Service Manual Level 3
Revision 01

Motorola V.series™ 120c

CDMA 800/1900/AMPS 800

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Contents

V.120c

CDMA DUAL BAND
TRI MODE PHONE

General:

Tarpon V. 120C Product Description

V.120C also known as Tarpon is based on CDMA platform 2000 reference architecture. This is a Dual Band Tri Mode phone- 1900Mhz CDMA /800 Mhz CDMA/ 800Mhz AMPS.

Innovative contoured design combine style and comfort in a small, sleek phone available in two colors,

Arctic silver and Navy Blue which can be personalized through interchangeable phone Wrap which are available in different colors and materials.

Large 96 X 64 Graphic LCD Display offering 4 lines of text, 1 line of icons and 1 line of prompts, improved usability with the new synergy user interface.

WAP 1.1 enabled micro browser, voice recognition driven dialing and short cuts, 32 alert tones, vibraCall discreet alert, Mobile originated and Mobile terminated SMS messaging, Fixed stub antenna.

A complete line of accessories, including FM stereo, Phone wrap covers, travel charger, headsets, vehicle power adapter, swivel belt clip and data connectivity kit.

19 keys on the keypad for synergy support. Volume keys and smart key on the sides. Integrated headset jack on the top above which is the power button and service indicator LED.

Accessory connector: 17 pin CE bus connector,

access to USB, RS232, power, ground, analog and digital audio, FM stereo headset.

Batteries: Lithium ion (600 mAh -6mm and 1100 mAh - 8mm)

V.120c LOGIC CIRCUIT

The main chip sets of Platform 2000 reference architecture products consists of WALLY and CCAP IC. The memory chips are the FLASH and the RAM.The WALLY includes the functionality of CPU + DSP + CSP + CIA. The WALLY is M-Core product (Motorola Proprietary) 32 bits. The CCAP IC works in Buck mode and provides the power management function of the phone. It also does the audio amplification and routing. It controls the 32Khz crystal, it interfaces with WALLY on 8 bit Parallel Bus. The communication to the accessories through the CSS bus connector is done through the CCAP IC. The audio through the external connector is digital. All audio interface is through CCAP IC- Alert, Phone Speaker, headset speaker & Microphone, External Speaker & Microphone, and Phone Microphone

The Wally IC integrates the functionality of Casper IC (which contains the MCU,

RIB, the CSP and the DSP) and CIA

Key features of the WALLY IC:

- M-Core integer processor, 32 bit RISC architecture

- 56600 NDE-UL DSP Core running at up to 70 Mhz @ 1.8V

- MCU-DSP interface

- CDMA signal processor (CSP3) ASIC

- 16 bit external memory interface for the MCU

- 8 bit parallel interface for CCAP

- 32-Input Interrupt Controller for the MCU

-Internal MCU ROM and RAM

- Special modules for CDMA mode

(all are MCU peripherals):

- Dual 9.8304 M samples/sec 4-bit ADCs

(RX I/Q with Receive AGC)

- Dual 4.9152 M samples/sec 9-bit DACs

- 13-bit linear CODEC

- 1-8bit, 2-10bit, 1-12bit measurement DAC

- 8-bit measurement ADC with 6 multiplexed inputs

10-bit AOC-loop control ADC and DAC (DSP peripheral)

A UART with auto baud detection

Universal serial bus (USB) interface module

Serial Audio Port interface

Key features of the CCAP IC:

CCAP IC uses Buck converter mode with no 5V supply

- 8 bit parallel interface from Wally

- Buck and Boost converters

- 8-Linear voltage regulators

- 2-Hi end linear regulators w/ common reference (PA Drain regulators)

- External B+ clamp regulator

- 3 Microphone Amplifiers

- Differential audio interfaces to and from Wally

- Audio Amps, Multiplexers and Speaker & Alert Drivers

- Headset and Send/End key detection

- Battery charger

- 6 input 8 bit ADC

- Real time clock (RTC) with coin cell backup supply and coin cell charger

- Timer circuits

- CE bus interface

- Vibrator and Backlight regulator inside the CCAP IC

The external memory consists of 32 Mega bit 1.8V FLASH and 4 Mega bit 1.8V SRAM

The butt plug is a 17 pin CE bus connector , which supports the USB and RS232 Serial communications. CE bus runs at 1.8V.

V.120c Supports a complete line of accessories including FM stereo. FM Radio headset (SYN8609) plugs into the CE bus connector.

V.120c will not support the 3WB or PST mode of communications.

Keypad connector is a 14 pin data no mating

connector-keypad, compression type

32 Khz crystal controlled by CCAP IC for RTC and slotted mode operation.

The charging circuit consists of Fast charger which is similar to StarTac , V.120c phones will also support Mid Rate charger

The flex connector interfaces the main board with the Display, Speaker and the RTC Battery in the flip.

The accessory antenna port is present on the back side of the phone near the antenna.

All the logic parts and IC's are placed on one side and all RF parts and IC's are placed on another side of the PCB

V.120c RF CIRCUIT

The RF circuit is somewhat similar to Dual band Caliber/Shark product, the V.120c phone contains FE IC (the front end IC)

The receiver contains two complete receiver paths : 800 Mhz path that is used by 800 Mhz analog and 800 Mhz CDMA signals, and a PCS band(1900 Mhz) path for PCS signal. The two paths have different RF, LO and IF frequencies.

The switching of the antenna and accessory antenna port is mechanical, normally close circuit with antenna connector, but when accessory RF cable is inserted in the accessory port the switch opens the circuit with antenna and closes the circuit with the accessory port.

For Frequencies and channel numbers look at the table in this manual

The FE IC contains the LNA's , interstage filtering and Mixers, the switching and gain of the LNA's is controlled by the control signals

ZIF/SYN IC extracts the broadband signal from the IF , demodulate the analog signal and sends it to the audio logic side for further processing.

ZIF/SYN IC controls the Main VCO ,the second LO and the TX offset VCO (in analog mode).

V.120c uses the single VCO module for main

LO (one for the 800 mhz band and another for PCS band) The output is split into RX_LO and TX_LO

for both the bands.

V.120c uses the ME3 IC - the mixer exciter IC

The ME3 IC allows to control the RF output power. The ME3 IC requires two LO's, one for PCS, and the other for the 800 Mhz band.

The IF pins (input to the ME3 IC) are the same for any band. The control signal (TX Att) at the AGC pins control the gain of the ME3 IC.

There is an external interstage RF filter between the mixer and exciter.

Balun is a component external to ME3 IC and is not a discreet part as in V.60c

From the mixer the outputs take two different paths one for TX PCS band and another for TX 800 Mhz band.

ME3 IC has 50 dBM attenuator control (input IF level= -23dBM , max output TX level= 25dBM)

At the output of ME3 IC band filter are used , in the PCS path two split band filters are used. V.120c uses celeritek PA HBT and not MOSFET as in V.60c.

Two stage PA in 800 Mhz band and three stage PA in PCS band .

In V.120c PA adjustable bias only Drain therefore the output power can be controlled by PA_B+ DAC besides ME3 IC (through Tx_Attn). PA gate Bias is not adjustable but fixed and regulated at 2.95v.

Theory of Operation

I. AMPS

RECEIVER

RECEIVER CIRCUITRY

The phone receives the RF signal from the Antenna or the RF test port, the received RF signal is routed through the Diplexer - FL11 to mono block duplex SAW filter – FL12. The RF signal is then routed to the Front End IC(FE IC) – U100 , which contains LNA which provides a 10-12 dB gain to the received RF signal, and U100 provides inter stage filtering and it contains Mixer which down converts the frequency of the signal to IF which is 109.65Mhz.

The local oscillator signal which is input to the FEIC is 978 – 1004 Mhz. The VCO module U680 is controlled by the ZIF/SYN IC – U932.

The mixer output IF signal 109.65Mhz is routed through IF filter- FL201 into the ZIF/SYN IC U932 for mixing with the second LO ,filtering and demodulation.

RECEIVER AUDIO

DISC - signal an AMPS discriminator audio which is the output of FM demodulator in U932 is produced by mixing the IF signal with the second LO (which is controlled by U932) and then filtered. The audio on DISC line goes to WALLY IC-U1100 to be digitized. All receive audio filtering and gain control is performed in the digital domain within the WALLY which contains DSP, the processed RX audio is converted back to analog and routed to CCAP IC – U2000 on signals AUDIO_P and AUDIO_M.

The CCAP - U2000 amplifies and route the audio signal(receive audio) to the speaker (phone speaker, boom speaker or external speaker). The alert tone originates in WALLY IC and follows the same path as receive audio except from CCAP it is routed to the alert.

TRANSMITTER

TRANSMITTER AUDIO

Audio from the Microphone (internal, boom or external) is routed through and amplified by CCAP – U2000 and then travel to the WALLY IC – U1100 on MIC1 and MICREF lines which is digitized by the CODEC inside the WALLY and the DSP present in WALLY performs the compression, pre-emphasis, limiting and band pass filtering function in the digital domain. All Amps signaling (SAT, ST, DTMF) is also generated in the digital domain by the DSP inside the WALLY. The digitized amps TX audio signal is converted back to analog inside the WALLY and

sent on FM line to the 154.8Mhz Tx offset VCO to modulate the transmitter frequency.

TRANSMITTER CIRCUITRY

The FM signal from WALLY modulates the Tx offset VCO signal which is external but controlled by ZIF/SYN – U932. The Tx IF modulated signal 154.8Mhz is input to the ME3 IC – U600 where it get mixed with the 979 – 1004 Mhz local oscillator signal. The Tx signal then passes through the band pass filter FL605 into the Power Amplifier (PA) – U430 where it is amplified and the output passes through the isolator U550 and then through TX band pass mono block duplex SAW filter FL12 and through diplexer FL11 to the antenna or RF test port.

II. CDMA CELLULAR (800Mhz) MODE OF OPERATION

RECEIVER

RECEIVER CIRCUITRY

The phone receives the RF signal from the Antenna or the RF test port, the received RF signal is routed through the Diplexer - FL11 to mono block duplex filter – FL12. The RF signal is then routed to the Front End IC(FE IC) – U100 , which contains LNA which provides three stage gain to the received RF signal based on its strength, and U100 provides inter stage filtering and it contains Mixer which down converts the frequency of the signal to IF which is 109.8Mhz.

The FE IC is controlled by WALLY through the following signals: FEIC_G1, FEIC_G2, and MODE.

The local oscillator signal which is input to the FEIC is 978 – 1004 Mhz. The VCO module U680 is controlled by the ZIF/SYN IC – U932.

The mixer output IF signal 109.8Mhz is routed through IF filter- FL200 into the ZIF/SYN IC U932 for mixing with the second LO ,filtering and demodulation.

RECEIVER AUDIO

Four outputs from U932 – RXIP, RXIM, RXQP, RXQM carries the base band signal of the receive digital call to the WALLY, the received QPSK data is gain controlled and converted to digital, the 1.2288 Mb/sec Rx data stream is then decoded by the CSP inside the WALLY to produce a signal containing only the desired data. The digital speech data is further decoded by the CELP vocoder a part of DSP within WALLY and then converted back into analog receive audio and routed to CCAP IC – U2000 on signals AUDIO_P and AUDIO_M.

The CCAP - U2000 amplifies and route the audio signal (receive audio) to the speaker (phone speaker, boom speaker or external speaker). The alert tone originates in WALLY IC and follows the same path as receive audio except from CCAP it is routed to the alert.

TRANSMITTER

TRANSMITTER AUDIO

Audio from the Microphone (internal, boom or external) is routed through and amplified by CCAP – U2000 and then travel to the WALLY IC – U1100 on MIC1 and MICREF lines which is digitized by the CODEC inside the WALLY and the DSP present in WALLY processes by CELP variable rate vocoder and then processed by the modem (CSP) within the WALLY which produces the 1.2288Mb/sec CDMA data stream. This stream is then converted to analog signals and send to ZIFSYN IC on four lines TXIP, TXIM, TXQP, TXQM. This modulates on the TX IF (QPSK modulation) 154.8Mhz TX offset VCO.

from WALLY modulates the Tx offset VCO signal which is external but controlled by ZIF/SYN – U932. The Tx IF modulated signal 154.8Mhz is input to the ME3 IC – U600 where it get mixed with the 979 – 1004 Mhz local oscillator signal. The Tx signal then passes through the band pass filter FL605 into the Power Amplifier (PA) – U430 where it is amplified and the output passes through TX band pass mono block duplex filter FL12 and through diplexer FL11 to the antenna or RF test port.

III. CDMA PCS (1900Mhz) MODE OF OPERATION

RECEIVER

RECEIVER CIRCUITRY

The phone receives the RF signal from the Antenna or the RF test port, the received RF signal is routed through the Diplexer - FL11 to mono block duplex ceramic filter – FL10. The RF signal is then routed to the Front End IC(FE IC) – U100 , which contains LNA which provides three stage gain to the received RF signal based on its strength, and U100 provides inter stage filtering and it contains Mixer which down converts the frequency of the signal to IF which is 109.8Mhz.

The FE IC is controlled by WALLY through the following signals: FEIC_G1, FEIC_G2, and MODE.

The local oscillator signal RX_LO_PCS is 2039-2100 Mhz. The VCO module U680 is controlled by the ZIF/SYN IC – U932.

The mixer output IF signal 109.8Mhz is routed through IF filter- FL200 into the ZIF/SYN IC U932 for mixing with the second LO ,filtering and demodulation.

RECEIVER AUDIO

Four outputs from U932 – RXIP, RXIM, RXQP, RXQM carries the base band signal of the receive digital call to the WALLY, the received QPSK data is gain controlled and converted to digital, the 1.2288 Mb/sec Rx data stream is then decoded by the CSP inside the WALLY to produce a signal containing only the desired data. The digital speech data is further decoded by the CELP vocoder a part of DSP within WALLY and then converted back into analog receive audio and routed to CCAP IC – U2000 on signals AUDIO_P and AUDIO_M.

The CCAP - U2000 amplifies and route the audio signal (receive audio) to the speaker (phone speaker, boom speaker or external speaker). The alert tone originates in WALLY IC and follows the same path as receive audio except from CCAP it is routed to the alert.

TRANSMITTER

TRANSMITTER AUDIO

Audio from the Microphone (internal, boom or external) is routed through and amplified by CCAP – U2000 and then travel to the WALLY IC – U1100 on MIC1 and MICREF lines which is digitized by the CODEC inside the WALLY and the DSP present in WALLY processes by CELP variable rate vocoder and then processed by the modem (CSP) within the WALLY which produces the 1.2288Mb/sec CDMA data stream. This stream is then converted to analog signals and send to ZIFSYN IC on four lines TXIP, TXIM, TXQP, TXQM. This modulates on the TX IF (QPSK modulation) 189.8Mhz TX offset VCO.

TRANSMITTER CIRCUITRY

The four signals TXIP, TXIM, TXQP, TXQM

TRANSMITTER CIRCUITRY

The four signals TXIP, TXIM, TXQP, TXQM from WALLY modulates the Tx offset VCO signal which is external but controlled by ZIF/SYN – U932. The Tx IF modulated signal 189.8Mhz is input to the ME3 IC – U600 where it get mixed with the 2039-2100 Mhz local oscillator signal. The Tx signal then passes through the filter FL601 into the Power Amplifier (PA) – U900 where it is amplified and the output passes through TX band pass mono block duplex filter FL10 and through diplexer FL11 to the antenna or RF test port.

FREQUENCY SYNTHESIZER CIRCUITRY

The phone contains three PLL frequency synthesizers controlled by U932.

1. The main VCO : there is only one VCO modules- which controls the tunable 979 – 1004Mhz main local oscillator – and is ON during Cellular or 800Mhz mode. and also controls the tunable 2039-2100Mhz main local oscillator, which is ON during PCS or 1900Mhz mode.

2. The Tx offset VCO: there are two modes and two frequency at which this oscillator which is internal to U932 works, but the tank circuit is external. There are two tank circuits one for Cellular mode (800 Mhz) which will set 309.6Mhz frequency for the oscillator to oscillate on. Another tank circuit for PCS mode (1900Mhz) which will set 379.6Mhz frequency for the oscillator to oscillate on. The Tx offset frequency is divided by 2 before being fed into the mixer for modulation.

3. The second LO: the second local oscillator also operates in two modes with two different frequencies: For AMPS mode the frequency is 219.3Mhz and for CDMA mode at cellular or 800Mhz band and PCS or 1900Mhz band the frequency is 219.8Mhz. The tank circuit is external to the U932. The frequency is divided by 2 before being fed into the mixer.

All the synthesizers obtain their reference frequency from the 16.8Mhz reference oscillator.

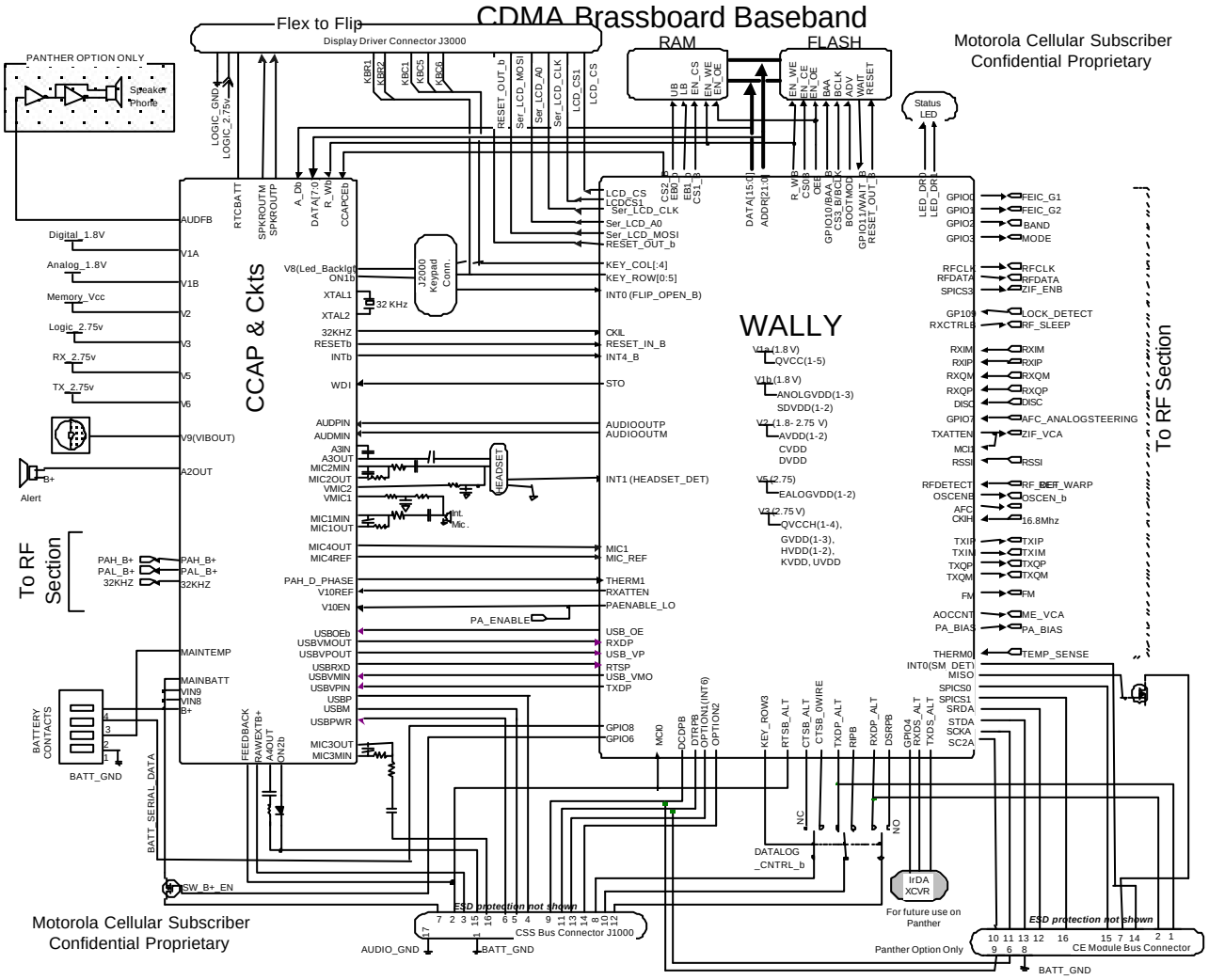
TRANSMIT POWER CONTROL CIRCUITRY

The transmit signal power (the output RF power) is controlled by the three control signals ZIF_VCA and ME_VCA from WALLY IC and PA_VCC from CCAP IC. The output power is controlled at three places, ZIFSYN – U932 which has a gain control of max 40dB and ME3 IC-U600 which has a total gain of max 36dB and PA has a gain of max 27-32dB.

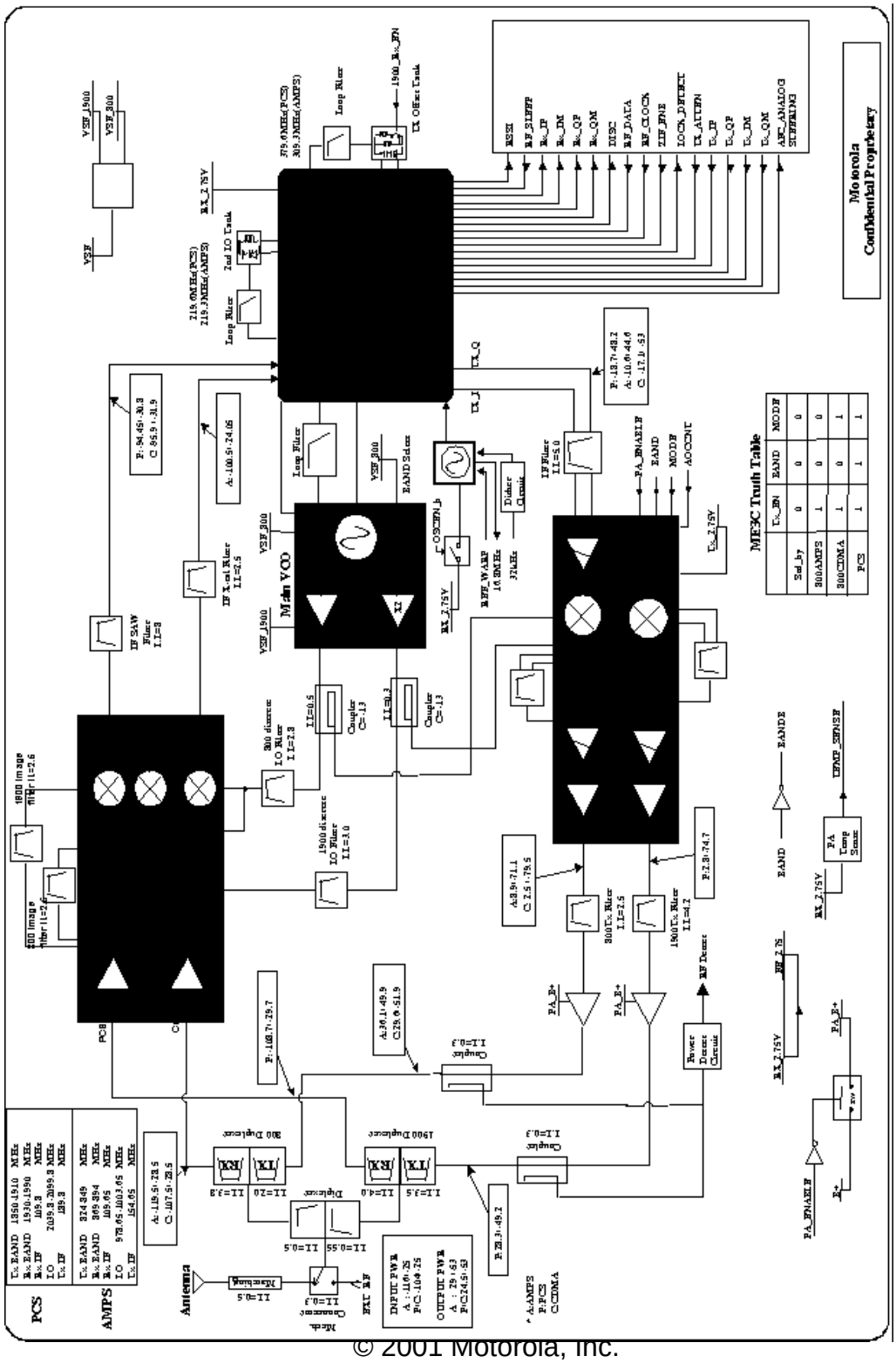
In Amps mode the power range is +8dBM to +28dBM. In CDMA mode the RF power range is from –50dBM to +23dBM.

In CDMA mode the power control operates in two mode: Open loop and Close loop. In open loop mode (at the beginning of registering – access probe) the power level is proportional to the received signal level, in close loop mode the power level is controlled by the CDMA cell based on the received signal strength at the cell site.

AUDIO LOGIC BLOCK DIAGRAM



RF SIDE BLOCK DIAGRAM



Disassembly

Introduction

Care must be taken during the disassembly and reassembly of the unit in order to avoid damaging or stressing the housing and internal components. Ensure that a properly grounded high impedance conductive wrist strap is used while

performing these procedures on electronic units.

Recommended Tools

The following tools are recommended for use during the disassembly and reassembly of the phone.

- Anti-Static Mat 6680387A95
- Ground Cord 6680334B36
- Wrist Band 4280385A59
_ Plastic Prying Tool SLN7223A
_ Rear Housing Removal Tool
_ Dental Pick
_ Tweezers
- T6 Torque Screw Driver

CAUTION

Many of the integrated circuit devices used in this equipment are vulnerable to damage from static charges. An anti-static wrist band, connected to an anti-static (conductive) work surface, must be worn during all phases of disassembly, repair, and reassembly.

Disassembly Procedure

Refer to the disassembly instructions and photo sequence on the following pages.

Assembly Procedure

Once the unit is disassembled and the repair

is carried out it then becomes obvious that to

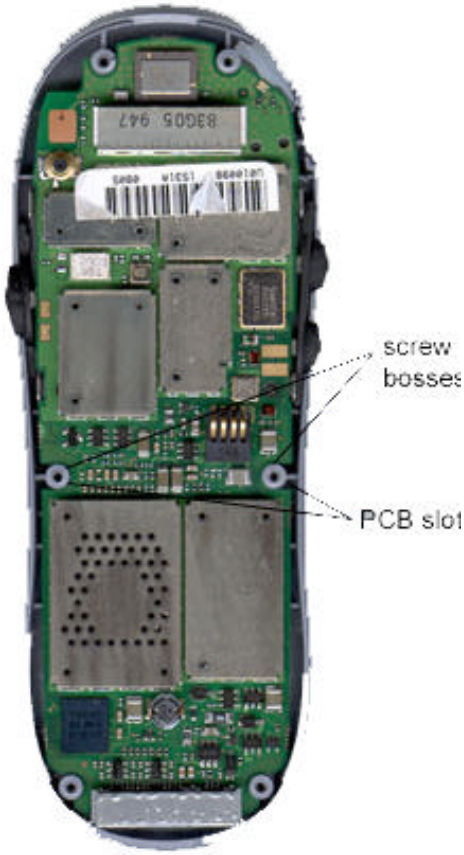
assemble the unit, the procedure is the reverse of that previously completed for disassembly.

Rear Housing Removal:

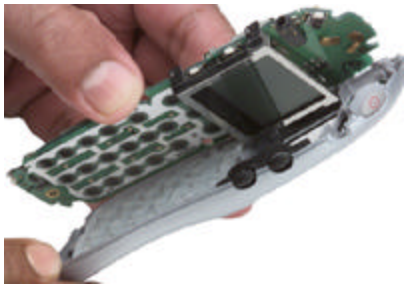
Using a generic screw driver unscrew all the 6 screws. Gently remove the Rear Housing as shown.

Board Removal:

The six screw bosses hold the board in place. Remove the board as shown.

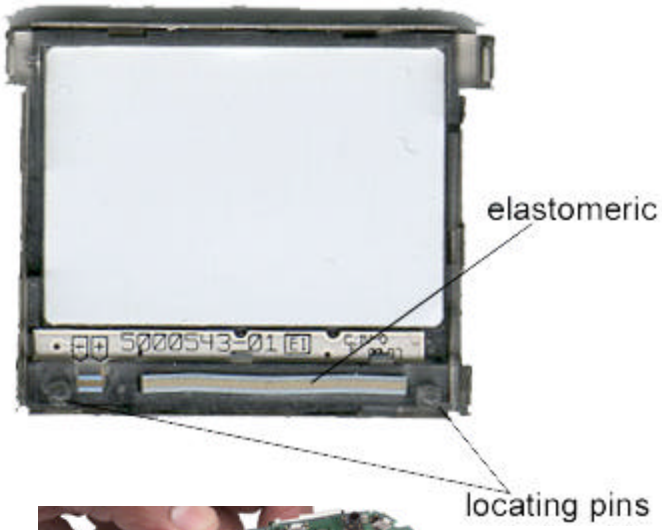


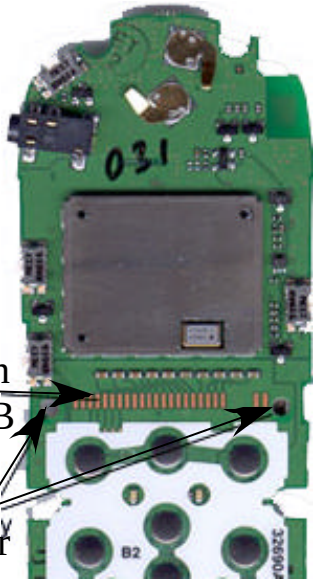
Board Removal



Display Removal:

The electrometric on the display makes contact with the power contacts on the PCB. There are two locating pins on the display are aligned and the four holding tabs are grabbing the board. Make sure you release the tabs and gently lift the display. Once you free the tabs on one side, the other side comes off easily.



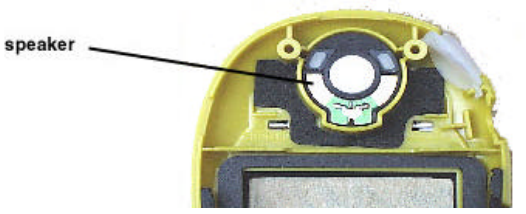


Keypad Removal:

Remove the keypad from the front housing as shown.

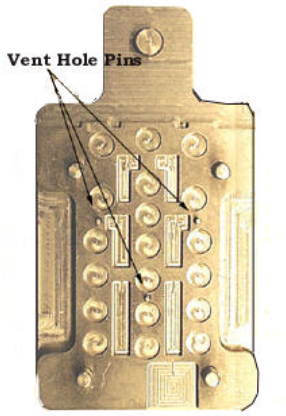
Speaker Removal:

There is a adhesive backing to the speaker, hence make sure you pry the speaker open by the help of a bezel stick.

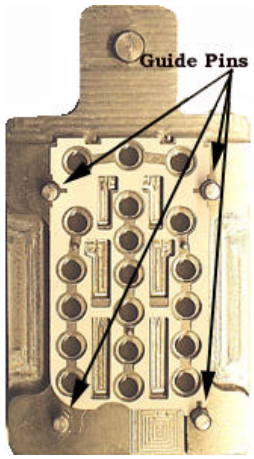


Acoustic Gasket, Power Button, VR Button< Volume Buttons and Display Gasket Button Removal:

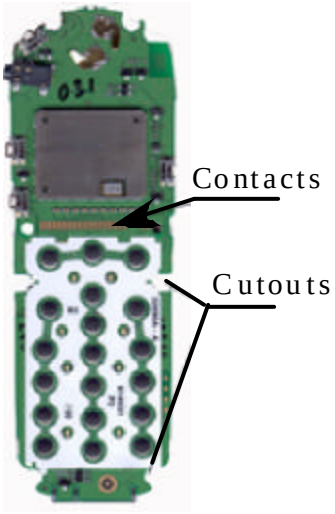
All of the above accessories are placed in their respective places and are easily removable.



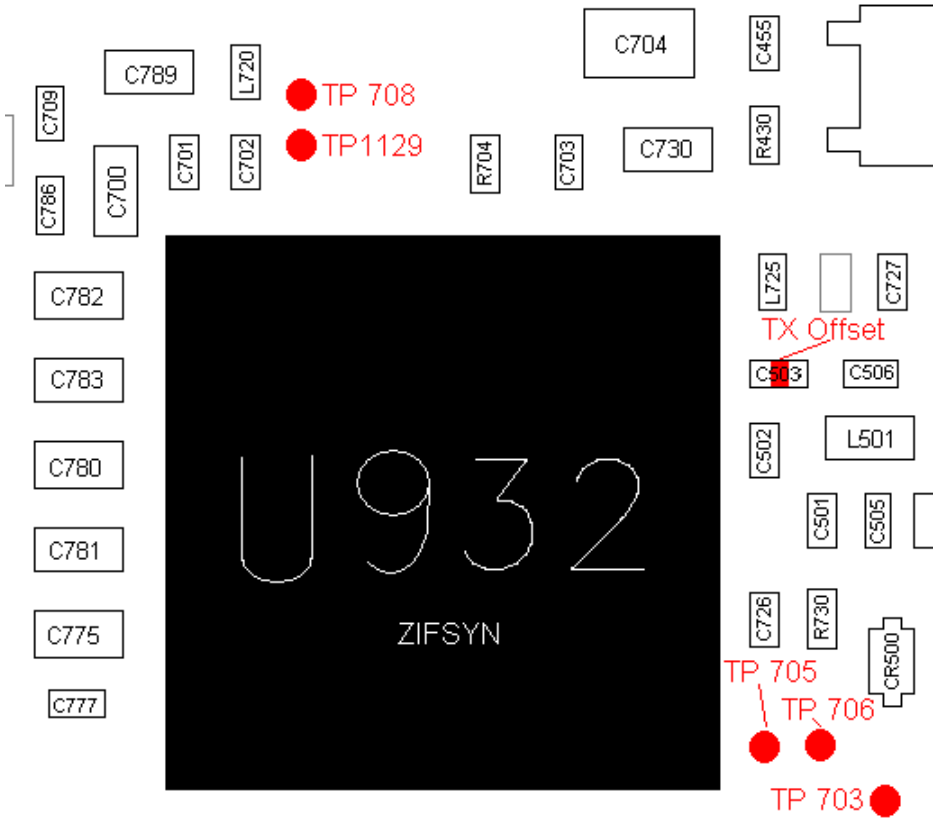
Mylar installing tool

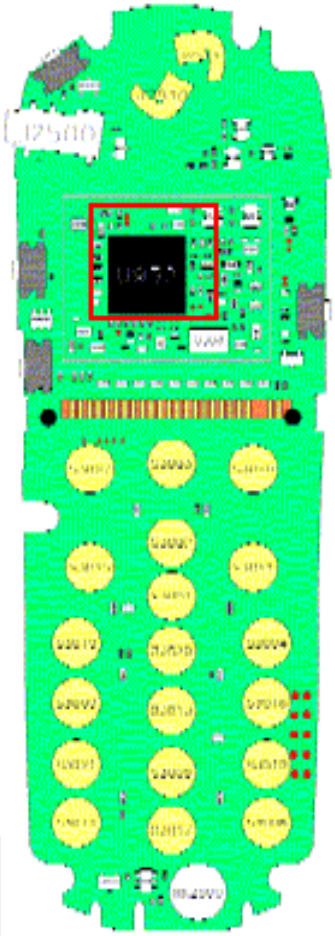


Mylar located in Between The Pins

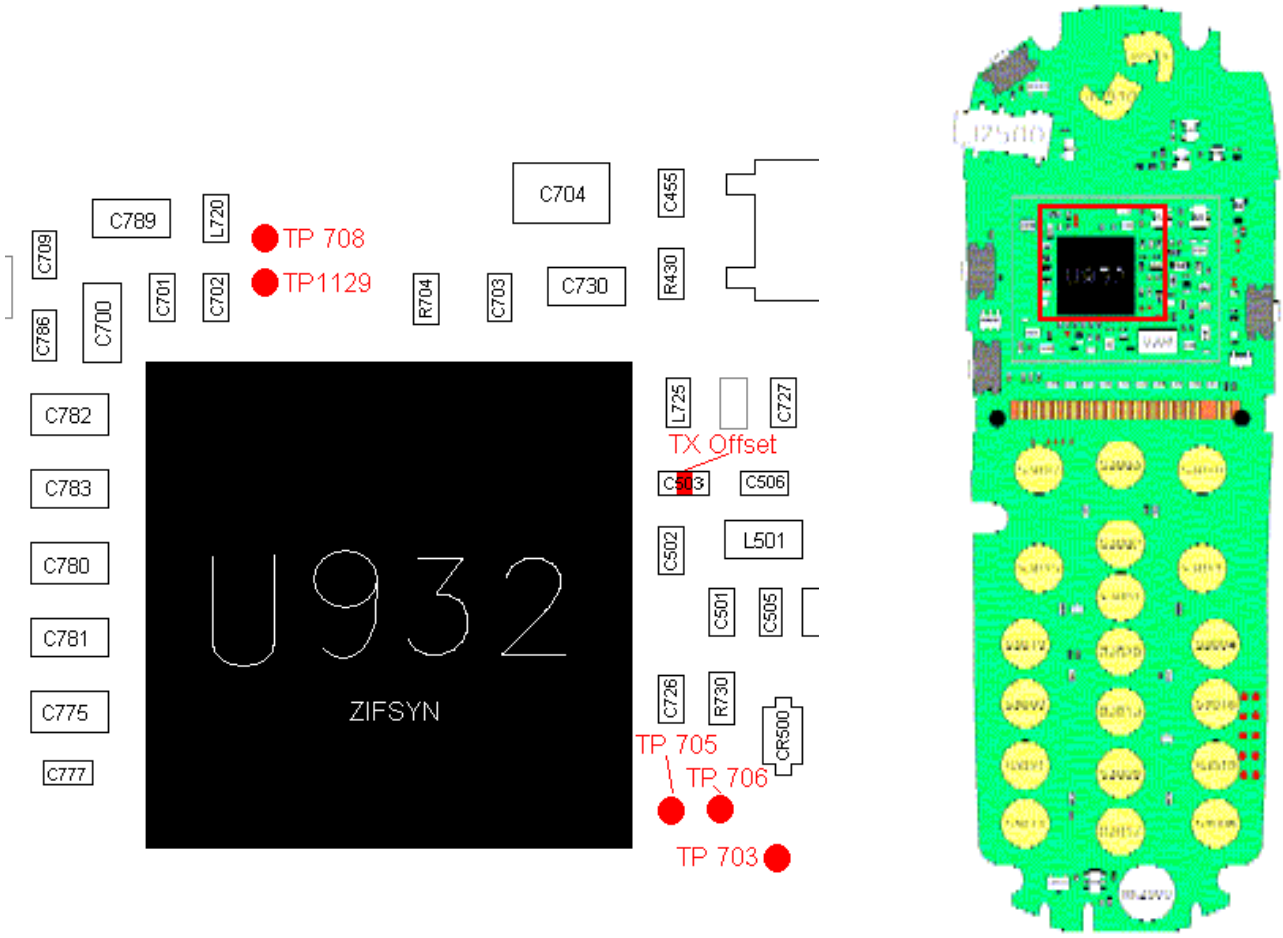


Mylar Place On The Board



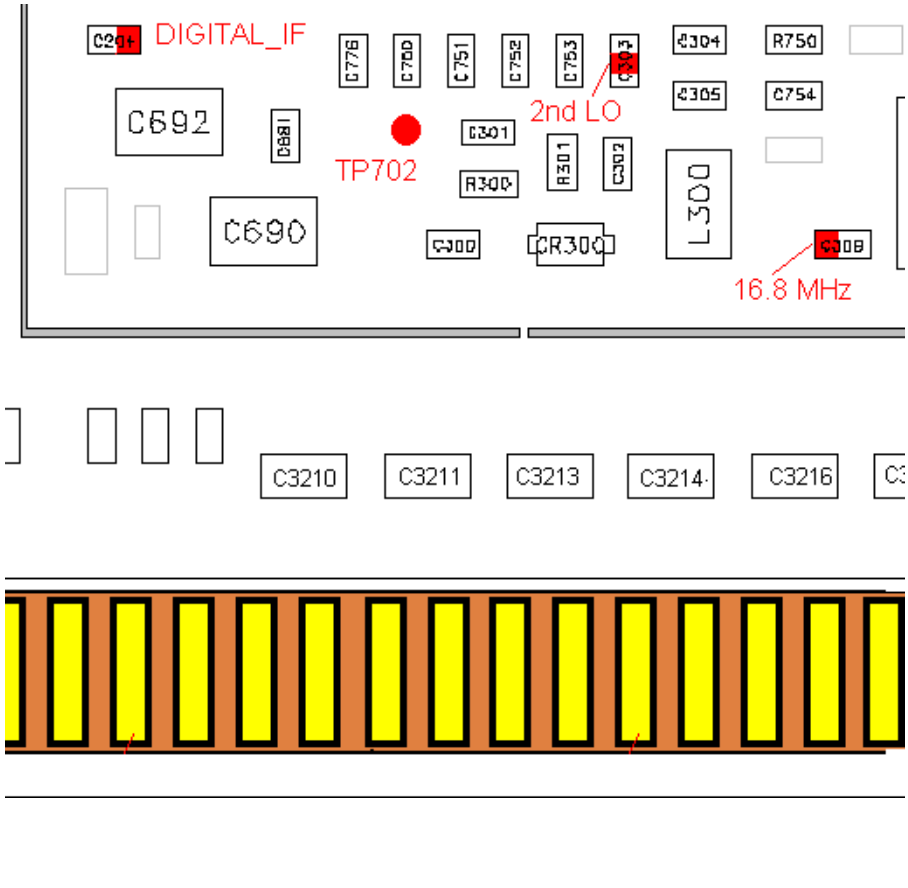


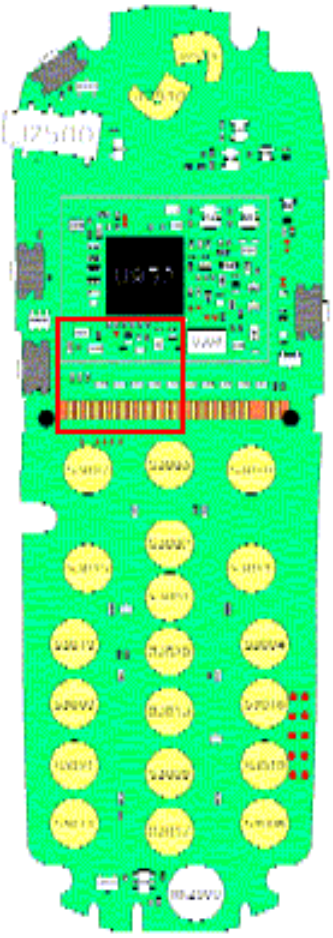
C503	Offset VCO, sniff to avoid loading, cell=309.6, PCS=379.6
TP703	TXIP
TP705	TXQM
TP706	TXQP
TP708	LOCKDETECT
TP1129	AFC_ANALOGSTEERING



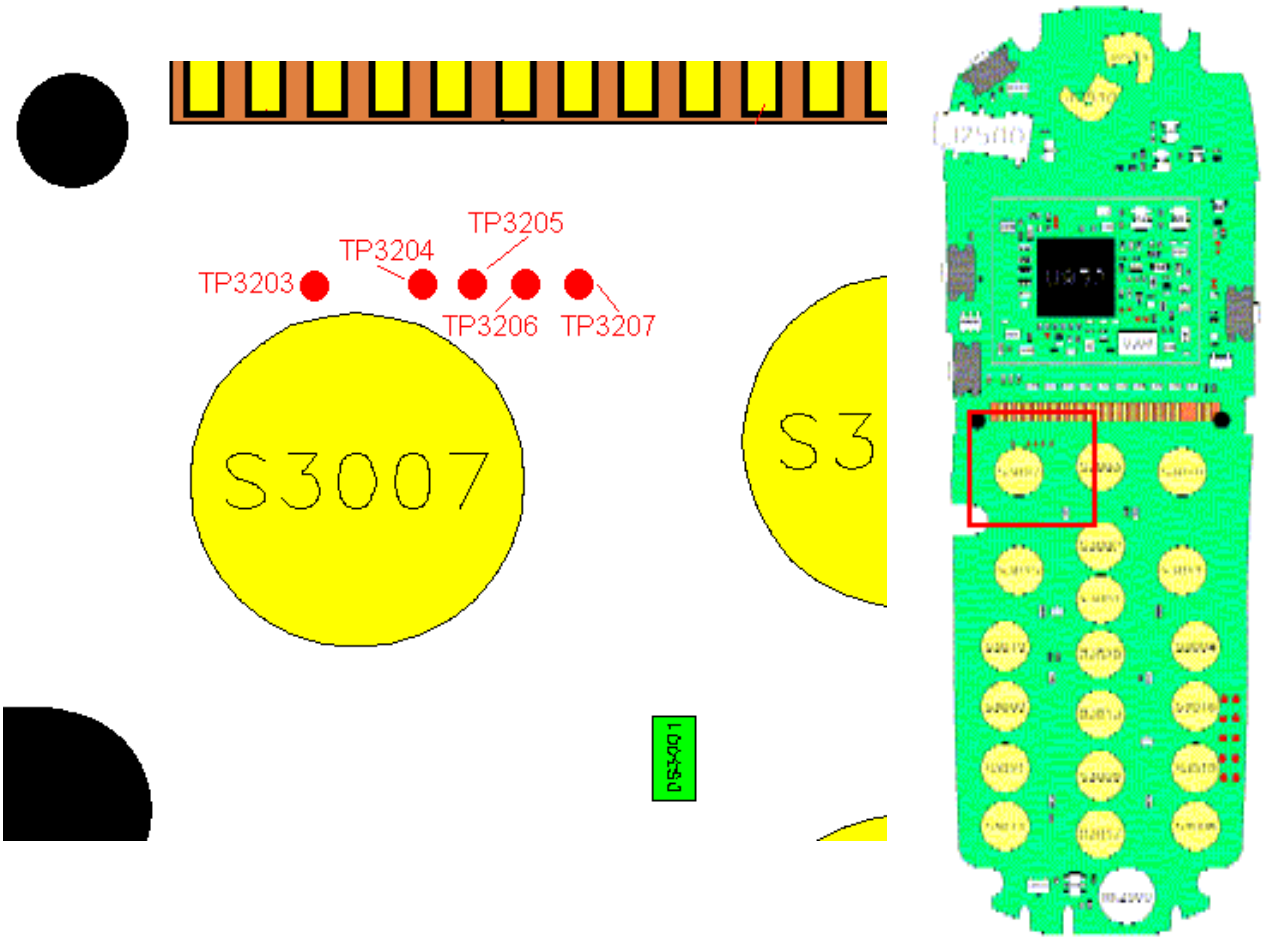
C503	Offset VCO, sniff to avoid loading, cell=309.6, PCS=379.6
TP703	TXIP
TP705	TXQM
TP706	TXQP
TP708	LOCKDETECT
TP1129	AFC_ANALOGSTEERING

Q100	BAND
R725	ZIF_VCA (analog signal)
TP701	RSSI receiver signal strength (analog signal)
TP704	TXIM
TP710	RF_CLOCK

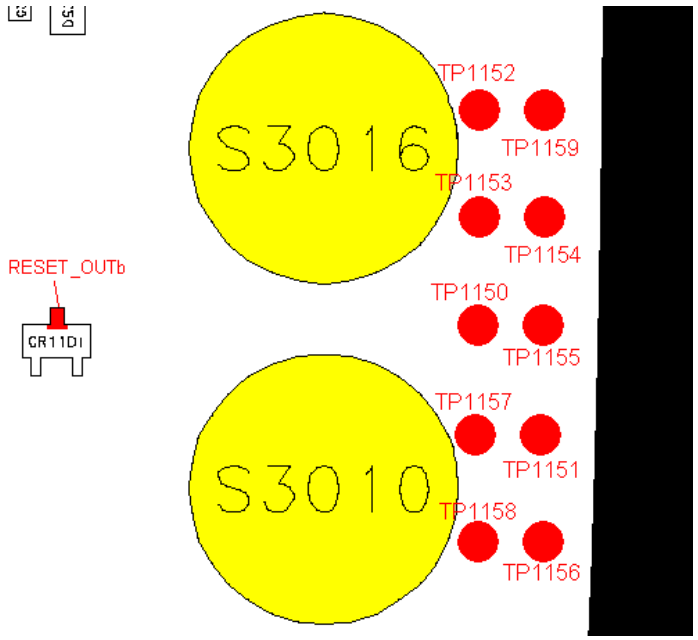


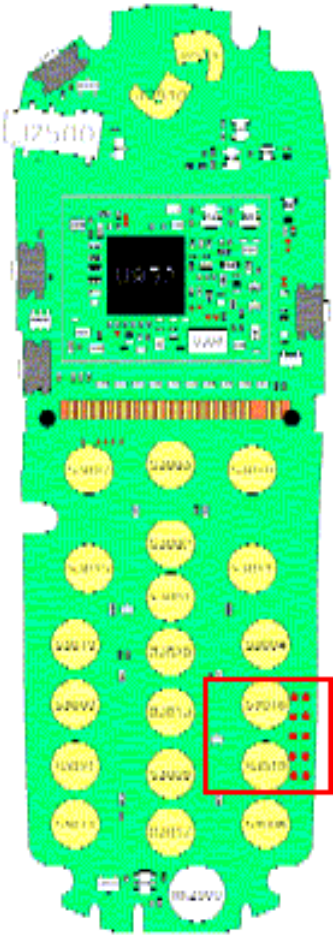


C204	RX IF to ZIFSYN, level is approx equal to input level
C303	2nd LO, 219 MHz
C308	16.8 MHz oscillator output
TP702	MTESTP

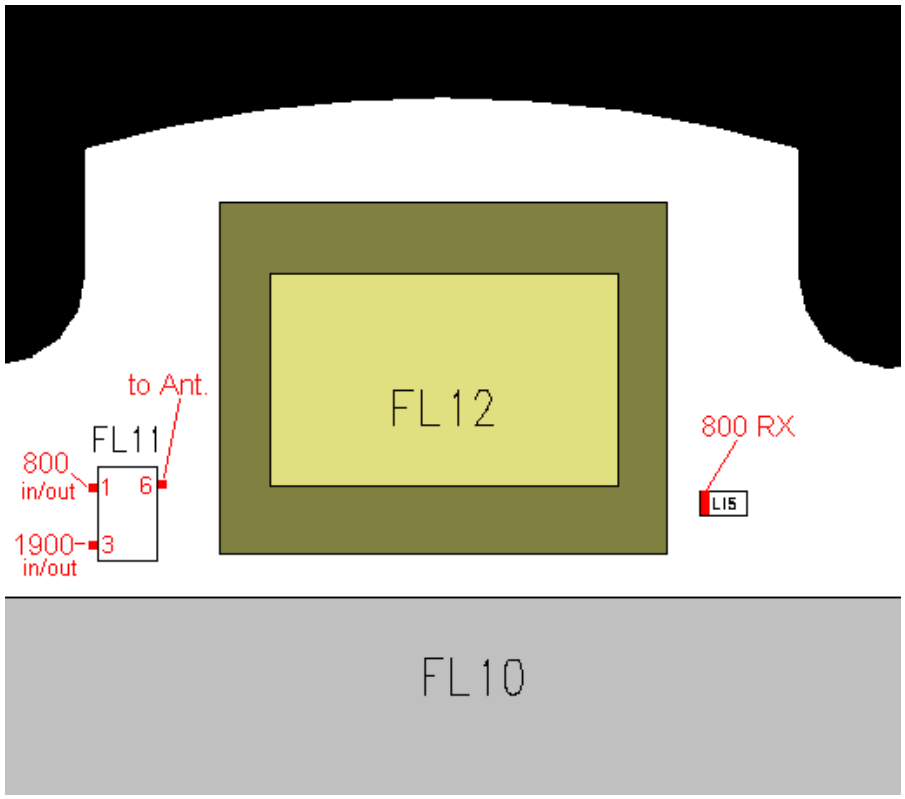


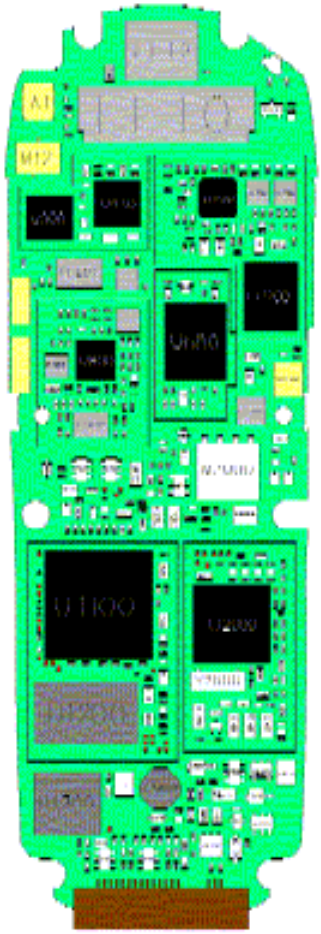
TP3203	LCD_CS
TP3204	RESET_OUTb
TP3205	LCD_A0
TP3206	LCD_CLK
TP3207	LCD_MOSI



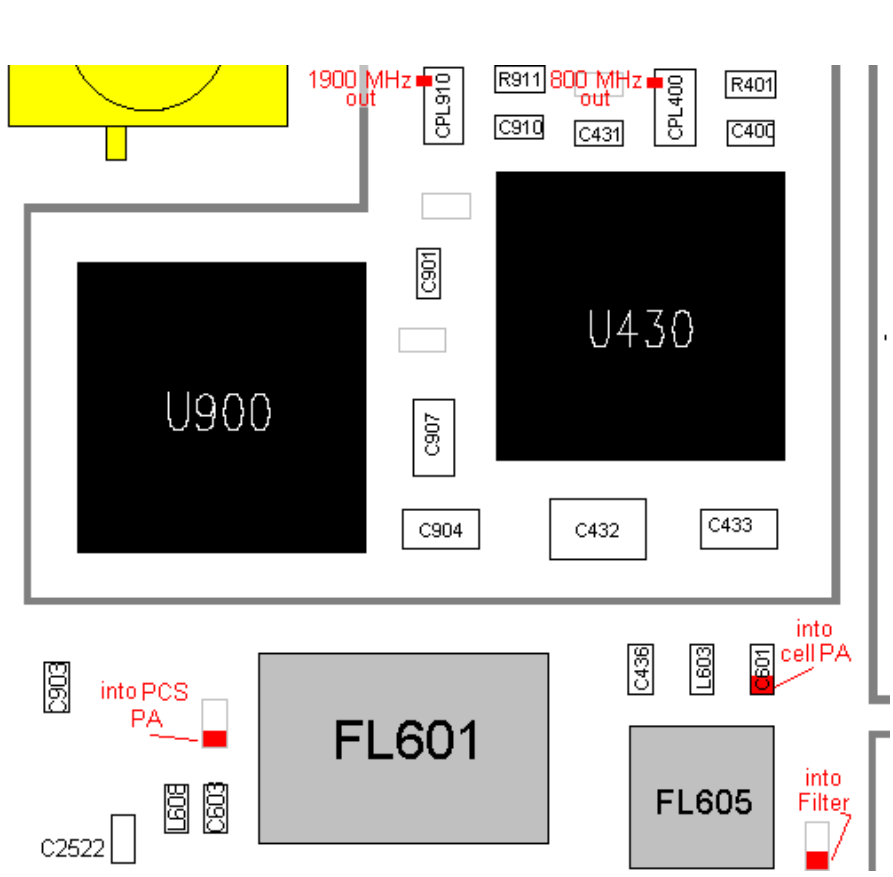


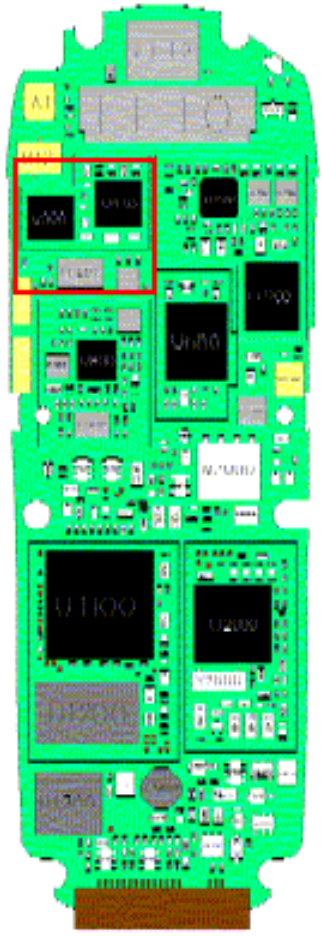
CR1101	RESET_OUTb
TP1150	JTAG interface
TP1151	JTAG interface
TP1152	JTAG interface
TP1153	JTAG interface
TP1154	JTAG interface
TP1155	JTAG interface
TP1156	JTAG interface
TP1157	JTAG interface
TP1158	JTAG interface
TP1159	JTAG interface



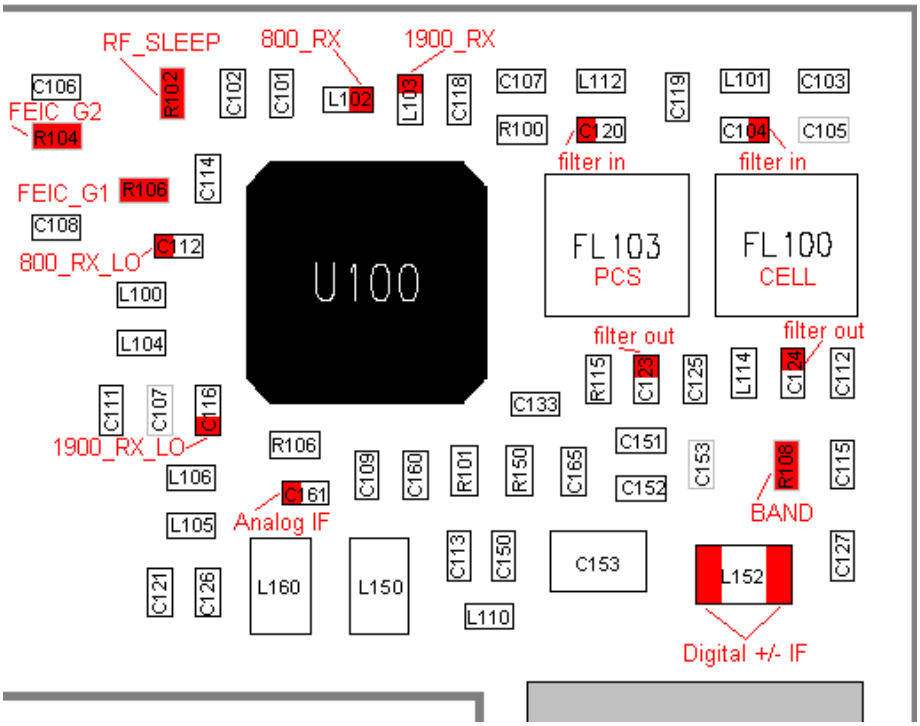


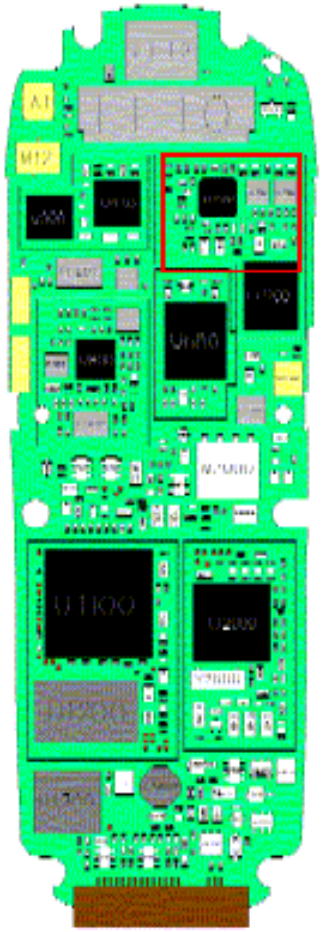
FL11 - 1
FL11 - 3
FL11 - 6
L15



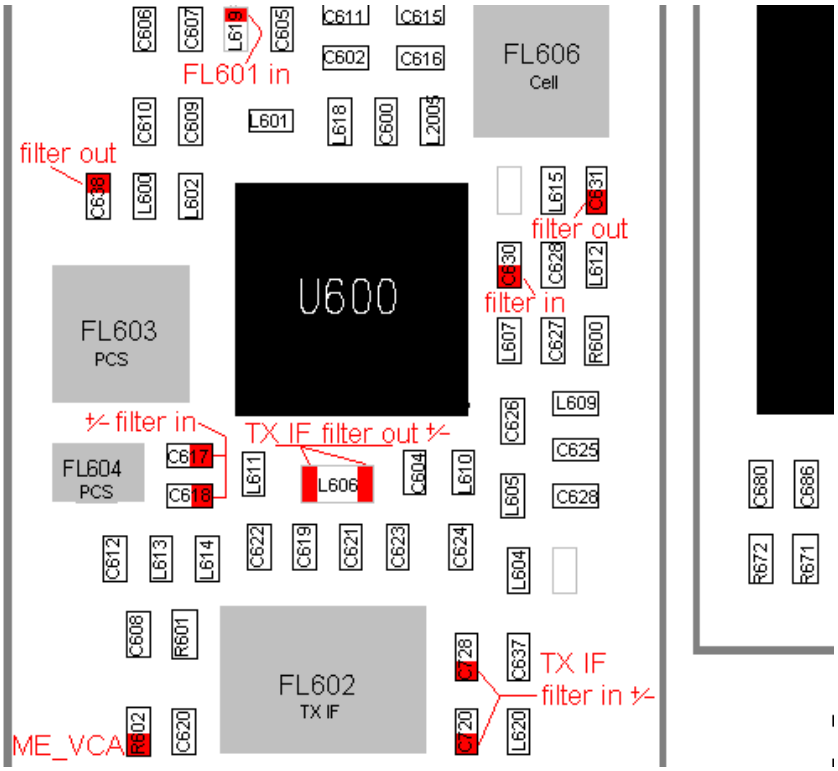


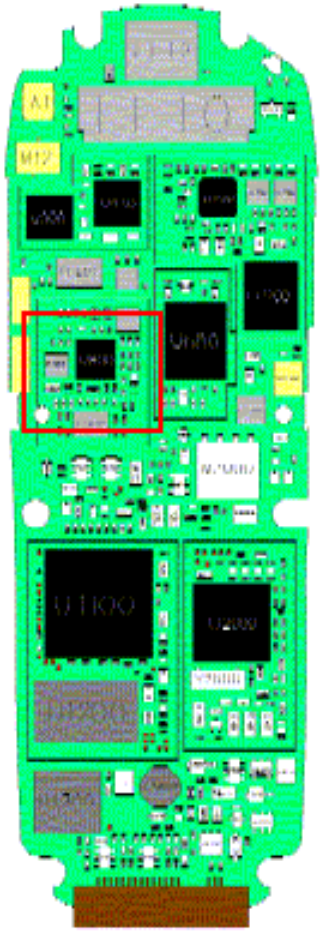
C601
C638 (DNP)
CPL400 - 3
CPL910 - 3
L616 (DNP)



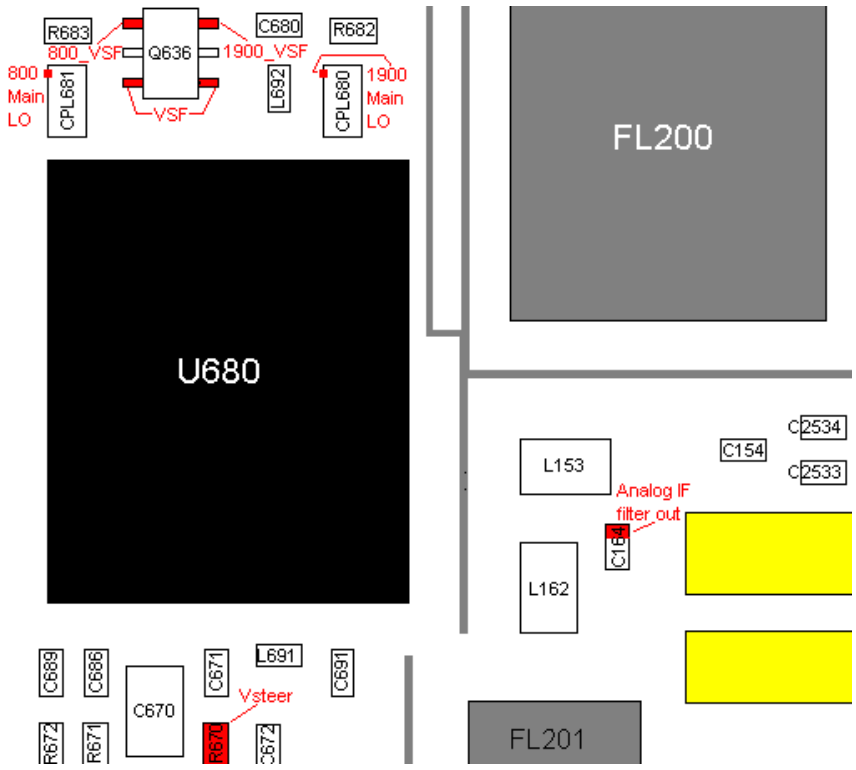


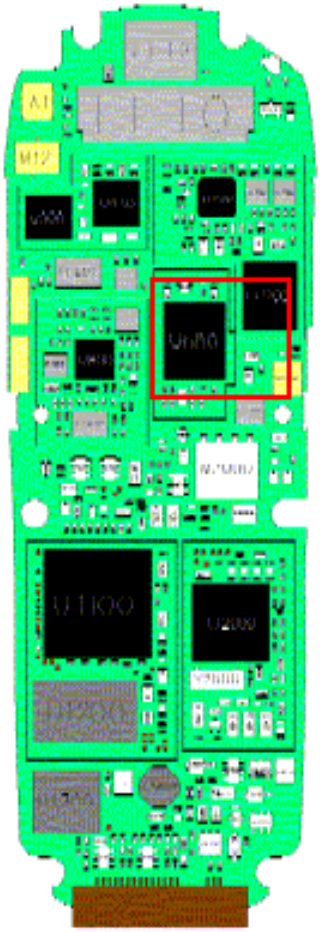
C104	CELL LNA out to filter FL100
C116	1900_RX_LO to FEIC
C112	
C120	
C123	
C124	
C161	
L102	
L103	
L152	
R102	
R104	
R106	
R108	



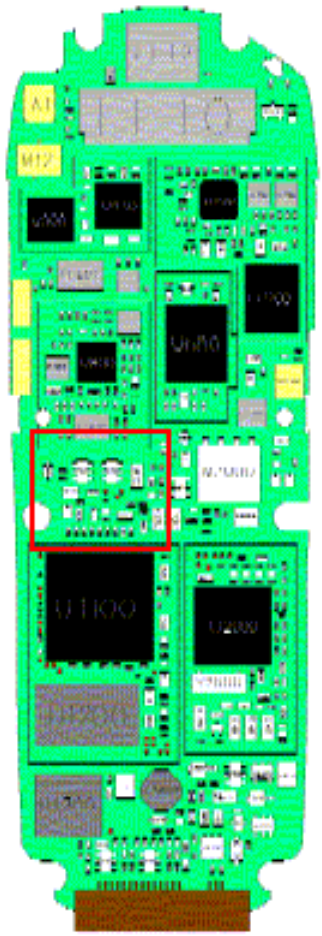


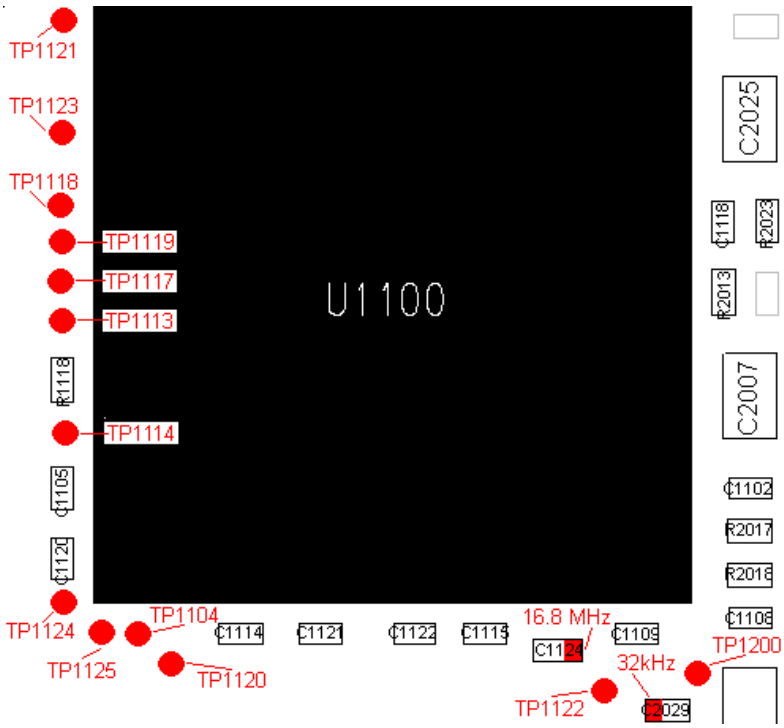
C617	ME3 PCS mixer output, filter (FL604) input
C618	ME3 PCS mixer output, filter (FL604) input
C630	ME3 CELL mixer output, filter (FL606) input
C631	filter (FL606) output, 3-5dB loss
C638	filter (FL603) output, 5-7dB loss (FL604 & FL603)
C720	TX IF filter (FL602) balanced input
C728	TX IF filter (FL602) balanced input
L606 (DNP)	TX IF filter output, 3-5dB loss
L619 (DNP)	PCS TX filter input
R602	ME_VCA (analog signal)

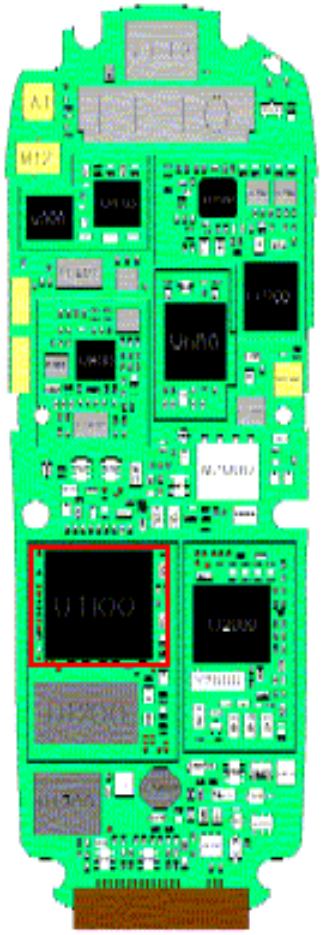




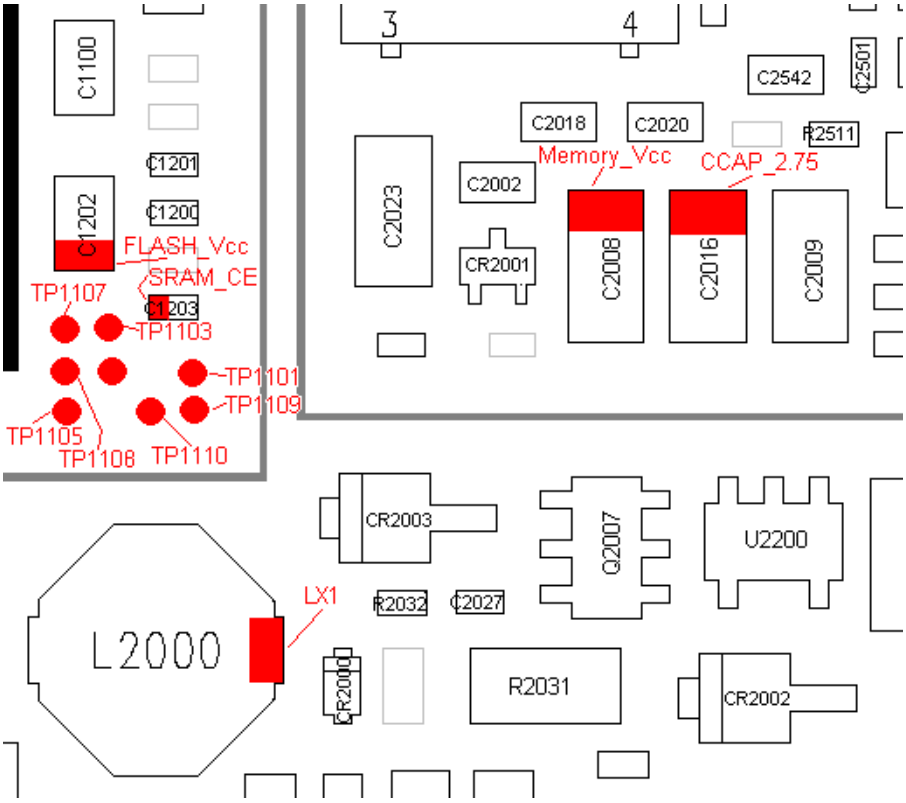
C164	Analog IF filter output, 3-5 dB loss from input level
CPL680	800 Main LO line coupler input, -15dBm min.
CPL681	1900 Main LO line coupler input, -15dBm min.
R670	Vsteer, Main LO tuning voltage, .9 to 2.3 Volts
Q636-1,4	VSF, filtered VCO supply voltage
Q636-3	VSF_1900, PCS VCO supply voltage
Q636-	VSF_800, CELL VCO supply voltage

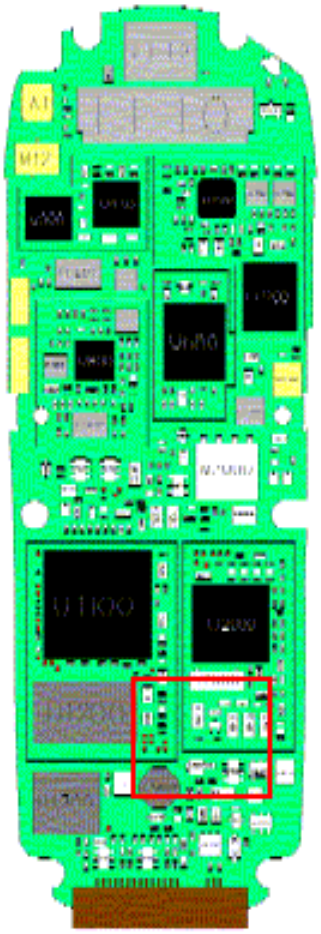




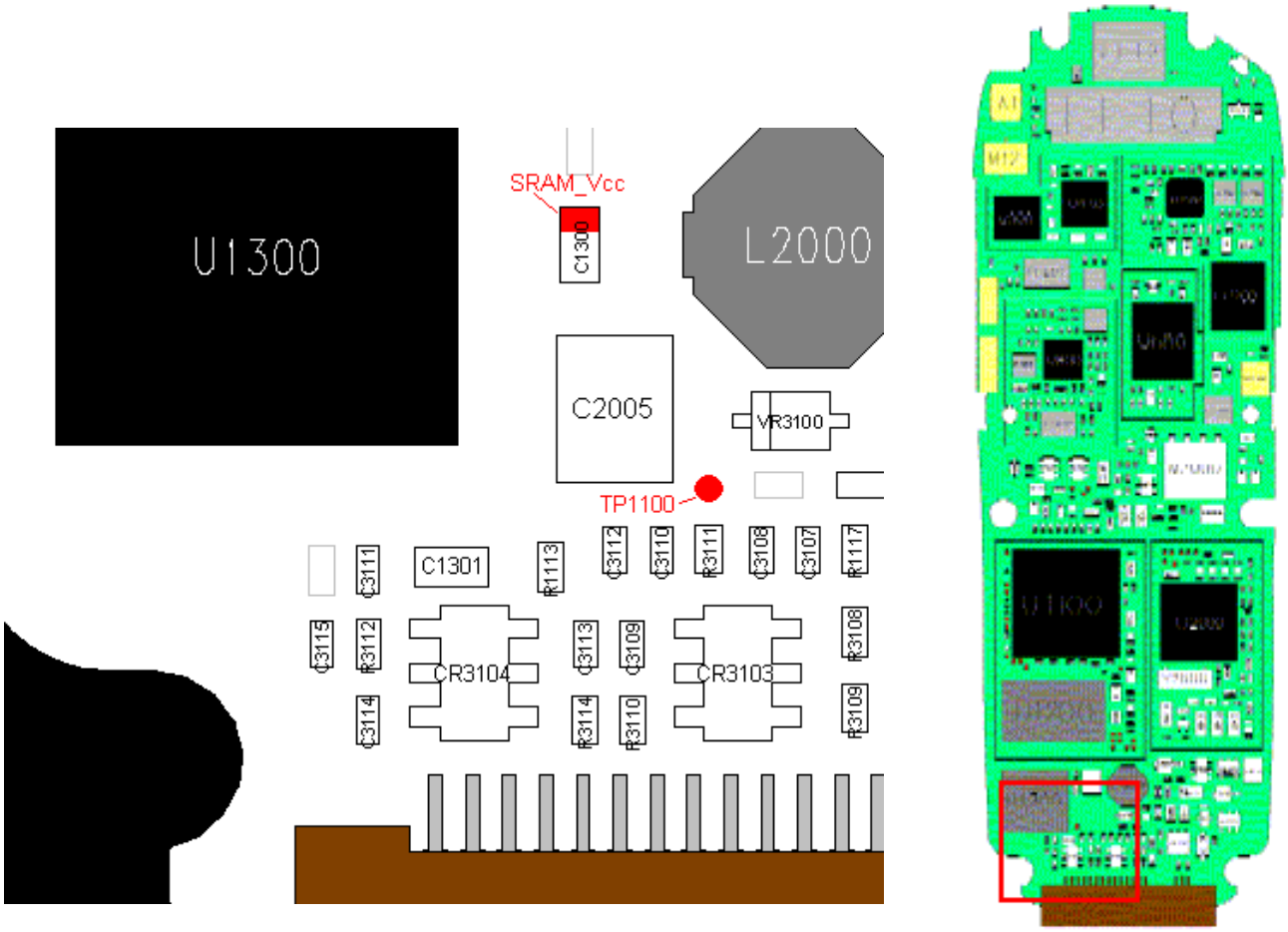


C1124	16.8 MHz
C2029	32 kHz
TP1104	CCAP_CSb
TP1113	Diag_Bus
TP1114	Diag_Bus
TP1117	ZIF_EN
TP1118	RF_Data
TP1119	RF_Clock
TP1120	CKO
TP1121	RESETb
TP1122	RESET_OUTb
TP1123	RF_Sleep
TP1124	
TP1125	
TP1200	WAITb





C1202	FLASH_Vcc
C1203	SRAM_CEb
C2008	MEMORY_Vcc
C2016	CCAP_2.74 (V4),
L2000	LX1, Buck/Boost regulator,
TP1101	A1
TP1102	A2
TP1103	SRAM_CSb
TP1106	
TP1107	R/W
TP1108	OEb
TP1109	EB0b
TP1110	EB1b



C3100	SRAM_Vcc, 2.75 Volts,
TP1100	D0, data bus bit 1

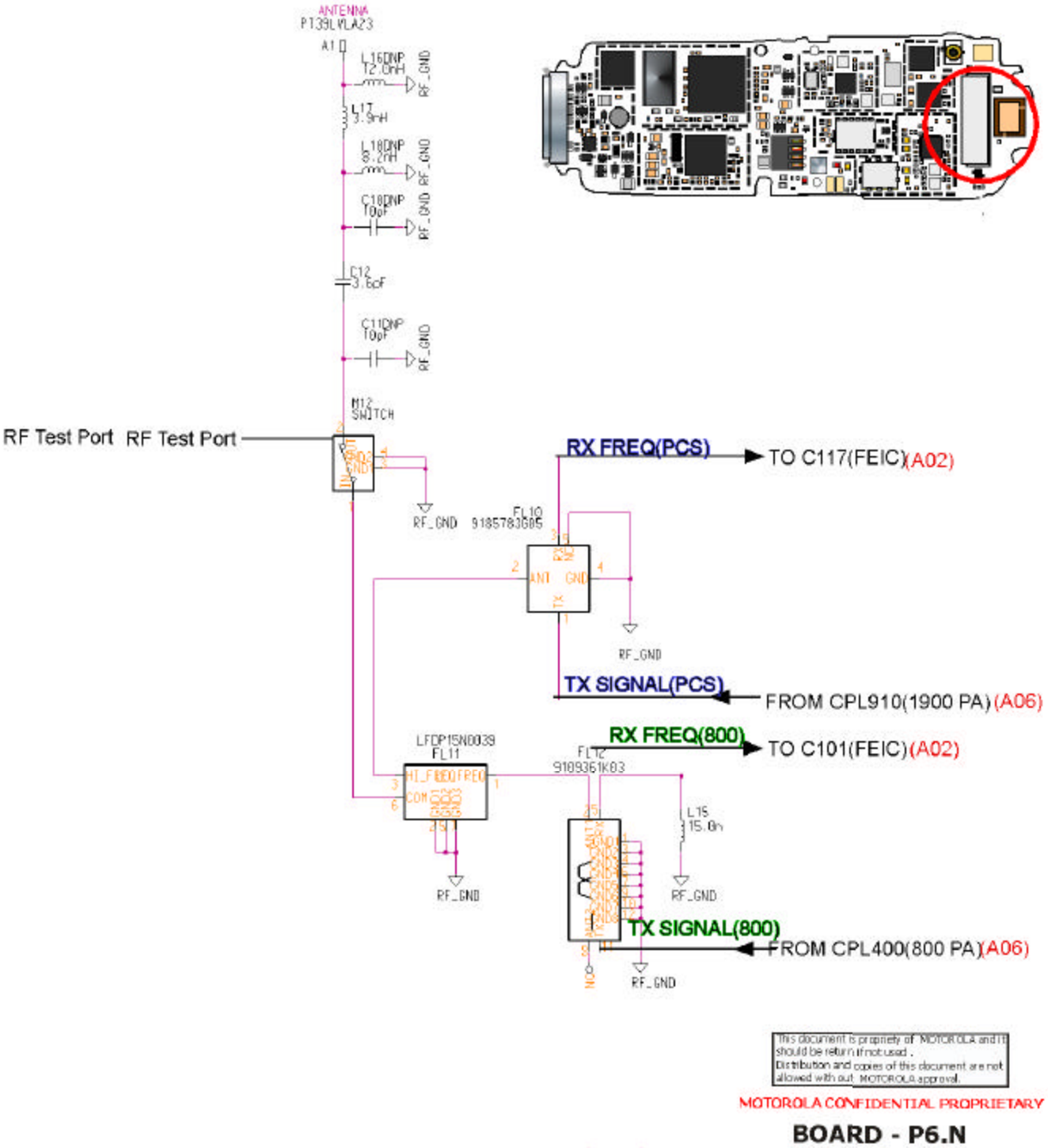
Tarpon Turn on Sequence

1.Power is applied to the accessory connector or the **ON/OFF** line is pulsed low if the battery is attached
2.CCAP_2.75 turns on and the **32kHz clock** starts
3.CCAP_INT goes high
4.LOGIC_2.75, LOGIC_1.8, DIGITAL_1.8, and the **16.8 MHz oscillator** starts
5.RX_2.75/**AUDIO_2.75** and **MEMORY_ Vcc** turn on
6.CCAP allows **RESETb** to go high
7.WALLY starts running
8.The **EIM** is set up
9.WALLY checks for valid boot code, if not found then radio goes into RAM Loader procedure
10.Verify valid main code, if not found then radio goes into RAM Loader procedure
11.Check to see of **OPT1** and **OPT2** are shorted, if they are then radio goes into RAM Loader procedure
12.WALLY sets up **WATCHDOG** (WD line goes high if all ok)
13.If **WATCHDOG** doesn't go high 50ms after RESETb then the CCAP shuts down radio
14.Boot and main code are downloaded into RAM and **WALLY** starts running from RAM
15.CCAP is setup for CDMA
16.System PLL are set up
17.WALLYdetermines what caused the radio to turn on

- **EXT_B+**,**ON/OFF** pulse, or **Power Key**
    1. **WALLY** checks for any accessories
    2. Starts the **MMI**
    3. Sounds wake up tone
    4. Looks for cell site
- **POWERCUT**
    1. Get the stored info out of RAM
    2. Do a silent reboot
- **ALARM** – take appropriate action
- No cause found – shut down

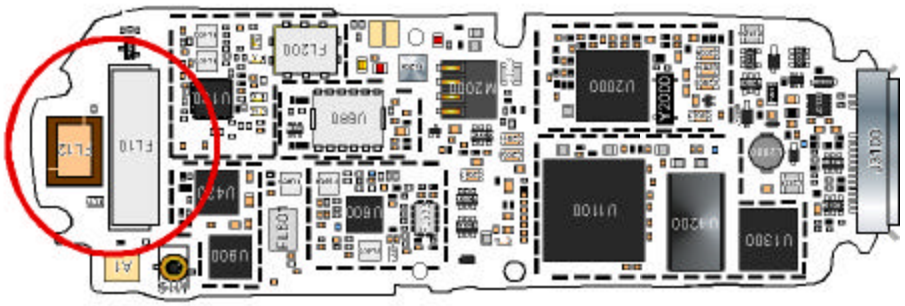
Antenna:A01

ACCESORY ANTENNA SWITCH AND DUPLEX FILTER

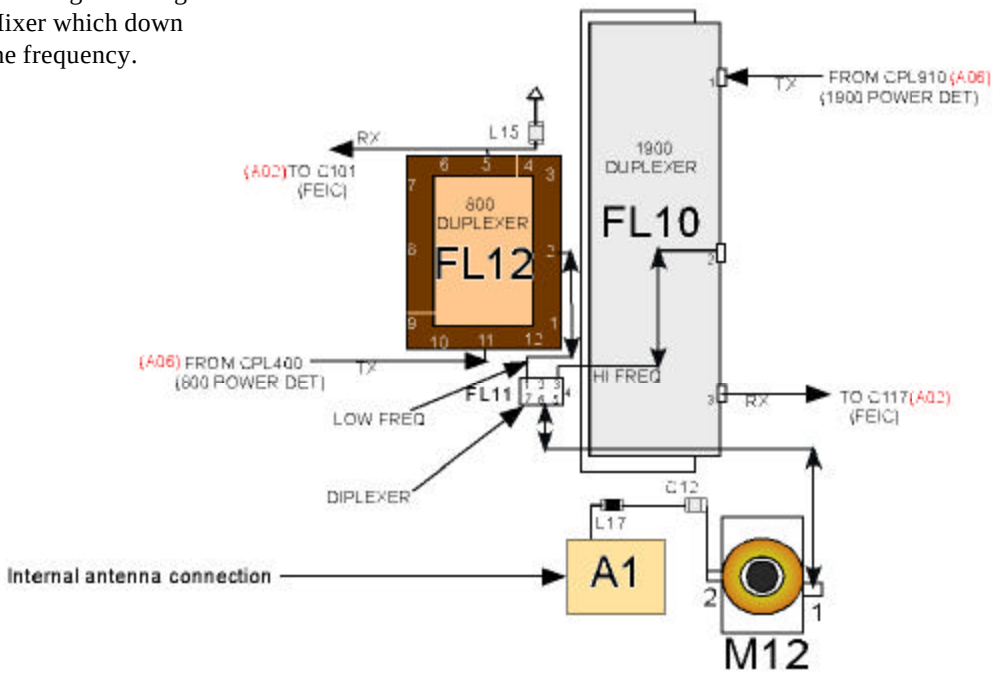


Antenna Circuit:A01

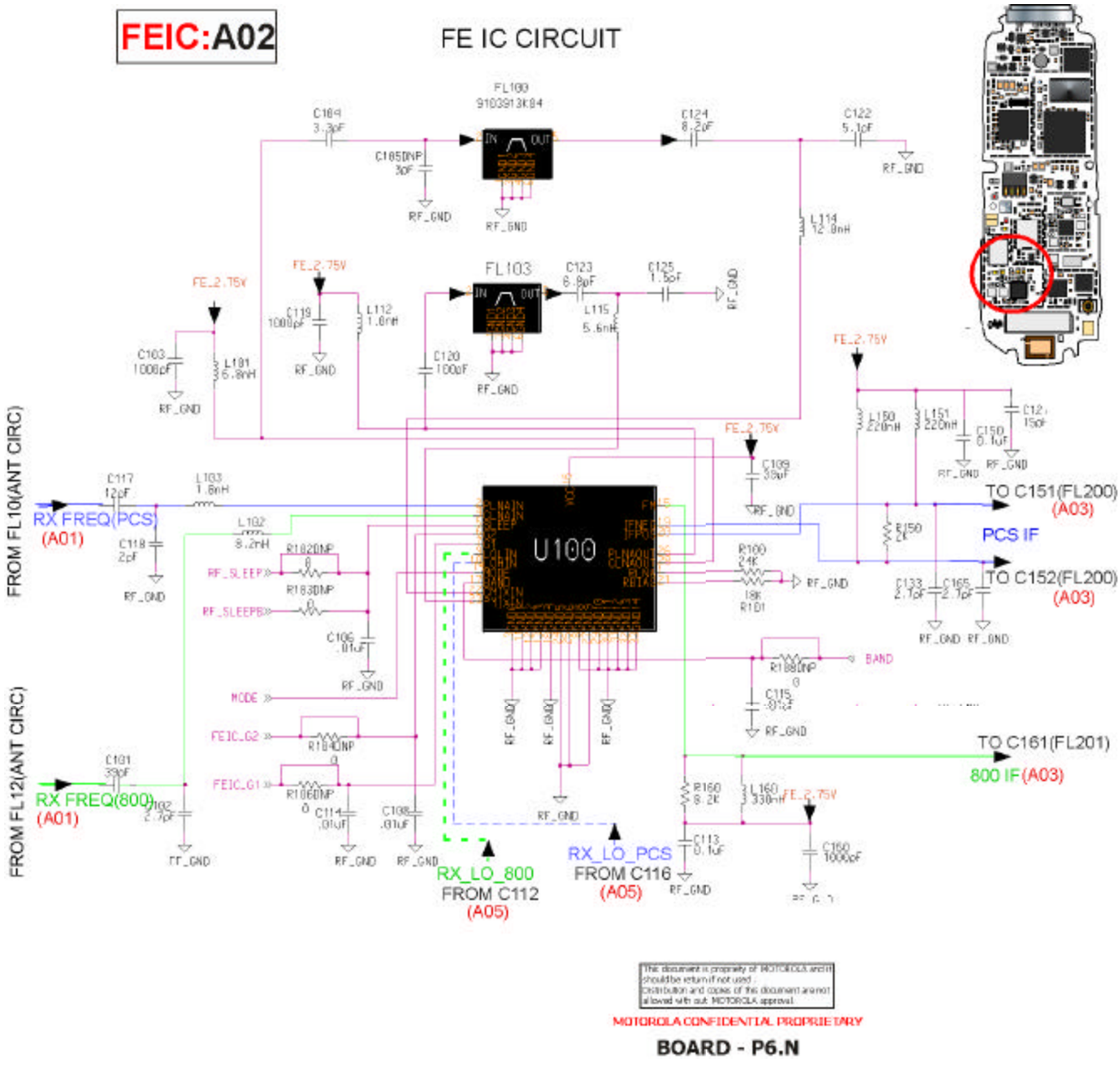
Antenna Board Layout



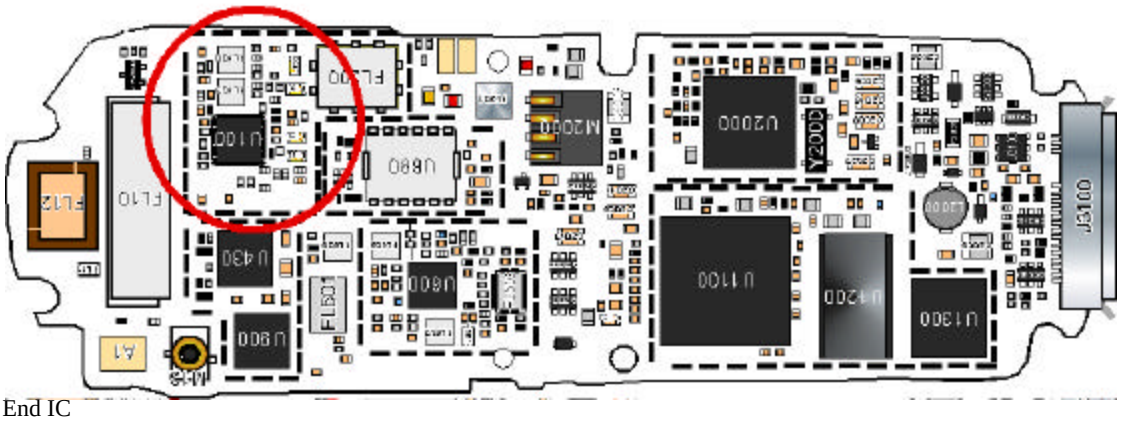
The phone receives the RF signal from the Antenna or the RF test port, the received RF signal is routed through the Diplexer – FL11 to mono block duplex SAW filter-FL12. The RF signal is then routed to the Front End IC (FE IC) – U100, which contains LNA which provides a 10-12 db gain to the received RF signal, and U100 provides inter stage filtering and it contains Mixer which down converts the frequency.



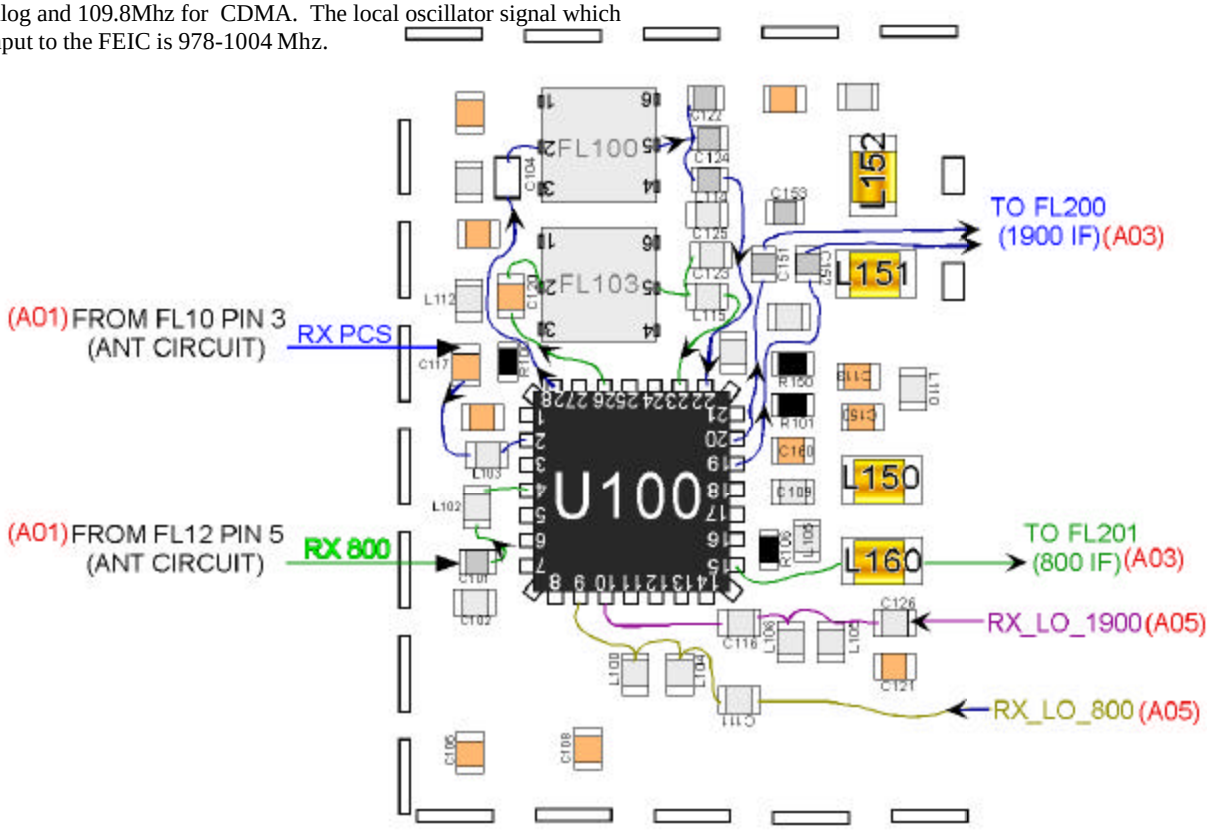
BOARD - P6.N


FEIC:A02
FE IC CIRCUIT
U100
FL100
FL103
FE_2.75V
RF_GND
FROM FL10(ANT CIRC)
RX FREQ(PCS)
(A01)
FROM FL12(ANT CIRC)
RX FREQ(800)
(A01)
TO C151(FL200)
(A03)
PCS IF
TO C152(FL200)
(A03)
TO C161(FL201)
800 IF(A03)
RX_LO_800
FROM C112
(A05)
RX_LO_PCS
FROM C116
(A05)
MODE
BAND
FEIC_G2
FEIC_G1
RF_SLEEP
RF_SLEEPB
MOTOROLA CONFIDENTIAL PROPRIETARY
BOARD - P6.N

FEIC:A02

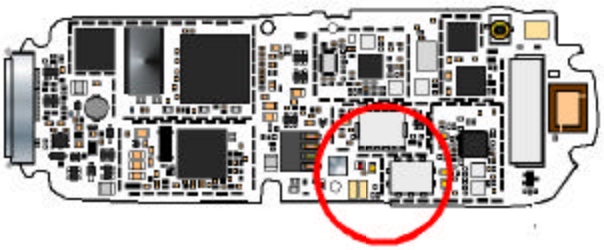


RF signal is routed to the Front End IC (FE IC)- U100, which contains LNA which provides a 10-12 dB gain to the received RF signal, and U100 provides interstage filtering and it contains Mixer which down converts the frequency of the signal to IF which is 109.65Mhz. for Analog and 109.8Mhz for CDMA. The local oscillator signal which is input to the FEIC is 978-1004 Mhz.

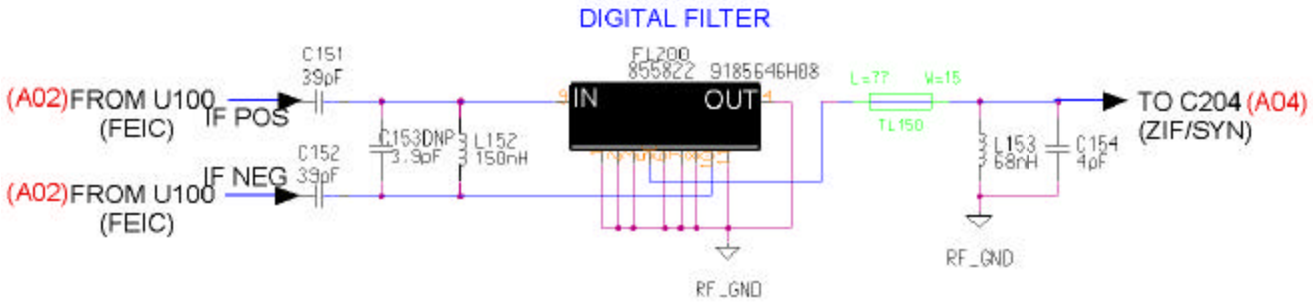


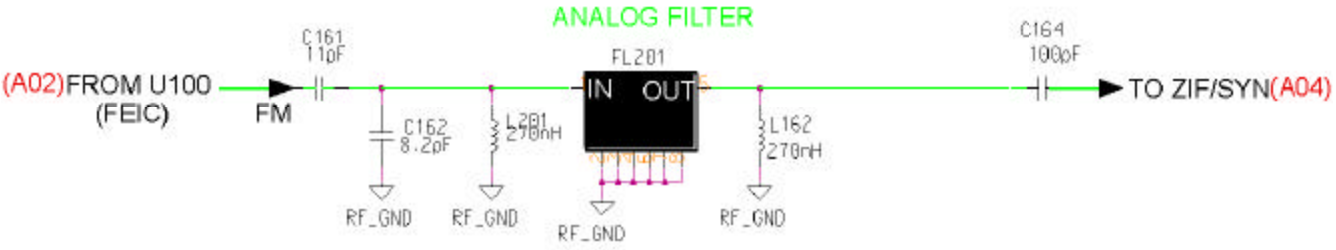
BOARD - P6.N

DIGITAL & ANALOG FILTERS:A03



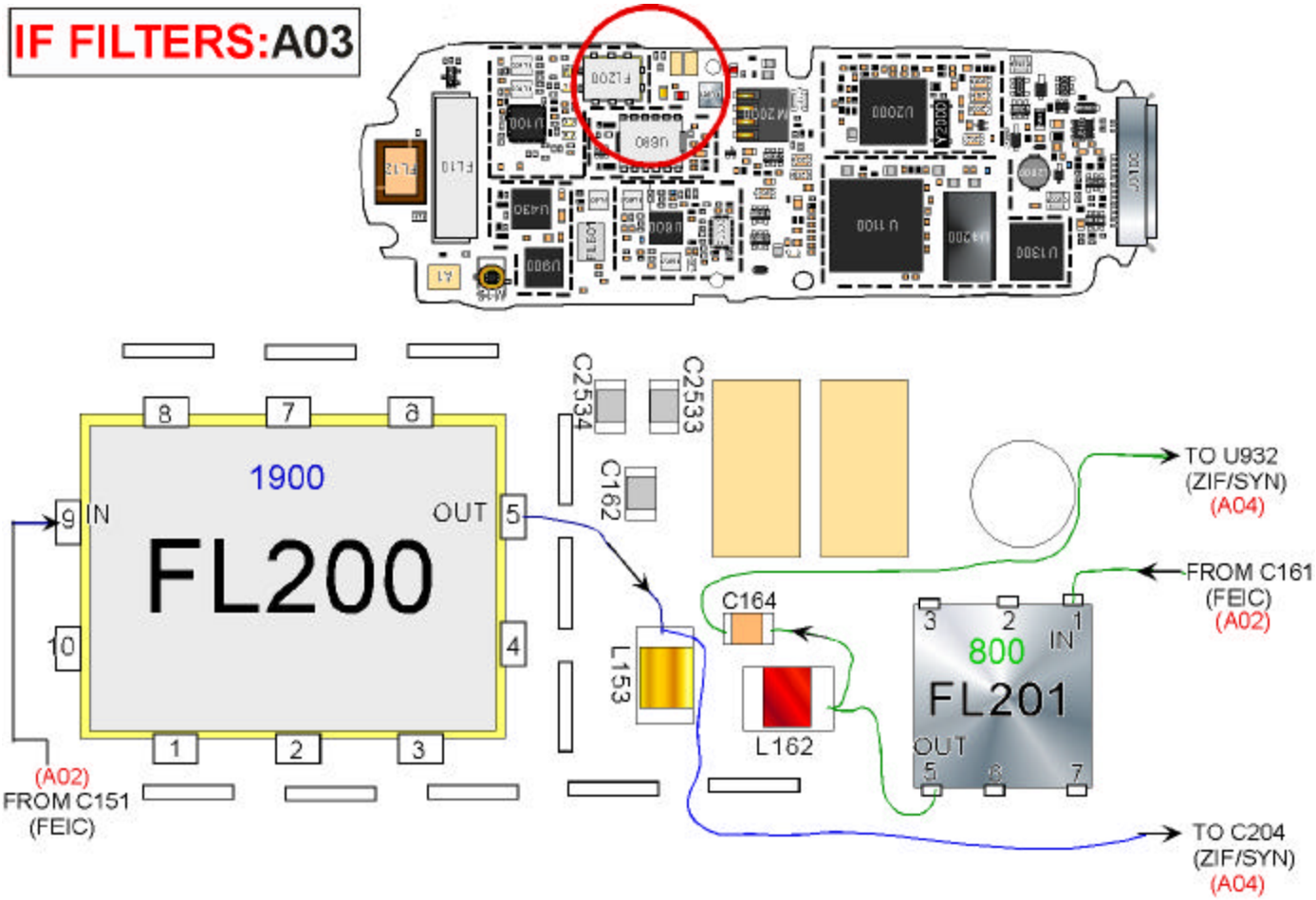
DIGITAL AND ANALOG IF





BOARD - P6.N

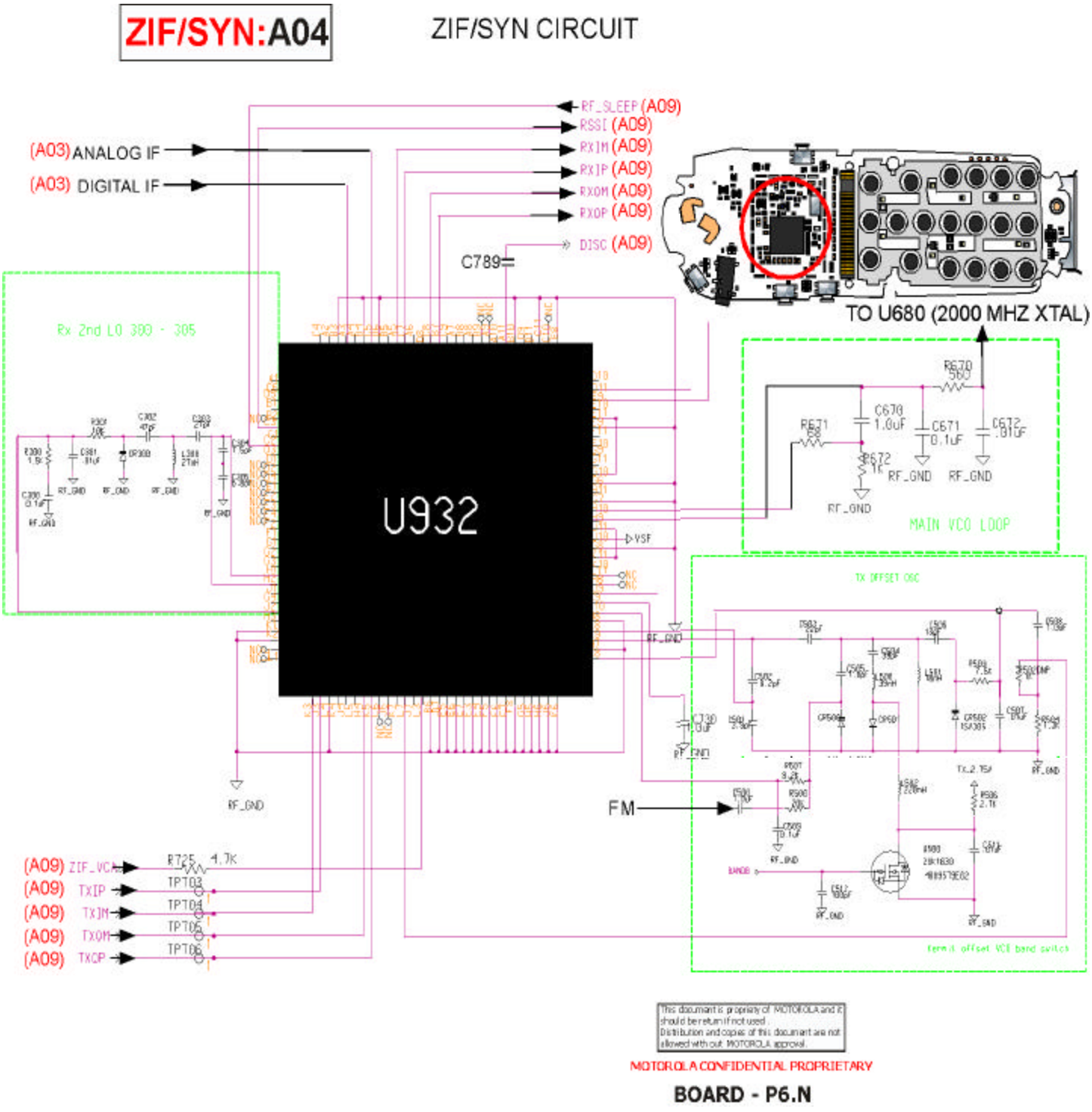
IF FILTERS:A03

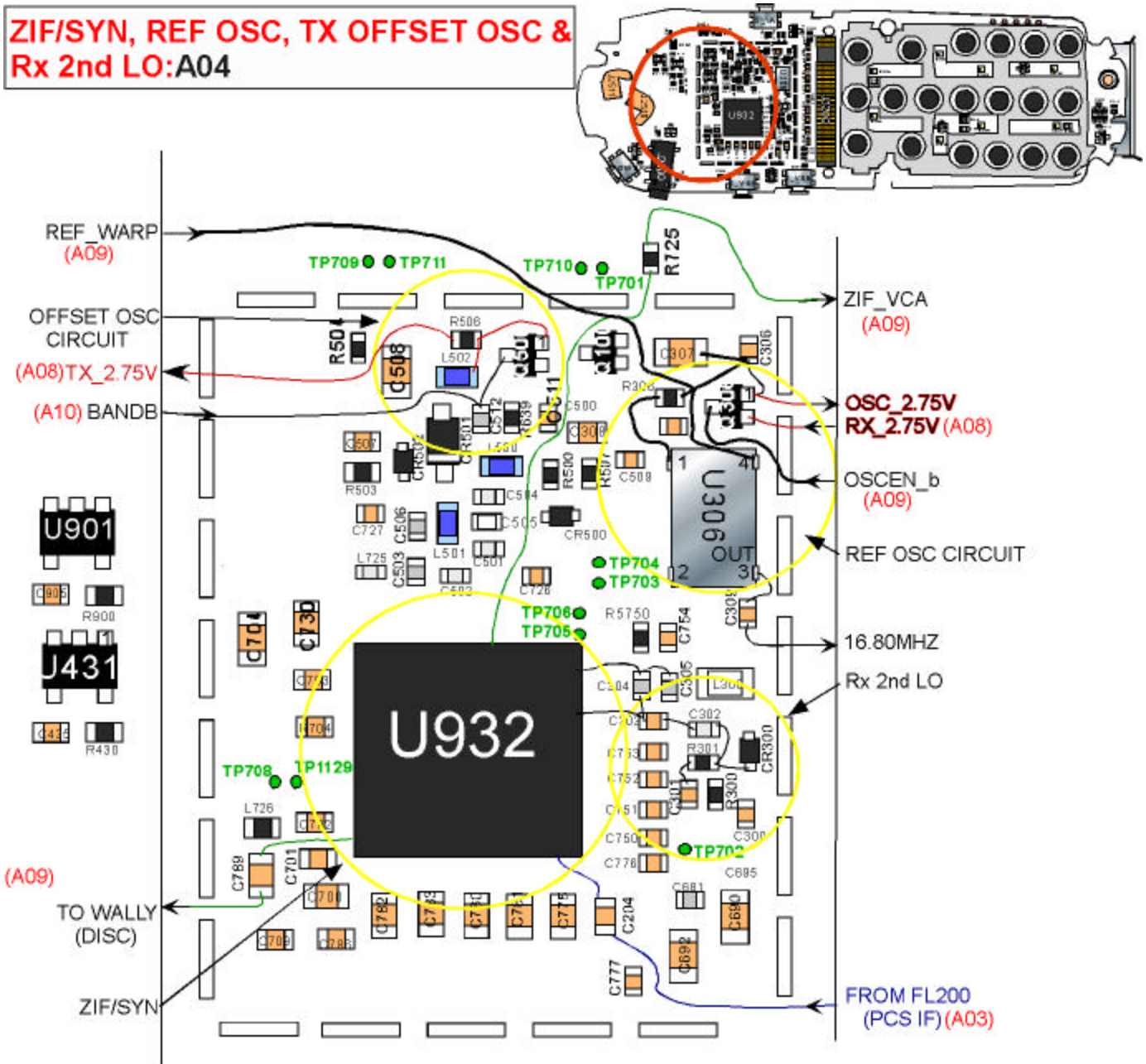


The mixer output IF signal 109.8Mhz is routed through IF filter- FL200 into the ZIF/SYN IC U932 for mixing with the second LO ,filtering and demodulation.

The mixer output IF signal 109.65Mhz is routed through IF filter- FL201 into the ZIF/SYN IC U932 for mixing with the second LO ,filtering and demodulation.

BOARD - P6.N





TP701 RSSI FROM WALLY
TP702 MTESTP
TP703 TXIP FROM WALLY
TP704 TXIM FROM WALLY
TP705 TXQM FROM WALLY
TP706 TXQP FROM WALLY
TP708 OCK_DETECT
TP709 RF_DATA
TP710 RF_CLOCK
TP711 ZIF_ENB

BOARD - P6.N

ZIF/SYN, REF OSC, TX OFFSET OSC & Rx 2nd LO:A04

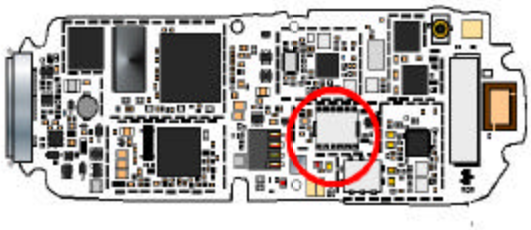
RECEIVE AUDIO
Four outputs from U932-RXIP, RXIM, RXQP,RXQM carries the base band signal of the receive digital call to the WALLY, the received QPSK data is gain controlled and converted to digital, the 1.2288 Bb/sec Rx data stream is then decoded by the CSP inside the WALLY to produce a signal containing only the desired data.

FREQUENCY SYNTHESIZER CIRCUITRY
The phone contains three PLL frequency synthesizers controlled by U932.
The main VCO: There is only one VCO modules-which controls the tunable 979-1004Mhz main local oscillator and is ON during Cellular or 800 Mhz mode and also controls the tunable 2039-2100Mhz main local oscillator, which is ON during PCS or 1900MHz mode.

The Tx VCO: There are two modes and two frequency at which this oscillator which is internal to U932 works, but the tank circuits is external. There are two tank circuits one for Cellular mode (800Mhz) which will set 309.6Mhz frequency for the oscillator to oscillate on. Another tank circuit for PCS mode (1900Mhz) which will set 379.6Mhz frequency for the oscillator to oscillate on. The Tx offset frequency is divided by 2 before being fed into the mixer for modulation.

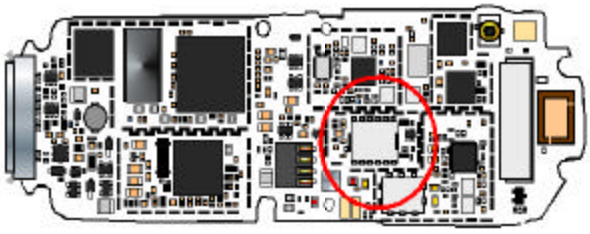
The second LO: The second local oscillator also operates in two modes with two different frequencies: For AMPS mode the frequency is 219.3Mhz and for CDMA mode at cellular or 800Mhz band and PCS or 1900 Mhz band the frequency is 219.8Mhz. The tank circuit is external to the U932. The frequency is divided by 2 before being fed into the mixer. All the synthesizers obtain their reference frequency from the 16.8Mhz reference oscillator.

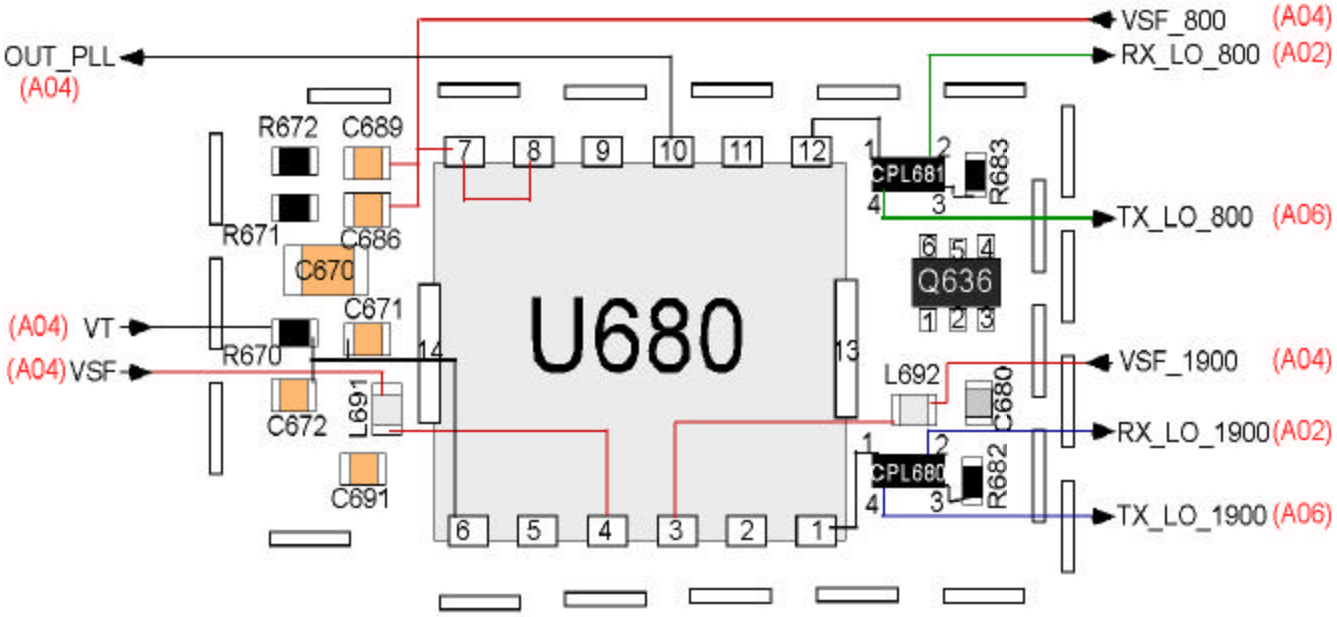
LO CIRCUIT:A05



BOARD - P6.N

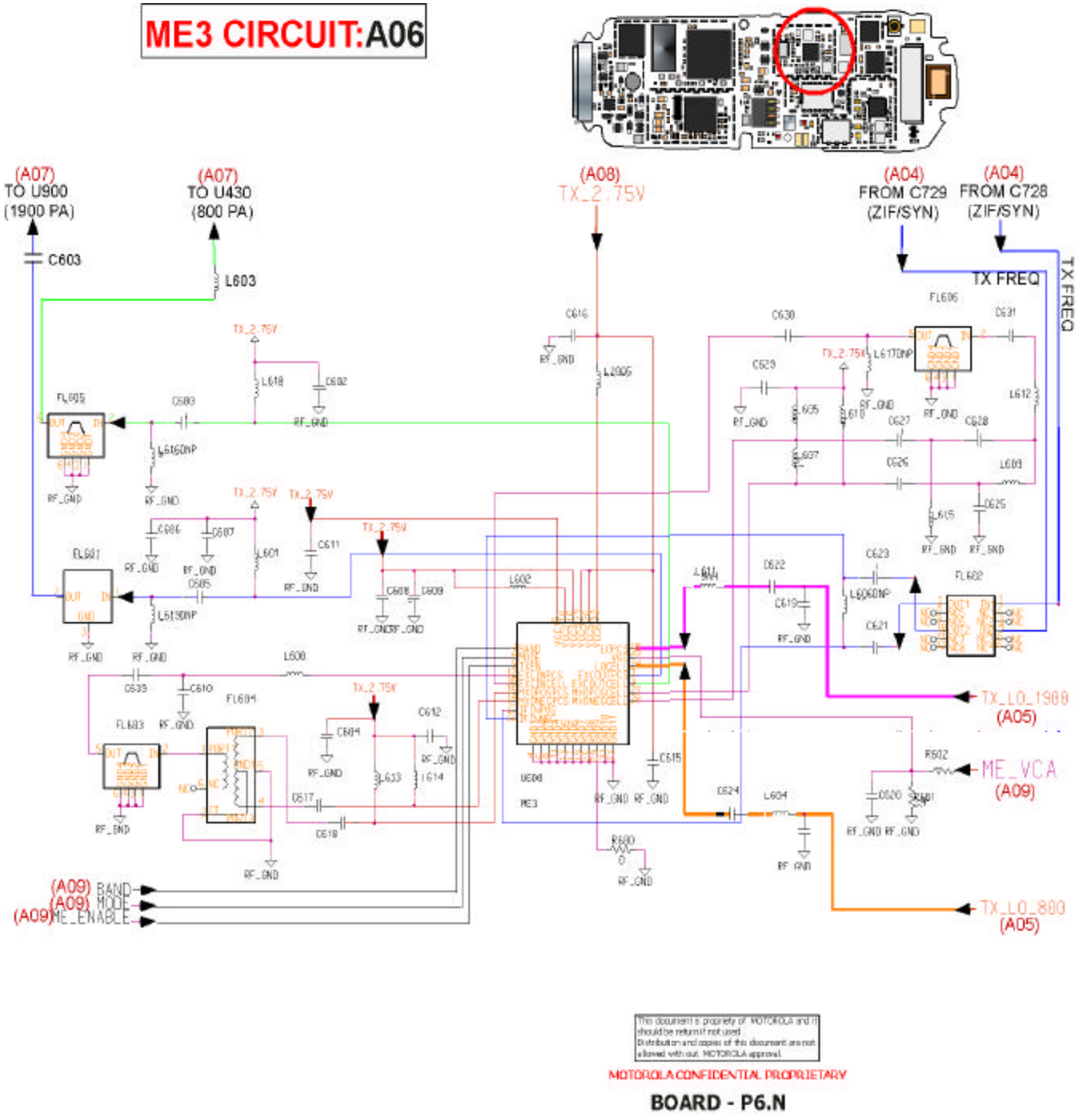
LO CIRCUIT:A05





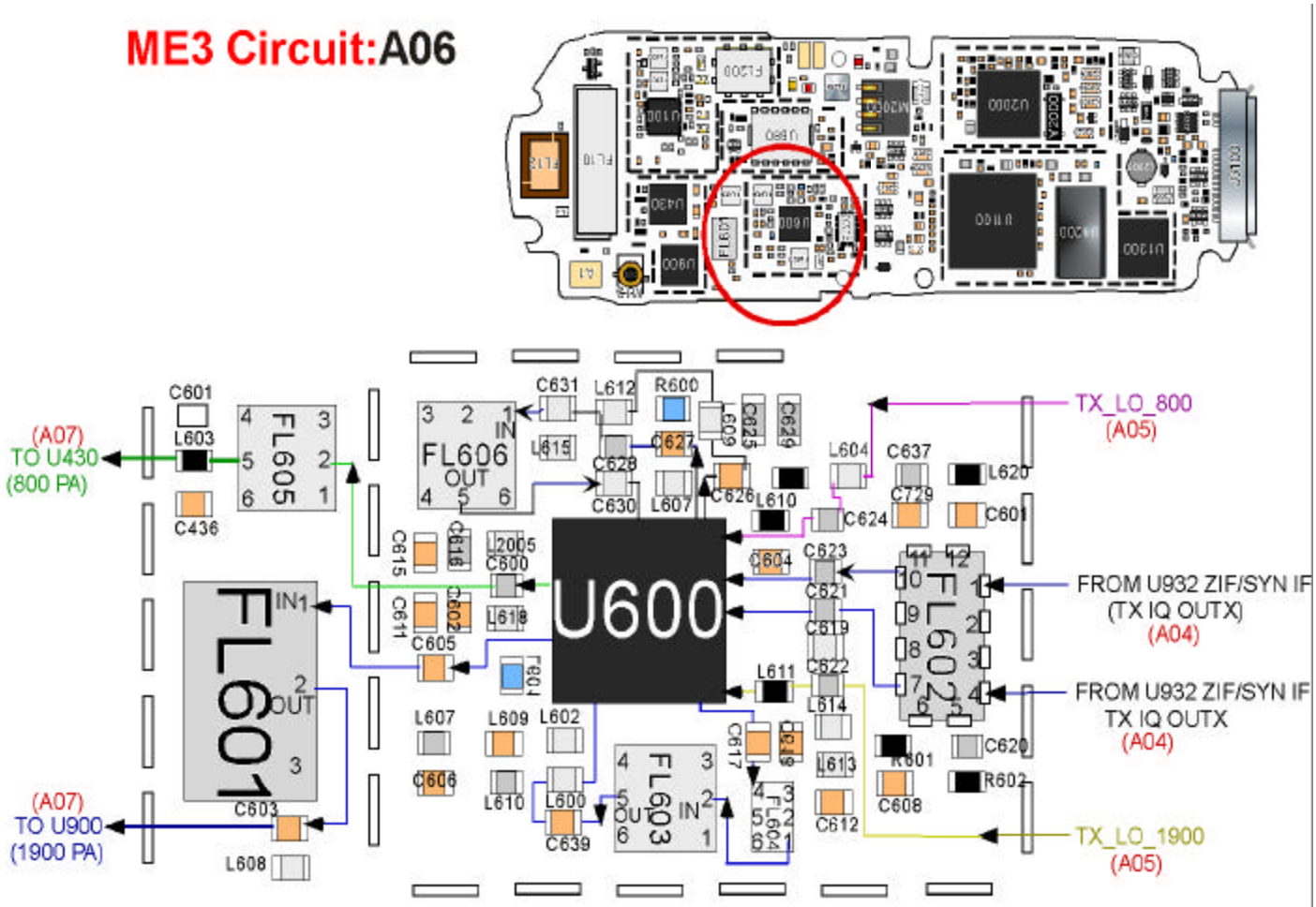
The U680 is a dual band VCO module for main LO (one for the 800 mhz band and another for PCS band) The output is split into RX_LO and TX_LO for both the bands. V.120c uses the ME3 IC - the mixer exciter IC. The ME3 IC allows to control the RF output power. The ME3 IC requires two LO's, one for PCS, and the other for the 800 Mhz band.

BOARD - P6.N



BOARD - P6.N

ME3 Circuit:A06

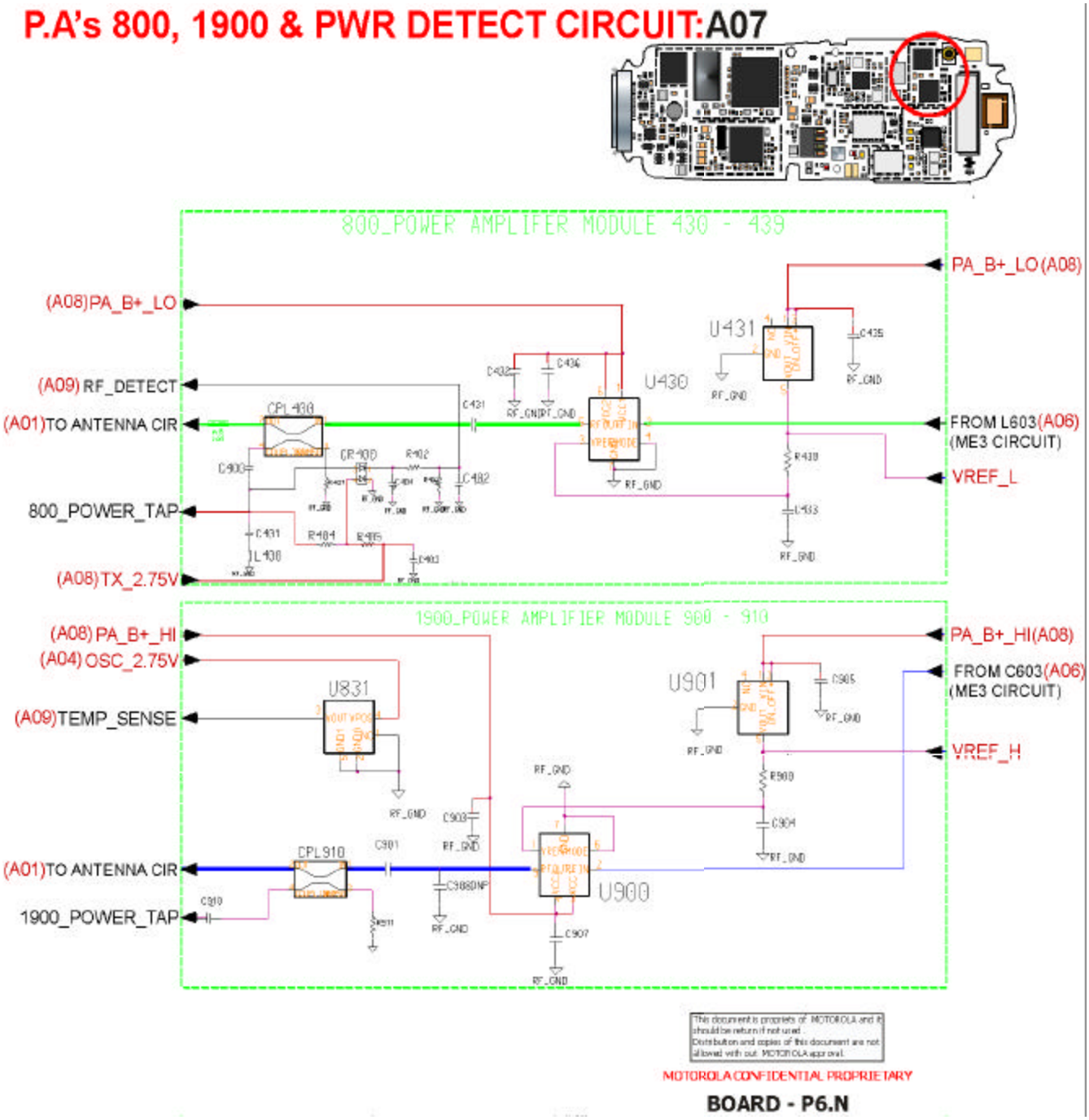


The IF pins (input to U600 IC) are the same for any band. The control signal (TX Att) at the AGC pins control the gain of the U600 IC. There is an external interstage RF filter between the mixer and exciter. From the mixer the outputs take two different paths one for TX PCS band and another for TX 800 Mhz band. ME3 IC has 50 dBM attenuator control (input IF level= -23dBM , max output TX level= 25dBM). At the output of ME3 IC band filter are used.

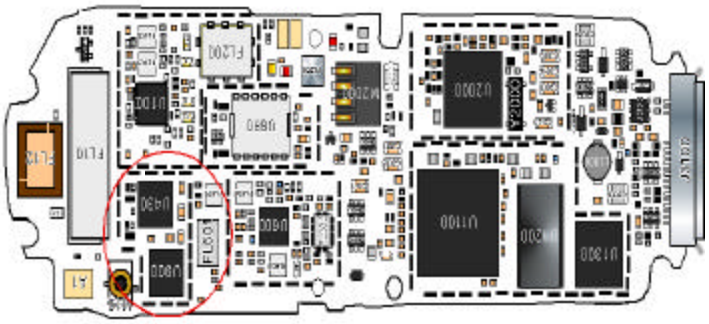
The Tx IF modulated signal 154.8Mhz is input to the ME3 IC – U600 where it get mixed with the 979 – 1004 Mhz local oscillator signal. The Tx signal then passes through the band pass filter FL605 into the Power Amplifier (PA)

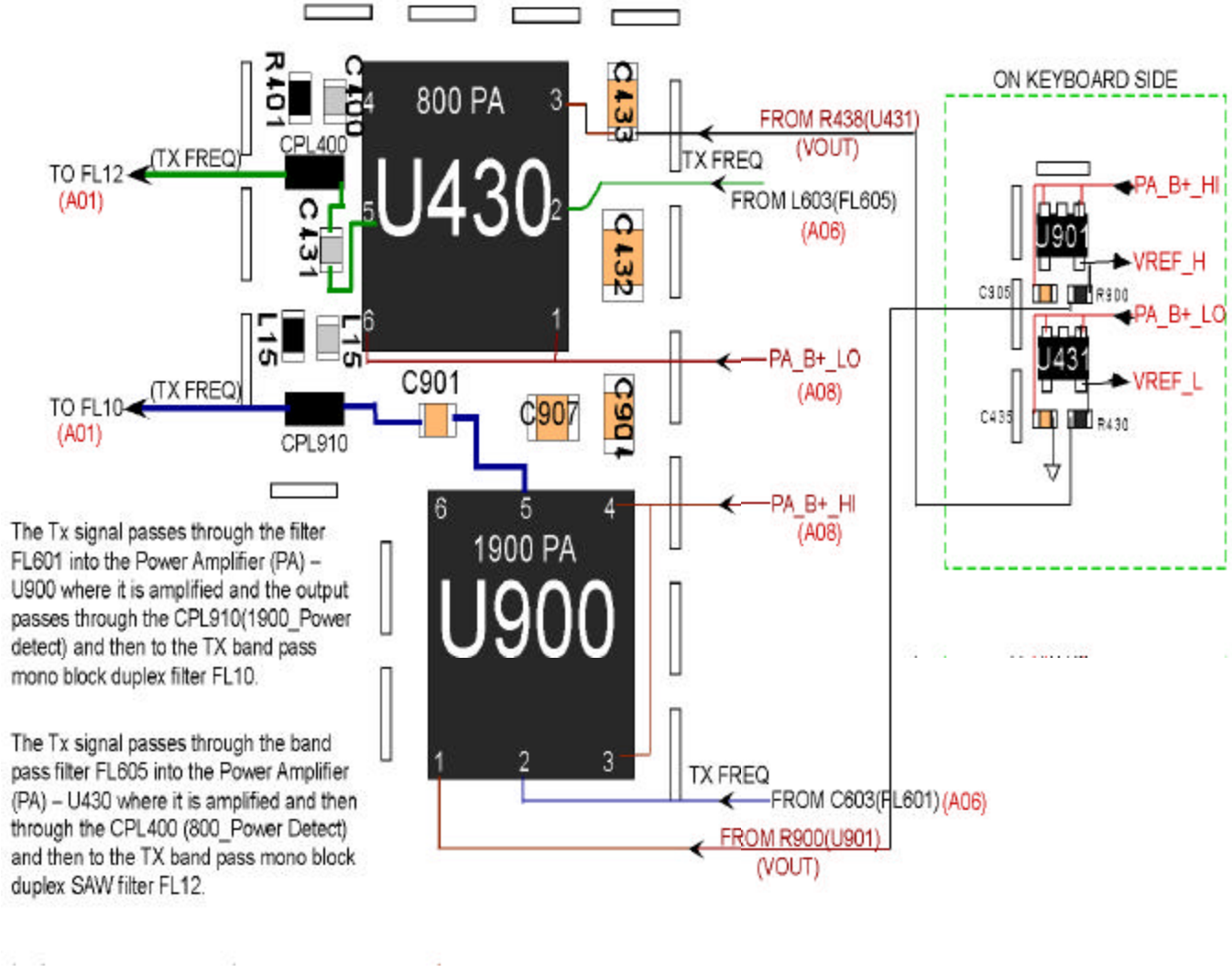
The Tx IF modulated signal 189.8Mhz is input to the ME3 IC – U600 where it get mixed with the 2039-2100 Mhz local oscillator signal. The Tx signal then passes through the filter FL601 into the Power Amplifier (PA)

BOARD - P6.N



PA 800, 1900 & POWER DETECT Circuit:A07

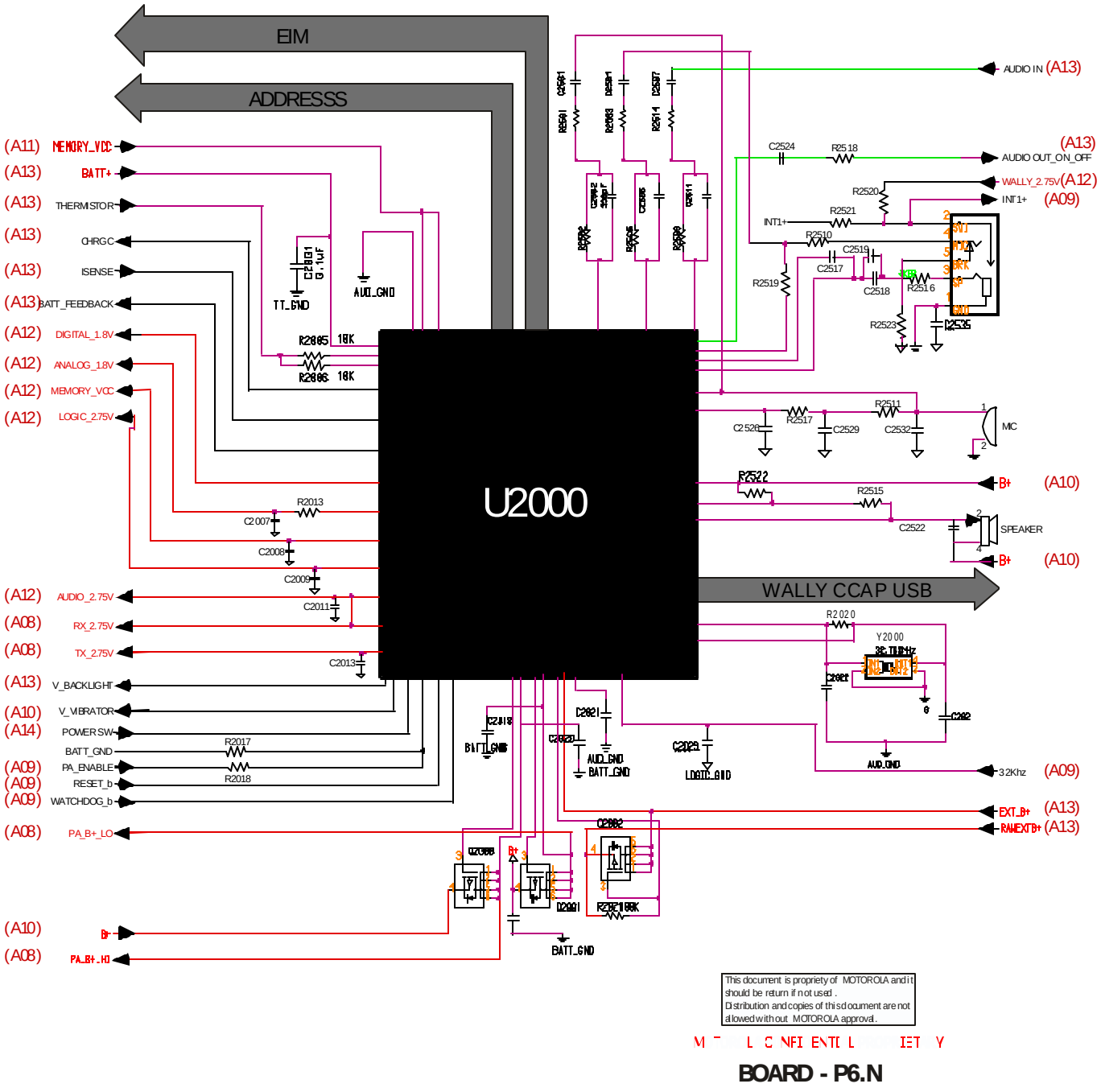




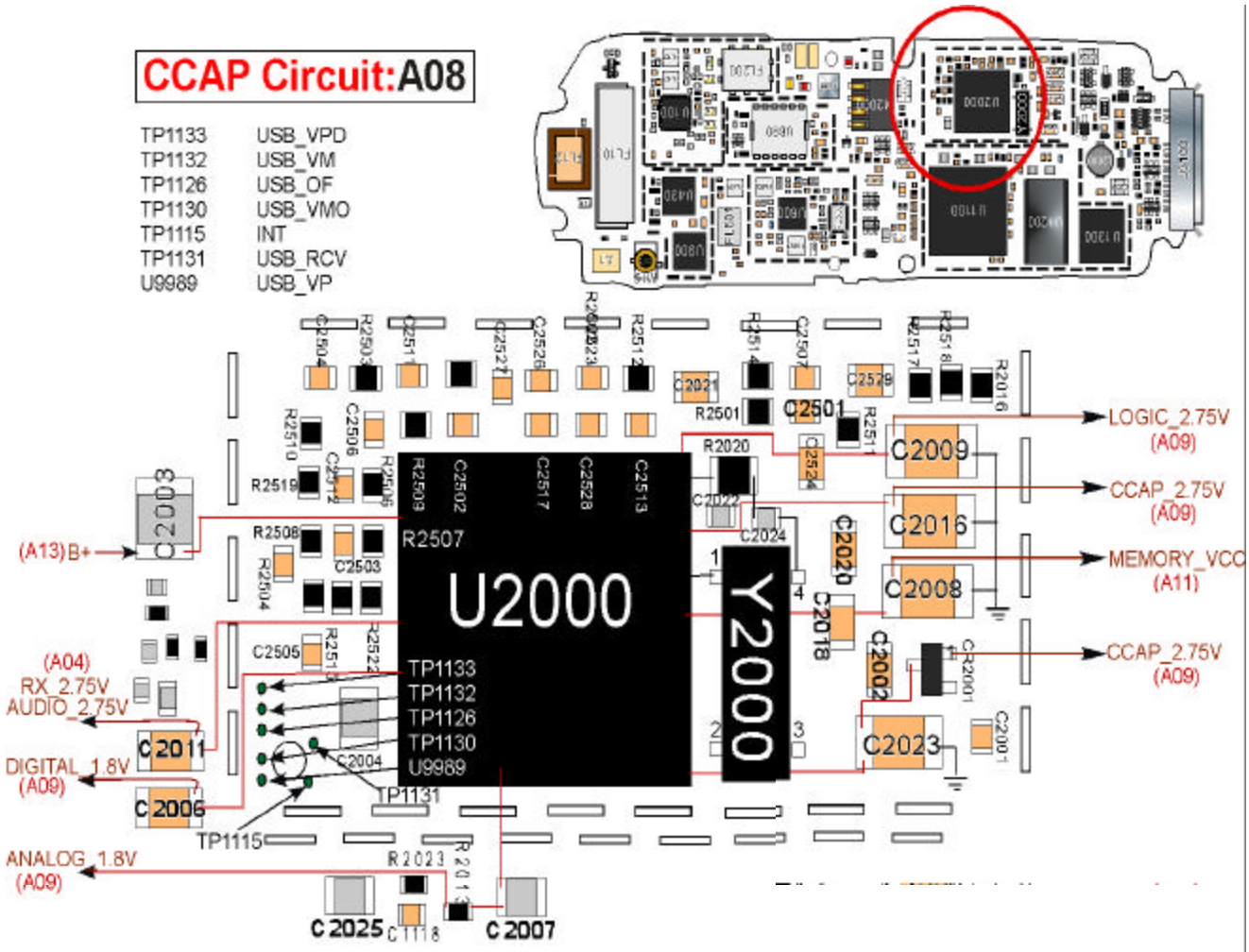
The Tx signal passes through the filter FL601 into the Power Amplifier (PA) – U900 where it is amplified and the output passes through the CPL910(1900_Power detect) and then to the TX band pass mono block duplex filter FL10.

The Tx signal passes through the band pass filter FL605 into the Power Amplifier (PA) – U430 where it is amplified and then through the CPL400 (800_Power Detect) and then to the TX band pass mono block duplex SAW filter FL12.

CCAP Circuit: A08



BOARD - P6.N



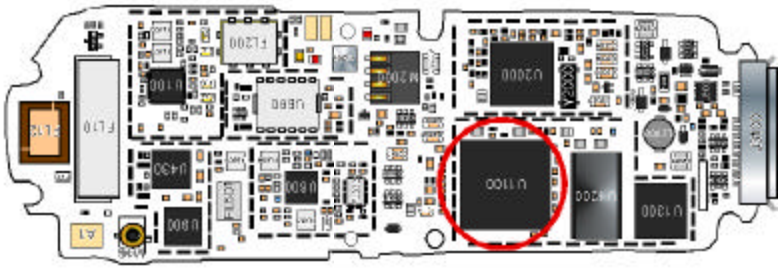
The CCAP IC works in Buck mode and provides the power management function of the phone. It also does the audio amplification and routing. It controls the 32Khz crystal, it interfaces with WALLY on 8 bit Parallel Bus. The communication to the accessories through the CE bus connector is done through the CCAP IC. The audio through the external connector is digital.

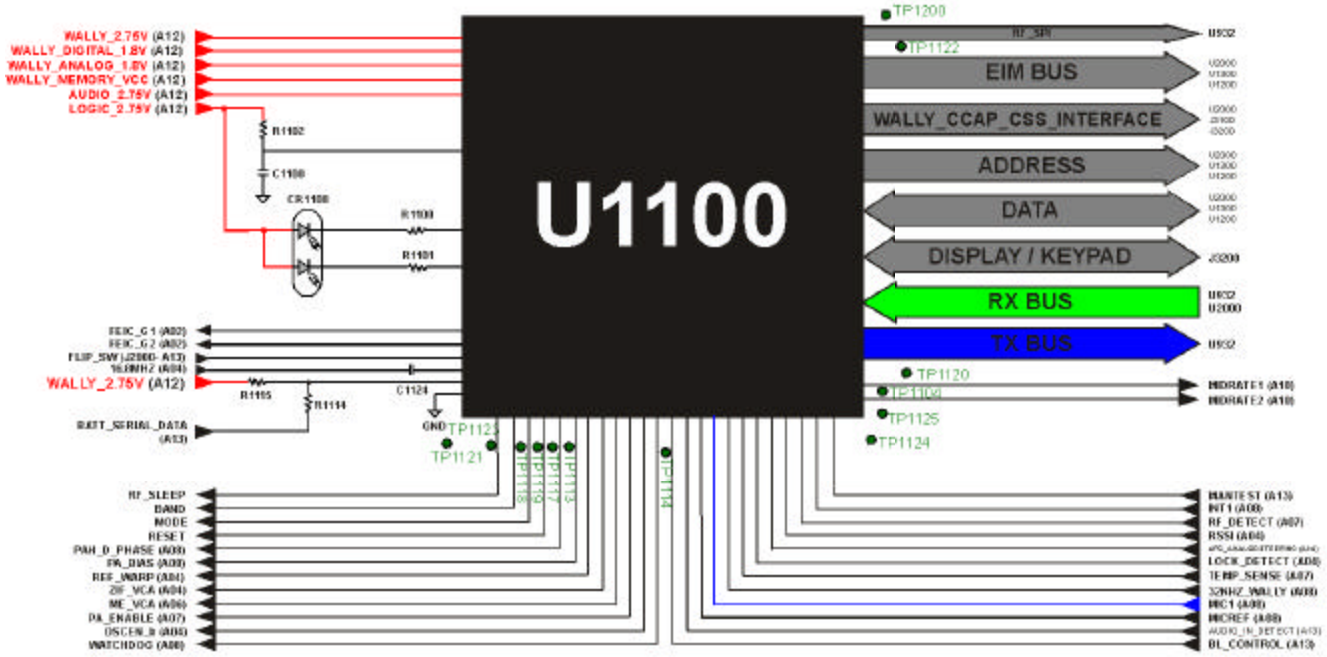
All audio interface is through CCAP IC- Alert, Phone Speaker, headset speaker & Microphone, External Speaker & Microphone, and Phone Microphone.

BOARD - P6.N

WALLY Circuit:A09

TP1121 RESET_b
TP1123 RF_SLEEP
TP1118 RF_DATA
TP1119 RF_CLOCK
TP1117 ZIF_ENB
TP1113 DIAG_BUS
TP1114 DIAG_BUS
TP1124 DIAG_BUS
TP1125 DIAG_BUS
TP1104 CCAP_CS_b
TP1120 CK0
TP1122 RESET_OUT_b

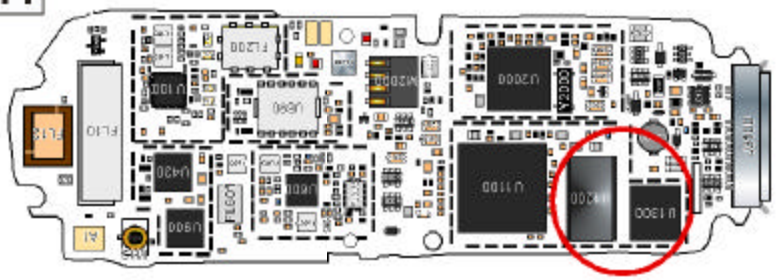


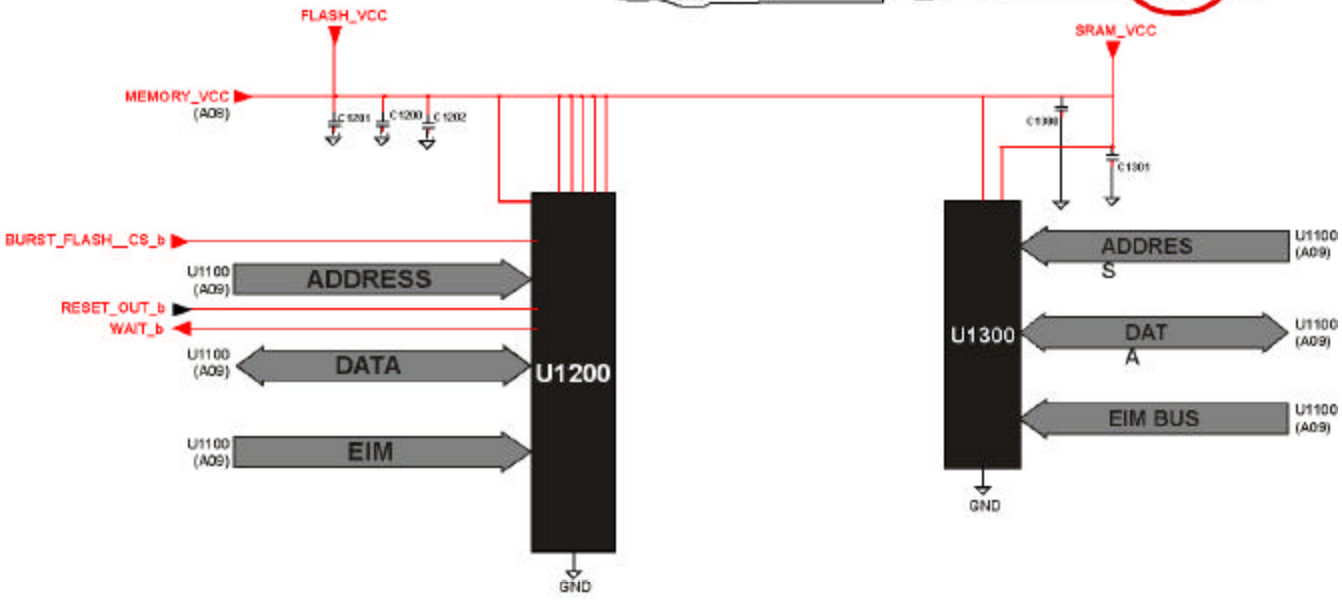


The Wally IC 1100 integrates the functionality of Casper IC (which contains the MCU, RIB, the CSP and the DSP) and CIA.

BOARD - P6.N

MEMORY CIRCUIT:A11





1. FLASH MEMORY - 32Mbits
   - (i) SEEM ELEMENTS (Old EEEPROM functionality)
     - FLEX
     - NAM
     - NVM
     - PRL
   - (ii) MAIN CODE

2. SRAM (4 Mbits)

3. WALLY has internal RAM & ROM (for MCU & DSP) AND BOOT CODE

BOARD - P6.N

Power Select, Charger & Vibrator: A10

POWER SELECT: A10

1. Power select circuit enables the phone to draw the current either from battery or Ext_B+
2. When voltage at Ext_B+ is present (more than 3.59V) the circuit disconnects the Battery from B+.
3. The circuit consists of Q2005 (switch), U2200 and Q2006.
4. Q2005 acts like a switch which connects or disconnects battery (Batt+) to B+.
5. Q2006 forces Q2005 to turn on and connect Battery to B+ when a mid rate charger is attached and the phone in a call. This is done with the help of a signal from Wally IC called Mid Rate 2.
6. Q2006 will only turn on, therefore U2200 is used to turn the Q2005 off once the is over.
7. U2200 will only turn off the switch (isolate Batt+ and B+).

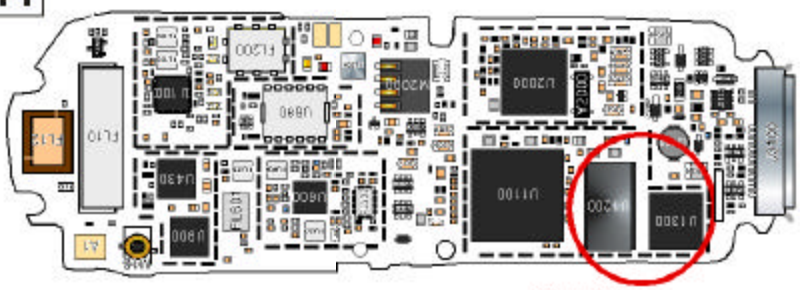
INTERNAL CHARGER: A10

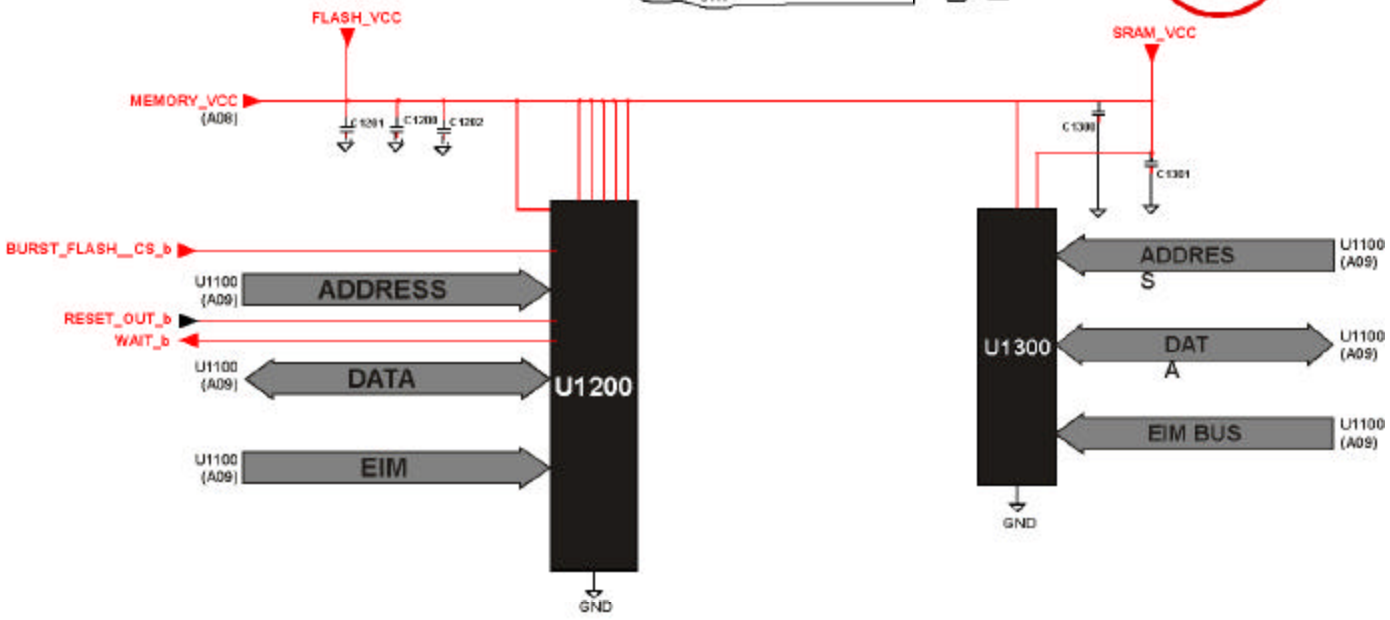
1. CHARGING OF THE BATTERY TAKES PLACE THROUGH q2007.
2. Current flows from RAWEXTB+ through Q2007 to the BATT+.
3. CHRGC is the signal from the CCAP IC controls the flow of current through Q2007 through Gate bisasing.
4. Wally IC controls the CCAP IC by writing into the DAC inside the CCAP and ISENSE input into the CCAP IC compare it with the DAC and the result is CHRGC signal.
5. Other signals that help in this charging process are Battery Thermistor sense, Battery Serial data and Batt+.
6. CR2003 diode prevents the reverse leakage of current.

VIBRATOR: A10

1. CCAP IC produces the vibrator drive signal which is the output of V9 regulator inside the IC and is produce when you select the feature and WALLY IC sends the command to CCAP IC

MEMORY CIRCUIT:A11





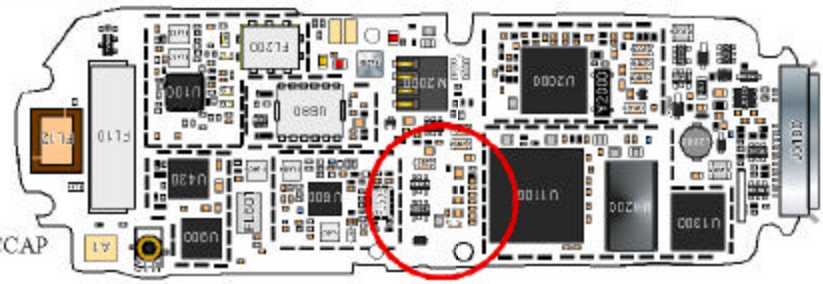
1. FLASH MEMORY - 32Mbits
   - (i) SEEM ELEMENTS (Old EEEPROM functionality)
     - FLEX
     - NAM
     - NVM
     - PRL
   - (ii) MAIN CODE

2. SRAM (4 Mbits)

3. WALLY has internal RAM & ROM(for MCU & DSP) AND BOOT CODE

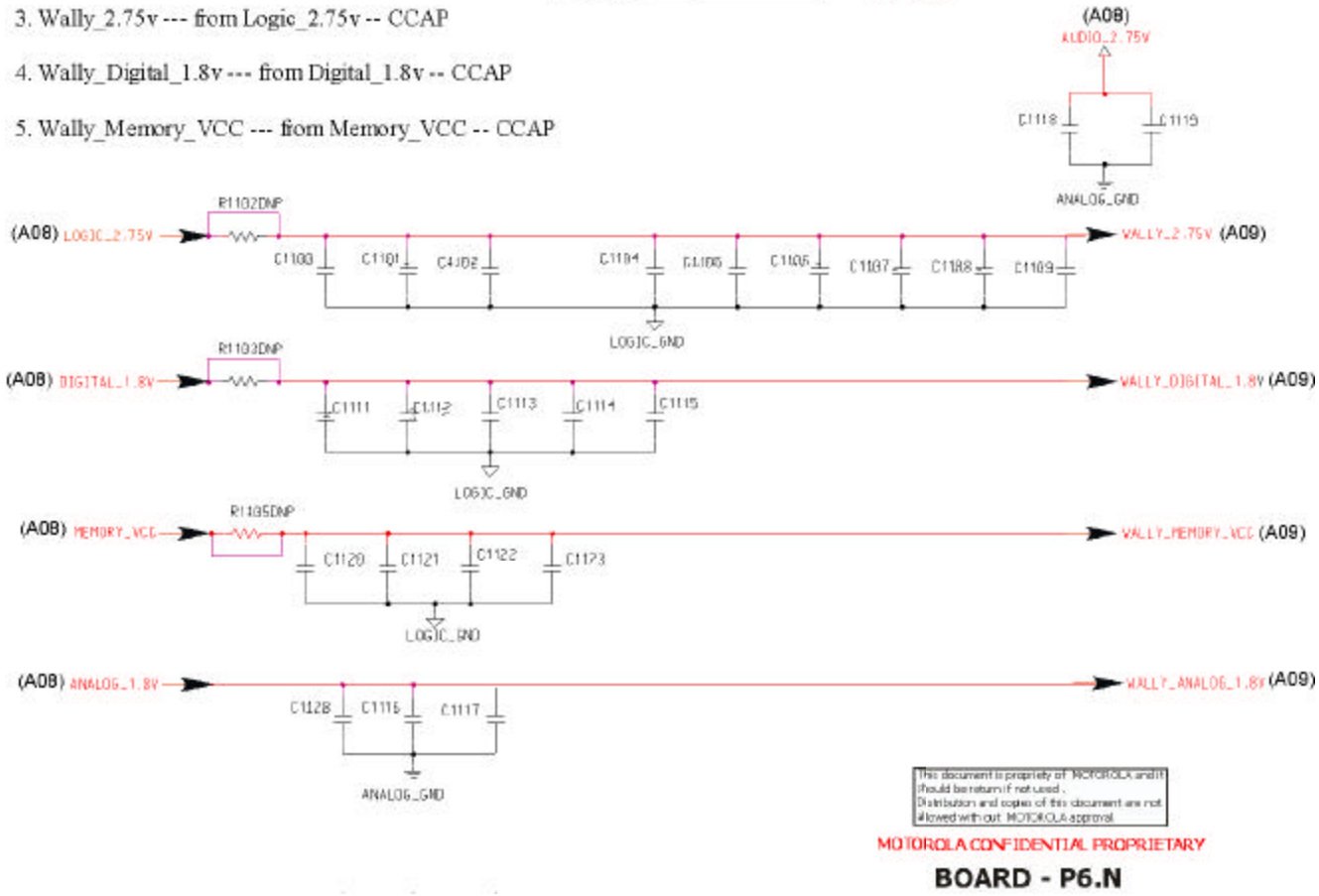
BOARD - P6.N

Power Distribuition:A12

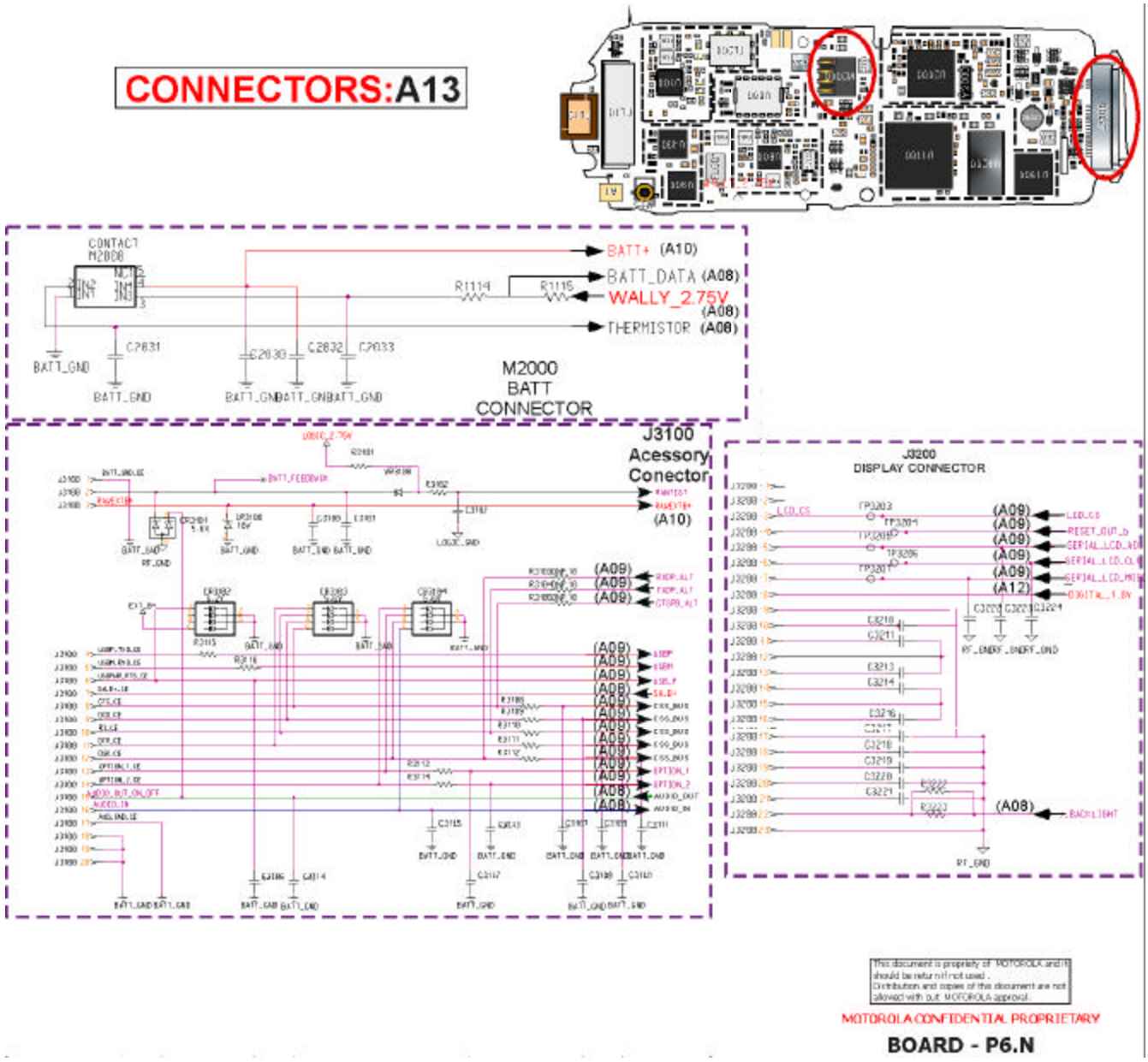


WALLY POWER SUPPLY

1. Audio_2.75v --- from Rx_2.75v-- CCAP
2. Wally_Analog_1.8v --- from Analog_1.8v -- CCAP
3. Wally_2.75v --- from Logic_2.75v -- CCAP
4. Wally_Digital_1.8v --- from Digital_1.8v -- CCAP
5. Wally_Memory_VCC --- from Memory_VCC -- CCAP



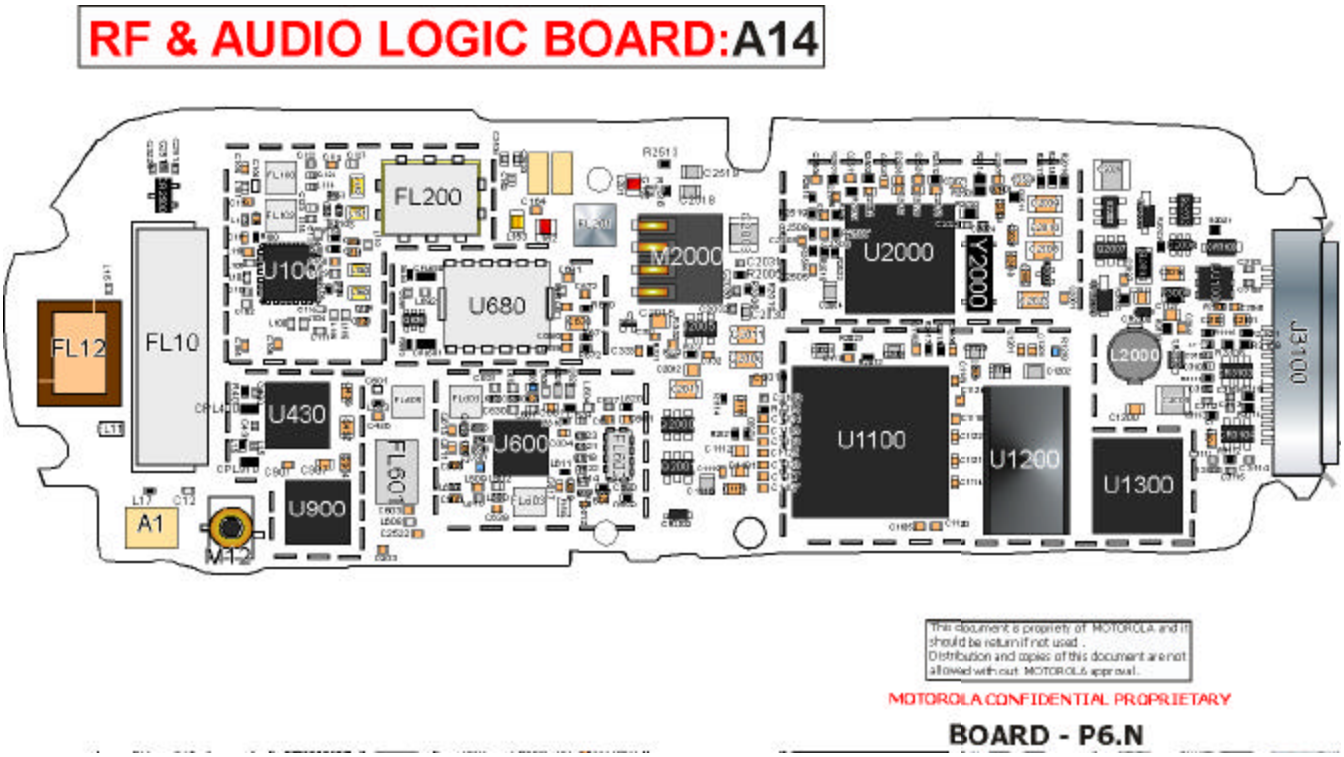
BOARD - P6.N



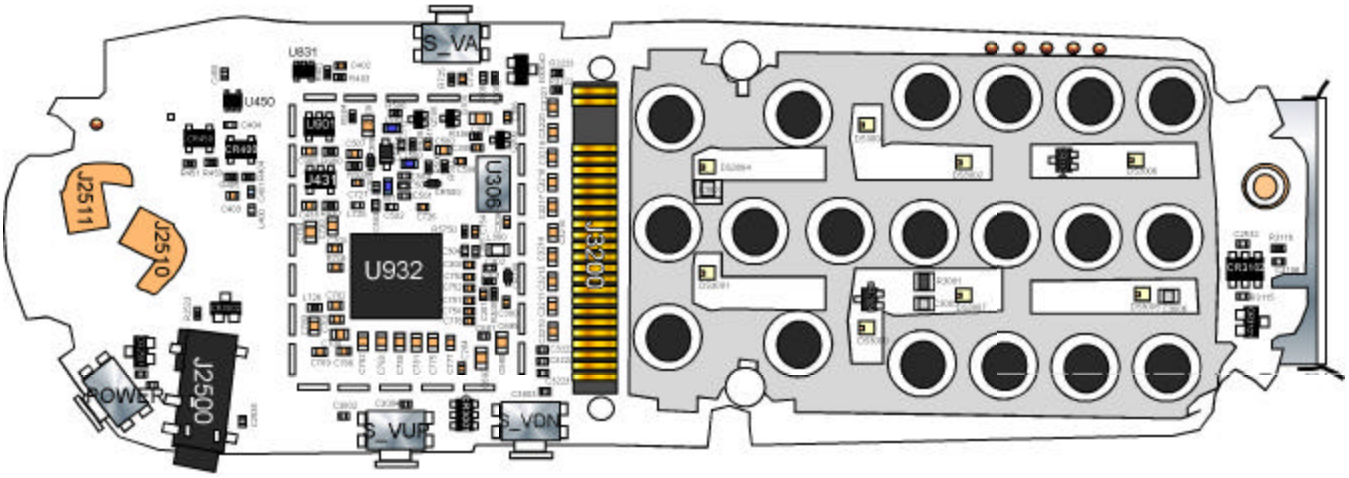
CONNECTORS: A13

CE BUS AND COMMUNICATIONS NOTES:

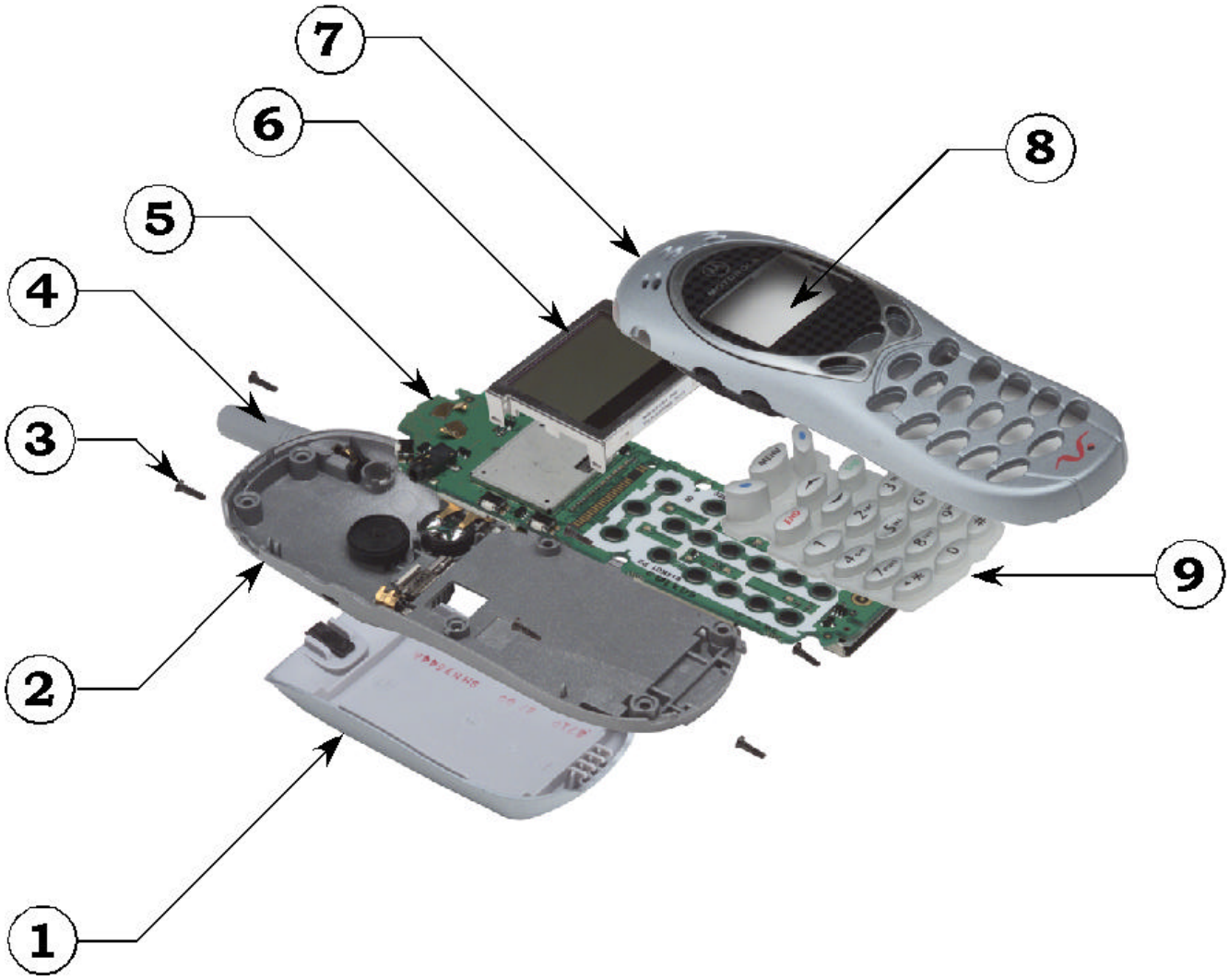
1. P2K Products supports two Serial Communication Protocols
   I. USB (Universal Serial Bus) II. RS232
2. USB: USES: Flashing phones, Desktop Speaker phone, Pro-installed car kit
3. USB needs USB cable to interfere with Personal computer.
4. RS232: USES: In factory for testing and phasing phones, flashing phone (will eventually phase out)
5. RS232 needs RS232 Data head to interface to PC.
6. USB and RS232 (3 wire) communications takes place through CCAP interface.
7. CE BUS pin 2-dual functions- BATTFDBK and MANST
8. BATTFDBK used for controlled power dissipation by the charger.
9. MANTST is used to detect the type of charger (Full rate, Mid rate, and Invalid).
10. Initially CCAP (ADC) reads the voltage on this pin (pin2) and then determines the charger type and then the BATTFDBK signal is active.
11. SWB+: is the power supply for speaker phone, RS232 data head, FM radio, and blue tooth clip on. When external supply present SWB+ should be low.
12. SWB+ is used to communicate(through toggling high or low) with desk top charger. High to charge front pocket, and when charging is over toggles low.



ZIF/SYN & KEYBOARD SIDE:A15



BOARD - P6.N



PART NUMBER	DESCRIPTION
1. 15D88790K	BATTERY COVER
2. 1588875K01	HSNG REAR ASSEMBLY TARPON V. CDMA
3. 0309315B07	SCREW TORX PLUS W/AUTOSER 1.8
4. 8589650K12	ANTENNA TELESCOPING TARPON
5. SYN7900A	BRD TARPON CDMA
6. 7202879Z72	LCD MODULE TARPON
7. 1588865K02	HSNG FRONT TARPON SYMPHONY BLUE
8. 6188789K01	LENS TARPON V.
9. 3888526L02	KEYPAD TARPON SPRINT

ELECTRICAL PARTS LIST

Reference Des	'Part Number	Description
C1007	2113743N40	CAP CHIP 39.0 PF 5% COG
C204	2113743L17	CAP CHIP 1000 PF 10% X7R
C2530	2113743N50	CAP CHIP 100 PF 5% COG
C2531	2113743N50	CAP CHIP 100 PF 5% COG
C2532	2113743N40	CAP CHIP 39.0 PF 5% COG
C2535	2113743N40	CAP CHIP 39.0 PF 5% COG
C300	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C3001	2113743N40	CAP CHIP 39.0 PF 5% COG
C3002	2113743N40	CAP CHIP 39.0 PF 5% COG
C3003	2113743N40	CAP CHIP 39.0 PF 5% COG
C3004	2113743N40	CAP CHIP 39.0 PF 5% COG
C3005	2113743N40	CAP CHIP 39.0 PF 5% COG
C3006	2113743N40	CAP CHIP 39.0 PF 5% COG
C3008	2113743N40	CAP CHIP 39.0 PF 5% COG
C301	2113743L41	CAP CHIP 10000 PF 10% X7R
C302	2113743N42	CAP CHIP 47.0 PF 5% COG
C303	2113743N36	CAP CHIP 27.0 PF 5% COG
C304	2113743N24	CAP CHIP 8.2 PF + -.5PF COG
C306	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C307	2311049A76	CAP TANT CHIP 2.2UF 10% 6V

C307	2311049A76	CAP TANT CHIP 2.2UF 10% 6V
C308	2113743L41	CAP CHIP 10000 PF 10% X7R
C309	2113743L41	CAP CHIP 10000 PF 10% X7R
C3106	2113743N40	CAP CHIP 39.0 PF 5% COG
C3210	2113928P04	CAP CER CHIP 1.0UF 20% 6.3V
C3211	2113928P04	CAP CER CHIP 1.0UF 20% 6.3V
C3213	2113928P04	CAP CER CHIP 1.0UF 20% 6.3V
C3214	2113928P04	CAP CER CHIP 1.0UF 20% 6.3V
C3216	2113928P04	CAP CER CHIP 1.0UF 20% 6.3V
C3217	2113743E20	CAP CHIP .10 UF 10%
C3218	2113743E20	CAP CHIP .10 UF 10%
C3219	2113743E20	CAP CHIP .10 UF 10%
C3220	2113743E20	CAP CHIP .10 UF 10%
C3221	2113743E20	CAP CHIP .10 UF 10%
C3222	2113743N40	CAP CHIP 39.0 PF 5% COG
C3223	2113743N40	CAP CHIP 39.0 PF 5% COG
C3224	2113743N40	CAP CHIP 39.0 PF 5% COG
C401	2113743N07	CAP CHIP 1.5 PF +-.25PF COG
C402	2113743L41	CAP CHIP 10000 PF 10% X7R
C403	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C404	2113743N40	CAP CHIP 39.0 PF 5% COG
C435	2113743N50	CAP CHIP 100 PF 5% COG
C450	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C500	2113928A01	CAP CER CHIP 1.0 UF 10V

C501	2113743N16	CAP CHIP 3.9 PF +-.25PF COG
C502	2113743N24	CAP CHIP 8.2 PF + -.5PF COG
C503	2113743N34	CAP CHIP 22.0 PF 5% COG
C504	2113743N40	CAP CHIP 39.0 PF 5% COG
C505	2104801Z06	CAP CER NPO 1.0PF 16V 1005 SMD
C506	2113743N29	CAP CHIP 13.0 PF 5% COG
C507	2113743L41	CAP CHIP 10000 PF 10% X7R
C508	2113928C03	CAP CER CHIP 1.0 UF 6.3V 10%
C509	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C511	2113743L41	CAP CHIP 10000 PF 10% X7R
C512	2113743N50	CAP CHIP 100 PF 5% COG
C681	2113743N40	CAP CHIP 39.0 PF 5% COG
C690	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C692	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C700	2113743E20	CAP CHIP .10 UF 10%
C701	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C702	2113743L13	CAP CHIP 680 PF 10% X7R
C703	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C704	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C709	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C725	2113743L35	CAP CHIP 5600 PF 10% X7R
C726	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C727	2113743M24	CAP CHIP 100000 PF +80-20% Y5V

C730	2113928A01	CAP CER CHIP 1.0 UF 10V
C750	2113743L41	CAP CHIP 10000 PF 10% X7R
C751	2113743L41	CAP CHIP 10000 PF 10% X7R
C752	2113743L41	CAP CHIP 10000 PF 10% X7R
C753	2113743L41	CAP CHIP 10000 PF 10% X7R
C754	2113743L41	CAP CHIP 10000 PF 10% X7R
C775	2113928G01	CAP CER CHIP .22 UF 6.3V 10%
C776	2113743L17	CAP CHIP 1000 PF 10% X7R
C777	2113743L41	CAP CHIP 10000 PF 10% X7R
C780	2113743E20	CAP CHIP .10 UF 10%
C781	2113743E20	CAP CHIP .10 UF 10%
C782	2113743E20	CAP CHIP .10 UF 10%
C783	2113743E20	CAP CHIP .10 UF 10%
C786	2113743L41	CAP CHIP 10000 PF 10% X7R
C789	2113928A01	CAP CER CHIP 1.0 UF 10V
C905	2113743N50	CAP CHIP 100 PF 5% COG
CR1101	4809606E07	DIODE DUAL ARRAY DA221
CR2004	4809606E07	DIODE DUAL ARRAY DA221
CR2501	4813830A70	DIODE DL 5.6V COM ANODE
CR300	4809877C08	DIODE VARACTOR 1SV279 SMD
CR3001	4813832P70	TRANS SUP 5.6V QUAD
CR3002	4813830A70	DIODE DL 5.6V COM ANODE
CR3003	4813830A70	DIODE DL 5.6V COM ANODE

CR3101	4813830A70	DIODE DL 5.6V COM ANODE
CR3102	4813832C73	TRANS SUP QUAD 6.2V
CR400	4809606E05	DIODE DUAL SCHOTTKEY SOT-143
CR450	4809606E05	DIODE DUAL SCHOTTKEY SOT-143
CR500	4809877C08	DIODE VARACTOR 1SV279 SMD
CR501	4809948D10	DIODE PIN BAR63-03
CR502	4809877C13	DIODE VARACTOR ISV305 SMD
DS3000	4809496B11	LED CHIP YEL-GRN 1608 CL191YG
DS3001	4809496B11	LED CHIP YEL-GRN 1608 CL191YG
DS3002	4809496B11	LED CHIP YEL-GRN 1608 CL191YG
DS3003	4809496B11	LED CHIP YEL-GRN 1608 CL191YG
DS3004	4809496B11	LED CHIP YEL-GRN 1608 CL191YG
DS3005	4809496B11	LED CHIP YEL-GRN 1608 CL191YG
DS3006	4809496B11	LED CHIP YEL-GRN 1608 CL191YG
DS3007	4809496B11	LED CHIP YEL-GRN 1608 CL191YG
L400	2409154M12	IND CER MLTILYR 8.2NH 1005
L500	2485793G11	IND CHIP WW 39 NH 2% 1608 SMD
L501	2485793G07	IND CHIP WW 18 NH 2% 1608 SMD
L502	2485793G20	IND CHIP WW 220NH 2% 1608 SMD
L725	2409154M48	IND CER MLTILYR 100 NH 1005
L726	2409154M75	IND CER MLTILYR 100 NH 1005
Q100	4809579E02	TSTR MOSFET N-CHAN 25K1830
Q306	4809579E24	TSTR FET P-CHAN 2SJ347 SC90

Q500	4809579E02	TSTR MOSFET N-CHAN 25K1830
R2523	0662057M98	RES. CHIP 10K 5% 20X40
R2523	0662057M98	RES. CHIP 10K 5% 20X40
R2523	0662057M98	RES. CHIP 10K 5% 20X40
R300	0662057M78	RES. CHIP 1500 5% 20X40
R300	0662057M78	RES. CHIP 1500 5% 20X40
R300	0662057M78	RES. CHIP 1500 5% 20X40
R3001	0662057N23	RES. CHIP 100K 5% 20X40
R3001	0662057N23	RES. CHIP 100K 5% 20X40
R3002	0662057N23	RES. CHIP 100K 5% 20X40
R3002	0662057N23	RES. CHIP 100K 5% 20X40
R301	0662057M98	RES. CHIP 10K 5% 20X40
R301	0662057M98	RES. CHIP 10K 5% 20X40
R301	0662057M98	RES. CHIP 10K 5% 20X40
R306	0662057M74	RES. CHIP 1000 5% 20X40
R306	0662057M74	RES. CHIP 1000 5% 20X40
R306	0662057M74	RES. CHIP 1000 5% 20X40
R3115	0662057M35	RES. CHIP 24 5% 20X40
R3115	0662057M35	RES. CHIP 24 5% 20X40
R3115	0662057M35	RES. CHIP 24 5% 20X40
R3116	0662057M35	RES. CHIP 24 5% 20X40
R3116	0662057M35	RES. CHIP 24 5% 20X40

R3116	0662057M35	RES. CHIP 24 5% 20X40
R3222	0662057M38	RES. CHIP 33 5% 20X40
R3222	0662057M38	RES. CHIP 33 5% 20X40
R3222	0662057M38	RES. CHIP 33 5% 20X40
R3223	0662057M38	RES. CHIP 33 5% 20X40
R3223	0662057M38	RES. CHIP 33 5% 20X40
R3223	0662057M38	RES. CHIP 33 5% 20X40
R402	0662057N05	RES. CHIP 18K 5% 20X40
R402	0662057N05	RES. CHIP 18K 5% 20X40
R403	0662057V21	RES CHIP 56K 1% 1/16W
R403	0662057V21	RES CHIP 56K 1% 1/16W
R404	0662057M90	RES. CHIP 4700 5% 20X40
R404	0662057M90	RES. CHIP 4700 5% 20X40
R405	0662057M95	RES. CHIP 7500 5% 20X40
R405	0662057M95	RES. CHIP 7500 5% 20X40
R430	0662057M26	RES. CHIP 10 5% 20X40
R430	0662057M26	RES. CHIP 10 5% 20X40
R430	0662057M26	RES. CHIP 10 5% 20X40
R450	0662057M74	RES. CHIP 1000 5% 20X40
R450	0662057M74	RES. CHIP 1000 5% 20X40
R450	0662057M74	RES. CHIP 1000 5% 20X40
R451	0662057M74	RES. CHIP 1000 5% 20X40
R451	0662057M74	RES. CHIP 1000 5% 20X40
R451	0662057M74	RES. CHIP 1000 5% 20X40

Bottom Side Electrical Parts List

Ref Des#	Part #	Description
C101	2113743N40	CAP CHIP 39.0 PF 5% COG
C102	2113743N12	CAP CHIP 2.7 PF +-.25PF COG
C103	2113743L17	CAP CHIP 1000 PF 10% X7R
C104	2104801Z18	CAP CER NPO 3.3PF 16V 1005 SMD
C106	2113743L41	CAP CHIP 10000 PF 10% X7R
C108	2113743L41	CAP CHIP 10000 PF 10% X7R
C109	2113743N40	CAP CHIP 39.0 PF 5% COG
C1100	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C1101	2113743E20	CAP CHIP .10 UF 10%
C1102	2113743L41	CAP CHIP 10000 PF 10% X7R
C1104	2113743L41	CAP CHIP 10000 PF 10% X7R
C1105	2113743L41	CAP CHIP 10000 PF 10% X7R
C1106	2113743L41	CAP CHIP 10000 PF 10% X7R
C1107	2113743L41	CAP CHIP 10000 PF 10% X7R
C1108	2113743L41	CAP CHIP 10000 PF 10% X7R
C1109	2113743L41	CAP CHIP 10000 PF 10% X7R
C111	2113743N09	CAP CHIP 2.0 PF +-.25PF COG
C1111	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C1112	2113743E20	CAP CHIP .10 UF 10%
C1113	2113743L41	CAP CHIP 10000 PF 10% X7R
C1114	2113743L41	CAP CHIP 10000 PF 10% X7R

C1115	2113743L41	CAP CHIP 10000 PF 10% X7R
C1116	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C1117	2113743L41	CAP CHIP 10000 PF 10% X7R
C1118	2113743L41	CAP CHIP 10000 PF 10% X7R
C1119	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C112	2113743N18	CAP CHIP 4.7 PF +-.25PF COG
C1120	2113743L41	CAP CHIP 10000 PF 10% X7R
C1121	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C1122	2113743L41	CAP CHIP 10000 PF 10% X7R
C1123	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C1124	2113743L41	CAP CHIP 10000 PF 10% X7R
C1125	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C1126	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C1127	2113743E20	CAP CHIP .10 UF 10%
C1128	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C113	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C113	2113743N12	CAP CHIP 2.7 PF +-.25PF COG
C114	2113743L41	CAP CHIP 10000 PF 10% X7R
C115	2113743L41	CAP CHIP 10000 PF 10% X7R
C116	2113743N07	CAP CHIP 1.5 PF +-.25PF COG
C117	2113743N28	CAP CHIP 12.0 PF 5% COG
C118	2113743N09	CAP CHIP 2.0 PF +-.25PF COG
C119	2113743L17	CAP CHIP 1000 PF 10% X7R
C12	2113743N15	CAP CHIP 3.6 PF +-.25PF COG

C120	2113743N50	CAP CHIP 100 PF 5% COG
C1200	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C1201	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C1202	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C121	2113743N03	CAP CHIP 1.0 PF +-.25PF COG
C122	2113743N19	CAP CHIP 5.1 PF + -.5PF COG
C123	2113743N22	CAP CHIP 6.8 PF + -.5PF COG
C124	2113743N24	CAP CHIP 8.2 PF + -.5PF COG
C125	2113743N07	CAP CHIP 1.5 PF +-.25PF COG
C126	2113743N07	CAP CHIP 1.5 PF +-.25PF COG
C127	2113743N30	CAP CHIP 15.0 PF 5% COG
C1300	2113743E20	CAP CHIP .10 UF 10%
C1301	2113743E20	CAP CHIP .10 UF 10%
C150	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C151	2113743N40	CAP CHIP 39.0 PF 5% COG
C152	2113743N40	CAP CHIP 39.0 PF 5% COG
C154	2113743N58	CAP CHIP 4.0PF 16V .25PF COG
C160	2113743L17	CAP CHIP 1000 PF 10% X7R
C161	2113743N27	CAP CHIP 11.0 PF 5% COG
C162	2113743N24	CAP CHIP 8.2 PF + -.5PF COG
C164	2113743N50	CAP CHIP 100 PF 5% COG
C165	2113743N12	CAP CHIP 2.7 PF +-.25PF COG
C2001	2113743M24	CAP CHIP 100000 PF +80-20% Y5V

C2002	2113743E11	CAP CHIP .039 UF 10% X7R
C2003	2185736G01	CAP CER Y5V 22UF 10V 3225 SMD
C2004	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C2005	2185736G01	CAP CER Y5V 22UF 10V 3225 SMD
C2007	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C2010	2113743E20	CAP CHIP .10 UF 10%
C2012	2113743E20	CAP CHIP .10 UF 10%
C2014	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C2015	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C2017	2113743E20	CAP CHIP .10 UF 10%
C2018	2113928P04	CAP CER CHIP 1.0UF 20% 6.3V
C2020	2113928P04	CAP CER CHIP 1.0UF 20% 6.3V
C2021	2113928P04	CAP CER CHIP 1.0UF 20% 6.3V
C2022	2113743N30	CAP CHIP 15.0 PF 5% COG
C2023	5109781E77	IC VOLT DECT 3.6V PST995NNR
C2023	2409154M03	IND CER MLTILYR 1.5NH 1005
C2023	2409154M07	IND CER MLTILYR 3.3NH 1005
C2023	2409154M99	IND CER MLTILYR 82.0NH 1005
C2023	2409154M48	IND CER MLTILYR 100 NH 1005
C2024	2113743N30	CAP CHIP 15.0 PF 5% COG
C2025	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C2026	2185736G01	CAP CER Y5V 22UF 10V 3225 SMD
C2027	2113743L41	CAP CHIP 10000 PF 10% X7R

C2029	2113743L17	CAP CHIP 1000 PF 10% X7R
C2030	2113743E20	CAP CHIP .10 UF 10%
C2031	2113743N40	CAP CHIP 39.0 PF 5% COG
C2032	2113743N40	CAP CHIP 39.0 PF 5% COG
C2033	2113743N40	CAP CHIP 39.0 PF 5% COG
C2040	2113743N50	CAP CHIP 100 PF 5% COG
C2041	2113743N50	CAP CHIP 100 PF 5% COG
C2101	2113743E20	CAP CHIP .10 UF 10%
C2103	2113743E20	CAP CHIP .10 UF 10%
C2501	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C2502	2113743L07	CAP CHIP 390 PF 10% X7R
C2503	2113743L25	CAP CHIP 2200 PF 10% X7R
C2504	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C2505	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C2506	2113743L03	CAP CHIP 270 PF 10% X7R
C2507	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C2508	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C2511	2113743L19	CAP CHIP 1200 PF 10% X7R
C2512	2113743L25	CAP CHIP 2200 PF 10% X7R
C2513	2113743L13	CAP CHIP 680 PF 10% X7R
C2515	2113743N26	CAP CHIP 10.0 PF 5% COG
C2516	2113743N40	CAP CHIP 39.0 PF 5% COG
C2517	2113743L17	CAP CHIP 1000 PF 10% X7R

C2518	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C2519	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C2522	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C2523	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C2524	2113928P04	CAP CER CHIP 1.0UF 20% 6.3V
C2526	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C2527	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C2528	2113743L13	CAP CHIP 680 PF 10% X7R
C2529	2113928P04	CAP CER CHIP 1.0UF 20% 6.3V
C2533	2113743N40	CAP CHIP 39.0 PF 5% COG
C2534	2113743N40	CAP CHIP 39.0 PF 5% COG
C3100	2113743N40	CAP CHIP 39.0 PF 5% COG
C3101	2113743N40	CAP CHIP 39.0 PF 5% COG
C3102	2113743N40	CAP CHIP 39.0 PF 5% COG
C3107	2113743N40	CAP CHIP 39.0 PF 5% COG
C3108	2113743N40	CAP CHIP 39.0 PF 5% COG
C3109	2113743N40	CAP CHIP 39.0 PF 5% COG
C3110	2113743N40	CAP CHIP 39.0 PF 5% COG
C3111	2113743N40	CAP CHIP 39.0 PF 5% COG
C3112	2113743N40	CAP CHIP 39.0 PF 5% COG
C3113	2113743N40	CAP CHIP 39.0 PF 5% COG
C3114	2113743N40	CAP CHIP 39.0 PF 5% COG
C3115	2113743N40	CAP CHIP 39.0 PF 5% COG

C3225	2113743N40	CAP CHIP 39.0 PF 5% COG
C330	2113743L25	CAP CHIP 2200 PF 10% X7R
C331	2113743N28	CAP CHIP 12.0 PF 5% COG
C332	2113743L17	CAP CHIP 1000 PF 10% X7R
C333	2113743N46	CAP CHIP 68.0 PF 5% COG
C400	2113743N38	CAP CHIP 33.0 PF 5% COG
C431	2113743N30	CAP CHIP 15.0 PF 5% COG
C432	2113928C03	CAP CER CHIP 1.0 UF 6.3V 10%
C433	2113928A01	CAP CER CHIP 1.0 UF 10V
C436	2113743N26	CAP CHIP 10.0 PF 5% COG
C600	2113743N40	CAP CHIP 39.0 PF 5% COG
C601	2104801Z06	CAP CER NPO 1.0PF 16V 1005 SMD
C602	2113743N50	CAP CHIP 100 PF 5% COG
C603	2113743N50	CAP CHIP 100 PF 5% COG
C604	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C605	2113743N50	CAP CHIP 100 PF 5% COG
C606	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C607	2113743N40	CAP CHIP 39.0 PF 5% COG
C608	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C609	2113743N26	CAP CHIP 10.0 PF 5% COG
C610	2113743N01	CAP CHIP 0.5 PF +-.25PF COG
C611	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C612	2113743N28	CAP CHIP 12.0 PF 5% COG

C615	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C616	2113743N36	CAP CHIP 27.0 PF 5% COG
C617	2113743N50	CAP CHIP 100 PF 5% COG
C618	2113743N50	CAP CHIP 100 PF 5% COG
C619	2104801Z15	CAP CER NPO 2.4PF 16V 1005 SMD
C620	2113743N40	CAP CHIP 39.0 PF 5% COG
C621	2113743N50	CAP CHIP 100 PF 5% COG
C622	2113743N50	CAP CHIP 100 PF 5% COG
C623	2113743N50	CAP CHIP 100 PF 5% COG
C624	2113743N21	CAP CHIP 6.2 PF + -.5PF COG
C625	2113743N09	CAP CHIP 2.0 PF +-.25PF COG
C626	2113743N10	CAP CHIP 2.2 PF +-.25PF COG
C627	2113743N10	CAP CHIP 2.2 PF +-.25PF COG
C628	2113743N09	CAP CHIP 2.0 PF +-.25PF COG
C629	2113743N40	CAP CHIP 39.0 PF 5% COG
C630	2113743N38	CAP CHIP 33.0 PF 5% COG
C631	2113743N38	CAP CHIP 33.0 PF 5% COG
C637	2113743N13	CAP CHIP 3.0 PF +-.25PF COG
C639	2113743N50	CAP CHIP 100 PF 5% COG
C670	2113928C03	CAP CER CHIP 1.0 UF 6.3V 10%
C671	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C672	2113743L41	CAP CHIP 10000 PF 10% X7R
C680	2113743M24	CAP CHIP 100000 PF +80-20% Y5V

C686	2113743N28	CAP CHIP 12.0 PF 5% COG
C689	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C691	2113743L41	CAP CHIP 10000 PF 10% X7R
C728	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C729	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C901	2113743L17	CAP CHIP 1000 PF 10% X7R
C903	2113743N26	CAP CHIP 10.0 PF 5% COG
C904	2113928A01	CAP CER CHIP 1.0 UF 10V
C907	2113928A01	CAP CER CHIP 1.0 UF 10V
C910	2113743N09	CAP CHIP 2.0 PF +-.25PF COG
CR2001	4809606E02	DIODE DUAL ARRAY DAN222
CR2002	4809653F07	RECT SCHTTKY 1A MBRM120ET3
CR2003	4809653F07	RECT SCHTTKY 1A MBRM120ET3
CR2500	4813830A70	DIODE DL 5.6V COM ANODE
CR2502	4809788E06	DIODE ZENER 6.8V UDZ6.8B
CR2503	4809606E02	DIODE DUAL ARRAY DAN222
CR3100	4813830C29	DIODE 16V `J1` MMSZ5246BT1
CR3103	4813832P70	TRANS SUP 5.6V QUAD
CR3104	4813832P70	TRANS SUP 5.6V QUAD
FL100	9103913K04	FLTR SAW TX 818MHZ SMD
FL103	9109239M06	FLTR SAW TX BP 1960MHZ 3MM SMD
FL12	9109361K03	FLTR SAW DUPLEX 850MHZ SMD
FL201	9185838J01	FLTR XTAL 109.65MHZ 3.8MM SMD

FL605	9103913K03	FLTR SAW TX 836MHZ SMD
FL606	9103913K03	FLTR SAW TX 836MHZ SMD
L100	2409154M10	IND CER MLTILYR 5.6NH 1005
L101	2409154M11	IND CER MLTILYR 6.8NH 1005
L102	2409154M12	IND CER MLTILYR 8.2NH 1005
L103	2409154M04	IND CER MLTILYR 1.8NH 1005
L104	2409154M07	IND CER MLTILYR 3.3NH 1005
L105	2409154M03	IND CER MLTILYR 1.5NH 1005
L106	2409154M04	IND CER MLTILYR 1.8NH 1005
L110	2409154M48	IND CER MLTILYR 100 NH 1005
L112	2409154M01	IND CER MLTILYR 1.0NH 1005
L114	2409154M14	IND CER MLTILYR 12.0NH 1005
L115	2409154M10	IND CER MLTILYR 5.6NH 1005
L15	2409154M15	IND CER MLTILYR 15.0NH 1005
L150	2404574Z13	IND CHIP WW 220NH 2% 2012 SMD
L151	2404574Z13	IND CHIP WW 220NH 2% 2012 SMD
L152	2404574Z11	IND CHIP WW 150NH 2% 2012 SMD
L153	2409414M16	IND CHIP WW 68 NH 5 % 2012
L160	2404574Z15	IND CHIP WW 330NH 2% 2012 SMD
L162	2404574Z14	IND CHIP WW 270NH 2% 2012 SMD
L17	2409154M83	IND CER MLTILYR 3.9 NH 1005
L2005	2409154M17	IND CER MLTILYR 22.0NH 1005
L201	2404574Z14	IND CHIP WW 270NH 2% 2012 SMD

L600	2409154M30	IND CER MLTILYR 3.3NH 1005
L601	2409154M12	IND CER MLTILYR 8.2NH 1005
L602	2409154M01	IND CER MLTILYR 1.0NH 1005
L603	2409154M86	IND CER MLTILYR 6.8 NH 1005
L604	2409154M15	IND CER MLTILYR 15.0NH 1005
L605	2409154M96	IND CER MLTILYR 47.0NH 1005
L607	2409154M17	IND CER MLTILYR 22.0NH 1005
L608	2409154M12	IND CER MLTILYR 8.2NH 1005
L609	2409154M16	IND CER MLTILYR 18.0NH 1005
L610	2409154M96	IND CER MLTILYR 47.0NH 1005
L611	2409154M83	IND CER MLTILYR 3.9 NH 1005
L612	2409154M16	IND CER MLTILYR 18.0NH 1005
L613	2409154M33	IND CER MLTILYR 5.6NH 1005
L614	2409154M33	IND CER MLTILYR 5.6NH 1005
L615	2409154M16	IND CER MLTILYR 18.0NH 1005
L618	2409154M17	IND CER MLTILYR 22.0NH 1005
L620	2409154M99	IND CER MLTILYR 82.0NH 1005
L691	2409154M48	IND CER MLTILYR 100 NH 1005
L692	2409154M48	IND CER MLTILYR 100 NH 1005
Q2000	4809579E29	TSTR FET P-CHAN SI3443DV 6TSOP
Q2001	4809579E29	TSTR FET P-CHAN SI3443DV 6TSOP
Q2002	4809579E29	TSTR FET P-CHAN SI3443DV 6TSOP
Q2005	4809579E29	TSTR FET P-CHAN SI3443DV 6TSOP

Q2006	4809939C03	TSTR DUAL NPN/PNP UMH3
Q2007	4809579E29	TSTR FET P-CHAN SI3443DV 6TSOP
Q636	4809579E42	FET DUAL P-CHAN FDG6304P SC70
R101	0662057N05	RES. CHIP 18K 5% 20X40
R1107	0662057M01	RES. CHIP 0 5% 20X40
R1114	0662057M50	RES. CHIP 100 5% 20X40
R1115	0662057M90	RES. CHIP 4700 5% 20X40
R1116	0662057N15	RES. CHIP 47K 5% 20X40
R1117	0662057N33	RES. CHIP 270K 5% 20X40
R1203	0662057M01	RES. CHIP 0 5% 20X40
R150	0662057M81	RES. CHIP 2000 5% 20X40
R160	0662057M96	RES. CHIP 8200 5% 20X40
R2005	0662057V02	RES CHIP 10K 1% 1/16W
R2006	0662057V02	RES CHIP 10K 1% 1/16W
R2013	0662057M02	RES. CHIP 1.0 5% 20X40
R2016	0662057M90	RES. CHIP 4700 5% 20X40
R2018	0662057M85	RES. CHIP 3000 5% 20X40
R2019	0662057M98	RES. CHIP 10K 5% 20X40
R2020	0662057B46	CHIP RES 10.0 MEG OHMS 5%
R2021	0662057N23	RES. CHIP 100K 5% 20X40
R2023	0662057M78	RES. CHIP 1500 5% 20X40
R2029	0662057M90	RES. CHIP 4700 5% 20X40
R2031	0609175L02	RES CHIP 0.25 1% .25W 1206
R2032	0662057N47	RES. CHIP 1.0 MEG 5% 20X40

R2100	0662057N09	RES. CHIP 27K 5% 20X40
R2101	0662057N23	RES. CHIP 100K 5% 20X40
R2501	0662057M98	RES. CHIP 10K 5% 20X40
R2502	0662057N23	RES. CHIP 100K 5% 20X40
R2503	0662057M95	RES. CHIP 7500 5% 20X40
R2504	0662057N07	RES. CHIP 22K 5% 20X40
R2505	0662057N27	RES. CHIP 150K 5% 20X40
R2506	0662057N09	RES. CHIP 27K 5% 20X40
R2507	0662057N09	RES. CHIP 27K 5% 20X40
R2508	0662057N07	RES. CHIP 22K 5% 20X40
R2509	0662057N12	RES. CHIP 36K 5% 20X40
R2510	0662057M90	RES. CHIP 4700 5% 20X40
R2511	0662057M90	RES. CHIP 4700 5% 20X40
R2512	0662057N47	RES. CHIP 1.0 MEG 5% 20X40
R2514	0662057N12	RES. CHIP 36K 5% 20X40
R2515	0662057M90	RES. CHIP 4700 5% 20X40
R2516	0662057M42	RES. CHIP 47 5% 20X40
R2517	0662057M68	RES. CHIP 560 5% 20X40

R2518	0662057M74	RES. CHIP 1000 5% 20X40
R2519	0662057M68	RES. CHIP 560 5% 20X40
R2520	0662057N31	RES. CHIP 220K 5% 20X40
R2521	0662057N03	RES. CHIP 15K 5% 20X40
R2522	0662057M92	RES. CHIP 5600 5% 20X40
R3000	0662057C27	CHIP RES 10 OHMS 5%
R3101	0662057V17	RES CHIP 39K 1% 1/16W
R3102	0662057V02	RES CHIP 10K 1% 1/16W
R3108	0662057M26	RES. CHIP 10 5% 20X40
R3109	0662057M26	RES. CHIP 10 5% 20X40
R3111	0662057M26	RES. CHIP 10 5% 20X40
R3112	0662057M26	RES. CHIP 10 5% 20X40
R3113	0662057M26	RES. CHIP 10 5% 20X40
R3114	0662057M26	RES. CHIP 10 5% 20X40
R331	0662057M76	RES. CHIP 1200 5% 20X40
R332	0662057M92	RES. CHIP 5600 5% 20X40
R333	0662057N10	RES. CHIP 30K 5% 20X40
R401	0662057M43	RES. CHIP 51 5% 20X40
R600	0662057M01	RES. CHIP 0 5% 20X40
R601	0662057N13	RES. CHIP 39K 5% 20X40
R602	0662057N06	RES. CHIP 20K 5% 20X40

R670	0662057M68	RES. CHIP 560 5% 20X40
R671	0662057M46	RES. CHIP 68 5% 20X40
R672	0662057M74	RES. CHIP 1000 5% 20X40
R682	0662057M43	RES. CHIP 51 5% 20X40
R683	0662057M43	RES. CHIP 51 5% 20X40
R911	0662057M43	RES. CHIP 51 5% 20X40
U2200	5109781E77	IC VOLT DECT 3.6V PST995NNR
U600	5109940K29	IC MIX/EXC CDMA/AMPS ME3 32BCC
Y2000	4809995L08	XTAL QUARTZ 32.768KHZ MC-156