

# Compal Confidential

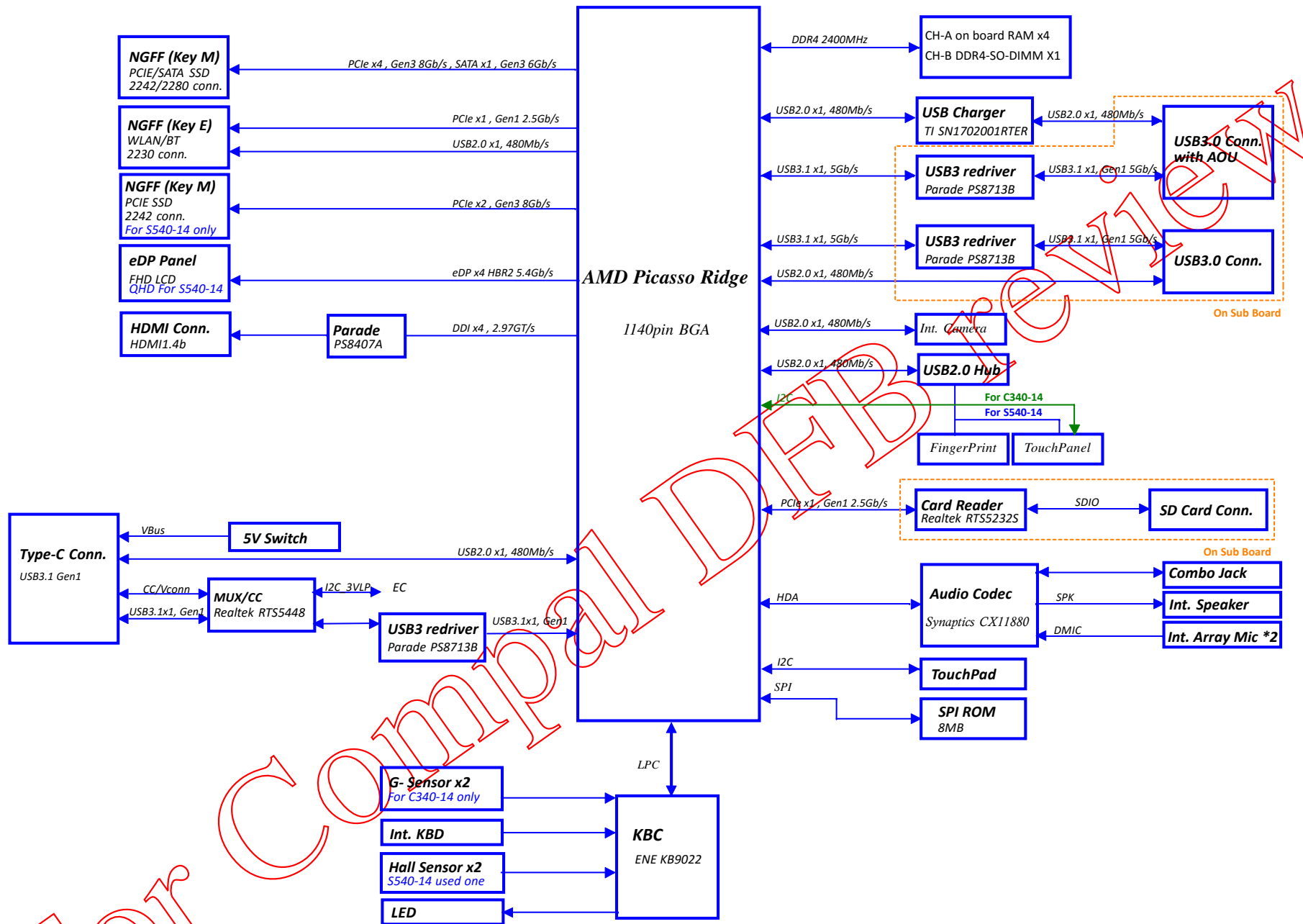
## M/B Schematics Document

### AMD Picasso FP5 APU with DDR4

EL4C2/EL452  
LA-H091P

Rev : 1.0  
2018-12-20

Security Classification	Compal Secret Data			Compal Electronics, Inc.		
Issued Date	2018/08/24	Deciphered Date	2018/05/25	Title		
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				Rev. 1.4	

Voltage Rails

Power Plane	Description	S0	S3	S5
VIN	Adapter power supply	ON	ON	ON
B+	AC or battery power rail for power circuit.	ON	ON	ON
+APU_CORE	Core voltage for APU	ON	OFF	OFF
+APU_CORE_SOC	Core voltage for APU	ON	OFF	OFF
+RTC_APU	RTC power	ON	ON	ON
+3VALW	3.3V always on power rail	ON	ON	ON
+3VS	3.3V 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
+0.8VALW	0.95V always on power rail	ON	ON	ON
+0.8VS	0.95V switched power rail	ON	OFF	OFF
+1.2V_DDR	1.2V power rail for APU and DDR	ON	ON	OFF
+2.5V_MEM	2.5V power rail for DDR	ON	ON	OFF
+0.6VS_VTT	0.6V switched power rail for DDR terminator	ON	OFF	OFF
+5VALW	5V always on power rail	ON	ON	ON
+5VS	5V switched power rail	ON	OFF	OFF

SMBUS Control Table

	SOURCE	APU	BATT	KB9022	SODIMM	WLAN	G-sensor	THM-sensor
EC_SMB_CK1 EC_SMB_DA1	KB9022 +3VALW	X	V +3VALW	V +3VALW	X	X	X	X
EC_SMB_CK2 EC_SMB_DA2	KB9022 +3VS	V +1.8VS	X	V +3VALW	X	X	X	V +3VS
EC_SMB_CK4 EC_SMB_DA4	KB9022 +3VS	X	X	X	X	X	V +3VS	X

EC SM Bus1 address

Device	Address	HEX
Smart Battery	0001 011x b	16H
Charger	0001 0010 b	12H

EC SM Bus2 address

Device	Address	HEX
APU	1001 100X b	98H
G-SEN (M/B)	0001 1000 b	18H
G-SEN (S/B)	0001 1001 b	19H
Thermal sensor	1001 101x b	9AH

APU I2C Bus address

Port	Device	Address	HEX
I2C 1	G-sensor (Reserve)		
I2C 2	DDR so-DIMM	1010 001Xb	A2H
	Touch Panel (Wacom)		0X0A
I2C 3	Touch Pad (Synaptics)		\$2C
	Touch Pad (Elan)		0X15
	G-sensor		

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

CPU

UC1  
SA0000C7640  
S IC RYZEN7 YM3700C4T4MFG 2.2G BGA 1140 APU  
APU\_R7@  
UC1  
SA0000CCR20  
S IC RYZEN5 YM3500C4T4MFG 2G BGA 1140 APU  
APU\_R5@

PCB

ZZZ  
DA8001H5010  
PCB 2GB LA-H091P REV1 M/B 3, A,2  
ZZZ 45@  
RO0000003HM  
HDMI Logo

EMC X4E

ZZZ  
X4EAF738L51  
SMT EMC FOR EE AH091 EL452  
X4EUMA@

DDR X76

ZZZ  
K7680638L51  
Hynix 1G onboard RAM  
X76DDR4H@  
ZZZ  
K7680638L52  
Micron 1G onboard RAM  
X76DDR4M@  
ZZZ  
K7680638L53  
Samsung 1G onboard RAM  
X76DDR4S@

BOM Structure Table

BOM Structure	Item	BOM Structure	Item
RAVEN7@	RAVEN7 CPU	X76GL@	O2 Card Reader
RAVEN5@	RAVEN5 CPU	X76RT@	Realtek Card Reader
RAVEN3@	RAVEN3 CPU	HDT@	For HDT Device used
X76DDR4H@	Onboard RAM HYNIX	FP@	Finger Print Component
X76DDR4M@	Onboard RAM MICRON	KBL@	Keyboard Backlight
X76DDR4S@	Onboard RAM SAMSUNG	@	Unpop
X76GRAM@	Onboard RAM couple cap	SDP@	SDR SDP Component
X4EUMA@	EMC component for UMA	DDP@	SDR DDP Component
ME@	ME part	C340@	C340 SKU
EMI@	EMI pop component	S540@	S540 SKU
@EMI@	EMI Unpop component	G_SEN@	G-sensor Component
ESD@	ESD pop component	QHD@	QHD panel component
@ESD@	ESD Unpop component	LS@	Level shift Component
20V_PRTCT@	20V protection circuit		
X76_PA@	Pericom USB re-driver		
X76_PE@	Parade USB re-driver		
X76_TI@	TI USB re-driver		
PA@	Pericom USB re-driver couple cap		
PE@	Parade USB re-driver couple cap		
TI@	TI USB re-driver couple cap		
RF@	RF pop component		
@RF@	RF Unpop component		

GPP Port Table

Port	Device
GPP0	CardReader (PCIe)
GPP1	WLAN (PCIe)
GPP2	
GPP3	SSD x 2 (PCIe)
GPP4	
GPP5	SSD x 4 (PCIe)
GPP6	
GPP7	

DisplayPort Table

Port	Device
0	eDP
1	HDMI
3	
2	

USB3.0 Port Table

Port	Device
0	Type C Right
1	USB3.0 Left-1
2	USB3.0 Left-2
3	
4	

USB2.0 Port Table

Port	Device
0	Type C Right
1	USB3.0 Left-1
2	USB3.0 Left-2
3	Camera
4	USB Hub
5	NGFF_BT
4~1	Touch Screen
4~2	Finger Print
4~3	
4~4	

Power Sequence

Boot

Shut  
Down

EC Pin 110 Input

EC Pin 112 Output

AC Plug

EC Pin 114 Input

EC Pin 100 Output

EC Pin 122 Output

EC Pin 123 Input

EC Pin 6 Input

EC Pin 95 Output

EC Pin 116 Output

EC Pin 98 Output

EC Pin 121 Output

EC Pin 32 Output

EC Pin 13 Input

VCIN1\_AC\_IN  
+3VLP  
EC\_ON  
+5VALW  
+3VALW  
3V/5VALW\_PG  
+1.8VALW  
+0.8VALW

ON/OFF#  
EC\_RSMRST#  
RTC\_CLK  
PBTN\_OUT#  
PM\_SLP\_S5#  
PM\_SLP\_S3#  
SYSON  
+2.5V  
+1.2V  
SUSP#  
0.8VS\_PWR\_EN  
+5VS  
+3VS  
+1.8VS  
+0.8VS  
+0.6VS  
VR\_ON  
+APU\_CORE  
+APU\_CORE\_SOC  
VGATE  
PCH\_PWROK  
APU\_PWRGD  
PLT\_RST#  
PCIE\_RST#  
APU\_RST#  
CLK\_PCIE

VCIN1\_AC\_IN  
+3VLP  
EC\_ON  
+5VALW  
+3VALW  
3V/5VALW\_PG  
+1.8VALW  
+0.8VALW

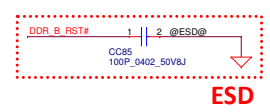
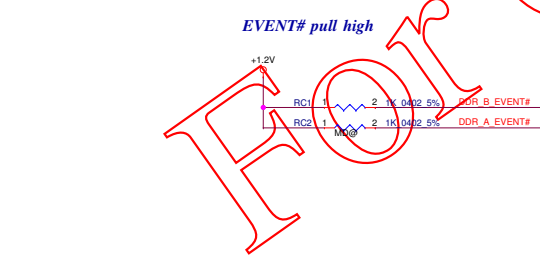
ON/OFF#  
EC\_RSMRST#  
RTC\_CLK  
PBTN\_OUT#  
PM\_SLP\_S5#  
PM\_SLP\_S3#  
SYSON  
+2.5V\_MEM  
+1.2V\_DDR  
SUSP#  
0.8VS\_PWR\_EN  
+5VS  
+3VS  
+1.8VS  
+0.8VS  
+0.6VS  
VR\_ON  
+APU\_CORE  
+APU\_CORE\_SOC  
VGATE  
PCH\_PWROK  
APU\_PWRGD  
PLT\_RST#  
PCIE\_RST#  
APU\_RST#  
CLK\_PCIE

T1\_Min : 10ms  
T2 : 15ms-26ms  
T3 : 30us-64us

T5\_Min : 1ms  
T8 : 15ms-17ms  
T9 : 12ms-14.6ms

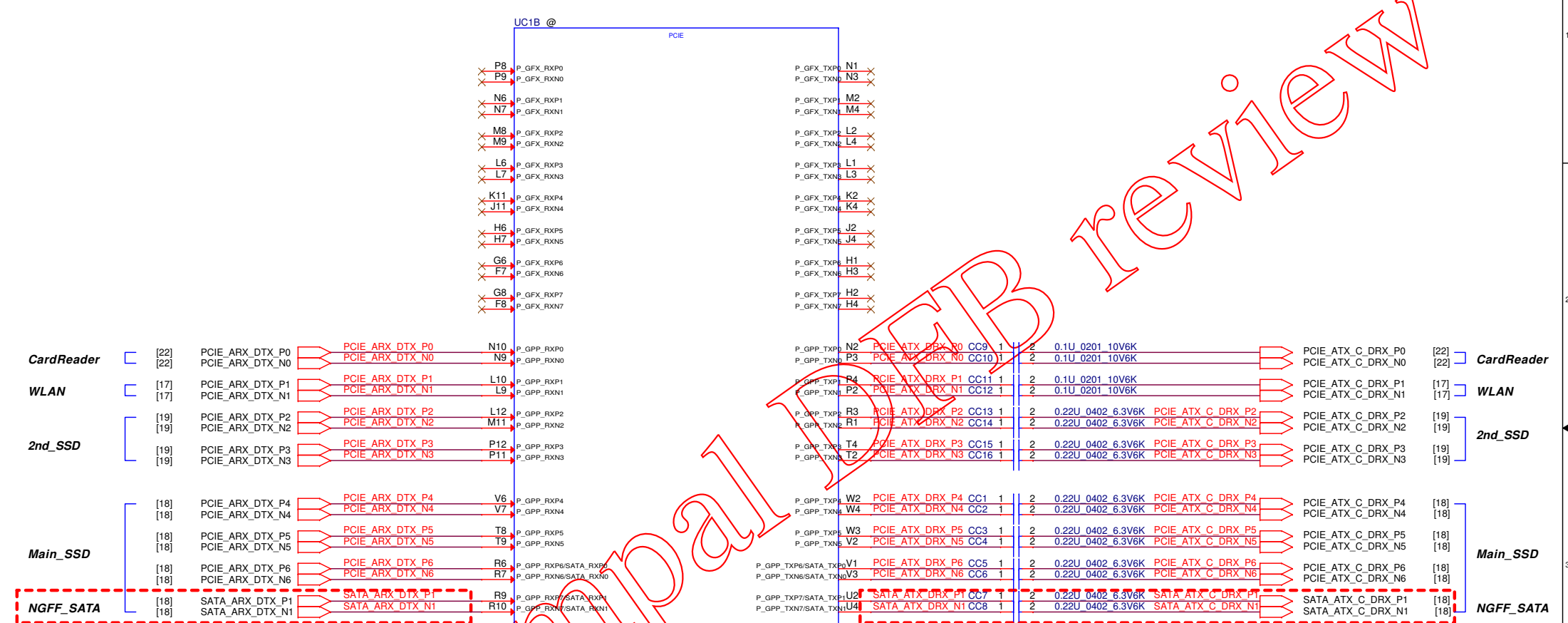
For

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		2018/05/25		Title	
				Power Sequence	
				LA-H091P	
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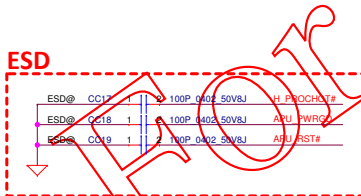
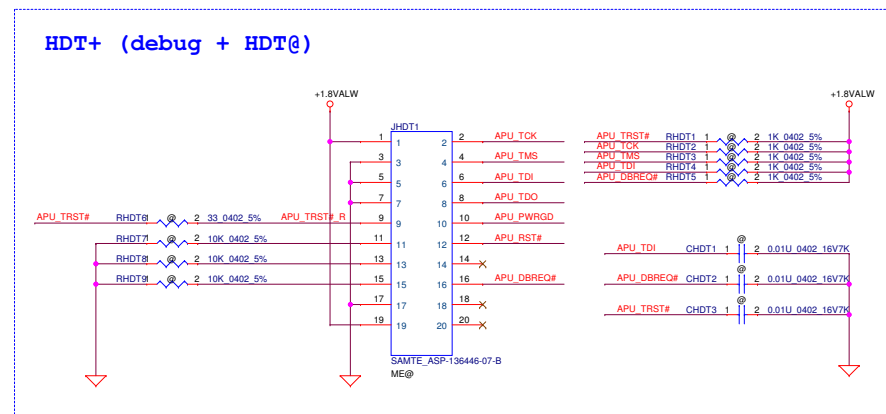
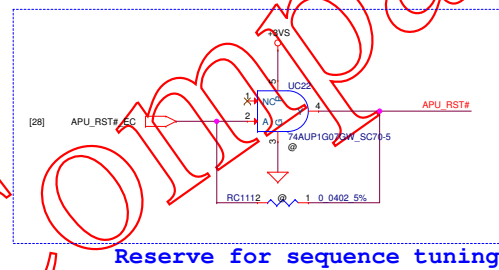
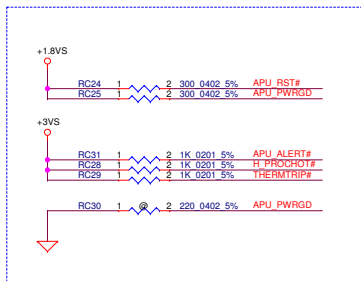
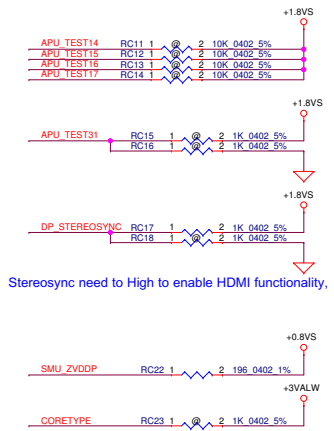
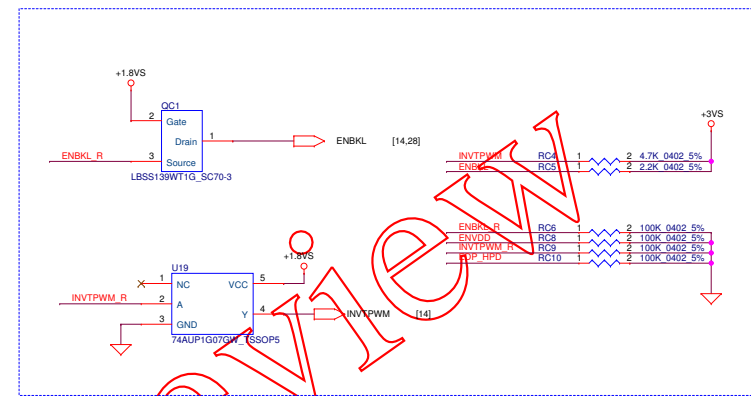
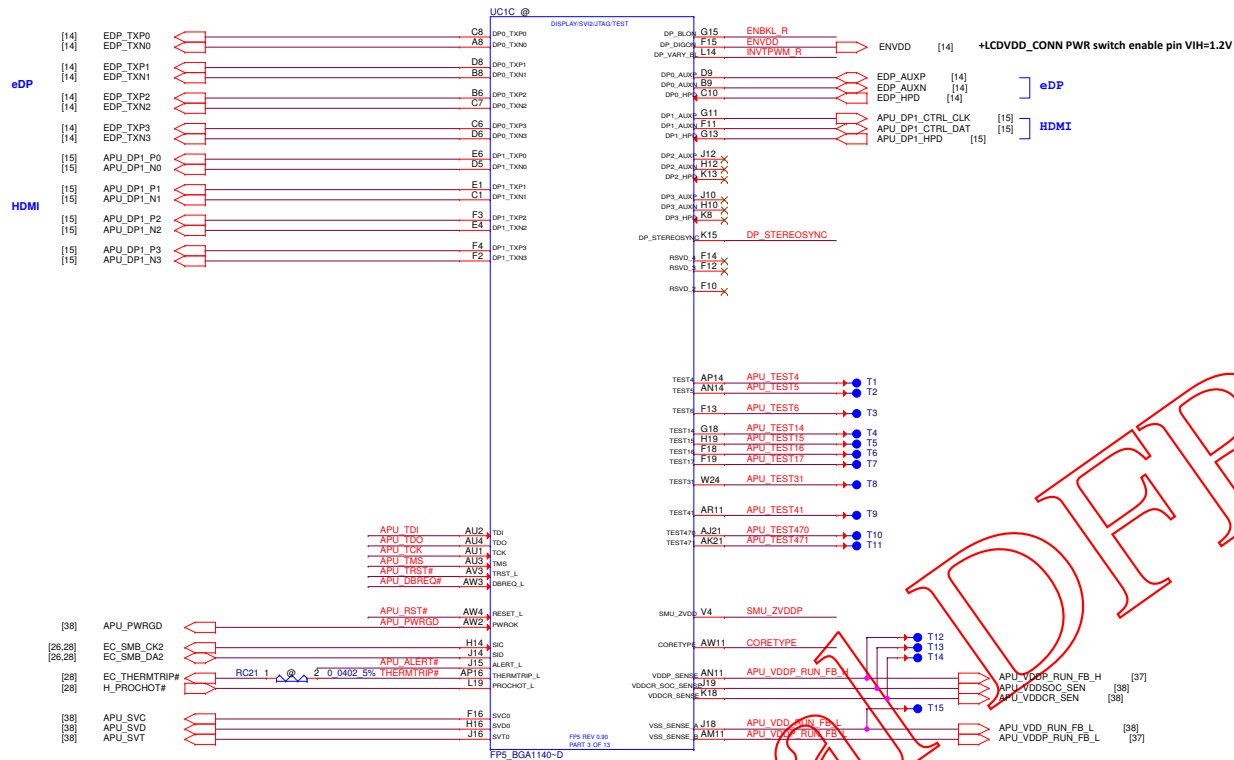
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Issued Date	2018/08/24	Deciphered Date	2018/05/25	Title	
				FP5 DDR4 MEMORY I/F	
				Size	Number
				Customer	Rev
				LA-H091P	1.0
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Main Func = CPU

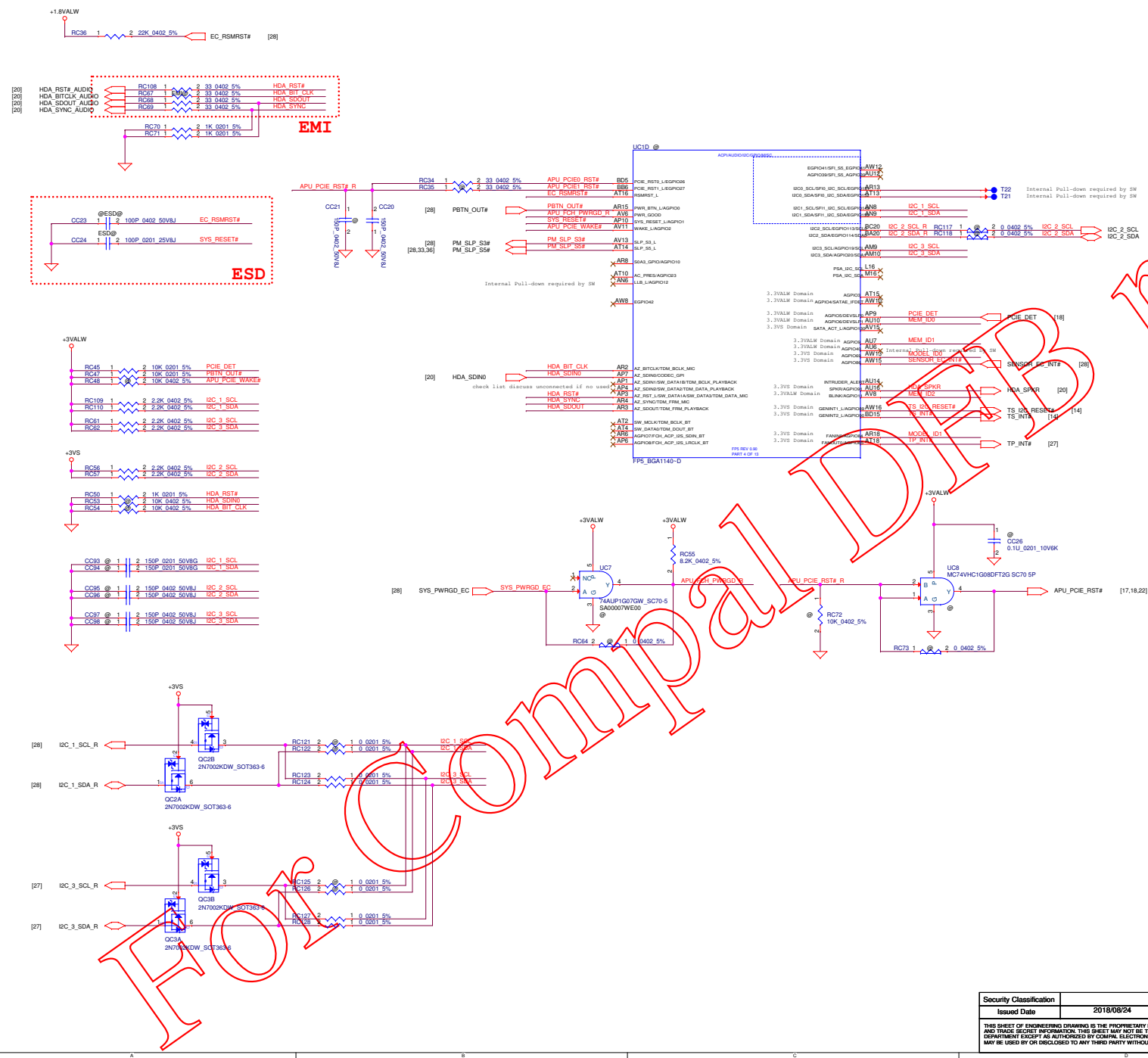


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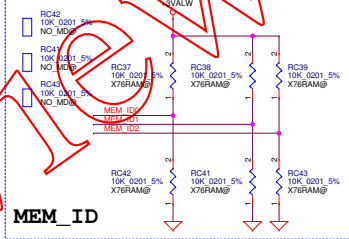
```
DP0: eDP
DP1: HDMI
DP2: N/A
DP3: N/A
```



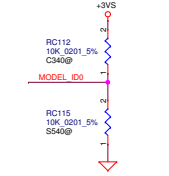
Security Classification		Compal Secret Data		Compal Electronics, Inc.				
Issued Date		2018/08/24	Deciphered Date	2018/05/25	Title		FP5 DISP/MISC/HDT	
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				Custm	LA-H091P			
								Date:



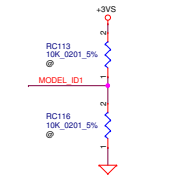
RAM vender	MEM_ID2	MEM_ID1	MEM_ID0
Hynix	1	1	1
Micron	1	1	0
Samsung	1	0	1
No onboard	0	0	0



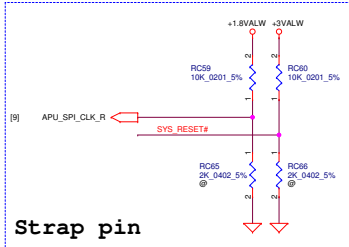
MODEL ID0	Detect
S540	0
C340	1



MODEL_ID1	Detect
	0
	1



## Reserve

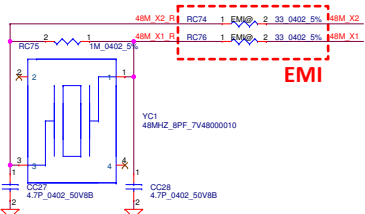


Strap pin

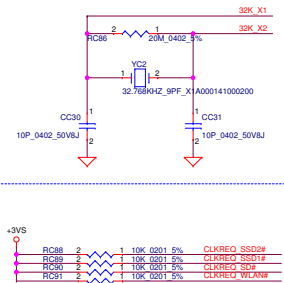
STRAP	DEFINITION
SPI_CLK	1 : Use 48MHZ Crystal Clock and Generate both internal and external clocks (Default) 0 : Use 100MHZ PCIE clock as reference clock and generate internal clocks only
SYS_RST#	1 : Normal reset mode (Default) 0 : short reset mode

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Issued Date	2018/08/24	Deciphered Date	2018/05/25	FP4 GPIO/AZ/MISC/STRAPS		
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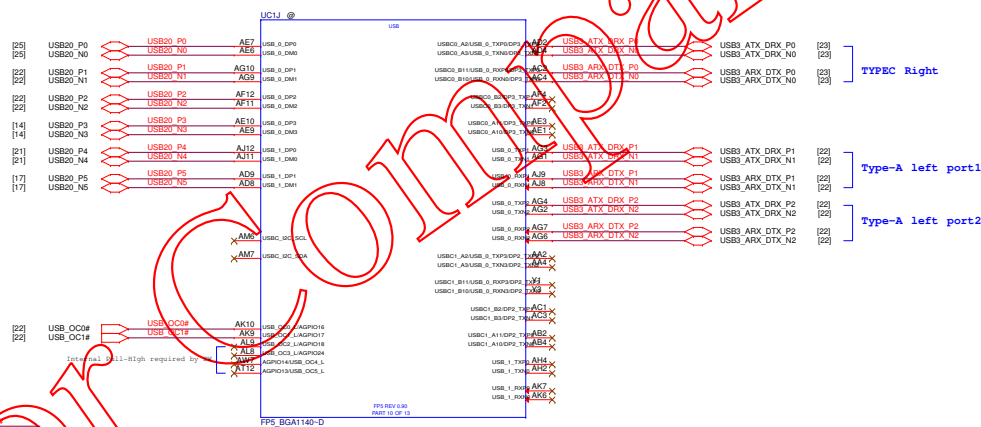
## 48MHz CRYSTAL



## 32.768KHz CRYSTAL



- USB3.1 Type-C
- USB3.1 Type-A port1
- USB3.1 Type-A port2
- Camera
- USB2.0 Hub
- NGFF\_BT

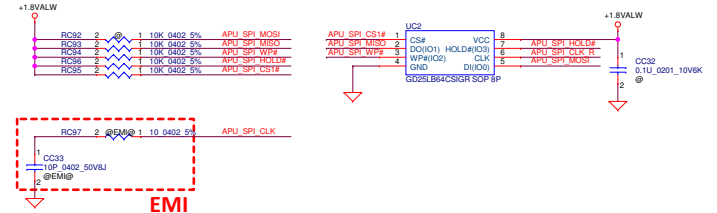


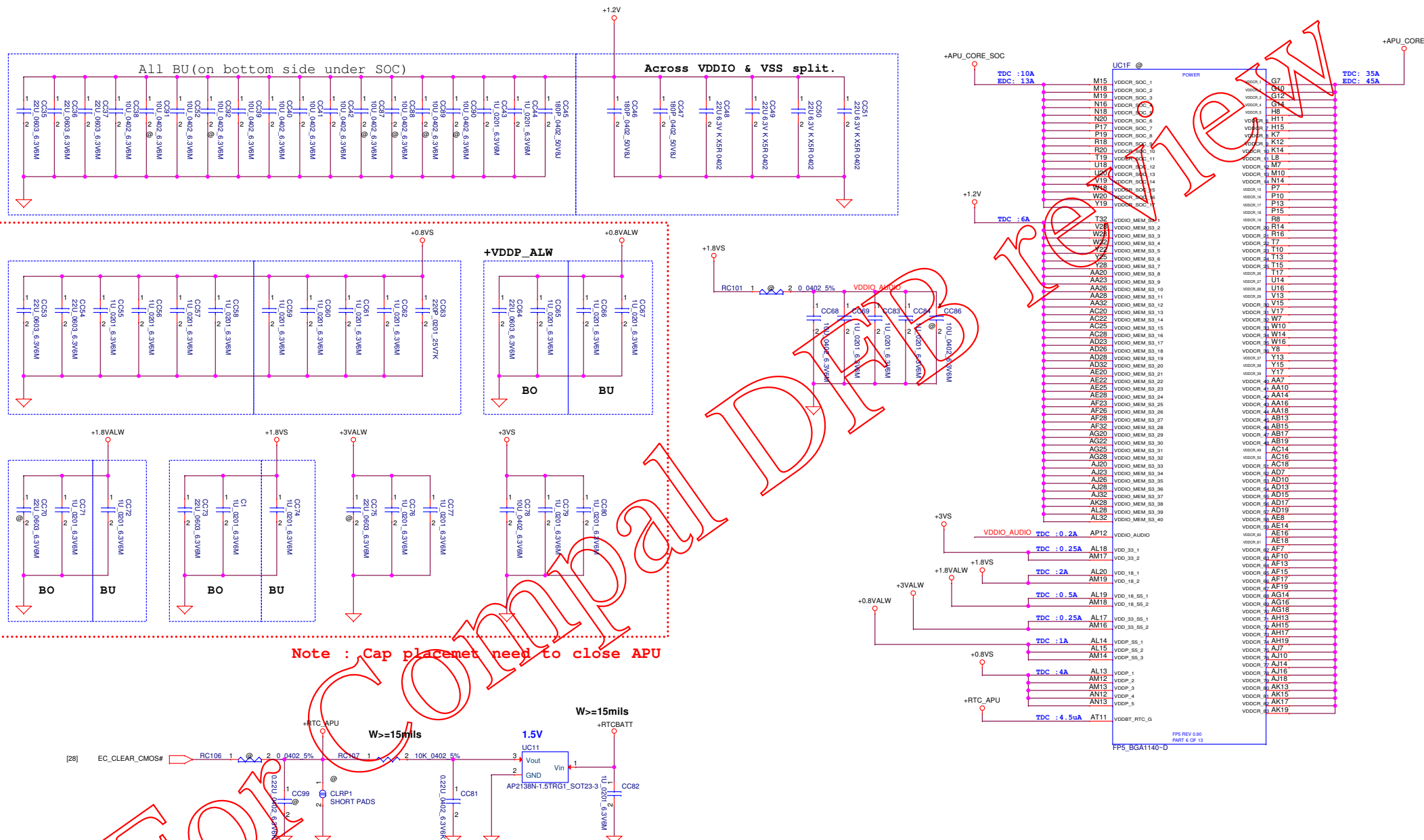
TYPEC Right

Type-A left port1

Type-A left port2

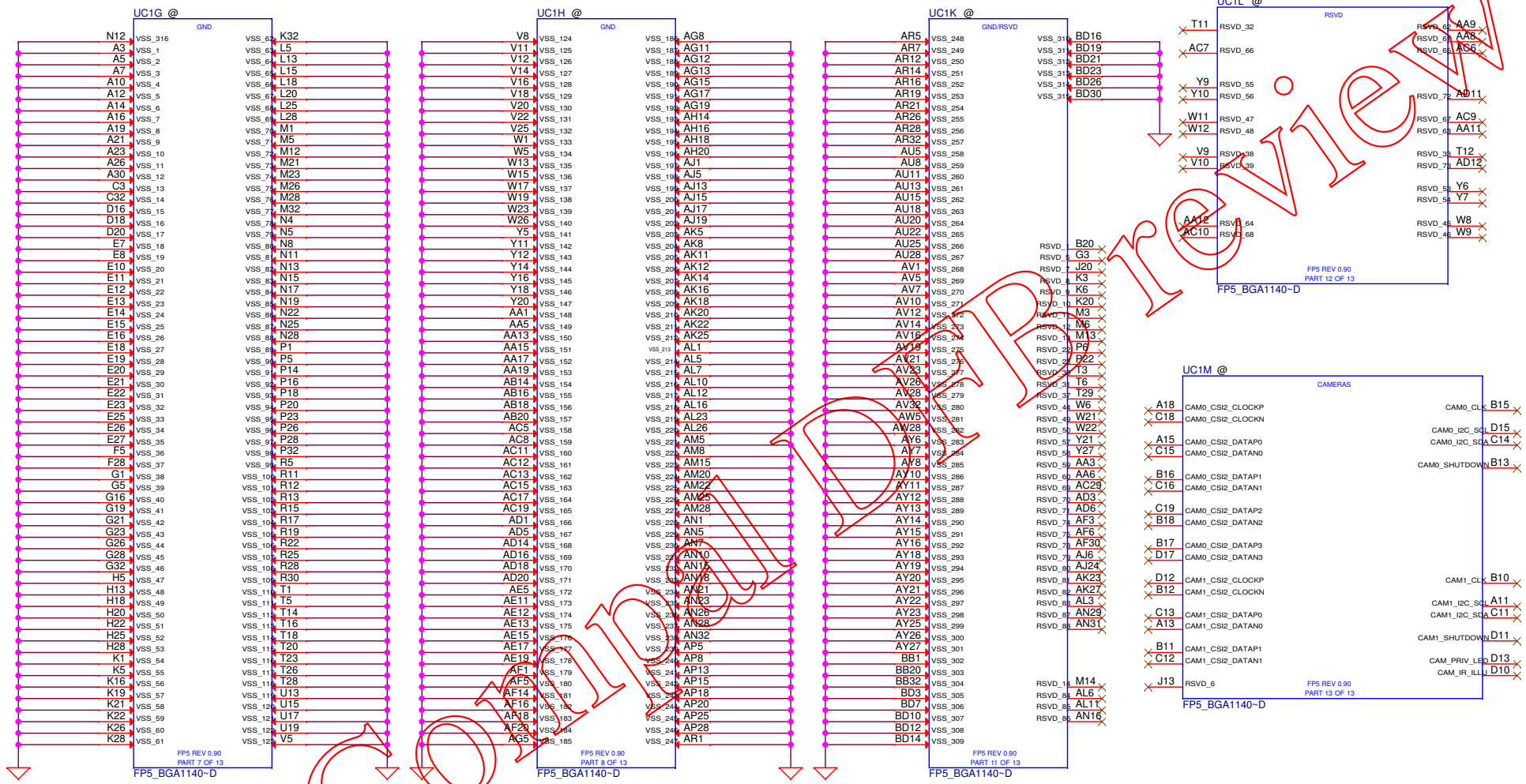
## 8MB SPI ROM





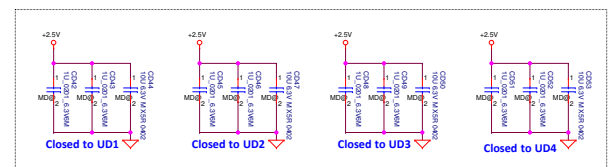
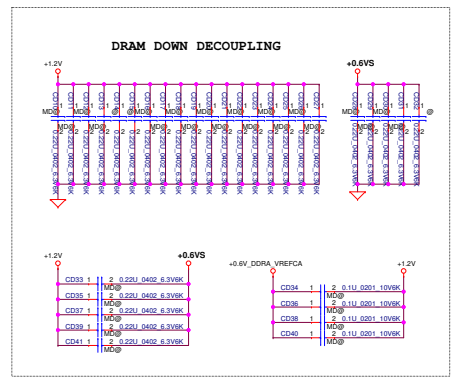
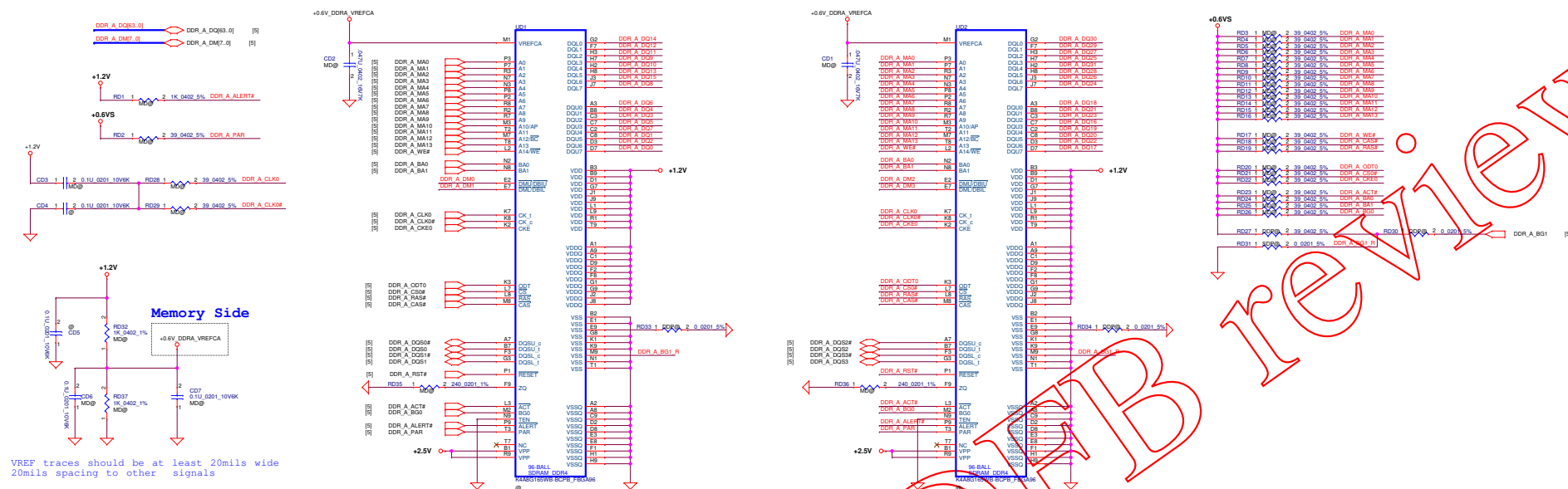
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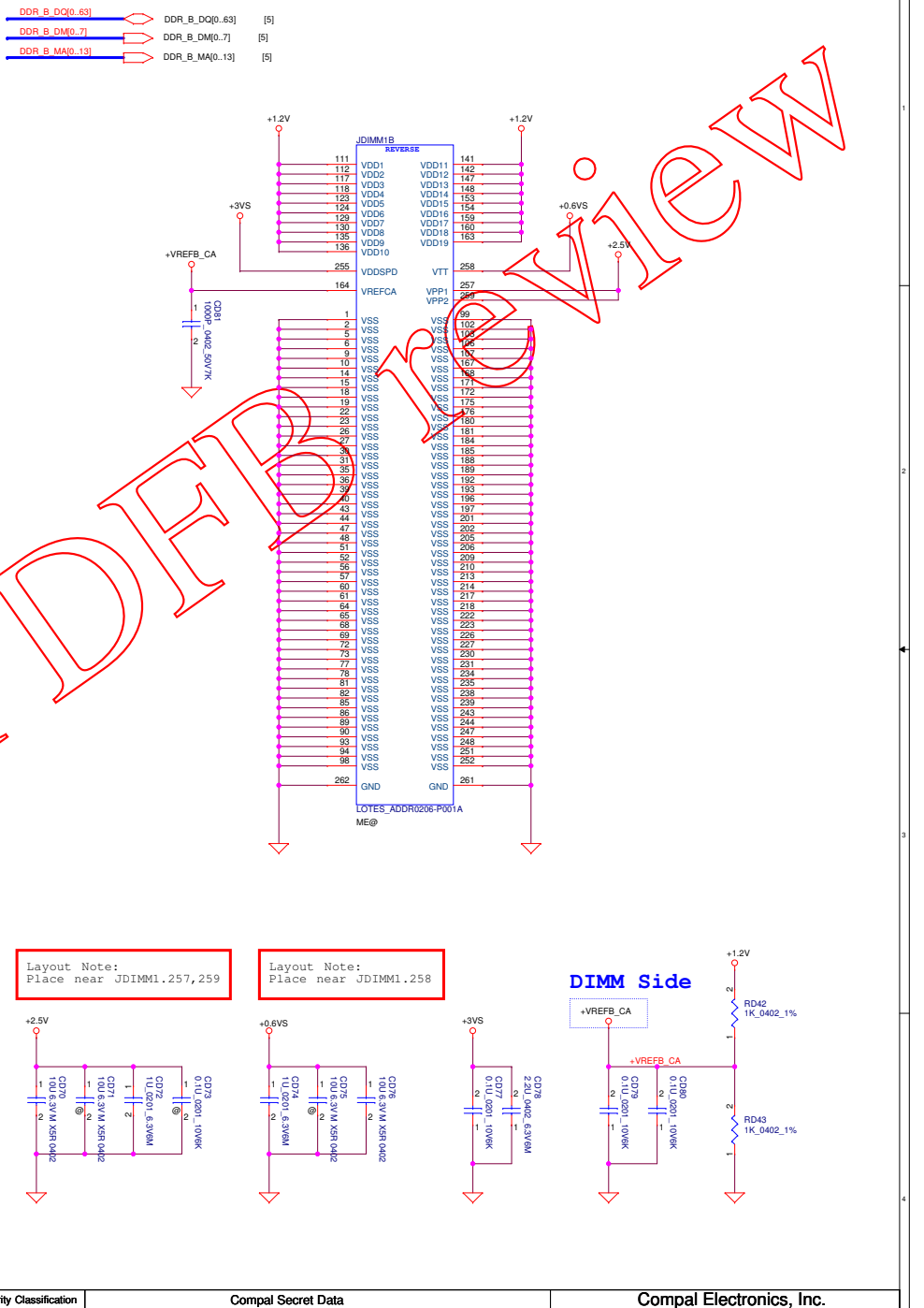
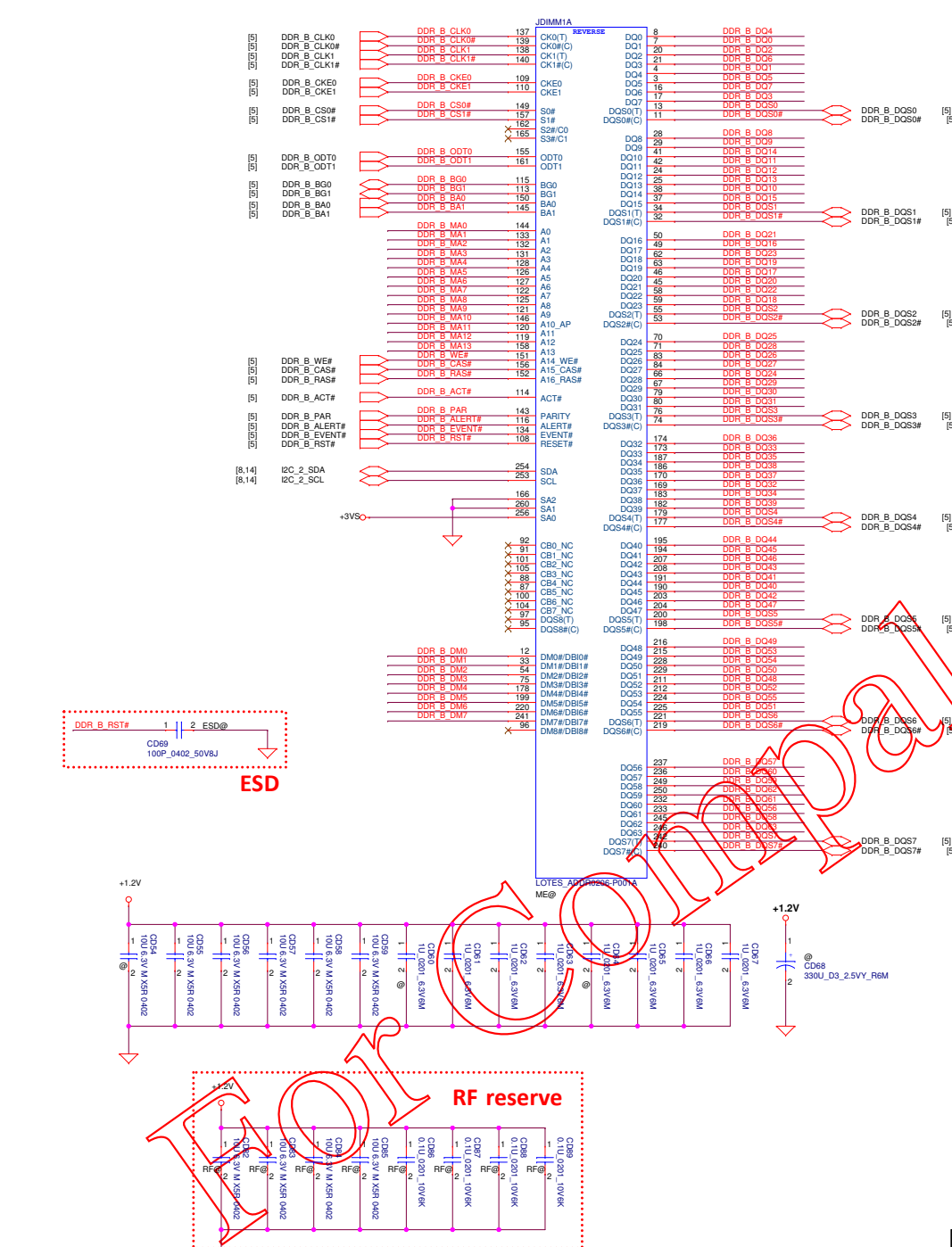
Main Func = CPU



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## Memory Down



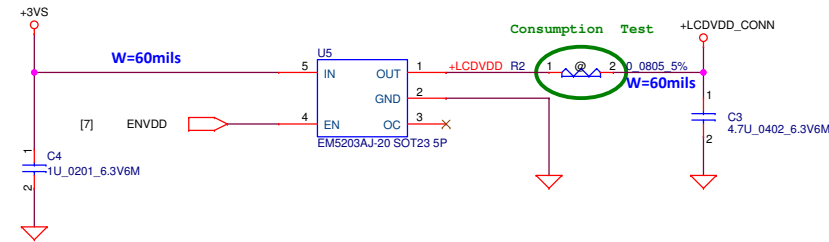


Layout Note:  
Place near JDIMM1.257,259

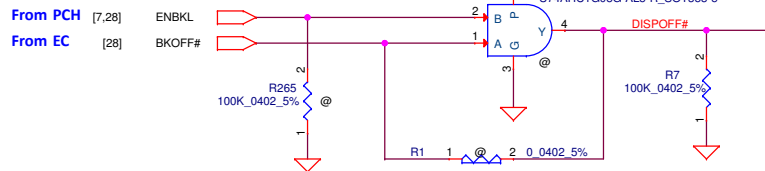
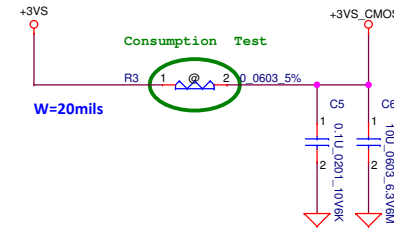
Layout Note:  
Place near JDIMM1.258

DIMM Side

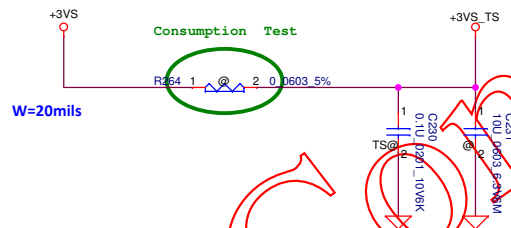
## LCD Power Circuit



## Camera



## Touch Screen

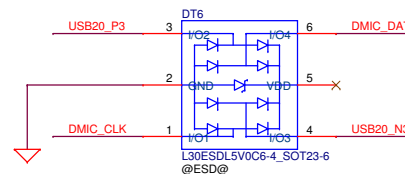


## Touch Screen

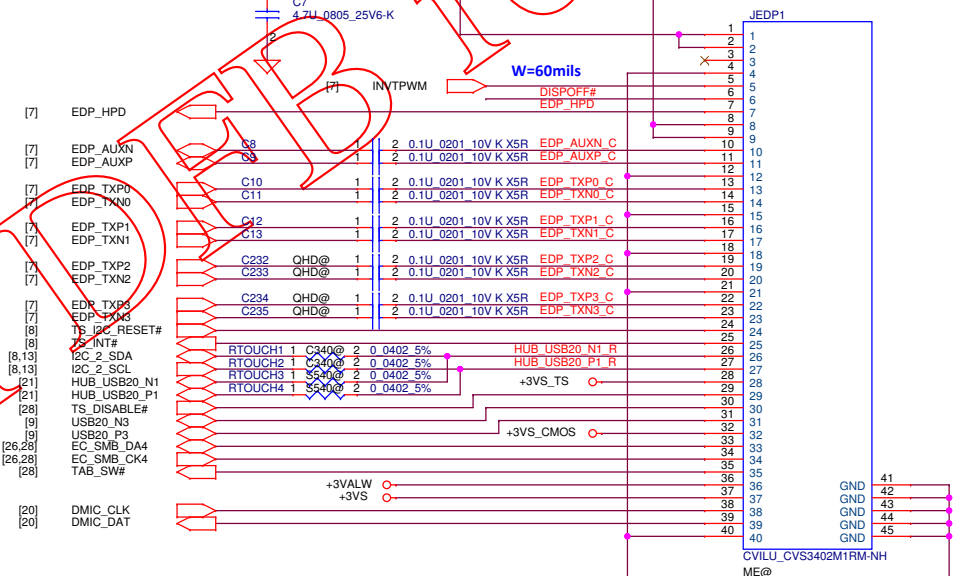
## Camera

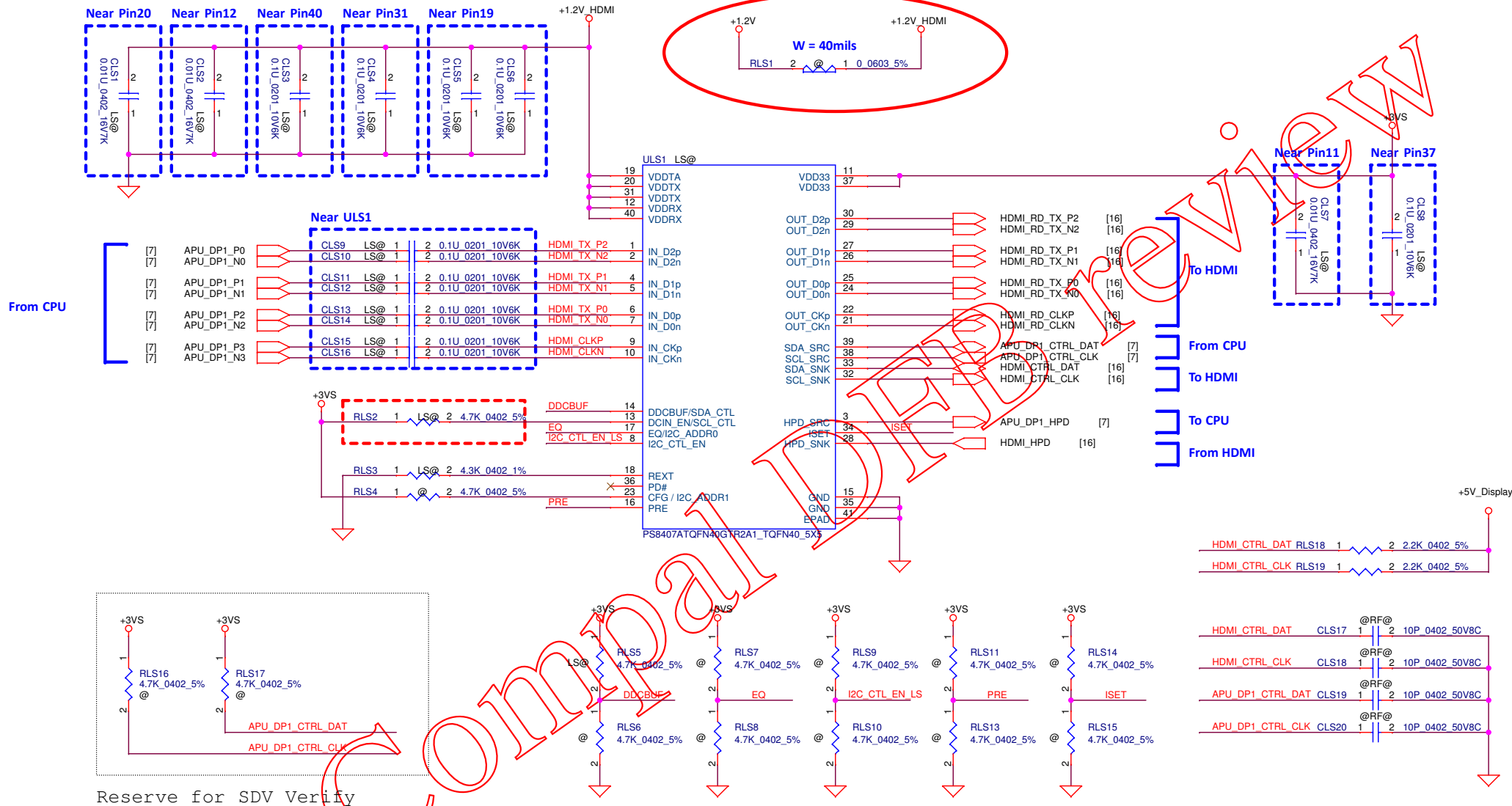
## G-Sensor

## DMIC



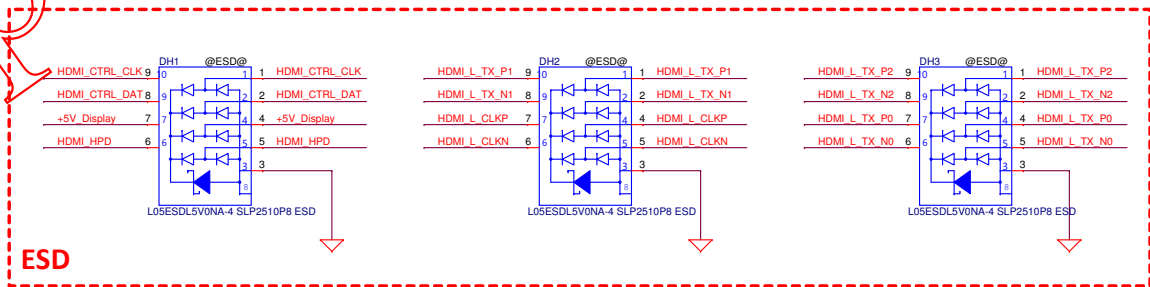
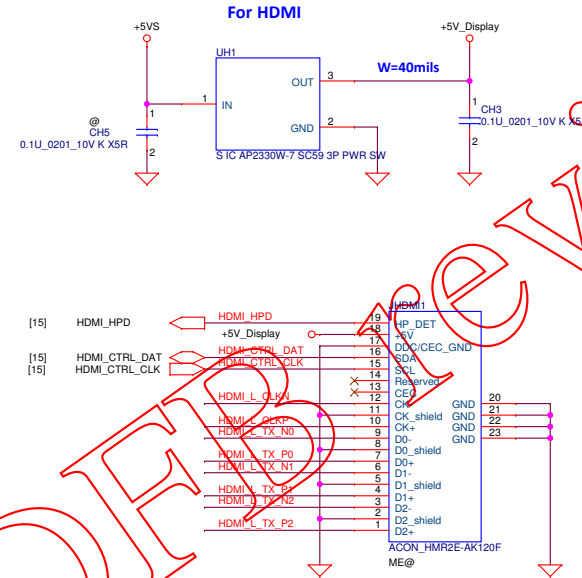
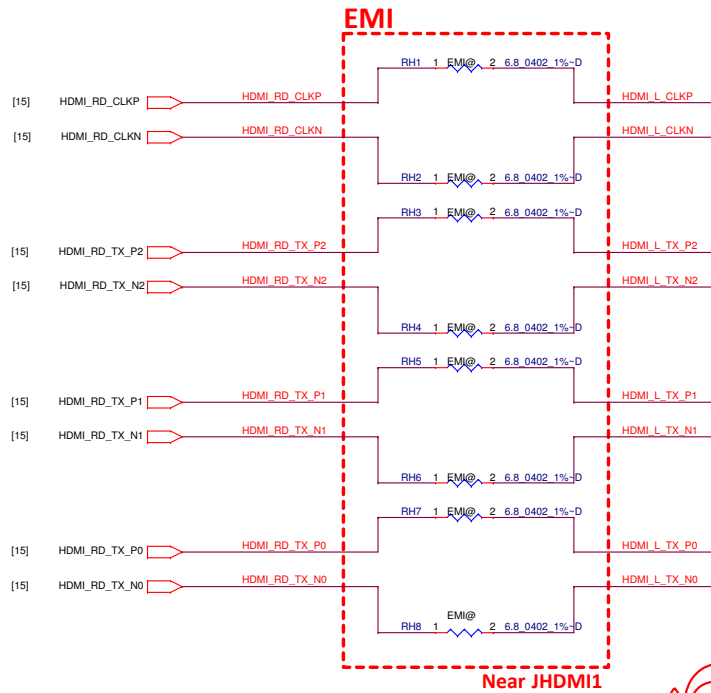
## eDP PANEL Conn.





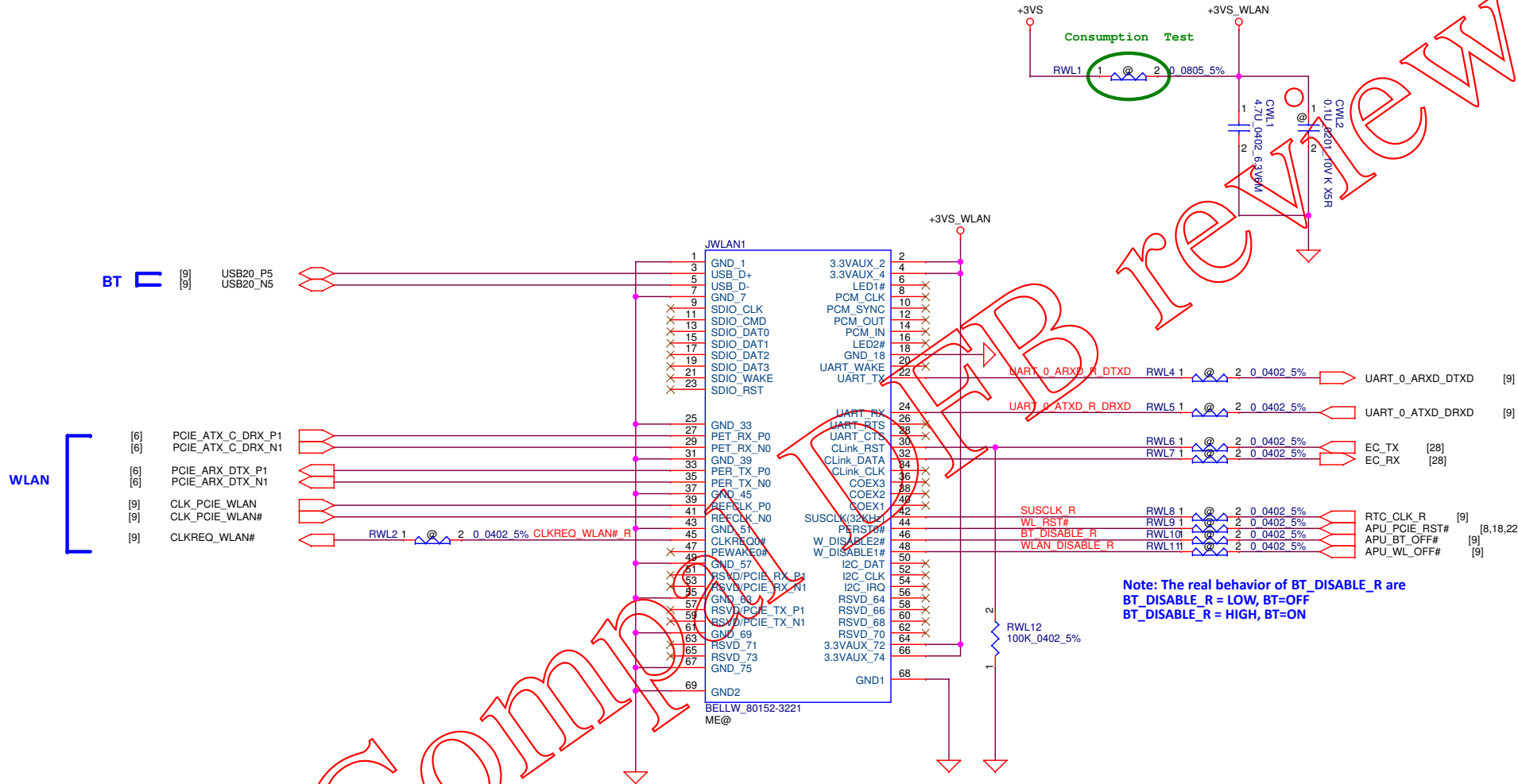
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Size	B	Document Number	LA-H091P	Rev	1.0
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# HDMI



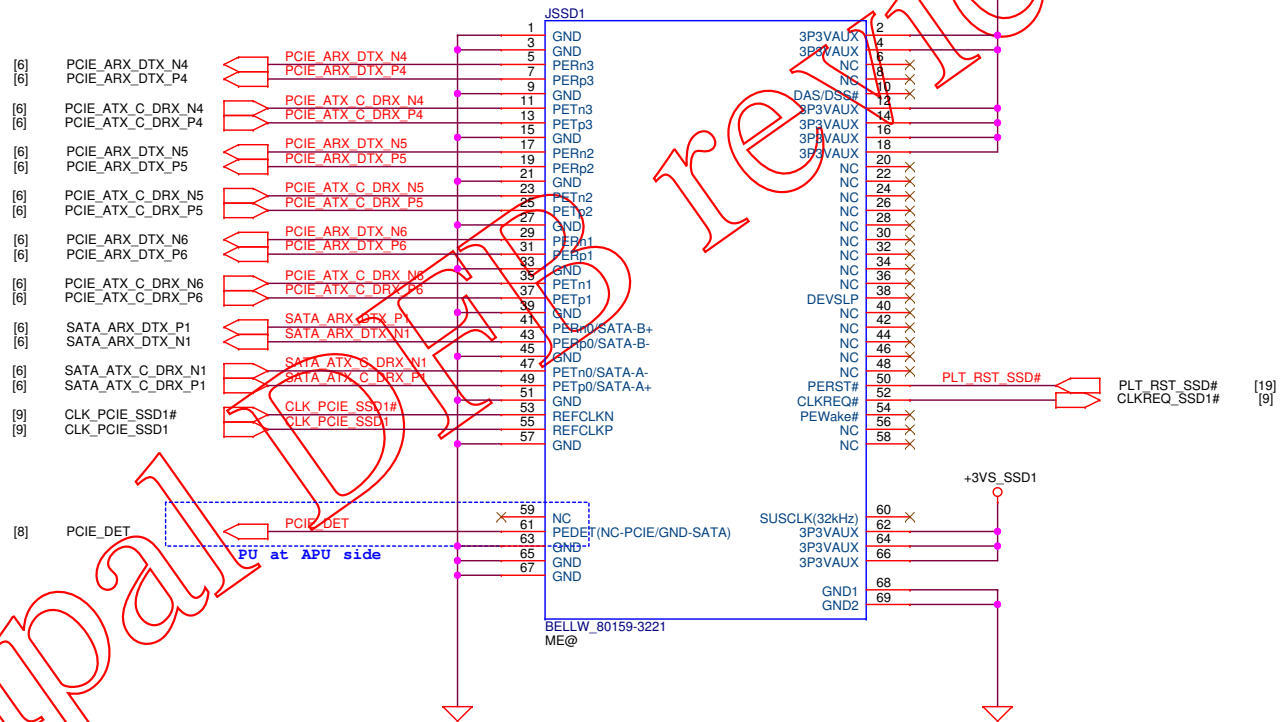
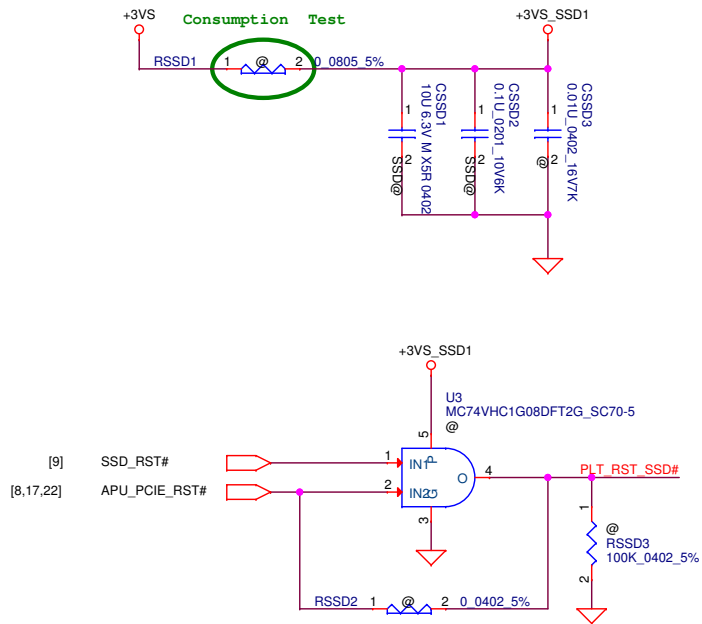
Security Classification		Compal Secret Data		Compal Electronics, Inc.	
Issued Date		Deciphered Date		Title	
2018/08/24		2018/05/25		HDMI	
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		LA-H091P		1.0	
Date: Monday, December 17, 2018		Sheet 16 of 41			

NGFF - WLAN / BT (E- KEY)



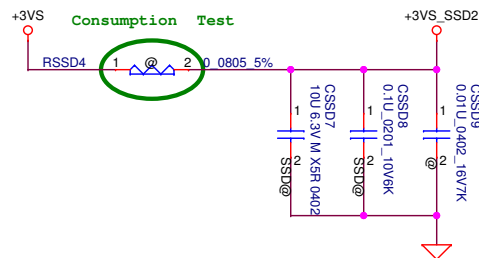
Security Classification		Compal Secret Data		Compal Electronics, Inc.	
Issued Date	2018/08/24	Deciphered Date	2018/05/25	Title	
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				Size	Document Number
				LA-H091P	
				Date:	Monday, December 17, 2018
				Sheet	17 of 41
				Rev	1.0

## NGFF for SSD co-lay SATA M.2 (M-KEY)



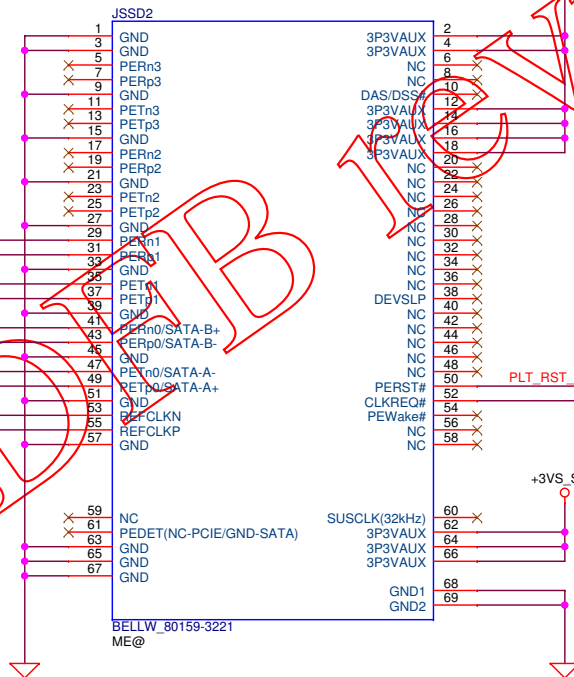
Security Classification		Compal Secret Data		Compal Electronics, Inc.	
Issued Date	2018/08/24	Deciphered Date	2018/05/25	Title	M.2 SSD/HDD
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				A	LA-H091P
					Rev 1.0
Date: Monday, December 17, 2018		Sheet 18 of 41			

# NGFF for 2nd\_SSD (M-KEY)



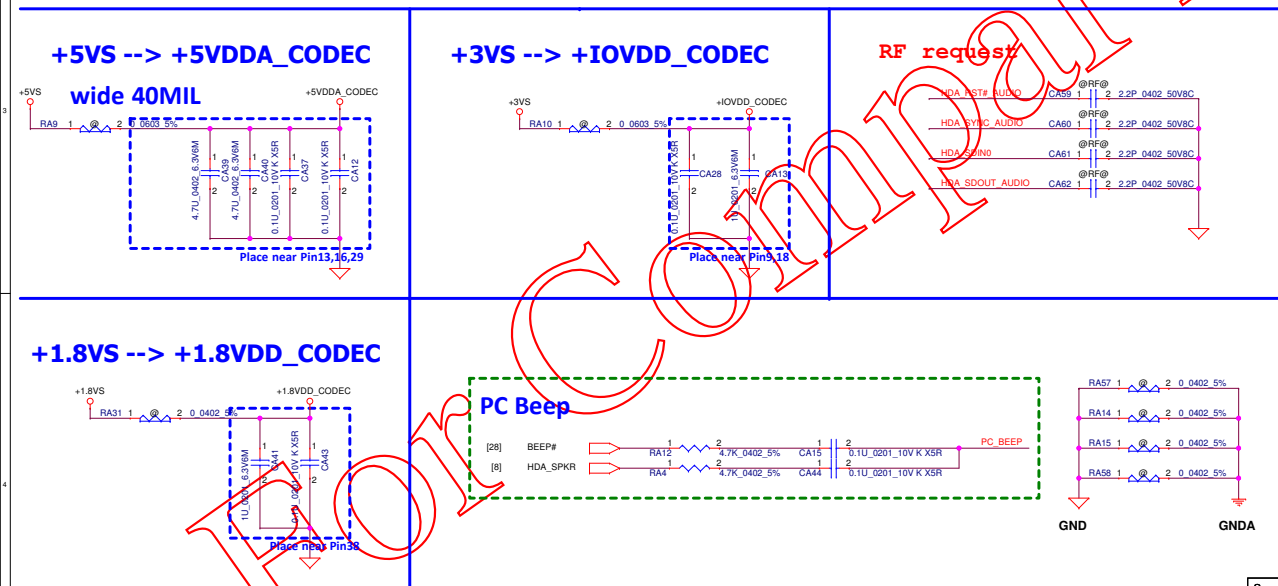
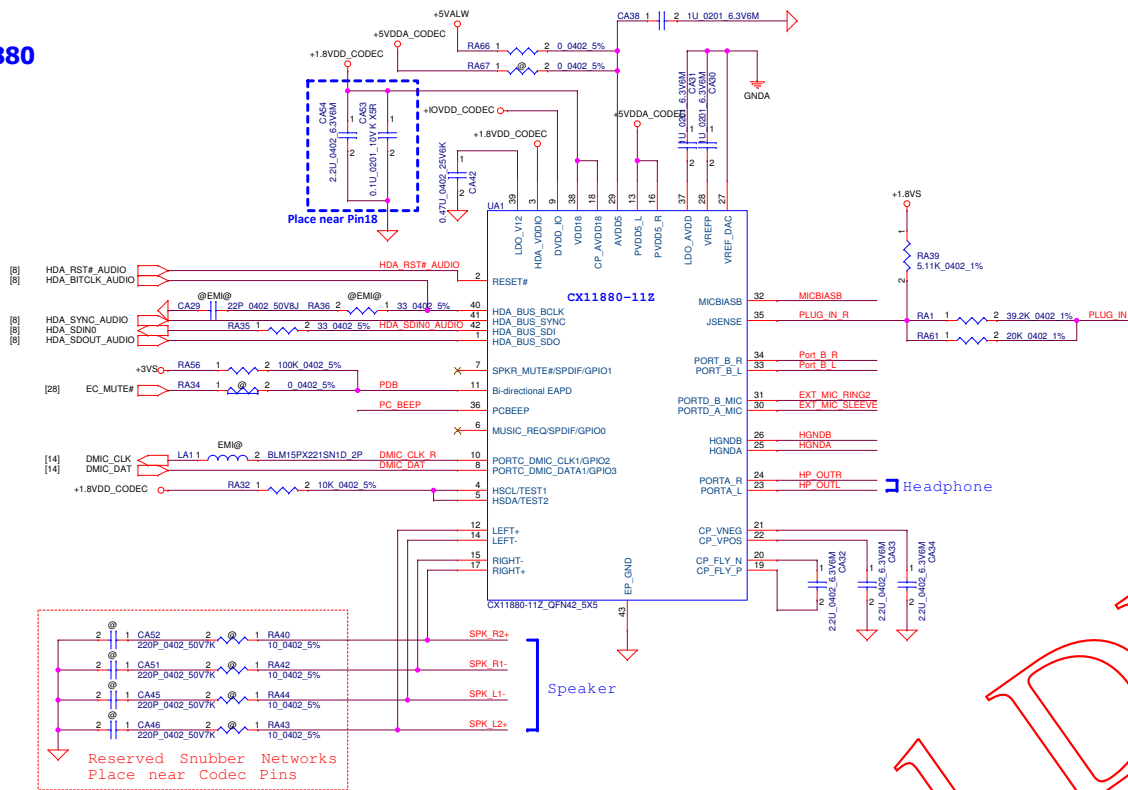
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[9] CLK\_PCIE\_SSD2

PCIE\_ARX\_DTX\_N3  
PCIE\_ARX\_DTX\_P3  
PCIE\_ATX\_C\_DRX\_N3  
PCIE\_ATX\_C\_DRX\_P3  
PCIE\_ARX\_DTX\_N2  
PCIE\_ARX\_DTX\_P2  
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CLK\_PCIE\_SSD2



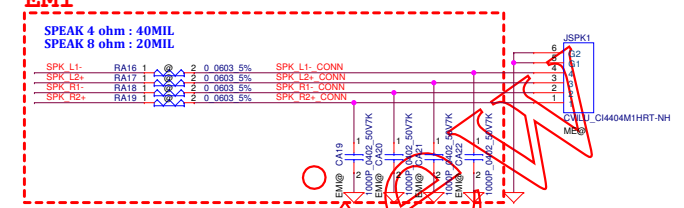
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Issued Date	2018/08/24	Deciphered Date	2018/05/25	Title	
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				Size	Rev
				Document Number	1.0
				LA-H091P	
				Date:	Monday, December 17, 2018
				Sheet	19 of 41

## CX11880

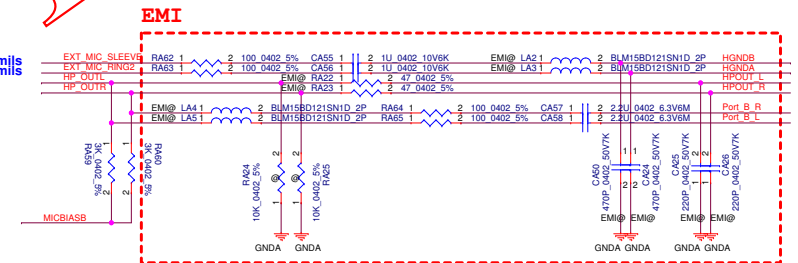
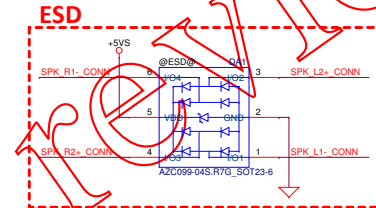


**Speaker**

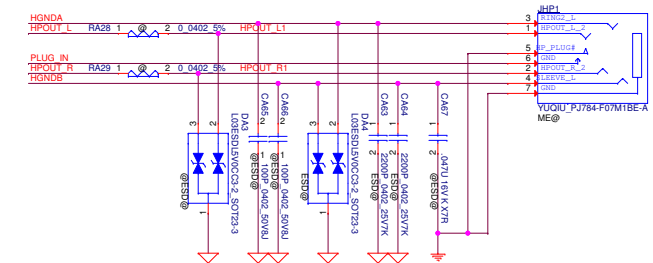
**FMT**            wide 40MIL



ESD protection needs to be placed near connector side



Combo Jack (Normal Open)

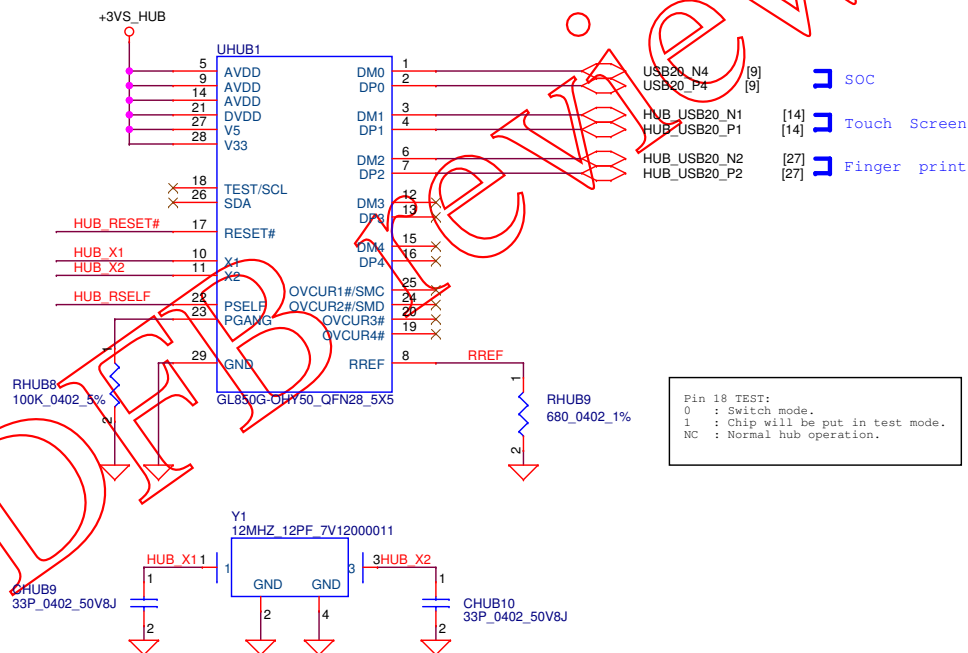


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				HD Audio Codec CX11880	
				Size	Document Number
Cushin	LA-H091P	Rev	1.0		
Date:	Monday, December 17, 2018	Sheet	20	of	41

CHUB8  
1U\_0201\_6.3V6M

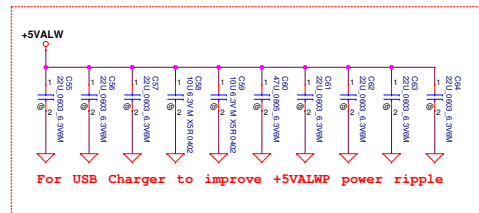
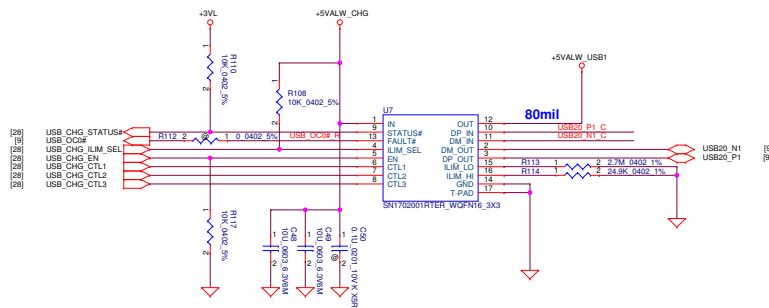
RHUB7  
47K\_0402\_5%

5V

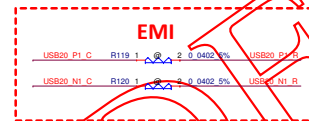
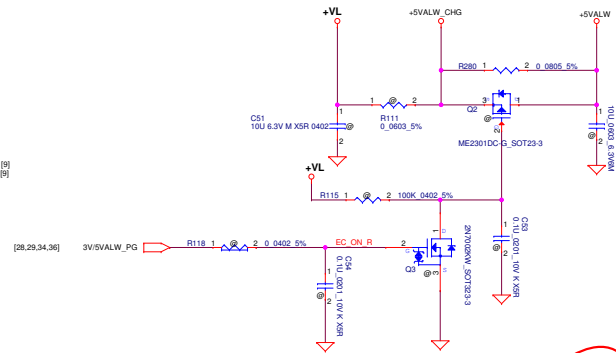


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				Document Number <b>LA-H091P</b>	1.0
Date:		Monday, December 17, 2018		Sheet	21 of 41

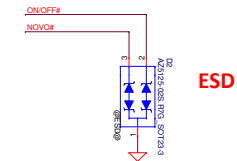
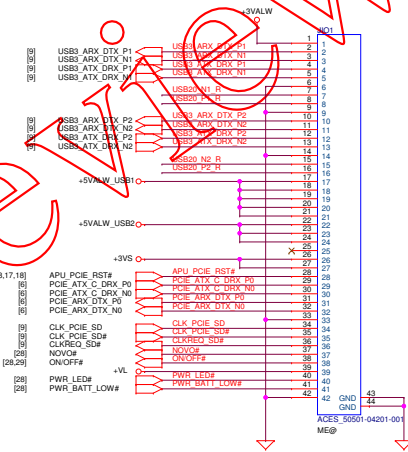
## USB3.0\_Port (AUO\_Port)



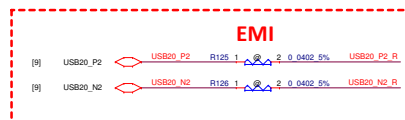
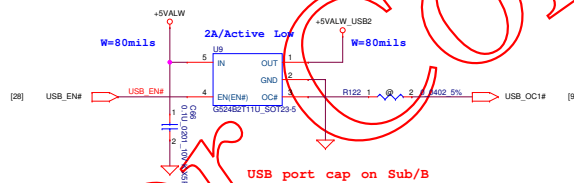
### USB Charge switch



## IO CONN

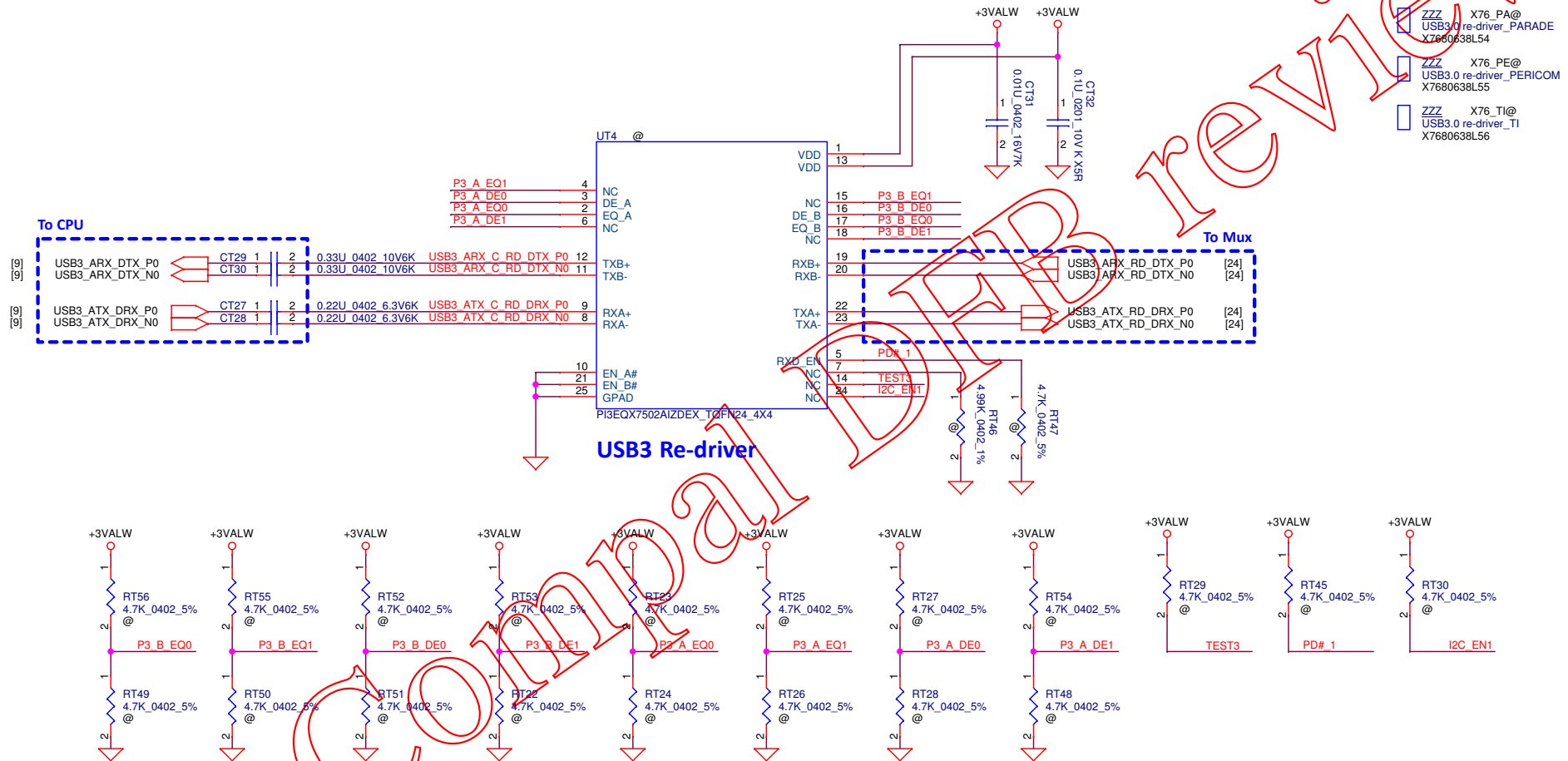


### USB3.0\_Port (Non AUO\_Port)



# Type-C USB3.1\_Port

TI @	UT4 TI@ SN65LVPE512RGER	RT48 TI@ 0_0402_5%	RT26 TI@ 0_0402_5%	RT22 TI@ 0_0402_5%	RT50 TI@ 0_0402_5%	RT51 TI@ 0_0402_5%
PA@	UT4 PA@ PS8713BTQFN24GTR2-A2	RT25 PA@ 4.7K_0402_5%				
PE@	UT4 PE@ PI3EQX7502AIZDEX TQFN24	RT49 PE@ 4.7K_0402_5%	RT24 PE@ 4.7K_0402_5%	RT28 PE@ 4.7K_0402_5%		



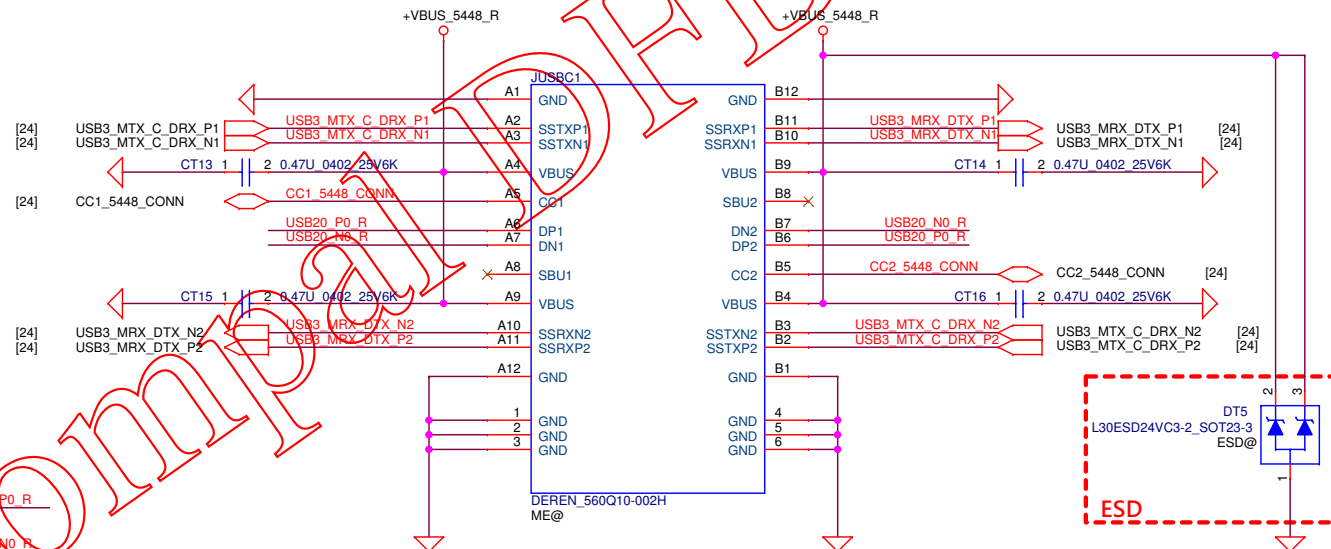
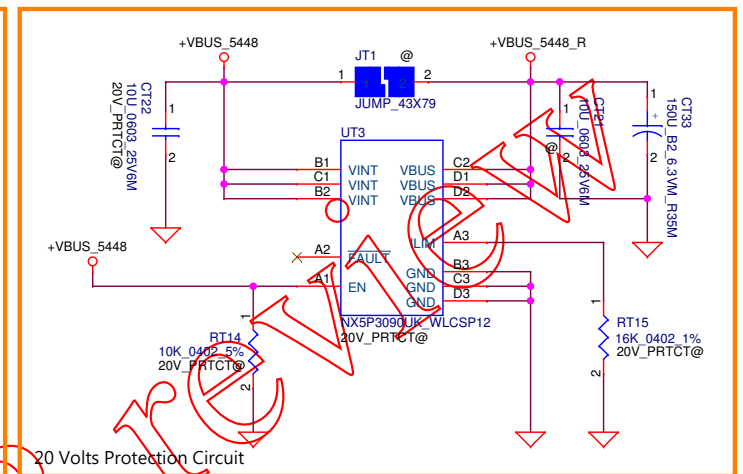
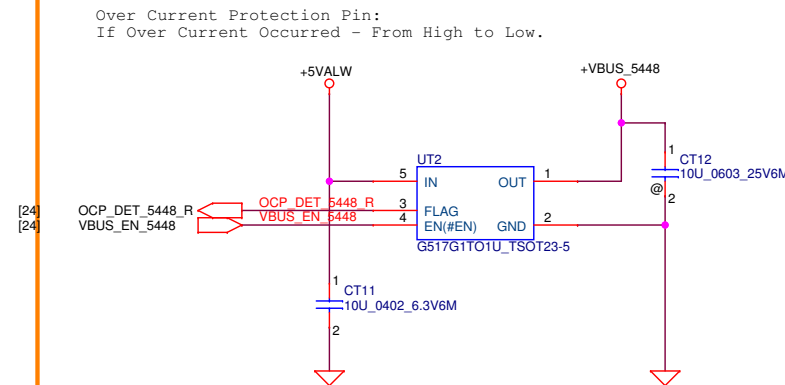
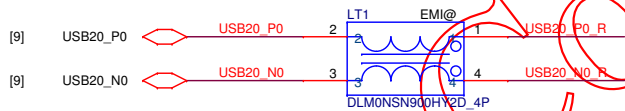
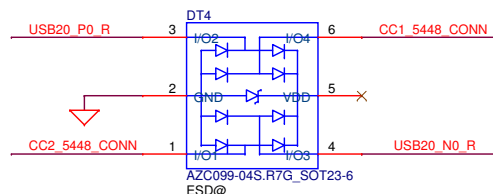
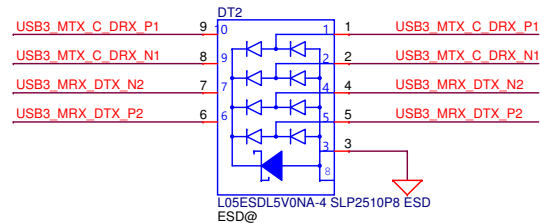
Security Classification		Compal Secret Data		Compal Electronics, Inc.	
Issued Date	2018/08/24	Deciphered Date	2018/05/25	Title	
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	M1	M0	Note
Rp:900mA	0	1	RT4/RT13 mount,RT12/RT5don't mount
Rp:1.5A	1	0	RT12/RT5 mount,RT4/RT13don't mount
Rp:3.0A	1	1	RT12/RT13mount,RT4/RT5 don't mount

Power switch enable pin	Note
Low Active	RT7/RT10 mount
High Active	RT10 mount, RT7 don't mount

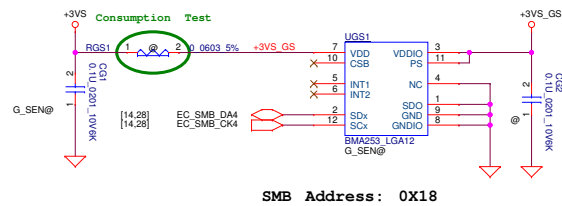
Power switch OCP pin	Note
Low Active	RT8/RT11 mount
High Active	RT11 mount, RT8 don't mount

## ESD COMPONENTS



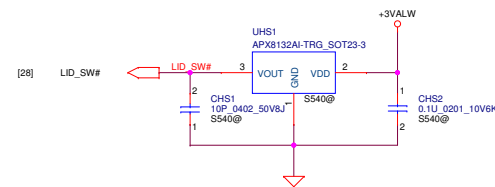
Security Classification		Compal Secret Data		<b>Compal Electronics, Inc.</b> <b>Type-C RTS5448 CONN</b>	
Issued Date	2018/08/24	Deciphered Date	2018/05/25	Title	
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				B	1.0
				<b>LA-H091P</b> Date: Wednesday, December 19, 2018    Sheet 25 of 41	

## G-Sensor

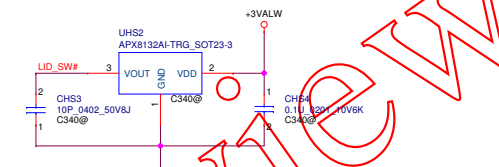


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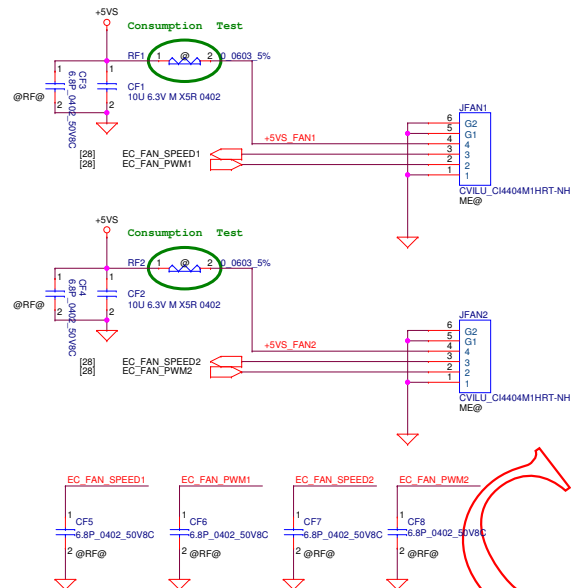
## Hall -Sensor for S540



## Hall -Sensor for C340

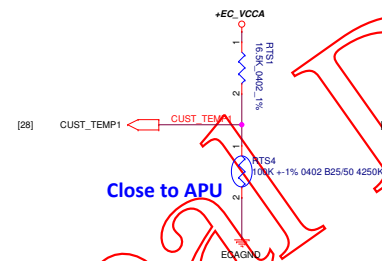


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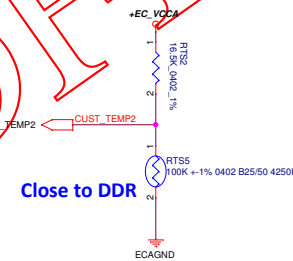


## Thermistor

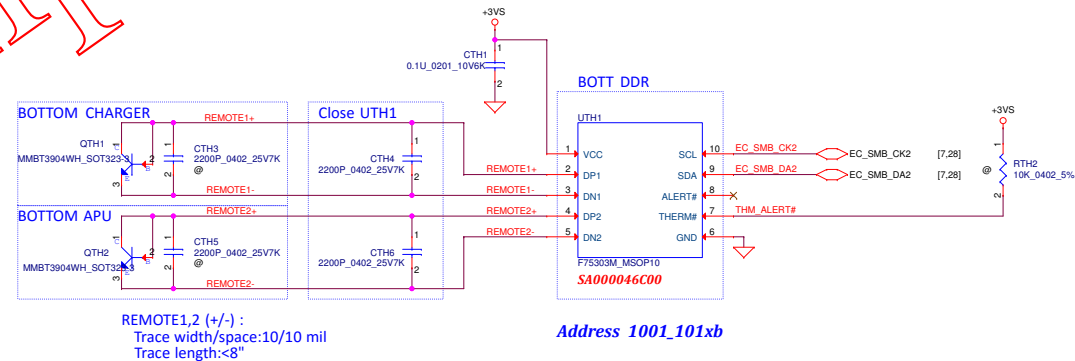
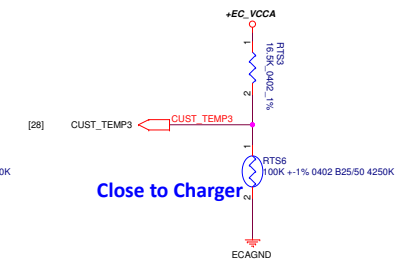
Thermal Decided



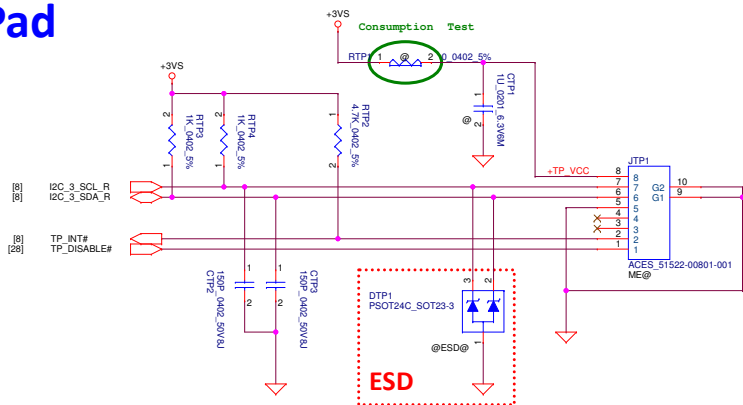
~~Thermal Decided~~



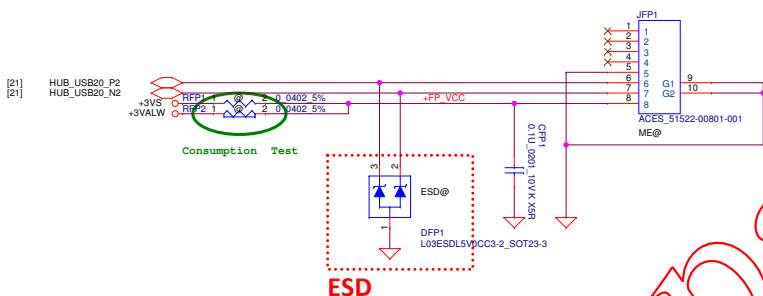
Thermal Decided



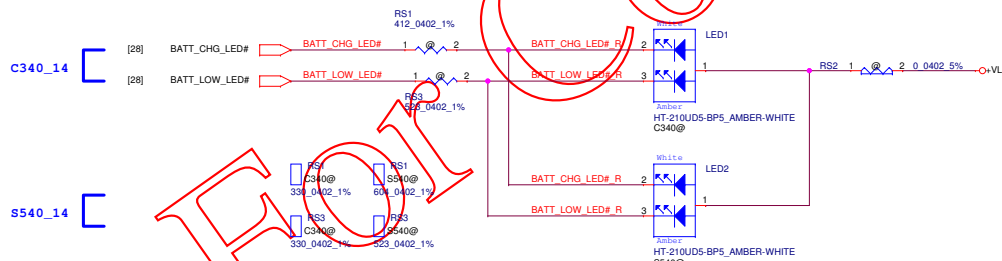
## Touch Pad



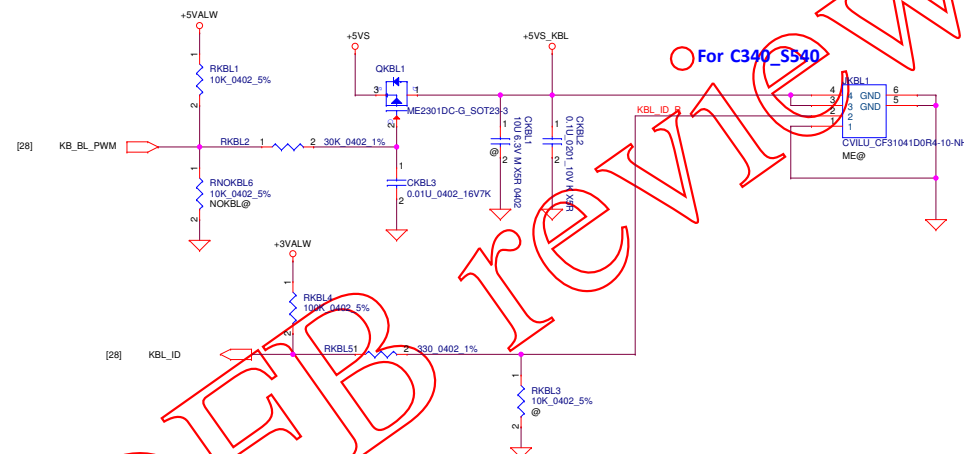
## Finger Printer



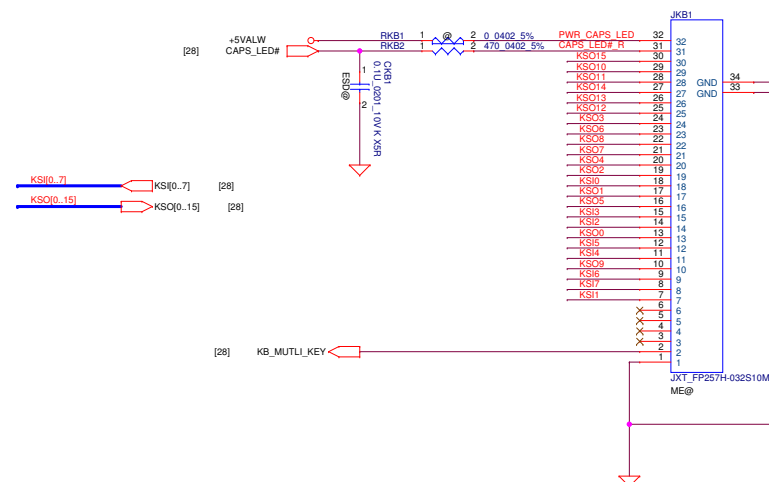
## LED



## Keyboard Backlight



## Keyboard Conn

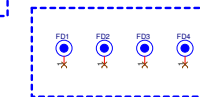
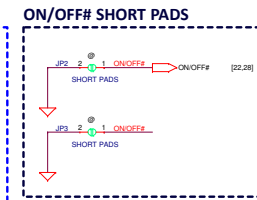
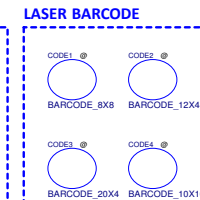
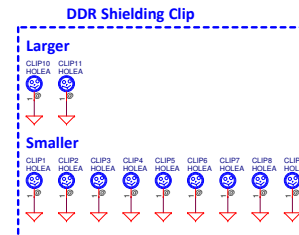
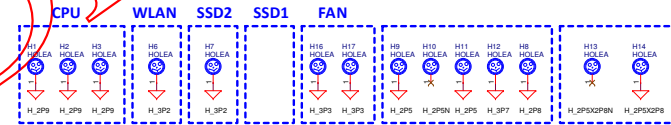
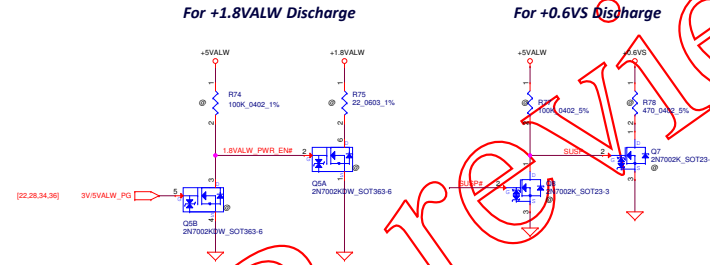
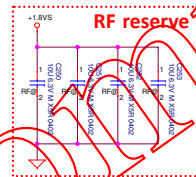
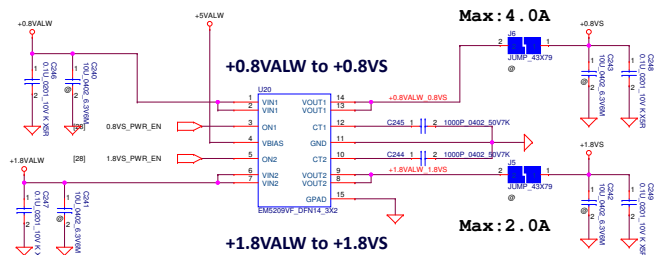
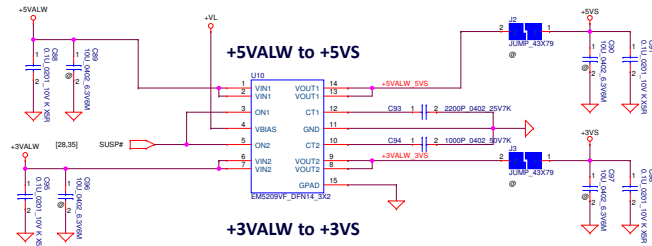


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				Document Number <b>LA-H091P</b>	
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**Compal Electronics, Inc.**  
**EC ENE KB9022**  
 Part Number **LA-H091P**  
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## DC to DC

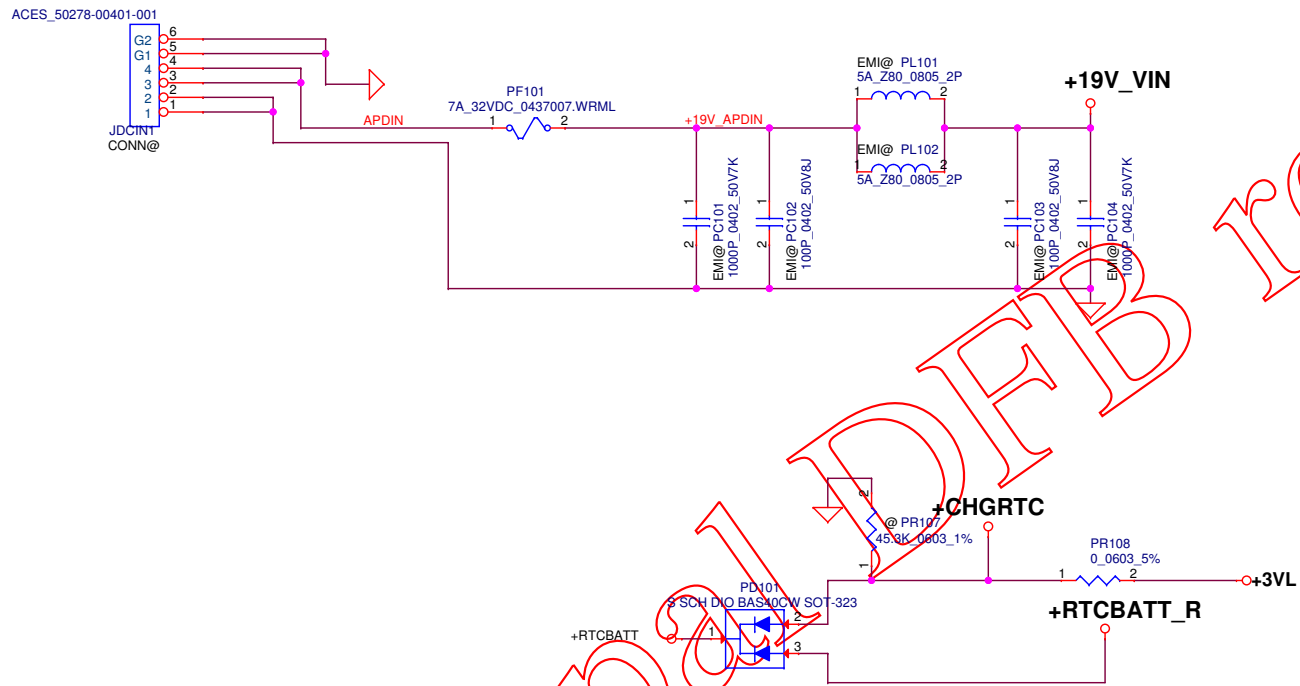
## Discharge Circuit



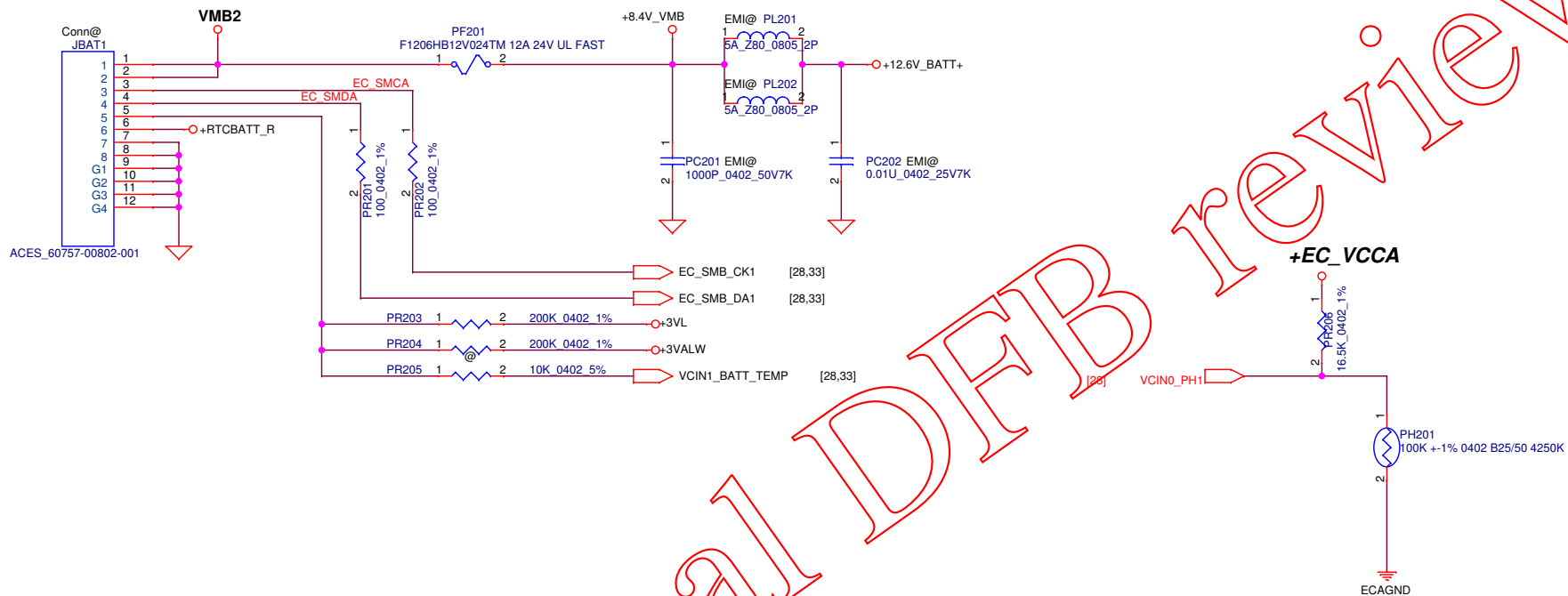
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Issued Date	2018/06/24	Deciphered Date	2018/05/25	Title	DC/DC Interface
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For Compal DEB review

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				Size Custom	Document Number LA-H091P
				Date	Monday, December 17, 2018
				Sheet	30 of 41

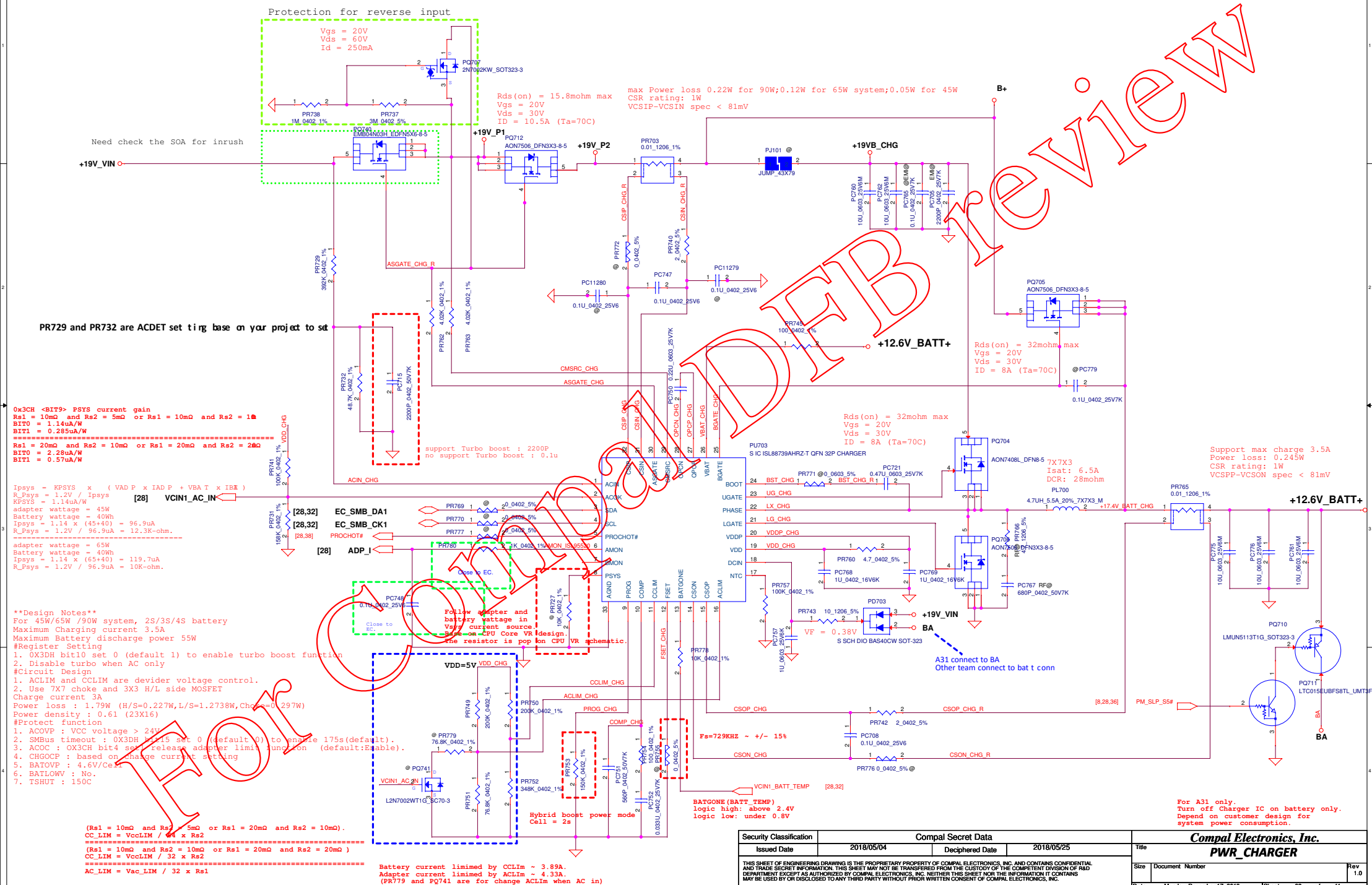


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Issued Date	2018/05/04	Deciphered Date	2018/05/25	PWR- DCIN / Vin Detector	
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**PH201 under CPU botten side :**  
**CPU thermal protection at 93 +-3 degree C**  
**Recovery at 56 +-3 degree C**

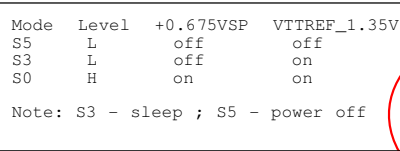
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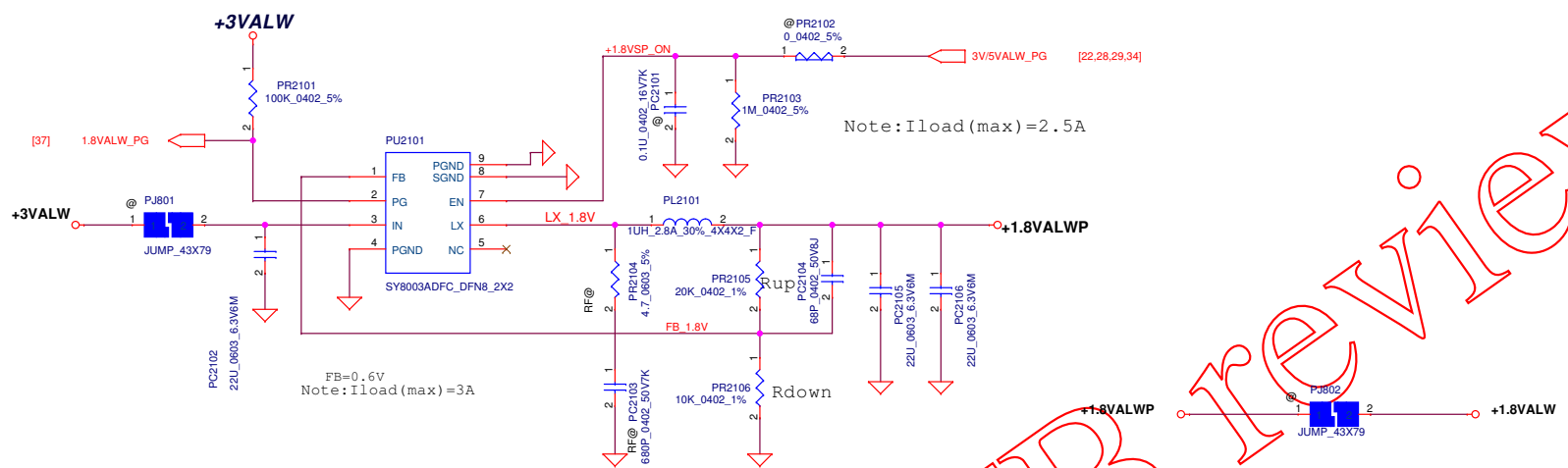
```
RT8207P_single_V3.mdd    For Single layer
RT8207P_dual_V3.mdd     For Dual layer
```

0.675Volt	+/-	5%
TDC	0.7A	
Peak Current	1A	



Switching Frequency: 540kHz  
I<sub>peak</sub>=8A  
I<sub>ocp</sub>~9.6A  
OVP: 113%~120%  
VFB=0.75V, V<sub>out</sub>=1.3545V

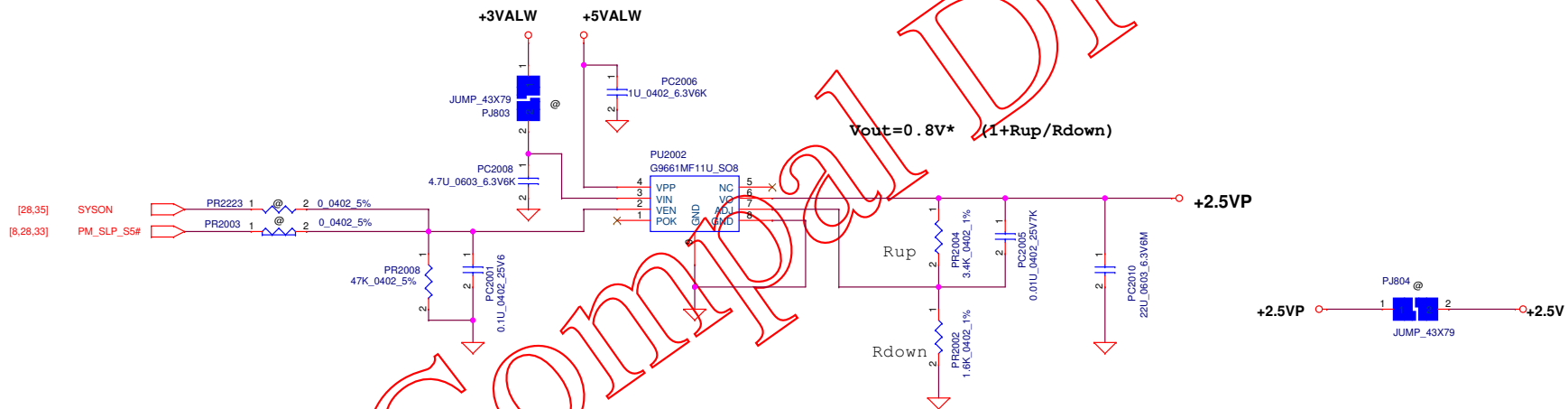
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Issued Date	2018/05/04	Deciphered Date	2018/05/25	Title <b>1.2VP/0.6VSP</b>		
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Note:  
When design Vin=5V, please stuff snubber  
to prevent Vin damage

$$V_{out} = 0.6V * (1 + R_{up}/R_{down})$$

$$V_{out} = 0.8V * (1 + R_{up}/R_{down})$$



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										+1.8VALW/+2.5V_G9661	
										Size	
										Document Number	
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SY8286\_V2\_single.mdd  
SY8286\_V2\_dual.mdd



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APU\_SVD and APU\_SVC RC filter put CPU side.  
APU\_SVT RC filter put controller side.

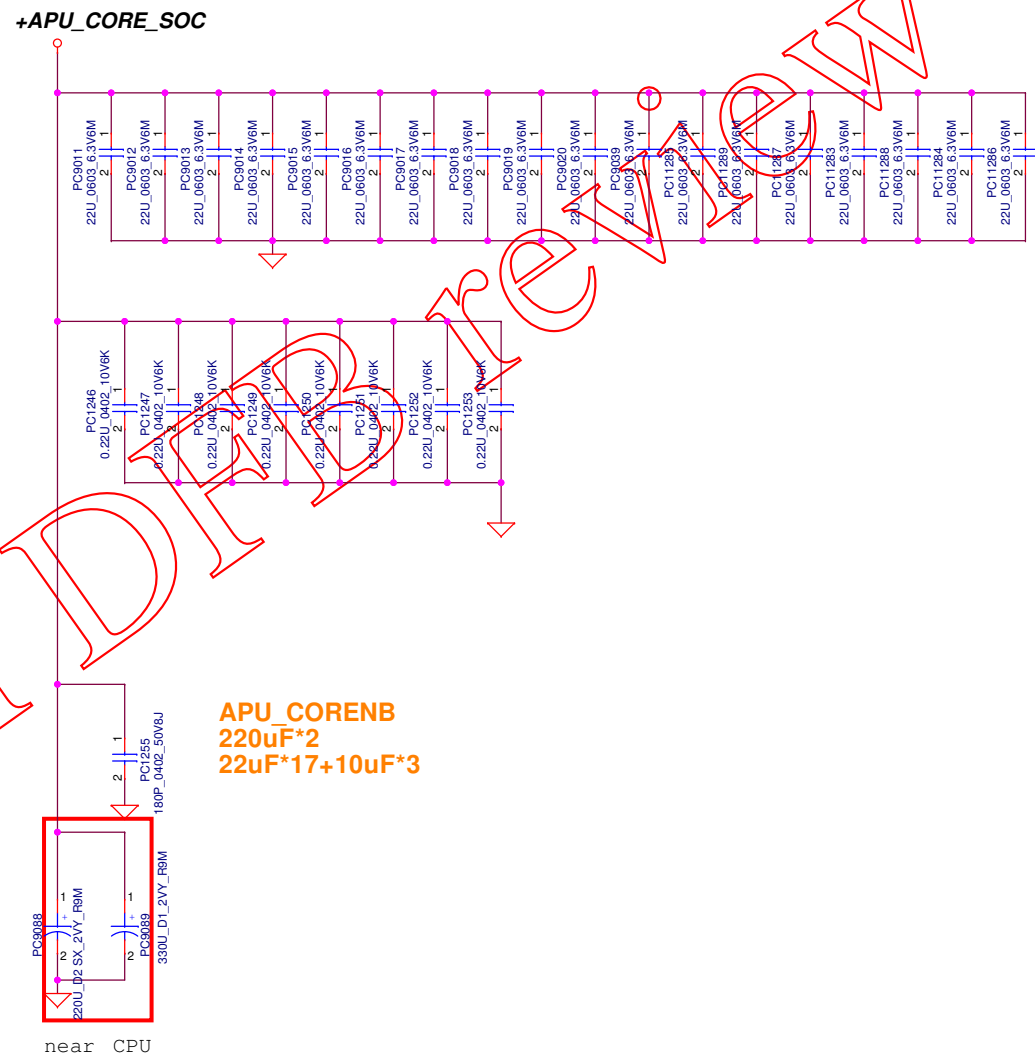
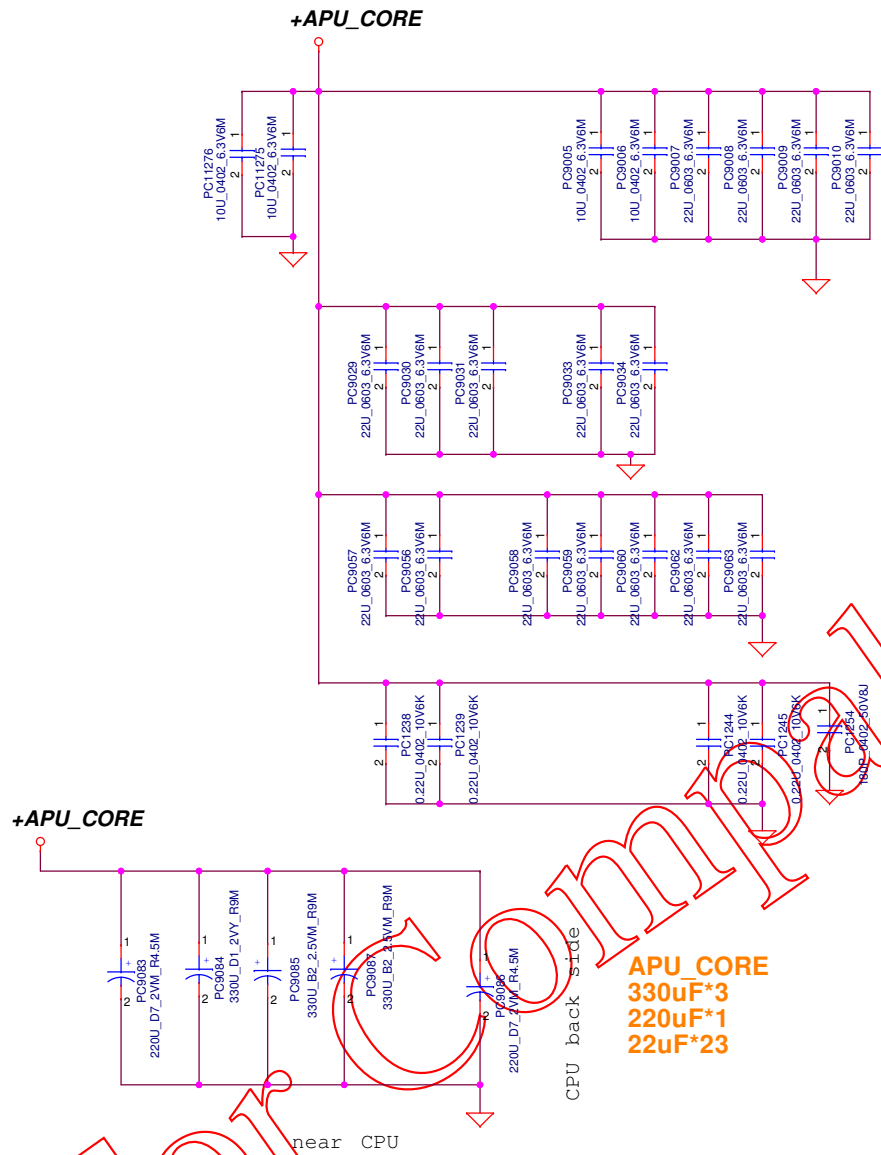
APU CORE  
TDC 35A (HILL)  
Peak current > 45A  
OCP current > 55A  
FSW=400kHz  
DCR 1.19mohm +/-5%  
H/S Rds(on) : 6.5mohm TYP MAX  
L/S Rds(on) : 2.0mohm , 2.5mohm

APU CORE\_NB  
TDC 19A (HILL)  
Peak current 13A  
OCP current > 16A  
FSW=400kHz  
DCR 1.19mohm +/-5%  
H/S Rds(on) : 6.5mohm TYP MAX  
L/S Rds(on) : 2.0mohm , 2.5mohm

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+*APU\_CORE*

## +APU\_CORE\_SOC



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EE PIR List for SIV phase

NO	DATE	PAGE	MODIFICATION LIST	PURPOSE
1	18/08/08	13	Re-connect DDR_B_CS0# to Pin149 and DDR_B_CS1# to Pin157.	Fix DDR S0-DIMM can't recognized issue
2	18/08/29	20	Swap SPK signal L/R for SPK module	For audio request
3	18/08/29	21	Change 12MHz cap from 20pF to 33pF	For crystal EA result fine tuning
4	18/08/29	9	Change 48MHz cap from 6.8pF to 4.7pF	For crystal EA result fine tuning
5	18/08/29	26	Add thermal sensor circuit	For thermal request\
6	18/08/29	25	Combine Type-C CC signal into DT4	For ESD request
7	18/08/29	29	Change 0.8VS/1.8VS solution from single to dual load switch	For EA fine tune
8	18/08/29	20	Reserve 4pcs 2.2pF cap. on audio HDA bus (RST#,SYNC,SDIN,SDOUT)	For RF request
9	18/08/29	7	Change RC17 to mount and RC18 to un-mount on DP_STEREOSYNC	For HDMI HW enable
10	18/09/13	27	Change RTP3,RTP4 from 10K to 1K , CTP2,CTP3 to 150pF	For EA fine tune

EE PIR List for SIT phase

NO	DATE	PAGE	MODIFICATION LIST	PURPOSE
1	18/10/29	28	Swap EC FAN1 PWM/SPEED & FAN2 PWM/SPEED trace	For Thermal request
2	18/10/29	26	RF required Reserve FAN PWM/Speed couple cap : CF3~CF8	For RF request
3	18/10/29	20	Supplier required modify AVDD5 power domain, +5VS to +5VALW	Follow Supplier suggestion
4	18/10/29	20	ESD required reserve HGND/HDNDB couple cap : CA63~CA66	For ESD EA test request

## Version change list (P.I.R. List)

Page 1 of 1 for  
PWR

Item	Reason for change	PG#	Modify List	Date	Phase
1	Based on AMD SDLE test	P38	Change PR1046 to 54.9k ohm	2018/08/23	For SIV
2	Based on AMD SDLE test	P38	Change PR1053 to 21.5k ohm	2018/08/23	For SIV
3	Based on AMD SDLE test	P38	Change PR1055 to 4.87k ohm	2018/08/23	For SIV
4	Based on AMD SDLE test	P38	Change PR1056 to 28.7k ohm	2018/08/23	For SIV
5	Based on AMD SDLE test	P38	Change PR2226 to 261k ohm	2018/08/23	For SIV

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