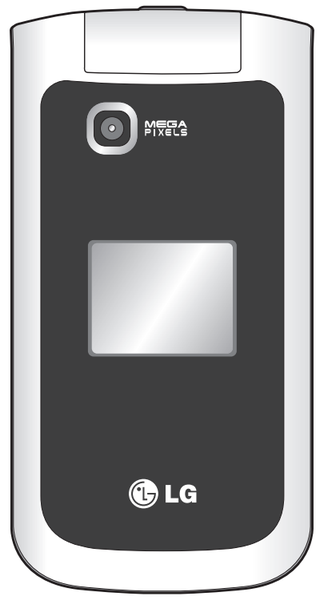
Service Manual

Model : LG420G

Internal Use Only

Service Manual

LG420G



Date: March, 2010 / 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 r, 3.7V 900mAh	
Stand by TIME	Up to 500hrs : Paging Period 5, RSSI -85dBm	
Talk time	Up to 320min : GSM Tx Level 7	
Stand by time	Up to 500 hours (Paging Period: 5, RSSI: -85 dBm)	
Charging time	Approx. 3 hours	
RX Sensitivity	GSM, EGSM: -107dBm, DCS: -107dBm	
TX output power	GSM850 : 32.5dBm(Level 5), PCS1900: 29.5dBm(Level 0)	
GPRS compatibility	Class 10	
SIM card type	3V / 1.8V	
Display	1.76“ 176X220 TFT , 1.04“ 96x64 TFT	
Status Indicator	Hard icons. Key Pad Total 24 * SEND, END, Clear, Soft(2), Navi(4), OK * Numeric(12) * Side: Camera, Volume(2)	
ANT	Internal	
EAR Phone Jack	5pin	
PC Synchronization	No	
Speech coding	AMR FR/HR, EFR/FR/HR, FR/HR	
Data and Fax	Yes	
Vibrator	Yes	
Loud Speaker	Yes	
Voice Recoding	Yes	
Microphone	Yes	

2. PERFORMANCE

Item	Feature	Comment
Speaker/Receiver	18x12Φ Speaker/ Receiver	
Travel Adapter	Yes	
MIDI	64 poly	
Camera	VGA	
Bluetooth / FM Radio	Bluetooth version 2.1 + EDR / No	

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
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
<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>32.5dBm</td><td>±1.5dB</td><td>13</td><td>17dBm</td><td>± 2dB</td></tr>
<tr><td>6</td><td>31dBm</td><td>±2dB</td><td>14</td><td>15dBm</td><td>± 2dB</td></tr>
<tr><td>7</td><td>29dBm</td><td>±2dB</td><td>15</td><td>13dBm</td><td>± 2dB</td></tr>
<tr><td>8</td><td>27dBm</td><td>±2dB</td><td>16</td><td>11dBm</td><td>± 3dB</td></tr>
<tr><td>9</td><td>25dBm</td><td>±2dB</td><td>17</td><td>9dBm</td><td>± 3dB</td></tr>
<tr><td>10</td><td>23dBm</td><td>±2dB</td><td>18</td><td>7dBm</td><td>± 3dB</td></tr>
<tr><td>11</td><td>21dBm</td><td>±2dB</td><td>19</td><td>5dBm</td><td>± 3dB</td></tr>
<tr><td>12</td><td>19dBm</td><td>±2dB</td><td></td><td></td><td></td></tr>
</table>
PCS1900
<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>29.5dBm</td><td>±1.5dB</td><td>8</td><td>14dBm</td><td>± 2dB</td></tr>
<tr><td>1</td><td>28dBm</td><td>±2dB</td><td>9</td><td>12dBm</td><td>± 3dB</td></tr>
<tr><td>2</td><td>26dBm</td><td>±2dB</td><td>10</td><td>10dBm</td><td>± 3dB</td></tr>
<tr><td>3</td><td>24dBm</td><td>±2dB</td><td>11</td><td>8dBm</td><td>± 3dB</td></tr>
<tr><td>4</td><td>22dBm</td><td>±2dB</td><td>12</td><td>6dBm</td><td>± 3dB</td></tr>
<tr><td>5</td><td>20dBm</td><td>±2dB</td><td>13</td><td>4dBm</td><td>± 3dB</td></tr>
<tr><td>6</td><td>18dBm</td><td>±2dB</td><td>14</td><td>2dBm</td><td>± 3dB</td></tr>
<tr><td>7</td><td>16dBm</td><td>±2dB</td><td>15</td><td>0dBm</td><td>± 3dB</td></tr>
</table>
</td></tr>
</table>

2. PERFORMANCE

Item	Description	Specification	
5	Output RF Spectrum (due to modulation)	**GSM850**	
		Offset from Carrier (kHz).	Max. dBc
		100	+0.5
		200	-33
		250	-36
		400	-60
		600~ <1,200	-60
		1,200~ <1,800	-63
		1,800~ <3,000	-66
		3,000~ <6,000	-68
		6,000	-74
		PCS1900	
		Offset from Carrier (kHz).	Max. dBc
		100	+0.5
		200	-33
		250	-36
		400	-60
		600~ <1,200	-63
		1,200~ <1,800	-63
		1,800~ <3,000	-68
		3,000~ <6,000	-68
		6,000	-76
6	Output RF Spectrum (due to switching transient)	**GSM850**	
		Offset from Carrier (kHz).	Max. dBm
		400	-20
		600	-24
		1,200	-24
		1,800	-27

<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">PCS1900</td></tr>
<tr><td colspan="2">Offset from Carrier (kHz).</td><td>Max. dBm</td></tr>
<tr><td colspan="2">400</td><td>-23</td></tr>
<tr><td colspan="2">600</td><td>-27</td></tr>
<tr><td colspan="2">1,200</td><td>-27</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
BER (Class II) < 2.439% @-107 dBm
PCS1900
BER (Class II) < 2.439% @-107 dBm</td></tr>
<tr><td>9</td><td>RX Level Report Accuracy</td><td colspan="3">±3 dB</td></tr>
<tr><td>10</td><td>SLR</td><td colspan="3">8±3 dB</td></tr>
<tr><td rowspan="10">11</td><td rowspan="10">Sending Response</td><td>Frequency (Hz)</td><td>Max.(dB)</td><td>Min.(dB)</td></tr>
<tr><td>100</td><td>-12</td><td>-</td></tr>
<tr><td>200</td><td>0</td><td>-</td></tr>
<tr><td>300</td><td>0</td><td>-12</td></tr>
<tr><td>1,000</td><td>0</td><td>-6</td></tr>
<tr><td>2,000</td><td>4</td><td>-6</td></tr>
<tr><td>3,000</td><td>4</td><td>-6</td></tr>
<tr><td>3,400</td><td>4</td><td>-9</td></tr>
<tr><td>4,000</td><td>0</td><td>-</td></tr>
<tr><td>12</td><td>RLR</td><td colspan="3">2±3 dB</td></tr>
</table>

2. PERFORMANCE

<table>
<tr><th>Item</th><th>Description</th><th colspan="3">Specification</th></tr>
<tr><td rowspan="11">13</td><td rowspan="11">Receiving Response</td><td>Frequency (Hz)</td><td>Max.(dB)</td><td>Min.(dB)</td></tr>
<tr><td>100</td><td>-12</td><td>-</td></tr>
<tr><td>200</td><td>0</td><td>-</td></tr>
<tr><td>300</td><td>2</td><td>-7</td></tr>
<tr><td>500</td><td>*</td><td>-5</td></tr>
<tr><td>1,000</td><td>0</td><td>-5</td></tr>
<tr><td>3,000</td><td>2</td><td>-5</td></tr>
<tr><td>3,400</td><td>2</td><td>-10</td></tr>
<tr><td>4,000</td><td>2</td><td></td></tr>
<tr><td colspan="3">* Mean that Adopt a straight line in between 300 Hz and 1,000 Hz to be Max. level in the range.</td></tr>
<tr><td>14</td><td>STMR</td><td colspan="3">13±5 dB</td></tr>
<tr><td>15</td><td>Stability Margin</td><td colspan="3">> 6 dB</td></tr>
<tr><td rowspan="9">16</td><td rowspan="9">Distortion</td><td 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 (23 MHz) tolerance</td><td colspan="3">±12 ppm</td></tr>
<tr><td>19</td><td>32.768KHz tolerance</td><td colspan="3">±20 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 1m</td></tr>
</table>

<table>
<tr><th>Item</th><th>Description</th><th colspan="2">Specification</th></tr>
<tr><td>21</td><td>Charge Current</td><td colspan="2">Fast Charge : Typ. 400 mA
Total Charging Time : < 3 hours</td></tr>
<tr><td rowspan="6">22</td><td rowspan="6">Antenna Display</td><td>Bar Number</td><td>Power</td></tr>
<tr><td>5→4</td><td>-79 ± 2</td></tr>
<tr><td>4-> 3</td><td>-88 ± 2</td></tr>
<tr><td>3 -> 2</td><td>-97 ± 2</td></tr>
<tr><td>2 -> 1</td><td>-103 ± 2</td></tr>
<tr><td>1 -> 0</td><td>-107 ± 2</td></tr>
<tr><td rowspan="5">23</td><td rowspan="5">Battery Indicator</td><td>Battery Bar Number</td><td>Voltage</td></tr>
<tr><td>3</td><td>≥ 3.74± 0.05 V</td></tr>
<tr><td>3 -> 2</td><td>3.74 ± 0.05 V</td></tr>
<tr><td>2 -> 1</td><td>3.63 ± 0.05 V</td></tr>
<tr><td>1 -> 0</td><td>3.50 ± 0.05 V</td></tr>
<tr><td rowspan="2">24</td><td rowspan="2">Low Voltage Warning
(Blinking Bar)</td><td colspan="2">≤ 3.50 ± 0.05V (Call), Once per 1 minute(Receiver)</td></tr>
<tr><td colspan="2">≤ 3.50 ± 0.05V (Standby), Once per 3 minutes(Speaker)</td></tr>
<tr><td>25</td><td>Forced shut down
Voltage</td><td colspan="2">3.34± 0.05V</td></tr>
<tr><td>26</td><td>Sustain RTC
without battery</td><td colspan="2">Over 5 hours</td></tr>
<tr><td>27</td><td>Battery Type</td><td colspan="2">Lithium-Ion Battery
Standard Voltage = 3.7 V
Battery full charge voltage = 4.2 V
Capacity: 900mAh</td></tr>
<tr><td>28</td><td>Travel Charger</td><td colspan="2">Switching-mode charger
Input: 100 ~ 350V, 50/60 Hz
Output: 4.8 V, 400 mA</td></tr>
</table>

3. TECHNICAL BRIEF

3.1 Digital Main Processor

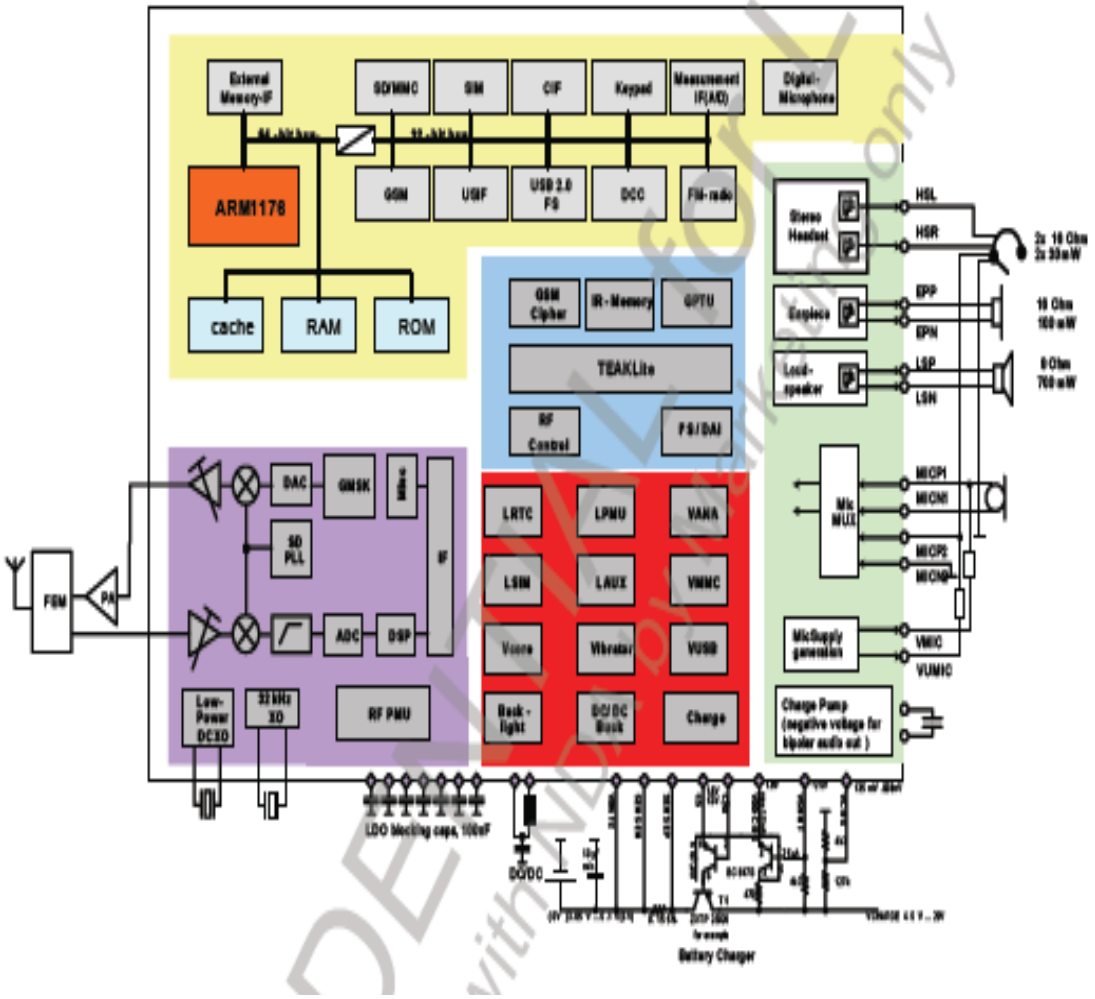


Figure. 3.1.1 X-Gold tm 213 Hardware Block Diagram

3.1.1 General

Technology:
– SoC, Monolithic, 65 nm CMOS
• Package:
– eWLB, 8x8x0.8 mm
– 0.5 mm pitch
– 217 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:
– 156 MHz TeakLite™
• MCU:
– ARM1176® @ 208 MHz
• MCU RAM:
– 3.00Mbit
• Memory I/F:
– 512 Mbit (can be extended to 2 Gbit in AD-Mux/Demux, and up to 4 Gbit in AAD-Mux mode)
• 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 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, A-GPS, WLAN support (I2C, I2S, SPI)

3.1.5 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

3.1.6 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-Ion
• 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)

3.1.7 Display

• Type
– 176*220, QCIF, 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)

3.1.8 Camera

• 1.3 Mpx YUV parallel interface
• HW JPEG encoder (39 Mpx/sec)
• 39 MHz Pixel Rate
• 15 fps@1.3 Mpx full resolution

3.1.9 Video Capabilities

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

3.1.10 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.

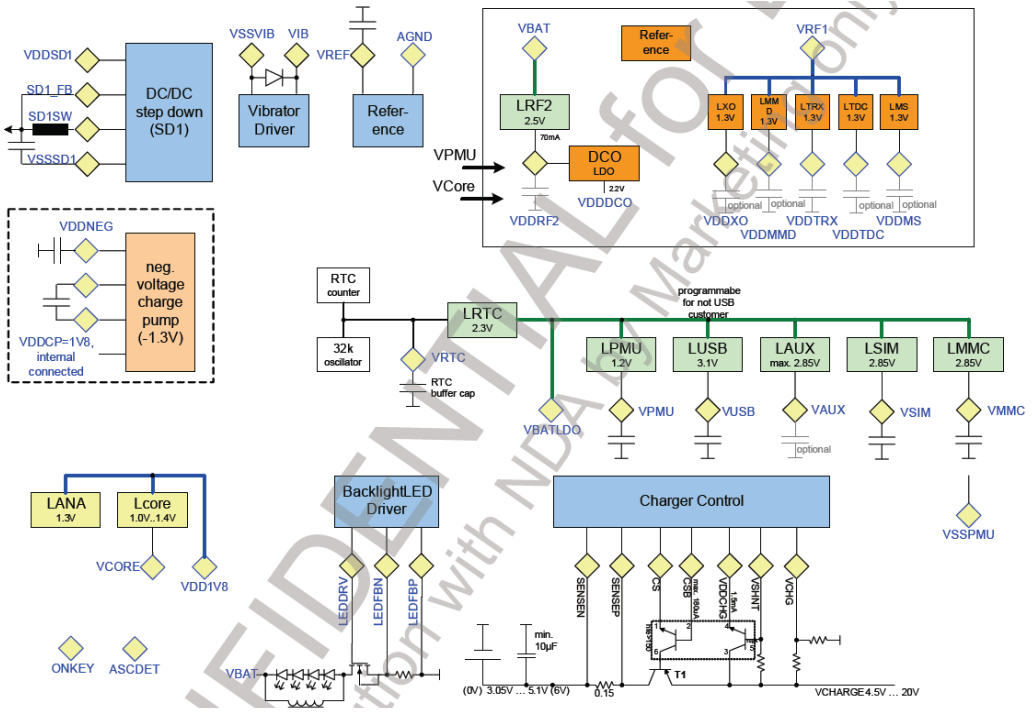


Figure. 3-2-1 Block Figure of the PMU Modules X-Gold tm 213

▪ **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.

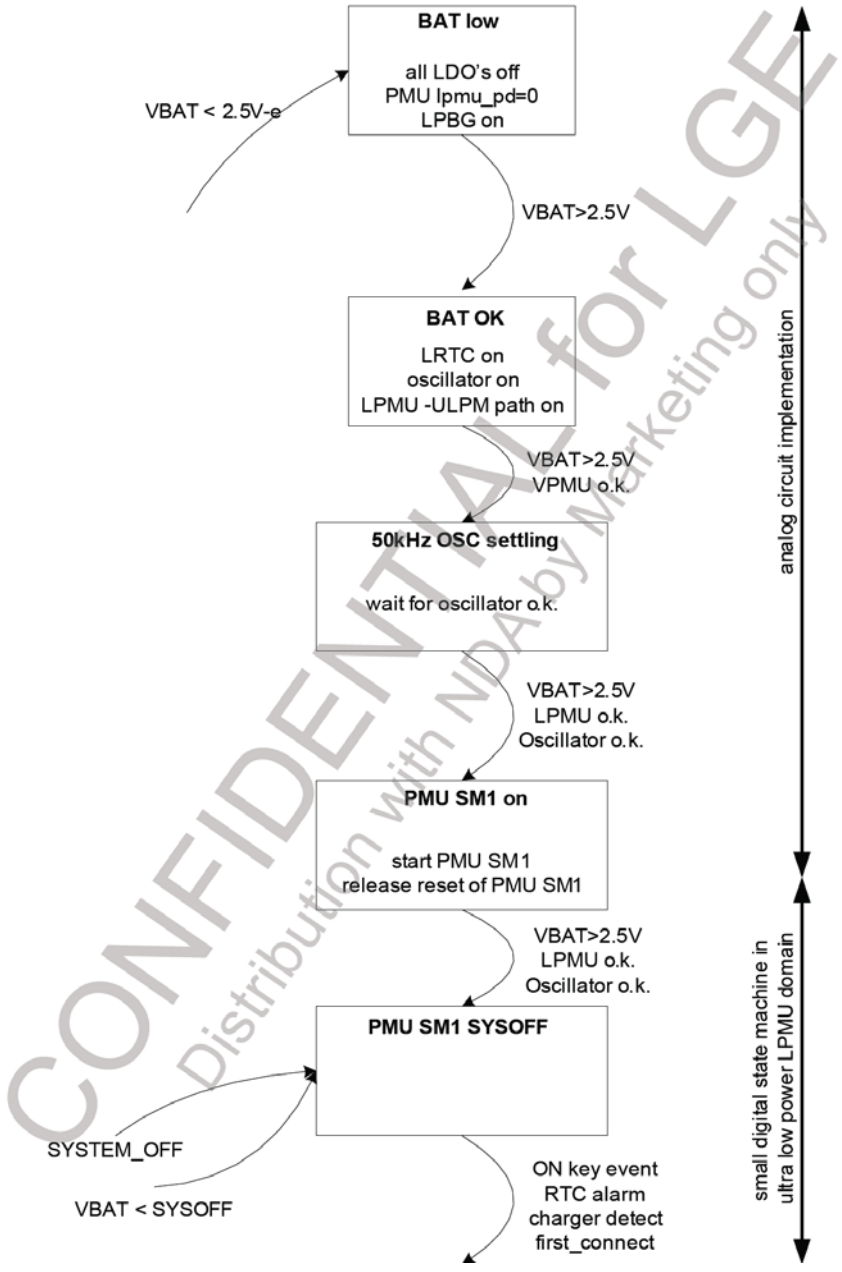


Figure.3.2.1 First Part of the State Machine,
Running in Different Power Domains than the Second Part

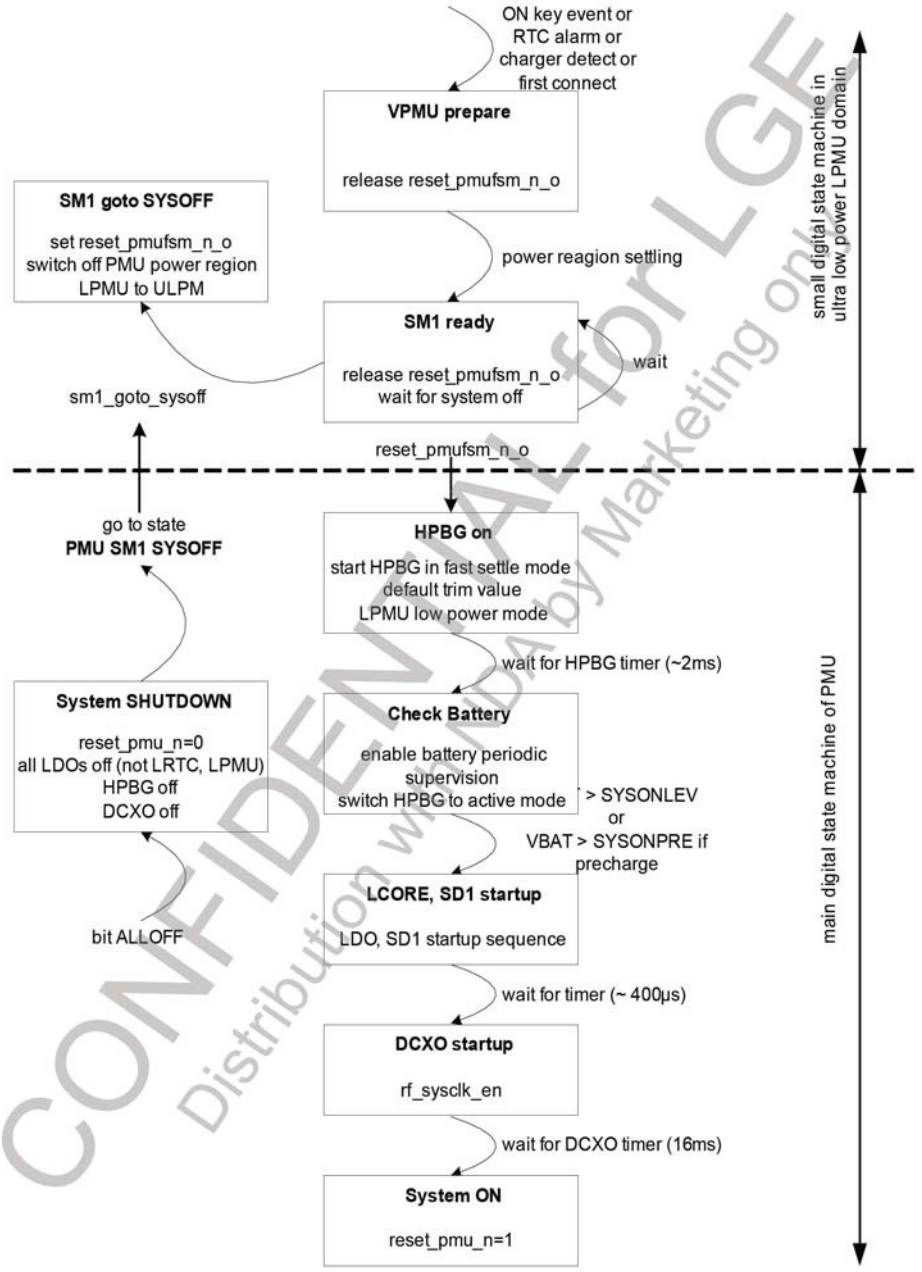


Figure 3.2.2 Second (Main) Part of the Startup State Machine in the VPMU Domain

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 213 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.

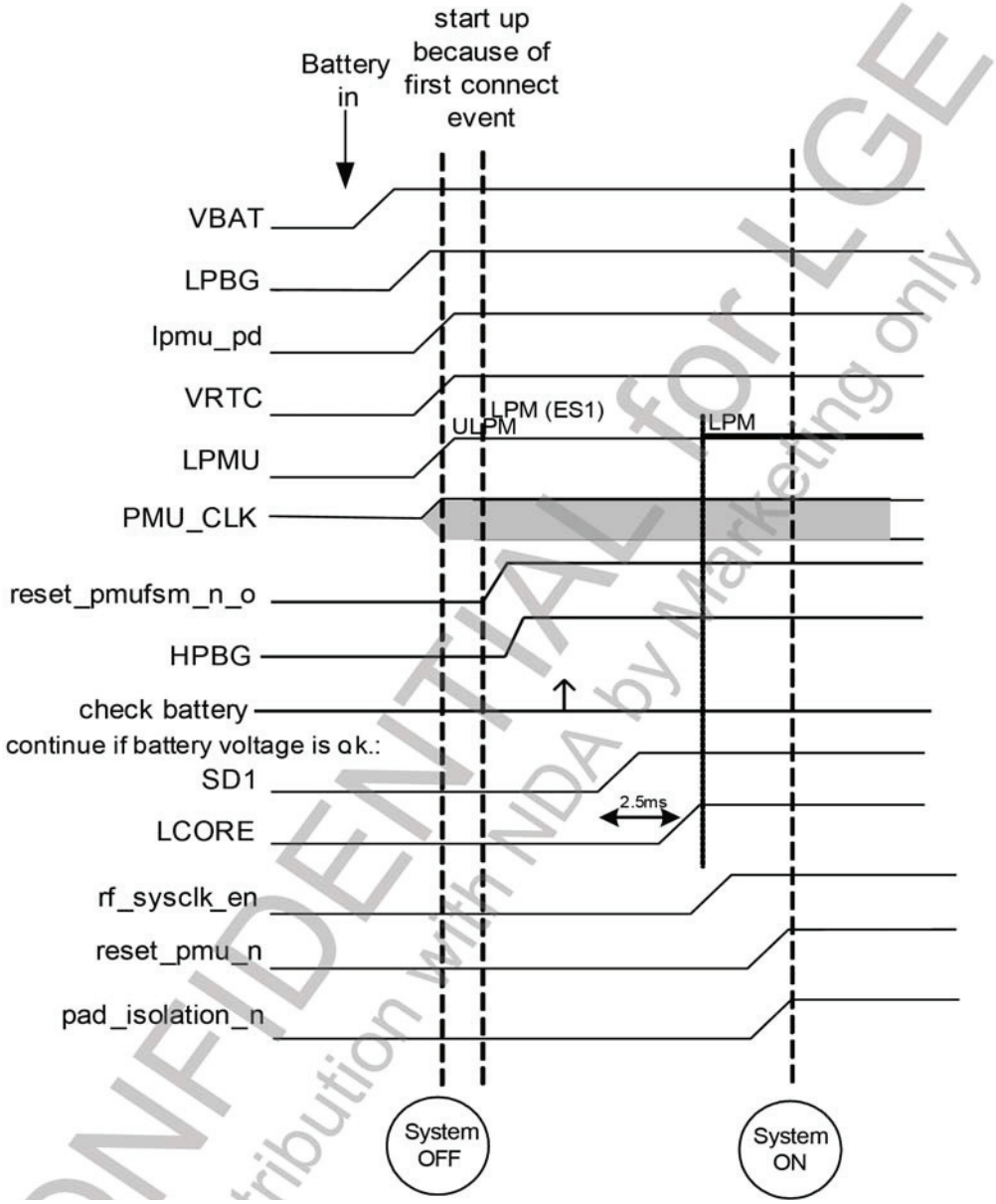


Figure 3.2.3 Start Up Sequence (triggered by First Connect Event)

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.

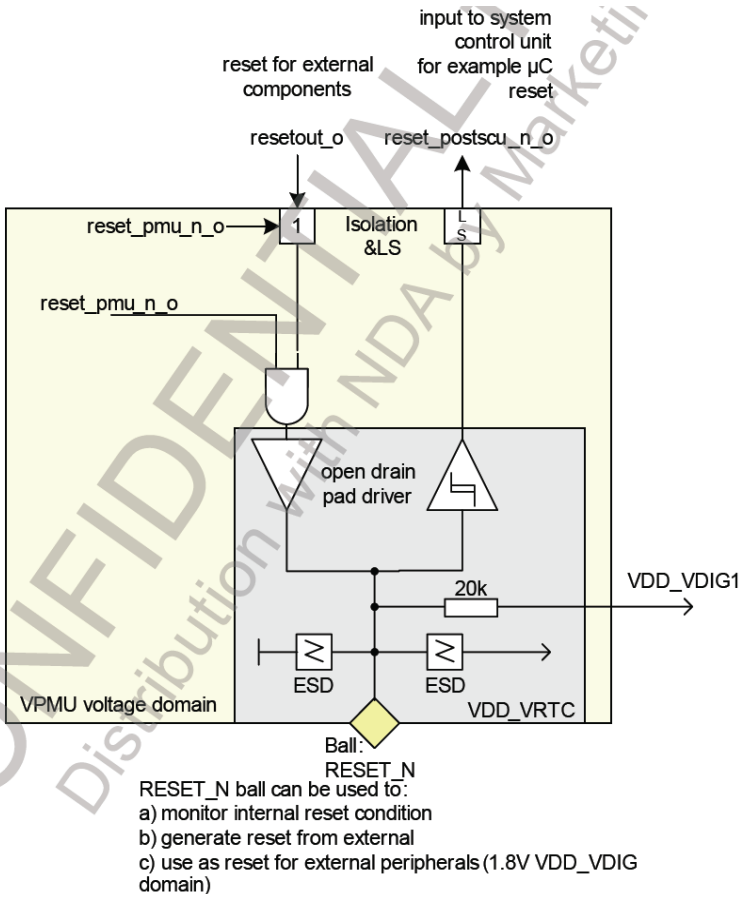


Figure 3.2.4 PMU, CGU and External Reset

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.

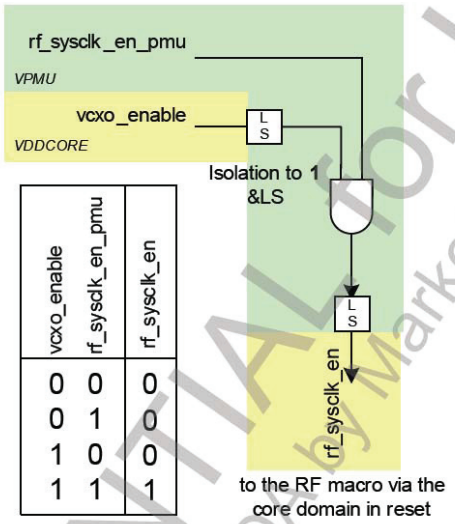


Figure 3.4.2 How sysclock Enable is Routed in the PMU

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 (SKY77548, U303)

3.3.1 Internal Block Diagram

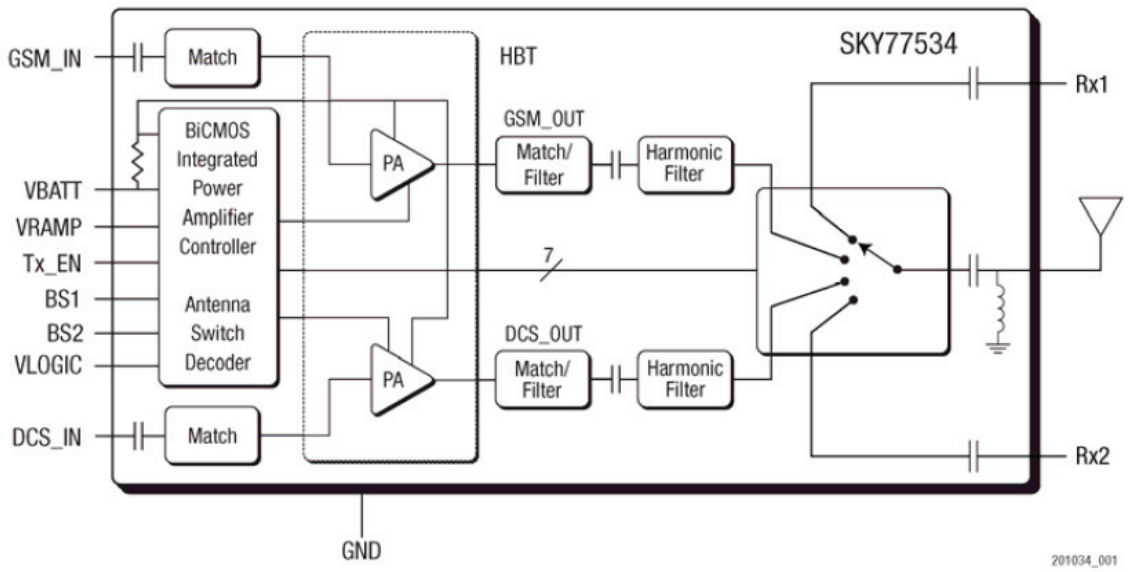


Figure. 3.3.1 SKY77548 FUNCTIONAL BLOCK DIAGRAM

3.3.2 General Description

The **SKY77548** is a transmit and receive front-end module (FEM) with Integrated Power Amplifier Control for quad-band cellular handsets comprising GSM850/900 and DCS1800/PCS1900 operation. Designed in a low profile, compact form factor.
The FEM also supports Class 12 General Packet Radio Service (GPRS) multi-slot operation.
The module consists of a GSM850/900 PA block and a DCS1800/PCS1900 PA block, impedance matching circuitry for 50 Ω input and output impedances, TX harmonics filtering, high linearity and a low insertion loss PHEMT RF switch, and a Power Amplifier Control (PAC) block with internal current sense resistor. A custom BiCMOS integrated circuit provides the internal PAC function and decoder circuitry to control the RF switches. The two Heterojunction Bipolar Transistor (HBT) PA blocks are fabricated onto a single Gallium Arsenide (GaAs) die. One PA block supports the GSM850/900 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 four receive pads are connected to the antenna pad through a PHEMT RF switch. The GaAs die, PHEMT die, Silicon (Si) die and passive components are mounted on a multi-layer laminate substrate. The assembly is encapsulated with plastic overmold.

Mode	VLOGIC	Input Control Bits		
		Tx_EN	BS1	BS2
STANDBY	0	X[1]	X[1]	X[1]
Rx1	1	0	0	1
Rx2	1	0	1	1
LB_Tx	1	1	0	X[1]
HB_Tx	1	1	1	X[1]

[1] X = DON'T CARE

[2] Rx1 and Rx2 are broadband receive ports and each supports the GSM850, GSM900, DCS, and PCS bands.

Figure 3.3.2 Band SW Logic Table

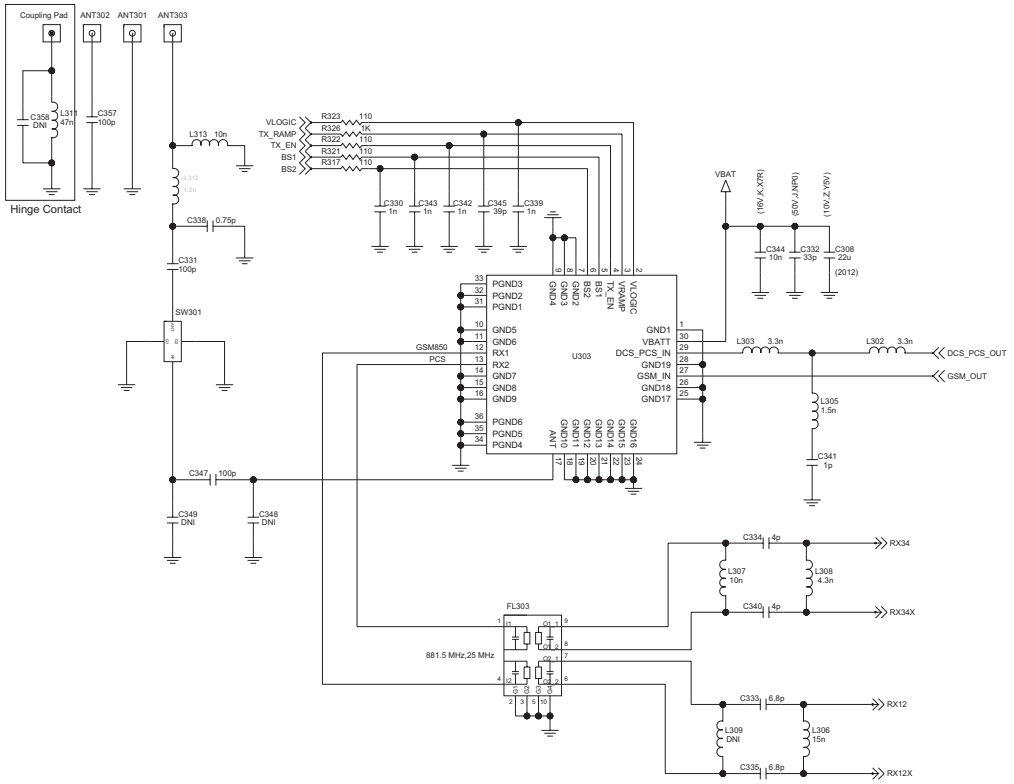


Figure 3.3.3 FEM CIRCUIT DIAGRAM

3.4 Crystal(26 MHz, X101)

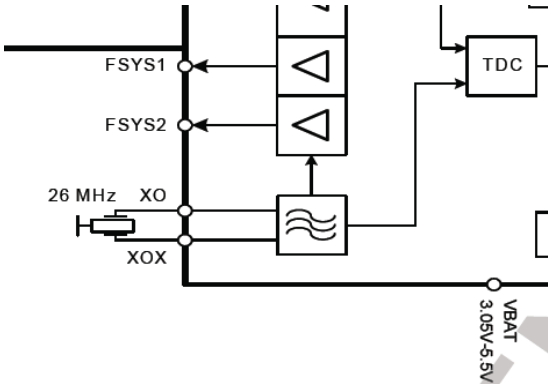


Figure. 3.4.1 Crystal Oscillator External Connection

The X-GOLDTM213 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.

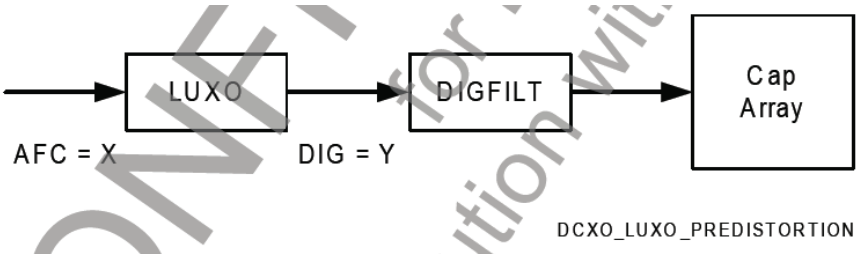


Figure. 3.4.2 Digital PREDISTORTION with LUXO

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 PMB8810 (U102)

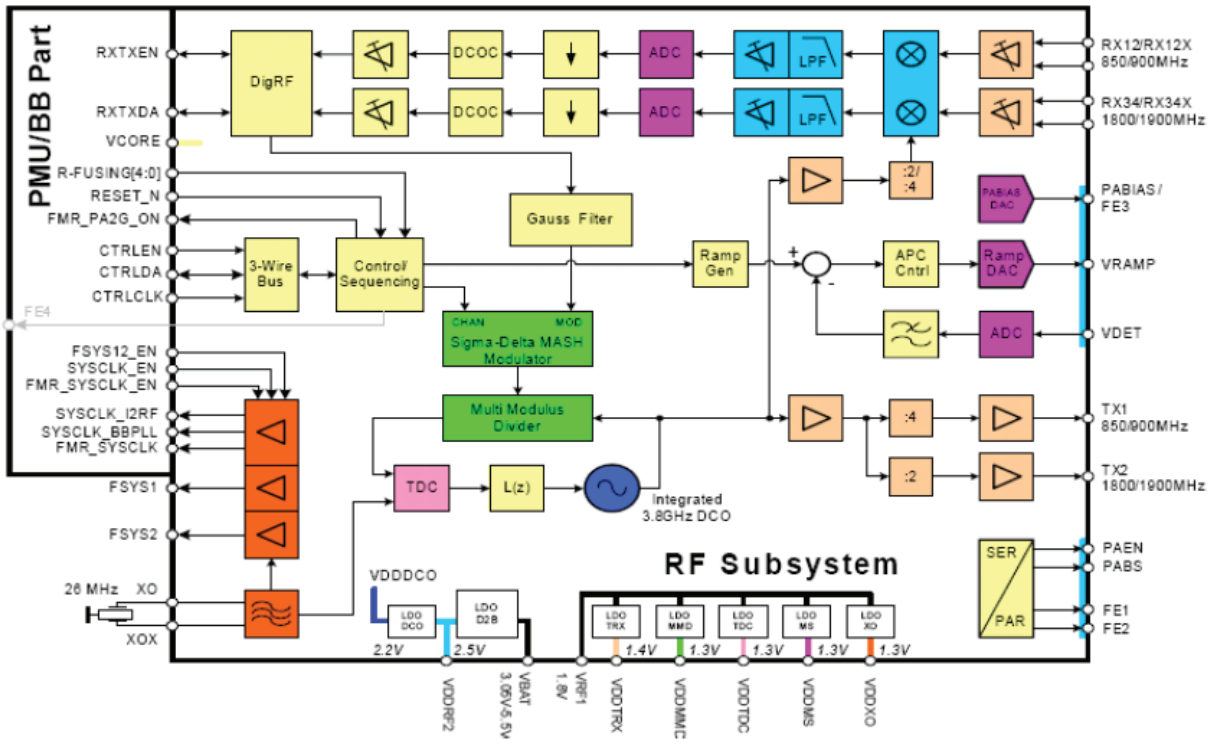


Figure. 3-5-1 Block DIAGRAM of RF Subsystem

3.5.1 GENERAL DESCRIPTION

The PMB8810 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™213 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.

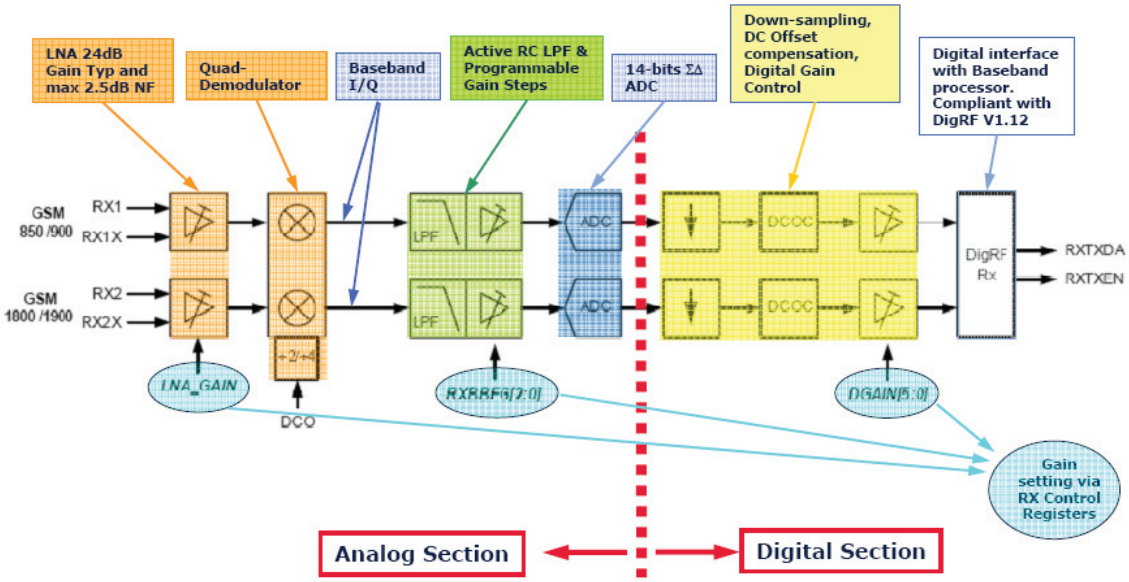


Figure. 3.5.2 RECEIVER CHAIN BLOCK DIAGRAM

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.

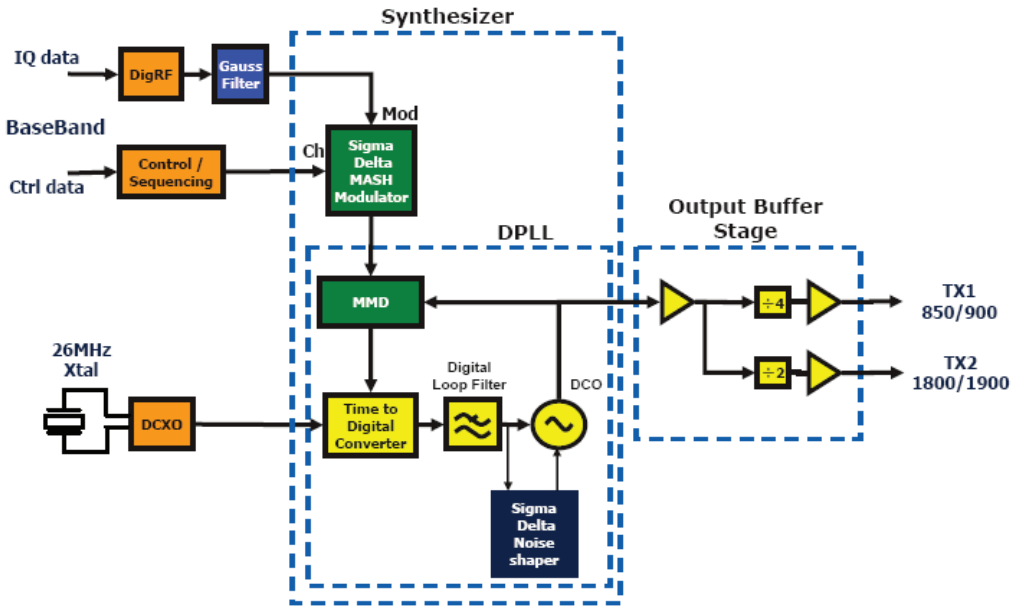


Figure. 3.5.3 TRANSMITTER CHAIN BLOCK DIAGRAM

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.

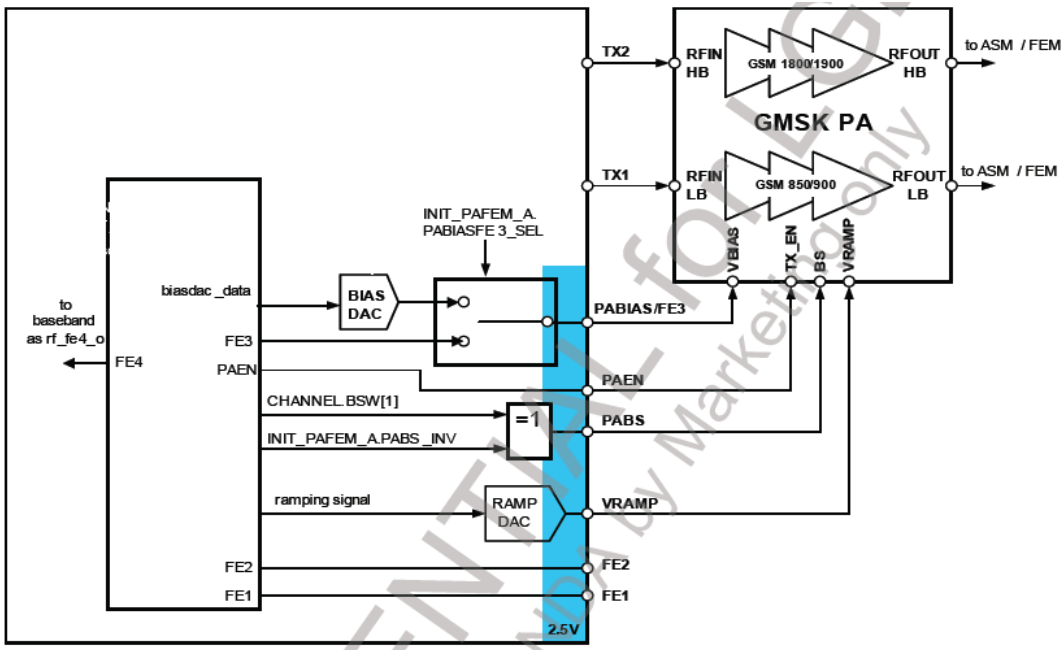


Figure. 3.5.4 PA AND FEM CONTROL BLOCK DIAGRAM

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.

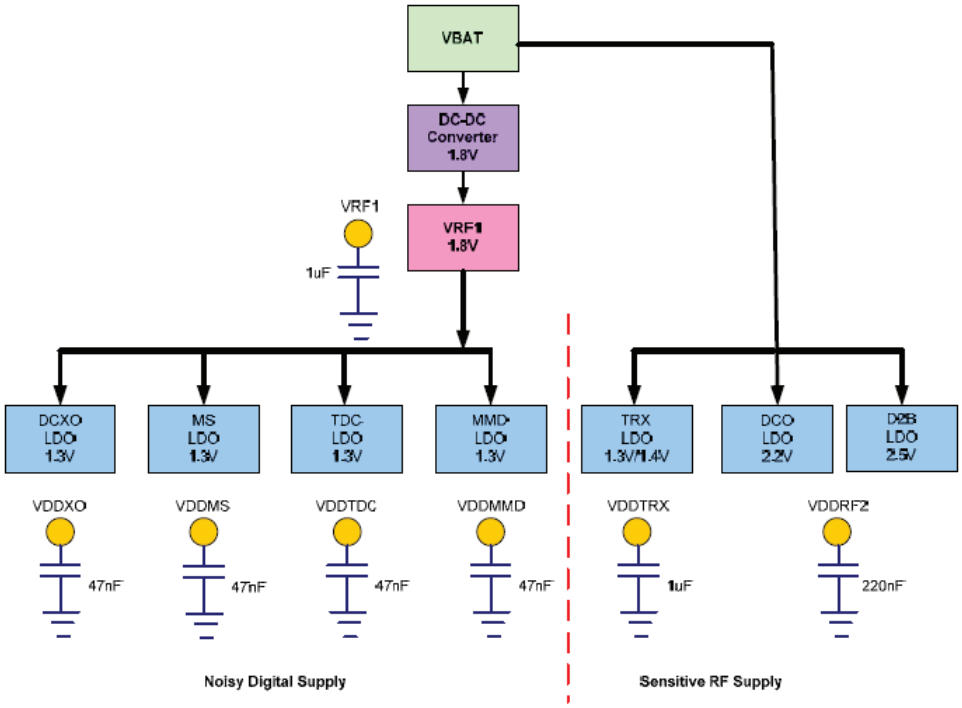


Figure. 3.5.5 POWER SUPPLY BLOCK DIAGRAM

3.6 MEMORY(PF38F5060M0Y0BE, U101)

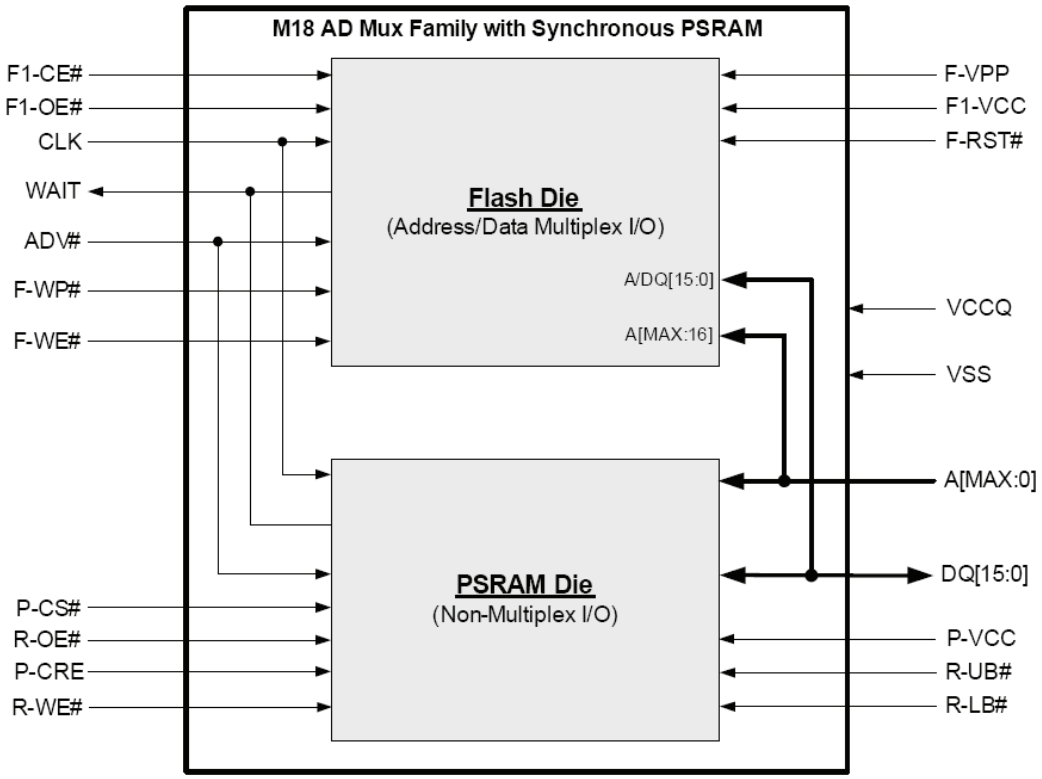


Figure. 3.6.1 MEMORY BLOCK DIAGRAM

The Numonyx™ StrataFlash® Cellular Memory (M18) device provides high read and write performance at low voltage on a 16-bit data bus.
The flash memory device has a multi-partition architecture with read-while-program and read-while-erase capability.
The device supports synchronous burst reads up to 108 MHz using ADV# and CLK address-latching (legacy-latching) on some litho/density combinations and up to 133 MHz using CLK address-latching only on some litho/density combinations. It is listed below in the following table.
.

Litho (nm)	Density (Mbit)	Supports frequency up to (MHz)	Sync read address-latching
90	256	133	CLK-latching
	512	108	Legacy-latching
65	128	133	CLK-latching
	256	133	CLK-latching
	512	108	Legacy-latching
	512	133	CLK-latching
	1024	108	Legacy-latching
	1024	133	CLK-latching

Table 3_6_1 M18 Frequency combinations

In continuous-burst mode, a data Read can traverse partition boundaries.
Upon initial power-up or return from reset, the device defaults to asynchronous arrayread mode. Synchronous burst-mode reads are enabled by programming the Read Configuration Register. In synchronous burst mode, output data is synchronized with a user-supplied clock signal. A WAIT signal provides easy CPU-to-flash memory synchronization.
Designed for low-voltage applications, the device supports read operations with VCC at 1.8 V, and erase and program operations with VPP at 1.8 V or 9.0 V. VCC and VPP can be tied together for a simple, ultra-low power design. In addition to voltage flexibility, a dedicated VPP connection provides complete data protection when VPP is less than VPPLK.
A Status Register provides status and error conditions of erase and program operations.
One-Time-Programmable (OTP) registers allow unique flash device identification that can be used to increase flash content security. Also, the individual block-lock feature provides zero-latency block locking and unlocking to protect against unwanted program or erase of the array.
The flash memory device offers three power savings features:
• Automatic Power Savings (APS) mode: The device automatically enters APS following a read-cycle completion.
• Standby mode: Standby is initiated when the system deselects the device by deasserting CE#.
• Deep Power-Down (DPD) mode: DPD provides the lowest power consumption and is enabled by programming in the Enhanced Configuration Register. DPD is initiatied by asserting the DPD pin.

3.7 BT module

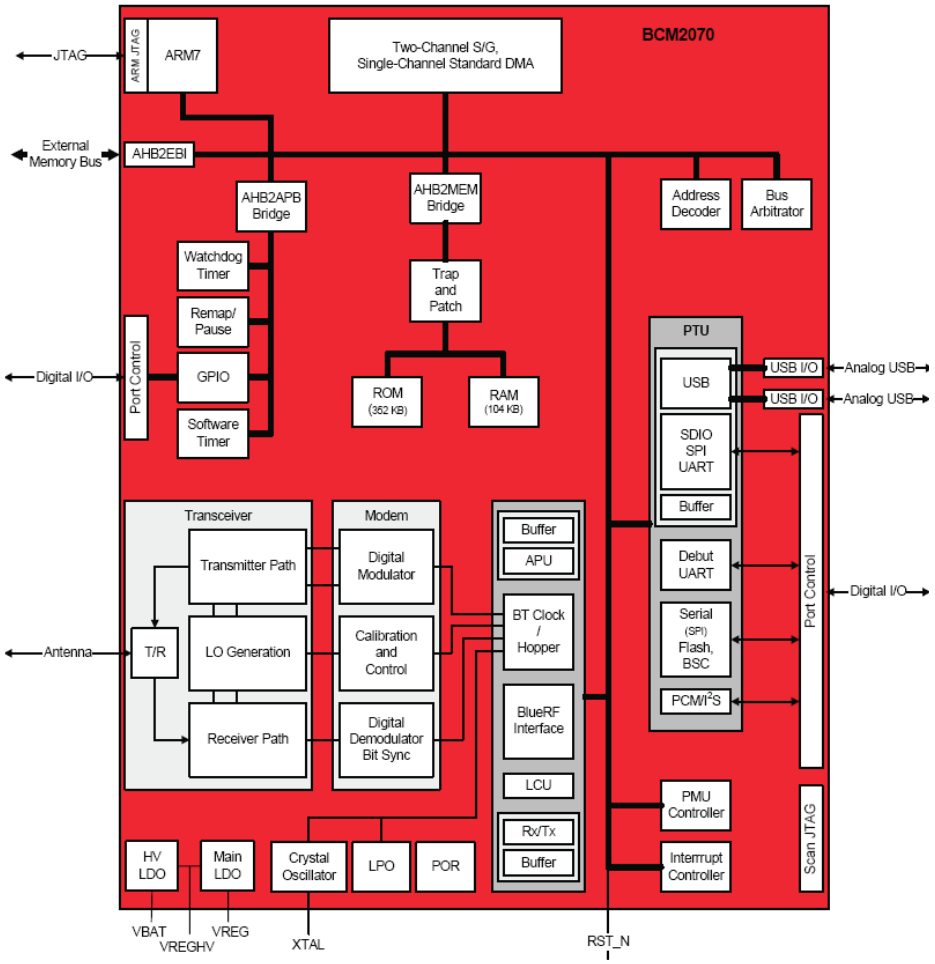


Figure 3.7.1. BT BLOCK DIAGRAM

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, B/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 eliable 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

SIM_CONNECTOR

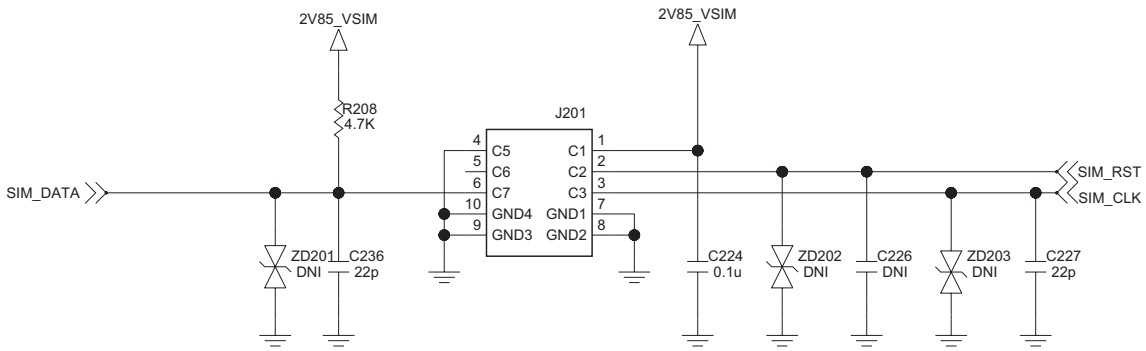


Figure 3.8.1. SIM CARD Interface

The Main Base Band Processor(XMM2130) provides SIM Interface Module.
The XMM2130 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, 3 signals SIM_DATA, SIM_CLK, SIM_RST.
And This model supports 1.8/3V SIM Card.

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

3.9 LCD Interface

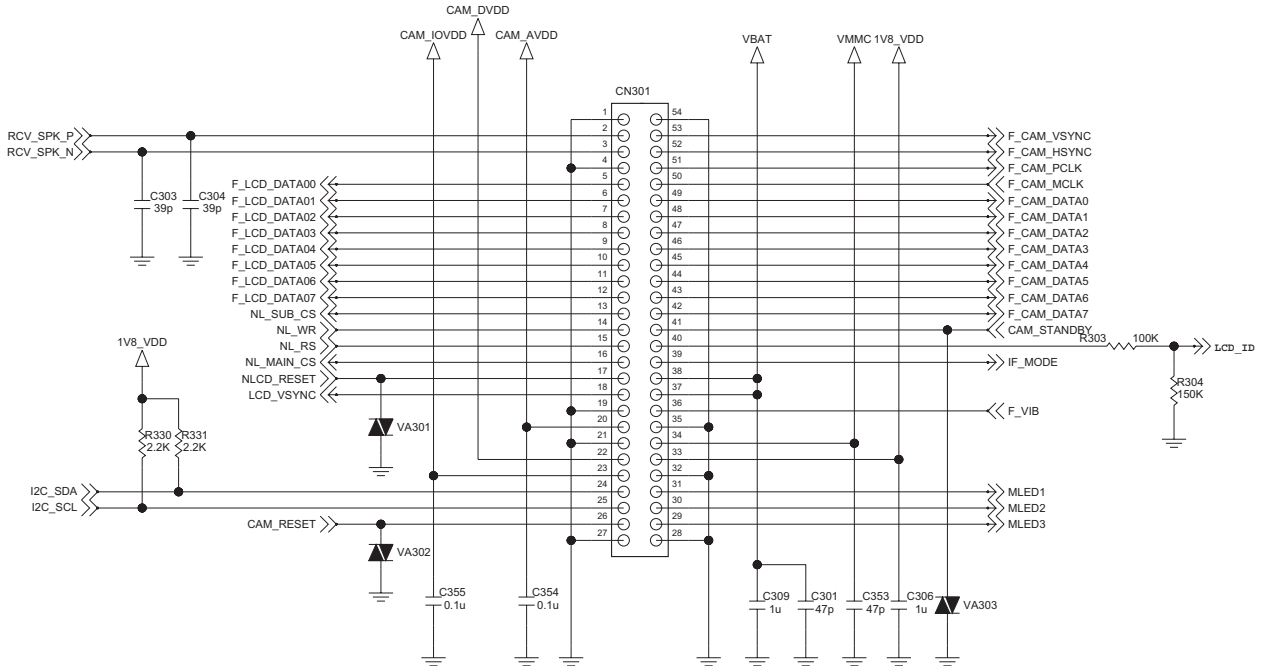


Figure 3.9.1. LCD Interface

LGDP4525B is a 262,144-color one-chip SoC driver for a-TFT liquid crystal display with resolution of 176RGBx220 dots, comprising a 528-channel source driver, a 220-channel gate driver, 87120 bytes RAM for graphic data of 176RGBx220 dots, and power supply circuit.
LGDP4525B can operate with low I/O interface power supply up to 1.65V, with an incorporated voltage follower circuit to generate voltage levels for driving an LCD.
The LGDP4525B also supports a function to display in 8 colors and a standby mode, allowing for precise power control by software. These features make the LGDP4525B an ideal LCD driver for medium or small size portable products such as digital cellular phones or small PDA, where long battery life is a major concern.

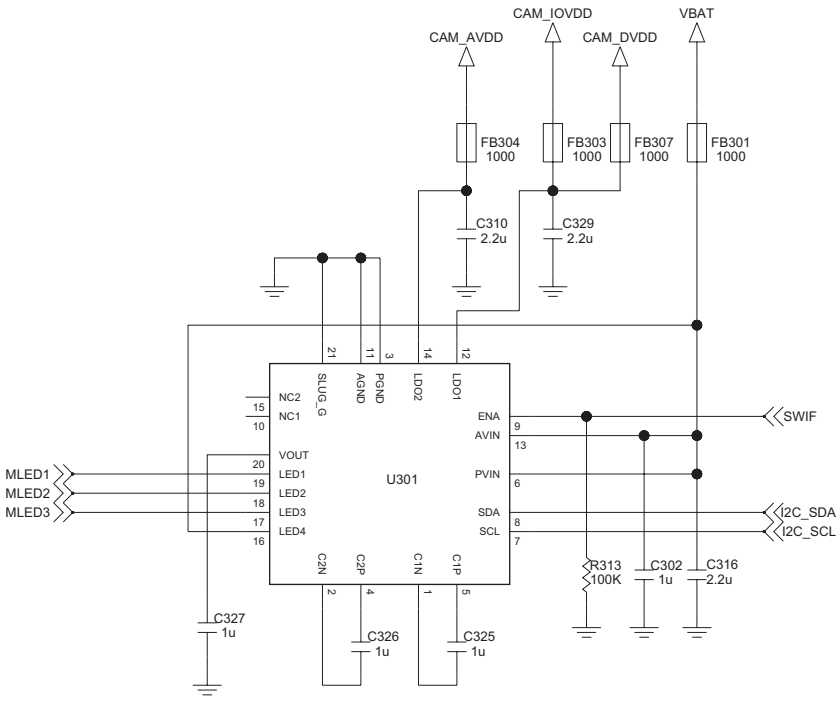


Figure 3.9.2. RT9367C CIRCUIT DIAGRAM

The RT9367C is a high efficiency charge pump LED driver using Semtech's proprietary mAhXLifeTM technology. Performance is optimized for use in single-cell Li-ion battery applications.

The charge pump provides backlight current in conjunction with four matched current sinks. The load and supply conditions determine whether the charge pump operates in 1x, 1.5x, or 2x mode. An optional fading feature that gradually adjusts the backlight current is provided to simplify control software. The RT9367C also provides two low- dropout, low-noise linear regulators for powering a camera module or other peripheral circuits.

The RT9367C uses the proprietary SemWireTM single wire interface. The interface controls all functions of the device, including backlight current and two LDO voltage outputs. The single wire implementation minimizes microcontroller and interface pin counts.

In sleep mode, the device reduces quiescent current to 100μA while continuing to monitor the serial interface. The two LDOs can be enabled when the device is in sleep mode. Total current reduces to 0.1μA in shutdown.

LED Backlight Current Sinks

The backlight current is set via the SemWire interface. The current is regulated to one of 32 values between 0.5mA and 25mA. The step size varies depending upon the current setting. Between 0.5mA and 12mA, the step size is 0.5mA. The step size increases to 1mA for settings between 12mA and 15mA and 2mA for settings greater than 15mA. This feature allows fi ner adjustment for dimming functions in the low current setting range and coarse adjustment at higher current settings where small current changes are not visibly noticeable in LED brightness.

All backlight current sinks have matched currents, even when there is variation in the forward voltages (△VF) of the LEDs. A △VF of 1.2V is supported when the input voltage is at 3.0V. Higher △VF LED mis-match is supported when VIN is higher than 3.0V. All current sink outputs are compared and the lowest output is used for setting the voltage regulation at the VOUT pin. This is done to ensure that suffi cient bias exists for all LEDs.

The backlight LEDs default to the off state upon powerup. For backlight applications using less than four LEDs, any unused output must be left open and the unused LED driver must remain disabled. When writing to the Backlight Enable Control register, a zero (0) must be written to the corresponding bit of any unused output.

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 Battery Charger Interface

CHARGING IC

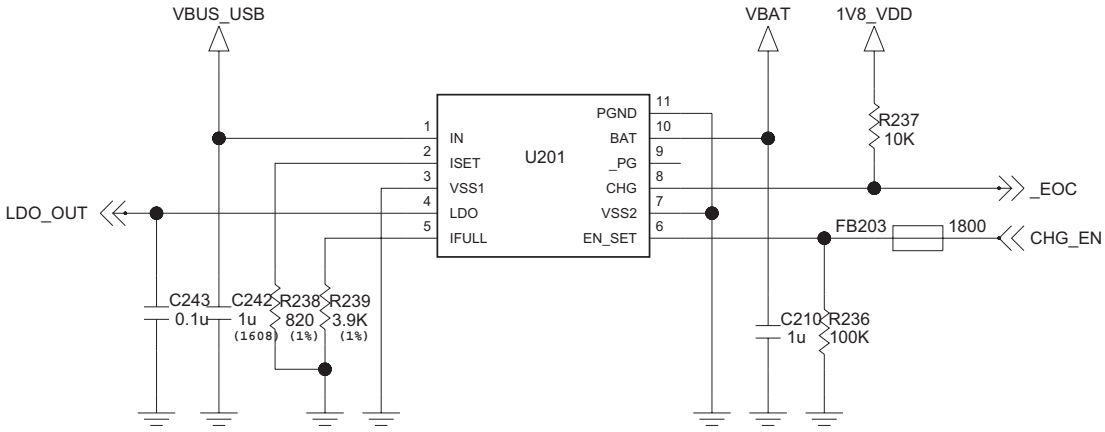


Figure 3.10.1 BATTERY CHARGER BLOCK

The BQ25040 is an intelligent, stand-alone constant current, constant-voltage (CCCV), thermally regulated dual input linear charger designed for charging a single-cell lithium-ion (Li+) battery.

The IC controls the charging sequence from the prequalification state through constant current fast charge, top-off charge, and full-charge indication.
Proprietary thermal-regulation circuitry limits the die temperature during fast charging or when the IC is exposed to high ambient temperatures, allowing maximum charging current without damaging the IC.

The BQ25040 accepts input supply range from -0.3V to 28V, but disables charging if the input voltages exceed +6.9V to protect against unqualified or faulty AC adapters cables. The IC operates over the extended temperature range (-40˚C to +85˚C)

3.11 Keypad Interface

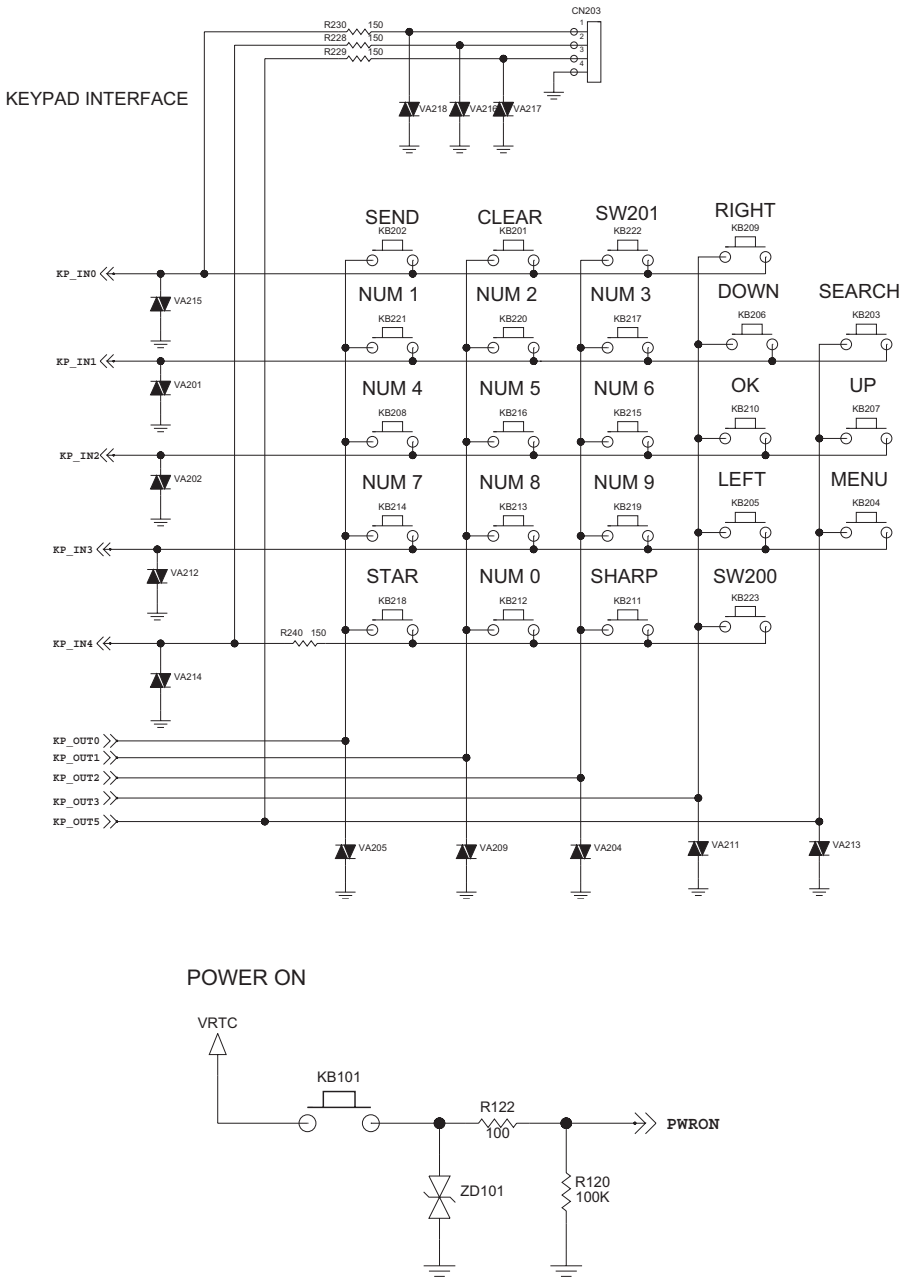


Figure 3.11.1 MAIN / SIDE KEY STRUCTURE

The Keypad Interface is a peripheral controller, which can be used for scanning external keypad matrices with up to 8 rows and 8 columns (that is 64 standard keys). By adding an additional row of keys connected to ground the number of keys can be extended by up to 8 keys. This results in a maximum number of 72 keys to by identified by the Keypad Interface Controller.
The Keypad Scan Module reduces the number of interrupts and polling through the processor and therefore reduces the power consumption. The module is able to debounce and scan the external keypad matrix automatically without any software intervention. After debouncing it generates an interrupt. The interface controller contains information about the key (or key combination) that was pressed and how long it was pressed.

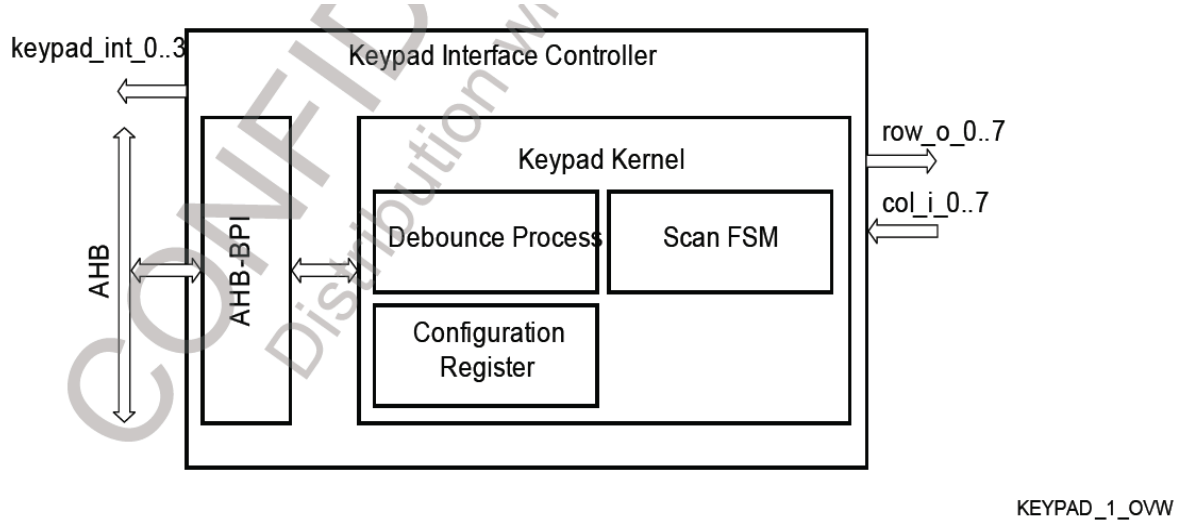


Figure 3.11.3 Block Diagram and System Integration of the KPD

3.12 Audio Front-End

3.12.1 Functional Overview

The audio front-end of X-GOLD™213 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™213. 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™213. 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.

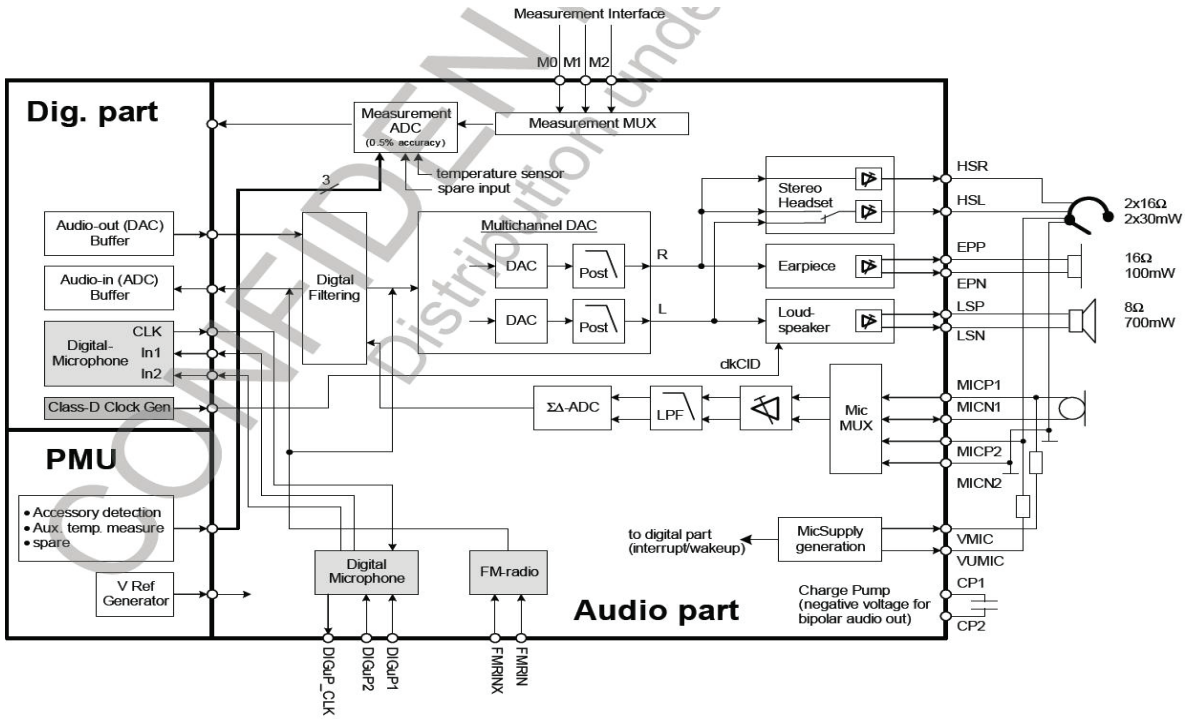


Figure 3.12.1 Audio Section Overview

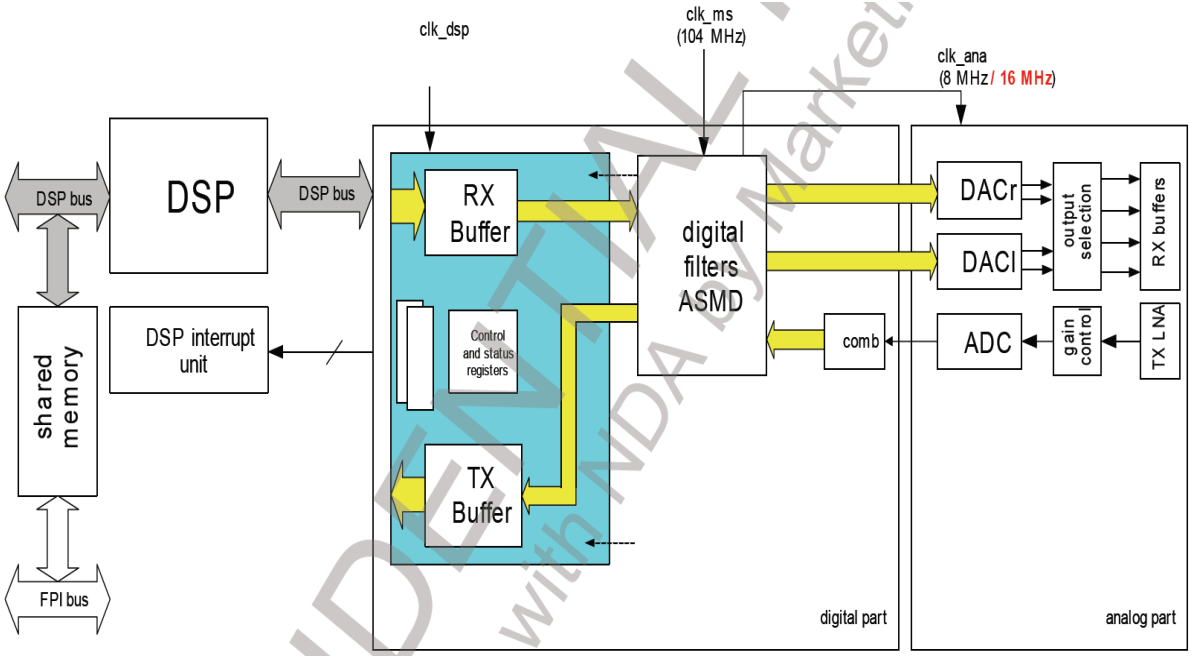


Figure 3.12.2 Overview of Clocking and Interfaces of Audio Front End

The audio front-end of X-GOLD™213 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™213.
• 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®.

3.12.2 Digital Part

The digital part of the X-GOLD™213 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™213 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™213 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).

3.12.3 Analog Part

The analog part of the X-GOLD™213 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™213 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™213 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.

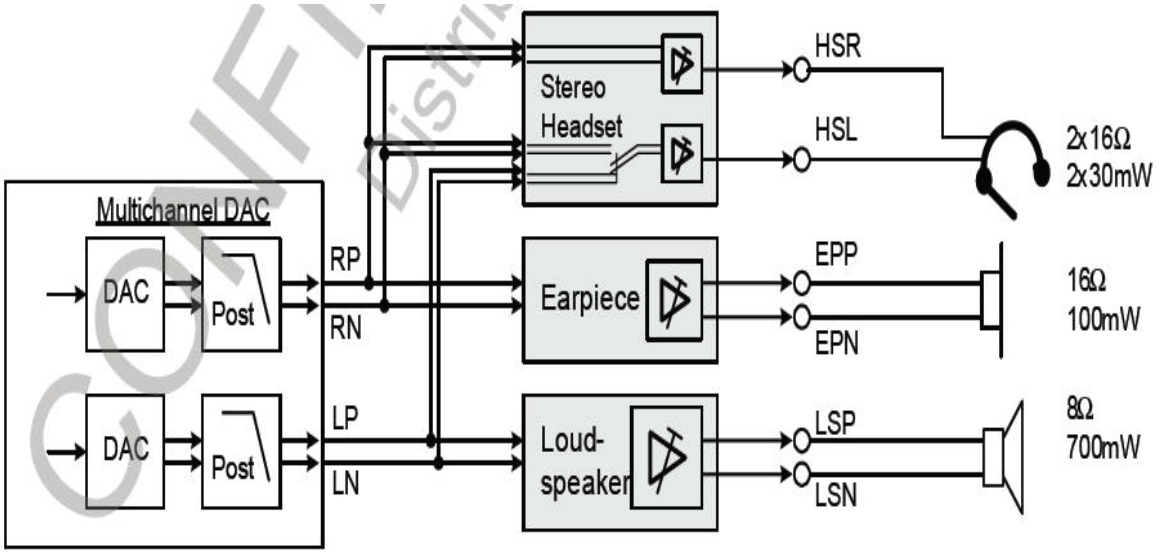


Figure 3.12.3 Switching for R/L DACs onto Buffers

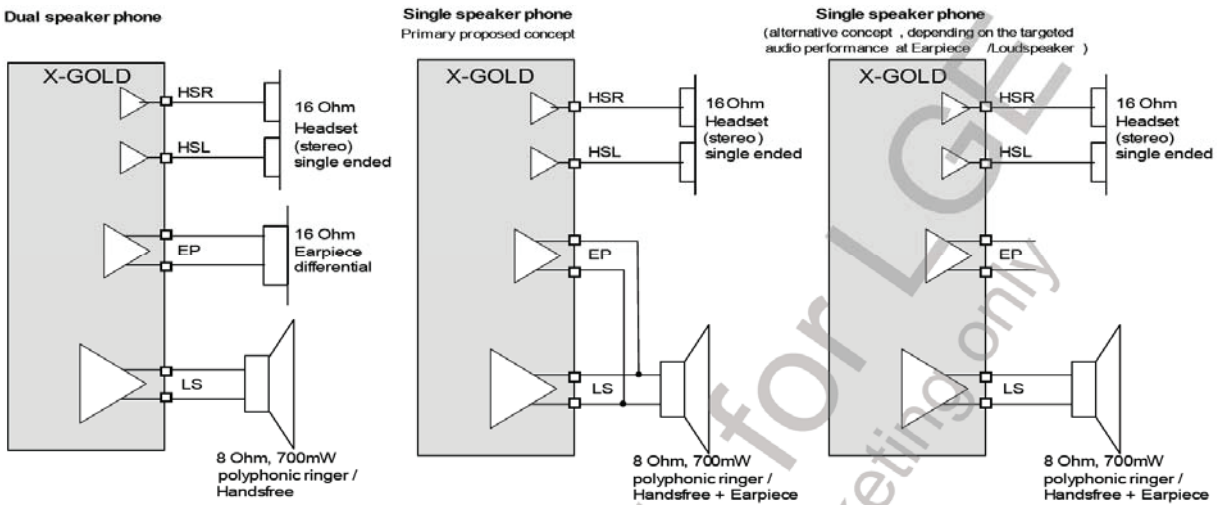


Figure 3.12.4 Different Application Scenarios

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™213 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™213 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.

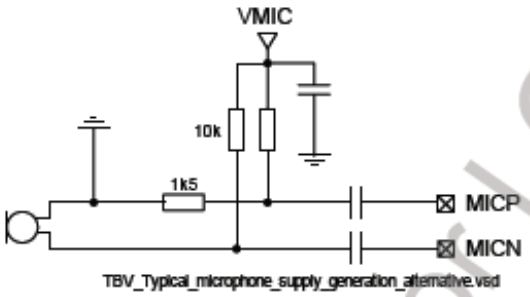


Figure 3.12.5 Typical Microphone Supply Generation (alternative)

3.13 Camera Interface(1.3M Fixed Focus Camera)

3.13.1 PMB8810 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.

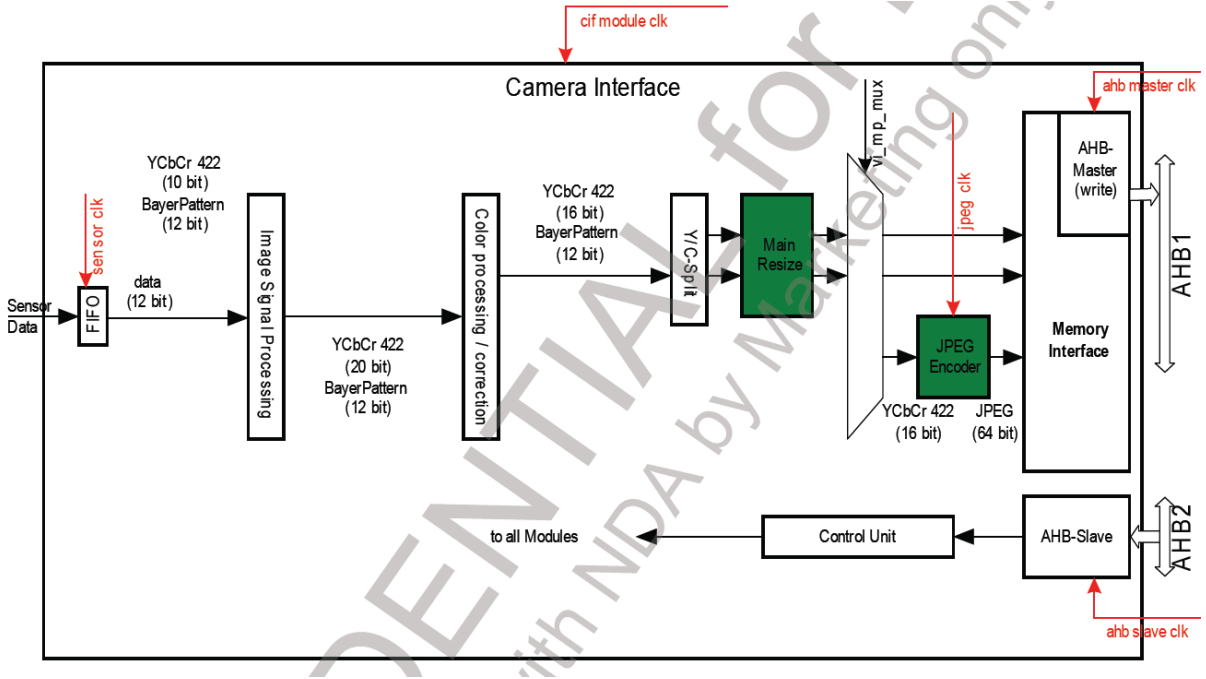


Figure 3.13.1 Block Diagram of Camera Interface

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

3.14 KEY BACLKLIGHT LED Interface

Key Backlight LED is controlled by switch (Q201). If KEY_BL_EN is high, Current is flowing from VBAT to LED. Then Light emitted from The LED.
KEY_BL_EN is operating PWM. It is reducing current consumption.

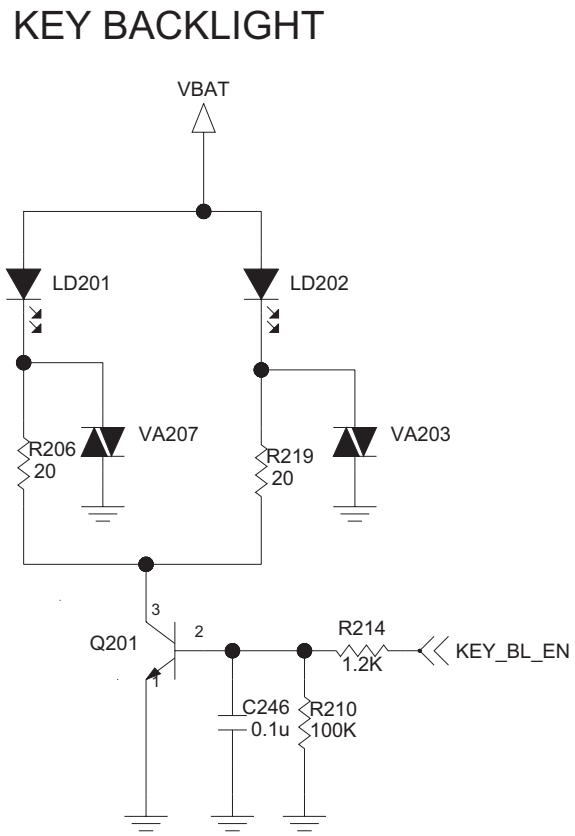


Figure 3.14.1 Key Backlight Block

3.15 Vibrator Interface

Support PWM signal which generated by hardware itself via register control.
Direct connect to the VIB and VSSVIB pin from XMM2130 without any external component required.
It is capable to driver the vibrator motor up to 150mA .

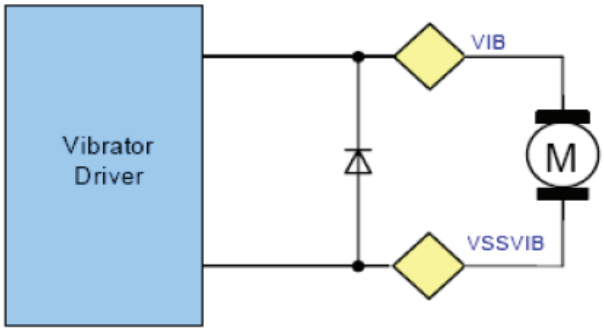


Figure 3.15.1 Vibrator Driver Block Diagram

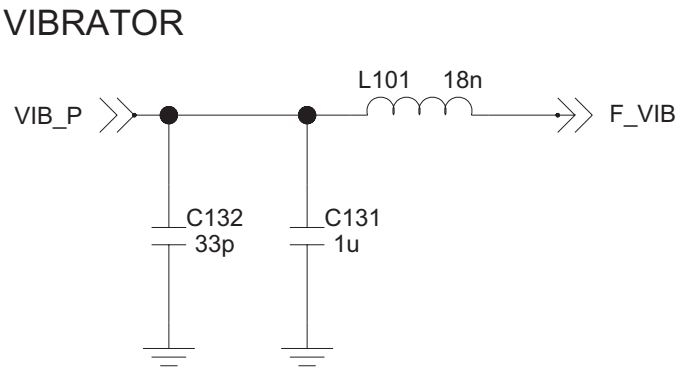


Figure 3.15.2 Vibrator Driver Block

3.16 Flip SW Interface

Hall sensor respond to the magnetic field. If it is used for mobile phones, It is used for opening of the Folder.
A little magnet attached to the folder. If folder is opened, Hall sensor is ON.
Therefore, to see whether the opening of the Folder

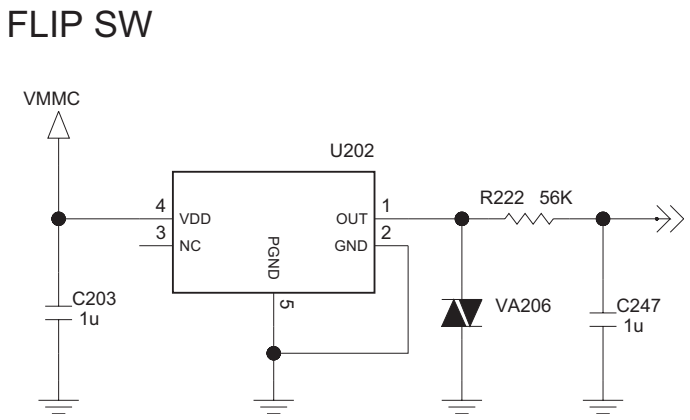


Figure 3-16-1 Hall effect switch Block Diagram

4. TROUBLE SHOOTING

4.1 RF Component

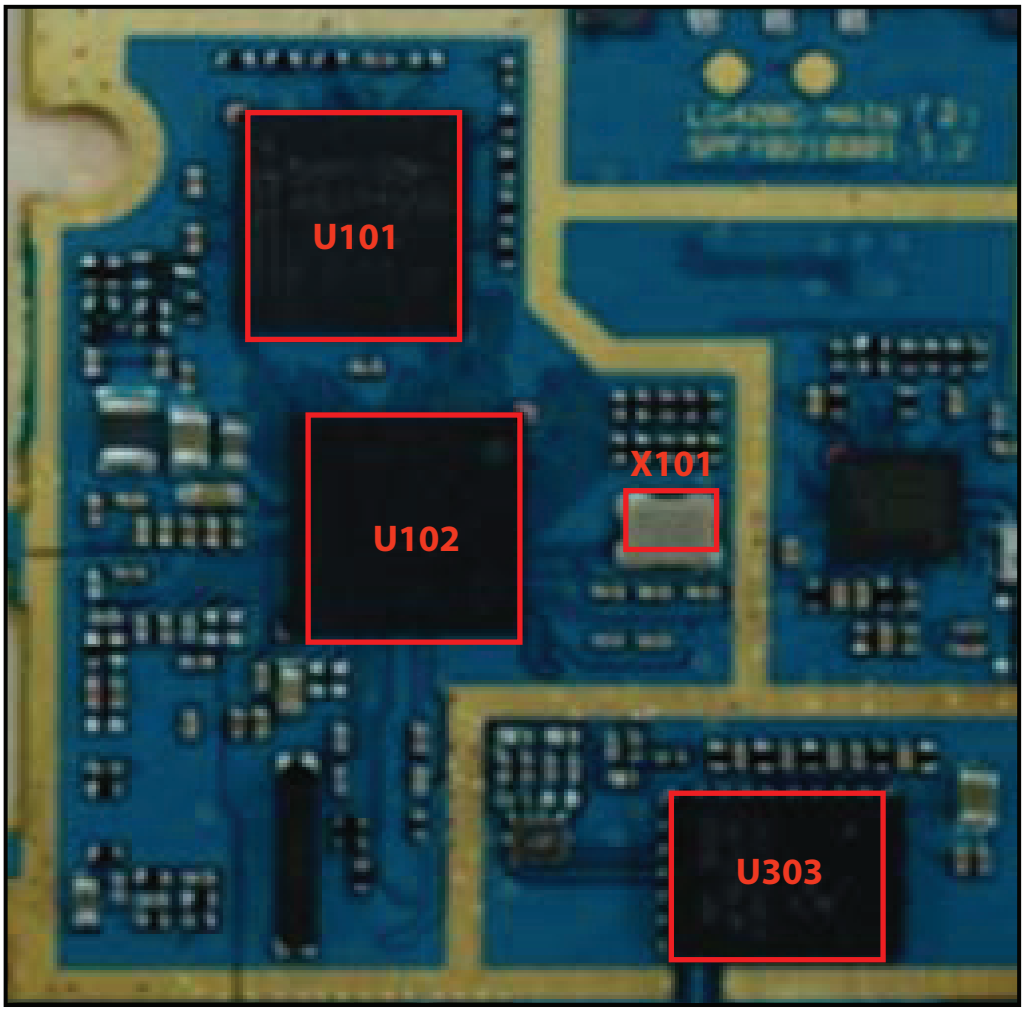
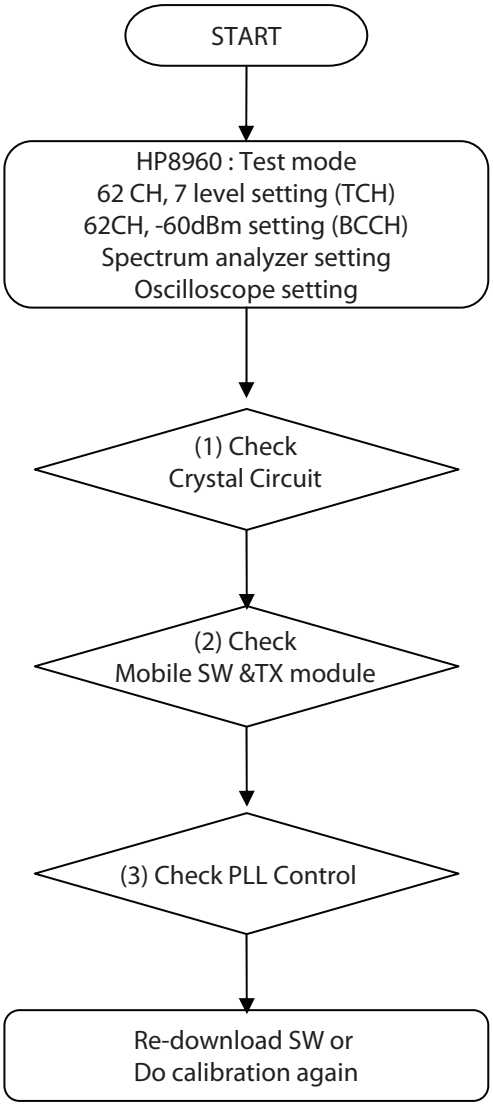


Figure 4.1

U101	Memory(512NOR/128pSRAM) PF38F5060M0Y3DF
U102 (PMB8810)	Main Chip (A-GOLDRADIO)
U303	FEM(Tx Module)
X101	Crystal, 26MHz Clock

4.2 RX Trouble

CHECKING FLOW



(1) Checking Crystal Circuit

TEST POINT

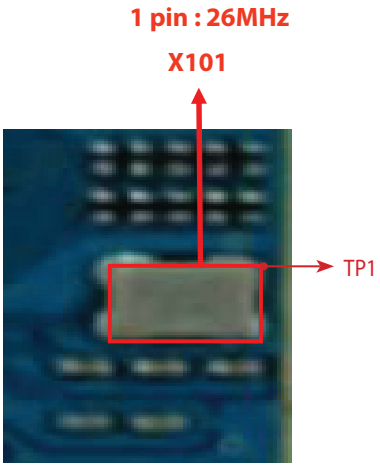
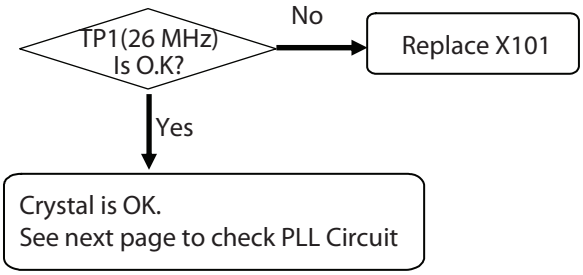


Figure 4.2.1

CHECKING FLOW



CIRCUIT

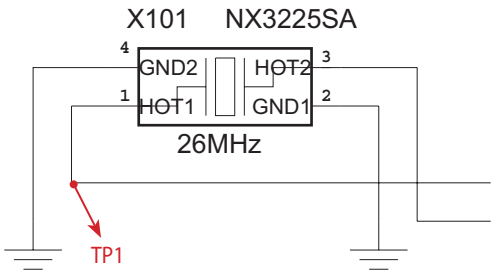


Figure 4.2.2

WAVEFORM

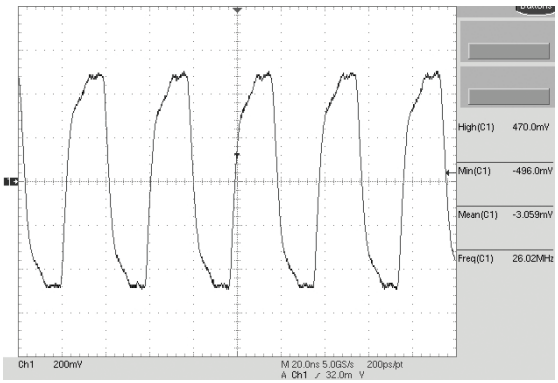


Figure 4.2.3

(2) Checking Mobile SW &FEM

TEST POINT

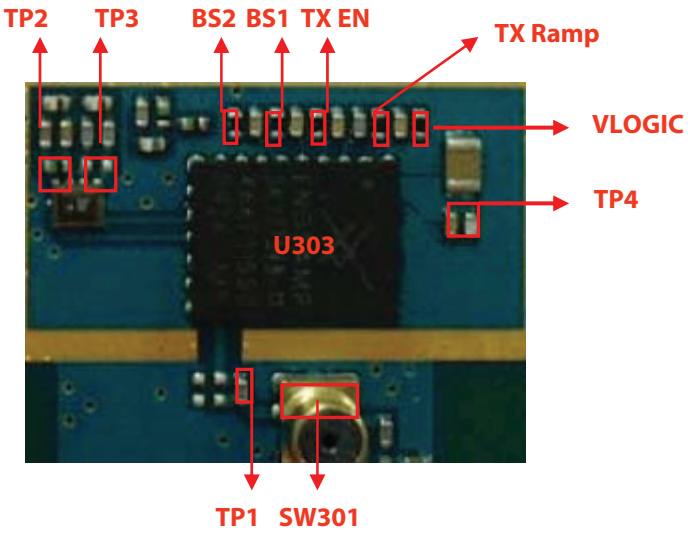
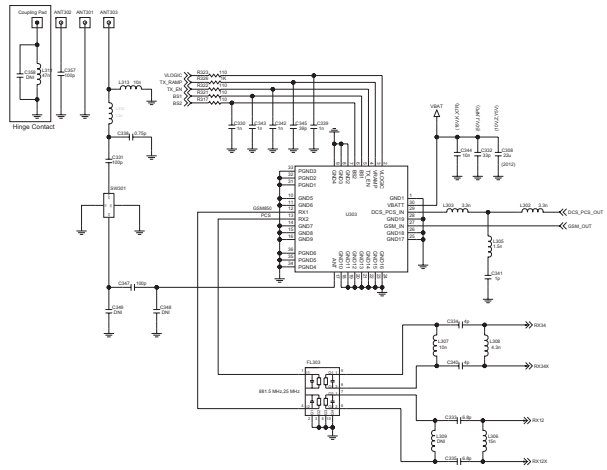


Figure 4.2.4

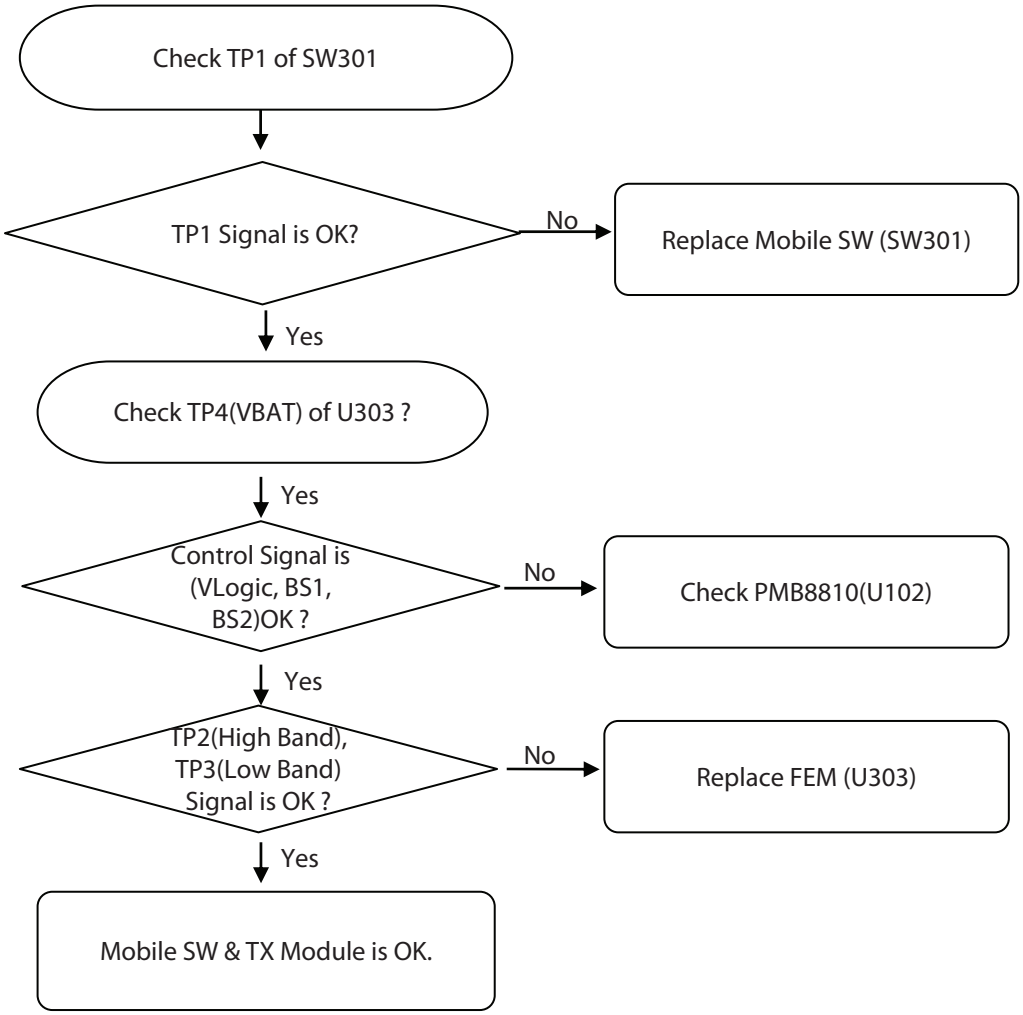
CIRCUIT



CONTROL LOGIC

GSM850 Rx

CHECKING FLOW

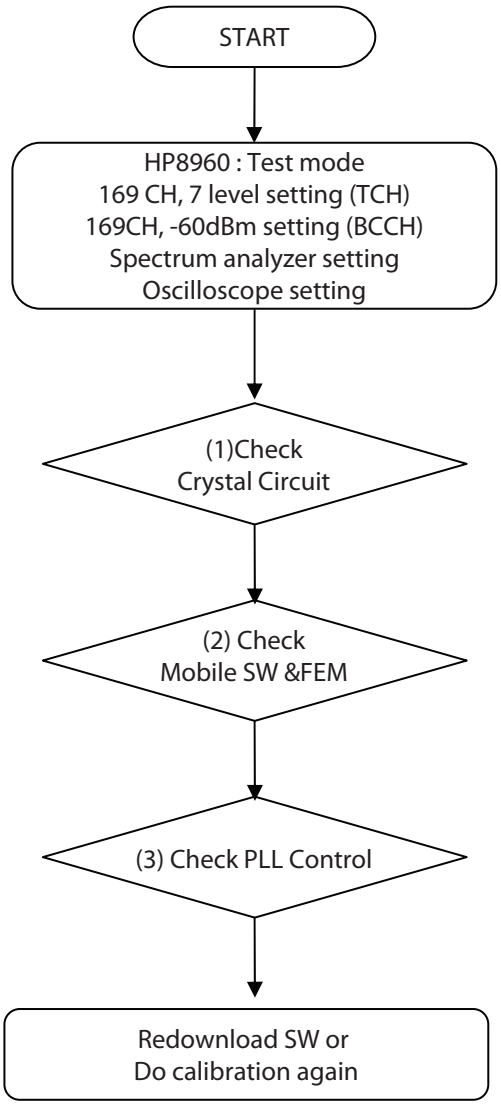


GSM 850 Rx

Mode	VLOGIC	Input Control Bits		
		Tx_EN	BS1	BS2
STANDBY	0	X[1]	X[1]	X[1]
Rx1	1	0	0	1
Rx2	1	0	1	1
LB_Tx	1	1	0	X[1]
HB_Tx	1	1	1	X[1]

4.3 TX Trouble

CHECKING FLOW



(1) Checking Crystal Circuit

TEST POINT

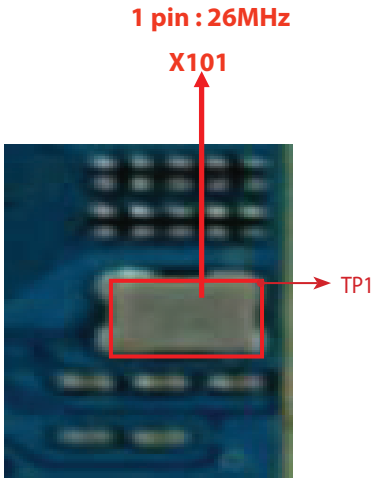
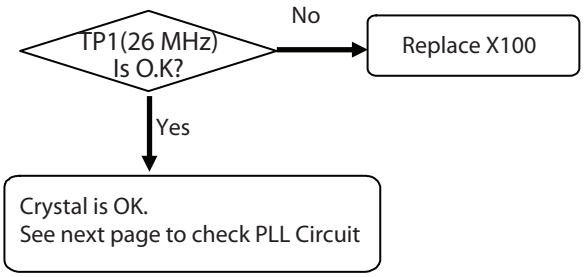


Figure 4.3.1

CHECKING FLOW



CIRCUIT

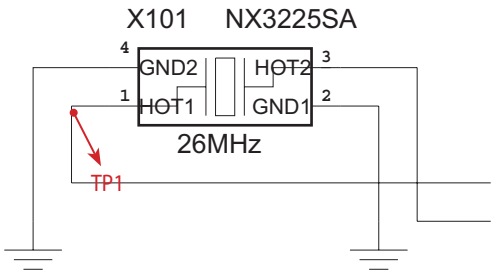


Figure 4.3.2

WAVEFORM

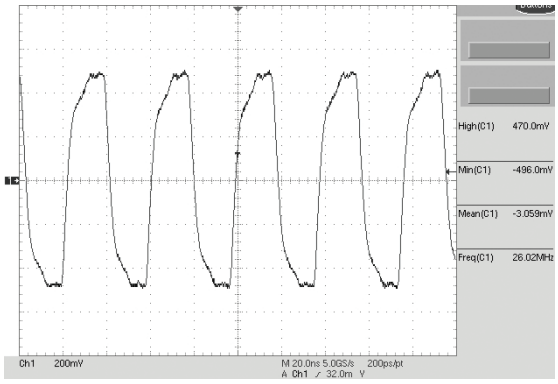


Figure 4.3.3

(2) Checking Mobile SW & TX Module

TEST POINT

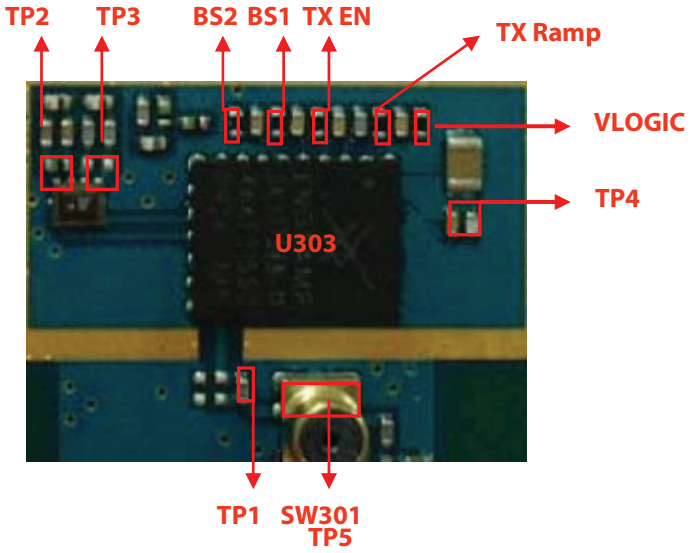


Figure 4.3.4

CIRCUIT

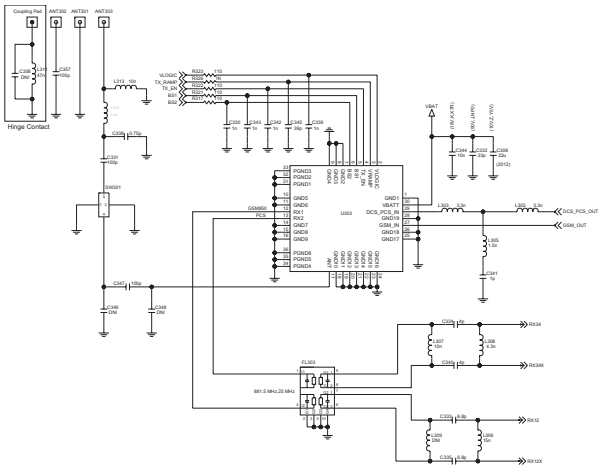


Figure 4.3.5

CONTROL LOGIC

EGSM Tx

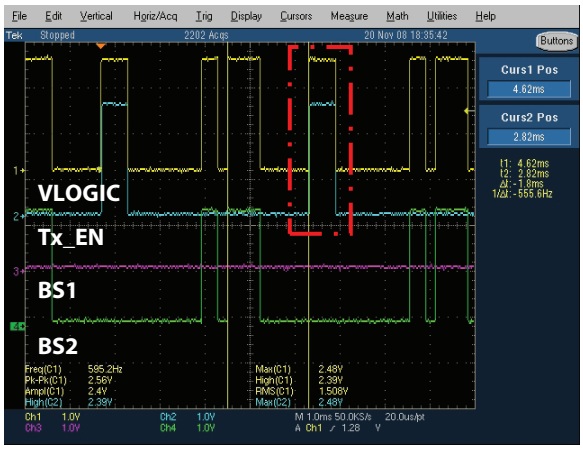
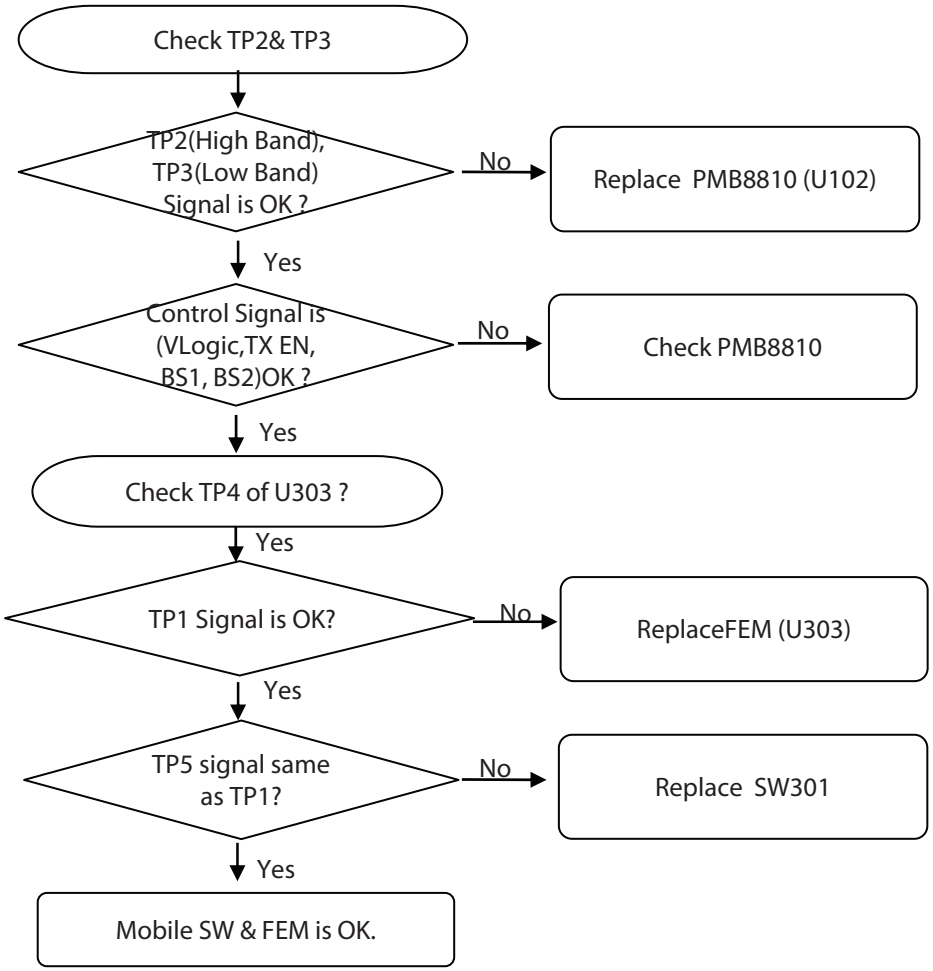


Figure 4.3.6

CHECKING FLOW



GSM 850 Tx

Mode	VLOGIC	Input Control Bits		
		Tx_EN	BS1	BS2
STANDBY	0	X[1]	X[1]	X[1]
Rx1	1	0	0	1
Rx2	1	0	1	1
LB_Tx	1	1	0	X[1]
HB_Tx	1	1	1	X[1]

4.4 Power On Trouble

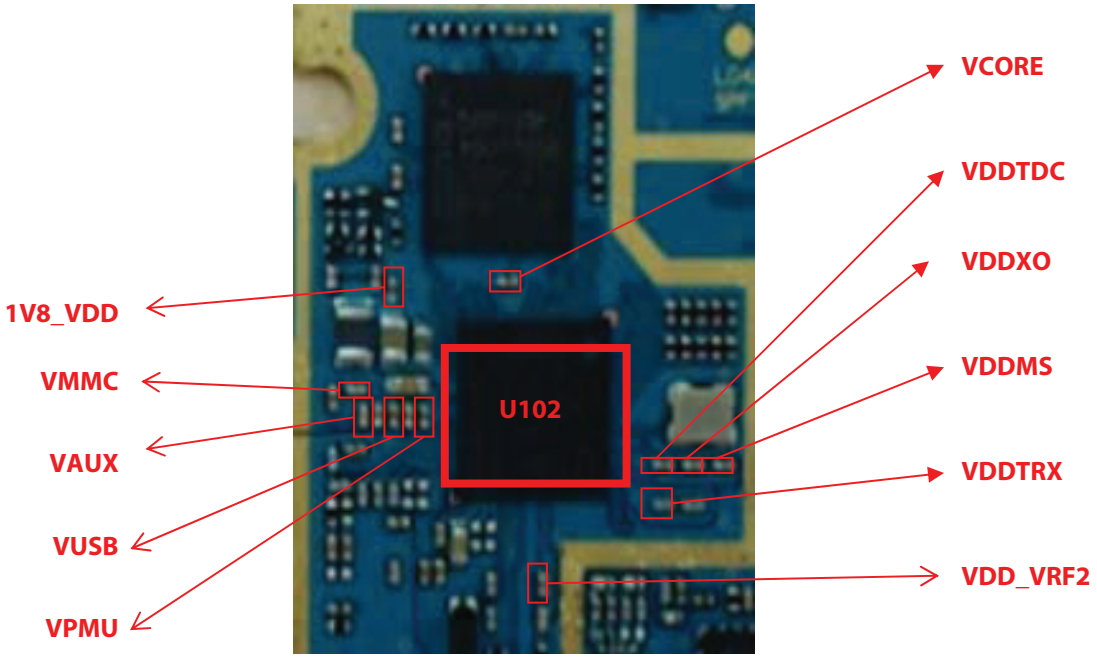


Figure 4.4.1

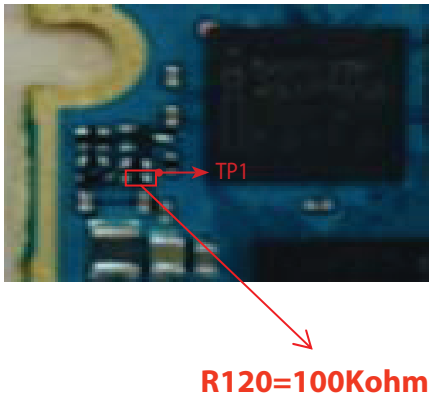


Figure 4.4.2

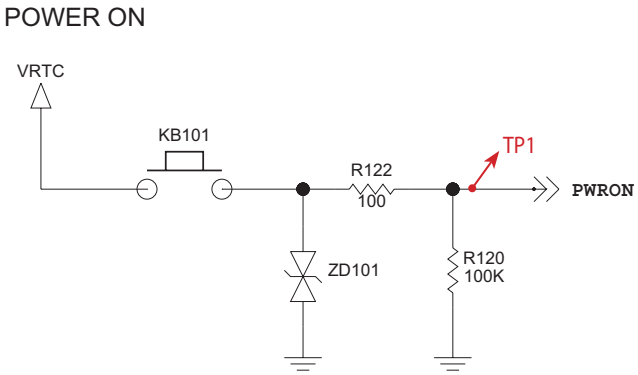


Figure 4.4.3 Remote power on

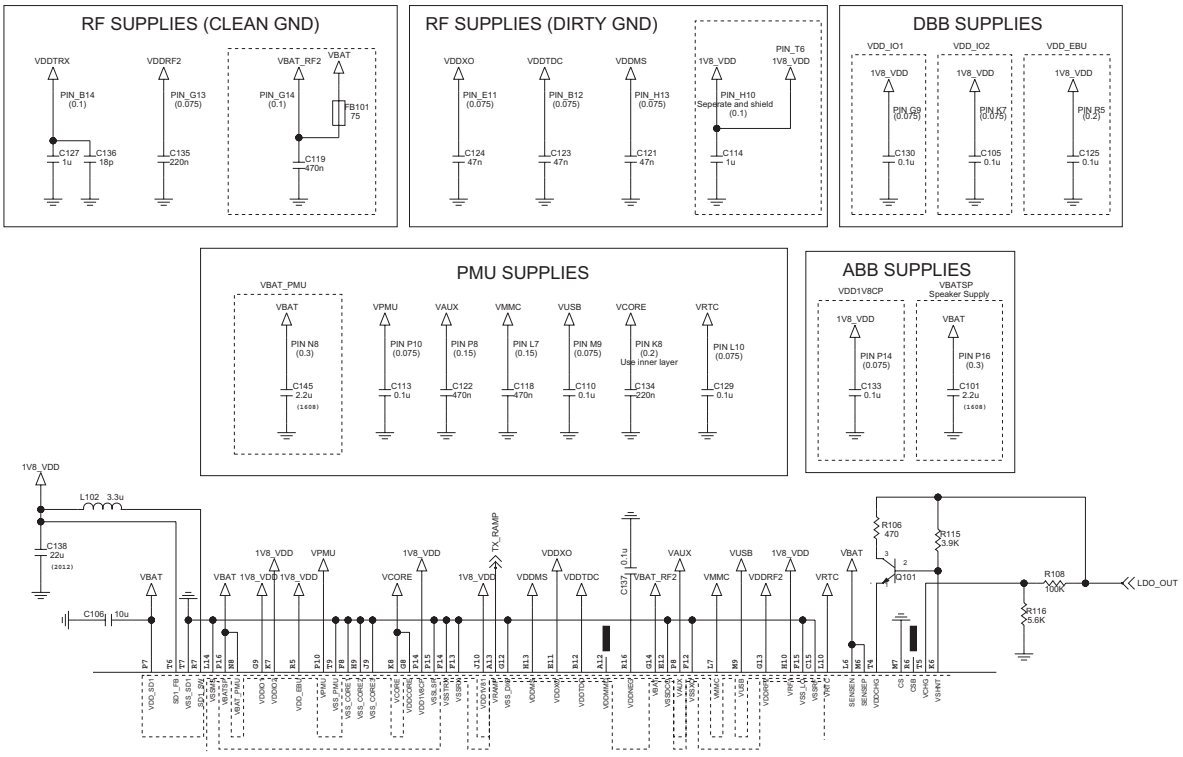


Figure 4.4.4 power block of LG420G

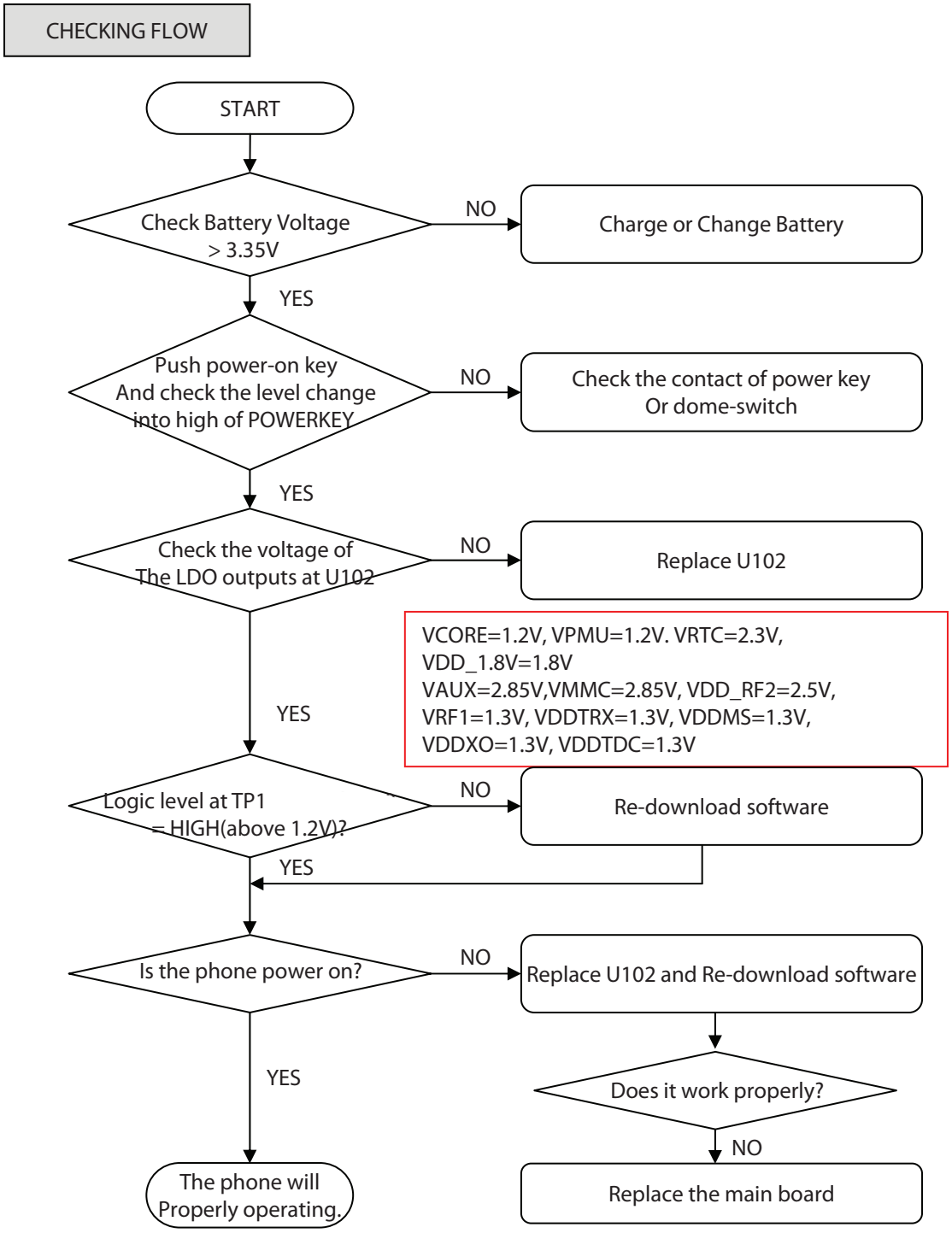


Figure 4.4.5

4.5 Charging Trouble

TEST POINT

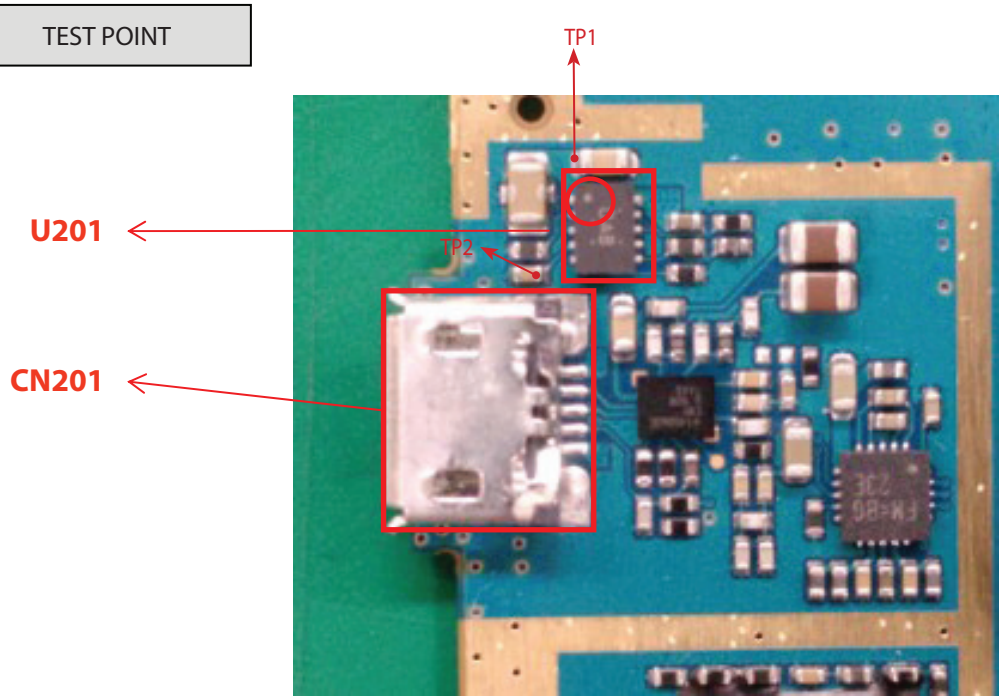


Figure 4.5.1

CIRCUIT

CHARGING IC

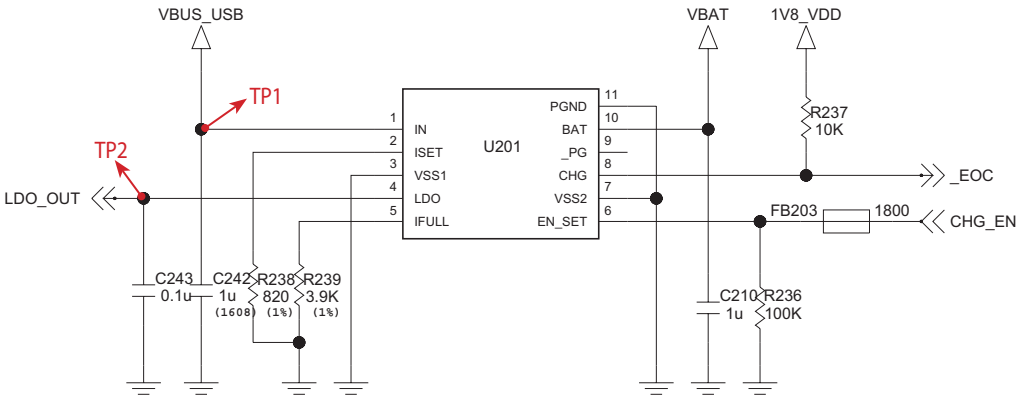


Figure 4.5.2

CHECKING FLOW

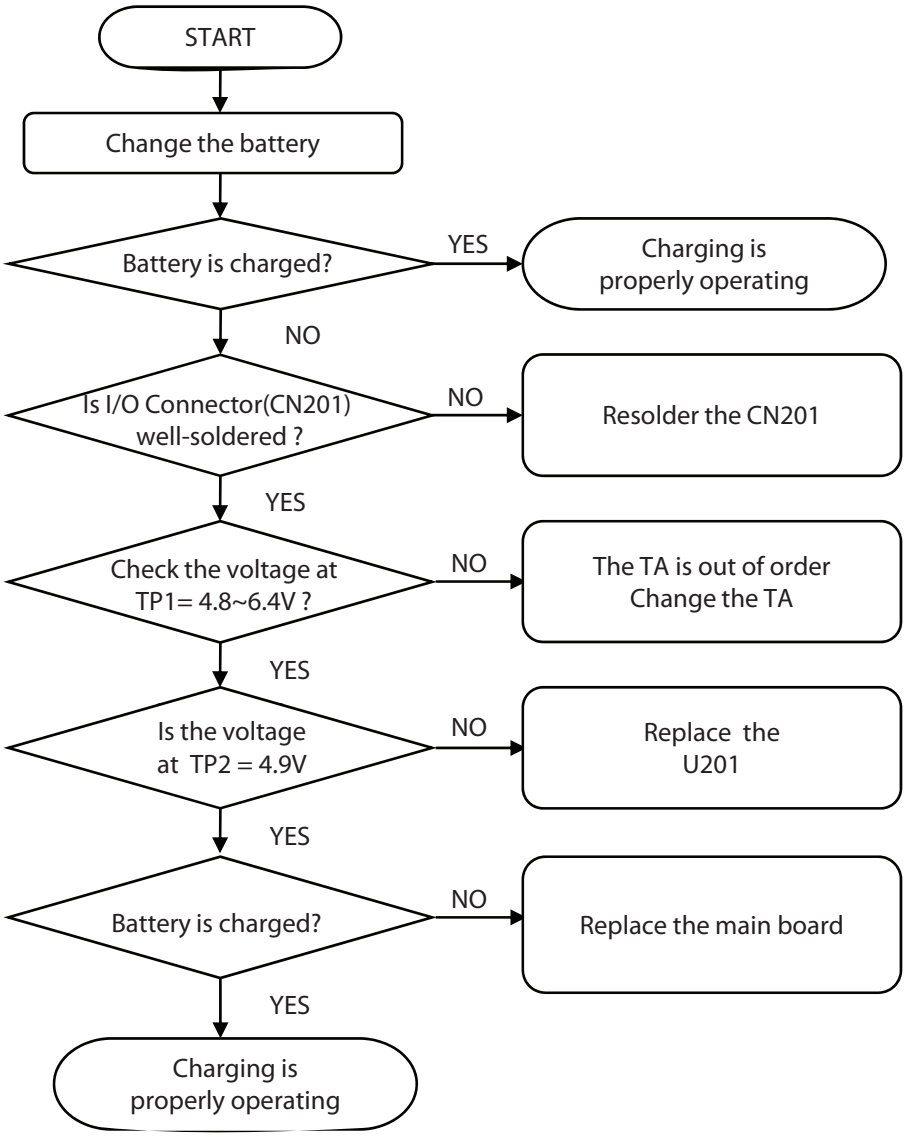


Figure 4.5.3

4.6 Vibrator Trouble

TEST POINT

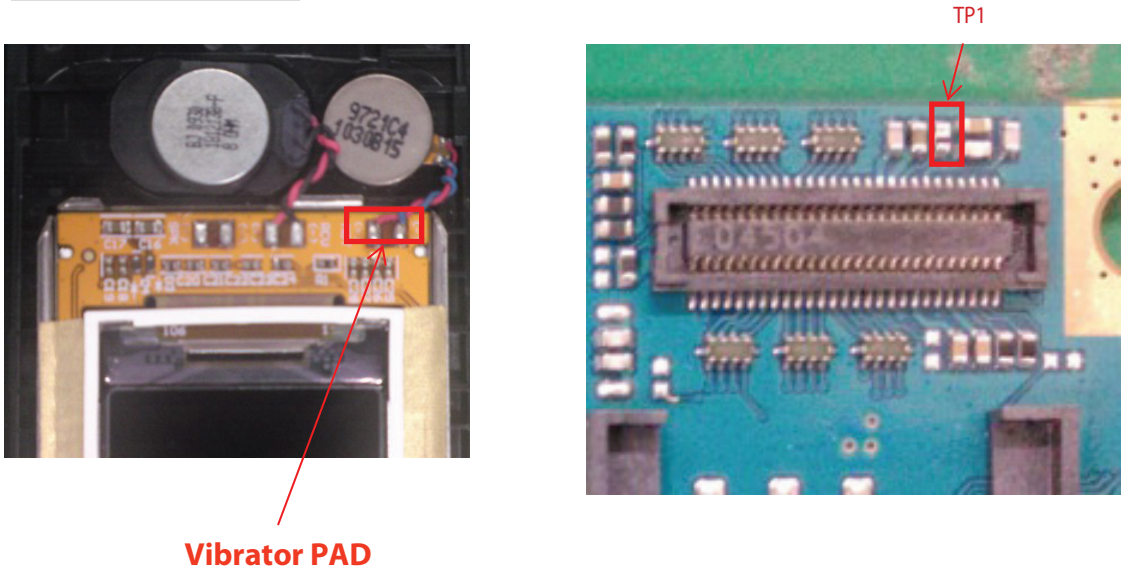


Figure 4.6.1

CIRCUIT

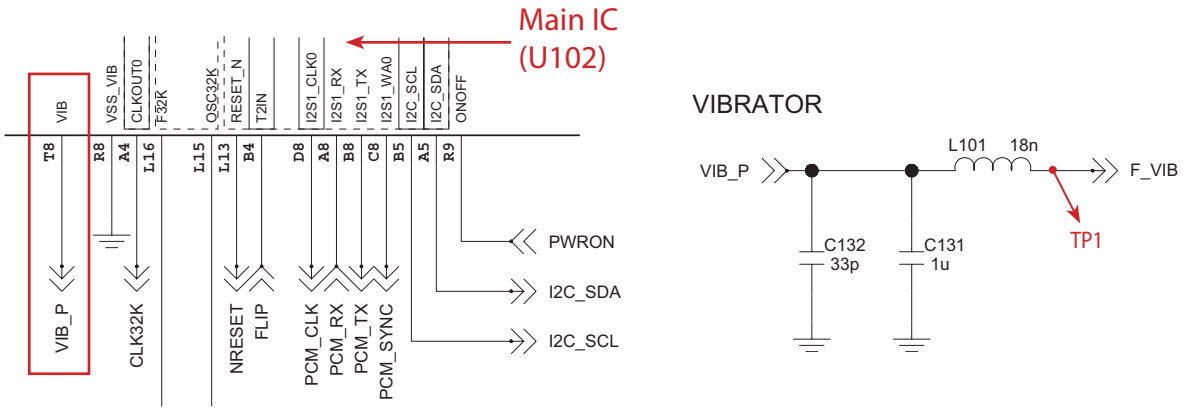


Figure 4.6.2

CHECKING FLOW

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

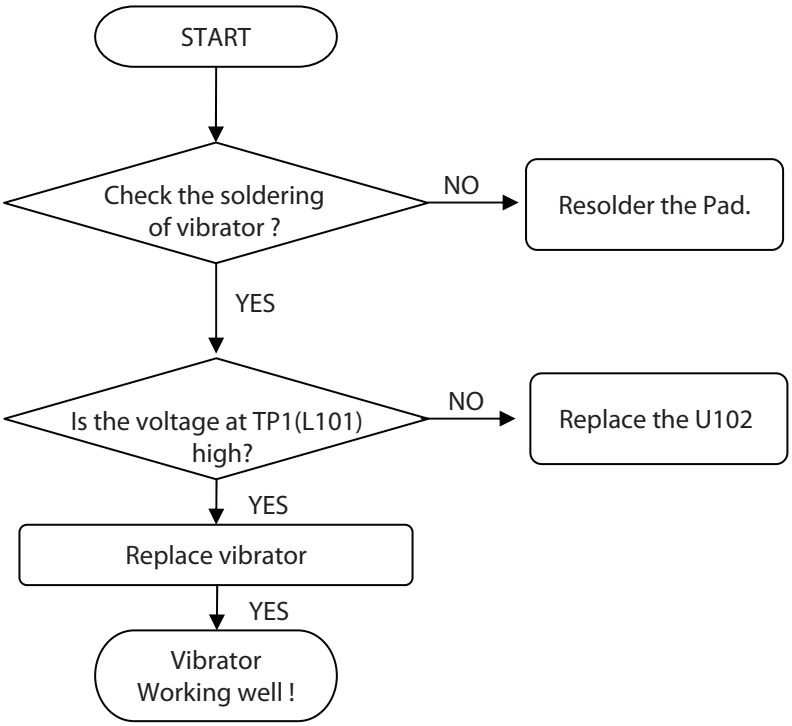


Figure 4.6.3

4.7 LCD Trouble

TEST POINT

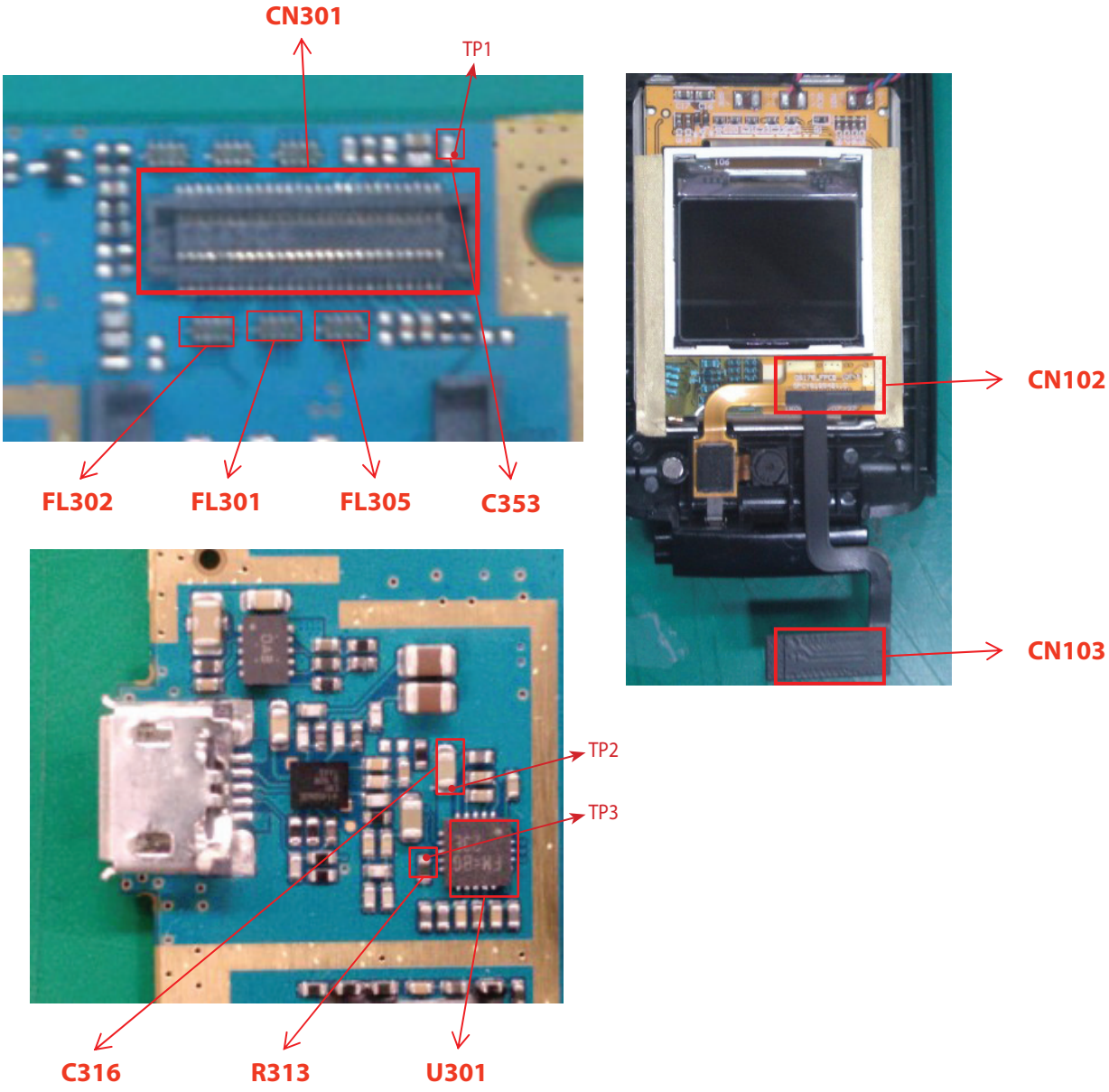


Figure 4.7.1

CIRCUIT

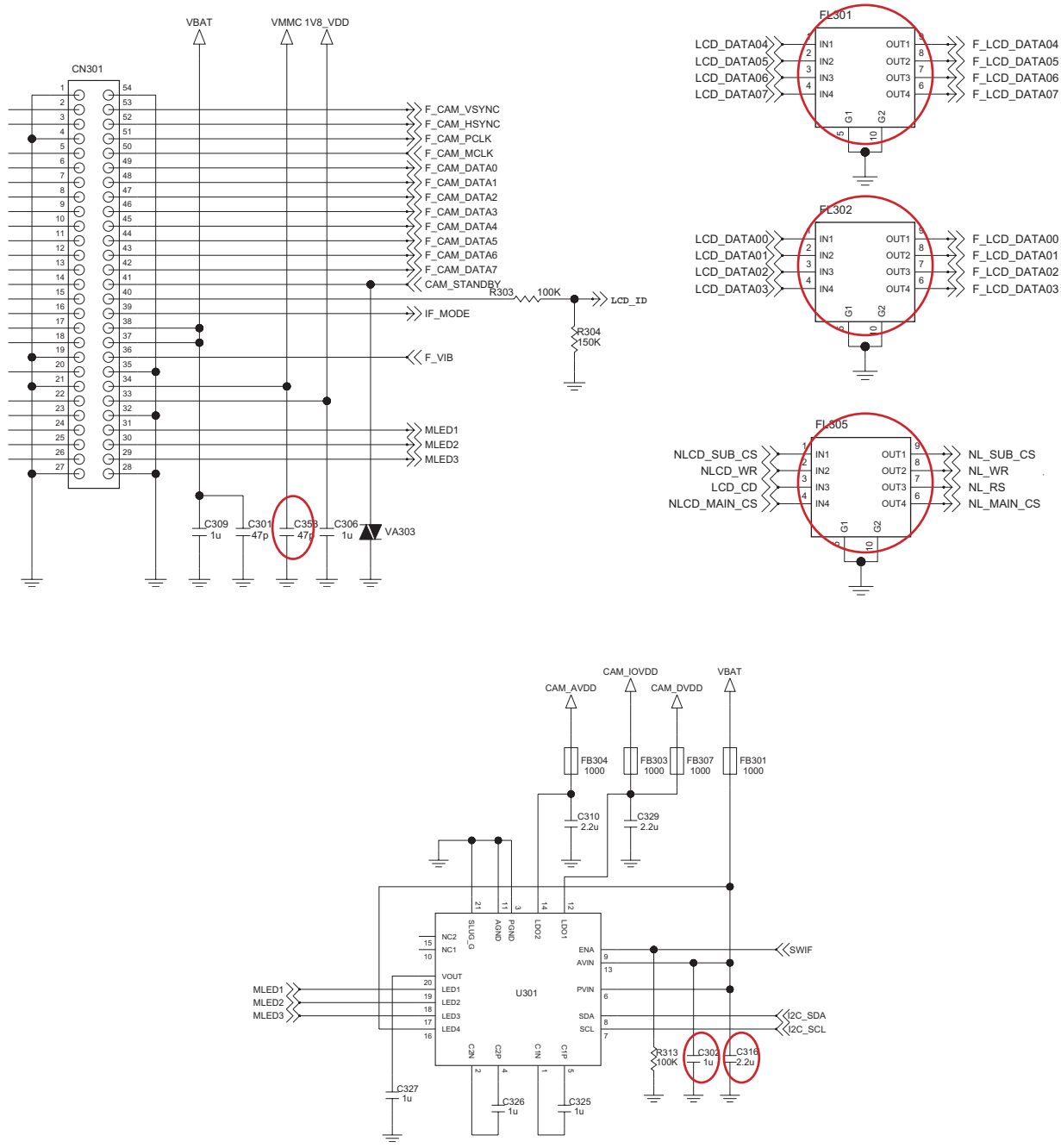
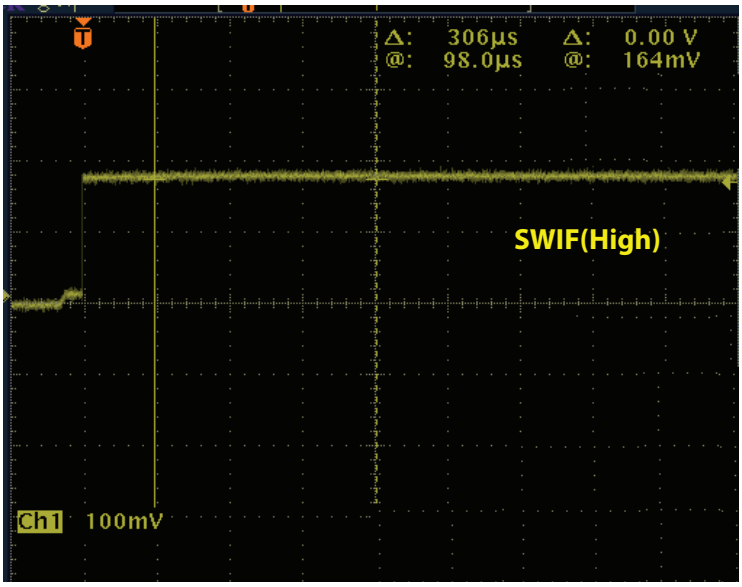
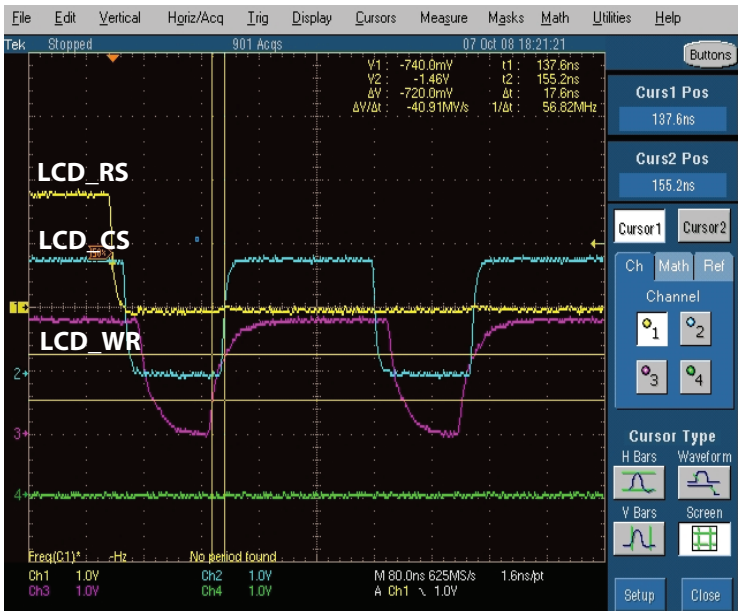


Figure 4.7.2

Waveform



Graph 4.7.1. LCD Backlight Control Signal Waveform



Graph 4.7.2. LCD Data Waveform

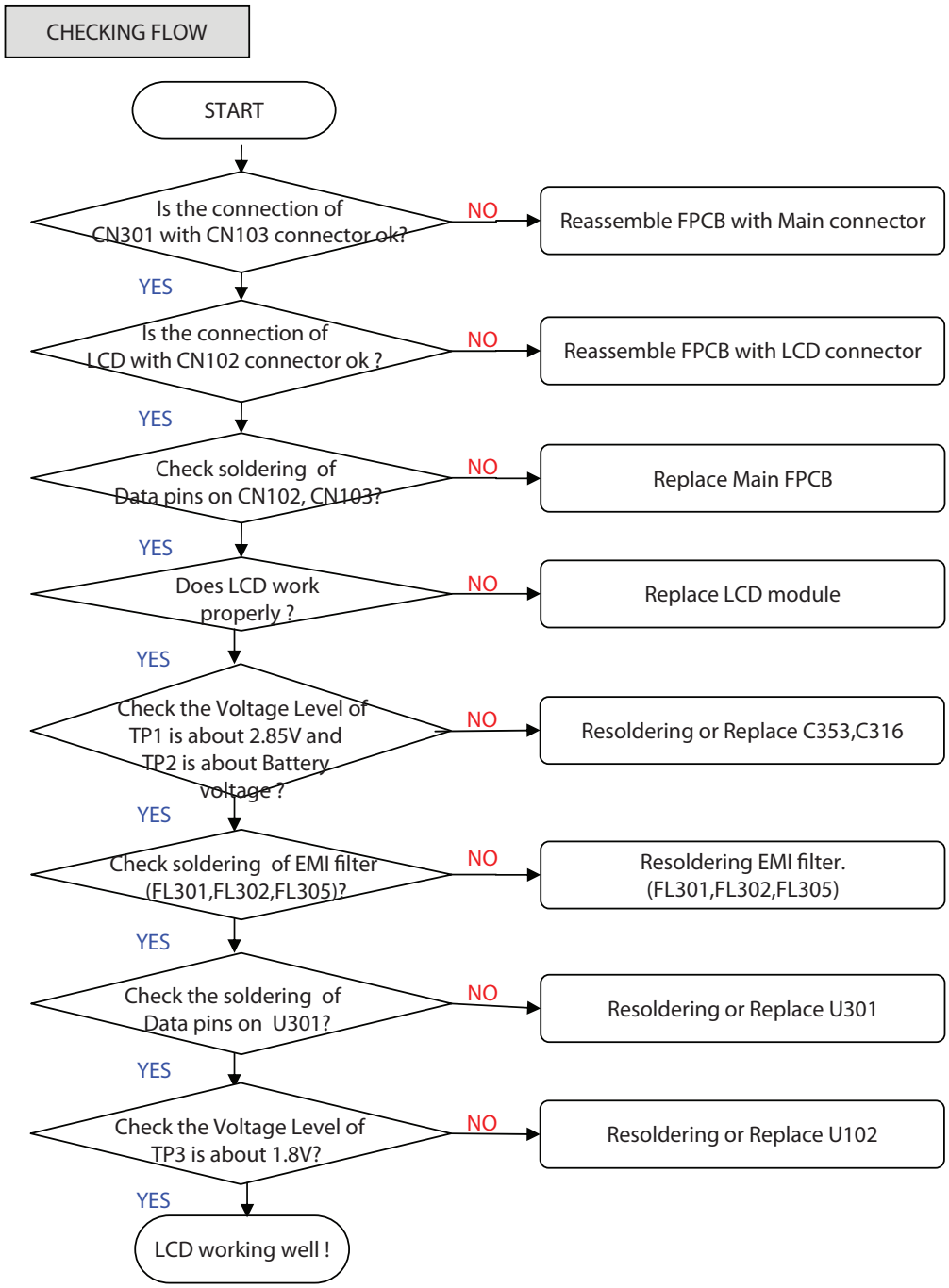


Figure 4.7.3

4.8 Camera Trouble

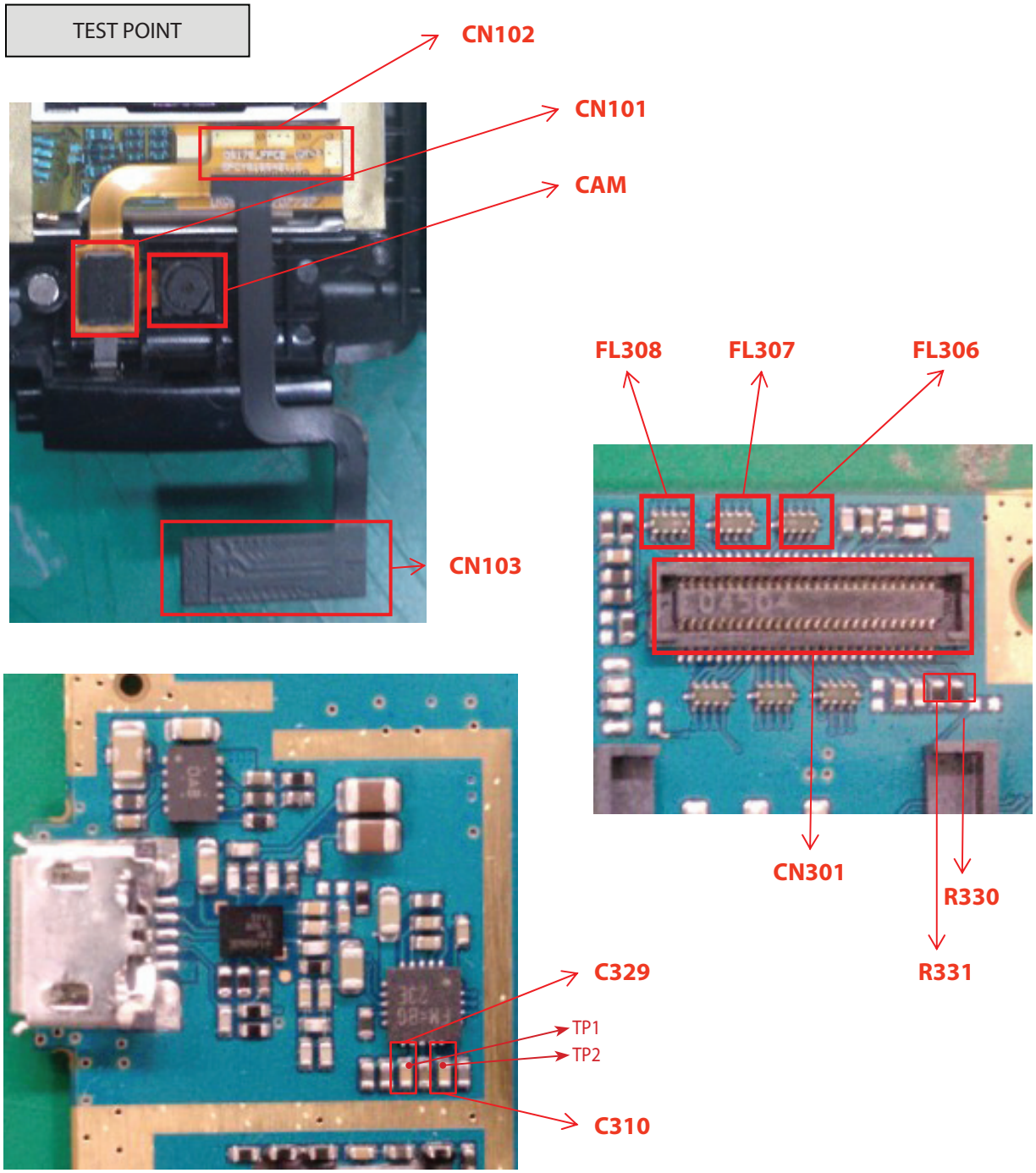


Figure 4.8.1

CIRCUIT

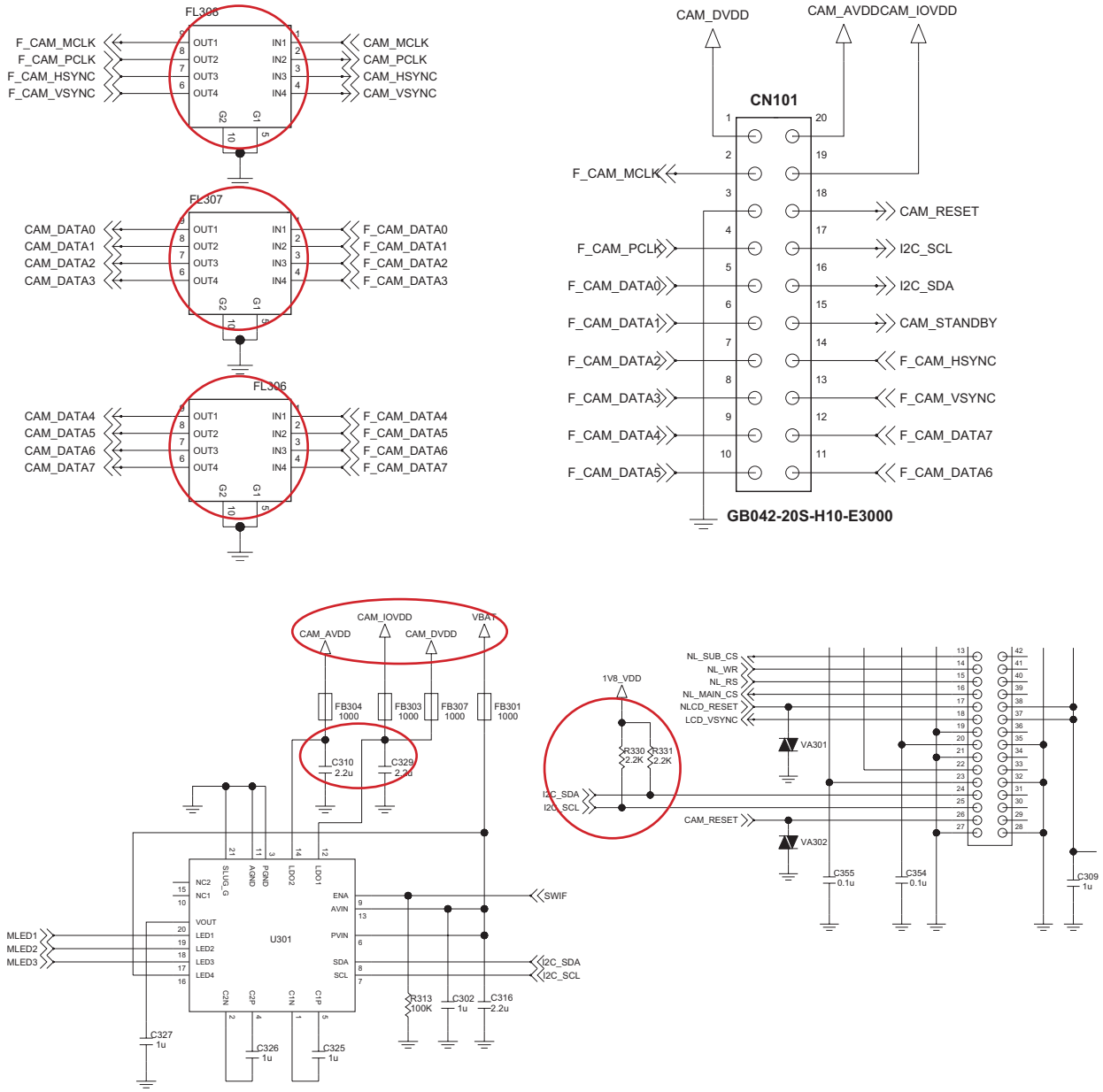
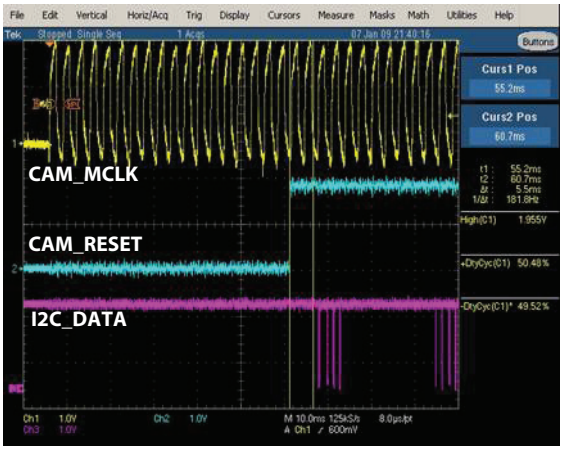
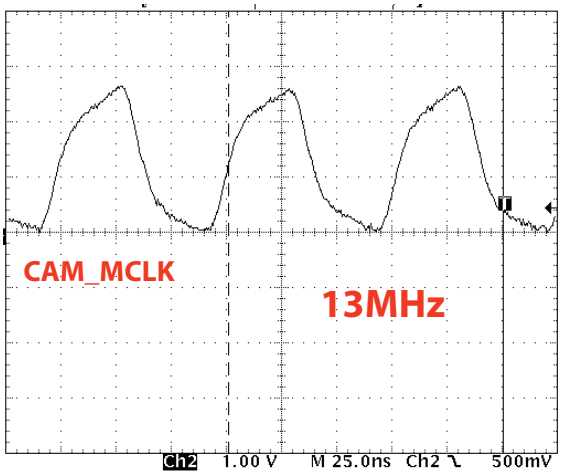


Figure 4.8.2

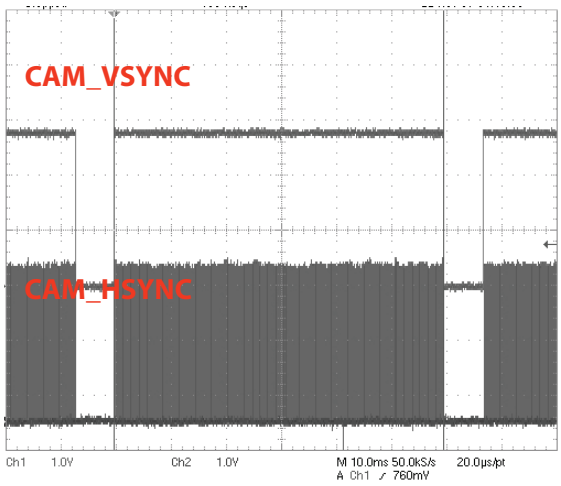
Waveform



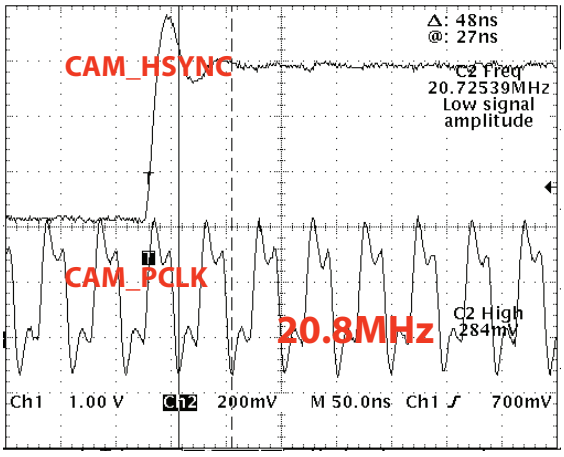
Graph 4.8.1. I2C Data Waveform



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

CHECKING FLOW

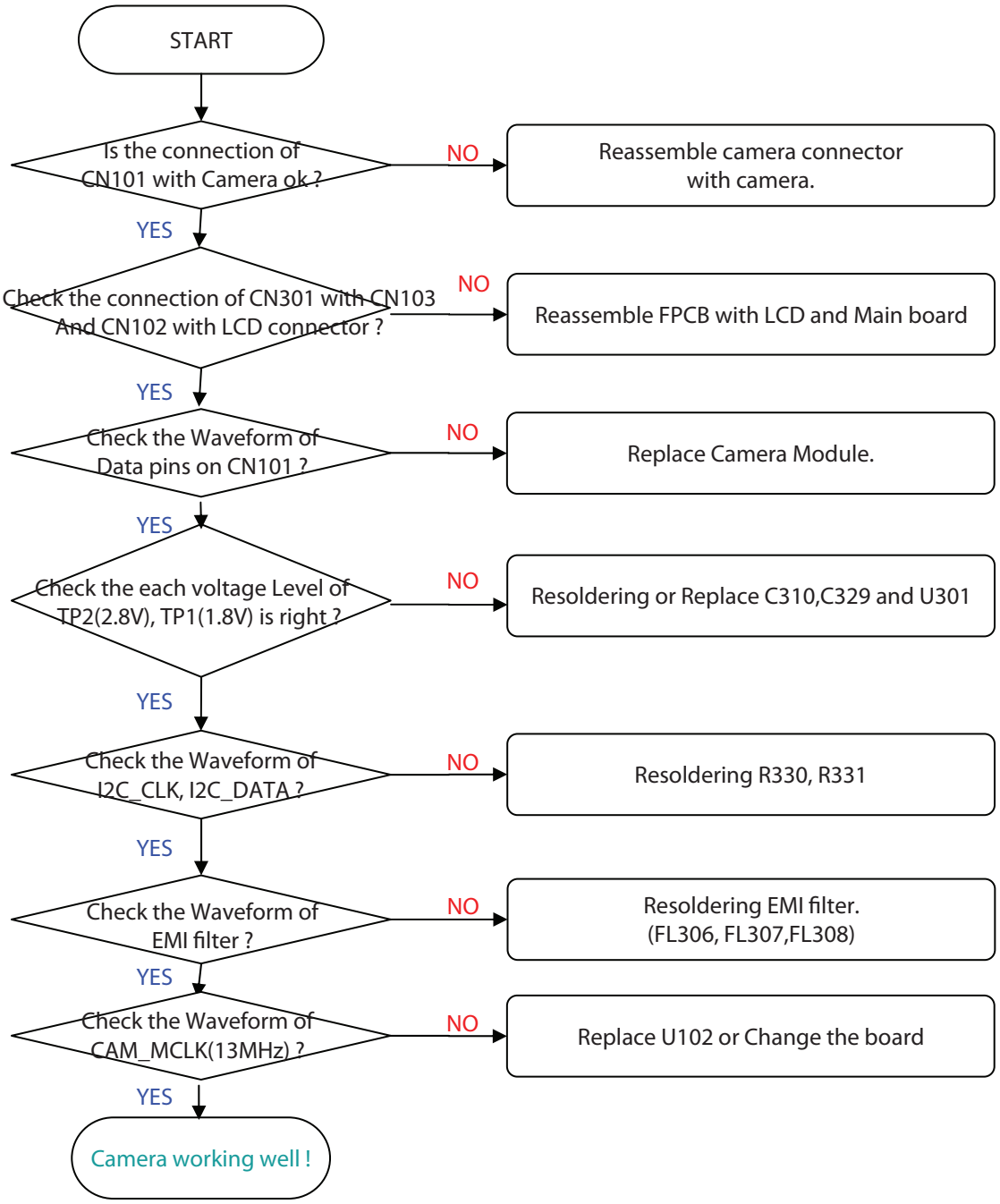
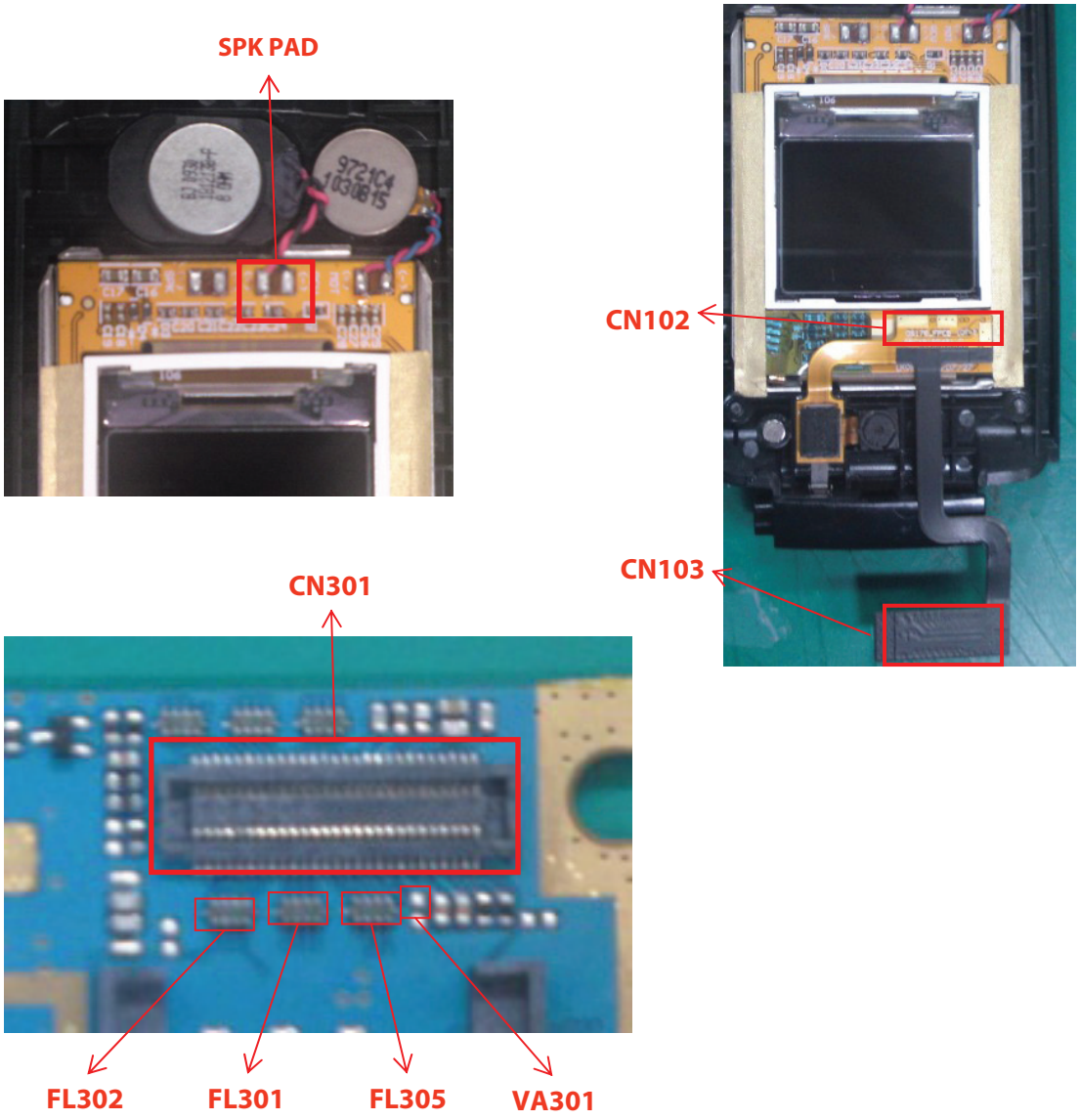


Figure 4.8.3.

4.9 Speaker and Receiver Trouble

TEST POINT



CHECKING FLOW

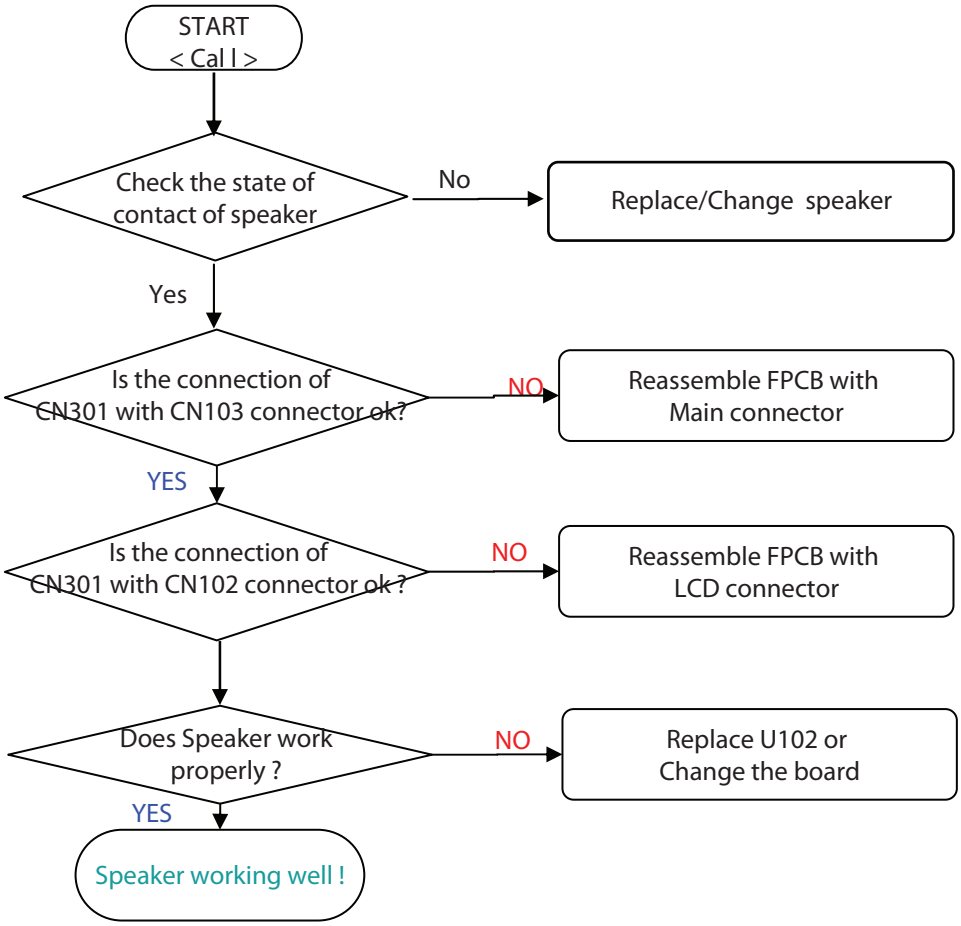


Figure 4.9.3

4.10 Earphone Trouble

TEST POINT

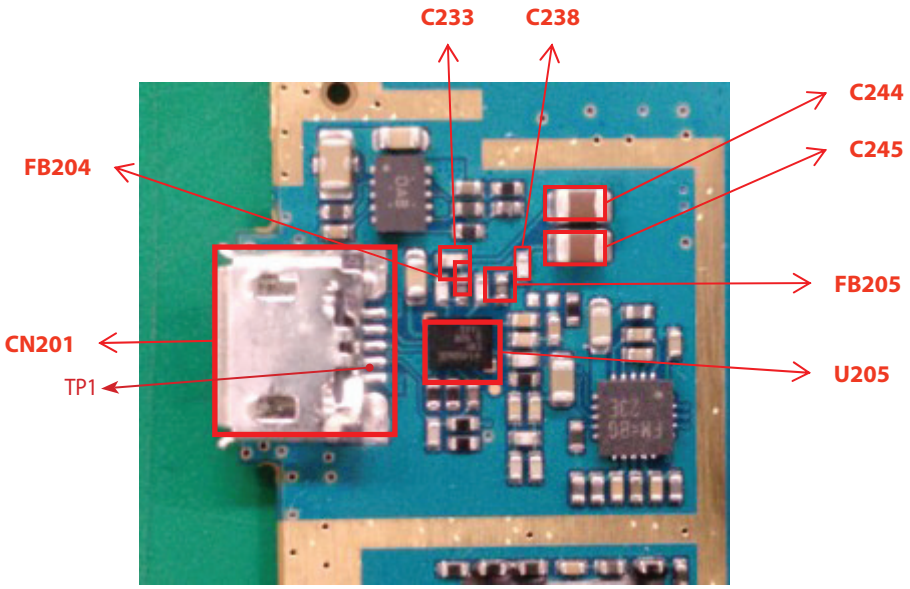


Figure 4.10.1

CIRCUIT

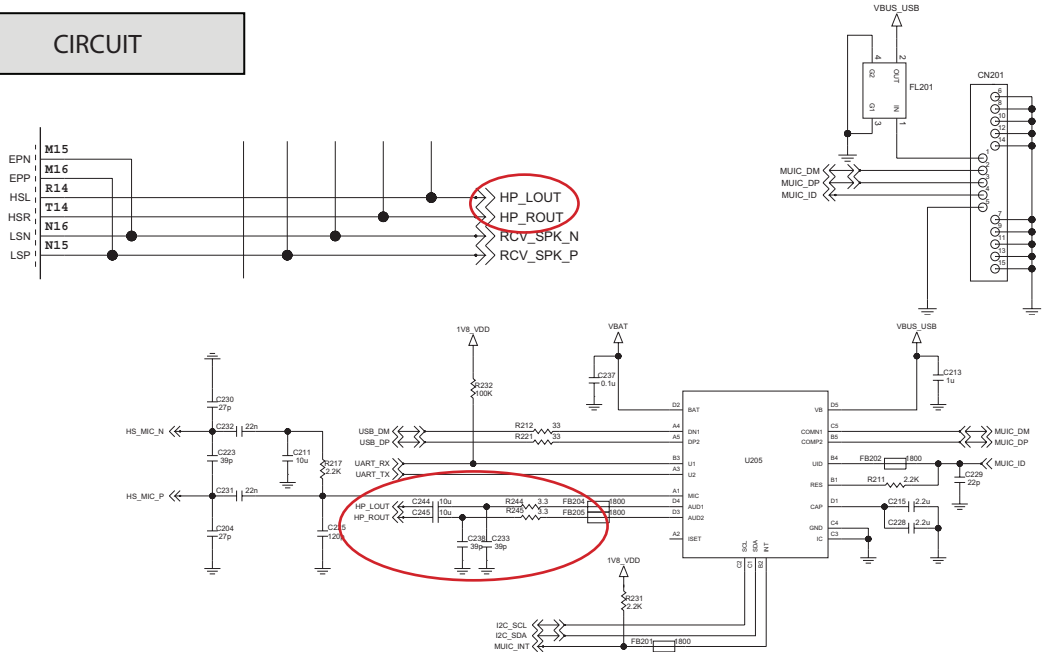


Figure 4.10.2

CHECKING FLOW

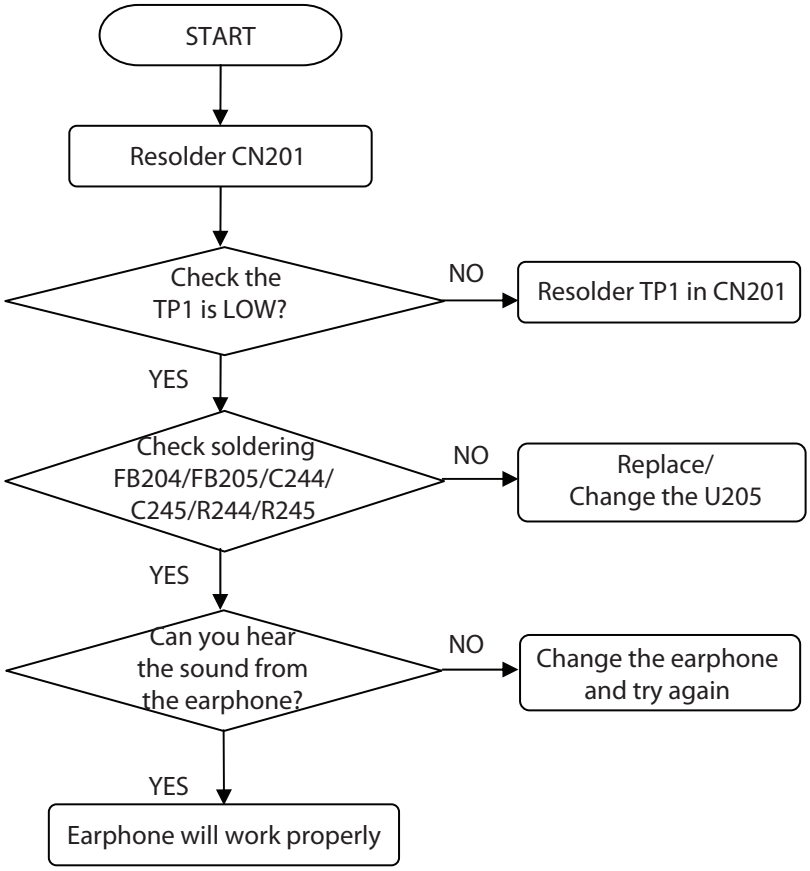


Figure 4.10.3

4.11 Microphone Trouble

TEST POINT

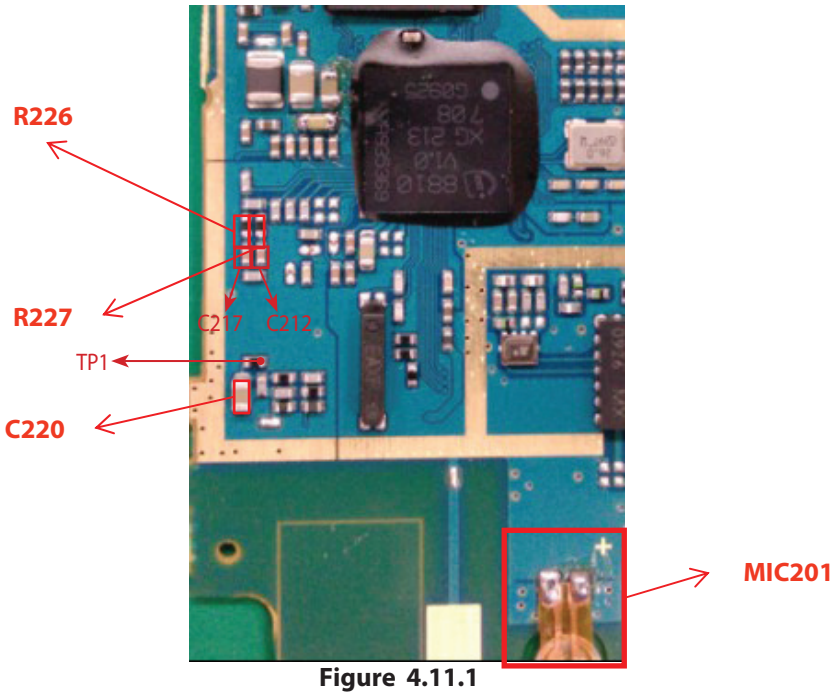


Figure 4.11.1

CIRCUIT

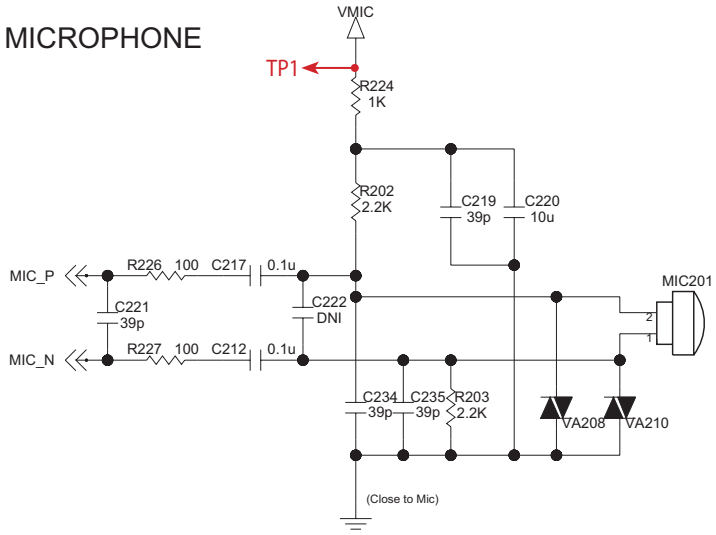


Figure 4.11.2

CHECKING FLOW

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

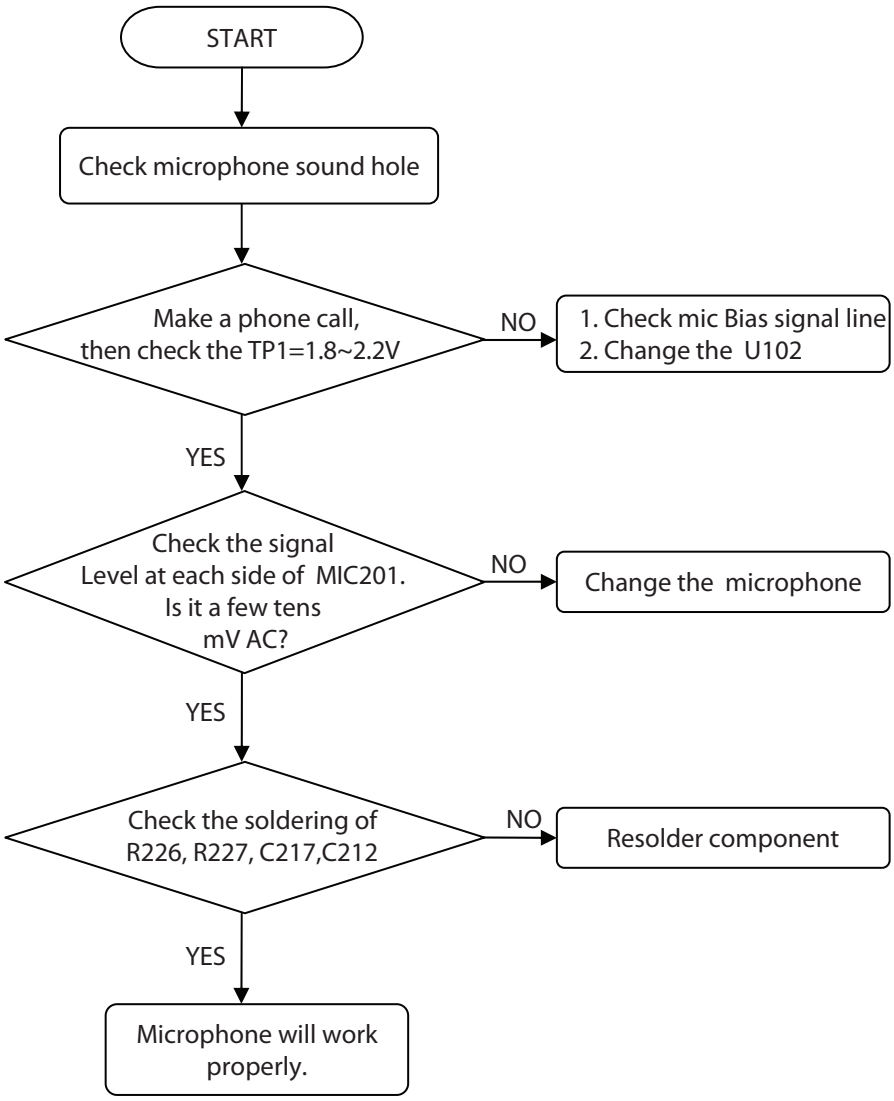


Figure 4.11.3

4.12 SIM Card Interface Trouble

TEST POINT

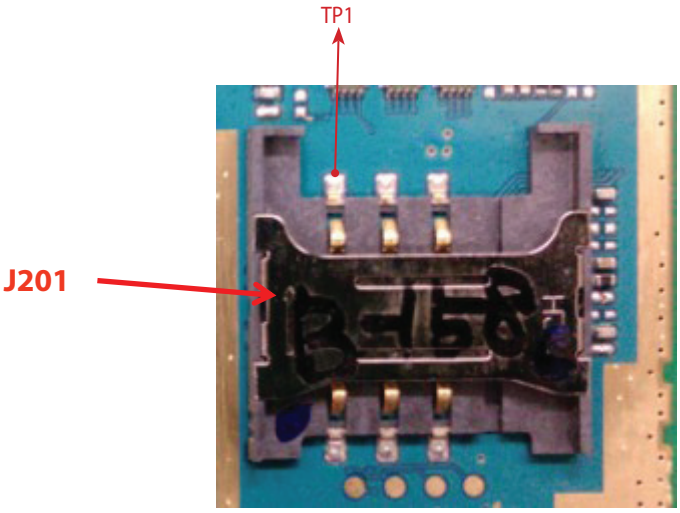


Figure 4.12.1

CIRCUIT

SIM_CONNECTOR

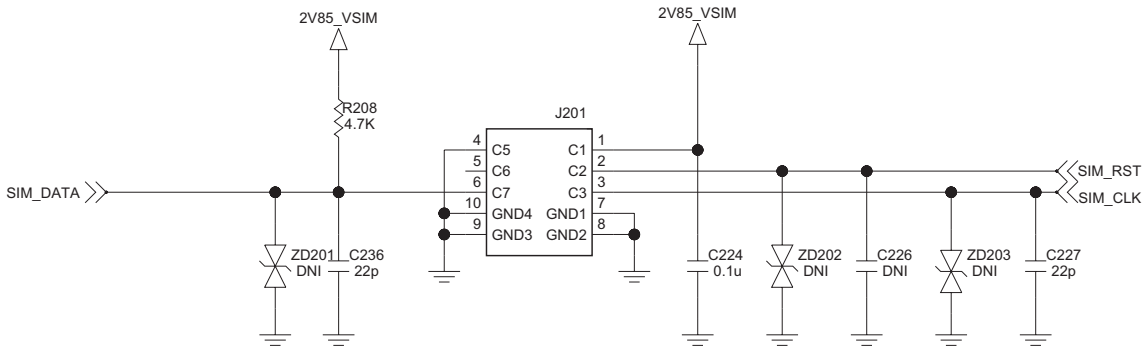


Figure 4.12.2

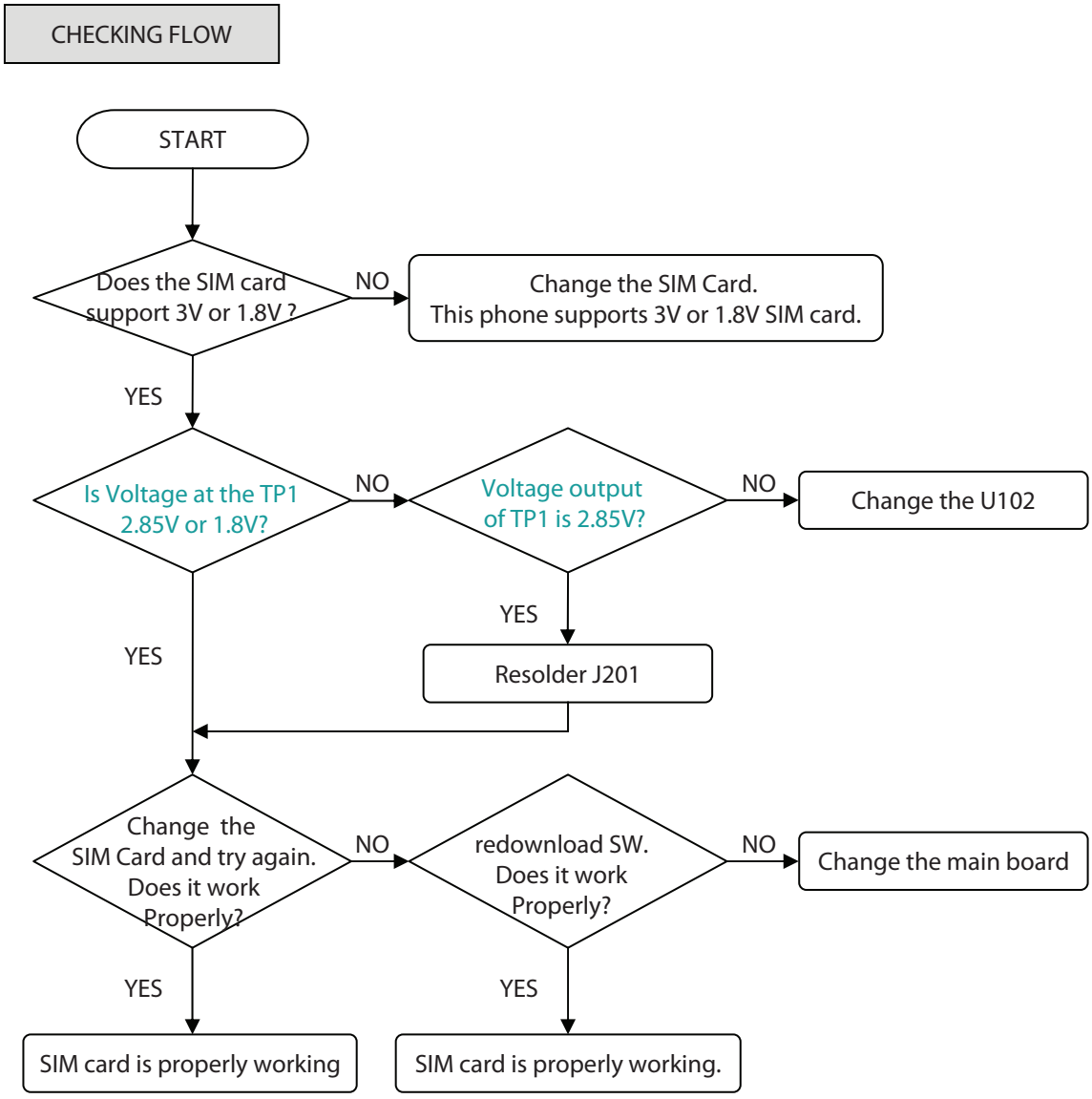


Figure 4.12.3

4.13 KEY backlight Trouble

TEST POINT

Main - TOP

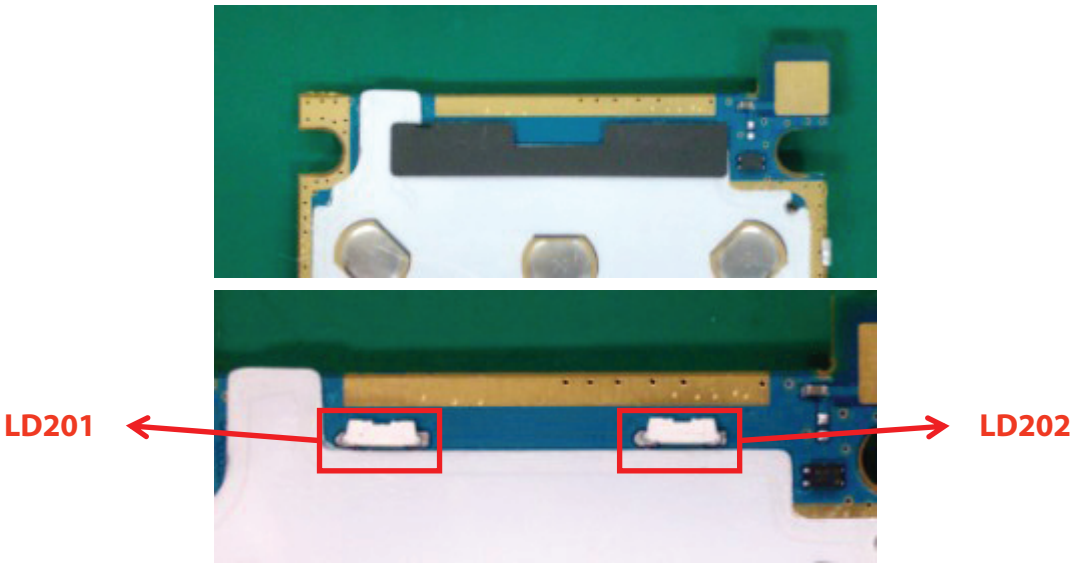


Figure 4.13.1

Main -BOTTOM

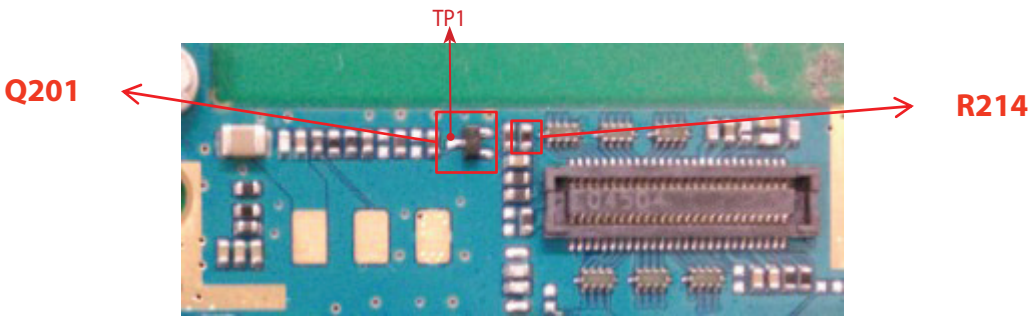


Figure 4.13.2

CIRCUIT

[Key backlight LED interface]

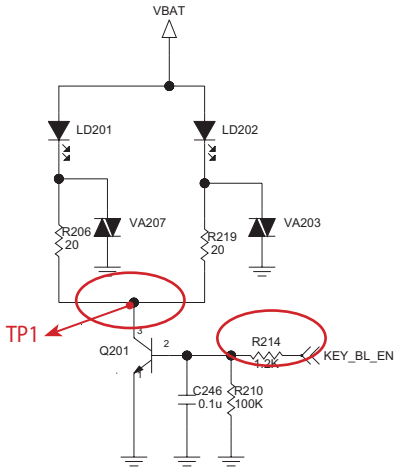


Figure_4.13.3

CHECKING FLOW

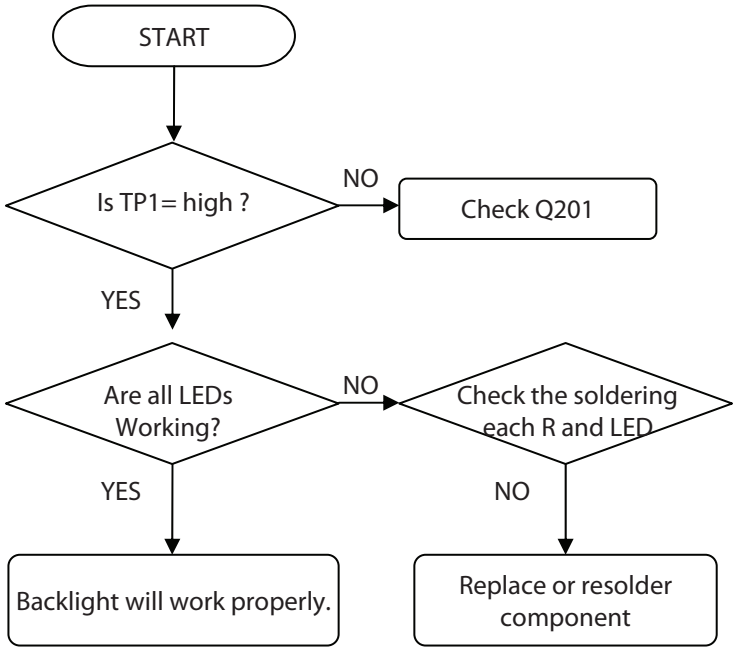


Figure 4.13.4

4.14 Bluetooth Trouble

TEST POINT

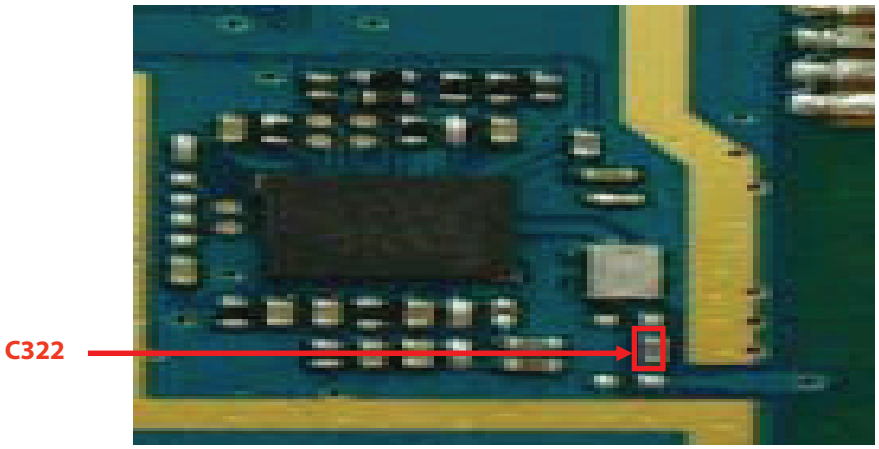


Figure 4.14.1

CIRCUIT

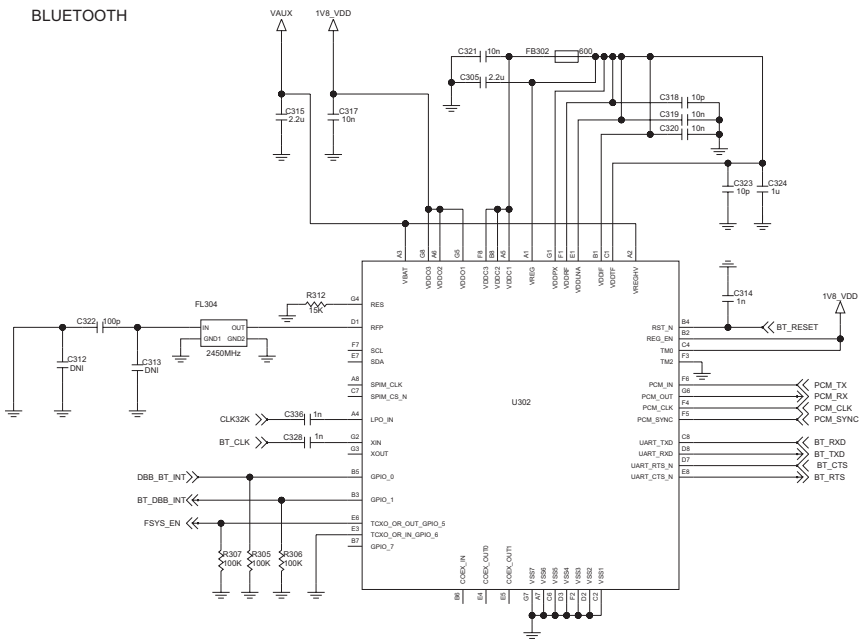


Figure 4.14.2

CHECKING FLOW

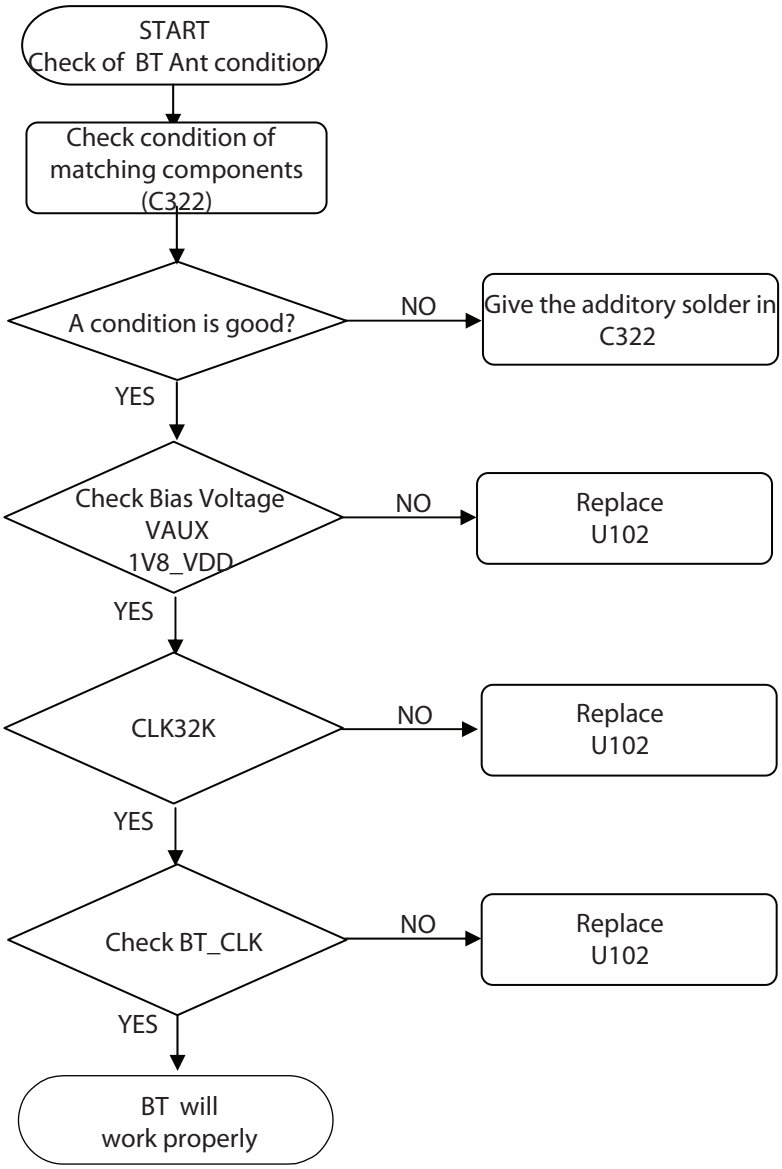


Figure 4.14.3

4.15 Folder on/off Trouble

TEST POINT

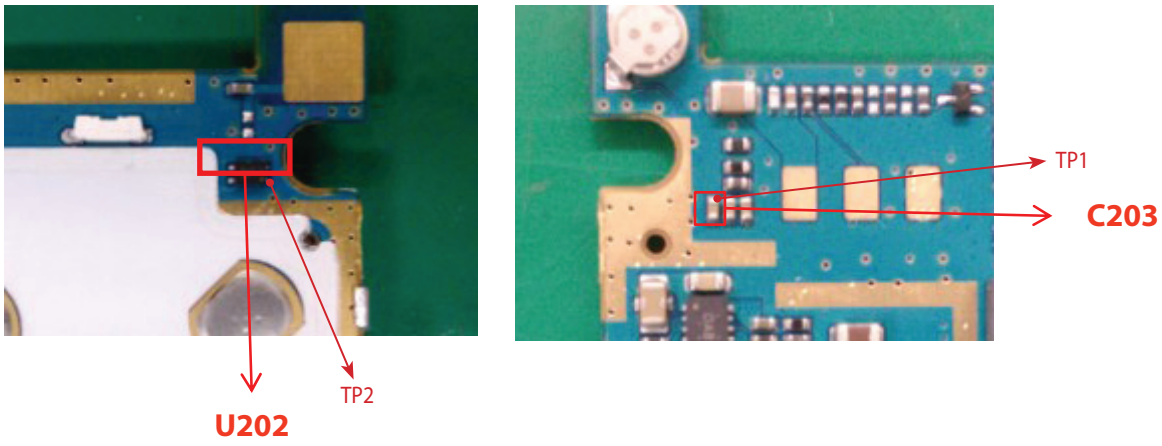


Figure 4.15.1

CIRCUIT

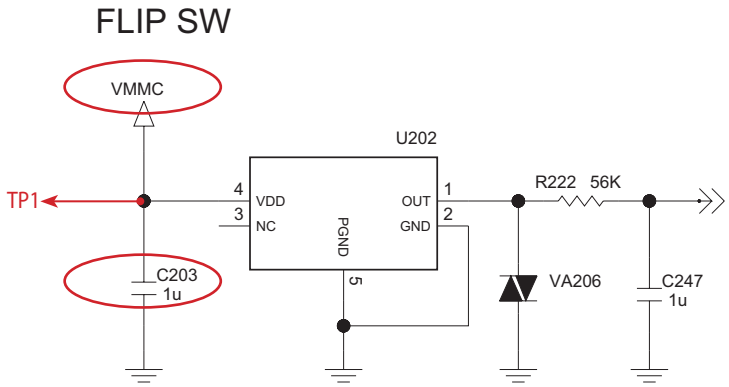


Figure 4.15.2

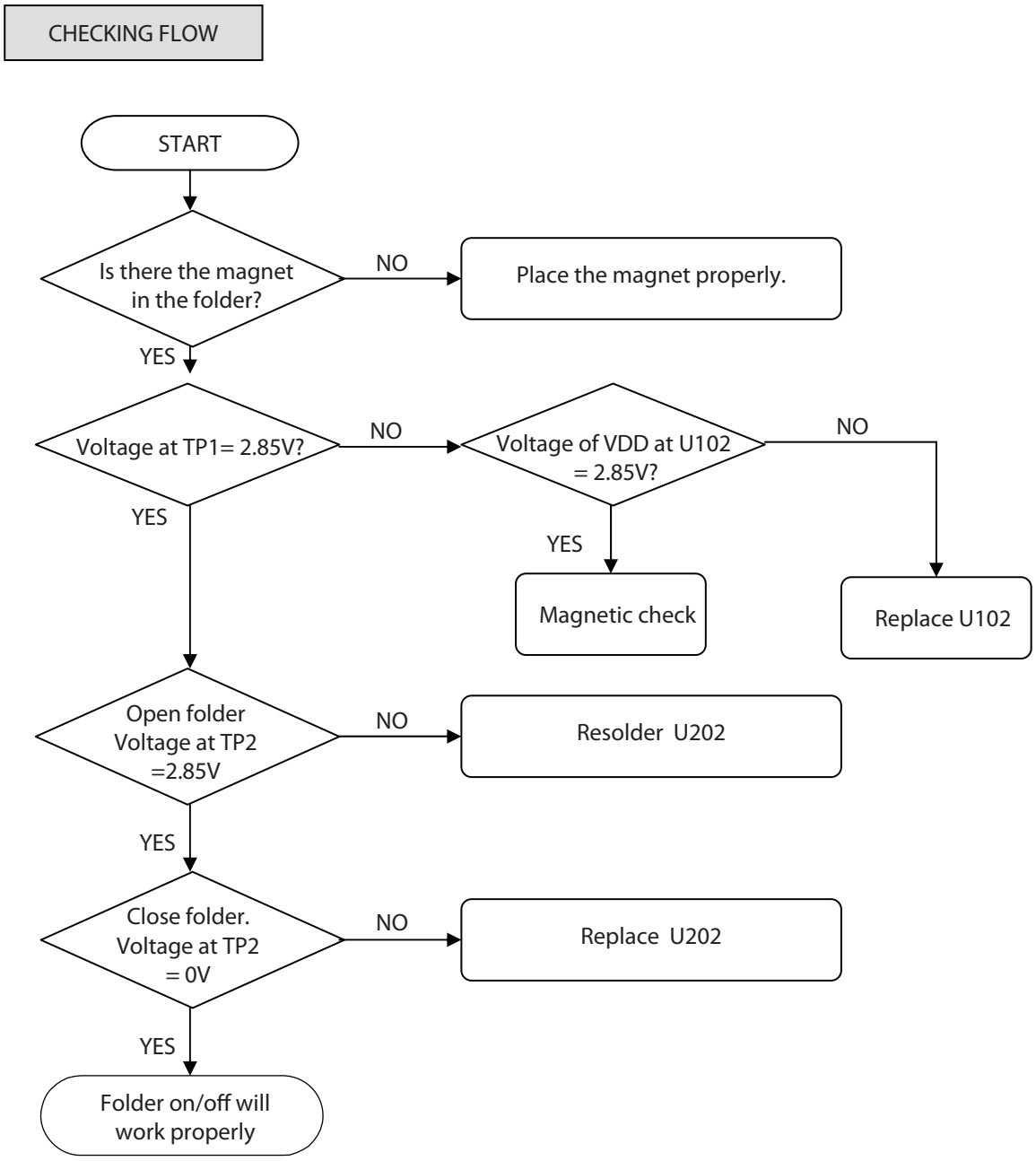


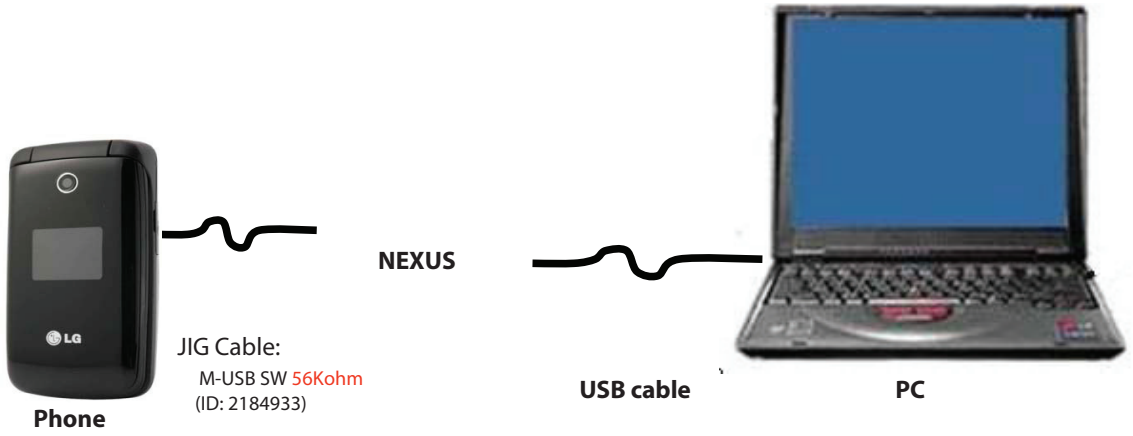
Figure 4.15.3

5. DOWNLOAD

5.1 S/W Download

Preparation

- Target terminal
- Nexus2 or Nexus3 with JIG Cable (M-USB SW 56Kohm)
- PC supporting USB with Windows 2000 and Windows XP.



• **Nexus 3 Setting method**

✓ **USB**

M18: 3G_SP
VCHAR: 5.0V
USB DOWNLOAD
REMOTE PWR: 0.0V

CABLE:
M-USB SW 56Kohm
(ID: 2184933)

• **Nexus 2 Setting Method**

✓ **USB** ☐: **Switch On**

USB	HIGH	**DC**
SERIAL	**LOW**	BATT

5.0V / M0 mode

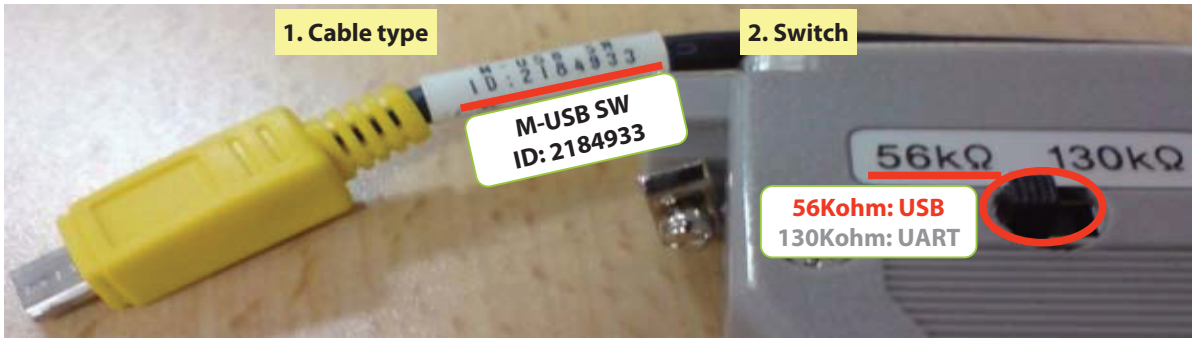
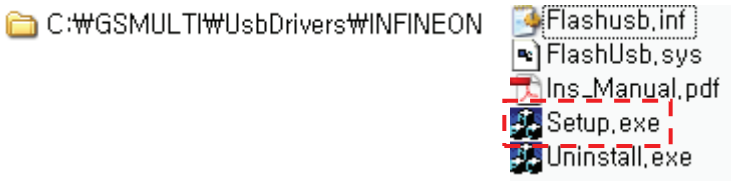


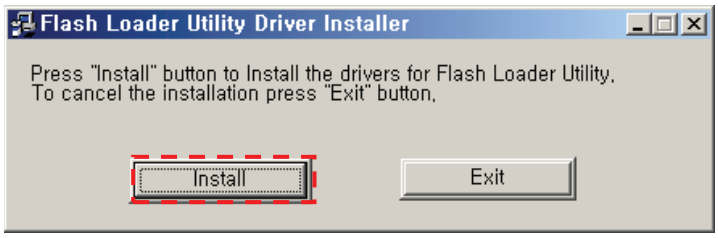
Figure 5.1. S/W download & upgrade setup

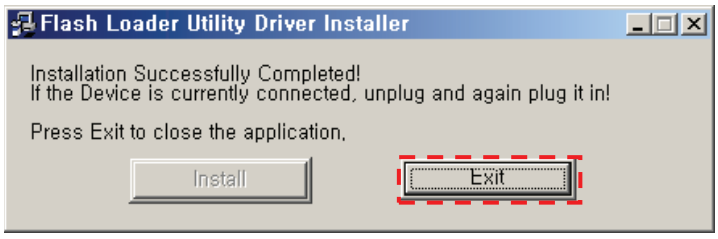
5.2 Download program user guide

5.2.1 USB Driver Installation to Downloading – INFINEON

a. Run “Setup.exe” for Installation Infineon usb driver.
b. Click Install button.
c. Click Exit button after installation completion.







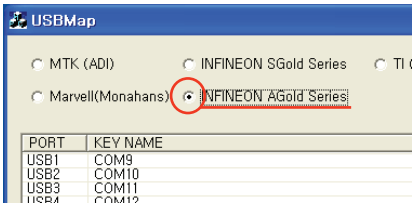
5.2.1 Device Detection

a. Connect cable within the device.
b. Windows will pop-up Found new hardware wizard and detect the new usb device.
c. Check “Install the software automatically (Recommended)” button, install driver for the device.
(or set specific location.)
d. In case of Infineon, “Flash Loader utility” will be installed..
e. If you have several usb ports for usb download, you have to repeat installation from No. a to No. c
for each the usb port.

Eg. In case of Infineon, “Flash Loader utility” will be installed as shown below.

5.2.3 USB Port Mapping

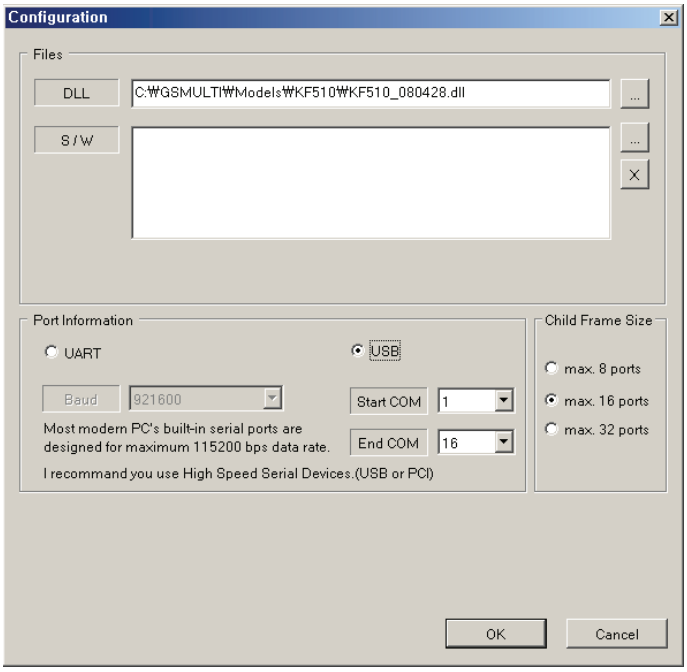
a. Setup_USB_PortMapping_04.zip
b. Run USB Map Program and check solution, click mapping start.
c. Connect the usb or nexus cable with the device in order of port number.
d. If you have the disable port, click “SKIP” button.
e. After mapping is completed, click “Save & Exit” button.



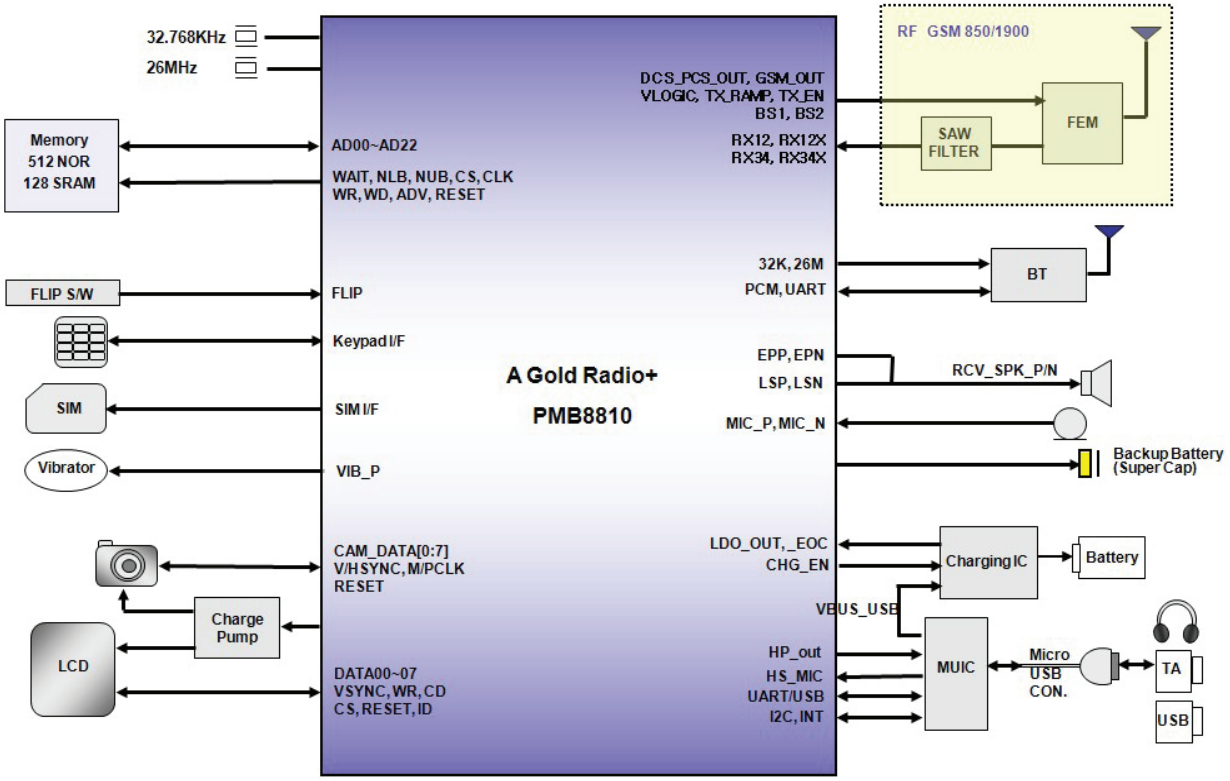
Connection in 1st port → **Connection in 2nd port** → **Skip 3rd port**

5.2.4 Configuration to Download

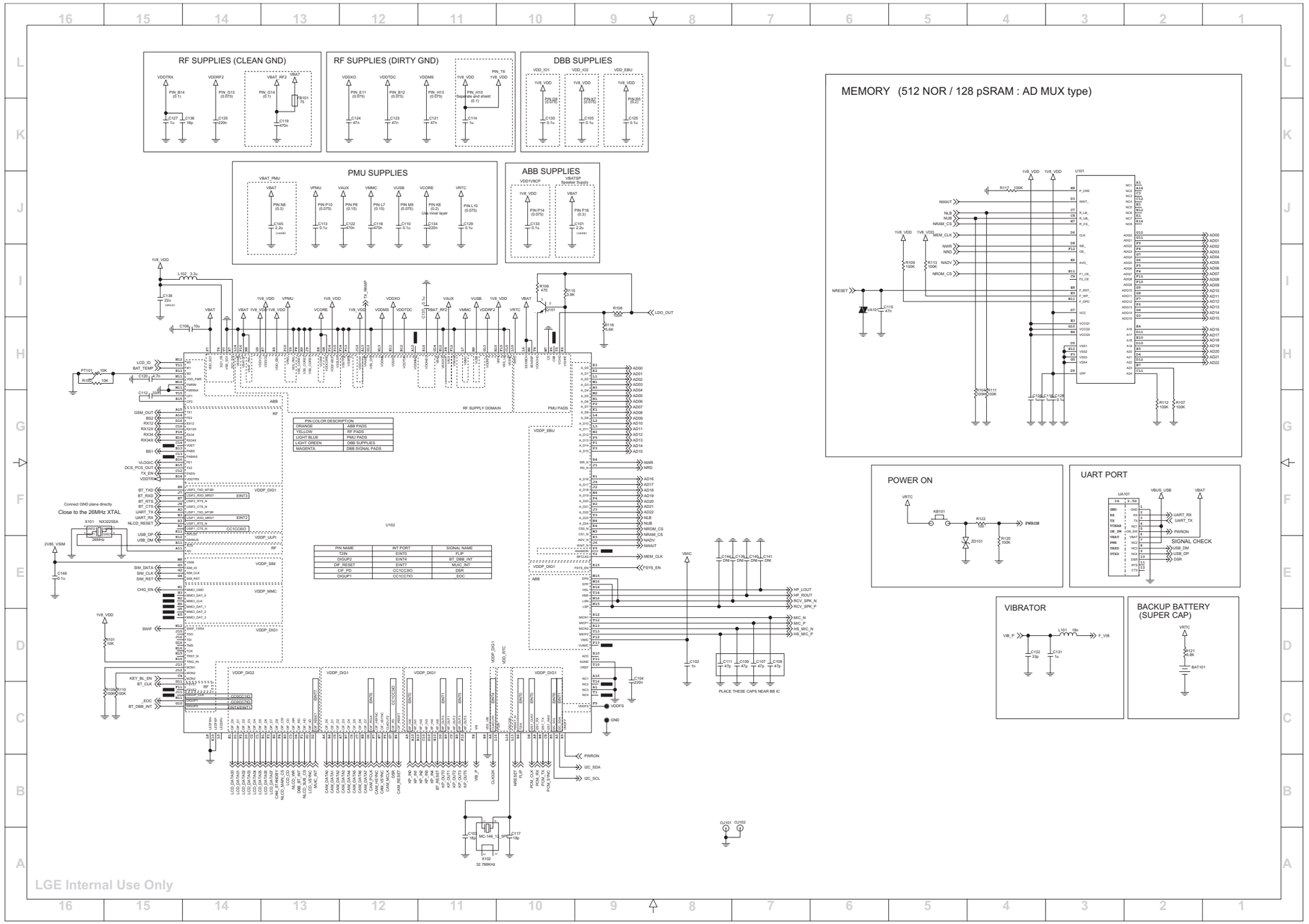
a. Run GSMULTI after version 3.0.
b. Select “Model DLL” file .(LG420G.dll)
c. LG420G is supported usb download, USB button will be appeared.



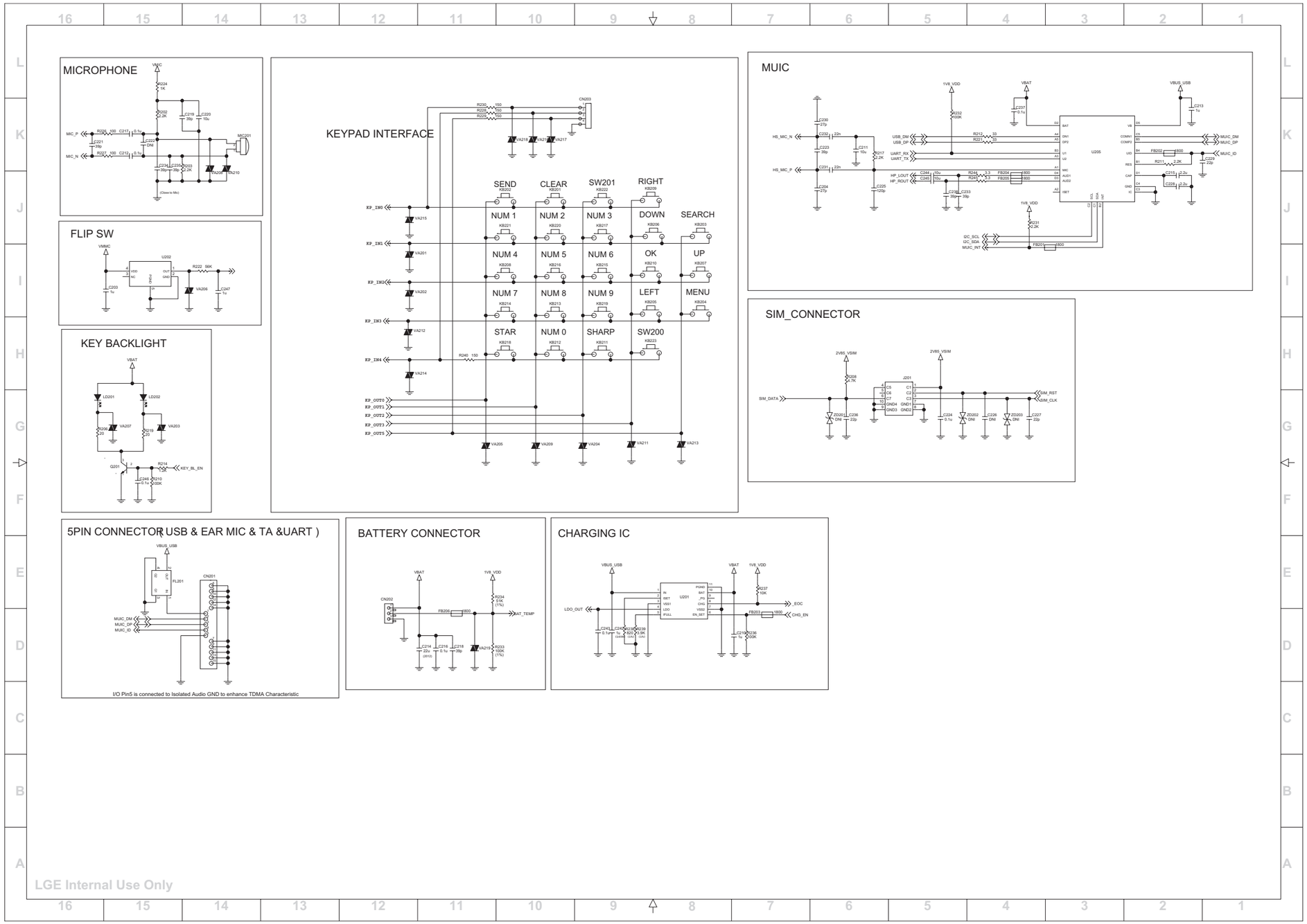
6. BLOCK DIAGRAM



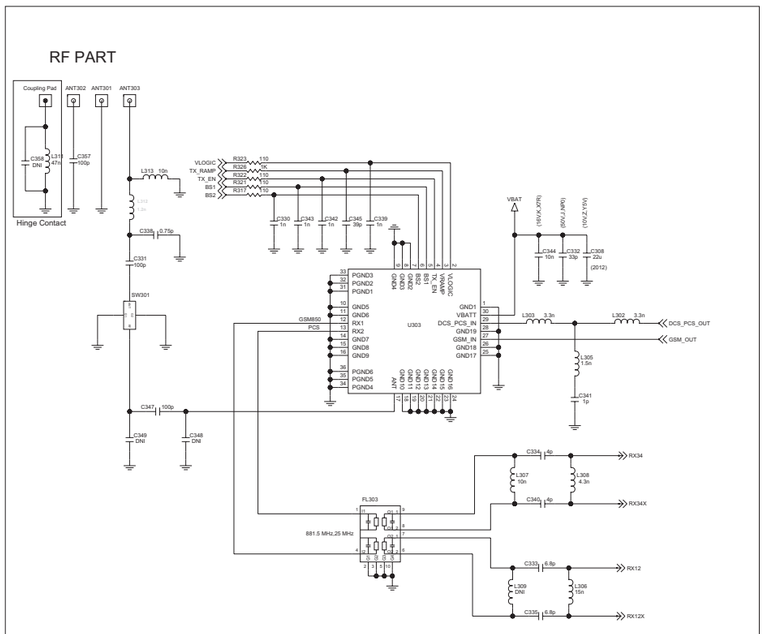
7. CIRCUIT DIAGRAM



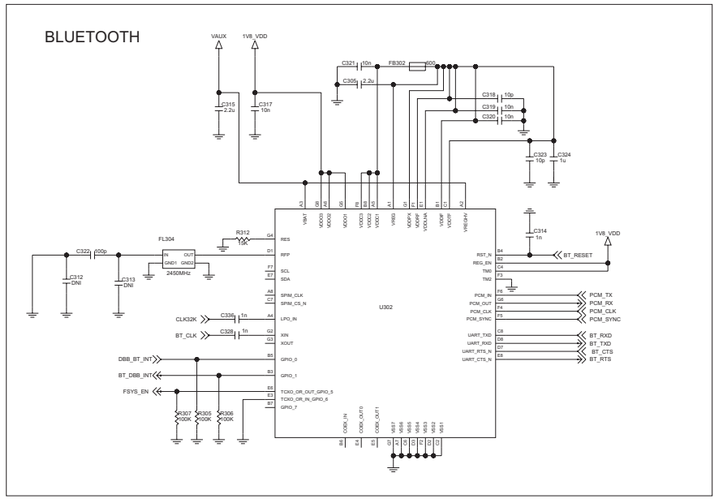
7. CIRCUIT DIAGRAM

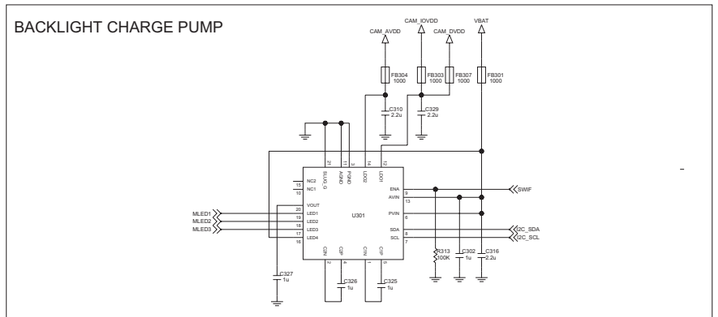


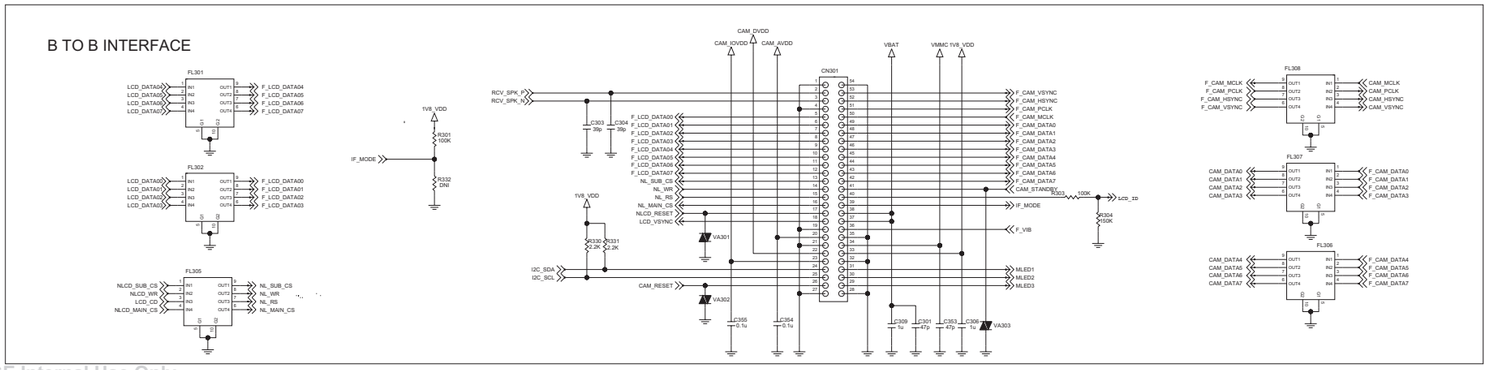
7. CIRCUIT DIAGRAM



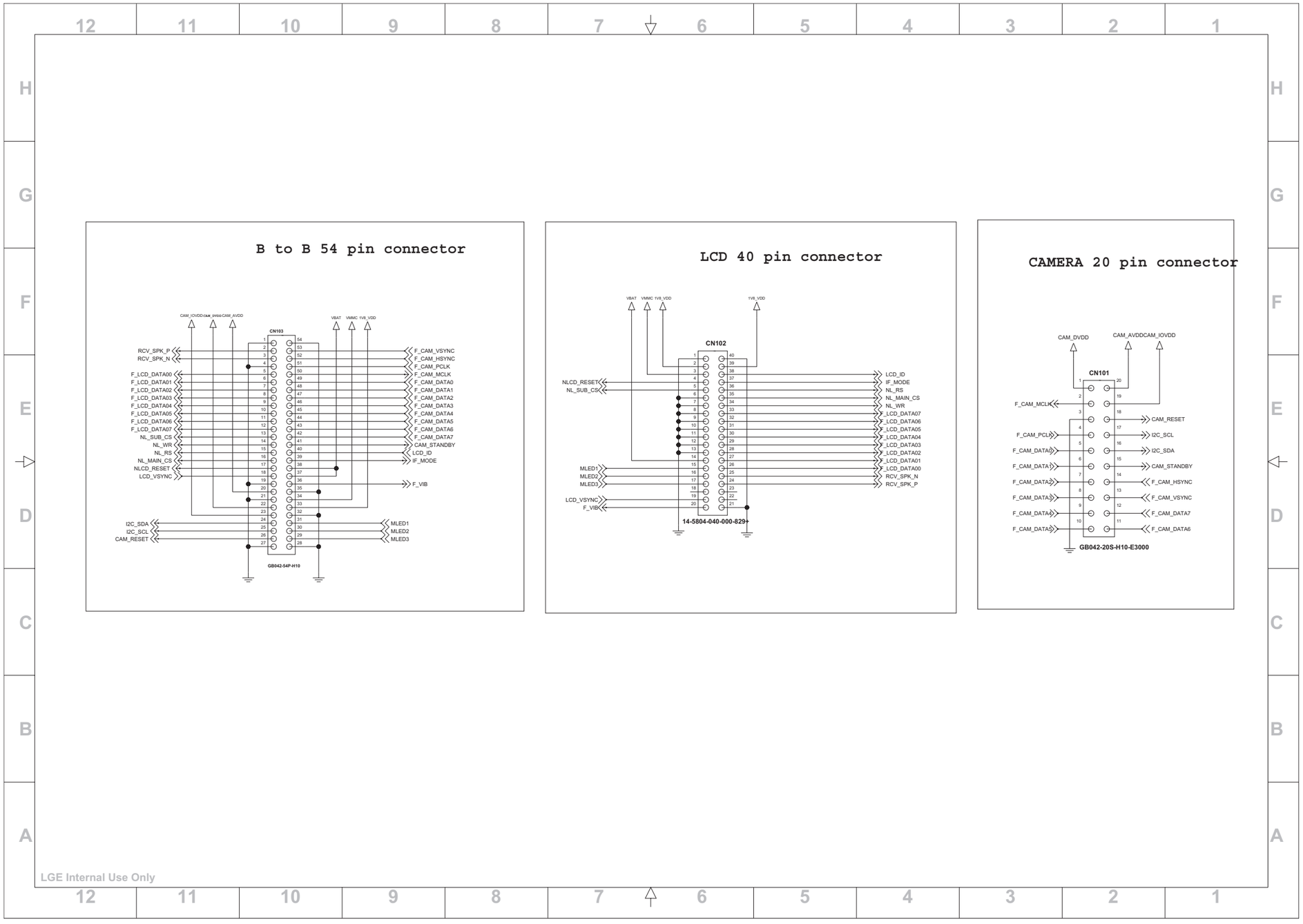
MODE	VLOGIC	TX_EN	BS1	BS2
STANDBY	LOW	X	X	X
EGSM_RX	HIGH	LOW	LOW	LOW
GSM850_RX	HIGH	LOW	LOW	HIGH
PCS_RX	HIGH	LOW	HIGH	HIGH
DCS_RX	HIGH	LOW	HIGH	LOW
LB_TX	HIGH	HIGH	LOW	X
HB_TX	HIGH	HIGH	HIGH	X



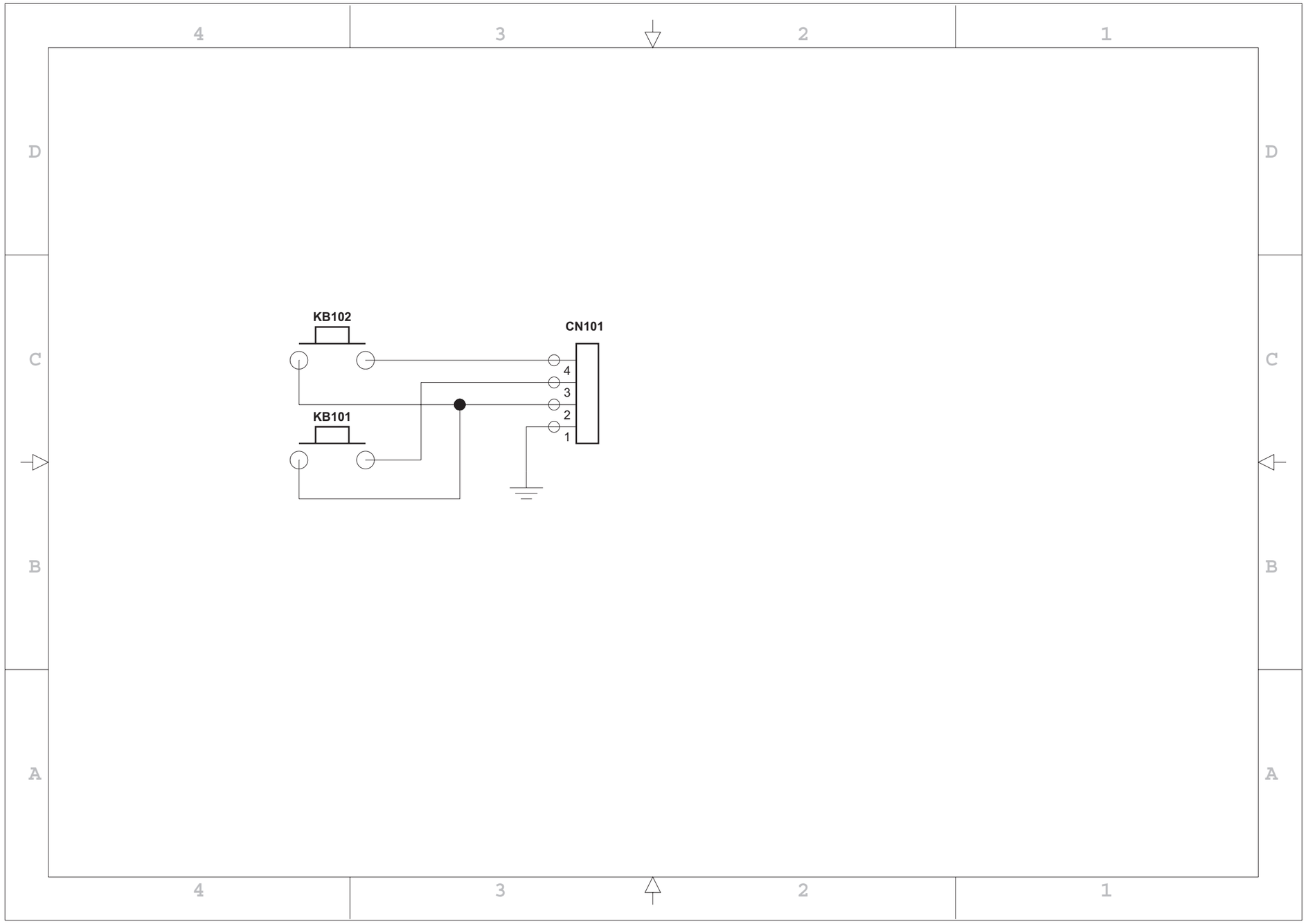




7. CIRCUIT DIAGRAM



7. CIRCUIT DIAGRAM



8. BGA Pin Map

8.1 BGA PIN MAP (Top View)

8.1.1 BGA IC pin check (U102)

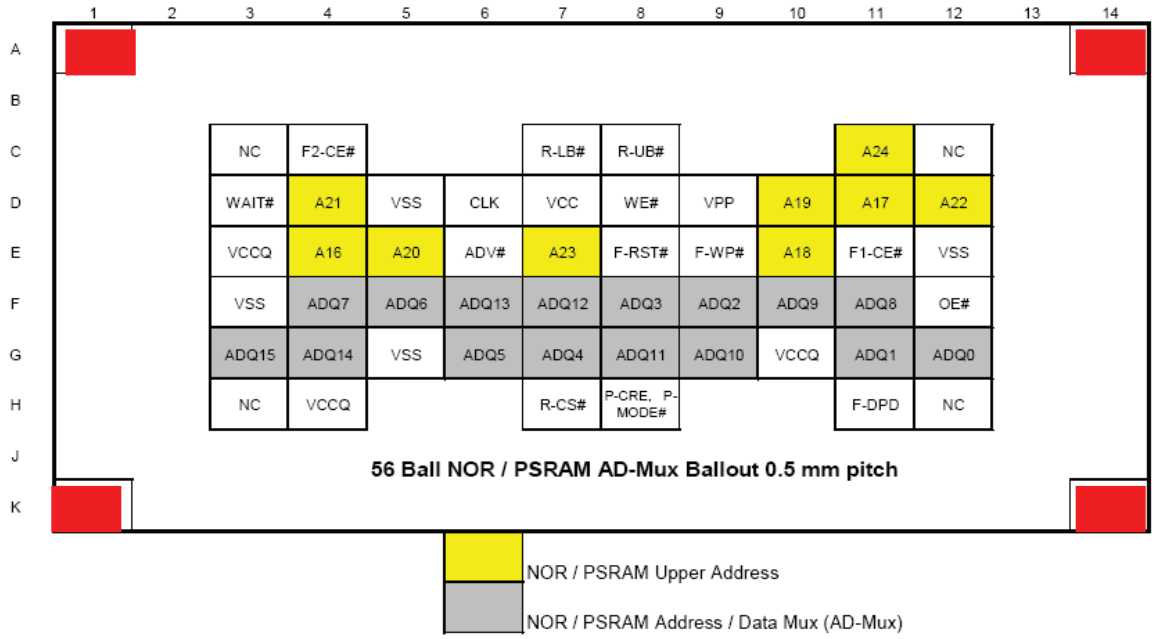
▪ **Ball Diagram (Top View), PMB8810(A-GOLDRADIO+)**

	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	
16	VSSRF2	FE1	RX12X	RX12	RX34X	RX34	TMS	TCK	TDI	TRIG_IN	F32K	EPP	LSN	VBATSP	VDDNEG		16
15	TX1	TX2	VSSRF			VSSLO		TRST_n	TDO	FSYS_EN	OSC32K	EPN	LSP	VSSLSR	CP2	CP1	15
14	FE2	VDDTRX	VDET			VSSTRX	VBAT				VSSMS			VDD1V8CP	HSL	HSR	14
13	VRAMP	PABS	PABIAS			VSSRX	VDDRF2	VDDMS	MON1		RESET_N			VUMIC	MICN2	MICP2	13
12	VDDMMD	VDDTDC	PAEN		VSSDCO	VSSXO	VSSDIG	SWIF_TXRX	MON2	DMINUS			M0	VMIC	MICN1	MICP1	12
11	XO	XOX			VDDXO	FSYS2	FSYS1	DIGuP1	DIGuP_CLK	DPLUS		FMRINX	VDD_FMR	AGND	M2	M1	11
10	KP_IN1	KP_IN2	KP_IN3	KP_IN4	KP_IN5	KP_OUT5	DIGuP2	VRF1	VDD1V81	LEDFBP	VRTC	FMRIN		VPMU	ACD	VREF	10
9	KP_IN0	KP_OUT1	KP_OUT2	KP_OUT0	KP_OUT3	VDDFS	VDDIO1	VSSCORE2	VSSCORE3		LEDDRV	VUSB		ANAMON	ONOFF	VSS_PMU	9
8	I2S1_RX	I2S1_TX	I2S1_WA0	I2S1_CLK0	CIF_D7	VSSCORE1	VDDCORE	USIF2_TXD_MTSR	USIF2_CTS_n	VCORE	LEDFBN	VSIM	VBAT_PMU	VAUX	VSS_VIB	VIB	8
7	CIF_D3	CIF_D4	CIF_D6		CIF_VSYNC	CIF_HSYNC	CIF_PD	USIF2_RTS_n	USIF2_RXD_MRST	VDDIO2	VMMC	CS		VDD_SD1	SD1SW	VSS_SD1	7
6	CIF_D0	CIF_D1	CIF_D5		CIF_RESET	CLKOUT2	CIF_PCLK	MMCI_DAT1	WAIT_n	VSHNT	SENSEN	SENSEP			CSB	SD1_FB	6
5	I2C_SDA	I2C_SCL	CIF_D2				MMCI_DAT2			MMCI_DAT3				A/D13	VDD_EBU	VCHG	5
4	CLKOUT0	T2IN	MON3	DIF_RD		DIF_CS1	CC_RST	A19	A17	CS0_n	A/D9		A24	A20	WR_n	VDDCHG	4
3	USIF1_RTS_n	USIF1_RXD_MRST	DIF_WR	DIF_D3	DIF_CD	DIF_D7	CC_IO	MMCI_DAT0	A22	A/D0	A/D11	CS1_n	A/D4	A/D15	ADV_n	A23	3
2	USIF1_TXD_MTSR	USIF1_CTS_n	DIF_D4	DIF_RESET	DIF_D8	DIF_D2	CC_CLK	MMCI_CLK	A18	A/D1	A/D10	A/D5	A/D12	A/D7	A21	BFCLKO	2
1	VSSCORE4	DIF_D6	DIF_D5	DIF_D1	DIF_D0	DIF_HD	DIF_VD	MMCI_CMD	RD_n	A/D8	A/D2	A/D3	A/D6	A/D14	A16		1
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	

: not in use

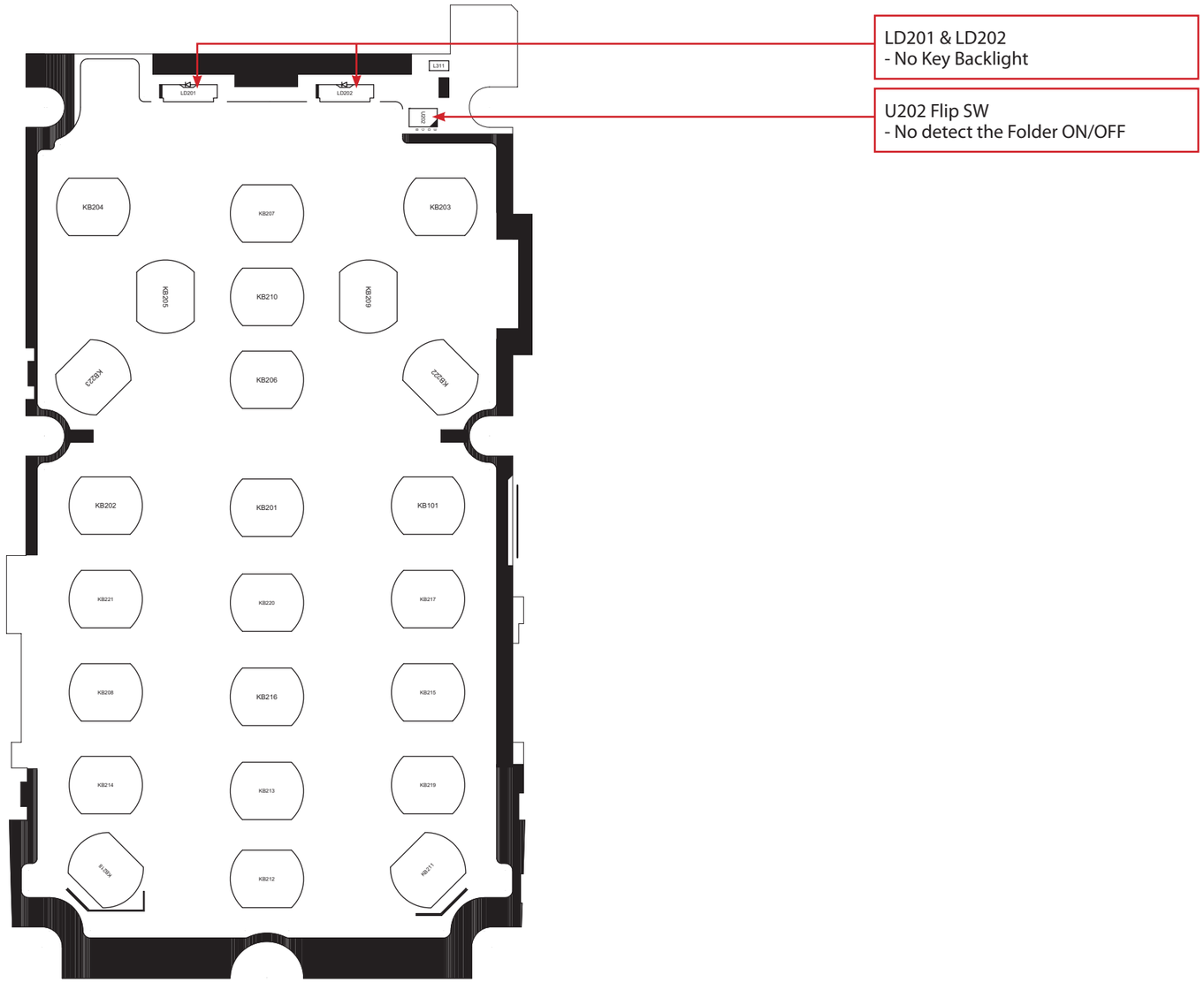
8.1.2 BGA IC pin check (U101)

▪ **Ball Diagram (Top View), PF38F5060M0Y3DF**



: not in use

9. PCB LAYOUT



LG420G_MAIN_SPFY0210801_1.2-TOP

9. PCB LAYOUT

BAT101
(Backup Battery)
-No Service

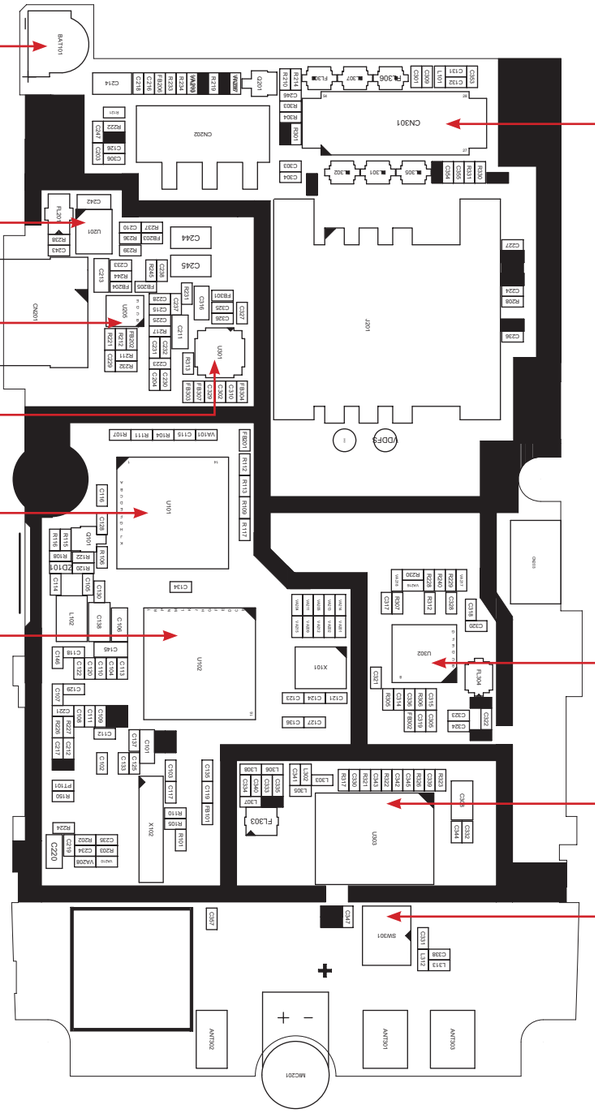
U201
(Charging IC)
-No Charging

U205
-No Earphone
-No Download

U301
-No LCD
Backlight

U101(Memory)
-No booting

U102 (Main BB)
-No operating almost all functions



CN201
(Main FPCB Connector)
- No LCD Display
- No Speaker & Receiver

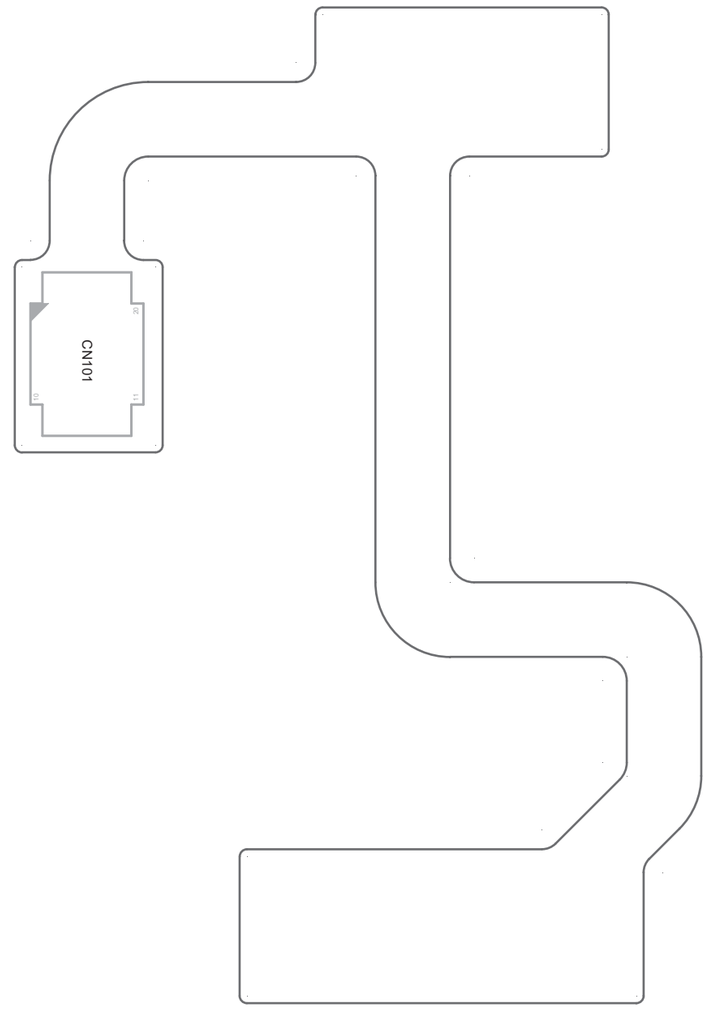
U302
-The Bluetooth working bad

U303(Tx Module)
- Can't make a call
-Tx Low power
- Not good BER
- No Service

SW301(mobile switch)
- Can't make a call
-Tx Low power
- Not good BER
- No Service

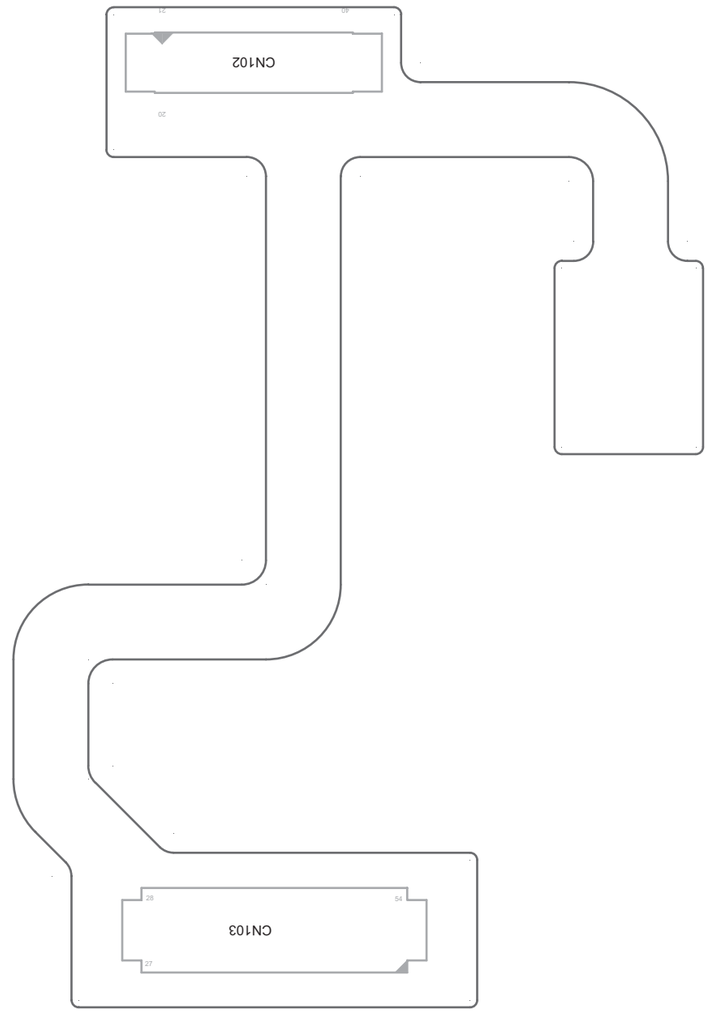
LG420G_MAIN_SPFY0210801_1.2-BOT

9. PCB LAYOUT



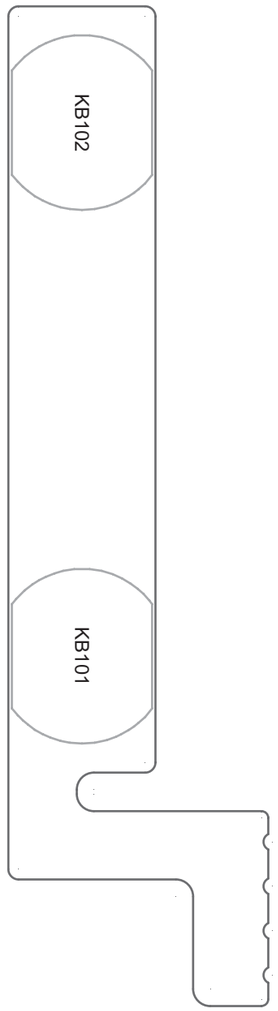
LG420G_FPCB_SPCY0199401-1.2-4M-TOP

9. PCB LAYOUT



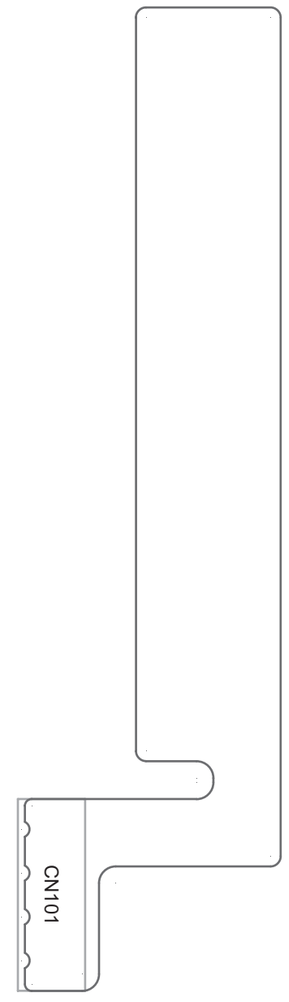
LG420G_FPCB_SPCY0199401-1.2-4M-BOT

9. PCB LAYOUT



LG420G_F_VOL_SPKY0078801-1.1-TOP

9. PCB LAYOUT



LG420G_F_VOL_SPKY0078801-1.1-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#*420# “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 test menu.

[1] Device Test

[1-1] Function Test
[1-2] Main LCD
[1-3] Sub LCD
[1-4] LCD Backlight
[1-5] Key Backlight
[1-6] Speaker
[1-7] Vibrator
[1-8] Camera
[1-8] Camera
[1-10] MicRcv
[1-11] Key Press Test
[1-12] SpeakerVibTest

[2] ELT Mode

[2-1] Automatic
[2-2] Manual

[3] Version

[3-1] SW Version Info
[3-1] HW Version Info

[4] Factory Reset

[5] Call Timer

[6] Eng Mode

[6-1] Band Selection
  [6-1-1] Auto
  [6-1-2] GSM850
  [6-1-3] GSM900
  [6-1-4] DCS 1800
  [6-1-5] PCS 1900
[6-2] Battery Info
[6-3] Audion Tunning
[6-4] UART Setting
[6-5] BT Testing
[6-6] Defect Report System
[6-7] SD card Info
[6-8] Test Menu Visible
[6-8] Unlimited Ringtone Size

[7] Network Info

[7-1] Cell Env.(Idle)
[7-2] Cell Env.(Ded)

11. STAND ALONE TEST

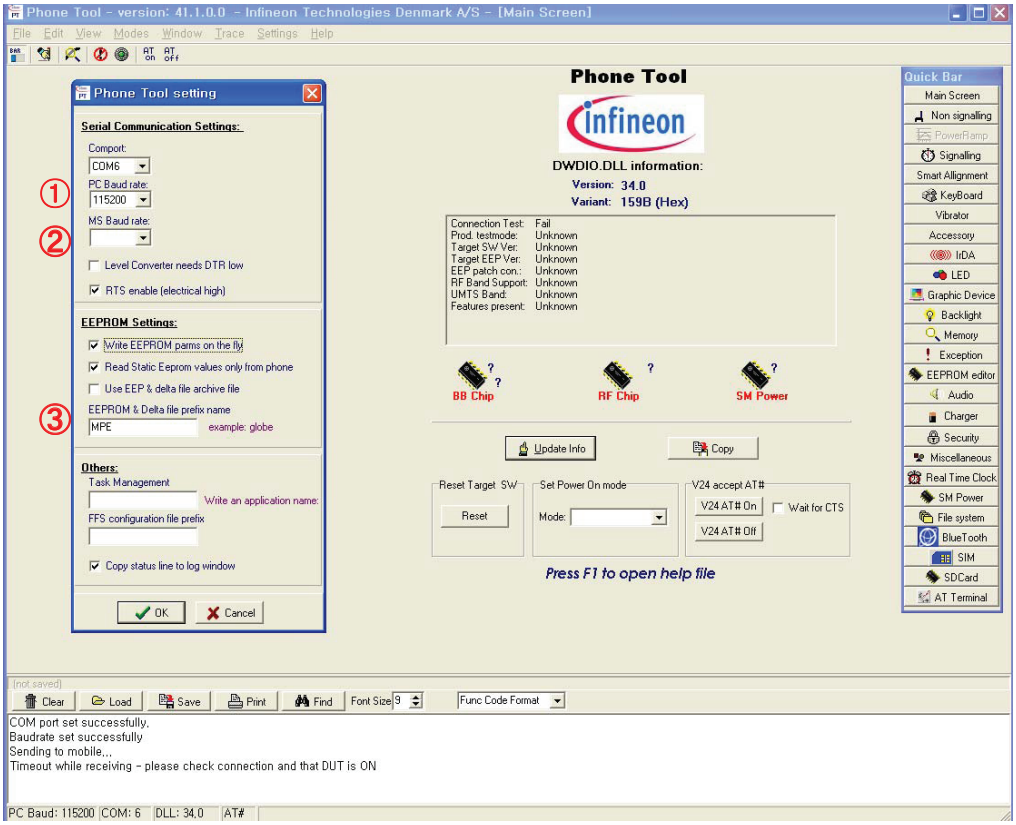
11.1 Introduction

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

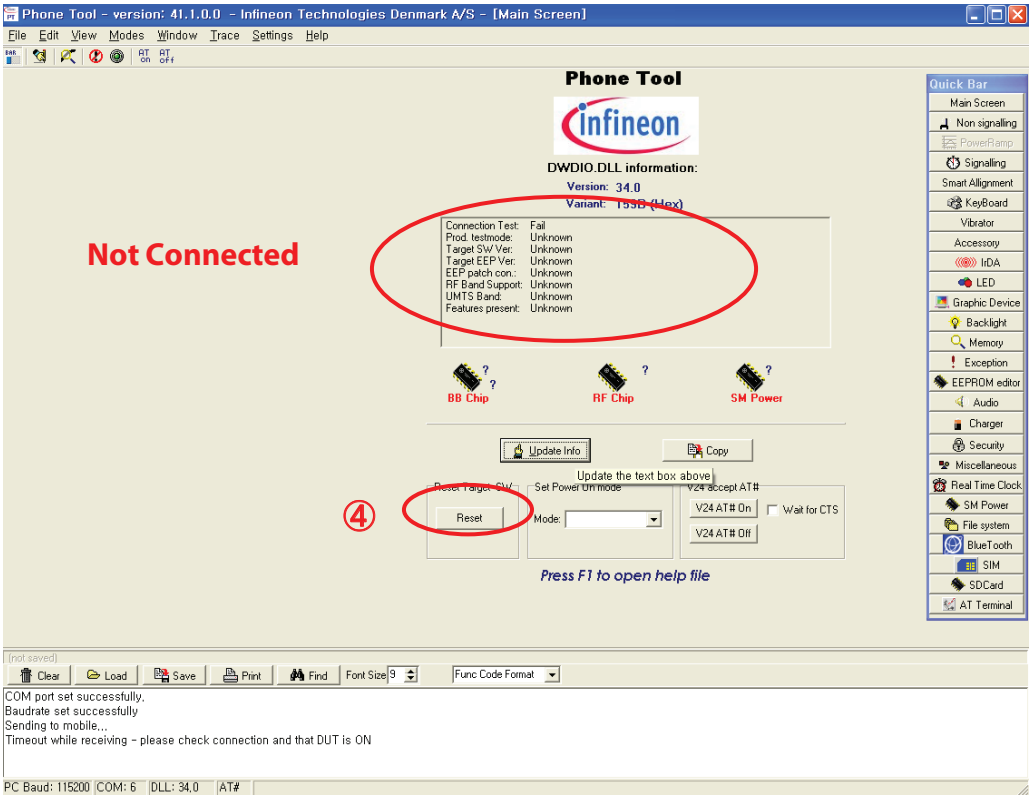
A. Tx Test
TX test - this is to see if the transmitter of the phones is activating normally.

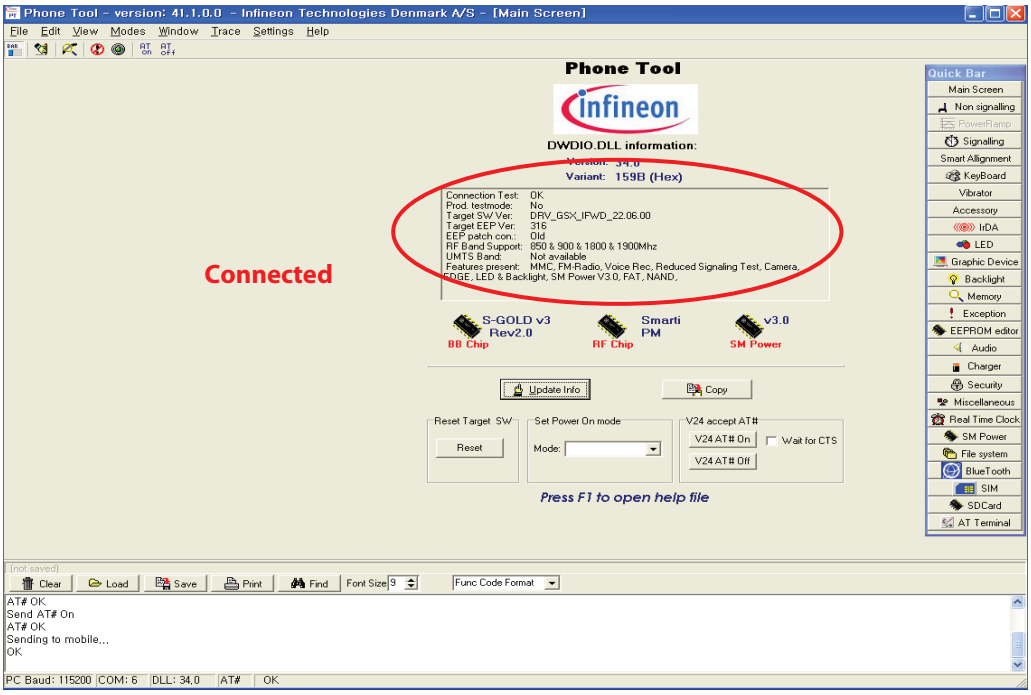
B. Rx Test
RX test - this is to see if the receiver of the phones is activating normally.

11.2 Setting Method



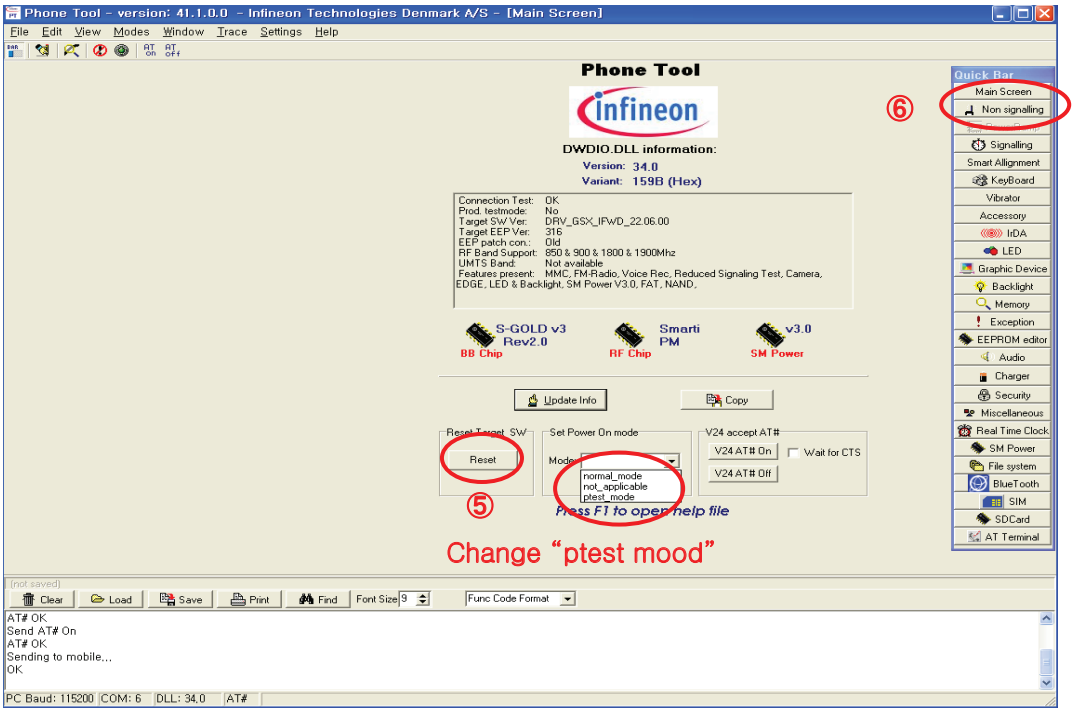
1. Set COM Port
2. Check PC Bau Rate
3. Confirm EEPROM & Delta file prefix name





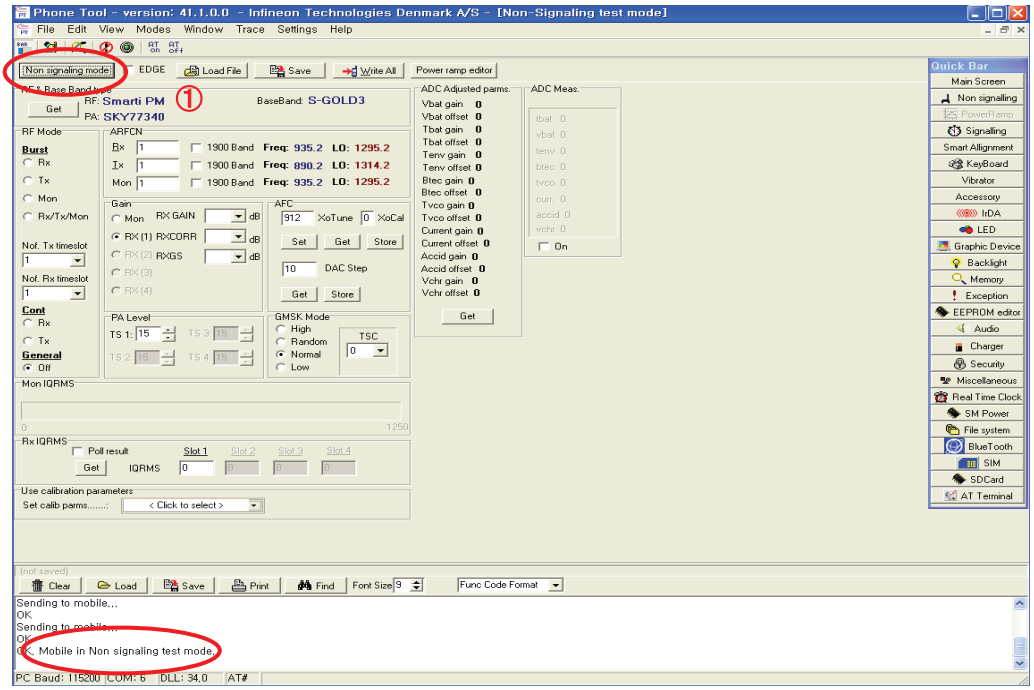
4. Click “Update Info” for communicating Phone and Test-Program

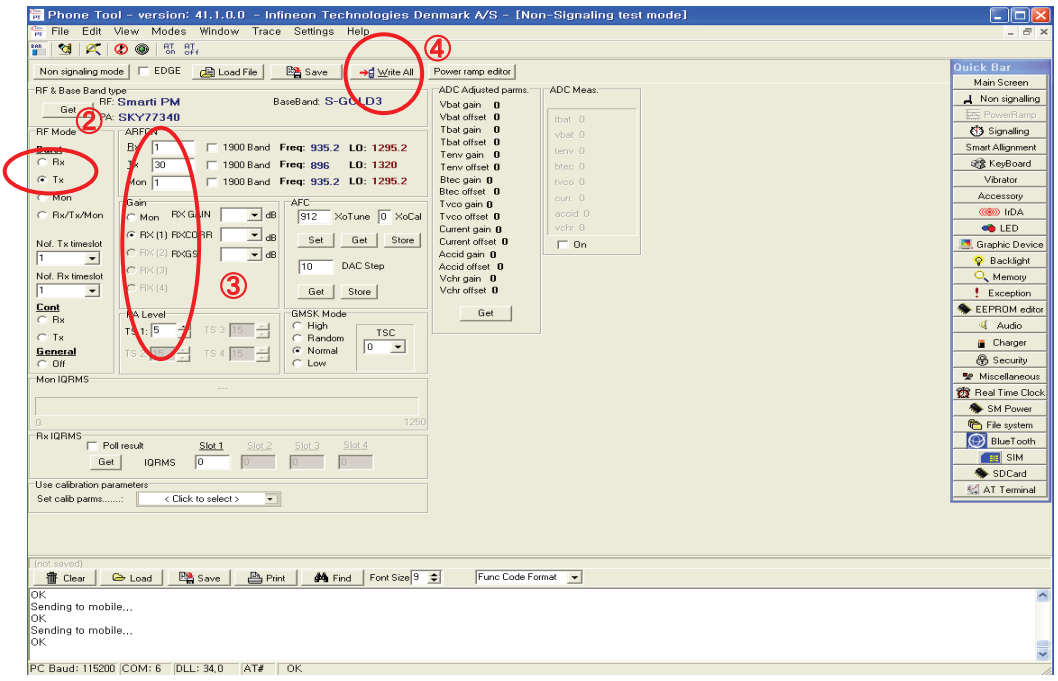
11. STAND ALONE TEST



5. For the purpose of the Standlone 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.

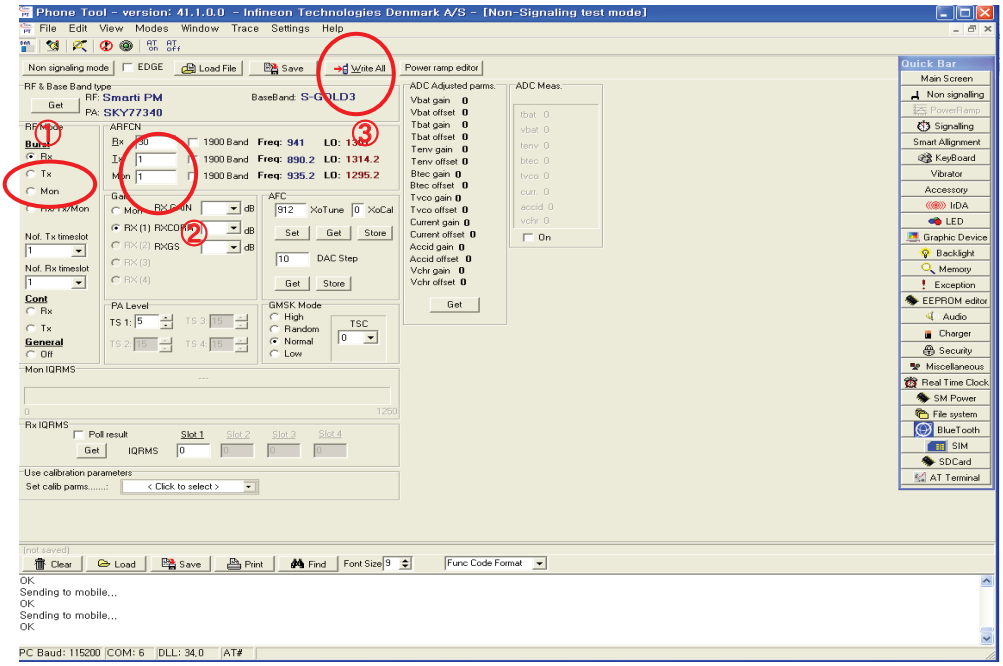
11.3 Tx Test

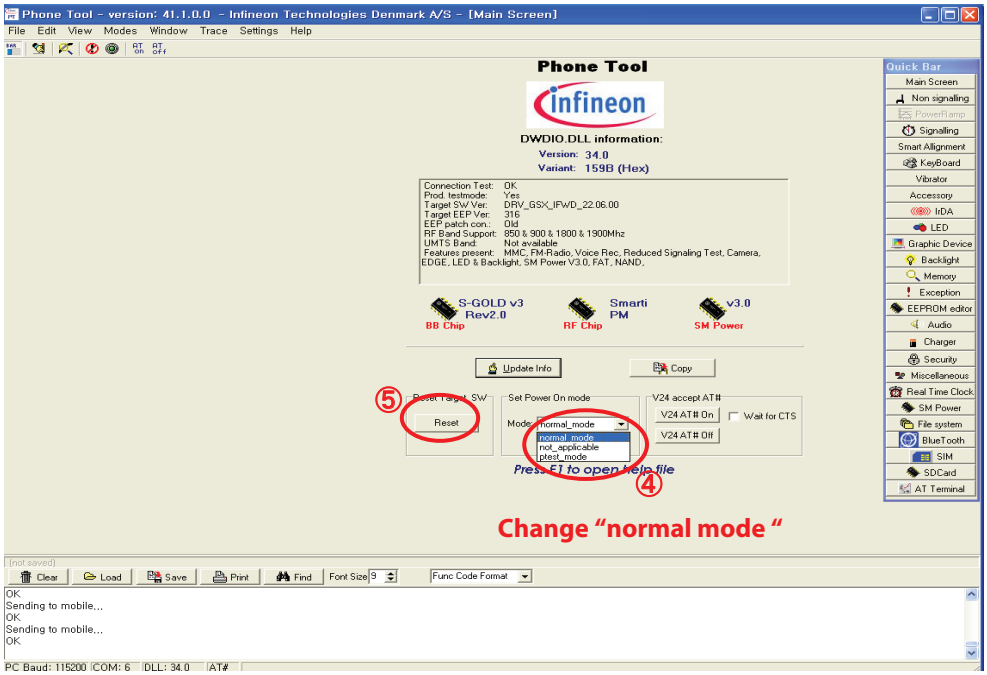




1. “Non signaling mode” bar and then confirm “OK” text in the command line.
2. Put the number of TX Channel in the ARFCN
3. Select “Tx” in the RF mode menu and “PCL” in the PA Level menu.
4. Finally, Click “Write All” bar and try the efficiency test of Phone.

11.4 Rx Test





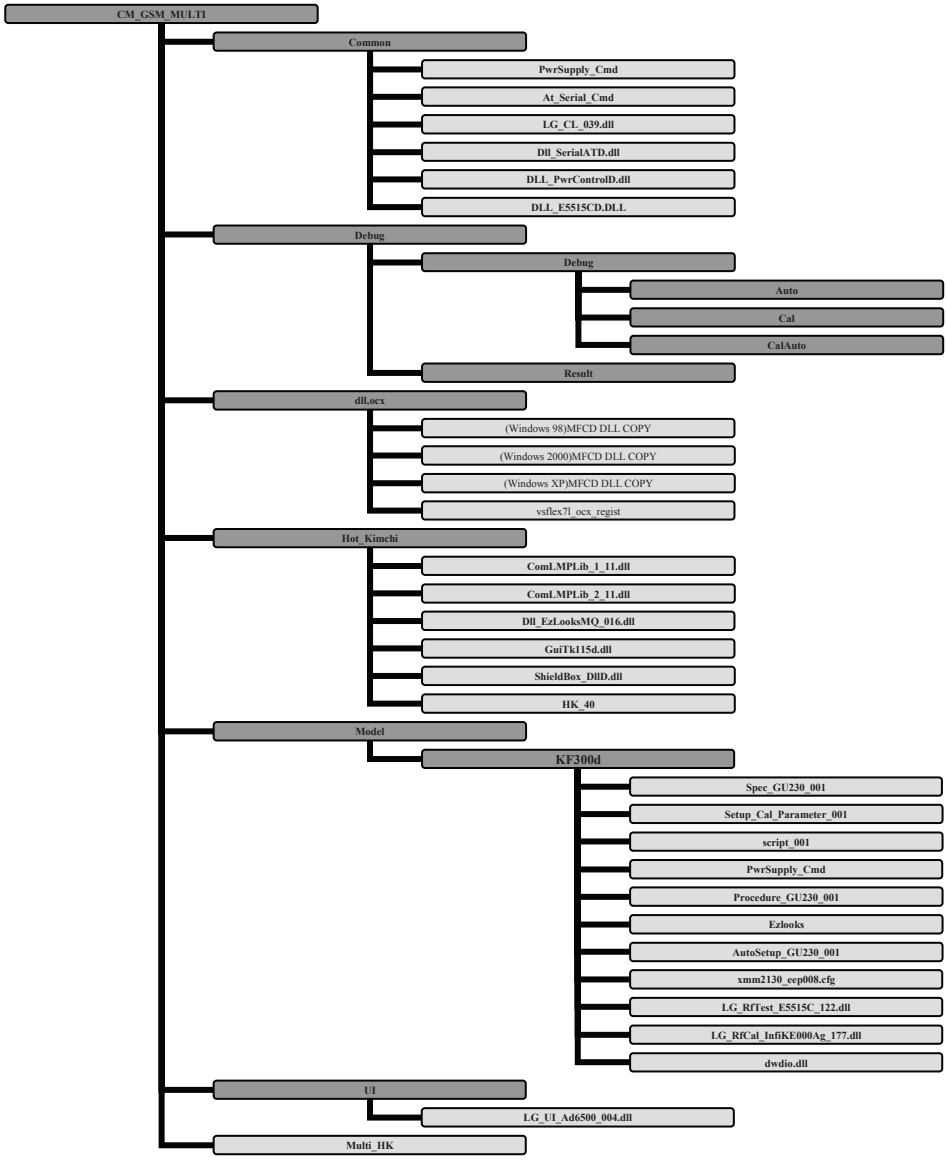
1. Put the number of RX Channel in the ARFCN.
2. Select "Rx" in the RF mode menu.
3. Finally, Click "Write All" bar and try the efficiency test of Phone.
4. The Phone must be changed "normal mode" after finishing Test.
5. Change the Phone to "normal mode" and then Click the "Reset" bar.

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 Configuration of HotKimchi



12.3 Description of Basic File

12.3.1 Common

-. **LG_CL_039.dll** : Common logic dll, Module In Charge of Reading PID & S/W Version, Booting.
-. **Dll_SerialATD.dll** : Serial Communication Module From Phone by AT Command.
-. **DLL_PwrControlD.dll** : Communication Module From Power supply.
-. **DLL_E5515CD.DLL** : Communication Module From Agilent 8960(Test Set).
-. **At_Serial_Cmd.xml** : Definition File of AT Command.
-. **PwrSupply_Cmd.xml** : Definition File of Power supply command.

12.3.2 Debug

-. **Debug** - Cal : Result File of Calibration.
Auto : Result File of Auto Test.
CalAuto : Result File of Cal & Auto Test.

12.3.3 dll, ocx

-. **vsflex7l_ocx_regist :** Registration File for System use

-. **Windows XXX)MFCD DLL :** Registration File for System use

12.3.4 HotKimchi

-. **HK_40.exe** : Execute File, HK_XX → XX is File Version.
-. **ComLMPLib_1_11.dll** : Communication Module With PLC or Shield Box In Automation Rack.
Support to J&S Shield Box and Tescom TC-5981A.
-. **ComLMPLib_2_11.dll** : Communication Module With PLC or Shield Box In Automation Rack.
Support to J&S Shield Box and Tescom TC-5981A.
-. **Dll_EzLooksMQ_005.dll** : Communication Module with ezTray Installed In Local PC.
-. **GuiTk115d.dll** : control library
-. **ShieldBox_DllD.dll** : Communication with Shield Box. Support to Tescom TC-5952B.

12.3.5 Model

-. **LG_RfCal_InfiKE000Ag_177.dll** : Main Module of Calibration
-. **LG_RfTest_E5515C_122.dll** : Main Module of Auto Test
-. **Xmm2130_eep008.cfg** : Cal Data Save binary Module.
-. **AutoSetup_GU230_100.xml** : RF TEST Setup Module.
-. **Ezlooks.xml** : Calibration ezLooks Item & Cal Spec Definition Module.
-. **Procedure_GU230_001.xml** : RF TEST Procedure Definition Module.
-. **Script_001.xml** : RF TEST Setup 및 calibration Setup Module.
-. **Spec_GU230_001.xml** : Definition Module of Auto Test Spec
-. **Setup_Cal_Parameter_001.xml** : Calibration Definition Module.

12.3.6 UI

-. LG_UI_Ad6500_002.dll : ADI Model UI Dll.

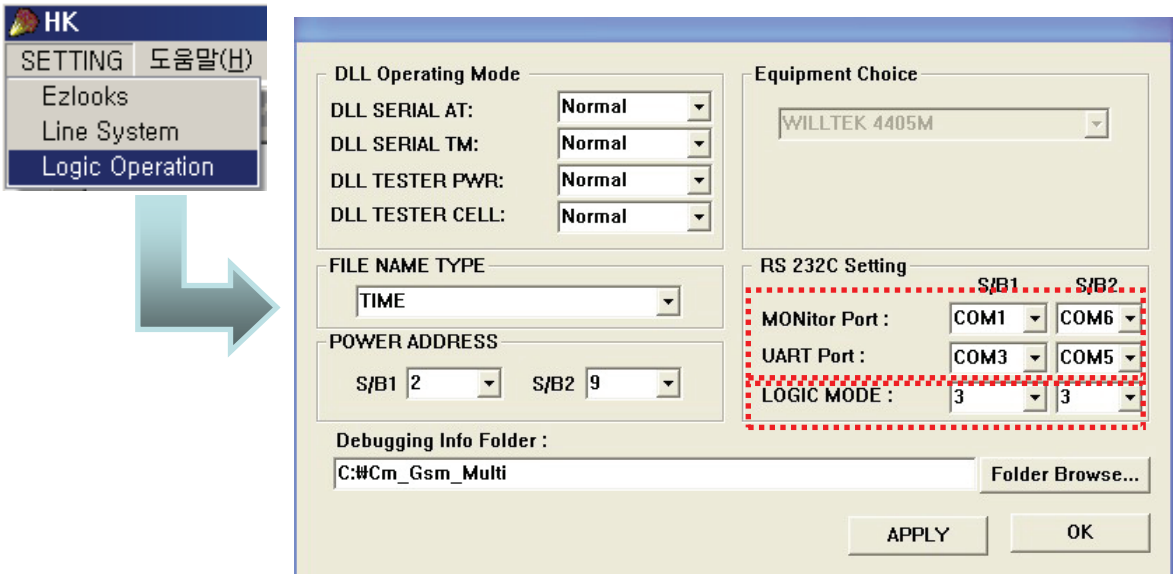
12.3.7 Multi_HK

-. Registration File For System Setting.

1. Connect as Fig 6-2(RS232 serial cable is connected between COM port of PC and MON port of TEST JIG, in general)
2. Set the Power Supply 4.0V
3. Set the 3rd, 4th of DIP SW ON state always
4. Press the Phone power key, if the Remote ON is used, 1st ON state

12.4 Procedure

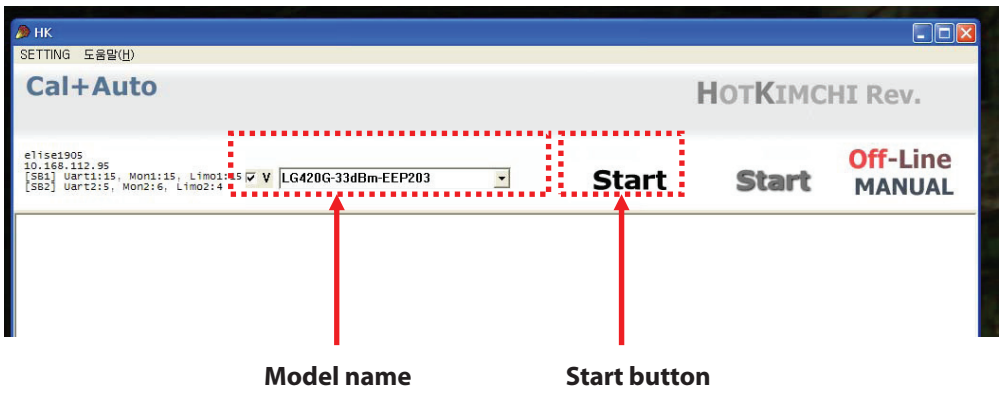
1. Copy the file to C:\Cm_Gsm_Multi
2. Copy the files of((Windows XXX)MFCD DLL, vsflex7l_ocx_regist to C:\Cm_Gsm_Multi\dll,ocx
3.Select MFCD DLL of your computer OS
4. Click on “vsflex7l_ocx_regist”
5. Click on “Multi_HK reg”
6. Connect as Fig 11-2 (RS232 serial cable is connected between COM port of PC, in general.
7. Run *HK_40exe* to start calibration.
8. Click “ Logic Operation” of “SETTING” menu bar



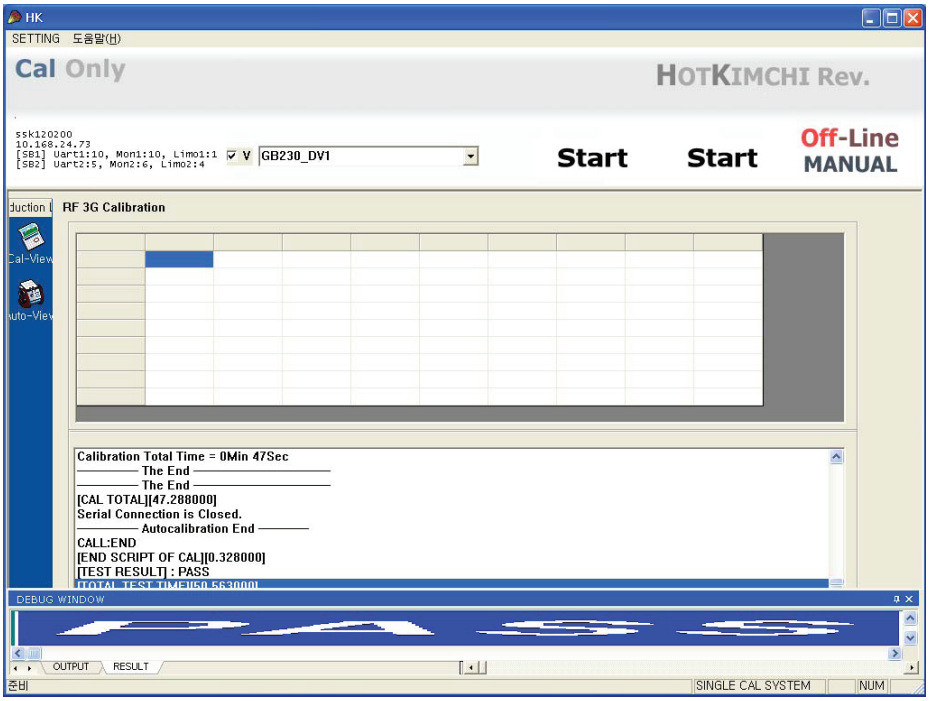
9. Set PORT (using RS232 cable) that PC can communicate with the phone
10. Select “ LOGIC MODE” that you want

Logic mode: 1-> Calibration only
2-> Auto test only
3-> Cal & Auto

11. Select the model name “LG420G”



12. Click “start” button



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

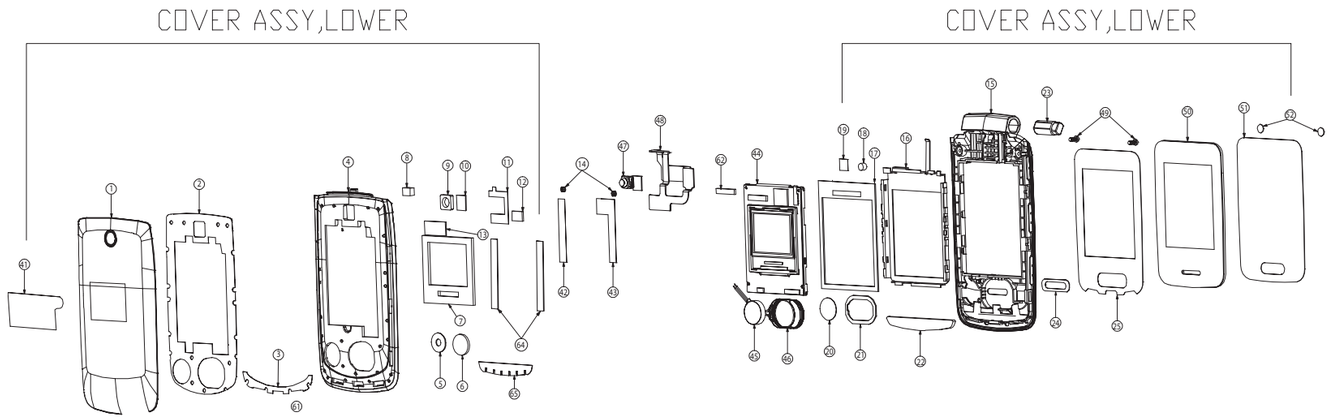
This procedure is for battery calibration.
You can get main Battery Config Table and temperature Config Table will be reset.

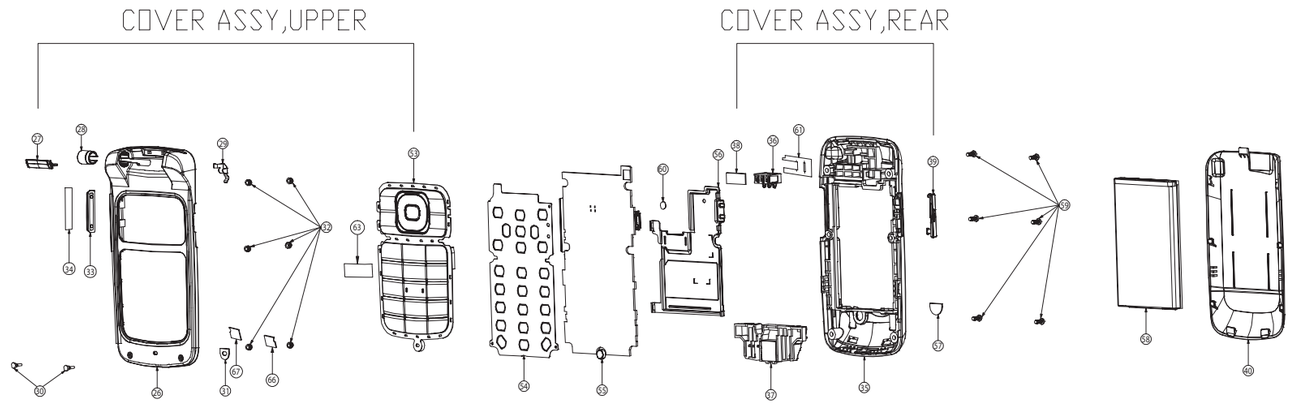
12.8 Target Power

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
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

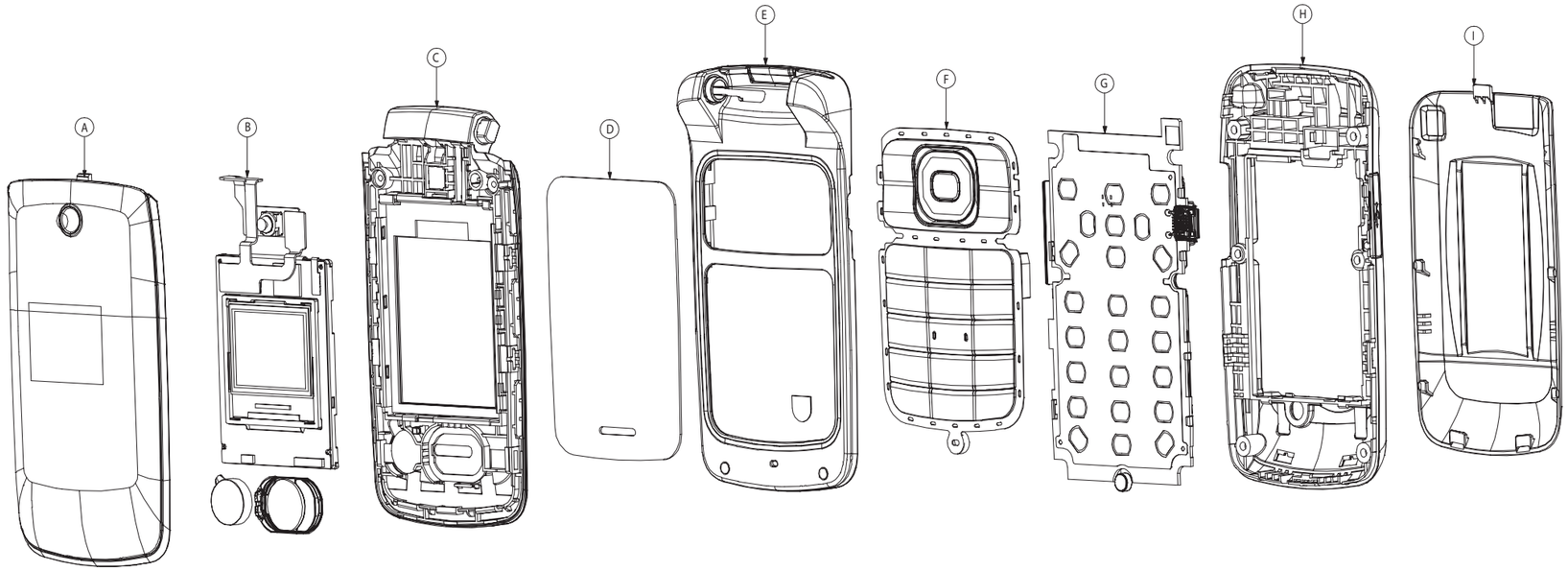
13.1 EXPLODED VIEW





66	PAD_FRONT_PCB_A	MPBZ0315301	1	
65	PAD_UPPER	MPBZ0315201	1	
64	PAD_UPPER_SIDE	MPBZ0315101	2	
63	PROTECTOR KEYPAD	MTAB0410801	1	
62	PAD_LCD_CONNECTOR	MPBZ0294101	1	
61	INSULATOR_REAR	MIDZ0231401	1	
60	A/S LABEL	MLAB0001102	1	
59	SCREW	GMZZ0017701	6	
58	BATTERY	SBPL0089901	1	
57	CAP_MOBILE	MSAZ0058801	1	
56	SHIELD_CAN	MCBA0077101	1	
55	PCB SMT	SAFF0257401	1	
54	METAL_DOME_ASSY	ADCA0105401	1	
53	KEYPAD_ASSY_MAIN	AKAC0005001	1	
52	CAP_SCREW	MCCH0155401	2	
51	TAPE_PROTECTION_LOWER	MTAB0354601	1	
50	WINDOW_MAIN	MWAC0131301	1	
49	SCREW	GMZZ0017701	2	
48	MAIN FPCB	SPCY0199401	1	
47	CAMERA	SVCY0019301	1	
46	SPEAKER	SUSY0028907	1	
45	MOTOR	SJMY0007109	1	
44	LCD	SVLM0036702	1	
43	GASKET_B	MGAZ0084601	1	
42	GASKET_A	MGAZ0083201	1	
41	PROTECTOR_WINDOW_SUB	MTAB0384301	1	
40	COVER_BATTERY	MCJA0100801	1	
39	CAP_EARPHONE_JACK	MCCC0069901	1	
38	PAD CONNECTOR REAR	MPBU0086001	1	
37	INTENNA	SNGF0053502	1	
36	BATTERY CONNECTOR	ENZY0015701	1	
35	COVER_REAR	MCJN0112401	1	
34	TAPE_PROTECTOR_SIDE	MTAB0363101	1	
33	BUTTON_SIDE	MBJZ0015701	1	
32	INSERT (2.4 X 1.5)	MICZ0021001	6	
31	FILTER_MIKE	MFBZ0006001	1	
30	STOPPER_FOLDER	MSGY0025501	2	
29	HINGE_TERMINAL	MCIZ0000501	1	
28	BUSHING_HINGE	MBIZ0003401	1	
27	STOPPER_HINGE	MSGY0025401	1	
26	COVER_FRONT	MCJK0117501	1	
25	TAPE_WINDOW_MAIN	MTAD0117401	1	
24	FILTER_SPEAKER	MFBZ0005901	1	
23	HINGE	MHFD0015501	1	
22	PAD_SPEAKER_B	MPBN0084801	1	
21	PAD_SPEAKER	MPBN0082901	1	
20	TAPE_MOTOR	MTAZ0259801	1	
19	TAPE_CAMERA	MTAK0032801	1	
18	MAGNET	MMAA0001601	1	
17	PAD_LCD_MAIN	MPBG0102101	1	
16	BRACKET_LCD	MBFZ0039901	1	
15	COVER LOWER	MCJY0003901	1	
14	INSERT (2.4 X 1.5)	MICZ0021001	2	
13	PAD_CONNECTOR_UPPER	MPBU0090501	1	
12	GASKET_FORM	MGAZ0084501	1	
11	GASKET_UPPER	MGAZ0084201	1	
10	PAD_CAMERA_CONNECTOR	MPBU0093201	1	
9	PAD_CAMERA	MPBT0087901	1	
8	PAD_FPCB	MPBZ0282401	1	
7	PAD_LCD_SUB	MPBG0103601	1	
6	PAD_SPEAKER_A	MPBN0082701	1	
5	PAD_MOTOR	MPBJ0071701	1	
4	COVER_UPPER	MCJX0005001	1	
3	TAPE_WINDOW_SUB_A	MTAD0119201	1	
2	TAPE_WINDOW_SUB	MTAD0119101	1	
1	WINDOW_SUB	MWAC0132801	1	

ASS'Y EXPLODED VIEW



No	Part Name	Part Number	Q'ty	Remark
I	COVER BATTERY	MCJA0100801	1	
H	COVER ASSY,REAR	ACGM0146301	1	
G	PCB MAIN	SAFY0346701	1	
F	COVER ASSY,FRONT	MCJK0117501	1	
E	KEYPAD MAIN	AKAC0005001	1	
D	WINDOW MAIN	MWAC0131301	1	
C	COVER ASSY,LOWER	ACGU0002501	1	
B	LCD	SVLM0036702	1	
A	COVER ASSY,UPPER	ACGT0002901	1	

13.2 Replacement Parts <Mechanic component>

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

Level	Location No.	Description	Part Number	Spec	Color	Remark
2	AAAY00	ADDITION	AAAY0431701		BLACK	
3	MCJA00	COVER,BATTERY	MCJA0100801	MOLD, PC LUPOY SC-1004A, , , , ,	BLACK	I, 40
3	MMBB00	MANUAL,OPERATION	MMBB0373201	PRINTING, (empty), , , , ,	WITHOUT COLOR	
2	APAY00	PACKAGE	APAY0082704		BLACK	
3	MBAD00	BAG,VINYL(PE)	MBAD0005204	COMPLEX, (empty), , , , ,	WITHOUT COLOR	
3	MBAD01	BAG,VINYL(PE)	MBAD0003101	1700*1700*0.04t	WITHOUT COLOR	
3	MLAC00	LABEL,BARCODE	MLAC0004501	Export(105*40)	WITHOUT COLOR	
3	MLAZ05	LABEL	MLAZ0050901	PRINTING, (empty), , , , ,	WITHOUT COLOR	
3	MPBZ	PAD	MPBZ0036841	BOX, SW, , , , , 1 COLOR	WITHOUT COLOR	
3	MPCY00	PALLET	MPCY0005202	COMPLEX, (empty), , , , ,	Without Color	
2	APEY00	PHONE	APEY0860002		BLACK	
3	ACGY00	COVER ASSY,EMS	ACGY0008101		WITHOUT COLOR	
4	ACGG	COVER ASSY,FOLDER	ACGG0102301		BLACK	
5	ACGK00	COVER ASSY,FRONT	ACGK0148201		BLACK	
6	MBIZ00	BUSHING	MBIZ0003401	COMPLEX, (empty), , , , ,	WITHOUT COLOR	28
6	MBJZ00	BUTTON	MBJZ0015701	COMPLEX, (empty), , , , ,	WITHOUT COLOR	33
6	MCIZ00	CONTACT	MCIZ0000501	COMPLEX, (empty), , , , ,	WITHOUT COLOR	29
6	MCJK00	COVER,FRONT	MCJK0117501	MOLD, PC LUPOY SC-1004A, , , , ,	BLACK	F, 26
7	MICZ00	INSERT	MICZ0021001		Without Color	32
6	MFBZ00	FILTER	MFBZ0006001	COMPLEX, (empty), , , , ,	WITHOUT COLOR	31
6	MPBZ00	PAD	MPBZ0315301	COMPLEX, (empty), , , , ,	BLACK	66
6	MPBZ01	PAD	MPBZ0315401	COMPLEX, (empty), , , , ,	BLACK	65
6	MSGY00	STOPPER	MSGY0025501	COMPLEX, (empty), , , , ,	WITHOUT COLOR	30

13. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	MSGY01	STOPPER	MSGY0025401	COMPLEX, (empty), , , , ,	WITHOUT COLOR	27
6	MTAB00	TAPE,PROTECTION	MTAB0363101	COMPLEX, (empty), , , , ,	WITHOUT COLOR	34
5	ACGT00	COVER ASSY,UPPER	ACGT0002901		DARK RED	A
6	MCJX00	COVER,UPPER	MCJX0005001	MOLD, PC LUPOY SC-1004A, , , , ,	BLACK	4
7	MICZ00	INSERT	MICZ0021001		Without Color	14
6	MGAZ00	GASKET	MGAZ0084201	COMPLEX, (empty), , , , ,	GOLD	11
6	MGAZ01	GASKET	MGAZ0084501	COMPLEX, (empty), , , , ,	GOLD	12
6	MPBG00	PAD,LCD	MPBG0103601	COMPLEX, (empty), , , , ,	BLACK	7
6	MPBJ00	PAD,MOTOR	MPBJ0071701	COMPLEX, (empty), , , , ,	BLACK	5
6	MPBN00	PAD,SPEAKER	MPBN0082701	COMPLEX, (empty), , , , ,	BLACK	6
6	MPBT00	PAD,CAMERA	MPBT0087901	COMPLEX, (empty), , , , ,	BLACK	9
6	MPBU00	PAD,CONNECTOR	MPBU0090501	COMPLEX, (empty), , , , ,	BLACK	13
6	MPBU01	PAD,CONNECTOR	MPBU0093201	COMPLEX, (empty), , , , ,	BLACK	10
6	MPBZ00	PAD	MPBZ0282401	COMPLEX, (empty), , , , ,	BLACK	8
6	MPBZ01	PAD	MPBZ0315101	COMPLEX, (empty), , , , ,	BLACK	64
6	MTAD00	TAPE,WINDOW	MTAD0119101	COMPLEX, (empty), , , , ,	WITHOUT COLOR	3
6	MTAD01	TAPE,WINDOW	MTAD0119201	COMPLEX, (empty), , , , ,	WITHOUT COLOR	2
6	MWAC00	WINDOW,LCD	MWAC0132801	MOLD, PC LUPOY SC-1004A, , , , ,	DARK RED	1
5	ACGU00	COVER ASSY,LOWER	ACGU0002501		BLACK	C
6	MBFZ00	BRACKET	MBFZ0039901	COMPLEX, (empty), , , , ,	WITHOUT COLOR	16
6	MCJY00	COVER,LOWER	MCJY0003901	MOLD, PC LUPOY SC-1004A, , , , ,	BLACK	15
6	MFBZ00	FILTER	MFBZ0005901	COMPLEX, (empty), , , , ,	WITHOUT COLOR	24
6	MHFD00	HINGE,FOLDER	MHFD0015501	COMPLEX, (empty), , , , ,	Without Color	23
6	MMAA00	MAGNET,SWITCH	MMAA0001601	7100 magnetic	Silver	18
6	MPBG00	PAD,LCD	MPBG0102101	COMPLEX, (empty), , , , ,	WITHOUT COLOR	17
6	MPBN00	PAD,SPEAKER	MPBN0082901	COMPLEX, (empty), , , , ,	BLACK	21
6	MPBN01	PAD,SPEAKER	MPBN0084801	COMPLEX, (empty), , , , ,	BLACK	22

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	MTAD00	TAPE,WINDOW	MTAD0117401	COMPLEX, (empty), , , , ,	WITHOUT COLOR	25
6	MTAK00	TAPE,CAMERA	MTAK0032801	COMPLEX, (empty), , , , ,	WITHOUT COLOR	19
6	MTAZ00	TAPE	MTAZ0259801	COMPLEX, (empty), , , , ,	WITHOUT COLOR	20
5	AKAC00	KEYPAD ASSY,MAIN	AKAC0005001		WITHOUT COLOR	E, 53
5	GMZZ00	SCREW MACHINE	GMZZ0017701	1.4 mm,3.0 mm,MSWR3 ,N ,+ ,- ,	Silver	59
5	MCCH00	CAP,SCREW	MCCH0155401	COMPLEX, (empty), , , , ,	WITHOUT COLOR	52
5	MGAZ00	GASKET	MGAZ0083201	COMPLEX, (empty), , , , ,	GOLD	42
5	MGAZ01	GASKET	MGAZ0084601	COMPLEX, (empty), , , , ,	GOLD	43
5	MIDZ00	INSULATOR	MIDZ0261501	COMPLEX, (empty), , , , ,	GREEN	
5	MPBZ00	PAD	MPBZ0294101	COMPLEX, (empty), , , , ,	BLACK	62
5	MRDY	REINFORCE	MRDY0000601	COMPLEX, (empty), , , , ,	WHITE	
5	MTAB00	TAPE,PROTECTION	MTAB0384301	COMPLEX, (empty), , , , ,	WITHOUT COLOR	41
5	MTAB01	TAPE,PROTECTION	MTAB0354601	COMPLEX, (empty), , , , ,	WITHOUT COLOR	51
5	MTAB02	TAPE,PROTECTION	MTAB0410801	COMPLEX, (empty), , , , ,	BLACK	63
5	MWAC	WINDOW,LCD	MWAC0131301	CUTTING, Tempered Glass, , , , ,	WITHOUT COLOR	D, 50
4	ACGM	COVER ASSY,REAR	ACGM0146301		BLACK	H
5	MCCC00	CAP,EARPHONE JACK	MCCC0069901	MOLD, Urethane Rubber S195A, , , , ,	WITHOUT COLOR	39
5	MCJN00	COVER,REAR	MCJN0112401	MOLD, PC LUPOY SC-1004A, , , , ,	COLOR UNFIXED	35
5	MIDZ00	INSULATOR	MIDZ0231401	COMPLEX, (empty), , , , ,	WITHOUT COLOR	61
5	MPBU00	PAD,CONNECTOR	MPBU0086001	COMPLEX, (empty), , , , ,	WITHOUT COLOR	38
5	MPBZ00	PAD	MPBZ0294201	COMPLEX, (empty), , , , ,	BLACK	
5	MSAZ00	SHEET	MSAZ0058801	COMPLEX, (empty), , , , ,	BLACK	57
4	GMZZ00	SCREW MACHINE	GMZZ0017701	1.4 mm,3.0 mm,MSWR3 ,N ,+ ,- ,	Silver	49
6	ACKA00	CAN ASSY,SHIELD	ACKA0021201		WITHOUT COLOR	
7	MCBA00	CAN,SHIELD	MCBA0077101	PRESS, STS, , , , ,	WITHOUT COLOR	56
7	MLAB	LABEL,A/S	MLAB0001102	C2000 USASV DIA 4.0	WHITE	60

13. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	ADCA00	DOME ASSY,METAL	ADCA0105401		WITHOUT COLOR	54
6	MLAZ00	LABEL	MLAZ0038301	PID Label 4 Array	WITHOUT COLOR	
3	MLAA00	LABEL,APPROVAL	MLAA0062301	COMPLEX, (empty), , , , ,	WITHOUT COLOR	

13.2 Replacement Parts

order is ordered

<Main component>

by SBOM standard on GCSC

Level	Location No.	Description	Part Number	Spec	Color	Remark
1		GSM(FOLDER)	TGFF0107101		COLOR UNFIXED	
7	BFAA00	FILM,INMOLD	BFAA0121101	; ,[empty] ,0.06 ,44.8 ,82.95	BLACK	
5	SACY00	PCB ASSY,FLEXIBLE	SACY0115001			
6	SACE	PCB ASSY,FLEXIBLE,SMT	SACE0095901			
7	SACC00	PCB ASSY,FLEXIBLE,SMT BOTTOM	SACC0070601			
8	ENBY	CONNECTOR,BOARD TO BOARD	ENBY0051301	40 , mm,STRAIGHT , , ,; , ,0.40MM ,[empty] ,MALE ,[empty] ,[empty] , ,		
8	ENBY00	CONNECTOR,BOARD TO BOARD	ENBY0042601	54 PIN,0.4 mm,ETC , , ,; , ,0.40MM ,[empty] ,MALE ,[empty] ,R/TP , ,		
7	SACD00	PCB ASSY,FLEXIBLE,SMT TOP	SACD0083301			
8	ENBY	CONNECTOR,BOARD TO BOARD	ENBY0039601	20 PIN,0.4 mm,ETC , ,H=1.0, Socket		
7	SPCY	PCB,FLEXIBLE	SPCY0199401	POLYI , mm,MULTI-4 , ,; , , , , , , , , ,		48
5	SJMY00	VIBRATOR,MOTOR	SJMY0007109	3 V,80 mA,10*3.0 ,17mm ,; ,3V , , , , , , ,		45
5	SUSY00	SPEAKER	SUSY0028907	ASSY ,8 ohm,89 dB,1812 mm,3.0T 15mm HAC Coil ,; , , , , , , ,WIRE		46
5	SVCY00	CAMERA	SVCY0019301	CMOS ,VGA ,SS LSI(1/10"), 5x13.5(5)x2.6t, F PCB		47
5	SVLM00	LCD MODULE	SVLM0036702	Main/Sub ,1.76 ,176*220 ,33.6*45.4*3.05T ,262K ,TFT ,TM ,LG4525B, R61514 , ,		B, 44
5	ENZY00	CONNECTOR,ETC	ENZY0015701	3 PIN,3 mm,ETC , ,H=6.5		36
5	SNGF00	ANTENNA,GSM,FIXED	SNGF0053502	3.0 ,-5.0 dBd,, ,internal, GSM850/1900 ,; ,DUAL ,-5.0 ,50 ,3.0		37
4	SAFY	PCB ASSY,MAIN	SAFY0346701			G
5	SAFB00	PCB ASSY,MAIN,INSERT	SAFB0106601			
6	BRAH00	RESIN,PC	BRAH0001301	; , , , ,[empty]	Black	
6	SPKY	PCB,SIDEKEY	SPKY0078801	POLYI ,0.2 mm,DOUBLE , ,; , , , , , , , , ,		
6	SUMY00	MICROPHONE	SUMY0003815	FPCB ,-44 dB,4*1.0 ,TDMA Noise improvement ,; , , ,[empty] ,[empty] , ,FPC		
5	SAFF00	PCB ASSY,MAIN,SMT	SAFF0257401			55
6	BSCB00	SOLDER,CREAM	BSCB0000201	Sn 99%-Ag 0.3%-Cu 0.7%-25~38um (Almit)	Black	
		SOLDER,CREAM	BSCB0000501	Sn 99%-Ag 0.3%-Cu 0.7%-25~38um (Ecojoin)	Black	

13. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	SAFC00	PCB ASSY,MAIN,SMT BOTTOM	SAFC0136001			
7	BAT101	MODULE,ETC	SMZY0023501	3.8 Backup Capacitor 0.03F ,; ,Module Assembly		
7	C101	CAP,CERAMIC,CHIP	ECCH0005603	2.2 uF,10V ,K ,X5R ,TC ,1608 ,R/TP		
7	C102	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
7	C103	CAP,CERAMIC,CHIP	ECCH0000113	18 pF,50V,J,NP0,TC,1005,R/TP		
7	C104	CAP,CHIP,MAKER	ECZH0001216	220 nF,10V ,K ,X5R ,TC ,1005 ,R/TP		
7	C105	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
7	C106	CAP,CERAMIC,CHIP	ECCH0005604	10000000 pF,6.3V ,M ,X5R ,TC ,1608 ,R/TP , , ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,0.8 mm		
7	C107	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP		
7	C108	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP		
7	C109	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP		
7	C110	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
7	C111	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP		
7	C112	CAP,CERAMIC,CHIP	ECCH0000161	33 nF,16V,K,X7R,HD,1005,R/TP		
7	C113	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
7	C114	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
7	C115	CAP,CERAMIC,CHIP	ECCH0000163	47 nF,10V,K,X5R,HD,1005,R/TP		
7	C116	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
7	C117	CAP,CERAMIC,CHIP	ECCH0000113	18 pF,50V,J,NP0,TC,1005,R/TP		
7	C118	CAP,CHIP,MAKER	ECZH0001217	470 nF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
7	C119	CAP,CHIP,MAKER	ECZH0001217	470 nF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
7	C120	CAP,CERAMIC,CHIP	ECCH0000151	4.7 nF,25V,K,X7R,HD,1005,R/TP		
7	C121	CAP,CERAMIC,CHIP	ECCH0002002	47000 pF,10V ,K ,B ,HD ,1005 ,R/TP		
7	C122	CAP,CHIP,MAKER	ECZH0001217	470 nF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
7	C123	CAP,CERAMIC,CHIP	ECCH0002002	47000 pF,10V ,K ,B ,HD ,1005 ,R/TP		
7	C124	CAP,CERAMIC,CHIP	ECCH0002002	47000 pF,10V ,K ,B ,HD ,1005 ,R/TP		
7	C125	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
7	C126	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
7	C127	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
7	C128	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
7	C129	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		

Level	Location No.	Description	Part Number	Spec	Color	Remark
7	C130	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
7	C131	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
7	C132	CAP,CHIP,MAKER	ECZH0000830	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
7	C133	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
7	C134	CAP,CHIP,MAKER	ECZH0001216	220 nF,10V ,K ,X5R ,TC ,1005 ,R/TP		
7	C135	CAP,CHIP,MAKER	ECZH0001216	220 nF,10V ,K ,X5R ,TC ,1005 ,R/TP		
7	C136	CAP,CERAMIC,CHIP	ECCH0000113	18 pF,50V,J,NP0,TC,1005,R/TP		
7	C137	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
7	C138	CAP,CHIP,MAKER	ECZH0025502	22000000 pF,6.3V ,M ,X5R ,HD ,2012 ,R/TP ,; ,0.85t ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,[empty]		
7	C145	CAP,CERAMIC,CHIP	ECCH0005603	2.2 uF,10V ,K ,X5R ,TC ,1608 ,R/TP		
7	C146	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
7	C203	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
7	C204	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
7	C210	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
7	C211	CAP,CERAMIC,CHIP	ECCH0005604	10000000 pF,6.3V ,M ,X5R ,TC ,1608 ,R/TP , , ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,0.8 mm		
7	C212	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
7	C213	CAP,CHIP,MAKER	ECZH0003503	1 uF,25V ,K ,X5R ,HD ,1608 ,R/TP		
7	C214	CAP,CHIP,MAKER	ECZH0025502	22000000 pF,6.3V ,M ,X5R ,HD ,2012 ,R/TP ,; ,0.85t ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,[empty]		
7	C215	CAP,CERAMIC,CHIP	ECCH0000198	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP		
7	C216	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
7	C217	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
7	C218	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
7	C219	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
7	C220	CAP,CERAMIC,CHIP	ECCH0005604	10000000 pF,6.3V ,M ,X5R ,TC ,1608 ,R/TP , , ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,0.8 mm		
7	C221	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
7	C223	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
7	C224	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
7	C225	CAP,CERAMIC,CHIP	ECCH0000129	120 pF,50V,J,NP0,TC,1005,R/TP		
7	C227	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
7	C228	CAP,CERAMIC,CHIP	ECCH0000198	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP		

13. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
7	C229	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
7	C230	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
7	C231	CAP,CERAMIC,CHIP	ECCH0000179	22 nF,16V ,K ,X5R ,HD ,1005 ,R/TP		
7	C232	CAP,CERAMIC,CHIP	ECCH0000179	22 nF,16V ,K ,X5R ,HD ,1005 ,R/TP		
7	C233	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
7	C234	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
7	C235	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
7	C236	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
7	C237	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
7	C238	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
7	C242	CAP,CHIP,MAKER	ECZH0003503	1 uF,25V ,K ,X5R ,HD ,1608 ,R/TP		
7	C243	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
7	C244	CAP,CERAMIC,CHIP	ECCH0006501	10000000 pF,6.3V ,K ,X5R ,TC ,2012 ,R/TP , , ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,1.25 mm		
7	C245	CAP,CERAMIC,CHIP	ECCH0006501	10000000 pF,6.3V ,K ,X5R ,TC ,2012 ,R/TP , , ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,1.25 mm		
7	C246	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
7	C247	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
7	C301	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP		
7	C302	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
7	C303	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
7	C304	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
7	C305	CAP,CERAMIC,CHIP	ECCH0000198	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP		
7	C306	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
7	C308	CAP,CHIP,MAKER	ECZH0025502	22000000 pF,6.3V ,M ,X5R ,HD ,2012 ,R/TP ,; ,0.85t ,[empty] ,[empty] ,[empty] ,[empty] ,[empty] ,[empty]		
7	C309	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
7	C310	CAP,CERAMIC,CHIP	ECCH0000198	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP		
7	C314	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
7	C315	CAP,CERAMIC,CHIP	ECCH0000198	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP		
7	C316	CAP,CERAMIC,CHIP	ECCH0005603	2.2 uF,10V ,K ,X5R ,TC ,1608 ,R/TP		
7	C317	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
7	C318	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		

Level	Location No.	Description	Part Number	Spec	Color	Remark
7	C319	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
7	C320	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
7	C321	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
7	C322	CAP,CHIP,MAKER	ECZH0000813	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
7	C323	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
7	C324	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
7	C325	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
7	C326	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
7	C327	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
7	C328	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
7	C329	CAP,CERAMIC,CHIP	ECCH0000198	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP		
7	C330	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
7	C331	CAP,CHIP,MAKER	ECZH0000813	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
7	C332	CAP,CHIP,MAKER	ECZH0000830	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
7	C333	CAP,CERAMIC,CHIP	ECCH0001001	6.8 pF,50V ,D ,NP0 ,TC ,1005 ,R/TP ,; , ,0.5PF ,50V ,NP0 ,[empty] ,1005 ,R/TP , mm		
7	C334	CAP,CERAMIC,CHIP	ECCH0000105	4 pF,50V,C,NP0,TC,1005,R/TP		
7	C335	CAP,CERAMIC,CHIP	ECCH0001001	6.8 pF,50V ,D ,NP0 ,TC ,1005 ,R/TP ,; , ,0.5PF ,50V ,NP0 ,[empty] ,1005 ,R/TP , mm		
7	C336	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
7	C338	CAP,CERAMIC,CHIP	ECCH0000196	0.75 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
7	C339	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
7	C340	CAP,CERAMIC,CHIP	ECCH0000105	4 pF,50V,C,NP0,TC,1005,R/TP		
7	C341	CAP,CHIP,MAKER	ECZH0000802	1 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
7	C342	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
7	C343	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
7	C344	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
7	C345	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
7	C347	CAP,CHIP,MAKER	ECZH0000813	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
7	C353	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP		
7	C354	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
7	C355	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
7	C357	CAP,CHIP,MAKER	ECZH0000813	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		

13. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
7	CN201	CONNECTOR,I/O	ENRY0008801	5 , mm,ANGLE , , ,; , ,0.64MM ,ANGLE ,[empty] ,DIP ,[empty] ,		
7	CN301	CONNECTOR,BOARD TO BOARD	ENBY0042701	54 PIN,0.4 mm,ETC , , ,; , ,0.40MM ,[empty] ,FEMALE ,SMD ,R/TP , ,		
7	FB101	FILTER,BEAD,CHIP	SFBH0007103	75 ohm,1005 ,CHIP BEAD, 300mA		
7	FB201	FILTER,BEAD,CHIP	SFBH0008102	1800 ohm,1005 ,Bead		
7	FB202	FILTER,BEAD,CHIP	SFBH0008102	1800 ohm,1005 ,Bead		
7	FB203	FILTER,BEAD,CHIP	SFBH0008102	1800 ohm,1005 ,Bead		
7	FB204	FILTER,BEAD,CHIP	SFBH0008102	1800 ohm,1005 ,Bead		
7	FB205	FILTER,BEAD,CHIP	SFBH0008102	1800 ohm,1005 ,Bead		
7	FB206	FILTER,BEAD,CHIP	SFBH0008102	1800 ohm,1005 ,Bead		
7	FB301	FILTER,BEAD,CHIP	SFBH0000912	1000 ohm,1005 ,		
7	FB302	FILTER,BEAD,CHIP	SFBH0000903	600 ohm,1005 ,		
7	FB303	FILTER,BEAD,CHIP	SFBH0000912	1000 ohm,1005 ,		
7	FB304	FILTER,BEAD,CHIP	SFBH0000912	1000 ohm,1005 ,		
7	FB307	FILTER,BEAD,CHIP	SFBH0000912	1000 ohm,1005 ,		
7	FL201	FILTER,EMI/POWER	SFEY0006501	SMD ,3 TERMINAL EMI FILTER		
7	FL301	FILTER,EMI/POWER	SFEY0016001	SMD ,Pb-free_22pF ,; ,Filter,LCR		
7	FL302	FILTER,EMI/POWER	SFEY0016001	SMD ,Pb-free_22pF ,; ,Filter,LCR		
7	FL303	FILTER,SAW,DUAL	SFSB0001301	881.5 MHz,25 MHz,1.8 dB,30 dB,1960 MHz,60 MHz,2.3 dB,12 dB,2.0*1.6*0.68 ,SMD ,869M~894M,1930M~1990M,10p,B,150_82,150_18,GSM850+PCS Rx ,; ,881.5, 1960 ,2.0*1.6*0.68 ,SMD ,R/TP		
7	FL304	FILTER,CERAMIC	SFCY0000901	2450 MHz,2.00*1.25*0.95 ,SMD ,Bluetooth Band Pass Filter		
7	FL305	FILTER,EMI/POWER	SFEY0016001	SMD ,Pb-free_22pF ,; ,Filter,LCR		
7	FL306	FILTER,EMI/POWER	SFEY0016001	SMD ,Pb-free_22pF ,; ,Filter,LCR		
7	FL307	FILTER,EMI/POWER	SFEY0016001	SMD ,Pb-free_22pF ,; ,Filter,LCR		
7	FL308	FILTER,EMI/POWER	SFEY0016001	SMD ,Pb-free_22pF ,; ,Filter,LCR		
7	J201	CONN,SOCKET	ENSY0018701	6 PIN,ETC , ,2.54 mm,H=1.8		
7	L101	INDUCTOR,CHIP	ELCH0001402	18 nH,J ,1005 ,R/TP ,Pb Free		
7	L102	INDUCTOR,SMD,POWER	ELCP0008003	3.3 uH,M ,2.5*2.0*1.0 ,R/TP ,Chip power		
7	L302	INDUCTOR,CHIP	ELCH0003826	3.3 nH,S ,1005 ,R/TP ,chip		
7	L303	INDUCTOR,CHIP	ELCH0003826	3.3 nH,S ,1005 ,R/TP ,chip		
7	L305	INDUCTOR,CHIP	ELCH0001033	1.5 nH,S ,1005 ,R/TP ,PBFREE		

Level	Location No.	Description	Part Number	Spec	Color	Remark
7	L306	INDUCTOR,CHIP	ELCH0004710	15 nH,J ,1005 ,R/TP ,		
7	L307	INDUCTOR,CHIP	ELCH0003824	10 nH,J ,1005 ,R/TP ,chip inductor,PBFREE		
7	L308	INDUCTOR,CHIP	ELCH0004733	4.3 nH,S ,1005 ,R/TP ,Coil		
7	L312	INDUCTOR,CHIP	ELCH0001411	1.2 nH,S ,1005 ,R/TP ,PBFREE		
7	L313	INDUCTOR,CHIP	ELCH0003824	10 nH,J ,1005 ,R/TP ,chip inductor,PBFREE		
7	PT101	THERMISTOR	SETY0006301	NTC ,10000 ohm,SMD ,1005, 3350~3399k, J, R/T, PBFREE		
7	Q101	TR,BJT,NPN	EQBN0020501	ESM ,0.15 W,R/TP , ,; ,NPN ,5V ,60V ,50V ,150mA ,0.1uA MAX ,10 MIN 700 MAX ,100mW ,ESM ,R/TP ,3P		
7	Q201	TR,BJT,NPN	EQBN0020501	ESM ,0.15 W,R/TP , ,; ,NPN ,5V ,60V ,50V ,150mA ,0.1uA MAX ,10 MIN 700 MAX ,100mW ,ESM ,R/TP ,3P		
7	R101	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
7	R104	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
7	R105	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
7	R106	RES,CHIP,MAKER	ERHZ0000484	470 ohm,1/16W ,J ,1005 ,R/TP		
7	R107	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
7	R108	RES,CHIP,MAKER	ERHZ0000204	100 Kohm,1/16W ,F ,1005 ,R/TP		
7	R109	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
7	R110	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
7	R111	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
7	R112	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
7	R113	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
7	R115	RES,CHIP,MAKER	ERHZ0000475	3900 ohm,1/16W ,J ,1005 ,R/TP		
7	R116	RES,CHIP,MAKER	ERHZ0000499	5600 ohm,1/16W ,J ,1005 ,R/TP		
7	R117	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
7	R120	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
7	R121	RES,CHIP,MAKER	ERHZ0000506	6800 ohm,1/16W ,J ,1005 ,R/TP		
7	R122	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
7	R150	RES,CHIP,MAKER	ERHZ0000203	10 Kohm,1/16W ,F ,1005 ,R/TP		
7	R202	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
7	R203	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
7	R206	RES,CHIP,MAKER	ERHZ0000240	20 ohm,1/16W ,F ,1005 ,R/TP		
7	R208	RES,CHIP,MAKER	ERHZ0000485	4700 ohm,1/16W ,J ,1005 ,R/TP		

13. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
7	R210	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
7	R211	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
7	R212	RES,CHIP,MAKER	ERHZ0000463	33 ohm,1/16W ,J ,1005 ,R/TP		
7	R214	RES,CHIP,MAKER	ERHZ0000412	1200 ohm,1/16W ,J ,1005 ,R/TP		
7	R217	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
7	R219	RES,CHIP,MAKER	ERHZ0000240	20 ohm,1/16W ,F ,1005 ,R/TP		
7	R221	RES,CHIP,MAKER	ERHZ0000463	33 ohm,1/16W ,J ,1005 ,R/TP		
7	R222	RES,CHIP	ERHY0000275	56K ohm,1/16W,J,1005,R/TP		
7	R224	RES,CHIP,MAKER	ERHZ0000404	1 Kohm,1/16W ,J ,1005 ,R/TP		
7	R226	RES,CHIP,MAKER	ERHZ0000201	100 ohm,1/16W ,F ,1005 ,R/TP		
7	R227	RES,CHIP,MAKER	ERHZ0000201	100 ohm,1/16W ,F ,1005 ,R/TP		
7	R228	RES,CHIP,MAKER	ERHZ0000420	150 ohm,1/16W ,J ,1005 ,R/TP		
7	R229	RES,CHIP,MAKER	ERHZ0000420	150 ohm,1/16W ,J ,1005 ,R/TP		
7	R230	RES,CHIP,MAKER	ERHZ0000420	150 ohm,1/16W ,J ,1005 ,R/TP		
7	R231	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
7	R232	RES,CHIP,MAKER	ERHZ0000204	100 Kohm,1/16W ,F ,1005 ,R/TP		
7	R233	RES,CHIP,MAKER	ERHZ0000204	100 Kohm,1/16W ,F ,1005 ,R/TP		
7	R234	RES,CHIP,MAKER	ERHZ0000295	51 Kohm,1/16W ,F ,1005 ,R/TP		
7	R236	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
7	R237	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
7	R238	RES,CHIP	ERHY0000185	820 ohm,1/16W ,F ,1005 ,R/TP		
7	R239	RES,CHIP,MAKER	ERHZ0000278	3900 ohm,1/16W ,F ,1005 ,R/TP		
7	R240	RES,CHIP,MAKER	ERHZ0000420	150 ohm,1/16W ,J ,1005 ,R/TP		
7	R244	RES,CHIP,MAKER	ERHZ0000478	3.3 ohm,1/16W ,J ,1005 ,R/TP		
7	R245	RES,CHIP,MAKER	ERHZ0000478	3.3 ohm,1/16W ,J ,1005 ,R/TP		
7	R301	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
7	R303	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
7	R304	RES,CHIP,MAKER	ERHZ0000423	150 Kohm,1/16W ,J ,1005 ,R/TP		
7	R305	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
7	R306	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
7	R307	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
7	R312	RES,CHIP	ERHY0000128	15K ohm,1/16W,F,1005,R/TP		

Level	Location No.	Description	Part Number	Spec	Color	Remark
7	R313	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
7	R317	RES,CHIP,MAKER	ERHZ0000408	110 ohm,1/16W ,J ,1005 ,R/TP , ,110 OHM ,5% ,1/16W ,1005 ,R/TP		
7	R321	RES,CHIP,MAKER	ERHZ0000408	110 ohm,1/16W ,J ,1005 ,R/TP , ,110 OHM ,5% ,1/16W ,1005 ,R/TP		
7	R322	RES,CHIP,MAKER	ERHZ0000408	110 ohm,1/16W ,J ,1005 ,R/TP , ,110 OHM ,5% ,1/16W ,1005 ,R/TP		
7	R323	RES,CHIP,MAKER	ERHZ0000408	110 ohm,1/16W ,J ,1005 ,R/TP , ,110 OHM ,5% ,1/16W ,1005 ,R/TP		
7	R326	RES,CHIP,MAKER	ERHZ0000404	1 Kohm,1/16W ,J ,1005 ,R/TP		
7	R330	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
7	R331	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
7	SW301	CONN,RF SWITCH	ENWY0004501	,SMD , dB,H=3.6, Straight type		
7	U101	IC	EUSY0368502	BGA ,56 ,R/TP ,512M NOR + 128M pSRAM 1.8V AD_AAD MUX, 8 by 8 ,56 ,R/TP , ,; ,IC,MCP		
7	U102	IC	EUSY0366601	BGA ,210 ,R/TP ,EDGE RF, BB, PM, FM RDS Onechip BB, 216pin, 0.5mm pitch ,; ,IC,Digital Baseband Processor		
7	U201	IC	EUSY0388501	DFN ,10 ,R/TP ,Cal Test Mode Single Charger IC for Micro USB ,; ,IC,Charger		
7	U205	IC	EUSY0405401	CSP ,20 ,R/TP ,MUIC ,; ,IC,Analog Multiplexer		
7	U301	IC	EUSY0344402	QFN ,20 ,R/TP ,4CH,2LDO,3X3 ,; ,IC,Sub PMIC		
7	U302	IC	EUSY0382201	FPBGA ,50 ,R/TP ,4.5x4.0x0.6, BT2.1, 0.5pitch ,; ,IC,Bluetooth		
7	U303	RF MODULE,HANDSET	SMRH0005801	MHz, MHz, ,GSM Dual Tx Module		
7	VA101	VARISTOR	SEVY0003901	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420, 1.0*0.5*0.6 , ,5.5 , ,480 ,1.0*0.5*0.6 ,[empty] ,SMD ,R/TP		
7	VA201	VARISTOR	SEVY0003901	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420, 1.0*0.5*0.6 , ,5.5 , ,480 ,1.0*0.5*0.6 ,[empty] ,SMD ,R/TP		
7	VA202	VARISTOR	SEVY0003901	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420, 1.0*0.5*0.6 , ,5.5 , ,480 ,1.0*0.5*0.6 ,[empty] ,SMD ,R/TP		
7	VA204	VARISTOR	SEVY0003901	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420, 1.0*0.5*0.6 , ,5.5 , ,480 ,1.0*0.5*0.6 ,[empty] ,SMD ,R/TP		
7	VA205	VARISTOR	SEVY0003901	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420, 1.0*0.5*0.6 , ,5.5 , ,480 ,1.0*0.5*0.6 ,[empty] ,SMD ,R/TP		
7	VA208	VARISTOR	SEVY0003901	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420, 1.0*0.5*0.6 , ,5.5 , ,480 ,1.0*0.5*0.6 ,[empty] ,SMD ,R/TP		
7	VA209	VARISTOR	SEVY0003901	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420, 1.0*0.5*0.6 , ,5.5 , ,480 ,1.0*0.5*0.6 ,[empty] ,SMD ,R/TP		
7	VA210	VARISTOR	SEVY0003901	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420, 1.0*0.5*0.6 , ,5.5 , ,480 ,1.0*0.5*0.6 ,[empty] ,SMD ,R/TP		

13. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
7	VA211	VARISTOR	SEVY0003901	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420, 1.0*0.5*0.6 , ,5.5 , ,480 ,1.0*0.5*0.6 ,[empty] ,SMD ,R/TP		
7	VA212	VARISTOR	SEVY0003901	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420, 1.0*0.5*0.6 , ,5.5 , ,480 ,1.0*0.5*0.6 ,[empty] ,SMD ,R/TP		
7	VA213	VARISTOR	SEVY0003901	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420, 1.0*0.5*0.6 , ,5.5 , ,480 ,1.0*0.5*0.6 ,[empty] ,SMD ,R/TP		
7	VA214	VARISTOR	SEVY0003901	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420, 1.0*0.5*0.6 , ,5.5 , ,480 ,1.0*0.5*0.6 ,[empty] ,SMD ,R/TP		
7	VA215	VARISTOR	SEVY0003901	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420, 1.0*0.5*0.6 , ,5.5 , ,480 ,1.0*0.5*0.6 ,[empty] ,SMD ,R/TP		
7	VA216	VARISTOR	SEVY0003901	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420, 1.0*0.5*0.6 , ,5.5 , ,480 ,1.0*0.5*0.6 ,[empty] ,SMD ,R/TP		
7	VA217	VARISTOR	SEVY0003901	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420, 1.0*0.5*0.6 , ,5.5 , ,480 ,1.0*0.5*0.6 ,[empty] ,SMD ,R/TP		
7	VA218	VARISTOR	SEVY0003901	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420, 1.0*0.5*0.6 , ,5.5 , ,480 ,1.0*0.5*0.6 ,[empty] ,SMD ,R/TP		
7	VA219	VARISTOR	SEVY0003901	5.5 V, ,SMD ,Vdc 5.5, Vb 8, Cp 420, 1.0*0.5*0.6 , ,5.5 , ,480 ,1.0*0.5*0.6 ,[empty] ,SMD ,R/TP		
7	X101	X-TAL	EXXY0018404	26 MHz,10 PPM,8 pF,40 ohm,SMD ,3.2*2.5*0.6 ,12ppm at -30'C ~ +85'C, C0 1.0pF, C1 3.6fF ,; ,26 ,10PPM ,8 , , ,SMD ,R/TP		
7	X102	X-TAL	EXXY0004602	.032768 MHz,20 PPM,12.5 pF,65000 ohm,SMD ,6.9*1.4*1.3 ,		
7	ZD101	DIODE,TVS	EDTY0008606	DFN-2 ,7.82 V,150 mW,R/TP ,PB-FREE		
6	SAFD00	PCB ASSY,MAIN,SMT TOP	SAFD0133401			
7	L311	INDUCTOR,CHIP	ELCH0001421	47 nH,J ,1005 ,R/TP ,PBFREE		
7	LD201	DIODE,LED,CHIP	EDLH0015107	WHITE ,ETC ,R/TP ,3.8x1.1x0.4t ,; ,[empty] ,2.95~3.25V ,30mA ,1200~1600mcd ,X:(0.287~0.311), Y:(0.276~0.315) ,110mW ,[empty] ,[empty] ,2P		
7	LD202	DIODE,LED,CHIP	EDLH0015107	WHITE ,ETC ,R/TP ,3.8x1.1x0.4t ,; ,[empty] ,2.95~3.25V ,30mA ,1200~1600mcd ,X:(0.287~0.311), Y:(0.276~0.315) ,110mW ,[empty] ,[empty] ,2P		
7	SPFY00	PCB,MAIN	SPFY0210801	FR-4 ,0.8 mm,BUILD-UP 6 , ,; , , , , , , , , ,		
7	U202	IC	EUSY0362601	SSON004 ,4 ,R/TP ,Hall IC ,; ,IC,CMOS		

13.3 Accessory

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

Level	Location No.	Description	Part Number	Spec	Color	Remark
3	SBPL00	BATTERY PACK,LI-ION	SBPL0089901	3.7 V,900 mAh,1 CELL,PRISMATIC ,CE110 BATT, LGC-IP, Pb-Free ,; ,3.7 ,900 ,0.2C ,PRISMATIC ,50x34x46 , ,BLACK ,Innerpack ,North America Label	Black	58
3	SSAD	ADAPTOR,AC-DC	SSAD0034401	100-240V ,5060 Hz,4.8 V,0.4 A,UL / CSA ,AC-DC ADAPTOR ,; ,90Vac~264Vac ,4.8Vdc ,400mA ,5060 , ,WALL 2P ,USB ,		