

Compal Confidential

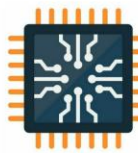
Hasswell M/B Schematics Document

Intel ULV Processor with DDR3L

Date : 2014/02/08

VER 1.0

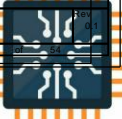
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Issued Date	2011/06/29	Deciphered Date	2011/06/29	Title	Cover Page
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				B	LA-B972P
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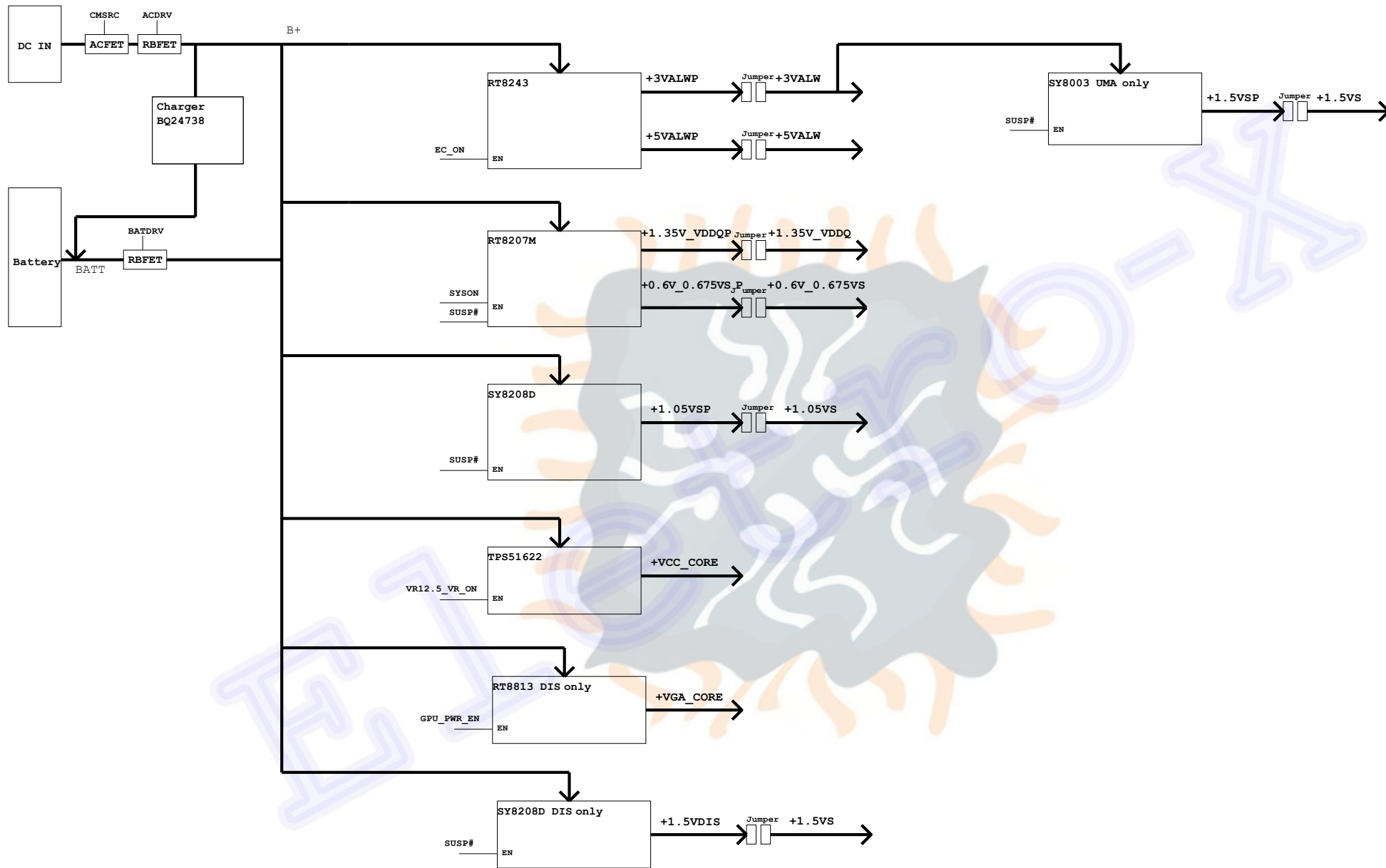


File Name :
LA-B972PR10



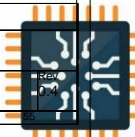
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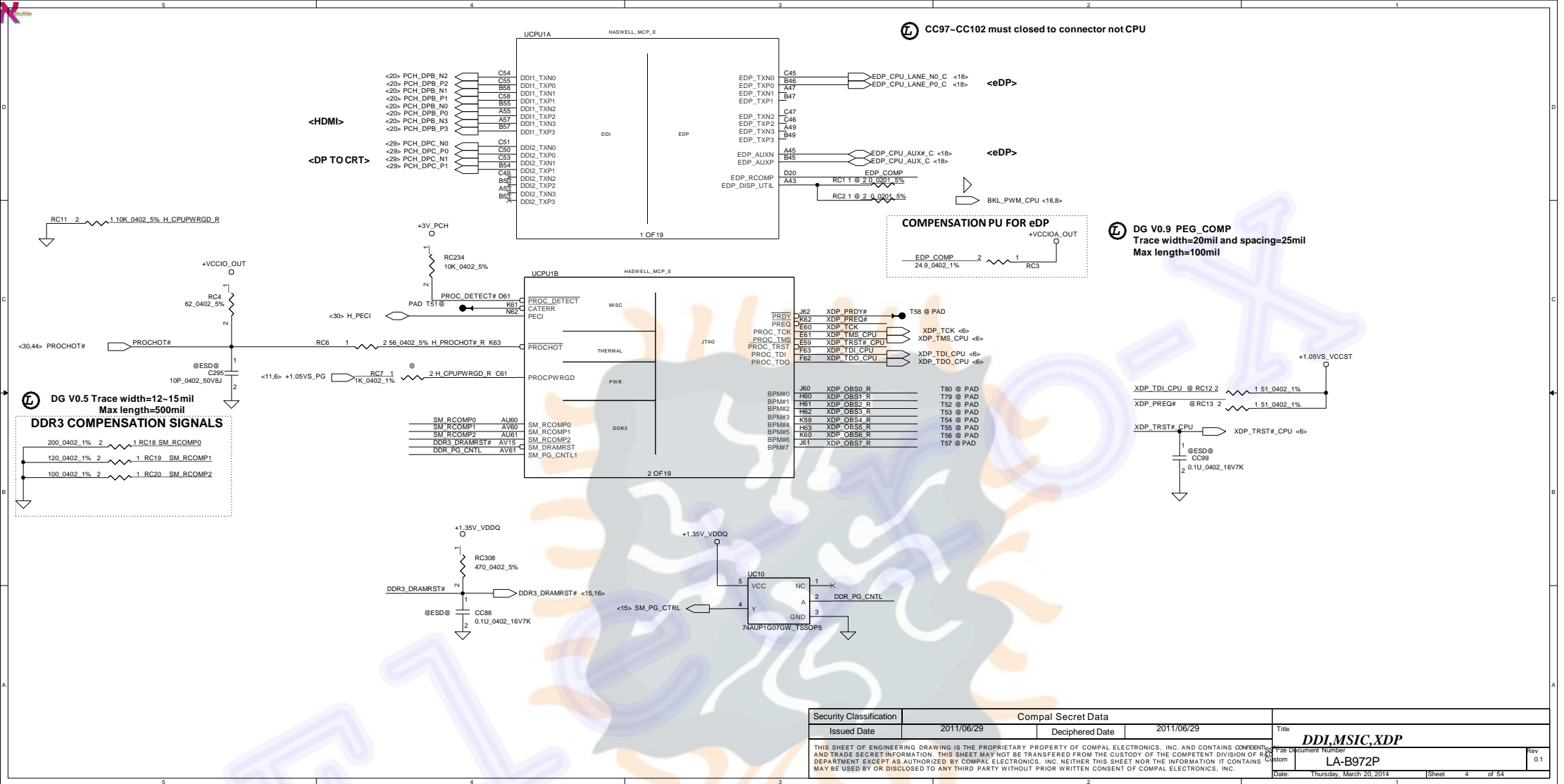


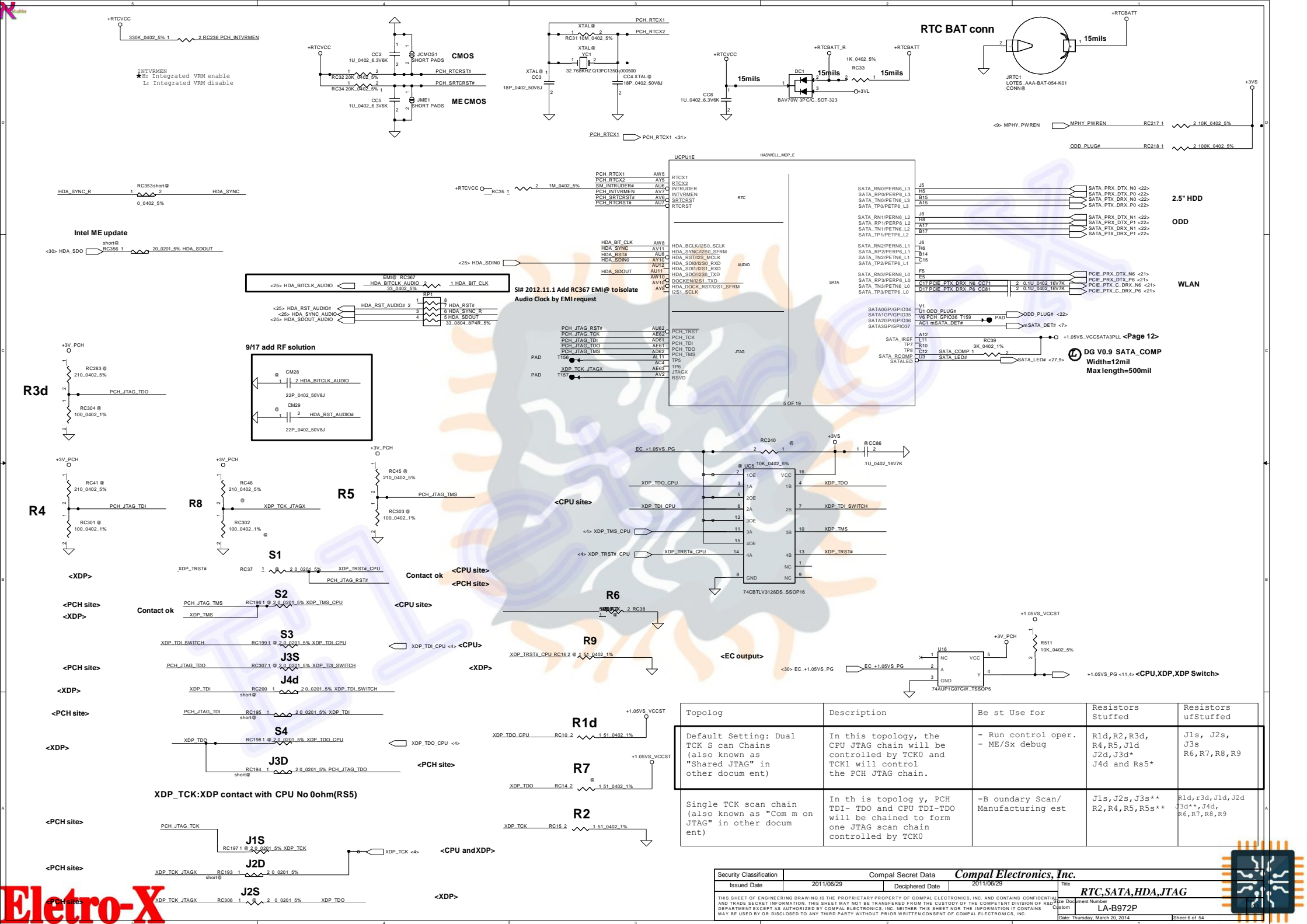


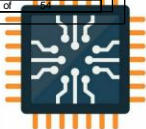
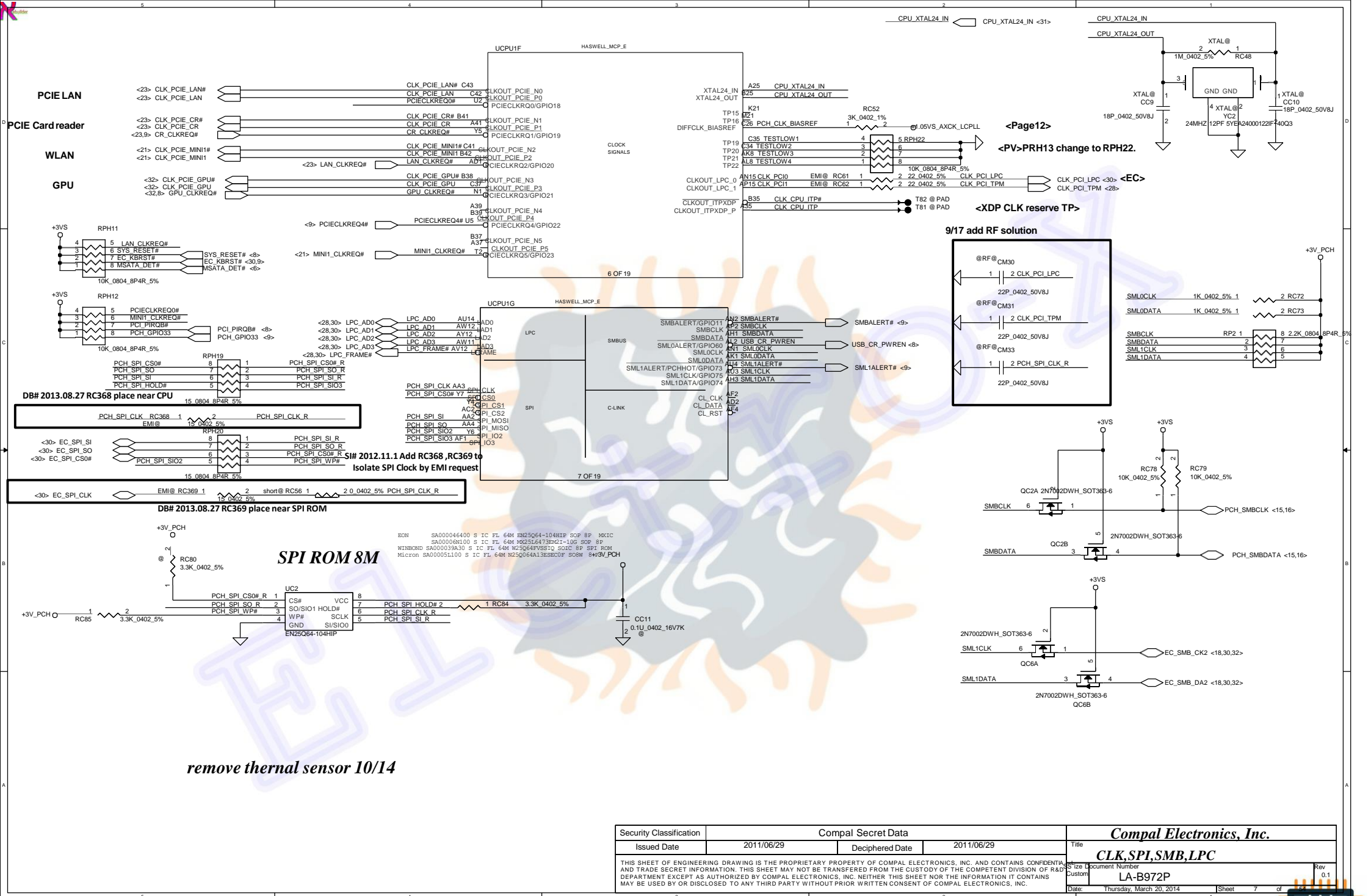
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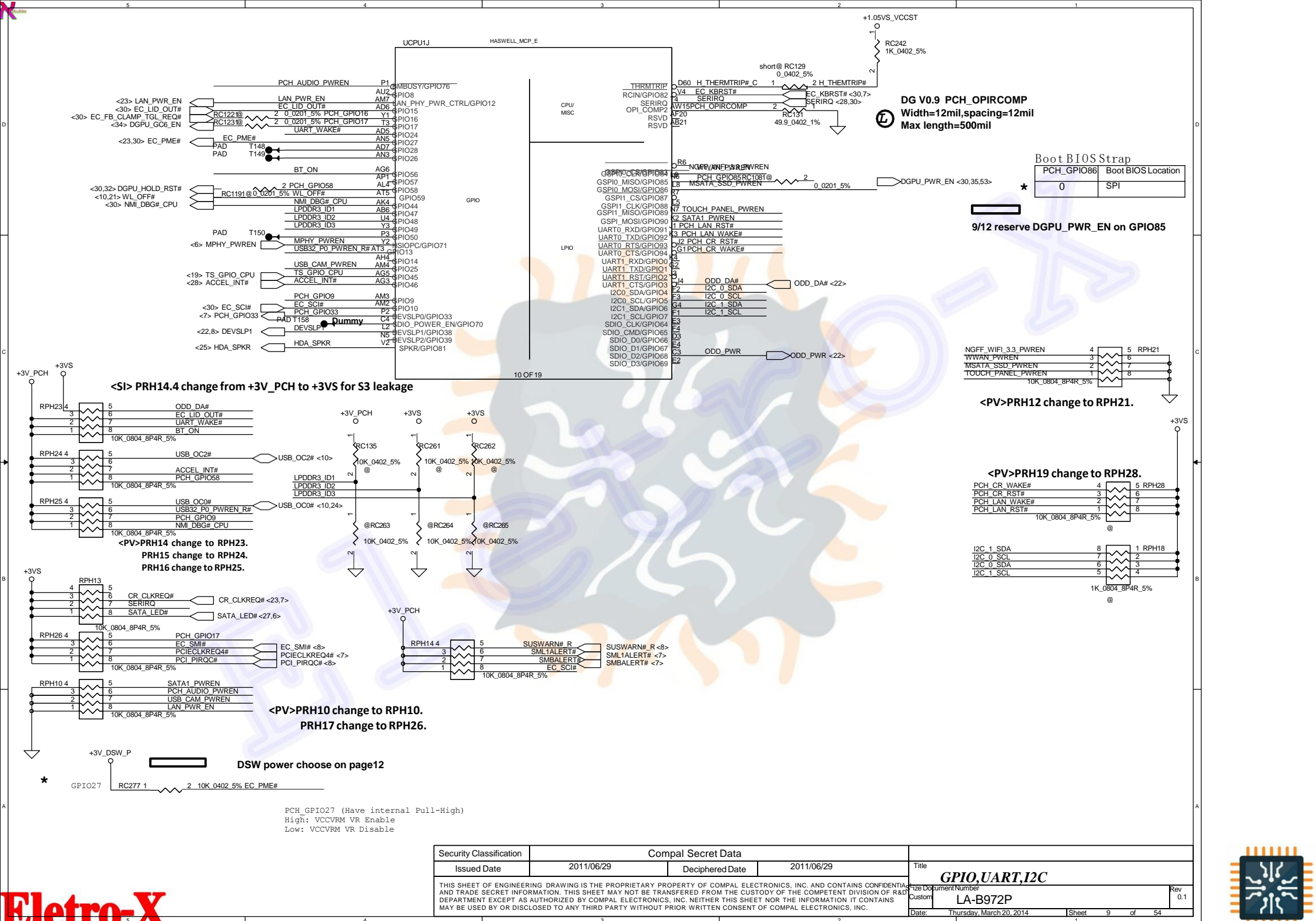
Compal Electronics, Inc.	
Title	Power Block Diagram
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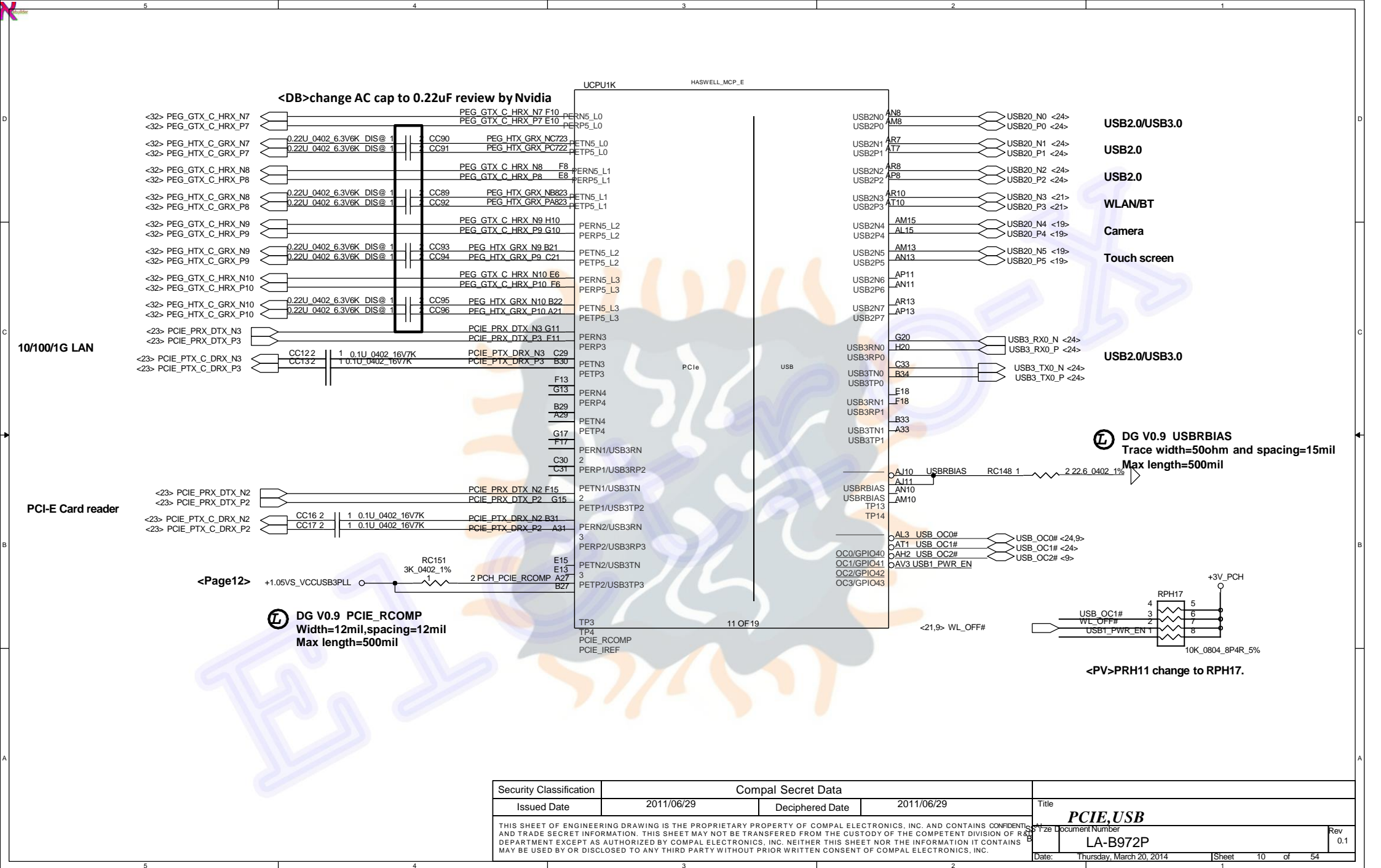












SVID ALERT

+1.05V_S_VCCST

DG V0.5 H_CPU
RC154 close to 100 Ohms
Max length=100mm

RC154
75.0402_5%

2

H_CPU_SVIDALRT#

RC155#3.0402_1%

<PWR VR12.6> VR_SVID_ALERT#

The diagram shows the SVID data pin (VR_SVID_DAT) connected to a pull-up resistor (RC156, 110_0402_1%) to the +1.05VS_VCCST supply. The pin is also connected to the <PWR VR12.6> pin, which is labeled as <50> VR_SVID_DAT.

<PWR VR12.6>

110_0402_1%

CN

VR_SVID_DAT

<50> VR_SVID_DAT

<CPU>

+1.05VS

RC234.1

2.0 0.002 5%

DG V0.5 VIDSOUT

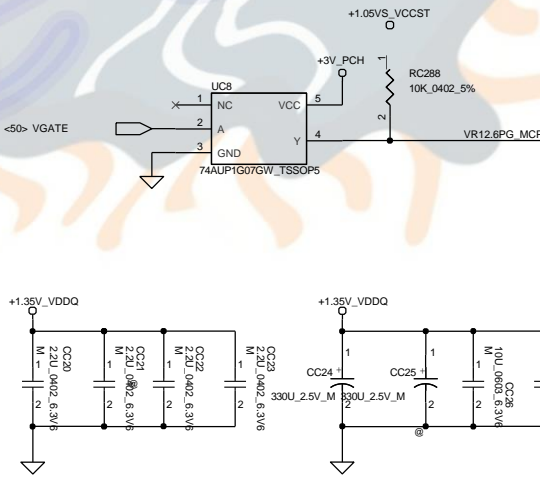
BC156 close to CPU1-500mil

<PWR_VR12.6>

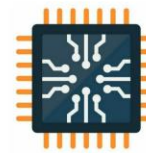
Signal	Pin	Component Pin
<50> VCCSENSE	E63	CC_SENSE
	A82	R_SVID
<VR_IV and CPU>	A59	CCIO_OUT
	E20	CCIOA_OUT
<EDP_COMP power rail>	A23	SVID
	A25	SVID
	AE59	SVID
		H CPU_SVIDALRT# L62
<50> VR_SVID_CLK	N63	VIDALERT
	L63	IDSCCLK
		IDSOUT
<4.6> +1.0VS_PG	B59	CCST_PWRGD
<50> VR12.5_VR_ON	F69	R_EN
	C59	R_READY
		VR12.6PG_MCP

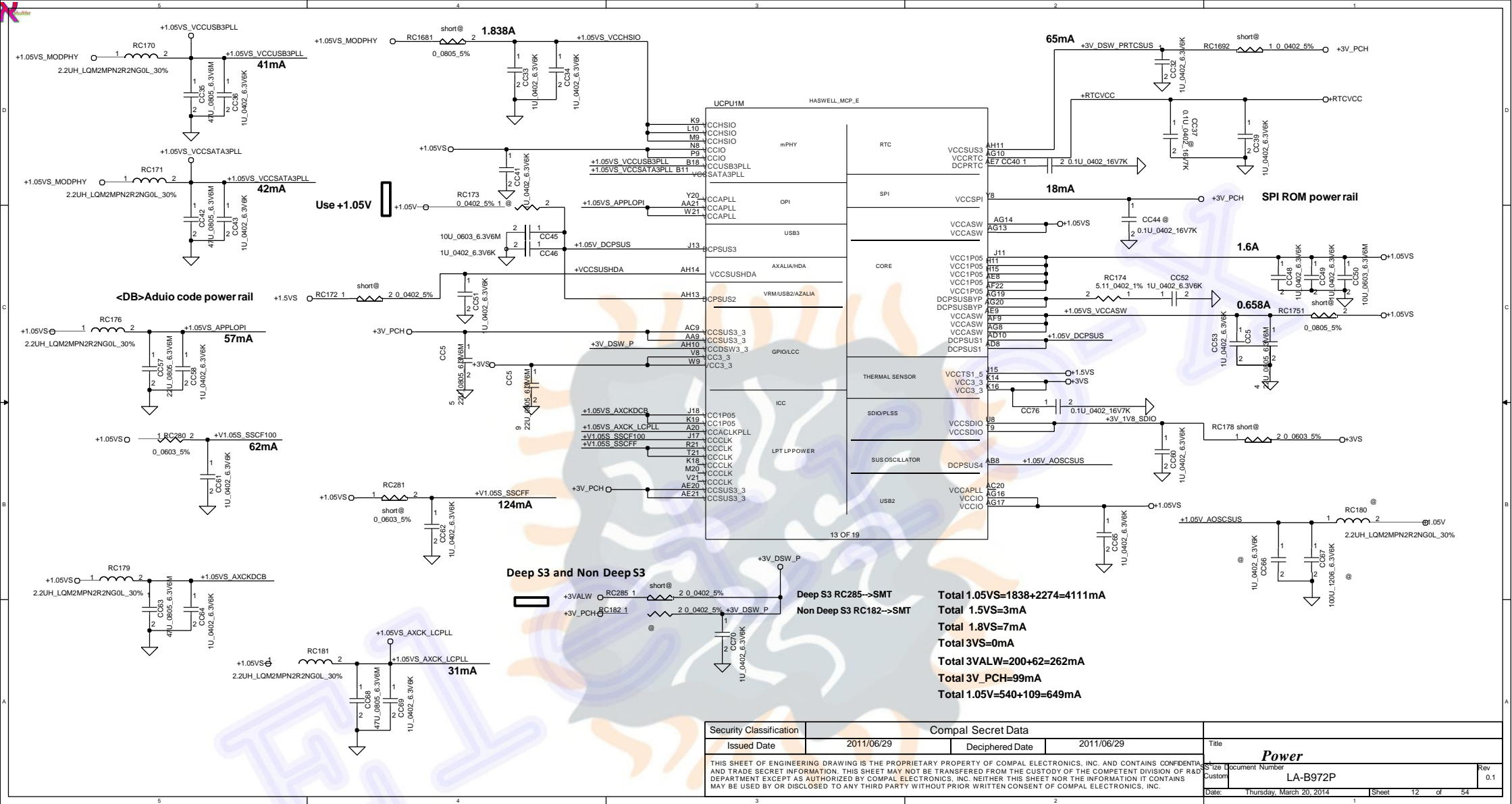
Pin 1 to 20 connection diagram for the STM32F407VGT6. The diagram shows connections for pins 1 through 20. Pins 1, 2, and 3 are connected to GND. Pin 4 is connected to CPU_PWR_DEBUG_H59. Pin 5 is connected to +1.05VS_VCCST. Pin 6 is connected to +VCC_CORE. Pin 7 is connected to GND. Pin 8 is connected to GND. Pin 9 is connected to GND. Pin 10 is connected to GND. Pin 11 is connected to GND. Pin 12 is connected to GND. Pin 13 is connected to GND. Pin 14 is connected to GND. Pin 15 is connected to GND. Pin 16 is connected to GND. Pin 17 is connected to GND. Pin 18 is connected to GND. Pin 19 is connected to GND. Pin 20 is connected to GND.

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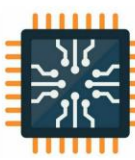


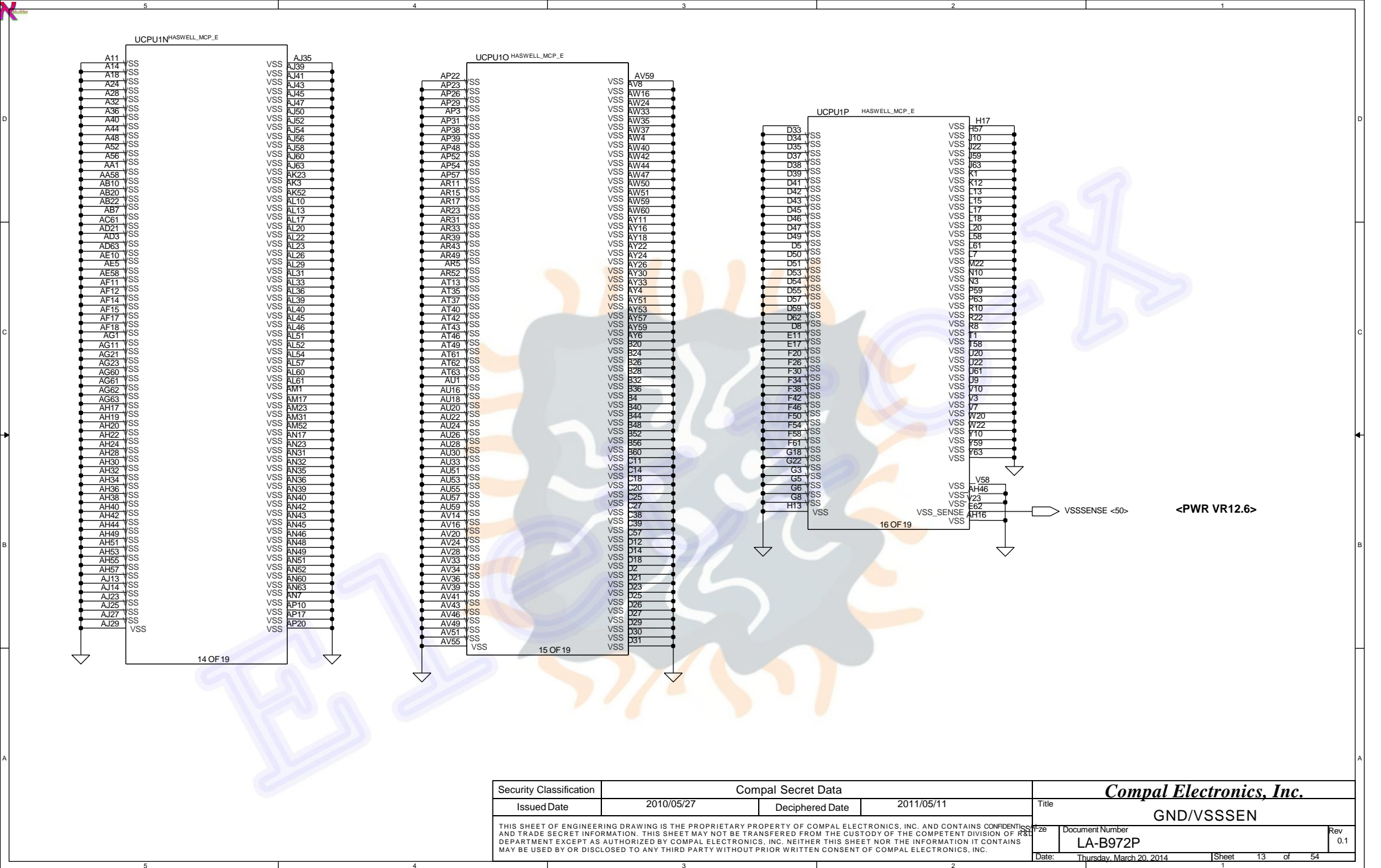
Eletro-X





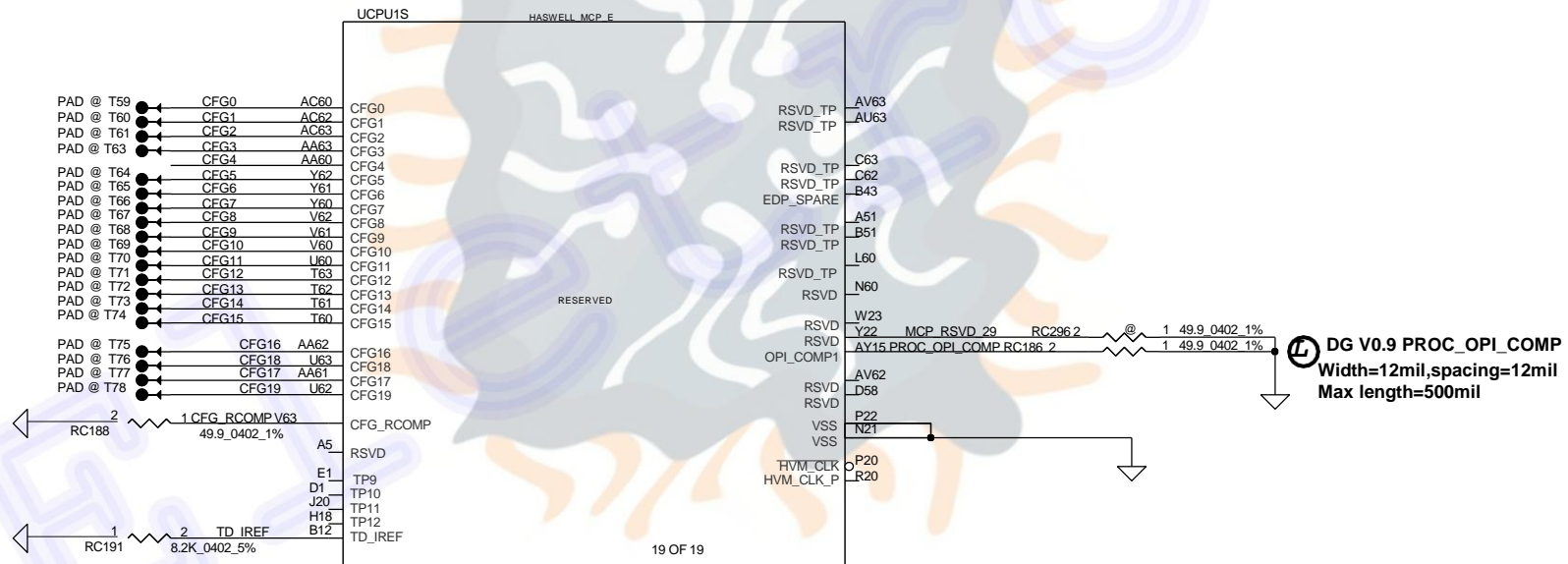
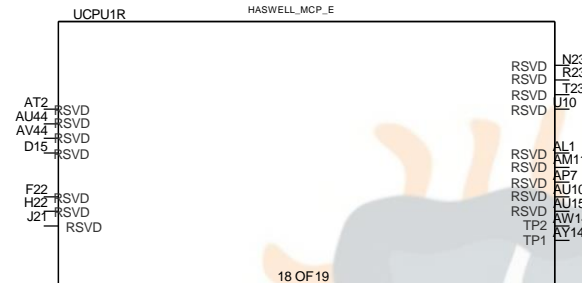
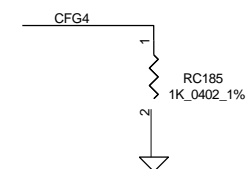
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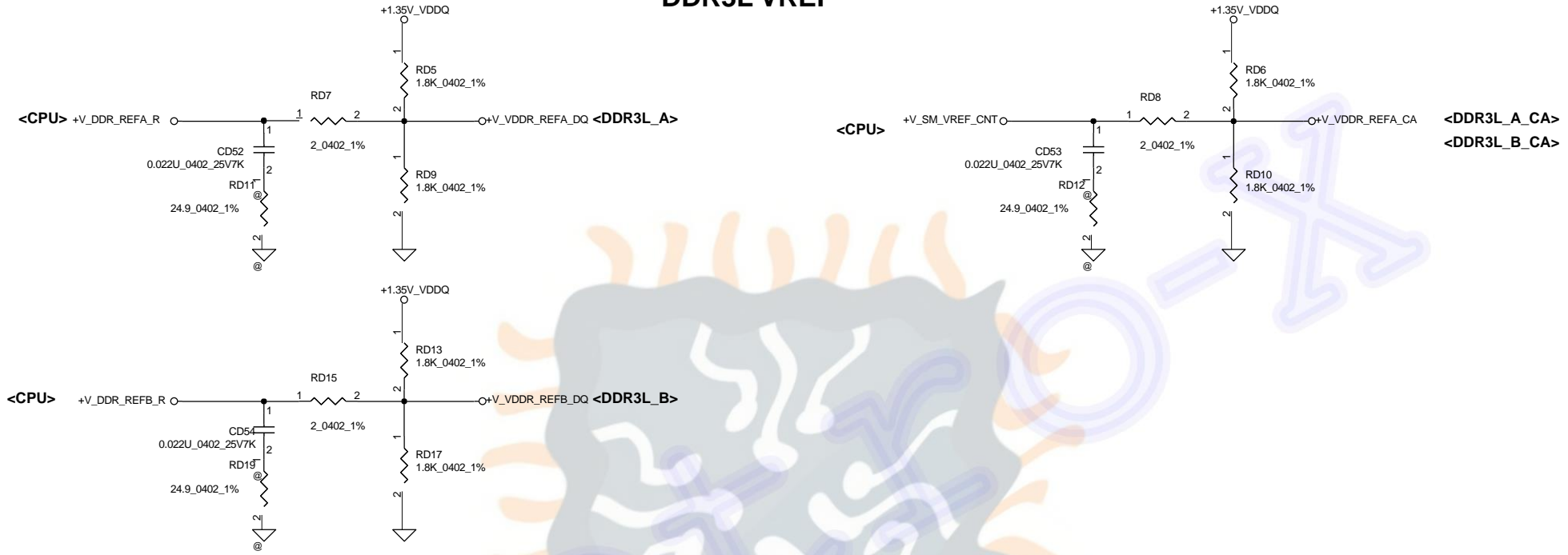




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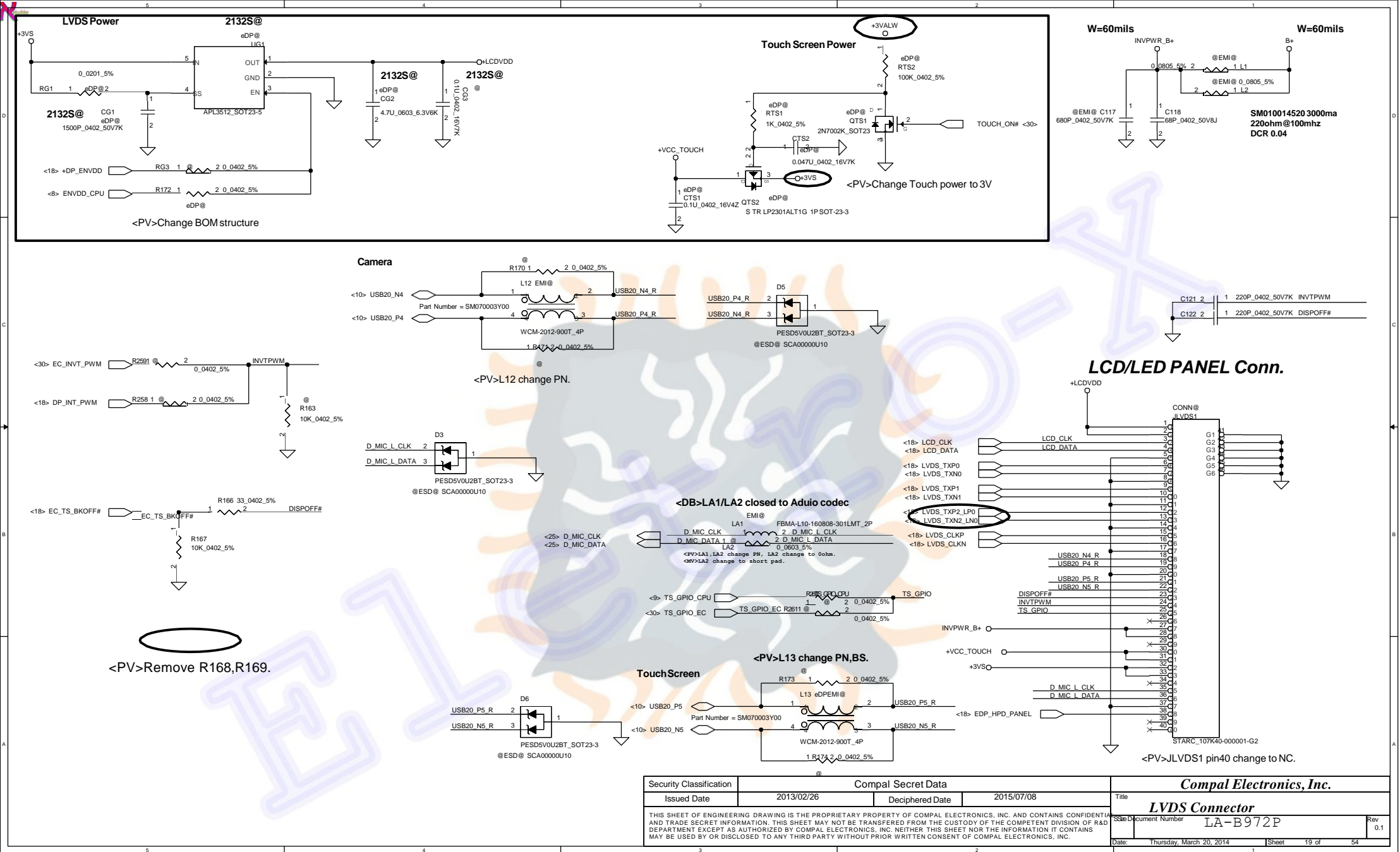


DDR3L VREF

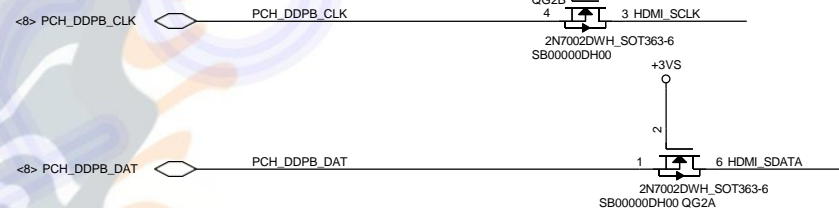
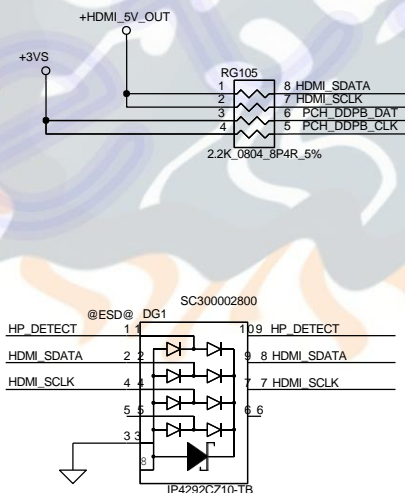
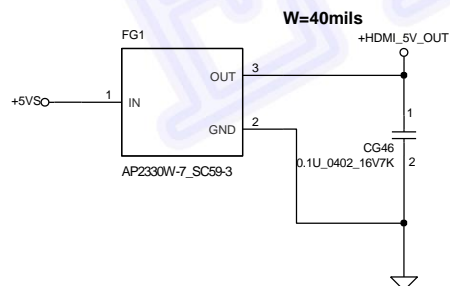
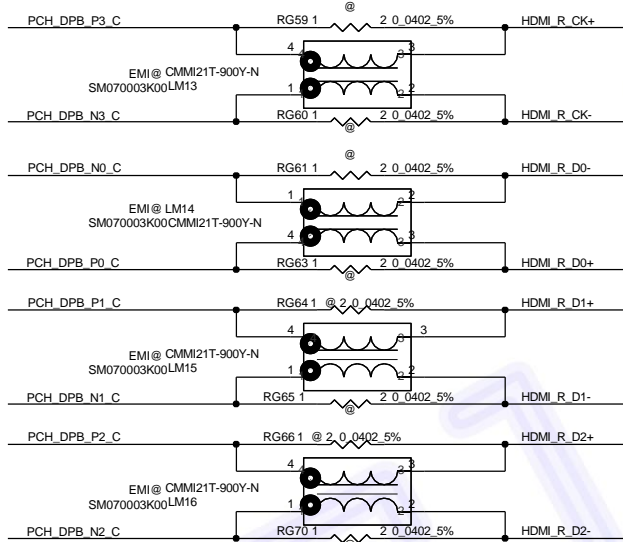
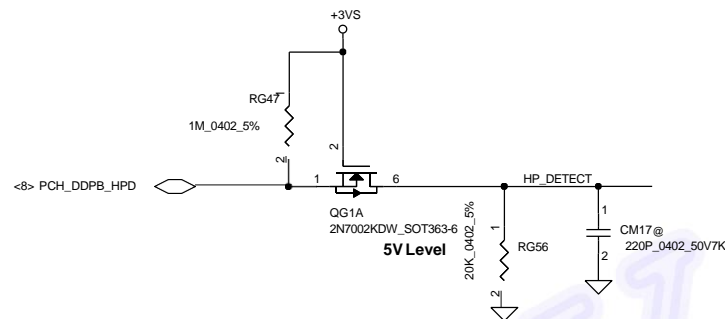
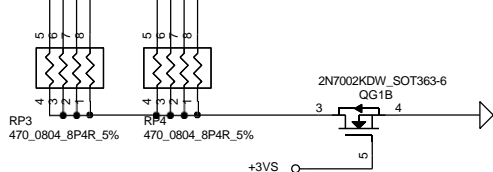
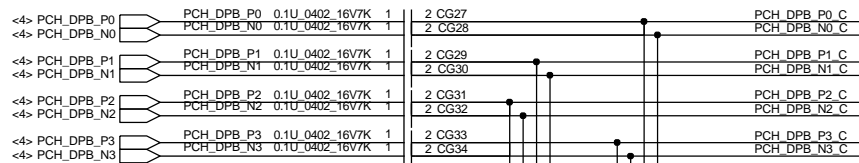


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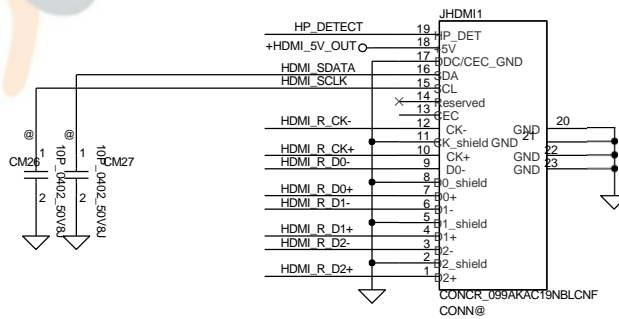




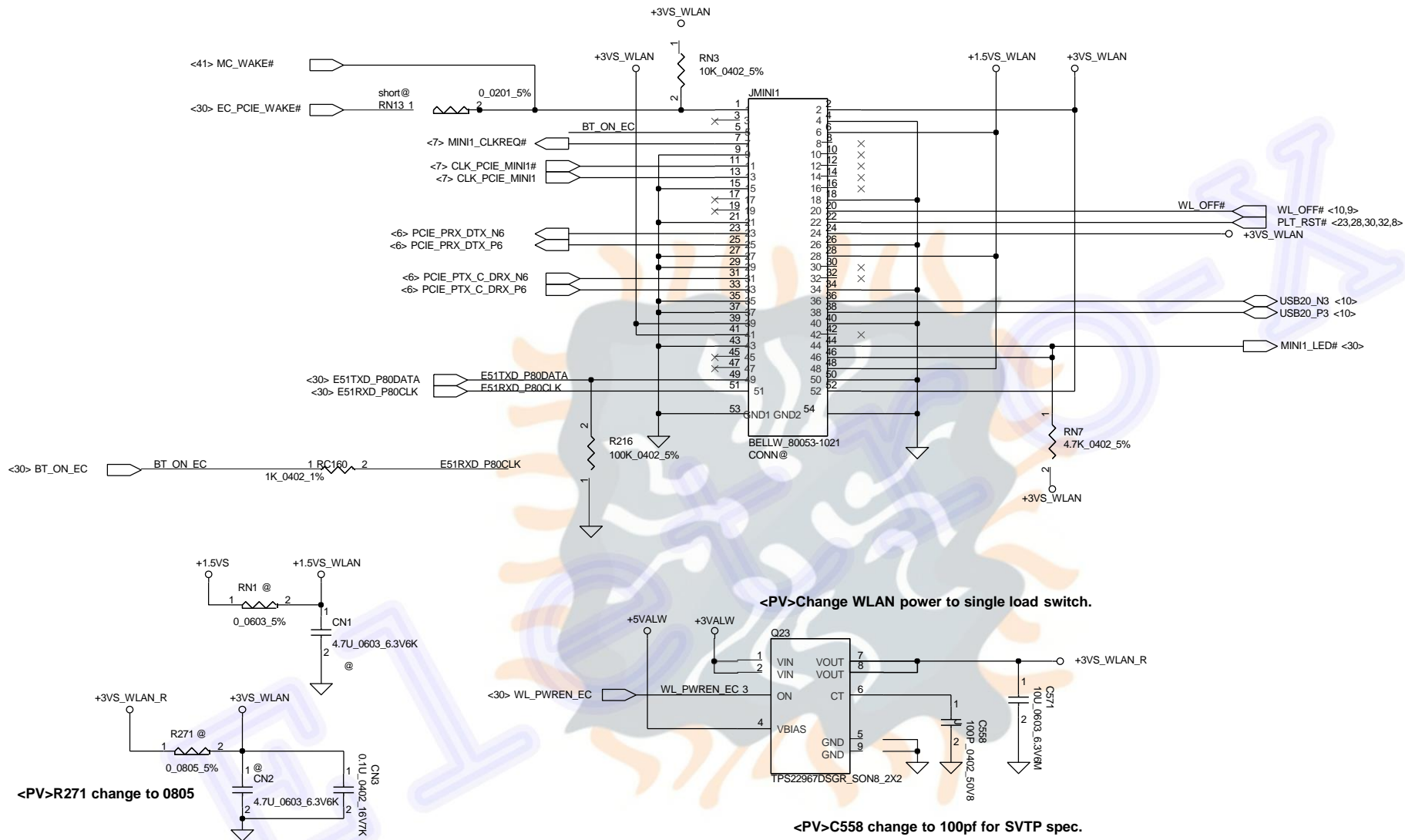
<CPU>



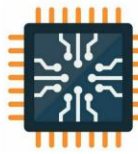
HDMI Conn.



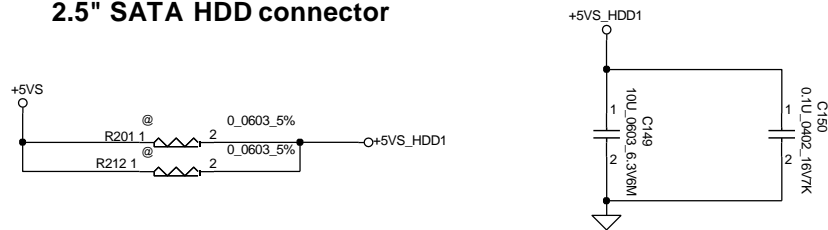
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Issued Date	2011/06/29	Deciphered Date	2011/06/29	HDMI Conn/Level shift	
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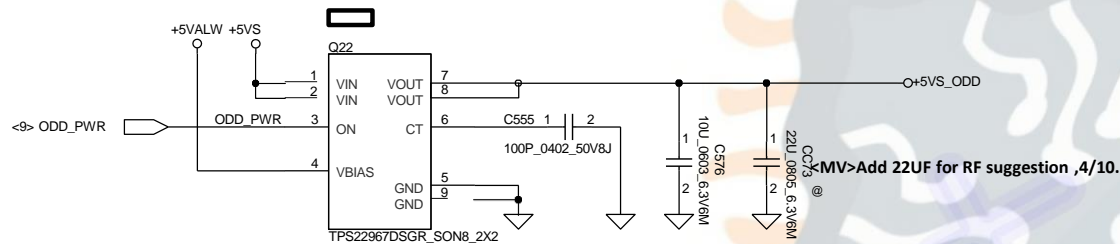


2.5" SATA HDD connector

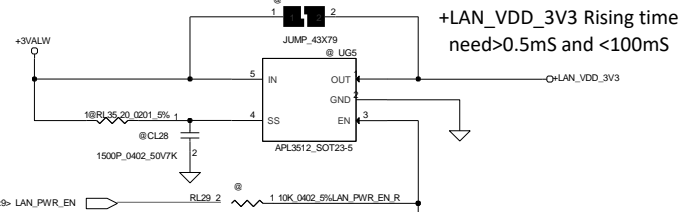


Change to dual load switch for ODD and WLAN

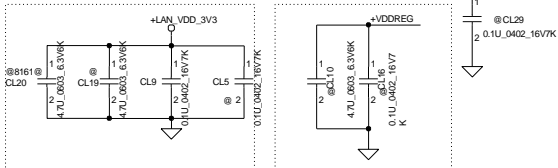
<PV>Q22 change to single load switch.



JHW1 need to short

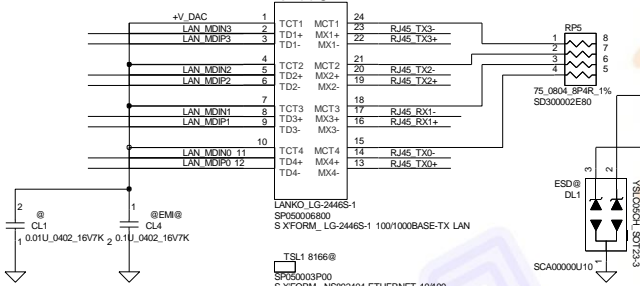


+LAN_VDD_3V3 Rising time need>0.5ms and <100ms



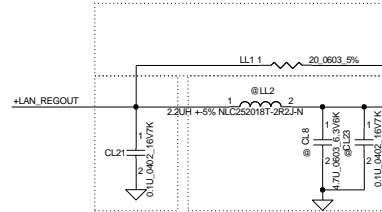
CL9 & CL5 close to UL1: Pin 11,32
CL19 close to UL1: Pin 32
CL20 close to UL1: Pin 11
CL10 & CL16 close to UL1: Pin 23

SP050005L00 Footprint

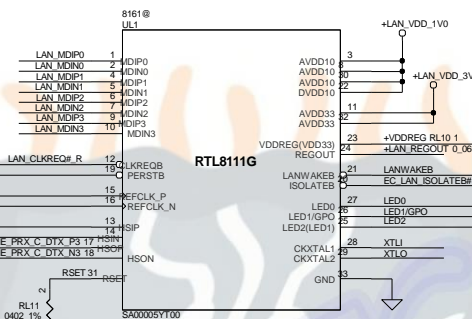


(SP050003P00) 10/100 8166@
(SP050006800) Giga 8161@

RTL8151G (LDO mode)



8151/8166 Co-Lay



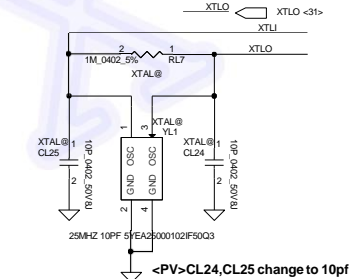
(SA000063500) 10/100 8166@
(SA00005YT00) Giga 8151@

LDO mode		Switching mode
LL1	SMT	@
CL21	SMT	@
LL2	@	SMT
CL8	@	SMT

CL14 & CL15 close UL1 Pin22
CL26 & CL27 close UL1 Pin30

Place CL11-CL13 close UL1 Pin 3, 8, 22

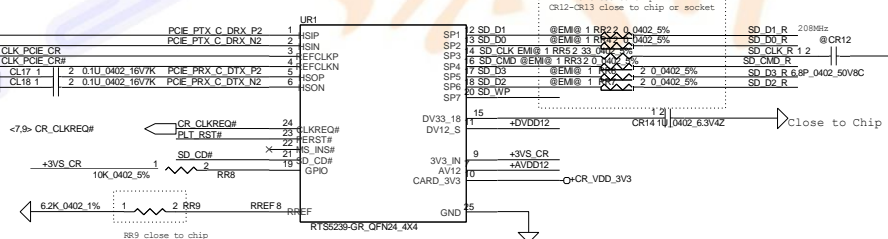
+LAN_VDD_3V3=40mil
+VDDREG=40mil
+LAN_REGOUT=60mil



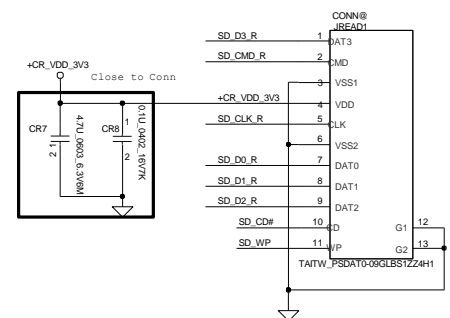
<PV>CL24,CL25 change to 10pf.

RJ45_TX3-	8	PR4-
RJ45_TX3+	7	PR4+
RJ45_RX1-	6	PR2-
RJ45_TX2-	5	PR3-
RJ45_TX2+	4	PR3+
RJ45_RX1+	3	PR2+
RJ45_TX0-	2	PR1-
RJ45_TX0+	1	PR1+

RTS5239

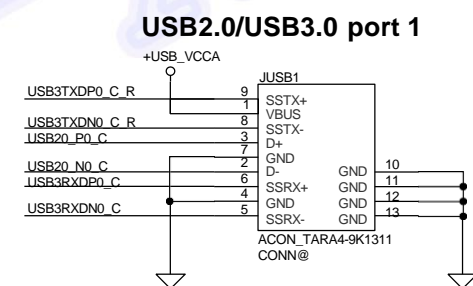
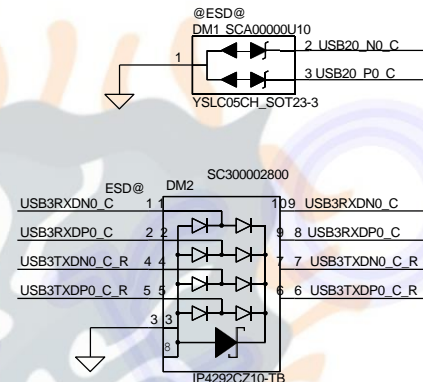
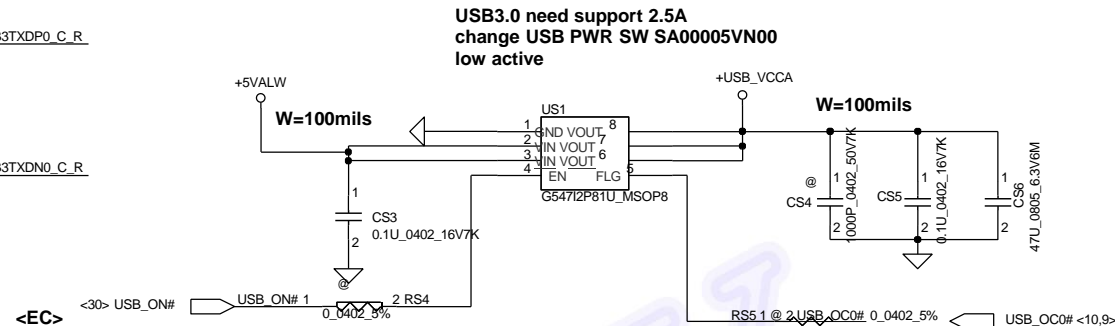
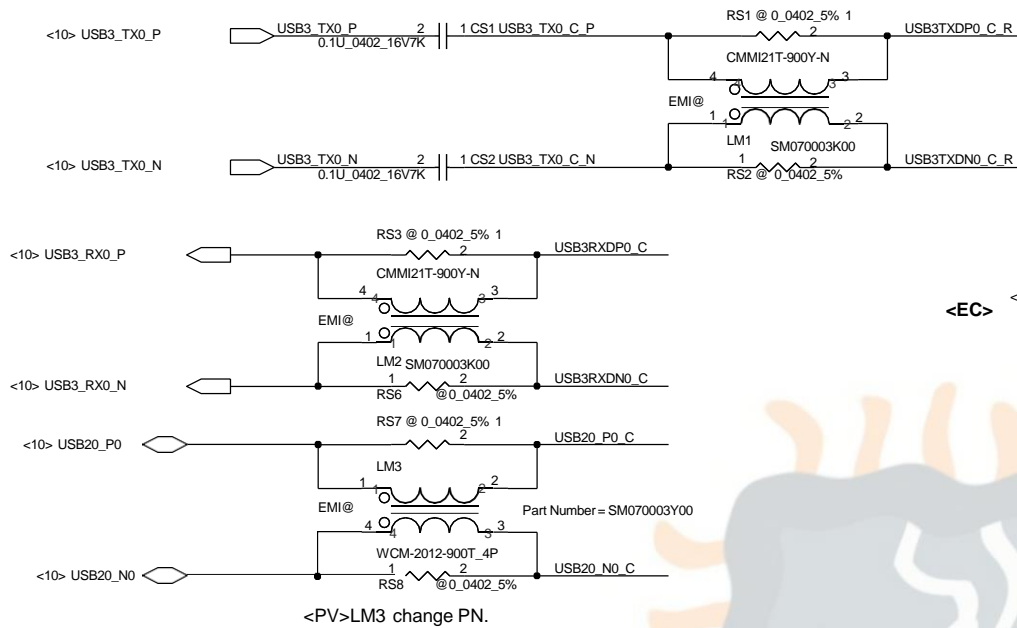


Card Reader Connector

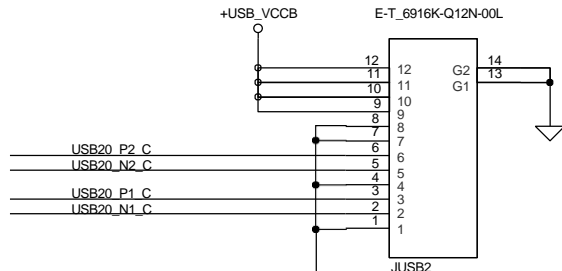
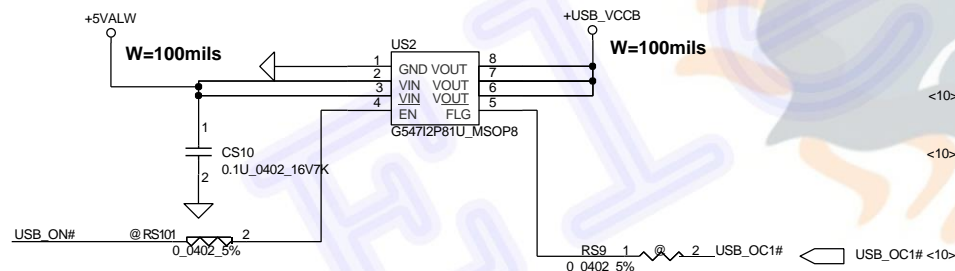


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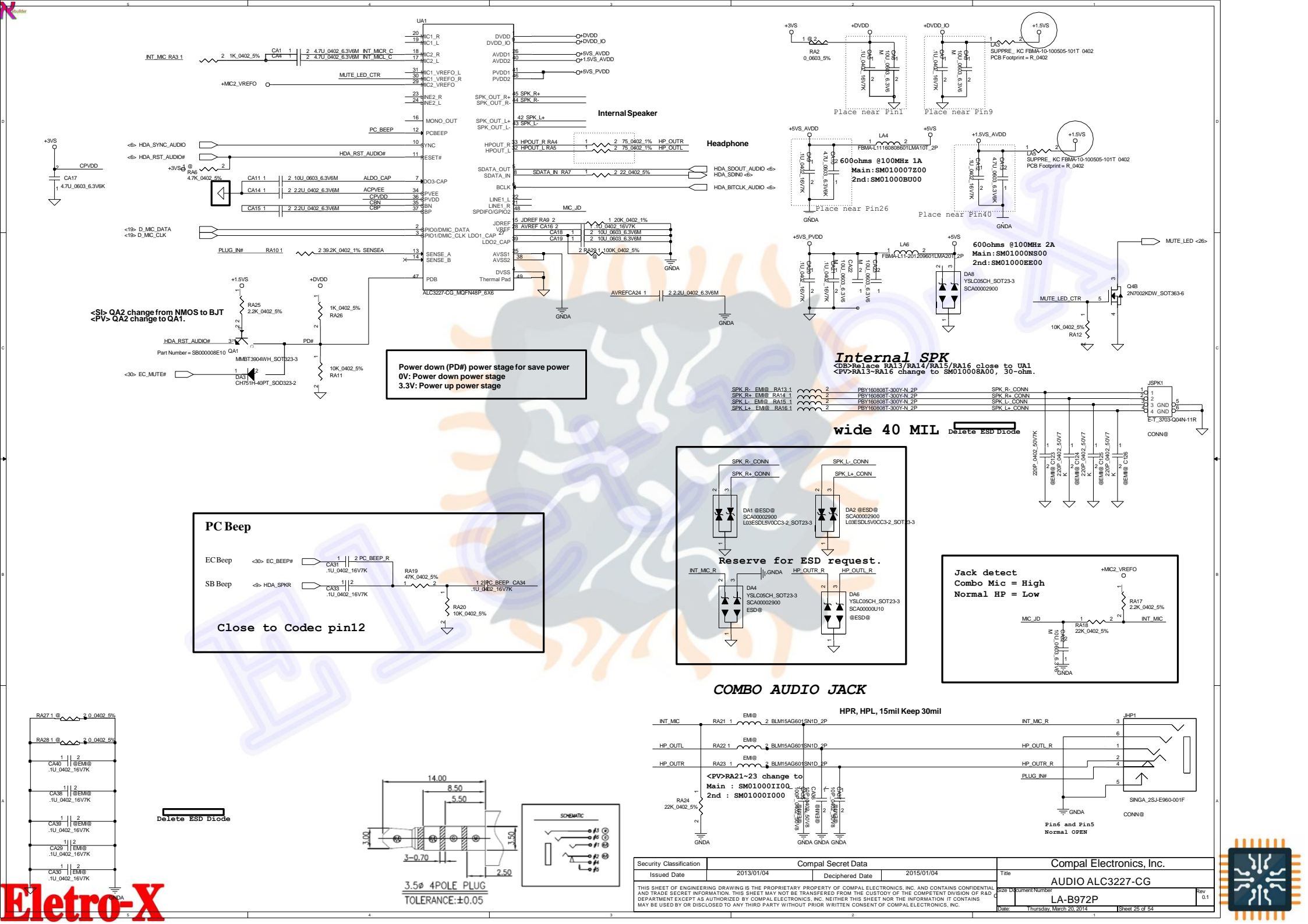


USB2.0 port x 2

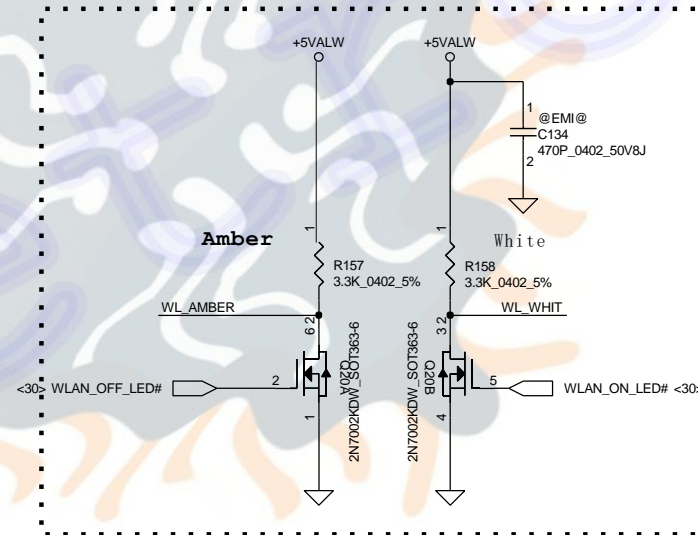
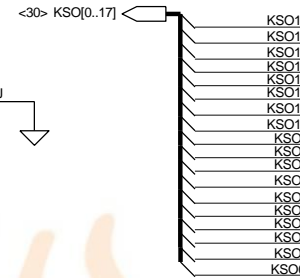
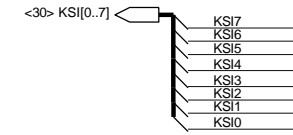
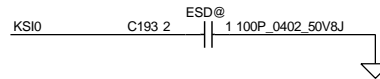
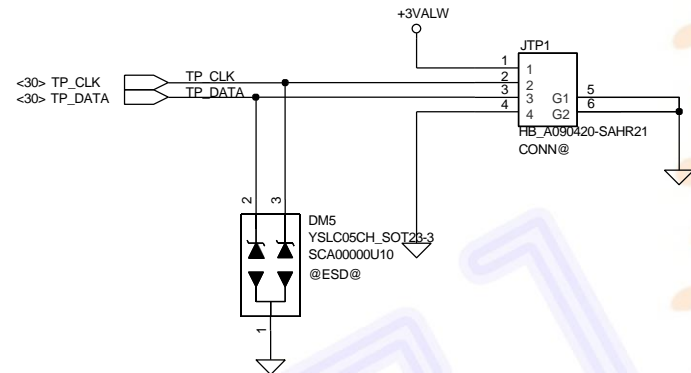


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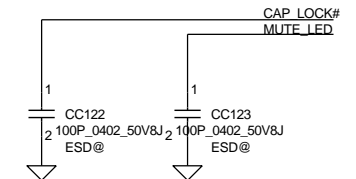
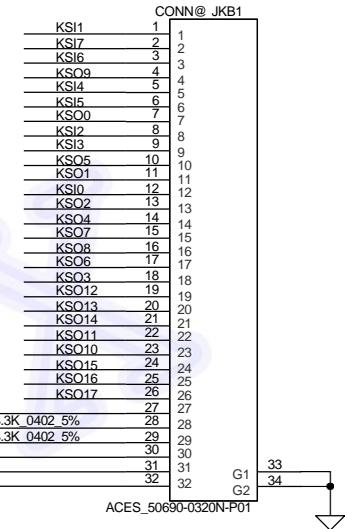




Touch pad conn



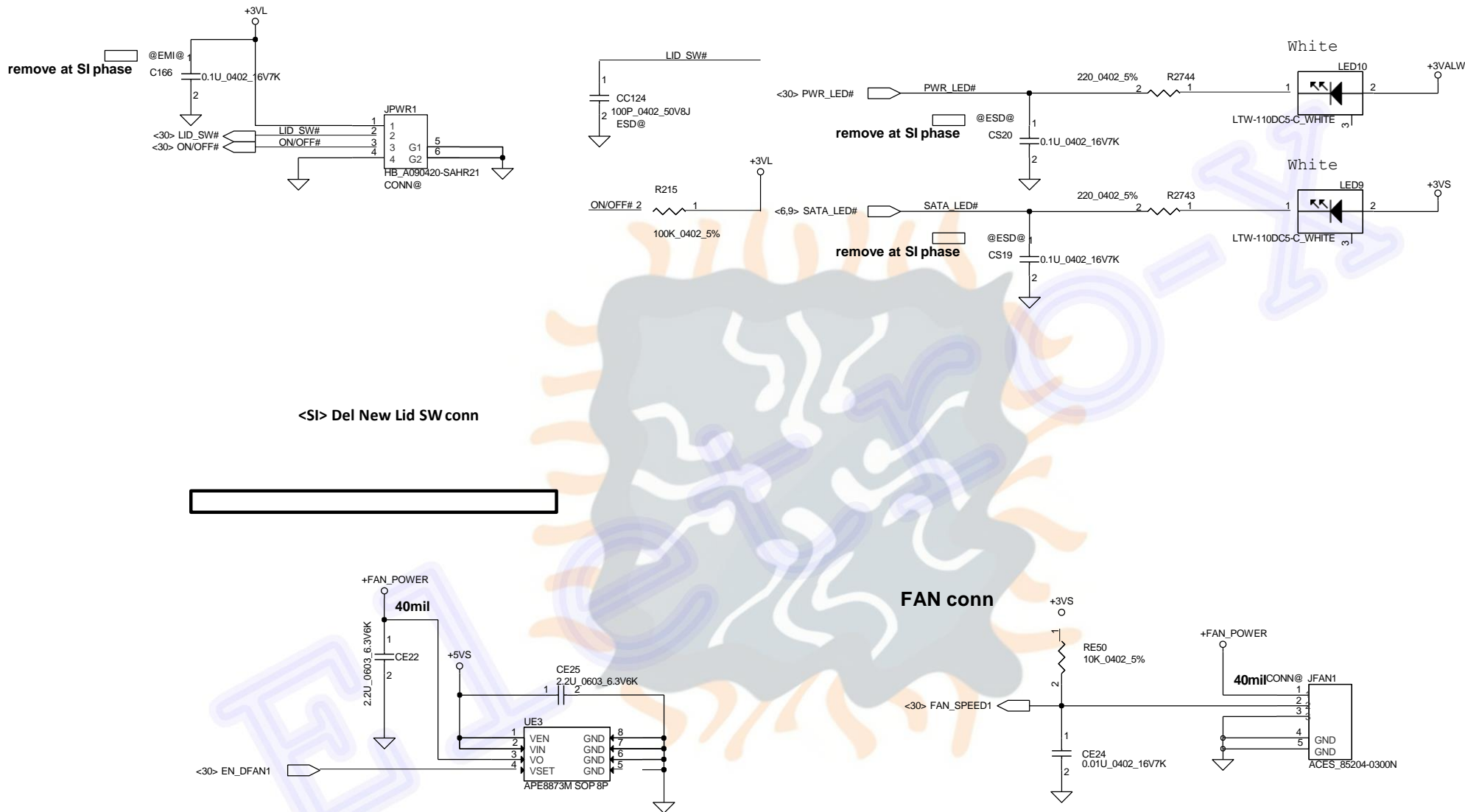
Keyboard conn



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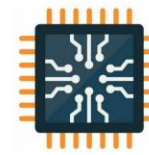
Power Button Connector

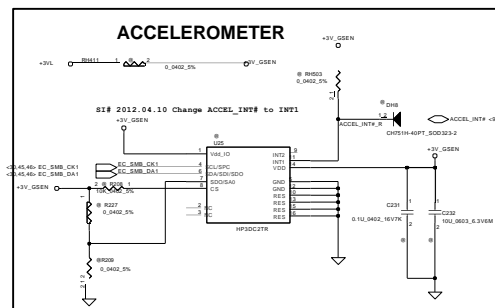
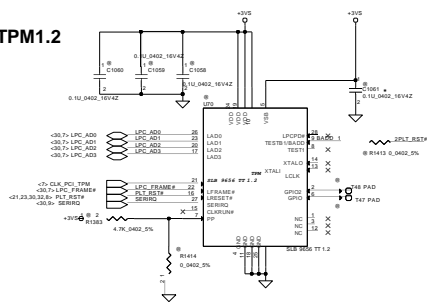


<SI> Del New Lid SW conn

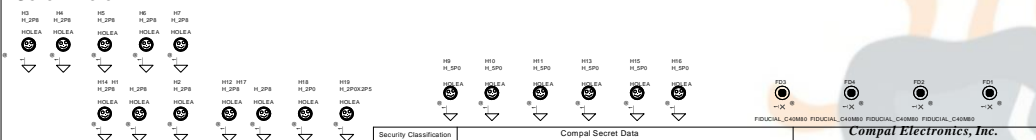
FAN conn

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				LA-B972P
				Rev 0.1
				Date: Thursday, March 20, 2014
				Sheet 27 of 54

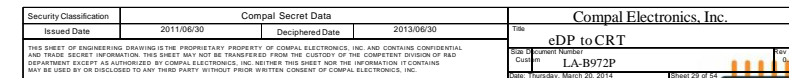




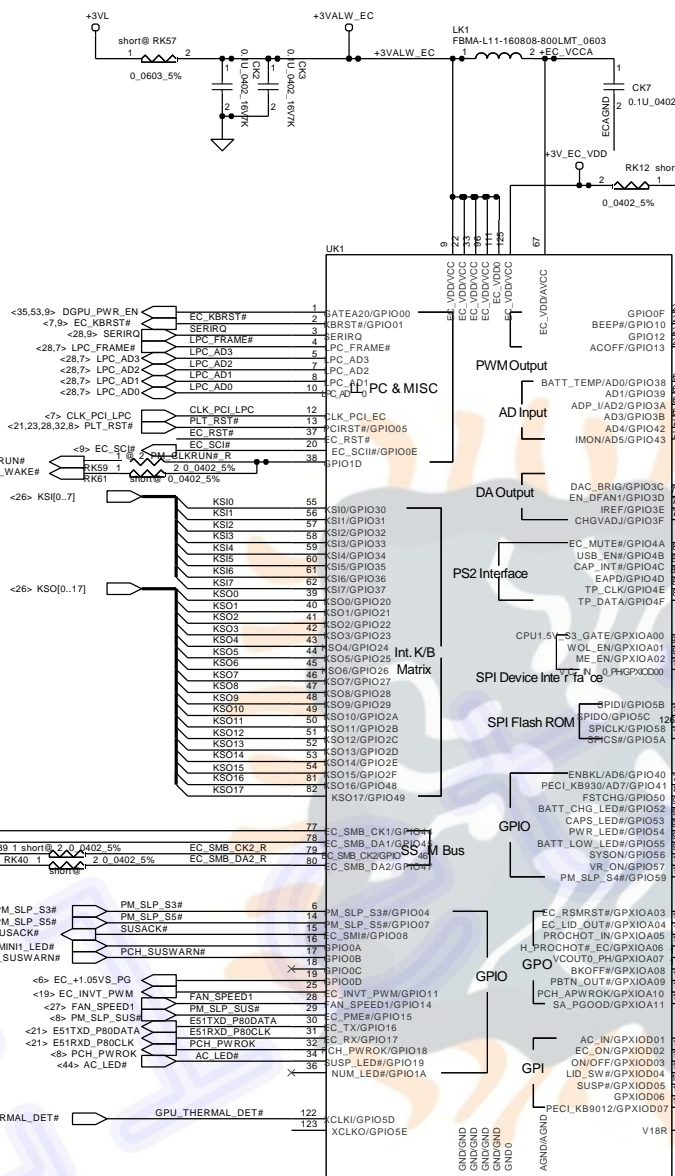
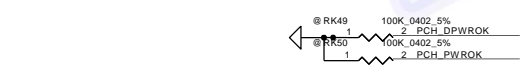
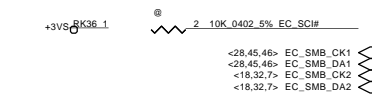
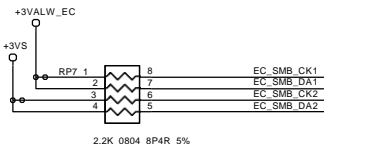
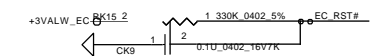
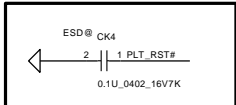
Screw Hole



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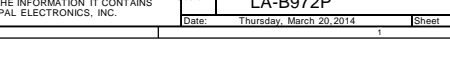
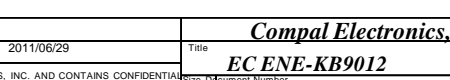
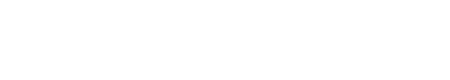
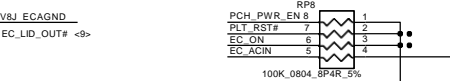
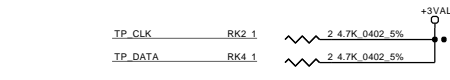
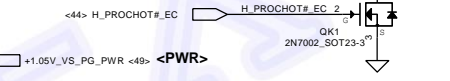
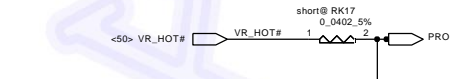
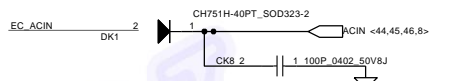
PV# 2013.01.29 Add CK4 for ESD protection



15"	DB	SI	PV	MV
UMA	12k ohm	20K ohm	33K ohm	56K ohm
RK13	12k ohm	20K ohm	33K ohm	56K ohm
DIS	160k ohm	240k ohm	330k ohm	560k ohm
RK13	160k ohm	240k ohm	330k ohm	560k ohm

14"	DB	SI	PV	MV
UMA	0 ohm	15K ohm	27K ohm	43K ohm
RK13	0 ohm	15K ohm	27K ohm	43K ohm
DIS	130k ohm	200k ohm	270k ohm	430k ohm
RK13	130k ohm	200k ohm	270k ohm	430k ohm

Board ID control
 <DB>RK13 change to 160K ==>for 15" DIS
 <DB>RK13 change to 12K ==>for 15" UMA

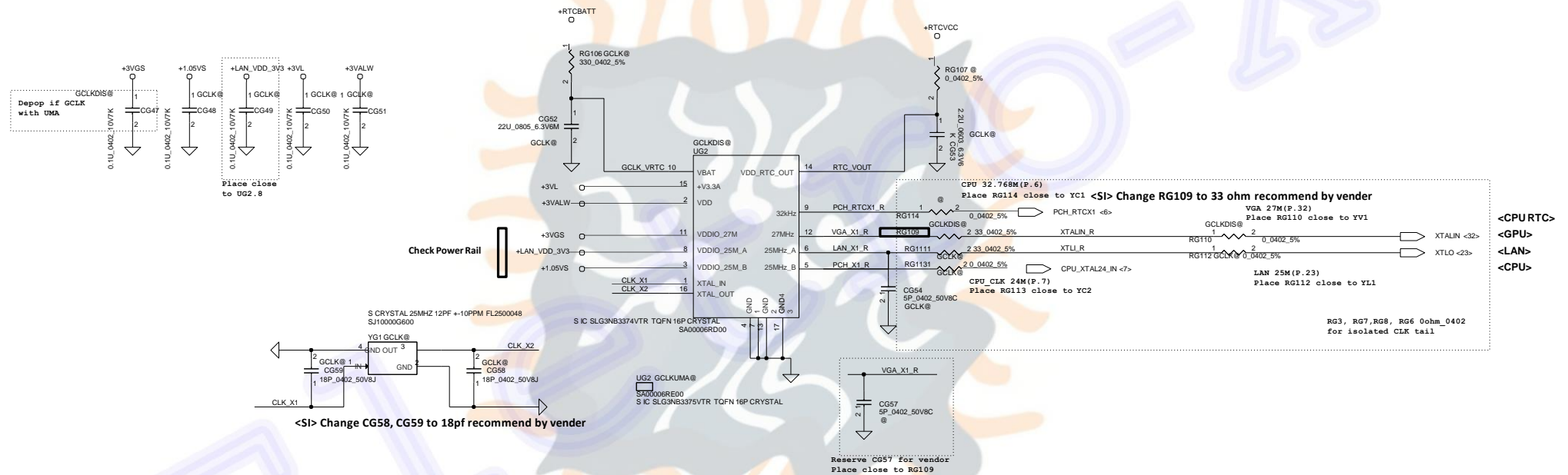


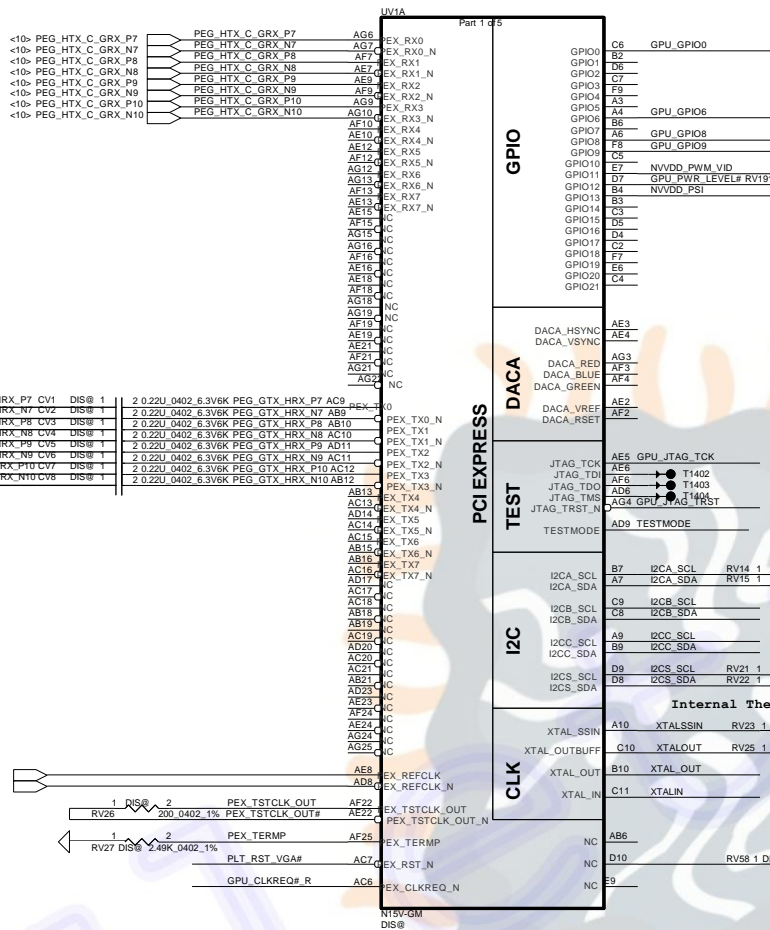
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BOM control

Platform	Silego P/N	Compal PN	25MHz(A)	32.768KHz	24MHz(B)	27MHz	8MHz	Remark
Intel ULT UMA	SLG3NB3375V	SA00006RE00	1	1	1	X	X	GCLKUMA@
Intel ULT Dis	SLG3NB3374V	SA00006RD00	1	1	1	1	X	GCLKDIS@

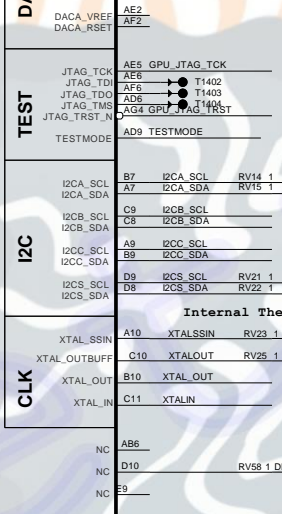
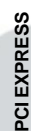
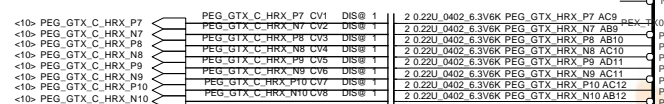
Base on A32 32.768KHz use 10ppm, G-CLK 25MHz X'TAL use 10ppm.





GPU_PWR_LEVEL# RV62 1 DIS@	2	100K_0402_5%
GPU_GPIO6 RV43 1 DIS@	2	10K_0402_5%
NVDD_PSI RV44 1 DIS@	2	10K_0402_5%
GPU_GPIO8 RV46 1 DIS@	2	10K_0402_5%
GPU_GPIO9 RV48 1 DIS@	2	10K_0402_5%

GPU_GPIO0 RV49 1 DIS@ 2.10K 0402 5%



DIS@ RV36

Signal	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
GPU_JTAG_TCK	1							8
TESTMODE		2						7
GPU_JTAG_TRST			3					6
GPU_CLKREQ#_R				4				5

10K 0804 8P4R 5%

DIS@ RV16

I2CB_SDA 1 8

I2CB_SCL 2 7

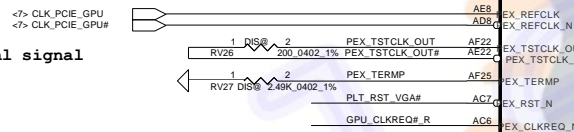
I2CC_SDA 3 6

I2CC_SCL 4 5

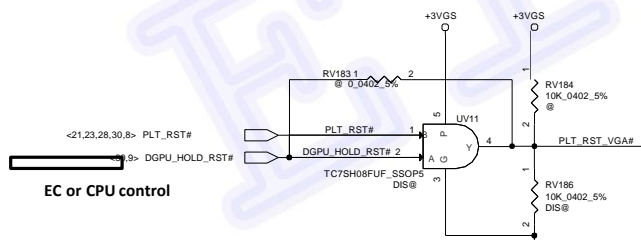
2.2K_0804_8P4R_5%

#08/22.unused I2C change to pull-down

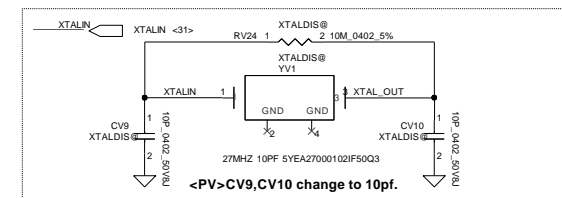
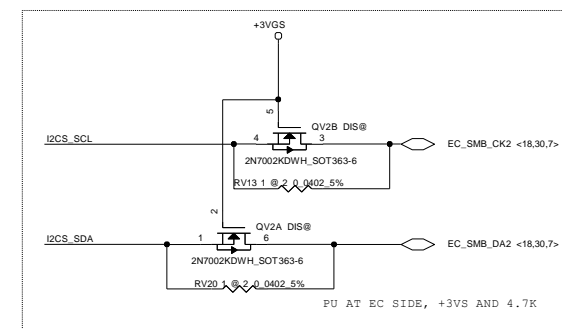
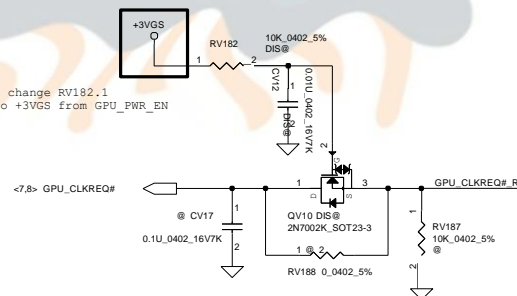
Differential signal



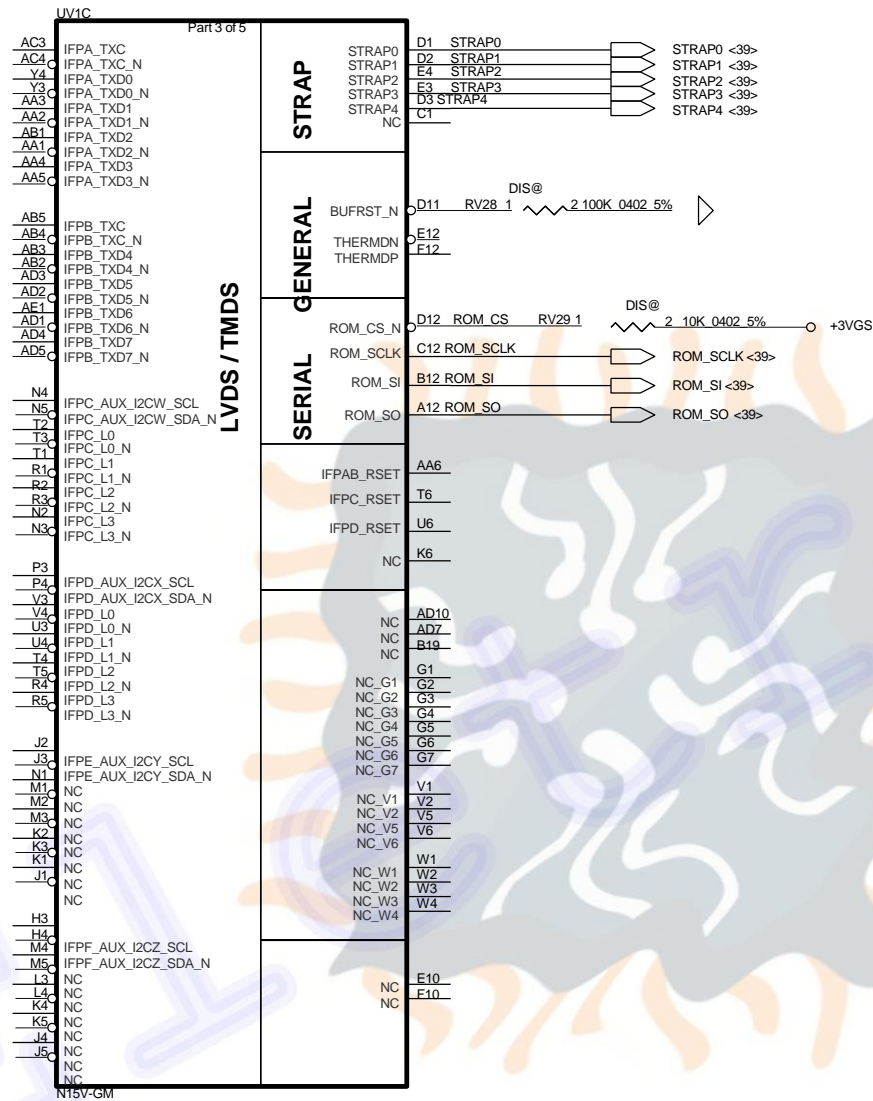
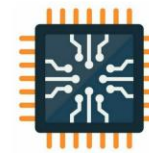
EC or CPU control



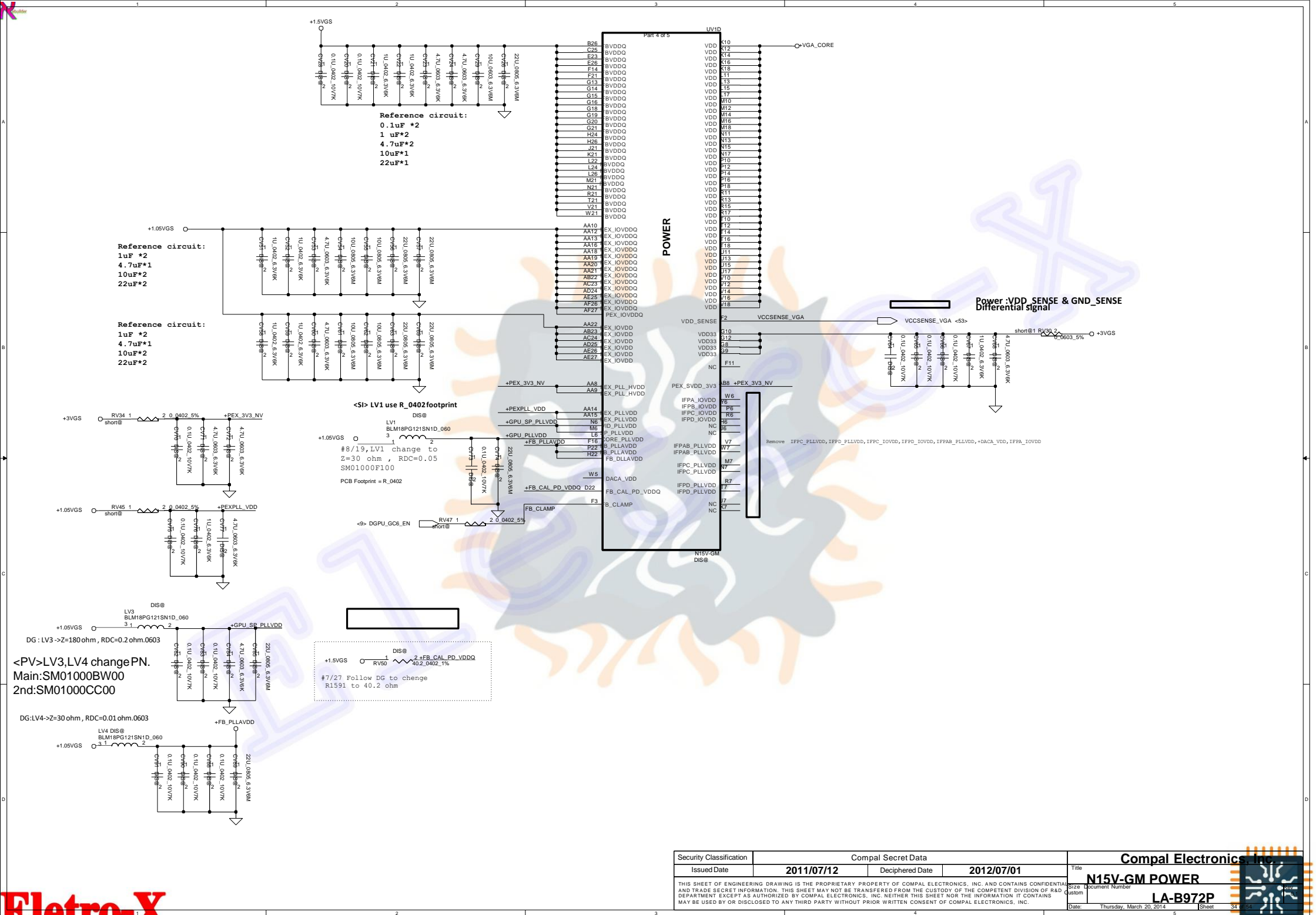
SI 11/05 change RV182.1
change to +3VGS from GPU PWR EN

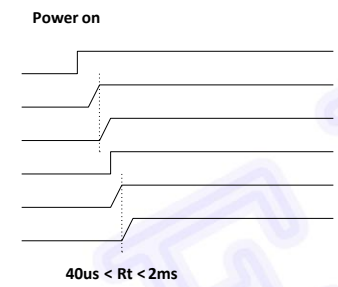
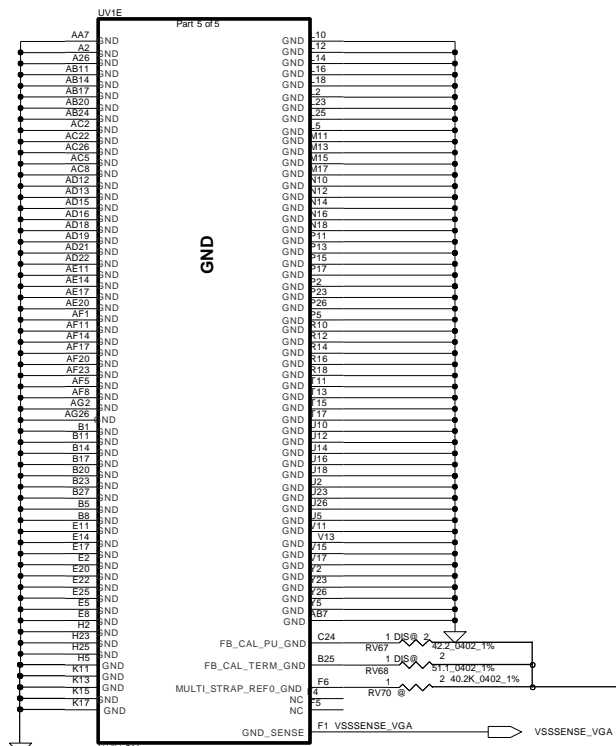


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				Size	Document Number
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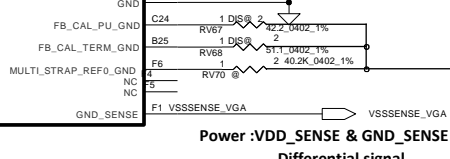
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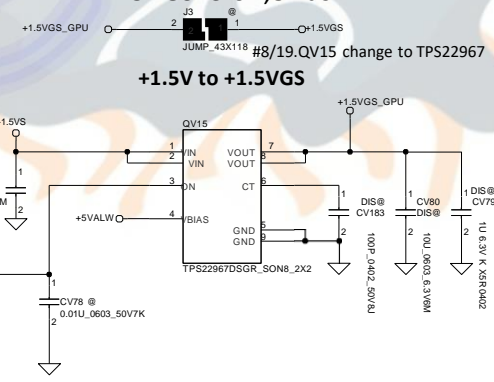
DGPU_PWR_EN
+3VGS
+VGA_CORE
DGPU_PWROK
+1.05VGS
+1.5VGS

40us < R_t < 2ms



#8/19.RV70 unpop , N15V-GM use binary mode.
Contrl by power

+1.5VGS=3.6A,8vias.



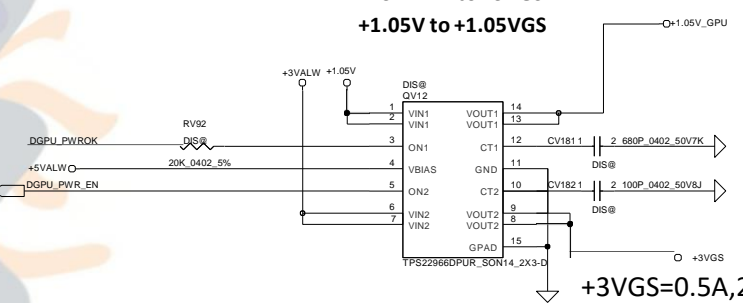
#08/20 Don't support GC6, Add RV66.
Unpop QV16, RV41, RV42, CV78.

#8/20 : N15V-GM don't support GC6 function. UV20 unpop.

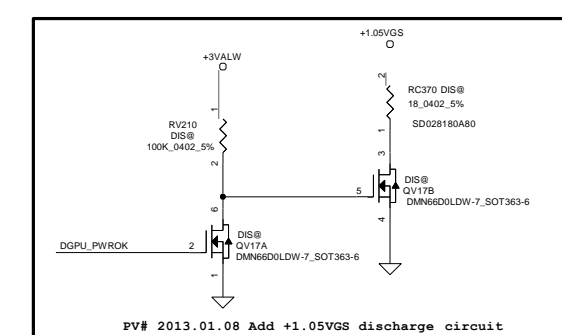


+1.05VGS=1.6A,4vias.

+3VALW to +3VGS
+1.05V to +1.05VGS



+3VGS=0.5A,2vias.



PV# 2013.01.08 Add +1.05VGS discharge circuit

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Compal Electronics, Inc.				N15V-GM VGA CORE, GND	
Date				Thursday, March 20, 2014	
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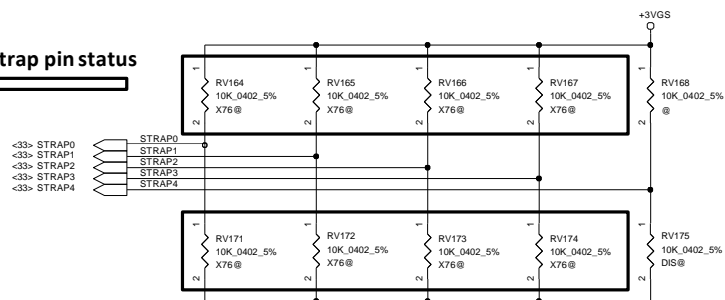


Data0~Data31

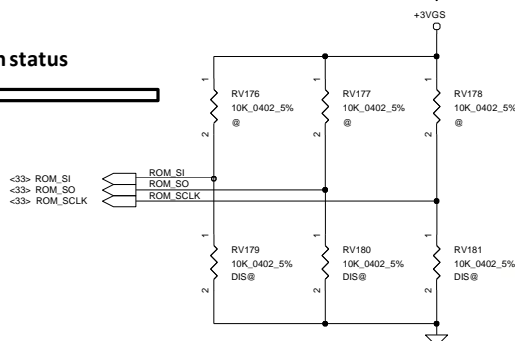
Rank 0



Check Strap pin status



Check SPI pin status



GPU	Project	VRAM size	CH	Description	Compal VRAM P/N	VRAM description	ROM CFG setup [3...0]	RAM_CFG	R P/N
	ZSO40	128M(X16)	CHA	DDR3 Hynix 128Mx16 1.5V	SA00006H400	H5TC2G63FFR-11C 1000MHz	1100	RV171+RV172+RV167+RV166	
	ZSO56	128M(X16)	CHA	DDR3 Micron 128Mx16 1.5V	SA000067500	MT41J128M16JT-093G-K 1000MHz	0001	RV164+RV172+RV173+RV174	
(One CH single rank)		128M(X16)	CHA	DDR3 Samsung 128Mx16 1.5V	SA000068U40	K4W2G1646Q-BC1A 1000MHz	1110	RV165+RV166+RV167+RV171	

#9/5 RAM_CFG follow RVL-06891-001 table 1.

Dule Rank layout with single Rank population.

Table 123

Strap pin Name	Strap Mapping	Resistance	Polarity	Logical Strapping Bit0
ROM_SCLK	SMB_ALT_ADDR	10K	Pull-down to GND.	
ROM_SI	SUB_VENDOR	10K	Pull-down to GND if no VBIOS ROM.	
ROM_SO	VGA_DEVICE	10K	Pull-down to GND(no diplay).	
STRAP0	RAM_CFG[0]	10K		
STRAP1	RAM_CFG[1]	10K		
STRAP2	RAM_CFG[2]	10K		
STRAP3	RAM_CFG[3]	10K		
STRAP4	PCIE_MAX_SPEED	10K	Pull-down to GND(PCIE Gen1).	

SMBUS_ALT_ADDR

0	0x9E (Default)
1	0x9C (Multi-GPU usage)

SUB_VENDOR

0	Disable (Default)
1	

VGA_DEVICE

0	Non-Primary 3D Acceleration Device(Class Code 302h)(Default)
1	Primary Display or VGA Device .

PCIE_MAX_SPEED

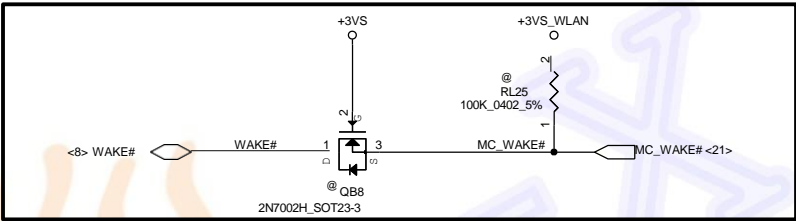
0	Limit to PCIe Gen1
1	PCIe Gen 2/3 Capable

USER Straps

User[3:0]	
1000-1100	Customer defined

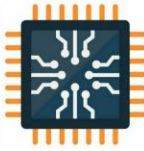
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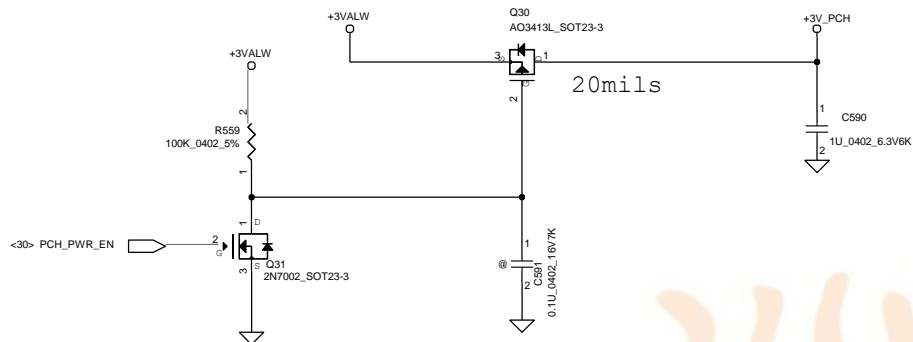
NGFF and WLAN



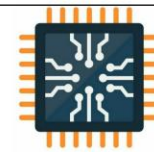
PV# 2013.01.23 Add QB8 abd RL25 to support OBFF
PV# 2013.02.22 Unpop QB4 and RL23 for not support OBFF

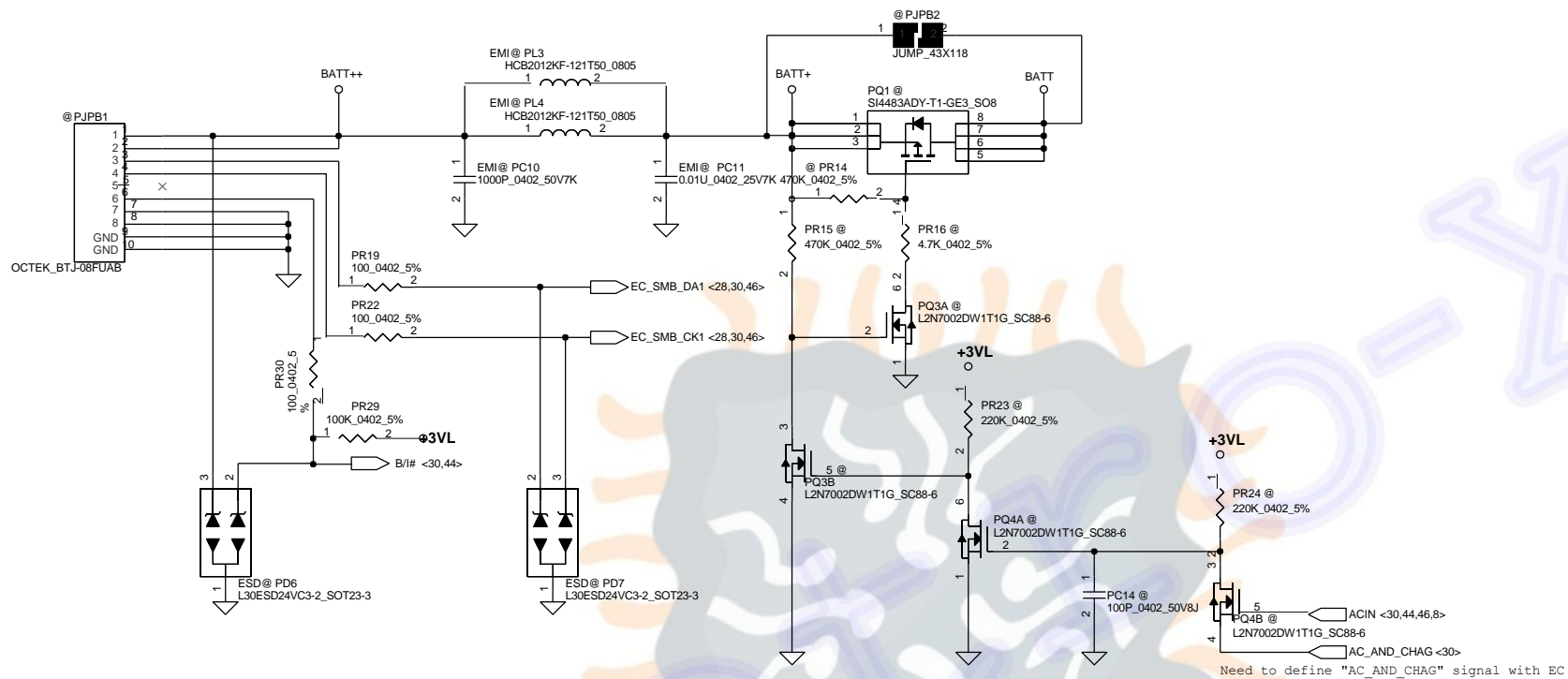
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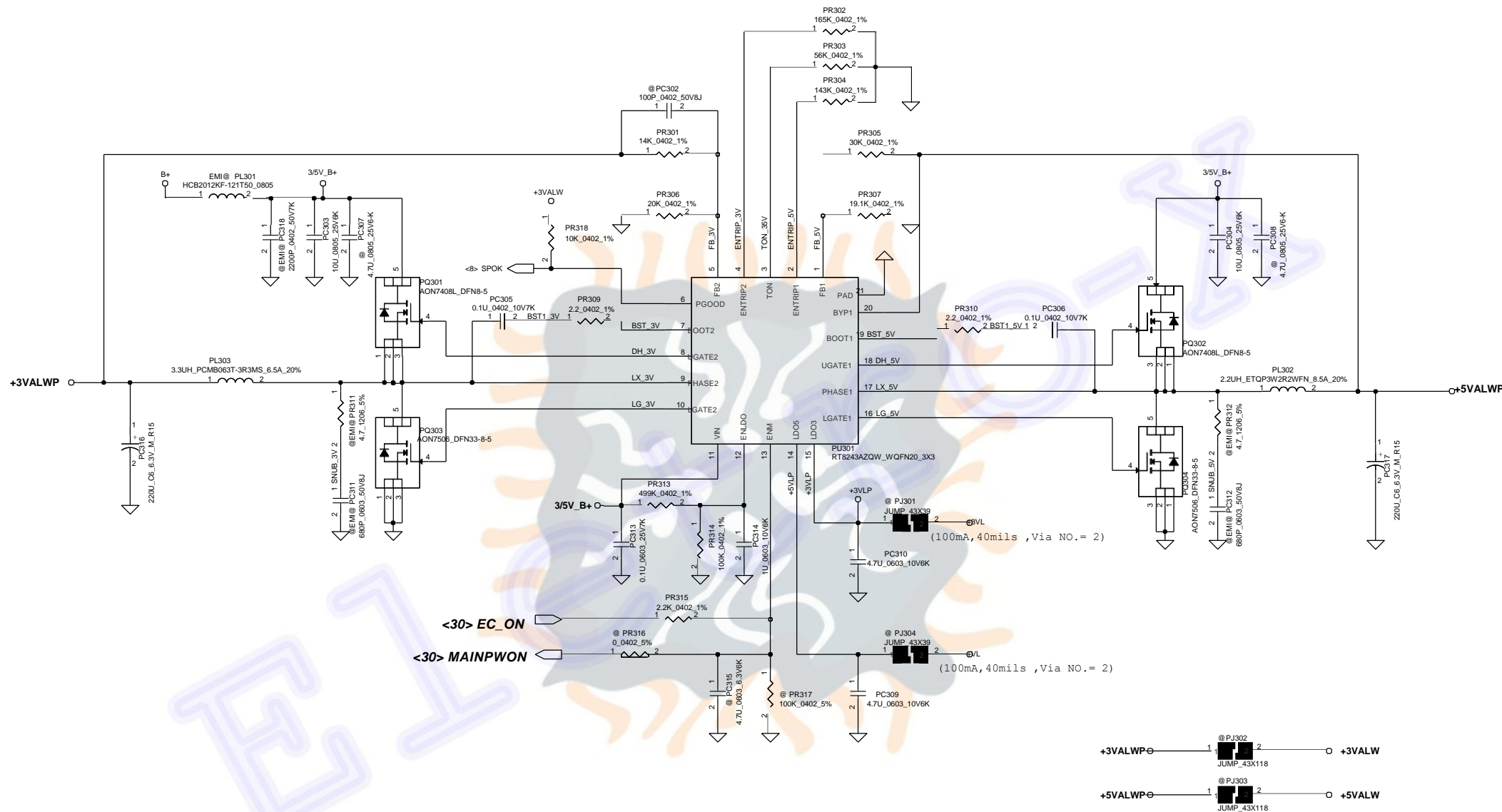
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Issued Date	2011/06/29	Deciphered Date	2011/06/29	Title	DC DC Device-1
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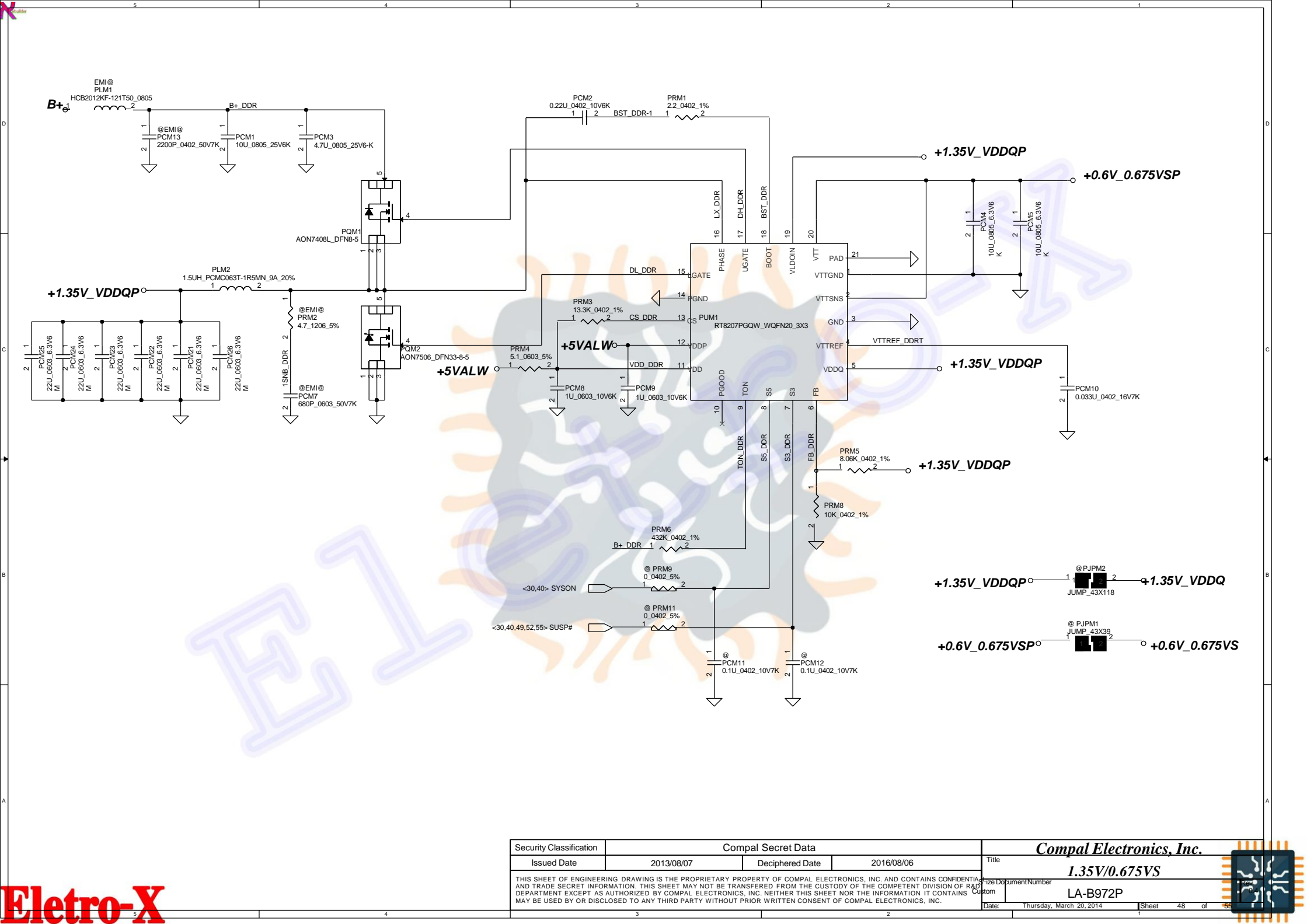


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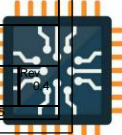
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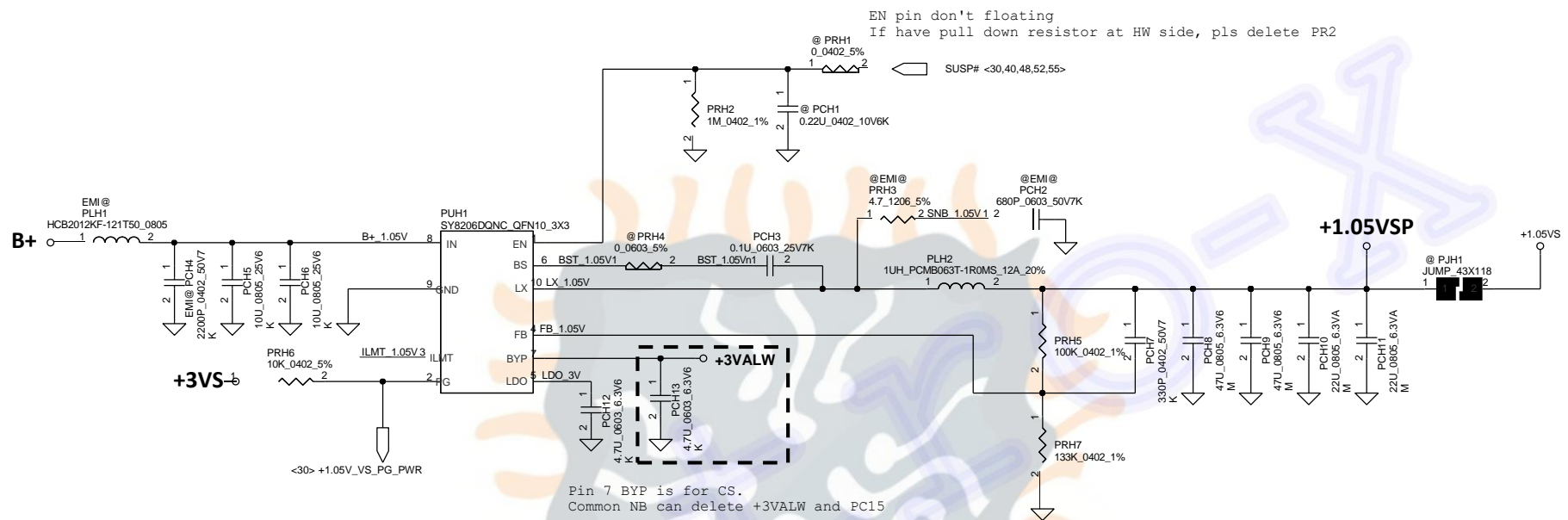


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EN pin don't floating
If have pull down resistor at HW side, pls delete PR2

SUSP# <30,40,48,52,55>

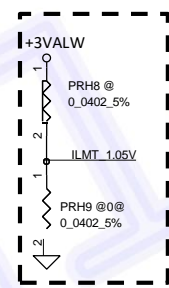
+1.05VSP

+1.05VS

continuous 6A
peak 12A

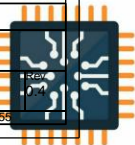
<30> +1.05V_VS_PG_PWR

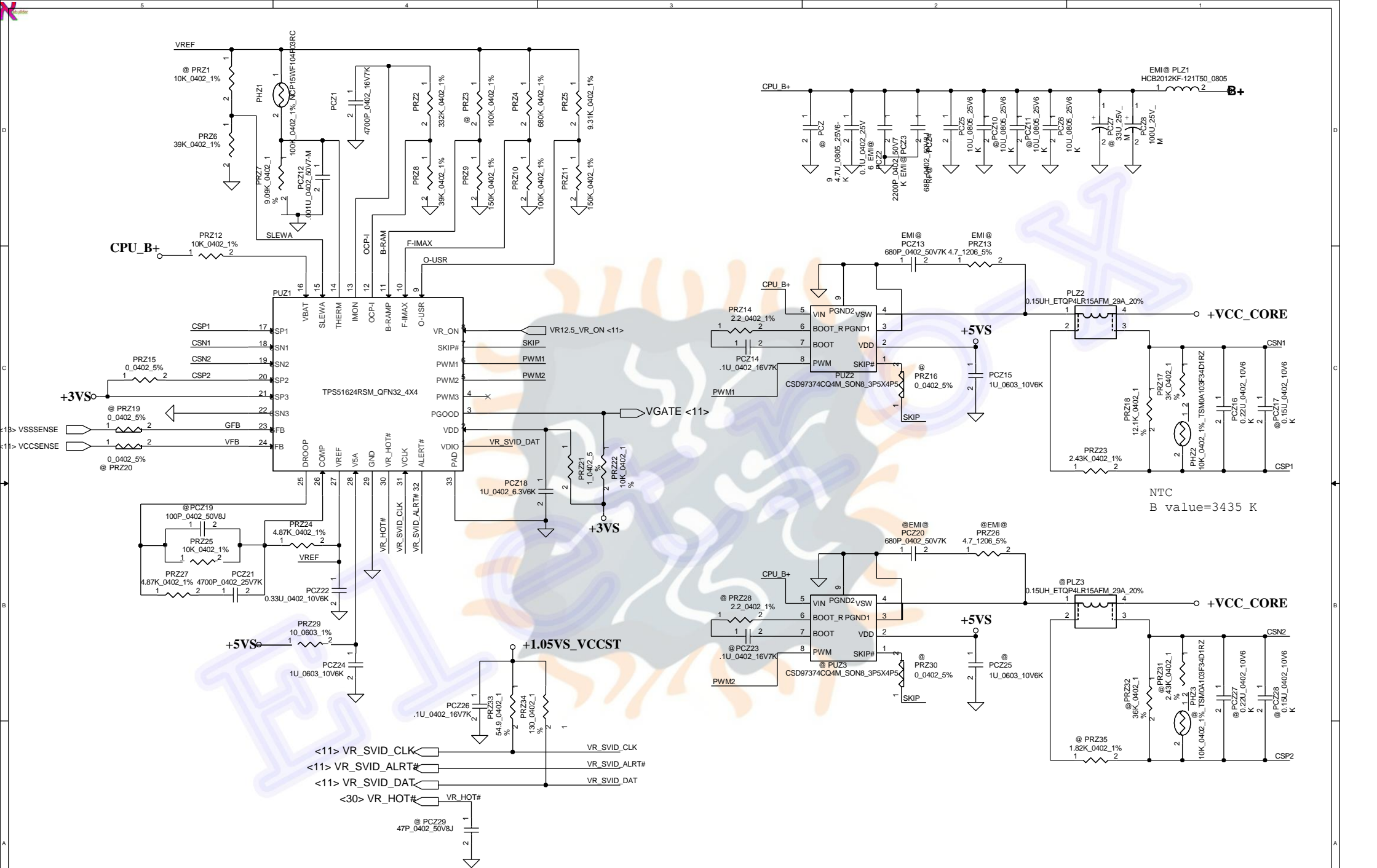
Pin 7 BYP is for CS.
Common NB can delete +3VALW and PC15



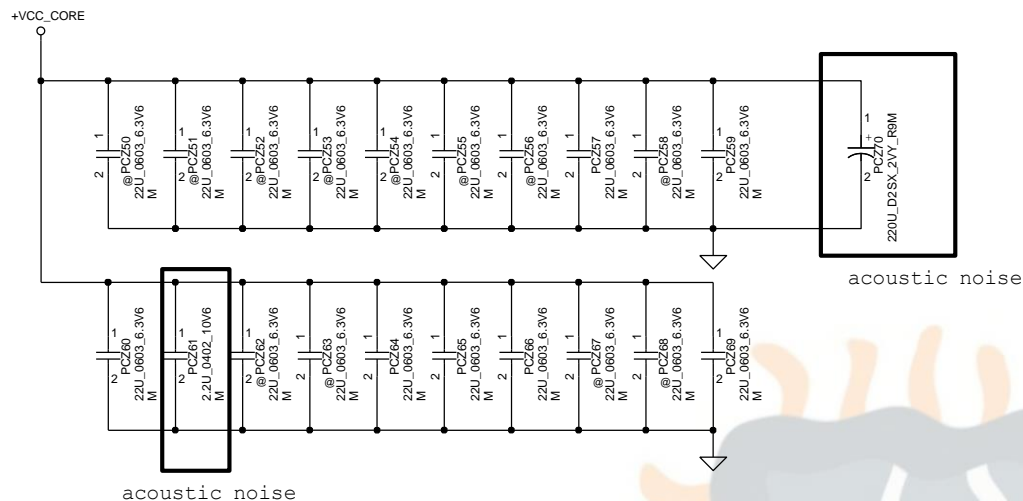
The current limit is set to 8A, 12A or 16A when this pin is pull low, floating or pull high

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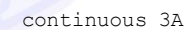





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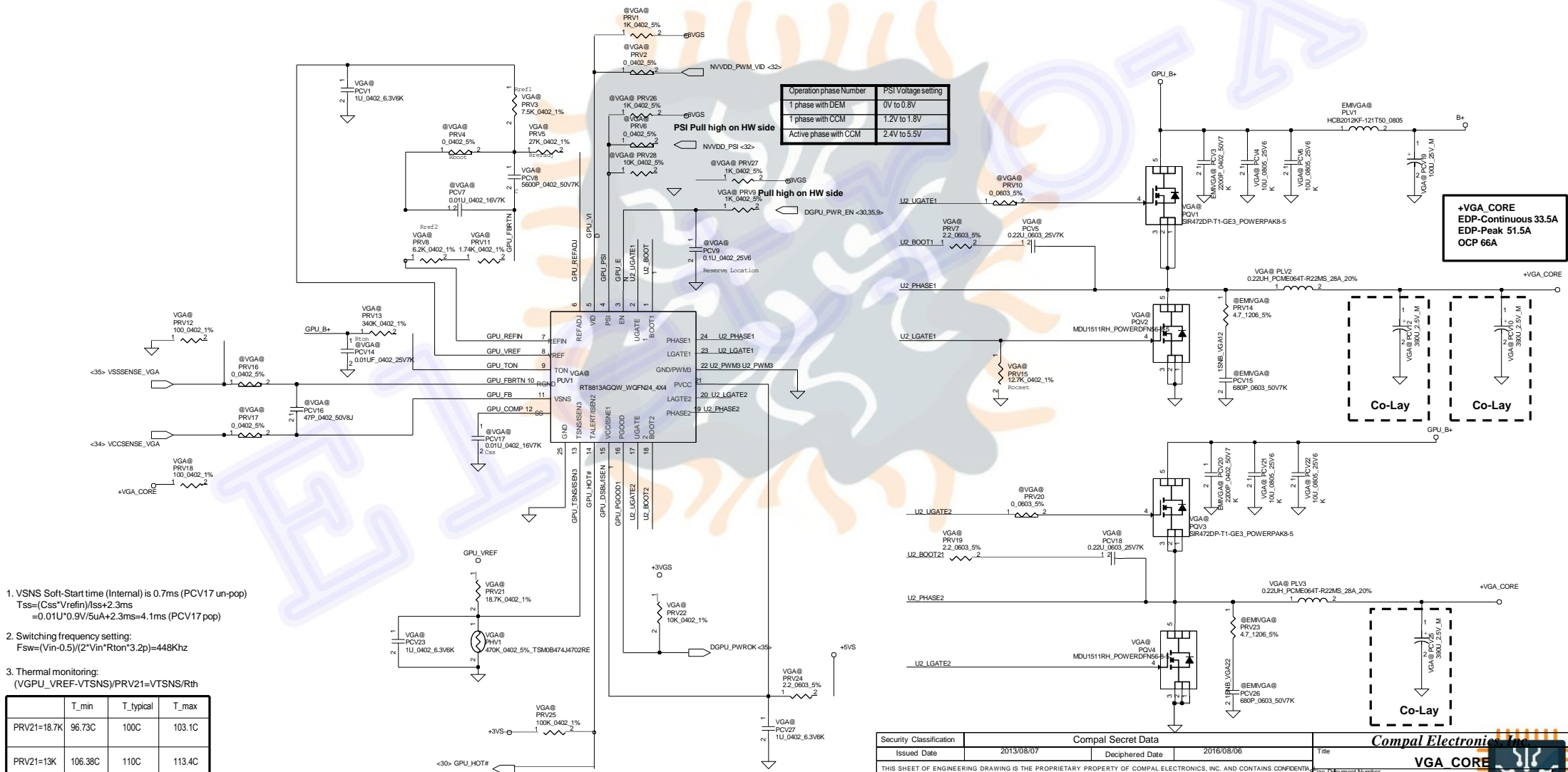
<div> <div>  </div> <div> <h1>Compal Electronics, Inc.</h1> </div> </div>									
Title		1.5VS							
Size Document Number		LA-B972P							
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1. VSNS Soft-Start time (Internal) is 0.7ms (PCV17 un-pop)
 $T_{SS} = (C_{SS} \cdot V_{REFIN}) / I_{SS} + 2.3ms$
 $= 0.01U \cdot 0.9V / 5uA + 2.3ms = 4.1ms$ (PCV17 pop)

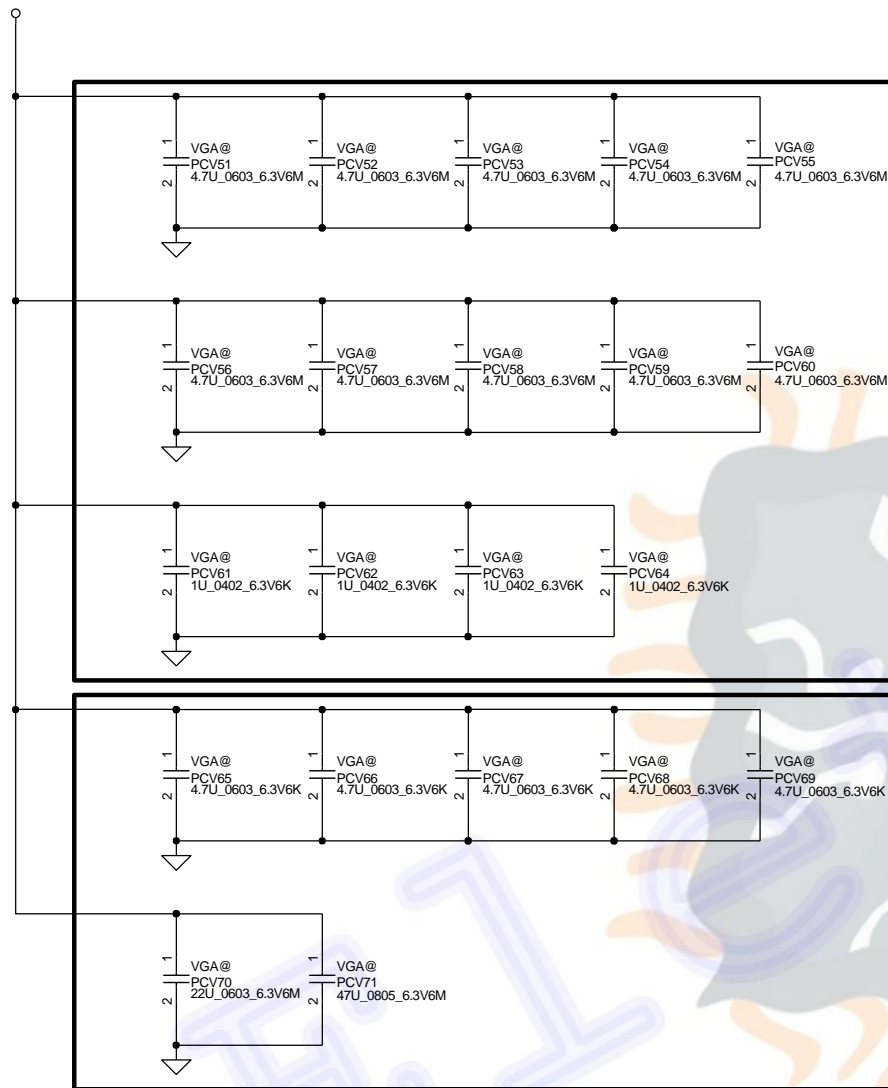
2. Switching frequency setting:
 $F_{SW} = (V_{IN} - 0.5) / (2 \cdot V_{IN} \cdot R_{TON} \cdot 3.2p) = 448KHz$

3. Thermal monitoring:
 $(V_{GPU_VREF} - V_{TSNS}) / PRV21 = V_{TSNS} / R_{th}$

	T _{min}	T _{typical}	T _{max}
PRV21=18.7K	96.73C	100C	103.1C
PRV21=13K	106.38C	110C	113.4C



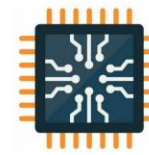
+VGA_CORE

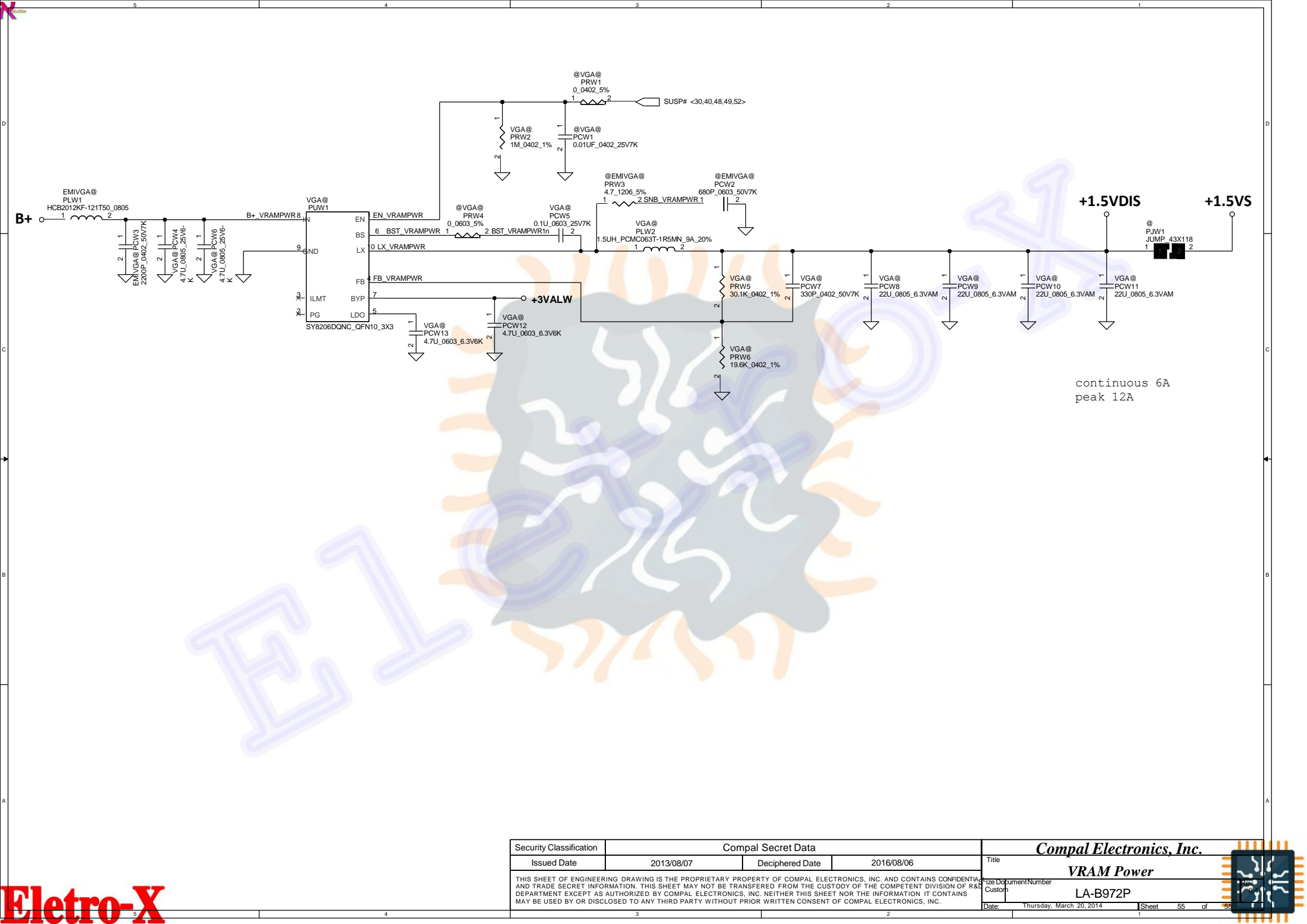


PLACE UNDER GPU

PLACE NEAR GPU

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VRAM Power		LA-B972P	
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