

# DVTB RELEASE BRD REV13

## N82 SINGLE\_BRD (MLB) 3/28/2008 (L) REV13

PAGE	CONTENTS
02	RADIO AND AP SCHEMATIC INSTANTIATION

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
051-7340	1	N82_SCHEMATIC_TOP	SCH	Y	?
820-2186	1	N82_SINGLE_BOARD	PCB	Y	?
AP_V1	7	DOCK JTAG STUFF OPTIONS FOR DEVELOPMENT		Y	DEVELOPMENT
AP_V1	2	DOCK JTAG STUFF OPTIONS FOR PRODUCTION		Y	PRODUCTION
AP_V1	1	HP MIC RETURN TO SNS		Y	HP_RET_SNS
AP_V1	1	HP MIC RETURN TO GND		Y	HP_RET_GND
AP_V1	1	MIKEY AVDD=VCC_MAIN		Y	MIKEY_VCCMAIN
AP_V1	1	MIKEY AVDD=CODEC_A3V		Y	MIKEY_A3V
RADIO_PROTO	1	3G RF SOLUTION		Y	3G_RF
RADIO_PROTO	1	2G RF SOLUTION		Y	2G_RF
AP_V1	5	3V SERIAL FLASH		Y	SFLASH_3V
AP_V1	4	1V8 SERIAL FLASH		Y	SFLASH_1V8
RADIO_PROTO	2	BT/WIFI MODULE (MURATA)		Y	MURATA
RADIO_PROTO	2	BT/WIFI MODULE ALPS		Y	ALPS

### N82 EEE BOM LABELS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
825-2029	1	EEE FOR 630-8772 (8G)	EEE:Y5K	Y	FLASH_8GB
825-2029	1	EEE FOR 630-8943 (16G)	EEE:YEU	Y	FLASH_16GB

BOARD - 820-2186  
 SCHEMATIC - 051-7340  
 BOM - 630-8772 (8GB)  
 BOM - 630-8943 (16GB)

### NAND BOM OPTIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
335S0517	1	8GB TOSHIBA 56NM FLASH TSOP48	U29_AP	Y	FLASH_8GB
335S0514	1	16GB SAMSUNG 51NM FLASH DSP/WMLP	U29_AP	Y	FLASH_16GB

### NAND ALTERNATES

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
335S0575	335S0517	FLASH_8GB	U29_AP	8GB SAMSUNG 63NM FLASH TSOP48
335S0548	335S0517	FLASH_8GB	U29_AP	8GB MICRON 50NM FLASH TSOP48
335S0545	335S0517	FLASH_8GB	U29_AP	8GB INTEL 50NM FLASH TSOP48

335S0573	335S0514	FLASH_16GB	U29_AP	16GB TOSHIBA 56NM FLASH BGA
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### SUB BOM FOR BT/WIFI MODULE

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
607-2683	1	FOR MURATA BT/WIFI MODULE	SB1	Y	BT_WIFI

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
607-2682	607-2683	BT_WIFI	SB1	FOR ALPS BT/WIFI MODULE

### EEE BOM LABELS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
825-2029	1	EEE FOR 607-2683 (MURATA)	EEE:0XL	Y	MURATA
825-2029	1	EEE FOR 607-2682 (ALPS)	EEE:0XM	Y	ALPS

### SERIAL FLASH BOM OPTIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
335S0552	1	SST 8MBIT 3V SERIAL FLASH	U11_AP	Y	SFLASH_3V
335S0555	1	ATMEL 8MBIT 1V8 SERIAL FLASH	U11_AP	Y	SFLASH_1V8

### VIDEO AMP ALTERNATE

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
35381625	35381650	?	U30_AP	VIDEO AMP

### ACC SWITCH ALTERNATE

PART NUMBER	ALTERNATE FOR PART NUMBER	BOM OPTION	REF DES	COMMENTS:
35381769	35381751	?	S1_AP	ACC SWITCH

### BB MEMORY BOM OPTIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
335S0486	1	BLANK BASEBAND MEMORY	U13_RF	Y	BB_MEM_BLANK
341S2247	1	PROGRAMMED BASEBAND MEMORY	U13_RF	Y	BB_MEM_PROGRAMMED

### 2G\_RF BOM OPTION

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
118S0407	1	STUFF 49.9 OHM FOR BAND5 LOAD	C35_RF	Y	2G_RF
118S0407	1	STUFF 49.9 OHM FOR BAND1 LOAD	C38_RF	Y	2G_RF
118S0407	1	STUFF 49.9 OHM FOR BAND2 LOAD	C40_RF	Y	2G_RF
131S0091	1	STUFF 10PF FOR BAND1	C39_RF	Y	2G_RF
339S0058	1	STUFF BT ONLY MODULE	U10_RF	Y	2G_RF

### BT/WIFI BOM OPTIONS

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
339S0040	1	MURATA BT/WIFI MODULE	U10_RF	Y	MURATA
339S0039	1	ALPS BT/WIFI MODULE	U10_RF	Y	ALPS
118S0012	1	RESISTOR ID FOR MURATA	R61_RF	Y	MURATA
118S0012	1	RESISTOR ID FOR ALPS	R6_RF	Y	ALPS

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	D	051-7340	02
SCALE	SHEET 1 OF 9		
NONE			

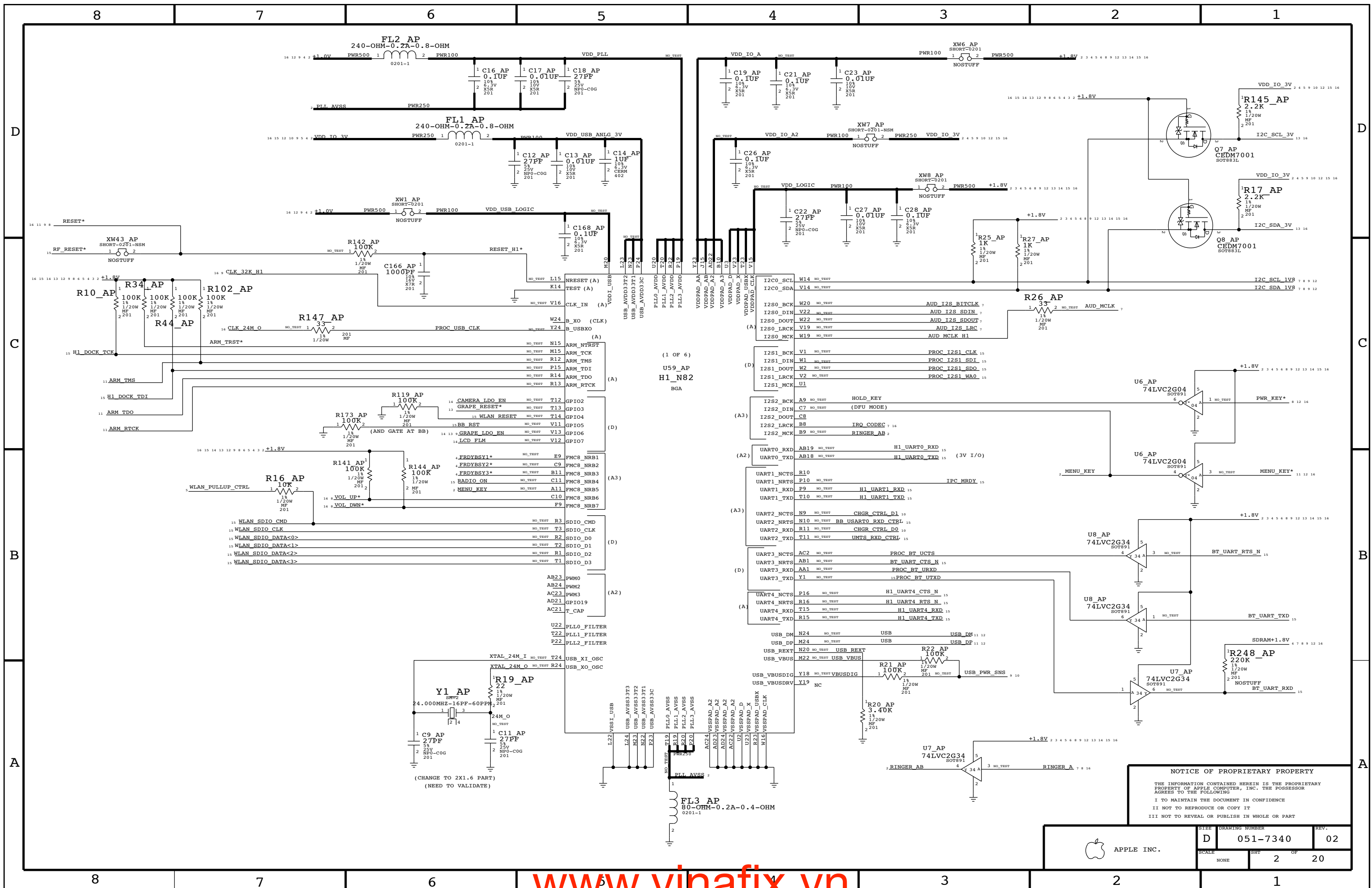
# MLB DVTB REV13

## N82 SINGLE BRD (MLB) AP -3/28/2008(L) REV13


PAGE	CONTENTS
02	H1 PERIPHERAL INTERFACES (UART/SDIO)
03	H1 DDR SDRAM INTERFACE , BOARD ID, VERSION ID
04	H1 NAND, NAND FLASH
05	H1 LCD INTERFACE, MPL CLCD INTERFACE, SERIAL FLASH
06	H1 CAMERA, VIDEO OUT
07	WM1817 AUDIO CODEC
08	HEADPHONE CONECTOR, VOLUME/HOLD ZIF, VIBRATOR
09	POWER MANAGEMENT UNIT
10	SWITCHING LTC4088 CHARGER
11	DOCK FLEX CONNECTOR
12	1A USB BRICK DETECT, ACCELEROMETER, POWER/MENU/DFU LOGIC
13	ZEPHYR2 LITE AND MARIO LITE (GRAPE), PROX ZIF
14	LCM CONNECTOR, CAMERA CONNECTOR
15	RADIO->AP INTERFACE
16	FUNCTIONAL TEST POINTS

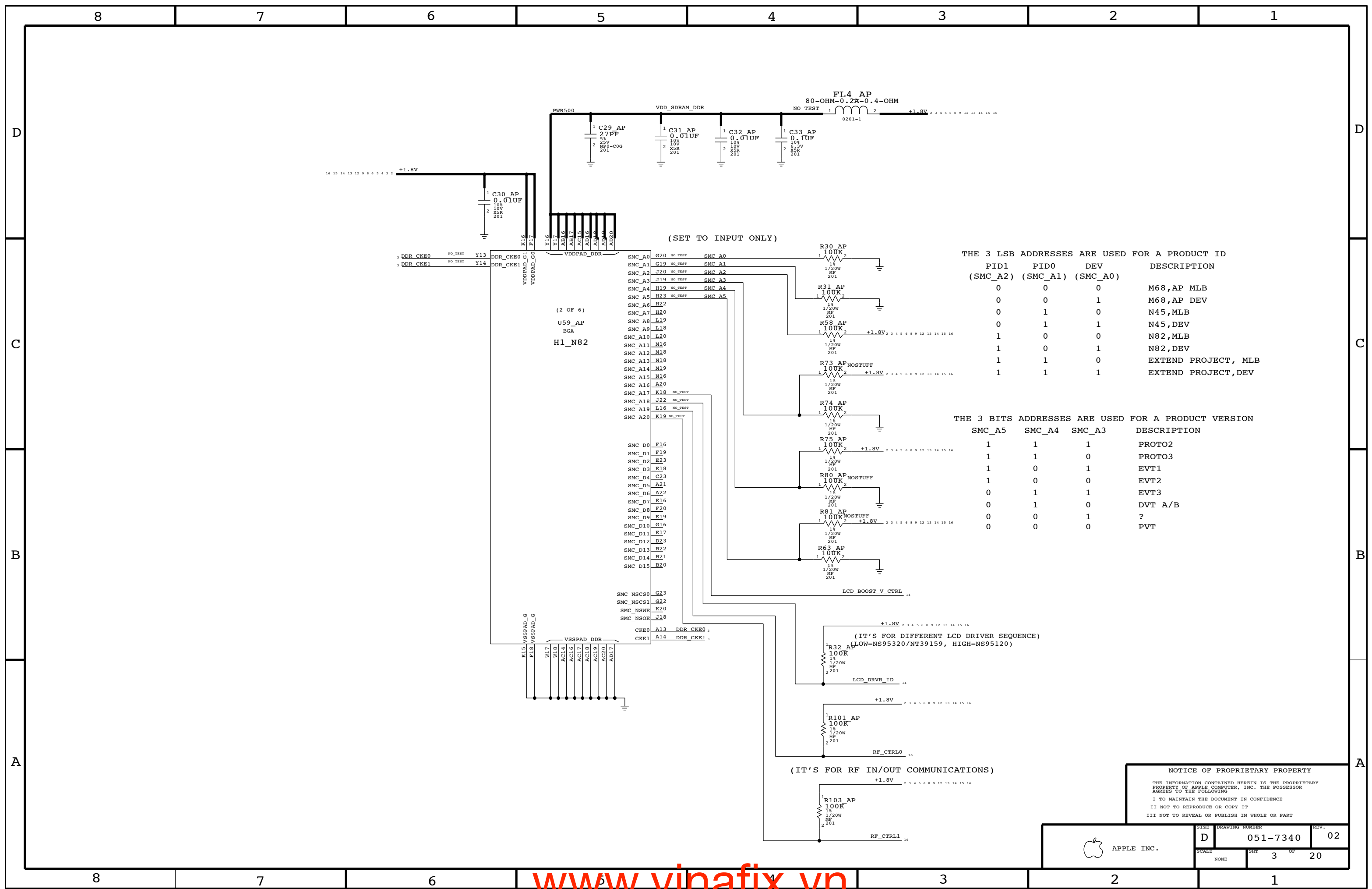
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	SCALE NONE	SHEET <b>2</b>



THE 3 LSB ADDRESSES ARE USED FOR A PRODUCT ID

PID1 (SMC_A2)	PID0 (SMC_A1)	DEV (SMC_A0)	DESCRIPTION
0	0	0	M68,AP MLB
0	0	1	M68,AP DEV
0	1	0	N45,MLB
0	1	1	N45,DEV
1	0	0	N82,MLB
1	0	1	N82,DEV
1	1	0	EXTEND PROJECT, MLB
1	1	1	EXTEND PROJECT, DEV

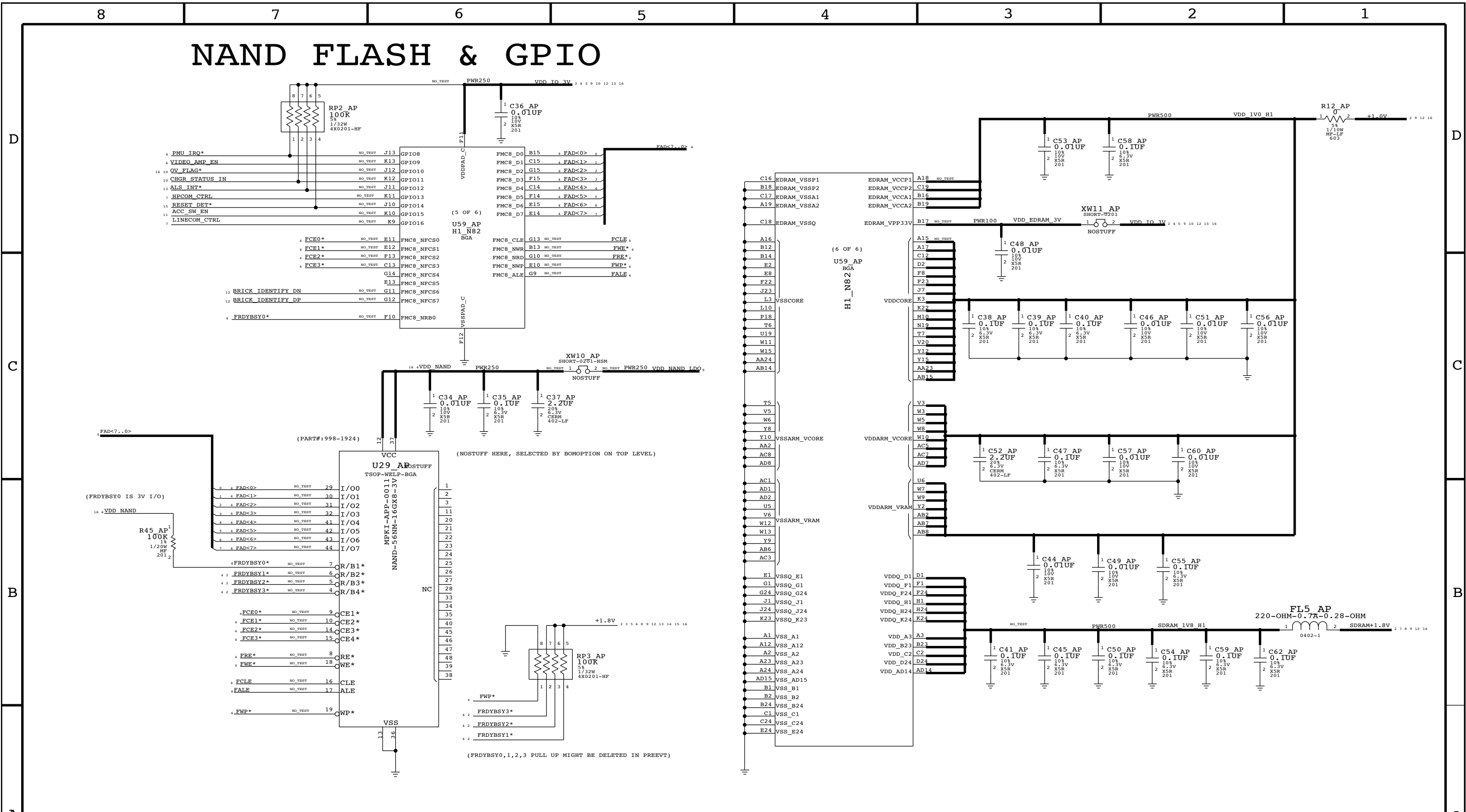
THE 3 BITS ADDRESSES ARE USED FOR A PRODUCT VERSION

SMC_A5	SMC_A4	SMC_A3	DESCRIPTION
1	1	1	PROTO2
1	1	0	PROTO3
1	0	1	EVT1
1	0	0	EVT2
0	1	1	EVT3
0	1	0	DVT A/B
0	0	1	?
0	0	0	PVT

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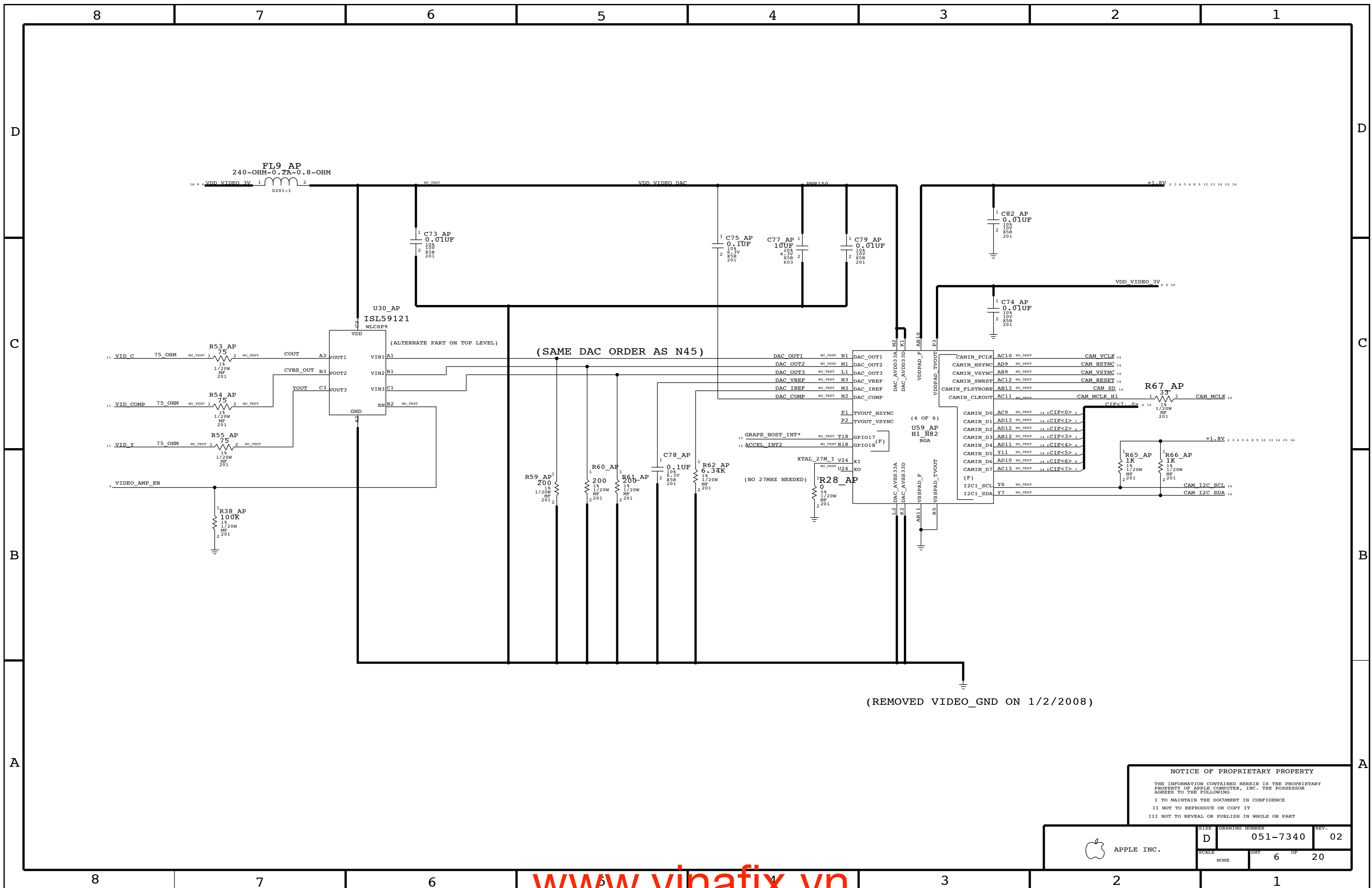
# NAND FLASH & GPIO



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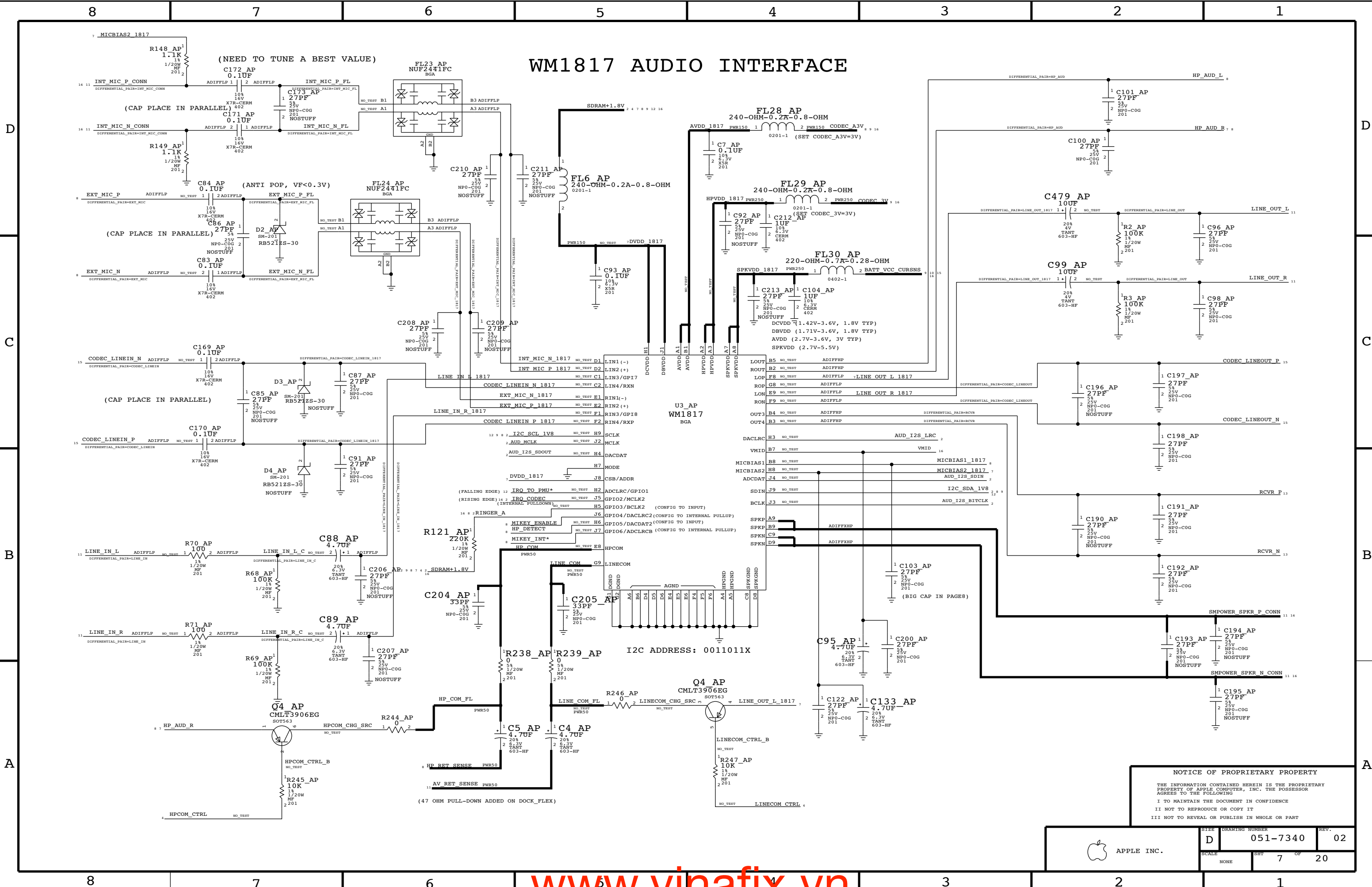




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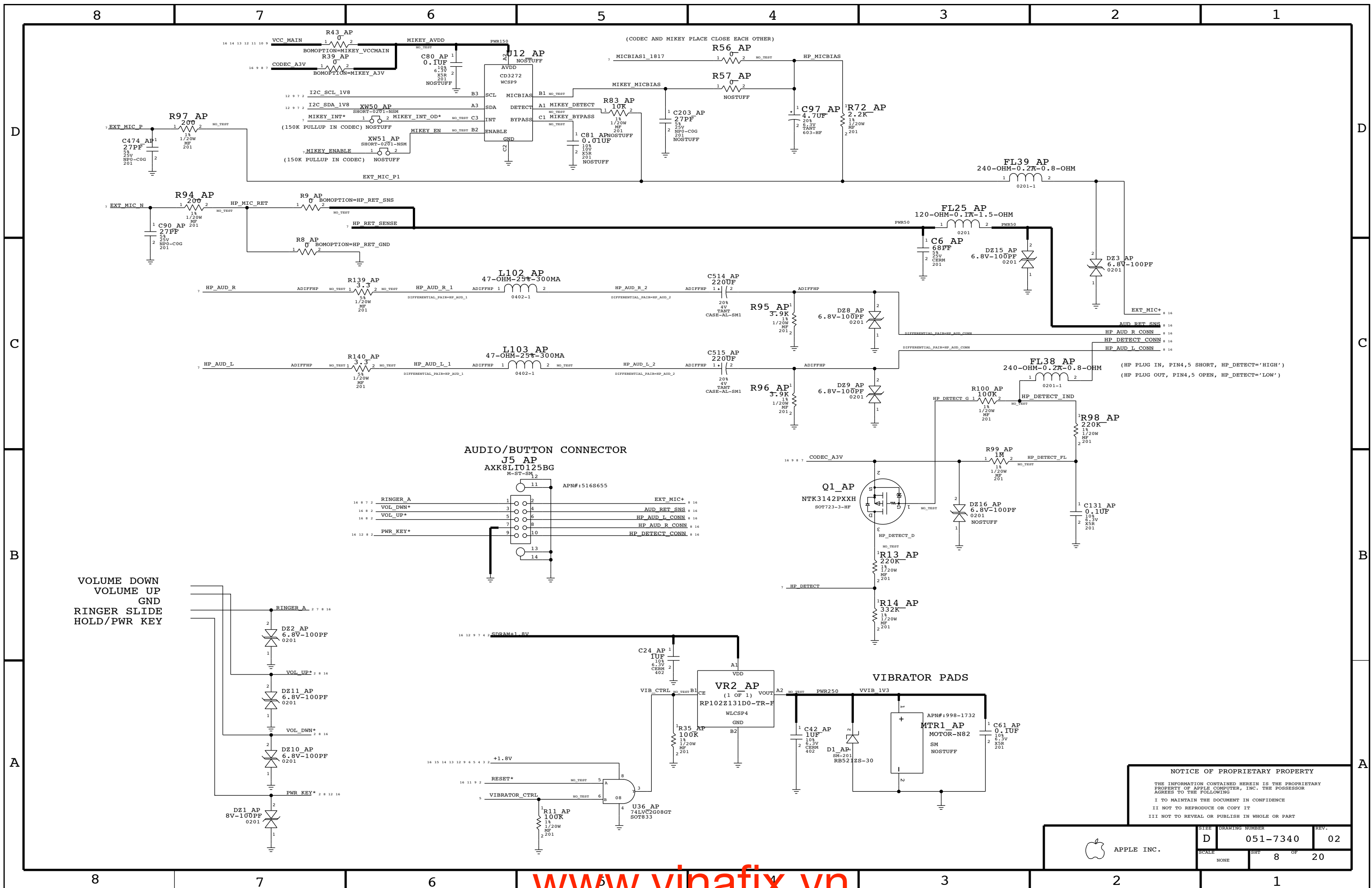
# WM1817 AUDIO INTERFACE



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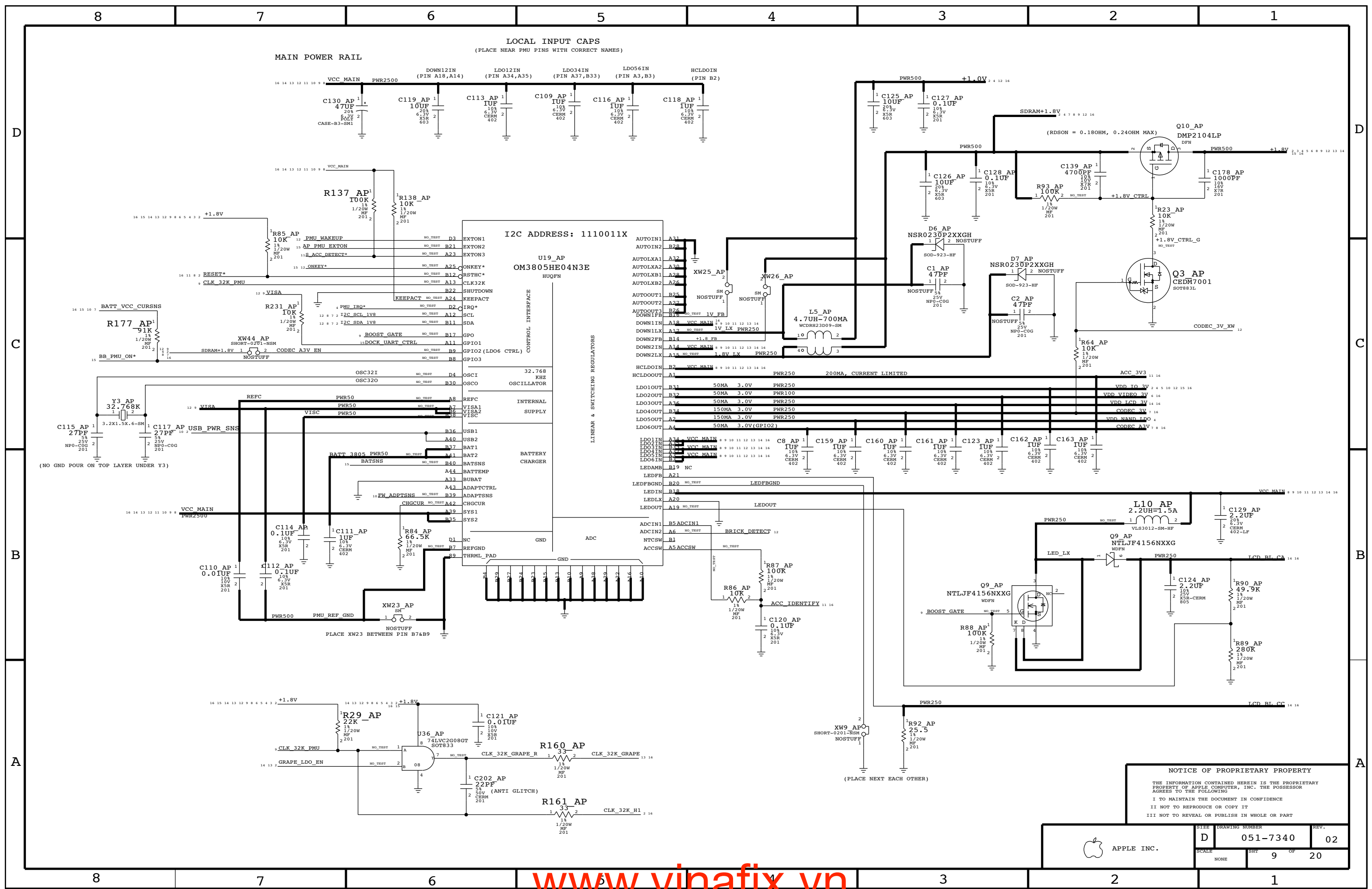
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SCALE	SHT	OF
NONE	8	20



LOCAL INPUT CAPS  
(PLACE NEAR PMU PINS WITH CORRECT NAMES)

MAIN POWER RAIL  
VCC\_MAIN PWR2500  
DOWN12IN (PIN A18,A14)  
LDO12IN (PIN A34,A35)  
LDO34IN (PIN A37,B33)  
LDO56IN (PIN A3,B3)  
HCLDOIN (PIN B2)

I2C ADDRESS: 1110011X

U19 AP  
OM3805HE04N3E  
HUQFN

CONTROL INTERFACE  
AUTOIN1 A31  
AUTOIN2 B29  
AUTOLXA1 A32  
AUTOLXA2 A30  
AUTOLXB1 A28  
AUTOLXB2 A26  
AUTOOUT1 B25  
AUTOOUT2 A27  
AUTOOUT3 B26  
DOWN1FB B16  
DOWN1IN A18  
DOWN1LX A17  
DOWN2FB B14  
DOWN2IN A14  
DOWN2LX A15

OSCILLATOR  
OSC321 NO\_TEST D4 32.768 KHZ  
OSC320 NO\_TEST B30

INTERNAL SUPPLY  
REFC PWR50  
VISA1 PWR50  
VISA2 PWR50  
VISC PWR50

BATTERY CHARGER  
BATSNS B40  
BAT2 B41  
BAT1 B37  
BAT2 B40  
BATSNS B40  
LEDFB B19  
LEDFBGND B20  
LEDFB A21  
LEDIN B18  
LEDLX A20  
LEDOUT A19

ADC  
ADCIN1 B5  
ADCIN2 A6  
NTCSW B1  
ACCSW A5

REFC PWR50  
VISA1 PWR50  
VISA2 PWR50  
VISC PWR50

BATSNS B40  
BAT2 B41  
BAT1 B37  
BAT2 B40  
BATSNS B40  
LEDFB B19  
LEDFBGND B20  
LEDFB A21  
LEDIN B18  
LEDLX A20  
LEDOUT A19

ADCIN1 B5  
ADCIN2 A6  
NTCSW B1  
ACCSW A5

REFC PWR50  
VISA1 PWR50  
VISA2 PWR50  
VISC PWR50

BATSNS B40  
BAT2 B41  
BAT1 B37  
BAT2 B40  
BATSNS B40  
LEDFB B19  
LEDFBGND B20  
LEDFB A21  
LEDIN B18  
LEDLX A20  
LEDOUT A19

ADCIN1 B5  
ADCIN2 A6  
NTCSW B1  
ACCSW A5

REFC PWR50  
VISA1 PWR50  
VISA2 PWR50  
VISC PWR50

BATSNS B40  
BAT2 B41  
BAT1 B37  
BAT2 B40  
BATSNS B40  
LEDFB B19  
LEDFBGND B20  
LEDFB A21  
LEDIN B18  
LEDLX A20  
LEDOUT A19

ADCIN1 B5  
ADCIN2 A6  
NTCSW B1  
ACCSW A5

REFC PWR50  
VISA1 PWR50  
VISA2 PWR50  
VISC PWR50

BATSNS B40  
BAT2 B41  
BAT1 B37  
BAT2 B40  
BATSNS B40  
LEDFB B19  
LEDFBGND B20  
LEDFB A21  
LEDIN B18  
LEDLX A20  
LEDOUT A19

ADCIN1 B5  
ADCIN2 A6  
NTCSW B1  
ACCSW A5

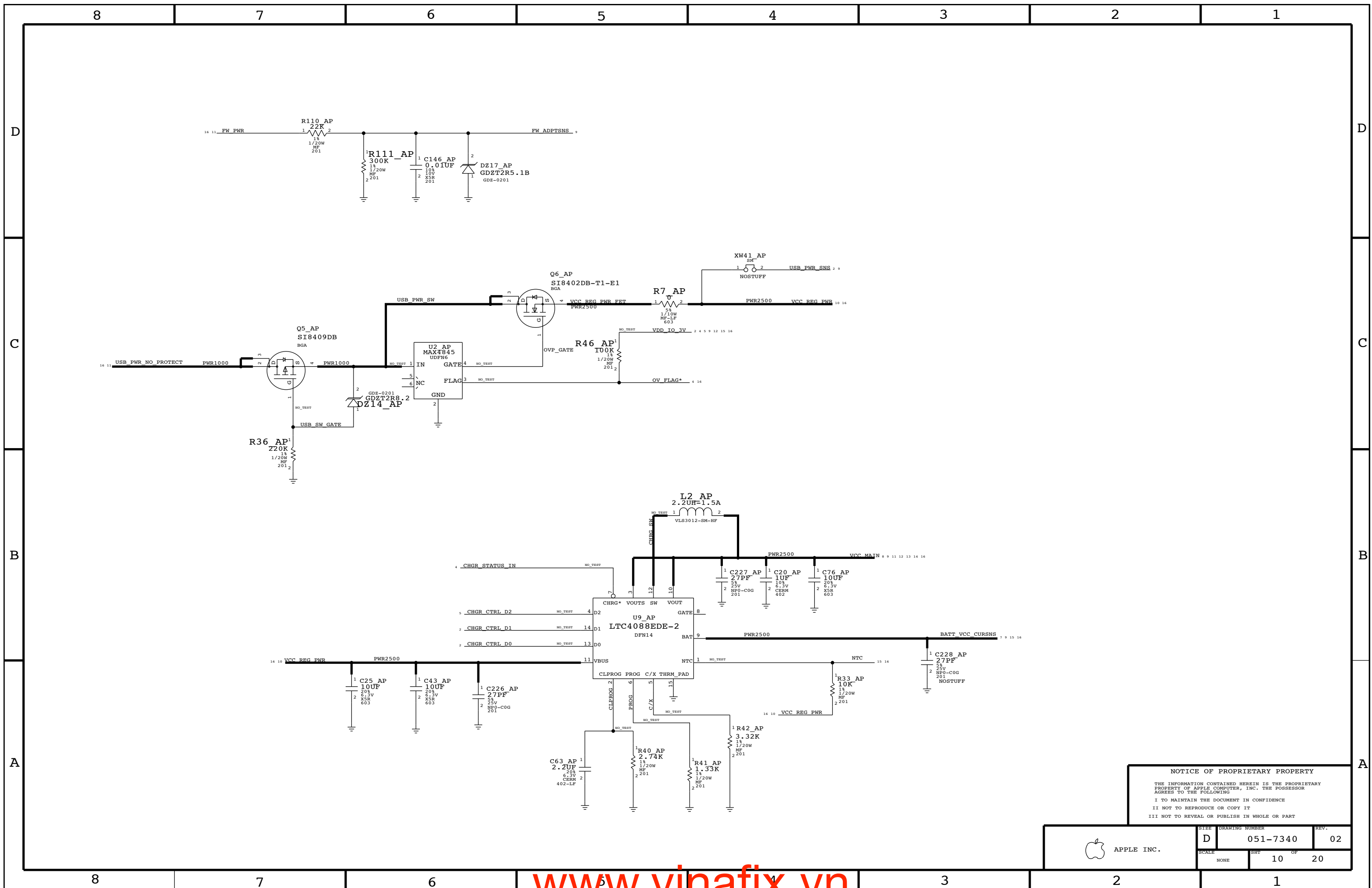
REFC PWR50  
VISA1 PWR50  
VISA2 PWR50  
VISC PWR50

BATSNS B40  
BAT2 B41  
BAT1 B37  
BAT2 B40  
BATSNS B40  
LEDFB B19  
LEDFBGND B20  
LEDFB A21  
LEDIN B18  
LEDLX A20  
LEDOUT A19

ADCIN1 B5  
ADCIN2 A6  
NTCSW B1  
ACCSW A5

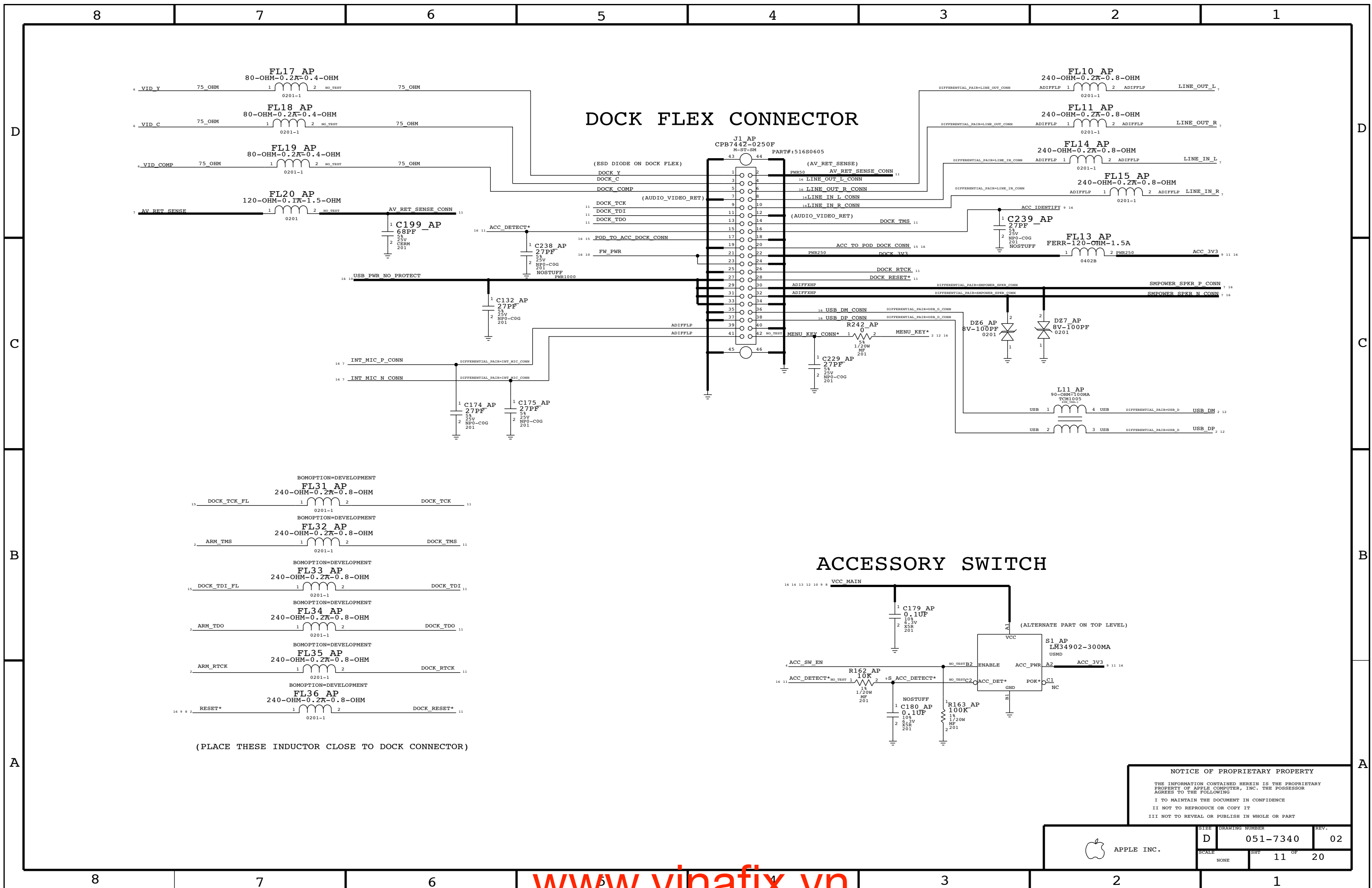
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SCALE	SHT	OF
NONE	9	20



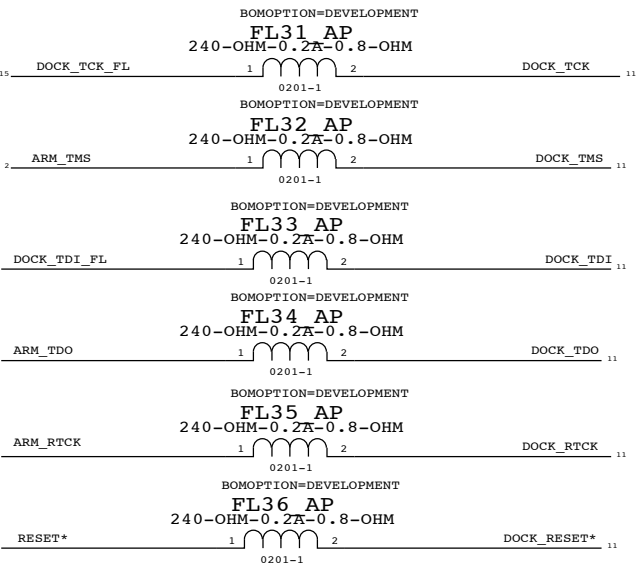
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	D	051-7340	02
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NONE	10	20	



# DOCK FLEX CONNECTOR

# ACCESSORY SWITCH



(PLACE THESE INDUCTOR CLOSE TO DOCK CONNECTOR)

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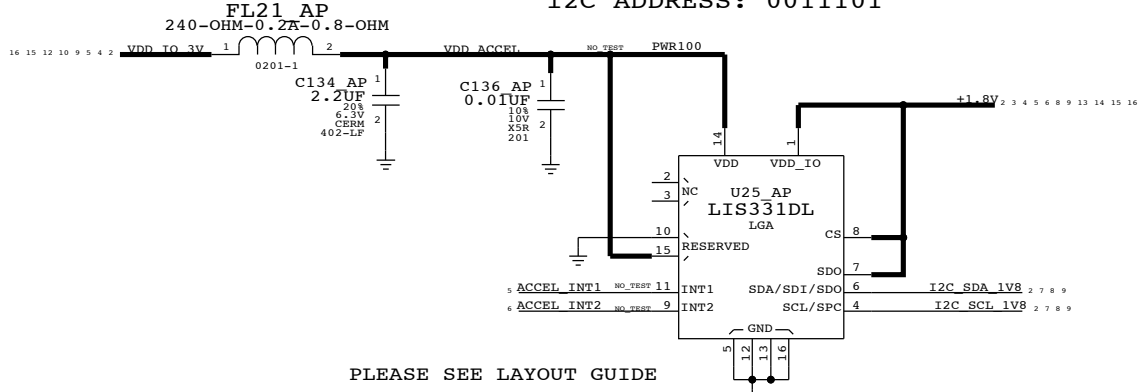
APPLE INC.	SIZE	DRAWING NUMBER	REV.
	D	051-7340	02
SCALE	SHT 11 OF 20		
NONE			

D

D

### ACCELEROMETER

I2C ADDRESS: 0011101

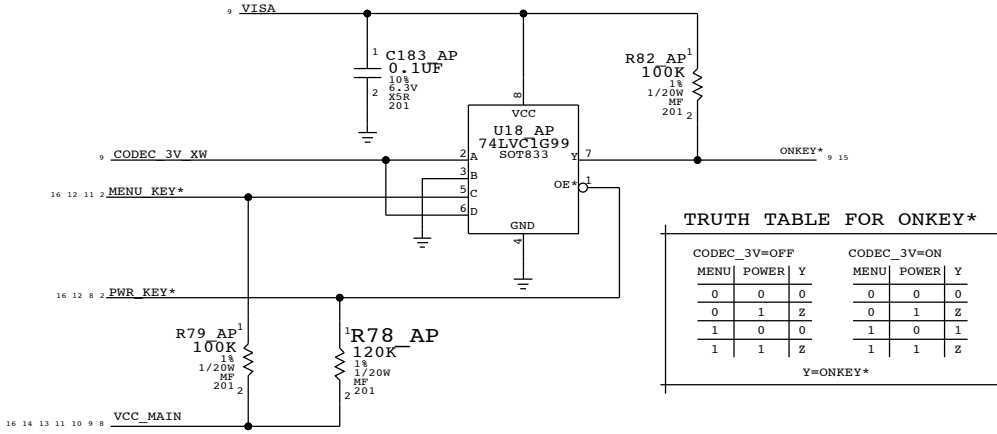


PLEASE SEE LAYOUT GUIDE

C

C

U18+ONKEY\* IS USED TO WAKE FROM OFF (PMU STANDBY)  
ONKEY\* HELD LOW FOR 6 SECONDS INITIATES PMU RESET SEQUENCE.



TRUTH TABLE FOR ONKEY\*

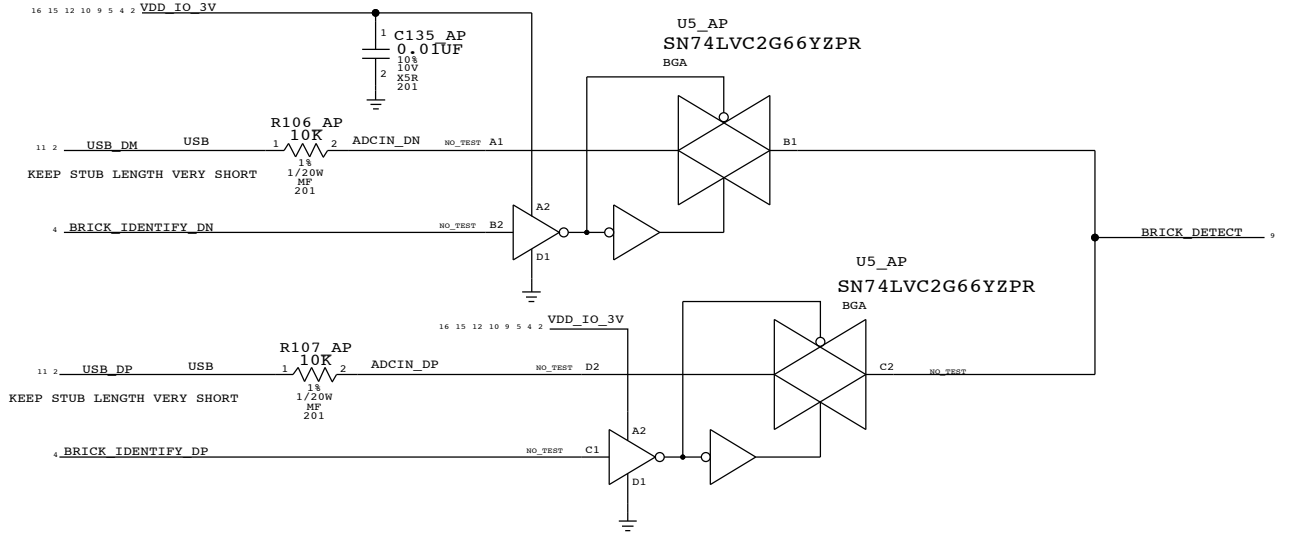
CODEC_3V=OFF			CODEC_3V=ON		
MENU	POWER	Y	MENU	POWER	Y
0	0	0	0	0	0
0	1	Z	0	1	Z
1	0	0	1	0	1
1	1	Z	1	1	Z

Y=ONKEY\*

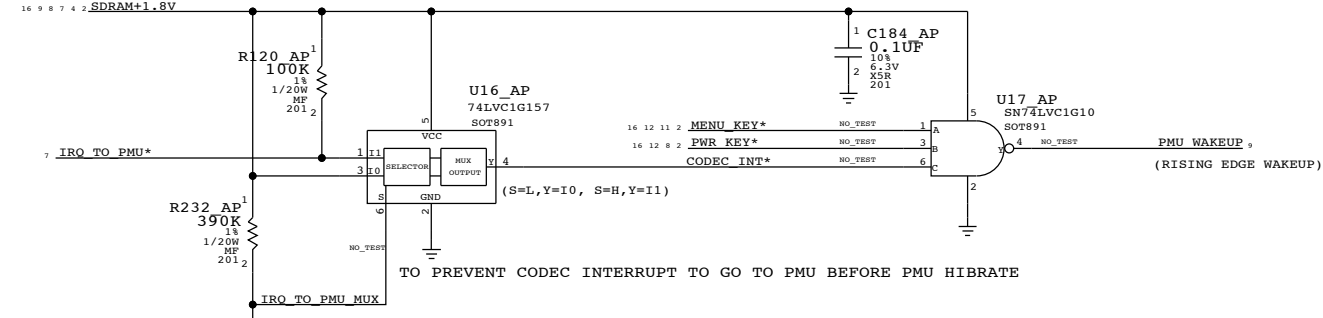
B

B

### ADAPTER CURRENT CAPACITY DETECTION



U17+WAKEUP IS USED TO WAKE FROM HIBERNATE (SUSPEND TO RAM)



TRUTH TABLE FOR PMU\_WAKEUP

EVENTS	SDRAM+1.8V=ON(PHONE IN HIBERNATE MODE)			
	CODEC INT*	MENU KEY*	POWER KEY*	PMU WAKEUP
WM8991 INT HAPPENS, MENU&HOLD KEY PRESSED	0	0	0	1
WM8991 INT HAPPENS & MENU KEY PRESSED	0	0	1	1
WM8991 INT HAPPENS & HOLD KEY PRESSED	0	1	0	1
WM8991 INTERRUPT HAPPENED	0	1	1	1
MENU & HOLD KEY PRESSED	1	0	0	1
MENU KEY PRESSED	1	0	1	1
HOLD KEY PRESSED	1	1	0	1
NO KEY PRESSED	1	1	1	0

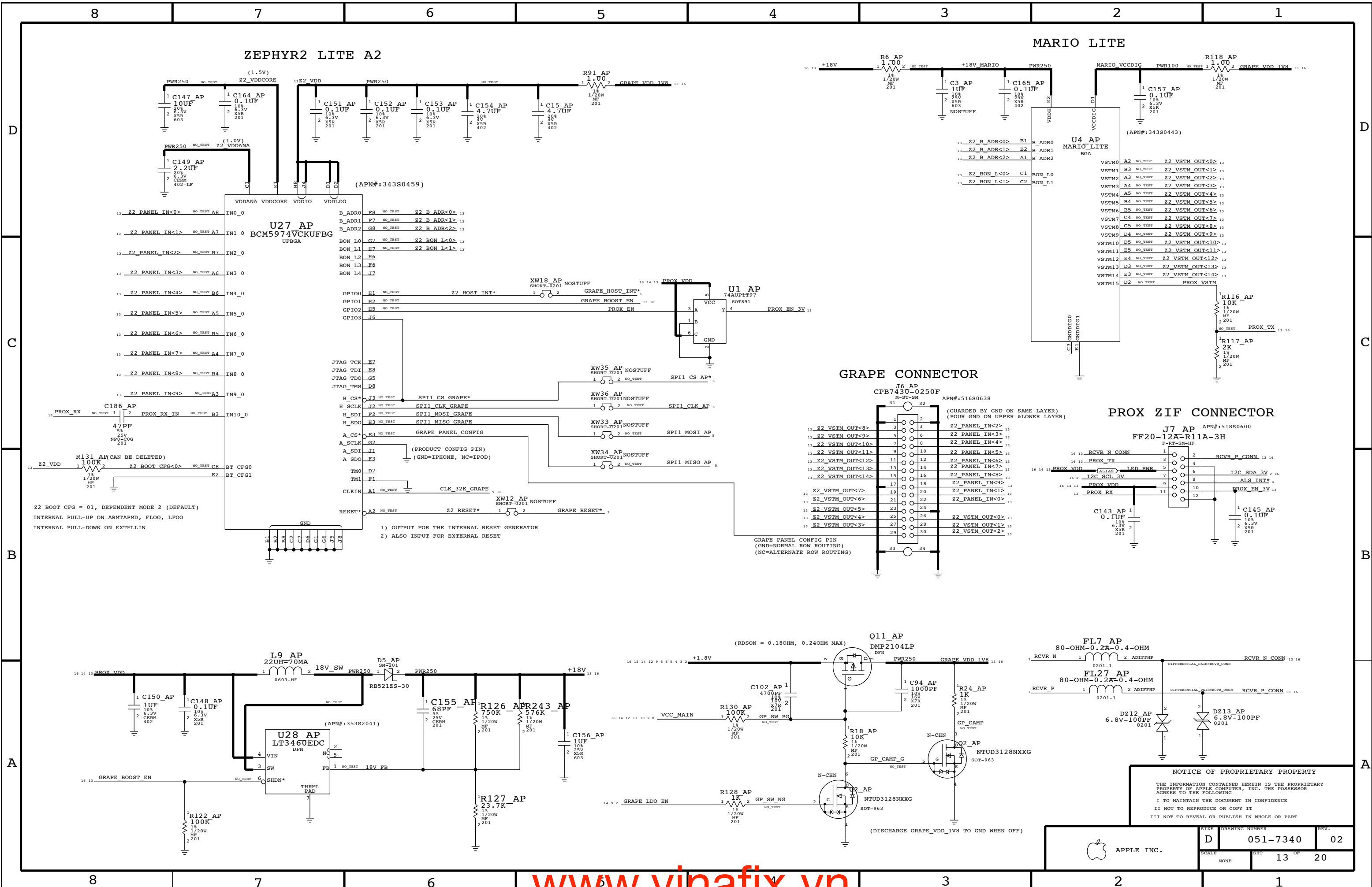
WM8991 INTERRUPT HAPPENS AT:  
 (1) RINGER KEY SLIDES  
 (2) HEAD PHONE PLUG IN/OUT  
 (3) HEAD PHONE SEND KEY PRESSED

A

A

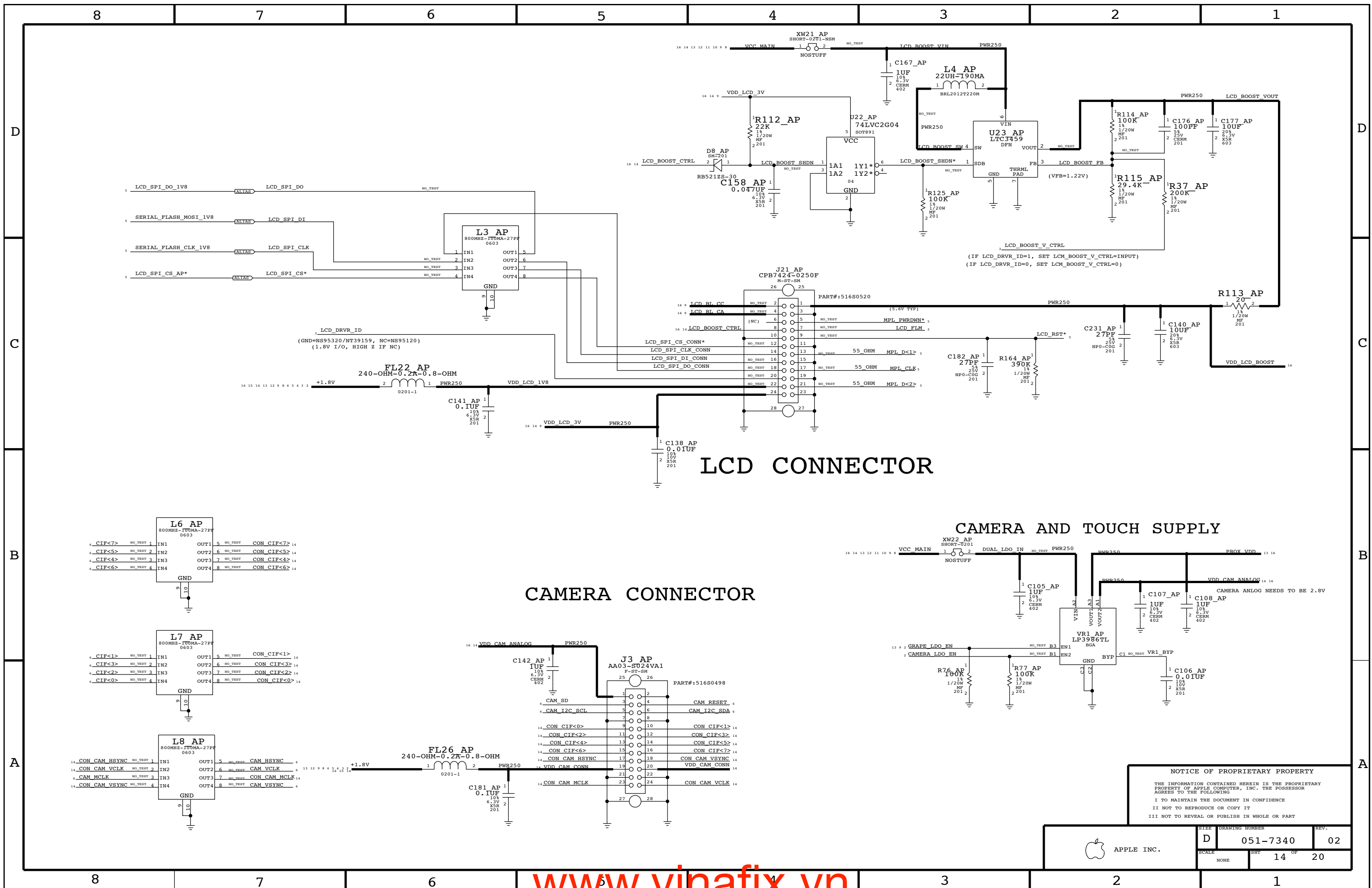
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SCALE	SHT 12 OF 20		
NONE			



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	NONE	13	13	02



### LCD CONNECTOR

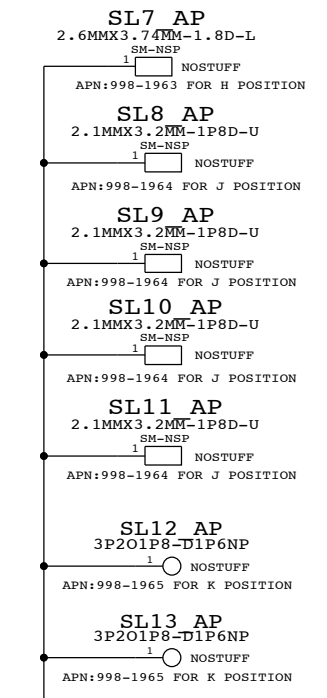
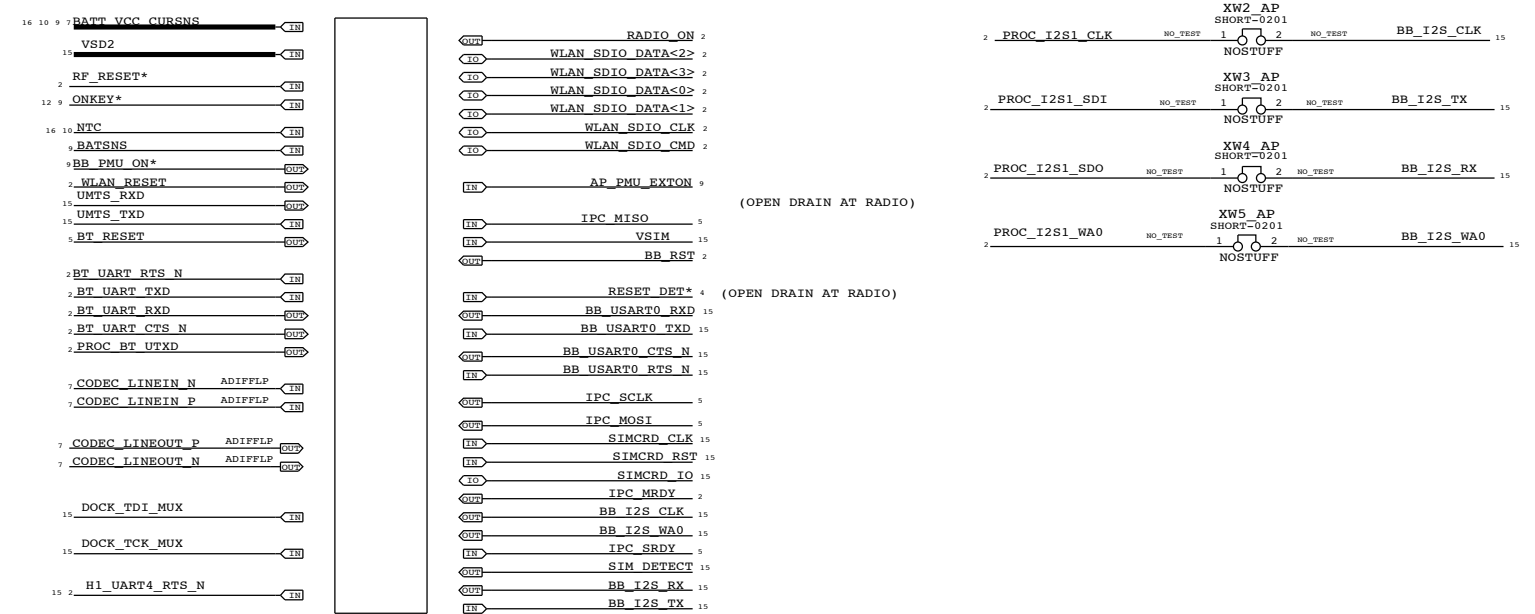
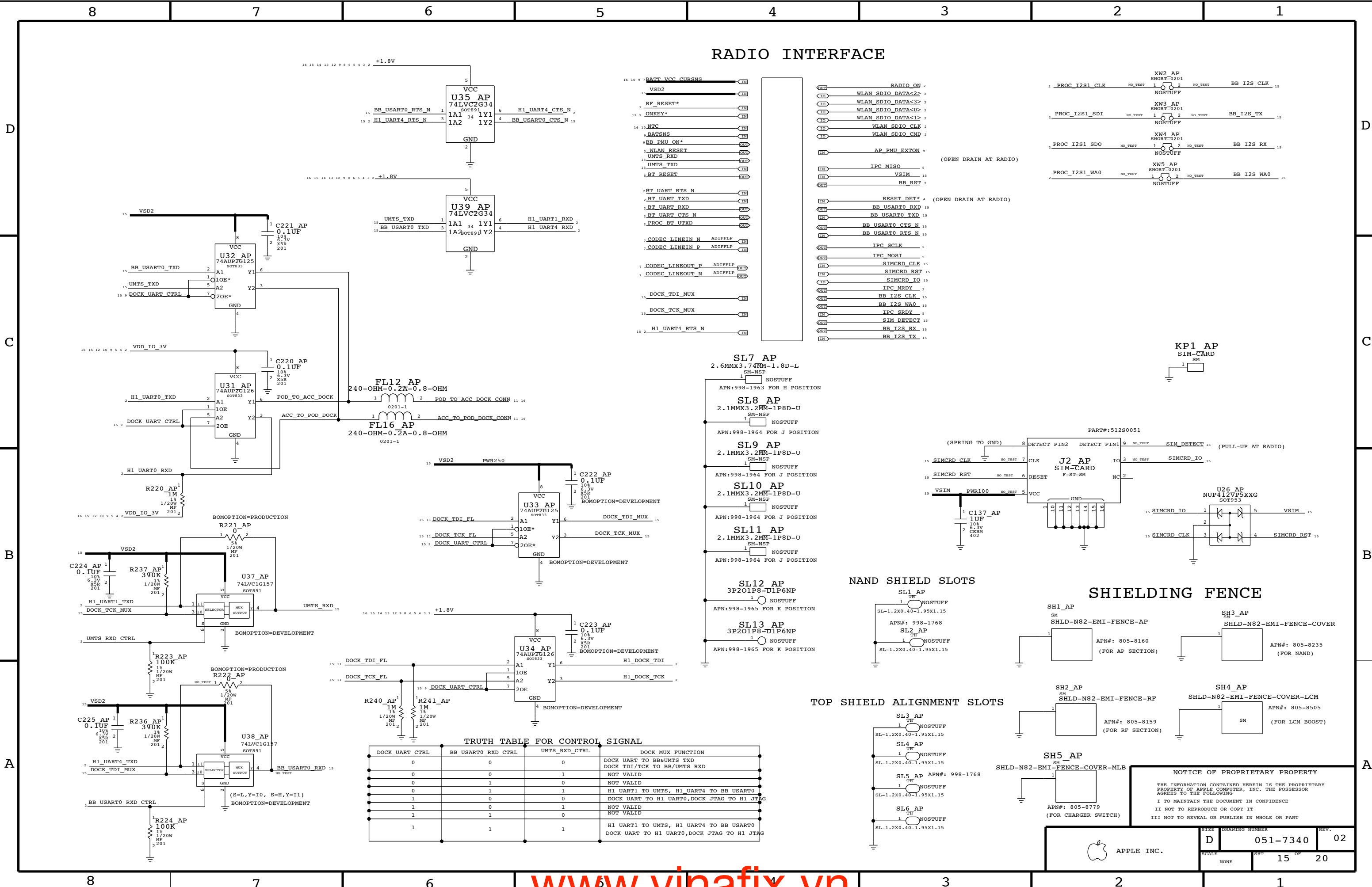
### CAMERA CONNECTOR

### CAMERA AND TOUCH SUPPLY

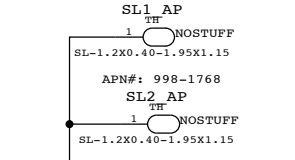
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SCALE	NONE	SHT	14 OF 20

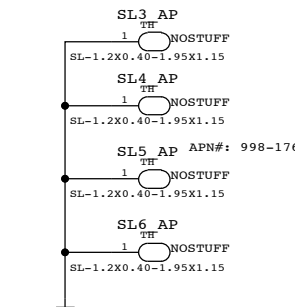
# RADIO INTERFACE



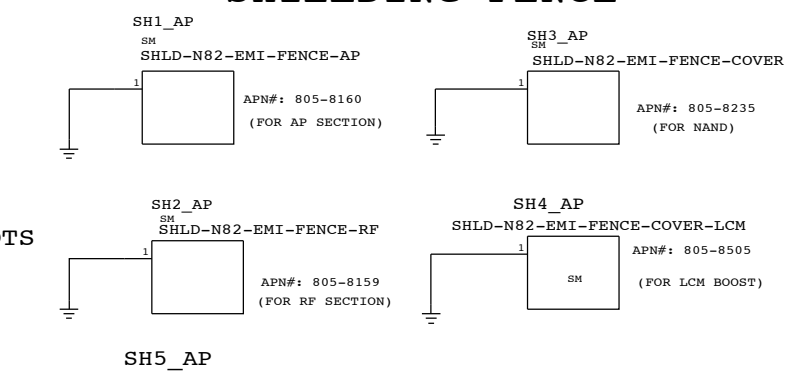
## NAND SHIELD SLOTS



## TOP SHIELD ALIGNMENT SLOTS



## SHIELDING FENCE



**TRUTH TABLE FOR CONTROL SIGNAL**

DOCK_UART_CTRL	BB_USART0_RXD_CTRL	UMTS_RXD_CTRL	DOCK_MUX_FUNCTION
0	0	0	DOCK UART TO BB/UMTS TXD
0	0	1	DOCK TDI/TCK TO BB/UMTS RXD
0	1	0	NOT VALID
0	1	1	NOT VALID
1	0	0	H1 UART1 TO UMTS, H1 UART4 TO BB USART0
1	0	1	DOCK UART TO H1 UART0, DOCK JTAG TO H1 JTAG
1	1	0	NOT VALID
1	1	1	NOT VALID
1	1	1	H1 UART1 TO UMTS, H1 UART4 TO BB USART0 DOCK UART TO H1 UART0, DOCK JTAG TO H1 JTAG

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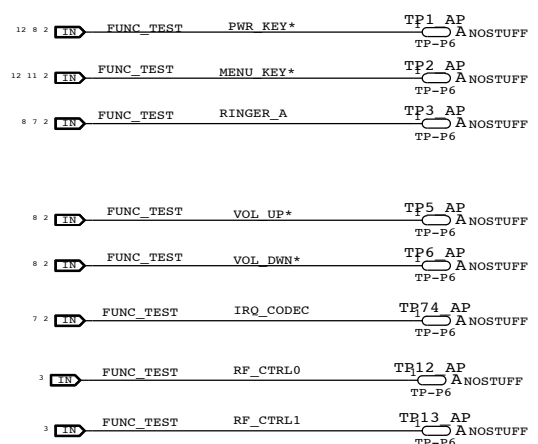
APPLE INC.

SCALE	DRAWING NUMBER	REV.
NONE	D 051-7340	02
SHT	15 OF	20

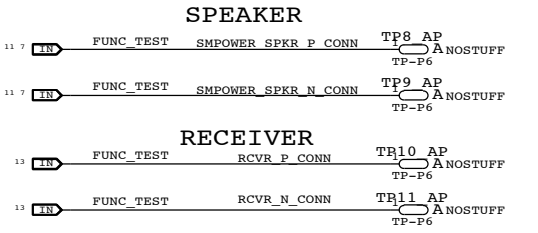


# TEST POINTS

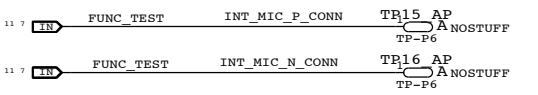
## GPIO



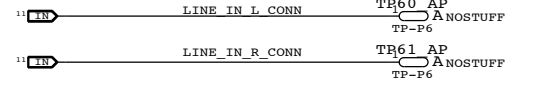
## AUDIO



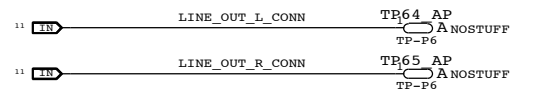
## MIC



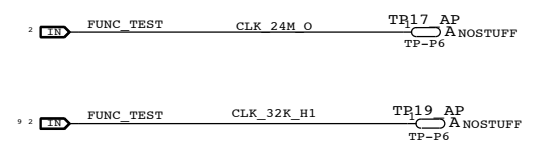
## LINE IN



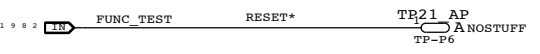
## LINE OUT



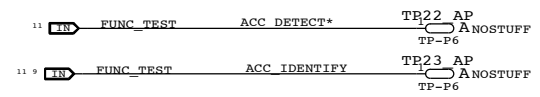
## CLOCK



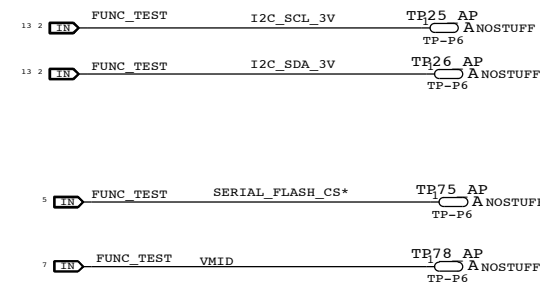
## RESET



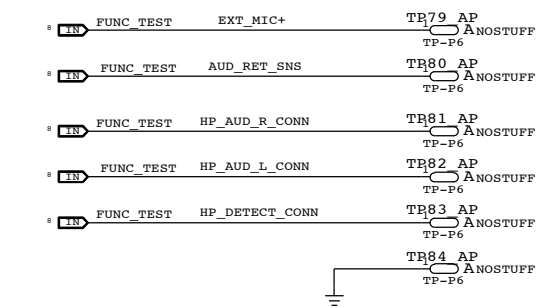
## ACCESSORY DETECT



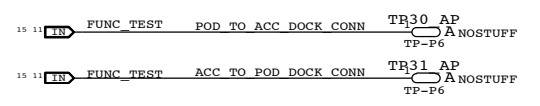
## I2C PINS



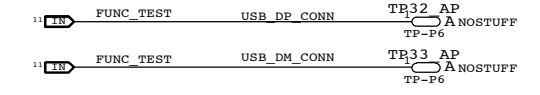
## HEADPHONE



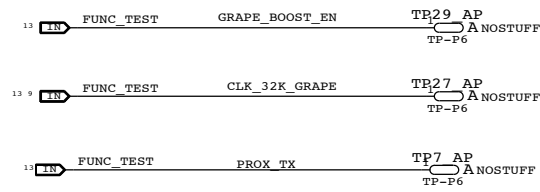
## UART



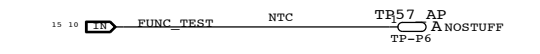
## USB



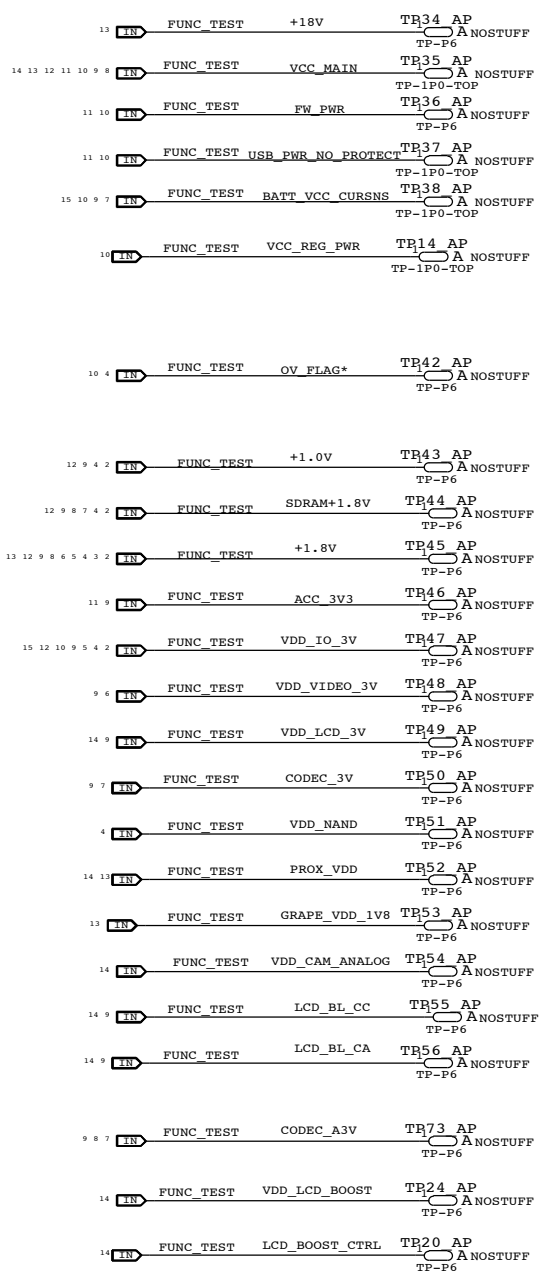
## GRAPE



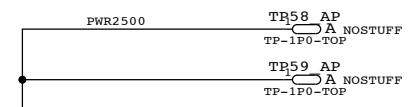
## THERMISTOR



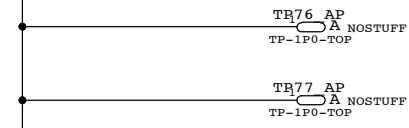
## POWER



## POWER GND



## SIGNAL GND



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	D	051-7340	02
SCALE	SHT		OF
NONE	16		20

# N82 HSDPA RADIO


## DVTB - 03/28/08:BRD REV13

PAGE	CONTENTS
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	BLUETOOTH
10	WLAN RADIO

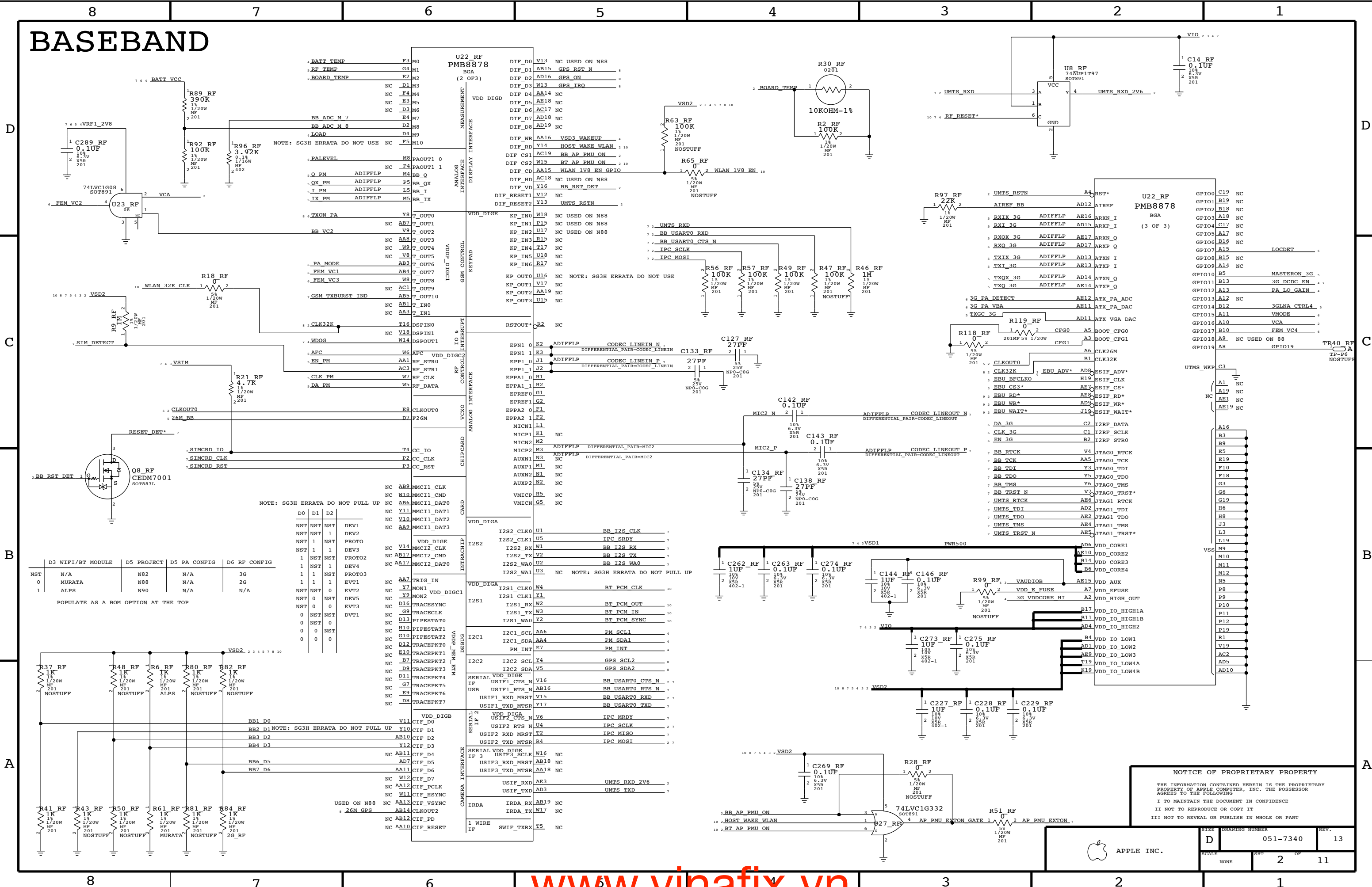
BOARD - 820-2186  
 SCHEMATIC - 051-7340  
 BOM - 630-8772

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	CRITICAL	BOM OPTION
051-7340	1	N82_RF_AND_AP_SCHEMATIC	SCH	Y	
820-2186	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: 051-7340	REV.: 13
	SCALE: NONE	SHEET: 1 OF 11	

# BASEBAND



NOTE: SG3H ERRATA DO NOT USE NC

NOTE: SG3H ERRATA DO NOT PULL UP

**U22\_RF PMB8878 (2 OF 3)**

F3	M0	DIF_D0	V13	NC USED ON N88	
G4	M1	DIF_D1	AB15	GPS_RST_N	
E2	M2	DIF_D2	AD16	GPS_ON	
NC	D1	M3	W13	GPS_IRQ	
NC	F4	M4	AA14	NC	
NC	E3	M5	DIF_D5	AE18	NC
NC	D3	M6	DIF_D6	AC17	NC
NC	M7	DIF_D7	AD18	NC	
E4	M7	DIF_D8	AD19	NC	
D2	M8	DIF_WR	AA16	VSD3_WAKEUP	
M9	D4	DIF_RD	Y14	HOST_WAKE_WLAN	
F5	M10	DIF_CS2	AC19	BB_AP_PMU_ON	
NC	F5	DIF_CS2	W15	BT_AP_PMU_ON	
M8	PAOUT1_0	DIF_CD	AA15	WLAN_IV8_EN_GPIO	
F4	PAOUT1_1	DIF_HD	AC18	NC USED ON N88	
M4	BB_Q	DIF_VD	Y16	BB_RST_DET	
P5	BB_QX	DIF_RESET1	V12	NC	
L5	BB_I	DIF_RESET2	Y13	UMTS_RSTN	
M5	BB_IX				

Y8	T_OUT0	KP_IN0	W18	NC USED ON N88
NC	AB7	KP_IN1	P15	NC USED ON N88
V9	T_OUT2	KP_IN2	U17	NC USED ON N88
NC	AA8	KP_IN3	R15	NC
NC	W9	KP_IN4	T17	NC
NC	V8	KP_IN5	U18	NC
AB3	T_OUT6	KP_IN6	R17	NC
AB4	T_OUT7	KP_OUT0	U16	NC NOTE: SG3H ERRATA DO NOT USE
W8	T_OUT8	KP_OUT1	V17	NC
NC	AC1	KP_OUT2	AA19	NC
AB5	T_OUT10	KP_OUT3	U15	NC
NC	AB1			
NC	AA3			
T16	DSPIN0	RSTOUT*	R2	NC
V18	DSPIN1			
W14	DSPOUT1			
W6	AFC	EPP1_0	K2	ADIFFLIP CODEC LINEIN N
AA1	RF_STRO	EPP1_1	K3	DIFFERENTIAL_PAIR=CODEC_LINEIN
AC3	RF_STR1	EPP1_0	J1	ADIFFLIP CODEC LINEIN P
W7	RF_CLK	EPP1_1	J2	DIFFERENTIAL_PAIR=CODEC_LINEIN
W5	RF_DATA	EPPA1_0	H1	
		EPPA1_1	H2	
		EPREF1	G1	
		EPREF1	G2	
		EPPA2_0	F1	
		EPPA2_1	F2	
		MICN1	L1	
		MICP1	K1	NC
		MICN2	M2	
		MICP2	M3	ADIFFLIP DIFFERENTIAL_PAIR=MIC2
		AUXN1	N3	ADIFFLIP DIFFERENTIAL_PAIR=MIC2
		AUXP1	M1	NC
		AUXN2	N1	NC
		AUXP2	N2	NC
		VMICB	H5	NC
		VMICN	G5	NC

	D3 WIFI/BT MODULE	D5 PROJECT	D5 PA CONFIG	D6 RF CONFIG
NST 0	N/A	N82	N/A	3G
	MURATA	N88	N/A	2G
1	ALPS	N90	N/A	N/A

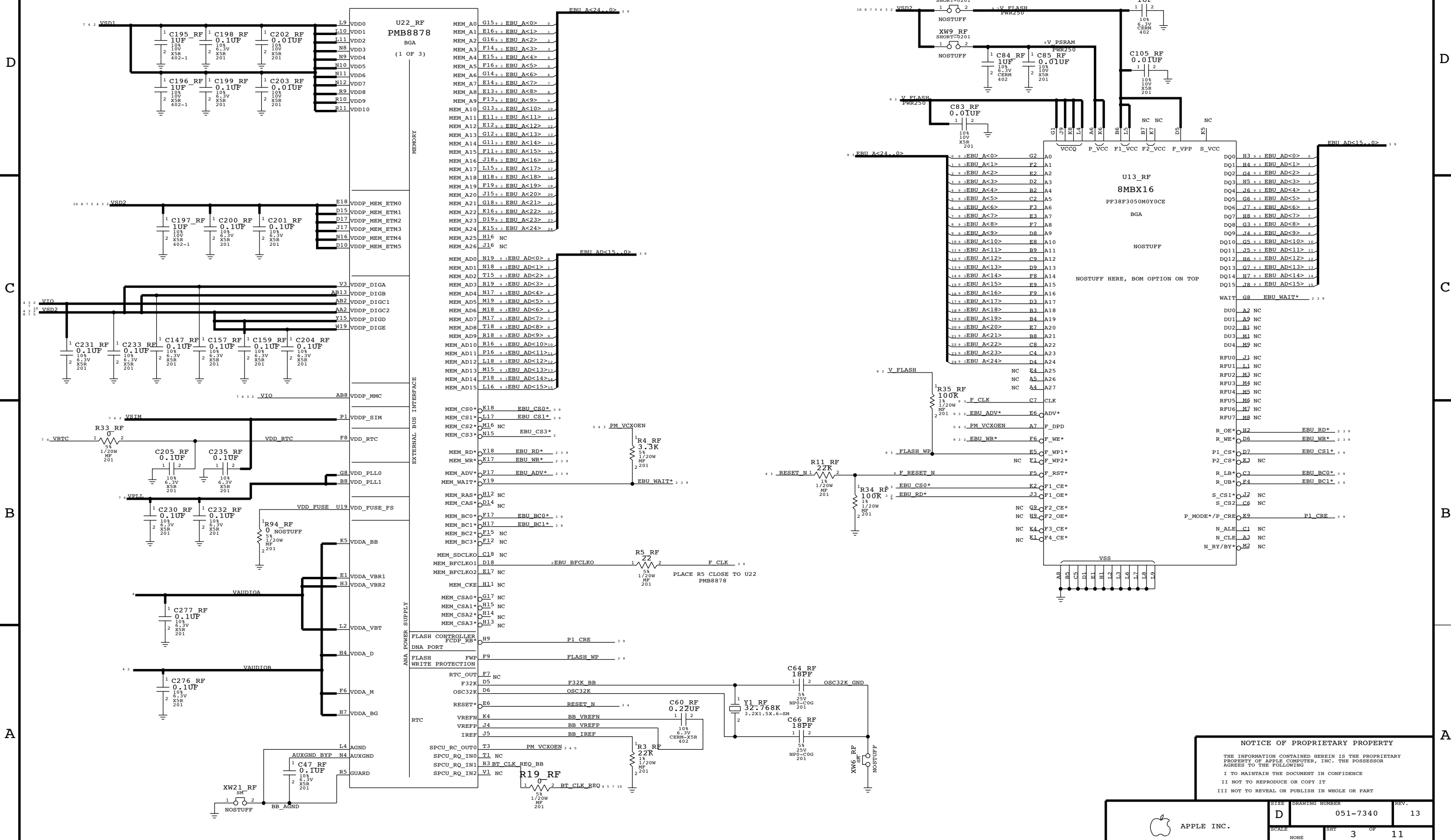
POPULATE AS A BOM OPTION AT THE TOP

D0	D1	D2	DEV1
NST	NST	NST	DEV1
NST	NST	1	DEV2
NST	1	NST	PROTO
NST	1	1	DEV3
1	NST	NST	PROTO2
1	1	NST	DEV4
1	1	1	EVT1
NST	NST	0	EVT2
NST	0	NST	DEV5
NST	0	0	EVT3
0	NST	NST	DVT1
0	NST	0	
0	0	0	
0	0	0	

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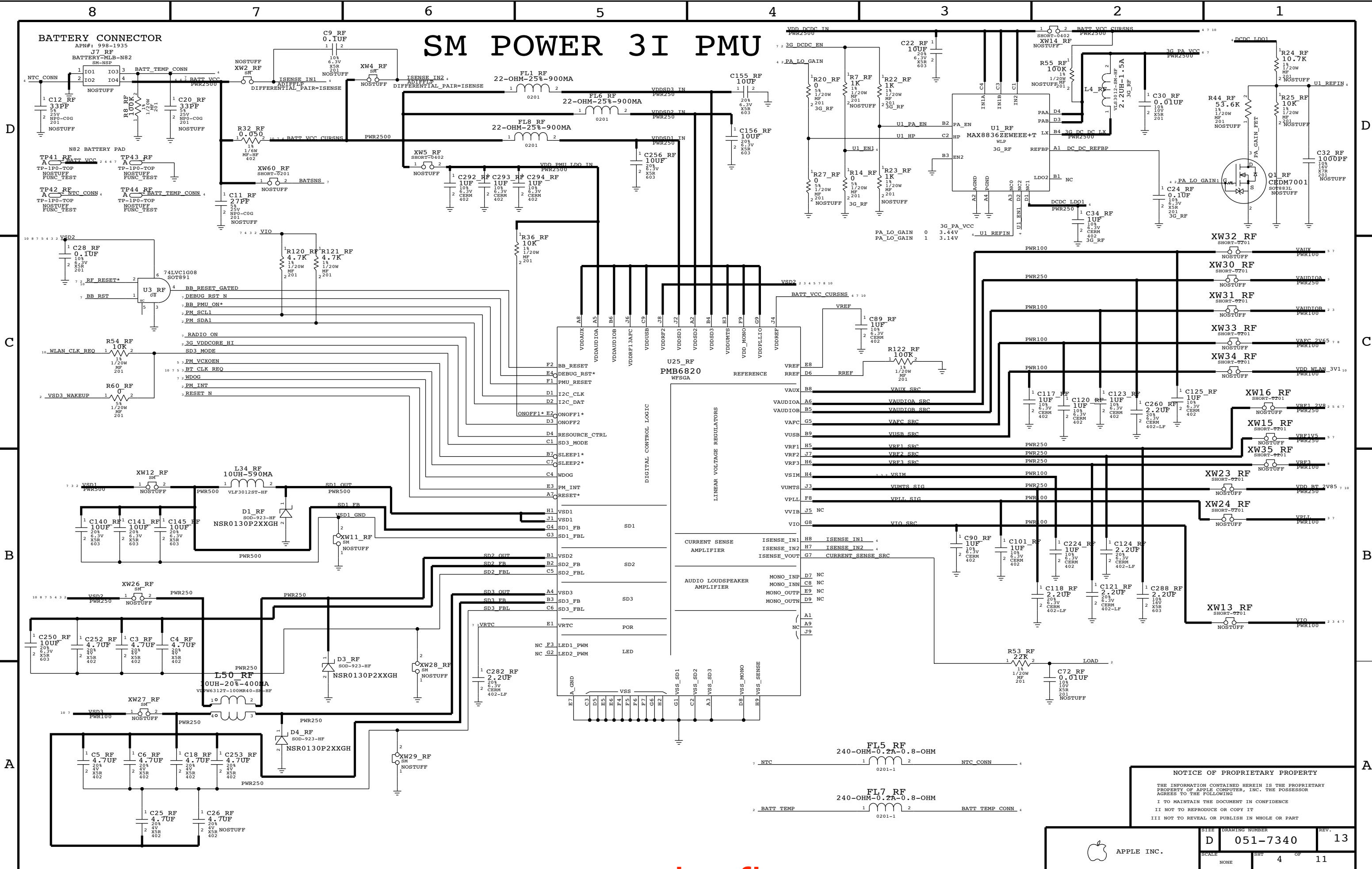
SCALE	DRAWING NUMBER	REV.
NONE	051-7340	13
SHT	2	OF 11

# BASEBAND/RADIO MEM



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	NONE	3	OF	11

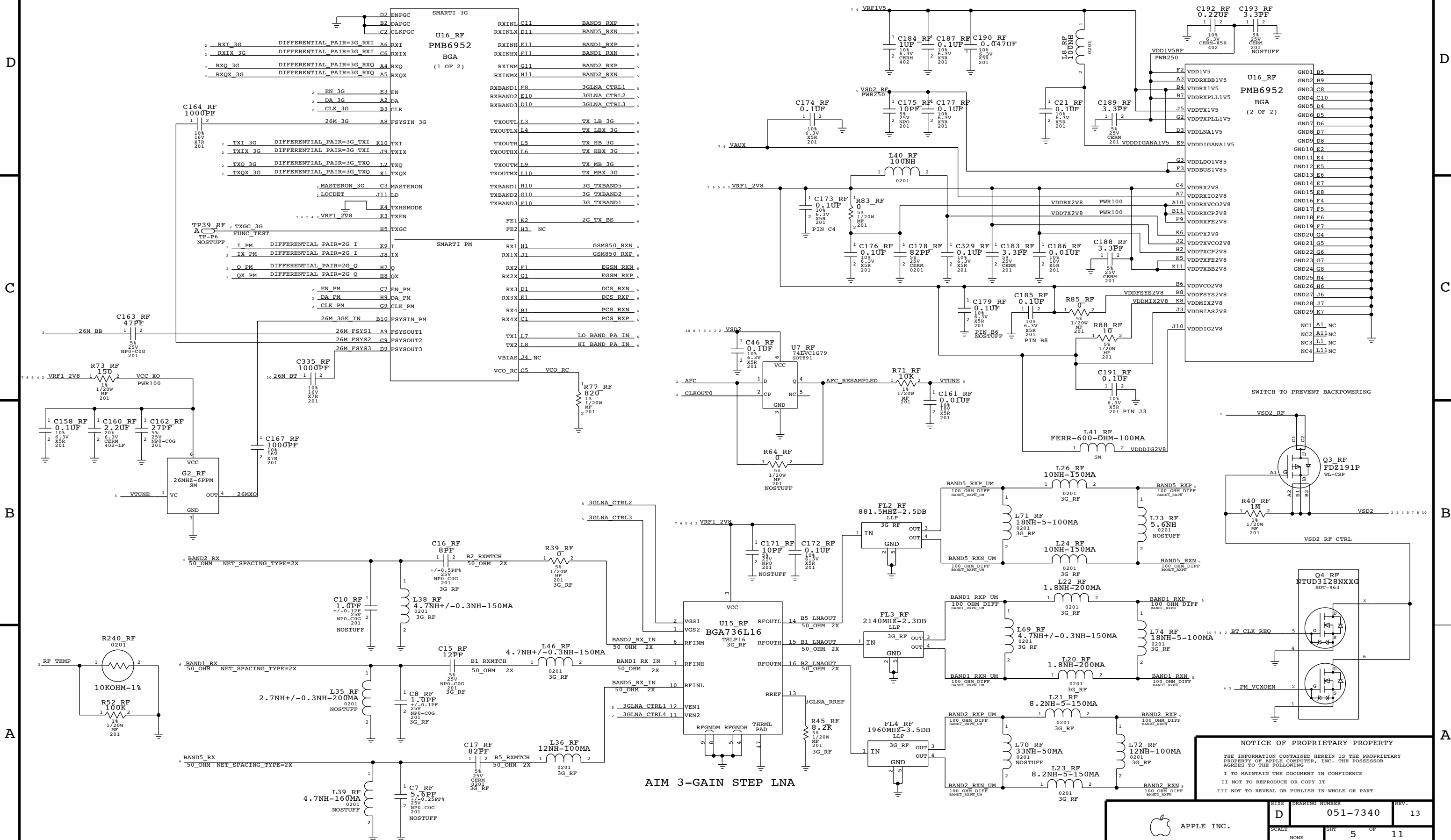


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SCALE	DRAWING NUMBER	REV.
NONE	D 051-7340	13
SHEET		4 OF 11

# GSM & UMTS TRANSCEIVER - SMARTI 3GE

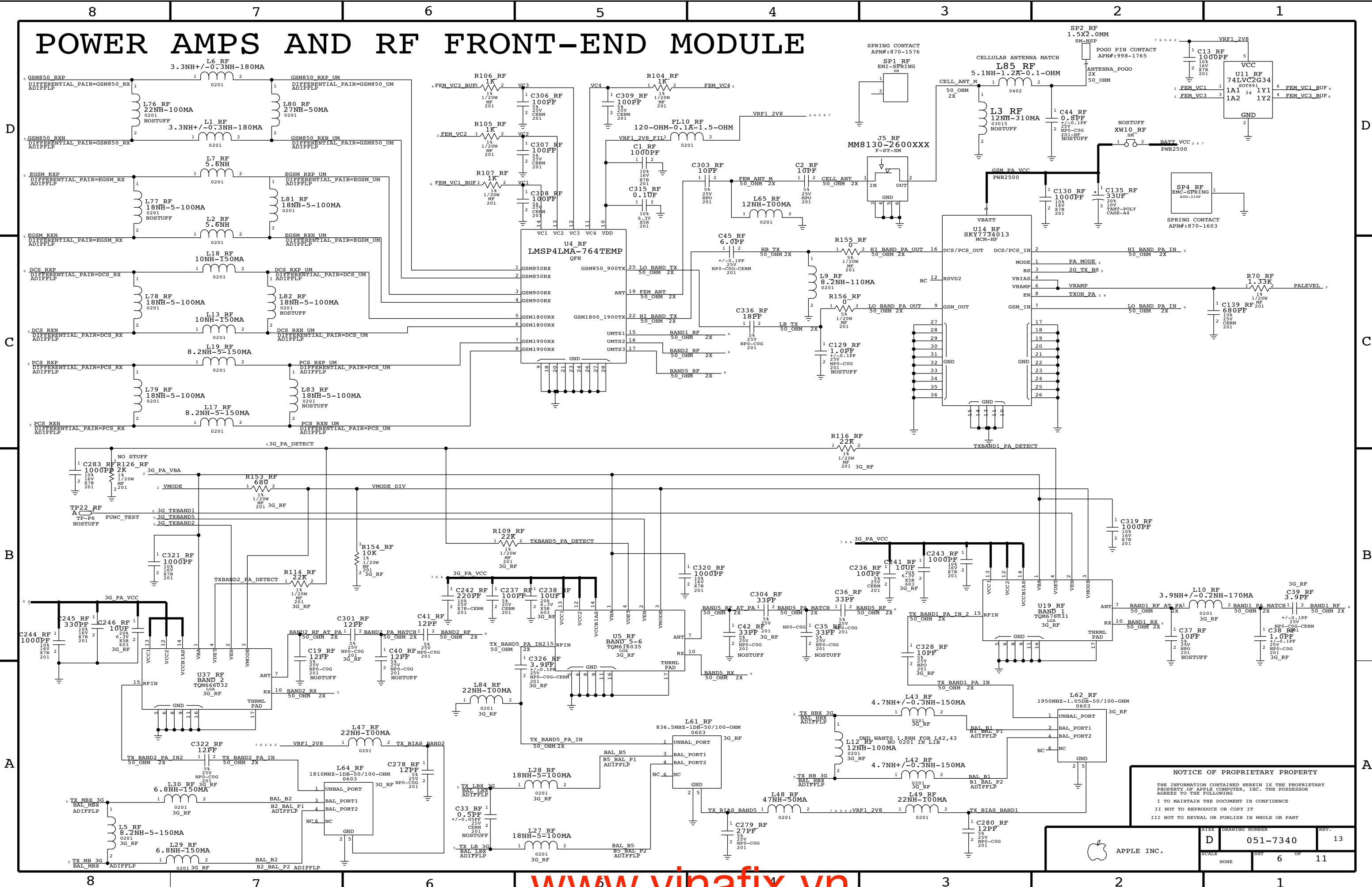
SMARTI3GE SUPPLIES



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APPLE INC.	D	051-7340	13
SCALE: NONE	SHEET: 5	OF: 11	REV: 13

# POWER AMPS AND RF FRONT-END MODULE



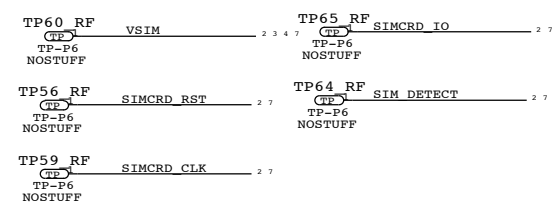
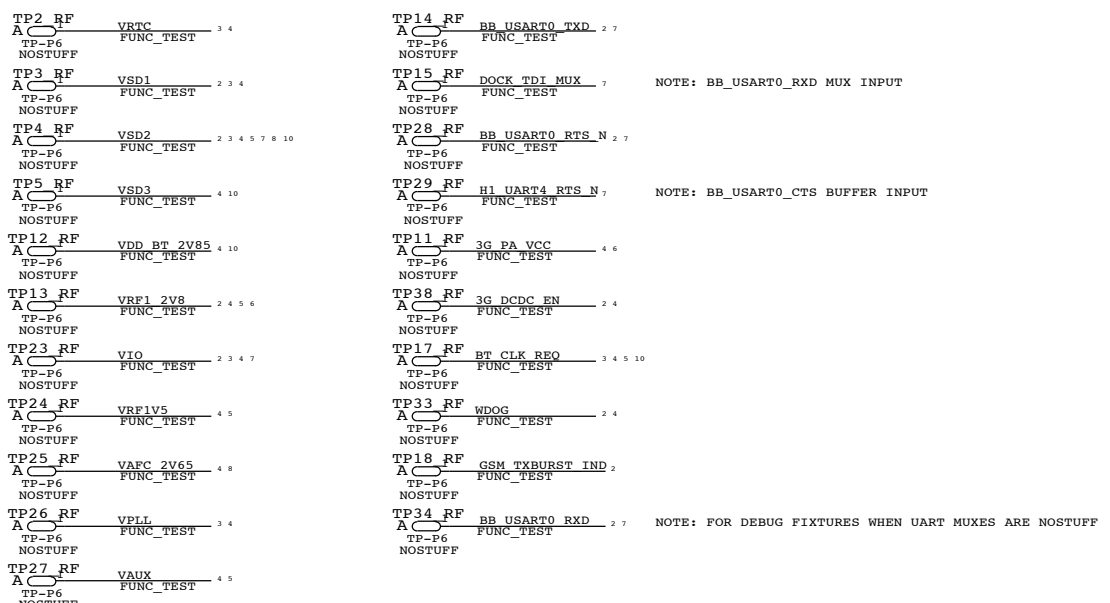
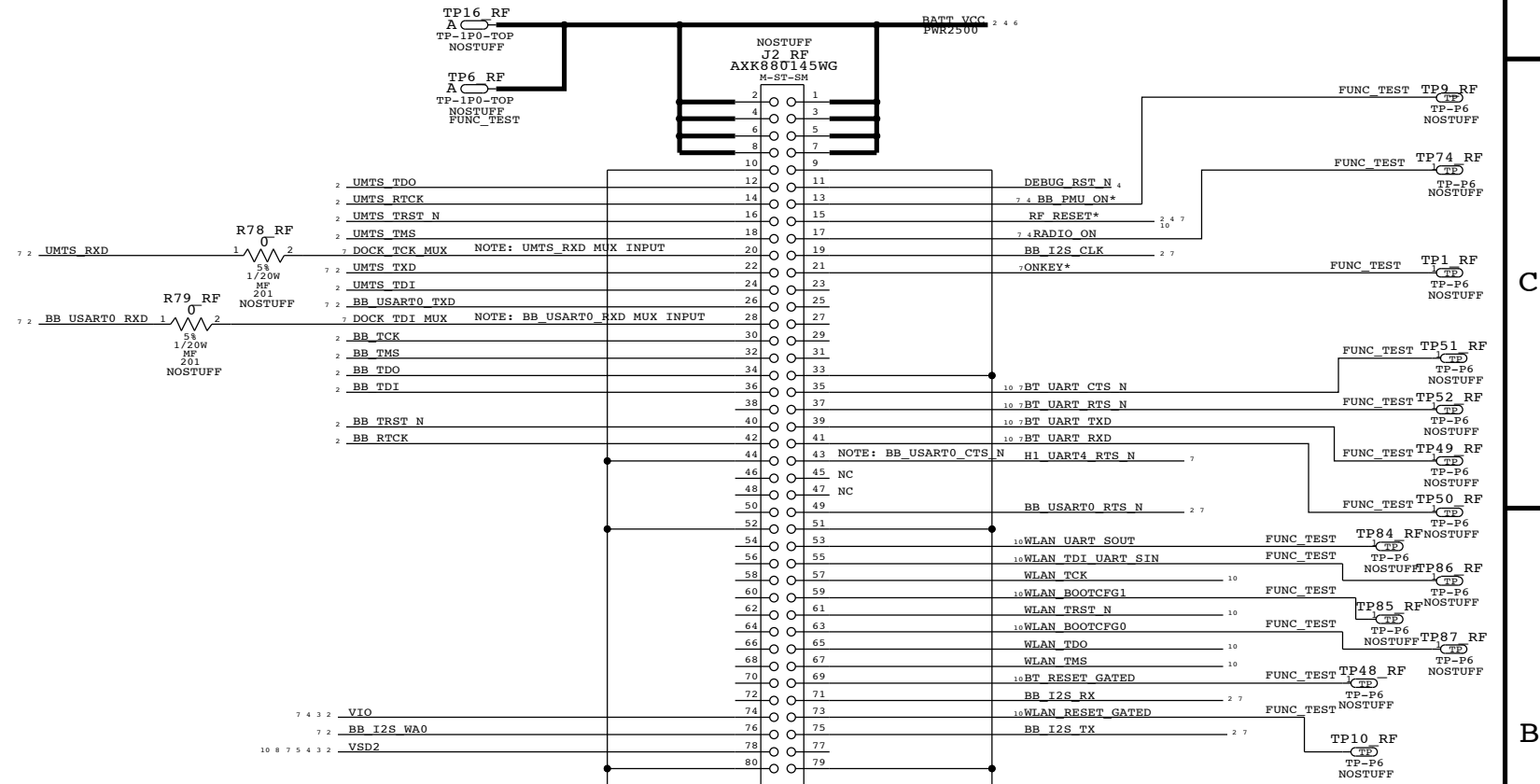
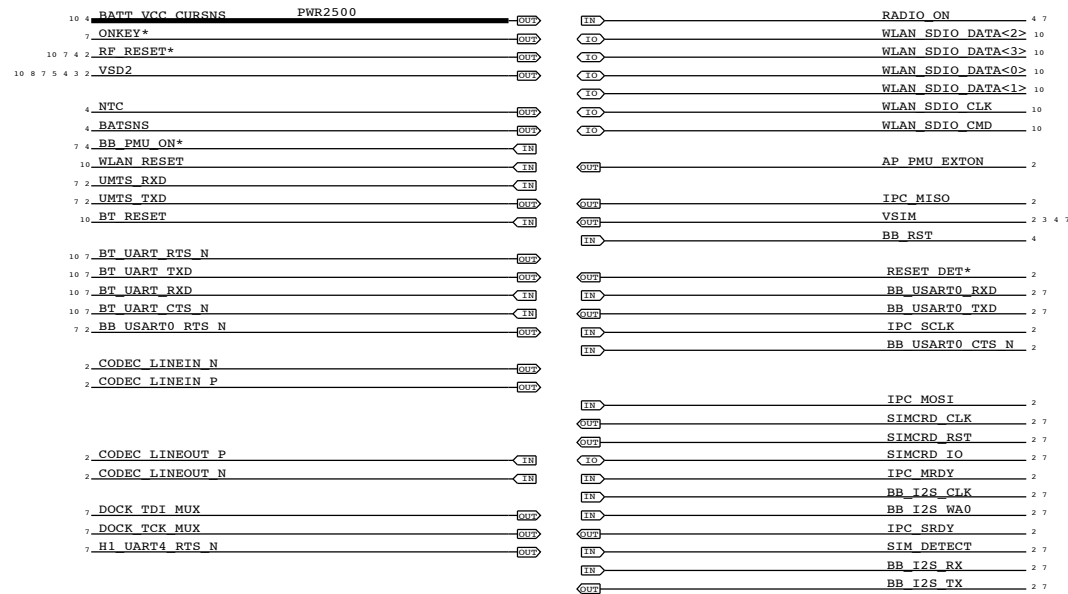
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APPLE INC.	DRAWING NUMBER	REV.
	051-7340	13
SCALE	SHEET	OF
NONE	6	11

# SYSTEM CONNECTORS

## AP CONNECTIONS

## DEBUG CONNECTOR 516S0612

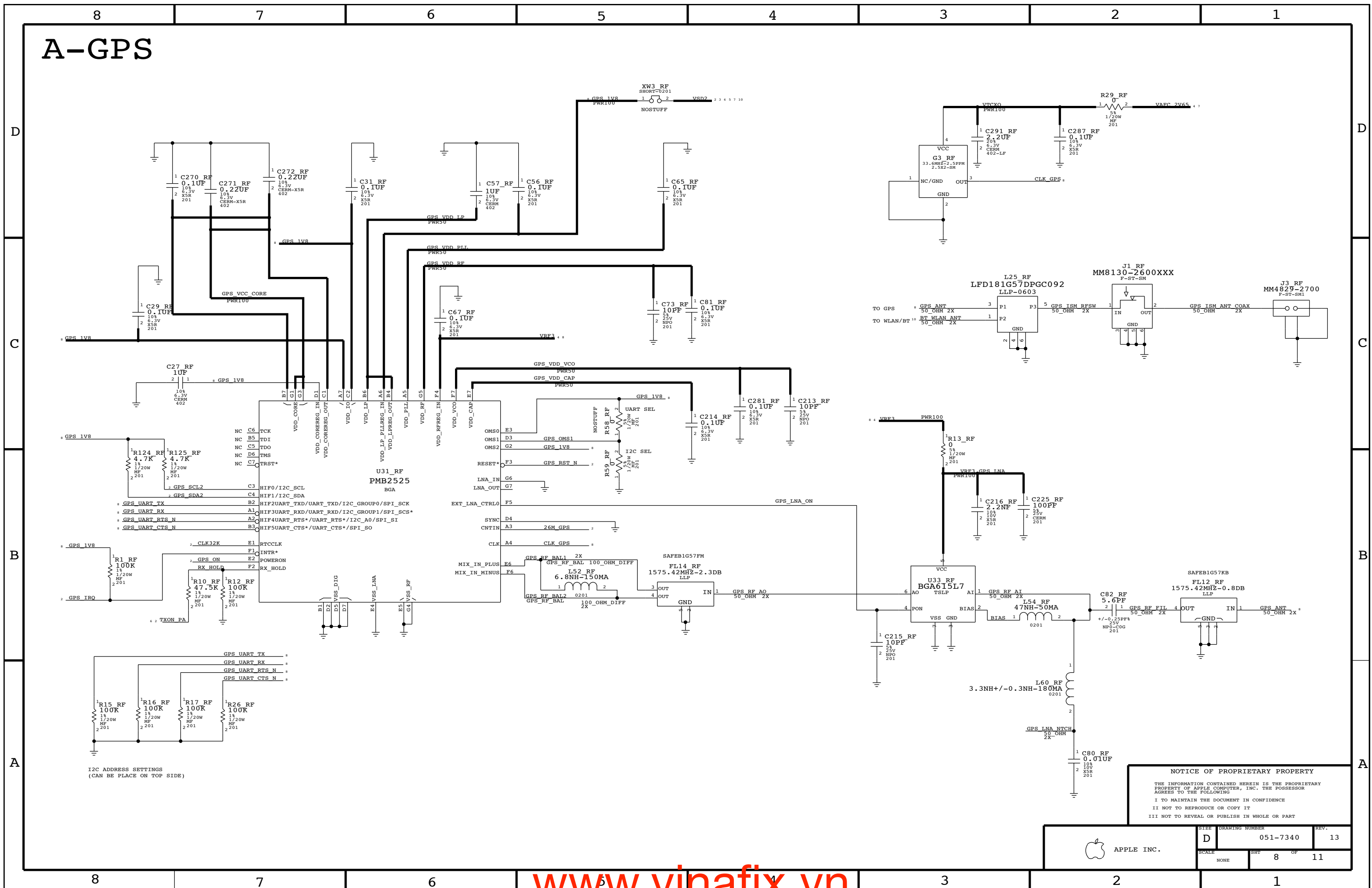


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	NONE	7	OF	13



# A-GPS

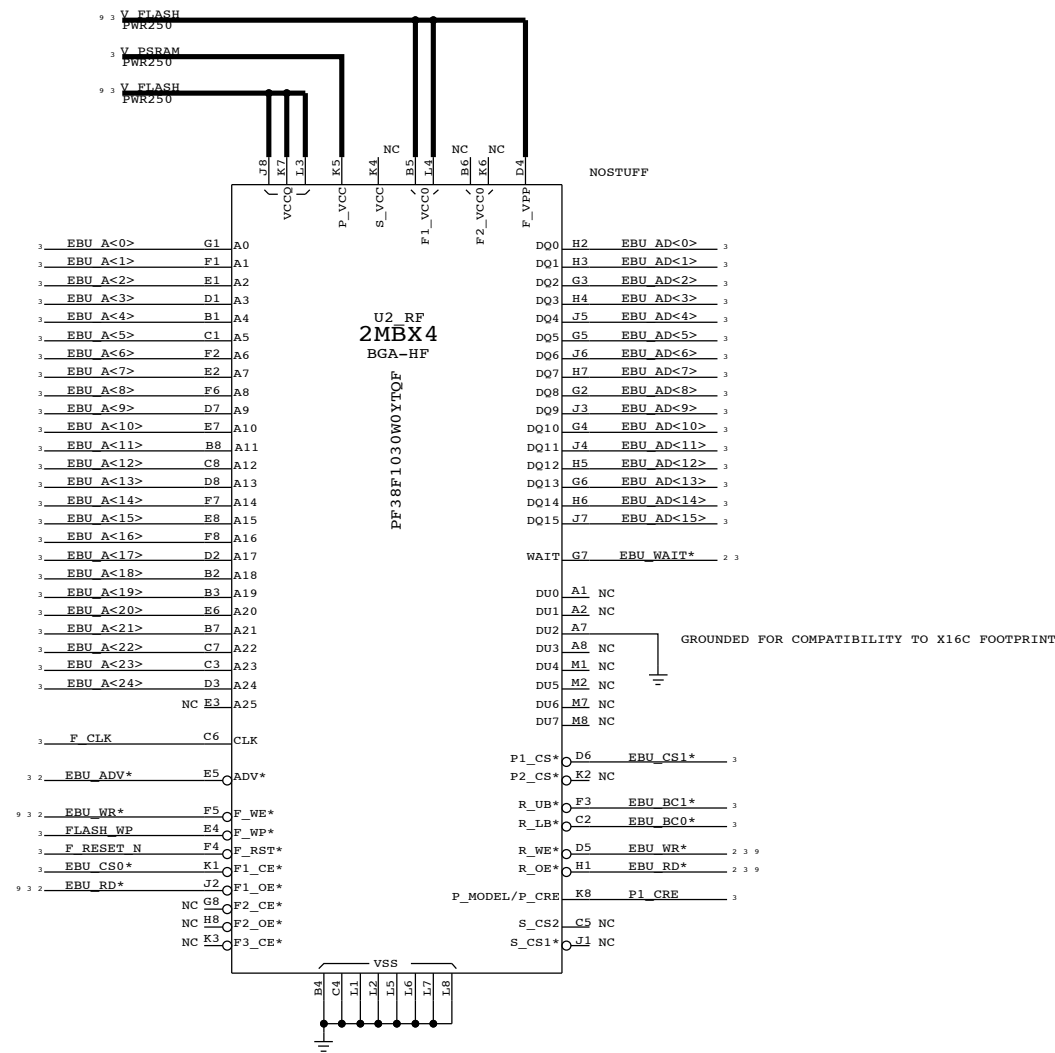


I2C ADDRESS SETTINGS  
(CAN BE PLACE ON TOP SIDE)

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SCALE		SHT	OF
NONE		8	11

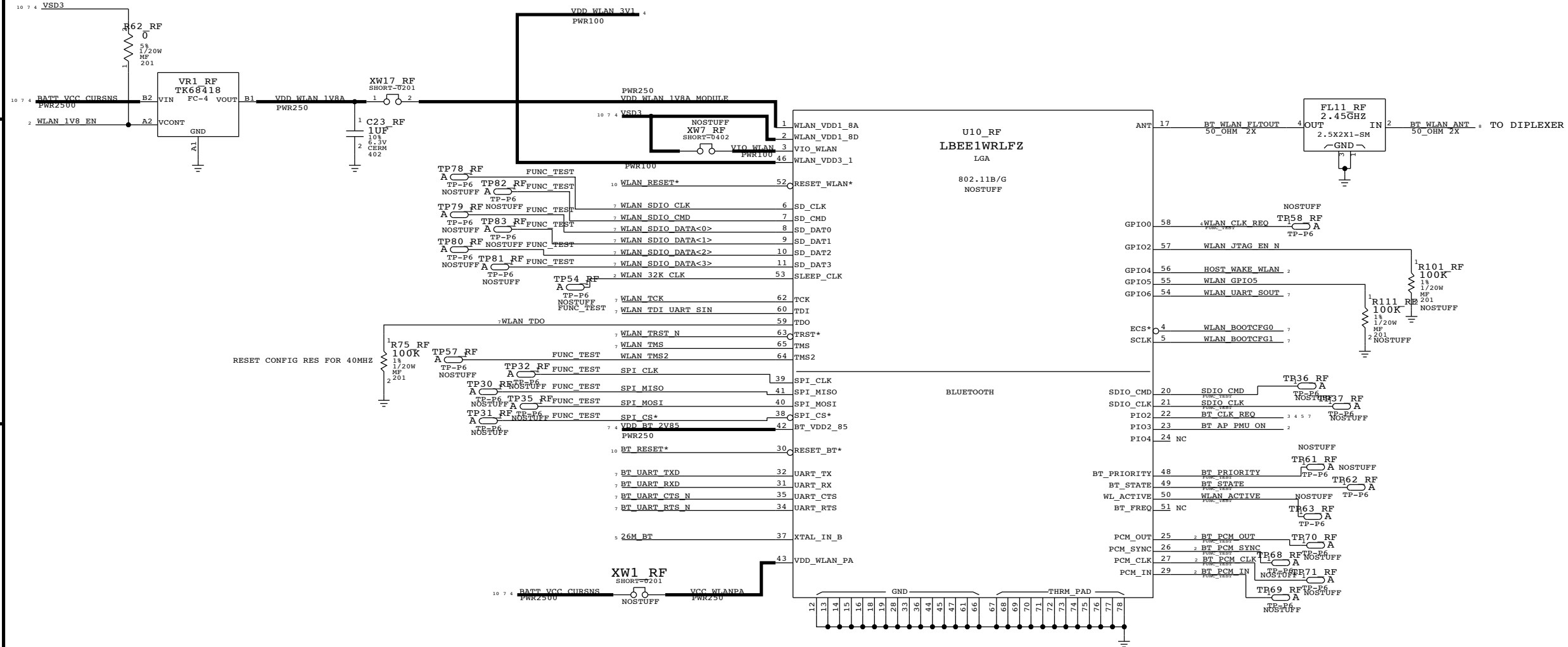
# DUAL FOOTPRINTED LOW-COST MEMORY OPTION



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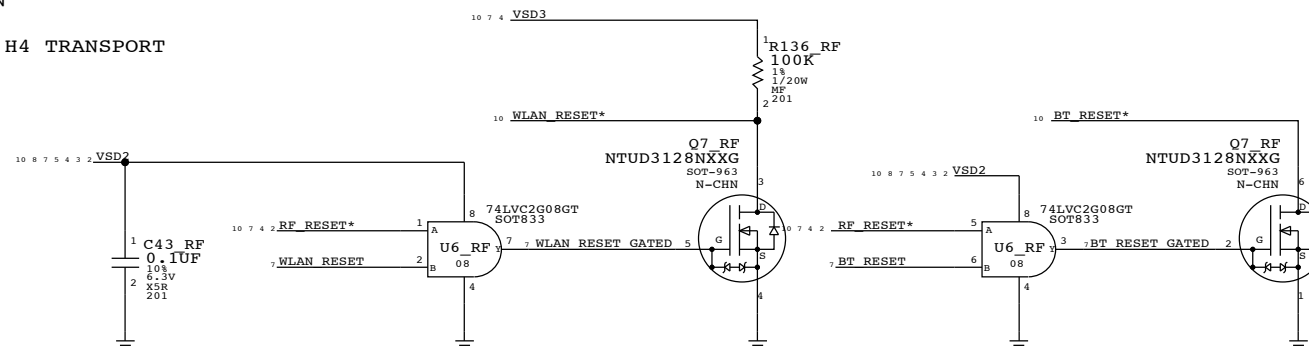
APPLE INC.	SIZE	DRAWING NUMBER	REV.
	D	051-7340	13
SCALE	SHEET 9 OF 11		
NONE			

# WLAN RADIO



HOST TRANSPORT CONFIGURATION  
MODULE CONFIGURED INTERNALLY FOR H4 TRANSPORT

TO ALLOW AP TO USE ACTIVE HIGH



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	NONE	D 051-7340	13
		SHT	OF
		10	11