT support ODDs / Devices.
*Place AC cap closer to the PCIe connector.
*Only 1x with Cap, RX Cap on Add in Card

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

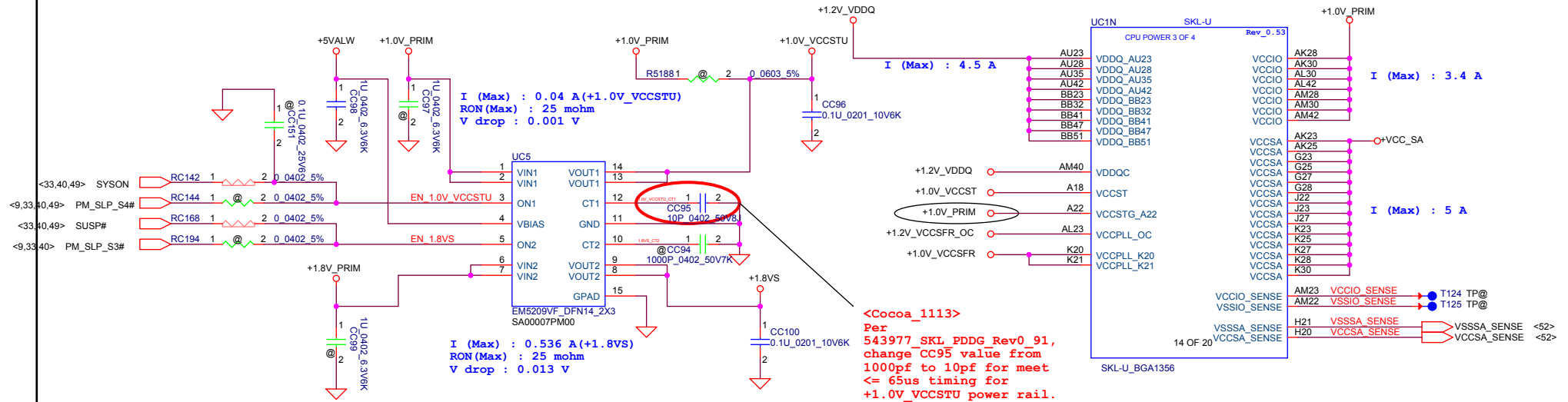


When PCIE8/SATA1A is used as SATA Port 1 (ODD), then PCIE11/SATA1B (M.2 SSD) cannot be used as SATA Port 1.

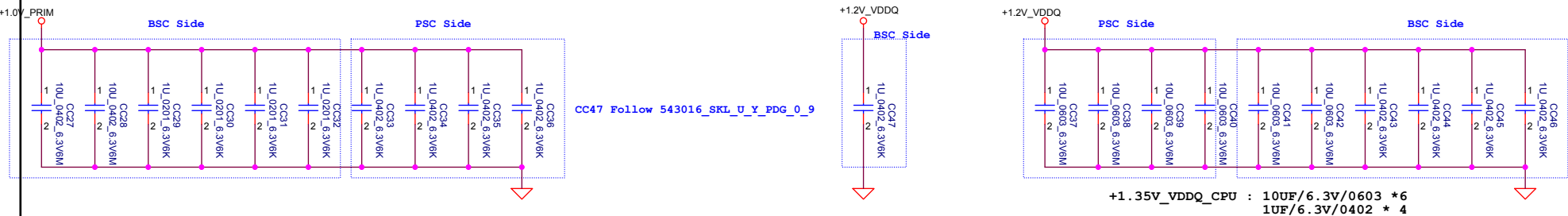
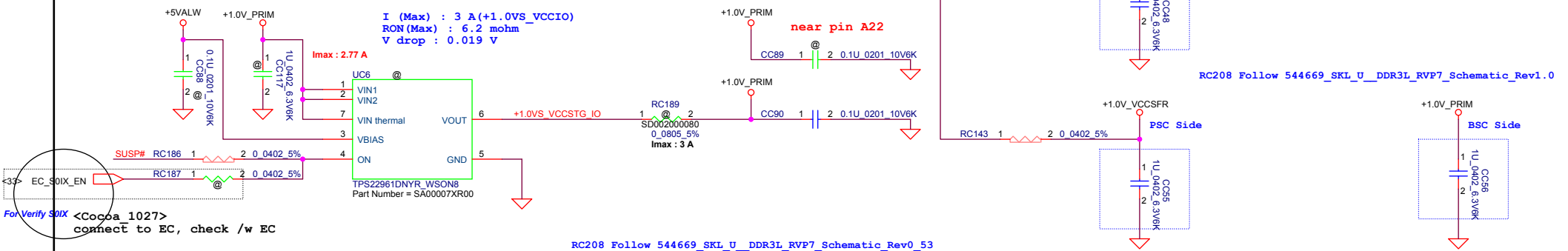
GPIO	DEVICE CONTROL
USB_OC0#	USB2 Port 1 and Port 2
USB_OC1#	USB2 Port 3
USB_OC2#	N/A
USB_OC3#	N/A
DEVSLP0	N/A
DEVSLP1	N/A
DEVSLP2	NGFF SSD KEY- M
SATA_GP0	N/A
SATA_GP1	ODD_PLUG#
SATA_GP2	PCIE/SATA



~~+1.0V_PRIM TO +1.0V_VCCSTU~~



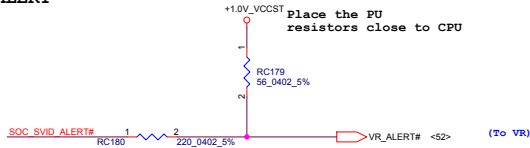
+1.0V_PRIM TO +1.0VS_VCCSTG / +1.0VS_VCCIO



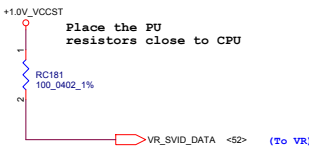
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Issued Date	2017/04/10	Deciphered Date	2019/12/15	Title	SKL-U(8/12)Power	
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For CPU2+3e SKU

SVID ALERT



SVID DATA



JU42A/JU42B for KBLR JU221 for KBLU

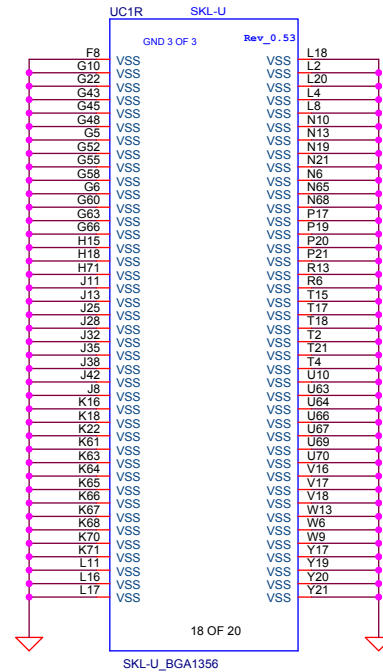
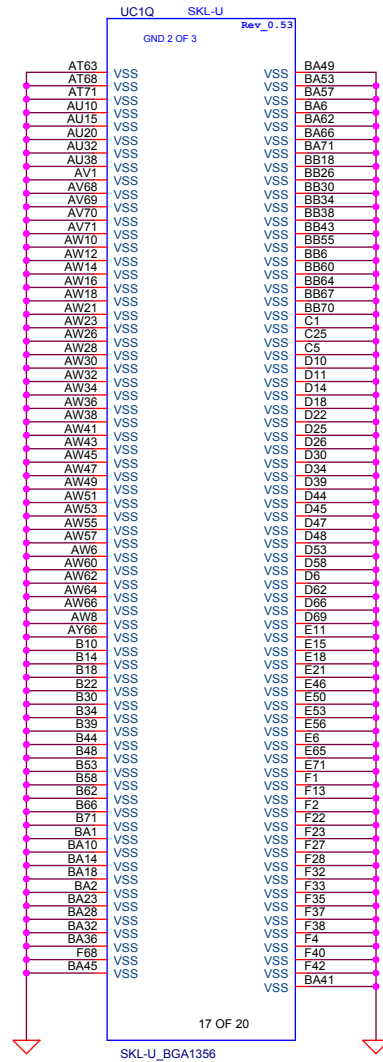
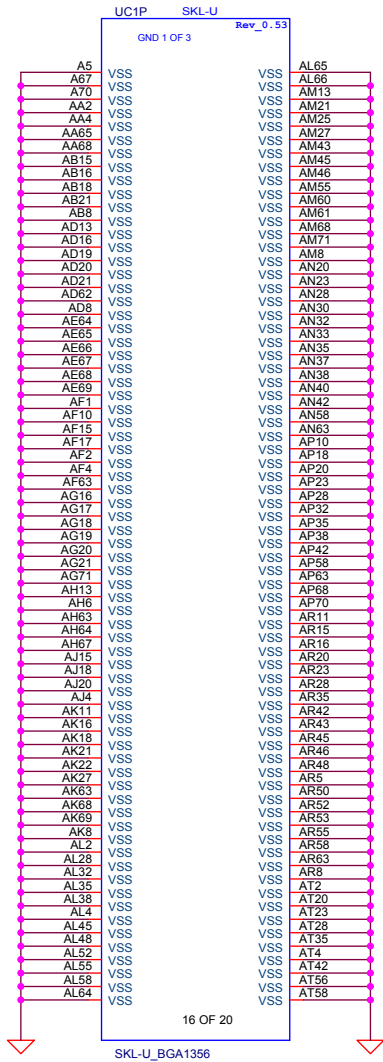
Trace Length < 25 mils

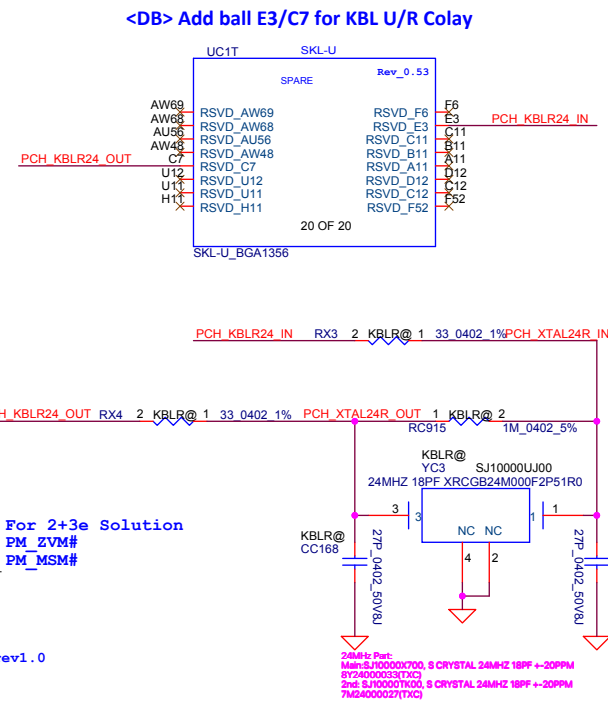
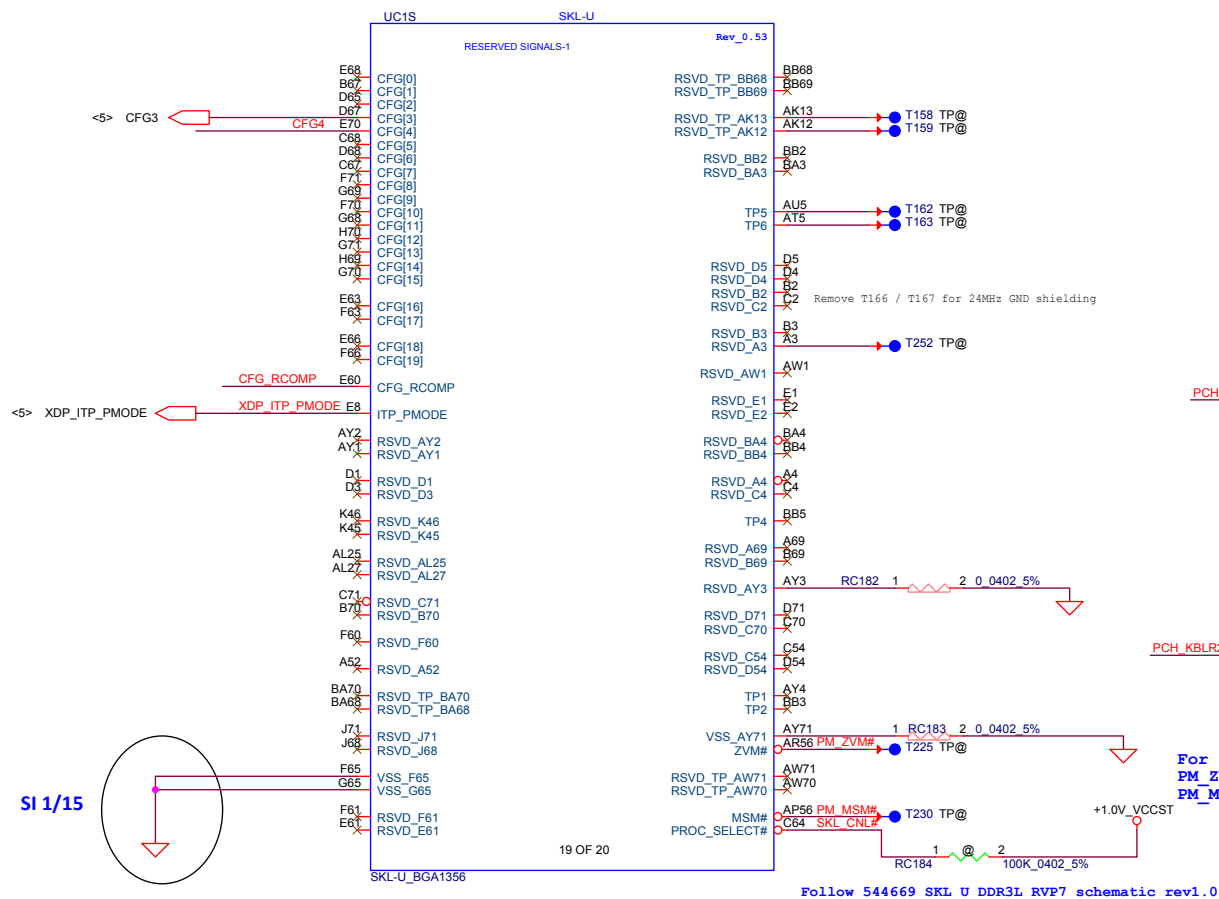
SOC PINS K52 AND AK52
SHOULD BE LEFT UNCONNECTED
FOR KBL R U42 DESIGNS

Trace Length < 25 mils

Ball #	Ball Names R-U42	Ball Names U22	R-U42/U22 common board guidelines
C7	XTAL24_OUT	NC	connect to R-U42 XTAL24_OUT
E3	XTAL24_IN	NC	connect to R-U42 XTAL24_IN
E35	NC	XTAL24_OUT	connect to U22 XTAL24_OUT
E37	NC	XTAL24_IN	connect to U22 XTAL24_IN
AK42	VCCCORE	VccGTx	connect to VccGTx/VCCCORE power plane island
AK43	VCCCORE	VccGTx	
AK45	VCCCORE	VccGTx	
AK46	VCCCORE	VccGTx	
AK48	VCCCORE	VccGTx	
AK50	VCCCORE	VccGTx	
AL43	VCCCORE	VccGTx	
AL46	VCCCORE	VccGTx	
AL50	VCCCORE	VccGTx	
AM48	VCCCORE	VccGTx	
AM50	VCCCORE	VccGTx	connect to VccGTx/VCCCORE power plane island
AM52	VCCCORE	VccGTx	
J43	VCCCGT	VCCGT	
J45	VCCCGT	VCCGT	
J46	VCCCGT	VCCGT	
J48	VCCCGT	VCCGT	
J50	VCCCGT	VCCGT	
J52	VCCCGT	VCCGT	
K48	VCCCGT	VCCGT	
K50	VCCCGT	VCCGT	
A48	VCCCGT	VCCGT	Must Not Be Connected. RVP use this signal for debug and testing purpose only.
A53	VCCCGT	VCCGT	
AK52	RSVD	VccGTx	
K52	RSVD	VCCGT	

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Display Port Presence Strap	
CFG4	1 : Disabled; No Physical Display Port attached to Embedded Display Port 0 : Enabled; An external Display Port device is connected to the Embedded Display Port

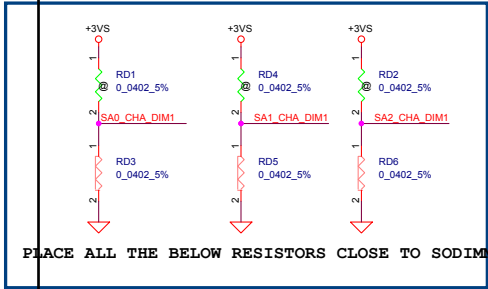
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CHANNEL-A

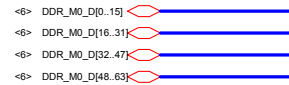
REVERSE TYPE

Interleaved Memory

TOP: JDIMM1 CONN Non-ECC DIMM



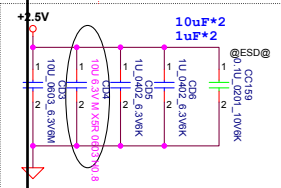
SPD ADDRESS FOR CHANNEL A :
WRITE ADDRESS: 0XA0
READ ADDRESS: 0XA1
SA0 = 0; SA1 = 0; SA2 = 0.
DDR4 POR OPERATING SPEED: 1867 MT/S
STRETCH GOAL IS 2133 MT/S



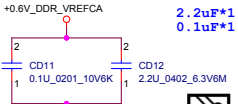
PLACE NEAR TO PIN

Layout Note:
Place near JDIMM1.257,259

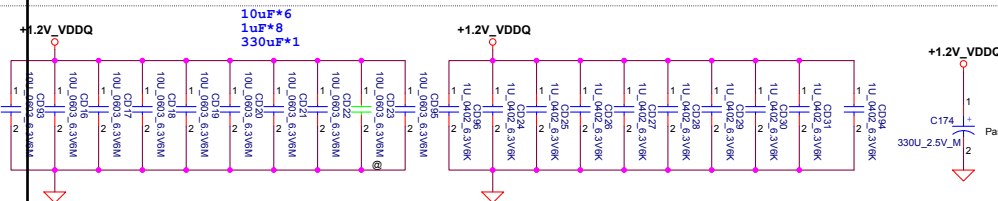
Layout Note:
Place near JDIMM1.258



Layout Note:
PLACE THE CAP near JDIMM1. 164

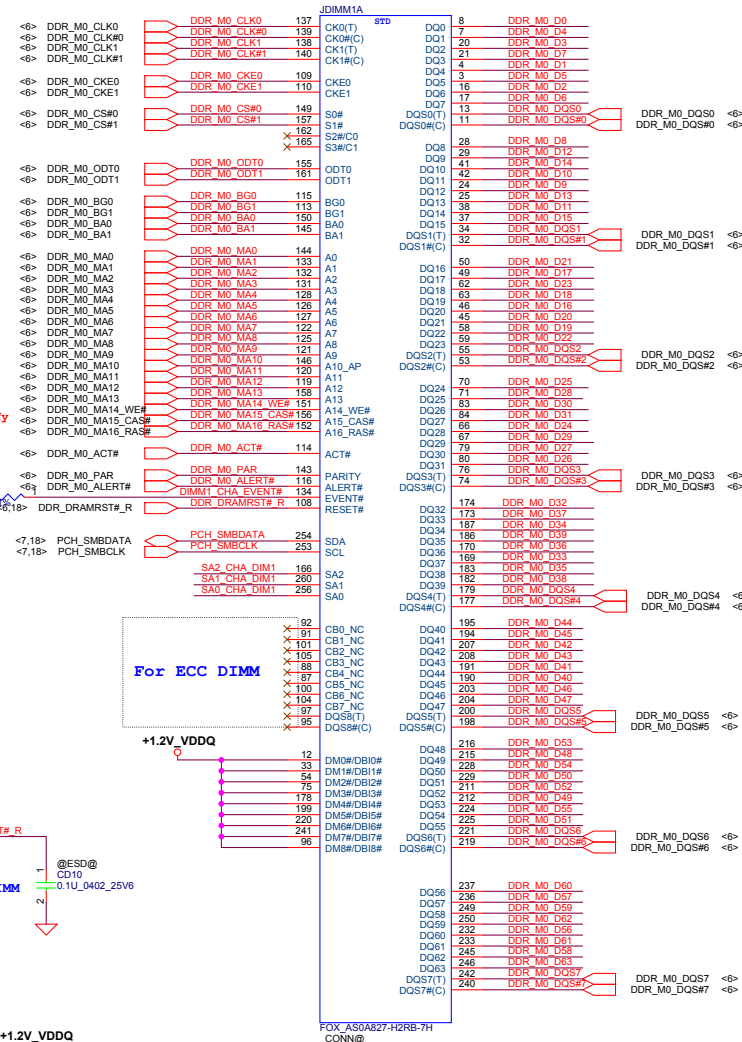


Layout Note:
Place near JDIMM1



Part Number:LTCX0069GA0
Part Value:S SOCKET FOX AS0A827-H2RB-7H 260P DDR4

PLACE NEAR TO SODIMM



For ECC DIMM

1.2V_VDDQ

DIMM Side

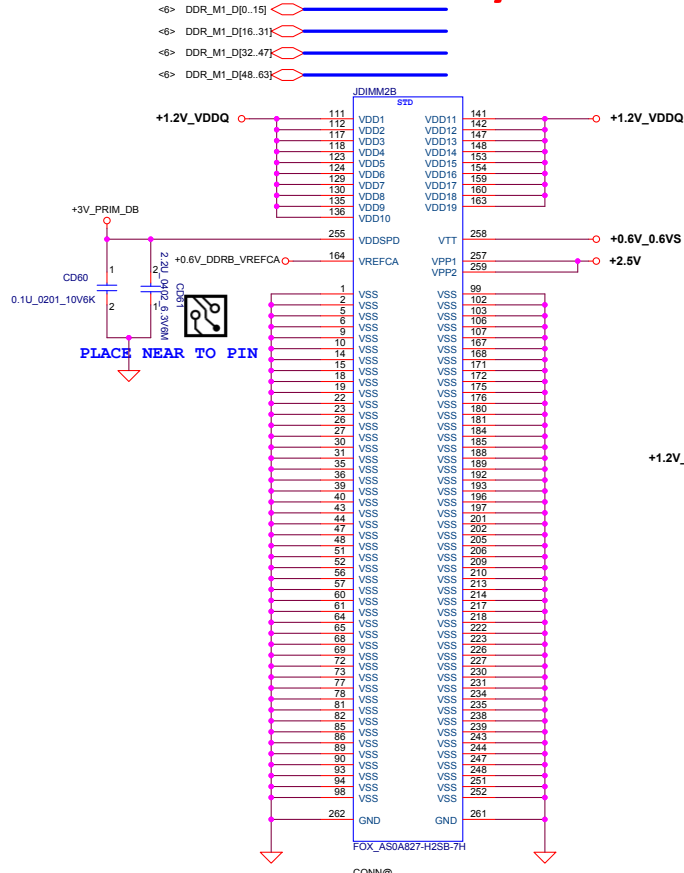
CPU Side

VREF traces should be at least 20 mils wide with 20 mils spacing to other signals

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STD (5.2 mm)

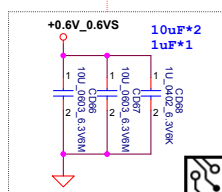
TOP: JDIMM2 CONN Non-ECC DIMM



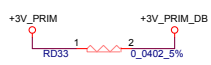
```
SPD ADDRESS FOR CHANNEL B :
WRITE ADDRESS: 0XA4
READ ADDRESS: 0XA3
SA0 = 0; SA1 = 1; SA2 = 0.
DDR4 POR OPERATING SPEED: 1867 MT/S
STRETCH GOAL IS 2133 MT/S
```

Layout Note:
Place near JDIMM2.257,259

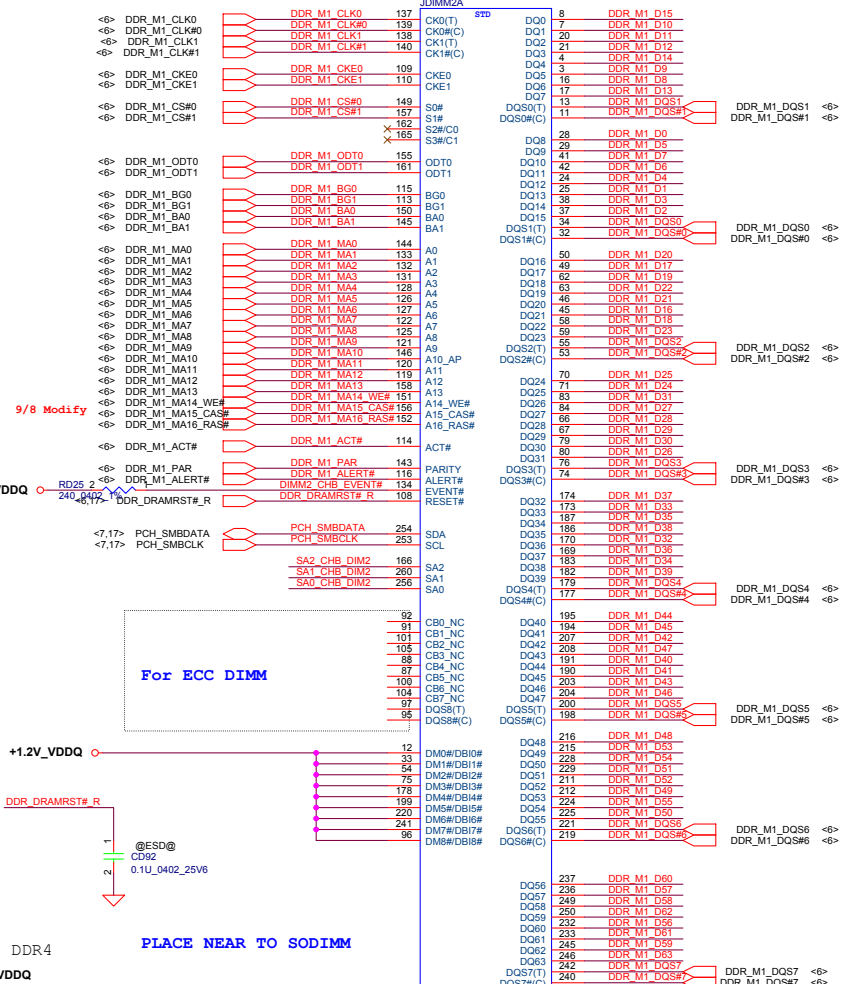
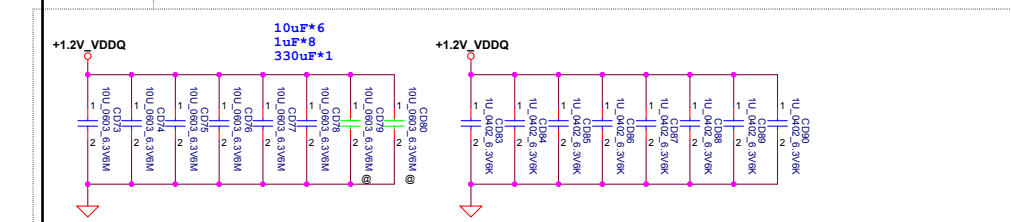
Layout Note:
Place near JDIMM2.258



Layout Note:
PLACE THE CAP WITHIN 200 MILS
FROM THE JDIMM2

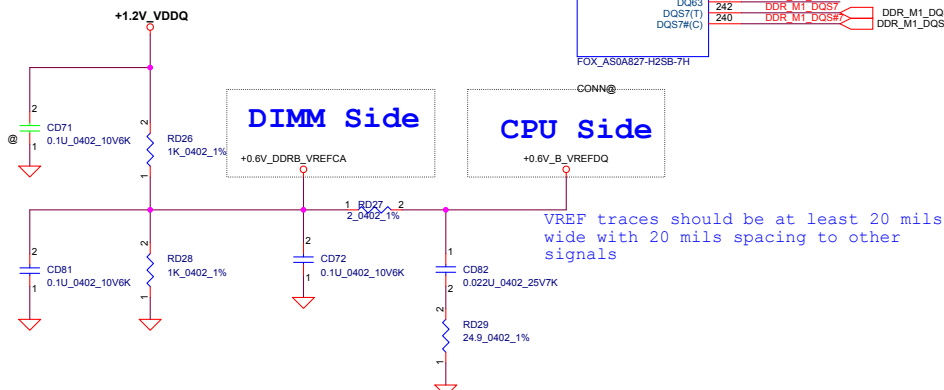


Layout Note:
Place near JDIMM2

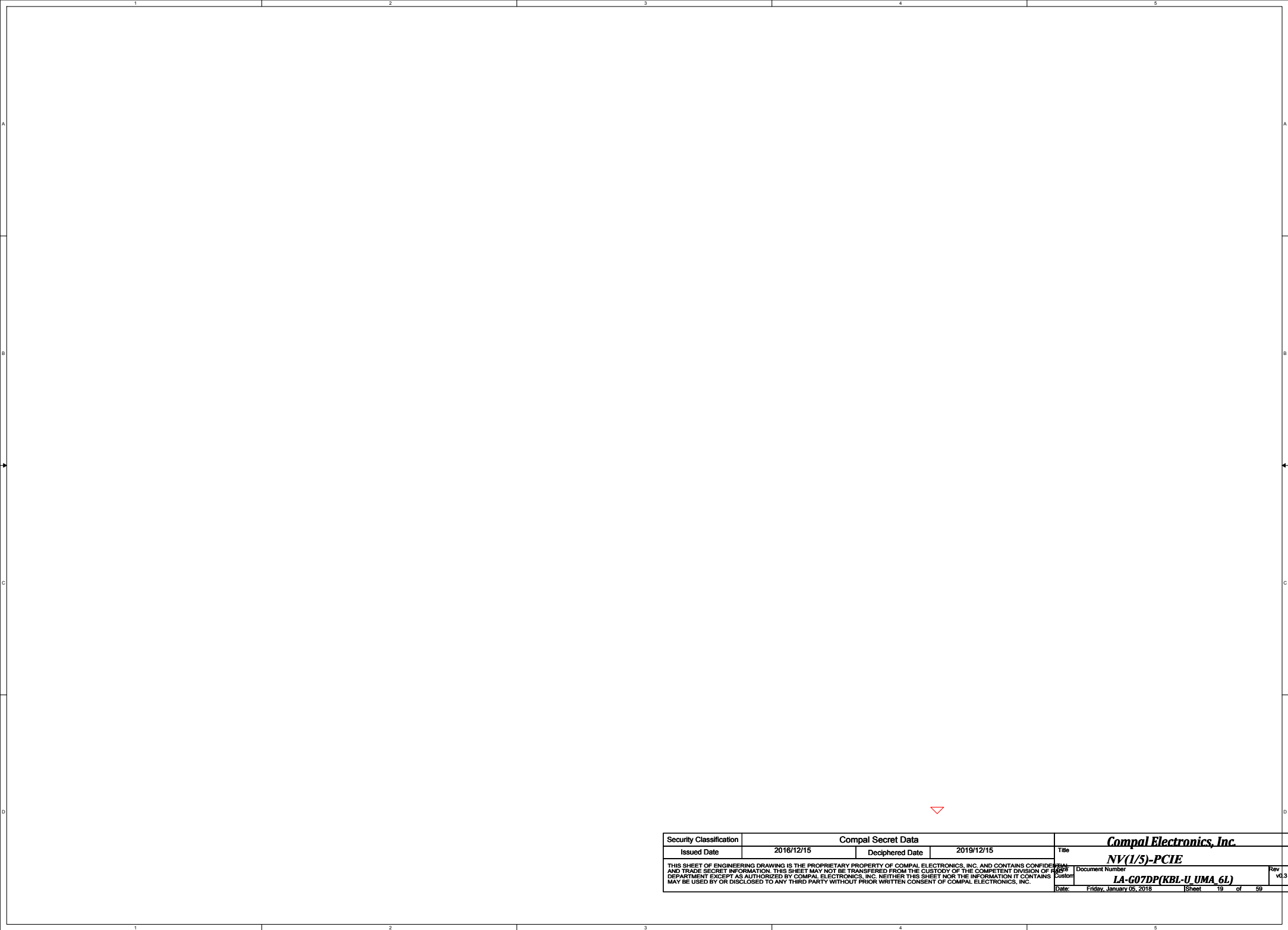


For ECC DIMM

PLACE NEAR TO SODIMM



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1	2	3	4	5
A				A
B				B
C				C
D				D

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Date: Friday, January 05, 2018			Sheet 22 of 88	

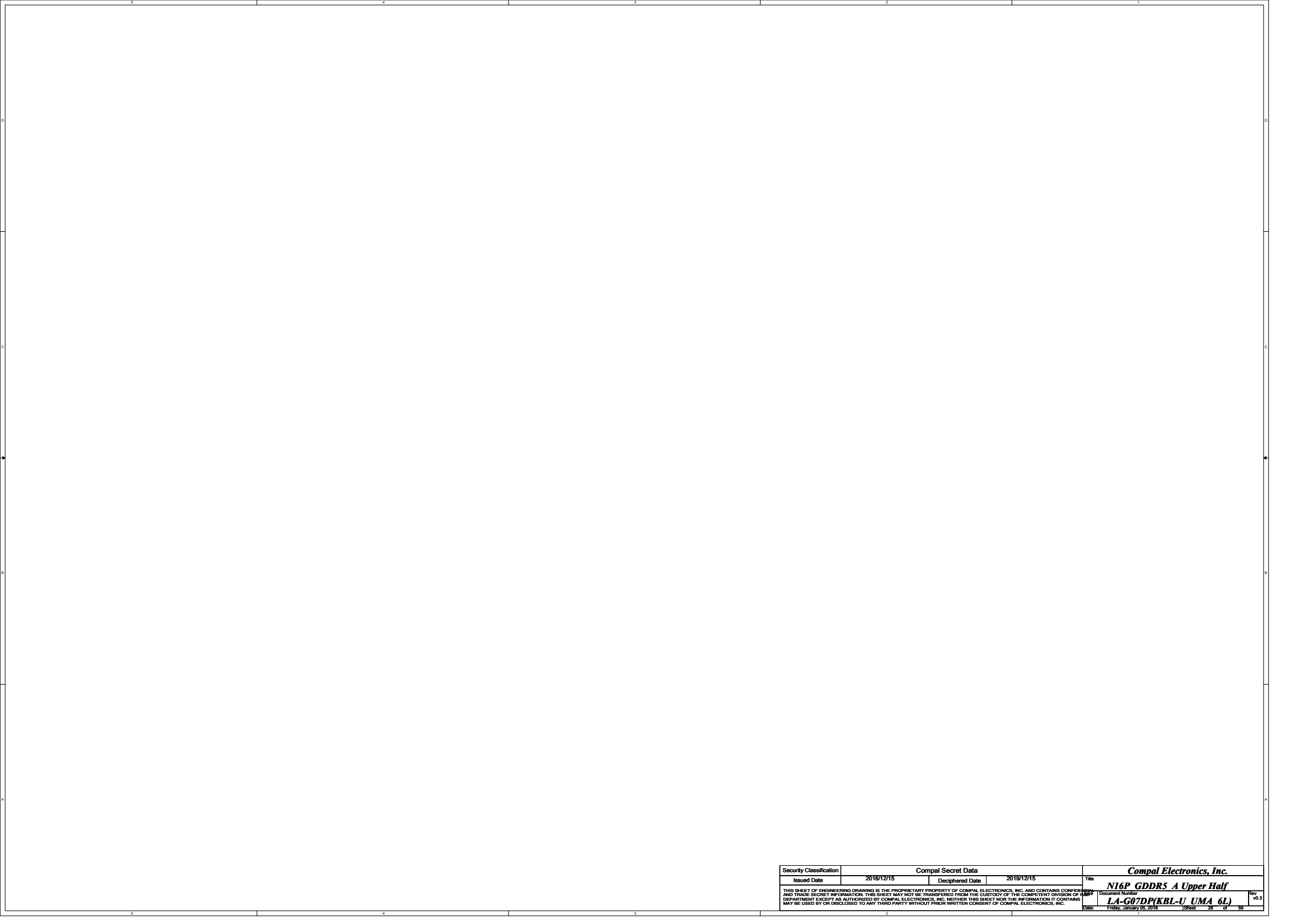


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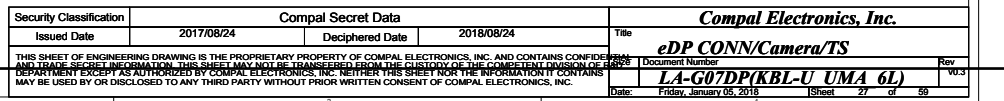
5	4	3	2	1
D				D
C				C
B				B
A				A
5	4	3	2	1

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Camera



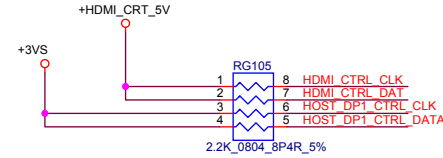
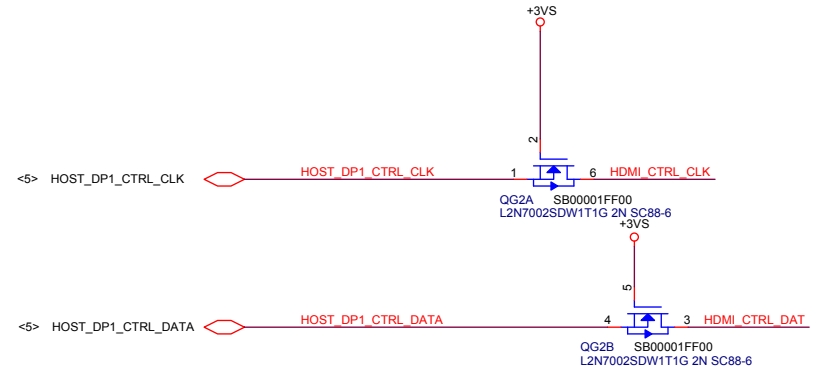
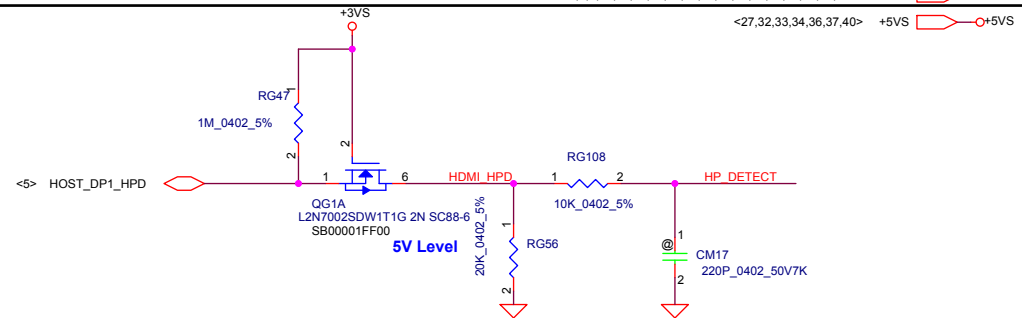
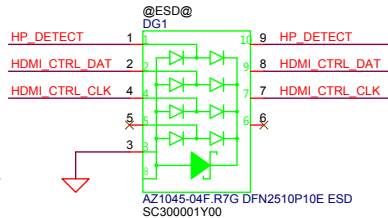
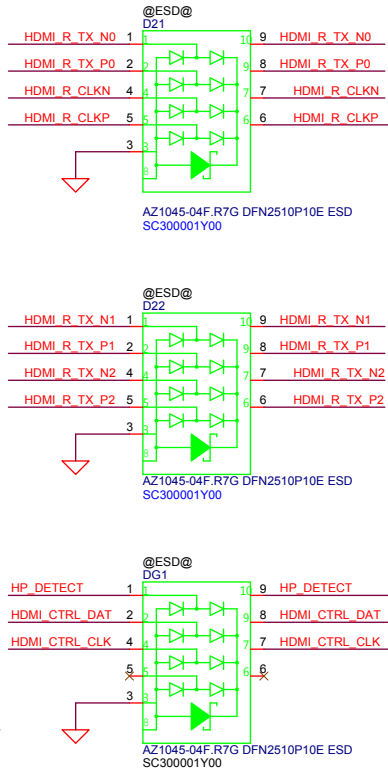
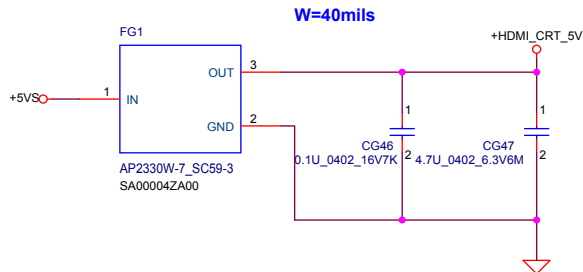
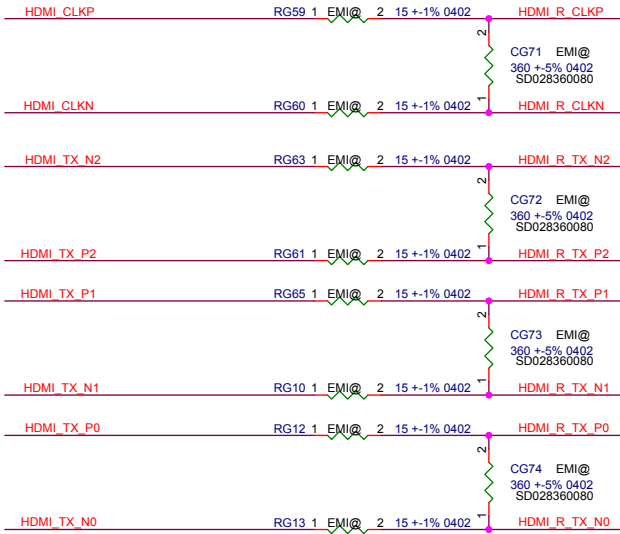
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1.3.2 Digital Display Interface Signal Mapping

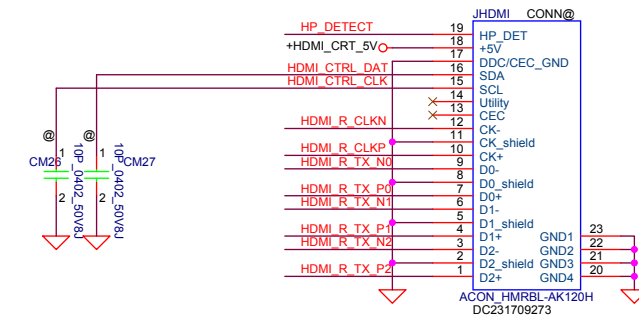
Table 1-4. Digital Display Interface Signal Mapping

Port	DDI PROCESSOR Pin Names	Display Port Mapping	HDMI* Mapping
Port 1	DDI1_TXN[0]	DDI1_LANE0_DP	HDMI_KC_TX2_DN
	DDI1_TXP[0]	DDI1_LANE0_DP	HDMI_KC_TX2_DP
	DDI1_TXN[1]	DDI1_LANE1_DP	HDMI_KC_TX1_DN
	DDI1_TXP[1]	DDI1_LANE1_DP	HDMI_KC_TX1_DP
	DDI1_TXN[2]	DDI1_LANE2_DP	HDMI_KC_TX0_DN
	DDI1_TXP[2]	DDI1_LANE2_DP	HDMI_KC_TX0_DP
	DDI1_TXN[3]	DDI1_LANE3_DP	HDMI_KC_CLK_DN
	DDI1_TXP[3]	DDI1_LANE3_DP	HDMI_KC_CLK_DP
	DDI1_HPD	DDI1_HPD_Q	DDI1_HPD_Q
	DDI1_CTRLCLK	NA	DDI1_CTRL_CLK
	DDI1_CTRLDATA	NA	DDI1_CTRL_DATA
	DDI1_0		HDMI_0
	DDI1_3		CLK

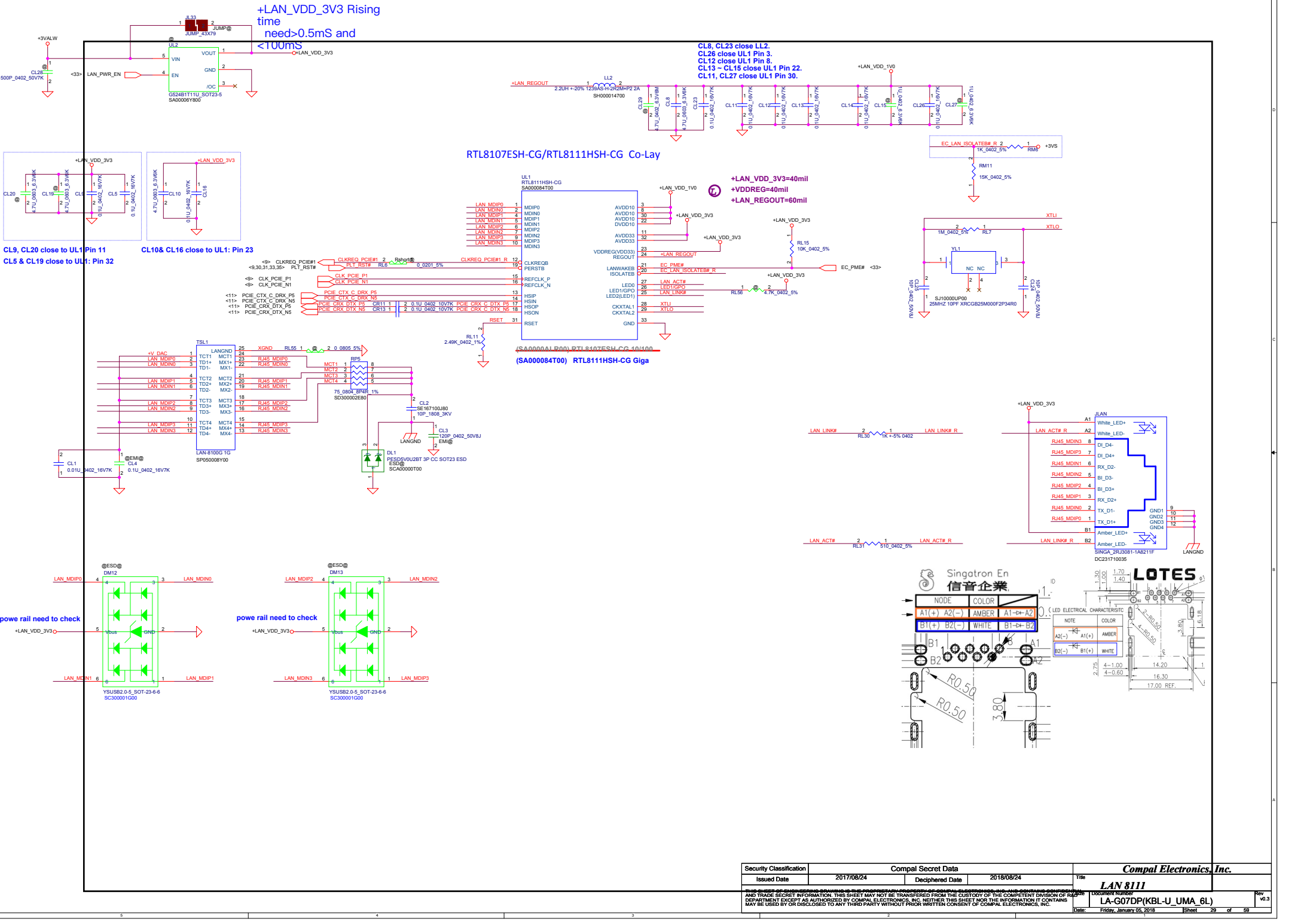
*DDA30_LA-F292PR02: RS_8.2ohm_RP_360ohm



HDMI Conn.

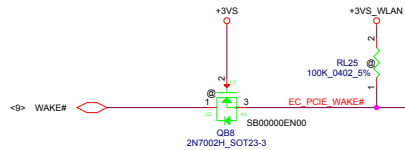


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NGFF and WLAN

Unpop QB8 and RL25 for not support OBF6



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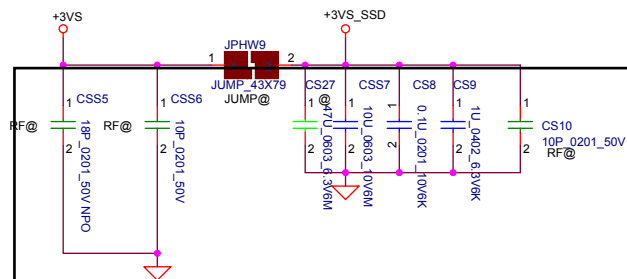


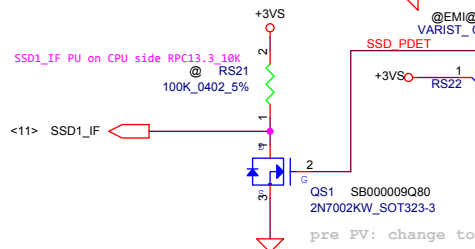
Figure 12-1. PCI Express* Link Configurations Supported by the Guidelines in this Chapter

PCH-LP Details	PCIe* Controller #1				PCIe* Controller #2				PCIe* Controller #3			
Flex I/O Lane #	5	6	7	8	9	10	11	12	13	14	15	16
PCIe* Lane #	1	2	3	4	5	6	7	8	9	10	11	12
Base-U	1x4	RP 1			RP 5				RP 9			
	1x4 LR	RP 1			RP 5				RP 9			
	2x2	RP 1		RP 3		RP 3		RP 5		RP 9		RP 11
	1x2+2x1	RP 1		RP 3		RP 4		RP 5		RP 9		RP 11 RP 12
	2x1+1x2	RP 4		RP 3		RP 1				RP 12		RP 11 RP 9
Premium-U	4x1	RP 1	RP 2	RP 3	RP 4	RP 5	RP 6	RP 7	RP 8	RP 9	RP 10	RP 11 RP 12
	1x4	RP 1			RP 5				RP 9			
	1x4 LR	RP 1			RP 5				RP 9			
	2x2	RP 1		RP 3		RP 3		RP 5		RP 7		RP 9 RP 11
	1x2+2x1	RP 1		RP 3		RP 4		RP 5		RP 7		RP 8 RP 9 RP 11 RP 12
	2x1+1x2	RP 4		RP 3		RP 1		RP 5		RP 7		RP 8 RP 9 RP 11 RP 12
	4x1	RP 1	RP 2	RP 3	RP 4	RP 5	RP 6	RP 7	RP 8	RP 9	RP 10	RP 11 RP 12

<SSD>

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<11> PCIe_CRX_DTX_P11
<11> PCIe_CTX_C_DRX_N11
<11> PCIe_CTX_C_DRX_P11
<14> PCIe_CRX_DTX_P12
<11> PCIe_CRX_DTX_N12
<11> PCIe_CTX_C_DRX_N12
<11> PCIe_CTX_C_DRX_P12
<9> CLK_PCIE_N4
<9> CLK_PCIE_P4

Key TYP. M

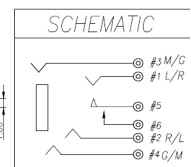
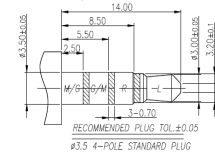
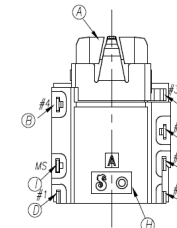
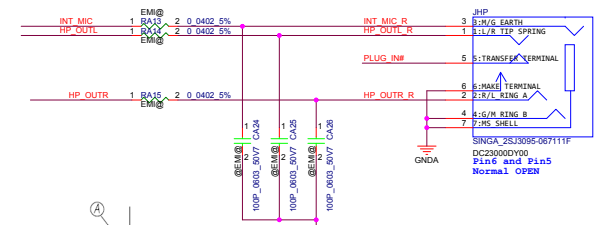
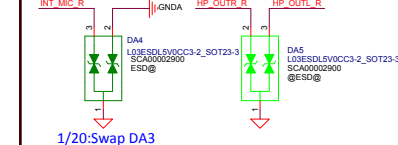
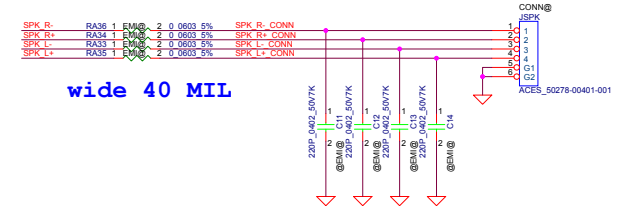
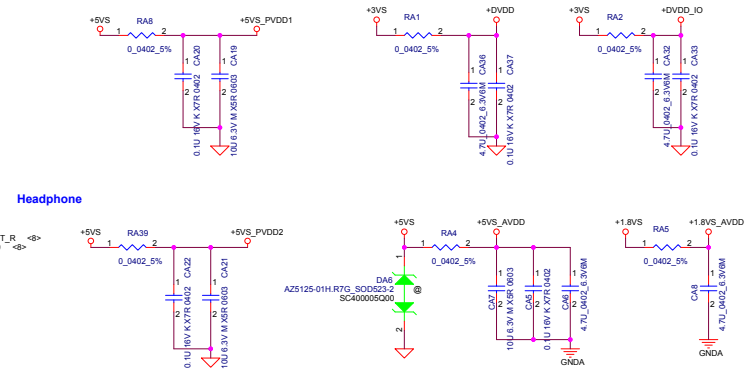


36.3.2.4 AC Capacitor General Guidelines for M.2 SSD Storage Routing on SATA / PCI Express* Multiplexed Ports

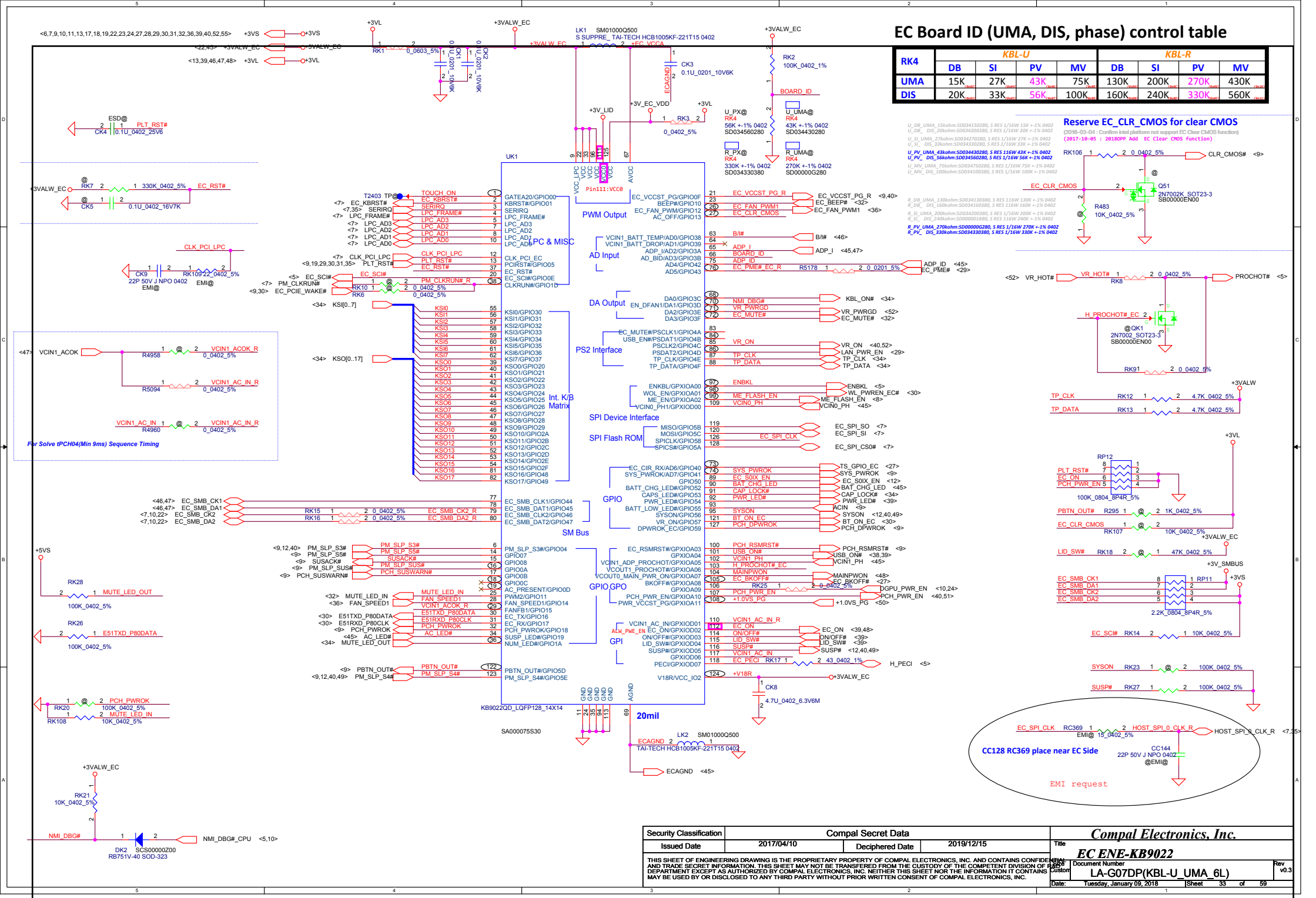
The following table summarizes the AC capacitor requirements on the motherboard when using the SATA/PCIe* multiplexed ports.

Note: When SATA and PCIe* are muxed, always route according to SATA design guidelines. SATA does not support signal polarity reversal and does not support lane reversal.

39	GND	PCIeM/Mo_D09000NU90_MZVLW10HMLH-009H1_F73H1Q_0FH	39	GND	Return Current Path	40	GND	Return Current Path
41	PETn0	PCIe TX	42	N/C		43	TXP	Transmitter Differential Signal Pair
43	PETn1	PCIe TX	44	N/C		45	TXN	Transmitter Differential Signal Pair
45	GND	Return current path	46	N/C		47	GND	Return Current Path
47	PERn0	PCIe Rx	48	N/C		49	PERn1	Receiver Differential Signal Pair
49	PERn1	PCIe Rx	50	PERST#		51	PERn2	Receiver Differential Signal Pair
51	GND	Return current path	52	CLKREQ#		53	GND	Return Current Path



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			Date Friday, January 05, 2018	User sjm 32 of 59
			Document Number LA-G07DP(KBL-U 5MA 6L)	



TP Button BD Connector

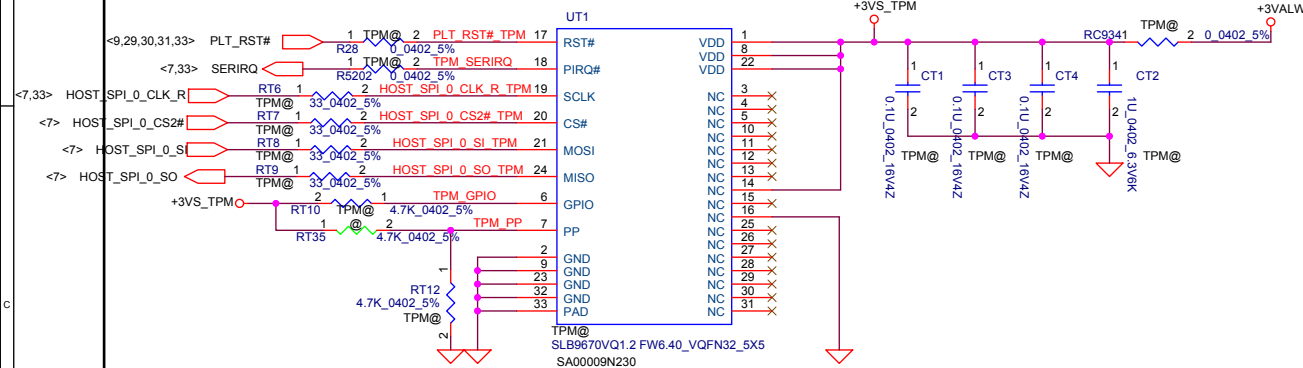
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Pin32	5V	5V

Keyboard conn

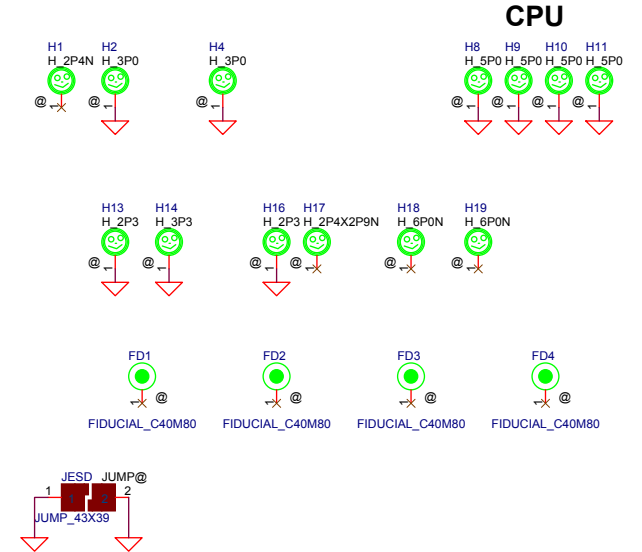
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				Customer	v0.3
				Date: Friday, January 05, 2018	Sheet 34 of 59

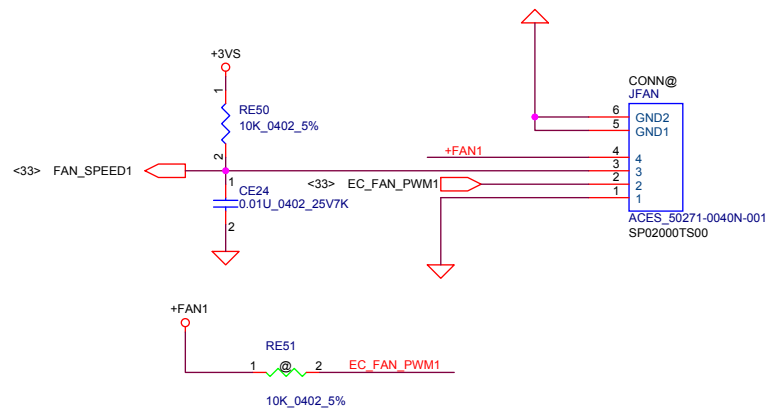
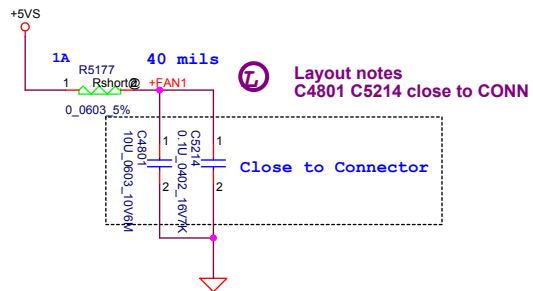
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Screw Hole



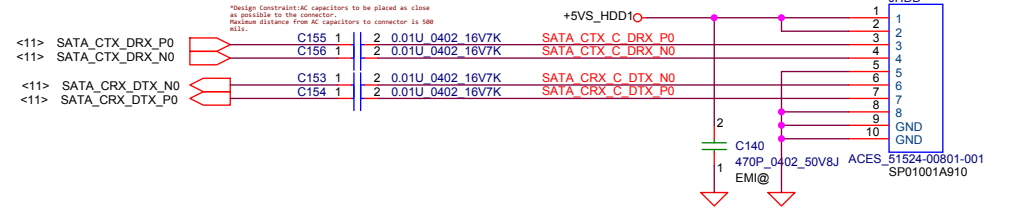
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				Date	Friday, January 03, 2016
				Sheet	35 of 59
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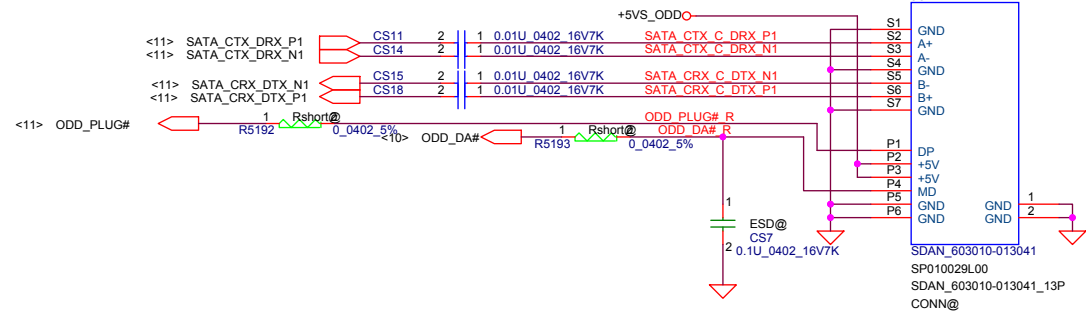
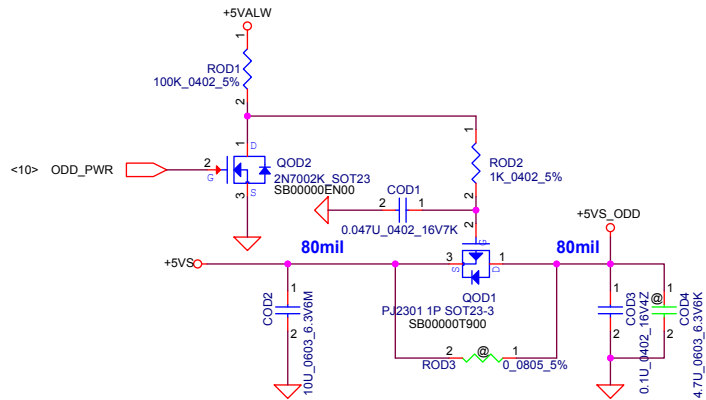
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				Date: Friday, January 05, 2018	Sheet 36 of 59

2.5" SATA HDD

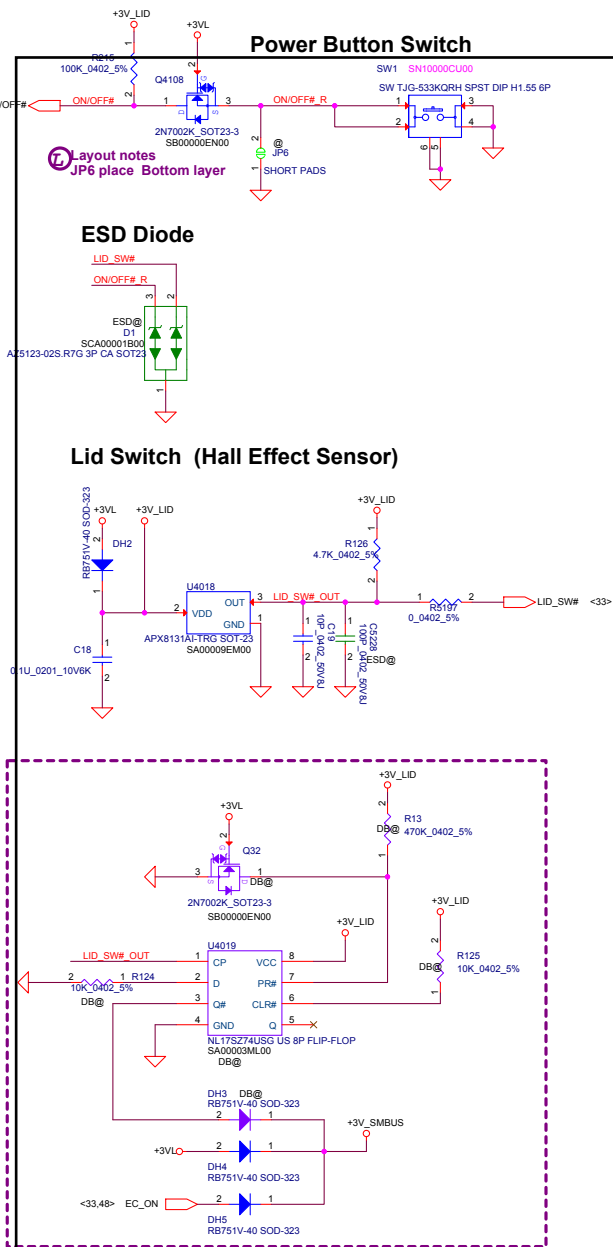
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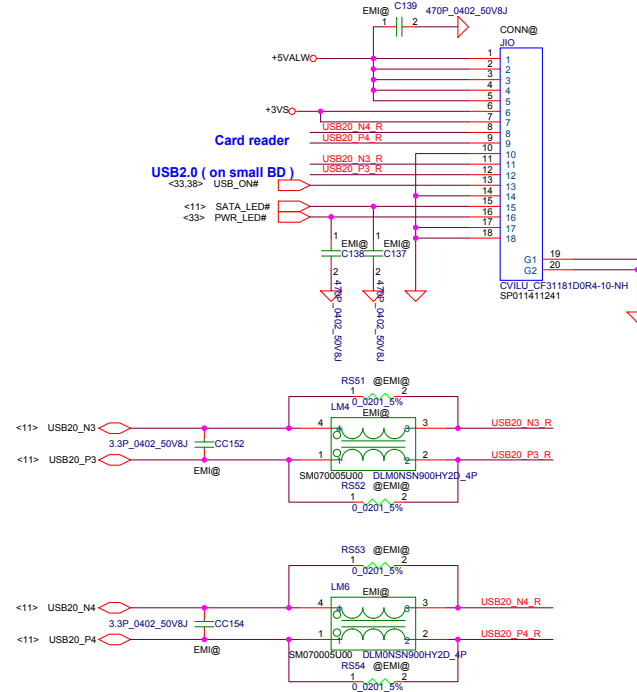
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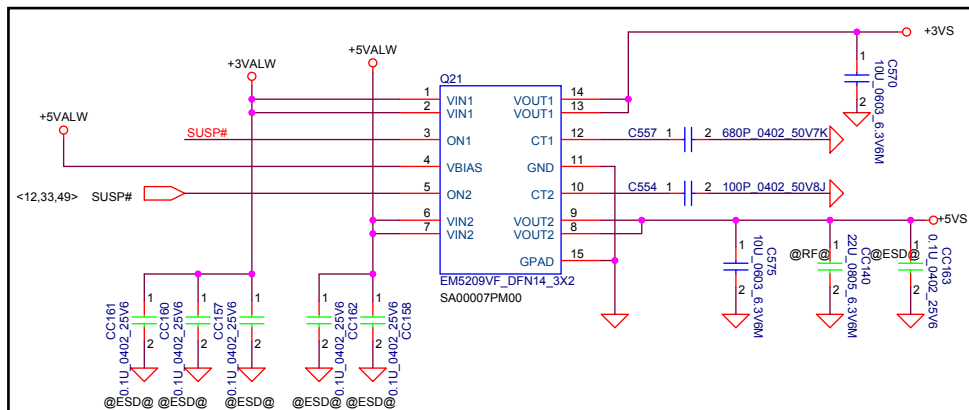
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				Date	Friday, January 05, 2018
				Sheet	37 of 59
				Rev	v0.3



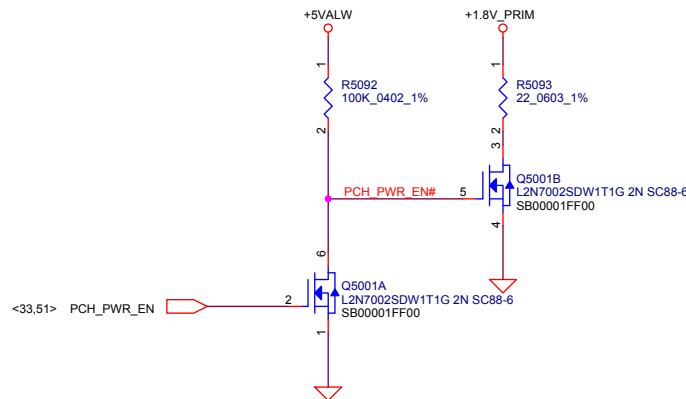
IO BD Connector (USB2.0,Card reader,HDD & PWR LED)



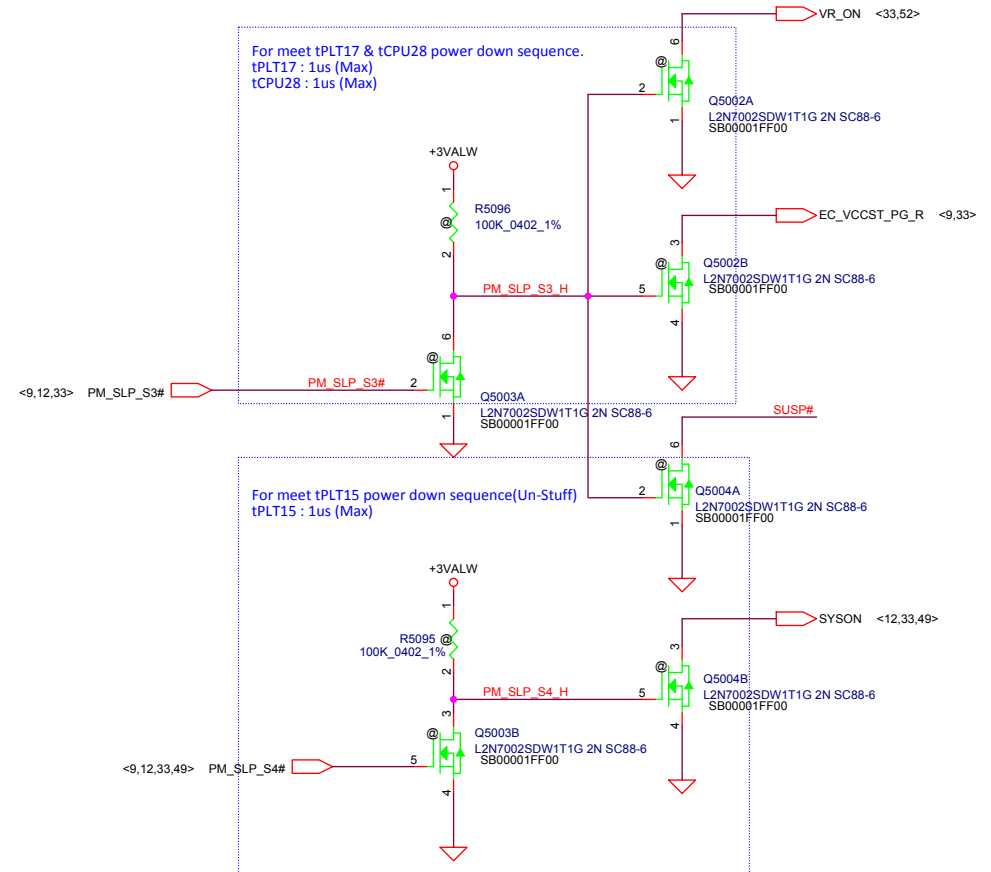
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For +1.8V_PRIM Discharge



+3VS <6,7,9,10,11,13,17,18,27,28,29,30,31,32,33,36,39,52>
+5VS <27,28,32,33,34,36,37>



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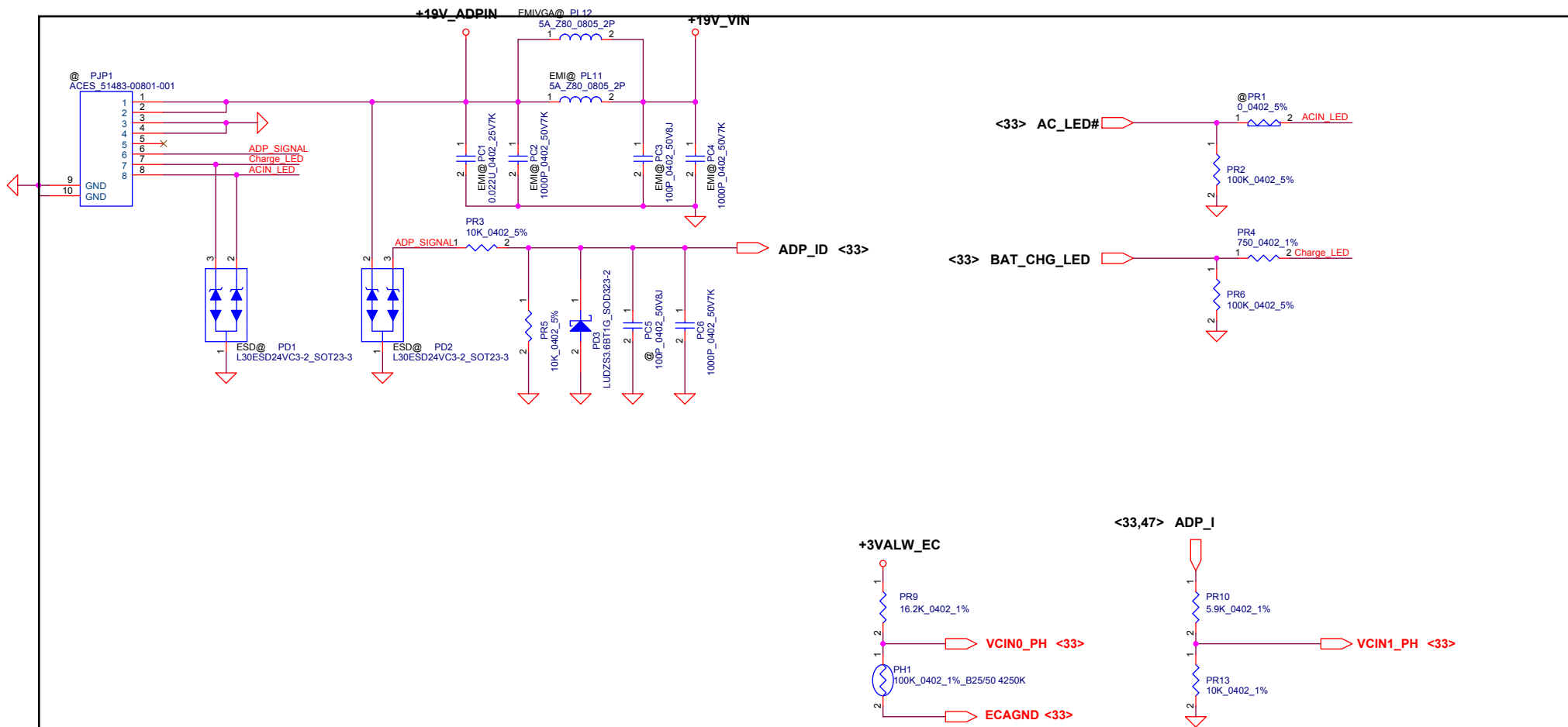
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Date: Friday, January 05, 2018		Sheet 42 of 59			



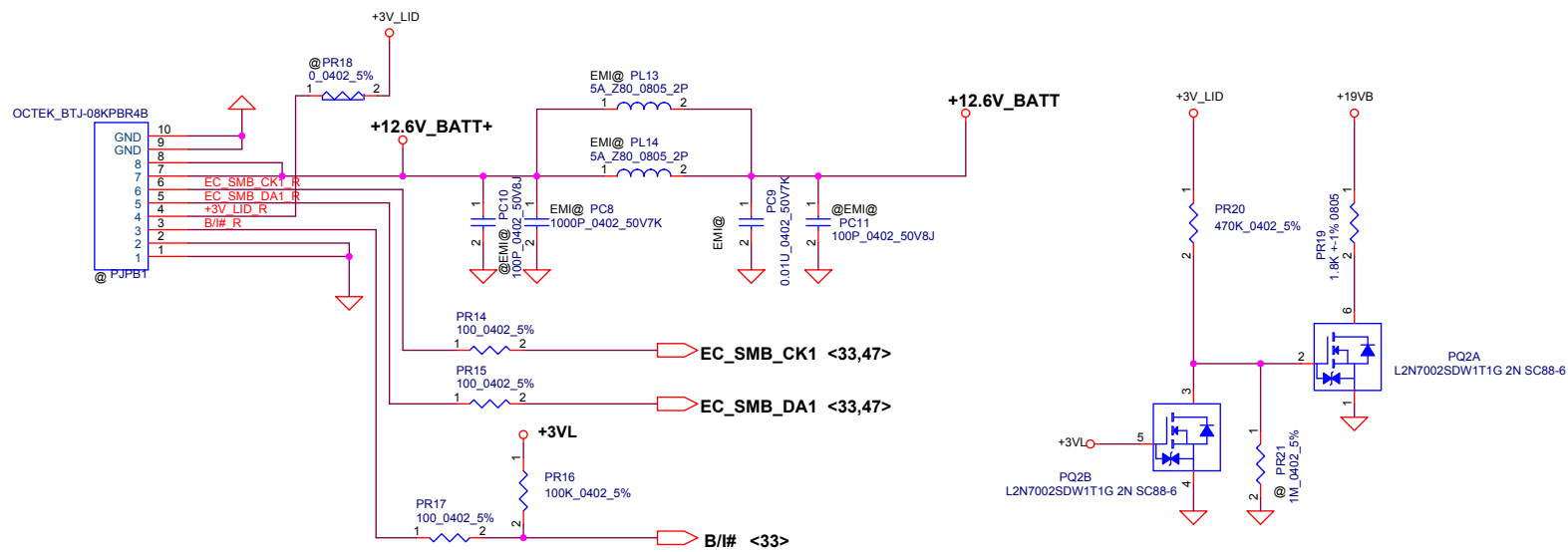
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				LA-G07DP(KBL-U UMA_6L)	v0.3
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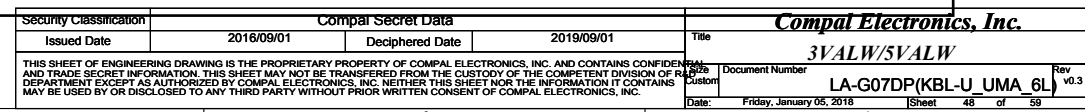
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Date:	Friday, January 05, 2018		Sheet	44	of	59

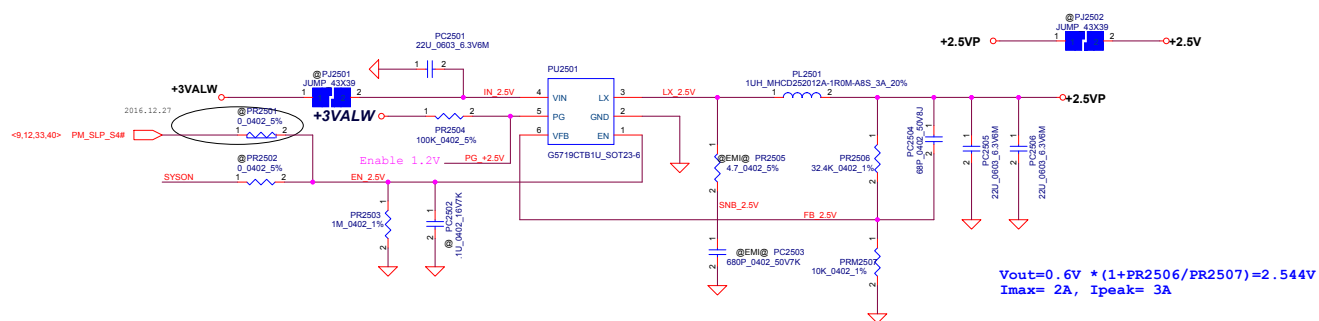



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				Date	Friday, January 05, 2018
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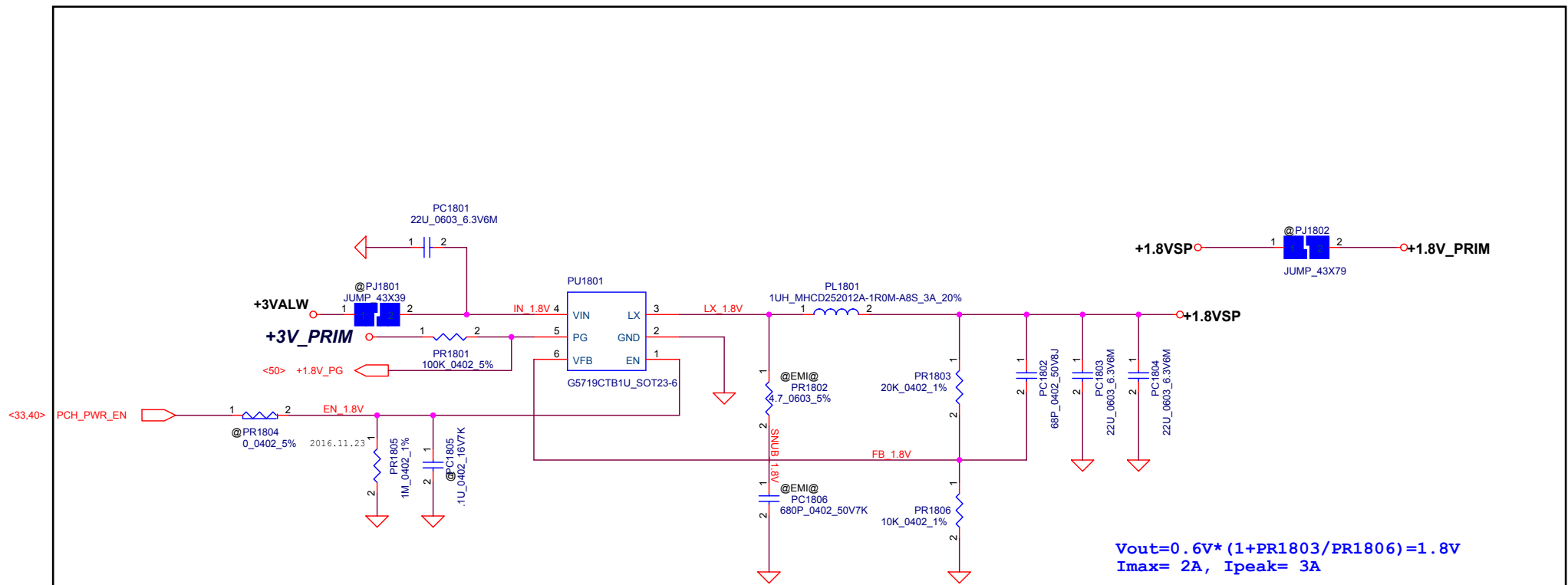


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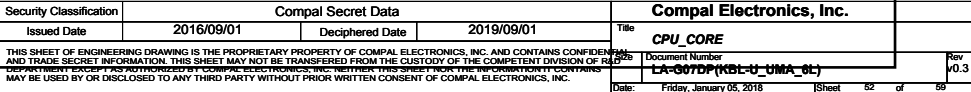
W :H>0.8V ; L<0.4V
W pin don't floating
F have pull down resistor at HW side,
lease delete PR601.

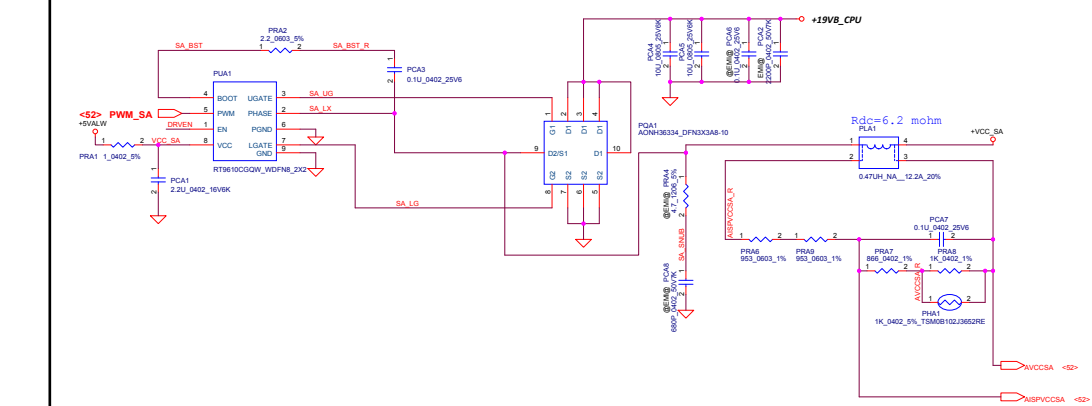
The current limit is set to 6A, 9A or 12A when this pin
is pull low, floating or pull high.

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								Document Number	
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				Date:	Sheet 51 of 59





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042
LL=10.3 mohm
TDC=
ICCMAX=5A
OCP=9.5A

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			Document Number	Rev. 0.0
			LA-G07PD(KBL-U, UMA) 68	
			Date	19-May-2016 05:18 (Sheet 53 of 56)

Security Classification	Compal Secret Data			Compal Electronics, Inc.	
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				LA-G07DP(KBL-U_UMA_6L)	V0.3
				Date: Friday, January 05, 2018	Sheet 55 of 59

Security Classification		Compal Secret Data		<i>Compal Electronics, Inc.</i>	
Issued Date	2015/09/01	Deciphered Date	2018/09/01	Title	
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				Date:	Friday, January 05, 2018
				Sheet	56 of 59

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Security Classification	Compal Secret Data			Compal Electronics, Inc.																										
Issued Date	2016/09/01	Deciphered Date	2018/09/01	Title																										
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				Date: Friday, January 05, 2018	Rev v0.3																									
Sheet 57 of 59																														
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