









CPU

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
337S00722	1	CPU,CPL8,SRF6U,FRQ,2.6,1.15,6C,BGA1440	U0500	CRITICAL	CPU:6C-2.6G
337S00731	1	CPU,CPL8,SRFD1,FRQ,2.3,1.2,8C,BGA1440	U0500	CRITICAL	CPU:8C-2.3G
337S00724	1	CPU,CPL8,SRFD0,FRQ,2.4,1.25,8C,BGA1440	U0500	CRITICAL	CPU:8C-2.4G
998-12472	1	INTERPOSER,CPL-H,BGA1440	U0500	CRITICAL	CPU:INTERPOSER

DRAM

Note: Two rows per part for legibility

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
333S00200	8	1C,DDR4-2666,8GBIT,19NM,H,BGA78	U0300,U0310,U0320,U0330,U0400,U0410,U0420,U0430	CRITICAL	DRAM:HY-16GB
333S00200	8	1C,DDR4-2666,8GBIT,19NM,H,BGA78	U0300,U0310,U0320,U0330,U0400,U0410,U0420,U0430	CRITICAL	DRAM:HY-16GB
333S00163	8	1C,DDR4-2666,8GBIT,211B,18NM,M,BGA78	U0300,U0310,U0320,U0330,U0400,U0410,U0420,U0430	CRITICAL	DRAM:MC-16GB
333S00163	8	1C,DDR4-2666,8GBIT,211B,18NM,M,BGA78	U0300,U0310,U0320,U0330,U0400,U0410,U0420,U0430	CRITICAL	DRAM:MC-16GB
333S00201	8	1C,DDR4-2666,16GBIT,19NM,H,BGA78	U0300,U0310,U0320,U0330,U0400,U0410,U0420,U0430	CRITICAL	DRAM:HY-32GB
333S00201	8	1C,DDR4-2666,16GBIT,19NM,H,BGA78	U0300,U0310,U0320,U0330,U0400,U0410,U0420,U0430	CRITICAL	DRAM:HY-32GB
998-18917	8	1C,DDR4-3200,16GBIT,16NM,ES,M,BGA78	U0300,U0310,U0320,U0330,U0400,U0410,U0420,U0430	CRITICAL	DRAM:MC-32GB
998-18917	8	1C,DDR4-3200,16GBIT,16NM,ES,M,BGA78	U0300,U0310,U0320,U0330,U0400,U0410,U0420,U0430	CRITICAL	DRAM:MC-32GB
998-18918	8	1C,DDR4-3200,32GBIT,16NM,ES,M,BGA78	U0300,U0310,U0320,U0330,U0400,U0410,U0420,U0430	CRITICAL	DRAM:MC-64GB
998-18918	8	1C,DDR4-3200,32GBIT,16NM,ES,M,BGA78	U0300,U0310,U0320,U0330,U0400,U0410,U0420,U0430	CRITICAL	DRAM:MC-64GB

GPU

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
337S00719	1	GPU,AMD,NAVI14,ULA,A0,ES,BGA1125	UA000	CRITICAL	GPU:ULA
337S00720	1	GPU,AMD,NAVI14,PROA,A0,ES,BGA1125	UA000	CRITICAL	GPU:PRA
998-19127	1	GPU,AMD,NAVI14,ULA,A0,ES,TDP,BGA1125	UA000	CRITICAL	GPU:TDP
998-19125	1	GPU,AMD,NAVI14,ULA,A0,ES,FF,PSL,BGA1125	UA000	CRITICAL	GPU:UFS
998-19126	1	GPU,AMD,NAVI14,ULA,A0,ES,SS,PSL,BGA1125	UA000	CRITICAL	GPU:USS
998-19109	1	GPU,AMD,NAVI14,ULA,A0,ES,FF,MTAG,BGA1125	UA000	CRITICAL	GPU:UPU
998-19110	1	GPU,AMD,NAVI14,ULA,A0,ES,SS,MTAG,BGA1125	UA000	CRITICAL	GPU:USU
998-19111	1	NAVI14 ADPTR,VDDGFX,VDDSOC,D406	UA000	CRITICAL	GPU:ADPTR_VDDCR
998-19112	1	NAVI14 ADPTR,VDDCI,MVDD,D407	UA000	CRITICAL	GPU:ADPTR_VMEM

VRAM

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
333S00209	4	1C,GDDR6,8GBIT,14GBPS,1.35V,18NM,M,BG180	U9600,U9610,U9700,U9710	CRITICAL	VRAM_IC:MC-4GB
333S00210	4	1C,GDDR6,8GBIT,14GBPS,1.35V,18NM,S,BG180	U9600,U9610,U9700,U9710	CRITICAL	VRAM_IC:SS-4GB
333S00211	4	1C,GDDR6,16GBIT,14GBPS,1.35V,19NM,H,B180	U9600,U9610,U9700,U9710	CRITICAL	VRAM_IC:HY-8GB
333S00212	4	1C,GDDR6,16GBIT,14GBPS,1.35V,16NM,M,B180	U9600,U9610,U9700,U9710	CRITICAL	VRAM_IC:MC-8GB
333S00213	4	1C,GDDR6,16GBIT,14GBPS,1.35V,18NM,S,B180	U9600,U9610,U9700,U9710	CRITICAL	VRAM_IC:SS-8GB

PCH CNL-H					
PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
337S00552	1	1C,CNL PCH-H,USFF,SR40F,FRQ,BGA499	U1200	CRITICAL	

ACE & Ridges

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
338S00441	2	1C,TBT,TITAN RIDGE DP,SLMBS,FRQ,CL,CSP337	U2800,UB000	CRITICAL	
353S01960	4	1C,CD3217,ACE2,B2,USB PWR SW W/HV,BGA123	U3100,U3200,UB300,UB400	CRITICAL	

Power Controllers					
PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
353S01525	1	1C,ISL9240HIB02,PMU,S0DMA,WCSF40,2.1X3.3MM	U7000	CRITICAL	
353S00928	1	1C,ISL95828A,INVP8 CPU RGB,QFN48,EX60M	U7100	CRITICAL	
338S00267	1	1C,PMU,CALP8,D249AA,OTP-A1,CSP24,0.4P	U7800	CRITICAL	
353S02108	1	1C,RAA22510A2,SV12,CONTROLLER,QFN40,5X5	UA600	CRITICAL	
353S01660	1	1C,SUPPLY,INTERS11,ISL6277B,SV12,0,QFN48	UA800	CRITICAL	

WIFI/BT Module & Alternate					
PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
339S00609	1	1C,MODULE,WIFI/BT,MBRATA,MBRPOCR,H,837,T,GA0185	U3730	CRITICAL	

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
339S00610	339S00609	ANY	ALL	WIFI/BT Module

Programmable Parts						
PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION	
341S01435	1	TBT-X,R0 (VXXXX) PROTO-3,X970	U2890	CRITICAL		341S01435
341S01436	1	TBT-T,R1 (VXXXX) PROTO-3,X970	UB090	CRITICAL		341S01436
341S01434	1	ROM,BT FLASH (V37) PROTO-3,X970	U3750	CRITICAL		341S01434
341S00725	1	WIFI ROM (V01) WW1,X665	U3710	CRITICAL		341S00725
341S01403	1	ROM,VBIOS,NAVI-14,PROA (VXXX) P-0-A,X970	UA130	CRITICAL	GPU:PRA	341S01403
341S01404	1	ROM,VBIOS,NAVI-14,ULA (VXXX) P-0-A,X970	UA130	CRITICAL	GPU:ULA	341S01404

H9M & Alternates					
PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
339S00373	1	POP,018RALTA8+2GB 21NM,H,B0,SCW,CSP1406	U3900	CRITICAL	SOC:2GB
339S00371	1	POP,018RALTA8+1GB 21NM,H,B0,ATK,CSP1406	U3900	CRITICAL	SOC:1GB


PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
339S00372	339S00373	ANY	ALL	H9M 2GB
339S00377	339S00373	ANY	ALL	H9M 2GB
339S00378	339S00373	ANY	ALL	H9M 2GB
339S00376	339S00371	ANY	ALL	H9M 1GB
339S00370	339S00371	ANY	ALL	H9M 1GB
339S00375	339S00371	ANY	ALL	H9M 1GB

SSD NAND

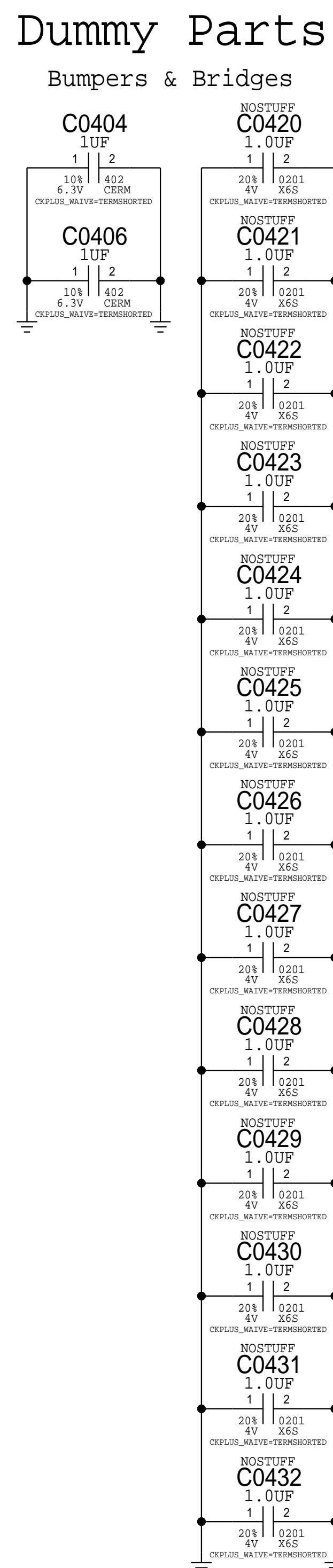
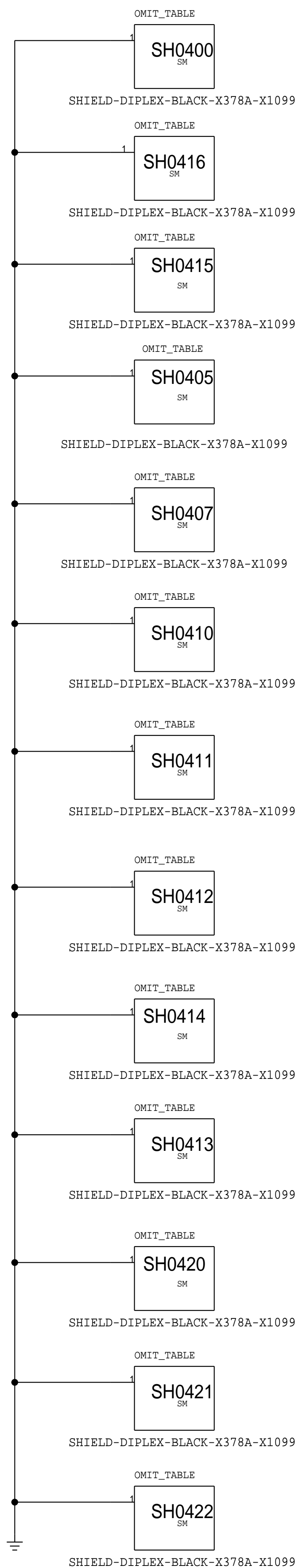
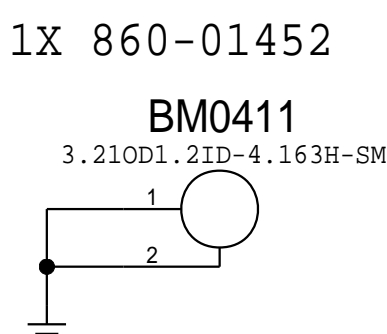
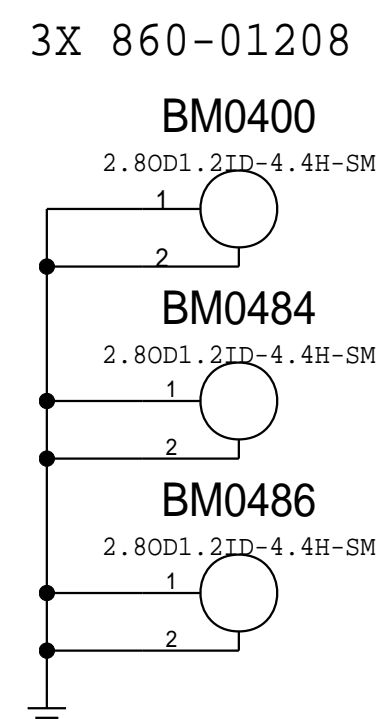
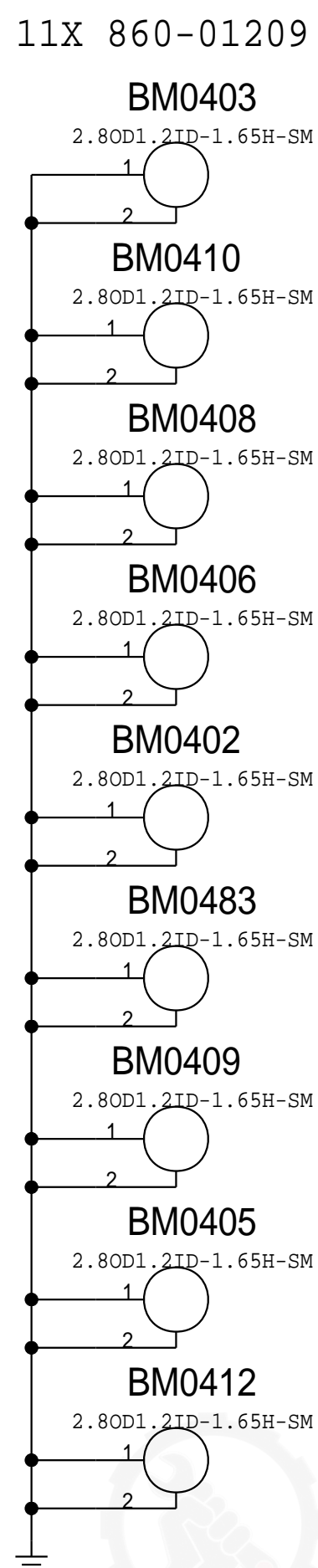
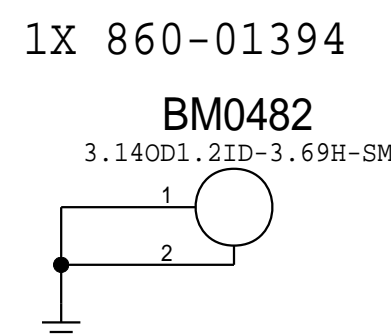
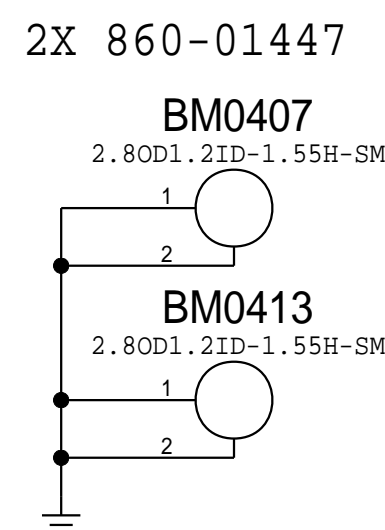
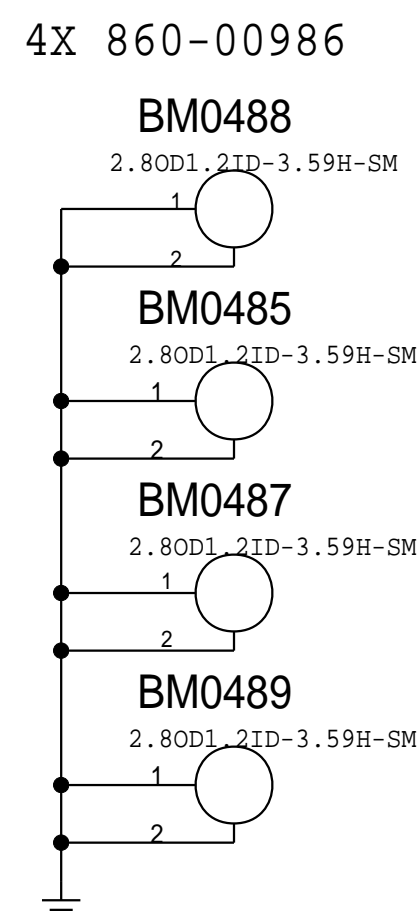
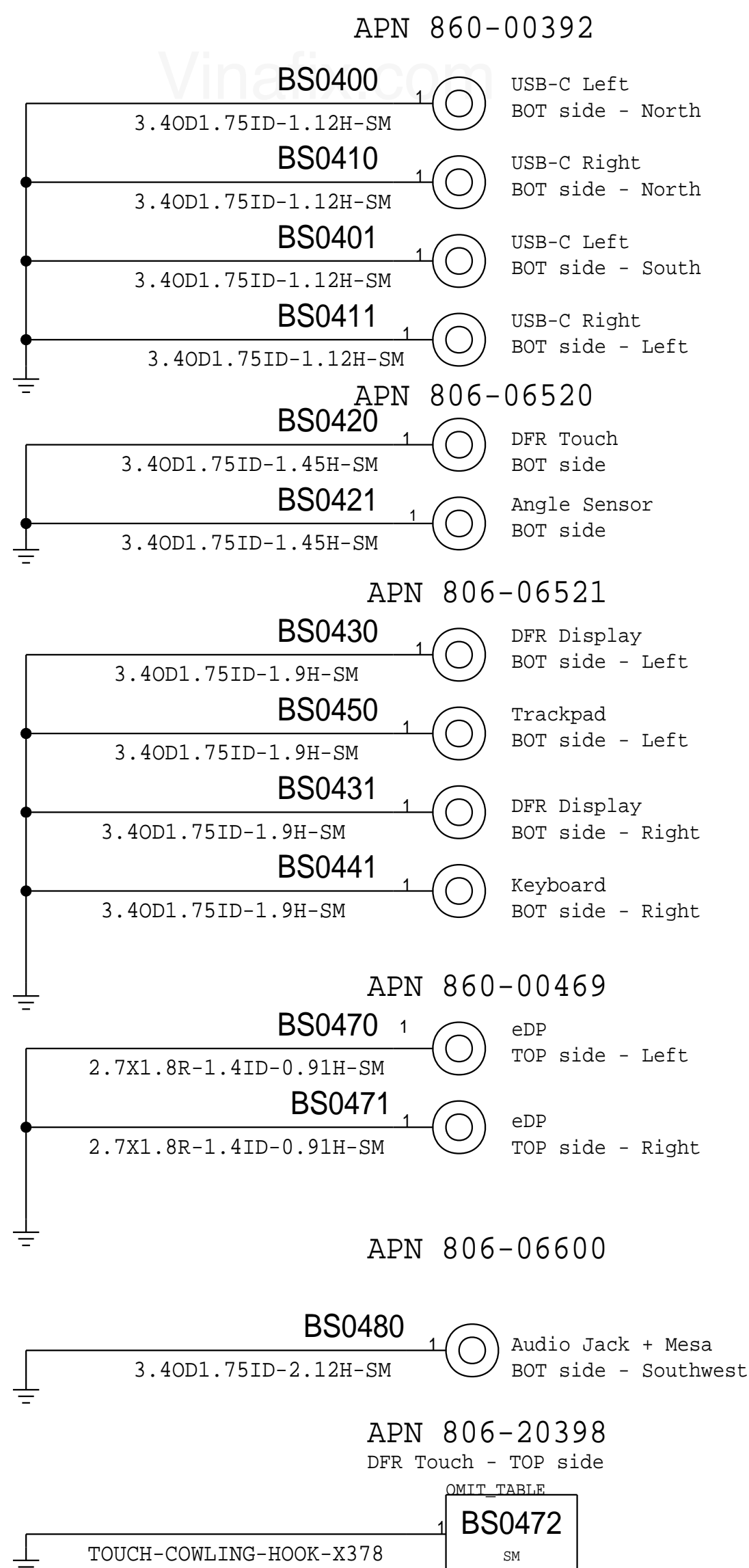
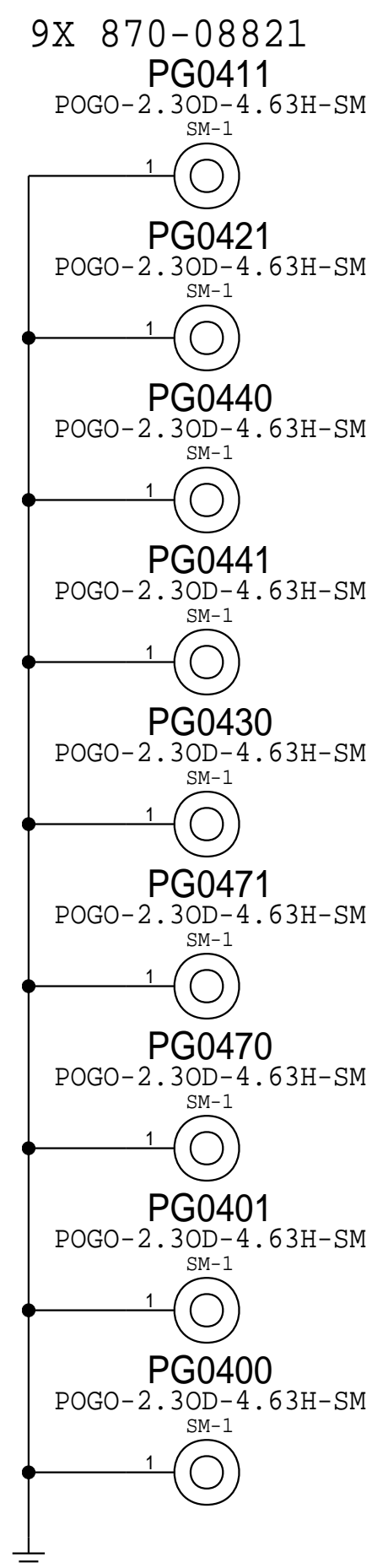
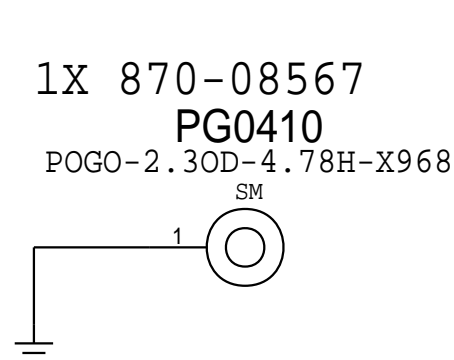
PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
998-16395	5	NAND,3DV4,64GBT,S48,256G,T,SUB Y,SLGA110	U8600,U9100,U9200,U9300,U9400	CRITICAL	SSD_NAND:TS-256
998-16969	5	NAND,3DV4,64GBT,S48,256G,SD,SUBY,SLGA110	U8600,U9100,U9200,U9300,U9400	CRITICAL	SSD_NAND:WD-256
998-16397	5	NAND,3DV4,128GBT,S48,256G,T,SUBY,SLGA110	U8600,U9100,U9200,U9300,U9400	CRITICAL	SSD_NAND:TS-512
335S00424	5	NAND,3DV5,128GBT,S48,256G,SS,SLGA110	U8600,U9100,U9200,U9300,U9400	CRITICAL	SSD_NAND:SS-512
998-16970	5	NAND,3DV4,128GBT,S48,256G,SD,SHY,SLGA110	U8600,U9100,U9200,U9300,U9400	CRITICAL	SSD_NAND:WD-512
335S00395	6	NAND,3DV4,192GBT,XXX,S48,256G,T,SLGA110	U8600,U8700,U9100,U9200,U9300,U9400	CRITICAL	SSD_NAND:TS-1TB
335S00407	6	NAND,3DV4,192GBT,XXX,S48,256G,H,SLGA110	U8600,U8700,U9100,U9200,U9300,U9400	CRITICAL	SSD_NAND:WD-1TB
335S00395	1	NAND,3DV4,192GBT,XXX,S48,256G,T,SLGA110	U8800	CRITICAL	SSD_NAND:TS-2TB
335S00397	6	NAND,3DV4,320GBT,XXX,S48,256G,T,SLGA110	U8600,U8700,U9100,U9200,U9300,U9400	CRITICAL	SSD_NAND:TS-2TB
335S00407	1	NAND,3DV4,192GBT,XXX,S48,256G,H,SLGA110	U8800	CRITICAL	SSD_NAND:WD-2TB
335S00408	6	NAND,3DV4,320GBT,XXX,S48,256G,SD,SLGA110	U8600,U8700,U9100,U9200,U9300,U9400	CRITICAL	SSD_NAND:WD-2TB
335S00380	8	NAND,3DV4,512GBT,S48,256G,H,SLGA110	U8600,U8700,U8800,U8900,U9100,U9200,U9300,U9400	CRITICAL	SSD_NAND:HY-4TB
335S00391	8	NAND,3DV4,512GBT,XXX,S48,256G,SD,SLGA110	U8600,U8700,U8800,U8900,U9100,U9200,U9300,U9400	CRITICAL	SSD_NAND:WD-4TB
335S00433	8	NAND,3DV4,1TBT,XXX,S48,512G,SD,SLGA110	U8600,U8700,U8800,U8900,U9100,U9200,U9300,U9400	CRITICAL	SSD_NAND:WD-8TB

SSD NAND Substrate Alts				
Sub1		Sub2		
PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
998-16394	998-16395	ANY	ALL	SSD NAND: TB_256
998-16944	998-16969	ANY	ALL	SSD NAND: WD_256
998-16396	998-16397	ANY	ALL	SSD NAND: TB_512
998-16945	998-16970	ANY	ALL	SSD NAND: WD_512

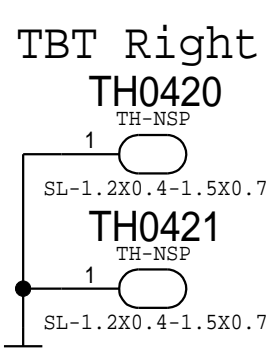
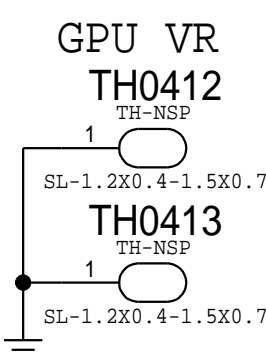
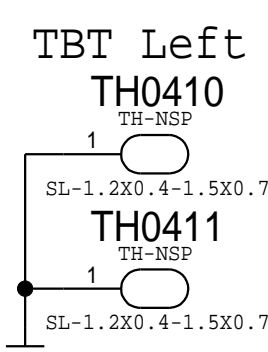
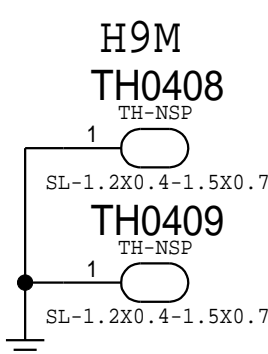
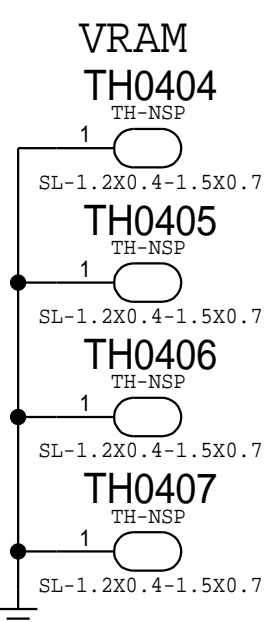
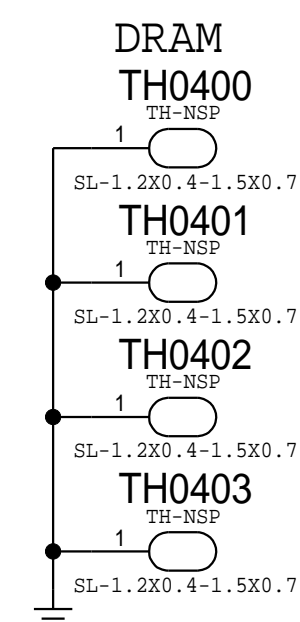
Plasma Cleaned POR				
PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
998-18459	335S00391	ANY	ALL	SSD NAND: WD-4TB Plasma

PAGE TITLE		
BOM Configuration 2		
 Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	
	PAGE	3 OF 200
	SHEET	3 OF 135






## Shield Can Through-Holes



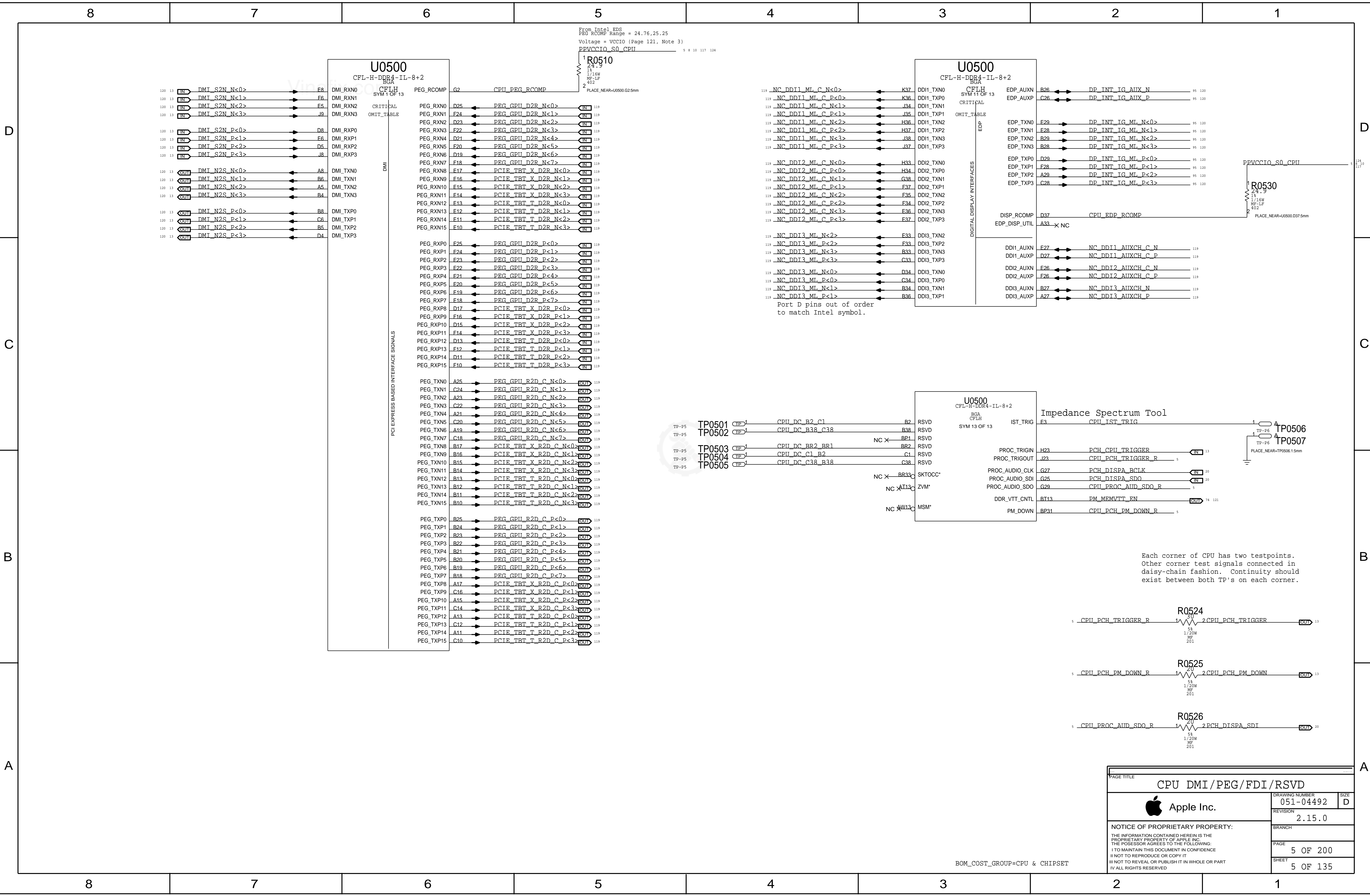
## Shield Cans & Cowlings

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
806-20400	1	SHIELD,FENCE,DIPLEX,X968	SH0400	CRITICAL	
806-17111	1	SHIELD,FENCE,H9M,X1181	SH0405	CRITICAL	
806-17829	1	SHIELD,FENCE,TR,RT,X1181	SH0407	CRITICAL	
806-20399	1	SHIELD,FENCE,TR,UT,X968	SH0410	CRITICAL	
806-21174	2	SHIELD,FENCE,DRAM,X1181	SH0411,SH0412	CRITICAL	
806-15804	2	SHIELD,SLED,GPU,X1183	SH0413,SH0415	CRITICAL	
806-13997	2	SHIELD,SLED,CPU,X1181	SH0414,SH0416	CRITICAL	
806-20878	1	SHIELD,FENCE,VRAM,X968	SH0420	CRITICAL	
806-20877	1	SHIELD,FENCE,VRAM,BTM,X968	SH0421	CRITICAL	
806-20876	1	SHIELD,FENCE,GPU VR,X968	SH0422	CRITICAL	
806-20398	1	TOP MODULE TOUCH,COWLING,SMT HOOK,X968	BS0472	CRITICAL	

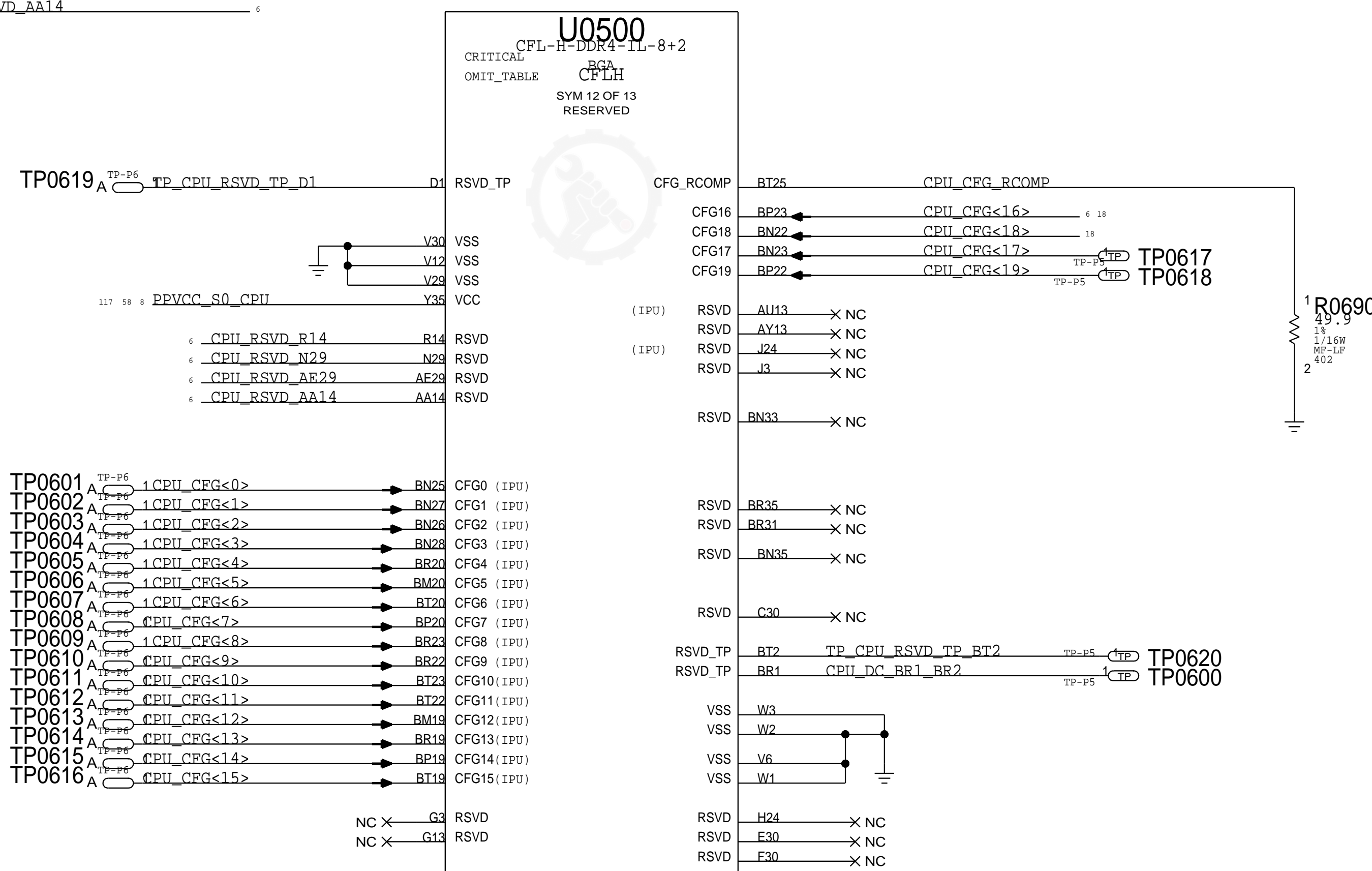
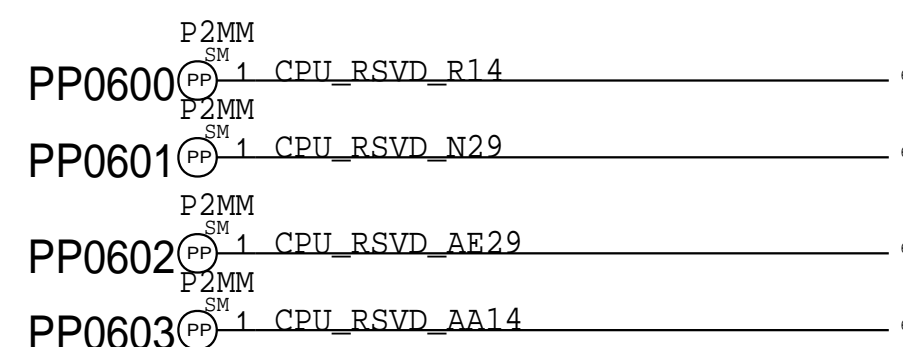
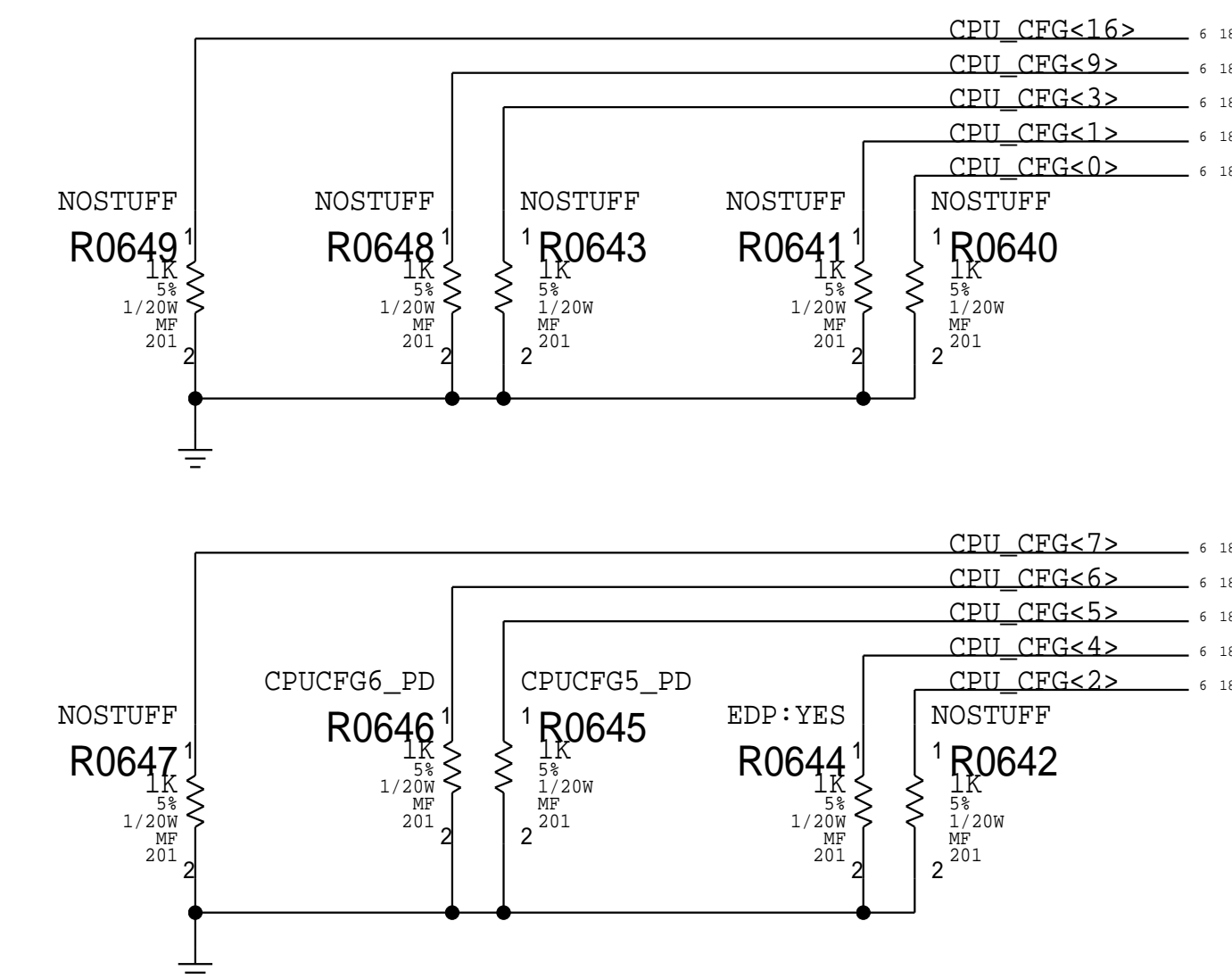
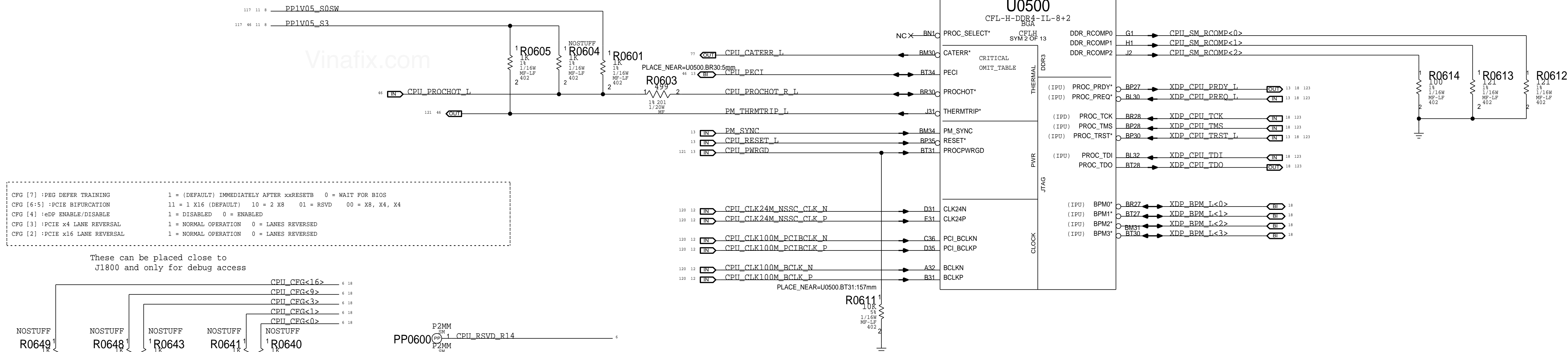
PAGE TITLE		DRAWING NUMBER		SIZE	
PD Parts		051-04492		D	
 Apple Inc.		REVISION		2.15.0	
NOTICE OF PROPRIETARY PROPERTY:		BRANCH			
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		PAGE		4 OF 200	
		SHEET		4 OF 135	

BOM\_COST\_GROUP=MECHANICALS










BOM GROUP	BOM OPTIONS
CPUPEG:X8X8	CPUCFG5_PD
CPUPEG:X8X4X4	CPUCFG6_PD,CPUCFG5_PD

To use PEG X16 configuration, simply remove CPUPEG:X8X8 and CPUPEG:X8X4X4 from BOMs.

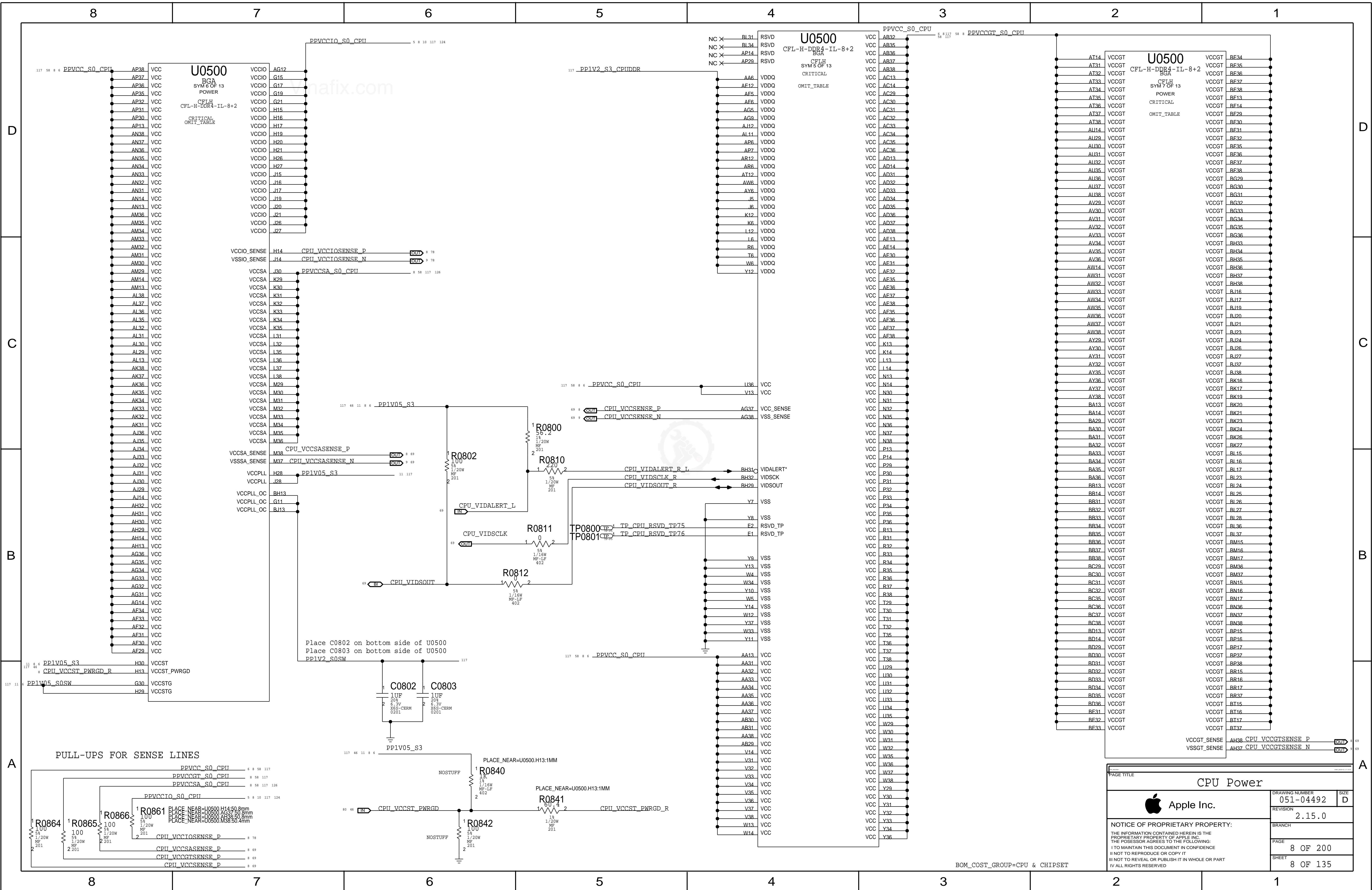
CFL H		
Name	Ball#	Signal Name
BN25	CFG[0]	NOA_N_0
BN27	CFG[1]	NOA_N_1
BN26	CFG[2]	NOA_N_2
BN28	CFG[3]	NOA_N_3
BR20	CFG[4]	NOA_N_4
BM20	CFG[5]	NOA_N_5
BT20	CFG[6]	NOA_N_6
BP20	CFG[7]	NOA_N_7
BR23	CFG[8]	NOA_N_8
BR22	CFG[9]	NOA_N_9
BT23	CFG[10]	NOA_N_10
BT22	CFG[11]	NOA_N_11
BM19	CFG[12]	NOA_N_12
BR19	CFG[13]	NOA_N_13
BP19	CFG[14]	NOA_N_14
BT19	CFG[15]	NOA_N_15
BN23	CFG[17]	NOA_STB_P_0
BP22	CFG[19]	NOA_STB_P_1
D1	RSVD_TP	PEG_VIEW0
E1	RSVD_TP	PEG_VIEW1
E2	RSVD_TP	PEG_VIEW3
E3	IST_TRIG	PEG_VIEW2
BT2	RSVD_TP	DDR_VIEW1
BR1	RSVD_TP	DDR_VIEW0

PAGE TITLE		DRAWING NUMBER		SIZE	
CPU Clock/Misc/JTAG/CFG		051-04492		D	
 Apple Inc.		REVISION		2.15.0	
NOTICE OF PROPRIETARY PROPERTY:		BRANCH			
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		PAGE		6 OF 200	
		SHEET		6 OF 135	

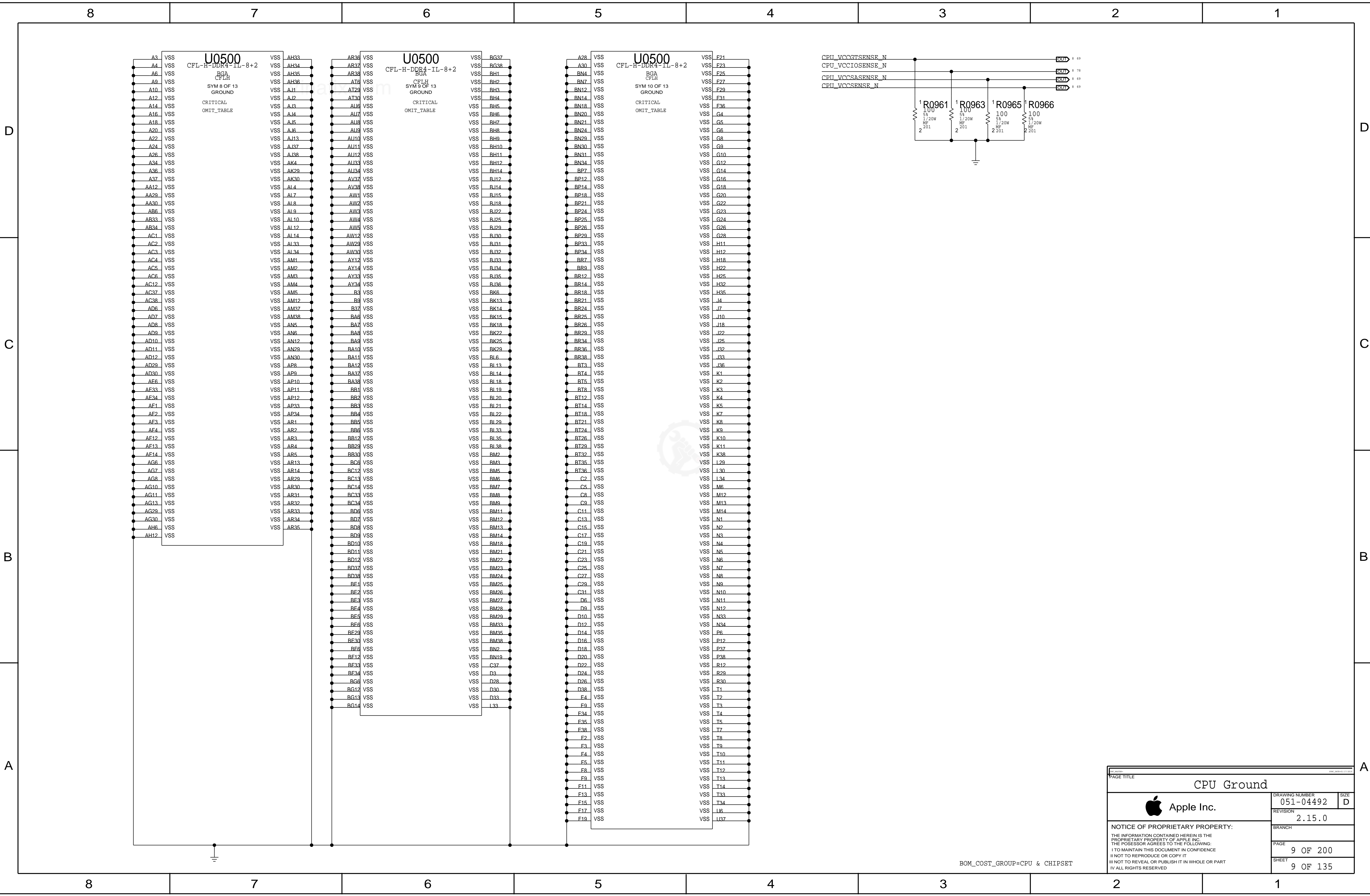












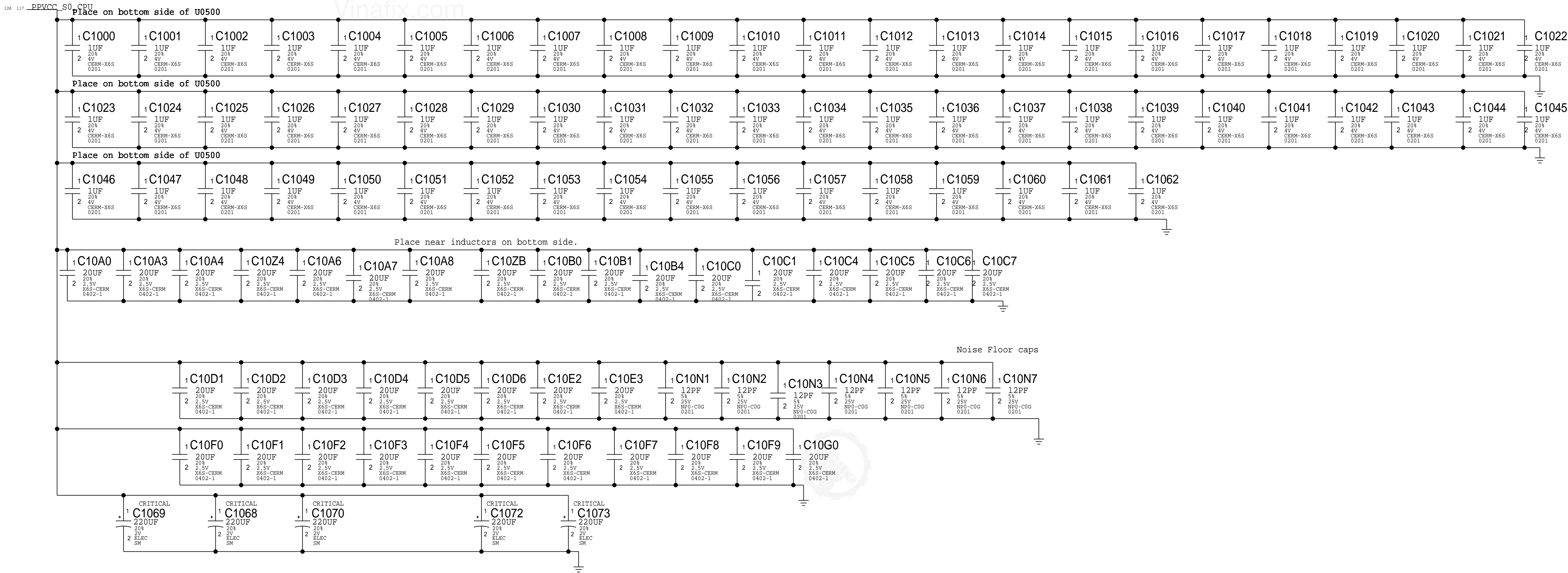


CPU VCore Decoupling

Intel recommendation: 5x 220uF ESR 5m ohms ESL 1.9nH each,4x 47uF 0805 8x22uF 0603, 28x 10uF 0402, 3x 10uF 0402, 69x 1uF 0201  
Apple Implementation:

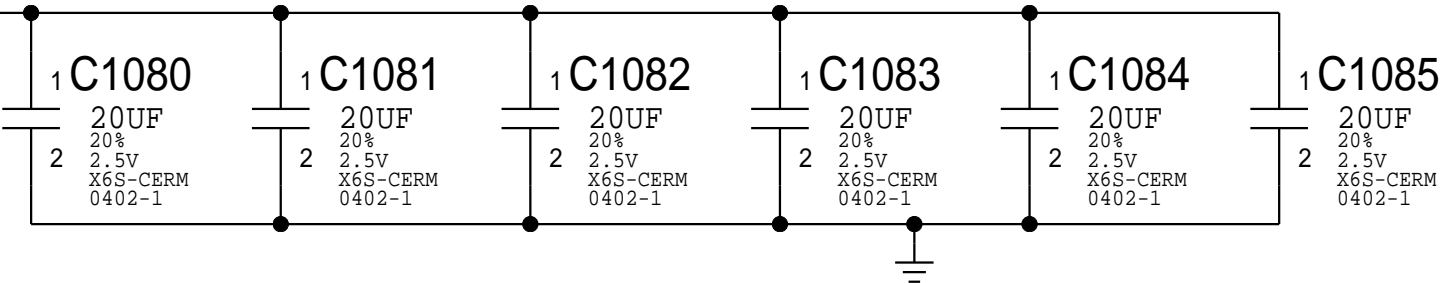
Vcc CPU Core Decoupling from 20140905 BOM

Board Edge: 2x 220uF, 4x 47uF rest on the back side



125 124 117 -PPIV2\_S3\_CPUDDR

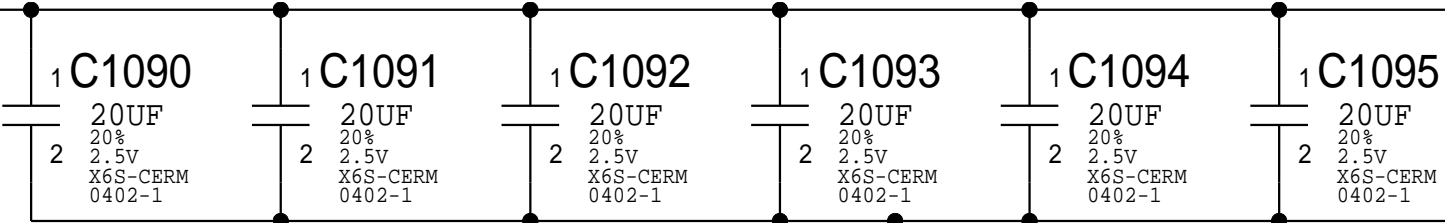
Place on bottom side of U0500.



CPU VDDQ Decoupling

Intel recommendation: 10x 10uF 0402, 4x 22uF 0602  
Apple Implementation:

Place on bottom side of U0500



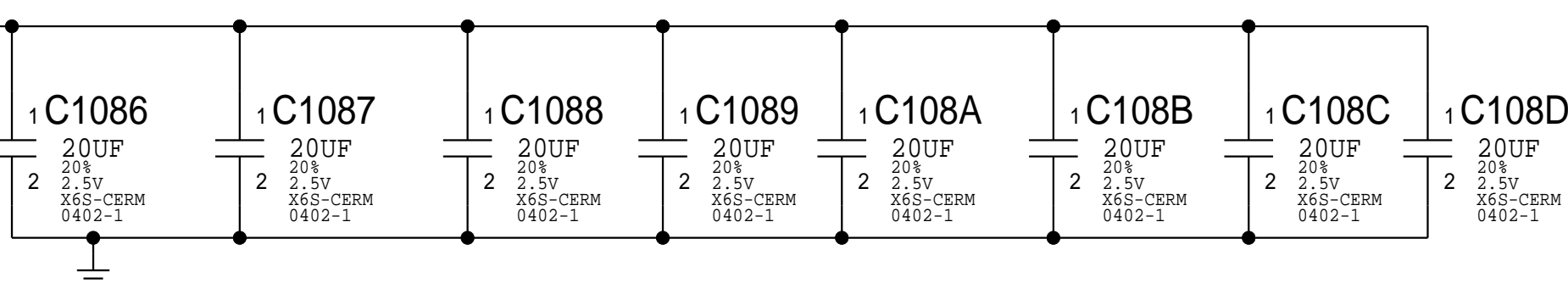
CRITICAL

CPU VCCIO Decoupling

Intel recommendation: 3x 10uF 0402 (opposite CPU)  
Apple Implementation:


Place near U0500 on bottom side

124 117 8 5 -BPVCCIO\_S0\_CPU



NOTE: Intel decoupling recommendations from CBR schematics for Skylake H doc#557227 and PDG section 48.1 (document# 546884)

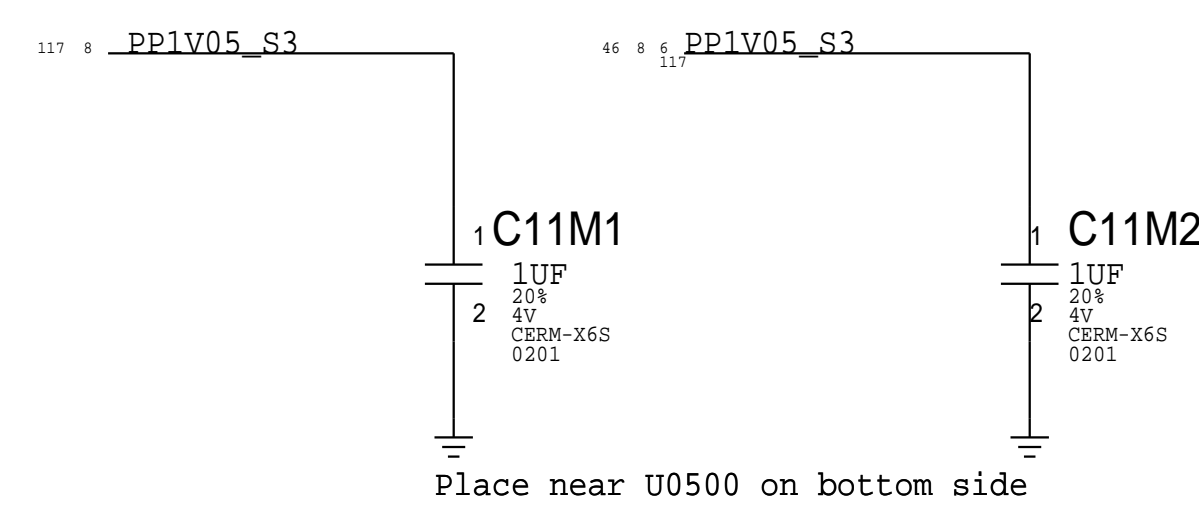
BOM\_COST\_GROUP=CPU & CHIPSET

PAGE TITLE		
CPU Decoupling 1		
 Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	
	PAGE	10 OF 200
	SHEET	10 OF 135






Board Edge: 4x220uF, 7x 47uF rest on back side



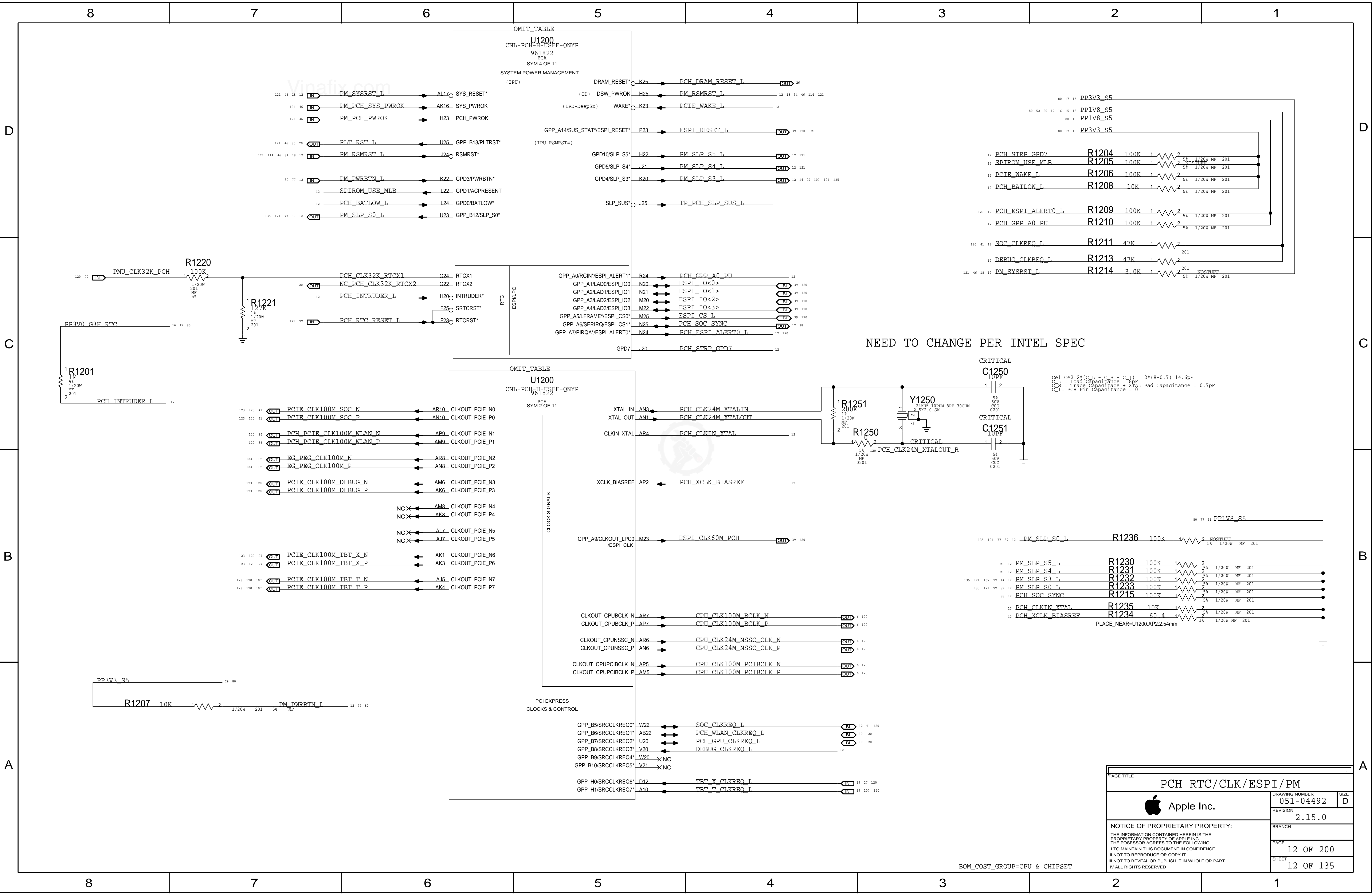
Intel recommendation: 2x 220uF, 1x 47uF 0805. 1x 22uF. 7x 10uF 0402, 3x 1uF 0201\_


Apple Implementation: 2x 220uF, 1x 22uF on board edge, everything else on back side

BOM\_COST\_GROUP=CPU & CHIPSET

PAGE TITLE		CPU Decoupling 2	
 Apple Inc.	DRAWING NUMBER	051-04492	SIZE
	REVISION	2.15.0	
	NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		
BRANCH			
PAGE		11 OF 200	
SHEET		11 OF 135	





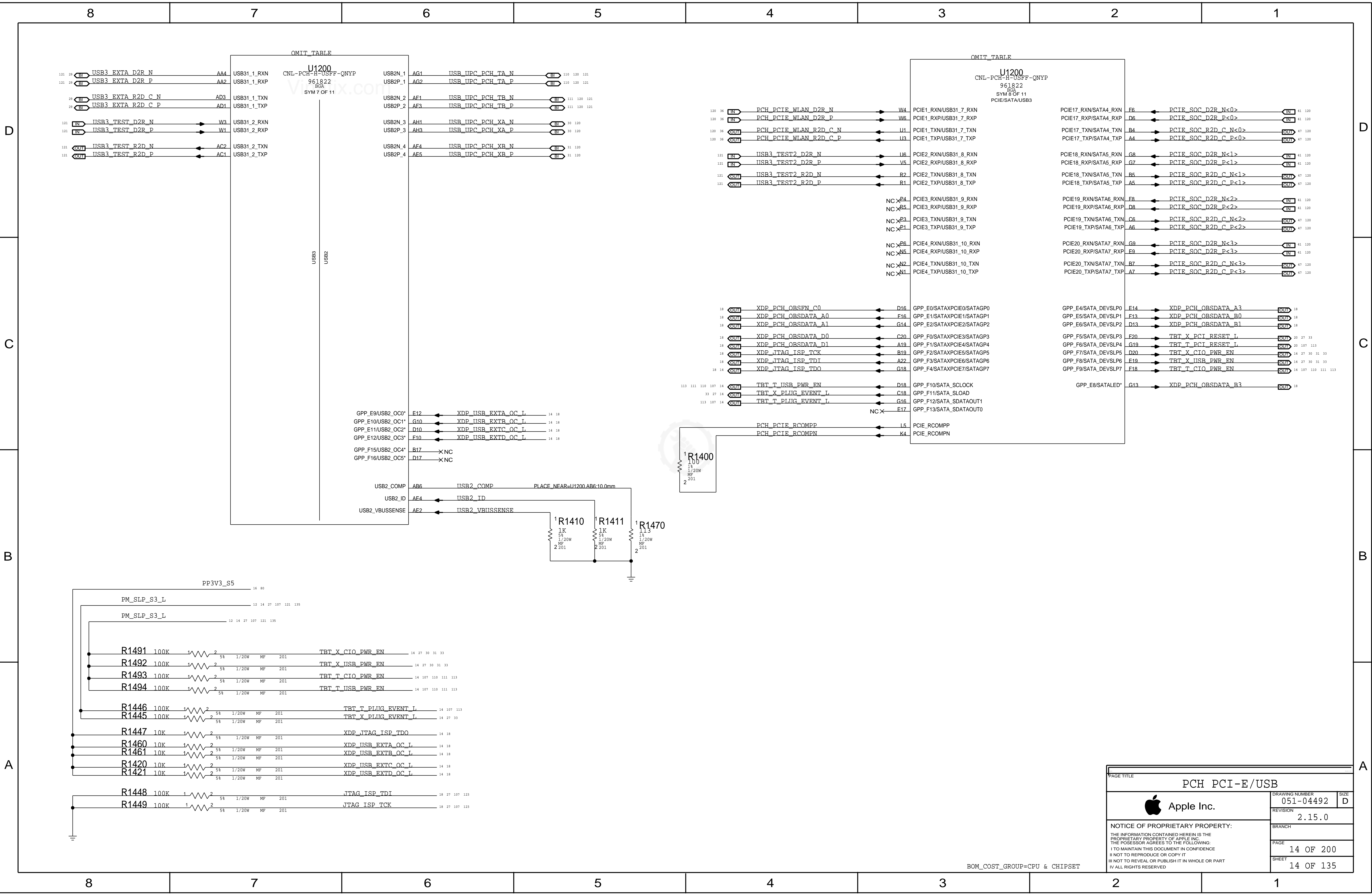
PAGE TITLE		
PCH RTC/CLK/ESPI/PM		
 Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
	BRANCH	
	PAGE	12 OF 200
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		SHEET 12 OF 135


BOM\_COST\_GROUP=CPU & CHIPSET









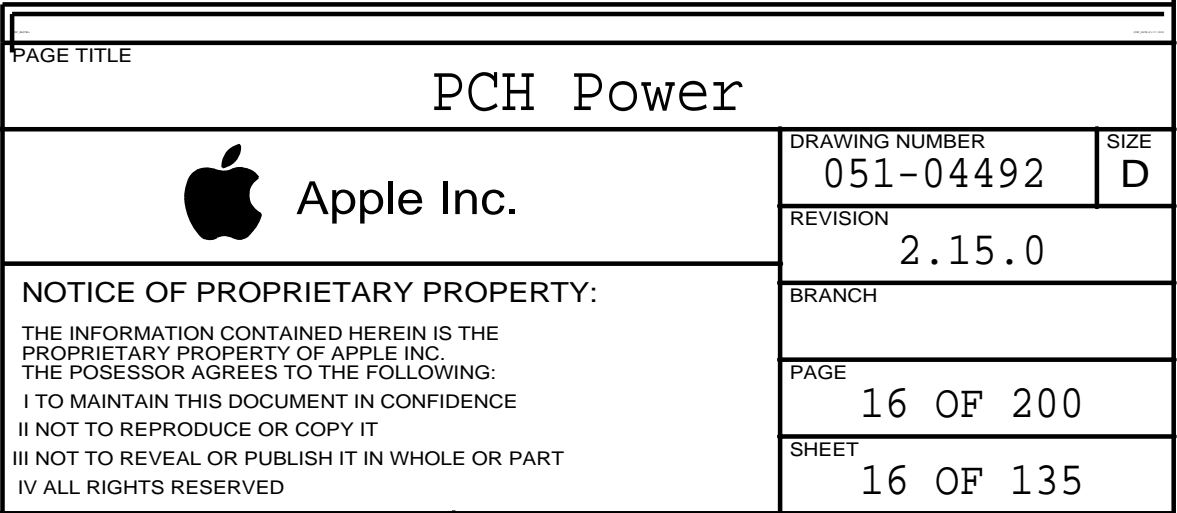
PAGE TITLE		
PCH PCI-E/USB		
 Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
	BRANCH	
	PAGE	14 OF 200
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		SHEET 14 OF 135

BOM\_COST\_GROUP=CPU & CHIPSET

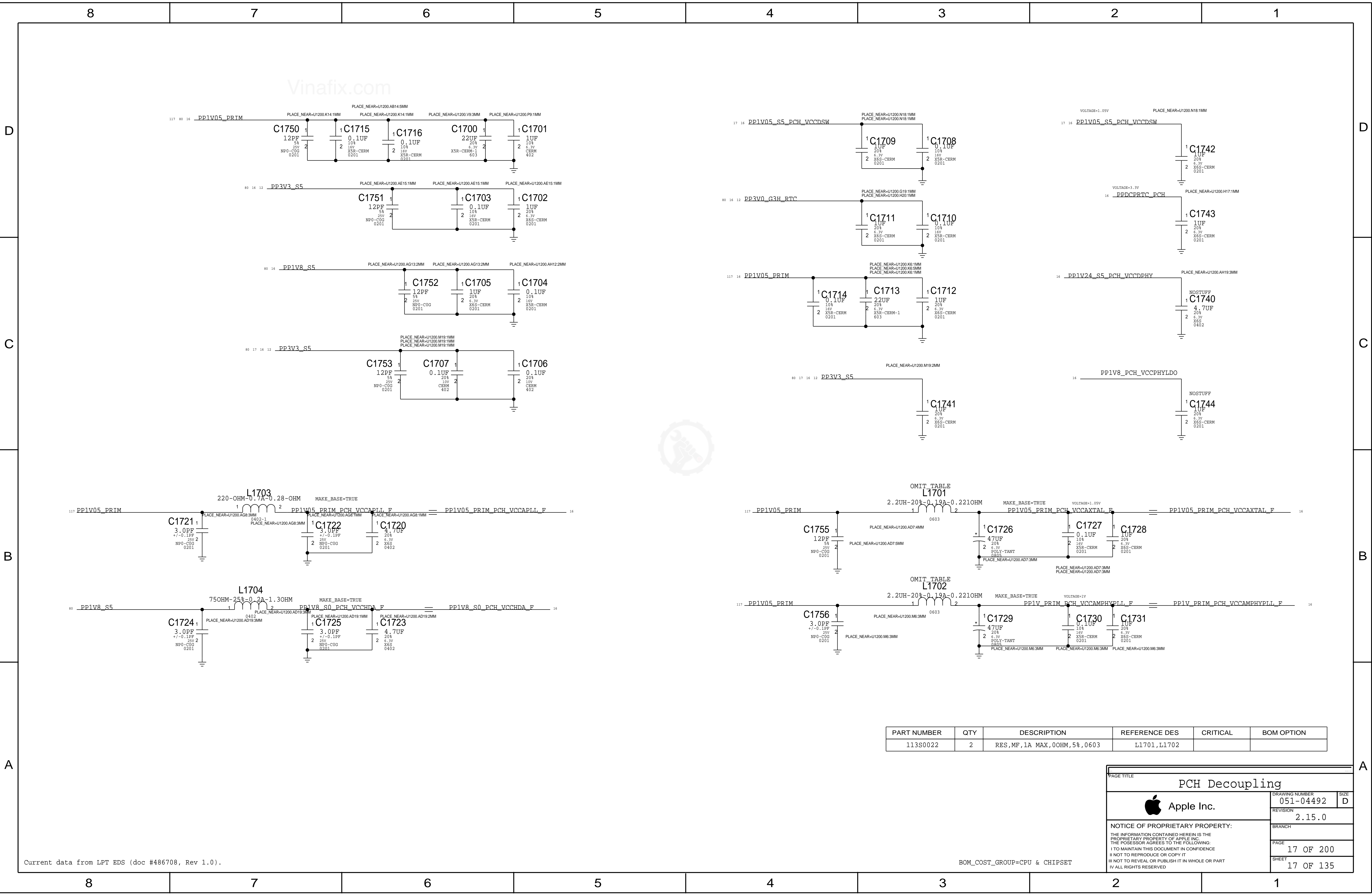












PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
113S0022	2	RES, MF, 1A MAX, 0OHM, 5%, 0603	L1701, L1702		

PAGE TITLE		
PCH Decoupling		
	DRAWING NUMBER	051-04492
	REVISION	2.15.0
	BRANCH	
	PAGE	17 OF 200
NOTICE OF PROPRIETARY PROPERTY:		SHEET
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		17 OF 135
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		
I NOT TO REPRODUCE OR COPY IT		
I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		
I ALL RIGHTS RESERVED		



8

7

6

5

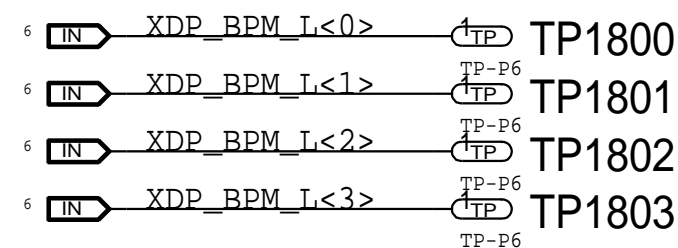
4

3

2

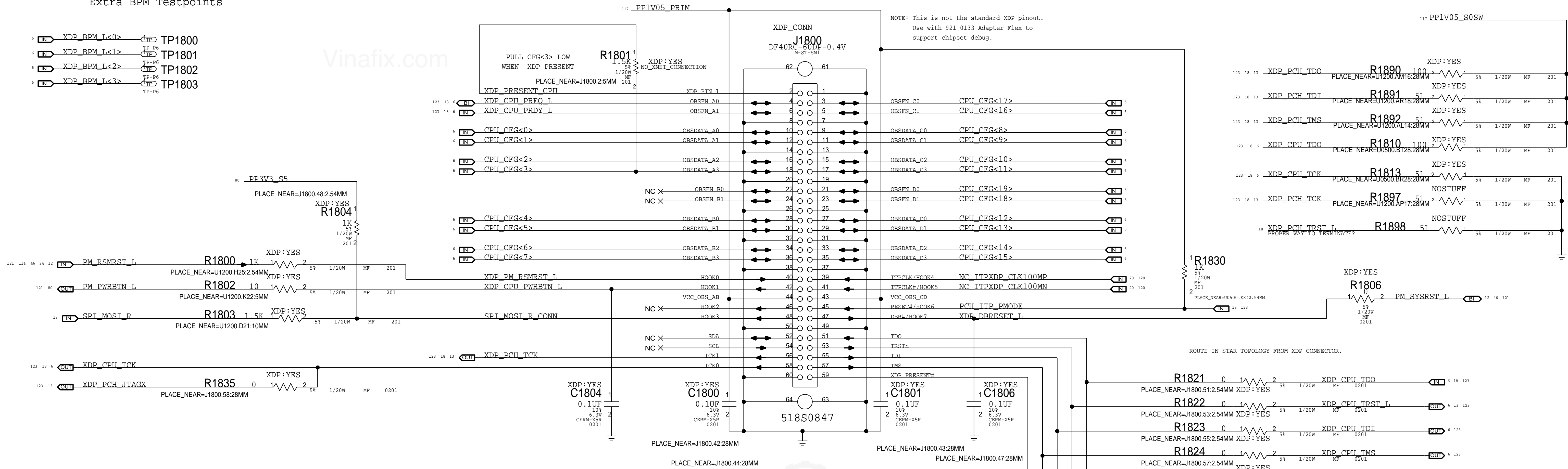
1

## Extra BPM Testpoints



Vinafix.com

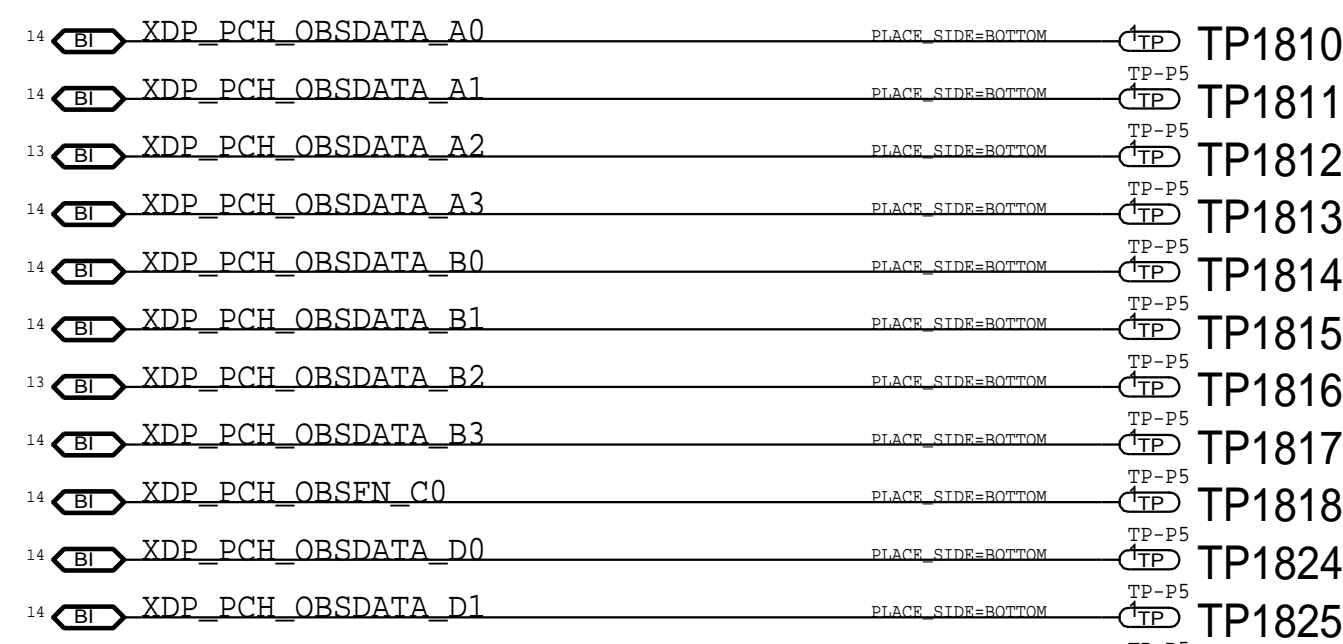
## Primary / Merged (CPU/PCH) Micro2-XDP



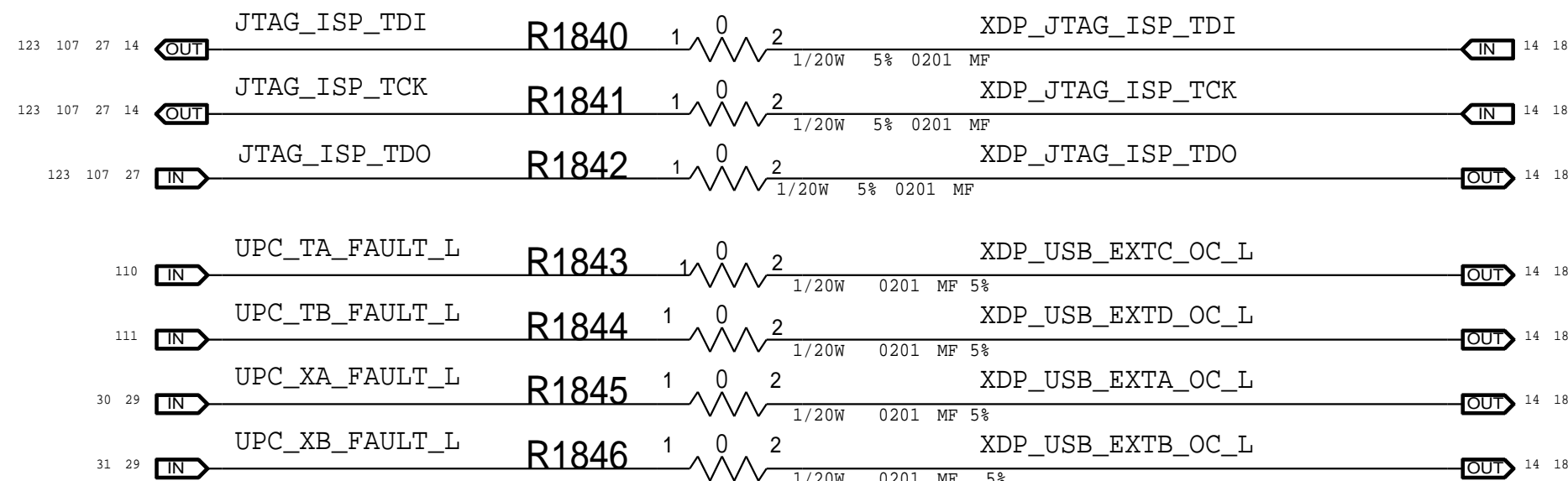
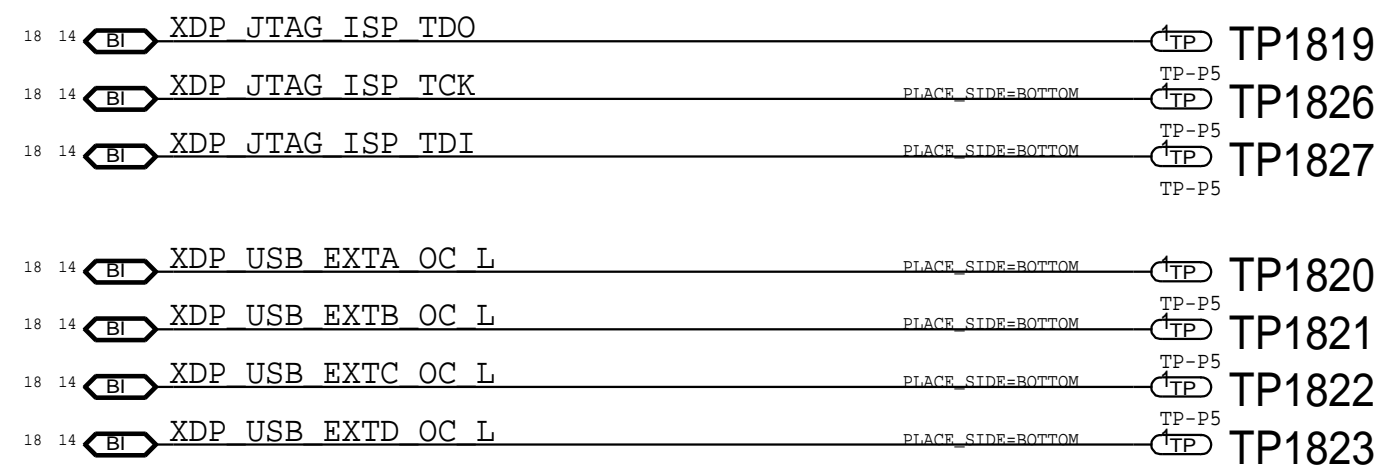
## PCH XDP Signals

These signals do not connect to the Primary (Merged) XDP connector in this architecture. The PDG puts them on a secondary XDP connector that is only needed in some PCH debugging situation. They are listed here to show their secondary XDP functions and to provide test points for signals that are not used elsewhere.

## PCH/XDP Signals



## Non-XDP Signals



Unused GPIOs have TPs.

USB Overcurrents are aliased, do not cause USB OC# events during PCH debug.

JTAG\_ISP (non-TMS) nets are aliased, do not attempt bit-banged JTAG during PCH debug.

BOM\_COST\_GROUP=DEBUG

8

7

6


5

4

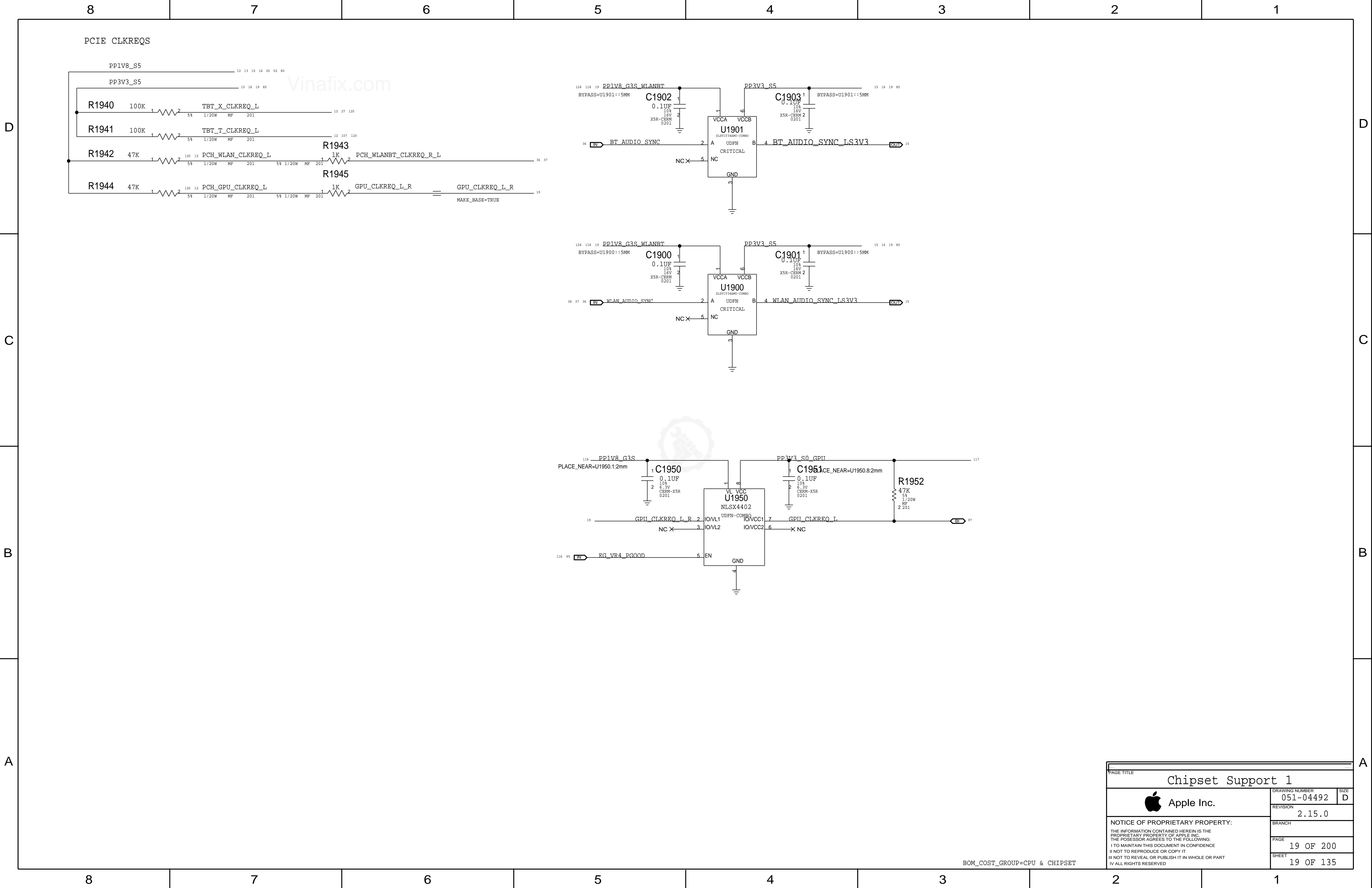
3

2

1

DESIGN: X502/MLB		
LAST CHANGE: Mon Jun 15 22:04:28 2015		
PAGE TITLE		
CPU/PCH Merged XDP		
 Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
	BRANCH	
	PAGE	18 OF 200
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		SHEET 18 OF 135





87654321

BOM\_COST\_GROUP=CPU & CHIPSET

Chipset Support 1

Apple Inc.

051-04492

D

2.15.0

19 OF 200

19 OF 135

NOTICE OF PROPRIETARY PROPERTY:

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:

I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE

II NOT TO REPRODUCE OR COPY IT

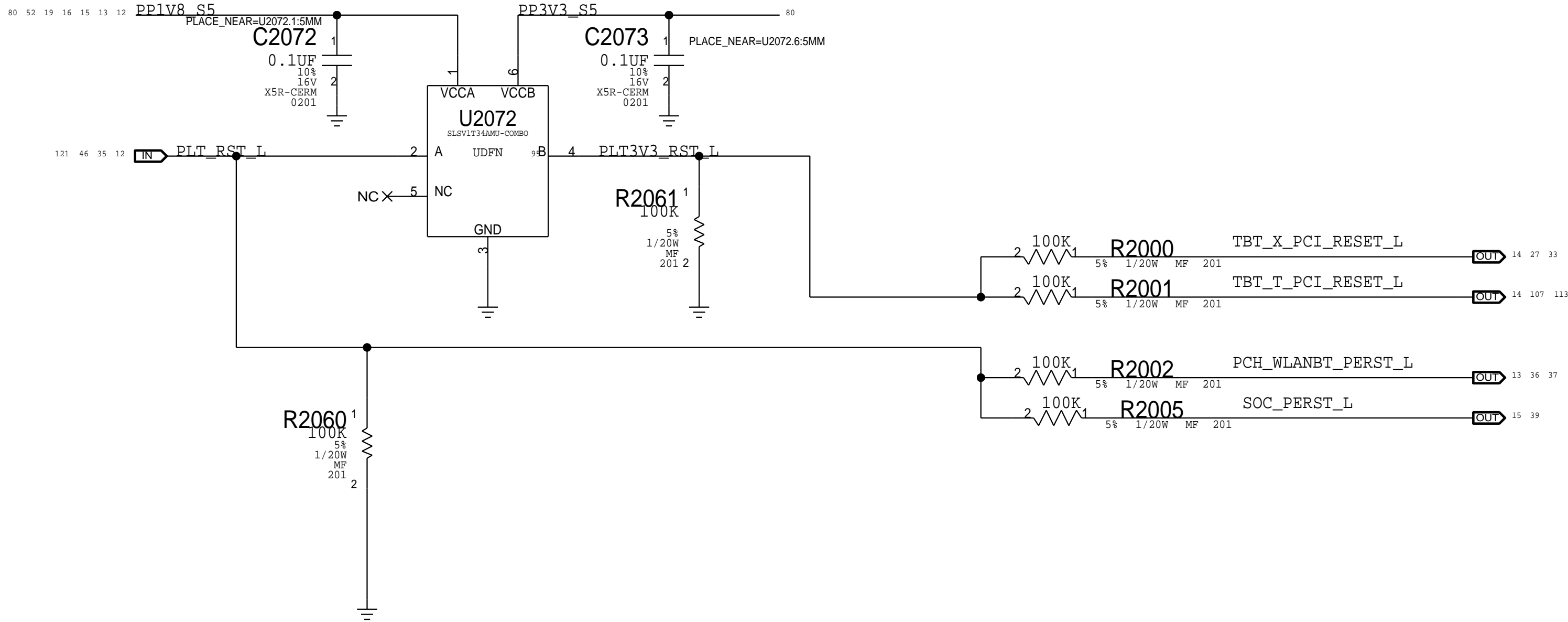
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART

IV ALL RIGHTS RESERVED



Vinafix.com

Platform Reset Connections



NC ALIASES 3

12 NC\_PCH\_CLK32K\_RTCX2 == NC\_PCH\_CLK32K\_RTCX2

SIGNAL ALIASES

13 PCH\_DISPA\_BCLK == PCH\_DISPA\_BCLK 5


13 PCH\_DISPA\_SDI == PCH\_DISPA\_SDI 5

13 PCH\_DISPA\_SDO == PCH\_DISPA\_SDO 5

120 18 NC\_ITPXD\_PCLK100MN == TRUE NC\_ITPXD\_PCLK100MN

120 18 NC\_ITPXD\_PCLK100MP == TRUE NC\_ITPXD\_PCLK100MP

Chipset Support 2

 Apple Inc.	DRAWING NUMBER	051-04492	SIZE	D
	REVISION	2.15.0		
	BRANCH			
	PAGE	20 OF 200		
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED				



## CPU-Based Margining

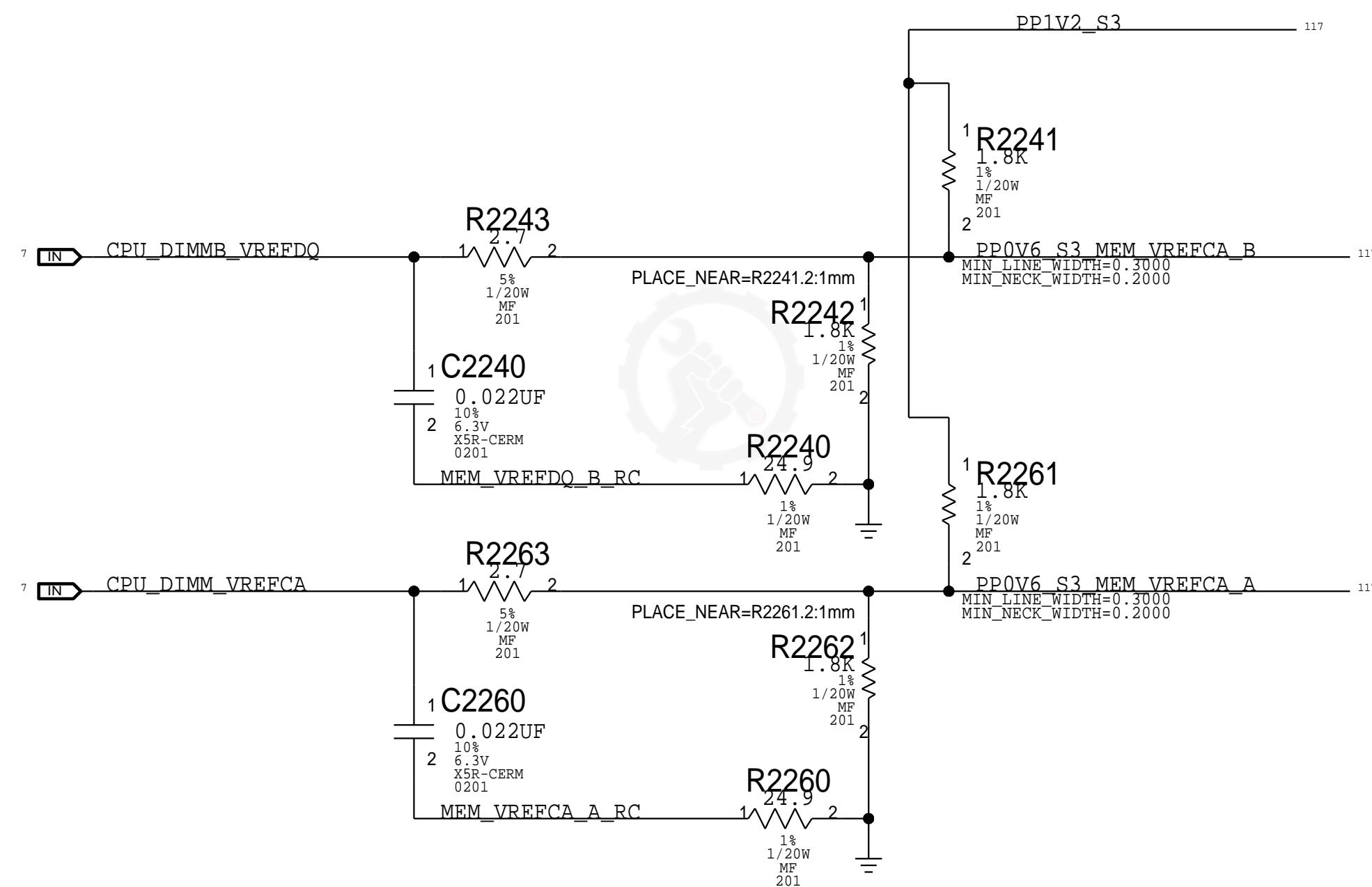
DDR4 VDDQ = 1.2V

MINIMUM Step Size = 0.50% \* VDDQ = 6.0mV per step  
TYPICAL Step Size = 0.65% \* VDDQ = 7.8mV per step  
MAXIMUM Step Size = 0.80% \* VDDQ = 9.6mV per step


KBL PLATFORM GUIDE Page.102 FOR DDR4 X8 MEMORY DOWN

DDR0\_VREF\_DQ = Not Used

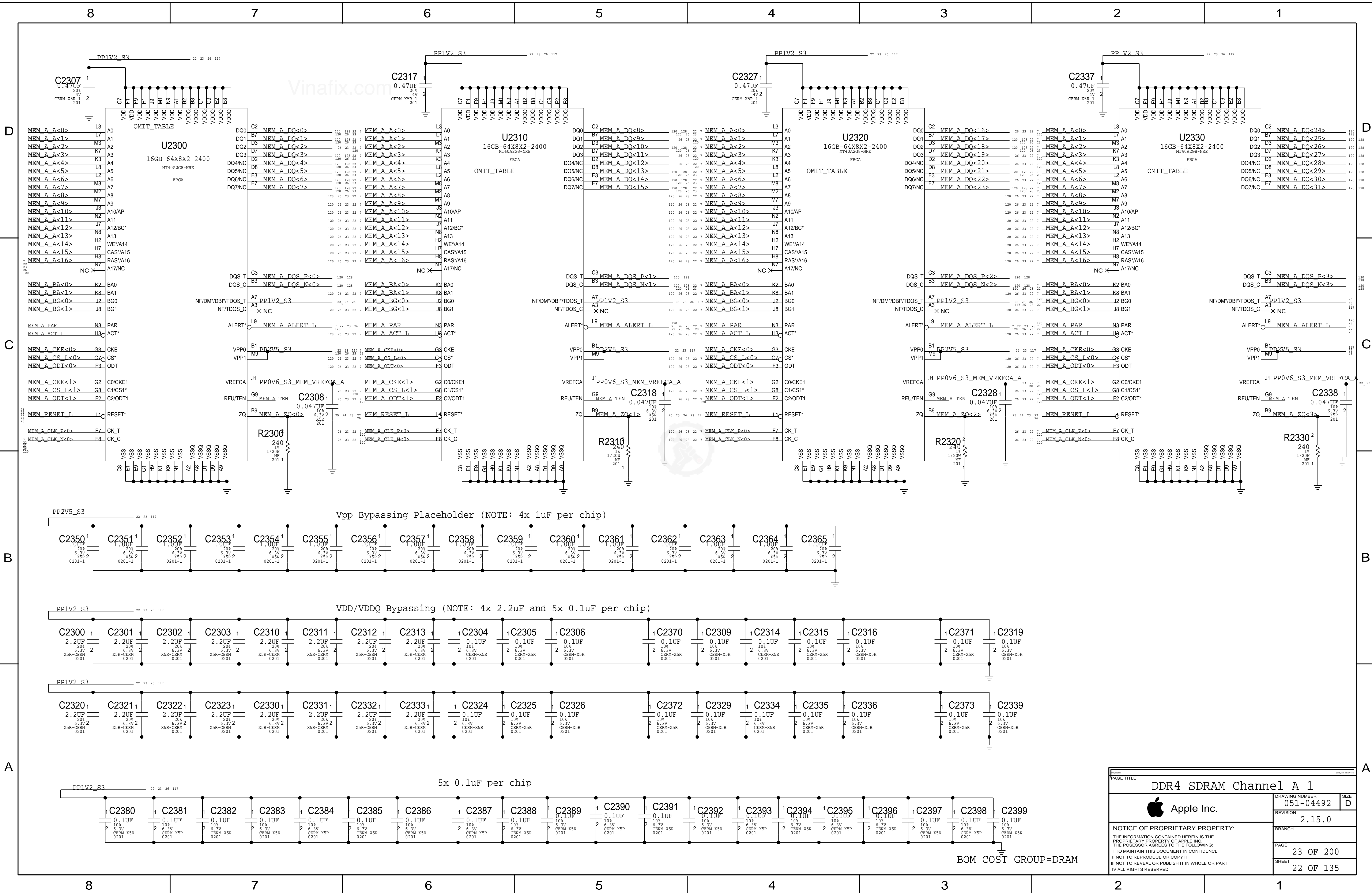
DDR1\_VREF\_DQ = Reference For Channel B  
DDR1\_VREF\_CA = Reference For Channel A




BOM\_COST\_GROUP=DRAM

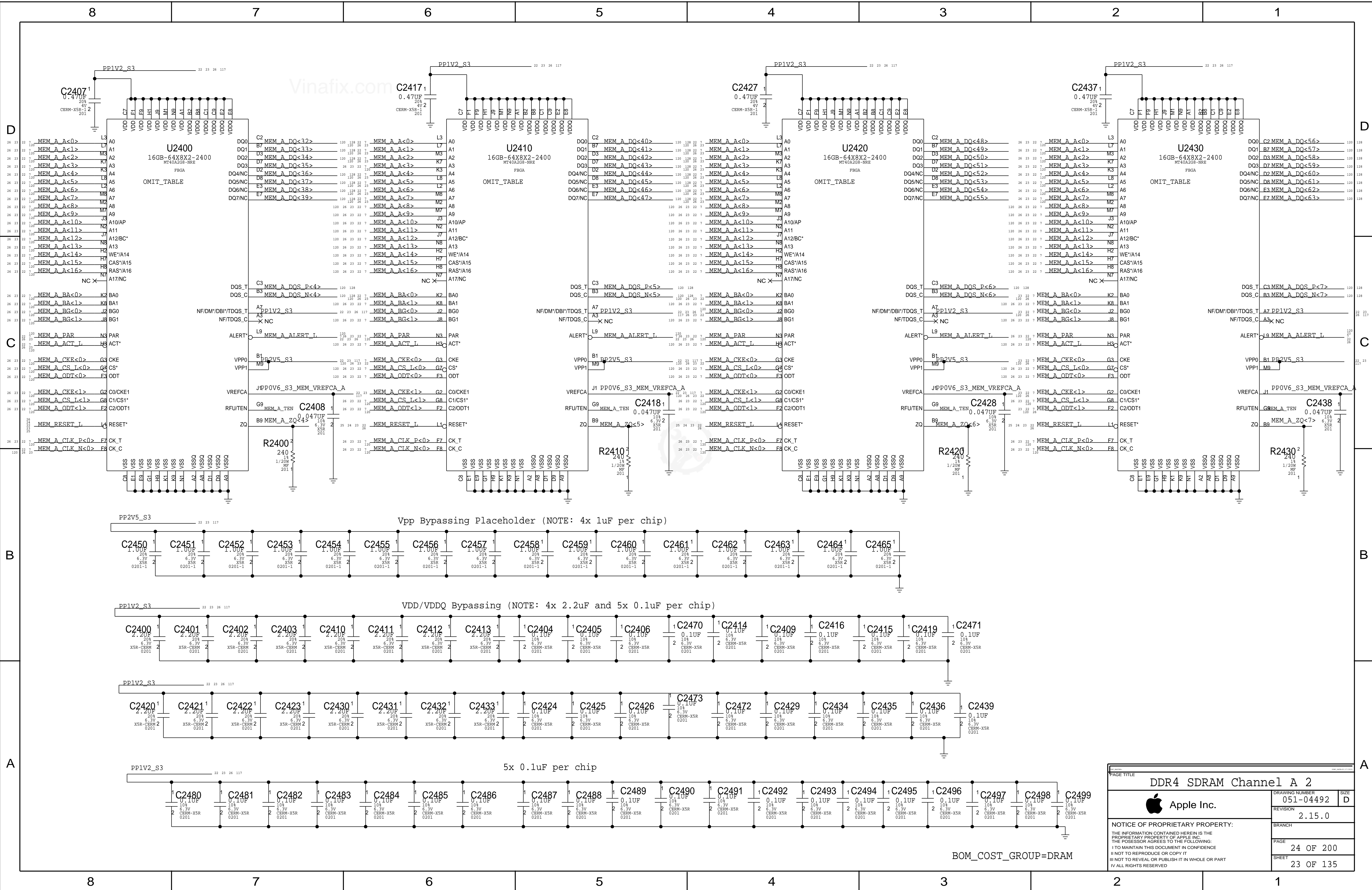
<small>DATE PLOTTED:</small> <b>PAGE TITLE</b>		<small>DATE_PLOT=01/17/01</small>	
 <b>Apple Inc.</b>		<b>DRAWING NUMBER</b> <b>051-04492</b>	<b>SIZE</b> <b>D</b>
		<b>REVISION</b> <b>2.15.0</b>	
		<b>BRANCH</b>  	
<b>NOTICE OF PROPRIETARY PROPERTY:</b> THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		<b>PAGE</b> <b>22 OF 200</b>	<b>SHEET</b> <b>21 OF 135</b>



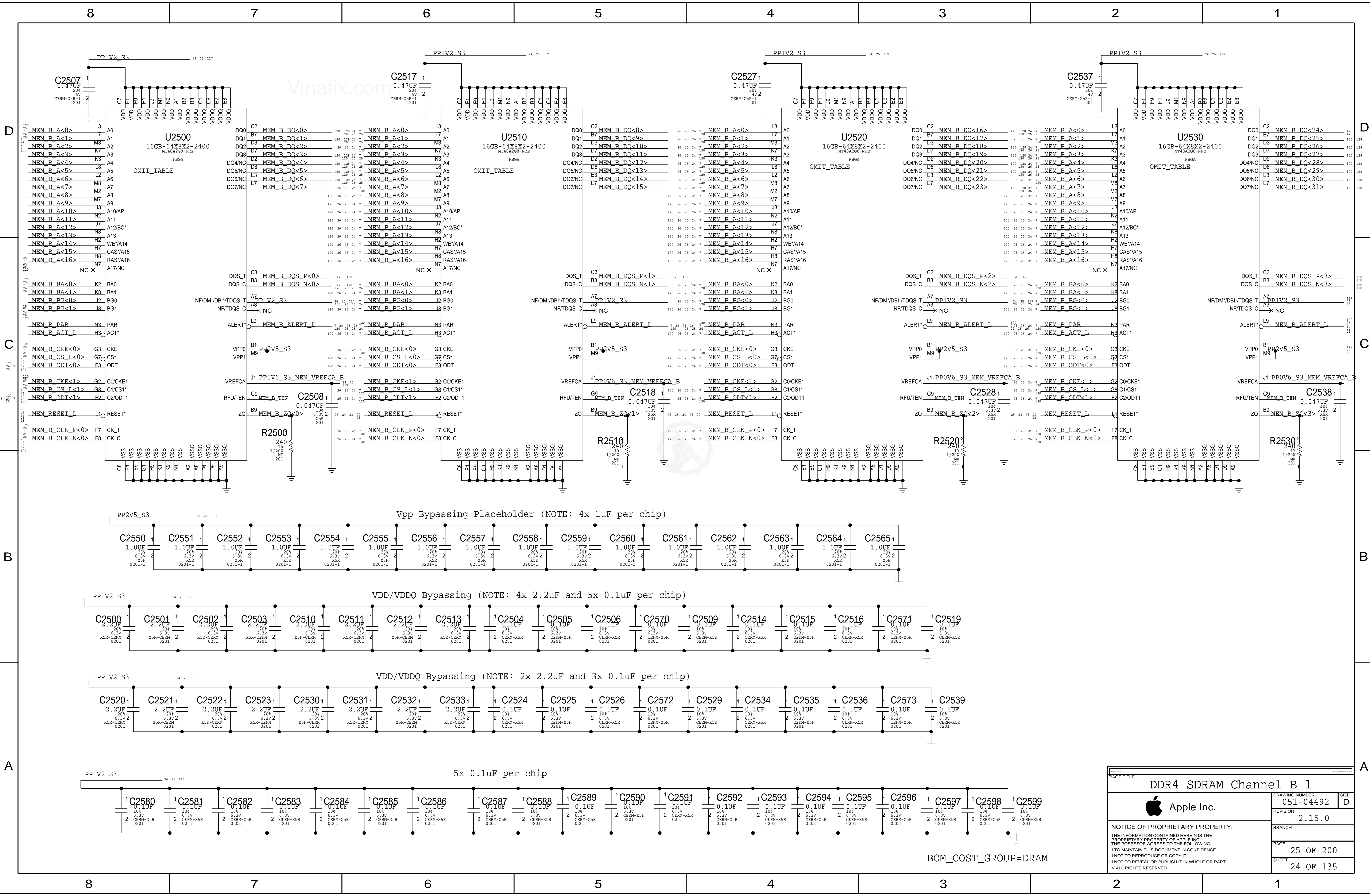


PAGE TITLE		DRAWING NUMBER		SIZE
DDR4 SDRAM Channel A 1		051-04492		D
 Apple Inc.		REVISION		
NOTICE OF PROPRIETARY PROPERTY:  THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		2.15.0		
		BRANCH		
		PAGE		
		23 OF 200		
		SHEET		
		22 OF 135		



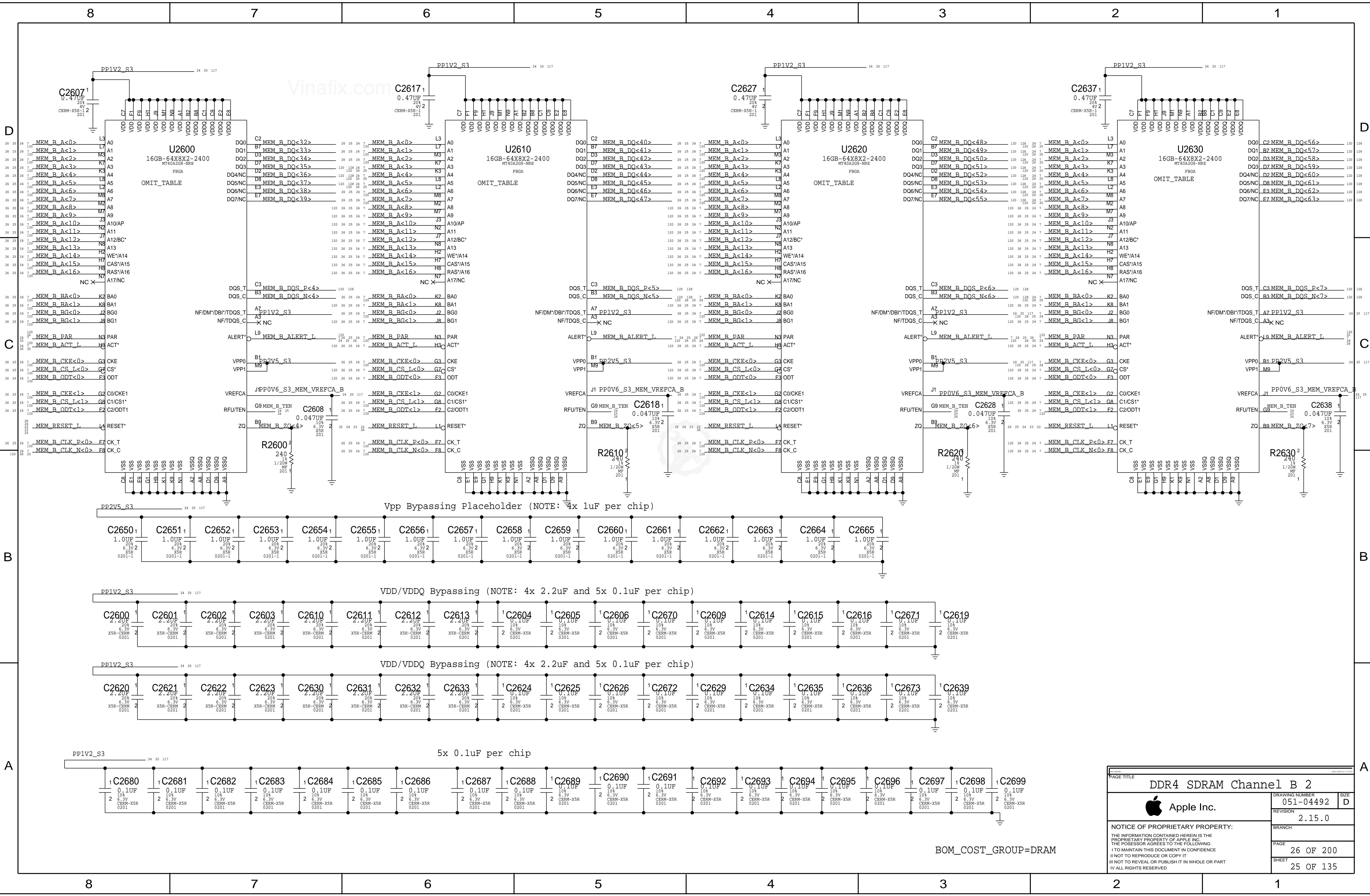






PAGE TITLE		
DDR4 SDRAM Channel B 1		
	DRAWING NUMBER	051-04492
	REVISION	2.15.0
NOTICE OF PROPRIETARY PROPERTY:		
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		
I NOT TO REPRODUCE OR COPY IT		
I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		
IV ALL RIGHTS RESERVED		
PAGE	25 OF 200	
SHEET	24 OF 135	

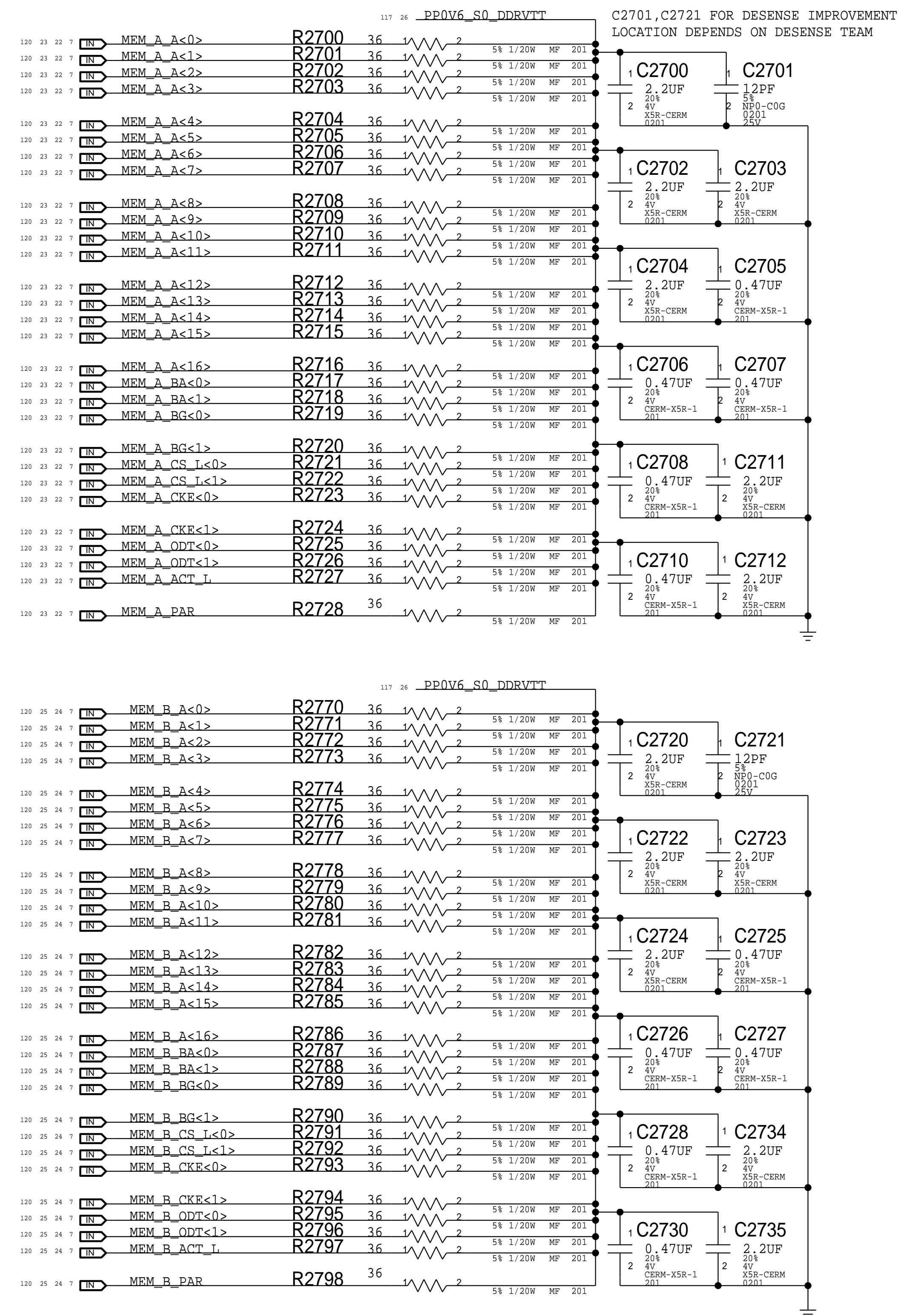
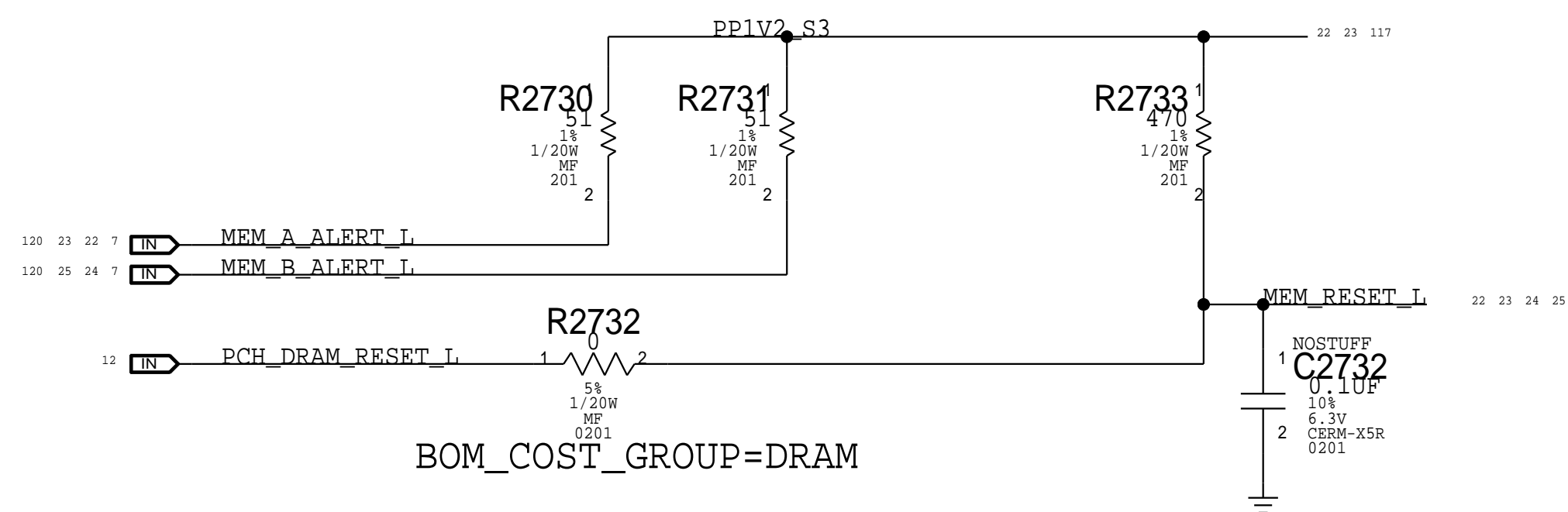
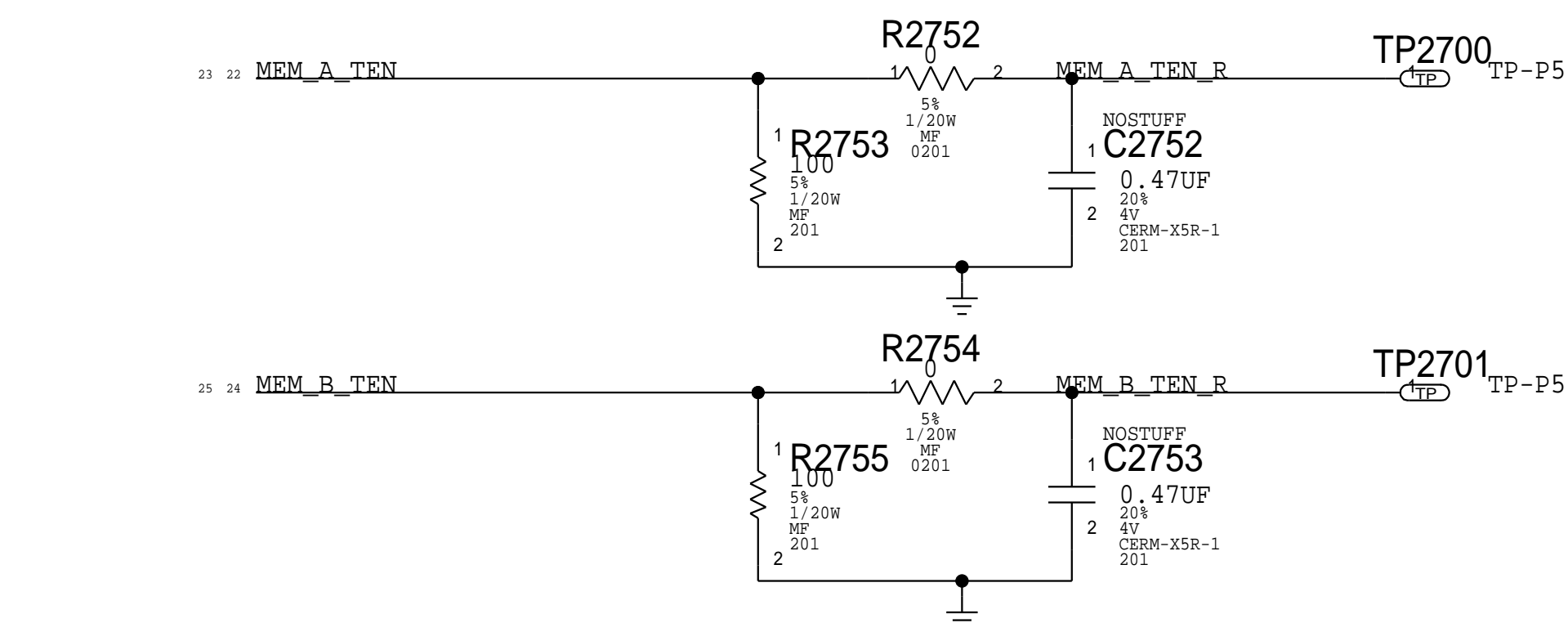





PAGE TITLE		
DDR4 SDRAM Channel B 2		
Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
	SIZE	D
NOTICE OF PROPRIETARY PROPERTY:		
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		
I NOT TO REPRODUCE OR COPY IT		
I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		
I ALL RIGHTS RESERVED		

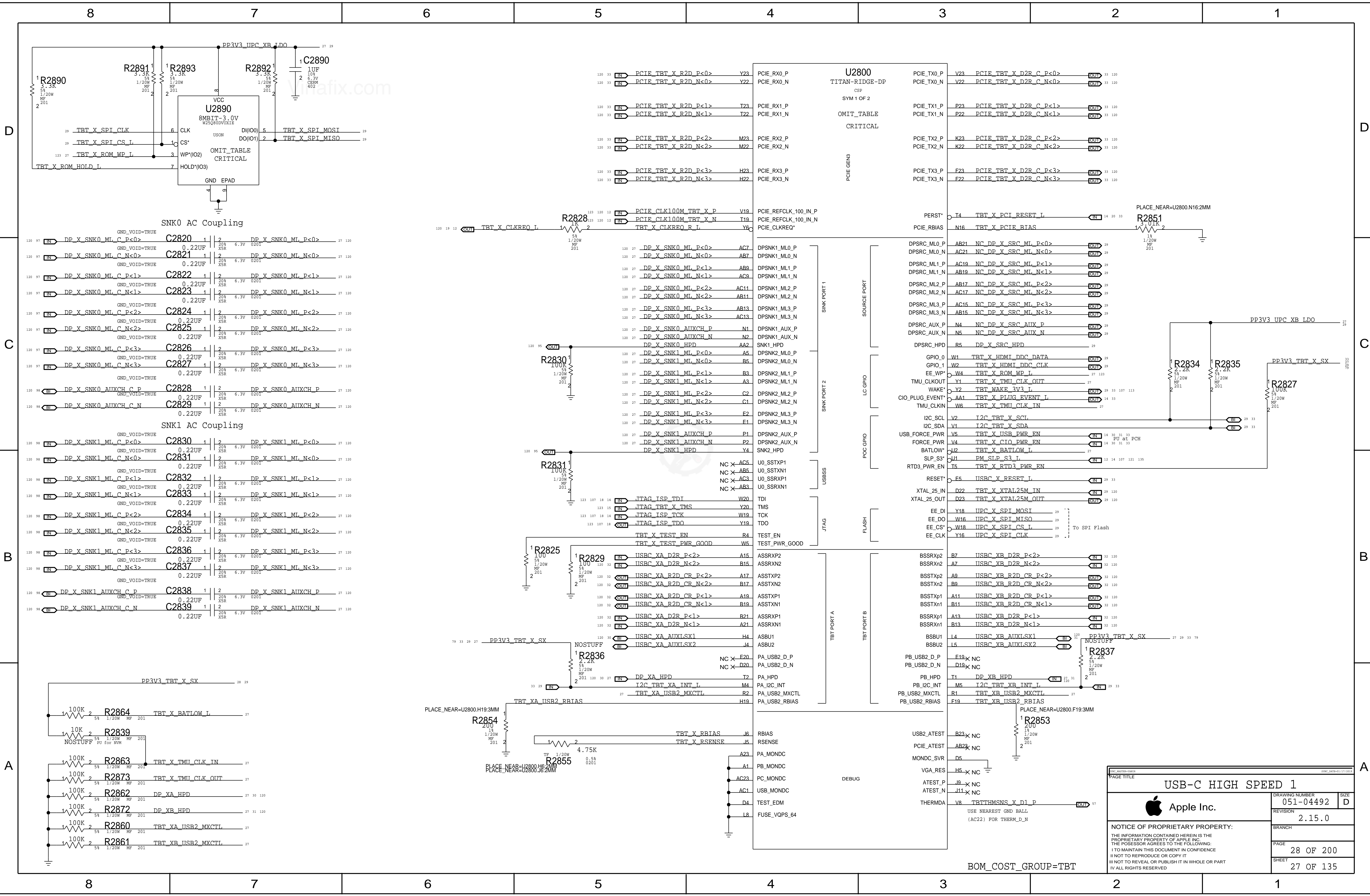
BOM\_COST\_GROUP=DRAM






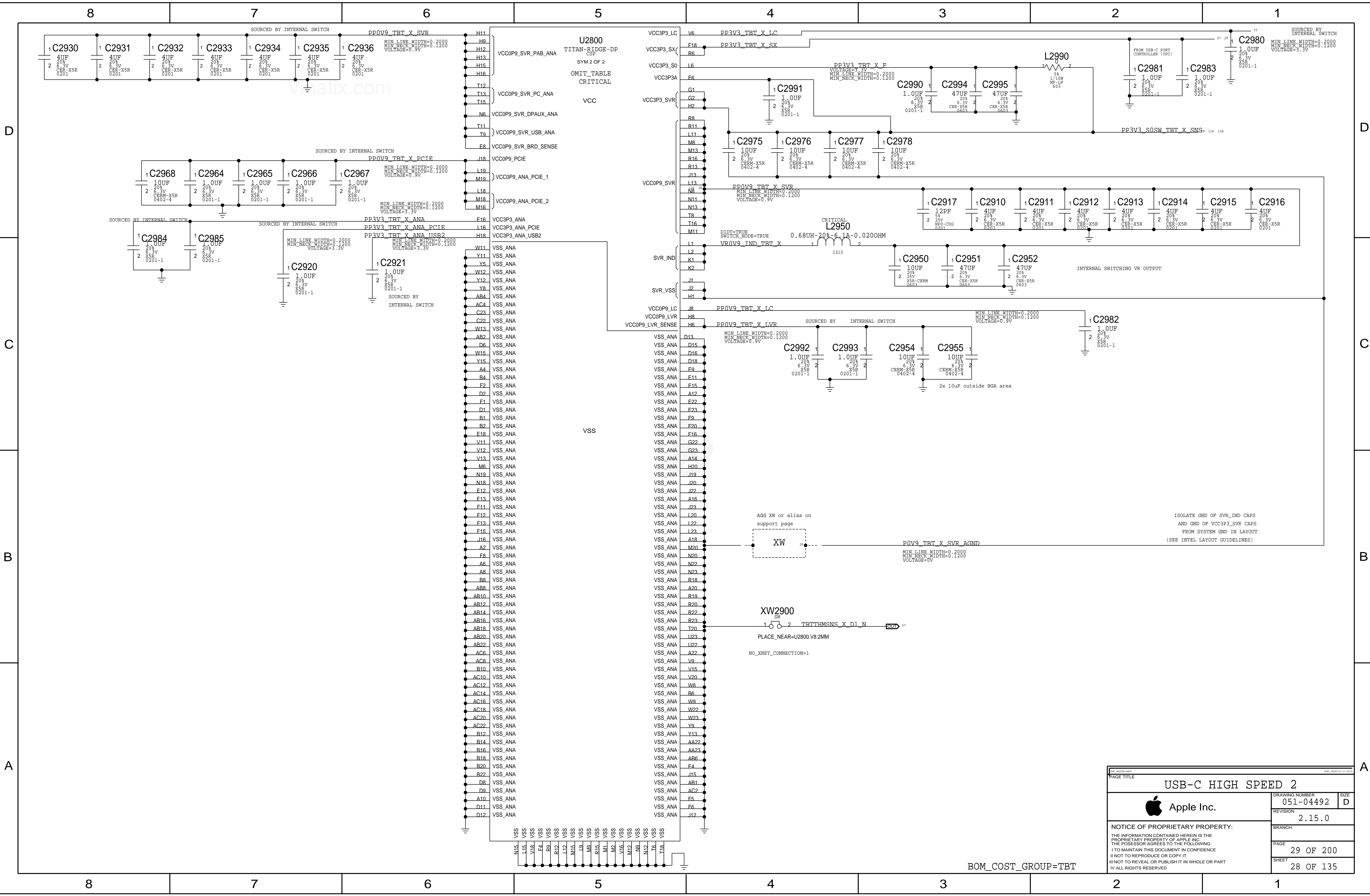
PAGE TITLE		DRAWING NUMBER		SIZE
 Apple Inc.		051-04492		D
		REVISION 2.15.0		
NOTICE OF PROPRIETARY PROPERTY:  THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		BRANCH		
		PAGE 27 OF 200		
		SHEET 26 OF 135		






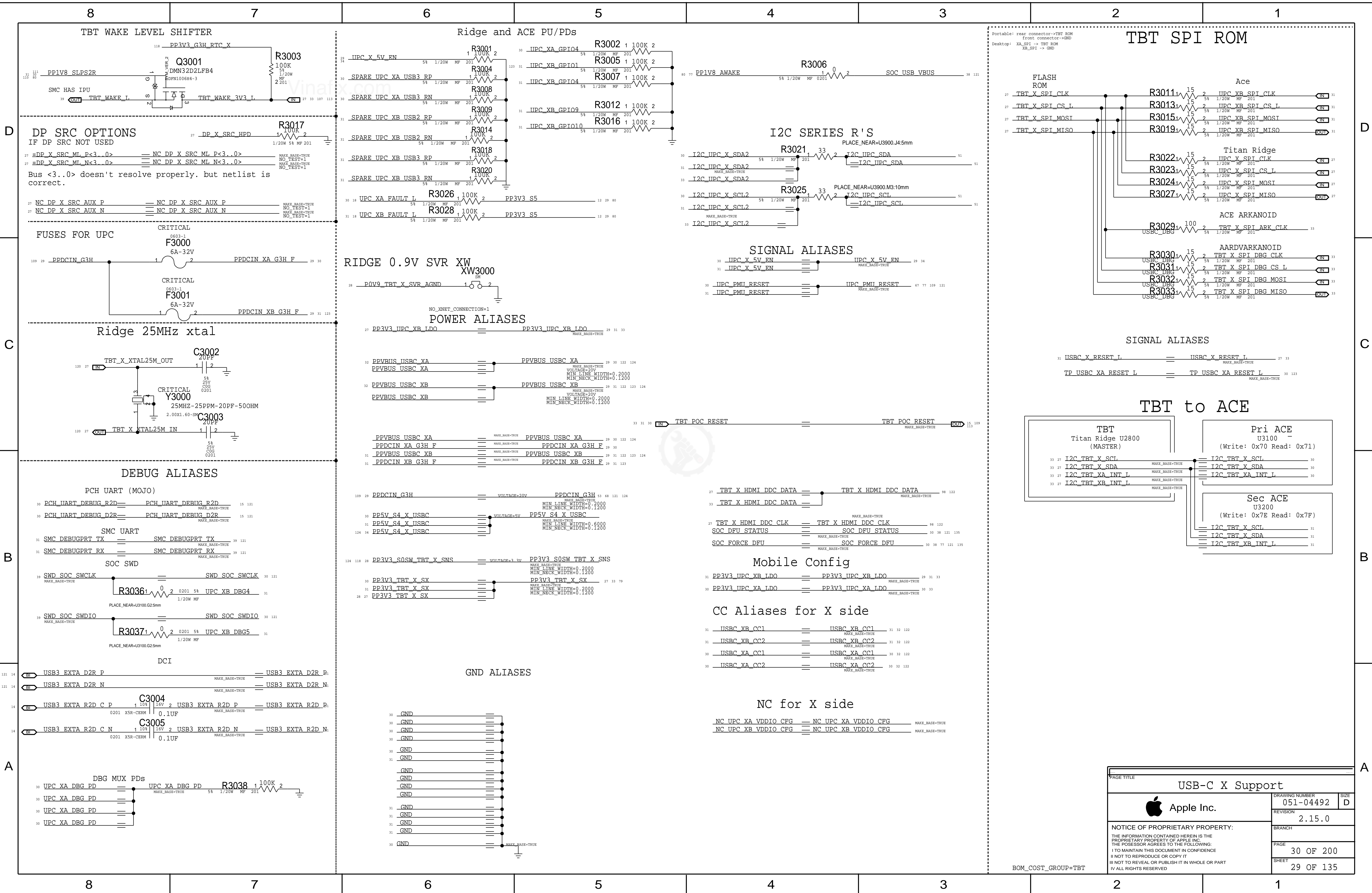
DWG: MASTER/VALER		DWG: 24781-01/17/2015	
PAGE TITLE			
USB-C HIGH SPEED 1			
 Apple Inc.	DRAWING NUMBER		SIZE
	051-04492		D
	REVISION		
	2.15.0		
NOTICE OF PROPRIETARY PROPERTY:		BRANCH	
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		PAGE	
		28 OF 200	
		SHEET	
		27 OF 135	





PAGE TITLE		
USB-C HIGH SPEED 2		
 Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
	BRANCH	
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		
PAGE		29 OF 200
SHEET		28 OF 135

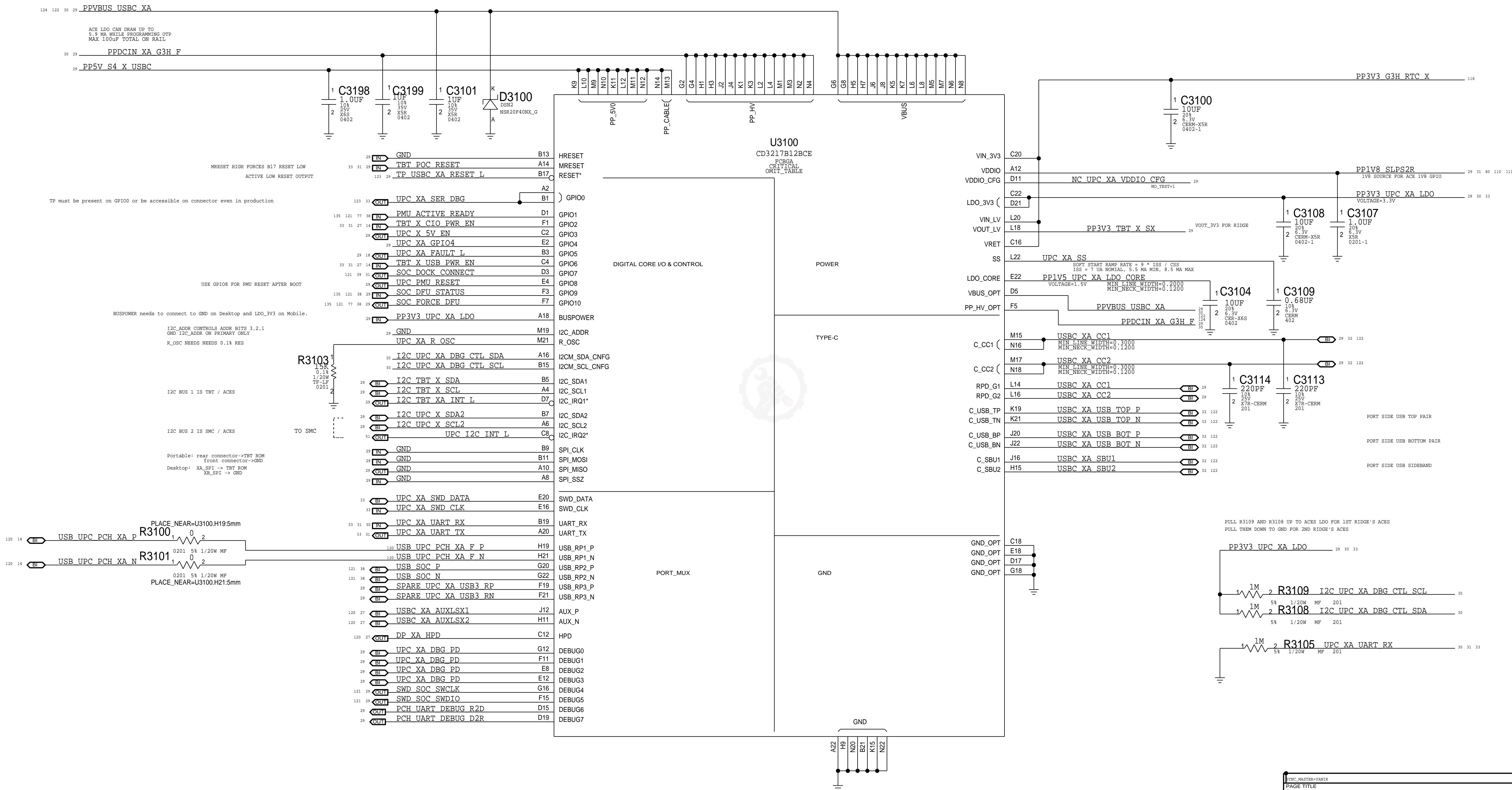






X PRIMARY ACE USB-C PORT CONTROLLER (UPC)

Vinafix.com



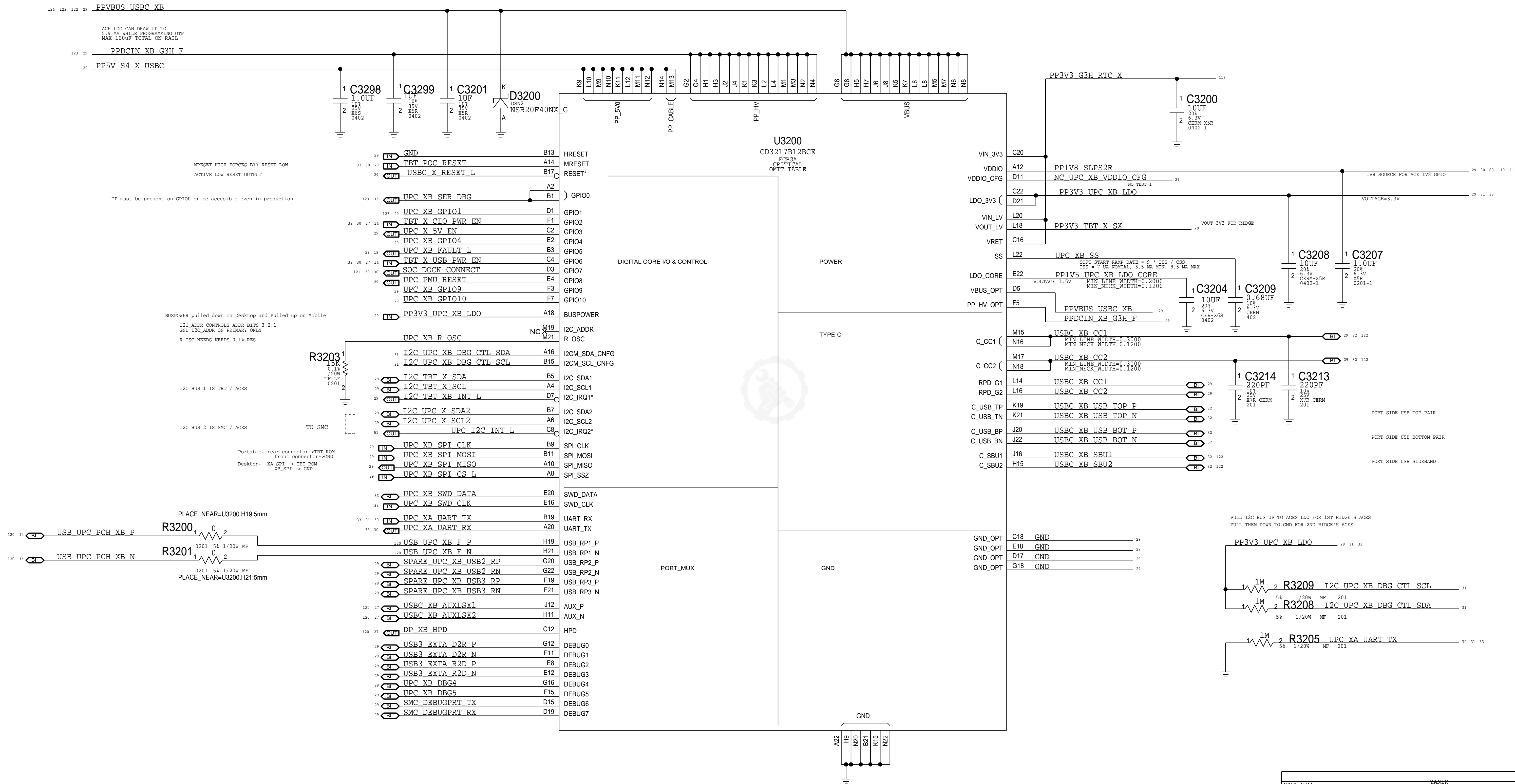
BOM\_COST\_GROUP=USB-C

PAGE TITLE			PAGE TITLE		
USB-C PORT CONTROLLER XA			USB-C PORT CONTROLLER XA		
Apple Inc.			Apple Inc.		
NOTICE OF PROPRIETARY PROPERTY:			NOTICE OF PROPRIETARY PROPERTY:		
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:			THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE			I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		
I NOT TO REPRODUCE OR COPY IT			I NOT TO REPRODUCE OR COPY IT		
I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART			I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		
I ALL RIGHTS RESERVED			I ALL RIGHTS RESERVED		
DRAWING NUMBER			DRAWING NUMBER		
051-04492			051-04492		
REVISION			REVISION		
2.15.0			2.15.0		
BRANCH			BRANCH		
PAGE			PAGE		
31 OF 200			31 OF 200		
SHEET			SHEET		
30 OF 135			30 OF 135		



# X SECONDARY ACE USB-C PORT CONTROLLER (UPC)

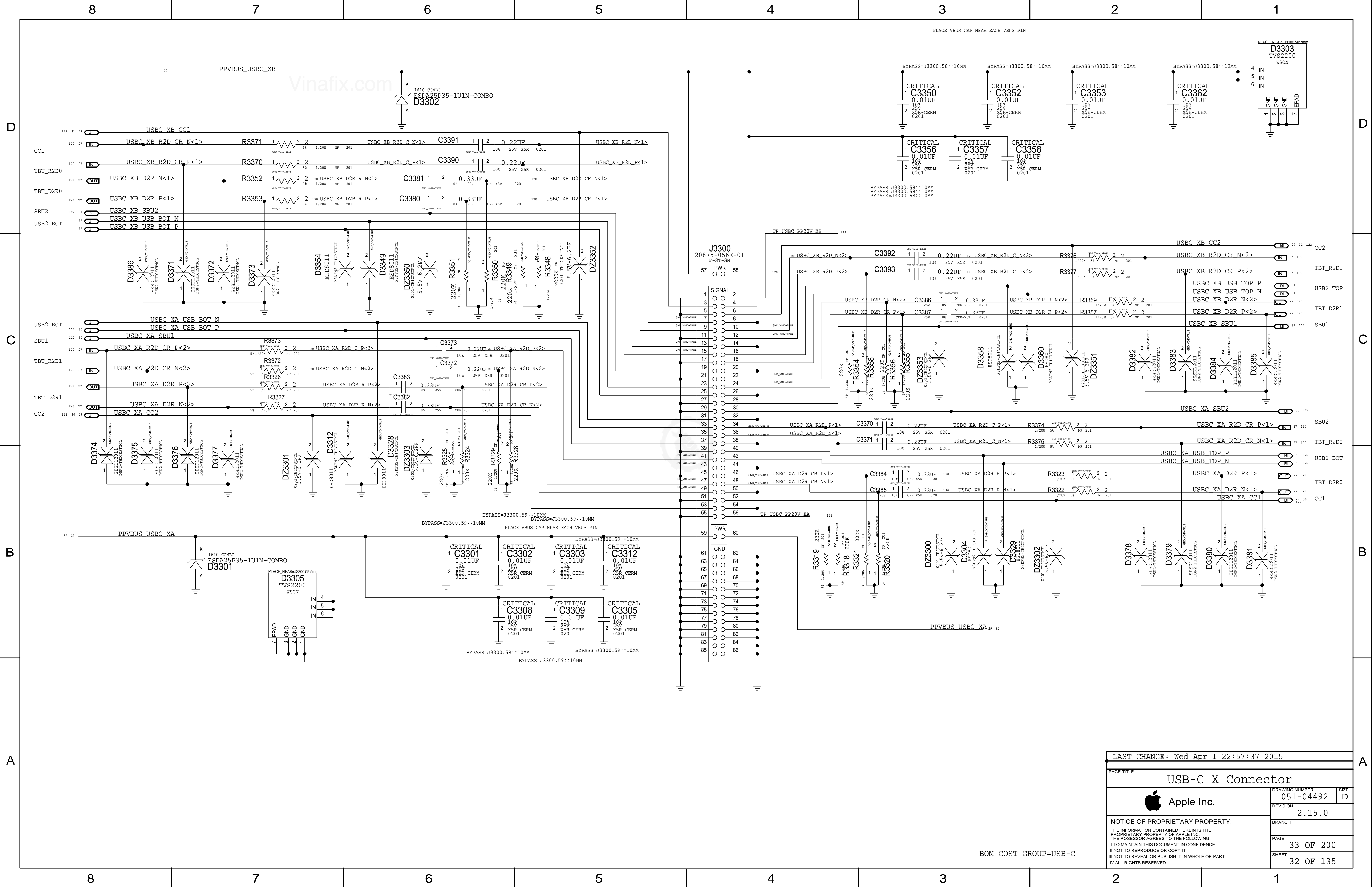
Vinafix.com



BOM\_COST\_GROUP=USB-C

PAGE TITLE			DRAWING NUMBER		SIZE	
USB-C PORT CONTROLLER XB			051-04492		D	
REVISION			2.15.0		BRANCH	
PAGE			32 OF 200		SHEET	
31 OF 135						

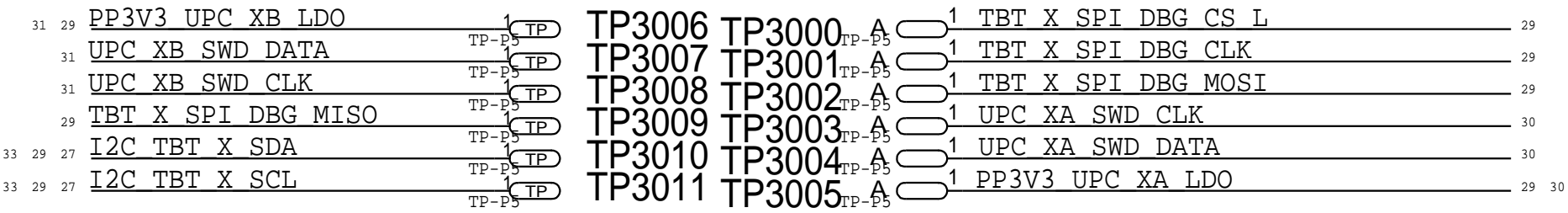






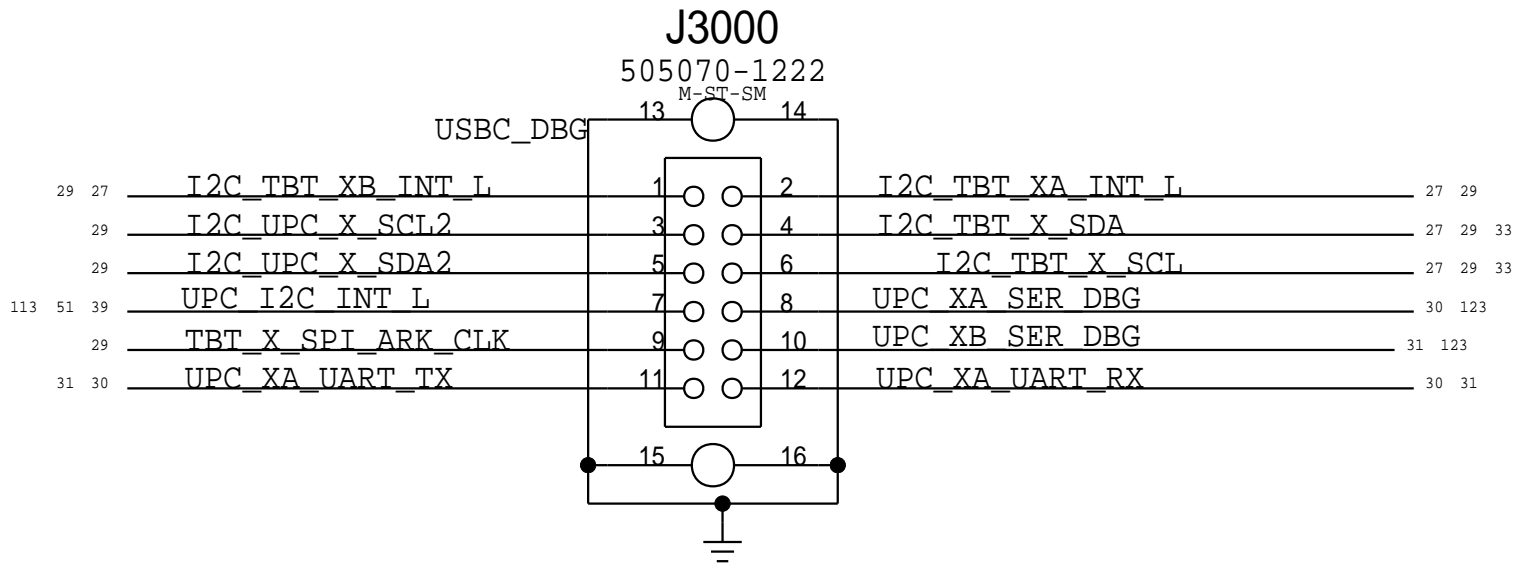
AARDVARKANOID CONN

Place on bottom



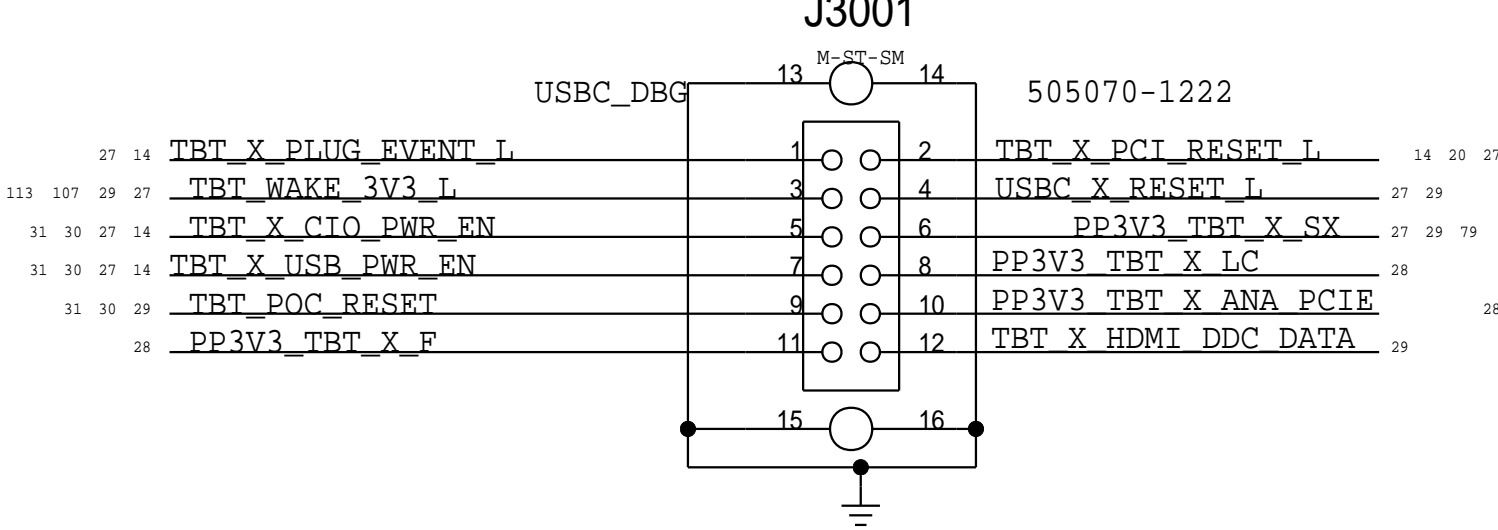
ACE ARKANOID CONN

Place on bottom




RIDGE ARKANOID CONN

Place on bottom



Ridge PCIe Caps



DESIGN: X1032/MLB_P4BP		
LAST CHANGE: Fri Jan 6 16:01:21 2017		
PAGE TITLE		
USB X Connector Support		
 Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	
	PAGE	34 OF 200
	SHEET	33 OF 135

BOM\_COST\_GROUP=USB-C



D

C

B

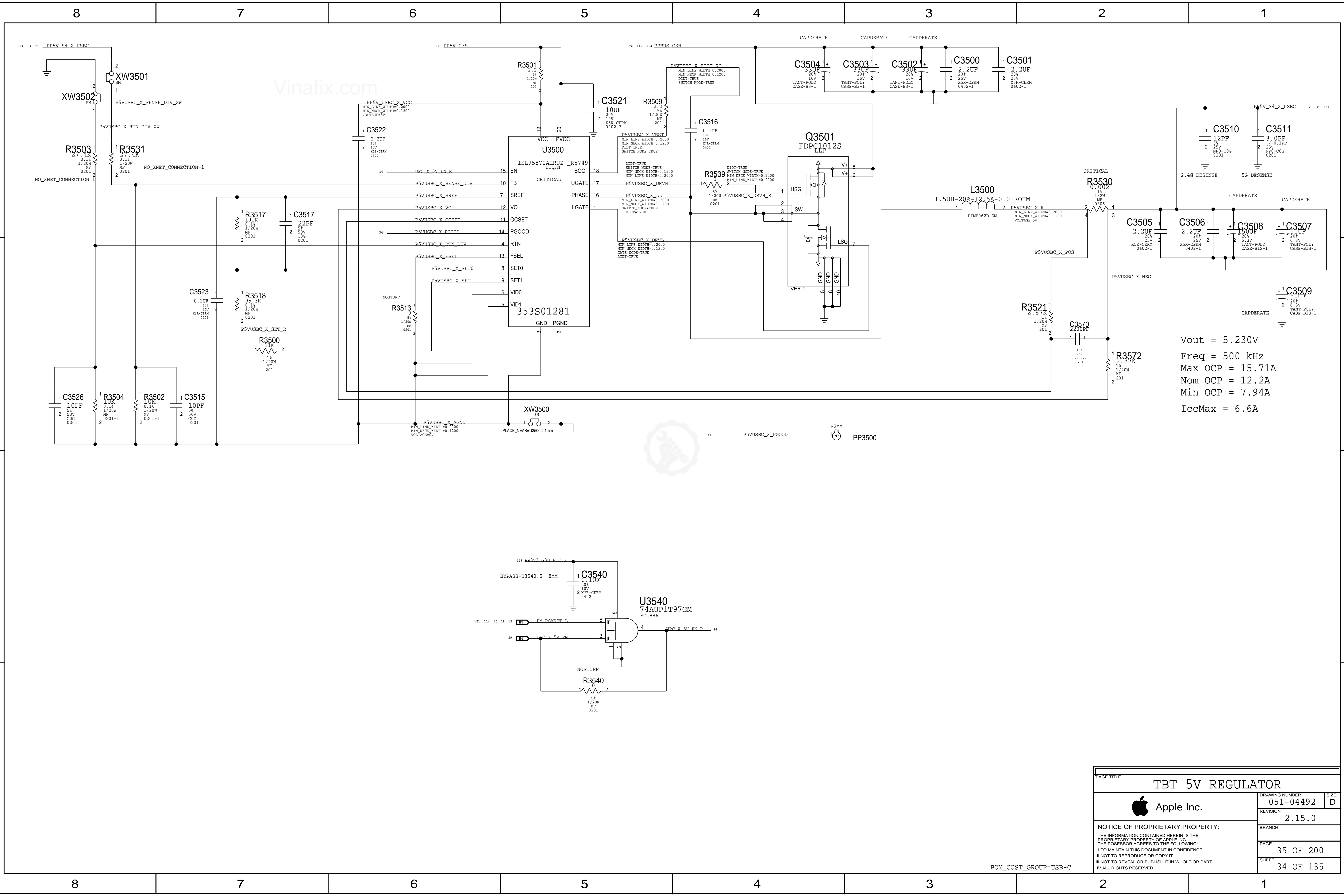
A


D

C

B

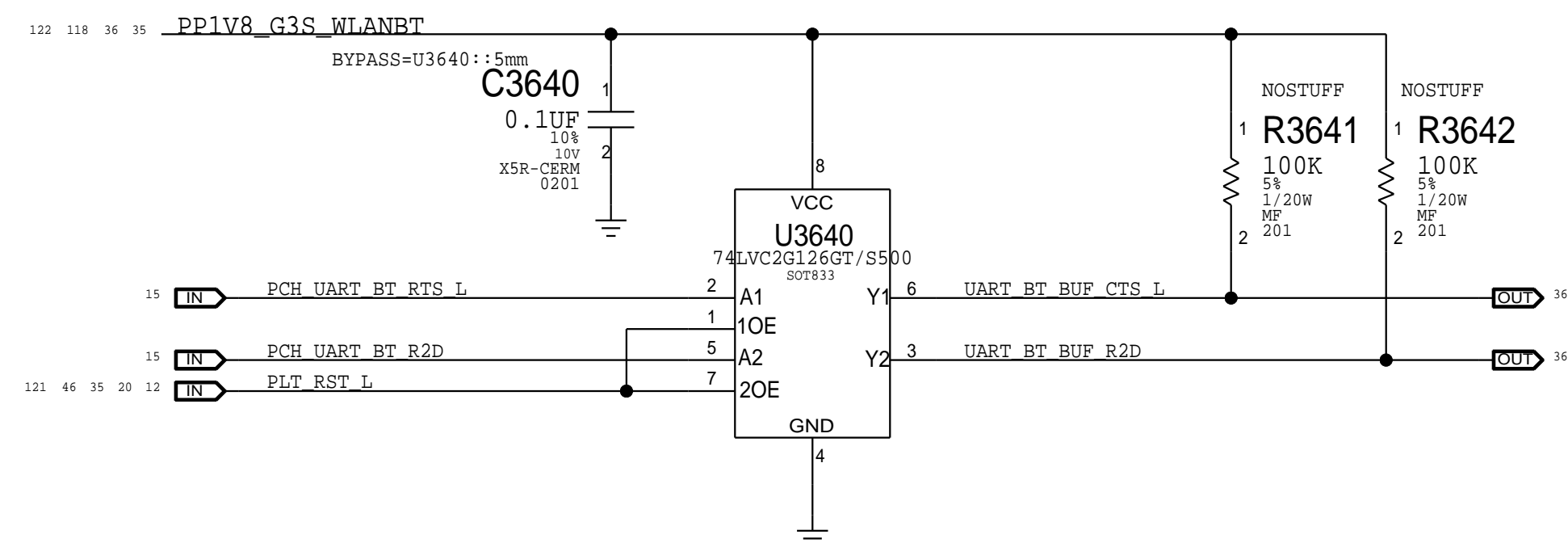
A



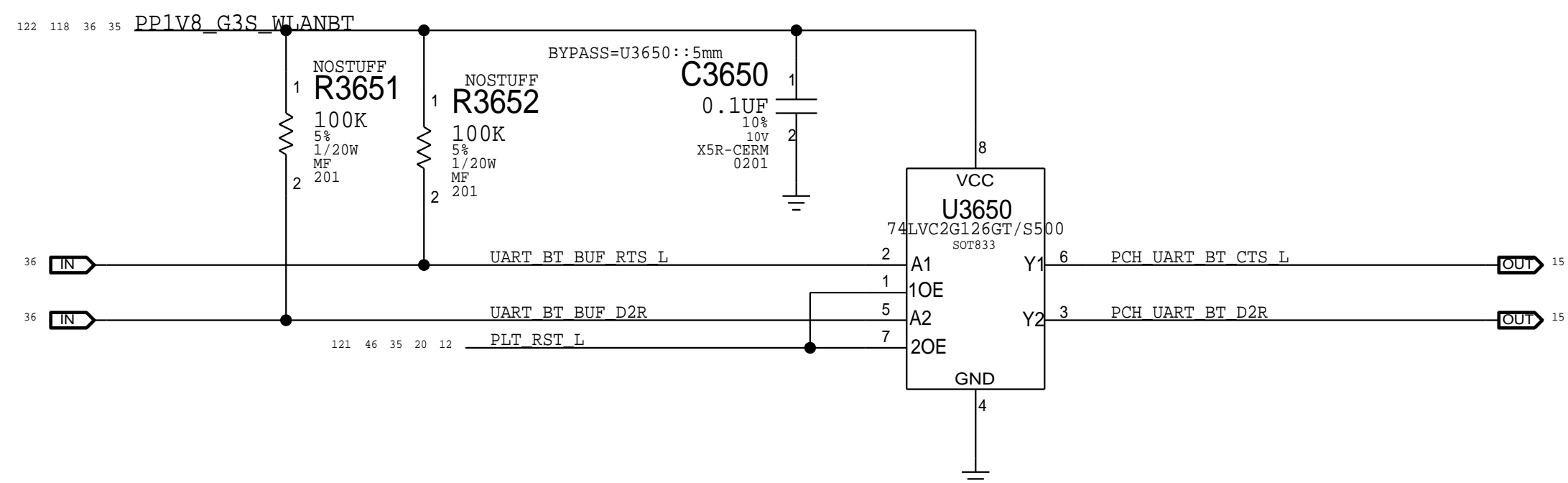
PAGE TITLE		
TBT 5V REGULATOR		
 Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
	BRANCH	
	PAGE	35 OF 200
NOTICE OF PROPRIETARY PROPERTY:		SHEET
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		34 OF 135
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		
I NOT TO REPRODUCE OR COPY IT		
I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		
I ALL RIGHTS RESERVED		

BOM\_COST\_GROUP=USB-C






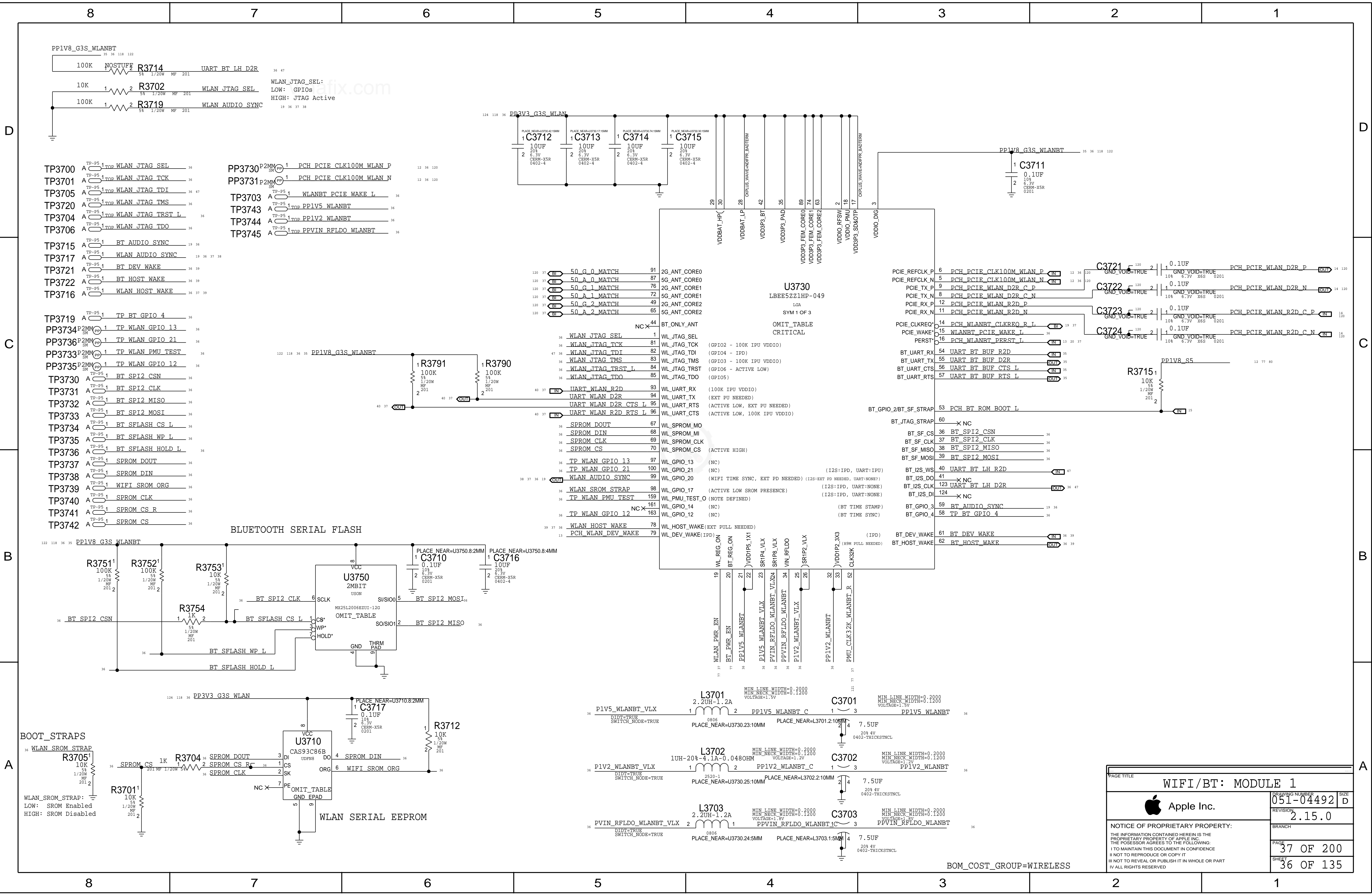
BT UART BUFFERS




BOM\_COST\_GROUP=WIRELESS

FORM MASTER-WRITE		FORM_DATE=01/17/2019	
PAGE TITLE			
 <h1>WIFI/BT: Support</h1> <h2>Apple Inc.</h2>		DRAWING NUMBER <b>051-04492</b>	SIZE <b>D</b>
NOTICE OF PROPRIETARY PROPERTY:  THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: 1 TO MAINTAIN THIS DOCUMENT IN CONFIDENCE 2 NOT TO REPRODUCE OR COPY IT 3 NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART 4 ALL RIGHTS RESERVED		REVISION <b>2.15.0</b>	
		BRANCH	
		PAGE <b>36 OF 200</b>	
		SHEET <b>35 OF 135</b>	

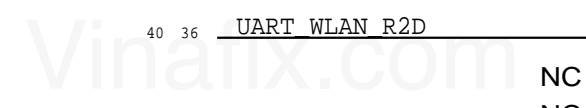




PAGE TITLE			
WIFI/BT: MODULE 1			
 Apple Inc.		DRAWING NUMBER	051-04492
		REVISION	2.15.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IN ALL RIGHTS RESERVED		BRANCH	
		PAGE	37 OF 200
		SHEET	36 OF 135

BOM\_COST\_GROUP=WIRELESS

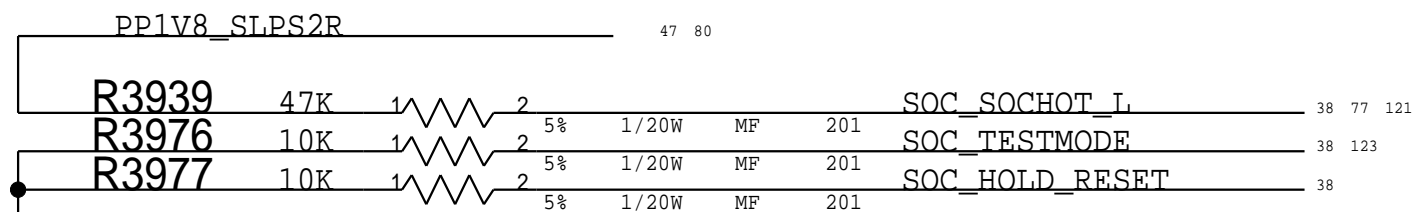
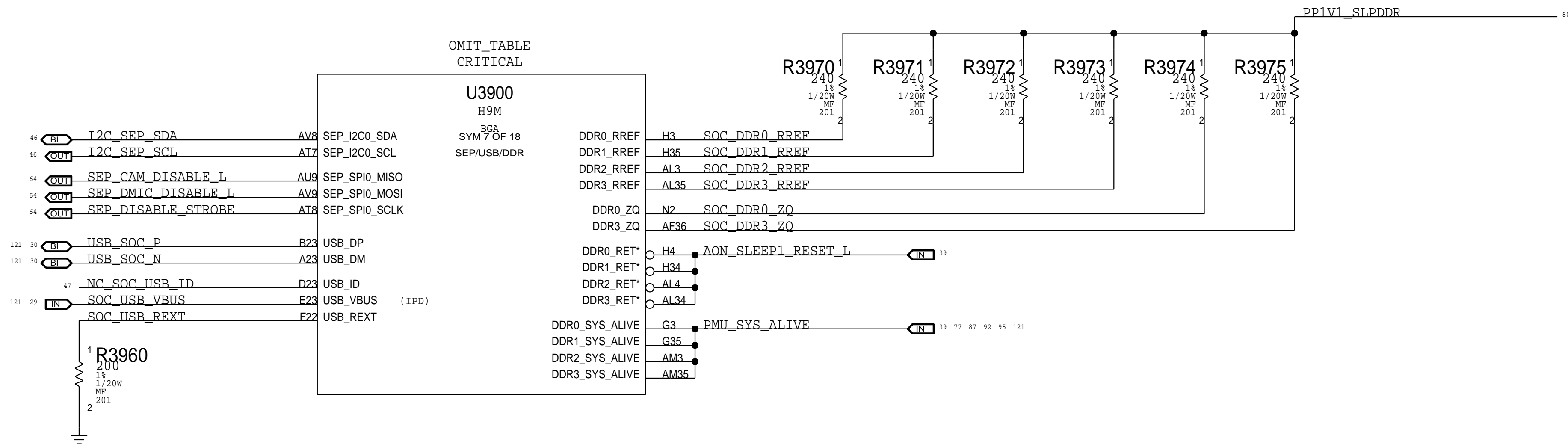
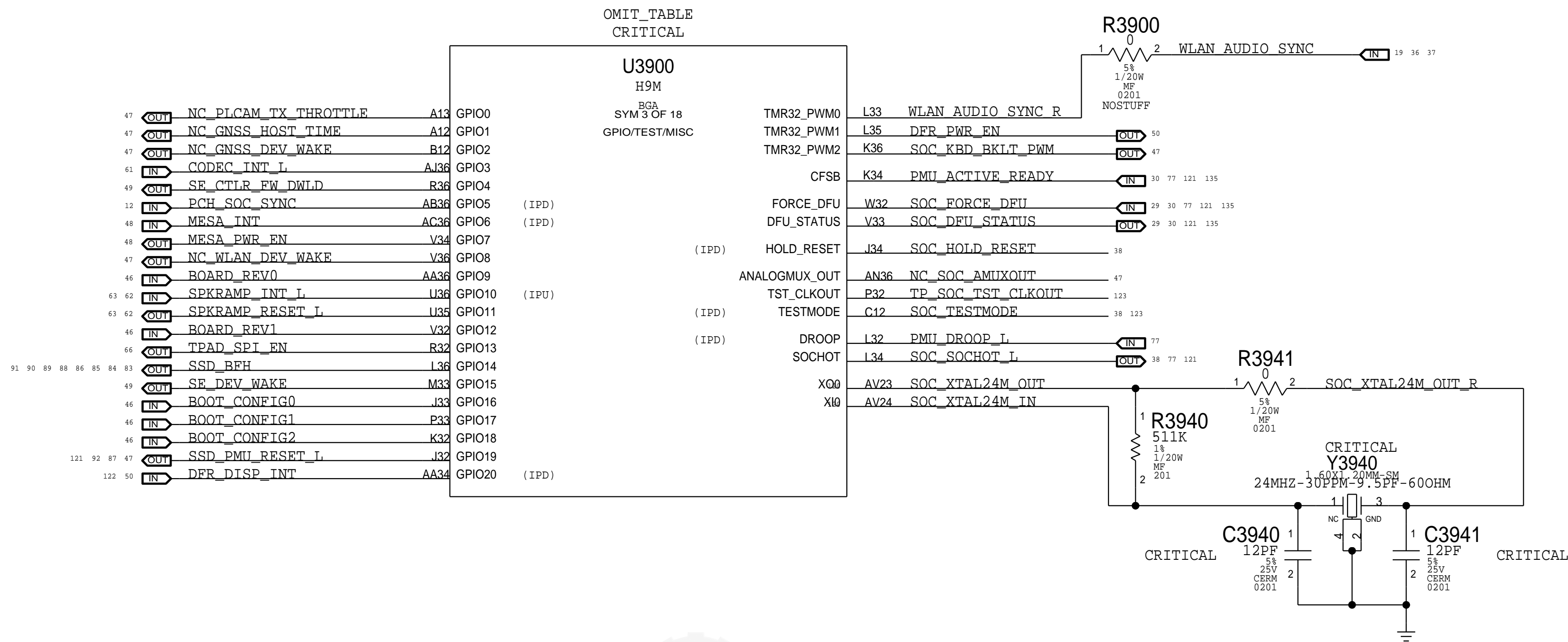







Note 1) IPU represents SW configured state, not HW default

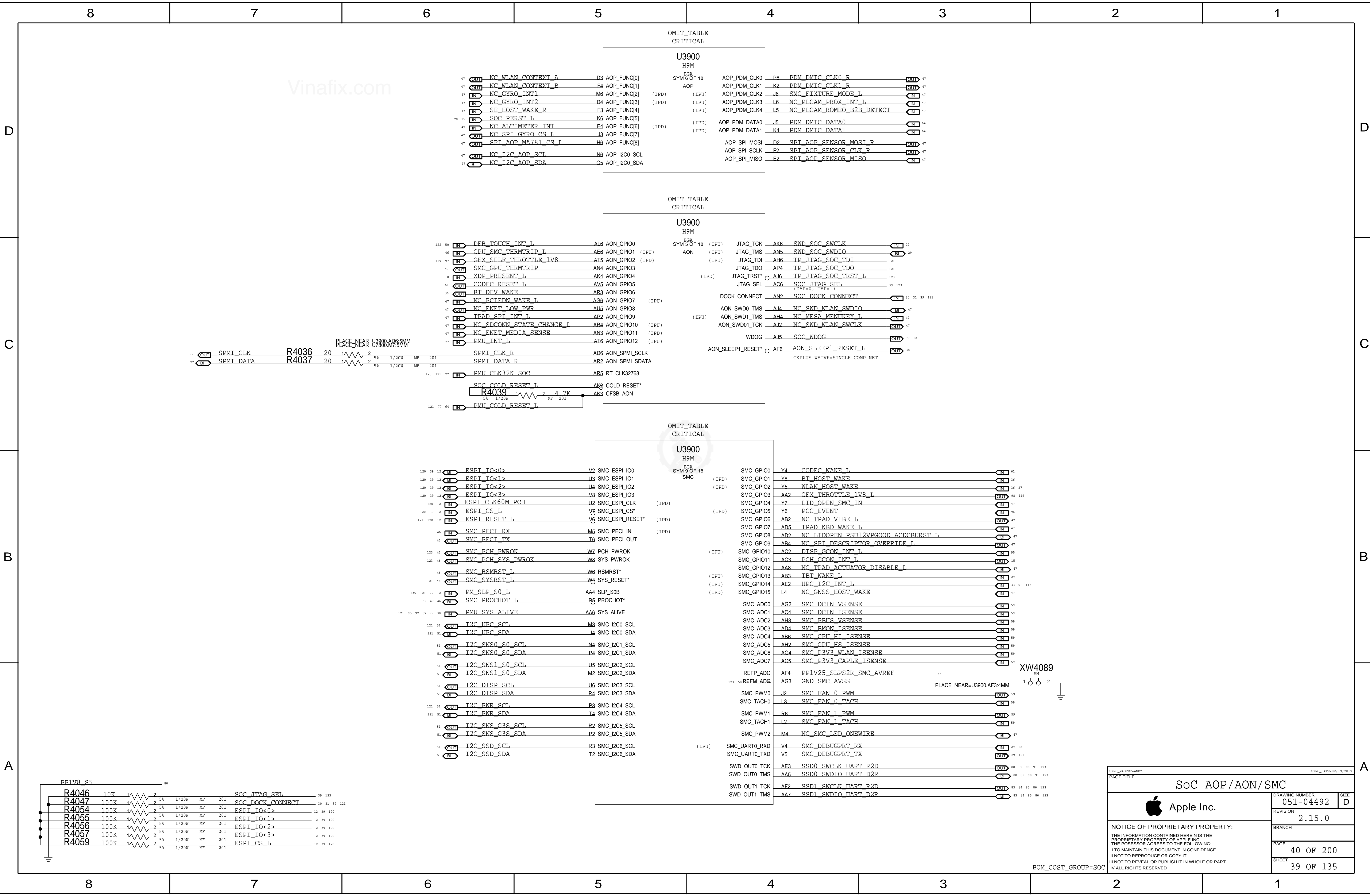
Vinafix.com



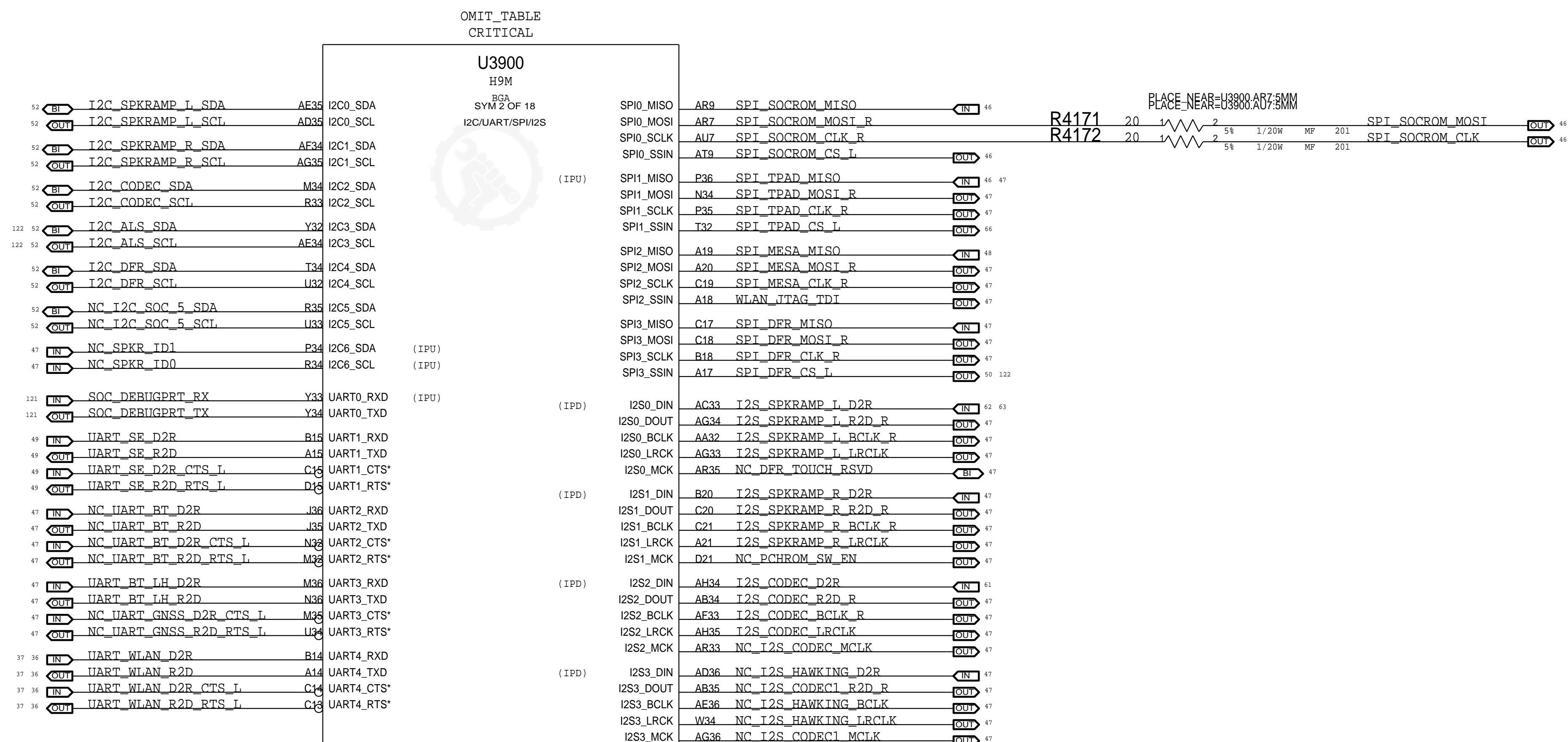
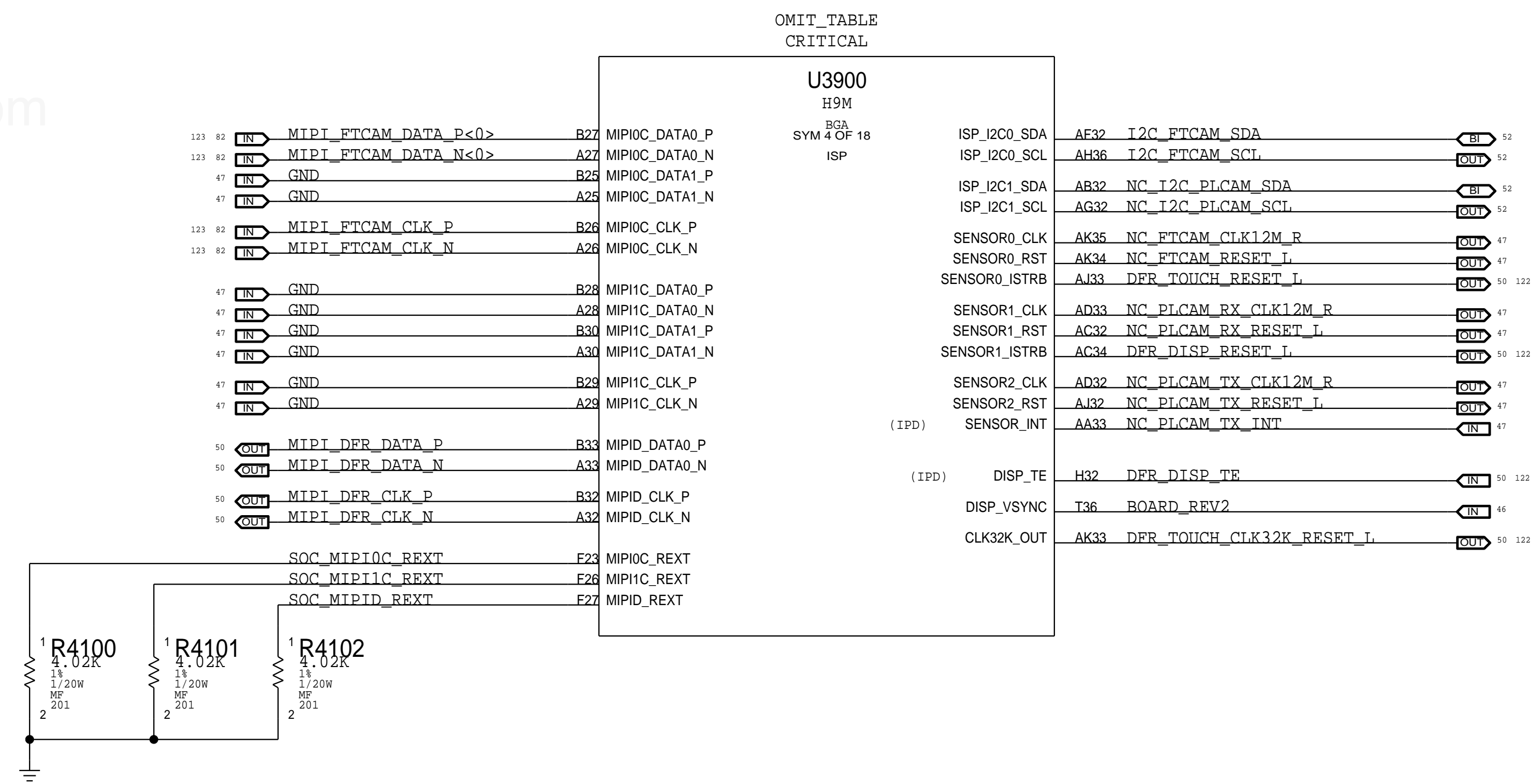
BOM\_COST\_GROUP=SOC

SYRC: HALSTER-AM9H		SYRC: DATE:03/17/2018		
PAGE TITLE				
SoC GPIO/SEP/USB/DDR/Test				
 Apple Inc.	DRAWING NUMBER		051-04492	SIZE
	REVISION		2.15.0	
	BRANCH			
	PAGE			39 OF 200
	SHEET			38 OF 135
NOTICE OF PROPRIETARY PROPERTY:				
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:				
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE				
II NOT TO REPRODUCE OR COPY IT				
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART				
IV ALL RIGHTS RESERVED				

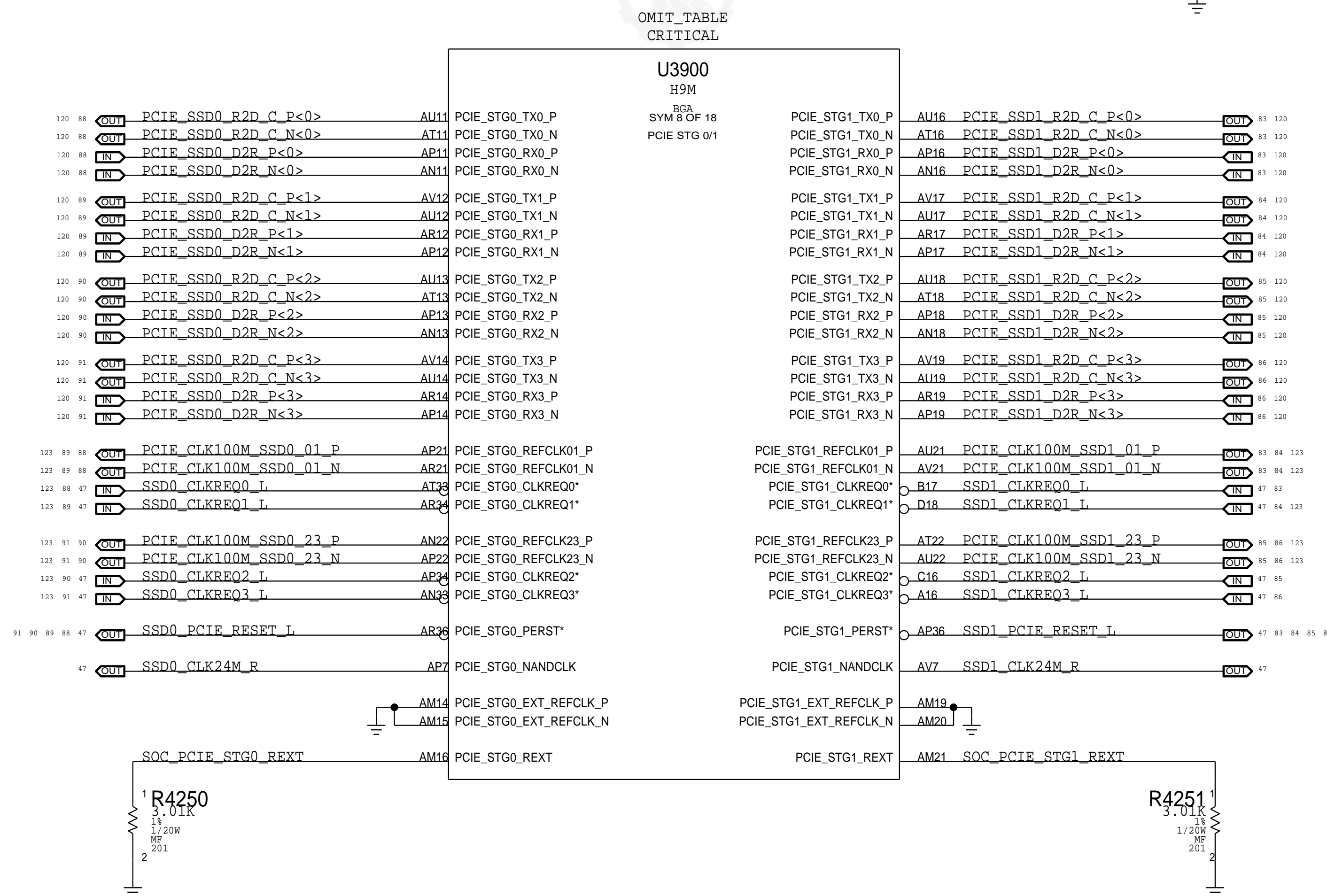
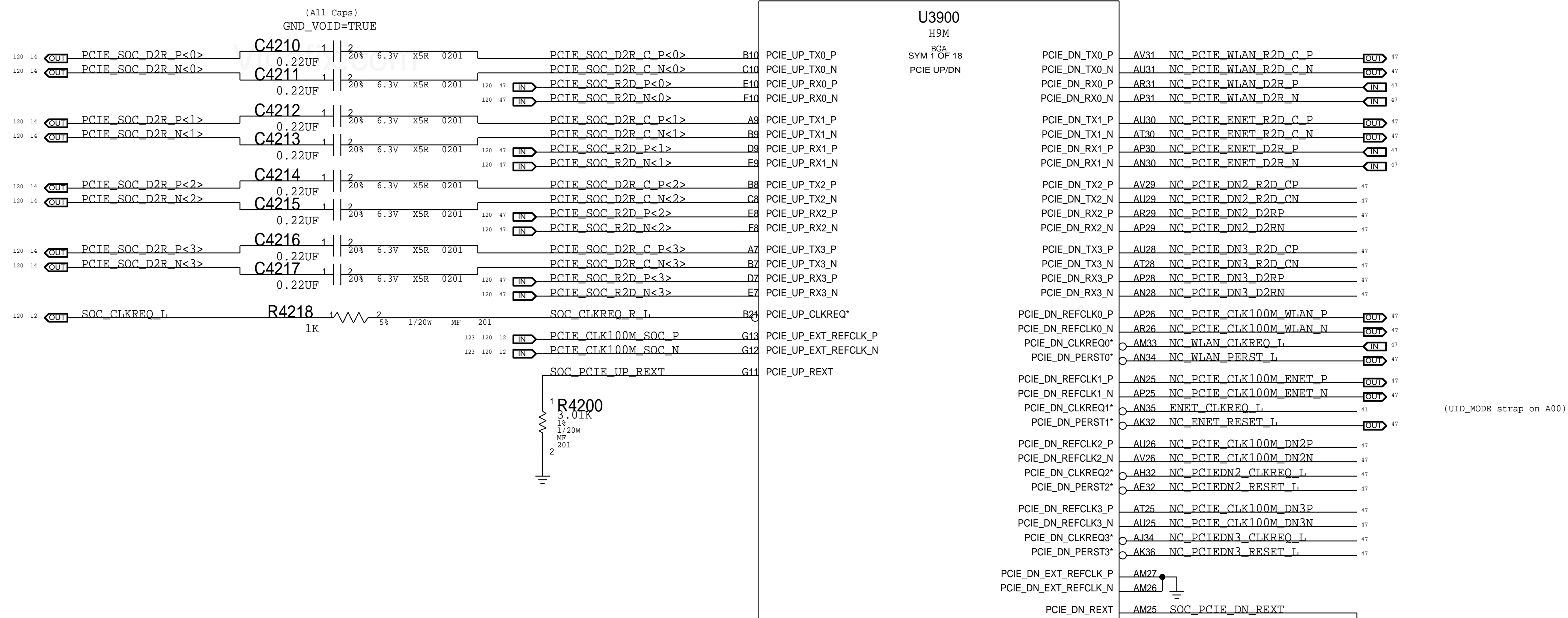




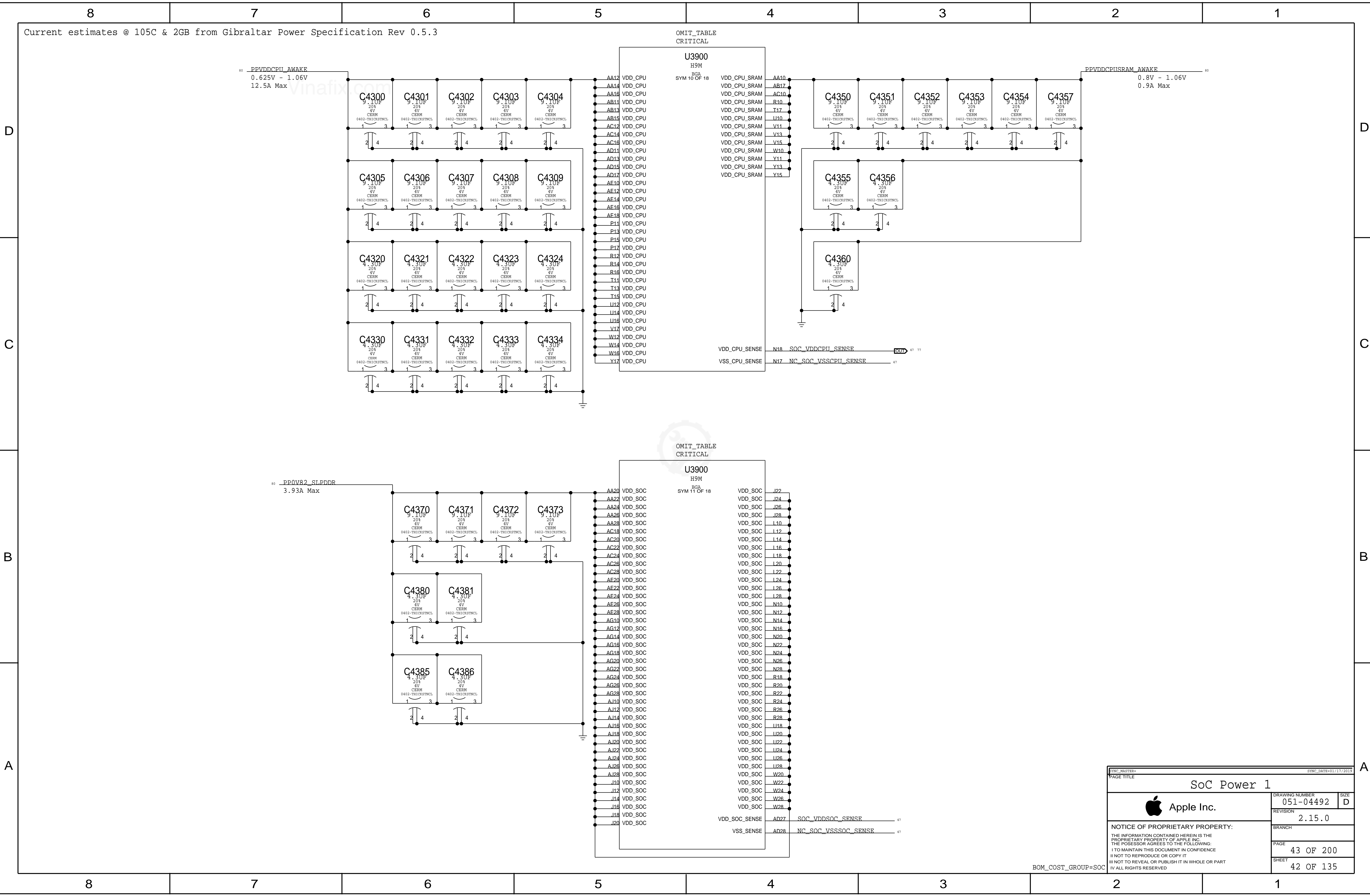












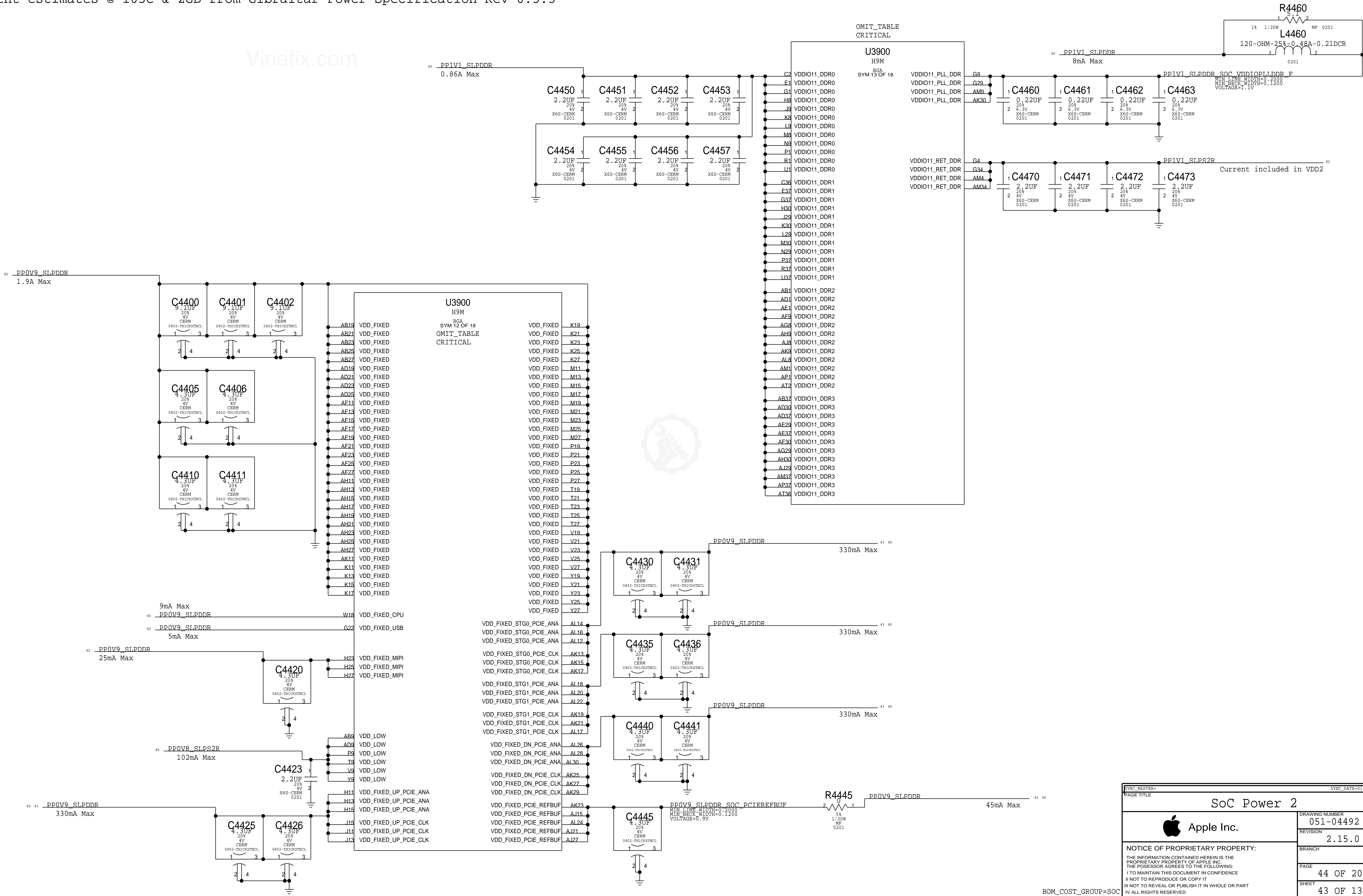
PAGE TITLE			PAGE TITLE		
SoC Power 1			SoC Power 1		
			DRAWING NUMBER	051-04492	SIZE
			REVISION	2.15.0	D
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART I ALL RIGHTS RESERVED			BRANCH		
			PAGE	43 OF 200	
			SHEET	42 OF 135	

BOM\_COST\_GROUP=SOC



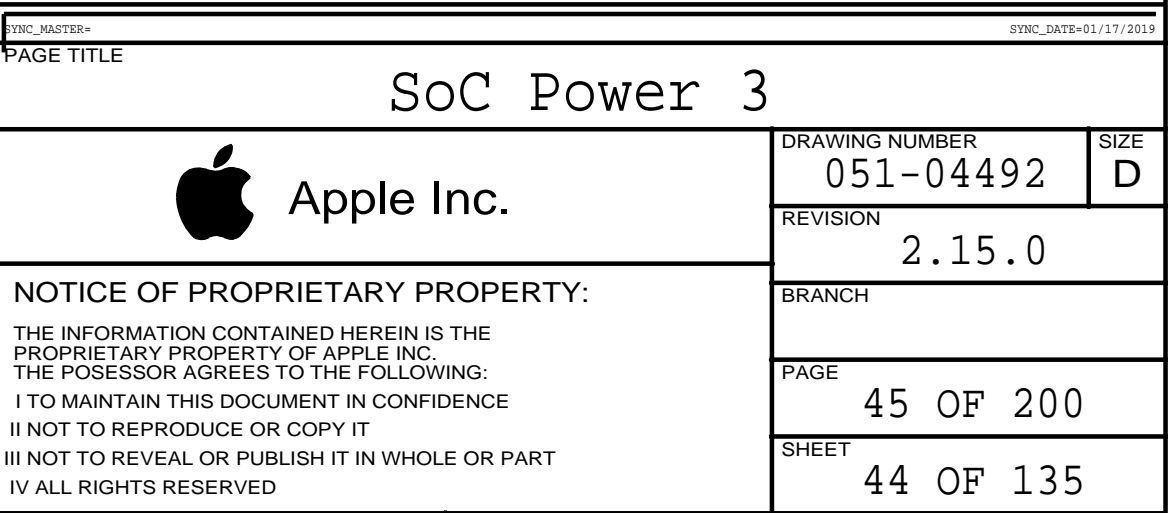
Current estimates @ 105C & 2GB from Gibraltar Power Specification Rev 0.5.3

Vinafix.com

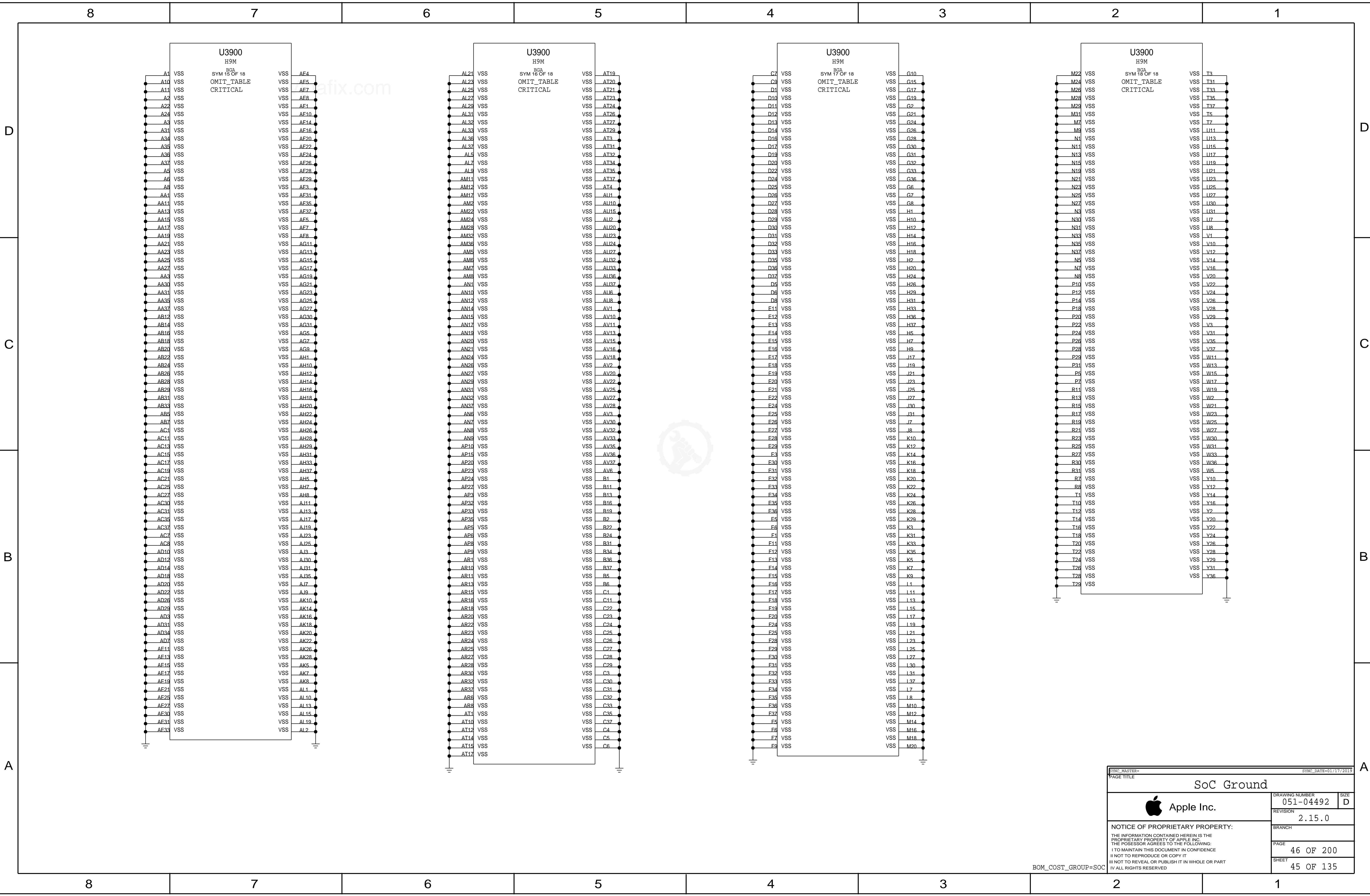



BOM\_COST\_GROUP=SOC





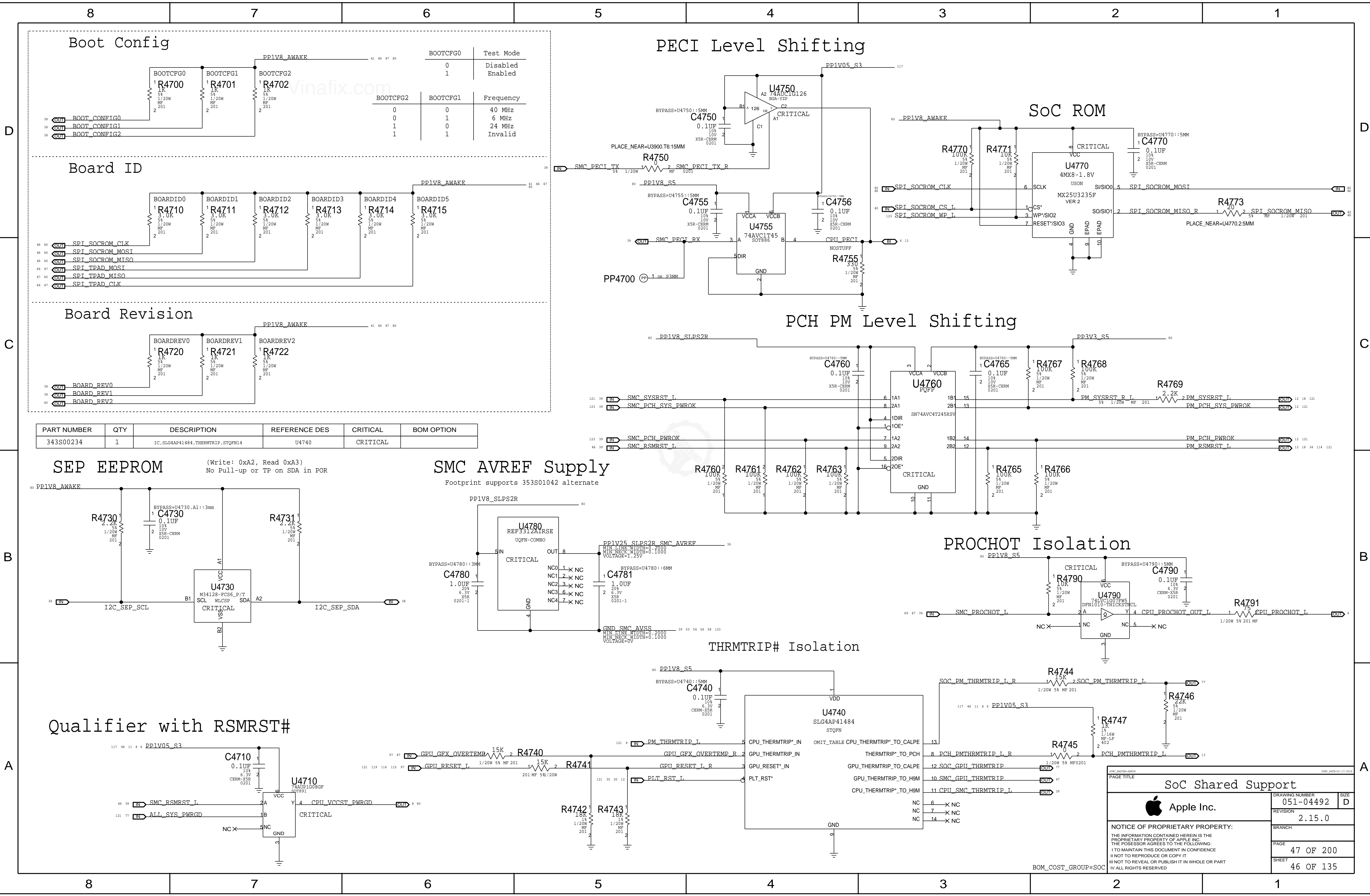




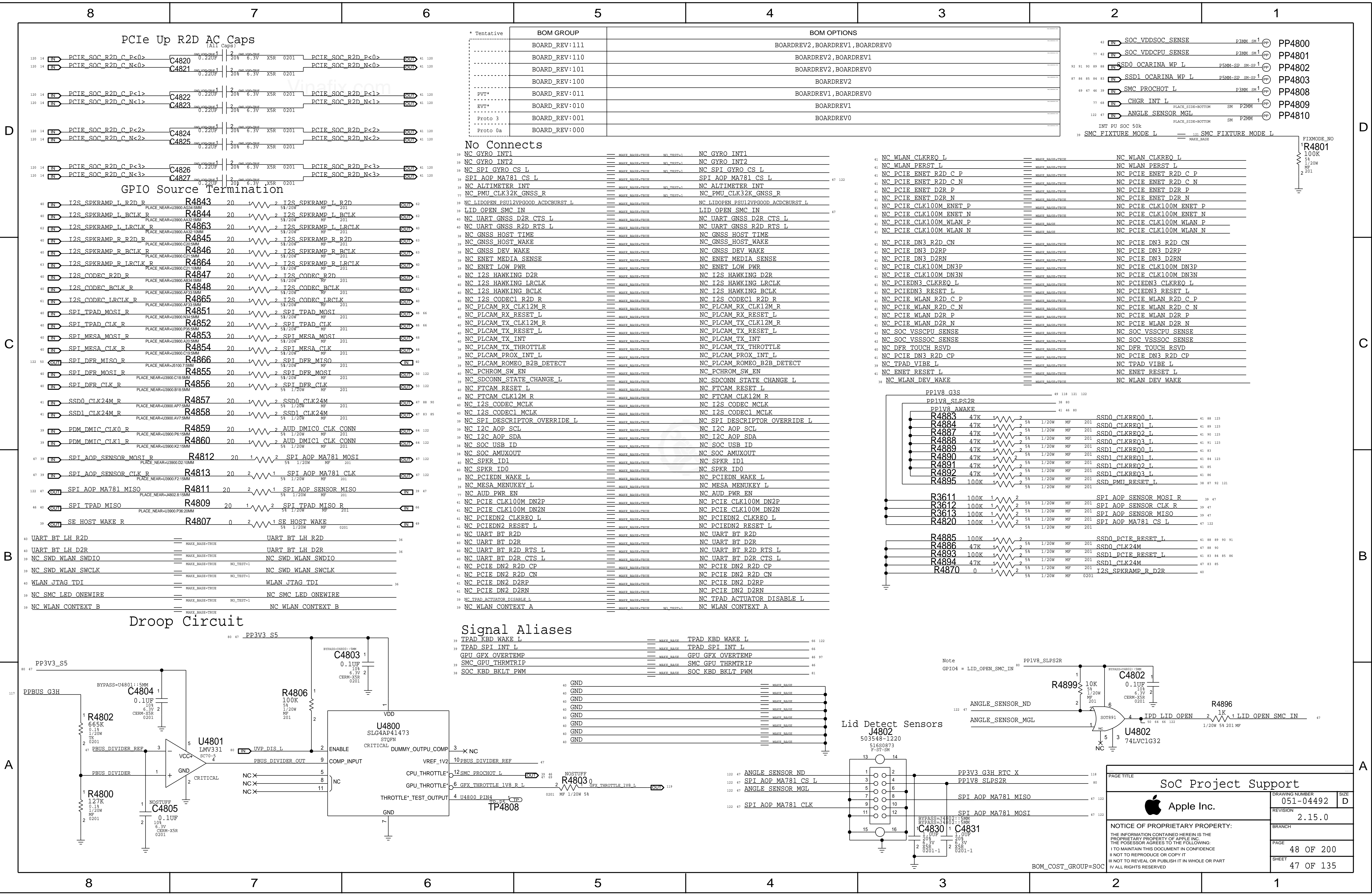
EYWC_MASTER=		PAGE TITLE		SYNC_DATE=01/17/2019	
 Apple Inc.		DRAWING NUMBER		SIZE	
		051-04492		D	
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		REVISION		2.15.0	
		BRANCH			
		PAGE		46 OF 200	
		SHEET		45 OF 135	

BOM\_COST\_GROUP=SOC











8

7

6

5

4

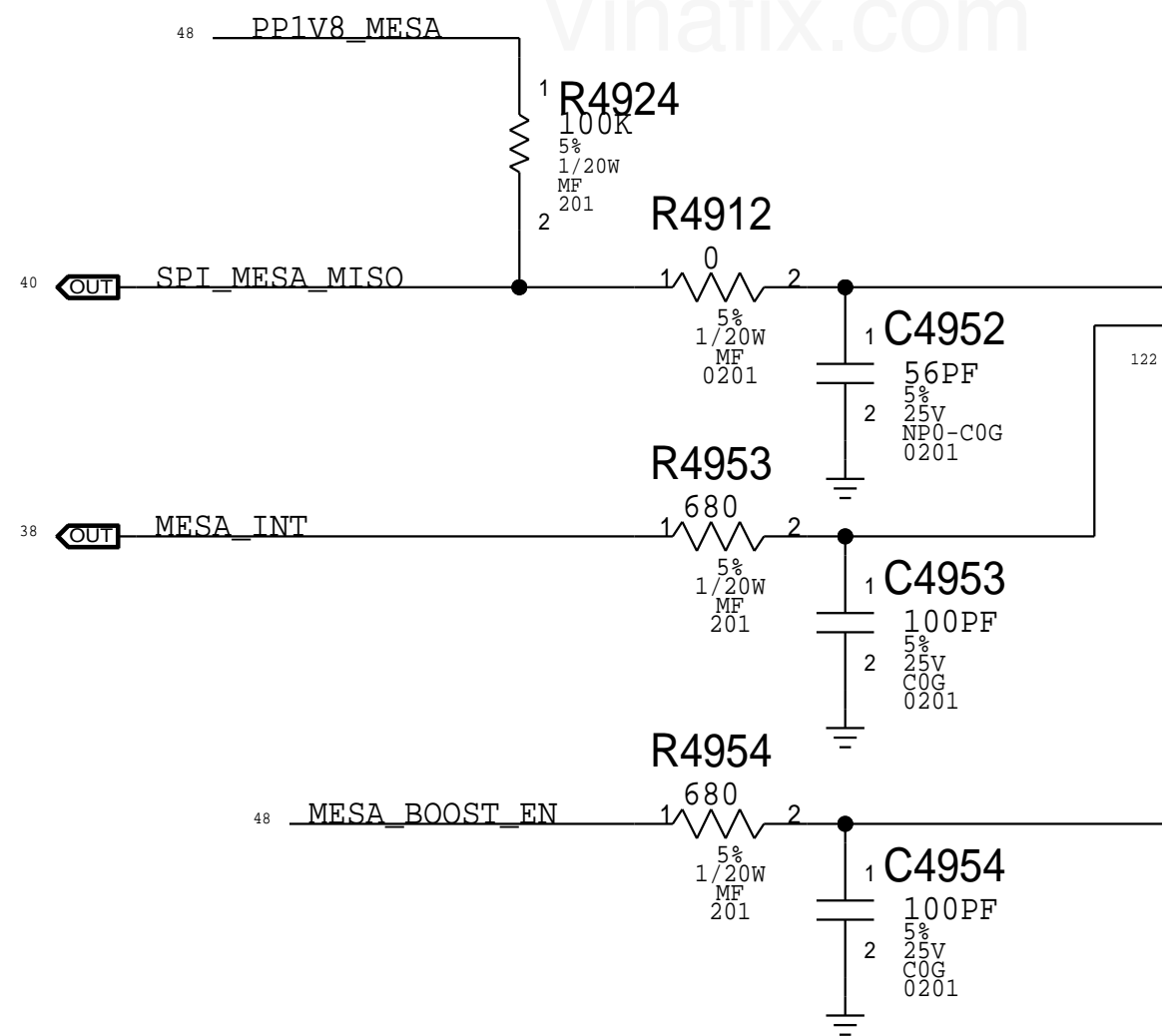
3

2

1

## ESD Filters

ISOLATE FROM OTHER COMPONENTS/NETS AS MUCH AS POSSIBLE



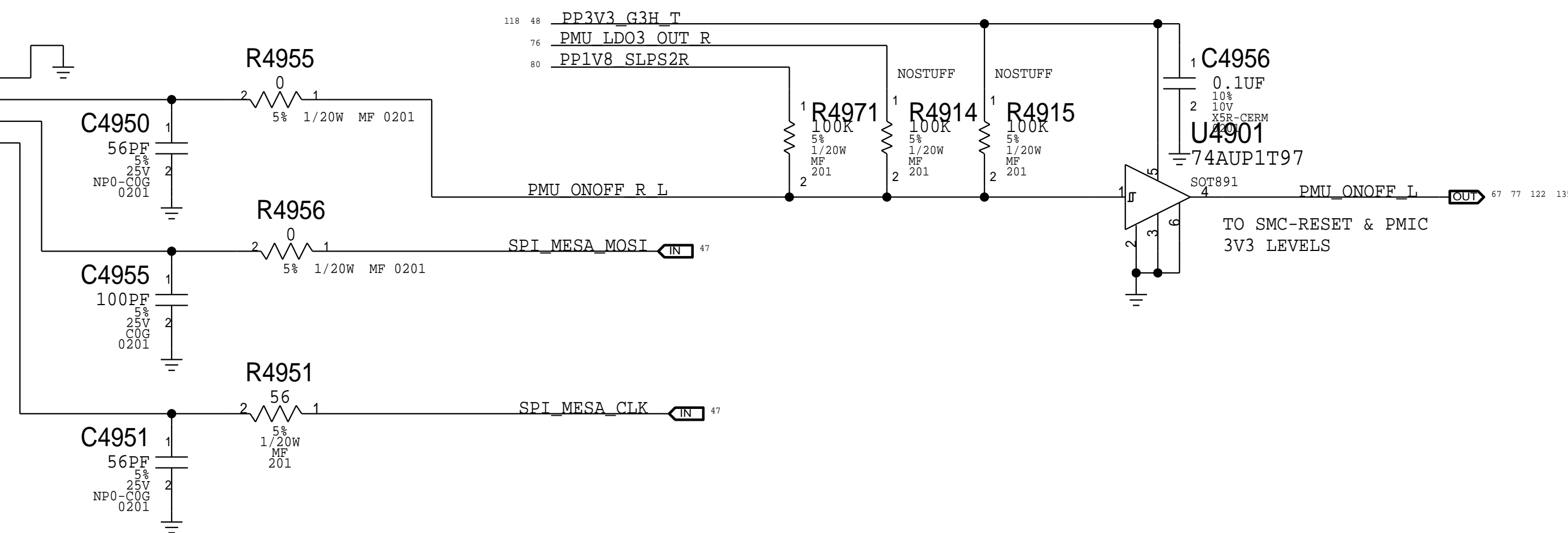
## MESA FLEX CONNECTOR

MLB = RECEPTACLE = 516S00203  
FLEX = PLUG = 516S00115

## ESD Filters

OP MODES ARE NO CALIBRE FOR MESA MODULE PIN 5&amp;7 DIFFEENCES

ISOLATE FROM OTHER COMPONENTS/NETS AS MUCH AS POSSIBLE



## MESA POWER SEQUENCING REQUIREMENTS:

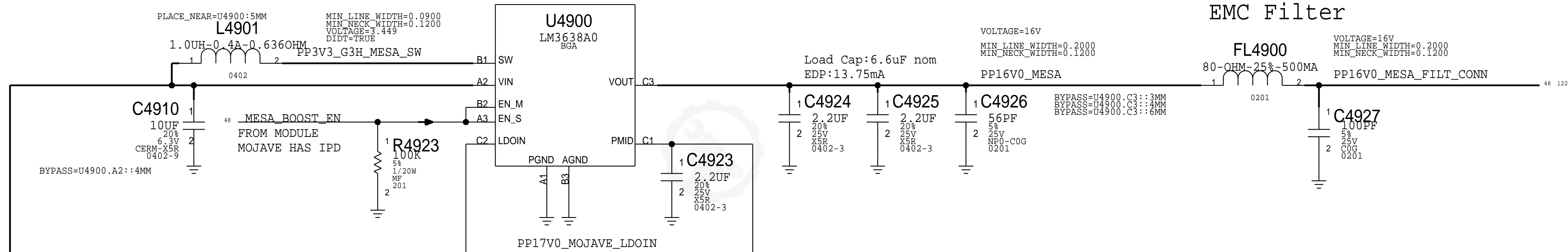
Power On: 1V8 -&gt; 3V3 -&gt; 16V0

Output Voltage	16.0V +/- 2%
Iout (max avg)	6mA
OCP (min)	13 mA
Active Discharge	15 mA sink
Max Output Cap	0.5uF @ 16V

Output Voltage	3.0V +/- 2%
Iout (max avg)	250mA
Dropout Voltage	155mV
OCP (min)	250 mA
Active Discharge	280 Ohm Typ

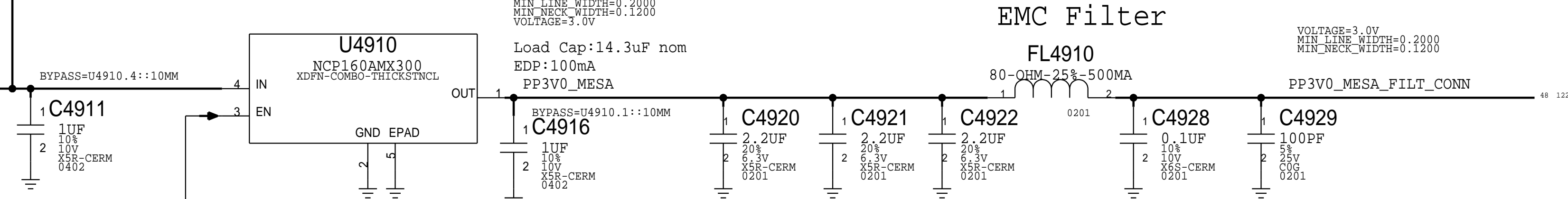
Output Voltage	1.825V +/- 2%
Iout (max avg)	250mA
Dropout Voltage	50mV Typ @ 100mA
OCP (min)	250 mA
Active Discharge	230 Ohm Typ
Max Output Cap	10uF

## MOJAVE 16V BOOST



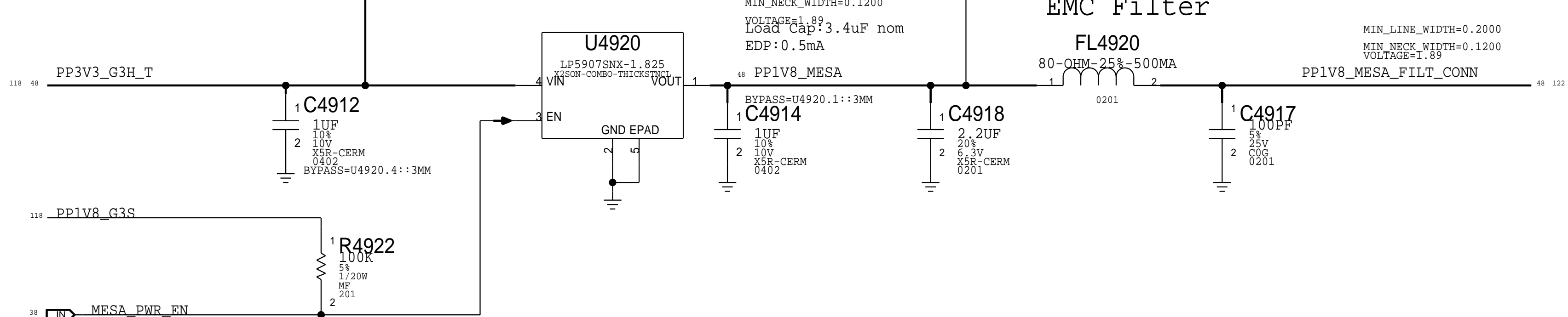
## EMC Filter

## 3.0V MESA




## EMC Filter

## 1.8V MESA

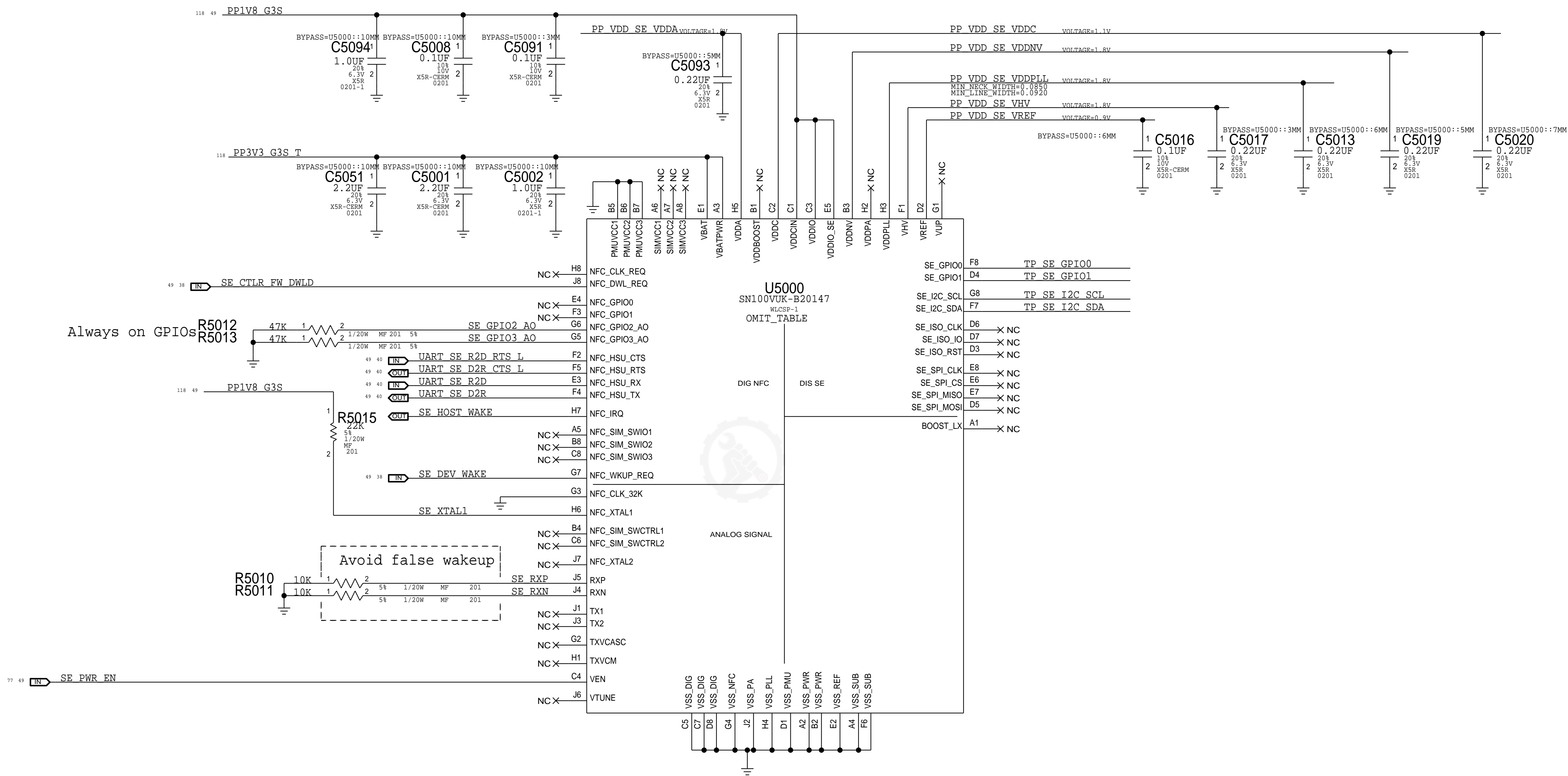


## EMC Filter

BOM\_COST\_GROUP=T151


PAGE TITLE			
MESA			
 Apple Inc.	DRAWING NUMBER	051-04492	SIZE D
	REVISION	2.15.0	
	BRANCH		
	PAGE	49 OF 200	
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		SHEET	48 OF 135



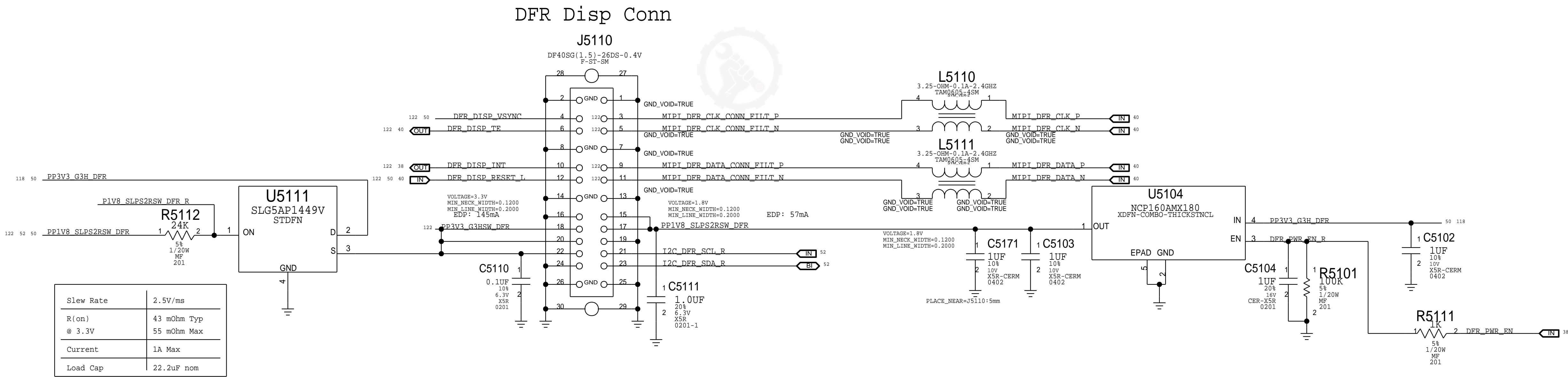
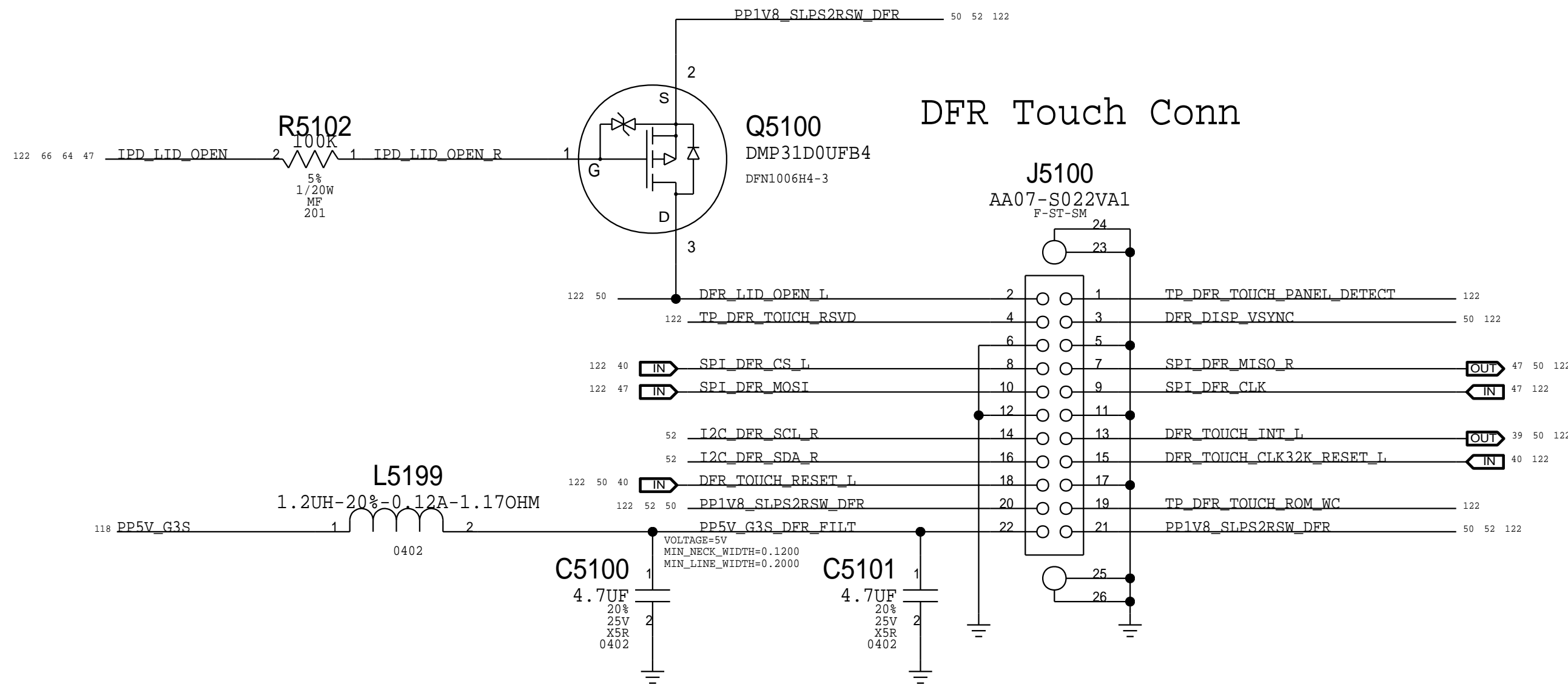


PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
998-15216	1	IC, SN100V, DEV, B2, WLCSPT2	U5000	CRITICAL	SE:DEV_2019
338S00445	1	IC, SN100V, PROD, B2, WLCSPT2	U5000	CRITICAL	SE:PROD_2019

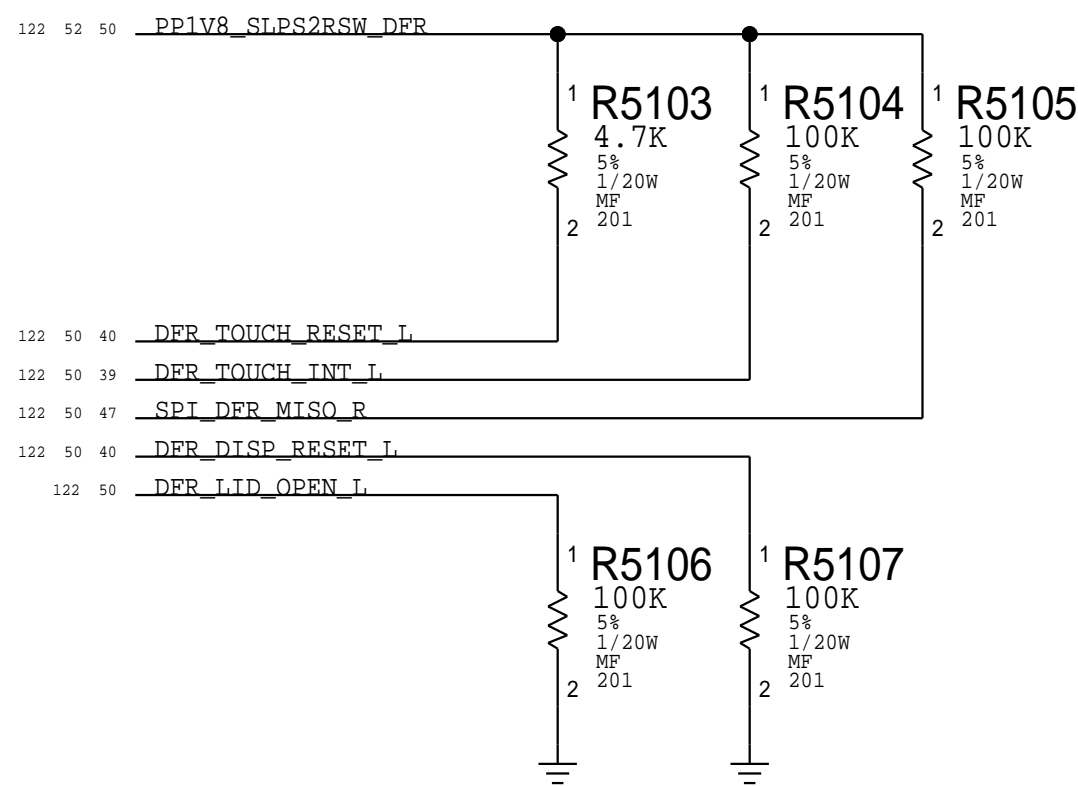
<b>PP1V8 G3S</b>						47	110	121	122	
R5001	100K	1		2	5%	1/20W	MF	201	UART SE R2D	40 49
R5002	100K	1		2	5%	1/20W	MF	201	UART SE D2R	40 49
R5003	100K	1		2	5%	1/20W	MF	201	UART SE R2D RTS L	40 49
R5004	100K	1		2	5%	1/20W	MF	201	UART SE D2R CTS L	40 49
R5000	100K	1		2	5%	1/20W	MF	201		
R5005	100K	1		2	5%	1/20W	MF	201	SE CTLR FW DWLD	38 49
R5006	100K	1		2	5%	1/20W	MF	201	SE DEV WAKE	38 49
					5%	1/20W	MF	201	SE PWR EN	49 77

PAGE NUMBER		PAGE TOTAL	
SECURE ELEMENT			
 Apple Inc.	DRAWING NUMBER		SIZE
	051-04492		D
NOTICE OF PROPRIETARY PROPERTY:	REVISION		
	2.15.0		
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH		
	PAGE 50 OF 200		
SHEET 49 OF 135			

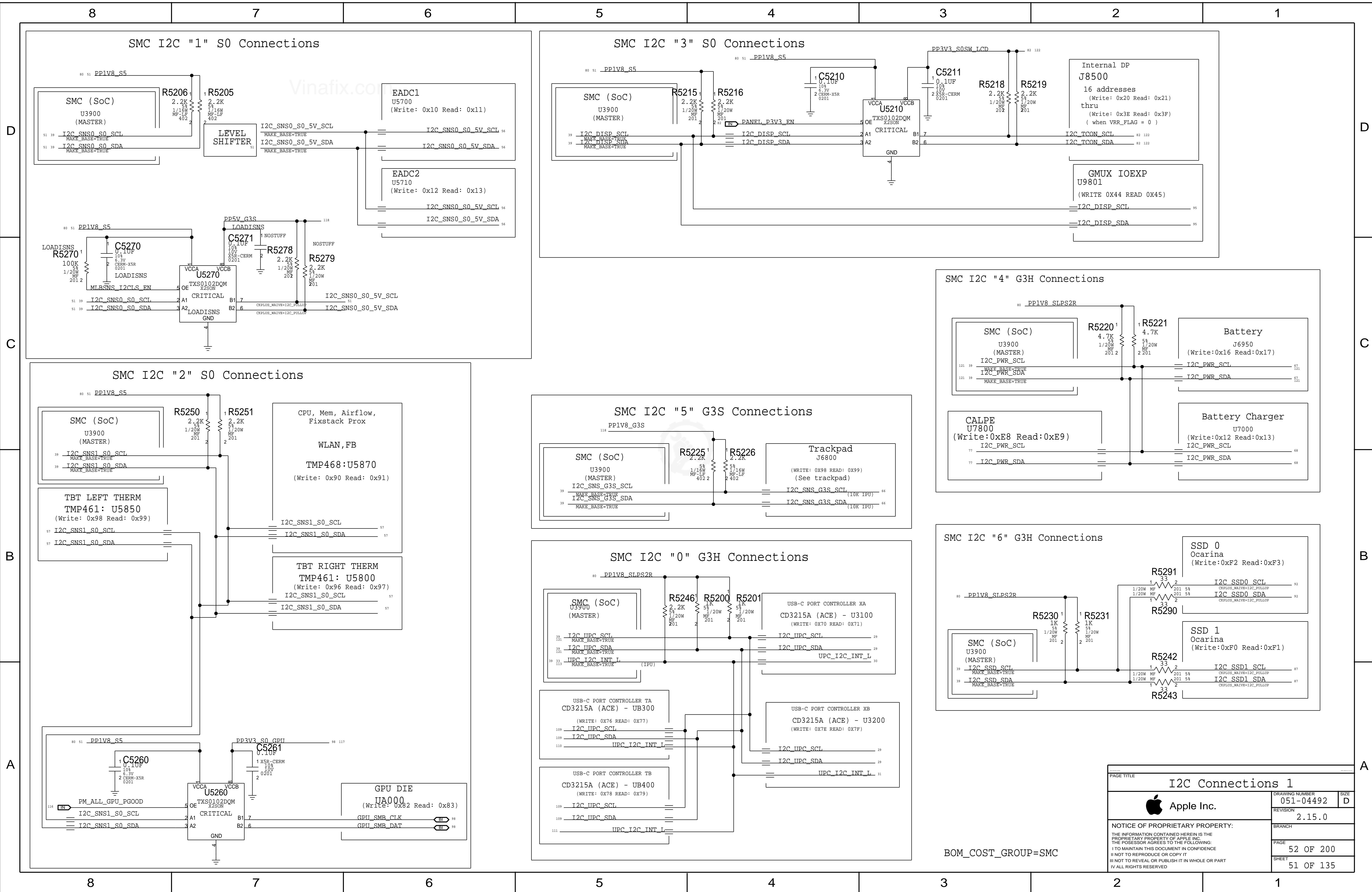





Slew Rate	2.5V/ms
R(on)	43 mOhm Typ
@ 3.3V	55 mOhm Max
Current	1A Max
Load Cap	22.2uF nom

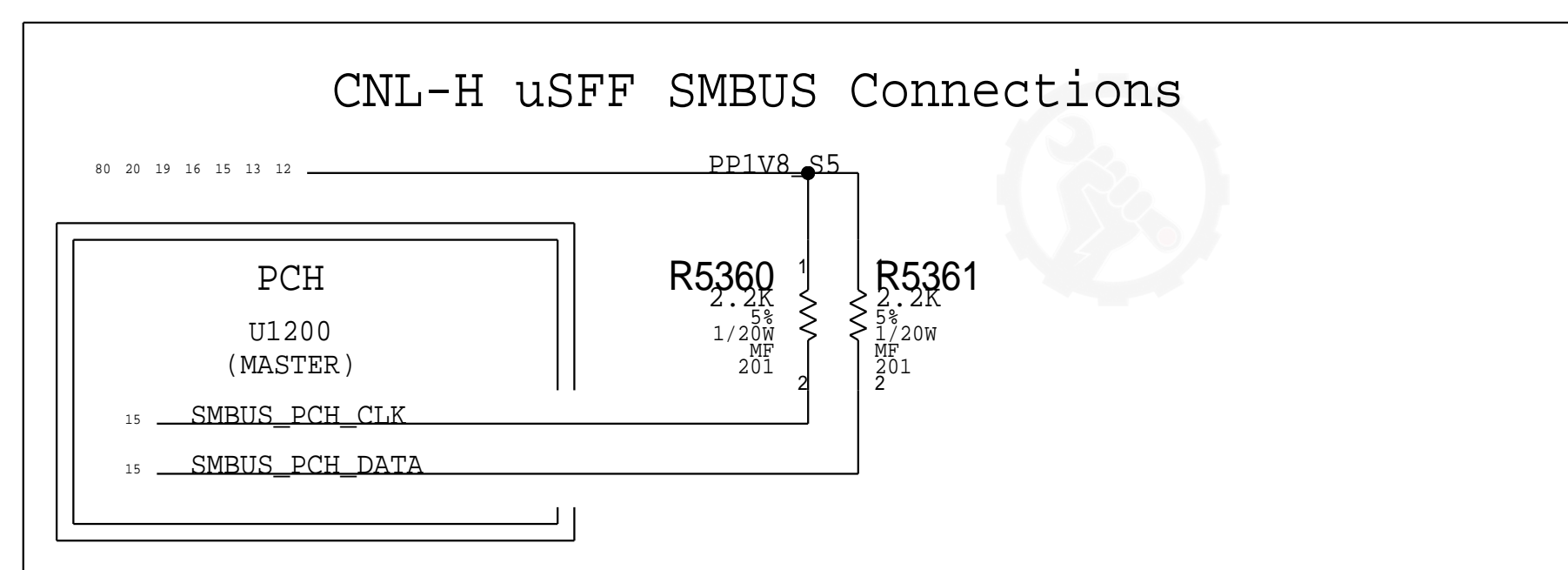
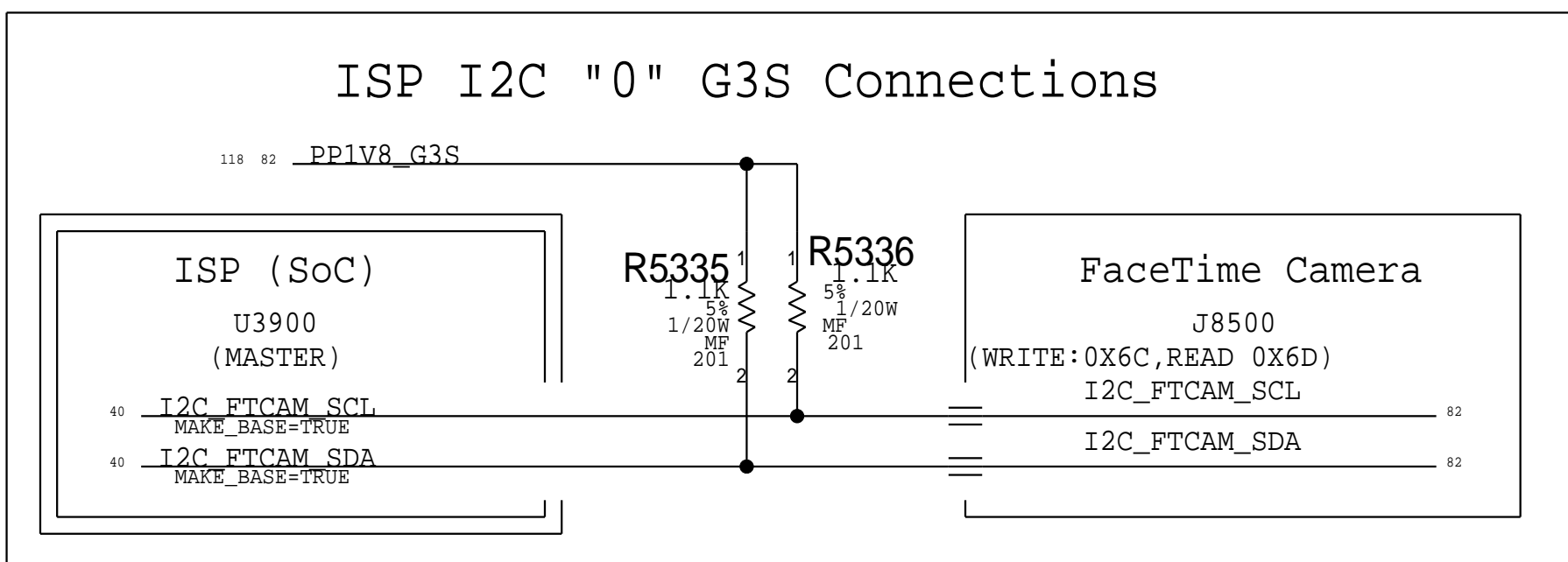
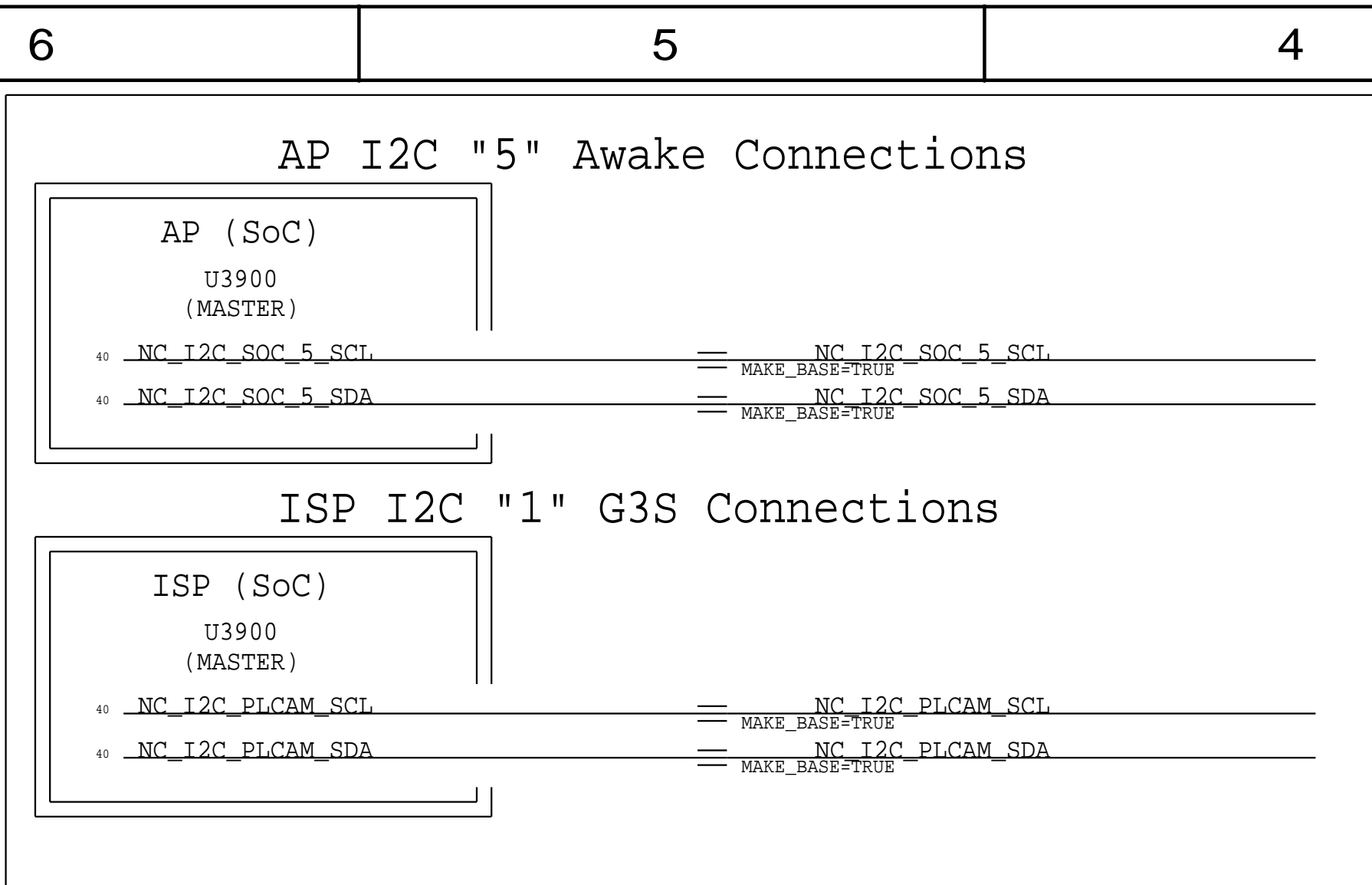
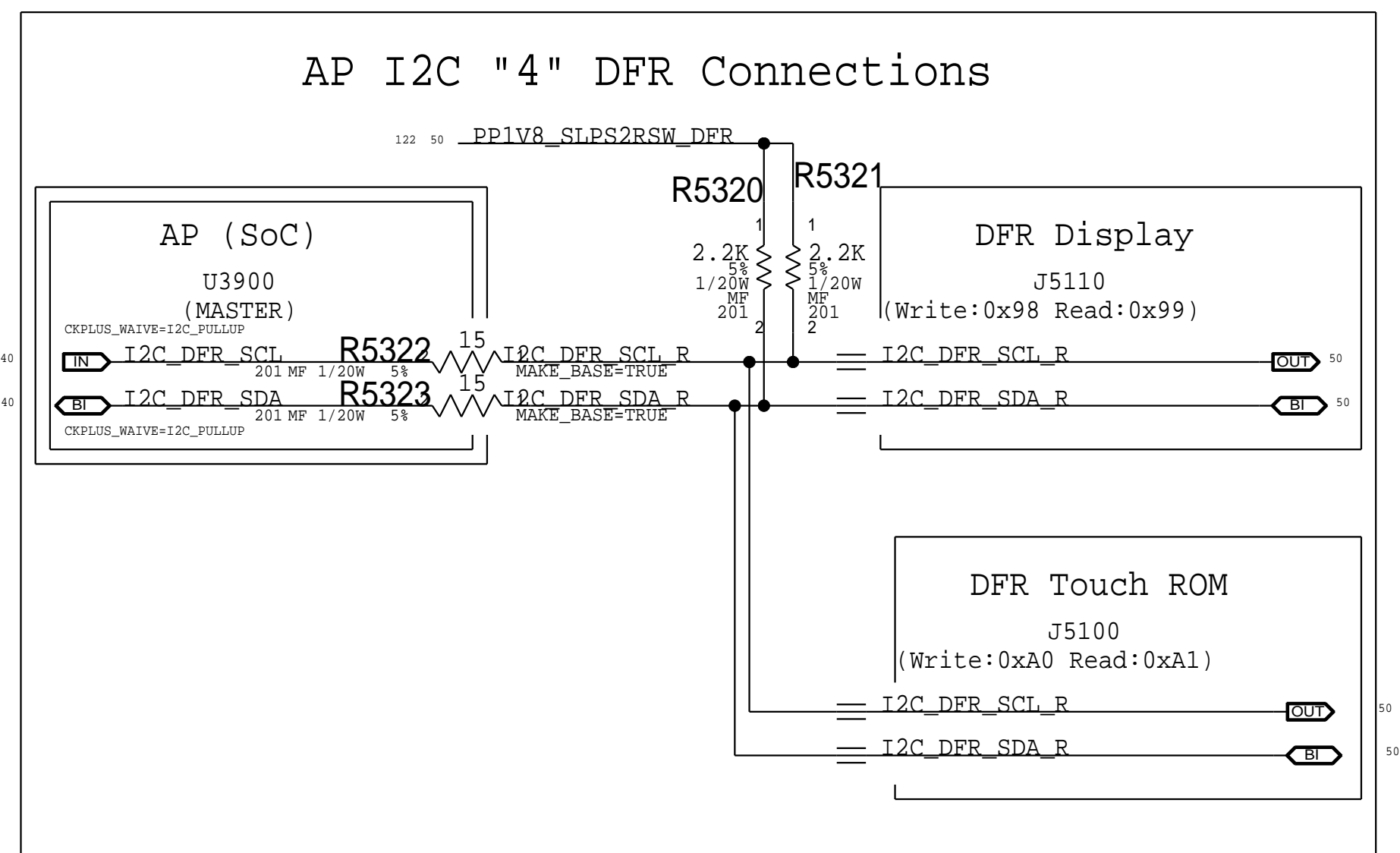
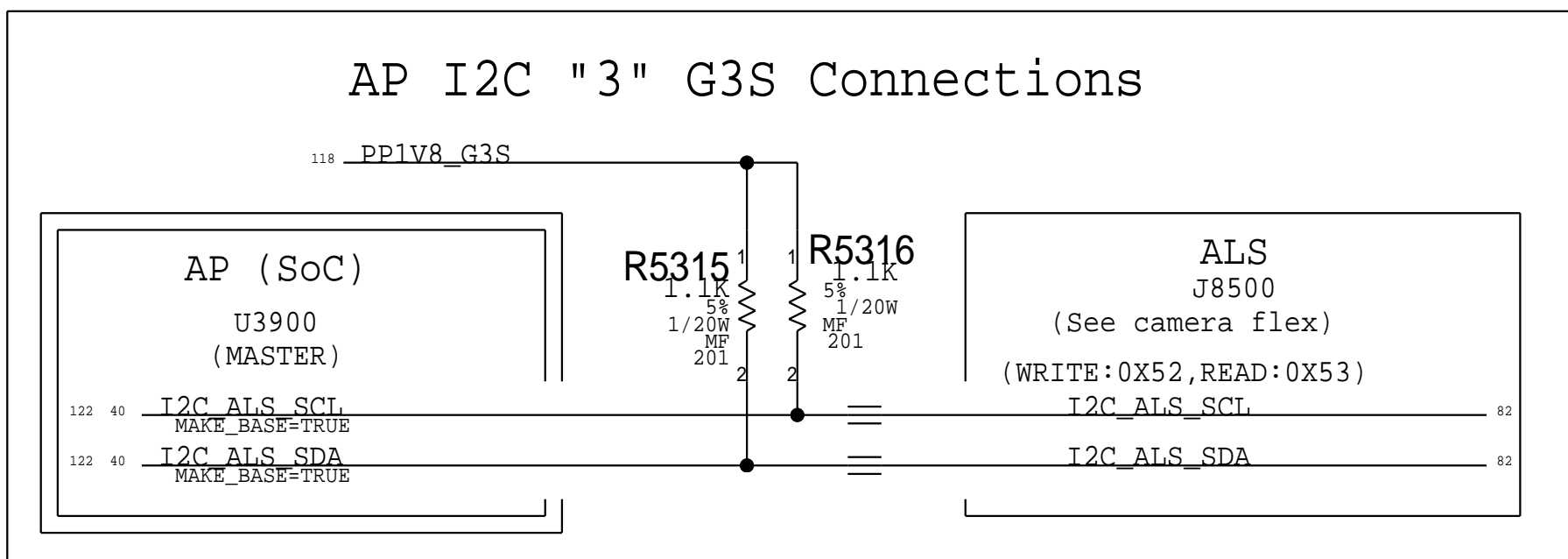
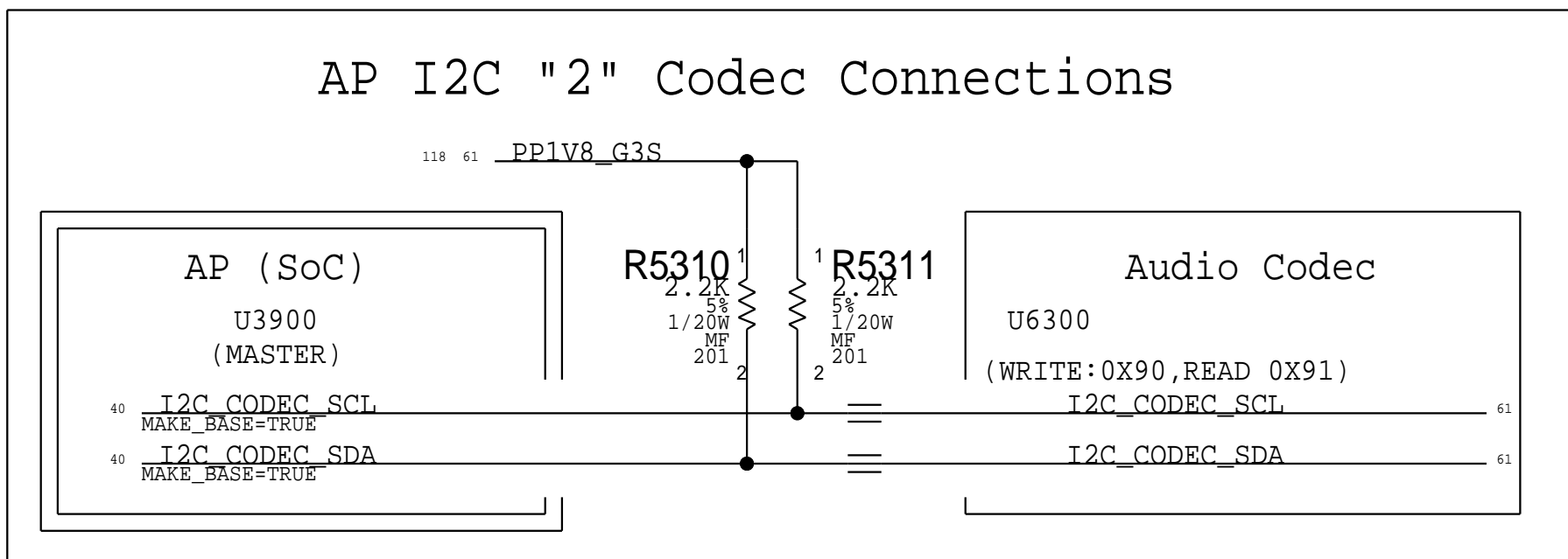
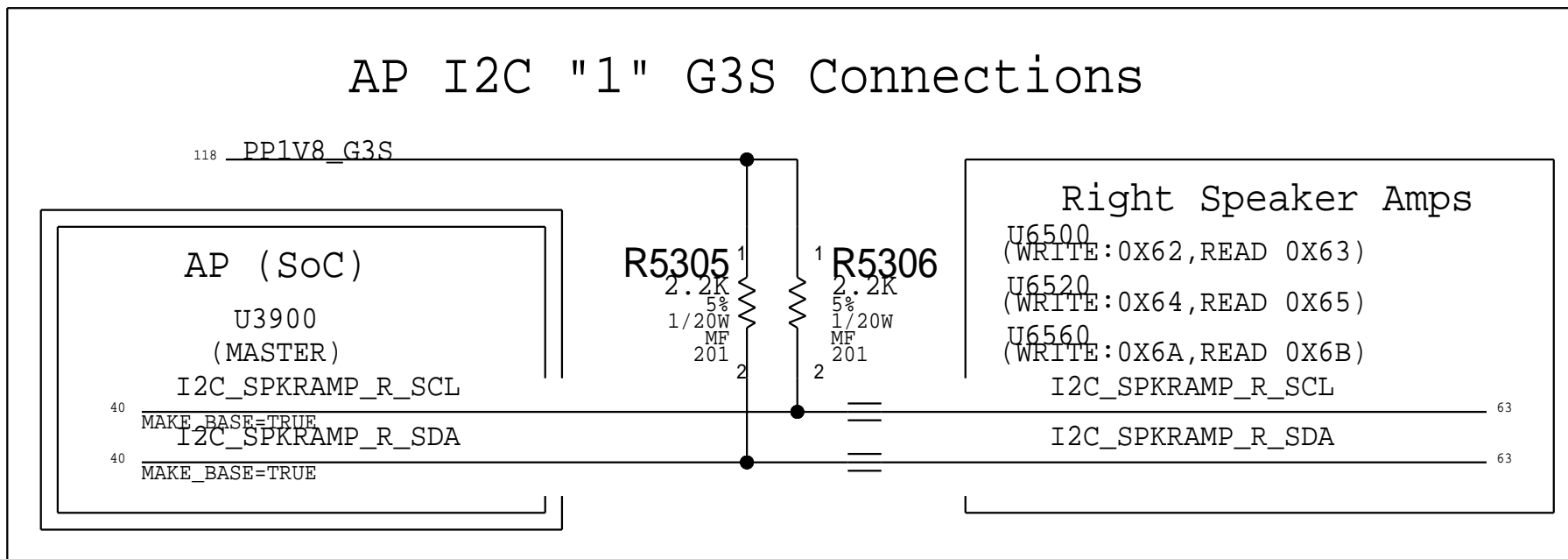
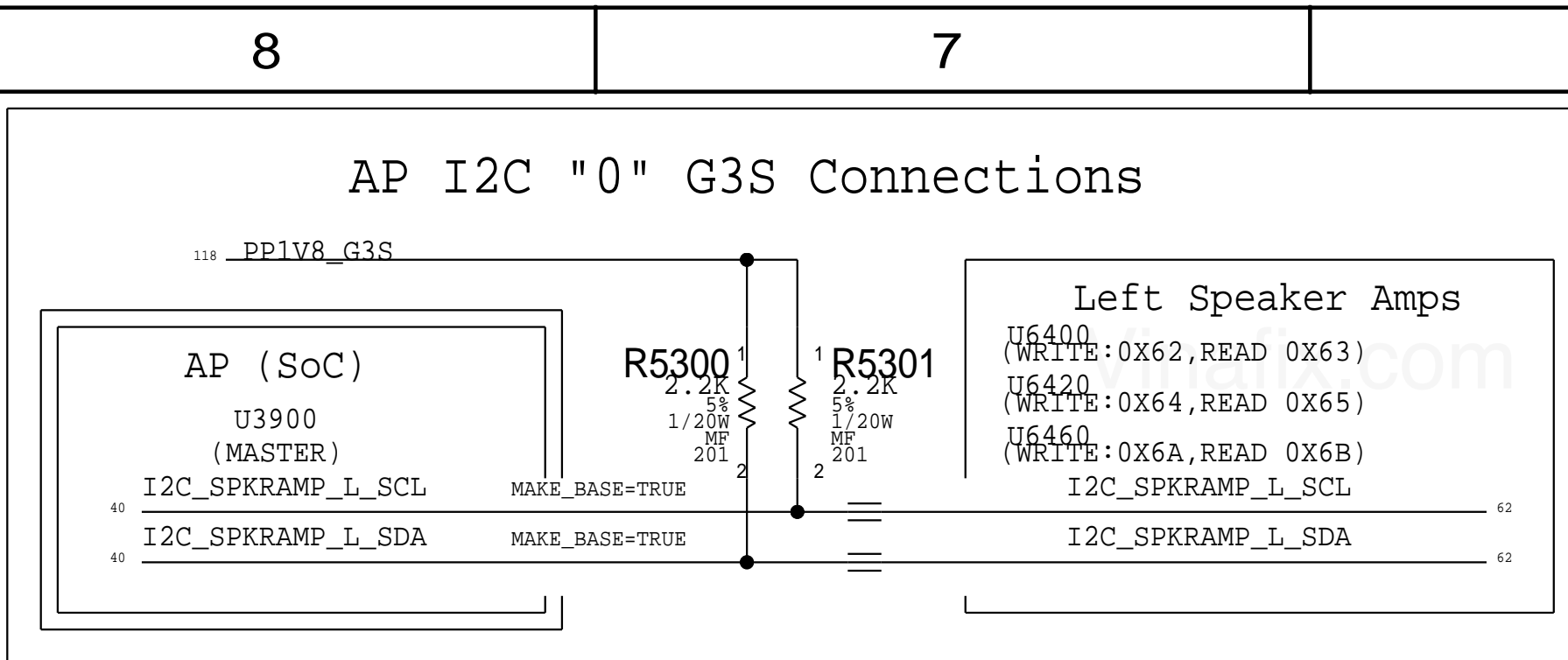







PAGE TITLE		
I2C Connections 1		
 Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		
BRANCH		PAGE
		52 OF 200
SHEET		51 OF 135





2		1
I2C Device Address		
Device	SMC IF	ADDR. (8b)
ACE XA	I2C0	0X70/1
ACE XB	I2C0	0X7E/F
ACE TA	I2C0	0X76/7
ACE TB	I2C0	0X78/9
EADC1	I2C1	0X10/1
EADC2	I2C1	0X12/3
Temp. Sensor Left	I2C2	0X98/9
Temp. Sensor Right	I2C2	0X96/7
CPU, MEM, WLAN Thermal	I2C2	0X90/1
GPU Analog Die Thermal	I2C2	0X92/3
GPU Digital Die Thermal	I2C2	0X82/3
TCON	I2C3	0X20/1
GMUX IOEXP	I2C3	0X44/5
Charger	I2C4	0X12/3
Battery	I2C4	0X16/7
Calpe	I2C4	0XE8/9
Trackpad	I2C5	0X98/9
SSD0	I2C6	0XF2/3
SSD1	I2C6	0XF0/1
SoC IF		
Left Spkr Amp. (U6400)	I2C0	0X62/3
Left Spkr Amp. (U6420)	I2C0	0X64/5
Left Spkr Amp. (U6460)	I2C0	0X6A/B
Right Spkr Amp. (U6500)	I2C1	0X62/3
Right Spkr Amp. (U6520)	I2C1	0X63/4
Right Spkr Amp. (U6560)	I2C1	0X6A/B
Audio Codec	I2C2	0X90/1
ALS	I2C3	0X52/3
DFR Display	I2C4	0X98/9
DFR Touch	I2C4	0XA0/1
NC.	I2C5	
NC.Spkr ID1	I2C6_SDA	
NC.Spkr ID0	I2C6_SCL	
ISP IF		
FT Camera	I2C0	0X6C/D
NC.	I2C1	
AOP IF		
NC.	I2C0	
PCH IF		
NC.	PULL-UP	

PAGE TITLE		DRAWING NUMBER		SIZE
I2C Connections 2		051-04492		D
 Apple Inc.		REVISION		
		2.15.0		
NOTICE OF PROPRIETARY PROPERTY:		BRANCH		
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I. TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II. NOT TO REPRODUCE OR COPY IT III. NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV. ALL RIGHTS RESERVED		PAGE		
		53 OF 200		
		SHEET		
		52 OF 135		

BOM\_COST\_GROUP=SMC



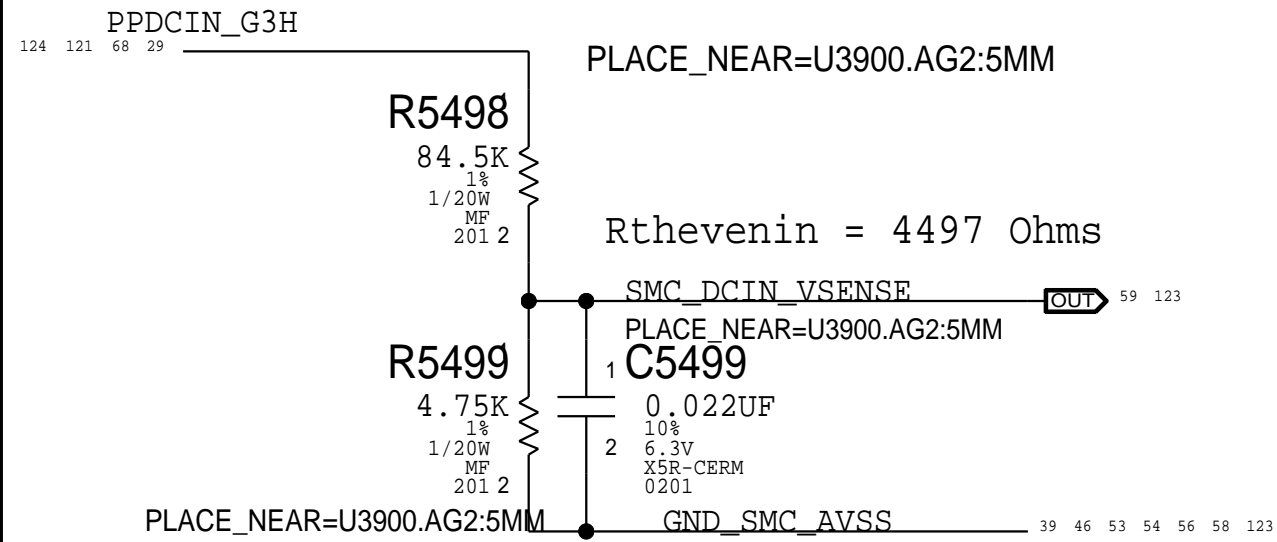
## DC-IN Voltage Sense (VD0R)

Gain: 0.05322x  
Vnominal: 20 V, Range: 23.49 V  
SMC ADC: 00  
Enables DC-In VSense divider when AC present.  
2.2KHz

## J152 Sensor Settings

IC	Vref	Vmax	SMC Sample Freq.	ADR RC filter
H9M	1.25	1.8	10kHz	0.1ms
CALPE	1.5	5.0	100Hz	10ms
EADC	2.5	5.0	1-2Hz (10Hz)	100ms

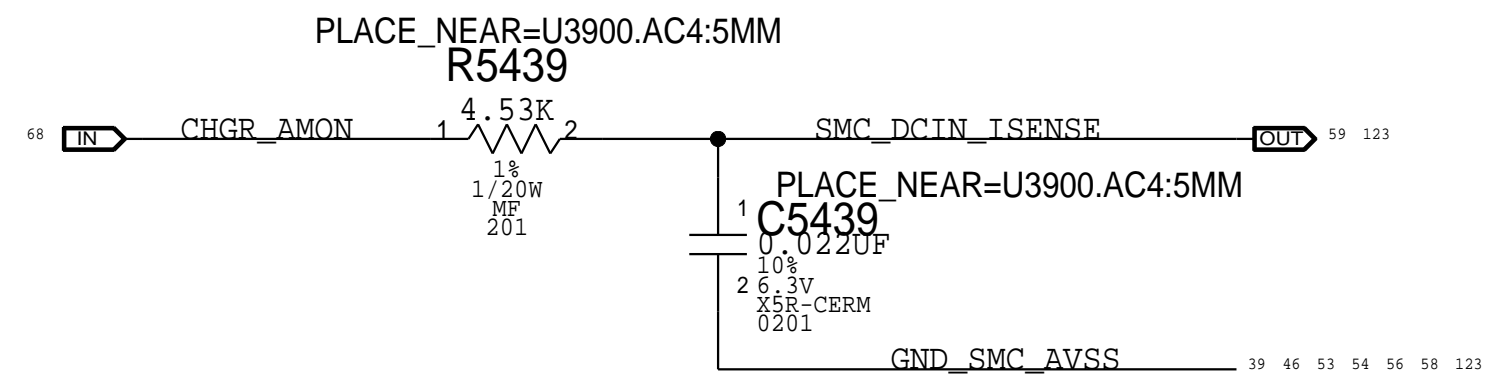
D



## DC-IN Current Sense (ID0R)

DISCharger Gain: 20x, EDP: 4.6 A  
Rsense: 0.010 (R7020)  
SMC ADC: 01

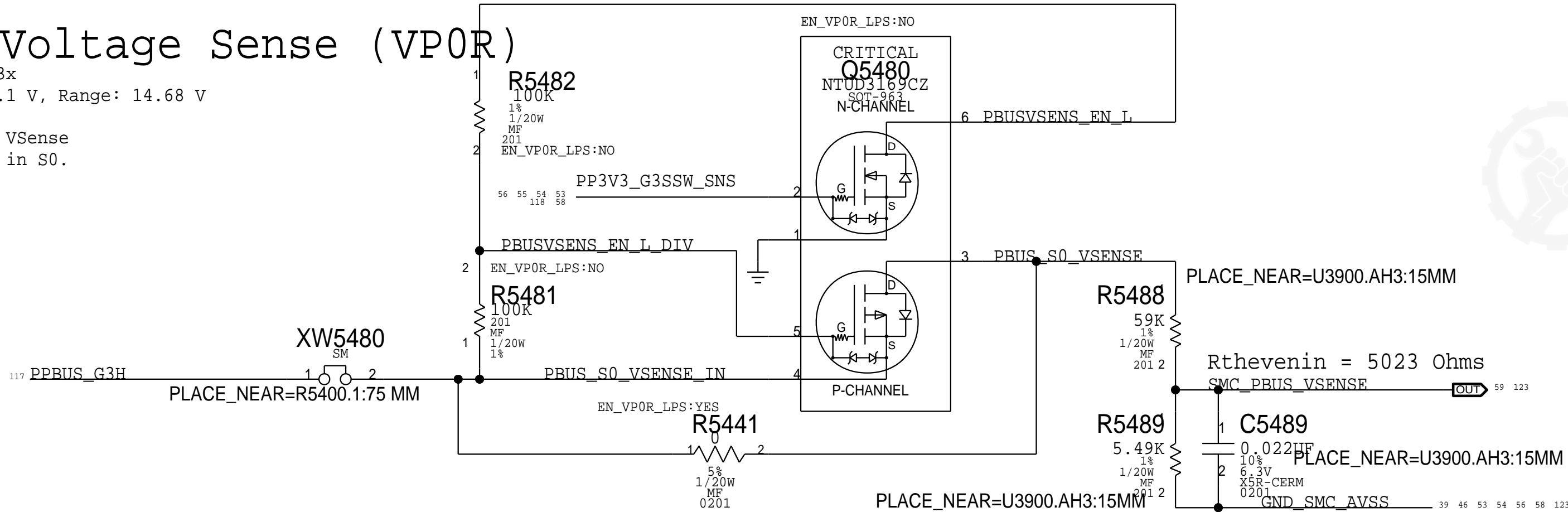
C



## PBUS Voltage Sense (VP0R)

Gain: 0.08513x  
Vnominal: 13.1 V, Range: 14.68 V  
SMC ADC: 02  
Enables PBUS VSense divider when in S0.

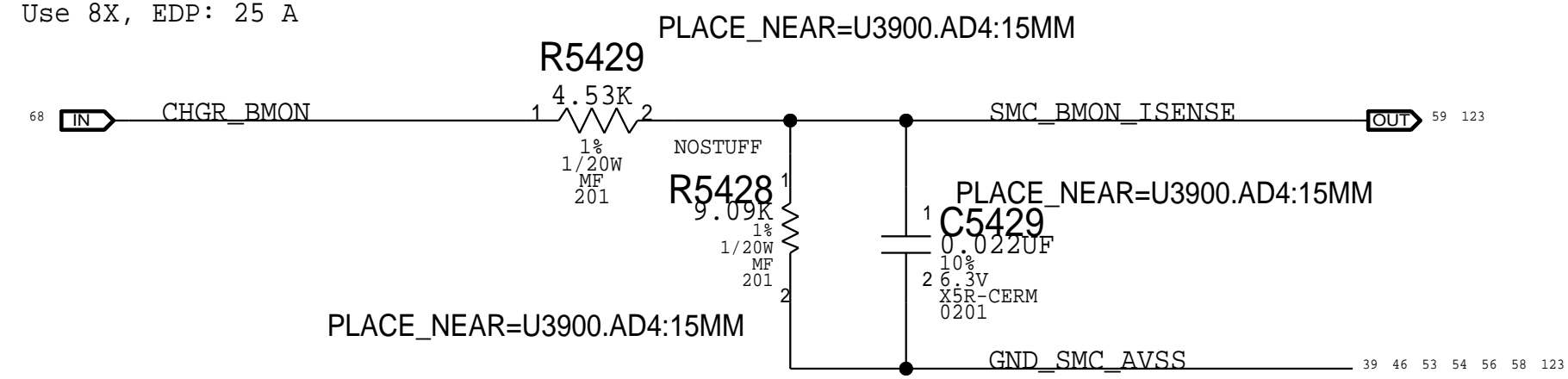
B



## Discharger BMON Current Sense (IPBR)

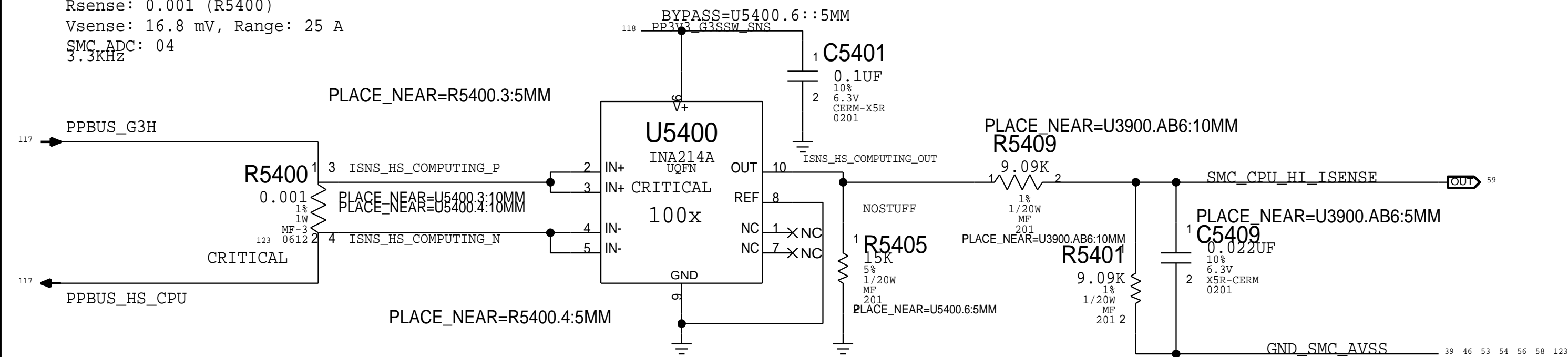
Charger Gain: 8X OR 64x, Use 8X, EDP: 25 A  
Rsense: 0.005 (R7060)  
SMC ADC: 03

A



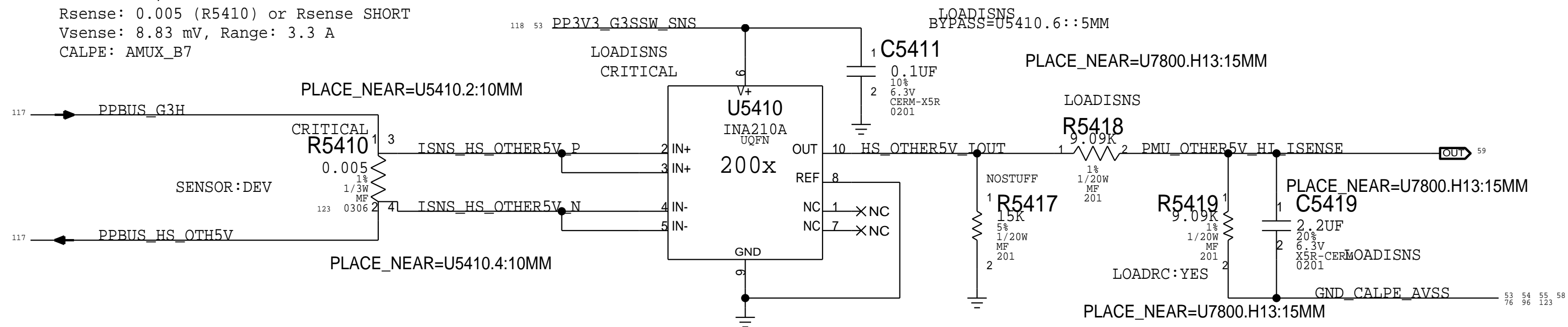
## CPU High Side Curent Sense (IC0R)

Gain: 100x, EDP: 16.8 A  
Rsense: 0.001 (R5400)  
Vsense: 16.8 mV, Range: 25 A  
3.3KHz



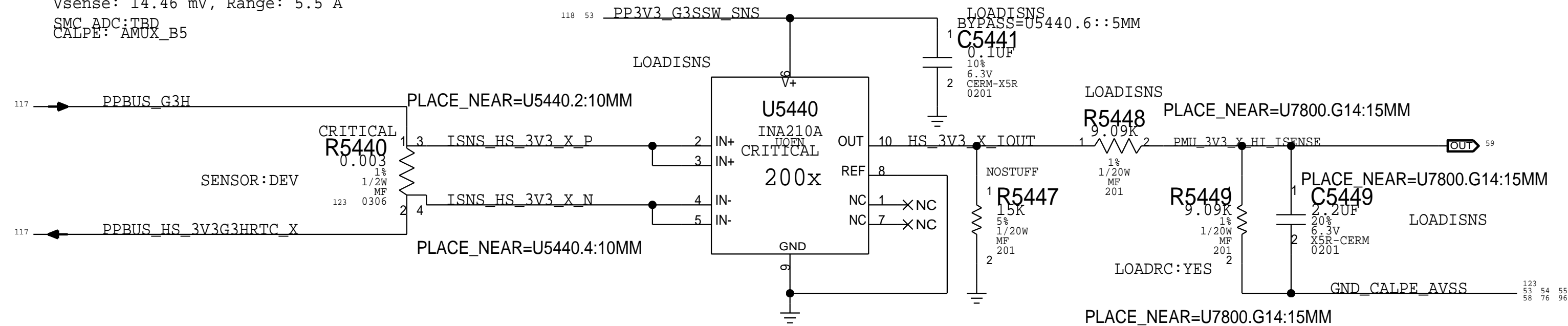
## OTHER 5V High Side Current Sense (IO5R)

Gain: 200x, EDP: 1.766 A  
Rsense: 0.005 (R5410) or Rsense SHORT  
Vsense: 8.83 mV, Range: 3.3 A  
CALPE: AMUX\_B7



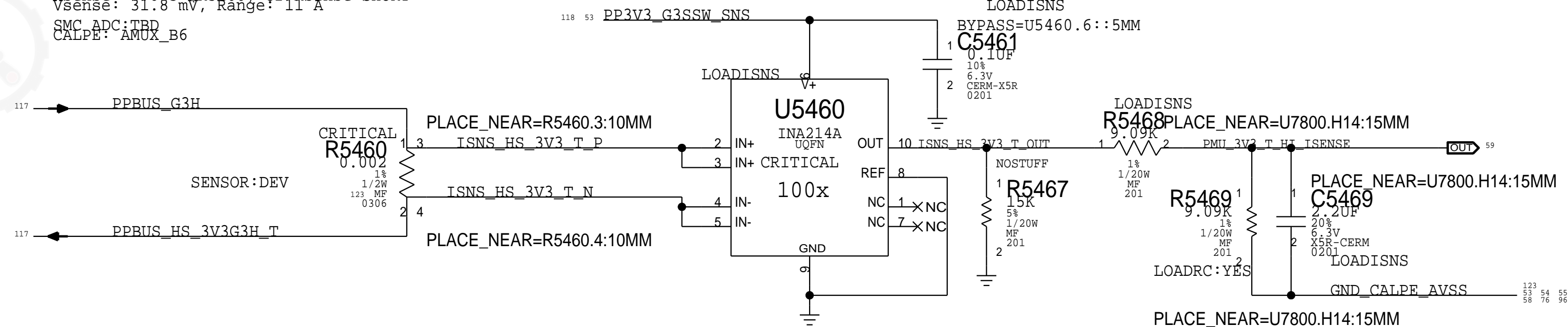
## LEFT SIDE 3.3V High Side Current Sense (IOLR)

Gain: 200x, EDP: 4.82 A  
Rsense: 0.003 (R5440) or Rsense SHORT  
Vsense: 14.46 mV, Range: 5.5 A  
SMC ADC: TRD  
CALPE: AMUX\_B5



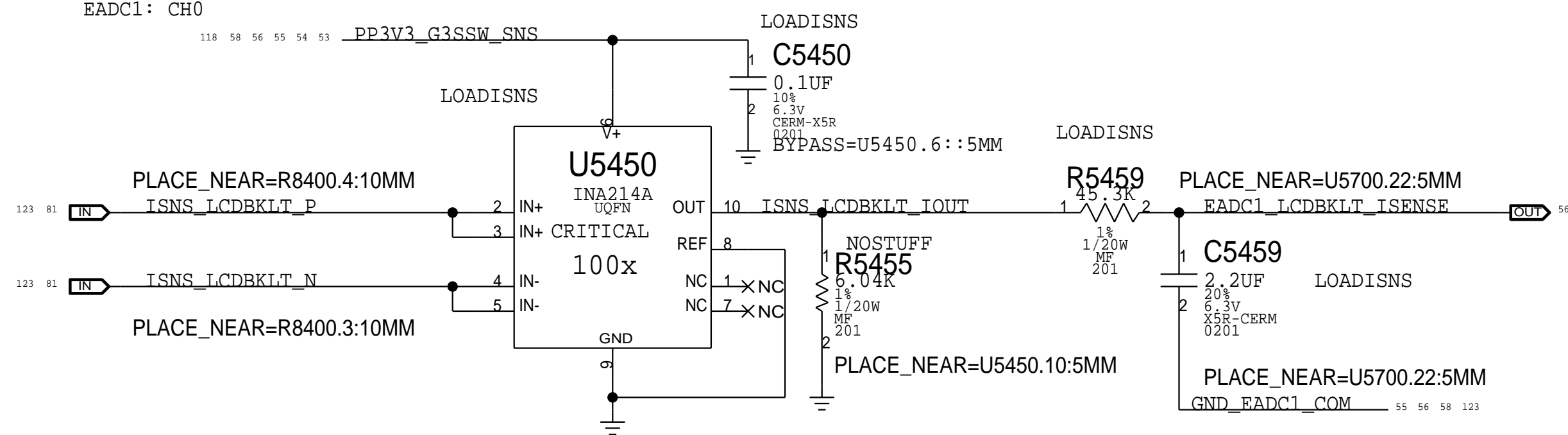
## RIGHT SIDE 3.3V High Side Current Sense (IORR)

Gain: 100x, EDP: 10.6 A  
Rsense: 0.003 (R5460) or Rsense SHORT  
Vsense: 31.8 mV, Range: 11 A  
SMC ADC: TRD  
CALPE: AMUX\_B6




## LCD Backlight Current Sense (IBLR)

Gain: 100x, EDP: 0.87 A  
Rsense: 0.025 (R8400)  
Vsense: 21.75 mV, Range: 1.32 A  
EADC1: CH0



PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
117S0008	3	RES,MTL,FLIM,100K,1/16W,0201,SMD,LF	R5449,R5469,R5419		LOADRC:NO

BOM\_COST\_GROUP=SENSORS

PAGE TITLE		
Power Sensors High Side		
 Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
	BRANCH	
	PAGE	54 OF 200
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		SHEET 53 OF 135

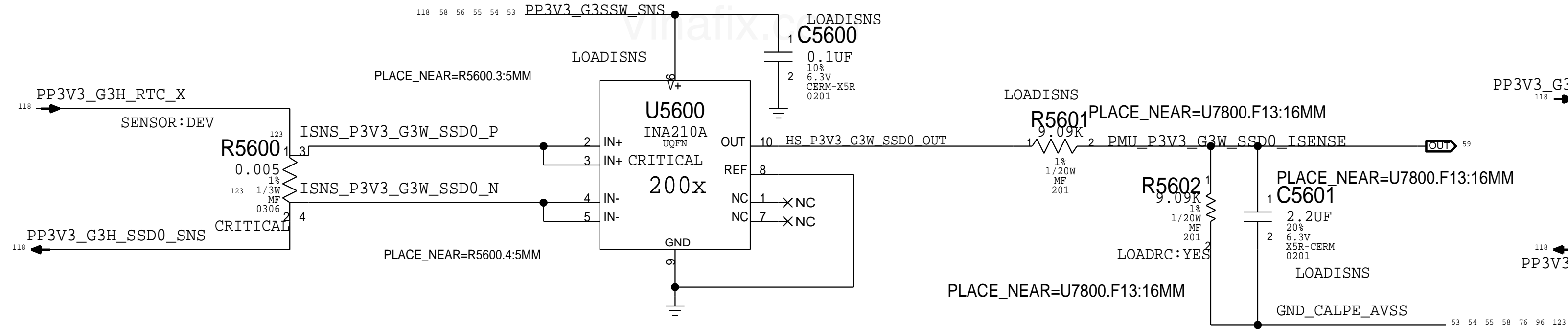






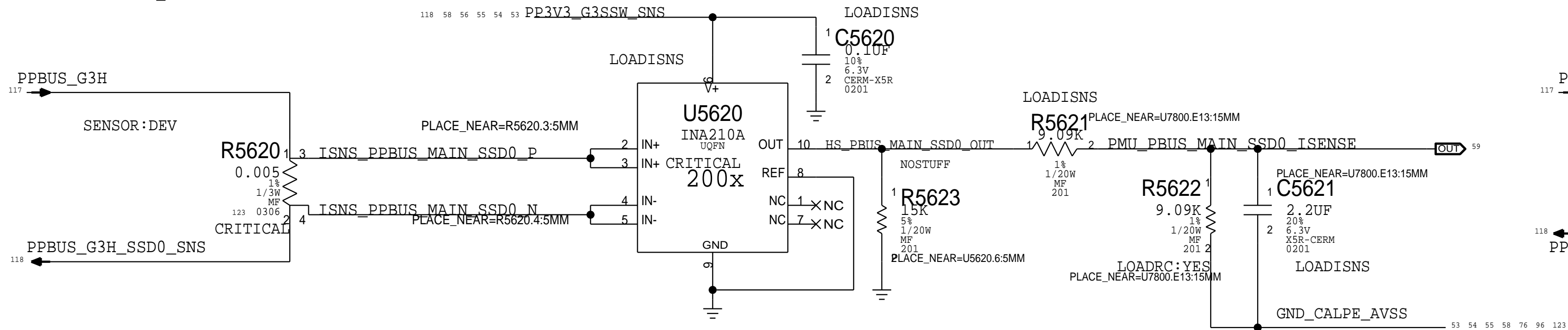
## PP3V3\_G3W\_SSD0 HIGH SIDE CURRENT SENSE (KEY IH0C)

```
GAIN: 200X, EDP: 1.48 A
RSENSE: 0.005 (RK710) OR RSENSE SHORT
VSENSE: 13 MV, RANGE: 2.5 A
CALPE: AMUX_B3
```



## PP12V SSD0 HIGH SIDE CURRENT SENSE (KEY IH0R)

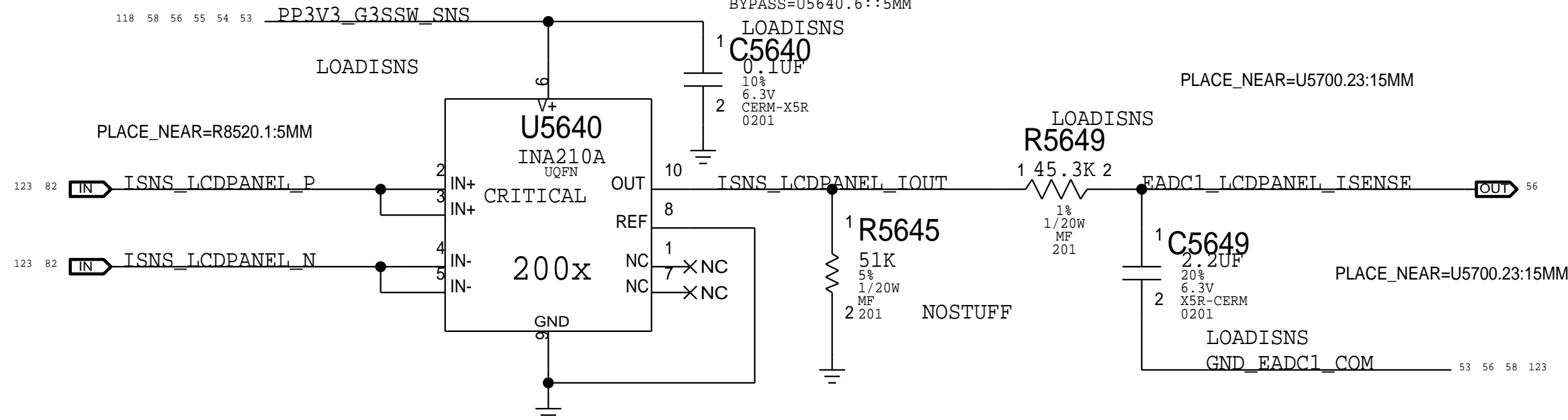
```
GAIN: 200X, EDP: 0.5 A
RSENSE: 0.005 (RK610) OR RSENSE SHORT
VSENSE: 13 MV, RANGE: 2.5 A
CALPE: AMUX_B1
```



## LCD Panel Current Sense (ILDC)

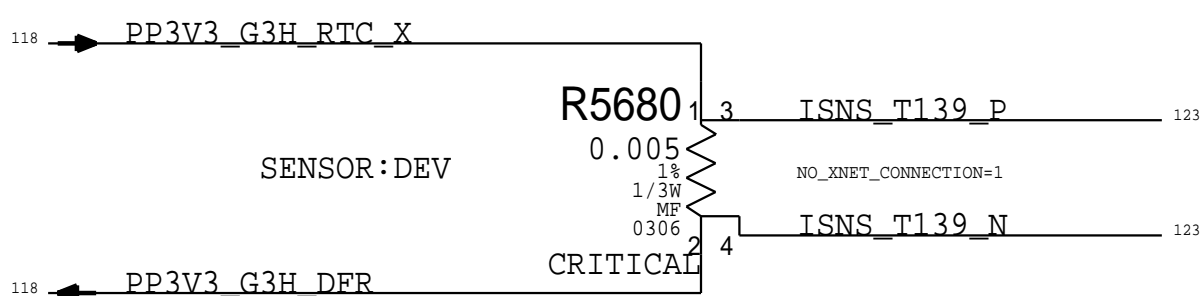
Gain: 200x. EDP: 1 A  
RSENSE: 0.01 (R8520) or Rsense SHORT  
Vsense: 5 mV, Range: 1.25 A

EADC1: CH1



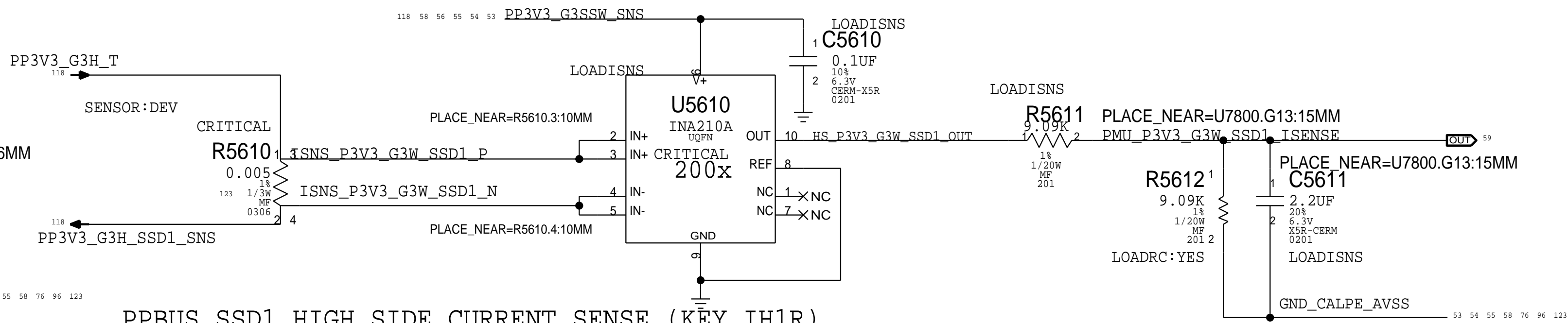
T139 Current Sense resistor

EDP: 0.06 A  
Rsense: 0.05 (R5680) or Rsense SHORT



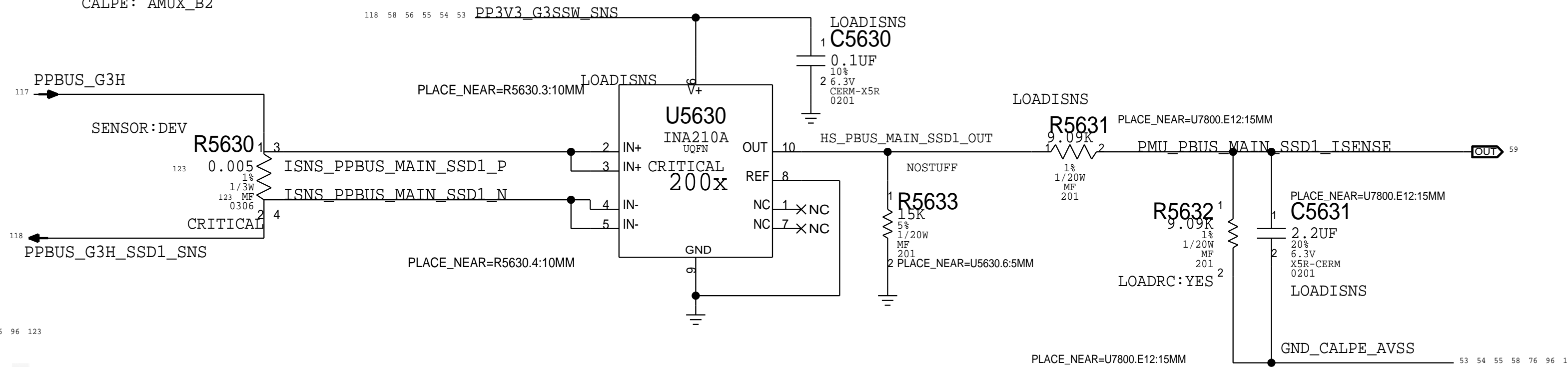
## PP3V3\_G3W\_SSD1 HIGH SIDE CURRENT SENSE (KEY IH1C)

```
GAIN: 200X, EDP: 1.48 A
RSENSE: 0.005 (RK760) OR RSENSE SHORT
VSENSE: 13 MV, RANGE: 2.5 A
CALPE: AMUX_B4
```



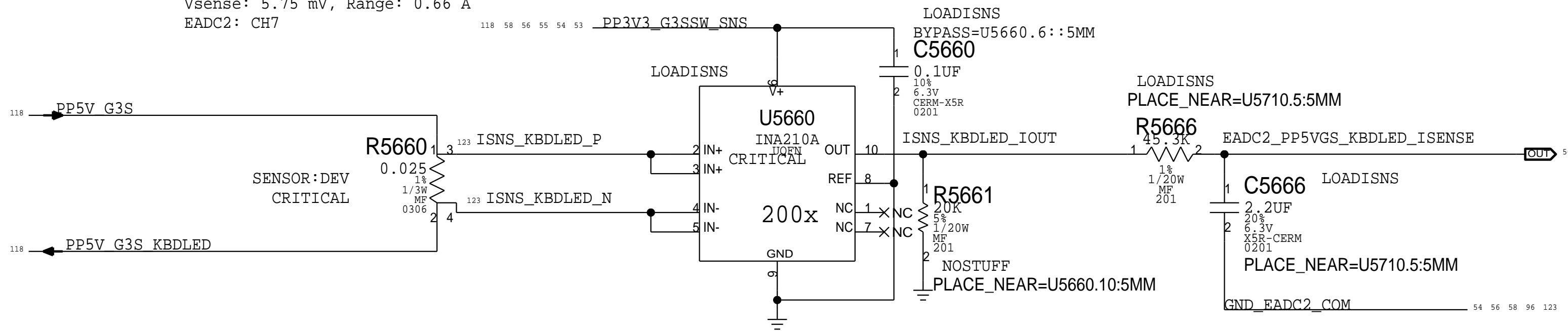
## PPBUS SSD1 HIGH SIDE CURRENT SENSE (KEY IH1R)

```
GAIN: 200X, EDP: 0.5 A
RSENSE: 0.005 (R5607) OR RSENSE SHORT
VSENSE: 13 MV, RANGE: 2.5 A
CALPE: AMUX_B2
```



## Keyboard backlight Current Sense (IKBC)

Gain: 200x, EDP: 0.23 A  
Rsense: 0.025 (R5660) or Rsense SHORT  
Vsense: 5.75 mV, Range: 0.66 A  
EADC2: CH7

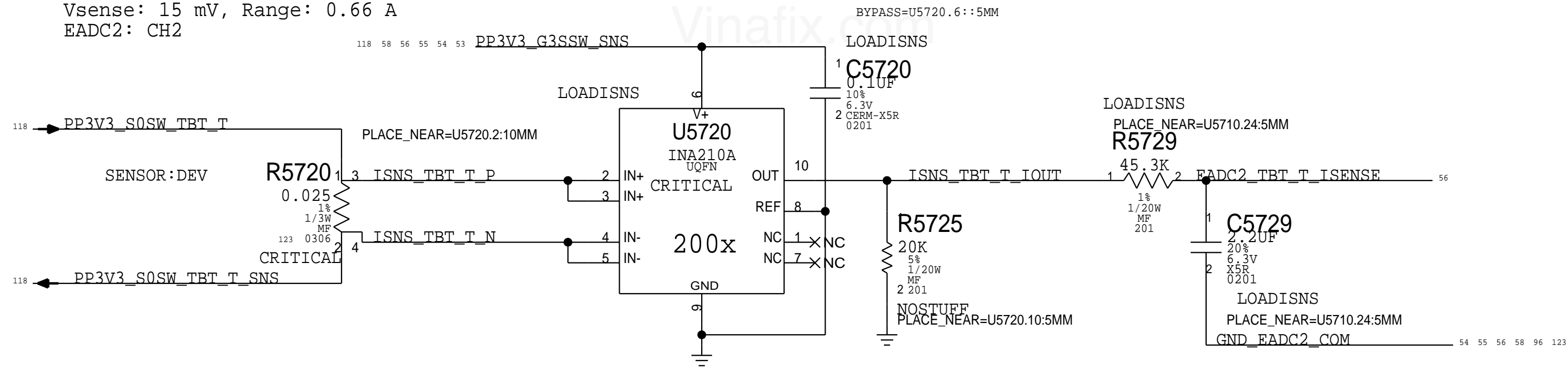


PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
117S0008	4	RES,MTL FLIM,100K,1/16W,0201,SMD,LF	R5602,R5612,R5622,R5632		LOADRC:NO



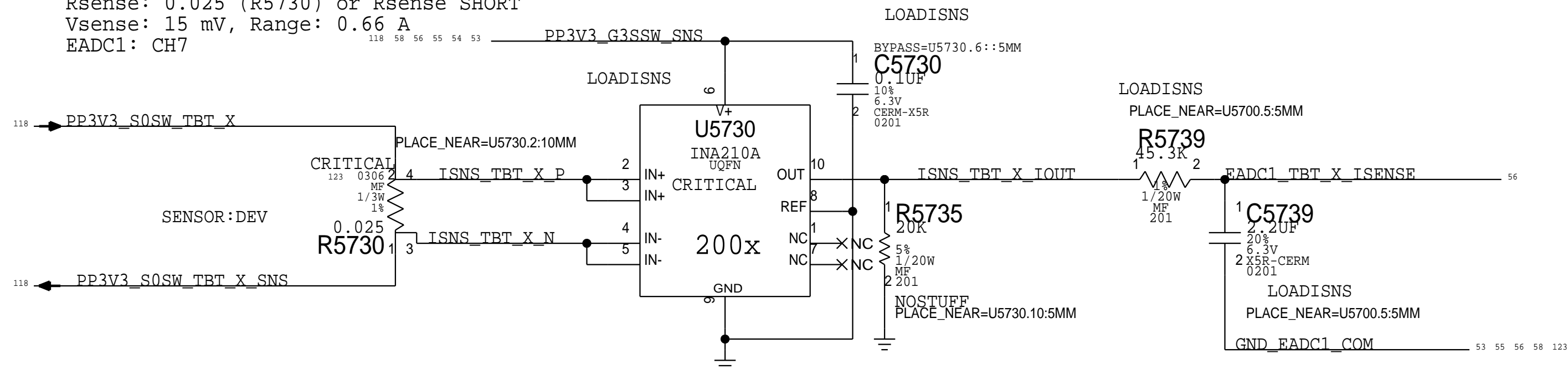
## Thunderbolt TBT RIGHT Current Sense (IURC)

Gain: 200x, EDP: 0.6 A  
Rsense: 0.025 (R5720) or Rsense SHORT  
Vsense: 15 mV, Range: 0.66 A  
EADC2: CH2



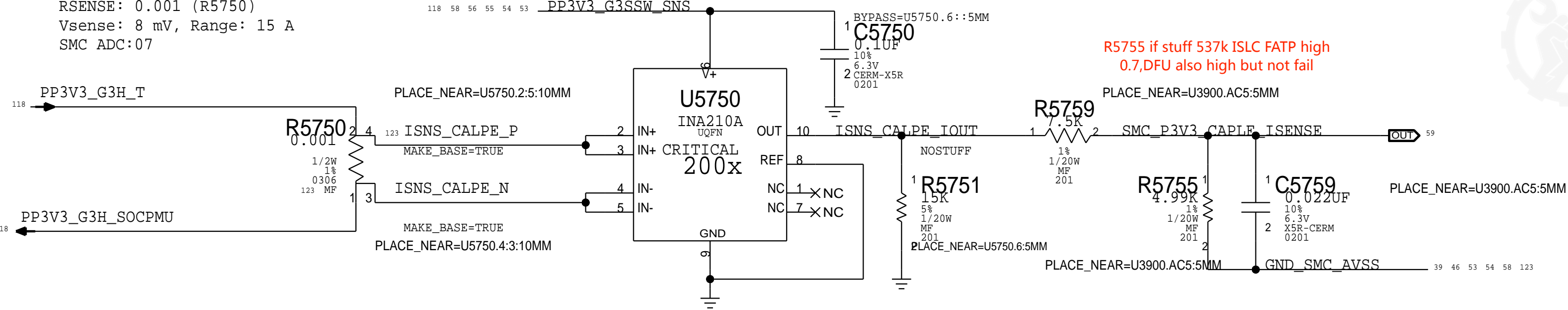
## Thunderbolt TBT LEFT Current Sense (IULC)

Gain: 200x, EDP: 0.6 A  
Rsense: 0.025 (R5730) or Rsense SHORT  
Vsense: 15 mV, Range: 0.66 A  
EADC1: CH7



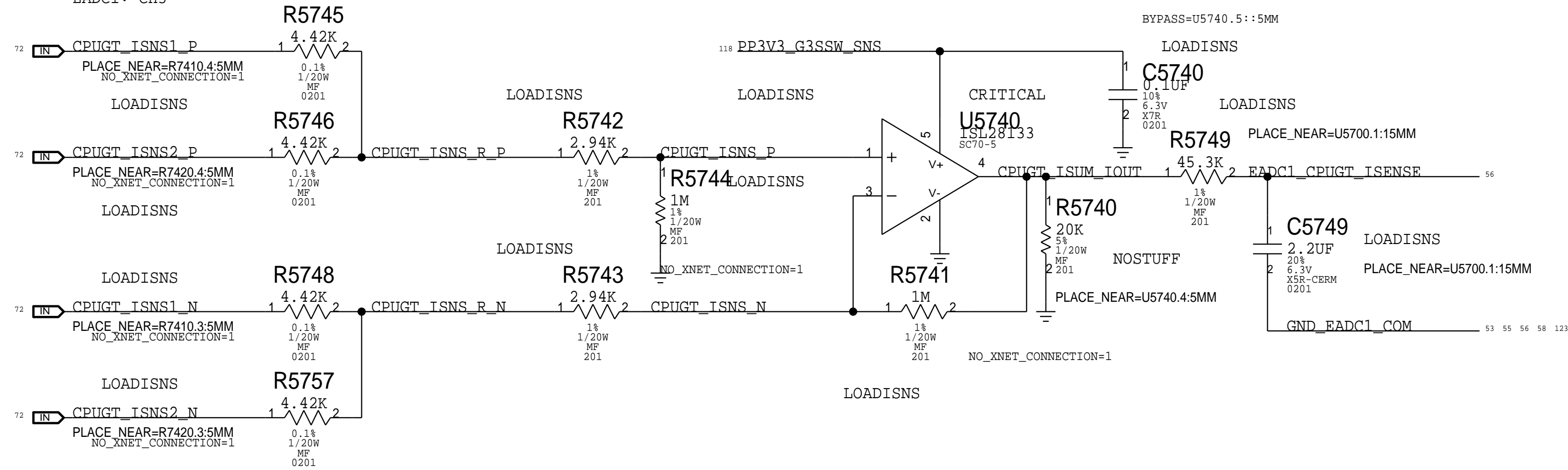
## Calpe 3V3 Current Sense (ISLC)

Gain: 200x, EDP: 8 A  
RSENSE: 0.001 (R5750)  
Vsense: 8 mV, Range: 15 A  
SMC ADC: 07



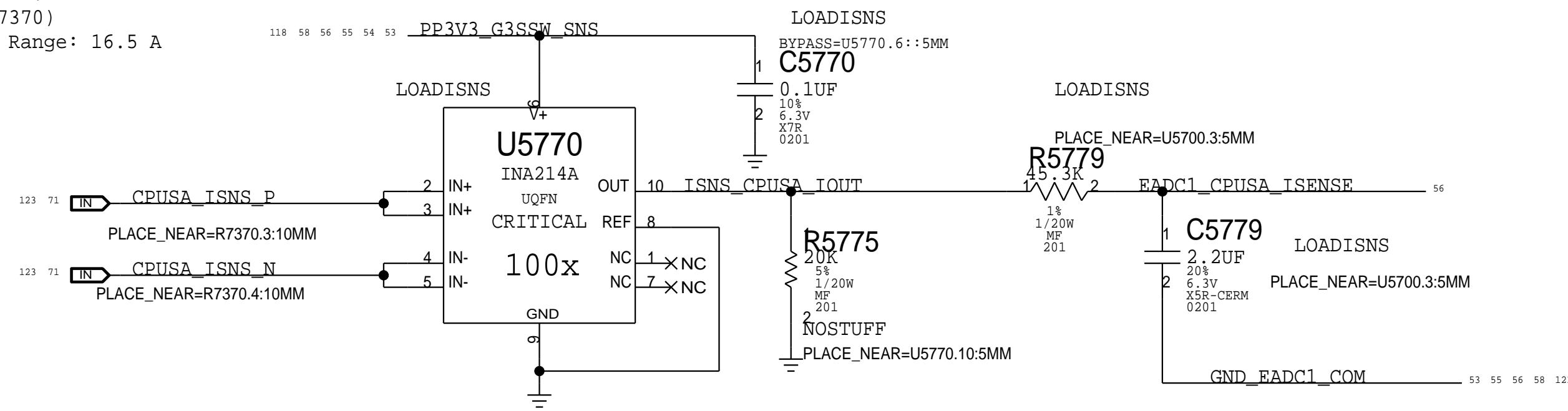
## CPU GT Current Sense (ICTC)

Gain: 240.78x, EDP: 32 A  
Rsense: 2x of 0.00075 (R7410, R7420), Rsum: 0.000375  
Vsense: 12 mV, Range: 36.55 A  
EADC1: CH3



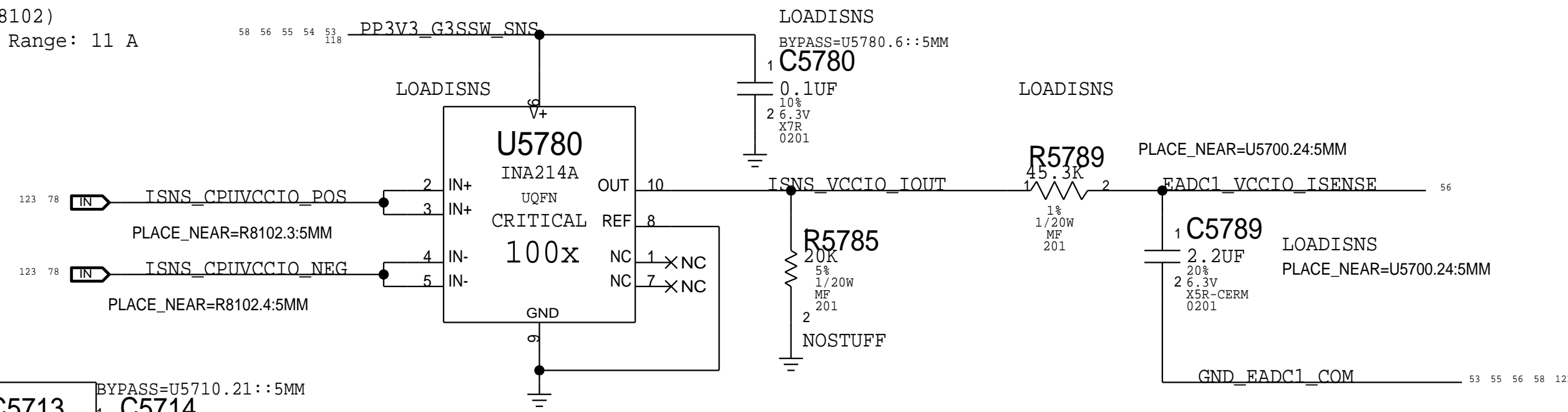
## CPU SA Current Sense (ICSC)

Gain: 100x, EDP: 11.1 A  
Rsense: 0.002 (R7370)  
Vsense: 22.2 mV, Range: 16.5 A  
EADC1: CH5

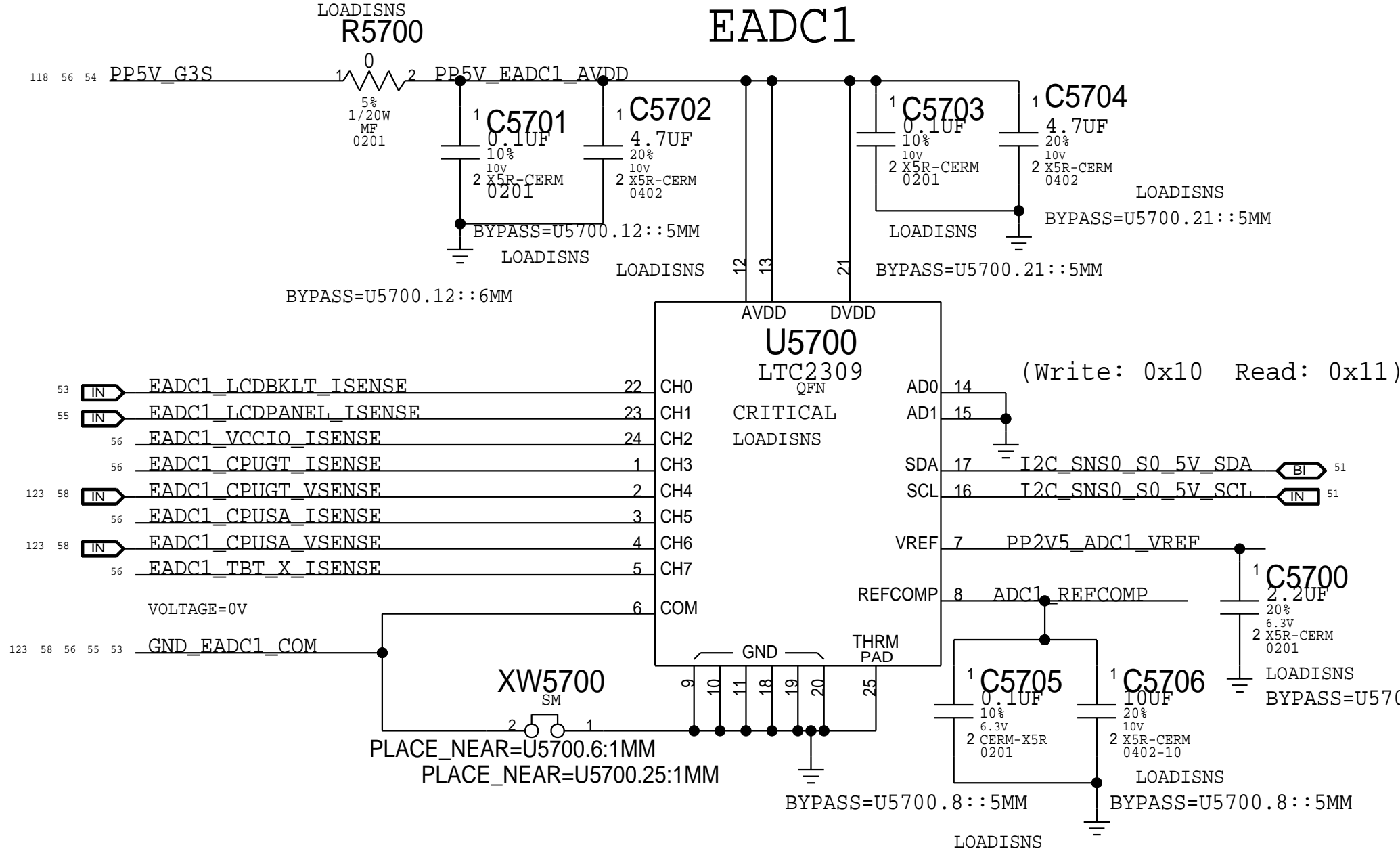


## CPU VCCIO Current Sense (ICIC)

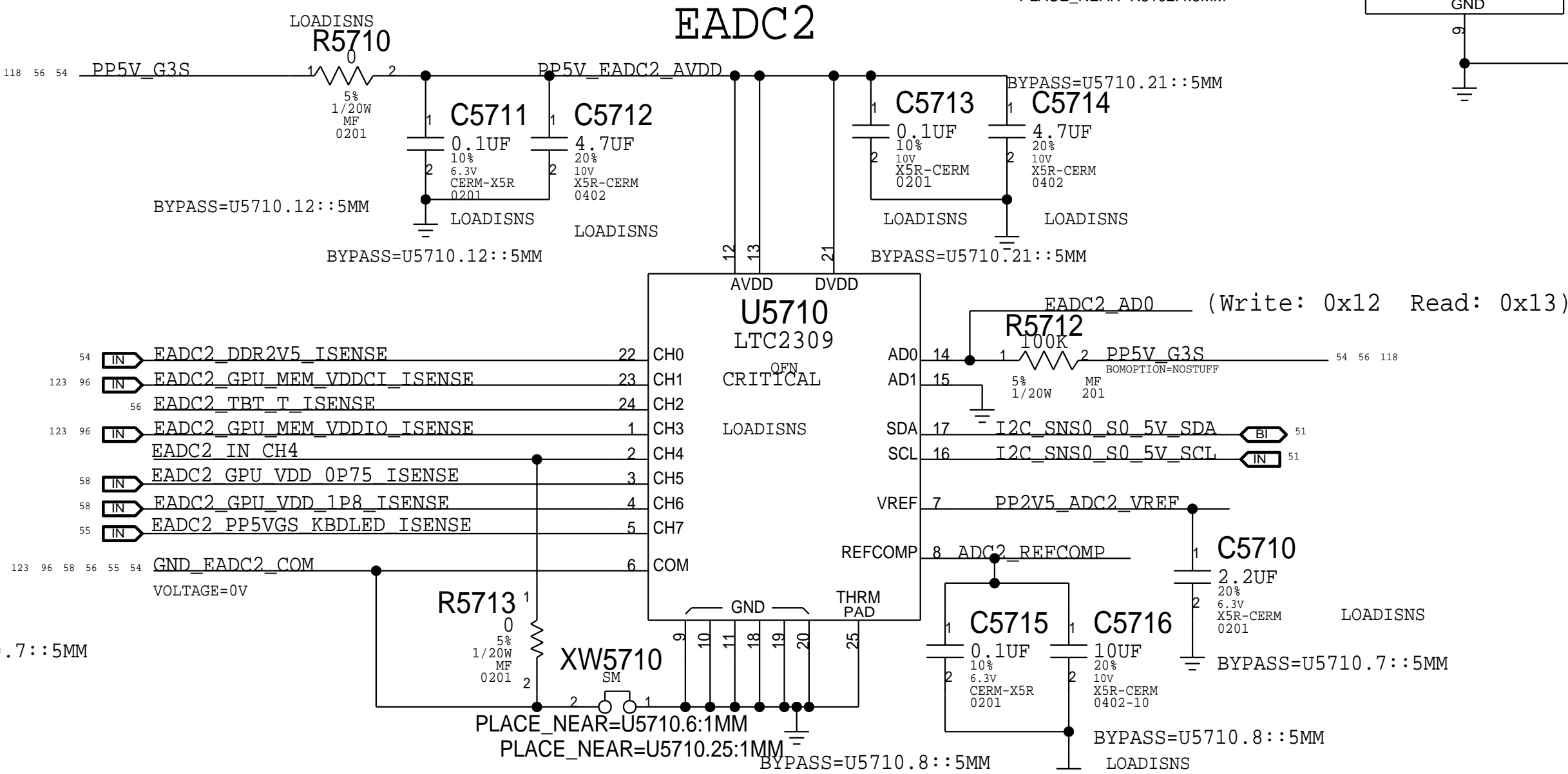
Gain: 100x, EDP: 6.4 A  
Rsense: 0.003 (R8102)  
Vsense: 19.2 mV, Range: 11 A  
EADC1: CH2




### EADC1



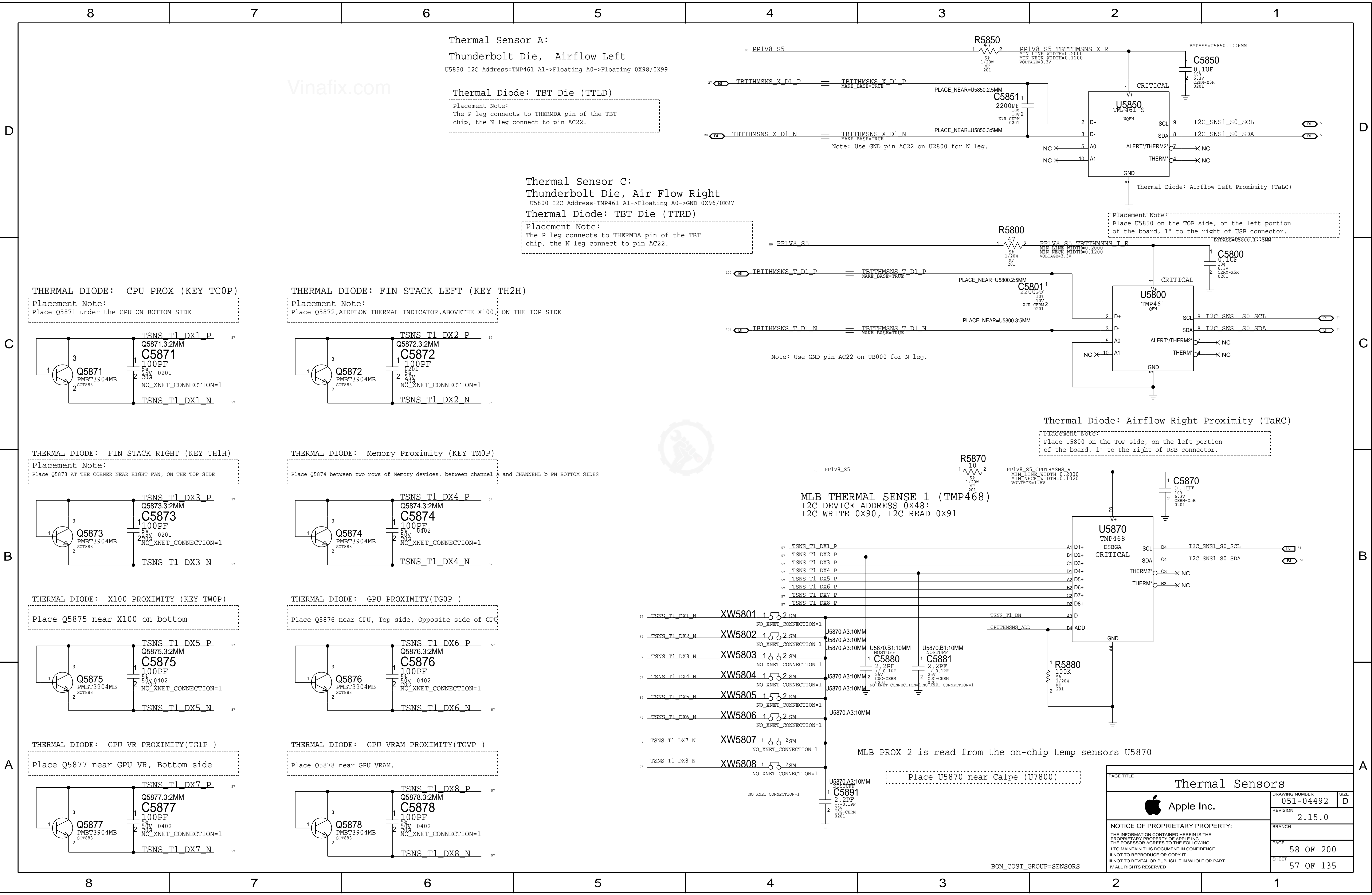
### EADC2



PAGE TITLE		
Power Sensors Extended 2		
 Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
	BRANCH	
	PAGE	57 OF 200
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IN ALL RIGHTS RESERVED		SHEET 56 OF 135

BOM\_COST\_GROUP=SENSORS










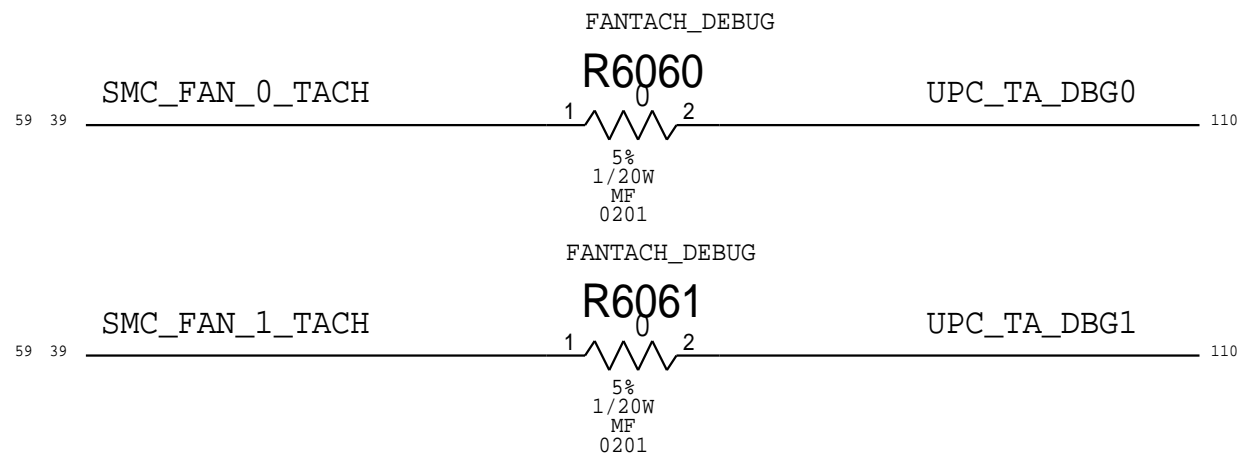
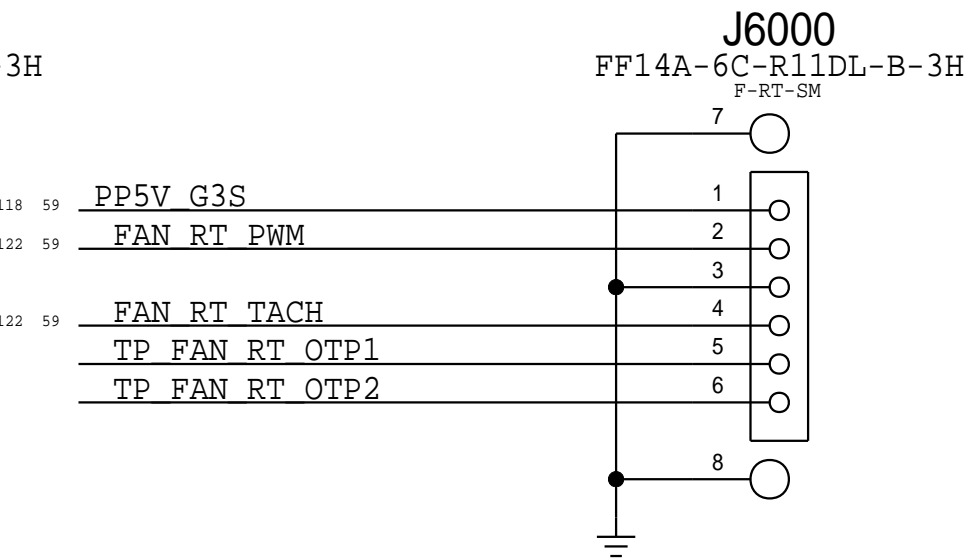
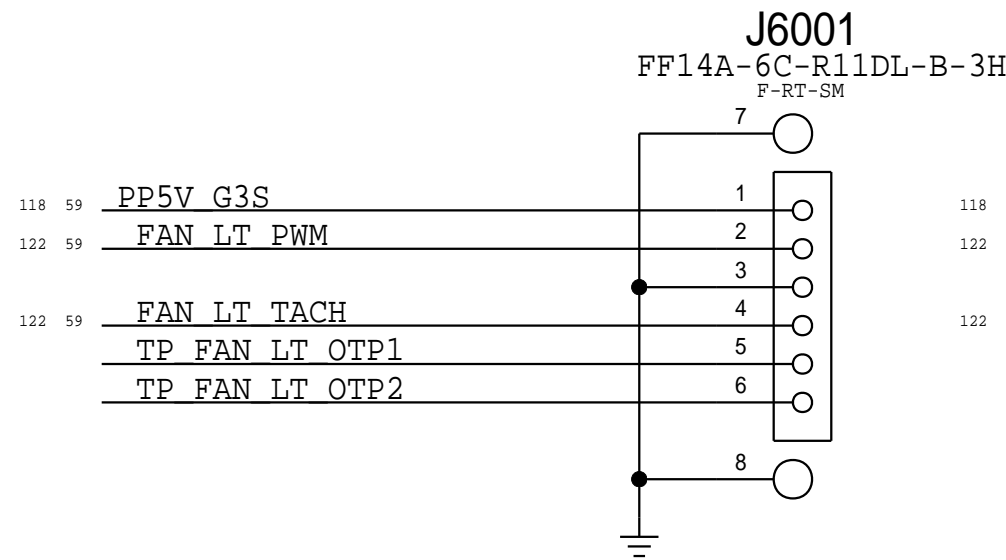
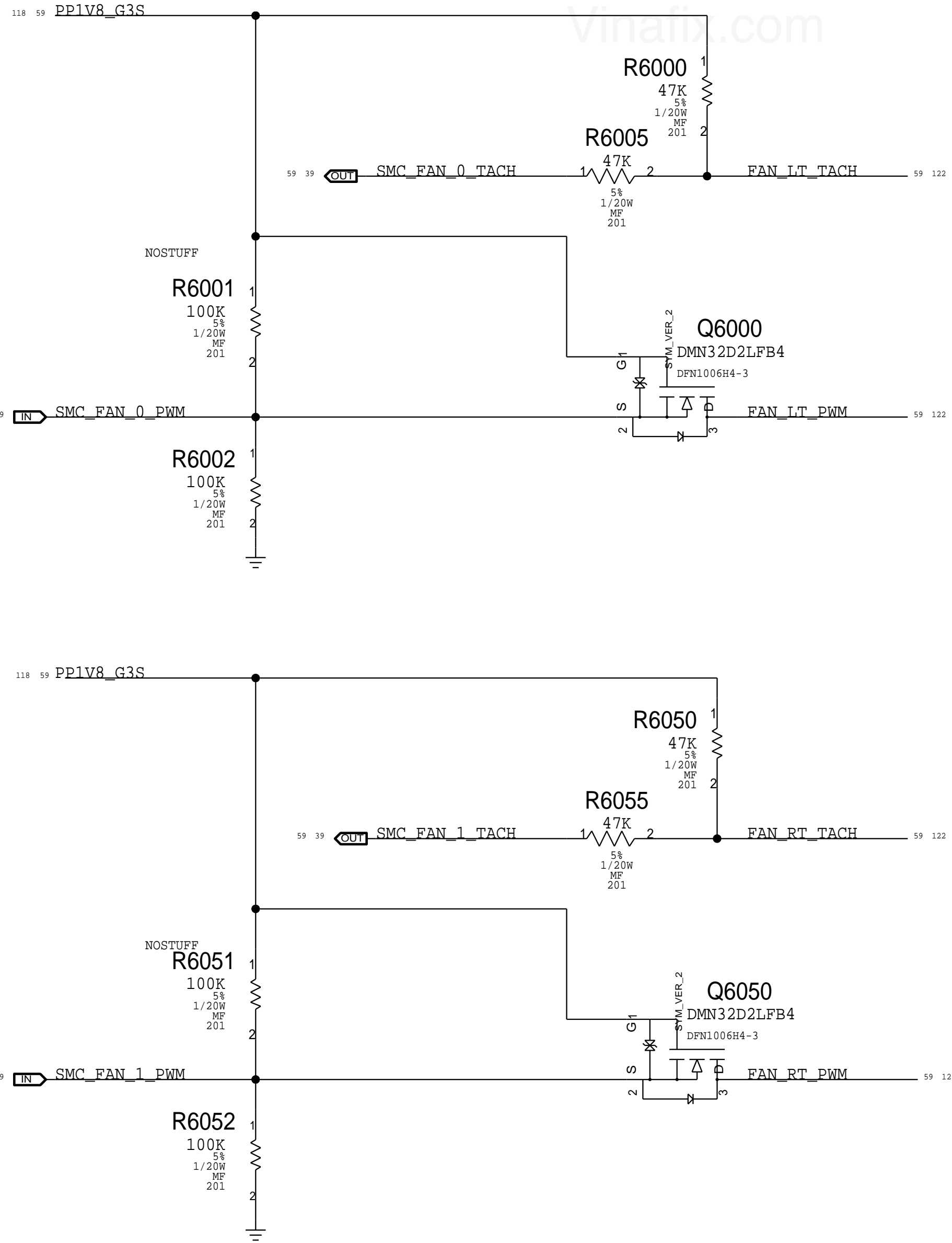
## GPU SENSORS



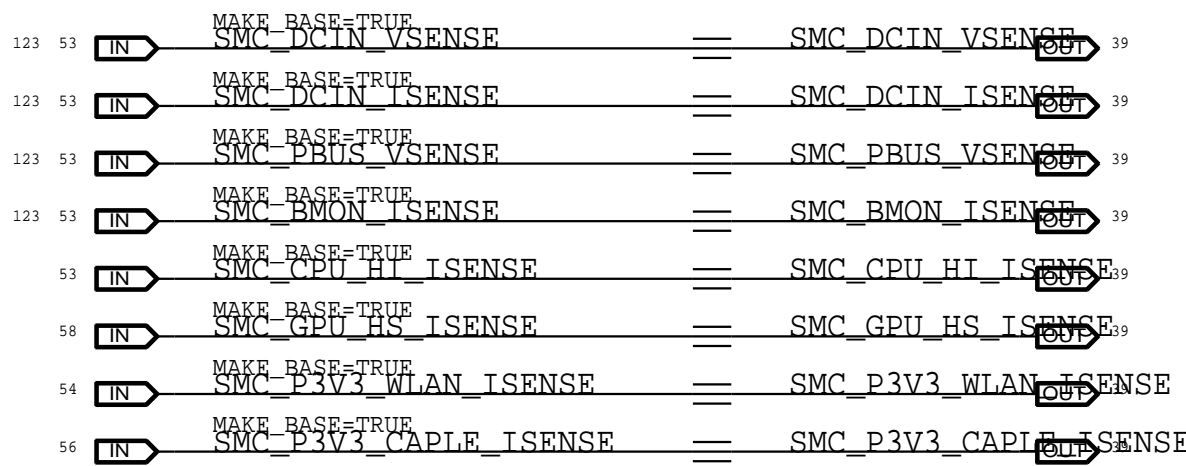
PAGE TITLE			
Power Sensor Extended 3			
 Apple Inc.	DRAWING NUMBER 051-04492		SIZE D
	REVISION 2.15.0		
NOTICE OF PROPRIETARY PROPERTY:		BRANCH	
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED			
PAGE		59 OF 200	
SHEET		58 OF 135	



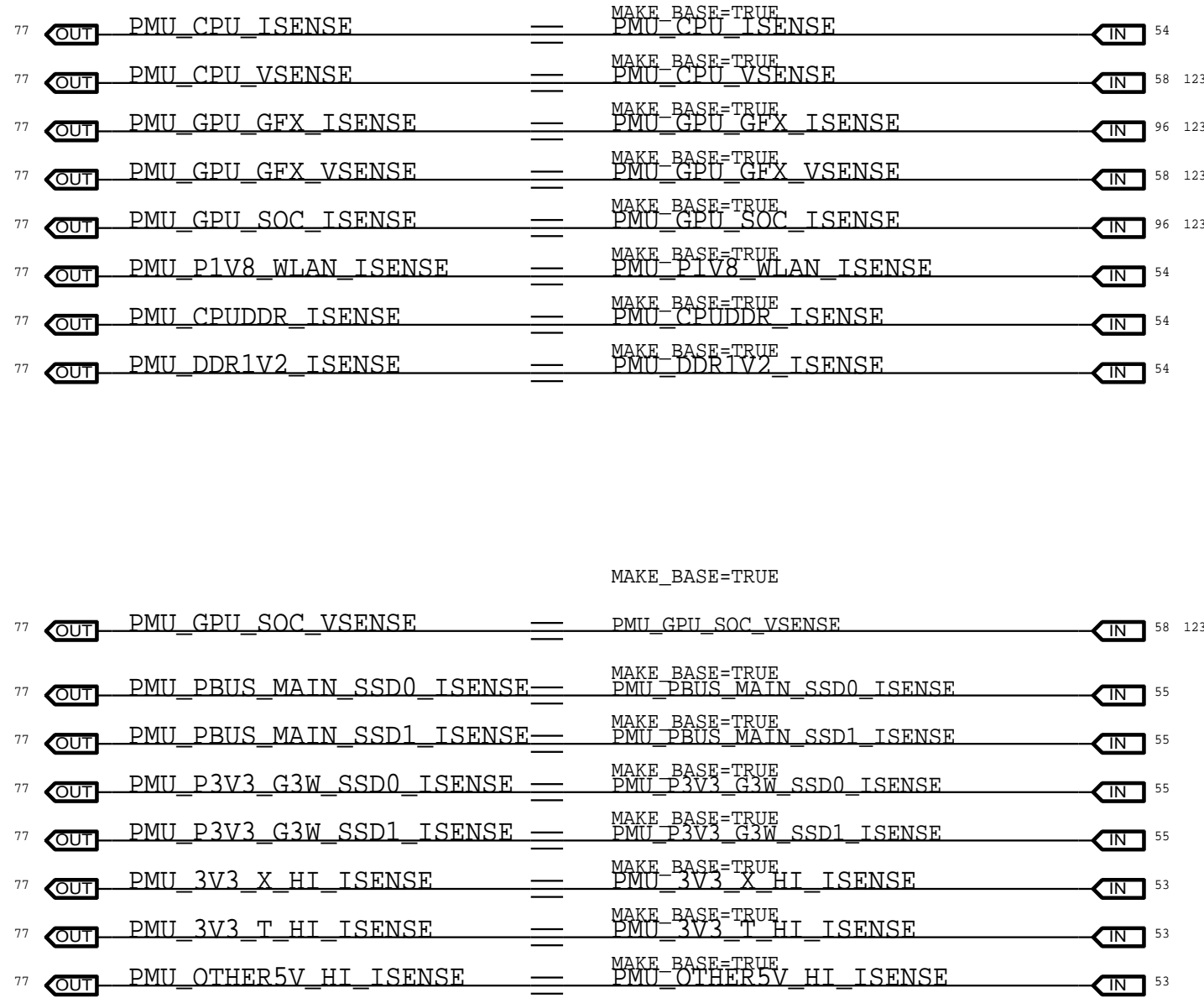
FAN CONNECTOR



H9M SMC ADC Assignments




CALPE AMUX Assignments



PAGE TITLE		
Fans/SMC/AMUX Support		
	DRAWING NUMBER	051-04492
	REVISION	2.15.0
NOTICE OF PROPRIETARY PROPERTY:		BRANCH
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		PAGE
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		60 OF 200
II NOT TO REPRODUCE OR COPY IT		SHEET
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		59 OF 135
IV ALL RIGHTS RESERVED		

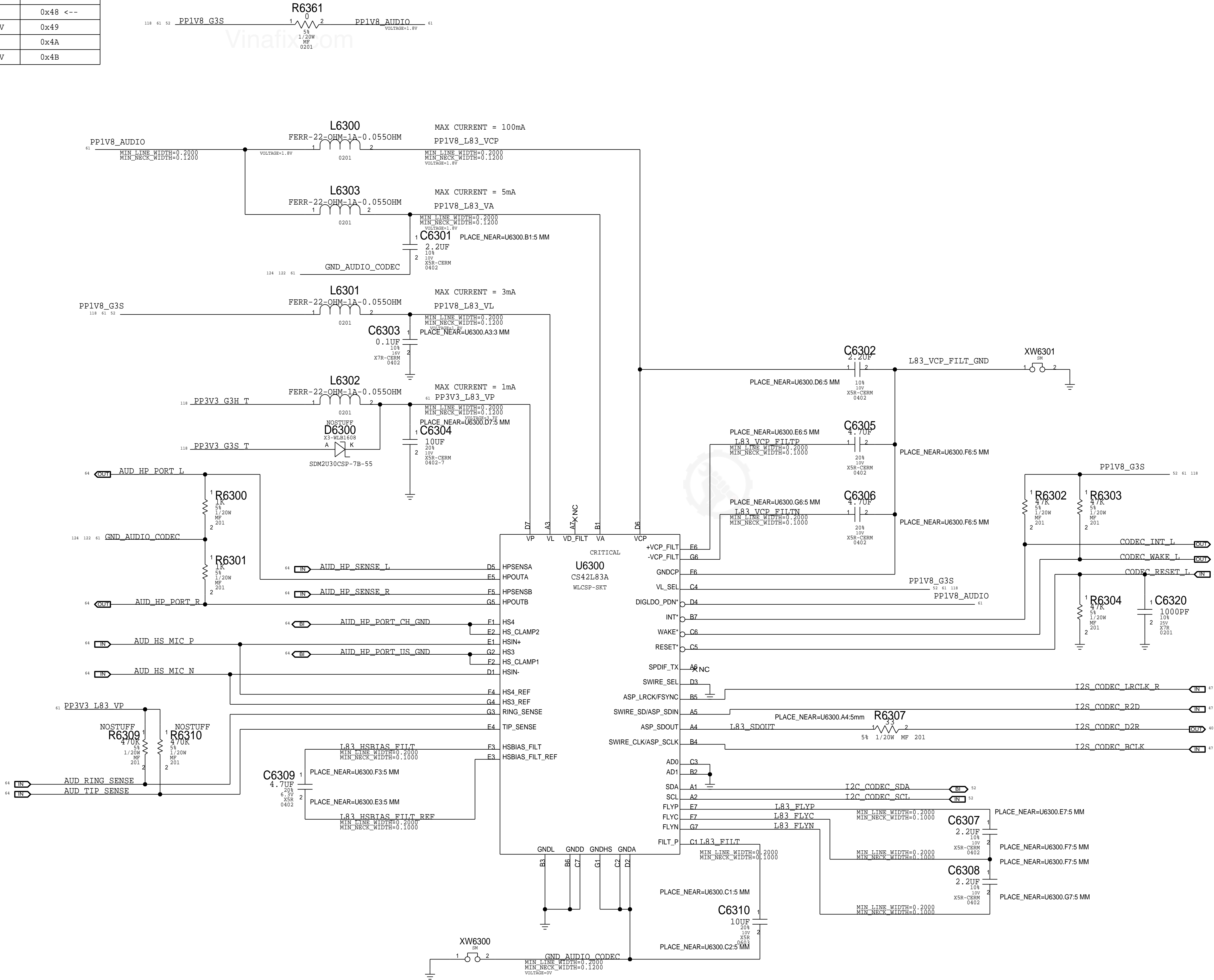
BOM\_COST\_GROUP=FAN



PAGE TITLE <h1 style="text-align: center;">Audio Placeholder</h1>		DRAWING NUMBER <div>051-04492</div>		SIZE <div>D</div>
 <div>Apple Inc.</div>		REVISION <div>2.15.0</div>		
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART I ALL RIGHTS RESERVED		BRANCH  PAGE <div>62 OF 200</div> SHEET <div>60 OF 135</div>		



AUDIO JACK CODEC I2C ADDRESS		
AD1	AD0	ADDRESS
GND	GND	0x48 <--
1.8V	1.8V	0x49
1.8V	GND	0x4A
1.8V	1.8V	0x4B



DESIGN: X502/DEV_MLB_U		
LAST CHANGE: Wed Feb 18 17:31:01 2015		
PAGE TITLE		
Audio Jack Codec		
	DRAWING NUMBER	051-04492
	REVISION	2.15.0
	BRANCH	
	PAGE	63 OF 200
NOTICE OF PROPRIETARY PROPERTY:		SHEET
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		61 OF 135
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		
II NOT TO REPRODUCE OR COPY IT		
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		
IV ALL RIGHTS RESERVED		



D

C

B

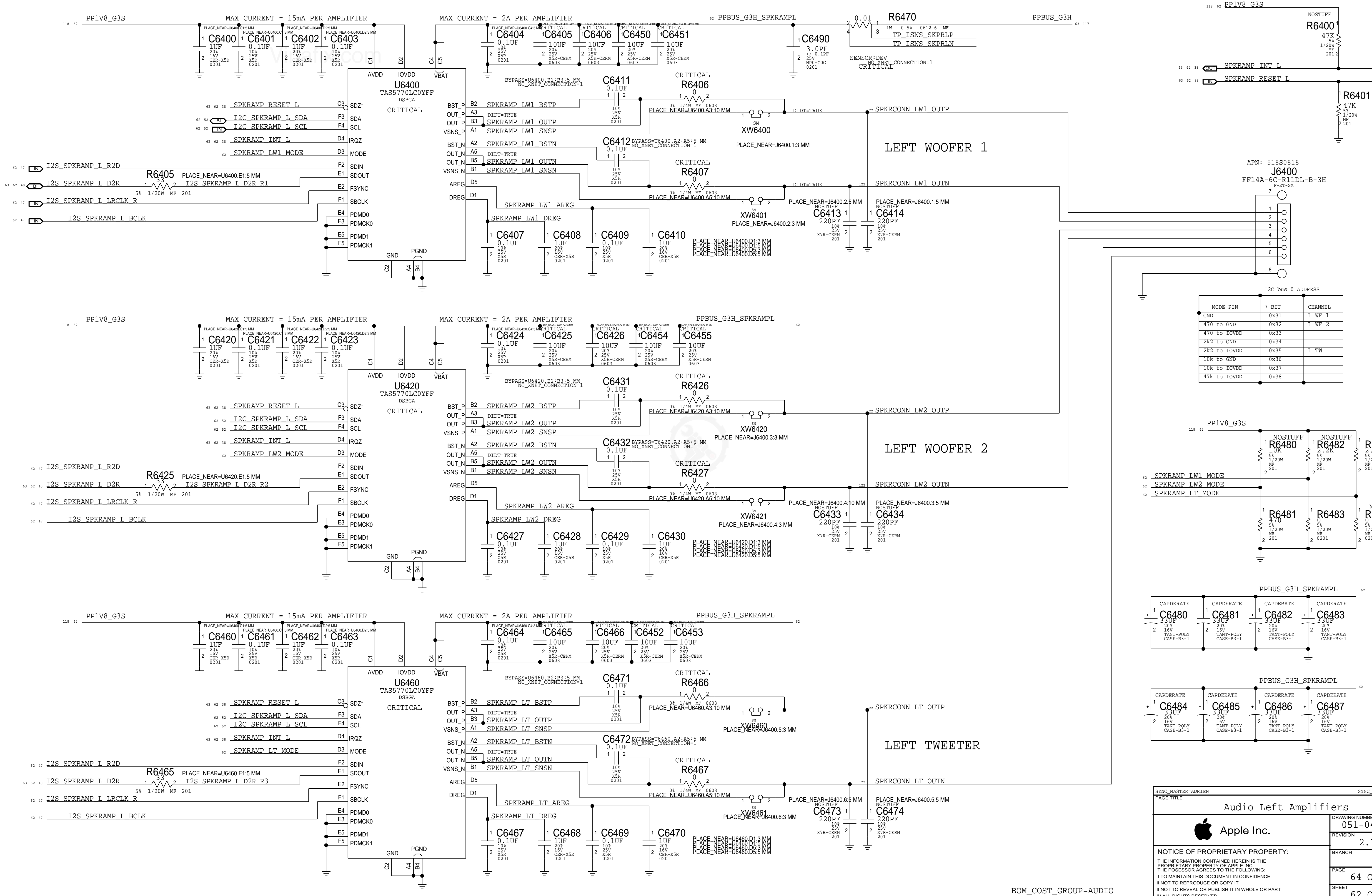
A

D

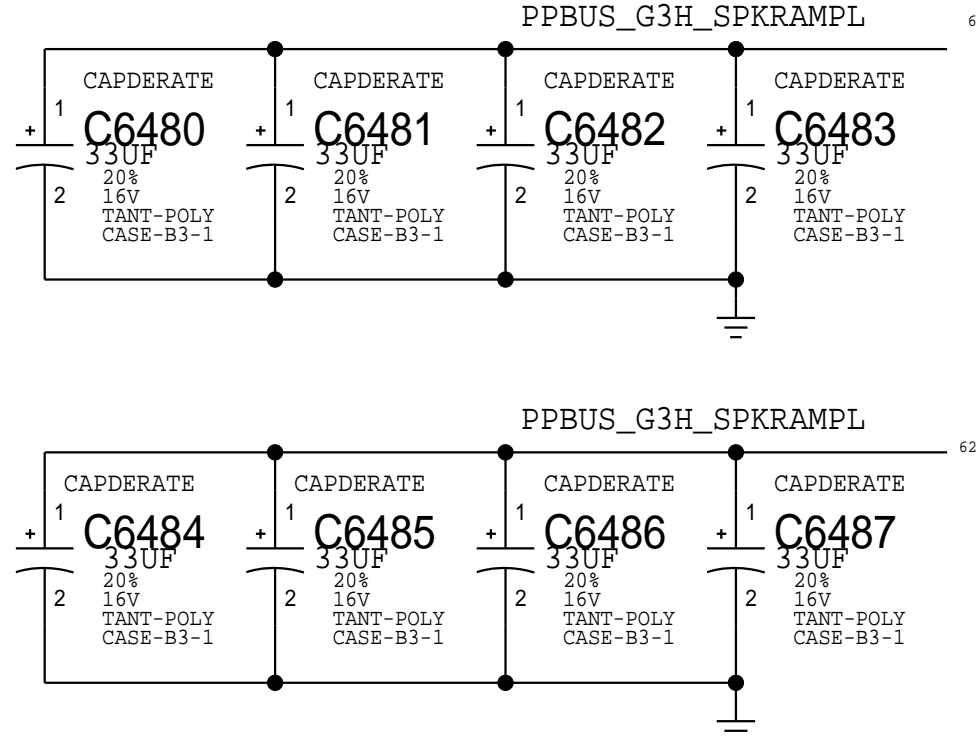
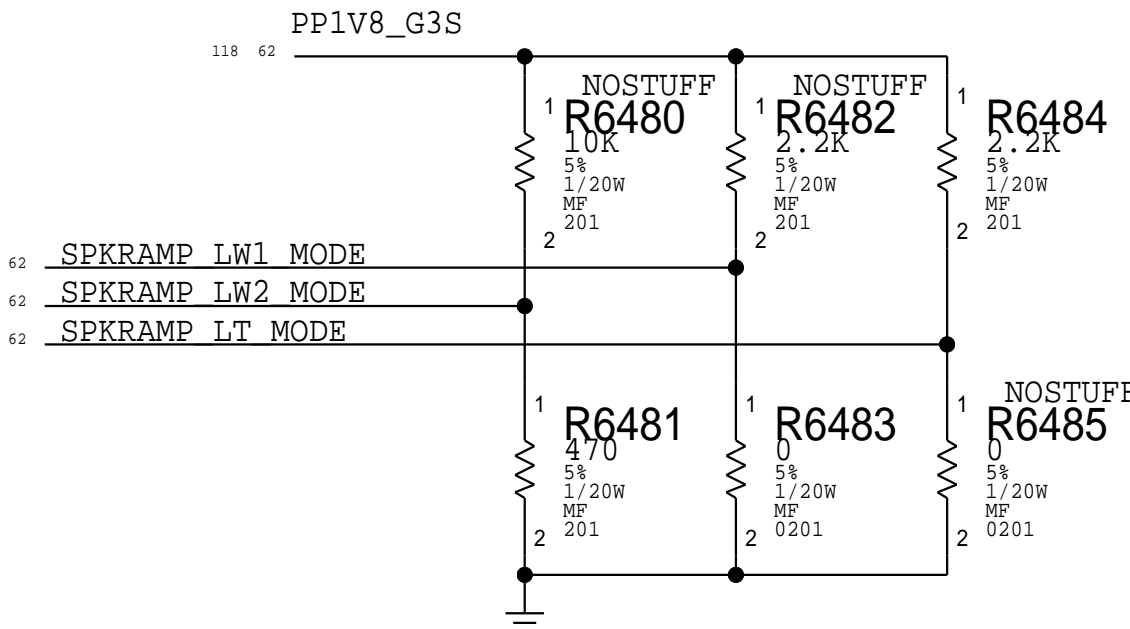
C

B

A



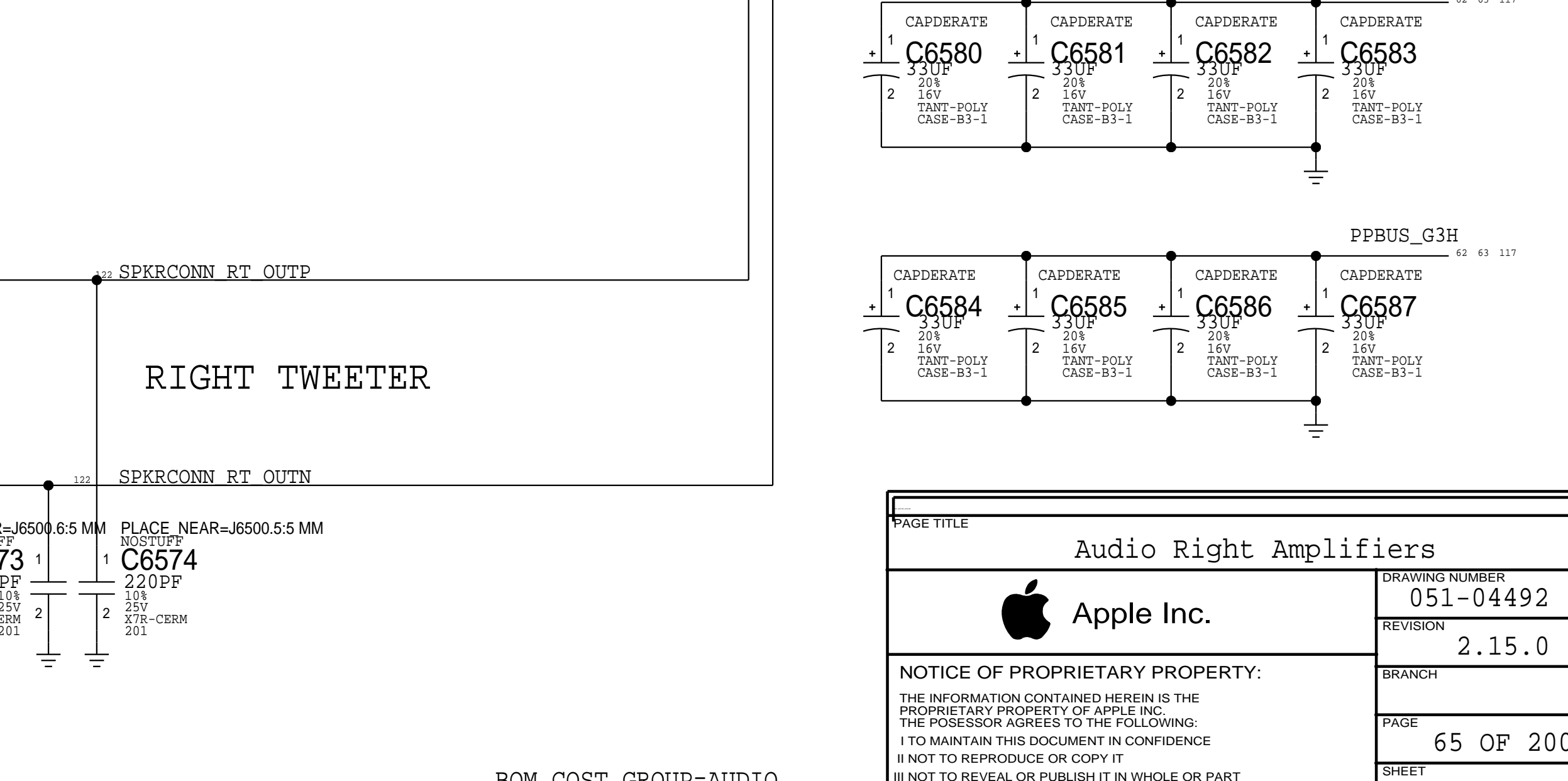
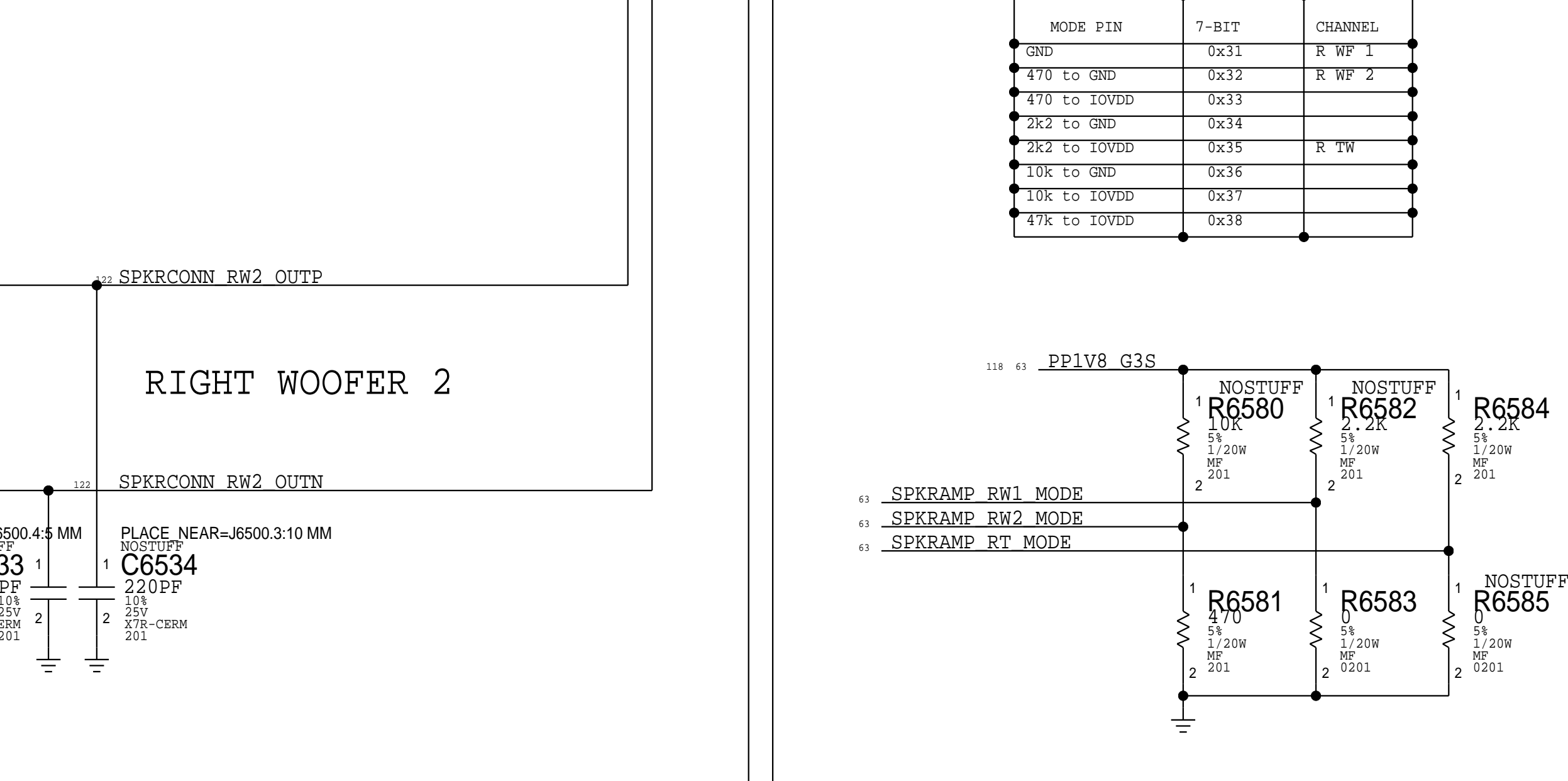
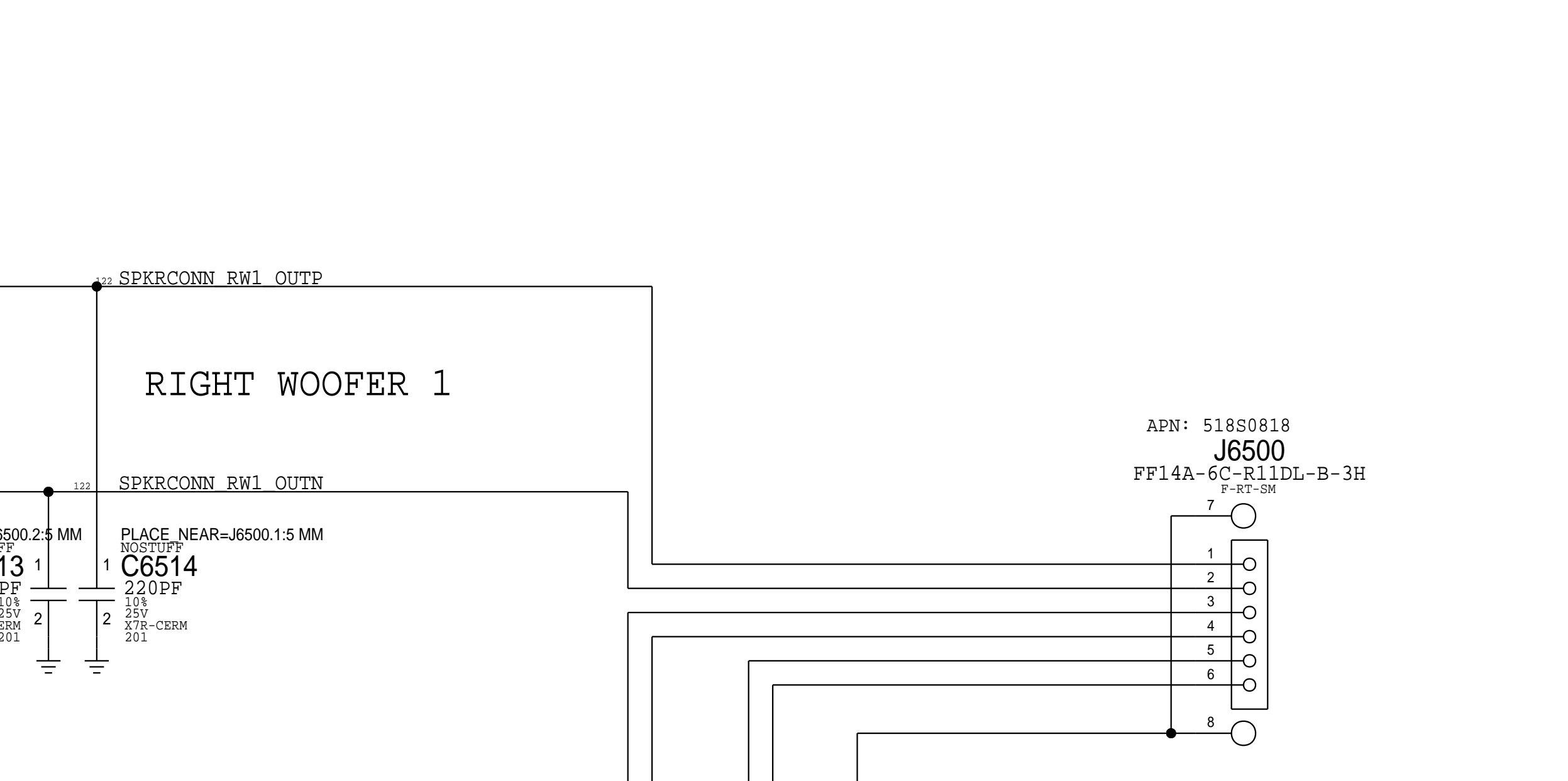
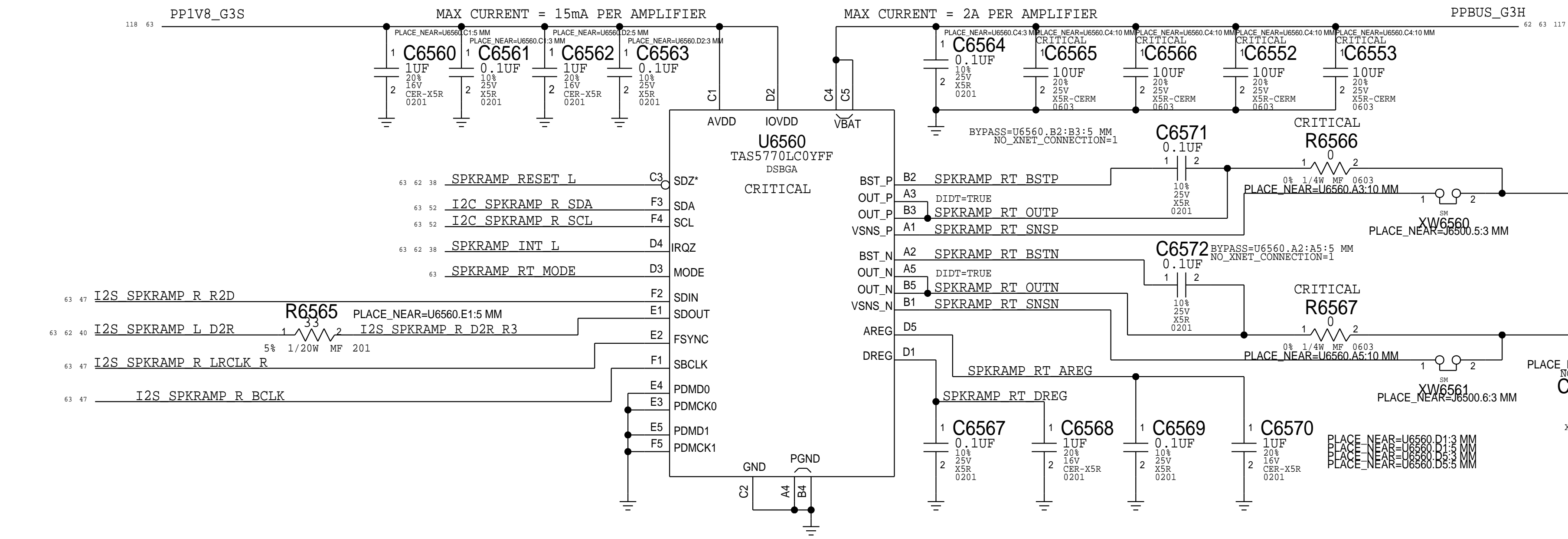
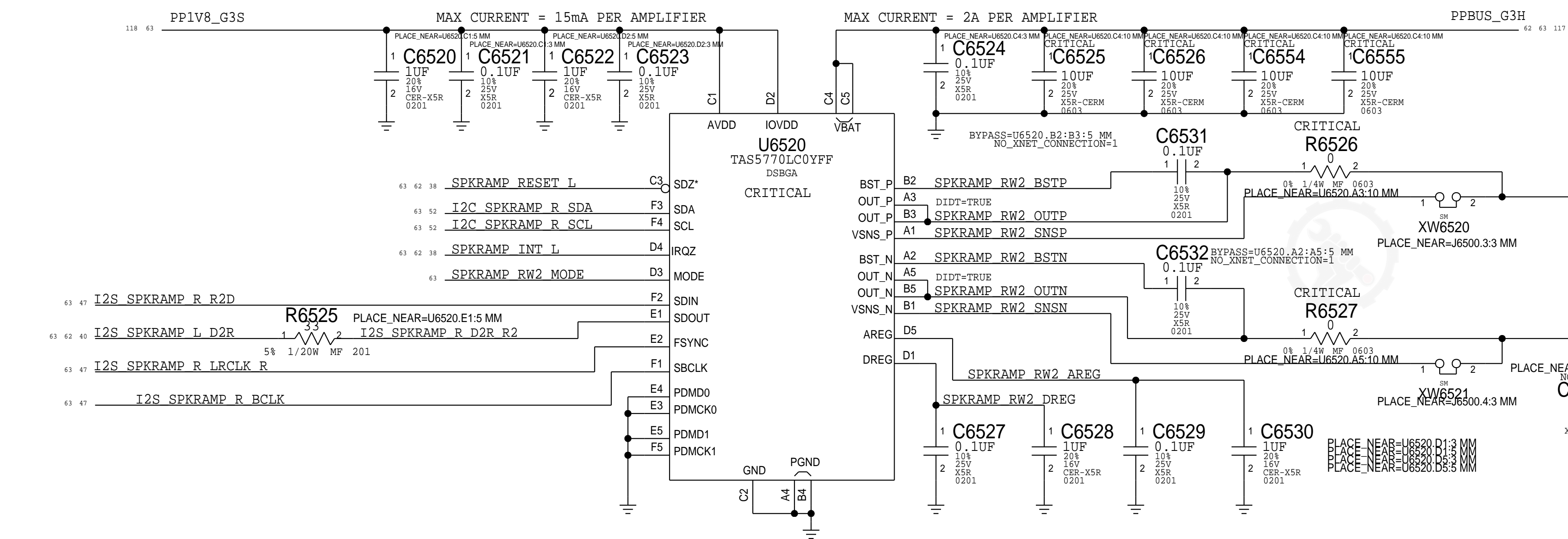
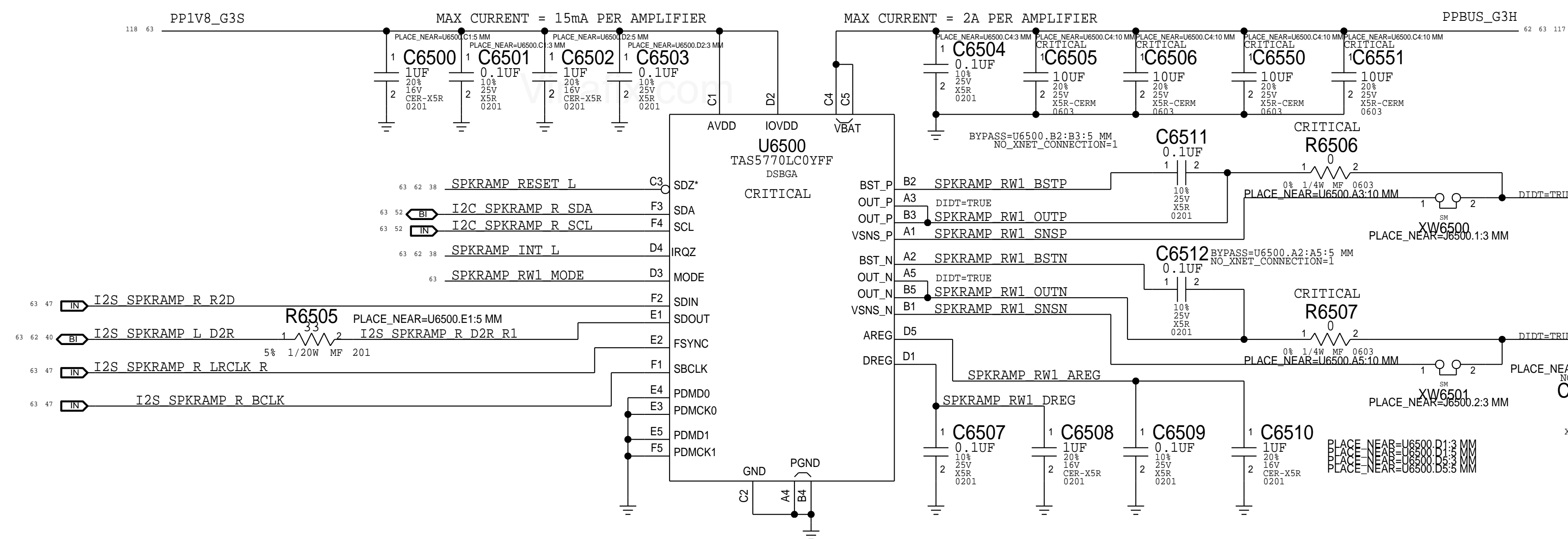
I2C bus 0 ADDRESS		
MODE PIN	7-BIT	CHANNEL
GND	0x31	L WF 1
470 to GND	0x32	L WF 2
470 to IOVDD	0x33	
2K2 to GND	0x34	
2K2 to IOVDD	0x35	L TW
10K to GND	0x36	
10K to IOVDD	0x37	
47K to IOVDD	0x38	



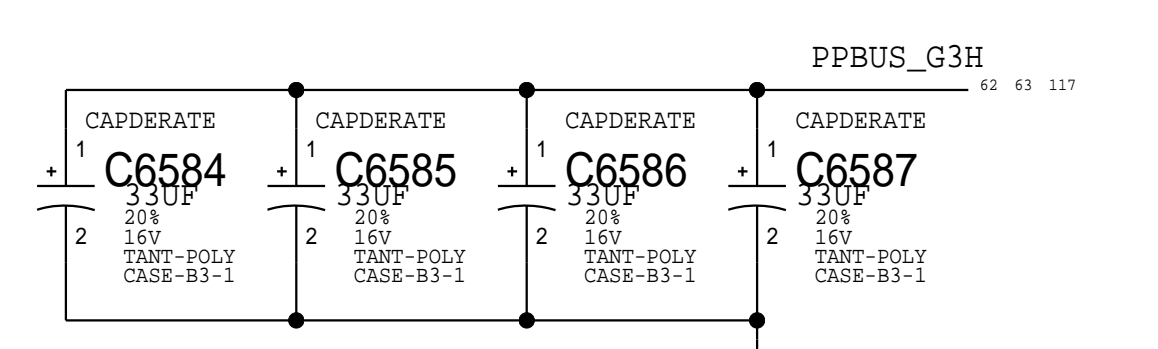
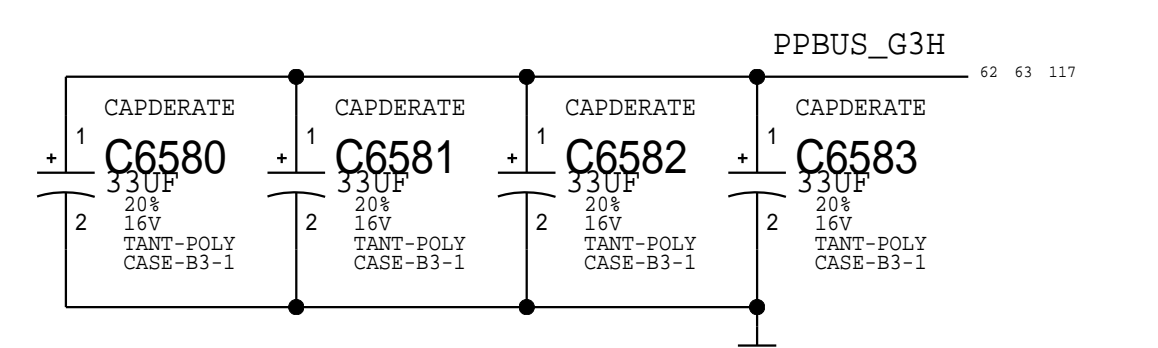
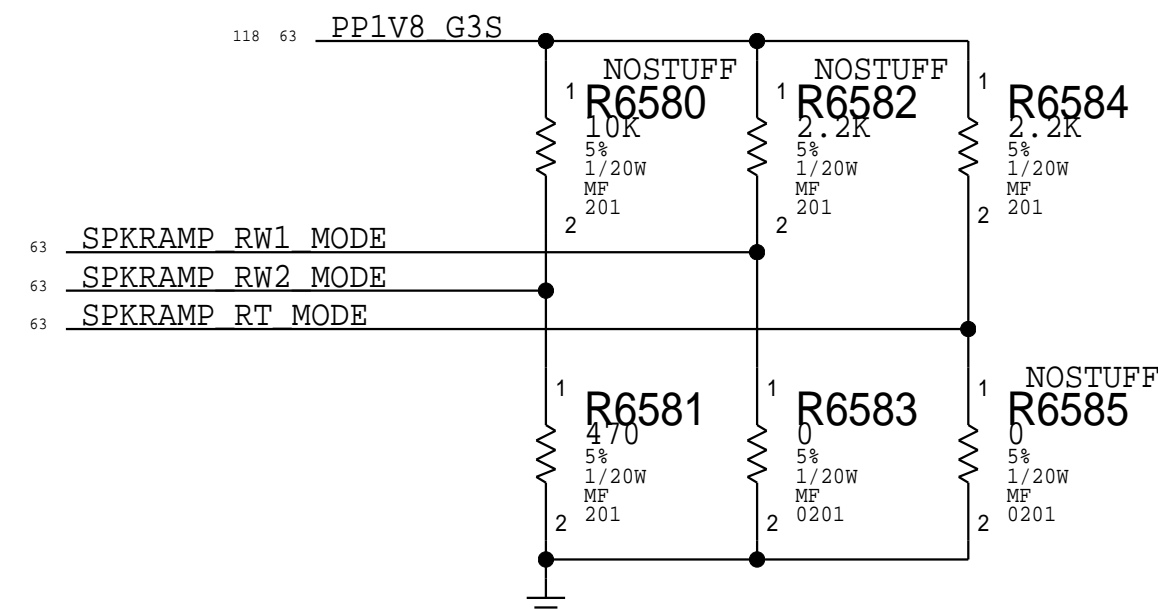
SYNC_MASTER=ADRIEN			SYNC_DATE=01/17/2019		
PAGE TITLE					
Audio Left Amplifiers					
			DRAWING NUMBER	051-04492	SIZE
			REVISION	2.15.0	D
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED			BRANCH		
			PAGE	64 OF 200	
			SHEET	62 OF 135	


BOM\_COST\_GROUP=AUDIO



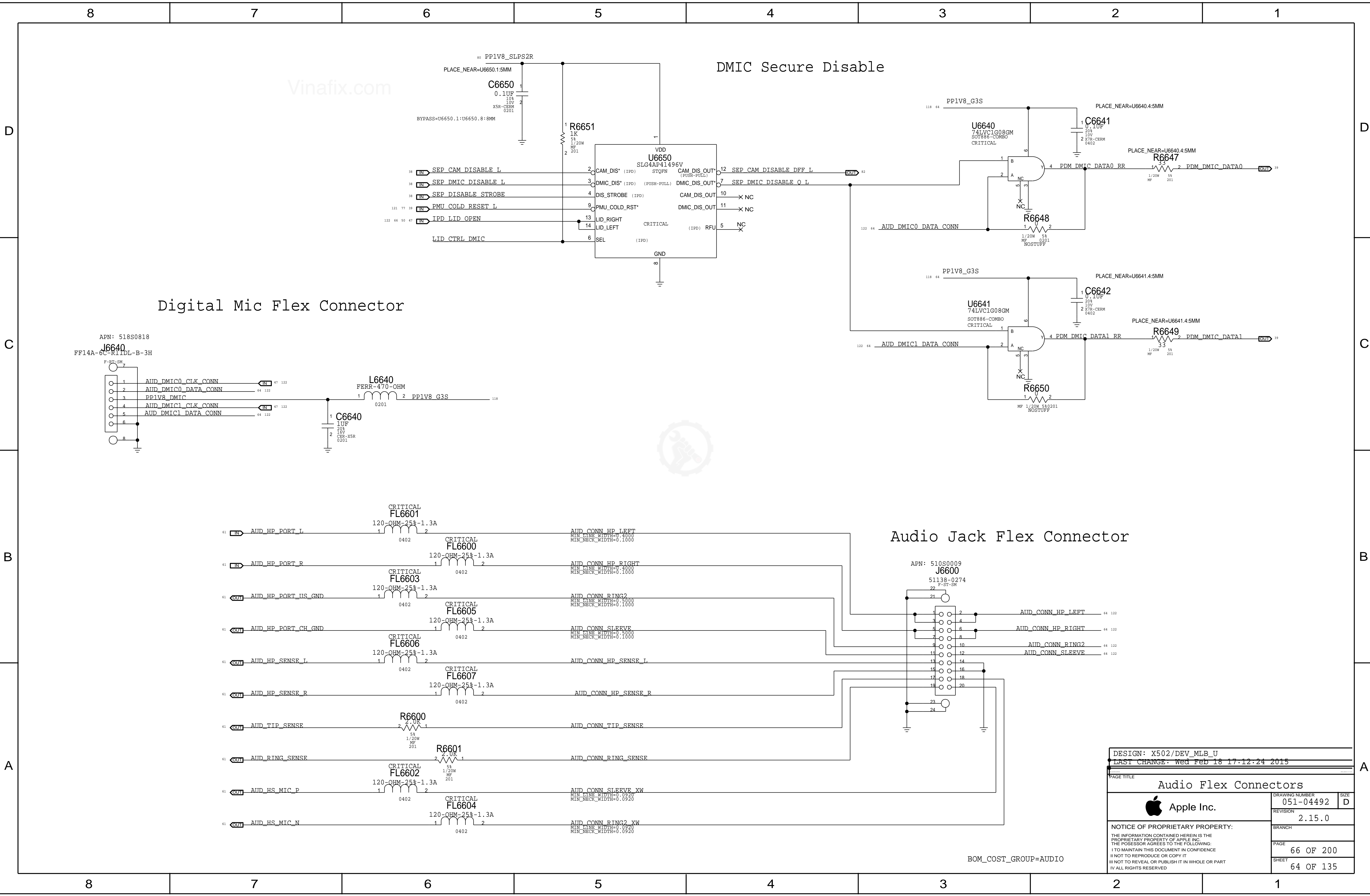


I2C BUS 1 ADDRESS		
MODE PIN	7-BIT	CHANNEL
GND	0x31	R WF 1
470 to GND	0x32	R WF 2
470 to IOVDD	0x33	
2K2 to GND	0x34	
2K2 to IOVDD	0x35	R TW
10k to GND	0x36	
10k to IOVDD	0x37	
47k to IOVDD	0x38	




PAGE TITLE		DRAWING NUMBER		SIZE	
Audio Right Amplifiers		051-04492		D	
 Apple Inc.		REVISION		2.15.0	
NOTICE OF PROPRIETARY PROPERTY:		BRANCH			
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		PAGE		65 OF 200	
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		SHEET		63 OF 135	
II NOT TO REPRODUCE OR COPY IT					
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART					
IV ALL RIGHTS RESERVED					





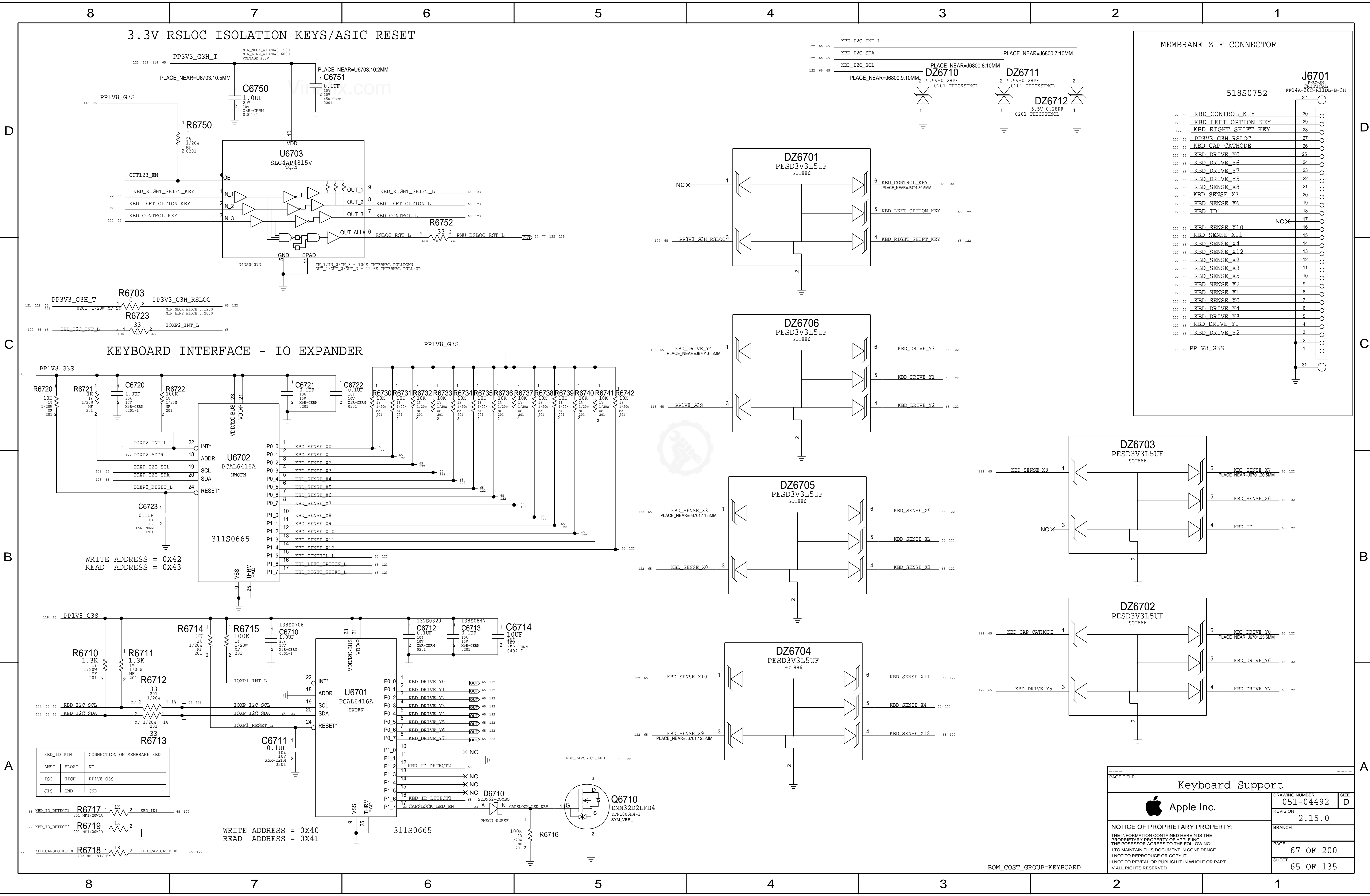
Digital Mic Flex Connector

Audio Jack Flex Connector

DESIGN: X502/DEV_MLB_U		
LAST CHANGE: Wed Feb 18 17:12:24 2015		
PAGE TITLE		
Audio Flex Connectors		
 Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
	PAGE	66 OF 200
	SHEET	64 OF 135
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		

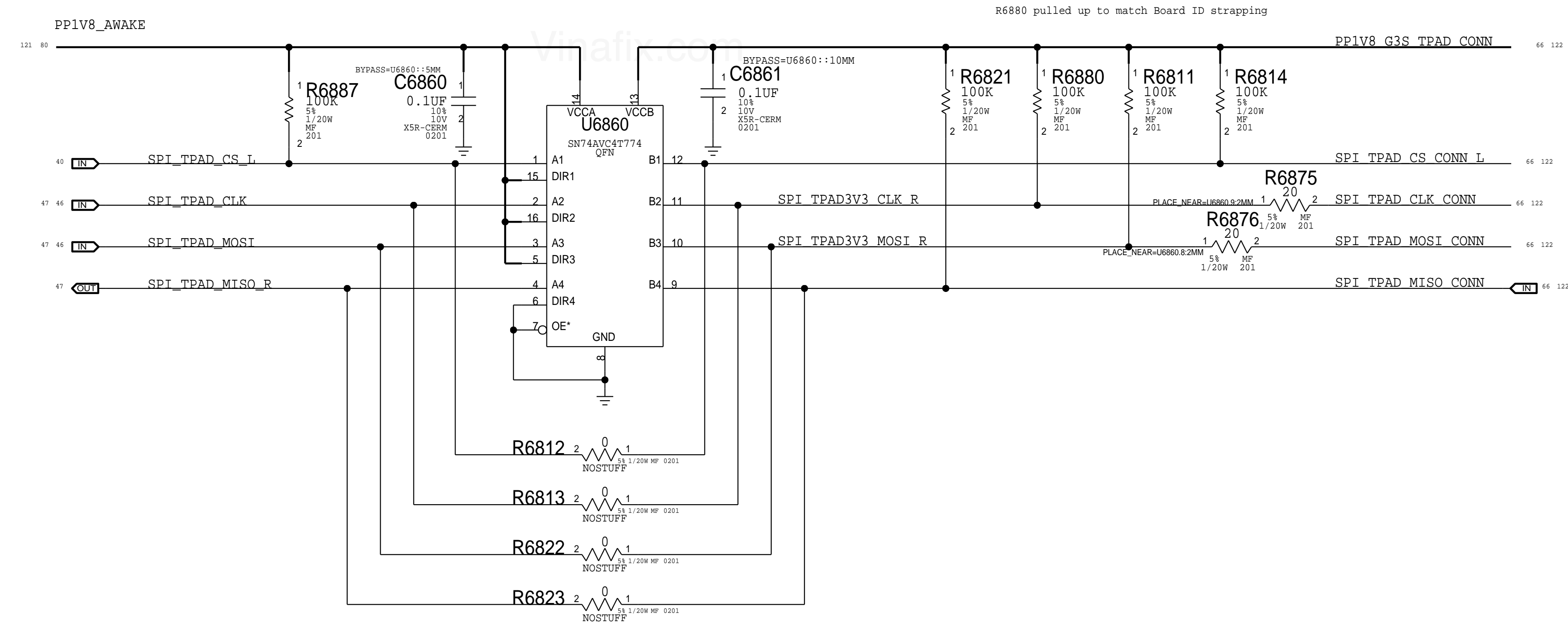
BOM\_COST\_GROUP=AUDIO



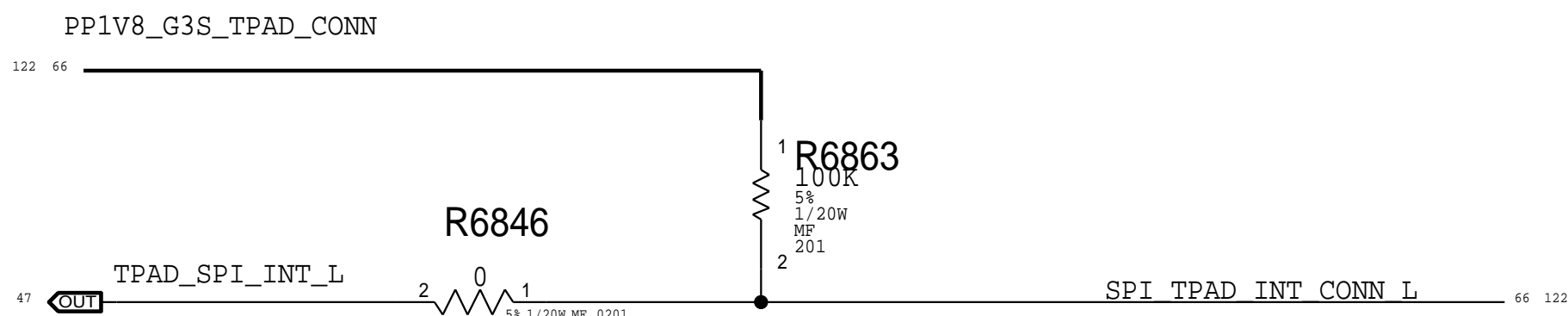
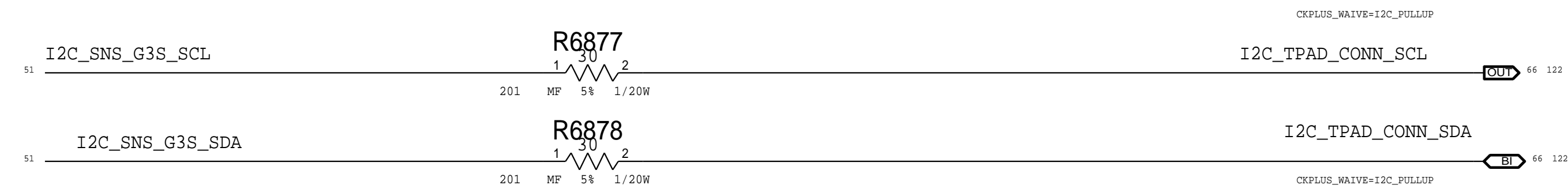




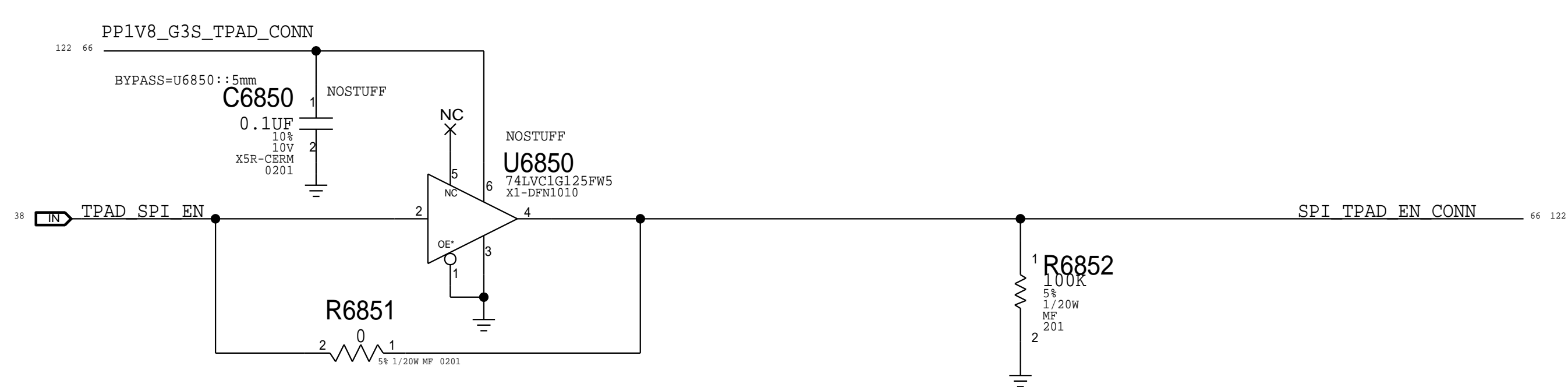
TPAD SPI AWAKE , G3S POWER RAILS ISOLATION, PULL-UPS ON G3S SIDE NEED TO MATCH BOARD\_ID



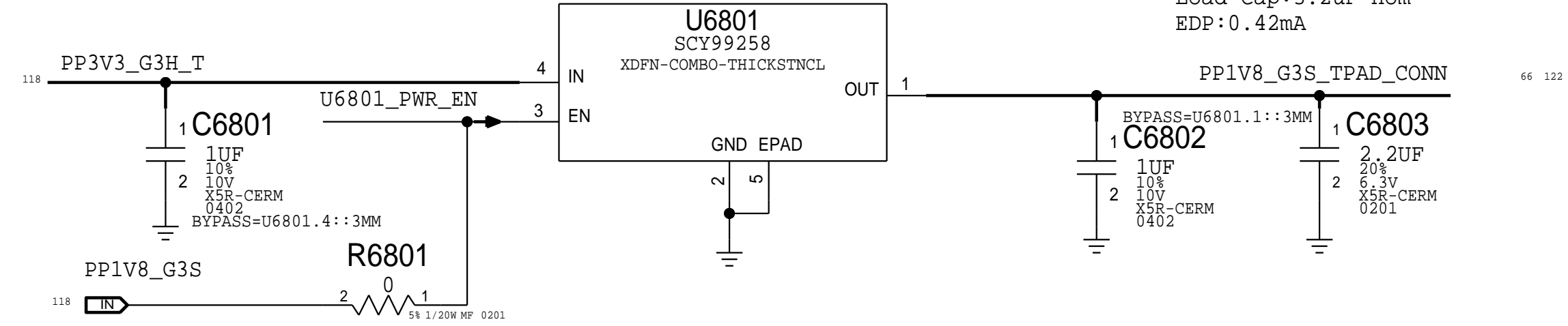
TPAD I2C, INT



TPAD SPI\_EN G3S POWER DOMAIN




1.8V TRACKPAD



(Placeholder for 450mA part symbol)

BOM\_COST\_GROUP=KEYBOARD

PAGE TITLE		
Trackpad Support		
 Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	
	PAGE	68 OF 200
	SHEET	66 OF 135



D



PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
632-00862	1	PCBA,FLEX,BMU PWR,X363	J6950	CRITICAL	

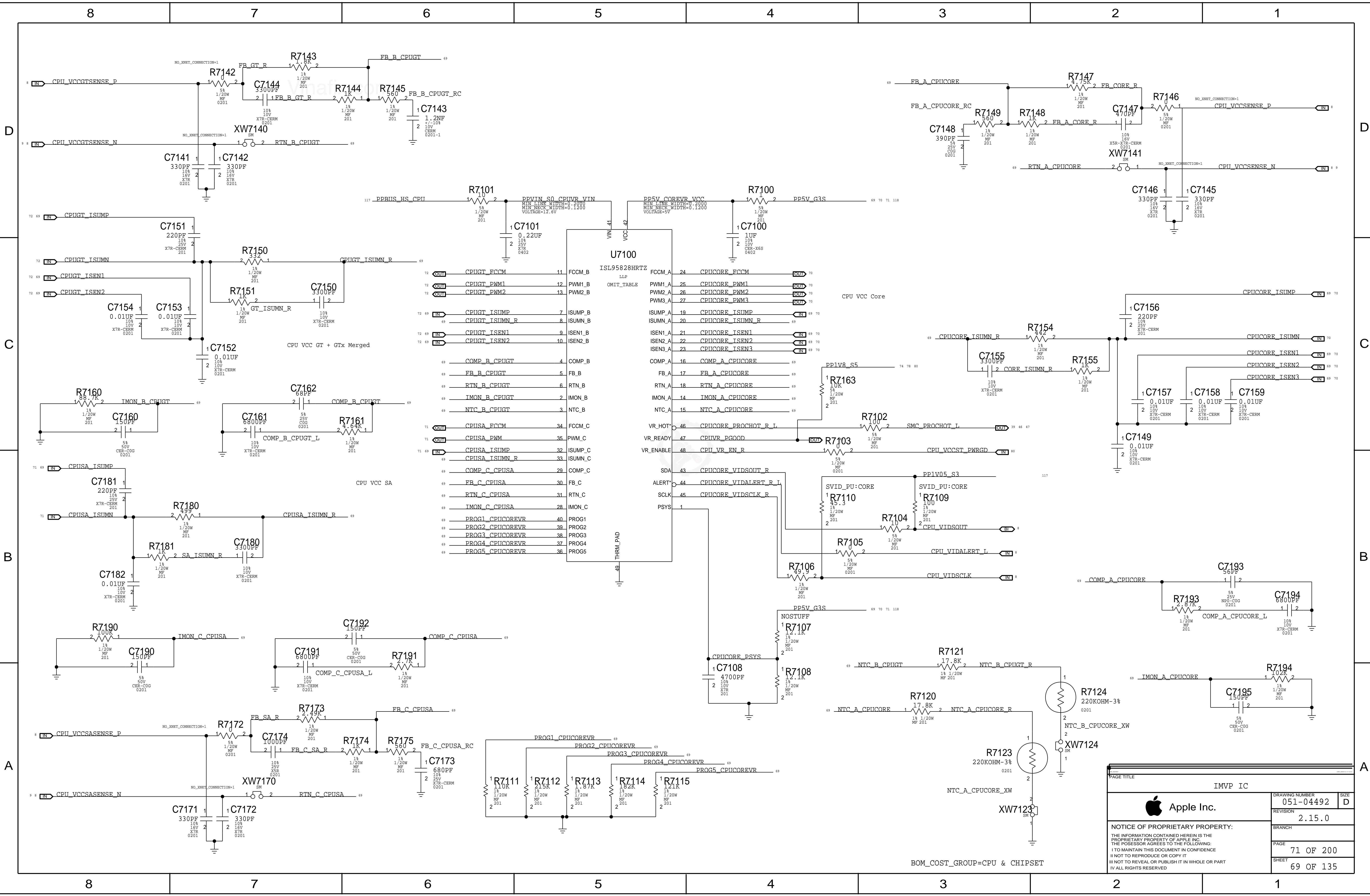



BOM\_COST\_GROUP=PLATFORM POWER





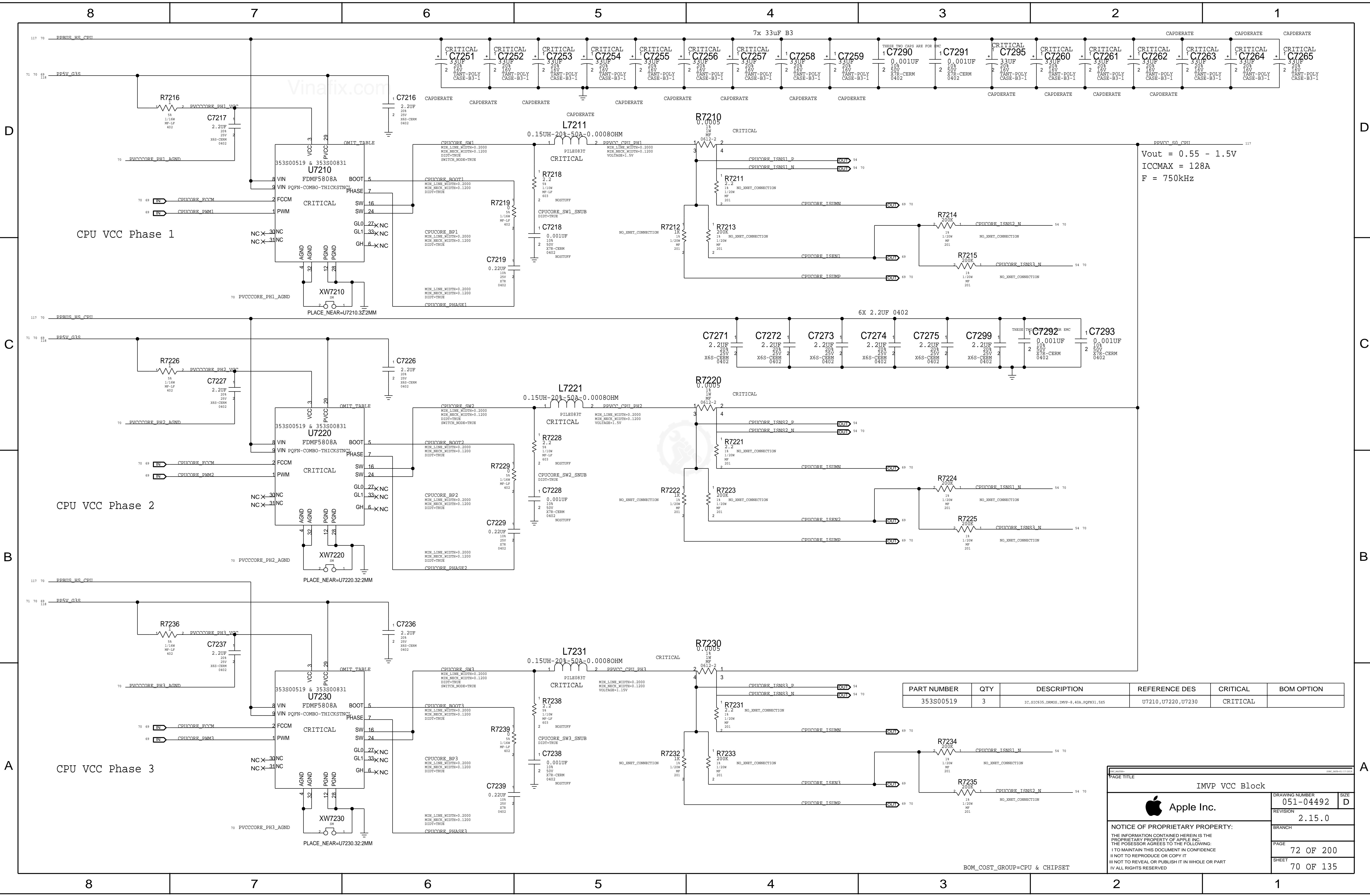




PAGE TITLE			IMVP IC	
 Apple Inc.		DRAWING NUMBER	051-04492	SIZE
		REVISION	2.15.0	D
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART I ALL RIGHTS RESERVED		BRANCH		
		PAGE	71 OF 200	
		SHEET	69 OF 135	


BOM\_COST\_GROUP=CPU & CHIPSET





Vout = 0.55 - 1.5V  
ICCMAX = 128A  
F = 750kHz

PART NUMBER	QTY	DESCRIPTION	REFERENCE DES	CRITICAL	BOM OPTION
353S00519	3	IC, SiC635, DR MOS, IWPV=8.40A, PQFN31, 5X5	U7210, U7220, U7230	CRITICAL	

PAGE NUMBER:		PAGE TITLE		DRAWING NUMBER		SIZE	
		IMVP VCC Block		051-04492		D	
 Apple Inc.		REVISION		2.15.0			
		BRANCH					
NOTICE OF PROPRIETARY PROPERTY:  THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		PAGE		72 OF 200			
		SHEET		70 OF 135			

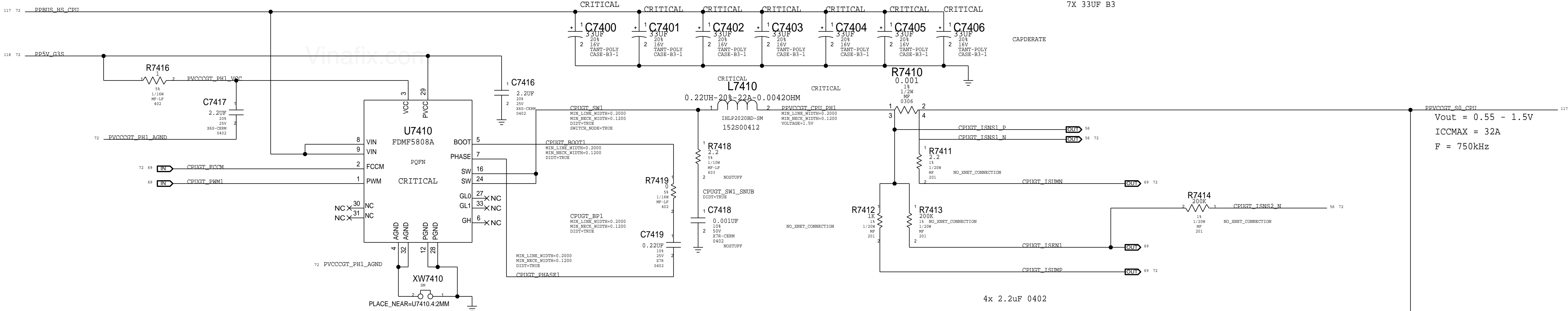
BOM\_COST\_GROUP=CPU & CHIPSET



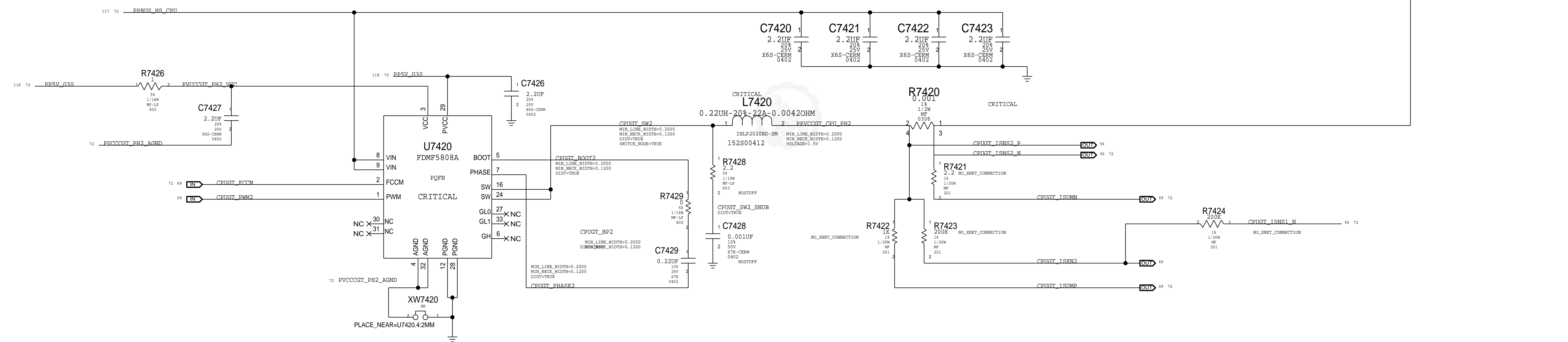





CPU VCCGT Phase 1



CPU VCCGT Phase 2

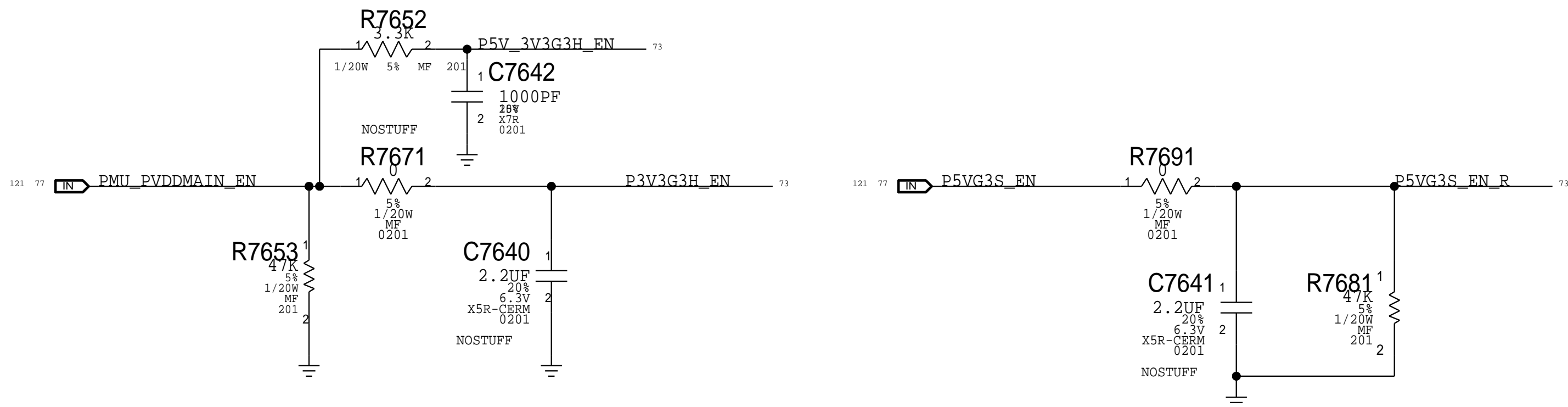
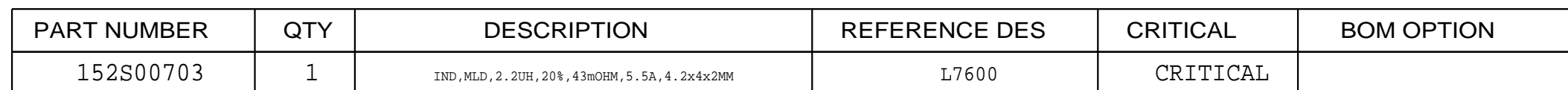



PAGE TITLE		
IMVP GT Block		
 Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART I ALL RIGHTS RESERVED	BRANCH	
	PAGE	74 OF 200
	SHEET	72 OF 135

BOM\_COST\_GROUP=CPU & CHIPSET

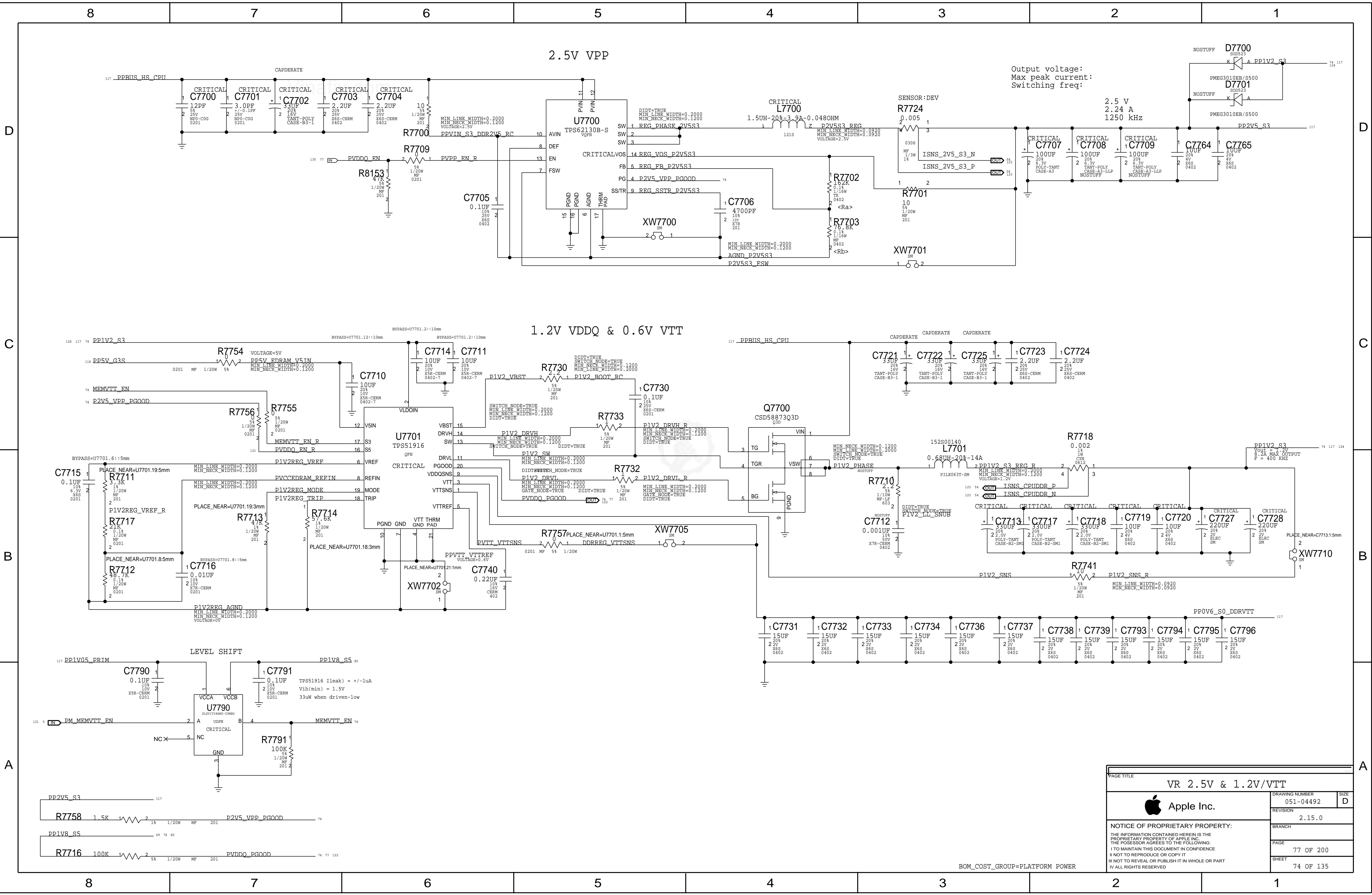


### 3.3V DSW - V6

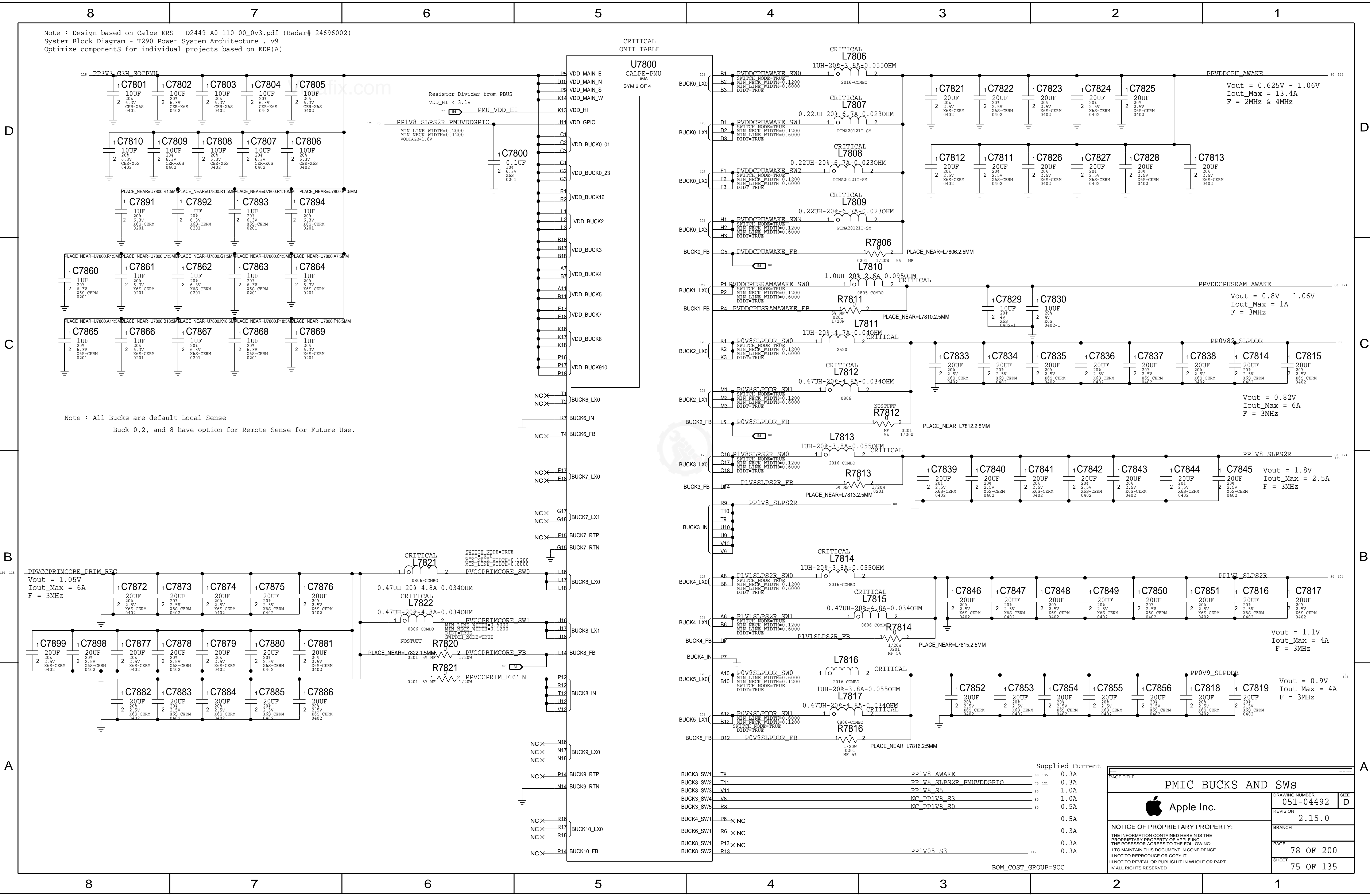


PAGE TITLE		
Power 5V 3.3V Supply		
 Apple Inc.	DRAWING NUMBER	SIZE
	051-04492	D
	REVISION	
	2.15.0	
NOTICE OF PROPRIETARY PROPERTY:		
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		
BRANCH		
PAGE	76 OF 200	
SHEET	73 OF 135	









Note : Design based on Calpe ERS - D2449-A0-110-00\_v3.pdf (Radar# 24696002)  
System Block Diagram - T290 Power System Architecture .v9  
Optimize components for individual projects based on EDP(A)

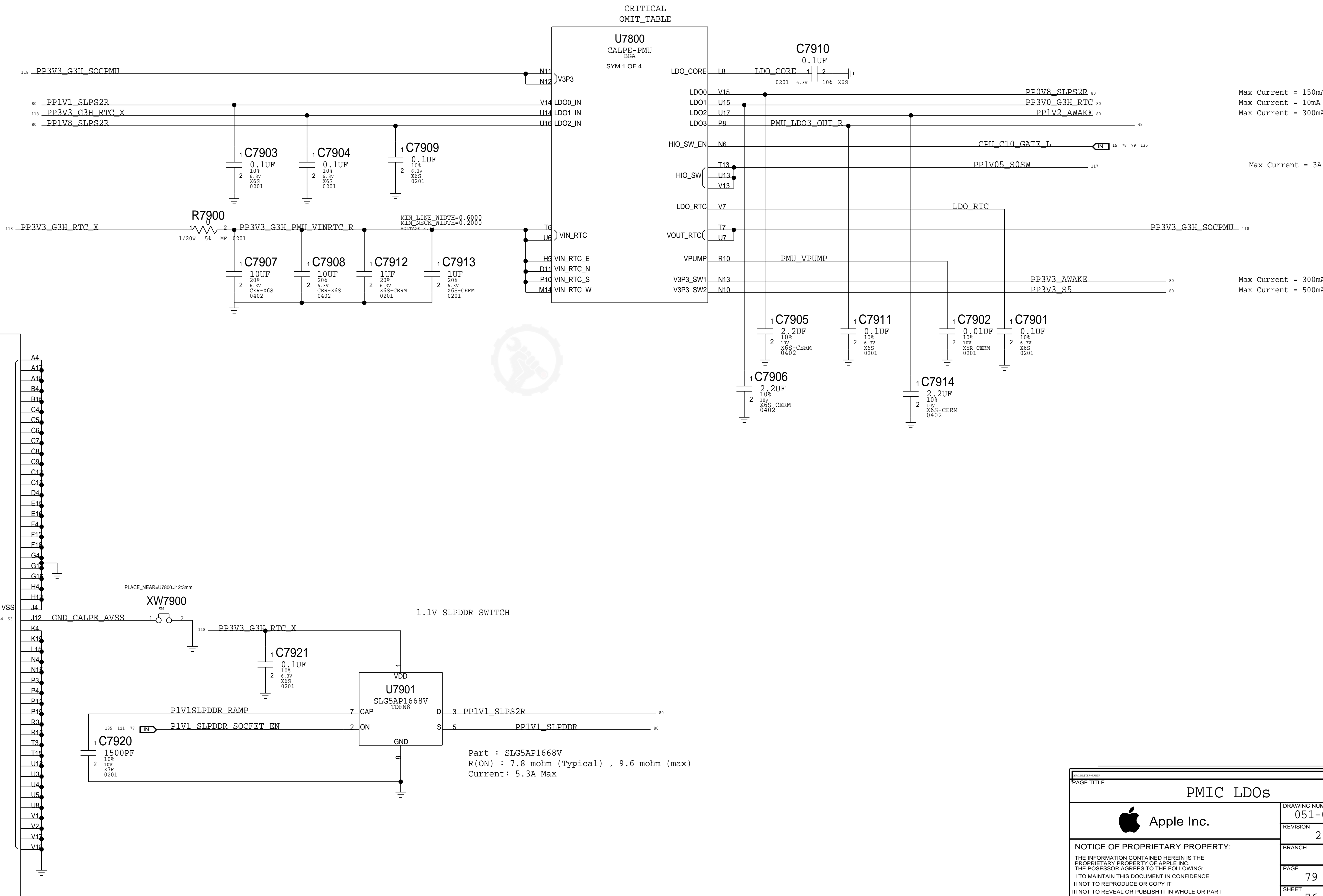
CRITICAL  
OMIT\_TABLE  
U7800  
CALPE-PMU  
BGA  
SYM 2 OF 4

Supplied Current				
BUCK3_SW1	T8	P1V8_AWAKE	80 135	0.3A
BUCK3_SW2	T11	P1V8_SLPS2R_PMIUDDGPITO	75 121	0.3A
BUCK3_SW3	V11	P1V8_S5	80	1.0A
BUCK3_SW4	V8	NC_P1V8_S3	80	1.0A
BUCK3_SW5	R8	NC_P1V8_S0	80	0.5A
BUCK4_SW1	P6	NC		0.5A
BUCK6_SW1	R6	NC		0.3A
BUCK8_SW1	P13	NC		0.3A
BUCK8_SW2	R13	P1V05_S3	117	0.3A


BOM\_COST\_GROUP=SOC

PAGE TITLE		PMIC BUCKS AND SWs	
		DRAWING NUMBER	051-04492
		REVISION	2.15.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		BRANCH	
		PAGE	78 OF 200
		SHEET	75 OF 135





BOM\_COST\_GROUP=SOC

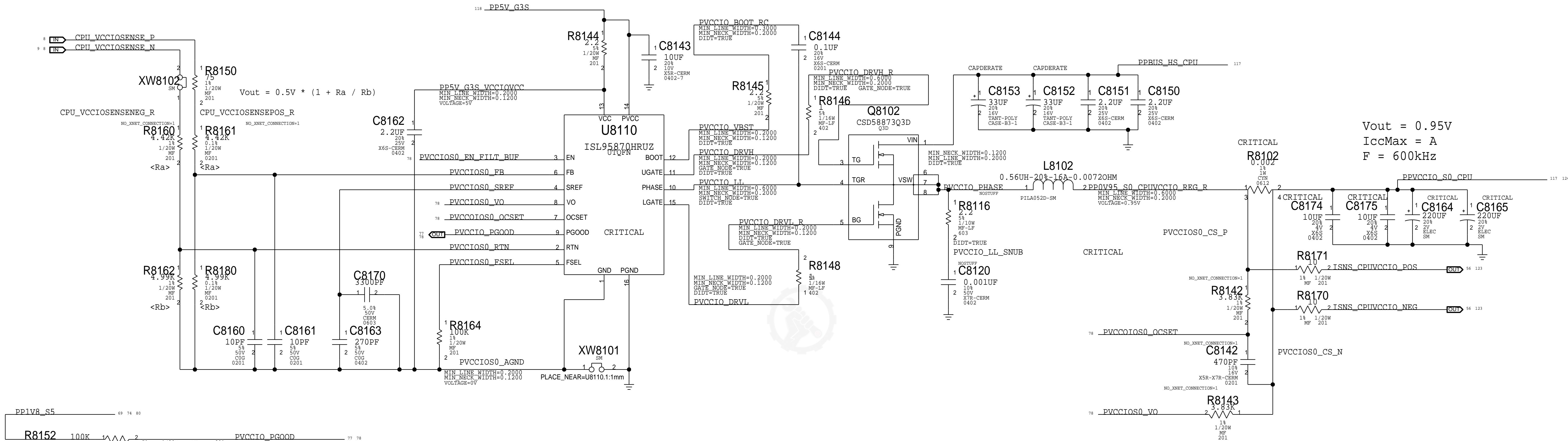
PAGE TITLE		
PMIC LDOs		
 Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART I ALL RIGHTS RESERVED	BRANCH	
	PAGE	79 OF 200
	SHEET	76 OF 135



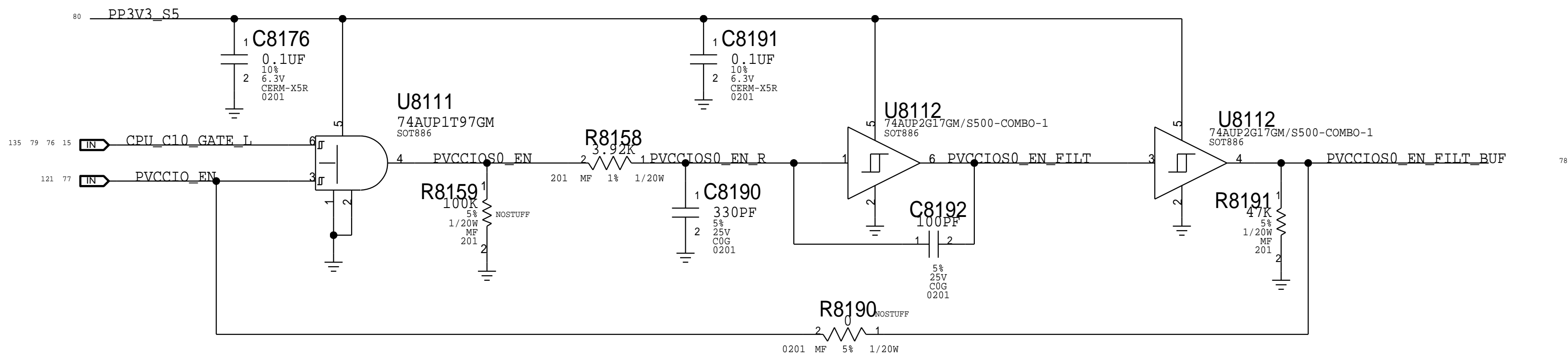





0.95V VCCIO



VCCIO ENABLE LOGIC

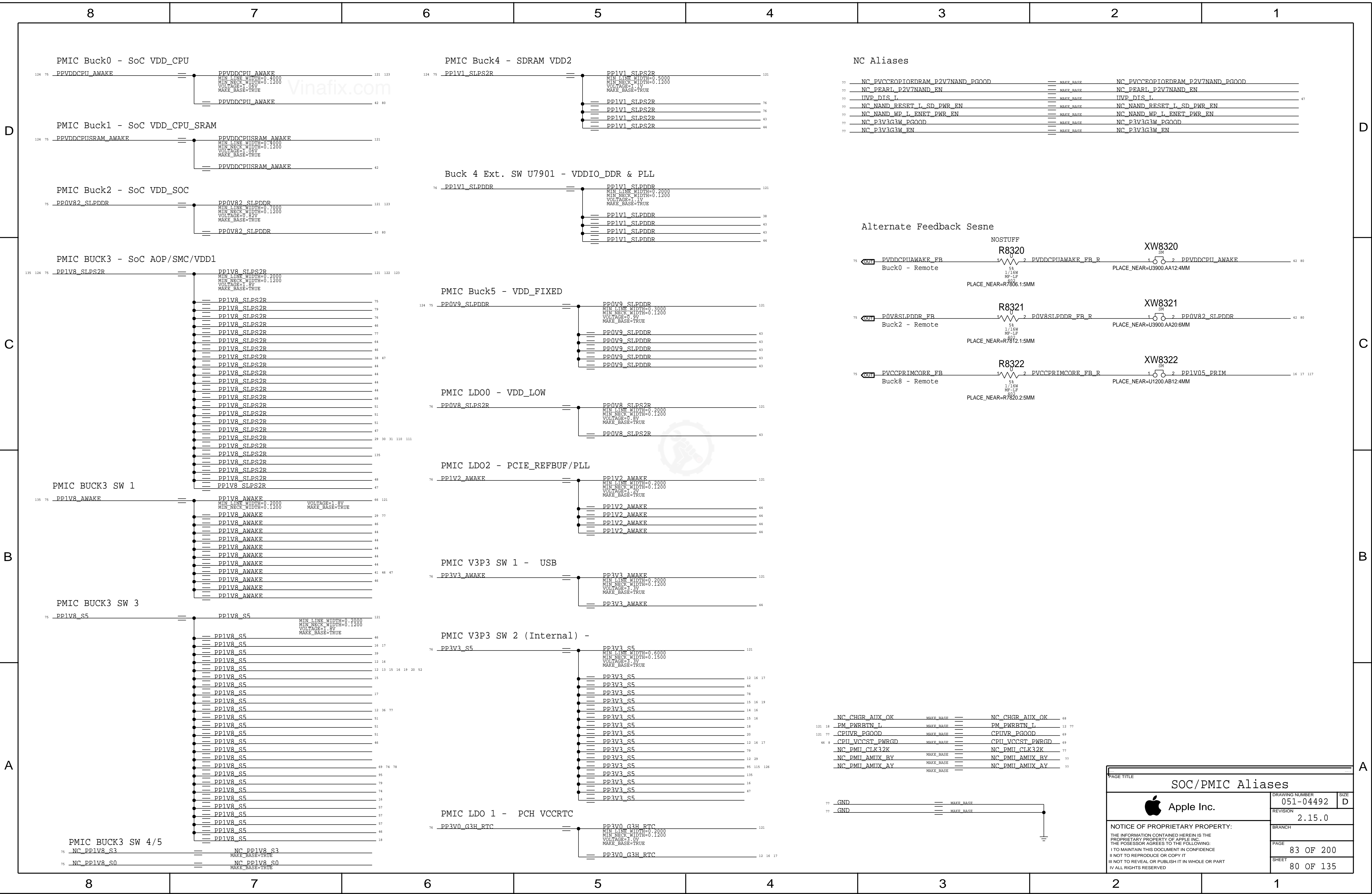


PAGE TITLE		
VR VCCIO		
 Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
	BRANCH	
	PAGE	81 OF 200
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		SHEET 78 OF 135















LCD PANEL INTERFACE (eDP) + Camera (MIPI)

MIPIC FILTERING

D

D

C

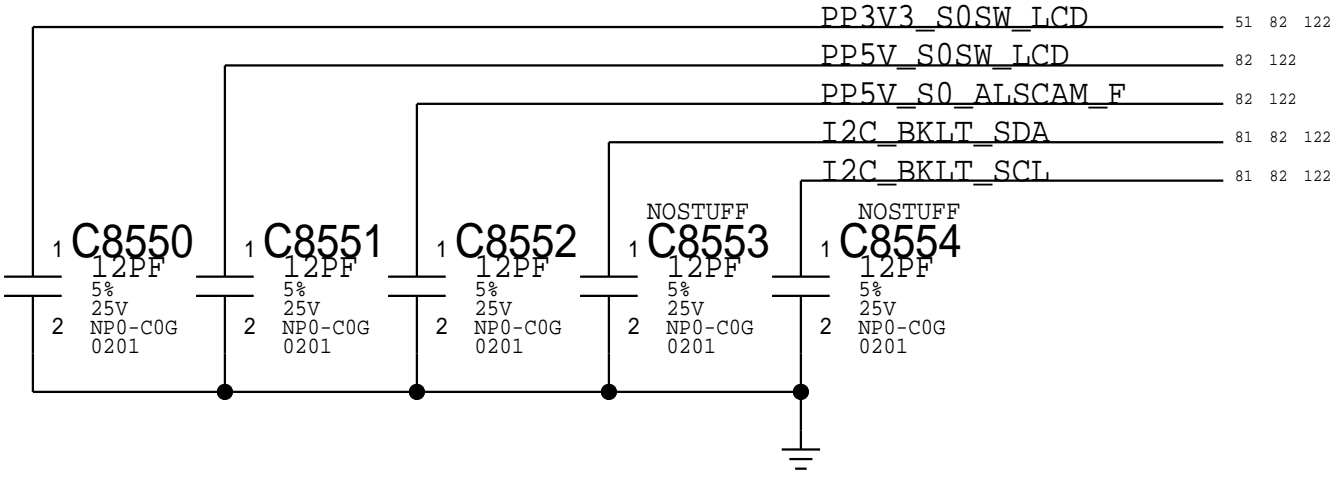
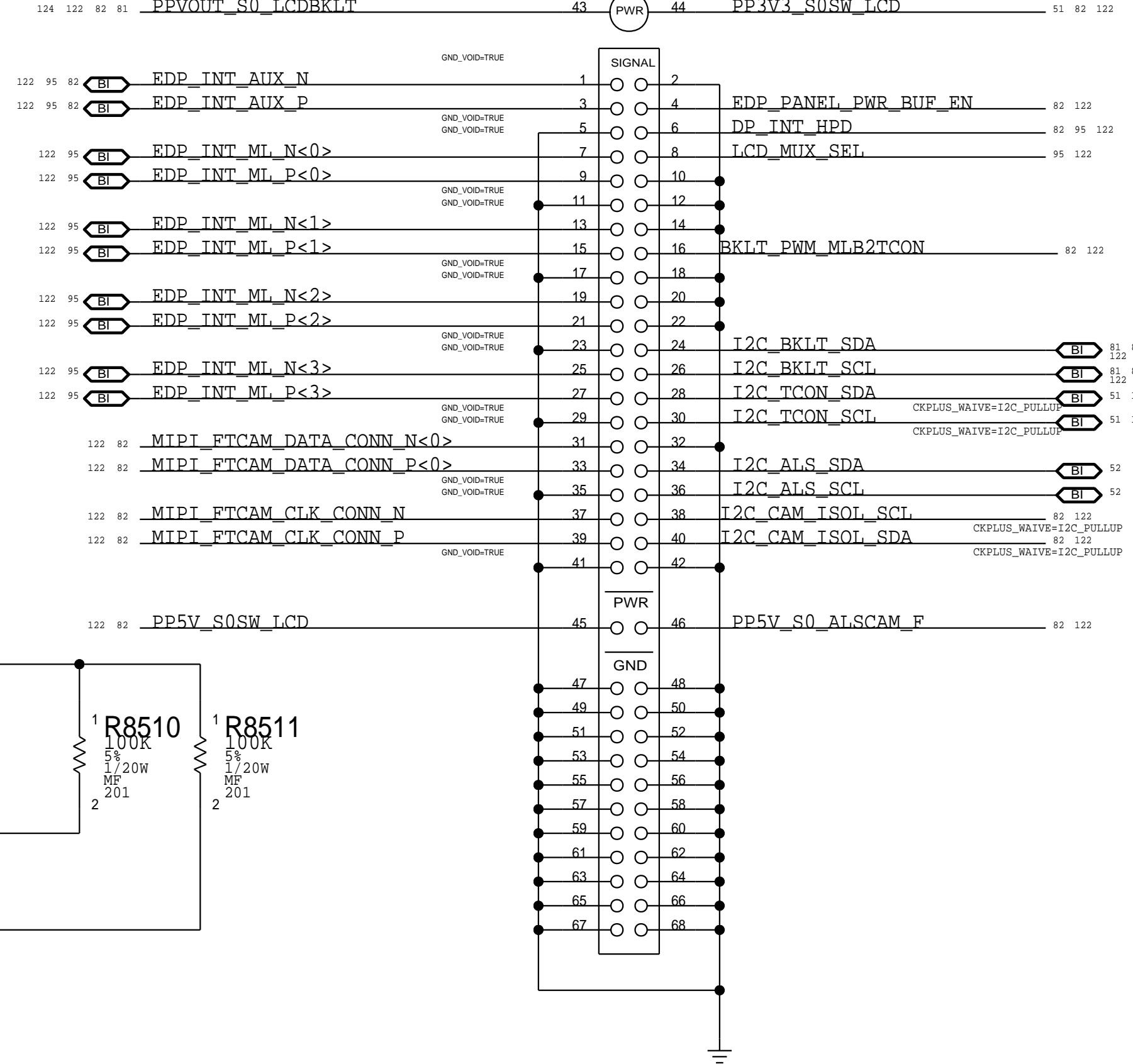
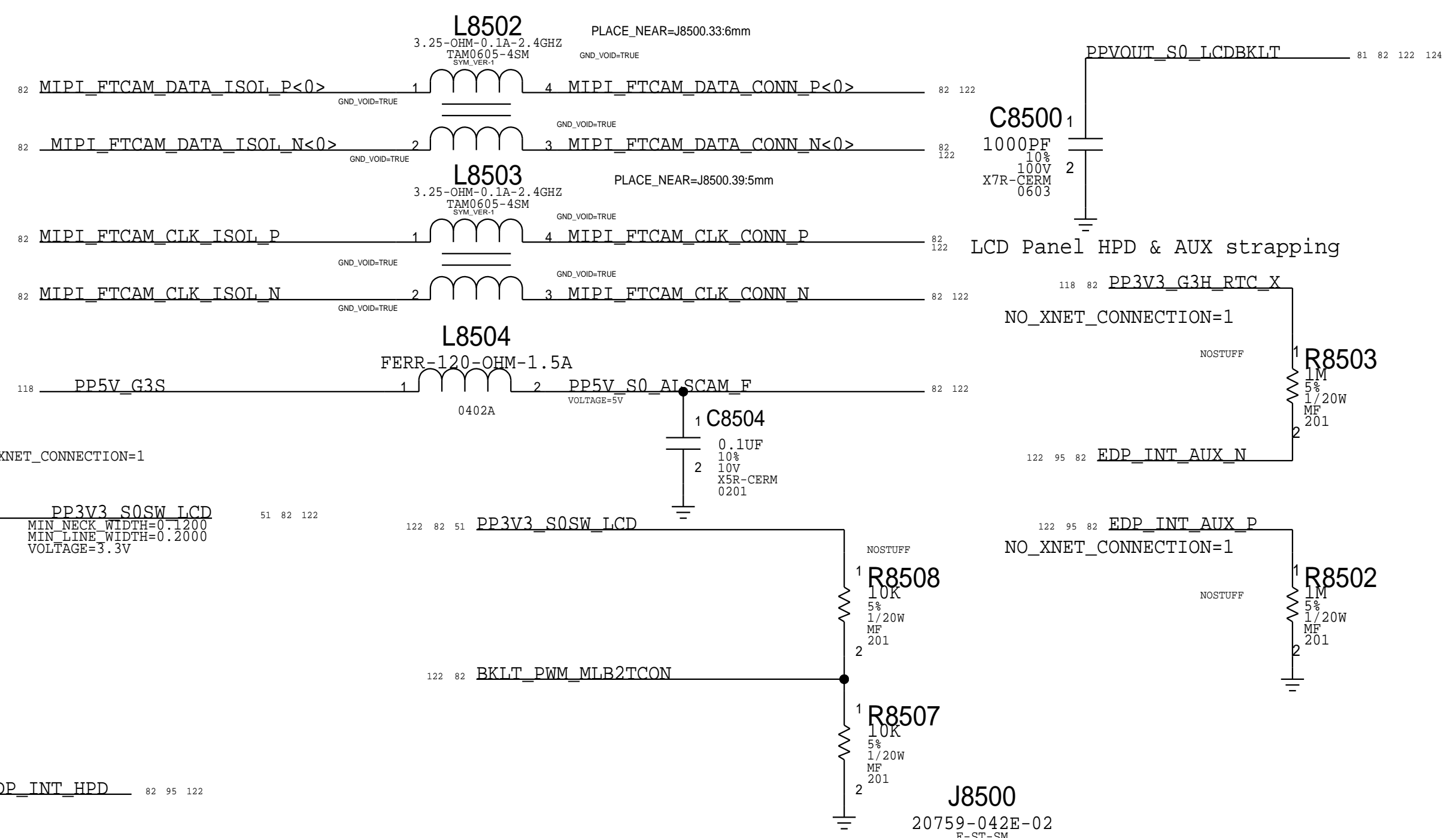
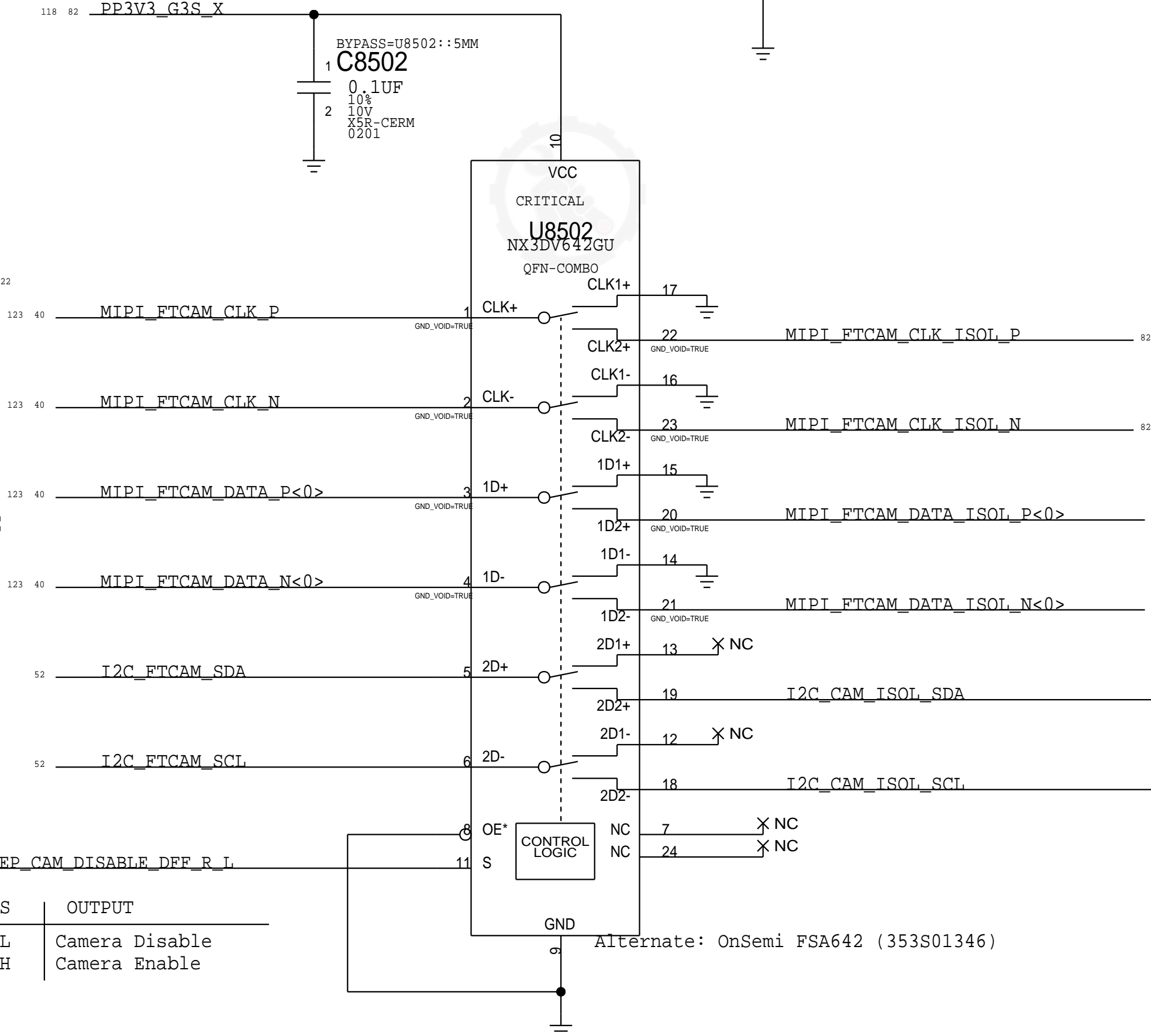
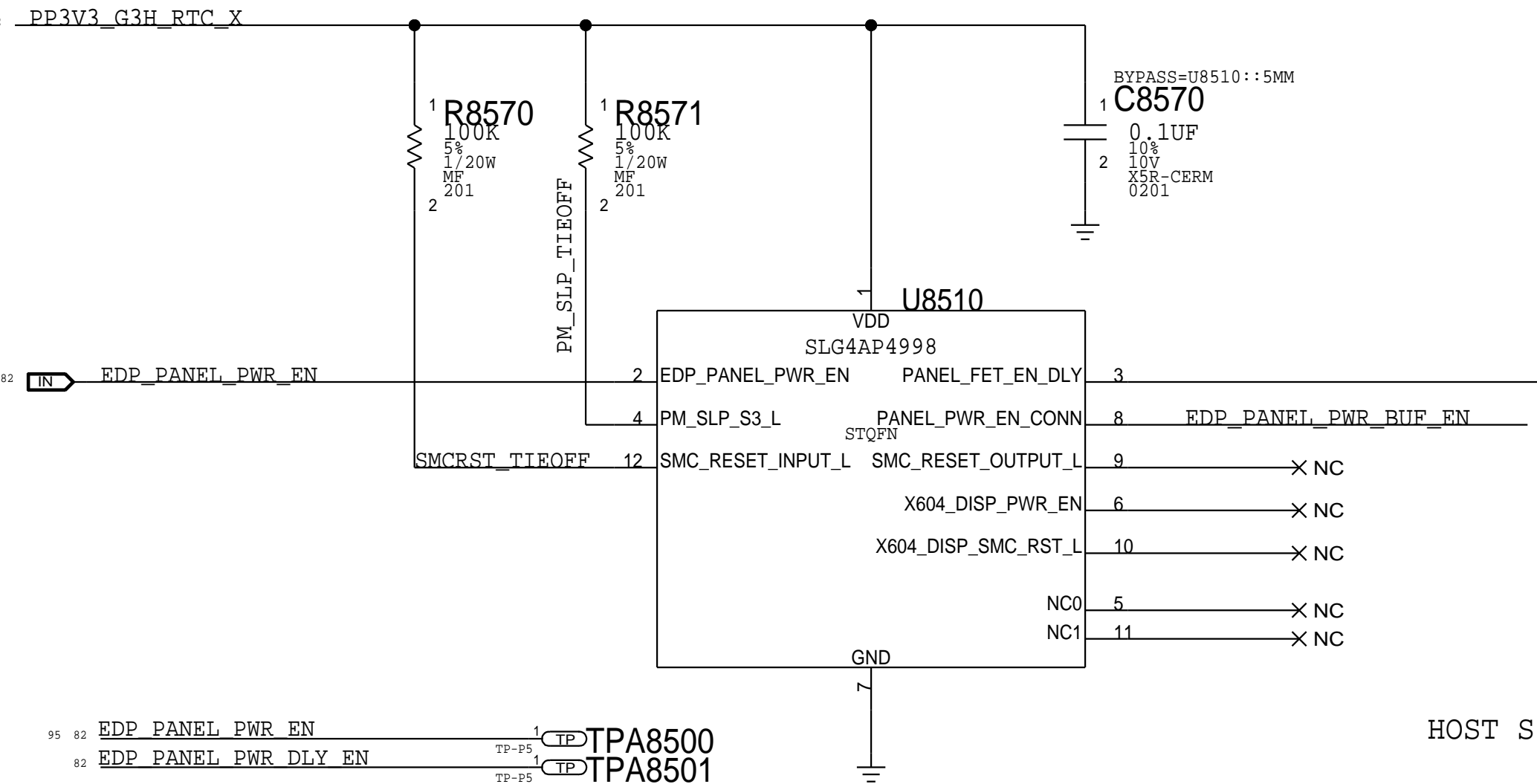
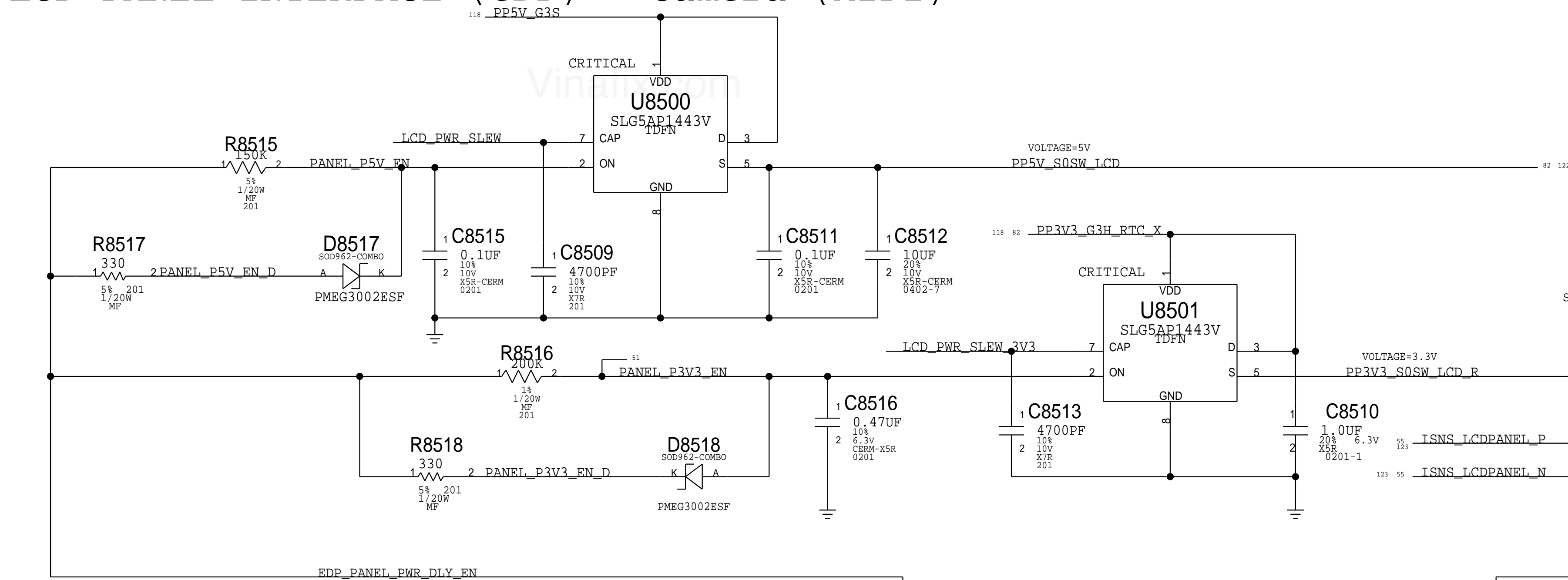
C

B

B

A

A



S	OUTPUT
L	Camera Disable
H	Camera Enable

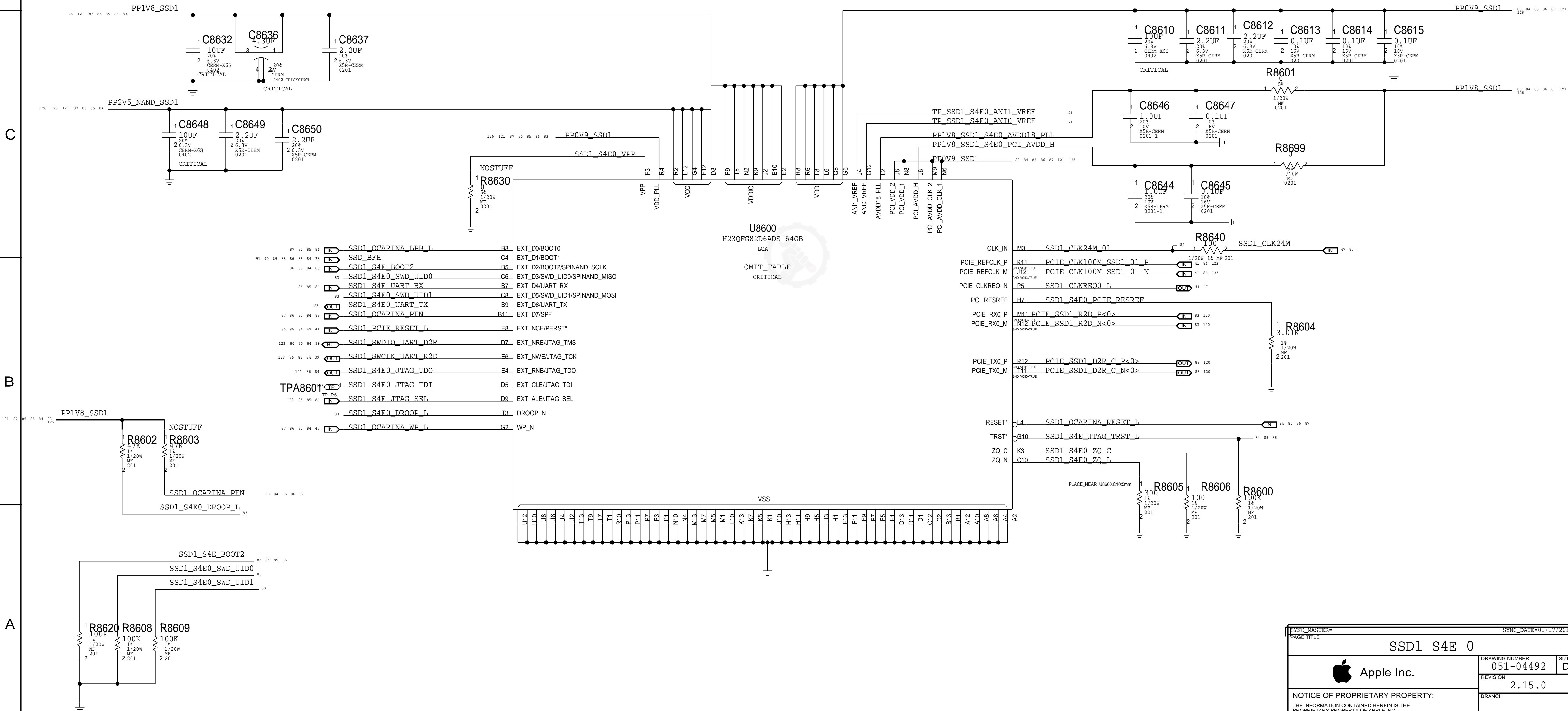
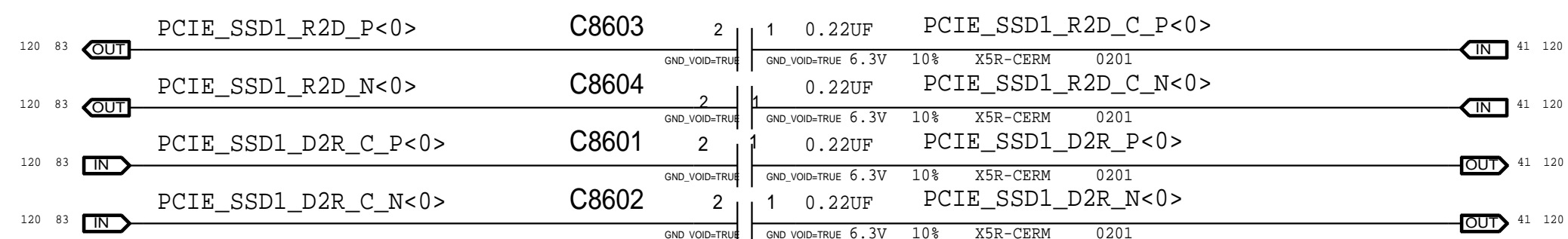
Alternate: OnSemi FSA642 (353S01346)

BOM\_COST\_GROUP=DISPLAY


PAGE TITLE		
eDP Display Connector		
DRAWING NUMBER		051-04492
REVISION		2.15.0
BRANCH		
PAGE		85 OF 200
SHEET		82 OF 135



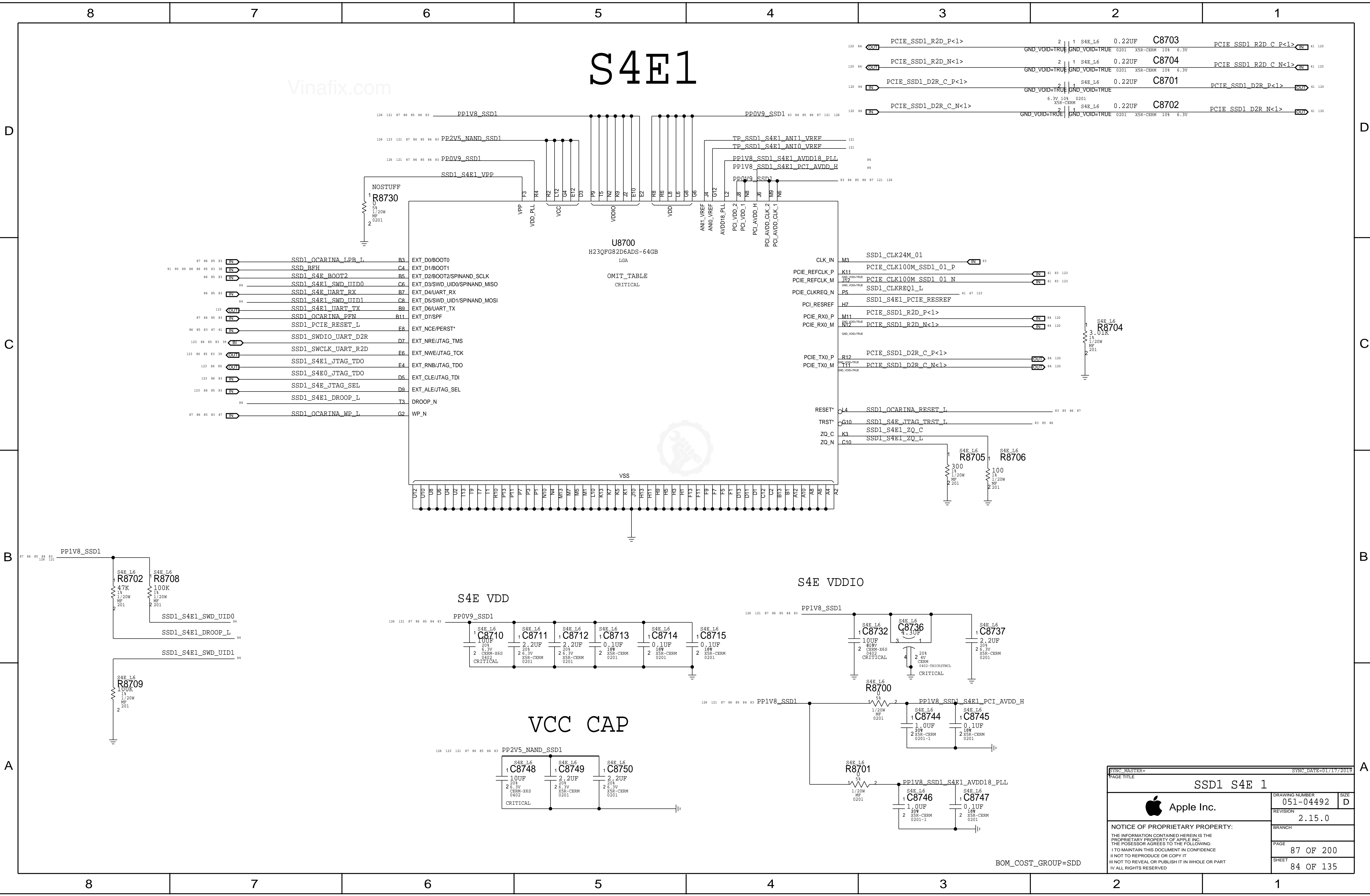
# S4E0



BOM\_COST\_GROUP=SDD

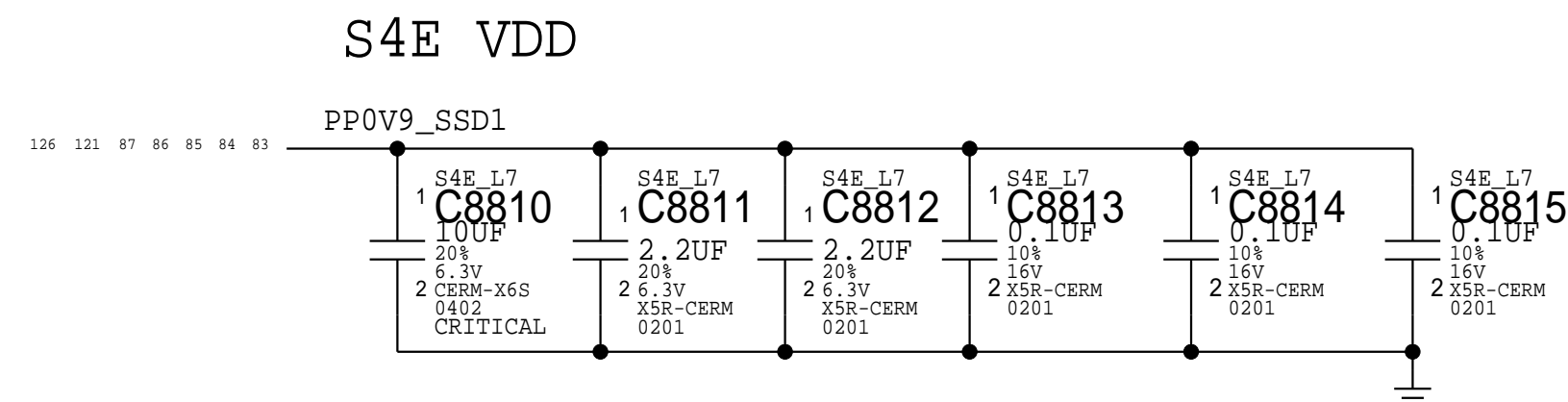
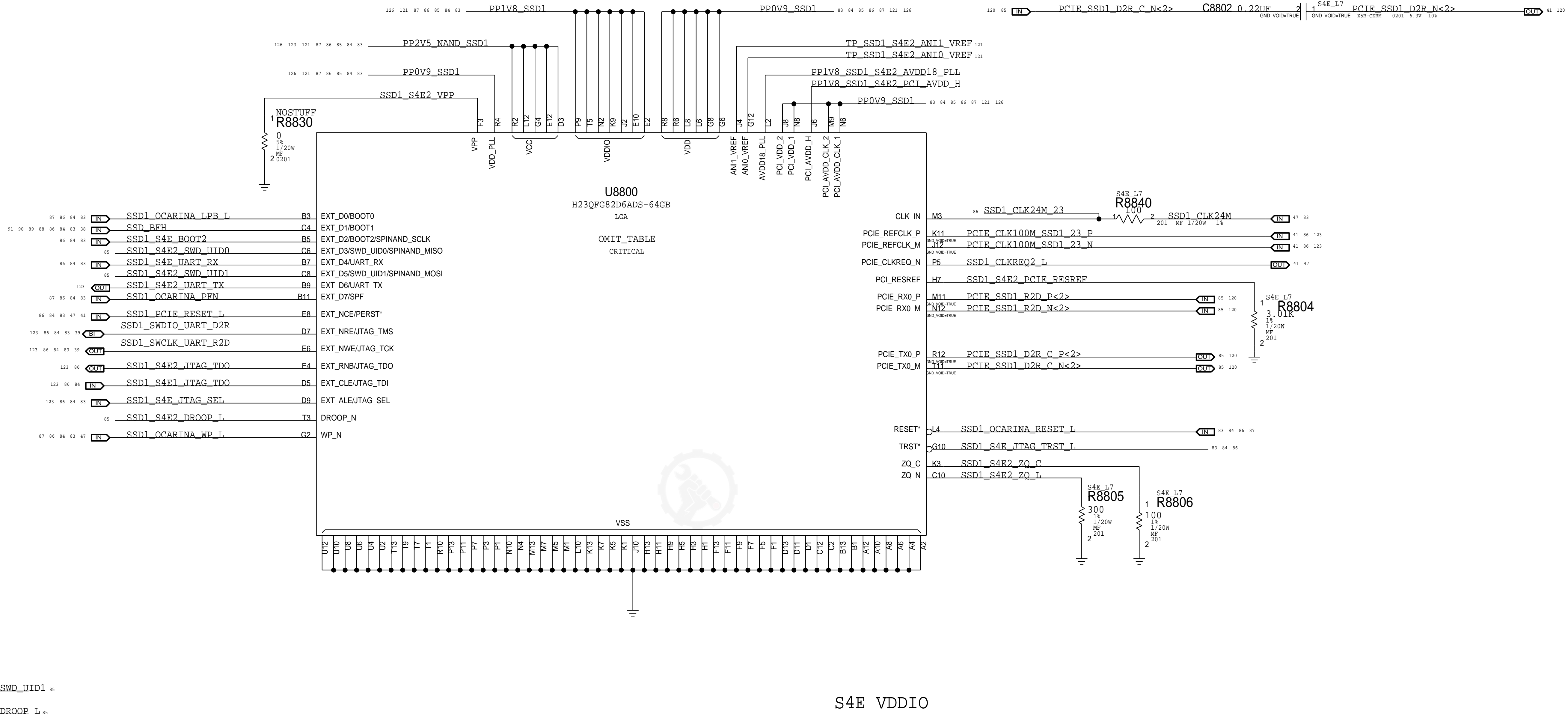
SYNCH MASTER=		SYNCH DATE=01/17/2019	
PAGE TITLE			
SSD1 S4E 0			
 Apple Inc.	DRAWING NUMBER		SIZE
	051-04492		D
	REVISION		
	2.15.0		
	BRANCH		
NOTICE OF PROPRIETARY PROPERTY:			
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I. TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED			
PAGE		86 OF 200	
SHEET		83 OF 135	



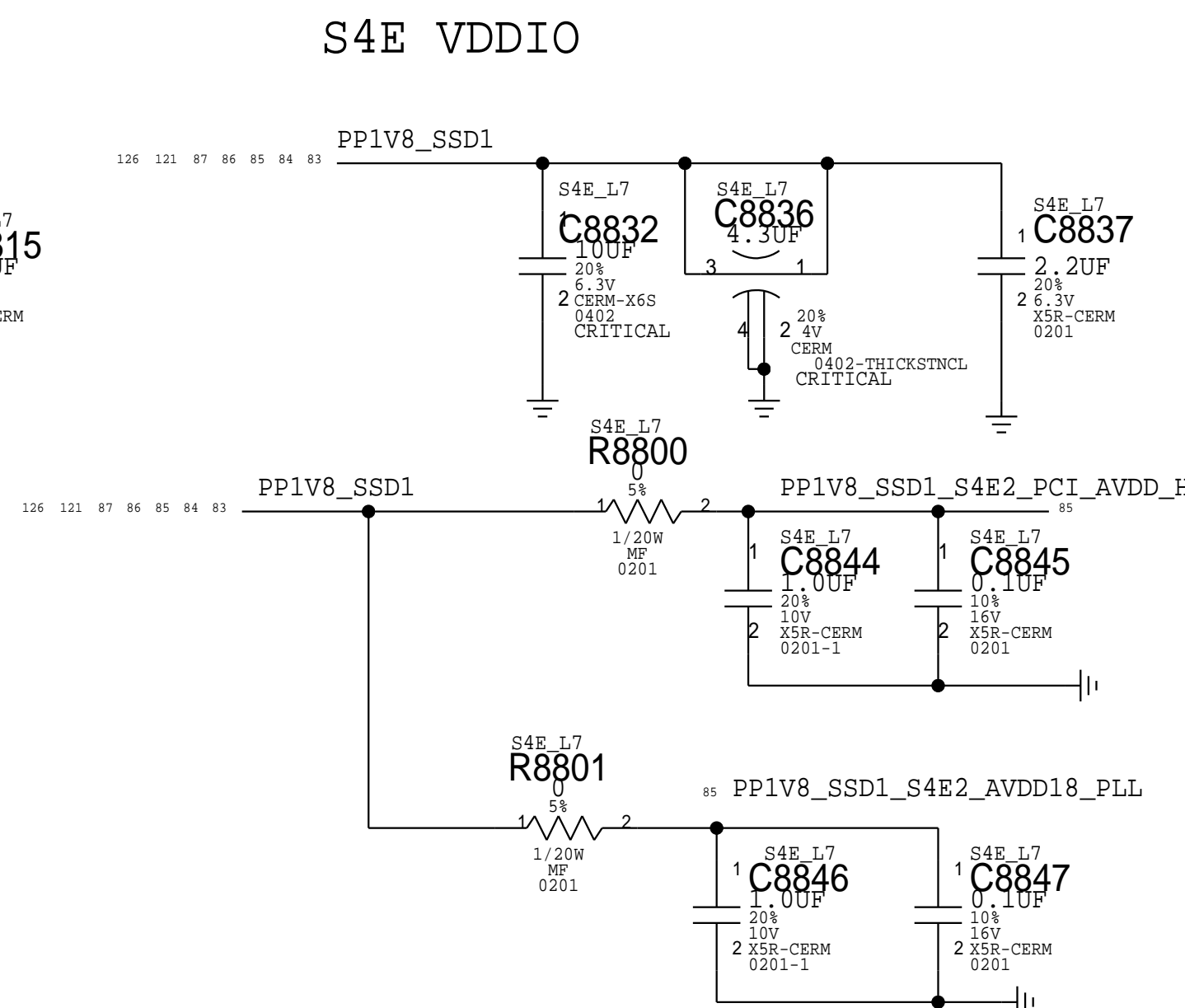
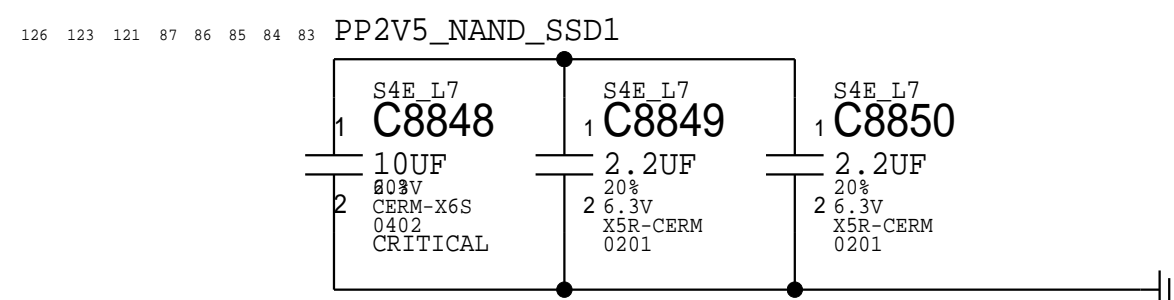





# S4E2



VCC CAP

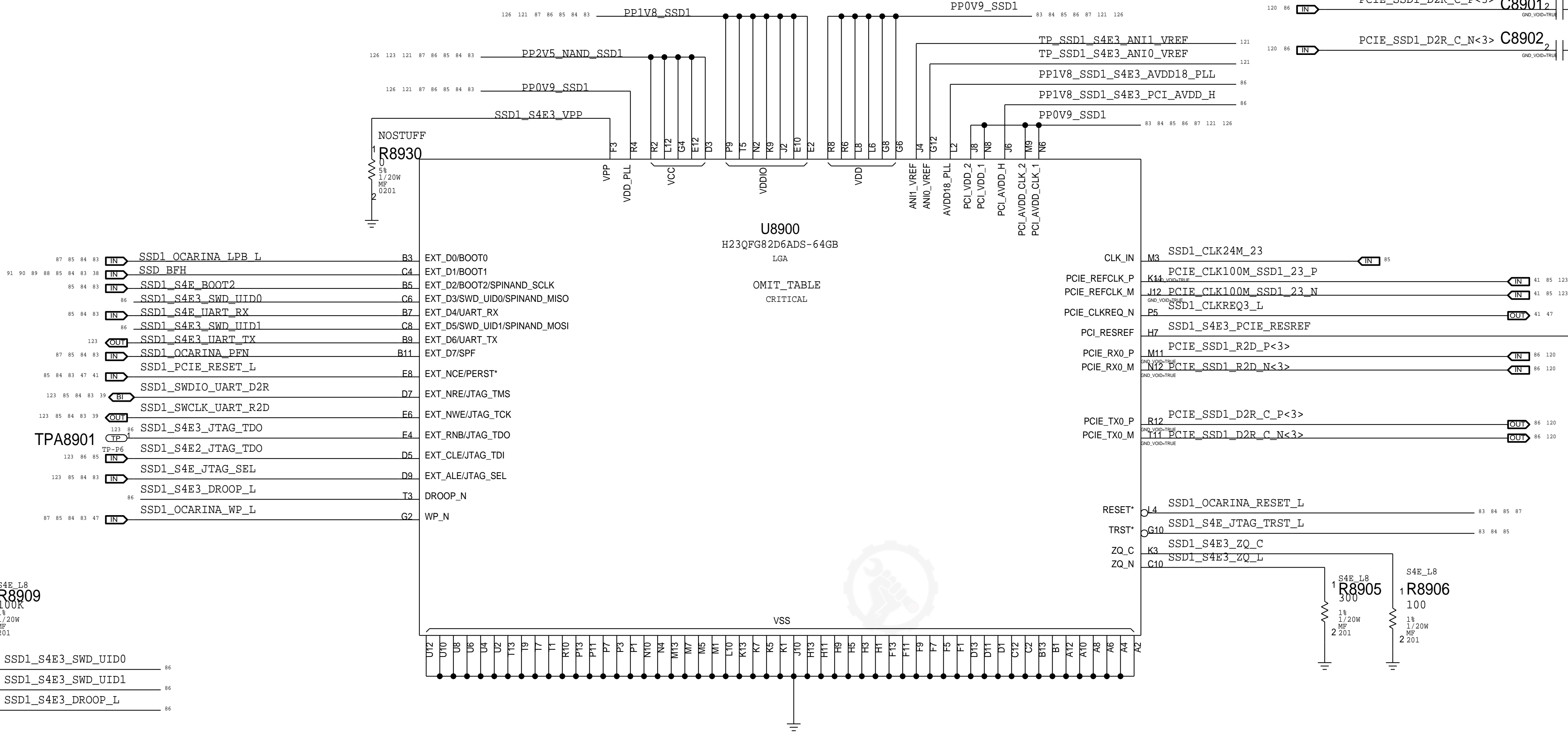


SYNCHMASTER=		SYNCHDATE=01/17/2019	
PAGE TITLE			
SSD1 S4E 2			
 Apple Inc.		DRAWING NUMBER	
		051-04492	
NOTICE OF PROPRIETARY PROPERTY:  THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		REVISION	
		2.15.0	
		BRANCH	
		PAGE	
		88 OF 200	
		SHEET	
		85 OF 135	

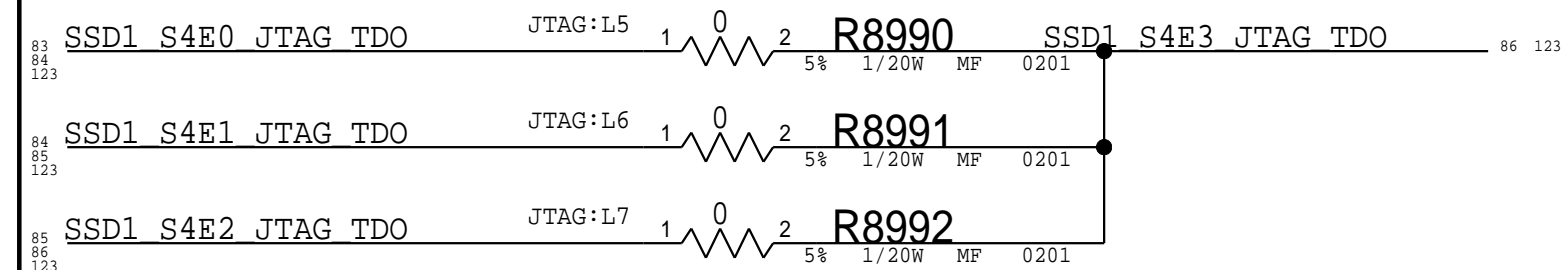


# S4E3

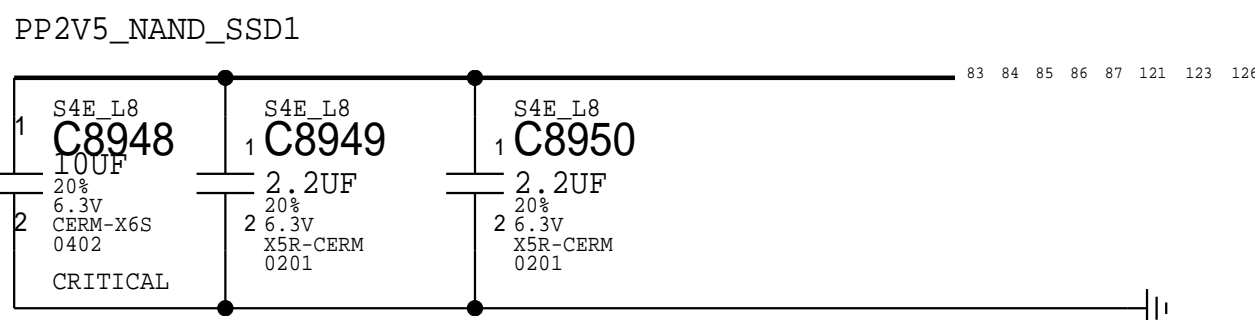
Vinafix.com



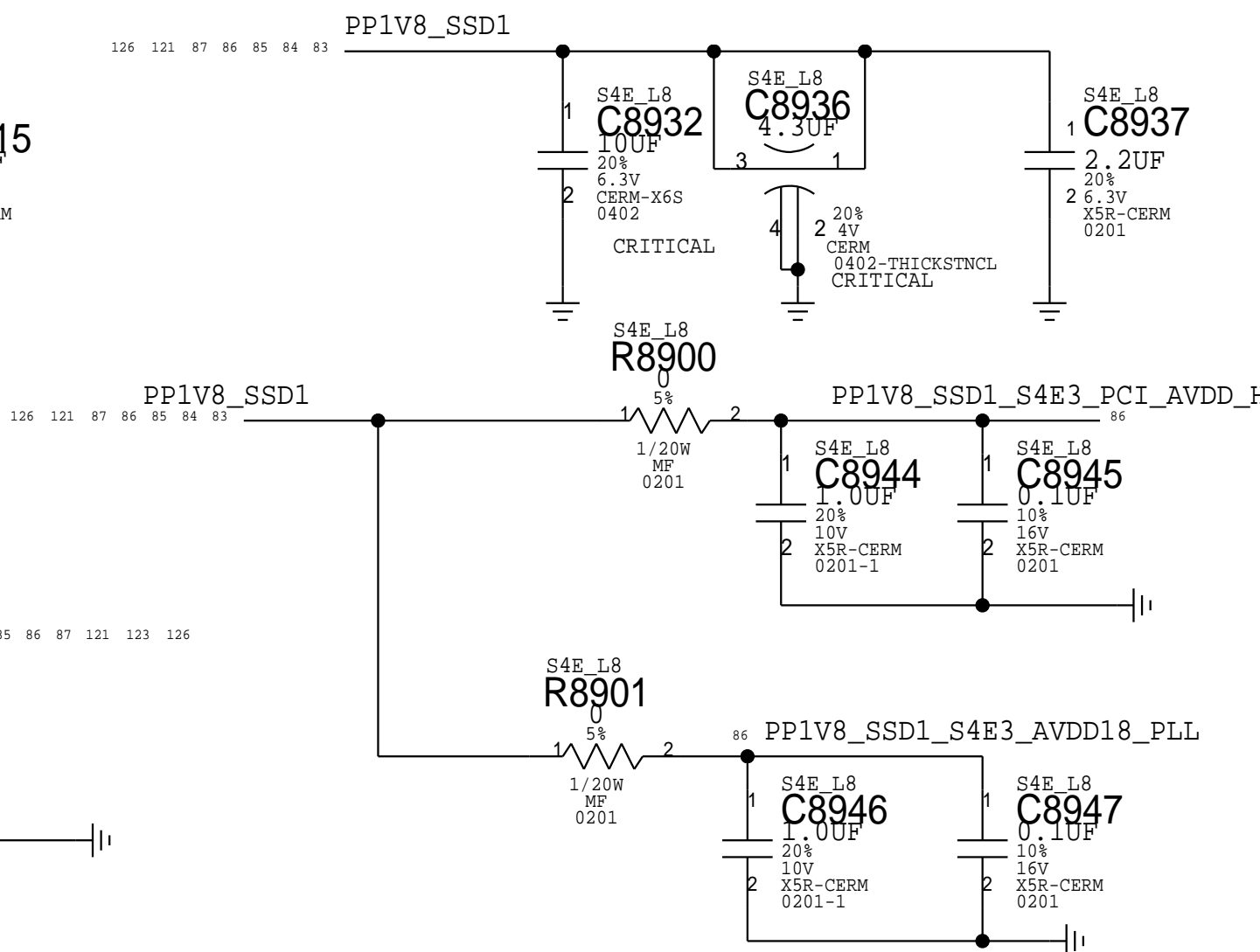
## JTAG Stuffing Option



## VCC CAP



## S4E VDDIO



BOM\_COST\_GROUP=SDD

SYNC_MASTER=		SYNC_DATE=01/17/2019	
PAGE TITLE		SSD1 S4E 3	
	DRAWING NUMBER	051-04492	SIZE
	REVISION	2.15.0	D
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		BRANCH	
		PAGE	89 OF 200
		SHEET	86 OF 135

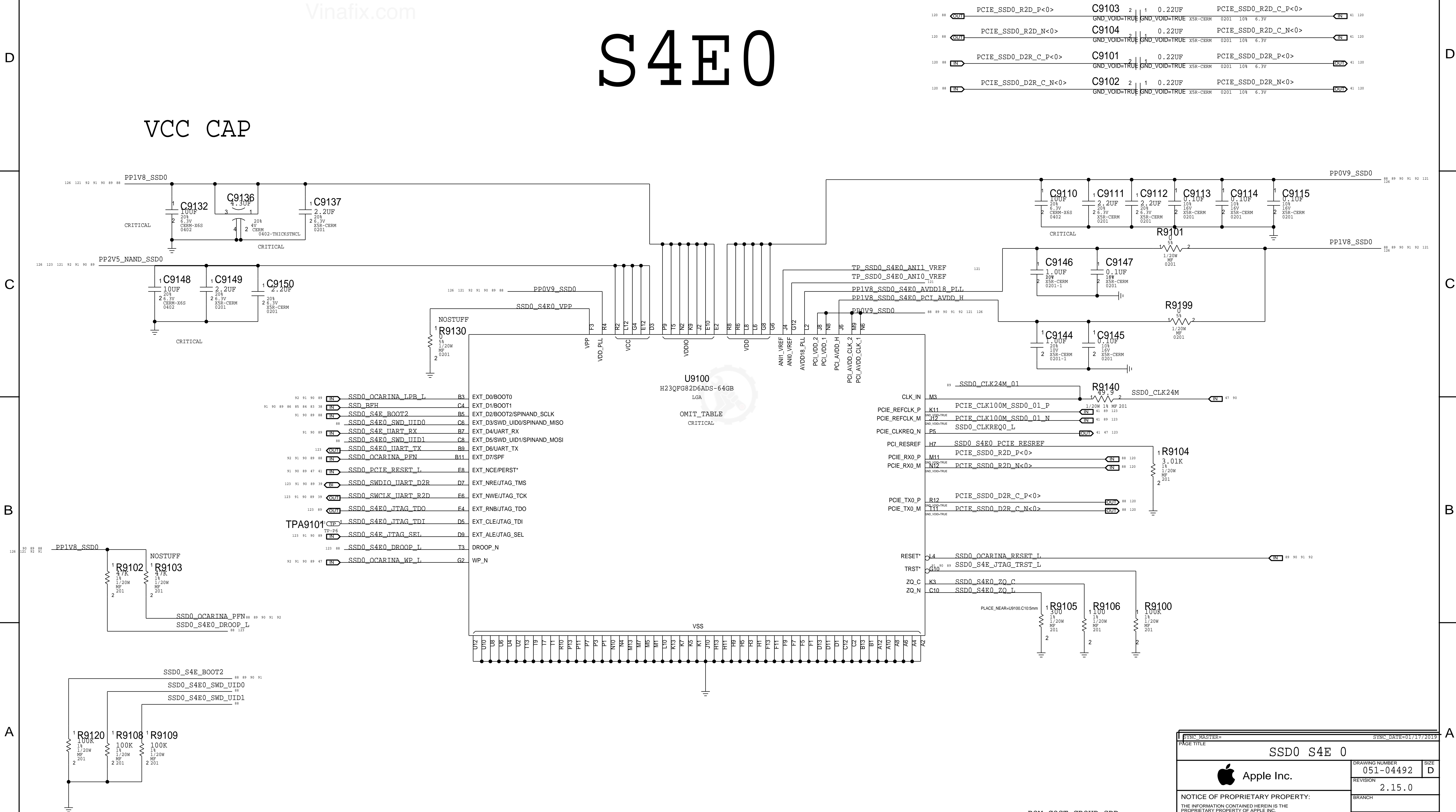







# S4E0

VCC CAP

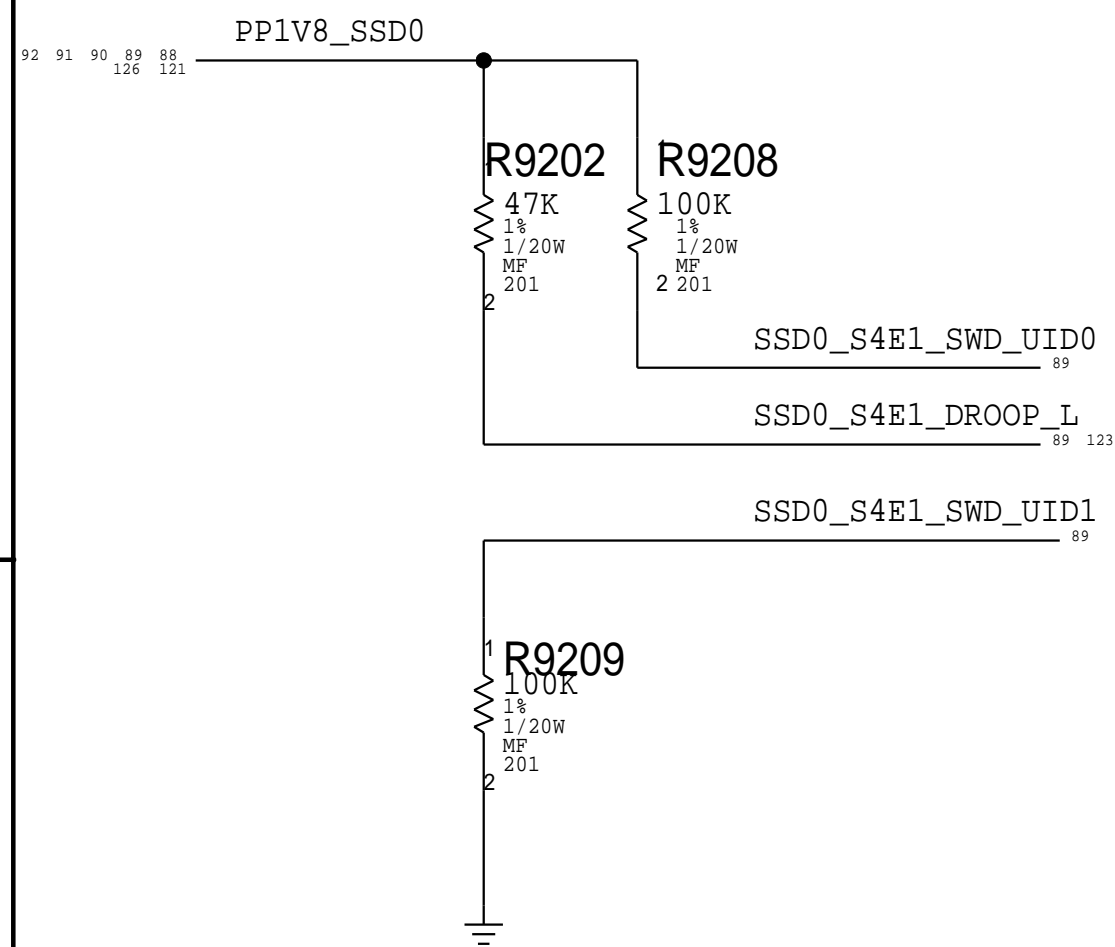
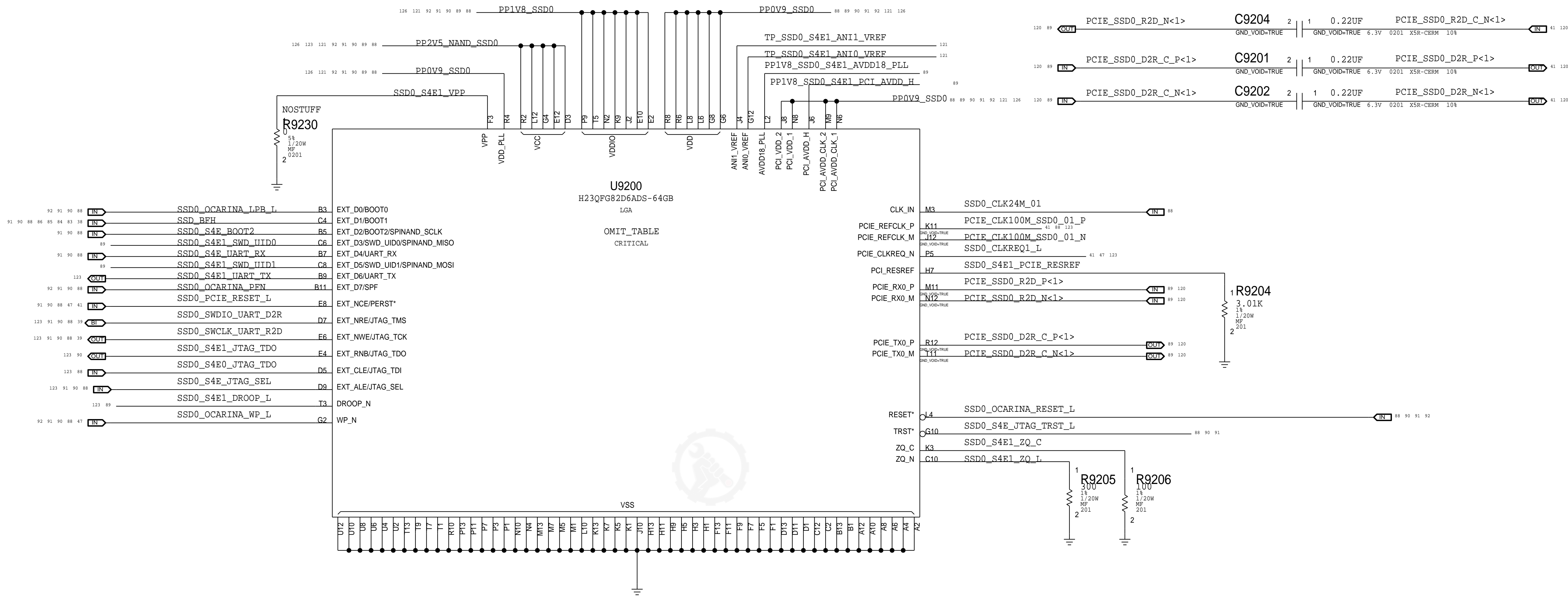


SYNCH_MASTER=		SYNCH_DATE=01/17/2019	
PAGE TITLE			
SSD0 S4E 0			
 Apple Inc.	DRAWING NUMBER		SIZE
	051-04492		D
	REVISION		
NOTICE OF PROPRIETARY PROPERTY:  THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		2.15.0	
		BRANCH	
		PAGE	91 OF 200
		SHEET	88 OF 135

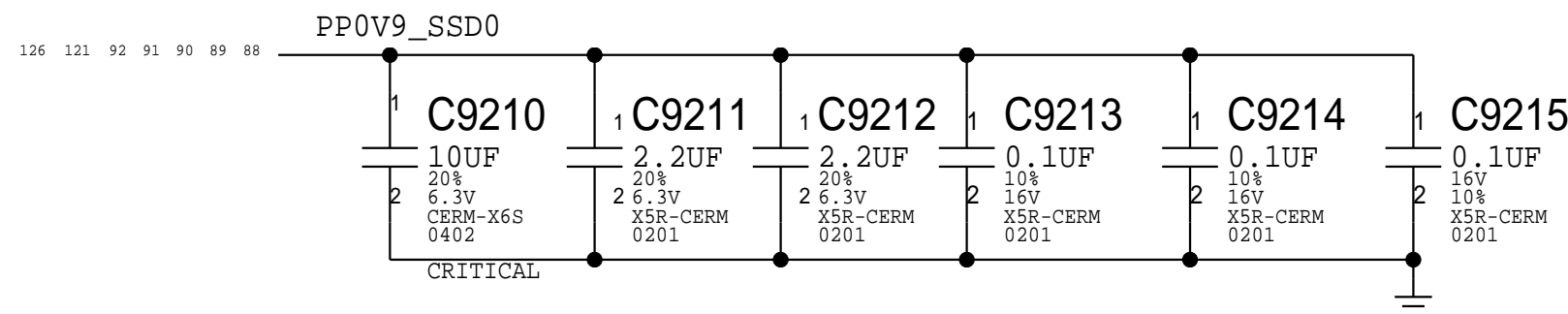


# S4E1

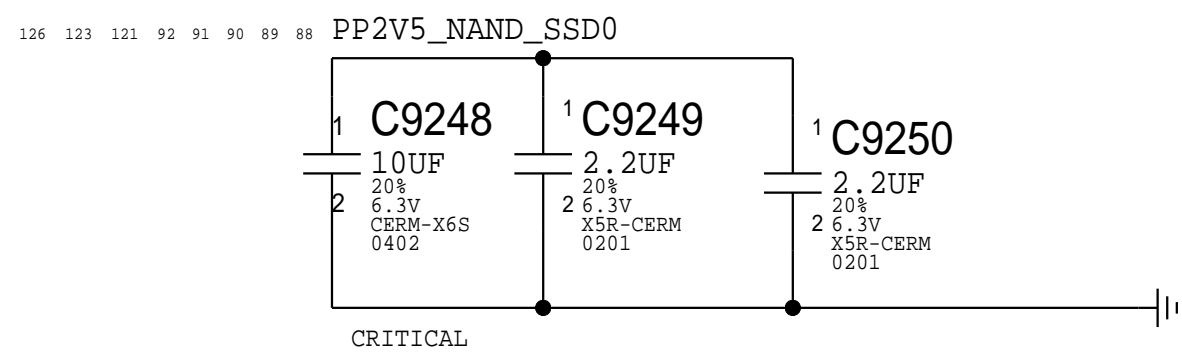
Vinafix.com



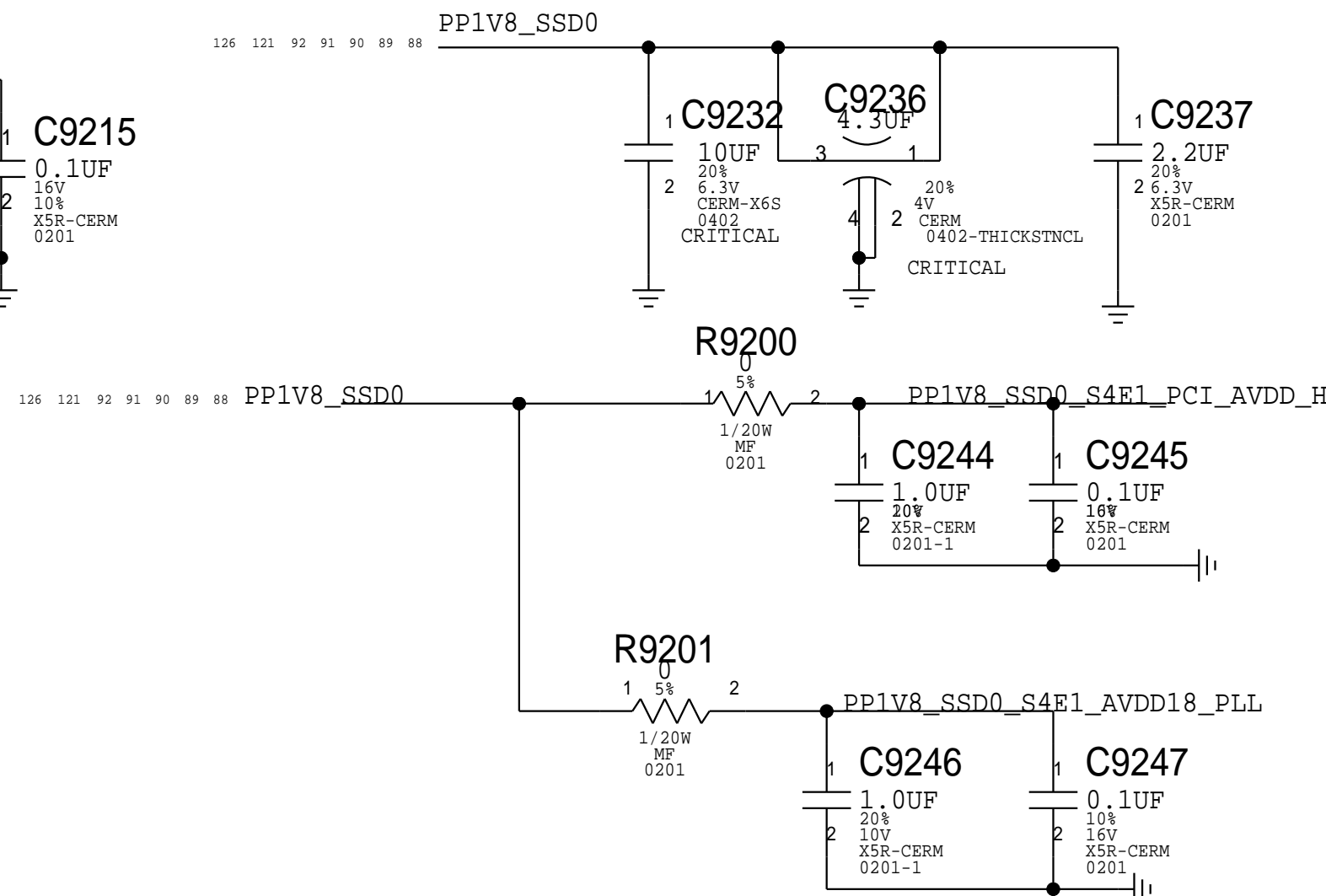
## S4E VDD



## VCC CAP



## S4E VDDIO



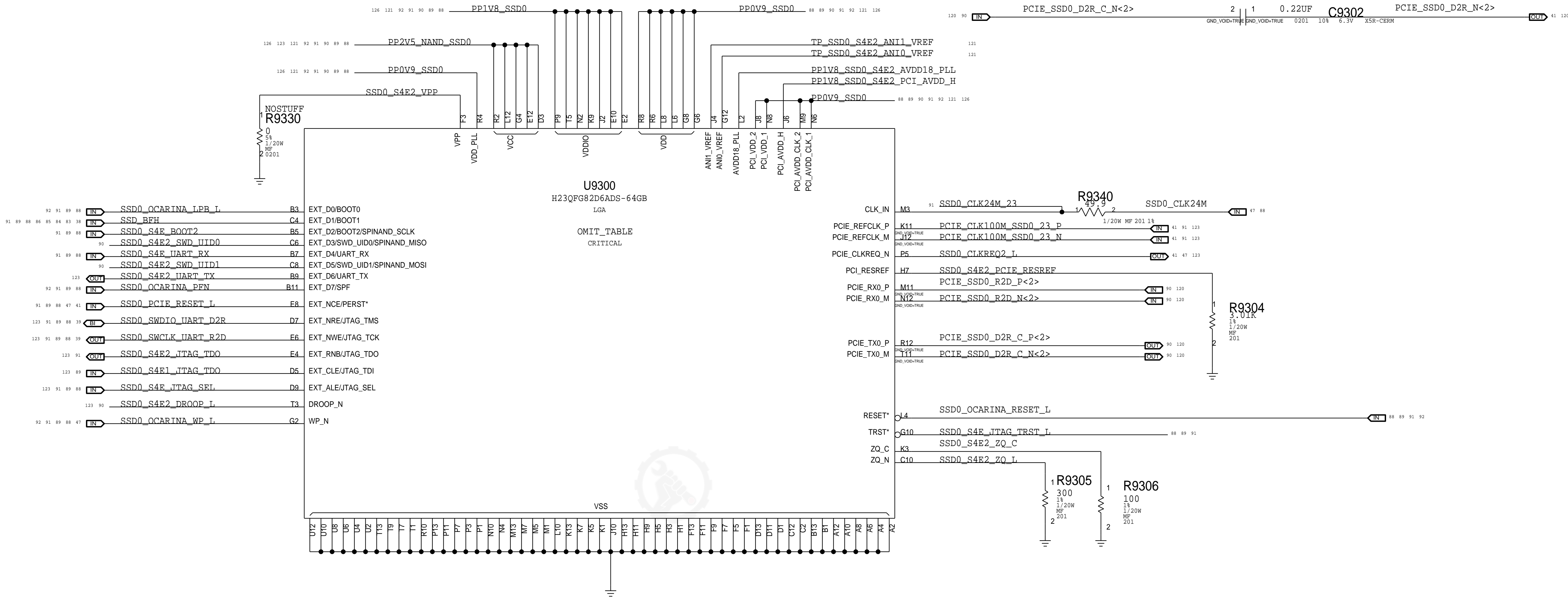
BOM\_COST\_GROUP=SDD

PAGE TITLE			DRAWING NUMBER			SIZE		
SSD0 S4E 1			051-04492			D		
NOTICE OF PROPRIETARY PROPERTY:			REVISION			2.15.0		
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:			PAGE			92 OF 200		
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE			SHEET			89 OF 135		
II NOT TO REPRODUCE OR PUBLISH IT								
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART								
IV ALL RIGHTS RESERVED								

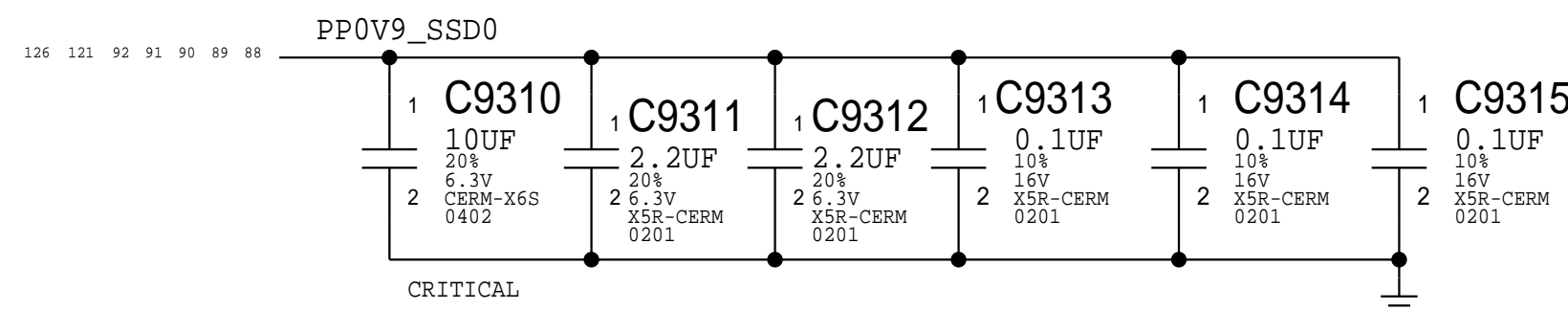


# S4E2

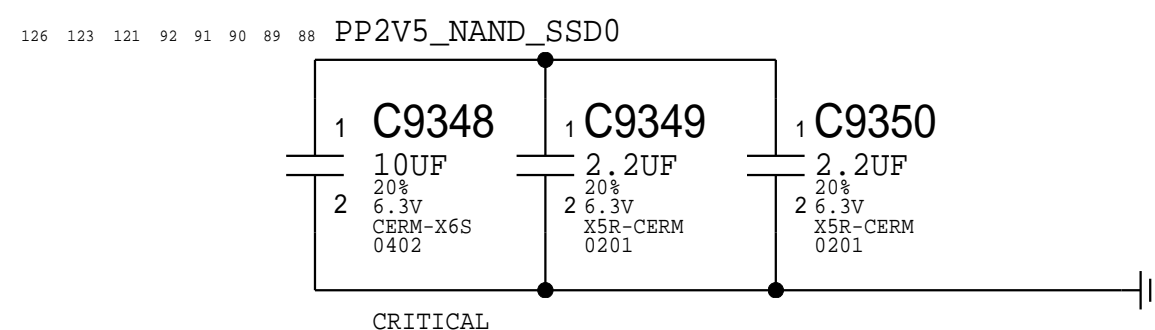
Vinafix.com



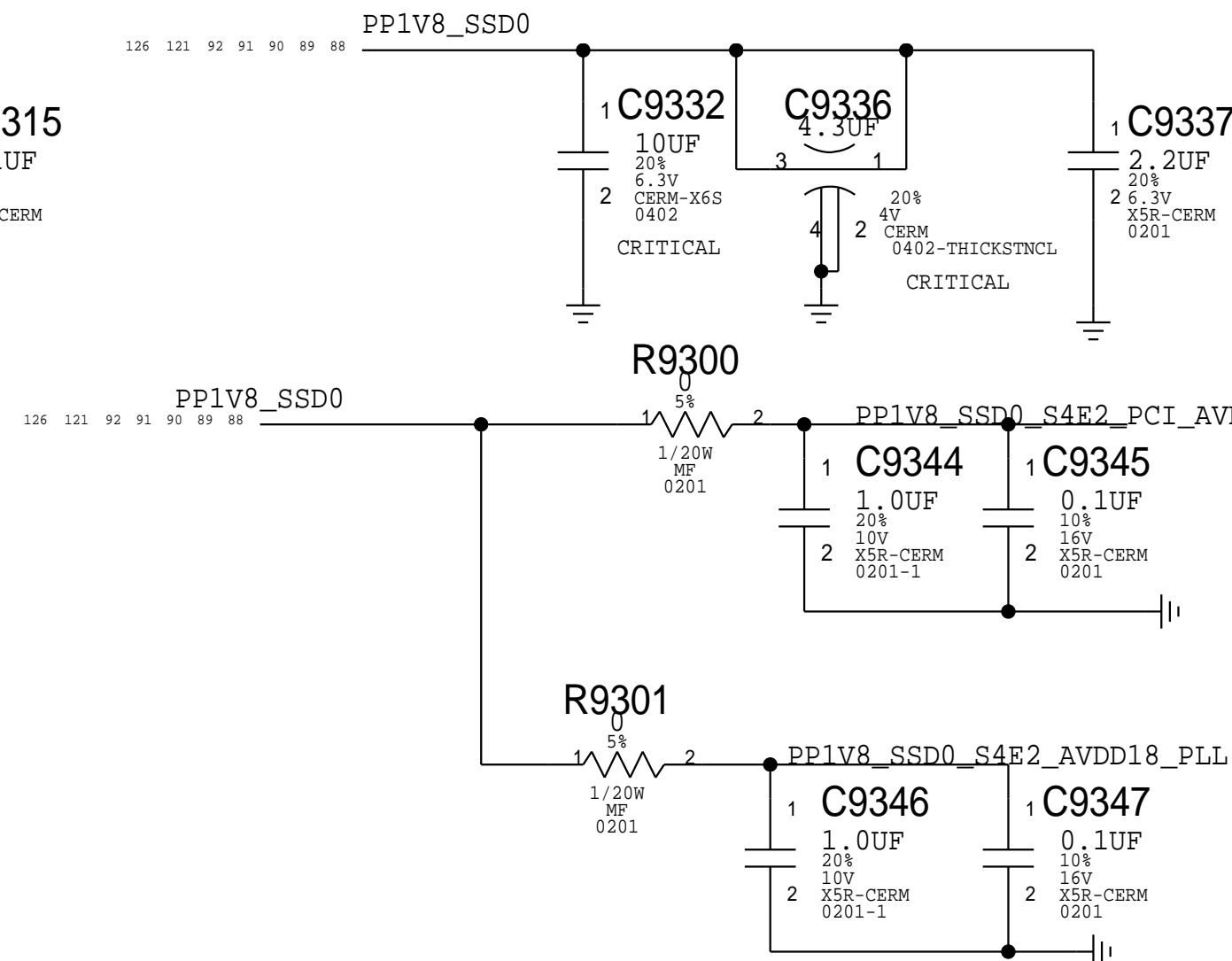
## S4E VDD



## VCC CAP



## S4E VDDIO

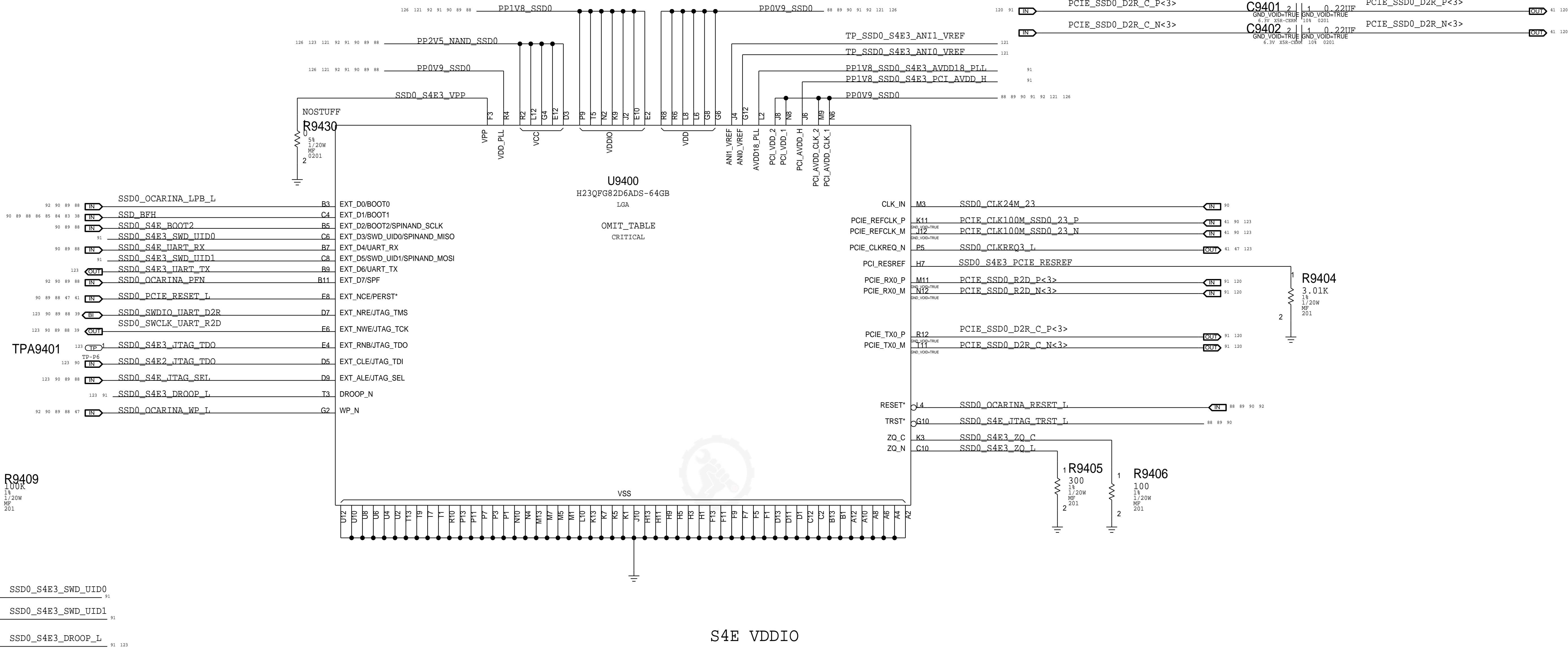


SYNC_MASTER=			SYNC_DATE=01/17/2019		
PAGE TITLE			SSD0 S4E 2		
			DRAWING NUMBER	051-04492	SIZE
			REVISION	2.15.0	D
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED			BRANCH		
			PAGE	93 OF 200	
			SHEET	90 OF 135	



# S4E3

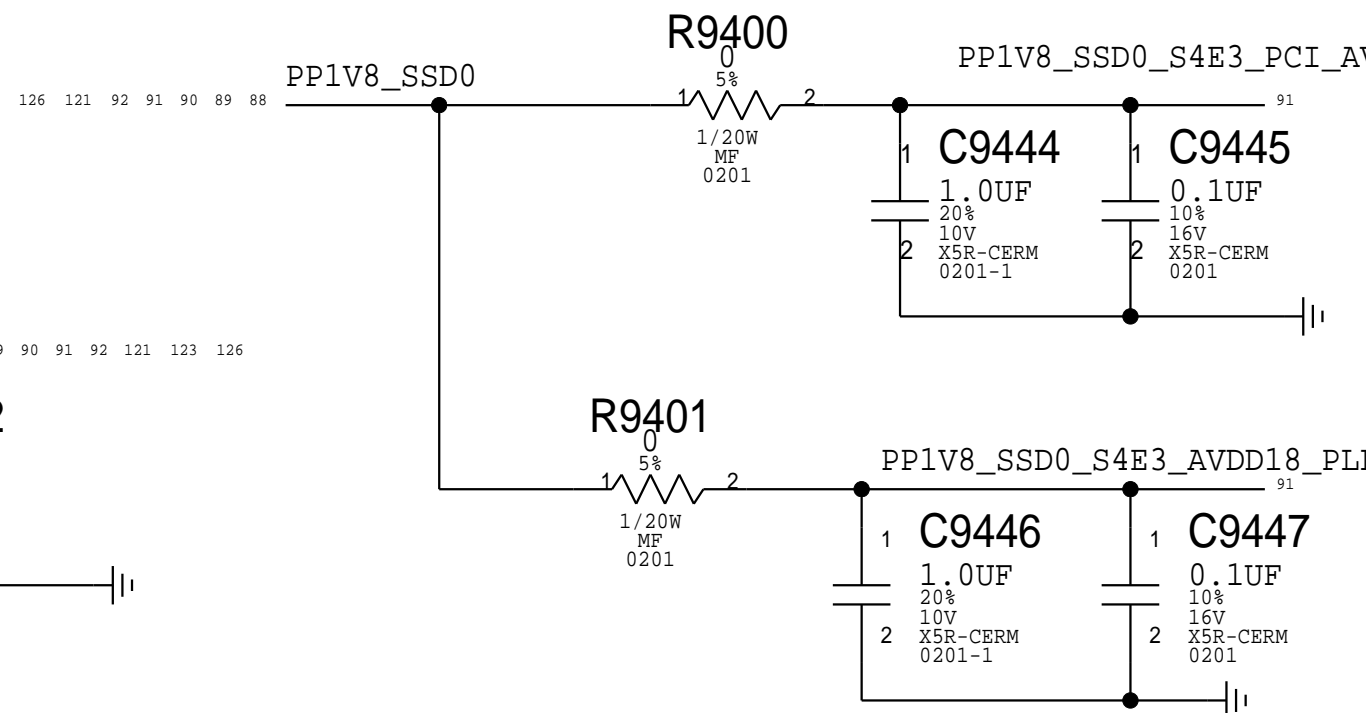
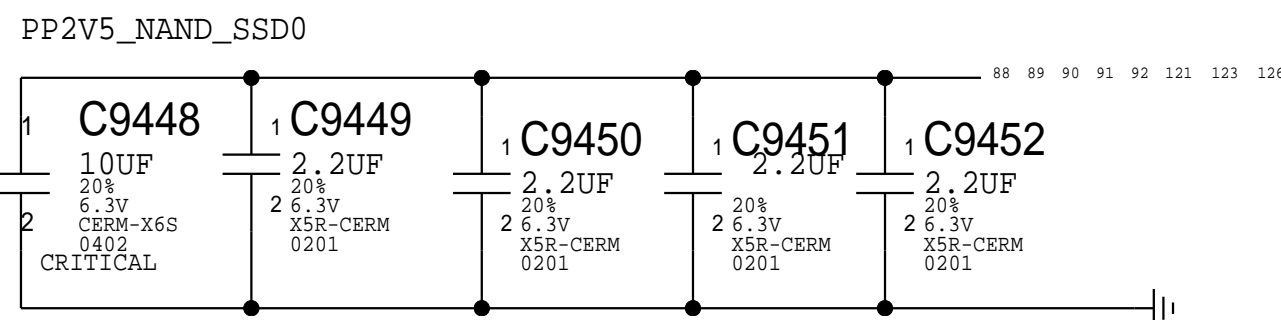
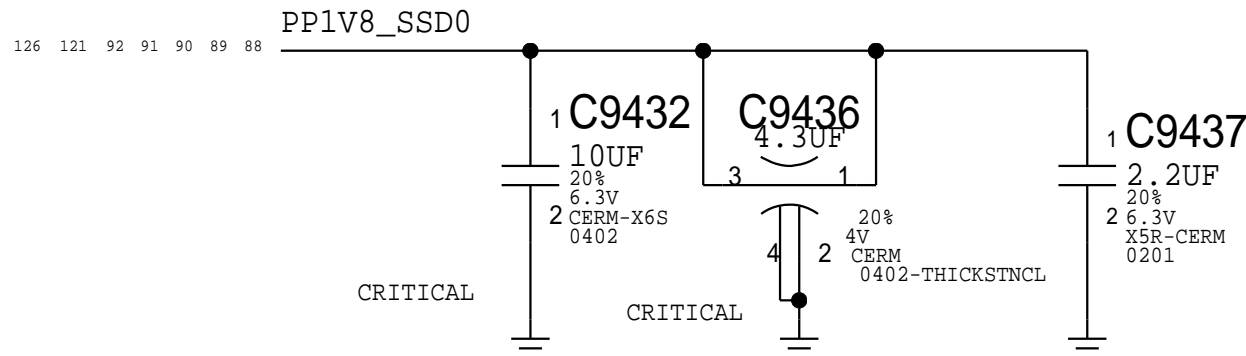
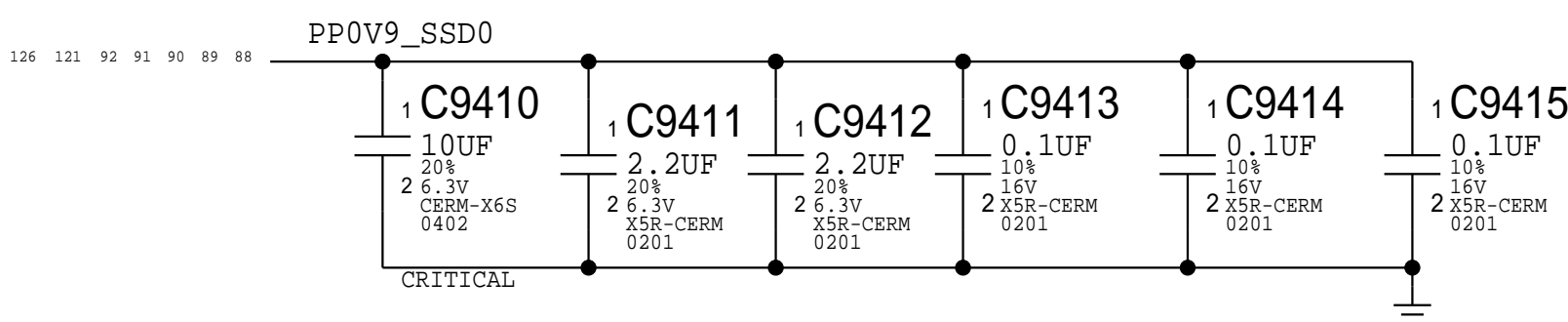
Vinafix.com



## S4E VDDIO

## S4E VDD

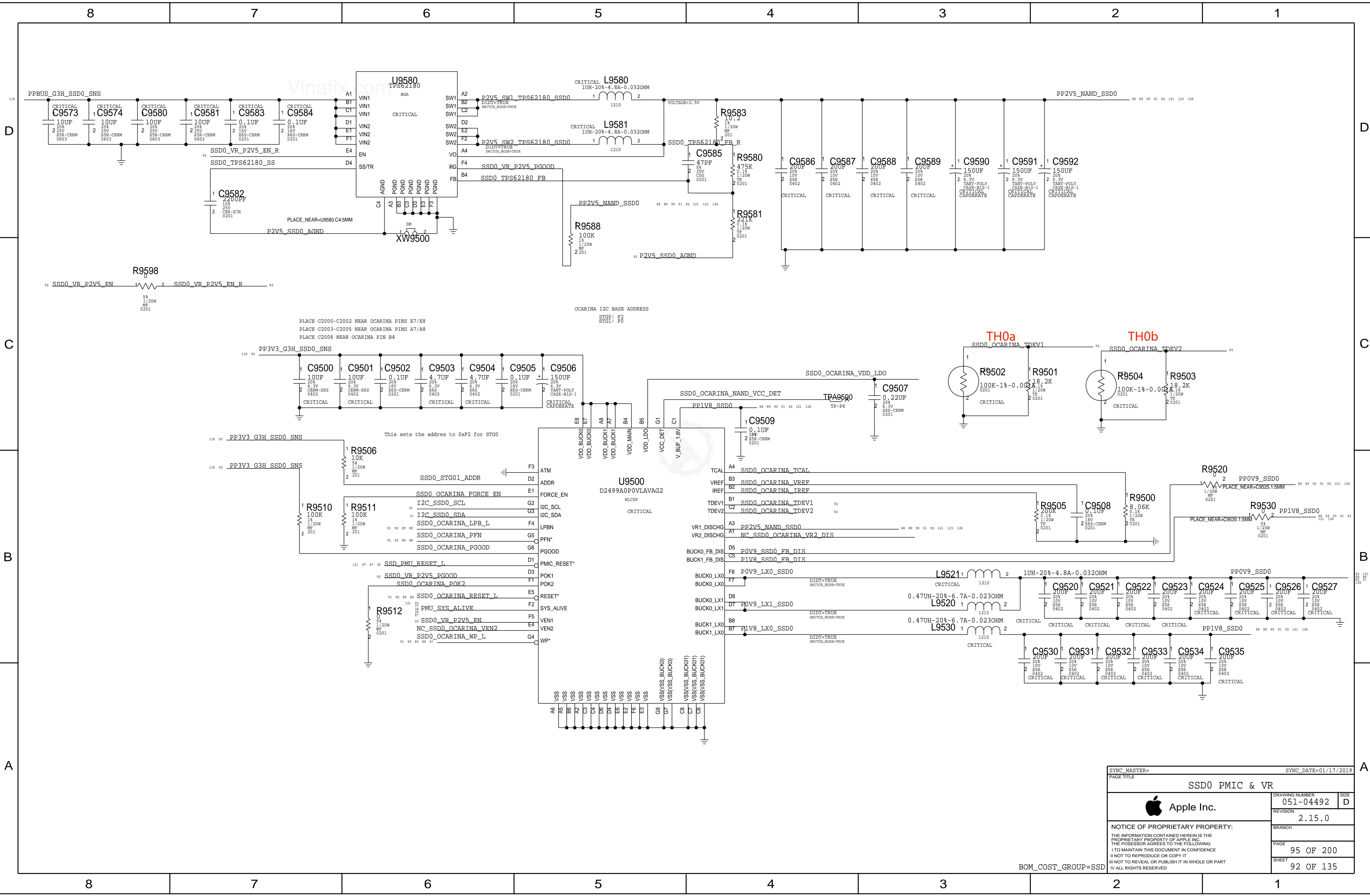
## VCC CAP



BOM\_COST\_GROUP=SDD

SYNC_MASTER=		SYNC_DATE=01/17/2019	
PAGE TITLE		SSD0 S4E 3	
	DRAWING NUMBER	051-04492	SIZE
	REVISION	2.15.0	D
	BRANCH		
	PAGE	94 OF 200	
NOTICE OF PROPRIETARY PROPERTY:		SHEET	
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		91 OF 135	
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE			
I NOT TO REPRODUCE OR COPY IT			
I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART			
I ALL RIGHTS RESERVED			

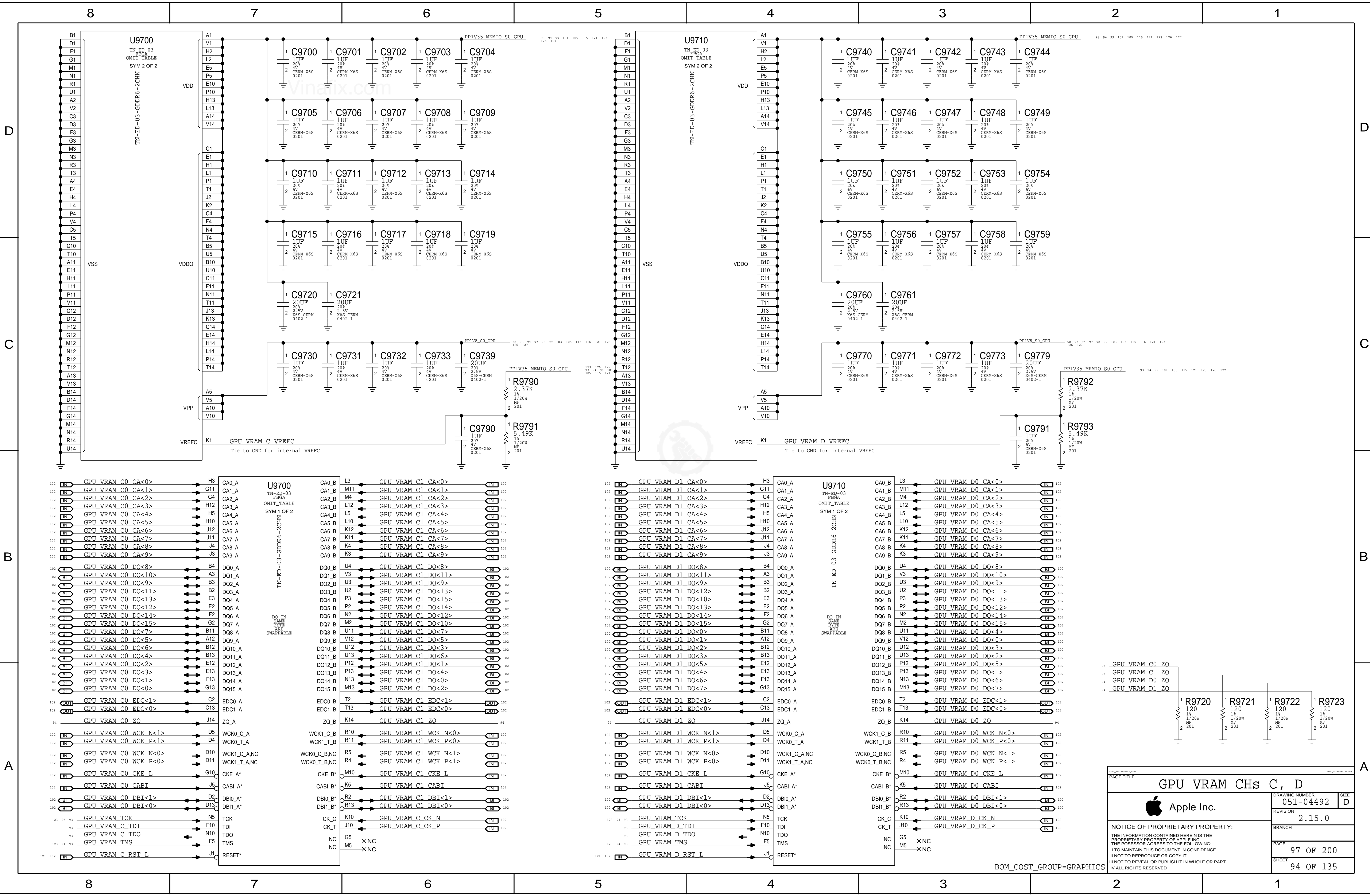










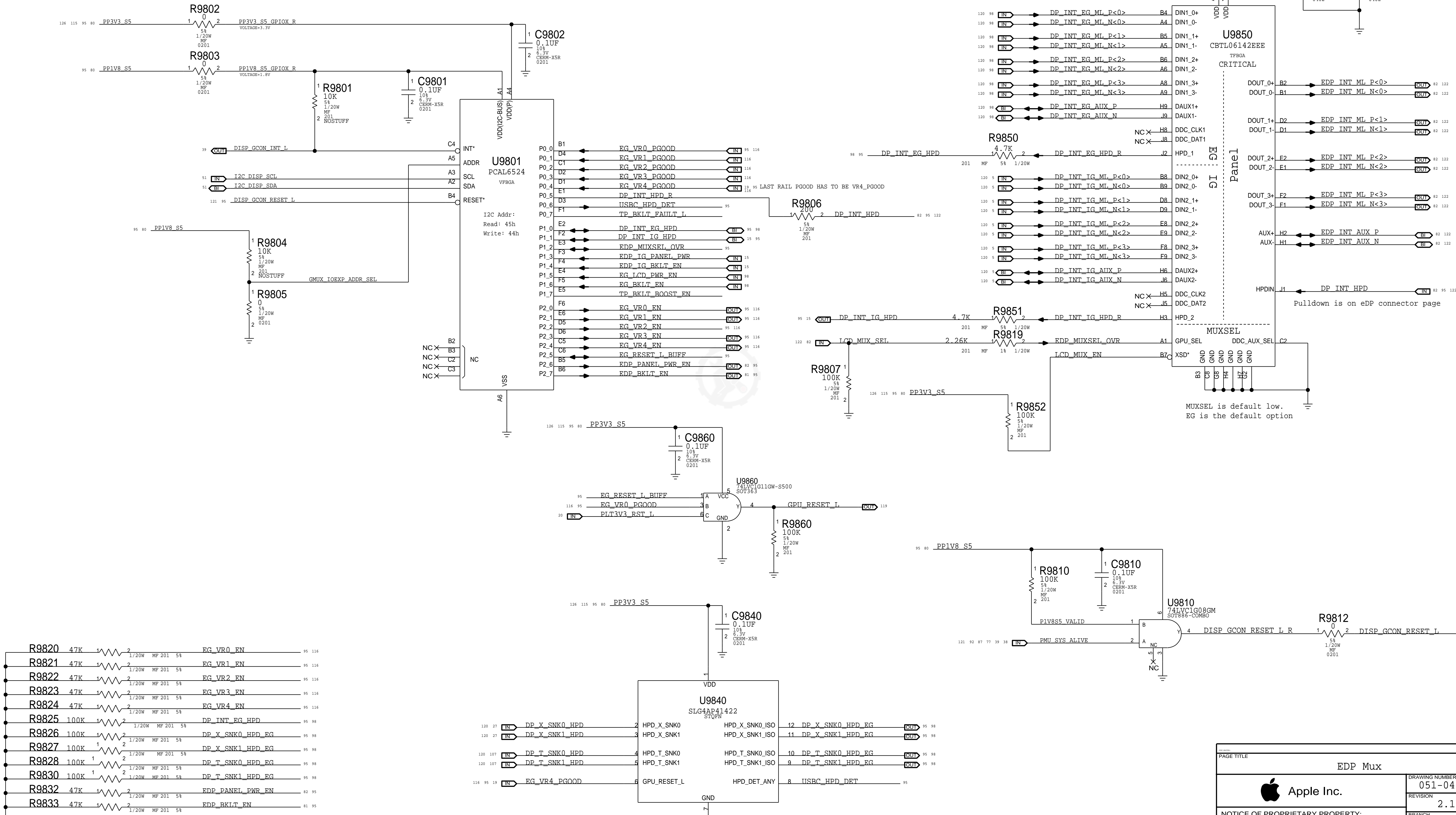





GMUX GPIO Expander

Vinafix.com

DP 2:1 Analog MUX



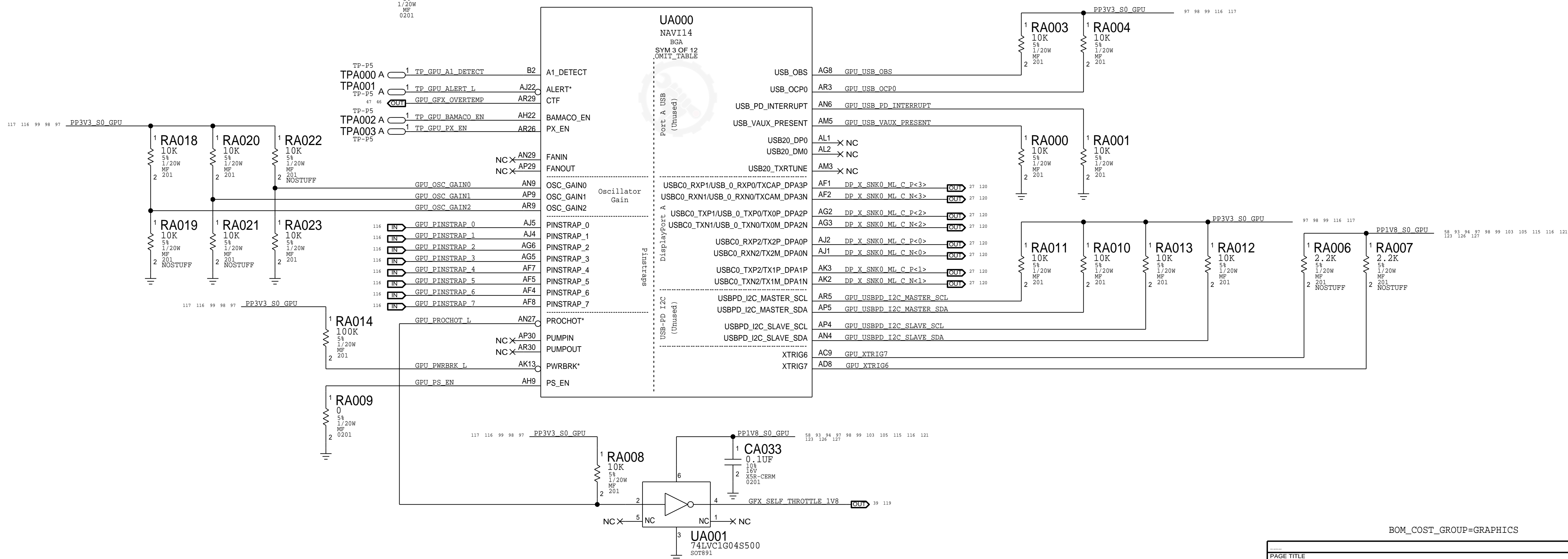
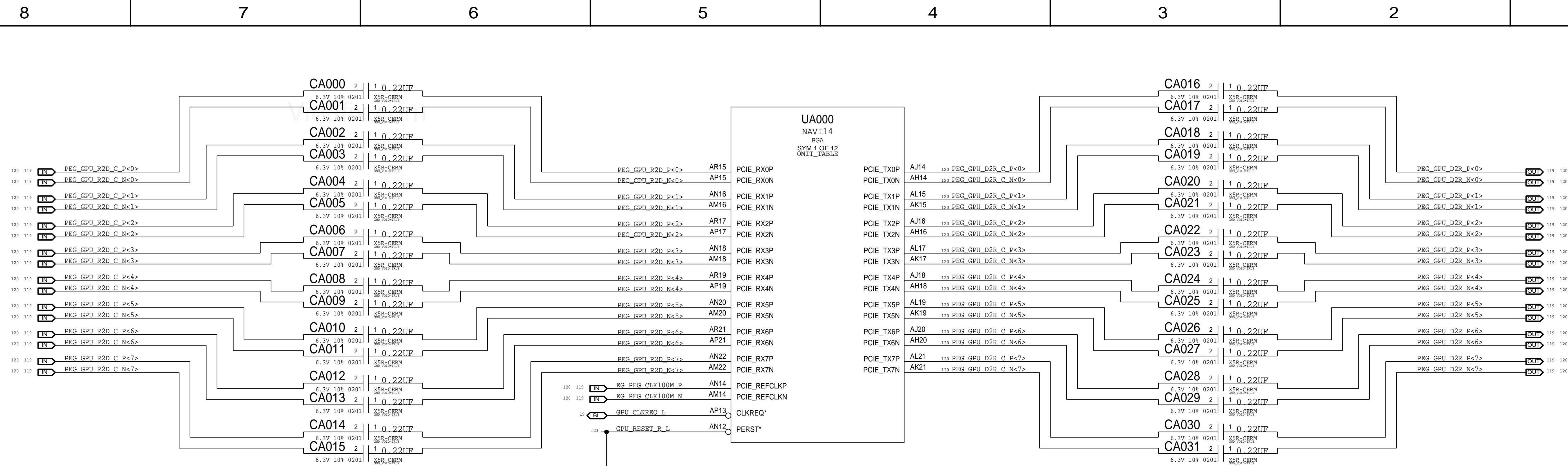
PAGE TITLE		
EDP Mux		
 Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	
	PAGE	98 OF 200
	SHEET	95 OF 135


BOM\_COST\_GROUP=GRAPHICS



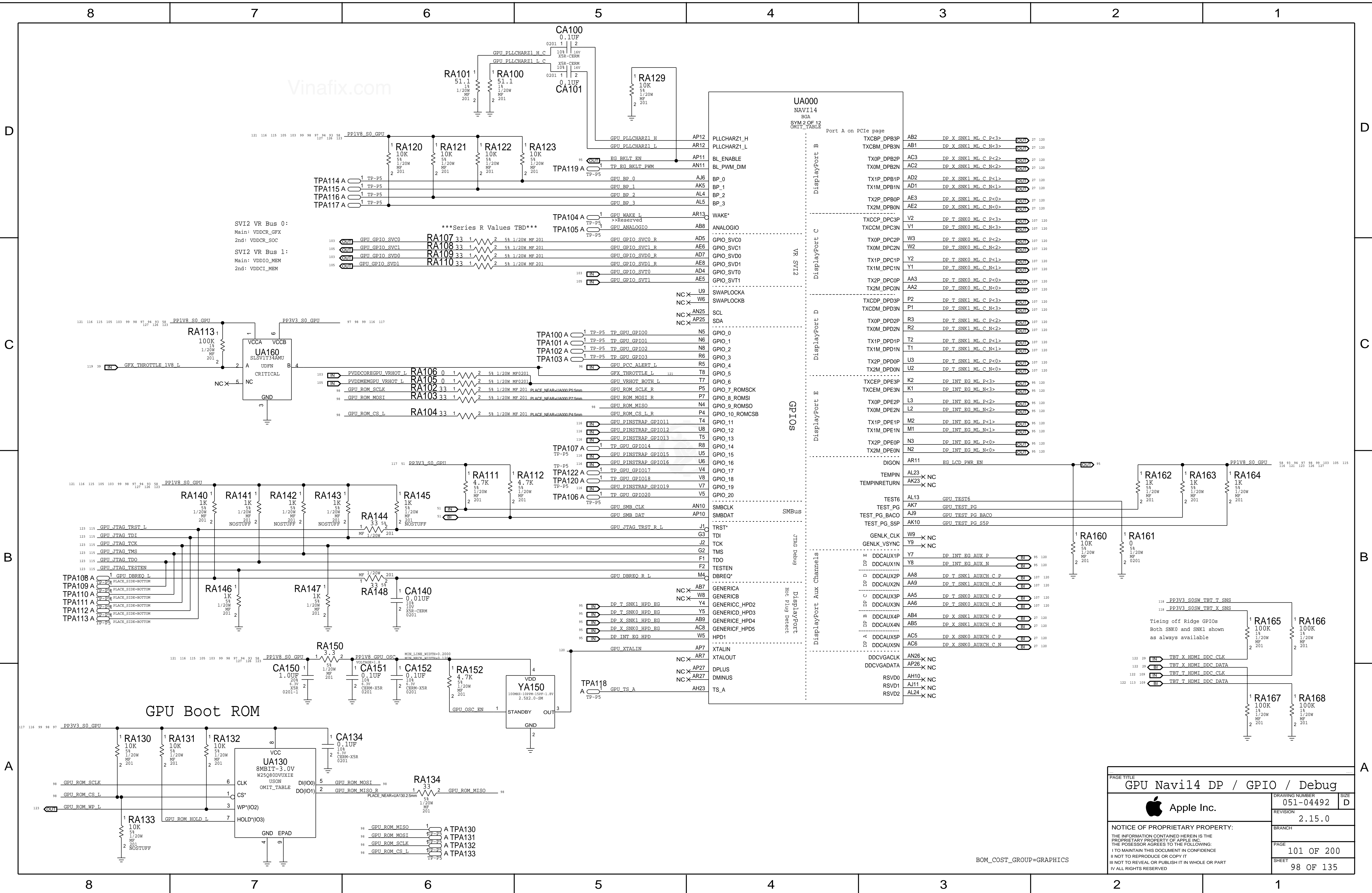




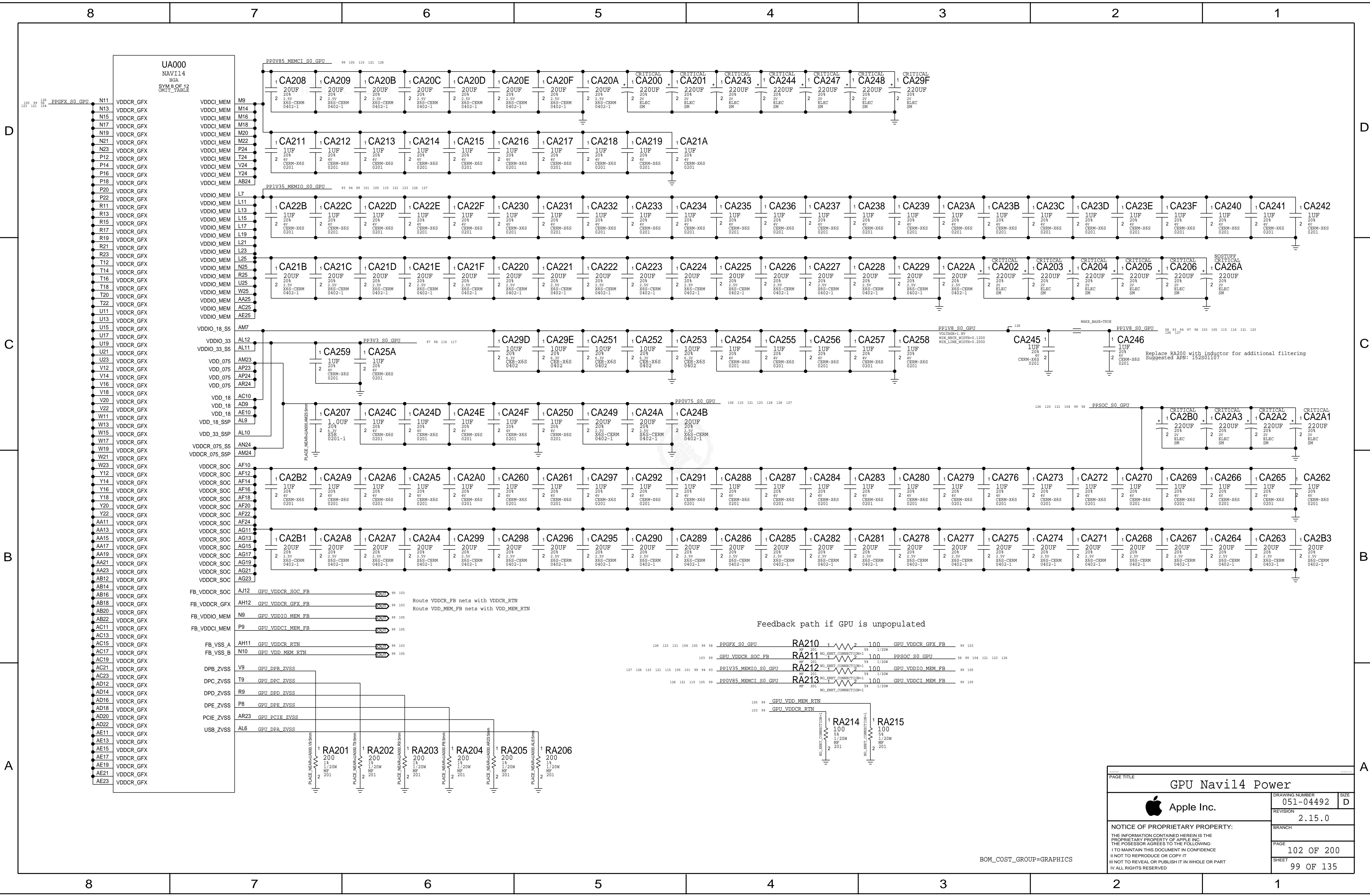


BOM_COST_GROUP=GRAPHICS					
PAGE TITLE GPU Navil4 PCIe / DP A / Misc					
 Apple Inc.				DRAWING NUMBER 051-04492	SIZE D
NOTICE OF PROPRIETARY PROPERTY:  THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED				REVISION 2.15.0	
				BRANCH	
				PAGE	100 OF 200
				SHEET	97 OF 135

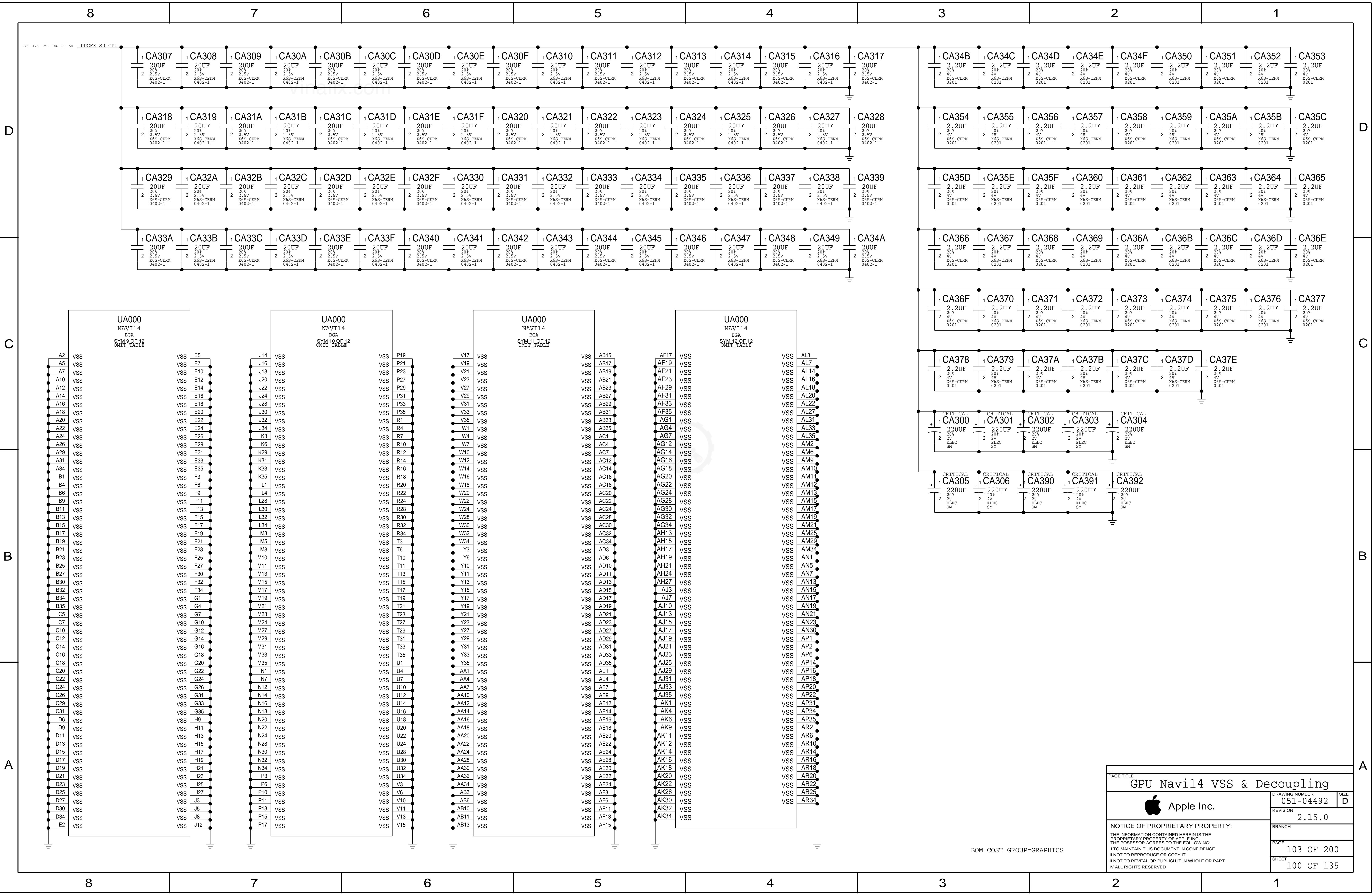









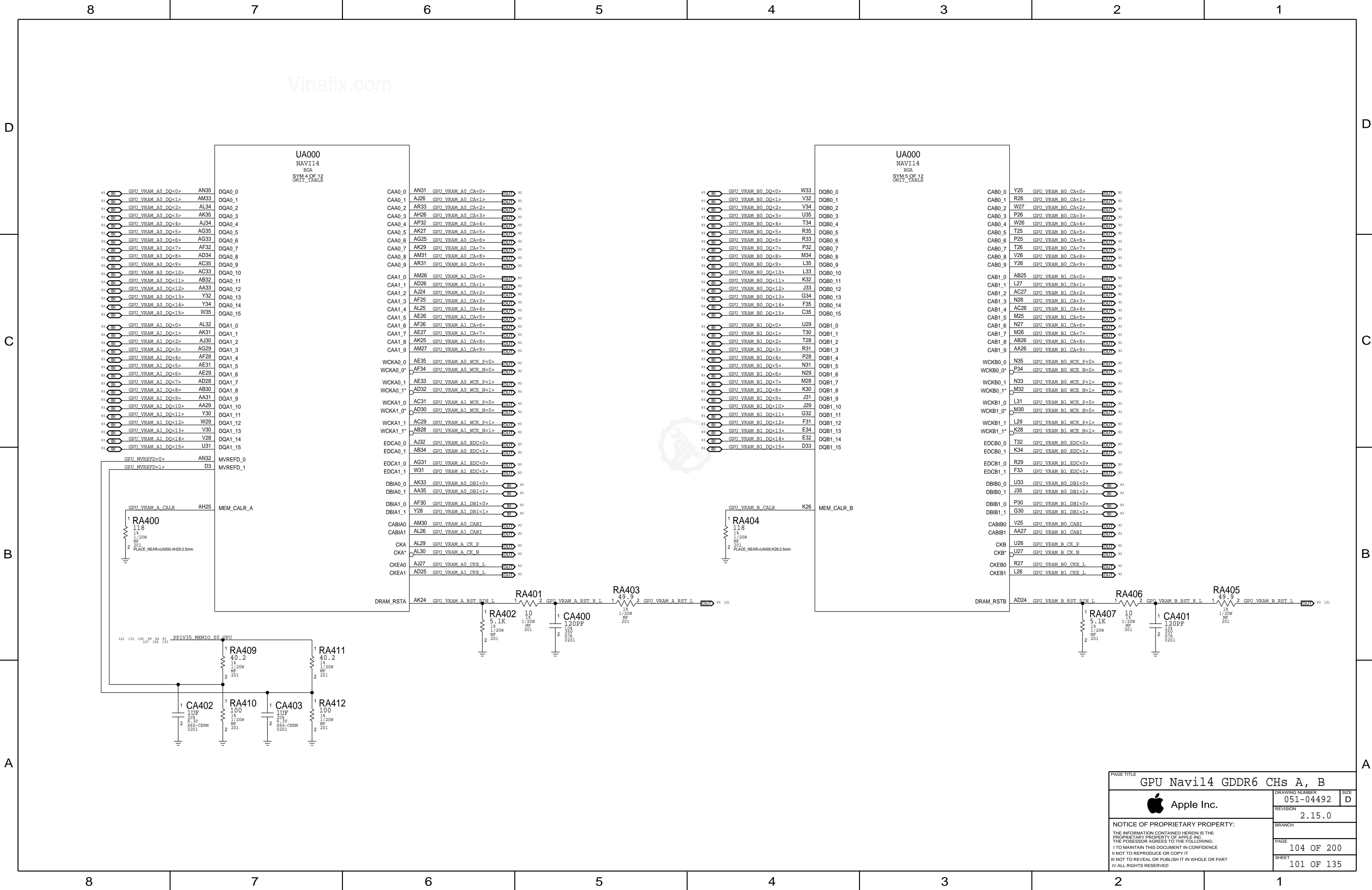




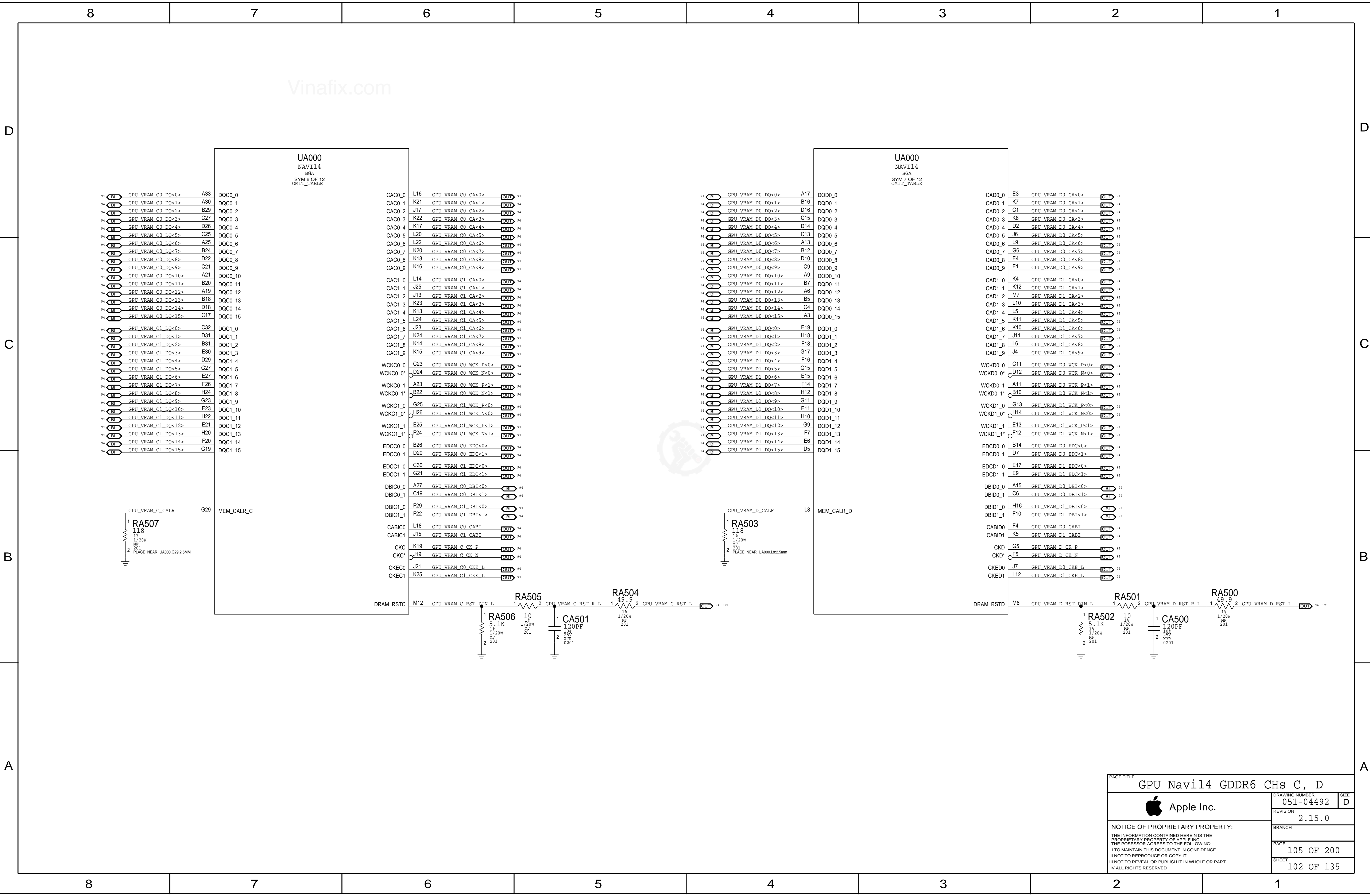
BOM\_COST\_GROUP=GRAPHICS

PAGE TITLE		
GPU Navi14 VSS & Decoupling		
 Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
	BRANCH	
	PAGE	103 OF 200
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IN ALL RIGHTS RESERVED		SHEET 100 OF 135





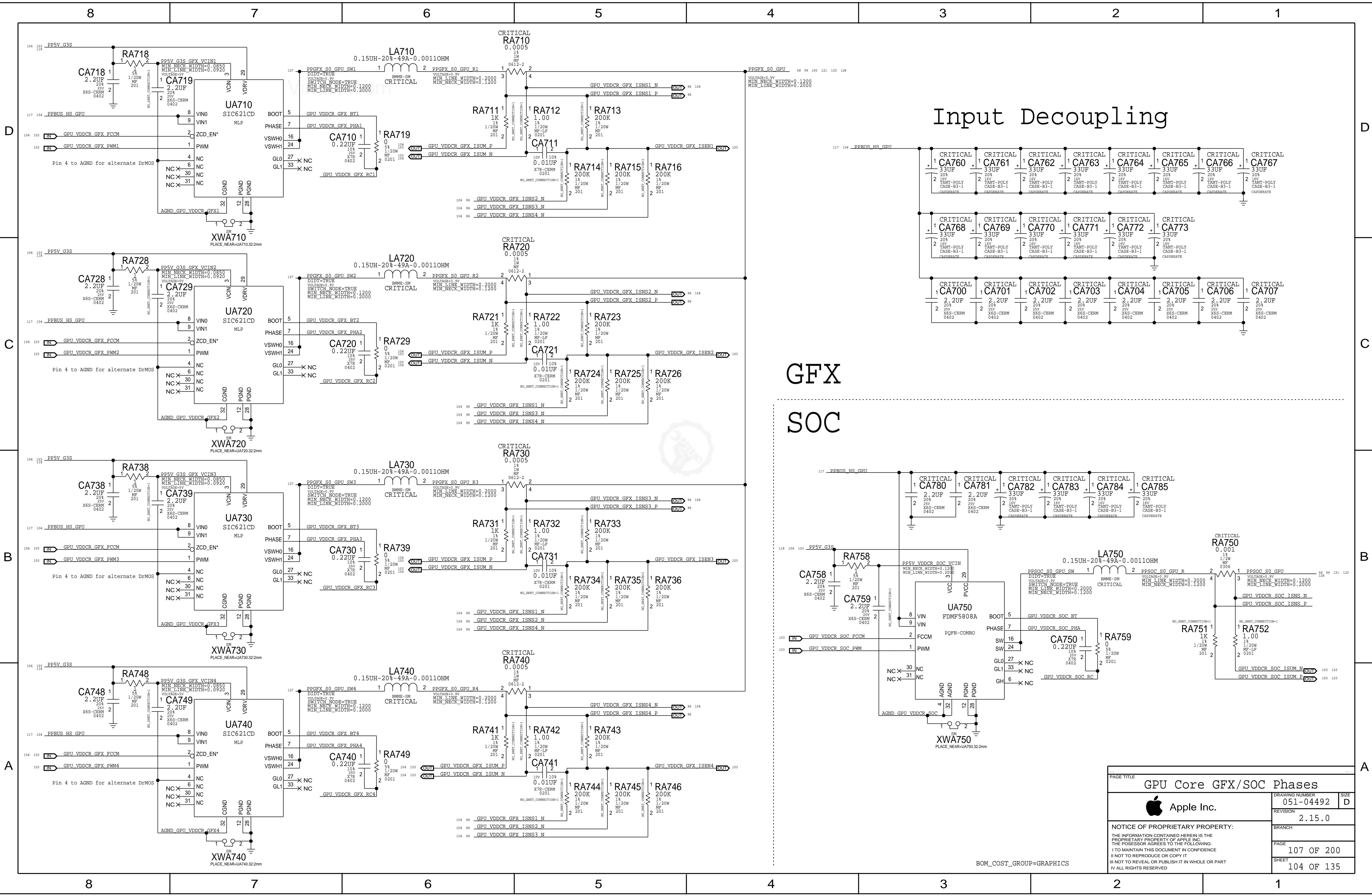












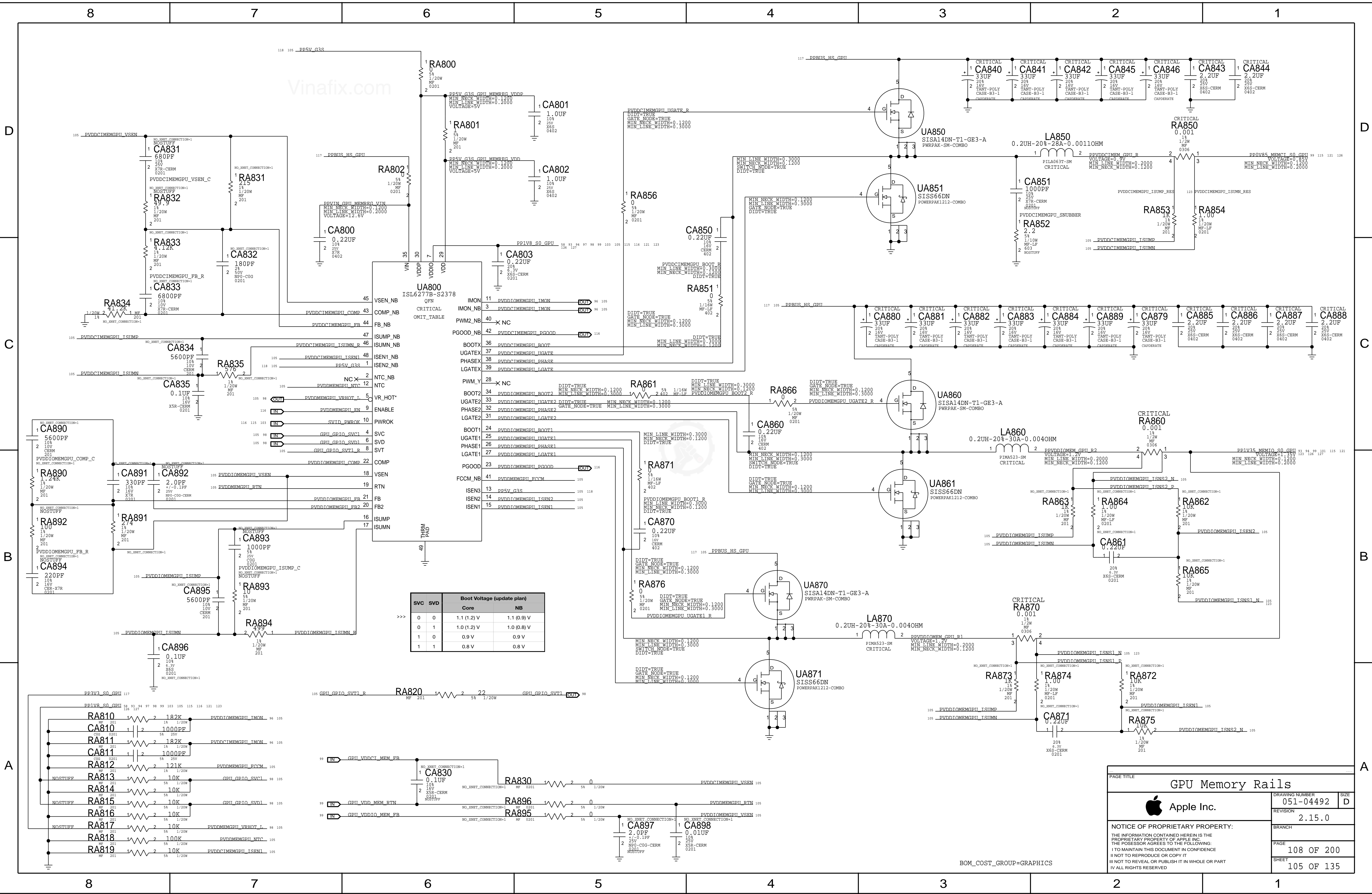
# Input Decoupling

# GFX SOC

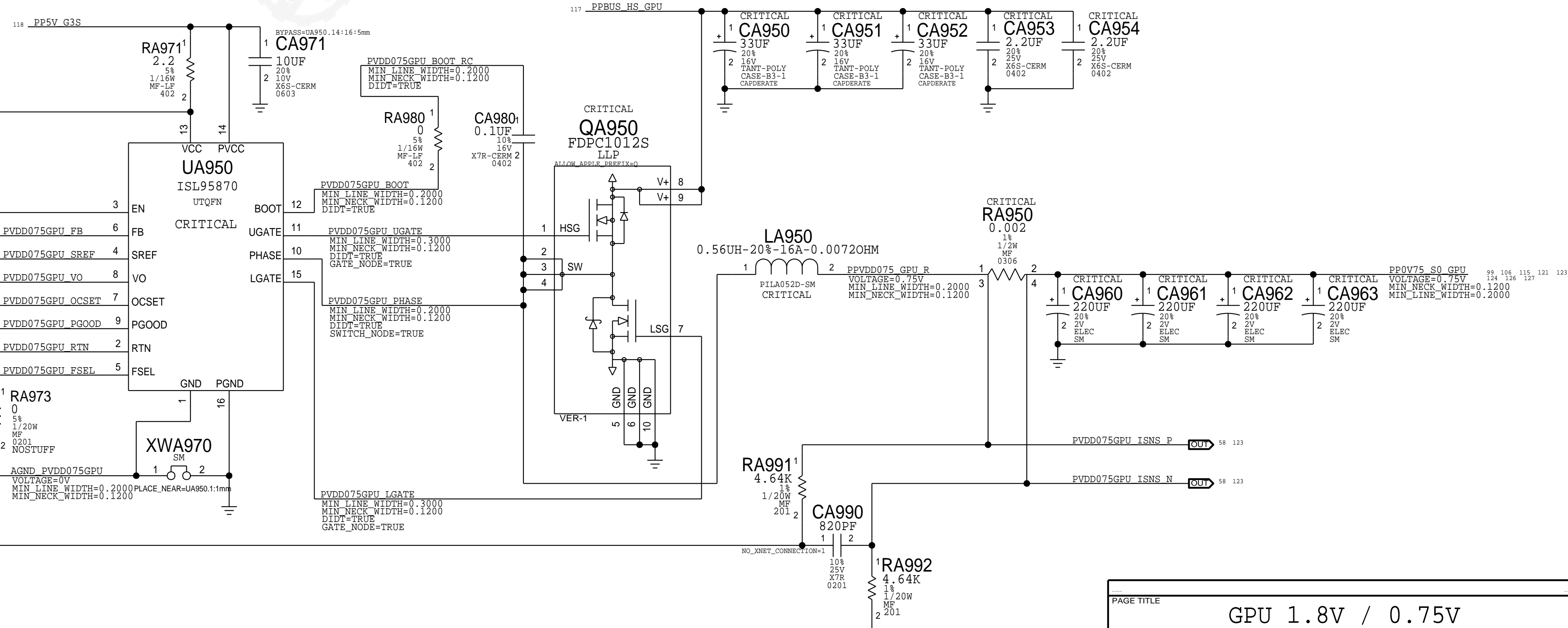
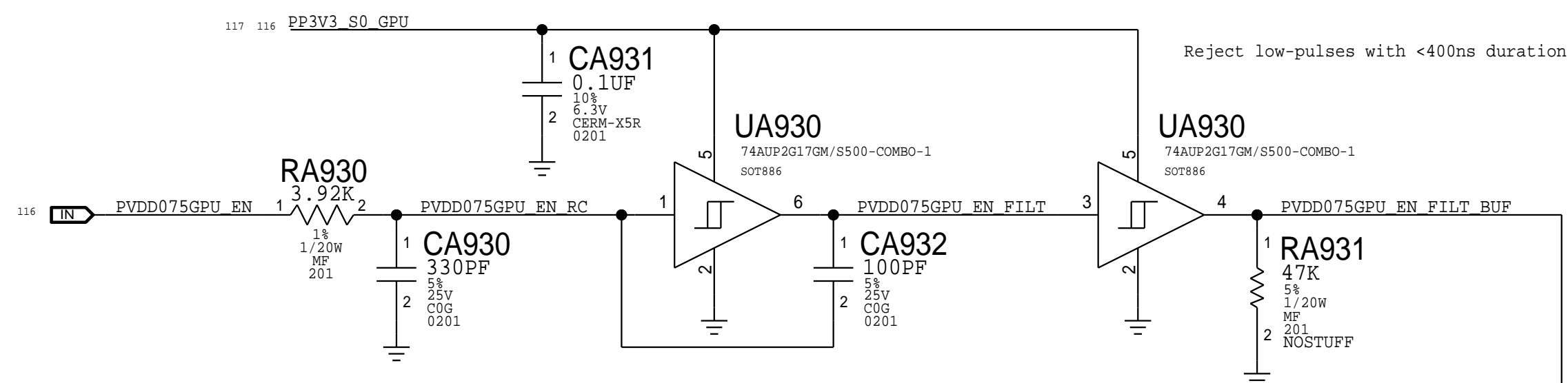
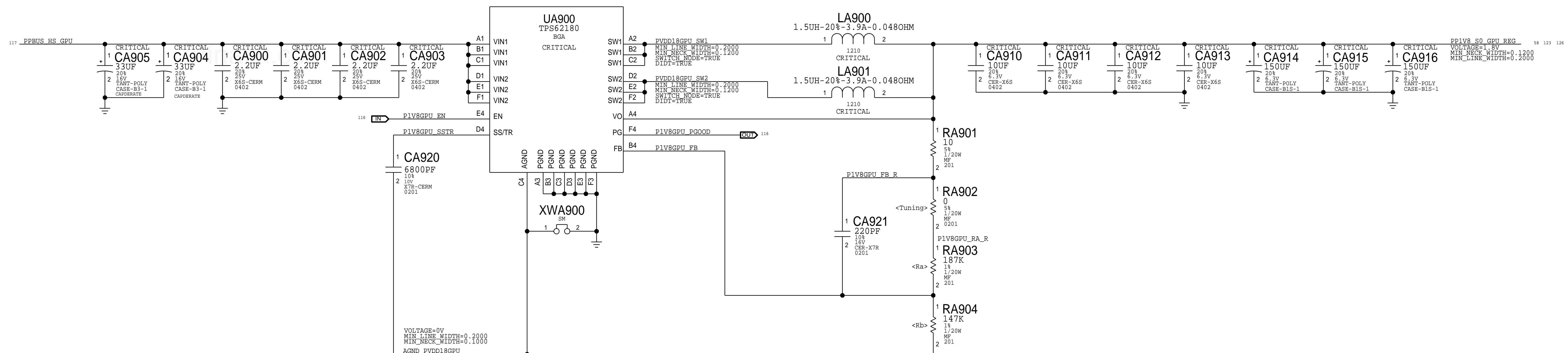
PAGE TITLE		
GPU Core GFX/SOC Phases		
	DRAWING NUMBER	051-04492
	REVISION	2.15.0
NOTICE OF PROPRIETARY PROPERTY:		BRANCH
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		PAGE
1 TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		107 OF 200
2 NOT TO REPRODUCE OR COPY IT		SHEET
3 IN NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		104 OF 135
4 ALL RIGHTS RESERVED		


BOM\_COST\_GROUP=GRAPHICS





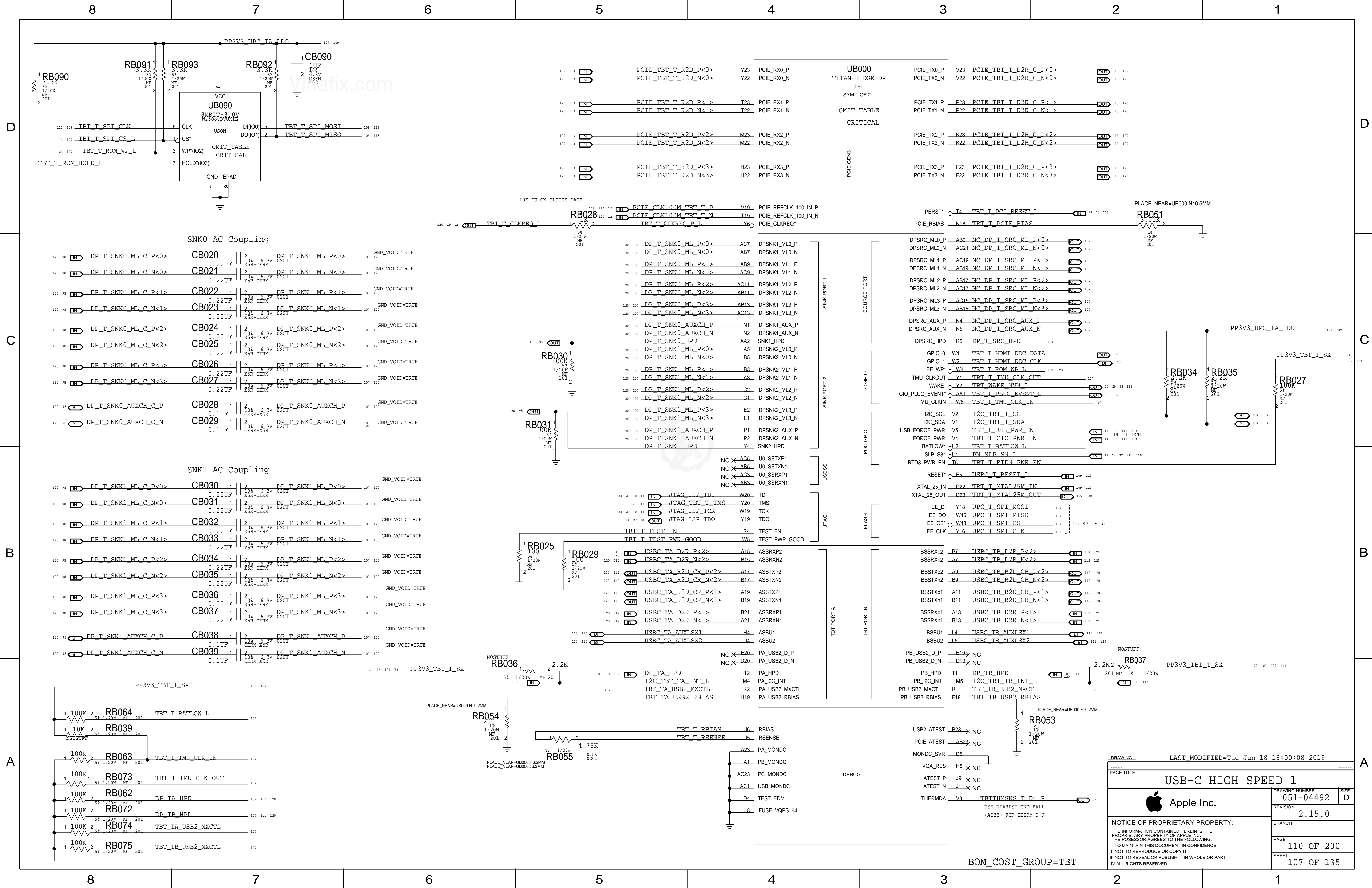




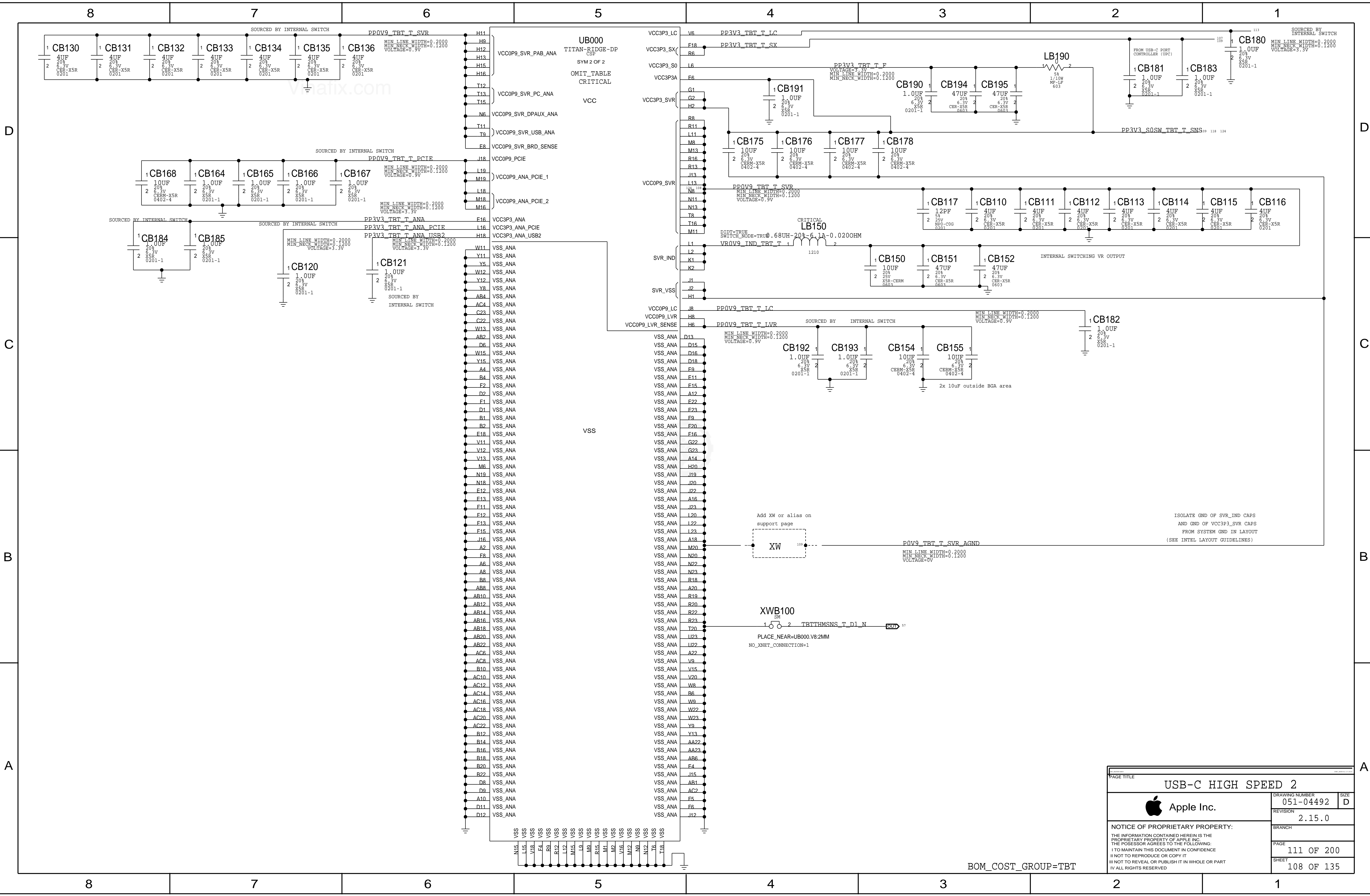
PAGE TITLE		GPU 1.8V / 0.75V	
 Apple Inc.	DRAWING NUMBER	051-04492	SIZE
	REVISION	2.15.0	
NOTICE OF PROPRIETARY PROPERTY:		BRANCH	
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		PAGE	109 OF 200
		SHEET	106 OF 135


BOM\_COST\_GROUP=GRAPHICS










PAGE TITLE		
USB-C HIGH SPEED 2		
 Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	BRANCH	
	PAGE	111 OF 200
	SHEET	108 OF 135










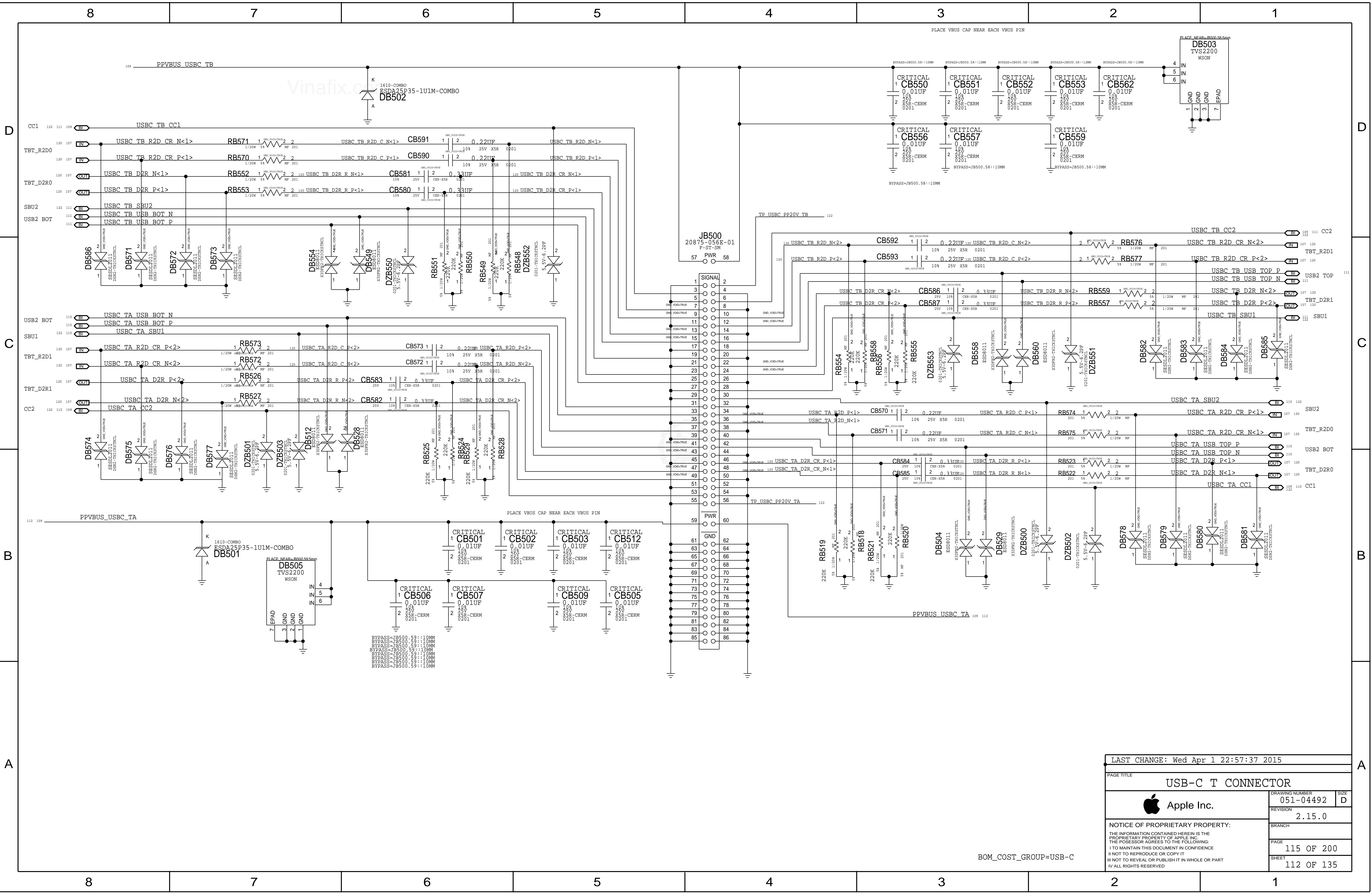
PAGE TITLE			
USB-C PORT CONTROLLER TA			
 Apple Inc.	DRAWING NUMBER		SIZE
	051-04492		D
NOTICE OF PROPRIETARY PROPERTY:  THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED	REVISION		
			2.15.0
	BRANCH		
	PAGE		113 OF 200
	SHEET		110 OF 135






PAGE TITLE			
USB-C PORT CONTROLLER TB			
 Apple Inc.	DRAWING NUMBER		SIZE
	051-04492		D
	REVISION		
NOTICE OF PROPRIETARY PROPERTY:		2.15.0	
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		BRANCH	
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE		PAGE	
II NOT TO REPRODUCE OR COPY IT		114 OF 200	
III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART		SHEET	
IV ALL RIGHTS RESERVED		111 OF 135	



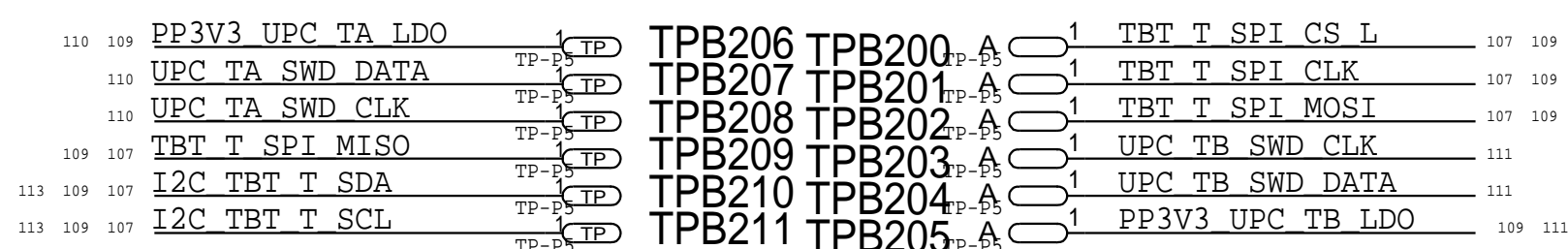


LAST CHANGE: Wed Apr 1 22:57:37 2015		
PAGE TITLE		
USB-C T CONNECTOR		
 Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
	BRANCH	
	PAGE	115 OF 200
	SHEET	112 OF 135
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART I ALL RIGHTS RESERVED		

BOM\_COST\_GROUP=USB-C



## AARDVARKANOID CONN

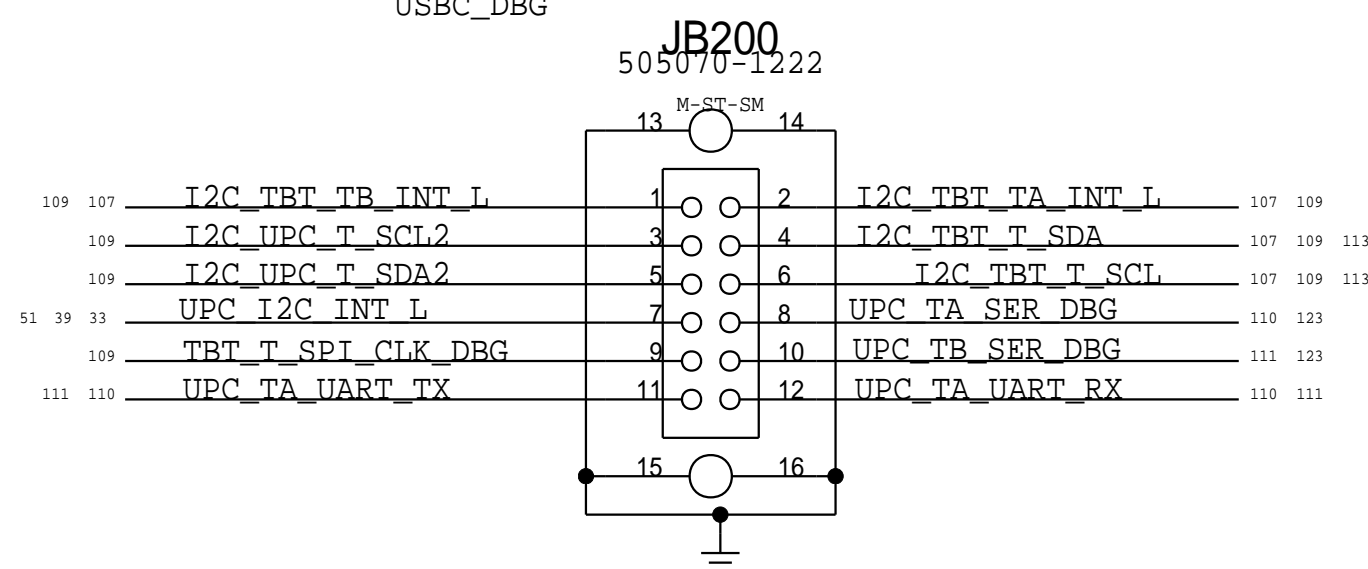


## ACE ARKANOID CONN

```

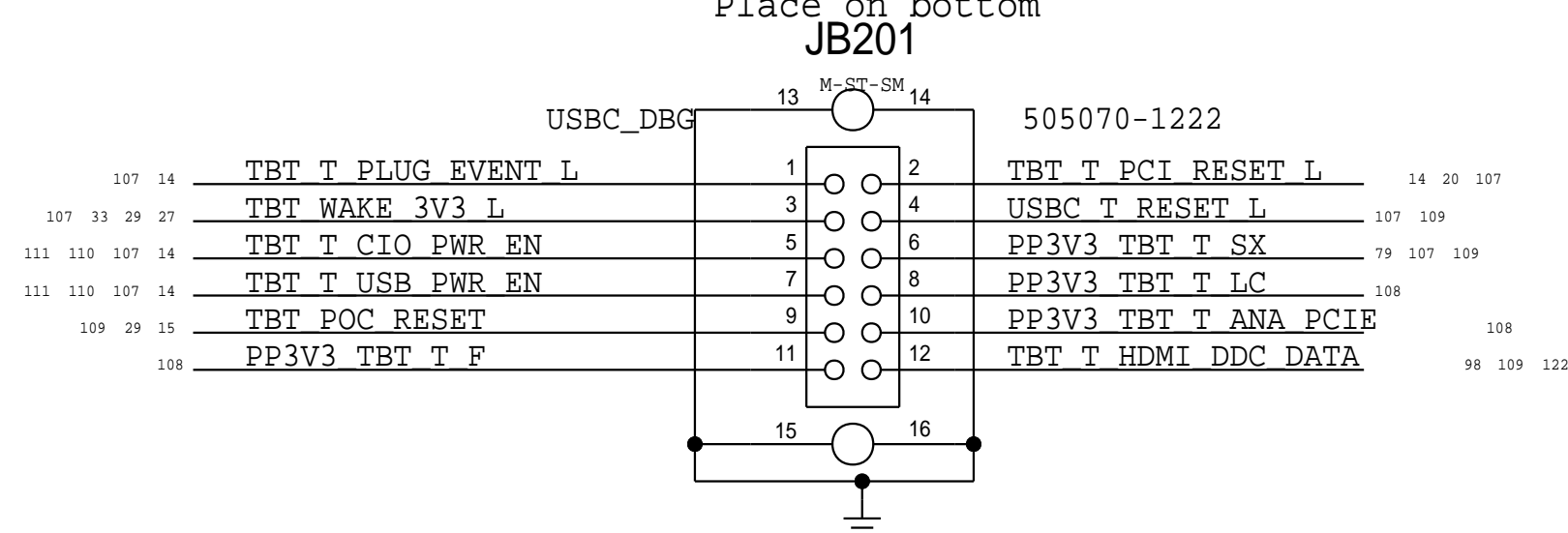
Place on bottom
USBC_DBG

```



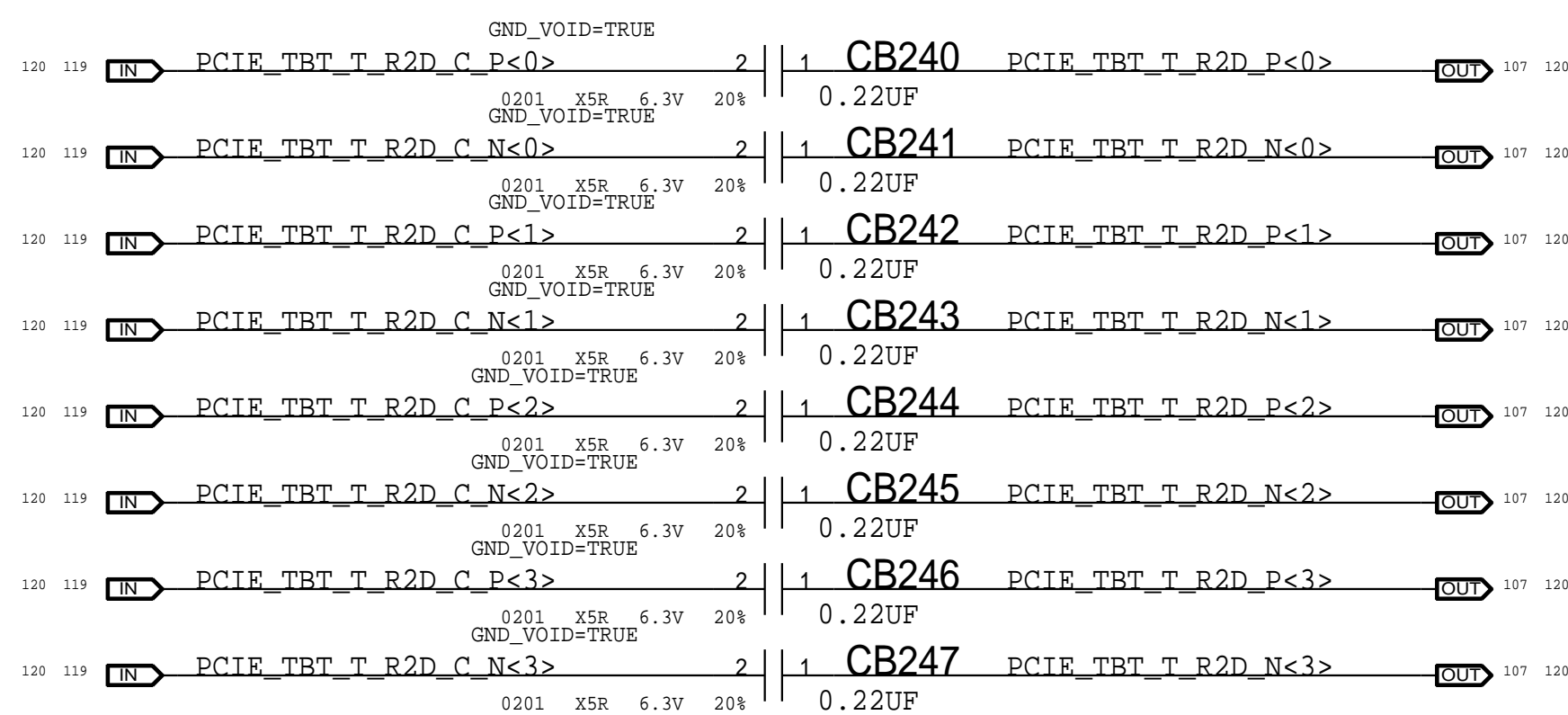
## RIDGE ARKANOID CONN

Place on bottom

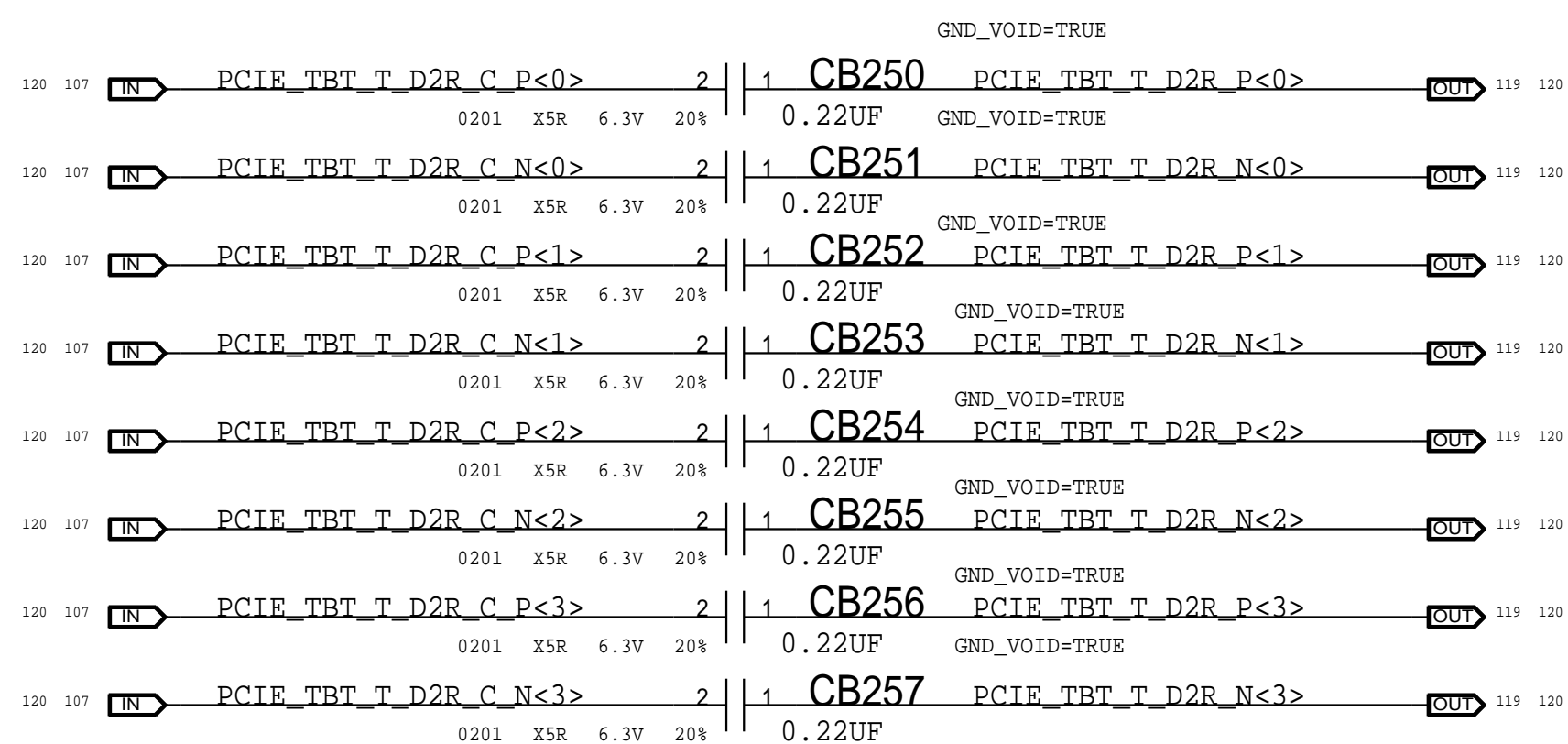



## Ridge PCIe Caps

## R2D



## D2R



DESIGN: X1032/MLB_P4BP		
LAST CHANGE: Fri Jan 6 16:01:21 2017		
PAGE TITLE		
USBC T Connector Support		
 Apple Inc.	DRAWING NUMBER 051-04492	
	SIZE D	
	REVISION 2.15.0	
NOTICE OF PROPRIETARY PROPERTY:		BRANCH
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART I V ALL RIGHTS RESERVED		PAGE 116 OF 200
		SHEET 113 OF 135







D

C

B

A

D

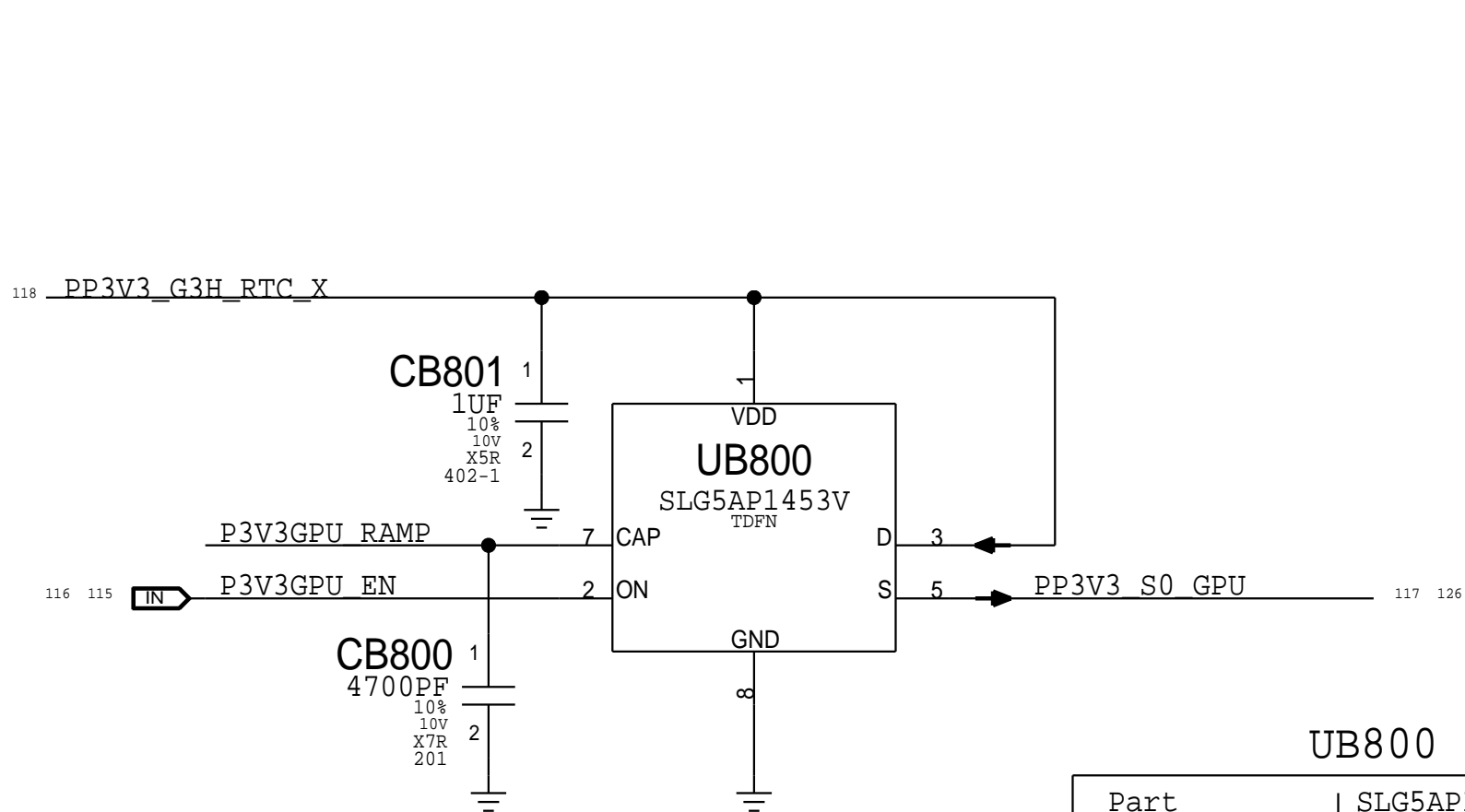
C

B

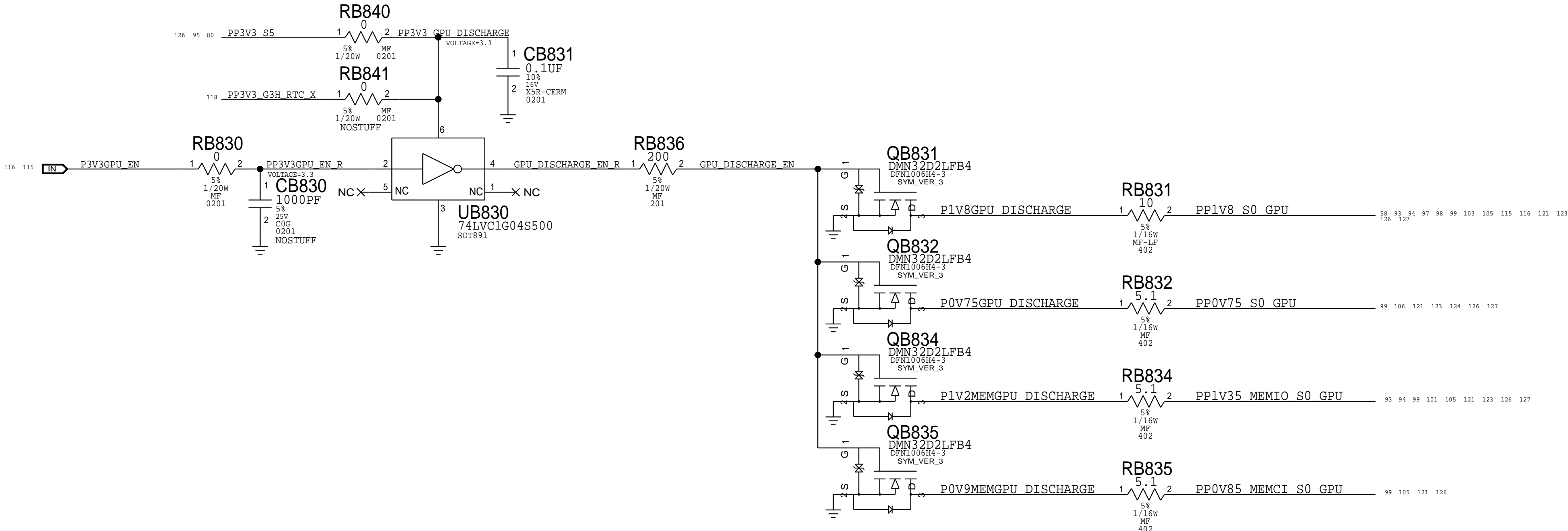
A

Vinafix.com

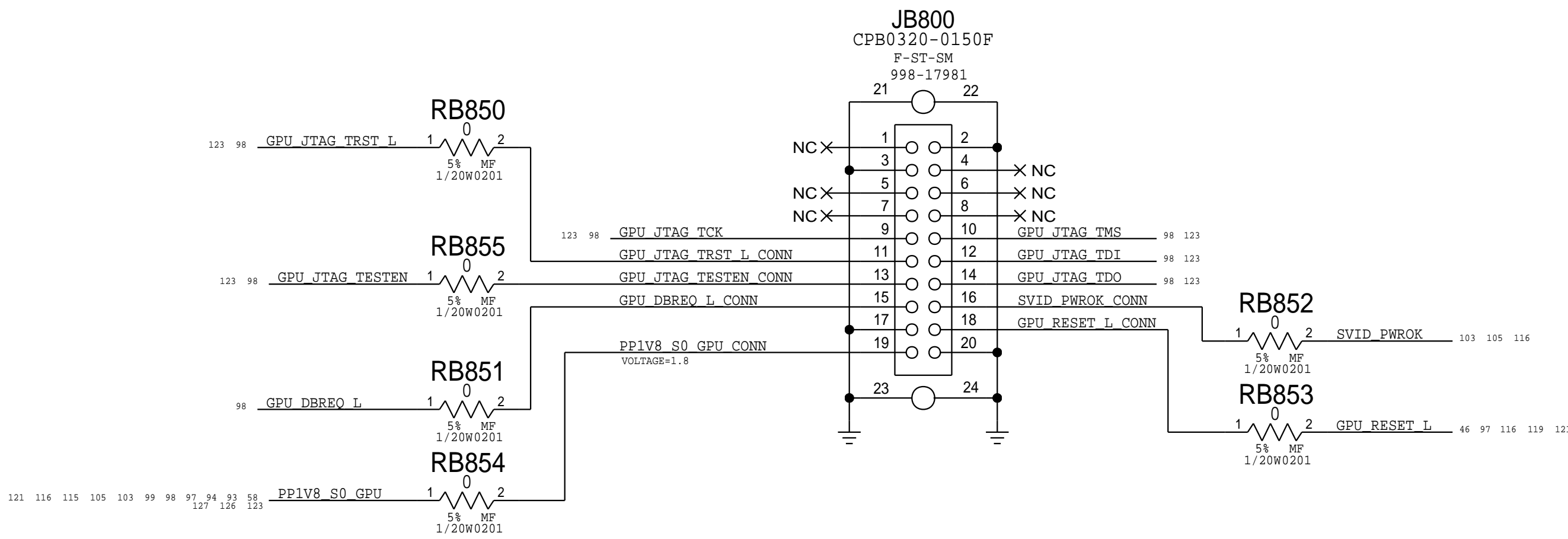
Active Discharge



UB800	
Part	SLG5AP1453V
Type	Load Switch
R(on) @ 5.3A	7.8 mOhm Typ 9.6 mOhm Max
Current	5.3A Max
T(total-on)	1.5ms



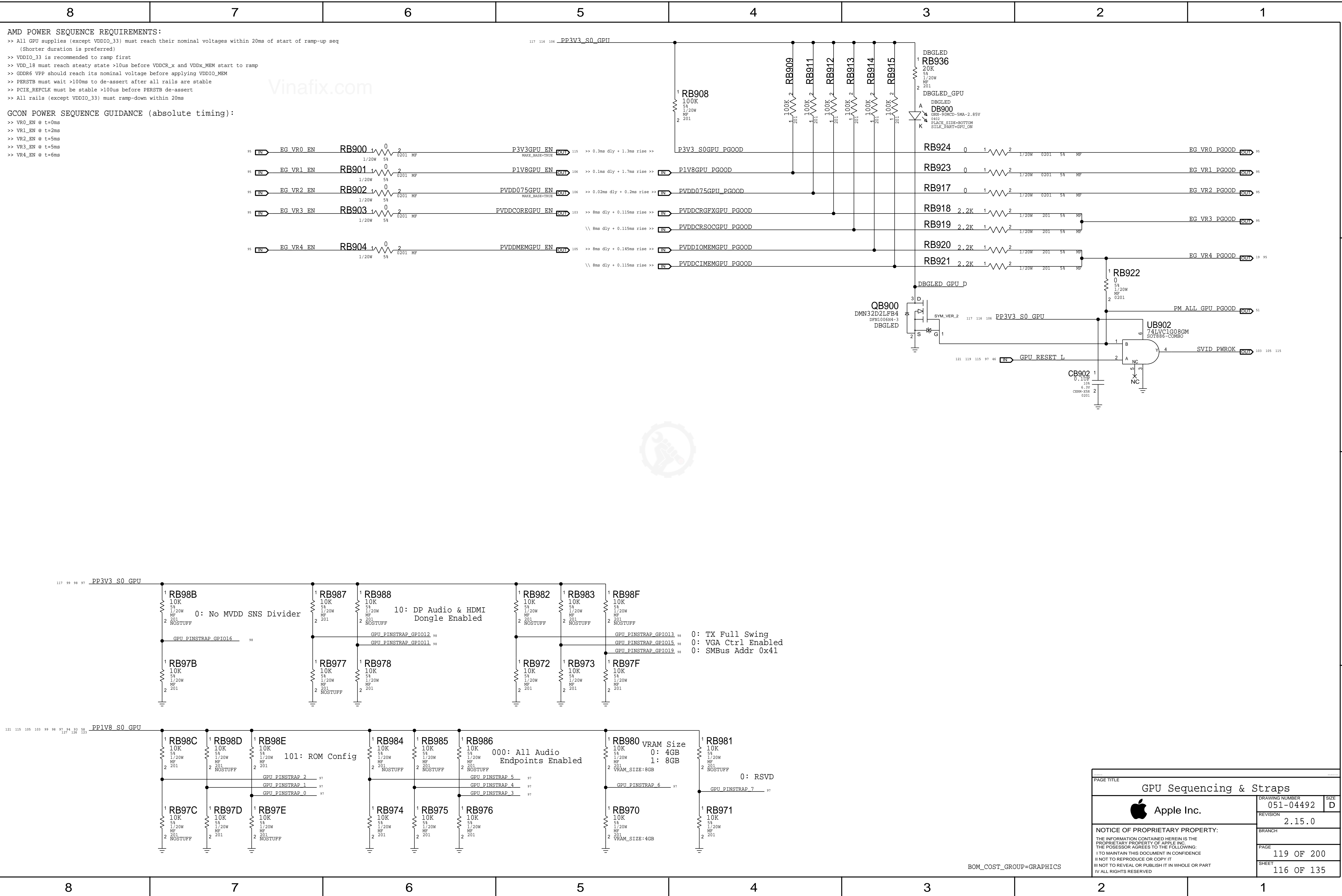
Nano-HDT



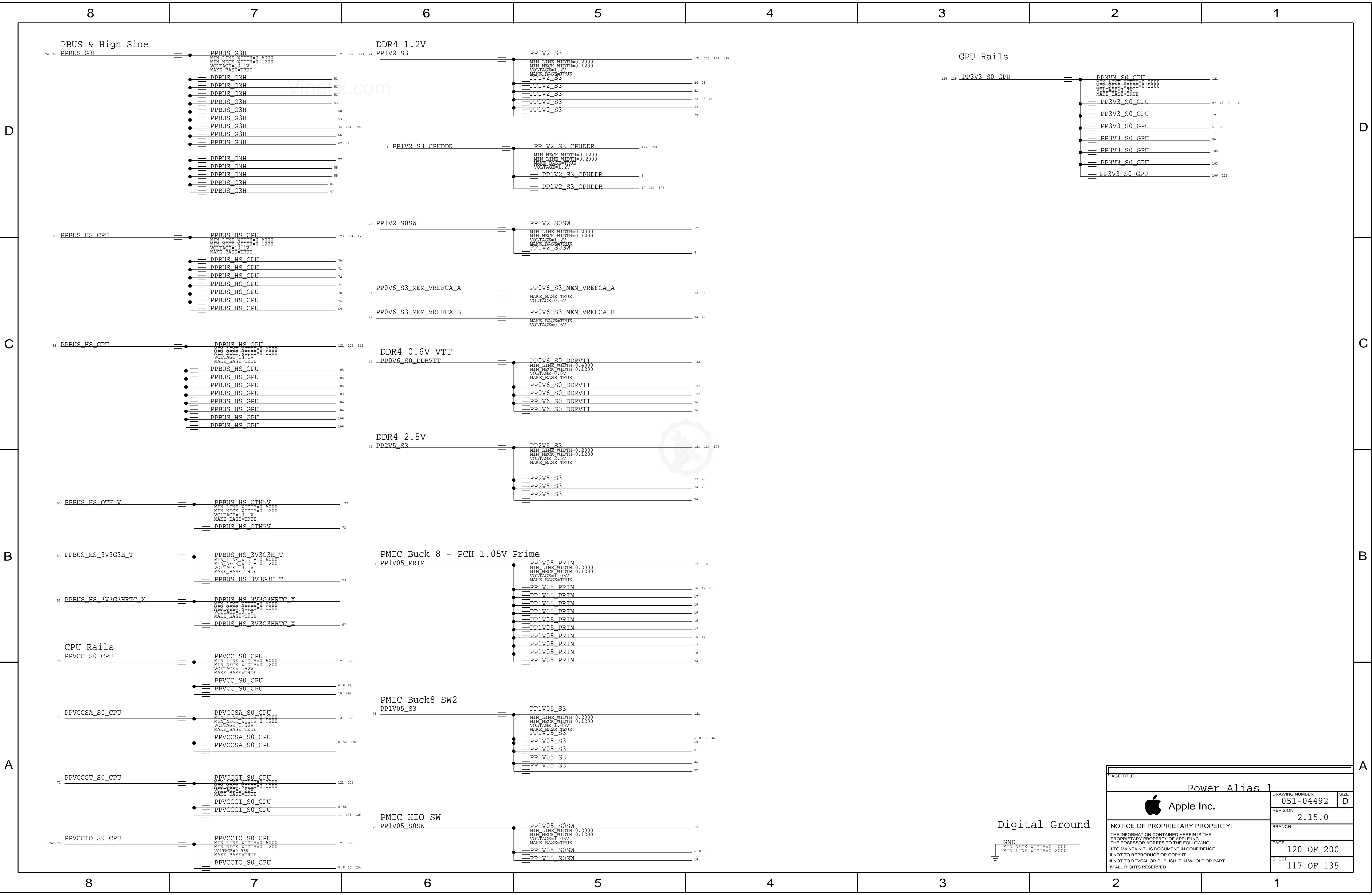
PAGE TITLE		
GPU 3.3V / Discharge		
	DRAWING NUMBER	051-04492
	REVISION	2.15.0
	BRANCH	
	PAGE	118 OF 200
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		SHEET 115 OF 135


BOM\_COST\_GROUP=GRAPHICS



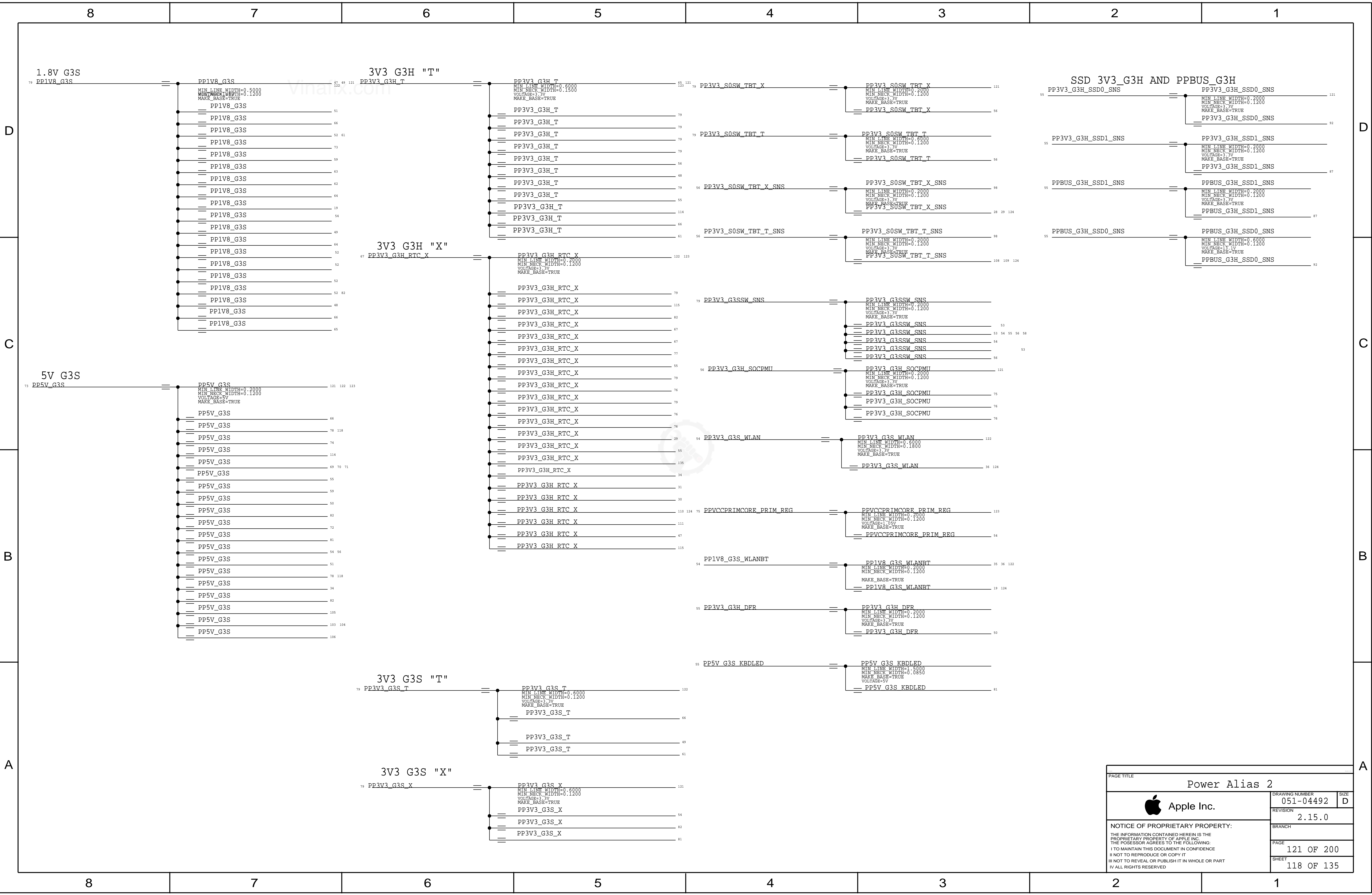




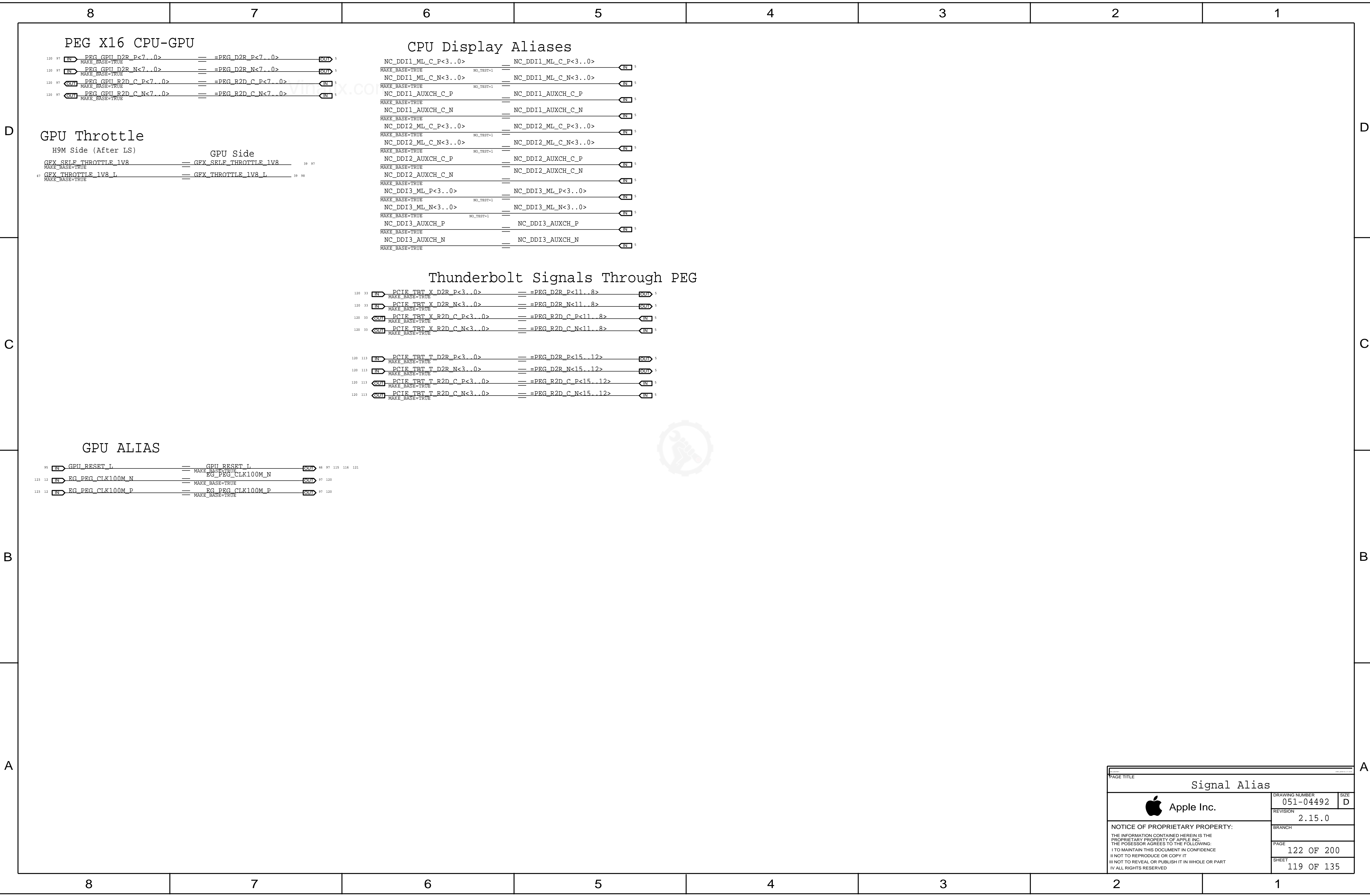


PAGE TITLE		
Power Alias 1		
 Apple Inc.	DRAWING NUMBER	051-04492
	REVISION	2.15.0
	BRANCH	
	PAGE	120 OF 200
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		SHEET 117 OF 135









8

7

6

5

4

3

2

1

8

7

6

5

4

3

2

1



ICT TESTPOINTS , High Speed NO\_TEST

PEG / GPU

119	97	IN	PEG_GPU_D2R_P<7..0>	NO_TEST=1
119	97	IN	PEG_GPU_D2R_N<7..0>	NO_TEST=1
97		IN	PEG_GPU_D2R_C_P<7..0>	NO_TEST=1
97		IN	PEG_GPU_D2R_C_N<7..0>	NO_TEST=1
97		IN	PEG_GPU_R2D_P<7..0>	NO_TEST=1
97		IN	PEG_GPU_R2D_N<7..0>	NO_TEST=1
119	97	IN	PEG_GPU_R2D_C_P<7..0>	NO_TEST=1
119	97	IN	PEG_GPU_R2D_C_N<7..0>	NO_TEST=1

PEG / TR

119	113	IN	PCIE_TBT_X_D2R_P<3..0>	NO_TEST=1
119	113	IN	PCIE_TBT_X_D2R_N<3..0>	NO_TEST=1
33	27	IN	PCIE_TBT_X_D2R_C_P<3..0>	NO_TEST=1
33	27	IN	PCIE_TBT_X_D2R_C_N<3..0>	NO_TEST=1
33	27	IN	PCIE_TBT_X_R2D_P<3..0>	NO_TEST=1
33	27	IN	PCIE_TBT_X_R2D_N<3..0>	NO_TEST=1
119	113	IN	PCIE_TBT_X_R2D_C_P<3..0>	NO_TEST=1
119	113	IN	PCIE_TBT_X_R2D_C_N<3..0>	NO_TEST=1
119	113	IN	PCIE_TBT_T_D2R_P<3..0>	NO_TEST=1
119	113	IN	PCIE_TBT_T_D2R_N<3..0>	NO_TEST=1
119	113	IN	PCIE_TBT_T_D2R_C_P<3..0>	NO_TEST=1
119	113	IN	PCIE_TBT_T_D2R_C_N<3..0>	NO_TEST=1
119	113	IN	PCIE_TBT_T_R2D_P<3..0>	NO_TEST=1
119	113	IN	PCIE_TBT_T_R2D_N<3..0>	NO_TEST=1
119	113	IN	PCIE_TBT_T_R2D_C_P<3..0>	NO_TEST=1
119	113	IN	PCIE_TBT_T_R2D_C_N<3..0>	NO_TEST=1

CPU EDP

95	5	IN	DP_INT_IG_ML_N<3..0>	NO_TEST=1
95	5	IN	DP_INT_IG_ML_P<3..0>	NO_TEST=1
95	5	IN	DP_INT_IG_AUX_N	
95	5	IN	DP_INT_IG_AUX_P	

DDR

23	22	IN	MEM_A_CLK_P<1..0>	NO_TEST=1
23	22	IN	MEM_A_CLK_N<1..0>	NO_TEST=1
23	22	IN	MEM_A_DQ<63..0>	NO_TEST=1
23	22	IN	MEM_A_DQS_P<7..0>	NO_TEST=1
23	22	IN	MEM_A_DQS_N<7..0>	NO_TEST=1
23	22	IN	MEM_A_CKE<3..0>	NO_TEST=1
23	22	IN	MEM_A_CS_L<1..0>	NO_TEST=1
23	22	IN	MEM_A_ODT<1..0>	NO_TEST=1
23	22	IN	MEM_A_A<16..0>	NO_TEST=1
23	22	IN	MEM_A_BA<1..0>	NO_TEST=1
23	22	IN	MEM_A_BG<1..0>	NO_TEST=1
23	22	IN	MEM_A_PAR	NO_TEST=1
23	22	IN	MEM_A_ALERT_L	NO_TEST=1
23	22	IN	MEM_A_ACT_L	NO_TEST=1
23	22	IN	MEM_B_CLK_P<1..0>	NO_TEST=1
23	22	IN	MEM_B_CLK_N<1..0>	NO_TEST=1
23	22	IN	MEM_B_DQ<63..0>	NO_TEST=1
23	22	IN	MEM_B_DQS_P<7..0>	NO_TEST=1
23	22	IN	MEM_B_DQS_N<7..0>	NO_TEST=1
23	22	IN	MEM_B_CKE<3..0>	NO_TEST=1
23	22	IN	MEM_B_CS_L<1..0>	NO_TEST=1
23	22	IN	MEM_B_ODT<1..0>	NO_TEST=1
23	22	IN	MEM_B_A<16..0>	NO_TEST=1
23	22	IN	MEM_B_BA<1..0>	NO_TEST=1
23	22	IN	MEM_B_BG<1..0>	NO_TEST=1
23	22	IN	MEM_B_PAR	NO_TEST=1
23	22	IN	MEM_B_ALERT_L	NO_TEST=1
23	22	IN	MEM_B_ACT_L	NO_TEST=1

DP X

27		IN	DP_X_SNK0_ML_P<3..0>	NO_TEST=1
27		IN	DP_X_SNK0_ML_N<3..0>	NO_TEST=1
97	27	IN	DP_X_SNK0_ML_C_P<3..0>	NO_TEST=1
97	27	IN	DP_X_SNK0_ML_C_N<3..0>	NO_TEST=1
27		IN	DP_X_SNK1_ML_P<3..0>	NO_TEST=1
27		IN	DP_X_SNK1_ML_N<3..0>	NO_TEST=1
97	27	IN	DP_X_SNK1_ML_C_P<3..0>	NO_TEST=1
97	27	IN	DP_X_SNK1_ML_C_N<3..0>	NO_TEST=1
27		IN	DP_X_SNK0_AUXCH_P	
27		IN	DP_X_SNK0_AUXCH_N	
97	27	IN	DP_X_SNK0_AUXCH_C_P	
97	27	IN	DP_X_SNK0_AUXCH_C_N	
95	27	IN	DP_X_SNK0_HPD	
30	27	IN	DP_XA_HPD	
27		IN	DP_X_SNK1_AUXCH_P	
27		IN	DP_X_SNK1_AUXCH_N	
97	27	IN	DP_X_SNK1_AUXCH_C_P	
97	27	IN	DP_X_SNK1_AUXCH_C_N	
97	27	IN	DP_X_SNK1_HPD	
31	27	IN	DP_XB_HPD	

H9M ESPI

39	12	IN	ESPI_CLK60M_PCH	NO_TEST=1
13	12	IN	ESPI_RESET_L	
39	12	IN	ESPI_IO<3..0>	NO_TEST=1
39	12	IN	ESPI_CS_L	NO_TEST=1
12		IN	PCH_ESPI_ALERT0_L	NO_TEST=1

DMI

13	5	IN	DMT_S2N_P<3..0>	NO_TEST=1
13	5	IN	DMT_S2N_N<3..0>	NO_TEST=1
13	5	IN	DMI_N2S_P<3..0>	NO_TEST=1
13	5	IN	DMI_N2S_N<3..0>	NO_TEST=1

PCH/WLANBT

36	14	IN	PCH_PCIE_WLAN_D2R_P	
36	14	IN	PCH_PCIE_WLAN_D2R_N	
36		IN	PCH_PCIE_WLAN_D2R_C_P	
36		IN	PCH_PCIE_WLAN_D2R_C_N	
36		IN	PCH_PCIE_WLAN_R2D_P	
36		IN	PCH_PCIE_WLAN_R2D_N	
36	14	IN	PCH_PCIE_WLAN_R2D_C_P	
36	14	IN	PCH_PCIE_WLAN_R2D_C_N	

PCH/SOC

41	14	IN	PCIE_SOC_D2R_P<3..0>	NO_TEST=1
41	14	IN	PCIE_SOC_D2R_N<3..0>	NO_TEST=1
41		IN	PCIE_SOC_D2R_C_P<3..0>	NO_TEST=1
41		IN	PCIE_SOC_D2R_C_N<3..0>	NO_TEST=1
47	41	IN	PCIE_SOC_R2D_P<3..0>	NO_TEST=1
47	41	IN	PCIE_SOC_R2D_N<3..0>	NO_TEST=1
47	14	IN	PCIE_SOC_R2D_C_P<3..0>	NO_TEST=1
47	14	IN	PCIE_SOC_R2D_C_N<3..0>	NO_TEST=1

USB2 HS D+/D-

30	14	IN	USB_UPC_PCH_XA_P	
30	14	IN	USB_UPC_PCH_XA_N	NO_TEST=1
31	14	IN	USB_UPC_PCH_XB_P	NO_TEST=1
31	14	IN	USB_UPC_PCH_XB_N	NO_TEST=1
121	110	14	USB_UPC_PCH_TA_P	
121	110	14	USB_UPC_PCH_TA_N	
121	111	14	USB_UPC_PCH_TB_P	
121	111	14	USB_UPC_PCH_TB_N	
30		IN	USB_UPC_PCH_XA_F_P	NO_TEST=1
30		IN	USB_UPC_PCH_XA_F_N	NO_TEST=1
31		IN	USB_UPC_PCH_XB_F_P	NO_TEST=1
31		IN	USB_UPC_PCH_XB_F_N	NO_TEST=1
110		IN	USB_UPC_PCH_TA_F_P	NO_TEST=1
110		IN	USB_UPC_PCH_TA_F_N	NO_TEST=1
111		IN	USB_UPC_PCH_TB_F_P	NO_TEST=1
111		IN	USB_UPC_PCH_TB_F_N	NO_TEST=1

DP T

107		IN	DP_T_SNK0_ML_P<3..0>	NO_TEST=1
107		IN	DP_T_SNK0_ML_N<3..0>	NO_TEST=1
107	98	IN	DP_T_SNK0_ML_C_P<3..0>	NO_TEST=1
107	98	IN	DP_T_SNK0_ML_C_N<3..0>	NO_TEST=1
107		IN	DP_T_SNK1_ML_P<3..0>	NO_TEST=1
107		IN	DP_T_SNK1_ML_N<3..0>	NO_TEST=1
107	98	IN	DP_T_SNK1_ML_C_P<3..0>	NO_TEST=1
107	98	IN	DP_T_SNK1_ML_C_N<3..0>	NO_TEST=1
107		IN	DP_T_SNK0_AUXCH_P	
107		IN	DP_T_SNK0_AUXCH_N	
107		IN	DP_T_SNK0_AUXCH_C_P	
107	98	IN	DP_T_SNK0_AUXCH_C_N	
107	95	IN	DP_T_SNK0_HPD	
110	107	IN	DP_TA_HPD	
107		IN	DP_T_SNK1_AUXCH_P	
107		IN	DP_T_SNK1_AUXCH_N	
107		IN	DP_T_SNK1_AUXCH_C_P	
107	98	IN	DP_T_SNK1_AUXCH_C_N	
107	95	IN	DP_T_SNK1_HPD	
111	107	IN	DP_TB_HPD	

CPU/PCH CLK (TP FOR PROTO BUILDS)

12	6	IN	CPU_CLK24M_NSSC_CLK_N	
12	6	IN	CPU_CLK24M_NSSC_CLK_P	
12	6	IN	CPU_CLK100M_PCIBCLK_P	
12	6	IN	CPU_CLK100M_BCLK_N	
12	6	IN	CPU_CLK100M_BCLK_P	
41	12	IN	PCIE_CLK100M_SOC_P	
41	12	IN	PCIE_CLK100M_SOC_N	
41	12	IN	SOC_CLKREQ0_L	
36	12	IN	PCH_PCIE_CLK100M_WLAN_P	
36	12	IN	PCH_PCIE_CLK100M_WLAN_N	
19	12	IN	PCH_WLAN_CLKREQ0_L	
19		IN	EG_PEG_CLK100M_P	
19		IN	EG_PEG_CLK100M_N	
19	12	IN	PCH_GPU_CLKREQ0_L	
19	12	IN	PCIE_CLK100M_DEBUG_P	
19	12	IN	PCIE_CLK100M_DEBUG_N	
19	12	IN	PCH_GPU_CLKREQ0_L	
19	12	IN	PCIE_CLK100M_TBT_X_P	
19	12	IN	PCIE_CLK100M_TBT_X_N	
19	12	IN	TBT_X_CLKREQ0_L	
19	12	IN	PCIE_CLK100M_TBT_T_P	
19	12	IN	PCIE_CLK100M_TBT_T_N	
19	12	IN	TBT_T_CLKREQ0_L	
20	18	IN	NC_ITPXPDP_CLK100MN	
20	18	IN	NC_ITPXPDP_CLK100MP	

USB-C X

32	27	IN	USBC_XA_D2R_P<2..1>	NO_TEST=1
32	27	IN	USBC_XA_D2R_N<2..1>	NO_TEST=1
32		IN	USBC_XA_D2R_R_P<2..1>	NO_TEST=1
32		IN	USBC_XA_D2R_R_N<2..1>	NO_TEST=1
32		IN	USBC_XA_D2R_CR_P<2..1>	NO_TEST=1
32		IN	USBC_XA_D2R_CR_N<2..1>	NO_TEST=1
32		IN	USBC_XA_R2D_P<2..1>	NO_TEST=1
32		IN	USBC_XA_R2D_N<2..1>	NO_TEST=1
32		IN	USBC_XA_R2D_C_P<2..1>	NO_TEST=1
32		IN	USBC_XA_R2D_C_N<2..1>	NO_TEST=1
32	27	IN	USBC_XA_AUXLSX1	
32	27	IN	USBC_XA_AUXLSX2	
32	27	IN	USBC_XB_D2R_P<2..1>	NO_TEST=1
32	27	IN	USBC_XB_D2R_N<2..1>	NO_TEST=1
32		IN	USBC_XB_D2R_R_P<2..1>	NO_TEST=1
32		IN	USBC_XB_D2R_R_N<2..1>	NO_TEST=1
32		IN	USBC_XB_D2R_CR_P<2..1>	NO_TEST=1
32		IN	USBC_XB_D2R_CR_N<2..1>	NO_TEST=1
32		IN	USBC_XB_R2D_P<2..1>	NO_TEST=1
32		IN	USBC_XB_R2D_N<2..1>	NO_TEST=1
32		IN	USBC_XB_R2D_C_P<2..1>	NO_TEST=1
32		IN	USBC_XB_R2D_C_N<2..1>	NO_TEST=1
32	27	IN	USBC_XB_AUXLSX1	
32	27	IN	USBC_XB_AUXLSX2	

USB-C T

107		IN	USBC_TA_D2R_P<2..1>	NO_TEST=1
107		IN	USBC_TA_D2R_N<2..1>	NO_TEST=1
107		IN	USBC_TA_D2R_R_P<2..1>	NO_TEST=1
107		IN	USBC_TA_D2R_R_N<2..1>	NO_TEST=1
107		IN	USBC_TA_D2R_CR_P<2..1>	NO_TEST=1
107		IN	USBC_TA_D2R_CR_N<2..1>	NO_TEST=1
107		IN	USBC_TA_R2D_P<2..1>	NO_TEST=1
107		IN	USBC_TA_R2D_N<2..1>	NO_TEST=1
107		IN	USBC_TA_R2D_C_P<2..1>	NO_TEST=1
107		IN	USBC_TA_R2D_C_N<2..1>	NO_TEST=1
107		IN	USBC_TA_R2D_CR_P<2..1>	NO_TEST=1
107		IN	USBC_TA_R2D_CR_N<2..1>	NO_TEST=1
107		IN	USBC_TA_AUXLSX1	
107		IN	USBC_TA_AUXLSX2	
107		IN	USBC_TB_D2R_P<2..1>	NO_TEST=1
107		IN	USBC_TB_D2R_N<2..1>	NO_TEST=1
107		IN	USBC_TB_D2R_R_P<2..1>	NO_TEST=1
107		IN	USBC_TB_D2R_R_N<2..1>	NO_TEST=1
107		IN	USBC_TB_D2R_CR_P<2..1>	NO_TEST=1
107		IN	USBC_TB_D2R_CR_N<2..1>	NO_TEST=1
107		IN	USBC_TB_R2D_P<2..1>	NO_TEST=1
107		IN	USBC_TB_R2D_N<2..1>	NO_TEST=1
107		IN	USBC_TB_R2D_C_P<2..1>	NO_TEST=1
107		IN	USBC_TB_R2D_C_N<2..1>	NO_TEST=1
107		IN	USBC_TB_R2D_CR_P<2..1>	NO_TEST=1
107		IN	USBC_TB_R2D_CR_N<2..1>	NO_TEST=1
107		IN	USBC_TB_AUXLSX1	
107		IN	USBC_TB_AUXLSX2	

H9M SSD NAND

91	90	89	88	IN	PCIE_SSD0_R2D_P<3..0>	NO_TEST=1	
91	90	89	88	IN	PCIE_SSD0_R2D_N<3..0>	NO_TEST=1	
91	90	89	88	41	IN	PCIE_SSD0_D2R_P<3..0>	NO_TEST=1
91	90	89	88	41	IN	PCIE_SSD0_D2R_N<3..0>	NO_TEST=1
91	90	89	88	41	IN	PCIE_SSD0_R2D_C_P<3..0>	NO_TEST=1
91	90	89	88	41	IN	PCIE_SSD0_R2D_C_N<3..0>	NO_TEST=1
91	90	89	88	IN	PCIE_SSD0_D2R_C_P<3..0>	NO_TEST=1	
91	90	89	88	IN	PCIE_SSD0_D2R_C_N<3..0>	NO_TEST=1	
86	85	84	83	IN	PCIE_SSD1_R2D_P<3..0>	NO_TEST=1	
86	85	84	83	IN	PCIE_SSD1_R2D_N<3..0>	NO_TEST=1	
86	85	84	83	41	IN	PCIE_SSD1_D2R_P<3..0>	NO_TEST=1
86	85	84	83	41	IN	PCIE_SSD1_D2R_N<3..0>	NO_TEST=1
86	85	84	83	41	IN	PCIE_SSD1_R2D_C_P<3..0>	NO_TEST=1
86	85	84	83	41	IN	PCIE_SSD1_R2D_C_N<3..0>	NO_TEST=1
86	85	84	83	IN	PCIE_SSD1_D2R_C_P<3..0>	NO_TEST=1	
86	85	84	83	IN	PCIE_SSD1_D2R_C_N<3..0>	NO_TEST=1	

XTAL

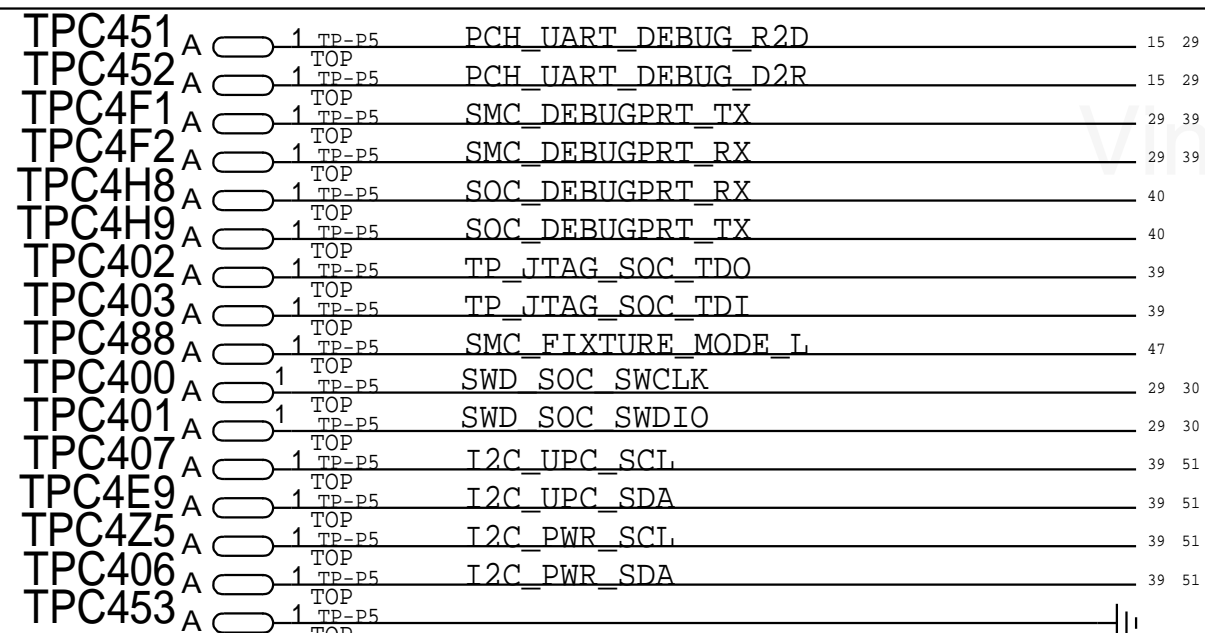
29	27	IN	TBT_X_XTAL25M_IN	NO_TEST=1
29	27	IN	TBT_X_XTAL25M_OUT	NO_TEST=1
109	107	IN	TBT_T_XTAL25M_IN	NO_TEST=1
109	107	IN	TBT_T_XTAL25M_OUT	NO



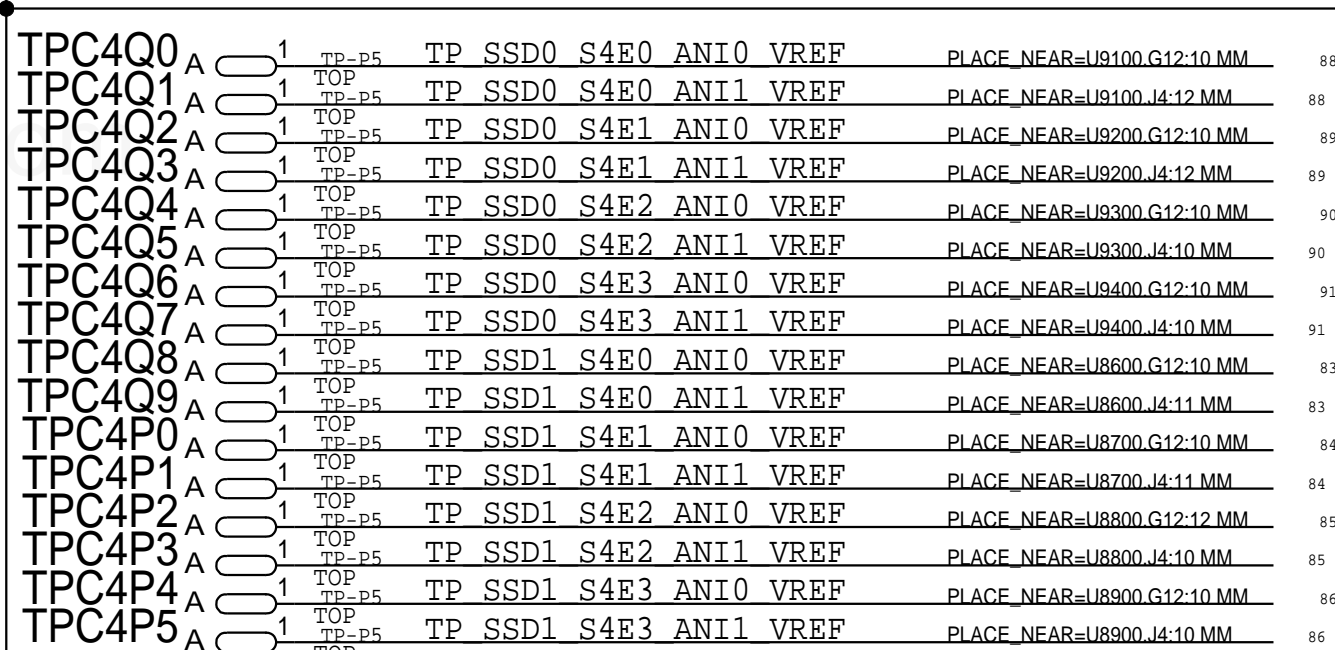


DFU AND FCT TESTPOINTS placed on top side of MLB, oppsite from CPU.

DEBUG PORT

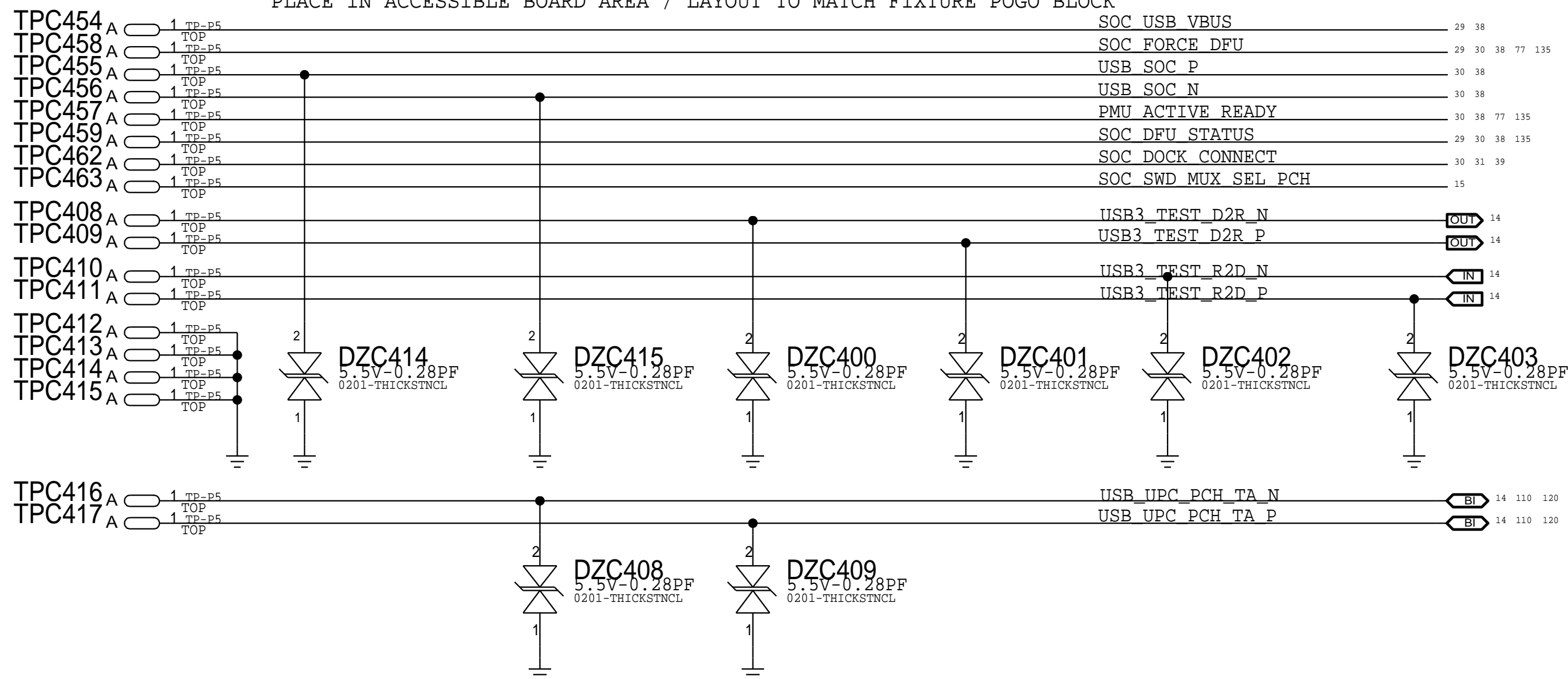


## SSD VREF



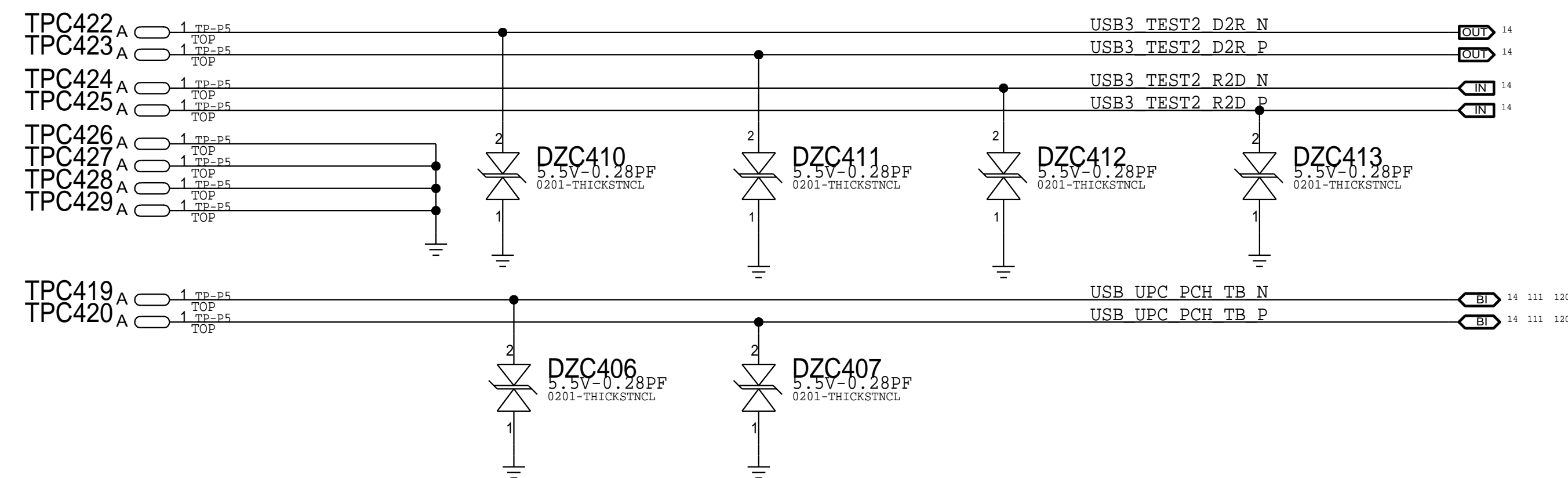
## SOC &amp; NON-CUSTOMER-FACING USB PORT 1

PLACE IN ACCESSIBLE BOARD AREA / LAYOUT TO MATCH FIXTURE POGO BLOCK



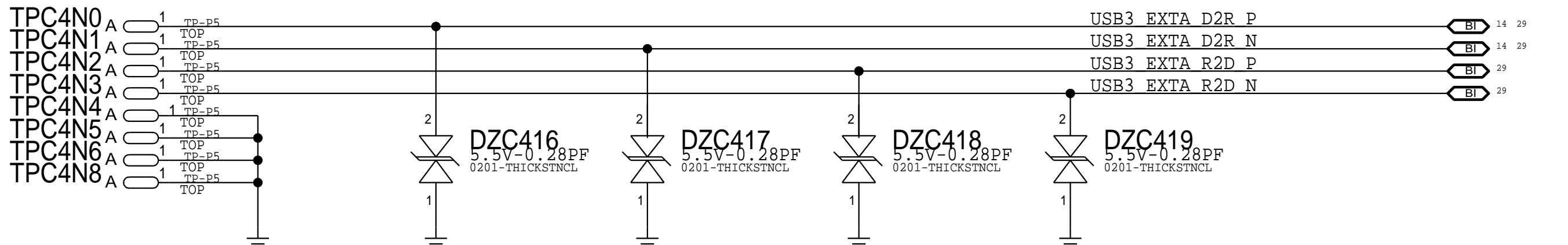
## NON-CUSTOMER-FACING USB PORT 2

PLACE IN ACCESSIBLE BOARD AREA / LAYOUT TO MATCH FIXTURE POGO BLOCK

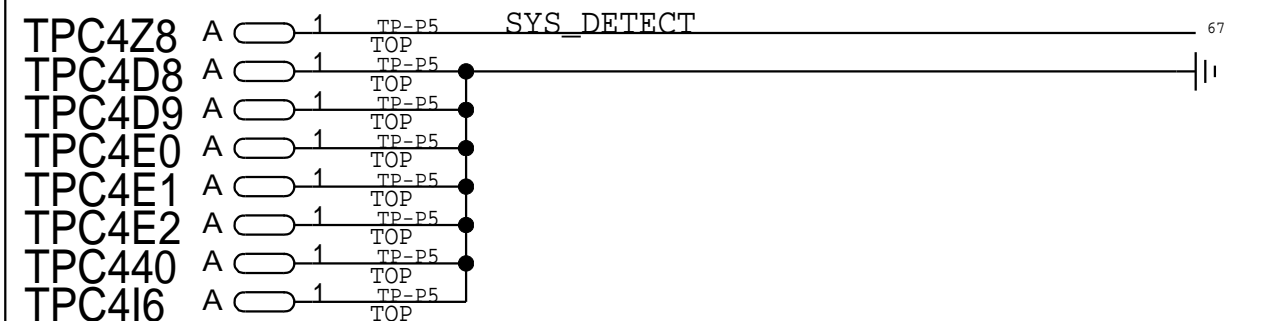
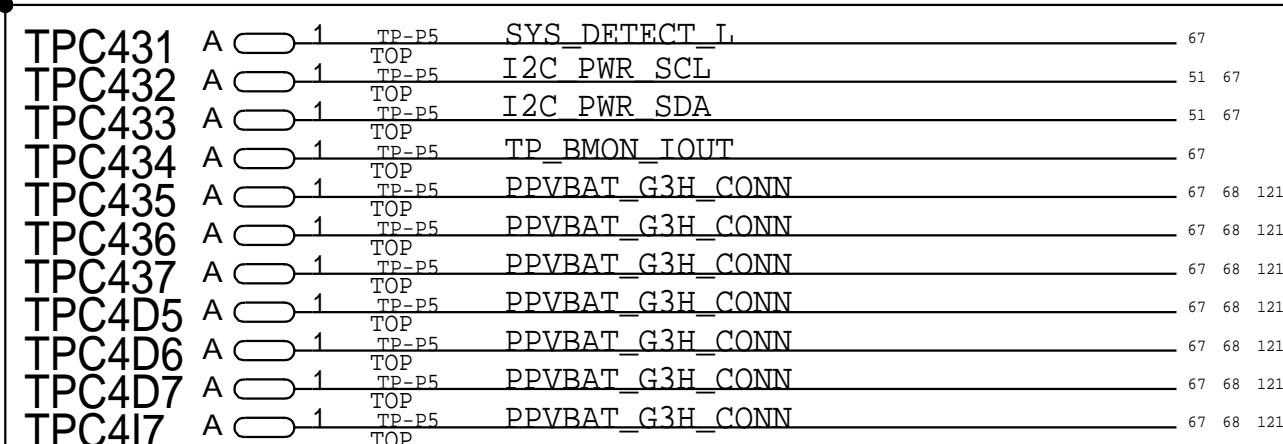


## DCI

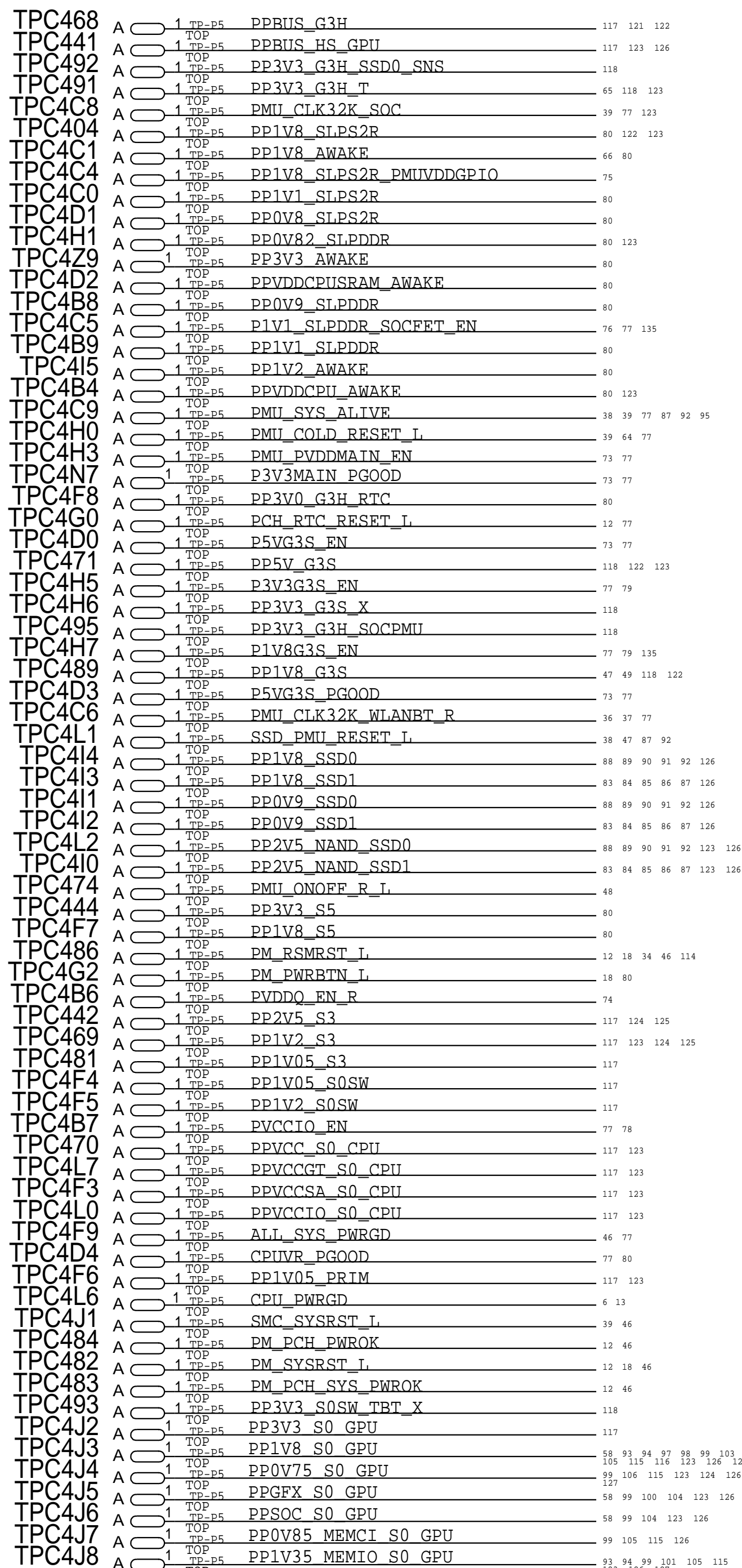
PLACE IN ACCESSIBLE BOARD AREA / LAYOUT TO MATCH FIXTURE POGO BLOCK



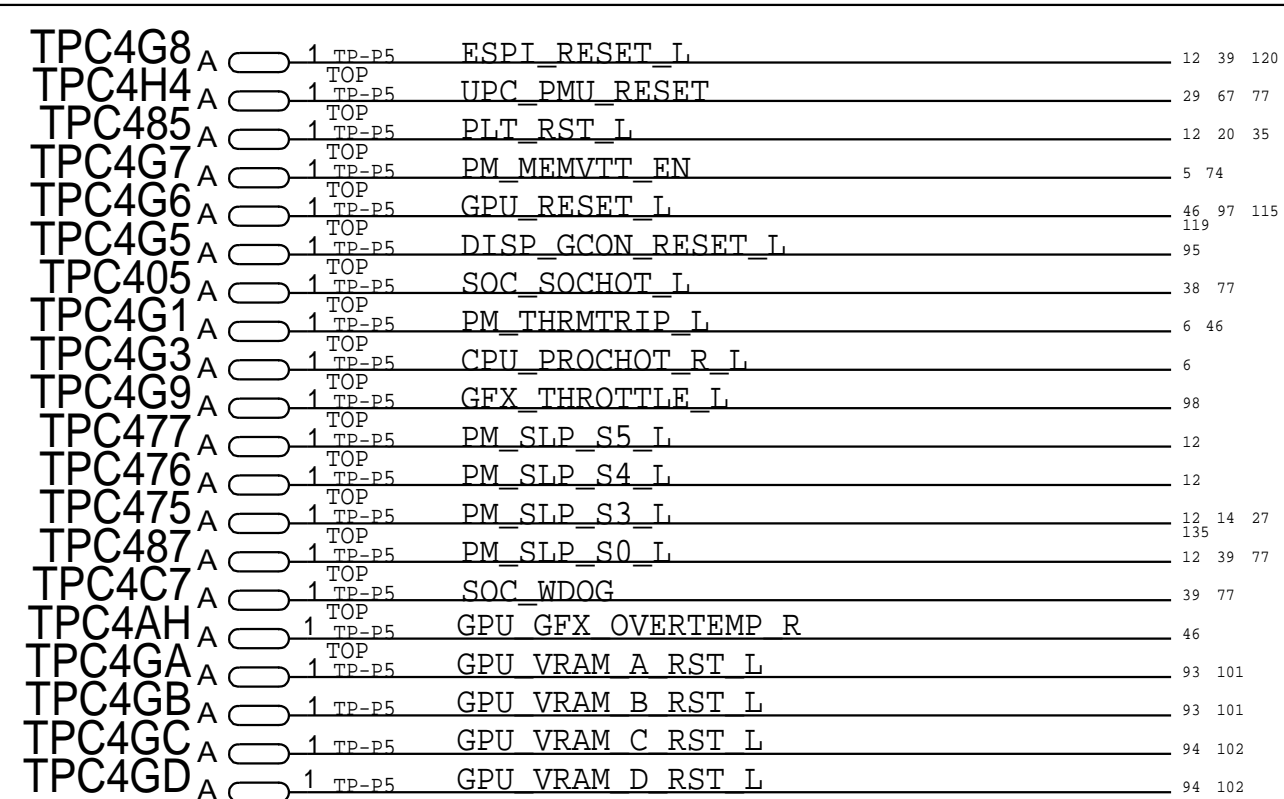
## BATTERY



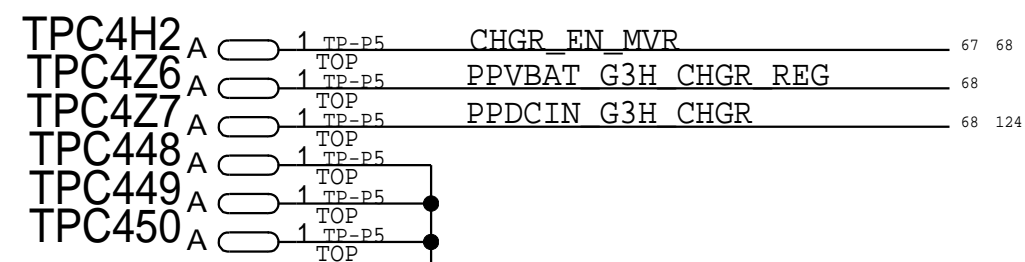
## POWER SEQUENCING



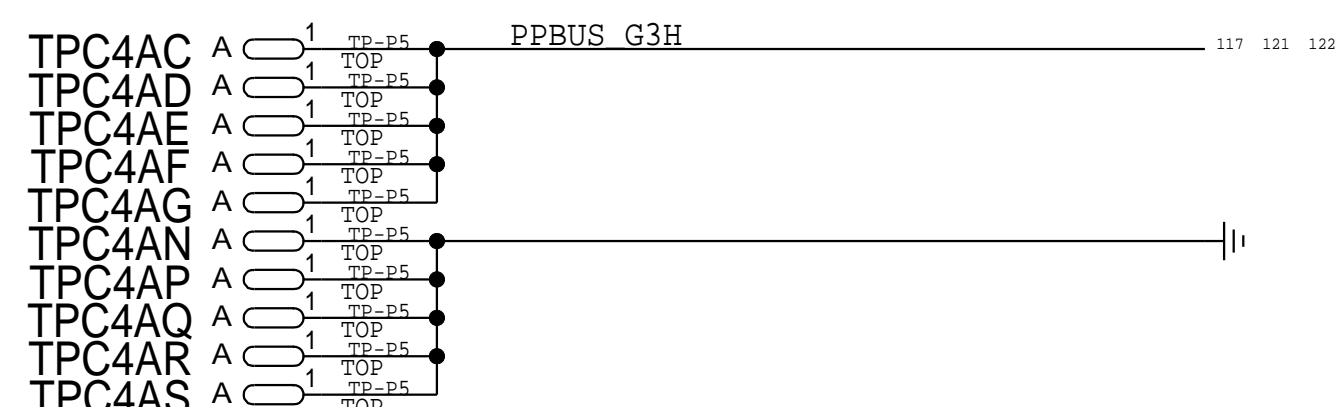
## STATUS AND RESETS



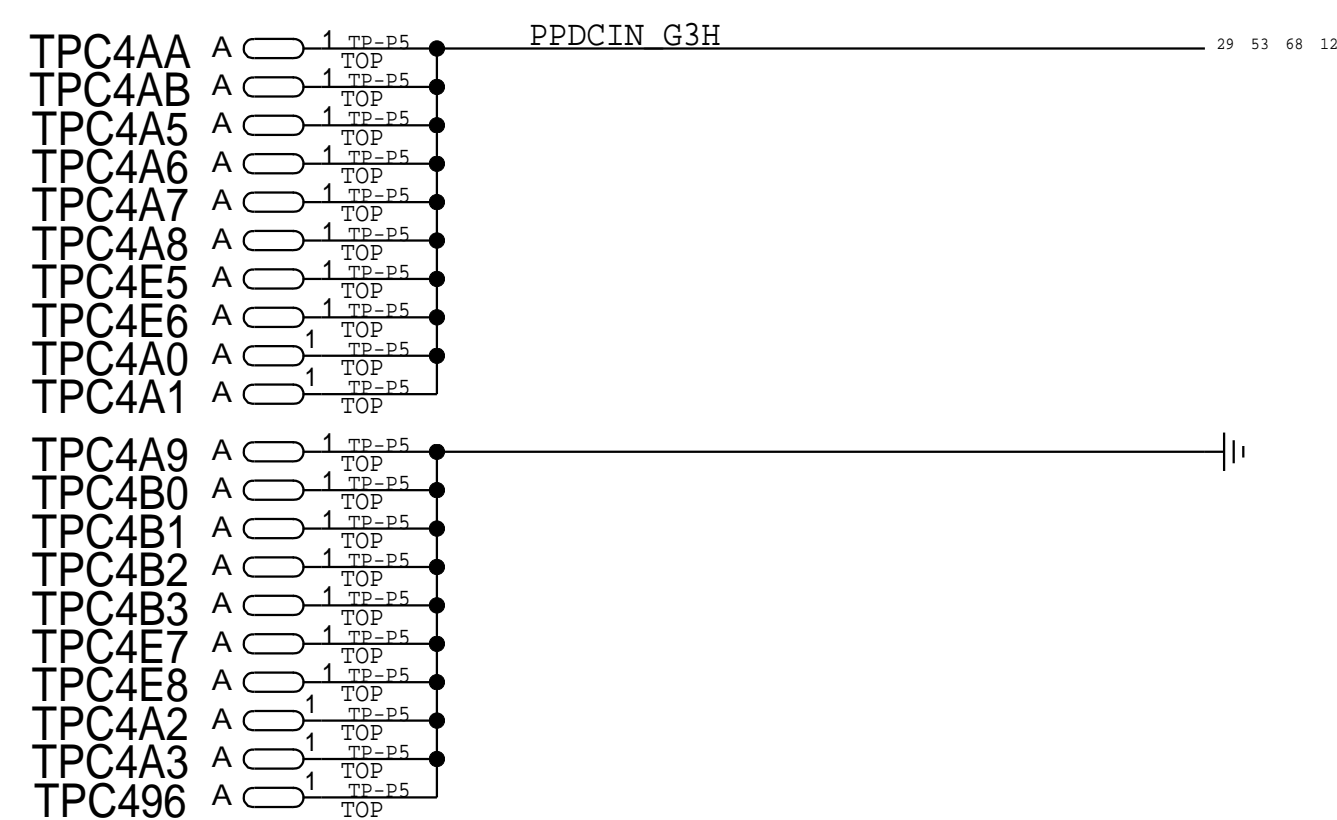
## CHARGER




## CBAT TRIM



LEFT SIDE POWER INPUT (100W)



PAGE TITLE		DRAWING NUMBER		SIZE	
DFU TEST POINTS		051-04492		D	
 Apple Inc.		REVISION		2.15.0	
NOTICE OF PROPRIETARY PROPERTY:		BRANCH			
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I. TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II. NOT TO REPRODUCE OR COPY IT III. NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV. ALL RIGHTS RESERVED		PAGE		124 OF 200	
		SHEET		121 OF 135	

---

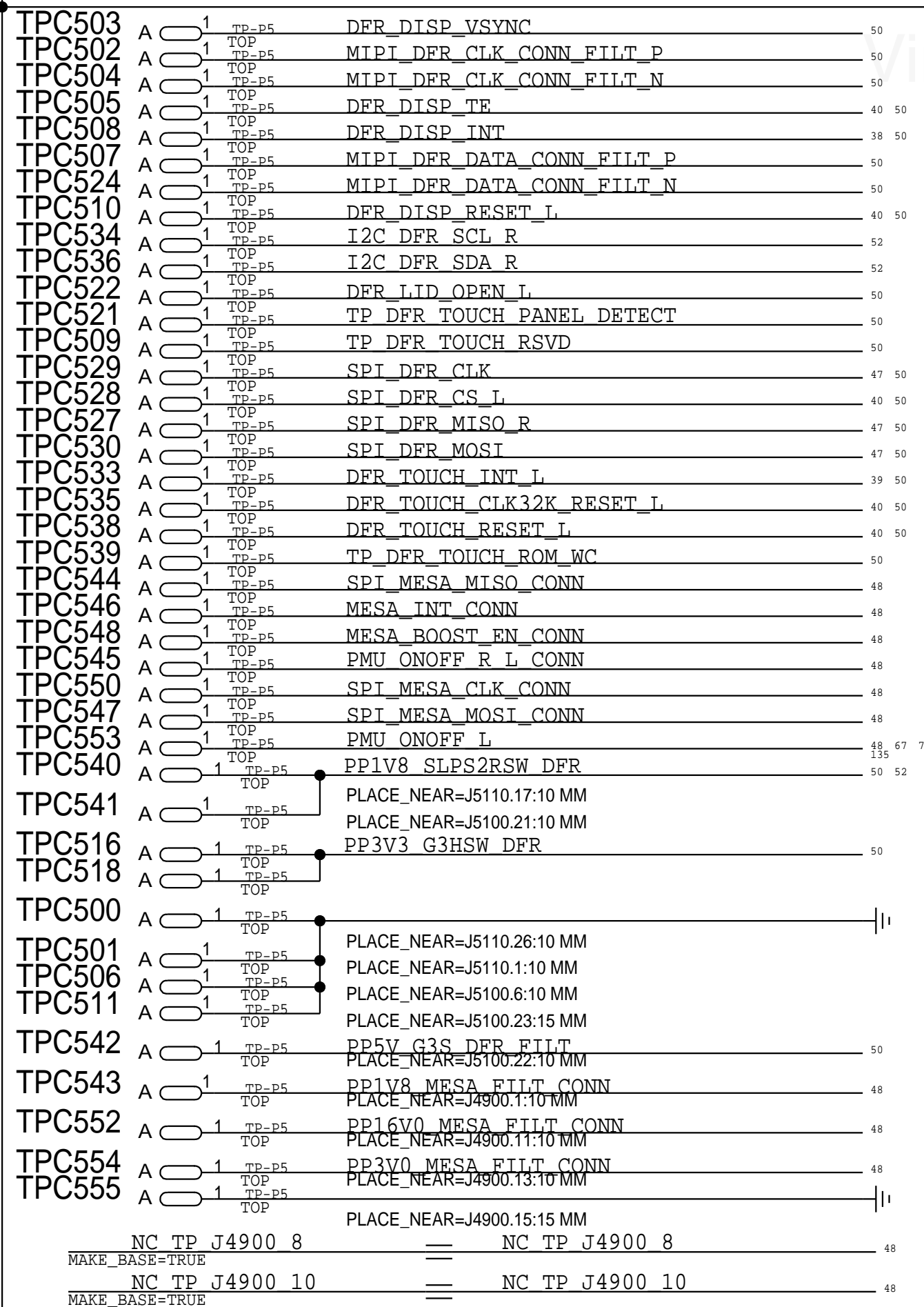
BOM COST GROUP=DEBUG



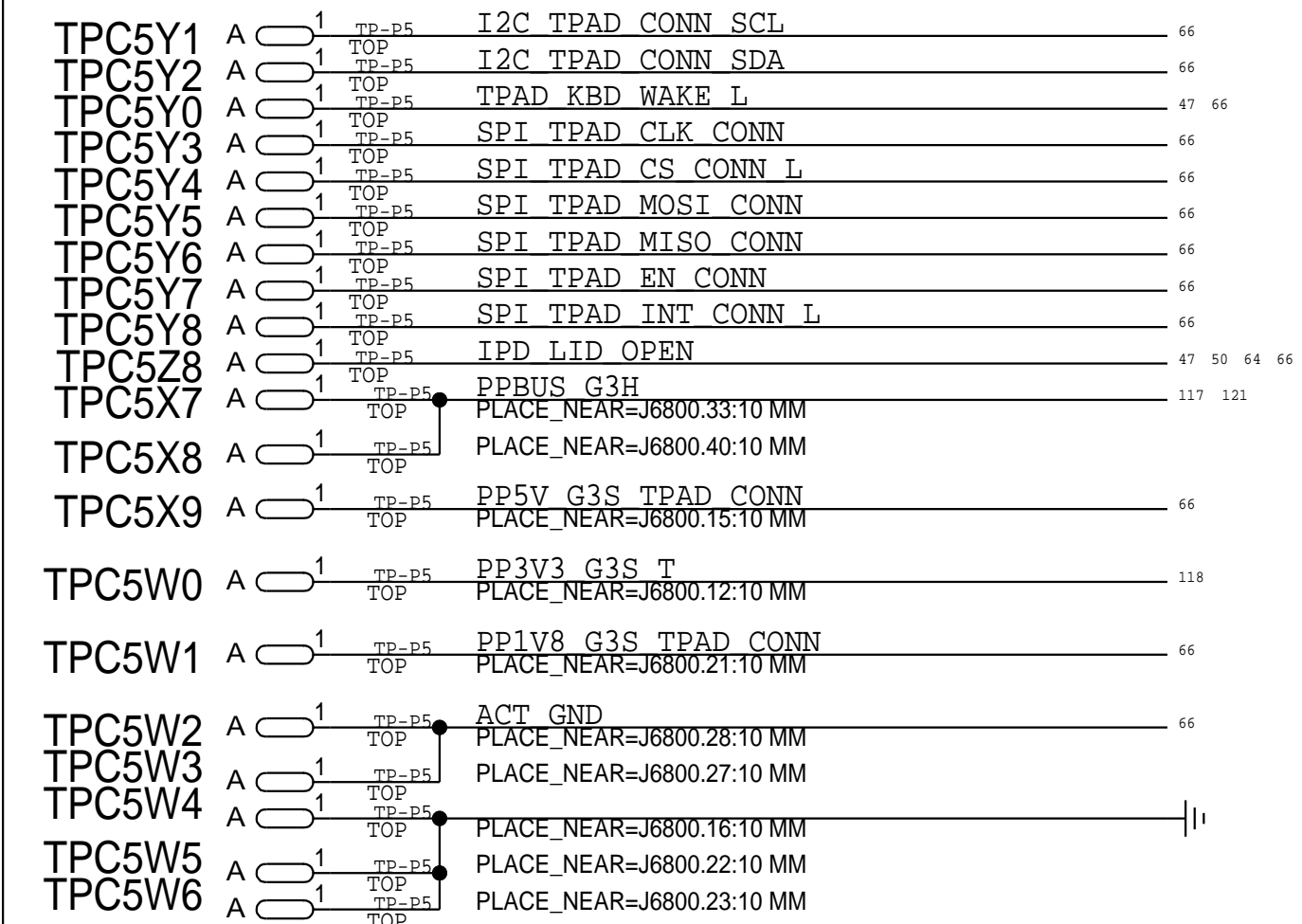


## FCT TEST POINTS (TOP SIDE OF MLB)

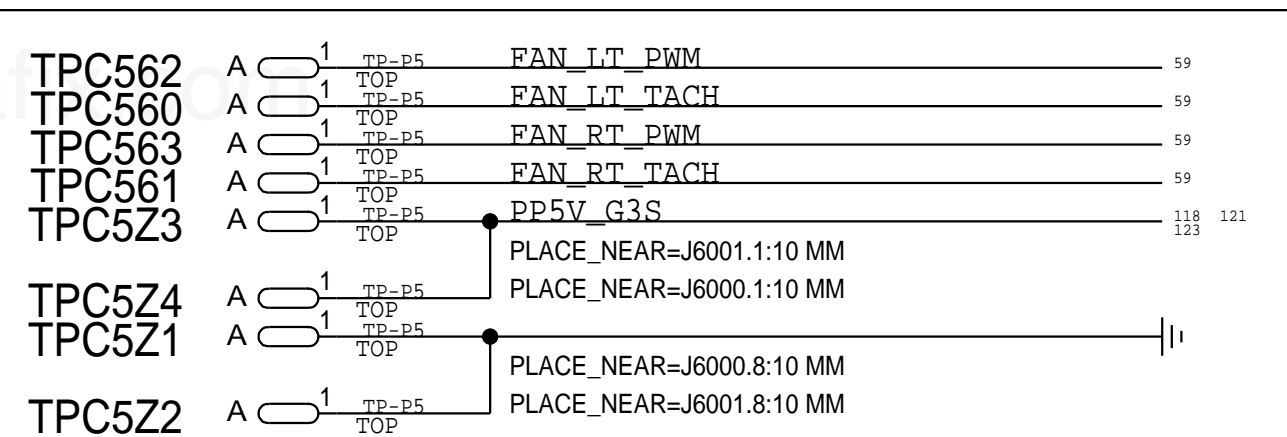
## DFR/MESA



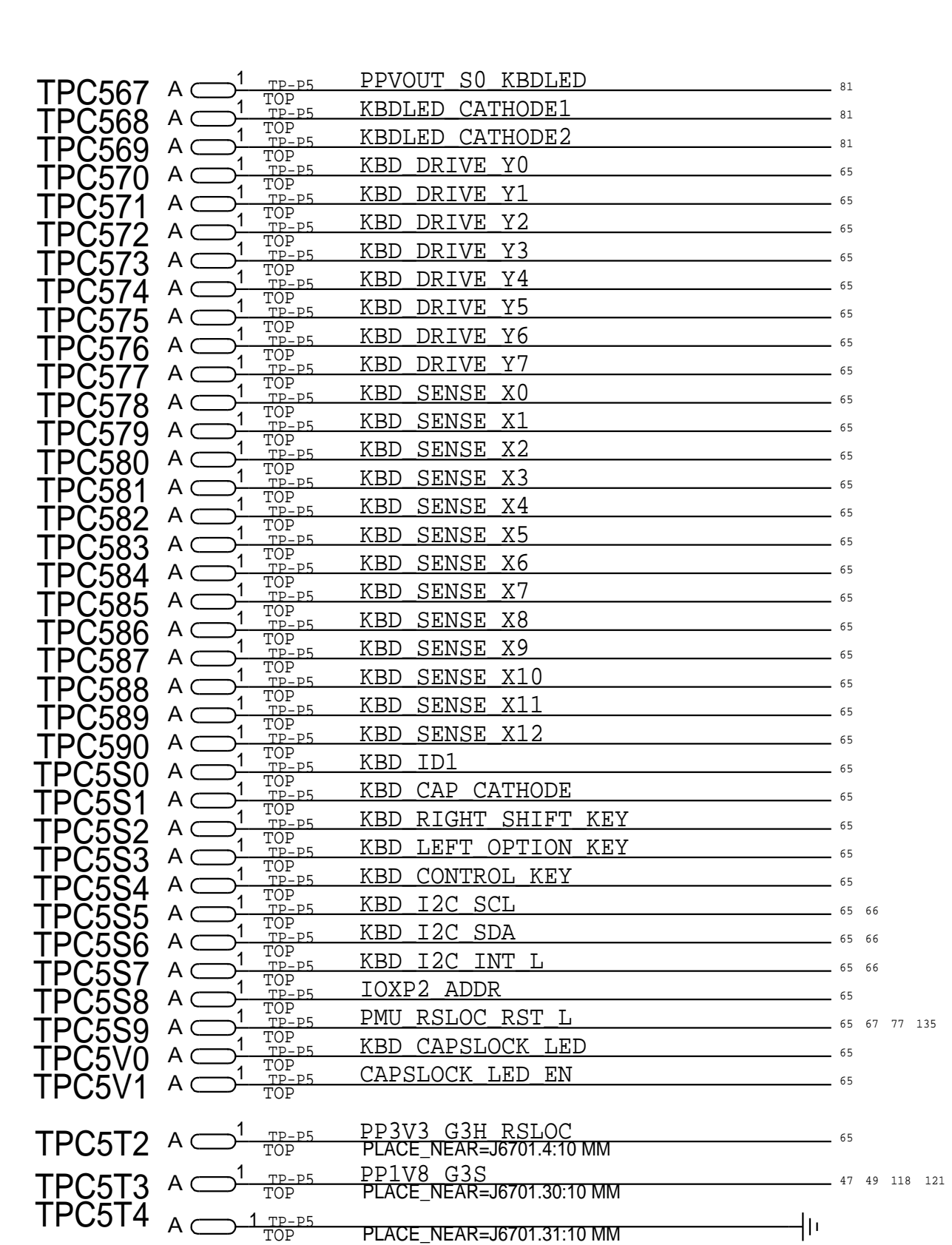
## TRACKPAD



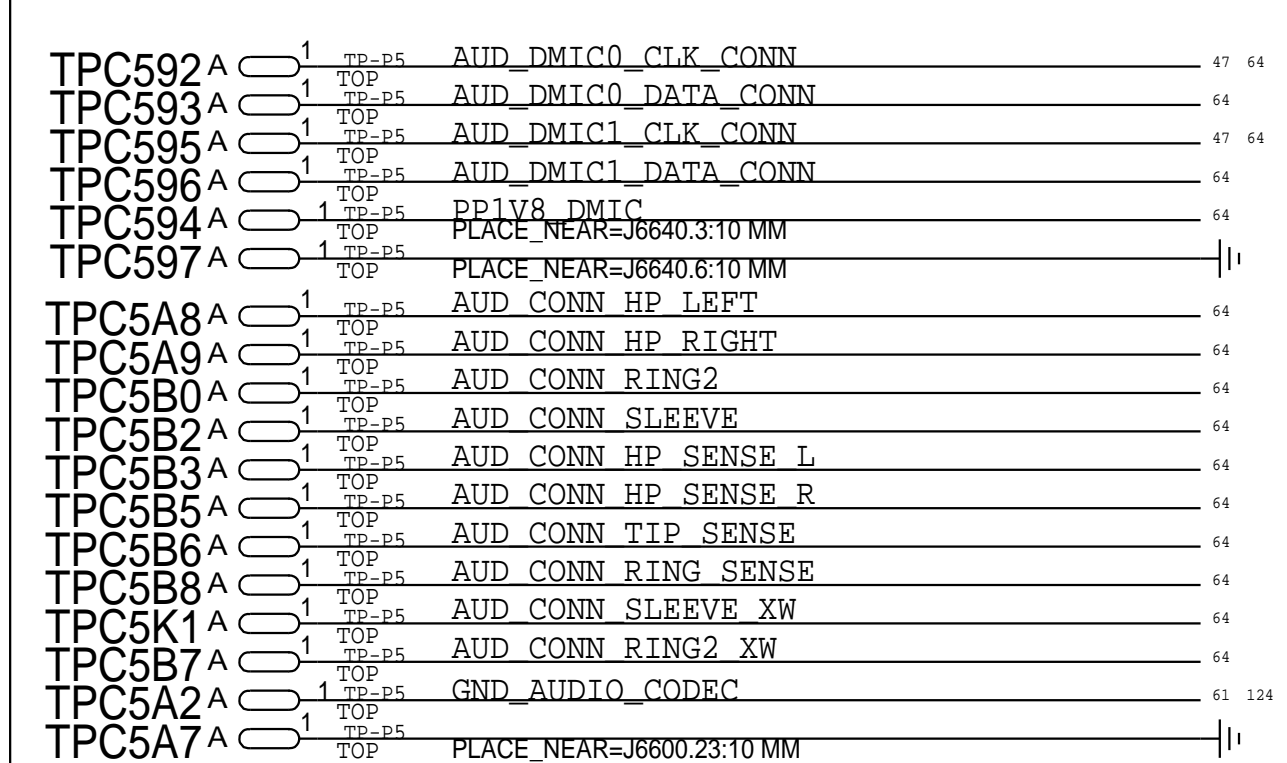
## FAN



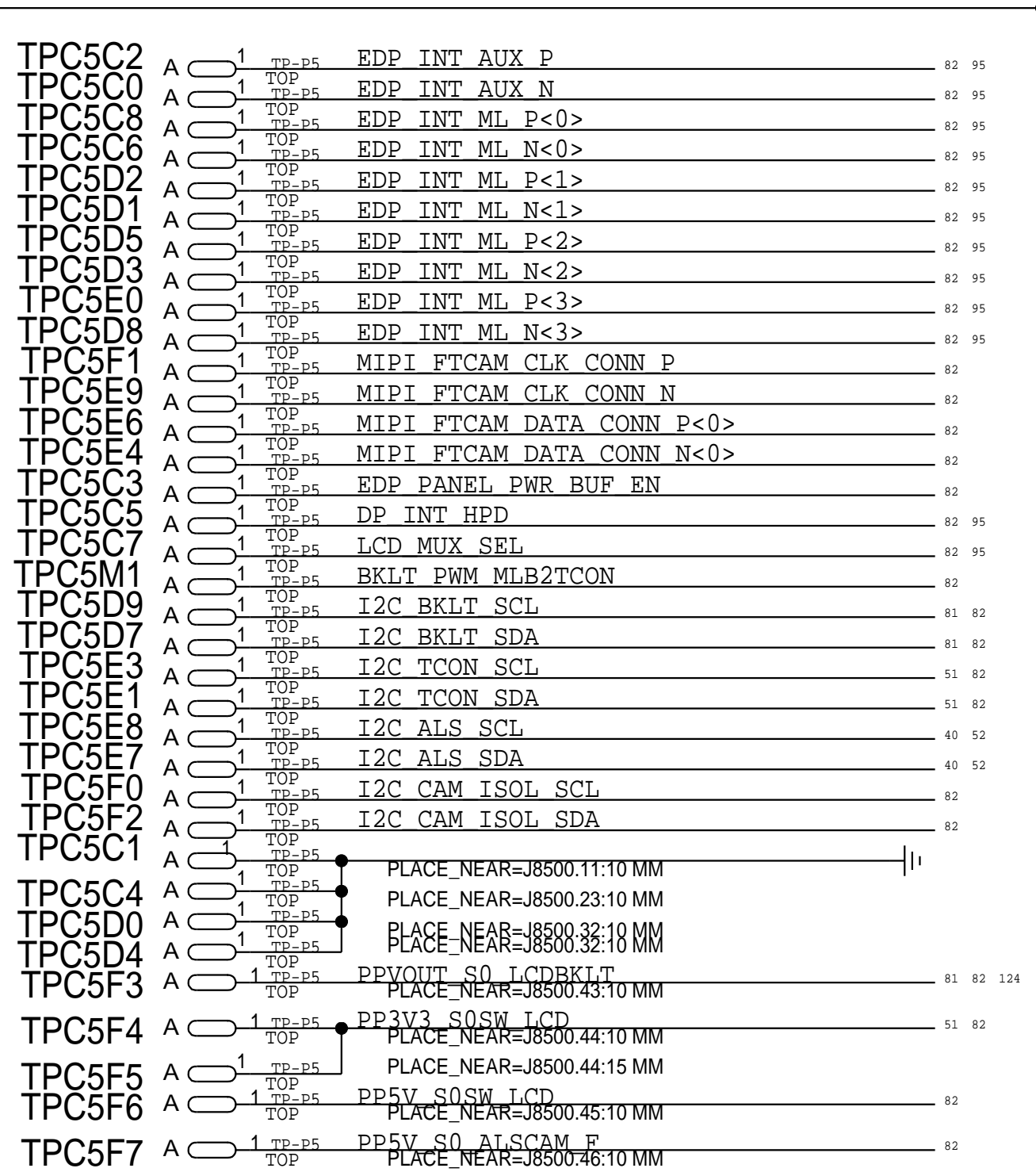
## KEYBOARD



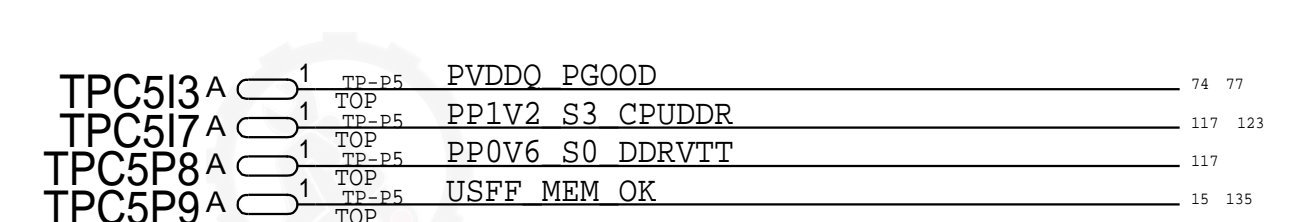
## DMIC AND AUDIO JACK



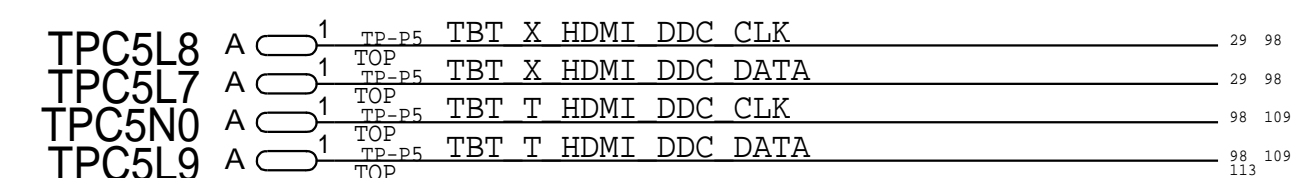
## EDP, CAMERA, ALS



## MEMORY

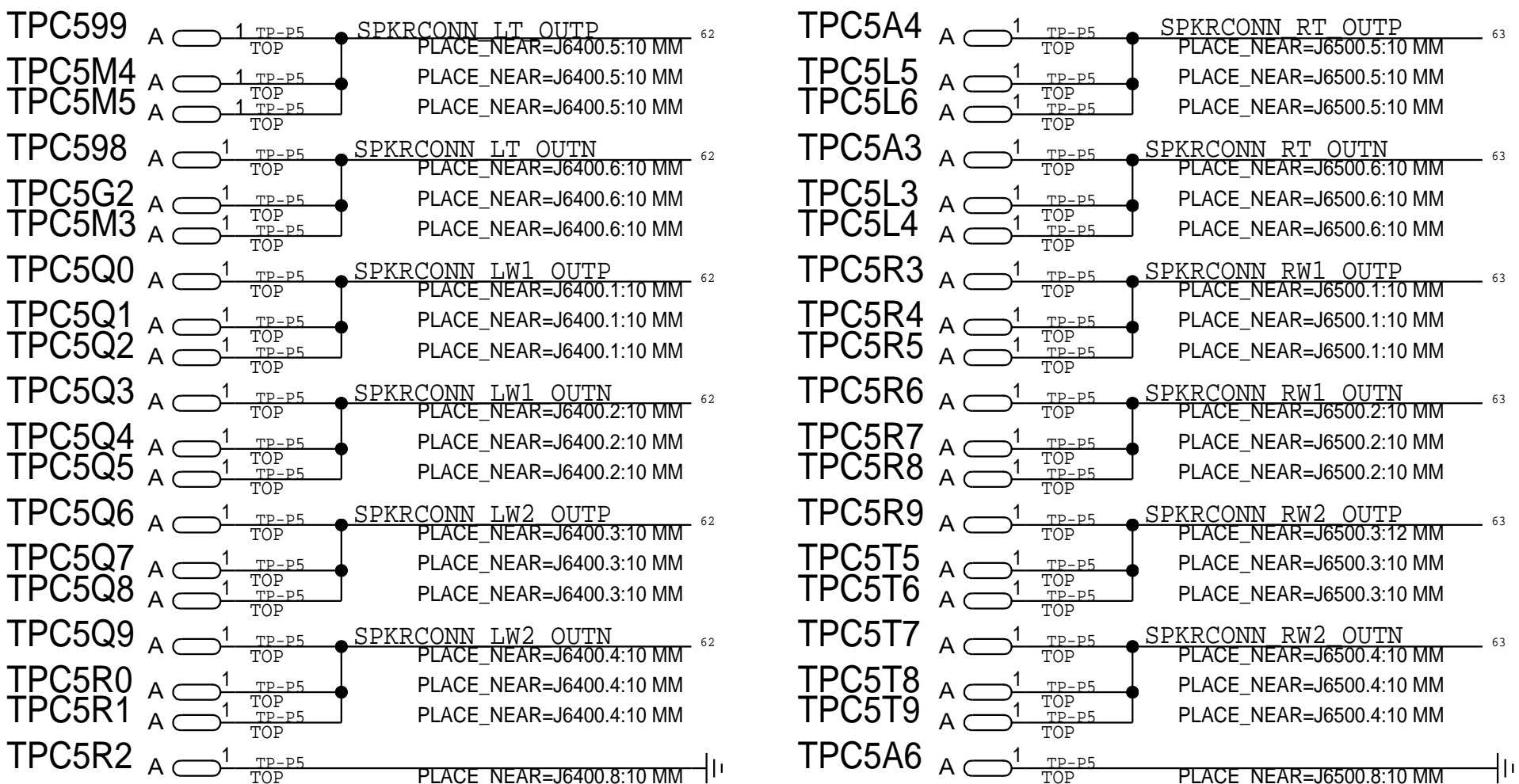


## DP SINK FORCING

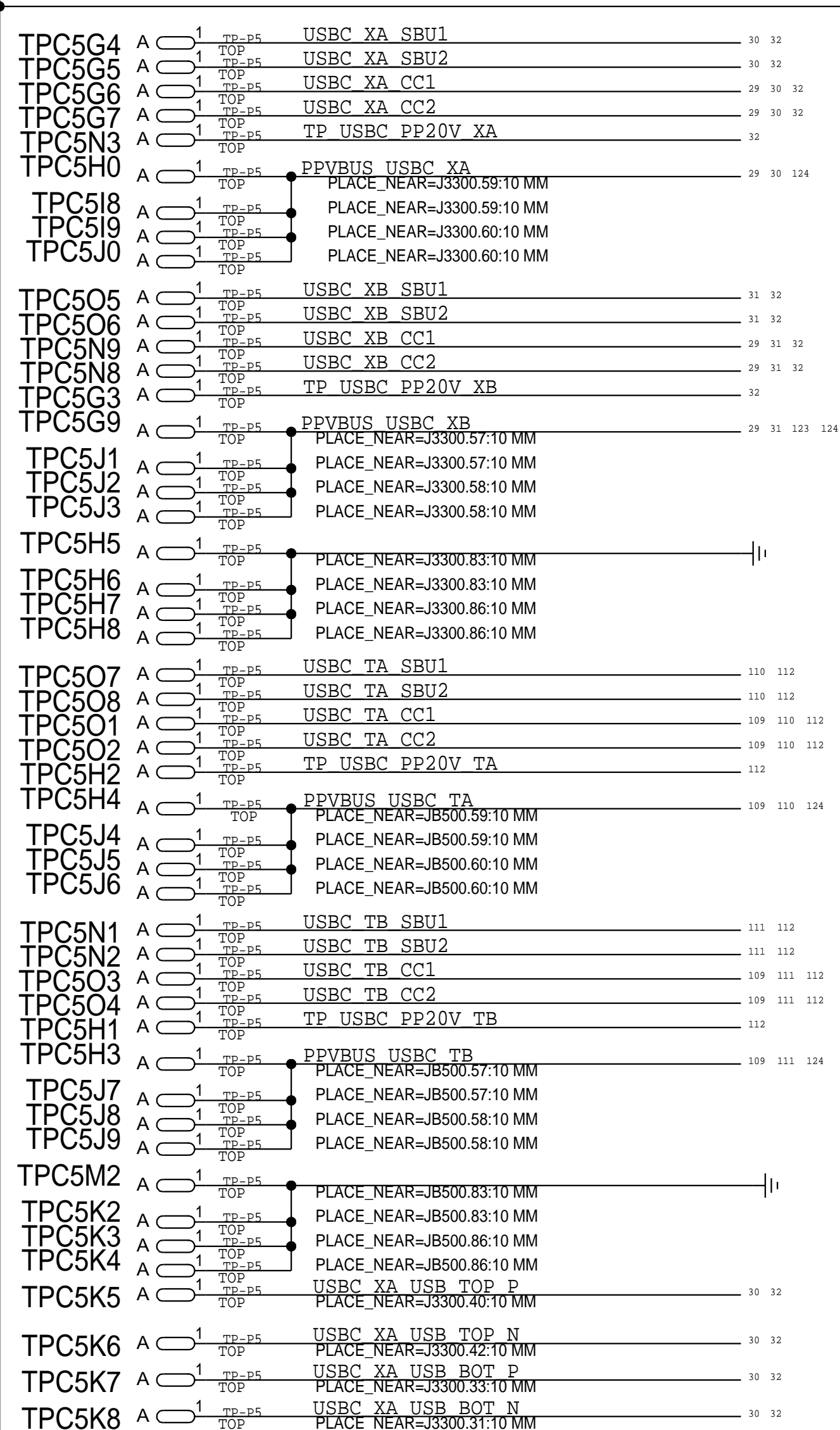


DATA	CLK	ACTION (ON BOOT)
0	0	ONLY SNK0 AVAILABLE
0	1	NORMAL OPERATION
1	0	NO SNKS AVAILABLE
1	1	ONLY SNK1 AVAILABLE

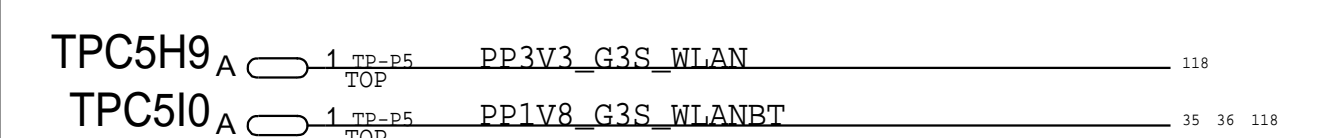
## SPEAKERS



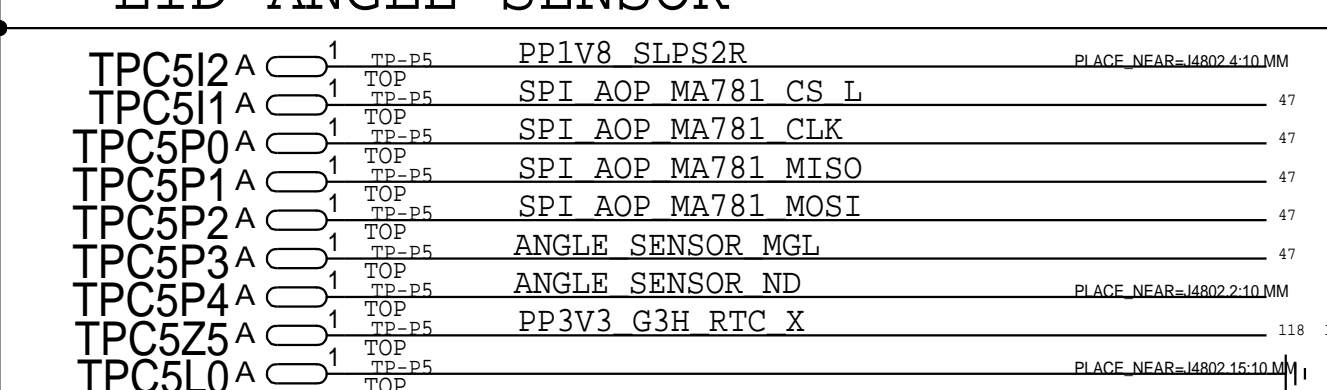
## USBC (PLACE NEAR CONNECTOR)




## WIRELESS



## LID ANGLE SENSOR

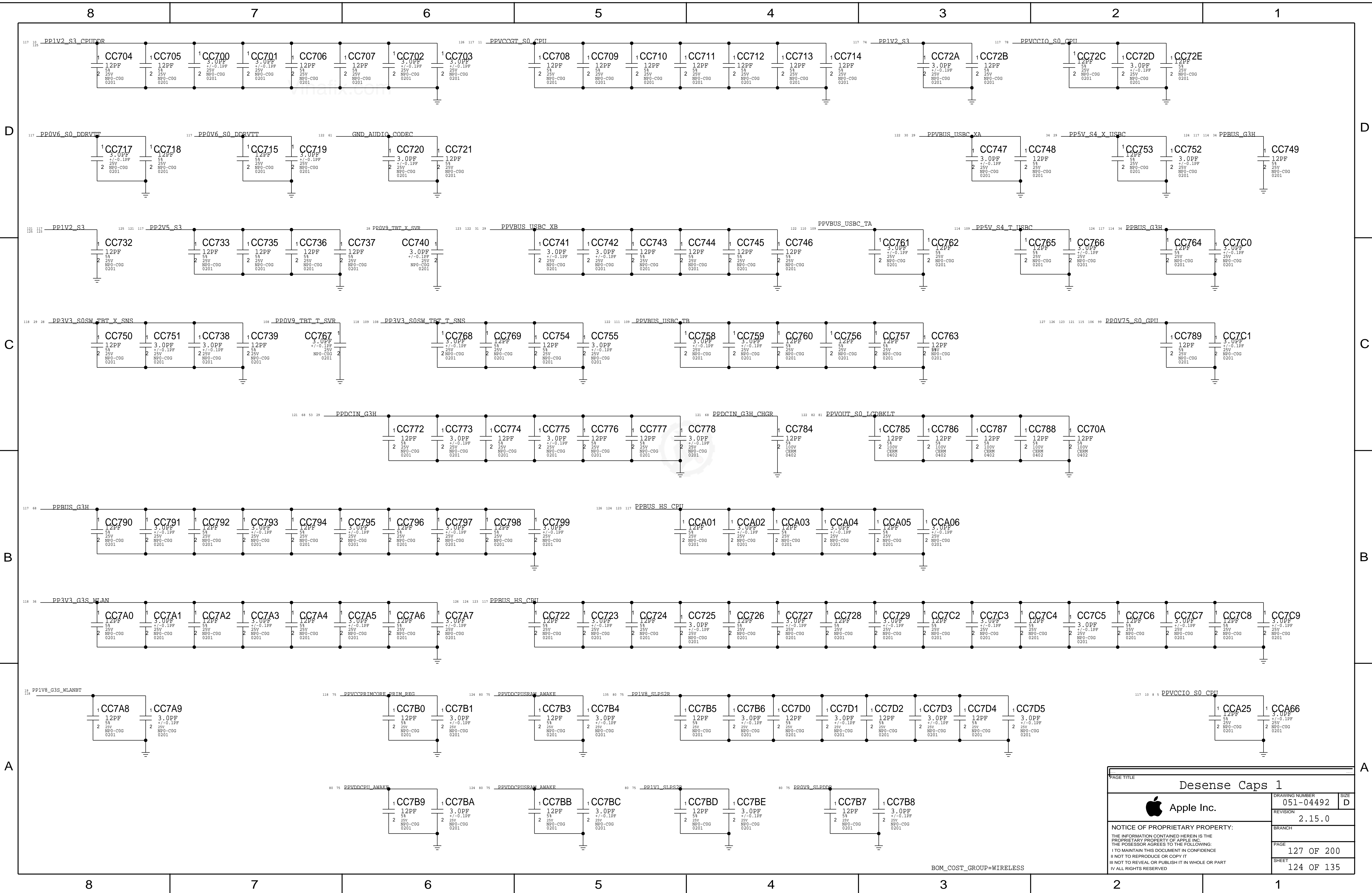


PAGE TITLE		FCT TESTPOINTS 2	
 Apple Inc.		DRAWING NUMBER	051-04492
		REVISION	2.15.0
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		BRANCH	
		PAGE	125 OF 200
		SHEET	122 OF 135

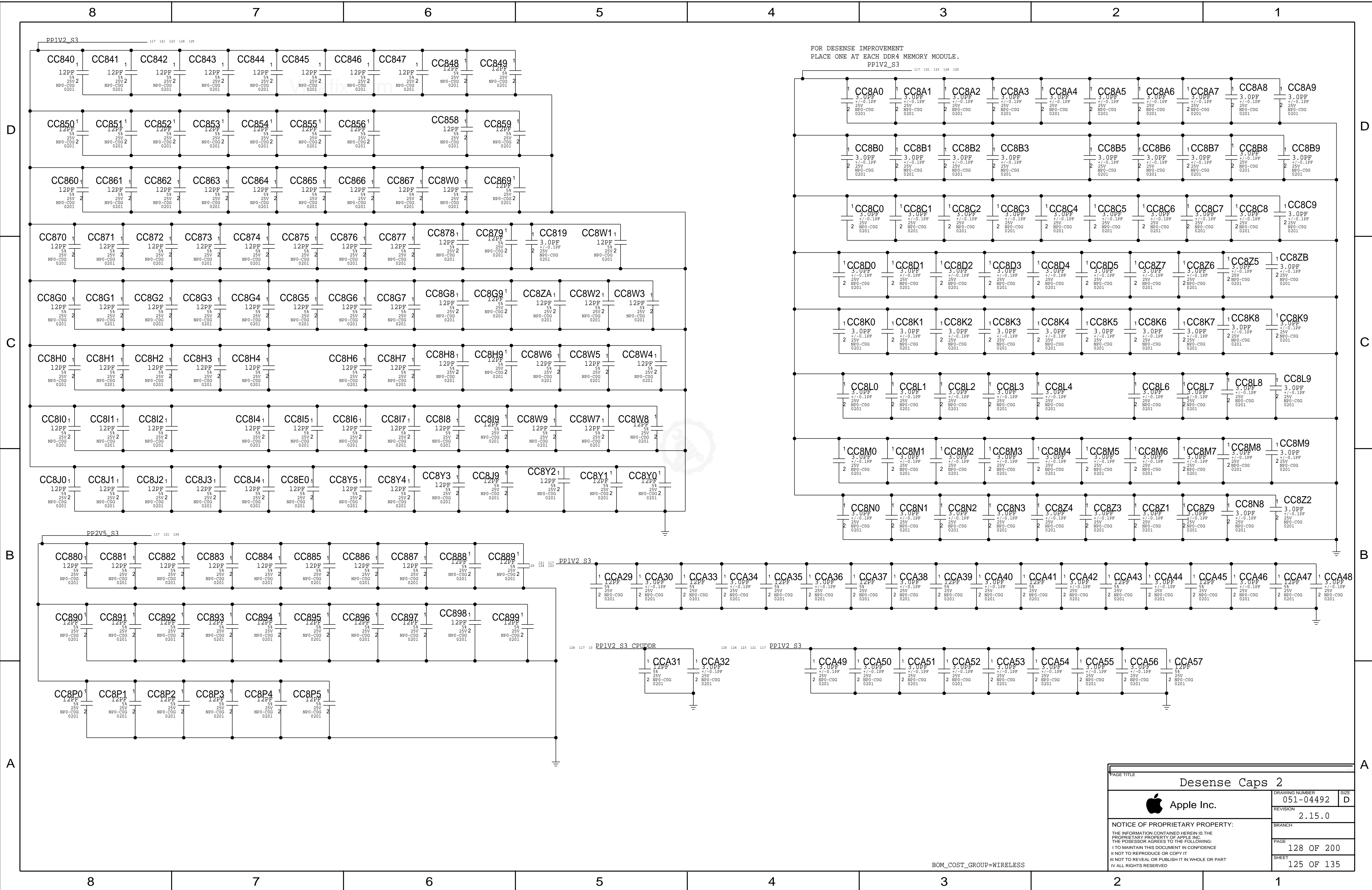




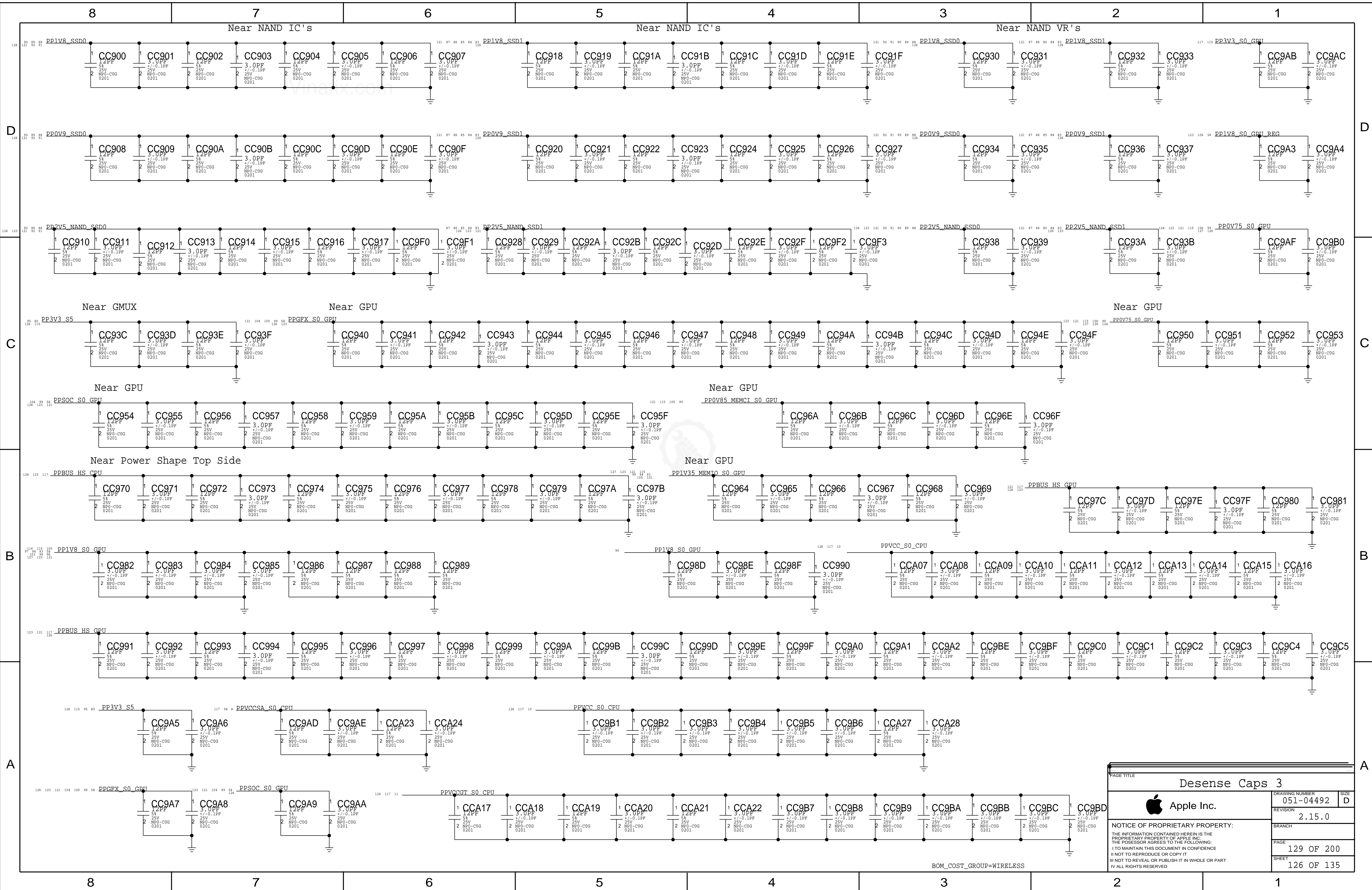




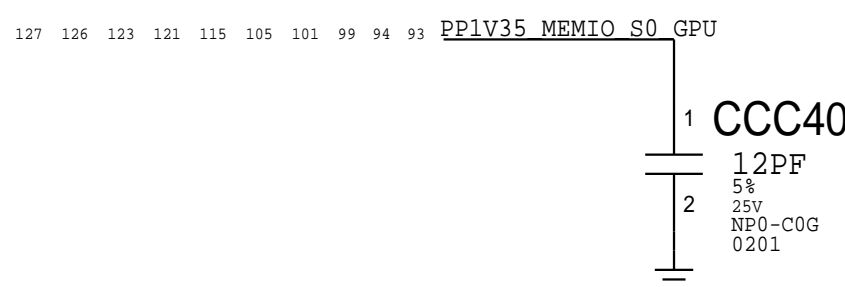
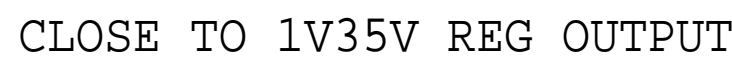
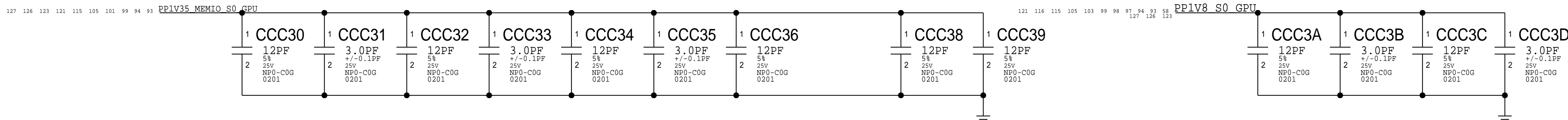
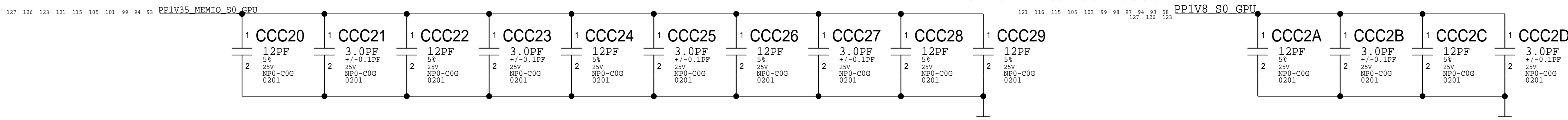
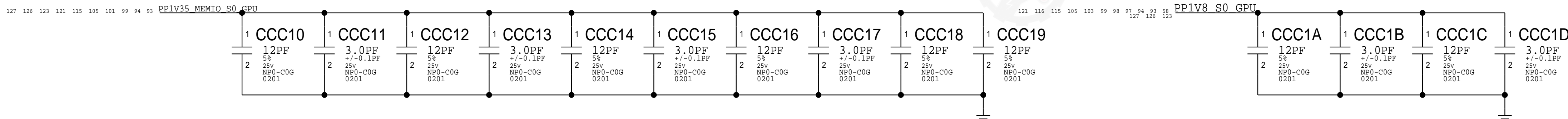
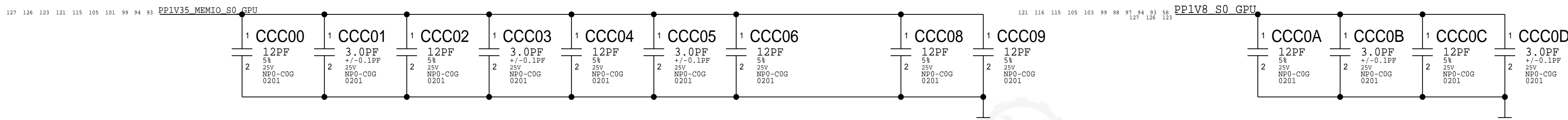
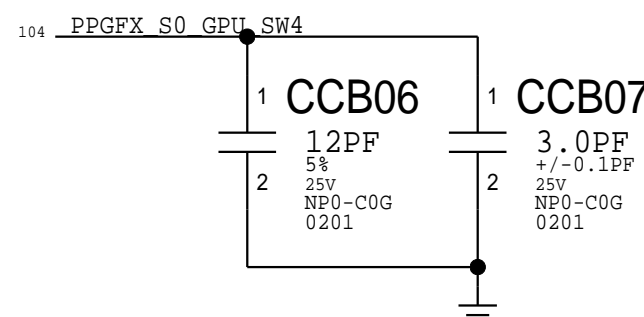
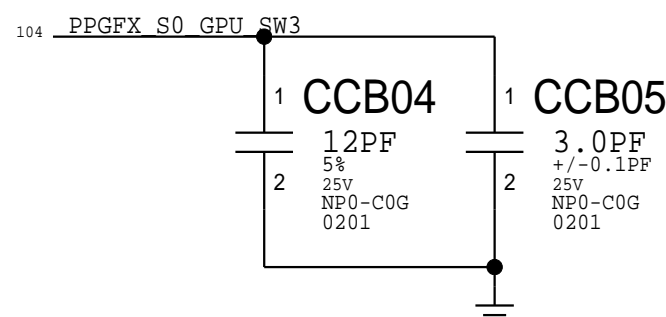
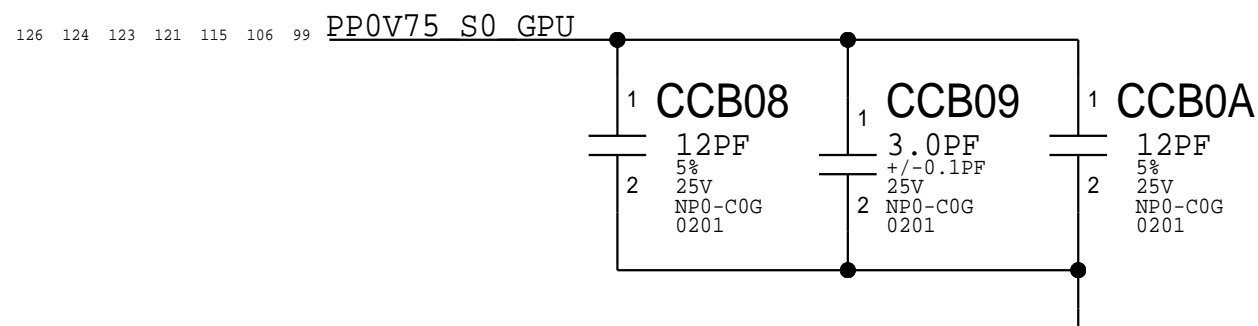
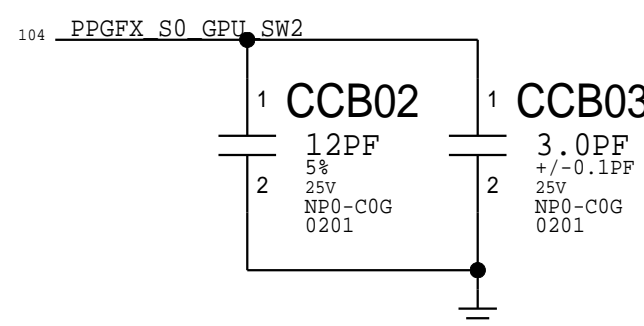
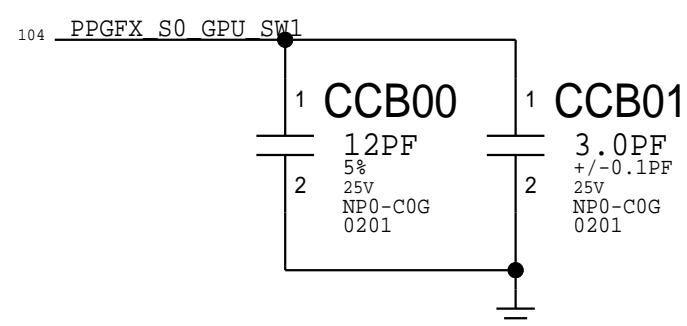
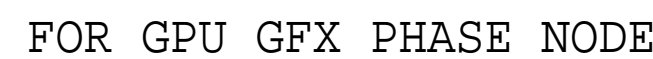













PAGE TITLE			
Desense Caps 4			
 Apple Inc.	DRAWING NUMBER		SIZE
	051-04492		D
	REVISION		
		2.15.0	
NOTICE OF PROPRIETARY PROPERTY:		BRANCH	
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:		PAGE	
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		130 OF 200	
		SHEET	
		127 OF 135	

BOM\_COST\_GROUP=WIRELESS




DDR4 COMMAND/ADDRESS  
Memory Bit/Byte Swizzle

KBL-H DDR4 NET			BIT SWIZZLE		
MAKE_BASE=TRUE					
100	22	MEM_A_DQ<0>		MEM_A_DQ<0>	?
100	22	MEM_A_DQ<1>		MEM_A_DQ<1>	?
100	22	MEM_A_DQ<2>		MEM_A_DQ<2>	?
100	22	MEM_A_DQ<3>		MEM_A_DQ<3>	?
100	22	MEM_A_DQ<4>		MEM_A_DQ<4>	?
100	22	MEM_A_DQ<5>		MEM_A_DQ<5>	?
100	22	MEM_A_DQ<6>		MEM_A_DQ<6>	?
100	22	MEM_A_DQ<7>		MEM_A_DQ<7>	?
100	22	MEM_A_DQ<8>		MEM_A_DQ<8>	?
100	22	MEM_A_DQ<9>		MEM_A_DQ<9>	?
100	22	MEM_A_DQ<10>		MEM_A_DQ<10>	?
100	22	MEM_A_DQ<11>		MEM_A_DQ<11>	?
100	22	MEM_A_DQ<12>		MEM_A_DQ<12>	?
100	22	MEM_A_DQ<13>		MEM_A_DQ<13>	?
100	22	MEM_A_DQ<14>		MEM_A_DQ<14>	?
100	22	MEM_A_DQ<15>		MEM_A_DQ<15>	?
100	22	MEM_A_DQ<16>		MEM_A_DQ<16>	?
100	22	MEM_A_DQ<17>		MEM_A_DQ<17>	?
100	22	MEM_A_DQ<18>		MEM_A_DQ<18>	?
100	22	MEM_A_DQ<19>		MEM_A_DQ<19>	?
100	22	MEM_A_DQ<20>		MEM_A_DQ<20>	?
100	22	MEM_A_DQ<21>		MEM_A_DQ<21>	?
100	22	MEM_A_DQ<22>		MEM_A_DQ<22>	?
100	22	MEM_A_DQ<23>		MEM_A_DQ<23>	?
100	22	MEM_A_DQ<24>		MEM_A_DQ<24>	?
100	22	MEM_A_DQ<25>		MEM_A_DQ<25>	?
100	22	MEM_A_DQ<26>		MEM_A_DQ<26>	?
100	22	MEM_A_DQ<27>		MEM_A_DQ<27>	?
100	22	MEM_A_DQ<28>		MEM_A_DQ<28>	?
100	22	MEM_A_DQ<29>		MEM_A_DQ<29>	?
100	22	MEM_A_DQ<30>		MEM_A_DQ<30>	?
100	22	MEM_A_DQ<31>		MEM_A_DQ<31>	?
100	23	MEM_A_DQ<32>		MEM_A_DQ<32>	?
100	23	MEM_A_DQ<33>		MEM_A_DQ<33>	?
100	23	MEM_A_DQ<34>		MEM_A_DQ<34>	?
100	23	MEM_A_DQ<35>		MEM_A_DQ<35>	?
100	23	MEM_A_DQ<36>		MEM_A_DQ<36>	?
100	23	MEM_A_DQ<37>		MEM_A_DQ<37>	?
100	23	MEM_A_DQ<38>		MEM_A_DQ<38>	?
100	23	MEM_A_DQ<39>		MEM_A_DQ<39>	?
100	23	MEM_A_DQ<40>		MEM_A_DQ<40>	?
100	23	MEM_A_DQ<41>		MEM_A_DQ<41>	?
100	23	MEM_A_DQ<42>		MEM_A_DQ<42>	?
100	23	MEM_A_DQ<43>		MEM_A_DQ<43>	?
100	23	MEM_A_DQ<44>		MEM_A_DQ<44>	?
100	23	MEM_A_DQ<45>		MEM_A_DQ<45>	?
100	23	MEM_A_DQ<46>		MEM_A_DQ<46>	?
100	23	MEM_A_DQ<47>		MEM_A_DQ<47>	?
100	23	MEM_A_DQ<48>		MEM_A_DQ<48>	?
100	23	MEM_A_DQ<49>		MEM_A_DQ<49>	?
100	23	MEM_A_DQ<50>		MEM_A_DQ<50>	?
100	23	MEM_A_DQ<51>		MEM_A_DQ<51>	?
100	23	MEM_A_DQ<52>		MEM_A_DQ<52>	?
100	23	MEM_A_DQ<53>		MEM_A_DQ<53>	?
100	23	MEM_A_DQ<54>		MEM_A_DQ<54>	?
100	23	MEM_A_DQ<55>		MEM_A_DQ<55>	?
100	23	MEM_A_DQ<56>		MEM_A_DQ<56>	?
100	23	MEM_A_DQ<57>		MEM_A_DQ<57>	?
100	23	MEM_A_DQ<58>		MEM_A_DQ<58>	?
100	23	MEM_A_DQ<59>		MEM_A_DQ<59>	?
100	23	MEM_A_DQ<60>		MEM_A_DQ<60>	?
100	23	MEM_A_DQ<61>		MEM_A_DQ<61>	?
100	23	MEM_A_DQ<62>		MEM_A_DQ<62>	?
100	23	MEM_A_DQ<63>		MEM_A_DQ<63>	?


KBL-H DDR4 NET			BIT SWIZZLE		
	MAKE_BASE=TRUE				
120	MEM_B_DQ<0>		MEM_B_DQ<0>		?
120	MEM_B_DQ<1>		MEM_B_DQ<1>		?
120	MEM_B_DQ<2>		MEM_B_DQ<2>		?
120	MEM_B_DQ<3>		MEM_B_DQ<3>		?
120	MEM_B_DQ<4>		MEM_B_DQ<4>		?
120	MEM_B_DQ<5>		MEM_B_DQ<5>		?
120	MEM_B_DQ<6>		MEM_B_DQ<6>		?
120	MEM_B_DQ<7>		MEM_B_DQ<7>		?
120	MEM_B_DQ<8>		MEM_B_DQ<8>		?
120	MEM_B_DQ<9>		MEM_B_DQ<9>		?
120	MEM_B_DQ<10>		MEM_B_DQ<10>		?
120	MEM_B_DQ<11>		MEM_B_DQ<11>		?
120	MEM_B_DQ<12>		MEM_B_DQ<12>		?
120	MEM_B_DQ<13>		MEM_B_DQ<13>		?
120	MEM_B_DQ<14>		MEM_B_DQ<14>		?
120	MEM_B_DQ<15>		MEM_B_DQ<15>		?
120	MEM_B_DQ<16>		MEM_B_DQ<16>		?
120	MEM_B_DQ<17>		MEM_B_DQ<17>		?
120	MEM_B_DQ<18>		MEM_B_DQ<18>		?
120	MEM_B_DQ<19>		MEM_B_DQ<19>		?
120	MEM_B_DQ<20>		MEM_B_DQ<20>		?
120	MEM_B_DQ<21>		MEM_B_DQ<21>		?
120	MEM_B_DQ<22>		MEM_B_DQ<22>		?
120	MEM_B_DQ<23>		MEM_B_DQ<23>		?
120	MEM_B_DQ<24>		MEM_B_DQ<24>		?
120	MEM_B_DQ<25>		MEM_B_DQ<25>		?
120	MEM_B_DQ<26>		MEM_B_DQ<26>		?
120	MEM_B_DQ<27>		MEM_B_DQ<27>		?
120	MEM_B_DQ<28>		MEM_B_DQ<28>		?
120	MEM_B_DQ<29>		MEM_B_DQ<29>		?
120	MEM_B_DQ<30>		MEM_B_DQ<30>		?
120	MEM_B_DQ<31>		MEM_B_DQ<31>		?
120	MEM_B_DQ<32>		MEM_B_DQ<32>		?
120	MEM_B_DQ<33>		MEM_B_DQ<33>		?
120	MEM_B_DQ<34>		MEM_B_DQ<34>		?
120	MEM_B_DQ<35>		MEM_B_DQ<35>		?
120	MEM_B_DQ<36>		MEM_B_DQ<36>		?
120	MEM_B_DQ<37>		MEM_B_DQ<37>		?
120	MEM_B_DQ<38>		MEM_B_DQ<38>		?
120	MEM_B_DQ<39>		MEM_B_DQ<39>		?
120	MEM_B_DQ<40>		MEM_B_DQ<40>		?
120	MEM_B_DQ<41>		MEM_B_DQ<41>		?
120	MEM_B_DQ<42>		MEM_B_DQ<42>		?
120	MEM_B_DQ<43>		MEM_B_DQ<43>		?
120	MEM_B_DQ<44>		MEM_B_DQ<44>		?
120	MEM_B_DQ<45>		MEM_B_DQ<45>		?
120	MEM_B_DQ<46>		MEM_B_DQ<46>		?
120	MEM_B_DQ<47>		MEM_B_DQ<47>		?
120	MEM_B_DQ<48>		MEM_B_DQ<48>		?
120	MEM_B_DQ<49>		MEM_B_DQ<49>		?
120	MEM_B_DQ<50>		MEM_B_DQ<50>		?
120	MEM_B_DQ<51>		MEM_B_DQ<51>		?
120	MEM_B_DQ<52>		MEM_B_DQ<52>		?
120	MEM_B_DQ<53>		MEM_B_DQ<53>		?
120	MEM_B_DQ<54>		MEM_B_DQ<54>		?
120	MEM_B_DQ<55>		MEM_B_DQ<55>		?
120	MEM_B_DQ<56>		MEM_B_DQ<56>		?
120	MEM_B_DQ<57>		MEM_B_DQ<57>		?
120	MEM_B_DQ<58>		MEM_B_DQ<58>		?
120	MEM_B_DQ<59>		MEM_B_DQ<59>		?
120	MEM_B_DQ<60>		MEM_B_DQ<60>		?
120	MEM_B_DQ<61>		MEM_B_DQ<61>		?
120	MEM_B_DQ<62>		MEM_B_DQ<62>		?
120	MEM_B_DQ<63>		MEM_B_DQ<63>		?

WAKE_BASE				
120	22	<u>TRUE</u>	<u>MEM_A_DQS_P&lt;0&gt;</u>	<u>== MEM_A_DQS_P&lt;0&gt;</u>
120	22	<u>TRUE</u>	<u>MEM_A_DQS_N&lt;0&gt;</u>	<u>== MEM_A_DQS_N&lt;0&gt;</u>
120	22	<u>TRUE</u>	<u>MEM_A_DQS_P&lt;1&gt;</u>	<u>== MEM_A_DQS_P&lt;1&gt;</u>
120	22	<u>TRUE</u>	<u>MEM_A_DQS_N&lt;1&gt;</u>	<u>== MEM_A_DQS_N&lt;1&gt;</u>
120	22	<u>TRUE</u>	<u>MEM_A_DQS_P&lt;2&gt;</u>	<u>== MEM_A_DQS_P&lt;2&gt;</u>
120	22	<u>TRUE</u>	<u>MEM_A_DQS_N&lt;2&gt;</u>	<u>== MEM_A_DQS_N&lt;2&gt;</u>
120	22	<u>TRUE</u>	<u>MEM_A_DQS_P&lt;3&gt;</u>	<u>== MEM_A_DQS_P&lt;3&gt;</u>
120	22	<u>TRUE</u>	<u>MEM_A_DQS_N&lt;3&gt;</u>	<u>== MEM_A_DQS_N&lt;3&gt;</u>
120	23	<u>TRUE</u>	<u>MEM_A_DQS_P&lt;4&gt;</u>	<u>== MEM_A_DQS_P&lt;4&gt;</u>
120	23	<u>TRUE</u>	<u>MEM_A_DQS_N&lt;4&gt;</u>	<u>== MEM_A_DQS_N&lt;4&gt;</u>
120	23	<u>TRUE</u>	<u>MEM_A_DQS_P&lt;5&gt;</u>	<u>== MEM_A_DQS_P&lt;5&gt;</u>
120	23	<u>TRUE</u>	<u>MEM_A_DQS_N&lt;5&gt;</u>	<u>== MEM_A_DQS_N&lt;5&gt;</u>
120	23	<u>TRUE</u>	<u>MEM_A_DQS_P&lt;6&gt;</u>	<u>== MEM_A_DQS_P&lt;6&gt;</u>
120	23	<u>TRUE</u>	<u>MEM_A_DQS_N&lt;6&gt;</u>	<u>== MEM_A_DQS_N&lt;6&gt;</u>
120	23	<u>TRUE</u>	<u>MEM_A_DQS_P&lt;7&gt;</u>	<u>== MEM_A_DQS_P&lt;7&gt;</u>
120	23	<u>TRUE</u>	<u>MEM_A_DQS_N&lt;7&gt;</u>	<u>== MEM_A_DQS_N&lt;7&gt;</u>

WAKE_BASE				
120	24	TRUE	MEM_B_DQS_P<0>	== MEM_B_DQS_P<0>
120	24	TRUE	MEM_B_DQS_N<0>	== MEM_B_DQS_N<0>
120	24	TRUE	MEM_B_DQS_P<1>	== MEM_B_DQS_P<1>
120	24	TRUE	MEM_B_DQS_N<1>	== MEM_B_DQS_N<1>
120	24	TRUE	MEM_B_DQS_P<2>	== MEM_B_DQS_P<2>
120	24	TRUE	MEM_B_DQS_N<2>	== MEM_B_DQS_N<2>
120	24	TRUE	MEM_B_DQS_P<3>	== MEM_B_DQS_P<3>
120	24	TRUE	MEM_B_DQS_N<3>	== MEM_B_DQS_N<3>
120	25	TRUE	MEM_B_DQS_P<4>	== MEM_B_DQS_P<4>
120	25	TRUE	MEM_B_DQS_N<4>	== MEM_B_DQS_N<4>
120	25	TRUE	MEM_B_DQS_P<5>	== MEM_B_DQS_P<5>
120	25	TRUE	MEM_B_DQS_N<5>	== MEM_B_DQS_N<5>
120	25	TRUE	MEM_B_DQS_P<6>	== MEM_B_DQS_P<6>
120	25	TRUE	MEM_B_DQS_N<6>	== MEM_B_DQS_N<6>
120	25	TRUE	MEM_B_DQS_P<7>	== MEM_B_DQS_P<7>
120	25	TRUE	MEM_B_DQS_N<7>	== MEM_B_DQS_N<7>

PAGE TITLE		DRAWING NUMBER		SIZE
Memory Bite/Byte Swizzle		051-04492	D	
 Apple Inc.		REVISION		
		2.15.0		
NOTICE OF PROPRIETARY PROPERTY:		BRANCH		
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		PAGE		
		131 OF 200		
		SHEET		
		128 OF 135		



SYNCH_MASTER=ANDY		SYNCH_DATE=10/14/2018	
PAGE TITLE			
Debug			
 Apple Inc.		DRAWING NUMBER	
		051-04492	
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I. TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		SIZE	
		D	
		REVISION	
		2.15.0	
		BRANCH	
		PAGE	
		140 OF 200	
		SHEET	
		129 OF 135	



8	7	6	5	4	3	2	1				
<div>Proto XTA BOMs</div> <table><tr><td>BOM NUMBER</td><td>BOM NAME</td><td>BOM OPTIONS</td></tr></table>								BOM NUMBER	BOM NAME	BOM OPTIONS	
BOM NUMBER	BOM NAME	BOM OPTIONS									

Proto XTA BOMs

BOM NUMBER	BOM NAME	BOM OPTIONS
------------	----------	-------------

Vinafix.com



PAGE TITLE			BOM 639 XTA		
DRAWING NUMBER		051-04492	SIZE		D
REVISION		2.15.0			
NOTICE OF PROPRIETARY PROPERTY: <small>THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED</small>		BRANCH			
		PAGE			
		141 OF 200			
		SHEET			
		130 OF 135			



8	7	6	5	4	3	2	1			
Proto XLA BOMs										
<table><tr><td>BOM NUMBER</td><td>BOM NAME</td><td>BOM OPTIONS</td></tr></table>								BOM NUMBER	BOM NAME	BOM OPTIONS
BOM NUMBER	BOM NAME	BOM OPTIONS								
D							D			
C							C			
B							B			
A							A			
8	7	6	5	4	3	2	1			



PAGE TITLE			BOM 639 XLA		
		DRAWING NUMBER	051-04492	SIZE	D
		REVISION	2.15.0		
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE II NOT TO REPRODUCE OR COPY IT III NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART IV ALL RIGHTS RESERVED		BRANCH		PAGE	
				143 OF 200	
		SHEET		131 OF 135	



8		7		6		5		4		3		2		1																														
D	<table><tr><th>BOM NUMBER</th><th>BOM NAME</th><th>BOM OPTIONS</th></tr><tr><td>639-08595</td><td>MLB,8C-2.4G,MC-16,ULA,SS-8GB,TS-1TB,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.4G,MEM:MC-16GB,GPU:ULA,VRAM:SS-8GB,SSD:TS-1TB</td></tr><tr><td>639-08596</td><td>MLB,8C-2.3G,HY-16,ULA,SS-4GB,WD-2TB,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:HY-16GB,GPU:ULA,VRAM:SS-4GB,SSD:WD-2TB</td></tr><tr><td>639-08597</td><td>MLB,6C-2.6G,MC-16,PRA,SS-4GB,TS-2TB,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-16GB,GPU:PRA,VRAM:SS-4GB,SSD:TS-2TB</td></tr><tr><td>639-08598</td><td>MLB,8C-2.4G,HY-32,ULA,MC-4GB,WD-8TB,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.4G,MEM:HY-32GB,GPU:ULA,VRAM:MC-4GB,SSD:WD-8TB</td></tr><tr><td>639-08599</td><td>MLB,6C-2.6G,MC-32,PRA,MC-4GB,SS-512,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-32GB,GPU:PRA,VRAM:MC-4GB,SSD:SS-512</td></tr><tr><td>639-08600</td><td>MLB,8C-2.4G,MC-64,ULA,SS-8GB,HY-4TB,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.4G,MEM:MC-64GB,GPU:ULA,VRAM:SS-8GB,SSD:HY-4TB</td></tr><tr><td>639-08601</td><td>MLB,8C-2.4G,HY-16,ULA,SS-4GB,TS-512,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.4G,MEM:HY-16GB,GPU:ULA,VRAM:SS-4GB,SSD:TS-512</td></tr><tr><td>639-08602</td><td>MLB,8C-2.3G,HY-32,PRA,SS-4GB,WD-4TB,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:HY-32GB,GPU:PRA,VRAM:SS-4GB,SSD:WD-4TB</td></tr><tr><td>639-08603</td><td>MLB,8C-2.3G,MC-16,PRA,MC-4GB,WD-8TB,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:MC-16GB,GPU:PRA,VRAM:MC-4GB,SSD:WD-8TB</td></tr></table>													BOM NUMBER	BOM NAME	BOM OPTIONS	639-08595	MLB,8C-2.4G,MC-16,ULA,SS-8GB,TS-1TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.4G,MEM:MC-16GB,GPU:ULA,VRAM:SS-8GB,SSD:TS-1TB	639-08596	MLB,8C-2.3G,HY-16,ULA,SS-4GB,WD-2TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:HY-16GB,GPU:ULA,VRAM:SS-4GB,SSD:WD-2TB	639-08597	MLB,6C-2.6G,MC-16,PRA,SS-4GB,TS-2TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-16GB,GPU:PRA,VRAM:SS-4GB,SSD:TS-2TB	639-08598	MLB,8C-2.4G,HY-32,ULA,MC-4GB,WD-8TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.4G,MEM:HY-32GB,GPU:ULA,VRAM:MC-4GB,SSD:WD-8TB	639-08599	MLB,6C-2.6G,MC-32,PRA,MC-4GB,SS-512,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-32GB,GPU:PRA,VRAM:MC-4GB,SSD:SS-512	639-08600	MLB,8C-2.4G,MC-64,ULA,SS-8GB,HY-4TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.4G,MEM:MC-64GB,GPU:ULA,VRAM:SS-8GB,SSD:HY-4TB	639-08601	MLB,8C-2.4G,HY-16,ULA,SS-4GB,TS-512,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.4G,MEM:HY-16GB,GPU:ULA,VRAM:SS-4GB,SSD:TS-512	639-08602	MLB,8C-2.3G,HY-32,PRA,SS-4GB,WD-4TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:HY-32GB,GPU:PRA,VRAM:SS-4GB,SSD:WD-4TB	639-08603	MLB,8C-2.3G,MC-16,PRA,MC-4GB,WD-8TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:MC-16GB,GPU:PRA,VRAM:MC-4GB,SSD:WD-8TB	D
	BOM NUMBER	BOM NAME	BOM OPTIONS																																									
	639-08595	MLB,8C-2.4G,MC-16,ULA,SS-8GB,TS-1TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.4G,MEM:MC-16GB,GPU:ULA,VRAM:SS-8GB,SSD:TS-1TB																																									
	639-08596	MLB,8C-2.3G,HY-16,ULA,SS-4GB,WD-2TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:HY-16GB,GPU:ULA,VRAM:SS-4GB,SSD:WD-2TB																																									
	639-08597	MLB,6C-2.6G,MC-16,PRA,SS-4GB,TS-2TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-16GB,GPU:PRA,VRAM:SS-4GB,SSD:TS-2TB																																									
	639-08598	MLB,8C-2.4G,HY-32,ULA,MC-4GB,WD-8TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.4G,MEM:HY-32GB,GPU:ULA,VRAM:MC-4GB,SSD:WD-8TB																																									
	639-08599	MLB,6C-2.6G,MC-32,PRA,MC-4GB,SS-512,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-32GB,GPU:PRA,VRAM:MC-4GB,SSD:SS-512																																									
	639-08600	MLB,8C-2.4G,MC-64,ULA,SS-8GB,HY-4TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.4G,MEM:MC-64GB,GPU:ULA,VRAM:SS-8GB,SSD:HY-4TB																																									
	639-08601	MLB,8C-2.4G,HY-16,ULA,SS-4GB,TS-512,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.4G,MEM:HY-16GB,GPU:ULA,VRAM:SS-4GB,SSD:TS-512																																									
	639-08602	MLB,8C-2.3G,HY-32,PRA,SS-4GB,WD-4TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:HY-32GB,GPU:PRA,VRAM:SS-4GB,SSD:WD-4TB																																									
639-08603	MLB,8C-2.3G,MC-16,PRA,MC-4GB,WD-8TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:MC-16GB,GPU:PRA,VRAM:MC-4GB,SSD:WD-8TB																																										
<table><tr><th>BOM NUMBER</th><th>BOM NAME</th><th>BOM OPTIONS</th></tr><tr><td>939-08060</td><td>MLB,NO CPU,NO GPU,NO SSD,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV</td></tr><tr><td>939-08061</td><td>MLB,CPU INTERPOSER,NO GPU,NO SSD,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:INTERPOSER</td></tr><tr><td>939-08062</td><td>MLB,NO CPU,GPU ADPTR VDDCR,NO SSD,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,GPU:ADPTR_VDDCR</td></tr><tr><td>939-08063</td><td>MLB,NO CPU,GPU ADPTR VMEM,NO SSD,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,GPU:ADPTR_VMEM</td></tr><tr><td>939-08197</td><td>MLB,6C-2.6G,MC-32,UFU,SS-8GB,WD-4TB,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-32GB,GPU:UFU,VRAM:SS-8GB,SSD:WD-4TB</td></tr><tr><td>939-08198</td><td>MLB,6C-2.6G,MC-32,USU,SS-8GB,WD-4TB,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-32GB,GPU:USU,VRAM:SS-8GB,SSD:WD-4TB</td></tr><tr><td>939-08199</td><td>MLB,8C-2.3G,HY-16,UFU,MC-4GB,TS-1TB,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:HY-16GB,GPU:UFU,VRAM:MC-4GB,SSD:TS-1TB</td></tr><tr><td>939-08200</td><td>MLB,8C-2.3G,HY-16,USU,MC-4GB,TS-1TB,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:HY-16GB,GPU:USU,VRAM:MC-4GB,SSD:TS-1TB</td></tr><tr><td>939-08201</td><td>MLB,8C-2.3G,HY-16,UFU,SS-4GB,TS-512,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:HY-16GB,GPU:UFU,VRAM:SS-4GB,SSD:TS-512</td></tr></table>													BOM NUMBER	BOM NAME	BOM OPTIONS	939-08060	MLB,NO CPU,NO GPU,NO SSD,X970	ALTERNATE,BOM_BASE,BOM_DEV	939-08061	MLB,CPU INTERPOSER,NO GPU,NO SSD,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:INTERPOSER	939-08062	MLB,NO CPU,GPU ADPTR VDDCR,NO SSD,X970	ALTERNATE,BOM_BASE,BOM_DEV,GPU:ADPTR_VDDCR	939-08063	MLB,NO CPU,GPU ADPTR VMEM,NO SSD,X970	ALTERNATE,BOM_BASE,BOM_DEV,GPU:ADPTR_VMEM	939-08197	MLB,6C-2.6G,MC-32,UFU,SS-8GB,WD-4TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-32GB,GPU:UFU,VRAM:SS-8GB,SSD:WD-4TB	939-08198	MLB,6C-2.6G,MC-32,USU,SS-8GB,WD-4TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-32GB,GPU:USU,VRAM:SS-8GB,SSD:WD-4TB	939-08199	MLB,8C-2.3G,HY-16,UFU,MC-4GB,TS-1TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:HY-16GB,GPU:UFU,VRAM:MC-4GB,SSD:TS-1TB	939-08200	MLB,8C-2.3G,HY-16,USU,MC-4GB,TS-1TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:HY-16GB,GPU:USU,VRAM:MC-4GB,SSD:TS-1TB	939-08201	MLB,8C-2.3G,HY-16,UFU,SS-4GB,TS-512,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:HY-16GB,GPU:UFU,VRAM:SS-4GB,SSD:TS-512	C	
BOM NUMBER	BOM NAME	BOM OPTIONS																																										
939-08060	MLB,NO CPU,NO GPU,NO SSD,X970	ALTERNATE,BOM_BASE,BOM_DEV																																										
939-08061	MLB,CPU INTERPOSER,NO GPU,NO SSD,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:INTERPOSER																																										
939-08062	MLB,NO CPU,GPU ADPTR VDDCR,NO SSD,X970	ALTERNATE,BOM_BASE,BOM_DEV,GPU:ADPTR_VDDCR																																										
939-08063	MLB,NO CPU,GPU ADPTR VMEM,NO SSD,X970	ALTERNATE,BOM_BASE,BOM_DEV,GPU:ADPTR_VMEM																																										
939-08197	MLB,6C-2.6G,MC-32,UFU,SS-8GB,WD-4TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-32GB,GPU:UFU,VRAM:SS-8GB,SSD:WD-4TB																																										
939-08198	MLB,6C-2.6G,MC-32,USU,SS-8GB,WD-4TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-32GB,GPU:USU,VRAM:SS-8GB,SSD:WD-4TB																																										
939-08199	MLB,8C-2.3G,HY-16,UFU,MC-4GB,TS-1TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:HY-16GB,GPU:UFU,VRAM:MC-4GB,SSD:TS-1TB																																										
939-08200	MLB,8C-2.3G,HY-16,USU,MC-4GB,TS-1TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:HY-16GB,GPU:USU,VRAM:MC-4GB,SSD:TS-1TB																																										
939-08201	MLB,8C-2.3G,HY-16,UFU,SS-4GB,TS-512,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:HY-16GB,GPU:UFU,VRAM:SS-4GB,SSD:TS-512																																										
<table><tr><th>BOM NUMBER</th><th>BOM NAME</th><th>BOM OPTIONS</th></tr><tr><td>939-08202</td><td>MLB,8C-2.3G,HY-16,USU,SS-4GB,TS-512,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:HY-16GB,GPU:USU,VRAM:SS-4GB,SSD:TS-512</td></tr><tr><td>939-08203</td><td>MLB,6C-2.6G,HY-32,UFS,HY-8GB,WD-8TB,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:HY-32GB,GPU:UFS,VRAM:HY-8GB,SSD:WD-8TB</td></tr><tr><td>939-08204</td><td>MLB,6C-2.6G,HY-32,USS,HY-8GB,WD-8TB,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:HY-32GB,GPU:USS,VRAM:HY-8GB,SSD:WD-8TB</td></tr><tr><td>939-08312</td><td>MLB,8C-2.3G,MC-16,UFU,SS-8GB,TS-1TB,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:MC-16GB,GPU:UFU,VRAM:SS-8GB,SSD:TS-1TB</td></tr><tr><td>939-08313</td><td>MLB,8C-2.3G,MC-16,USU,SS-8GB,TS-1TB,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:MC-16GB,GPU:USU,VRAM:SS-8GB,SSD:TS-1TB</td></tr><tr><td>939-08203</td><td>MLB,6C-2.6G,HY-32,UFS,HY-8GB,WD-8TB,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:HY-32GB,GPU:UFS,VRAM:HY-8GB,SSD:WD-8TB</td></tr><tr><td>939-08204</td><td>MLB,6C-2.6G,HY-32,USS,HY-8GB,WD-8TB,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:HY-32GB,GPU:USS,VRAM:HY-8GB,SSD:WD-8TB</td></tr><tr><td>939-08312</td><td>MLB,8C-2.3G,MC-16,UFU,SS-8GB,TS-1TB,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:MC-16GB,GPU:UFU,VRAM:SS-8GB,SSD:TS-1TB</td></tr><tr><td>939-08313</td><td>MLB,8C-2.3G,MC-16,USU,SS-8GB,TS-1TB,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:MC-16GB,GPU:USU,VRAM:SS-8GB,SSD:TS-1TB</td></tr></table>													BOM NUMBER	BOM NAME	BOM OPTIONS	939-08202	MLB,8C-2.3G,HY-16,USU,SS-4GB,TS-512,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:HY-16GB,GPU:USU,VRAM:SS-4GB,SSD:TS-512	939-08203	MLB,6C-2.6G,HY-32,UFS,HY-8GB,WD-8TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:HY-32GB,GPU:UFS,VRAM:HY-8GB,SSD:WD-8TB	939-08204	MLB,6C-2.6G,HY-32,USS,HY-8GB,WD-8TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:HY-32GB,GPU:USS,VRAM:HY-8GB,SSD:WD-8TB	939-08312	MLB,8C-2.3G,MC-16,UFU,SS-8GB,TS-1TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:MC-16GB,GPU:UFU,VRAM:SS-8GB,SSD:TS-1TB	939-08313	MLB,8C-2.3G,MC-16,USU,SS-8GB,TS-1TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:MC-16GB,GPU:USU,VRAM:SS-8GB,SSD:TS-1TB	939-08203	MLB,6C-2.6G,HY-32,UFS,HY-8GB,WD-8TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:HY-32GB,GPU:UFS,VRAM:HY-8GB,SSD:WD-8TB	939-08204	MLB,6C-2.6G,HY-32,USS,HY-8GB,WD-8TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:HY-32GB,GPU:USS,VRAM:HY-8GB,SSD:WD-8TB	939-08312	MLB,8C-2.3G,MC-16,UFU,SS-8GB,TS-1TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:MC-16GB,GPU:UFU,VRAM:SS-8GB,SSD:TS-1TB	939-08313	MLB,8C-2.3G,MC-16,USU,SS-8GB,TS-1TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:MC-16GB,GPU:USU,VRAM:SS-8GB,SSD:TS-1TB	B	
BOM NUMBER	BOM NAME	BOM OPTIONS																																										
939-08202	MLB,8C-2.3G,HY-16,USU,SS-4GB,TS-512,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:HY-16GB,GPU:USU,VRAM:SS-4GB,SSD:TS-512																																										
939-08203	MLB,6C-2.6G,HY-32,UFS,HY-8GB,WD-8TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:HY-32GB,GPU:UFS,VRAM:HY-8GB,SSD:WD-8TB																																										
939-08204	MLB,6C-2.6G,HY-32,USS,HY-8GB,WD-8TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:HY-32GB,GPU:USS,VRAM:HY-8GB,SSD:WD-8TB																																										
939-08312	MLB,8C-2.3G,MC-16,UFU,SS-8GB,TS-1TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:MC-16GB,GPU:UFU,VRAM:SS-8GB,SSD:TS-1TB																																										
939-08313	MLB,8C-2.3G,MC-16,USU,SS-8GB,TS-1TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:MC-16GB,GPU:USU,VRAM:SS-8GB,SSD:TS-1TB																																										
939-08203	MLB,6C-2.6G,HY-32,UFS,HY-8GB,WD-8TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:HY-32GB,GPU:UFS,VRAM:HY-8GB,SSD:WD-8TB																																										
939-08204	MLB,6C-2.6G,HY-32,USS,HY-8GB,WD-8TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:HY-32GB,GPU:USS,VRAM:HY-8GB,SSD:WD-8TB																																										
939-08312	MLB,8C-2.3G,MC-16,UFU,SS-8GB,TS-1TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:MC-16GB,GPU:UFU,VRAM:SS-8GB,SSD:TS-1TB																																										
939-08313	MLB,8C-2.3G,MC-16,USU,SS-8GB,TS-1TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.3G,MEM:MC-16GB,GPU:USU,VRAM:SS-8GB,SSD:TS-1TB																																										
<table><tr><th>BOM NUMBER</th><th>BOM NAME</th><th>BOM OPTIONS</th></tr><tr><td>939-08336</td><td>MLB,8C-2.4G,MC-32,UFS,SS-8GB,WD-4TB,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.4G,MEM:MC-32GB,GPU:UFS,VRAM:SS-8GB,SSD:WD-4TB</td></tr><tr><td>939-08337</td><td>MLB,8C-2.4G,MC-32,USS,SS-8GB,WD-4TB,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.4G,MEM:MC-32GB,GPU:USS,VRAM:SS-8GB,SSD:WD-4TB</td></tr><tr><td>939-08338</td><td>MLB,6C-2.6G,MC-64,USS,SS-4GB,TS-512,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-64GB,GPU:USS,VRAM:SS-4GB,SSD:TS-512</td></tr><tr><td>939-08339</td><td>MLB,6C-2.6G,MC-64,UFS,SS-4GB,TS-512,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-64GB,GPU:UFS,VRAM:SS-4GB,SSD:TS-512</td></tr><tr><td>939-08522</td><td>MLB,6C-2.6G,MC-32,USS,SS-4GB,TS-512,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-32GB,GPU:USS,VRAM:SS-4GB,SSD:TS-512</td></tr><tr><td>939-08523</td><td>MLB,6C-2.6G,MC-32,UFS,SS-4GB,TS-512,X970</td><td>ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-32GB,GPU:UFS,VRAM:SS-4GB,SSD:TS-512</td></tr></table>													BOM NUMBER	BOM NAME	BOM OPTIONS	939-08336	MLB,8C-2.4G,MC-32,UFS,SS-8GB,WD-4TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.4G,MEM:MC-32GB,GPU:UFS,VRAM:SS-8GB,SSD:WD-4TB	939-08337	MLB,8C-2.4G,MC-32,USS,SS-8GB,WD-4TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.4G,MEM:MC-32GB,GPU:USS,VRAM:SS-8GB,SSD:WD-4TB	939-08338	MLB,6C-2.6G,MC-64,USS,SS-4GB,TS-512,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-64GB,GPU:USS,VRAM:SS-4GB,SSD:TS-512	939-08339	MLB,6C-2.6G,MC-64,UFS,SS-4GB,TS-512,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-64GB,GPU:UFS,VRAM:SS-4GB,SSD:TS-512	939-08522	MLB,6C-2.6G,MC-32,USS,SS-4GB,TS-512,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-32GB,GPU:USS,VRAM:SS-4GB,SSD:TS-512	939-08523	MLB,6C-2.6G,MC-32,UFS,SS-4GB,TS-512,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-32GB,GPU:UFS,VRAM:SS-4GB,SSD:TS-512	A										
BOM NUMBER	BOM NAME	BOM OPTIONS																																										
939-08336	MLB,8C-2.4G,MC-32,UFS,SS-8GB,WD-4TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.4G,MEM:MC-32GB,GPU:UFS,VRAM:SS-8GB,SSD:WD-4TB																																										
939-08337	MLB,8C-2.4G,MC-32,USS,SS-8GB,WD-4TB,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:8C-2.4G,MEM:MC-32GB,GPU:USS,VRAM:SS-8GB,SSD:WD-4TB																																										
939-08338	MLB,6C-2.6G,MC-64,USS,SS-4GB,TS-512,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-64GB,GPU:USS,VRAM:SS-4GB,SSD:TS-512																																										
939-08339	MLB,6C-2.6G,MC-64,UFS,SS-4GB,TS-512,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-64GB,GPU:UFS,VRAM:SS-4GB,SSD:TS-512																																										
939-08522	MLB,6C-2.6G,MC-32,USS,SS-4GB,TS-512,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-32GB,GPU:USS,VRAM:SS-4GB,SSD:TS-512																																										
939-08523	MLB,6C-2.6G,MC-32,UFS,SS-4GB,TS-512,X970	ALTERNATE,BOM_BASE,BOM_DEV,CPU:6C-2.6G,MEM:MC-32GB,GPU:UFS,VRAM:SS-4GB,SSD:TS-512																																										
<table><tr><td colspan="2">PAGE/TITLE</td><td colspan="2">BOM 639 MISC</td></tr><tr><td rowspan="2"> Apple Inc.</td><td>DRAWING NUMBER</td><td>051-04492</td><td>SIZE</td></tr><tr><td>REVISION</td><td>2.15.0</td><td>D</td></tr><tr><td colspan="2" rowspan="3">NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART I ALL RIGHTS RESERVED</td><td>BRANCH</td><td></td></tr><tr><td>PAGE</td><td>144 OF 200</td></tr><tr><td>SHEET</td><td>132 OF 135</td></tr></table>													PAGE/TITLE		BOM 639 MISC		 Apple Inc.	DRAWING NUMBER	051-04492	SIZE	REVISION	2.15.0	D	NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART I ALL RIGHTS RESERVED		BRANCH		PAGE	144 OF 200	SHEET	132 OF 135													
PAGE/TITLE		BOM 639 MISC																																										
 Apple Inc.	DRAWING NUMBER	051-04492	SIZE																																									
	REVISION	2.15.0	D																																									
NOTICE OF PROPRIETARY PROPERTY: THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING: I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE I NOT TO REPRODUCE OR COPY IT I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART I ALL RIGHTS RESERVED		BRANCH																																										
		PAGE	144 OF 200																																									
		SHEET	132 OF 135																																									
8		7		6		5		4		3		2		1																														



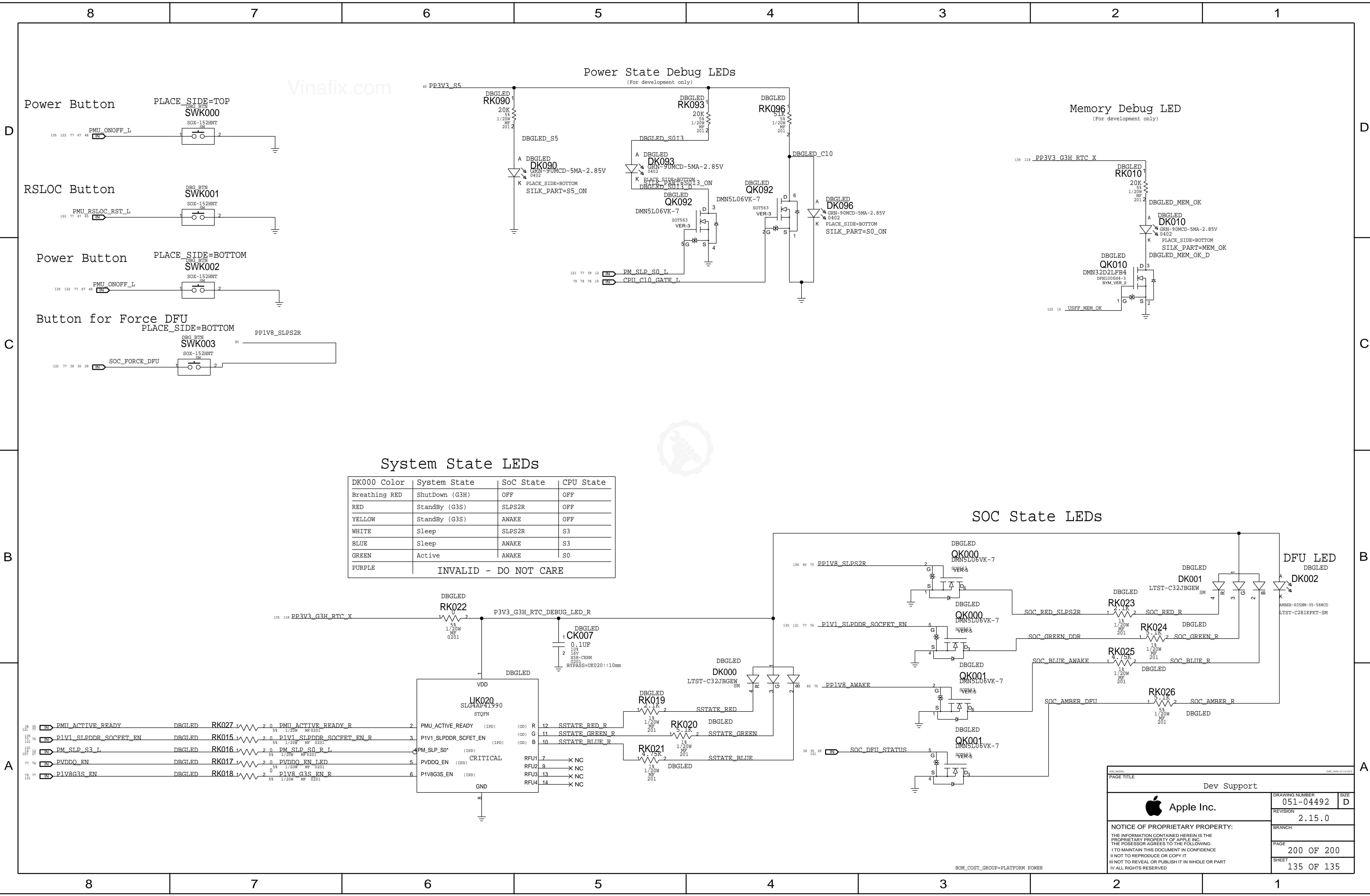
8					7					6					5					4					3					2					1																																							
Alternate Parts																																																																										
PART NUMBER					ALTERNATE FOR PART NUMBER					BOM OPTION					REF DES					COMMENTS:					PART NUMBER					ALTERNATE FOR PART NUMBER					BOM OPTION					REF DES					COMMENTS:					PART NUMBER					ALTERNATE FOR PART NUMBER					BOM OPTION					REF DES					COMMENTS:				
197S00046					197S00036					ANY					ALL					Epson w/ TXC					353S00878					353S00599					ANY					ALL										103S00248					103S00247					ANY					ALL					8.06k 0.1% Resistor				
197S00047					197S00036					ANY					ALL					Kyocera w/ TXC					371S00190					371S00085					ANY					ALL										103S00250					103S00249					ANY					ALL					18.2k 0.1% Resistor				
197S00048					197S00036					ANY					ALL					Murata w/ TXC					107S0248					107S0250					ANY					ALL										116S00006					116S0175					ANY					ALL					00hm Resistor				
376S1080					376S0820					ANY					ALL										107S00033					107S00034					ANY					ALL										128S00094					128S00067					ANY					ALL					150uF POLY CAP				
152S00726					152S00592					ANY					ALL										107S00103					107S00058					ANY					ALL					Cyntec w/ Yageo					128S00069					128S00067					ANY					ALL					150uF POLY CAP				
376S1053					376S0604					ANY					ALL					Diodes alt to Fairchild					311S00013					311S0508					ANY					ALL										128S00065					128S00067					ANY					ALL					150uF POLY CAP				
353S00636					353S4037					ANY					ALL										132S00064					132S0409					ANY					ALL										138S00097					138S0750					ANY					ALL					4.7uF CAP				
155S00007					155S0667					ANY					ALL										128S0364					128S0264					ANY					ALL					Kemet w/ Panasonic					131S00134					131S00041					ANY					ALL					31561601: 12pF Desense				
376S1106					376S0678					ANY					ALL					Fairchild alt to Vishay					128S00058					128S00098					ANY					ALL					NEC w/ Rohm					107S00101					107S00005					ANY					ALL					31560708: 5mOhm				
371S00127					371S00182					ANY					ALL										107S00071					107S00053					ANY					ALL										107S00087					107S00029					ANY					ALL					31560843: 5mOhm				
152S00769					152S00659					ANY					ALL										102S00054					102S00053					ANY					ALL										107S00086					107S00056					ANY					ALL					31560937: 3mOhm				
372S00016					372S00015					ANY					ALL										376S00086					376S0761					ANY					ALL										107S00100					107S00057					ANY					ALL					31561063: 2mOhm				
107S00041					107S00039					ANY					ALL										107S00044					107S00076					ANY					ALL										107S0240					107S0255					ANY					ALL					31561401: 1mOhm				
740S00041					740S0159					ANY					ALL										311S00195					311S00196					ANY					ALL										107S00139					107S0178					ANY					ALL					31561213: 220k Resistor				
311S00138					311S0436					ANY					ALL										740S00019					740S00007					ANY					ALL					Bourns w/ Polytronics					128S0296					128S0487					ANY					ALL					31561532: 47uF-PT				
152S00725					152S00590					ANY					ALL										353S00852					353S4262					ANY					ALL					TI w/ OnSemi					128S00012					128S0487					ANY					ALL					31561532: 47uF-PT				
152S00841					152S00238					ANY					ALL										138S0775					138S0860					ANY					ALL										353S00750					353S00877					ANY					ALL									
376S00219					376S00079					ANY					ALL					TI for Fairchild					138S0789					138S0941					ANY					ALL					Murata w/ SS					353S00832					353S00525					ANY					ALL					IMVP SA				
311S00121					311S0398					ANY					ALL										152S00363					152S00048					ANY					ALL										353S00831					353S00519					ANY					ALL					IMVP VCORE				
311S0596					311S0593					ANY					ALL										152S00415					152S00140					ANY					ALL										152S00782					152S00772					ANY					ALL					IMVP CORE INDUCTOR				
353S3526					353S3528					ANY					ALL										155S00204					155S0731					ANY					ALL										138S00105					138S00037					ANY					ALL					31563978: 10uF CER				
353S3527					353S3528					ANY					ALL										311S00060					311S0273					ANY					ALL										138S0714					138S0713					ANY					ALL					31564912: 10uF				
197S00131					197S00116					ANY					ALL										128S00009					128S00093					ANY					ALL										138S0648					138S0703					ANY					ALL					31564224: 4.7uF CER				
197S00117					197S00116					ANY					ALL										128S00103					128S00093					ANY					ALL					47539941: 33uF CAP					138S00284					128S00136					ANY					ALL					47567111: 2.2uF CER				
197S00115					197S00116					ANY					ALL										128S00106					128S00093					ANY					ALL					49355299: 27uF CAP					138S0715					138S0732					ANY					ALL					31565015: 1uF CER				
152S00398					152S00204					ANY					ALL										128S00107					128S00093					ANY					ALL					49355299: 27uF CAP					152S00845					152S00815					ANY					ALL									
152S00786					152S00344					ANY					ALL										138S0738					138S1101					ANY					ALL					Samsung alt to Murata					138S00111					138S00036					ANY					ALL					31563894: 20uF CER				
311S00165					311S00164					ANY					ALL										107S00234					107S00235					ANY					ALL										138S00286					138S00036					ANY					ALL					47541665: 20uF CER				
128S00050					128S0351					ANY					ALL										311S00156					311S00129					ANY					ALL										132S00012					132S0401					ANY					ALL					31563715: 0.22uF				
138S00047					138S00073					ANY					ALL										155S0660					155S0513					ANY					ALL										138S00084					138S00060					ANY					ALL					31564055: 47uF CER				
353S01041					353S01042					ANY					ALL										197S00120					197S00118					ANY					ALL										138S0739					138S0706					ANY					ALL					NEC w/ Vishay				
155S0665					155S0232					ANY					ALL										152S00368					152S00269					ANY					ALL										138S0945					138S0706					ANY					ALL					NEC w/ Rohm				
740S00051					740S00050					ANY					ALL										311S0271					311S00008					ANY					ALL					NXP w/ Diodes					138S0641					138S0700					ANY					ALL					Murata w/ SS&Taiyo				
152S00724					152S00311					ANY					ALL										311S00104					311S00091					ANY					ALL										138S0759					138S0762					ANY					ALL									
155S0694					155S0387					ANY					ALL										371S00170					371S00125					ANY					ALL										138S00049					138S0831					ANY					ALL									
103S0321					103S0276					ANY					ALL										128S00039					128S00038					ANY					ALL										107S00090					107S00055					ANY					ALL									
740S0144					740S0118					ANY					ALL										128S0302					128S00038					ANY					ALL										138S0663					138S0853					ANY					ALL									
740S00028					740S0118					ANY					ALL										138S1103					138S0719					ANY					ALL										376S00282					376S1128																			



8		7		6		5		4		3		2		1	
Alternate Parts Keyboard															
PART NUMBER		ALTERNATE FOR PART NUMBER		BOM OPTION		REF DES		COMMENTS:							
138S0786		138S0847		ANY		ALL									
131S00059		131S0852		ANY		ALL									
138S00087		138S1086		ANY		ALL									
152S00812		152S1701		ANY		ALL									
371S00217		371S00079		ANY		ALL									
353S00497		353S00796		ANY		ALL									
152S01024		152S00386		ANY		ALL									
152S00997		152S00476		ANY		ALL									
371S00220		371S00181		ANY		ALL		DIODE							
353S01831		353S00519		ANY		ALL									
138S00181		138S0835		ANY		ALL									

</





Vinafix.com

DK000 Color	System State	SoC State	CPU State
Breathing RED	ShutDown (G3H)	OFF	OFF
RED	StandBy (G3S)	SLPS2R	OFF
YELLOW	StandBy (G3S)	AWAKE	OFF
WHITE	Sleep	SLPS2R	S3
BLUE	Sleep	AWAKE	S3
GREEN	Active	AWAKE	S0
PURPLE	INVALID - DO NOT CARE		

Apple Inc.

NOTICE OF PROPRIETARY PROPERTY:  
THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF APPLE INC. THE POSSESSOR AGREES TO THE FOLLOWING:  
I TO MAINTAIN THIS DOCUMENT IN CONFIDENCE  
I NOT TO REPRODUCE OR COPY IT  
I NOT TO REVEAL OR PUBLISH IT IN WHOLE OR PART  
IV ALL RIGHTS RESERVED

051-04492

2.15.0

200 OF 200

135 OF 135

Dev Support

135 OF 135