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B5W18/19 Schematics Document

AMD "Carrizo/Carrizo-L/Bristol Ridge/Stoney Ridge" Platform

AMD 12~25W APU With Excavator/Puma+ Core

LA-D661P REV:0.3

2016-03-14

Security Classification	Compal Secret Data		
Issued Date	2016/03/14	Deciphered Date	2018/03/14

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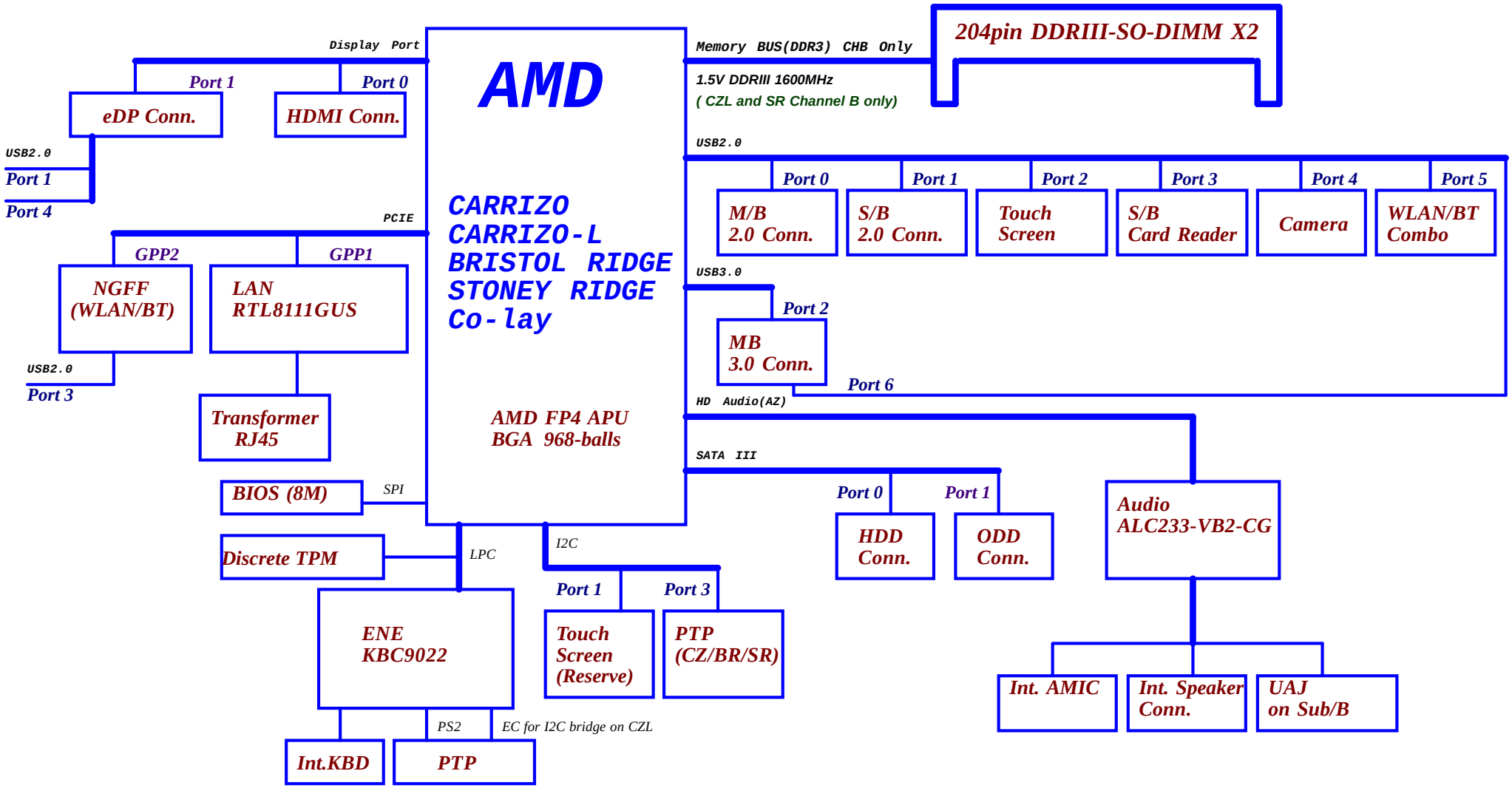
Model Name : Tricera_BS



Sub-borad

Card Reader_AUDIO_USB/B

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Title: BLOCK DIAGRAMS

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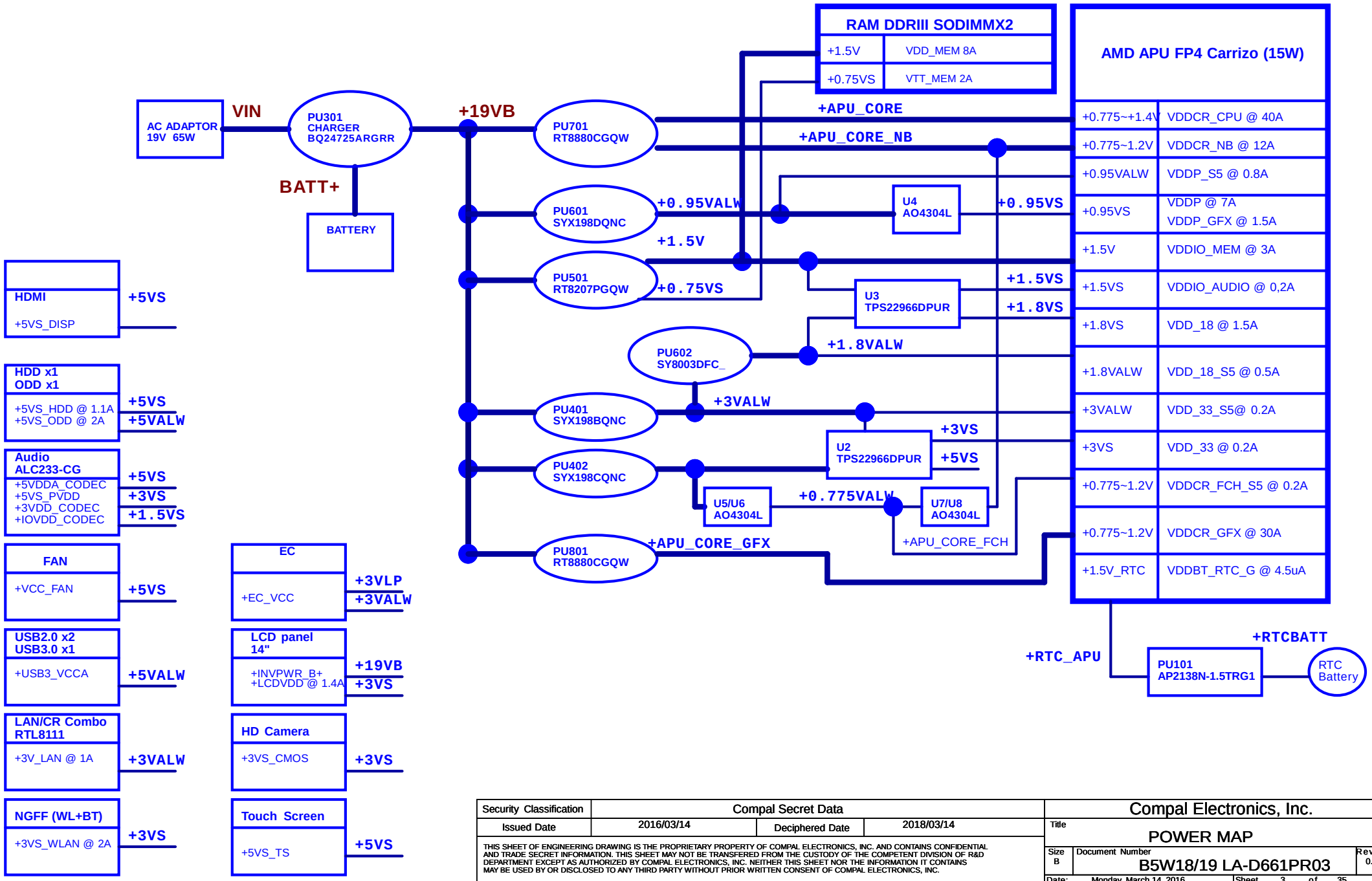

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Title: POWER MAP

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Voltage Rails

Power Plane	Description	S0	S3	S5
VIN	Adapter power supply (19V)	ON	ON	ON
+19VB	AC or battery power rail for power circuit.	ON	ON	ON
+APU_CORE	Core voltage for APU	ON	OFF	OFF
+APU_CORE_NB	Voltage for On-die VGA of APU	ON	OFF	OFF
+APU_CORE_GFX	Voltage for GFX	ON	OFF	OFF
+APU_CORE_FCH	Fusion Controller Hub Power Supply	ON	ON	ON
+0.95VALW	0.95V always on power rail	ON	ON	ON
+0.95VS	0.95V switched power rail	ON	OFF	OFF
+1.8VALW	1.8V always on power rail	ON	ON	ON
+1.8VS	1.8V switched power rail	ON	OFF	OFF
+1.5V	1.5V power rail for APU and DDR	ON	ON	OFF
+1.5VS	1.5V switched power rail	ON	OFF	OFF
+0.75VS	0.75V switched power rail for DDR terminator	ON	OFF	OFF
+0.775VALW	0.775V always on power rail	ON	ON	ON
+3VALW	3.3V always on power rail	ON	ON	ON
+3VS	3.3V switched power rail	ON	OFF	OFF
+5VALW	5V always on power rail	ON	ON	ON
+5VS	5V switched power rail	ON	OFF	OFF
+RTC_APU	RTC power	ON	ON	ON
+3VSDGPU	VGA power	ON	OFF	OFF
+1.8VSDGPU	VGA power	ON	OFF	OFF
+1.5VSDGPU	VGA power	ON	OFF	OFF
+0.95VSDGPU	VGA power	ON	OFF	OFF
+VGA_CORE	VGA power	ON	OFF	OFF

Board ID / SKU ID Table for AD channel

Vcc	3.3V				
Ra	100K +/- 1%				
Board ID	Rb	V min	V typ	V max	EC AD
0	0		0.000V	0.300V	0x00 - 0x0B
1	12K +/- 1%	0.347V	0.354V	0.360V	0x0C - 0x1C
2	15K +/- 1%	0.423V	0.430V	0.438V	0x1D - 0x26
3	20K +/- 1%	0.541V	0.550V	0.559V	0x27 - 0x30
4	27K +/- 1%	0.691V	0.702V	0.713V	0x31 - 0x3B
5	33K +/- 1%	0.807V	0.819V	0.831V	0x3C - 0x46
6	43K +/- 1%	0.978V	0.992V	1.006V	0x47 - 0x54
7	56K +/- 1%	1.169V	1.185V	1.200V	0x55 - 0x64
8	75K +/- 1%	1.398V	1.414V	1.430V	0x65 - 0x76
9	100K +/- 1%	1.634V	1.650V	1.667V	0x77 - 0x87
10	130K +/- 1%	1.849V	1.865V	1.881V	0x88 - 0x96
11	160K +/- 1%	2.015V	2.031V	2.046V	0x97 - 0xA3
12	200K +/- 1%	2.185V	2.200V	2.215V	0xA4 - 0xAD
13	240K +/- 1%	2.316V	2.329V	2.343V	0xAE - 0xB7
14	270K +/- 1%	2.395V	2.408V	2.421V	0xB8 - 0xC0
15	330K +/- 1%	2.521V	2.533V	2.544V	0xC1 - 0xC9
16	430K +/- 1%	2.667V	2.677V	2.687V	0xCA - 0xD3
17	560K +/- 1%	2.791V	2.800V	2.808V	0xD4 - 0xDC
18	750K +/- 1%	2.905V	2.912V	2.919V	0xDD - 0xE6
19	NC	3.000V	3.300V		0xE7 - 0xFF

BOARD ID Table

Board ID	PCB Revision
0	EVT
1	DVT
2	PVT
3	
4	
5	
6	
7	

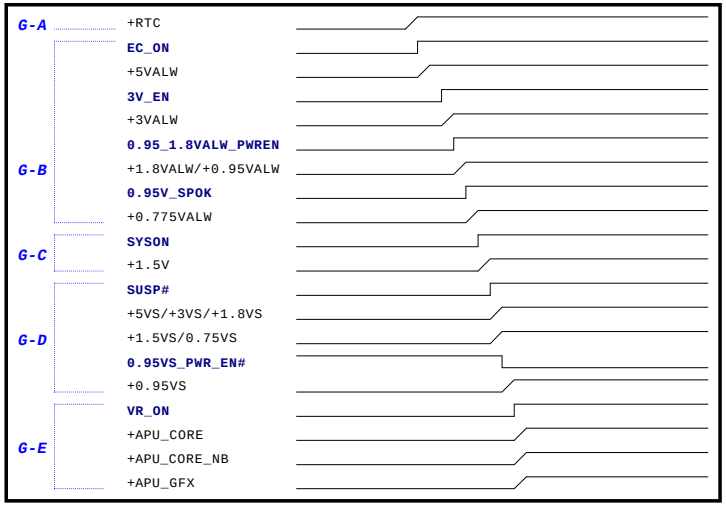
SMBus/I2C Address Table

Master	Device	Address(7 bit)	Address(8bit)	
			Write	Read
APU SMBus Port 0 (+3VS)	JDIMM1	0101 0000b 50H	1010 0000b A0H	1010 0001b A1H
	JDIMM2	0101 0001b 51H	1010 0010b A2H	1010 0011b A3H
APU SMBus Port 1 (+3VALW)	Use As I2C			
APU I2C Port 0 (+1.8VS)	N.A			
APU I2C Port 1 (+1.8VS)	N.A			
APU I2C Port 2 (+3VS)	Use As SMBus			
APU I2C Port 3 (+3VALW)	PTP (Synaptics)	0010 1100b 2CH	0101 1000b 58H	0101 1001b 59H
EC SMBus Port 1 (+3VALW)	Smart Battery	0000 1011b 0BH	0001 0110b 16H	0001 0111b 17H
	Charger IC (BQ24725)	0000 1001b 09H	0001 0010b 12H	0001 0011b 13H
EC SMBus Port 2 (+3VS)	APU Temp. (TSI)	0100 1100b 4CH	1001 1000b 98H	1001 1001b 99H

BOM Structure Table

BOM Structure	BTO Item
@	Unpop
@EMC@	EMI/ESD Unpop
EMC@	EMI/ESD pop
T13EMC@	Carrizo/Bristol/Stoney EMI/ESD pop
T2EMC@	Carrizo-L EMI/ESD pop
255@	ALC255 Pop
233@	ALC233 Pop
9012@	KBC9012 Pop
9022@	KBC9022 Pop
T13@	Carrizo/Bristol/Stoney Pop
T1@	Carrizo/Bristol Pop
T2@	Carrizo-L Pop
T3@	Stoney Pop
8111H@	8111H Pop
8111GUS@	8111GUS Pop
TPM@	TPM Pop
45@	HDMI Royalty
CONN@	ME Connector
JP@	Jump
RS@	R-Short
TP@	Test Point
CZ@	BIOS Board ID for CZ
BR@	BIOS Board ID for BR

POWER SEQUENCE



ZZZ

PCB
Part Number = DA80016V000
PCB 1NW LA-D661P REV0 MB 1

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Title: NOTES LIST

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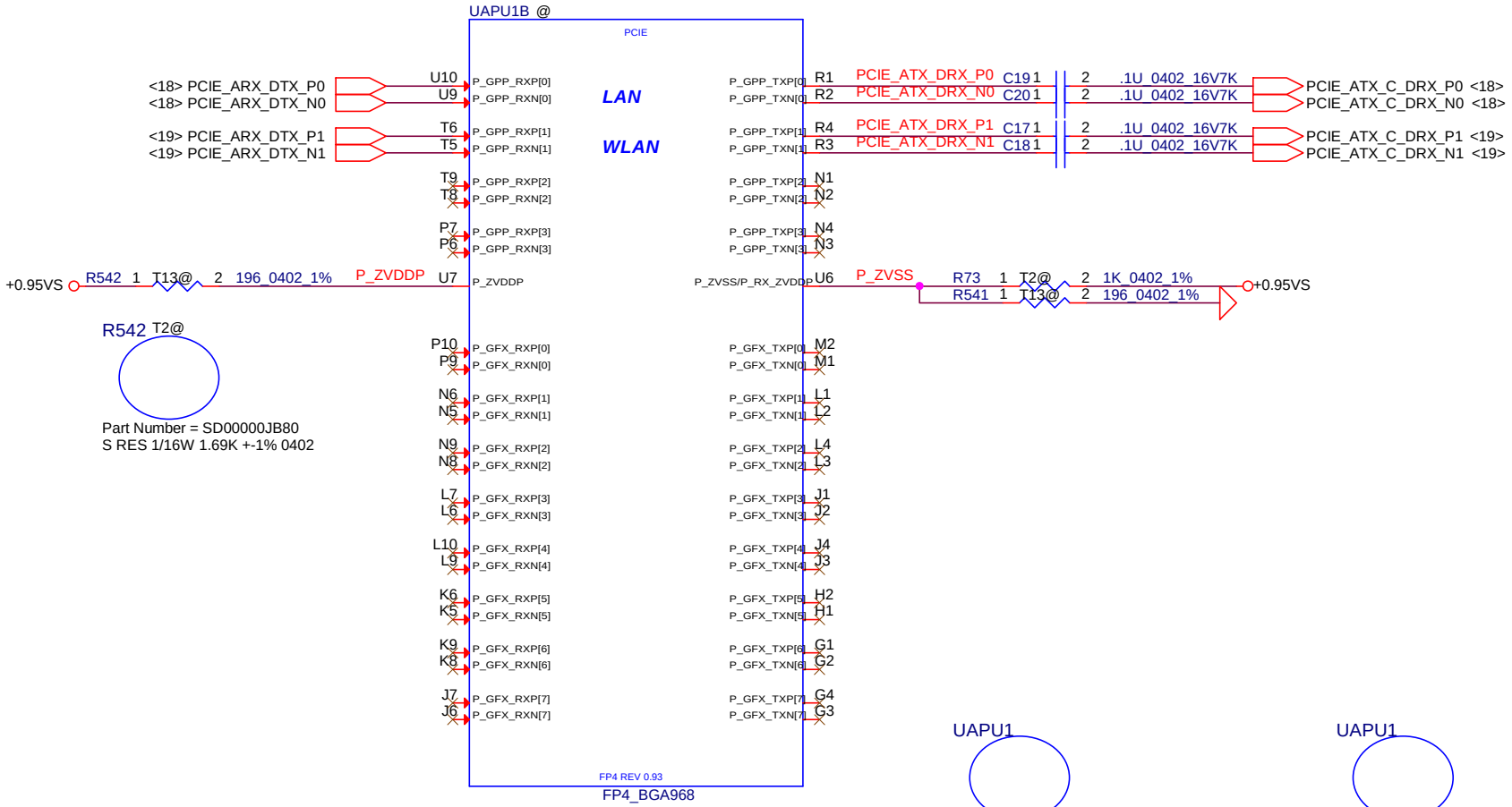

R542 T2@

Part Number = SD00000JB80
S RES 1/16W 1.69K +-1% 0402

UAPU1

APU SRA9@
Part Number = SA00009VY00
S IC A9-9410 AM9410AFY23AC 2.9G BGA APU

UAPU1

APU CZLA8@
Part Number = SA00008PS40
S IC A8 SERIES AM7410JBY44JB 2.2G ABO!

UAPU1

APU BRFX@
Part Number = SA00009LB00
S IC FX-9800P FM980PADY44AB 2.7G BGA968P

UAPU1

APU CZFX@
Part Number = SA00008T310
S IC FX-8800P FM880PAAY43KA 2.1G ABO !

UAPU1

APU SRA6@
Part Number = SA00009VZ00
S IC A6-9210 AM9210AVY23AC 2.4G BGA APU

UAPU1

APU CZLA6@
Part Number = SA00008KX40
S IC CARRIZO-L AM7310JBY44JB 2G BGA ABO!

UAPU1

APU BRA10@
Part Number = SA00009LD00
S IC A10-9600P AM960PADY44AB 2.4G BGA968

UAPU1

APU CZA10@
Part Number = SA00008T410
S IC A10-8700P AM870PAAY43KA 1.8G ABO!

UAPU1

APU SRE2@
Part Number = SA00009X000
S IC E2-9010 EM9010AVY23AC 2G BGA968 APU

UAPU1

APU CZLA4@
Part Number = SA00008J540
S IC CARRIZO-L AM7210JBY44JB 1.8G ABO!

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Title: FP4 PCIE

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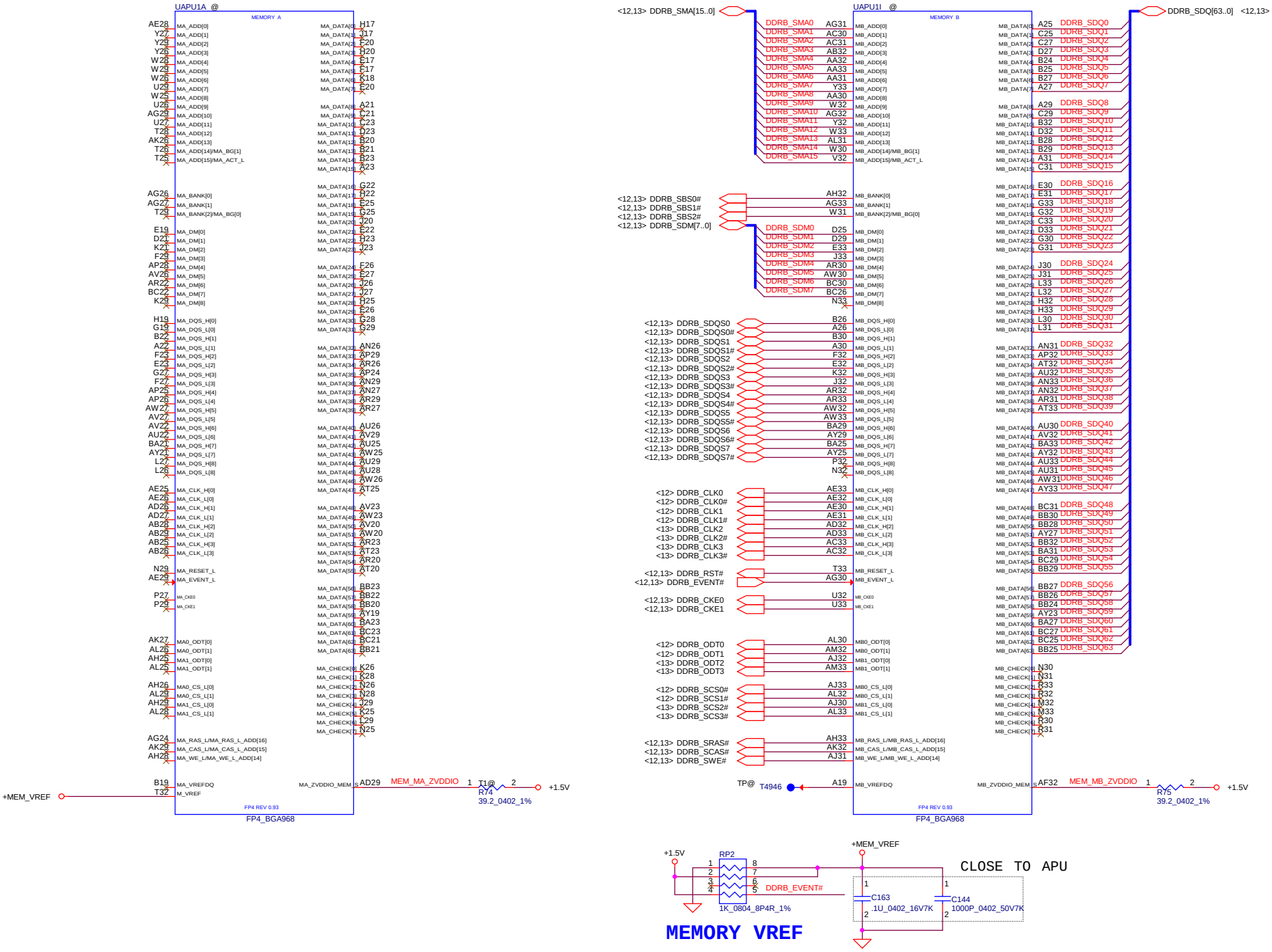

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Title: FP4 MEMORY INTERFACE

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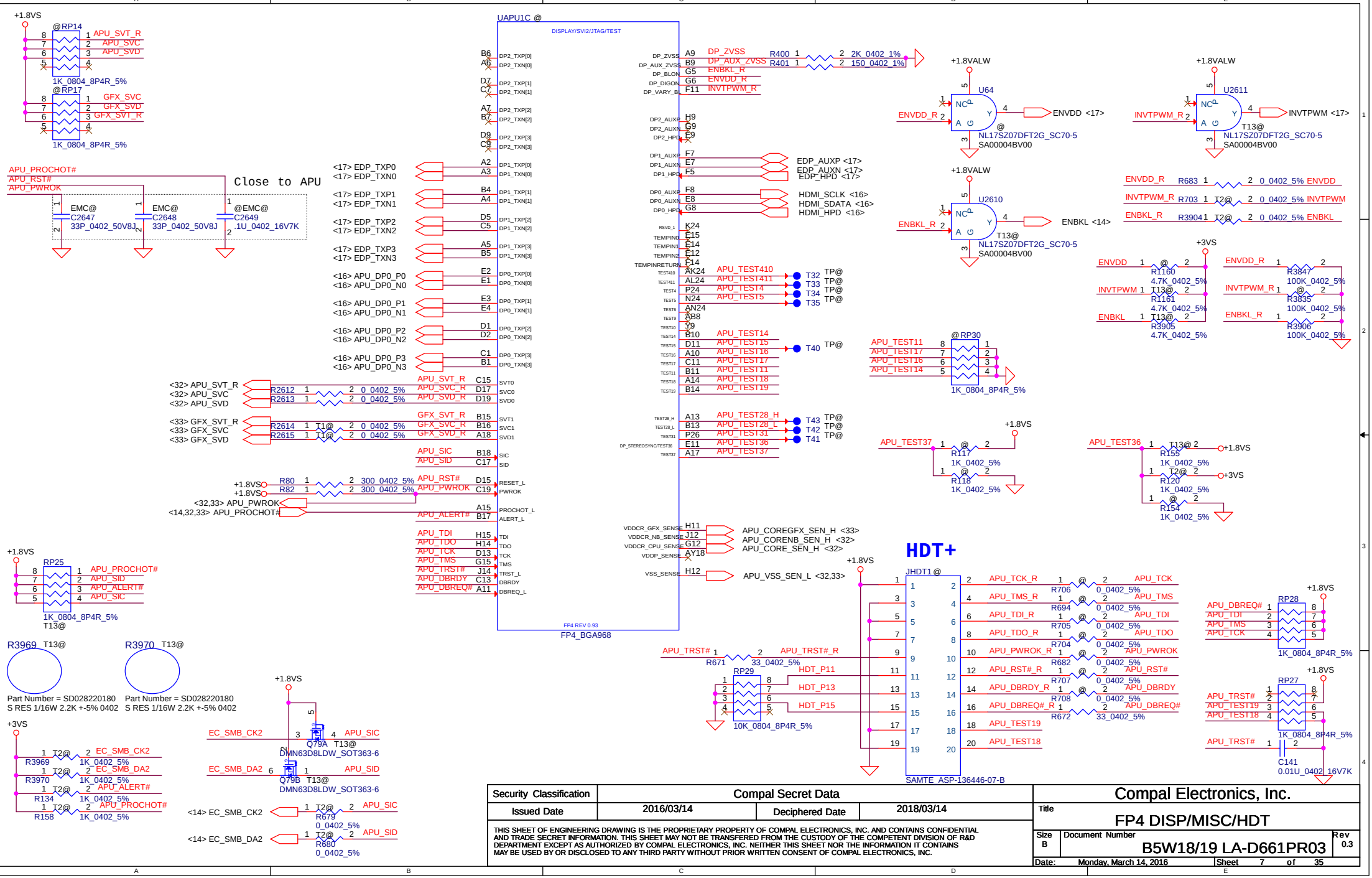

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UAPU1D @

ACPI/SD/AZ/GPIO/RTC/I2C/UART/MISC

FP4_BGA968

	AGPIO12	AGPIO10
SR	0	0
BR	0	1
CZ	1	0
CZL	1	1

32.768KMHz CRYSTAL

	LPC_CLK0_EC	LPC_CLK1	LPC_FRAME#	MEM_VOLT_SEL/AGPIO3 <INT PU>		RTC_CLK <INT PU>	BLINK/AGPIO11 <INT PU>	SYS_RST# <INT PU>
				CZL	CZ			
H	BOOT FAIL TIMER ENABLED	CLKGEN ENABLE (DEFAULT)	SPI ROM (DEFAULT)	1.8V SPI ROM	ENHANCED RESET (DEFAULT)	COIN BATT ON BOARD (DEFAULT)	LDT_RST#/PG OUTPUT TO APU (DEFAULT)	NORMAL RESET MODE (DEFAULT)
L	BOOT FAIL TIMER DISABLED (DEFAULT)	CLKGEN DISABLED	LPC ROM	3.3V SPI ROM (Default)	TRADITION RESET	COIN BATT NOT ON BOARD	OUTPUT TO PADS	SHORT RST MODE

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Title: FP4 GPIO/AZ/MISC/STRAPS

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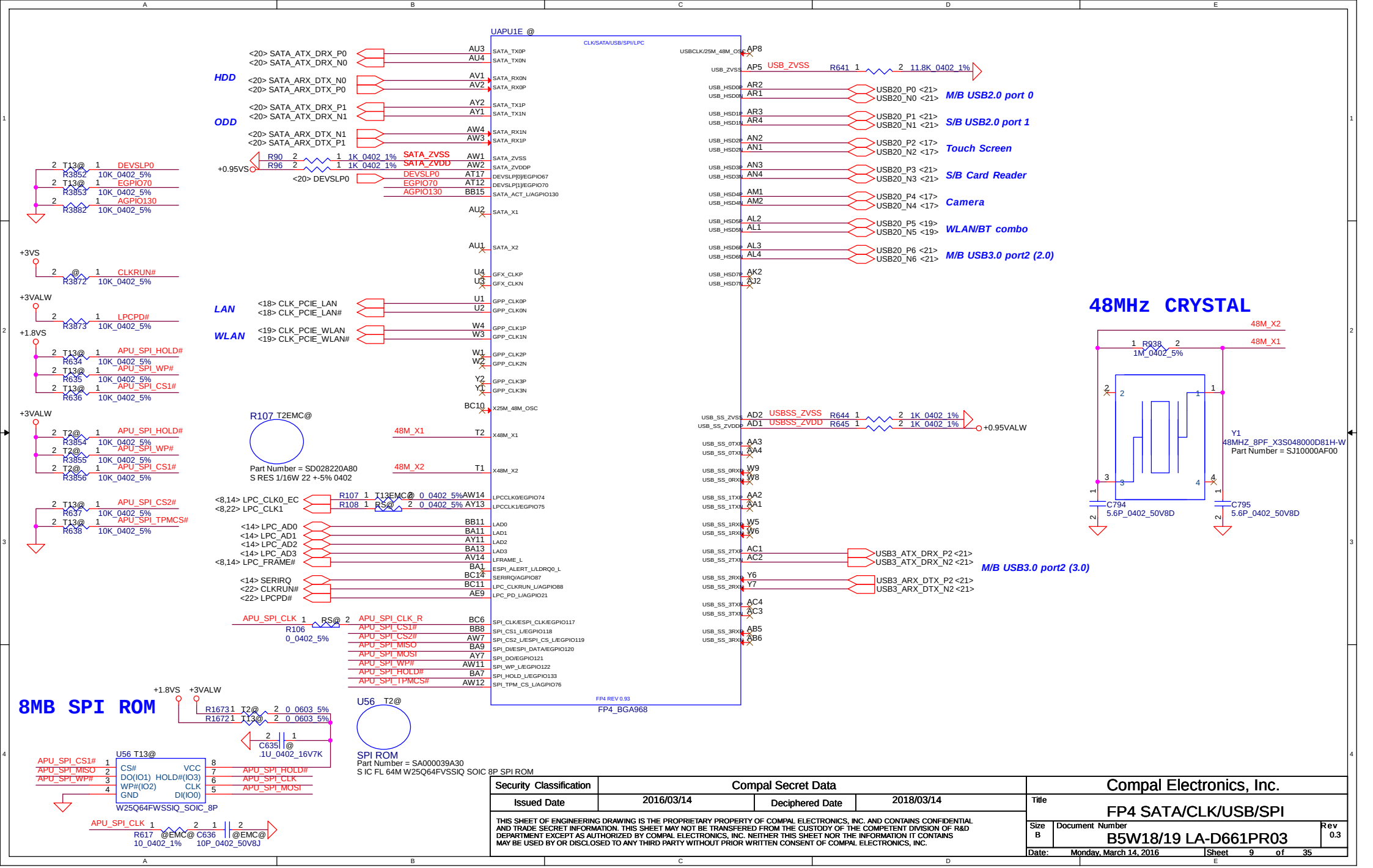

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Title: FP4 SATA/CLK/USB/SPI

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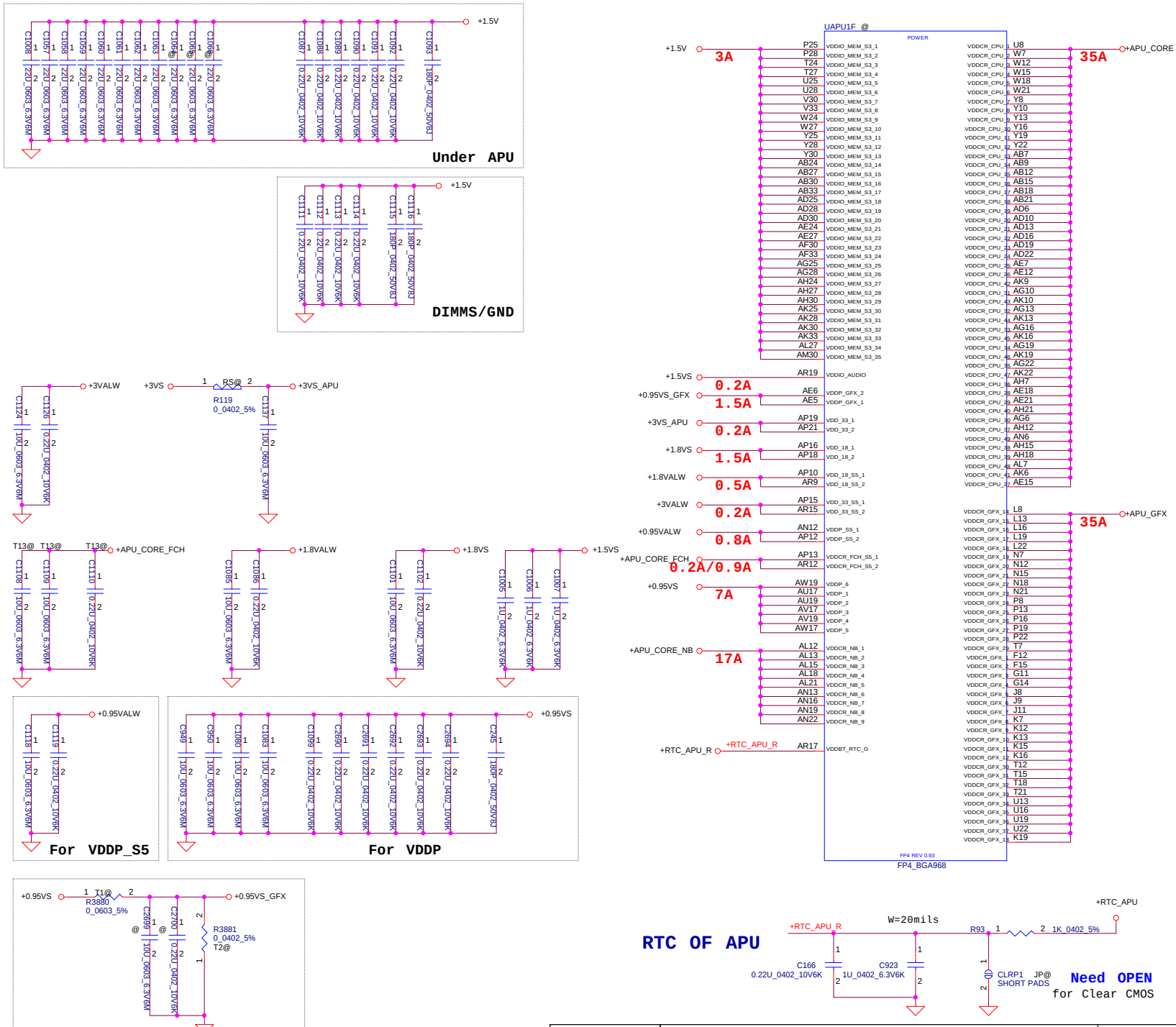

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Title: FP4 PWR

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Title	FP4 GND	
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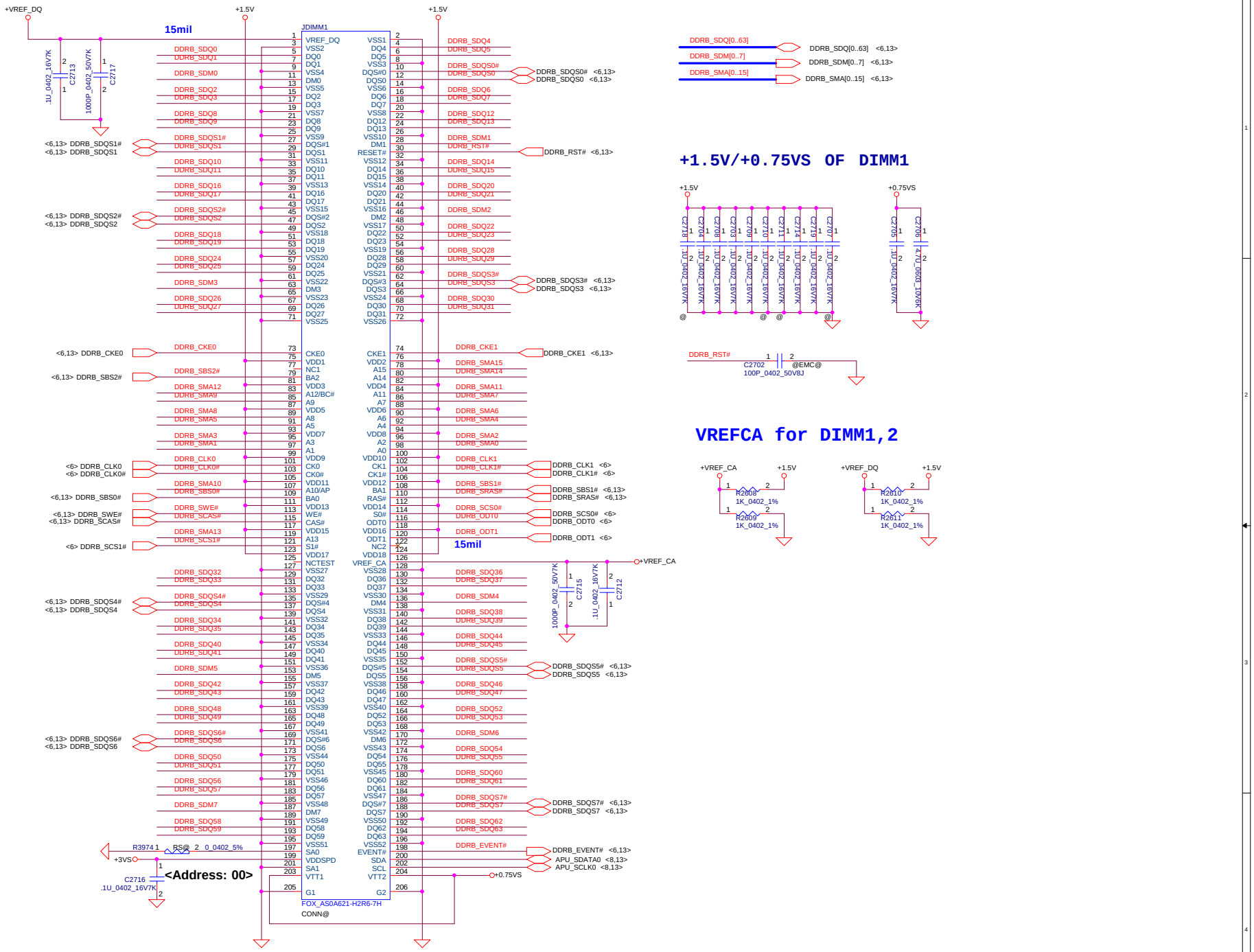

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Title: DDR3 SODIMM-I Socket

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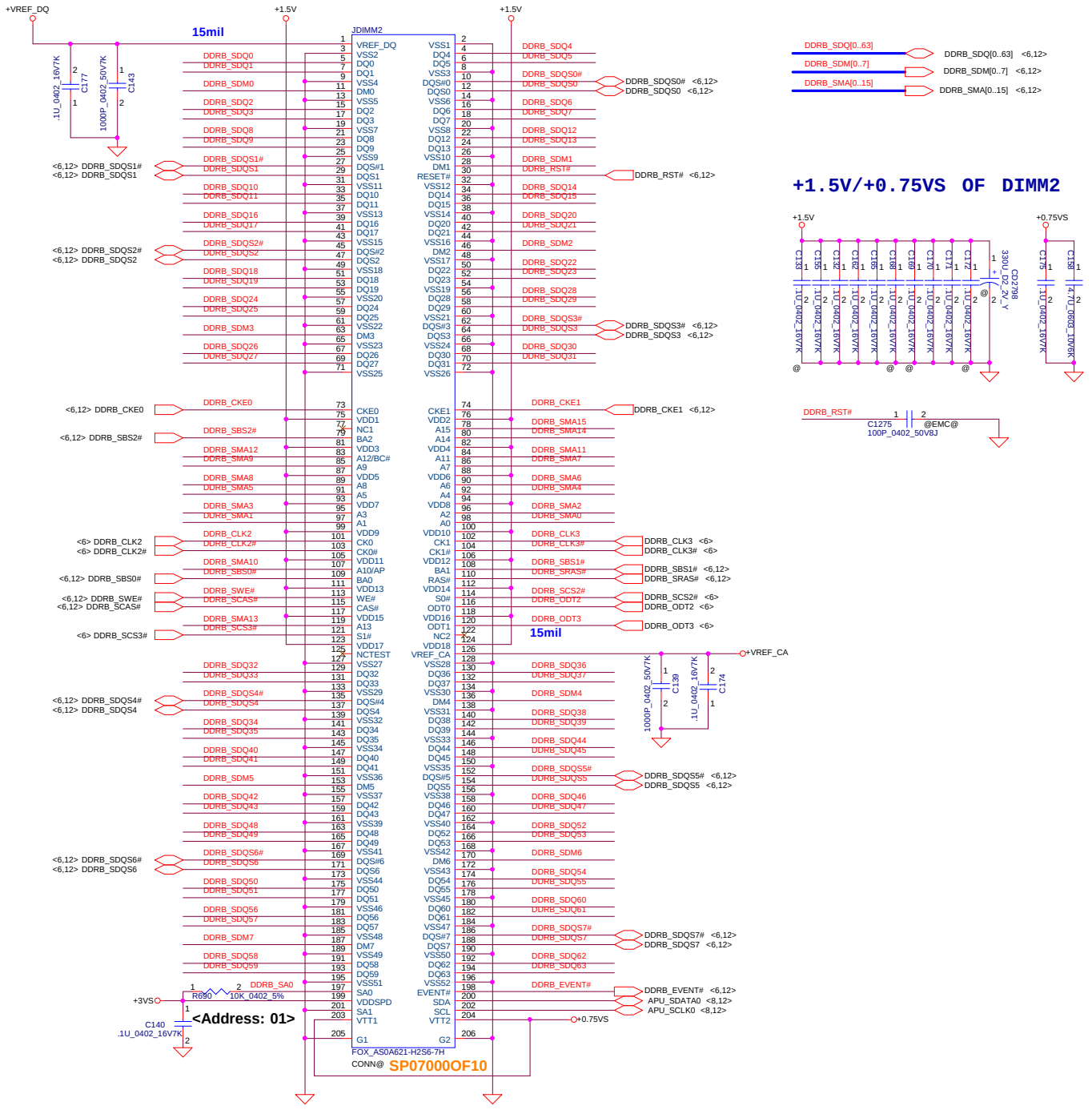

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Title: DDR3 SODIMM-II Socket

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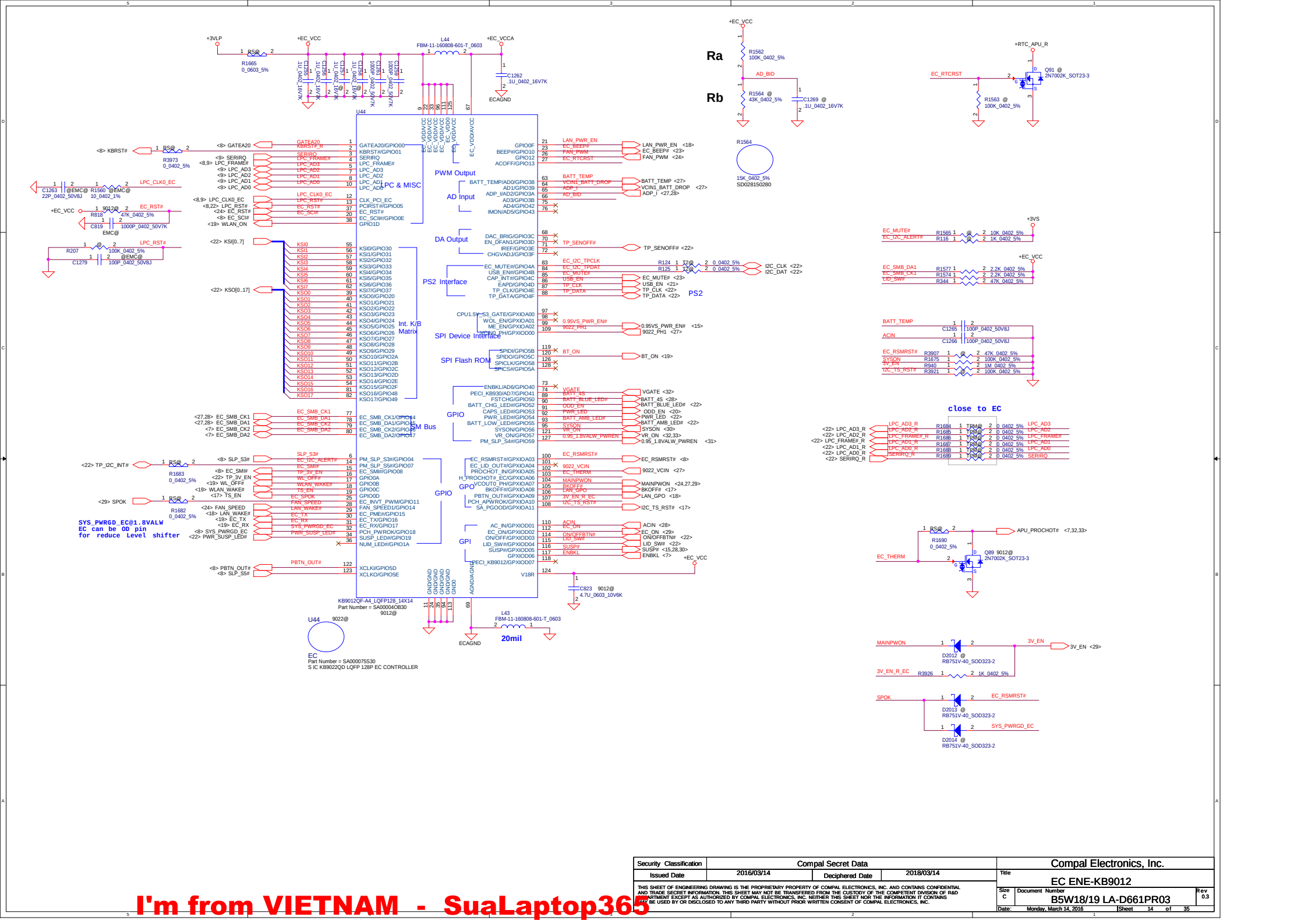

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Title: EC ENE-KB9012

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C	B5W18/19 LA-D661PR03	0.3

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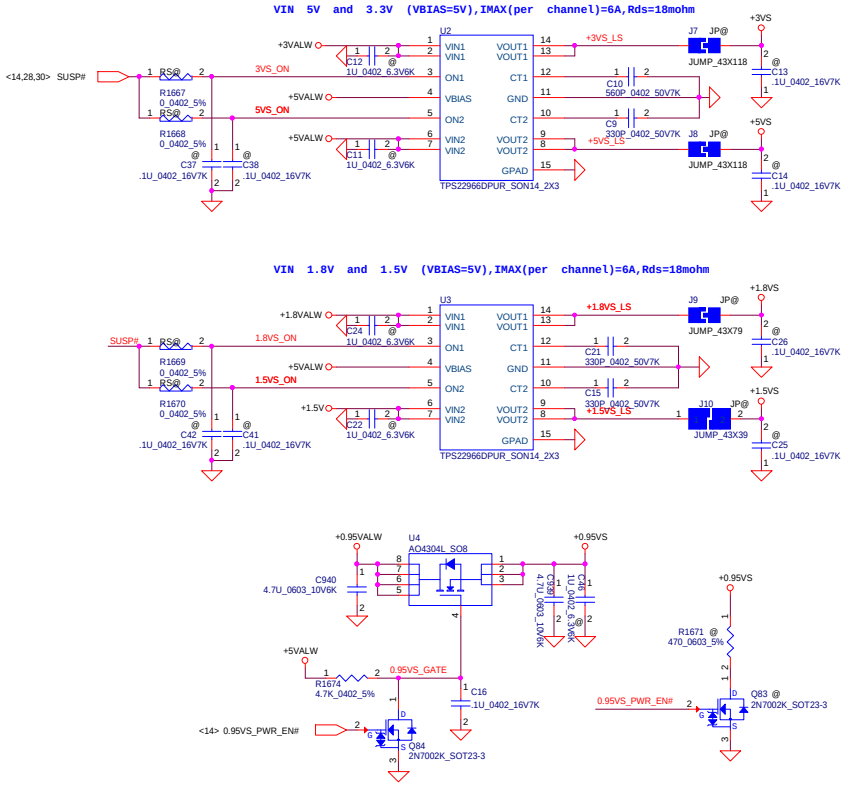

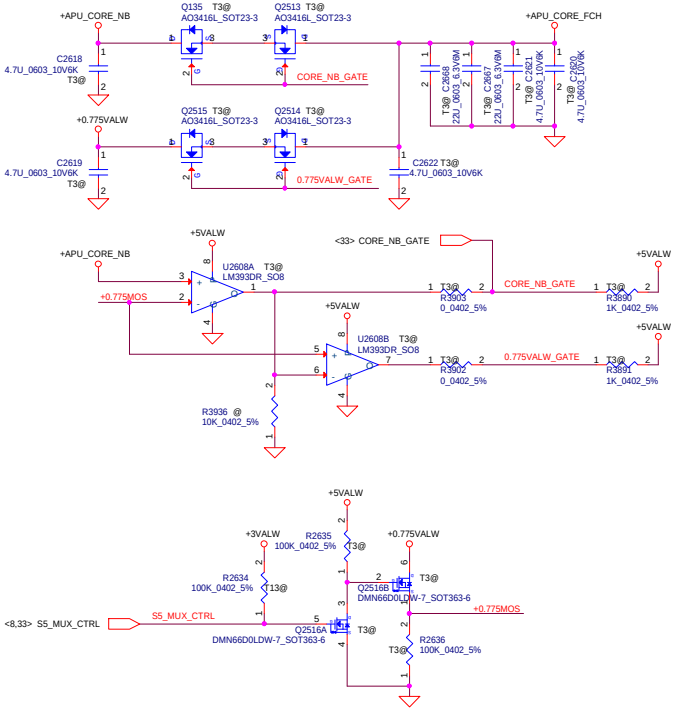

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Title: P22-DC INTERFACE

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Custom	B5W18/19 LA-D661PR03	0.3

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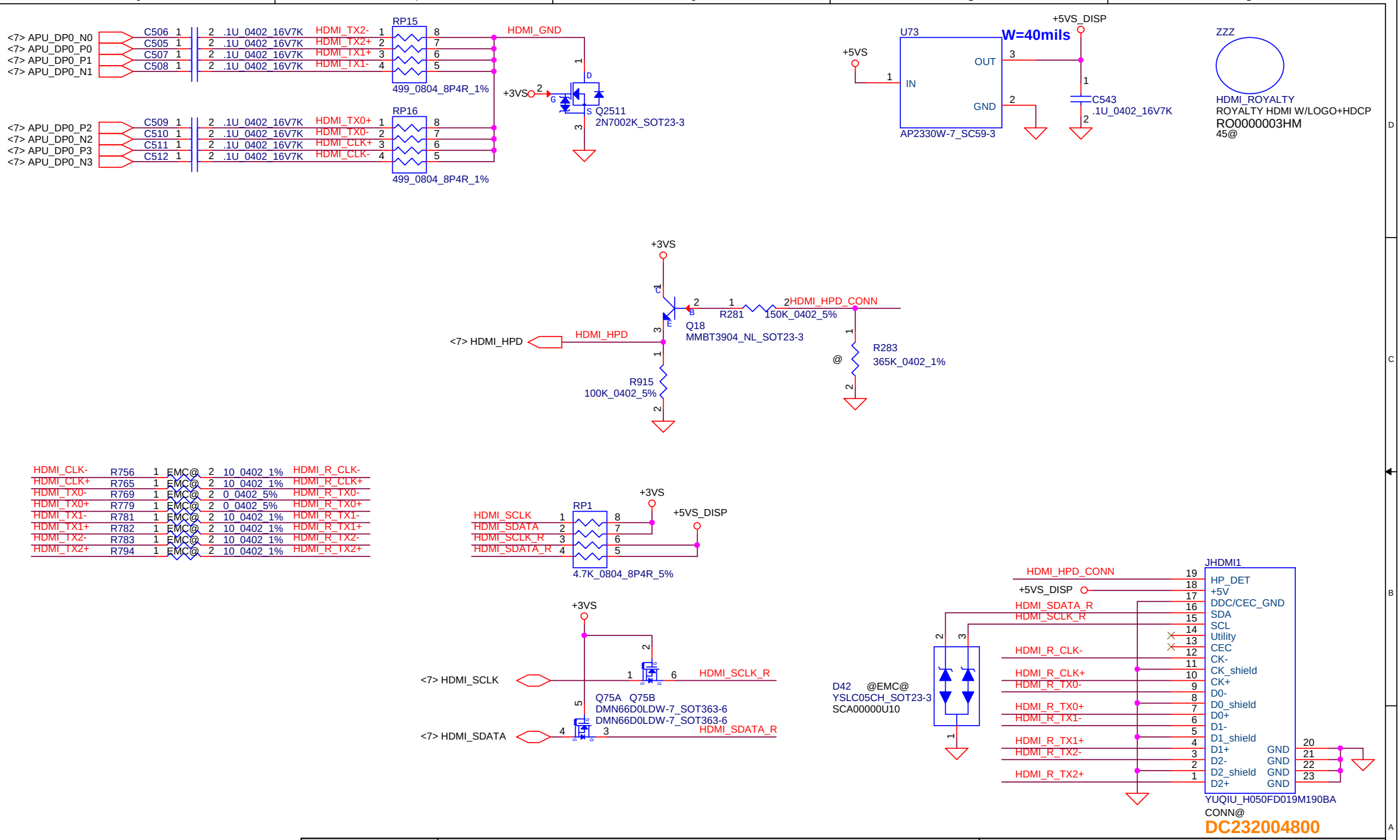

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Compal Electronics, Inc.

Title: HDMI CONN

Size	Document Number	Rev
Custom	B5W18/19 LA-D661PR03	0.3

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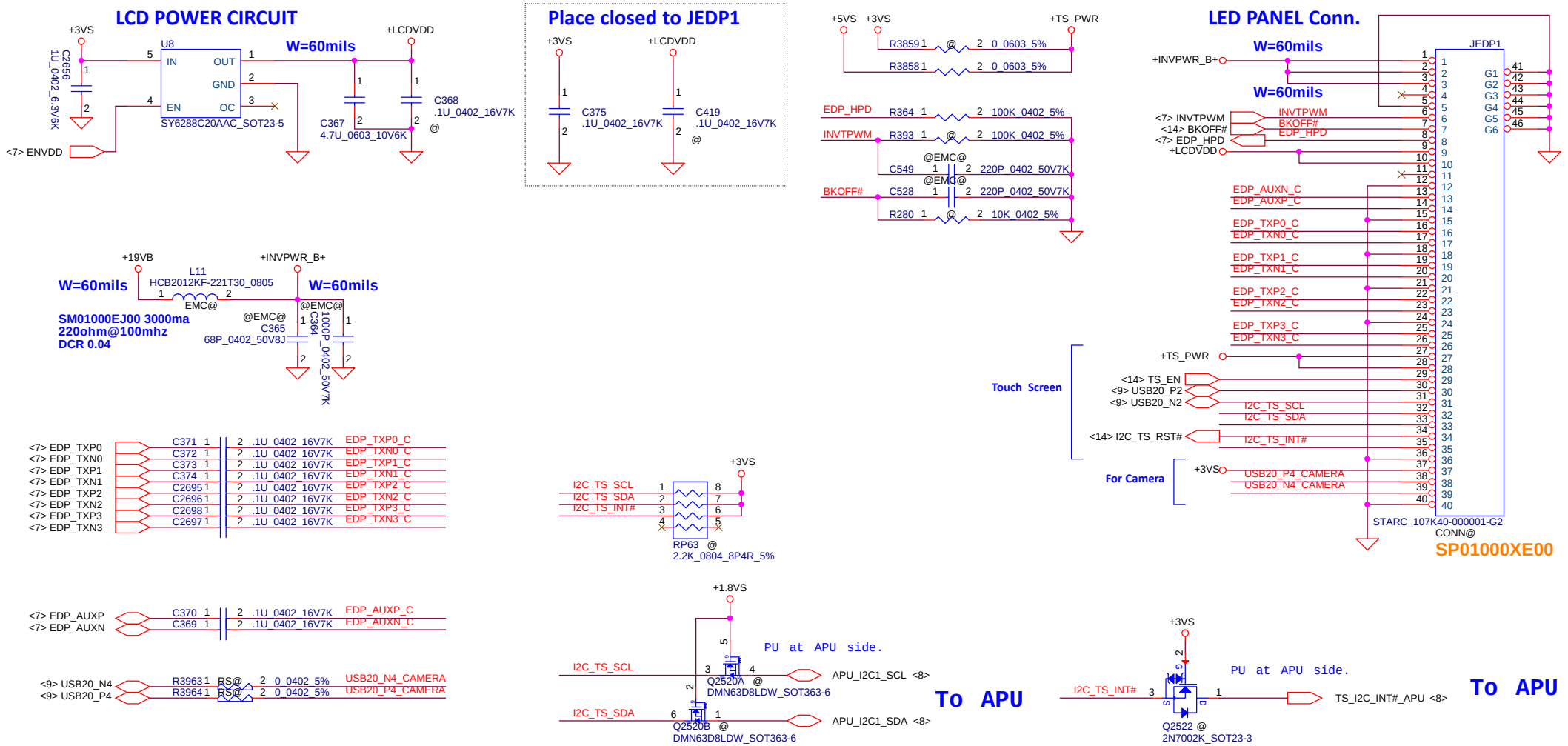

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Issued Date	2016/03/14	Deciphered Date	2018/03/14

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Compal Electronics, Inc.

Title: eDP/Camera/Touch Screen

Size	Document Number	Rev
Custom	B5W18/19 LA-D661PR03	0.3

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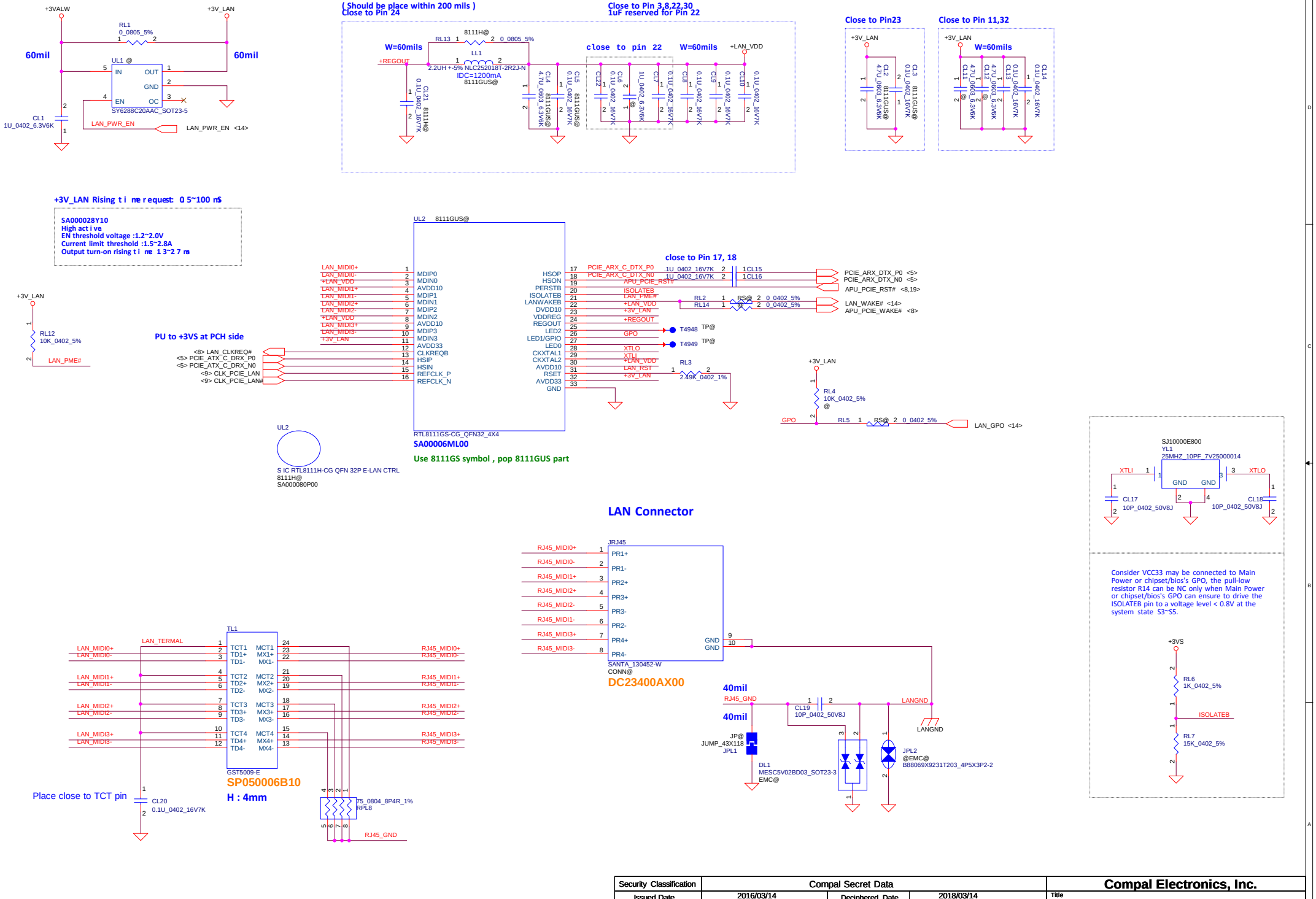

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Issued Date	2016/03/14	Deciphered Date	2018/03/14

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Compal Electronics, Inc.

Title	LAN_RTL8111GUS-CG	
Size: Custom	Document Number: B5W18/19 LA-D661PR03	Rev: 0.3
Date: Monday, March 14, 2016	Sheet 18 of 35	

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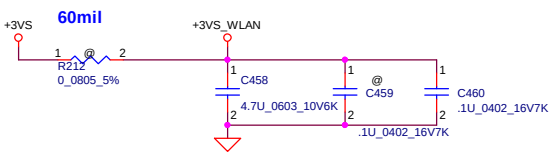
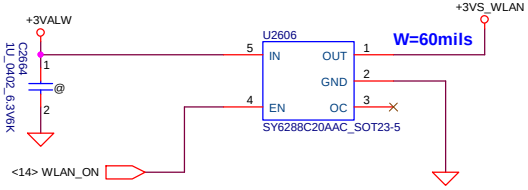
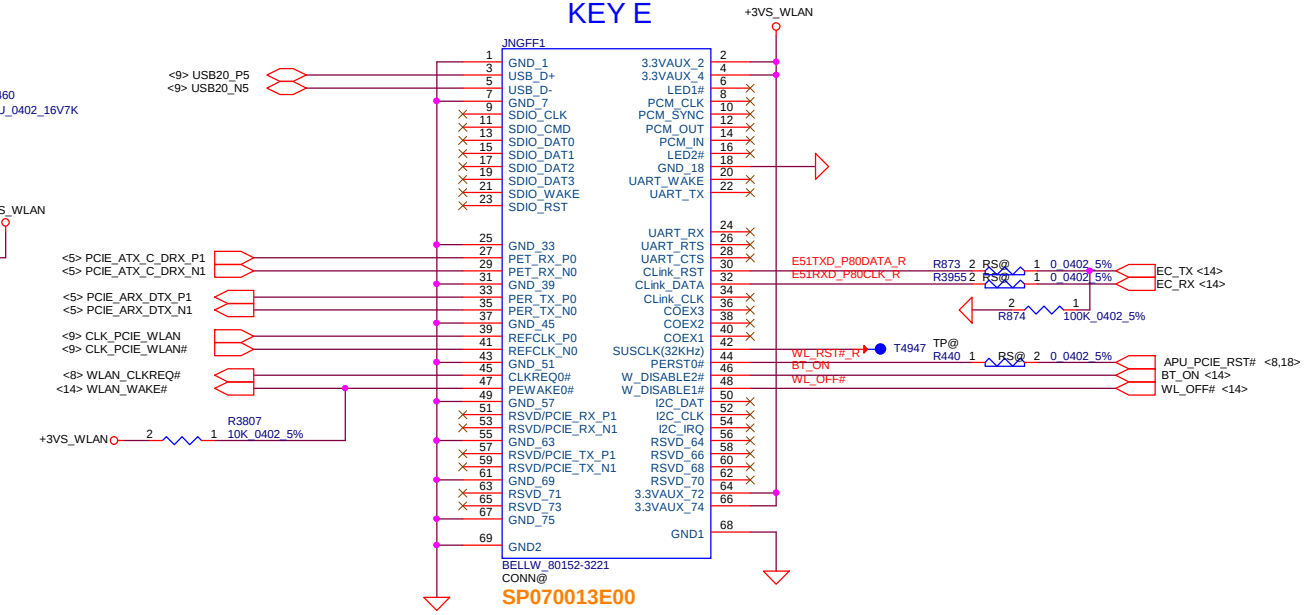
Wireless LAN





NGFF WL+BT (KEY E)

KEY E



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Compal Electronics, Inc.

Title: M.2 Key E (WLAN)

Size	Document Number	Rev
Custom	B5W18/19 LA-D661PR03	0.3

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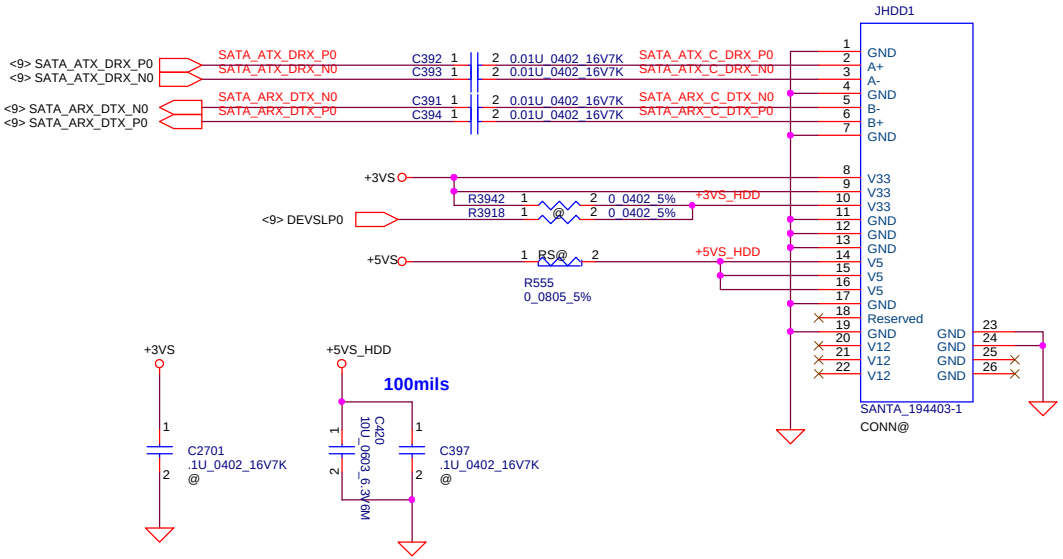
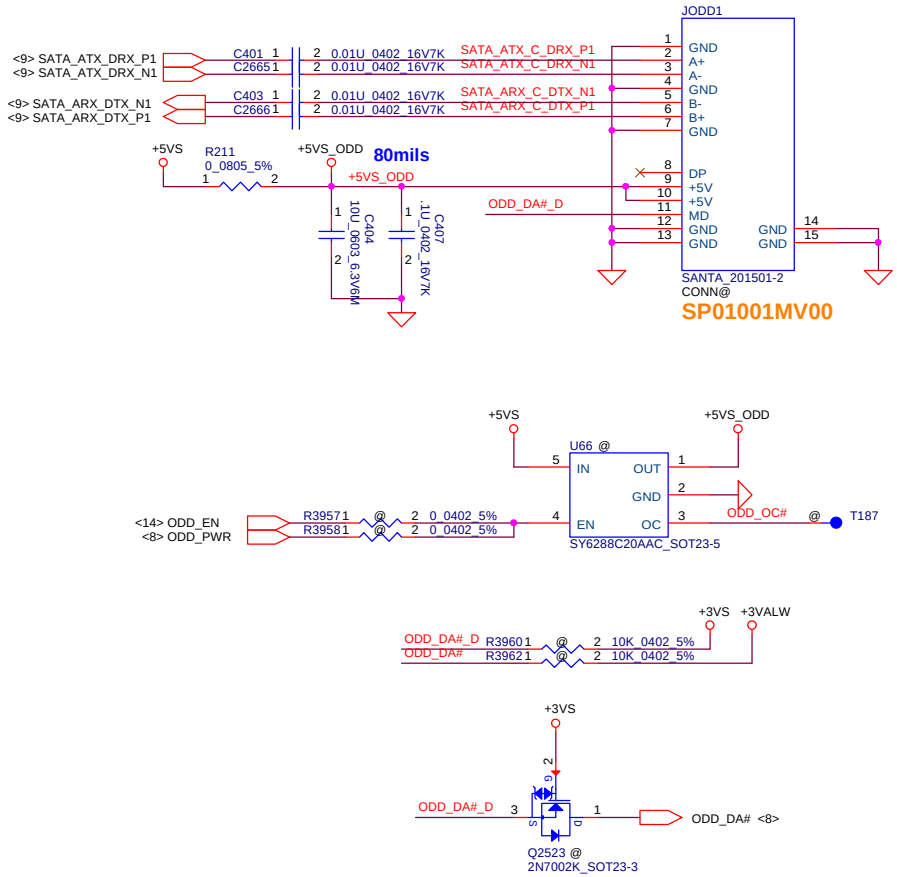
SATA HDD Conn.



SATA ODD Conn.



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Compal Electronics, Inc.

Title: HDD/ODD

Size	Document Number	Rev
Custom	B5W18/19 LA-D661PR03	0.3

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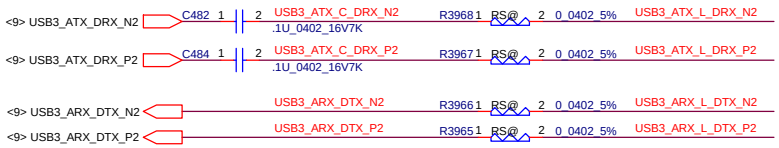
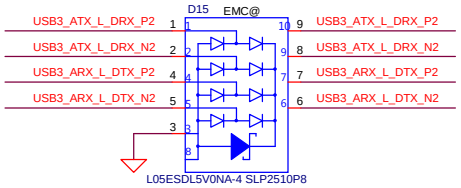
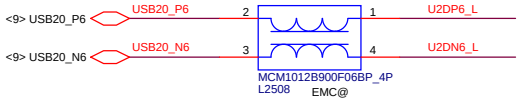
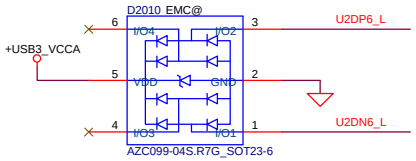
USB3.0 (Port 2)

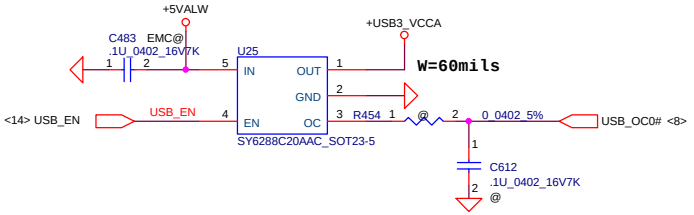


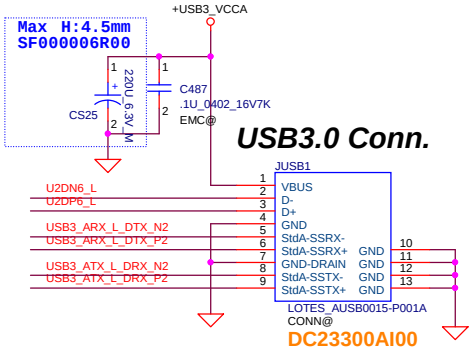
For ESD request



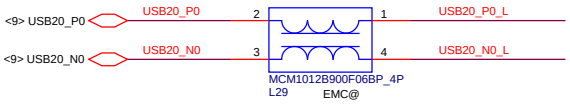


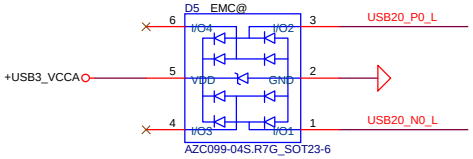


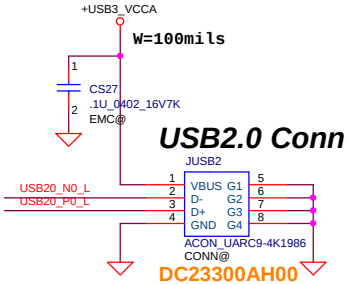




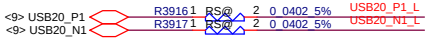
USB2.0 (Port 0)

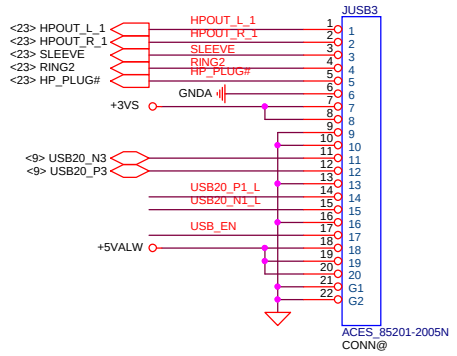






USB/B (USB, AUDIO, CR)





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Compal Electronics, Inc.			
Title	USB2.0/USB3.0		
Size: Custom	Document Number: B5W18/19 LA-D661PR03		Rev: 0.3
Date: Monday, March 14, 2016	Sheet 21 of 35		

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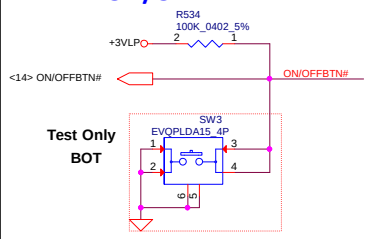
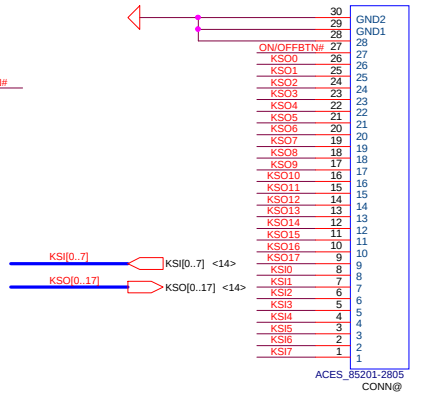
ON/OFF BTN

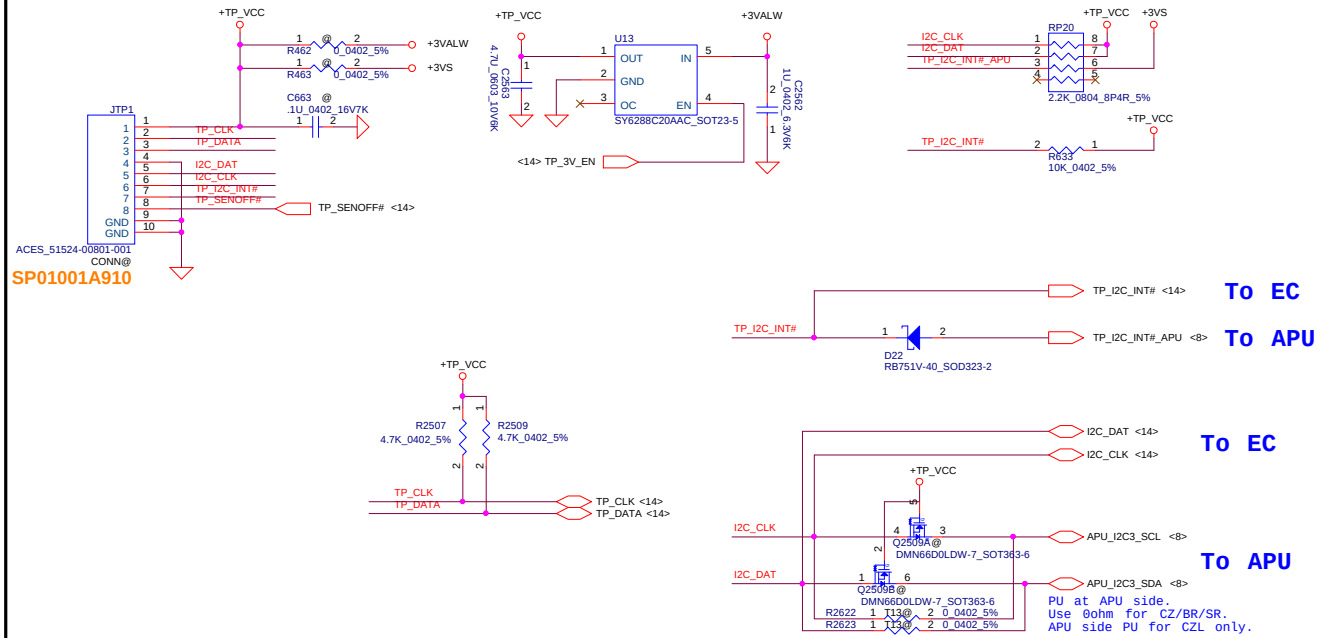


KB Conn.



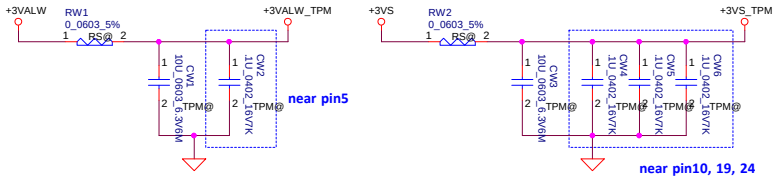
SP01000GO00

TP/B Conn.

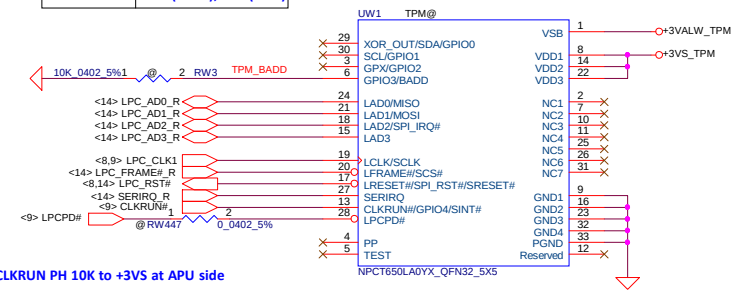


SP01001A910

TPM



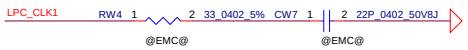
BADD	SELECTION
* 1	AEh(write), AFh(read)



CLKRUN PH 10K to +3VS at APU side

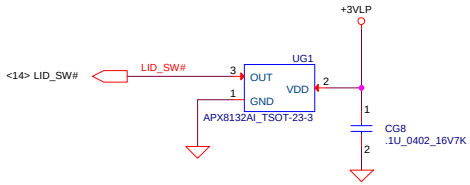
LPCPD# had internal PH

SA00008EL40, S IC NPCT650AB1YX QFN 32P TPM

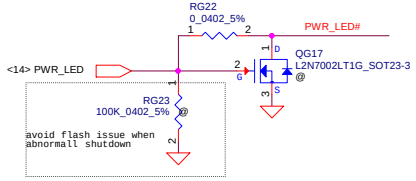


Lid Switch

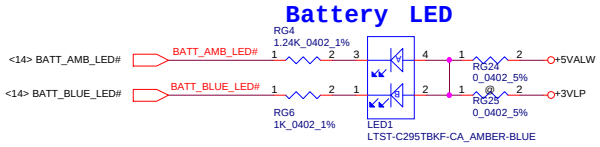
(Hall Effect Switch)



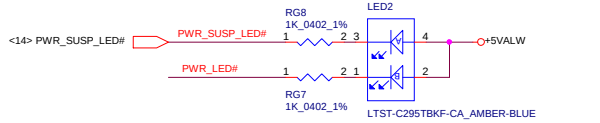
LED



Battery LED



Power LED



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Compal Electronics, Inc.

Title: KB/TP/TPM Connector/LED

Size: Custom | Document Number: B5W18/19 LA-D661PR03 | Rev: 0.3

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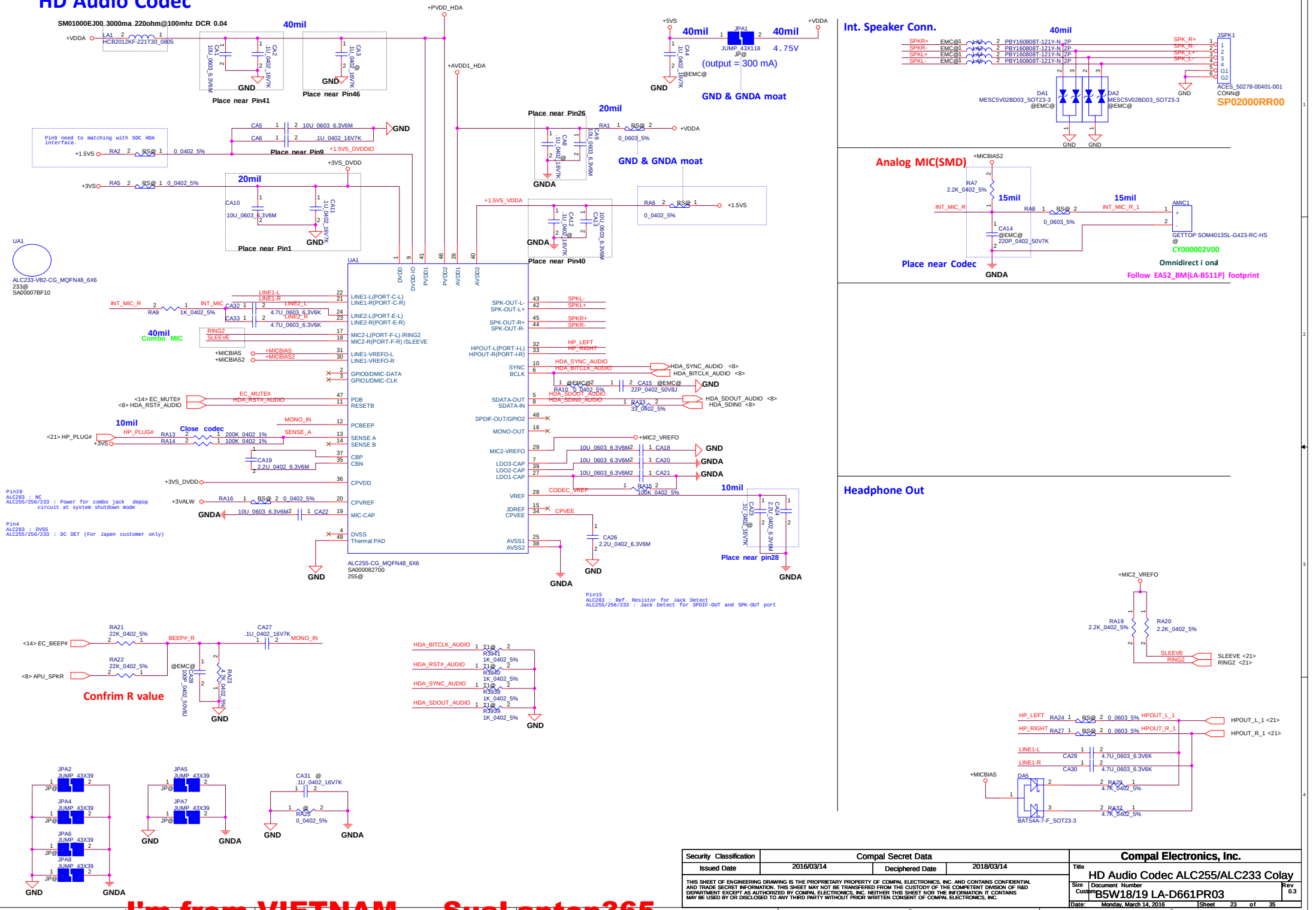
HD Audio Codec



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Compal Electronics, Inc.

Title: HD Audio Codec ALC255/ALC233 Colay

Size: Custom | Document Number: B5W18/19 LA-D661PR03 | Rev: 0.3

Date: Monday, March 14, 2016 | Sheet 23 of 35

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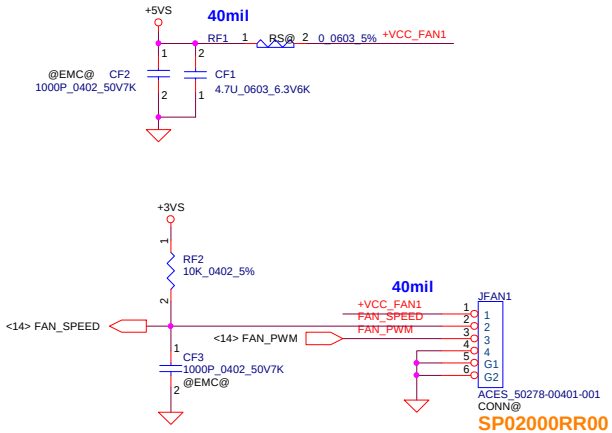
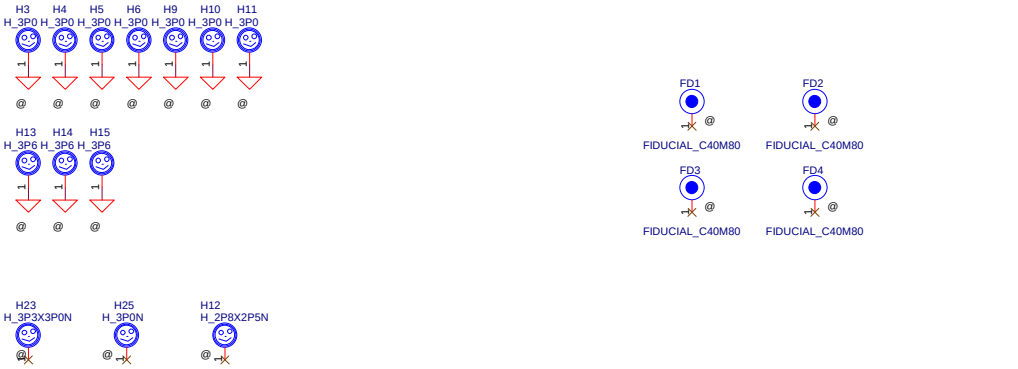
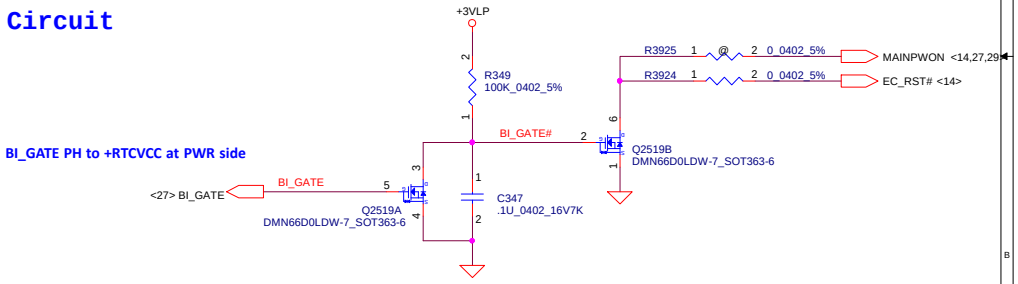
FAN Conn



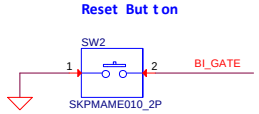
Screw Hole



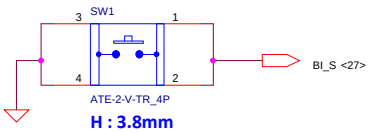
Reset Circuit



Reset Button



BI SW



H : 3.8mm

Release : Battery Of
Push : Battery ON

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Compal Electronics, Inc.

Title: FAN/BATT RESET_DEGUB SW

Size	Document Number	Rev
Custom	B5W18/19 LA-D661PR03	0.3

Date: Monday, March 14, 2016 Sheet 24 of 35

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0.2
1. Change EC BID to 1 for DVT,R1564 change to 12Kohm.
2. Change R756,R765,R781,R782,R783,R794 to 10 ohm for HDMI EA result.
3. Combine power.
4. Change R555,RL2,RL5 to R-short;Unpop R682,R694,R704,R705,R706,R707,R708.
5. Change H13,H14,H15 to H_3P6.
6. Combine power.
7. Combine power.
8. Combine power.
9. Change C2647,C2648 to 33P for ESD request.
10. Pop R1562 for EC BID to 1.
11. Change RG4 to 1.24kohm; RG6,RG7,RG8 to 1kohm.

0.3
1. Change R108,R3916,R3917,R3963,R3964,R3965,R3966,R3967,R3968,R873,R3955 to R-short.
2. Change EC BID to 2 for PVT,R1564 change to 15Kohm.
3. Combine power.

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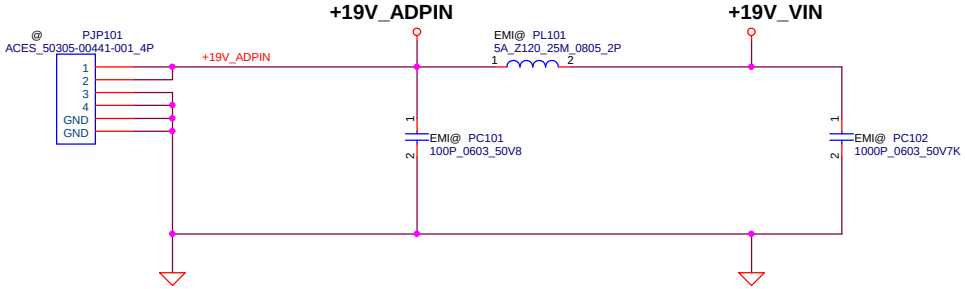
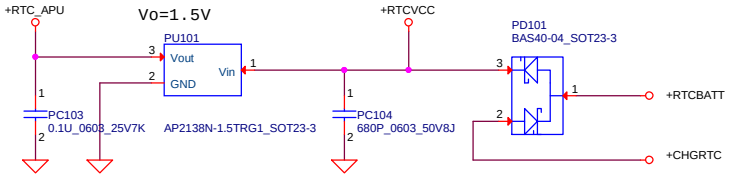
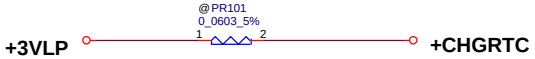
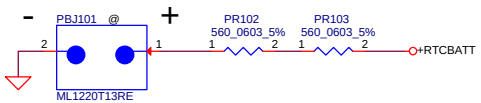
Title	HW-PIR	
Size C	Document Number B5W18/19 LA-D661PR03	Rev 0.3
Date: Monday, March 14, 2016	Sheet 25 of 35	









Security Classification	Compal Secret Data		
Issued Date	2016/03/14	Deciphered Date	2018/03/14

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Compal Electronics, Inc.

Title: DCIN

Size	Document Number	Rev
Custom	B5W18/19 LA-D661PR03	0.3

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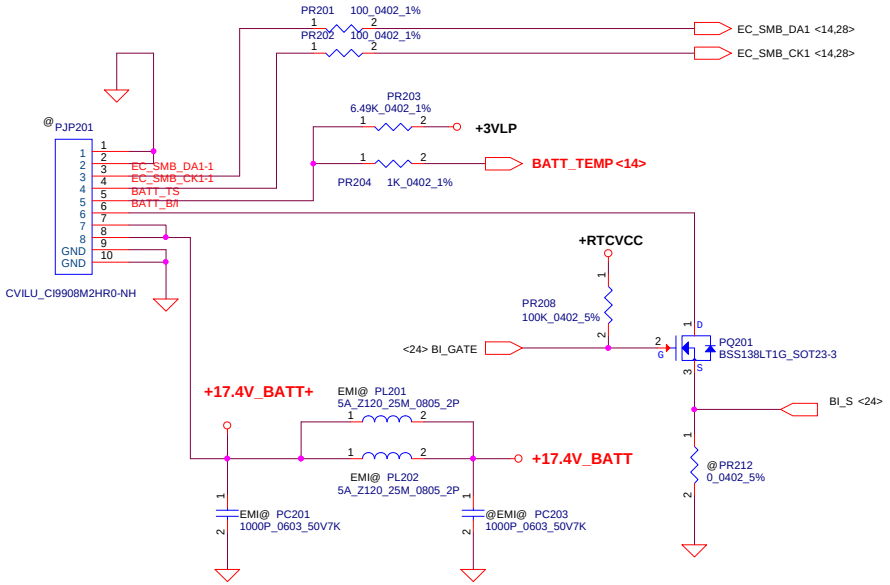
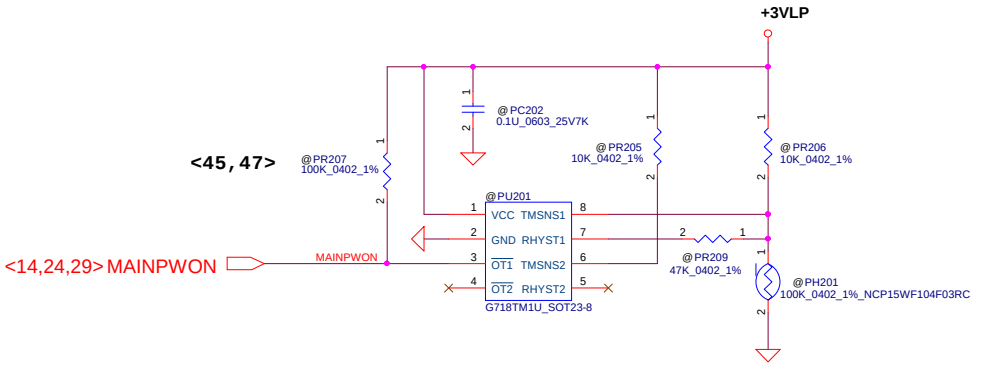




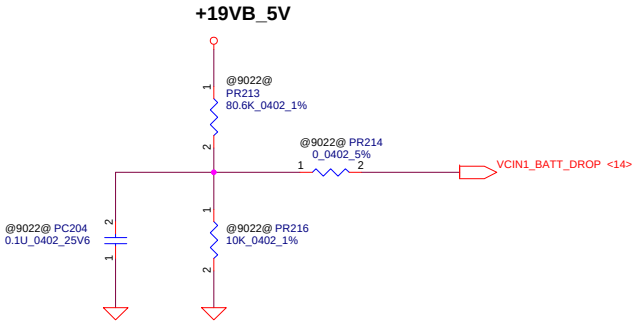
For KB9022 OTP	Active	Recovery
VCIN0_PH(V)	92C, 1V	56C, 2.V
PH202(ohm)	7.3092K	26.11K

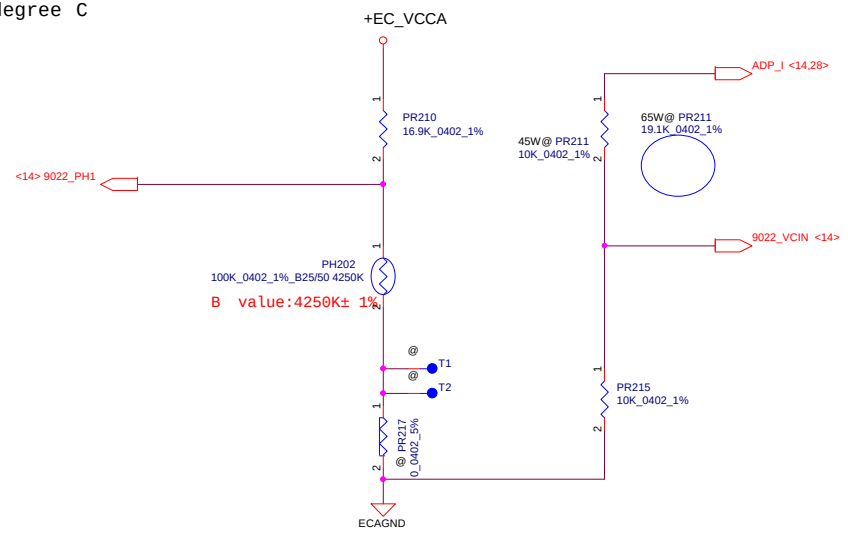
For KB9012 sense 20mΩ	Active	Recovery
SR 45W	58.5W, 0.61V	58.5W, 0.61V
BR 65W	84.5W, 0.61V	84.5W, 0.61V

PH202 under CPU botten side :
CPU thermal protection at 96 degree C (shutdown)
Recovery at 56 degree C

2013/10/02
Add for ENE9022 Battery Voltage drop detection.
Connect to ENE9022 pin64 AD1.

Reserve for 2-cell design





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Title: BATTERY CONN / OTP

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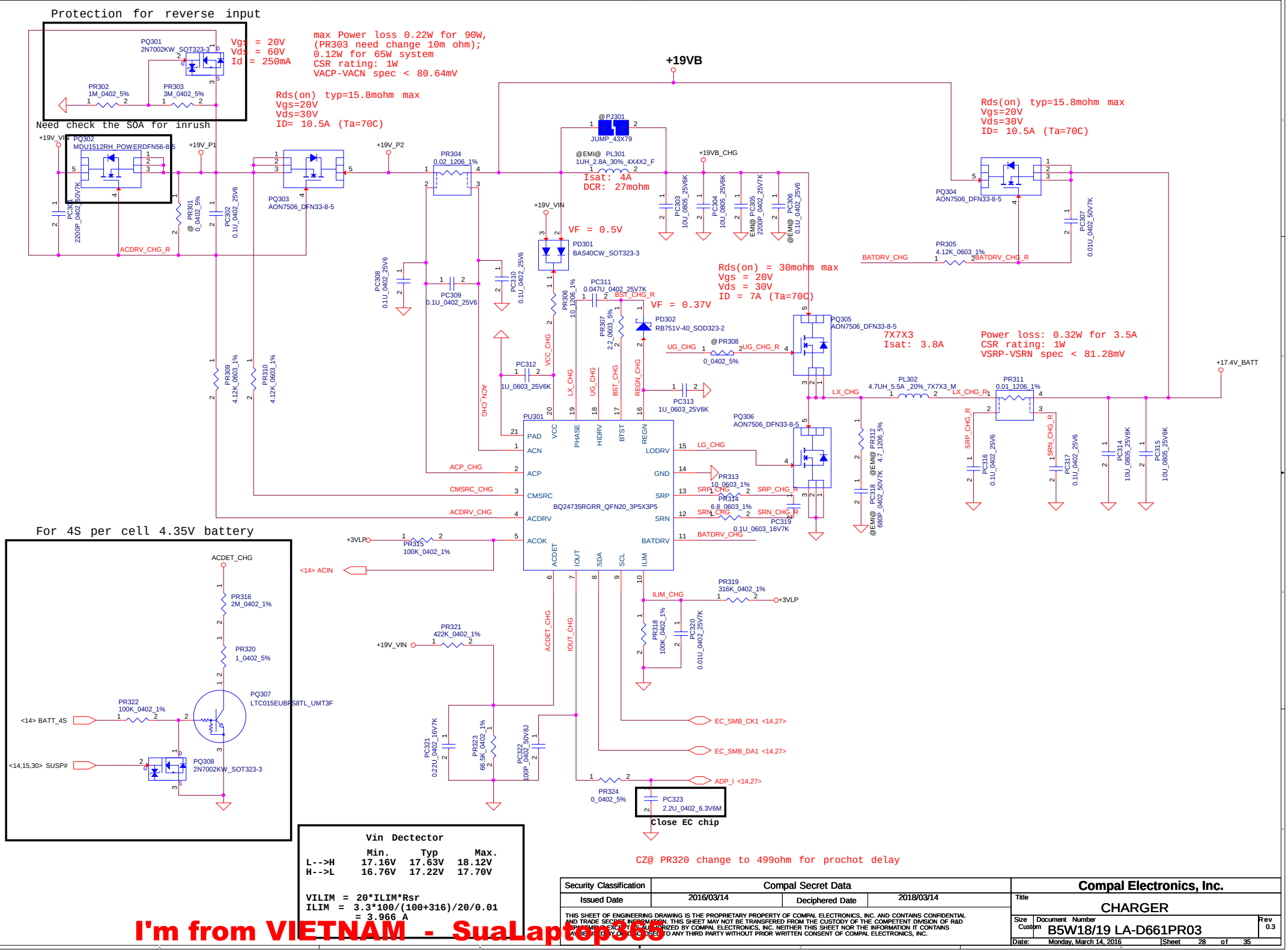
Protection for reverse input
Vgs = 20V
Vds = 60V
Id = 250mA
max Power loss 0.22W for 90W,
(PR303 need change 10m ohm);
0.12W for 65W system
CSR rating: 1W
VACP-VACN spec < 80.64mV
Rds(on) typ=15.8mohm max
Vgs=20V
Vds=30V
ID= 10.5A (Ta=70C)
Need check the SOA for inrush
+19VB
Isat: 4A
DCR: 27mohm
VF = 0.5V
Rds(on) = 30mohm max
Vgs = 20V
Vds = 30V
ID = 7A (Ta=70C)
VF = 0.37V
7X7X3
Isat: 3.8A
Power loss: 0.32W for 3.5A
CSR rating: 1W
VSRP-VSRN spec < 81.28mV
+17.4V_BATT
BQ24735RGRR_QFN20_3P5X3P5
For 4S per cell 4.35V battery
Vin Dectector
Min. Typ Max.
L-->H 17.16V 17.63V 18.12V
H-->L 16.76V 17.22V 17.70V
VILIM = 20*ILIM*Rsr
ILIM = 3.3*100/(100+316)/20/0.01
= 3.966 A
Close EC chip
CZ@ PR320 change to 499ohm for prochot delay
Security Classification
Compal Secret Data
Issued Date
2016/03/14
Deciphered Date
2018/03/14
Compal Electronics, Inc.
CHARGER
B5W18/19 LA-D661PR03
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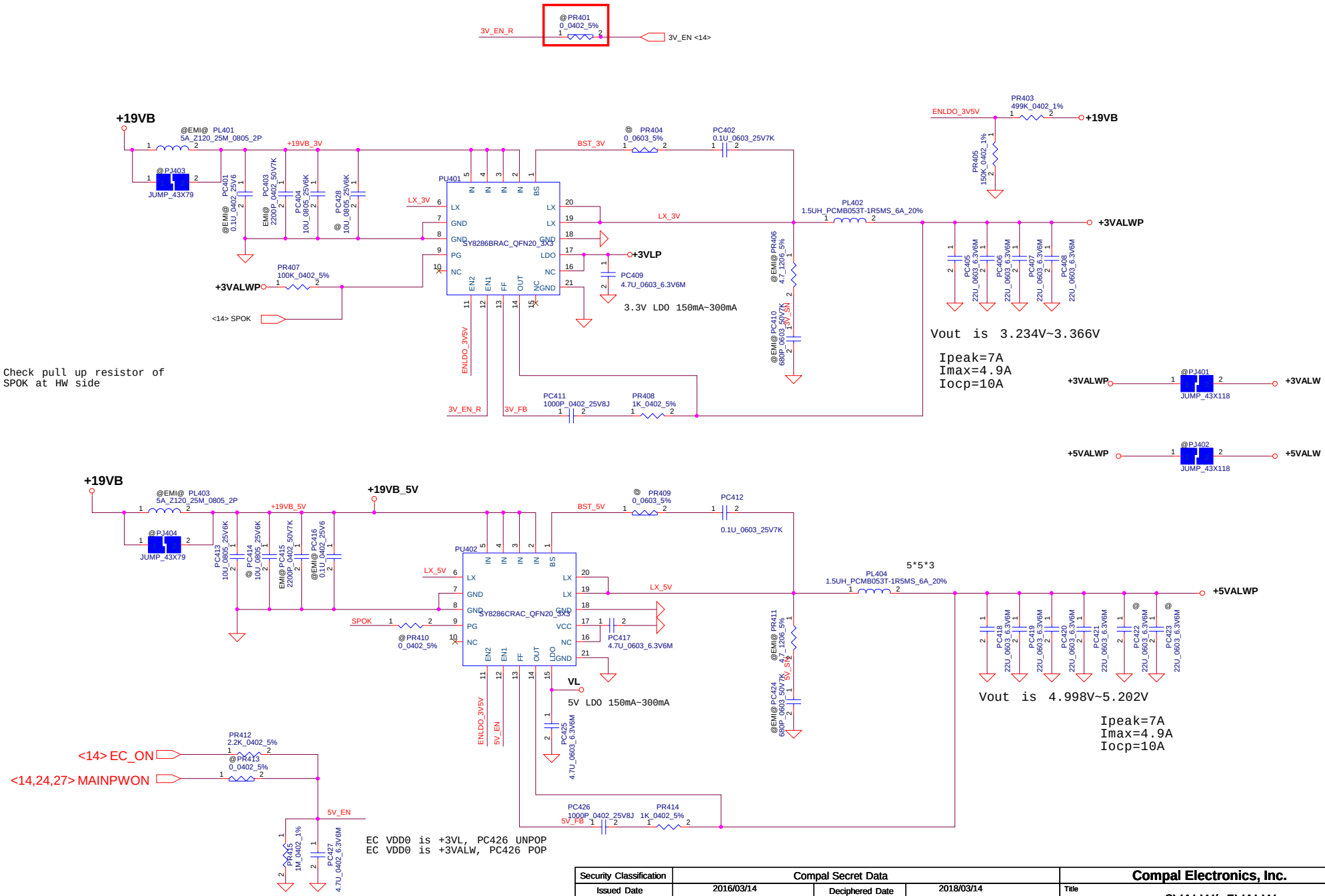

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Title	+3VALW/+5VALW
Size: Custom	Document Number: B5W18/19 LA-D661PR03
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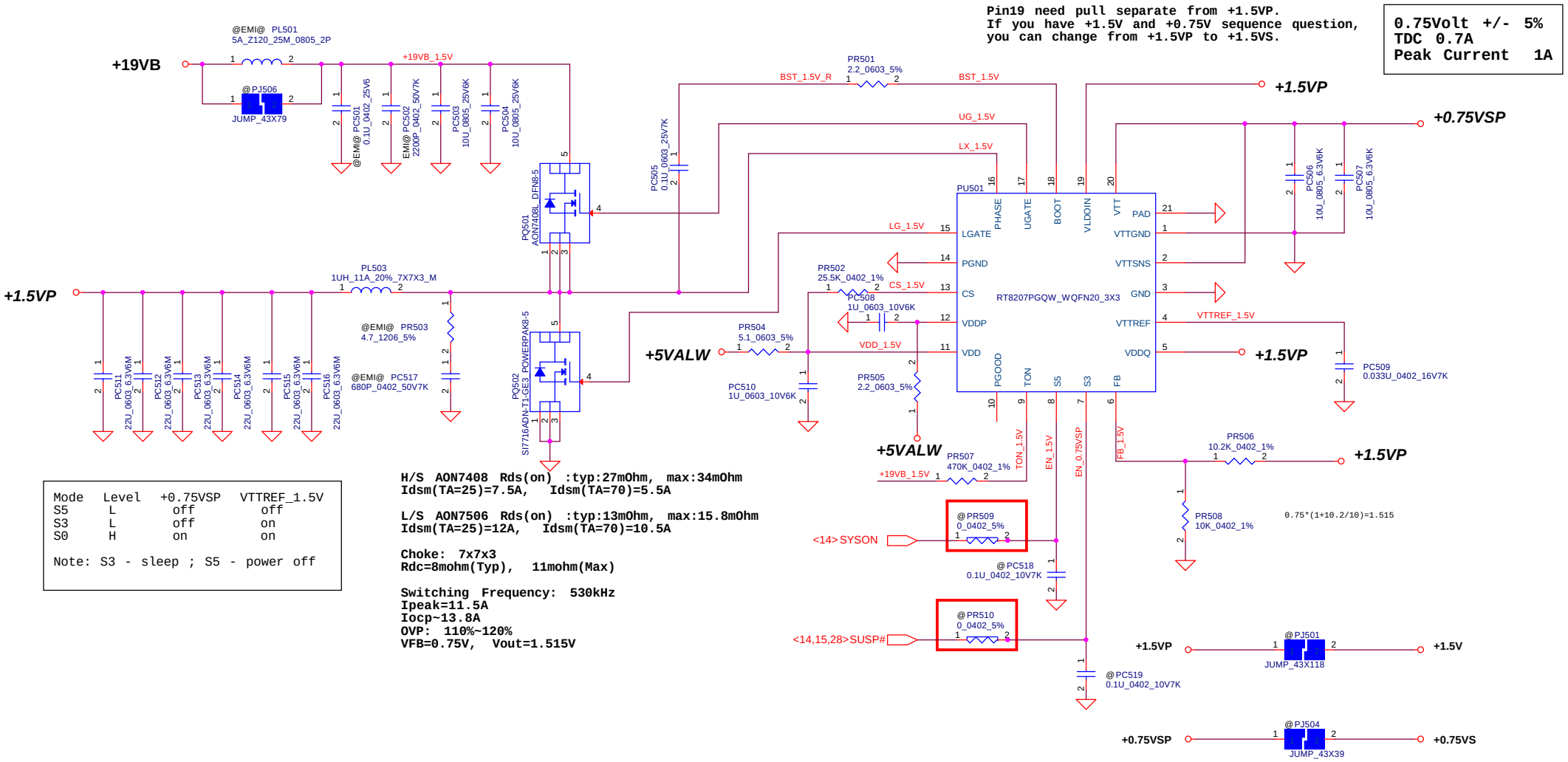

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Compal Electronics, Inc.

Title	+1.5VP/+0.75VSP	
Size: Custom	Document Number: B5W18/19 LA-D661PR03	Rev: 0.3
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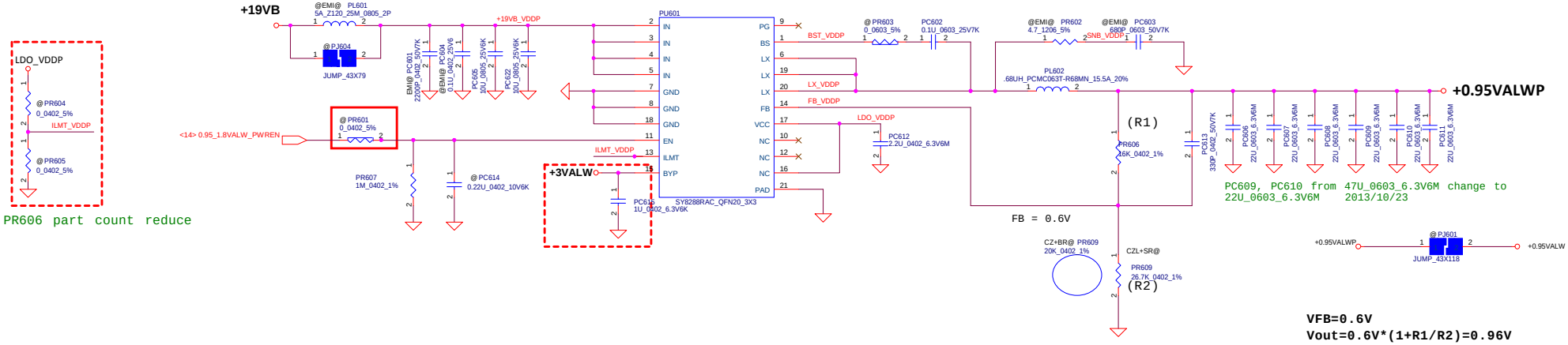
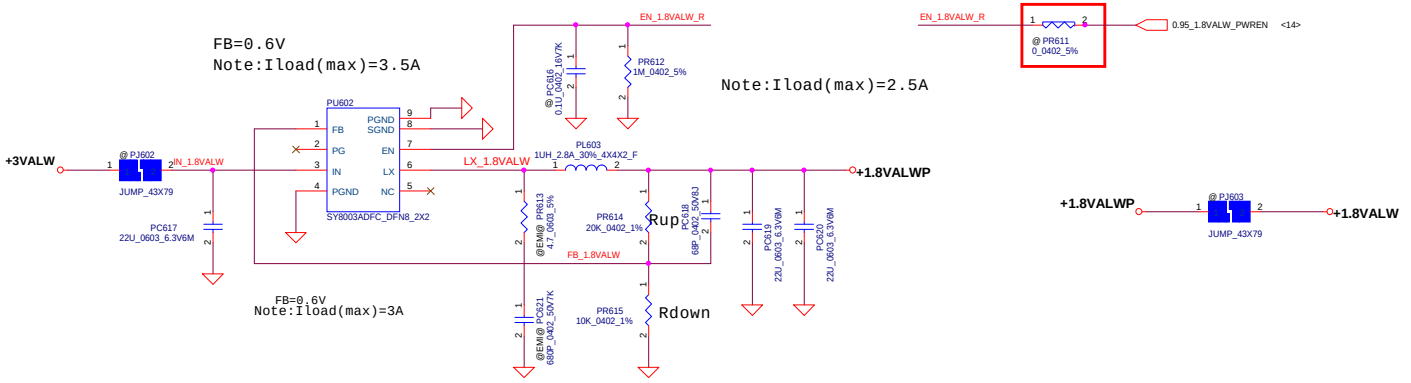
EN pin don't floating
If have pull down resistor at HW side, pls delete PR2

Module model information
SY8208D_V1.mdd



PC609, PC610 from 47U_0603_6.3V6M change to 22U_0603_6.3V6M 2013/10/23

VFB=0.6V
Vout=0.6V*(1+R1/R2)=0.96V



Note:
When design Vin=5V, please stuff snubber to prevent Vin damage

Vout=0.6V* (1+Rup/Rdown)

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Size C	Document Number B5W18/19 LA-D661PR03		Rev 0.3
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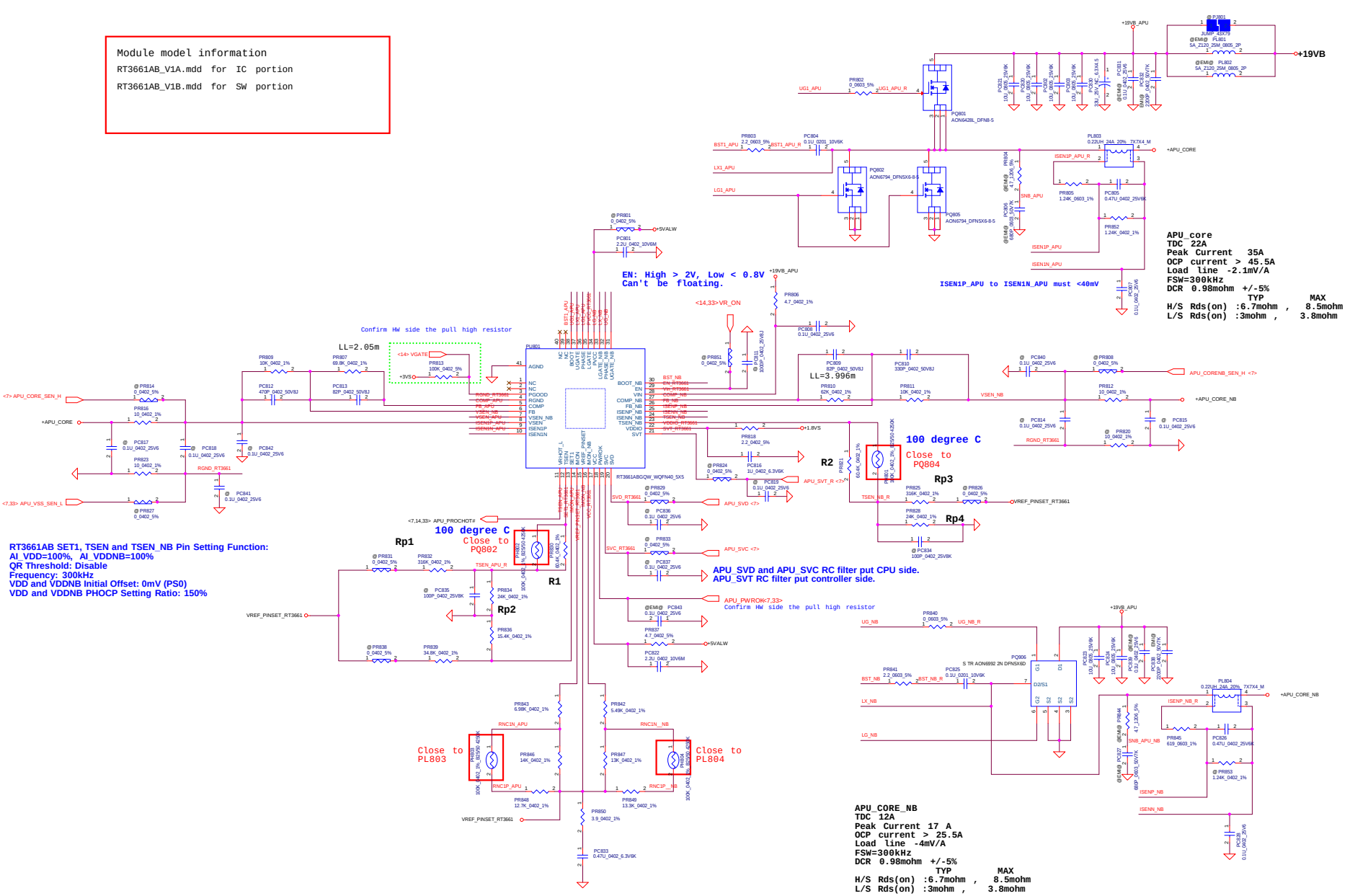
Module model information

RT3661AB_V1A.mdd for IC portion

RT3661AB_V1B.mdd for SW portion



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Issued Date	2016/03/14	Deciphered Date 2018/03/14	Title +APU_CORE/+APU_CORE_NB
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Module model information

RT3669EA_V1A.mdd for IC portion

RT3669EA_V1B.mdd for SW portion

EN Threshold: H>2V , L<0.8V

check hardware side GFX_VR_ON have pull low

LL=2.05m

close to low side MOSFET

100 degree C

close to PL903

TSEN Pin Setting for GFX Controller Frequency, Initial Offset and PHOCP Setting Ratio:

VTSEN_DIV=3.2*Rp2/Rp1+Rp2
=3.2*33.602k/66.5k+33.602k
=1074m V

Frequency = 400kHz
Initial Offset = 0mV
VDD PHOCP Setting Ratio = 200%

SET1 Pin Setting for GFX Controller AI Gain Ratio:

VTSET1_DIV=3.2*RD/RU+RD
=3.2*14.7k/34k+14.7k
=966 mV

AI_GFX = 100%

SET1 Pin Setting for GFX Controller QR Threshold:

VTSET1_IR=80u*RU*RD/RU+RD
=80u*34k*14.7k/34k+14.7k
=821 mV

QR Threshold (GFX) : Disable

Vout_LDO=0.4*((R1+R2)/R2)
=0.4*((340k+360k)/360K)
=0.778 V

GFX_SVD and GFX_SVC RC filter put CPU side.
GFX_SVT RC filter put controller side.

GFX_core
TDC 22A
Peak Current 35A
OCP current > 45.5A
Load line -2.1mV/A
FSW=400kHz
DCR 0.98mohm +/-5%
TYP MAX
H/S Rds(on) :6.7mohm , 8.5mohm
L/S Rds(on) :3mohm , 3.8mohm

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Size	Document Number		Rev
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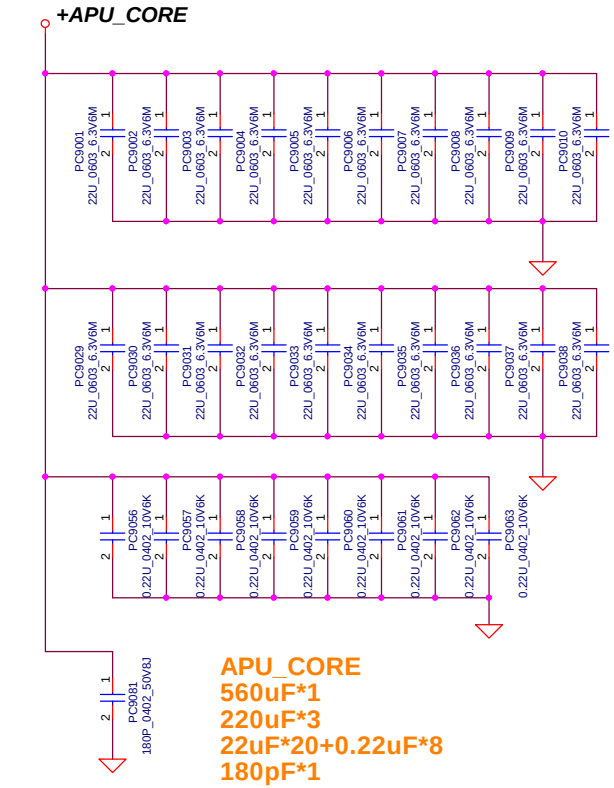
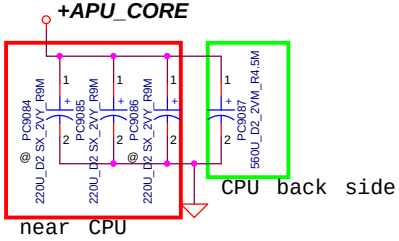
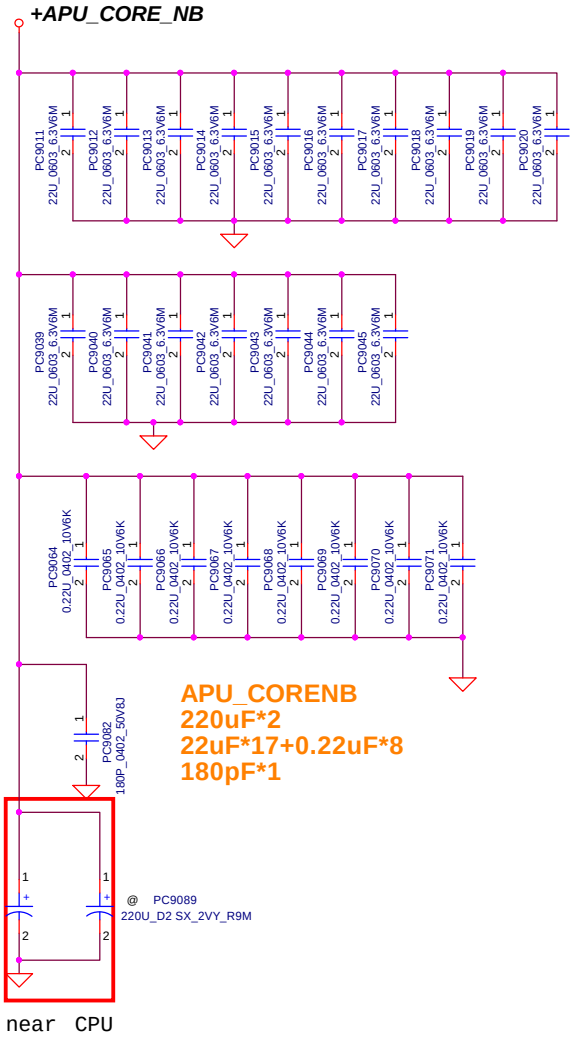
+APU_CORE



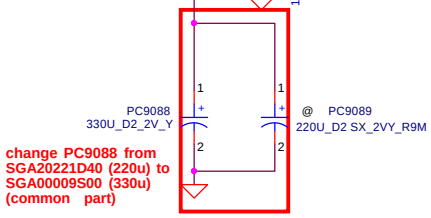
APU_CORE
560uF*1
220uF*3
22uF*20+0.22uF*8
180pF*1



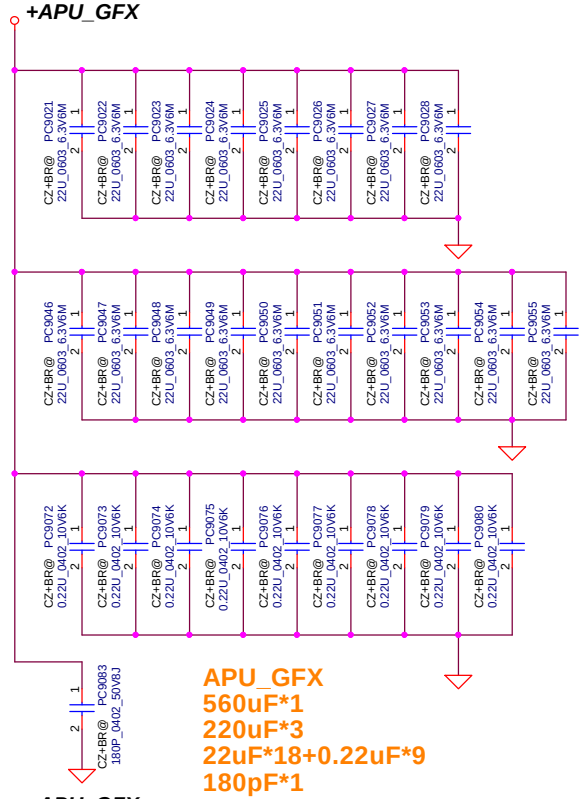
+APU_CORE_NB



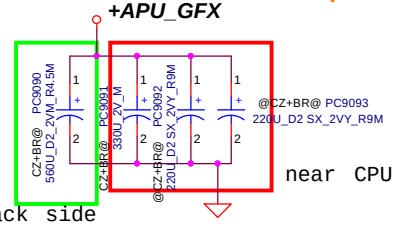
APU_CORENB
220uF*2
22uF*17+0.22uF*8
180pF*1



+APU_GFX



APU_GFX
560uF*1
220uF*3
22uF*18+0.22uF*9
180pF*1



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Title	+APU_CORE Cap	
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Version change list (P.I.R. List)

Item	Fixed Issue	Reason for change	Rev.	PG#	Modify List	Date	Phase
01	electrolytic capacitor is close to PCB edge, high risk of component crack issue.	electrolytic capacitor is close to PCB edge, high risk of component crack issue.	01	33	change PC904 to SGA00007I00 for DFB request		
02	tune CPU transient and LL	tune CPU transient and LL	01	32 33	change PC810 from 470p to 330p change PR807 from 64.9k to 69.8k change PR810 from 59k to 62k change PR911 from 64.9k to 82k change PC9091from SGA20221D40 to SF000008L00 change PC9088 from SGA20221D40 (220u) to SGA00009S00 (330u) (common part) unpop PC9084, PC9086, PC9089, PC9092, PC9093		
03	in S5, APU_CORE_FCH leakage to APU_CORE_NB	in S5, APU_CORE_FCH leakage to APU_CORE_NB	01	33	unpop PQ905 add PR931 0ohm and connect to CORE_NB_GATE		
04	reduce part count	reduce part count	01	32 33	change 0ohm to R-short: PR918, PR933, PR833, PR926, PR929, PR814, PR943, PR824, PR908, PR801, PR851, PR914, PR808, PR826, PR922, PR838, PR906, PR827, PR934, PR829, PR831, PR921, PR915		
05							
06							
07							
08							

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