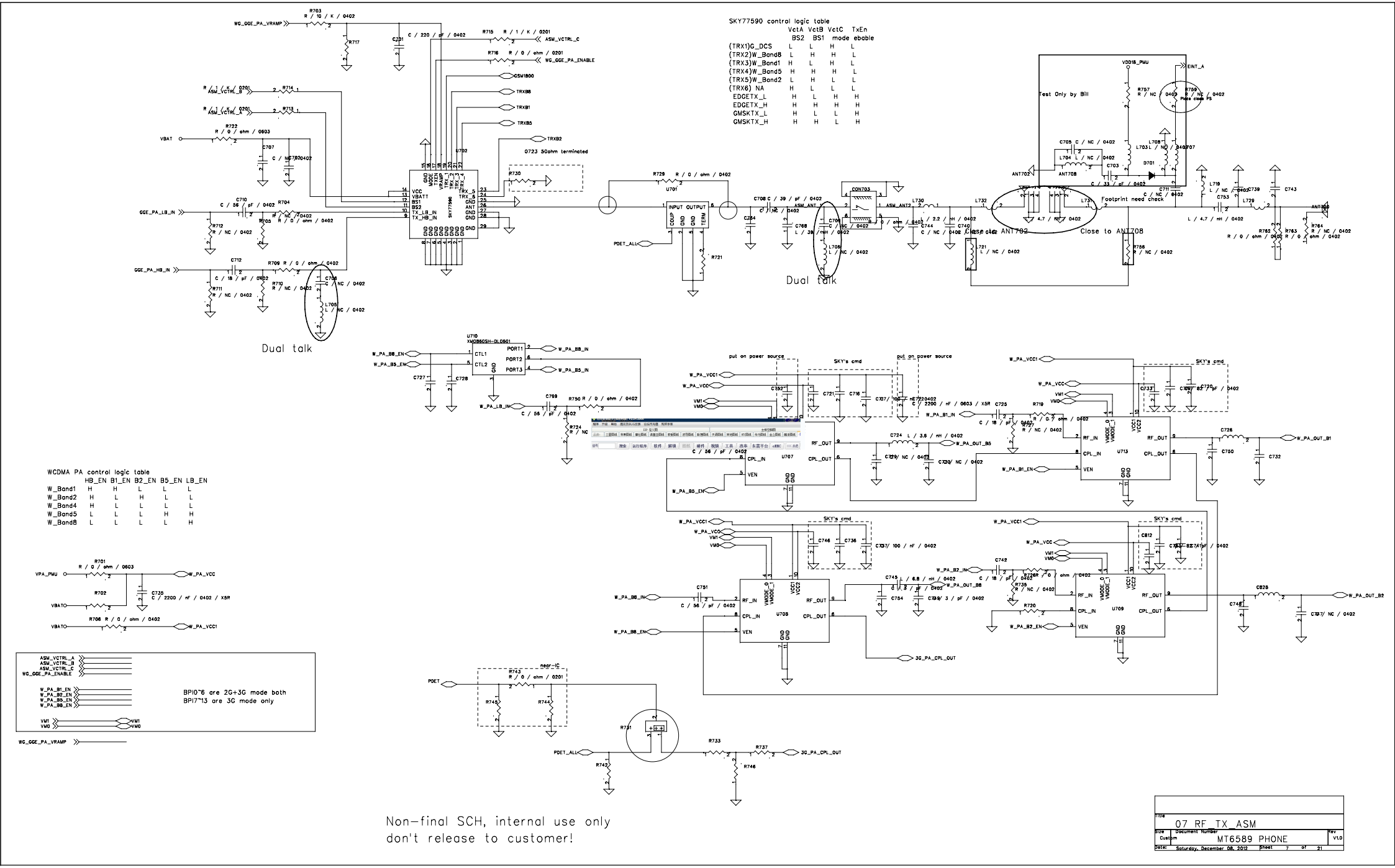
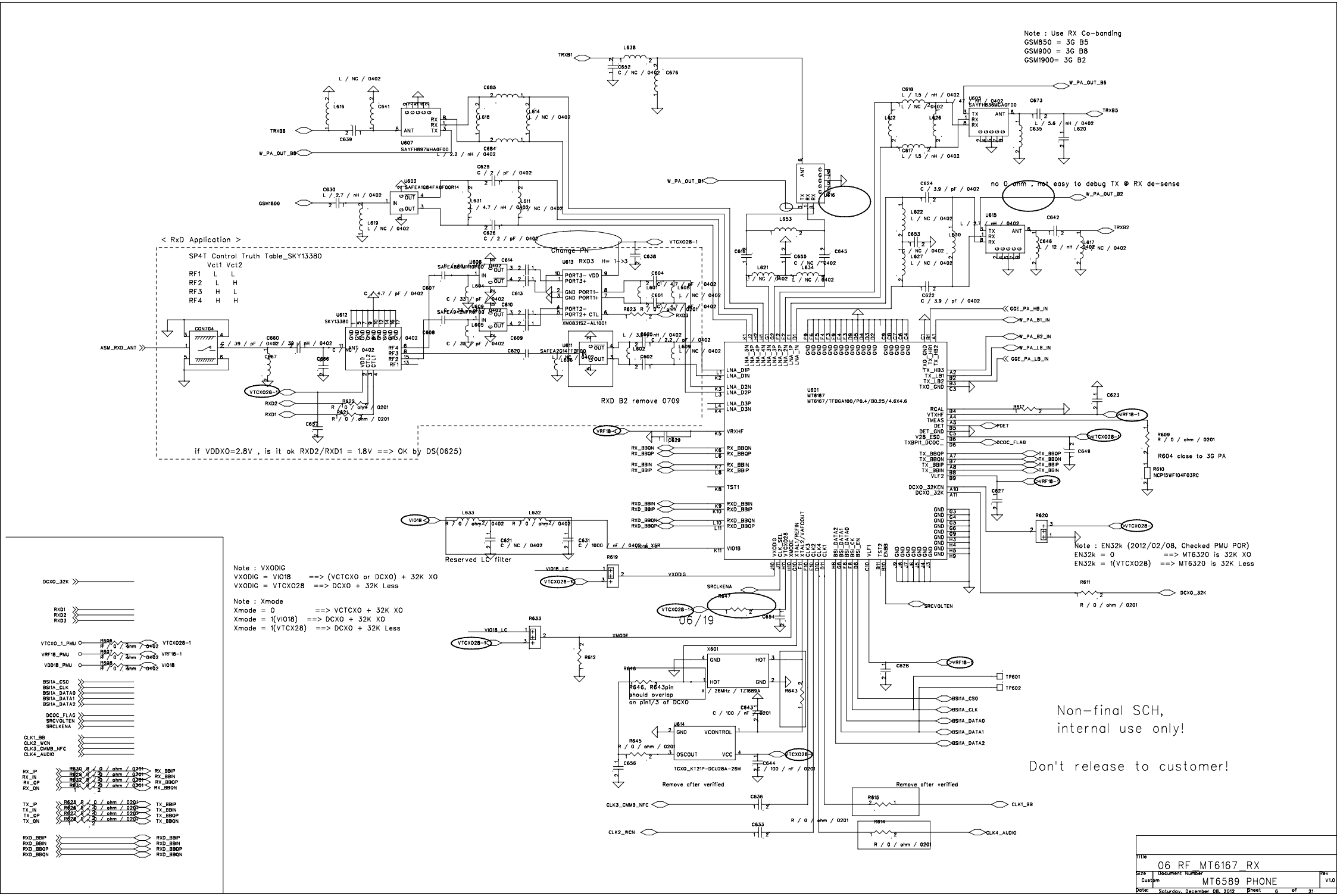
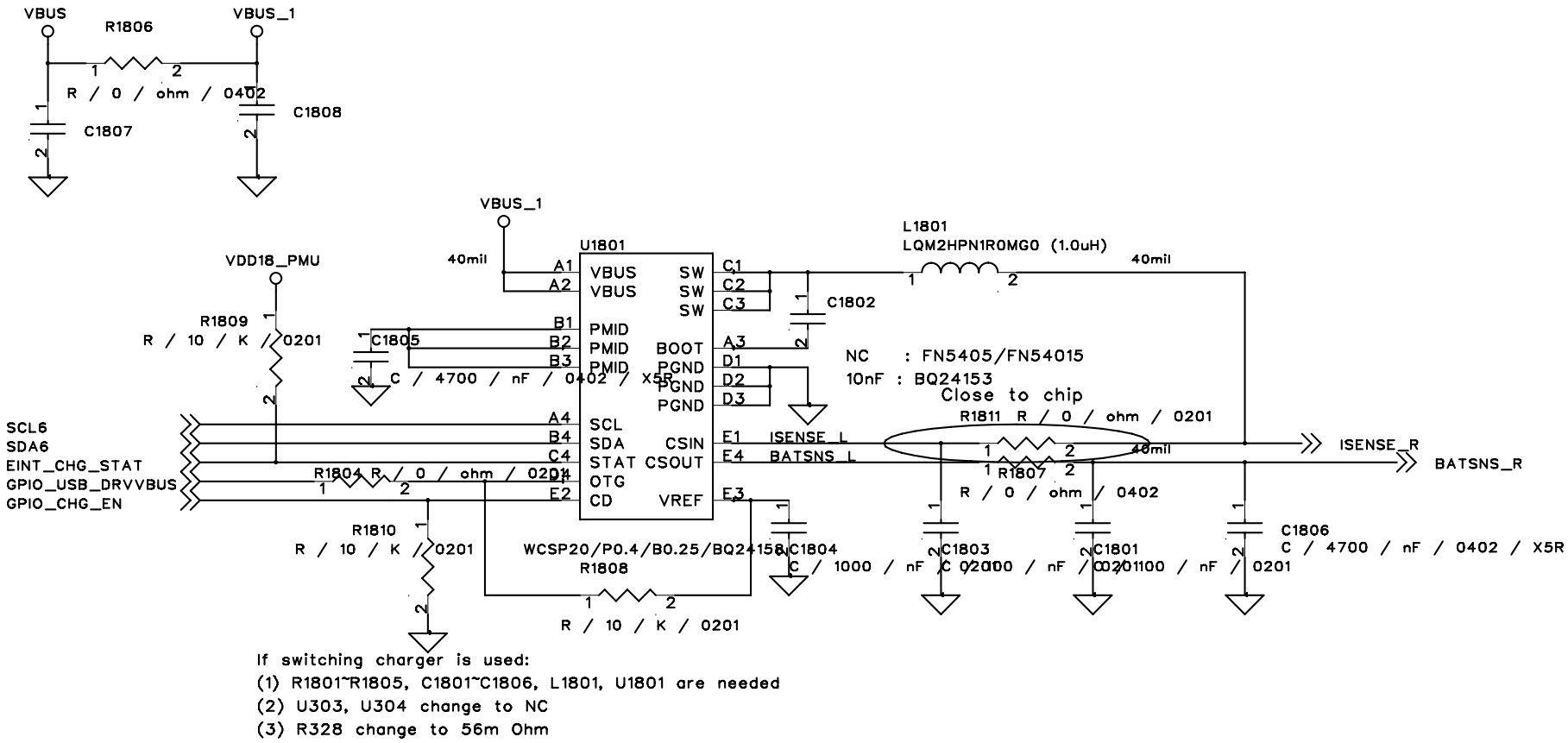


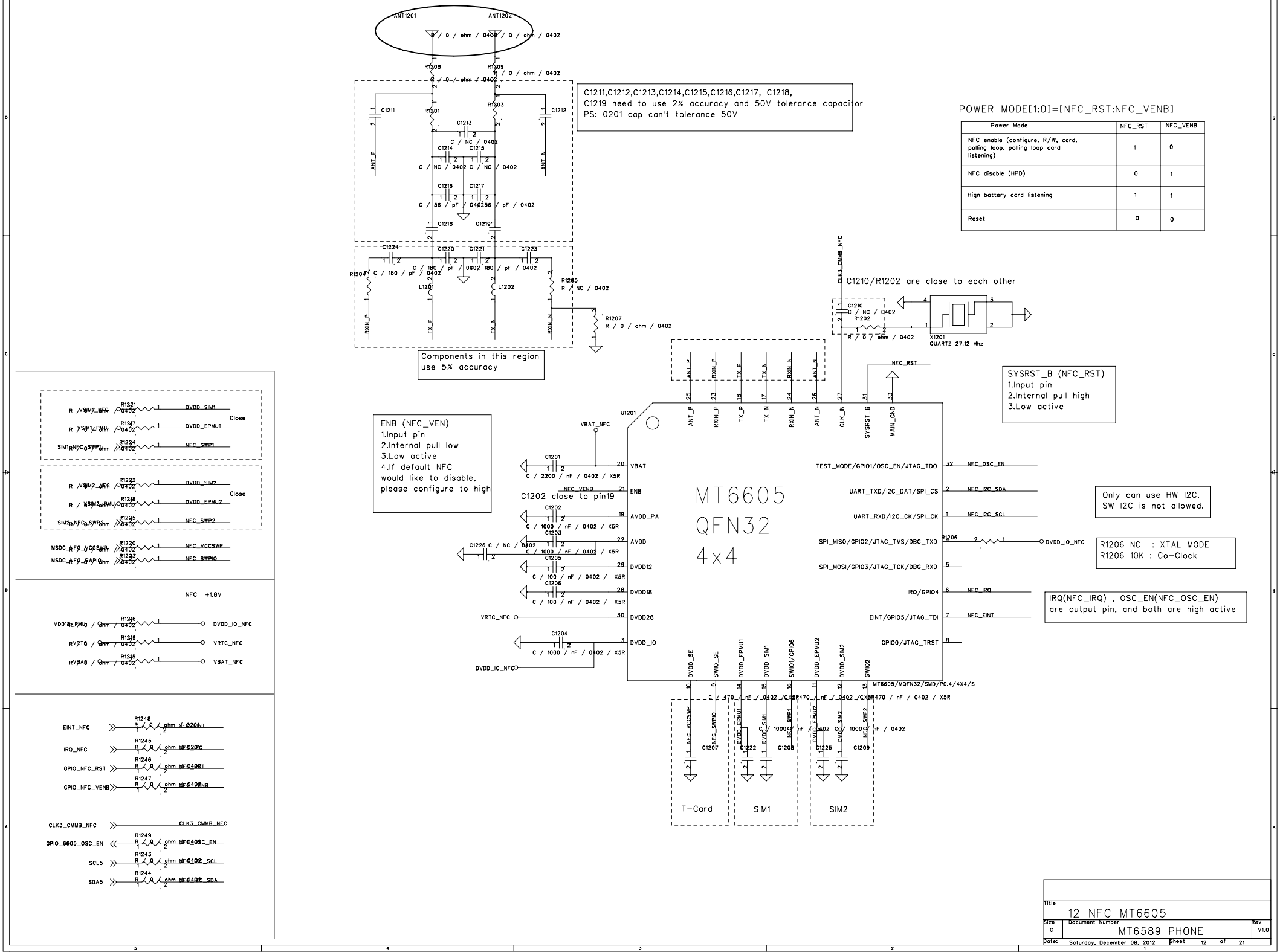

Note : Use RX Co-banding
GSM850 = 3G B5
GSM900 = 3G B8
GSM1900= 3G B2
< RxD Application >
SP4T Control Truth Table_SKY13380
Vct1 Vct2
RF1 L L
RF2 L H
RF3 H L
RF4 H H
Change PN
RXD B2 remove 0709
if VDDXO=2.8V , is it ok RXD2/RXD1 = 1.8V ==> OK by DS(0625)
no 0 ohm , not easy to debug TX @ RX de-sense
R604 close to 3G PA
Note : EN32k (2012/02/08, Checked PMU POR)
EN32k = 0 ==> MT6320 is 32K XO
EN32k = 1(VTCXO28) ==> MT6320 is 32K Less
Reserved LC filter
Note : VXODIG
VXODIG = VIO18 ==> (VCTCXO or DCXO) + 32K XO
VXODIG = VTCXO28 ==> DCXO + 32K Less
Note : Xmode
Xmode = 0 ==> VCTCXO + 32K XO
Xmode = 1(VIO18) ==> DCXO + 32K XO
Xmode = 1(VTCX28) ==> DCXO + 32K Less
06/19
Remove after verified
Remove after verified
Non-final SCH,
internal use only!
Don't release to customer!
Title
06_RF_MT6167_RX
Size Custom
Document Number
MT6589 PHONE
Rev V1.0
Date: Saturday, December 08, 2012
Sheet 6 of 21

Switching Charger



If switching charger is used:
(1) R1801~R1805, C1801~C1806, L1801, U1801 are needed
(2) U303, U304 change to NC
(3) R328 change to 56m Ohm

Title: 18 Switching Charger		
Size: A	Document Number: MT6589 PHONE	Rev: V1.0
Date: Saturday, December 08, 2012	Sheet 17 of 21	


ANT1201
ANT1202
R / 0 / ohm / 0402
R1208
R1209
R1201
R1203
C1211
C1212
C1213
C / NC / 0402
C1214
C1215
C / NC / 0402
C / NC / 0402
ANT_P
ANT_N
C1216
C1217
C / 56 / pF / 0402
C / 56 / pF / 0402
C1218
C1219
C1224
C1220
C1221
C1223
C / 180 / pF / 0402
C / 180 / pF / 0402
C / 180 / pF / 0402
R1204
R1205
R / NC / 0402
L1201
L1202
RXIN_P
TX_P
TX_N
RXIN_N
R1207
R / 0 / ohm / 0402
C1211,C1212,C1213,C1214,C1215,C1216,C1217, C1218,
C1219 need to use 2% accuracy and 50V tolerance capacitor
PS: 0201 cap can't tolerance 50V
Components in this region
use 5% accuracy
POWER MODE[1:0]=[NFC_RST:NFC_VENB]
Power Mode | NFC_RST | NFC_VENB
NFC enable (configure, R/W, card, polling loop, polling loop card listening) | 1 | 0
NFC disable (HPD) | 0 | 1
Hign battery card listening | 1 | 1
Reset | 0 | 0
CLK3_CMMB_NFC
C1210/R1202 are close to each other
C1210
C / NC / 0402
R1202
R / 0 / ohm / 0402
X1201
QUARTZ 27.12 Mhz
NFC_RST
SYSRST_B (NFC_RST)
1.Input pin
2.Internal pull high
3.Low active
ENB (NFC_VEN)
1.Input pin
2.Internal pull low
3.Low active
4.If default NFC
would like to disable,
please configure to high
U1201
VBAT_NFC
C1201
C / 2200 / nF / 0402 / X5R
NFC_VENB
C1202 close to pin19
C1202
C / 1000 / nF / 0402 / X5R
C1203
C1226 C / NC / 0402
C / 1000 / nF / 0402 / X5R
C1205
C / 100 / nF / 0402 / X5R
C1206
C / 100 / nF / 0402 / X5R
VRTC_NFC
C1204
C / 1000 / nF / 0402 / X5R
DVDD_IO_NFC
MT6605
QFN32
4x4
ANT_P
RXIN_P
TX_P
TX_N
RXIN_N
ANT_N
CLK_IN
SYSRST_B
MAIN_GND
VBAT
ENB
AVDD_PA
AVDD
DVDD12
DVDD18
DVDD28
DVDD_IO
TEST_MODE/GPIO1/OSC_EN/JTAG_TDO
UART_TXD/I2C_DAT/SPI_CS
UART_RXD/I2C_CK/SPI_CK
SPI_MISO/GPIO2/JTAG_TMS/DBG_TXD
SPI_MOSI/GPIO3/JTAG_TCK/DBG_RXD
IRQ/GPIO4
EINT/GPIO5/JTAG_TDI
GPIO0/JTAG_TRST
NFC_OSC_EN
NFC_I2C_SDA
NFC_I2C_SCL
R1206
DVDD_IO_NFC
NFC_IRQ
NFC_EINT
DVDD_SE
SWIO_SE
DVDD_EPMU1
DVDD_SIM1
SWIO1/GPIO6
DVDD_EPMU2
DVDD_SIM2
SWIO2
MT6605/MQFN32/SMD/P0.4/4X4/S
C / 470 / nF / 0402 /CX5R
C / 470 / nF / 0402 /CX5R
C / 470 / nF / 0402 / X5R
NFC_VCCSWP
NFC_SWPIO
C1207
C1222
C1205
C1225
C1209
T-Card
SIM1
SIM2
Only can use HW I2C.
SW I2C is not allowed.
R1206 NC : XTAL MODE
R1206 10K : Co-Clock
IRQ(NFC_IRQ) , OSC_EN(NFC_OSC_EN)
are output pin, and both are high active
R / NC / 0402
R1221
DVDD_SIM1
Close
R / NC / 0402
R1247
DVDD_EPMU1
SIM1_NFC_SWP1
R / 0 / ohm / 0402
R1224
NFC_SWP1
R / NC / 0402
R1232
DVDD_SIM2
Close
R / NC / 0402
R1238
DVDD_EPMU2
SIM2_NFC_SWP2
R / 0 / ohm / 0402
R1235
NFC_SWP2
MSDC_NFC_VCCSWP
R / 0 / ohm / 0402
R1220
NFC_VCCSWP
MSDC_NFC_SWPIO
R / 0 / ohm / 0402
R1223
NFC_SWPIO
NFC +1.8V
VDD18_PMU
R / 0 / ohm / 0402
R1236
DVDD_IO_NFC
RVRTC
R / 0 / ohm / 0402
R1239
VRTC_NFC
RVBAT
R / 0 / ohm / 0402
R1225
VBAT_NFC
EINT_NFC
R / 0 / ohm / 0402
R1248
EINT
IRQ_NFC
R / 0 / ohm / 0402
R1245
IRQ
GPIO_NFC_RST
R / 0 / ohm / 0402
R1246
RST
GPIO_NFC_VENB
R / 0 / ohm / 0402
R1247
ENB
CLK3_CMMB_NFC
CLK3_CMMB_NFC
GPIO_6605_OSC_EN
R / 0 / ohm / 0402
R1249
OSC_EN
SCL5
R / 0 / ohm / 0402
R1243
SCL
SDA5
R / 0 / ohm / 0402
R1244
SDA
Title
12_NFC_MT6605
Size
C
Document Number
MT6589 PHONE
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V1.0
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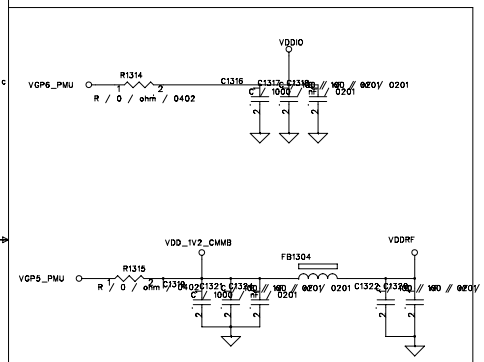
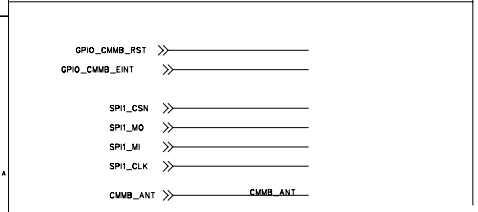
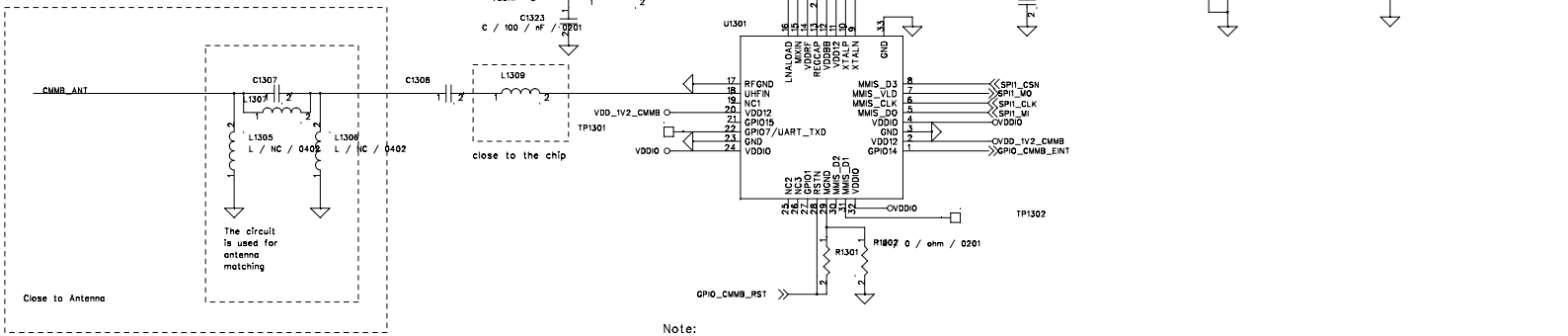
IF258







Note:
Leave these NC pins floating, do not connect them to GND or Power

Title	13 CMMB (IF258)	
Size: Custom	Document Number: MT6589 PHONE	Rev: V1.0
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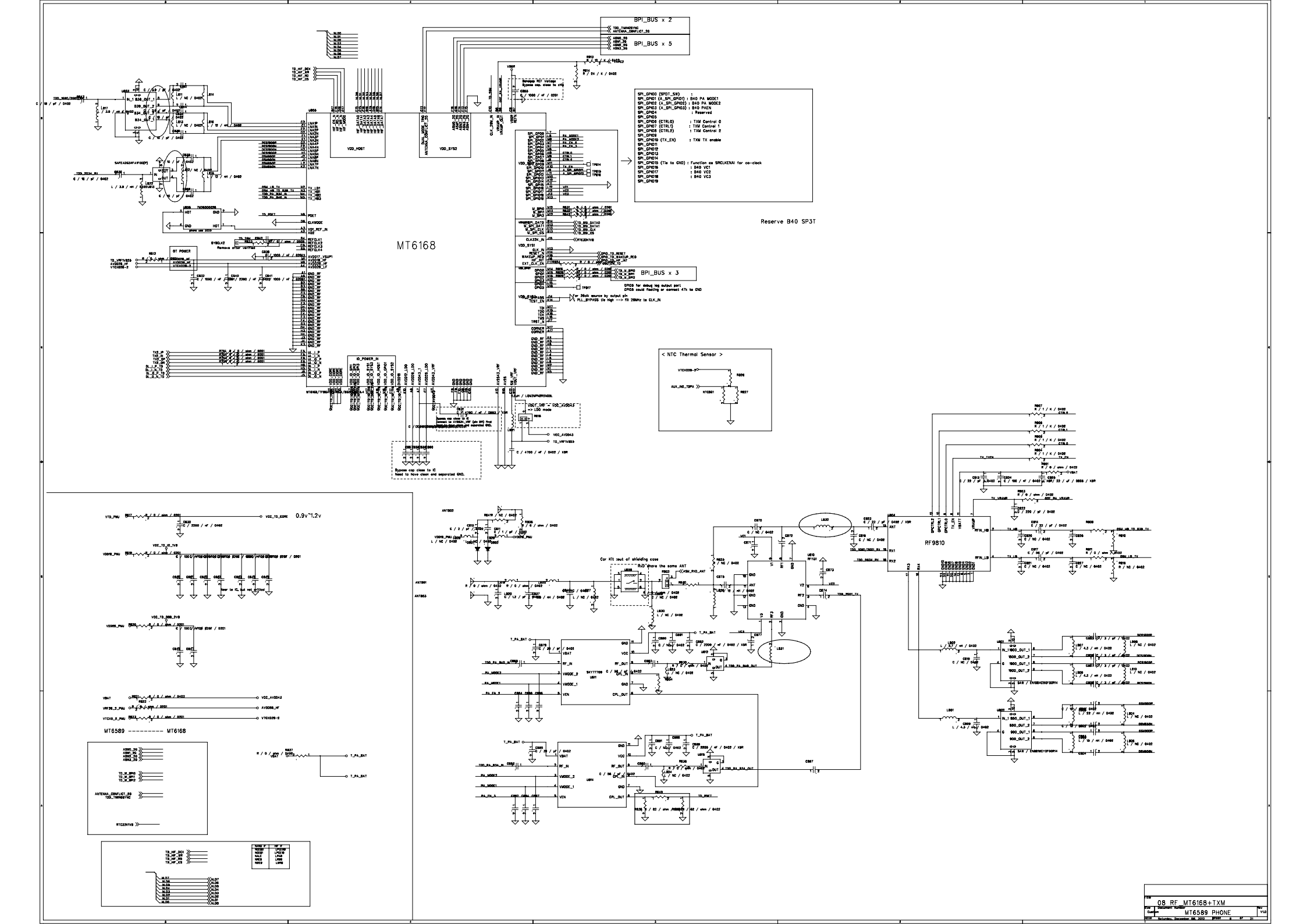
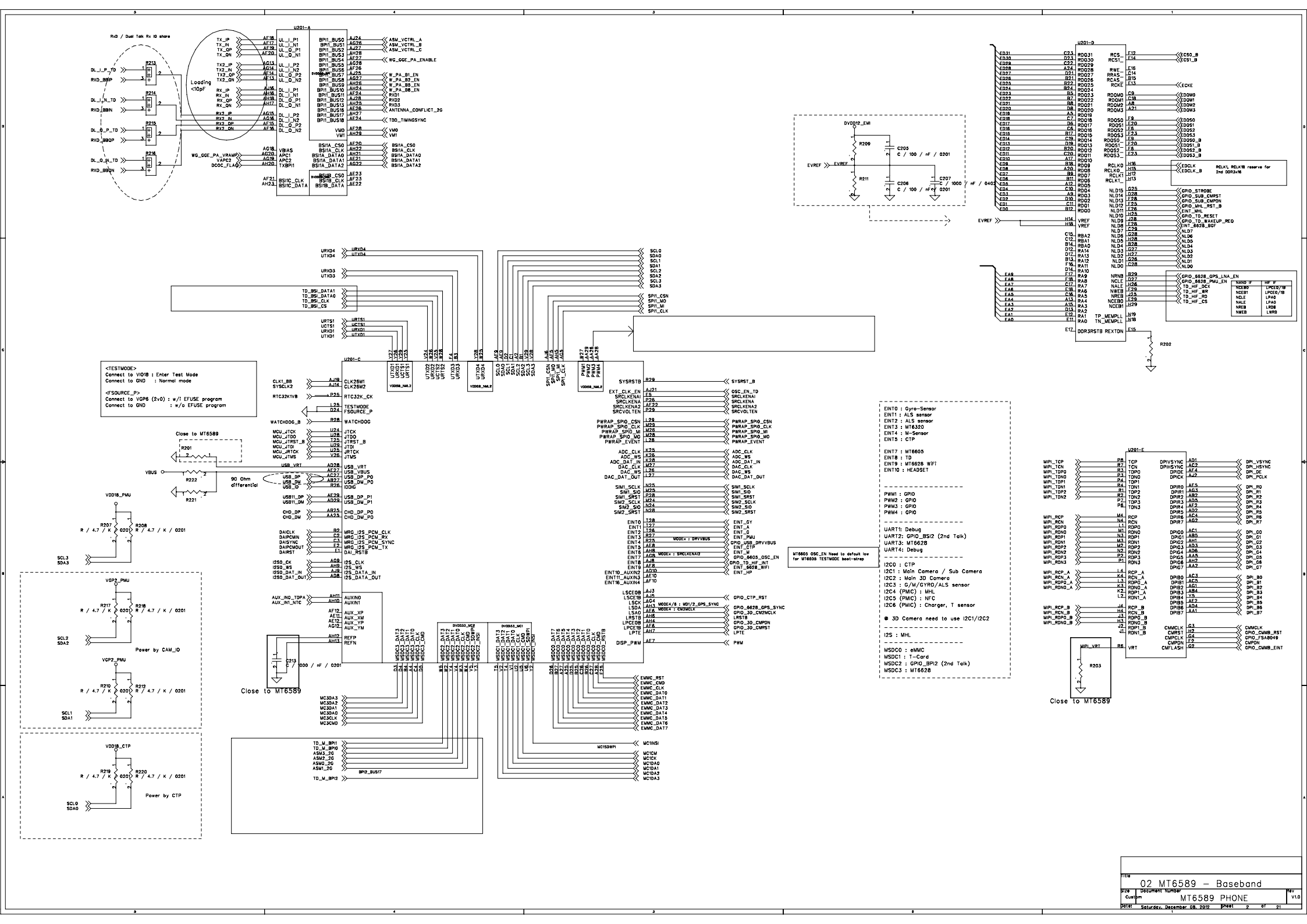

BPI_BUS x 2
BPI_BUS x 5
BPI_BUS x 3
MT6168
MT6589 --------- MT6168
Reserve B40 SP3T
< NTC Thermal Sensor >
RF9810
0.9v~1.2v
SPI_GPIO0 (SPDT_SW) :
SPI_GPIO1 (A_SPI_GPIO1) : B40 PA MODE1
SPI_GPIO2 (A_SPI_GPIO2) : B40 PA MODE2
SPI_GPIO3 (A_SPI_GPIO3) : B40 PAEN
SPI_GPIO4 : Reserved
SPI_GPIO5
SPI_GPIO6 (CTRL0) : TXM Control 0
SPI_GPIO7 (CTRL1) : TXM Control 1
SPI_GPIO8 (CTRL2) : TXM Control 2
SPI_GPIO9
SPI_GPIO10 (TX_EN) : TXM TX enable
SPI_GPIO11
SPI_GPIO12
SPI_GPIO13
SPI_GPIO14
SPI_GPIO15 (Tie to GND) : Function as SRCLKENAI for co-clock
SPI_GPIO16 : B40 VC1
SPI_GPIO17 : B40 VC2
SPI_GPIO18 : B40 VC3
SPI_GPIO19
08_RF_MT6168+TXM
MT6589 PHONE


Rx3 / Dual Talk Rx IO share
Loading <10pF
U201-A
U201-C
U201-D
U201-E
DVDD12_EMI
R209
C205 C / 100 / nF / 0201
R211
C206 C / 100 / nF / 0201
C207 C / 1000 / nF / 0402
EVREF
R202
<TESTMODE>
Connect to VIO18 : Enter Test Mode
Connect to GND : Normal mode
<FSOURCE_P>
Connect to VGP6 (2v0) : w/I EFUSE program
Connect to GND : w/o EFUSE program
Close to MT6589
VBUS
R222
R221
90 Ohm differential
VDD18_PMU
R207 R / 4.7 / K / 0201
R208 R / 4.7 / K / 0201
SCL3
SDA3
VGP2_PMU
R217 R / 4.7 / K / 0201
R218 R / 4.7 / K / 0201
SCL2
SDA2
Power by CAM_IO
VGP2_PMU
R210 R / 4.7 / K / 0201
R212 R / 4.7 / K / 0201
SCL1
SDA1
C213 C / 1000 / nF / 0201
Close to MT6589
VDD18_CTP
R219 R / 4.7 / K / 0201
R220 R / 4.7 / K / 0201
Power by CTP
SCL0
SDA0
EINT0 : Gyro-Sensor
EINT1 : ALS sensor
EINT2 : ALS sensor
EINT3 : MT6320
EINT4 : M-Sensor
EINT5 : CTP
EINT7 : MT6605
EINT8 : TD
EINT9 : MT6628 WIFI
EINT10 : HEADSET
PWM1 : GPIO
PWM2 : GPIO
PWM3 : GPIO
PWM4 : GPIO
UART1: Debug
UART2: GPIO_BSI2 (2nd Talk)
UART3: MT6628
UART4: Debug
I2C0 : CTP
I2C1 : Main Camera / Sub Camera
I2C2 : Main 3D Camera
I2C3 : G/M/GYRO/ALS sensor
I2C4 (PMIC) : MHL
I2C5 (PMIC) : NFC
I2C6 (PMIC) : Charger, T sensor
* 3D Camera need to use I2C1/I2C2
I2S : MHL
MSDC0 : eMMC
MSDC1 : T-Card
MSDC2 : GPIO_BPI2 (2nd Talk)
MSDC3 : MT6628
MT6605 OSC_EN Need to default low for MT6589 TESTMODE boot-strap
R203
Close to MT6589
Title: 02 MT6589 – Baseband
Size: Custom
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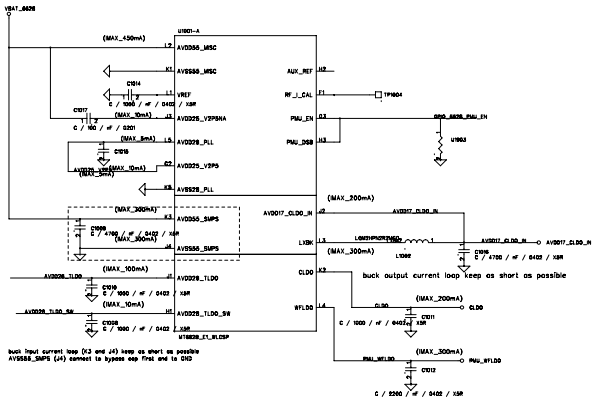
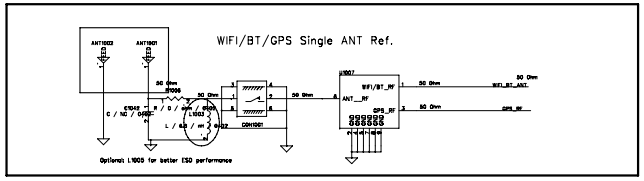
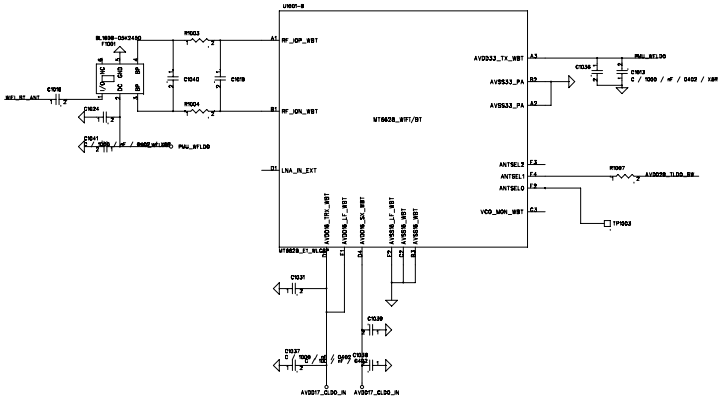
MT6628_PMU



MT6628_BT/WiFi





MT6628_GPIO

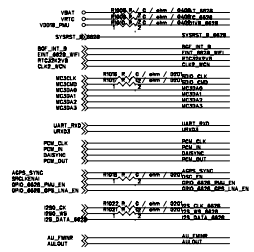
WiFi_Host	0	SDIO	
ANTSEL=2	1	SPI	

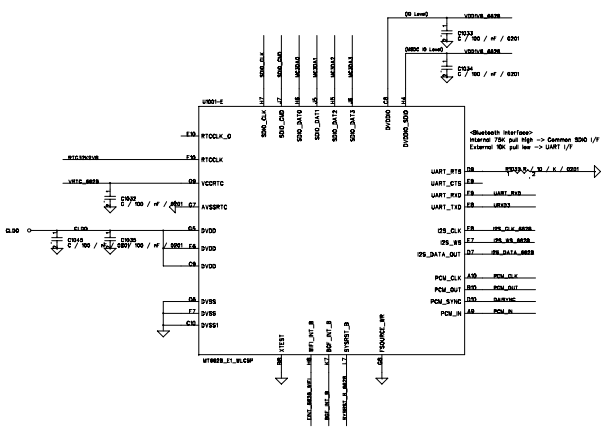
	00	TCXO	
Xtal/DCS	01	Xtal	
ANTSEL=1 (b'0)	10	EXTCK	
	11	RESERVERD	

BT/COM Host	0	UART	MT6626E2
UART_RTS	1	SDIO	MT6626E2

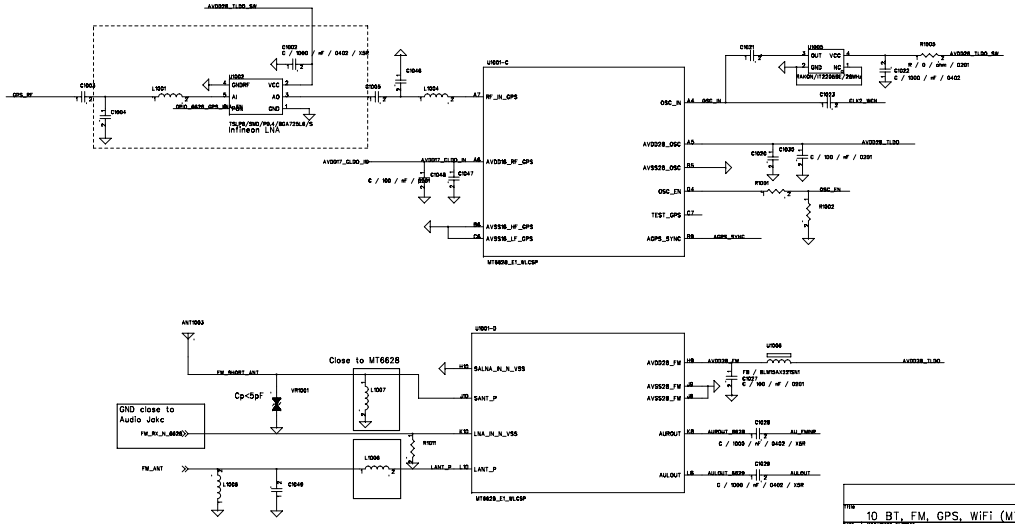
BT/COM Host	0	SDIO	MT6626E1
ANTSEL=0	1	UART	MT6626E1

MT6589 <==> MT6628 Connector





MT6628_GPS / FM



Title	10_BT, FM, GPS, WiFi (MT6620)		
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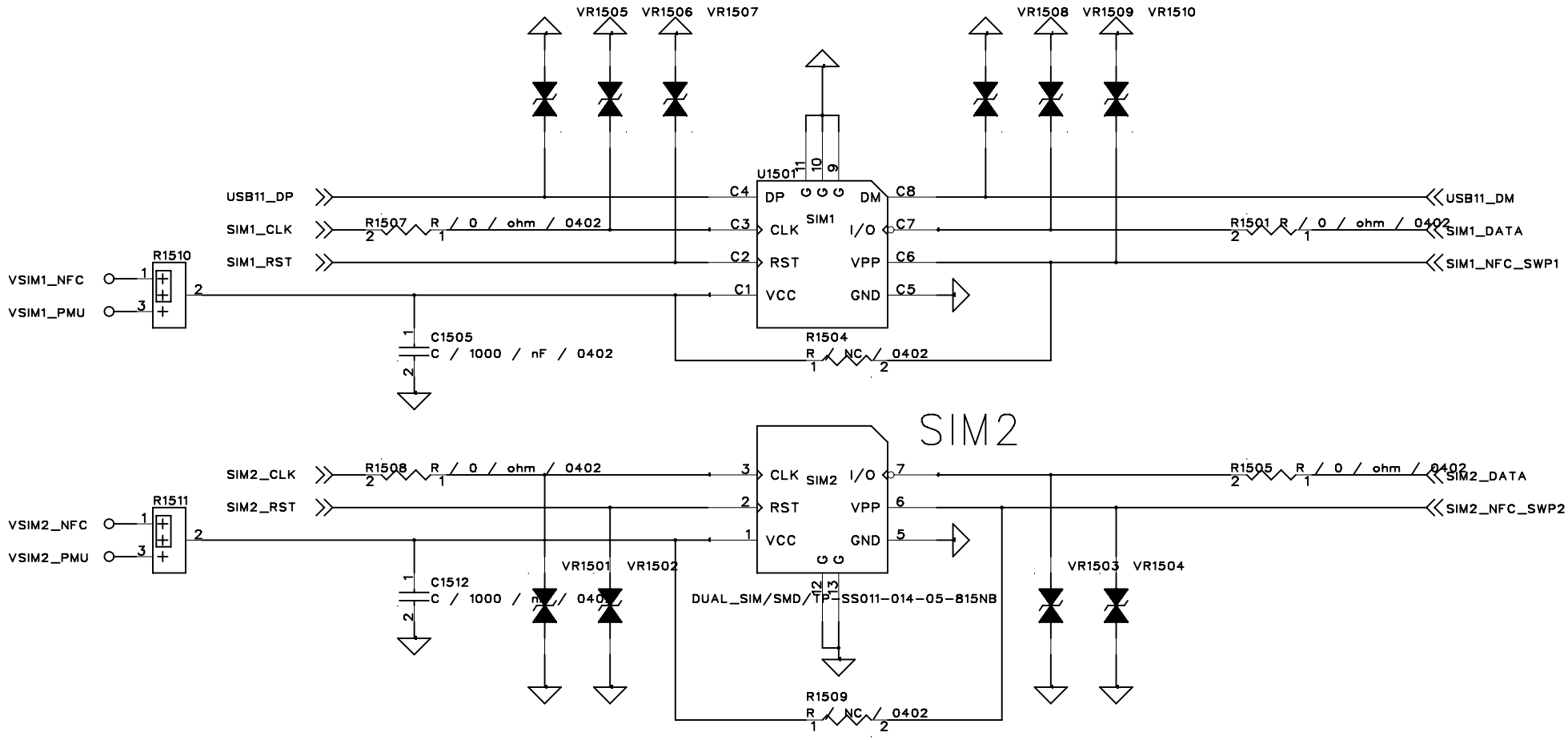
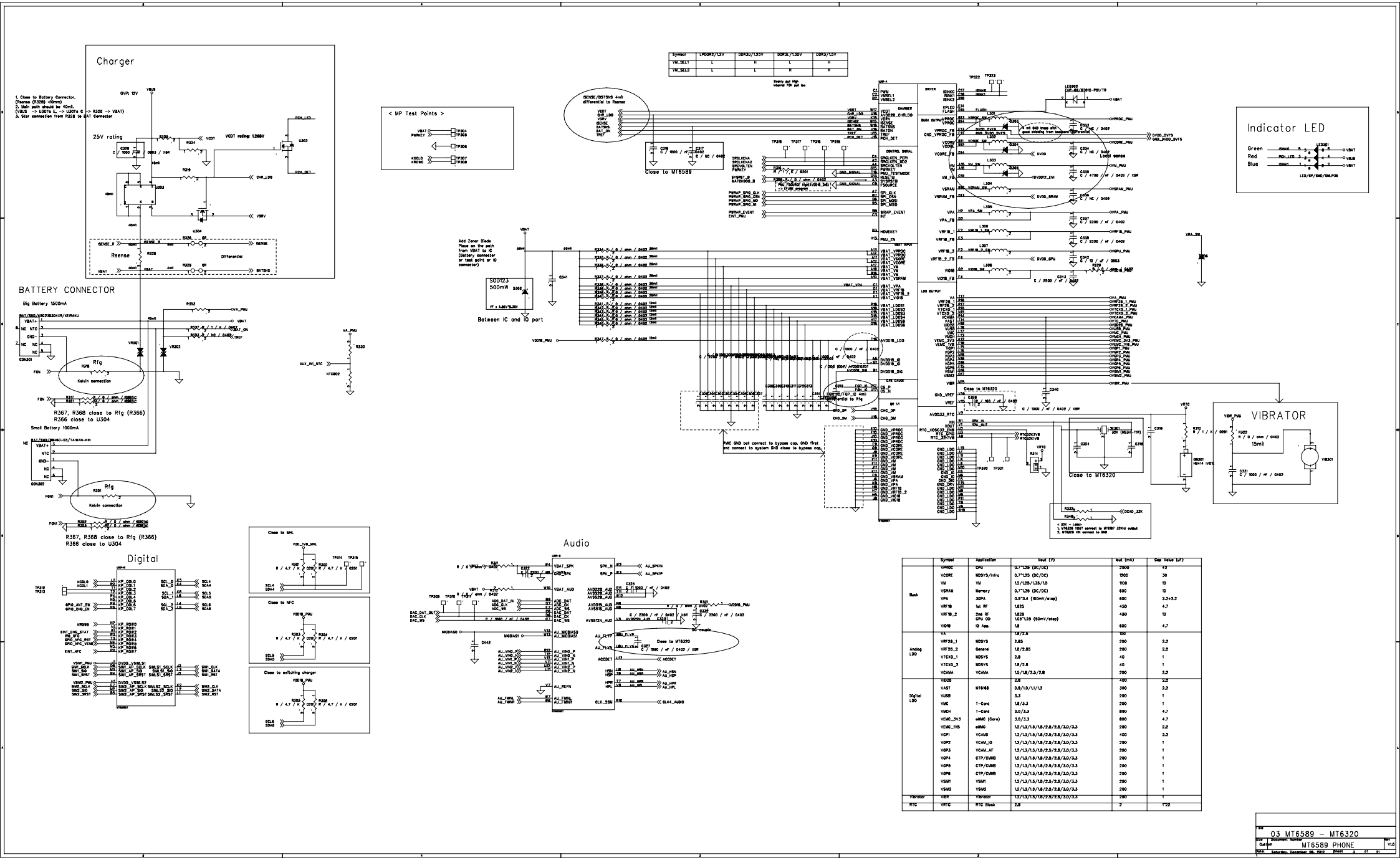
SIM1 & SmartCard

8-pin connector



Title	15 Dual SIM, IC-USB	
Size: Custom	Document Number: MT6589 PHONE	Rev: V1.0
Date: Saturday, December 08, 2012	Sheet 15 of 21	

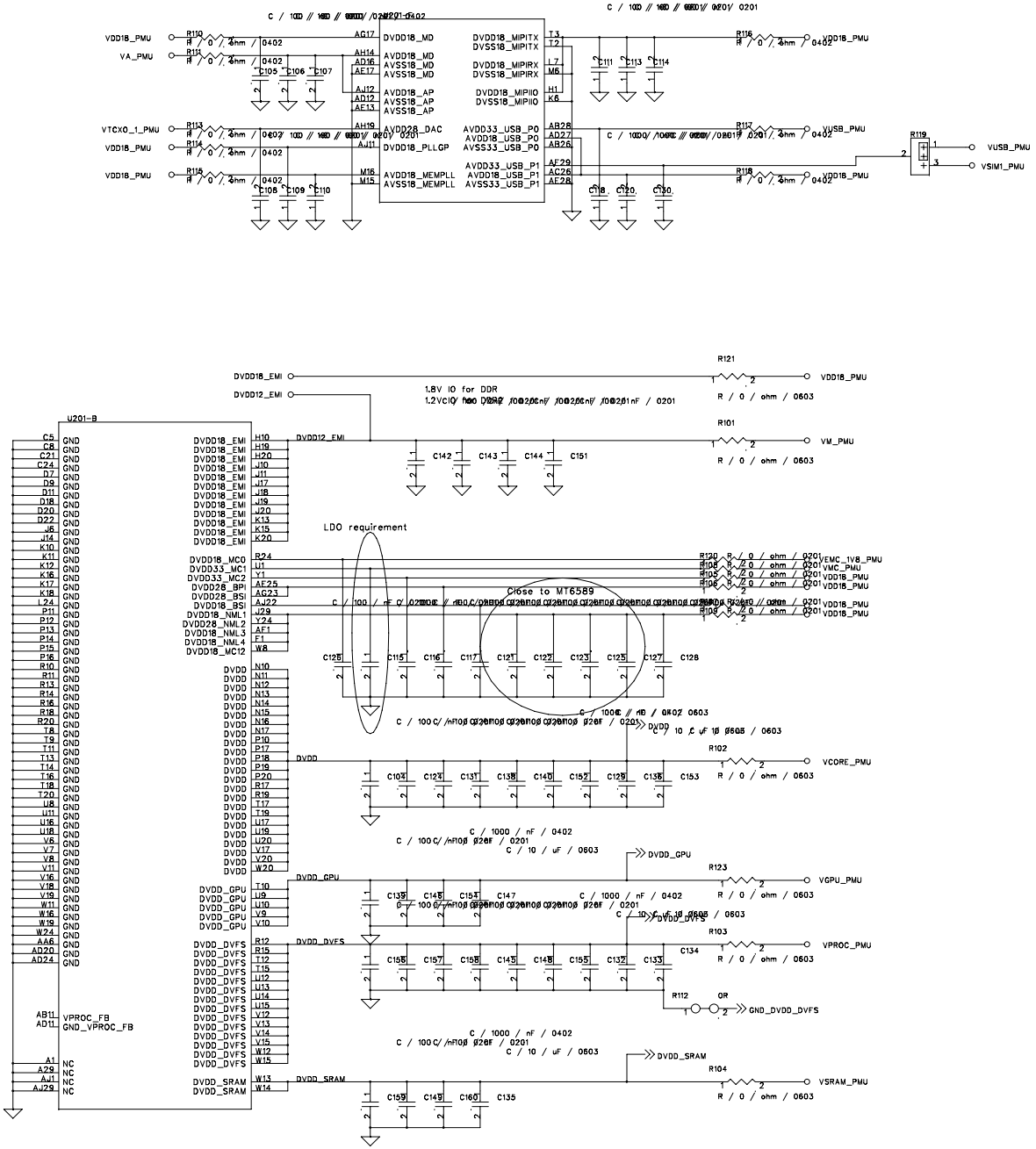


Symbol	LPDDR2/1.2V	DDR2U/1.25V	DDR3L/1.35V	DDR3/1.5V
VM_SEL1	L	H	L	H
VM_SEL2	L	L	H	H

Weakly pull High Internal 75K pull low

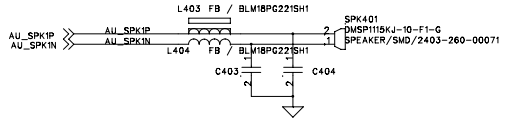
	Symbol	Application	Vout (V)	Iout (mA)	Cap Value (uF)
Buck	VPROC	CPU	0.7~1.25 (DC/DC)	2000	4.7
	VCORE	MDSYS/Infra	0.7~1.25 (DC/DC)	1200	30
	VM	VM	1.2/1.25/1.35/1.5	1100	10
	VSRAM	Memory	0.7~1.25 (DC/DC)	600	10
	VPA	3GPA	0.9~3.4 (100mV/step)	600	2.2+2.2
	VRF1S	1st RF	1.825	450	4.7
	VRF1S_2	2nd RF	1.825	450	10
	VIO18	IO App.	GPU OD 1.05~1.35 (50mV/step)	600	4.7
Analog LDO	VA		1.8/2.5	100	2.2
	VRF28_1	MDSYS	2.80	200	2.2
	VRF28_2	General	1.8/2.85	200	2.2
	VTCXO_1	MDSYS	2.8	40	1
	VTCXO_2	MDSYS	1.8/2.8	40	1
	VCAMA	VCAMA	1.5/1.8/2.5/2.8	200	2.2
Digital LDO	VIO28		2.8	400	2.2
	VAST	MT6168	0.9/1.0/1.1/1.2	300	2.2
	VUSB		3.3	200	1
	VMC	T-Card	1.8/3.3	200	1
	VMCH	T-Card	3.0/3.3	800	4.7
	VEMC_3V3	eMMC (Core)	3.0/3.3	600	4.7
	VEMC_1V8	eMMC	1.2/1.3/1.8/1.8/2.5/2.8/3.0/3.3	200	2.2
	VCP1	VCAM0	1.2/1.3/1.5/1.8/2.5/2.8/3.0/3.3	400	2.2
	VGP2	VCAM_IO	1.2/1.3/1.5/1.8/2.5/2.8/3.0/3.3	200	1
	VGP3	VCAM_AF	1.2/1.3/1.5/1.8/2.5/2.8/3.0/3.3	200	1
	VGP4	CTP/CMMB	1.2/1.3/1.5/1.8/2.5/2.8/3.0/3.3	200	1
	VGP5	CTP/CMMB	1.2/1.3/1.5/1.8/2.5/2.8/3.0/3.3	200	1
	VGP6	CTP/CMMB	1.2/1.3/1.5/1.8/2.5/2.8/3.0/3.3	200	1
	VSIM1	VSIM1	1.2/1.3/1.5/1.8/2.5/2.8/3.0/3.3	200	1
	VSIM2	VSIM2	1.2/1.3/1.5/1.8/2.5/2.8/3.0/3.3	200	1
Vibrator	VIBR	Vibrator	1.2/1.3/1.5/1.8/2.5/2.8/3.0/3.3	200	1
RTC	VRTC	RTC Block	2.8	2	T22

Title	03 MT6589 - MT6320		
Size	Document Number		Rev
Custom	MT6589 PHONE		V1.0
Date:	Saturday, December 08, 2012	Sheet 3 of 21	

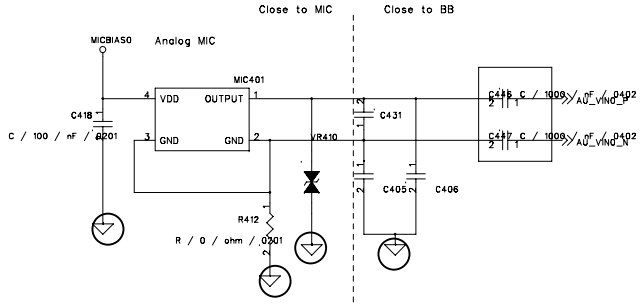


Title	01 MT6589 – Power		
Size: C	Document Number: MT6589 PHONE		Rev: V1.0
Date: Saturday, December 08, 2012	Sheet 1 of 21		

Speaker

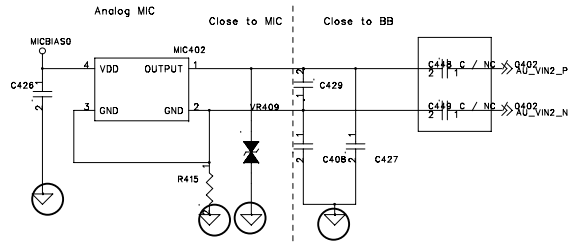


Handset Microphone 1



together then single via to main GND

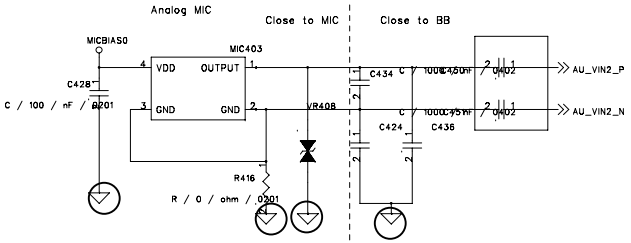
Handset Microphone 2-1



together then single via to main GND

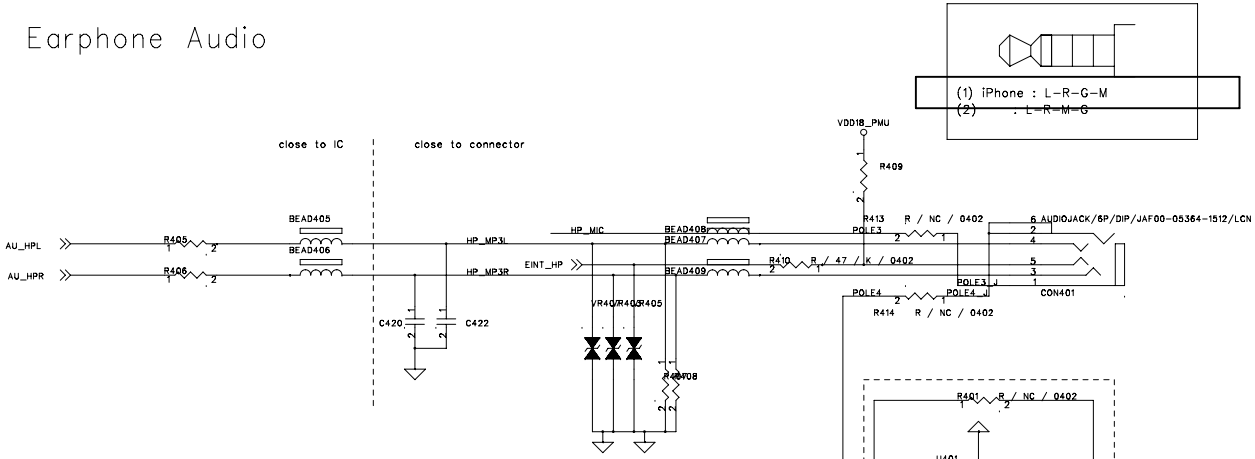
Close to MIC Close to BB

Handset Microphone 2-2

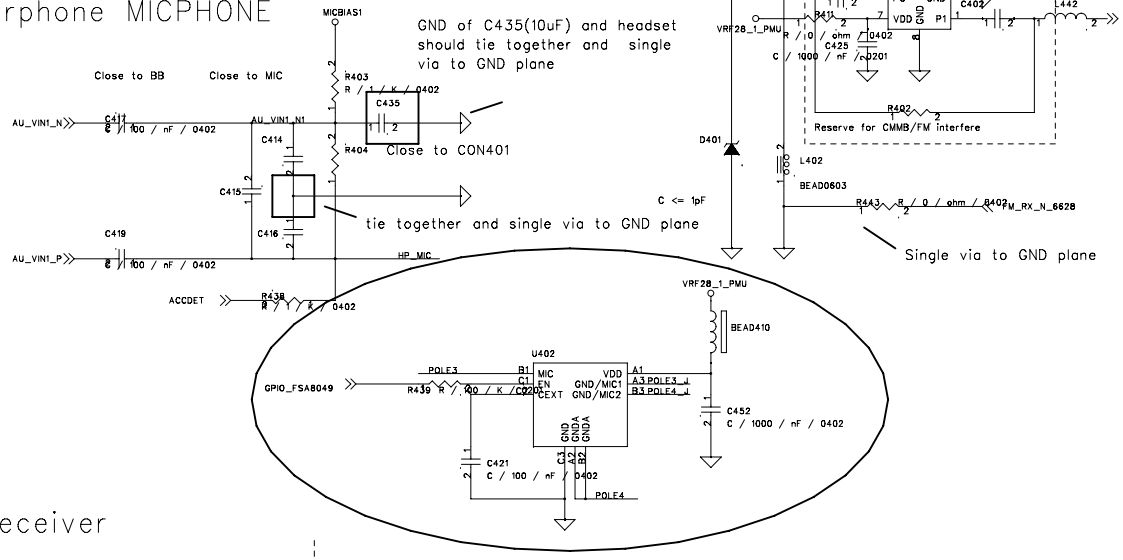


together then single via to main GND

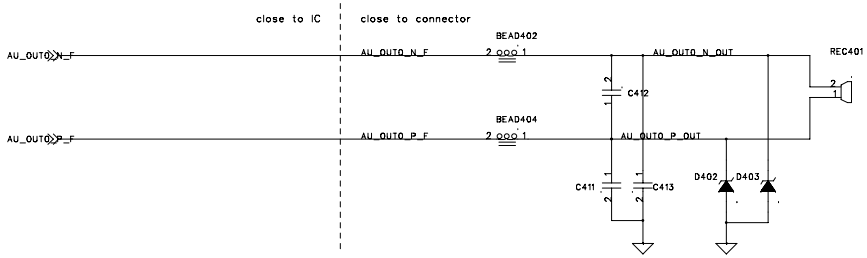
Earphone Audio



Earphone MICPHONE



Receiver



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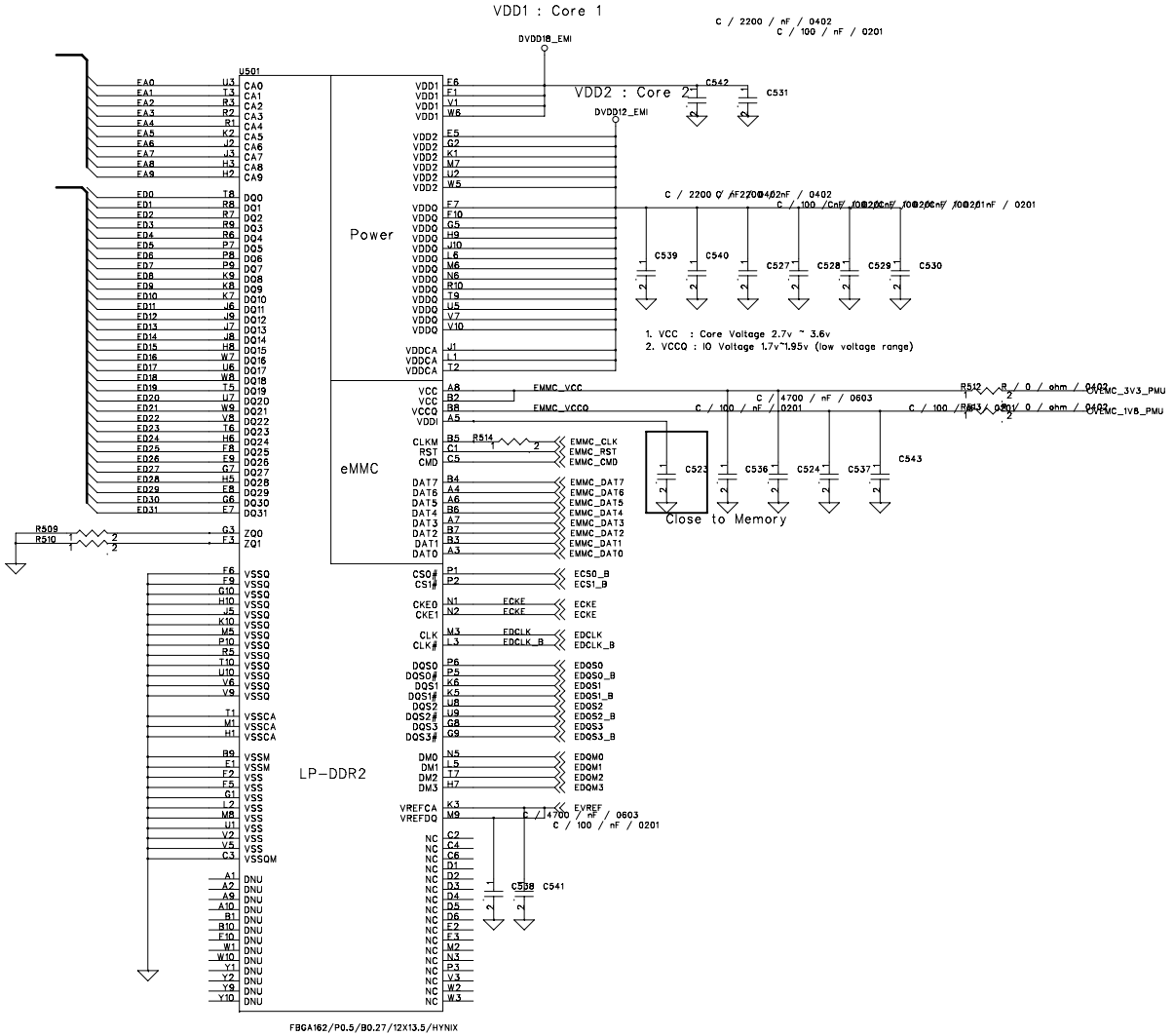
eMMC+LPDDR2

162 Ball, 0.5mm pitch

VDD1=1.8V
VDD2=1.20V
VDDCA=1.2V
VDDQ= 1.20V



Title	05 Memory (eMMC + x32LPDDR2)	
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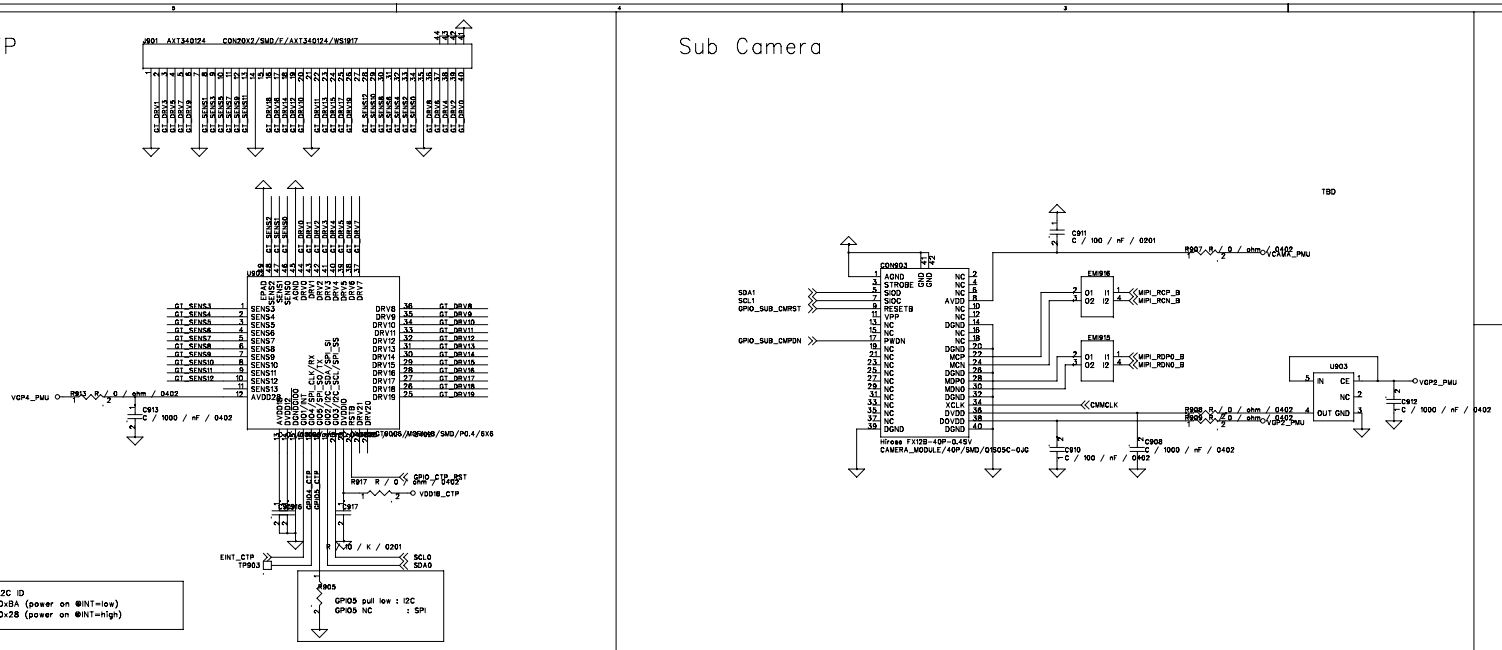
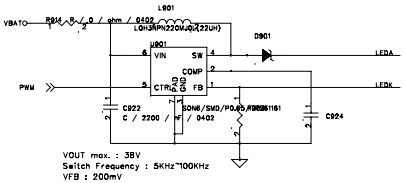
CTP

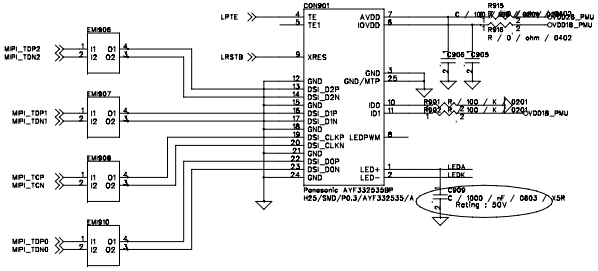


Sub Camera

Backlight LED Driver

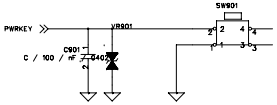


Main LCM

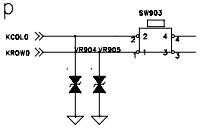


Power Key

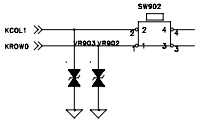
DO NOT put pull-up resistor on PWRKEY



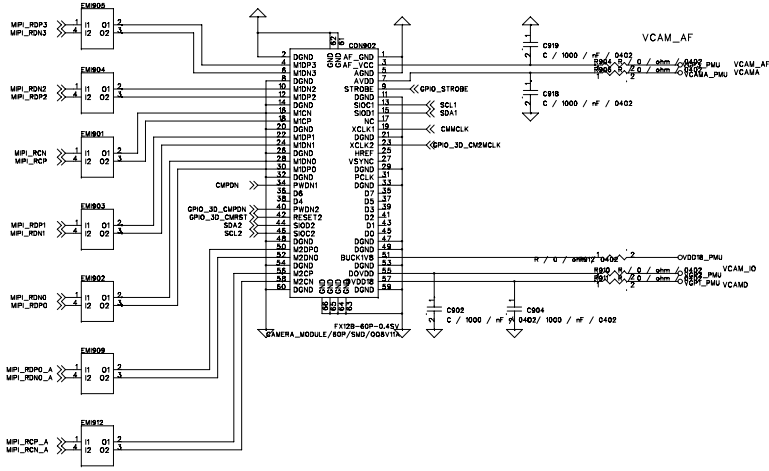
Volume Up



Volume Down



Main Camera



3D LCM (Reserved)

Title	09 LCD, CTP, Camera, Sidekey		
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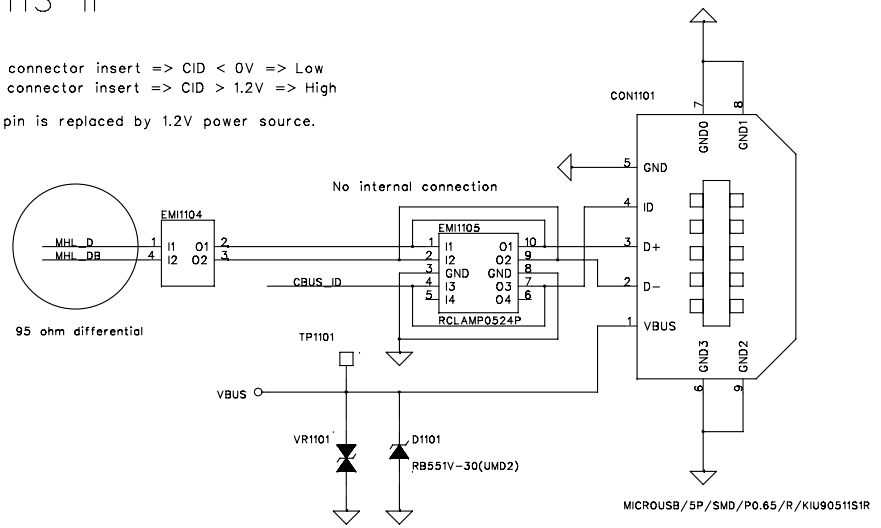
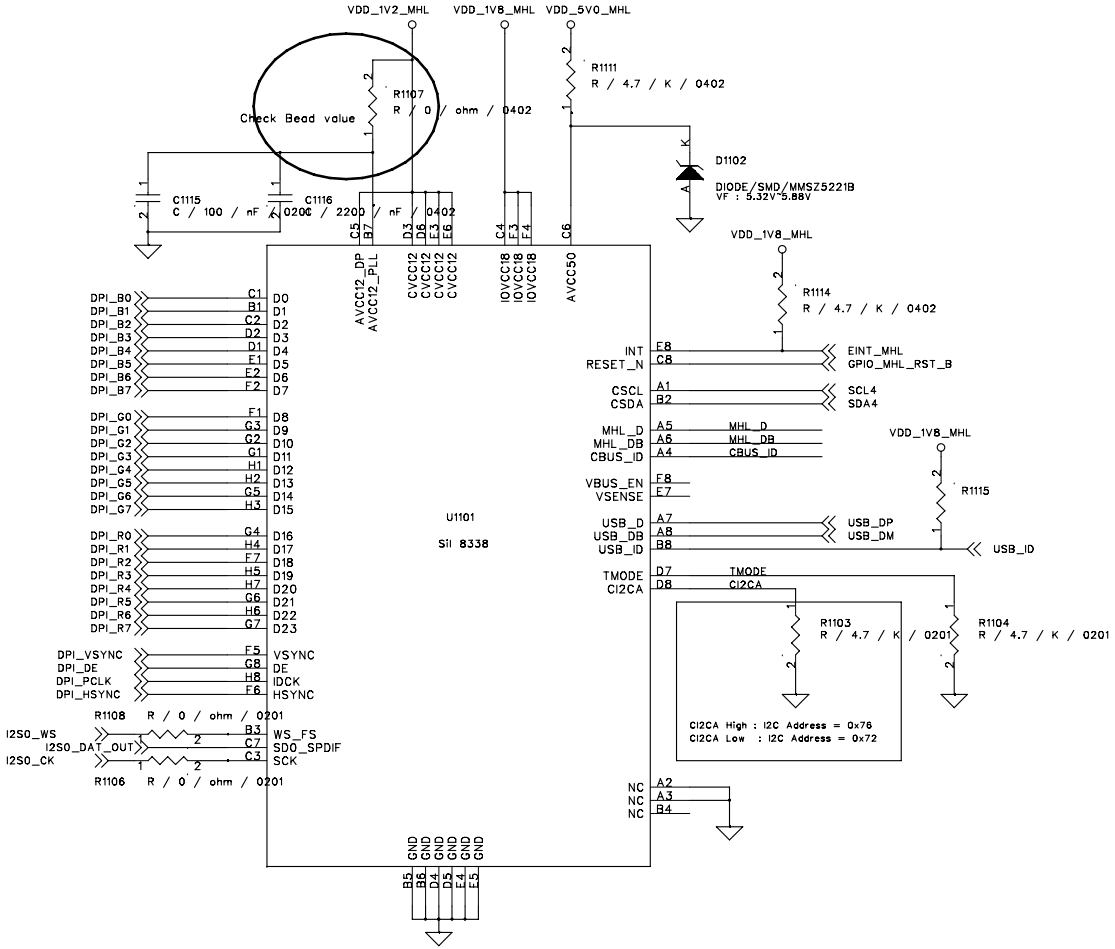
USB HS IF

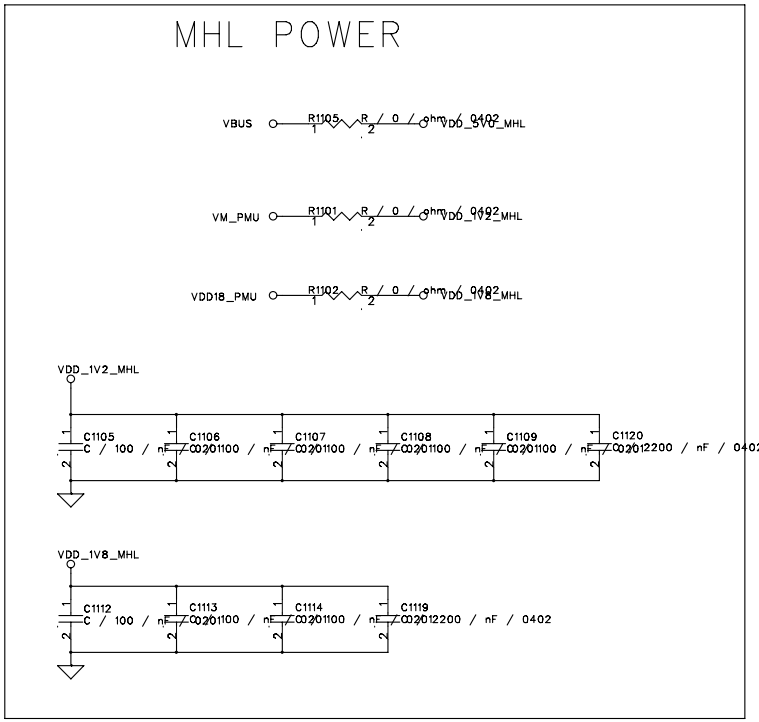
If mini-A connector insert => CID < 0V => Low
If mini-B connector insert => CID > 1.2V => High

IDPULLUP pin is replaced by 1.2V power source.





MHL POWER



Title	11.USB (MHL Sil8338)	
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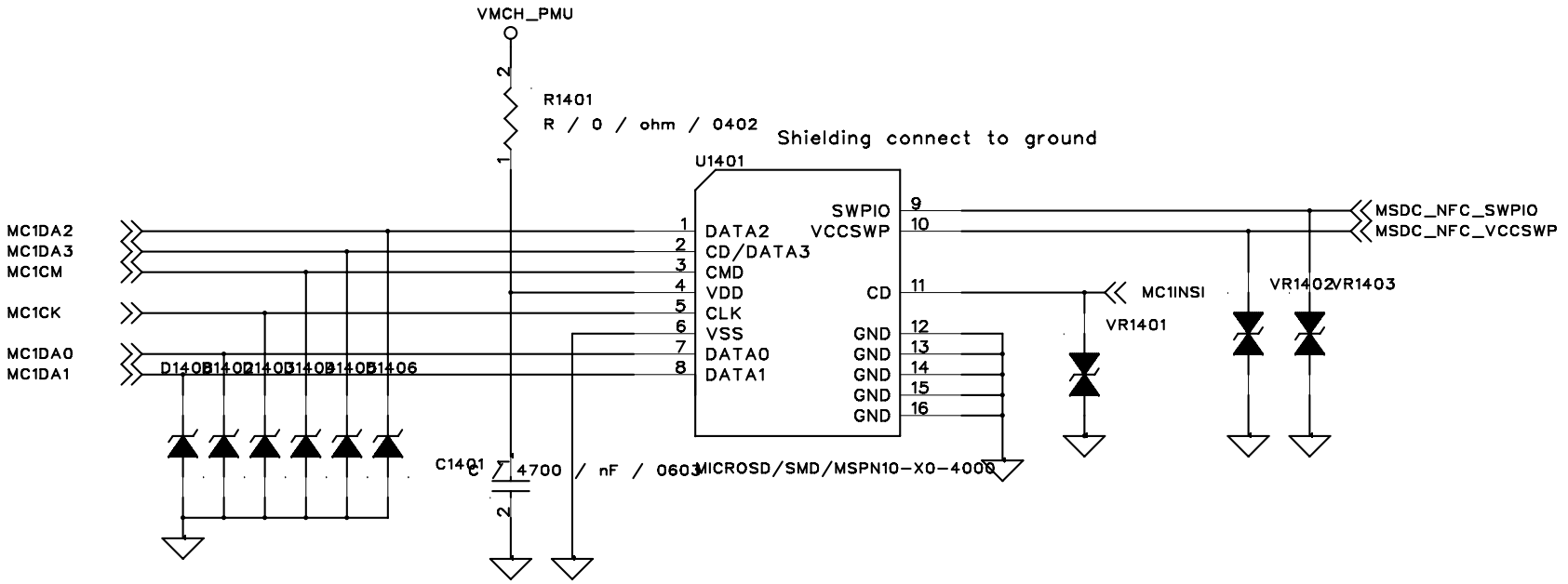
SD CARD



Title	14 Memory CARD	
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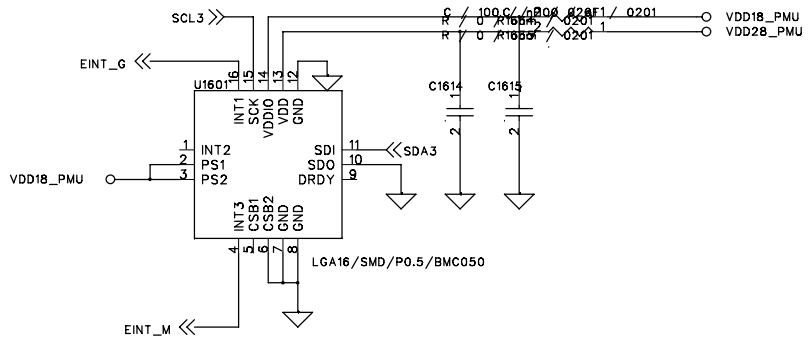
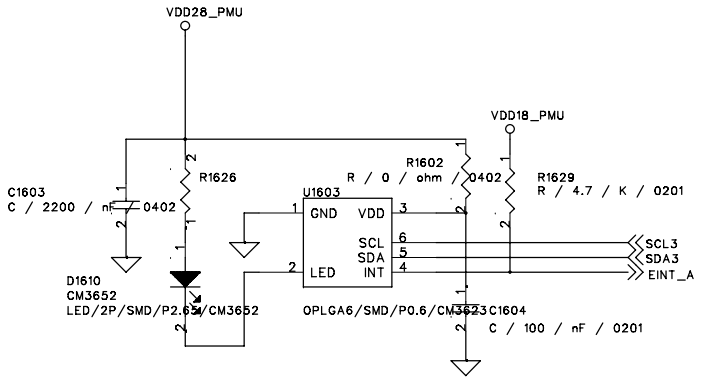
G+M-Sensor

G Sensor I2C address : 0x18
M Sensor I2C address : 0X10



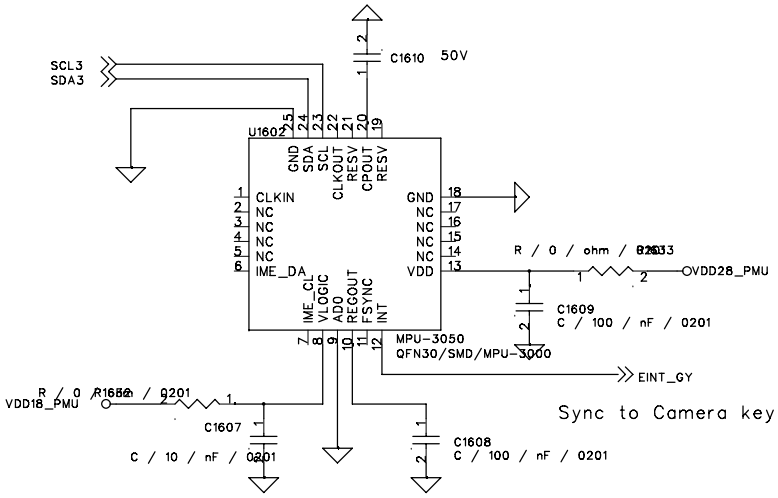
ALS & PS Sensor

ALS I2C address: 0X90 to 0X92
PS I2C address: 0XF0 to 0XF2



Gyro Sensor

I2C Address: 0x68 (Write:0xD0, Read:0xD1)



Title: 16 Sensors, OFN (Key)

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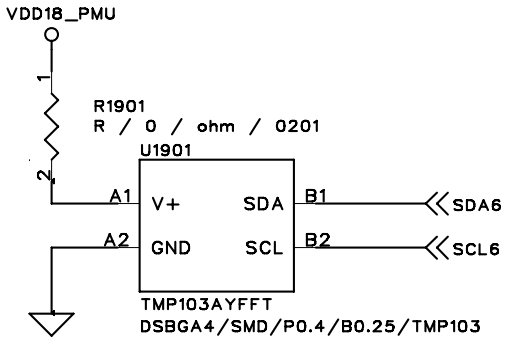
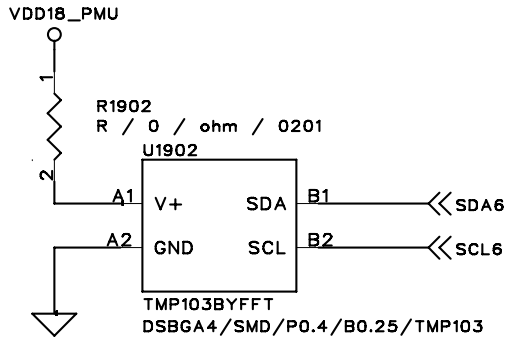
Thermal Sensor A



Thermal Sensor B



Title: 19 Thermal Sensor		
Size: A	Document Number: MT6589 PHONE	Rev: V1.0
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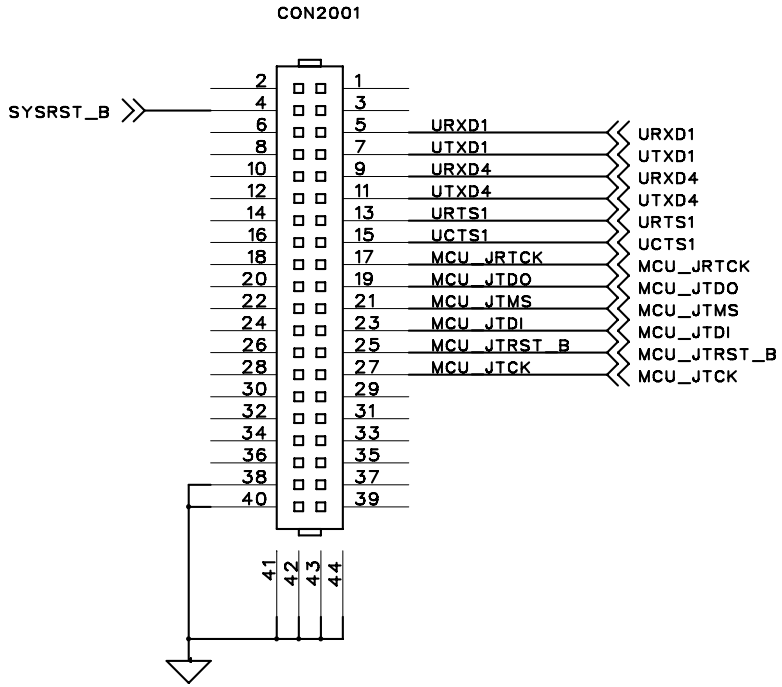

Title: 20 Debug		
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Title	98 Block Diagram		
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Date	Category	Item	SW Modification
2012.12.08 (V0.02)	General	Clone from K89 MT6589_MT6167_MT6168_MT6628_MT6320_EMMC_LPDDR2_WG+TG_20121207-1.DSN Clone from PCB WS2130-1207	

Title	Change Notice	
Size: C	Document Number	Rev: ?
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