REVISED HISTORY

DATE	ISSUE	CONTENTS OF CHANGES	S/W VERSION
		Initial Release	

The information in this manual is subject to change without notice and should not be construed as a commitment by LGE Inc. Furthermore, LGE Inc. reserves the right, without notice, to make changes to equipment design as advances in engineering and manufacturing methods warrant.

This manual provides the information necessary to install, program, operate and maintain the G1500.

Table Of Contents

1. INTRODUCTION

1.1 Purpose

This manual provides the information necessary to repair, calibration, description and download the features of LG-G1500.

1.2 Regulatory Information

A. Security

Toll fraud, the unauthorized use of telecommunications system by an unauthorized part (for example, persons other than your company's employees, agents, subcontractors, or person working on your company's behalf) can result in substantial additional charges for your telecommunications services. System users are responsible for the security of own system. There may be risks of toll fraud associated with your telecommunications system. System users are responsible for programming and configuring the equipment to prevent unauthorized use. The manufacturer does not warrant that this product is immune from the above case but will prevent unauthorized use of common-carrier telecommunication service of facilities accessed through or connected to it. The manufacturer will not be responsible for any charges that are resulted from such unauthorized use.

B. Incidence of Harm

If a telephone company determines that the equipment provided to customer is faulty and possibly causing harm or interruption in service to the telephone network, it should disconnect telephone service until repair can be done. A telephone company may temporarily disconnect service as long as repair is not done.

C. Changes in Service

A local telephone company may make changes in its communications facilities or procedure. If these changes could reasonably be expected to affect the use of this phone or compatibility with the network, the telephone company is required to give advanced written notice to the user, allowing the user to take appropriate steps to maintain telephone service.

D. Maintenance Limitations

Maintenance limitations on this model must be performed only by the manufacturer or its authorized agent. Therefore, note that unauthorized alternations or repair may affect the regulatory status of the system and may void any remaining warranty.

E. Notice of Radiated Emissions

The LG-G1500 complies with rules regarding radiation and radio frequency emission as defined by local regulatory agencies. In accordance with these agencies, you may be required to provide information such as the following to the end user.

F. Pictures

The pictures in this manual are for illustrative purposes only; your actual hardware may look slightly different.

G. Interference and Attenuation

The LG-G1500 may interfere with sensitive laboratory equipment, medical equipment, etc. Interference from unsuppressed engines or electric motors may cause problems.

H. Electrostatic Sensitive Devices

ATTENTION

Boards, which contain Electrostatic Sensitive Device (ESD), are indicated by the  **sign.**

Following information is ESD handling:

- Service personnel should ground themselves by using a wrist strap when exchange system boards.
- When repairs are made to a system board, they should spread the floor with anti-static mat which is also grounded.
- Use a suitable, grounded soldering iron.
- Keep sensitive parts in these protective packages until these are used.
- When returning system boards or parts like EEPROM to the factory, use the protective package as described.

1.3 Abbreviations

For the purposes of this manual, following abbreviations apply:

APC	Automatic Power Control
BB	Baseband
BER	Bit Error Rate
CC-CV	Constant Current – Constant Voltage
DAC	Digital to Analog Converter
DCS	Digital Communication System
dBm	dB relative to 1 milli watt
DSP	Digital Signal Processing
ESD	Electrostatic Discharge
FPCB	Flexible Printed Circuit Board
GMSK	Gaussian Minimum Shift Keying
GPIB	General Purpose Interface Bus
GSM	Global System for Mobile Communications
IPUI	International Portable User Identity
IF	Intermediate Frequency
LCD	Liquid Crystal Display
LDO	Low Drop Output
LED	Light Emitting Diode
OPLL	Offset Phase Locked Loop

1. INTRODUCTION

PAM	Power Amplifier Module
PCB	Printed Circuit Board
PGA	Programmable Gain Amplifier
PLL	Phase Locked Loop
PSTN	Public Switched Telephone Network
RF	Radio Frequency
RLR	Receiving Loudness Rating
RMS	Root Mean Square
RTC	Real Time Clock
SAW	Surface Acoustic Wave
SIM	Subscriber Identity Module
SLR	Sending Loudness Rating
SRAM	Static Random Access Memory
PSRAM	Pseudo SRAM
STMR	Side Tone Masking Rating
TA	Travel Adapter
TDD	Time Division Duplex
TDMA	Time Division Multiple Access
UART	Universal Asynchronous Receiver/Transmitter
VCO	Voltage Controlled Oscillator
VCTCXO	Voltage Control Temperature Compensated Crystal Oscillator
WAP	Wireless Application Protocol

2. PERFORMANCE

2.1 H/W Features

Item	Feature	Comment
Support	Dual band (EGSM/DCS) Bar Type GPRS	
Size	105.2 × 45.6 × 21.3 mm (Max)	
Weight	80g (Standard battery)	
Battery	3.7V > 850mAh Li-Ion (Standard)	
Talk Time (PL : 7)	3hours (Min) at 850mAh (Standard)	
Standby Time (PL : 9)	200hours (Min) at 850mAh (Standard)	
ANT Type	Internal Antenna	
LCD	128 × 64 Dot, B/W	
Back Light	LED Back Light	
Back Light Color	Blue Color	
Vibrator	Yes (Coin Type)	
LED Indicator	Use LCD Backlight	
Buzzer	Yes	
C-MIC	Yes	
Receiver	Yes	
Earphone Jack	Yes (3 Pole Type)	
SIM Socket	Yes (SIM Block Type)→3V only	
Volume key	Navigation Key	
Voice Dialing	Yes	
I/O Connect	18 Pin (Batt. 3Pole)	
Basic ACC'Y	Travel Adapter(3hour-Charging Time)Standard Battery (LI-Ion 850mAh)Earphone (include Hook Switch)	
Option	Hand/Neck Strap, Data Kit, CLA, CD	

2. PERFORMANCE

2.2 Technical Specification

<table>
<tr><th>Item</th><th>Description</th><th>Specification</th></tr>
<tr><td>1</td><td>Frequency Band</td><td>GSM
TX: 890 + n × 0.2 MHz
RX: 935 + n × 0.2 MHz (n=1~124)
EGSM
TX: 890 + (n-1024) × 0.2 MHz
RX: 935 + (n-1024) × 0.2 MHz (n=975~1024)
DCS
TX: 1710 + (n-512) × 0.2 MHz
RX: 1805 + (n-512) × 0.2 MHz (n=512~885)</td></tr>
<tr><td>2</td><td>Phase Error</td><td>RMS < 5 degrees
Peak < 20 degrees</td></tr>
<tr><td>3</td><td>Frequency Error</td><td>< 0.1 ppm</td></tr>
<tr><td rowspan="20">4</td><td rowspan="20">Power Level</td><td>GSM, EGSM</td></tr>
<tr><td>
<table>
<tr><td>Level</td><td>Power</td><td>Toler.</td><td>Level</td><td>Power</td><td>Toler.</td></tr>
<tr><td>5</td><td>33dBm</td><td>±2dB</td><td>13</td><td>17dBm</td><td>± 3dB</td></tr>
<tr><td>6</td><td>31dBm</td><td>±3dB</td><td>14</td><td>15dBm</td><td>± 3dB</td></tr>
<tr><td>7</td><td>29dBm</td><td>±3dB</td><td>15</td><td>13dBm</td><td>± 3dB</td></tr>
<tr><td>8</td><td>27dBm</td><td>±3dB</td><td>16</td><td>11dBm</td><td>± 5dB</td></tr>
<tr><td>9</td><td>25dBm</td><td>±3dB</td><td>17</td><td>9dBm</td><td>± 5dB</td></tr>
<tr><td>10</td><td>23dBm</td><td>±3dB</td><td>18</td><td>7dBm</td><td>± 5dB</td></tr>
<tr><td>11</td><td>21dBm</td><td>±3dB</td><td>19</td><td>5dBm</td><td>± 5dB</td></tr>
<tr><td>12</td><td>19dBm</td><td>±3dB</td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>DCS</td></tr>
<tr><td>
<table>
<tr><td>Level</td><td>Power</td><td>Toler.</td><td>Level</td><td>Power</td><td>Toler.</td></tr>
<tr><td>0</td><td>30dBm</td><td>±2dB</td><td>8</td><td>14dBm</td><td>± 3dB</td></tr>
<tr><td>1</td><td>28dBm</td><td>±3dB</td><td>9</td><td>12dBm</td><td>± 4dB</td></tr>
<tr><td>2</td><td>26dBm</td><td>±3dB</td><td>10</td><td>10dBm</td><td>± 4dB</td></tr>
<tr><td>3</td><td>24dBm</td><td>±3dB</td><td>11</td><td>8dBm</td><td>± 4dB</td></tr>
<tr><td>4</td><td>22dBm</td><td>±3dB</td><td>12</td><td>6dBm</td><td>± 4dB</td></tr>
<tr><td>5</td><td>20dBm</td><td>±3dB</td><td>13</td><td>4dBm</td><td>± 4dB</td></tr>
<tr><td>6</td><td>18dBm</td><td>±3dB</td><td>14</td><td>2dBm</td><td>± 5dB</td></tr>
<tr><td>7</td><td>16dBm</td><td>±3dB</td><td>15</td><td>0dBm</td><td>± 5dB</td></tr>
</table>
</td></tr>
</table>

Item	Description	Specification	
5	Output RF Spectrum (due to modulation)	**GSM, EGSM**	
		Offset from Carrier (kHz).	Max. dBc
		100	+0.5
		200	-30
		250	-33
		400	-60
		600~ <1,200	-60
		1,200~ <1,800	-60
		1,800~ <3,000	-63
		3,000~ <6,000	-65
		6,000	-71
		DCS	
		Offset from Carrier (kHz).	Max. dBc
		100	+0.5
		200	-30
		250	-33
		400	-60
		600~ <1,200	-60
		1,200~ <1,800	-60
		1,800~ <3,000	-65
		3,000~ <6,000	-65
		6,000	-73
6	Output RF Spectrum (due to switching transient)	**GSM, EGSM**	
		Offset from Carrier (kHz).	Max. dBm
		400	-19
		600	-21
		1,200	-21
		1,800	-24

2. PERFORMANCE

<table>
<tr><th>Item</th><th>Description</th><th colspan="3">Specification</th></tr>
<tr><td rowspan="6">6</td><td rowspan="6">Output RF Spectrum
(due to switching
transient)</td><td colspan="3">DCS</td></tr>
<tr><td colspan="2">Offset from Carrier (kHz).</td><td>Max. dBm</td></tr>
<tr><td colspan="2">400</td><td>-22</td></tr>
<tr><td colspan="2">600</td><td>-24</td></tr>
<tr><td colspan="2">1,200</td><td>-24</td></tr>
<tr><td colspan="2">1,800</td><td>-27</td></tr>
<tr><td>7</td><td>Spurious Emissions</td><td colspan="3">Conduction, Emission Status</td></tr>
<tr><td>8</td><td>Bit Error Ratio</td><td colspan="3">GSM, EGSM
BER (Class II) < 2.439% @-102 dBm
DCS
BER (Class II) < 2.439% @-100 dBm</td></tr>
<tr><td>9</td><td>RX Level Report Accuracy</td><td colspan="3">±3 dB</td></tr>
<tr><td>10</td><td>SLR</td><td colspan="3">8±3 dB</td></tr>
<tr><td rowspan="9">11</td><td rowspan="9">Sending Response</td><td>Frequency (Hz)</td><td>Max.(dB)</td><td>Min.(dB)</td></tr>
<tr><td>100</td><td>-12</td><td>-</td></tr>
<tr><td>200</td><td>0</td><td>-</td></tr>
<tr><td>300</td><td>0</td><td>-12</td></tr>
<tr><td>1,000</td><td>0</td><td>-6</td></tr>
<tr><td>2,000</td><td>4</td><td>-6</td></tr>
<tr><td>3,000</td><td>4</td><td>-6</td></tr>
<tr><td>3,400</td><td>4</td><td>-9</td></tr>
<tr><td>4,000</td><td>0</td><td>-</td></tr>
<tr><td>12</td><td>RLR</td><td colspan="3">2±3 dB</td></tr>
</table>

<table>
<tr><th>Item</th><th>Description</th><th colspan="3">Specification</th></tr>
<tr><td rowspan="11">13</td><td rowspan="11">Receiving Response</td><td>Frequency (Hz)</td><td>Max.(dB)</td><td>Min.(dB)</td></tr>
<tr><td>100</td><td>-12</td><td>-</td></tr>
<tr><td>200</td><td>0</td><td>-</td></tr>
<tr><td>300</td><td>2</td><td>-7</td></tr>
<tr><td>500</td><td>*</td><td>-5</td></tr>
<tr><td>1,000</td><td>0</td><td>-5</td></tr>
<tr><td>3,000</td><td>2</td><td>-5</td></tr>
<tr><td>3,400</td><td>2</td><td>-10</td></tr>
<tr><td>4,000</td><td>2</td><td></td></tr>
<tr><td colspan="3">* Mean that Adopt a straight line in between 300 Hz and 1,000 Hz to be Max. level in the range.</td></tr>
<tr><td>14</td><td>STMR</td><td colspan="3">13±5 dB</td></tr>
<tr><td>15</td><td>Stability Margin</td><td colspan="3">> 6 dB</td></tr>
<tr><td rowspan="9">16</td><td rowspan="9">Distortion</td><td>dB to ARL (dB)</td><td colspan="2">Level Ratio (dB)</td></tr>
<tr><td>-35</td><td colspan="2">17.5</td></tr>
<tr><td>-30</td><td colspan="2">22.5</td></tr>
<tr><td>-20</td><td colspan="2">30.7</td></tr>
<tr><td>-10</td><td colspan="2">33.3</td></tr>
<tr><td>0</td><td colspan="2">33.7</td></tr>
<tr><td>7</td><td colspan="2">31.7</td></tr>
<tr><td>10</td><td colspan="2">25.5</td></tr>
<tr><td>17</td><td>Side Tone Distortion</td><td colspan="3">Three stage distortion < 10%</td></tr>
<tr><td>18</td><td>System frequency
(13 MHz) tolerance</td><td colspan="3">≤ 2.5 ppm</td></tr>
<tr><td>19</td><td>32.768KHz tolerance</td><td colspan="3">≤ 30 ppm</td></tr>
<tr><td>20</td><td>Power Consumption</td><td colspan="3">Full power
< 243mA (GSM,EGSM), < 209mA (DCS)

Standby
Normal < 4mA (Max. power)</td></tr>
</table>

2. PERFORMANCE

<table>
<tr><th>Item</th><th>Description</th><th colspan="2">Specification</th></tr>
<tr><td>21</td><td>Talk Time</td><td colspan="2">GSM/Level 7 (Battery Capacity 850mA): Up to 180 Min
GSM/Level 12 (Battery Capacity 850mA): Up to 300 Min</td></tr>
<tr><td>22</td><td>Standby Time</td><td colspan="2">Under conditions, Up to 200hours:
1. Brand new and full 850mAh battery
2. Full charge, no receive/send and keep GSM in idle mode.
3. Broadcast set off.
4. Signal strength display set at 3 level above.
5. Backlight of phone set off.</td></tr>
<tr><td>23</td><td>Ringer Volume</td><td colspan="2">At least 80dB under below conditions:
1. Ringer set as ringer.
2. Test distance set as 50cm</td></tr>
<tr><td>24</td><td>Charge Voltage</td><td colspan="2">Fast Charge: < 500mA
Slow Charge: < 60mA</td></tr>
<tr><td rowspan="7">25</td><td rowspan="7">Antenna Display</td><td>Antenna Bar Number</td><td>Power</td></tr>
<tr><td>5</td><td>-85 dBm ~</td></tr>
<tr><td>4</td><td>-90 dBm ~ -86 dBm</td></tr>
<tr><td>3</td><td>-95 dBm ~ -91 dBm</td></tr>
<tr><td>2</td><td>-100 dBm ~ -96 dBm</td></tr>
<tr><td>1</td><td>-105 dBm ~ -101 dBm</td></tr>
<tr><td>0</td><td>~ -105 dBm</td></tr>
<tr><td rowspan="5">26</td><td rowspan="5">Battery Indicator</td><td>Battery Bar Number</td><td>Voltage</td></tr>
<tr><td>0</td><td>~ 3.62 V</td></tr>
<tr><td>1</td><td>3.62 ~ 3.73 V</td></tr>
<tr><td>2</td><td>3.73 ~ 3.82 V</td></tr>
<tr><td>3</td><td>3.82 V ~</td></tr>
<tr><td rowspan="2">27</td><td rowspan="2">Low Voltage Warning</td><td colspan="2">3.5 ± 0.03V (Call)</td></tr>
<tr><td colspan="2">3.62 ± 0.03V (Standby)</td></tr>
<tr><td>28</td><td>Forced shut down Voltage</td><td colspan="2">3.35 ± 0.03V</td></tr>
<tr><td>29</td><td>Battery Type</td><td colspan="2">1 Li-ion Battery
Standard Voltage = 3.7 V
Battery full charge voltage = 4.2 V
Capacity: 850mAh</td></tr>
</table>

Item	Description	Specification
27	Travel Charger	Switching-mode charger Input: 100 ~ 240 V, 60 Hz Output: 5.2 V, 800 mA

3. TECHNICAL BRIEF

3.1 General Description

The RF parts consists of a transmitter part,a receiver part,a synthesizer part,a voltage supply part,a VCTCXO part. And the main RF Chipset CX74017[U441]is a single-chip dual-band transceiver for the extended global system for mobile communication[E-GSM900MHz]/
Digital communication system[DCS1800MHz] voice and data transfer applications.
This device integrated a direct conversion receiver architecture, which eliminates the need of Intermediate Frequency, a transmitter based on a modulation loop architecture and fractional-N synthesizer part with built in TXVCO and Local-VCO.

3.2 Receiver

The Receiver part in CX74017 contains all active circuits completely, full receiver chain with the exception of discrete front-end RF SAW filters. The filtered and amplified signal is down converted in the RF-mixer to the baseband output. The receiver path is supported by internal channel filtering.
The RF front-end circuit is shown Fig. 3-1.

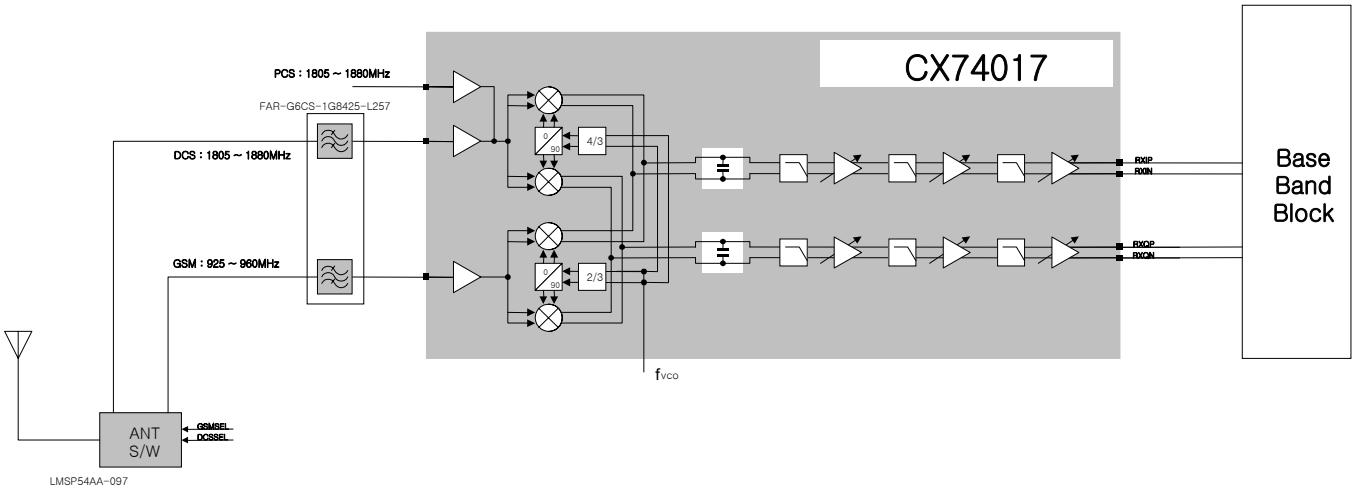


Figure. 3-1 RF Front-end Circuit

A. RF Front End

RF front end consists of Antenna Switch(FL407), dual band LNAs integrated in transceiver(U441). The Received RF signals (GSM 925MHz ~ 960MHz, DCS 1805MHz ~ 1880MHz) are fed into the antenna or mobile switch. An antenna matching circuit is between the antenna and the mobile switch. The Antenna Switch (FL407) is used to control the Rx and TX paths. And, the input signals VC1 and VC2 of a FL407 are connected to DCSSEL(GPO_9) and GSMSEL(GPO_11) ports of U105 to switch either TX or RX path on. When the RX path is turned on, the received RF signal then feeds either Rx _900_RF or RX_1800_RF path controlled by GSM-RX and DCS-RX respectively. This Rx_900_RF path contains one SAW filter, followed after the Antenna Switch (FL407), to filter any unwanted signal apart from the DCS RX band. And, the RX_1800_RF path is the same case.
The logic and current for Antenna Switch is given below Table 3-1

Table 3-1 The logic and current

	VC1	VC2	Current
GSM TX	0 V	2.7 V	10.0 mA max
DCS TX	2.7 V	0 V	10.0 mA max
GSM/DCS RX	0 V	0 V	<0.1 mA

These two paths are then connected to the LNAGSMN (#11) and LNADCSIN (#13) of CX74017 (U 441), respectively. A low-noise bipolar RF amplifier, contained within the U441, amplifies the RF signal. The RF signals from the front-end pass to the receiver mixers within the U441 device.

B. Demodulator and baseband processing

In direct conversion receiver there is only one mixer down-converting received RF signal to BB signal directly. The gain down converting mixer is 40dB at high gain mode and 22dB at low gain mode. The Rx gain setting is done in the AGC algorithm. The nominal gain of the receiver is set as a function of the expected signal strength at the antenna input so that a desired level is reached at the Rx I/Q. 7 blocks in the receiver chain have variable gains, LNA, Mixer, LPF1, VGA1, gmC Filter, Auxiliary gain control and VGA2. The gain settings can be adjustable via 3-wire bus control lines. The baseband signals pass via integrated low-pass filters to the baseband A/D converters. The remainder of the channel filtering is performed by the baseband chipset. The demodulator contains switches to maintain the sense of the baseband I/Q outputs with respect to the incoming RF signal on both GSM900 and DCS1800.

C. DC offset compensation

Three correction loops ensure that DC offsets, generated in the CX74017, do not overload the baseband chain at any point.
After compensation, the correction voltages are held on capacitors for the duration of the receive slot(s). A rising edge on the RXEN signal, selected via the serial interface, placed the DC compensation circuitry in the track mode.

3.3 Transmitter Part

The Transmitter part contains CX74017 active parts, PAM and Antenna Switch. The CX74017 active part consists of a vector modulator and offset phase-locked loop block(OPLL) including down-converter, phase detector, loop filter and dual band transmit VCO which can operate at either final RF output frequency. The RF GMSK outputs from the transmit VCO are fed directly to the RF power amplifiers.

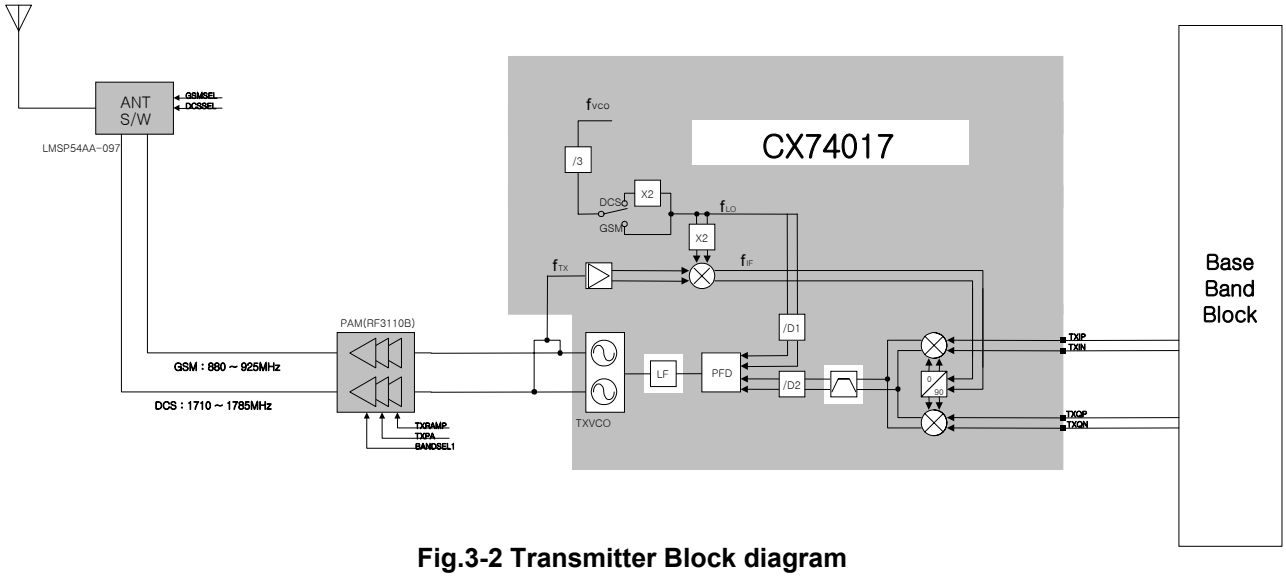


Fig.3-2 Transmitter Block diagram

The peak output power and the profile of the transmitted burst are controlled by means of power control loop. The power control function is integrated, eliminating the need for directional couplers, detector diodes, power control IC and other power control circuitry. This allows the module to be driven directly from the DAC output. The PA outputs from the directional coupler pass to the antenna connector via Antenna Switch.

A. IF Modulator

The baseband converter(BBC) within the GSM chipset generates I and Q baseband signals for the transmit vector modulator. The modulator provides more than 40dBc of carrier and unwanted side-band rejection and produces a GMSK modulated signal. The baseband software is able to cancel out differential DC offsets in the I/Q baseband signals caused by imperfections in the D/A converters.
The TX-Modulator implements a quadrature modulator. The IF-frequency input signal is split into two precise orthogonal carriers, which are multiplied by the baseband modulation signal IT/ITX and QT/QTX. It is used as reference signal for the OPLL.

B. OPLL

The offset mixer down converts the feedback Tx RF signal using LO to generate a IF modulating signal. The IF signal goes via external passive bandpass filter to one port of the phase detector. The other side of the phase detector input is LO signal. The phase detector generates an error current proportional to the phase difference between the modulated signal from the offset mixer and the reference signal from the LO.
The error current is filtered by a second order low-pass filter to generate an output voltage which depends on the GMSK modulation and the desired channel frequency. This voltage controls the transmit VCO such that the VCO output signal, centered on the correct RF channel, is frequency modulated with the original GMSK data. The OPLL acts as a tracking narrowband band pass filter tuned to the desired channel frequency. This reduces the wideband noise floor of the modulation and up-conversion process and provides significant filtering of spurious products.

C. Synthesizer Part

The CX74017 includes a fully integrated UHF VCO with an on-chip LC tank.
A single sigma-delta fractional-N synthesizer can phase lock the local osillator used in both transmit and receive path to a precision frequency reference input. Fractional-N operation offers low phase noise and fast setting times, allowing for multiple slot applications such as GPRS.
The generated frequency is given by the following equation.

$$f_{VCO} = \frac{\left(N + 3.5 + \frac{FN}{2^{22}}\right) f_{ref}}{R}$$

where : f_{VCO} = Generated VCO frequency
N = N-divider ratio integer part
FN = Fractional setting
R = R-divider ratio
f_{VCO} = Reference Frequency

The counter and mode settings of the synthesizer are also programmed via 3-wire interface.

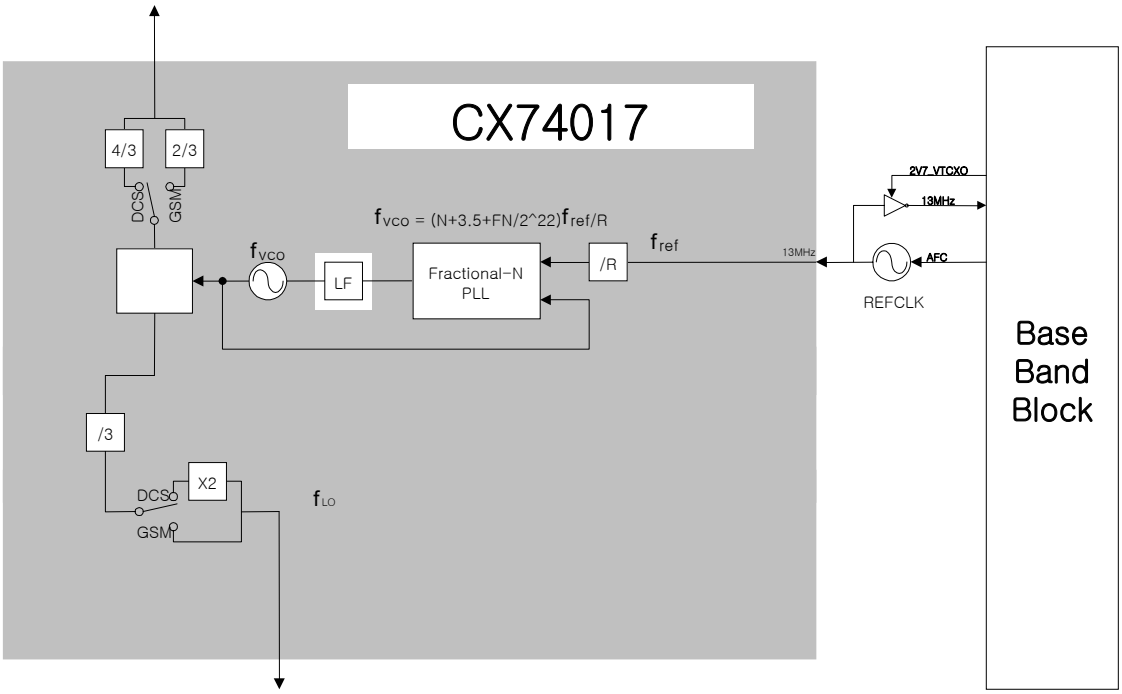


Figure 3-3. Synthesizer Block diagram.

D. Power Amplifier Module

The RF3110B[U416] is a Dual band amplifier for E-GSM(880 to 915MHz) and DCS1800(1710 to 1785MHz). The efficiency of module is the 50% at nominal output power for E-GSM and the 45% for DCS 1800. This module should be operated under the GSM burst pulse. To avoid permanent degradation, CW operation should not be applied. To avoid the oscillation at no input power, before the input is cut off, the control voltage Vapc should be control to less than 0.5V.
We have to improve thermal resistance, the through holes should be layouted as many as possible on PCB under the module. And to get good stability, all the GND terminals should be soldered to ground plane of PCB.

3.4 13 MHz Clock

The 13 MHz clock (VC-TCXO-208C) consists of a TCXO (Temperature Compensated Crystal Oscillator) which oscillates at a frequency of 13 MHz.
It is used within the CX74017 RF Main Chip, BB Analog chip-set (AD6521), and Digital (AD6522).

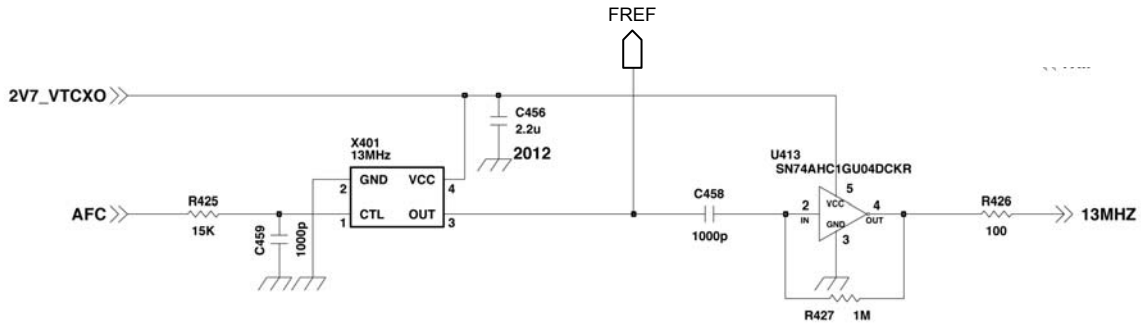


Figure 3-4. VCTCXO Circuit.

3.5 Power Supplies for RF Circuits

There are two regulators used in the phone to provide RF power. One is contained inside of ADP3408 (U101), power management IC to provide the power for the VCTXO (X401). The other is used to provide the power for remaining RF circuits.

Regulator	Voltage	Powers	Enable Signal
Regulator 1(U101,2V7_VTCXO)	2.7V± 0.5V	VCTCXO	
Regulator 2 (U414,RF2V8)	2.85V± 0.5V	RF circuitry	VSYNTHEN

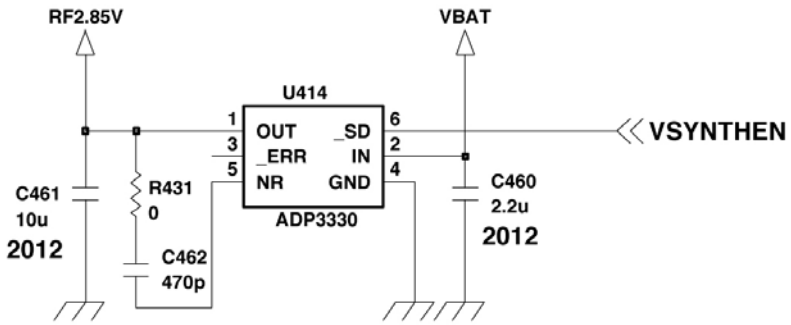


Figure 3-5. Regulator Circuit.

3.6 Testing Set-up and Checking Signals

A. Received RF Level and Checks

This section shows the typical RF power levels expected throughout the receiver path. A block diagram shows the locations of the RF measurement points and levels as shown in Fig. 3-11.

Receiver Testing Set-up
To check the receiver the following conditions have to be set:

On a signal generator or a GSM/DCS test box, output amplitude of CW sugnal = -60 dBm at either: 947.4 MHz (CH62) when testing the GSM RX path or 1842.6 MHz (CH699) when testing the DCS RX path. Set the DC power supply to 4.0 V.

Note: All RF values shown are only intended as a guide figure and may differ from readings taken with other test equipment and leads. Lead and connector losses should always be taken into account when performing such RF measurements.

Testing Receiver
Using a suitable high frequency probe measure the RF levels at the relevant points shown in **Fig. 3-9** and compare your measurements with those shown in the diagram. If there are any major difference between the readings taken and those indicated then further investigation of that particular point will be required. It will also be necessary to ensure that all the following power supplies and signals are present which control this part of the receiver circuit:

1. The Control Signal of FEM (see Fig. 3-15, 16, 17)
2. RF2V8 (see Fig. 3-12)
3. 2V7_VTCXO (see Fig. 3-13)
4. 13MHz (see Fig. 3-14)
5. CLK, DATA, SEN (see Fig. 3-18)
8. RX IP, IN, QP, QN (see Fig. 3-21)

B. Transmitted RF Power Level and Checks

This section shows the typical RF power levels expected throughout the transmitter path. A block diagram shows the locations of the RF measurement points and levels as shown in Fig. 3-8.

Transmitter Testing Set-up
To check the transmitter the following conditions have to be set:

1. Set the DC Power supply to 4.0 V.
2. Power up the GSM/DCS test set and then establishing a call with an attached mobile on active mode.
3. Select Channel, TX Level and Input Level according to which parameter is required.

Note: All RF values shown are only intended as a guide figure and may differ from readings taken with other test equipment and leads. Lead and connector losses should always be taken into account when performing such RF measurements.

Testing Transmitter

Using a suitable high frequency probe measure the RF levels at the relevant points shown in Fig. 3-9, 10. and compare your measurements with those shown in the diagram. If there are any major difference between the readings taken and those indicated then further investigation of that particular point will be required. It will also be necessary to ensure that all the following power supplies and signals are present which control this part of the transmitter circuit:

1. The Control Signal of FEM (see Fig. 3-15, 16, 17)
2. RF2V8 (see Fig. 3-12)
3. 2V7_VTCXO (see Fig. 3-13)
4. 13 MHz (see Fig. 3-14)
5. TXEN, TXRAMP, TXPA (see Fig. 3-19)
6. TX IP, IN, QP, QN (see Fig. 3-20)

RF components (Component Side)

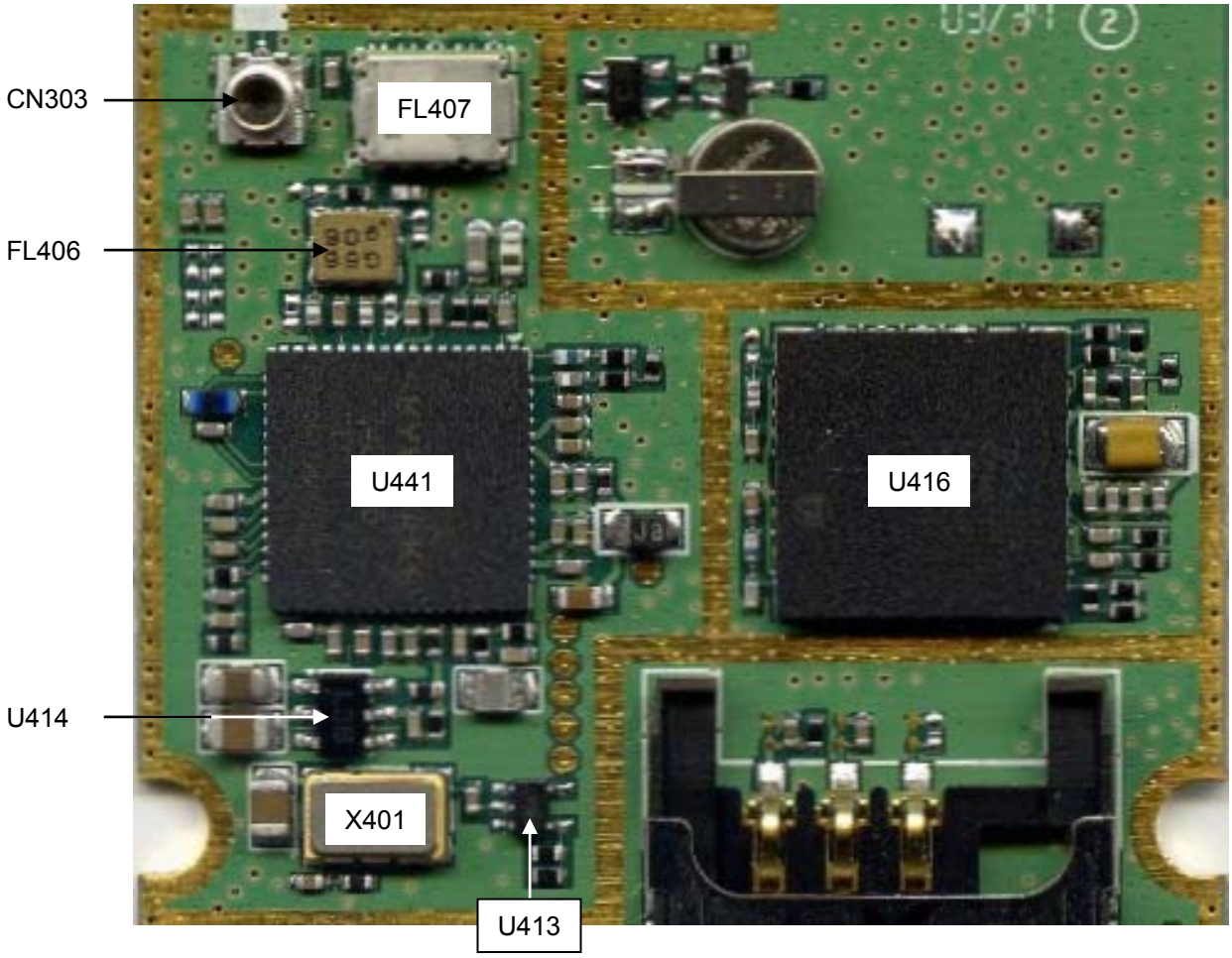


Figure 3-6. RF components (Component Side).

Reference	Description	Reference	Description
U441	RF Main Chipset	FL406	Dual SAW Filter
CN303	Mobile S/W	X401	VCTCXO
FL407	Ant. S/W	U414	LDO
U416	PAM	U413	Inverter IC

Test point of Rx Levels

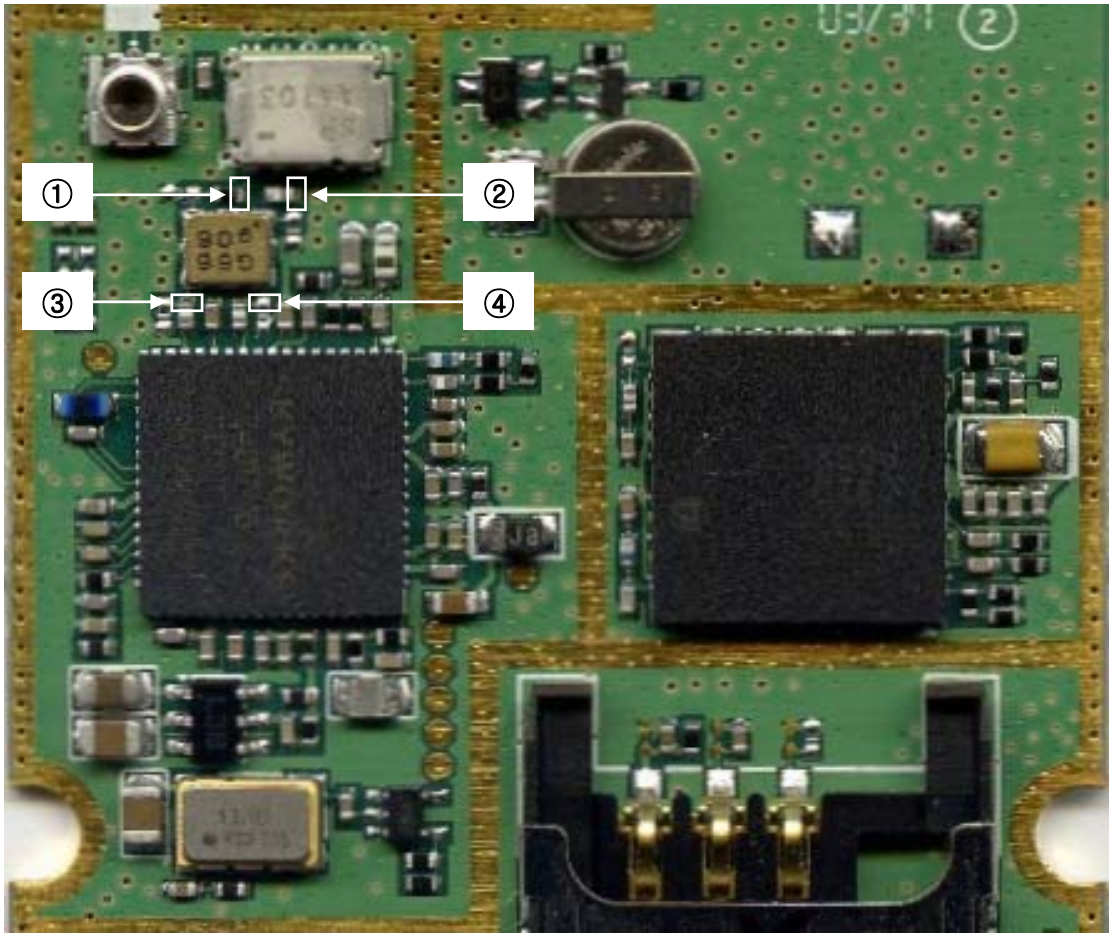


Figure 3-7. Test point of Rx Power Levels.

Test point of Tx Power Levels

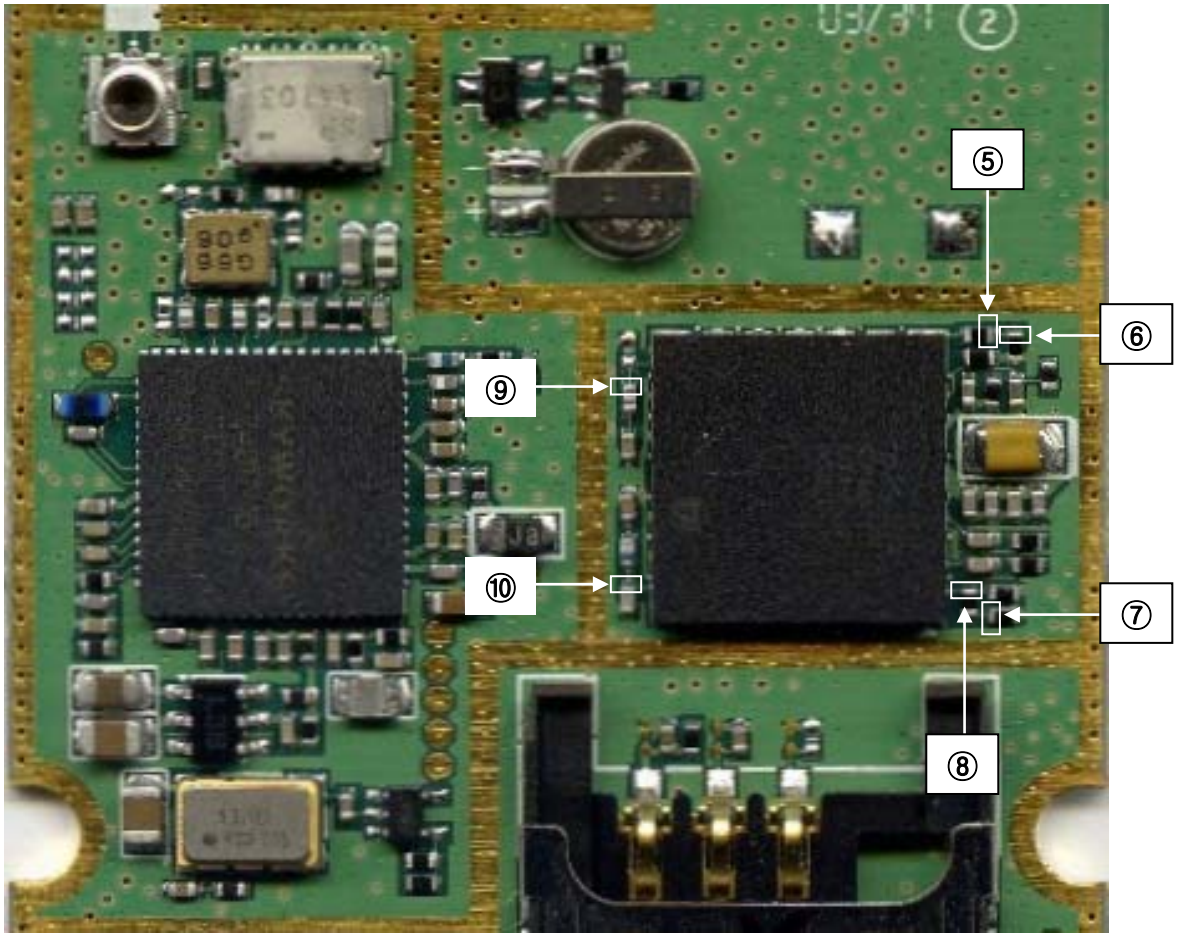


Figure 3-8. Test point of Tx Power Levels.

Test point of Tx Power Levels

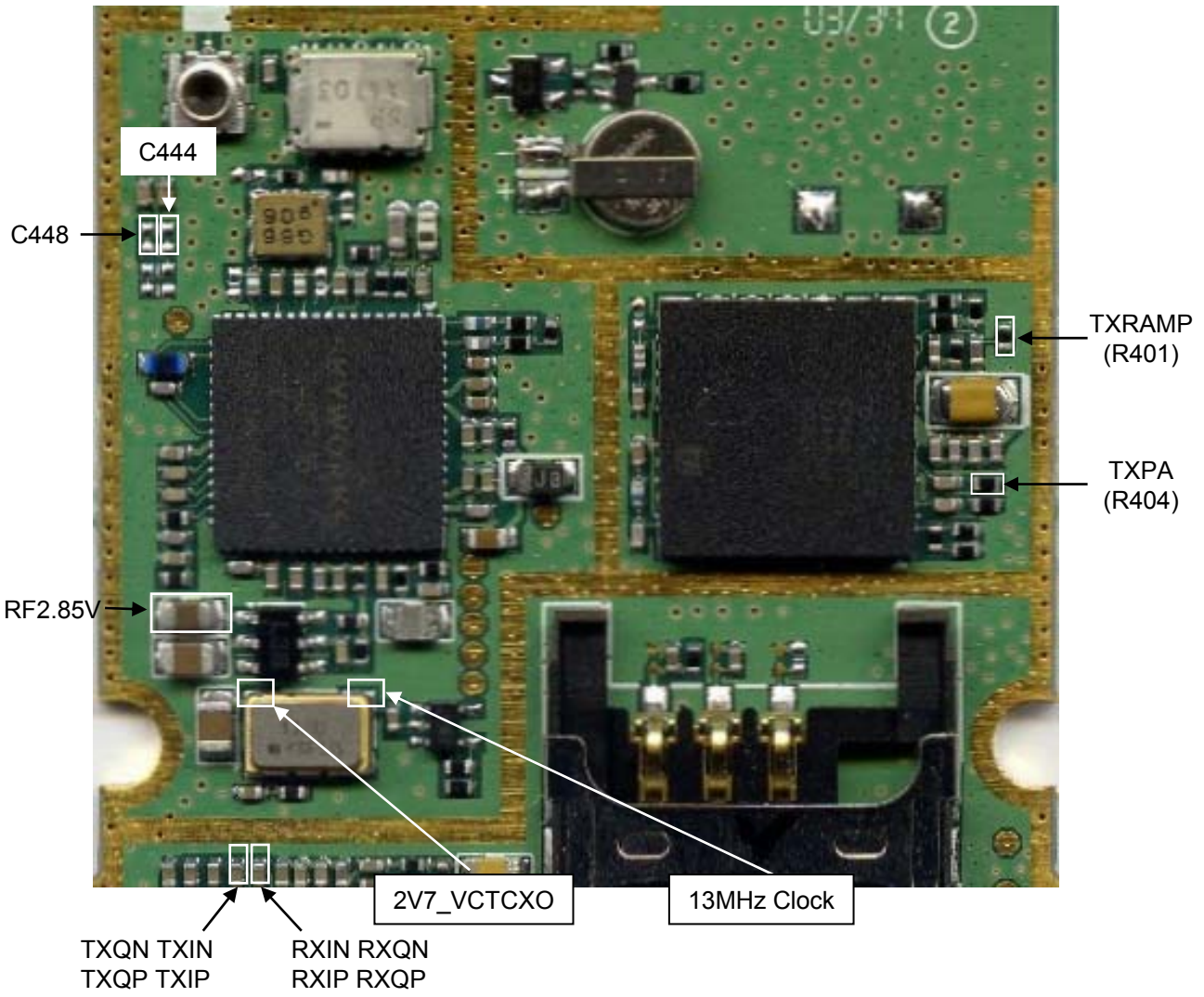


Figure 3-9. Control signal test points

Control signal test points

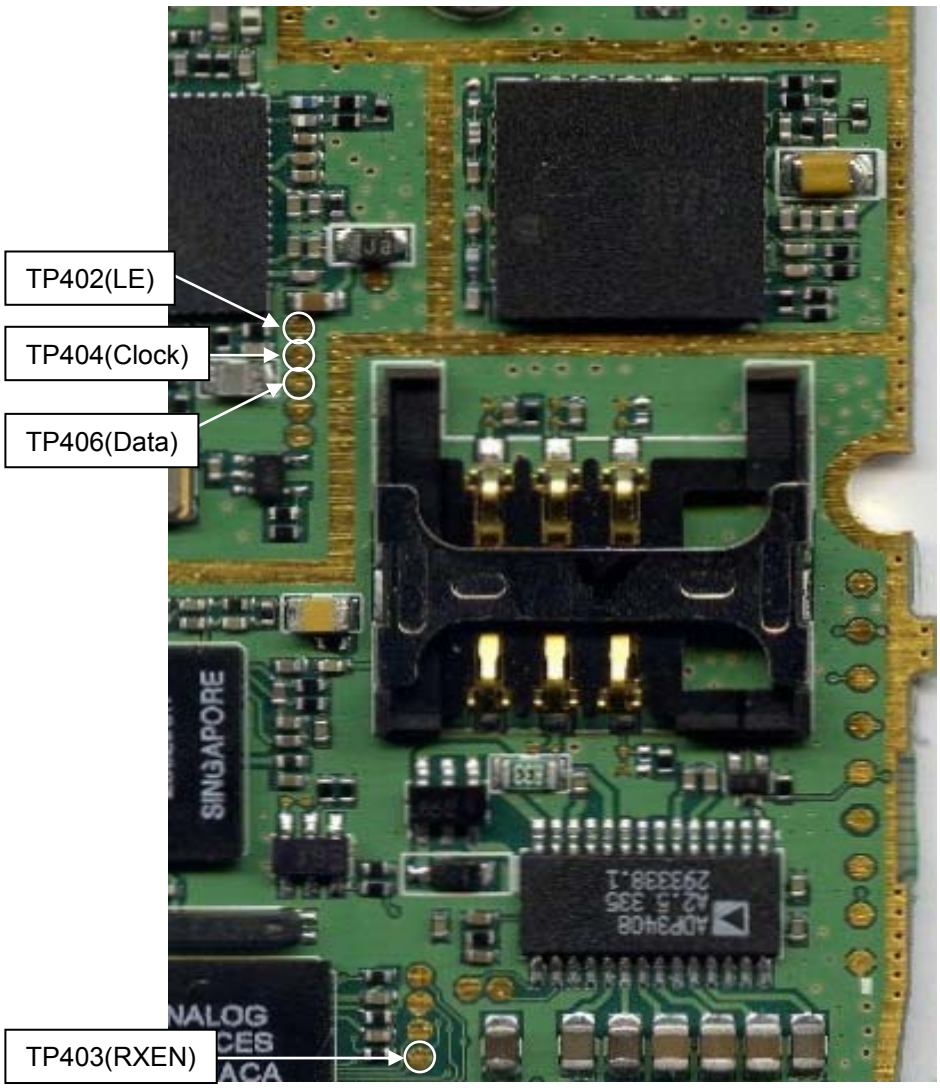


Figure 3-10. Control signal test points

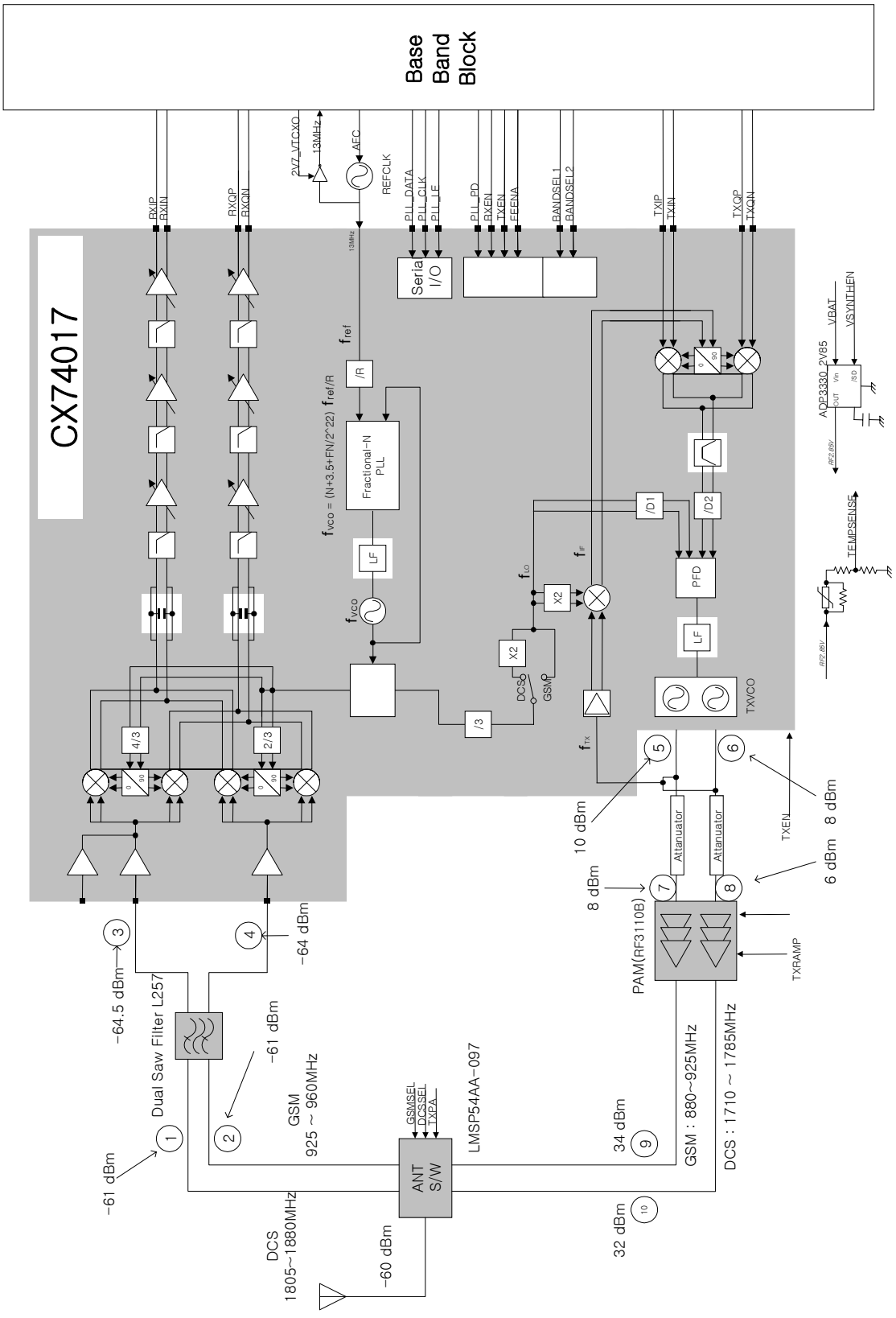


Figure 3-9. Transmitter & Receiver RF Levels

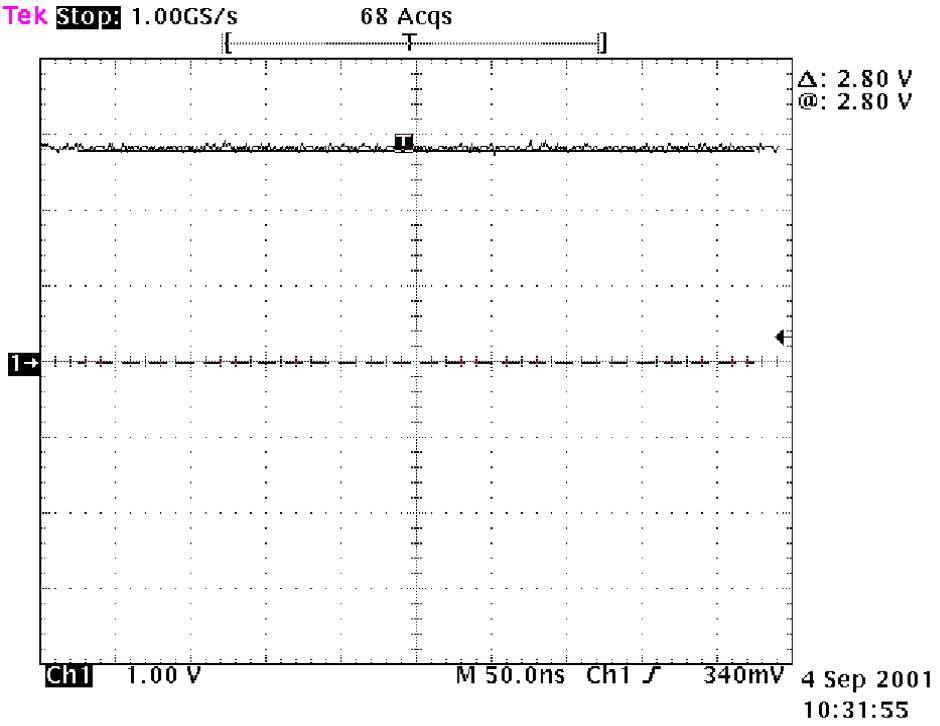


Figure 3-12. Regulator Output (RF2V8)

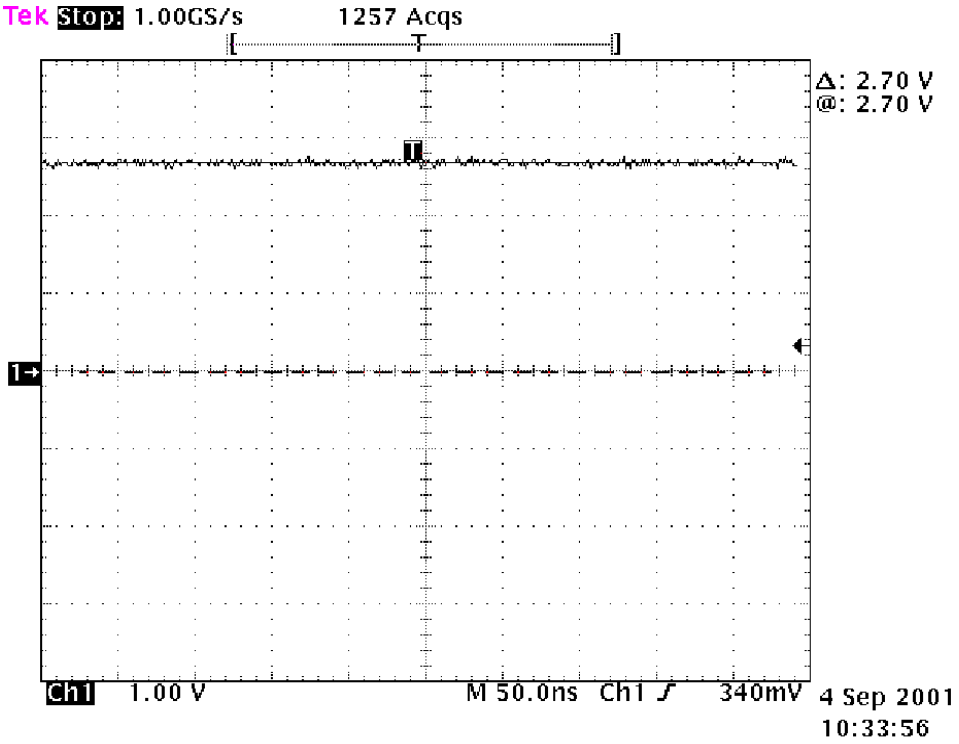


Figure 3-13. VCTCXO Power Supply (2V7_VTCXO).

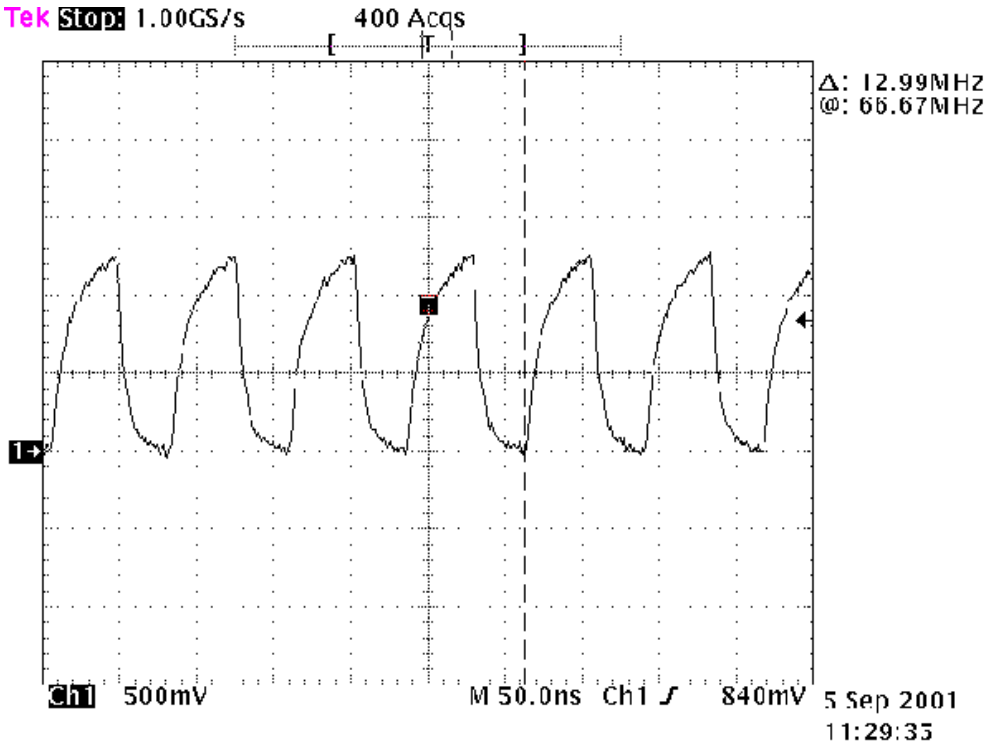


Figure 3-14. 13MHz Clock.

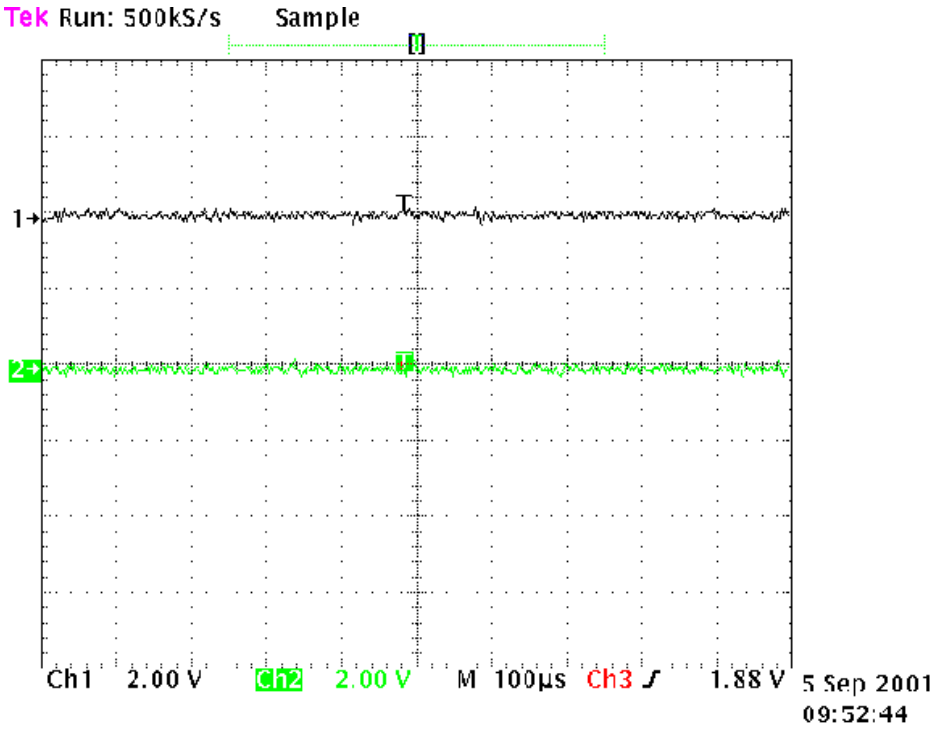


Figure 3-15. Control Signal (VC1,VC2) in Rx mode (GSM, DCS both).

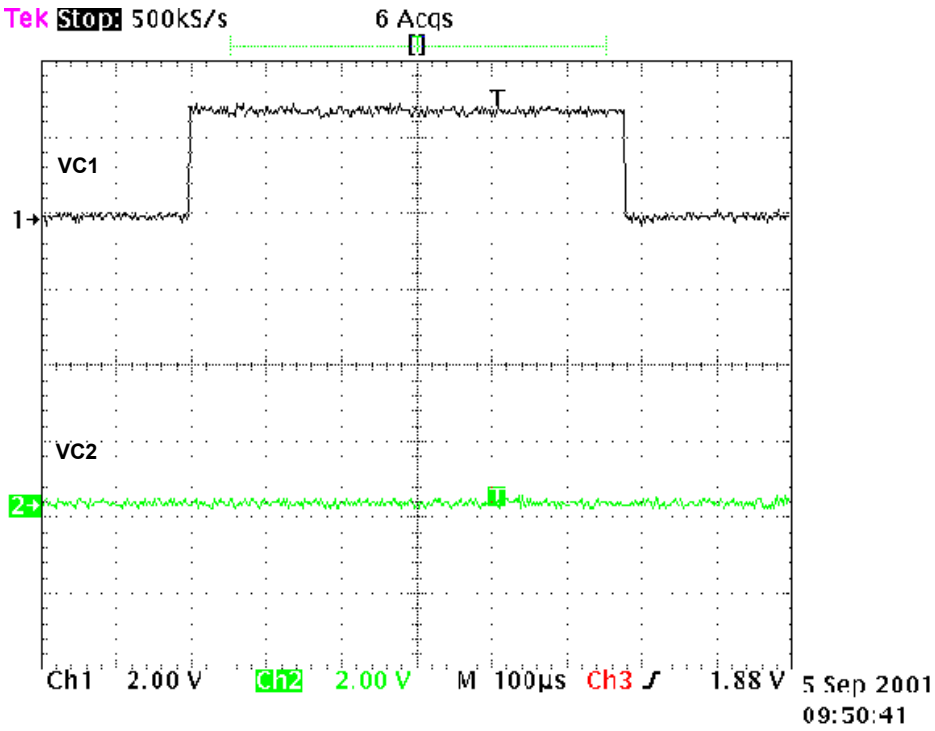


Figure 3-16. Control Signal of FEM in GSM TX mode

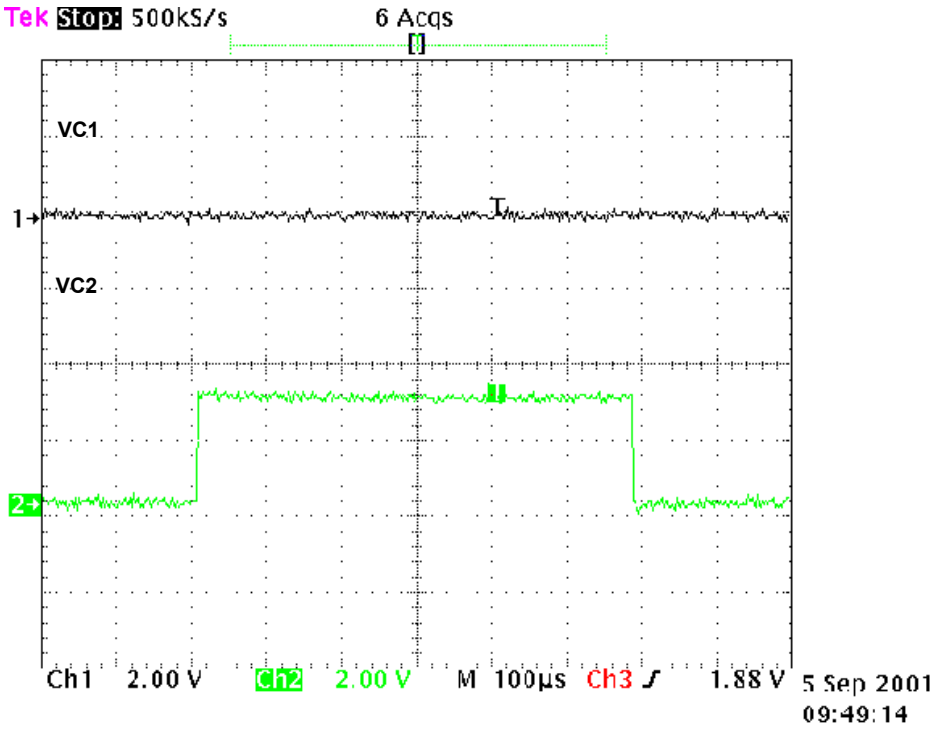


Figure 3-17. Control Signal of FEM in DCS TX mode.

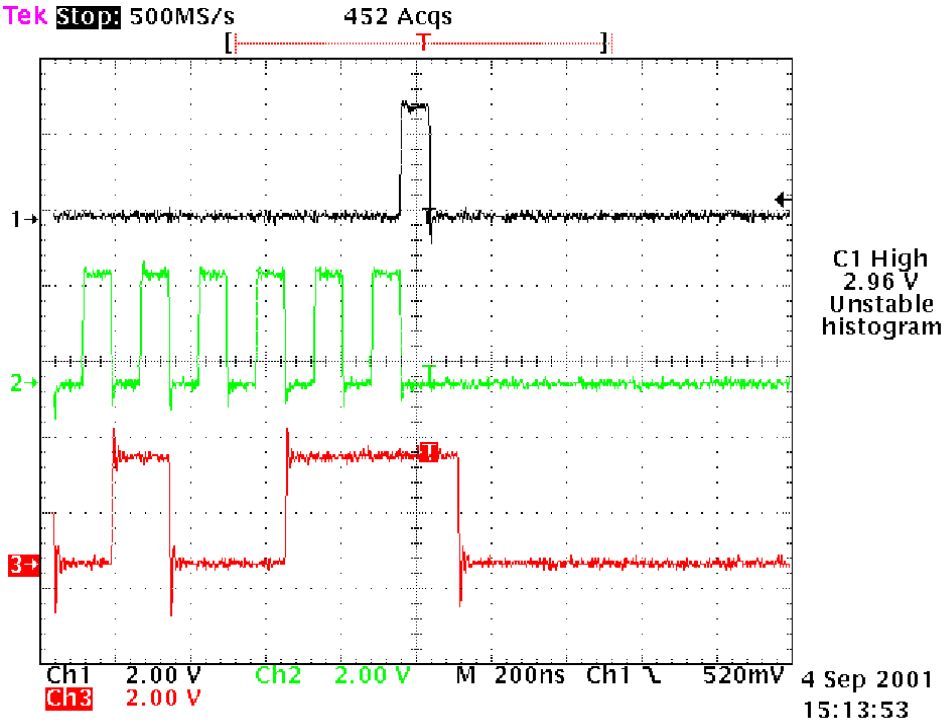


Figure 3-18. LE, Clock, Data

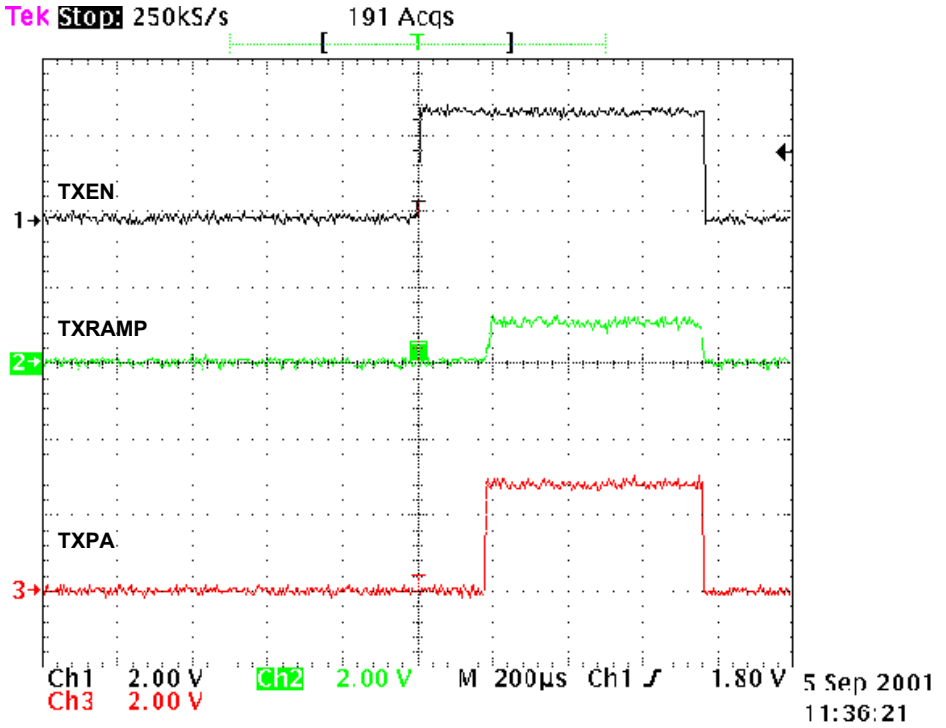


Figure 3-19. TXEN, TXRAMP, TXPA.

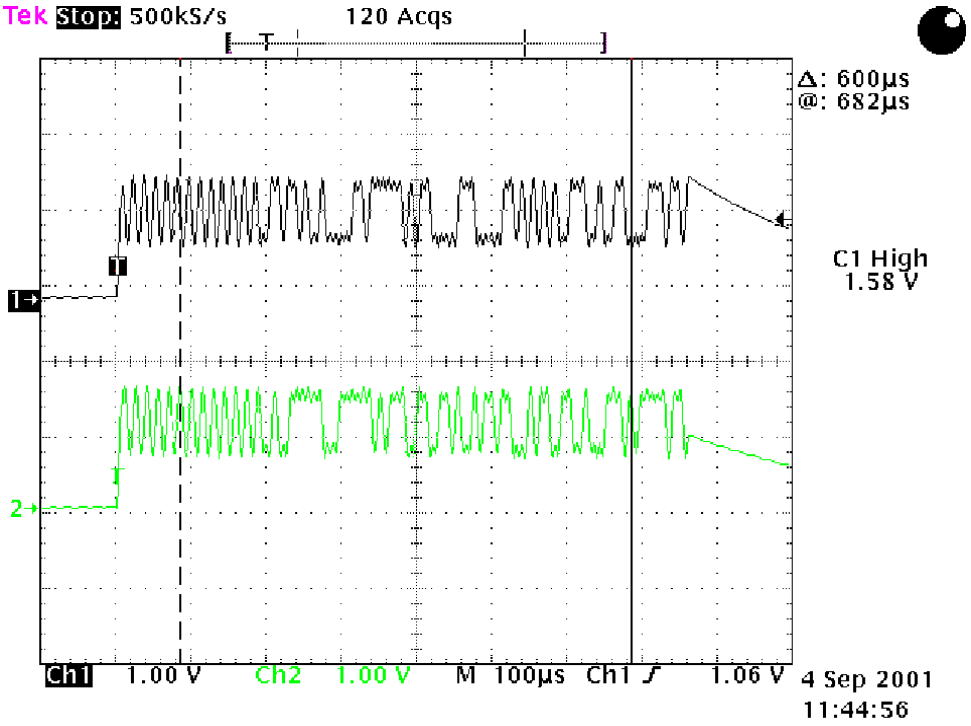


Figure 3-20. TX IQ Signal

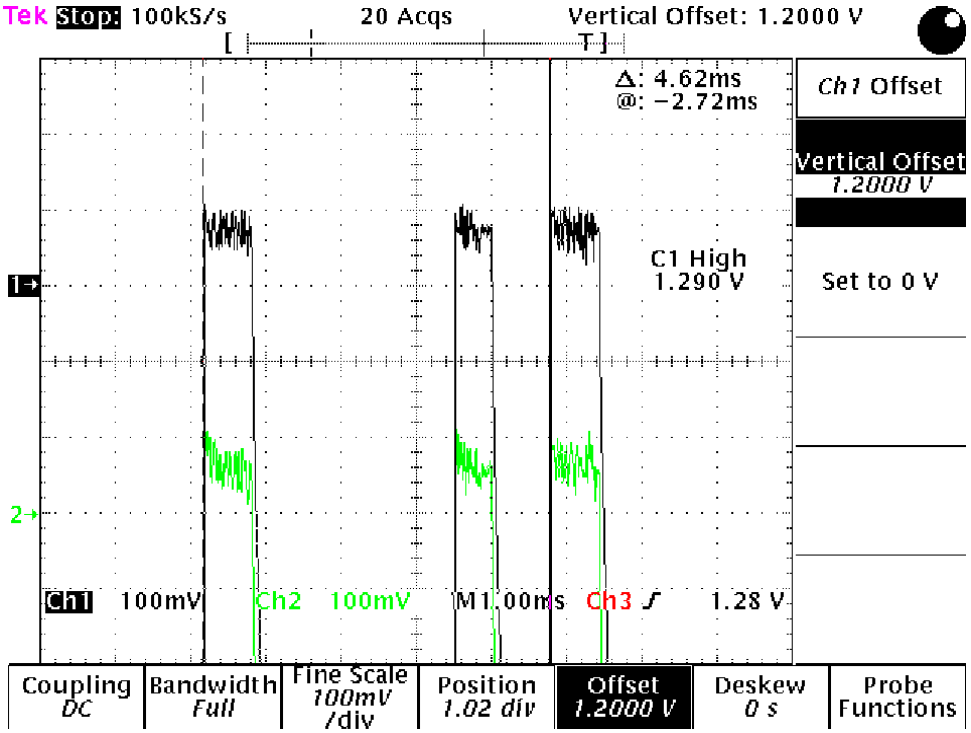


Figure 3-21. RX IQ Signal

3.7 Digital Main Processor

The AD6522 is an ADI designed processor.

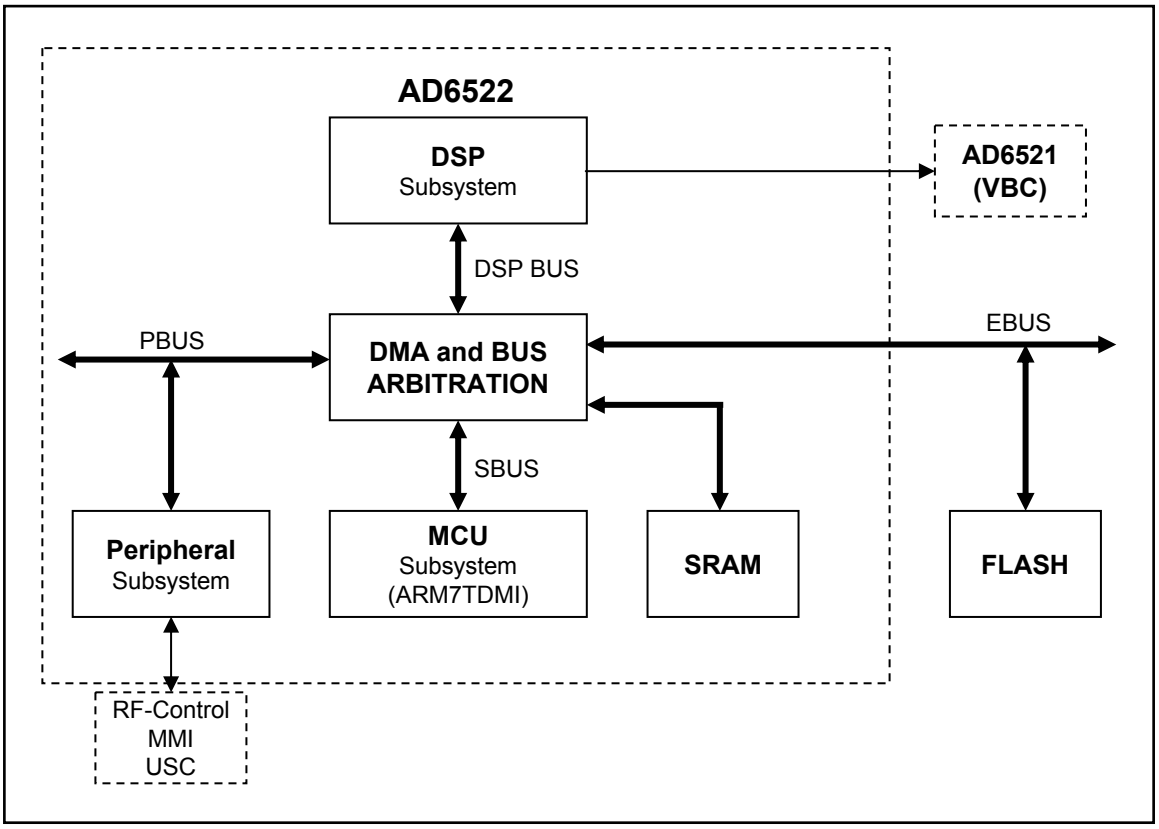


Figure 3-22. Top level block diagram of the AD6522 internal architecture.

BUS Arbitration Subsystem

- It is to work as a cross point for data accesses between the three main buses.
- EBUS is for external accesses, primarily from Flash memory for code and data.
- RBUS is for internal RAM access.
- PBUS is for access to internal peripheral modules such as UART, RTC or SIM.
- In addition to the three main system buses, it has SBUS, IOBUS and DMABUS.

DSP subsystem

- It consists of ADI DSP, Viterbi coprocessor, ciphering unit and a cache memory/controller system.
- The DSP can run at a maximum clock frequency of 78MHz at 2.45V.
- The Viterbi and ciphering accelerators enable a very efficient implementation of the channel equalization, encryption and decryption tasks.

MCU subsystem

• It consists of an ARM7TDMI central processing unit, a boot ROM, a clock generation and access control module.
• The maximum clock frequency for the ARM7TDMI is 39MHz at 2.45V.
• The main clock is 13MHz and it is provided by VCTCXO. The Clock & BS(Bus Select) generator make internal clock by multiplying the main clock by 1X, 1.5X, 2X and 3X.
• The boot ROM contains MCU code for basic communication between the ARM and one of the serial ports in the Universal System Connector subsystem.

Peripheral subsystem

• It contains four major groups of elements.
• The MMI group is a collection of all the functionality that are needed to implement a complete user interface including keyboard, display, backlight, RTC, general purpose I/O etc.
• House Keeping group consists of three different sub-modules: The Watch Dog Timer, the Interrupt Controller, and the general timers.
• GSM system group consists of the time base generation together with the synthesizer interface, which form the radio control.
• Direct Memory Access is located between the three system buses (PBUS, RBUS and EBUS) and can move any data from any address location on one system bus to any address location on another system bus.

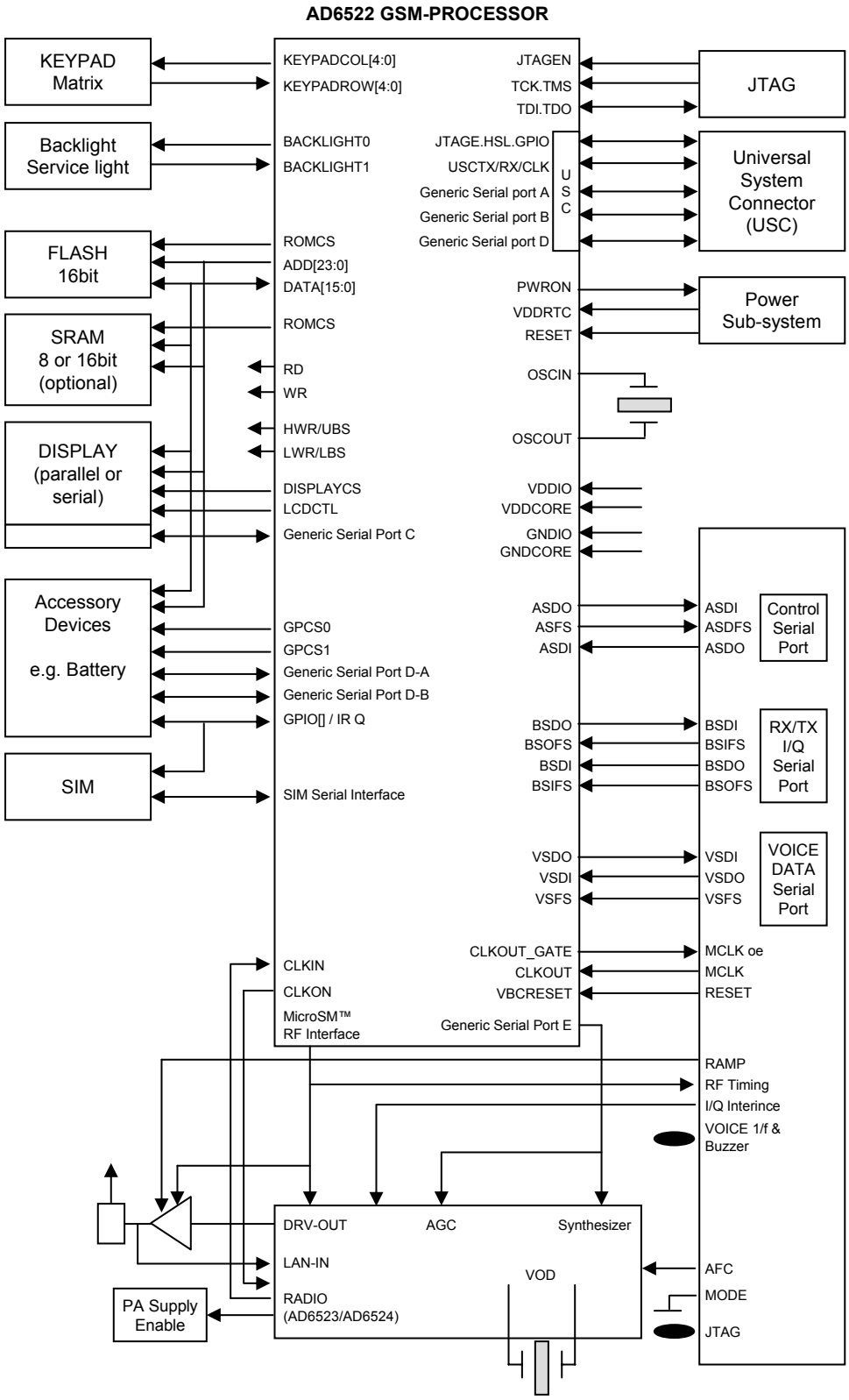


Figure 3-23. System interconnection of AD6522 external interfaces.

Interconnection with external devices

RTC block interface
Countered by external X-TAL
The X-TAL oscillates 32.768KHz.

LCD module interface
Controlled by _LCD_MAIN_CS, LCD_RES, LCD_RS, _WR, _RD , DATA [00...07] ports.

Table 3-3.

	Description
LCD_MAIN_CS	LCD chip enable. Each LCD has CS pin
LCD_RES	This pin resets LCD module.
LCD_RS	This pin determines whether the data to LCD module is display data or control data.
_WR, _RD	Read/Write control.
DATA [00...07]	Parallel data line.

RF interface
The AD6522 control RF parts through TXEN, RXON1, RXON2, AGCEN, SDATA, SCLK, SEN etc.

Table 3-4.

Signal Name	Description
TXEN	TX Enable/Disable
RXON1	LNA, Mixer 1 On/Off
RXON2	Mixer 2 On/Off
AGCEN	AGC Enable/Disable
SDATA	Serial Data to PLL
SCLK	Clock to PLL
SEN	PLL Enable/Disable

SIM interface

The AD6522 check status periodically in call mode if SIM card is inserted or not, but the AD6522 don't check in deep sleep mode.

Interface by SIMDATAOP, SIMCLK, SIM_RST(GPIO_23)

Table 3-5.

	Description
SIMDATAOP	This pin receives and sends data to SIM card. This model supports only 3.0 volt interface SIM card.
SIMCLK	Clock 3.25MHz frequency.
SIM_RST(GPIO_23)	Reset SIM block.

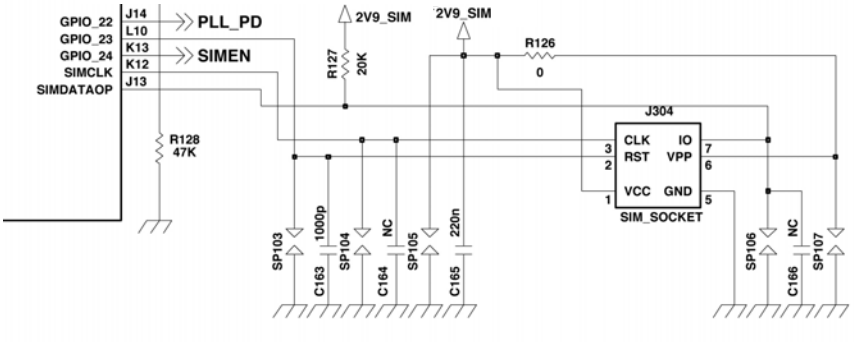


Figure 3-24. SIM Interface of AD6522.

Key interface

Include 5 column and 5 row. The AD6522 detect key press by interrupt.

ADP3408 interrupt

There are two interrupts EOC and CHARGEDET

EOC: End of Charge. Charging would be stopped when AD6522 receive this input.

CHARGEDET: This interrupt is generated when charge is inserted.

3.8 Analog Main Processor

AD6521

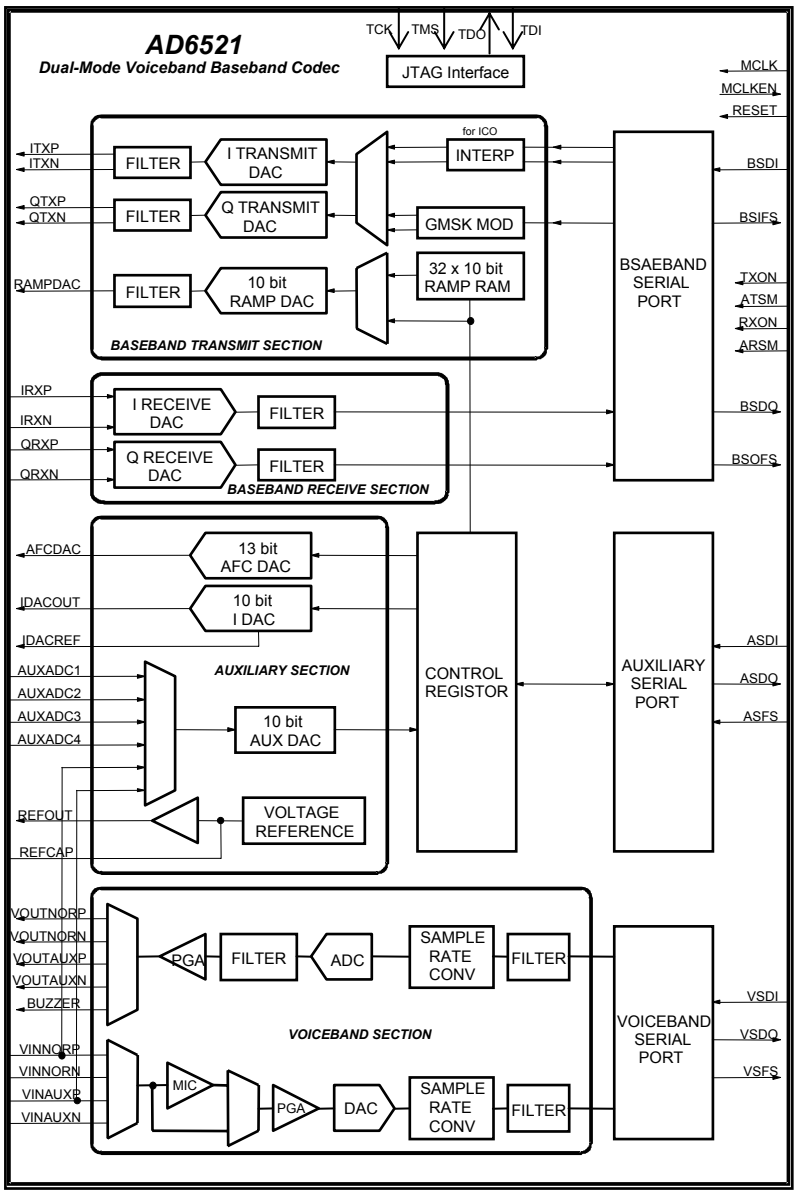


Figure 3-25. AD6521 function block diagram.

3. TECHNICAL BRIEF

BB Transmit section

This section generates in-phase and quadrature BB modulated GMSK signals (BT = 0.3) in accordance with GSM 05.05 Phase 2 specifications.

• The transmit channel consists of a digital GMSK modulator, a matched pair of 10-bit DACs and a matched pair of reconstruction filter.

BB Receive section

This section consists of two identical ADC channels that process baseband in-phase(I) and quadrature(Q) input signals.
Each channel consists of a coarse switched capacitor input filter, followed by a high-order sigma-delta modulator and a lowpass digital filter.

Auxiliary section

This section contains two auxiliary DACs (AFC DAC, IDAC) for system control.
This section also contains AUX ADC and Voltage Reference
AUX ADC : 6 channel 10 bits
AFC DAC : 13 bits
IDAC : 10 bits

Voiceband section

Receive audio signal from MIC. The phones use differential configuration.
Send audio signal to Receiver. The phones use differential configuration.
It interconnect with external device like main microphone, main receiver, ear-phon through the VOUT NORP, VOUTNORN, VOUTAUXP, VOUTAUXN
VOUTNORP, VOUTNORN: Main Receiver positive/negative terminal.
VOUTAUXP, VOUTAUXN: Hands free kit speaker positive/negative terminal.

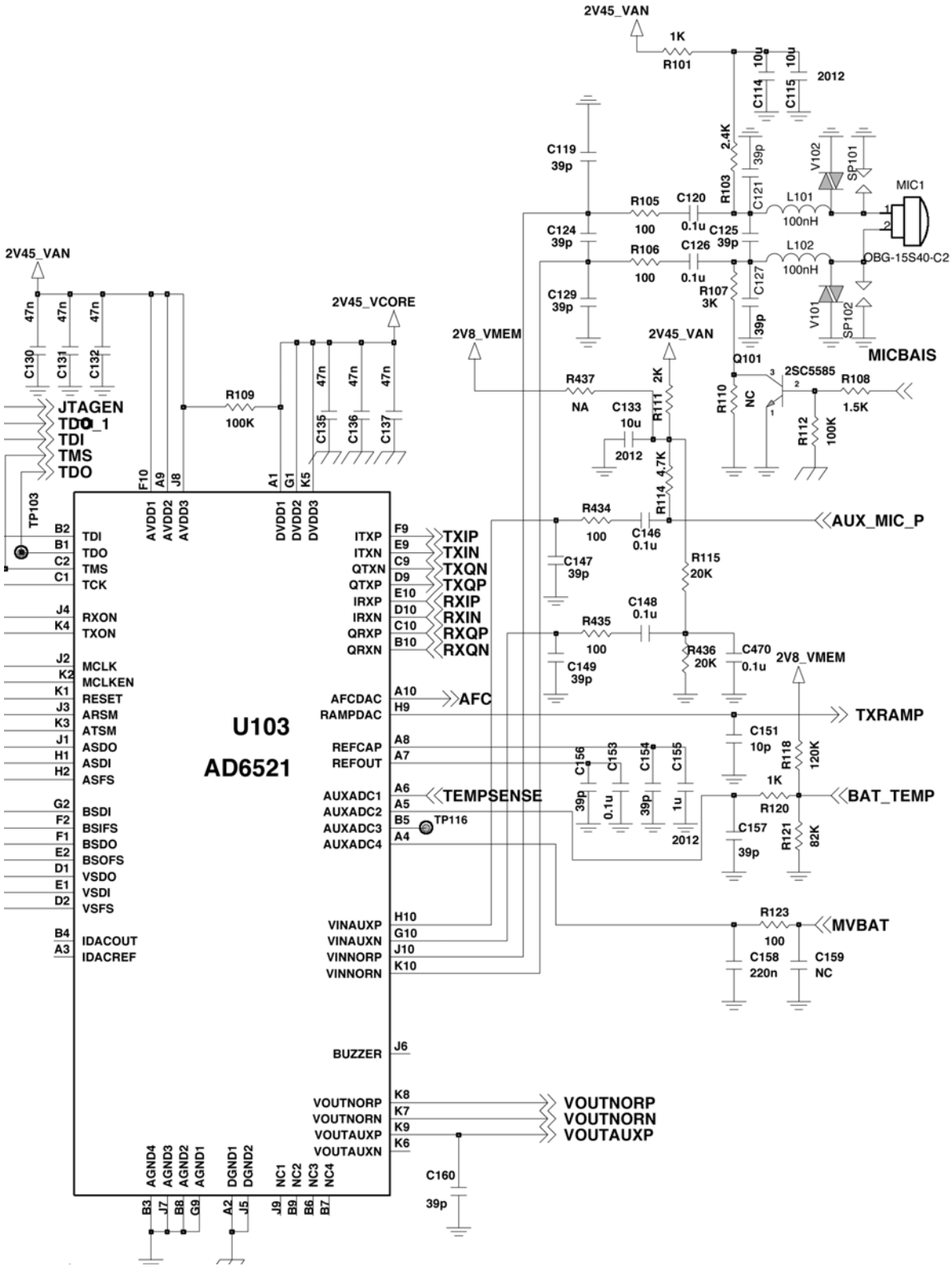


Figure 3-26. AD6521 Circuit diagram

3.9 Power Management

ADP3408

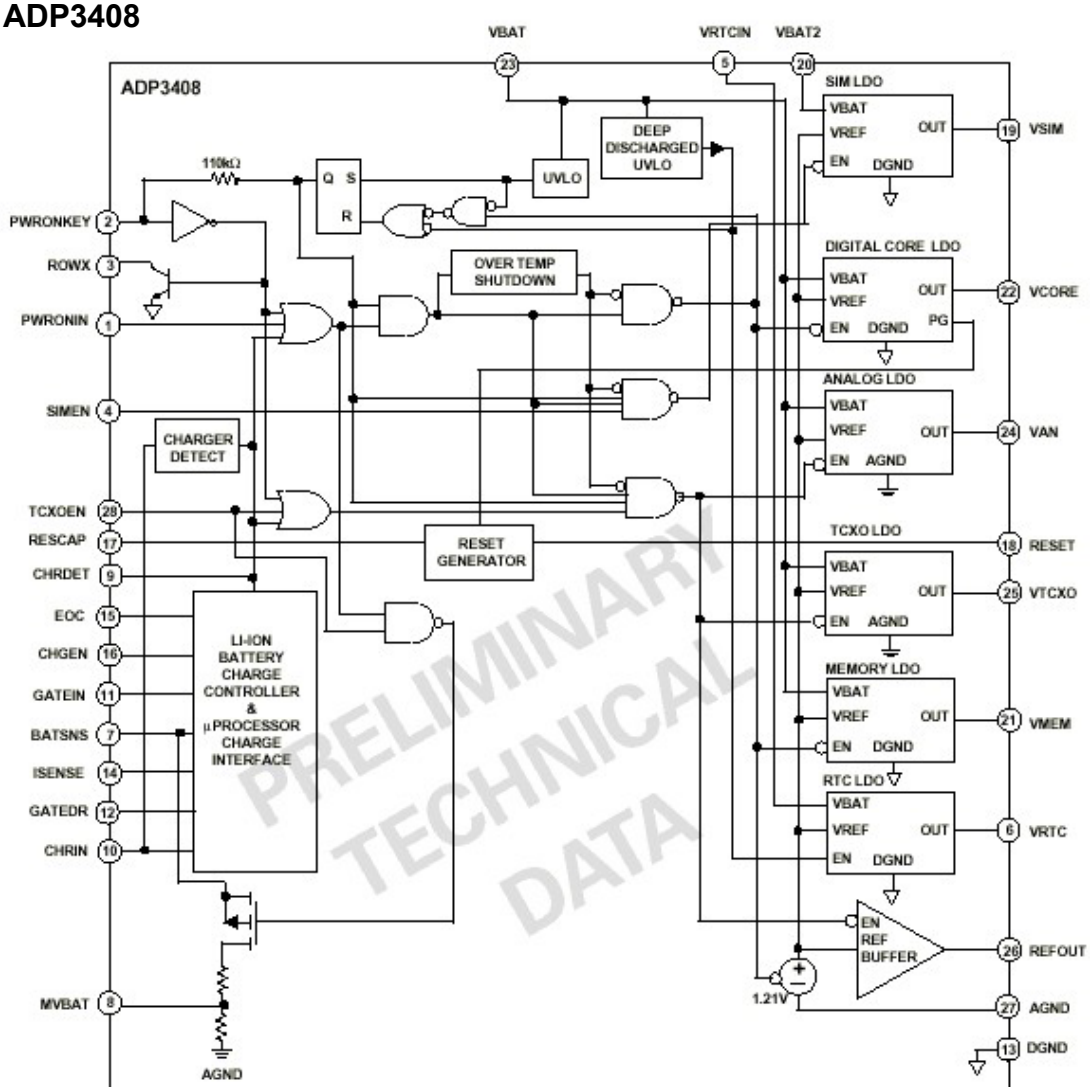


Figure 3-28. ADP3408 inner block diagram

Power up sequence logic

The ADP3408 controls power on sequence.

Power on sequence

If a battery is inserted, the battery powers the 6 LDOs.
Then if PWRONKEY is detected, the LDOs output turn on.
REFOUT is also enabled, Reset is generated and send to the AD6522.

LDO block

There are 6LDOs in the ADP3408

Table 3-6.

	Description
VSIM	2.86V (is provided to SIM card)
VCORE	2.45V (is provided to the AD6522 & AD6521's digital core)
VRTC	2.45V (is provided to the RTC and Backup Battery)
VAN	2.45V (is provided to the AD6521 I/O and used as microphone bias)
VTCXO	2.715V (is provided to VCTCXO)
VMEM	2.80V (is provided to Flash)

Battery charging block

It can be used to charge Lithium Ion and/or Nickel Metal Hydride batteries. The phones use Li-Ion battery only. Charger initialization, trickle charging, and Li-Ion charging control are implemented in hardware.

Charging Process

1. Check charger is inserted or not.
2. If ADP3408 detects that Charger is inserted, the CC-CV charging starts.
3. Exception: When battery voltage is lower than 3.2V, the precharge (low current charge mode) starts firstly. And the battery voltage reache to 3.2V, the CC-CV charging starts.

Pins used for charging

CHRDET : Interrupt to AD6522 when charger is plugged.
CHGEN : Control signal from AD6522 to charge Li+ battery.
EOC : Interrupt to AD6522 when battery is fully charged.
GATEIN : Control signal from AD6522 to charge NiMH battery. But, not used.
MVBAT : Battery voltage divider. Divide ratio is 1:2.3 and it is sensed in AD6521 AUX_ADC4.

TA (Travel Adaptor)

Input voltage : AC 110V ~ 240V, 60Hz
Output voltage : DC 5.2V(±0.2 V)
Output current : Max 800mA (±50mA)

Battery

Li-ion battery : Max 4.2V, Nom 3.7V
Standard battery : Capacity - 850mAh, Li-ion

3.10 Memories

- 32M flash memory + 8M SRAM
- 16 bit parallel data bus
- ADD01 ~ ADD21.
- RF Calibration data are stored in Flash

3.11 Display and Interface

Table 3-7.

	LCD
Display Format	128 x 64 dots
Back light	LED Backlight

The phone has single type LCD. There are the control output LCD_CS which is derived from AD6522, this acts as the chip select enable for the LCD . AD6522 uses DATA[00:07] pins to send data for displaying graphical text onto the LCD

3.12 Keypad Switches and Scanning

The key switches are metal domes, which make contact between two concentric pads on the keypad layer of the PCB when pressed. There are 19switches (S301-S325,not used S303~S309), connected in a matrix of 5 rows by 5 columns, as shown in Figure, except for the power switch (S310), which is connected independently. Functions, the row and column lines of the keypad are connected to ports of AD6522. The columns are outputs, while the rows are inputs and have pull-up resistors built in. When a key is pressed, the corresponding row and column are connected together, causing the row input to go low and generate an interrupt. The columns/rows are then scanned by AD6522 to identify the pressed key.

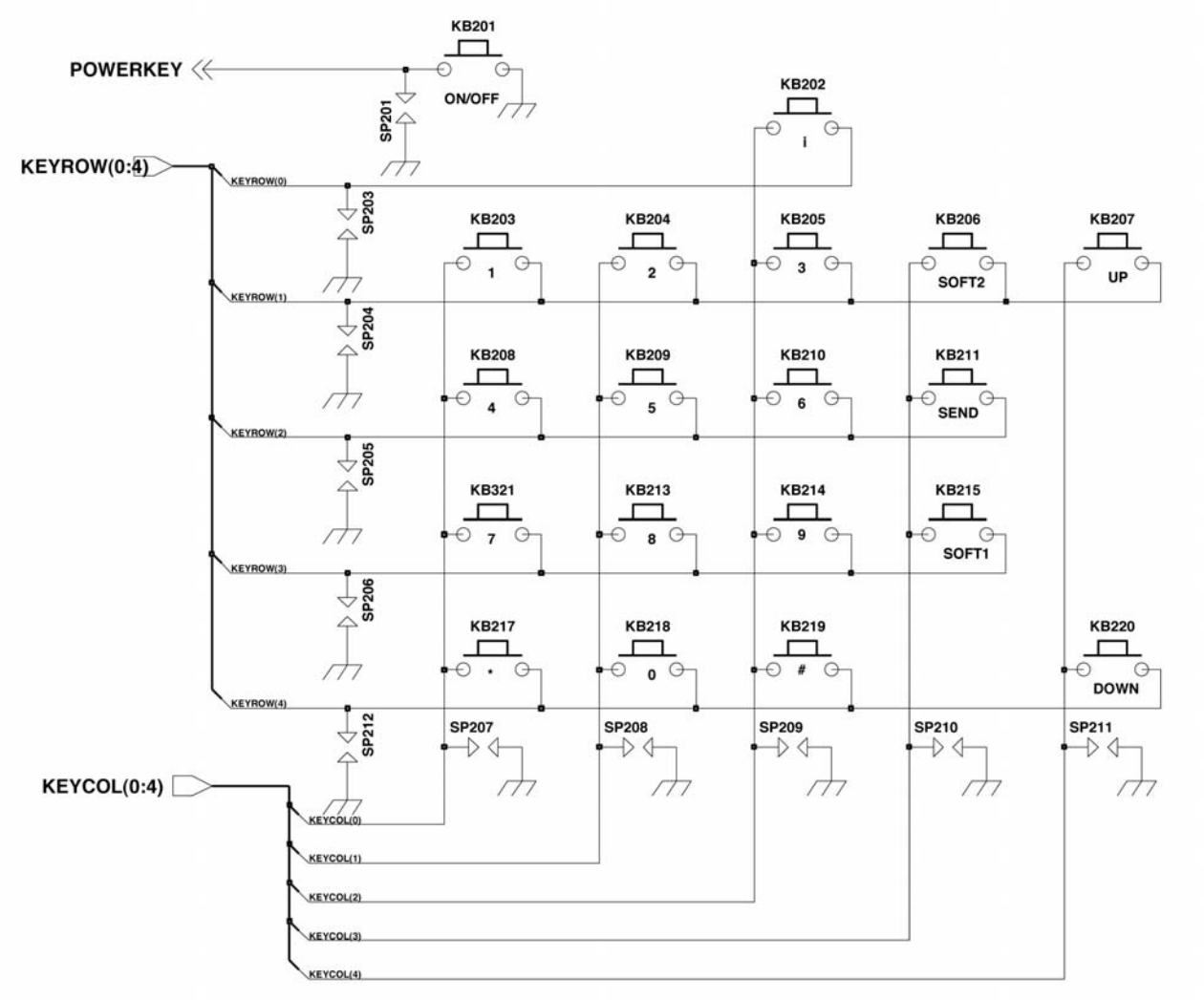


Figure 3-29. Keypad Switches and Scanning.

3.13 Microphone

The microphone is placed to the front cover and contacted to main PCB. The audio signal is passed to VINNORP (#J10) and VINNORN (#K10) pins of AD6522. The voltage supply 2V45_VAN is output from ADP3408, and is a bias voltage for both the VINNORP (through R101) and VINAUX (through R112) lines. The VINNOR or VINAUX signal is then A/D converted by the Voiceband ADC part of AD6521. The digitized speech is then passed to the DSP section of AD6522 for processing (coding, interleaving etc.).

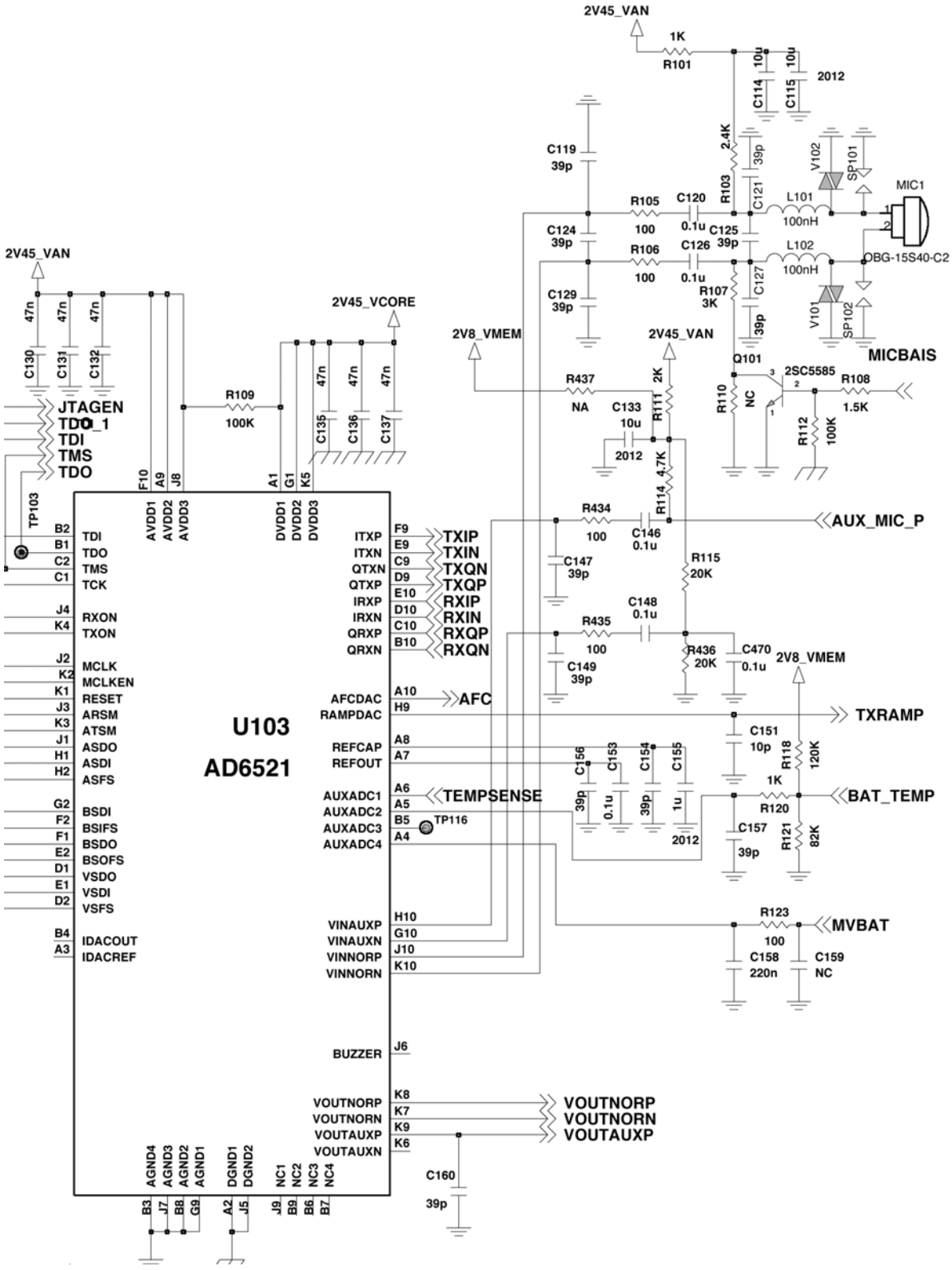


Figure 3-30. Microphone

3.14 Earpiece

The earpiece is driven directly from AD6521 VOUTNORP (#K8) and VOUTNORN (#K7) pins and the gain is controlled by the PGA in an AD6521. The earpiece is placed in the front cover and contacted to main PCB.

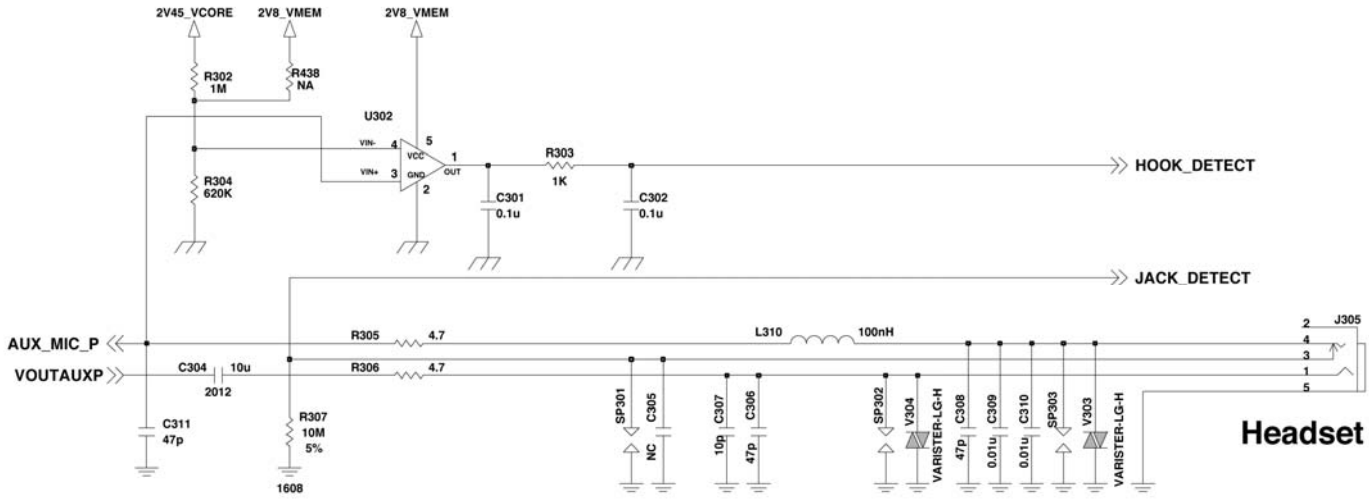


Figure 3-31. Earpiece.

3.15 Headset Jack Interface

Headset Jack has the single-end structure in both audio in and out. The audio out to the headset jack is used only one line(VOUTAUXP).

3.16 Key Back-light Illumination

In key back-light illumination, there are 12 Blue LEDs in Main Board, which are driven by KEY_BACKLIGHT line from AD6522.

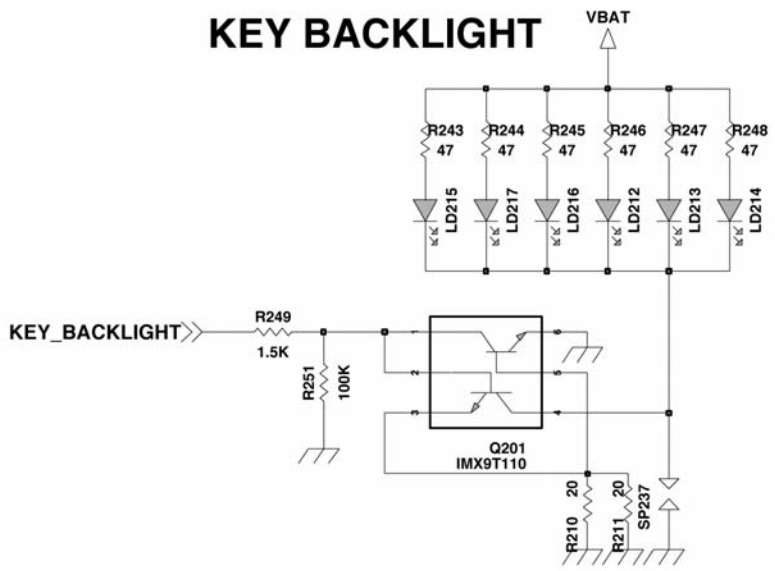


Figure 3-32. Key Back-light Illumination

3.17 LCD Back-light Illumination

In LCD Back-light illumination, there is an driver in FPCB Board, which is driven by BACKLIGHT line from AD6522.

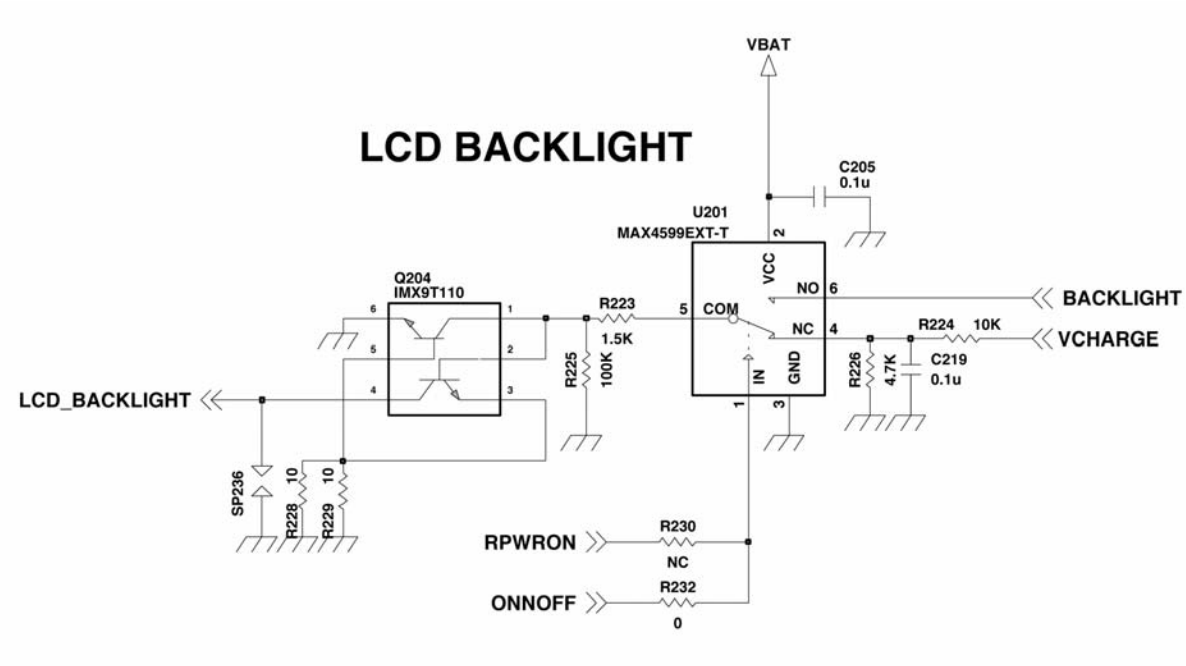


Figure 3-33. LCD back-light Illumination.

3.18 Speaker & MIDI IC

LG-G1500 use High quality buzzer sound.
Its sounds more smoothly comparing to other buzzer sound because of using audio AMP and speaker.
LG-G1500 also uses step-up ring sound mechanism. When ring volume is set to maxim and a incoming call is occurred, it rings from low to high gradually.

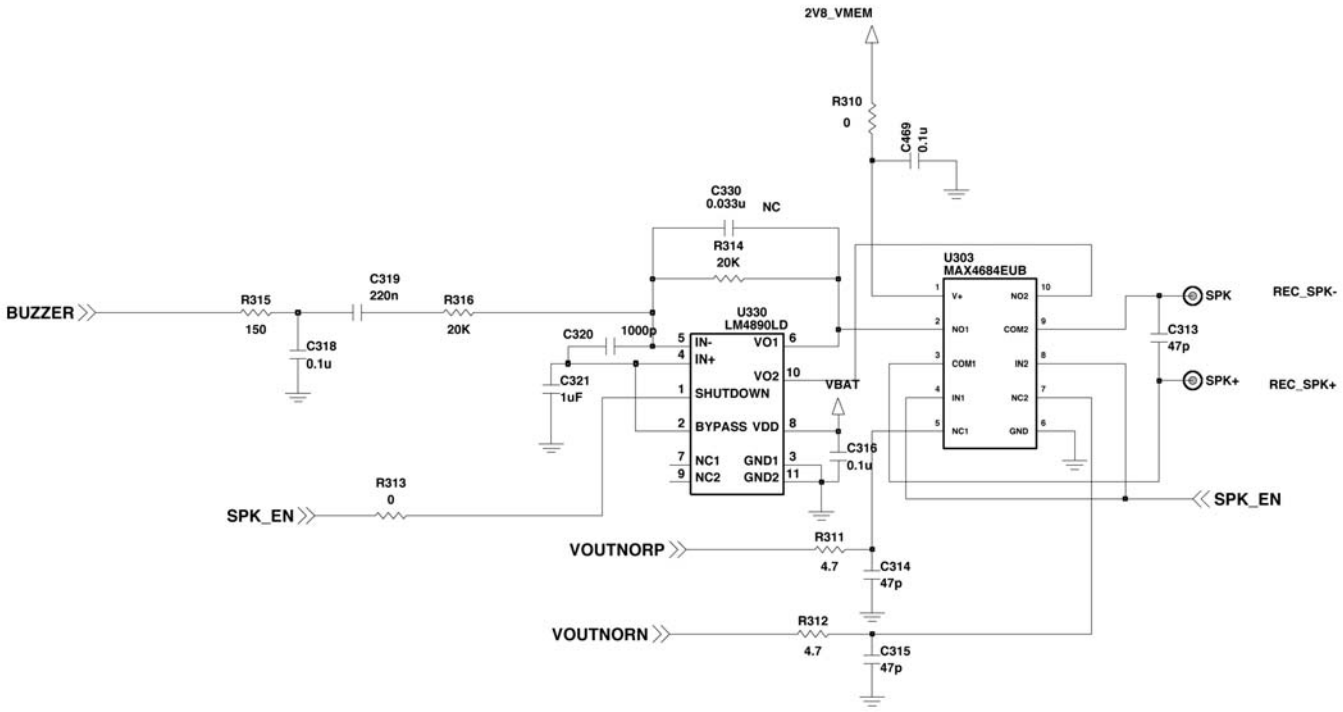
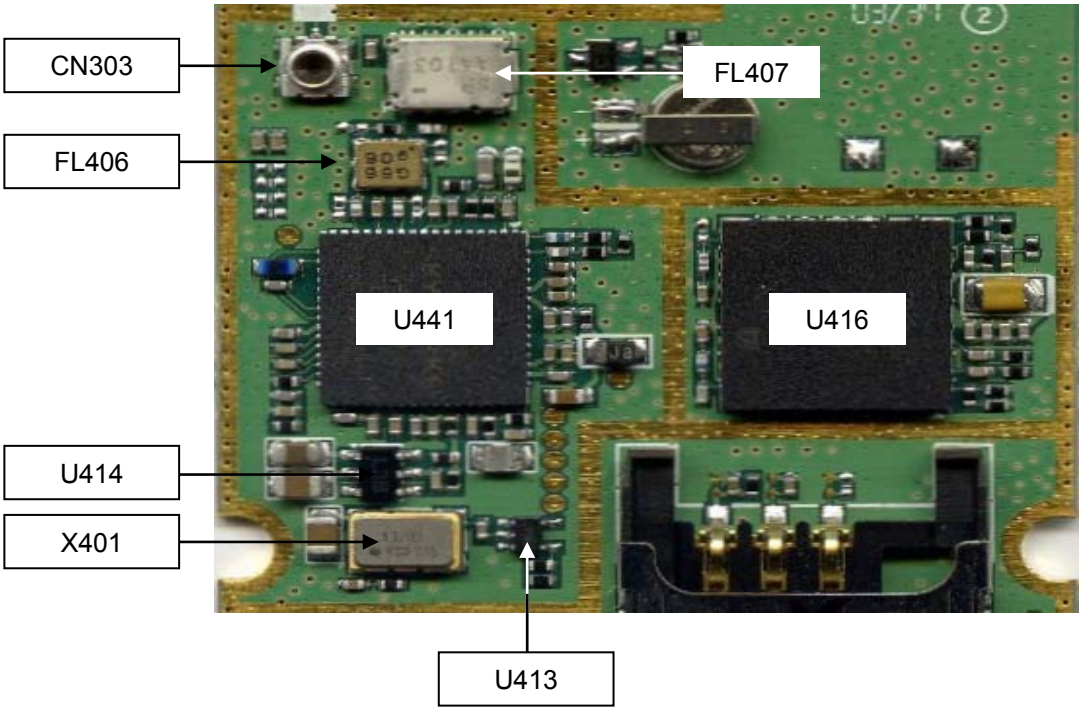


Figure 3-34. Speaker & Buzzer

4. TROUBLESHOOTING

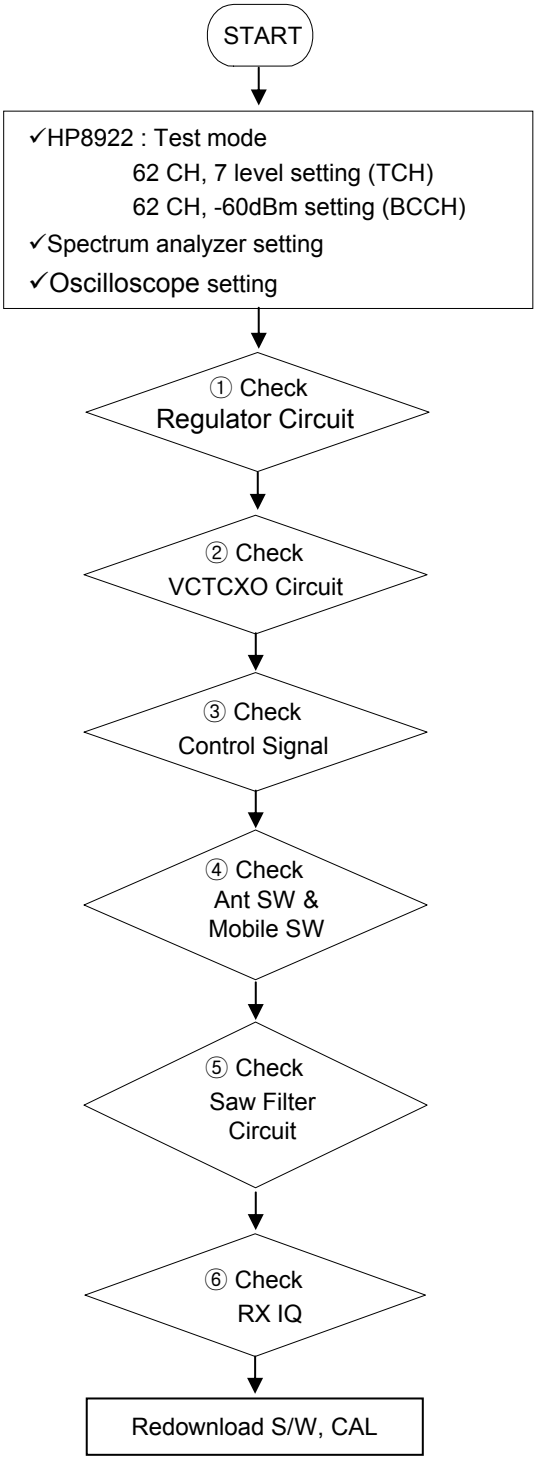
4.1 RF Components

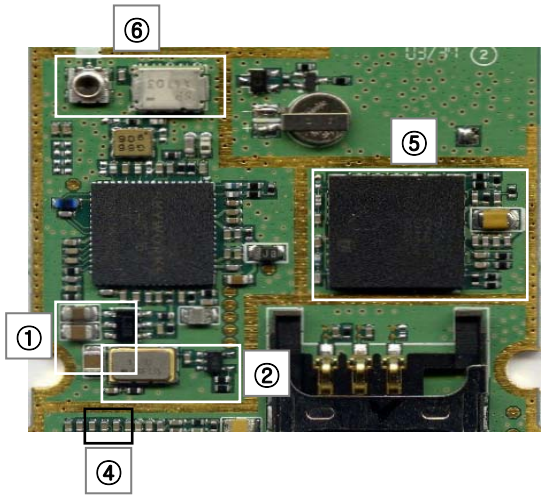


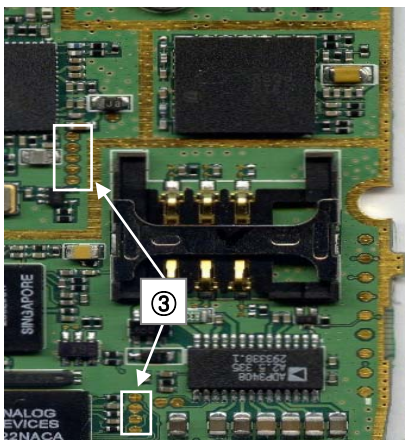
RF Components

Reference	Description	Reference	Description
U441	RF Main Chipset	FL406	Dual SAW Filter
CN303	Mobile S/W	X401	VCTCXO
FL407	Ant. S/W	U414	LDO
U416	PAM	U413	Inverter IC

4.2 RX Trouble

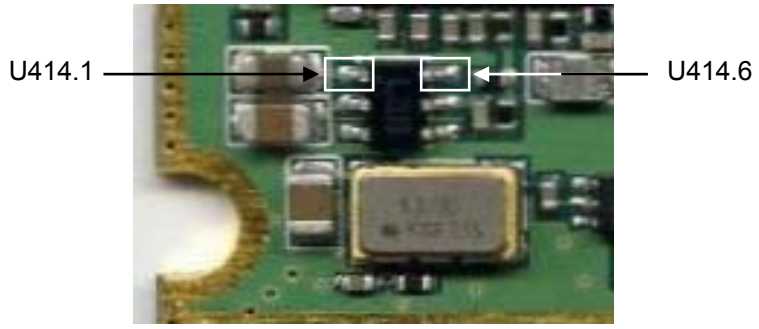


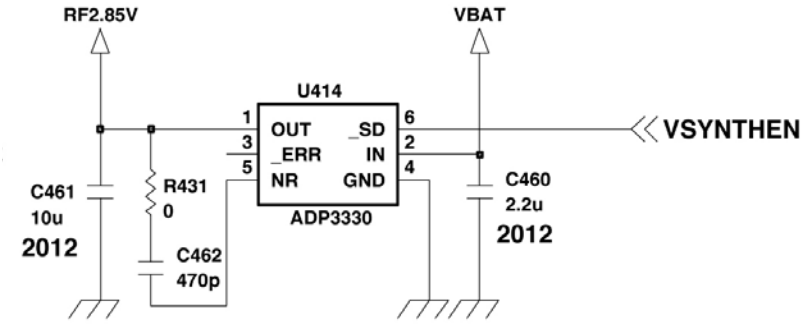


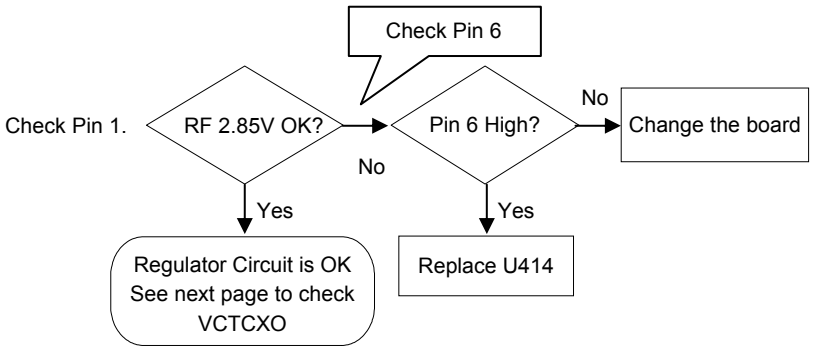


Now See next Page to see
How to check each parts

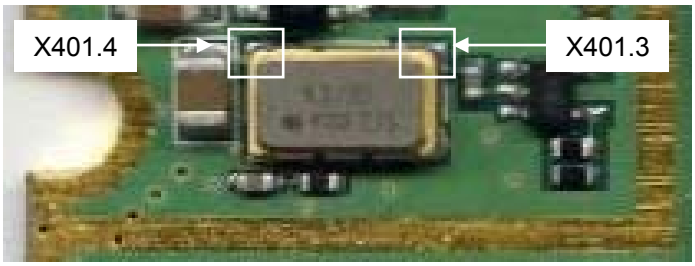
4.2.1 Checking Regulator Circuit

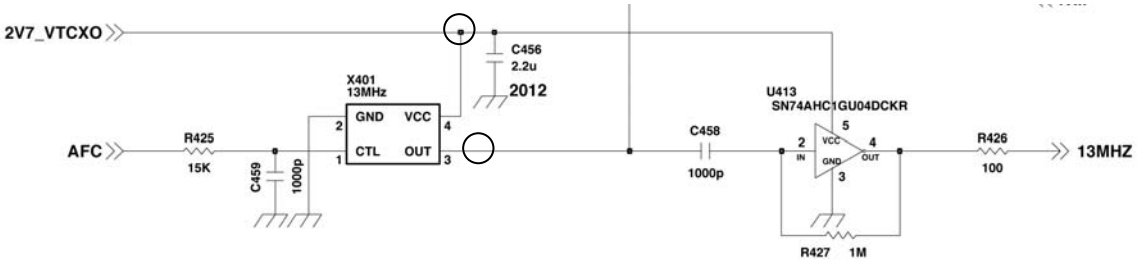


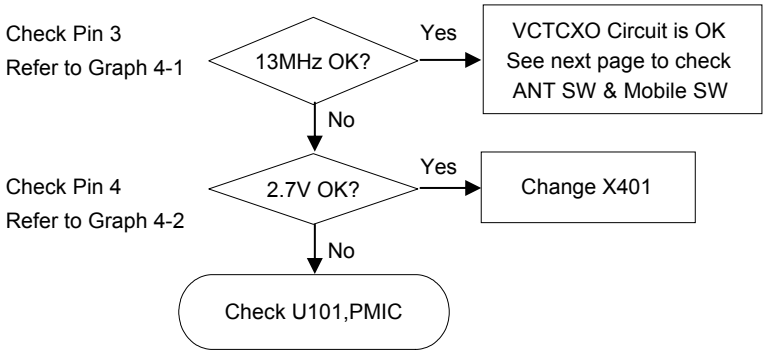


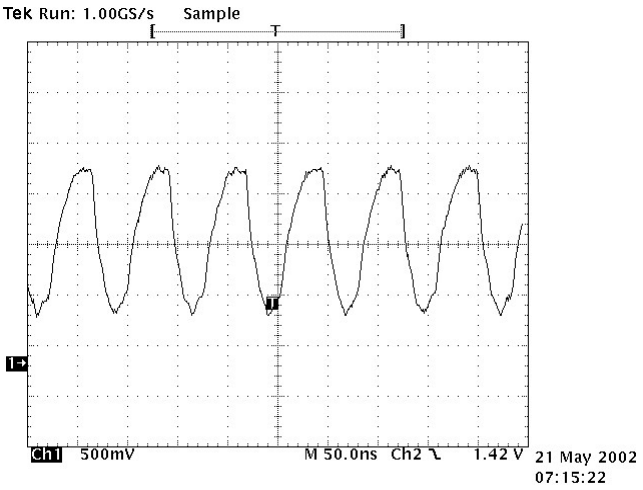


4.2.2 Checking VCTCXO Circuit

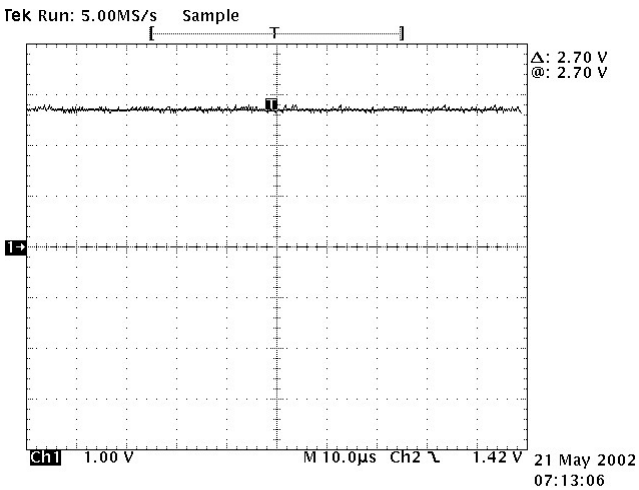






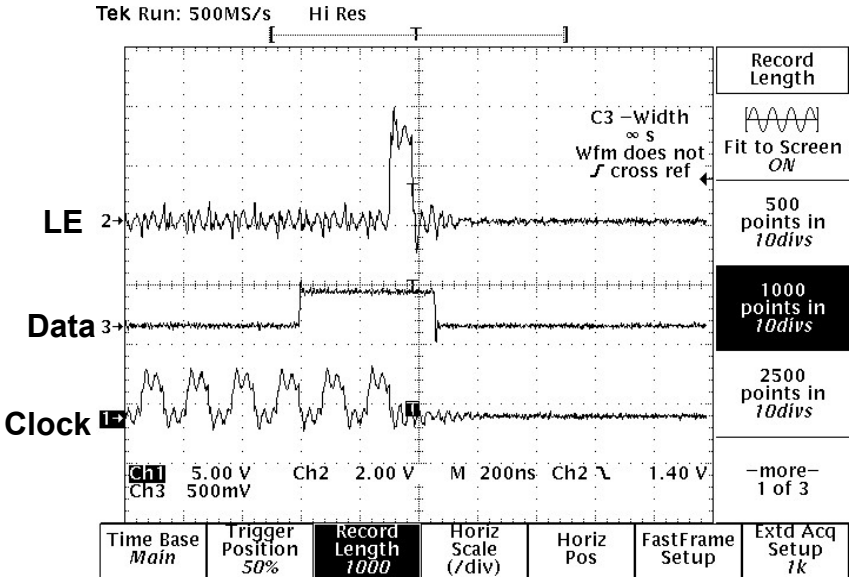


Graph 4-1. VCTCXO 13MHz

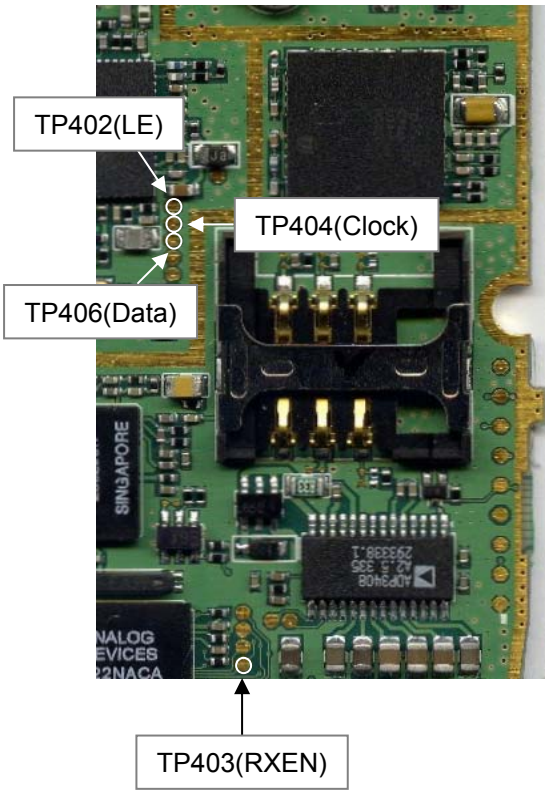


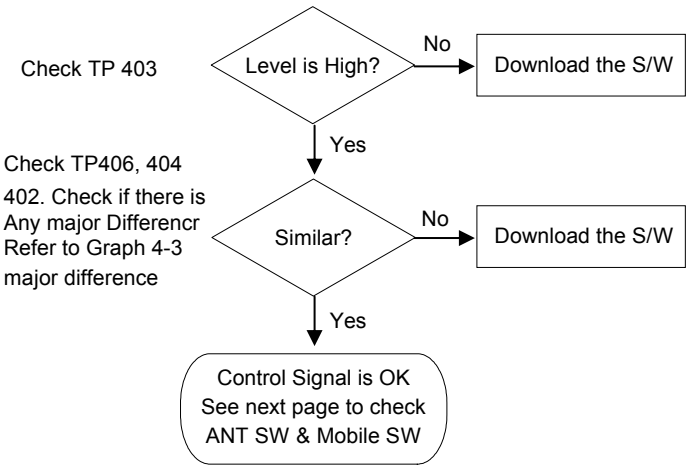
Graph 4-2. VCTCXO 2.7V

4.2.3 Checking PLL Control Signal

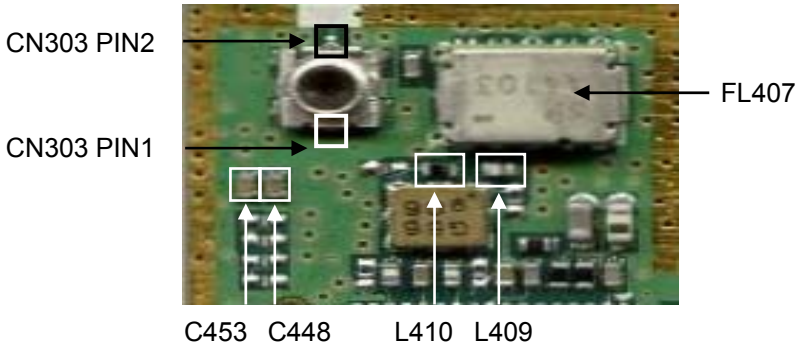


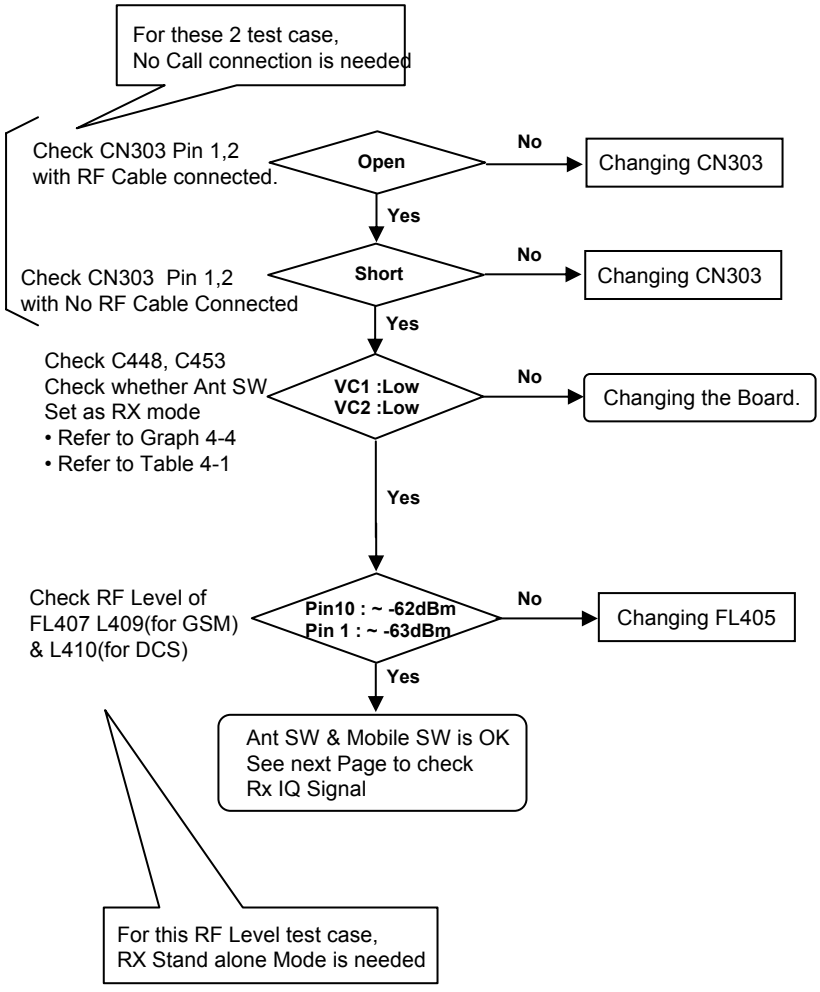
Graph 4-3. RF Control Signal



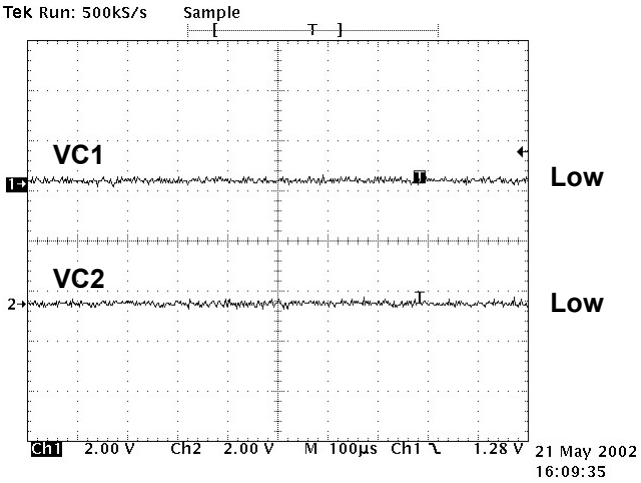


4.2.4 Checking Ant SW & Mobile SW

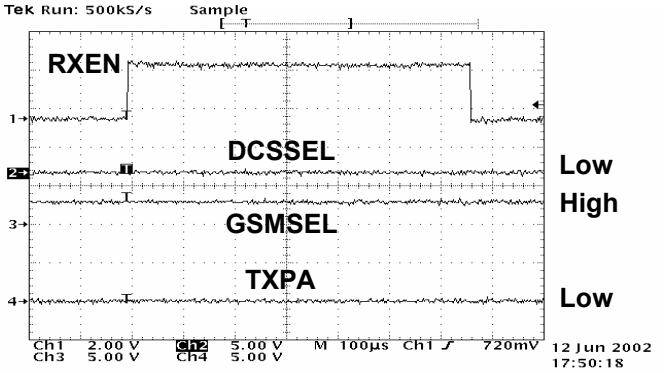




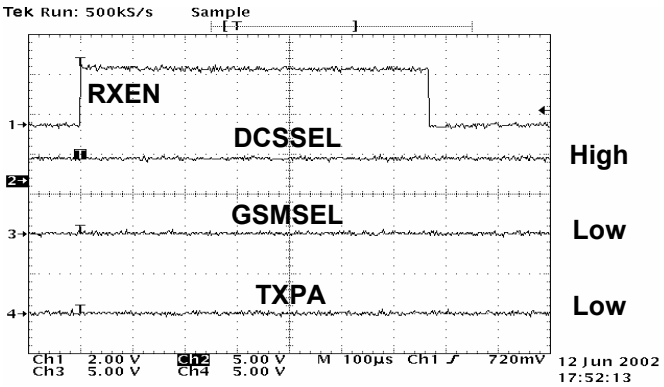
4. TROUBLESHOOTING



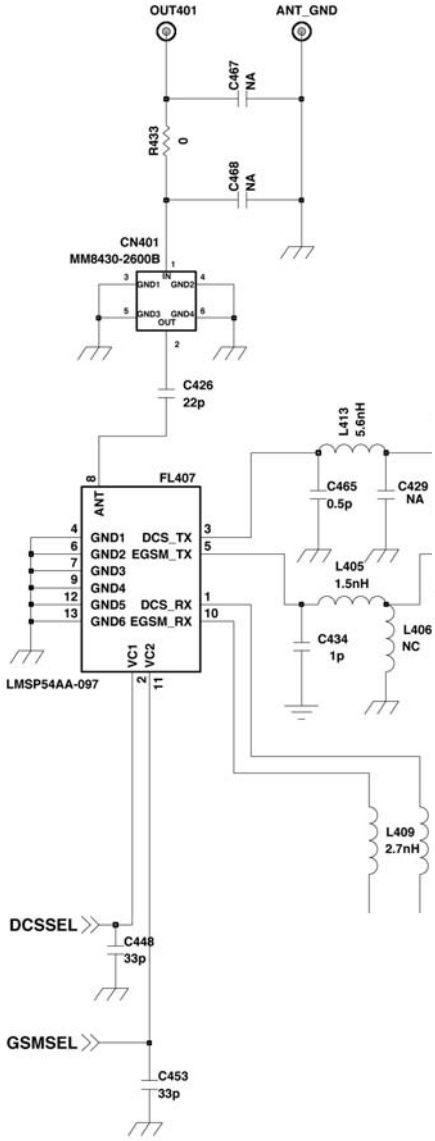
Graph 4-4. ANT SW Control
GSM, DCS RX Mode



Graph 4-5. Dual AND Gate input
For GSM RX Mode



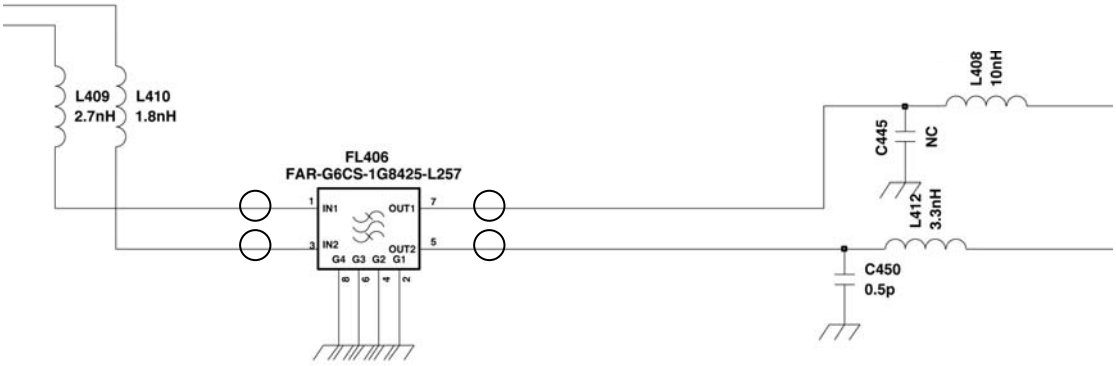
Graph 4-6. Dual AND Gate input
For DCS RX Mode

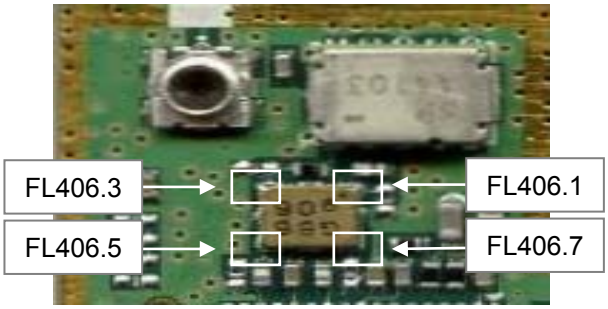


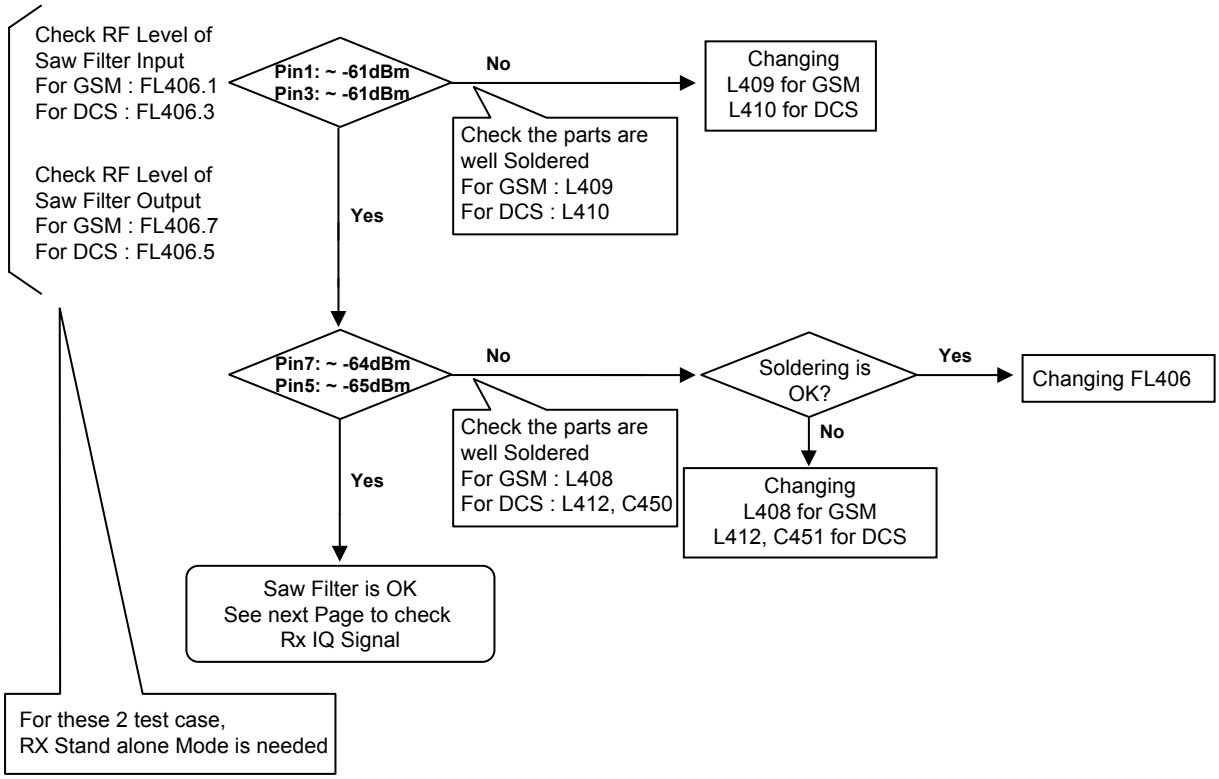
ANT SW	GSMSEL	DCSSEL	TXPA
EGSM TX	1	0	1
DCS TX	0	1	1
EGSM RX	1	0	0
DCS RX	0	1	0

Table 4-1. ANT SW Control Logic

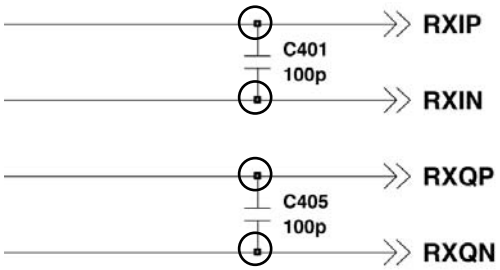
4.2.5 Checking SAW Filter Circuit

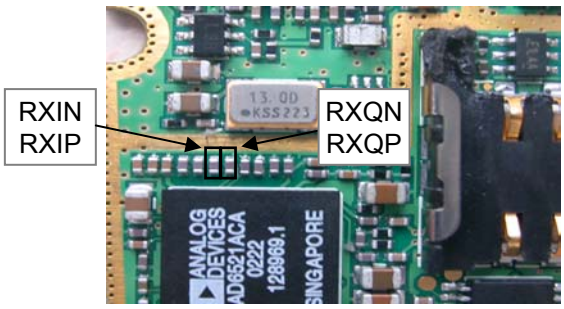


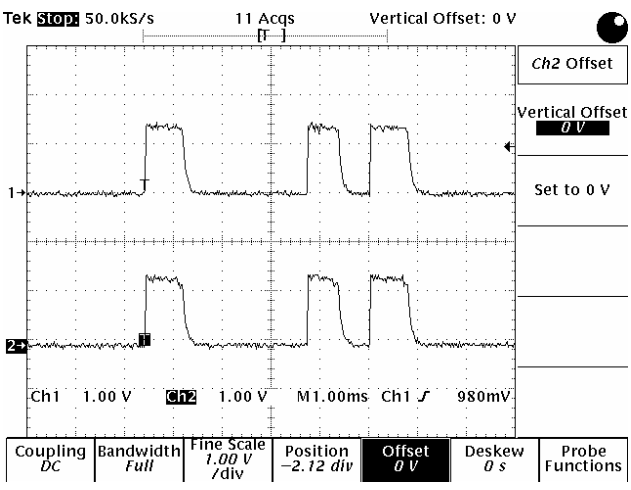




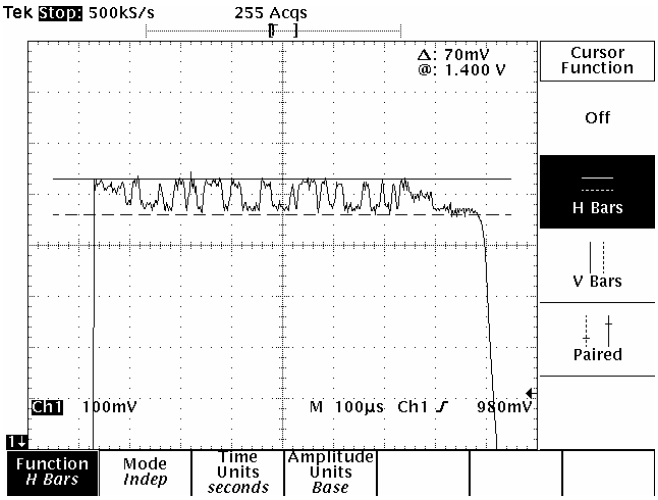
4.2.6 Checking RX IQ







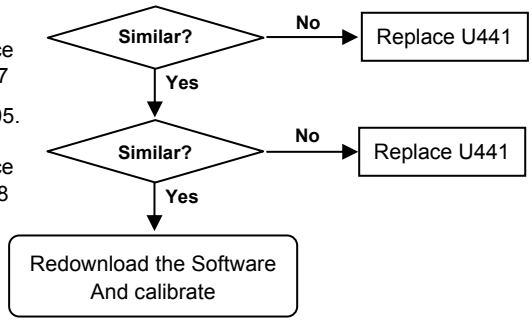
Graph 4-7. RX IQ Signal



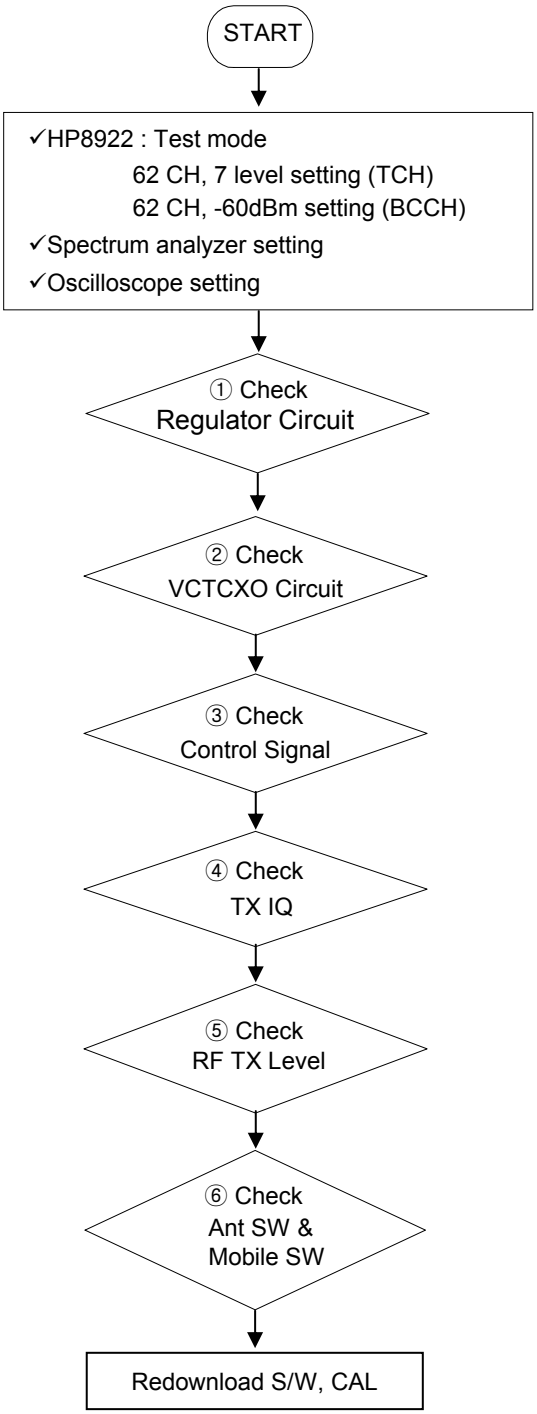
Graph 4-8. RX I Signal (Extended)

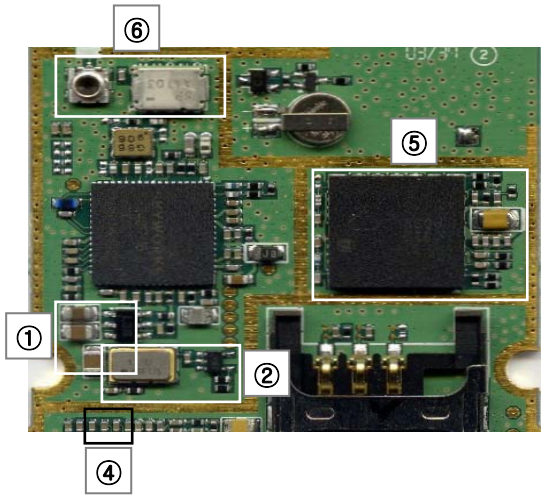
Check C401, 405.
Check if there is
Any Major Difference
♦Refer to Graph 4-7

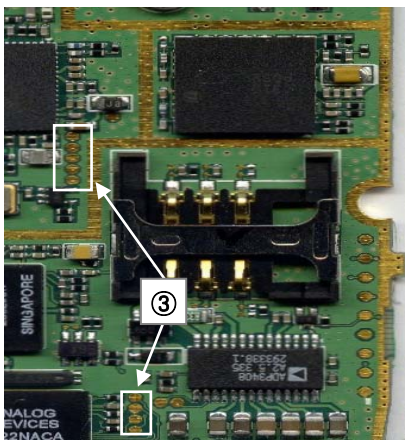
Check C401 or C405.
Check if there is
Any Major Difference
♦Refer to Graph 4-8



4.3 TX Trouble



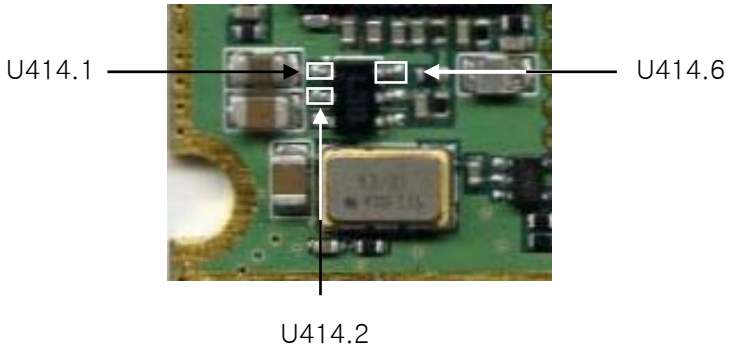


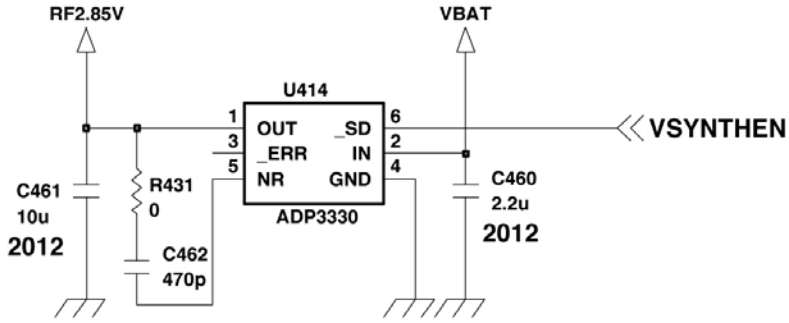


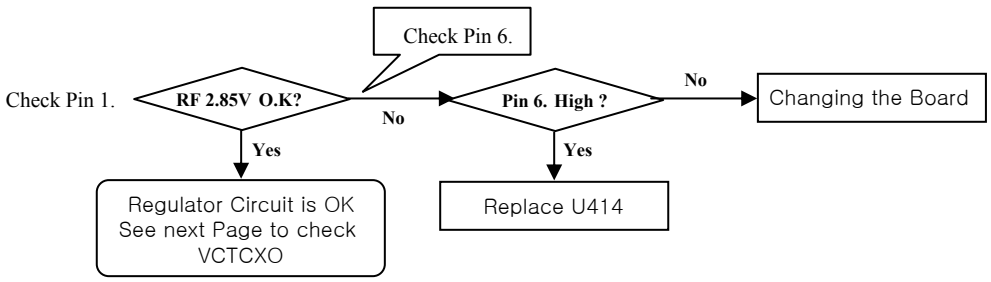
Now See next Page to see
How to check each parts

4-3-1 Checking Regulator Circuit

• If you already check this point while checking RX part, you can skip this test.

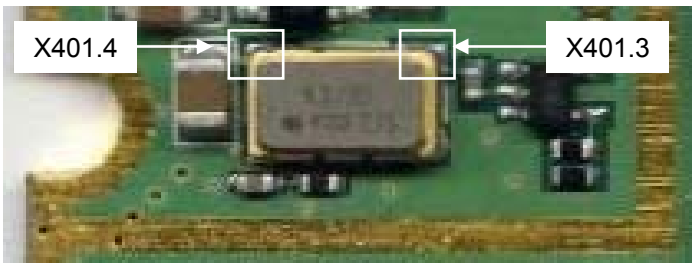


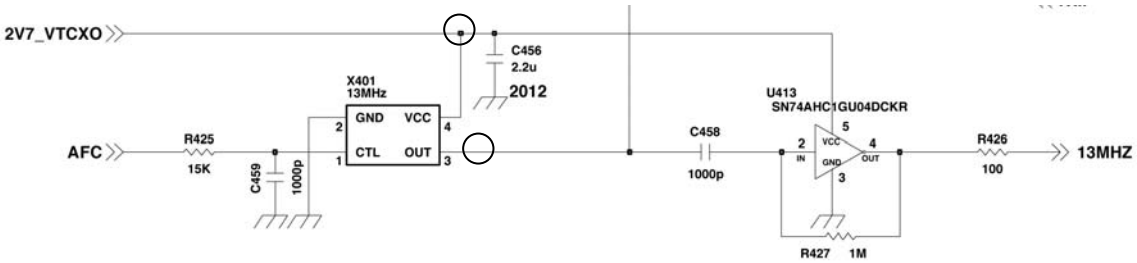


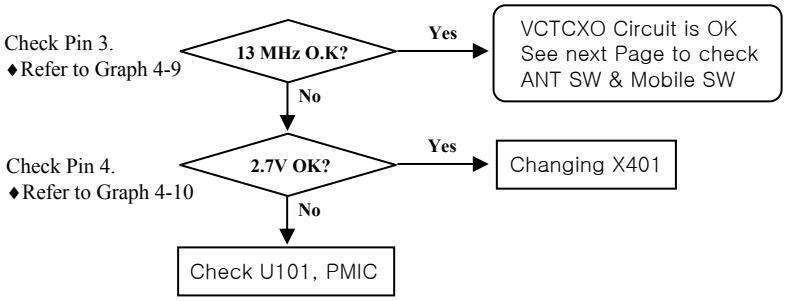


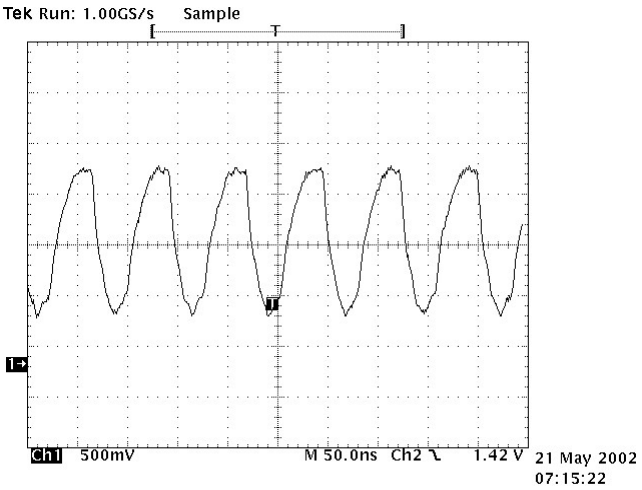
4-3-2 Checking VCTCXO Circuit

• If you already check this point while checking RX part, you can skip this test.

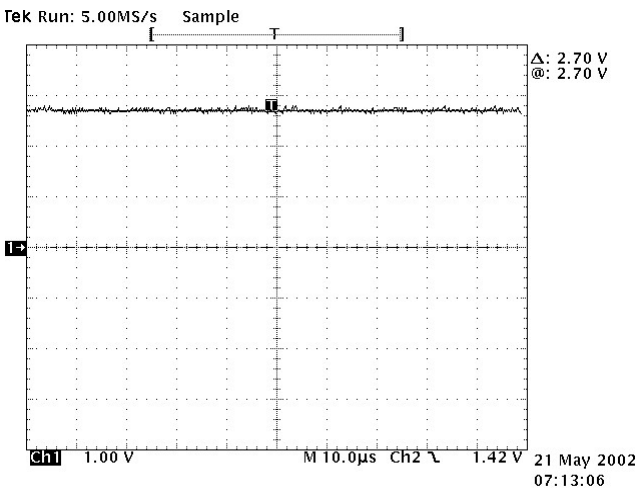






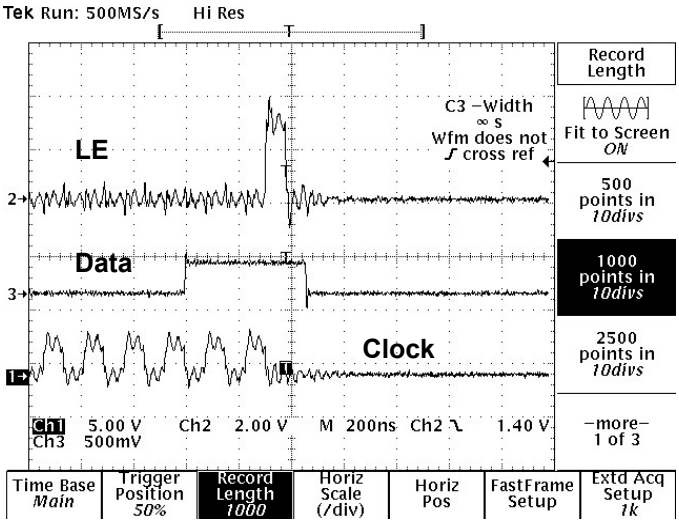


Graph 4-9. VCTCXO 13MHz

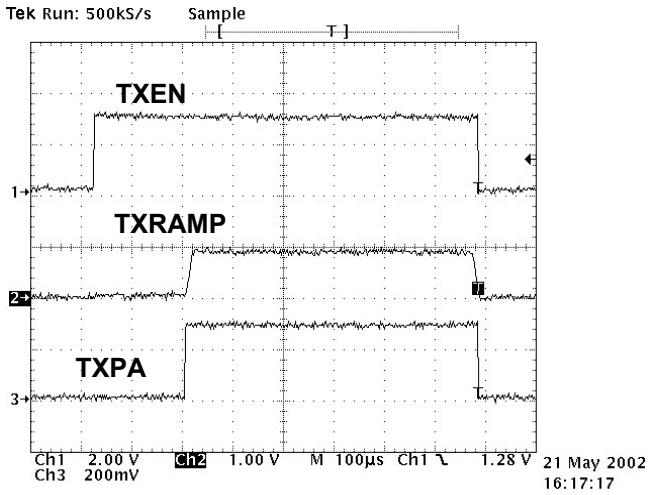


Graph 4-10. VCTCXO 2.7V

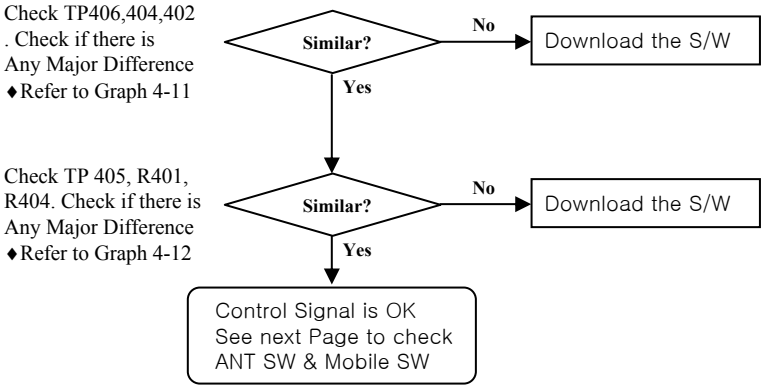
4-3-3 Checking Control Signal



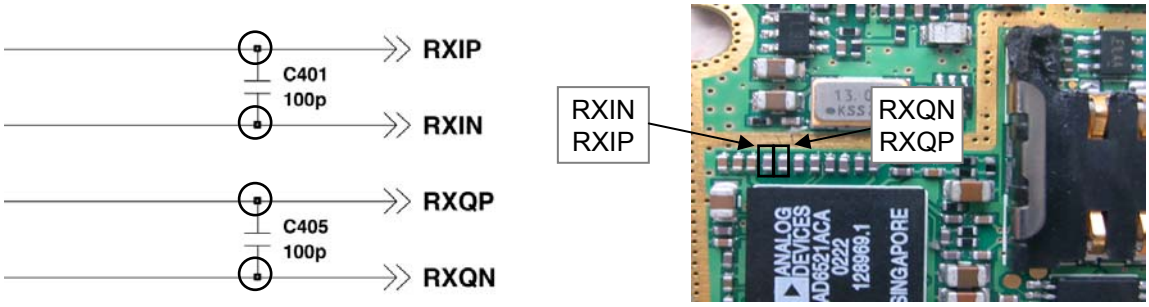
Graph 4-11. RF Control Signal

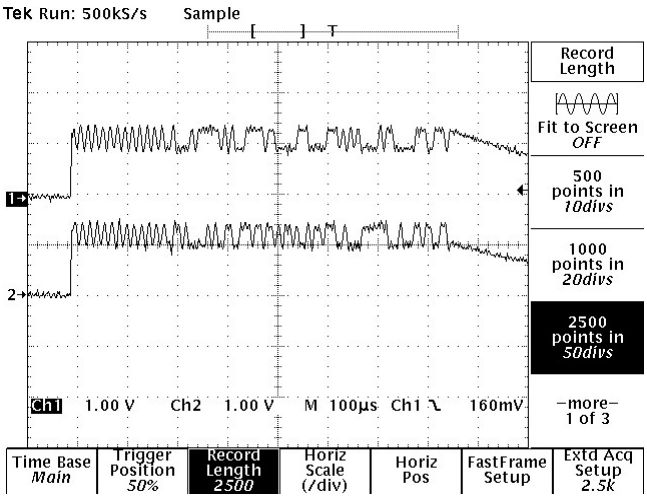


Graph 4-12. RF Control Signal (TX_EN, TX_RAMP, TX_PA)

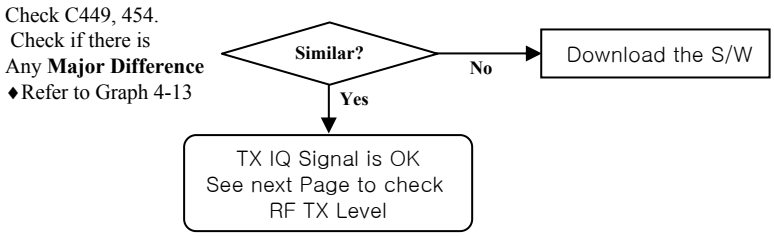


4-3-4 Checking TX IQ

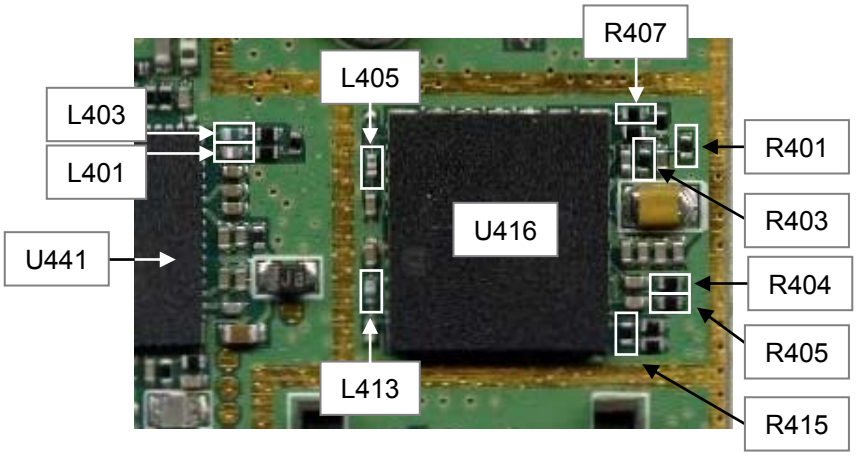


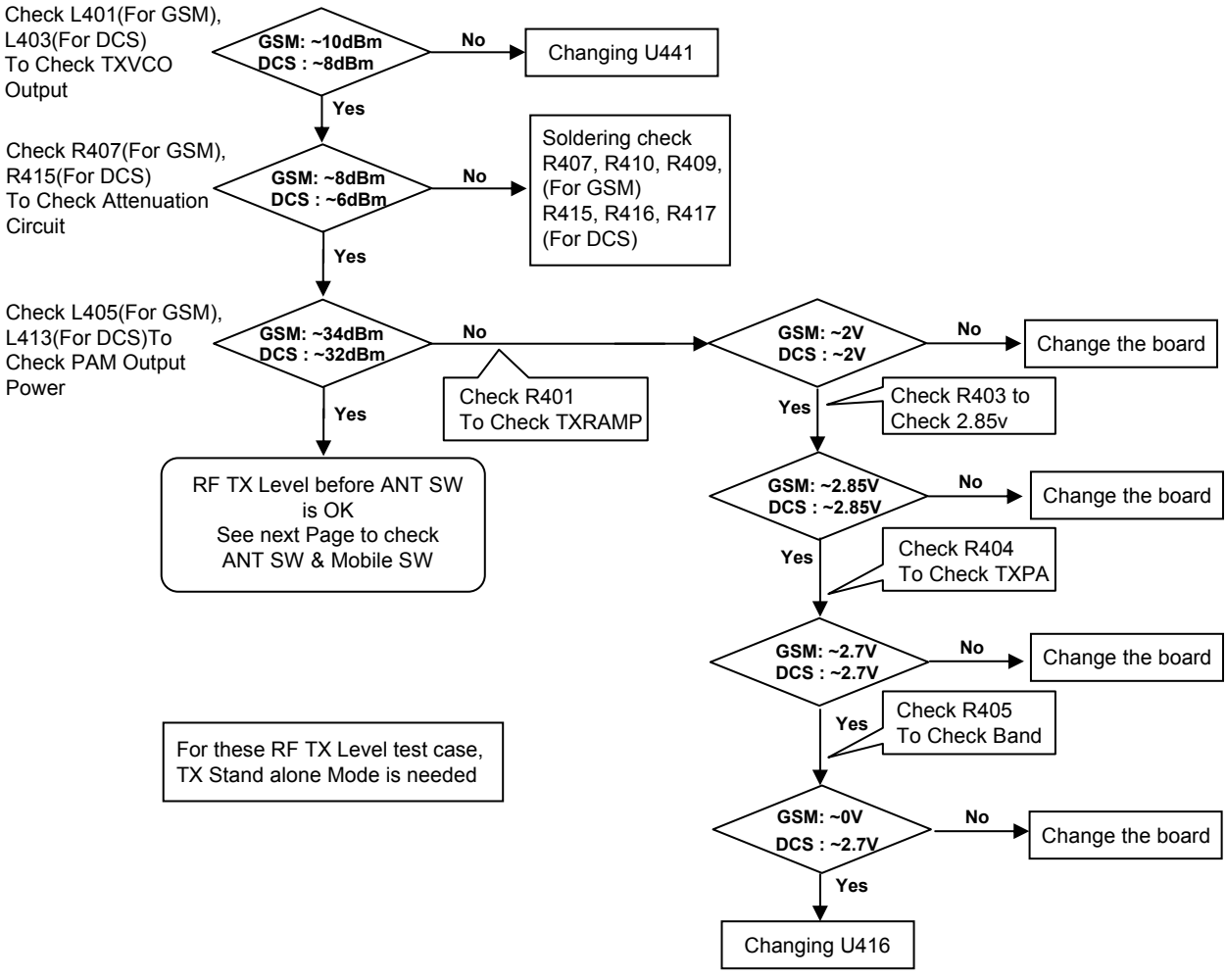


Graph 4-13. TX IQ Signal

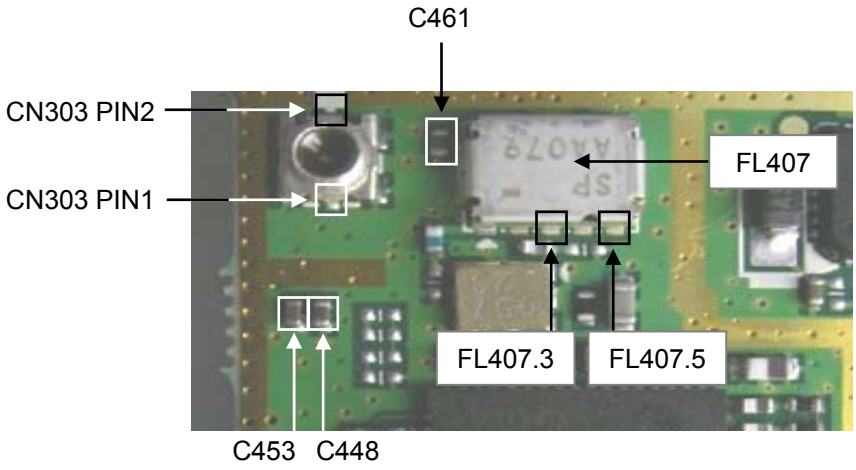


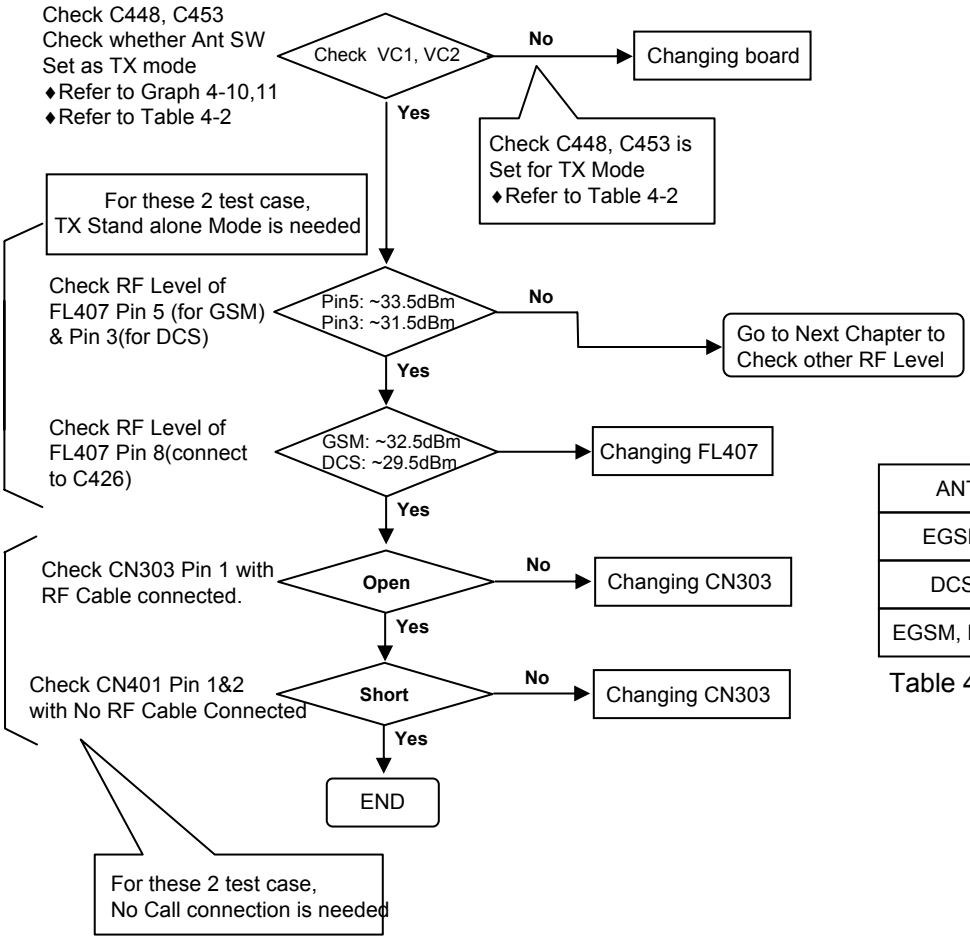
4-3-5 Checking RF TX Level





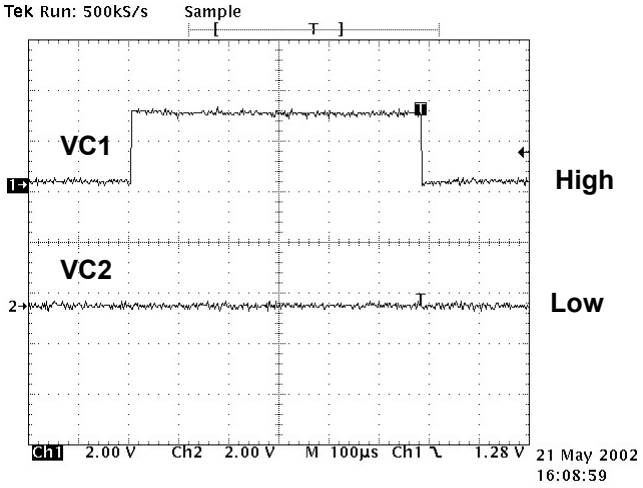
4-3-6 Checking Ant SW & Mobile SW



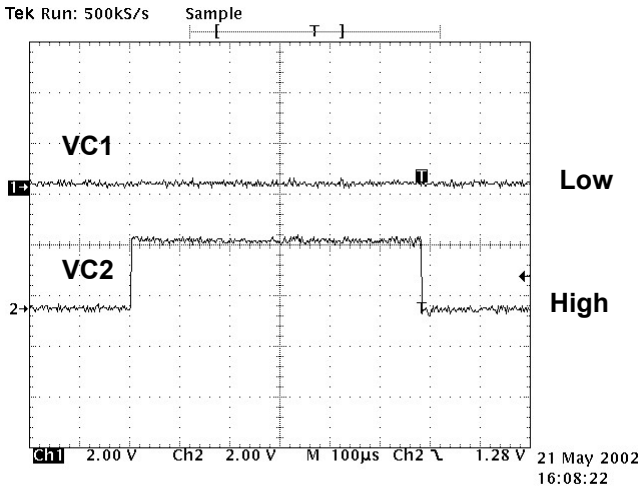


ANT SW	VC1(C448)	VC2(C444)
EGSM TX	0	1
DCS TX	1	0
EGSM, DCS RX	0	0

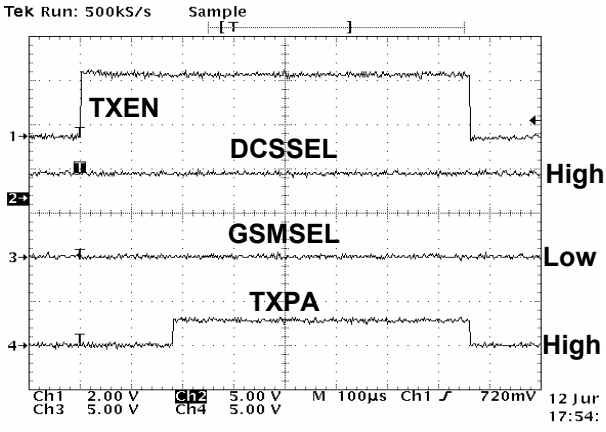
Table 4-2. ANT SW Control Logic



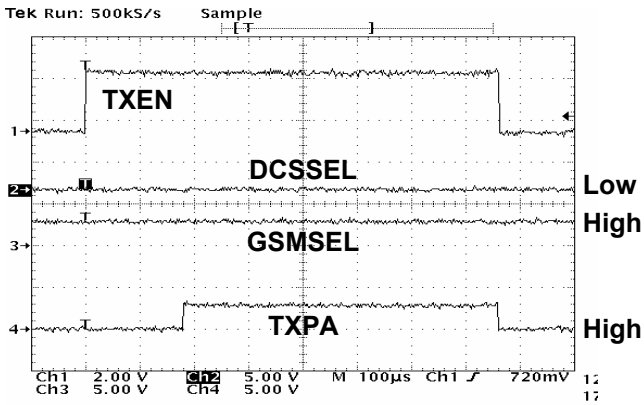
Graph 4-14. ANT SW Control
DCS TX Mode



Graph 4-15. ANT SW Control
GSM TX Mode



Graph 4-16. Dual AND Gate input
For DCS TX Mode

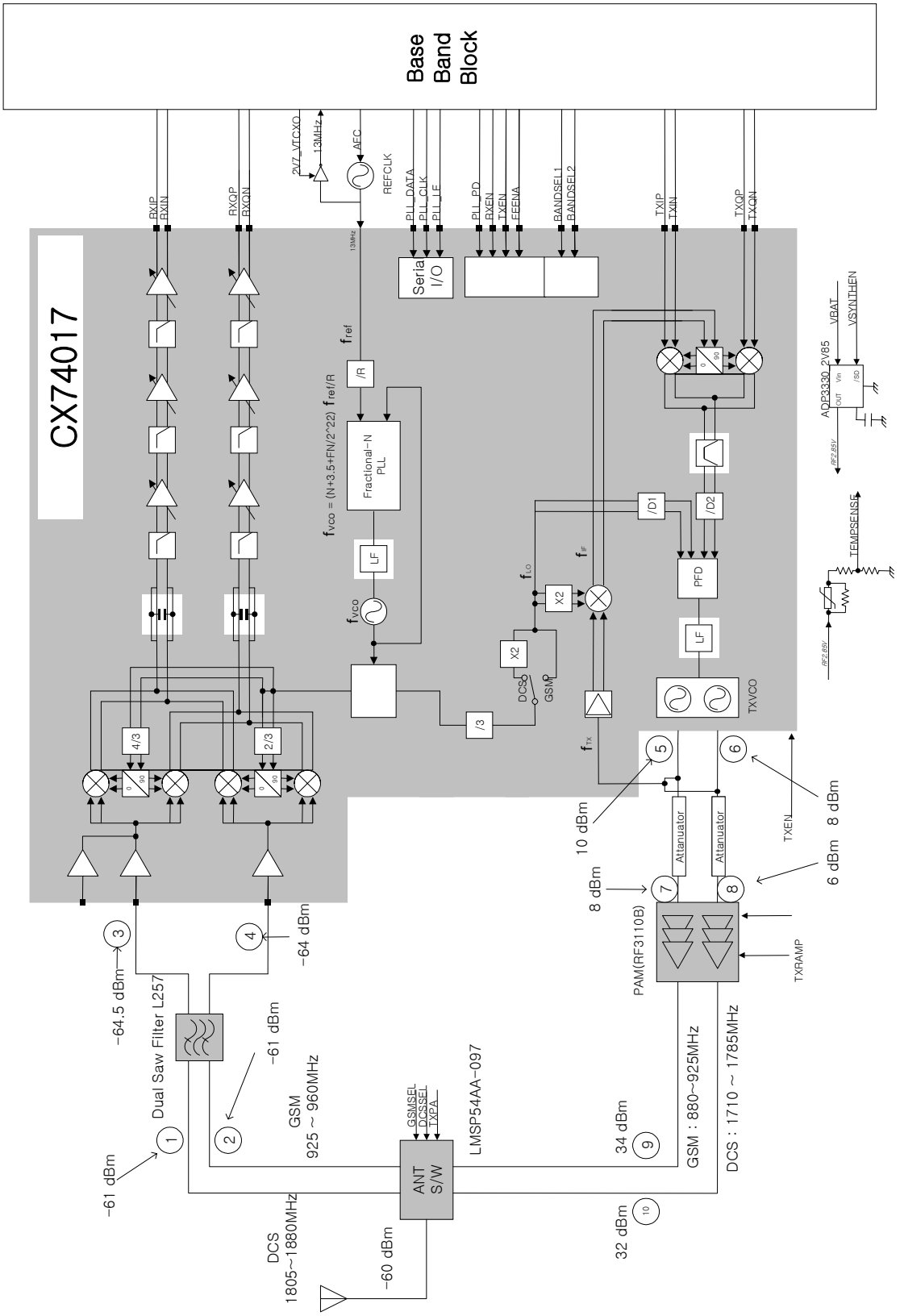


Graph 4-17. Dual AND Gate input
For GSM TX Mode

ANT SW	GSMSEL	DCSSEL	TXPA
EGSM TX	1	0	1
DCS TX	0	1	1
EGSM RX	1	0	0
DCS RX	0	1	0

Table 4-1. ANT SW Control Logic

4-3-7 Receiver and Transmitter RF Level



4-3-8 Receiver RF Level

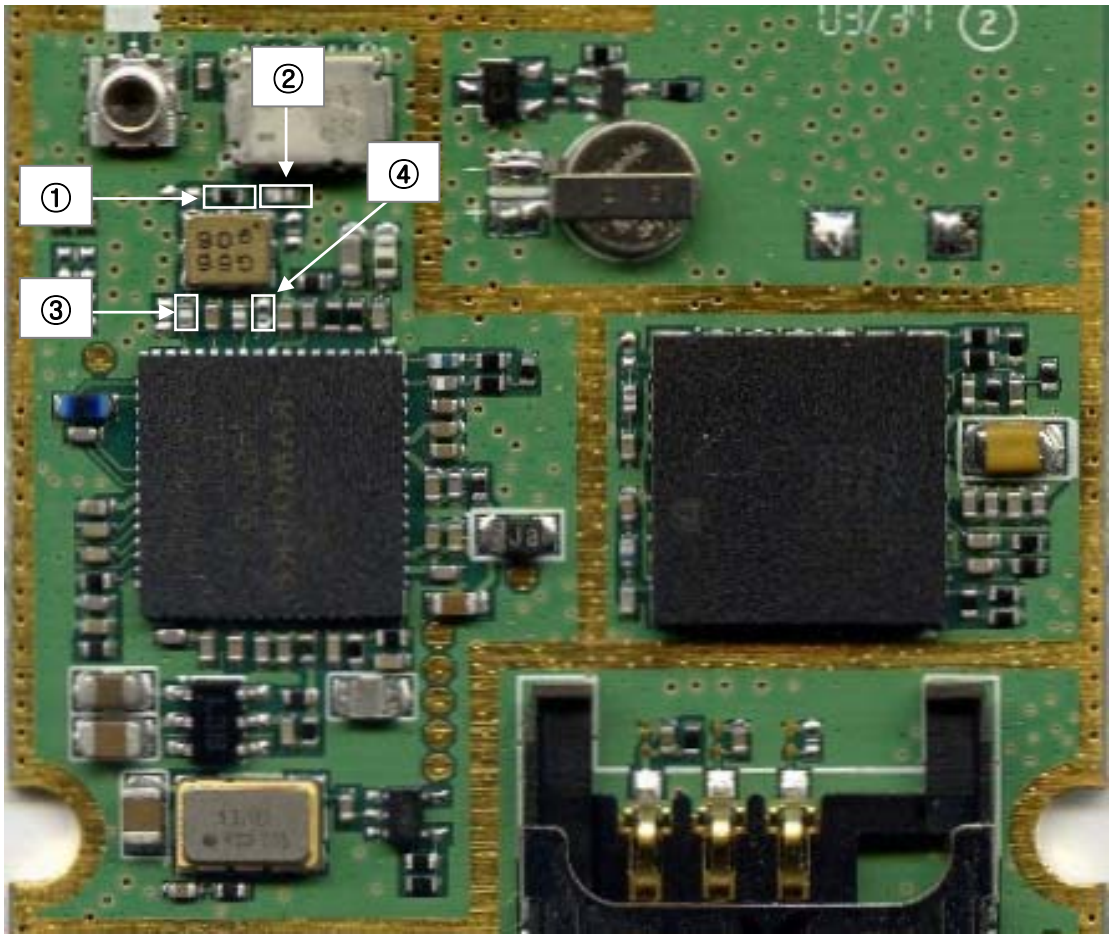


Figure 4-1. Test Points of Rx Level.

4-3-9 Transmitter RF Level

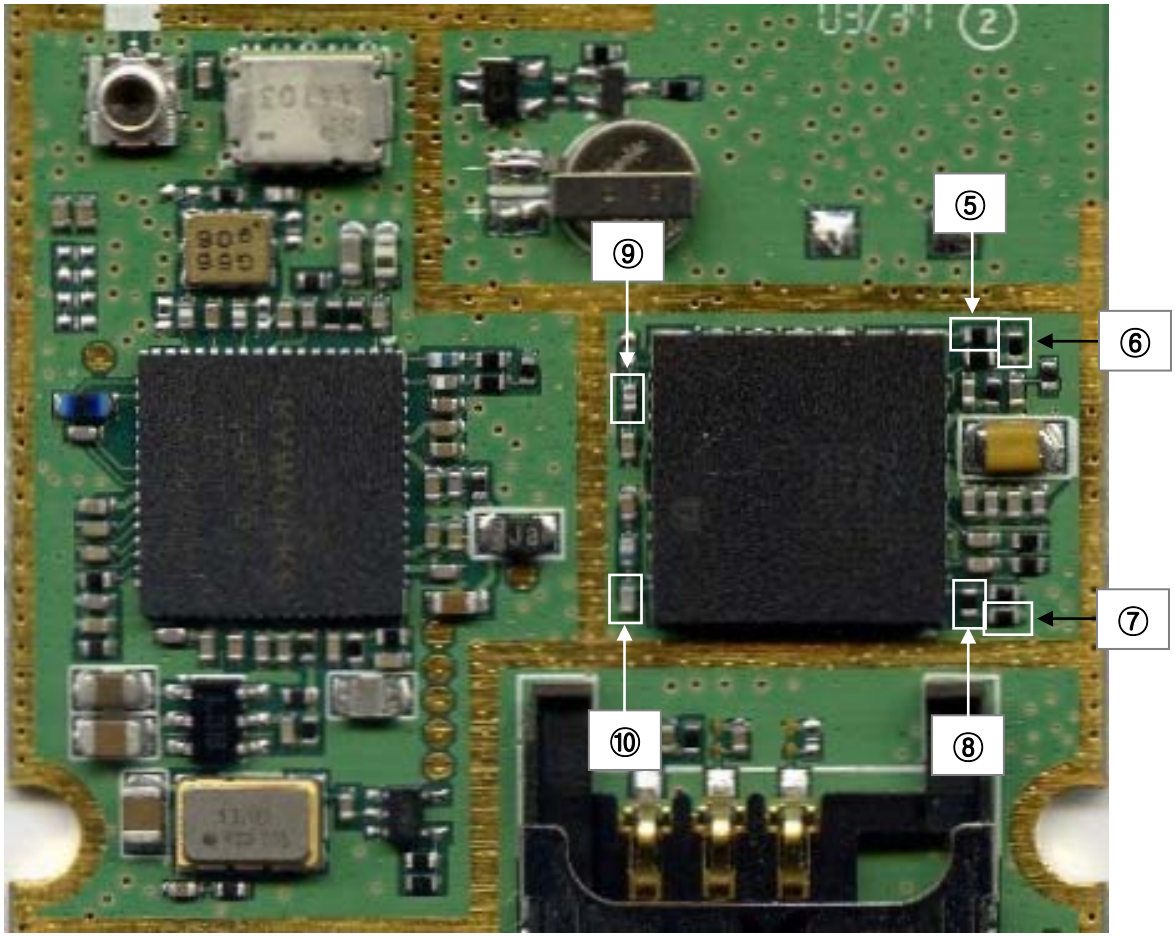


Figure 4-2. Test Points of Tx Level.

4-3-10 Test Points for RF Components

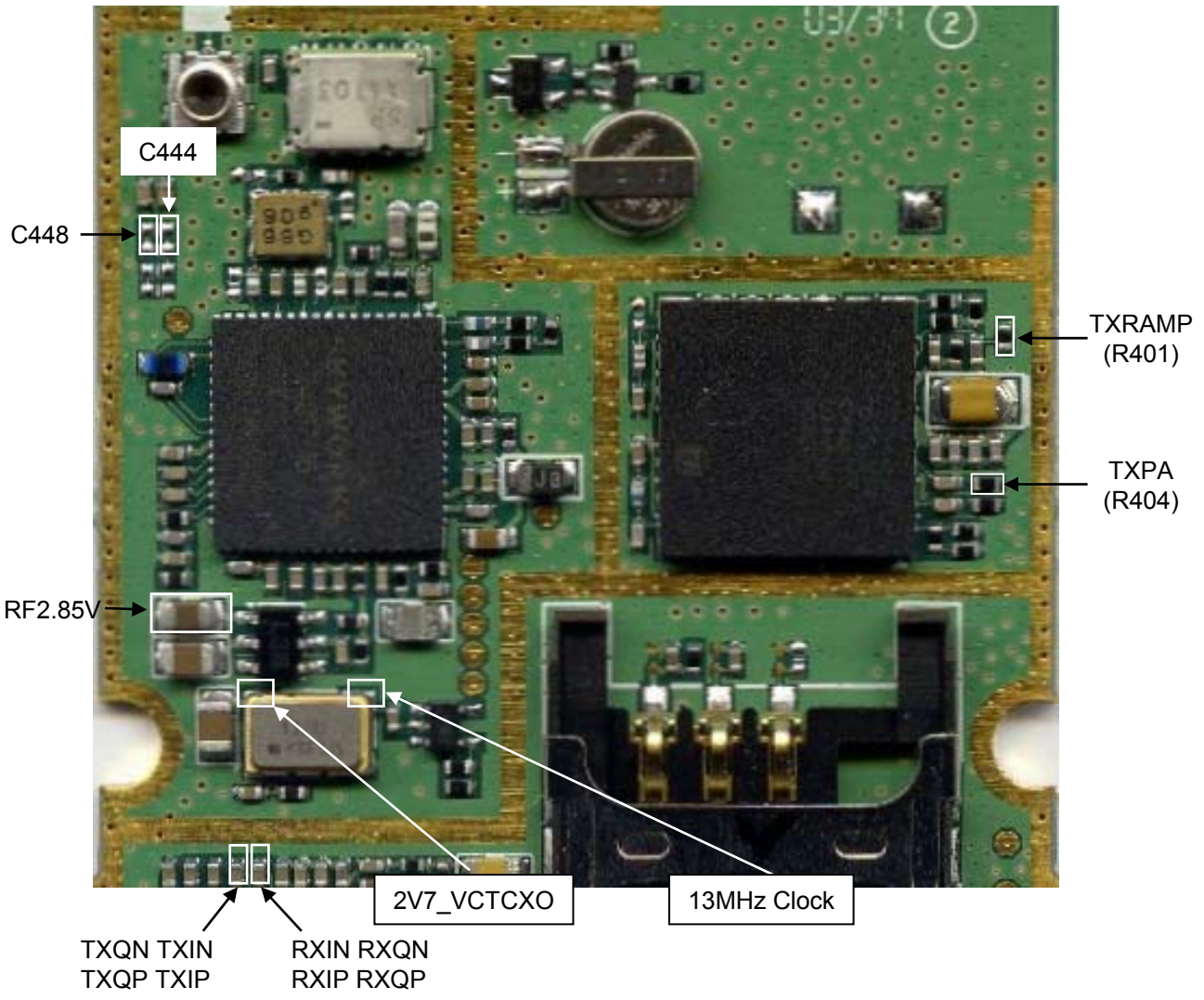


Figure 4-3. Test Points for RF components

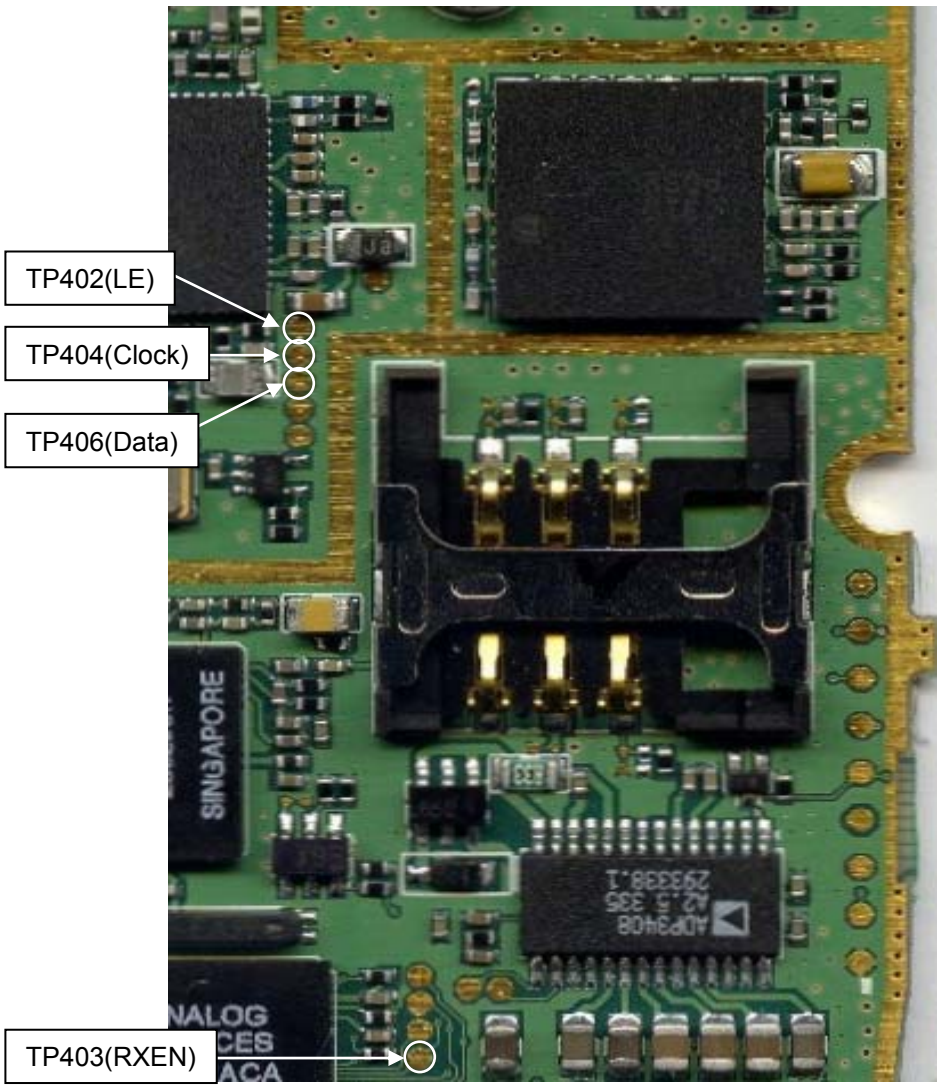
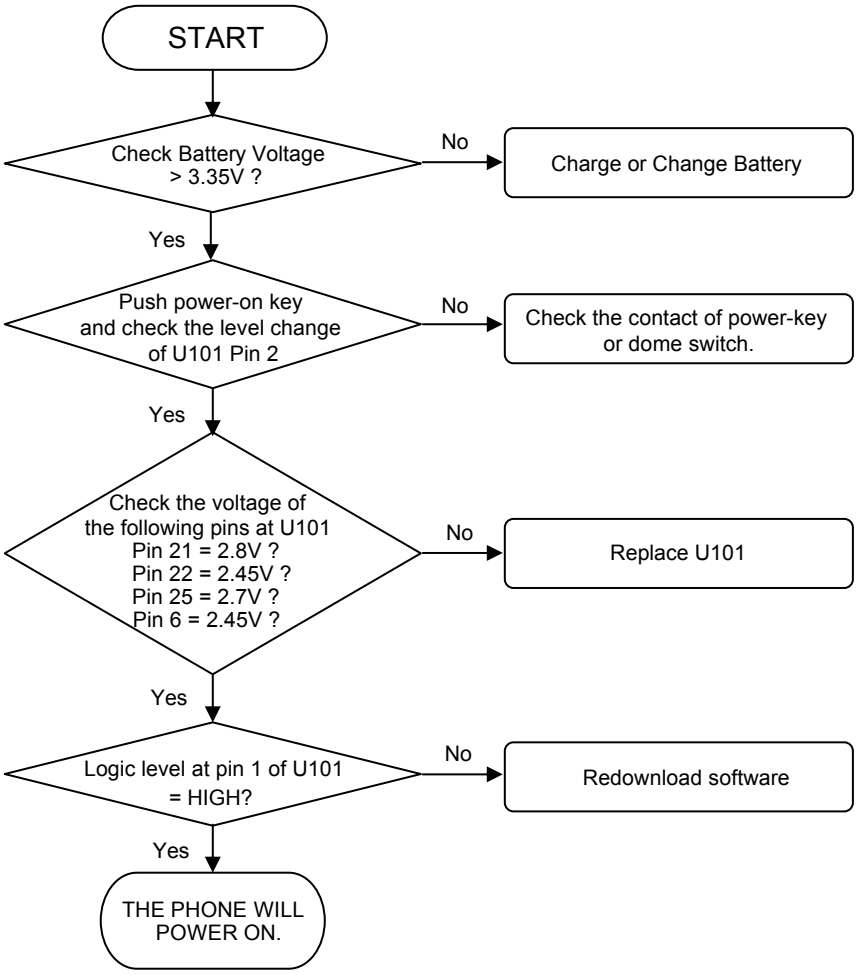


Figure 4-4. Test Points for RF Components (Keypad Side/Lower)

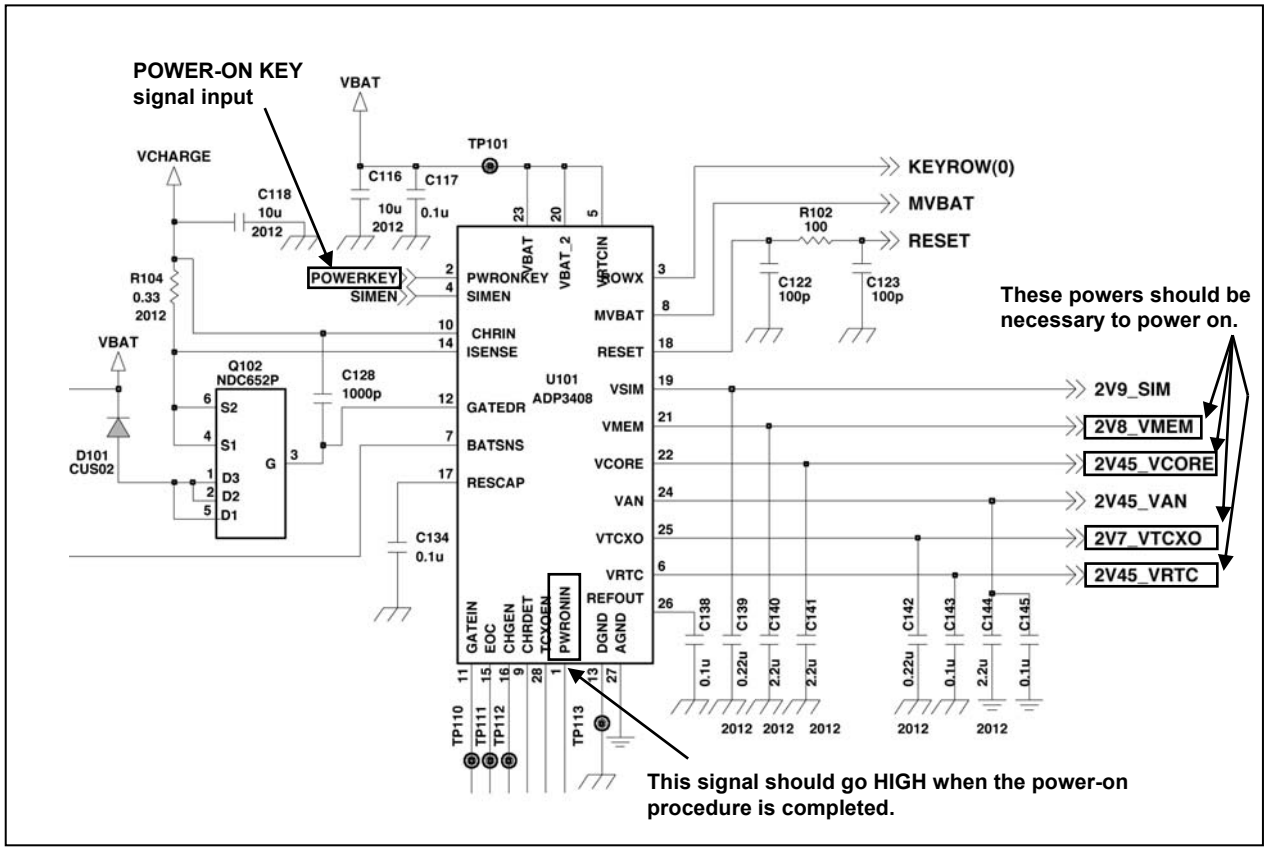
4. TROUBLESHOOTING

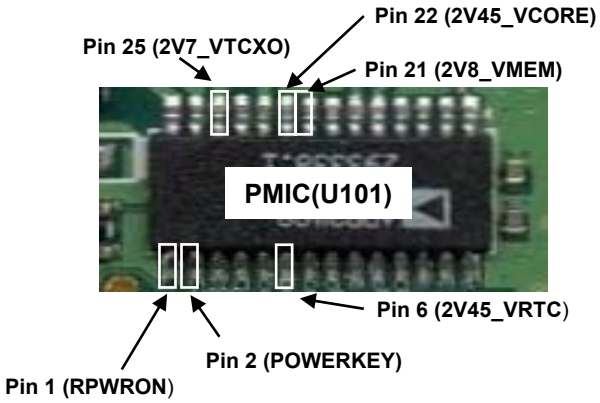
4.4 Power On Trouble

SETTING : Connect PIF, and set remote switch off at PIF.



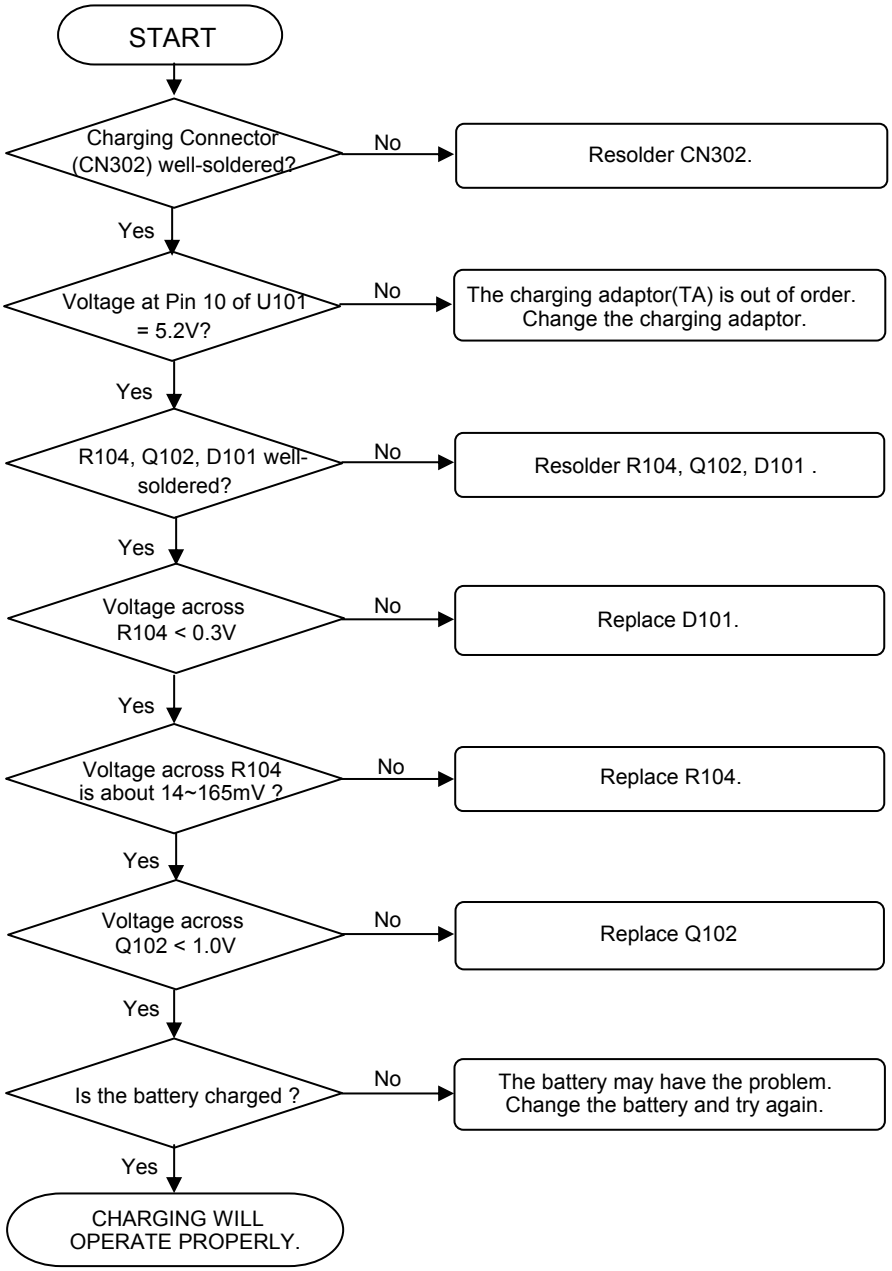
Test) U101 (PMIC) Check!!



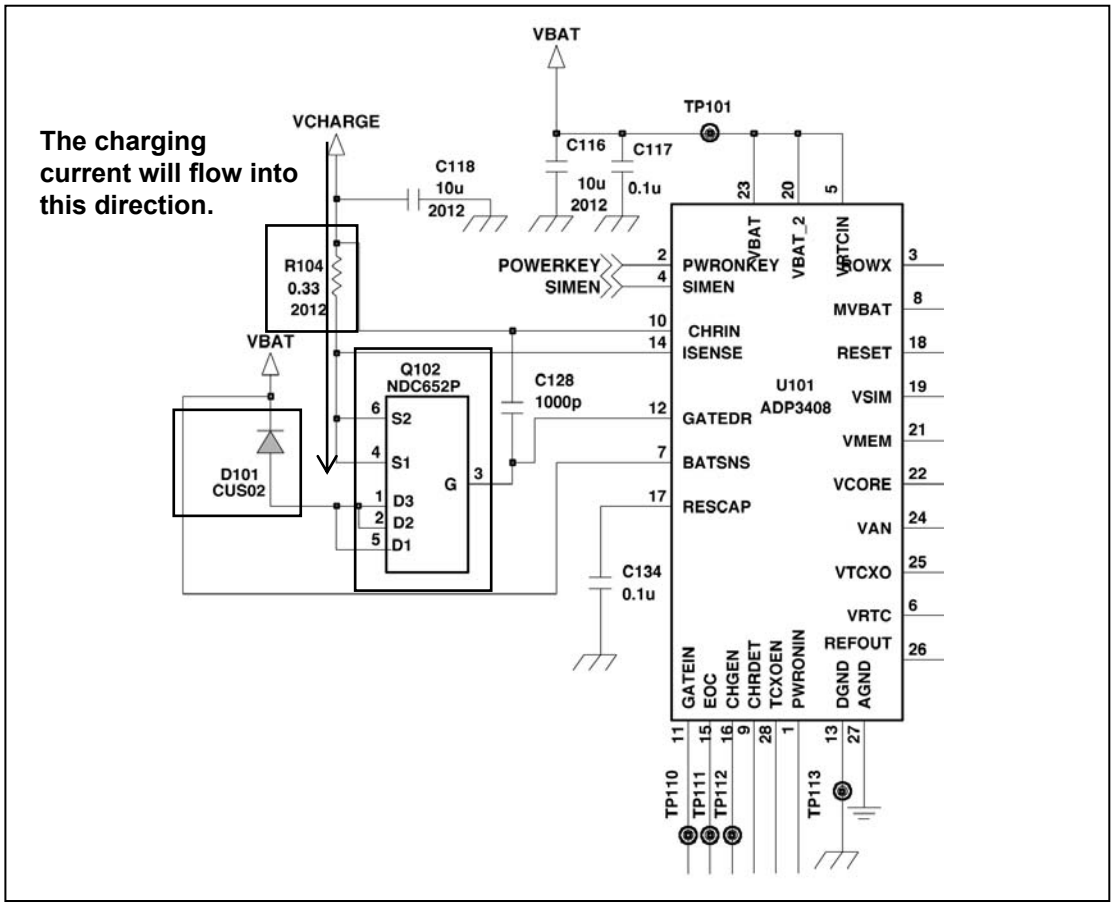


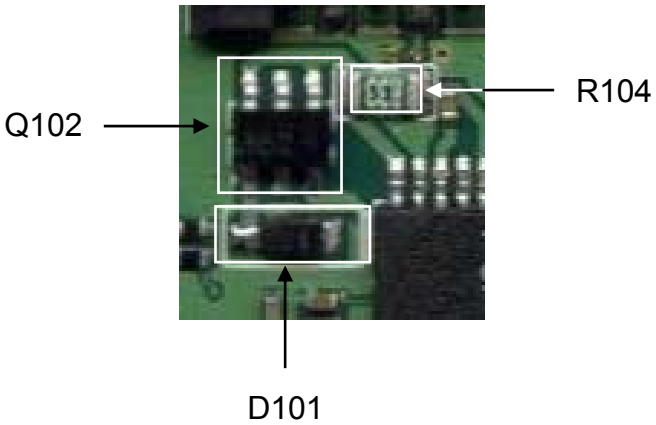
4.5 Charging Trouble

SETTING : Connect the battery and the charging adaptor (TA).

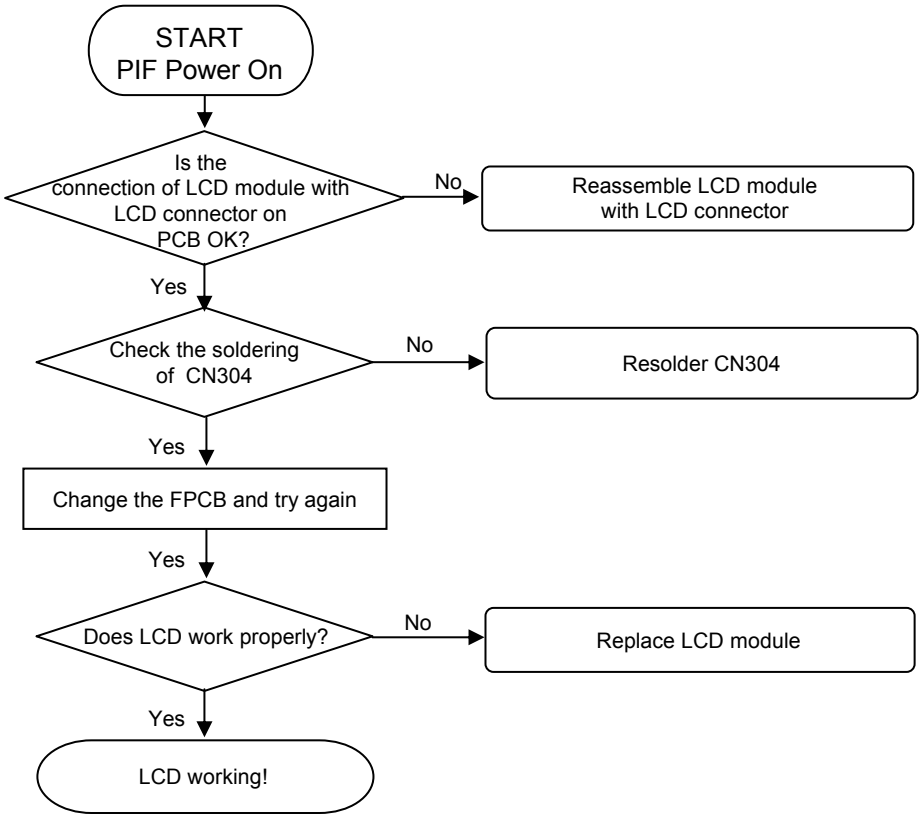


Test) Q301 & D302 Check!!

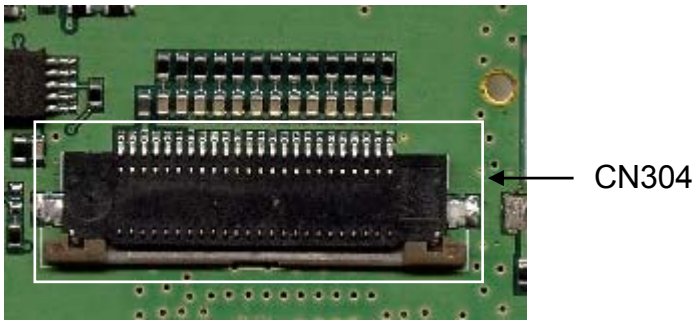


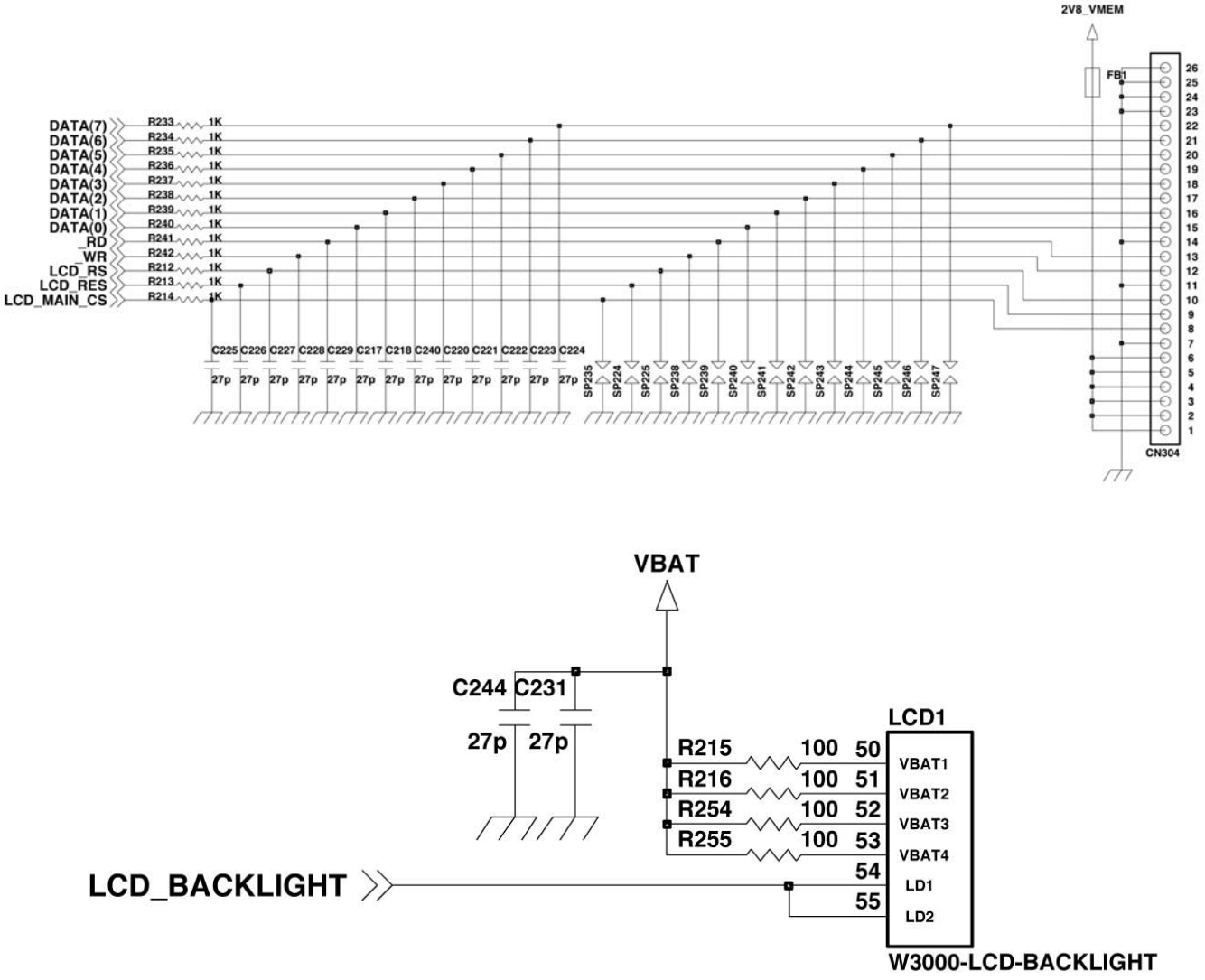


4.6 LCD Trouble



Test) CN301 Check!!





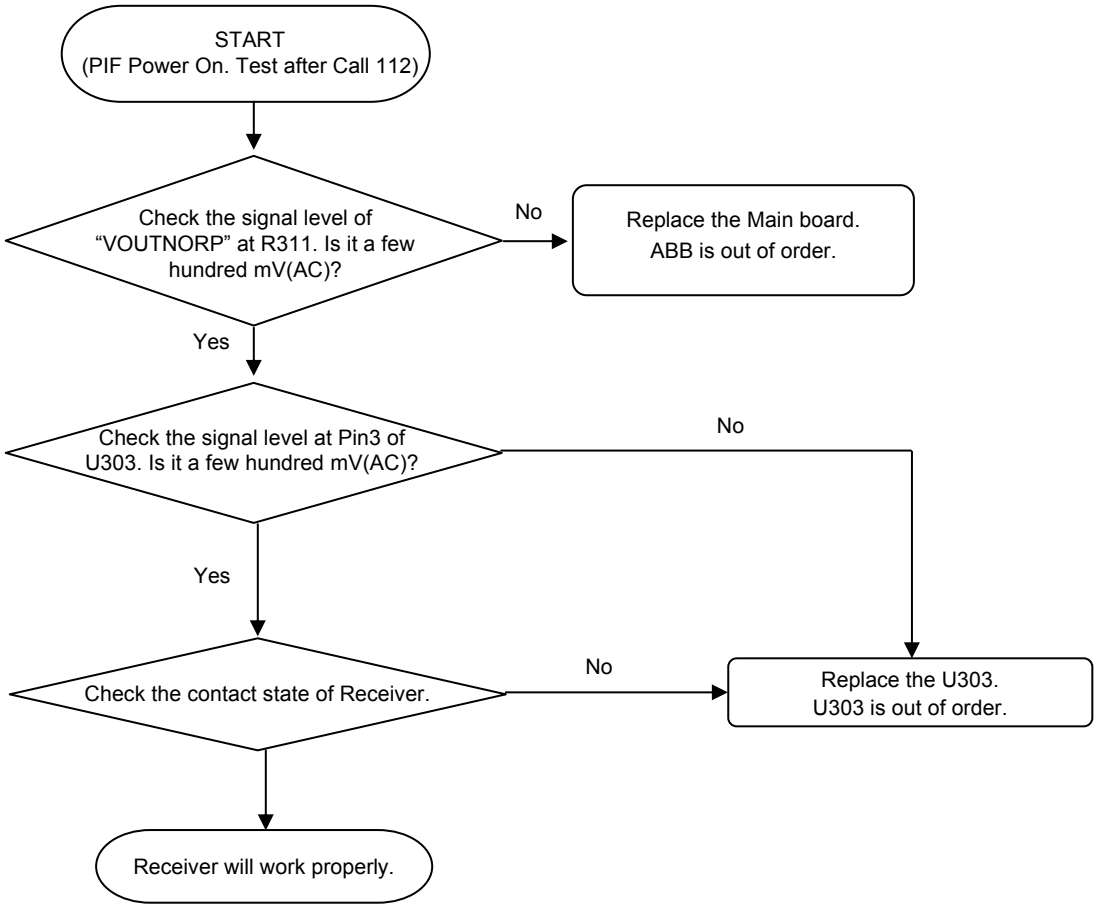
A) Check the connection between LCD & Main board

B) Check the soldering of LCD & Main board

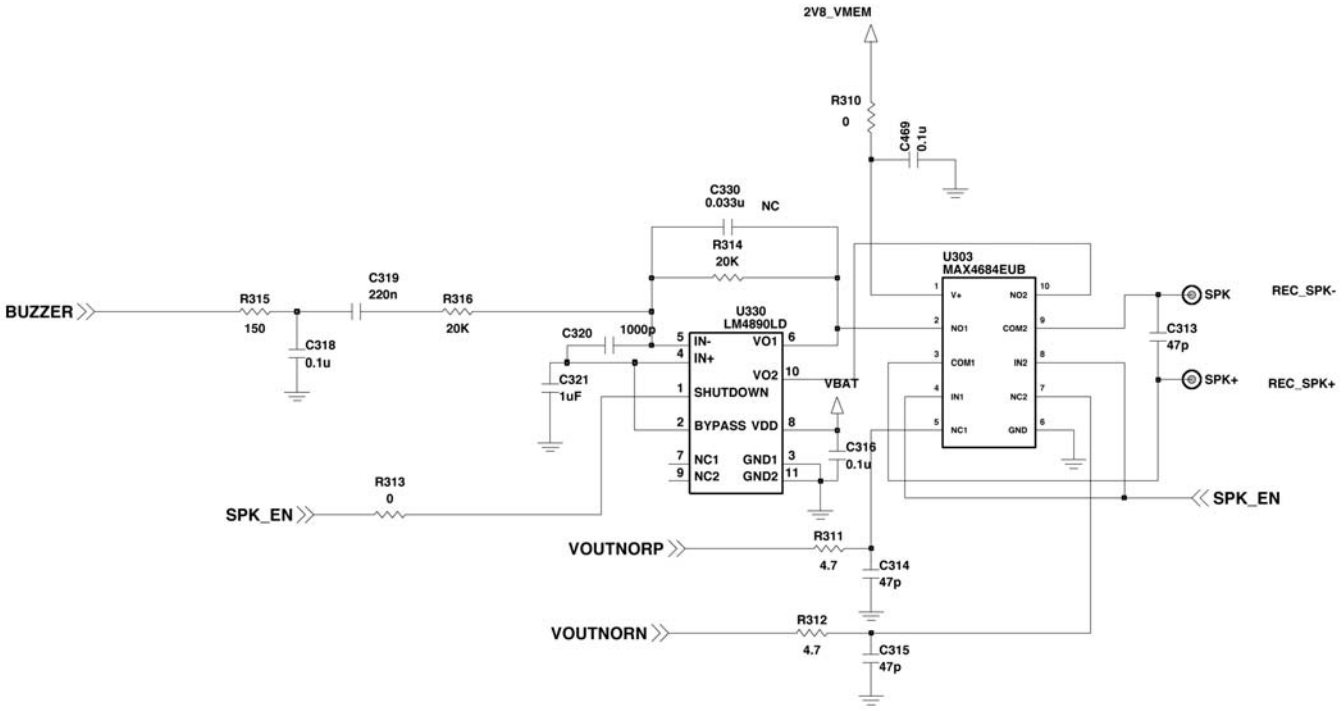
C) Replace LCD module

4.7 Receiver Trouble

SETTING : After Initialize Agilent 8960, Test in EGSM, DCS Mode

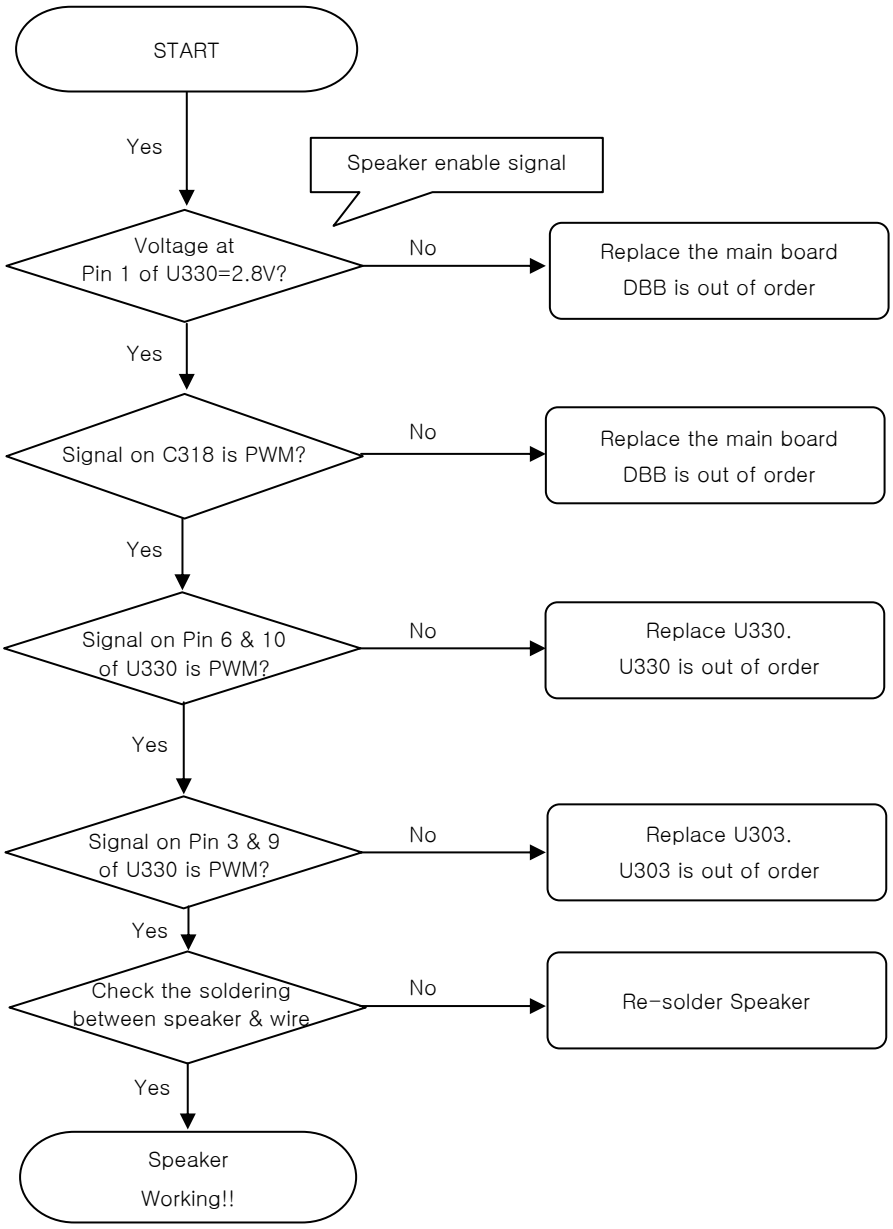


• **The Receiver part Circuit Diagram**

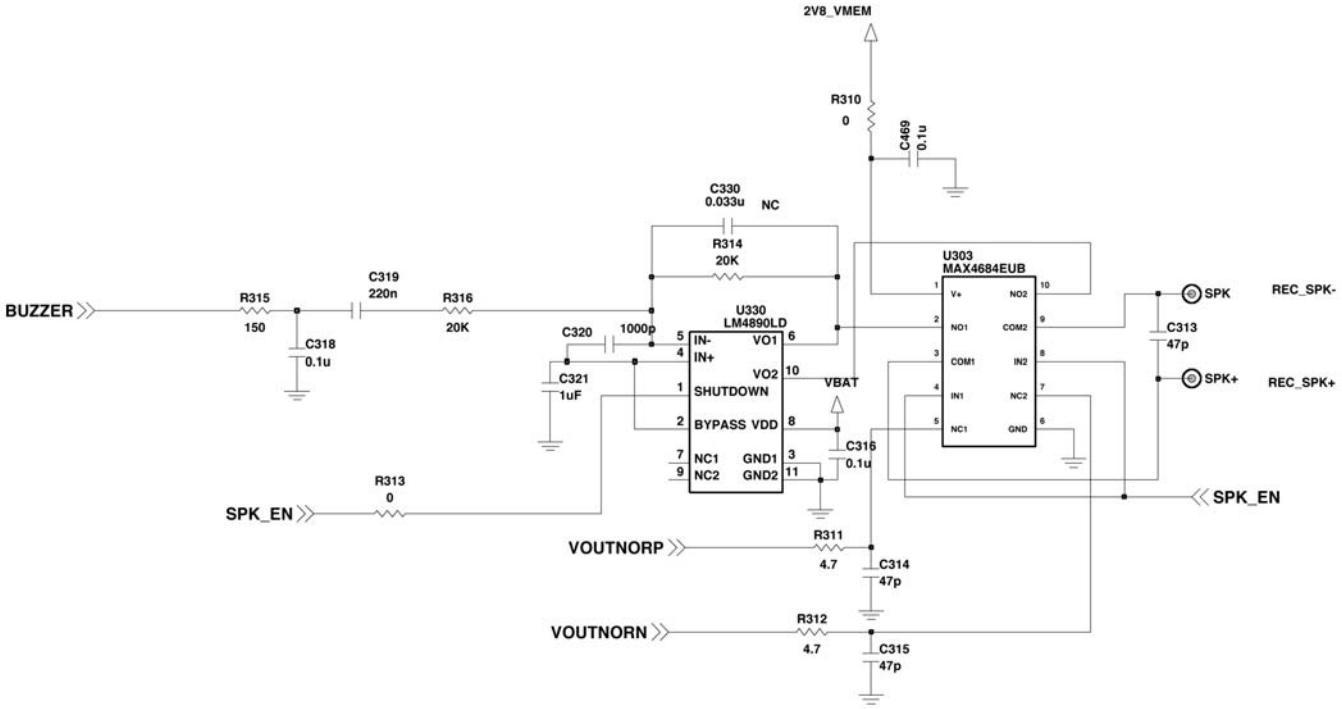


4.8 Speaker Trouble

SETTING : Connect PIF to the phone, and Power on. Enter The engineering mode, and set "Melody on" at Buzzer of BB test menu.

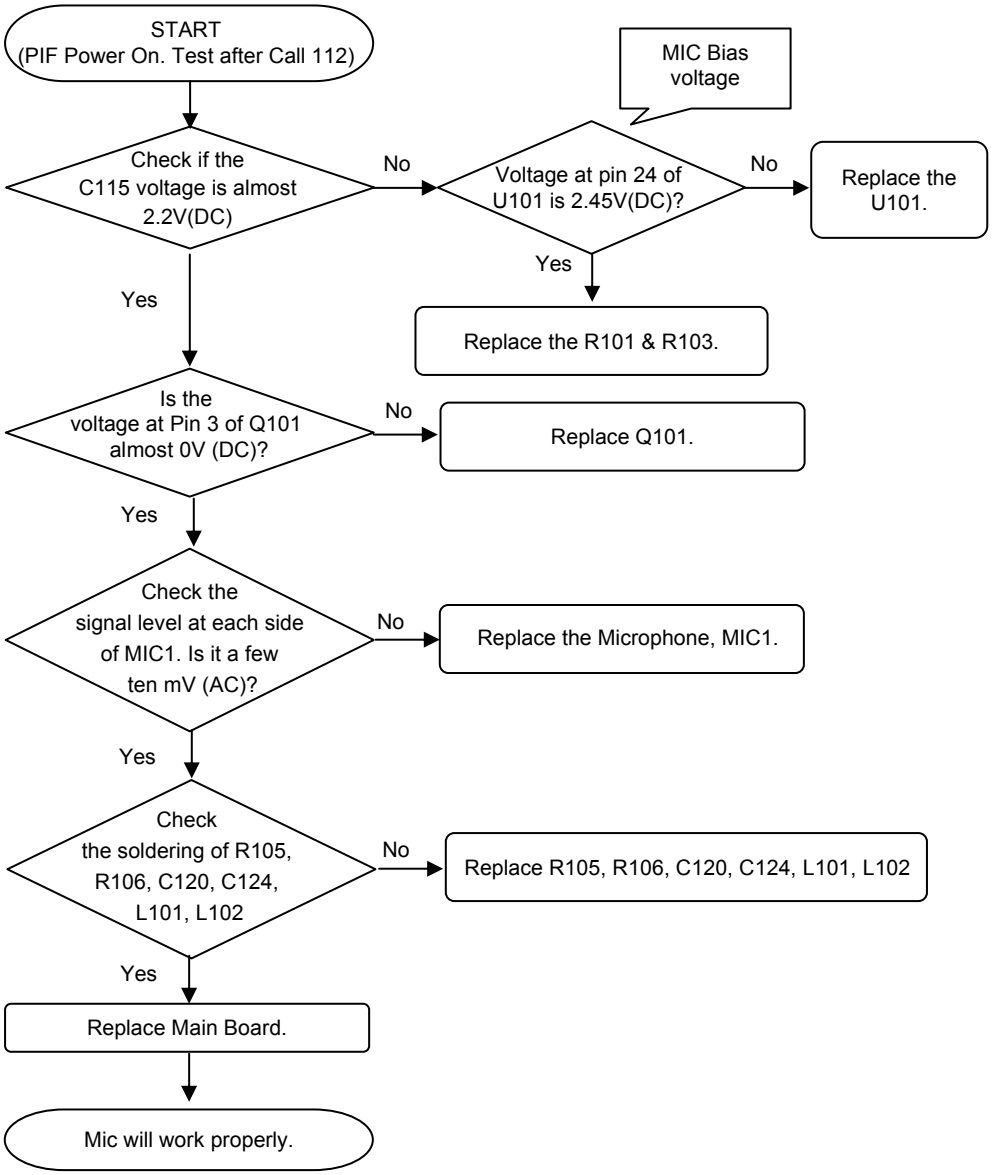


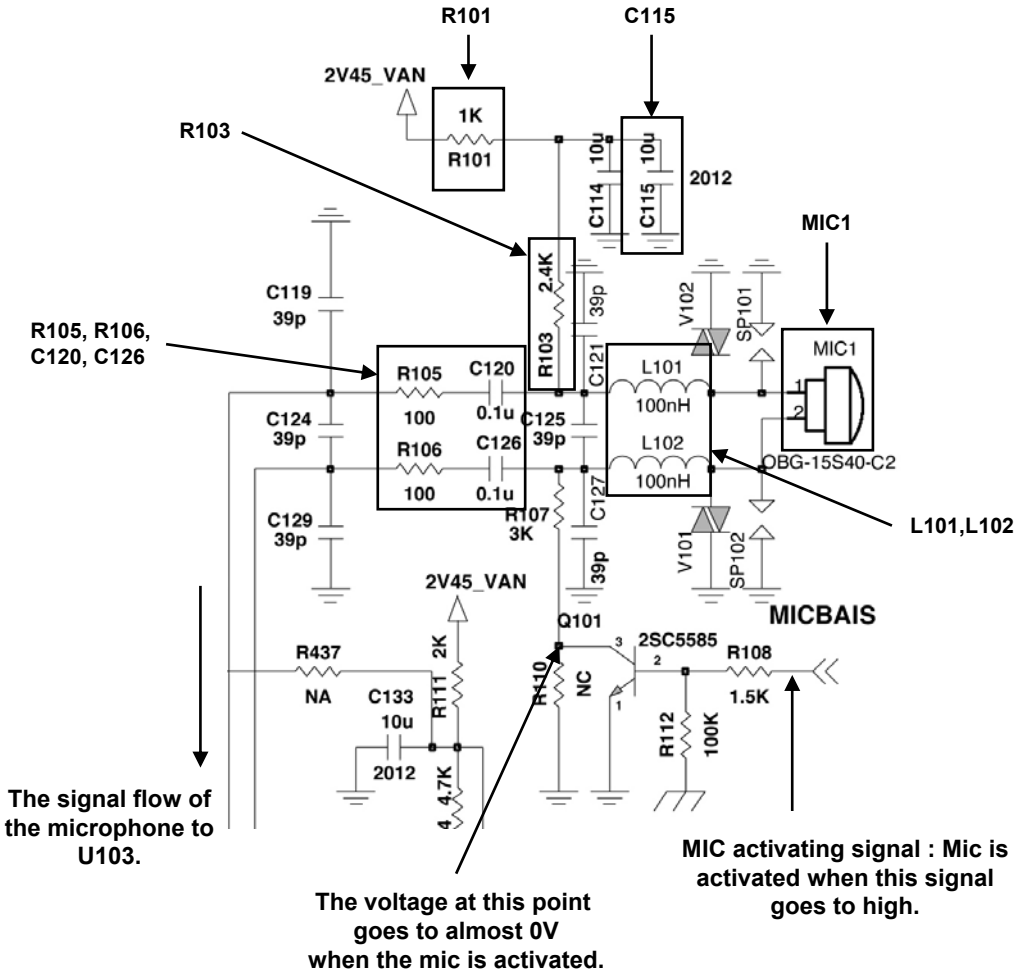
• **Test) Speaker Check!!**

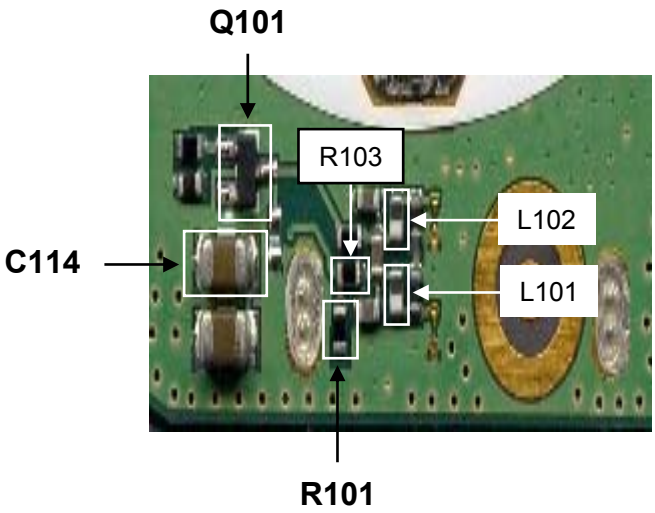


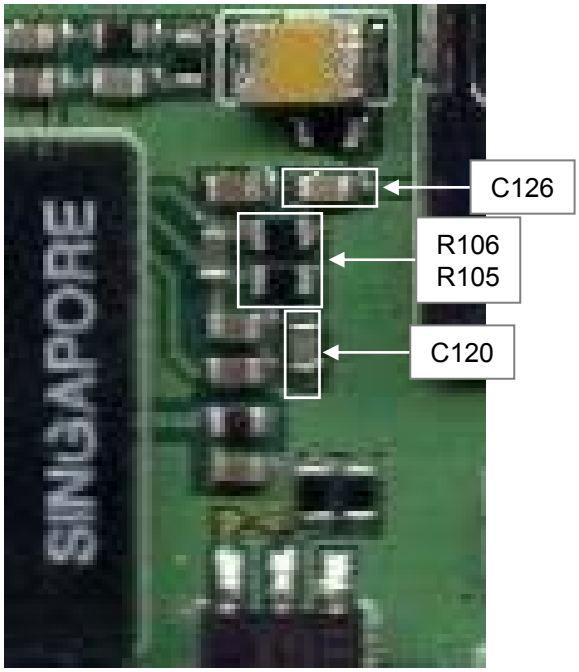
4.9 Mic. Trouble

SETTING : After Initialize Agilent 8960, Test in EGSM, DCS Mode.



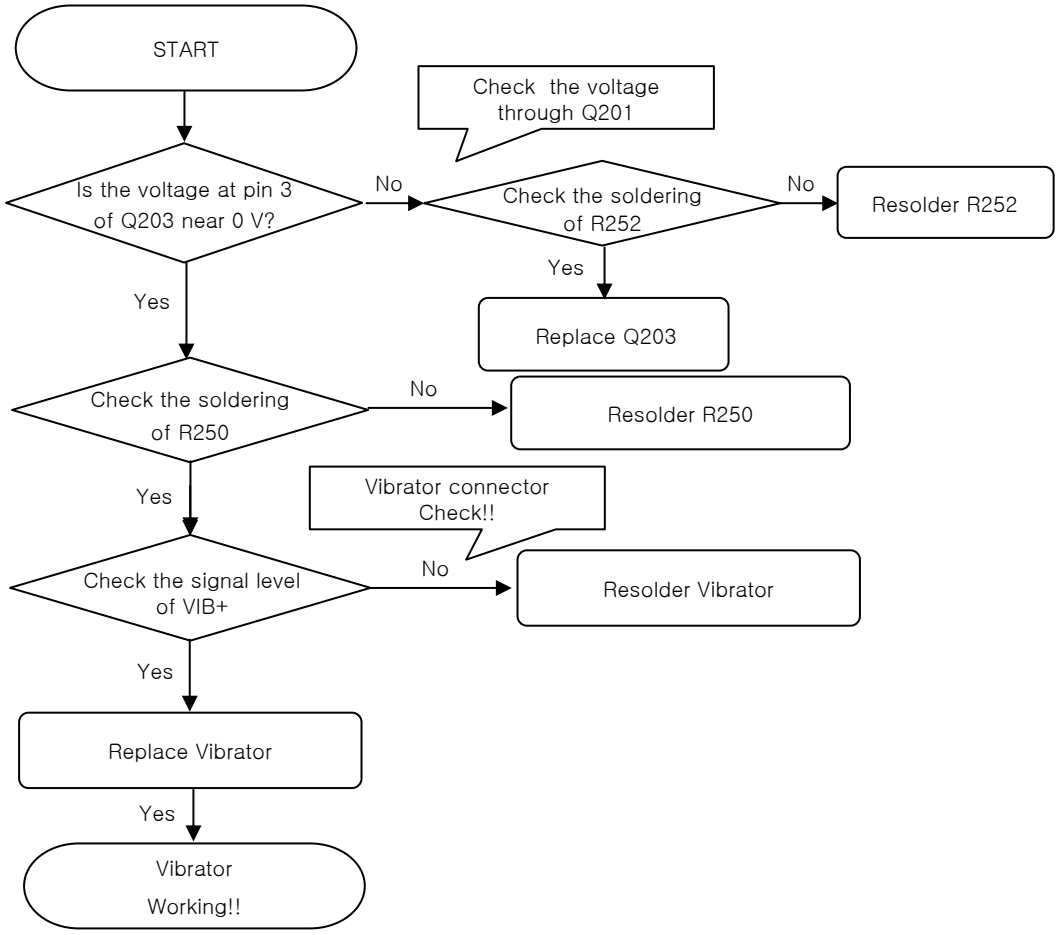

R101
C115
2V45_VAN
1K
R101
R103
10u
C114
C115
10u
2012
MIC1
2.4K
R103
C119
39p
39p
C121
V102
SP101
MIC1
R105, R106,
C120, C126
R105
C120
100
0.1u
C125
39p
L101
100nH
L102
100nH
C124
39p
R106
C126
100
0.1u
OBG-15S40-C2
L101,L102
R107
3K
C127
C129
39p
39p
V101
SP102
2V45_VAN
MICBAIS
Q101
2SC5585
R437
NA
2K
R111
C133
10u
2012
4.7K
R110
NC
R112
100K
R108
1.5K
The signal flow of
the microphone to
U103.
The voltage at this point
goes to almost 0V
when the mic is activated.
MIC activating signal : Mic is
activated when this signal
goes to high.

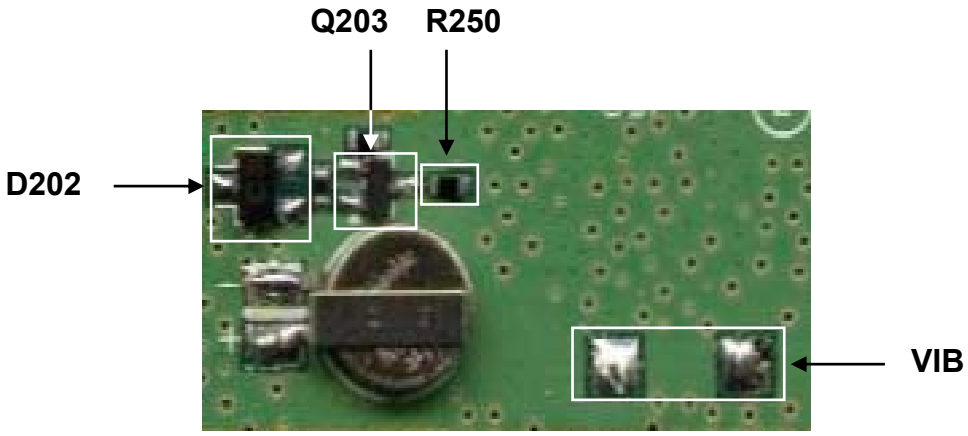

Q101
R103
L102
C114
L101
R101

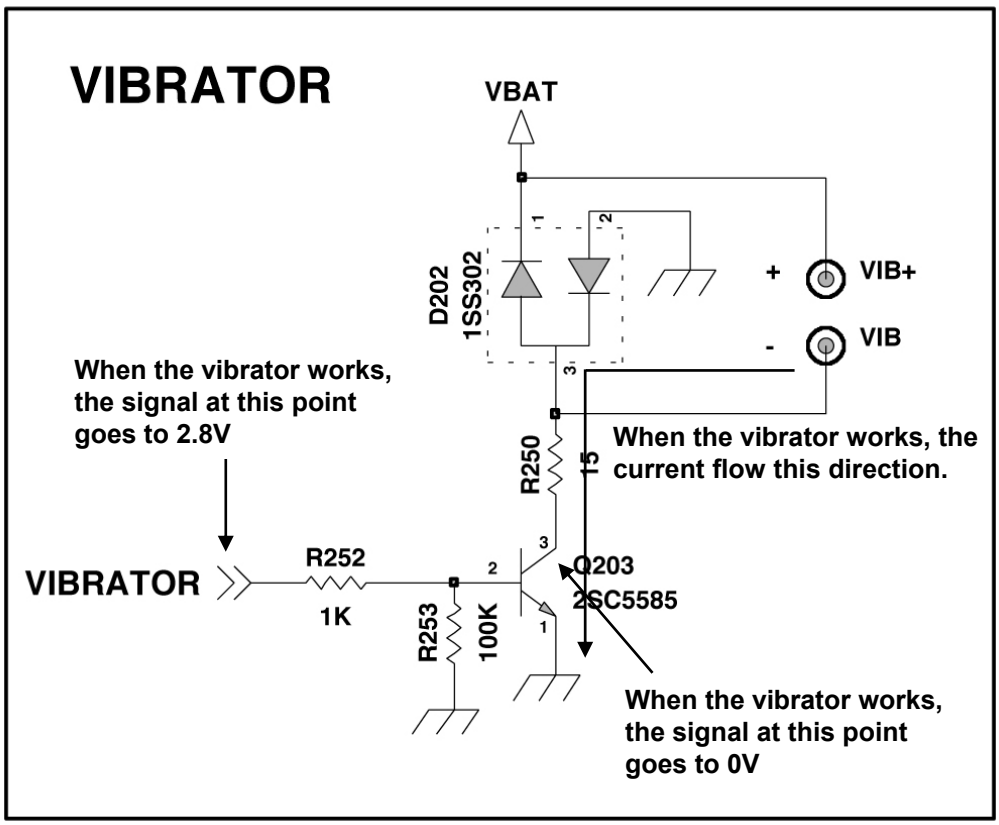

C126
R106
R105
C120
SINGAPORE

4.10 Vibrator Trouble

SETTING : Connect PIF to the phone, and Power on. Enter The engineering mode(2945#*#), and set 'Vibrator on' at Vibration of BB test menu.

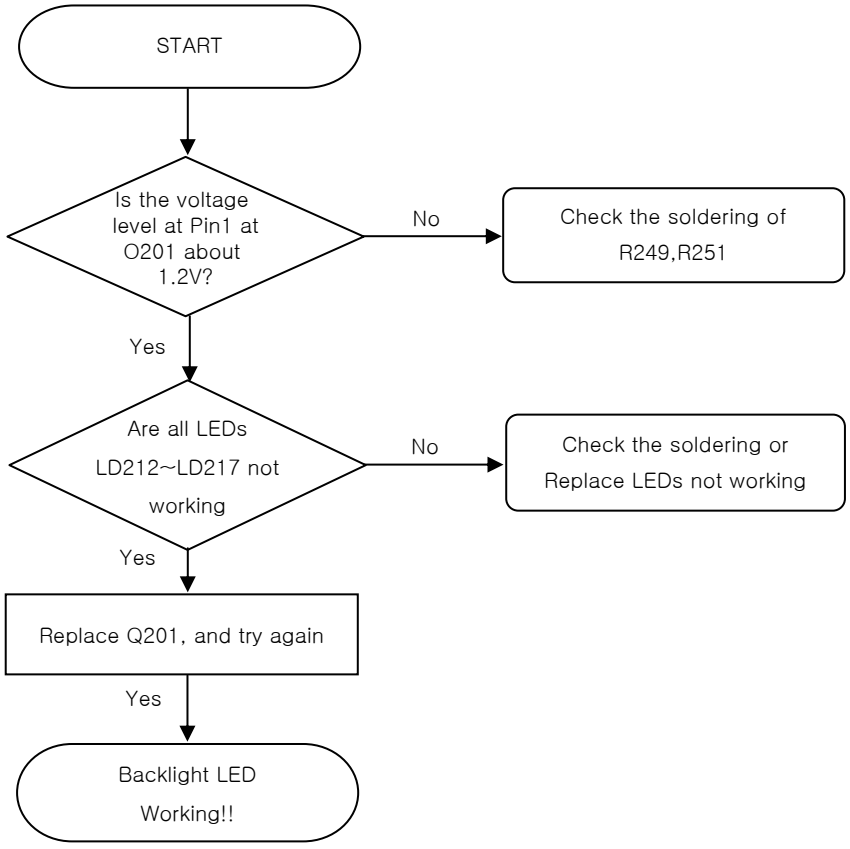



Q203
R250
D202
VIB

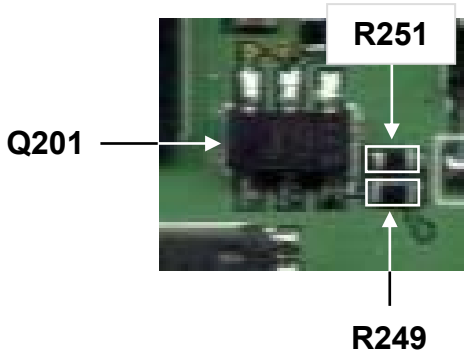

VIBRATOR
VBAT
D202
1SS302
+
VIB+
-
VIB
When the vibrator works, the signal at this point goes to 2.8V
When the vibrator works, the current flow this direction.
R250
15
VIBRATOR
R252
1K
Q203
2SC5585
R253
100K
When the vibrator works, the signal at this point goes to 0V

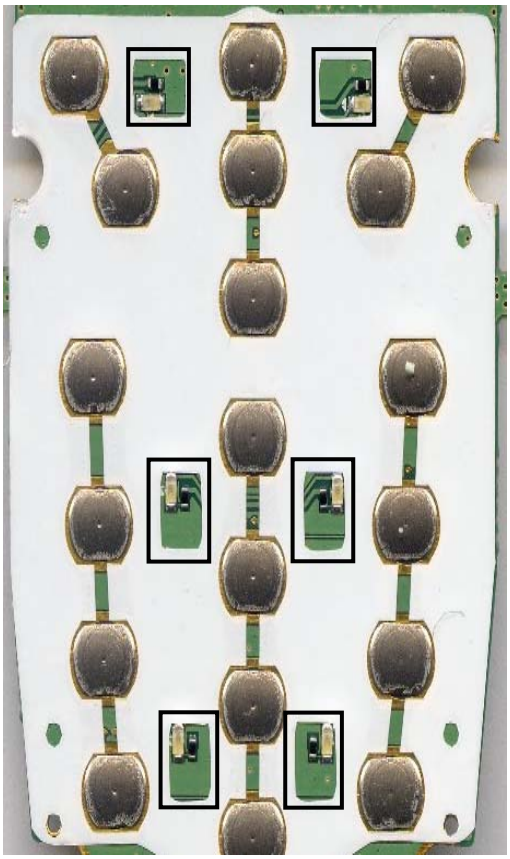
4.11 Backlight LED Trouble

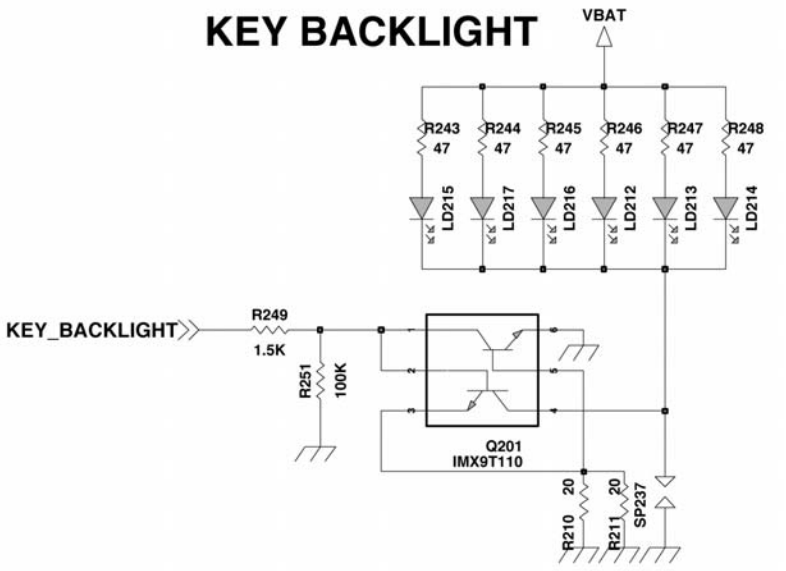
SETTING : Connect PIF to the phone, and power on. Enter engineering mode, and set "Backlight on" in "at" "BB test-Backlight" menu



• Test) D302~D313/Diode & Q201 Check!!



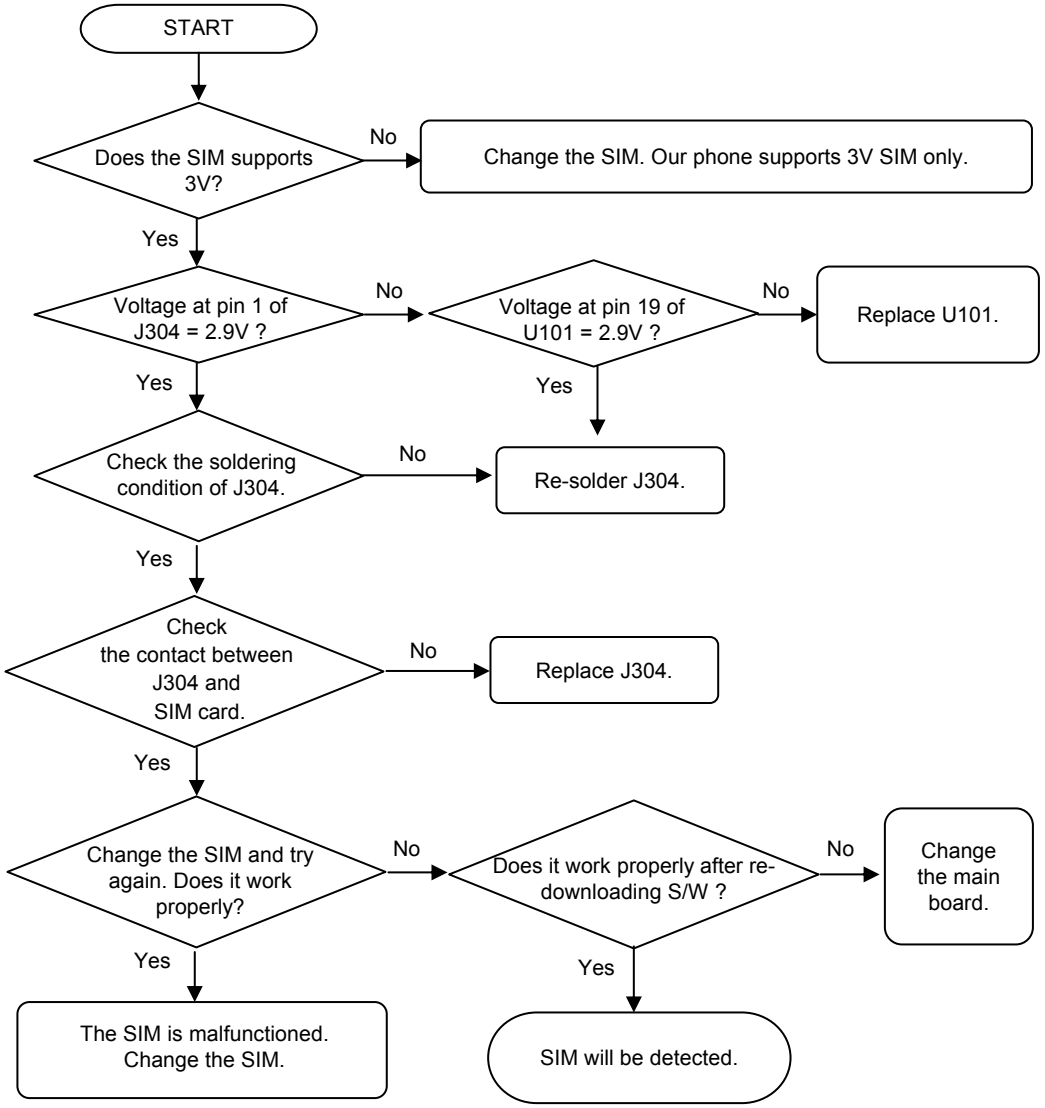




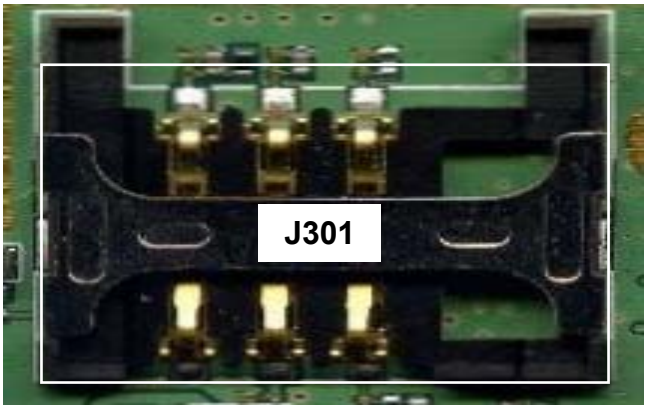
A) Check the diode LD212~LD217.
B) Check the current through Q201.

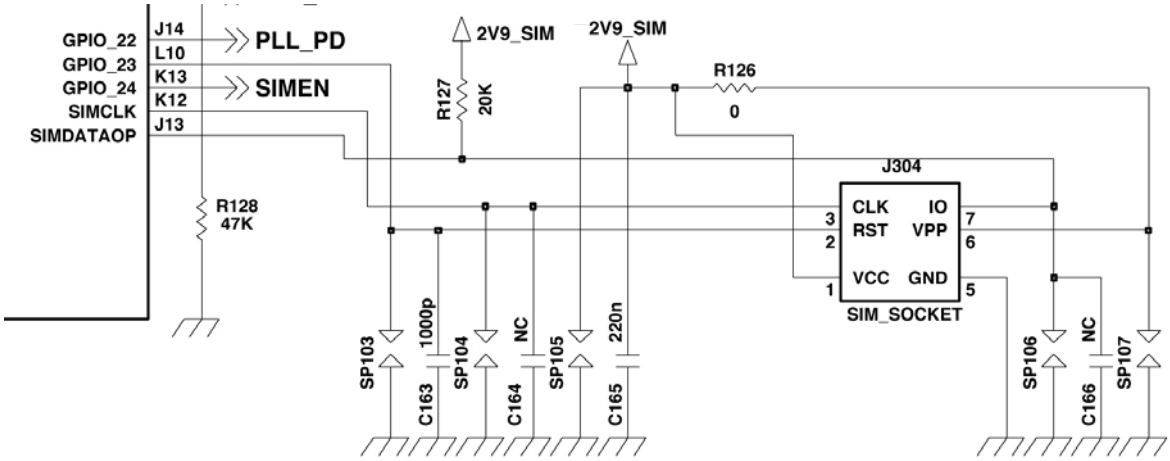
4.12 SIM Detect Trouble

SETTING : Insert the SIM into J304. Connect PIF to the phone, and power on.



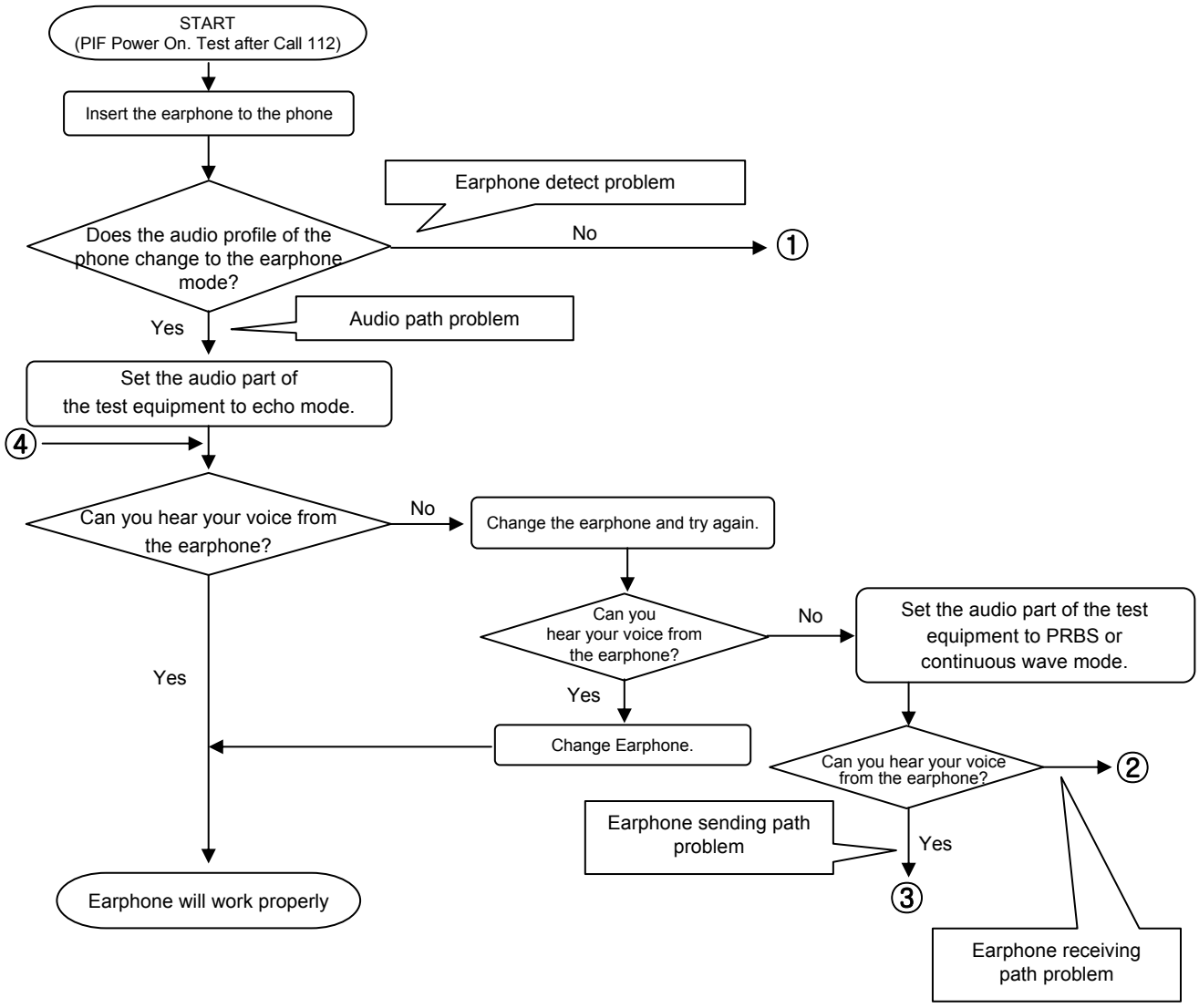
• **Test) SIM Connector Check!!**

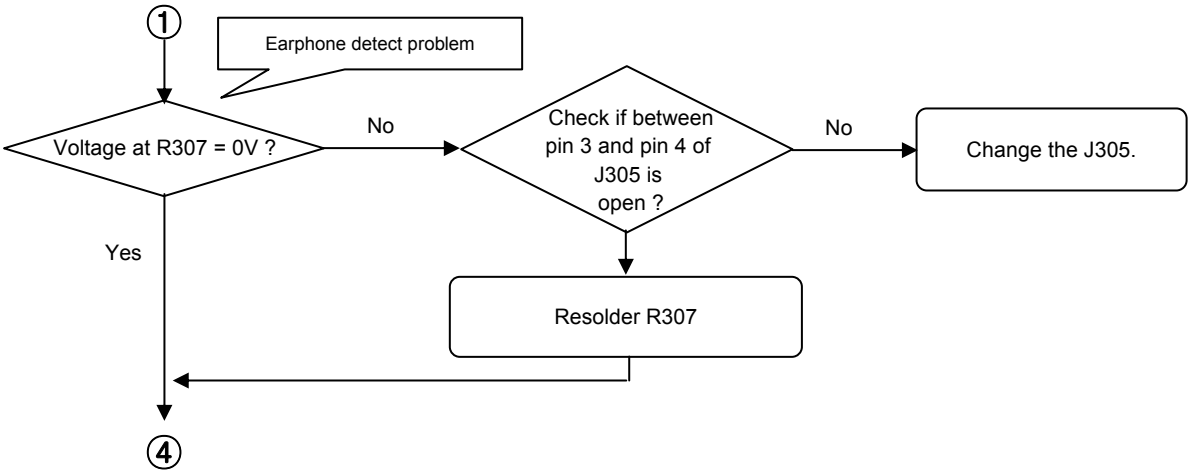


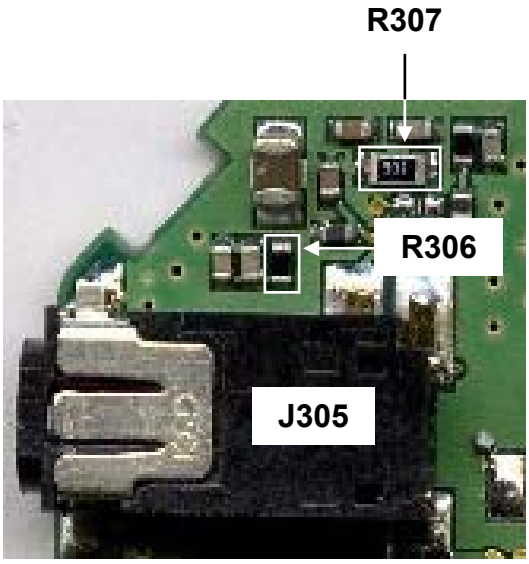


4.13 Earphone Trouble

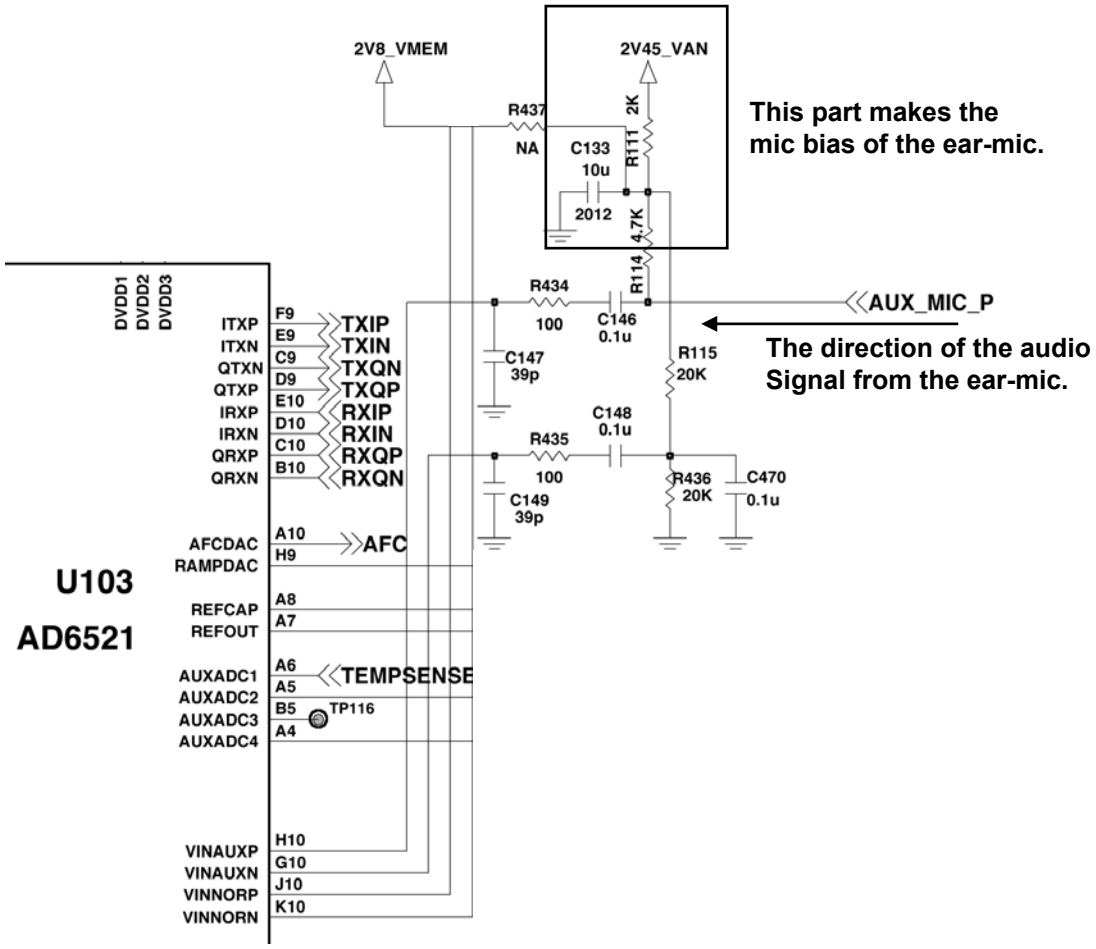
SETTING : After Initialize Agilent 8960, Test in EGSM, DCS Mode.




①
Earphone detect problem
Voltage at R307 = 0V ?
No
Check if between pin 3 and pin 4 of J305 is open ?
No
Change the J305.
Yes
Resolder R307
④

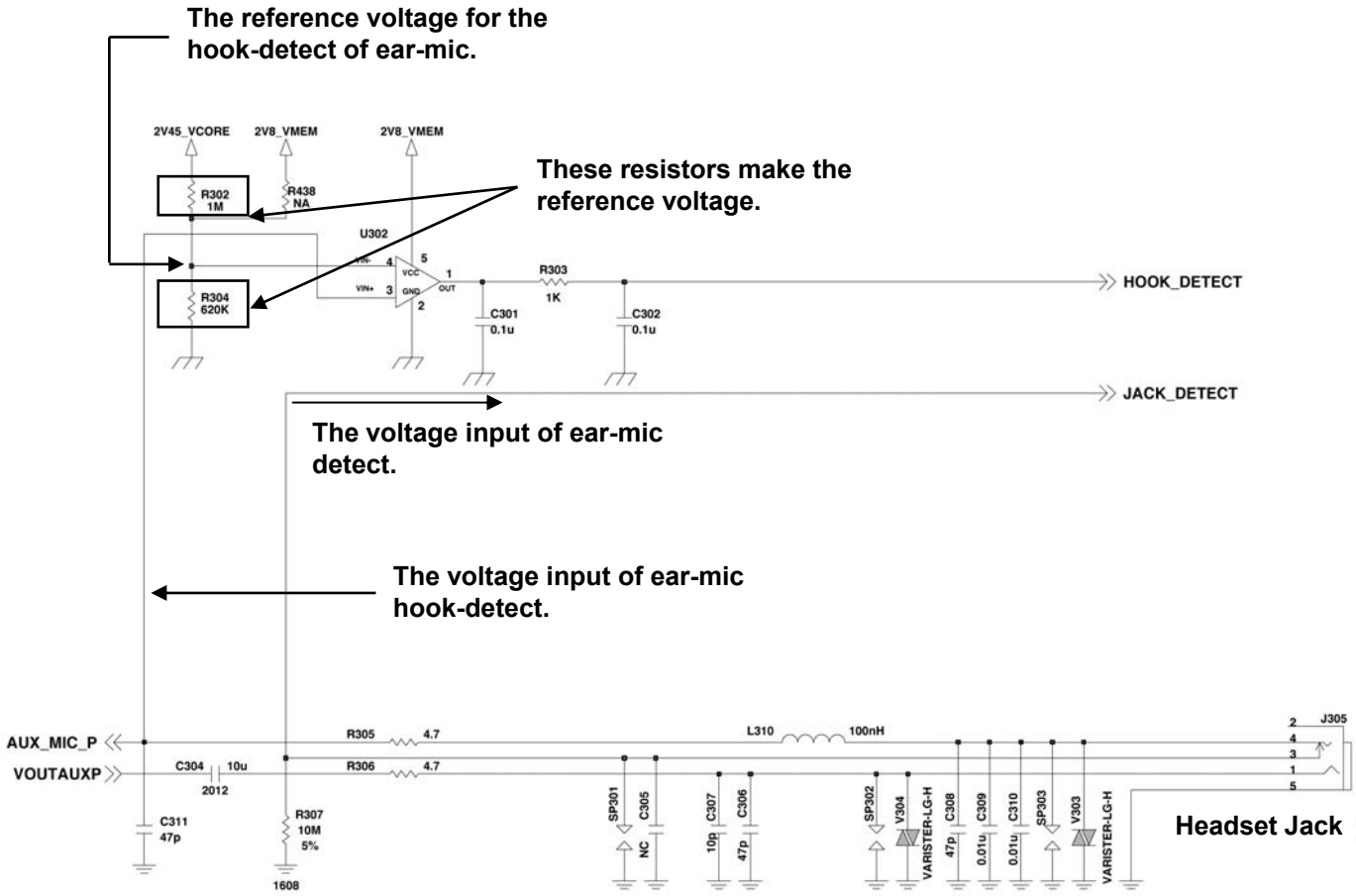

R307
R306
J305

Mic bias and path for the ear-mic



4. TROUBLESHOOTING

Ear-mic detection part



The circuit diagram of the ear-mic jack

5. DISASSEMBLY INSTRUCTION

5.1 Disassembly

1. Remove the Battery and Screws as shown below.

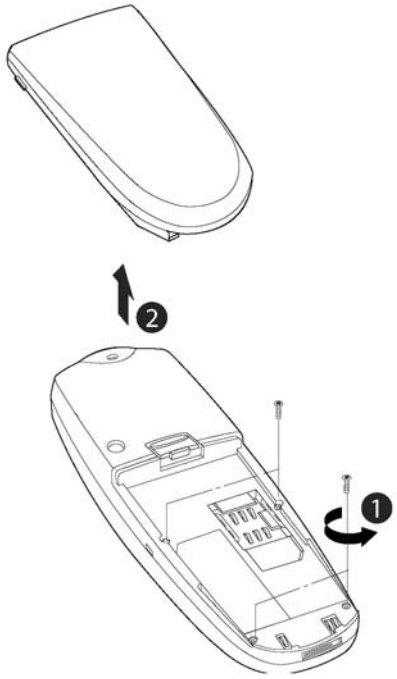


Figure 5-1. Removing the Battery.

2. Lift up and remove the Rear cover.

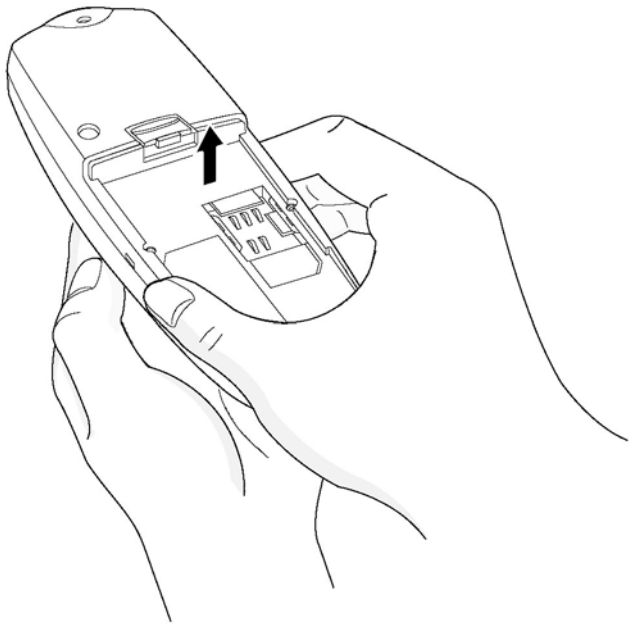


Figure 5-2. Removing the Rear cover.

3. Detach the rest components as shown below.

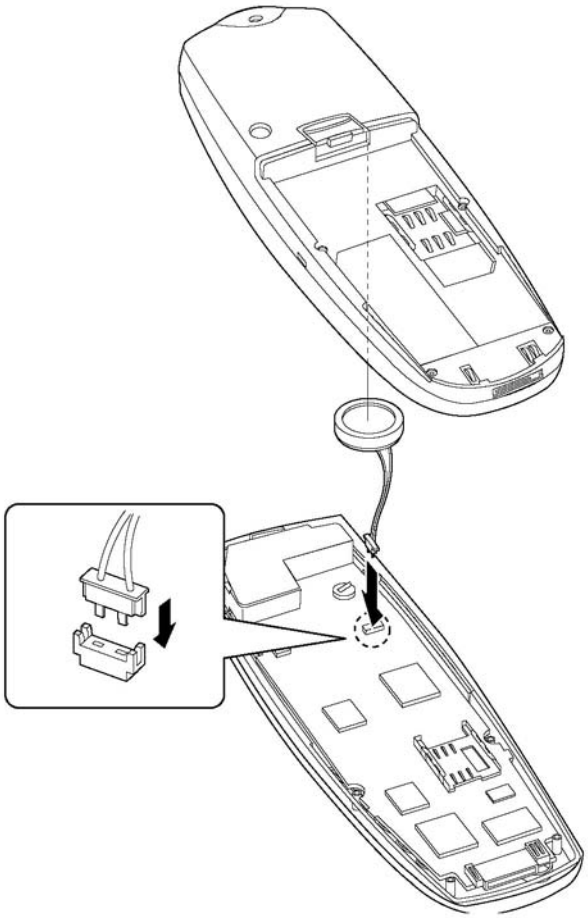


Figure 5-3. Detaching the rest components.

4. First, lift up PCB and remove the Antenna holding the hooks of the both end sides. After that, detach the Receiver and Keypad.

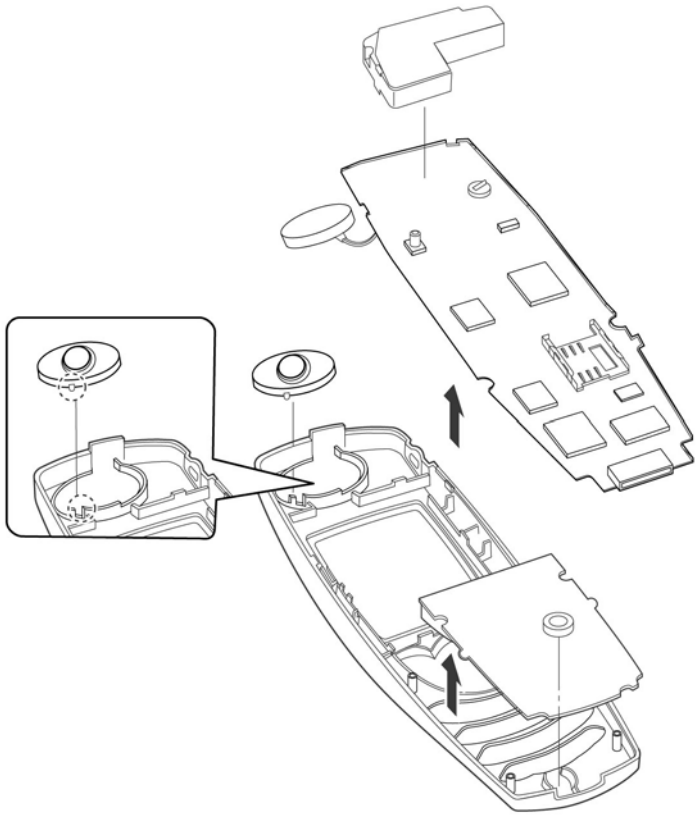


Figure 5-4. Removing PCB, Antenna, Receiver and Keypad.

5. Use a tweezers to remove the Battery locker and Spring.

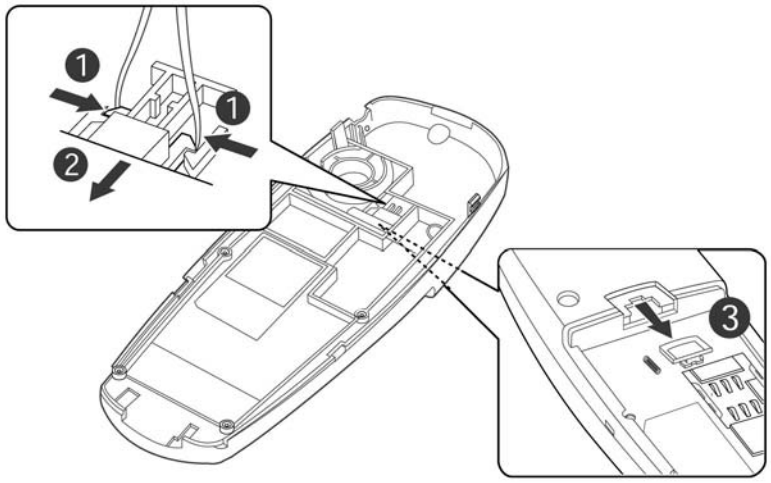


Figure 5-5. Removing the Battery locker.

6. DOWNLOAD AND CALIBRATION

6.1 Download

Figure 6-1 illustrate a download set-up

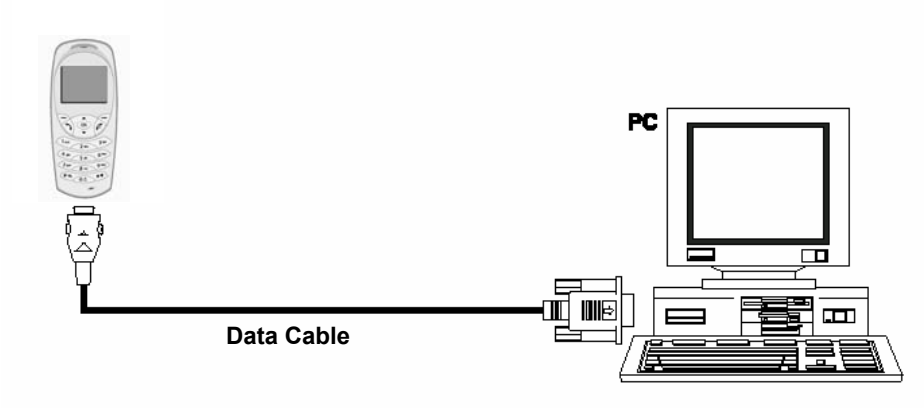


Figure 6-1. Download Setup 1.

Download procedure
Access flash loader program in PC.
Select source code you want to download.
Don't check OWCD AND VERIFY in flash loader window.
Push start button in flash loader window.

Condition
1. Disconnect TA to the Datakit and phone have a battery
a. VBAT < 3.2V
Don't download to the phone.
b. 3.2V ≤ VBAT ≤ 3.4 V
First : Connect Datakit to the phone.
Second : Push the power on button until finish download.
c. VBAT > 3.4V
First : Connect Datakit to the phone.
Second : Push the power on button during 1~2second.

2. Connect TA to the Datakit and phone have a battery
a. VBAT < 3.2V
Don't download to the phone.
b. VBAT ≥ 3.2 V
Connect Datakit to the phone.

3. Download method when battery under 3.2 voltage

First : Remove battery in the phone

Second : Connect TA to the Datakit

Third : Connect phone to the Datakit.

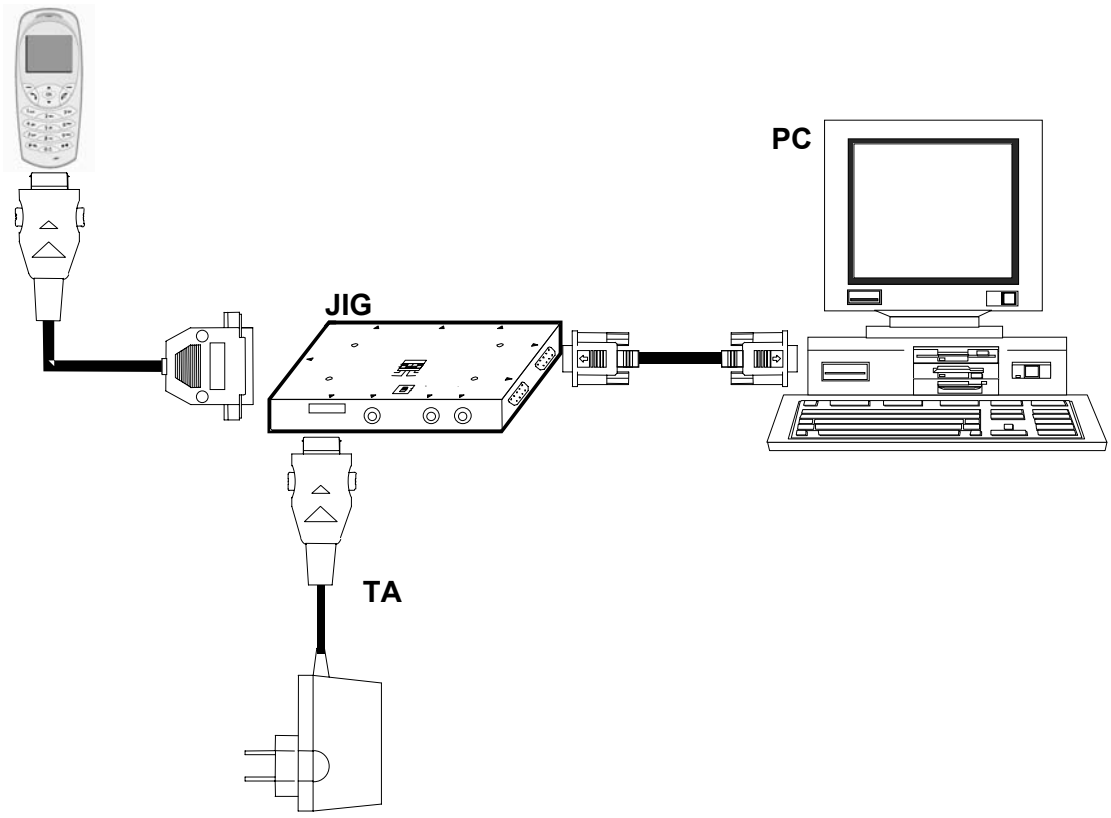


Figure 6-2. Download Setup 2.

6. DOWNLOAD AND CALIBRATION

6.2 Calibration

A. Equipment List

Table 6-1. Calibration Equipment List.

Equipment for Calibration	Type / Model	Brand
Wireless Communication Test Set	HP 8960	Agilent
RS-232 Cable and Test JIG		
RF Cable		
Power Supply		
Service SW	Laputa	
Test SIM card		
PC (For Software Installation)	Pentium II Class above 300MHz	

B. Equipment setup

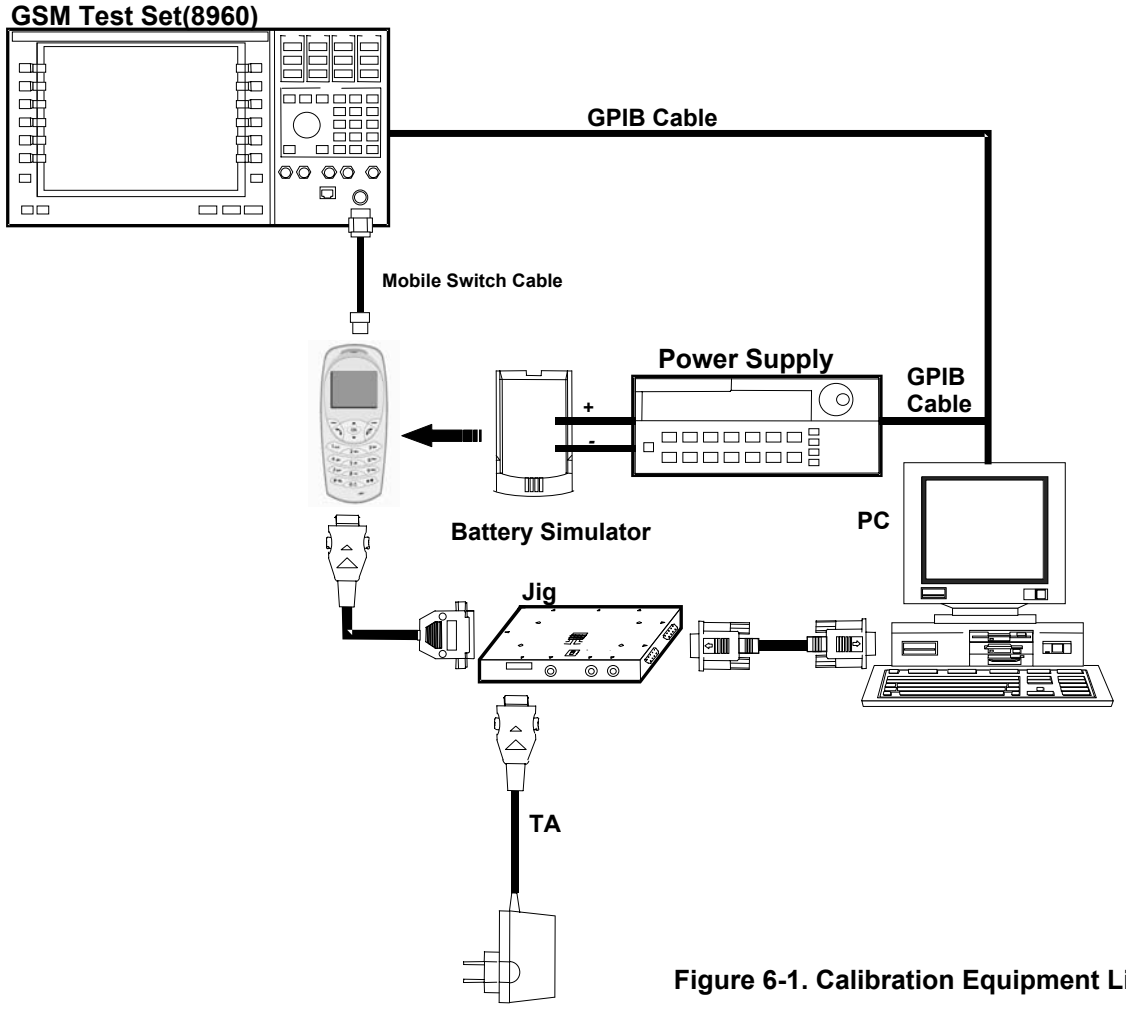


Figure 6-1. Calibration Equipment List.

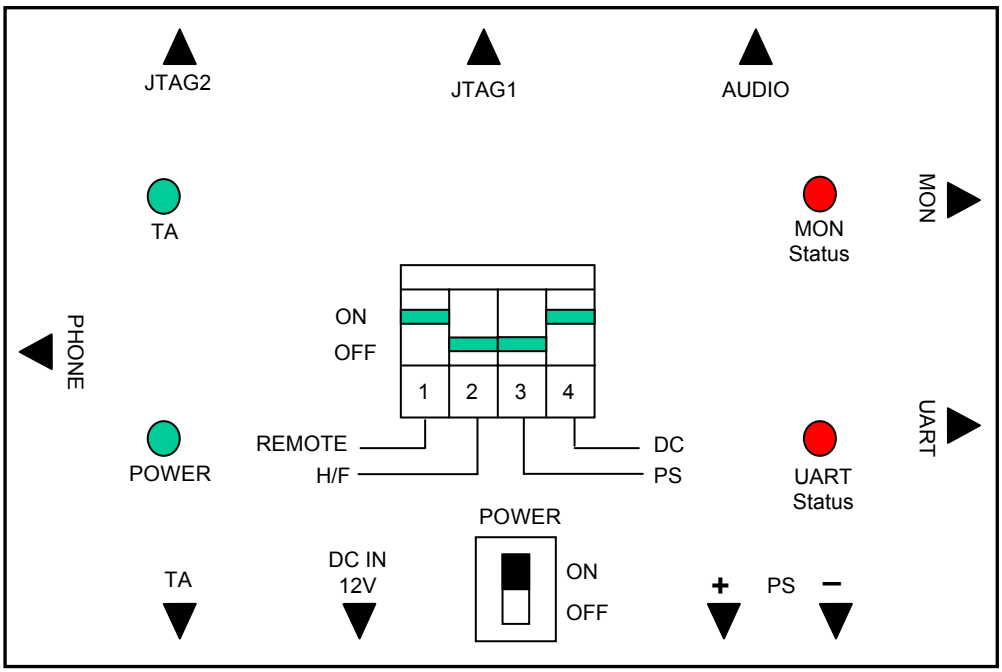


Figure 6-3 The top view of Test JIG

C. Test Jig Operation

Power Source	Description
Power Supply	Usually 4.0V
DC Adaptor	9.5V, 500mA

Table 6-2 Jig Power

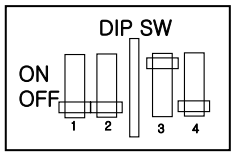
Switch Number	Name	Description
Switch 1	RPWRON	In ON state, phone is awaked.
Switch 2	HF_DETECT	Turn on for AUDIO TEST
Switch 3	Power Supply	Power is provided for phone from Power Supply
Switch 4	DC Power	Power is provided for phone from DC adaptor

Table 6-3 Jig DIP Switch

LED Number	Name	Description
LED 1	POWER	Power is provided for Test Jig
LED 2	TA	Indicate charging state of the phone battery
LED 3	UART	Indicate data transfer state through the UART port
LED 4	MON	Indicate data transfer state through the MON port

Table 6-4 LED Description

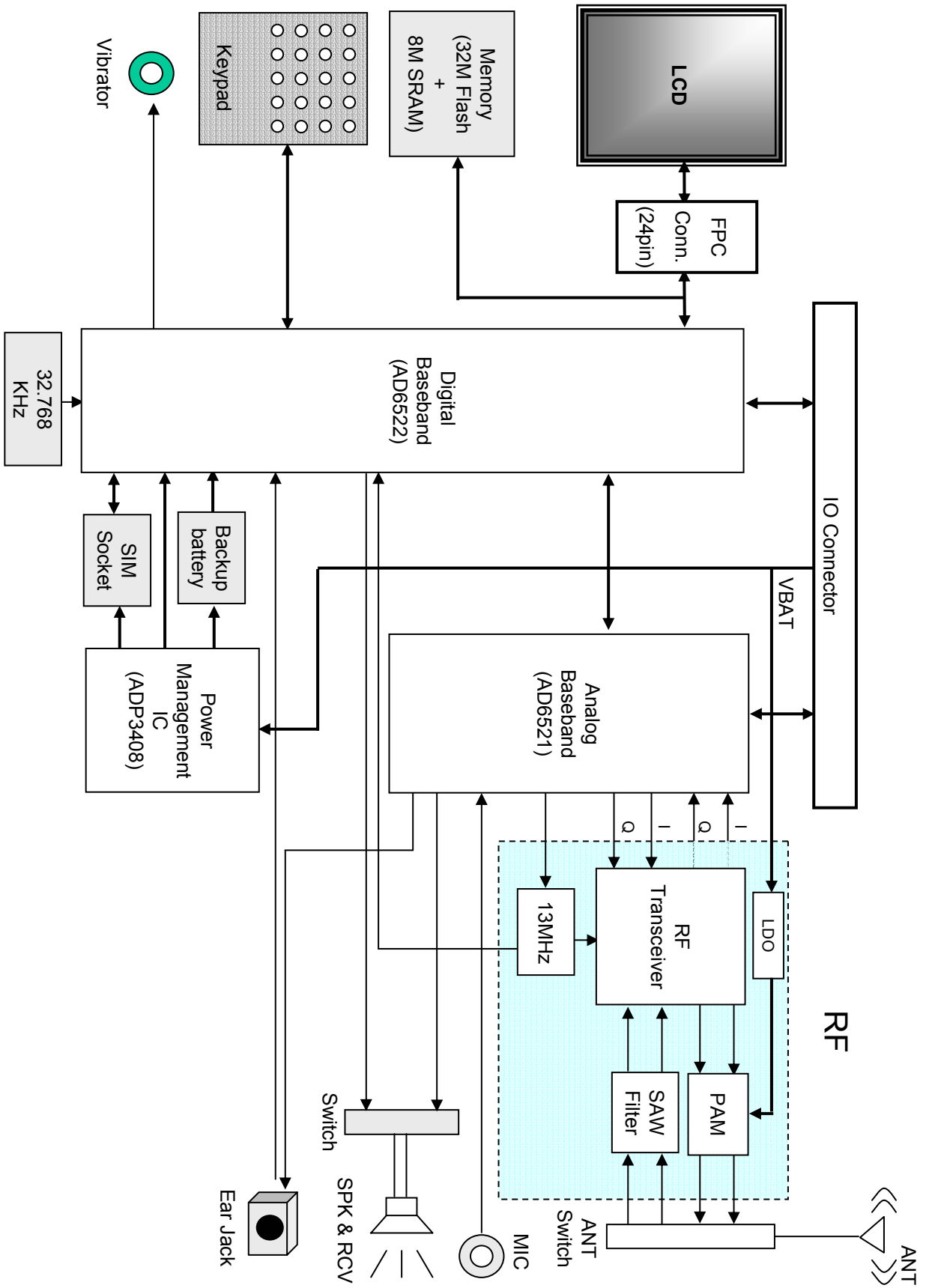
1. Connect as Fig. 9-3.(RS232 Serial cable is connected between COM port of PC and MON port of TEST JIG, in general)
2. Set the Power Supply 4.0 V, also DC adaptor may be used



3. Set the 3rd of DIP SW ON state, In case of DC adapter, set 4th ON state
4. Press the Phone power key, If the Remote ON is used, 1st ON state

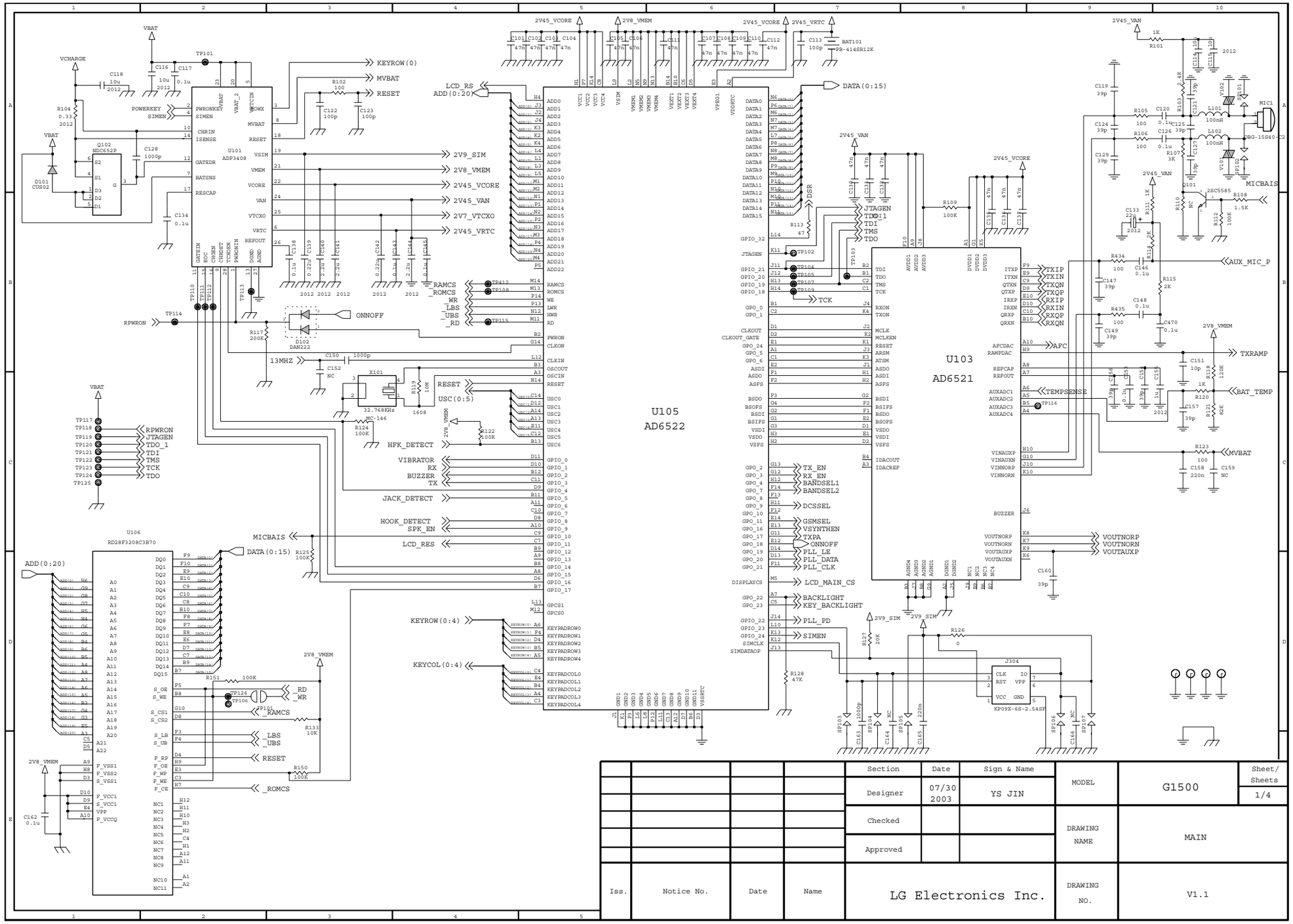
D. Procedure

1. Connect as Fig. 9-3.(RS232 Serial cable is connected between COM port of PC and MON port of TEST JIG, in general)
2. POWER ON PC then enter into Windows 98.(Remark: Windows 2000 system could be feasible)
3. Run AUTOCAL.exe, then AUTOCAL application window will be appeared.

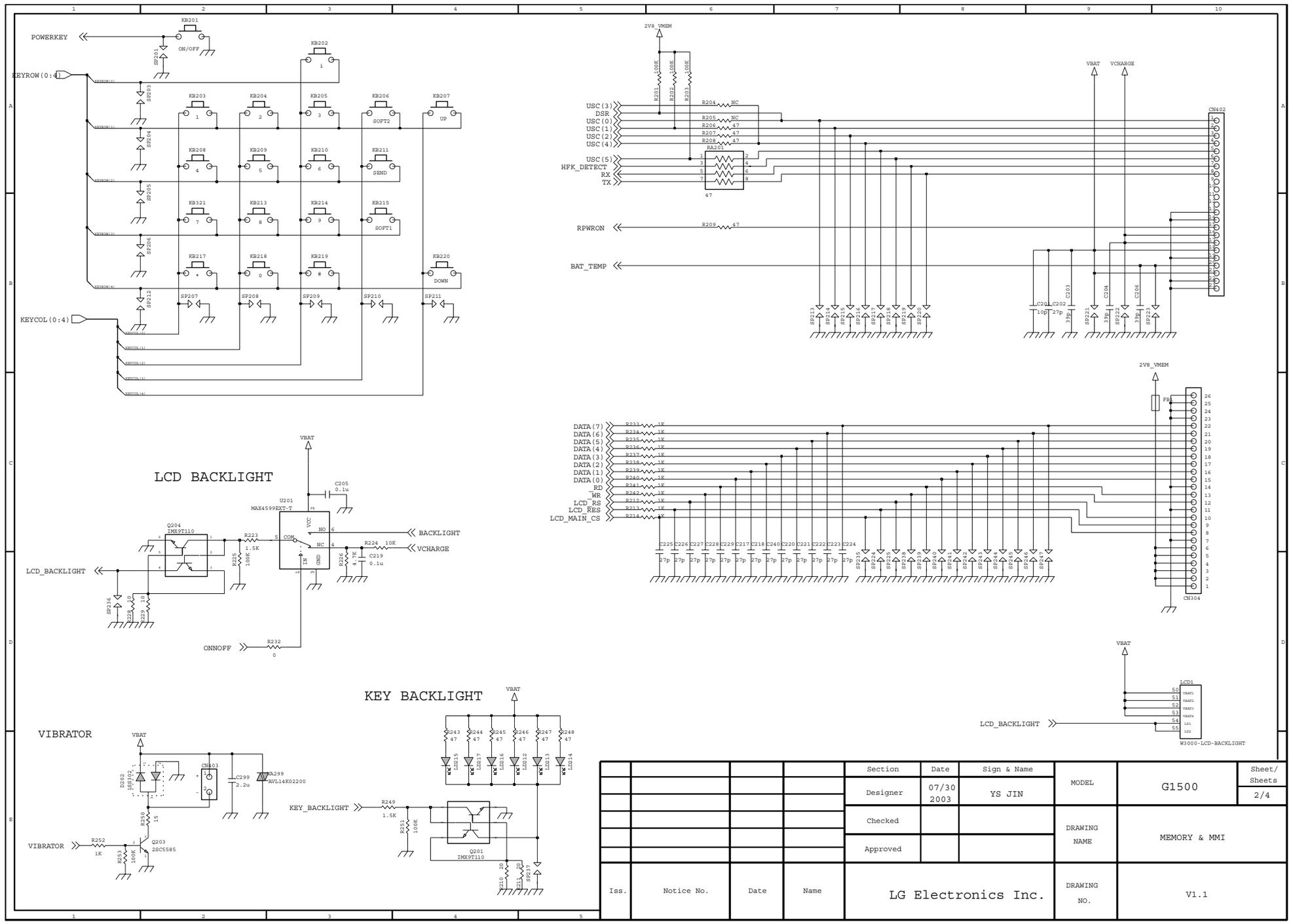

7. BLOCK DIAGRAM
LCD
FPC Conn. (24pin)
Memory (32M Flash + 8M SRAM)
Keypad
Vibrator
32.768 KHz
Digital Baseband (AD6522)
IO Connector
VBAT
SIM Socket
Backup battery
Power Management IC (ADP3408)
Analog Baseband (AD6521)
Q
I
Q
I
13MHz
RF Transceiver
LDO
SAW Filter
PAM
RF
Switch
SPK & RCV
Ear Jack
MIC
ANT Switch
ANT

8.CIRCUIT DIAGRAM

8.1 Main Chipset



8.2 Memory & MMI

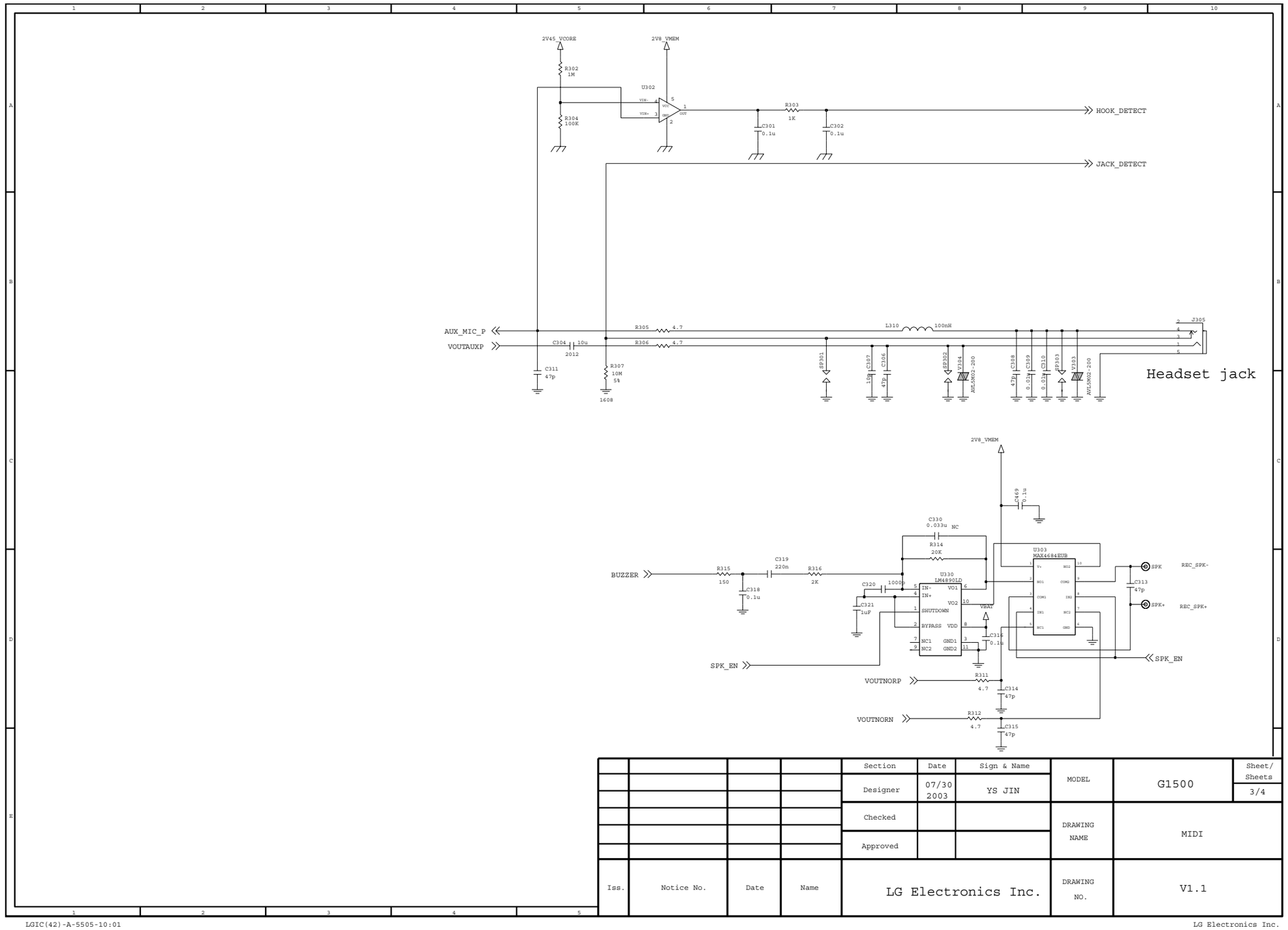


				Section	Date	Sign & Name	MODEL	G1500	Sheet/ Sheets
				Designer	07/30 2003	YS JIN			2/4
				Checked			DRAWING NAME	MEMORY & MMI	
				Approved					
Iss.	Notice No.	Date	Name	LG Electronics Inc.			DRAWING NO.	V1.1	

LGIC(42)-A-5505-10:01

LG Electronics Inc.

8.3 MIDI

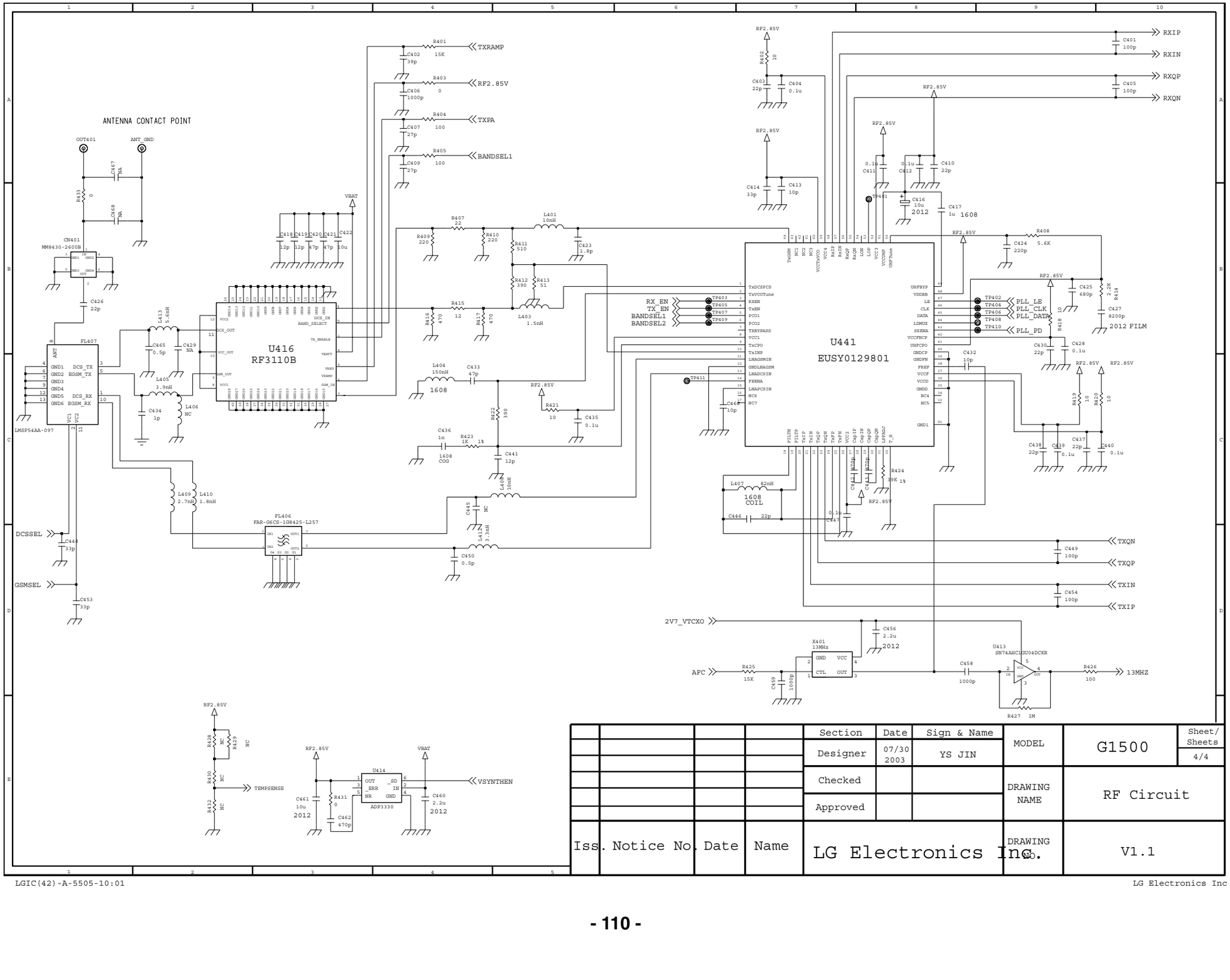


Iss.	Notice No.	Date	Name	Section	Date	Sign & Name	MODEL	G1500	Sheet/ Sheets
				Designer	07/30 2003	YS JIN			3/4
				Checked			DRAWING NAME	MIDI	
				Approved					
				LG Electronics Inc.			DRAWING NO.	V1.1	

LGIC(42)-A-5505-10:01

LG Electronics Inc.

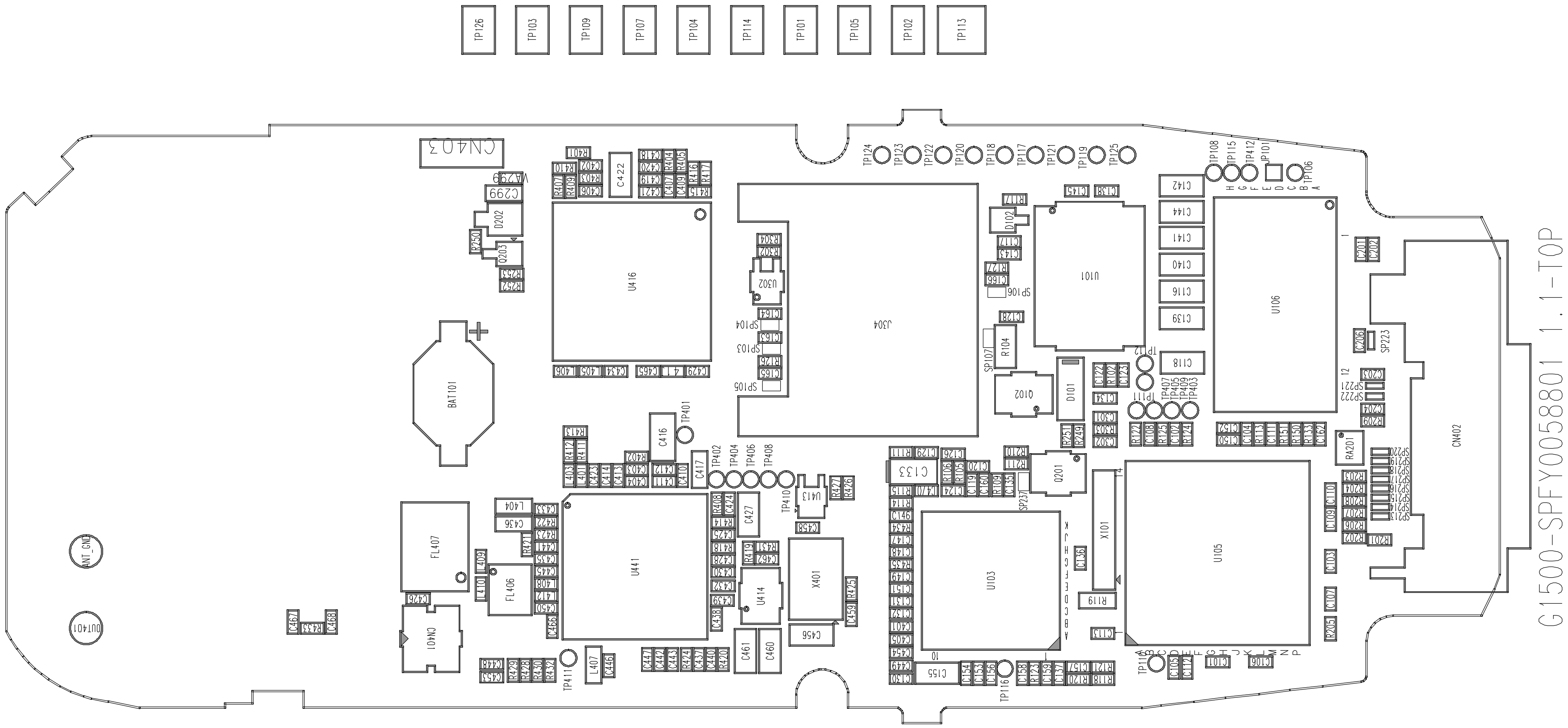
8.4 RF Circuit



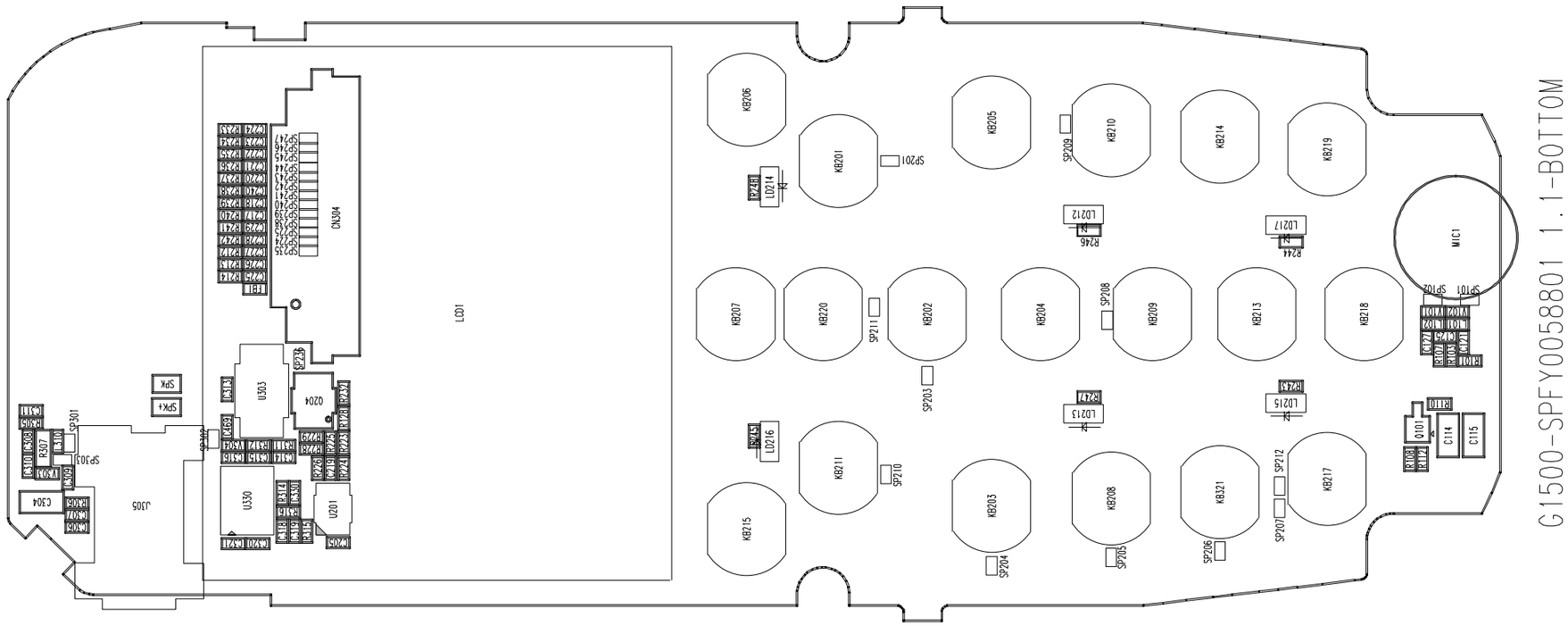
LGIC(42)-A-5505-10:01

LG Electronics Inc

9. PCB LAYOUT



9. PCB LAYOUT

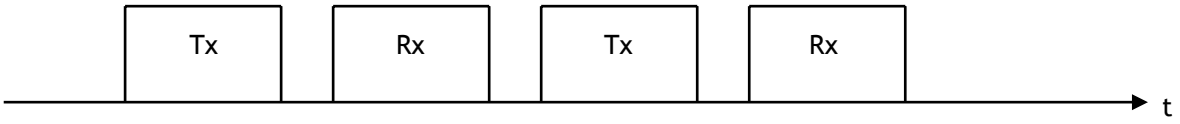

G1500-SPFY0058801_1.1-BOTTOM
CN304
LCD1
U303
Q204
U330
U201
J305
SPK
SPK+
SP301
SP303
KB206
KB201
KB205
KB210
KB214
KB219
KB207
KB220
KB202
KB204
KB209
KB213
KB218
KB215
KB211
KB203
KB208
KB321
KB217
MIC1
SP201
SP209
SP211
SP203
SP208
SP210
SP204
SP205
SP206
SP212
SP207
SP101
SP102
LD214
LD212
LD217
LD216
LD213
LD215
Q101
C114
C115
R246
R244
R247
R245
R110

10. STANDALONE TEST

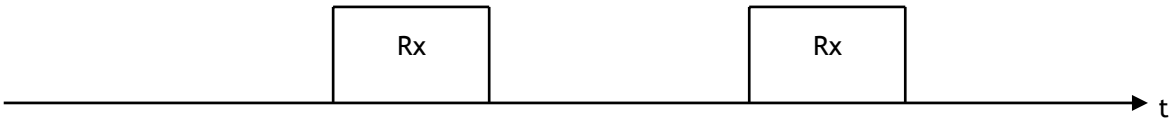
10.1 What's the Standalone Test?

Set the Phone to Perform only Tx or Rx mode.

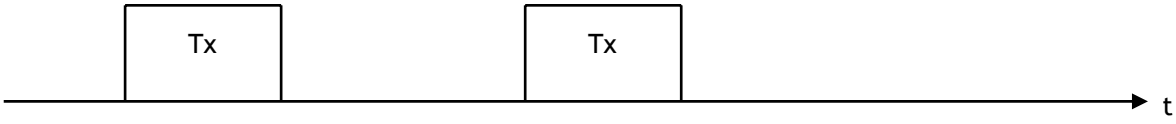
1. During the Normal Call



2. During Rx Standalone

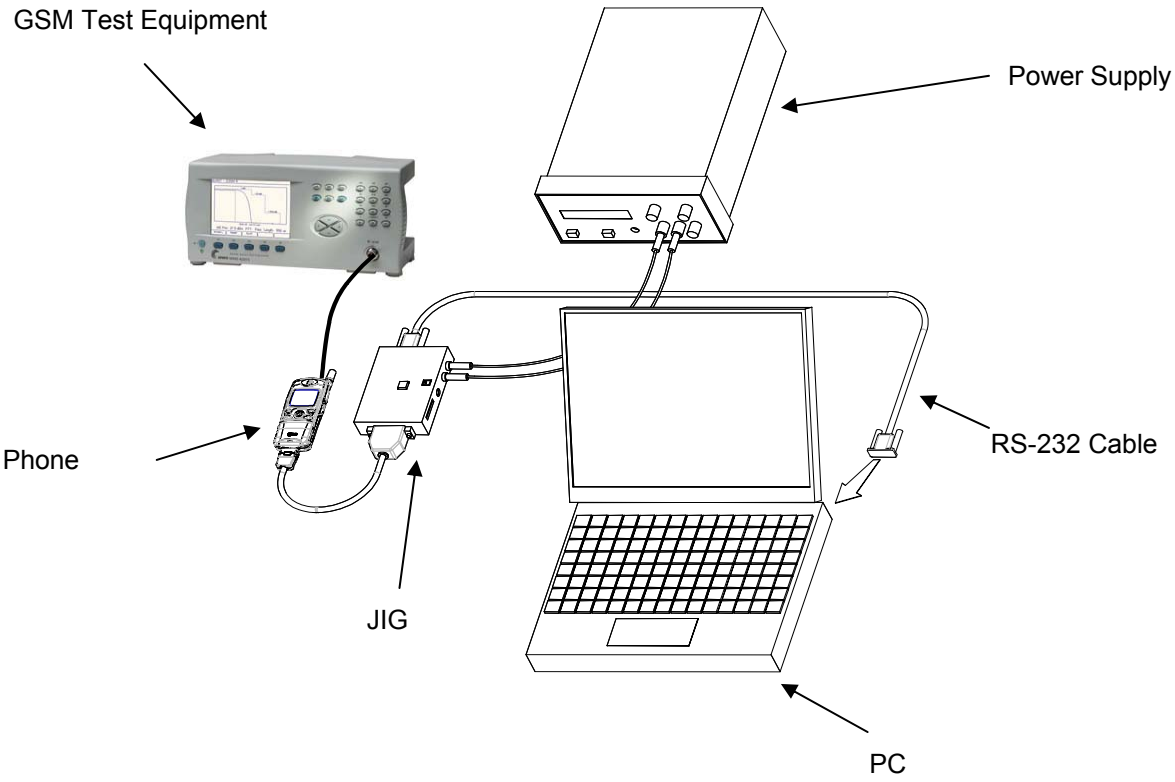


3. During Tx Standalone

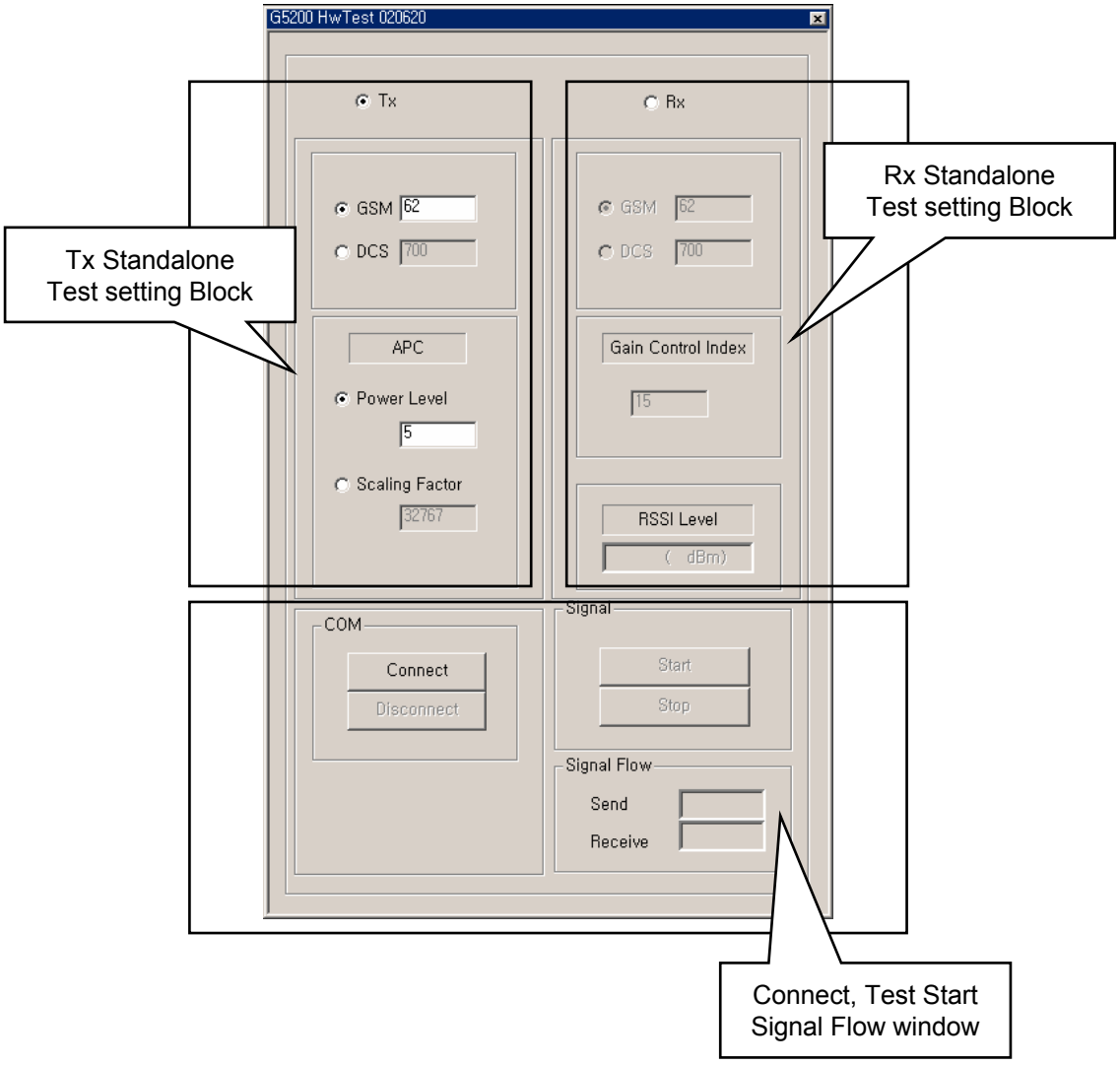


10. STAN ALONE TEST

10.2 Standalone Test Equipment Setup



10.3 HW Test : Software for Standalone Test Setup



10.4 Tx Stand alone Test Setting

1. Setting the Test Equipment as 'Test Mode-BCH'

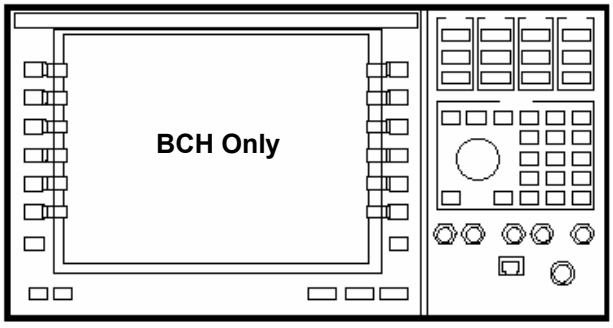
Example)

For HP8960
On the Control Window
Operating Mode : Test
Test Function : BCH

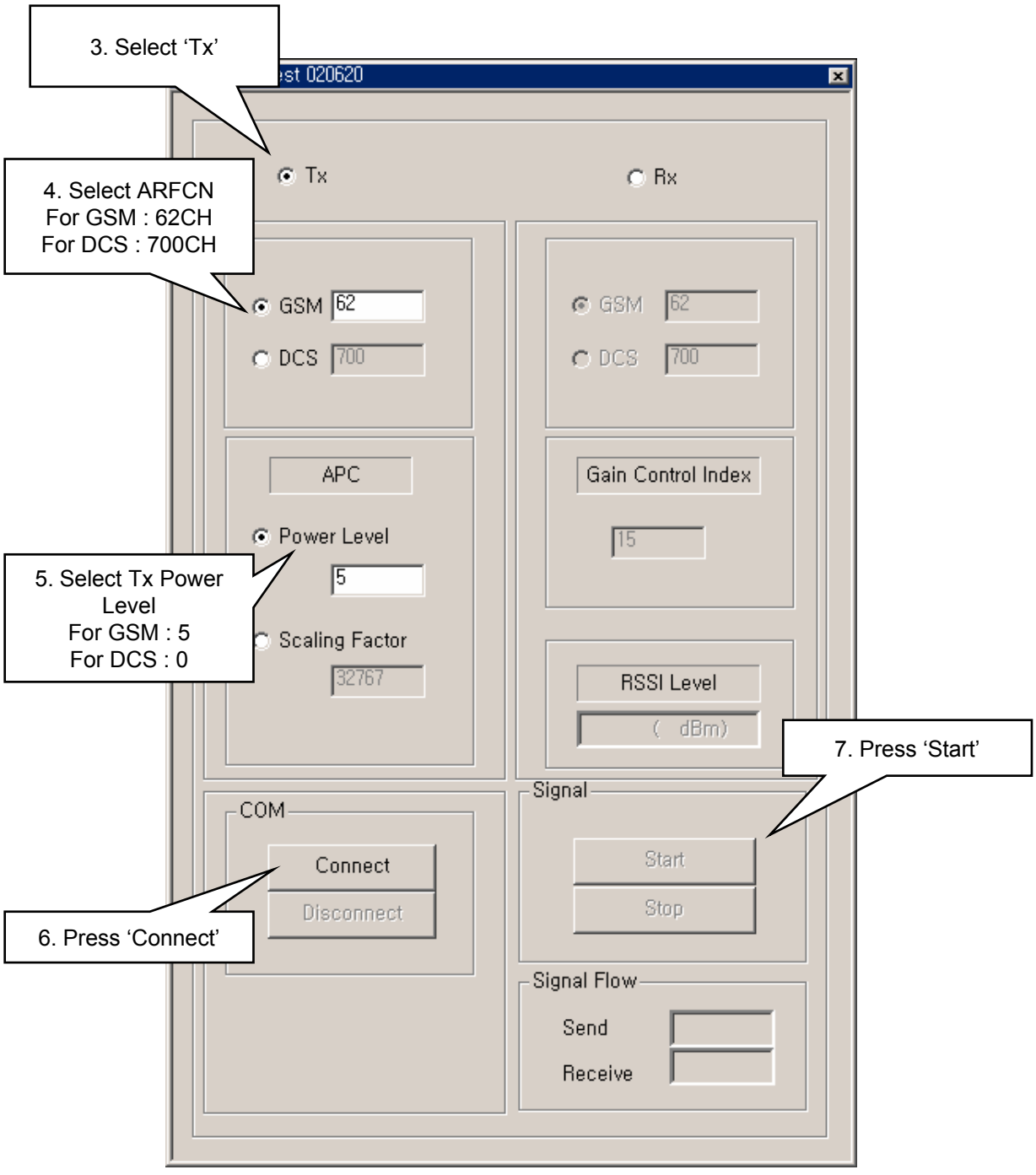
For HP8922
Operating mode : Test Mode

2. Setting Channel and Power

For GSM	For DCS
BCH : 62 CH	BCH : 700 CH
TCH : 62 CH	TCH : 700 CH
Tx Level : 5	Tx Level : 0



Tx Stand alone Test Setting



10.5 Rx Stand alone Test Setting

1. Setting the Test Equipment as 'CW Mode'

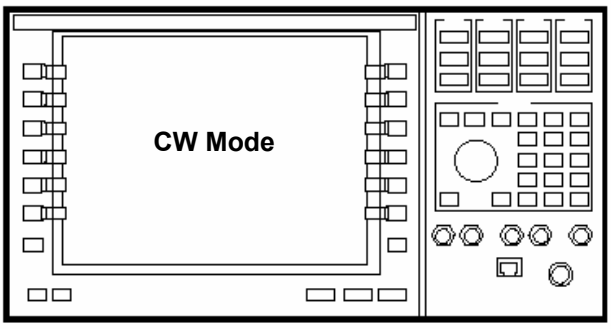
Example)

For HP8960
On the Control Window
Operating Mode : Test
Test Function : CW
For HP8922
Operating mode : CW Generator

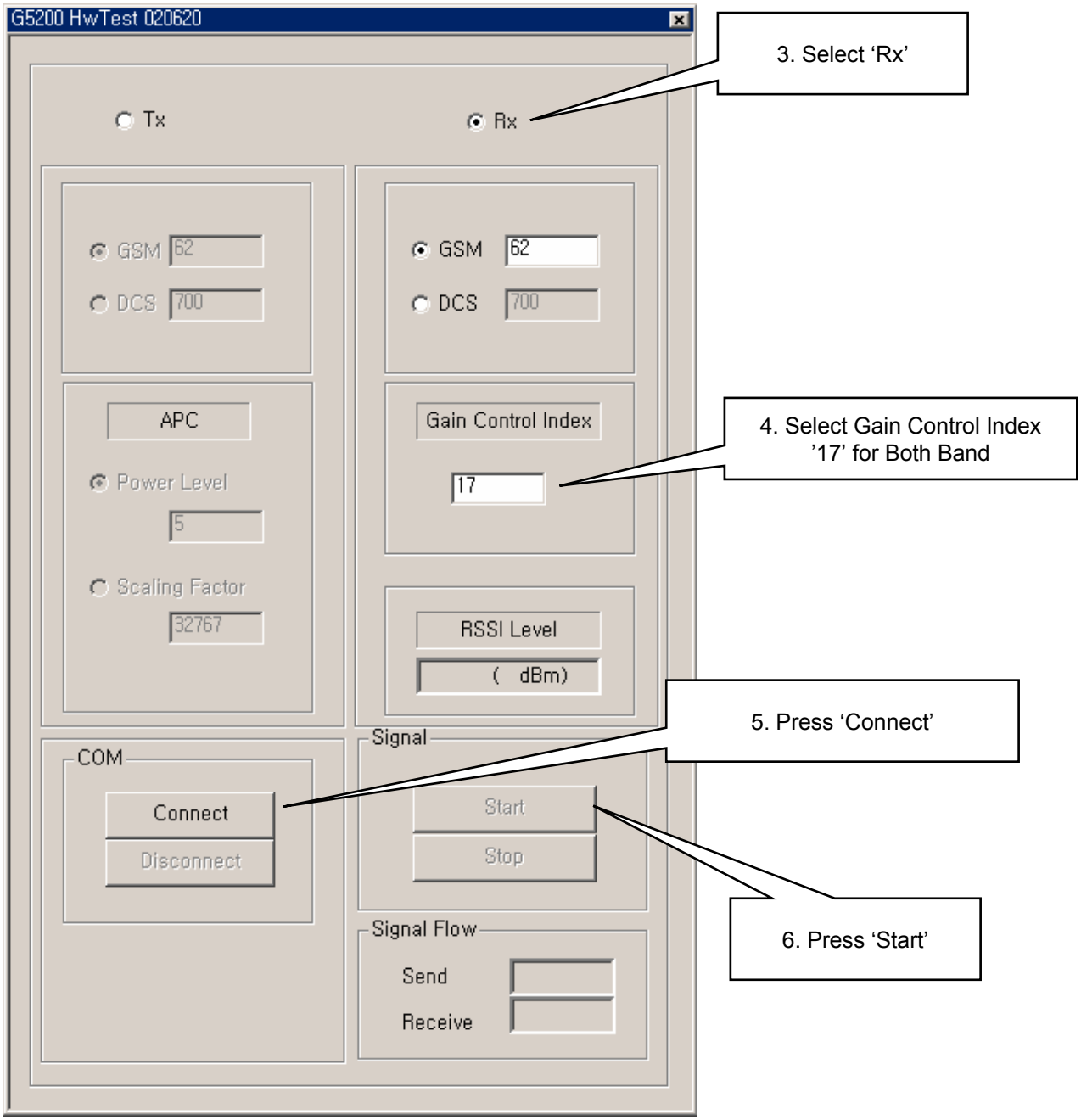
2. Setting Channel and Power

For GSM
BCH : 62 CH
TCH : 62 CH
Tx Level : 5

For DCS
BCH : 700 CH
TCH : 700 CH
Tx Level : 0

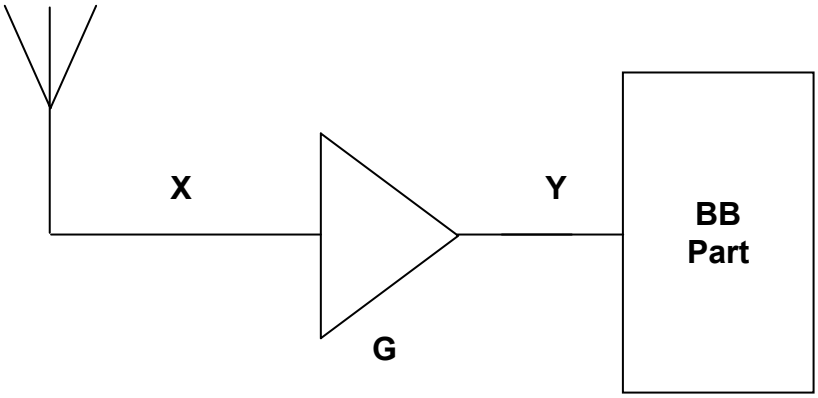


Rx Stand alone Test Setting



10.6 What's the Rx Calibration

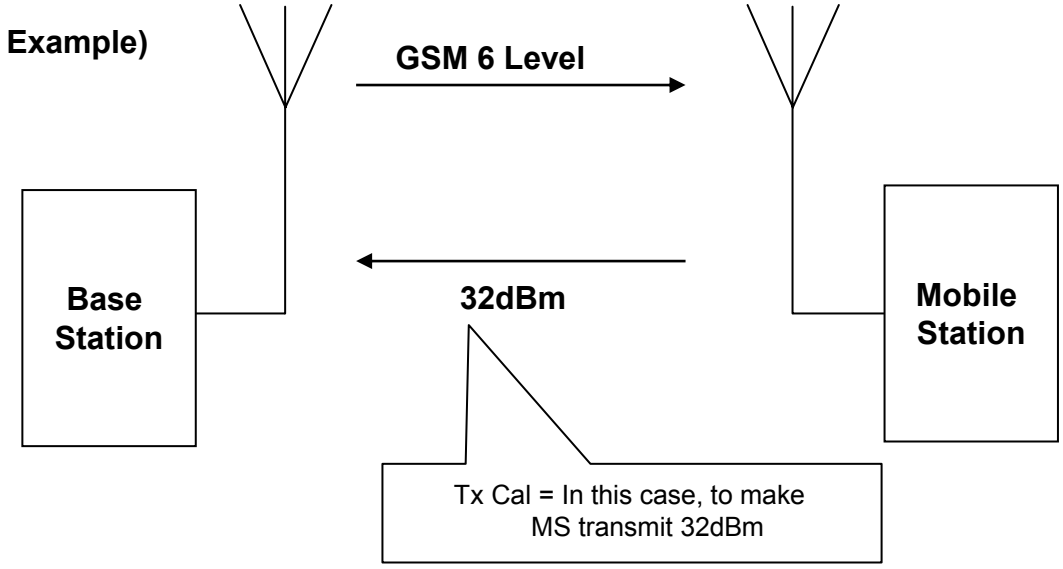
Setting the AGC Gain to make same Rx Power fed into the Base Band Part Regardless of Antenna Input Level



X(Input Level)+G(Gain)=Y

10.7 What's the Tx Calibration

To make Tx Power Level transmitted properly following the information of Base Station



10.8 How to Rx Calibration

1. Setting And Test same as Rx Standalone Test
2. Read the Gain Value on the HWTest Software
3. Using the calculation Excel File, Calculate Rx Gain Table Value
4. Using Caledit Software, Open the Basic.bin
5. Write the Calculated Value on the Rx Gain Table of Basic.bin

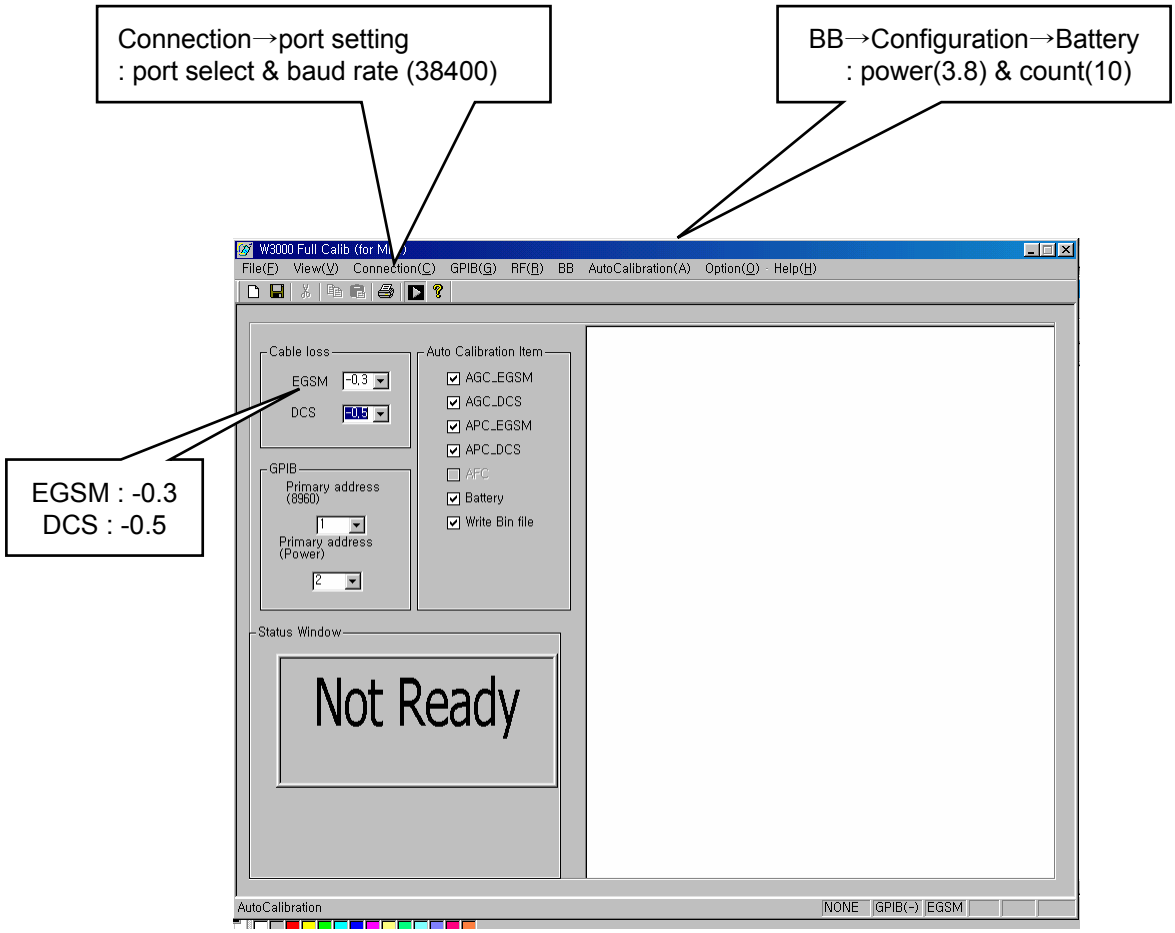
10.9 How to Tx Calibration

1. Setting And Test same as Tx Standalone Test (Start From the Max Level of Each Band)
2. Checking 'Scaling Factor' instead of 'Power Level' (Don't Change the Power Ramp Table!)
3. Change the 'Scaling Factor' Value for MS to transmit the Proper Value
   (Check the Power Level Table on Next Page)
4. Write the 'Scaling Factor' Value on Ramp Factor Table of Basic.bin
5. Change the Tx Level of the Test Equipment and do the same procedure from 1~4

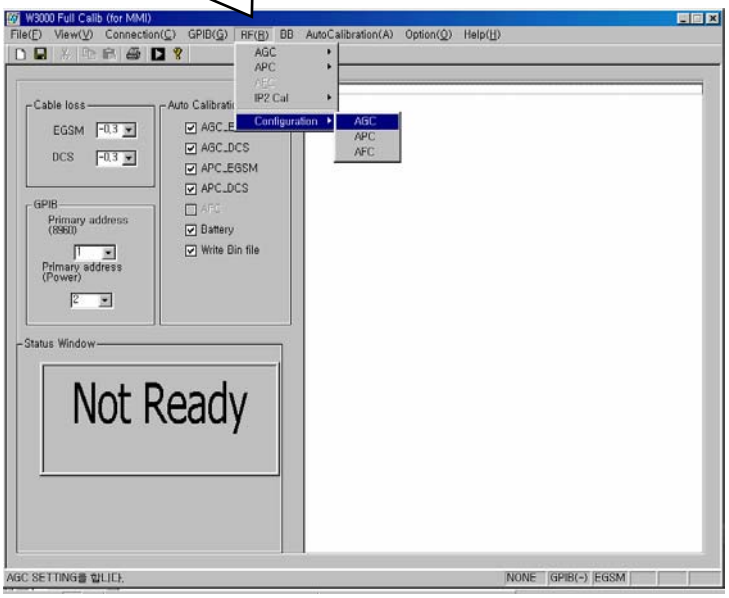
10.10 Target powers in dBm for each power level

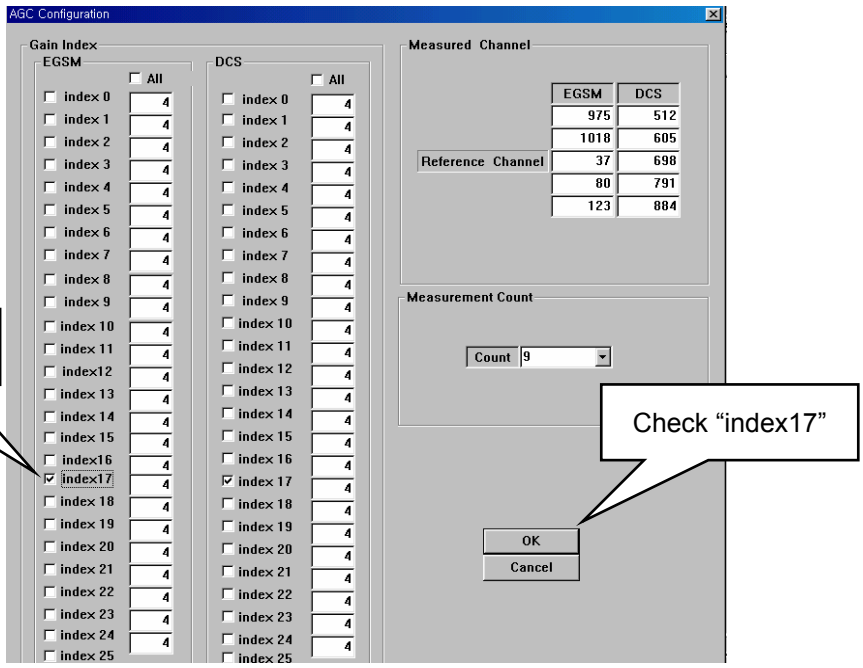
Power Level	GSM	DCS	Power Level	GSM	DCS
0		29	10	23	10
1		28	11	21	8
2		26	12	19	6
3		24	13	17	5
4		22	14	15	4
5	32	20	15	13	3
6	31	18	16	11	
7	29	16	17	9	
8	27	14	18	7	
9	25	12	19	6	

10. STAN ALONE TEST



3. RF→Configuration→AGC

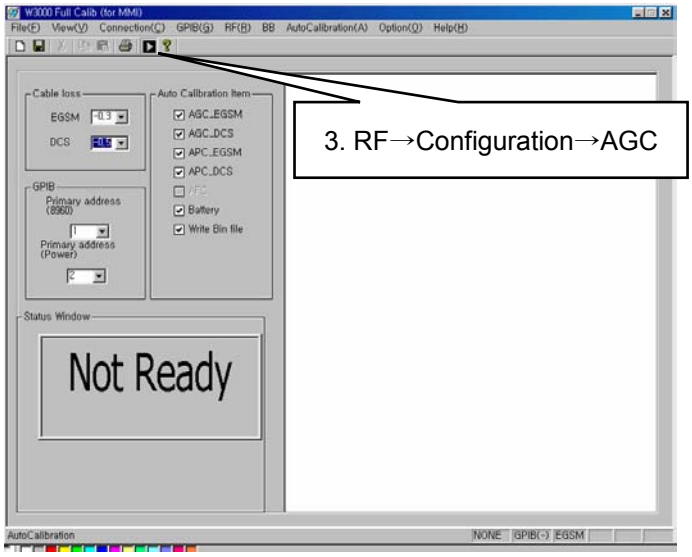


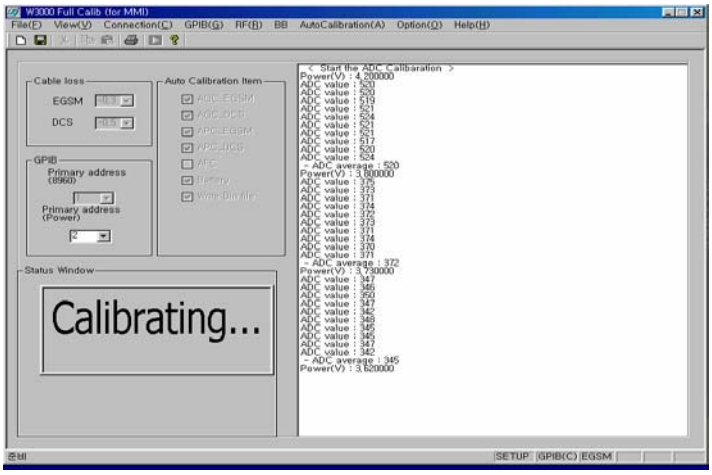


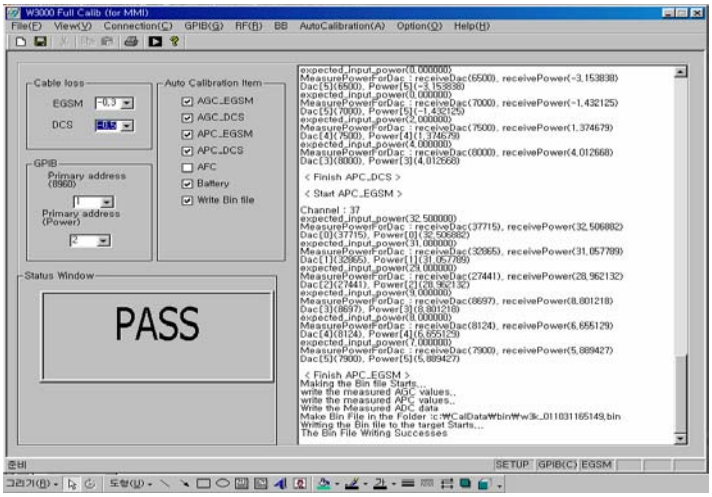
Check “index17”

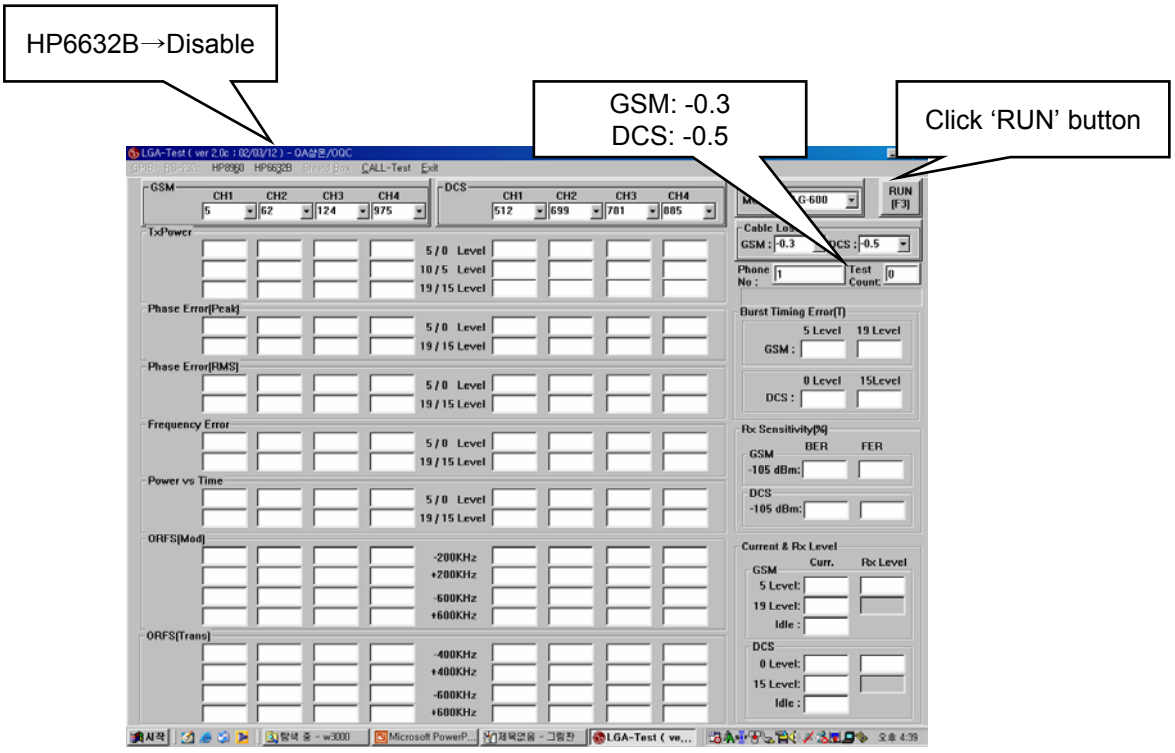
Check “index17”

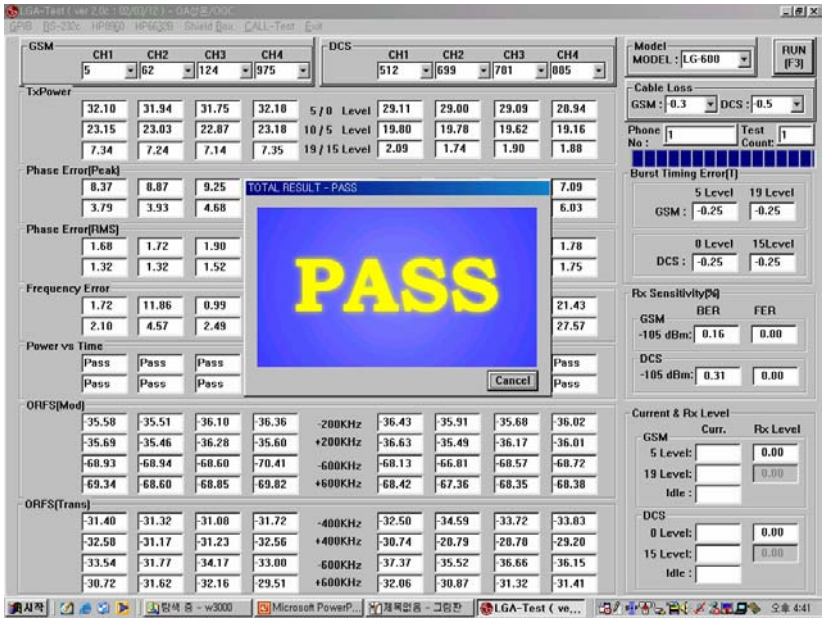
10. STAN ALONE TEST





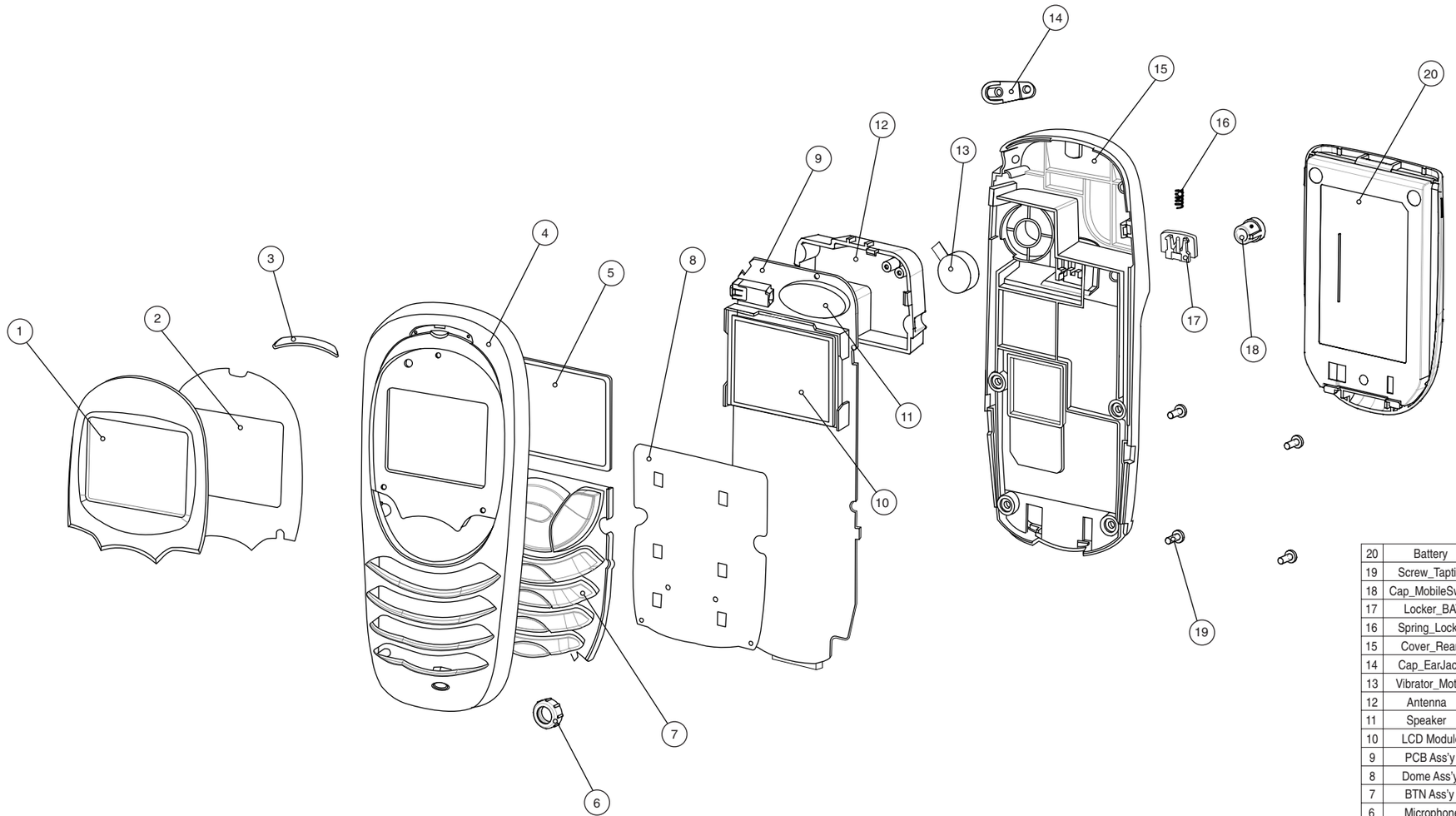



HP6632B→Disable
GSM: -0.3
DCS: -0.5
Click 'RUN' button


TOTAL RESULT - PASS
PASS
Cancel

11. EXPLODED VIEW & REPLACEMENT PART LIST

11.1 Exploded View



NO	품 명	품 번	수 량
20	Battery	SBPL0072113	1
19	Screw_Taptite	GTZZ0000604	4
18	Cap_MobileSwitch	MCCF0012001	1
17	Locker_BAT	MLEA0012901	1
16	Spring_Locker	MSDB0001701	1
15	Cover_Rear	MCJN0016701	1
14	Cap_EarJack	MCCC0011601	1
13	Vibrator_Motor	SJMY0006102	1
12	Antenna	SNGF0003101	1
11	Speaker	SUSY0007801	1
10	LCD Module	SVLM0003801	1
9	PCB Ass'y	SAFY0086101	1
8	Dome Ass'y	ADCA0015501	1
7	BTN Ass'y	ABGA0002301	1
6	Microphone	SUMY0004601	1
5	Pad_LCD	MPBG0016201	1
4	Cover_front	MCJK0020201	1
3	Deco_front	MDAG0005101	1
2	Tape_Window	MTAD0017701	1
1	Window_LCD	MWAC0032201	1

11.2 Accessory

Level	Location No.	Description	Part Number	Specification	SVC	Color	Remark
2	MHBY00	HANDSTRAP	MHBY0001101	Neck Strap 400mm (CDMA,common use)	Y	Gray	
2	SBPL00	BATTERY PACK,LI-ION	SBPL0072113	3.7 V,850 mAh,1 CELL,PRISMATIC ,G1500 BATTERY(SV)	Y	Silver	20
2	SGEY00	EAR PHONE/EAR MIKE SET	SGEY0002901	G7000,G5200 Common use, 3P EAR MIC	Y		
2	SSAD00	ADAPTOR,AC-DC	SSAD0007824	100-240V ,60 Hz,5.2 V,800 mA,CE,CB,GOST ,EU PLUG(18P),STD	Y		
2	WSYY00	SOFTWARE	WSYY0094102	G1500INDSV	N		

11.3 Replacement Parts

<Mechanic component>

Level	Location No.	Description	Part Number	Specification	SVC	Color	Remark
1		GSM,BAR/FILP	TGSM0016801	G1500 INDSV BAR TYPE	N	Silver	
2	ABEZ00	BOX ASSY	ABEZ0037802	BOX ASSY(for G1500STD wo_DK)	N	Silver	
3	MBAD00	BAG,VINYL(PE)	MBAD0002901	LOWDENSITY POLYETHYLENE(t=0.05mm)	N		
3	MBEE00	BOX,MASTER	MBEE0040901	BOX,MASTER(New_package_mbox)	N	Silver	
3	MBEF00	BOX,UNIT	MBEF0052301	BOX,UNIT(for G1500STD)	N	Silver	
3	MLAJ00	LABEL,MASTER BOX	MLAJ0001701	55x100(ORANGE)	N		
3	MLAQ00	LABEL,UNIT BOX	MLAQ0001601		N		
3	MLAZ00	LABEL	MLAZ0033401	210x297(ORANGE#FOR PALLET)	N		
3	MPAD00	PACKING,SHELL	MPAD0004501	PACKING,SHELL(New_package_wo_datakit)	N	Silver	
3	MPCY00	PALLET	MPCY0008902	PALLET(New_package_pallet+aluminum euro)	N	Silver	
3	MPCY01	PALLET	MPCY0008901	PALLET(New_package_pallet+aluminum)	N	Silver	
2	AMBA00	MANUAL ASSY,OPERATION	AMBA0029101	G1500 Manual ASSY for India	N		
3	MCDF00	CARD,WARRANTY	MCDF0004401	Warranty card for India (Common Use)	N	Blue	
3	MMBB00	MANUAL,OPERATION	MMBB0110901	G1500 User manual for India	N		
2	APEY00	PHONE	APEY0115501	G1500 INDSV BAR TYPE	N	Silver	
3	ABGA00	BUTTON ASSY,DIAL	ABGA0002301	G1500 EUASV, SILVER	Y	Silver	7
3	ACGK00	COVER ASSY,FRONT	ACGK0028401	G1500 EUASV, SILVER	Y	Silver	
4	MCJK00	COVER,FRONT	MCJK0020201	G1500 EUASV, SILVER	N	Silver	4
4	MDAG00	DECO,FRONT	MDAG0005101	G1500 EUASV, SILVER	N	Silver	3
4	MPBG00	PAD,LCD	MPBG0016201	G1500 EUASV, SILVER	N	Silver	5
4	MTAD00	TAPE,WINDOW	MTAD0017701	G1500 EUASV, SILVER	Y	Silver	2
3	ACGM00	COVER ASSY,REAR	ACGM0029001	G1500 EUASV	Y	Silver	
4	ACGM00	COVER ASSY,REAR	ACGM0026101	G1500 EUASV, SILVER	Y	Silver	
5	MCCC00	CAP,EARPHONE JACK	MCCC0011601	G1500 EUASV, SILVER	N	Silver	14
5	MCJN00	COVER,REAR	MCJN0016701	G1500 EUASV, SILVER	N	Silver	15
5	MLEA00	LOCKER,BATTERY	MLEA0012901	G1500 EUASV, SILVER	Y	Silver	17
5	MPBZ00	PAD	MPBZ0037301	G1500 pad (9.3 * 9.3, t=3.0)	Y	Black	
5	MSDB00	SPRING,COIL	MSDB0001701	G7000	Y	Pearl White	16
5	MTAB00	TAPE,PROTECTION	MTAB0032701	G1500 Rear protect tape	Y		
4	SJMY00	VIBRATOR,MOTOR	SJMY0006102	3 V,.9 A,12*18 ,G1500 PORON 0.5MM, CONNECTOR TYPE	Y		13
3	ADCA00	DOME ASSY,METAL	ADCA0015501	G1500 EUASV, SILVER	Y	Silver	8
3	AWAB00	WINDOW ASSY,LCD	AWAB0007101	G1500 EUASV, SILVER	Y	Silver	
4	BFAA00	FILM,INMOLD	BFAA0012201	G1500 EUASV, SILVER	Y	Silver	
4	MWAC00	WINDOW,LCD	MWAC0032201	G1500 EUASV, SILVER	Y	Silver	1
3	GTZZ00	SCREW TAP TITE	GTZZ0000604	M1.7x4.0,MSWR3(FN) ,N ,ETC-	Y	Black	19

Level	Location No.	Description	Part Number	Specification	SVC	Color	Remark
3	LCD	LCD MODULE	SVLM0003801	128*64 ,34.8*30.55*4.4(t) ,D/IC:S6B0723TB-01(SSE),LED B/L(BLUE)	Y		10
3	MCCF00	CAP,MOBILE SWITCH	MCCF0012001	G1500 EUASV, SILVER	Y	Silver	18
3	MIC	MICROPHONE	SUMY0004601	ASSY ,-40 dB,6*1.5 ,W3000 MIC	Y		6
3	MLAK00	LABEL,MODEL	MLAK0006901		N		
3	MTAB	TAPE,PROTECTION	MTAB0028801		Y		
2	MLAZ00	LABEL	MLAZ0035801	LABEL(for India MRP Label)	N	Cobalt Blue	
3	SUSY	SPEAKER	SUSY0007801	ASSY ,8 ohm,87 dB,24 mm,2413,OVAL TYPE	Y		11

11.3 Replacement Parts

<Main component>

Level	Location No.	Description	Part Number	Specification	SVC	Color	Remark
3	SAFY00	PCB ASSY,MAIN	SAFY0086001	G1500 BAR TYPE B/W LCD	Y	Silver	9
4	SAFA00	PCB ASSY,MAIN,AUTO	SAFA0031601	G1500 BAR TYPE B/W LCD	N	Silver	
5	BAT101	CONN,JACK/PLUG, EARPHONE	ENJE0003001	2 ,2 PIN,W3000 Back Up Battery Holder	Y		
5	C101	CAP,CERAMIC,CHIP	ECCH0000163	47 nF,10V,K,X5R,HD,1005,R/TP	Y		
5	C102	CAP,CERAMIC,CHIP	ECCH0000163	47 nF,10V,K,X5R,HD,1005,R/TP	Y		
5	C103	CAP,CERAMIC,CHIP	ECCH0000163	47 nF,10V,K,X5R,HD,1005,R/TP	Y		
5	C104	CAP,CERAMIC,CHIP	ECCH0000163	47 nF,10V,K,X5R,HD,1005,R/TP	Y		
5	C105	CAP,CERAMIC,CHIP	ECCH0000163	47 nF,10V,K,X5R,HD,1005,R/TP	Y		
5	C106	CAP,CERAMIC,CHIP	ECCH0000163	47 nF,10V,K,X5R,HD,1005,R/TP	Y		
5	C107	CAP,CERAMIC,CHIP	ECCH0000163	47 nF,10V,K,X5R,HD,1005,R/TP	Y		
5	C108	CAP,CERAMIC,CHIP	ECCH0000163	47 nF,10V,K,X5R,HD,1005,R/TP	Y		
5	C109	CAP,CERAMIC,CHIP	ECCH0000163	47 nF,10V,K,X5R,HD,1005,R/TP	Y		
5	C110	CAP,CERAMIC,CHIP	ECCH0000163	47 nF,10V,K,X5R,HD,1005,R/TP	Y		
5	C111	CAP,CERAMIC,CHIP	ECCH0000163	47 nF,10V,K,X5R,HD,1005,R/TP	Y		
5	C112	CAP,CERAMIC,CHIP	ECCH0000163	47 nF,10V,K,X5R,HD,1005,R/TP	Y		
5	C113	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C114	CAP,CERAMIC,CHIP	ECCH0003401	10 uF,6.3V ,Z ,Y5V ,HD ,2012 ,R/TP	Y		
5	C115	CAP,CERAMIC,CHIP	ECCH0003401	10 uF,6.3V ,Z ,Y5V ,HD ,2012 ,R/TP	Y		
5	C116	CAP,CERAMIC,CHIP	ECCH0003401	10 uF,6.3V ,Z ,Y5V ,HD ,2012 ,R/TP	Y		
5	C117	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C118	CAP,CERAMIC,CHIP	ECCH0003401	10 uF,6.3V ,Z ,Y5V ,HD ,2012 ,R/TP	Y		
5	C119	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C120	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C121	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C122	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C123	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C124	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C125	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C126	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C127	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C128	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP	Y		
5	C129	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C130	CAP,CERAMIC,CHIP	ECCH0000163	47 nF,10V,K,X5R,HD,1005,R/TP	Y		
5	C131	CAP,CERAMIC,CHIP	ECCH0000163	47 nF,10V,K,X5R,HD,1005,R/TP	Y		
5	C132	CAP,CERAMIC,CHIP	ECCH0000163	47 nF,10V,K,X5R,HD,1005,R/TP	Y		
5	C133	CAP,TANTAL,CHIP,MAKER	ECTZ0003602	22 uF,6.3V ,M ,STD ,2012 ,R/TP	Y		

Level	Location No.	Description	Part Number	Specification	SVC	Color	Remark
5	C134	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C135	CAP,CERAMIC,CHIP	ECCH0000163	47 nF,10V,K,X5R,HD,1005,R/TP	Y		
5	C136	CAP,CERAMIC,CHIP	ECCH0000163	47 nF,10V,K,X5R,HD,1005,R/TP	Y		
5	C137	CAP,CERAMIC,CHIP	ECCH0000163	47 nF,10V,K,X5R,HD,1005,R/TP	Y		
5	C138	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C139	CAP,CERAMIC,CHIP	ECCH0000371	0.22 uF,50V,Z,Y5V,HD,2012,R/TP	Y		
5	C140	CAP,CERAMIC,CHIP	ECCH0000379	2.2 uF,6.3V ,K ,X5R ,HD ,2012 ,R/TP	Y		
5	C141	CAP,CERAMIC,CHIP	ECCH0000379	2.2 uF,6.3V ,K ,X5R ,HD ,2012 ,R/TP	Y		
5	C142	CAP,CERAMIC,CHIP	ECCH0000371	0.22 uF,50V,Z,Y5V,HD,2012,R/TP	Y		
5	C143	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C144	CAP,CERAMIC,CHIP	ECCH0000379	2.2 uF,6.3V ,K ,X5R ,HD ,2012 ,R/TP	Y		
5	C145	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C146	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C147	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C148	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C149	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C150	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP	Y		
5	C151	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP	Y		
5	C153	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C154	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C155	CAP,CERAMIC,CHIP	ECCH0000378	1 uF,16V ,K ,X7R ,HD ,2012 ,R/TP	Y		
5	C156	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C157	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C158	CAP,CERAMIC,CHIP	ECCH0001811	220000 pF,10V ,Z ,Y5V ,HD ,1005 ,R/TP	Y		
5	C160	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C162	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C163	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP	Y		
5	C165	CAP,CERAMIC,CHIP	ECCH0001811	220000 pF,10V ,Z ,Y5V ,HD ,1005 ,R/TP	Y		
5	C201	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP	Y		
5	C202	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C203	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C204	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C205	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C206	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C217	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C218	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C219	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C220	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C221	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C222	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP	Y		

Level	Location No.	Description	Part Number	Specification	SVC	Color	Remark
5	C223	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C224	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C225	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C226	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C227	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C228	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C229	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C240	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C299	CAP,CERAMIC,CHIP	ECCH0005801	2.2 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP	Y		
5	C301	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C302	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C304	CAP,CERAMIC,CHIP	ECCH0003401	10 uF,6.3V ,Z ,Y5V ,HD ,2012 ,R/TP	Y		
5	C306	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C307	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP	Y		
5	C308	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C309	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP	Y		
5	C310	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP	Y		
5	C311	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C313	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C314	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C315	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C316	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C318	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C319	CAP,CERAMIC,CHIP	ECCH0004902	220 nF,10V ,Z ,Y5V ,TC ,1005 ,R/TP	Y		
5	C320	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP	Y		
5	C321	CAP,CERAMIC,CHIP	ECCH0004903	1 uF,6.3V ,Z ,Y5V ,TC ,1005 ,R/TP	Y		
5	C330	CAP,CERAMIC,CHIP	ECCH0000161	33 nF,16V,K,X7R,HD,1005,R/TP	Y		
5	C401	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C402	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C403	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C404	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C405	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C406	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP	Y		
5	C407	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C409	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C410	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C411	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C412	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C413	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP	Y		
5	C414	CAP,CERAMIC,CHIP	ECCH0000186	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP	Y		

Level	Location No.	Description	Part Number	Specification	SVC	Color	Remark
5	C416	CAP,TANTAL,CHIP	ECTH0001701	10 uF,6.3V ,M ,L_ESR ,2012 ,R/TP	Y		
5	C417	CAP,CERAMIC,CHIP	ECCH0000276	1 uF,10V,Z,Y5V,HD,1608,R/TP	Y		
5	C418	CAP,CERAMIC,CHIP	ECCH0000111	12 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C419	CAP,CERAMIC,CHIP	ECCH0000111	12 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C420	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C421	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C422	CAP,CERAMIC,CHIP	ECCH0003401	10 uF,6.3V ,Z ,Y5V ,HD ,2012 ,R/TP	Y		
5	C423	CAP,CERAMIC,CHIP	ECCH0000183	1.8 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP	Y		
5	C424	CAP,CERAMIC,CHIP	ECCH0000133	220 pF,50V ,K ,X7R ,HD ,1005 ,R/TP	Y		
5	C425	CAP,CERAMIC,CHIP	ECCH0000141	680 pF,50V,K,X7R,HD,1005,R/TP	Y		
5	C426	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C427	CAP,FILM,MPP	ECFD0000101	8200 pF,16V ,J ,NI ,SMD ,2012 mm,R/TP	Y		
5	C428	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C430	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C432	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP	Y		
5	C433	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C434	CAP,CERAMIC,CHIP	ECCH0000102	1 pF,50V,C,NP0,TC,1005,R/TP	Y		
5	C435	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C436	CAP,CERAMIC,CHIP	ECCH0000247	1 nF,50V,J,NP0,TC,1608,R/TP	Y		
5	C437	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C438	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C439	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C440	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C441	CAP,CERAMIC,CHIP	ECCH0000111	12 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C442	CAP,CERAMIC,CHIP	ECCH0000139	470 pF,50V,K,X7R,HD,1005,R/TP	Y		
5	C443	CAP,CERAMIC,CHIP	ECCH0000139	470 pF,50V,K,X7R,HD,1005,R/TP	Y		
5	C446	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C447	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C448	CAP,CERAMIC,CHIP	ECCH0000186	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP	Y		
5	C449	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C450	CAP,CERAMIC,CHIP	ECCH0000101	0.5 pF,50V,C,NP0,TC,1005,R/TP	Y		
5	C453	CAP,CERAMIC,CHIP	ECCH0000186	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP	Y		
5	C454	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP	Y		
5	C456	CAP,CERAMIC,CHIP	ECCH0000379	2.2 uF,6.3V ,K ,X5R ,HD ,2012 ,R/TP	Y		
5	C458	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP	Y		
5	C459	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP	Y		
5	C460	CAP,CERAMIC,CHIP	ECCH0000379	2.2 uF,6.3V ,K ,X5R ,HD ,2012 ,R/TP	Y		
5	C461	CAP,CERAMIC,CHIP	ECCH0003401	10 uF,6.3V ,Z ,Y5V ,HD ,2012 ,R/TP	Y		
5	C462	CAP,CERAMIC,CHIP	ECCH0000139	470 pF,50V,K,X7R,HD,1005,R/TP	Y		
5	C465	CAP,CERAMIC,CHIP	ECCH0000101	0.5 pF,50V,C,NP0,TC,1005,R/TP	Y		

Level	Location No.	Description	Part Number	Specification	SVC	Color	Remark
5	C466	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP	Y		
5	C469	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	C470	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP	Y		
5	CN304	CONNECTOR,FFC/FPC	ENQY0005301	24 PIN,0.5 mm,ANGLE ,SN-PB ,FPCB 0.2T / HEIGHT 0.9	Y		
5	CN401	CONN,RF SWITCH	ENWY0000401	STRAIGHT ,SMD ,0.1 dB,3*3*1.8 / 500 CYCLES	Y		
5	CN402	CONN,RECEPTACLE	ENEY0002501	18 PIN,3 ,0 ,0.5 PITCH / 18 PIN I/O + POWER	Y		
5	CN403	CONNECTOR,BOARD TO BOARD	ENBY0001802	2 PIN,1.27 mm,STRAIGHT ,SILVER ,	Y		
5	D101	DIODE,SWITCHING	EDSY0012101	US-FLAT ,30 V,1 A,R/TP ,2.5*1.25*0.6(t)	Y		
5	D102	DIODE,SWITCHING	EDSY0005701	EMT3 ,80 V,4 A,R/TP ,	Y		
5	D202	DIODE,SWITCHING	EDSY0005301	SC-70 ,80 V,0.1 A,R/TP ,	Y		
5	FB1	FILTER,BEAD,CHIP	SFBH0000903	600 ohm,1005 ,	Y		
5	FL406	FILTER,SAW	SFSY0014401	MHz,3.0*2.5*0.9(t) ,SMD ,DUAL SAW FILTER,EGSM-RX/DCS1800-RX	Y		
5	FL407	FILTER,SEPERATOR	SFAY0001901	880/960 ,1710/1880 ,1.3 dB,1.5 dB,30 dB,25 dB,ETC ,5.4*4.0*1.8	Y		
5	J304	CONN,SOCKET	ENSY0007604	6 PIN,ETC ,SOCKET ,2.54 mm,U8150 SIM CNT (2.3t)	Y		
5	J305	CONN,JACK/PLUG, EARPHONE	ENJE0002301	3,5 PIN,G7000 EAR JACK 3 pole, 5 pin KSD	Y		
5	L101	INDUCTOR,CHIP	ELCH0005009	100 nH,J ,1005 ,R/TP ,	Y		
5	L102	INDUCTOR,CHIP	ELCH0005009	100 nH,J ,1005 ,R/TP ,	Y		
5	L310	INDUCTOR,CHIP	ELCH0005009	100 nH,J ,1005 ,R/TP ,	Y		
5	L401	INDUCTOR,CHIP	ELCH0001001	10 nH,J,1005,R/TP	Y		
5	L403	INDUCTOR,CHIP	ELCH0001404	1.5 nH,S,1005,R/TP	Y		
5	L404	INDUCTOR,CHIP	ELCH0000718	150 nH,J,1608,R/TP	Y		
5	L405	INDUCTOR,CHIP	ELCH0001420	3.9 nH,S ,1005 ,R/TP ,CDMA	Y		
5	L407	INDUCTOR,CHIP	ELCH0003806	82 nH,G ,1608 ,R/TP ,CDMA for common use	Y		
5	L408	INDUCTOR,CHIP	ELCH0001001	10 nH,J,1005,R/TP	Y		
5	L409	INDUCTOR,CHIP	ELCH0005002	2.7 nH,S ,1005 ,R/TP ,	Y		
5	L410	INDUCTOR,CHIP	ELCH0005010	1.8 nH,S ,1005 ,R/TP ,	Y		
5	L412	INDUCTOR,CHIP	ELCH0001405	3.3 nH,S,1005,R/TP	Y		
5	L413	INDUCTOR,CHIP	ELCH0005014	5.6 nH,S ,1005 ,R/TP ,	Y		
5	LD212	DIODE,LED,CHIP	EDLH0004502	BLUE ,1608 ,R/TP ,0.35T	Y		
5	LD213	DIODE,LED,CHIP	EDLH0004502	BLUE ,1608 ,R/TP ,0.35T	Y		
5	LD214	DIODE,LED,CHIP	EDLH0004502	BLUE ,1608 ,R/TP ,0.35T	Y		
5	LD215	DIODE,LED,CHIP	EDLH0004502	BLUE ,1608 ,R/TP ,0.35T	Y		
5	LD216	DIODE,LED,CHIP	EDLH0004502	BLUE ,1608 ,R/TP ,0.35T	Y		
5	LD217	DIODE,LED,CHIP	EDLH0004502	BLUE ,1608 ,R/TP ,0.35T	Y		
5	Q101	TR,BJT,NPN	EQBN0007101	EMT3 ,0.15 W,R/TP ,LOW FREQUENCY	Y		
5	Q102	TR,FET,P-CHANNEL	EQFP0003301	SOT-6 ,1.6 W,30 V,2.4 A,R/TP ,use for charge P-CHANNEL FET	Y		
5	Q201	TR,BJT,NPN	EQBN0004801	SMT6 ,0.2 W,R/TP ,	Y		

Level	Location No.	Description	Part Number	Specification	SVC	Color	Remark
5	Q203	TR,BJT,NPN	EQBN0007101	EMT3 ,0.15 W,R/TP ,LOW FREQUENCY	Y		
5	Q204	TR,BJT,NPN	EQBN0004801	SMT6 ,0.2 W,R/TP ,	Y		
5	R101	RES,CHIP	ERHY0000241	1K ohm,1/16W,J,1005,R/TP	Y		
5	R102	RES,CHIP	ERHY0000220	100 ohm,1/16W,J,1005,R/TP	Y		
5	R103	RES,CHIP	ERHY0000248	2.4K ohm,1/16W,J,1005,R/TP	Y		
5	R104	RES,CHIP	ERHY0001103	0.33 ohm,1/4W ,F ,2012 ,R/TP	Y		
5	R105	RES,CHIP	ERHY0000220	100 ohm,1/16W,J,1005,R/TP	Y		
5	R106	RES,CHIP	ERHY0000220	100 ohm,1/16W,J,1005,R/TP	Y		
5	R107	RES,CHIP	ERHY0000118	3K ohm,1/16W,F,1005,R/TP	Y		
5	R108	RES,CHIP	ERHY0000244	1.5K ohm,1/16W,J,1005,R/TP	Y		
5	R109	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP	Y		
5	R111	RES,CHIP	ERHY0000241	1K ohm,1/16W,J,1005,R/TP	Y		
5	R112	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP	Y		
5	R113	RES,CHIP	ERHY0000213	47 ohm,1/16W,J,1005,R/TP	Y		
5	R114	RES,CHIP	ERHY0000246	2K ohm,1/16W,J,1005,R/TP	Y		
5	R115	RES,CHIP	ERHY0000246	2K ohm,1/16W,J,1005,R/TP	Y		
5	R117	RES,CHIP	ERHY0000286	200K ohm,1/16W,J,1005,R/TP	Y		
5	R118	RES,CHIP	ERHY0000282	120K ohm,1/16W,J,1005,R/TP	Y		
5	R119	RES,CHIP	ERHY0000512	10M ohm,1/16W,J,1608,R/TP	Y		
5	R120	RES,CHIP	ERHY0000241	1K ohm,1/16W,J,1005,R/TP	Y		
5	R121	RES,CHIP	ERHY0000278	82K ohm,1/16W,J,1005,R/TP	Y		
5	R122	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP	Y		
5	R123	RES,CHIP	ERHY0000220	100 ohm,1/16W,J,1005,R/TP	Y		
5	R124	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP	Y		
5	R125	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP	Y		
5	R126	RES,CHIP	ERHY0000201	0 ohm,1/16W,J,1005,R/TP	Y		
5	R127	RES,CHIP	ERHY0000265	20K ohm,1/16W,J,1005,R/TP	Y		
5	R128	RES,CHIP	ERHY0000273	47K ohm,1/16W,J,1005,R/TP	Y		
5	R133	RES,CHIP	ERHY0000261	10K ohm,1/16W,J,1005,R/TP	Y		
5	R150	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP	Y		
5	R151	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP	Y		
5	R201	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP	Y		
5	R202	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP	Y		
5	R203	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP	Y		
5	R206	RES,CHIP	ERHY0000213	47 ohm,1/16W,J,1005,R/TP	Y		
5	R207	RES,CHIP	ERHY0000213	47 ohm,1/16W,J,1005,R/TP	Y		
5	R208	RES,CHIP	ERHY0000213	47 ohm,1/16W,J,1005,R/TP	Y		
5	R209	RES,CHIP	ERHY0000213	47 ohm,1/16W,J,1005,R/TP	Y		
5	R210	RES,CHIP	ERHY0000207	20 ohm,1/16W,J,1005,R/TP	Y		
5	R211	RES,CHIP	ERHY0000207	20 ohm,1/16W,J,1005,R/TP	Y		

Level	Location No.	Description	Part Number	Specification	SVC	Color	Remark
5	R212	RES,CHIP	ERHY0000241	1K ohm,1/16W,J,1005,R/TP	Y		
5	R213	RES,CHIP	ERHY0000241	1K ohm,1/16W,J,1005,R/TP	Y		
5	R214	RES,CHIP	ERHY0000241	1K ohm,1/16W,J,1005,R/TP	Y		
5	R223	RES,CHIP	ERHY0000244	1.5K ohm,1/16W,J,1005,R/TP	Y		
5	R224	RES,CHIP	ERHY0000261	10K ohm,1/16W,J,1005,R/TP	Y		
5	R225	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP	Y		
5	R226	RES,CHIP	ERHY0000254	4.7K ohm,1/16W,J,1005,R/TP	Y		
5	R228	RES,CHIP	ERHY0000203	10 ohm,1/16W,J,1005,R/TP	Y		
5	R229	RES,CHIP	ERHY0000203	10 ohm,1/16W,J,1005,R/TP	Y		
5	R232	RES,CHIP	ERHY0000201	0 ohm,1/16W,J,1005,R/TP	Y		
5	R233	RES,CHIP	ERHY0000241	1K ohm,1/16W,J,1005,R/TP	Y		
5	R234	RES,CHIP	ERHY0000241	1K ohm,1/16W,J,1005,R/TP	Y		
5	R235	RES,CHIP	ERHY0000241	1K ohm,1/16W,J,1005,R/TP	Y		
5	R236	RES,CHIP	ERHY0000241	1K ohm,1/16W,J,1005,R/TP	Y		
5	R237	RES,CHIP	ERHY0000241	1K ohm,1/16W,J,1005,R/TP	Y		
5	R238	RES,CHIP	ERHY0000241	1K ohm,1/16W,J,1005,R/TP	Y		
5	R239	RES,CHIP	ERHY0000241	1K ohm,1/16W,J,1005,R/TP	Y		
5	R240	RES,CHIP	ERHY0000241	1K ohm,1/16W,J,1005,R/TP	Y		
5	R241	RES,CHIP	ERHY0000241	1K ohm,1/16W,J,1005,R/TP	Y		
5	R242	RES,CHIP	ERHY0000241	1K ohm,1/16W,J,1005,R/TP	Y		
5	R243	RES,CHIP	ERHY0000213	47 ohm,1/16W,J,1005,R/TP	Y		
5	R244	RES,CHIP	ERHY0000213	47 ohm,1/16W,J,1005,R/TP	Y		
5	R245	RES,CHIP	ERHY0000213	47 ohm,1/16W,J,1005,R/TP	Y		
5	R246	RES,CHIP	ERHY0000213	47 ohm,1/16W,J,1005,R/TP	Y		
5	R247	RES,CHIP	ERHY0000213	47 ohm,1/16W,J,1005,R/TP	Y		
5	R248	RES,CHIP	ERHY0000213	47 ohm,1/16W,J,1005,R/TP	Y		
5	R249	RES,CHIP	ERHY0000244	1.5K ohm,1/16W,J,1005,R/TP	Y		
5	R250	RES,CHIP	ERHY0000205	15 ohm,1/16W,J,1005,R/TP	Y		
5	R251	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP	Y		
5	R252	RES,CHIP	ERHY0000241	1K ohm,1/16W,J,1005,R/TP	Y		
5	R253	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP	Y		
5	R302	RES,CHIP	ERHY0000296	1M ohm,1/16W,J,1005,R/TP	Y		
5	R303	RES,CHIP	ERHY0000241	1K ohm,1/16W,J,1005,R/TP	Y		
5	R304	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP	Y		
5	R305	RES,CHIP	ERHY0000202	4.7 ohm,1/16W,J,1005,R/TP	Y		
5	R306	RES,CHIP	ERHY0000202	4.7 ohm,1/16W,J,1005,R/TP	Y		
5	R307	RES,CHIP	ERHY0000512	10M ohm,1/16W,J,1608,R/TP	Y		
5	R311	RES,CHIP	ERHY0000202	4.7 ohm,1/16W,J,1005,R/TP	Y		
5	R312	RES,CHIP	ERHY0000202	4.7 ohm,1/16W,J,1005,R/TP	Y		
5	R314	RES,CHIP	ERHY0000265	20K ohm,1/16W,J,1005,R/TP	Y		

Level	Location No.	Description	Part Number	Specification	SVC	Color	Remark
5	R315	RES,CHIP	ERHY0000223	150 ohm,1/16W,J,1005,R/TP	Y		
5	R316	RES,CHIP	ERHY0000246	2K ohm,1/16W,J,1005,R/TP	Y		
5	R401	RES,CHIP	ERHY0000263	15K ohm,1/16W,J,1005,R/TP	Y		
5	R402	RES,CHIP	ERHY0000203	10 ohm,1/16W,J,1005,R/TP	Y		
5	R403	RES,CHIP	ERHY0000201	0 ohm,1/16W,J,1005,R/TP	Y		
5	R404	RES,CHIP	ERHY0000220	100 ohm,1/16W,J,1005,R/TP	Y		
5	R405	RES,CHIP	ERHY0000220	100 ohm,1/16W,J,1005,R/TP	Y		
5	R407	RES,CHIP	ERHY0000208	22 ohm,1/16W,J,1005,R/TP	Y		
5	R408	RES,CHIP	ERHY0000255	5.6K ohm,1/16W,J,1005,R/TP	Y		
5	R409	RES,CHIP	ERHY0000226	220 ohm,1/16W,J,1005,R/TP	Y		
5	R410	RES,CHIP	ERHY0000226	220 ohm,1/16W,J,1005,R/TP	Y		
5	R411	RES,CHIP	ERHY0000234	510 ohm,1/16W,J,1005,R/TP	Y		
5	R412	RES,CHIP	ERHY0000231	390 ohm,1/16W,J,1005,R/TP	Y		
5	R413	RES,CHIP	ERHY0000214	51 ohm,1/16W,J,1005,R/TP	Y		
5	R414	RES,CHIP	ERHY0000247	2.2K ohm,1/16W,J,1005,R/TP	Y		
5	R415	RES,CHIP	ERHY0000204	12 ohm,1/16W,J,1005,R/TP	Y		
5	R416	RES,CHIP	ERHY0000109	470 ohm,1/16W,F,1005,R/TP	Y		
5	R417	RES,CHIP	ERHY0000109	470 ohm,1/16W,F,1005,R/TP	Y		
5	R418	RES,CHIP	ERHY0000203	10 ohm,1/16W,J,1005,R/TP	Y		
5	R419	RES,CHIP	ERHY0000203	10 ohm,1/16W,J,1005,R/TP	Y		
5	R420	RES,CHIP	ERHY0000203	10 ohm,1/16W,J,1005,R/TP	Y		
5	R421	RES,CHIP	ERHY0000203	10 ohm,1/16W,J,1005,R/TP	Y		
5	R422	RES,CHIP	ERHY0000231	390 ohm,1/16W,J,1005,R/TP	Y		
5	R423	RES,CHIP	ERHY0000112	1K ohm,1/16W,F,1005,R/TP	Y		
5	R424	RES,CHIP	ERHY0000141	39K ohm,1/16W,F,1005,R/TP	Y		
5	R425	RES,CHIP	ERHY0000263	15K ohm,1/16W,J,1005,R/TP	Y		
5	R426	RES,CHIP	ERHY0000220	100 ohm,1/16W,J,1005,R/TP	Y		
5	R427	RES,CHIP	ERHY0000296	1M ohm,1/16W,J,1005,R/TP	Y		
5	R431	RES,CHIP	ERHY0000201	0 ohm,1/16W,J,1005,R/TP	Y		
5	R433	RES,CHIP	ERHY0000201	0 ohm,1/16W,J,1005,R/TP	Y		
5	R434	RES,CHIP	ERHY0000220	100 ohm,1/16W,J,1005,R/TP	Y		
5	R435	RES,CHIP	ERHY0000220	100 ohm,1/16W,J,1005,R/TP	Y		
5	RA201	RES,ARRAY,R	ERNR0000401	47 ohm, ohm,8 PIN,J ,1/32 W ,SMD ,R/TP	Y		
5	SPFY00	PCB,MAIN	SPFY0058801	FR-4 ,1.0 mm,MULTI-6 ,G1500_DCS	Y	Aluminum Silver	
5	U101	IC	EUSY0100401	TSSOP ,28 PIN,R/TP ,GSM POWER MANAGEMENT SYSTEM	Y		
5	U103	IC	EUSY0100701	64 BALL LFBGA / MINI-BGA ,64 PIN,R/TP ,DUAL-MODE VOICEBAND BASEBAND CODEC / AD20MSP430	Y		
5	U105	IC	EUSY0100601	160 PIN MINI-BGA ,160 PIN,R/TP ,GSM DIGITAL BASEBAND / AD20MSP430	Y		

Level	Location No.	Description	Part Number	Specification	SVC	Color	Remark
5	U106	IC	EUSY0101502	68-BALL STACKED-CSP ,68 PIN,R/TP ,14 X 8 MATRIX / 32-FLASH / 08-SRAM / 70 NS	N		
5	U201	IC	EUSY0077301	SC70-6/SOT23-6 ,6 PIN,R/TP ,	Y		
5	U302	IC	EUSY0077701	SC70-5 ,5 PIN,R/TP ,	Y		
5	U303	IC	EUSY0119001	10 uMAX ,10 PIN,R/TP ,DUAL SPDT ANALOG SWITCHES	Y		
5	U330	IC	EUSY0149701	LLP ,10 PIN,R/TP ,1 Watt Audio Power Amplifier / Leadless Type	Y		
5	U413	IC	EUSY0077201	SOT(DCK) ,5 PIN,R/TP ,	Y		
5	U414	IC	EUSY0076701	SOT-23-6 ,6 PIN,R/TP ,	Y		
5	U416	PAM	SMPY0003902	35 dBm,53 %,1 A,-50 dBc,25 dB,10*10*1.7 ,SMD ,	Y		
5	U441	IC	EUSY0129801	Land Grid Array(LGA) ,64 PIN,R/TP ,9 x 9 mm	Y		
5	V101	RES,VARIABLE,ETC	ERVZ0000101	ohm, PIN, ,SMD ,R/TP ,1005 SIZE CHIP VARISTOR	Y		
5	V102	RES,VARIABLE,ETC	ERVZ0000101	ohm, PIN, ,SMD ,R/TP ,1005 SIZE CHIP VARISTOR	Y		
5	V303	RES,VARIABLE,ETC	ERVZ0000101	ohm, PIN, ,SMD ,R/TP ,1005 SIZE CHIP VARISTOR	Y		
5	V304	RES,VARIABLE,ETC	ERVZ0000101	ohm, PIN, ,SMD ,R/TP ,1005 SIZE CHIP VARISTOR	Y		
5	VA299	VARISTOR	SEVY0000702	14 V,10% ,SMD ,	Y		
5	X101	X-TAL	EXXY0004601	0.32768 MHz,20 PPM,12.5 pF,65000 ohm,SMD ,6.9*1.4*1.3 ,	Y		
5	X401	VCTCXO	EXSK0000801	13.0 MHz, PPM,10 pF,SMD ,5.0*3.2*1.5 ,	Y		