

iPhone 3GS Advanced Schematic By OM Tesla



iPhone 3GS 7/10/2009 REVA

PAGE	CONTENTS
02	RADIO AND AP SCHEMATIC INSTANTIATION

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
051-8004	1	N88_SCHEMATIC_TOP	SCH	Y	?
820-2580	1	N88_SINGLE_BOARD	PCB	Y	?
PROTO_RADIO	1	2G RF SOLUTION		Y	2G_RF
PROTO_RADIO	1	3G RF SOLUTION		Y	3G_RF
COMPASS	1	BOTTOM COMPASS LOCATION		Y	COMPASS_BOT
COMPASS	1	TOP COMPASS LOCATION		Y	COMPASS_TOP
JTAG	1	JTAG DEVELOPMENT BOM		Y	DEVELOPMENT
JTAG	1	JTAG PRODUCTION BOM		Y	PRODUCTION

BOARD - 820-2580
 SCHEMATIC - 051-8004
 MCO - 056-2731

BOM - 639-0065 (16GB+MURATA)
 BOM - 639-0066 (16GB+MITSUMI)
 BOM - 639-0067 (32GB+MURATA)
 BOM - 639-0068 (32GB+MITSUMI)

NAND BOM OPTIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
335S0643	1	8GB HYNIX 48NM FLASH	U1_AP	Y	FLASH_8GB
335S0642	1	16GB SAMSUNG 42NM FLASH	U1_AP	Y	FLASH_16GB
335S0650	1	32GB SAMSUNG 43NM FLASH	U1_AP	Y	FLASH_32GB

NAND ALTERNATES

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
335S0637	335S0598	FLASH_8GB	U1_AP	8GB SAMSUNG 42NM FLASH
		?		

DEV FUSED BB BOM OPTION

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
998-2348	1	DEV FUSED BB	U22_RF	Y	DEV_FUSED_BB

N88 EEE BOM LABELS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
825-2029	1	EEE FOR 639-0066 (16G)	EEE:8DL	Y	EEE_16GB_MURATA
825-2029	1	EEE FOR 639-0067 (16G)	EEE:8DM	Y	EEE_16GB_MITSUMI
825-2029	1	EEE FOR 639-0068 (32G)	EEE:8DN	Y	EEE_32GB_MURATA
825-2029	1	EEE FOR 639-0069 (32G)	EEE:8DP	Y	EEE_32GB_MITSUMI

SIM CONNECTOR ALTERNATE

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
512S0069	512S0060	?	J2_AP	SIM CONNECTOR
512S0070	512S0060	?	J2_AP	SIM CONNECTOR

WIFI/BT BOM OPTIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
339S0072	1	MURATA WIFI/BT MODULE	U6_RF	Y	MURATA
339S0077	1	MITSUMI WIFI/BT MODULE	U6_RF	Y	MITSUMI
118S0012	1	MURATA ID RESISTOR	R61_RF	Y	MURATA
118S0012	1	MITSUMI ID RESISTOR	R6_RF	Y	MITSUMI

GPS TCXO BOM OPTIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
197S0290	1	KDS TCXO	G3_RF	Y	KDS_GPS_TCXO
197S0333	1	EPSON TCXO	G3_RF	Y	EPSON_GPS_TCXO

VIDEO AMP ALTERNATE

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
353S1625	353S1650	?	U14_AP	VIDEO AMP

DISPLAY DC-DC ALTERNATE

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
353S1989	353S2529	?	U20_AP	LCM DC-DC

ZIF CONNECTOR ALTERNATE

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
518S0611	518S0600	?	J7_AP	ALS ZIF CONN

26 MHZ ALTERNATE

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
197S0255	197S0275	?	G2_RF	RF 26 MHZ CLK

BAND 2 PA

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
353S2363	1	BAND 2 PA, IPX	U37_RF	Y	IPX_BAW
353S2522	1	BAND 2 PA, TRIQUINT	U37_RF	Y	TQNT_BAW

RF DDR MEMORY

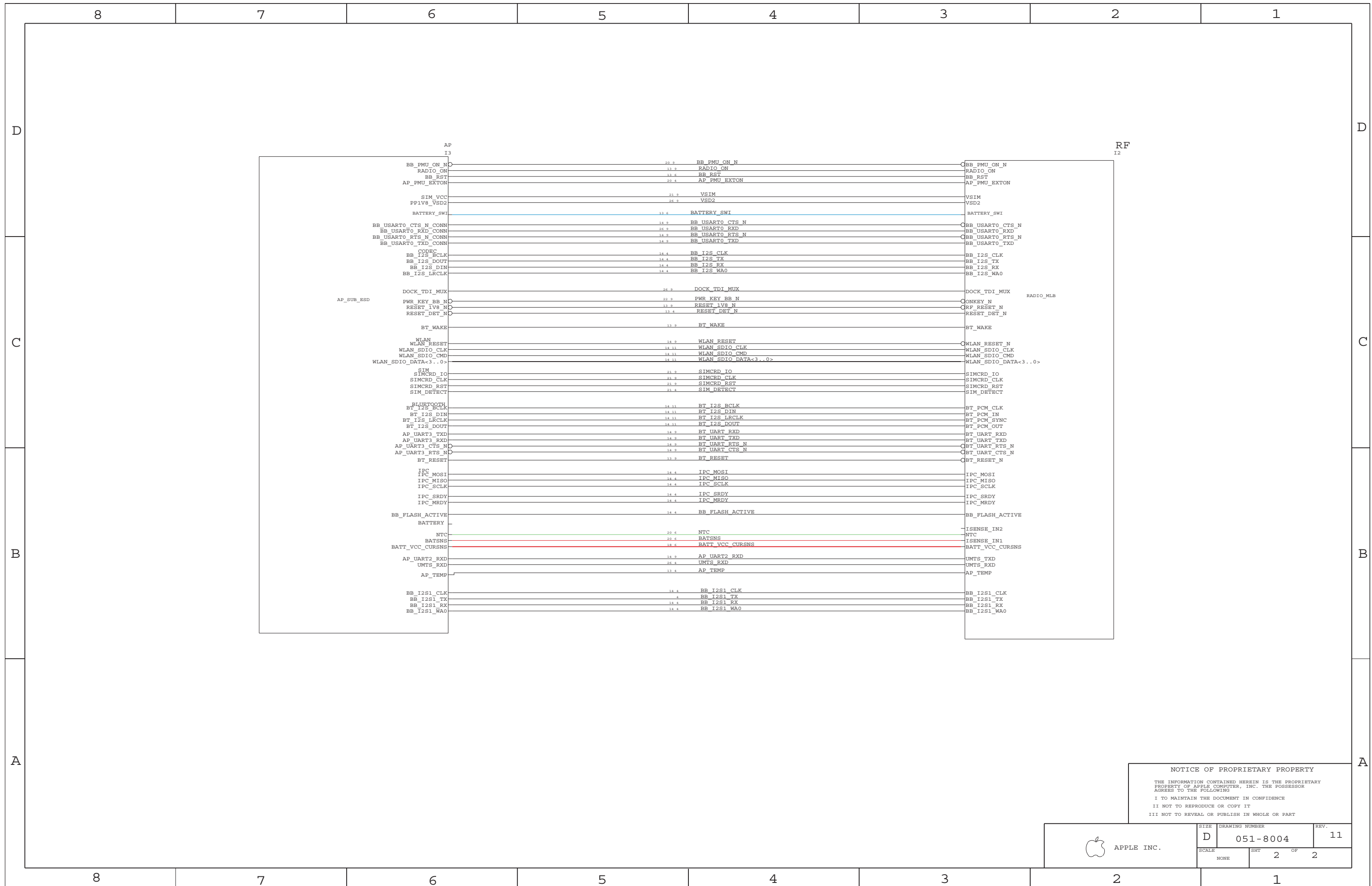
PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
335S0617	1	SPANSION DDR	U1_RF	Y	RF_SPANSION
335S0652	1	NUMONYX DDR	U1_RF	Y	RF_NUMONYX
335S0632	1	SAMSUNG DDR	U1_RF	Y	RF_SAMSUNG
341S2474	1	ALL SUPPLIER SUB-BOM DDR	U1_RF	Y	RF_PROGRAMMED_BASEBAND_MEMORY

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SCALE	DRAWING NUMBER	REV.
NONE	051-8004	11
SHT	1 OF	2



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	SIZE	DRAWING NUMBER	REV.
	D	051-8004	11
SCALE	SHT 2 OF 2		
NONE			

iPhone 3GS (ICE2.1) HSDPA RADIO


06/23/09(A):BRD

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02	BASEBAND
03	BASEBAND + MEMORY
04	BASEBAND PMU
05	GSM & UMTS TRANSCEIVER
06	POWER AMPS AND RF FRONT END
07	SYSTEM CONNECTORS
08	A-GPS
09	WLAN AND BLUETOOTH RADIO

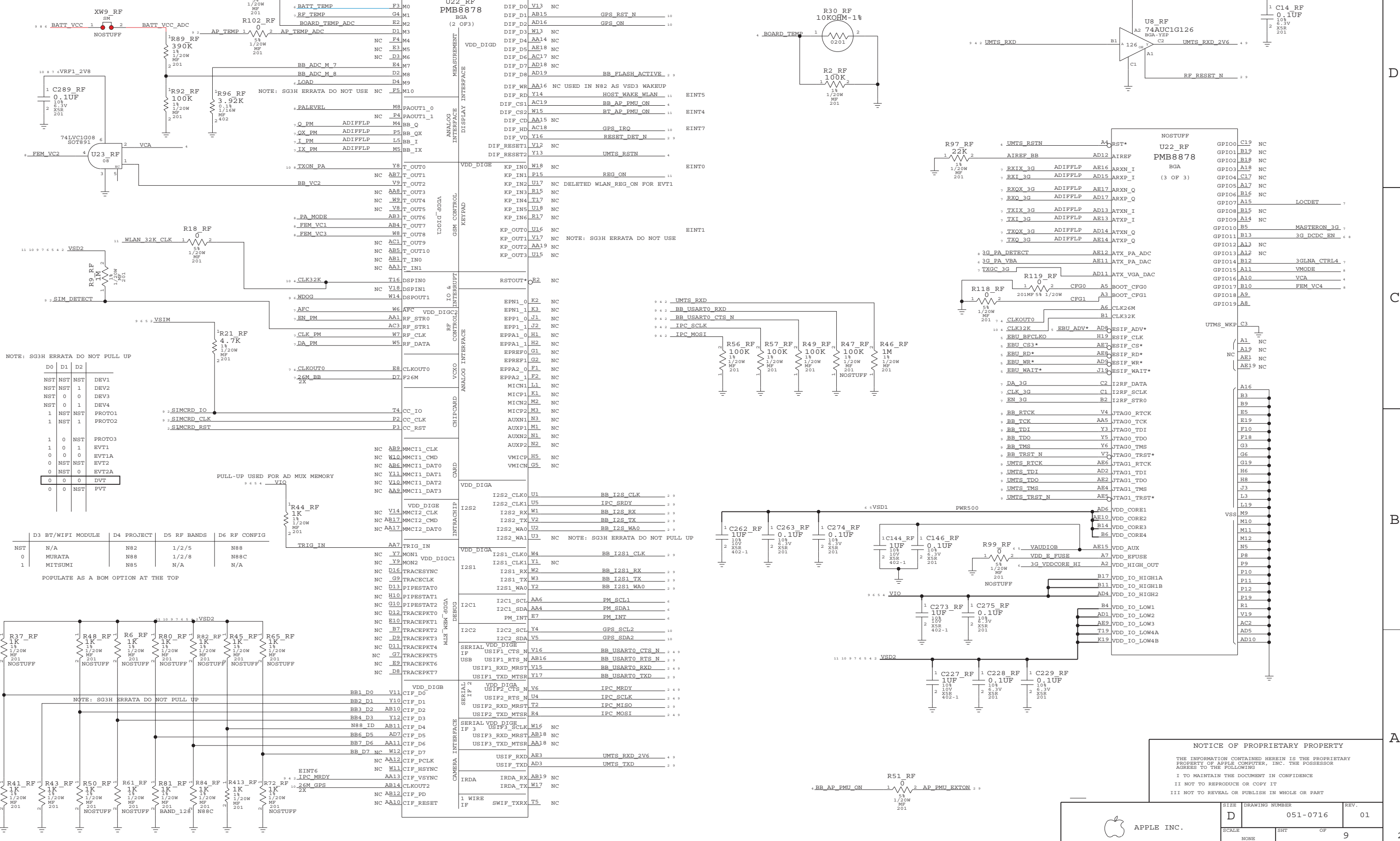
BOARD - 920-0593
 SCHEMATIC - 951-0716
 BOM - 630-9356

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
951-0716	1	N82_RF_AND_AP_SCHEMATIC	SCH	Y	
920-0593	1	N82_RF_AND_AP_PCB	PCB	Y	
825-2029	1	EEE: Y5K(8GB), YEU(16GB)	EEE:Y5K	Y	

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 APPLE INC.	SIZE D	DRAWING NUMBER 051-0716	REV. 01
	SCALE NONE	SHT 1 OF 9	

BASEBAND



NOTE: SG3H ERRATA DO NOT PULL UP

D0	D1	D2	
NST	NST	NST	DEV1
NST	0	1	DEV2
NST	0	0	DEV3
NST	0	1	DEV4
1	NST	NST	PROTO1
1	NST	1	PROTO2
1	0	NST	PROTO3
1	0	1	EVT1
0	0	0	EVT1A
0	NST	NST	EVT2
0	NST	0	EVT2A
0	0	0	DVT
0	0	NST	FVT

PULL-UP USED FOR AD MUX MEMORY

D3	BT/WIFI MODULE	D4	PROJECT	D5	RF BANDS	D6	RF CONFIG
NST	N/A	N82	N82	1/2/5	N88		
0	MURATA	N88	N88	1/2/8	N88C		
1	MITSUMI	N85	N/A	N/A	N/A		

POPULATE AS A BOM OPTION AT THE TOP

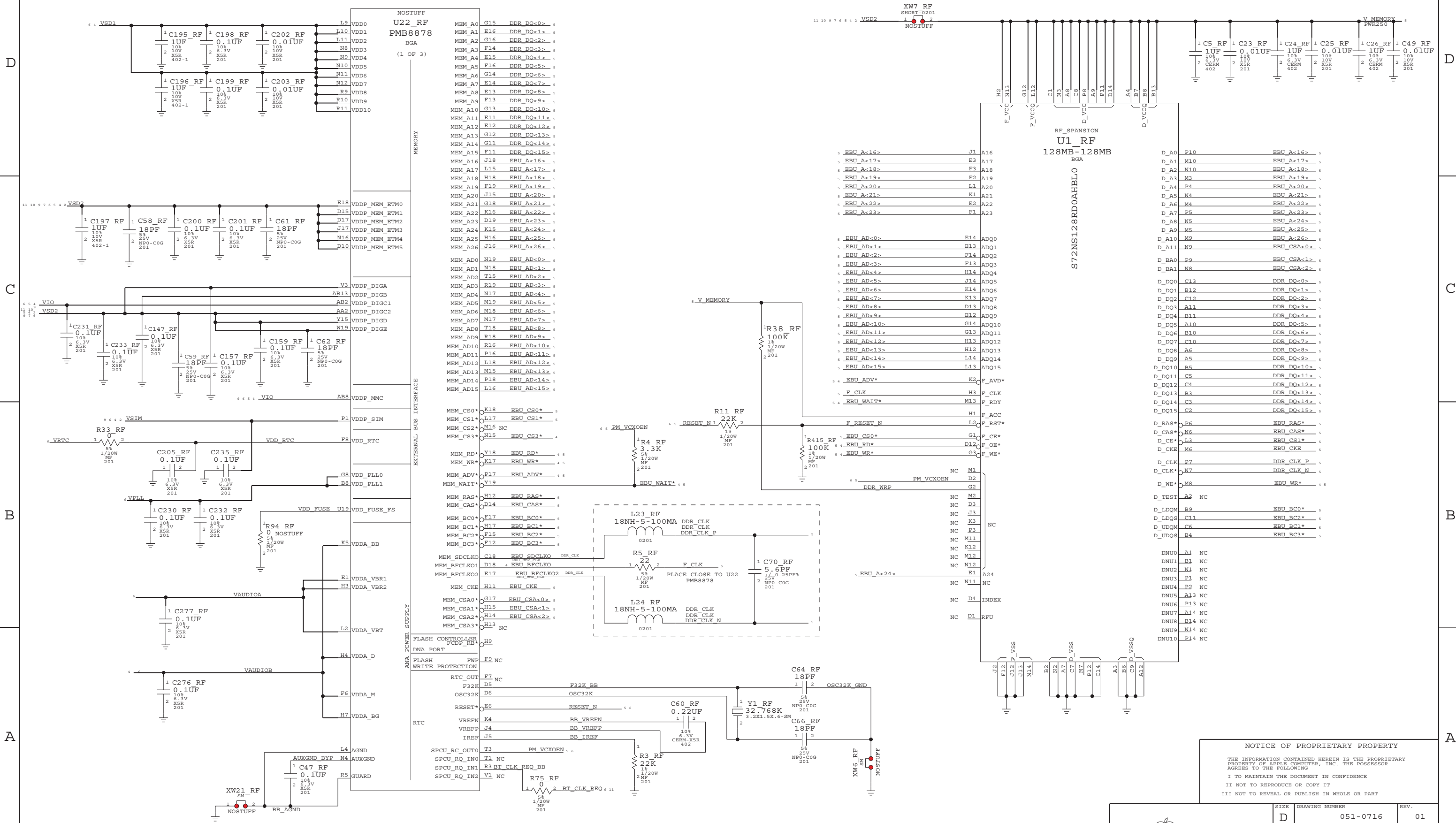
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BASEBAND/RADIO MEM

NOR/DDR MCP STACK



MEMORY

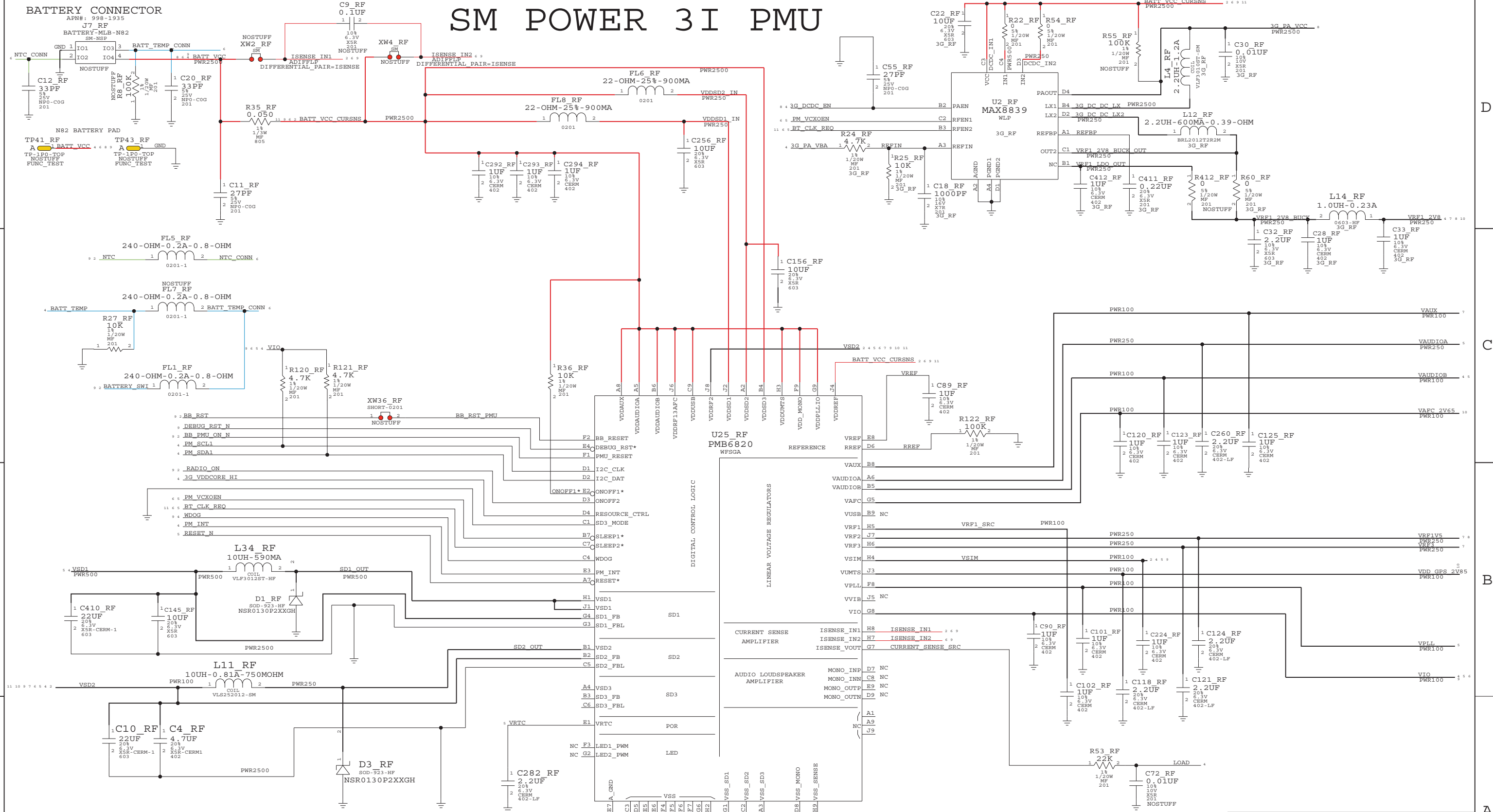
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MEM_A3	F14	DDR_DQ<3>
MEM_A4	E15	DDR_DQ<4>
MEM_A5	F16	DDR_DQ<5>
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MEM_A7	E14	DDR_DQ<7>
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MEM_A9	F13	DDR_DQ<9>
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MEM_A15	F11	DDR_DQ<15>
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MEM_CS2*	M16	NC
MEM_CS3*	N15	EBU_CS3*
MEM_RD*	Y18	EBU_RD*
MEM_WR*	K17	EBU_WR*
MEM_ADV*	P17	EBU_ADV*
MEM_WAIT*	Y19	EBU_WAIT*
MEM_RAS*	H12	EBU_RAS*
MEM_CAS*	D14	EBU_CAS*
MEM_BC0*	F17	EBU_BC0*
MEM_BC1*	H17	EBU_BC1*
MEM_BC2*	F15	EBU_BC2*
MEM_BC3*	F12	EBU_BC3*
MEM_SDCLK0	C18	EBU_SDCLK0
MEM_BFCLK01	D18	EBU_BFCLK01
MEM_BFCLK02	E17	EBU_BFCLK02
MEM_CKE	H11	EBU_CKE
MEM_CSA0*	G17	EBU_CSA<0>
MEM_CSA1*	H15	EBU_CSA<1>
MEM_CSA2*	H14	EBU_CSA<2>
MEM_CSA3*	H13	NC

U1 RF 128MB-128MB BGA

F_VCC	H2	
F_VCCQ	N13	
D_VCC	G12	
D_VCCQ	C1	
	N3	
	N8	
	A8	
	C8	
	P8	
	A9	
	E11	
	D14	
	A4	
	B7	
	B8	
	B13	
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D_A1	M10	EBU_A<17>
D_A2	N10	EBU_A<18>
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D_A4	P4	EBU_A<20>
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D_BA0	P9	EBU_CSA<1>
D_BA1	N8	EBU_CSA<2>
D_DQ0	C13	DDR_DQ<0>
D_DQ1	B12	DDR_DQ<1>
D_DQ2	C12	DDR_DQ<2>
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D_DQ7	C10	DDR_DQ<7>
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D_DQ15	C2	DDR_DQ<15>
D_RAS*	P6	EBU_RAS*
D_CAS*	N6	EBU_CAS*
D_CE*	L3	EBU_CS1*
D_CKE	M6	EBU_CKE
D_CLK	P7	DDR_CLK_P
D_CLK*	N7	DDR_CLK_N
D_WE*	M8	EBU_WR*
D_TEST	A2	NC
D_LDQM	B9	EBU_BC0*
D_LDQS	C11	EBU_BC2*
D_UDQM	C6	EBU_BC1*
D_UDQS	B4	EBU_BC3*
DNU0	A1	NC
DNU1	B1	NC
DNU2	N1	NC
DNU3	P1	NC
DNU4	E2	NC
DNU5	A13	NC
DNU6	P13	NC
DNU7	A14	NC
DNU8	B14	NC
DNU9	N14	NC
DNU10	P14	NC

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SM POWER 3I PMU

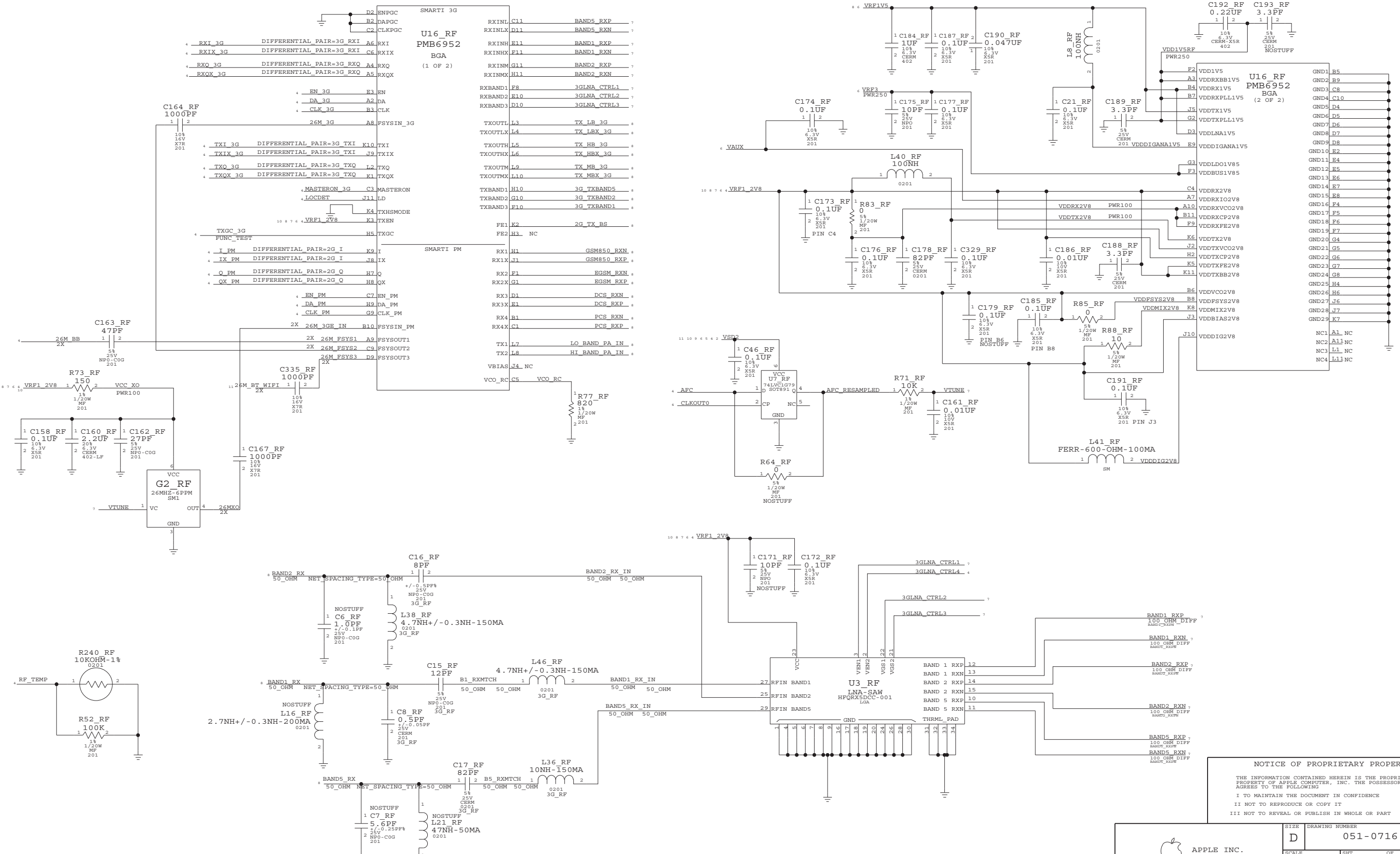


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APPLE INC.	SIZE	DRAWING NUMBER	REV.
	D	051-0716	01
SCALE	SHT	OF	
NONE	4	9	

GSM & UMTS TRANSCIEVER - SMARTI 3GE

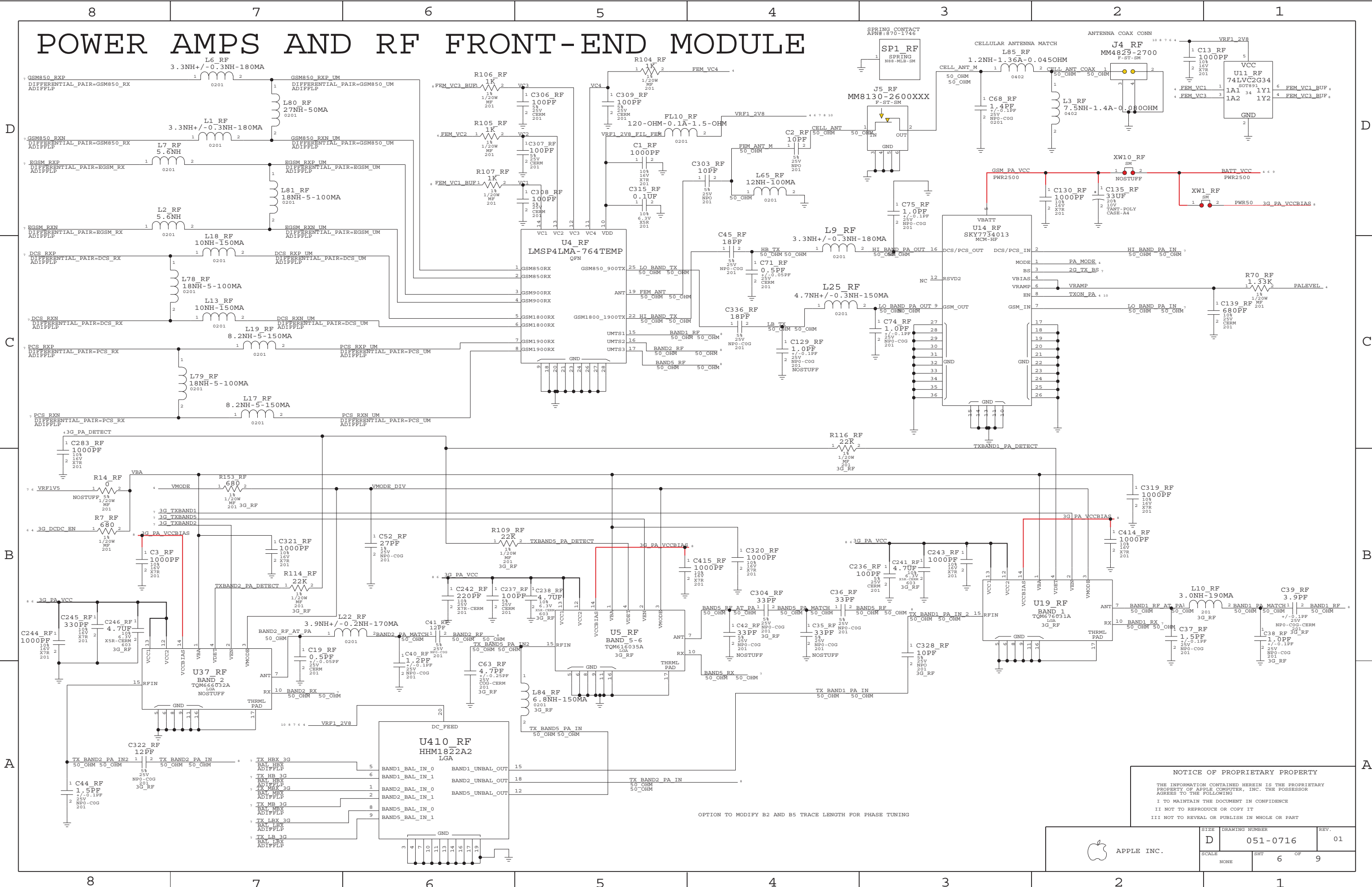
SMARTI3GE SUPPLIES



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	D	051-0716	01
SCALE	NONE	SHT	5 OF 9

POWER AMPS AND RF FRONT-END MODULE



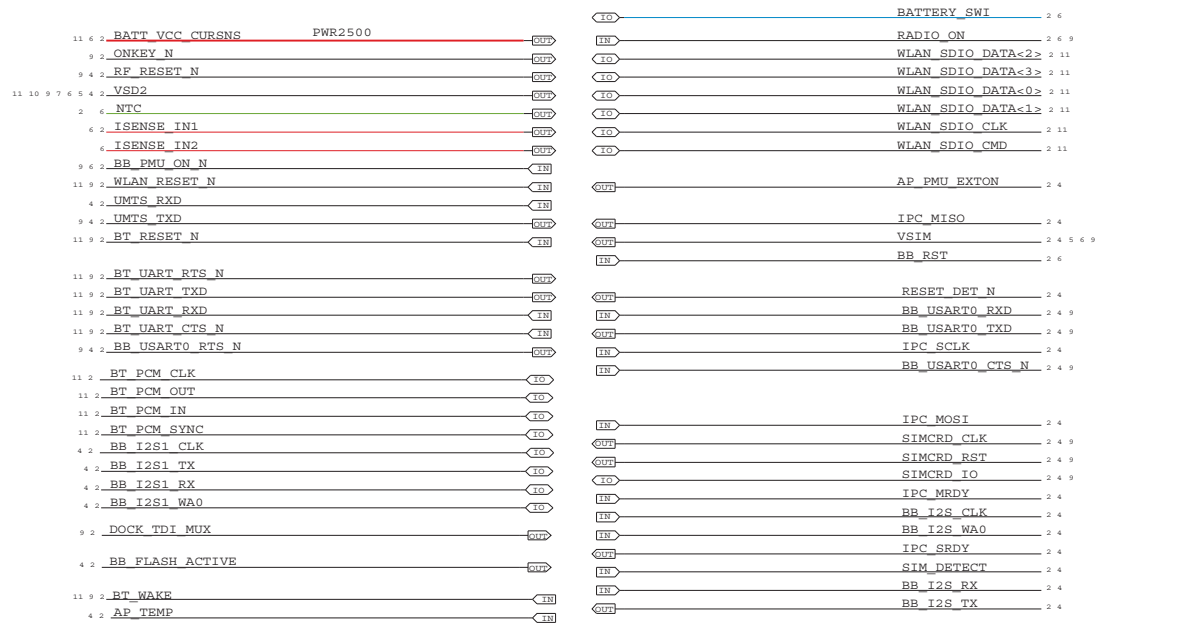
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SCALE	SHT	OF	
NONE	6	9	

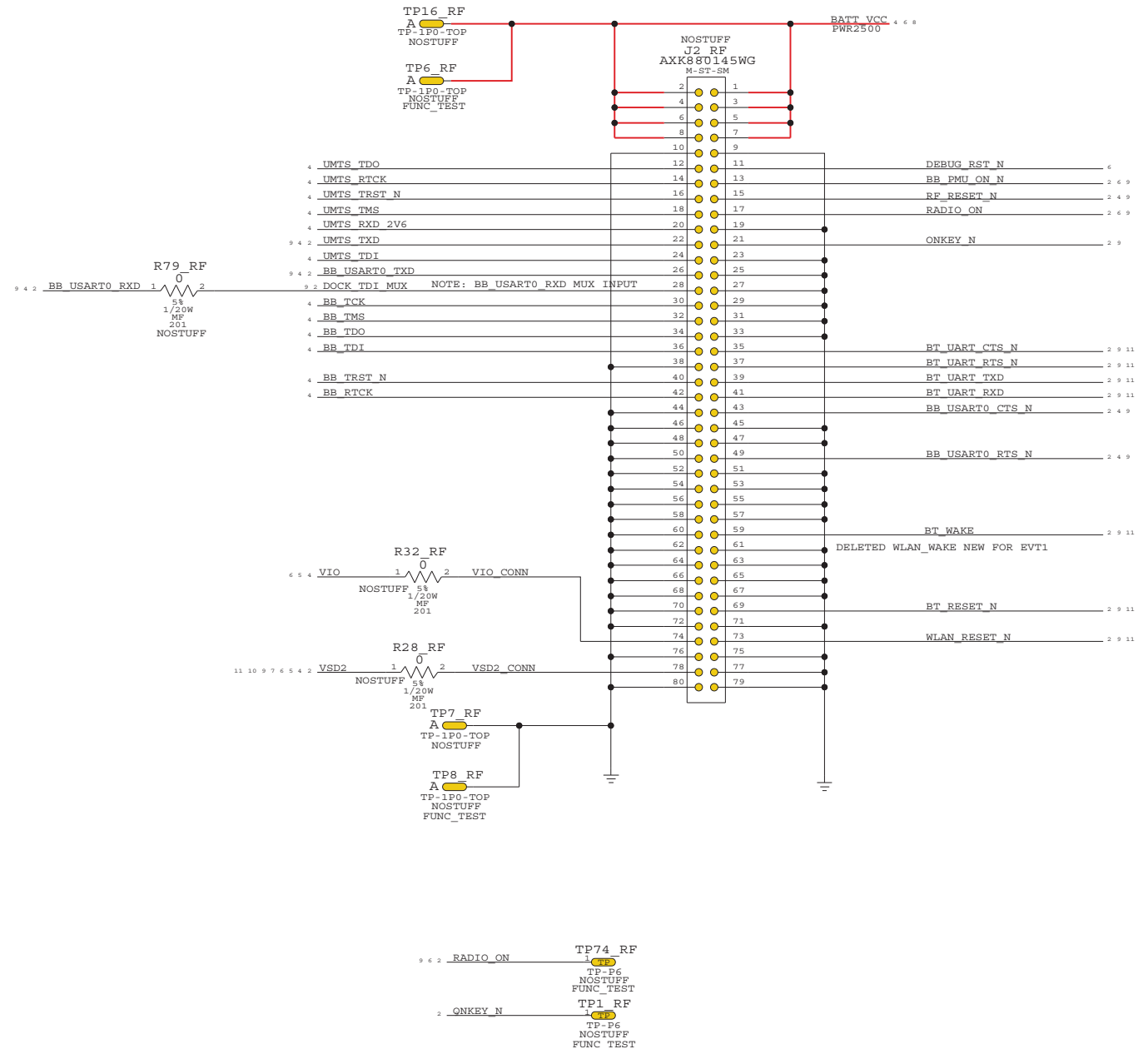
OPTION TO MODIFY B2 AND B5 TRACE LENGTH FOR PHASE TUNING

SYSTEM CONNECTORS

AP CONNECTIONS



DEBUG CONNECTOR 516S0612



TP15 RF
A TP-P6 NOSTUFF
DOCK_TDI_MUX 2 9 NOTE: BB_USARTO_RXD MUX INPUT
FUNC_TEST

TP33 RF
A TP-P6 NOSTUFF
WDOG 4 6 PLACE TEST POINT ON TOP SIDE
FUNC_TEST

TP60 RF
A TP-P6 NOSTUFF
VSIM 2 4 5 6 9

TP56 RF
A TP-P6 NOSTUFF
SIMCRD_RST 2 4 9

TP59 RF
A TP-P6 NOSTUFF
SIMCRD_CLK 2 4 9

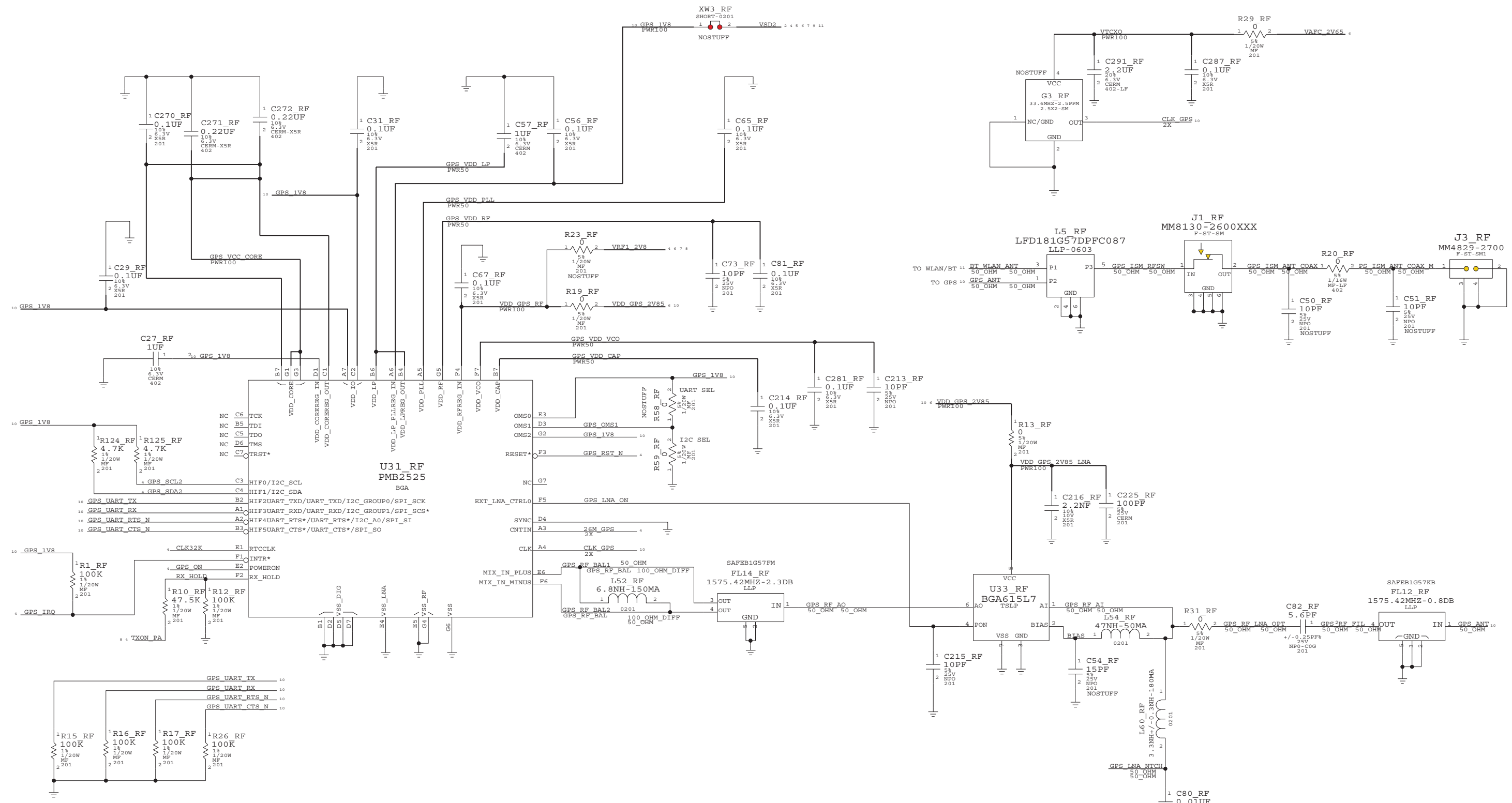
TP65 RF
A TP-P6 NOSTUFF
SIMCRD_IO 2 4 9

NOTE: FOR DEBUG FIXTURES WHEN UART MUXES ARE NOSTUFF

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APPLE INC.	SIZE	DRAWING NUMBER	REV.
	D	051-0716	01
SCALE	SHT 7 OF 9		
NONE			

A-GPS

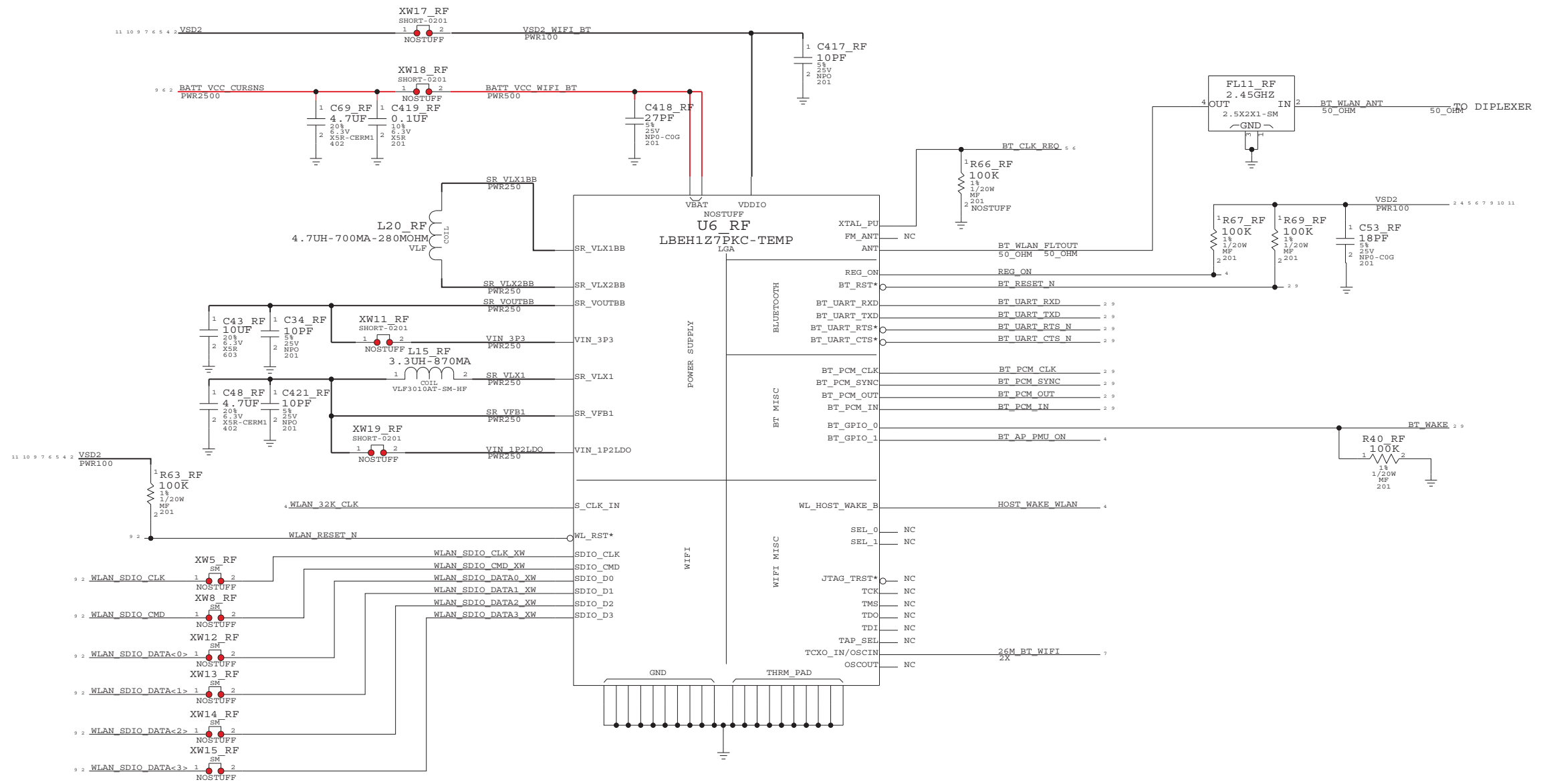


I2C ADDRESS SETTINGS
(CAN BE PLACE ON TOP SIDE)

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	SIZE	DRAWING NUMBER	REV.
	D	051-0716	01
SCALE	SHT	OF	
NONE	8	9	

WLAN RADIO



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APPLE INC.	SIZE	DRAWING NUMBER	REV.
	D	951-0716	01
SCALE	SHT	OF	
NONE	9	9	

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7

6

5

4

3

2

1

iPhone 3GS H2-BASED SUB-DESIGN 07/10/09 BOARD REVA

D

D

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2	2	AP MAIN	N/A	N/A
3	3	AP PWR, AP WIFI/MIPI	N/A	N/A
4	4	AP NAND	N/A	N/A
5	5	AP RGB/CLCD	N/A	N/A
6	6	AP TVOUT	N/A	N/A
7	7	L61 AUDIO INTERFACE	N/A	N/A
8	8	L61 HP	N/A	N/A
9	9	PMU	N/A	N/A
10	10	SIM, ACCEL, VIBE	N/A	N/A
11	11	INTERFACE ASSIGNMENTS	N/A	N/A
12	12	DOCK	N/A	N/A
13	13	NIMBUS	N/A	N/A
14	14	CAMERA	N/A	N/A
15	15	RADIO CONNECTIVITY	N/A	N/A
16	16	PROX, ALS	N/A	N/A
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19	34	Cross Reference Page		
20	35	Cross Reference Page		
21	36	Cross Reference Page		
22	37	Cross Reference Page		

PDF PAGE	CSA PAGE	CONTENTS	SYNC MASTER	DATE
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24	39	Cross Reference Page		
25	40	Cross Reference Page		

C

C

B

B

A


A

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
951-0719	1	P4C_DEV_SCHEMATIC	SCH	Y	
920-0596	1	P4C_DEV_PCB	PCB	Y	
825-2029	1	EEE	EEE:???	Y	

SOCKET BOM OPTIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
998-1925	1	M2_TEST_SOCKET	SKT1	Y	SOCKET
998-1922	1	NUMBUS TEST SOCKET	SKT2	Y	SOCKET

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 APPLE INC.	SIZE D	DRAWING NUMBER 951-0719	REV. 1
	SCALE NONE	SHT 1	OF 25

8

7

6

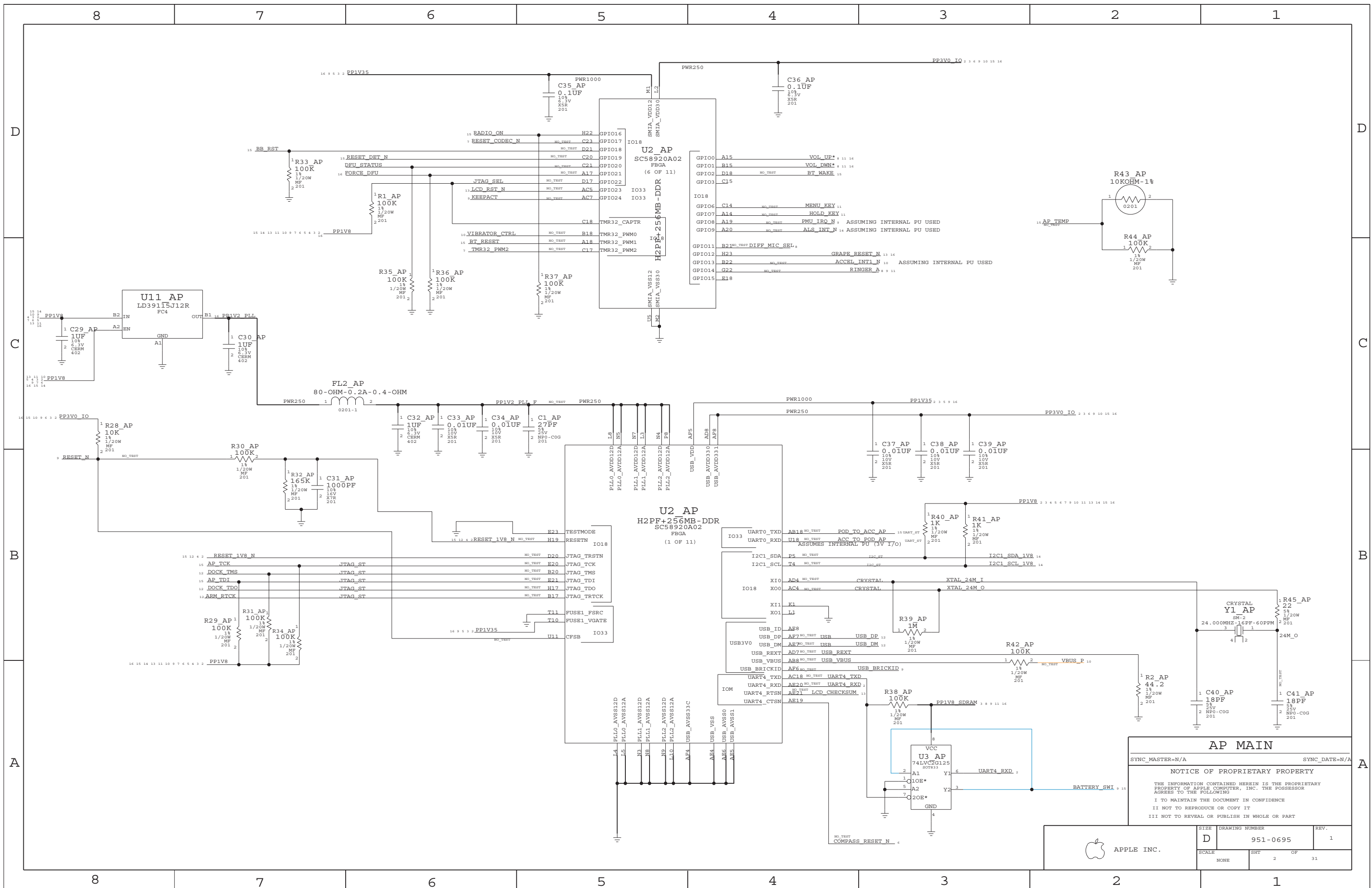
5

4

3

2

1



AP MAIN

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NOTICE OF PROPRIETARY PROPERTY

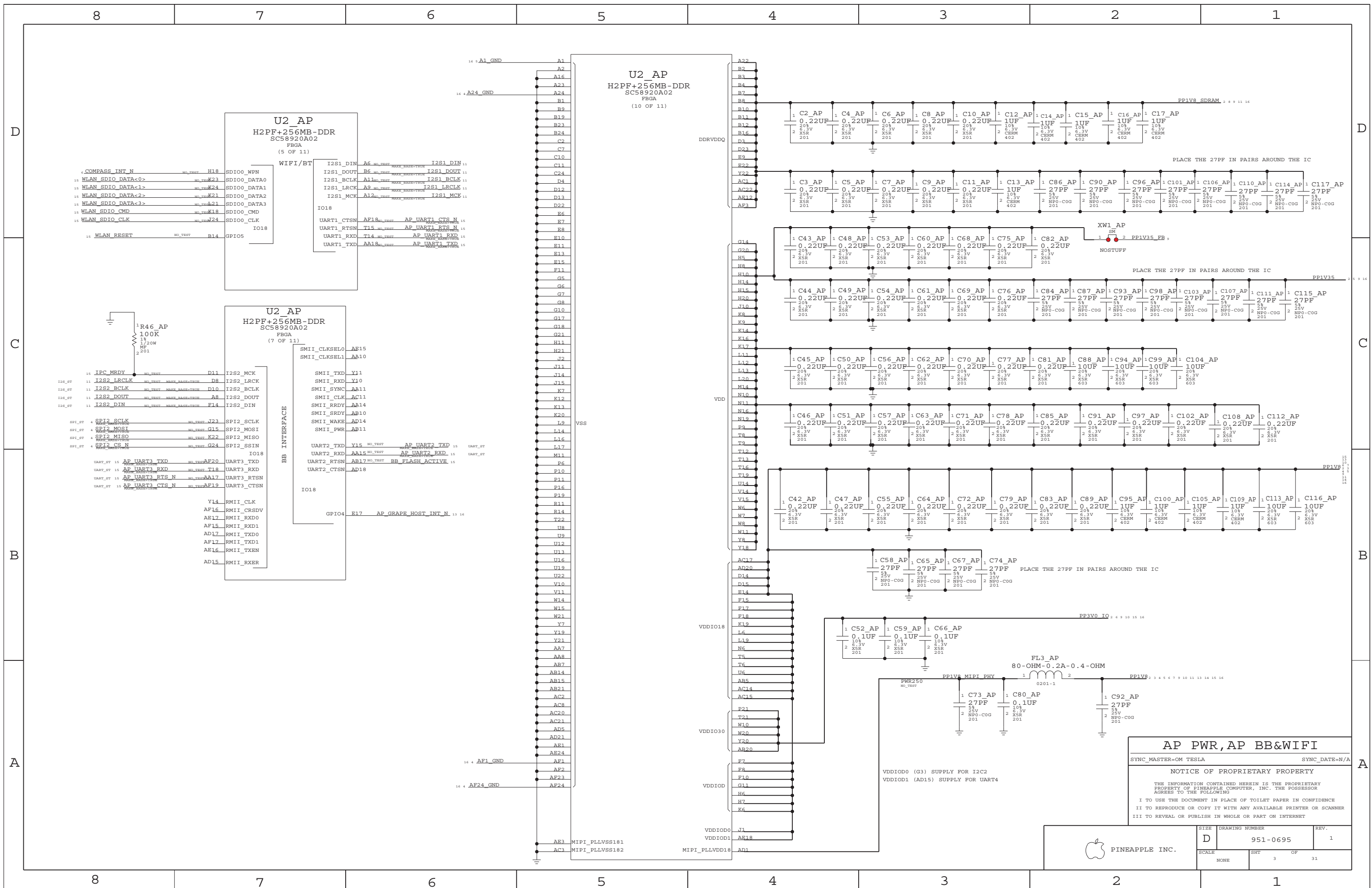
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 APPLE INC.	SIZE	DRAWING NUMBER	REV.
	D	951-0695	1
SCALE	SHT	OF	31
NONE	2		



U2_AP
H2PF+256MB-DDR
SC58920A02
FBGA
(10 OF 11)

U2_AP
H2PF+256MB-DDR
SC58920A02
FBGA
(5 OF 11)

U2_AP
H2PF+256MB-DDR
SC58920A02
FBGA
(7 OF 11)

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WLAN_SDIO_DATA<0> K23
WLAN_SDIO_DATA<1> K24
WLAN_SDIO_DATA<2> K21
WLAN_SDIO_DATA<3> L21
WLAN_SDIO_CMD K18
WLAN_SDIO_CLK Z24

R46 AP
100K
1/20W
201

IPC_MRDY D11
I2S2_LRCLK D8
I2S2_BCLK D10
I2S2_DOUT A8
I2S2_DIN F14
SPI2_SCLK J23
SPI2_MOSI G15
SPI2_MISO K22
SPI2_CS_N G24
AP_UART3_TXD AF20
AP_UART3_RXD T18
AP_UART3_RTS_N AA17
AP_UART3_CTS_N AF19

WIFI/BT
I2S1_DIN A6
I2S1_DOUT B6
I2S1_BCLK A11
I2S1_LRCLK A9
I2S1_MCK A12
IO18
UART1_CTSN AF18
UART1_RTSN T15
UART1_RXD T14
UART1_TXD AA18

SMII_CLKSELO AE15
SMII_CLKSELI AA10
SMII_TXD Y11
SMII_RXD Y10
SMII_SYNC AA11
SMII_CLK AC11
SMII_RDY AA14
SMII_SRDY AB10
SMII_WAKE AD14
SMII_PWR AB11
UART2_TXD Y15
UART2_RXD AA15
UART2_RTSN AB17
UART2_CTSN AD18
GPIO4 E17

BB INTERFACE
IO18
Y14 RMII_CLK
AF16 RMII_CRSDV
AE17 RMII_RXD0
AF15 RMII_RXD1
AD17 RMII_TXD0
AF17 RMII_TXD1
AE16 RMII_TXEN
AD15 RMII_RXER

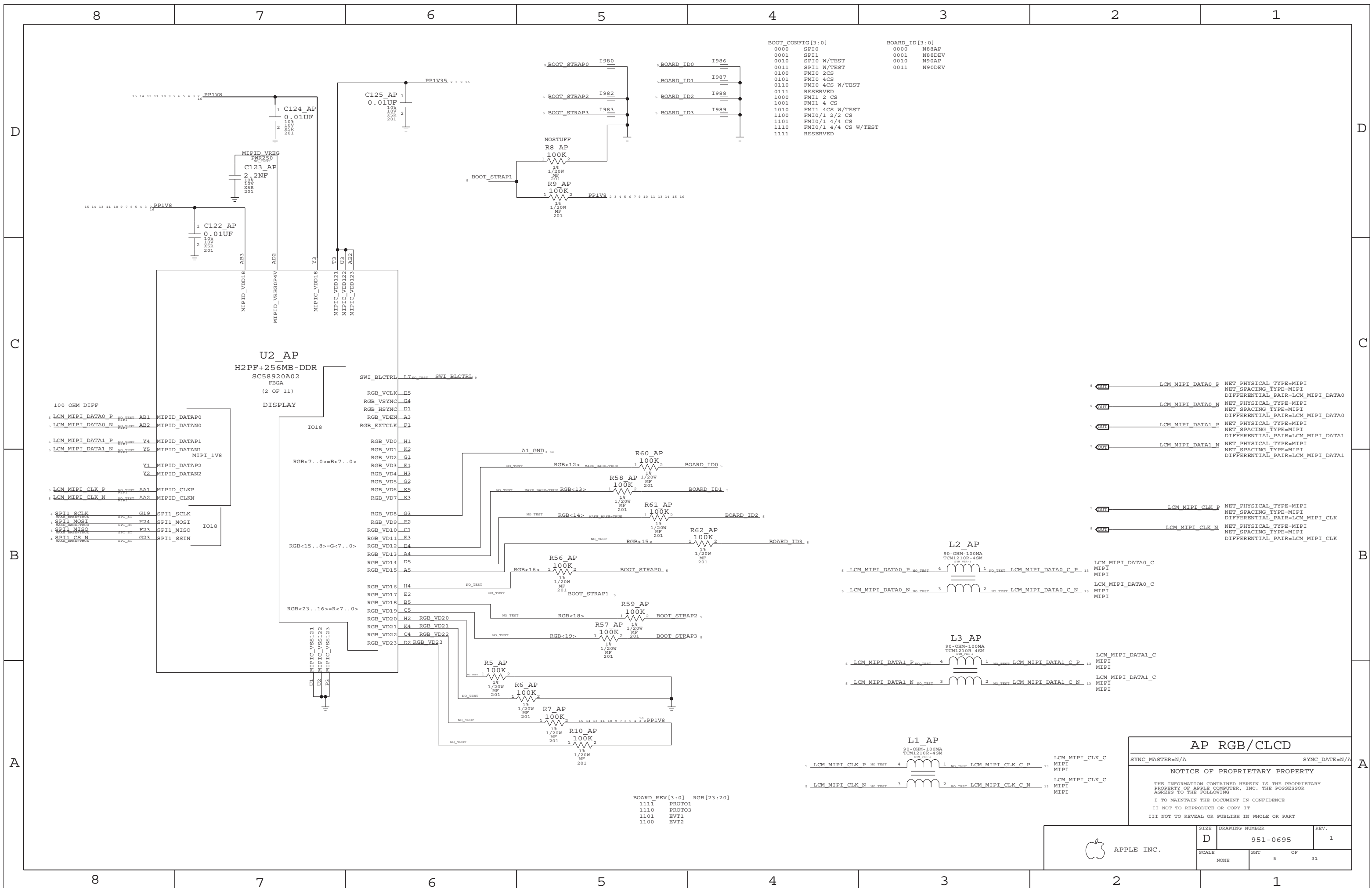
AP PWR, AP BB&WIFI
SYNC_MASTER=OM TESLA SYNC_DATE=N/A

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SIZE	DRAWING NUMBER	REV.
D	951-0695	1
SCALE	SHT	OF
NONE	3	31



PINEAPPLE INC.



BOOT_CONFIG[3:0]		BOARD_ID[3:0]	
0000	SPI0	0000	N88AP
0001	SPI1	0001	N88DEV
0010	SPI0 W/TEST	0010	N90AP
0011	SPI1 W/TEST	0011	N90DEV
0100	FMIO 2CS		
0101	FMIO 4CS		
0110	FMIO 4CS W/TEST		
0111	RESERVED		
1000	FMII 2 CS		
1001	FMII 4 CS		
1010	FMII 4CS W/TEST		
1100	FMIO/1 2/2 CS		
1101	FMIO/1 4/4 CS		
1110	FMIO/1 4/4 CS W/TEST		
1111	RESERVED		

BOARD_REV[3:0]		RGB[23:20]	
1111	PROTO1		
1110	PROTO3		
1101	EVT1		
1100	EVT2		

AP RGB/CLCD

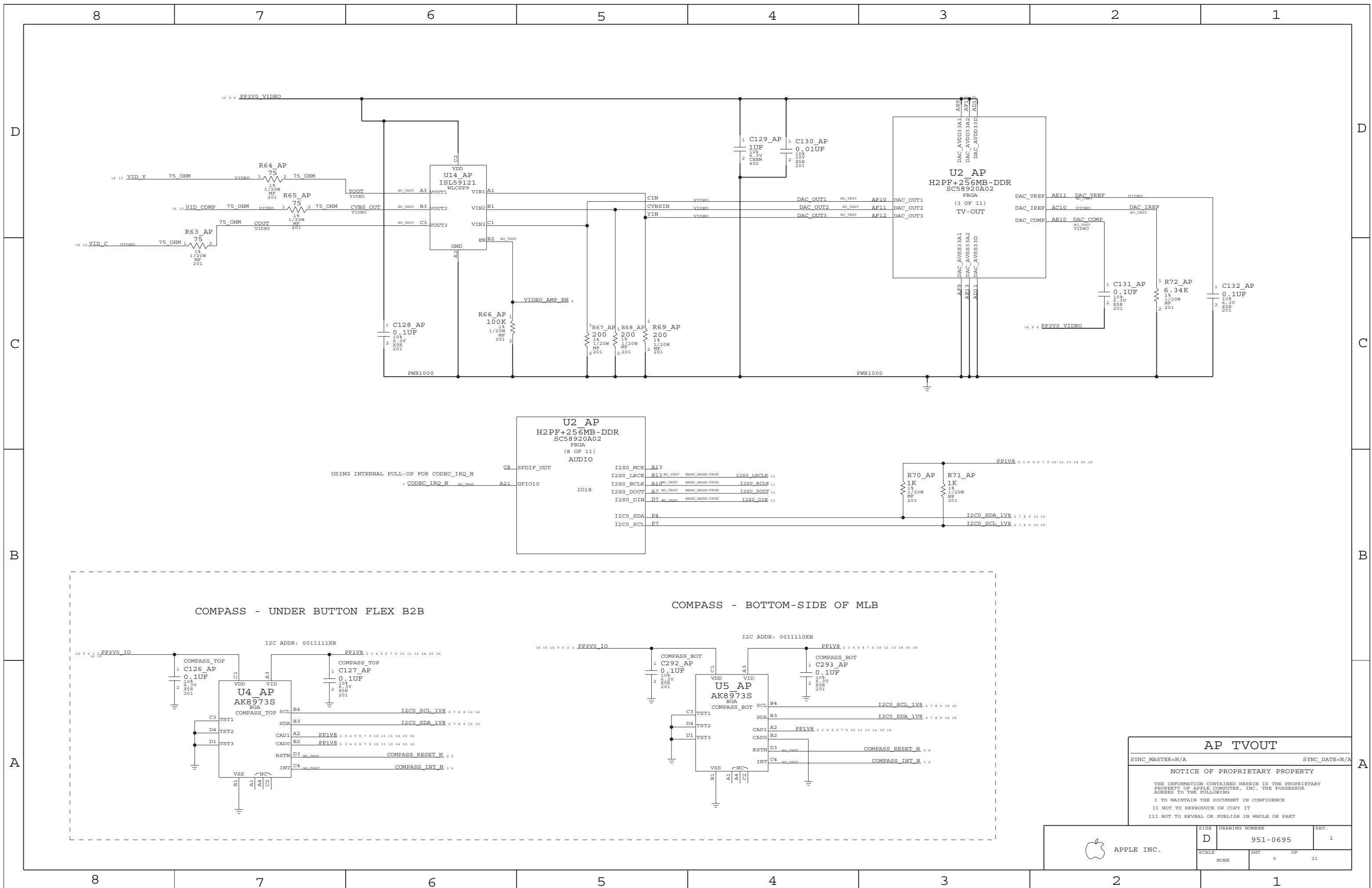
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APPLE INC.	SIZE	DRAWING NUMBER	REV.
	D	951-0695	1
SCALE	NONE	SHT	5 OF 31



AP TVOUT

SYNC_MASTER=N/A SYNC_DATE=N/A

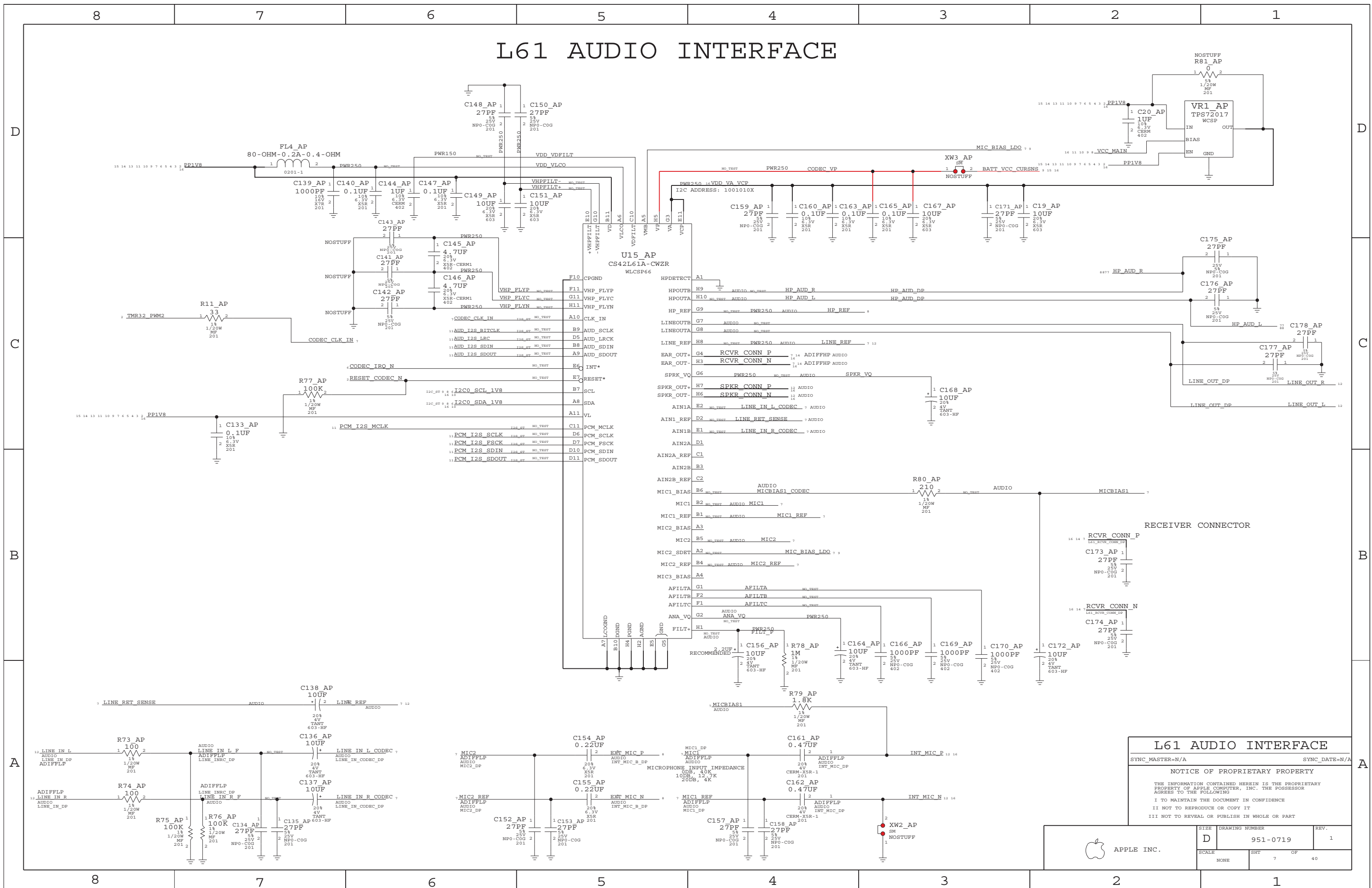
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APPLE INC.	SIZE D	DRAWING NUMBER 951-0695	REV. 1
	SCALE NONE	SHEET 6	OF 31

L61 AUDIO INTERFACE

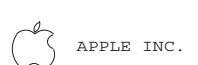


L61 AUDIO INTERFACE

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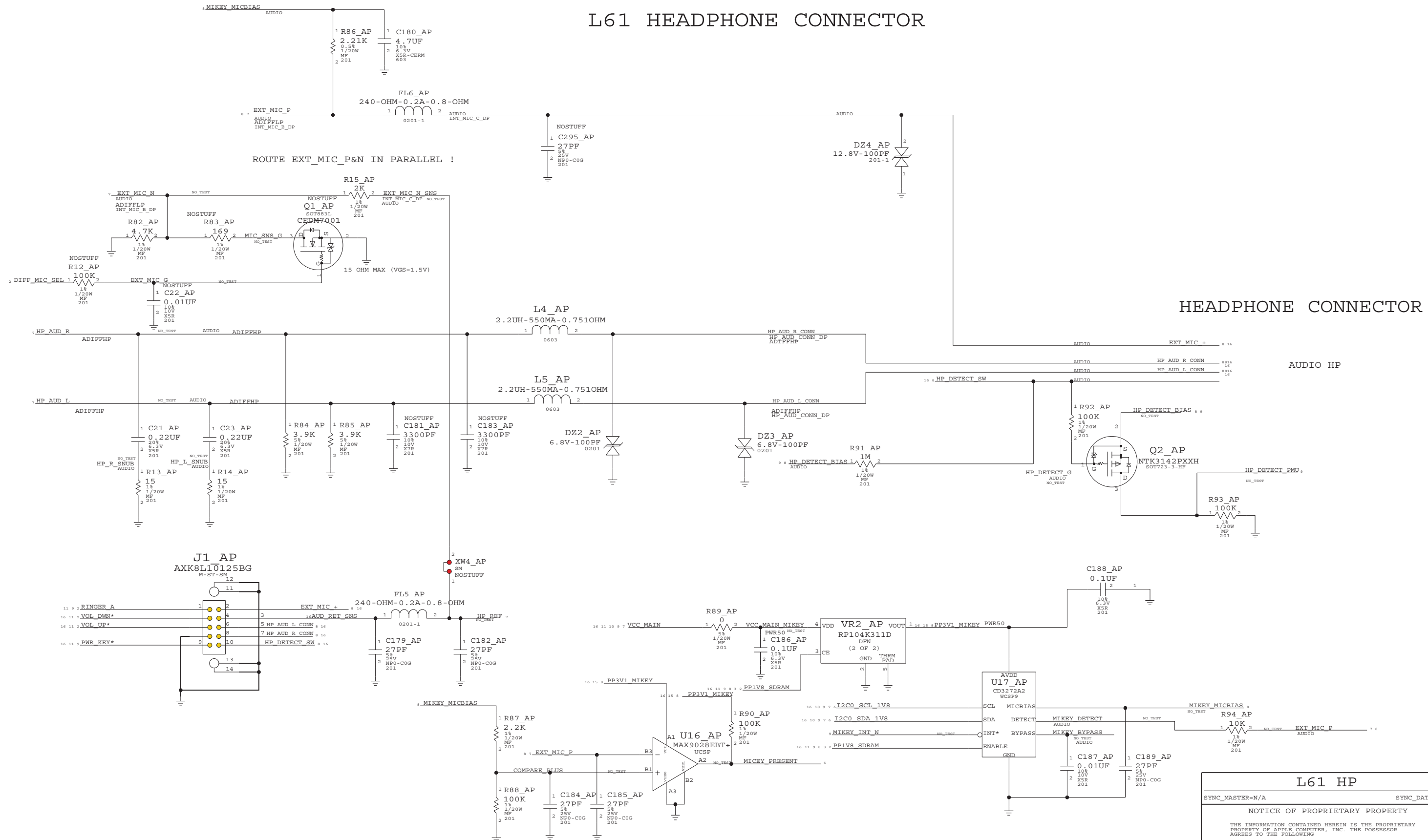
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SIZE	DRAWING NUMBER	REV.
D	951-0719	1
SCALE	SHT	OF
NONE	7	40

L61 HEADPHONE CONNECTOR



HEADPHONE CONNECTOR

L61 HP

SYNC_MASTER=N/A SYNC_DATE=N/A

NOTICE OF PROPRIETARY PROPERTY

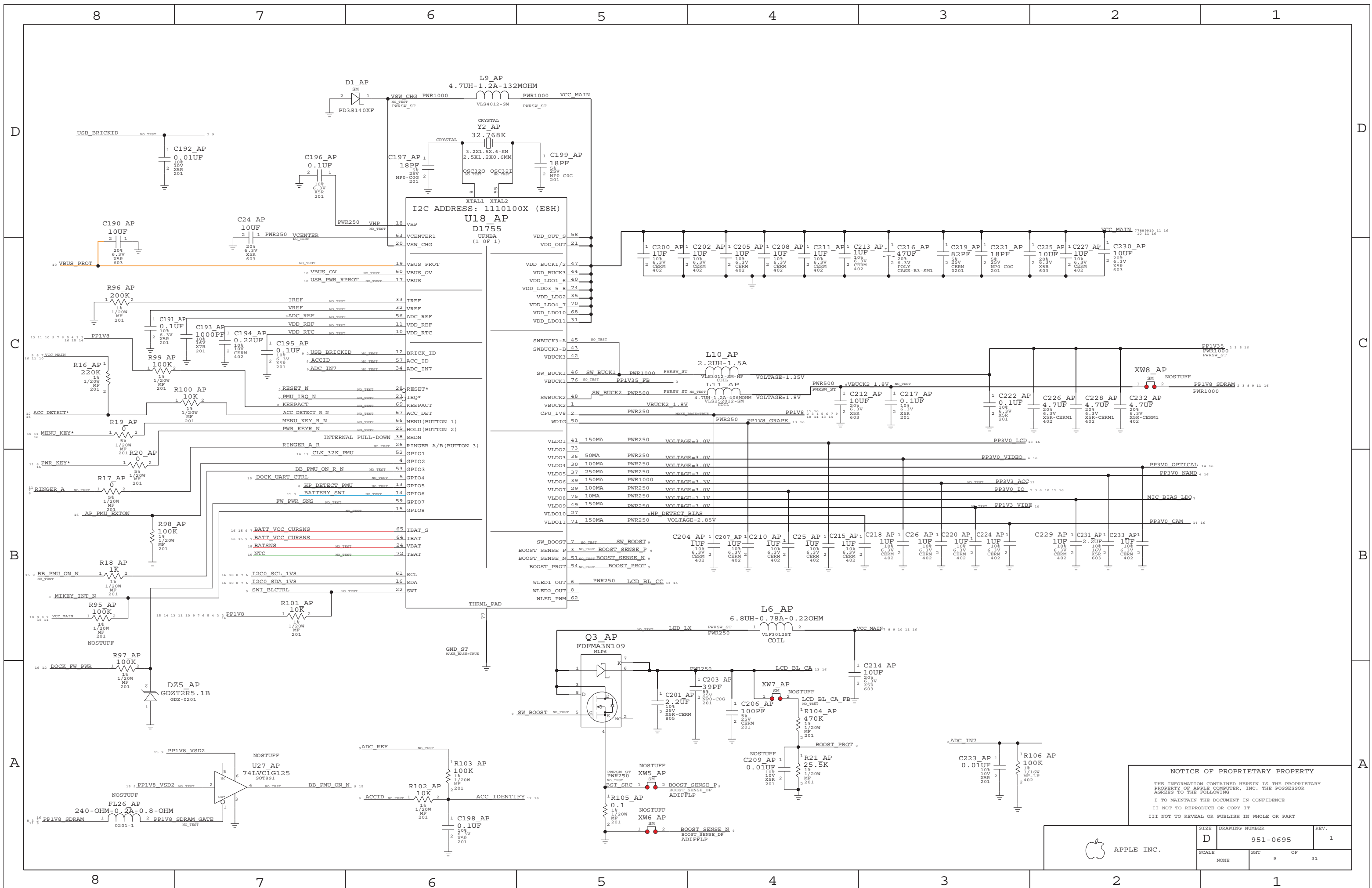
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	SIZE	DRAWING NUMBER	REV.
	D	951-0695	1
SCALE	SHT		OF
NONE	8		31



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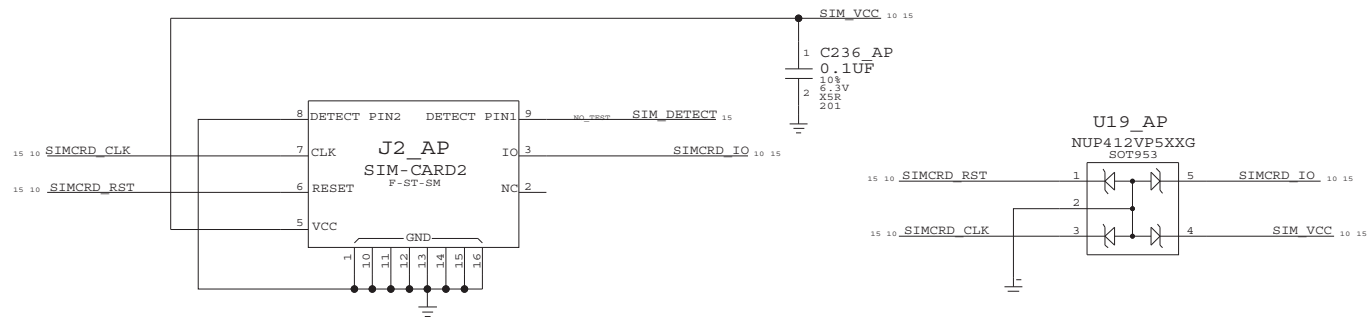
I TO MAINTAIN THE DOCUMENT IN CONFIDENCE

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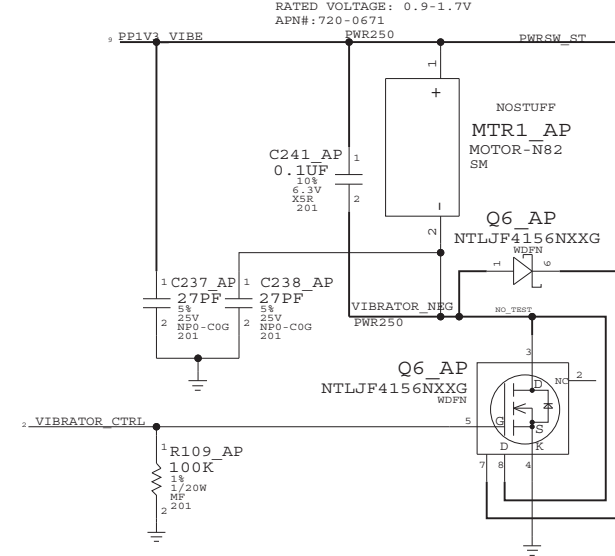
III NOT TO REVEAL OR PUBLISH IN WHOLE OR PART

APPLE INC.	SIZE	DRAWING NUMBER	REV.
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SCALE	SHT	OF	31
NONE	9		

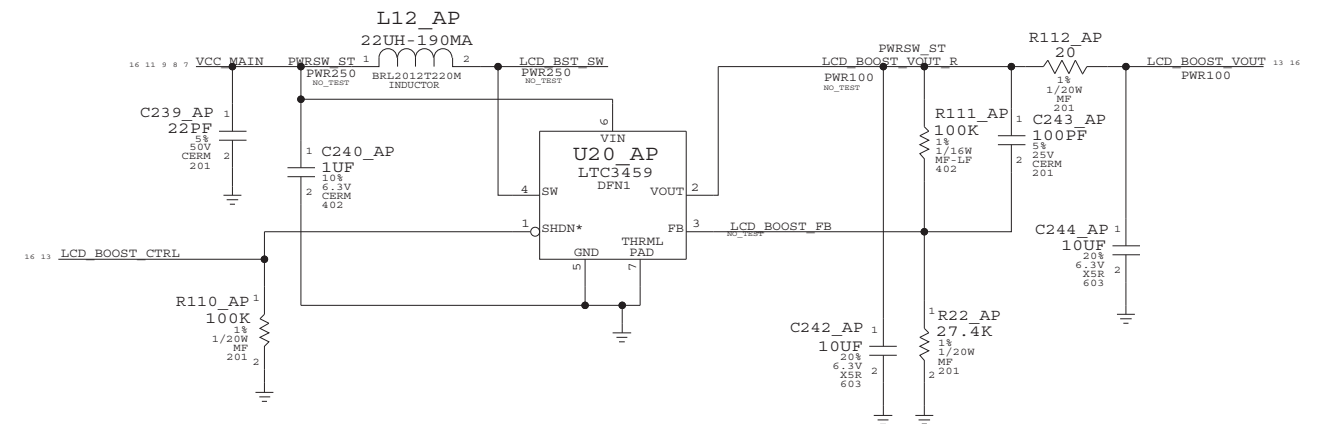
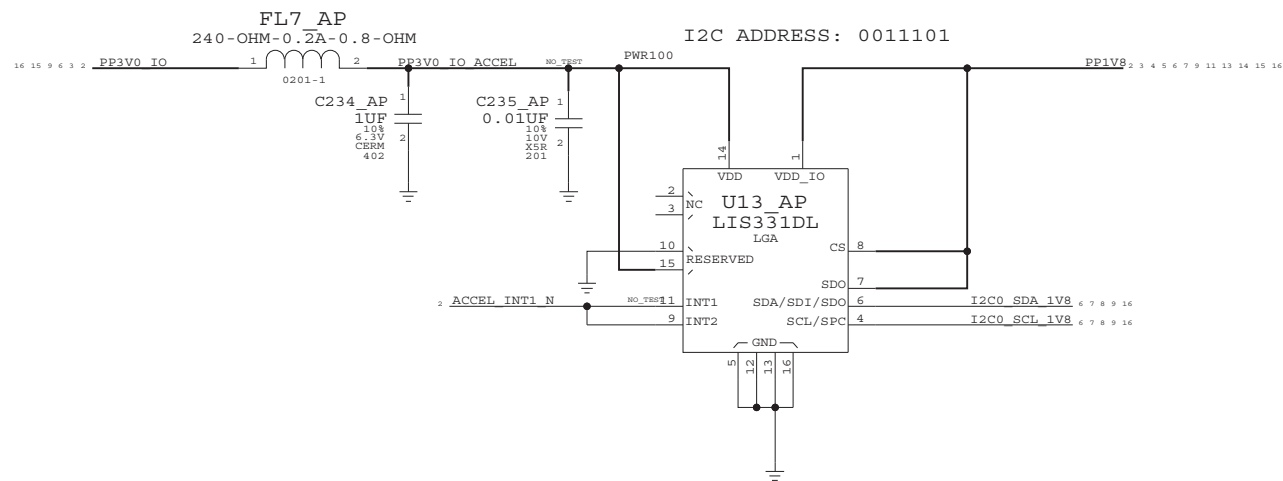
SIM CARD SLOT AND ESD



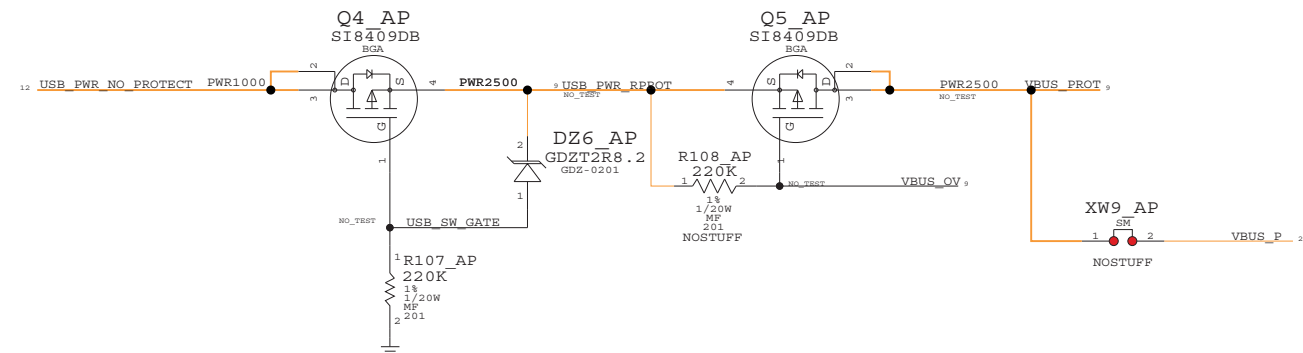
VIBRATOR PADS



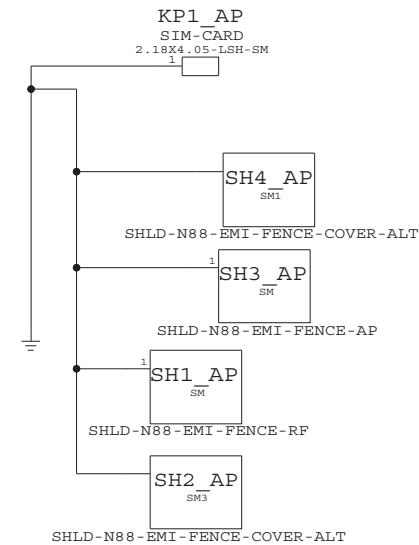
ACCELEROMETER



USB OVER/REVERSE VOLTAGE PROTECTION



SHIELDS AND SIMKEY



SIM, ACCEL, VIBE

SYNC_MASTER=N/A SYNC_DATE=N/A

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SCALE	SHT	OF
NONE	10	25

8

7

6

5

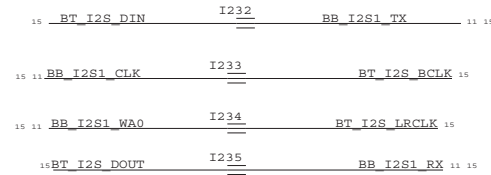
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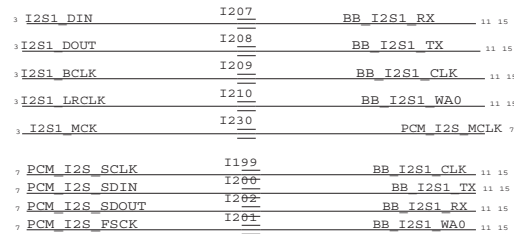
2

1

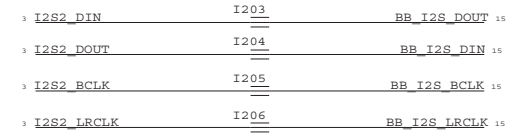
VOICE I2S TO BT



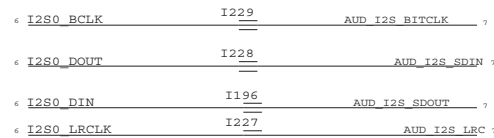
VOICE I2S AP/BB/CODEC



AP TO BB SIDETONE I2S



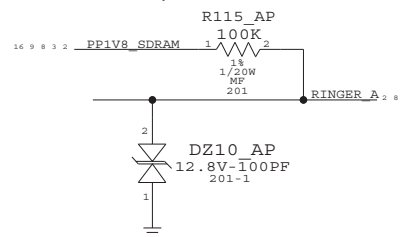
AP MULTIMEDIA I2S TO CODEC



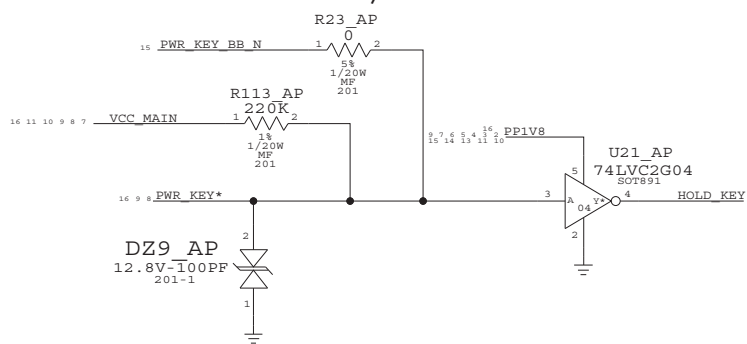
VOLUME SWITCHES



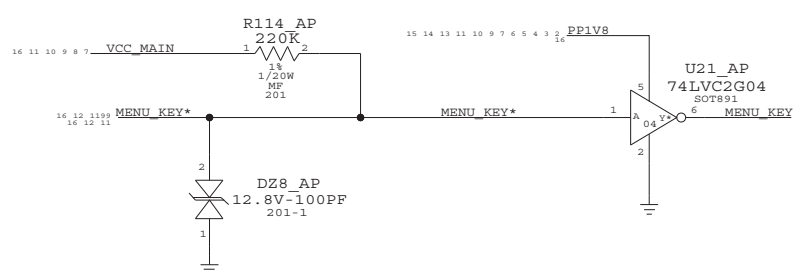
RINGER A/B SWITCH



POWER/HOLD KEY



MENU KEY



INTERFACE ASSIGNMENTS

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SIZE	DRAWING NUMBER	REV.
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SCALE	SHT	OF
NONE	11	25

8

7

6

5

4

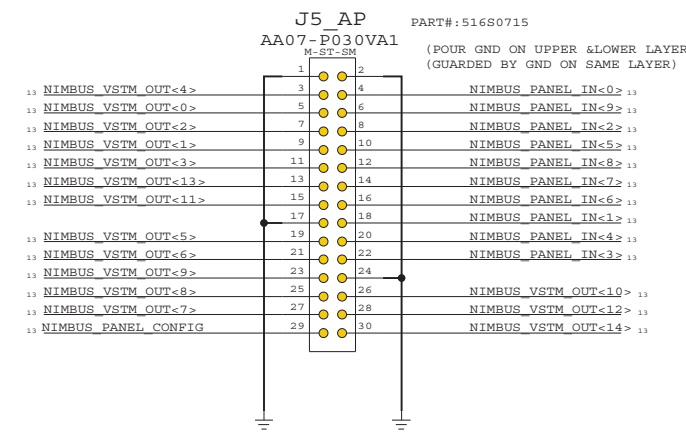
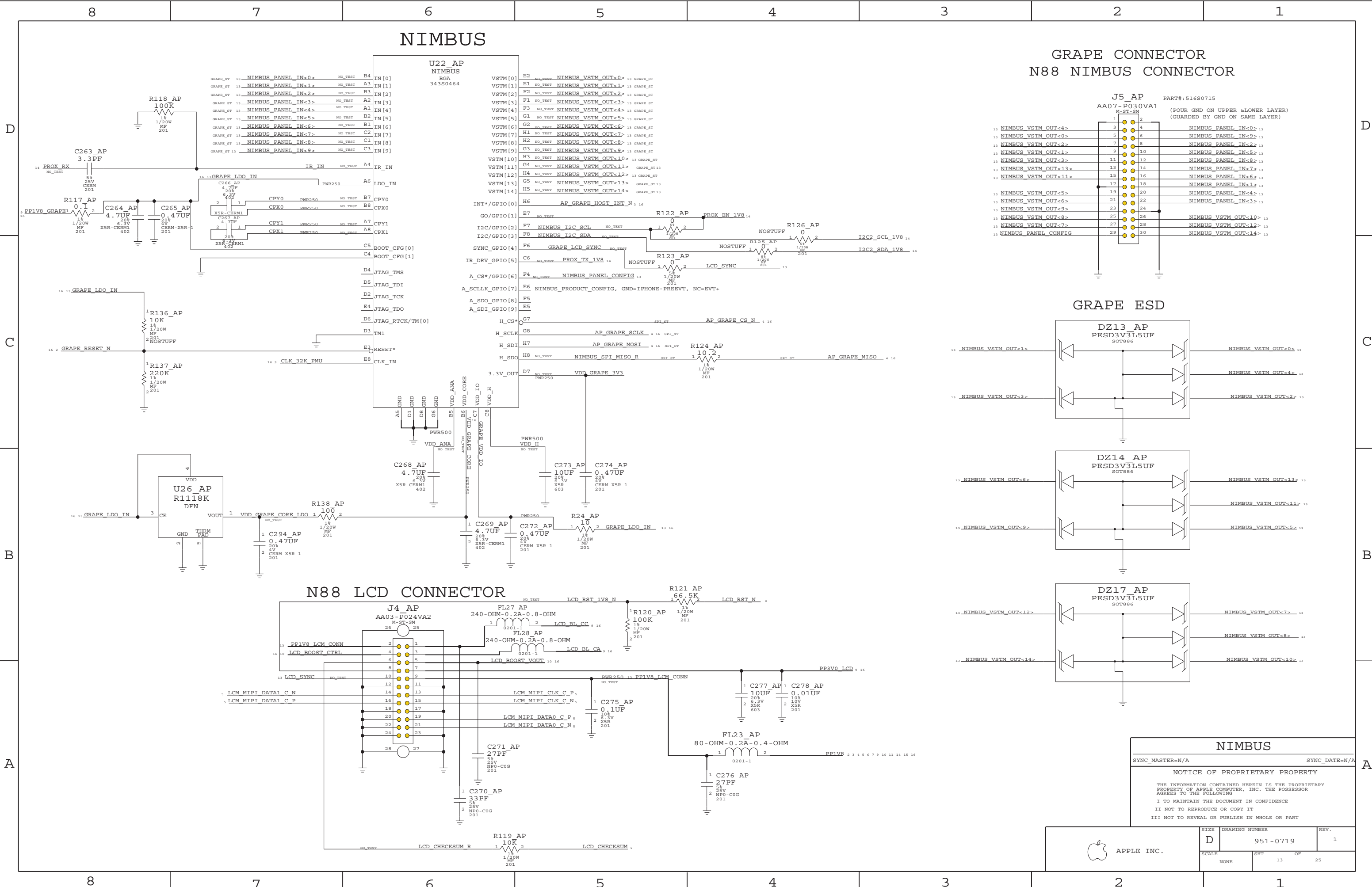
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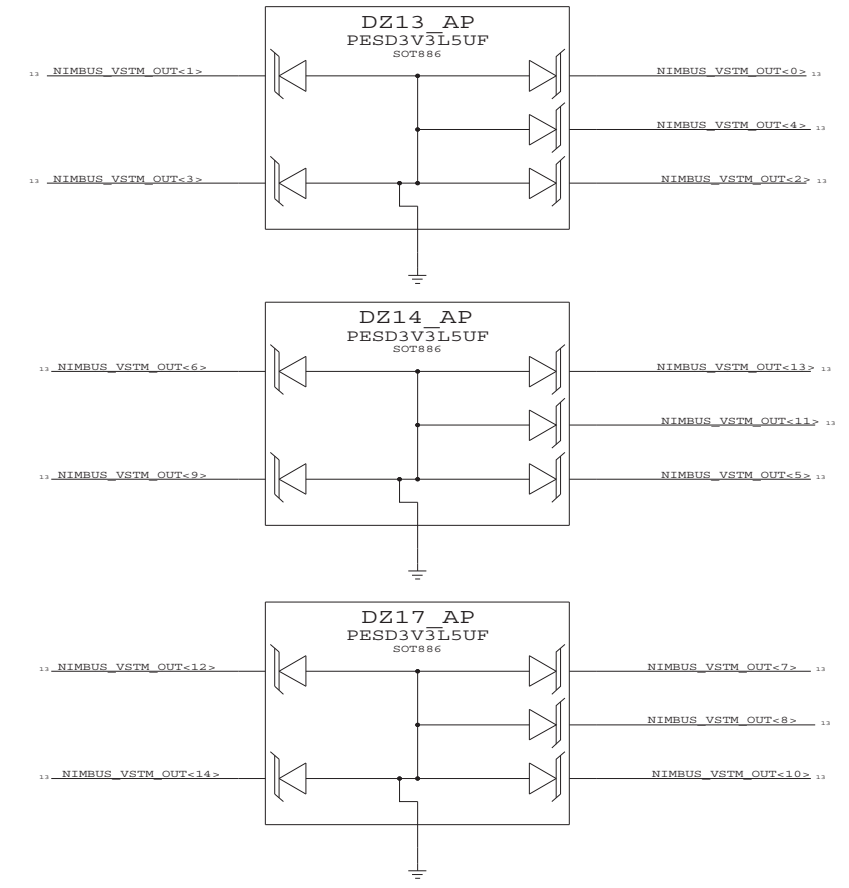
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NIMBUS

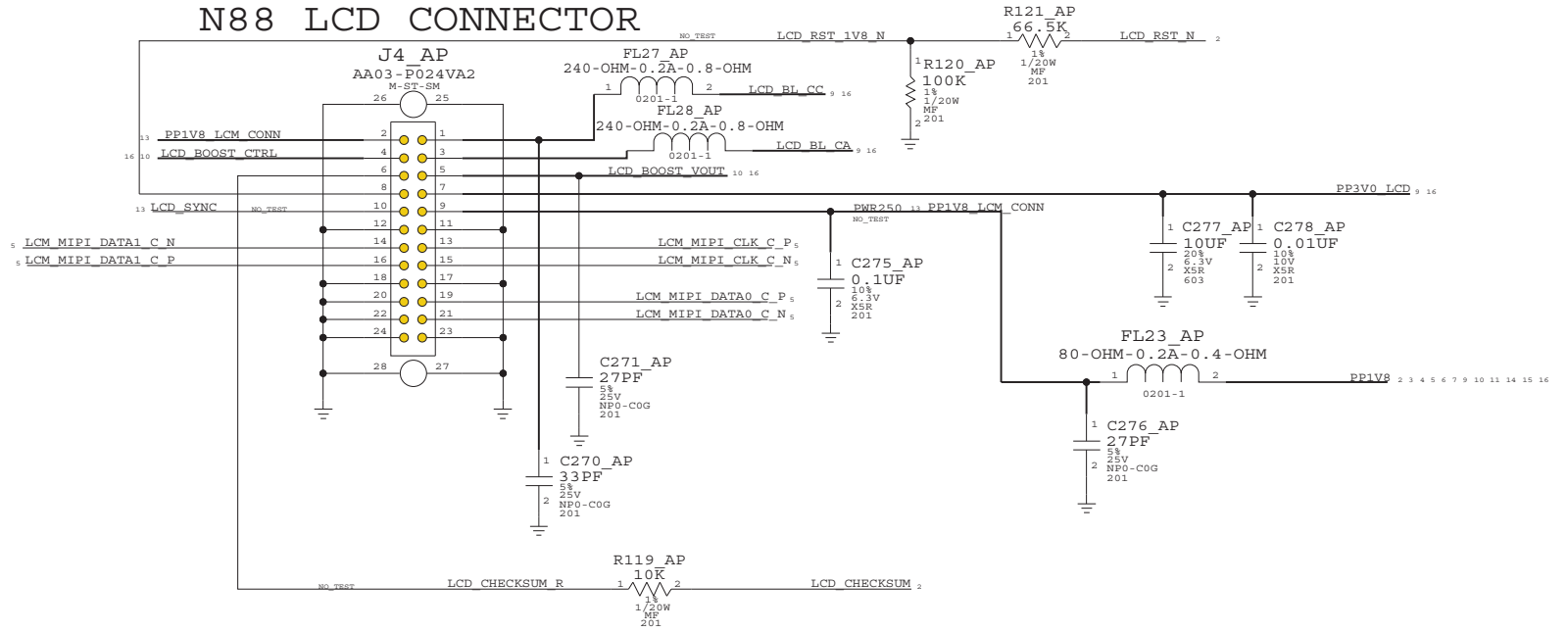
GRAPE CONNECTOR N88 NIMBUS CONNECTOR



GRAPE ESD



N88 LCD CONNECTOR



NIMBUS

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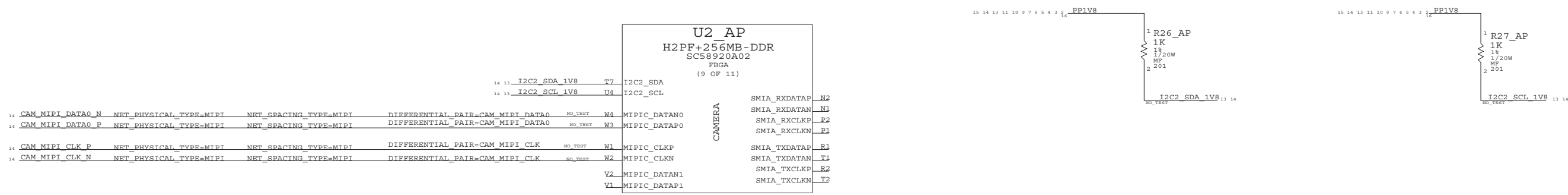
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II NOT TO REPRODUCE OR COPY IT

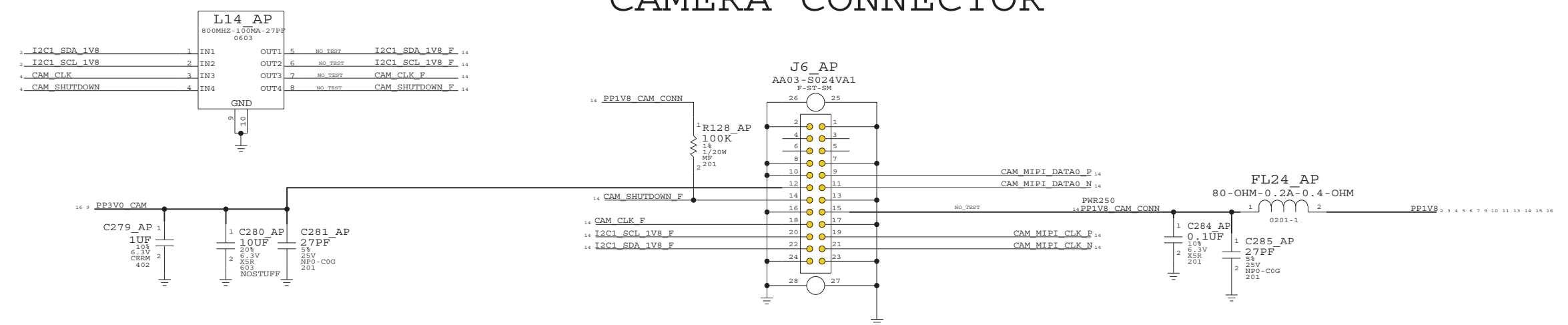
III NOT TO REVEAL OR PUBLISH IN WHOLE OR PART

	SCALE	SHT	OF	REV.
	NONE	13	25	1

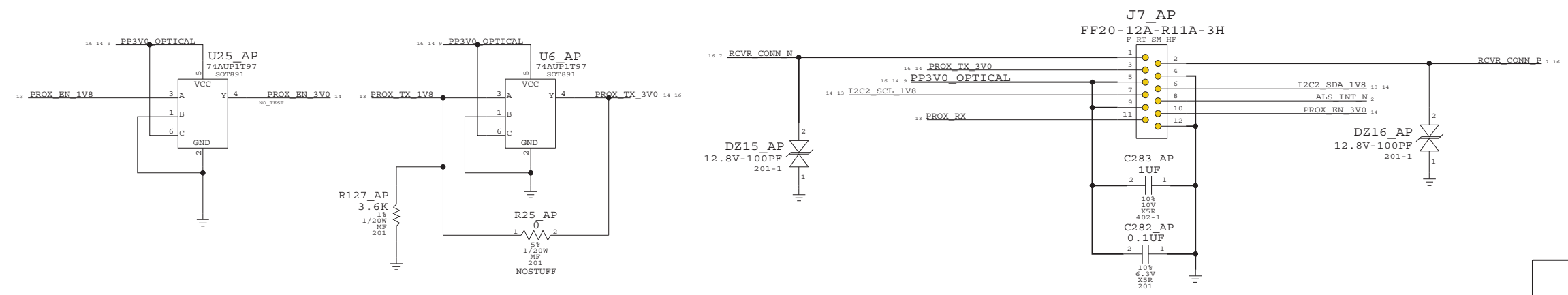
CAMERA INTERFACE



CAMERA CONNECTOR



ALS/PROX



CAMERA

SYNC_MASTER=N/A SYNC_DATE=N/A

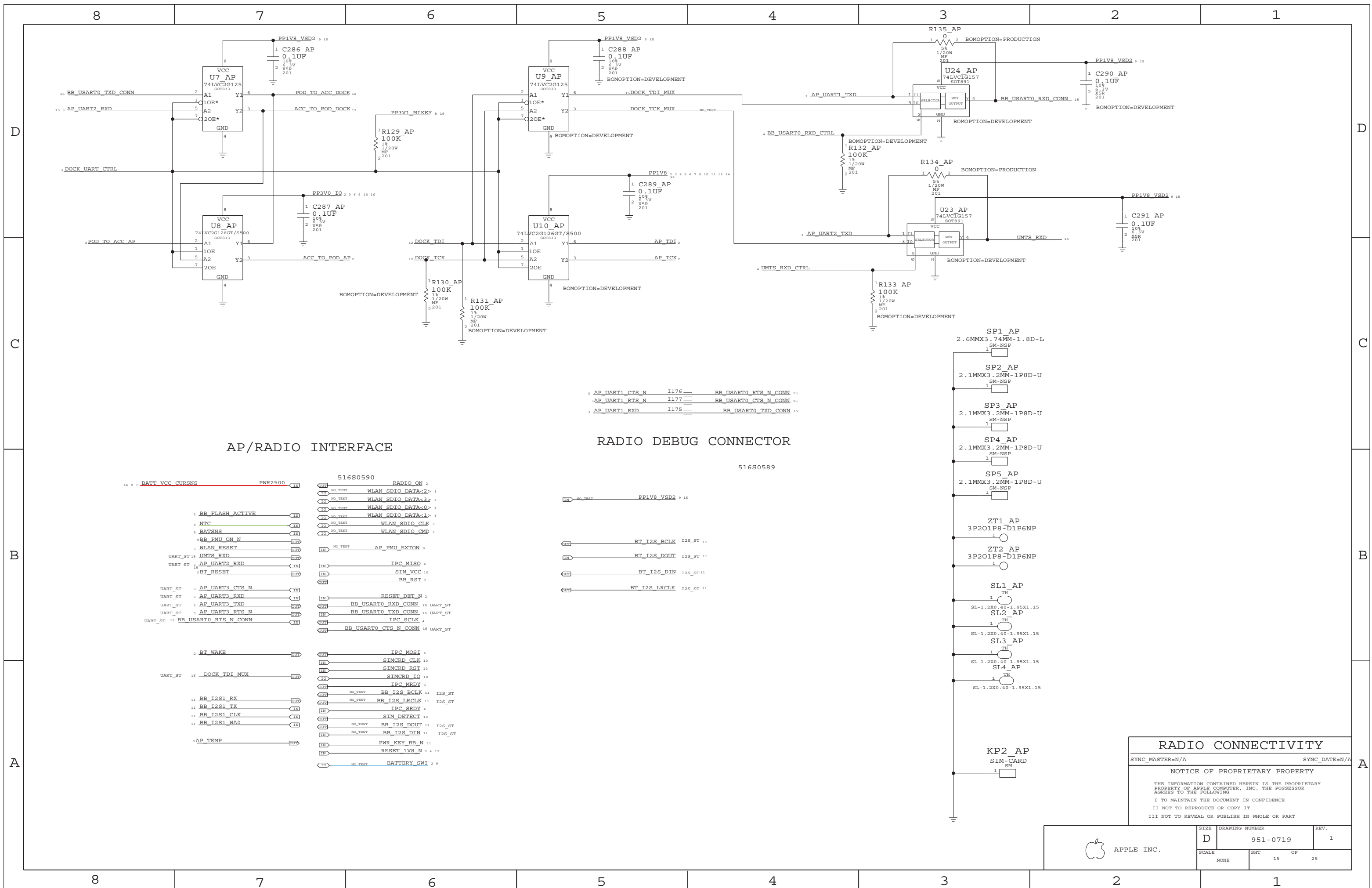
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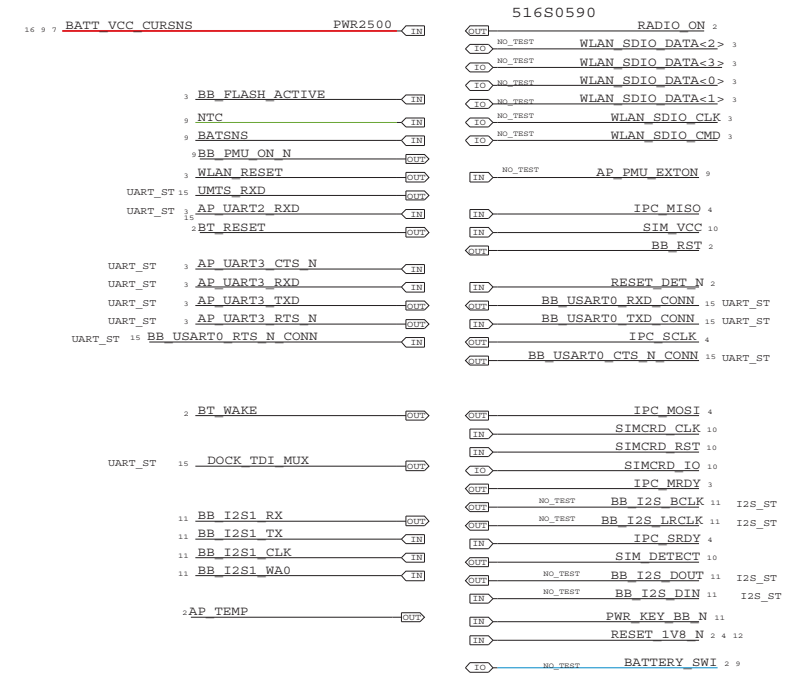
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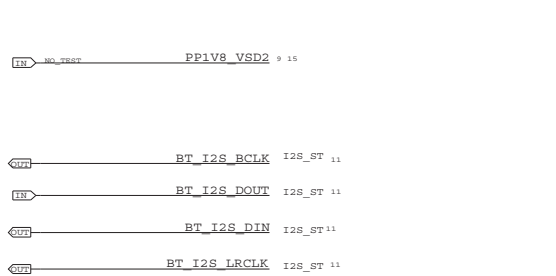
III NOT TO REVEAL OR PUBLISH IN WHOLE OR PART



AP/RADIO INTERFACE



RADIO DEBUG CONNECTOR



RADIO CONNECTIVITY

SYNC_MASTER=N/A SYNC_DATE=N/A

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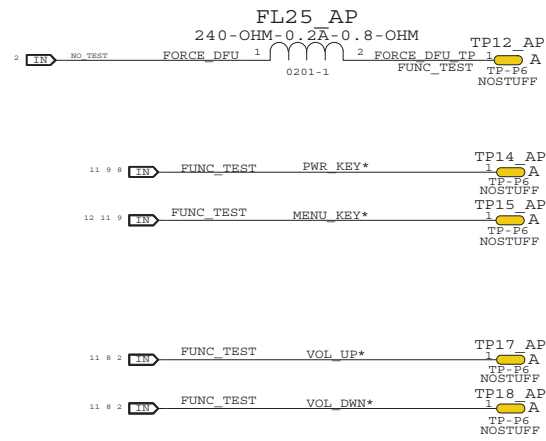
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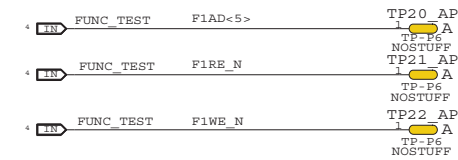
APPLE INC.	SIZE	DRAWING NUMBER	REV.
	D	951-0719	1
SCALE	SHT OF		
NONE	15 OF 25		

TEST POINTS

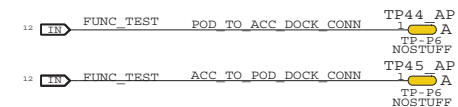
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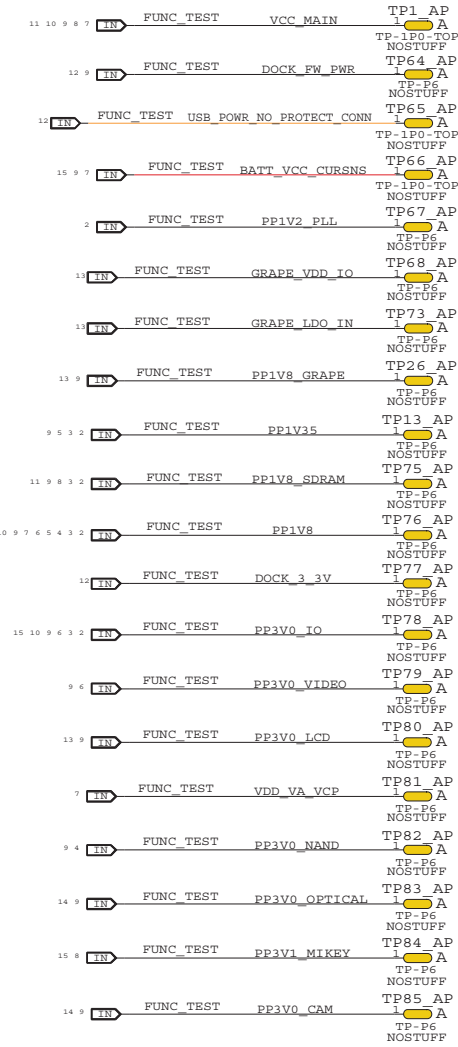
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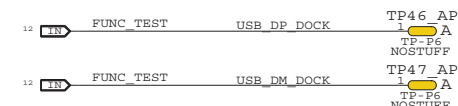
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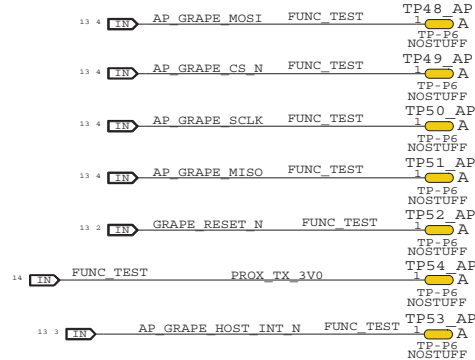
POWER



USB



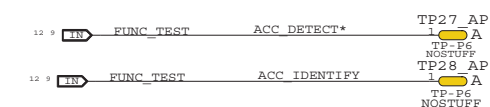
NIMBUS



CLOCKS

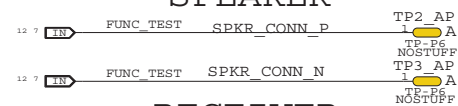


ACCESSORY DETECT

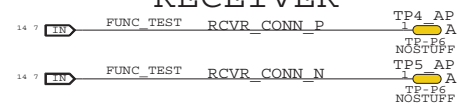


AUDIO

SPEAKER



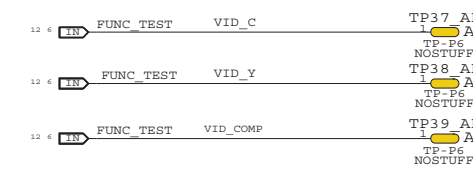
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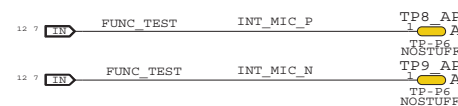
I2C PINS



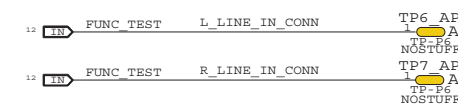
VIDEO



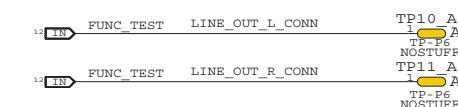
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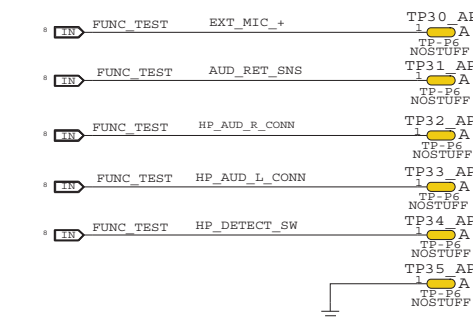
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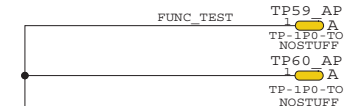
LINE OUT



HEADPHONE



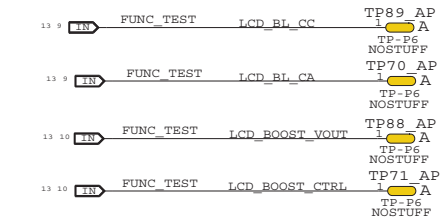
POWER GND



SIGNAL GND



LCD



RESERVED FOR OUTPUT OF LDO

PROX, ALS

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APPLE INC.

SIZE	DRAWING NUMBER	REV.
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SCALE	SHT	OF
NONE	16	25