Internal Use Only

Service Manual

LG-T385

Date: March, 2012 / Issue 1.0

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1. INTRODUCTION

1.1 Purpose

This manual provides the information necessary to repair, calibration, description and download the features of this model.

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 are 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 result 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 the 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. The user may not make any changes and/or repairs expect as specifically noted in this manual. 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

This model 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

Phone 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 Ratio
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
EEPROM	Electrical Erasable Programmable Read-Only Memory
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

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
Standard Battery	Lithium-Ion, 3.7V 950mAh	
Stand by TIME	Up to 500 hrs : Paging Period 5, RSSI 85dBm	
Talk time	Up to 5hrs : GSM Tx Level 7	
Stand by time	Up to 500 hours (Paging Period: 5, RSSI: -85 dBm)	
Charging time	Approx 3hours	
RX Sensitivity	GSM, EGSM: -109dBm, DCS: -109dBm	
TX output power	GSM, EGSM: 32.5dBm(Level 5), DCS , PCS: 29.5dBm(Level 0)	
GPRS compatibility	Class 12	
SIM card type	3V / 1.8V	
Display	MAIN : 2.8" TFT 240 × 320 pixel 262K Color	
Status Indicator	Send Key, End Key, Cancel Key, Volume Up/Down Key, PWR(Lock) Key,	
ANT	Internal	
EAR Phone Jack	Yes (3.5Φ)	
PC Synchronization	Yes	
Speech coding	EFR/FR/HR	
Data and Fax	Yes	
Vibrator	Yes	
Loud Speaker	Yes	
Voice Recoding	Yes	
Microphone	Yes	

Item	Feature	Comment
Speaker/Receiver	18x12Φ Speaker/ Receiver	
Travel Adapter	Yes	
MIDI	SW MIDI (Mono SPK)	
Camera	2.0M FF	
Bluetooth / FM Radio	Bluetooth version 2.1 / Wired FM radio (Earphone needed)	

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>GSM850
TX: 824 ~ 849 MHz
RX: 869 ~ 894 MHz
EGSM
TX: 880 ~ 915MHz
RX: 925 ~ 960 MHz
DCS
TX: 1710 ~ 1785 MHz
RX: 1805 ~ 1880 MHz
PCS
TX: 1850 ~ 1910 MHz
RX: 1930 ~ 1990 MHz</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>4</td><td>Power Level</td><td>
GSM850/EGSM
<table>
<tr><th>Level</th><th>Power</th><th>Toler.</th><th>Level</th><th>Power</th><th>Toler.</th></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>
DCS/PCS
<table>
<tr><th>Level</th><th>Power</th><th>Toler.</th><th>Level</th><th>Power</th><th>Toler.</th></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)	**GSM850/ 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/PCS	
		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)	**GSM850/ EGSM**	
		Offset from Carrier (kHz).	Max. dBm
		400	-19
		600	-21
		1,200	-21
		1,800	-24

<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/PCS</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">GSM850, EGSM
BER (Class II) < 2.439% @-102 dBm
DCS,PCS
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">12±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">4±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">> 17 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 colspan="2">dB to ARL (dB)</td><td>Level Ratio (dB)</td></tr>
<tr><td colspan="2">-35</td><td>17.5</td></tr>
<tr><td colspan="2">-30</td><td>22.5</td></tr>
<tr><td colspan="2">-20</td><td>30.7</td></tr>
<tr><td colspan="2">-10</td><td>33.3</td></tr>
<tr><td colspan="2">0</td><td>33.7</td></tr>
<tr><td colspan="2">7</td><td>31.7</td></tr>
<tr><td colspan="2">10</td><td>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>Ringer Volume</td><td colspan="3">At least 55 dBspl under below conditions:
1. Ringer set as ringer.
2. Test distance set as 1 m</td></tr>
</table>

<table>
<tr><th>Item</th><th>Description</th><th colspan="3">Specification</th></tr>
<tr><td>21</td><td>Charge Current</td><td colspan="3">Fast Charge : Typ. 400 mA
Slow Charge : Typ. 80mA
Total Charging Time : < 3.5 hours</td></tr>
<tr><td rowspan="9">22</td><td rowspan="9">Antenna Display</td><td>Bar Number</td><td colspan="2">Power</td></tr>
<tr><td>7</td><td colspan="2">Over -92</td></tr>
<tr><td>7 -> 5</td><td colspan="2">-93 ± 2</td></tr>
<tr><td>5 -> 4</td><td colspan="2">-98 ± 2</td></tr>
<tr><td>4 -> 2</td><td colspan="2">-101 ± 2</td></tr>
<tr><td>2 -> 1</td><td colspan="2">-104 ± 2</td></tr>
<tr><td>1 -> 0</td><td colspan="2">-106 ± 2</td></tr>
<tr><td>0 -> OFF</td><td colspan="2">Under -106</td></tr>
<tr><td rowspan="5">23</td><td rowspan="5">Battery Indicator</td><td colspan="2">Battery Bar Status</td><td>Percent (%)</td></tr>
<tr><td colspan="2">Full (16 level)</td><td>≥ 94%</td></tr>
<tr><td colspan="2">Decrease gradually</td><td>93~10%</td></tr>
<tr><td colspan="2">Battery icon color : Green → Red</td><td>≤10%</td></tr>
<tr><td colspan="2">Empty(0 level)</td><td>≤ 2%</td></tr>
<tr><td rowspan="2">24</td><td rowspan="2">Low Voltage Warning
(Blinking Bar)</td><td colspan="3">10%, 5% 2times (standby) – Speaker</td></tr>
<tr><td colspan="3">≤ 10% at every 1min. (call) - Receiver</td></tr>
<tr><td>25</td><td>Forced shut down
Voltage</td><td colspan="3">0% (about 3.35V)</td></tr>
<tr><td>26</td><td>Sustain RTC
without battery</td><td colspan="3">Over 2 hours</td></tr>
<tr><td>27</td><td>Battery Type</td><td colspan="3">Lithium-Ion Battery
Standard Voltage = 3.7 V
Battery full charge voltage = 4.2 V
Capacity: 950mAh</td></tr>
<tr><td>28</td><td>Travel Charger</td><td colspan="3">Switching-mode charger
Input: 100 ~ 240V, 50/60 Hz
Output: 4.8V, 400mA</td></tr>
</table>

3. TECHNICAL BRIEF

3.1 Digital Main Processor

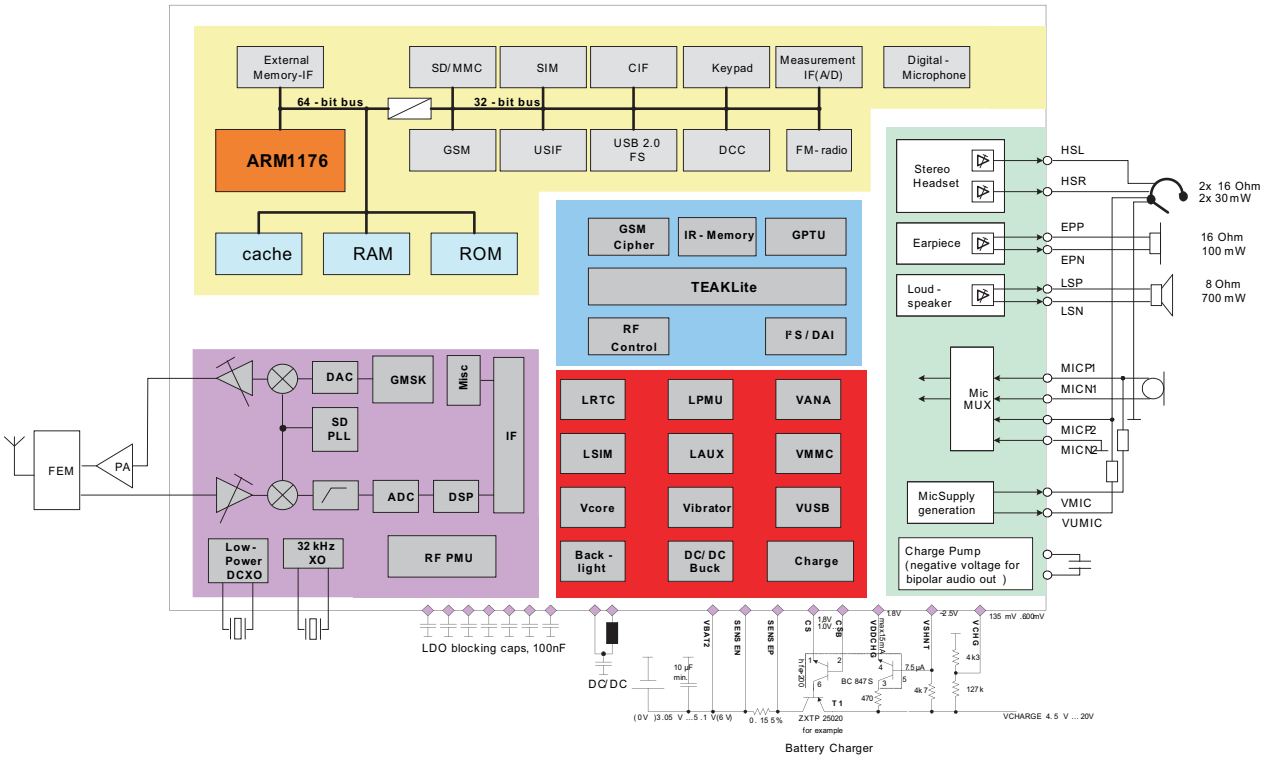


Figure. 3.1.1 X-Gold tm 215 Hardware Block Diagram

3.1.1 General

• Technology:
– SoC, Monolithic, 65 nm CMOS
• Package:
– eWLB, 8x9 x0.8 mm
– 0.5 mm pitch
– 240 balls / 6-layer PCB

3.1.2 RF Transceiver

• Dual-band direct conversion receiver
• Tri/Quad-band possible with external circuitry
• Fully integrated digital controlled X0
• Additional buffer for 2 external system clocks
• Fully digital RF-Synthesizer incl. ΣΔ-Transmitter

3.1.3 Baseband

• DSP:
– 178 MHz TeakLite™
• MCU:
– ARM1176® @ 208 MHz
• MCU RAM:
– 3.00Mbit
• Memory I/F:
– 1 Gbit NOR flash/OneNAND flash/SDR SDRAM
– 4 Gbit NAND flash/DDR SDRAM
• Modem:
– GPRS class 12, (RX/TX CS1-CS4)
– EGPRS class 12, (RX MCS1-MCS9, TX MCS1-MCS4)
• Cipher Units:
– A51/2/3
– GEA-1/2/3
• Security:
– OMTP TR0
– Secure Boot
– RSA(ROM)/SHA-1(HW accel.)
– OCDS disabling
– Certificate Management

• Speech Codec:
– FR / HR / EFR / NB-AMR
• Audio Codec (running on ARM1176):
– SP-MIDI
– SB-ADPCM
– MP3
– WB-AMR
– AAC/AAC+/eAAC+
• Others:
– DARP (SAIC)
– TTY
• Customization:
– E-Fuses

3.1.4 External Memory

• External Bus Unit
– 16-bit address bus
– 16-bit address/data muxed bus
– 1.8V support
• Flash / RAM
– NOR Type
– NAND Type (1 bit ECC supported)
– Parallel Flash / Cellular RAM(Page & Burst Mode)
    - 16-bit AD-multiplexed
    - 16-bit AAD-multiplexed
– iNAND Type e.g. oneNAND
– SDRAM
    - DDR SDRAM : up to 4 Gbit
    - SDR SDRAM : up to 1 Gbit
• Memory card
– SD/MMC card interface with 1 or 4 data lines

3.1.5 Connectivity

• 3xUSIF (configurable either as SPI or UART), I2C, I2S; Interfaces @ 1.8V
• Direct (U)SIM 1.8/3V
• USB2.0 up to 480 Mbit/s (High Speed) w/ external USB Phy over ULPI interface
• Stereo Headset (Amplifier integrated)
• 3 external analog measurement PIN's
• Bluetooth

3.1.6 Mixed Signal

• Improved audio performance
• Loudspeaker Audio Class D Amplifier, 700 mW@8 Ω mono for hands-free and ringing
• Stereo Headset 2x30 mW@16 Ω w/o coupling C
• Mono Earpiece 100 mW@16 Ω
• Digital microphone supported
• Differential microphone inputs

3.1.7 FM Radio

• Integrated FM radio
– FM Stereo RDS Receiver
– Sensitivity 2 µV EMF
– Support for US & EU bands
– Stereo recording

3.1.8 Power Management

• Direct-to-Battery Connection
– LDOs (incl. capless)
– DC/DC step-down converter
– DC/DC step-up for white LED supply
• Battery Type
– Li-Polymer
• Charging control
– Battery temperature
– Watchdog protection
– Start-up on flat battery
• External Charger
– Switch mode
• USB battery charging
– USB charging spec 1.0 compliant
• Backlight
– Up to 4 serial white LEDs (integrated LDO)

3.1.9 Main LCD Display

• Type
– 240*320, QVGA, 262k color (parallel)
• Interface
– Parallel 8/9bit MIPI-DBI Type B
– Serial MIPI-DBI Type C
– Interf. voltage at 1.8V or 2.8V
• gRacr - Display Controller (Hardware)
– 30 fps Display update without DMA (up to 60 fps) (full or partial)
– Video post processing Scaling, Rotation (90° steps), Mirroring
– Overlay with alpha blending
– Color conversion YUV -> RGB
– 2D vector graphics (Lines, filled rectangles, Bit block transfer (e.g. sprites, scrolling, antialiased bitmap fonts)

3.1.10 Camera

• 3 Mpx YUV parallel interface
• HW JPEG encoder (39 Mpx/sec)
• 39 MHz Pixel Rate
• 15 fps@ 3 Mpx full resolution

3.1.11 Video Capabilities

• Video Decoding MPEG-4/H.263
– QCIF@30 fps
– QVGA@15fps
• Video Encoding MPEG-4/H.263
– QCIF@15 fps

3.1.12 Audio Capabilities

• Polyphonic ring tones
– 64 voices MIDI, SP-MIDI
– FM synthesizer
• AMR-WB
• True ring tones (MP3)
• MP3, eAAC+
• G.722 SB-ADPCM encoding/decoding

3.2 Power Management

A mobile platform requires power supplies for different functions. These power supplies are generated in the integrated power management Unit (PMU). The PMU is designed to deliver the power for a typical standard phone.

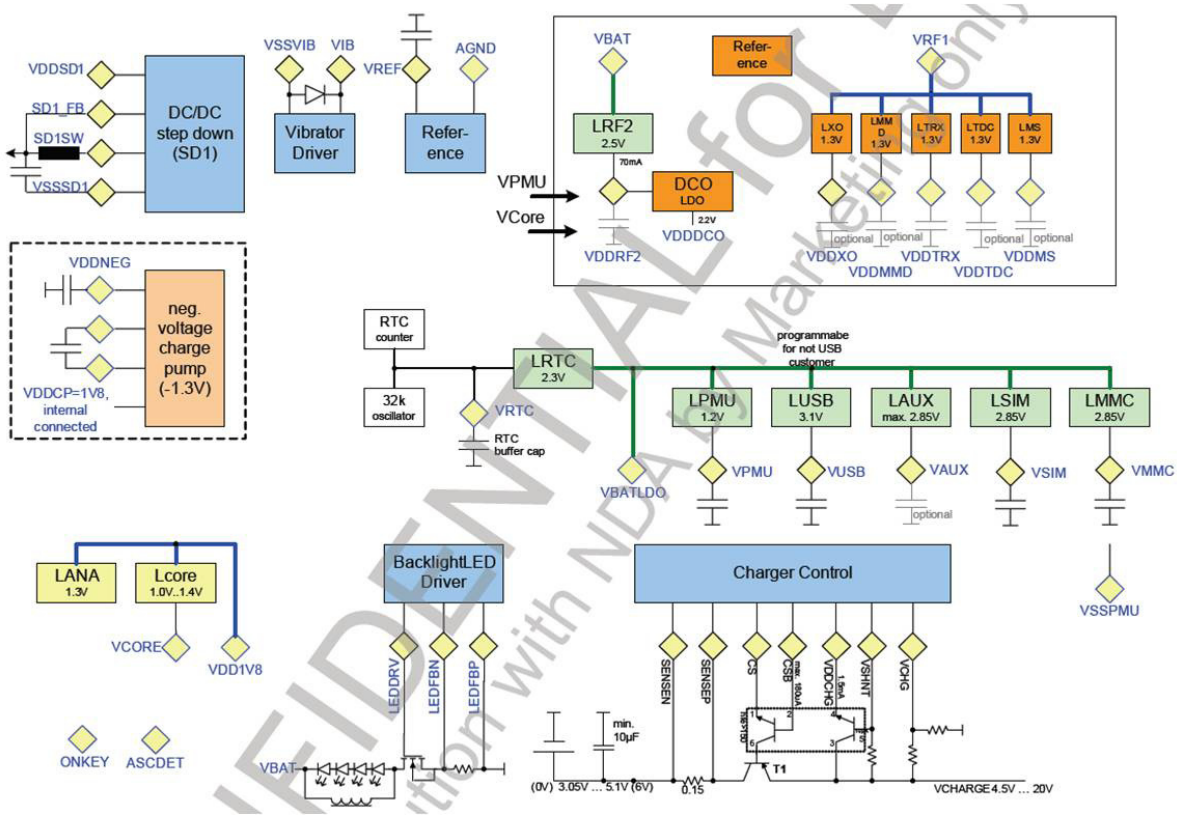


Figure. 3-2-1 Block Figure of the PMU Modules X-Gold tm 215

▪ **DC/DC Step Down Converter for 1.8V (SD1)**

The DC/DC converter generates a 1.8V supply rail. This voltage rail is used to supply main parts of the system, like the digital core of the chip (via LDO LCORE), some parts of the mixed signal macro, parts of the RF macro and the external memory if a 1.8V memory is used. The efficiency of the DC/DC converter is optimized for an average load current of 100mA. That is the load current estimated for the GSM talk mode.

▪ Linear voltage Regulators (low dropout) LDOs

The LDOs are used to generate the supply for the different supply domains not directly supplied out of the DC/DC converter.

The VSIM output current is high enough to drive USB SIM cards.

▪ LCORE

The LCORE LDO provides the VCORE supply used for most of the digital parts of the chip

▪ LPMU

The LPMU provides VPMU sued for the PMU supply, e.g. for the startup state machine and analog parts like ADC, sense amplifier etc.

▪ LUSB

The LUSB LDO generates the supply for the USB transceiver (output driver and input). If no USB interface is required, LUSB can be used as general purpose LDO.

▪ LAUX

The LAUX generates VAUX. It is a general purpose LDO and can be used for different functions depending on the phone application, e.g. for the display or Camera.

▪ LMMC

The LMMC generates VMMC. It is a general purpose LDO and can be used e,g. for memory cards

▪ LSIM

The LSIM LDO generates the VSIM supply for the SIM card and interface. It is designed to supply Standard SIM cards.

▪ Other LDOs

The RF module has implemented several LDO's for different RF Power domain.

The mixed signal module has some LDO's for the audio driver and microphone supply.

Supply Domain LDO Name	Voltage	Max. Current	Output Cap	Input Domain	Comment
VBAT	0 ... 6.0 V				Operating range is 3.05 V ... 5.5 V, system emergency switch off voltage is about 2.8 V
VDD1V8	1.8 V	450 mA	22 µF	VBAT	This voltage is generated by the DC/DC converter with 3.3 µH inductor, The voltage is used for: Memory supply, and via LDO's for digital core supply, mixed signal supply and RF supply.
LCORE	1.2 V	300 mA	2x100 nF	VDD1V8	
LANA	1.3 V	10 mA	No	VDD1V8	No ball
LRTC	2.3 V	2 mA	>=100 nF	VBAT	This supply is only used for the HPBG, the 32.768 kHz oscillator and the real-time clock counter required during the sleep- and low-power mode.
LPMU	1.2 V	15 mA	100 nF	VBAT	Supply for the digital part of the PMU including digital control of DC/DC converter. This voltage is also used for the N-DEMOS driver of DC/DC converter and the class-D amplifier and the core PLL.
LUSB	3.1 V	40 mA	100 nF	VBAT	Used for the USB driver supply or as general purpose LDO with programmable output voltages (2.5 V, 2.85 V, 3.1 V)
LAUX	1.5 V ... 2.85 V	150 mA	470 nF	VBAT	General purpose LDO for e.g. Display, Bluetooth, Camera etc. Programmable output voltages are (1.5 V, 1.8 V, 2.5 V, 2.85 V)
LSIM	1.8 V / 2.85 V	30 mA	>=100 nF	VBAT	LDO dedicated to the SIM-Card supply. It is chip internal connected to the SIM interface driver.
LMMC	1.5 V ... 2.85 V	150 mA	>=470 nF	VBAT	General purpose LDO, targeted for MMC/SD card supply.
VDDNEG	-1.3 V	100 mA	100 nF	VDD1V8	Negative voltage for the bipolar headset audio driver. Generated by a charge pump.

Table. 3-2-1 Power supply Domains (without RF)

3.2.1 Power on and startup

▪ Analog startup Circuit

Because the POR circuit and the LPBG are directly connected to the battery, it is not possible to switch them off. If the battery voltage exceed the power on reset threshold (2.5V), the power on reset is released, the LPMU regulator and the LRTC voltage regulator are switched on. The LPMU regulator starts in its ultra-low power mode

The LPMU regulator generates a control signal (lpmu_OK) that enables the 50KHZ PMU oscillator. The output clock of the oscillator is checked with a fully coded counter. A counter overflow releases the reset (vpmu_rst_n) signal for the small PMU state-machine.

▪ Small first digital State-Machine

The small PMU state-machine is always connected to VPMU After starting from reset the small startup state machine enters the SYSTEM OFF state and only continuous the startup procedure if a switch on event like first connect, on-key, wake up or charge detect occurs.

▪ PMU-main State-Machine

The main PMU state-machine is always connected to VPMU also. The power up sequence driven by the PMU state-machine can be seen in Figure18. After enabling the reference (HPGB) and waiting for the settling time, the battery voltage is measured and compared with the power on threshold. If the battery voltage is high enough, the SD1 DC/DC converter and the LCORE LDO are started. A timer ensures that the supply voltage will be stable before the DCXO is enabled. The DCXO settling time is ensured using a fixed timer. After an overflow of this timer, the reset is released for the rest of the system. The PMU state machine remains in this System-ON state until the system is switched into the OFF state. For example the system sleep mode is completely configured by software(for example switching off the LDO's, switching of the DCXO etc.) and controlled by the VCXO_enable signal. The reason for the startup is stored in the ResetSourceRead register.

▪ Battery Measurement

The ADC and the oscillator for the ADC needs the VDD_ADC supply voltage from the LADC LDO. LADC uses either the charger voltage VDD_CHARGE or VDDRTC as input voltage. The input voltage is selected automatically by a bulk switch circuit. LADC, the ADC and the oscillator are enabled on request for every battery measurement if the charger unit is not running. This is handled by an ADC control block in one of the state-machines. If the charger unit is running the ADC is controlled by the charger state-machine

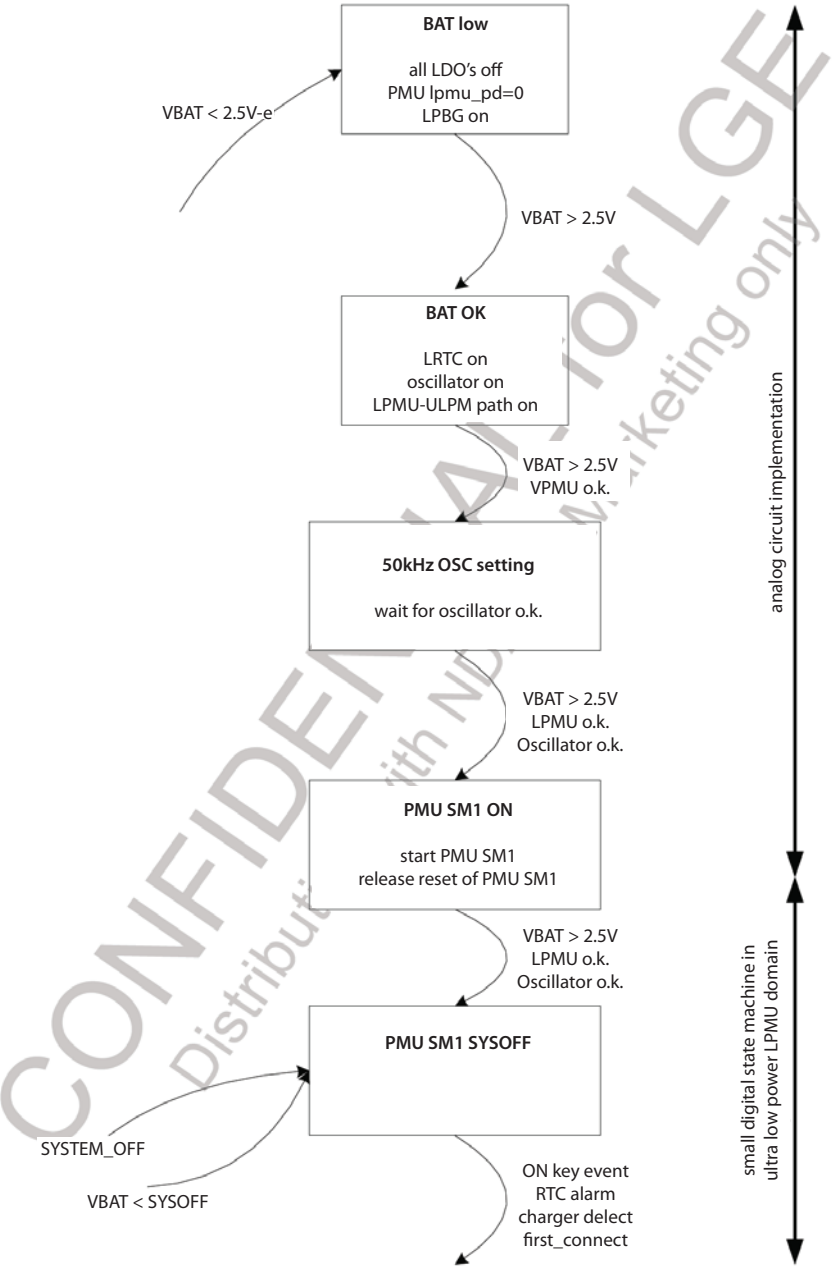


Figure.3.2.2 First Part of the State Machine, Running in Dierent Power Domains than the Second Part

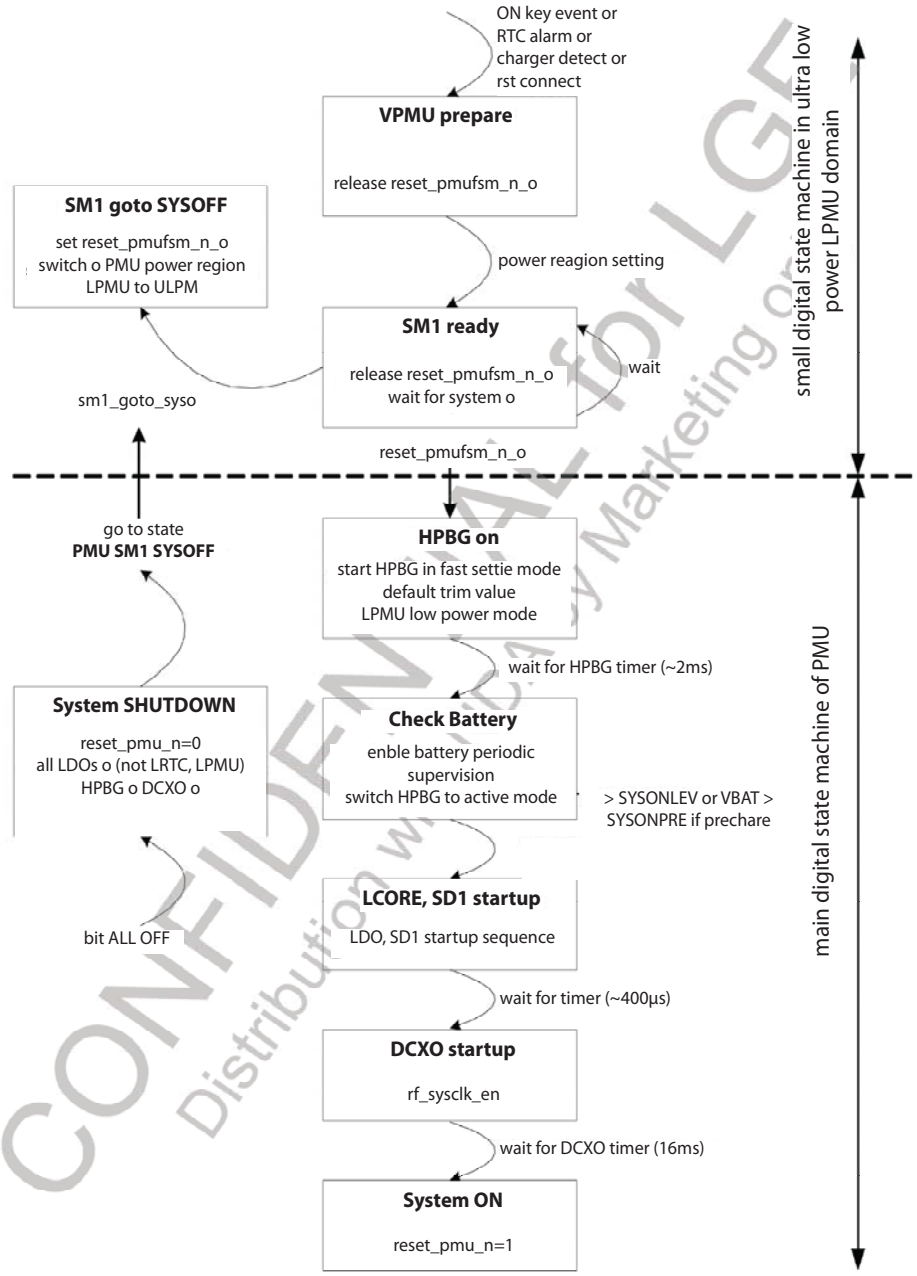


Figure 3.2.2 Second (Main) Part of the Startup State Machine in the VPMU Domain

3.2.2 Switching on due to first connect

If the battery voltage is connected the first time, that means the system enters the first time the SYSOFF state, this is stored in a first connect flag. If the first connect flag is set, the system will start immediately and not wait for any other system on event in the SYSOFF state.

3.2.3 Switching on due to on-Key event

The on key is connected to the ONKEY pad. The ESD protection and the input structure of this pad are connected to VRTC. If the ONKEY pad is forced to VRTC by an external key or similar circuit, the system starts. The ONKEY is sampled with the PMU clock. It has to be sampled four times high before a valid on event is generated. The status of the ON key can be read in the PMU registers, so it can be used as a functional key during phone operation also

3.2.4 Switching on due to RTC alarm

The real time clock can generate a wakeup signal called RTC alarm. This signal is sampled from the state-machine and after successfully detecting a high, the system is switched on.

3.2.5 Switching on due to charging

When a battery with a voltage below the SSONLEV level is inserted, the state machine will not start the system. As long as the battery voltage stays lover than SYSONLEV the system will stay off. The only possibility to start up the system is due to an external charger.

If an external charger is connected and detected and the battery is charged above the SYSONPRE voltage level the system will start up.

The PMU main state machine waits in the Check battery state until the battery voltage condition is fulfilled. The charger state machine provides the necessary pre-charge indication signal. This pre-charge signal is denounced in a small counter to have a stable signal. This is important, especially in half/full-wave charging where the charger detection is switching between charger detected/not detected according the AC supply frequency. reasons

For details on pre-charging see the charger chapter. The charger is controlled by an independent state machine. The pre-charge signal is used to trigger the pre-charge signal is used to trigger the pre-charge functionality. The charger state machine fully control the pre-charge, the PMU-state machine now changes to state HPBG on state and the system starts. This state change is indicated to the charger state-machine to enable the charger watchdog for safety

3.2.6 Power Supply Start-up sequence

In order to avoid an excessive drop on the battery voltage caused by in-rush current during system power-on, possibly leading to system instability and “hick-ups” a staggered turn-on approach for the regulators is implemented. The regulators are turned on in a well defined sequence, thus spreading the in-rush current transients over time.

The IO’s of X-GOLD TM 215 are isolated in OFF mode (core supply is off). The isolation signal is controlled by the PMU state machine. This ensures that the PADs are in a well defined state during core supply settling. This allows to power up the LCORE core regulator and wait for the core to reach reset state before powering up the I/O supply regulators.

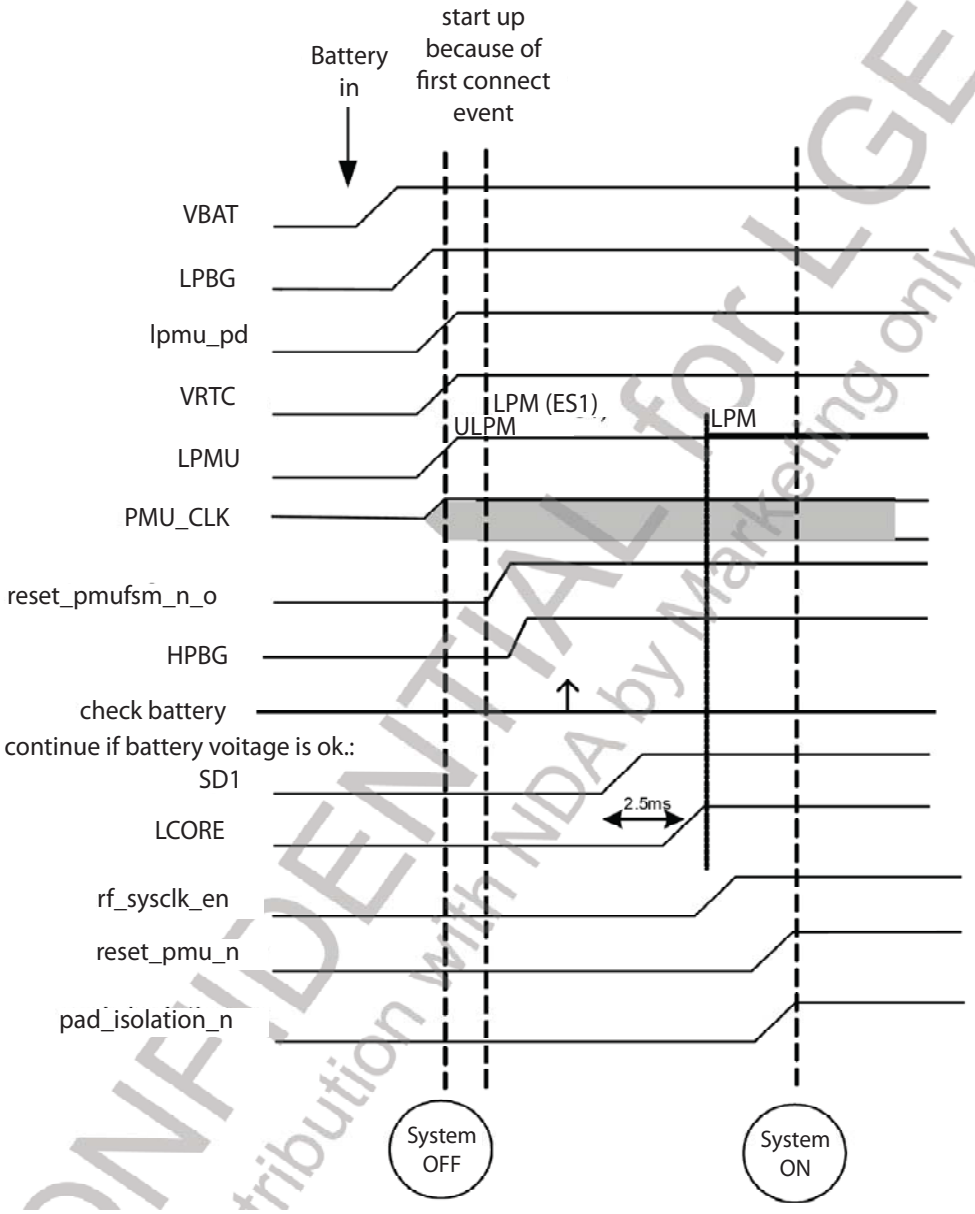


Figure 3.2.3 Start Up Sequence (triggered by First Connect Event)

3.2.7 External Reset Handling

The chip reset can be controlled by an external RESET_N ball. If this ball is pulled low, the chip will be reset. All PMU registers are reset during the external reset including LSIM control bits. The PMU statemachines are also not reset from the external reset. An SW or watchdog reset will not reset the PMU registers. A SW and Watchdog reset is seen on the reset_n pad to allow the reset of external devices. Basically there are three reset sources, first the reset signal controlled by the PMU (reset_pmu_n_o), second the reset signal controlled by the SCU (resetout_o) and third the external reset (RESET_N). The SCU reset is triggered by SW (for example due to a SW reset or watchdog reset). The PMU reset is controlled by the PMU state machine. The output of the reset handling block is the reset_postscu_n_o signal. This signal controls for example the µC subsystem and releases reset for the controller. During normal start up, the PMU releases the reset_pmu_n_o signal after entering the SYSTEM ON state. At this time the resetout_o signal is high, the RESET_N pad is not pulled low and therefore the reset_postscu_n_o signal follows the reset_pmu_n_o signal. That means the µC reset will be released and the µC starts operation. If the SW triggers an external reset via the SCU, signal resetout_o will be forced to low for a certain time and RESET_N will be forced to low by the open drain driver. At the same time the feedback to the SCU will be masked to not reset the baseband. The RESET_N pad is in the VDDRTC domain but the internal pull up is connected to the VDD_VDIG1 (1.8V) domain. That allows the pad to be used as reset for external devices running in the VDD1V8 domain. The RESET_N pad can also be used to monitor the chip internal reset condition during startup.

The open drain driver is a weak driver, that means it can be forced to high during debug from external pushing some current into the pad. In testmode signal reset_pmu_n_o is high, that means the chip reset is fully controlled from external

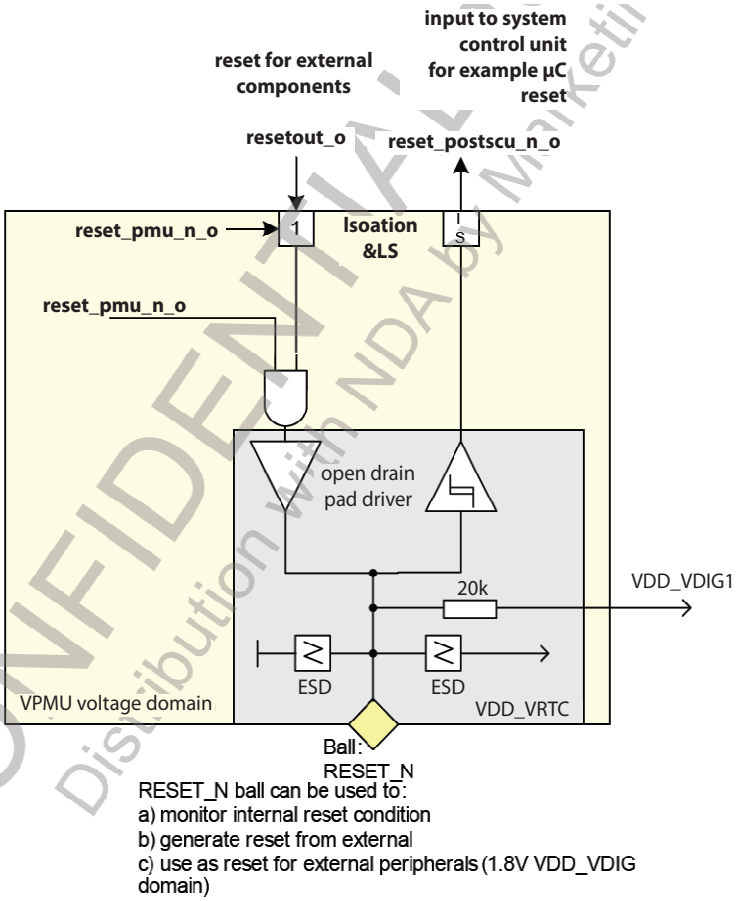


Figure 3.2.4 PMU, CGU and External Reset

3.2.8 Sysclock Switching

The PMU controls the rf_sysclk_en signal of the DCXO in the RF macro. During startup the PMU enables the DCXO. After the system is running the DCXO is controlled by the SCU of the baseband by using the vcxo_enable signal. This is handled by a dedicated logic in the PMU, see **Figure 21**. As long as rf_sysclk_en_pmu, the output of the PMU state-machine is high, vcxo_enable controls the rf_sysclk_en signal to the RF. If rf_sysclk_en_pmu is low, the DXCO is switched off, independent from vcxo_enable.

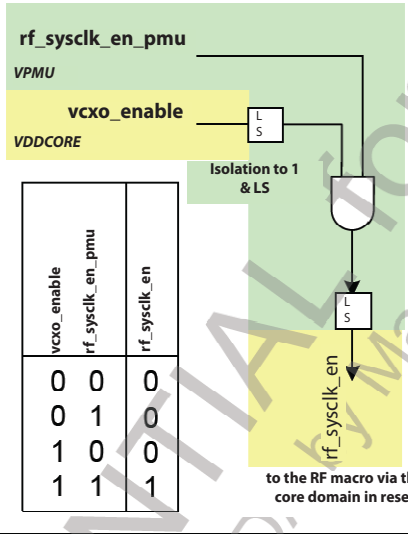


Figure 3.4.2 How sysclock Enable is Routed in the PMU

3.2.9 Undervoltage Shutdown

In active mode the PMU periodically measures the battery voltage using the ADC from the charger unit. If the battery is measured to be below the programmable shut-down level (called SYSOFF), the system changes to OFF mode. This is done via the SHUTDOWN state of the PMU state machine. (see chapter switch OFF)

3.2.10 Software Reset

A software reset does not affect any PMU register. The PMU register are reset with the reset_pmufsm_n_o signal. That means all PMU register are reset in OFF state. For details about the SW reset see chapter **External Reset Handling**

3.2.11 PMU Clock

During the first startup (for example plugging in a battery) a PMU internal oscillator is used for generation of the PMU clock (pmu_clock). The frequency is slightly above 32 kHz (typ. 50 kHz) to be out of the audio band also for worst case devices. After first startup the software shall enable the 32 kHz crystal oscillator. It is not possible to use the 32 kHz oscillator during first startup, because the settling time of the oscillator can be quite long. After the 32 kHz oscillator is running and settled the software shall switch the PMU clock to the 32 kHz clock and disable the internal PMU oscillator for power saving reasons. The 32 kHz oscillator shall never be disabled after the PMU clock has been switched. The ADC in the charger unit has it's own oscillator generating a frequency of about 10 MHz. This oscillator is running during charging and during battery measurements triggered by the PMU. It is off otherwise.

3.2.12 System Sleep Mode

The sleep mode is controlled by using the VCXO_enable signal. This signal is used to switch the LDO's and the DC/DC converter SD1 in a programmable way into its low power mode (PFM). In addition DC/DC converter SD1 can be configured to change the output voltage to a lower value for additional power saving. VCXO_enable is also used to deactivate the HPBG and setting LDO LPMU in the ultra-low-power mode. In addition the DCXO is switched off by the VCXO_enable signal. The VCXO_enable signal is also used to switch some LDO's (software configured) to sleep and/or off mode or to change the output voltages of said LDO's. The state of the main PMU state machine is not changed due to VCXO_enable.

3.2.13 DC/DC Pre-Load Register Handling

The DC/DC converter works in different modes. If the mode is switched from PFM to PWM the pulse-width of the DC/DC converter depends on the current battery voltage (and on the output voltage). The PMU state-machine knows the battery voltage because of the battery supervision function. Depending on this value it selects a startup pulse-width for the DC/DC converter out of a register table. (4-values)

3.2.14 Power Down Sequence

Setting bit OFF in the GeneralControl register switches the system into OFF mode. After the turn off event, the state-machine switches to the SHUTDOWN state. The reset_pmu_n_o signal changes to low, the I/O pads are isolated using the padisolation_n signal, the LCORE LDO and the SD1 DC/DC converter are switched off, the LPMU LDO is switched to ultra-low power mode, the DCXO is turned off and the bandgap buffer is disabled. Before switching OFF the software shall have enabled the 32 kHz oscillator and has switched the PMU clock to the 32 kHz clock to archive the target OFF current

3.3 FEM with integrated Power Amplifier Module (SKY77550-21, U101)

3.3.1 Internal Block Diagram

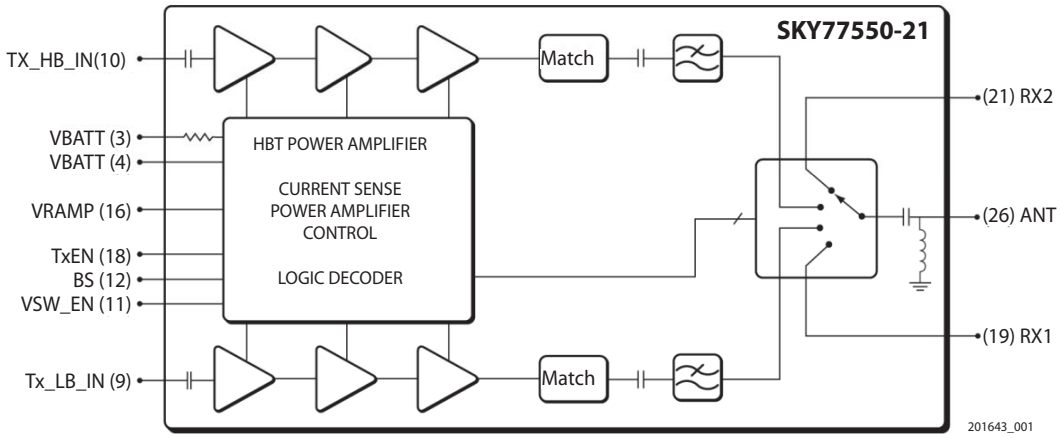


Figure. 3-3-1 SKY77550-21 FUNCTIONAL BLOCK DIAGRAM

3.3.2 General Description

SKY77550-21 is a transmit and receive Front-End Module (FEM) with Integrated Power Amplifier Control (iPAC™) designed in a low profile, compact form factor for dual-band cellular handsets comprising GSM850 / GSM900 and DCS1800 / PCS1900 operation. The SKY77550-21 offers a complete Transmit VCO-to-Antenna and Antenna-to-Receive SAW filter solution. The FEM also supports Class 12 General Packet Radio Service (GPRS) multi-slot operation.

The module consists of a GSM850 / GSM900 PA block and a DCS1800 / PCS1900 PA block, impedance-matching circuitry for 50 ohm input and output impedances, Tx harmonics filtering, high linearity / low insertion loss RF switch, and a Power Amplifier Control (PAC) block with internal current sense resistor. The two Heterojunction Bipolar Transistor (HBT) PA blocks, a BiFET PAC and switch control circuit are fabricated onto a single Gallium Arsenide (GaAs) die. One PA block supports the GSM850 / GSM900 bands and the other PA block supports the DCS1800 / PCS1900 bands. Both PA blocks share common power supply pads to distribute current. The output of each PA block and the outputs to the two receive pads are connected to the antenna pad through an RF switch. The GaAs die, Switch die and passive components are mounted on a multi-layer laminate substrate. The assembly is encapsulated with plastic overmold.

Mode	Input Control Bits		
	VSW_EN	TxEN	BS
STANDBY	0	0	0
Rx1[1]	1	0	0
Rx2[1]	1	0	1
Tx_LB	1	1	0
Tx_HB	1	1	1

Figure 3.3.2 Band SW Logic Table

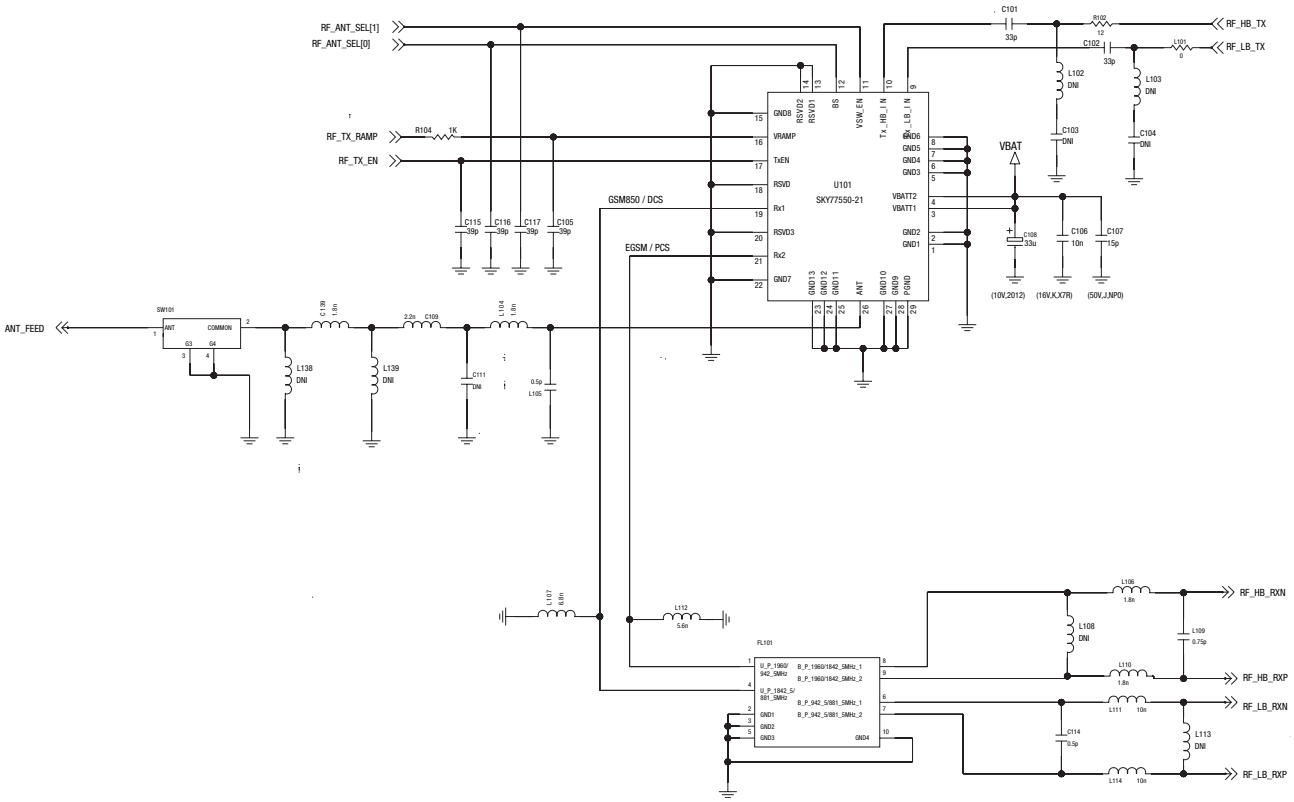


Figure 3.3.3 FEM CIRCUIT DIAGRAM

3.4 Crystal(26 MHz, X201)

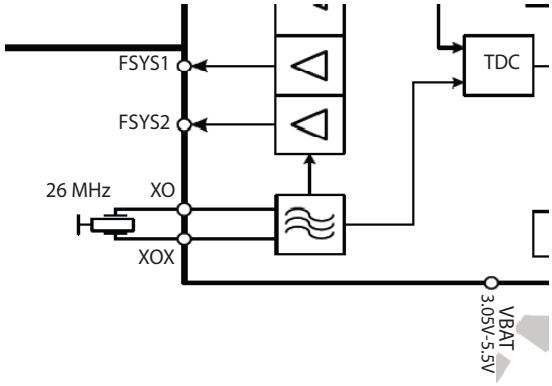


Figure. 3.4.1 Crystal Oscillator External Connection

The X-GOLDTM215 RF-Subsystem contains a fully integrated 26 MHz digitally controlled crystal oscillator, designed for 8 pF crystals. The only external part of the oscillator is the crystal itself. Overall pulling range of the DCXO is approximately ±55 ppm, controllable by a 13-bit tuning word.

This frequency serves as comparison frequency within the RF-PLL and as clock frequency for the digital circuitry.
The 26 MHz reference clock can also be applied to external components like Bluetooth or GPS, via the two buffered output signals FSYS1 and FSYS2

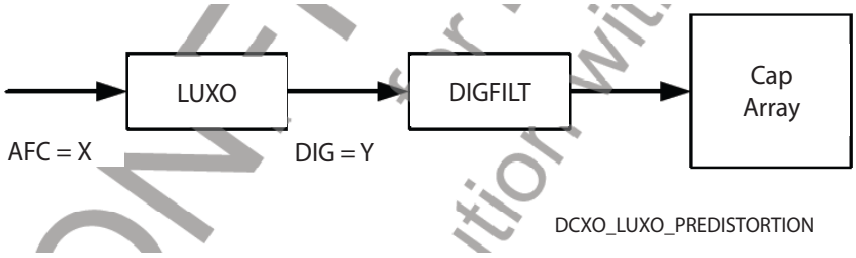


Figure. 3.4.2 Digital PREDISTORTION with LUXO

The DCXO tuning characteristic should be a first order linear function of the programming word AFC. The variable capacitance array is a first order linear function of the digital word DIG, which leads to a nonlinear curve ppm vs. DIG (and also a nonlinear ppm vs. AFC for DIG=AFC). In order to linearize the ppm vs. AFC curve the implementation of a predistortion is necessary.
To get the wanted linear ppm vs. AFC tuning curve some digital predistortion of the AFC word is required. This predistortion is performed by the linearization unit for crystal oscillator (LUXO). The LUXO calculates the corresponding DIG value according to the given AFC value.

3.5 RF Subsystem of PMB8815 (U201)

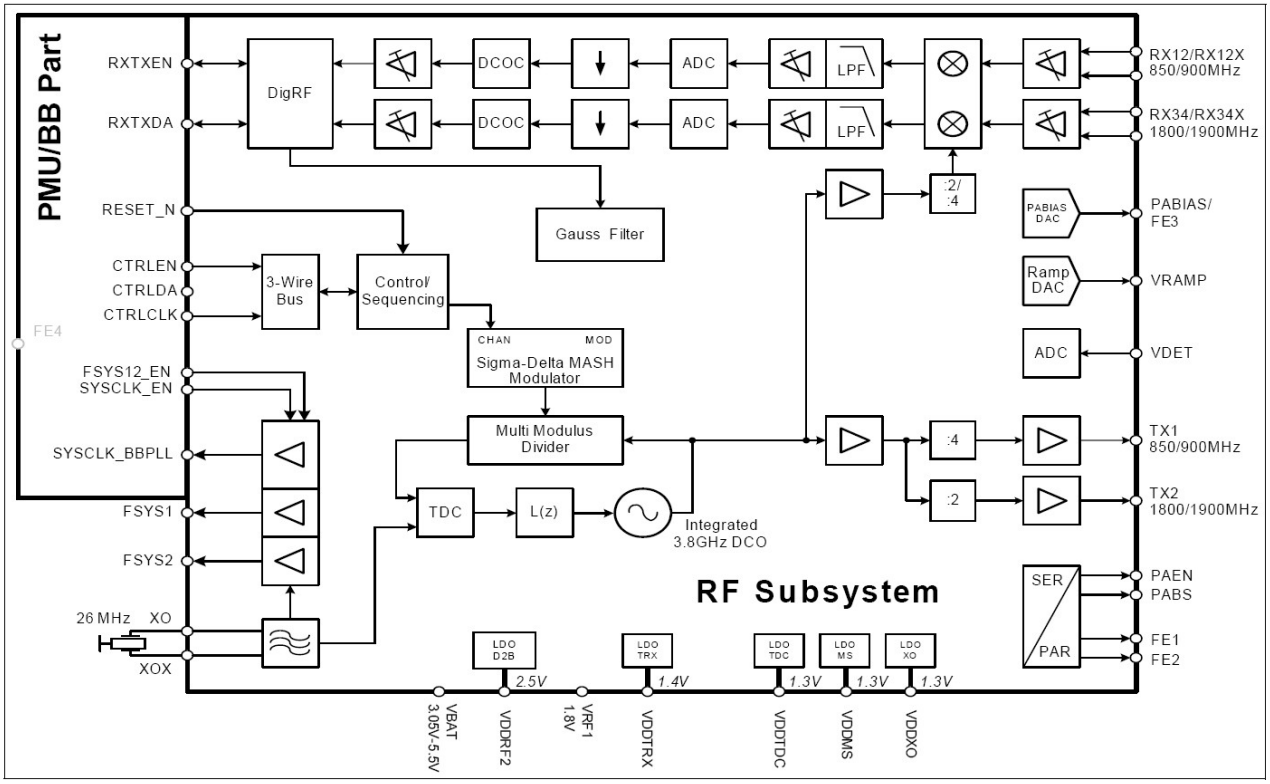


Figure. 3-5-1 Block DIAGRAM of RF Subsystem

3.5.1 GENERAL DESCRIPTION

The PMB8815 RF subsystem is designed for dual-band GSM voice and data applications (GPRS class 12). The system can be configured to support one low band, GSM850 or EGSM900, and one high band, DCS1800 or PCS1900. A block diagram of the RF subsystem is given in Figure 3-4-1.

3.5.2 FUNCTIONAL DESCRIPTION

3.5.2.1 Receiver

The X-GOLD™215 dual-band receiver is based on a Direct Conversion Receiver (DCR) architecture. Input impedance of the LNAs is optimized to achieve a matching without (external) high quality inductors. By use of frequency dividers (by 2/4) the LO frequency is derived from the RF frequency synthesizer.
The receive path is fully differential to suppress the on-chip interferences and reduce DC-offsets. The analog chain of the receiver contains two LNAs (low/high band), a quadrature mixer followed by an analog baseband filter and 14-bit continuous-time delta-sigma analog-to-digital converter. The filtered and digitized signal is fed into the digital signal processing chain, which provides decimation, DC offset removal and programmable gain control.

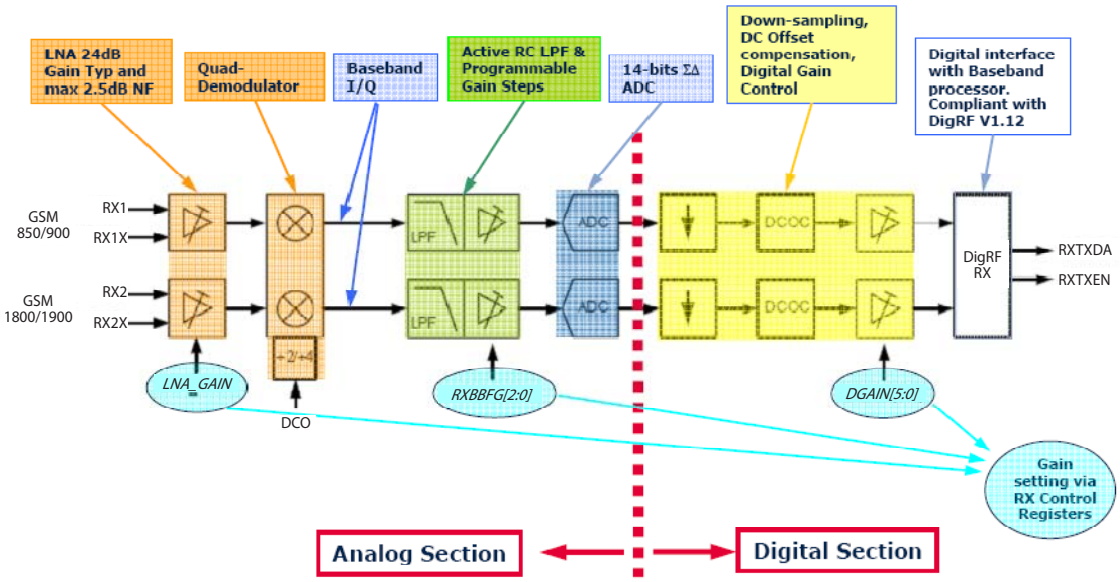


Figure. 3.5.2 RECEIVER CHAIN BLOCK DIAGRAM

3.5.2.2 Transmitter

The GMSK transmitter supports power class 4 for GSM850 or GSM900 as well as power class 1 for DCS1800 or PCS1900. The digital transmitter architecture is based on a fractional-N sigma-delta synthesizer for constant envelope GMSK modulation. This configuration allows a very low power design without any external components.

Up- and down-ramping is performed via the ramping DAC connected to VRAMP.

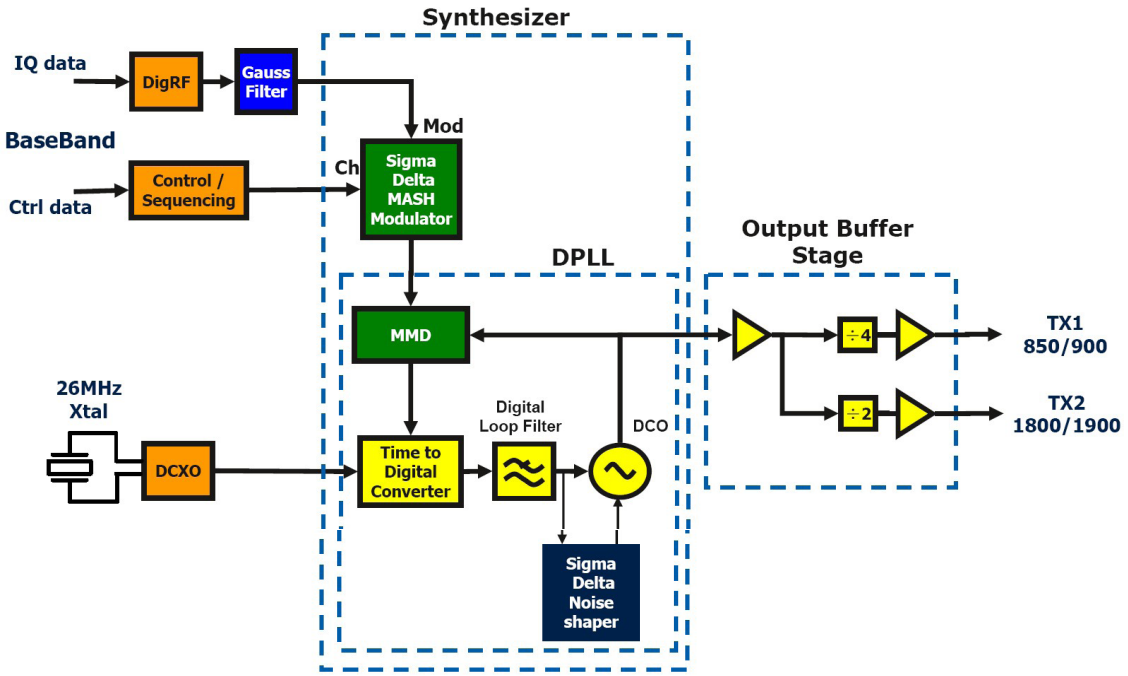


Figure. 3.5.3 TRANSMITTER CHAIN BLOCK DIAGRAM

RF synthesizer

The RF subsystem contains a fractional-N sigma-delta synthesizer for the frequency synthesis. Respective to the chosen band of operation the phase locked loop (PLL) operates at twice or forth of the target signal frequency. In receive operation mode the divided output signal of the digital controlled oscillator output (DCO) serves as local oscillator signal for the balanced mixer. For transmit operation the fractional-N sigma-delta synthesizer is used as modulation loop to process the phase/frequency signal. The 26 MHz reference signal of the phase detector incorporated in the PLL is provided by the reference oscillator.

3.5.2.3 Front-end/PA Control Interface

Two outputs (FE1, FE2) for direct control of antenna switch modules enable to select RX- and TX-mode as well as low- and high-band operation.

An extra band select signal PABS for the power amplifier is used, to support discrete PA and switching modules. Time accurate power dissipation of the PA is achieved by the control signal PAEN.

A minor set of power amplifiers require a bias voltage to enhance power efficiency. Support of this power amplifiers is achieved by the implemented bias DAC.

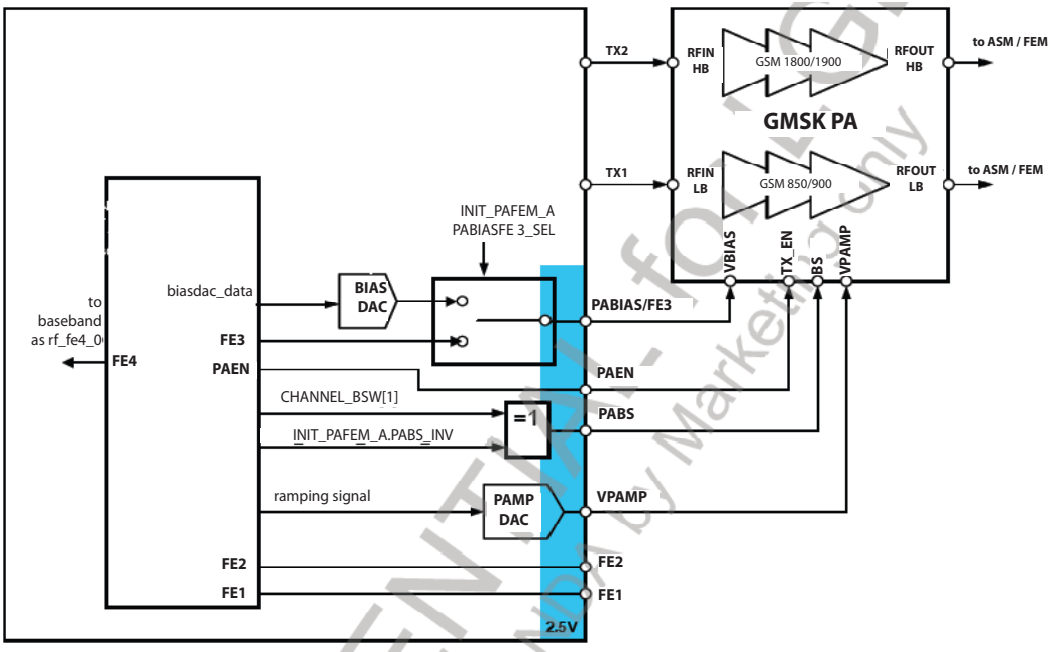


Figure. 3.5.4 PA AND FEM CONTROL BLOCK DIAGRAM

3.5.2.4 Power Supply

To increase power efficiency most parts of the RF subsystem are supplied by the DCDC converter situated in the PMU subsystem. Conversion of the 1.8 V output voltage of the DCDC to the 1.3 V/1,4 V circuit supply voltages is achieved by several Low-DropOut regulators (LDO).
One embedded direct-to-battery LDO provides the 2.5 V supply voltage for the remaining circuits.

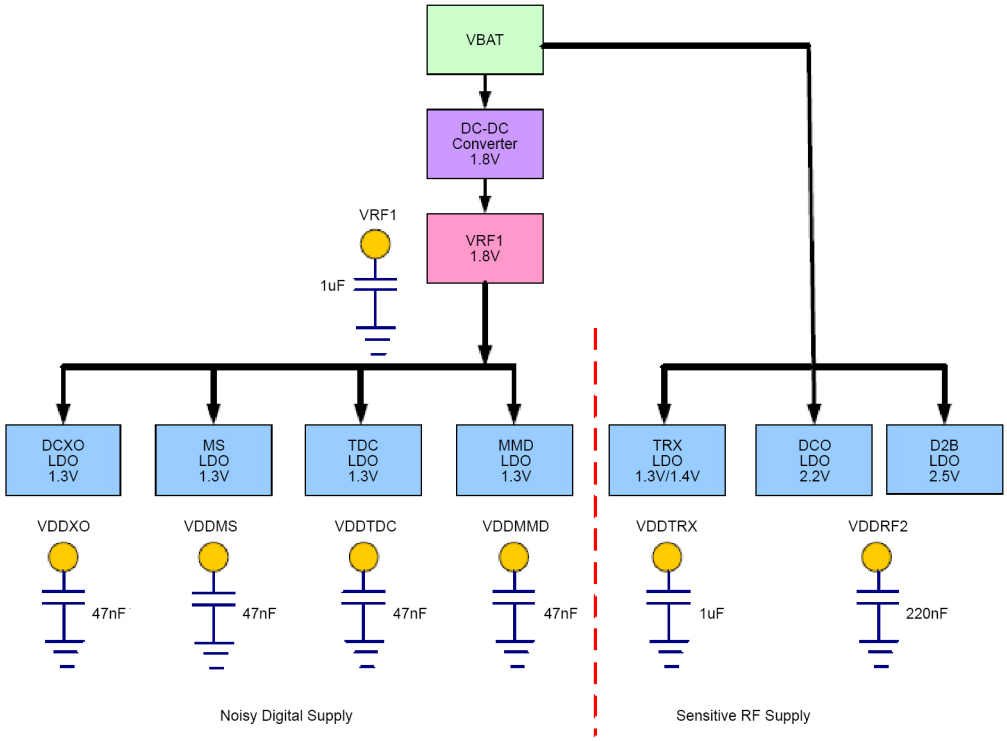


Figure. 3.5.5 POWER SUPPLY BLOCK DIAGRAM

3.6 MEMORY(H9DA2GH1GHMMMR, U301)

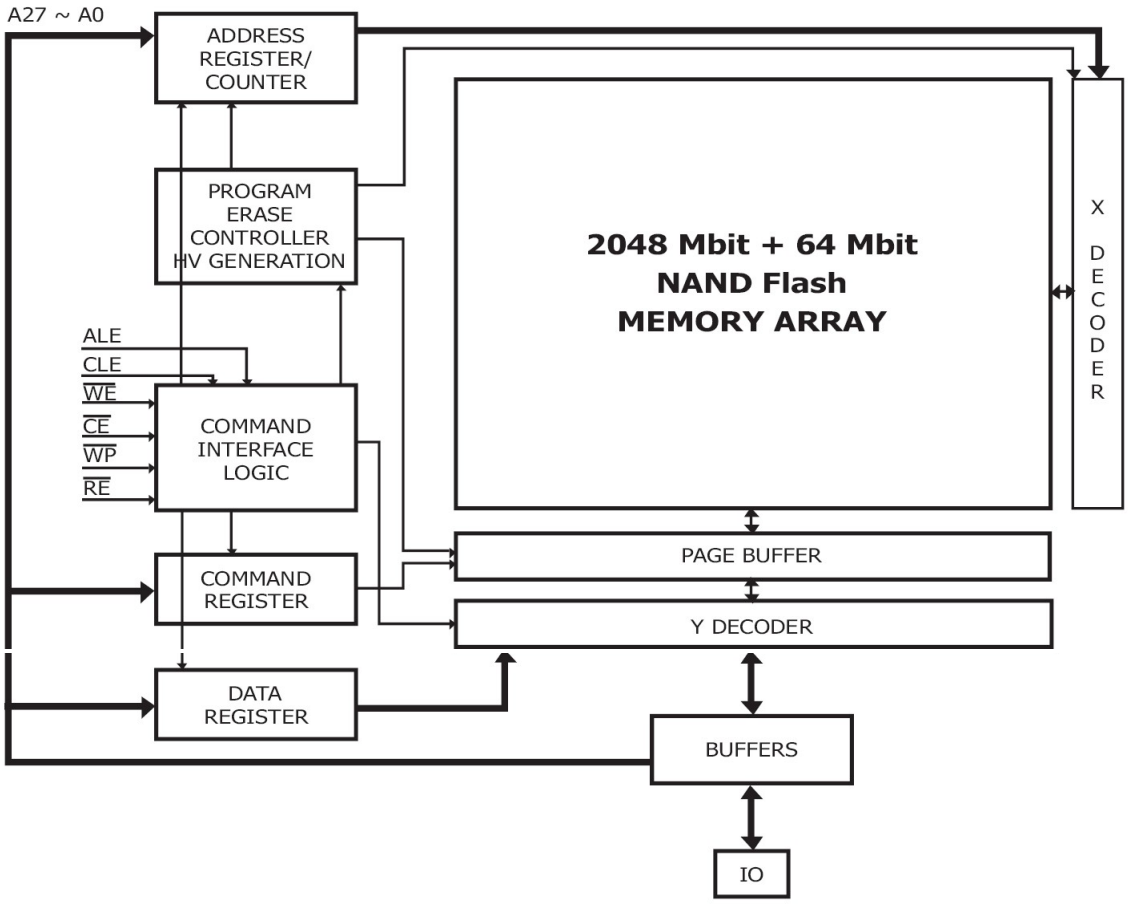


Figure. 3.6.1 MEMORY BLOCK DIAGRAM

Hynix NAND Flash is a 128Mx16bit with spare 4Mx16 bit capacity.

The device is offered in 1.8 Vcc Power Supply, and with x16 I/O interface.

Its NAND cell provides the most cost-effective solution for the solid state mass storage market.

The memory is divided into blocks that can be erased independently so it is possible to preserve valid data while old data is erased.

The device contains 2048 blocks, composed by 64 pages.

Memory array is split into 2 planes, each of them consisting of 1024 blocks.

Like all other 2KB - page NAND Flash devices, a program operation allows to write the 2112-byte page in typical 250us and an erase operation can be performed in typical 3.5ms on a 128K-byte block.

In addition to this, thanks to multi-plane architecture, it is possible to program 2 pages at a time (one per each plane) or to erase 2 blocks at a time (again, one per each plane). As a consequence, multi-plane architecture allows program time to be reduced by 40% and erase time to be reduction by 50%. In case of multi-plane operation, there is small degradation at 1.8V application in terms of program/erase time..

[NAND Flash]

● MULTIPLANE ARCHITECTURE

● SUPPLY VOLTAGE

- Vcc = 1.7 - 1.95 V

● MEMORY CELL ARRAY

- (1K + 32) Words x 64 pages x 2048 blocks

● PAGE SIZE

- (1K+ 32 spare) Words

● BLOCK SIZE

- (64K + 2K spare) Words

● PAGE READ / PROGRAM

- Random access : 25us (max.)
- Sequential access : 45ns (min.)
- Page program time : 250us (typ.)
- Multi-page program time (2 pages): 250us (Typ.)

● BLOCK ERASE / MULTIPLE BLOCK ERASE

- Block erase time: 3.5 ms (Typ)
- Multi-block erase time (2 blocks): 3.5ms (Typ.)

● SEQURITY

- OTP area
- Sreial number (unique ID)
- Hardware program/erase disabled during
- power transition

● ADDITIONAL FEATURE

- Multiplane Architecture:

  Array is split into two independent planes.

  Parallel operations on both planes are available, having program and erase time.
- Single and multiplane copy back program with auto matic EDC (error detection code)
- Single and multiplane page re-program
- Single and multiplane cache program
- Cache read
- Multiplane block erase

● RELIABILITY

- 100,000 Program / Erase cycles (with 1bit /528Byte ECC)
- 10 Year Data retention

● ONFI 1.0 COMFLIANT COMMAND SET ELECTRICAL SIGNATURE

- Munufacture ID: ADh
- Device ID

[DDR SDRAM]

● Double Data Rate architecture

- two data transfer per clock cycle

● x16 bus width

● Supply Voltage

- VDD / VDDQ = 1.7 - 1.95 V

● Memory Cell Array

- 16Mb x 4Bank x 16 I/O

● Bidirectional data strobe (DQS)

● Input data mask signal (DQM)

●Input Clock

- Differential Clock Inputs (CK, /CK)

● MRS, EMRS

- JEDEC Standard guaranteed

● CAS Latency

- Programmable CAS latency 2 or 3 supported

● Burst Length

- Programmable burst length 2 / 4 / 8 with both sequential and interleave mode

3.7 BT module

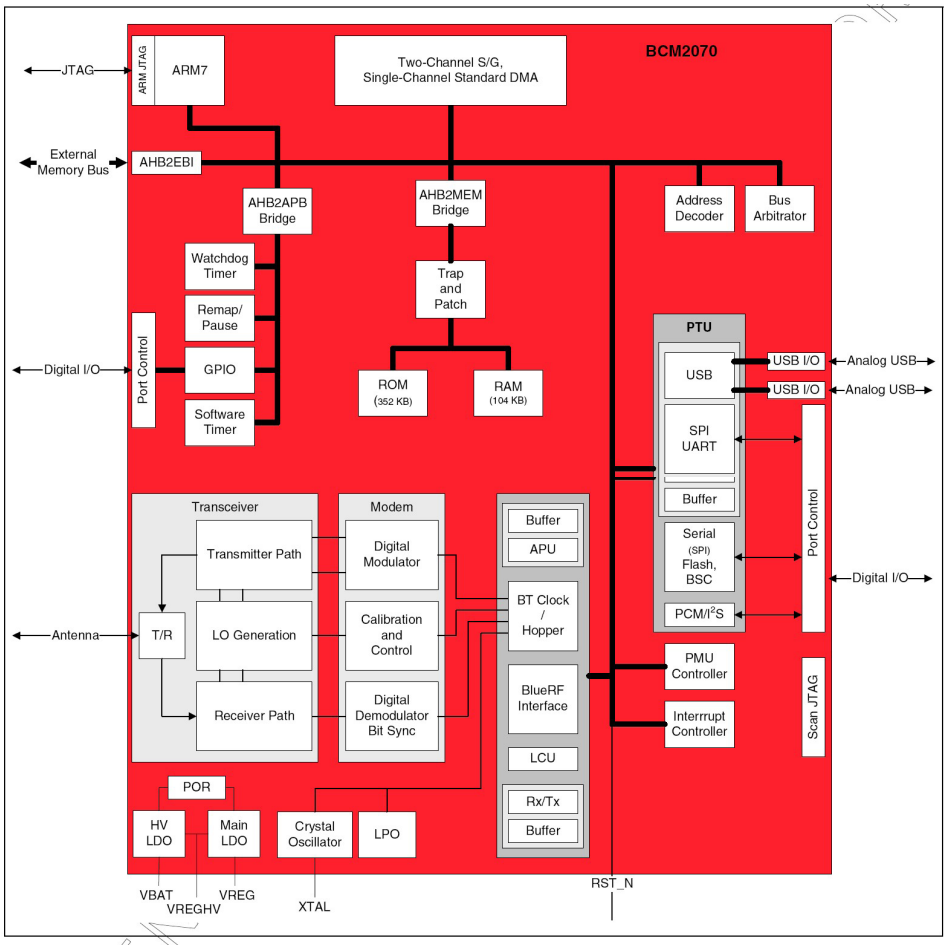


Figure 3_7_1. BT BLOCK DIAGRAM

This module has an integrated radio transceiver that has been optimized for use in 2.4GHz Bluetooth Wireless systems. It has been designed to provide low-power, robust communications for applications Operating in the globally available 2.4GHz unlicensed ISM band. It is fully compliant with the Bluetooth Radio Specification and enhanced data rate specification and meets or exceed the requirement to provide the highest communication link quality of service.

3.7.1 Transmitter path

This module features a fully integrated zero IF transmitter. The baseband transmitted data Is digitally modulated in the modem block and up-converted the 2.4GHz ISM band in the Transmitter path. The transmitter path consists of signal filtering, I/Q up-conversion, high -output power amplifier(PA), and RF filtering. It also incorporates modulation schemes P/4-DQPSK for 2 Mbps and 8-DPSK for 3 Mbps to support enhanced data rate.

• Digital modulator

The digital modulator performs the data modulation and filtering required for the GFSK, ㄱㅠ/4DQPSK, and 8-DPSK signal. The fully digital modulator minimizes any frequency drift Or anomalies in the modulation characteristics of the transmitted signal and is much more Stable than direct VCO modulation schemes.

• Power Amplifier

The integrated PA for the BCM2070 is configurable for Class 2 operation, transmitting up to +4 dBm as well as Class 1 operation and transmit power up to +12 dBm at the chip, gFSK, >2.5V supply. Due to the linear nature of the PA, combined with some integrated filtering, no External filters are requires for meeting Bluetooth and regulatory harmonic and spurious requirements. For integrated mobile handset applications, where Bluetooth is integrated next to the celluar radio, minimal external filtering can be applied to achieve near thermal noise levels for spurious and radiated noise emissions.
Using a highly linearized, temperature compensated design the PA can transmit +12 dBm for Basic rate and +10 dBm for enhanced data rates(2 to 3 Mbps). A flexible supply voltage range Allows the PA to operate from 1.2V to 3.0V. The minimum supply voltage at VDDTF is 1.8V to achieve +10dBm of transmit power.

3.7.2 Receiver path

The receiver path uses a low IF scheme to down-convert the received signal for demodulation in the digital demodulator and bit synchronizer. The receiver path provides a high degree of Linearity, an extended dynamic range, and high order on-chip channel filtering to ensure reliable operation in the noisy 2.4GHz ISM bnad. The front-end topology, with built-in out -of-bnad attenuation, enables the device to be used in most applications with no off-chip Filtering. For integrated handset operation where the Bluetooth function is integrated close to the celluar transmitter, minimal external filtering is required to eliminate the desensitization of The receiver by the cellular transmit signal.

3.8 SIM Card Interface

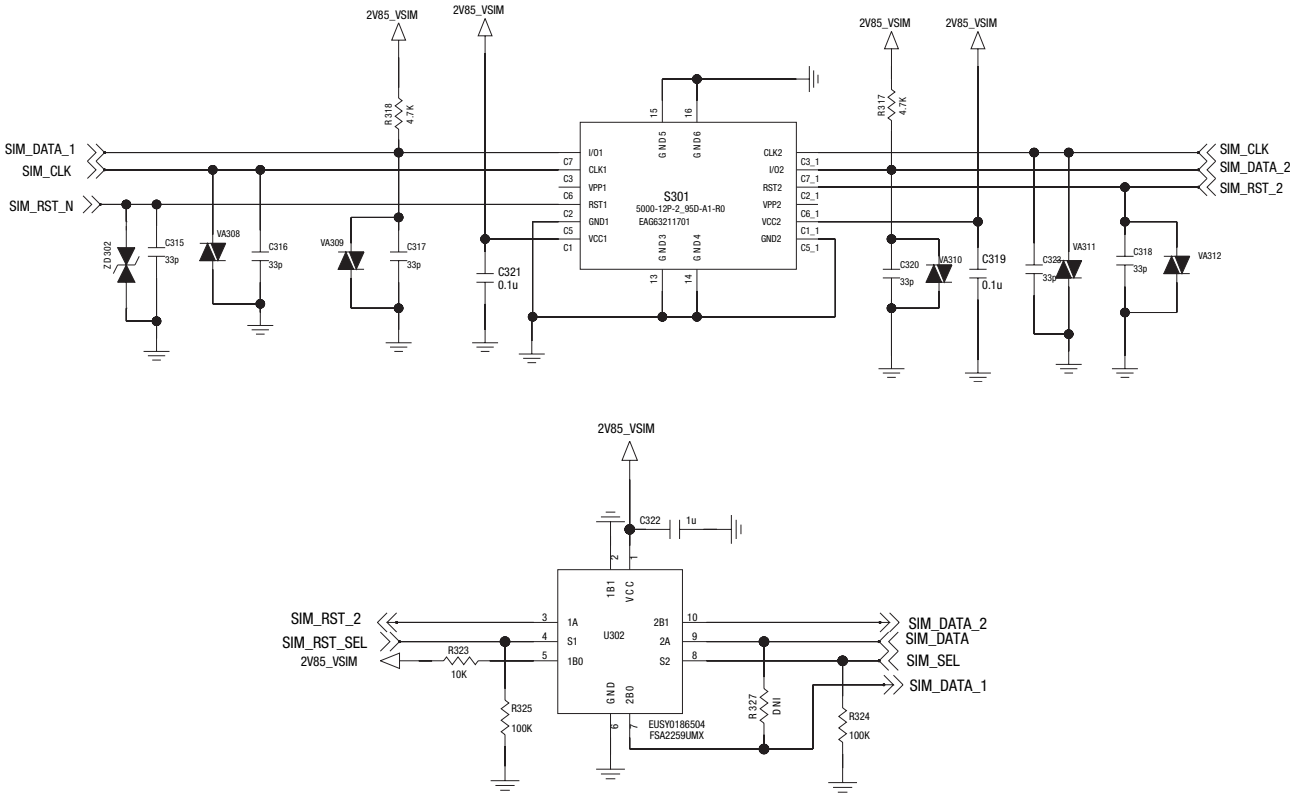


Figure 3-8-1.Dual SIM CARD Interface

The Main Base Band Processor(XMM215) provides SIM Interface Module.

The XMM215 checks status Periodically During established call mode whether SIM card is inserted or not, but it doesn't check during deep sleep mode. In order to communicate with SIM card, 5 signals SIM_DATA_1, SIM_DATA_2, SIM_CLK, SIM_RST_N, SIM_RST_2

And This model supports 2.85V SIM Card.

Signal	Description
SIM_RST_N	This signal makes SIM card to HW default status.
SIM_CLK	This signal is transferred to SIM card.
SIM_DATA_1	This signal is interface datum.

3.9 LCD Interface

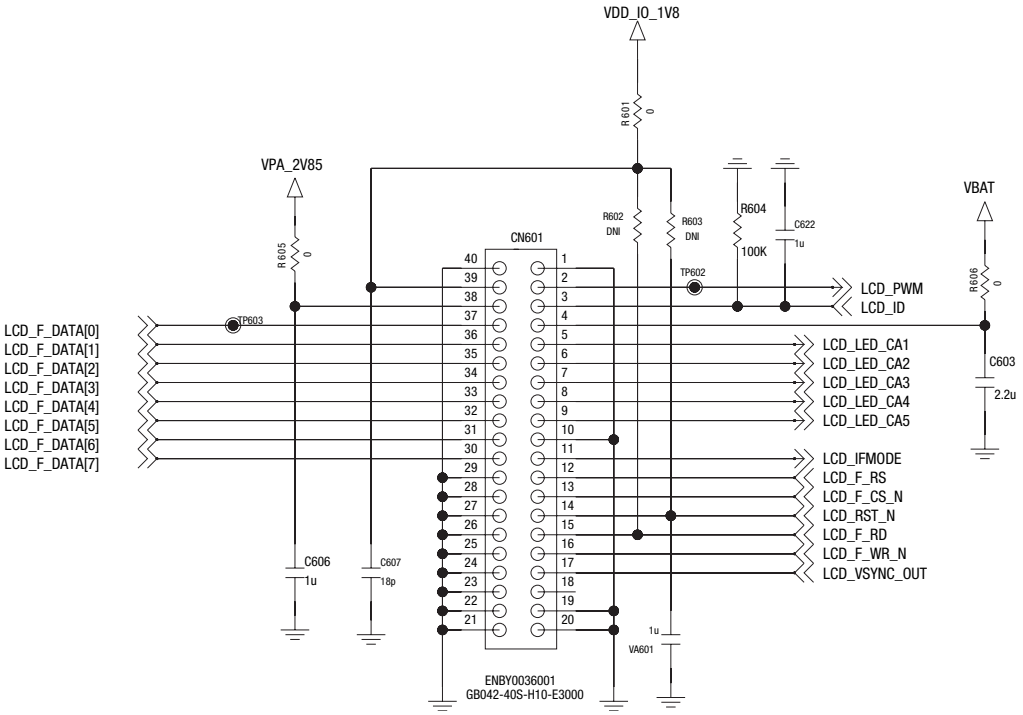


Figure 3-9-1. LCD Interface (B to B Connector on Main PCB)

The LM320DN1A module is a Color Active Matrix Liquid Crystal Display with an Light Emission Diode(LED) Back Light system. The matrix employs a-Si Thin Film Transistor as the active element. It is a transmissive type display operating in the normally Black mode. This TFT-LCD has a 3.19 inch diagonally measured active display area with 240 * RGB * 320 resolution. Each pixel is divided into R,G,B dots which are arranged in vertical stripes. Gray scale or the brightness of the dots Color is determined with a 6 bit gray scale signal for each dot, thus, presenting a palette of More than 262,144 colors.

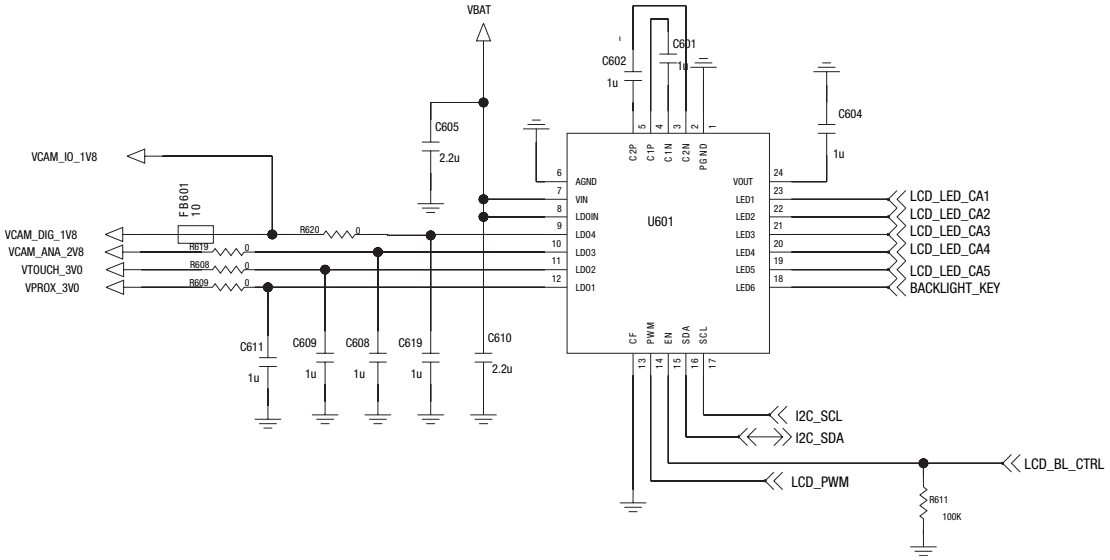


Figure 3-9-2. RT9396 CIRCUIT DIAGRAM

The RT9396 is a power management IC (PMIC) for backlighting and phone camera applications. The PMIC contains a 6-Channel charge pump white LED driver and four low dropout linear regulators.

The charge pump drives up to 6 white LEDs with regulated constant current for uniform intensity. Each channel (LED1 to LED6) supports up to 25mA of current. These 6-Channels can be also programmed as 4 plus 2-Channels or 5 plus 1-Channels with different current setting for auxiliary LED application. The RT9396 maintains highest efficiency by utilizing a x1/ x1.5/ x2 fractional charge pump and low dropout current regulators. An internal 6-bit DAC is used for backlight brightness control. Users can easily configure up to 64-steps of LED current via the I2C interface control. The RT9396 also comprises low noise, low dropout regulators, which provide up to 200mA of current for each of the four channels. The four LDOs deliver 3% output accuracy and low dropout voltage of 200mV @ 200mA.

Users can easily configure LDO output voltage via the I2C interface control. The LDOs also provide current limiting and over-temperature functions. The RT9396 is available in a WQFN-24L 3x3 package.

LED Backlight Current

RT9396 communicates with a host (master) Using the standard I2C 2-wire interface. The two bus lines of SCL and SDA must be pulled high when the bus is not in use. Internal pull-up resistors are installed. After the START condition, the I2C master sends a chip address. This address is eight bits long, consisting of seven address bits and a following data direction bit (R/W). The RT9396 address is 10101000 (A8h) and is a receive-only (slave) device. The second word selects the register to which the data will be written. The third word contains data to write to the selected register. Figure 2 shows the writing information for the four LDOs as well as for each LED current. In the second word, the sub-address of the four LDOs is "001" and the sub-address of the LED Driver for different dimming modes are respectively "010", "011" and "100". For the LDO output voltage setting, bits B1 to B4 represent each LDO channel respectively where a "1" indicates selected and a "0" means not selected. The B0 bit controls on/off (1/0) mode for the selected LDO channel(s). Then, in the third word, bite C0 to C3 control a 16-step setting of LDO1 to LDO4.The voltage values are listed in Table 1. For LED dimming, there are three operating modes (Backlight I, Backlight II and Backlight III) to select from by writing respectively "010", "011" and "100" into the First three bits of the second word, It should be noticed that no matter which mode is selected, LED1 to LED3 must be turned on, else LED4 to LED6 can not be Turned on. When Backlight I is selected, all six LEDs have the same behavior. Their 64-step dimming currents are set by bits C0 to C5, which are listed in Table 2. The bits C6 and C7 determine the fade in/out time of each step as shown in Figure 2. For Backlight II and Backlight III, two sets of LEDs, called Main and Sub, can work separately.

Backlight Quiescent Current

The quiescent current required to operate all four backlights is reduced by 1.5mA when backlight current is set to 4.0mA or less. This feature results in higher efficiency under light-load conditions. Further reduction in quiescent current will result from using fewer than four LEDs.

3.10 MiniABB (Battery Charger & MUIC) Interface

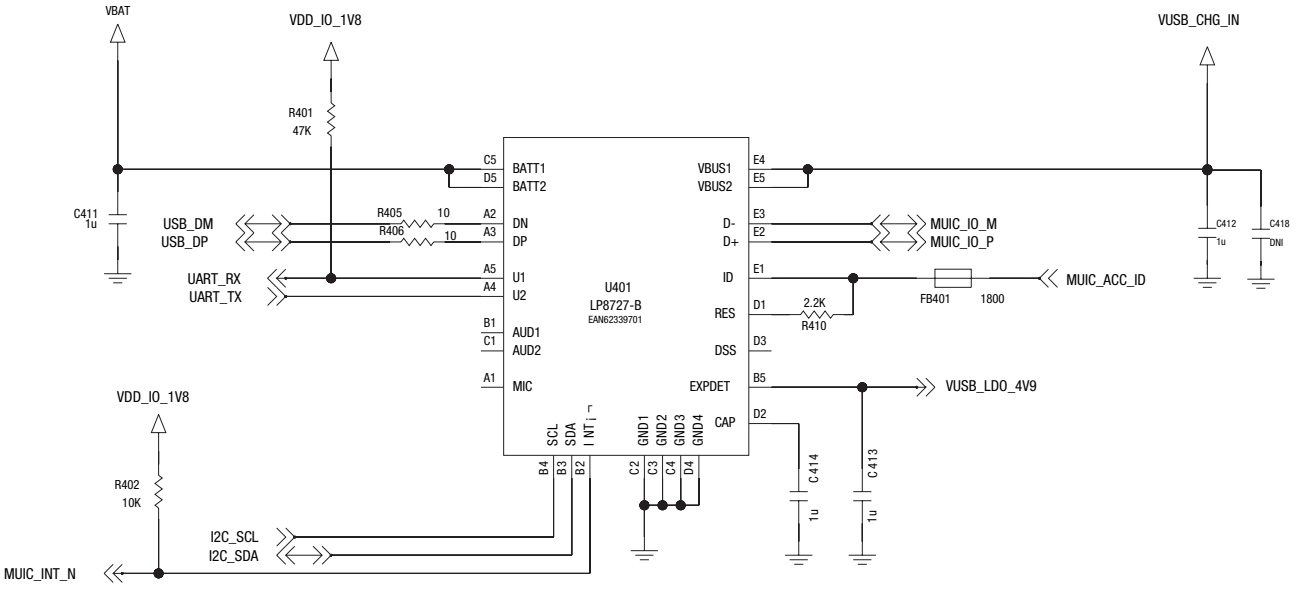


Figure 3-10-1 Mini ABB BLOCK

The LP8727 is designed to provide automatic multiplexing switches between Micro/Min USB connector and USB, UART, and Audio paths in cellular phone applications, and it also contains a single-input Li-ion battery charger and over-voltage protected LDO. Programming is handled via ans I2C compatible Serial Interface allowing control of charger, multiplexing switches, and reading status information of the device.

The multiplexing switches on USB and UART support High-Speed USB and Audio inputs can be driven to negative voltage rail. The LP8727 is compatible with USB charging specification rev 1.1 form USB IF.

The Li-ion charger requires few external components and integrates the Power FET. Charging is thermally regulated to obtain the most efficient charging rate for a given ambient temperature. It has Over-Voltage Protection (OVP) circuit at the charger input protects the PMU from input voltage up to +28V, eliminating the need for and external protection circuitry.

An Over-voltage protected LDO which can supply up to 50mA is designed for powering up low voltage USB transceiver or waking up a PMU(Power Management Unit)when an external power source(either USB VBUS or wall adapter) is connected to the USB connector.

3.11 Audio Interface

3.11.1 Functional Overview

The audio front-end of X-GOLD™215 offers the digital and analog circuit blocks for both receive and transmit audio operation, from a mobile phone perspective (called audio-in and audio-out subsequently). It features a high-quality, stereo digital-to-analog path with amplifier stages for connecting acoustic transducers to X-GOLD™215. In audio-in path the supply voltage generation for electret microphones, a low-noise amplifier and analog to digital conversion are integrated in X-GOLD™215. A more detailed functional description will be given in the following sections.

The audio front-end itself can be considered to be organized in three sub-blocks:

- Interface to processor cores (TEAKLite® and - indirectly - ARM)
- Digital filters
- Analog part

The following figure shows an architecture overview of the Audio section.

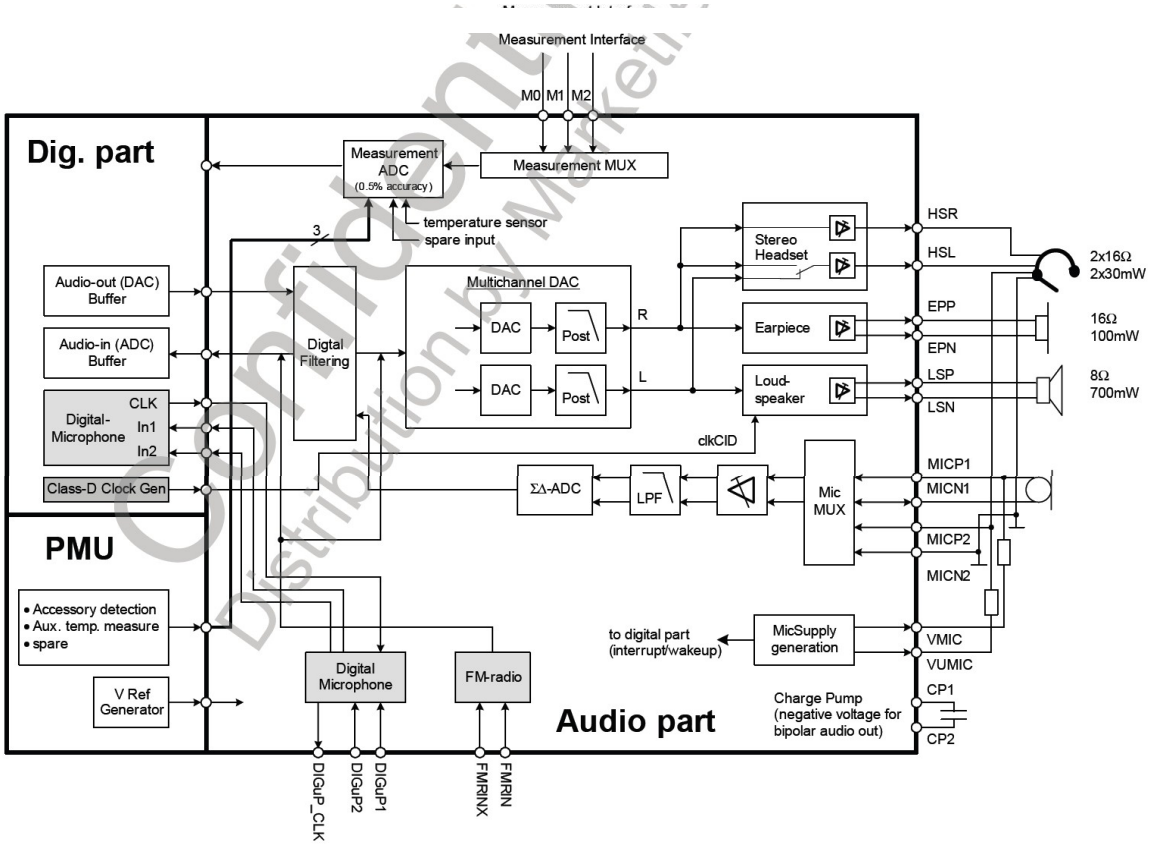


Figure 3.12.1 Audio Section Overview

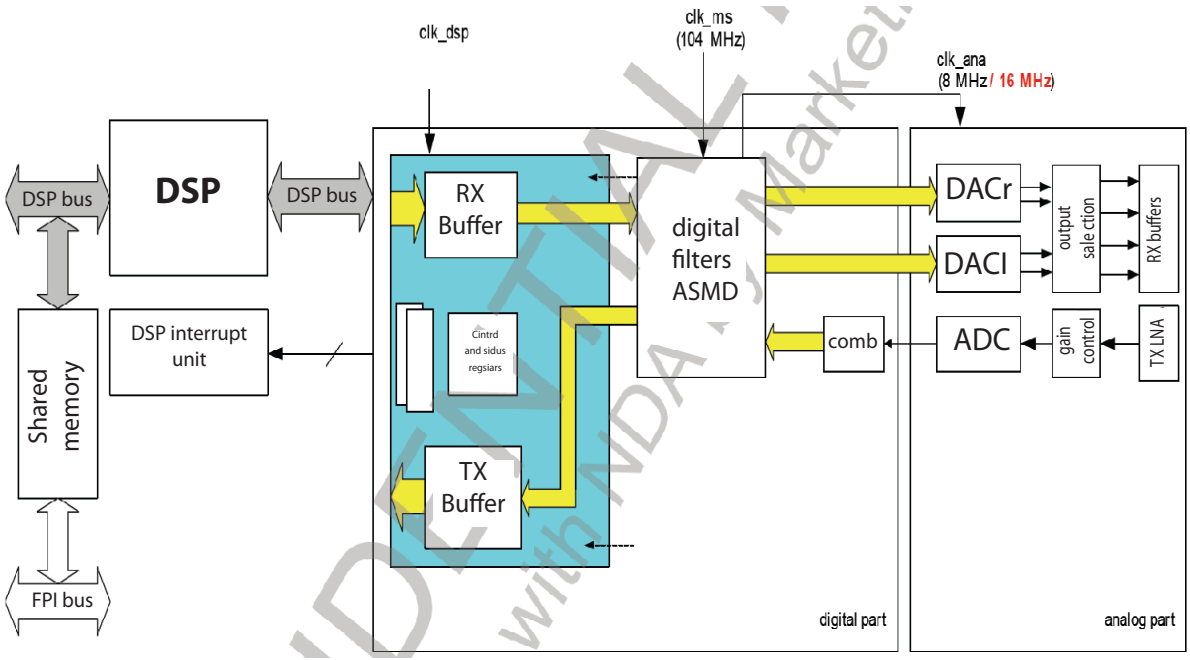


Figure 3.12.2 Overview of Clocking and Interfaces of Audio Front End

The audio front-end of X-GOLD™215 has the following major operation modes:

• Power-down: All analog parts are in power down and all clocks of the digital part are switched off.

• Audio mode: Digital decimation/interpolation filters are connected to the interface buffers and the analog part is enabled.

These major modes can be modified by certain control register settings.

• Due to the new gain settings in the TX path, the maximum input voltage is limited to 0.8 Vpp.

• In both voiceband paths, the value range for voice samples is confined to 97.5%, i.e. to [-31948, 31947] or [8334H, 7CCBH] in X-GOLD™215.

• On the TX path, 83% "1"s on the VTPDM line correspond to a 16-bit value of 7CCBH and 17% "1"s correspond to a 16-bit value of 8334H at the digital filter output. Thus the usable range is 66%. This range can be scaled to 100% by Firmware.

• The high-pass functions of the voiceband filters have to be implemented in firmware on TEAKLite®.

3.11.2 Digital Part

The digital part of the X-GOLD™215 audio front-end comprises an interface to the TEAKLite® bus, interfaces to the interrupt units of TEAKLite®, digital interpolation filters for oversampling digital-to-analog conversion, digital decimation filters for analog-to-digital conversion and an interface to the analog part of the audio front-end. For the digital microphone all the filtering is done in a dedicated hardware. The output sample stream is then fed in a duplicated ring buffer structure like the data from the analog microphone path (after A/D conversion and subsequent digital filtering).

*** Interpolation Filter**

The interpolation path of the X-GOLD™215 audio front-end increases the sampling rate of the audio samples to the rate of the digital-to-analog converter. Because the input sampling rates can vary between 8 kHz and 47.619 kHz the filter characteristic and oversampling ratio can be adjusted to the respective sampling rate. The requirements for the interpolation filters depend on the sampling rate, because a sufficient out-of-band discrimination in the audio frequency band (20 Hz,...,20 kHz) has to be ensured.

*** Decimation Filter**

The digital decimation filter on X-GOLD™215 has two operating modes: 8 kHz output sampling rate and 16 kHz output sampling rate (or 16 kHz output sample rate and 16kHz bandwidth in case of doubled ASMD clock).

3.11.3 Analog Part

The analog part of the X-GOLD™215 audio front-end in audio-out direction consists of a stereo digital to analog converter (multi-bit oversampling converter) which transforms the output of the digital interpolation filter into analog signals. It is followed by the gain control/amplifier section. The DAC outputs can be switched to several output buffers. In audio-in section there is an input multiplexer which selects either one of two differential microphone inputs to be connected to the low-noise amplifier and analog pre-filter. The signals from the analog pre-filter are input to a second-order sigma-delta analog-to-digital converter. In addition there is a connection for FM-radio playing.

*** Audio-out Part**

The analog audio-out part consists of two multi-bit digital-to-analogue converters (DAC) and an output stage. The signal sources are switched to the output drivers in the output stage The output drivers consist of: a) one mono, differential class-D Loudspeaker driver, b) one mono, differential Earpiece driver and c) one stereo, single-ended (with uni- or bipolar signals), Headset driver.

▪ **Digital-to-analog converters**

The multi-bit oversampling DACs of the X-GOLD™215 audio front-end convert the 16-bit data words coming from the digital interpolation filters to analogue signals.

▪ **Output Amplifier**

The different output buffers in X-GOLD™215 are driven by the outputs of the selection block. The differential earpiece driver can be used to drive a 16 Ω earpiece and works in differential. The two single ended headset drivers can be used to drive a 16 Ω headset. They can work unipolar mode, where an AC coupling of the headset might be needed, or can work also in bipolor mode. The differential loudspeaker driver can be used to drive a 8 Ω loudspeaker. As it is a class-D amplifier the needed suppression of the higher harmonics of the switching signals has to be achieved by the external circuitry. The buffers are designed to be short circuit protected.

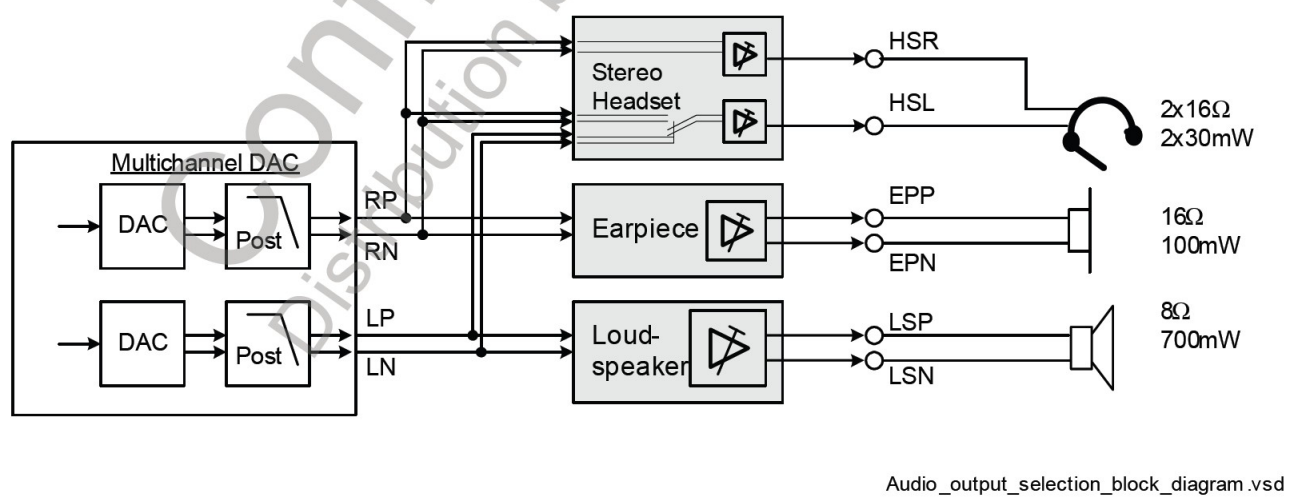


Figure 3.12.3 Switching for R/L DACs onto Buffers

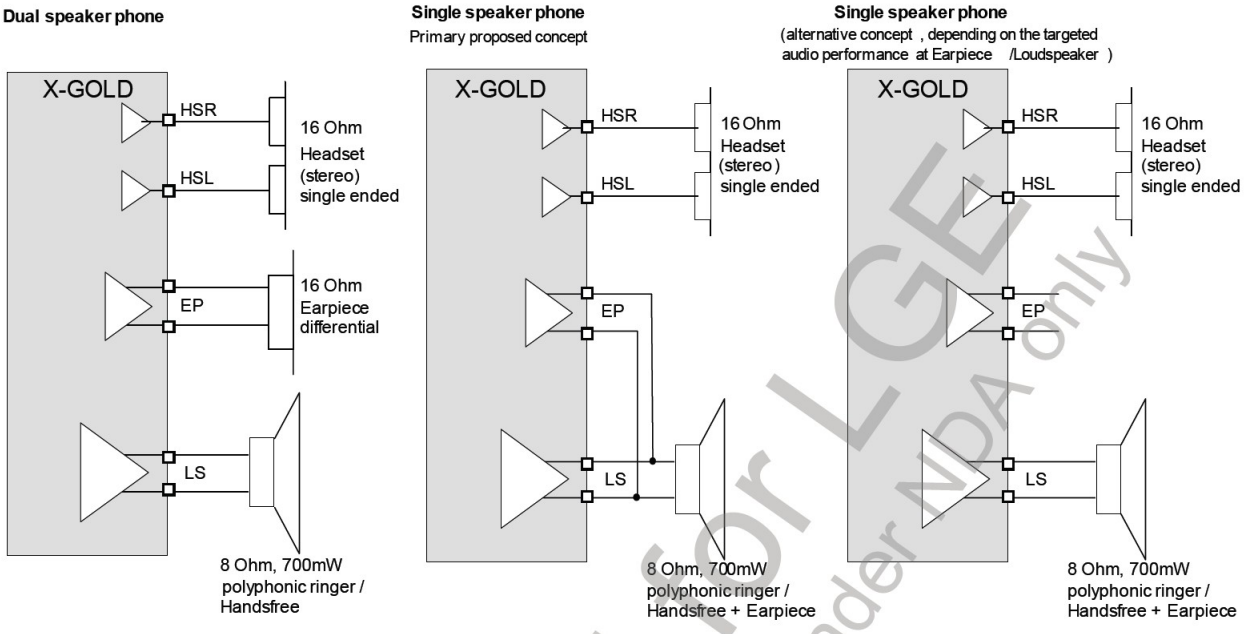


Figure 3.12.4 Different Application Scenarios

In order to achieve the single-speaker concept by parallel connection of Earpiece and Headset amplifier the Earpiece amplifier have to sustain the up to 5 V voltage of the class-D amplifier.

▪ **Audio-in Path**

The audio-in path of X-GOLD™215 provides two differential microphone input sources, MIC1and MIC2.

• The inputs for microphone MIC1 are MICP1 and MICN1.
• The inputs for microphone MIC2 are MICP2 and MICN2.

The audio-in path consists of an input selector, a low noise amplifier and following pre-filter with gain control, a second order ΣΔ-converter and a digital decimation filter. It supports both standard GSM (bandwidth 3.5 kHz) and wideband (bandwidth 7 kHz) speech bands.
The differential input signal from the microphone first passes a low noise amplifier and following pre-filter and an anti-aliasing pre-filtering stage achieving and overall variable gain ranging from 0 dB to +39 dB . The signal is then modulated by a second order ΣΔ-converter which is clocked with the same clock rate as the digital to analog converters. The ΣΔ-converter delivers a 1-bit pulse density modulated data stream at a rate of 2 MHz to the digital decimation filter which reduces the rate to 8 kHz or 16 kHz, depending on the current mode.
To improve SNR the sample frequency can be doubled in dedicated modes and the modulated data stream is 4MHz instead of 2 MHz.

▪ Microphone Supply

X-GOLD™215 has a single ended power-supply concept for electret microphones:
For both modes a minimal load capacitance of t.b.d. nF is necessary to guarantee stable operation of the buffer. The maximal load capacitance must not exceed t.b.d. nF.
2 microphone supplies VMIC and VUMIC are available. The supply VUMIC has a ultra-low-power mode, where the current consumption is minimum, whilst at the same time the noise performance is reduced.
For this purpose the VUMIC is directly supplied out of the VMIC regulator, the Mic-Buffer can be switched off and only the quiescent current of the VMIC regulator is present. This mode can be used to supply a headset and allow accessory detection with highly reduced current consumption For normal operation the supply can be switched to normal operation mode with improved noise performance. In case of an digital microphone VMIC can be used for supplying this microphone.

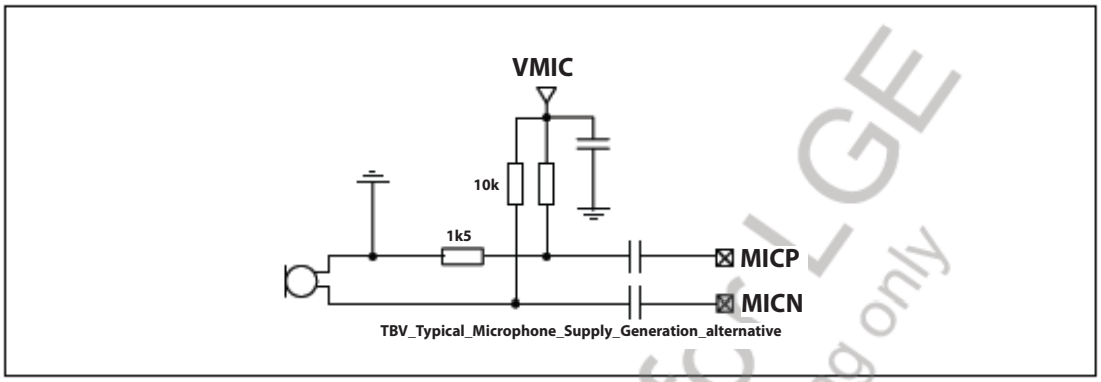


Figure 3.11.5 Typical Microphone Supply Generation (alternative)

3.12 Camera Interface(2M Fixed Focus Camera)

3.12.1 XMM215 Camera Interface

The Camera Interface (CIF) represents a complete video and still picture input interface (see Figure 26).

The CIF contains image processing, scaling, and compression functions. The integrated image processing unit supports image sensors with integrated YC_bC_r processing.

Scaling is used for downsizing the sensor data for either displaying them on the LCD, or for generating data streams for MPEG-4 compression. In general, YC_bC_r 4:2:2 JPEG compressed images should use the full sensor resolution, but they can also be downscaled to a lower resolution for smaller JPEG files. Scaling also can be used for digital zoom effects, because the scalers are capable of up-scaling as well.

CIF

All data is transmitted via the memory interface to an AHB bus system using a bus master interface.

Programming is done by register read/write transactions using an AHB slave interface.

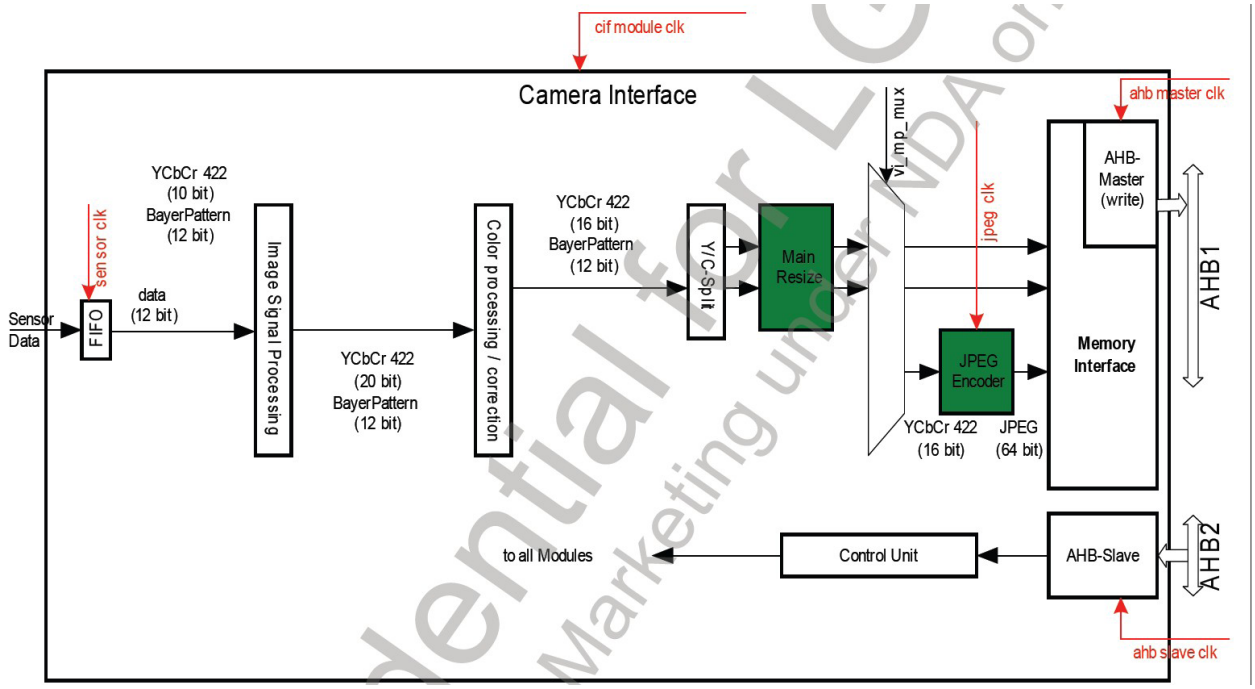


Figure 3.12.1 Block Diagram of Camera Interface

Functional Overview of CIF

The following list gives an overview over the CIF's functionality:

- 78 MHz system clock
- 78 MHz sensor clock
- 78 MHz JPEG encoder clock
- 32-bit AHB slave programming interface
- ITU-R BT 601 compliant video interface supporting YC_bC_r
- ITU-R BT 656 compliant video interface supporting YC_bC_r data
- 8-bit camera interface
- 12-bit resolution per color component internally
- YC_bC_r 4:2:2 processing
- Hardware JPEG encoder incl. JFIF1.02 stream generator and programmable quantization and Huffman tables
- Windowing and frame synchronization
- Continuous resize support
- Frame skip support for video (e.g. MPEG-4) encoding
- Macro block line, frame end, capture error, data loss interrupts and sync. (h_start, v_start) interrupts
- Programmable polarity for synchronization signals
- Luminance/chrominance and chrominance blue/red swapping for YUV input signals
- Maximum input resolution of 3 Mpixels (2048x1536 pixels)
- Main scaler with pixel-accurate up- and down-scaling to any resolution between 3 MP (2048x1536) and 32x16
- pixel in processing mode
- Buffer in system memory organized as ring-buffer
- Buffer overflow protection for raw data and JPEG files
- Asynchronous reset input, software reset for the entire IP and separate software resets for all sub-modules
- Interconnect test support
- Semi planar storage format
- Color processing (contrast, saturation, brightness, hue)
- Power management by software controlled clock disabling of currently not needed sub-modules

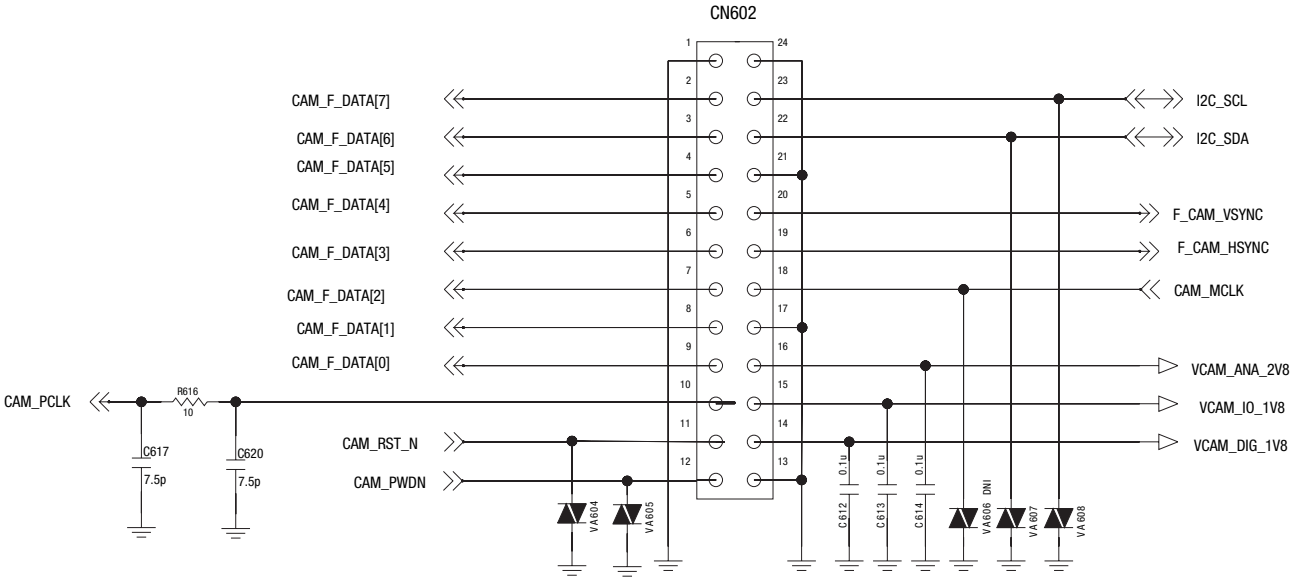


Figure 3-12 Camera Connector

3.13 Touch Interface

The touch controller is an analog interface circuit for a human interface touch screen device.
All of touch functions are composed of a register-based architecture and are controlled through the internal register sets by serial interface.

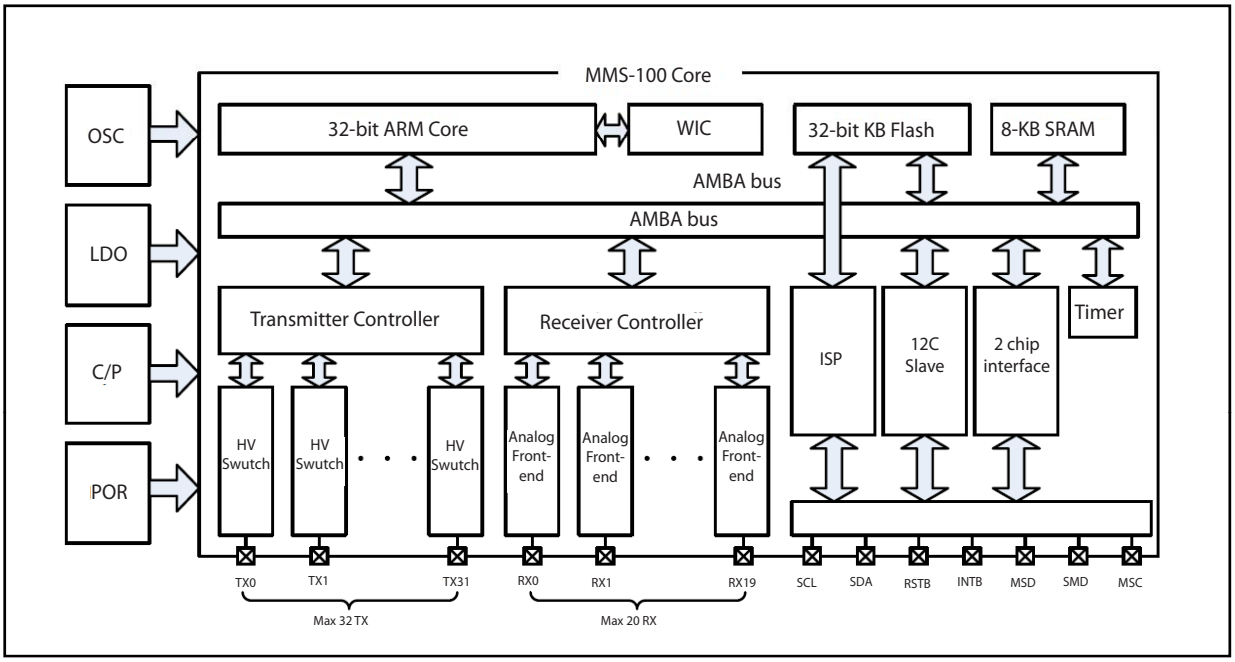


Figure 3-13Touch Driver Block Diagram

MMS-100 Series are composed of a 32-bit ARM processor, a wakeup interrupt controller (WIC), a 32-Kbytes flash memory, an 8-Kbytes SRAM, a Receiver Controller with max 20 receiver channels(RX), a Transmitter Controller with max 32 transmitter channel(TX), an embedded I2C slave with four serial I/O lines, a timer, an internal oscillator, an internal LDO, an internal C/P for HV, and a POR.
A transmitter controller and a receiver controller activate corresponding TX channels and RX channels sequentially.
A LDO generates a regulated power supply voltage from noisy voltage source. The generated voltage is used for the power supply voltage of analog circuits. PSRR is highly improved by the internal LDO.
A charge pump generates a high voltage source for driving TX channels. The overdriven voltage increases the signal strength, thereby improving SNR.
A POR generates a reset signal at power-up.

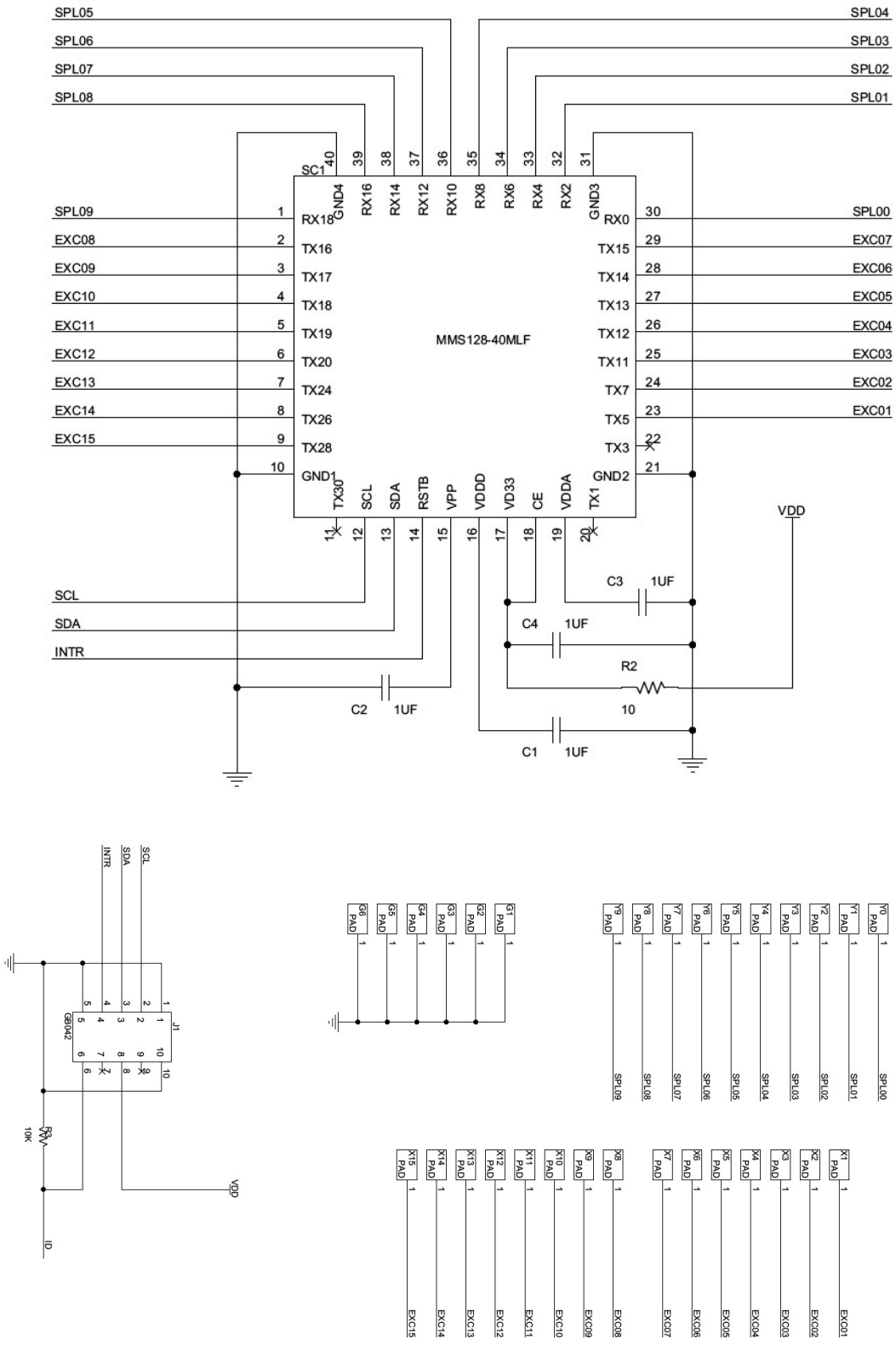


Figure 3-13-2 Touch Driver Block

4. TROUBLE SHOOTING

4.1 RF Component

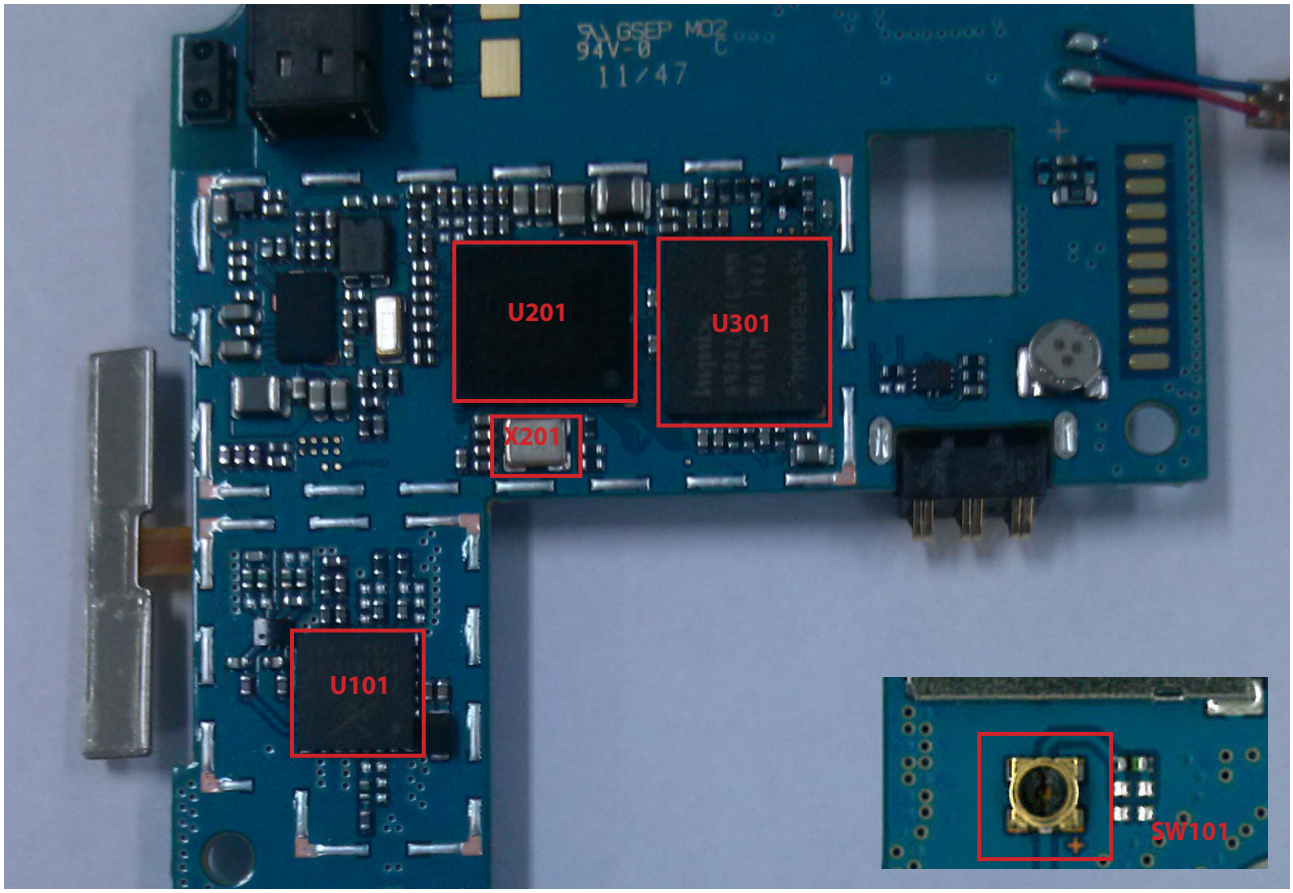
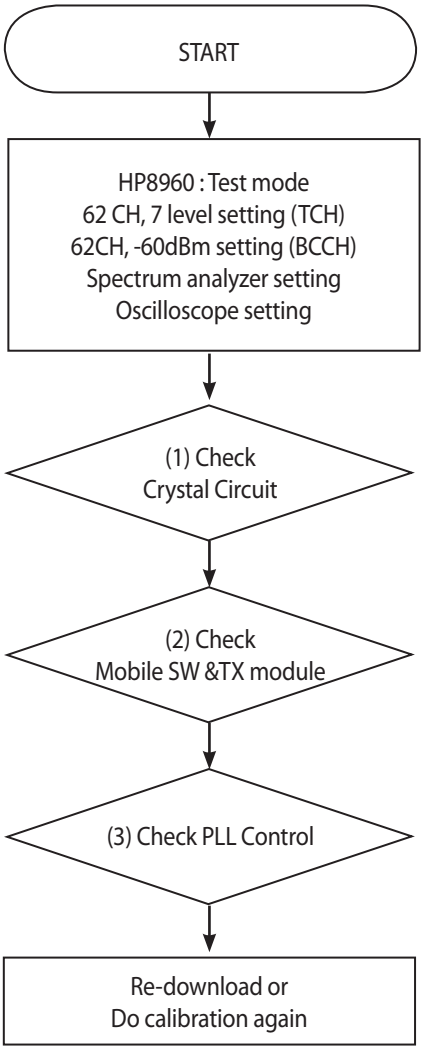


Figure 4.1

U301	Memory(2G NAND/1G SDRAM) H9DA2GH1GHMMMR-46M
U201	Main Chip (A-GOLD RADIO NAND) PMB8815
U101	GPRS QUAD TX DUAL RX MODULE SKY77550-21
X201	Crystal, 26MHz Clock TSX- 3225
SW101	RF Switch MS-156C

4.2 RX Trouble



(1) Checking Crystal Circuit

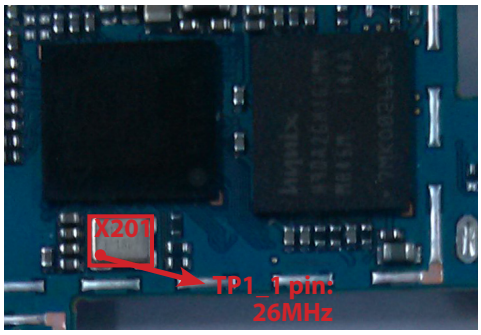
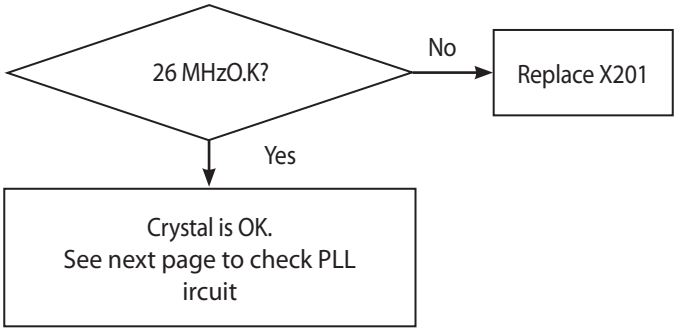


Figure 4.2.1



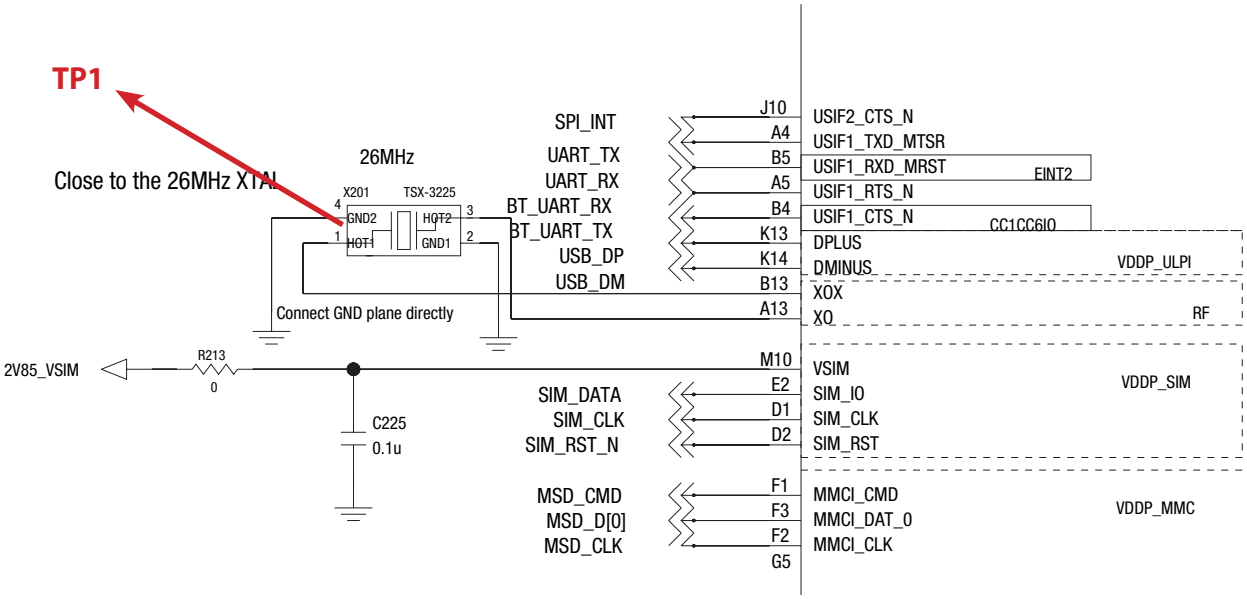


Figure 4.2.2

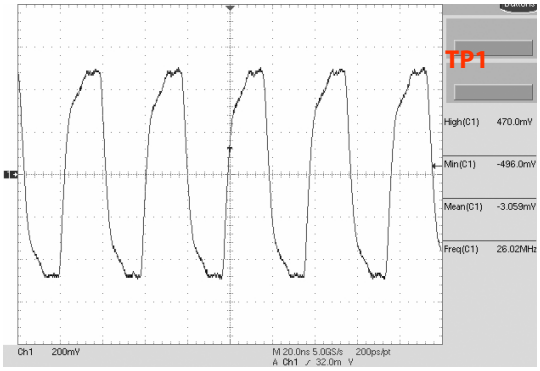
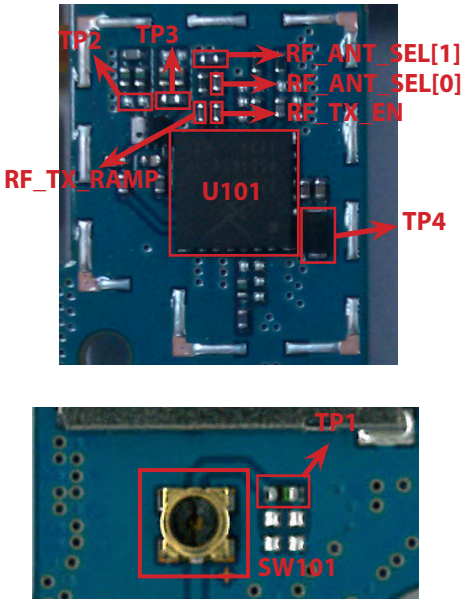


Figure 4.2.3

(2) Checking Mobile SW &TX Module



EGSM Rx

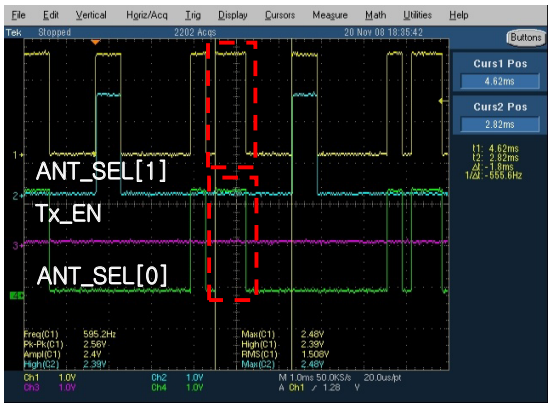
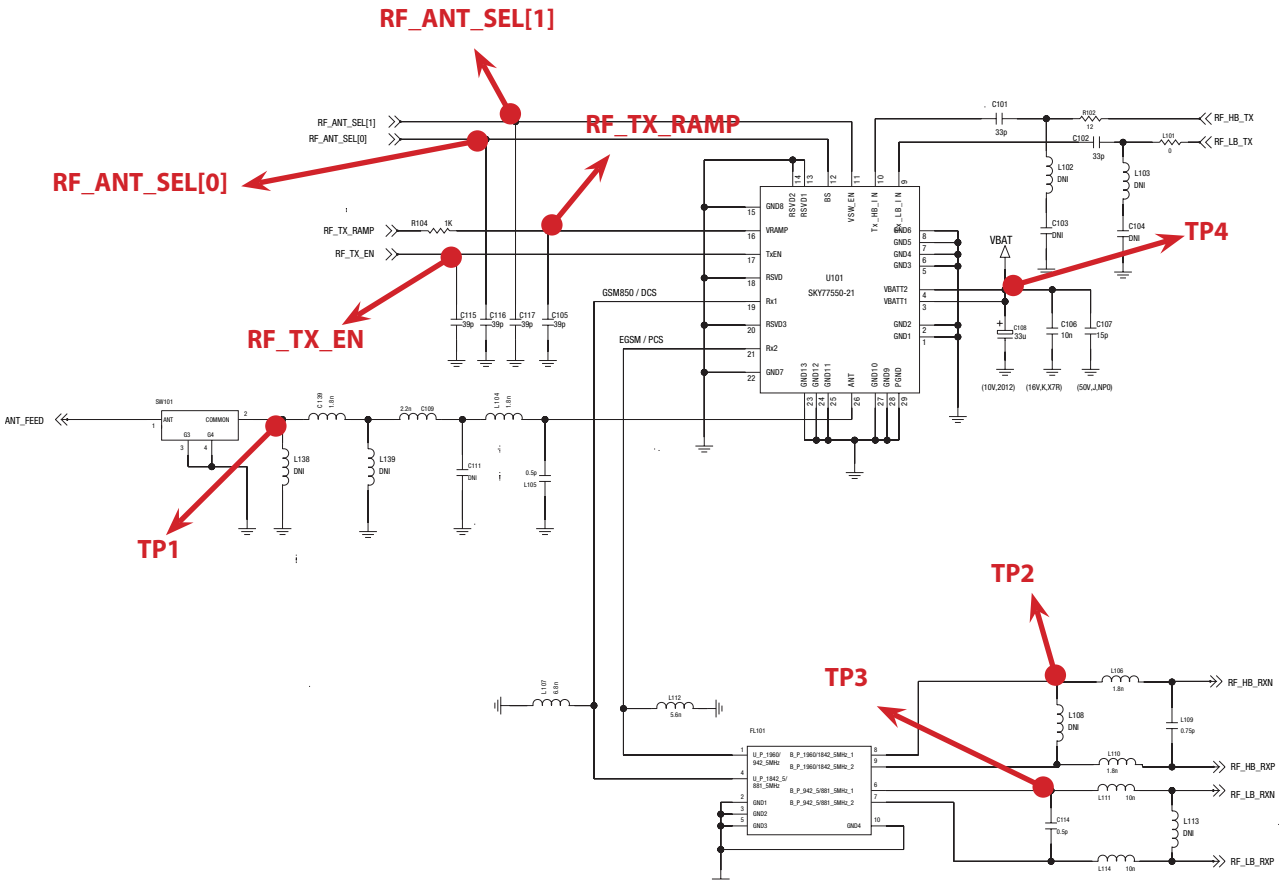
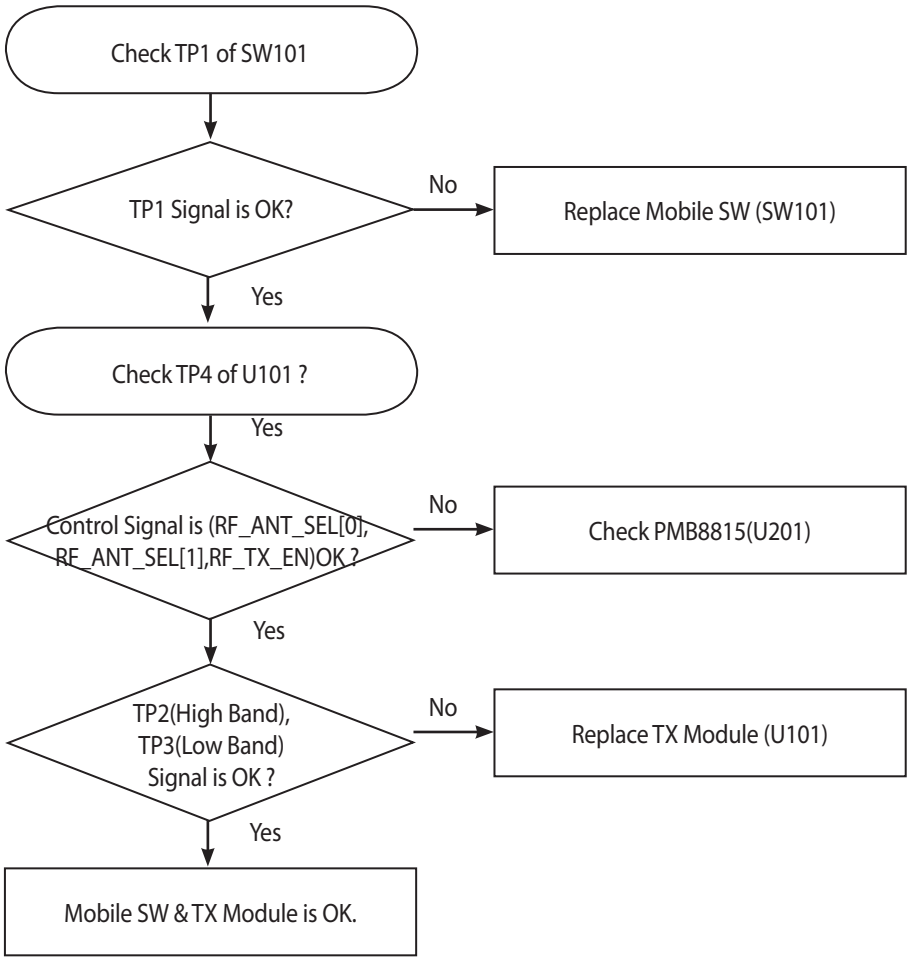


Figure 4.2.4





EGSM Rx

MODE	VSW_EN	BS	Tx Enable
STANDBY	LOW	LOW	LOW
RX1	HIGH	LOW	LOW
RX2	HIGH	HIGH	LOW
850/900 TX	HIGH	LOW	HIGH
DCS/PCS TX	HIGH	HIGH	HIGH

4.3 Power On Trouble

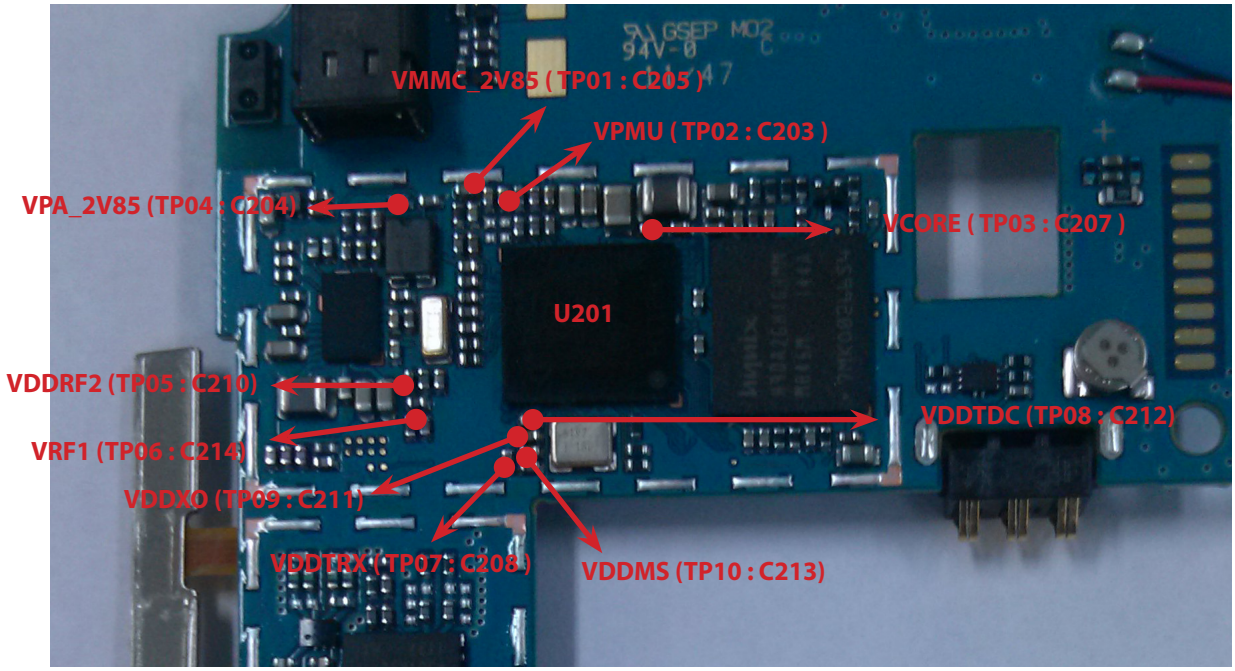


Figure 4.1

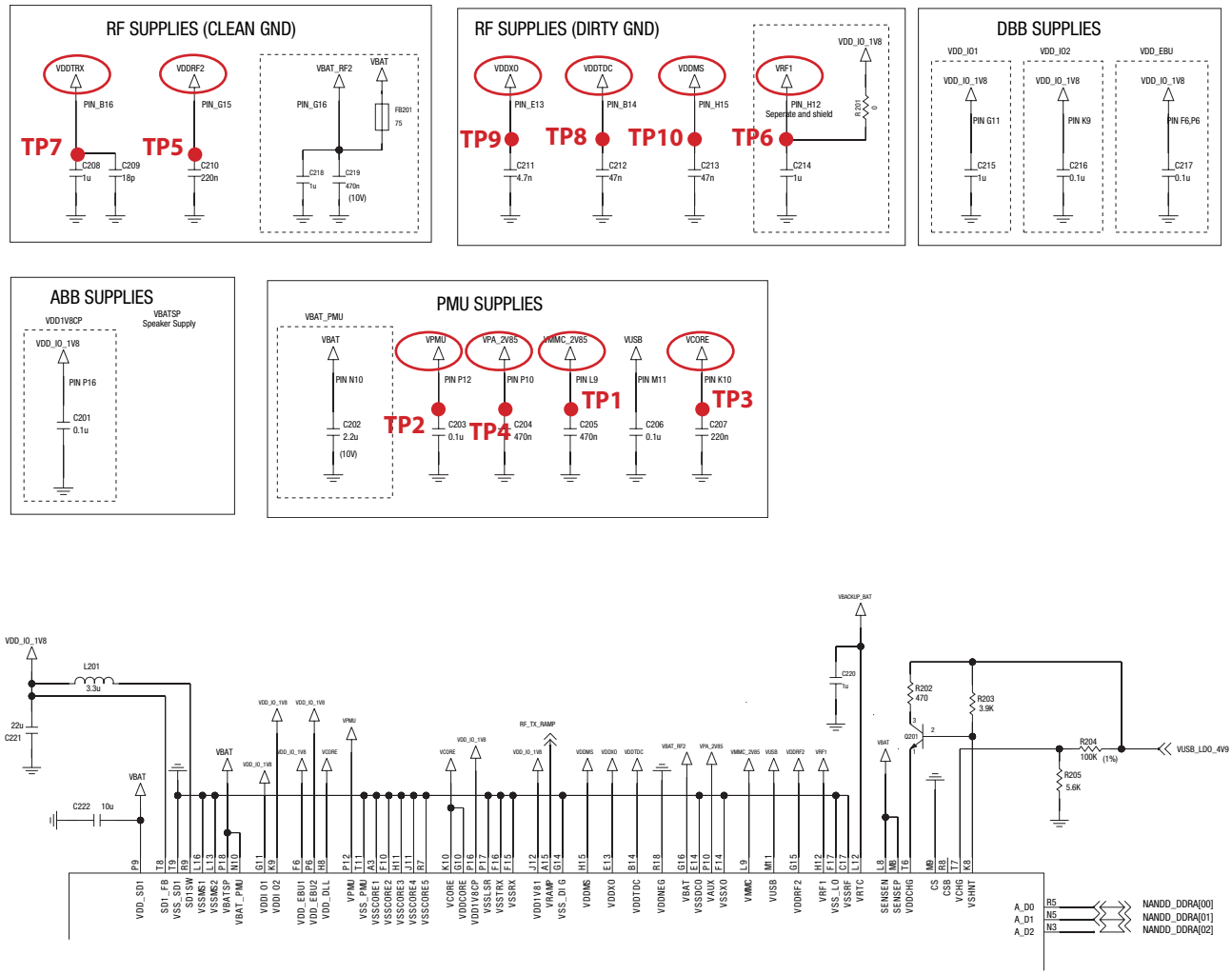
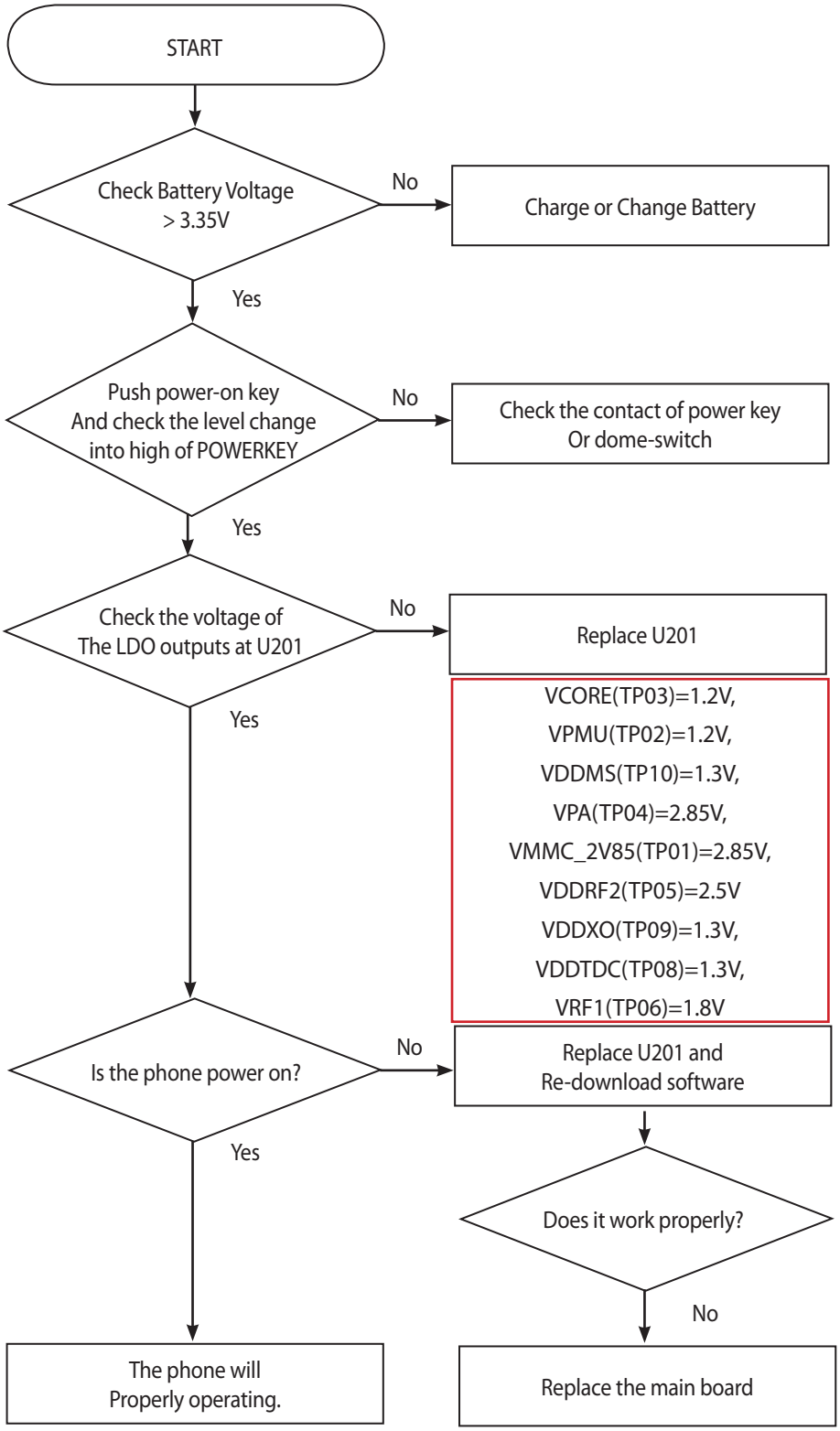


Figure 4.2 power block of T385



4.4 Charging Trouble

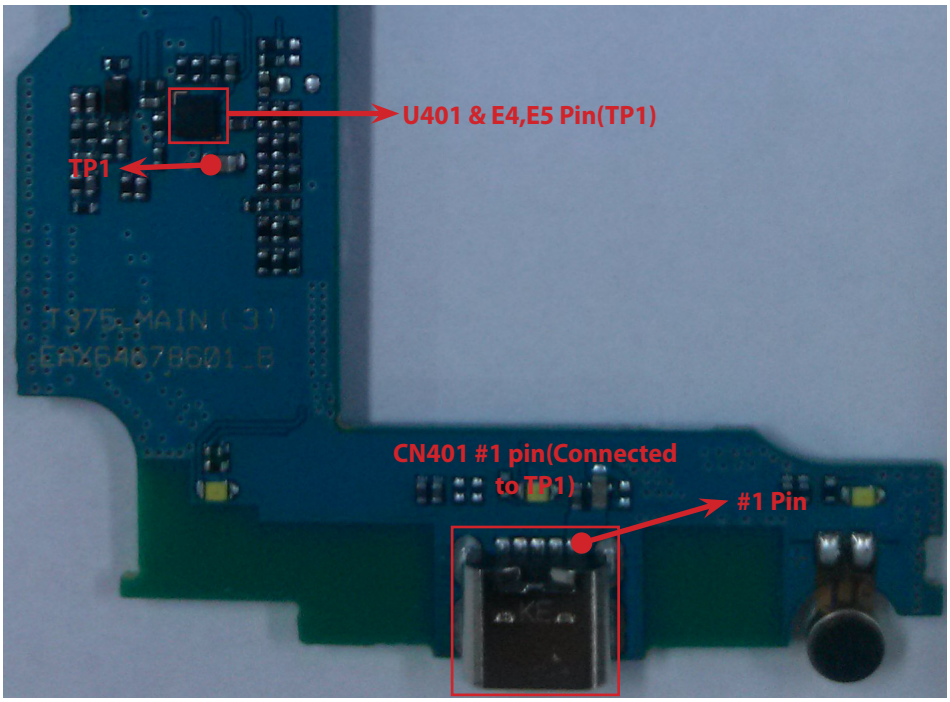
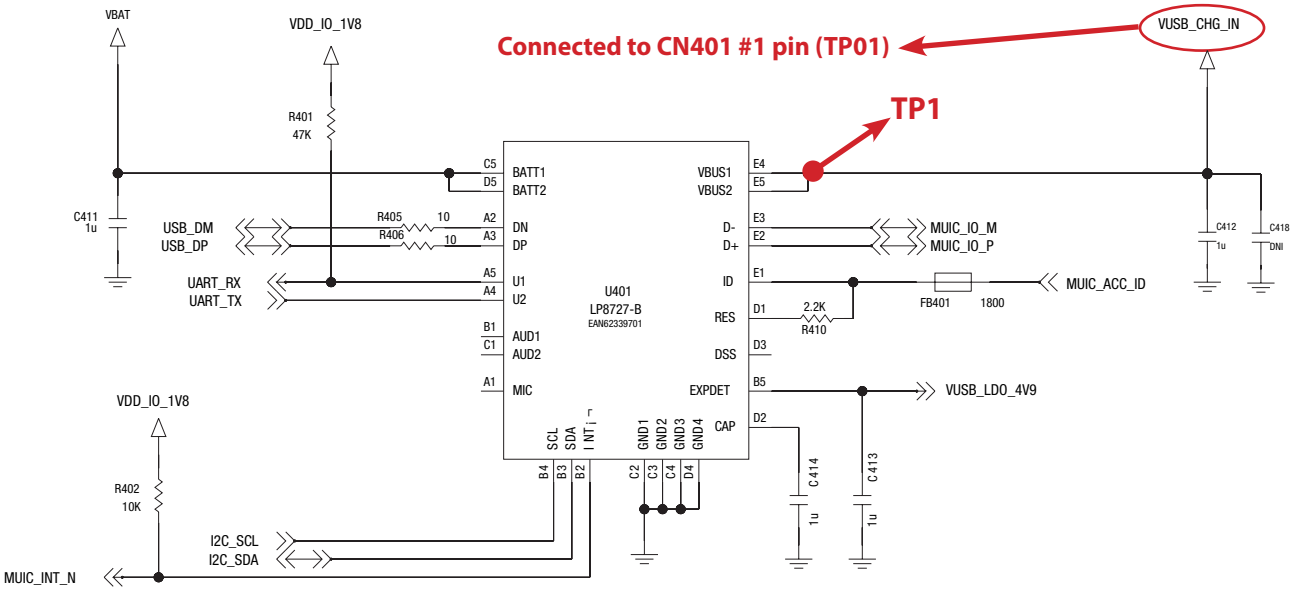
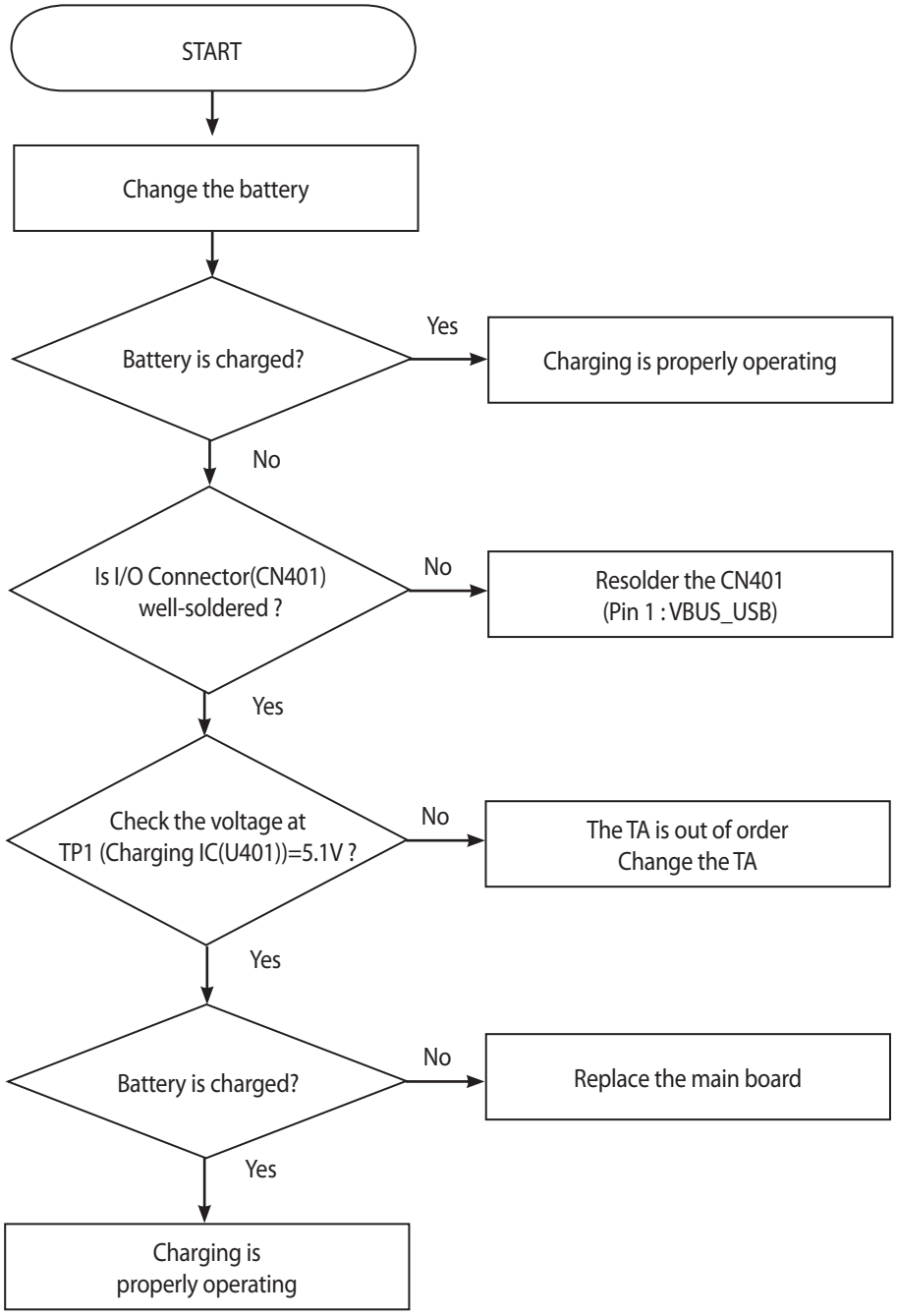


Figure 4.5





4.5 Vibrator Trouble

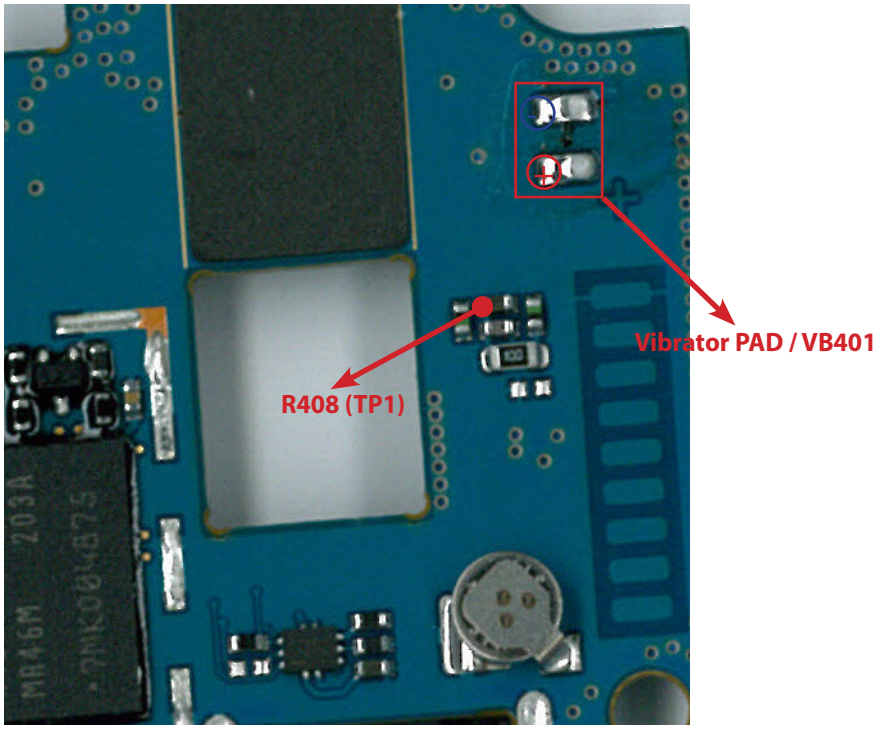
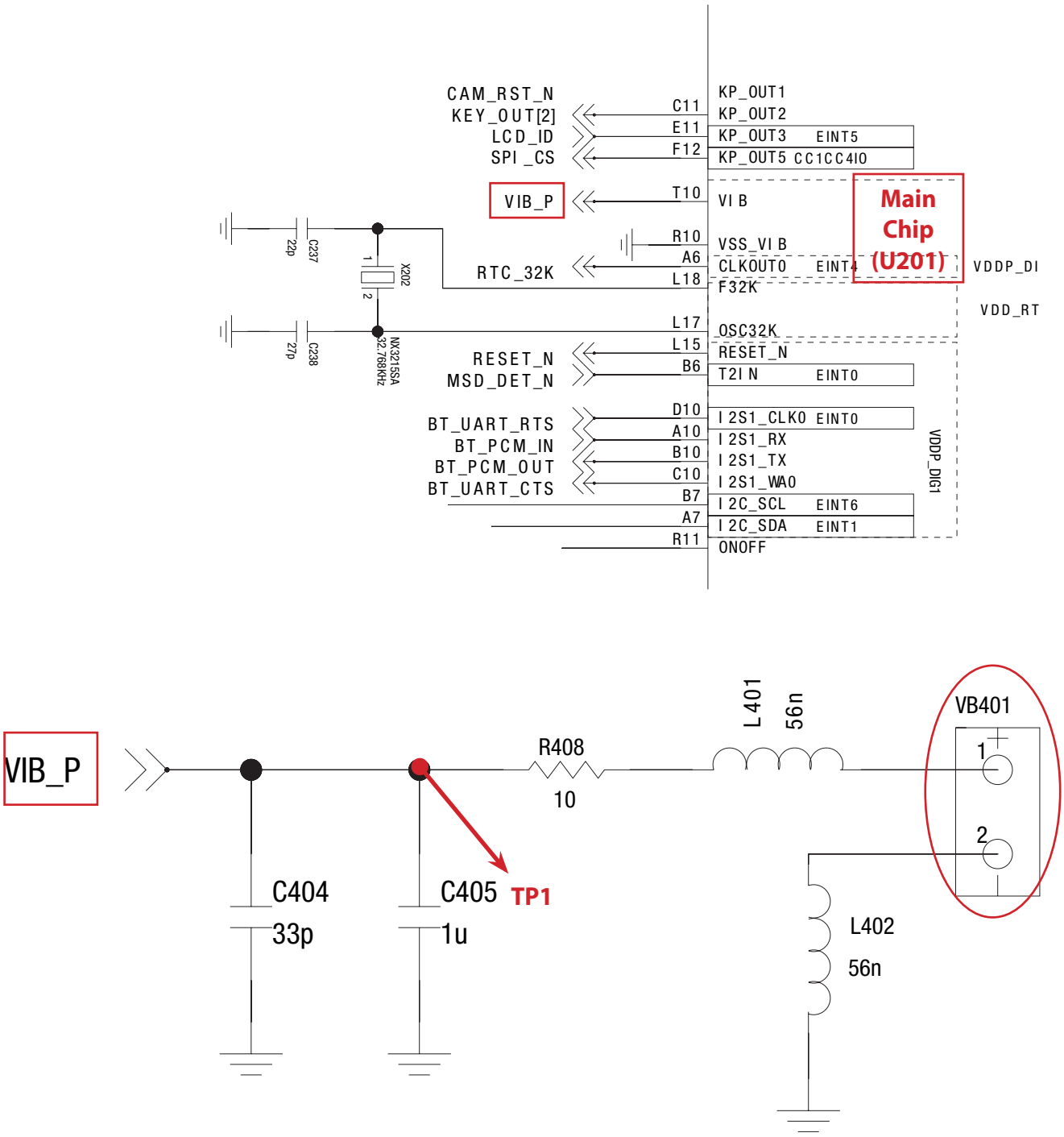
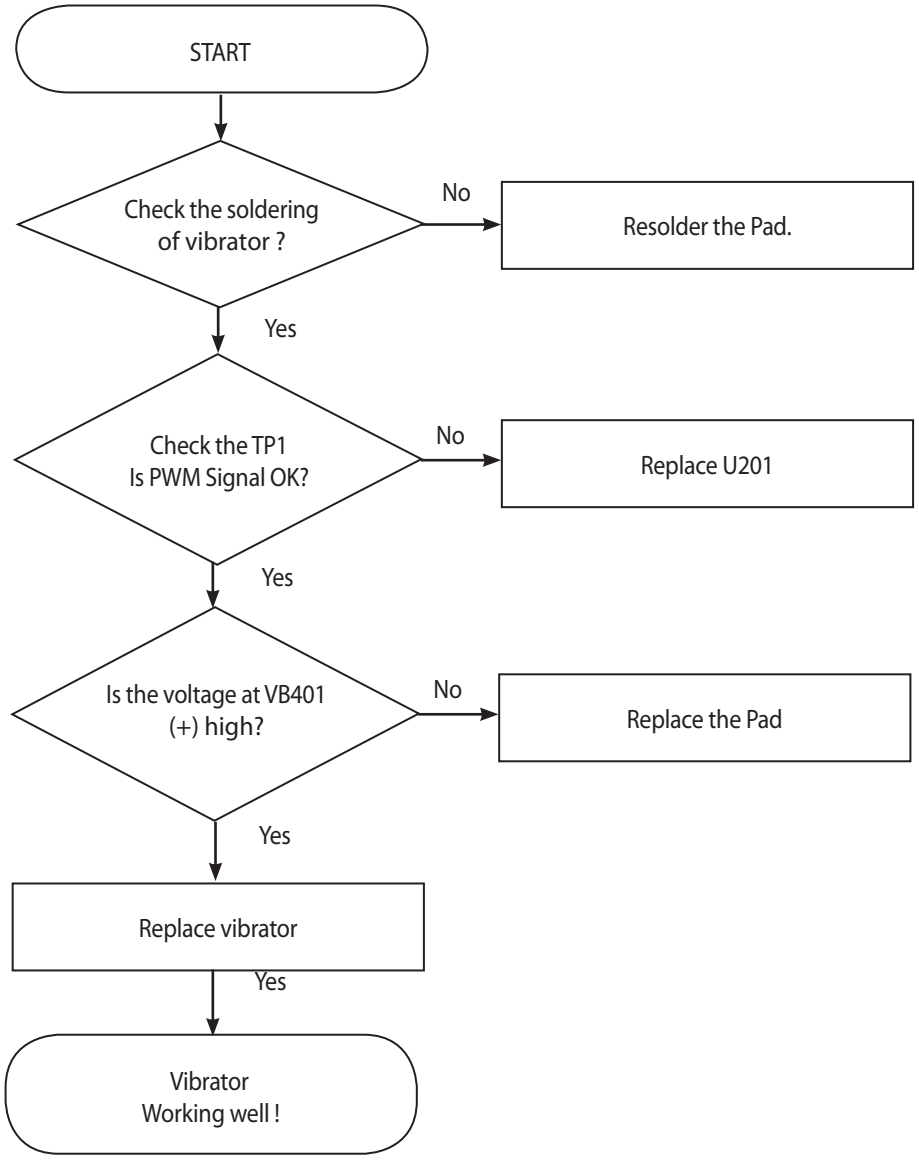


Figure 4.6



SETTING : Enter the engineering mode, and set vibrator on at vibration of BB test menu



4.6 LCD Trouble

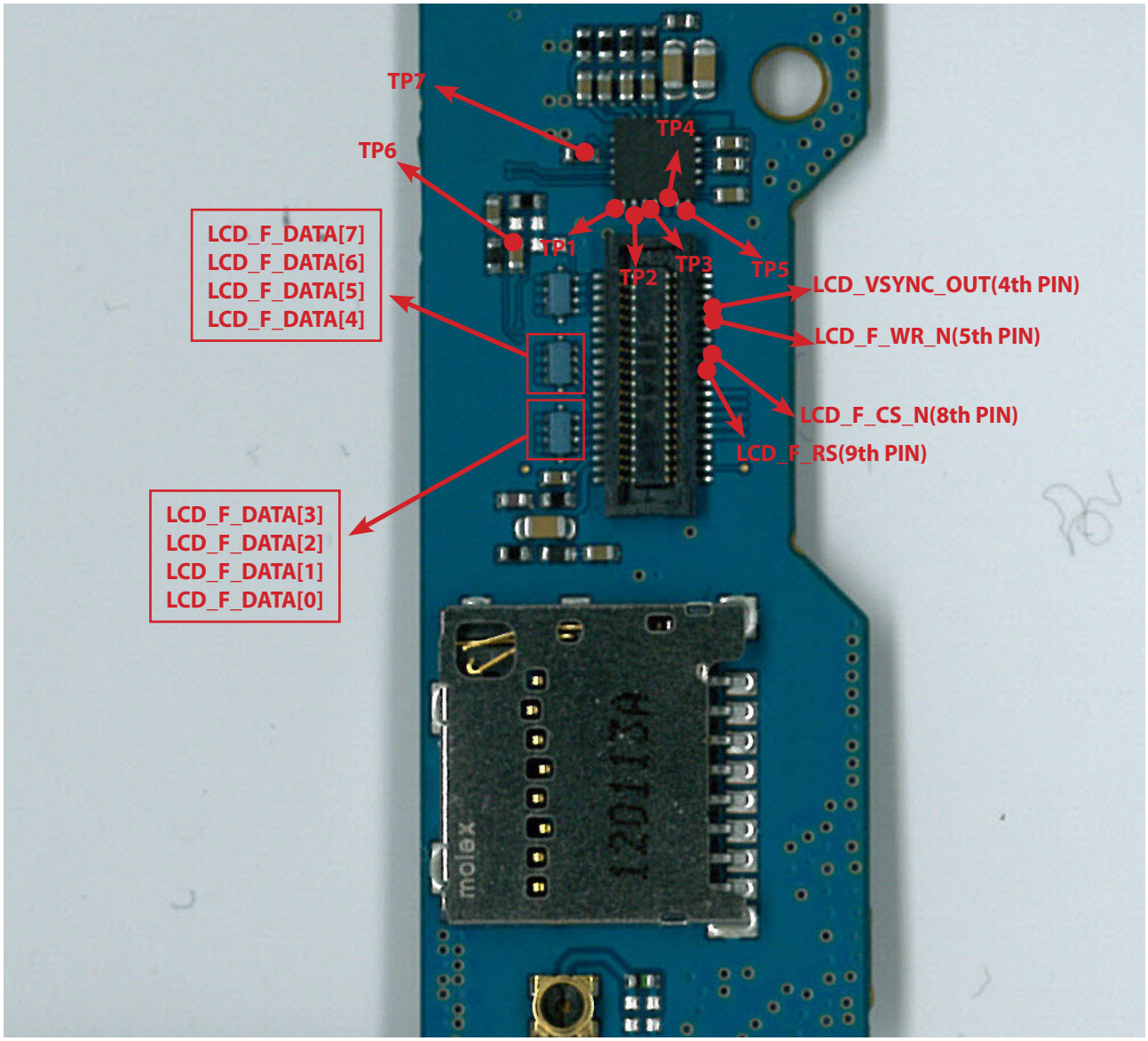
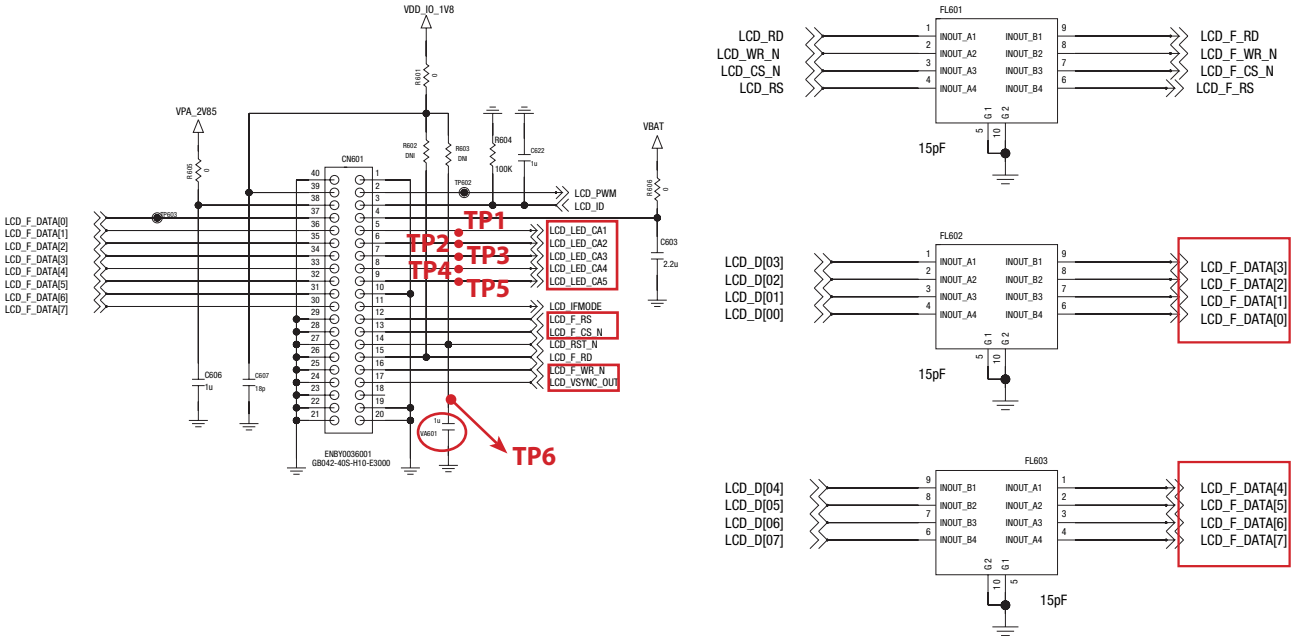
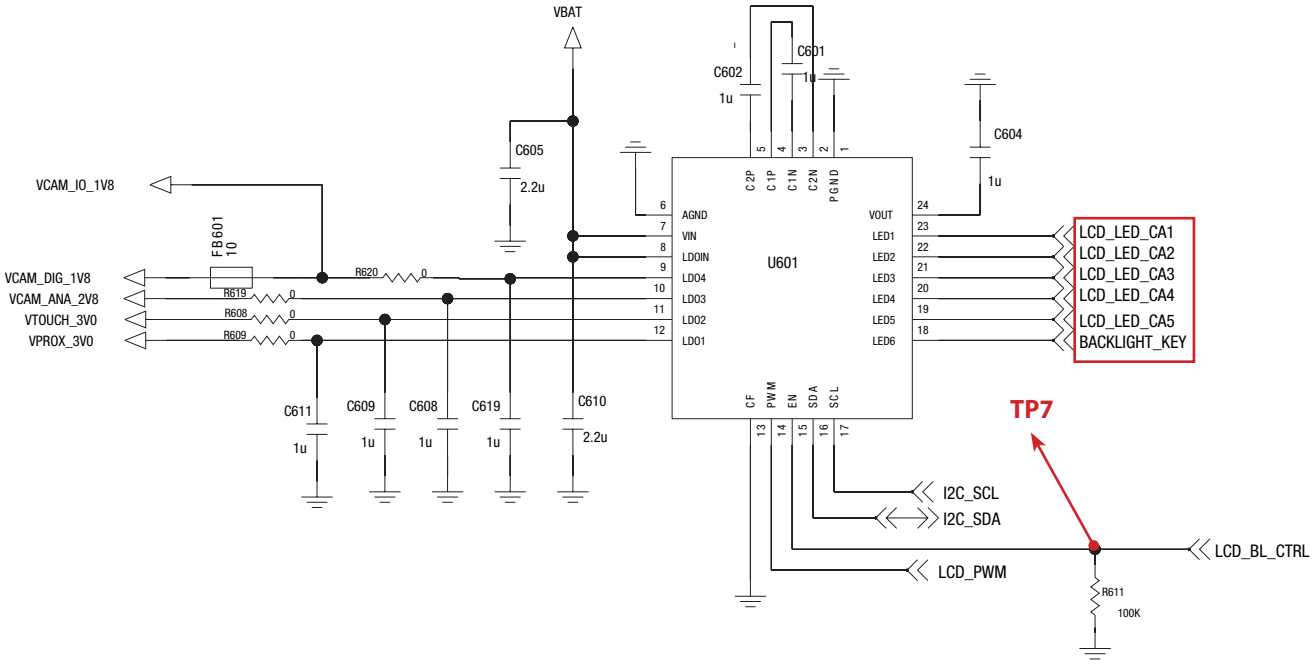
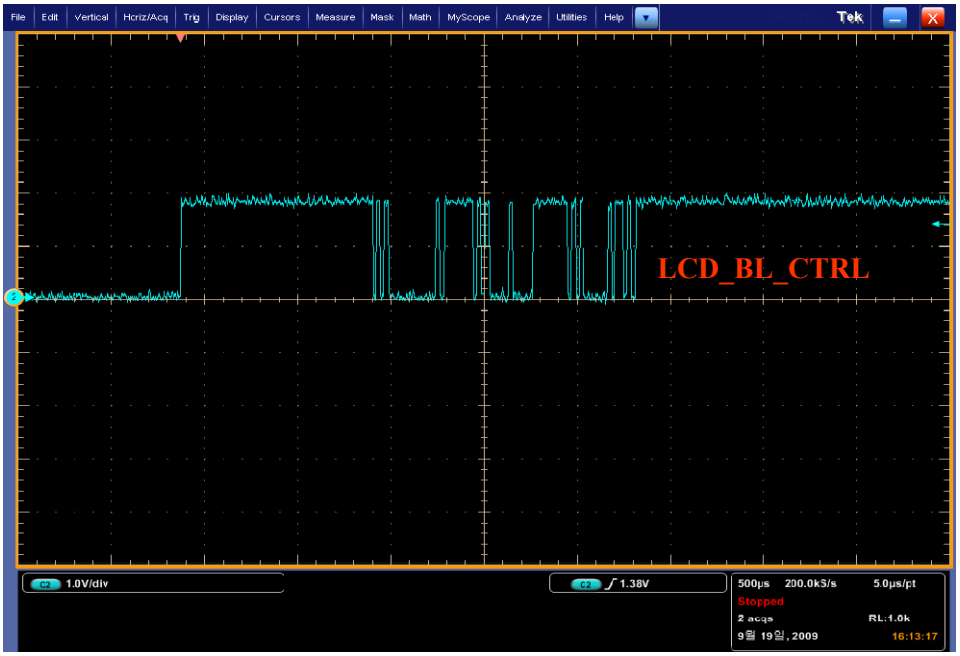


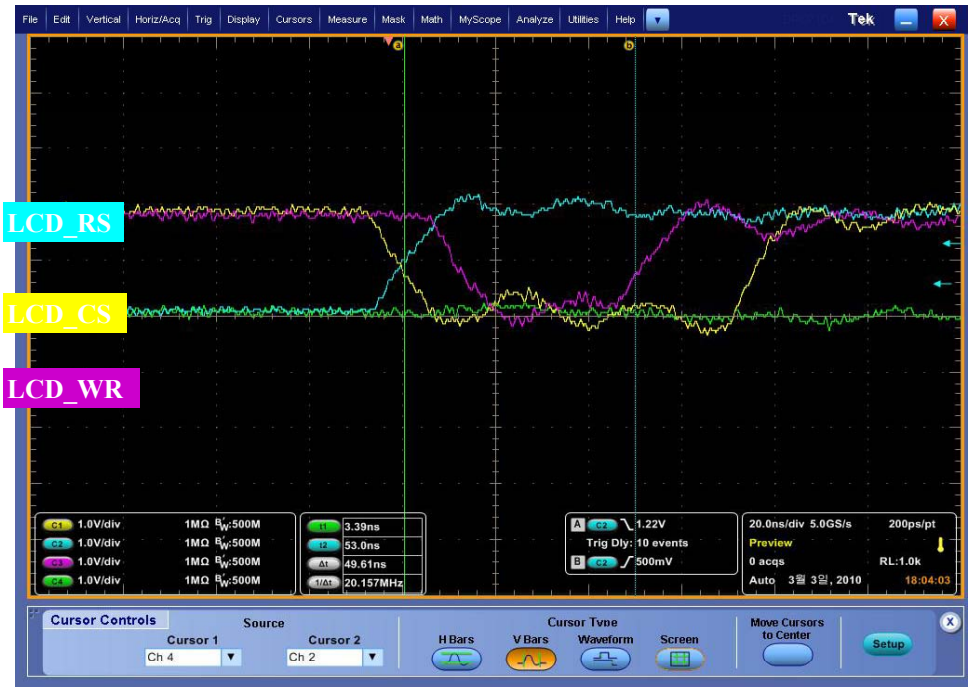
Figure 4.7



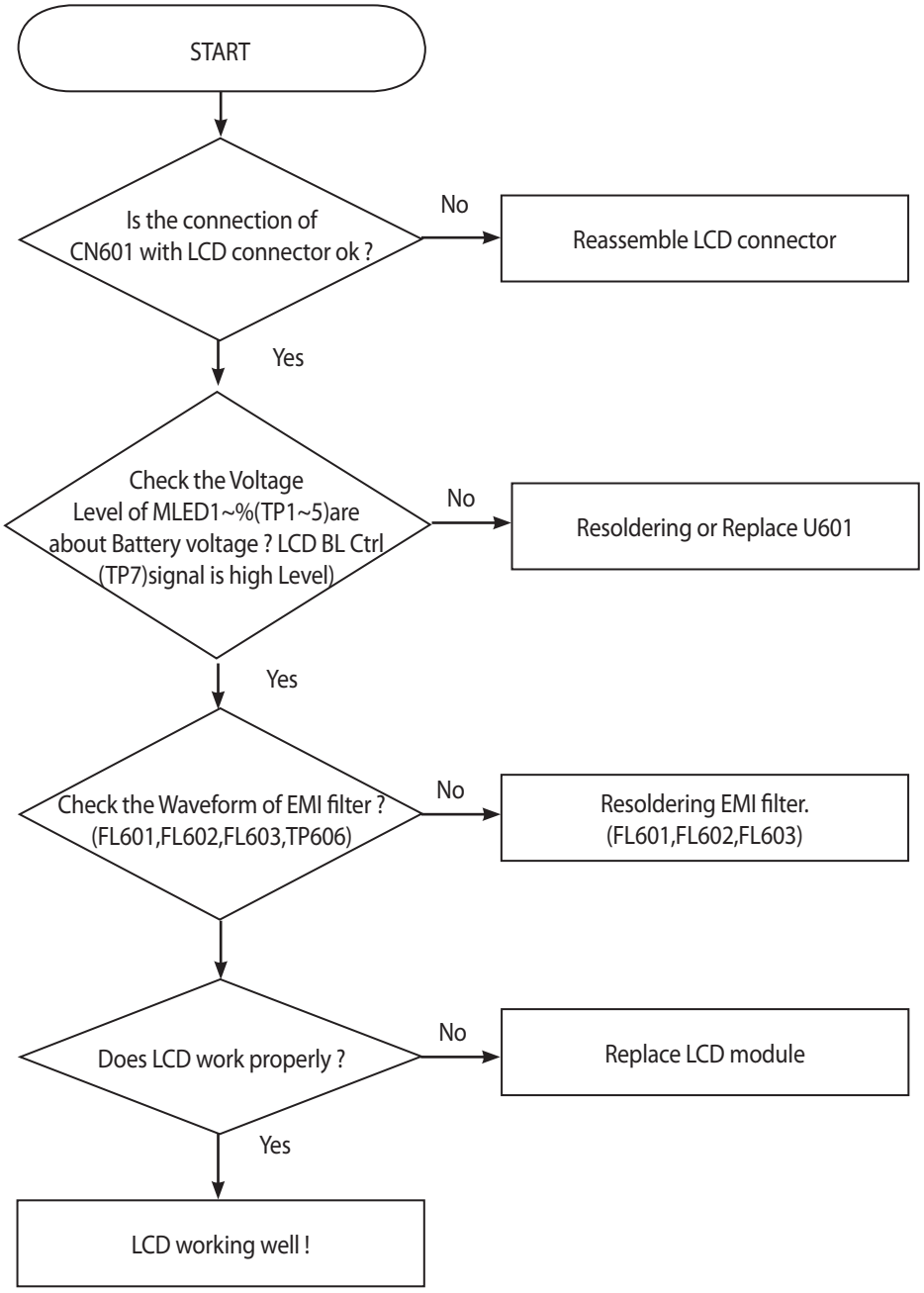




Graph 4.7.1. LCD Backlight Control Signal Waveform



Graph 4.7.2. LCD Data Waveform



4.7 Camera Trouble

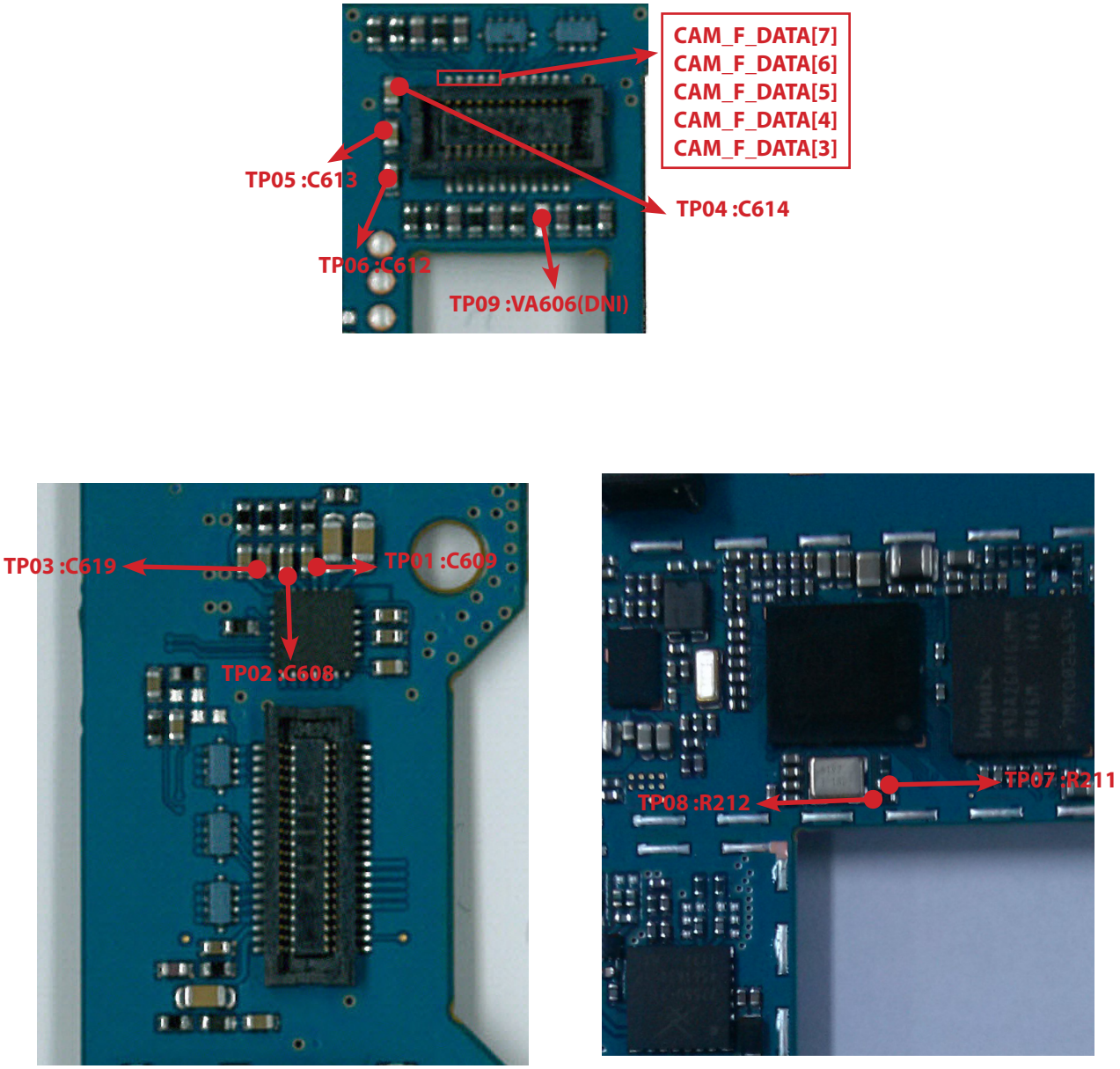
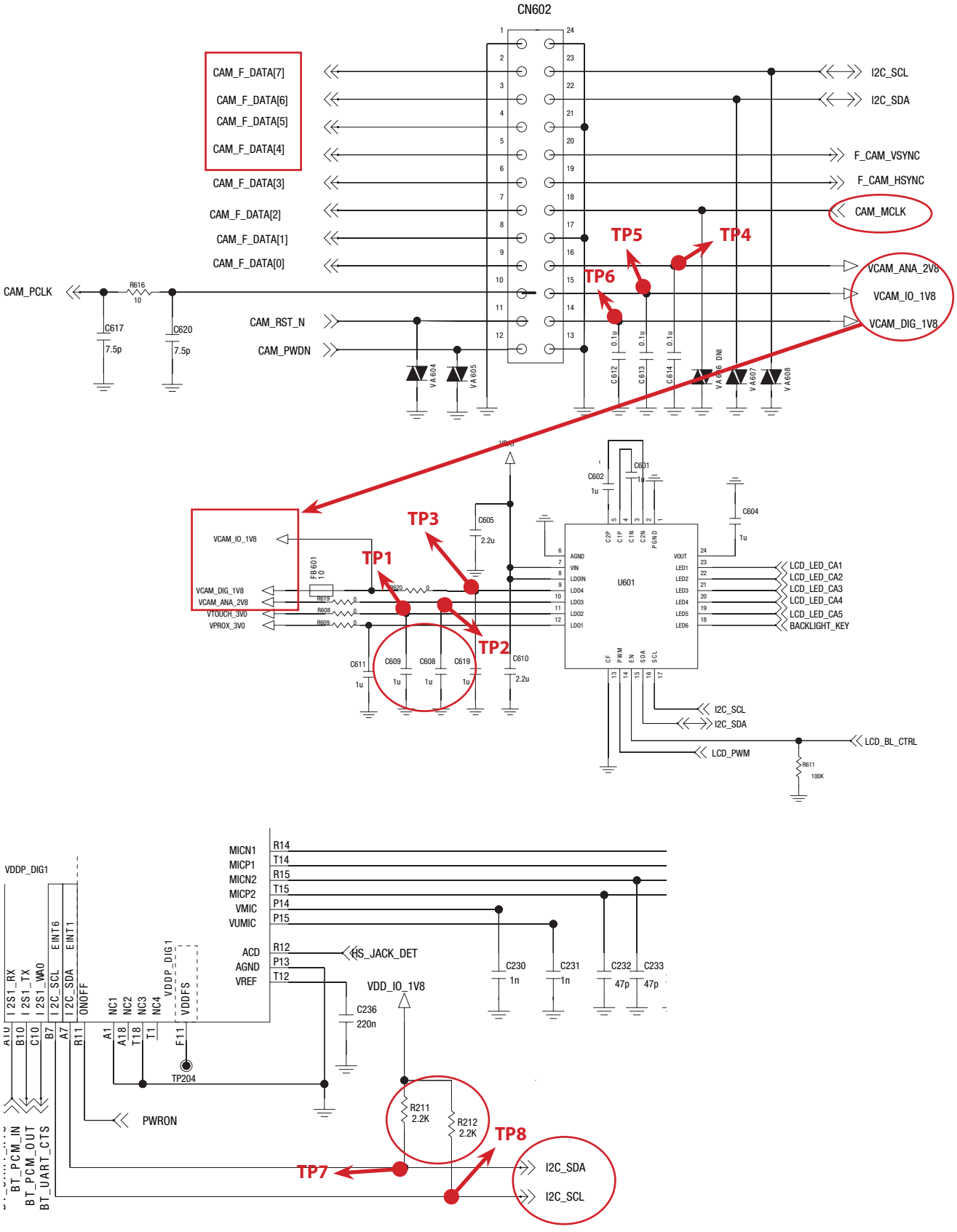
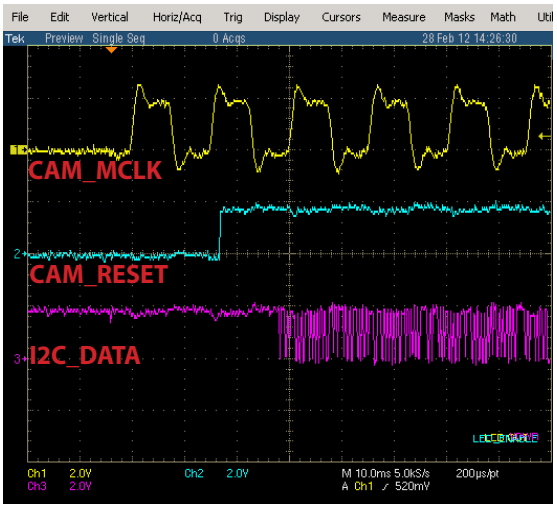
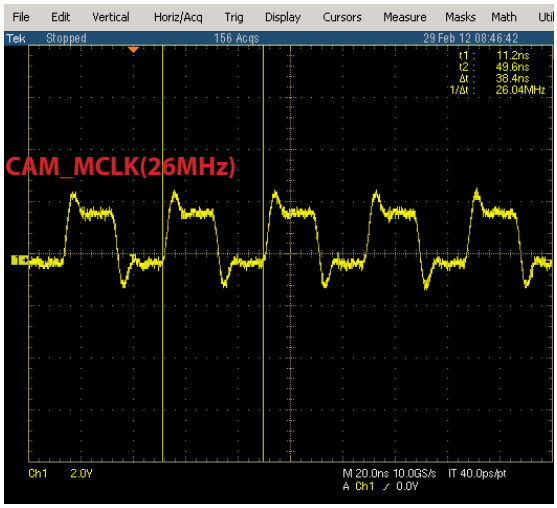


Figure 4.8

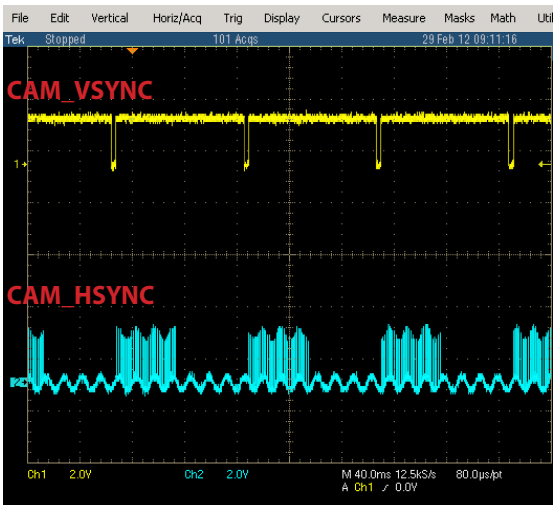




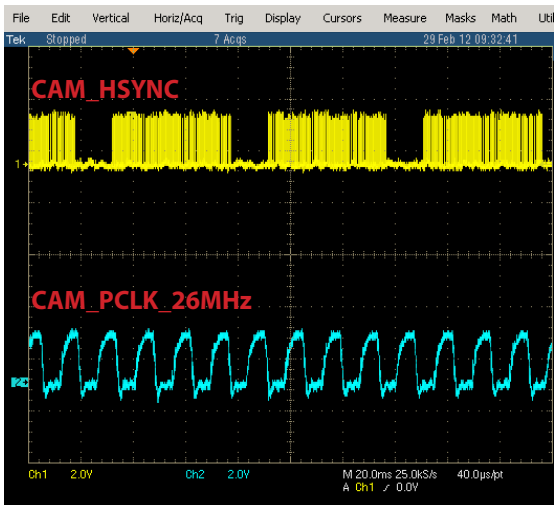
Graph 4.8.1. I2C Data Waveform



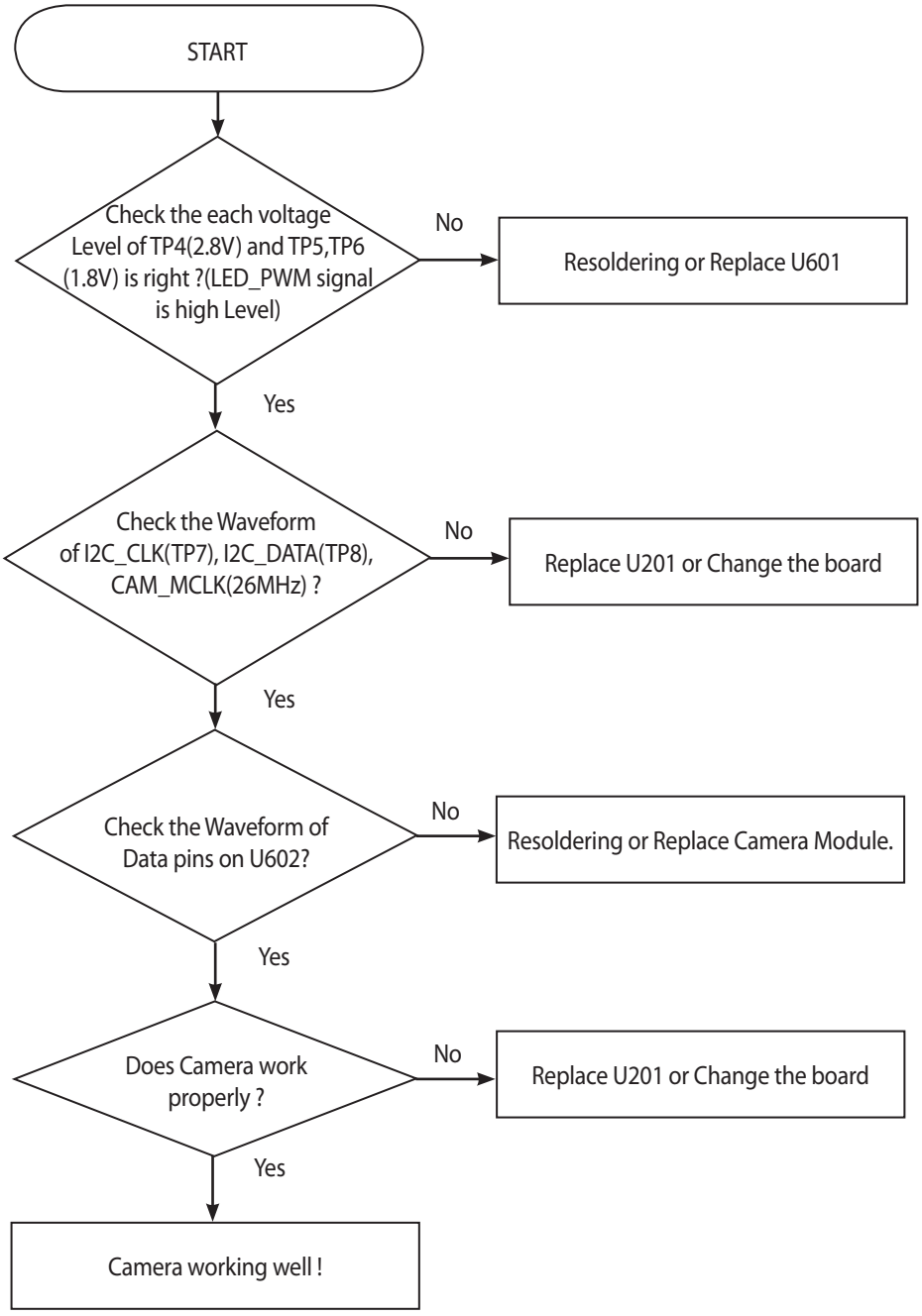
Graph 4.8.2. MCLK Waveform



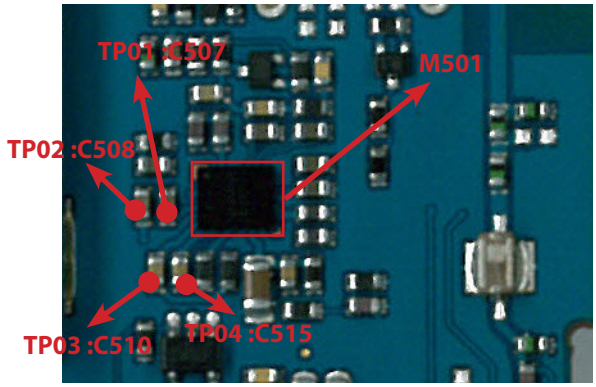
Graph 4.8.3.CAM_VSYNC vs. CAM_HSYNC Waveform

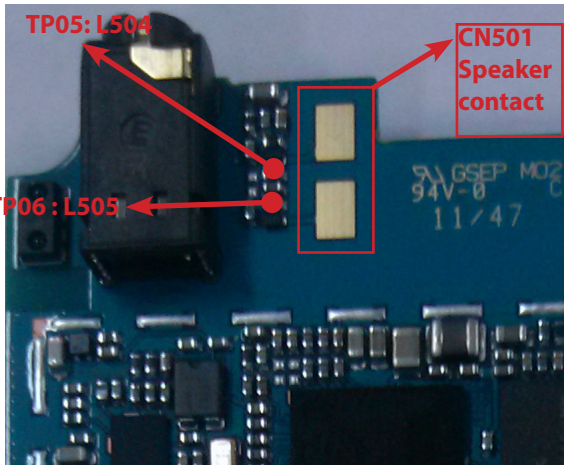


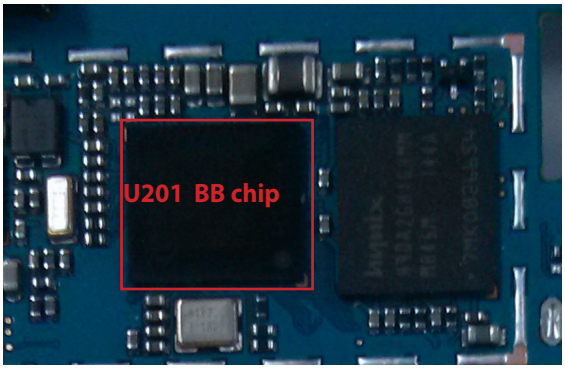
Graph 4.8.4.CAM_HSYNC vs. CAM_PCLK Waveform

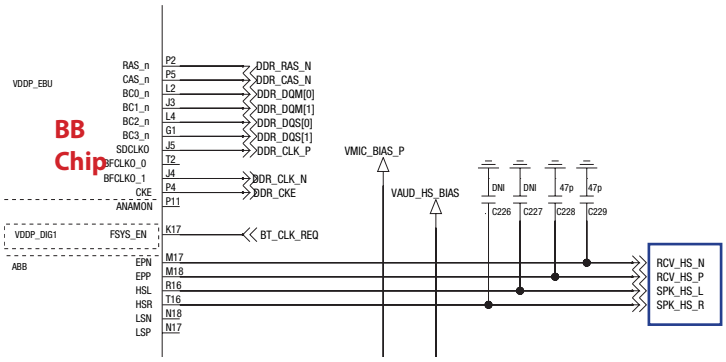


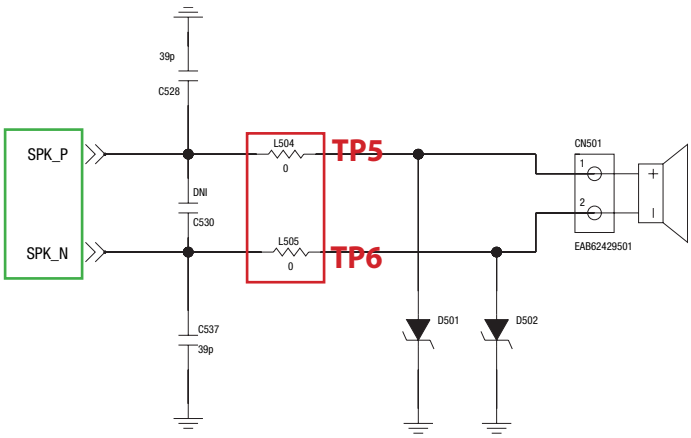
4.8 Speaker / Receiver Trouble

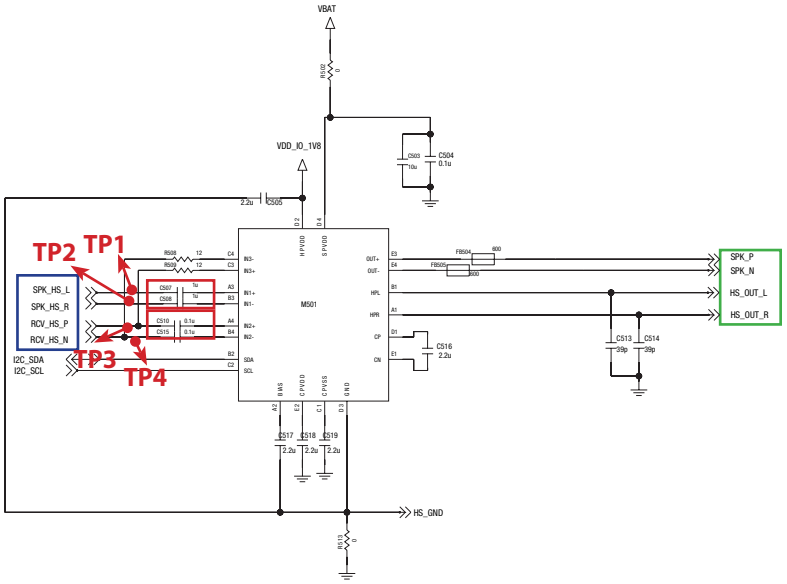


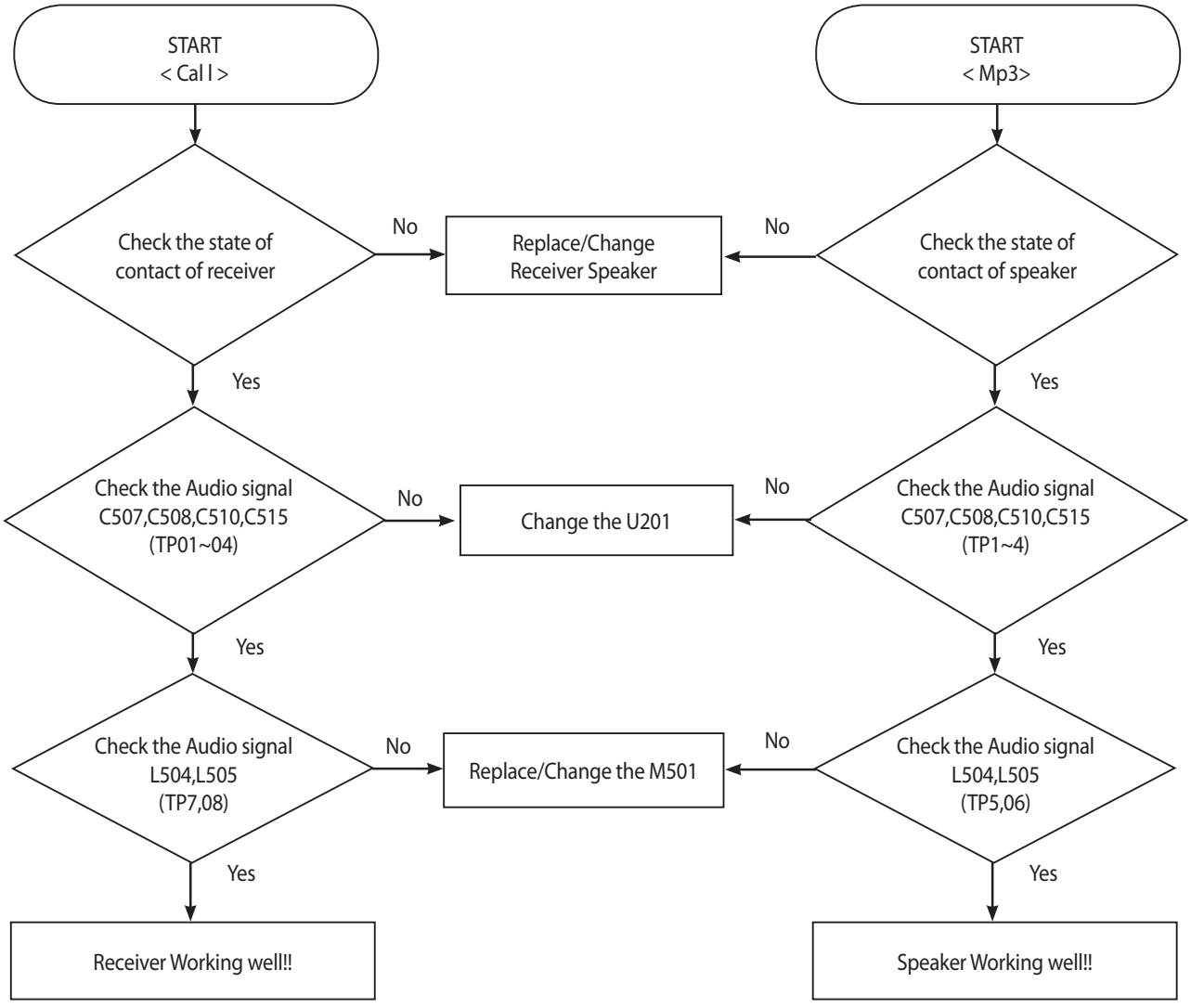




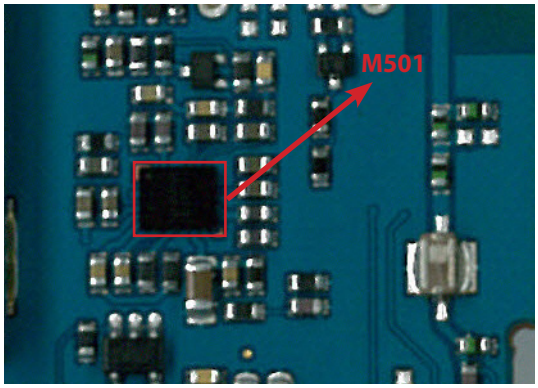


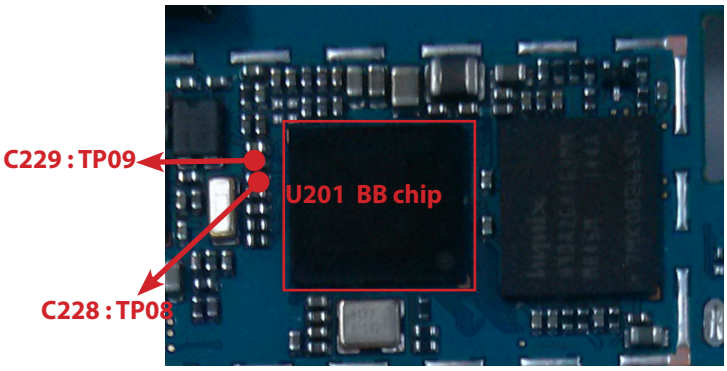


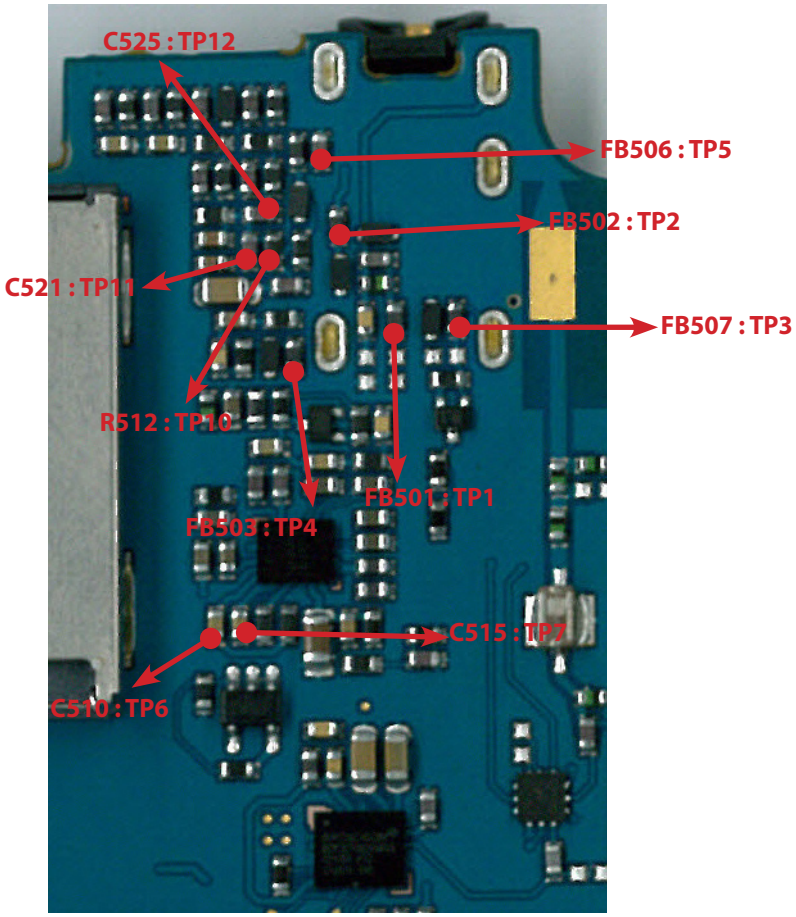


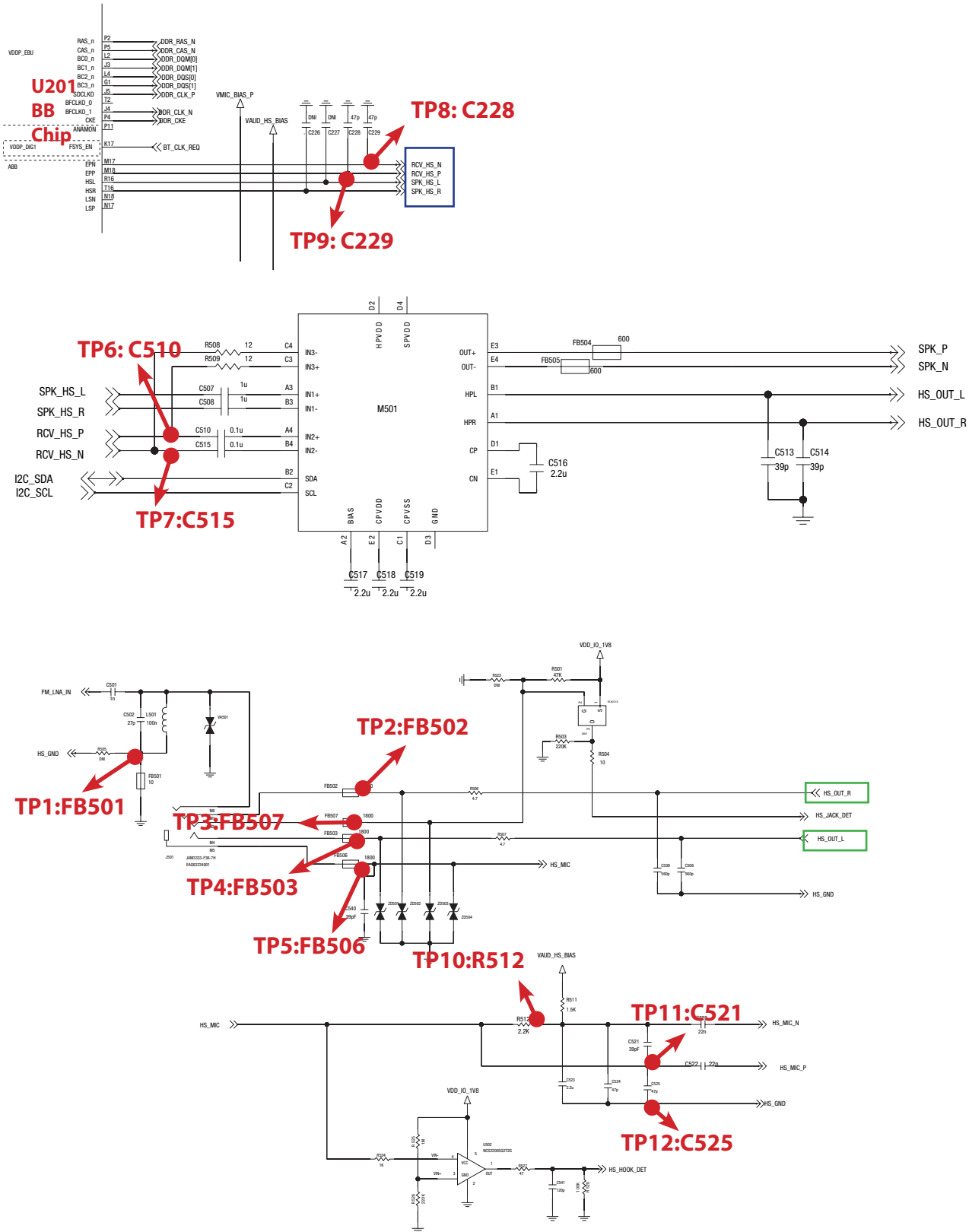


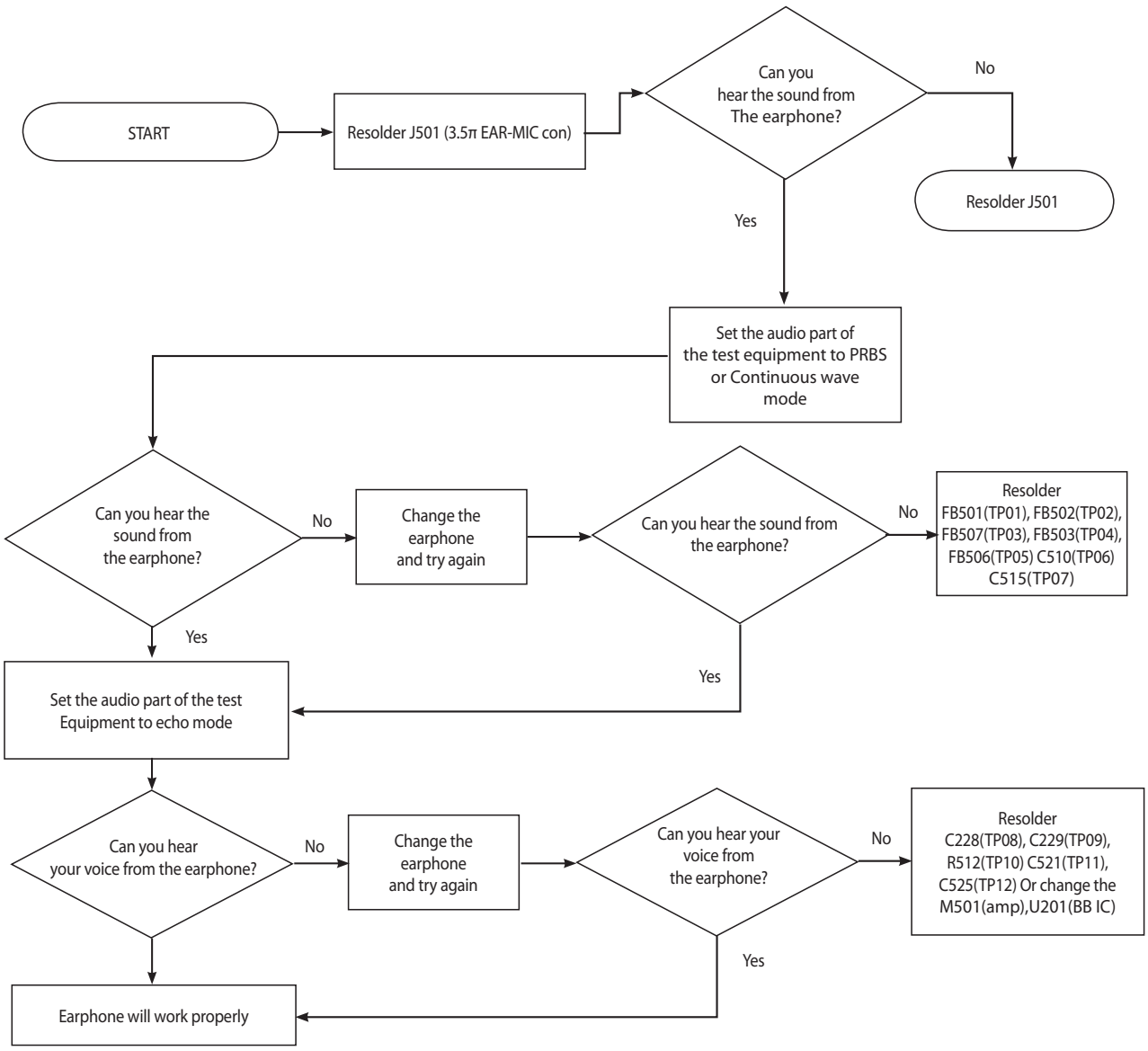
4.9 Earphone Trouble











4.10 Microphone Trouble

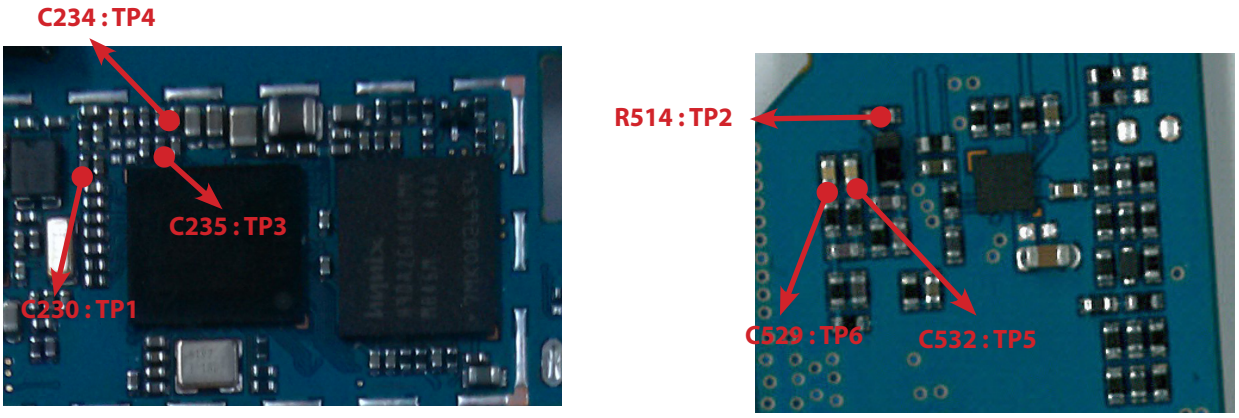
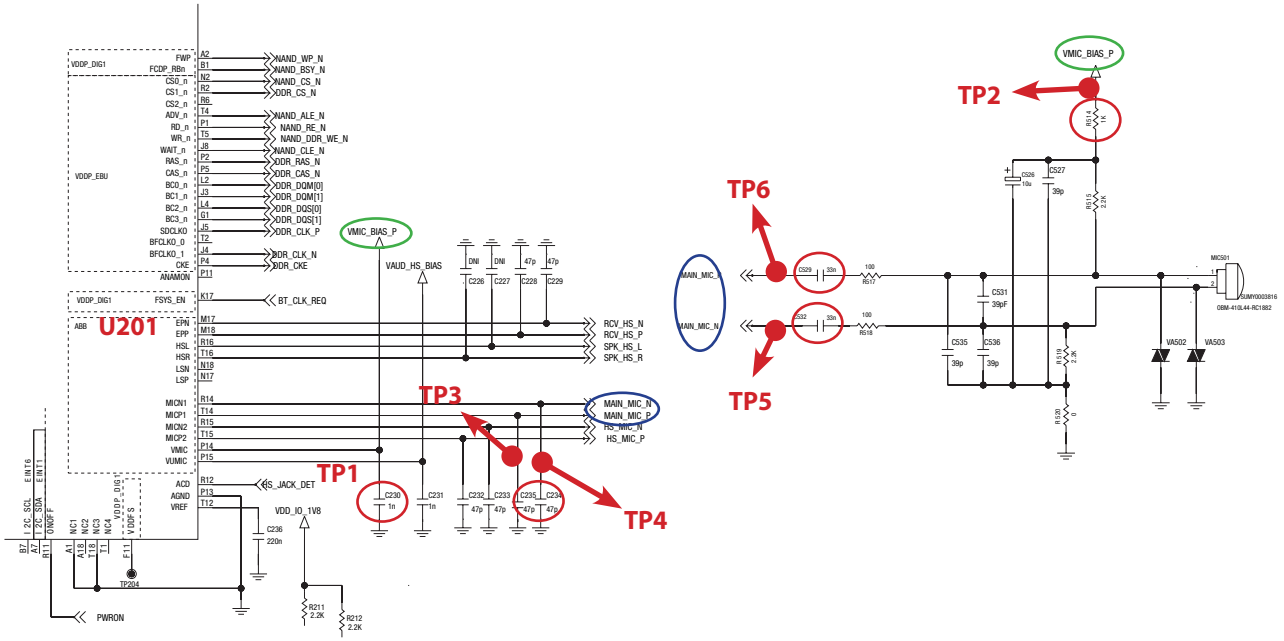
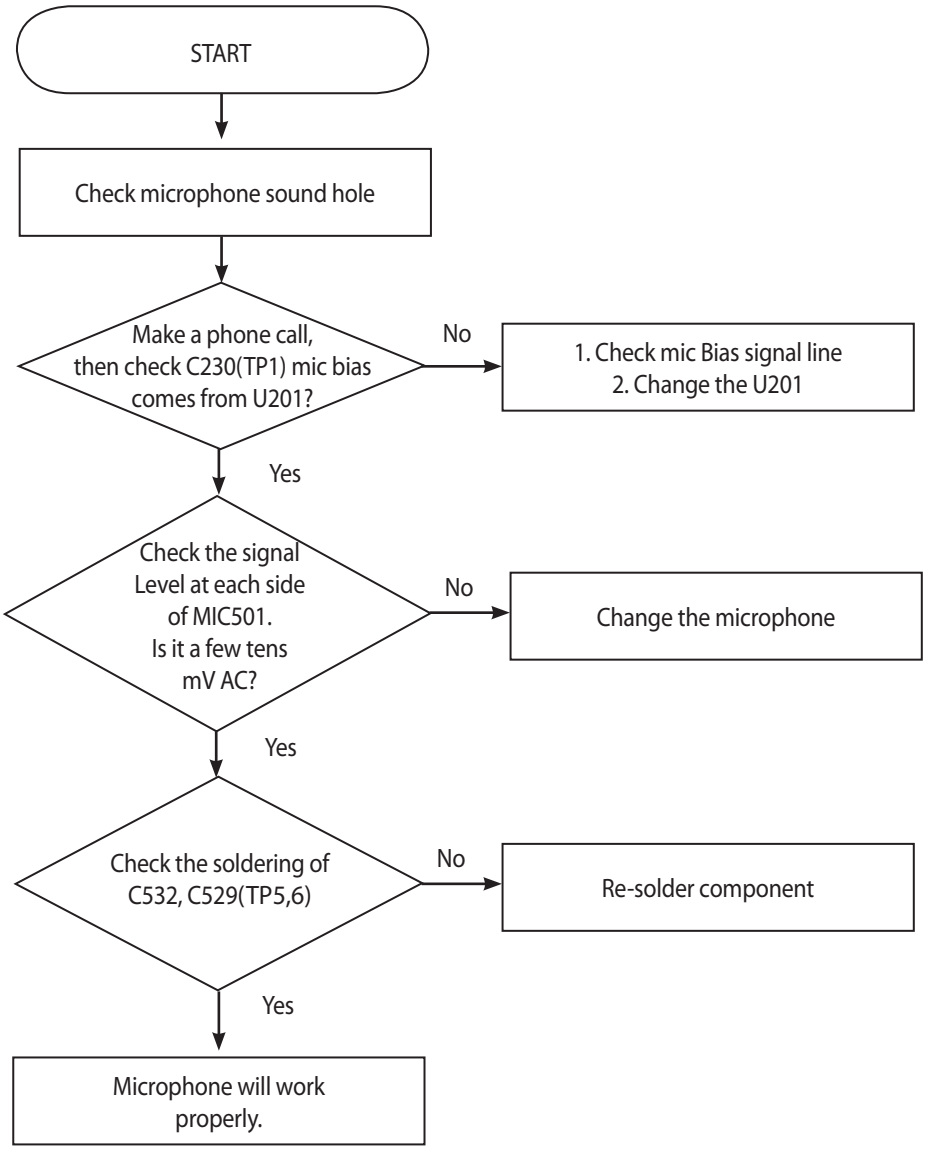


Figure 4.12



SETTING : After initialize Agilent 8960, Test EGSM900, DCS mode (or GSM850, PCS mode)



4.11 SIM Card Interface Trouble

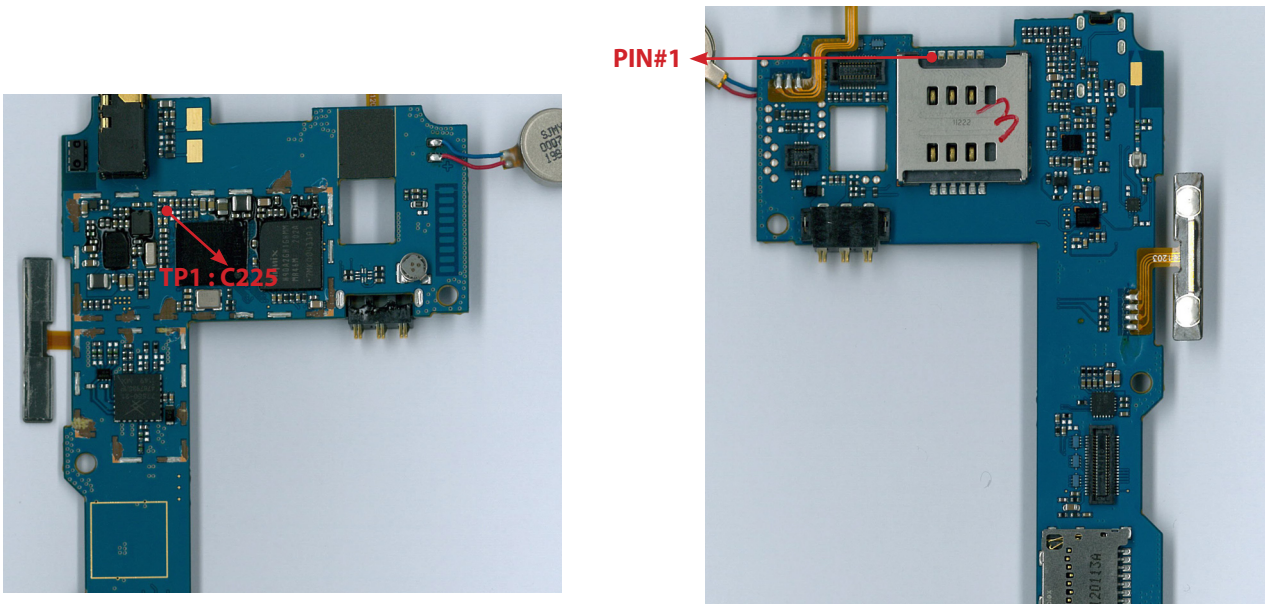
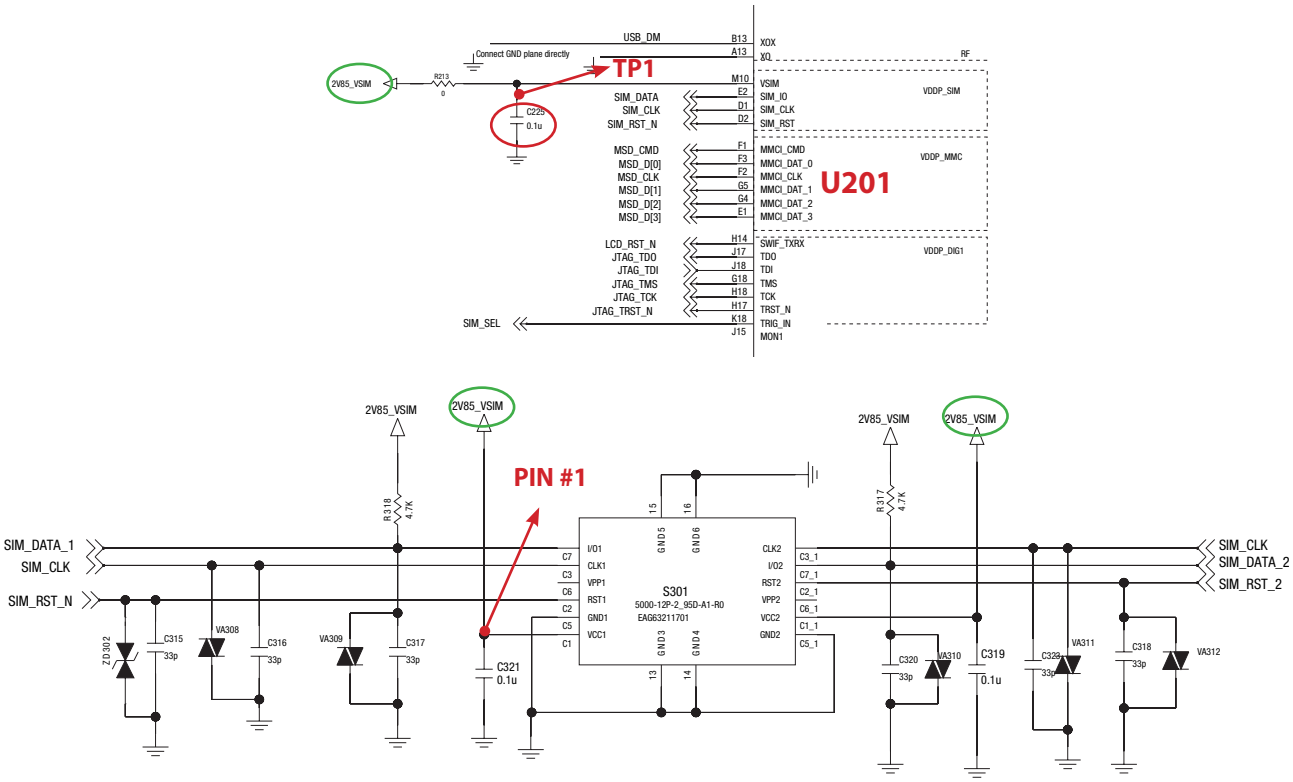
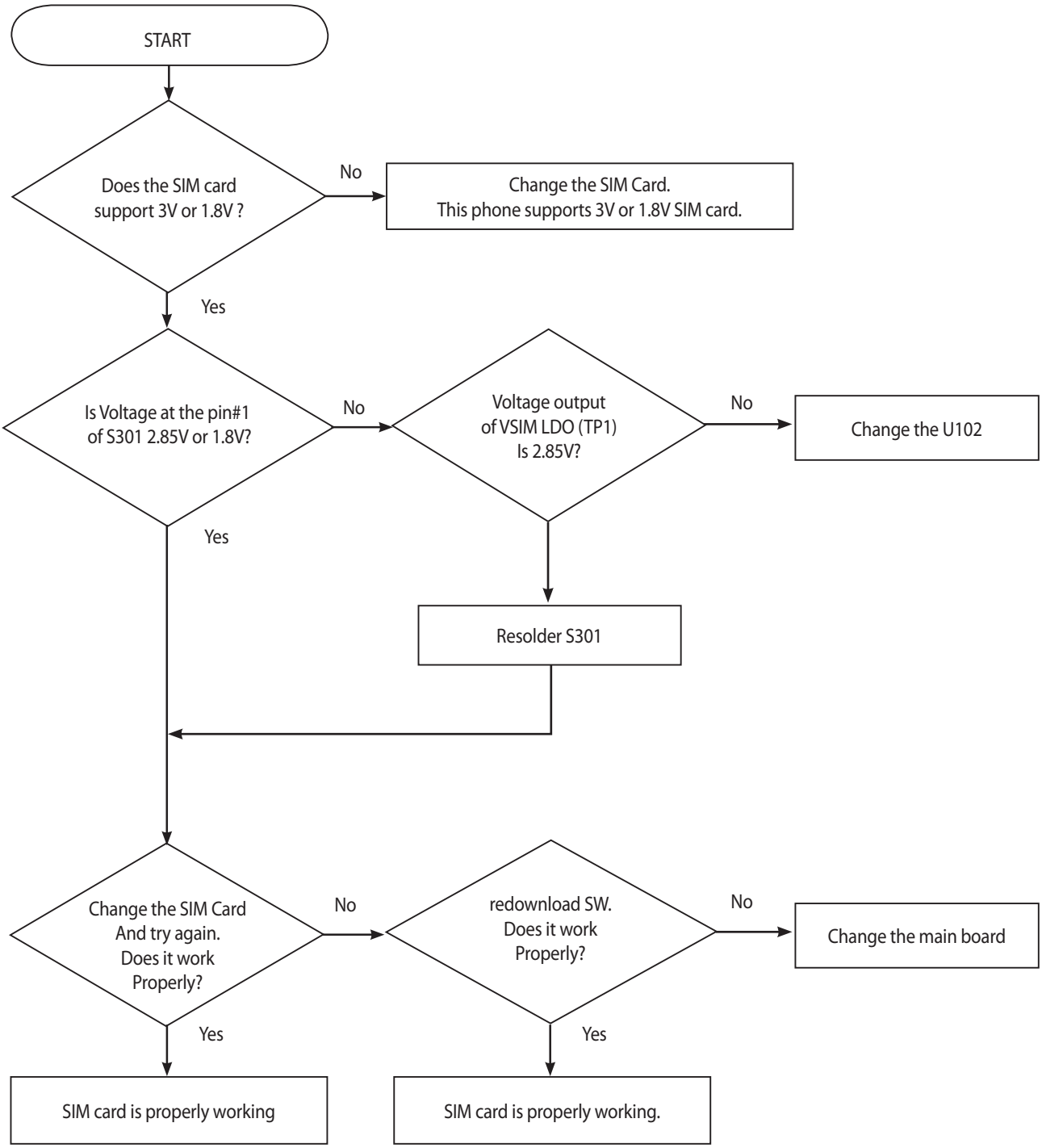


Figure 4.13





4.12 Micro SD (uSD) Trouble

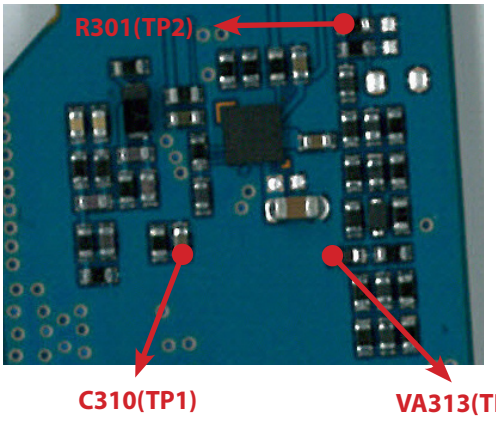
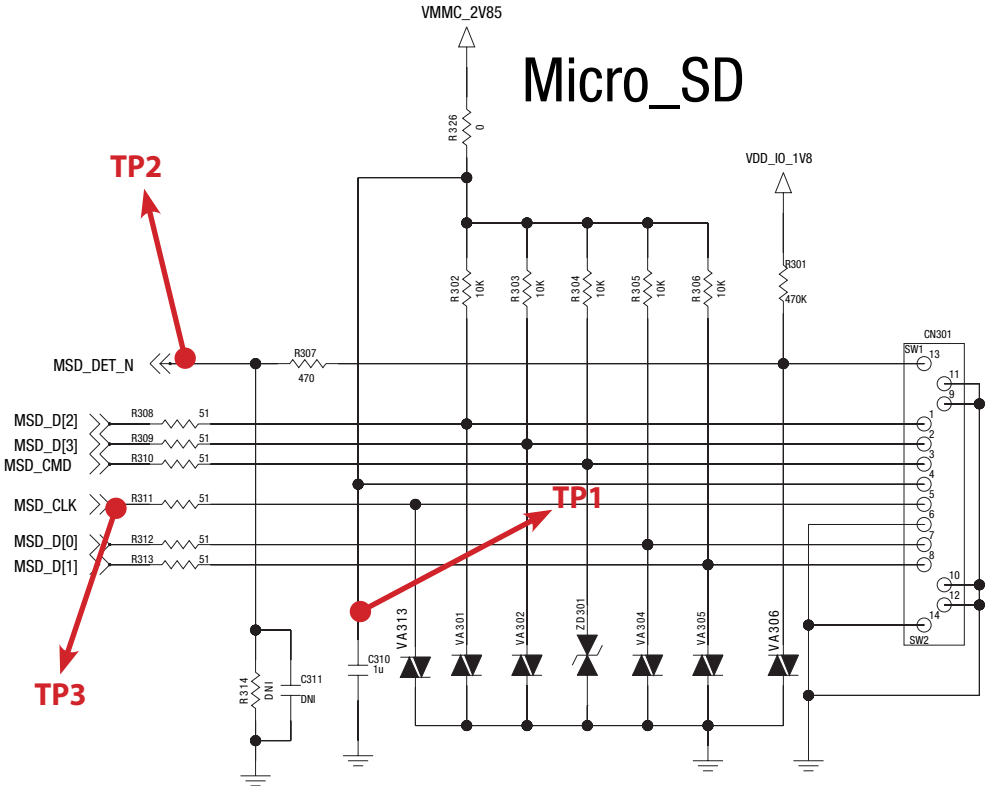
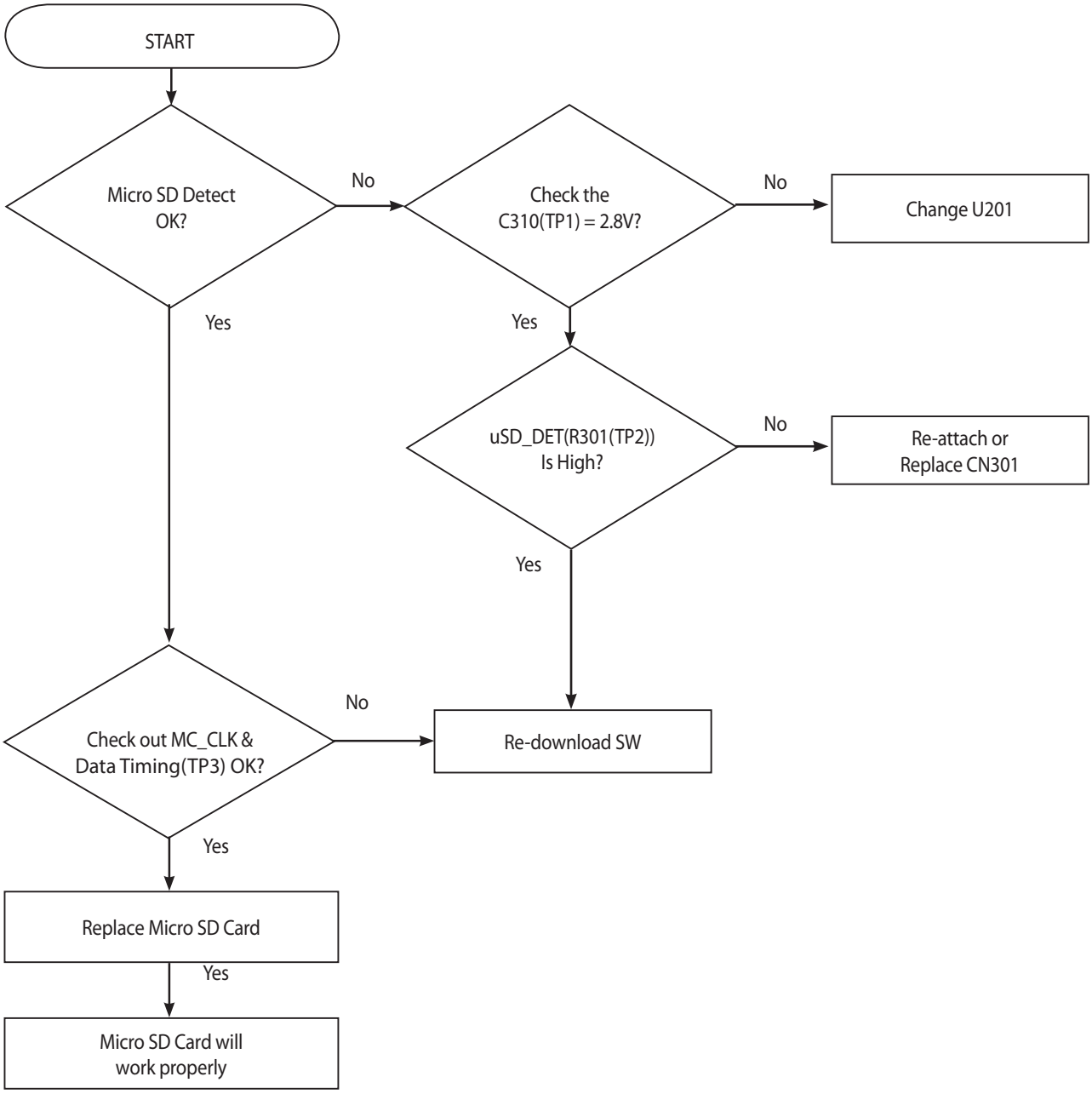


Figure 4.14





4.13 Bluetooth Trouble

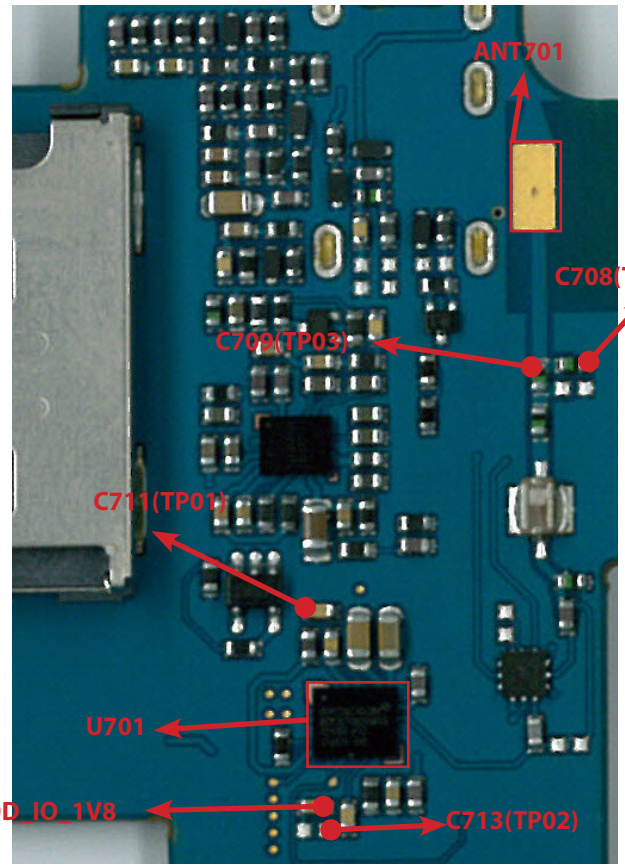
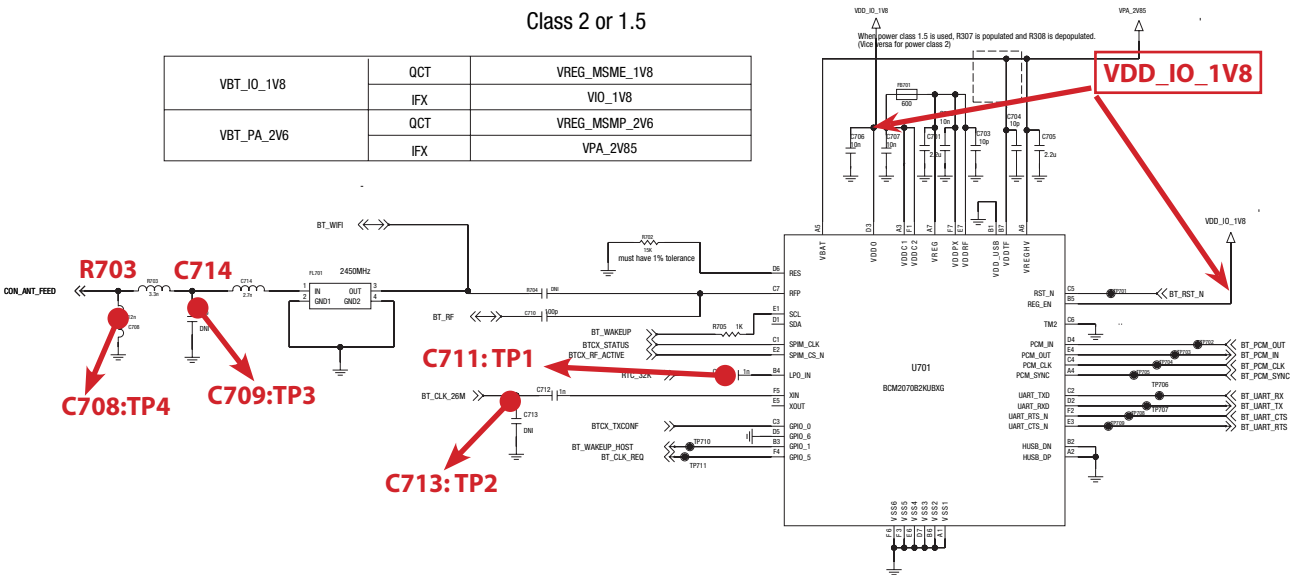
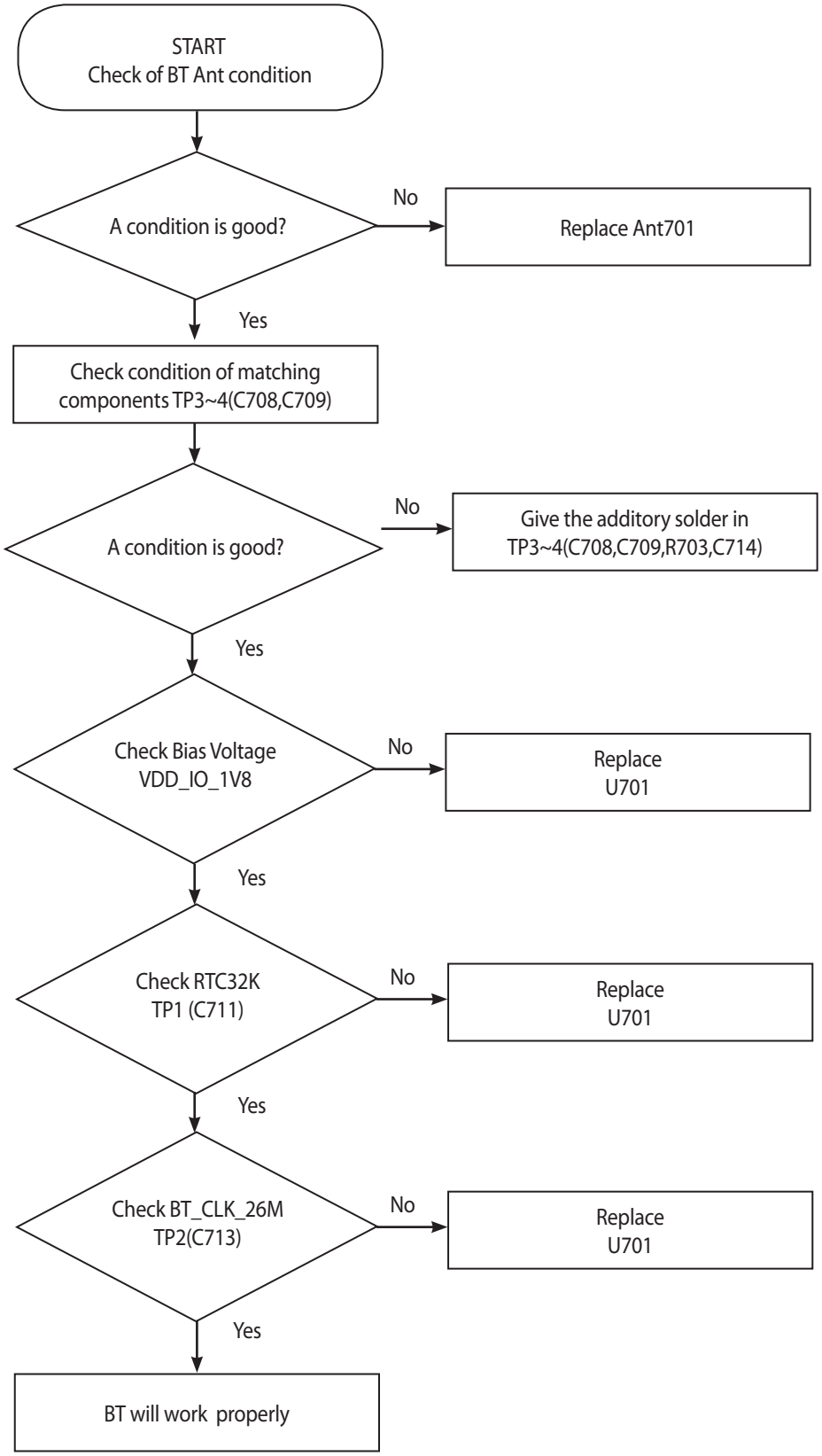
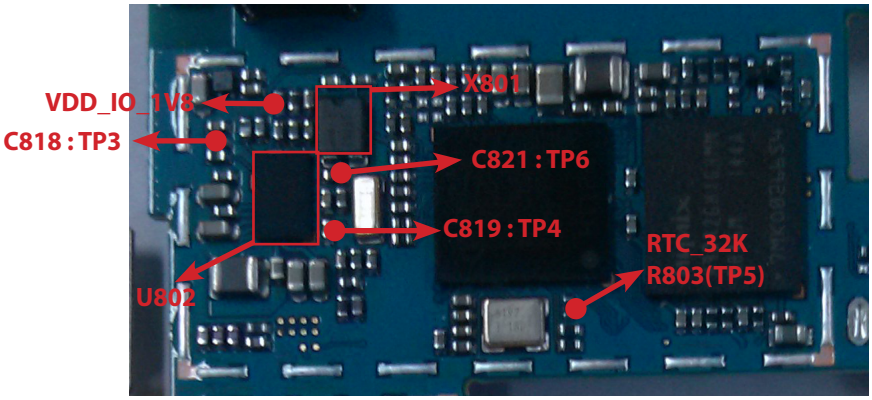


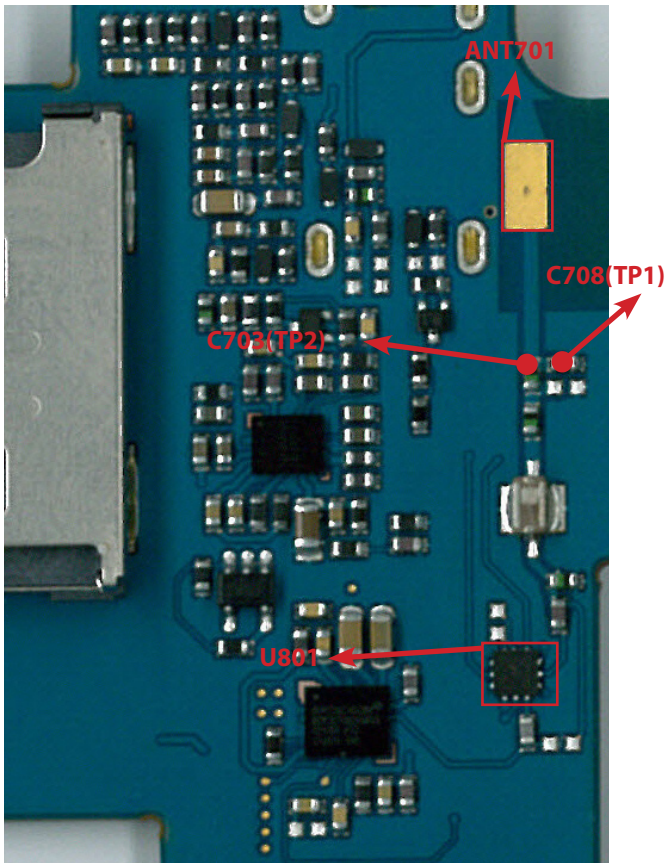
Figure 4.16.1

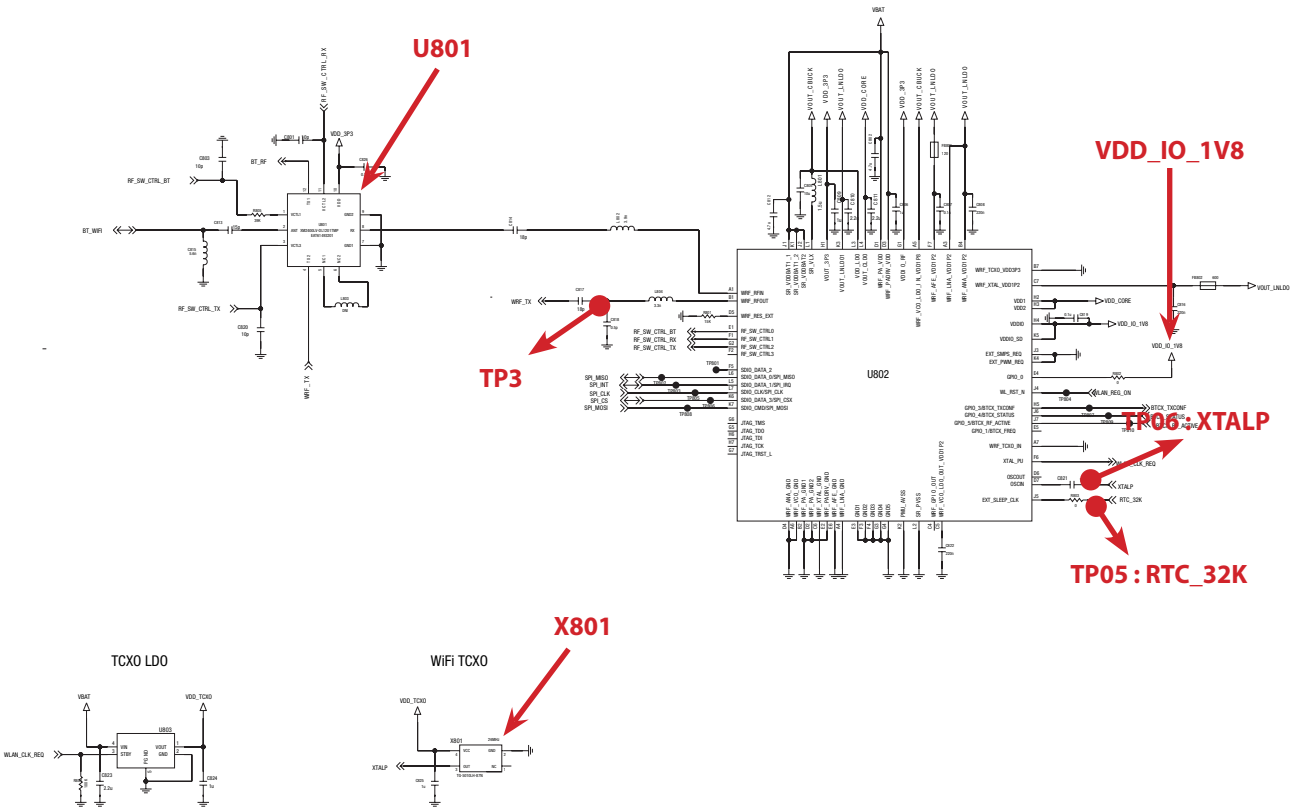


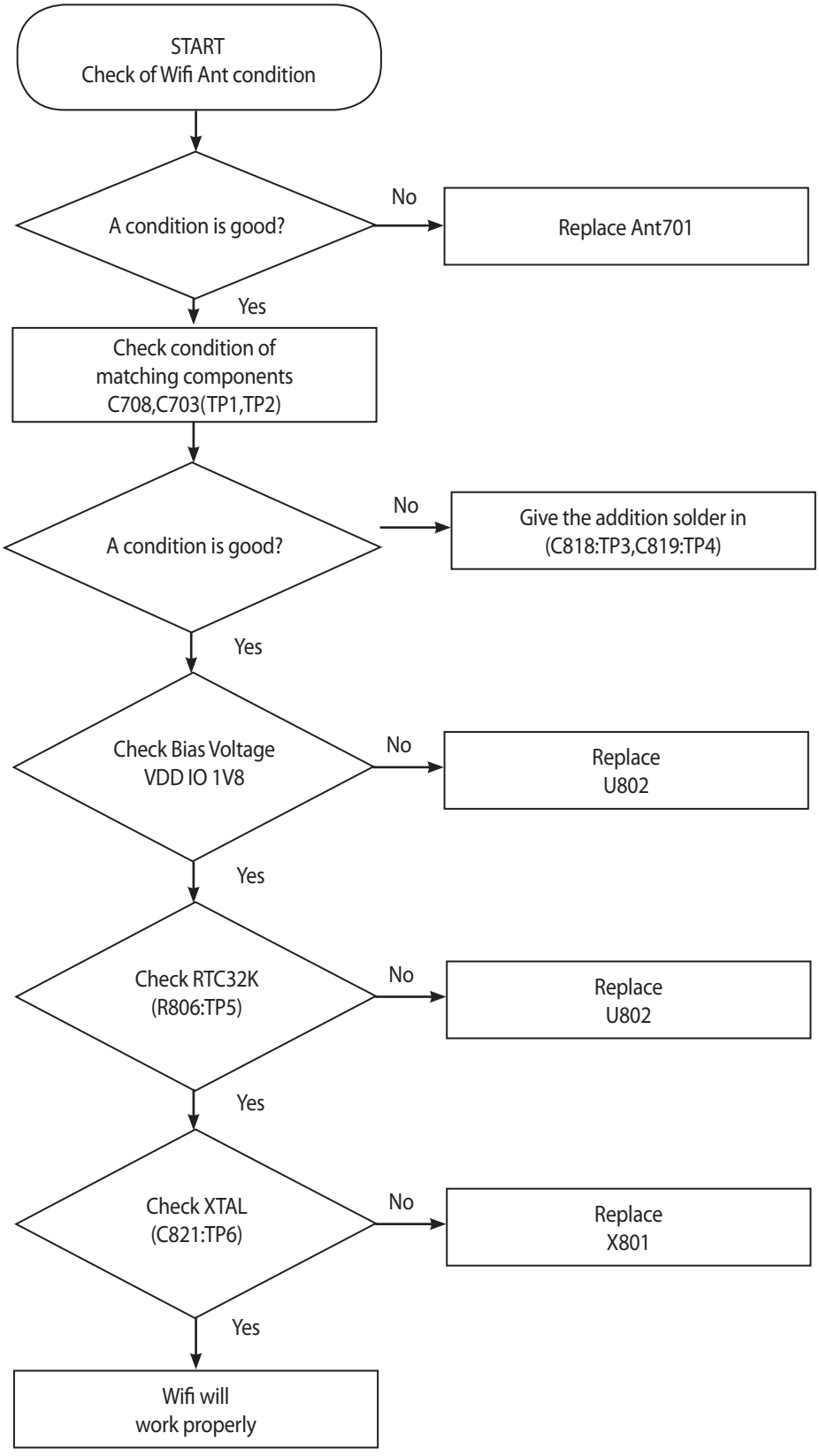


4.14 WiFi Trouble









4.15 FM Radio Trouble

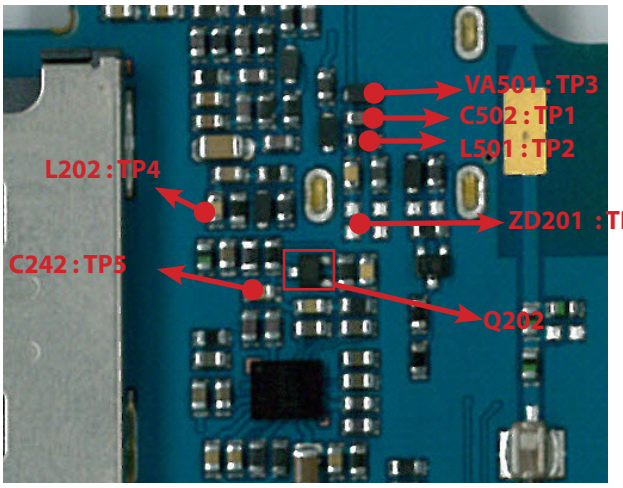
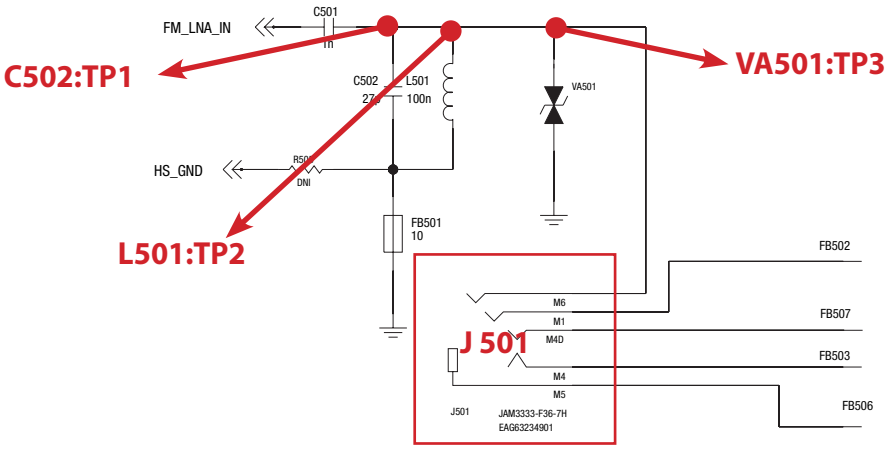
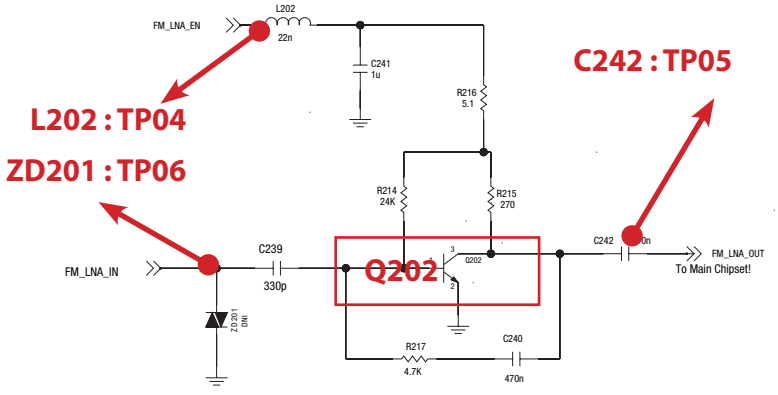
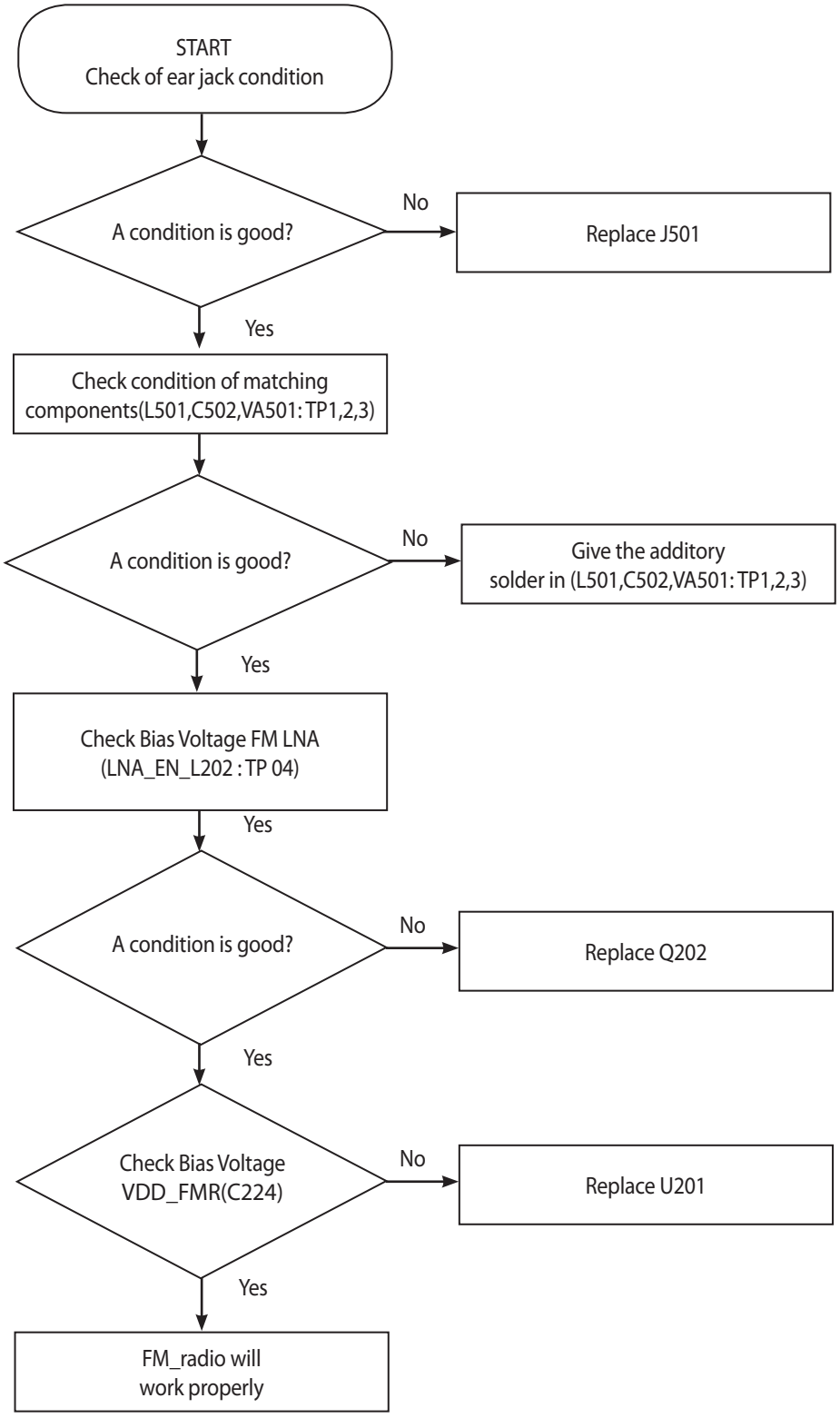


Figure 4.17

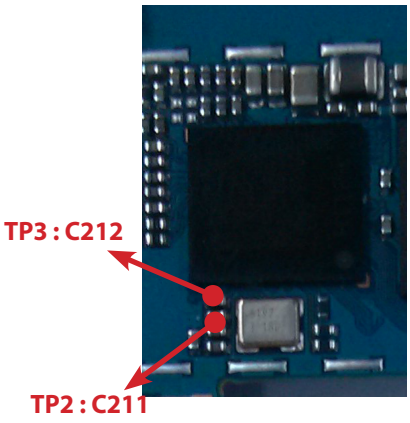


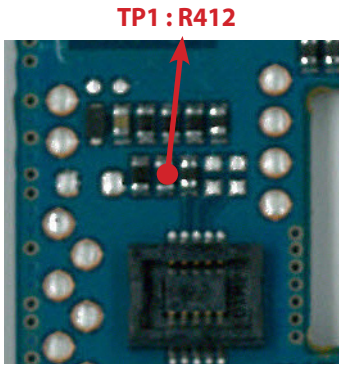
FM Radio(LNA)

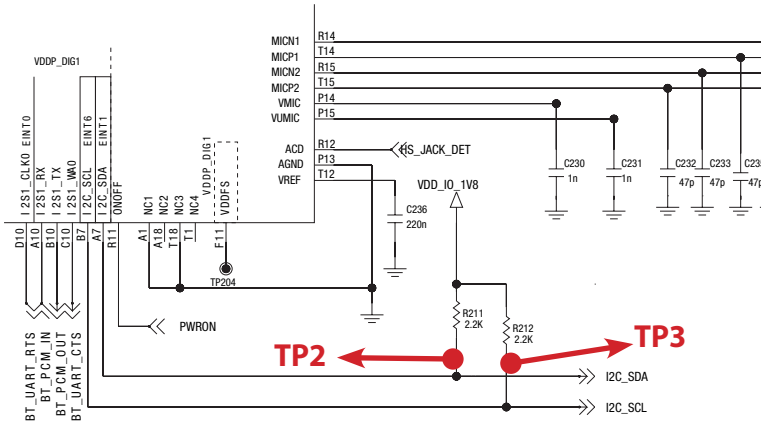


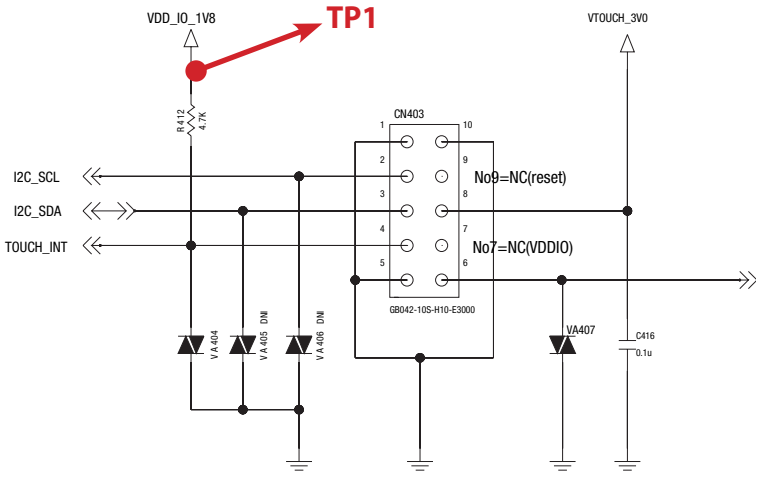


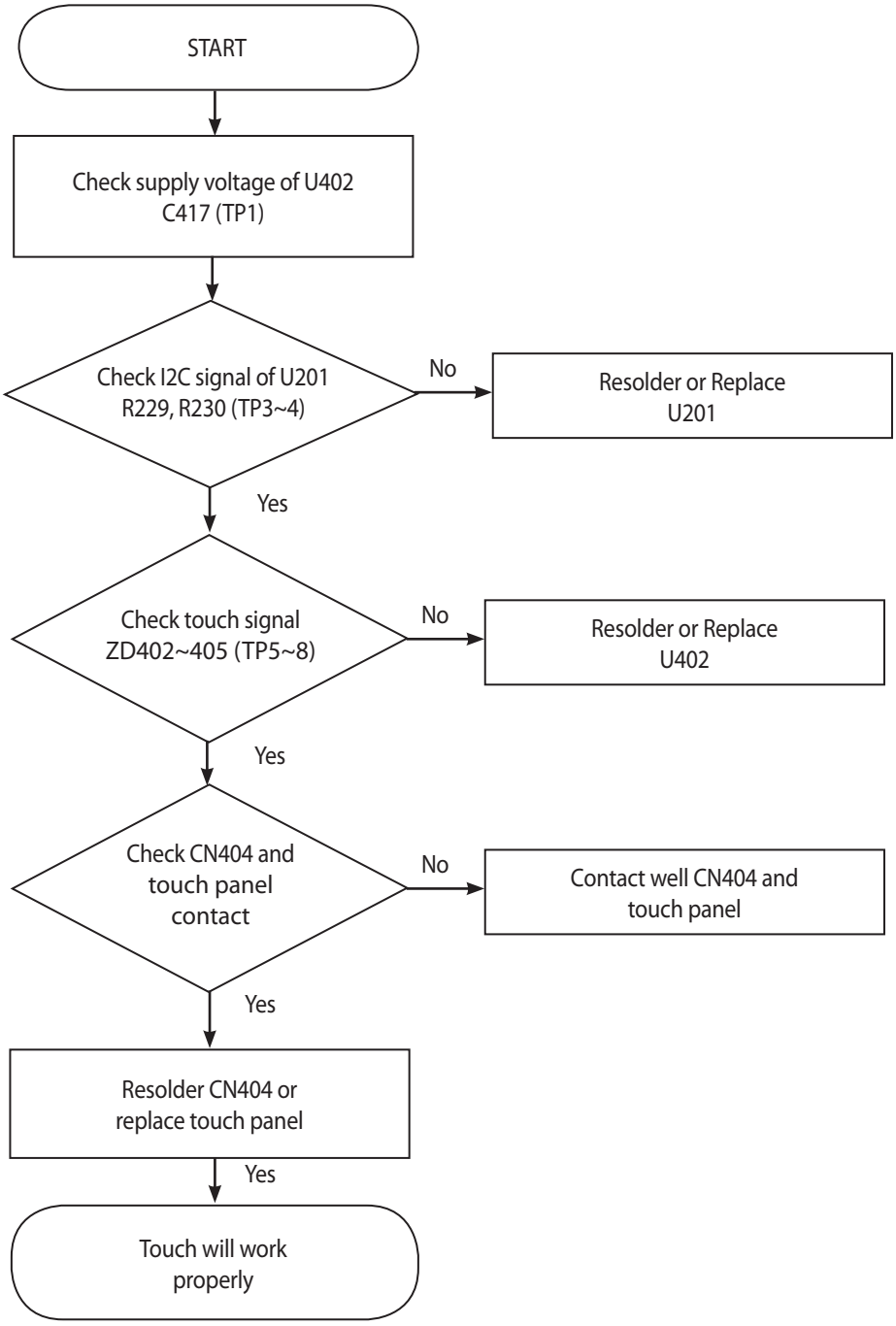
4.16 Touch trouble



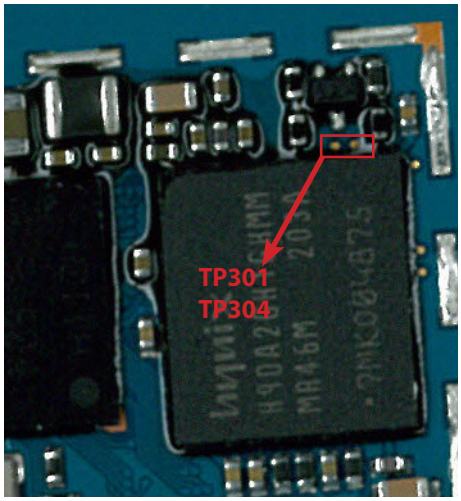


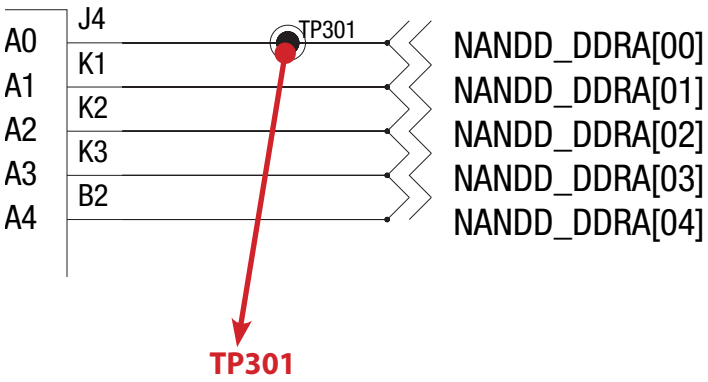


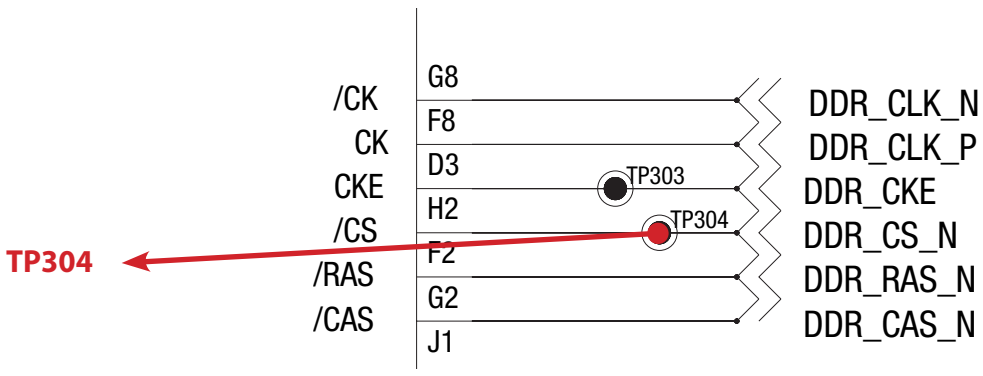


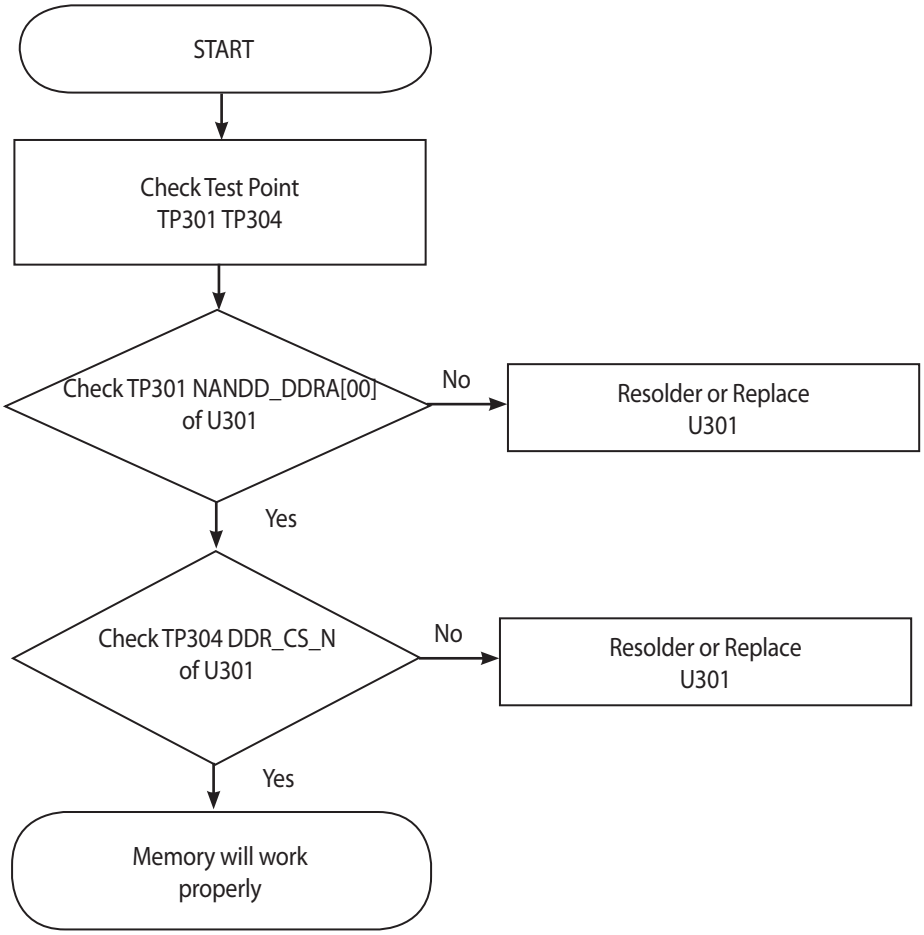


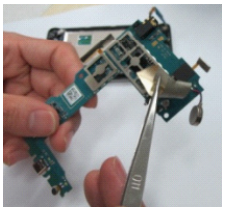
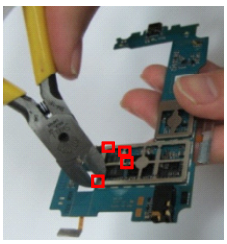
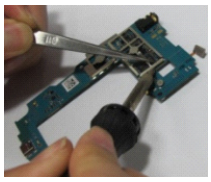
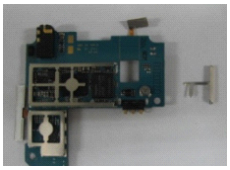
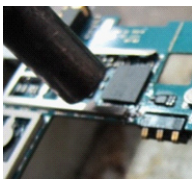
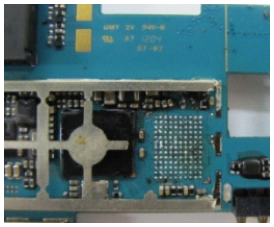
4.17 Memory trouble

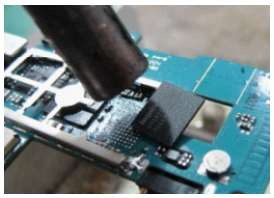
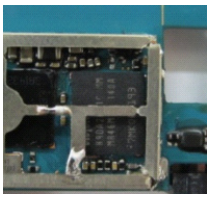
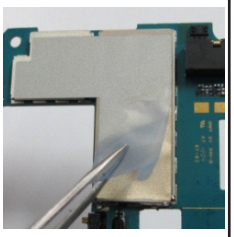
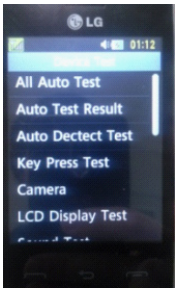




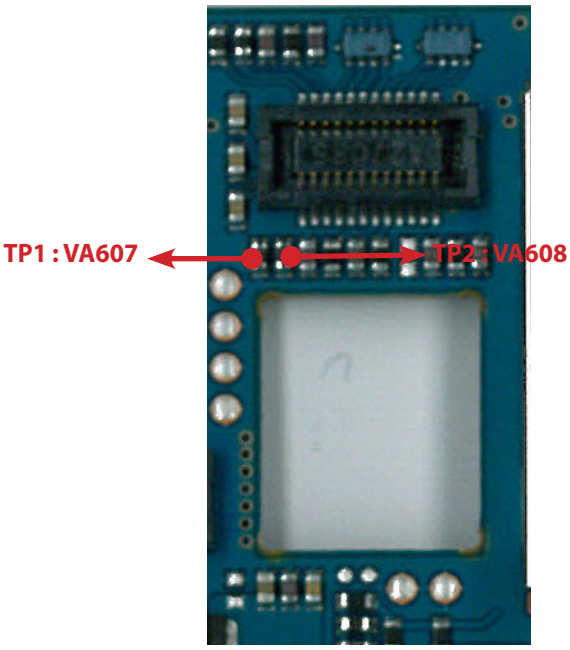


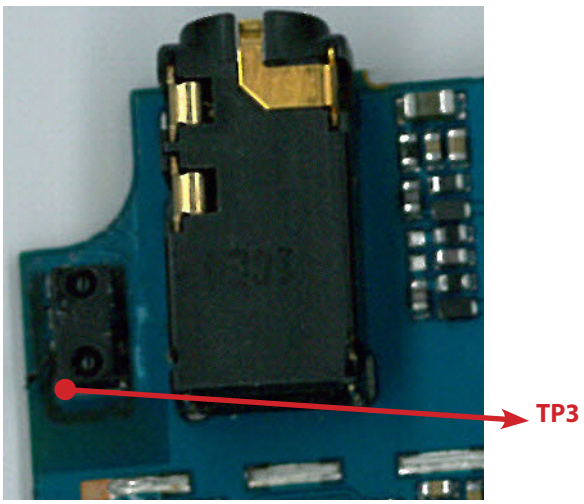


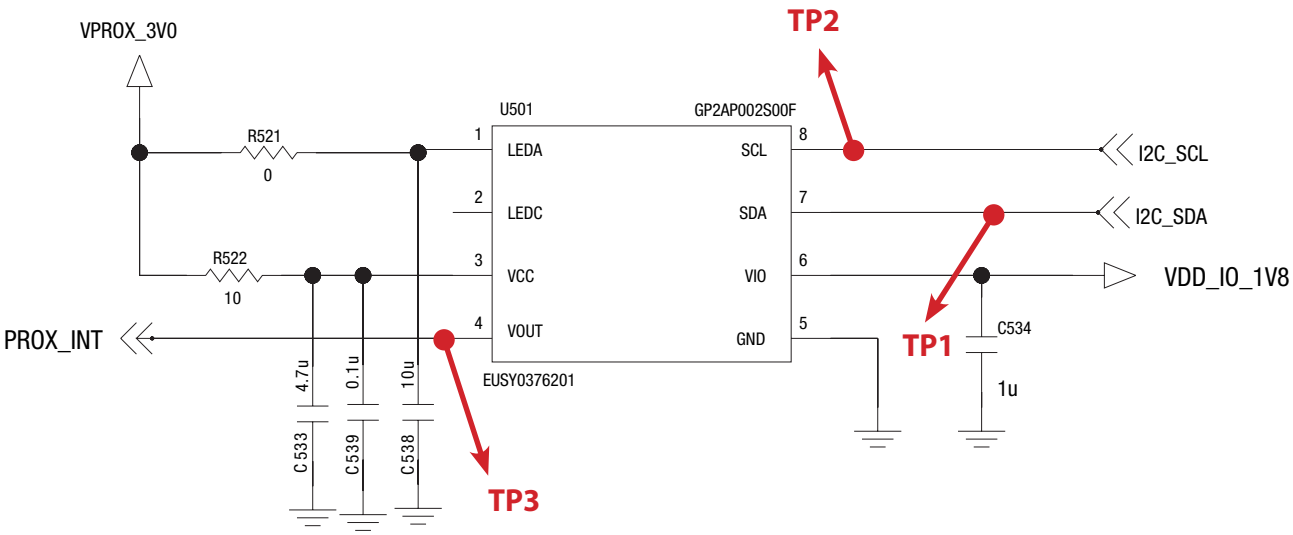
<table>
<tr><th>Process</th><th colspan="3">Detail Guide</th><th>Description</th></tr>
<tr><td rowspan="2">Disassemble Main Board</td><td colspan="2">  </td><td>  </td><td rowspan="2">1. Disassemble the main board from the Phone.
2. Detach gold gasket tape from shield-can via pincette.</td></tr>
<tr><td colspan="2">Main Board</td><td>Detach gold gasket tape</td></tr>
<tr><td rowspan="2">Cut off shield can</td><td>  </td><td>  </td><td>  </td><td rowspan="2">1. Cut 4-point of shield-can that checked red quadrangle via nipper.
2. Flowing iron through applying heat. In same time lift a piece of shield can with a pincette.
3. Separated shield-can throw away.</td></tr>
<tr><td>Cut 4-points that checked red quadrangle</td><td>Apply heat to shield-can that removing part</td><td>Shield-can cut off Main board</td></tr>
<tr><td rowspan="2">Remove Memory</td><td colspan="2">  </td><td>  </td><td rowspan="2">1. Apply heat via heat-gun.
2. Pick up through pincette when complete melting solder.
3. Polish-up around of Memory IC pad via Solder paste for deliberate mounting Memory IC.</td></tr>
<tr><td colspan="2">Melt solder via heat-gun.</td><td>Polish up Memory IC pad area</td></tr>
</table>

<table>
<tr><td rowspan="2">Soldering Memory and Shield can</td><td>  </td><td>  </td><td>  </td><td rowspan="2">1. Ready to rework new normal Memory.
2. Be locate exactly position via pincette.
3. Apply heat via heat-gun.
4. Be careful when using heat-gun for not blowing up other parts.
5. Find out shield-can and soldering</td></tr>
<tr><td>Ready to rework memory</td><td>Soldering Memory IC.</td><td>Soldering shield can.</td></tr>
<tr><td rowspan="2">Attaching gold gasket and assemble</td><td>  </td><td>  </td><td> 
</td><td rowspan="2">1. Attach gold gasket and remove vinyl through pincette.
2. Assemble other parts that is disassembled before.
3. Function test after finishing assemble.</td></tr>
<tr><td>Attach gold gasket</td><td>Assemble phone</td><td>Function test</td></tr>
</table>

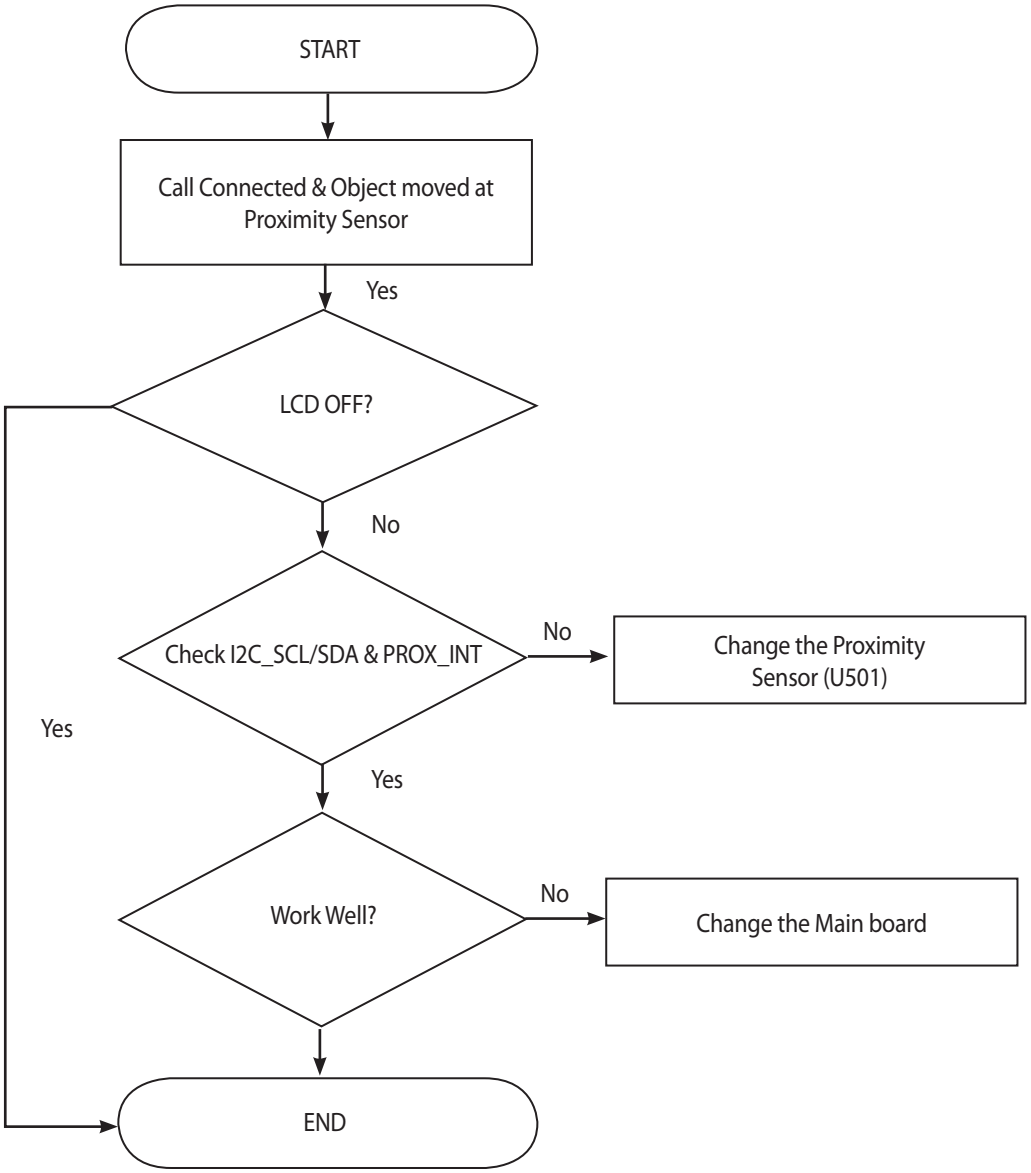
4.18 Proximity Sensor on/off Trouble Shooting







Proximity Sensor is worked as below :
Call connected -> Object moved at the sensor -> Control the screen's on/off operation automatically



Measurement

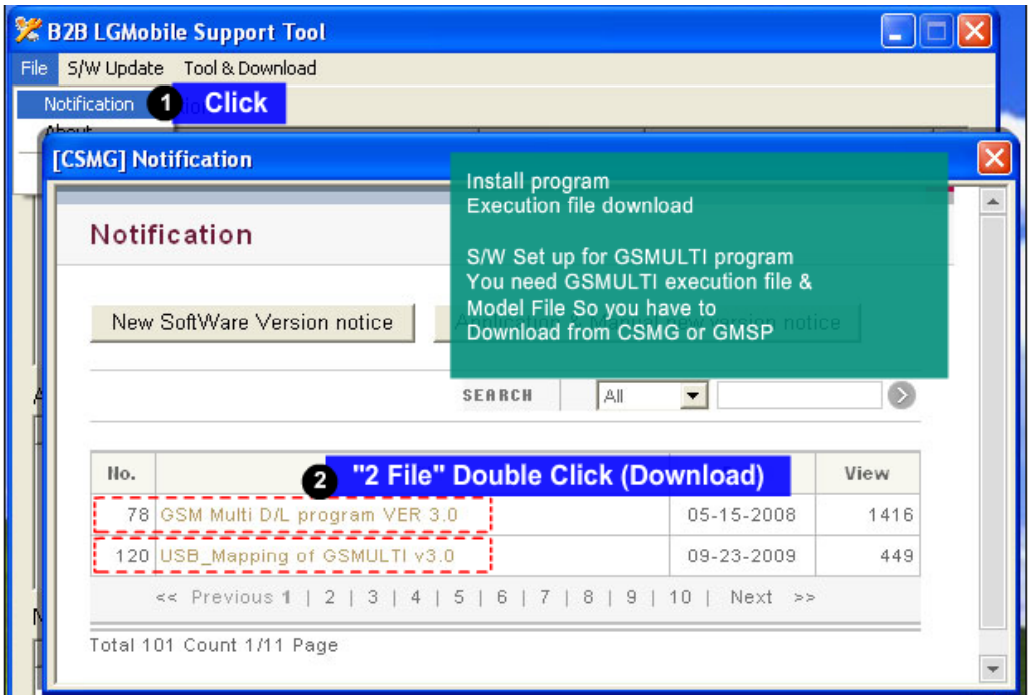
VREG_MSME_1.8V

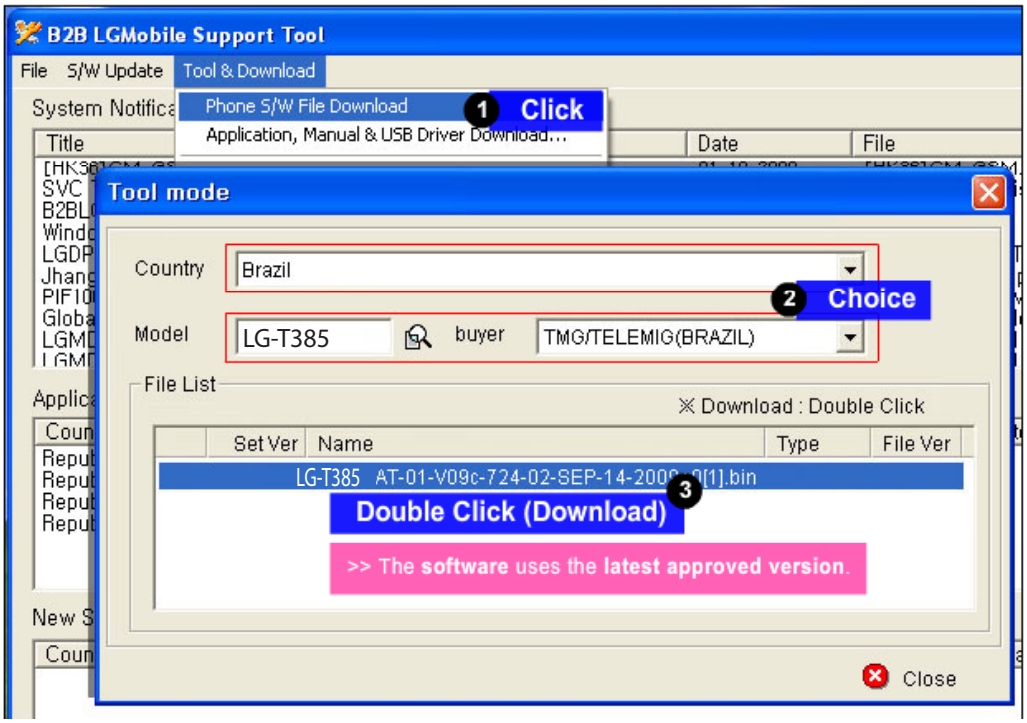
VREG_PROX_2.6V

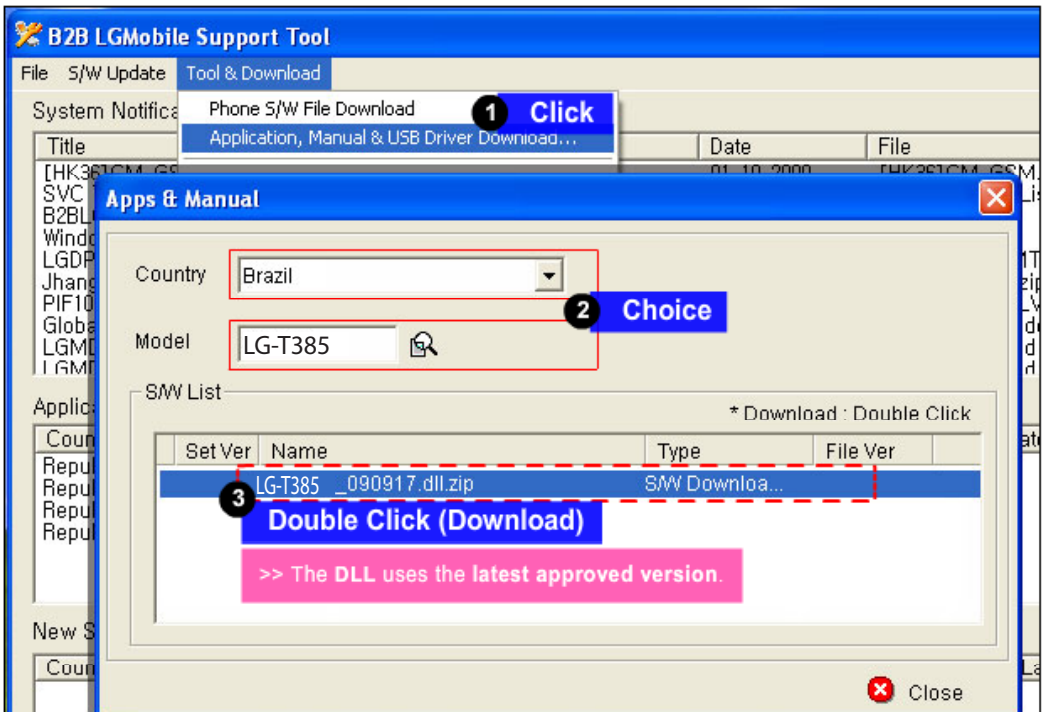
PROX_OUT

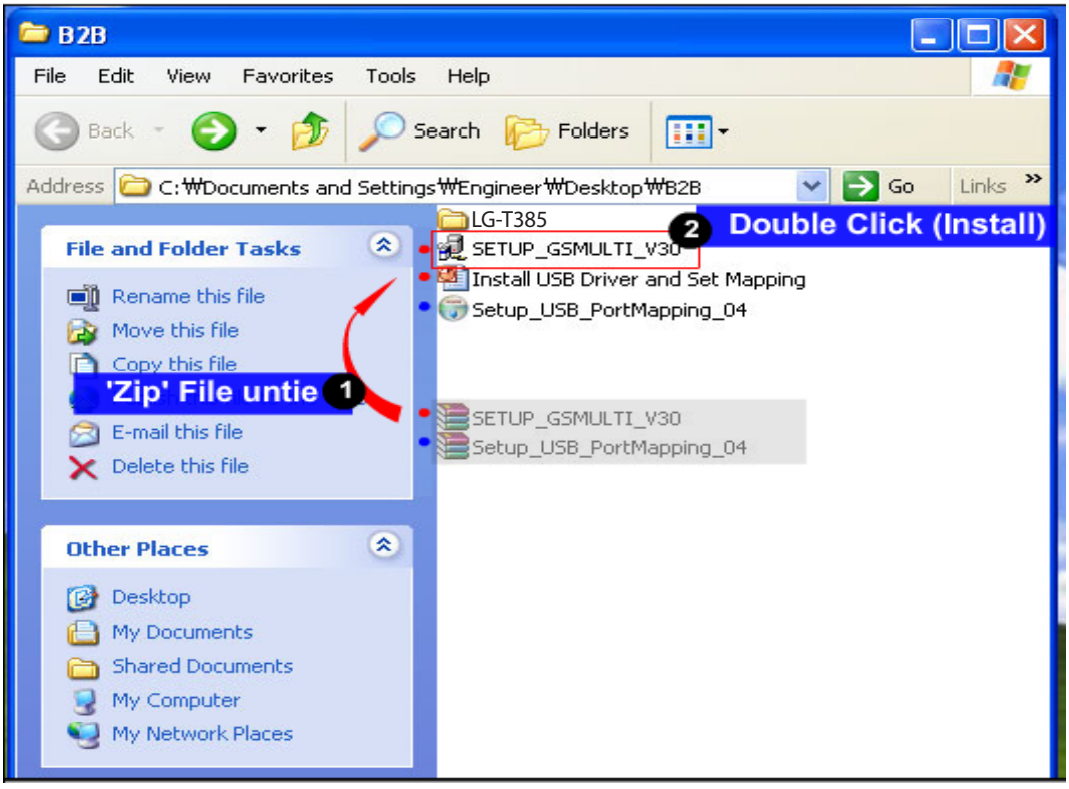
PROX_I2C_SCL / SDA

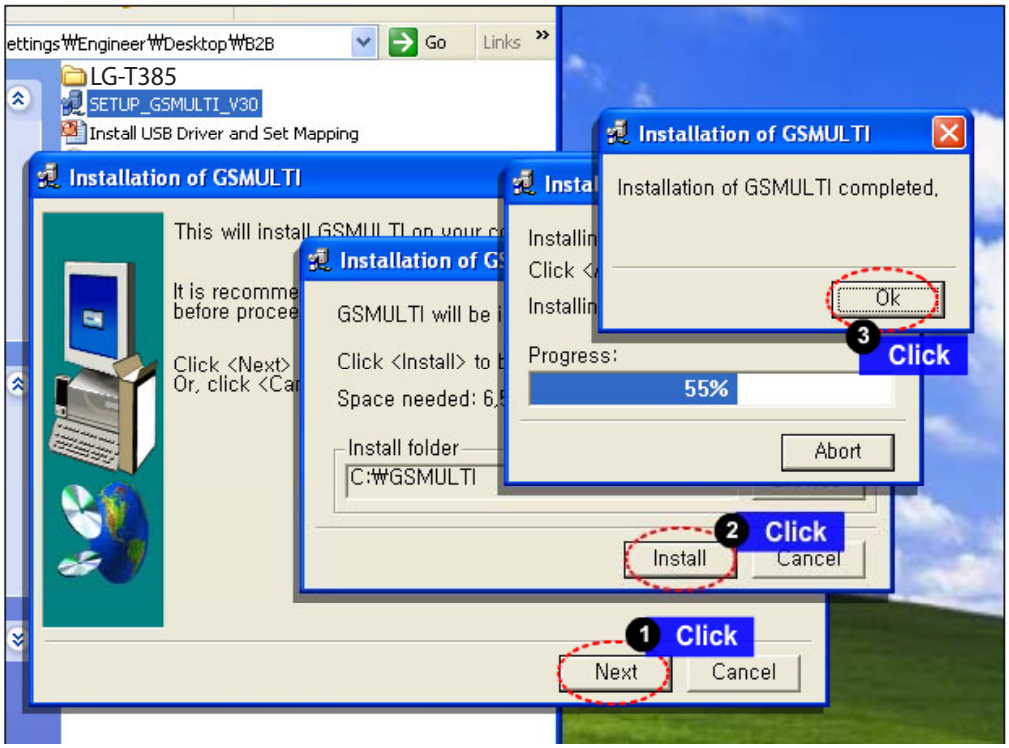
5. DOWNLOAD

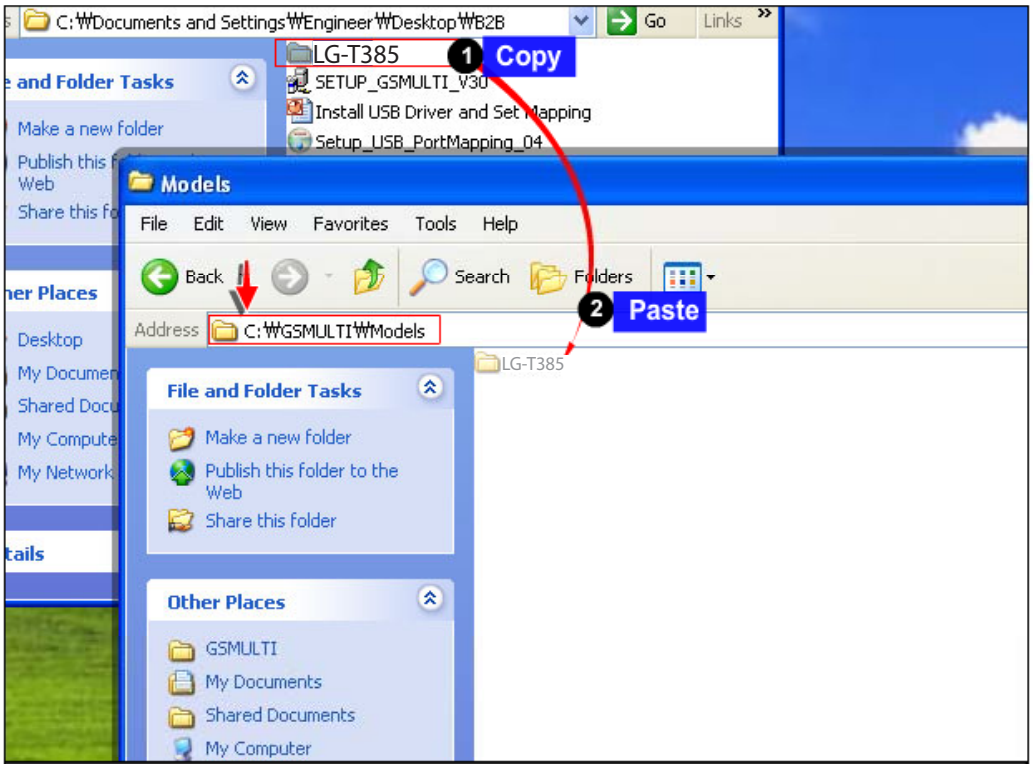


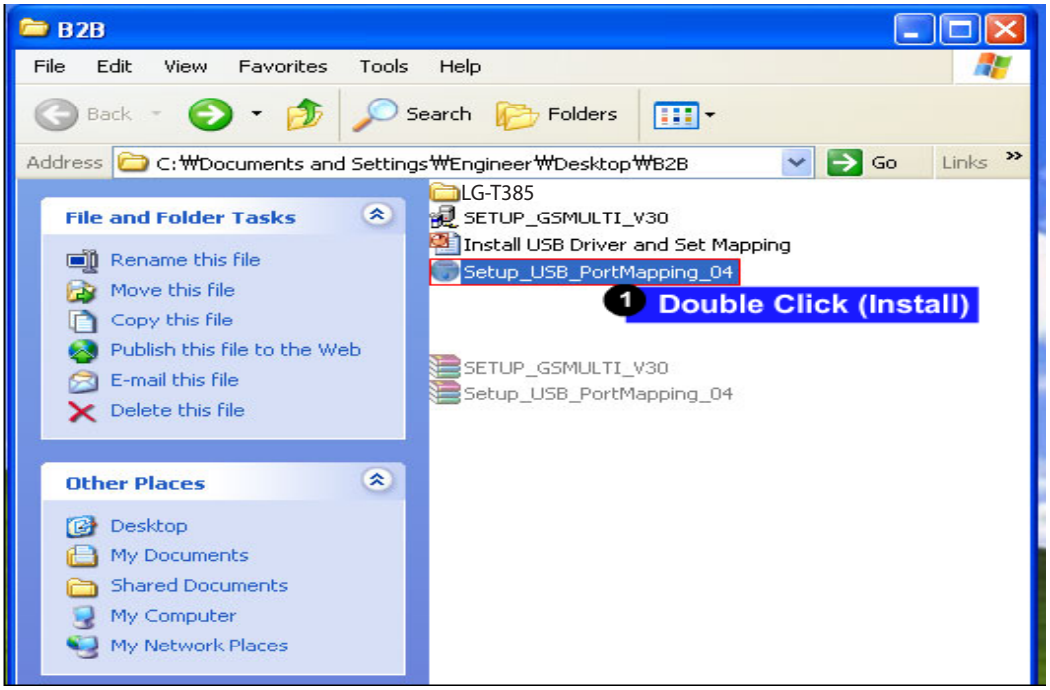


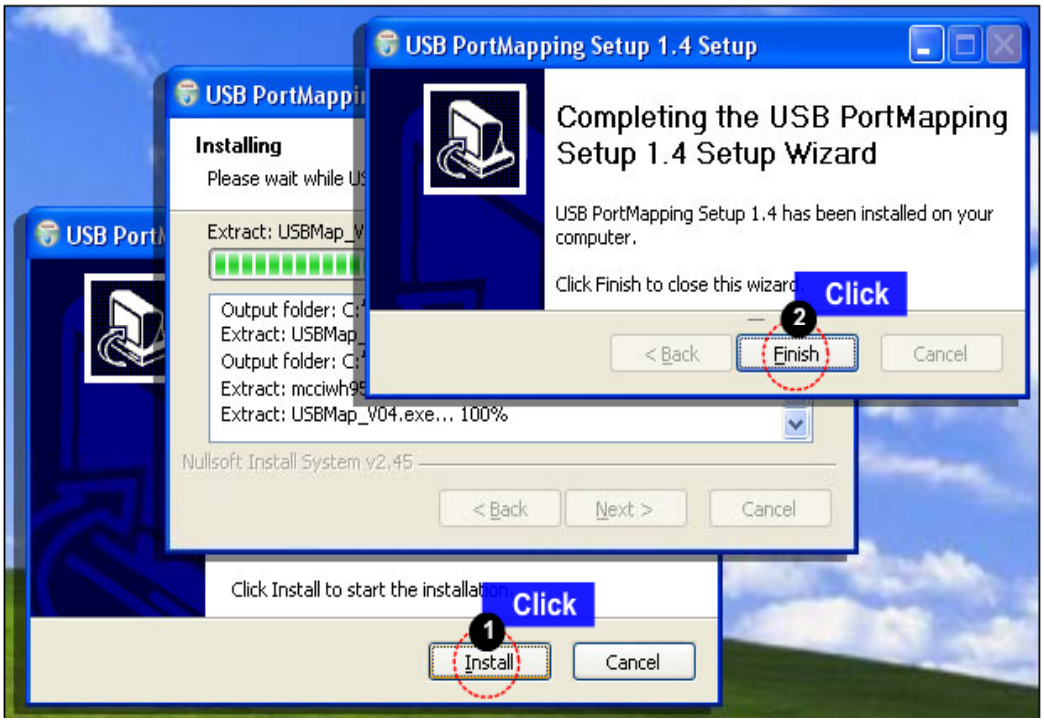


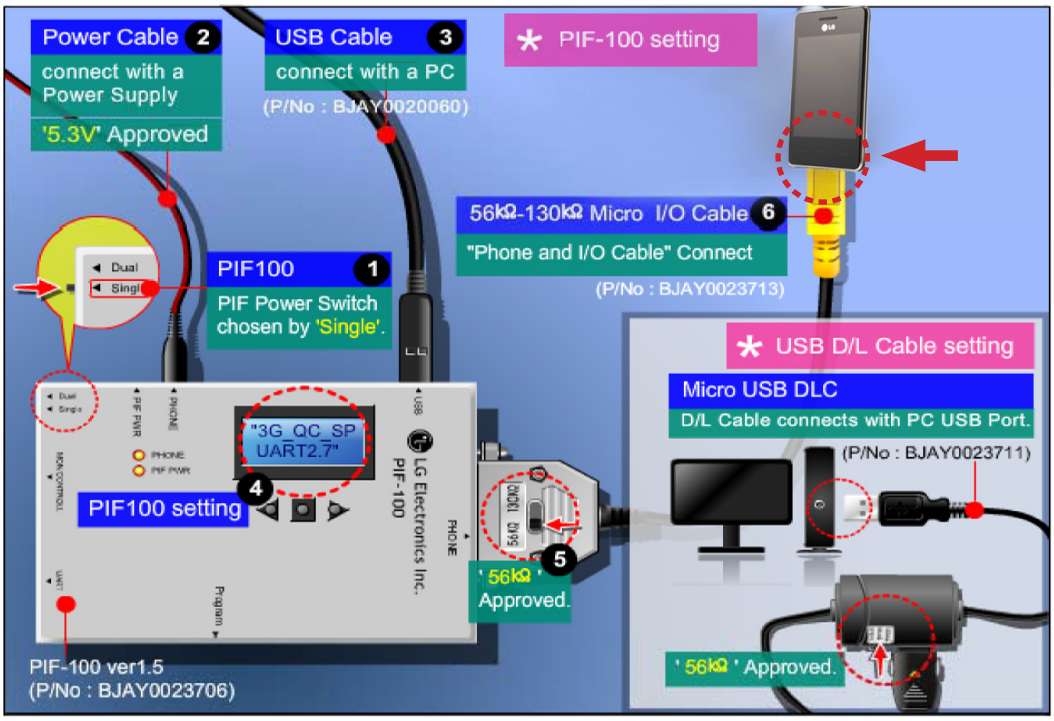


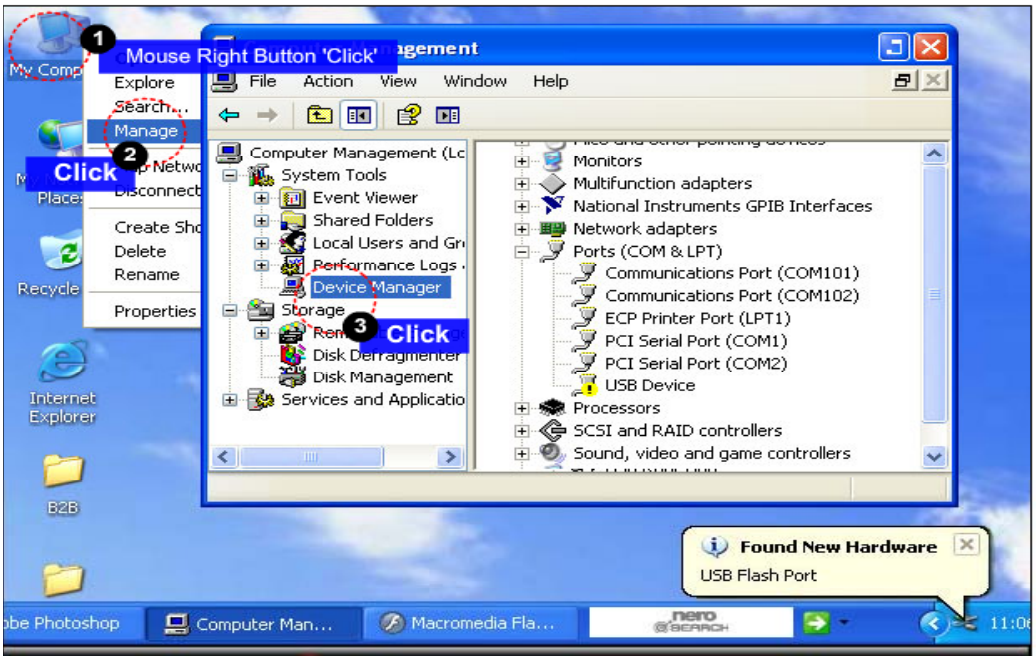


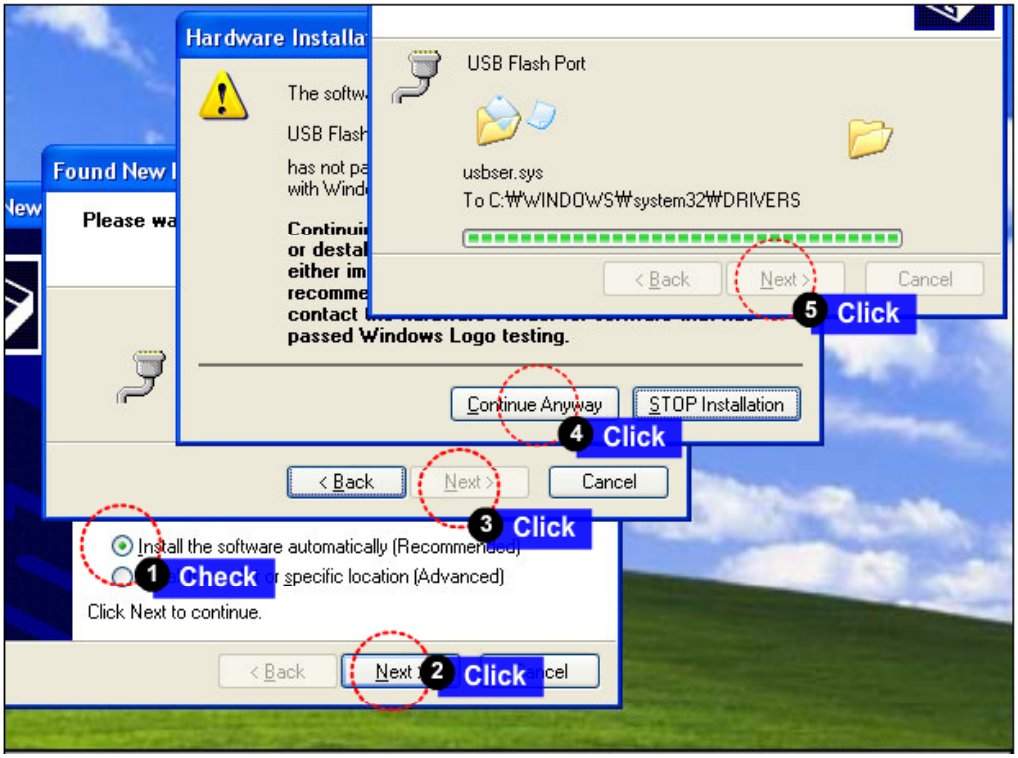


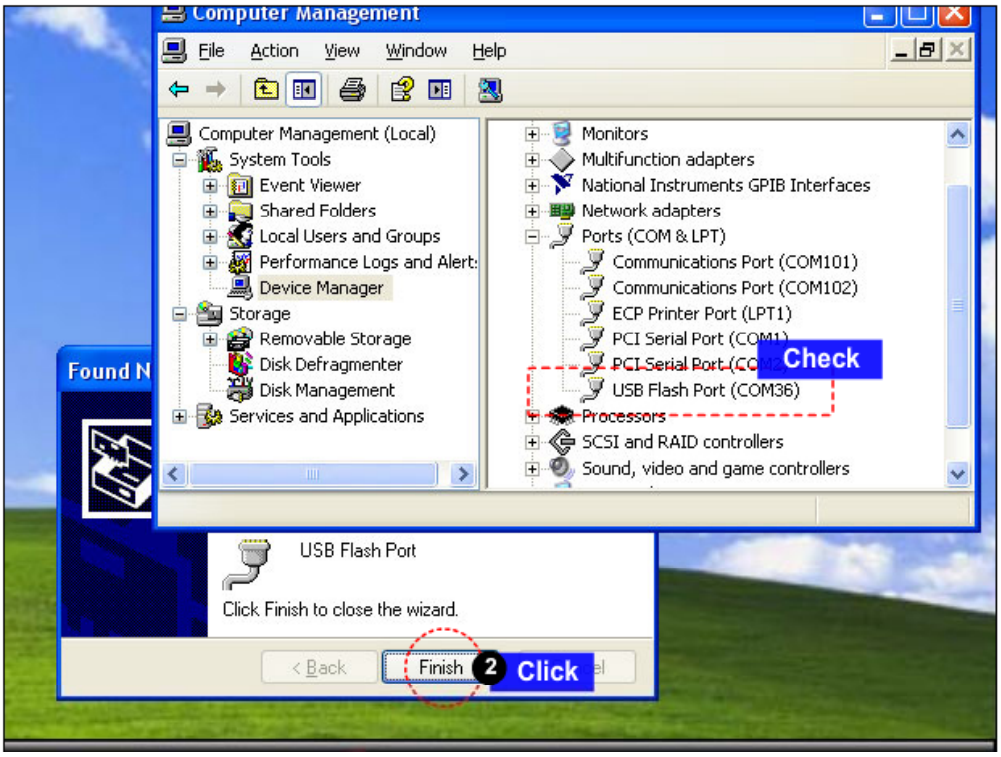


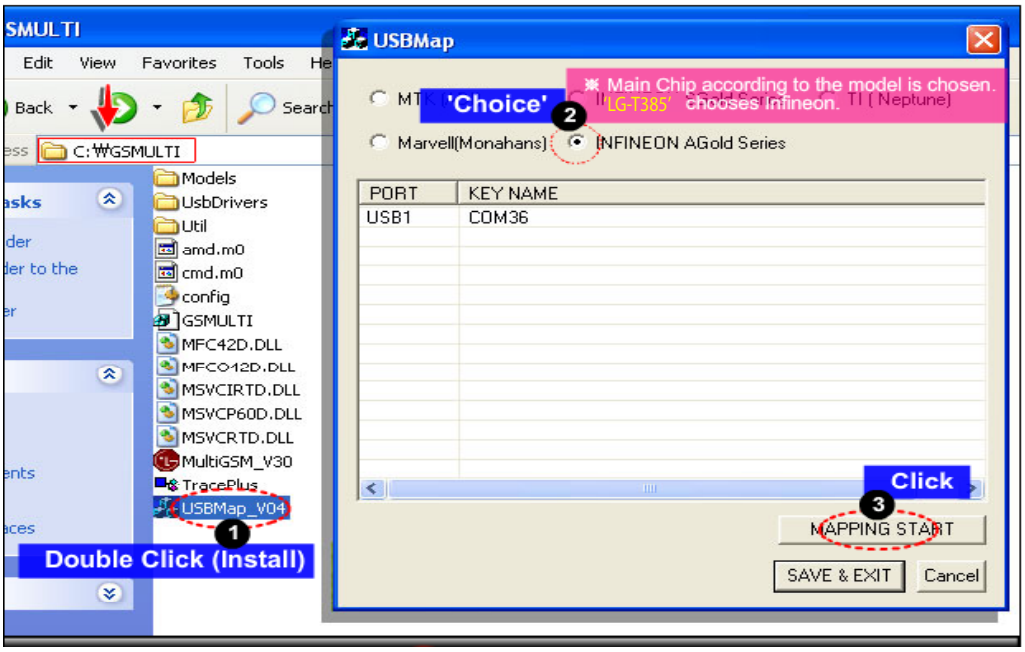


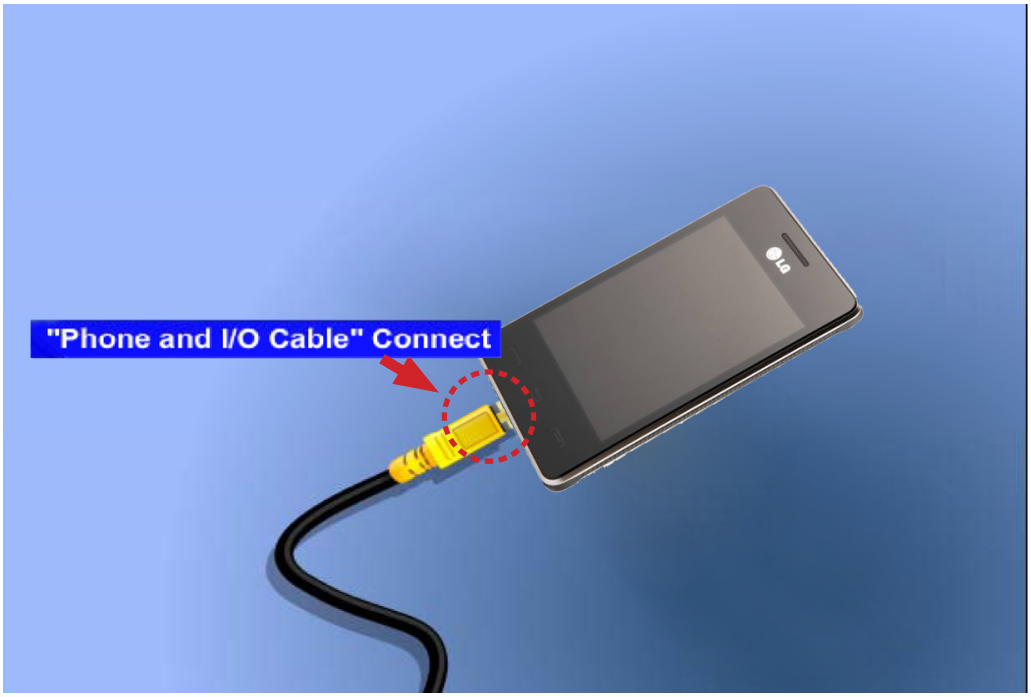


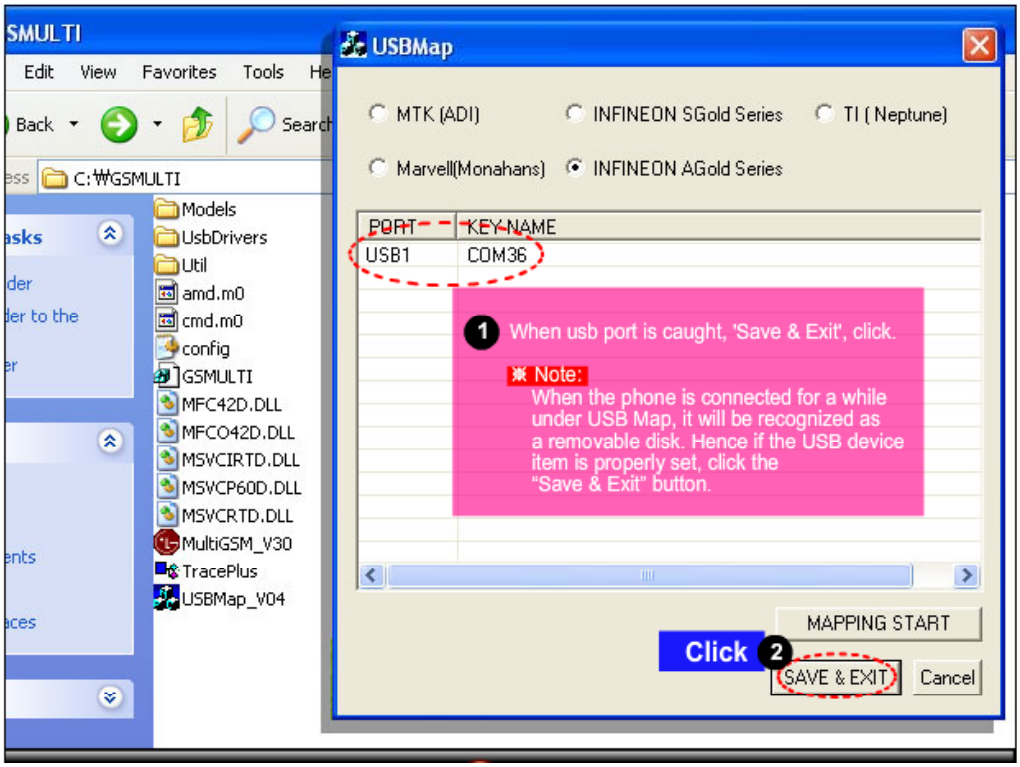


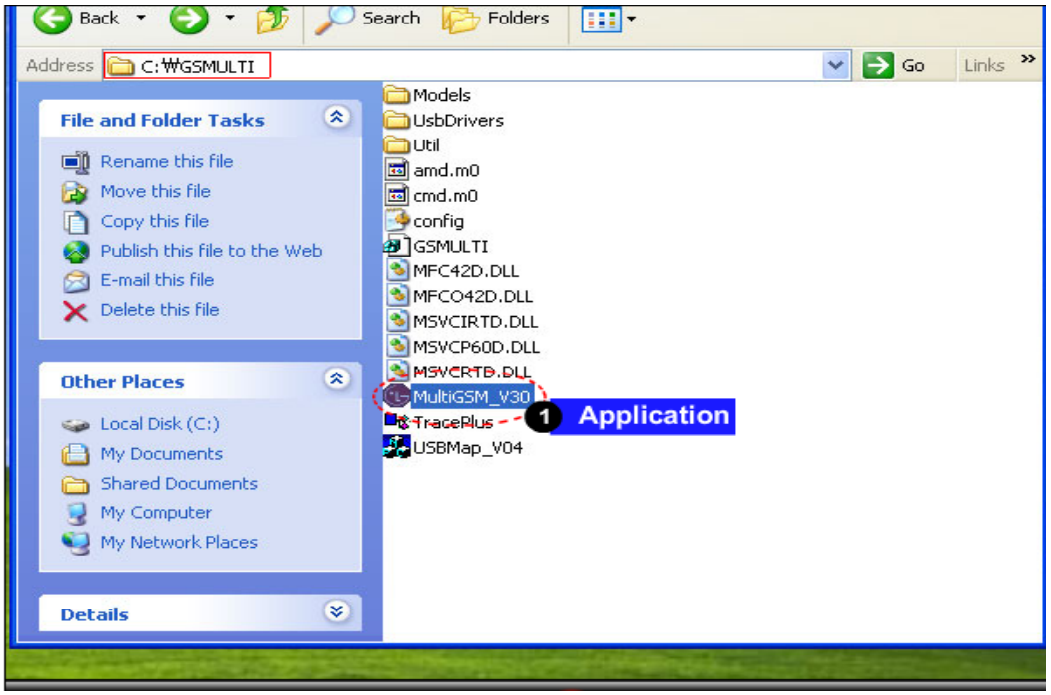


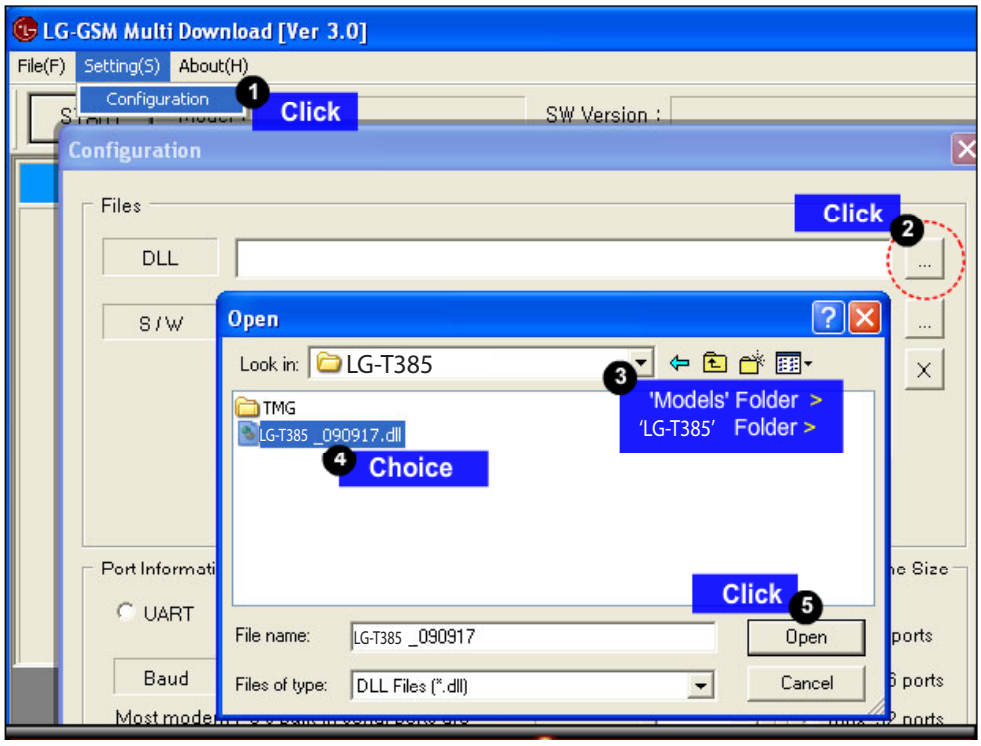


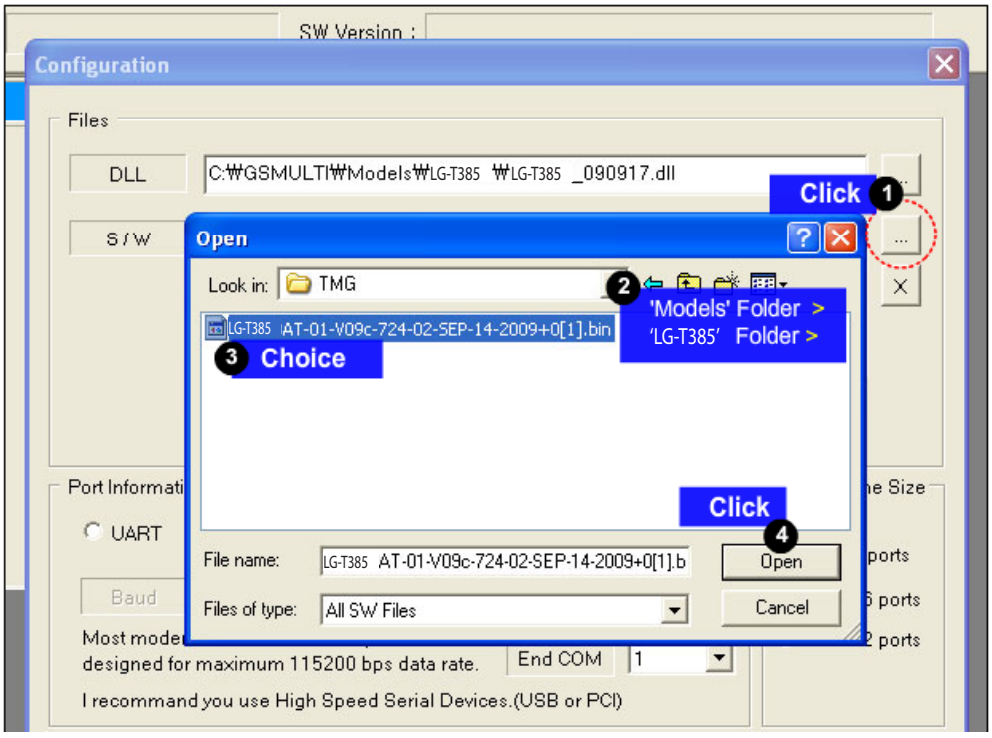


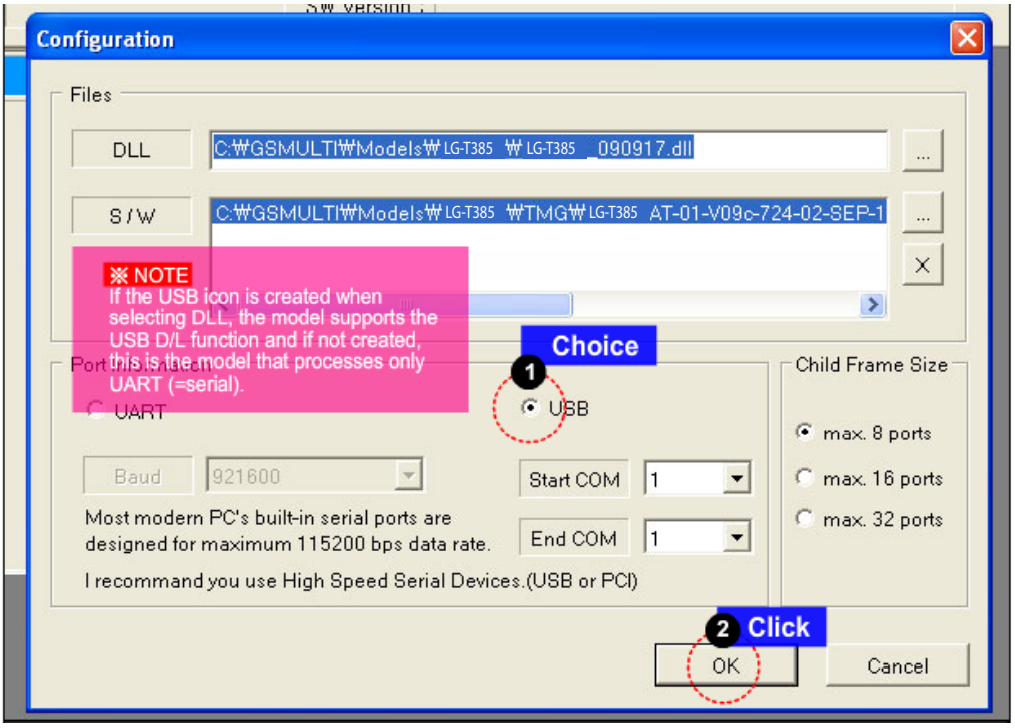


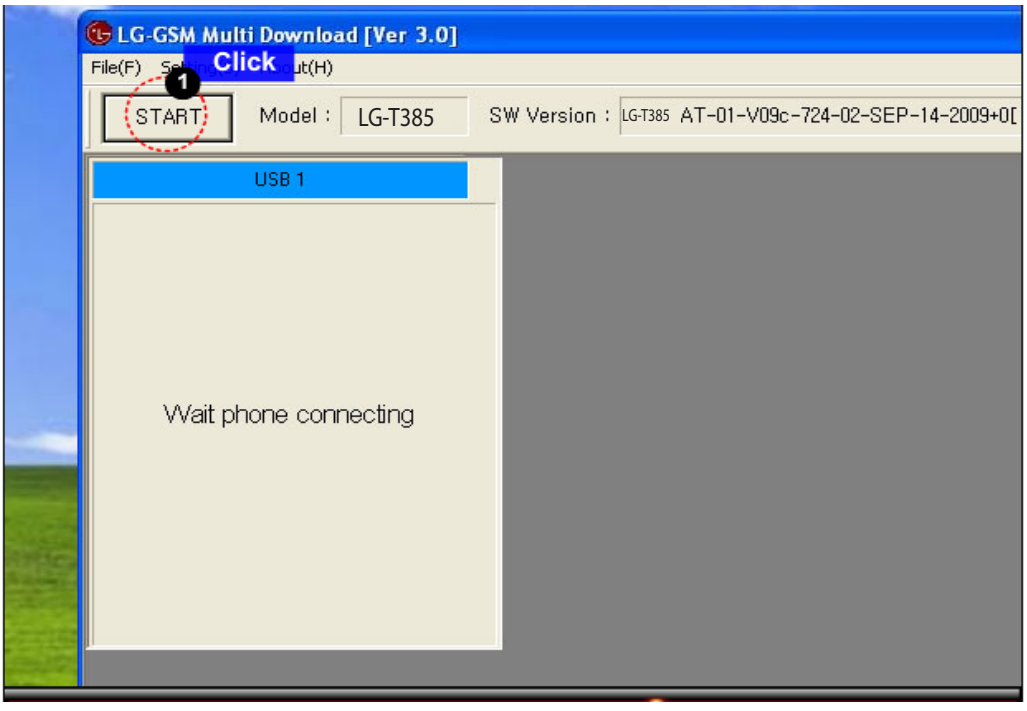


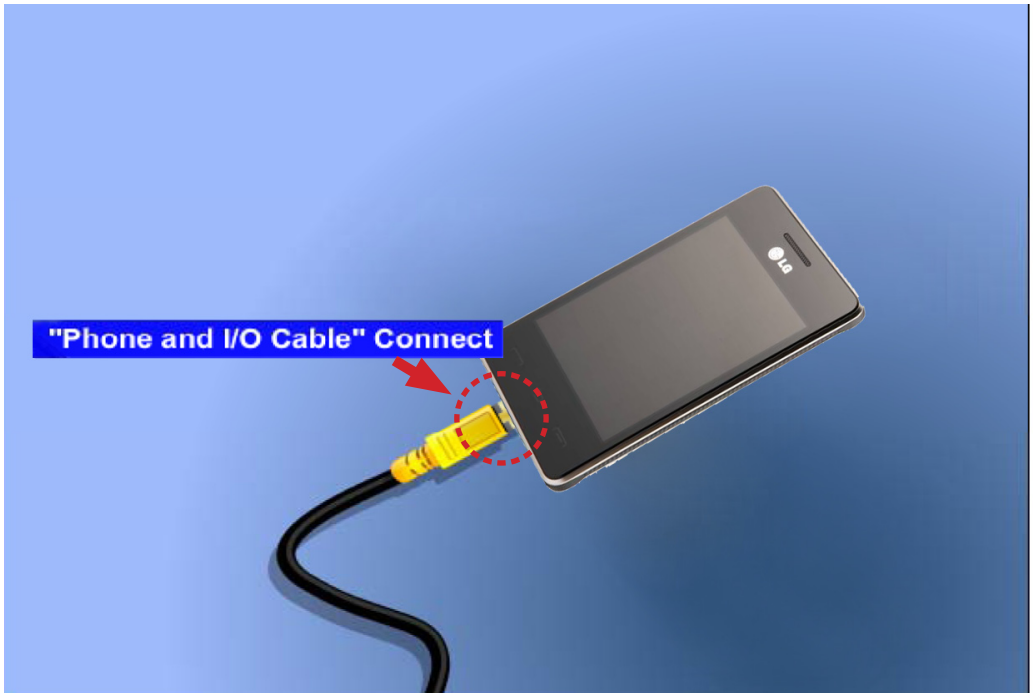


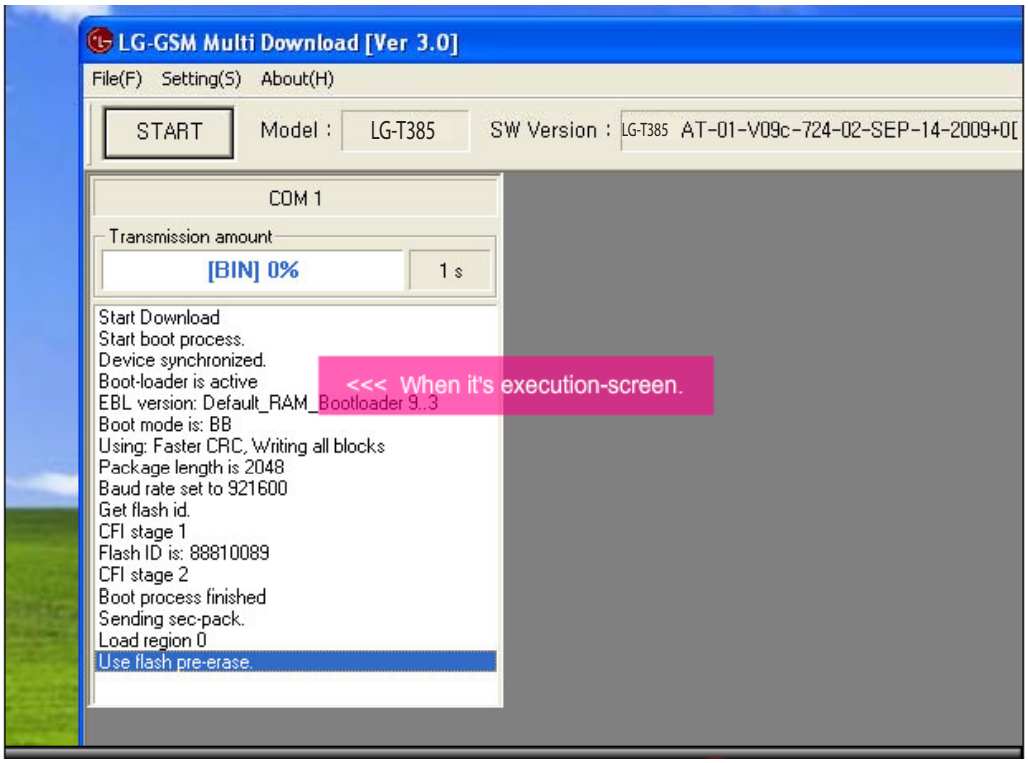


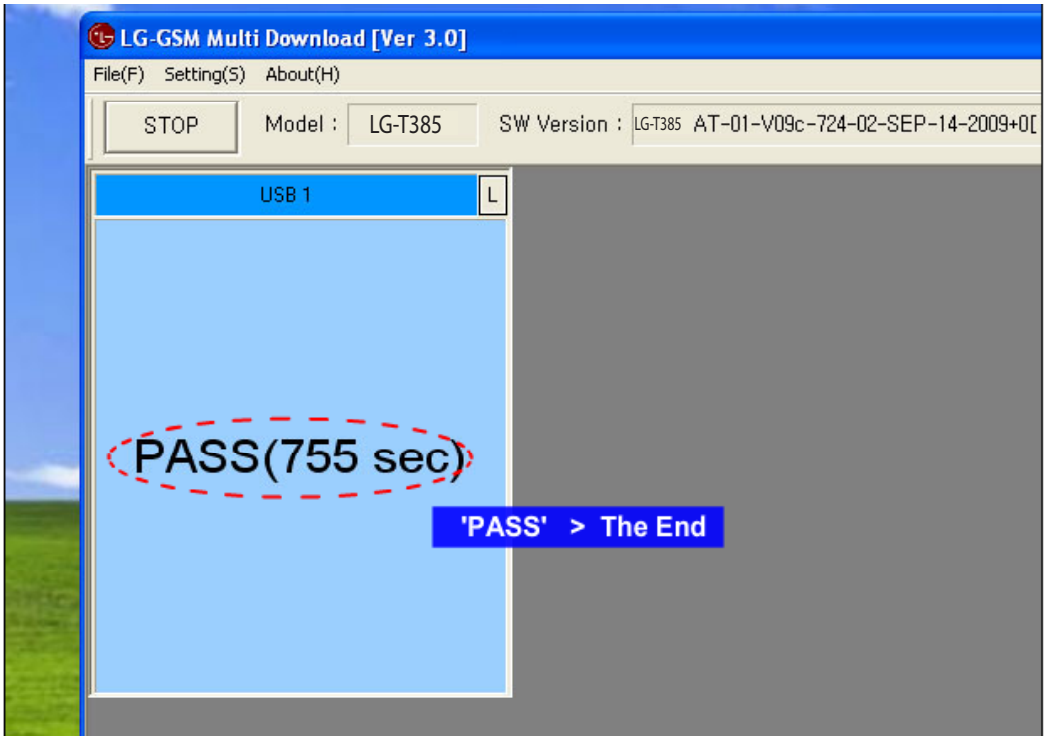




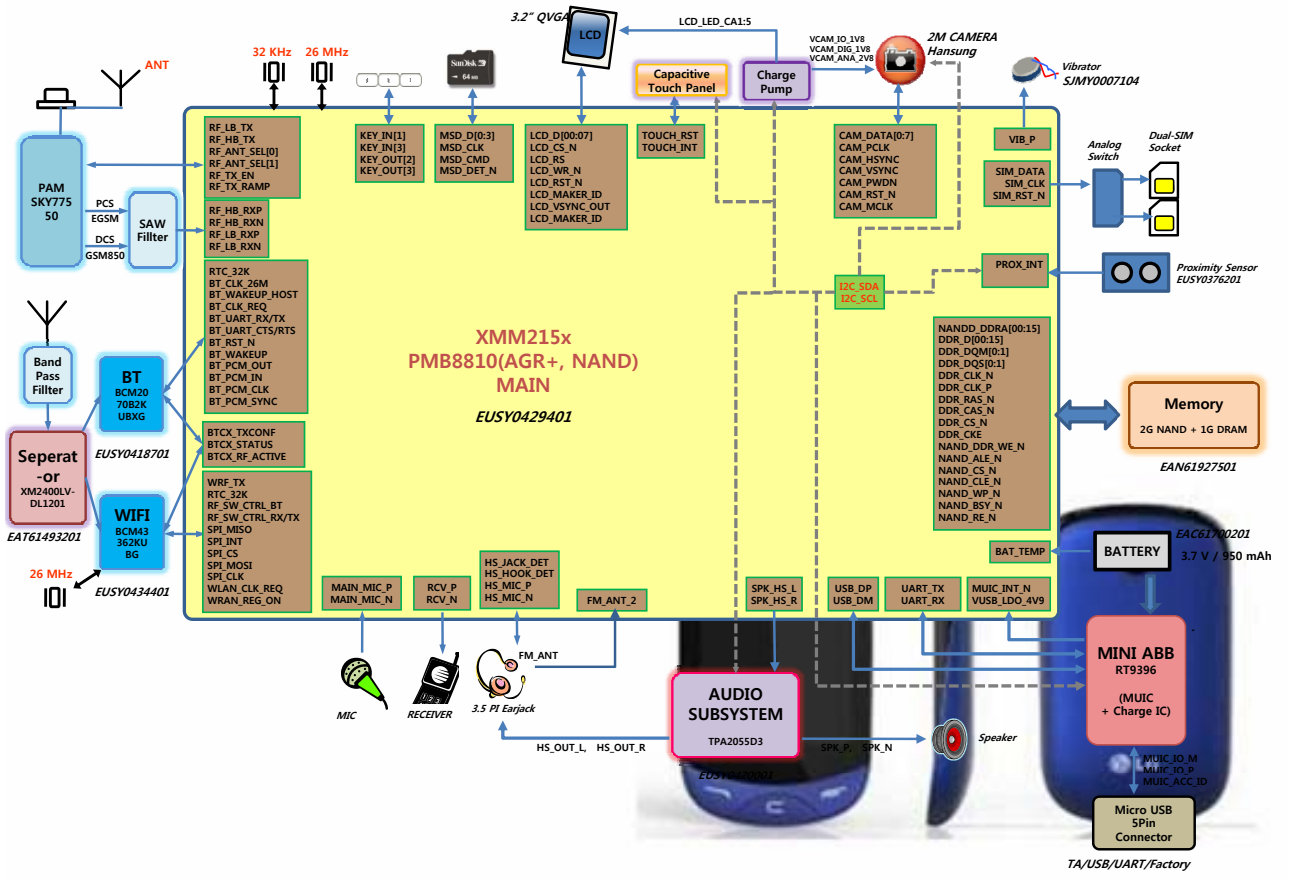








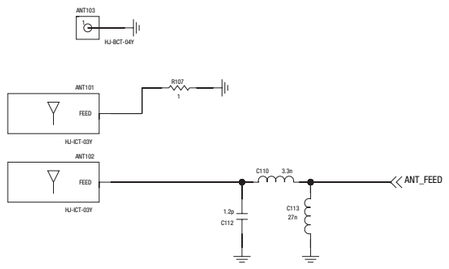
6. BLOCK DIAGRAM



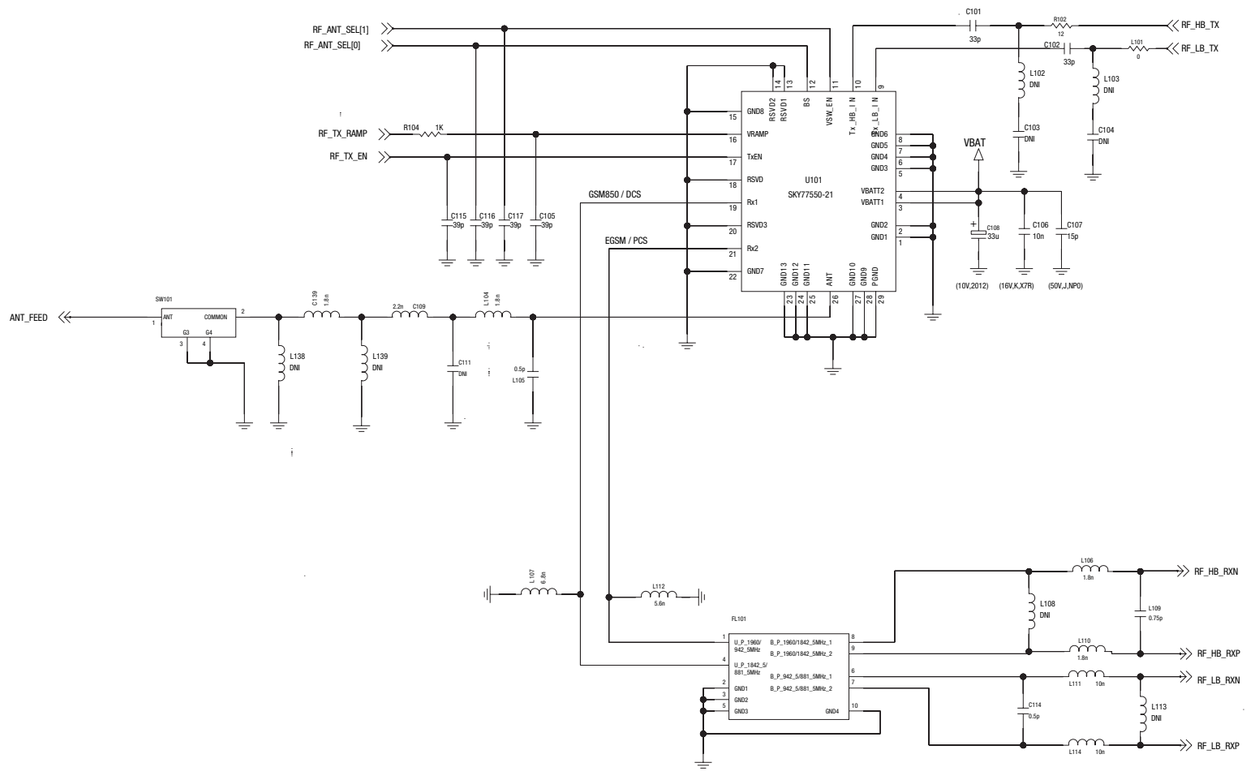
7. CIRCUIT DIAGRAM

RF

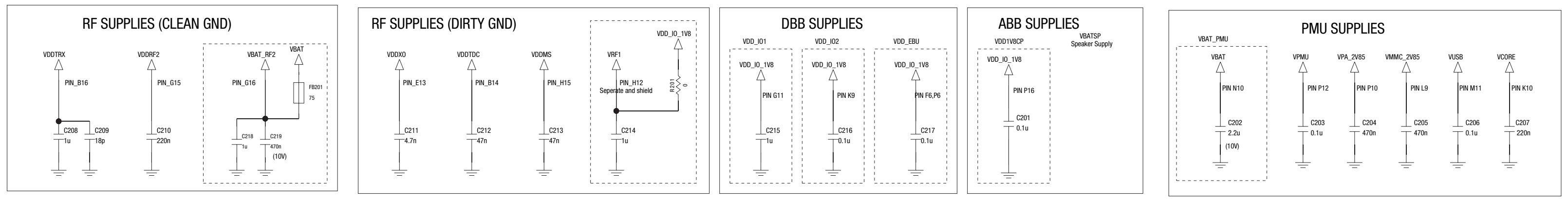
1-0-1-2 ANT_PAD_Ver1.0

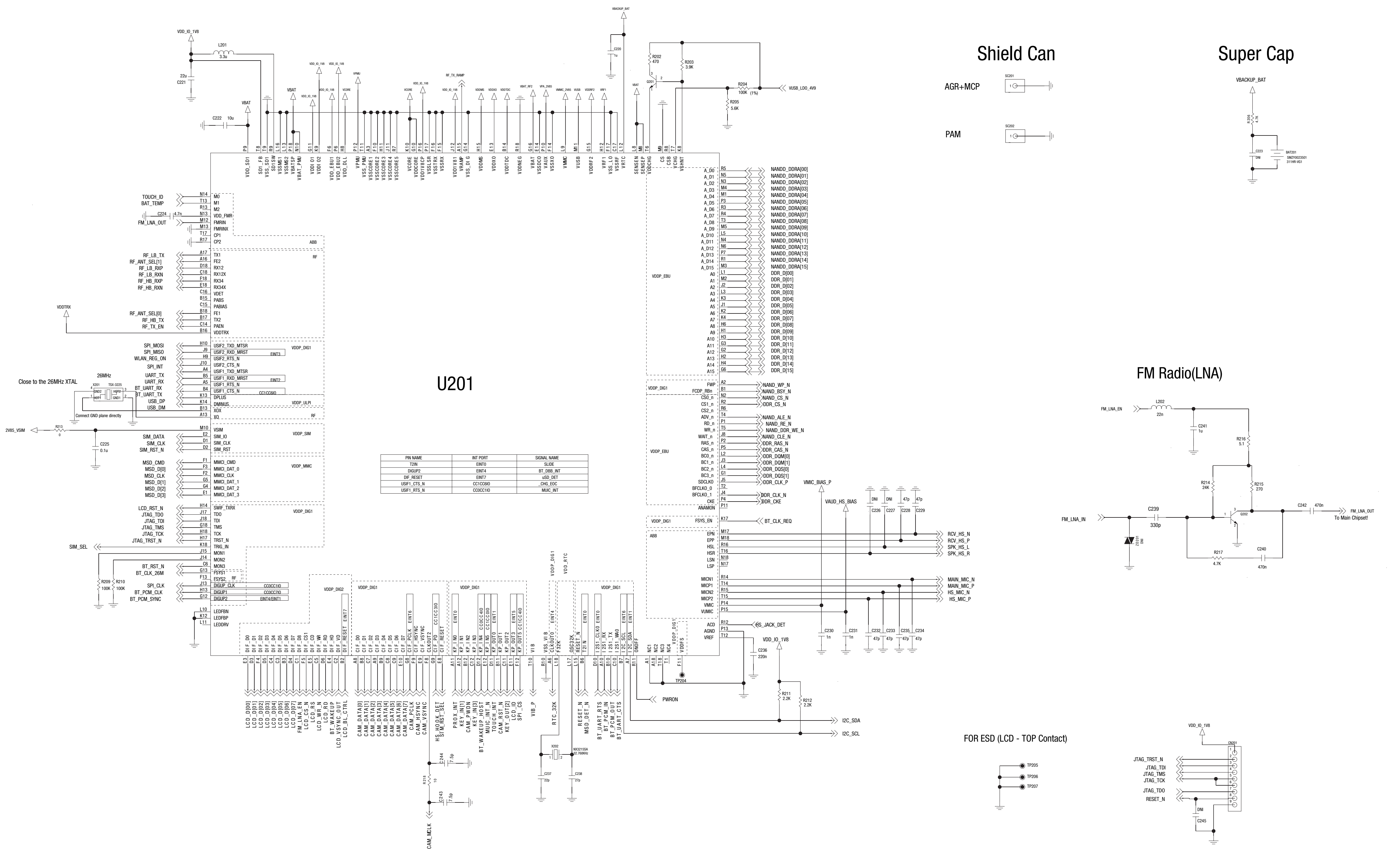


MODE	VSW_EN	BS	Tx Enable
STANDBY	LOW	LOW	LOW
RX1	HIGH	LOW	LOW
RX2	HIGH	HIGH	LOW
850/900 TX	HIGH	LOW	HIGH
DCS/PCS TX	HIGH	HIGH	HIGH



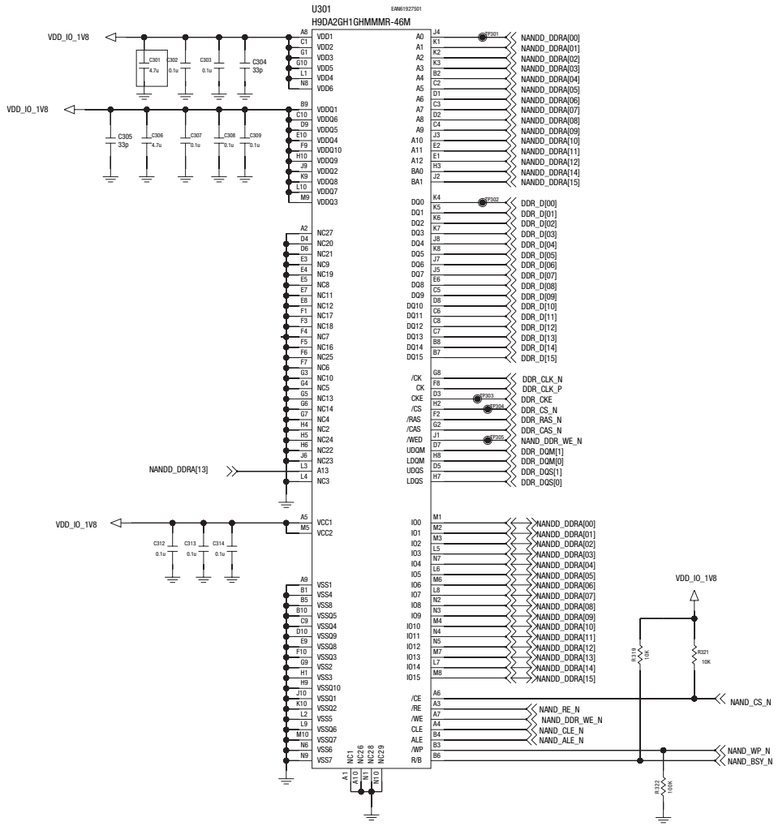
2-5-1-2_IFX_XMM215x_NAND_V0.1





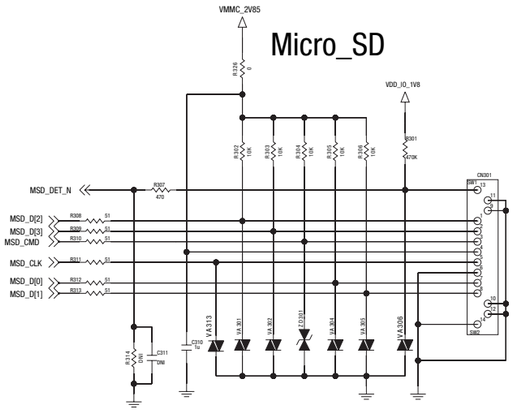
PIN NAME	INT PORT	SIGNAL NAME
T2IN	EINT0	SLIDE
DIGUP2	EINT4	BT_DBB_INT
DIF_RESET	EINT7	uSD_DET
USIF1_CTS_N	CC1CC6IO	_CHG_EOC
USIF1_RTS_N	CC0CC1IO	MUIC_INT

MCP2-1_2G_1G DDRx16_hynix



8-3-1-2_Push_168T_Ver1.0

Micro_SD

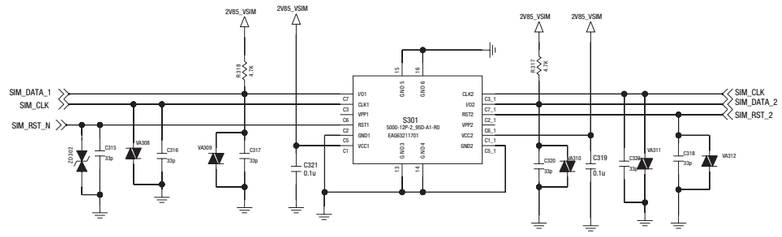


MSD_DET_N

No card	High
Insert	Low

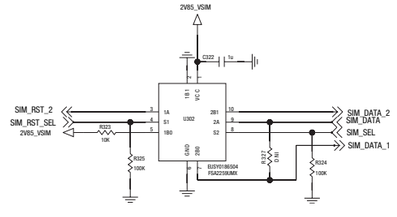
Pin Number	Description
T1	DAT2
T2	CD/DAT3
T3	CMD
T4	VDD
T5	CLK
T6	VSS
T7	DAT0
T8	DAT1

SIM_CONNECTOR Dual

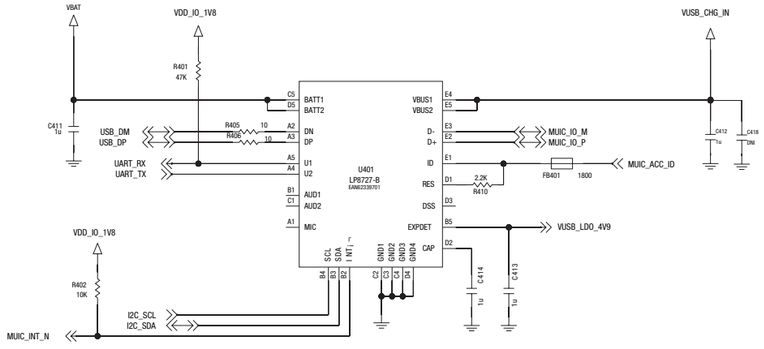


SIM Switch

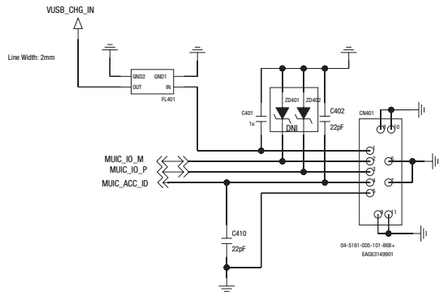
If Dual SIM, R327=DNI and U302=Insert.
If single SIM, R327=0ohm and U302=DNI.



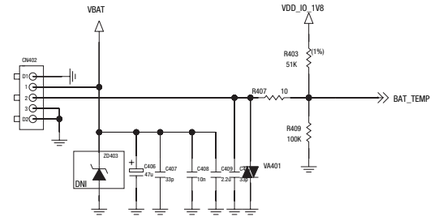
MINI ABB (MUIC + CHARGE ID)



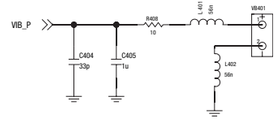
4-2-3-1 Micro-USB 5pin normal



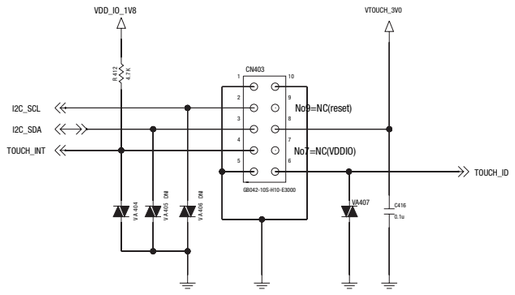
4-5-1-1 Battery Connector



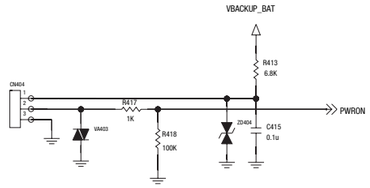
MOTOR



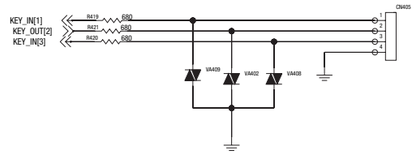
C-Touch Connector



POWER ON

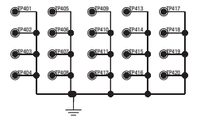


SIDE KEY INTERFACE

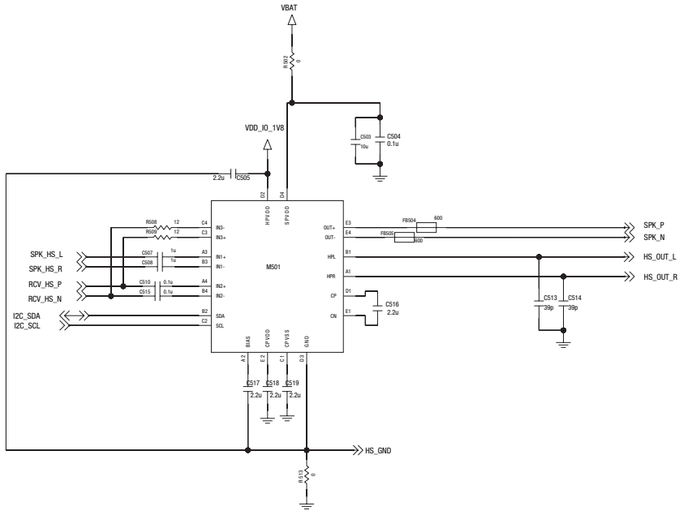


	KEY_OUT2	KEY_OUT3
KEY_IN0	X	SEND
KEY_IN1	Vol_down	CLR
KEY_IN3	Vol_UP	END

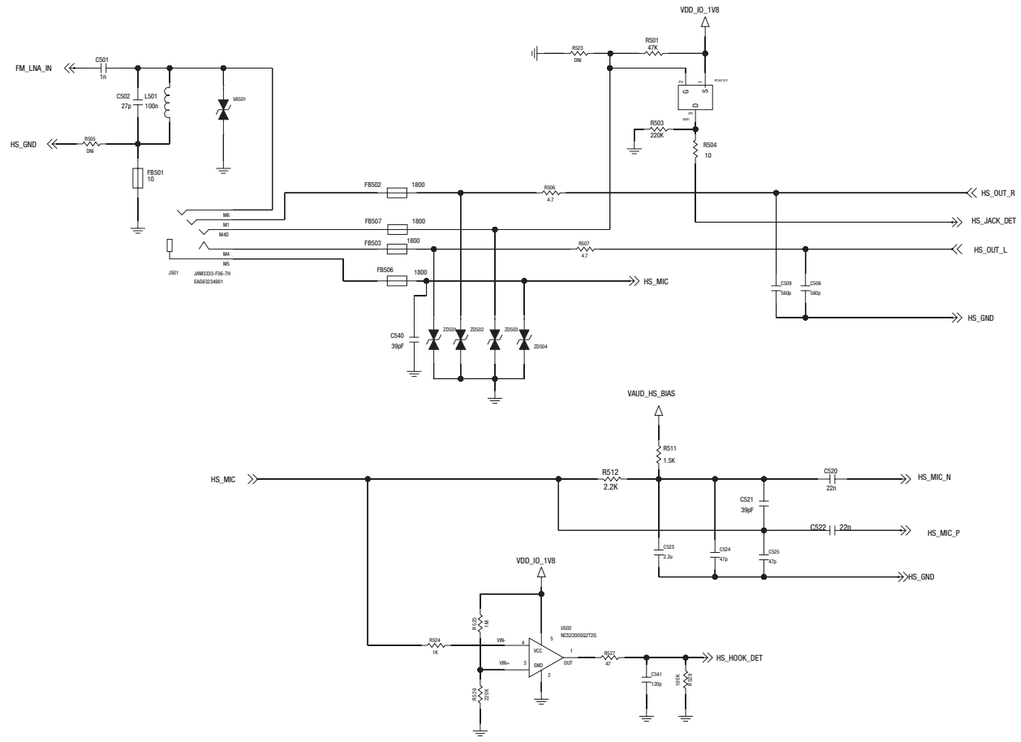
ESD GND



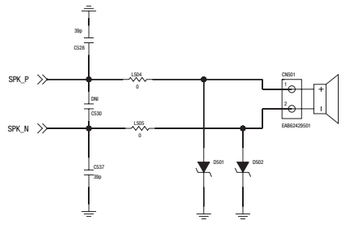
AUDIO SUBSYSTEM



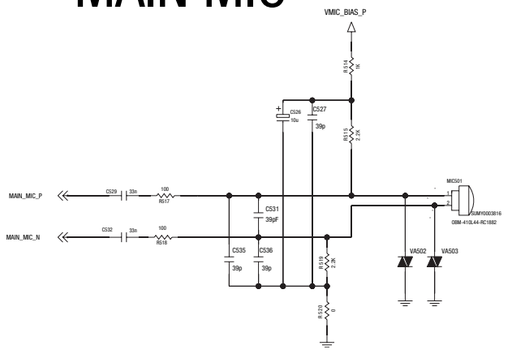
3.5pi HEADSET



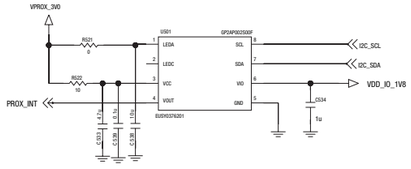
SPEAKER



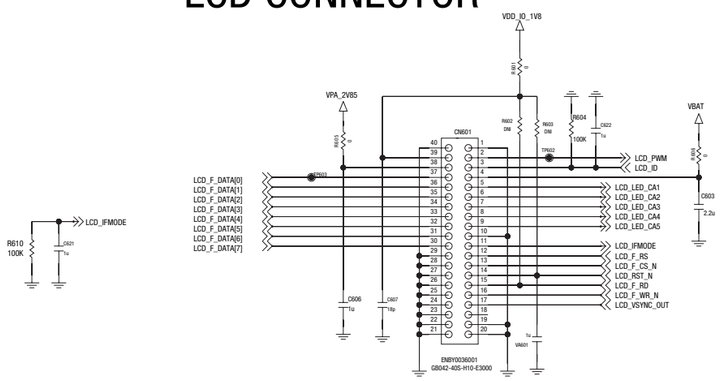
MAIN MIC

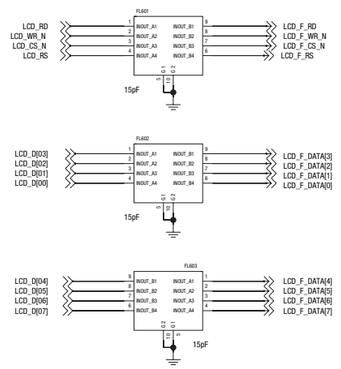


Proximity Sensor

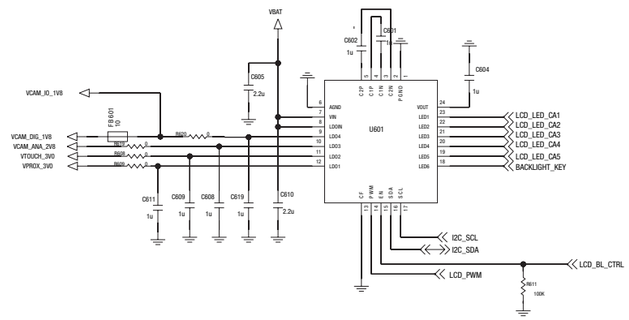


LCD CONNECTOR

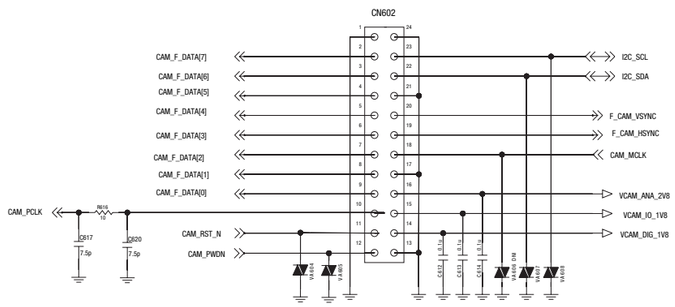




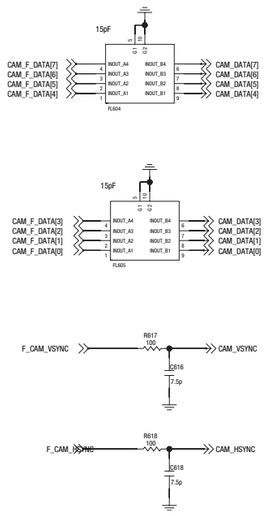
6ch_CHARGING PUMP _4LDO



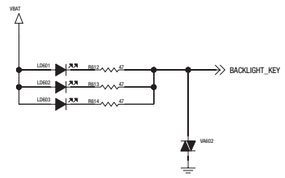
2M_FF_CAMERA



CAM_EMI FILTER



KEY BACKLIGHT LED

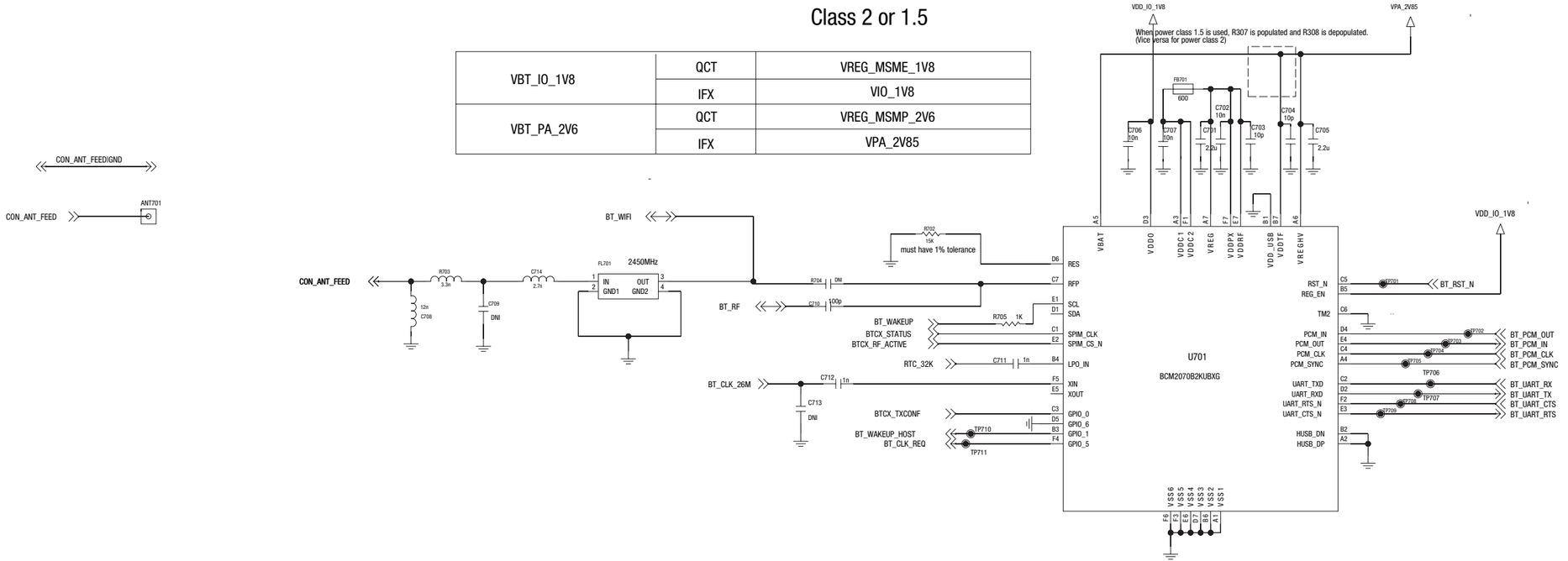


BT

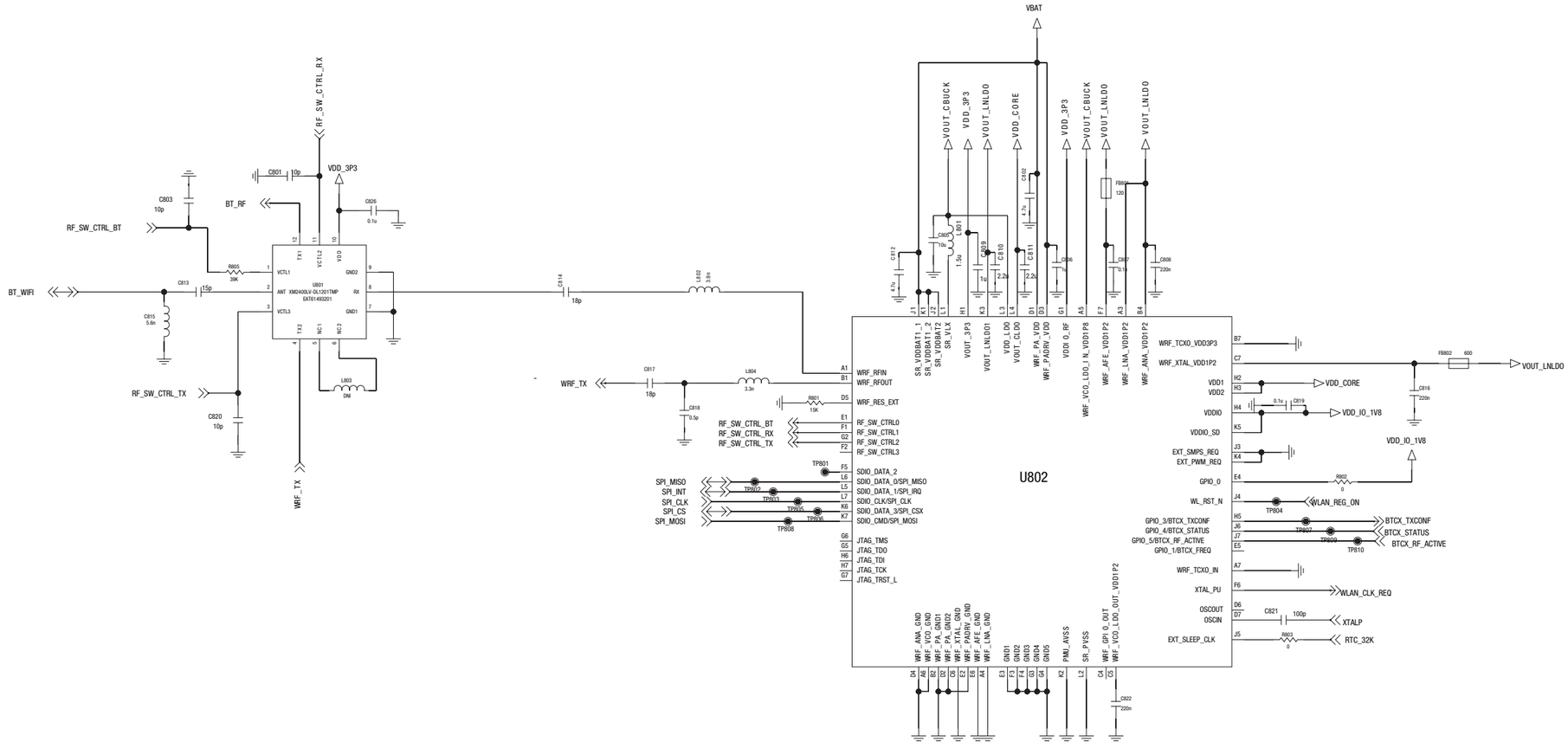
7-1-1-3_BCM2070(QCT & IFX Only)_0.4Pitch

Class 2 or 1.5

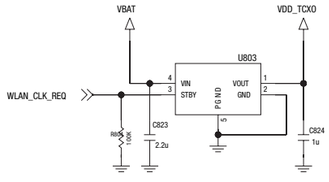
VBT_IO_1V8	QCT	VREG_MSME_1V8
	IFX	VIO_1V8
VBT_PA_2V6	QCT	VREG_MSMP_2V6
	IFX	VPA_2V85



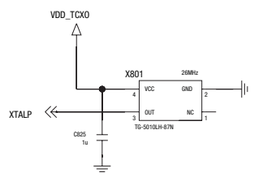
WIFI



TCXO LDO



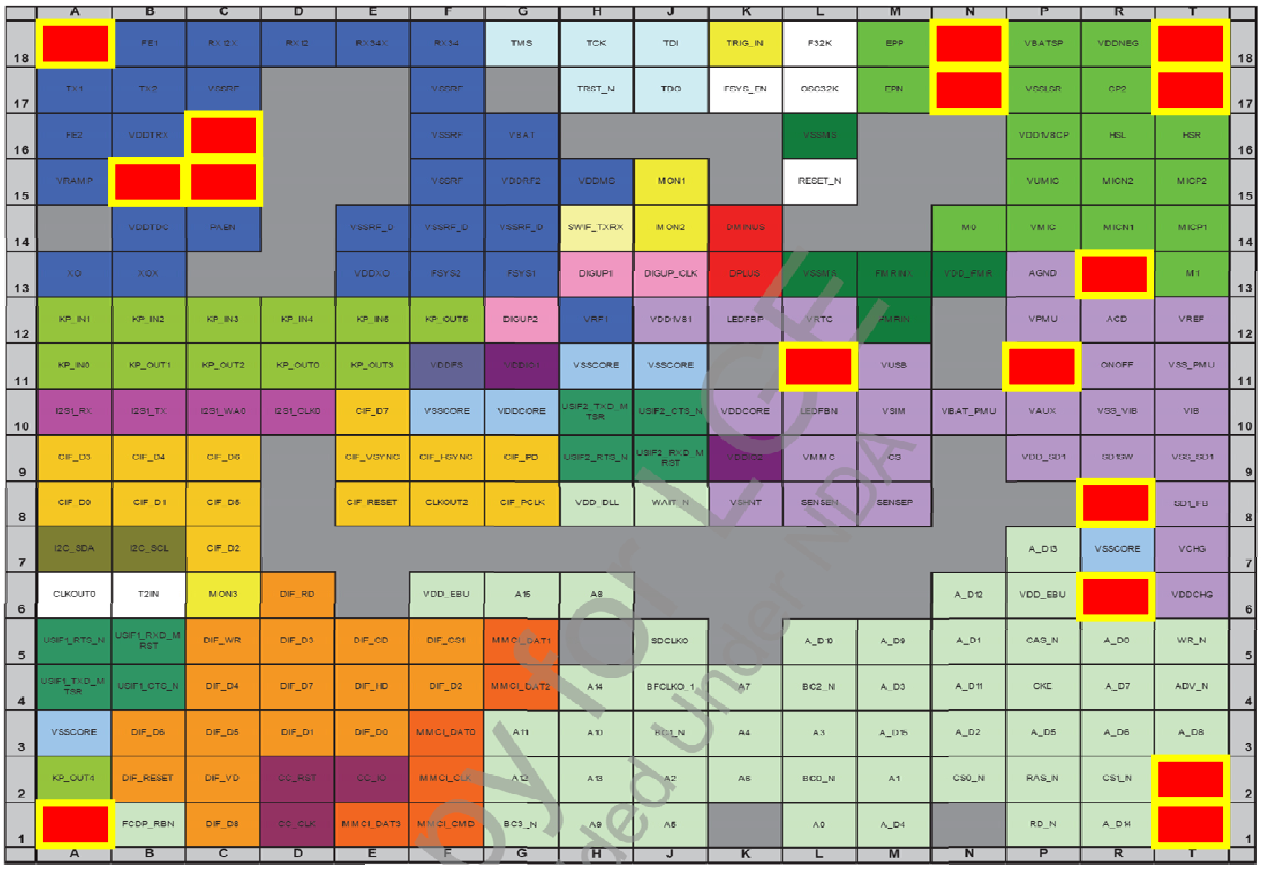
WiFi TCXO



8. BGA PIN MAP

BGA IC pin check (U201)

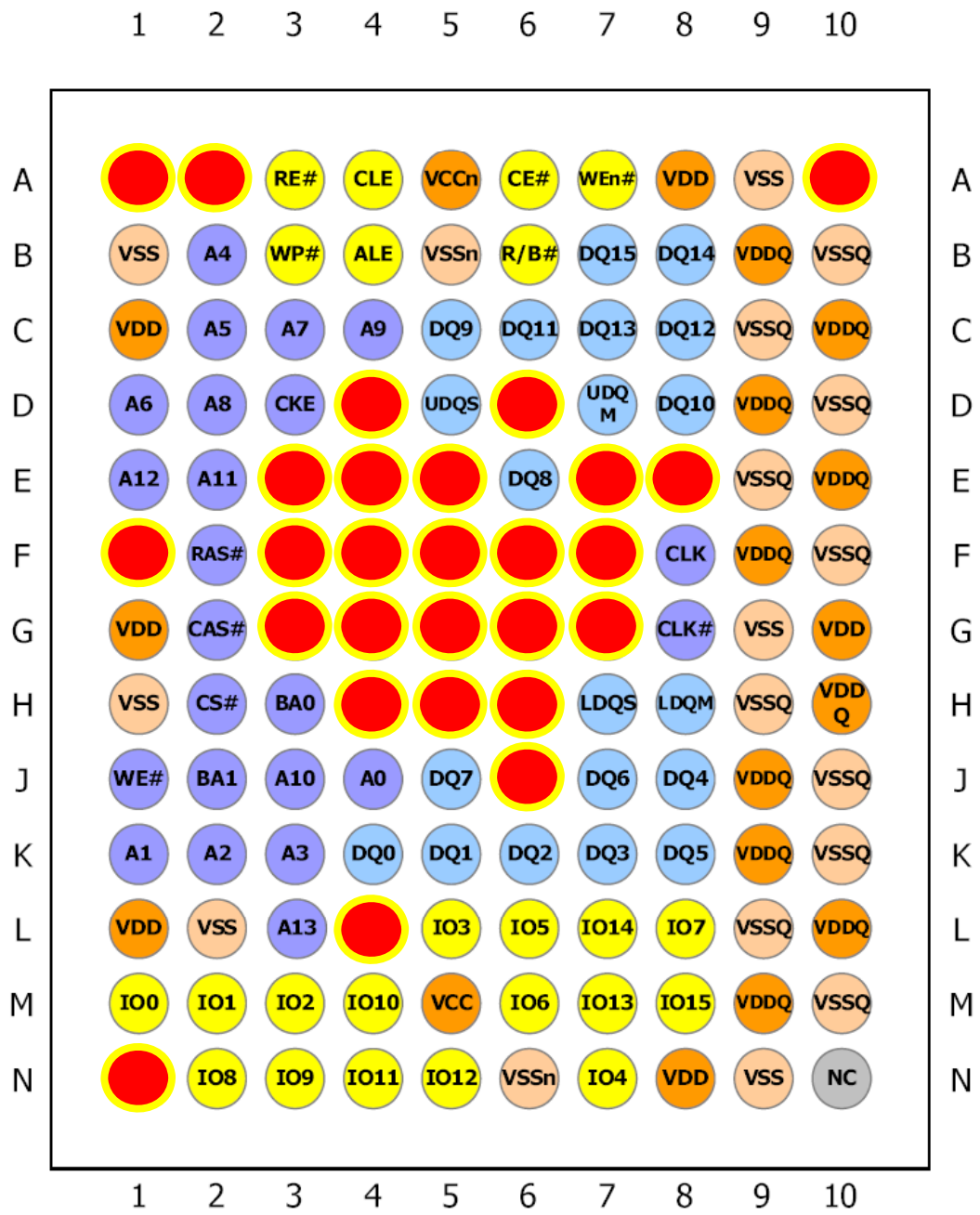
•Ball Diagram (Top View), PMB8815(A-GOLDRADIO+)



: not in use

BGA IC pin check (U301)

* Ball Diagram (Top View), H9DA2GH1GHMMMR-46M



: not in use

9. PCB LAYOUT

J501 : 3.5Φ ear Jack
-no Earphone, headset MIC

U802 : WiiFi Module
- No WiFi Connection

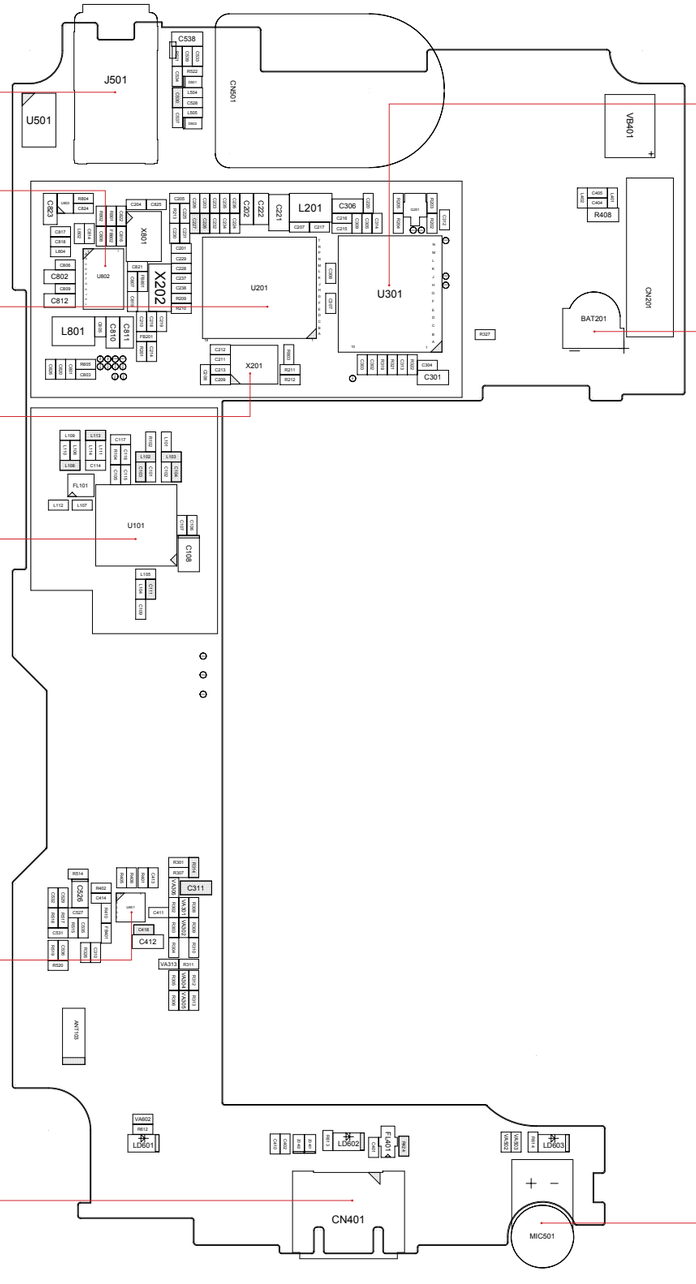
U201 : BB IC
-no Power On.
-no Service.
-no FM Radio

X201 : 26Mhz X-tal
-no Power On
-no Service

U101 : Tx Module
-no Service
-RF Sensitivity & TX Power

U401 : MUIC + Charge ID
-no Booting.
-no USB/Serial Connection.
-no Battery Charge.
-no LCD Backlight

CN401 :I/O conn.
-no USB Connection.
-no Serial Connection.

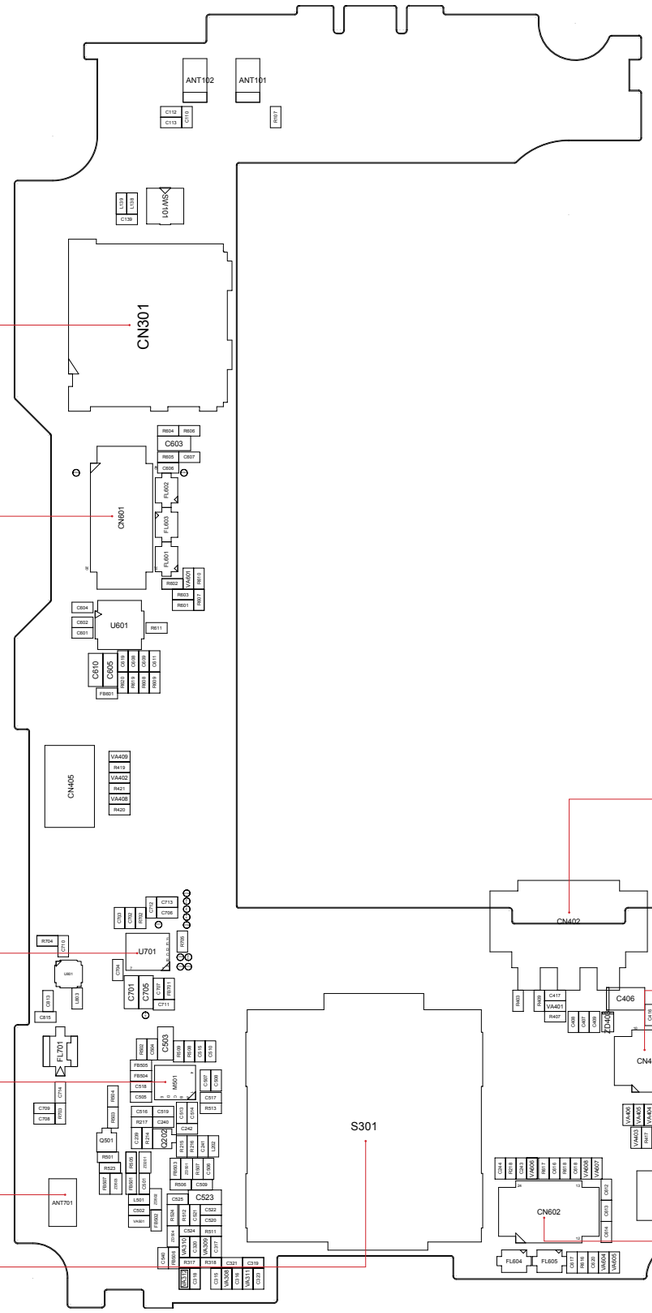


U301 : Memory
-no Booting

BAT201 : Backup Cap.
-RTC Reset

MIC501
.no Voice sending
-no Voice recoding

LG-T385_MAIN_EAX64678601_1.0_TOP



CN301 : Flash Socket
-no Flash Memory

CN601 : LCD Conn.
-no Display

U701 : BT Module
-no BT connection

M501 :Audio Sub System
-no Sound

ANT701 : BT/WiFi Intenna contact.
-no BT connection
-no WiFi connection

S301 : SIM Conn.
-no Sim

CN402 : Battery Conn.
-no power on

CN403 : Touch screen connector
-no touch screen

CN602 : 2M Camera connector
-no Camera

LG-T385_MAIN_EAX64678601_1.0_BOT

10.ENGINEERING MODE

Engineering mode is designed to allow a service man/engineer to view and test the basic functions provided by a handset. The key sequence for switching the engineering mode on is "1809#*350# "Select. Pressing END will switch back to non-engineering mode operation. Use Up and Down key to select a menu and press 'select' key to progress the test. Pressing 'back key will switch back to the original testmenu.

[1] BB TEST
[1-1] Battery Info
[1-1-1] BattInfo
[1-2] Bluetooth Test
[1-2-1] Enter Test Mode
[1-2-2] OnOff Test
[1-2-3] Headset Test
[1-2-4] BT Test1
[1-2-5] BT Test2
[2] Model Version
[1-2-6] Xhtml Compose Print
[2-1] Version
[1-2-7] Xhtml Print Test
[3] Eng Mode
[3-1] Cell environ.
[3-2] PS Layer Info
[3-2-1] Mobility
[3-2-2] RadioRes
[3-3] Layer1 Info
[3-4] Reset Information
[3-5] Memory
[3o-n6f]i gMuermarGioennConf
[3-7] MemAllUse
[3-8] MemDetUse
[3-9] MemDump
[3-10] Change Frequency Band
[4] Call Timer
[5] Factory Reset
[6] MF TEST
[6-1] All Auto Test
[6-2] Backlight
[6-2-1] Backlight On
[6-2-2] Backlight Off
[6-3] Audio
[6-3-1] Audio Test
[6-4] Vibrator
[6-4-1] Vibrator On
[6-4-2] Vibrator Off
[6-5] LCD
[6-5-1] Auto LCD
[6-6] Key pad
[6-7] Mic Speaker
[6-8] Camera
[6-8-1] Camera Main Preview
[6-8-2] Flash On
[6-8-3] Flash Off
[6-9] FM Radio
[6-8-4] Camera Flash Bunning
[6-9-1] FM Radio Test
[7] Network selection
[7-1] Automatic
[7-2] GSM850
[7-3] EGSM
[7-4] DCS
[7-5] PCS

11. STAND ALONE TEST

11.1 Introduction

This manual explains how to examine the status of RX and TX of the model.

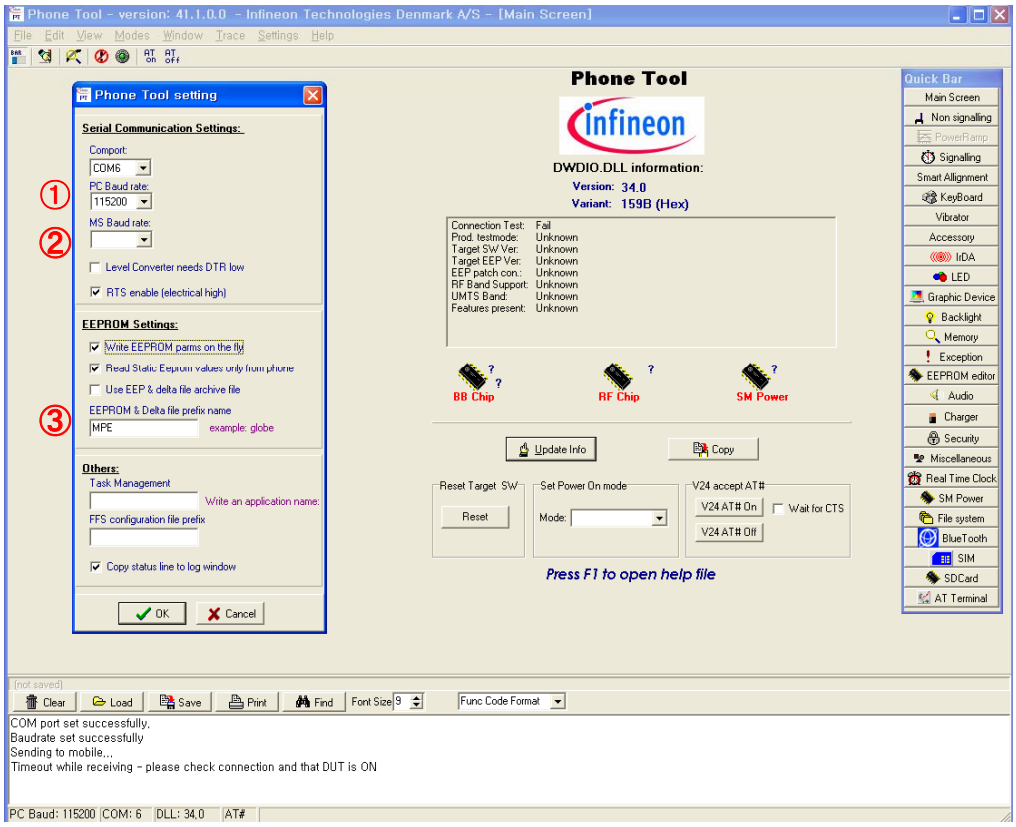
A. Tx Test

TX test - this is to see if the transmitter of the phones is activating normally.

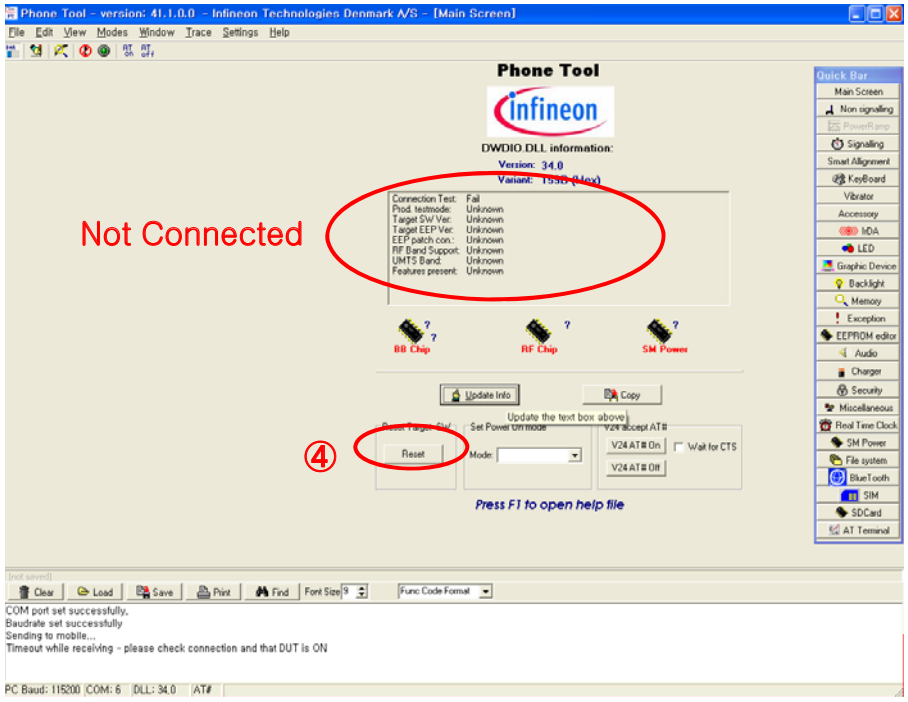
B. Rx Test

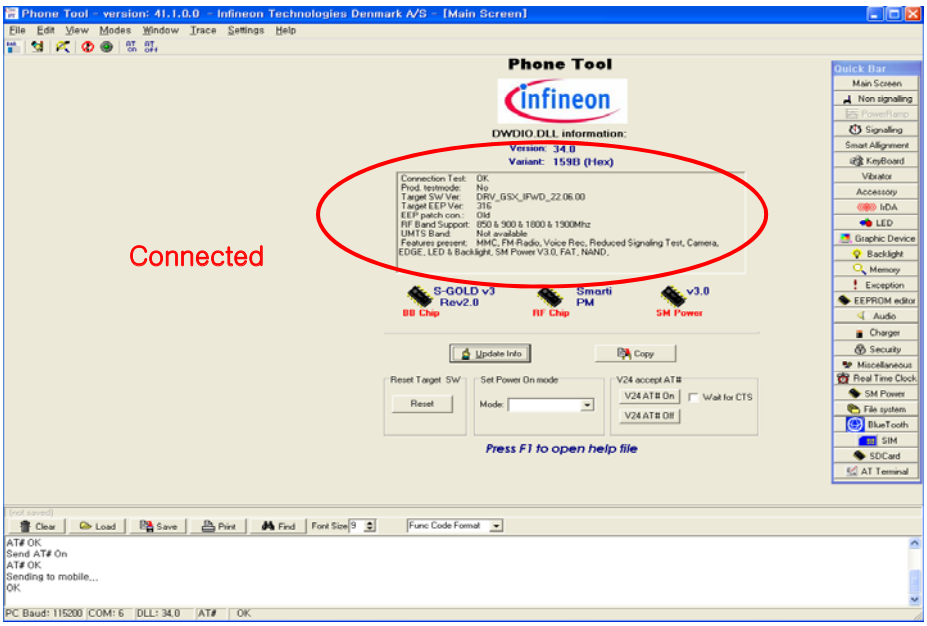
RX test - this is to see if the receiver of the phones is activating normally.

11.2 Setting Method



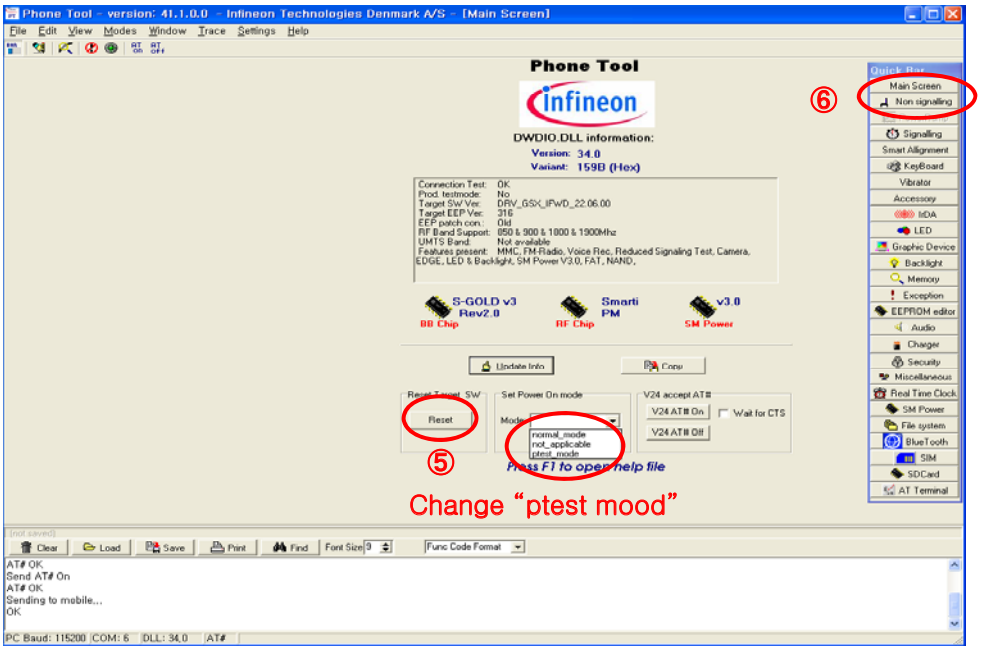
1. Set COM Port
2. Check PC Bau Rate
3. Confirm EEPROM & Delta file prefix name
4. Click “Update Info” for communicating Phone and Test-Program



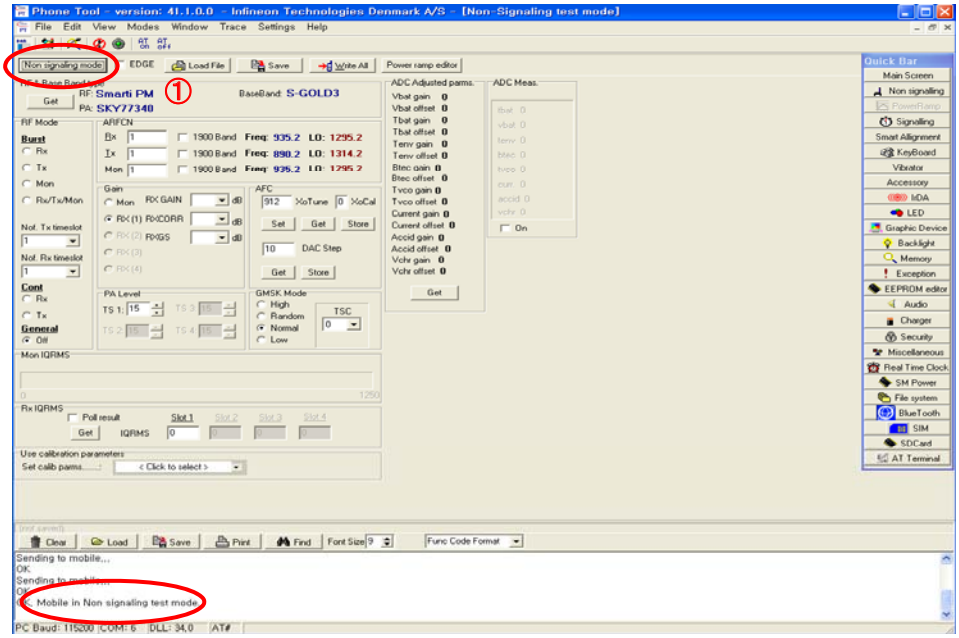


5. For the purpose of the Standalone Test, Change the Phone to “ptest mode” and then Click the “Reset” bar.

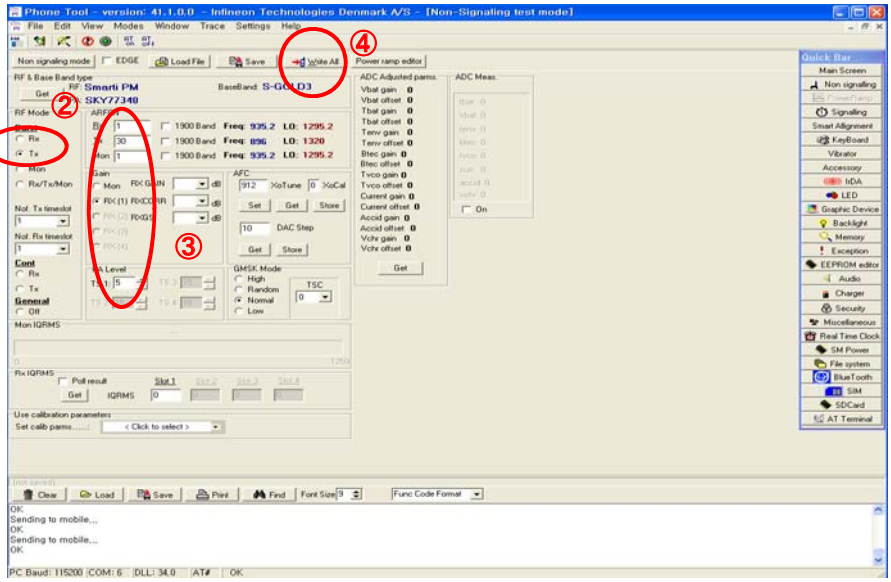
6. Select “Non signaling” in the Quick Bar menu. Then Standalone Test setup is finished.



11.3 Tx Test

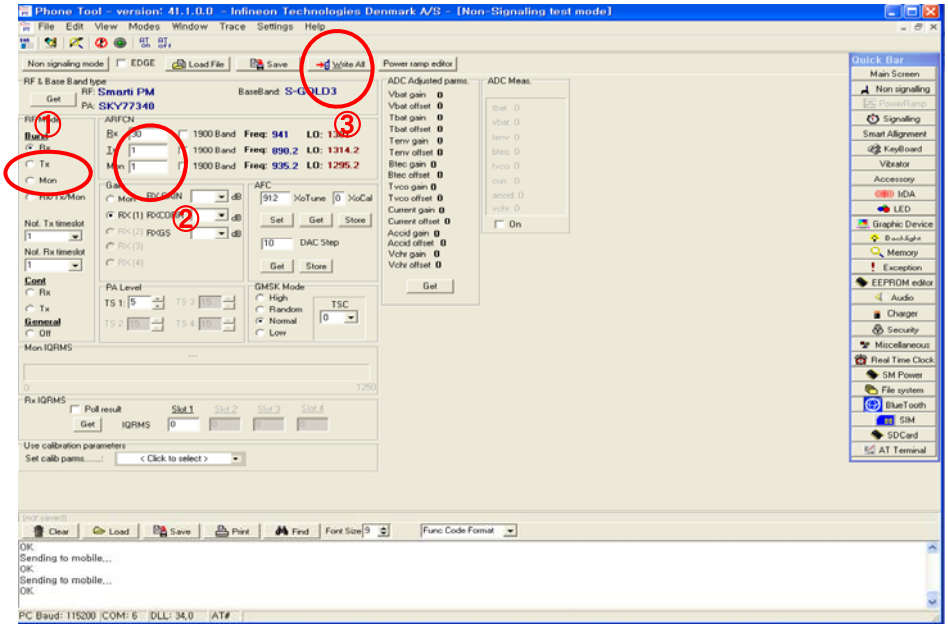


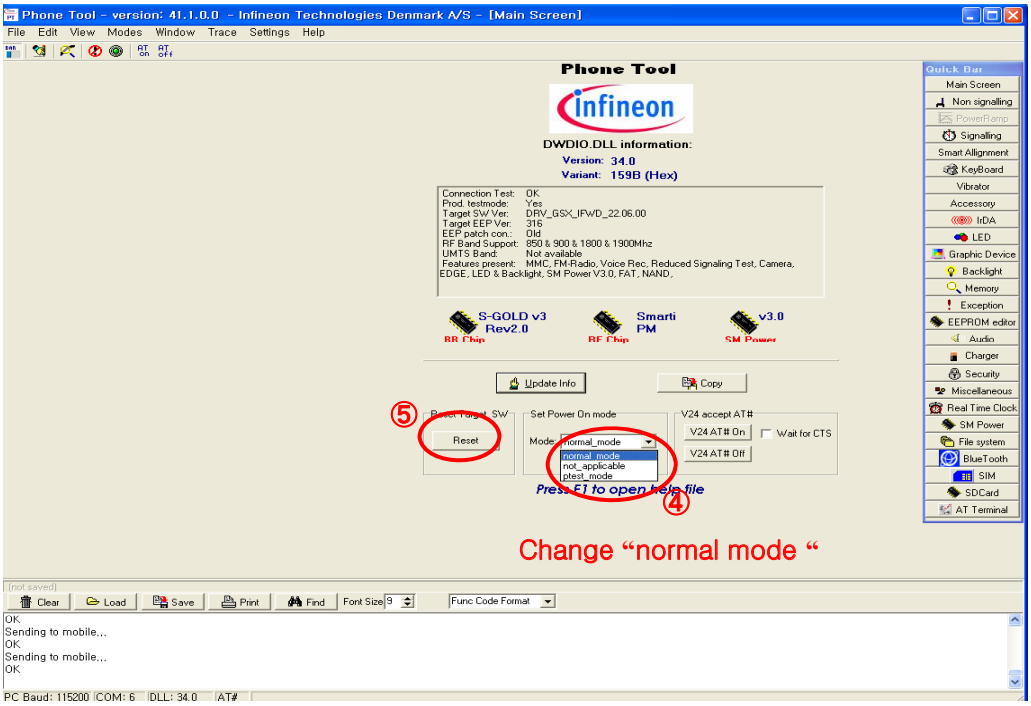
1. "Non signaling mode" bar and then confirm "OK" text in the command line.
2. Put the number of TX Channel in the ARFCN
3. Select "Tx" in the RF mode menu and "PCL" in the PA Level menu.
4. Finally, Click "Write All" bar and try the efficiency test of Phone.



11.4 Rx Test

1. Put the number of RX Channel in the ARFCN.
2. Select “Rx” in the RF mode menu.
3. Finally, Click “Write All” bar and try the efficiency test of Phone.
4. The Phone must be changed “normal mode” after finishing Test.
5. Change the Phone to “normal mode” and then Click the “Reset” bar.



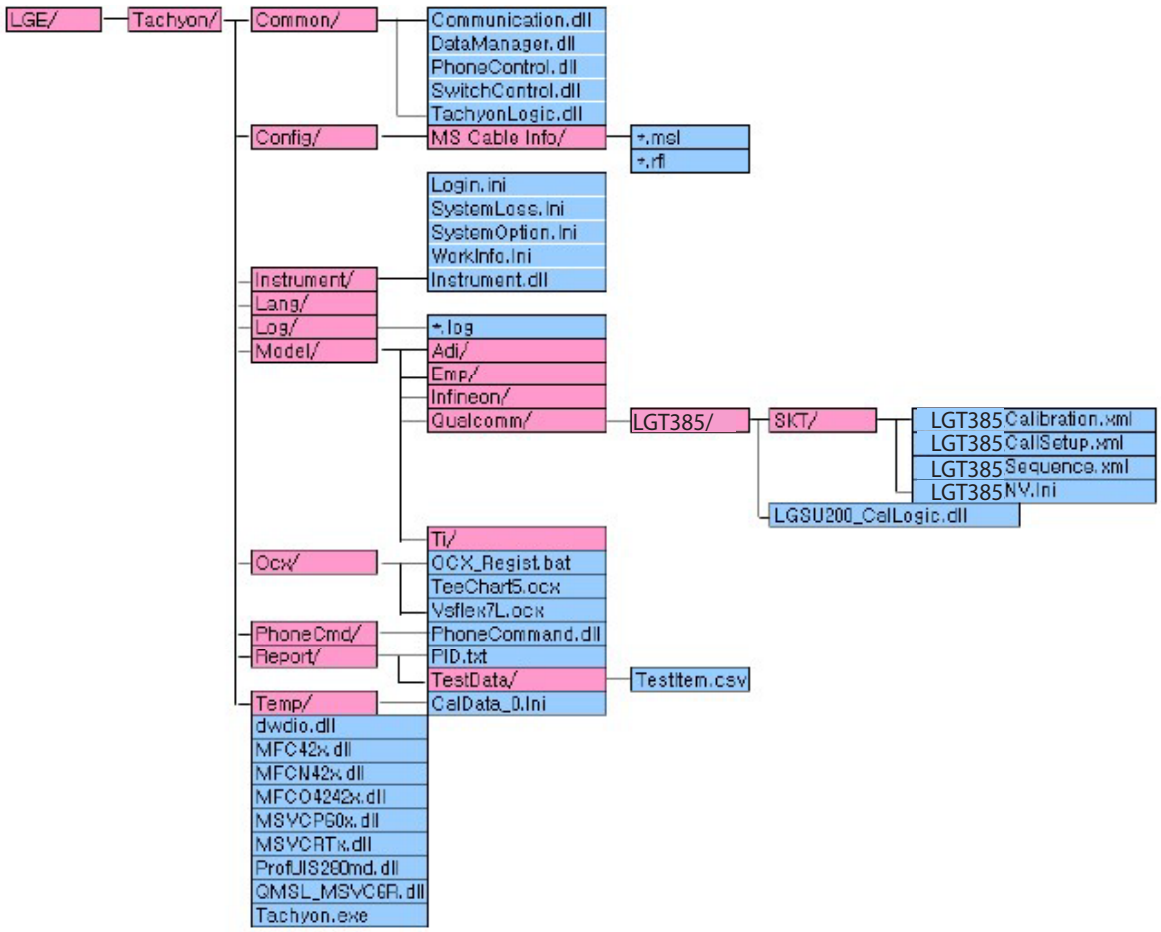


12.AUTO CALIBRATION

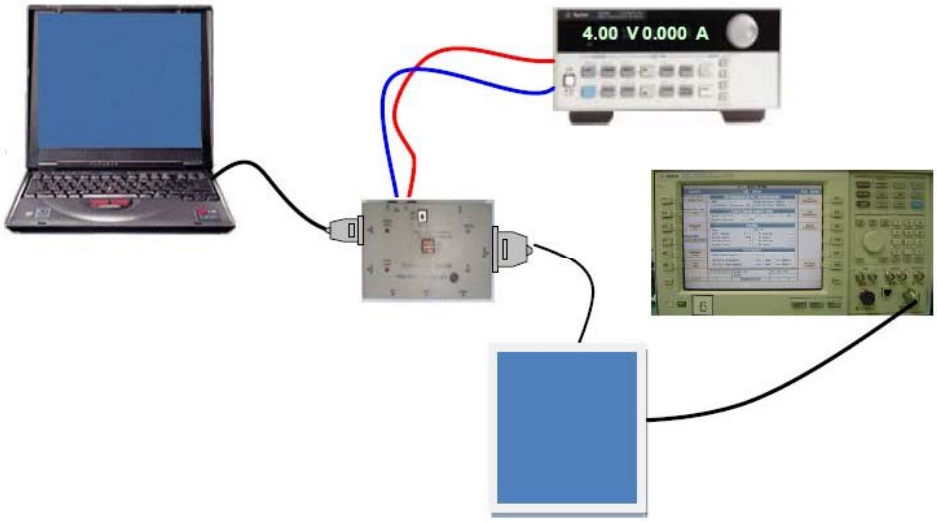
12.1 Overview

Auto-cal (Auto Calibration) is the PC side Calibration tool that perform Tx, Rx and Battery Calibration with Agilent 8960(GSM call setting instrument) and Tektronix PS2521G(Programmable Power supply).
Auto-cal generates calibration data by communicating with phone and measuring equipment then write it into calibration data block of flash memory in GSM phone.

12.2 Tachyon Directory

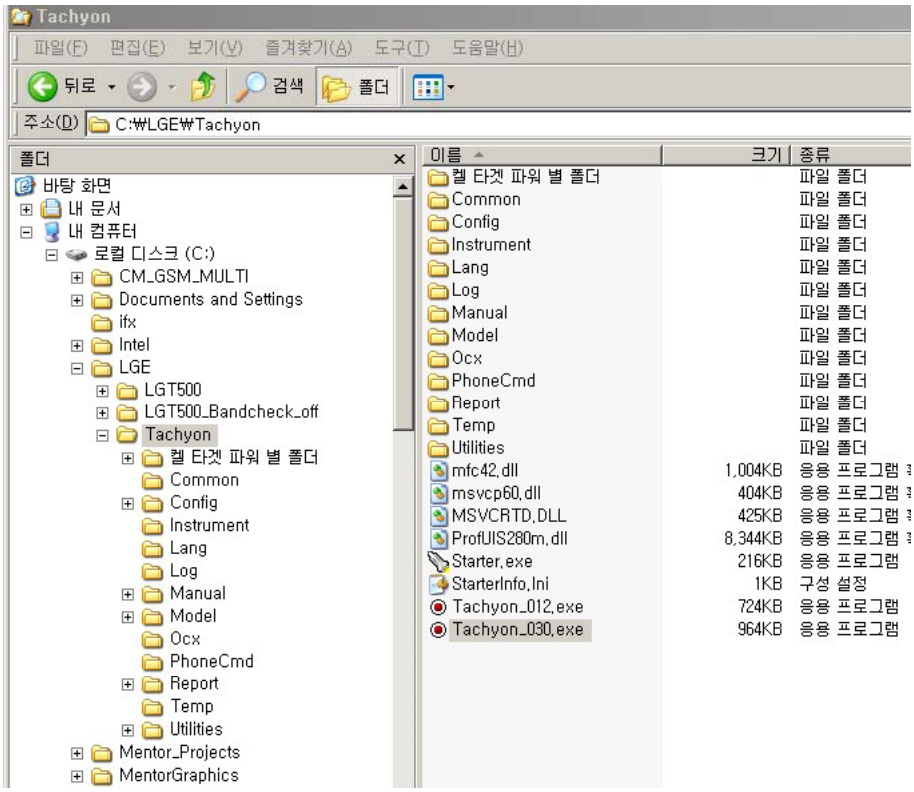


12.3 Test Equipment Setup

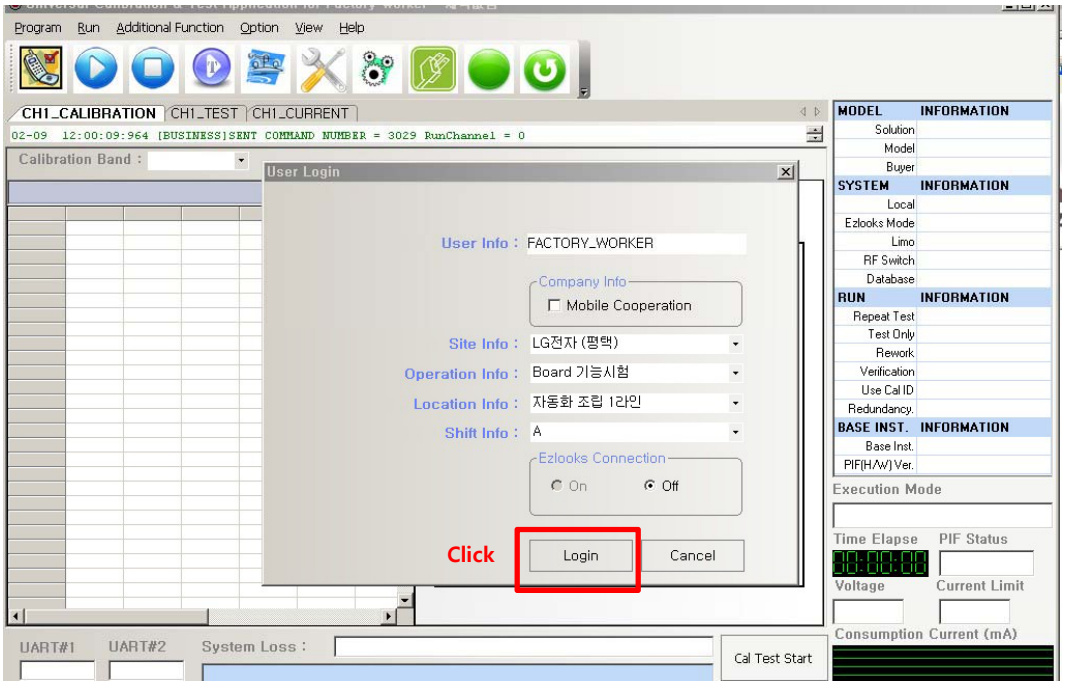


12.4 Procedure

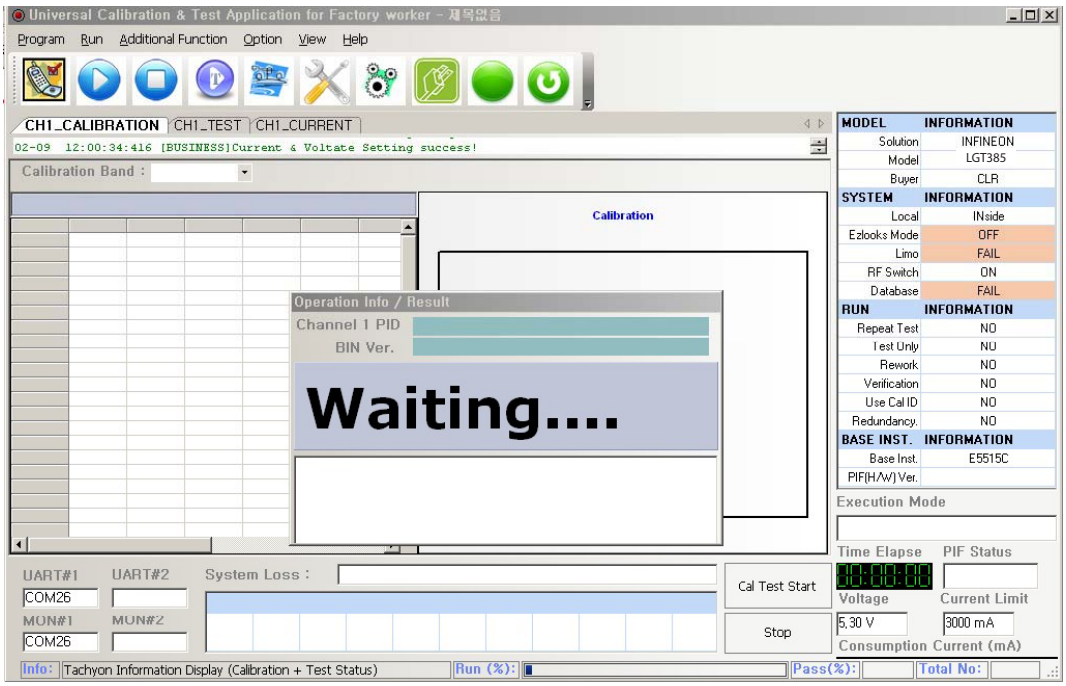
1 .Turn on the Phone.
2. "/LGE/Tachyon/Tachyon.exe"



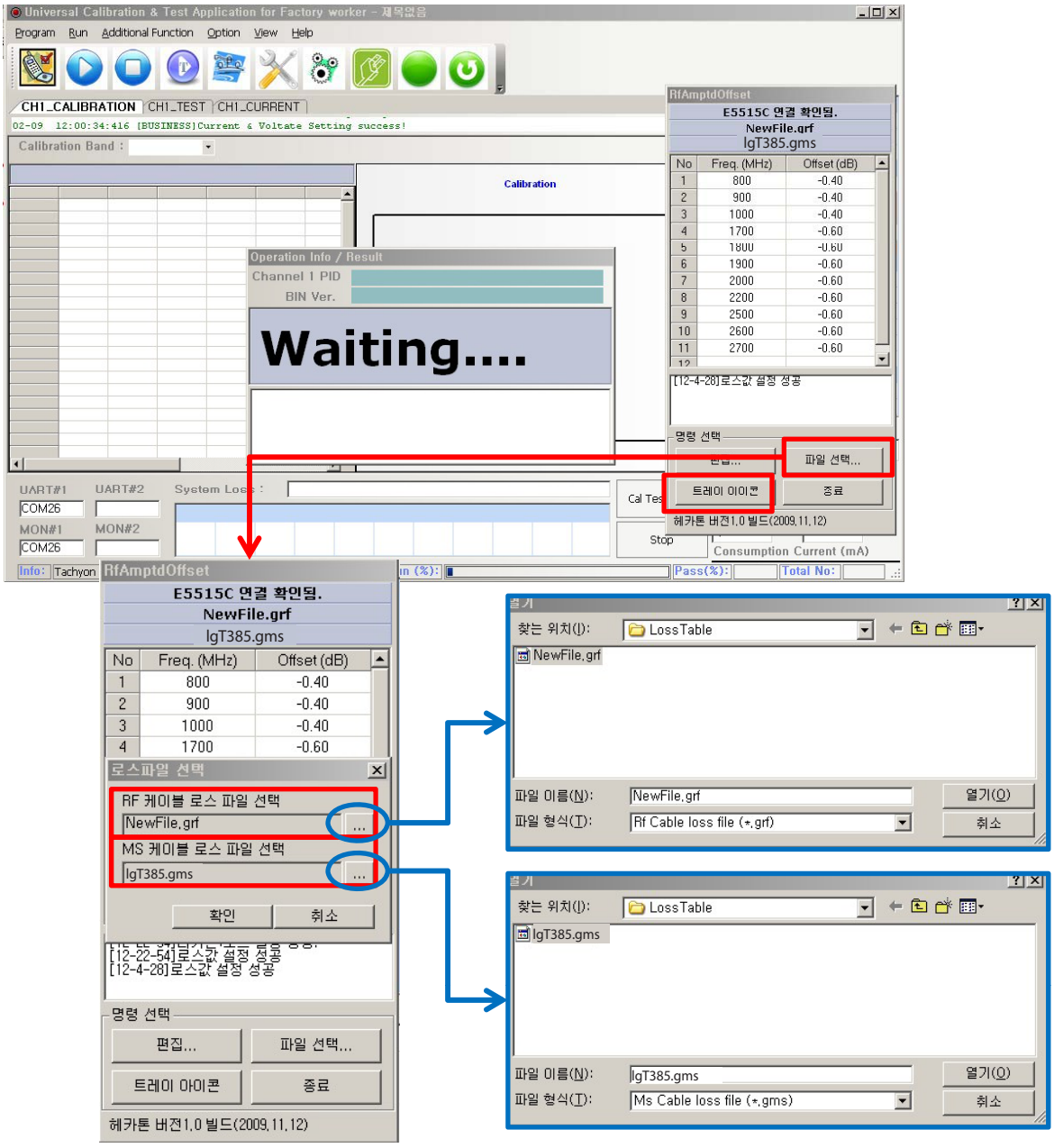
3. Tachyon Login



4. Tachyon Main

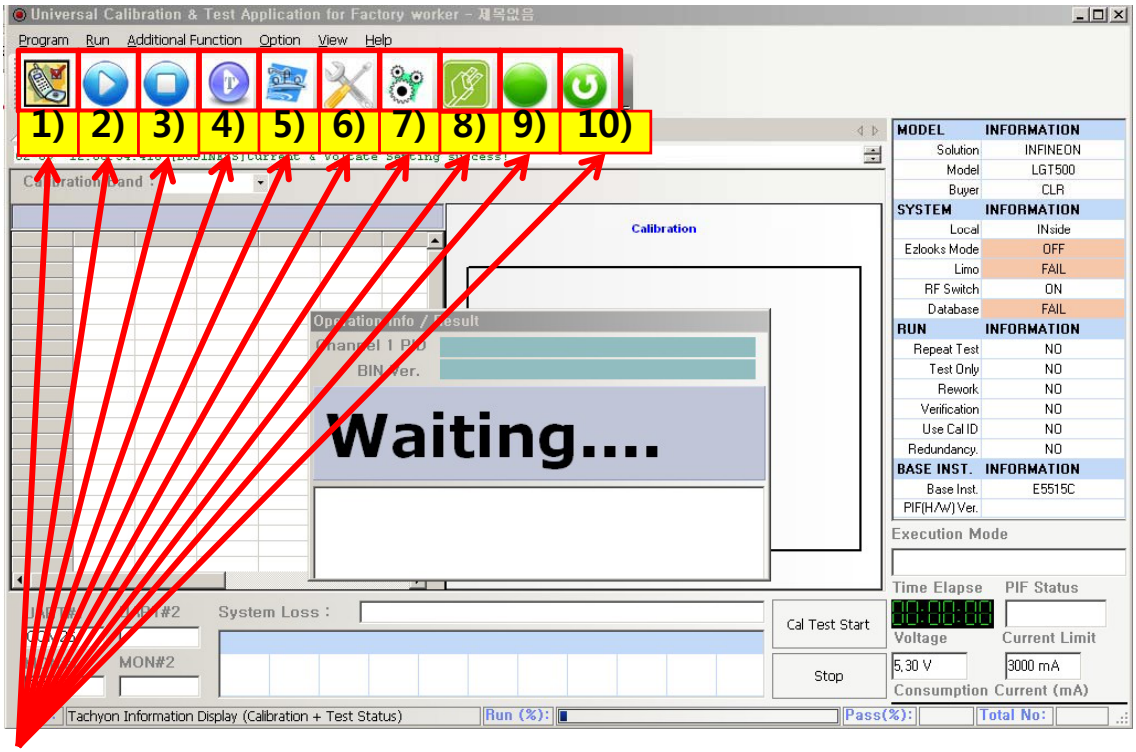


5. Tachyon Loss Setting



6. Tachyon Setting

(1) Tachyon Main UI



1) User Model Selection

2) Calibration + Auto Test

3) Stop

4) Auto Test Only

5) Loss Setting

6) System Option Setting

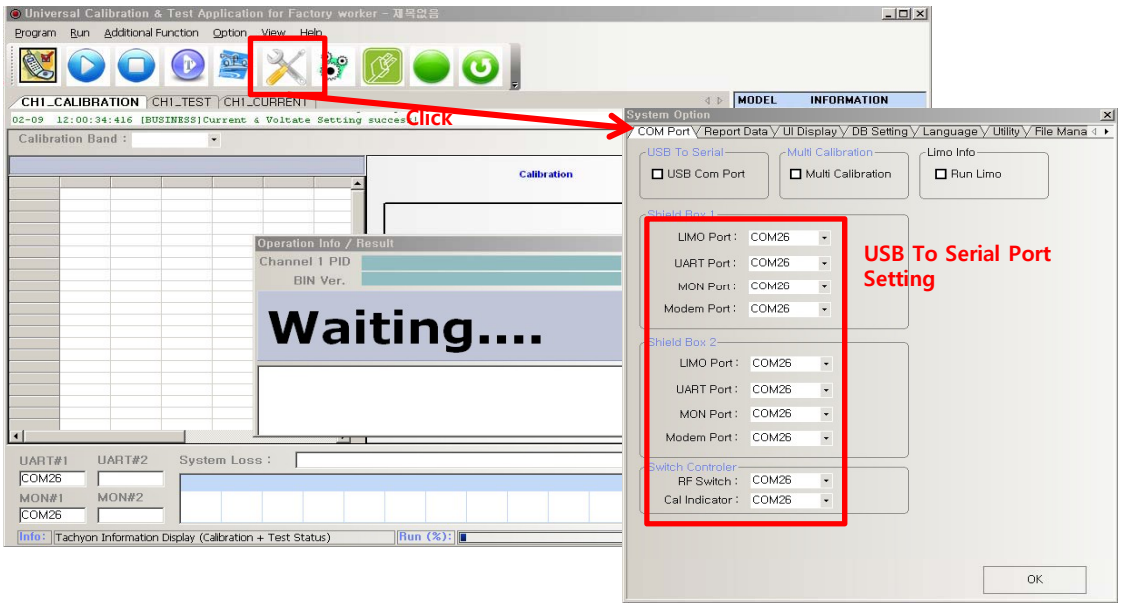
7) Running Option Setting

8) Voltage Current Setting

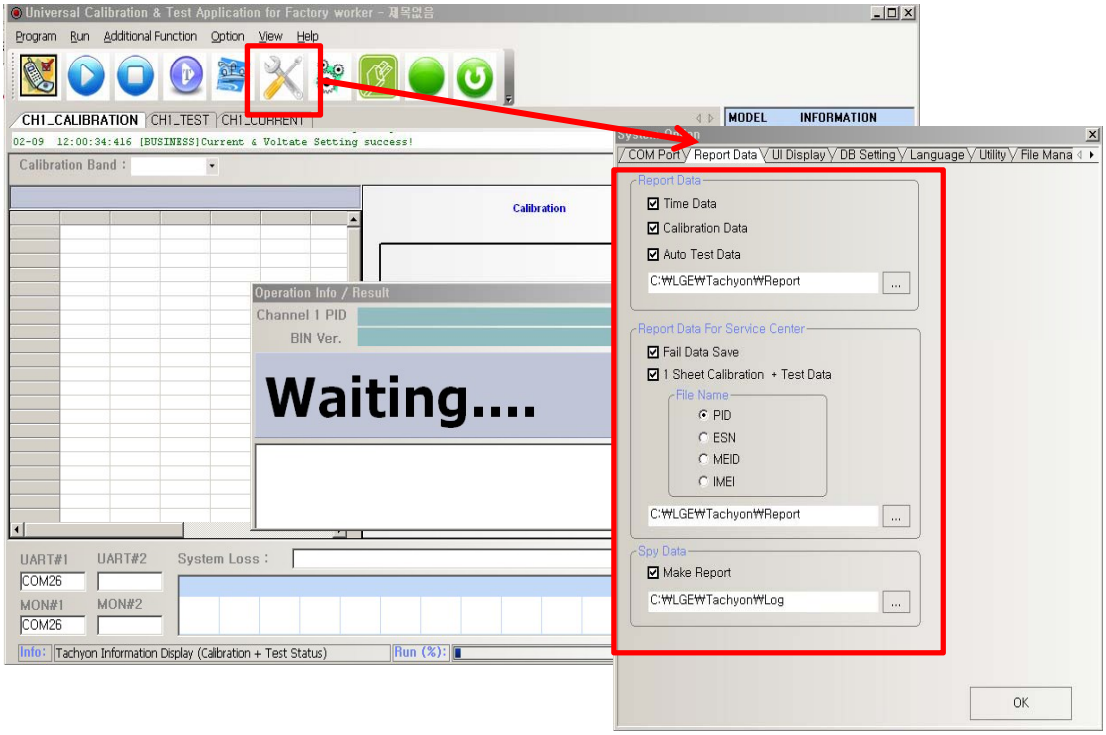
9) Show Result Window

10) Click after setting

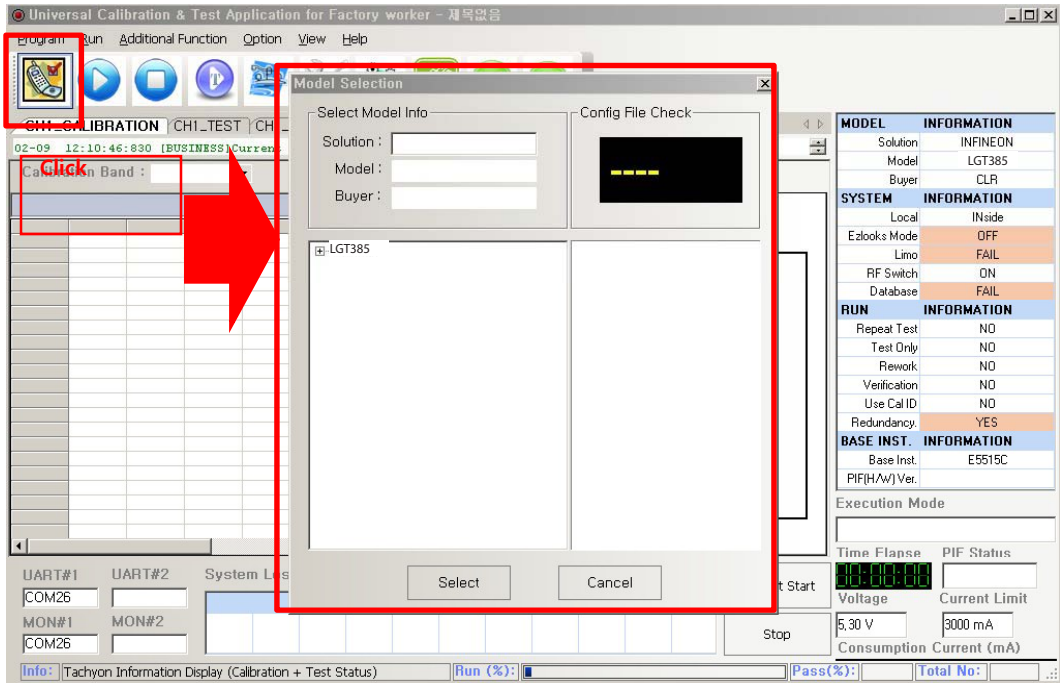
(2) Click "System Option Setting" Menu

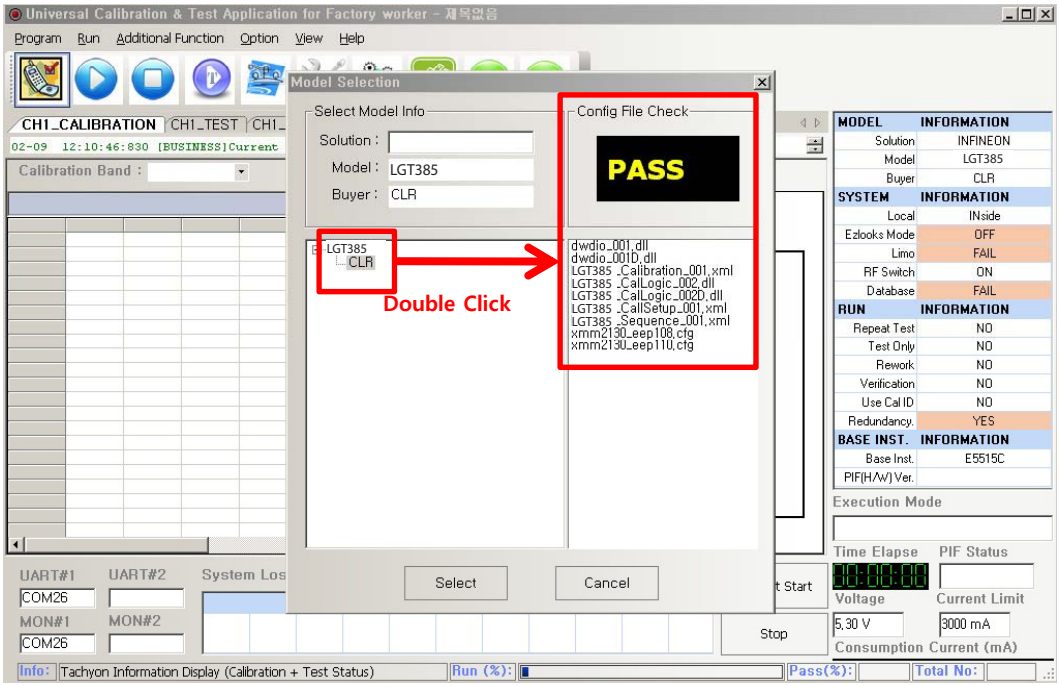


(3) Report Data

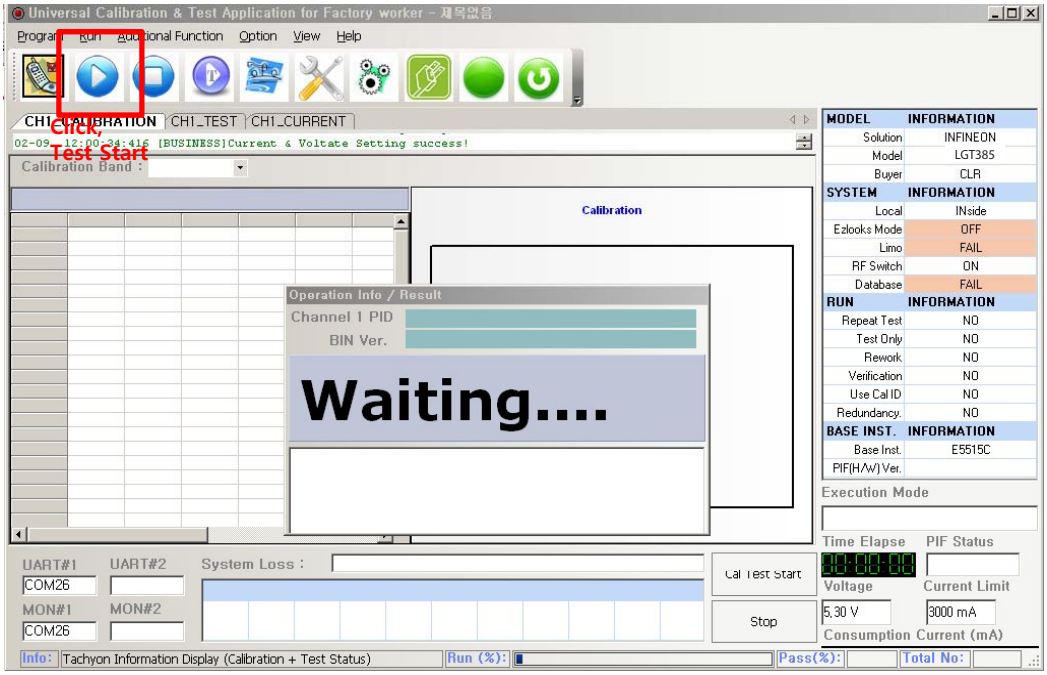


7. Click "User Model Selection" Menu

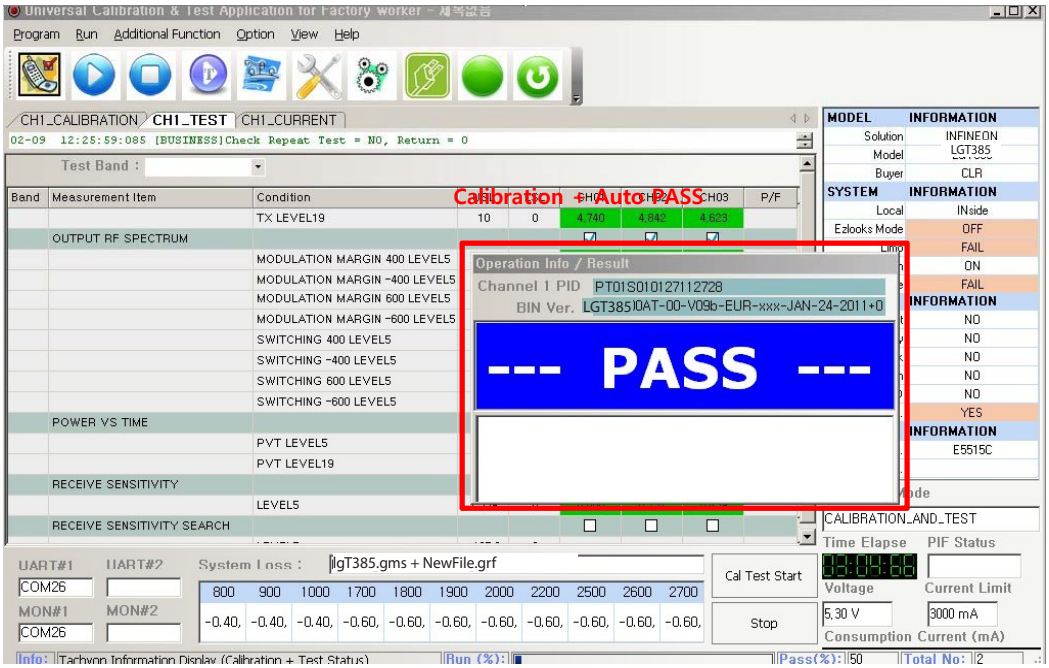




8. Tachyon RF Calibration Start



9. Tachyon RF Calibration finishes.



12.5 AGC

This procedure is for Rx calibration.

In this procedure, We can get RSSI correction value. Set band EGSM and press Start button the result window will show correction values per every power level and gain code and the same measure is performed per every frequency.

12.6 APC

This procedure is for Tx calibration.

In this procedure you can get proper scale factor value and measured power level.

12.7 ADC

This procedure is for battery calibration.

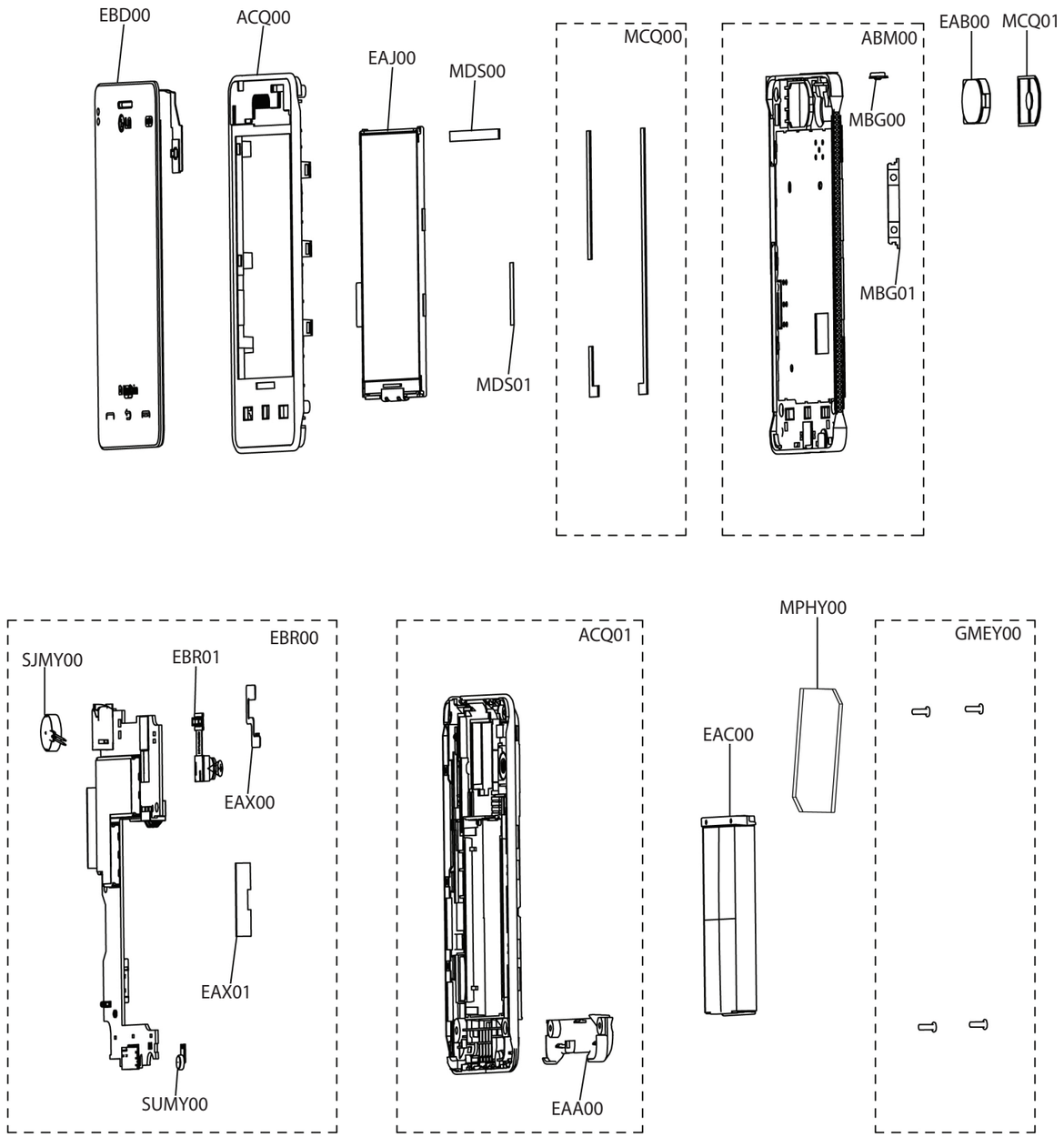
You can get main Battery Config Table and temperature Config Table will be reset.

12.8 Target Power

BAND	Description	Low	Middle	High
GSM 850	Channel	128	191	251
	Frequency	824.2 MHz	836.8 MHz	848.8 MHz
	Max power	32.5 dBm	32.5 dBm	32.5 dBm
EGSM 900	Channel	975	37	124
	Frequency	880.2 MHz	897.4 MHz	914.8 MHz
	Max power	32.5 dBm	32.5 dBm	32.5 dBm
DCS1800	Channel	512	699	885
	Frequency	1710.2 MHz	1747.6 MHz	1784.8 MHz
	Max power	29.5 dBm	29.5 dBm	29.5 dBm
PCS 1900	Channel	512	661	810
	Frequency	1850.2 MHz	1880 MHz	1909.8 MHz
	Max power	29.5 dBm	29.5 dBm	29.5 dBm

13. EXPLODED VIEW & REPLACEMENT PART LIST

13.1 EXPLODED VIEW



Location	Description
ACQ00	Cover Assembly,Rear
EAA00	PIFA Antenna,Multiple
EAB00	Speaker,Dual Mode
EAJ00	LCD Module
EBD00	Touch Window Assembly
ABM00	Can Assembly,Shield
MBG00	Button
MBG01	Button,Side
ACQ01	Cover Assembly,Front
MCQ00	Damper,Speaker
MCQ01	Damper,LCD
MDS01	Gasket
MDS00	Gasket
EBR00	PCB Assembly,Main
EAX01	PCB,Flexible
EAX00	PCB,Sidekey
EBR01	Camera Module
SJMY00	Motor,DC
SUMY00	Microphone,Condenser
GMEY00	Screw,Machine
MPHY00	Plate,Protector
EAC00	Rechargeable Battery,Lithium Ion
MCK00	Cover,Battery

13.2 ReplacementParts <Mechanic component>

Note: This Chapterisused for reference,Part order is ordered by SBOM standard on GCSC

Level	LocationNo.	Description	PartNumber	Spec	Remark
1	AGQ000000	Phone Assembly	AGQ86717201	LGT385.ATURBK BK:BLACK BLACK -	
2	MEZ002101	Label,Approval	MLAA0062316	COMPLEX GU280 OREBK ZZ:Without Color COMPLEX, (empty), , , , ,	
2	ACQ100400	Cover Assembly,EMS	ACQ86021101	LGT385.ATURBK BK:BLACK BLACK -	
3	ACQ00	Cover Assembly,Rear	ACQ85971301	LGT375.ATHABK ZZ:Without Color -	
4	MDS000000	Gasket	MDS63943701	COMPLEX LGT375.ATHABK ZZ:Without Color -	
4	MKC009400	Window,Camera	MKC64323201	CUTTING PC LGT375.ATHABK ZZ:Without Color -	
4	MEZ000900	Label,After Service	MLAB0001102	COMPLEX C2000 CGRSV WA:White C2000 USASV DIA 4.0 PRINTING,	
4	MCK063300	Cover,Rear	MCK67156601	MOLD PC LGT375.ATHABK ZZ:Without Color -	
4	MJN020800	Tape,Decor	MJN68116901	COMPLEX LGT375.ATHABK ZZ:Without Color -	
4	MCQ043300	Damper,LCD	MCQ66973101	COMPLEX LGT375.ATHABK ZZ:Without Color -	
4	MCQ015700	Damper,Connector	MCQ66973201	COMPLEX LGT375.ATHABK ZZ:Without Color -	
4	MCQ009400	Damper,Camera	MCQ66998101	COMPLEX LGT375.ATHABK ZZ:Without Color -	
4	MCQ074201	Damper,Speaker	MCQ66998301	COMPLEX LGT375.ATHABK ZZ:Without Color -	
4	MCR000000	Decor	MCR64793701	MOLD PC LGT375.ATHABK ZZ:Without Color -	
4	MCQ000000	Damper	MCQ66953901	COMPLEX LGT375.ATHABK ZZ:Without Color -	
3	ACQ003400	Cover Assembly,Bar	ACQ86111401	LGT385.ATURBK BK:BLACK BLACK -	

Level	LocationNo.	Description	PartNumber	Spec	Remark
4	MJN061100	Tape,Protect	MJN68155901	COMPLEX LGT385.ATURBK ZZ:Without Color -	
4	ABM00	Can Assembly,Shield	ABM73757601	LGT375.ATHABK ZZ:Without Color -	
5	MBG00	Button	MBG64586701	MOLD PC LGT375.ATHABK ZZ:Without Color -	
5	MBG01	Button,Side	MBG64586601	MOLD PC LGT375.ATHABK ZZ:Without Color -	
5	ABM070300	Can Assembly,Shield	ABM73797201	LGT375.ATHABK ZZ:Without Color -	
6	MBK070300	Can,Shield	MBK63273801	PRESS STS 304 0.4 LGT375.ATHABK ZZ:Without Color -	
5	MHK000000	Sheet	MHK63757801	COMPLEX LGT375.ATHABK ZZ:Without Color -	
5	MJN000000	Tape	MJN68171001	COMPLEX LGT375.AVNMBK ZZ:Without Color -	
5	MDJ000000	Filter	MDJ63407501	COMPLEX LGT375.ATHABK ZZ:Without Color -	
5	MJN061100	Tape,Protect	MJN68081501	COMPLEX LGT375.ATHABK ZZ:Without Color -	
5	MJN061101	Tape,Protect	MJN68081601	COMPLEX LGT375.ATHABK ZZ:Without Color -	
4	ACQ01	Cover Assembly,Front	ACQ85989401	LGT375.ATHABK ZZ:Without Color -	
5	MJB000000	Stopper	MJB62950101	COMPLEX LGT375.ATHABK ZZ:Without Color -	
5	MDJ000000	Filter	MDJ63464901	COMPLEX LGT375.ATHABK ZZ:Without Color -	
5	MCQ049800	Damper,Motor	MCQ66998001	COMPLEX LGT375.ATHABK ZZ:Without Color -	
5	MCQ074200	Damper,Speaker	MCQ66954001	COMPLEX LGT375.ATHABK ZZ:Without Color -	
5	MCK032700	Cover,Front	MCK67121901	MOLD PC LGT375.ATHABK ZZ:Without Color -	

Level	LocationNo.	Description	PartNumber	Spec	Remark
6	MET099500	INSERT,NUT	MICE0016910	MECH_COMMON ZY,ZZ,PRESS, STS, , , , ,	
5	MJN000000	Tape	MJN68099901	COMPLEX LGT375.ATHABK ZZ:Without Color -	
5	MJN089300	Tape,Window	MJN68116601	COMPLEX LGT375.ATHABK ZZ:Without Color -	
4	MCQ00	Damper,Speaker	MCQ66953801	COMPLEX LGT375.ATHABK ZZ:Without Color -	
4	MCQ01	Damper,LCD	MCQ66997801	COMPLEX LGT375.ATHABK ZZ:Without Color -	
4	MDS01	Gasket	MDS63977801	COMPLEX LGT375.ATHABK ZZ:Without Color -	
4	MDS00	Gasket	MDS63977901	COMPLEX LGT375.ATHABK ZZ:Without Color -	
4	MEV000000	Insulator	MEV64107701	COMPLEX LGT375.ATHABK ZZ:Without Color -	
4	MJN061101	Tape,Protect	MJN68155801	COMPLEX LGT375.AVNMBK ZZ:Without Color -	
6	ANT101 ANT102	Contact	MCIZ0008201	COMPLEX LG-VN530 VRZ DW:DARK BROWN PRESS, BeCu, , 3.0, 1.5, 1.5,	
5	MEZ000000	Label	MLAZ0038301	COMPLEX LG-VX6000 ZZ:Without Color PID Label 4 Array PRINTING,	
6	ANT103	Contact	MCIZ0008701	COMPLEX L-04C, ANTTWV ZZ:Without Color PRESS, YCUT-FX, 4.2, 2.5, 1.5,	
6	SC202	Can,Shield	MBK63214601	PRESS SUS 304 0.2 LGT375.ATHABK ZZ:Without Color -	
6	SC201	Can,Shield	MBK63273901	PRESS SUS 304 0.2 LGT375.ATHABK ZZ:Without Color -	
5	MCQ049800	Damper,Motor	MCQ67046101	COMPLEX LGT375.ATHABK ZZ:Without Color -	
5	MDS000000	Gasket	MDS63978001	COMPLEX LGT375.ATHABK ZZ:Without Color -	
5	MEV000000	Insulator	MEV64231201	COMPLEX LGT375.AVNMBK ZZ:Without Color insulator_PCB	

Level	LocationNo.	Description	PartNumber	Spec	Remark
3	GMEY00	Screw,Machine	GMEY0013901	BH + 1.4mM 4mM MSWR FZB N - ARIMA COMMUNICATIONS CORP.	
3	MPHY00	Plate,Protector	MPHY0001005	COMPLEX CU8180.BUMWPF ZZ:Without Color -	
1	AGF000000	Package Assembly	AGF76517805	LGT385.ATURBK ZZ:Without Color LG-T385 TUR(EU1W/SMS Text UB/TUR Peel/1,200EA)	
2	MAY084000	Box,Unit	MAY65497207	BOX Paper 120 90 56 4 COLOR LGT385.ATURBK ZZ:Without Color LG-T385 TUR(SMS Text) Unit Box(EU1W)	
2	MEZ084100	Label,Unit Box	MLAQ0018064	PRINTING LGC105.ATURBK ZZ:Without Color Turkey Peel & SMS Label TUR only_Peel+SMS text_unit box label_105×40	
2	AGJ000000	PALLET ASSY	APLY0003901	GD510 BALBK BK,ZZ,EU1 TYPE_Body(SW)+Cap(EU)+AL_1200EA	
3	MBEC00	Box,Carton	MBEC0003601	COMPLEX GD510 CZESV ZZ:Without Color -	
3	MCCL00	Cap,Box	MCCL0002501	COMPLEX GD510 CZESV ZZ:Without Color -	
3	MPCY00	Pallet	MPCY0012403	COMPLEX KG800 FRABK DB:DARK BLUE -	
2	MBAD00	Bag,Vinyl	MBAD0005204	COMPLEX LG-LX260 SPRAG ZZ:Without Color -	
2	MBEE00	Box,Master	MBEE0061001	COMPLEX GD510.ACZESV ZZ:Without Color EU1 Master Box	
2	MLAJ00	Label,Master Box	MLAJ0004402	PRINTING CG300 CGR DG ZZ:Without Color LABEL MASTER BOX(for CGR TDR 2VER. mbox_label) GSM standard_master box label	
2	MLAZ01	Label	MLAZ0050901	COMPLEX KU990.AGBRBK ZZ:Without Color Battery Warning Label (Lithium ion Battery Label)	
1	AAD000000	Addition Assembly	AAD85976201	LGT385.ATURBK BK:BLACK BLACK -	
2	MCK00	Cover,Battery	MCK67265401	MOLD PC LGT385.ATURBK ZZ:Without Color -	

13.2 ReplacementParts <Main component>

Note: This Chapterisused for reference, Part order is ordered by SBOM standard on GCSC

Level	LocationNo.	Description	PartNumber	Spec	Remark
4	EAA00	PIFA Antenna,Multiple	EAA62788401	CN007068 QUAD -5DB 5:1 LDS Type - SHANGHAI AMPHENOL AIRWAVE	
4	EAA030101	PIFA Antenna Bluetooth	EAA62824501	LS01-I-11123-A0 SINGLE -5DB 5:1 Metal Stamping Type - LS Mtron Ltd.	
4	EAB00	Speaker,Dual Mode	EAB62429501	1812-8T-05PP Nd-Fe-B 700mW 8OHM 91DB 720HZ 1812*3.0T DCCA new pin type PIN KIRYN TELECOM CO., LTD	
4	EAJ00	LCD Module	EAJ62130001	LM320DN1A QVGA 3.2INCH 240X320 400CD COLOR 60% 4/3 500 60Hz Inverter N LED 2D - TOVIS	
4	EBD00	Touch Window Assembly	EBD61386301	STWC-L0008FA CAPACITIVE TOUCH PFF MMS128 3.2" B to B - SUNTEL CO.,LTD.	
3	EBR00	PCB Assembly,Main	EBR75393801	LGT385.ATURBK 1.0 Main	
4	EBR071800	PCB Assembly Main,SMT	EBR75393901	LGT385.ATURBK 1.0 Main	
5	EBR071600	PCB Assembly Main,SMT Bottom	EBR75368801	LGT385.ATURBK 1.0 Main	
6	C112	Capacitor Ceramic,Chip	ECCH0000196	MCH155A0R75C 0.75pF 0.25PF 50V NP0 - 55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	C406	Capacitor TA,Conformal	ECTH0002002	F981A336MSA 33uF 20% 10V 3.3UA -55TO+125C 6OHM 2.0X1.25X0.8MM NONE SMD R/TP 0.9T max. NICHICON CORPORATION, EAST JAPAN SALES OFFICE	
6	C714	Inductor Multilayer,Chip	ELCH0001403	LL1005-FHL1N0S 1NH 0.3NH - 400mA - - 0.1OHM 20GHZ 7 SHIELD NONE 1.0X0.5X0.5MM R/TP TOKO, INC.	
6	C708	Inductor Multilayer,Chip	ELCH0001401	LL1005-FHL15NJ 15NH 5% - 300mA 0.5OHM 2.8GHZ 9 SHIELD NONE 1.0X0.5X0.5MM R/TP TOKO, INC.	

Level	LocationNo.	Description	PartNumber	Spec	Remark
6	R502 R513 R601 R605 R606 R608 R609 R619 R620	Resistor,Chip	ERHZ0000401	MCR01MZSJ000 0OHM 5% 1/16W 1005 R/TP - ROHM.	
6	C703 C704	Capacitor Ceramic,Chip	ECCH0000110	MCH155A100D 10pF 0.5PF 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	R218 R504 R616	Resistor,Chip	ERHZ0000402	MCR01MZP5J100 10OHM 5% 1/16W 1005 R/TP - ROHM.	
6	C408 C702 C706 C707	Capacitor Ceramic,Chip	ECCH0000155	MCH153CN103KK 10nF 10% 16V X7R - 55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	L501	Inductor Multilayer,Chip	ELCH0003842	LQG15HSR10J02D 100NH 5% - 150mA - - 1.25OHM 600MHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO.,LTD.	
6	U601	IC,Sub PMIC	EUSY0344403	RT9396GQW QFN,24,R/TP,4CH+2LDO,IC,Sub PMICIC,Sub PMIC RICHTEK TECHNOLOGY CORP.	
6	R216	Resistor,Chip	ERHZ0003801	MCR01MZP5J5R1 5.1OHM 5% 1/16W 1005 R/TP - ROHM.	
6	C604 C608 C609 C611 C619 C621 C622 VA601	Capacitor Ceramic,Chip	ECCH0004904	GRM155R60J105K 1uF 10% 6.3V X5R -55TO+85C 1005 R/TP - MURATA MANUFACTURING CO.,LTD.	
6	FL601 FL602 FL603 FL604 FL605	Filter,EMI/Power	SFEY0013201	EVRC14S03Q030100R ESD/EMI 0HZ 15pF 0H SMD R/TP AMOTECH CO., LTD.	

Level	LocationNo.	Description	PartNumber	Spec	Remark
6	ZD201 ZD302 ZD404 ZD501 ZD502 ZD503 ZD504	Diode,TVS	EDTY0012501	UCLAMP3311T.TCT 3.3V 3.5V min. 6.5V 5A - SLP1006P2T R/TP 2P 1 SEMTECH CORPORATION	
6	C315 C316 C317 C318 C320 C323 C407 C417	Capacitor Ceramic,Chip	ECZH0000830	C1005C0G1H330JT000F 33pF 5% 50V NP0 - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	R503,R526	Resistor,Chip	ERHZ0000445	MCR01MZP5J224 220KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	C505 C516 C517 C518 C519	Capacitor Ceramic,Chip	ECCH0000198	CL05A225MQ5NSNC 2.2uF 20% 6.3V X5R - 55TO+85C 1005 R/TP . SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	M501	IC,Audio Sub System	EUSY0420001	TPA2055D3 1.6~5.5V 0W WLCSP R/TP 20P - TEXAS INSTRUMENTS INCO.	
6	C319 C321 C415 C416 C504 C510 C515 C612 C613 C614	Capacitor Ceramic,Chip	ECZH0003103	GRM36X7R104K10PT 100nF 10% 10V X7R - 55TO+125C 1005 R/TP - MURATA MANUFACTURING CO.,LTD.	
6	Q202	TR,Bipolar	EQBN0019201	KTC3770V NPN 3V 20V 12V 100mA 999A 999 100mW VSM R/TP 3P KEC CORPORAITION	
6	C524 C525	Capacitor Ceramic,Chip	ECCH0000122	MCH155A470JK 47pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	C241 C507 C508 C601 C602 C606	Capacitor Ceramic,Chip	ECZH0001215	C1005X5R1A105KT000F 1uF 10% 10V X5R - 55TO+85C 1005 R/TP - TDK KOREA COOPERATION	

Level	LocationNo.	Description	PartNumber	Spec	Remark
6	R419 R420 R421	Resistor,Chip	ERHZ0000505	MCR01MZP5J681 680OHM 5% 1/16W 1005 R/TP - ROHM.	
6	R417 R524 R705	Resistor,Chip	ERHZ0000404	MCR01MZP5J102 1KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	R206 R217 R317 R318 R412	Resistor,Chip	ERHY0000254	MCR01MZP5J472 4.7KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	R702	Resistor,Chip	ERHZ0000221	MCR01MZP5F1502 15KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	FB502 FB503 FB506 FB507	Filter,Bead	SFBH0008102	BLM15HD182SN1D 1800 ohm 1.0X0.5X0.5 25% 2.2 ohm 0.2A SMD R/TP 2P 0 MURATA MANUFACTURING CO.,LTD.	
6	C502	Capacitor Ceramic,Chip	ECCH0000117	CL05C270JB5NNNC 27pF 5% 50V NP0 -55TO+125C 1005 R/TP 0.5 SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	FB504 FB505 FB701	Filter,Bead	SFBH0008101	BLM15AG601SN1D 600 ohm 1.0X0.5X0.5 25% 0.6 ohm 0.3A SMD R/TP 2P 0 MURATA MANUFACTURING CO.,LTD.	
6	R413	Resistor,Chip	ERHZ0000506	MCR01MZP5J682 6.8KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	VA402 VA404 VA408 VA409 VA604 VA605 VA607 VA608	Varistor	SEVY0004301	ICVL0518100Y500FR 18V 0% 10F 1.0*0.5*0.55 NONE SMD R/TP INNOCHIPS TECHNOLOGY	
6	R501	Resistor,Chip	ERHZ0000486	MCR01MZP5J473 47KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	CN301	Socket,Card	EAG62830201	104031-0811 SD 8P ANGLE SMD R/TP 11.95x11.40x1.42t, Push-pull type MOLEX	
6	CN602	Connector,BtoB	ENBY0034201	GB042-24S-H10-E3000 24P 0.40MM STRAIGHT SOCKET SMD R/TP 1M - LS Mtron Ltd.	
6	C513 C514 C521 C540	Capacitor Ceramic,Chip	ECCH0000120	MCH155A390J 39pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	

Level	LocationNo.	Description	PartNumber	Spec	Remark
6	VA401 VA403	Varistor	SEVY0005202	EVLC5S02100 5.5V 0% 100F 1.0*0.5*0.6 UL SMD R/TP AMOTECH CO., LTD.	
6	R506 R507	Resistor,Chip	ERHZ0000488	MCR01MZP5J4R7 4.7OHM 5% 1/16W 1005 R/TP - ROHM.	
6	VA308 VA309 VA310 VA311 VA312	Varistor	SEVY0004001	EVLC18S02003 18V 0% 3F 1.0*0.5*0.6 NONE SMD R/TP AMOTECH CO., LTD.	
6	S301	Card Socket	EAG63211701	5000-12P-2.95D-A1-R0 SIM 12P STRAIGHT SMD T/REEL - HYUPJIN I&C CO.,LTD.	
6	R512	Resistor,Chip	ERHZ0000443	MCR01MZP5J222 2.2KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	C243 C244 C616 C617 C618 C620	Capacitor Ceramic,Chip	ECCH0010501	GRM1555C1H7R5D 7.5pF 0.5PF 50V C0G - 55TO+125C 1005 R/TP - MURATA MANUFACTURING CO.,LTD.	
6	FB501 FB601	Filter,Bead	SFBH0007102	BLM15AG100SN1D 10 ohm 1.0X0.5X0.5 5 ohm 0.05 ohm 1A SMD R/TP 2P 0 MURATA MANUFACTURING CO.,LTD.	
6	C110 R703	Inductor Multilayer,Chip	ELCH0003826	LQG15HS3N3S02D 3.3NH 0.3NH - 300mA - - 0.17OHM 6GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO.,LTD.	
6	C815	Inductor Multilayer,Chip	ELCH0003836	LQG15HS5N6S02D 5.6NH 0.3NH - 300mA 0.2OHM 4.5GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO.,LTD.	
6	CN403	Connector,BtoB	ENBY0051001	GB042-10S-H10-E3000 10P 0.4MM STRAIGHT FEMALE SMD R/TP 1M - LS Mtron Ltd.	
6	R107	Resistor,Chip	EBC61835701	RC0402FR-071RL 1OHM 1% 1/16W 1005 R/TP - YAGEO CORPORATION	
6	R418 R604 R610 R611	Resistor,Chip	ERHZ0000406	MCR01MZP5J104 100KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	R409 R528	Resistor,Chip	ERHZ0000204	MCR01MZP5F1003 100KOHM 1% 1/16W 1005 R/TP - ROHM.	

Level	LocationNo.	Description	PartNumber	Spec	Remark
6	R215	Resistor,Chip	ERHZ0000531	MCR01MZP5J271 270OHM 5% 1/16W 1005 R/TP - ROHM.	
6	C607	Capacitor Ceramic,Chip	ECCH0000113	MCH155A180J 18pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	Q501	FET	EBK61952101	KTJ6131V P-CHANNEL MOSFET -30V +-20 -0.05A 40OHM 100mW VSM R/TP 3P KEC CORPORAITION	
6	C523 C603 C605 C610 C701 C705	Capacitor Ceramic,Chip	ECCH0005603	GRM188R61A225K 2.2uF 10% 10V X5R - 55TO+85C 1608 R/TP - MURATA MANUFACTURING CO.,LTD.	
6	C501 C506 C509 C711 C712	Capacitor Ceramic,Chip	ECCH0000143	MCH155CN102KK 1nF 10% 50V X7R -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	C813	Capacitor Ceramic,Chip	ECCH0000112	MCH155C150J 15pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	C520 C522	Capacitor Ceramic,Chip	ECCH0000179	GRM155R71C223K 22nF 10% 16V X7R - 55TO+85C 1005 R/TP - MURATA MANUFACTURING CO.,LTD.	
6	R407	Resistor,Chip	ERHZ0000206	MCR01MZP5F10R0 10OHM 1% 1/16W 1005 R/TP - ROHM.	
6	C409	Capacitor Ceramic,Chip	ECCH0007804	CL05A225MP5NSNC 2.2uF 20% 10V X5R - 55TO+85C 1005 R/TP 0.5MM SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	C240 C242	Capacitor Ceramic,Chip	ECZH0001217	GRM155R60J474K 470nF 10% 6.3V X5R - 25TO+70C 1005 BK-DUP - MURATA MANUFACTURING CO.,LTD.	
6	C503	Capacitor Ceramic,Chip	ECCH0007803	CL10A106MP8NNNC 10uF 20% 10V X5R - 55TO+85C 1608 R/TP 0.8MM SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	VA407	Varistor	SEVY0004101	ICVN0505X150FR 5.6V 0% 360F 1.0*0.5*0.55 NONE SMD R/TP INNOCHIPS TECHNOLOGY	
6	R527	Resistor,Chip	ERHZ0000483	MCR01MZP5J470 47OHM 5% 1/16W 1005 R/TP - ROHM.	

Level	LocationNo.	Description	PartNumber	Spec	Remark
6	R617 R618	Resistor,Chip	ERHY0003301	MCR01MZP5J101 100OHM 5% 1/16W 1005 R/TP - ROHM.	
6	R508 R509	Resistor,Chip	ERHZ0000348	MCR01MZP5F12R0 12OHM 1% 1/16W 1005 R/TP - ROHM.	
6	CN601	Connector,BtoB	ENBY0036001	GB042-40S-H10-E3000 40P 0.4MM STRAIGHT SOCKET SMD R/TP 1M ENGINEERING PLASTIC UL94V-0 AU OVER NI LS Mtron Ltd.	
6	R525	Resistor,Chip	ERHZ0000407	MCR01MZP5J105 1MOHM 5% 1/16W 1005 R/TP - ROHM.	
6	C139	Inductor Multilayer,Chip	ELCH0003847	LQG15HS1N8S02D 1.8NH 0.3NH - 300mA 0.1OHM 6GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO.,LTD.	
6	C239	Capacitor Ceramic,Chip	ECCH0000137	C1005X7R1H331KT000F 0.33nF 10% 50V X7R - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	R403	Resistor,Chip	ERHZ0000295	MCR01MZP5F5102 51KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	U502	IC,Comparator	EUSY0250501	NCS2200SQ2T2G NCS2200SQ2T2G,SC70,5 PIN,R/TP,Comparator,pin compatible to EUSY0077701 - - SC70 R/TP 5P - ON SEMICONDUCTOR	
6	U701	IC,Bluetooth	EUSY0418701	BCM2070B2KUBXG 2.3VTO5.5V 158.4mW 42P - WLBGA R/TP 42P BROADCOM ASIA DISTRIBUTION PTE LTD	
6	VA501	Diode,TVS	EDTY0010501	RCLAMP1521P.TCT 15V 16.7 28V 4A 0W SLP1006P2 R/TP 2P 1 SEMTECH CORPORATION	
6	C541	Capacitor Ceramic,Chip	ECCH0000129	MCH155A121JK 120pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	L202	Inductor Multilayer,Chip	ELCH0003839	LQG15HS22NJ02D 22NH 5% - 300mA 0.42OHM 1.9GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO.,LTD.	
6	R214	Resistor,Chip	ERHZ0000449	MCR01MZP5J243 24KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	FL701	Filter,Dielectric	SFDY0003001	DEA202450BT-1275A1 DEA202450BT-1275A1,2450 MHz,2.0*1.25*1.05,SMD,2400M~2500M,IL 1.6,4pin,U-U,50-50,BT BPF TDK CORPORATION	

Level	LocationNo.	Description	PartNumber	Spec	Remark
6	SW101	Connector,RF	ENWY0008701	MS-156C NONE STRAIGHT SOCKET SMD T/REEL AU 50OHM 400mDB HIROSE KOREA CO.,LTD	
6	CN402	Connector Terminal Block	EAG63254401	00 9245 003 032 868+ 3P 3.00MM STRAIGHT DIP T/REEL - KYOCERA ELCO KOREA SALES CO.,LTD.	
6	C710	Capacitor Ceramic,Chip	ECZH0000813	C1005C0G1H101JT 100pF 5% 50V C0G - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	R511	Resistor,Chip	ERHZ0000529	MCR01MZP5J152 1.5KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	U801	Module, FEM(Front End Module)	EAT61493201	XM2400LV-DL1201TMP 8DBM 12.5DB 10% 12mA 12mA 2.2DB 23.5DBM 4DBM 12P 1.6x1.6x0.4MM - MURATA MANUFACTURING CO.,LTD.	
5	EBR071700	PCB Assembly,Main,SMT Top	EBR75368901	LGT385.ATURBK 1.0 Main	
6	VA502 VA503	Varistor	SEVY0007901	ICVS0505481FR 5.6V 0% 480F 1.0*0.5*0.55 NONE SMD R/TP INNOCHIPS TECHNOLOGY	
6	D501 D502	Diode,TVS	EDTY0012101	PESD5V0F1BL 5.5V 6V min 11V 2.5A - SOD-882 R/TP 2P 1 STC CORP.	
6	C714	Inductor Multilayer,Chip	ELCH0001403	LL1005-FHL1N0S 1NH 0.3NH - 400mA - - 0.1OHM 20GHZ 7 SHIELD NONE 1.0X0.5X0.5MM R/TP TOKO, INC.	
6	L804	Inductor Multilayer,Chip	ELCH0003815	LQG15HS2N7S02D 2.7NH 0.3NH - 300mA 0.15OHM 6GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO.,LTD.	
6	R408	Resistor,Chip	ERHZ0000749	RC0603JR-074R7L 4.7OHM 5% 1/10W 1608 R/TP - YAGEO CORPORATION	
6	EAX010000	PCB,Main	EAX64678601	LGT375.ABRABK 1.0 FR-4 Staggered via 8 0.8 Main	
6	R502 R513 R601 R605 R606 R608 R609 R619 R620	Resistor,Chip	ERHZ0000401	MCR01MZSJ000 0OHM 5% 1/16W 1005 R/TP - ROHM.	

Level	LocationNo.	Description	PartNumber	Spec	Remark
6	C529 C532	Capacitor Ceramic,Chip	ECCH0000161	MCH153CN333KK 33nF 10% 16V X7R -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	C604 C608 C609 C611 C619 C621 C622 VA601	Capacitor Ceramic,Chip	ECCH0004904	GRM155R60J105K 1uF 10% 6.3V X5R -55TO+85C 1005 R/TP - MURATA MANUFACTURING CO.,LTD.	
6	C319 C321 C415 C416 C504 C510 C515 C612 C613 C614	Capacitor Ceramic,Chip	ECZH0003103	GRM36X7R104K10PT 100nF 10% 10V X7R -55TO+125C 1005 R/TP - MURATA MANUFACTURING CO.,LTD.	
6	X201	Crystal	EXXY0025701	TSX- 3225 TSX- 3225 TSX- 3225,26 MHz,10 PPM,8 pF,40 ohm,SMD ,32X25X0.6 ,X-Tal (Infinion chip), Pb-Free EPSON TOYOCOM CORP EPSON TOYOCOM CORP	
6	LD601 LD602 LD603	LED,Chip	EDLH0015103	19-217/UTD-S887-1/TR8 Snow White 2.7~3.0 30mA 90~180mcd x, y 110mW 1608 R/TP 2P - EVERLIGHT ELECTRONICS CO., LTD.	
6	C406	Capacitor,TA,Conformal	ECTH0002002	F981A336MSA 33uF 20% 10V 3.3UA -55TO+125C 6OHM 2.0X1.25X0.8MM NONE SMD R/TP 0.9T max. NICHICON CORPORATION, EAST JAPAN SALES OFFICE	
6	FB504 FB505 FB701	Filter,Bead	SFBH0008101	BLM15AG601SN1D 600 ohm 1.0X0.5X0.5 25% 0.6 ohm 0.3A SMD R/TP 2P 0 MURATA MANUFACTURING CO.,LTD.	
6	ZD201 ZD302 ZD404 ZD501 ZD502 ZD503 ZD504	Diode,TVS	EDTY0012501	UCLAMP3311T.TCT 3.3V 3.5V min. 6.5V 5A - SLP1006P2T R/TP 2P 1 SEMTECH CORPORATION	
6	R203	Resistor,Chip	ERHZ0000475	MCR01MZP5J392 3.9KOHM 5% 1/16W 1005 R/TP - ROHM.	

Level	LocationNo.	Description	PartNumber	Spec	Remark
6	C513 C514 C521 C540	Capacitor Ceramic,Chip	ECCH0000120	MCH155A390J 39pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	C524 C525	Capacitor Ceramic,Chip	ECCH0000122	MCH155A470JK 47pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	C221	Capacitor Ceramic,Chip	ECZH0025502	GRM219R60J226M 0.000022F 20% 6.3V X5R - 55TO+85C 2012 R/TP 0.85MM MURATA MANUFACTURING CO.,LTD.	
6	C401 C412	Capacitor Ceramic,Chip	EAE62505701	CL10A105KB8NNNC 1uF 10% 50V X5R - 55TO+85C 1608 R/TP 0.9T max. SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	R418 R604 R610 R611	Resistor,Chip	ERHZ0000406	MCR01MZP5J104 100KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	FB201	Filter,Bead	SFBH0007103	BLM15BB750SN1D 75 ohm 1.0X0.5X0.5 25% 0.4 ohm 0.3A SMD R/TP 2P 0 MURATA MANUFACTURING CO.,LTD.	
6	C240 C242	Capacitor Ceramic,Chip	ECZH0001217	GRM155R60J474K 470nF 10% 6.3V X5R - 25TO+70C 1005 BK-DUP - MURATA MANUFACTURING CO.,LTD.	
6	C408 C702 C706 C707	Capacitor Ceramic,Chip	ECCH0000155	MCH153CN103KK 10nF 10% 16V X7R - 55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	R308 R309 R310 R311 R312 R313	Resistor,Chip	ERHZ0000490	MCR01MZP5J510 51OHM 5% 1/16W 1005 R/TP - ROHM.	
6	C523 C603 C605 C610 C701 C705	Capacitor Ceramic,Chip	ECCH0005603	GRM188R61A225K 2.2uF 10% 10V X5R - 55TO+85C 1608 R/TP - MURATA MANUFACTURING CO.,LTD.	

Level	LocationNo.	Description	PartNumber	Spec	Remark
6	R302 R303 R304 R305 R306 R319 R321 R323	Resistor,Chip	ERHZ0000405	MCR01MZP5J103 10KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	R202 R307	Resistor,Chip	ERHZ0000484	MCR01MZP5J471 470OHM 5% 1/16W 1005 R/TP - ROHM.	
6	C710	Capacitor Ceramic,Chip	ECZH0000813	C1005C0G1H101JT 100pF 5% 50V C0G - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	C207 C210 C236 C808 C816 C822	Capacitor Ceramic,Chip	ECZH0001216	C1005X5R1A224KT000E 220nF 10% 10V X5R - 55TO+85C 1005 R/TP - TDK KOREA COOPERATION	
6	VA402 VA404 VA408 VA409 VA604 VA605 VA607 VA608	Varistor	SEVY0004301	ICVL0518100Y500FR 18V 0% 10F 1.0*0.5*0.55 NONE SMD R/TP INNOCHIPS TECHNOLOGY	
6	C501 C506 C509 C711 C712	Capacitor Ceramic,Chip	ECCH0000143	MCH155CN102KK 1nF 10% 50V X7R -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	R617 R618	Resistor,Chip	ERHY0003301	MCR01MZP5J101 100OHM 5% 1/16W 1005 R/TP - ROHM.	
6	L401 L402	Inductor Multilayer,Chip	ELCH0003825	LQG15HS56NJ02D 56NH 5% - 200mA 0.82OHM 800MHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO.,LTD.	
6	FB502 FB503 FB506 FB507	Filter,Bead	SFBH0008102	BLM15HD182SN1D 1800 ohm 1.0X0.5X0.5 25% 2.2 ohm 0.2A SMD R/TP 2P 0 MURATA MANUFACTURING CO.,LTD.	
6	X801	Oscillator,TCXO	EXST0001901	TG-5010LH-87N 26MHZ 2.5PPM 2.8V 32.0x25.0x10.0MM - SMD R/TP EPSON TOYOCOM CORP	

Level	LocationNo.	Description	PartNumber	Spec	Remark
6	C703 C704	Capacitor Ceramic,Chip	ECCH0000110	MCH155A100D 10pF 0.5PF 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	U301	IC,MCP,NAND	EAN61927501	H9DA2GH1GHMMMR-46M NAND/2G SDRAM/1G 1.7VTO1.95V 8.0x9.0x0.9 TR 130P NAND+DDR SDRAM FBGA 2Gb NAND(LB/128Mx16)+1Gb DRAM(DDR/200MHz/16Mx4x16) HYNIX SEMICONDUCTOR INC.	
6	U501	IC,Proximity	EUSY0376201	GP2AP002S00F GP2AP002S00F GP2AP002S00F,,8 ,R/TP , SHARP CORPORATION. SHARP CORPORATION.	
6	VA308 VA309 VA310 VA311 VA312	Varistor	SEVY0004001	EVLC18S02003 18V 0% 3F 1.0*0.5*0.6 NONE SMD R/TP AMOTECH CO., LTD.	
6	R417 R524 R705	Resistor,Chip	ERHZ0000404	MCR01MZP5J102 1KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	L802	Inductor Multilayer,Chip	ELCH0001057	1005GC2T3N9SLF 3.9NH 0.3NH - 300mA 0.22OHM 4GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	C607	Capacitor Ceramic,Chip	ECCH0000113	MCH155A180J 18pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	C219	Capacitor Ceramic,Chip	ECZH0001210	C1005Y5V1A474ZT000F 470nF -20TO+80% 10V Y5V -30TO+85C 1005 R/TP - TDK KOREA COOPERATION	
6	C301 C306	Capacitor Ceramic,Chip	ECCH0006201	C1608X5R0J475KT000N 4.7uF 10% 6.3V X5R - 55TO+85C 1608 R/TP - TDK CORPORATION	
6	C241 C507 C508 C601 C602 C606	Capacitor Ceramic,Chip	ECZH0001215	C1005X5R1A105KT000F 1uF 10% 10V X5R - 55TO+85C 1005 R/TP - TDK KOREA COOPERATION	
6	U401	IC,Mini ABB	EAN62339701	LP8727- B MUIC with Charger IC CSP R/TP 25P TEXAS INSTRUMENTS KOREA LTD, HONGKONG BRANCH.	

Level	LocationNo.	Description	PartNumber	Spec	Remark
6	C114 C818 L105 L109	Capacitor Ceramic,Chip	ECZH0001002	C1005CH1H0R5BT000F 0.5pF 0.1PF 50V NP0 -55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	R612 R613 R614	Resistor,Chip	ERHY0008207	RC1005F470CS 47OHM 1% 1/16W 1005 R/TP - SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	C526	Capacitor,TA,Confo rmal	ECTH0001902	F981A106MMA 10uF 20% 10V 1UA -55TO+125C 8OHM 1.6X0.85X0.8MM NONE SMD R/TP 0.9T max. NICHICON CORPORATION, EAST JAPAN	
6	C315 C316 C317 C318 C320 C323 C407 C417	Capacitor Ceramic,Chip	ECZH0000830	C1005C0G1H330JT000F 33pF 5% 50V NP0 -55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	R402	Resistor,Chip	ERHZ0000203	MCR01MZP5F1002 10KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	R512	Resistor,Chip	ERHZ0000443	MCR01MZP5J222 2.2KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	L201	Inductor,Wire Wound,Chip	ELCP0009410	LQM2HPN3R3MG0 3.3UH 20% - 350mA 0.35 1.2 0.1OHM - - SHIELD 2.5X2X1MM NONE R/TP MURATA MANUFACTURING CO.,LTD.	
6	C502	Capacitor Ceramic,Chip	ECCH0000117	CL05C270JB5NNNC 27pF 5% 50V NP0 -55TO+125C 1005 R/TP 0.5 SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	C212 C213	Capacitor Ceramic,Chip	ECCH0002002	C1005X7R1A473KT000F 47000pF 10% 10V Y5P -30TO+85C 1005 R/TP - TDK CORPORATION	
6	CN401	Connector,I/O	EAG63149901	04-5161-005-101-868+ 5P 0.50MM STRAIGHT RECEPTACLE DIP R/TP Reverse type(New IO) KYOCERA ELCO KOREA SALES CO.,LTD.	
6	R205	Resistor,Chip	ERHZ0000499	MCR01MZP5J562 5.6KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	C826	Capacitor Ceramic,Chip	ECCH0002001	C1005JB0J104KT000F 0.1uF 10% 6.3V Y5P -30TO+85C 1005 R/TP - TDK CORPORATION	
6	L111 L114	Inductor Multilayer,Chip	ELCH0003824	LQG15HS10NJ02D 10NH 5% - 300mA 0.26OHM 3.4GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO.,LTD.	

Level	LocationNo.	Description	PartNumber	Spec	Remark
6	C805	Capacitor Ceramic,Chip	ECCH0007805	CL05A106MQ5NUNC 10uF 20% 6.3V X5R -55TO+85C 1005 R/TP - SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	FL101	Filter,Saw,Dual	EAM62290001	SAKEX881MAN0F00R14 881.5/942.5/1842.5/1960MHz 1.8*1.4*0.6 SMD R/TP 10P MURATA MANUFACTURING CO.,LTD.	
6	C109	Inductor Multilayer,Chip	ELCH0003832	LQG15HS2N2S02D 2.2NH 0.3NH - 300mA - - 0.12OHM 6GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO.,LTD.	
6	C503	Capacitor Ceramic,Chip	ECCH0007803	CL10A106MP8NNNC 10uF 20% 10V X5R -55TO+85C 1608 R/TP 0.8MM SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	C538	Capacitor Ceramic,Chip	ECCH0005604	GRM188R60J106M 10000000 pF,6.3V,M,X5R,TC,1608,R/TP,0.8 mm MURATA MANUFACTURING CO.,LTD.	
6	C813	Capacitor Ceramic,Chip	ECCH0000112	MCH155C150J 15pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	U101	Module,Tx Module	EAT61713801	SKY77550-21 0DBM 0DB 0% 0A 0A 0DB 0DBM 0DBM 28P 6.0x6.0x0.9MM GPRS TxM, Quad Tx, Dual Rx, SP4T SKYWORKS SOLUTIONS INC.	
6	BAT201	Capacitor Assembly	SMZY0023501	PAS311HR-VG1 3.8 Backup Capacitor 0.03F,Module Assembly, KOREA TAIYO YUDEN.CO., LTD.	
6	C211 C224	Capacitor,Ceramic, Chip	ECCH0000151	CL05B472KB5NNNC 4.7nF 10% 25V X7R -55TO+125C 1005 R/TP - SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	FB801	Filter,Bead	SFBH0007101	BLM15AG121SN1D 120 ohm 1.0X0.5X0.5 25% 0.25 ohm 0.5A SMD R/TP 2P 0 MURATA MANUFACTURING CO.,LTD.	
6	R409 R528	Resistor,Chip	ERHZ0000204	MCR01MZP5F1003 100KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	R218 R504 R616	Resistor,Chip	ERHZ0000402	MCR01MZP5J100 10OHM 5% 1/16W 1005 R/TP - ROHM.	
6	R102	Resistor,Chip	ERHZ0000410	MCR01MZP5J120 12OHM 5% 1/16W 1005 R/TP - ROHM.	

Level	LocationNo.	Description	PartNumber	Spec	Remark
6	C237 C402 C410	Capacitor Ceramic,Chip	ECCH0000115	MCH155A220JK 22pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	Q201	TR,Bipolar	EQBN0020501	KTC4075E NPN 5V 60V 50V 150mA 100NA 700 100mW ESM R/TP 3P KEC CORPORAITION	
6	FL401	Filter,EMI/Power	SFEY0015301	NFM18PC104R1C3 ESD/EMI 0HZ 0.1uF 0H SMD R/TP MURATA MANUFACTURING CO.,LTD.	
6	X202	Crystal	EXXY0026801	NX3215SA 32.768KHZ 20PPM 0F NONE SMD R/TP NIHON DEMPA KOGYO CO.,LTD.	
6	U802	IC Assembly	EUSY0434401	BCM43362SKUBG BCM43362SKUBG BROADCOM ASIA DISTRIBUTION PTE LTD	
6	R805	Resistor,Chip	ERHZ0000476	MCR01MZP5J393 39KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	U201	IC,Digital Baseband Processor,GSM	EUSY0429401	PMB8815 ,281,EDGE Rx,ARM11 208MHz,NAND booting,2.0Mp,FMR,IC,Digital Baseband Processor BGA R/TP 281P INFINEON TECHNOLOGIES (ASIA PACIFIC) PTE LTD.	
6	U803	IC,LDO Voltage Regulator	EUSY0407101	BU28TD4WNVX SSON004,4,R/TP,2.8V 150mA Single LDO,IC,LDO Voltage RegulatorIC,LDO Voltage Regulator ROHM.	
6	R301	Resistor,Chip	ERHZ0000487	MCR01MZP5J474 470KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	C802 C812	Capacitor Ceramic,Chip	ECCH0007802	CL10A475KP8NNNC 4.7uF 10% 10V X5R - 55TO+85C 1608 R/TP - SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	R407	Resistor,Chip	ERHZ0000206	MCR01MZP5F10R0 10OHM 1% 1/16W 1005 R/TP - ROHM.	
6	U302	IC,Analog Switch	EUSY0186504	FSA2259UMX QFN ,8 ,R/TP ,Dual SPDT ,; ,IC,Analog Switch FAIRCHILD SEMICONDUCTOR	
6	C139	Inductor Multilayer,Chip	ELCH0003847	LQG15HS1N8S02D 1.8NH 0.3NH - 300mA 0.1OHM 6GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO.,LTD.	
6	L801	Inductor,Wire Wound,Chip	ELCP0012801	MIPS2520D1R5-LG 1.5UH 30% - 1.2A 1.2 1.2 0.1OHM - - SHIELD 2.5X2X1MM NONE R/TP FDK CORPORATION.	

Level	LocationNo.	Description	PartNumber	Spec	Remark
6	R702	Resistor,Chip	ERHZ0000221	MCR01MZP5F1502 15KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	C533	Capacitor Ceramic,Chip	ECCH0017601	CL05A475MQ5NRNC 4.7uF 20% 6.3V X5R - 55TO+85C 1005 R/TP 0.5MM SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	L112	Inductor Multilayer,Chip	ELCH0004718	1005GC2T5N6SLF 5.6NH 0.3NH - 300mA 0.27OHM 3.2GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	R501	Resistor,Chip	ERHZ0000486	MCR01MZP5J473 47KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	VA301 VA302 VA304 VA305	Varistor	SEVY0003801	EVLC18S02015 18V 0% 15F 1.0*0.5*0.6 NONE SMD R/TP AMOTECH CO., LTD.	
6	J501	Jack,Phone	EAG63234901	JAM3333-F36-7H 5P 2P STRAIGHT R/TP 3.5M BLACK 5P Reverse type HON HAI PRECISION INDUSTRY CO.,LTD.	
6	L107	Inductor,Multilayer, Chip	ELCH0001408	LL1005-FHL6N8J 6.8NH 5% - 300mA 0.23OHM 5.6GHZ 9 SHIELD NONE 1.0X0.5X0.5MM R/TP TOKO, INC.	
5	SAD010000	Software,Mobile	SAD33305901	Base V10b - MIDDLE EAST AND AFRICA IFX -	
4	EBR071500	PCB Assembly Main,Insert	EBR75394001	LGT385.ATURBK 1.0 Main	
5	EAX01	PCB,Flexible	EAX64733401	LGT375.ATHABK 1.0 POLYI Multi 2 0.15 Flexible	
5	EAX00	PCB,Sidekey	EAX64733301	LGT375.ATHABK 1.0 POLYI Multi 2 0.15 Sidekey	
5	EBR01	Camera Module	EBP61562201	C2FA-H440A C2FA-H440A 2M FF Hynix 1/5", FPC 0deg. 7mm LG INNOTEK CO., LTD	
5	SJMY00	Motor,DC	SJMY0007104	3V 80mA 0A 12KRPM 0RPM 0SEC 0GF.CM 0OHM	
5	SUMY00	Microphone,Condenser	SUMY0003816	OBM-410L44-RC1882 -44DB 2.2KOHM OMNI 1TO10V 4x1.0t FPCB BSE CO., LTD.	
5	RAA050100	Resin,PC	BRAH0001301	UF2040 or 3075BHF . . NONE	

13.3 Accessory

Note: This Chapterisused for reference,Part order is ordered by SBOM standard onGCSC

Level	LocationNo.	Description	PartNumber	Spec	Remark
2	EAY060000	Adapters	EAY62389801	STA-U35ED2 100-240V 4.8V 400mA 50-60Hz CB, CE WALL 2P USB - DONGDO ELECTRONICS CO.,LTD	
2	EAC00	Rechargeable Battery,Lithium Ion	EAC61700101	LGIP-531A-WWU-LGC PRISMATIC 3.7V 950mAH 190mAH 34x50x5.5 34.15x53.55x5.7 BLACK Bar Type 553450, 950mAh, Bar Type, WW, Up LG Chem,LTD.	
2	EAB010200	Earphone,Stereo	SGEY0003219	EMB-LGE001STKE ,BLACK,4 POLE PLUG,3.5 4,Earphone,Stereo CRESYN CO.,LTD	
2	AFN053800	Manual Assembly Operation	AFN75741501	LGT385.ATURBK ZZ:Without Color Manual assy for LGT385 TUR	
3	MFL053800	Manual Operation	MFL67525101	PRINTING LGT385.ATURBK ZZ:Without Color Manual for LGT385 TUR	