

Compal Confidential

DAT20 Schematics Document

Banias uFCPGA Package with 855PM(Odem) + ICH4-M

2003-10-23

REV: 1.0

Compal Electronics, Inc.

Title

Cover Sheet

Document Number

DAT20 LA-1971

Rev

1.0

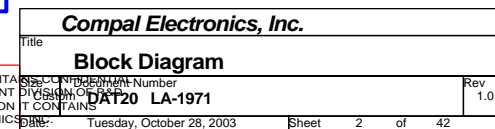
Date: Tuesday, November 11, 2003

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Block Diagram

The diagram shows two components in separate boxes. The left box contains the text "Thermal Sensor" and "ADM1032ARM" in a red serif font, with "page 4" in a black sans-serif font at the bottom. The right box contains the text "Clock Generator" and "ICS950810CG" in a red serif font, with "page 12" in a black sans-serif font at the bottom.



Voltage Rails

Power Plane	Description	S0-S1	S3	S5
VIN	Adapter power supply (19V)	N/A	N/A	N/A
B+	AC or battery power rail for power circuit.	N/A	N/A	N/A
+CPU_CORE	Core voltage for CPU	ON	OFF	OFF
+VCCP	1.05V rail for Processor I/O	ON	OFF	OFF
+1.2VS	1.2VS switched power rail for MCH	ON	OFF	OFF
+1.25VS	1.25V switched power rail	ON	OFF	OFF
+1.5VALW	1.5V power rail	ON	ON	ON
+1.5VS	AGP 4X	ON	OFF	OFF
+1.8VS	1.8V switched power rail	ON	OFF	OFF
+2.5V	2.5V power rail	ON	ON	OFF
+2.5VS	2.5V switched power rail	ON	OFF	OFF
+3VALW	3.3V always on power rail	ON	ON	ON*
+3V	3.3V power rail	ON	ON	OFF
+3VS	3.3V switched power rail	ON	OFF	OFF
+5VALW	5V always on power rail	ON	ON	ON*
+5V	5V power rail	ON	ON	OFF
+5VS	5V switched power rail	ON	OFF	OFF
+12VALW	12V always on power rail	ON	ON	ON*
+RTCVCC	RTC power	ON	ON	ON

Note : ON* means that this power plane is ON only with AC power available, otherwise it is OFF.

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
0	0	0 V	0 V	0 V
1	8.2K +/- 5%	0.216 V	0.250 V	0.289 V
2	18K +/- 5%	0.436 V	0.503 V	0.538 V
3	33K +/- 5%	0.712 V	0.819 V	0.875 V
4	56K +/- 5%	1.036 V	1.185 V	1.264 V
5	100K +/- 5%	1.453 V	1.650 V	1.759 V
6	200K +/- 5%	1.935 V	2.200 V	2.341 V
7	NC	2.500 V	3.300 V	3.300 V

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

External PCI Devices

Device	IDSEL#	REQ#/GNT#	Interrupts
VGA			PIRQA
CardBus	AD20	2	PIRQA
LAN	AD17	3	PIRQF
Mini-PCI	AD18,AD22	1/4	PIRQG/PIRQH
1394	AD16	0	PIRQE

EC SM Bus1 address

Device	Address	Device	Address
Smart Battery	0001 011X b	ADM1032	1001 110X b
EEPROM(24C16/02)	1010 000X b		
(24C04)	1011 000Xb		

EC SM Bus2 address

ICH4-M SM Bus address

Device	Address
Clock Generator (ICS950810CG)	1101 001Xb
DDR DIMM0	1010 000Xb
DDR DIMM1	1010 001Xb

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Title

Notes

Revision Number

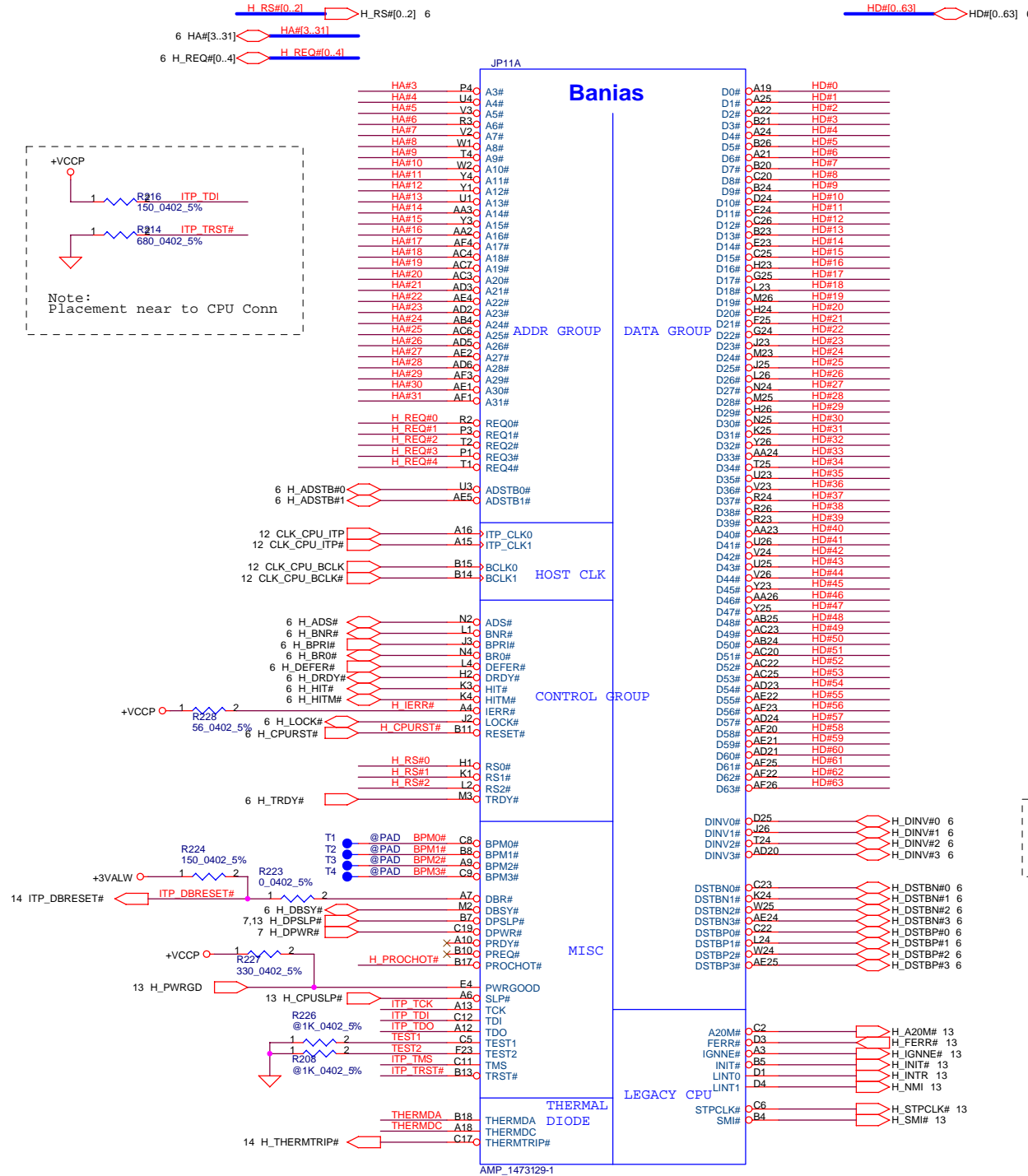
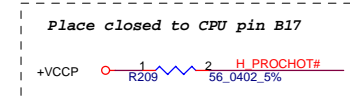
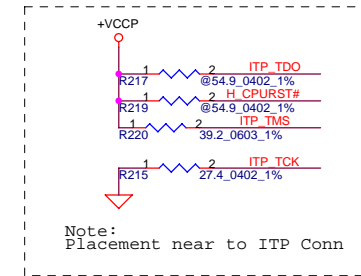
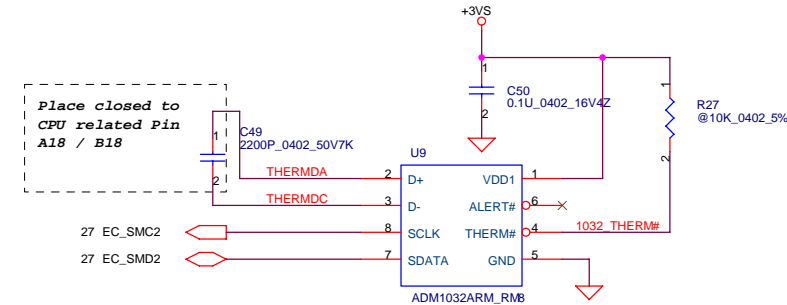
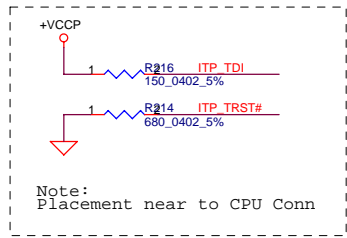
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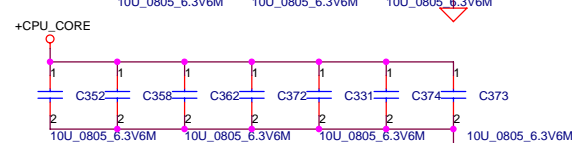
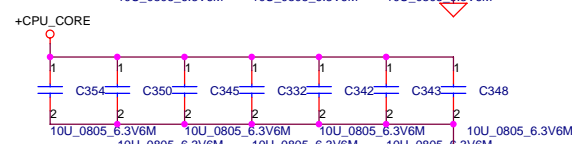
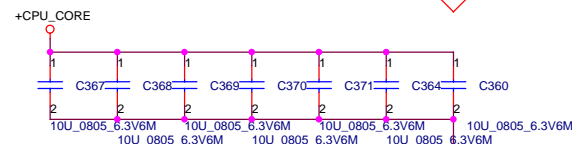
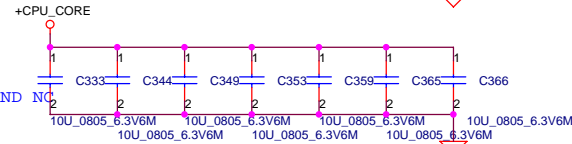
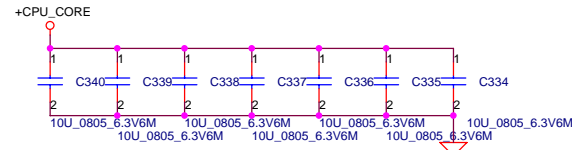
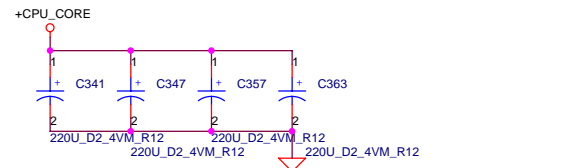
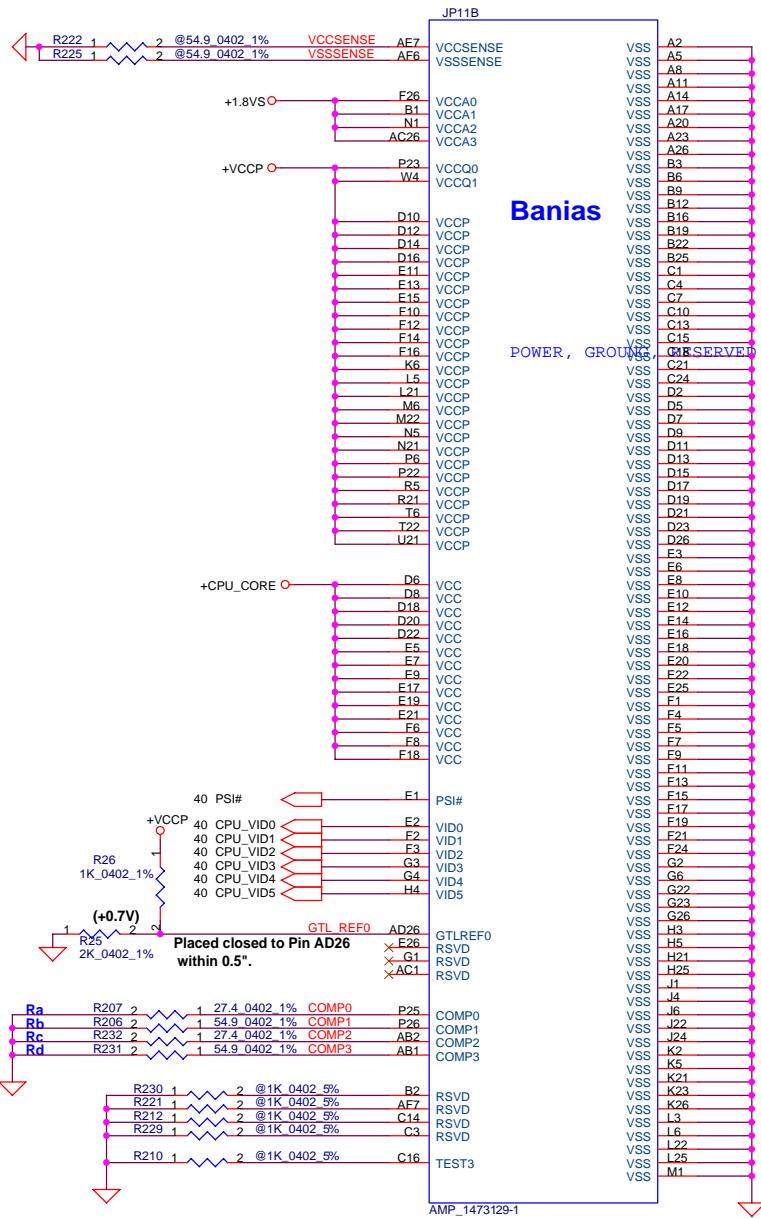
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Monday, October 27, 2003

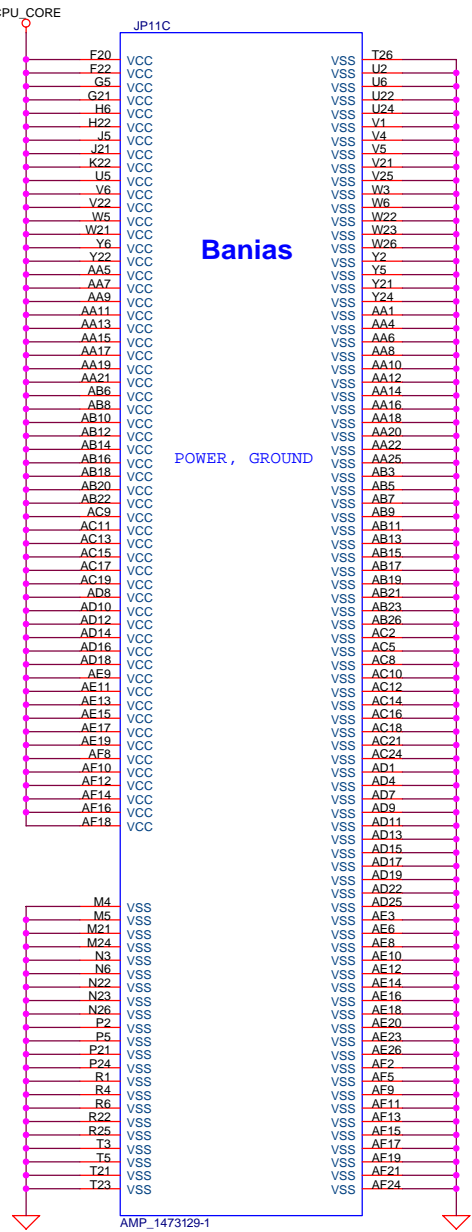
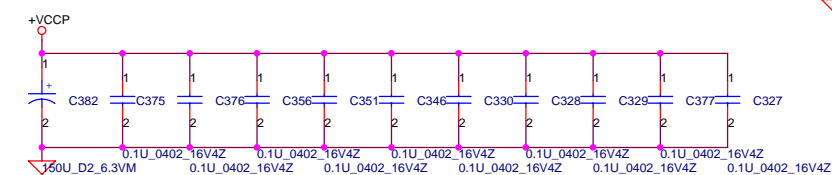
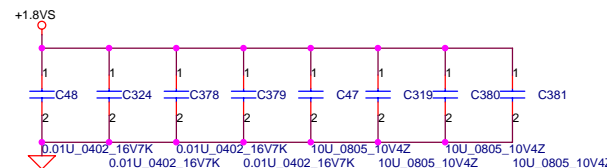
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Vcc-core Decoupling	C, uF	ESR, mohm	ESL, nH
SPCAP, Polymer	4X220uF	12m ohm/4	3.5nH/4
MLCC 0805 X5R	35X10uF	5m ohm/35	0.6nH/35



4 H_RS#[0..2] H_RS#[0..2]
4 HA#[3..31] HA#[3..31]
4 H_REQ#[0..4] H_REQ#[0..4]

HD#[0..63] HD#[0..63] 4

17 AGP_AD#[0..31] AGP_AD#[0..31]
17 AGP_C/BE#[0..3] AGP_C/BE#[0..3]
17 AGP_SBA#[0..7] AGP_SBA#[0..7]

AGP AD0 R27
AGP AD1 R28
AGP AD2 T25
AGP AD3 R25
AGP AD4 T26
AGP AD5 T27
AGP AD6 U27
AGP AD7 U28
AGP AD8 V26
AGP AD9 V27
AGP AD10 T23
AGP AD11 U23
AGP AD12 T24
AGP AD13 U24
AGP AD14 U25
AGP AD15 V24
AGP AD16 Y27
AGP AD17 Y26
AGP AD18 AA28
AGP AD19 AB25
AGP AD20 AB27
AGP AD21 AB27
AGP AD22 AB26
AGP AD23 Y23
AGP AD24 AB23
AGP AD25 AA24
AGP AD26 AA25
AGP AD27 AB24
AGP AD28 AC25
AGP AD29 AC24
AGP AD30 AC22
AGP AD31 AD24

AGP C/BE#0 V25
AGP C/BE#1 V23
AGP C/BE#2 Y25
AGP C/BE#3 AA23

AGP FRAME# Y24
AGP DEVSEL# W28
AGP IRDY# W27
AGP TRDY# W24
AGP STOP# W23
AGP PAR W25
AGP REQ# AG24
AGP GNT# AH25

AGP ADSTB0 R24
AGP ADSTB0# R23
AGP ADSTB1 AC27
AGP ADSTB1# AC28

AGP SBA0 AH28
AGP SBA1 AH27
AGP SBA2 AG28
AGP SBA3 AG27
AGP SBA4 AE28
AGP SBA5 AE27
AGP SBA6 AE24
AGP SBA7 AE25

AGP SBSTB AE27
AGP SBSTB# AE26
AGP RBF# AE22
AGP WBF# AE23
AGP PIPE# AE22

AGP ST0 AG25
AGP ST1 AG24
AGP ST2 AG26

CLK MCH 66M P22

CLK MCH 66M

CLK MCH 66M

Odem

HUB

AGP

GND

HUB PD0 P25
HUB PD1 P24
HUB PD2 N27
HUB PD3 P23
HUB PD4 M26
HUB PD5 M25
HUB PD6 L28
HUB PD7 L27
HUB PD8 M27
HUB PD9 M28
HUB PD10 M24

HUB_PSTRB 13
HUB_PSTRB# 13
HUB_RCOMP P27
HUB_VREF P26

HUB_VREF

HUB_VREF

HUB_VREF

HUB_VREF

HUB_VREF

HUB_VREF

HUB_VREF

HUB_VREF

HUB_VREF

HUB_VREF

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HUB_VREF

HUB_VREF

HUB_VREF

HUB_VREF

HUB_VREF

HUB_VREF

HUB_VREF

HUB_VREF

ST1	ST2	MCH	STRAP
X	1	DDR	
0	X	TEST MODE	
1	X	400 Mhz	PSB

Note:
Ra & Rb placed at
center of MCH and AGP

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Title

Odem (1/3)

Revision Number

Rev 1.0

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DDR_SMA[0..12] 9
 9 DDR_SDQ[0..63] 9
 9 DDR_SDQS[0..8] 9
 9 DDR_CB[0..7] 9

U8C

Odem

MEMORY

DDR_SMA0 E12
 DDR_SMA1 E17
 DDR_SMA2 E16
 DDR_SMA3 G17
 DDR_SMA4 G18
 DDR_SMA5 E18
 DDR_SMA6 F19
 DDR_SMA7 G20
 DDR_SMA8 G19
 DDR_SMA9 F21
 DDR_SMA10 E13
 DDR_SMA11 E20
 DDR_SMA12 G21
 XG22

DDR_SDQS0 F26
 DDR_SDQS1 C26
 DDR_SDQS2 C23
 DDR_SDQS3 B19
 DDR_SDQS4 D12
 DDR_SDQS5 C18
 DDR_SDQS6 C5
 DDR_SDQS7 F3
 DDR_SDQS8 E15

9 DDR_SWE#
 9 DDR_SRAS#
 9 DDR_SCAS#

9 DDR_CLK0
 9 DDR_CLK0#
 9 DDR_CLK1
 9 DDR_CLK1#
 9 DDR_CLK2
 9 DDR_CLK2#
 10 DDR_CLK3
 10 DDR_CLK3#
 10 DDR_CLK4
 10 DDR_CLK4#
 10 DDR_CLK5
 10 DDR_CLK5#

9,10 DDR_CKE0
 9,10 DDR_CKE1
 10 DDR_CKE2
 10 DDR_CKE3

9,10 DDR_SCS#0
 9,10 DDR_SCS#1
 10 DDR_SCS#2
 10 DDR_SCS#3

9 DDR_SBS0
 9 DDR_SBS1

SCK0
 SCCK#0
 SCCK1
 SCCK#1
 SCCK2
 SCCK#2
 SCCK3
 SCCK#3
 SCCK4
 SCCK#4
 SCCK5
 SCCK#5

SCKE0
 SCKE1
 SCKE2
 SCKE3

SCS#0
 SCS#1
 SCS#2
 SCS#3

SBS0
 SBS1

SMVREF0
 SMVREF1

SMRCOMP
 RCVENIN#

RCVENOUT#

DPSLP#
 DPWPR#
 NC0
 NC1

AD27

AD27

AD27

AD27

AD27

AD27

AD27

AD27

AD27

AD27

AD27

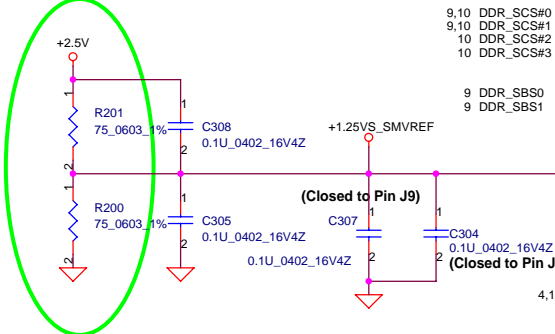
G28 DDR_SDQ0
 E27 DDR_SDQ1
 C28 DDR_SDQ2
 E28 DDR_SDQ3
 H25 DDR_SDQ4
 G27 DDR_SDQ5
 F25 DDR_SDQ6
 B28 DDR_SDQ7
 E27 DDR_SDQ8
 C27 DDR_SDQ9
 B25 DDR_SDQ10
 C25 DDR_SDQ11
 B27 DDR_SDQ12
 D27 DDR_SDQ13
 D26 DDR_SDQ14
 E25 DDR_SDQ15
 D24 DDR_SDQ16
 E23 DDR_SDQ17
 C22 DDR_SDQ18
 E21 DDR_SDQ19
 C24 DDR_SDQ20
 B23 DDR_SDQ21
 D22 DDR_SDQ22
 B21 DDR_SDQ23
 C21 DDR_SDQ24
 D20 DDR_SDQ25
 C19 DDR_SDQ26
 D18 DDR_SDQ27
 C20 DDR_SDQ28
 E19 DDR_SDQ29
 C18 DDR_SDQ30
 E17 DDR_SDQ31
 E13 DDR_SDQ32
 C12 DDR_SDQ33
 B11 DDR_SDQ34
 C10 DDR_SDQ35
 B13 DDR_SDQ36
 C13 DDR_SDQ37
 C11 DDR_SDQ38
 D10 DDR_SDQ39
 E10 DDR_SDQ40
 C9 DDR_SDQ41
 D8 DDR_SDQ42
 E8 DDR_SDQ43
 E11 DDR_SDQ44
 B9 DDR_SDQ45
 C7 DDR_SDQ46
 C6 DDR_SDQ47
 D6 DDR_SDQ48
 D4 DDR_SDQ49
 B3 DDR_SDQ50
 E6 DDR_SDQ51
 B5 DDR_SDQ52
 C4 DDR_SDQ53
 E4 DDR_SDQ54
 C3 DDR_SDQ55
 D3 DDR_SDQ56
 F4 DDR_SDQ57
 F3 DDR_SDQ58
 B2 DDR_SDQ59
 C2 DDR_SDQ60
 E2 DDR_SDQ61
 G4 DDR_SDQ62
 C16 DDR_CB0
 D16 DDR_CB1
 B15 DDR_CB2
 C14 DDR_CB3
 B17 DDR_CB4
 C17 DDR_CB5
 C15 DDR_CB6
 D14 DDR_CB7

RSTIN#
 RSVD1
 TESTIN#

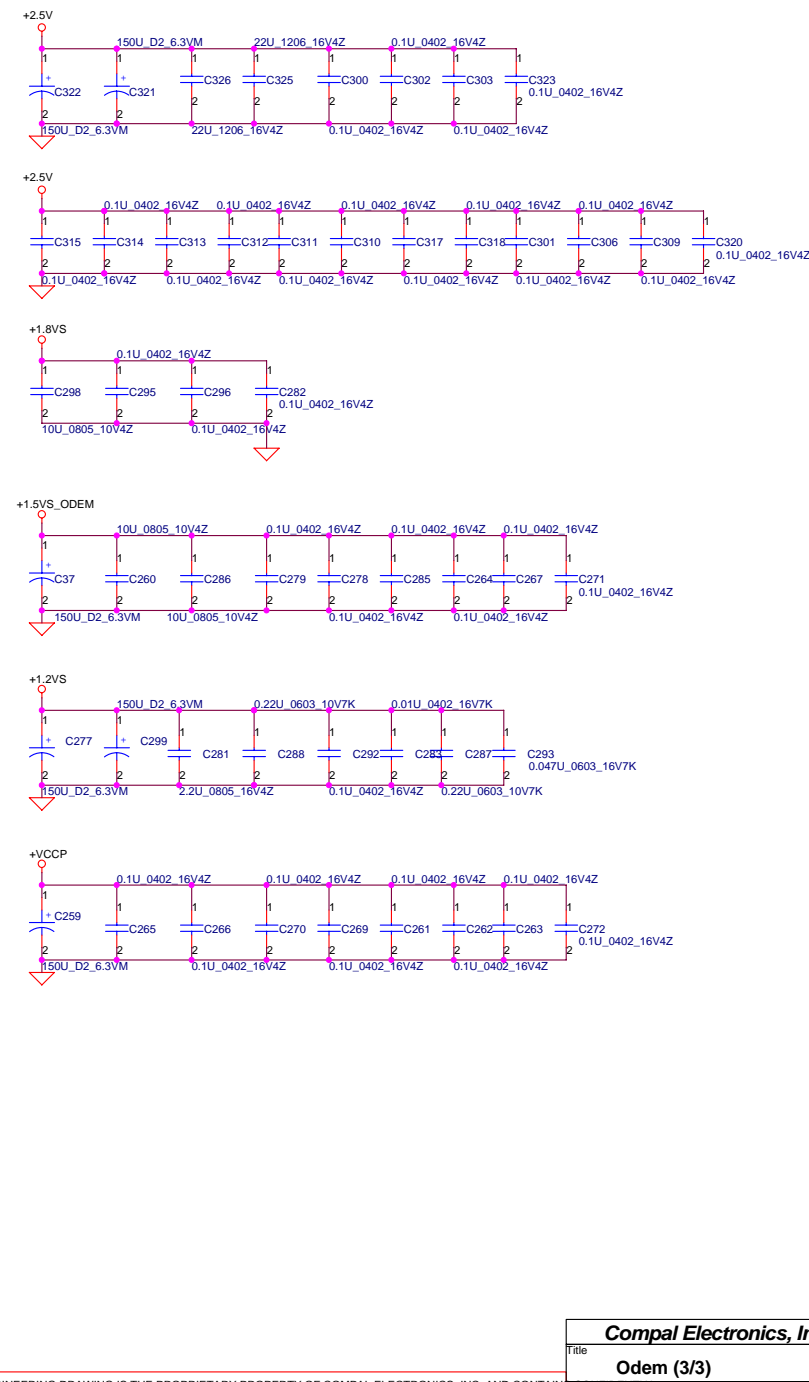
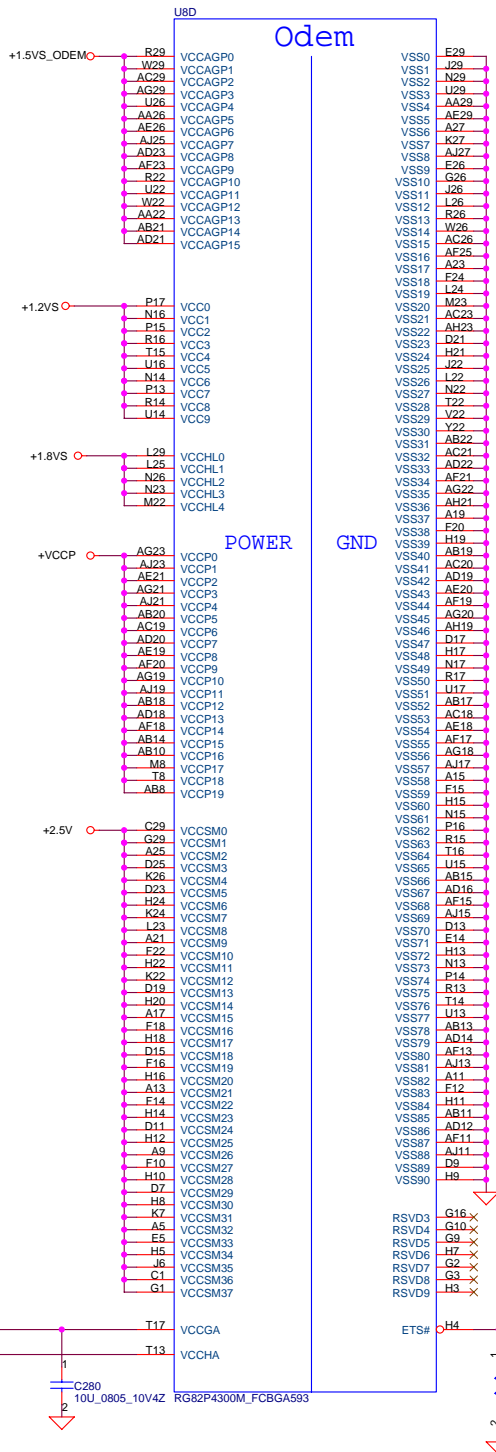
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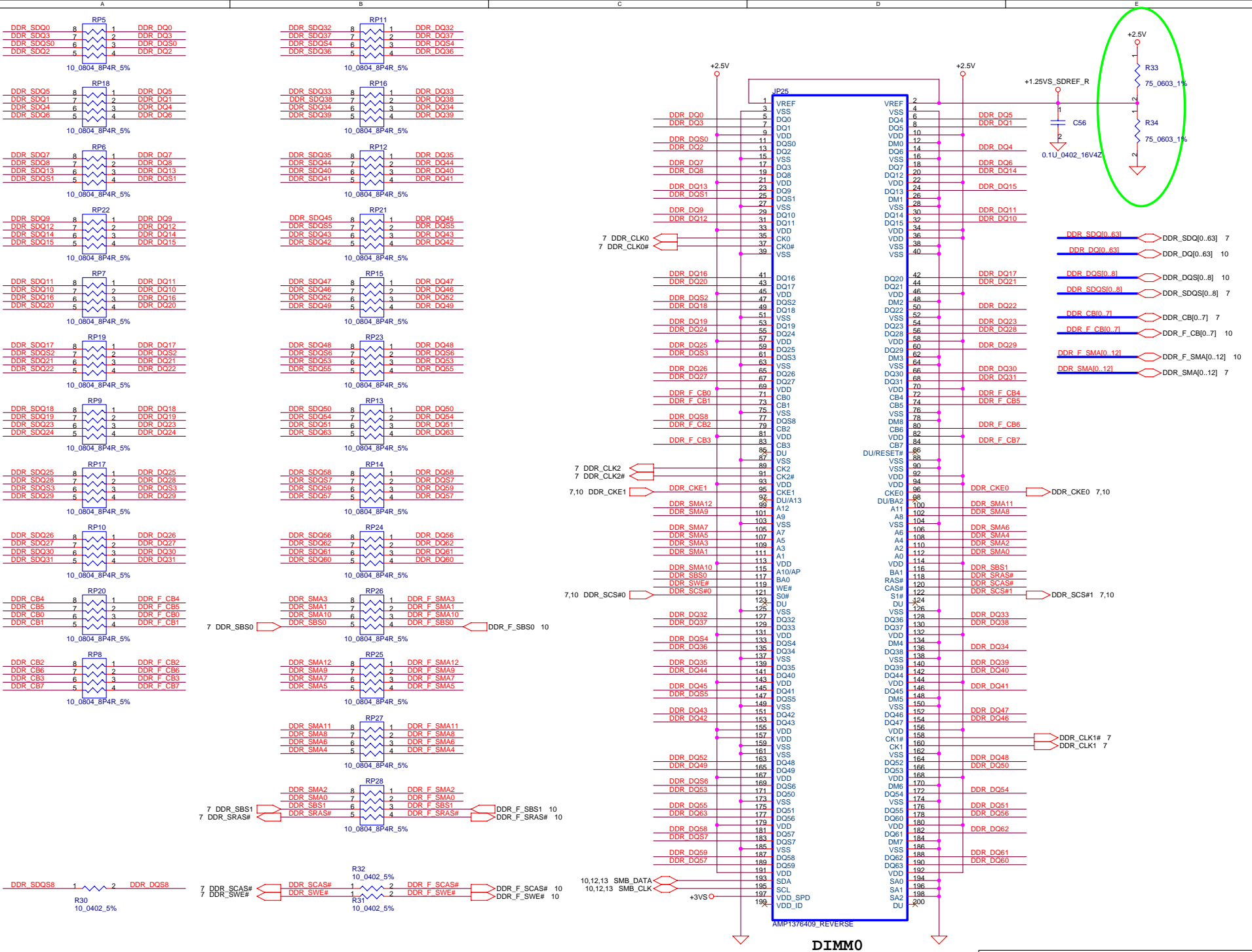
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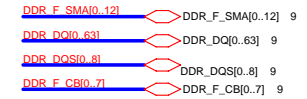
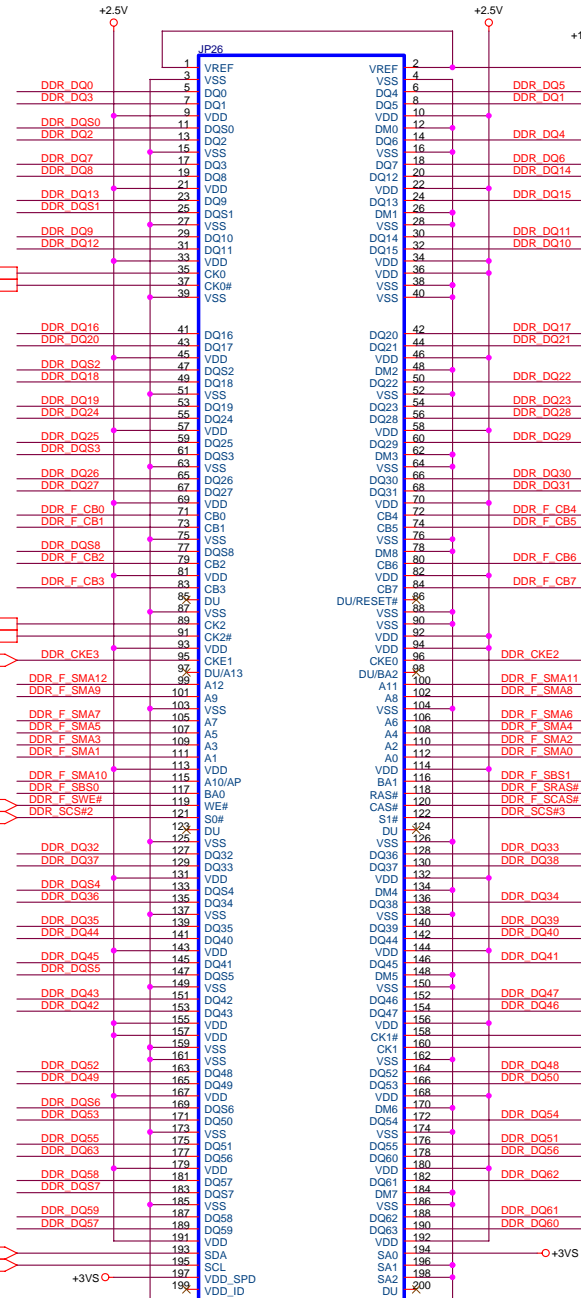
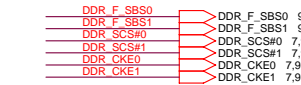
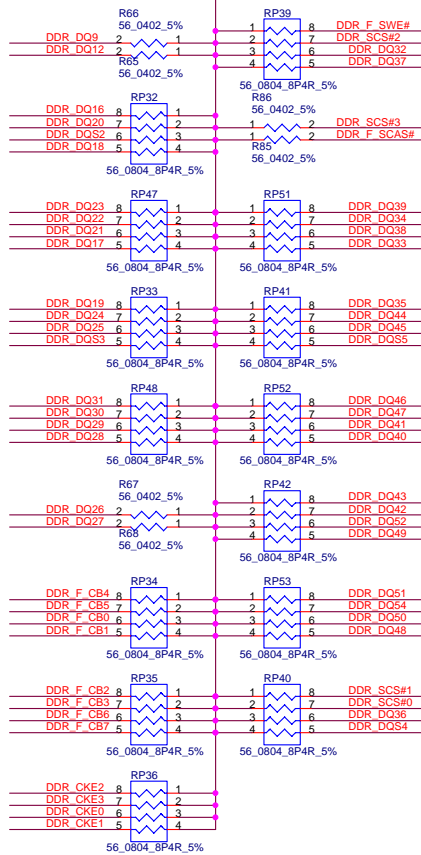
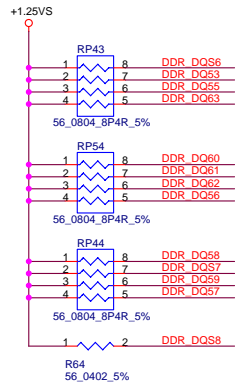
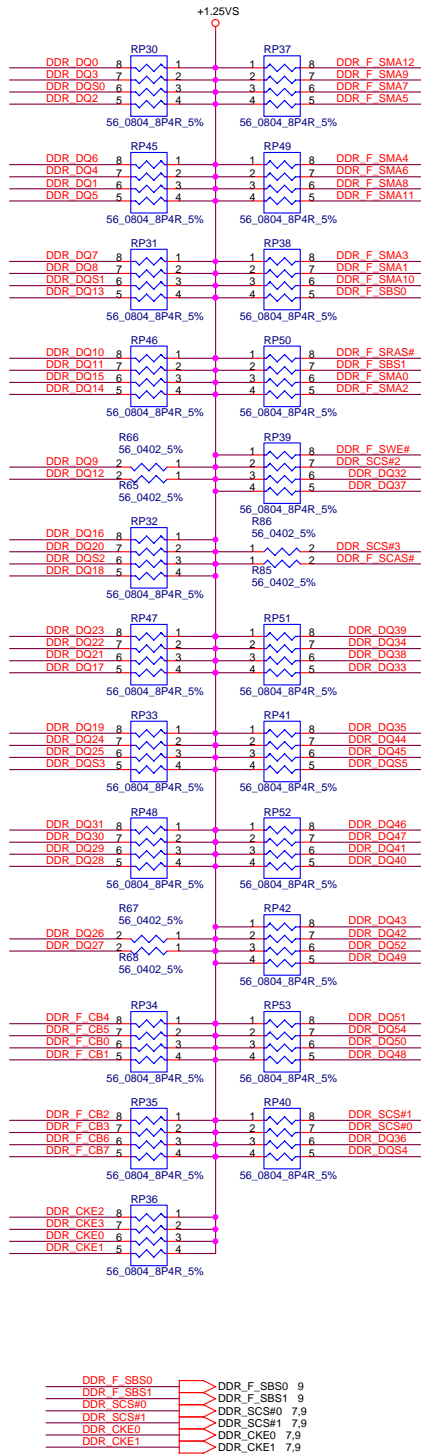
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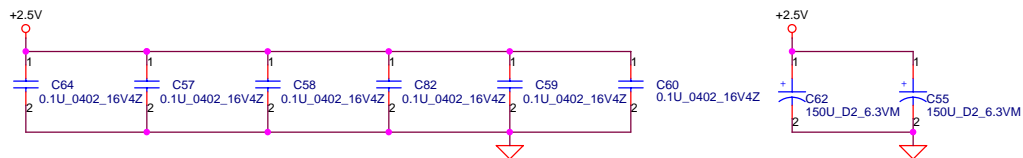
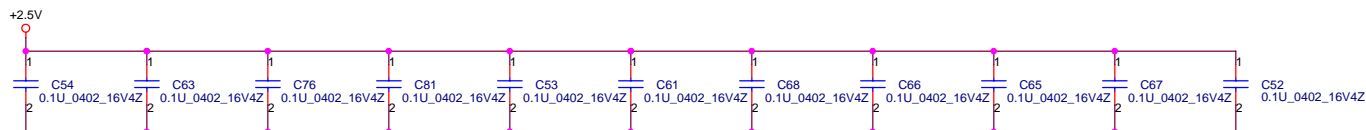


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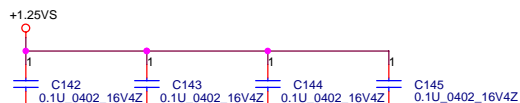
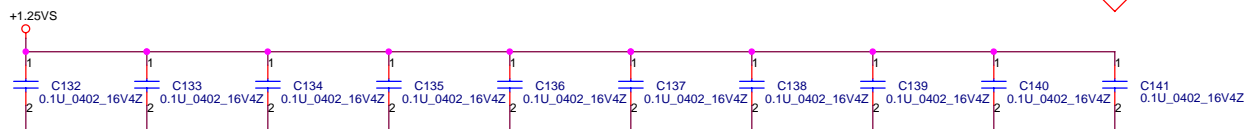
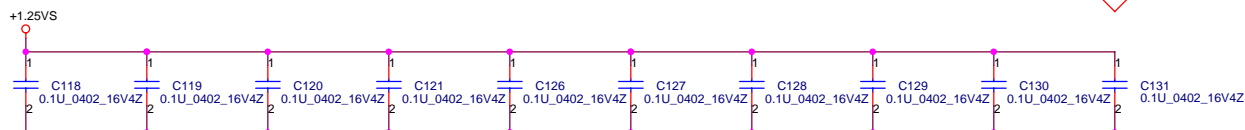
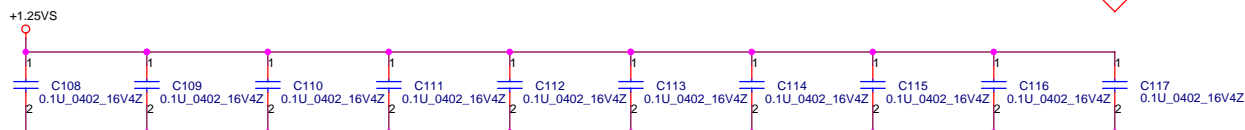
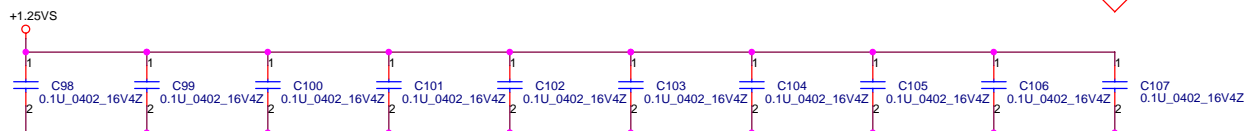
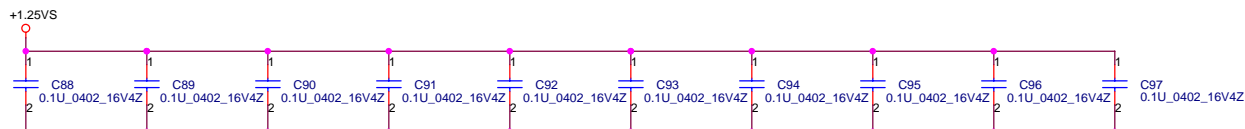
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DDR-SODIMM SLOT1	
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Layout note :
Distribute as close as possible
to DDR-SODIMM.



Layout note :
Place one cap close to every 2 pull up resistors termination to
+1.25V



Compal Electronics, Inc.

Title
DDR SODIMM Decoupling

Revision Number
DDR20 LA-1971

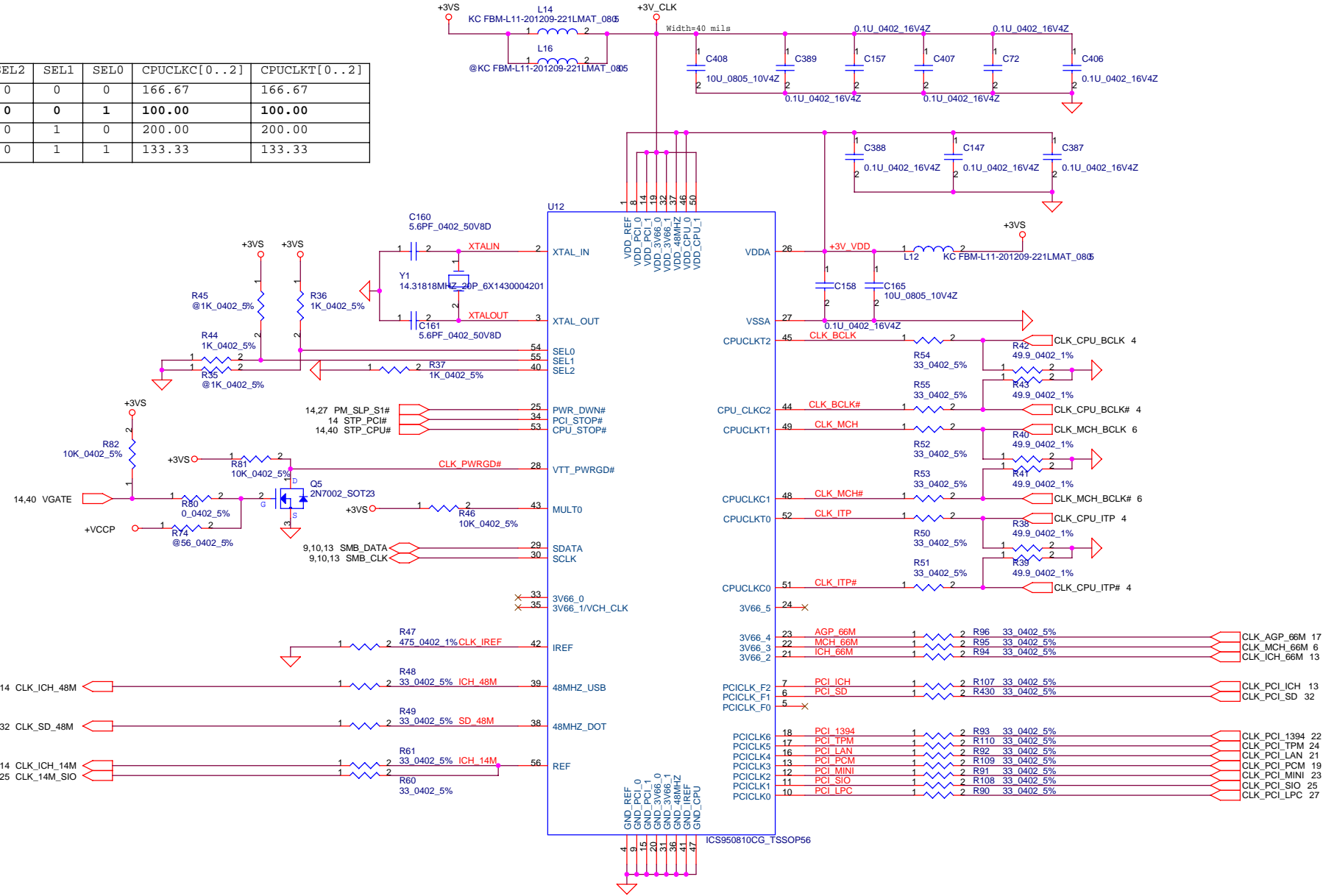
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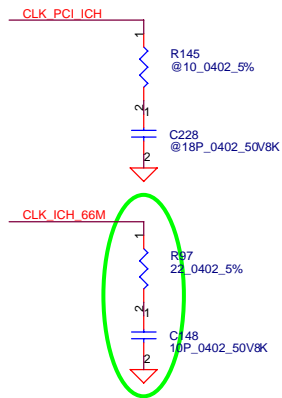
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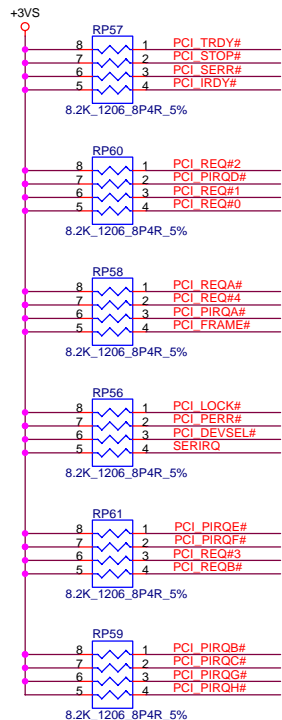
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SEL2	SEL1	SEL0	CPUCLKC[0..2]	CPUCLKT[0..2]
0	0	0	166.67	166.67
0	0	1	100.00	100.00
0	1	0	200.00	200.00
0	1	1	133.33	133.33

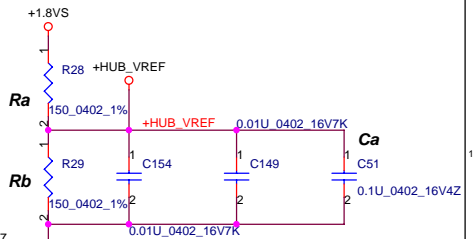
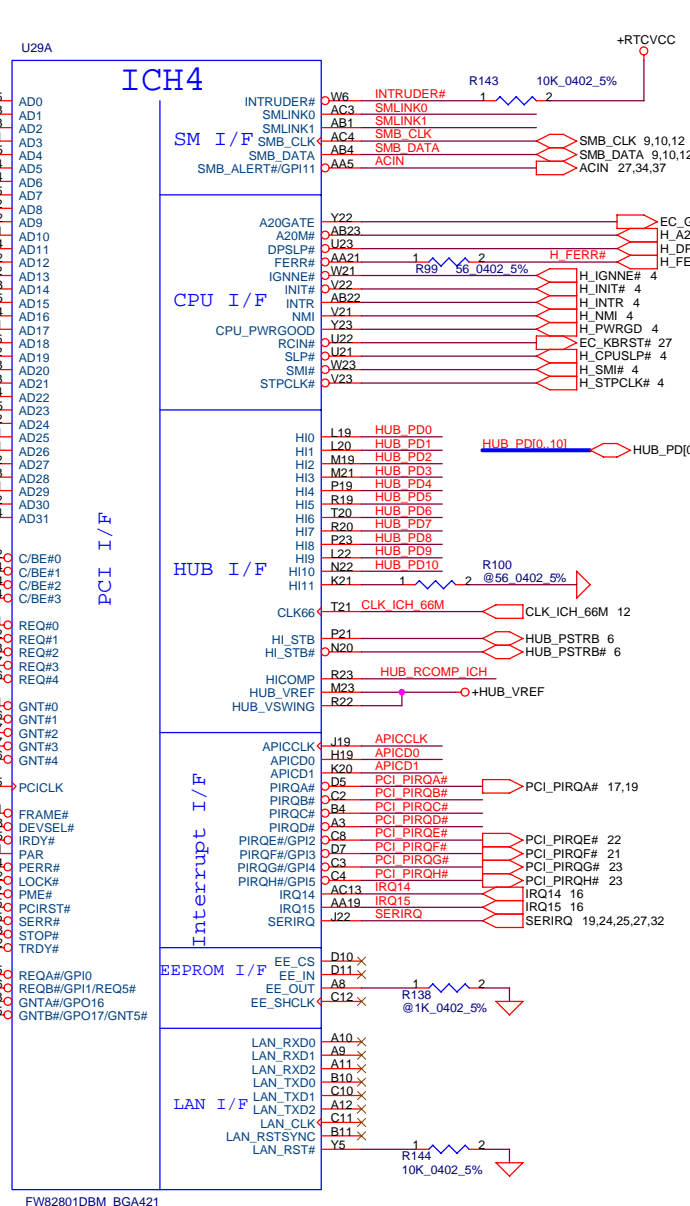
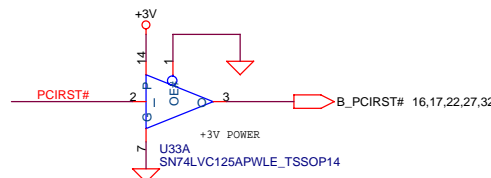
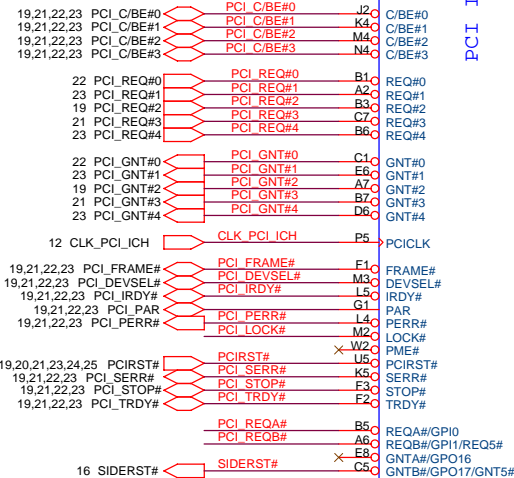




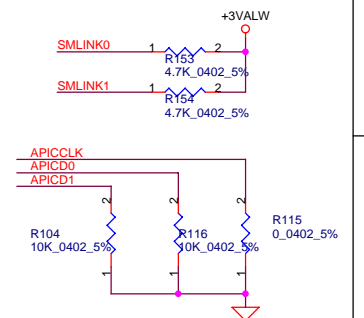
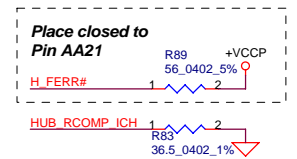
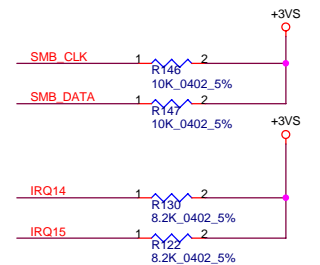
PCI Pullups



19,21,22,23 PCI_AD[0..31] PCI_AD[0..31]

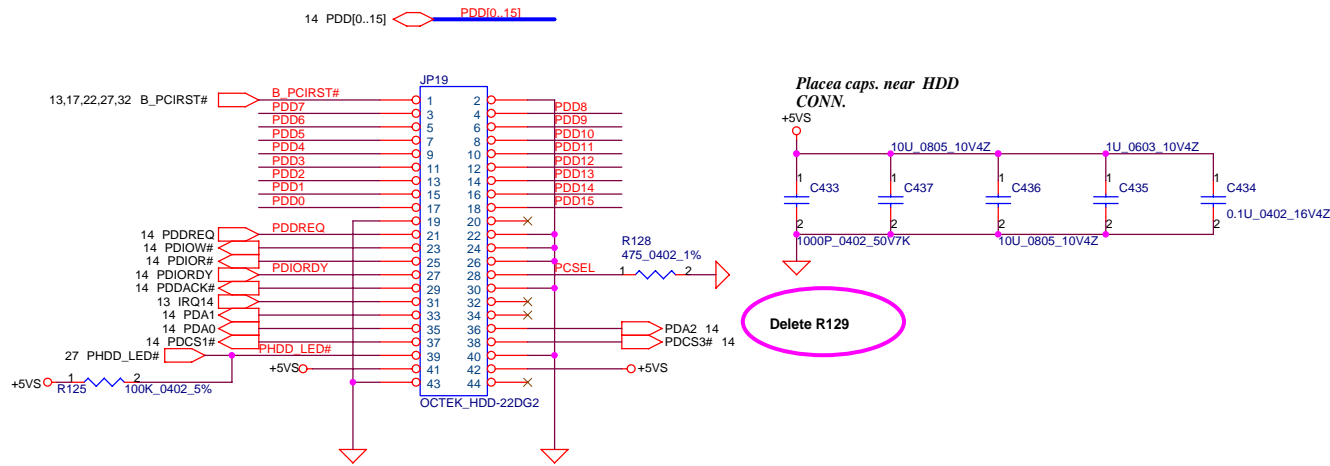


Note: Ra, Rb, Ca placement center of MCH and ICH4M

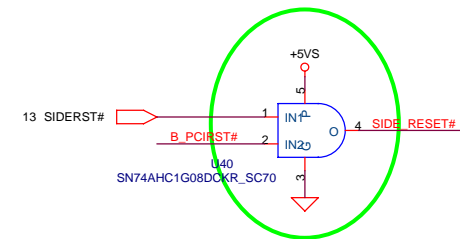
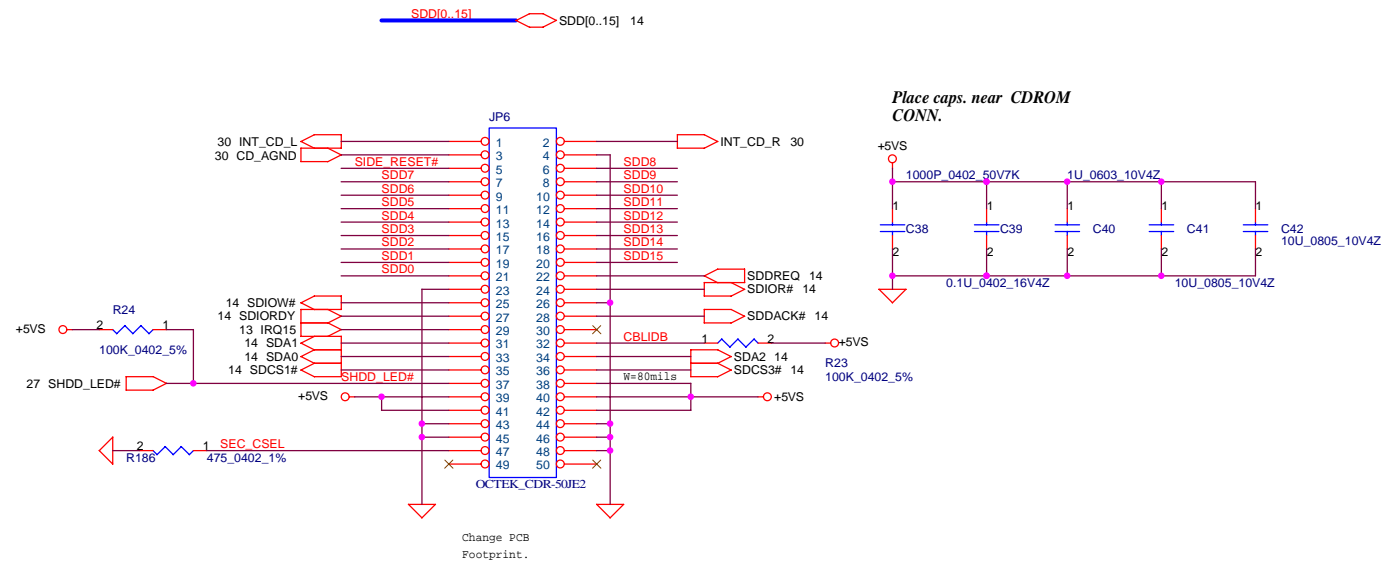




HDD Connector



CD-ROM Connector



Compal Electronics, Inc.

IDE/CD-ROM Module

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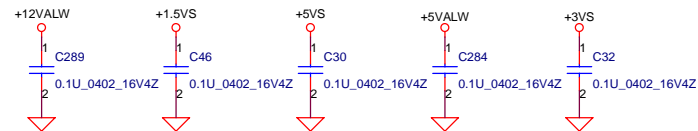
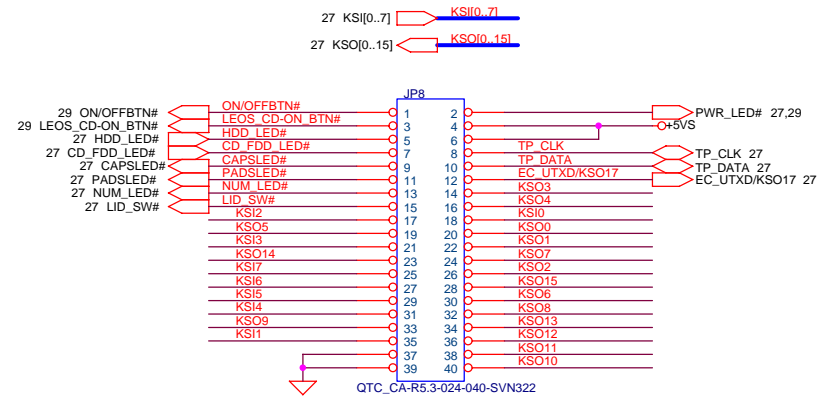
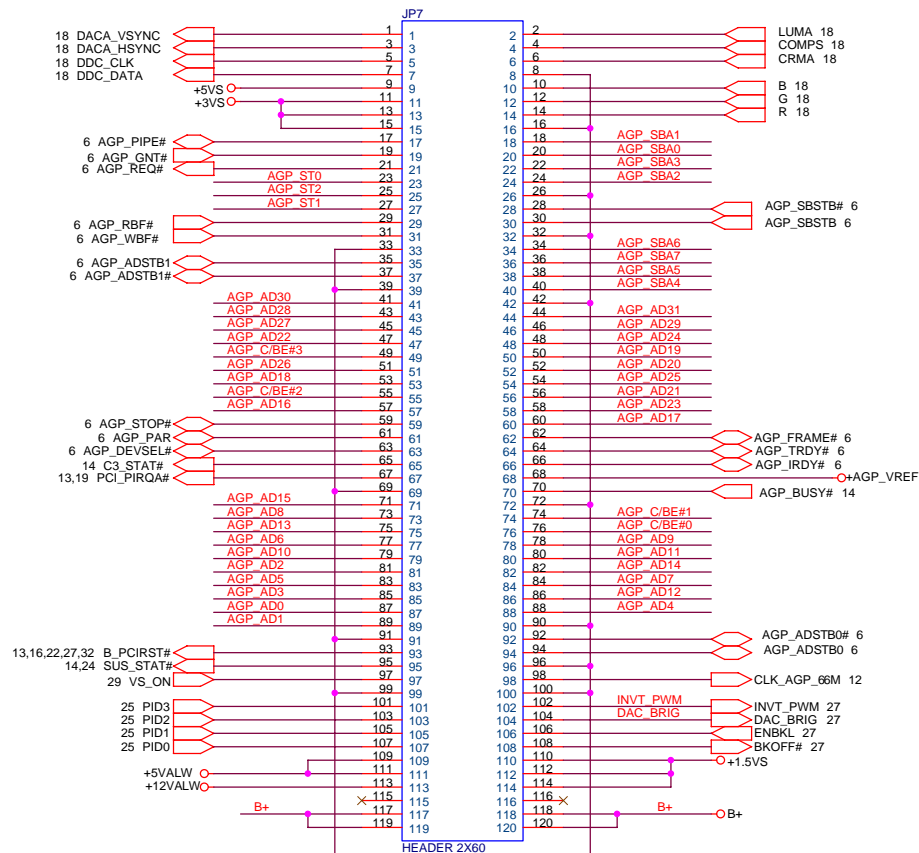
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6 AGP_ST[0..2] AGP_ST[0..2]

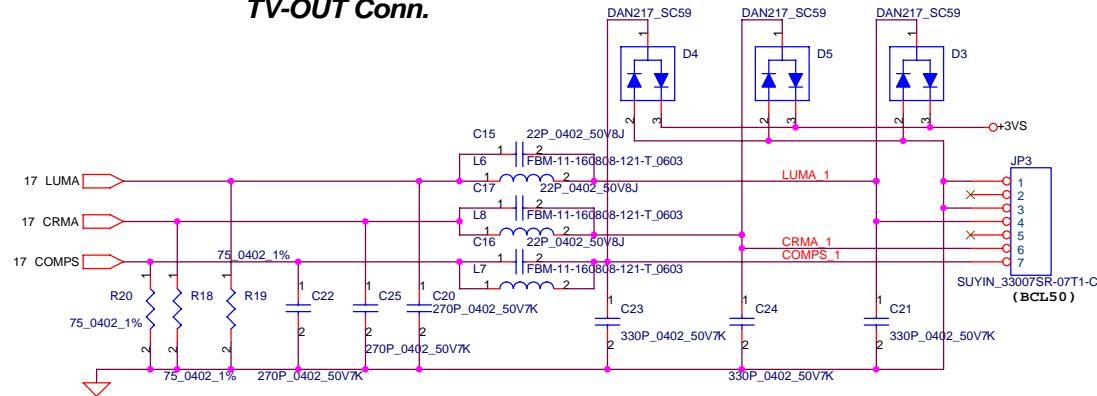
6 AGP_AD[0..31] AGP_AD[0..31]

6 AGP_C/BE[0..3] AGP_C/BE[0..3]

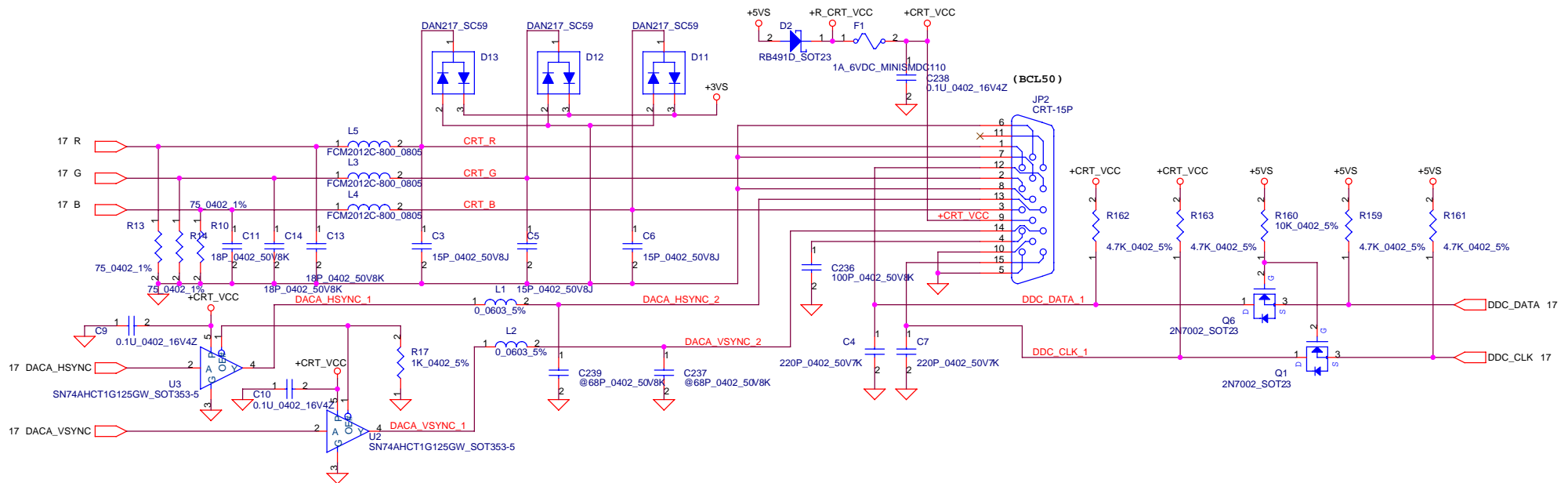
6 AGP_SBA[0..7] AGP_SBA[0..7]



TV-OUT Conn.



CRT Conn.



Compal Electronics, Inc.

CRT,TV-OUT CONNECTOR

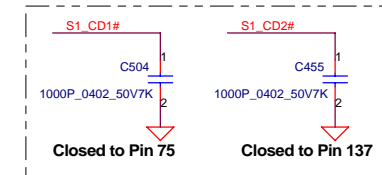
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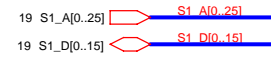
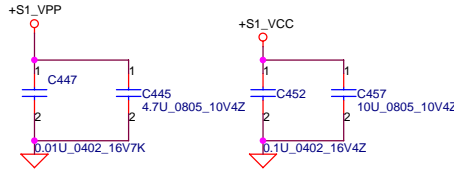
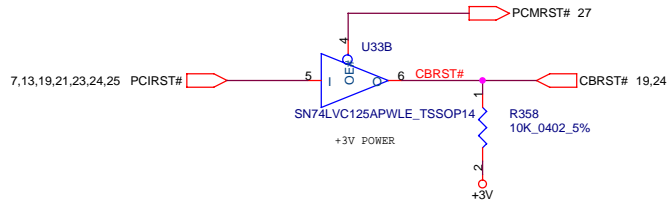
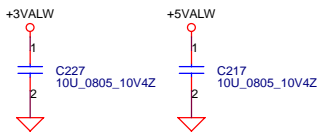
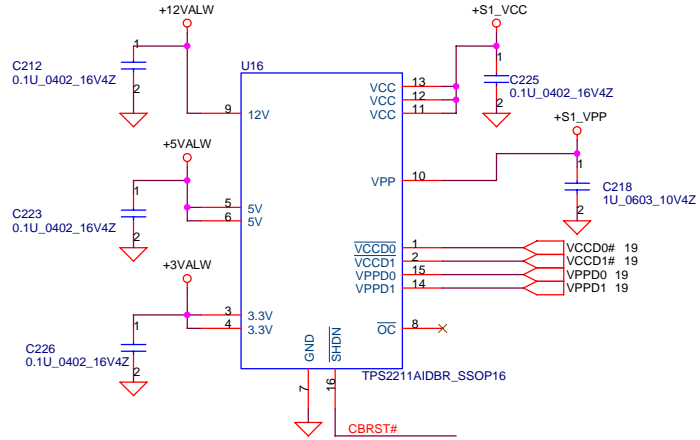
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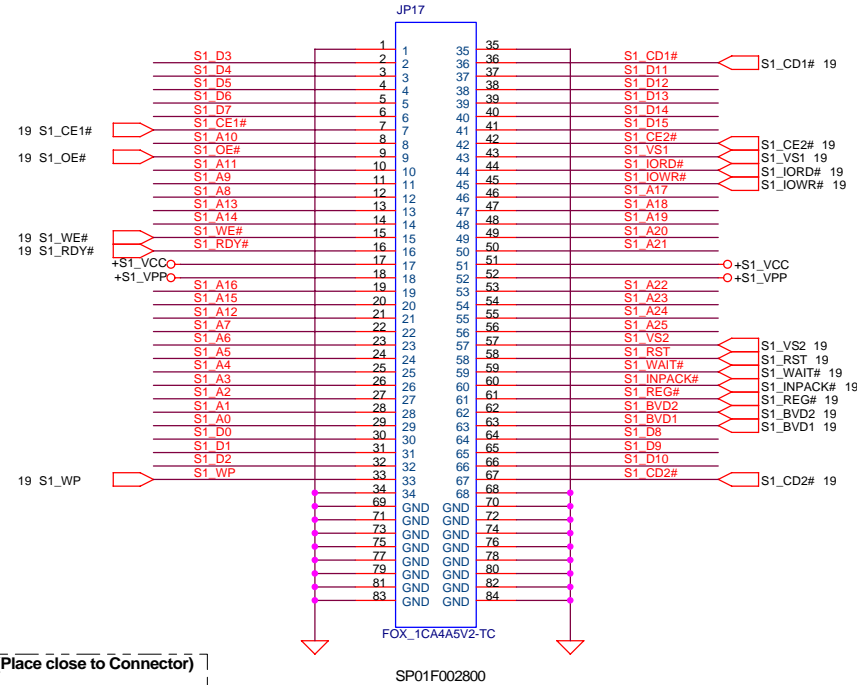
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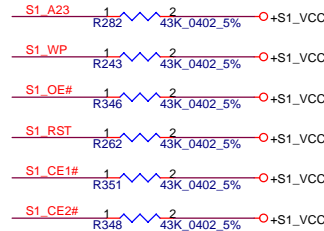
PCMCIA Power Controller



CardBus Socket



For CB1410 Rev.B0 (Place close to Connector)



Compal Electronics, Inc.

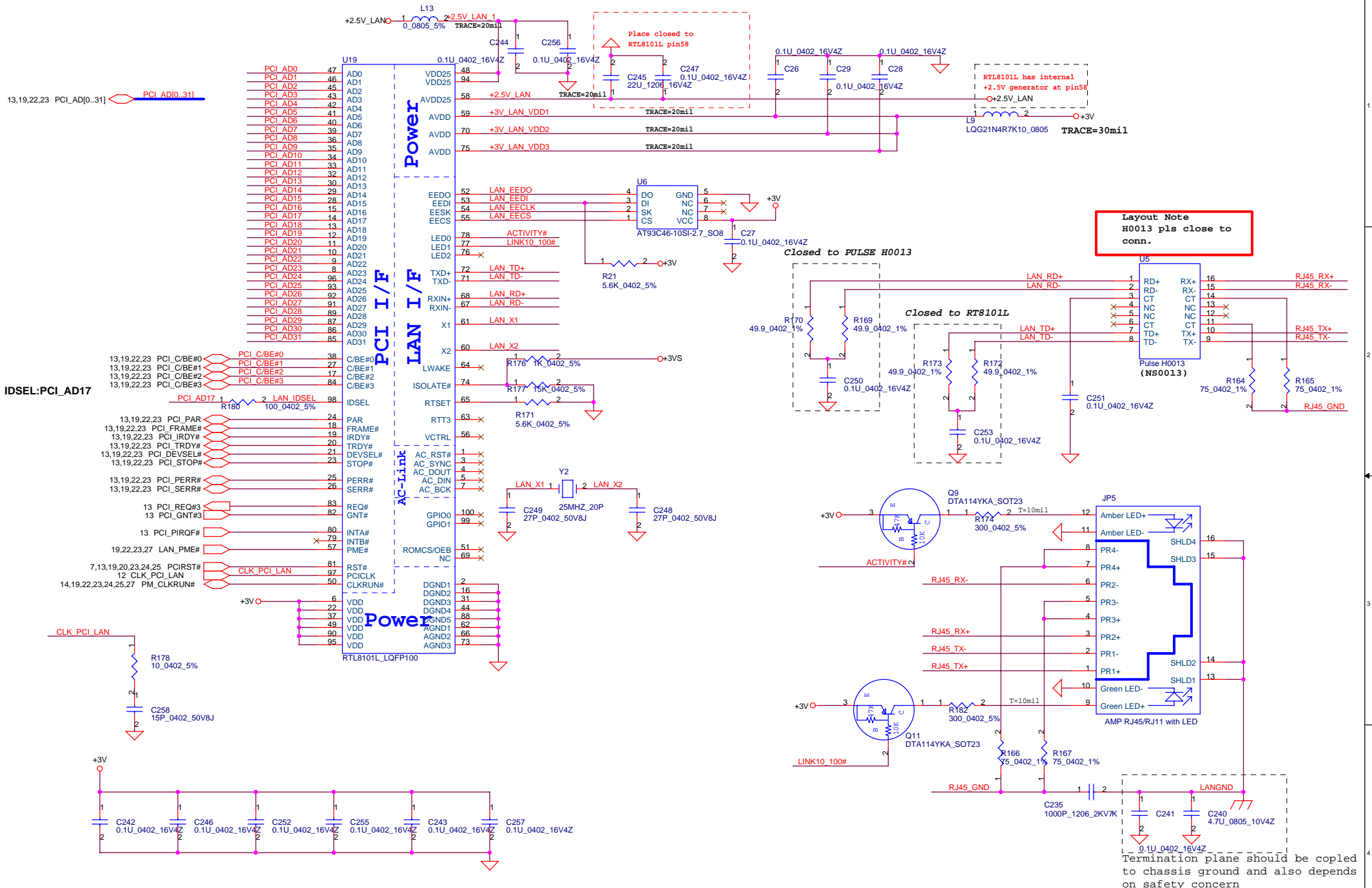
CardBus Socket

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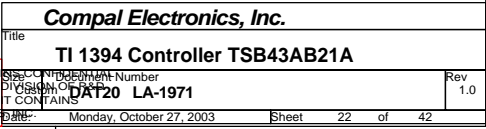
Compal Electronics, Inc.

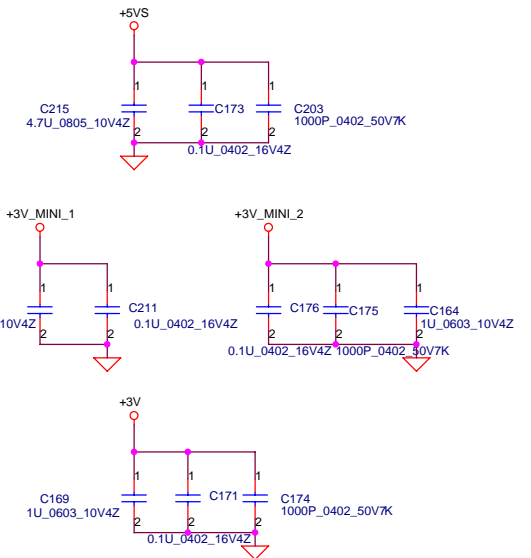
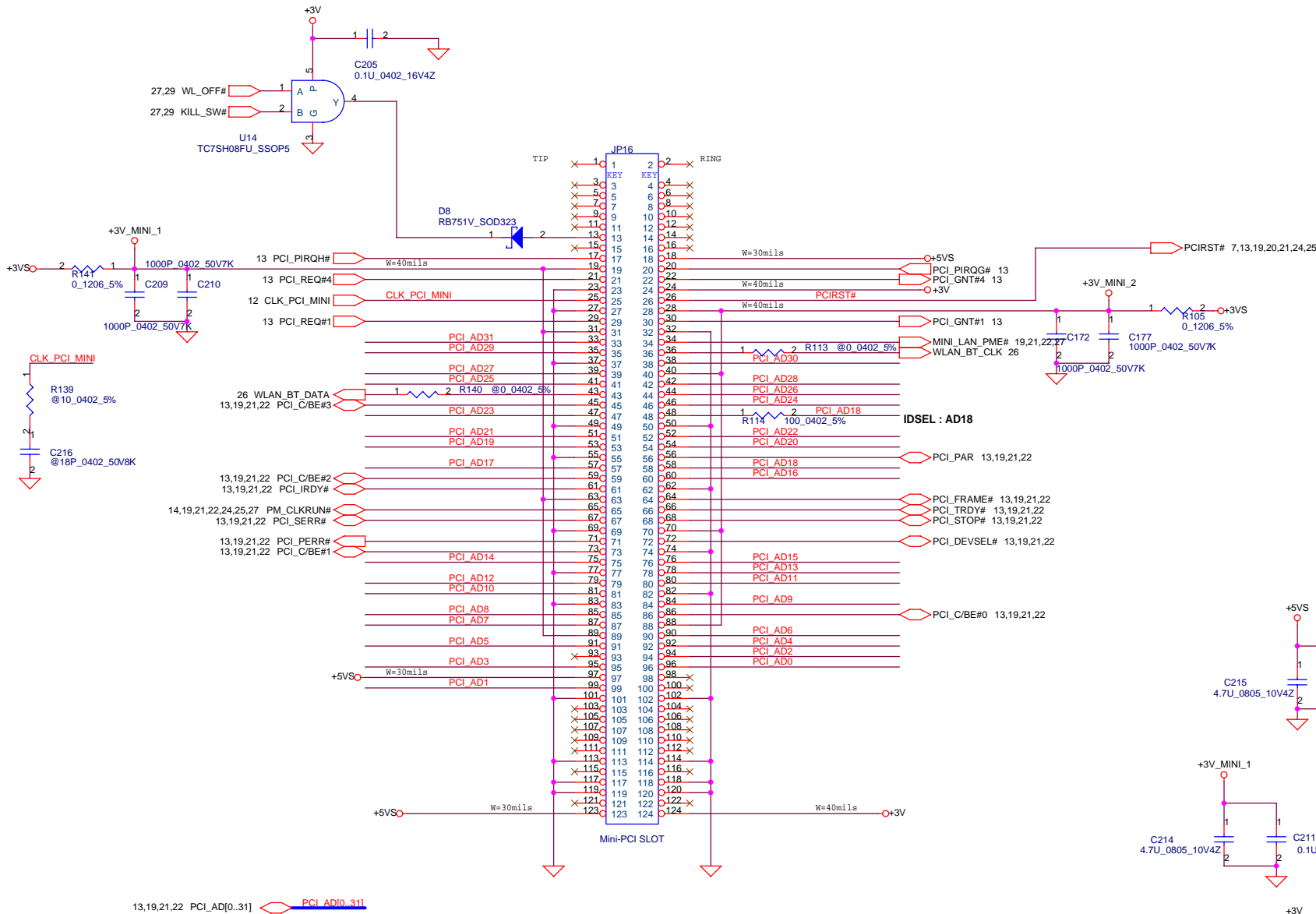
LAN REALTEK RTL8101L

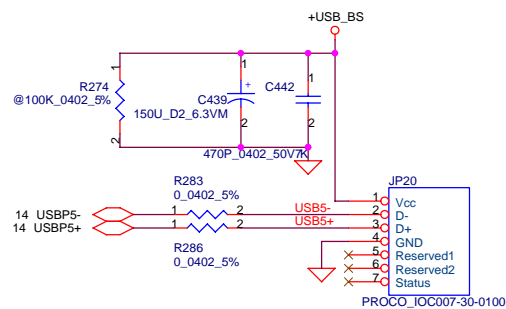
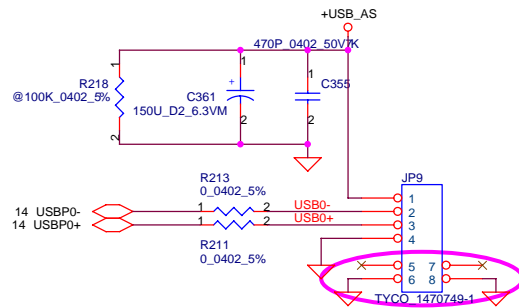
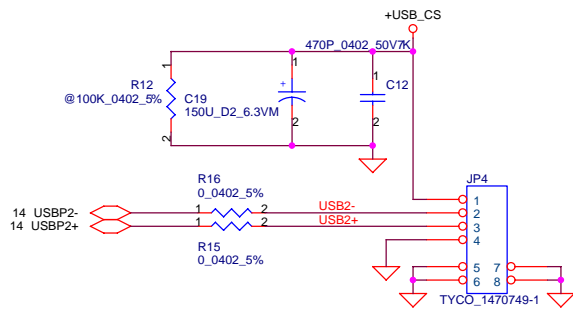
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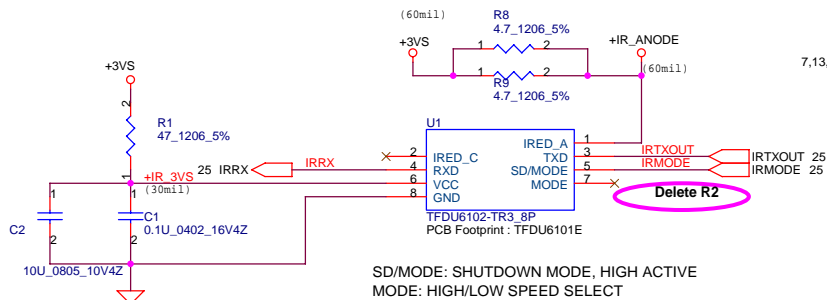
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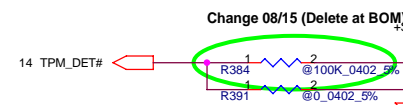
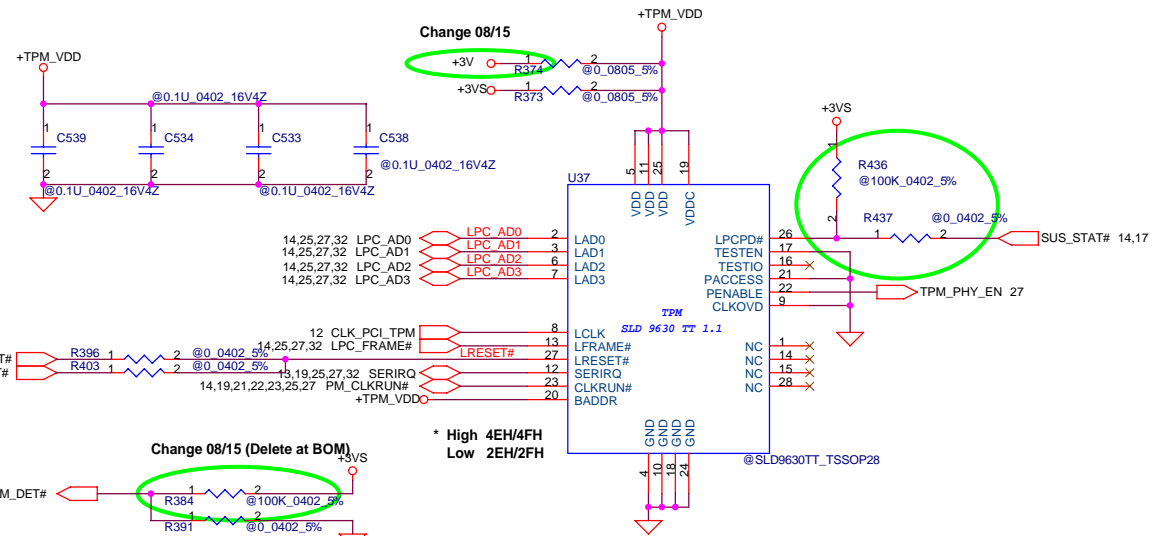
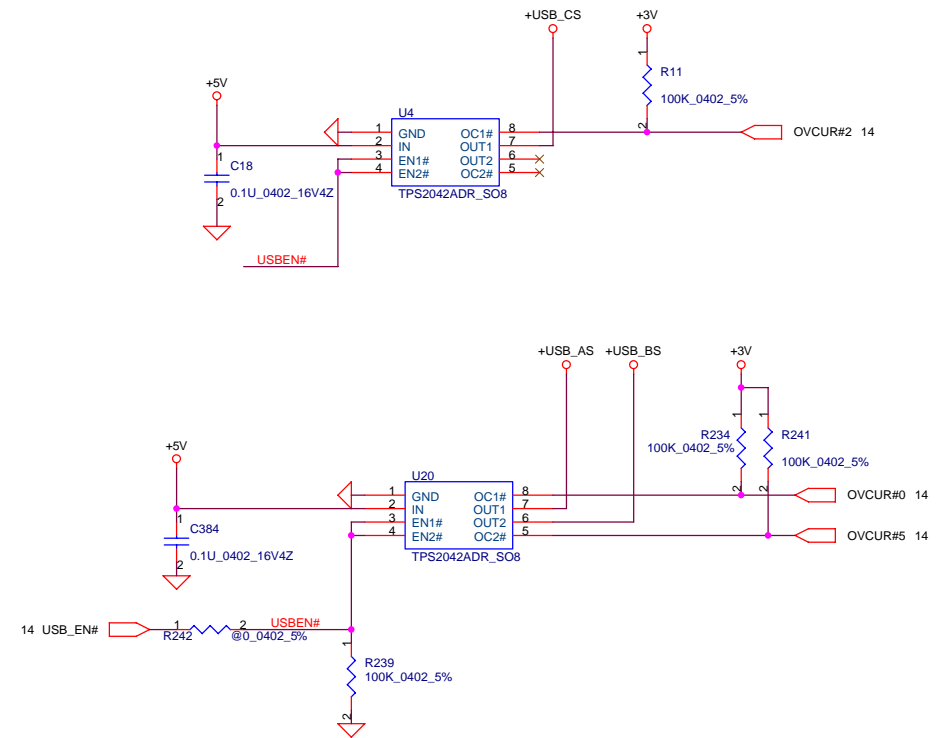




FIR Module



SD/MODE: SHUTDOWN MODE, HIGH ACTIVE
MODE: HIGH/LOW SPEED SELECT

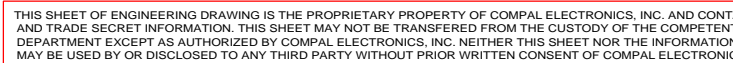


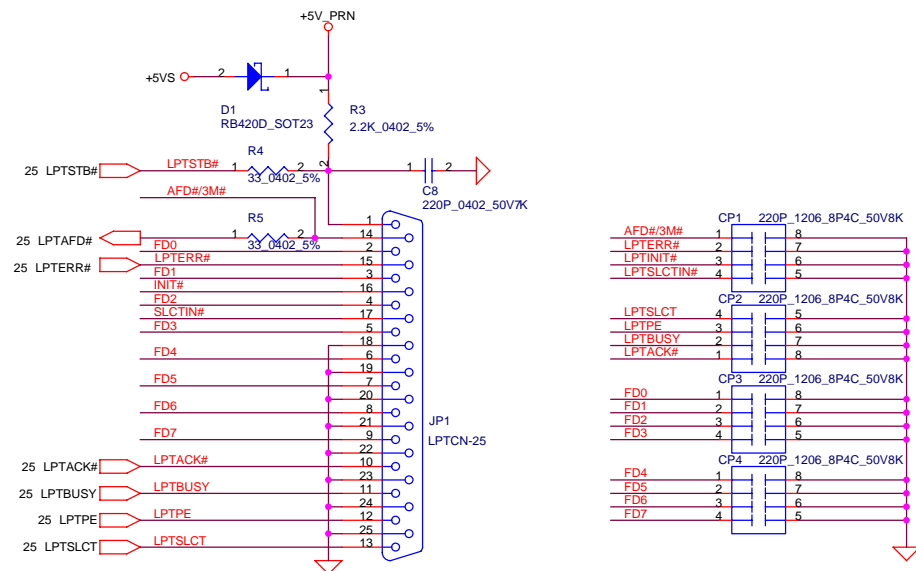
Compal Electronics, Inc.	
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USB / FIR / TPM	
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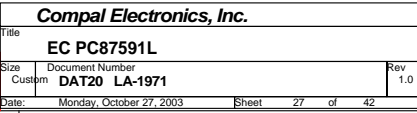


PARALLEL / MDC PORT

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CF2 CF4 CF1 CF3 CF8
SMDC40M80 SMDC40M80 SMDC40M80 SMDC40M80 SMDC40M80

CF15 CF5 CF6 CF9 CF12
SMDC40M80 SMDC40M80 SMDC40M80 SMDC40M80 SMDC40M80

CF11 CF14 CF13 CF16
SMDC40M80 SMDC40M80 SMDC40M80 SMDC40M80

FD1 FD2 FD3
FIDUCAL FIDUCAL FIDUCAL

FD4 FD5 FD6
FIDUCAL FIDUCAL FIDUCAL

H4 H3 H9 H22 H19
H_S315D138 H_S315D138 H_S315D138 H_S315D138 H_S315D138

H17 H21 H15 H14
H_S315D138 H_S315D138 H_S315D138 H_S315D138

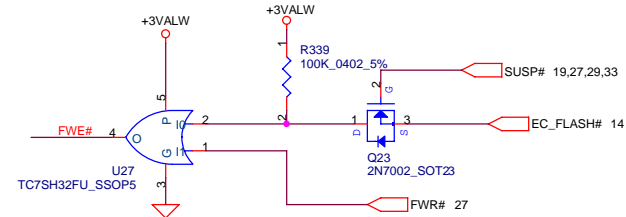
H1 H2 H8 H10
H_S315D165 H_S315D165 H_S315D165 H_S315D165

H6 H7 H11 H12
H_C354D165 H_C354D165 H_C354D165 H_C354D165

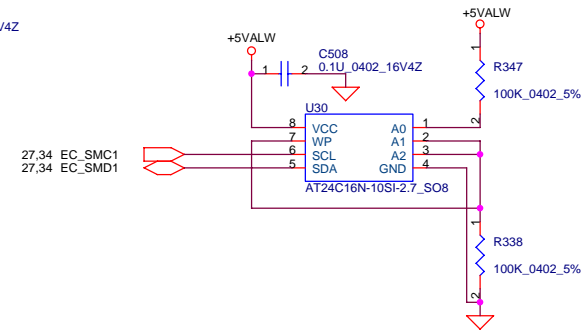
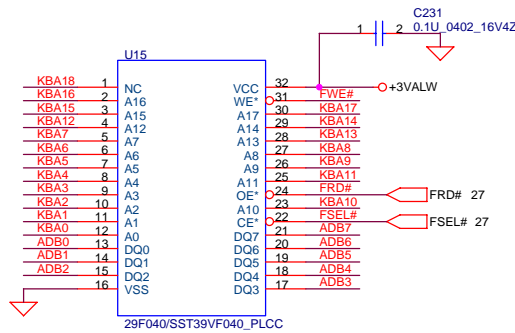
H18 H16 H20
H_C276D142 H_C256D165 H_R386X189D307X110

H13 H5
H_S315D138 H_S394D165

H24 H23
H_O292X55D272X35 H_O174X55D154X35



27 KBA[0..18] KBA[0..18]
27 ADB[0..7] ADB[0..7]



Compal Electronics, Inc.

BIOS & EXT. I/O PORT

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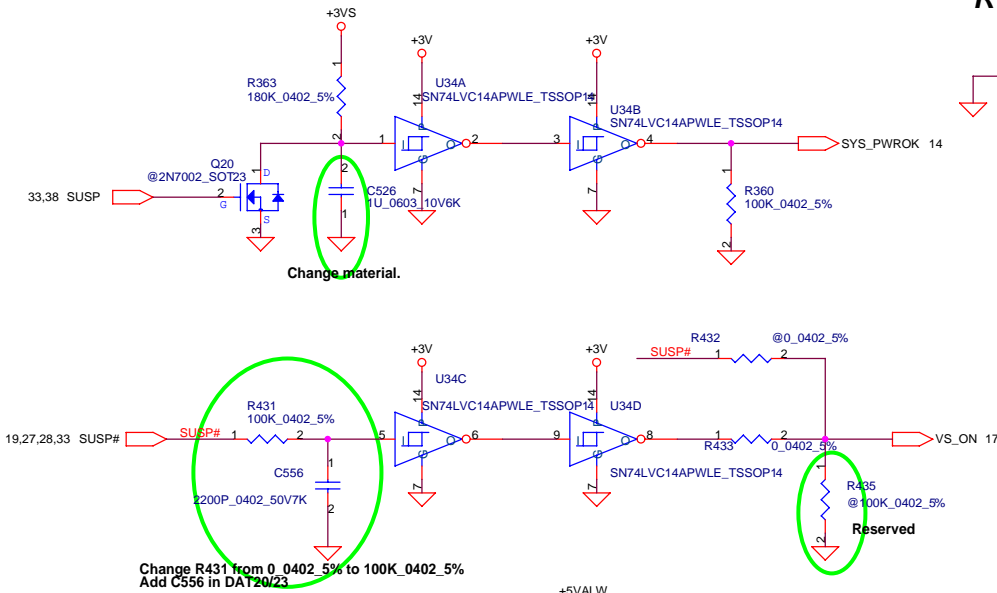
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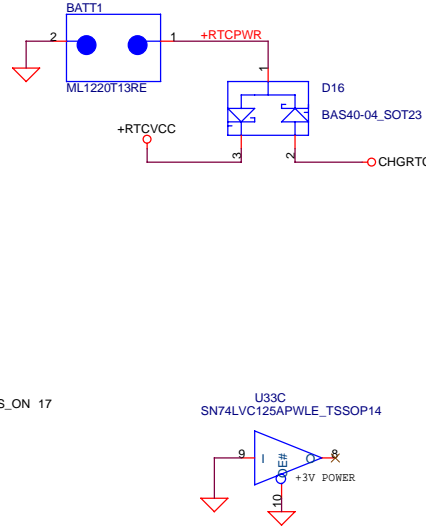
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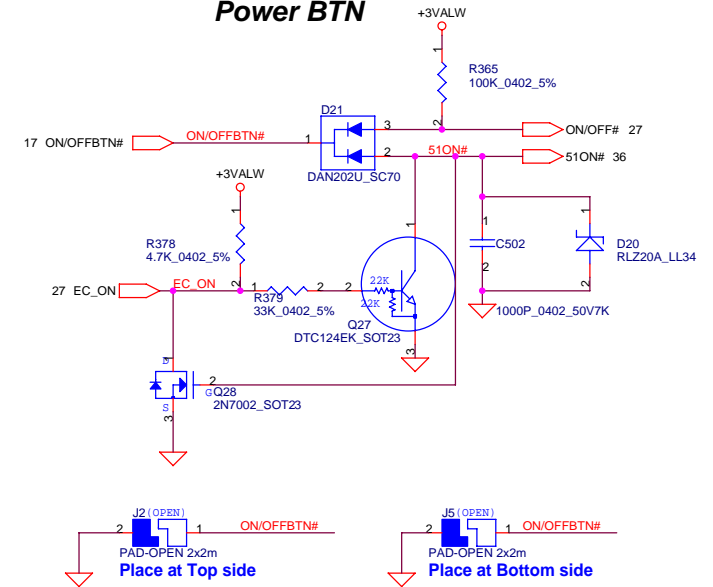
Power ON Circuit



RTC Battery

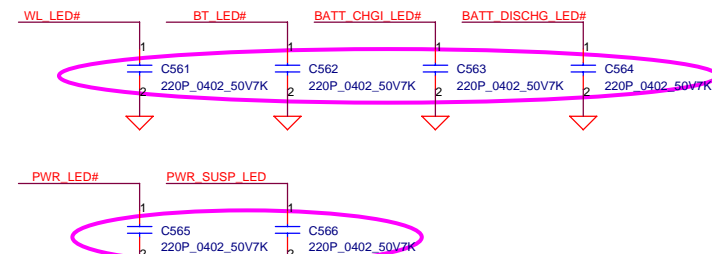
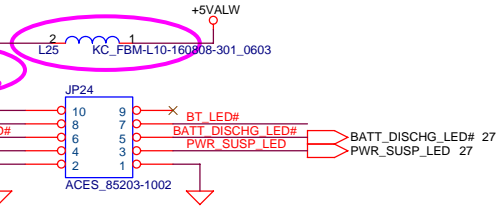


Power BTN

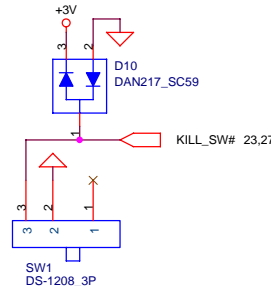


LED INDICATOR	C38	30
PWR	Blue	Green
PWR_SUSP	AMB	AMB
BATT_CHGI	Blue	Green
BATT_DISCHG	AMB	AMB
WL_LED	Blue	Green
BT_LED	AMB	AMB
SD_LED	None	Green

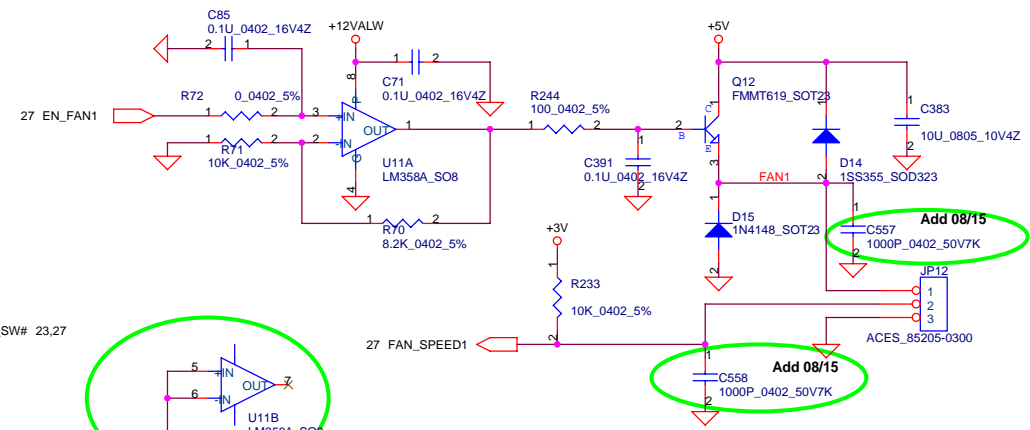
LED/B Connector



KILL_Switch



Fan Control circuit



Compal Electronics, Inc.

Power OK/Reset/RTC battery

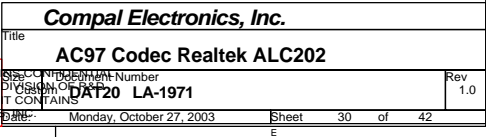
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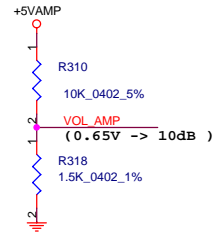
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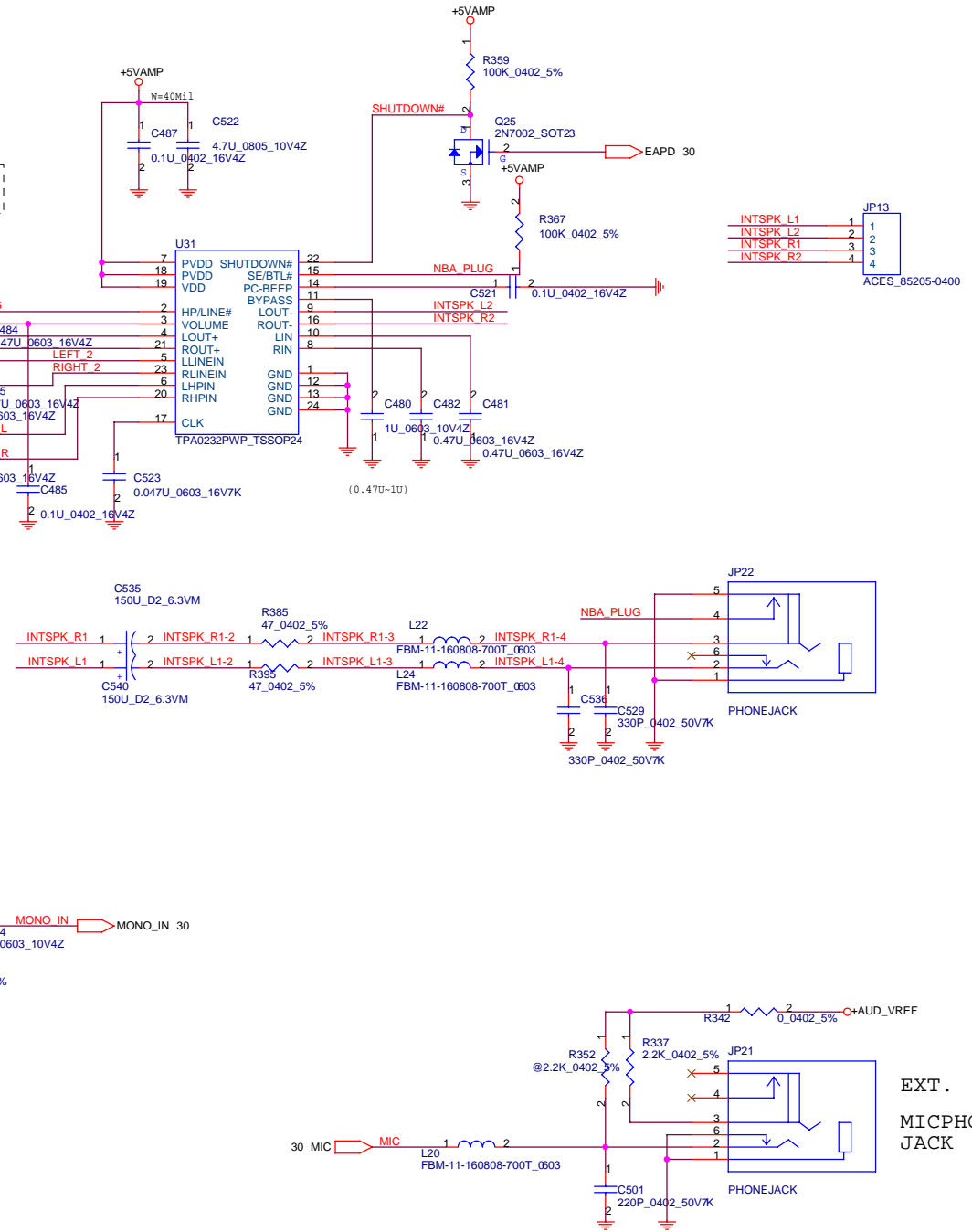
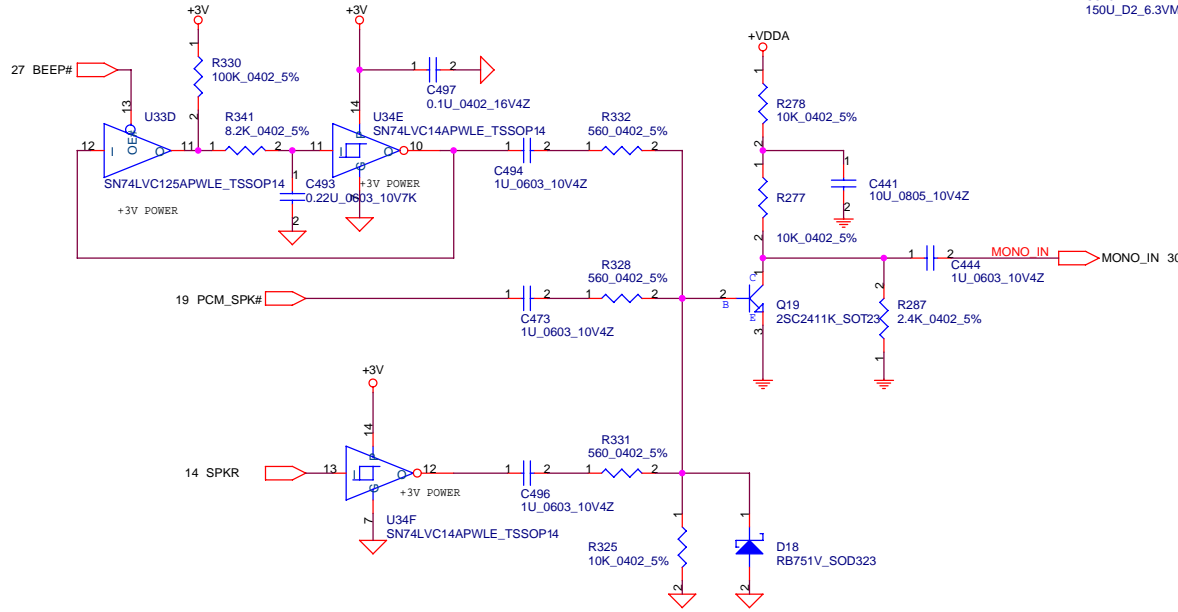
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Pin 2 HIGH PIN 6,20 ACTIVE
LOW PIN 5,23 ACTIVE



Delete C476 & C531

Delete R319 & R371



Compal Electronics, Inc.

Power OK/Reset/RTC battery/Lid Switch/Int. KB

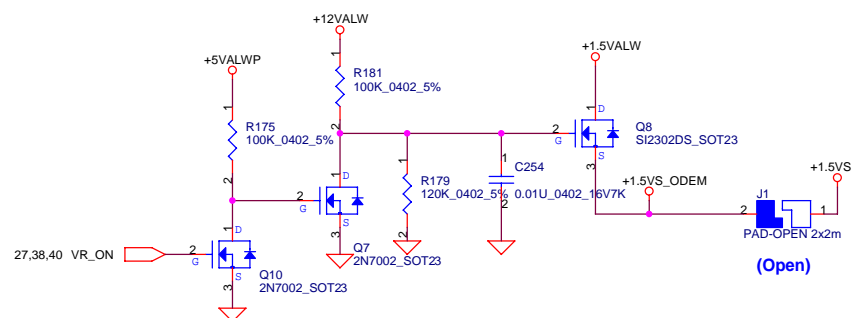
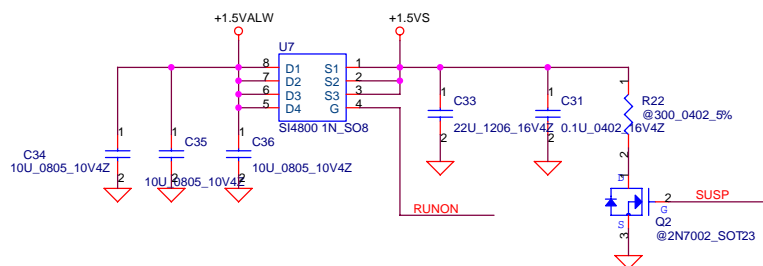
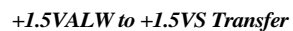
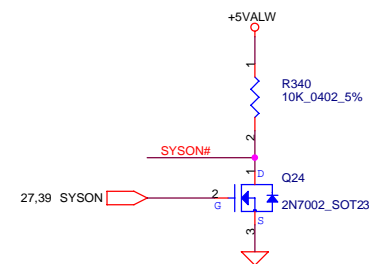
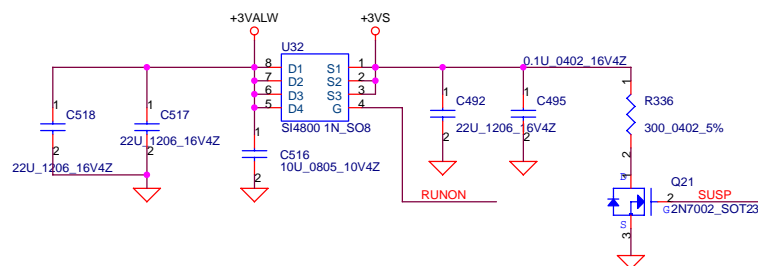
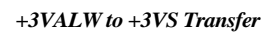
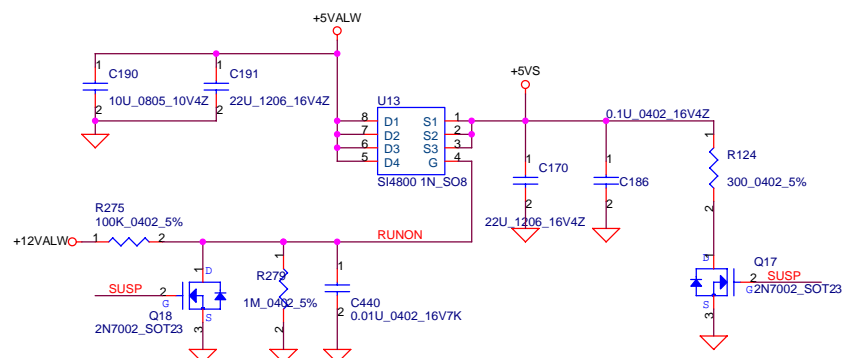
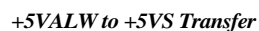
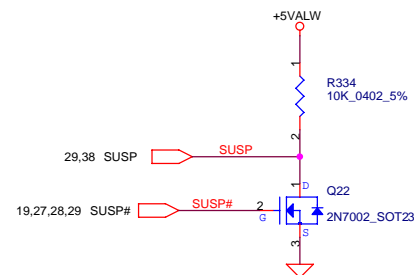
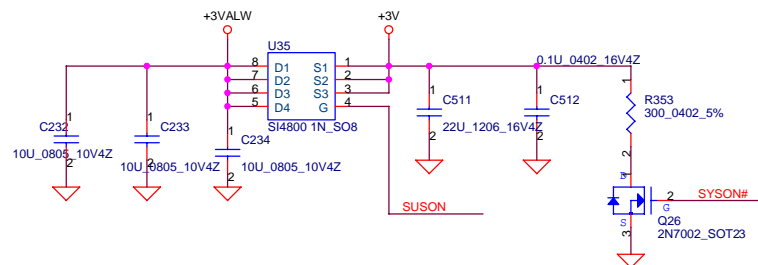
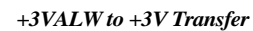
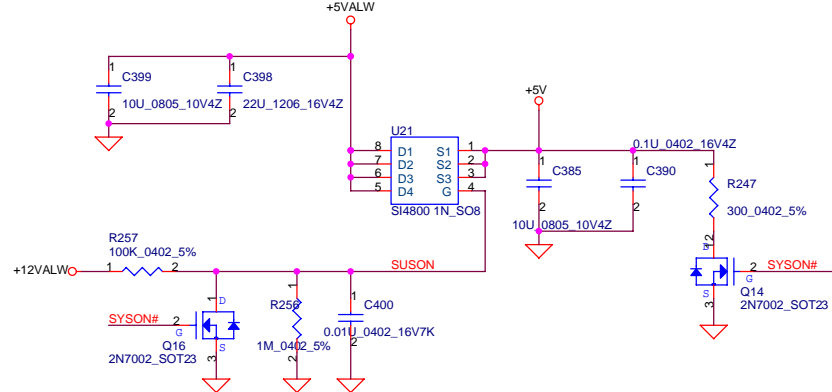
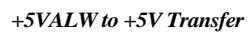
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Compal Electronics, Inc.

DC/DC Circuit Interface

CONFIDENTIAL Number
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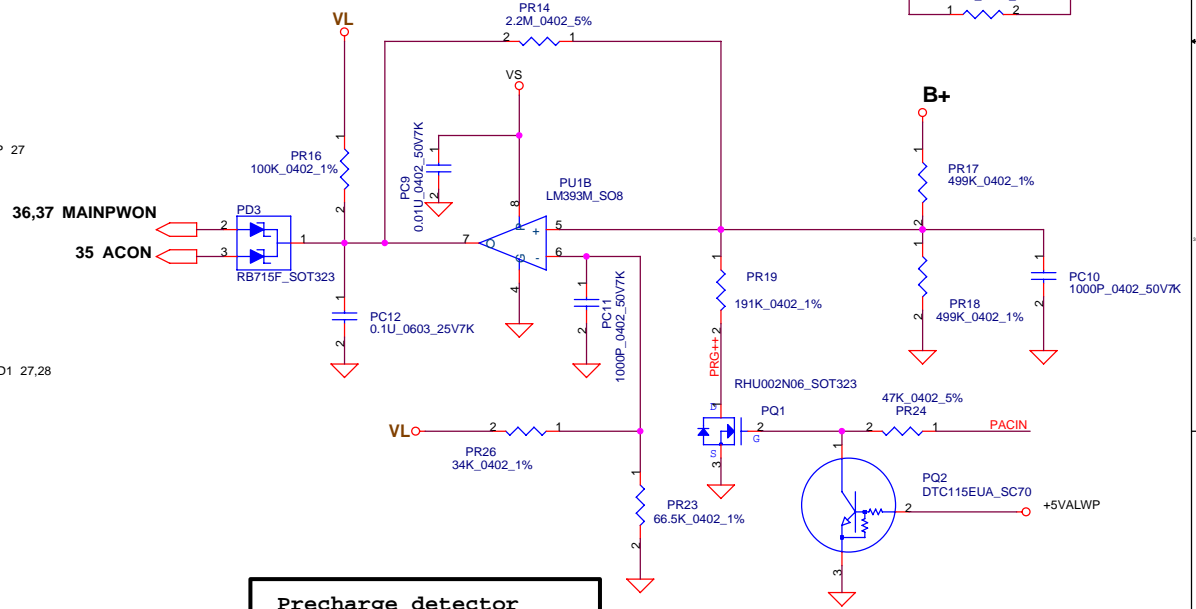
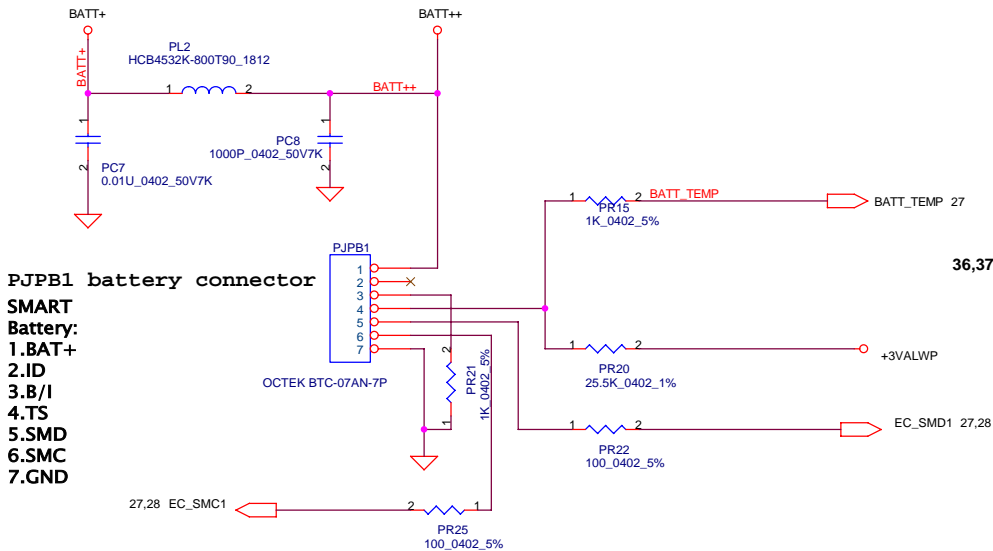
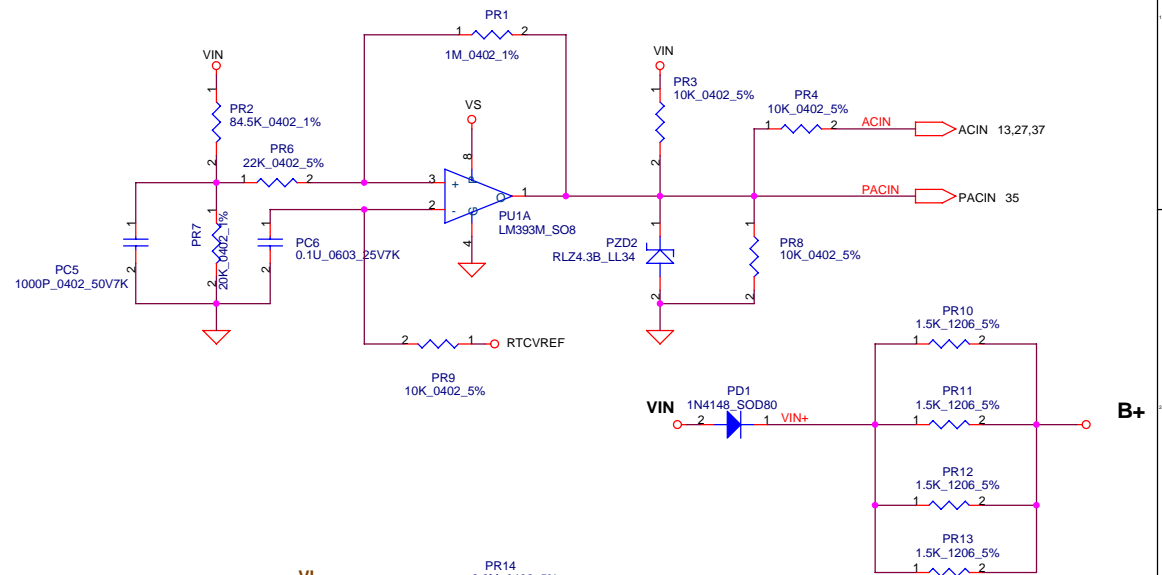
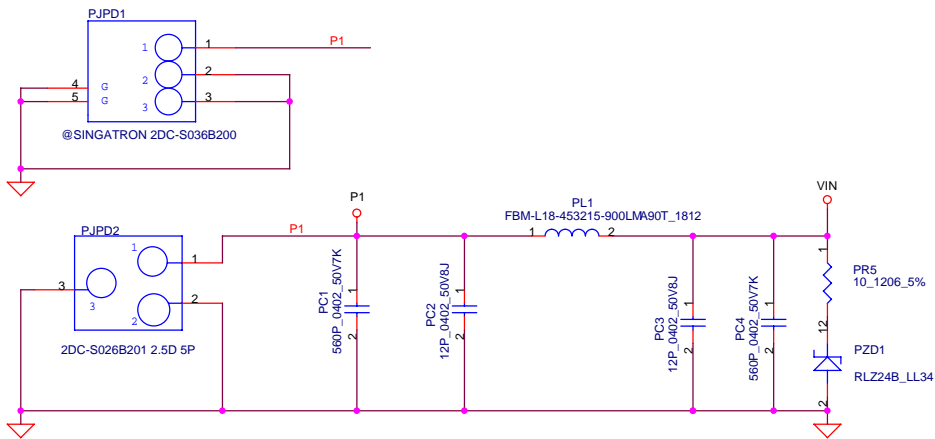
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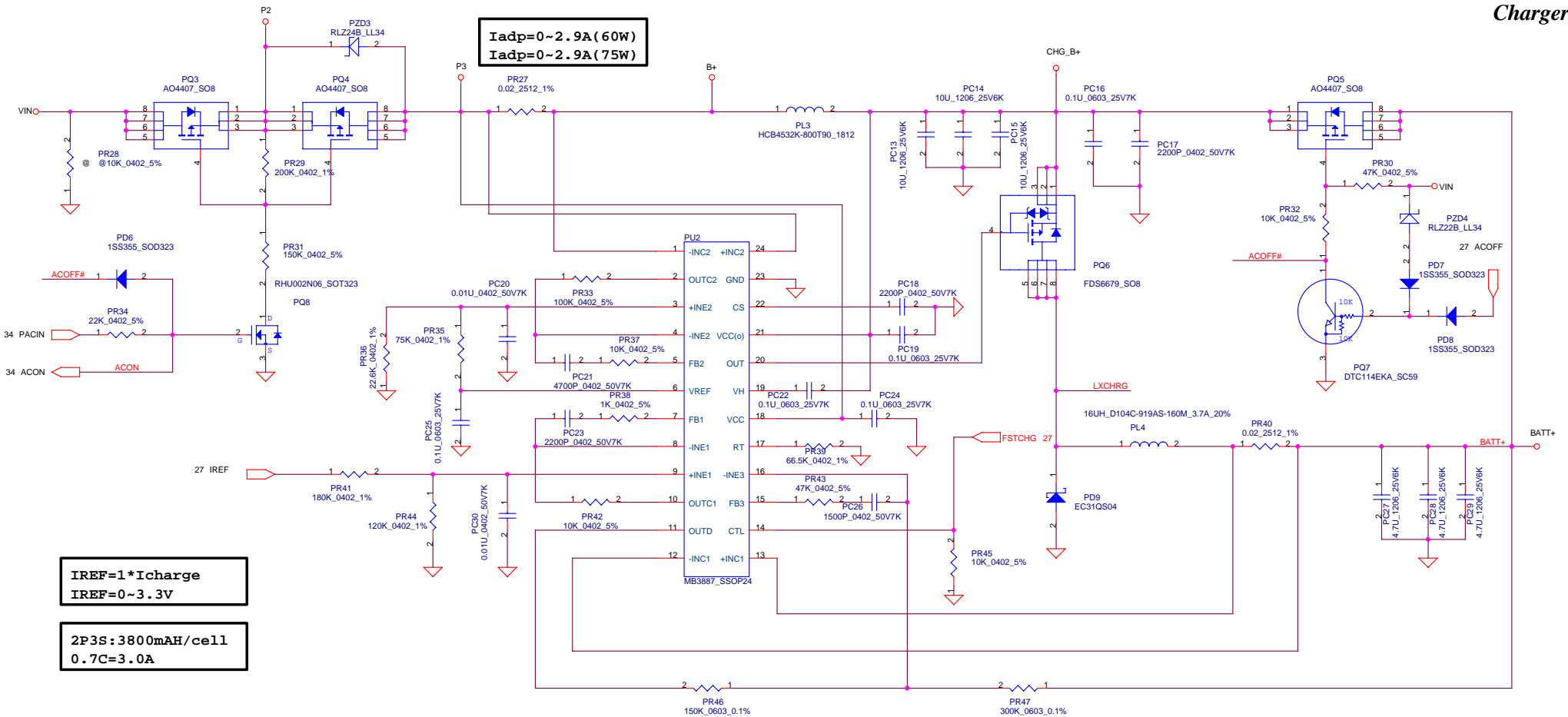
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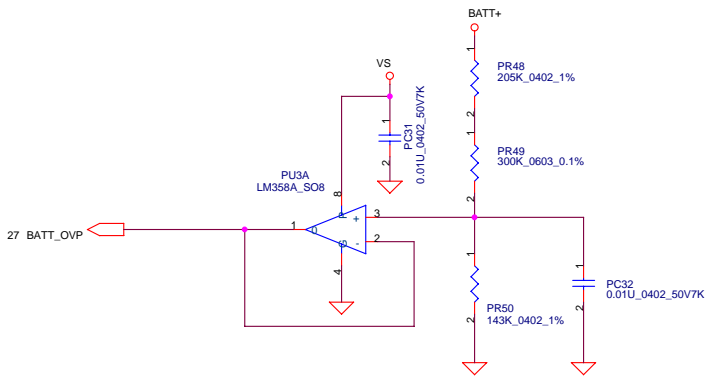
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Charge voltage
3S CC-CV MODE : 12.6V

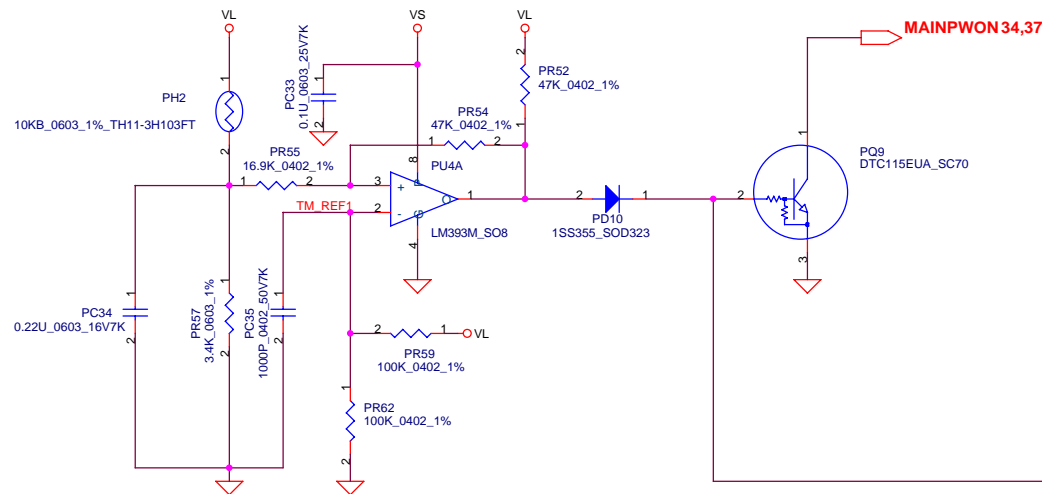
OVP voltage :
LI-3S :12.9V----BATT-OVP=2.84V
BATT-OVP=0.2206*BATT+



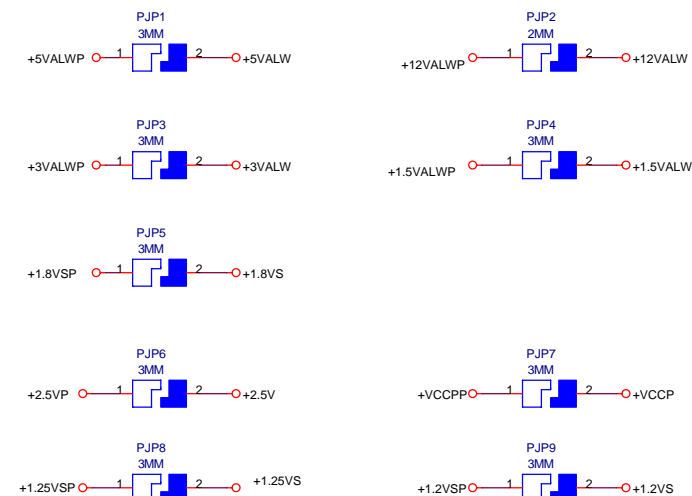
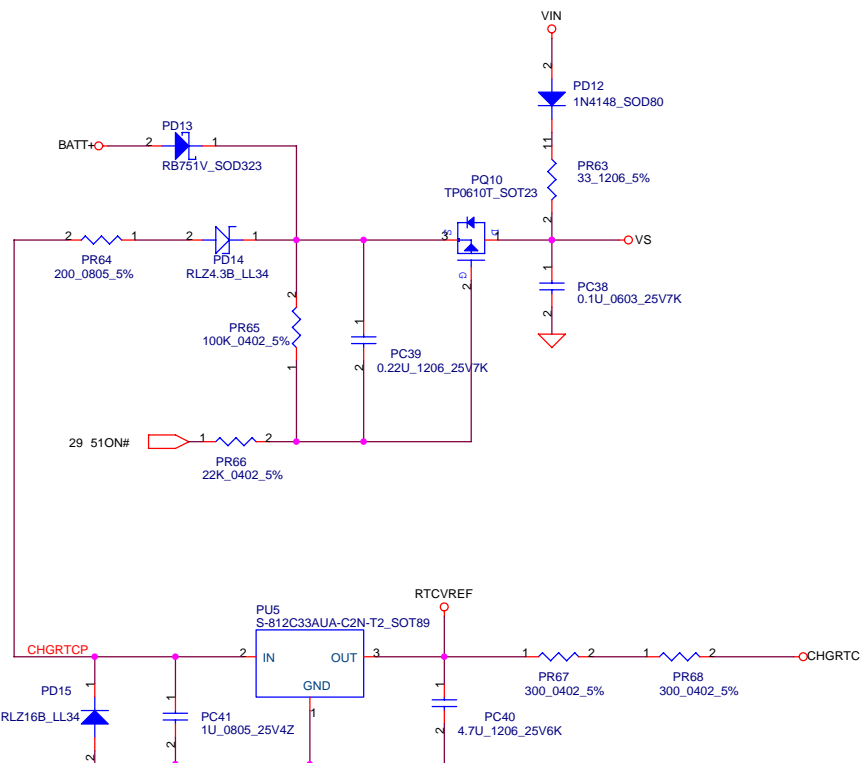
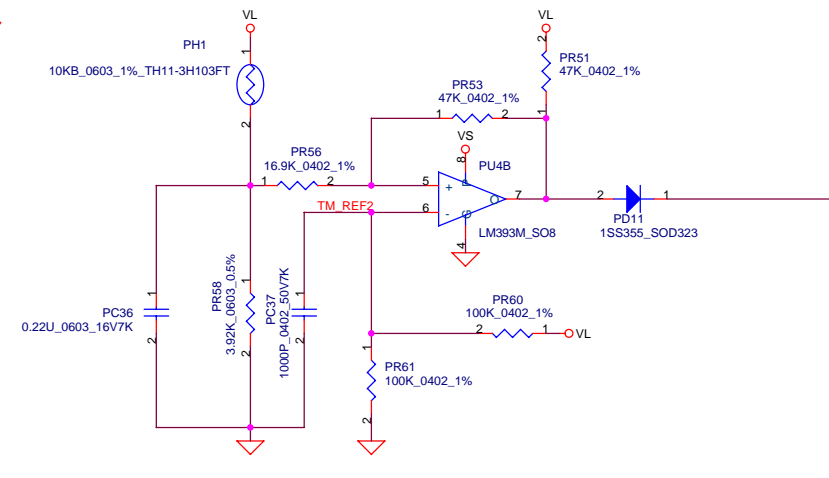
Compal Electronics, Inc.			
Charger			
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CPU thermal protection at 85 degree C
Recovery at 44(45) degree C

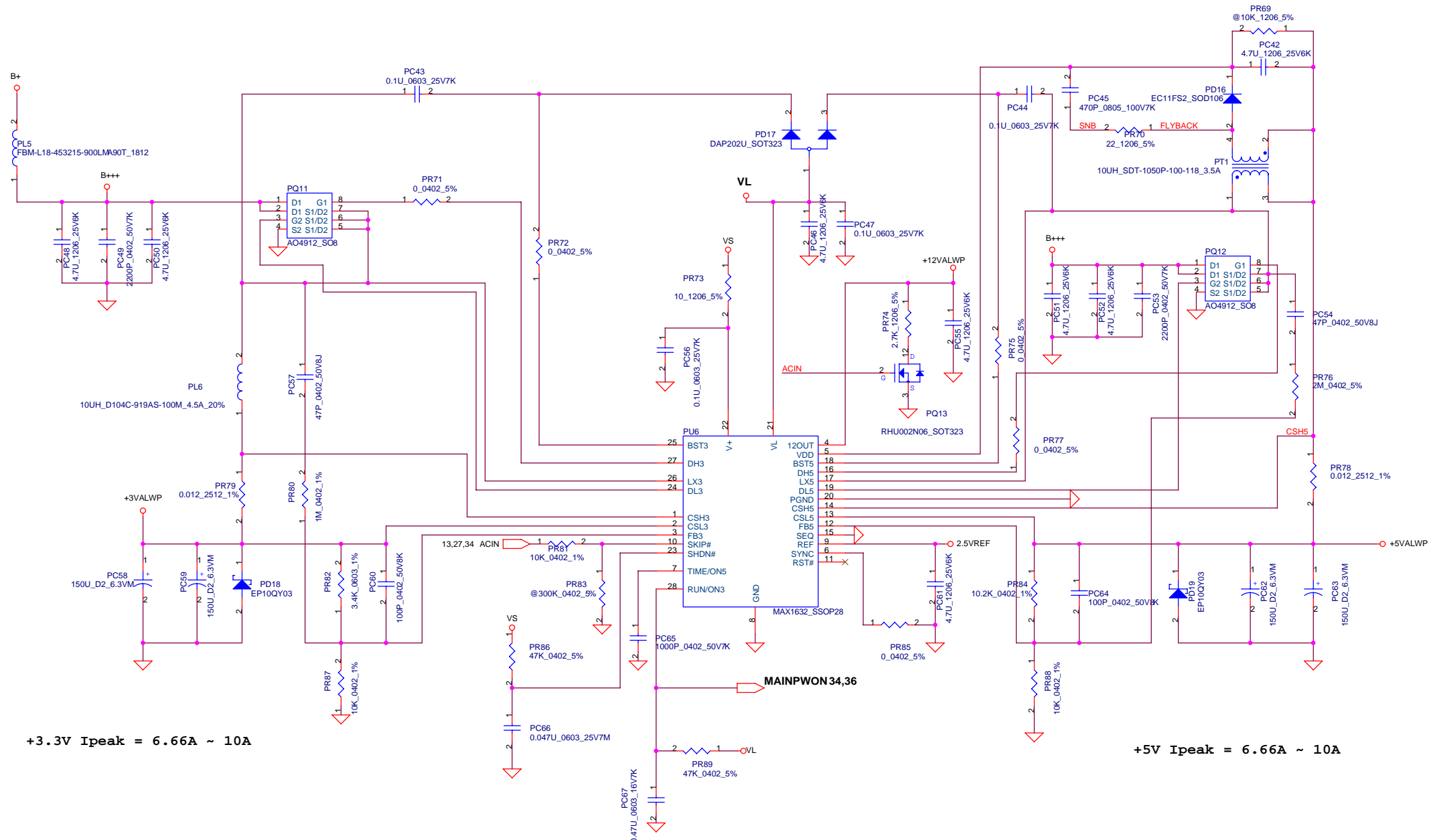


BAT. thermal protection at 78 degree C
Recovery at 39(40) degree C



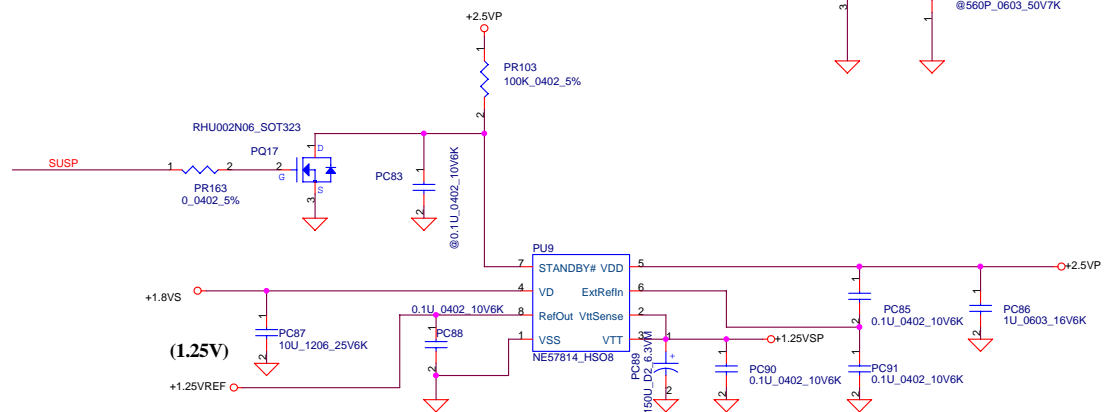
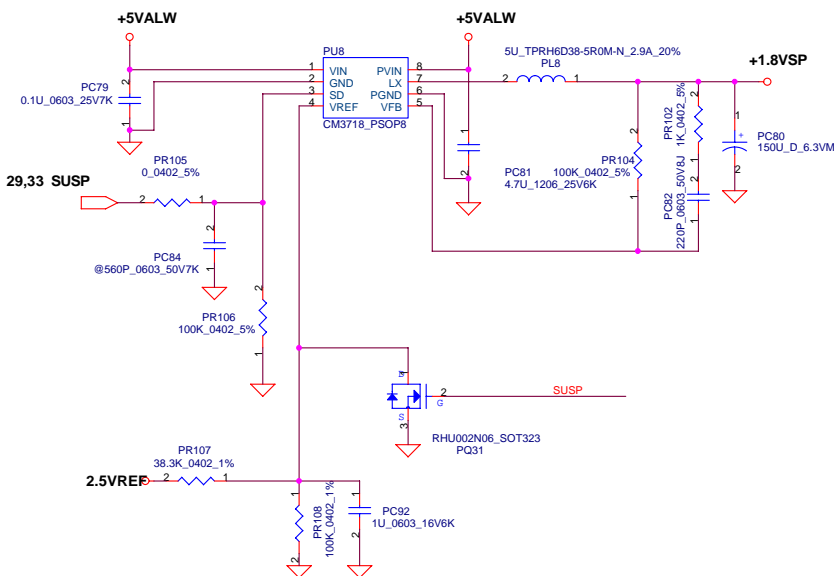
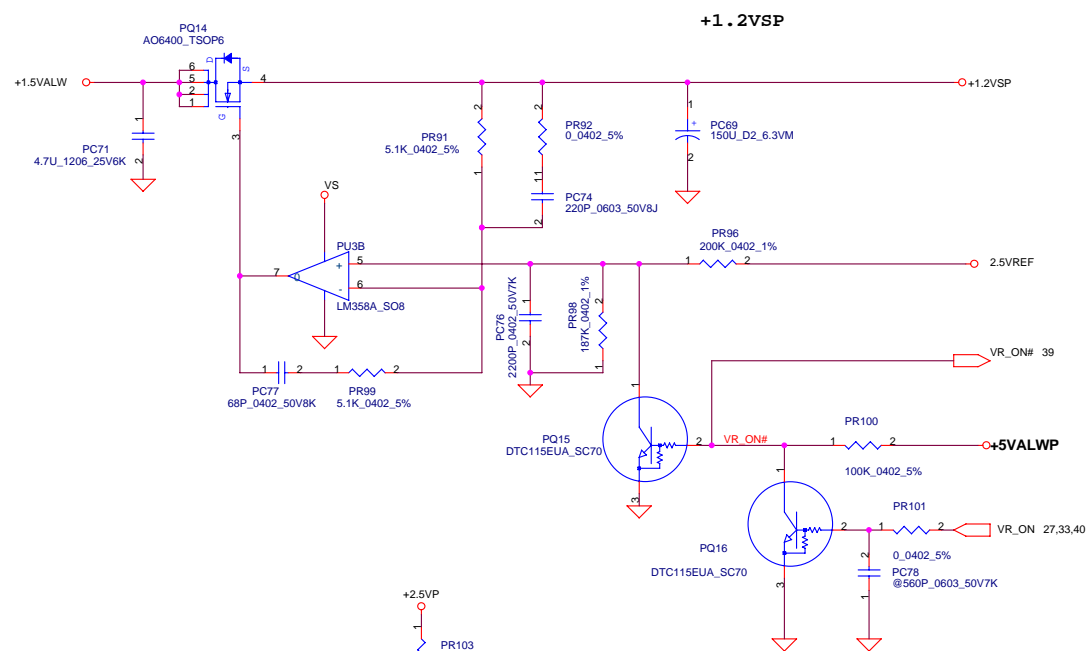
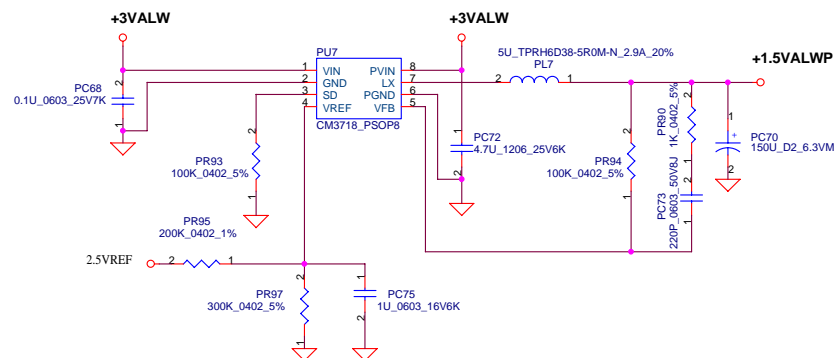
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Title			
RTC Battery & OTP			
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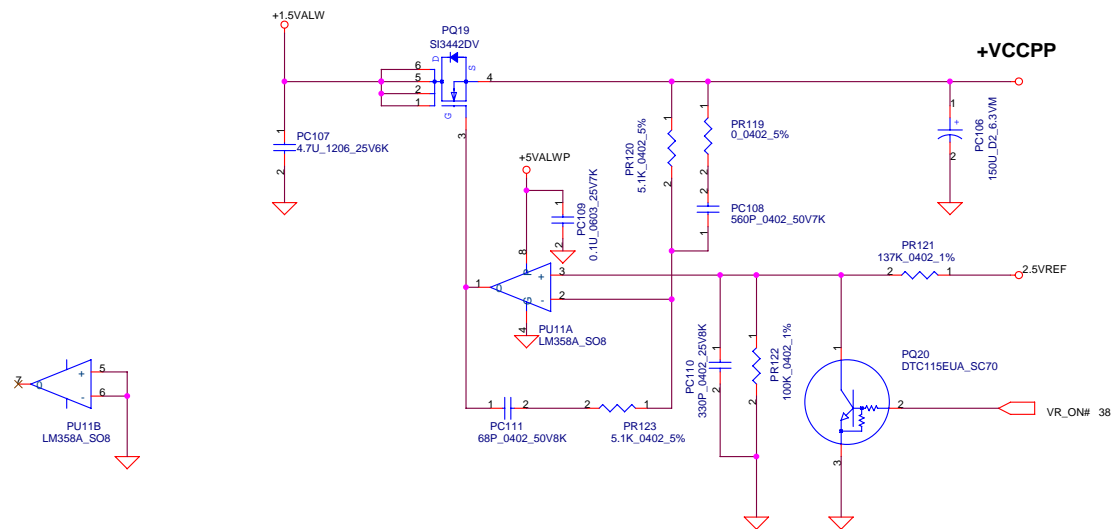
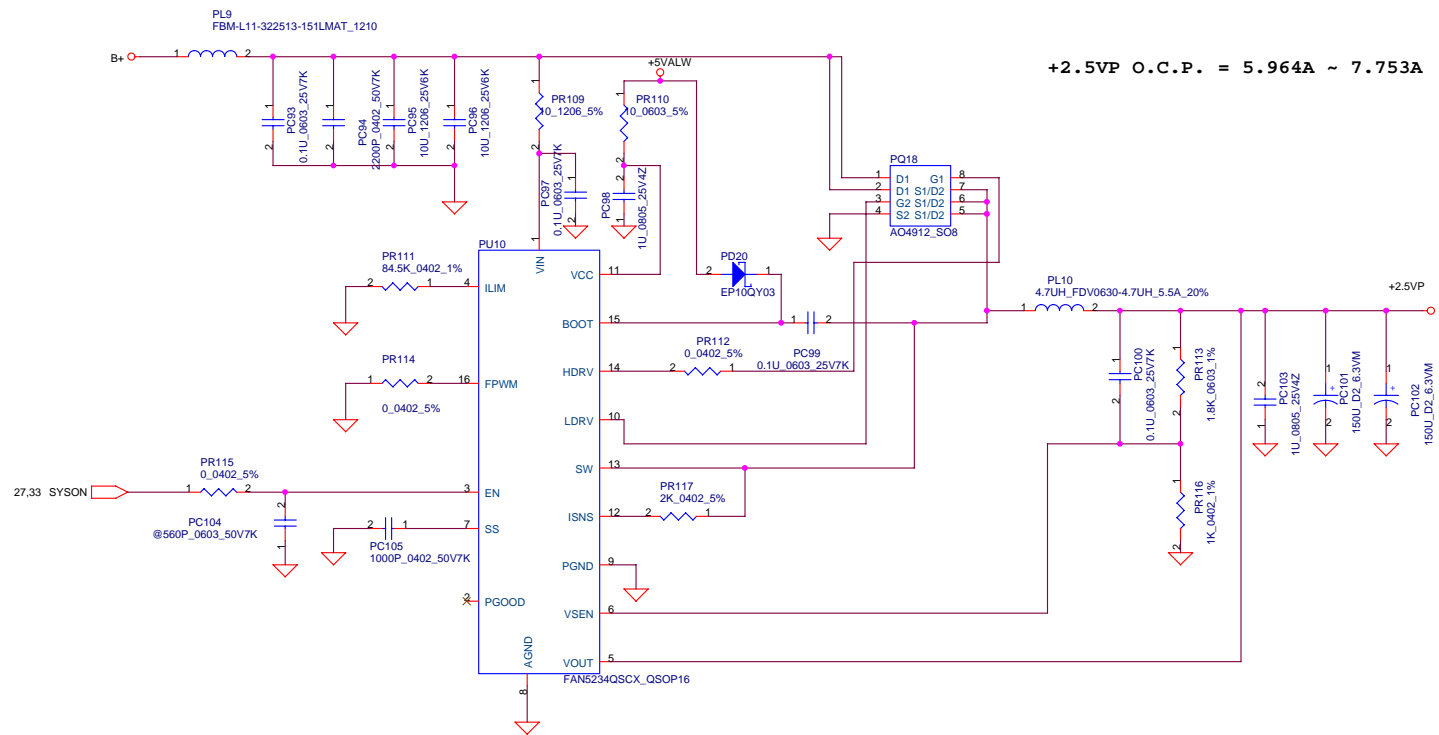
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Compal Electronics, Inc.			
Title			
+5VALWP / +3VALWP / +12VALWP			
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Compal Electronics, Inc.			
Title	+1.8VSP & +1.25VSP & 1.5VALWP & +1.2VSP		
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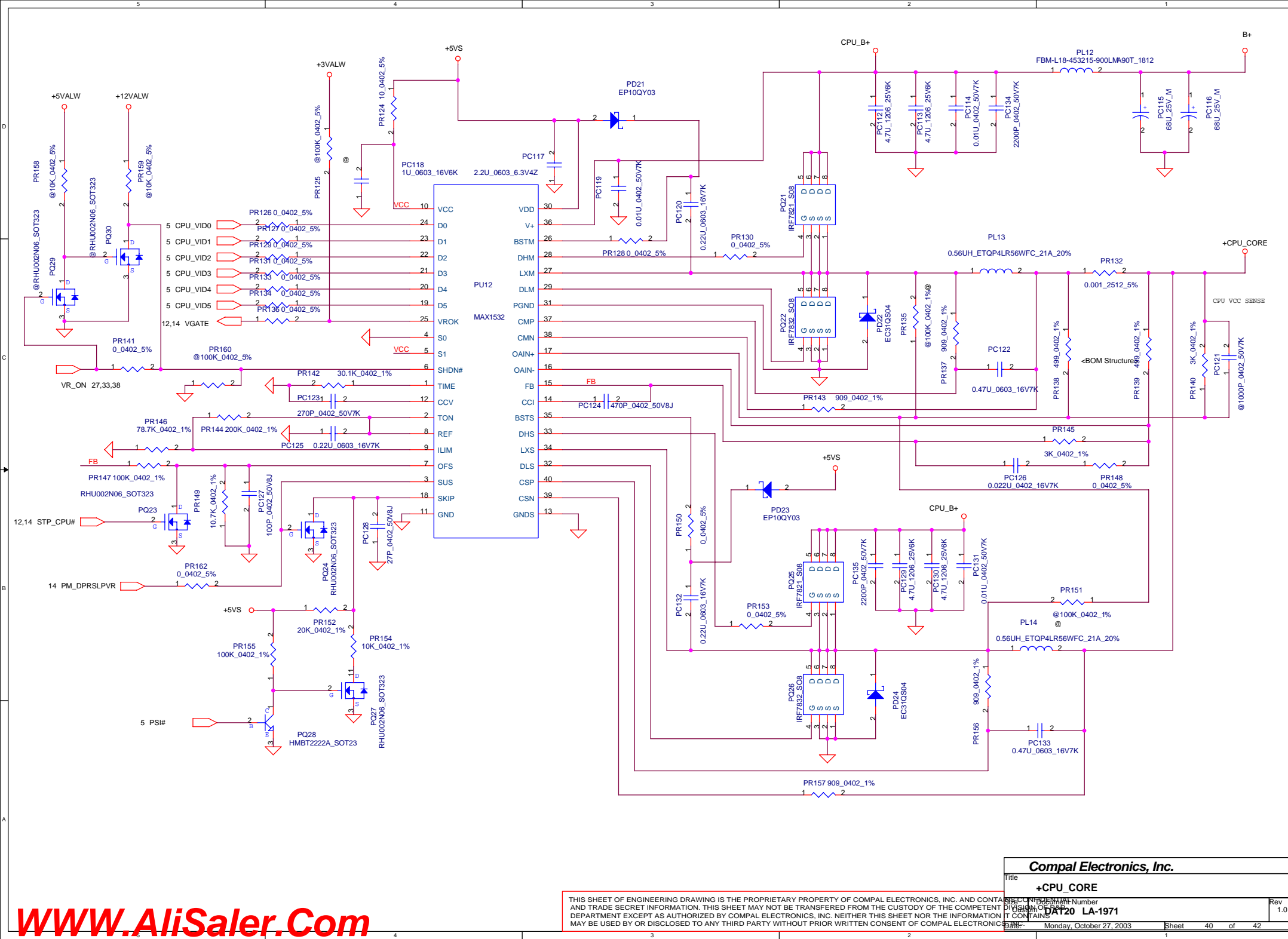


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Compal Electronics, Inc.

DDR +2.5VP & VCCPP

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DAT20 PIR LIST

HW PIR LIST

EVT -> DVT

[Page 7 & 9] Change Material R33, R34, R200, R201 (75_0603_1%)

[Page 14] Change Material R38 (20_0603_1%)

[Page 16] Change Material U40

[Page 24] Modify R374 connected from +3VALW to +3V & delete R384 (Remove TPM detect function)

[Page 25] Delete RP65 & R260 which reserved for LPC47N227

[Page 26] Change SLCTIN# connection.

[Page 27] Change R308 from 0_0402_5% to 8.2K_0402_5% for DVT test AD_BID0

[Page 29] Change material for C526 from 1U_0603_10V4Z to 1U_0603_10V6K
 Add C556 2200P_0402_50V7K
 Add C557, C558 1000P_0402_50V7K

[Page 30] Add L10
 Change C84 from 4.7U_0805_10V4Z to 10U_0805_10V4Z
 Add C555 10U_0805_10V4Z
 Delete C184, C179 1U_0603_10V4Z

[Page 32] R156 from 390_0402_5% to 360_0402_5%

[Page 27] R409 from 10K_0402_5% to 47K_0402_5% & add C559 0.1U_0402_16V4Z

DVT -> PVT

[Page 12] Delete C70, C80, C166, C167, C168

[Page 24] Delete R2 (Reserved for FIR)

[Page 31] Delete C476, C531, R319, R371 AudioHigh pass filter.

PVT -> MP

[Page 12] Add C160, C161 5.6PF_0402_50V8D

[Page 19] Delete R329

[Page 25] Delete R63

[Page 27] Add R438

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Title			
DAT20 PIR LIST			
SHEET NUMBER			
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CUSTOMER			
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Version change list (P.I.R. List)

Page 1 of 1

Item	Fixed Issue	Reason for change	Rev.	PG#	Modify List	B.Ver#	Phase
1	M/B cannot power on.	RC delay time is not enough of Max1632 on3 pin.	0.2	34	1.Change PC67 from 0.047U_0805_10V6K to 0.47U _16V K X7R 0603.	0.2	DVT
2	Layout symbol error.	Layout symbol error.	0.2	37	1.Change PR26 PCB footprint from R_0603 to R_0402.	0.2	DVT
3	Layout symbol error.	Layout symbol error.	0.2	40	1.Change PD22 from EP10QY03 to EP31QS04.	0.2	DVT
4	System cannot re-start and Windows fail when into C4.	The CPU cannot into skip mode,happen the OVP when C4.	0.2	40	Swap the PR154 and PR155.	0.2	DVT
5	Rating not enough.	Rating not enough.	0.2	34	1.Change PC66 from 0.047U_00603_16V7K to 0.047U_00603_25V7M.	0.2	DVT
6.	Rating is not enough.	Surge power rating concerned.	0.2	39	1.Change PR109 from 10_0603 to 10_1206.	0.2	DVT
7.	Change size.	Change size.	0.2		1.Change PR149,PR44,PR48,PR82,PR36,PR107,PR39,PR121, PR140,PR145 and PR146 from 0603 to 0402.	0.2	DVT
8.	Change size.	Change size.	0.2		1.Change PC114,PC131,PC49,PC21,PC53,PC128,PC126,PC124,PC31, PC7 and PC9 from 0603 to 0402.	0.2	DVT
9.	Change size.	Change size.	0.2		1.Change PC56,PC24,OC38,PC100,PC16 and PC19 from 0805 to 0603.	0.2	DVT
10.	Choke rating is not enough.	Charge current power rating concerned.	0.2	35	1.Change PL4 from 22UH to 16UH.	0.2	DVT
11.	Appication of CM3718 has overshoot issue during system on.	Charge control signal SHDN# to reference.	0.2	38	1.Add PQ31.	0.2	DVT
12.	EMI issue of charger.	EMI issue of charger.	0.3	35	1.Change PQ6 from AO4407 to FDS6679. Add the PR164 on GATE pin of PQ6.	0.3	PVT
13.	EMI issue of CPU_CORE.	EMI issue of CPU_CORE.	0.3	40	1.Change PQ21 and PQ25 from IRF7821 to IRF7811A. Add the 2200P on PC134 and PC135.	0.3	PVT
14.							

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Title

PWR-PIR

S&C Control Number

DAT20 LA-1971

Rev

1.0

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