

MODEL NAME : *PALB0*
PCB NO : *LA-6801P (DAB00000410)*
BOM P/N : *46198531L01 -->R3*
46198531L02 -->R1
46198531L03 -->R3
46198531L04 -->R1

Dell/Compal Confidential

Schematic Document

Specter (Huron River)

Sandy Bridge (PGA) + Cougar Point (standard)

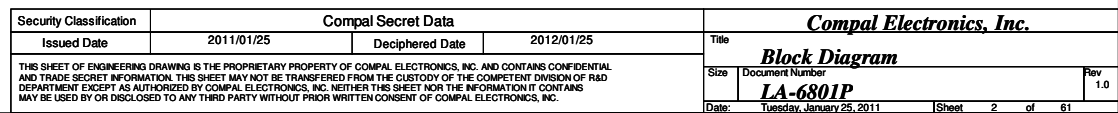
DISCRETE VGA N12E-GE-B (optimus)

2011-01-25

Rev: 1.0

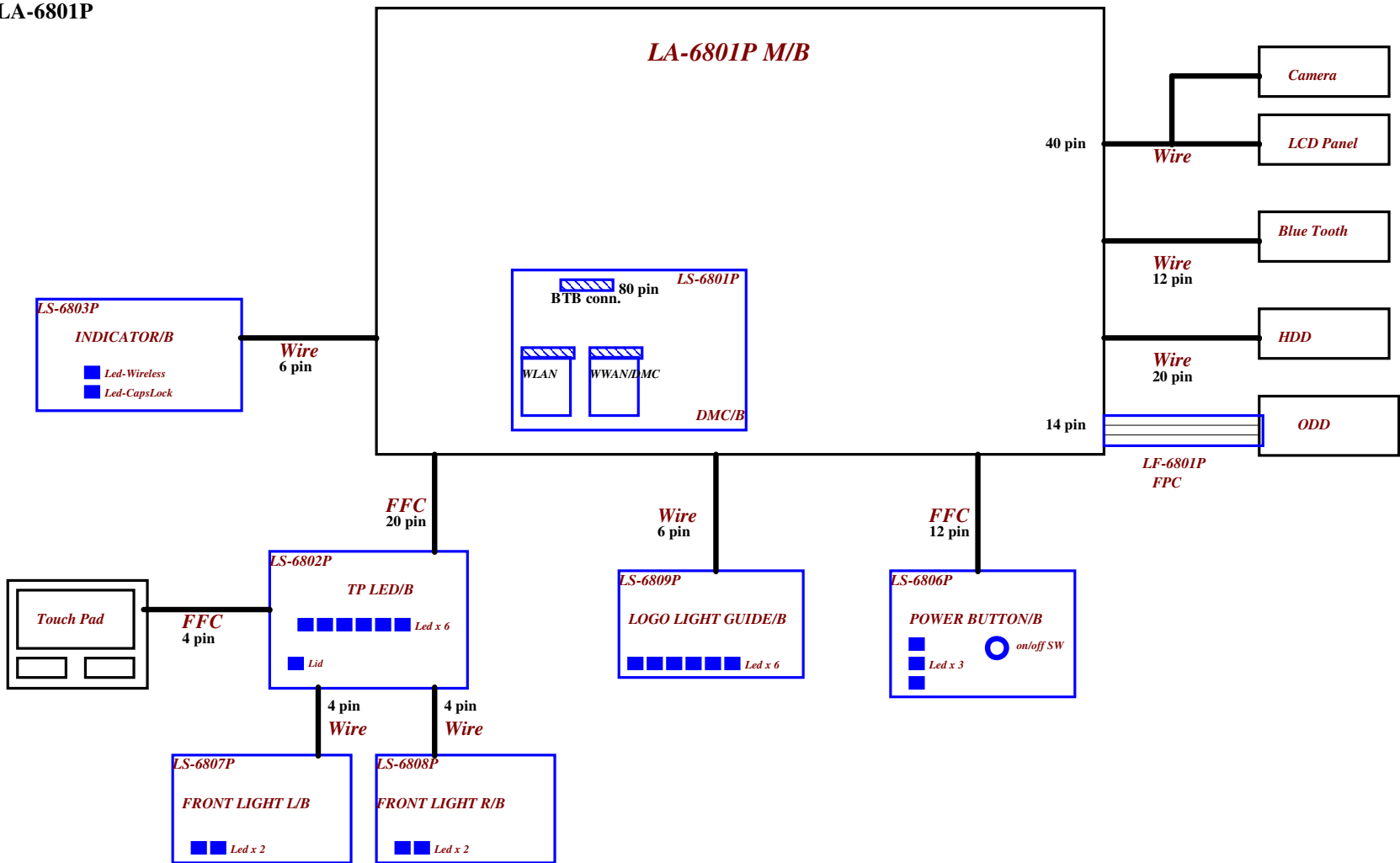
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Project Code : PALB0
File Name : LA-6801P



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Board ID Table for AD channel

Vcc	3.3V +/- 5%				
Ra	100K +/- 5%				
Board ID	Rb	VAD_BID_min	VAD_BID_typ	VAD_BID_max	EC_AD3
0	0	0 V	0 V	0.155 V	0x00-0x0C
1	8.2K +/- 5%	0.168 V	0.250 V	0.362 V	0x0D-0x1C
2	18K +/- 5%	0.375 V	0.503 V	0.621 V	0x1D-0x30
3	33K +/- 5%	0.634 V	0.819 V	0.945 V	0x31-0x49
4	56K +/- 5%	0.958 V	1.185 V	1.359 V	0x4A-0x69
5	100K +/- 5%	1.372 V	1.650 V	1.838 V	0x6A-0x8E
6	200K +/- 5%	1.851 V	2.200 V	2.420 V	0x8F-0xBB
7	NC	2.433 V	3.300 V	3.300 V	0xBC-0xFF

BOARD ID Table

Board ID	PCB Revision
0	0.1
1	0.2
2	0.3
3	0.4
4	1.0
5	
6	
7	

PCH

USB PORT#	DESTINATION
0	None
1	JUSB1 (2.0 Ext Left Side)
2	Bluetooth
3	CAMERA
4	JMINI1 (WLAN)
5	JMINI2 (WWAN/DMC)
6	ELC 8051
7	None
8	None
9	None
10	None
11	None
12	None
13	None

SMBUS Control Table

	SOURCE	MINI1	MINI2	BATT	SODIMM	Thermal Sensor 1	Thermal Sensor 2	FFS	VGA Thermal Sensor	VGA	DMC	XDP	Charger
EC_SMB_CK1 EC_SMB_DA1	KB930			V									
EC_SMB_CK2 EC_SMB_DA2	KB930					V	V		V				
PCH_SML0CLK PCH_SML0DATA	PCH												
PCH_SML1CLK PCH_SML1DATA	PCH												V
MEM_SMBCLK MEM_SMBDATA	PCH	V	V		V			V		V	V	V	

Link

CLKOUT	DESTINATION
PCI0	PCH_LOOPBACK
PCI1	EC LPC
PCI2	None
PCI3	None
PCI4	None

	DIFFERENTIAL	DESTINATION	FLEX CLOCKS	DESTINATION
CLK	CLKOUT_PCIE0	None	CLKOUTFLEX0	None
	CLKOUT_PCIE1	10/100/1G LAN	CLKOUTFLEX1	None
	CLKOUT_PCIE2	MINI CARD-2 WWAN	CLKOUTFLEX2	None
	CLKOUT_PCIE3	MINI CARD-1 WLAN	CLKOUTFLEX3	None
	CLKOUT_PCIE4	CARD READER		
	CLKOUT_PCIE5	None		
	CLKOUT_PCIE6	USB 3.0		
	CLKOUT_PCIE7	None		
	CLKOUT_PEG_B	None		

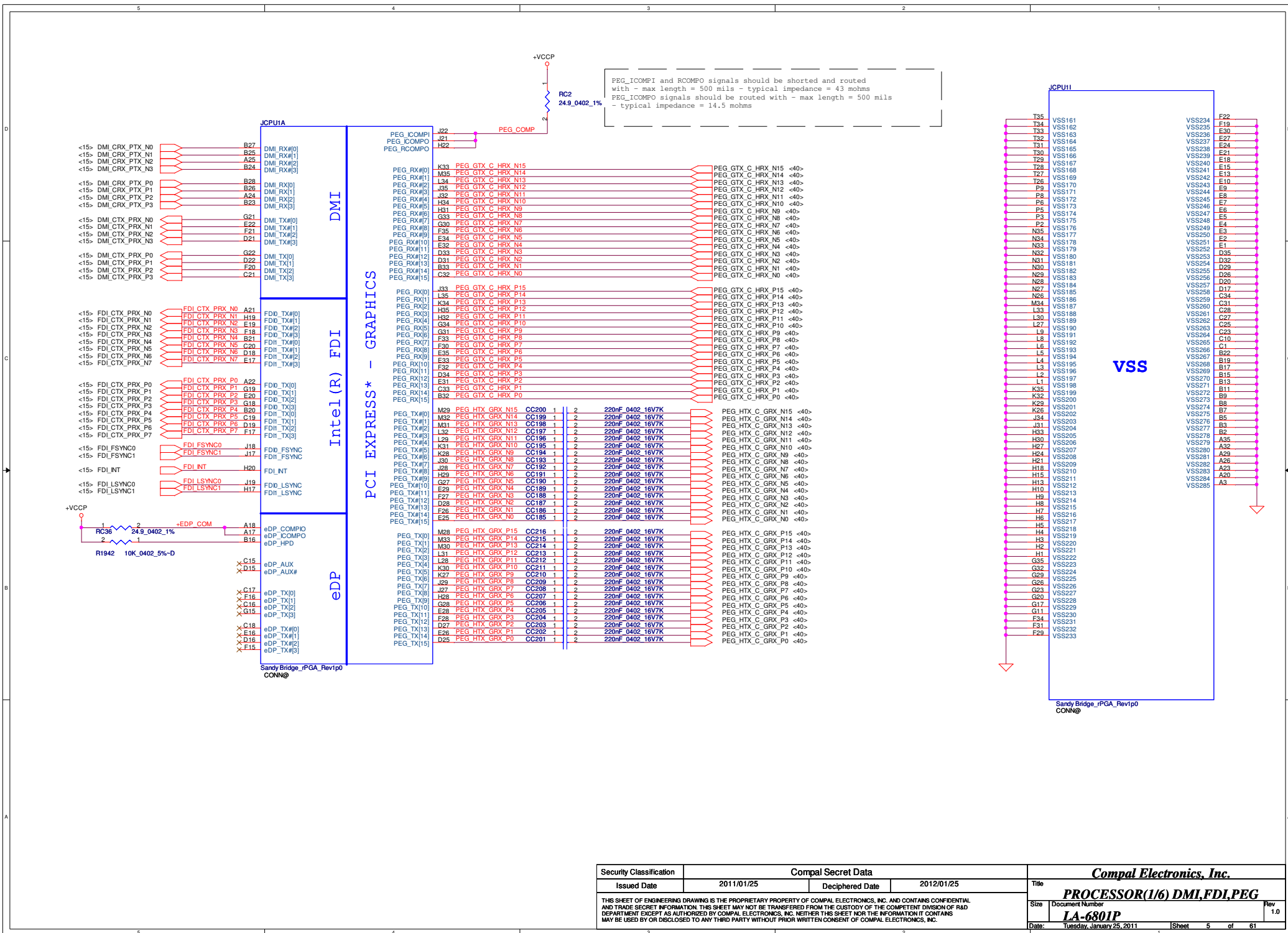
SATA	DESTINATION
SATA0	HDD
SATA1	None
SATA2	ODD
SATA3	None
SATA4	None
SATA5	None

PCI EXPRESS	DESTINATION
Lane 1	10/100/1G LAN
Lane 2	MINI CARD-2 WWAN/DMC
Lane 3	MINI CARD-1 WLAN
Lane 4	CARD READER
Lane 5	None
Lane 6	USB 3.0
Lane 7	None
Lane 8	None

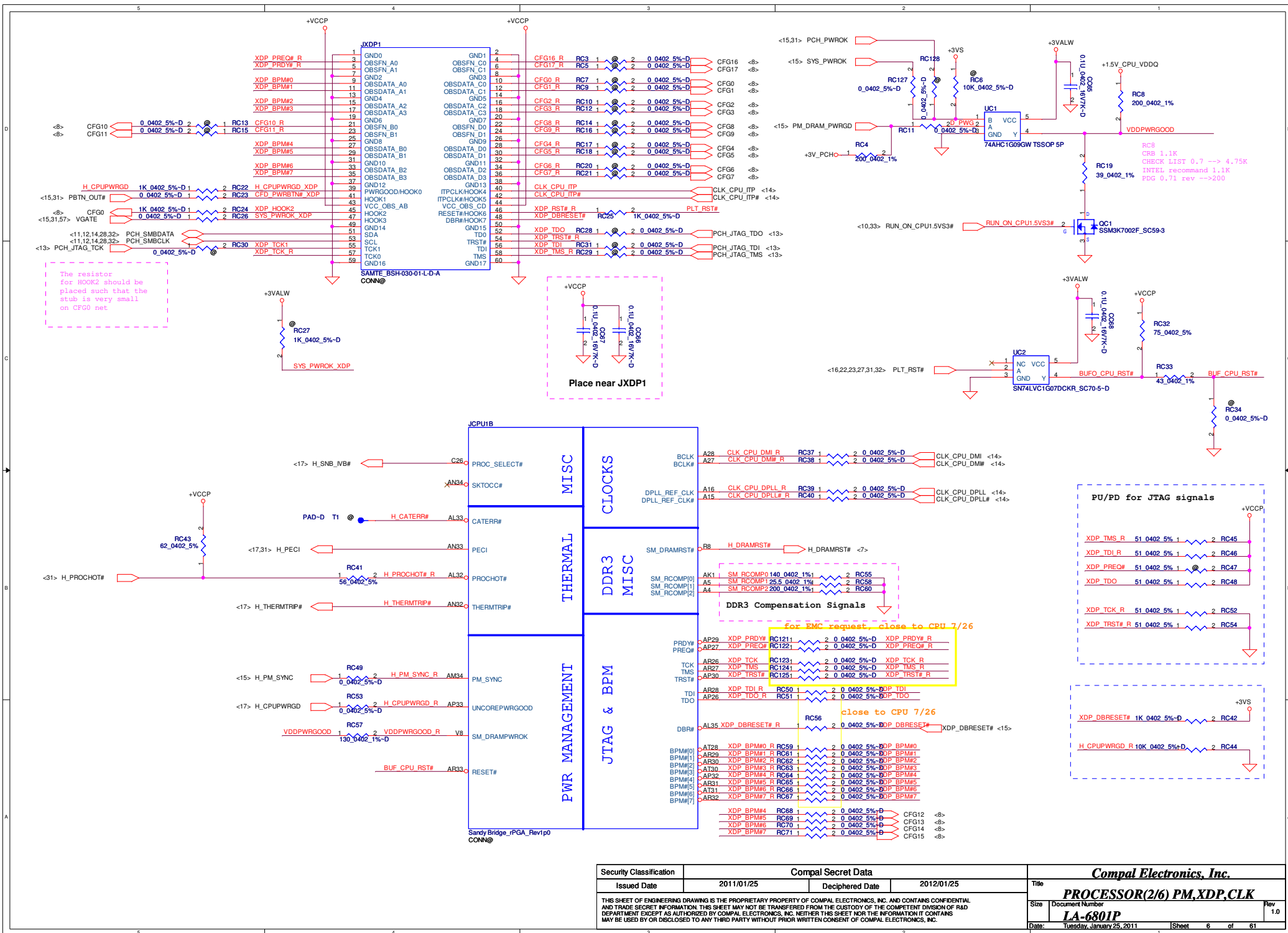
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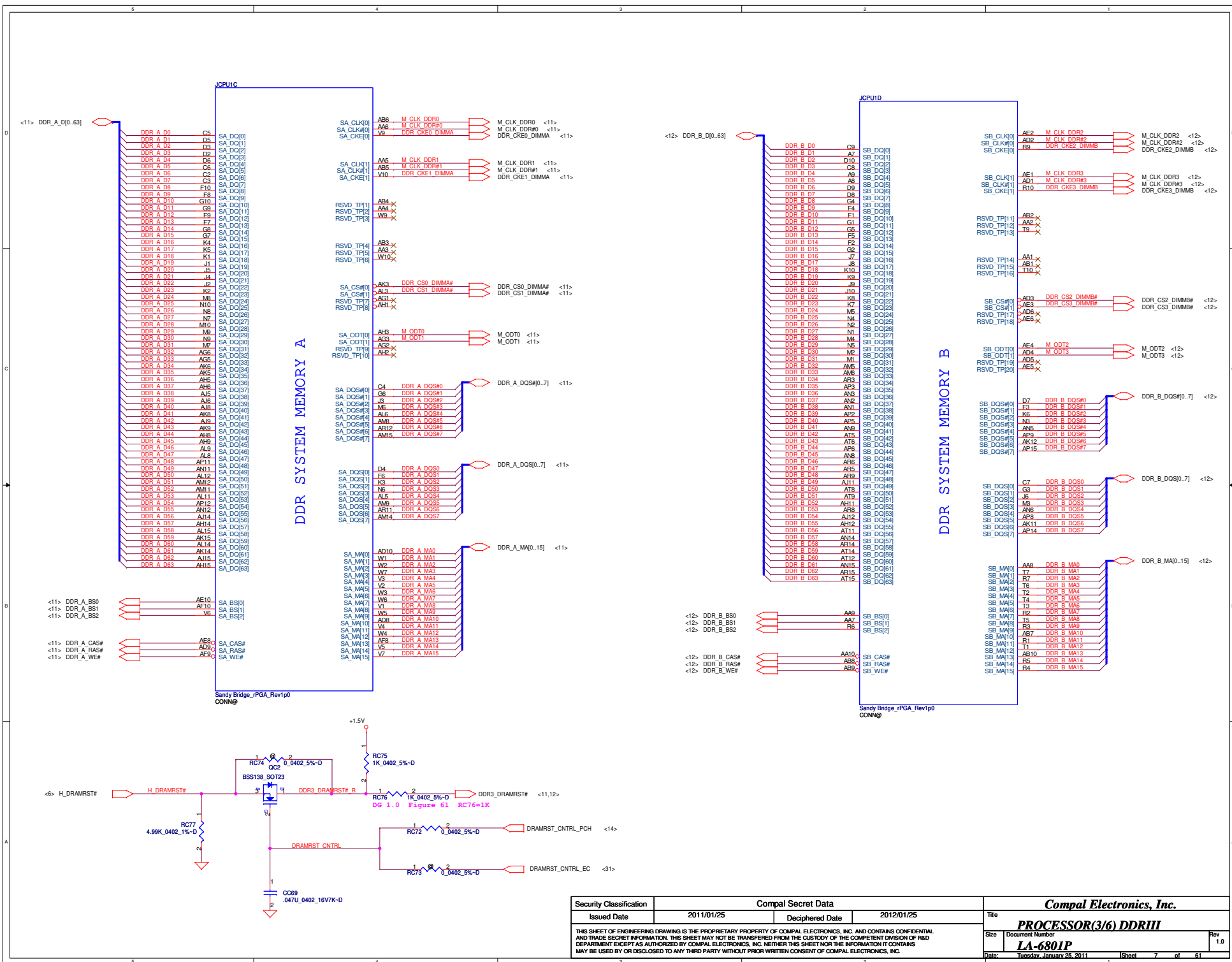


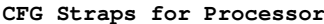
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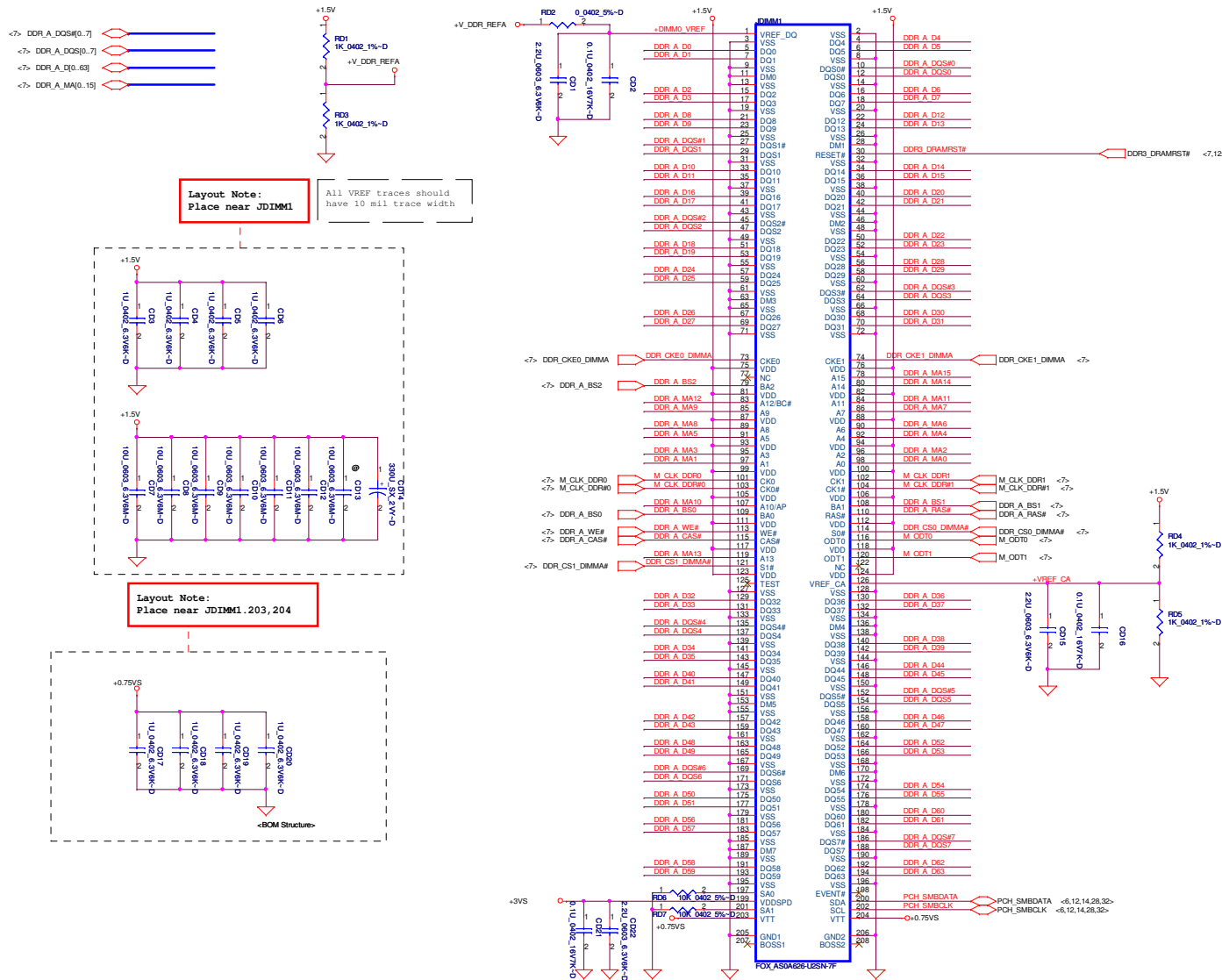


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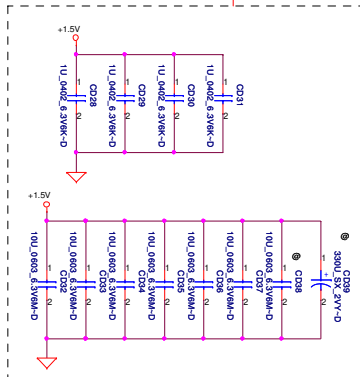




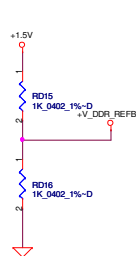
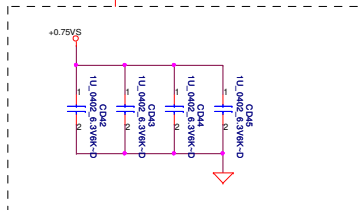
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<7> DDR_B_DQS#(0..7)
 <7> DDR_B_DQS(0..7)
 <7> DDR_B_DQ.63
 <7> DDR_B_MA(0..15)

Layout Note:
 Place near JDIMMB

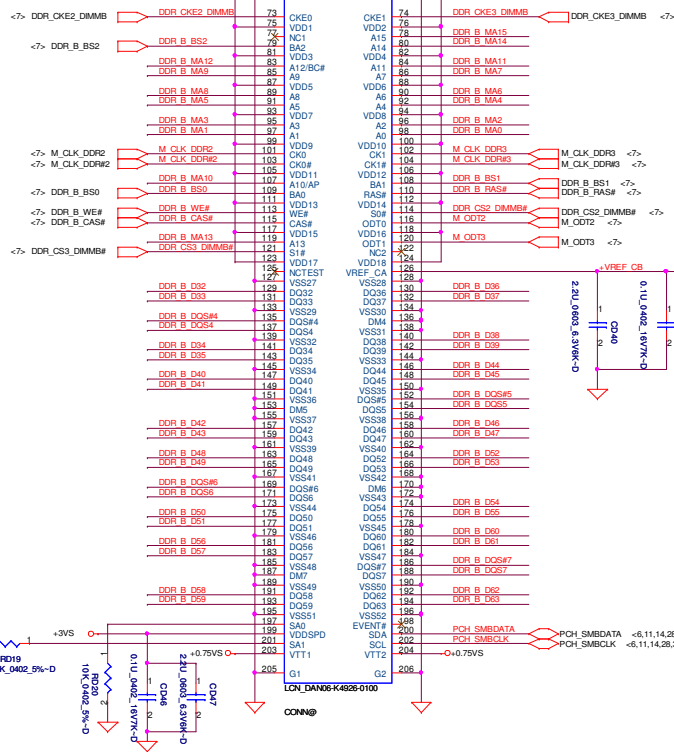


Layout Note:
 Place near JDIMMB.203,204

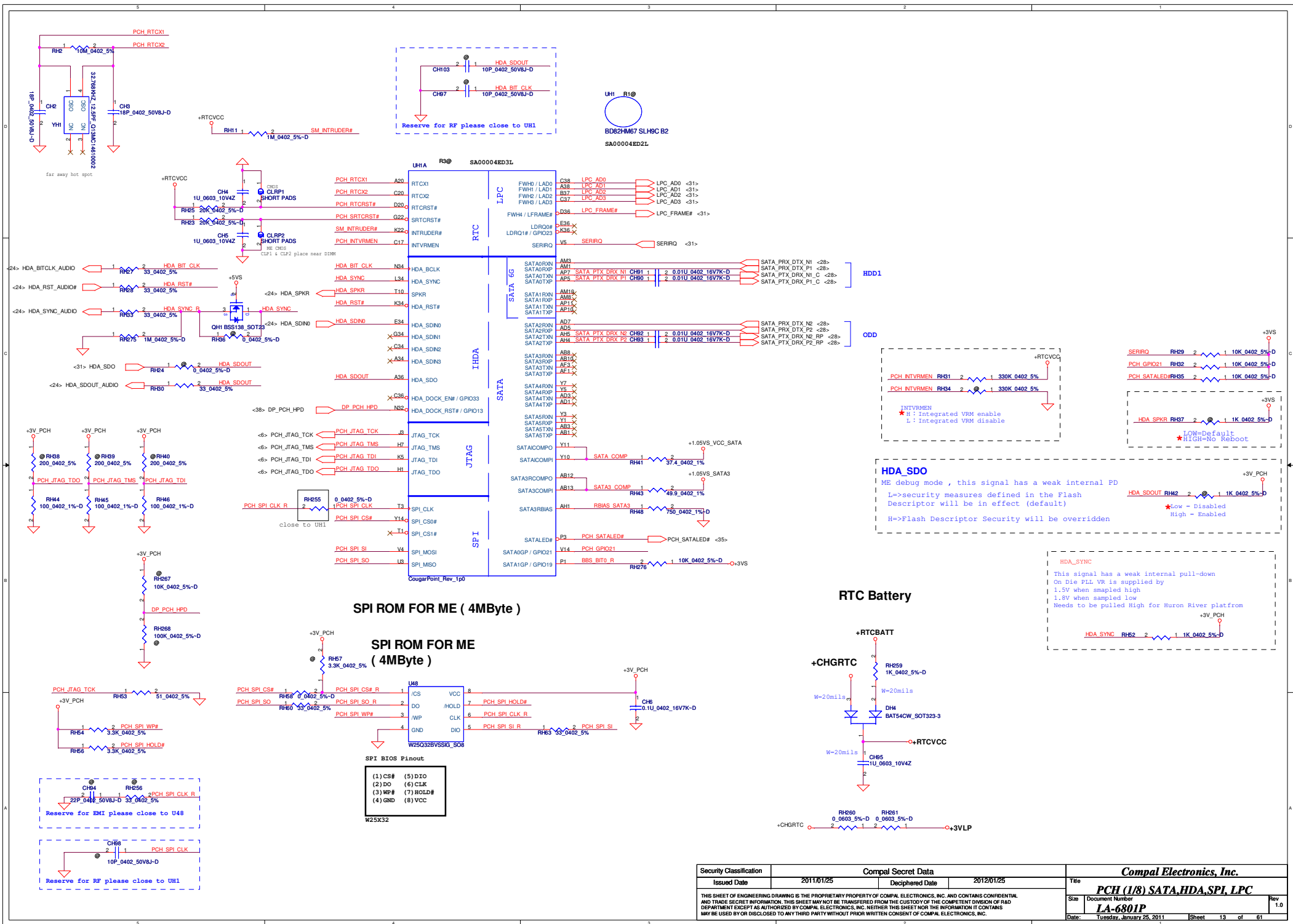


Note:
 Check voltage tolerance of
 VREF_DQ at the DIMM socket

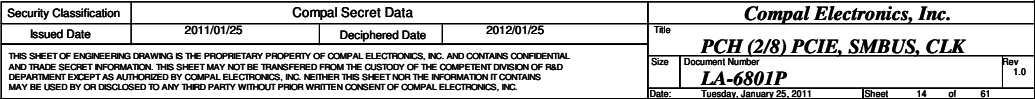
All VREF traces should
 have 10 mil trace width

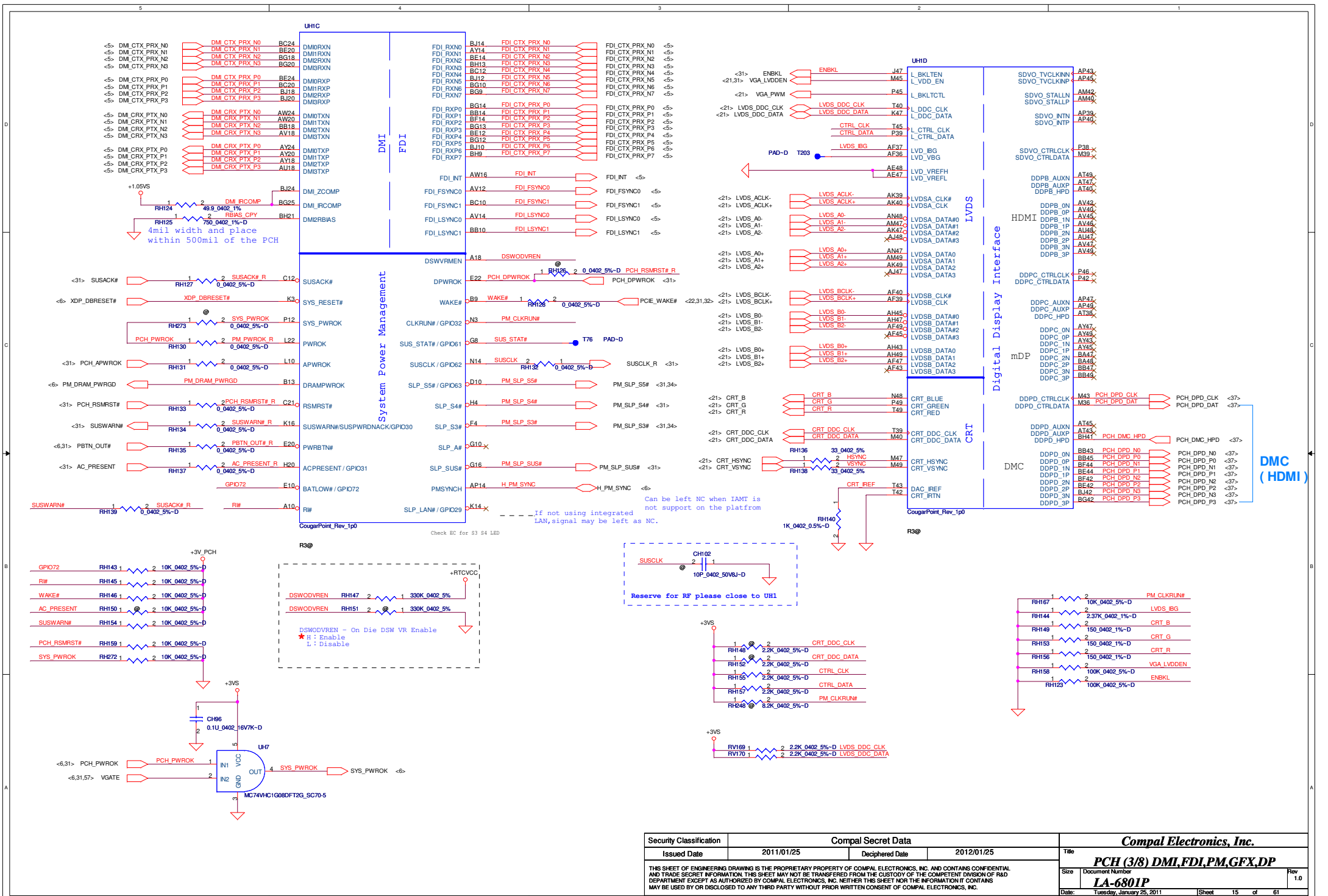


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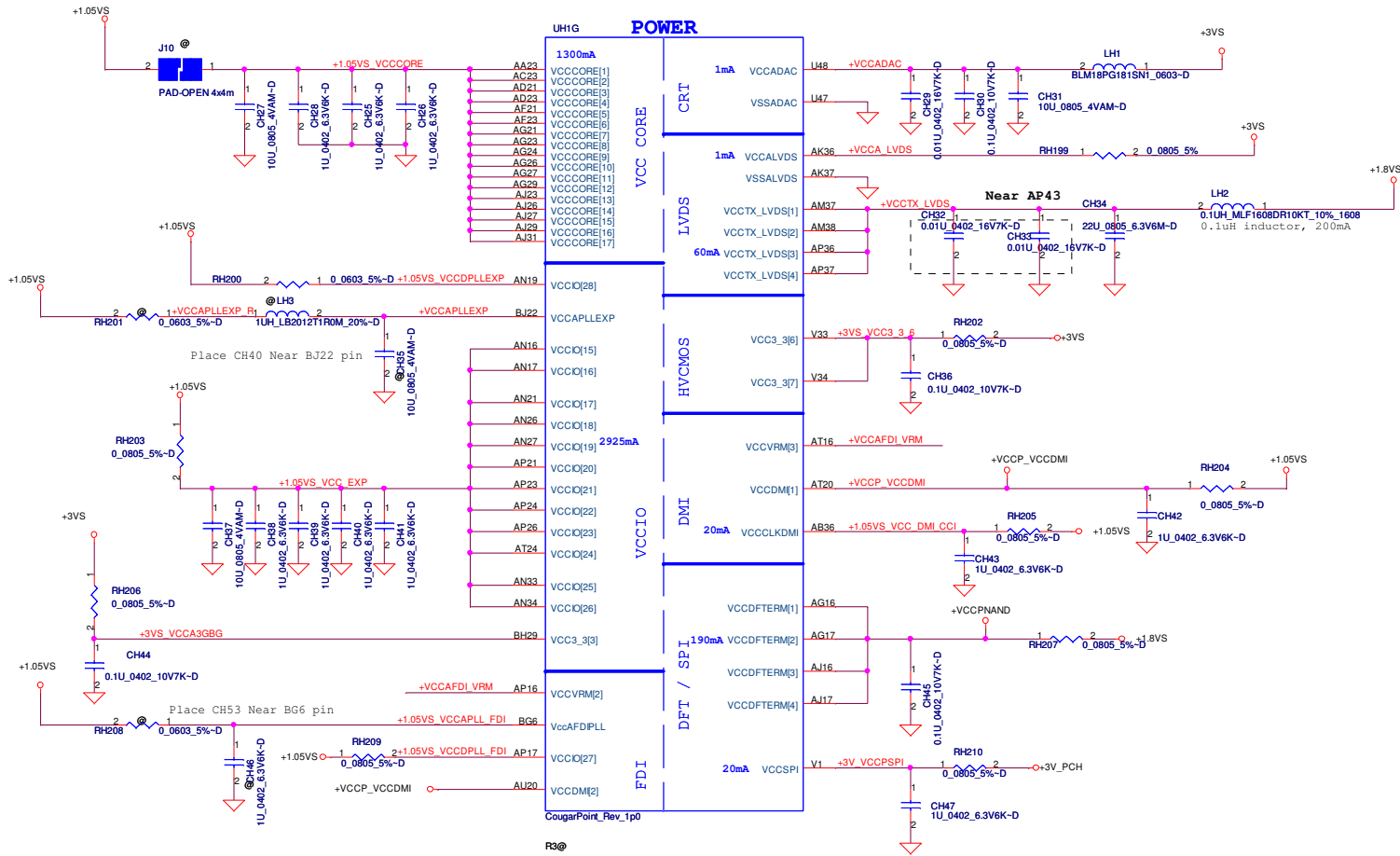


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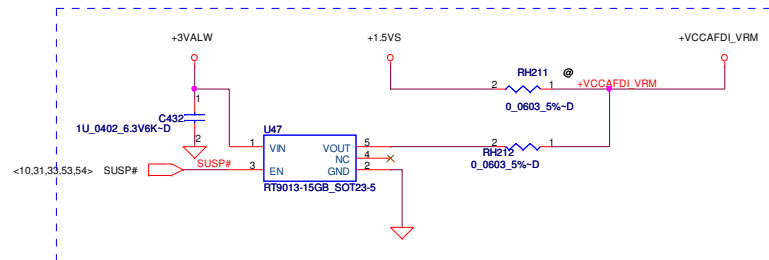


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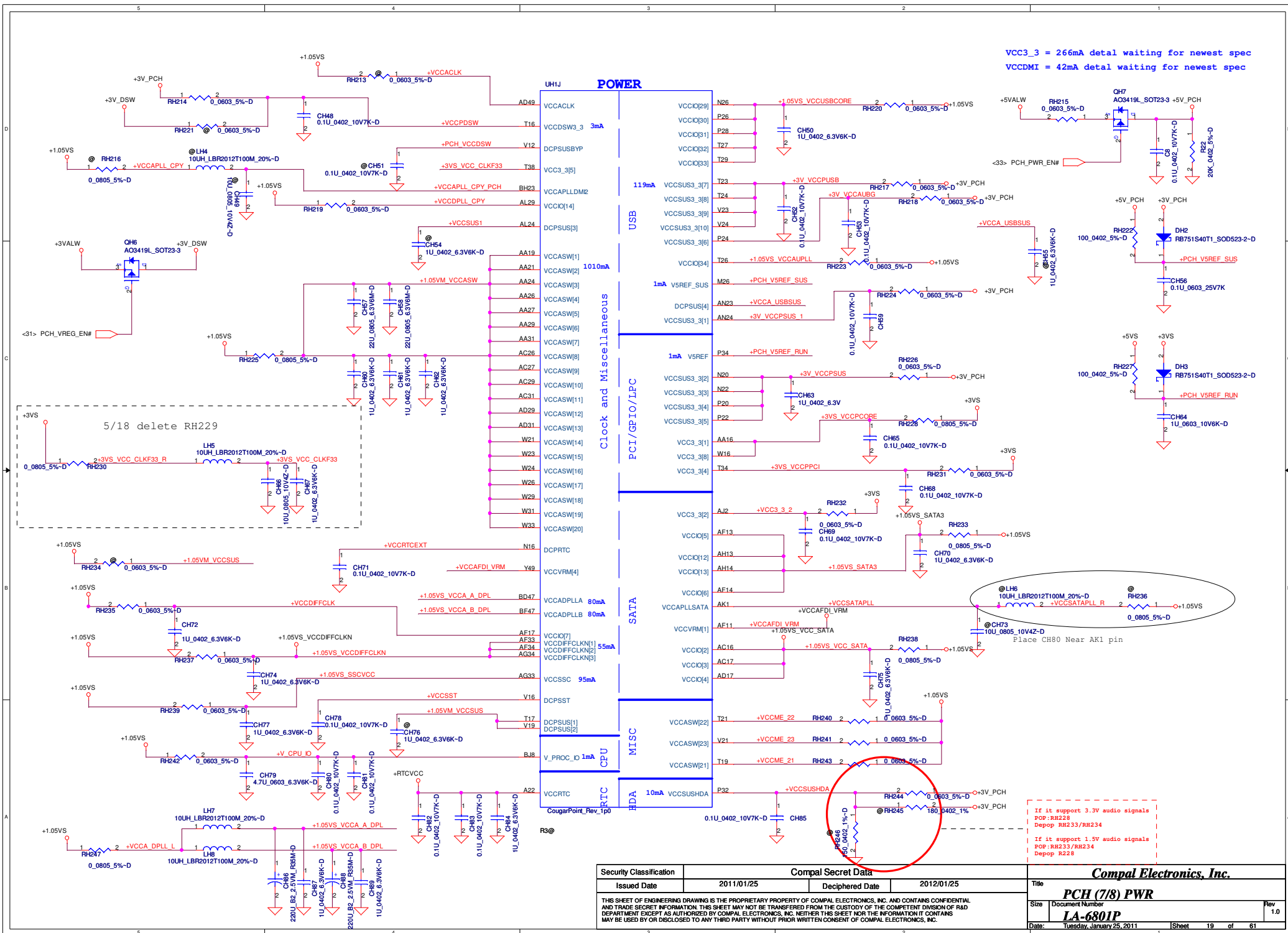


PCH Power Rail Table		
Voltage Rail	Voltage	S0 Iccmax Current (A)
V_PROC_IO	1.05	0.001
V5REF	5	0.001
V5REF_Sus	5	0.001
Vcc3_3	3.3	0.266
VccADAC	3.3	0.001
VccADPLLA	1.05	0.08
VccADPLLb	1.05	0.08
VccCoxe	1.05	1.3
VccDMI	1.05	0.042
VccIO	1.05	2.925
VccASW	1.05	1.01
VccSPI	3.3	0.02
VccDSW	3.3	0.003
VccpNAND	1.8	0.19
VccRTC	3.3	6 uA
VccSus3_3	3.3	0.119
VccSusHDA	3.3 / 1.5	0.01
VccVRM	1.8 / 1.5	0.16
VccCLKDMI	1.05	0.02
VccSSC	1.05	0.095
VccDIFFCLKN	1.05	0.055
VccALVDS	3.3	0.001
VccTX_LVDS	1.8	0.06

VCCVRM = 160mA detal waiting for newest spec



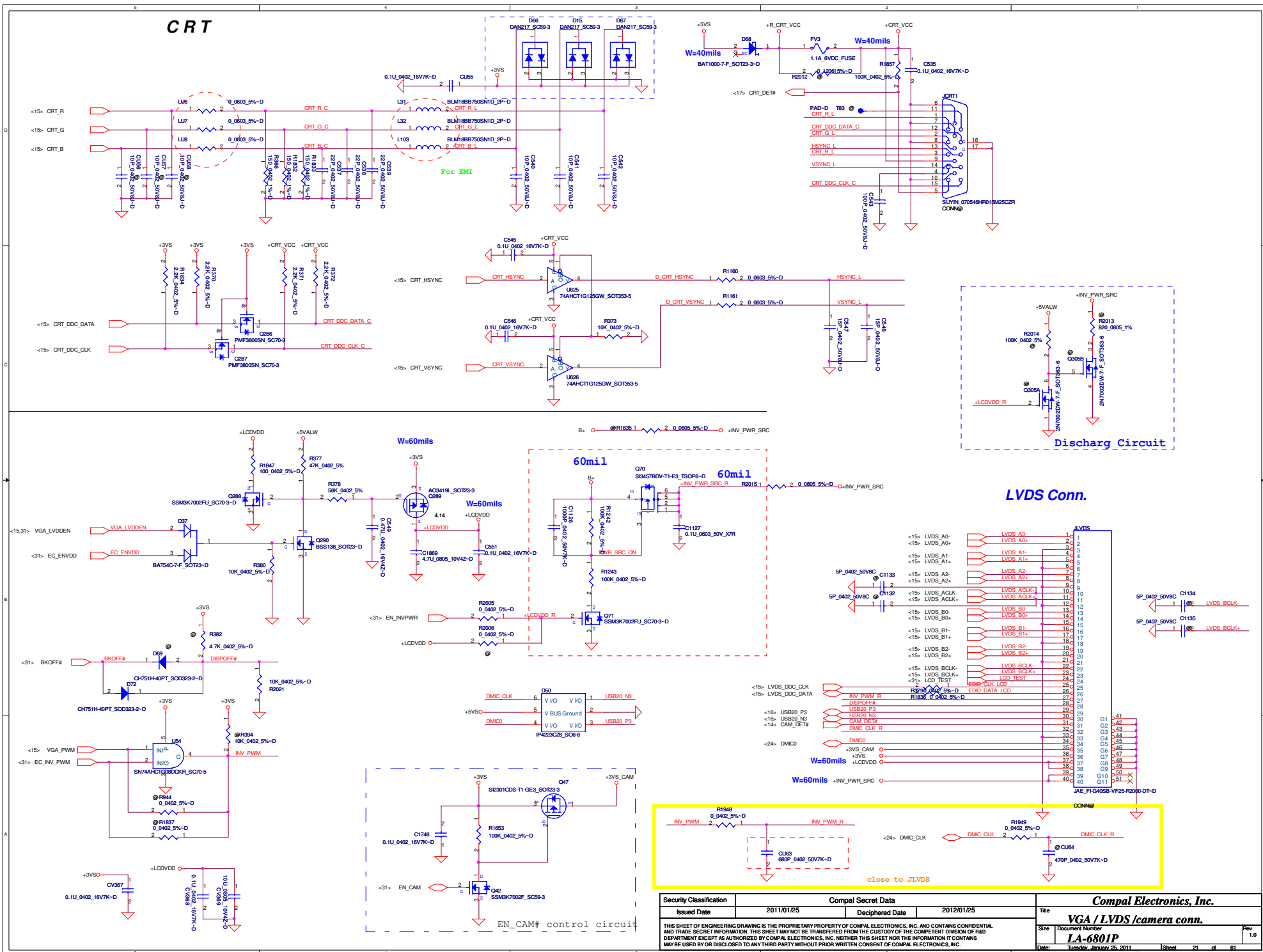
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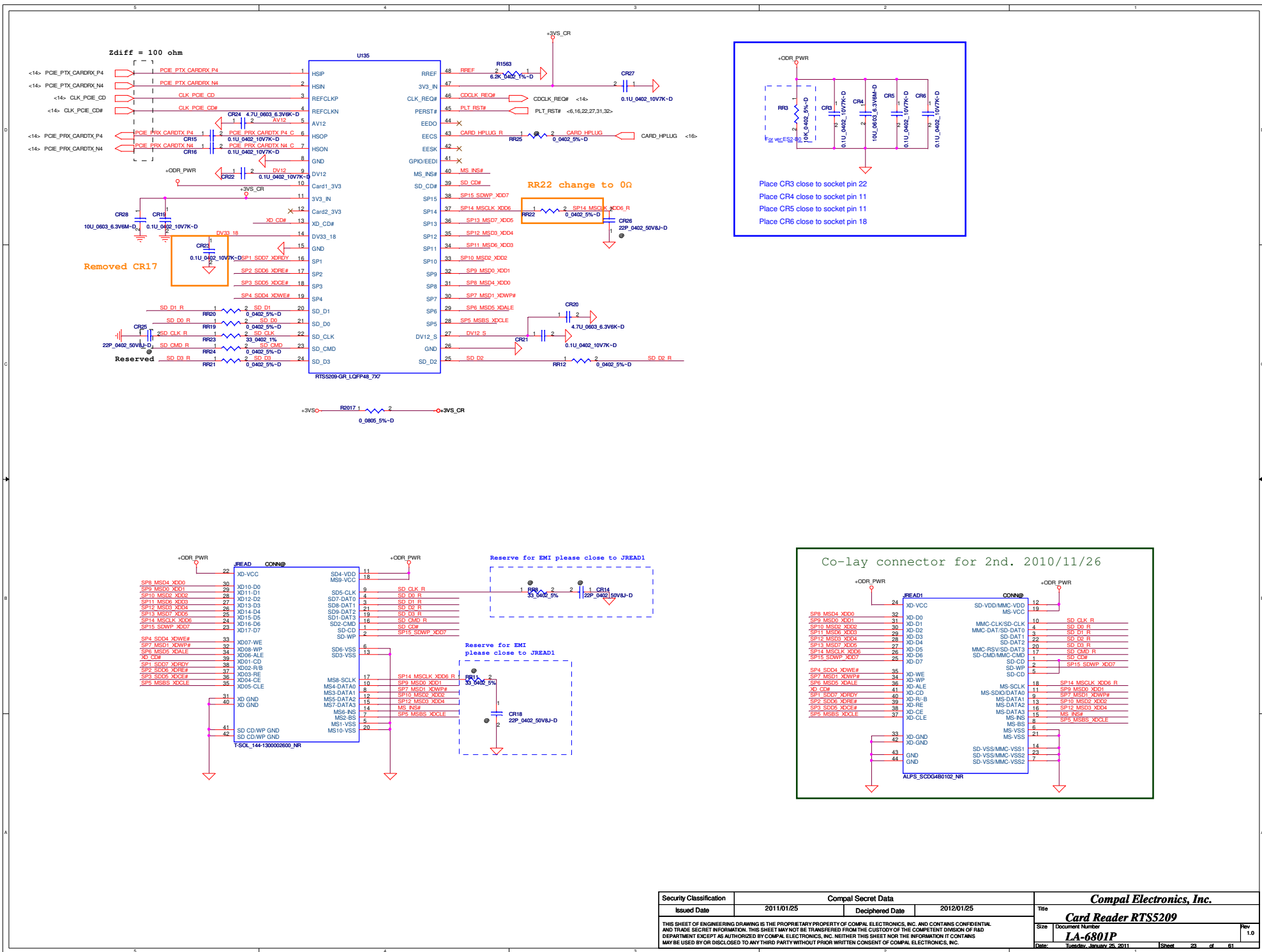


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CRT

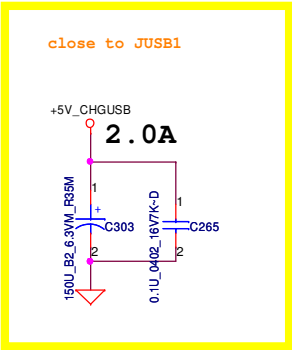
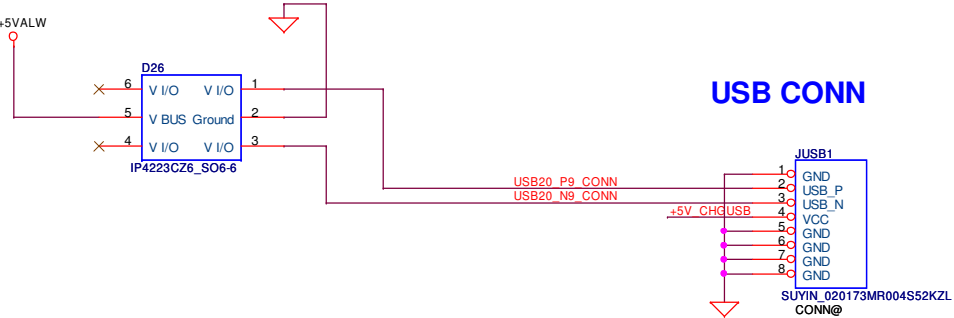
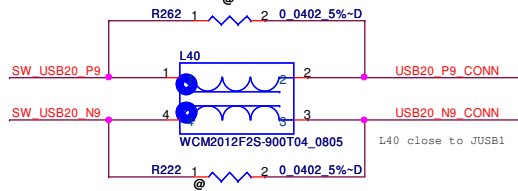
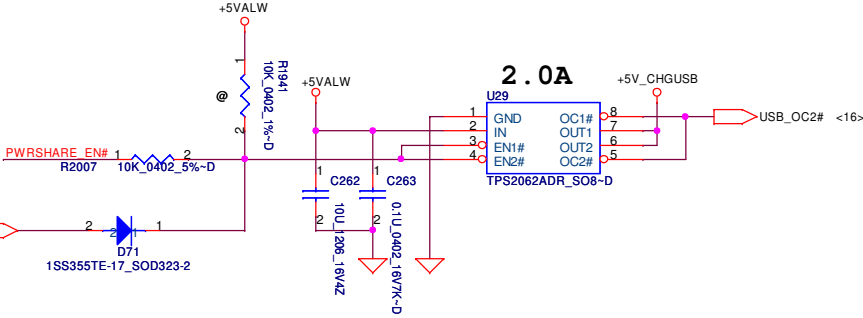
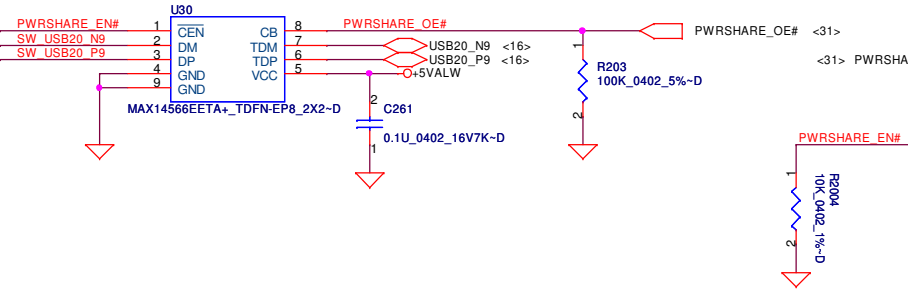


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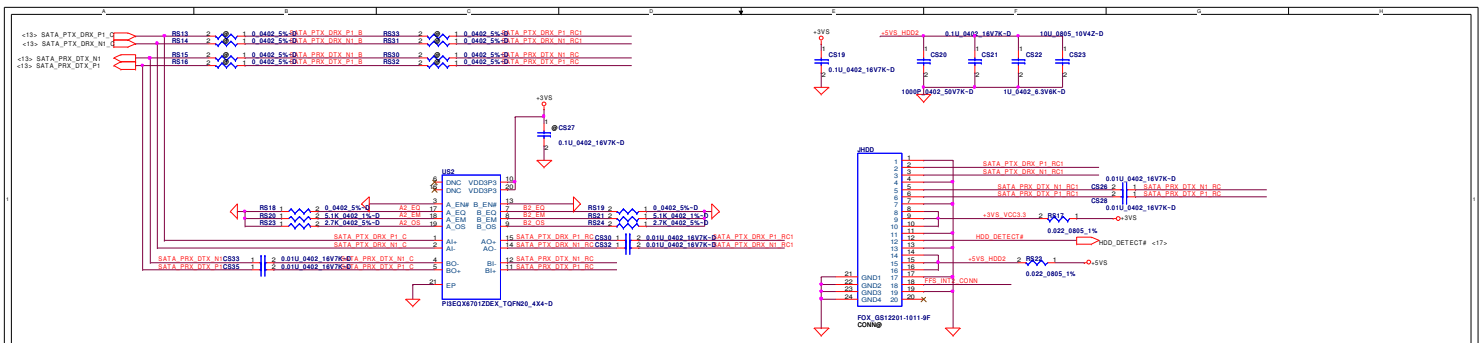
Power share

CB	Function
L	auto detection charger identification active
H	DP/DM=TDP/TDM

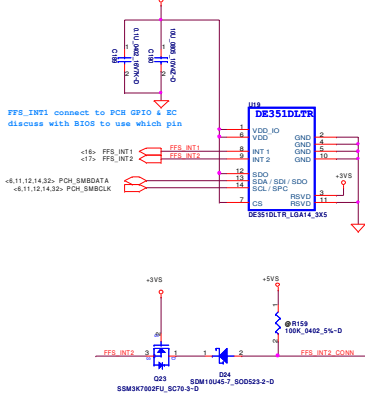


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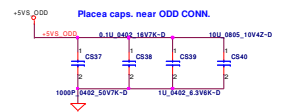




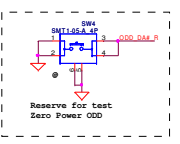
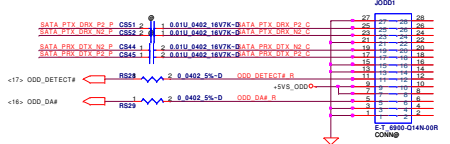
Free Fall Sensor



	MAXIM 1st	TI 2nd
P/N	SA00003LH1L	SA00003EX0L
RS43 RS44	pop	depop
RS47 RS48	depop	pop
RS53 RS54	pop	depop

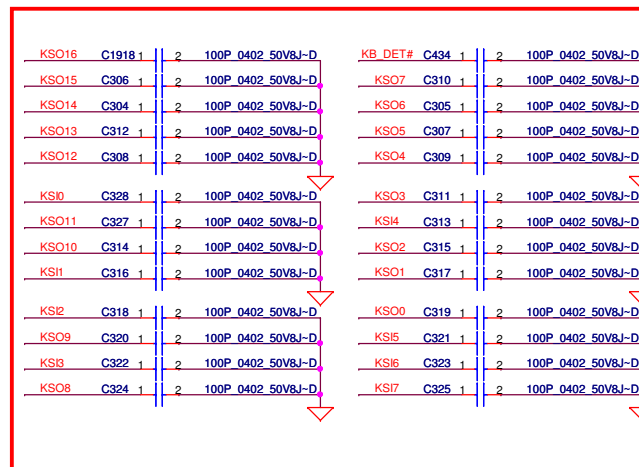
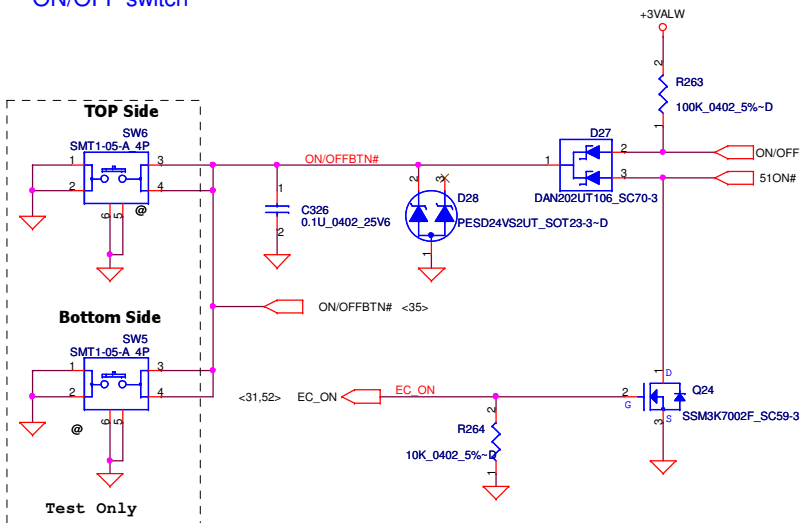


SATA ODD Conn.

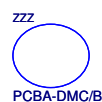
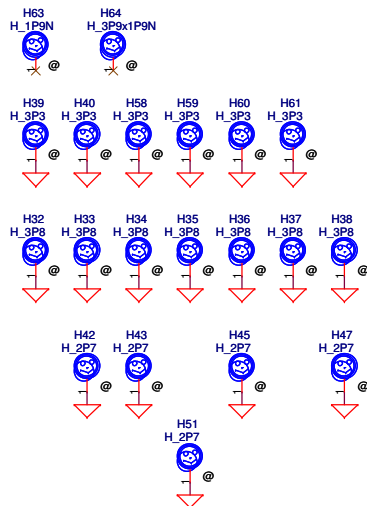
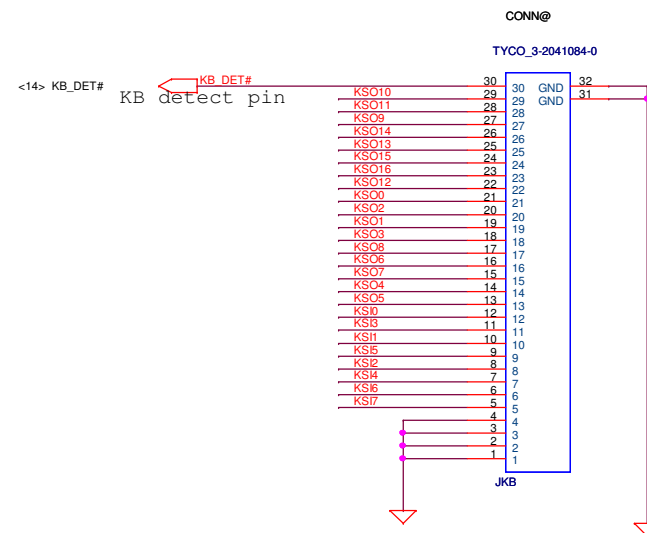


ON/OFF switch

Power Button



INT_KBD Conn.

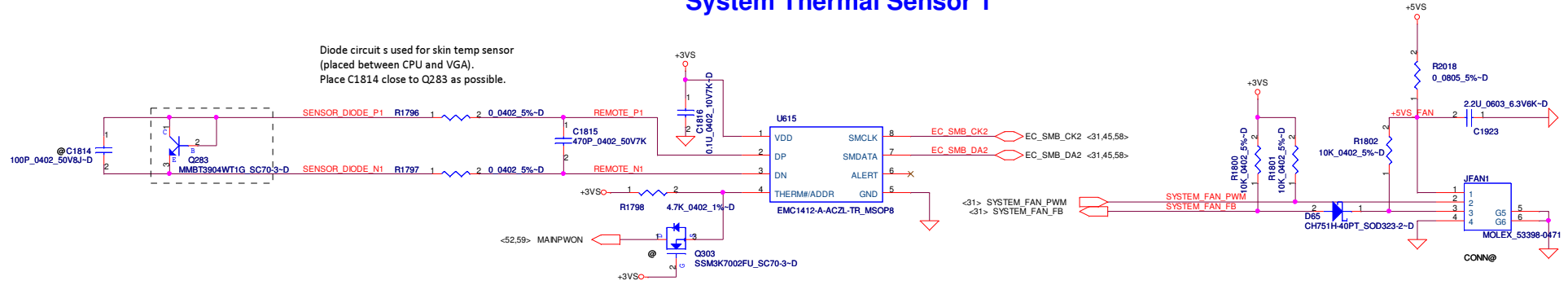


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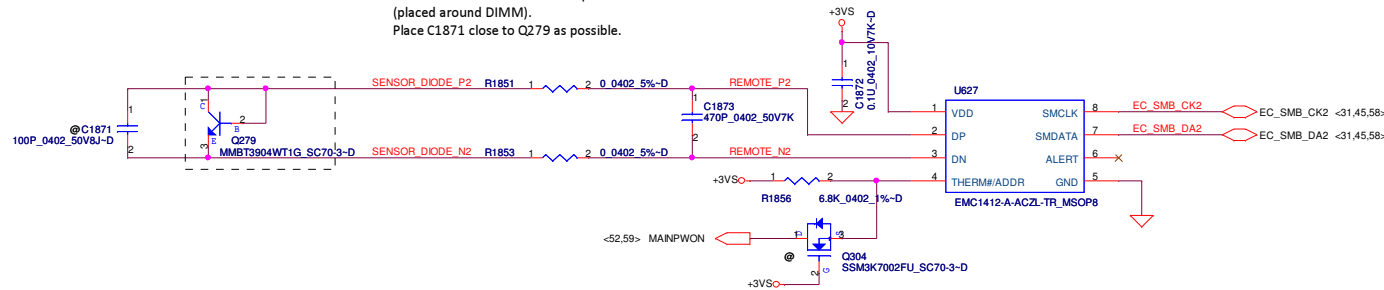
System Thermal Sensor 1

Diode circuit s used for skin temp sensor
(placed between CPU and VGA).
Place C1814 close to Q283 as possible.

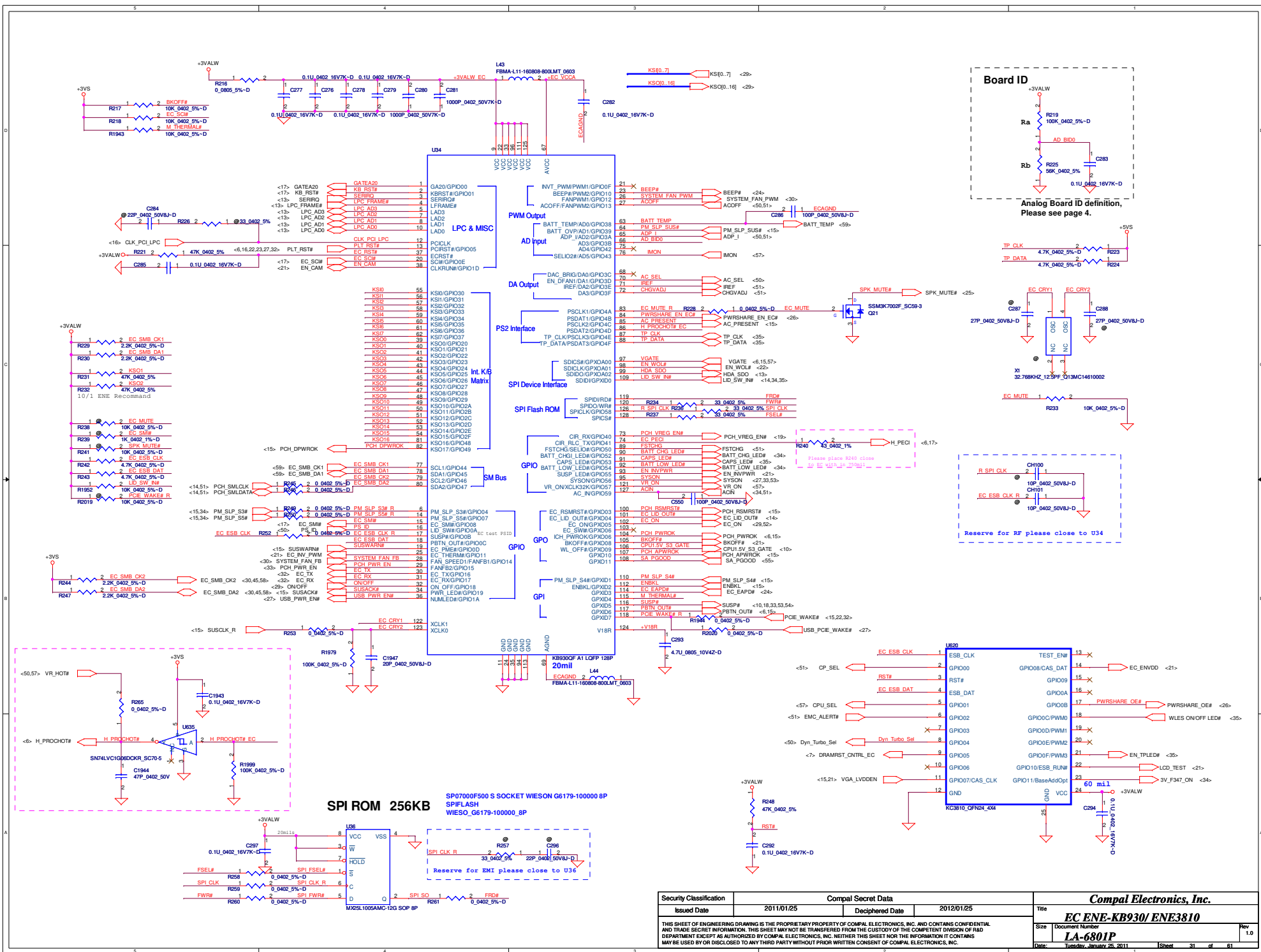


System Thermal Sensor 2

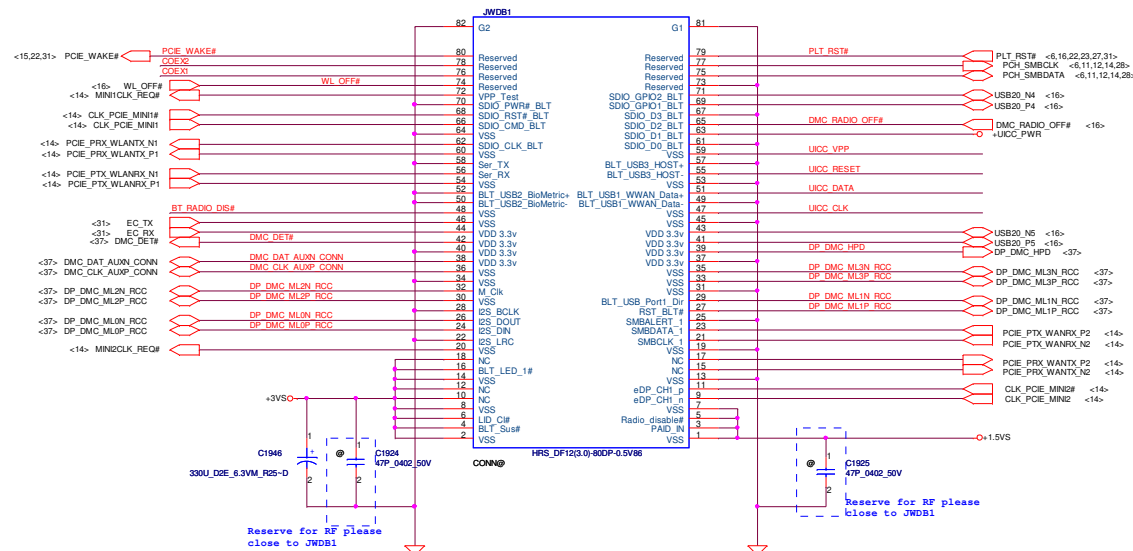
Diode circuit s used for skin temp sensor
(placed around DIMM).
Place C1871 close to Q279 as possible.



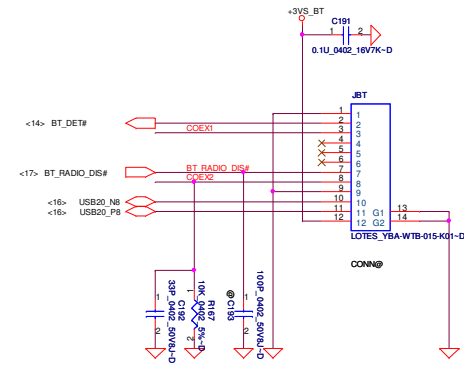
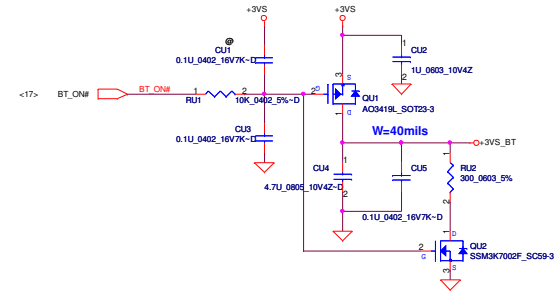
Security Classification	Compal Secret Data			Title	
Issued Date	2011/01/25	Deciphered Date	2012/01/25	FAN Controller	
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				Date:	1.0
				Tuesday, January 25, 2011	Sheet 30 of 61



To DMC PCB connector

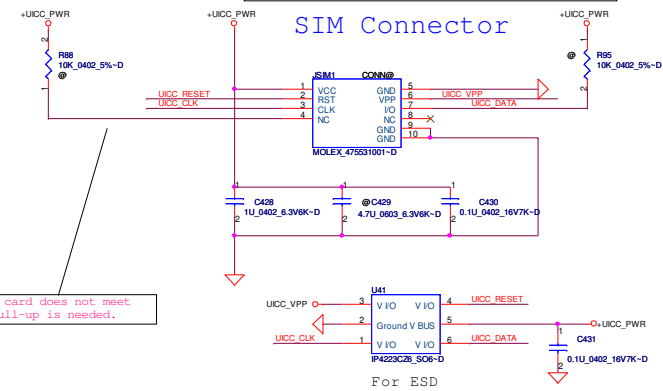


BlueTooth



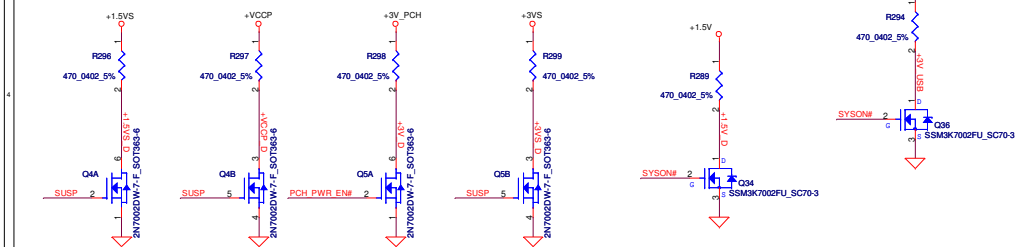
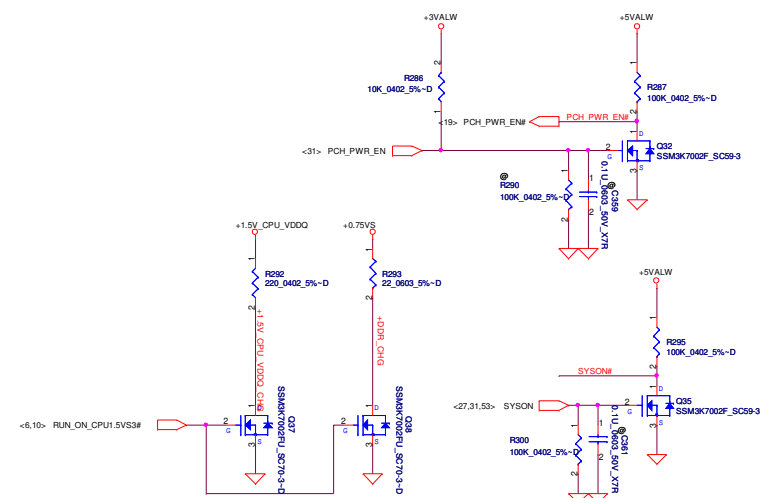
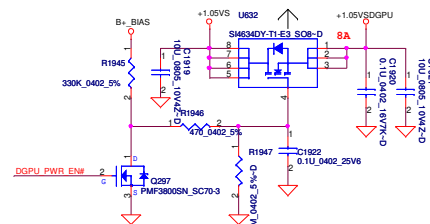
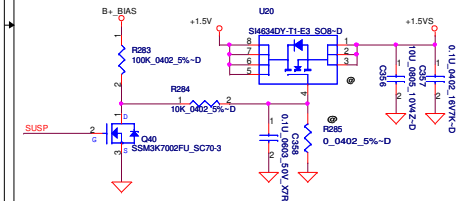
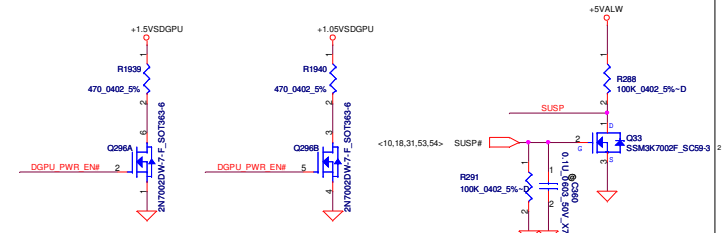
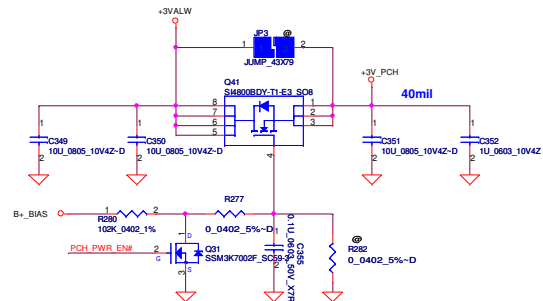
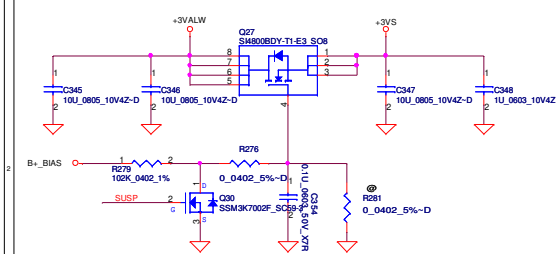
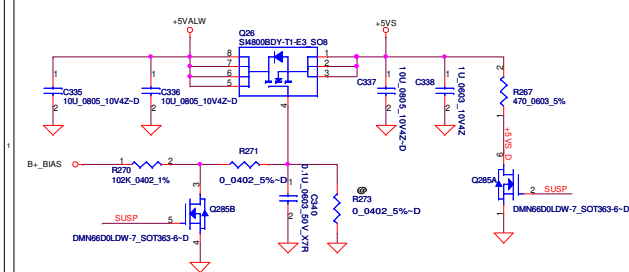
SIM card board 4.7uF change to 1uF for Tiger detect issue.

SIM Connector

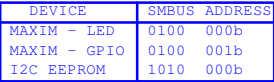


Reserve for SIM card does not meet rise time and pull-up is needed.

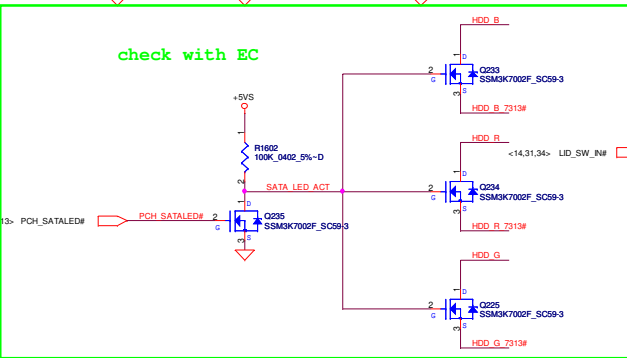
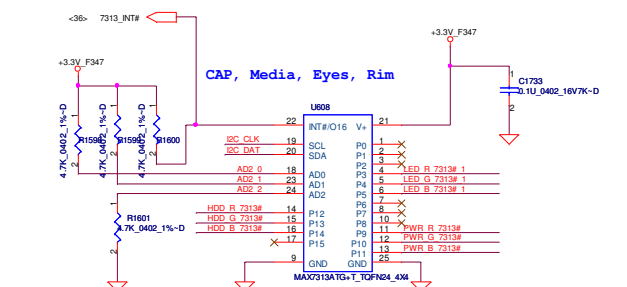
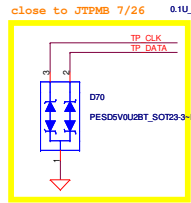
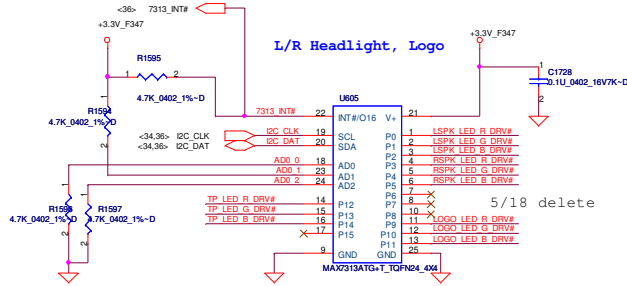
Security Classification		Compal Secret Data		Title	
Issued Date	2011/01/25	Deciphered Date	2012/01/25	Mini Card - WLAN / DMC / BT	
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				LA-6801P	New 1.0
				Date:	Tuesday, January 25, 2011
				Sheet	32 of 61



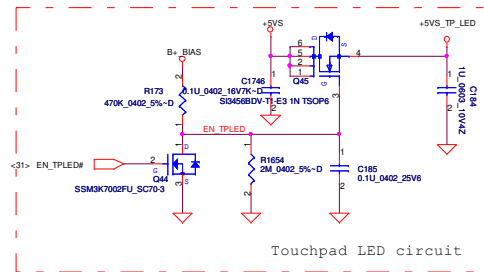
Security Classification		Compal Secret Data		Compal Electronics, Inc. Title DC/DC Interface Size Document Number LA-6801P		
Issued Date	2011/01/25	Deciphered Date	2012/01/25	Rev 1.0 Date: Tuesday, January 25, 2011 Sheet 33 of 61		
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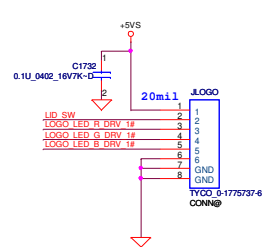
Touchpad LED CONN



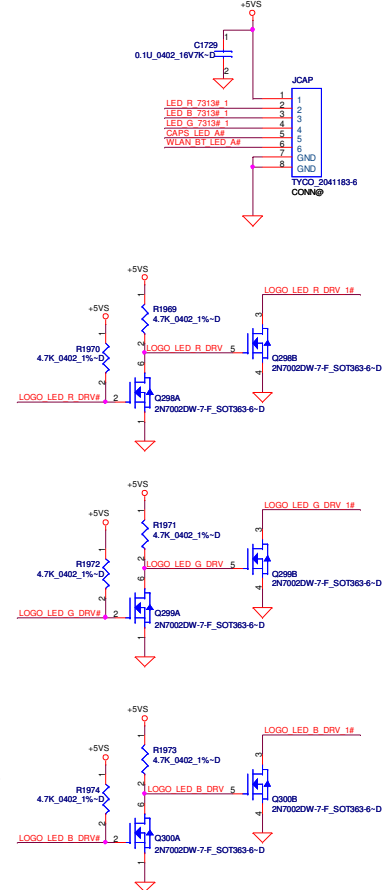
Reference	AD2	AD1	AD0	MAX7313
U605	0	1	0	L/R Headlight , Logo, TP
U608	0	1	1	Num, CAP , SCR EJECT, REV, PLAY/PAUSE FFWD, Vol_DWN, Vol_UP Wireless ON/OFF AWCC Button Alien Adrenaline Power Button Eyes Power Button Rim



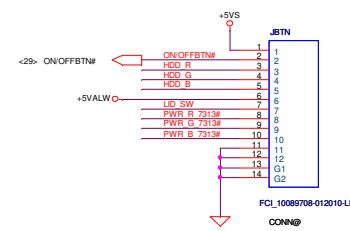
LOGO Board CONN



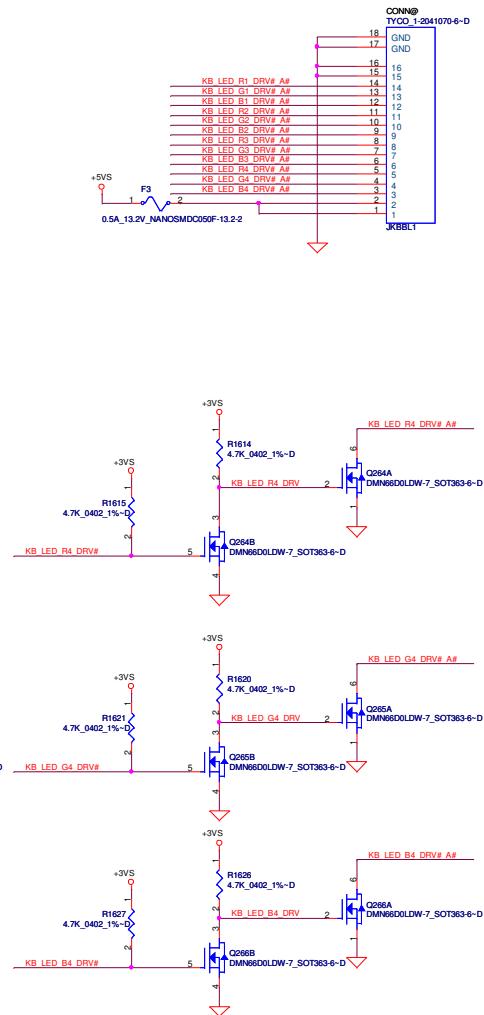
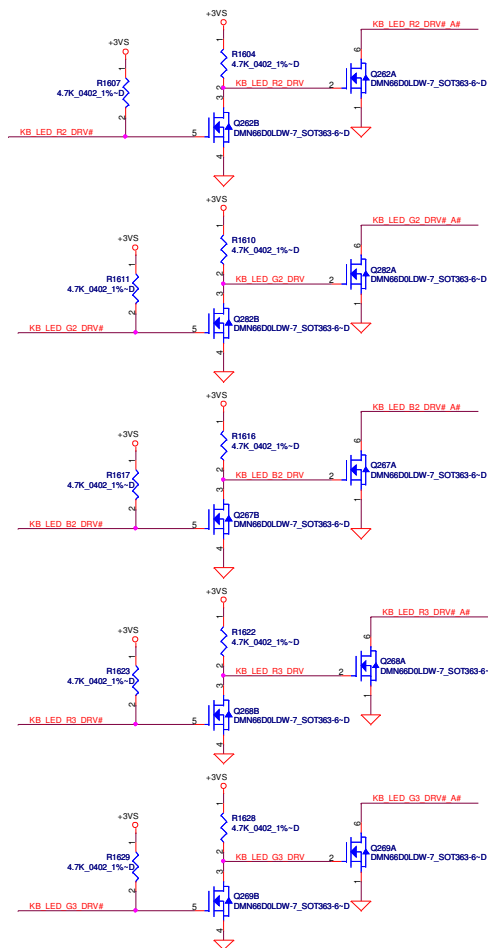
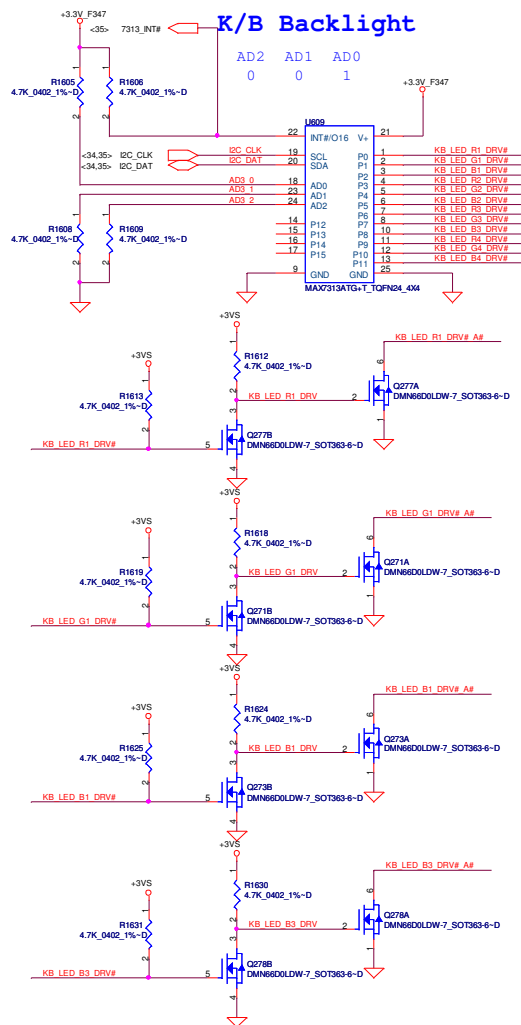
Indicator CONN



PWR BTN Board CONN

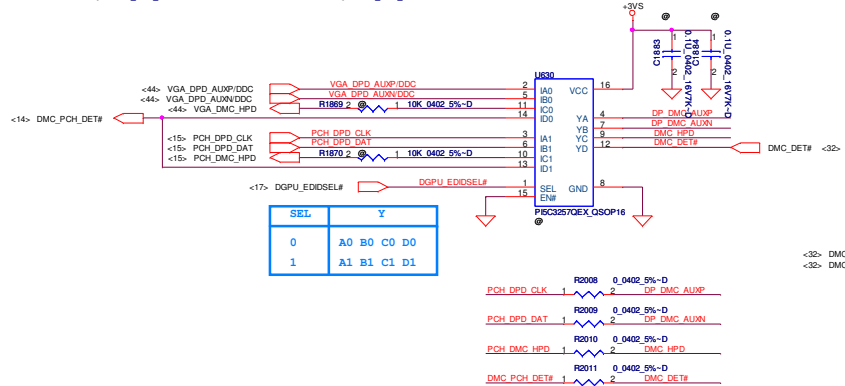
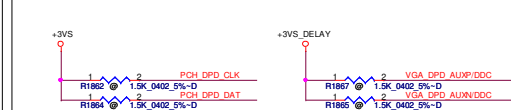


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Date:	Tuesday, January 25, 2011	Sheet	36	of 61

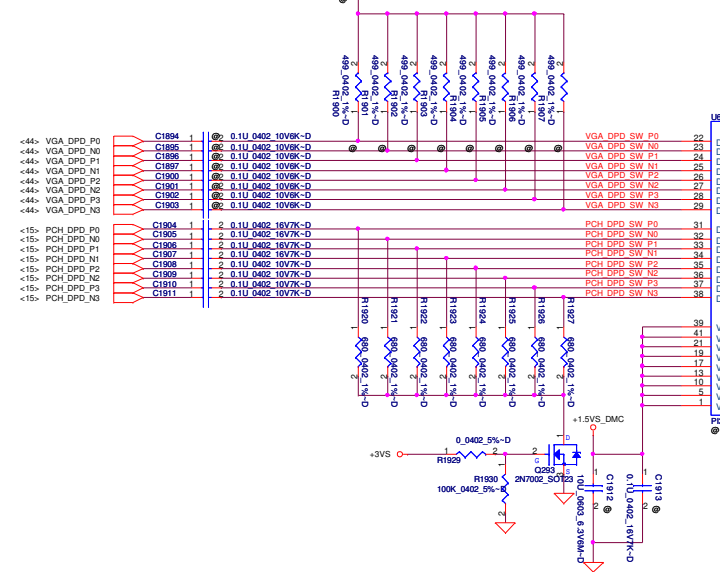
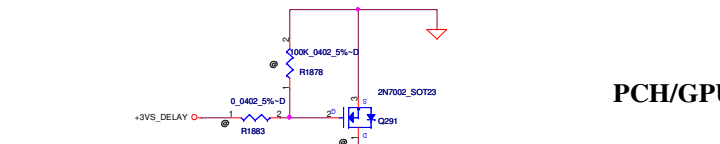


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Issued Date	2011/01/25	Deciphered Date	2012/01/25	ELC (3)
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				Document Number
				LA-6801P
				Date: Tuesday, January 25, 2011
				Sheet 36 of 61

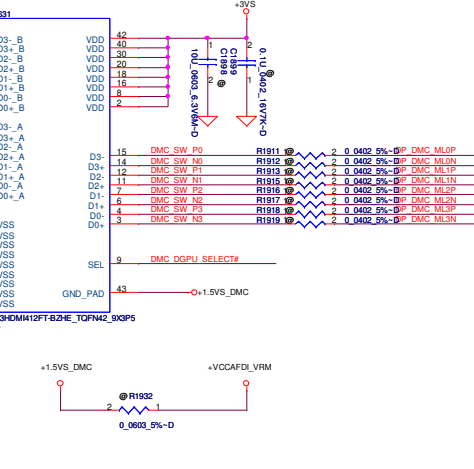
PCH/GPU DDC SW for DMC



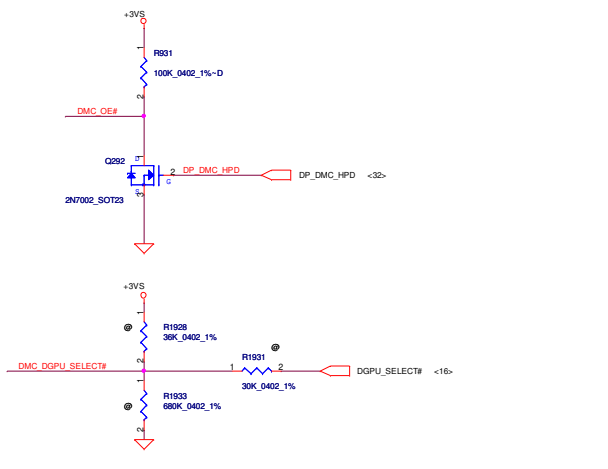
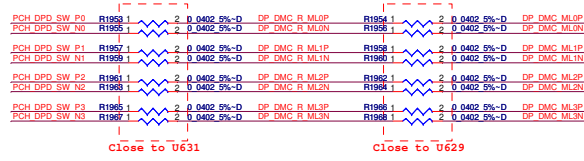
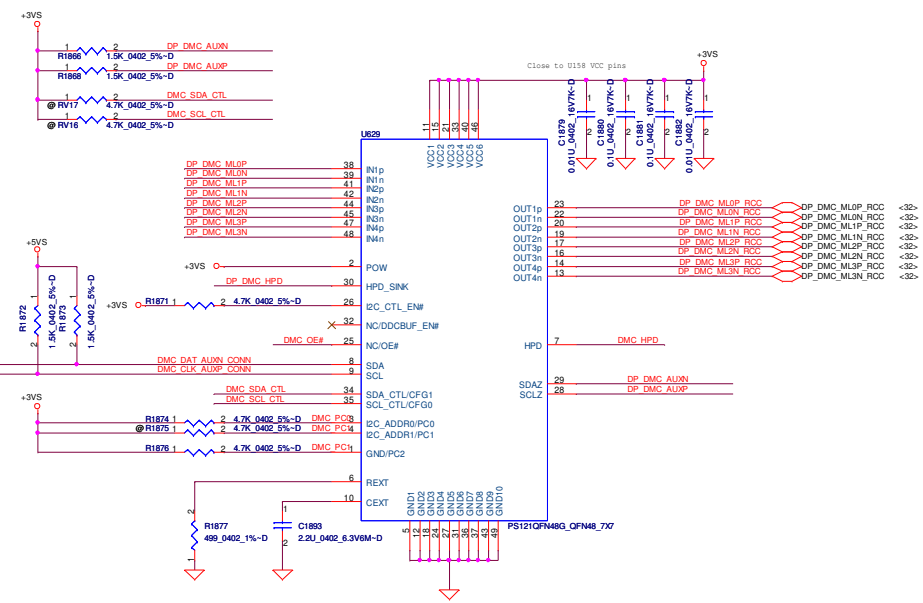
PCH/GPU AUX&LANE SW for DMC



6/5 change C188, C1162 0805 to 0603



DMC Redriver

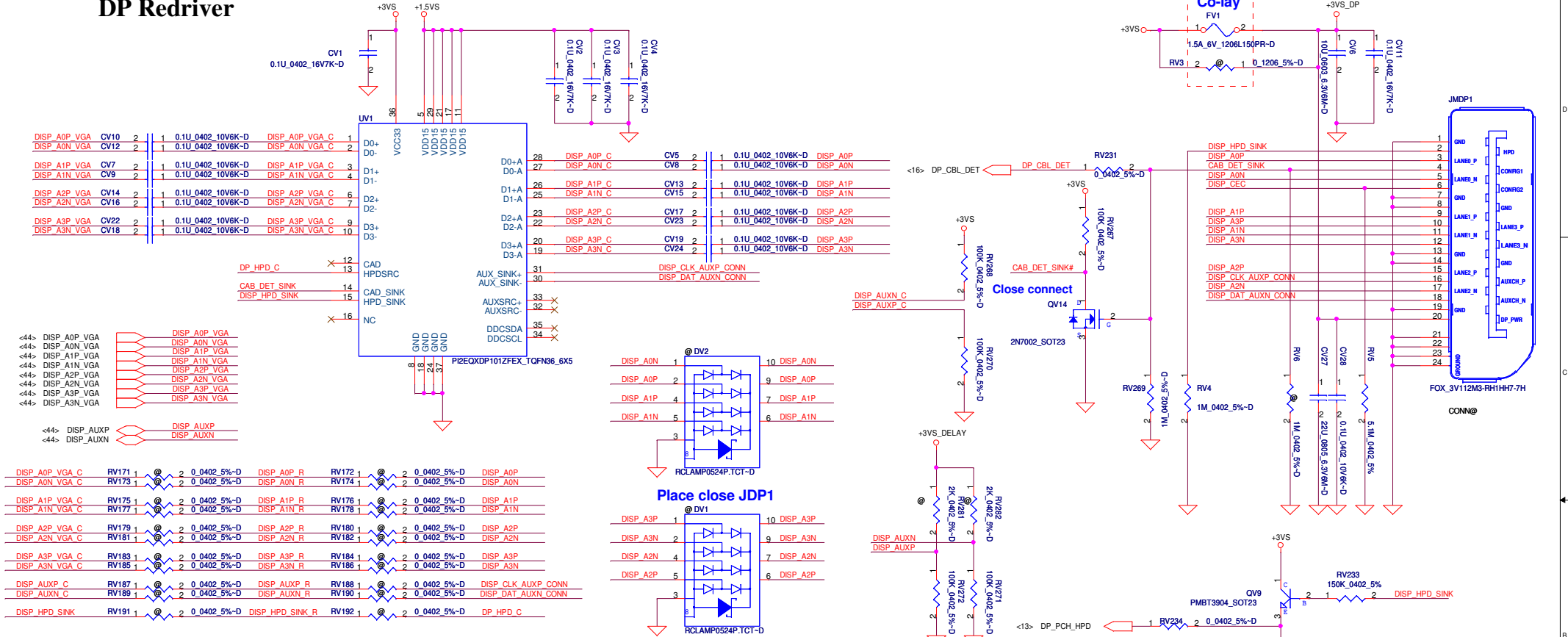


AUX_SEL/SEL1&2	Chanel	Source
0	A	GPU
1	B	PCH

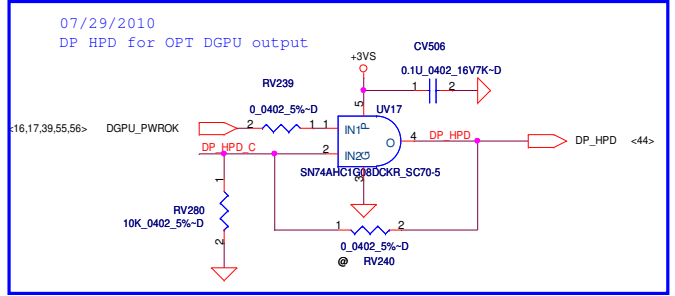
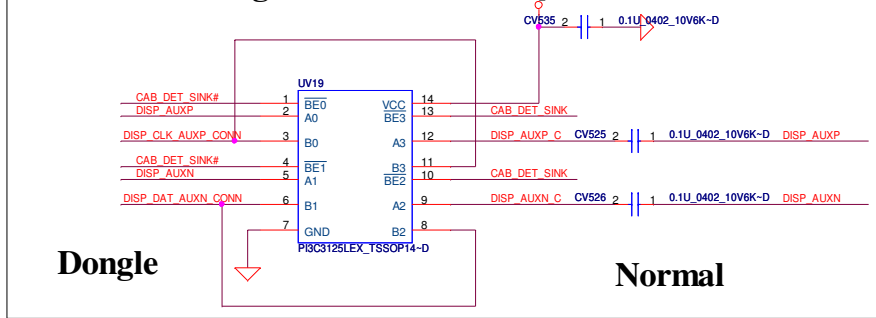
Security Classification	Compal Secret Data		Title	
Issued Date	2011/01/25	Deciphered Date	2012/01/25	DMC MUX/Redriver
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Date:	Tuesday, January 25, 2011	Sheet	37	of 61

DP Redriver

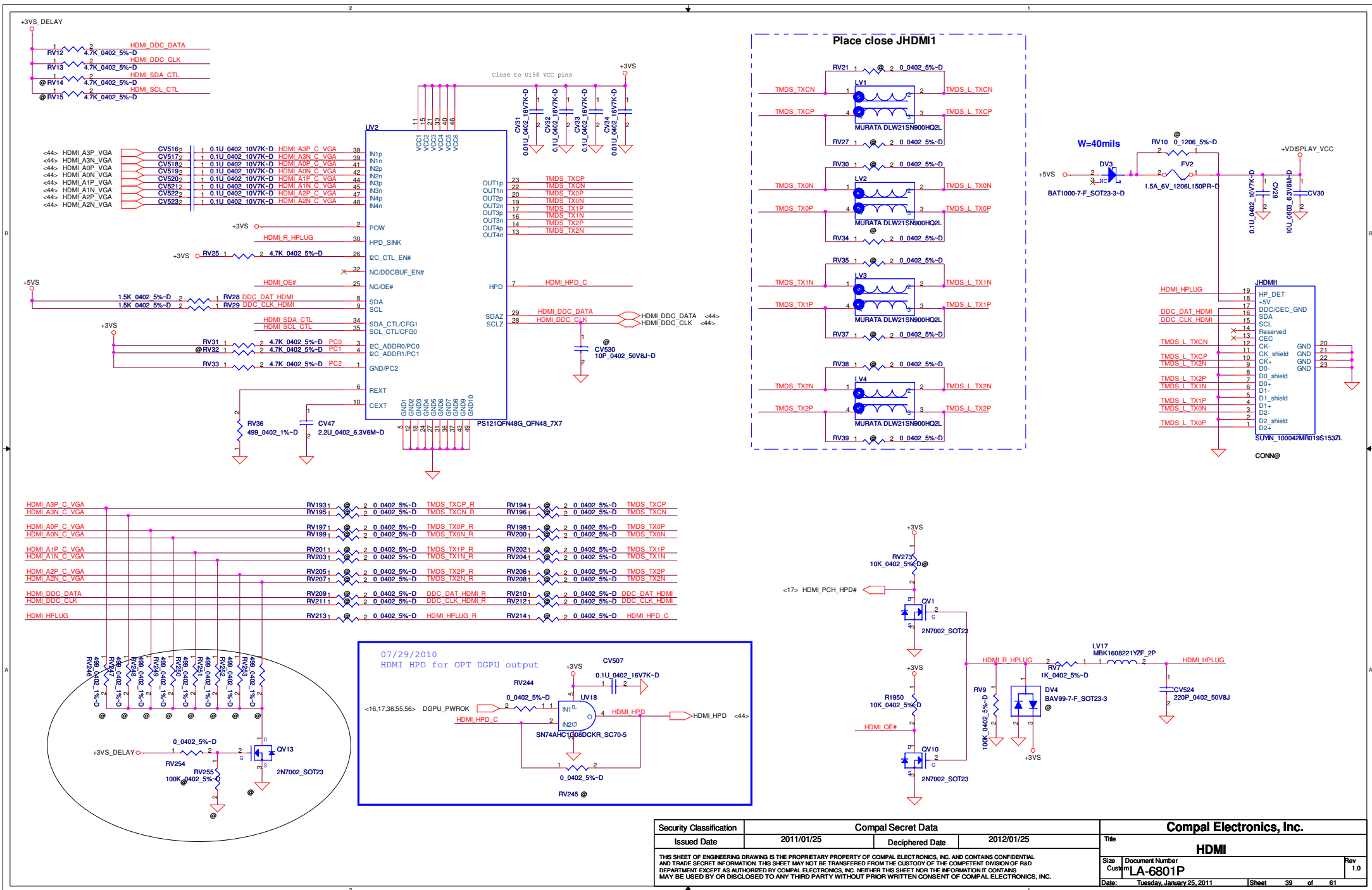
6/5 change C61 0805 to 0603

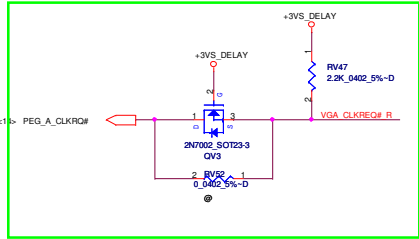
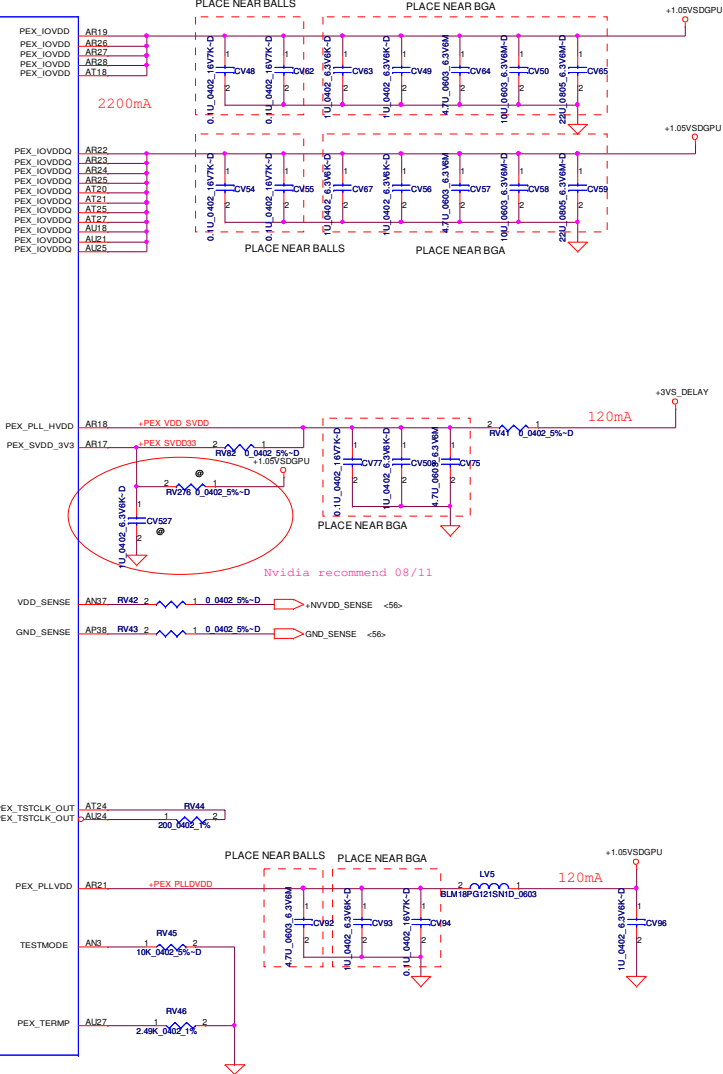
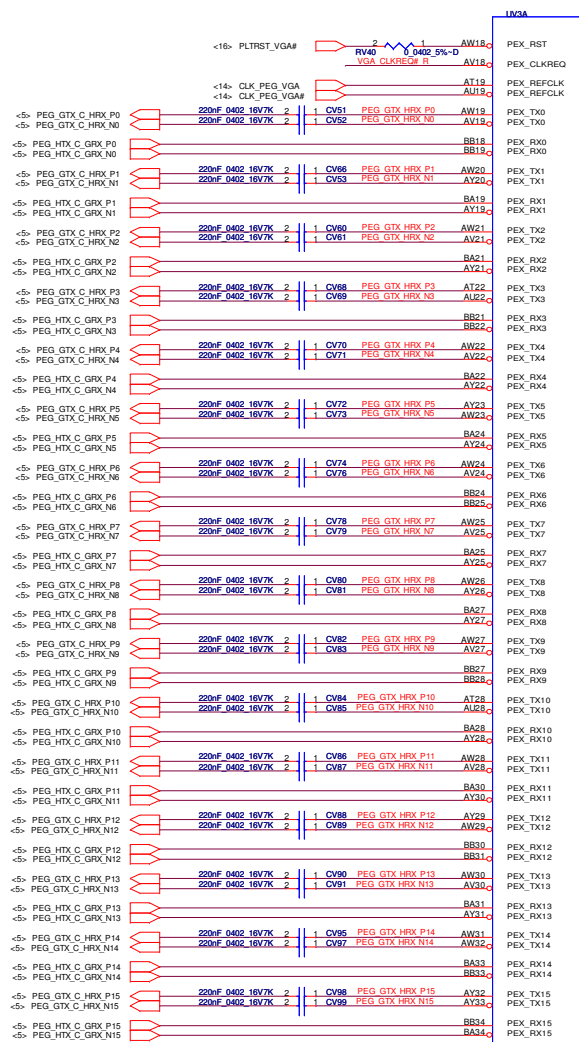


GPU DDC Dongle SW for DP

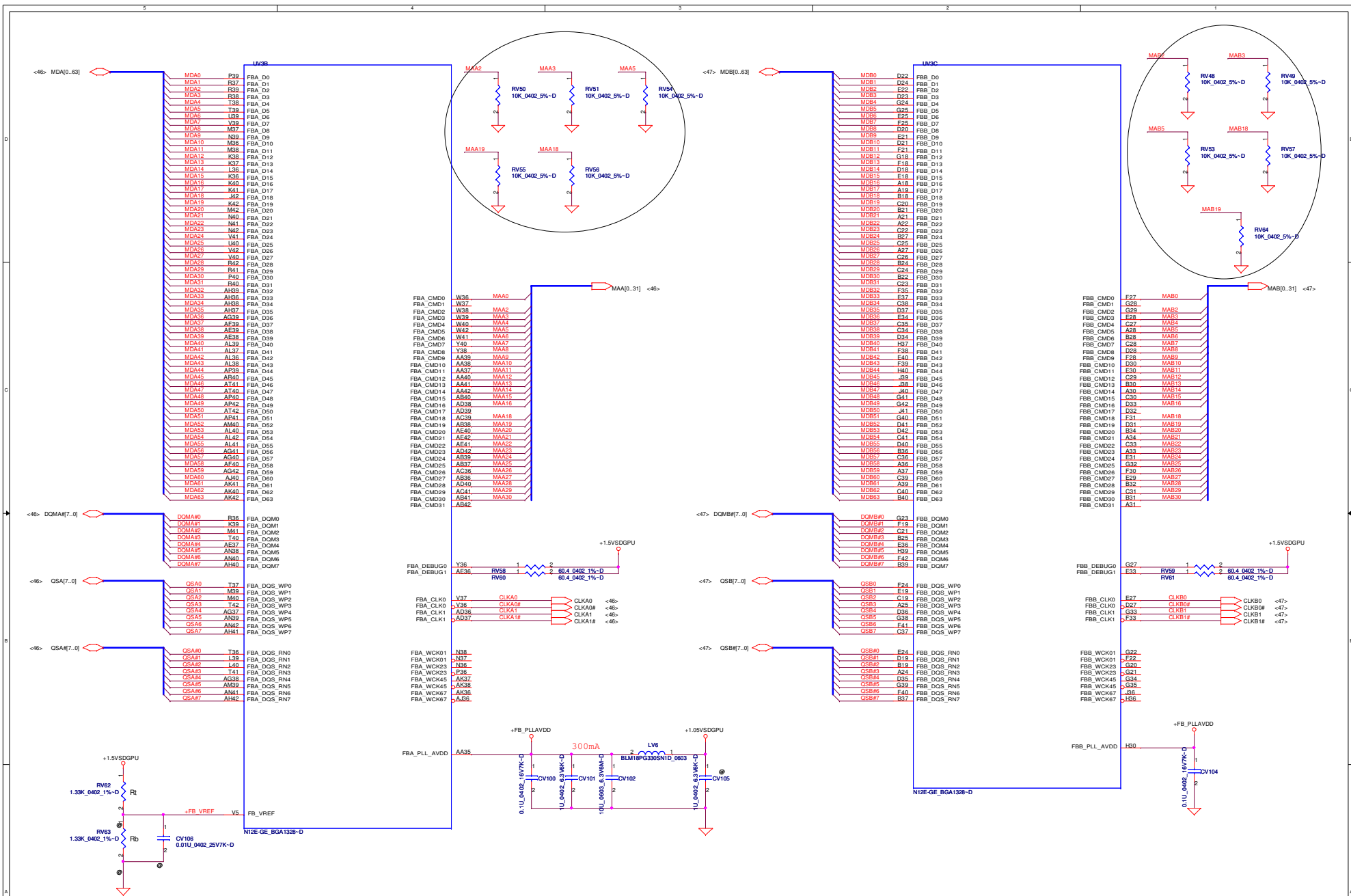


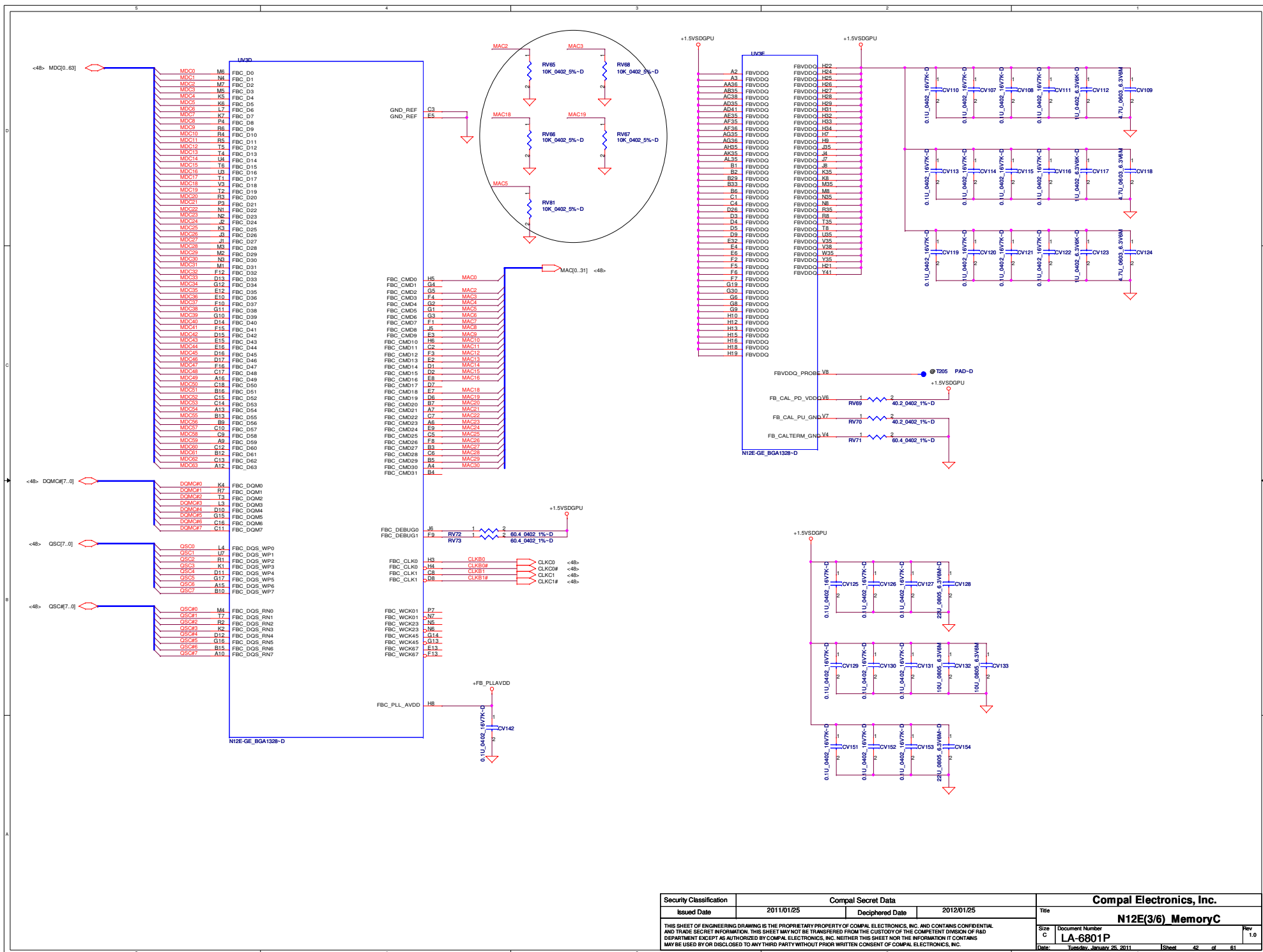
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Issued Date	2011/01/25	Deciphered Date	2012/01/25	Title	Mini Display Port
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				Custom	LA-6801P
				Date	Tuesday, January 25, 2011
				Sheet	38 of 61
				Rev	1.0



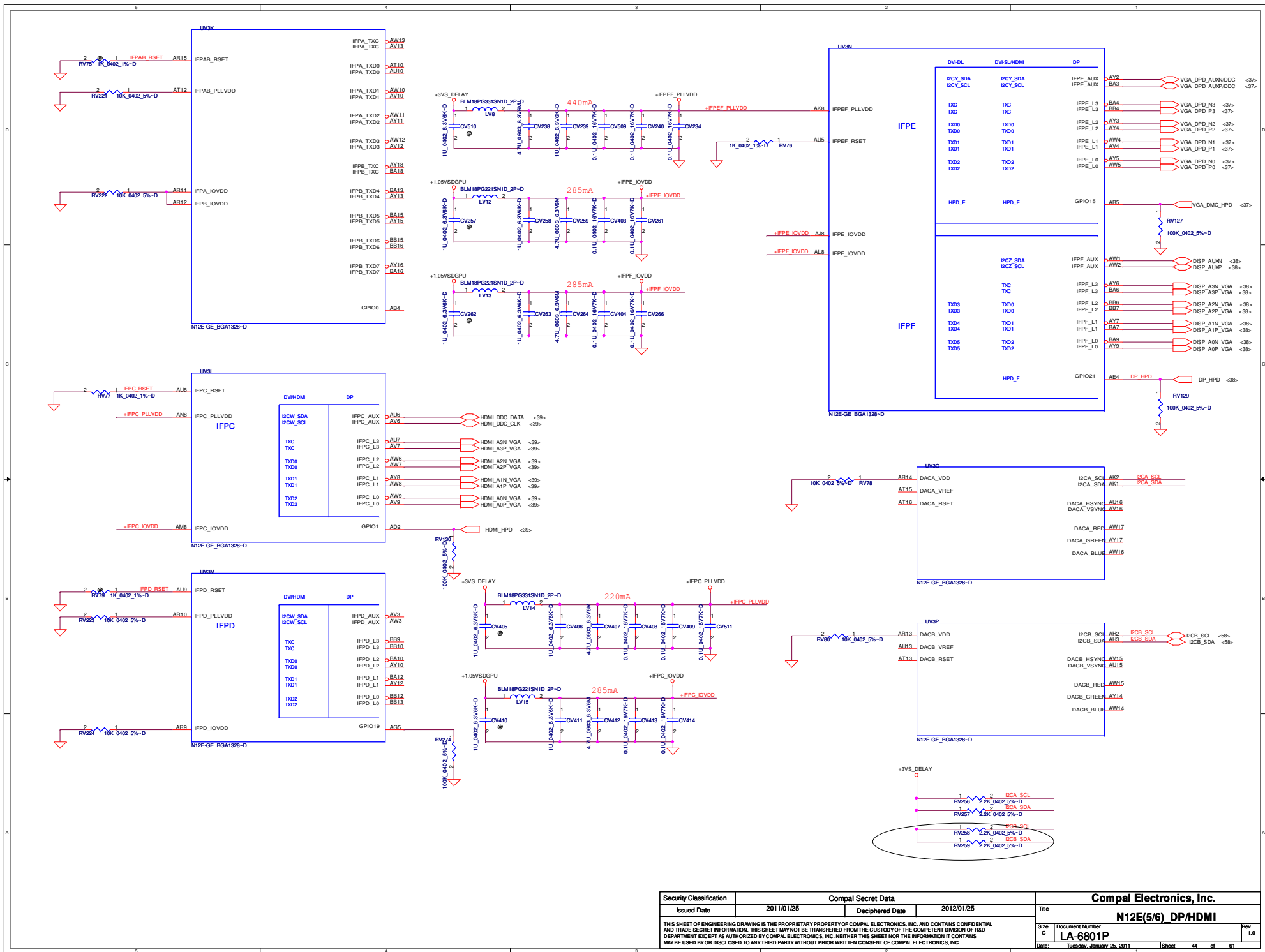


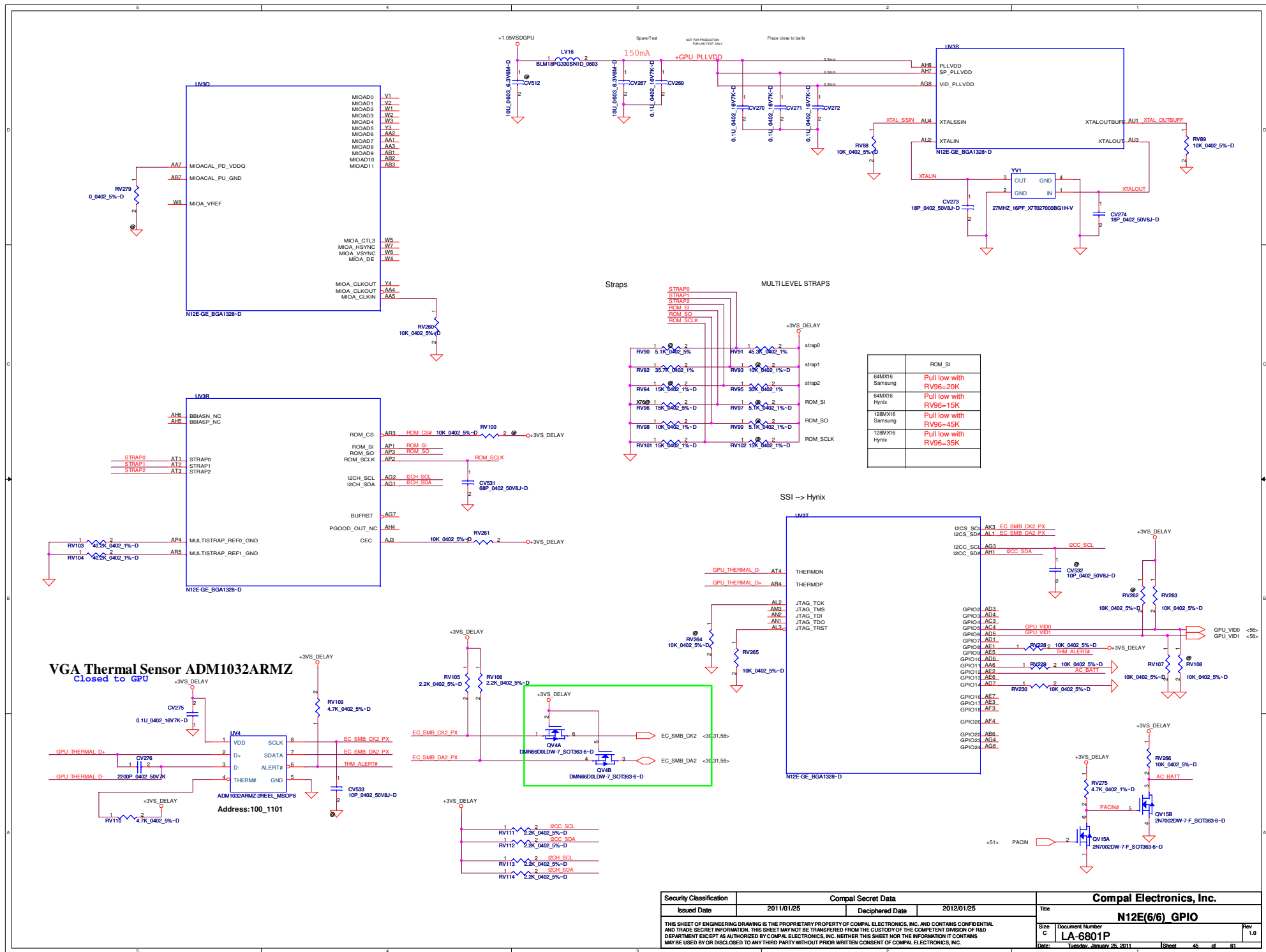
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Issued Date	2011/01/25	Deciphered Date	2012/01/25	Title	
				N12E(1/6) PCIE	
				Size	Document Number
				C	LA-6801P
				Date	Version
				Tuesday, January 25, 2011	1.0
				Sheet	40 of 61

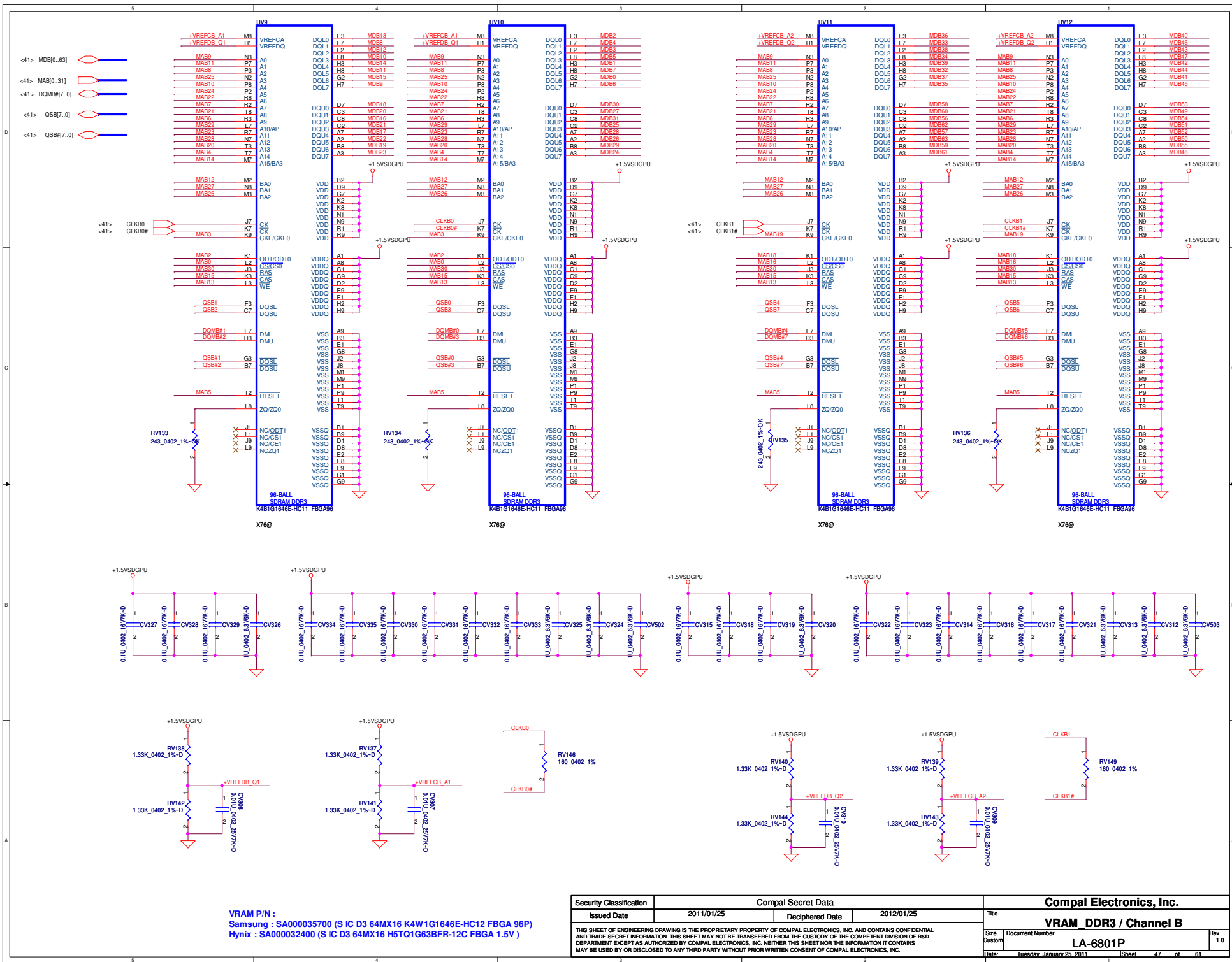




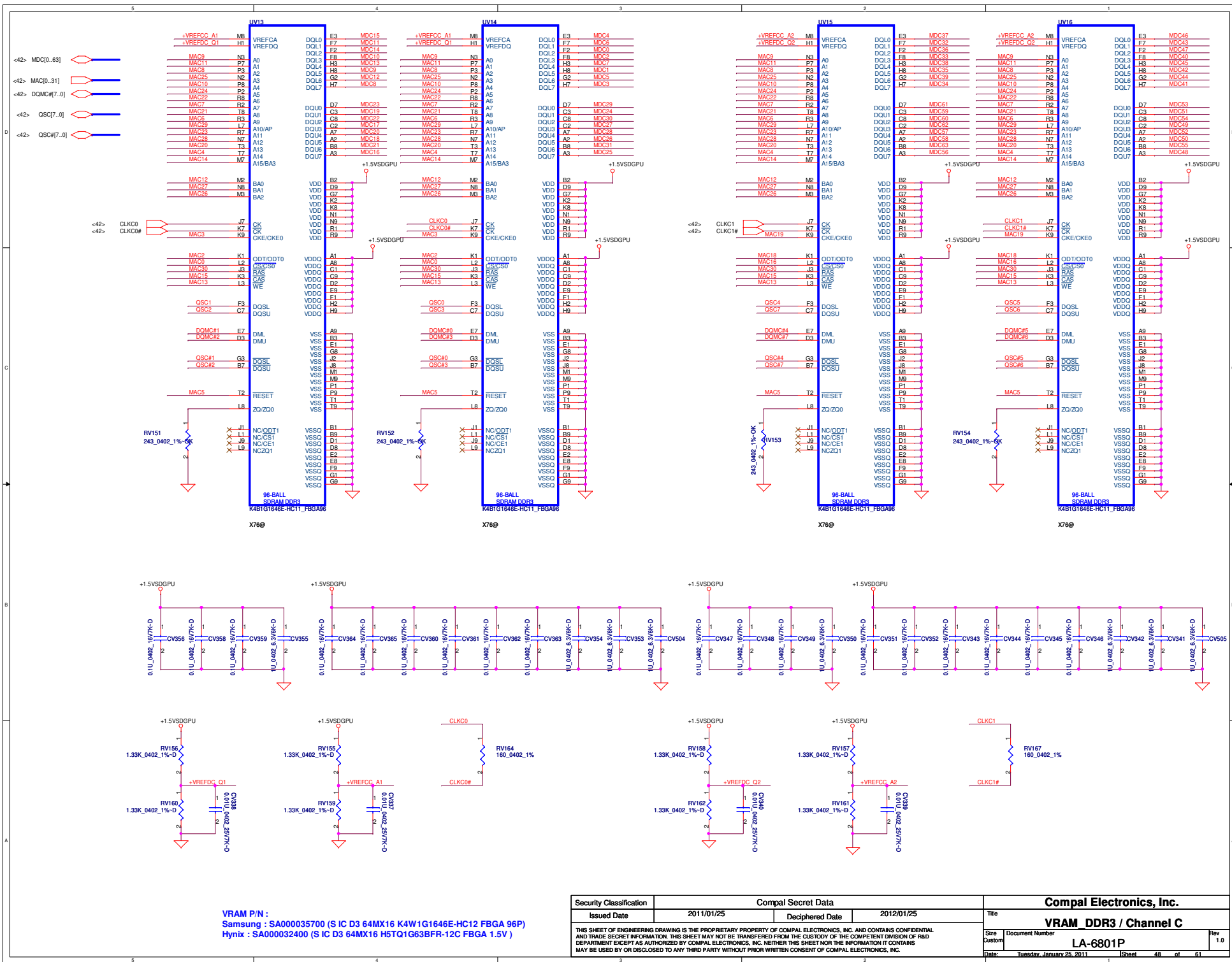
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Issued Date	2011/01/25	Deciphered Date	2012/01/25	Title	N12E(3/6) MemoryC
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				Date:	Tuesday, January 25, 2011
				Sheet	42 of 61



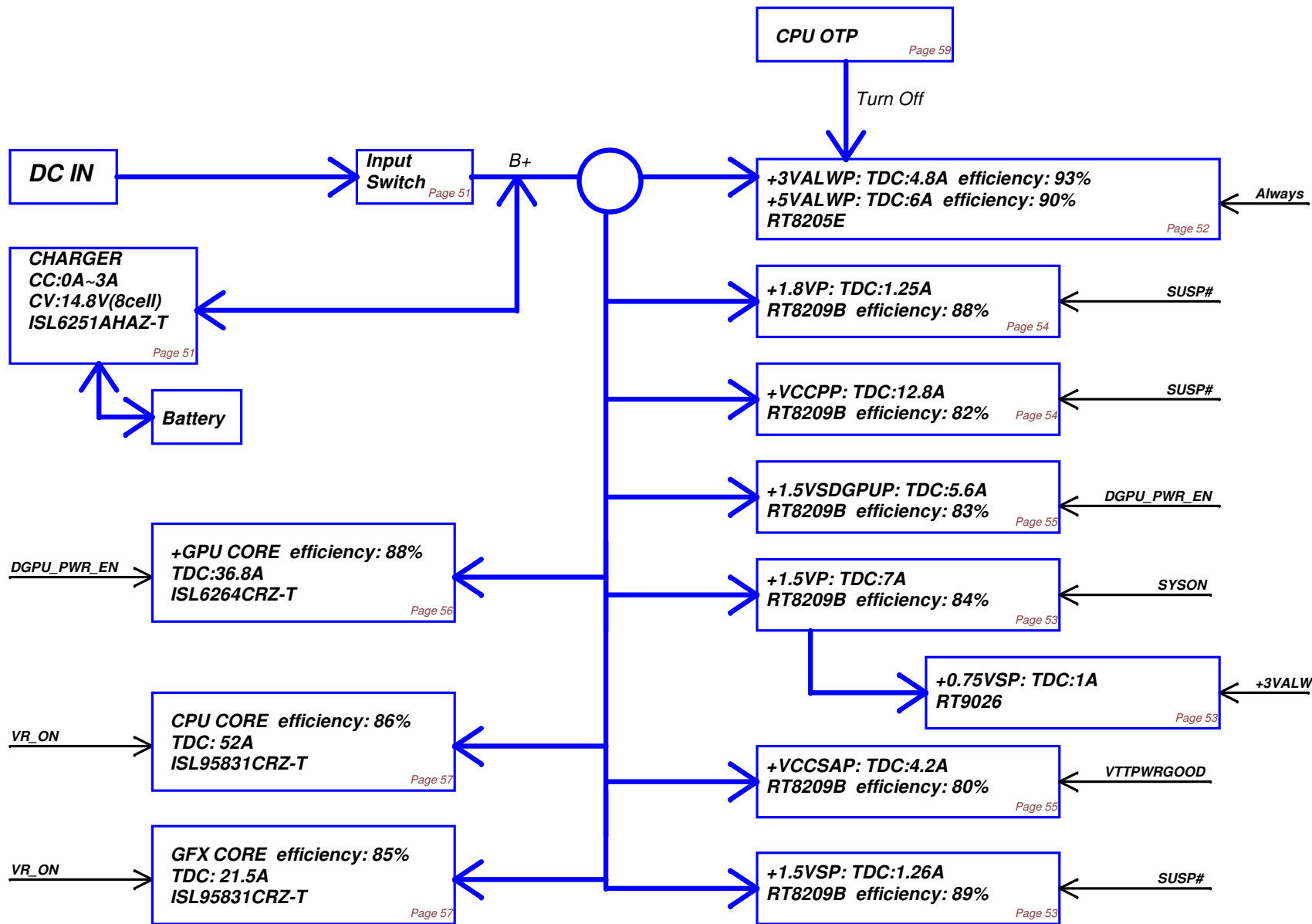




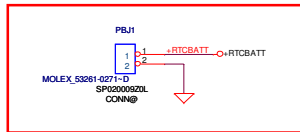
Security Classification		Compal Secret Data		Compal Electronics, Inc.	
Issued Date	2011/01/25	Deciphered Date	2012/01/25	Title	VRAM_DDR3 / Channel B
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				Date	Tuesday, January 25, 2011
				Sheet	47 of 61



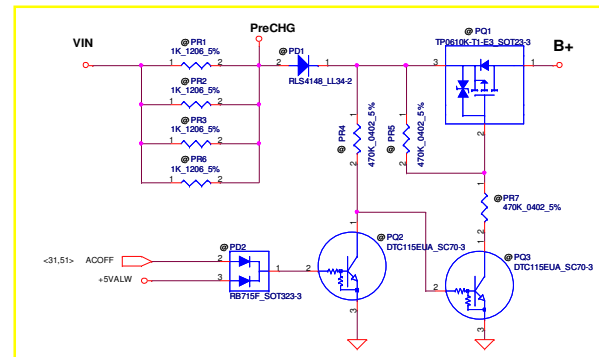
Power block



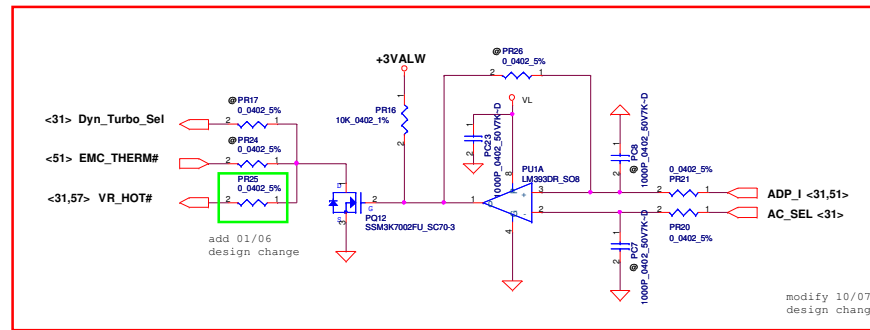
Security Classification		Compal Secret Data		Compal Electronics, Inc.	
Issued Date	2011/01/25	Deciphered Date	2012/01/25	Title	POWER BLOCK DIAGRAM
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				Date: Tuesday, January 25, 2011	Sheet 49 of 61



modify 10/21
for ME request



del 12/13
design change



modify 10/07
design change

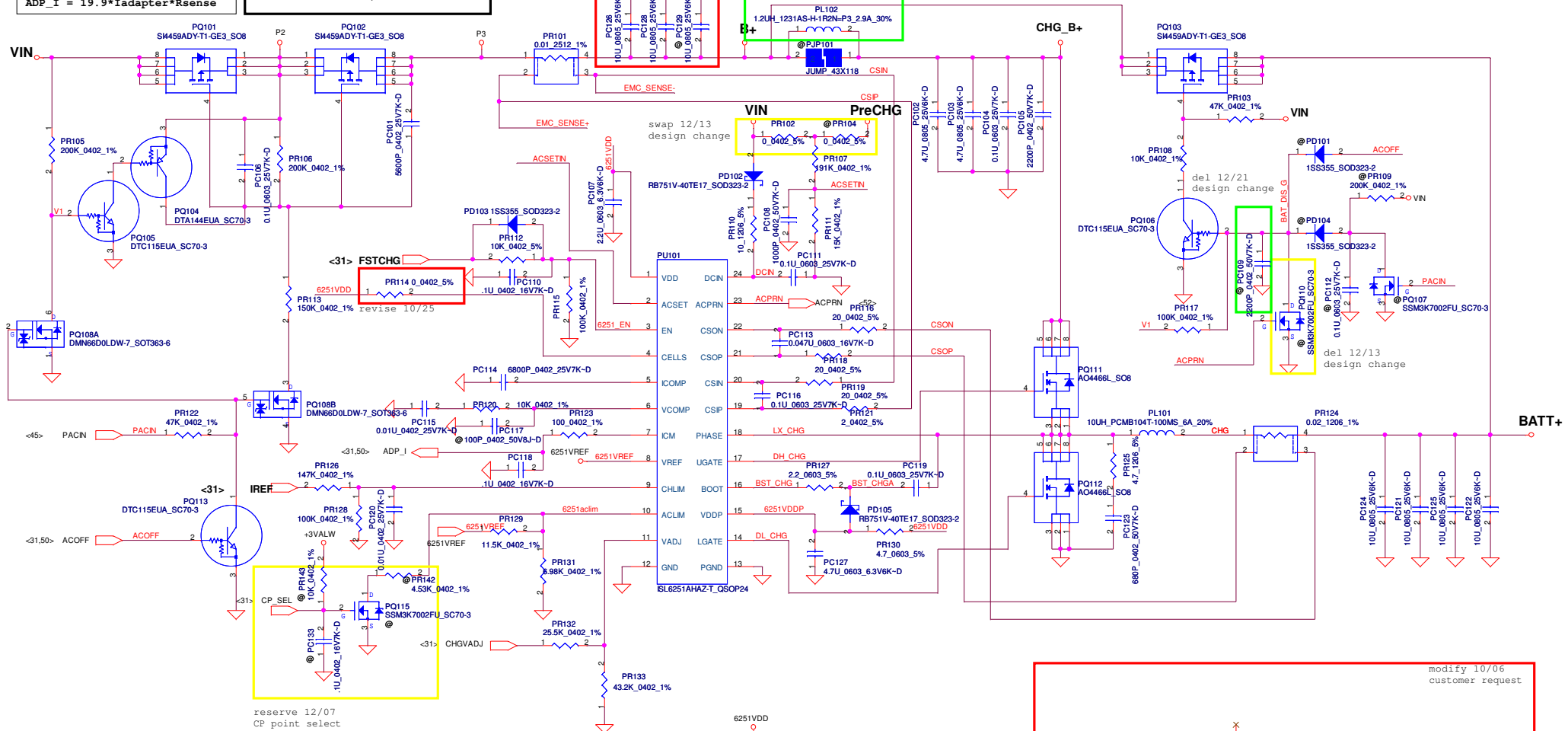
Iada=0~7.693A (150W/19.5V=7.693A)

ADP_I = 19.9*Iadapter*Rsense

CP = 90%*Iada ; CP = 6.92A

add 10/19
for EMI request

add 01/20
for EMI request



CP mode

$I_{input} = (1/0.02) (0.05 * V_{ac1m} / 2.39 + 0.05)$
 $V_{ac1m} = 2.39 * ((6.98K / 152K) / ((11.5K / 152K) + (6.98K / 152K)))$

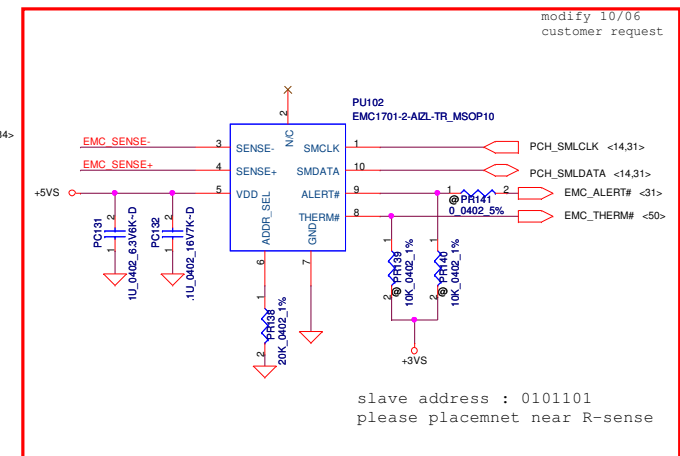
CC=3.3A

IREF=I*charge

IREF=0.25V~3.3V

CHGVADJ	CV mode
0V	3.99V per cell
1.93V	4.2V per cell
3.3V	4.35V per cell

BATT Type	Charging Voltage (0x15)	CV mode
Normal 4S LI-ON Cells	14800mV	14.80V



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Size	Document Number	Rev	Date	
Custom	LA-6801P	1.0	Tuesday, January 25, 2011	
Sheet		51	of 61	

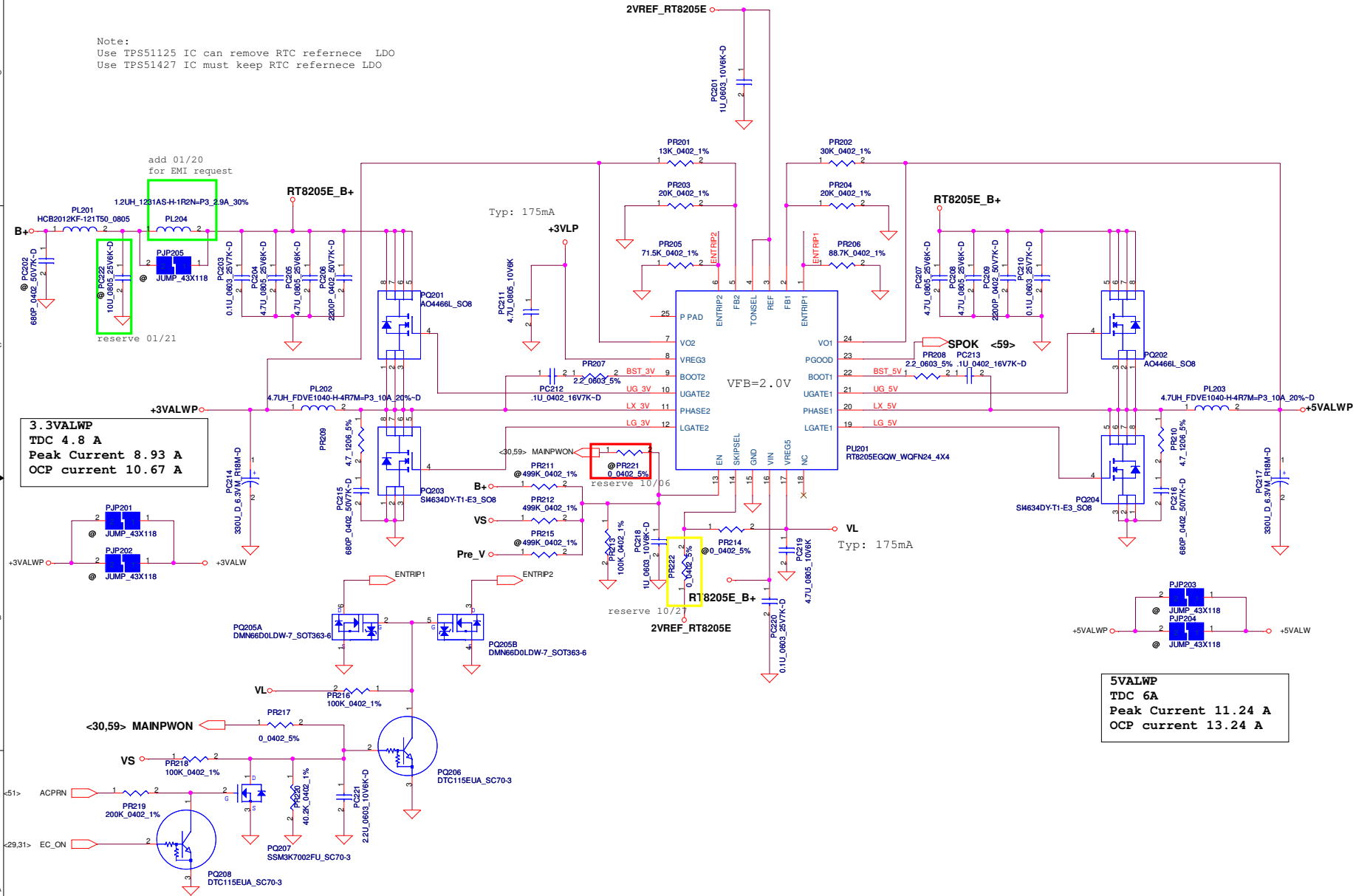
Note:
Use TPS51125 IC can remove RTC refernece LDO
Use TPS51427 IC must keep RTC refernece LDO

add 01/20
for EMI request

reserve 01/21

Typ: 175mA

Typ: 175mA



<30,59> MAINPWON

VS

ACPRN

EC_ON

VS

VS

VS

VS

VS

VS

Security Classification		Compal Secret Data		Compal Electronics, Inc.	
Issued Date	2011/01/25	Deciphered Date	2012/01/25	Title	3VALWP/5VALWP
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				Custom	LA-6801P
				Date	Tuesday, January 25, 2011
				Sheet	52 of 61
				Rev	1.0

<27,31,33> SYSON

+5VALW

+3VALW

1.5VDDR_VID0

1.5VDDR_VID1

+3VALW

+5VALW

<10,18,31,33,54> SUSP#

DDR GPIO Output Voltage Selection		
bit2 = 1.5DDR_VID0	bit1 = 1.5DDR_VID1	DDR Vout
0	0	1.65V
0	1	1.6V
1	0	1.55V
1	1	1.5V (Default)

+3VALW

+1.5VSP
Imax=1.26A
Ipeak=1.8A
Iocp (minimum)=4A

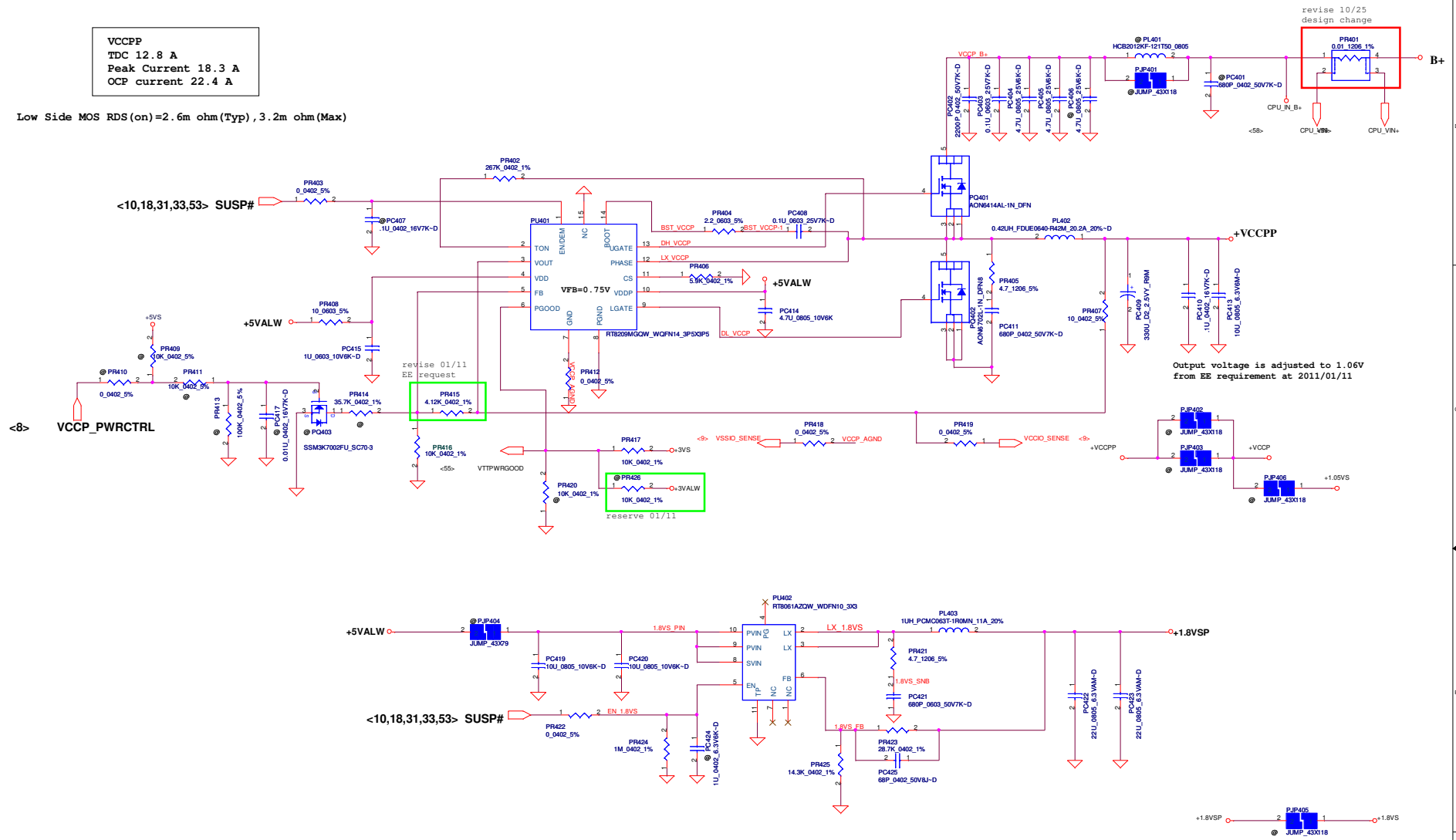
modify 10/20
for EMI request

1.5VP
TDC 7 A
Peak Current 10 A
OCP current 12 A

Low Side MOS RDS(on)=5.5m ohm(Typ), 6.7m ohm(Max)

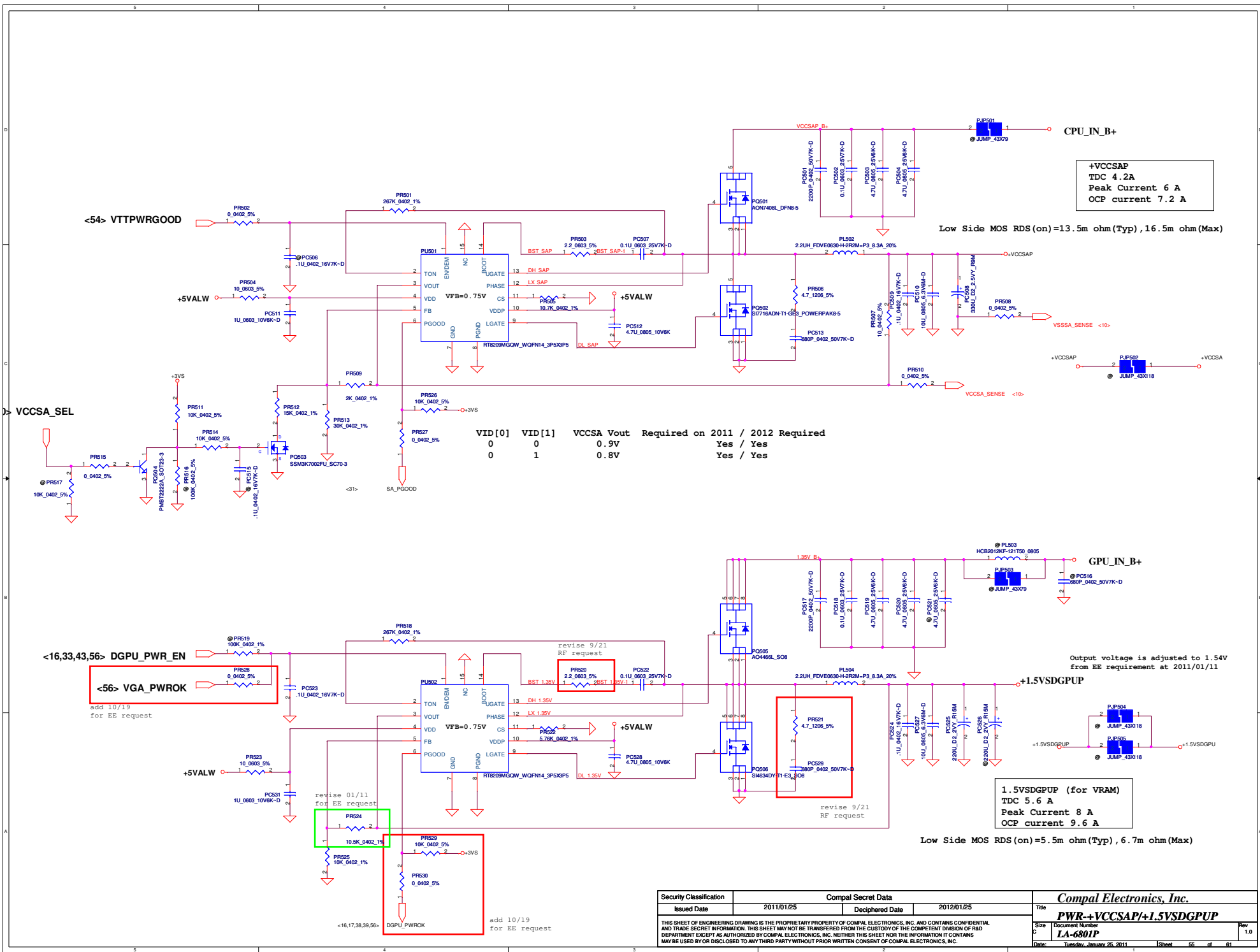
VCCPP
TDC 12.8 A
Peak Current 18.3 A
OCP current 22.4 A

Low Side MOS RDS(on)=2.6m ohm(Typ), 3.2m ohm(Max)



1.8VSP
TDC 1.25 A
Peak Current 1.75 A
OCP current 4 A

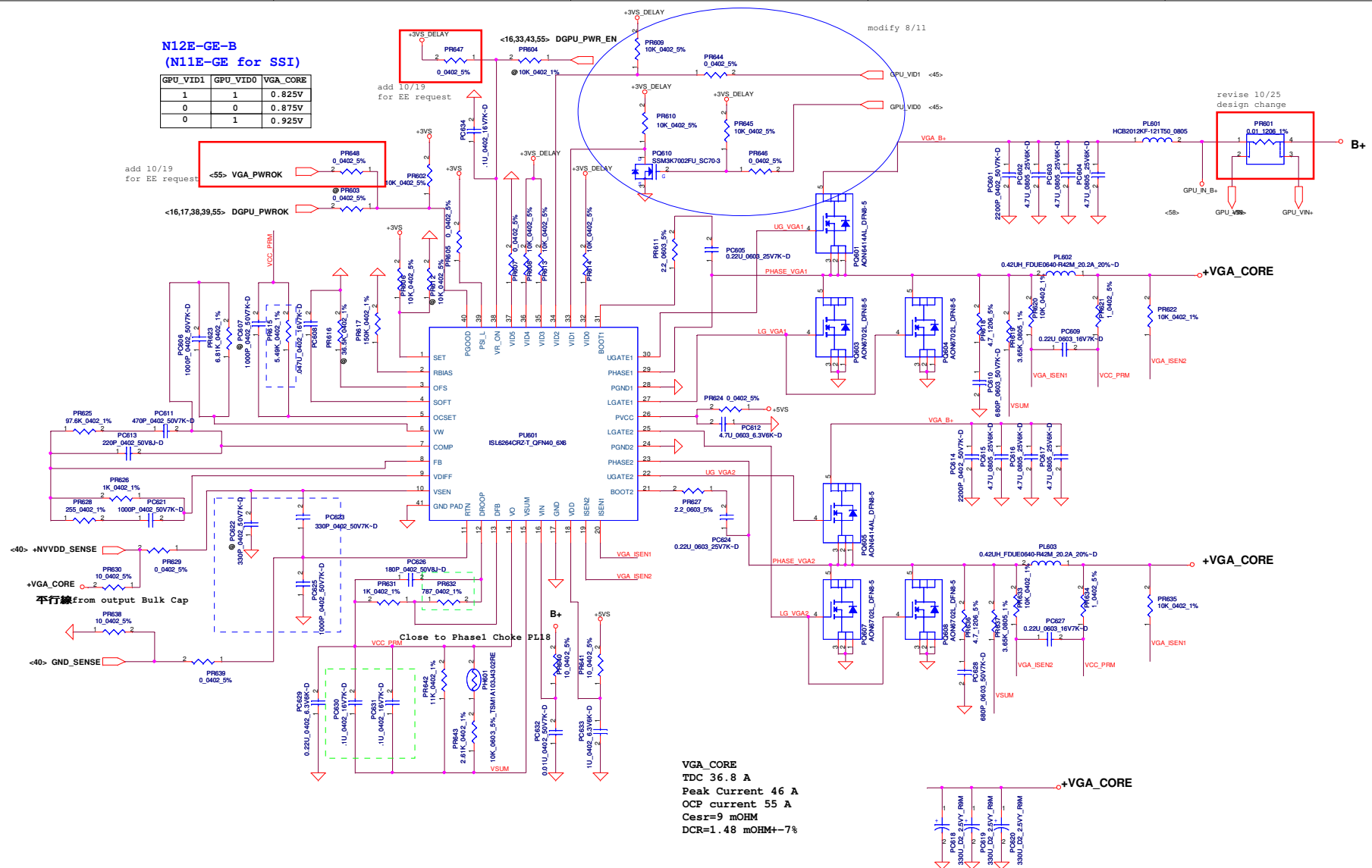
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Issued Date	2011/01/25	Deciphered Date	2012/01/25	Compal Electronics, Inc.	
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Issued Date	2011/01/25	Deciphered Date	2012/01/25	PWR+VCCSAP/+1.5VSDGPUP	
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Date: Tuesday, January 25, 2011		Sheet 55 of 61			

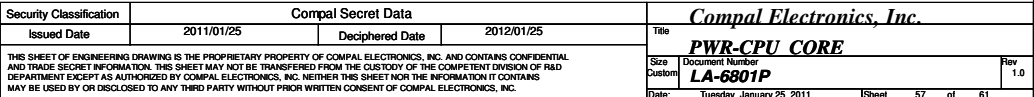
N12E-GE-B
(N11E-GE for SSI)

GPU_VID1	GPU_VID0	VGA_CORE
1	1	0.825V
0	0	0.875V
0	1	0.925V



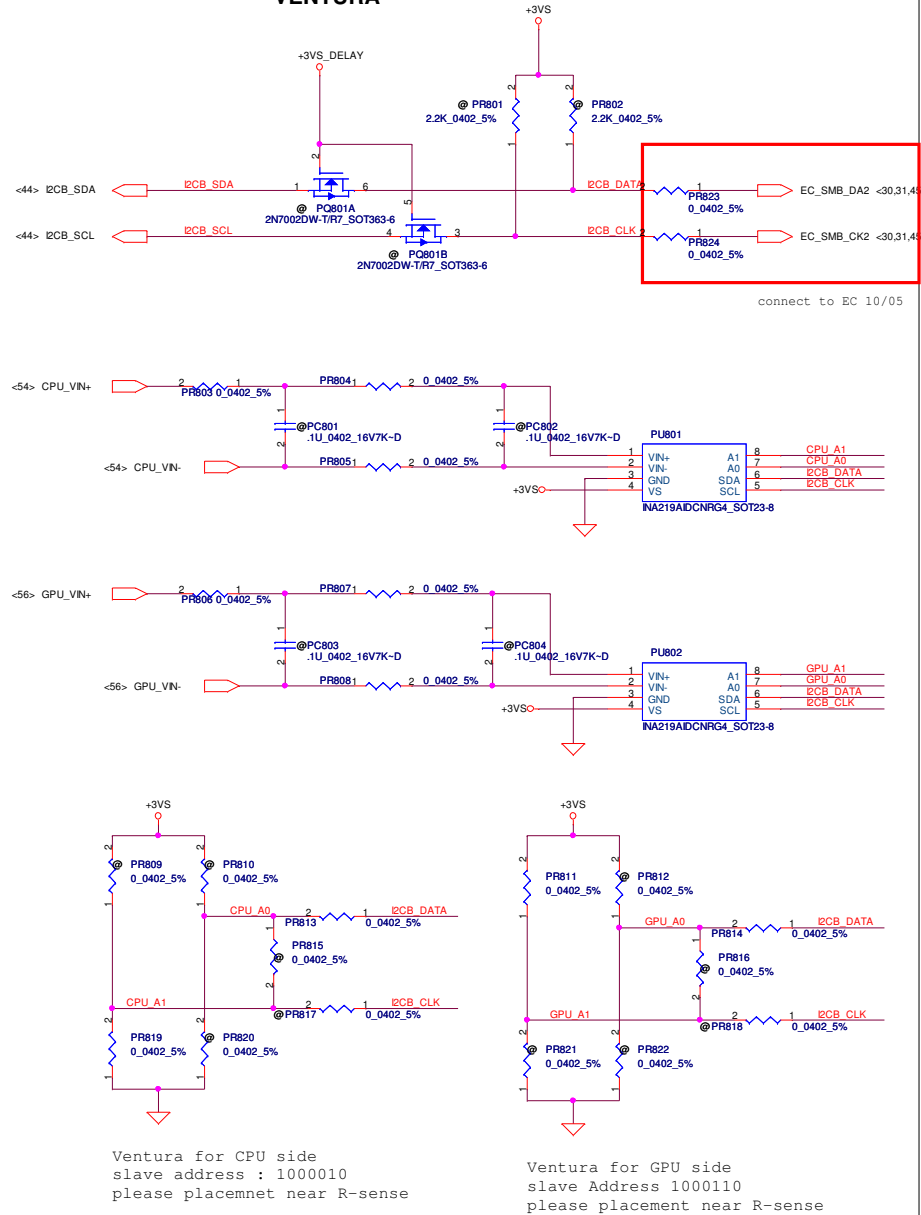
VGA_CORE
TDC 36.8 A
Peak Current 46 A
OCP current 55 A
Cesi=9 mOHM
DCR=1.48 mOHM+-7%

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Quad & Dual CORE selection						
CORE	CPU_SEL	Quad_SEL	Quad_SEL#	PR758//PR769	PR755//PR770	PROG1
Dual	L	L	H	TBD	TBD	4.32k
Quad (Default)	H	H	L	953	3.74k	0

VENTURA



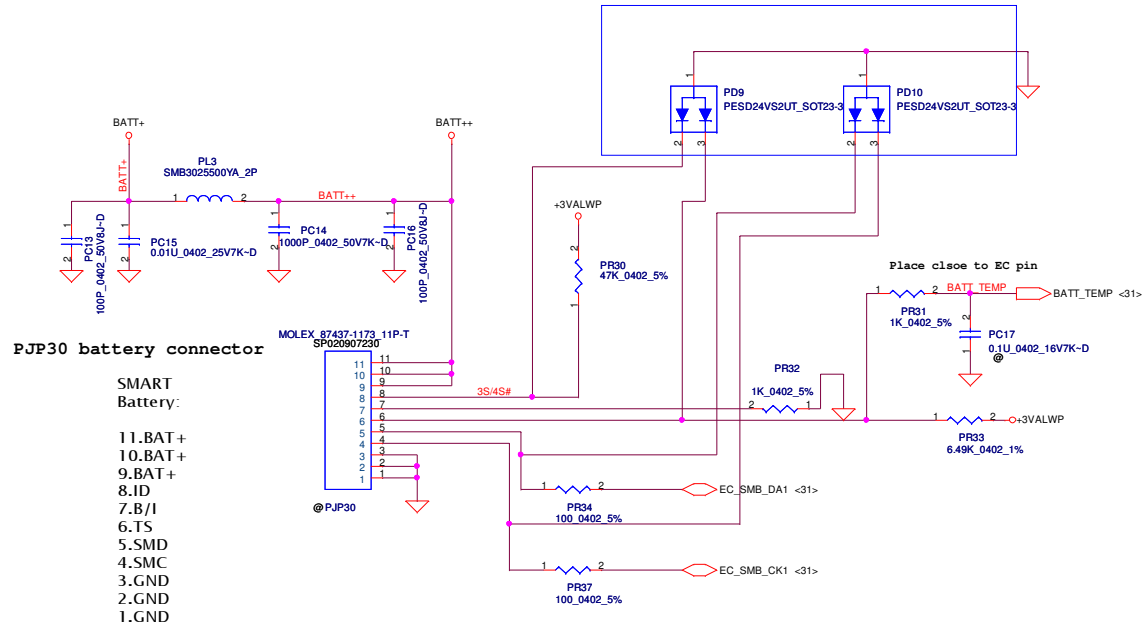
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VENTURA

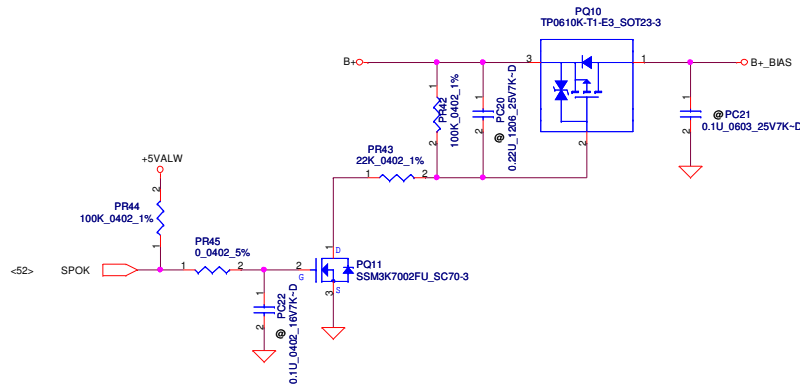
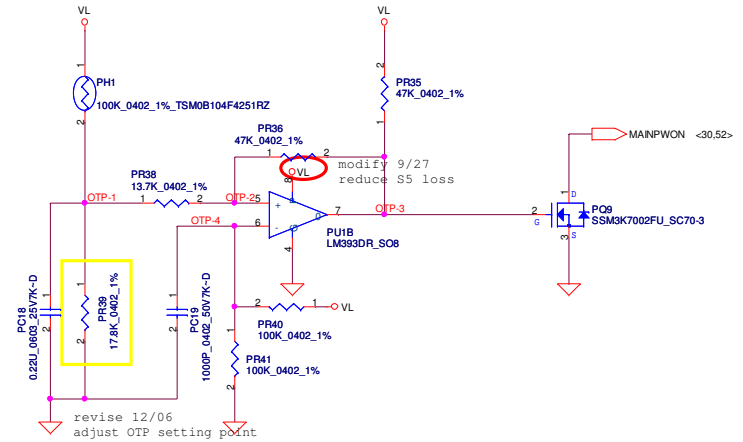
Rev
1.0

revise 8/09
ESD request



Battery Connect/OTP

PH1 under CPU bottom side :
CPU thermal protection at 90 degree C
Recovery at 50 degree C



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				Rev	1.0

Version Change List (P. I. R. List)

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Item	Page#	Title	Date	Request Owner	Issue Description	Solution Description	Rev.
1	50	PWR-DCIN / Vin Detector	10/09/17	COMPAL	reduce SS loss	add PU2;PR27;PC11;PC12	0.2
2	55	+VCCSAP/+1.5VSDGUP	10/09/21	COMPAL	RF request	add PR521;PC529 change PR520 from 0 to 2.2	0.2
3	57	+CPU_CORE	10/09/21	COMPAL	design change	change PR703 from 0 to 27.4K	0.2
4	51	CHARGER	10/10/06	COMPAL	design change	change PC131 from 0.1u to 1u	0.2
5	50	PWR-DCIN / Vin Detector	10/10/07	COMPAL	design change	add PQ12;PC23	0.2
6	54	+VCCPP/+1.8VSP	10/10/07	COMPAL	design change	modify 1.8VSP solution	0.2
7	51	CHARGER	10/10/19	COMPAL	EMI request	add PC126;PC128	0.2
8	55	+VCCSAP/+1.5VSDGUP	10/10/19	COMPAL	EE request	add PR528;PR529;PR530 del PR519	0.2
9	56	+VGA_CORE	10/10/19	COMPAL	EE request	add PR647;PR648 del PR603;PR604	0.2
10	51	CHARGER	10/10/25	COMPAL	design change	change PR114 from 47K to 0	0.2
11	54	+VCCPP/+1.8VSP	10/10/25	COMPAL	design change for use ventura curcuit	change PR401 from 0 to 0.01	0.2
12	56	+VGA_CORE	10/10/25	COMPAL	design change for use ventura curcuit	change PR601 from 0 to 0.01	0.2
13	57	+CPU_CORE	10/10/25	COMPAL	change CPU OCP setting	change PR758 from 887 to 953	0.2
14	57	+CPU_CORE	10/10/25	COMPAL	change GFX OCP & LL setting	change PR723 from 442 to 487 change PR713 from 2.61K to 2.43K	0.2
15	57	+CPU_CORE	10/10/25	COMPAL	quad & dual core CPU switch setting design	add PQ717;PQ718;PQ720;PR771;PR772;PR773;PR767;PR768;PC767;PC768	0.2
16	58	VENTURA	10/10/25	COMPAL	add ventura connect to EC	add PU801;PU802;PR803;PR804;PR805;PR806;PR807;PR808	0.2
						;PR811;PR813;PR814;PR819;PR823;PR824	0.2
17	57	+CPU_CORE	10/10/26	COMPAL	design change for solve acoustic issue	add PC766	0.3
18	52	3VALWP/5VALWP	10/10/27	COMPAL	design change for reserve adjust working frequency	add PR222	0.3
19	59	BATTERY CONN	10/12/06	COMPAL	adjust OTP setting point	change PR39 from 16.9K to 17.8K	0.3
20	50	PWR-DCIN / Vin Detector	10/12/13	COMPAL	design change for delete prechange circuit	del PR1;PR2;PR3;PR4;PR5;PR6;PR7;PD1;PD2;PQ1;PQ2;PQ3	0.3
21	51	CHARGER	10/12/13	COMPAL	design change for delete prechange circuit	del PR104;PQ110 add PR102	0.3
22	53	+1.5VP/+0.75VSP/+1.5VSP	10/12/13	COMPAL	EE request for use memory over clocking circuit	add PR312;PR318	0.3
23	53	+1.5VP/+0.75VSP/+1.5VSP	10/12/20	COMPAL	design change for adjust original output voltage	swap PR314;PR317 and PR320;PR323	0.4
24	51	CHARGER	10/12/21	COMPAL	design change for delete prechange circuit	del PC109	0.4
25	50	PWR-DCIN / Vin Detector	11/01/06	COMPAL	design change for add AC peak power function	add PR25	0.4
26	54	+VCCPP/+1.8VSP	11/01/11	COMPAL	EE request for adjust output voltage	change PR415 from 4.02K to 4.12K	0.4
27	55	+VCCSAP/+1.5VSDGUP	11/01/11	COMPAL	EE request for adjust output voltage	change PR524 from 10K to 10.5K	0.4
28	51	CHARGER	11/01/20	COMPAL	EMI request	add PL102	0.4
29	52	3VALWP/5VALWP	11/01/20	COMPAL	EMI request	add PL204	0.4

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