Service Manual

LG

Service Manual

U8290

Model : U8290

Date: August, 2005 / Issue 1.0

Table Of Contents

Table Of Contents

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 phones 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 the phones 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

A 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.

2. PERFORMANCE

2.1 System Overview

Item	Specification
Shape	GSM900/1800/1900 and WCDMA Folder Handset
Size	89.2 X 47.8 X 24.5 mm
Weight	115 g (with Battery)
Power	4.0V normal, 1400 mAh Li-Polymer
Talk Time	Over 170 min (WCDMA, Tx=12 dBm, Voice) Over 220 min (GSM, Tx=Max, Voice)
Standby Time	Over 170 Hrs (WCDMA, DRX=1.28) Over 250 Hrs (GSM, Paging period=9)
Antenna	Fixed Type (Fixed Screw)
LCD	Main 176 X 220 pixel (TFT) / sub 96 X 96 pixel (CSTN)
LCD Backlight	White LED Back Light (2way ; main/sub common)
Camera	1.3 Mega pixel (CMOS)
Vibrator	Yes (Coin Type)
LED Indicator	No
C-MIC	Yes
Receiver	Yes
Earphone Jack	Yes (12 pin)
Connectivity	Bluetooth, USB
Volume Key	Push Type(+, -)
External Memory	Trans-Flash
I/O Connect	24 Pin

2.2 Usable environment

1) Environment

Item	Spec.
Voltage	4.0 V(Typ), 3.38 V(Min), [Shut Down : 3.28 V]
Operation Temp	-20 ~ +60 °C
Storage Temp	-30 ~ +85 °C
Humidity	85 % (Max)

2) Environment (Accessory)

Item	Spec.	Min	Typ.	Max	Unit
TA Power	Available power	100	220	240	Vac

* CLA : 12 ~ 24 V(DC)

2.3 Radio Performance

1) Transmitter - GSM Mode

No	Item		GSM		DCS & PCS	
1	Conducted Spurious Emission	MS allocated Channel	100k~1GHz	-39dBm	9k ~ 1GHz	-39dBm
					1G~[A]MHz	-33dBm
			1G~12.75GHz	-33dBm	[A]M~[B]MHz	-39dBm
					[B]M~12.75GHz	-33dBm
		Idle Mode	100k~880MHz	-60dBm	100k~880MHz	-60dBm
			880M~915MHz	-62dBm	880M~915MHz	-62dBm
			915M~1GHz	-60dBm	915M~1GHz	-60dBm
			1G~[A]MHz	-50dBm	1G~[A]MHz	-50dBm
			[A]M~[B]MHz	-56dBm	[A]M~[B]MHz	-56dBm
			[B]M~12.5GHz	-50dBm	[B]M~12.5GHz	-50dBm

* In case of DCS : [A] -> 1710, [B] -> 1785

* In case of PCS : [A] -> 1850, [B] -> 1910

2. PERFORMANCE

No	Item		GSM		DCS & PCS	
2	Radiated Spurious Emission	MS allocated Channel	30M ~ 1GHz	-36dBm	30M~1GHz	-36dBm
					1G~[A]MHz	-30dBm
			1G ~ 4GHz	-30dBm	[A]M~[B]MHz	-36dBm
					[B]M~4GHz	-30dBm
		Idle Mode	30M ~ 880MHz	-57dBm	30M~880MHz	-57dBm
			880M ~ 915MHz	-59dBm	880M~915MHz	-59dBm
			915M~1GHz	-57dBm	915M~1GHz	-57dBm
			1G~[A]MHz	-47dBm	1G~[A]MHz	-47dBm
			[A]M~[B]MHz	-53dBm	[A]M~[B]MHz	-53dBm
			[B]M~4GHz	-47dBm	[B]M~4GHz	-47dBm
3	Frequency Error		±0.1ppm		±0.1ppm	
4	Phase Error		±5(RMS)		±5(RMS)	
			±20(PEAK)		±20(PEAK)	
5	Frequency Error Under Multipath and Interference Condition		3dB below reference sensitivity		3dB below reference sensitivity	
			RA250 : ±200Hz		RA250: ±250Hz	
			HT100 : ±100Hz		HT100: ±250Hz	
			TU50 : ±100Hz		TU50: ±150Hz	
			TU3 : ±150Hz		TU1.5: ±200Hz	
6	Output RF Spectrum	Due to modulation	0 ~ 100kHz	+0.5dB	0 ~ 100kHz	+0.5dB
			200kHz	-30dB	200kHz	-30dB
			250kHz	-33dB	250kHz	-33dB
			400kHz	-60dB	400kHz	-60dB
			600 ~ 1800kHz	-66dB	600 ~ 1800kHz	-60dB
			1800 ~ 3000kHz	-69dB	1800 ~ 6000kHz	-65dB
			3000 ~ 6000kHz	-71dB	≥6000kHz	-73dB
			≥6000kHz	-77dB		
		Due to Switching transient	400kHz	-19dB	400kHz	-22dB
			600kHz	-21dB	600kHz	-24dB
			1200kHz	-21dB	1200kHz	-24dB
			1800kHz	-24dB	1800kHz	-27dB

*** In case of DCS : [A] -> 1710, [B] -> 1785** *** In case of PCS : [A] -> 1850, [B] -> 1910**

No	Item	GSM			DCS & PCS		
7	Intermodulation attenuation		–		Frequency offset		800kHz
					Intermodulation product should be Less than 55dB below the level of Wanted signal		
8	Transmitter Output Power	Power control Level	Power (dBm)	Tolerance (dB)	Power control Level	Power (dBm)	Tolerance (dB)
		5	33	±3	0	30	±3
		6	31	±3	1	28	±3
		7	29	±3	2	26	±3
		8	27	±3	3	24	±3
		9	25	±3	4	22	±3
		10	23	±3	5	20	±3
		11	21	±3	6	18	±3
		12	19	±3	7	16	±3
		13	17	±3	8	14	±3
		14	15	±3	9	12	±4
		15	13	±3	10	10	±4
		16	11	±5	11	8	±4
		17	9	±5	12	6	±4
		18	7	±5	13	4	±4
		19	5	±5	14	2	±5
					15	0	±5
9	Burst timing	Mask IN			Mask IN		

2) Transmitter-WCDMA Mode

No	Item	Specification
1	Maximum Output Power	Class3: +24dBm(+1/-3dB) Class4: +21dBm(±2dB)
2	Frequency Error	±0.1ppm
3	Open Loop Power control in uplink	±9dB@normal, ±12dB@extreme
4	Inner Loop Power control in uplink	Adjust output(TPC command) cmd 1dB 2dB 3dB +1 +0.5/1.5 +1/3 +1.5/4.5 0 -0.5/+0.5 -0.5/+0.5 -0.5/+0.5 -1 -0.5/-1.5 -1/-3 -1.5/-4.5 group(10equal command group) +1 +8/+12 +16/+24
5	Minimum Output Power	-50dBm(3.84MHz)
6	Out-of-synchronization handling of output power	Qin/Qout : PCCH quality levels Toff@DPCCH/Ior : -22 -> -28dB Ton@DPCCH/Ior : -24 -> -18dB
7	Transmit OFF Power	-56dBm(3.84MHz)
8	Transmit ON/OFF Time Mask	±25us PRACH,CPCH,uplinlk compressed mode
9	Change of TFC	±25us Power varies according to the data rate DTX : DPCH off (minimize interference between UE)
10	Power setting in uplink compressed	±3dB(after 14slots transmission gap)
11	Occupied Bandwidth(OBW)	5MHz(99%)
12	Spectrum emission Mask	-35-15*(Δf-2.5)dBc@Δf=2.5~3.5MHz, 30k -35-1*(Δf-3.5)dBc@Δf=3.5~7.5MHz, 1M -39-10*(Δf-7.5)dBc@Δf=7.5~8.5MHz, 1M -49 dBc@Δf=8.5~12.5MHz, 1M

No	Item	Specification
13	Adjacent Channel Leakage Ratio(ACLR)	33dB@5MHz, ACP>-50dBm 43dB@10MHz, ACP>-50dBm
14	Spurious Emissions (*: additional requirement)	-36dBm@f=9~150KHz, 1K BW -36dBm@f=50KHz~30MHz, 10K BW -36dBm@f=30MHz~1000MHz, 100K BW -30dBm@f=1~12.5GHz, 1M BW (*)-41dBm@f=1893.5~1919.6MHz, 300K (*)-67dBm@f=925~935MHz, 100K BW (*)-79dBm@f=935~960MHz, 100K BW (*)-71dBm@f=1805~1880MHz, 100K BW
15	Transmit Intermodulation	-31dBc@5MHz,Interferer -40dBc -41dBc@10MHz, Interferer -40dBc
16	Error Vector Magnitude(EVM)	17.5%(>-20dBm) (@12.2K, 1DPDCH+1DPCCH)
17	Transmit OFF Power	-15dB@SF=4.768Kbps, Multi-code transmission

3)Receiver - GSM Mode

No	Item		GSM	DCS & PCS
1	Sensitivity (TCH/FS Class II)		-105dBm	-105dBm
2	Co-Channel Rejection (TCH/FS Class II, RBER, TU high/FH)		C/Ic=7dB	Storage -30 ~ +85
3	Adjacent Channel Rejection	200kHz	C/Ia1=-12dB	C/Ia1=-12dB
		400kHz	C/Ia2=-44dB	C/Ia2=-44dB
4	Intermodulation Rejection		Wanted Signal: -98dBm 1st interferer: -44dBm 2nd interferer: -45dBm	Wanted Signal: -96dBm 1st interferer: -44dBm 2nd interferer: -44dBm
5	Blocking Response (TCH/FS Class II, RBER)		Wanted Signal: -101dBm Unwanted : Depend on Frequency	Wanted Signal: -101dBm Unwanted : Depend on Frequency

4) Receiver - WCDMA Mode

No	Item	Specification
1	Reference Sensivitivity Level	-106.7dBm(3.84 MHz)
2	Maximum Input Level	-25dBm(3.84MHz) -44dBm/3.84MHz(DPCH_Ec) UE@+20dBm output power(Class3)
3	Adjacent Channel Selectivity(ACS)	33dB UE@+20dBm output power(Class3)
4	In-band Blocking	-56dBm/3.84MHz@10MHz UE@+20dBm output power(Class3)
		-44dBm/3.84MHz@15MHz UE@+20dBm output power(Class3)
5	Out-band Blocking	-44dBm/3.84MHz@f=2050~2095 and 2185~2230MHz UE@+20dBm output power(Class3)
		-30dBm/3.84MHz@f=2025~2050 and 2230~2255MHz UE@+20dBm output power(Class3)
		-15dBm/3.84MHz@f=1~2025 and 2255~12500MHz UE@+20dBm output power(Class3)
6	Spurious Response	-44dBm CW UE@+20dBm output power(Class3)
7	Intermodulation Characteristic	-46dBm CW@10MHz -46dBm/3.84MHz@20MHz UE@+20dBm output power(Class3)
8	Spurious Emissions	-57dBm@f=9KHz~1GHz, 100K BW -47dBm@f=1~12.5GHz, 1M BW -60dBm@f=1920MHz~1980MHz, 3.84M BW -60dBm@f=2110MHz~2170MHz, 3.84M BW

2.4 Current Consumption

	Stand by	Voice Call	VT
WCDMA	Under 8.5 mA (DRX=1.28)	Under 450 mA (Tx=12dBm)	Under 640mA (Tx=12dBm)
GSM	Under 6.3 mA (Paging=9period) Under 7.0 mA (@Bluetooth Connected, Paging=9period)	Under 380 mA (Tx=Max)	

(Stand by and Voice Call Test Condition : Bluetooth off, LCD backlight Off)
(VT Test Condition : Speaker off, LCD backlight On)

2.5 RSSI Bar

Level Change	WCDMA	GSM
BAR 5 → 4	-85 ±2 dBm	-85 ±2 dBm
BAR 4 → 3	-90 ±2 dBm	-90 ±2 dBm
BAR 3 → 2	-95 ±2 dBm	-95 ±2 dBm
BAR 2 →1	-98 ±2 dBm	-100 ±2 dBm
BAR 1 → 0	-101 ±2 dBm	-105 ±2 dBm

2.6 Battery Bar

Indication	Standby
Bar 4	Over 3.83 ±0.05V
Bar 4 → 3	3.82 ±0.05V
Bar 3 → 2	3.74 ±0.05V
Bar 2 → 1	3.67 ±0.05V
Bar 1 → Empty	3.49 ±0.05V
Low Voltage, Warning message+ Blinking	3.38 ±0.05V (Stand-by) / 3.49 ±0.05V (Talk) [Interval : 3min(Stand-by) / 1min(Talk)]
Power Off	3.28 ±0.05V↓

2.7 Sound Pressure Level

No	Test Item		Specification	
1	Sending Loudness Rating (SLR)	MS	8 ±3 dB	
2	Receiving Loudness Rating (RLR)	MS	Nor	-7 ±3 dB
		MS	Max	-18 ±3 dB
3	Side Tone Masking Rating (STMR)	MS	Min	17 dB
4	Echo Loss (EL)	MS	Min	40 dB
5	Sending Distortion (SD)	MS	Refer to Table 30.3	
6	Receiving Distortion (RD)	MS	Refer to Table 30.4	
7	Idle Noise-Sending (INS)	MS	Max	-64 dBm0p
8	Idle Noise-Receiving (INR)	MS	Nor	Under -47 dBPA
		MS	Max	Under -36 dBPA
9	Sending Loudness Rating (SLR)	Headset	8±3dB	
10	Receiving Loudness Rating (RLR)	Headset	Nor	-1 ±3 dB
		Headset	Max	-12 ±3 dB
11	Side Tone Masking Rating (STMR)	Headset	Min	25 dB
12	Echo Loss (EL)	Headset	Min	40 dB
13	Sending Distortion (SD)	Headset	Refer to Table 30.3	
14	Receiving Distortion (RD)	Headset	Refer to Table 30.4	
15	Idle Noise-Sending (INS)	Headset	Max	-55 dBm0p
16	Idle Noise-Receiving (INR)	Headset	Nor	Under -45 dBPA
		Headset	Max	Under -40 dBPA
17	TDMA Noise -. GSM : Power Level : 5 DCS/PCS : Power Level : 0 (Cell Power : -90 ~ -105 dBm) -,. Acoustic (Max Vol.) MS/Headset SLR : 8 ±3dB MS/Headset RLR : -18 ±3dB / -15dB (SLR/RLR : Mid-value setting)	MS and Headset	Max	-62 dBm

2.8 Charging

- **Charging Method :** CC & CV (Constant Current and Constant Voltage)
- **Maximum Charging Voltage :** 4.2 V
- **Maximum Charging Current :** 600 mA
- **Normal Battery Capacity :** 1400 mAh
- **Charging Time :** Max 4.0 hours (except for trickle charging time)
- **Full charging indication current (charging icon stop current) :** 60 mA
- **Cut-off voltage :** 3.28 V

3. TECHNICAL BRIEF

3.1 General Description

The U8290 supports UMTS-2100 DS-WCDMA, EGSM-900, DCS-1800, and PCS-1900. All receivers and the UMTS transmitter use the radioOne1Zero-IF architecture to eliminate intermediate frequencies, directly converting signals between RF and baseband. The EGSM, DCS1800 and PCS1900 transmitters use a baseband-to-IF upconversion followed by an offset phase-locked loop that translates the GMSK-modulated signal to RF.

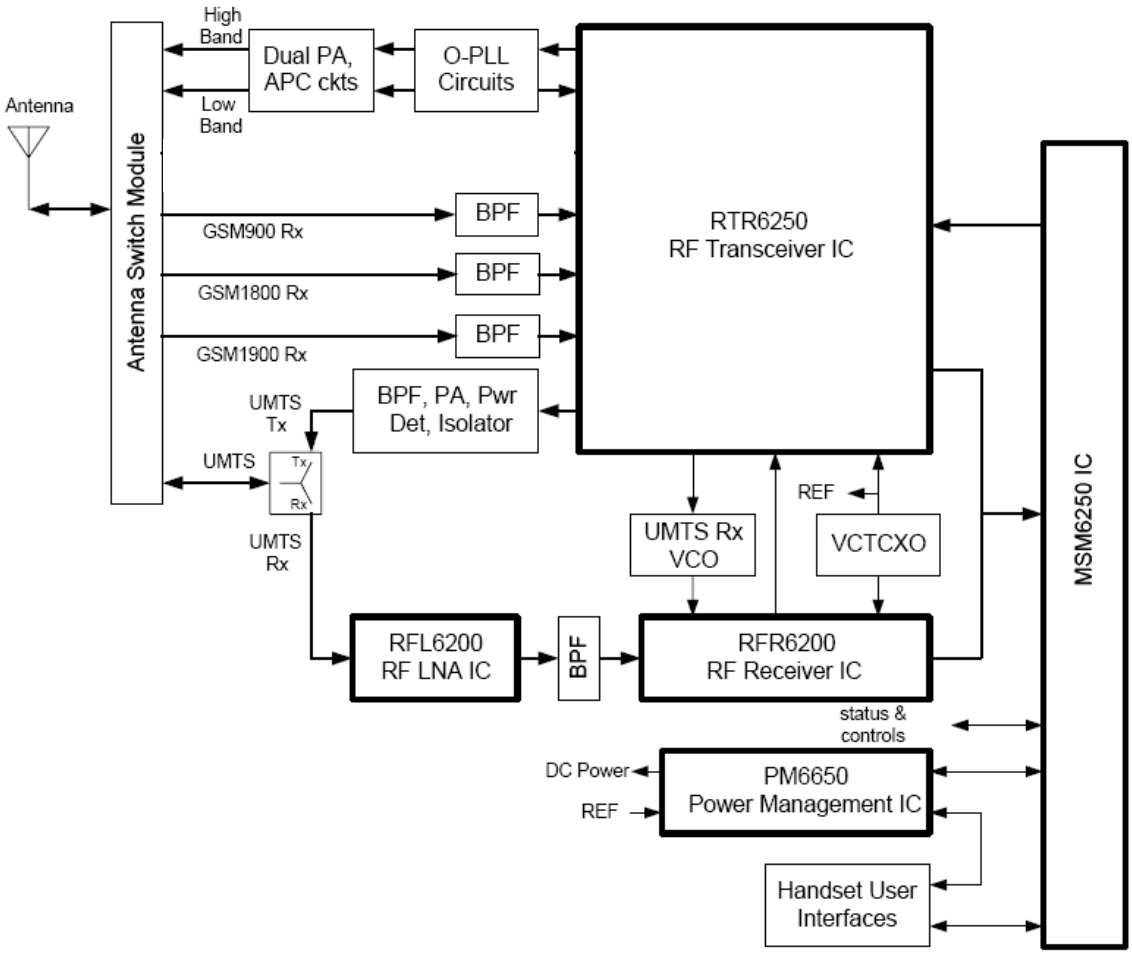


Figure 3.1-1 Block diagram of RF part

[1] QUALCOMM's branded chipset that implements a Zero-IF radio architecture.

A generic, high-level functional block diagram of U8290 is shown in Figure 1-1. One antenna collects base station forward link signals and radiates handset reverse link signals. The antenna connects with receive and transmit paths through a switch module (plus a duplexer for UMTS-2100 operation).

The UMTS receive signal is amplified by the RFL6200 LNA then passes through a bandpass filter before being applied to the RFR6200 Receiver IC. On-chip circuits downconvert the received signal directly from RF to baseband using radioOne Zero-IF techniques. Generation of the UMTS downconverter LO is distributed between the RTR6250 (phase-locked loop), the RFR6200 (buffer amplifiers and LO distribution circuits) and external UHF VCO and loop filter circuits. The RFR6200 IC outputs analog baseband signals for further processing by the MSM device. This baseband interface is shared with the RTR6250 EGSM /DCS/PCS receiver outputs.

EGSM, DCS and PCS receive signals pass through their bandpass filters then are applied to the RTR6250 IC. Similar to the UMTS path, RTR6250 circuits downconvert the received signals directly from RF to baseband. The EGSM/DCS/PCS downconverter LO is generated mostly within the RTR6250 (PLL and distribution functions); the UMTS Rx CH VCO and loop filter are off-chip. The RTR analog baseband outputs are routed to the MSM6250 IC for further processing (an interface shared with the RFR).

The UMTS transmit path begins with analog baseband signals from the MSM device that drive the RTR6250 IC. Integrated PLL and VCO circuits generate the Tx LO used in the quadrature upconverter that translates baseband signals directly to RF. The RTR6250 output driver stages deliver fairly high-level signals that are filtered and applied to the power amplifiers (PA). The PA output is routed to the antenna through a duplexer and switch module.

The shared EGSM-900, DCS-1800, and PCS-1900 transmit path begins with the same baseband interface from the MSM6250 IC that is used for the UMTS band. A single EGSM/DCS/PCS quadrature upconverter translates the GMSK-modulated signal to a convenient intermediate frequency (IF) that forms one input to an offset phase-locked loop (OPLL). OPLL functions are split between the RTR6250 IC and off-chip loop filter and dual Tx VCO circuits, and translate the GMSK-modulated signal to the desired EGSM-900, DCS-1800 or PCS-1900 channel frequency. This signal is applied to a dual power amplifier (only one is active at a time). The enabled path continues with the PA, an automated power control (APC) circuit that samples the transmit power and adjusts its level, the switch module (which includes a band-appropriate lowpass filter), and the antenna.

U8290 power supply voltages are managed and regulated by the PM6650 Power Management IC. This versatile device integrates all wireless handset power management, general housekeeping, and user interface support functions into a single mixed signal IC. It monitors and controls the external power source and coordinates battery recharging while maintaining the handset supply voltages using low dropout, programmable regulators.

3. TECHNICAL BRIEF

The device's general housekeeping functions include an ADC and analog multiplexer circuit for monitoring on-chip voltage sources, charging status, and current flow, as well as user-defined off-chip variables such as temperature, RF output power, and battery ID. Various oscillator, clock, and counter circuits support IC and higher-level handset functions. Key parameters such as under-voltage lockout and crystal oscillator signal presence are monitored to protect against detrimental conditions.

3.2 GSM Mode

3.2.1 GSM Receiver

The Dual-mode U8290's receiver functions are split between the three RFICs as follows:

- UMTS-2100 operation uses the RFL6200 LNA and RFR6200 Receiver ICs to implement the receive signal path, accepting an RF input and delivering analog baseband outputs (I and Q).
- EGSM-900, DCS-1800, and PCS-1900 modes both use the RTR6250 IC only.

Each mode has independent front-end circuits and down-converters, but they share common baseband circuits (with only one mode active at a time). All receiver control functions are beginning with SBI[2]-controlled parameters.

RF Front end consists of antenna, antenna switch module(SFAY0004601), and three RX saw filters(GSM, DCS, and PCS). The antenna switch module allows multiple operating bands and modes to share the same antenna. In U8290, a common antenna connects to one of six paths: 1) UMTS-2100 Rx/Tx, 2) EGSM-900 Rx, 3) EGSM-900 Tx, 4) DCS-1800 Rx, and 5) DCS-1800,PCS-1900 Tx(High Band Tx's share the same path), 6) PCS-1900 Rx. UMTS operation requires simultaneous reception and transmission, so the UMTS Rx/Tx connection is routed to a duplexer that separates receive and transmit signals. EGSM, DCS, and PCS operation is time division duplexed, so only the receiver or transmitter is active at any time and a frequency duplexer is not required.

	ANT_SEL2 GPIO(11)	ANT_SEL1 GPIO(10)	ANT_SEL0 GPIO(9)
GSM 900 TX	LOW	LOW	HIGH
GSM 900 RX/W-CDMA	LOW	LOW	LOW
DCS 1800/PCS 1900 TX	HIGH	HIGH	LOW
DCS 1800 RX	LOW	HIGH	LOW
PCS 1900 RX	HIGH	LOW	LOW

Table 3.2.1-1 Antenna Switch Module Control logic

[2] The RFIC operating modes and circuit parameters are MSM-controlled through the proprietary 3-line Serial Bus Interface (SBI). The Application Programming Interface (API) is used to implement SBI commands. The API is documented in AMSS Software - please see applicable AMSS Software documentation for details.

3. TECHNICAL BRIEF

The EGSM, DCS, and PCS receiver inputs of RTR6250 are connected directly to the transceiver front-end circuits(filters and antenna switch module). EGSM, DCS, and PCS receiver inputs are similar to the RFR6200 UMTS Rx input in that they also use differential configurations to improve common-mode rejection and second-order non-linearity performance. The balance between the complementary signals is critical and must be maintained from the RF filter outputs all the way into the IC pins

Since EGSM, DCS, and PCS signals are time-division duplex (the handset can only receive or transmit at one time), switches are used to separate Rx and Tx signals in place of frequency duplexers - this is accomplished in the switch module.

The EGSM, DCS, and PCS receive signals are routed to the RTR6250 through band selection filters and matching networks that transform single-ended 50-Ωsources to differential impedances optimized for gain and noise figure. Similar to the RFR, the RTR input uses a differential configuration to improve second-order inter-modulation and common mode rejection performance. The RTR6250 input stages include MSM-controlled gain adjustments that maximize receiver dynamic range.

The amplifier outputs drive the RF ports of the quadrature RF-to-baseband downconverters. The downconverted baseband outputs are multiplexed and routed to lowpass filters (one I and one Q) having passband and stopband characteristics suitable for GMSK processing. These filter circuits include DC offset corrections.
The filter outputs are buffered and passed on to the MSM6250 IC for further processing (an interface shared with the RFR6200 UMTS receiver outputs).

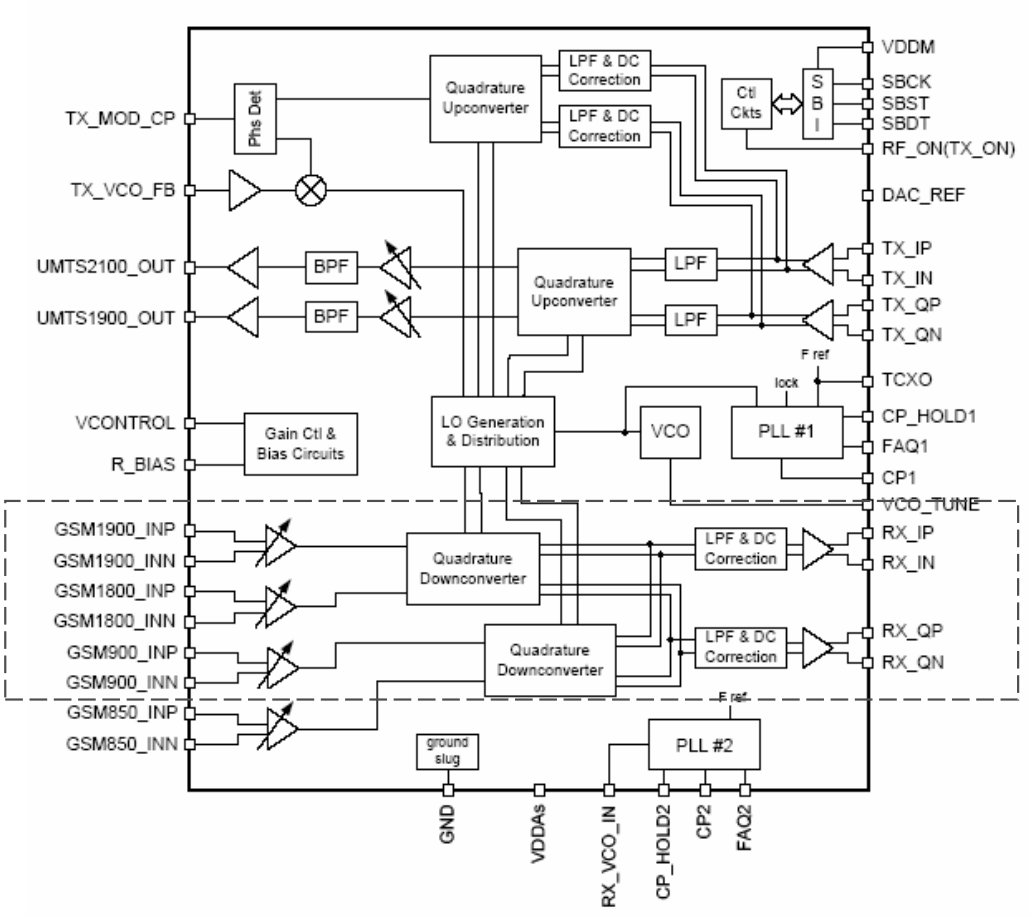


Figure 3.2.1-1 RTR6250 IC Functional Block Diagram

3.2.2 GSM Transmitter

The shared GSM Low-band (EGSM900) and High-band (DCS1800, PCS1900) transmit path begins with the baseband inputs from the MSM6250 IC. These differential analog input signals are buffered, lowpass filtered, corrected for DC offsets then applied to the GSM quadrature upconverter. The upconverter LO signals are generated from the transceiver VCO signal by the LO distribution and generation circuits within RTR6250. This upconverter translates the GMSKmodulated signal to a convenient intermediate frequency (IF) that forms one input to a frequency/phase detector circuit. This IF signal is the reference input to an offset phase-locked loop (OPLL) circuit as shown in Figure 3.2.2-1.

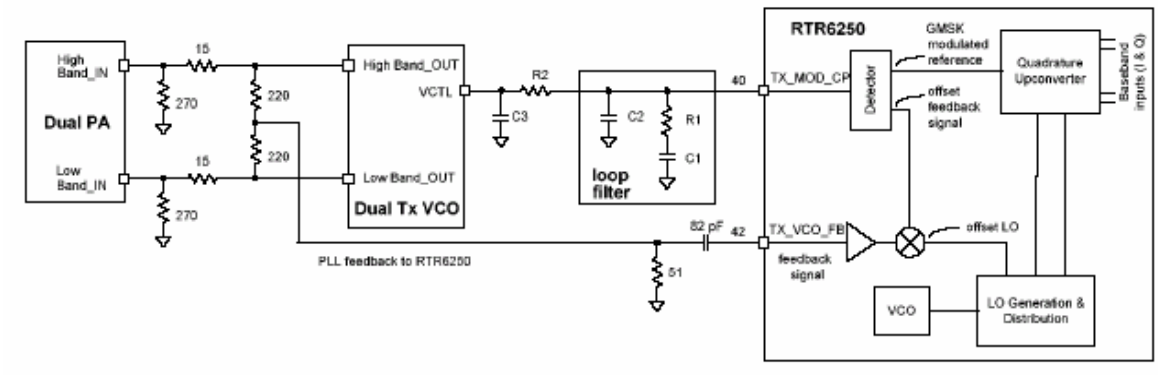


Figure 3.2.2-1 Offset phase-locked loop interfaces

The feedback path of this OPLL circuit includes a downconversion from the RF output frequency range to the IF range. The two inputs to this downconversion mixer are formed as follows:

1. The dual Tx VCO output (operating in the desired RF output frequency range) is buffered within the RTR6250 IC then applied to the mixer RF port.
2. The LO Generation and Distribution circuits that deliver the transmit path.s LO for the baseband-to-IF upconversion also provides the .offset LO. signal that is applied to the feedback path.s mixer LO port.

The mixer IF port output is the offset feedback signal - the variable input to the frequency/phase detector circuit. The detector compares its variable input to its reference input and generates an error signal that is lowpass filtered by the loop filter and applied to the dual Tx VCO tuning port to force the VCO output in the direction that minimizes errors. As mentioned earlier, the VCO output is connected to the feedback path thereby creating a closed-loop control system that will force frequency and phase errors between the variable and reference inputs to zero.

The waveform at the dual Tx VCO output is the GMSK-modulated signal centered at the desired GSM channel frequency. A phase-locked loop circuit is used to translate the GMSK-modulated signal from IF to RF primarily for two reasons:

1. Phase-locked loops provide a lowpass filter function from the reference input to the VCO output. This results in a bandpass function centered at the desired channel frequency that provides steep, well-controlled rejection of the out-of-band spectrum.
2. The resulting output bandpass function is virtually unchanged as the transmitter is tuned over channels spanning the GSM operating band.

The PA is a key component in any transmitter chain and must complement the rest of the transmitter precisely. For GSM band operation, the closed-loop transmit power control functions add even more requirements relative to the UMTS PA. In addition to gain control and switching requirements, the usual RF parameters such as gain, output power level, several output spectrum requirements, and power supply current are critical. The gain must be sufficient and variable to deliver the desired transmitter output power given the VCO output level, the subsequent passive devices' losses, and the control set point. The maximum and minimum transmitter output power levels depend upon the operating band class and mobile station class per the applicable standard. Transmitter timing requirements and inband and out-of-band emissions, all dominated by the PA, are also specified by the applicable standard.

The active dual Tx VCO output is applied to the dual power amplifier to continue the transmit path, and feedback to the RTR6250 IC to complete the frequency control loop. The PA operating band (EGSM or DCS/PCS) is selected by the MSM device GPIO control (GSM_PA_BAND).

3.3 WCDMA Mode

3.3.1 Receiver

The UMTS duplexer receiver output is routed to LNA circuits within the RFL6200 device. These LNA functions are removed from the RFR6200 IC to improve mixer LO to RF isolation - a critical parameter in the Zero-IF architecture. Isolation is further improved using high reverse isolation circuits in the LNA designs. The LNA gain is incrementally and dynamically controlled by the MSM device to maximize receiver dynamic range.

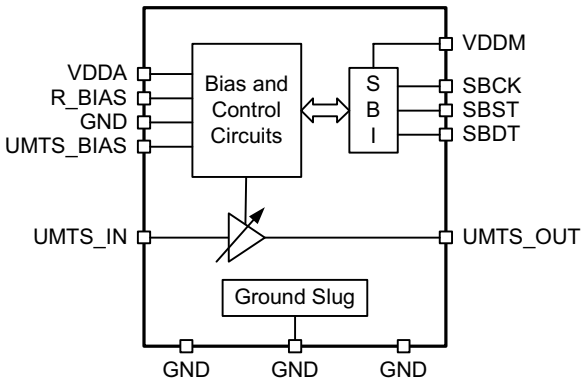


Figure 3.3.1-1 RFL6200 IC functional block diagram

The UMTS LNA output is routed to the RFR6200 through a band selection filter that transforms a single-ended 50Ω source to a differential impedanc e that is matched to the RFR6200 IC. The RFR input uses a differential configuration to improve second-order inter-modulation and common mode rejection performance. The RFR6200 input stages include MSM-controlled gain adjustments that further extend receiver dynamic range.

The RFR6200 IC (Figure 3.3.1-2) provides the UMTS Zero-IF receiver signal path, from RF to analog baseband. The input gain stage implements MSM controlled gain adjustments to extend receiver dynamic range. The amplifier output drives the RF port of the quadrature RF-to-baseband downconverter then the downconverted baseband outputs are routed to lowpass filters (one I and one Q) whose passband and stopband characteristics are suitable for DS-WCDMA signals. The filter outputs are buffered and routed to the MSM device for further processing. This baseband interface is shared with the RTR6250 EGSM/DCS/PCS receiver outputs.

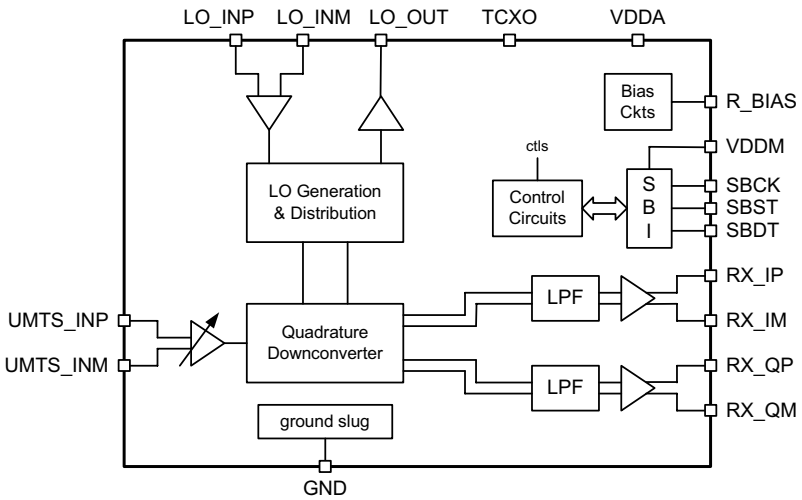


Figure 3.3.1-2 RFR6200 IC functional block diagram

The RFR6200 IC includes LO generation and distribution circuitry to reduce offchip component requirements. The UMTS Rx LO source is created using an external UMTS Rx CH VCO that is closed-loop controlled by the RTR6250 PLL2 via a discrete loop filter. The external UMTS_RX_VCO signal is processed by the LO generation and distribution circuits to create the quadrature downconverter LO signal. The LO signal applied at the mixer ports are at a frequency different than the VCO frequency. This assures that the VCO frequency is different than the RF frequency, an important consideration for Zero-IF processing. QUALCOMM.s Mobile Station Modem (MSM6250) device provides status and control signaling, employing power reduction features (such as selective circuit power-down, gain control, and bias control) to extend handset standby time.

3.3.2 Transmitter

The UMTS transmit path begins with analog baseband signals from the MSM device that drive the RTR6250 IC. The RTR6250 IC provides all the UMTS transmitter active signal-path circuits except the power amplifiers. Analog (I and Q) differential signals from the MSM device are buffered, filtered, and applied to Baseband-to-RF quadrature upconverters. Gain control is implemented on-chip.
The RF outputs include an integrated matching inductor, reducing the off-chip matching network to a single series capacitor.

The RTR6200 UMTS output is routed to its power amplifier through a bandpass filter, and delivers fairly high-level signals that are filtered and applied to the PA. The PA device used in U8290 is “Load Insensitive PA”- no need to use isolator - and routed to the duplexer Tx port directly. Transmit power is delivered from the duplexer to the antenna through the switch module.

The RTR6250 IC integrates LO generation and distribution circuits on-chip, substantially reducing off-chip requirements. Various modes and programmable features result in a highly flexible transceiver LO output that supports not only UMTS transmissions, but all EGSM900 and DCS1800/PCS1900 Rx and Tx modes as well.

The UMTS Tx LO (PLL1) is generated almost entirely on-chip, requiring only the loop filter off-chip (two capacitors and two resistors); all UMTS Tx VCO and PLL circuits are on-chip. An internal RTR6250 switch routes the internal VCO signal to the LO generation and distribution circuits to create the necessary UMTS Tx LO signals.

3.4 LO Phase-locked Loop

Most LO functions are fully integrated on-chip, do not require user adjustment, and need not be considered by handset designers. QUALCOMM has established and implemented frequency plans and LO generation schemes that support the radioOne 6250-IIseries chipset while requiring minimal off-chip design effort. Only one area requires handset designer attention: the loop filters of each phase-locked loop (PLL).

3.4.1 UMTS Rx PLL (PLL2)

UMTS Rx LO functional blocks are distributed between the RFR6200 IC, RTR6250 IC, and external UMTS_RX_CH_VCO and loop filter components (Figure 3.4.1-1).
The external UMTS_RX_CH_VCO must be enabled for UMTS Rx operation and disabled otherwise; a dedicated MSM6250 IC signal (UHF_VCO_EN) enables the VCO.

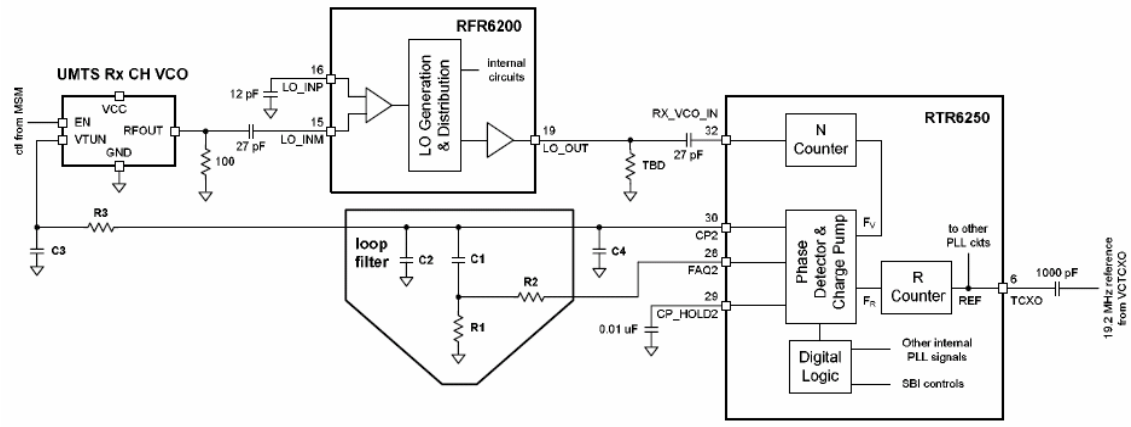


Figure 3.4.1-1 UMTS Rx PLL functional block diagram

The RFR6200 IC accommodates single-ended or differential LO inputs; if singleended, either pin can be active. AC-couple the inactive pin to ground using an appropriately valued capacitor (12 pF is used in U8290). The 27 pF capacitor should be used to AC-couple the active pin to the VCO signal. Using only the selected VCO signal, the RFR6200 IC LO generation and distribution circuits create the necessary LO signals for the active quadrature downconverter.

A sample of the downconverter LO is buffered and routed from RFR6200 IC pin 19 to RTR6250 IC pin 32 (RX_VCO_IN). This signal requires a terminating resistor near the RTR6250 IC input pin and an AC coupling capacitor that assures the internal RTR6250 IC biasing is not disrupted in the example. Good microstrip or stripline controlled-impedance techniques must be used

Most UMTS Rx PLL circuits are included within the RTR6250 IC: reference divider, phase detector, charge pump, feedback divider, and digital logic that generate LOCK status. The buffered 19.2 MHz TCXO signal provides the synthesizer input (REF), the frequency reference to which the PLL is phase and frequency locked.
The reference is divided by the R-Counter to create a fixed frequency input to the phase detector, FR. The other phase detector input (FV) varies as the loop acquires lock, and is generated by dividing the RX_VCO_IN frequency using the feedback path.s N-Counter. The closed loop will force FV to equal FR when locked. If the loop is not locked the error between FV and FR will create an error signal at the output of the charge pump. This error signal is filtered by the loop filter and applied to the VCO, tuning the output frequency such that the error is decreased. Ultimately the loop forces the error to approach zero and the PLL is phase and frequency locked.

Many key PLL performance characteristics are largely determined by the loop filter design - stability, transitory response, settling time, and phase noise.

3.4.2 Transceiver PLL (PLL1)

All LO functional blocks for the other handset modes(UMTS Tx, EGSM Tx/Rx, DCS Tx/Rx, PCS Tx/Rx) are integrated into the RTR6250 IC except the loop filter components (Figure 3.4.2-1). On-chip circuits include reference divider, phase detector, charge pump, VCO, feedback divider, and digital logic status. The functional description given in Section 3.4.1 for the UMTS Rx PLL applies to the Transceiver PLL as well.

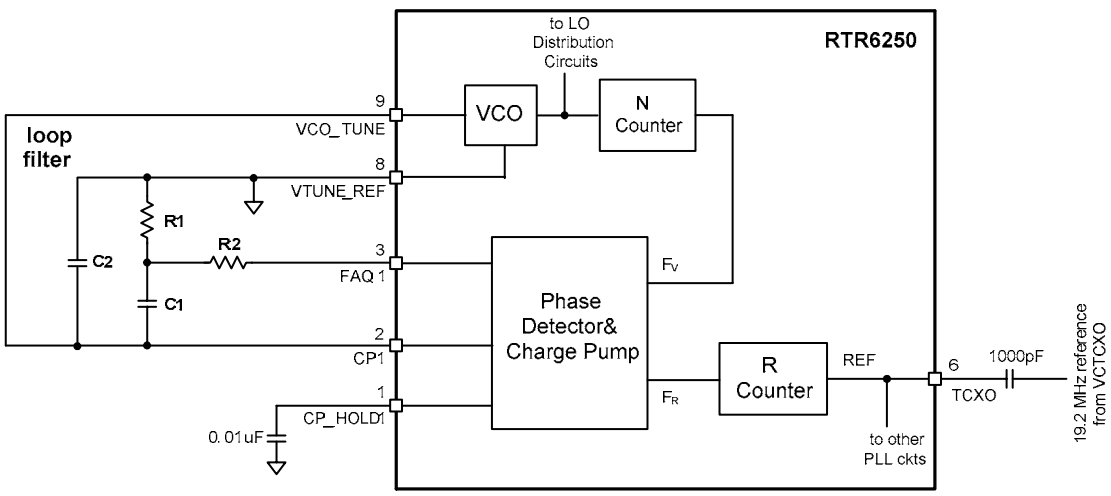


Figure 3.4.2-1 Transceiver PLL functional block diagram

The off-chip loop filter allows optimization of key PLL performance characteristics (stability, transitory response, settling time, and phase noise) for different applications. Guidelines are provided in the next subsection for proper implementation of this critical circuit.

3.5 Off-chip RF Components

3.5.1 Antenna switch module (U207 : LMSP43MA-288)

The antenna switch module allows multiple operating bands and modes to share the same antenna. In the U8290 design, a common antenna connects to one of six paths: 1) UMTS-2100 Rx/Tx, 2) EGSM Rx, 3) DCS-1800 Rx, 4) PCS-1900 Rx, 5)EGSM Tx Tx, and 6) DCS-1800, PCS-1900 Tx. UMTS operation requires simultaneous reception and transmission, so the UMTS Rx/Tx connection is routed to a duplexer that separates receive and transmit signals. GSM band of operation is time division duplexed, so only the receiver or transmitter is active at any time and a frequency duplexer is not required. The module includes lowpass filters for the GSM bands transmit paths to reduce out-of-band emissions, PA harmonics in particular.

3.5.2 UMTS duplexer (U202 : DMF1950IHC)

A UMTS duplexer splits a single operating band into receive and transmit paths. Important performance requirements include:

-. Insertion loss . this component is also in the receive and transmit paths; In the U8290 typical losses: UMTS Tx = 1.2 dB, UMTS Rx = 1.5 dB.

-. Out-of-band rejection or attenuation . the duplexer provides input selectivity for the receiver, output filtering for the transmitter, and isolation between the two. Rejection levels for both paths are specified over a number of frequency ranges. Two Tx-to-Rx isolation levels are critical to receiver performance:

-. Rx-band isolation . the transmitter is specified for out-of-band noise falling into the Rx band. This noise leaks from the transmit path into the receive path, and must be limited to avoid degrading receiver sensitivity. The required Rx-band isolation depends on the PA out of-band noise levels and Rx-band losses between the PA and LNA. Typical duplexer Rx band isolation value is 45 dB.

-. Tx-band isolation . the transmit channel power also leaks into the receiver. In this case, the leakage is outside the receiver passband but at a relatively high level. It combines with Rx band jammers to create cross-modulation products that fall inband to desensitize the receiver. The required Tx-band isolation depends on the PA channel power and Tx-band losses between the PA and LNA. Typical duplexer Tx-band isolation value is 50 dB.

-. Passband ripple . the loss of this fairly narrowband device is not flat across its passband. Passband ripple increases the receive or transmit insertion loss at specific frequencies, creating performance variations across the band.s channels, and should be controlled.

-. Return loss . minimize mismatch losses with typical return losses of 10 dB or more (VSWR <2:1).

-. Power handling . high power levels in the transmit path must be accommodated without degraded performance. The specified level depends on the operating band class and mobile station class (per the applicable standard), as well as circuit losses and antenna EIRP. Several duplexer characteristics depend upon its source and load impedances. QUALCOMM strongly recommends an isolator be used between the UMTS PA and duplexer to assure proper performance.

3.5.3 UMTS Power Amplifier (U204 : SKY77410)

The SKY77410 Load Insensitive Power Amplifier (LIPA™) module is a fully matched 16-pin surface mount module developed for Wideband Code Division Multiple Access (WCDMA) applications. This small and efficient power amplifier packs full coverage of the 1850-1980 MHz bandwidth into a single compact package.

SKY77410 meets the stringent spectral linearity requirements of WCDMA transmission with high power added efficiency for power output of up to 28 dBm, even with a load mismatch of 4:1 VSWR - eliminating the need for an isolator. A low current (VCONT) pin provides improved operating efficiency in the low RF power range. To further improve efficiency in this range, a separate VBIAS pin can be directly connected to the battery, which allows reducing VCC1 and VCC2 voltages to 0.8 V to achieve very low power consumption.

The single Gallium Arsenide (GaAs) Microwave Monolithic Integrated Circuit (MMIC) contains all active circuitry in the module. The MMIC contains on-board bias circuitry, as well as input and interstage matching circuits. The output match is realized off-chip within the module package to optimize efficiency and power performance into a 50 Ω load. This device is manufactured with Skyworks' GaAs Heterojunction Bipolar Transistor (HBT) process that provides for all positive voltage DC supply operation while maintaining high efficiency and good linearity.
Primary bias to the SKY77410 is supplied directly from a three-cell Ni-Cd, a singlecell Li-Ion, or other suitable battery with an output in the 3.2 to 4.2 volt range.
Power down is accomplished by setting the voltage on the low current reference pin to zero volts. No external supply side switch is needed as typical “off” leakage is a few microamperes with full primary voltage supplied from the battery.

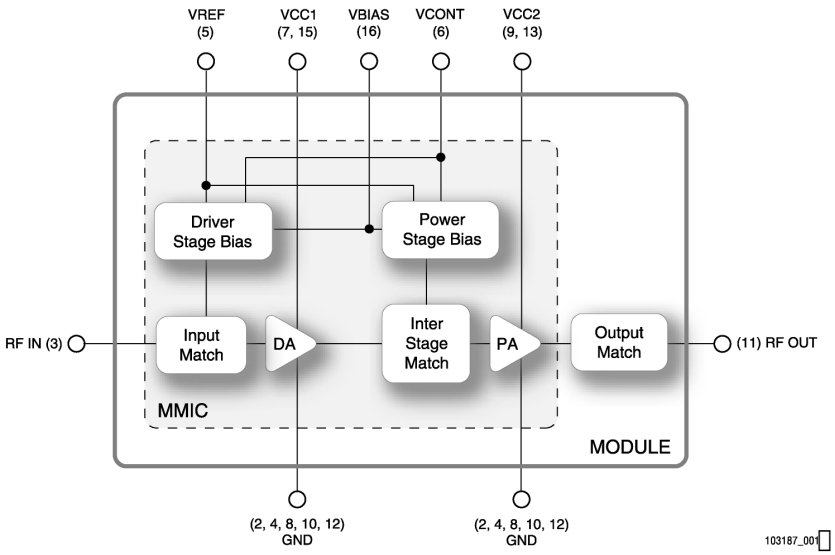


Figure 3.5.3-1 UMTS PA functional block diagram

An isolator between the Power Amplifier and the duplexer is highly recommended to provide constant load and source impedances (respectively) to those devices. This improves PA stability, ACPR performance, and harmonic suppression, as well as duplexer isolation, insertion loss, and ripple. Transmitter performance is always improved when an isolator is included and is well worth the added cost.

3.5.4 Thermistor (RT200 : 68K_2012_10%)

This thermistor senses temperature variations around UMTS PA to adjust PA gain deviation for assure compliance with the applicable transmit power control standards. Negative temperature compensation thermistor is used in the U8290.

3.5.5 UMTS transmit power detector (U203 : LMV225TLX)

This detector couples PA output power level to calibrate the transmitter characteristic over the channel variation and temperature. Its detector coupling range and converted voltage is based on diode sensitivity and transmitter power level.
The U8290 uses National Semiconductor LMV225TLX power detector IC. In Figure 3.5.5-1, R1 is set to 1.8 resulting in an attenuation of 31.4dB. The output voltage is proportional to the logarithm of the input power. Figure 3.5.5-2 shows the output voltage versus PA output power of the LMV225TLX setup as depicted in Figure 3.5.5-1

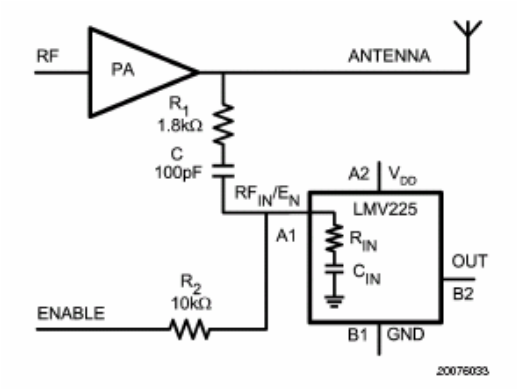


Figure 3.5.5-1 Block diagram of LMV225TLX with high resistive tap

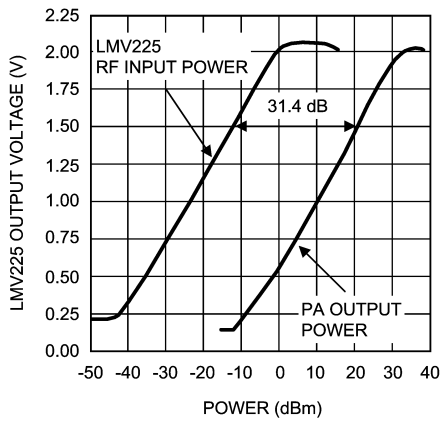


Figure 3.5.5-2 Power detector response, Vout vs PA output power

3.5.6 Dual band GSM power amplifier (U209 : SKY77328)

The SKY77328 Power Amplifier Module (PAM) is designed in a low profile (1.2 mm), compact form factor for quad-band cellular handsets comprising GSM850/900, DCS1800, and PCS1900 operation. The PAM also supports Class 12 General Packet Radio Service (GPRS) multi-slot operation.

The module consists of separate GSM850/900 PA and DCS1800/PCS1900 PA blocks, impedance-matching circuitry for 50 Ω input and output impedances, and a Power Amplifier Control (PAC) block with an internal current-sense resistor. The custom BiCMOS integrated circuit provides the internal PAC function and interface circuitry.

Fabricated onto a single Gallium Arsenide (GaAs) die, one Heterojunction Bipolar Transistor (HBT) PA block supports the GSM850/900 bands and the other supports the DCS1800 and PCS1900 bands. Both PA blocks share common power supply pins to distribute current. The GaAs die, the Silicon (Si) die, and the passive components are mounted on a multi-layer laminate substrate. The assembly is encapsulated with plastic overmold.

RF input and output ports of the SKY77328 are internally matched to a 50Ω load to reduce the number of external components for a quad-band design.

leakage current (2.5 μA, typical) of the dual PA module maximizes handset standby time. The SKY77328 also contains band-select switching circuitry to select GSM (logic 0) or DCS/PCS (logic 1) as determined from the Band Select (BS) signal. In Figure 3.5.6-1 below, the BS pin selects the PA output (DCS/PCS OUT or GSM850/900 OUT) and the Analog Power Control (VAPC) controls the level of output power.

The VBATT pin connects to an internal current-sense resistor and interfaces to an integrated power amplifier control (iPAC™) function, which is insensitive to variations in temperature, power supply, process, and input power. The ENABLE input allows initial turn-on of PAM circuitry to minimize battery drain.

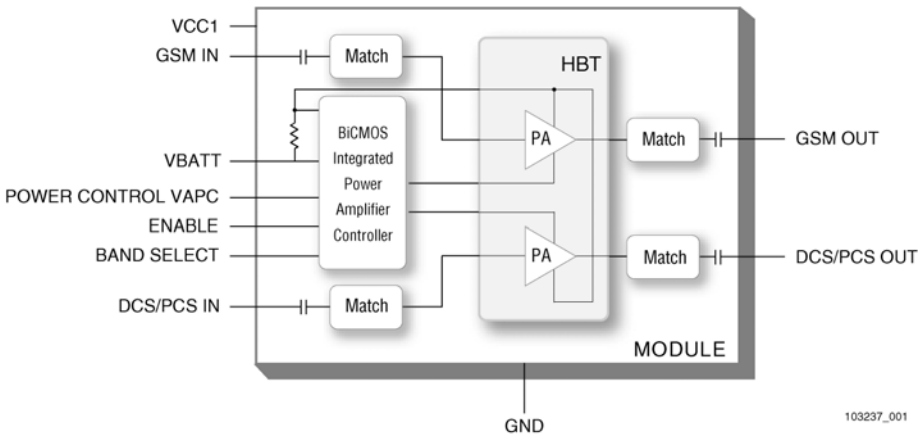


Figure 3.5.6-1 GSM PA functional block diagram

3.5.7 GSM transmit VCO (U210 : MQW5V0C869M)

The dual Tx VCO is a key component within the GSM OPLL. This VCO performance directly impacts PLL and transmitter performance. VCO specifications refer to muRata MQW5V0C869M datasheet.

The dual Tx VCO outputs, one for Low-band GSM and one for high band, drive a resistive network that splits the active signal into two signals: 1) the input to the active PA. this is the low loss path, and 2) the OPLL feedback signal . this is the high loss path. See Figure 8-1 for recommended topology and resistor values.
The losses from the VCO outputs to the PA inputs must be factored into the output chain.s power budget. Each path includes a π-pad that introduces approximately a 3-dB loss. The low band GSM π-pad is formed by R235 plus R232, R228, and R229; the high band GSM π-pad is formed by R236 plus R232, R234, and R233. One leg of each π-pad is used to couple the VCO output to form the feedback path as described below.
For a given VCO output drive level, the loss to the RTR6250 input must assure the specified input level is achieved (-18 to -12 dBm). Large resistors included in the π-pads are used to lightly couple off the VCO outputs to create the feedback signal. Since the RTR6250 TX_VCO_FB pin presents fairly high impedance, an external terminating resistor is required (R232, 51 Ω). A series capacitor (82 pF) AC couples the feedback signal into the RTR6250 IC.

3.5.8 UMTS Rx RF filter (FL200 : B7728)

An RF filter is located between the UMTS LNA and mixer. Insertion loss is important, but not as critical as losses before the LNA. The most important parameters of this component include:

- Out-of-band rejection or attenuation levels, usually specified to meet these conditions:
  - Far out-of-band signals - ranging from DC up to the first band of particular concern and from the last band of particular concern to beyond three times the highest passband frequency.
  - Tx-band leakage - the transmitter channel power, although attenuated by the duplexer, still presents a cross-modulation threat in combination with Rx-band jammers. The RF filter must provide rejection of this Tx-band leakage.
  - Other frequencies of particular concern. bands known to include other wireless transmitters that may deliver significant power levels to the receiver input.
- Phase and amplitude balance - the ZIF architecture requires well-balanced differential inputs to the RFR6200 IC. This is accomplished by the RF filter which takes a single-ended output from the RFL6200 IC and provides differential outputs having nominal 180° phase separation. Phase and/or amplitude imbalance causes degraded common-mode rejection and second-order nonlinearity, so their requirements are specified jointly.
  - ±3 degrees and ± 1 dB
  - -12 to + 3 degrees and ± 0.7 dB

Of course, passband ripple and return loss are still important in all cases for the same reasons explained in the antenna switch module and duplexer sections.

3.5.9 GSM band Rx RF filter (FL201, FL202, FL203)

FL201 - B7037 925 ~ 960MHz EGSM Rx RF filter
FL202 - B7844 1805 ~1880MHz DCS1800 Rx RF filter
FL203 - B7846 1930 ~ 1990MHz PCS1900 Rx RF filter

The GSM mode RF filters are located before their LNAs, so their insertion losses are extremely critical (1.5 dB typical). Other important parameters are:

- Out-of-band rejection or attenuation levels
  - Far out-of-band signals - ranging from DC up to the first band of particular concern and from the last band of particular concern to beyond three times the highest passband frequency.
  - Frequencies of particular concern . bands known to include other wireless transmitters that may deliver significant power levels to the receiver input.
  - GSM band receivers operate while the handset transmitters are off so there are no Tx-band leakage attenuation requirements.
- Phase and amplitude balance - the UMTS discussion presented above applies for GSM bands as well. See the data sheet for specific values. Of course, passband ripple and return loss are still important in all cases for the same reasons explained in the antenna switch module and duplexer sections.

3.5.10 VCTCXO (U206 : TG-5001LA-19.2MHz)

The Voltage Controlled Temperature Compensated Crystal Oscillator (VCTCXO) provides the reference frequency for all RFIC synthesizers as well as clock generation functions within the MSM6250 IC. **The 6250-series chipset requires a 19.2 MHz nominal VCTCXO frequency.** The oscillator frequency is controlled by the MSM6250's TRK_LO_ADJ pulse density modulated signal in the same manner as the transmit gain control.

The filtered PDM signal results in an analog control signal into the VCTCXO tuning port whose voltage is directly proportional to the density of the digital bit stream. The MSM device varies the pulse density to change the analog control voltage that sets the oscillator frequency - all within a feedback control loop that minimizes handset frequency drift relative to the network.

3.5.11 UMTS Rx VCO (U208 : MQL302A1G71)

The UMTS Rx CH VCO is a key component within its phase-locked loop; VCO performance directlry impacts PLL and receiver performance. When the phone is not in the UMTS mode the unused VCO must be turned off by UHF_VCO_EN logic signal from MSM6250. Using only the external UMTS_RX_VCO signal, the LO generation and distribution circuits create the necessary LO signals for the quadrature downconverter.

3.5.12 Bluetooth (U406 : LBDA254AN0, ANT400 : LDA31)

The MSM6250 includes BT baseband embedded BT 1.1 compliant baseband core, so the other bluetooth components are an bluetooth RF module and Antenna. Figure 3.5.12-1 shows the bluetooth system architecture in the U8290.

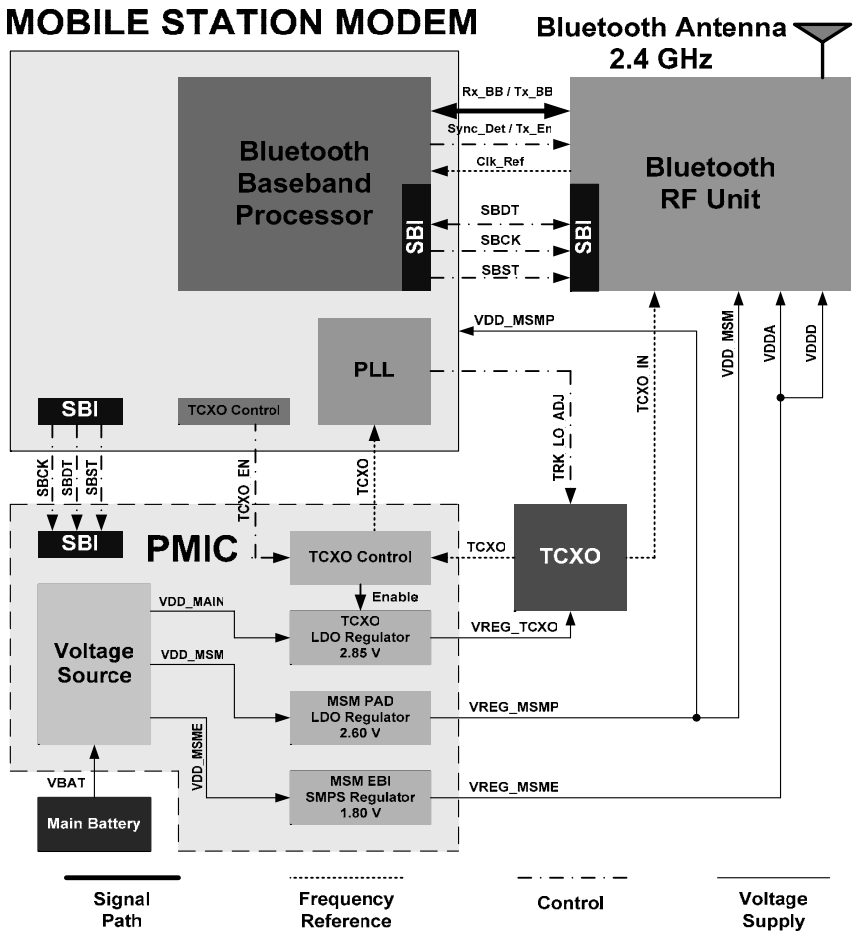


Figure 3.5.12-1 Bluetooth system architecture

3. BB Technical Description

3.6 Digital Baseband(DBB/MSM6250)

3.6.1 General Description

A. Features(MSM6250)

- The ARM926EJ-S microprocessor can operate at up to 150 MHz with variable rate, software controlled clocks to provide greater standby time.
- Integrated PLL to provide additional on-chip clock frequencies
- Supports low-power, low-frequency crystal to enable TCXO shutoff
- Integrated USIM Controller for direct interface to USIM card
- Software-controlled power management feature
- Automatic access conversion of 32-bit data accesses to 16-bit devices
- Advanced 409-ball CSP packaging
- WCDMA Access
  - Maximum of eight simultaneous transport channels
  - Four coded composite transport channels (CCTrCH)
  - PS data rates supporting 384kbps DL / 64kbps UL
- GSM/GPRS Access
  - GSM/GPRS network signaling (from Layer 1 to 3)
  - GSM AMR,EFR,FR
- Operation and Services
  - SIM Interfaces
  - General Purpose I/O (GPIO) Interface
  - Dual Memory Buses(EBI1 & EBI2)
  - JTAG
  - RTC
- Data Communication
  - IrDA ® (SIR)
  - UARTs (ACB, EDB (RS232))
  - Slave USB

3.7 Hardware Architecture

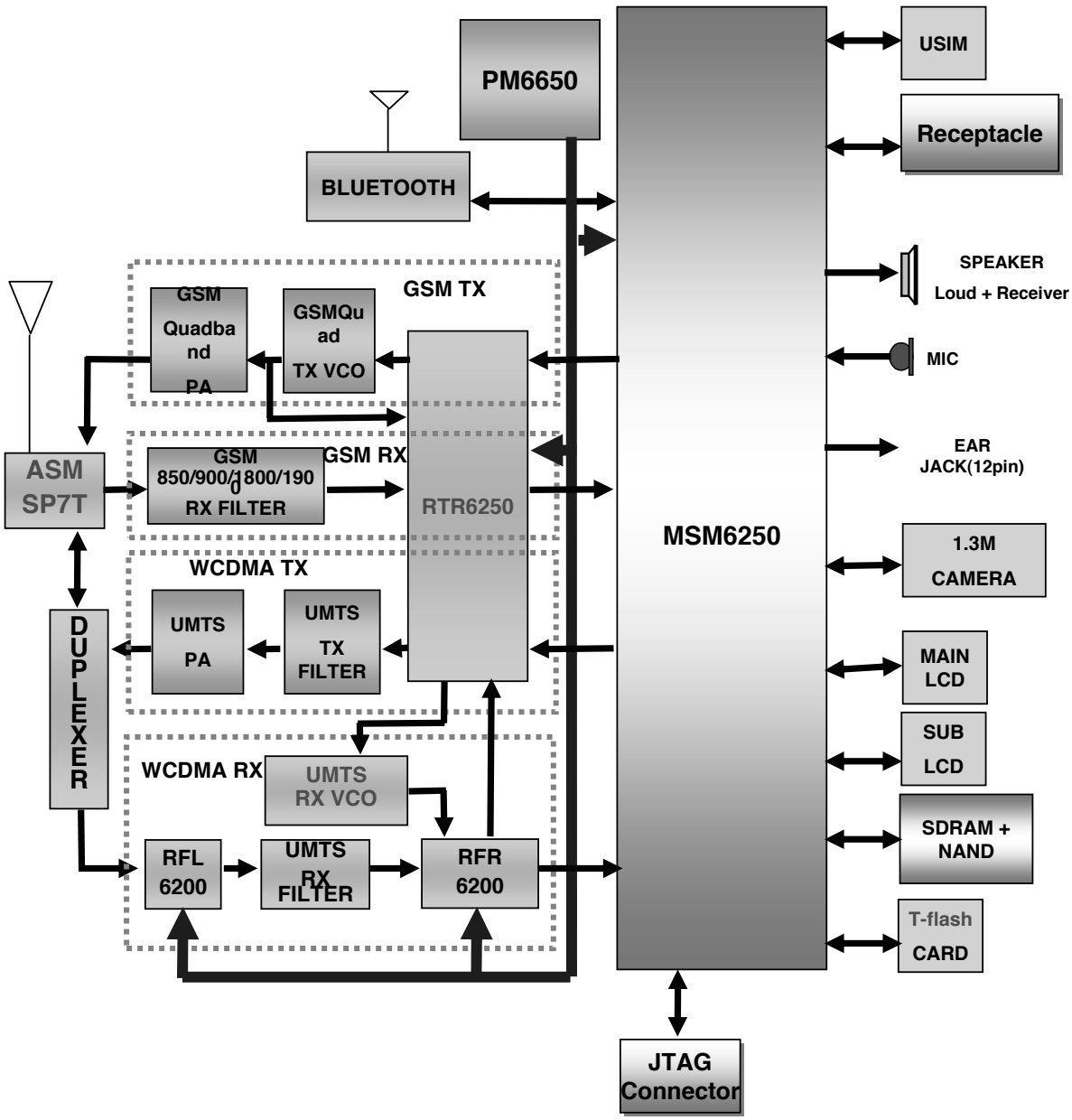


Figure 3.7-1 Simplified Block Diagram

3.7.1 Block Diagram(MSM6250)

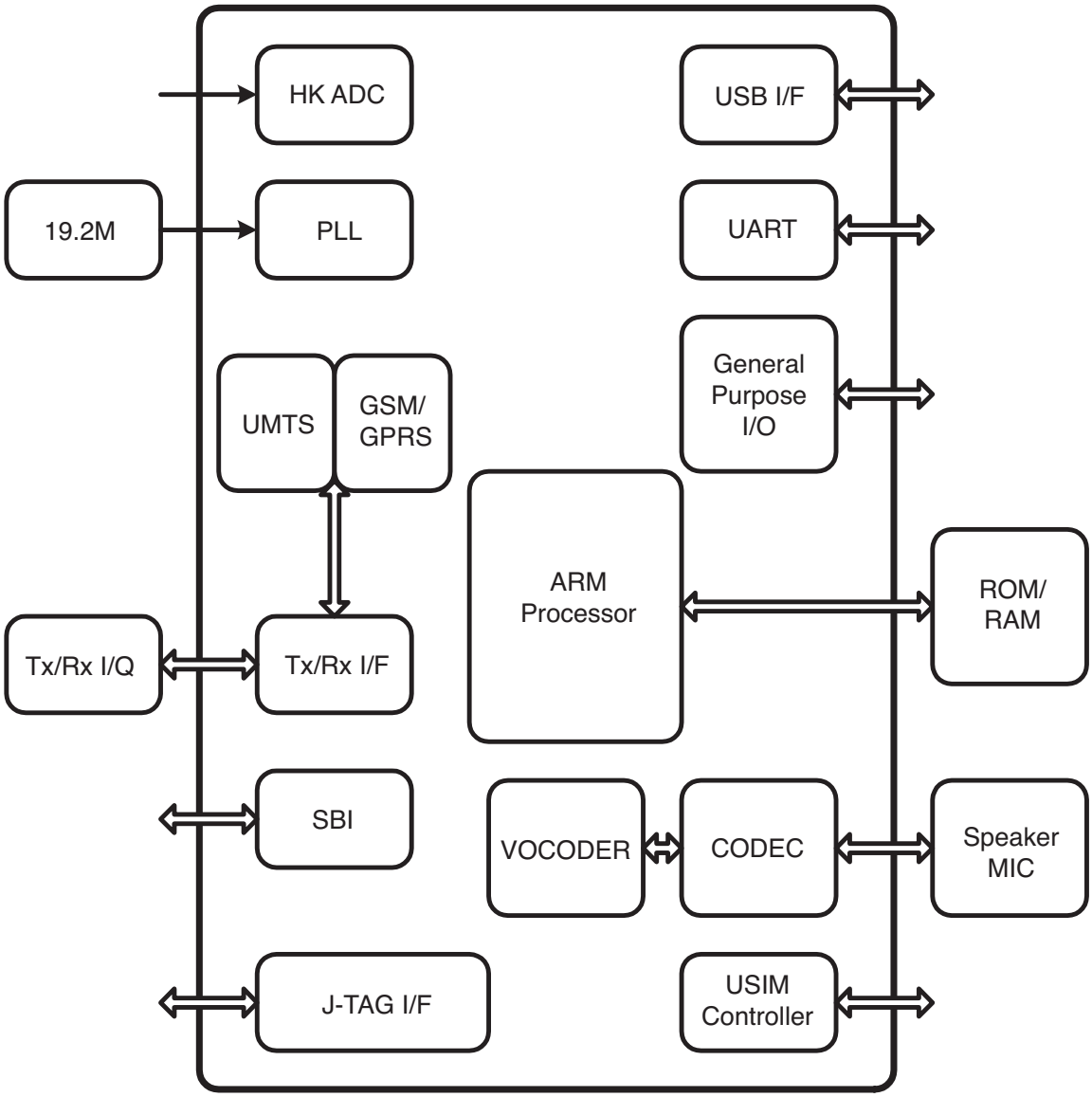


Figure 3.7.1-1 Simplified Block Diagram of MSM6200

3.8 Subsystem(MSM6250)

3.8.1 ARM Microprocessor Subsystem

The MSM6250 device uses an embedded ARM926EJ-S microprocessor. This microprocessor, through the system software, controls most of the functionality for the MSM, including control of the external peripherals such as the keypad, LCD, RAM, and ROM devices. Through a QUALCOMM proprietary serial bus interface (SBI) the ARM926EJ-S configures and controls the functionality of the RTR6250, RFR6200, RFL6200, and PM6650 devices.

3.8.2 UMTS Subsystem

The UMTS Subsystem performs the digital UMTS signal processing. Its components include:
• Searcher engine
• Demodulating fingers
• Combining block
• Frame deinterleaver
• Viterbi decoder
• Up-link subsystem
• Turbo decoder
On the down-link channel the UMTS subsystem searches, demodulates, and decodes incoming CPICH, CCPCH, SCH, and Traffic Channel information. It extracts packet data from the downlink traffic channel and prepares the packet data for processing. For the up-link, the CDMA subsystem processes the packet data and modulates the up-link traffic channel (DCH).

3.8.3 GSM Subsystem

The GSM Subsystem performs the digital GSM signal processing.

3.8.4 RF Interface

The RF interface communicates with the mobile station's external RF and analog baseband circuits. Signals to these circuits control signal gain in the Rx and Tx signal path and maintain The system's frequency reference.

3.8.5 Serial Bus Interface(SBI)

The MSM6250 device's SBI is designed specifically to be a quick, low pin count control protocol for QUALCOMM's RTR6250, RFR6200, RFL6200, and PM6650 ASICs. Using the SBI, the RTR6250, RFR6200, RFL6200, and PM6650 devices can be configured for different operating modes and for minimum power consumption, extending battery life in Standby mode. The SBI also controls DC baseband offset errors.

3.8.6 Wideband CODEC

The MSM6250 device integrates a wideband voice/audio CODEC into the mobile station modem (MSM). The CODEC supports two differential microphone inputs, one differential earphone output, one single-ended earphone output, and a differential analog auxiliary interface on two single-ended earphone output. The CODEC integrates the microphone and earphone amplifiers into the MSM6250 device, reducing the external component count to just a few passive components. The microphone (Tx) audio path consists of a two-stage amplifier with the gain of the second stage set externally. The Rx/Tx paths are designed to meet the ITU-G.712 requirements for digital transmission systems.

3.8.7 Vocoder Subsystem

The MSM6250 device's QDSP4000 supports AMR vocoder. In addition, the QDSP4000 has modules to support the following audio functions: DTMF tone generation, DTMF tone detection, Tx/Rx volume controls, Tx/Rx automatic gain control (AGC), Rx Automatic Volume Control (AVC), EarSeal Echo Canceller (ESEC), Acoustic Echo Canceller (AEC), Noise Suppression (NS), and programmable, 13-tap, Type-I, FIR, Tx/Rx compensation filters. The MSM6200 device's integrated ARM7TDMI processor downloads the firmware into the QDSP4000 and configures QDSP4000 to support the desired functionality.

3.8.8 HKADC

TheMSM6250 device has an on-chip 8-bit analog-to-digital converter (ADC) which is intended to digitize DC signals corresponding to analog parameters such as battery voltage, temperature, and RF power levels. The MSM6250 device has six analog input pins which are multiplexed to the input of the internal HKADC.

3.8.9 Mode Select and JTAG Interfaces

The mode pins to the MSM6250 device determine the overall operating mode of the ASIC. The options under the control of the mode inputs are Native mode, which is the normal subscriber unit operation, and ETM mode, which allows monitoring of the ARM bus and passes compressed information via the trace port to the MultiTrace trace port analyzer. The MSM6250 device complies with the ANSI/IEEE 1149.1A-1993 feature list. The JTAG interface can be used to test digital interconnects between devices within the mobile station during manufacture.

3.8.10 General-Purpose Input/Output Interface

The MSM6250 device has general-purpose bidirectional input/output pins. Some of the GPIO pins have alternate functions supported on them. The alternate functions include USB interface, additional RAM, ROM, general-purpose chip selects, parallel LCD interface, and UART interface.

3.8.11 UART

There are three UARTs in the MSM6250 ASIC:
- UART1 for data
- UART2 (can be used for USIM interface)
- UART3 (can be used for PM SBI interface)

3.8.12 USB

The MSM6250 device integrates a universal serial bus (USB) controller that supports both unidirectional and bidirectional transceiver interfaces. The USB controller acts as a USB function communicating with the USB host. The USB controller also supports digital audio through USB interface and connects directly to the QDSP4000 for the audio processing.

3.9 External memory interface

A. MSM6250

The MSM6250 have two external memory interfaces with arbitration for the multi-layer AHB system and memory controllers. The EBI1 bus is a high performance bus that supports a wide variety of memories. EBI2 bus is targeted to be the interface for slow peripheral devices(i,.e., LCD) as well as the NAND flash memory.

• EBI1 Features
- 16 bit static and dynamic memory interface
- 32 bit dynamic memory interface
- 24 bits of address for static memory devices which can support up to 32MBytes on each chip select
- Synchronous burst memories supported (burst NOR, burst PSRAM)
- Synchronous DRAM memories supported
- Byte addressable memory supporting 8 bit, 16 bit and 32 bit accesses
- Pseudo SRAM (PSRAM) memory support

• EBI2 Features
- Support for asynchronous FLASH and SRAM(16bit & 8bit).
- Interface support for byte addressable 16bit devices(UB_N & LB_N signals).
- 2Mbytes of memory per chip select.
- Support for 8 bit wide NAND flash.
- Support for parallel LCD interfaces, port mapped of memory mapped(16 & 8 bit)

• 512Mb NAND flash memory + 512Mb SDRAM

• 2-CS(Chip Select) are used

Interface Spec				
Device	Part Name	Maker	Read Access Time	Write Access Time
FLASH	TY90009C00A0GG	Toshiba	65 ns	65 ns
SDRAM	TY90009C00A0GG	Toshiba	13 ns	13 ns

Table 3.9-1 Table External memory interface for U8290

3.10 H/W SubSystem

3.10.1 RF Interface

A. RTR6250(WCDMA_Tx, GSM_Tx/Rx)

MSM6250 controls RF part(RTR6250) using these signals.

- SBST,SBDT,SBCK : SBI I/F signals for control Sub-chipset
- PAON : Power AMP on RF part
- RX_I/Q,TX_I/Q : I/Q for T/Rx of RF
- TX_AGC_ADJ : control the gain of the Tx signal prior to the power amplifier

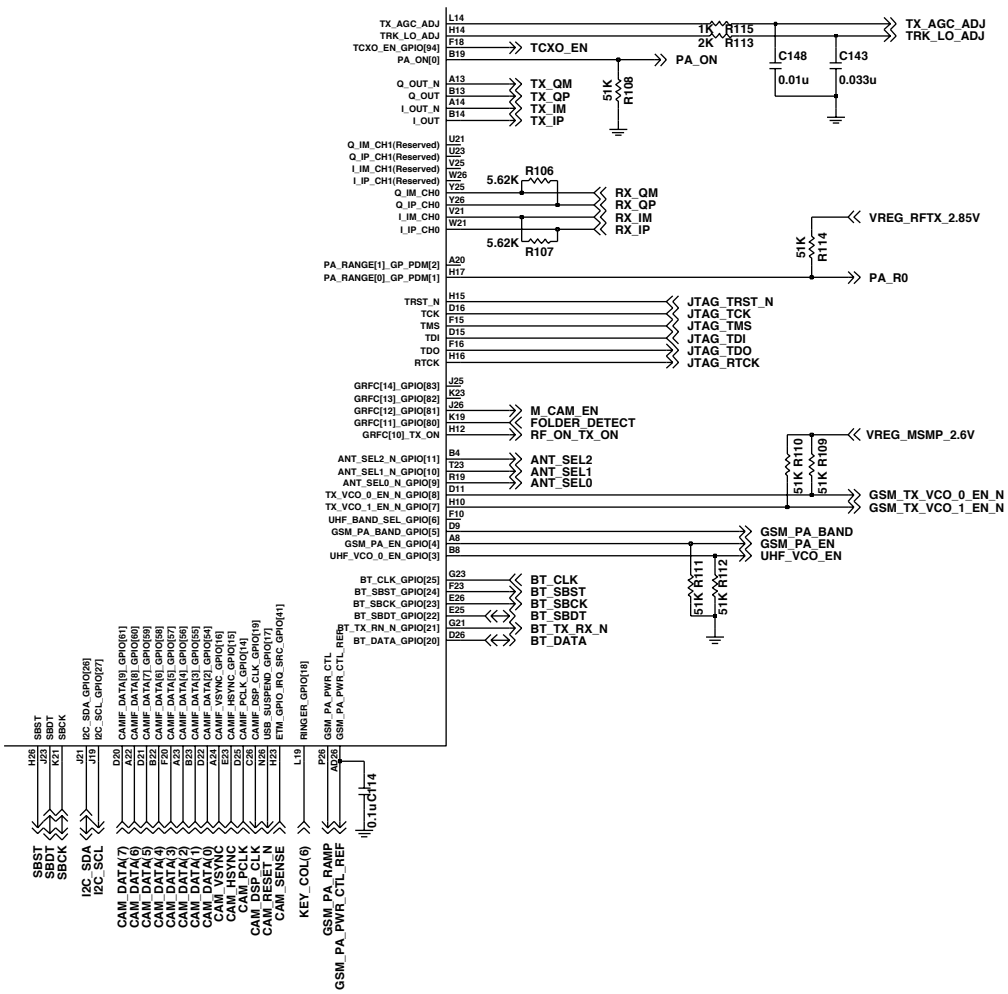


Figure 3.10.1-1 Schematic of RF Interface of MSM6250

B. RFR6200(WCDMA_Rx)

• SBST,SBDT,SBCK : SBI I/F signals for control Sub-chipset
• RX_I/Q, : I/Q for Rx of RF

C. RFL6200(WCDMA_Rx_LNA)

• SBST,SBDT,SBCK : SBI I/F signals for control Sub-chipset

D. the others

• UHF_VCO_BAND_SEL : WCDMA(3G)/GSM(2G) VCO Band Selection of UHF VCO
• UHF_VCO_EN : WCDMA(3G)/GSM(2G) UHF VCO Enable
• GSM_PA_BAND : DCS/GSM Band Selection of Power Amp
• TRK_LO_ADJ : TCXO(19.2M) Control
• PA_ON : WCDMA TX Power Amp Enable
• ANT_SEL[0-2] : Ant Switch Module Mode Selection(WCDMA,GSM Tx/Rx,DCS Tx/Rx)
• GSM_PA_RAMP : Power Amp Gain Control of APC_IC
• GSM_PA_EN : Power Amp Gain Control Enable of APC_IC
• GSM_TX_VCO_0_EN_N : GSM Band Tx VCO Enable of Dual VCO
• GSM_TX_VCO_1_EN_N : DCS Band Tx VCO Enable of Dual VCO

3.10.2 MSM SubSystem

3.10.2.1 SIM Interface

SIM interface scheme is shown in Figure.
And, there control signals are followed

- USIM_CLK : USIM Clock
- USIM_Reset : USIM Reset
- USIM_Data : USIM Data T/Rx

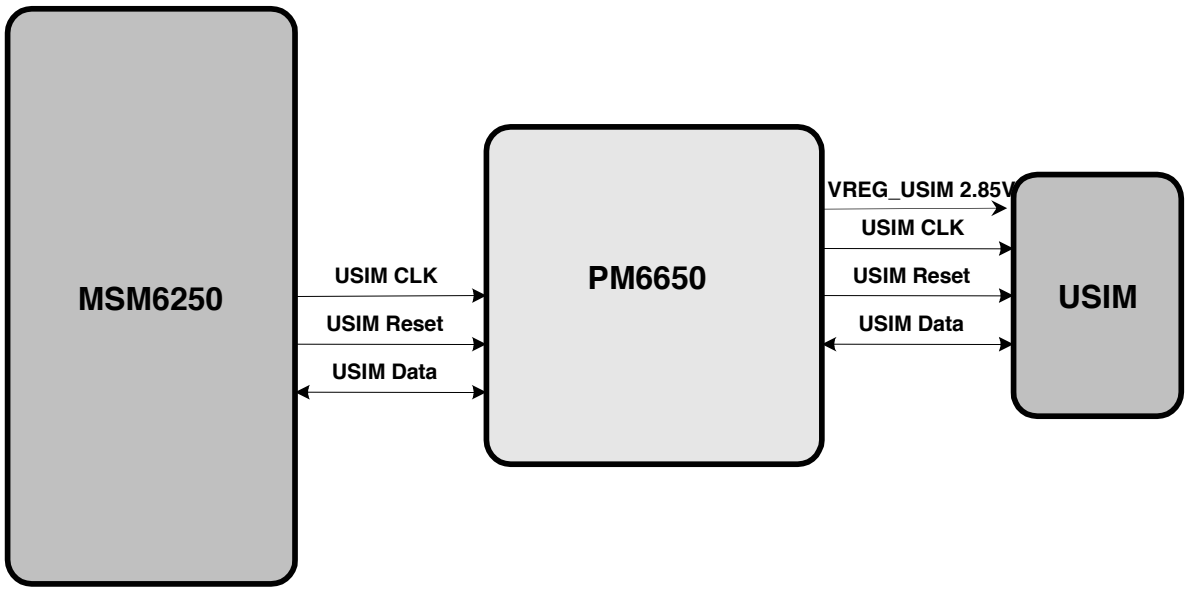


Figure 3.10.2.1-1 SIM Interface

3.10.2.2 UART Interface

UART signals are connected to MSM GPIO through IO connector with 115200 bps speed.

GPIO_Map	Name	Note
GPIO_96	RX_M	Data_Rx
GPIO_95	TX_M	Data_Tx

Table 3.10.2.2-1 UART Interface

3.10.2.3 USB

The MSM6250 device contains a Universal Serial Bus (USB) interface to provide an efficient interconnect between the mobile phone and a personal computer (PC). The USB interface of the MSM6250 was designed to comply with the definition of a peripheral as specified in USB Specification, Revision 1.1. Therefore, by definition, the USB interface is also compliant as a peripheral with the USB Specification, Revision 2.0. The USB Specification Revision 1.1 defines two speeds of operation, namely low-speed (1.5 Mbps) and full-speed (12 Mbps), both of which are supported by the MSM6250.

Name	Note
USB_RCV	Rx_Data to MSM
USB_DAT	Data to/from MSM
USB_SE0	Data to/from MSM
USB_OE_N	Out-Put Enable of Transceiver
USB_VBUS	USB_Power From Host(PC)
USB_D+	USB Data+ to Host
USB_D-	USB Data- to Host

Table 3.10.2.3-1 USB Signal Interface

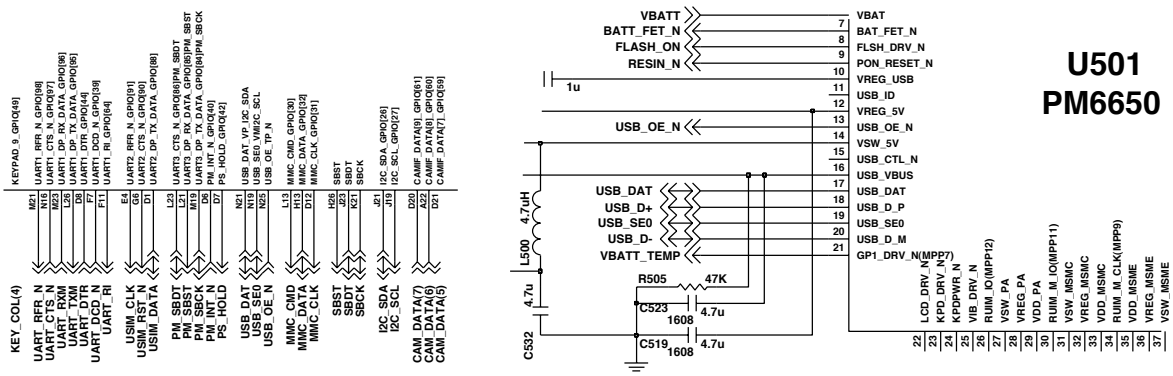


Figure 3.10.2.3-1 Schematic of USB block(MSM6250 Side & PM6650 Side)

3.10.2.4 HKADC(House Keeping ADC)

The MSM6250 device has an on-chip 8-bit analog-to-digital converter (HKADC) which is tended to digitize DC signals corresponding to analog parameters such as battery voltage, temperature, and RF power levels. The MSM6250 device has six analog input pins which are multiplexed to the input of the internal HKADC.

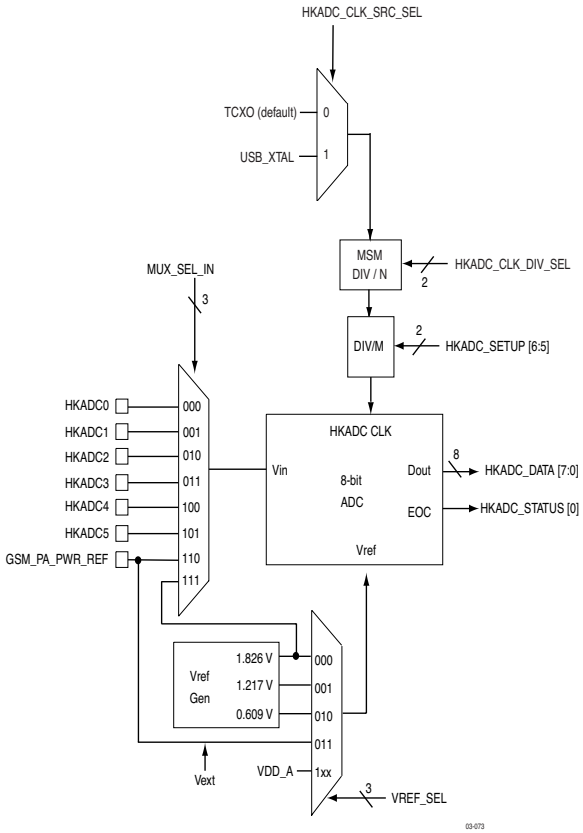


Figure 3.10.2.4-1 MSM6250 HKADC Block diagram

Ch	Signal	Note
HKADC0	AMUX_OUT	RF PAM Temperature
HKADC1	VBATT_LEVEL	Battery voltage level
HKADC2	HDET1	RF PAM Power Level
HKADC3	MULTI_ADC	Ear Remote control Key Detection
HKADC4	VBATT_SENSE	Battery Detection

Table 3.10.2.4-1 HKADC channel table

3.10.3 Power Block

3.10.3.1 General

MSM6250, included RF, is fully covered by PM6650(Qualcomm PMIC). PM6650 cover the power of MSM6260, MSM memory, RF block, Bluetooth, Camera, T-flash, USIM and TCXO.
Major power components are :

PM6650(U501) : Phone power supply
SI91841DT_18(U400) : MSM MIC Bias
SI91841DT_18(U606) : Camera Digital power
MIC5205-3.0(U607) : LCD Power

3.10.3.2 PM6650

The PM6650 device (Figure 1-1) integrates all wireless handset power management. The power management portion accepts power from all the most common sources - battery, external charger, adapter, coin cell back-up - and generates all the regulated voltages needed to power the appropriate handset electronics. It monitors and controls the power sources, detecting which sources are applied, verifying that they are within acceptable operational limits, and coordinates battery and coin cell recharging while maintaining the handset electronics supply voltages. Eight programmable output voltages are generated using low dropout voltage regulators, all derived from a common trimmed voltage reference.
A dedicated controller manages the TCXO warm-up and signal buffering, and key parameters (under-voltage lockout and crystal oscillator signal presence) are monitored to protect against detrimental conditions.
MSM device controls and statuses the PM6650 IC using a three-line Serial Bus Interface (SBI) supplemented by an Interrupt Manager for time-critical information. Another dedicated IC Interface circuit monitors multiple trigger events and controls the power-on sequence.

3. TECHNICAL BRIEF

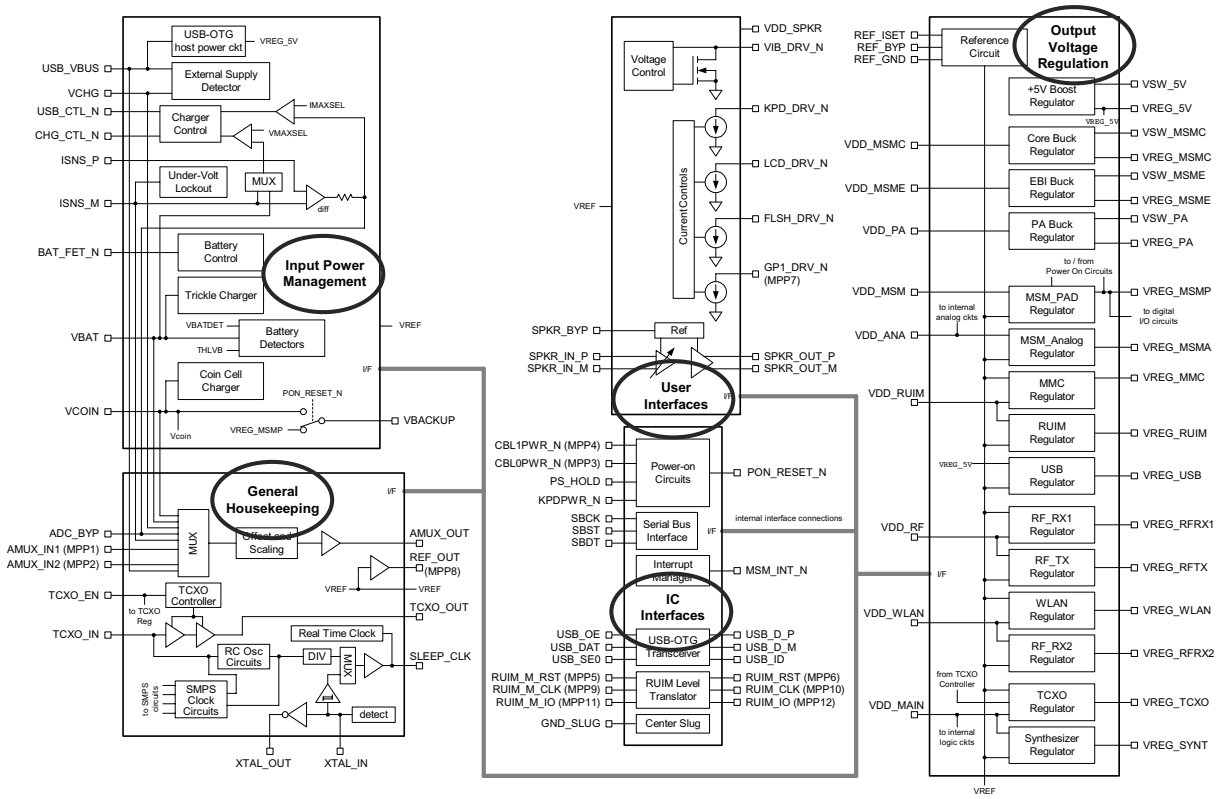
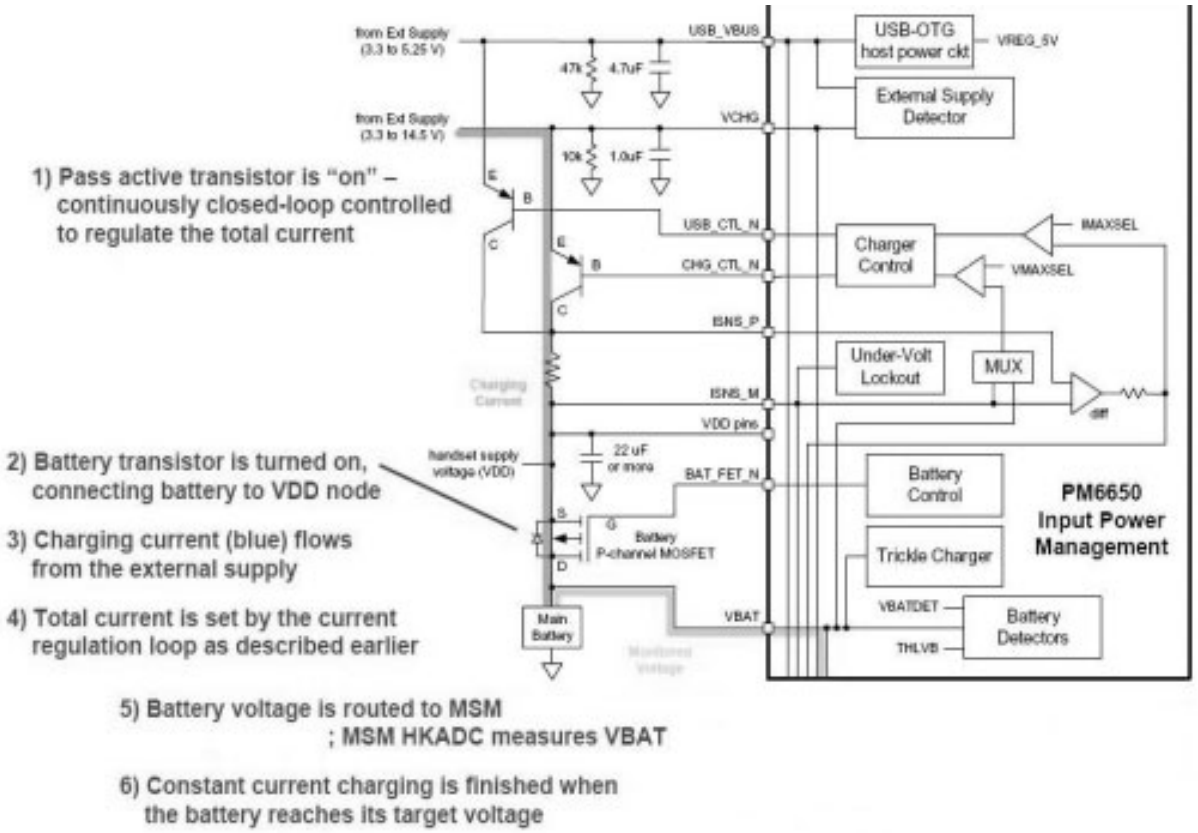


Figure 3.10.3.2-1 PM6650 Functional Block Diagram

3.10.3.3 Charging control

A programmable charging block in PM6650 is used for battery charging. It is possible to set limits for the charging current. The external supply typically connects directly to pin (VCHG). The voltage on this pin (VCHG) is monitored by detection circuitry to ascertain whether a valid external supply is applied or not. For additional accuracy or to capture variations over time, this voltage is routed internally to the housekeeping ADC via the analog multiplexer. PM6650 circuits monitor voltages at VCHARGER and ICHARGE pins to determine which supply should be used and when to switch between the two supplies. These pins are connected to the Source (or emitter) and Drain (or collector) contacts of the pass transistor respectively.



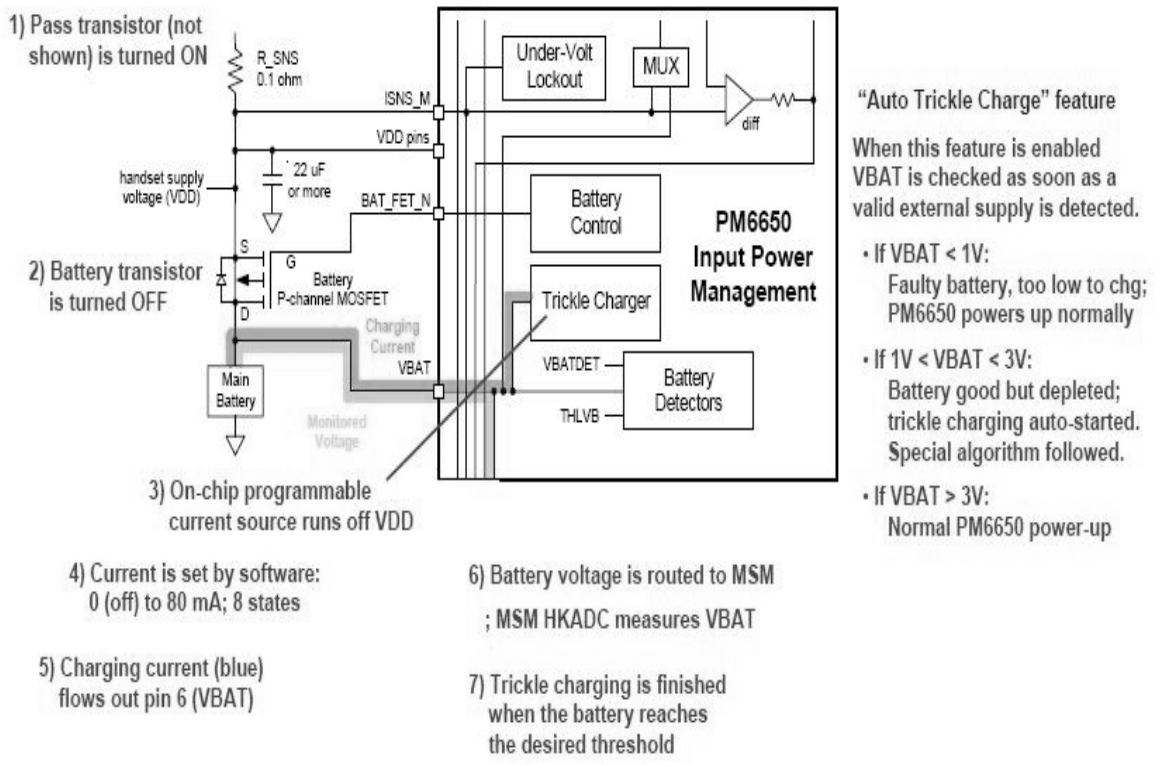
4.2V~3.82V	3.81V~3.74V	3.73V~3.67V	3.66V~3.49V	3.48V~3.28V
100~75 (%)	75~50 (%)	50~25 (%)	25~2 (%)	2~0 (%)

U8290 Battery Bar Display(Stand By Condition)

Trickle Charging

Trickle Charging of the main battery, enabled through SBI control and powered from VDD, is provided by the PM6650 IC, The trickle charger is on-chip programmable current source that supplies current from VDD to pin (VBAT). Trickle charging can be used for lithium-ion and nickel-based batteries, with its performance specified below (3.2V). The charging current is set to 80mA.

Parameter	Min	Typ	Max	Unit
Trickle Current	60	80	100	mA



Constant Current Charging

The PM6650 IC supports constant current charging of the main battery by controlling the charger pass transistor and the battery transistor. The constant current charging continues until the battery reaches its target voltage, 4.2V.

Constant Voltage Charging

Constant voltage charging begins when the battery voltage reaches a target voltage, 4.2V.
The end of constant voltage charging is commonly detected 10% of the full charging current (110mA)

- Charging Method : CC & CV (Constant Current & Constant Voltage)
- Maximum Charging Voltage : 4.2V
- Maximum Charging Current : 600mA
- Nominal Battery Capacity : 1400 mAh
- Charger Voltage : 4.6V
- Charging time : Max 3.5h (Except time trickle charging)
- Full charge indication current (icon stop current) : 110mA
- Low battery POP UP : Idle - 3.38V, Dedicated(GSM/WCDMA) - 3.49V
- Low battery alarm interval : Idle - 3 min, Dedicated - 1min
- Cut-off voltage : 3.28V

3.10.4 Key Pad

There are 26 buttons and 3 side keys in Figure. Shows the Keypad circuit. ‘END’ Key is connected On_SW to PMIC(PM6650) and MSM(GPIO76).

	COL0	COL1	COL2	COL3	COL4	COL5
ROW0				CLR (Clear)	MENU	Side key (camera)
ROW1	1	2	3	LEFT	UP	Side key (Down)
ROW2	4	5	6	OK	RIGHT	Side Key (Up)
ROW3	7	8	9	SEND	SEARCH	
ROW4	HOT4 (*)	0	HOT5(#)	DN	BACK	

Table 3.10.4-1 Key Matrix Mapping Table

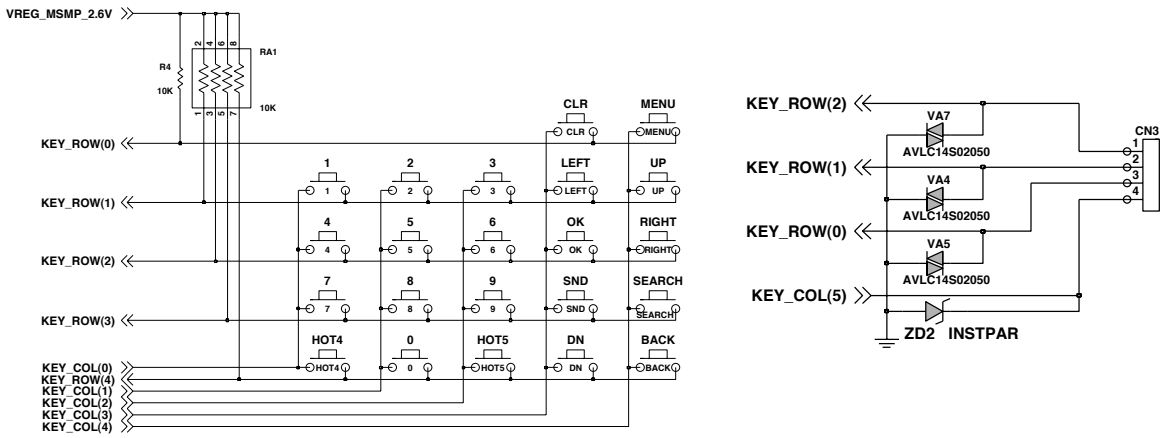


Figure 3.10.4-1 Keypad Circuit

3.10.5 Camera Interface

U8290 Installed a 1.3M Pixel CMOS VGA Camera.
Below figure show the camera board to board connector and camera I/F signal.

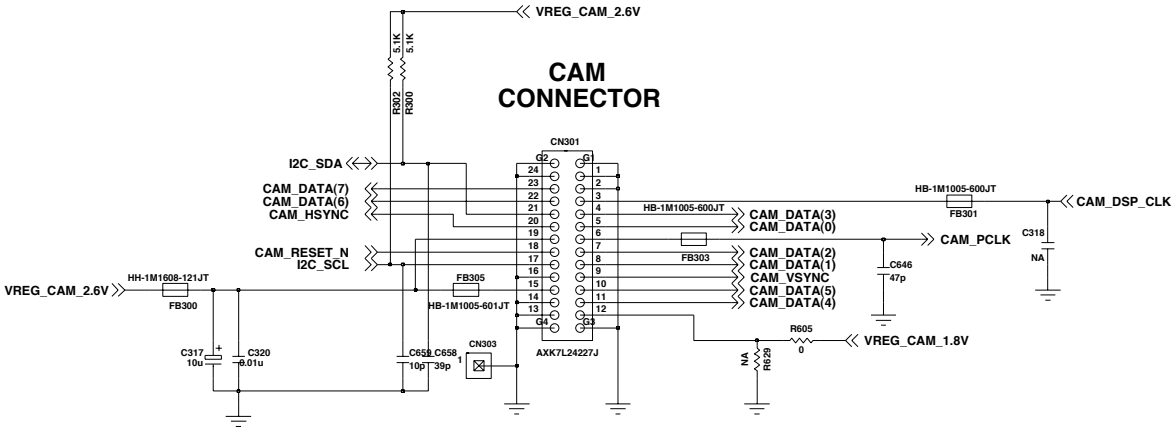


Figure 3.10.5-1 Camera Board to Board Connector

The Camera module is connected to main board with 24pin Board to Board connector (AXK7L24227). Its interface is dedicated camera interface port in MSM6250. The camera port supply 24MHz master clock to camera module and receive 12MHz pixel clock (30fps), vertical sync signal, horizontal sync signal, reset signal and 8bits data from camera module. The camera module is controlled by I2C port from MSM6250.

No	Name	Port	Note
1	GND	GND	GND
2	GND	GND	GND
3	CAM_DSP_CLK	I	Master Clock(24M)
4	CAM_DATA(3)	O	Data
5	CAM_DATA(0)	O	Data
6	CAM_PCLK	O	Clock for Camera Data Out
7	CAM_DATA(1)	O	Data
8	CAM_DATA(2)	O	Data
9	CAM_VSYNC	O	Vertical Synch
10	CAM_DATA(5)	O	Data
11	CAM_DATA(4)	O	Data
12	VREG_CAM_1.8V	I	Camera Digital Power
13	GND	GND	GND
14	GND	GND	GND
15	VREG_CAM_2.6V	I	Camera Analog, I/O Power
16	GND	GND	GND
17	I2C_SCL	I	I2C Clock
18	CAM_RESET_N	I	Camera reset signal
19	VREG_CAM_2.6V	I	Camera Analog, I/O Power
20	CAM_HSYNC	O	Horizontal Sync
21	I2C_SDA	I/O	I2C command
22	CAM_DATA(6)	O	Data
23	CAM_DATA(7)	O	Data
24	GND	GND	GND

Table 3.10.5-1 Interface between Camera Module and Main Board (in camera module)

3.10.6 Folder ON/OFF Operation

There is a magnet to detect the folder status, opened or closed.
If a magnet is close to the hall-effect switch, the voltage at pin2 of U604 goes to 0V. Otherwise, 2.6V.
This folder signal is delivered to MSM6250 GPIO80.

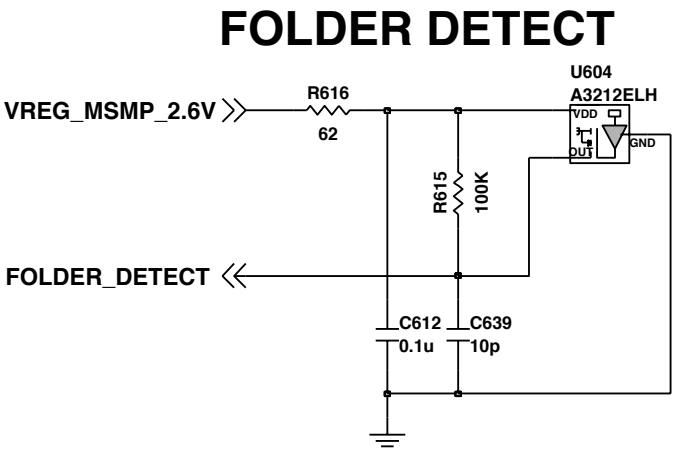


Figure 3.10.6-1 Schematic of Folder ON/OFF detection circuit on keypad

3.10.7 Camera Direction Detection

CAM_SENSE detects the Camera Direction (front or back)

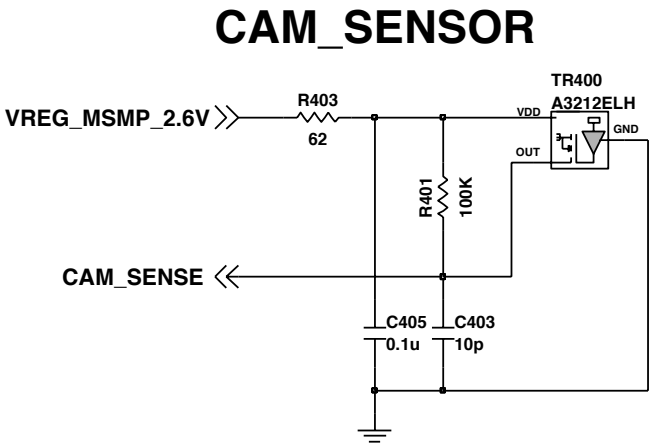


Figure 3.10.7-1 Camera Direction Detection

3.10.8 Keypad Light

There are 17 blue LEDs in key board backlight circuit, which are driven by KEYBD_BACKLIGHT line form PM6650.

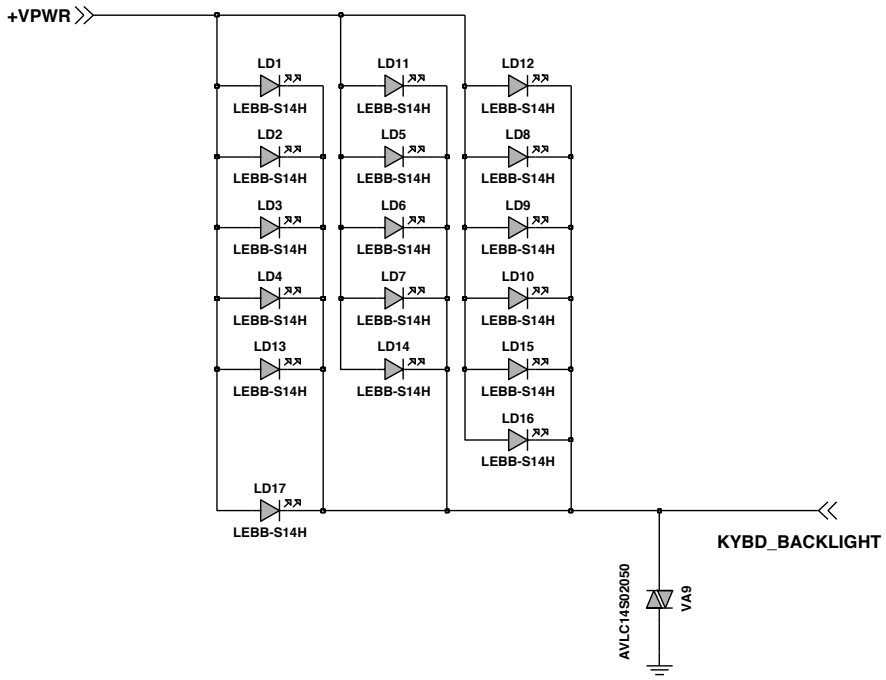
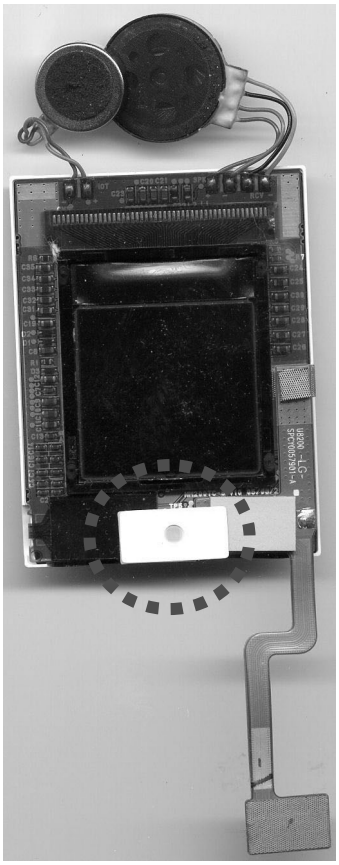


Figure 3.10.8-1 Keypad Backlight Circuit

3.10.9 Camera Light Flash

There is White LED in U8290 Folder Upper, and Drive circuit is in Main Board, which are showed below. Flash lighted by FLASH_ON Signal of FLASH_DRV_N in PM6650.



3.10.10 LCD Module

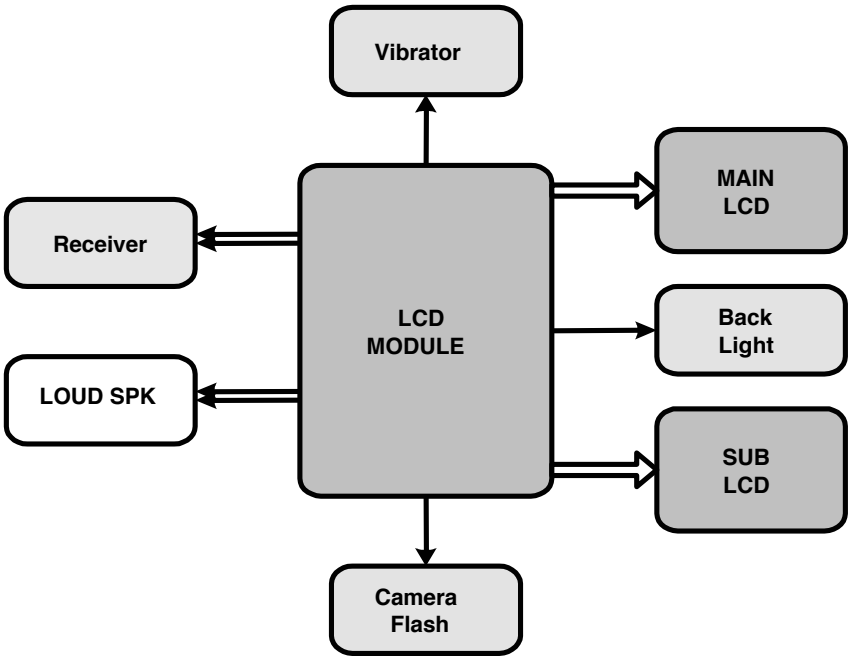


Figure 3.10.10-1 LCD Module Block Diagram

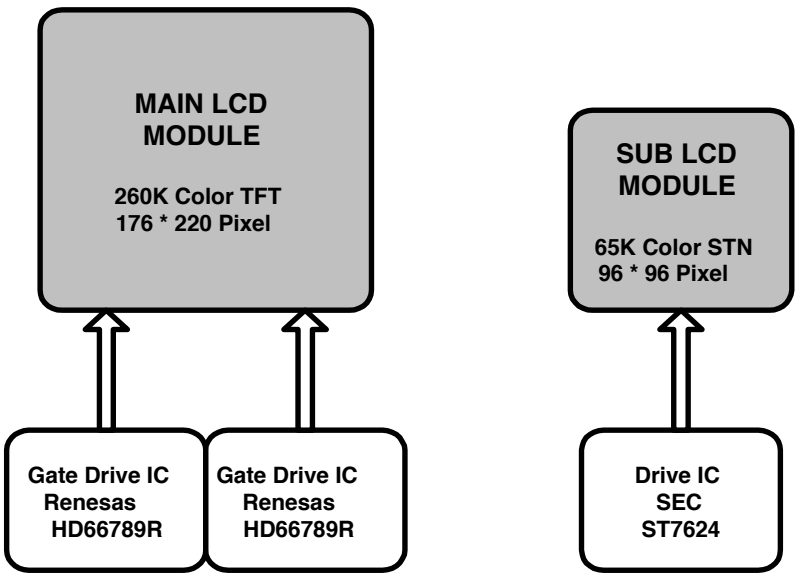


Figure 3.10.10-2 LCD Module(Main & Sub LCD)

3.10.10.1 Display & LCD FPC Interface

LCD module is connected to key board with 60-pin BtoB connector (CN300_24_5087_060_007_829) and Speaker, Receiver, Vibrator, Camera Flash is connected by soldering the leads to pads in LCD module. The LCD is controlled by 16-bit EBI2 in MSM6250

1 : GND
2 : SPK+ : Loud Speaker +
3 : SPK- : Loud Speaker -
4 : RCV+ : 8ohm SPK+
5 : RCV- : 8ohm SPK-
6 : MAIN_LCD_CS_N : Sub LCD chip select
7 : SUB_LCD_CS_N : Main LCD chip select
8 : LCD_IF_MODE : LCD interface selection (9bit or 16bit)
9 : KBYD_BACKLIGHT : Keypad LED Turn on/off control
10 : ON_SW* : Power On Key
11 : GND
12 : LCD_BACK_EN : LCD Backlight LED Turn on/off control
13 : LCD_RESET_N : Reset for main and sub LCD
14 : MOT_PWR- : Motor Turn on/off control
15 : LCD_ADS : Command or Data For Main and sub LCD
16 : EBI2_OE_N : LCD Read Enable signal
17 : EBI2_WE_N : LCD Write Enable signal
18 : LCD_MAKER_ID : Sub LCD Module Vendor selection
19 : VREG_5V : Camera flash Power (+5V)
20 : GND
21 : GND
22 : FLASH_ON : Camera flash turn on/off control
23 : GND
24 : VREG_LCD_3.0V : Main and sub LCD power (+3.0V)
25 : VREG_MSMP_2.6V : Not Used(+2.6V)
26 : GND
27 : +VPWR : LCD module Power source (+3.0V ~ +4.2V)
28 : +VPWR : LCD module Power source (+3.0V ~ +4.2V)
29 : +VPWR : LCD module Power source (+3.0V ~ +4.2V)
30 : GND
31 : GND
32 : KEY_COL(5) : Keypad Column
33 : KEY_COL(4) : Keypad Column
34 : KEY_COL(3) : Keypad Column
35 : KEY_COL(2) : Keypad Column
36 : KEY_COL(1) : Keypad Column
37 : KEY_COL(0) : Keypad Column
38 : GND
39 : KEY_ROW(4) : Keypad Row
40 : KEY_ROW(3) : Keypad Row
41 : KEY_ROW(2) : Keypad Row
42 : KEY_ROW(1) : Keypad Row
43 : KEY_ROW(0) : Keypad Row
44 : EBI2_DATA(0) : Data Line
45 : EBI2_DATA(1) : Data Line
46 : EBI2_DATA(2) : Data Line
47 : EBI2_DATA(3) : Data Line
48 : EBI2_DATA(4) : Data Line
49 : EBI2_DATA(5) : Data Line
50 : EBI2_DATA(6) : Data Line
51 : EBI2_DATA(7) : Data Line
52 : EBI2_DATA(8) : Data Line
53 : EBI2_DATA(9) : Data Line
54 : EBI2_DATA(10) : Data Line
55 : EBI2_DATA(11) : Data Line
56 : EBI2_DATA(12) : Data Line
57 : EBI2_DATA(13) : Data Line
58 : EBI2_DATA(14) : Data Line
59 : EBI2_DATA(15) : Data Line
60 : GND

3.10.11 Audio and Sound

3.10.11.1 Overview of Audio & Sound path

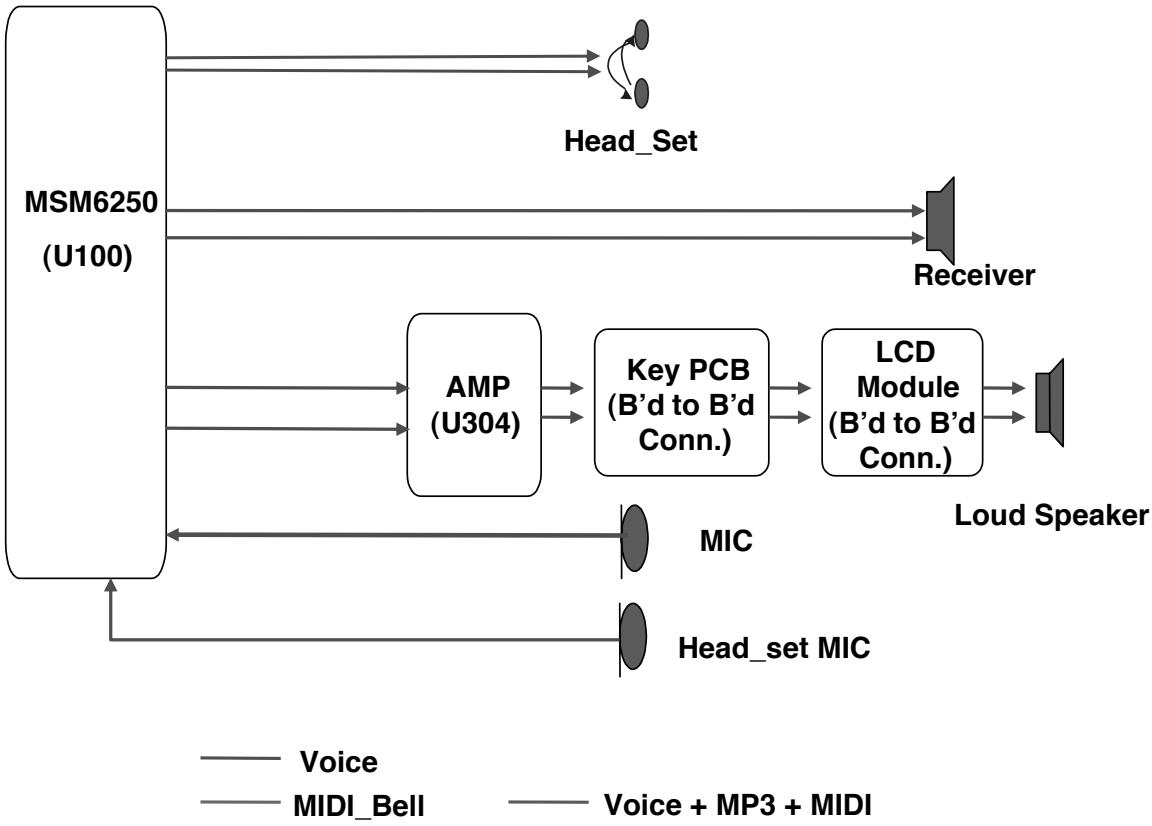


Figure 3.10.11.1-1 Audio & Sound Path Block Diagram

3.10.11.2 Audio Signal Processing & Interface

Audio signal processing is divided Uplink path and downlink path.
The uplink path amplifies the audio signal from MIC and converts this analog signal to digital signal and then transmit it to DBB Chip (MSM6250). This transmitted signal is reformed to fit in GSM & WCDMA Frame format and delivered to RF Chip. The downlink path amplifies the signal from DBB chip (MSM6250) and outputs it to Receiver (or Speaker).
The receive path can be directed to either one of two earphone amplifiers or the auxiliary output.
The outputs earphone1 (EAR1OP, EAR1ON) and Auxiliary out (AUXOP, AUXON) are differential outputs. Earphone2 (EAR2O) is a single-ended output stage designed to drive a headset speaker.
The microphone interface consists of two differential microphone inputs, one differential auxiliary input and a two-stage audio amplifier.

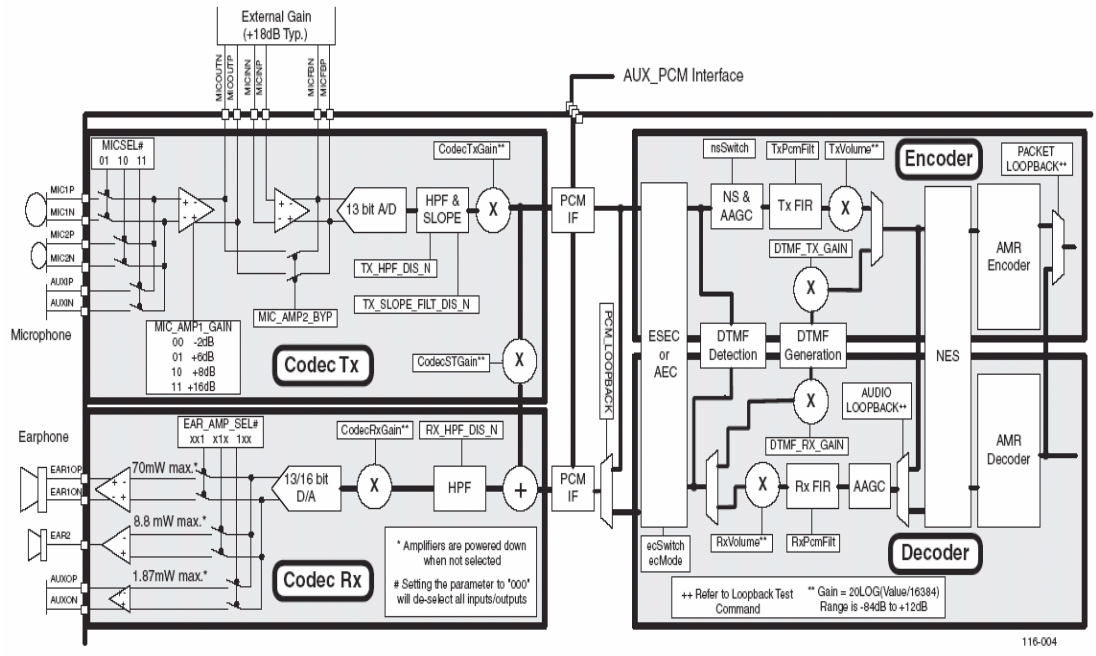
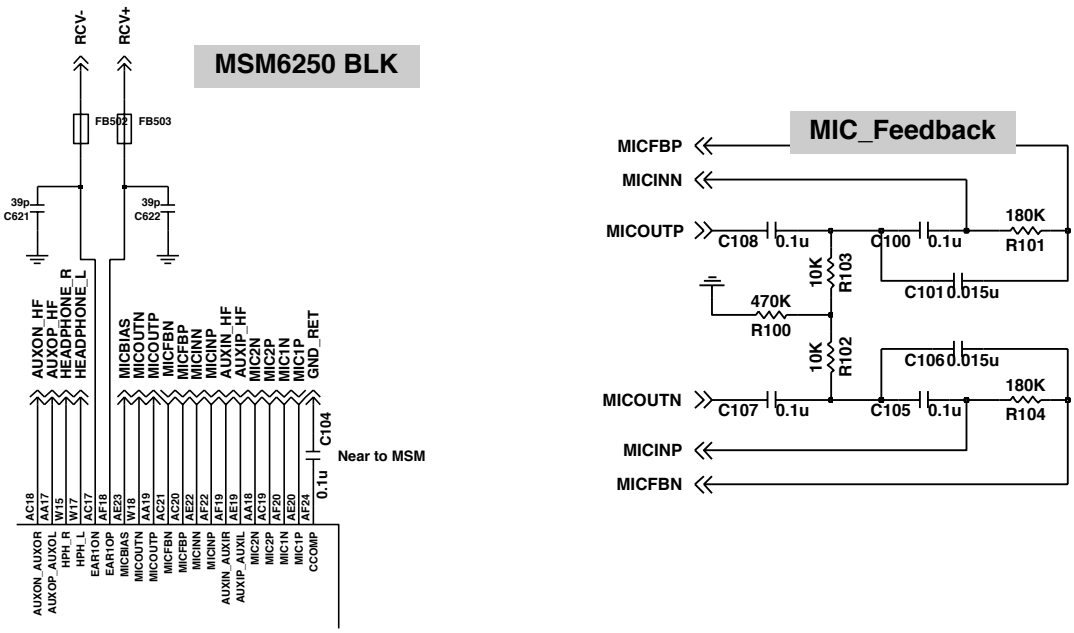


Figure 3.10.11.2-1 Audio Interface Detailed Diagram(MSM6200)



EAR JACK

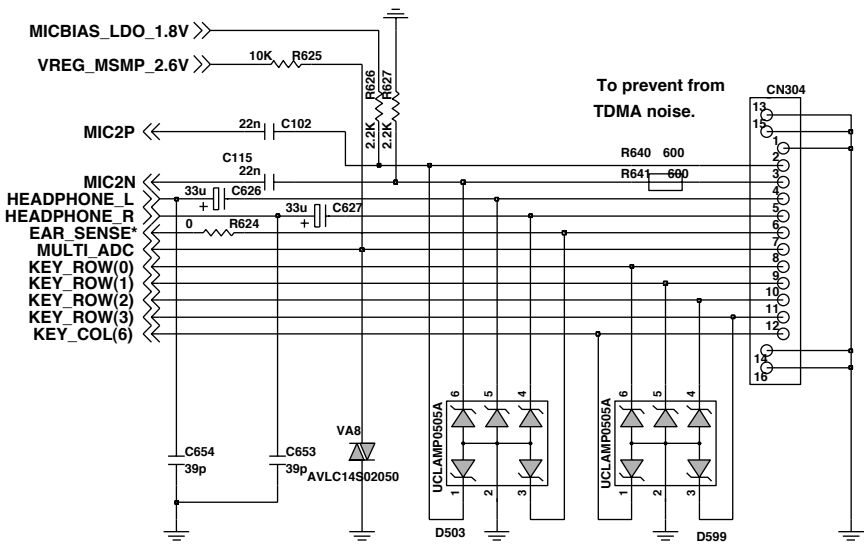


Figure 3.10.11.2-2 Audio Section scheme

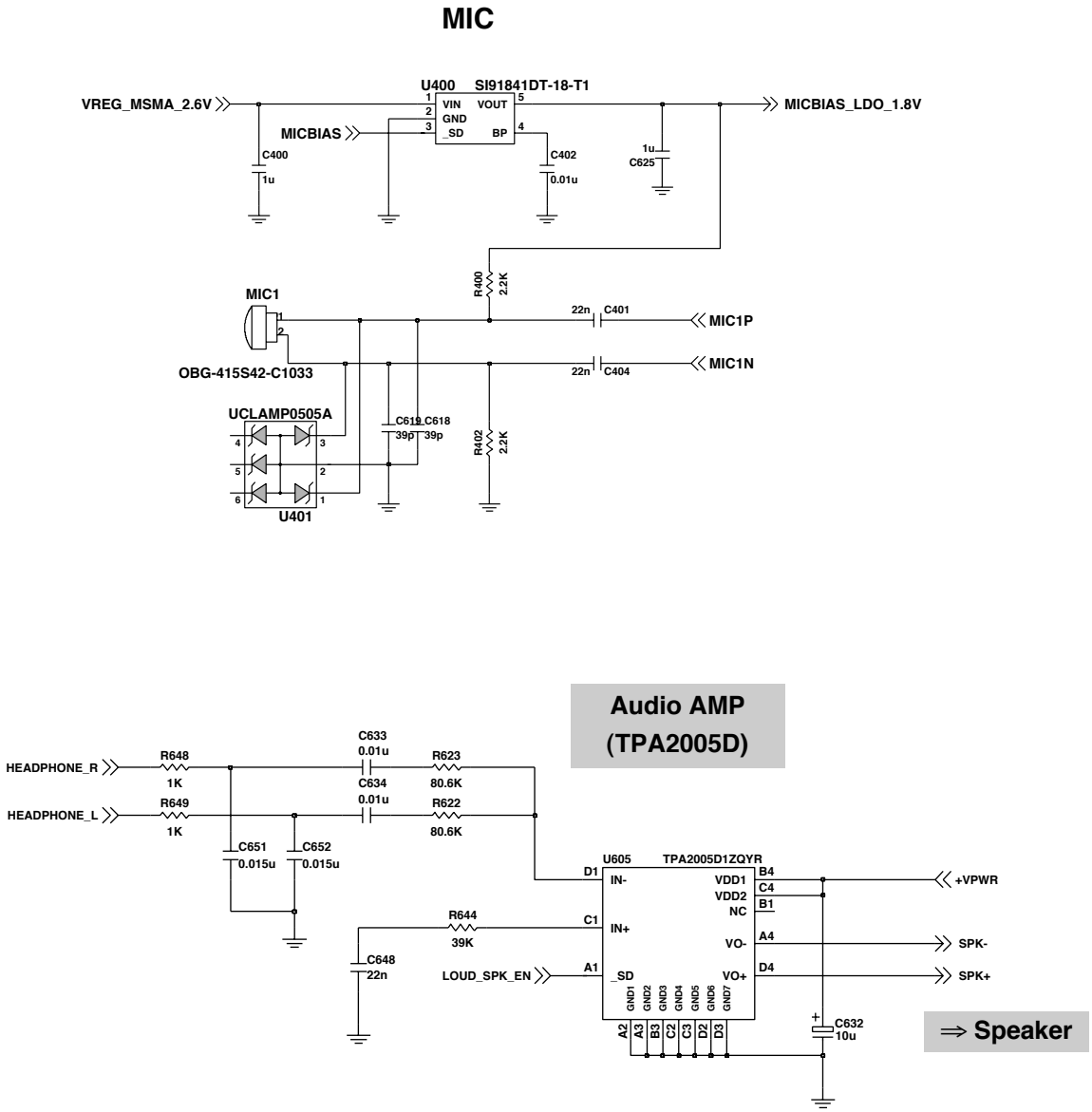


Figure 3.10.11.2-3 Audio Section scheme

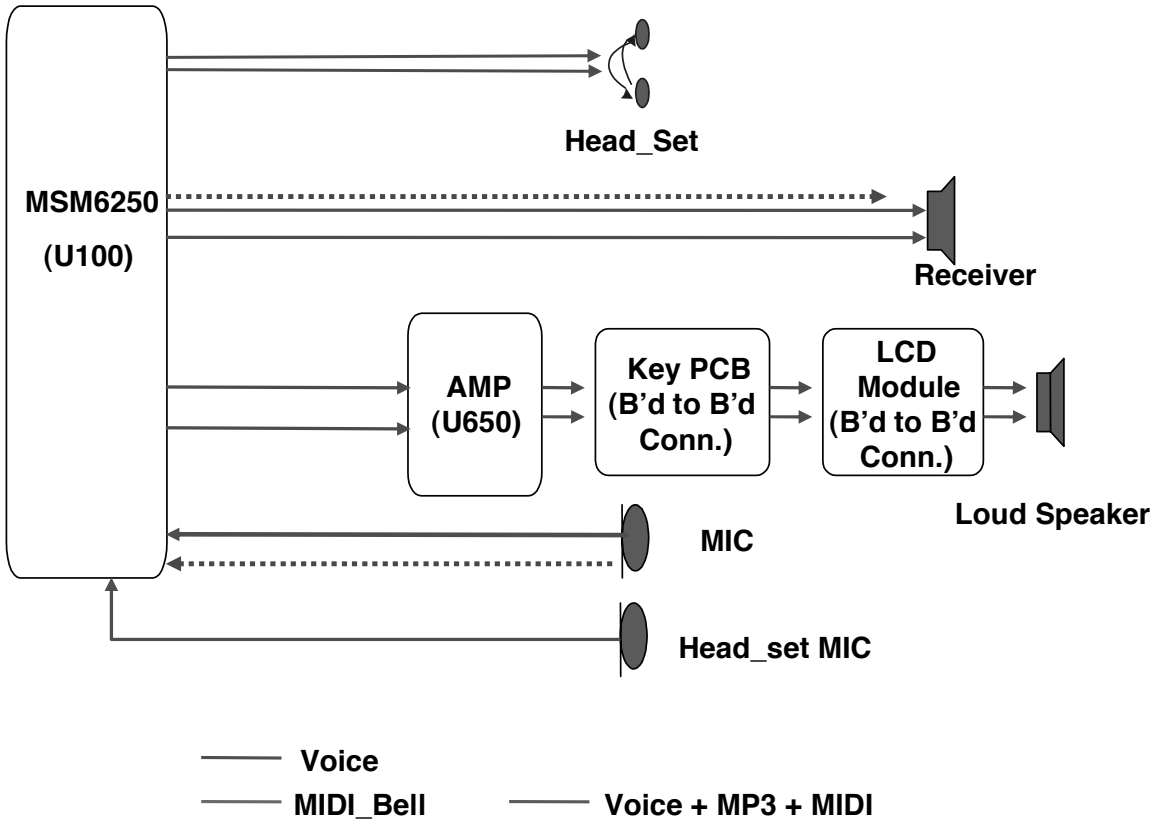
3.10.11.3 Audio Mode

Audio Mode includes three states.(Voice call, Video Telephony, Midi, MP3). And each states is sorted by followed Detail Mode according to external Devices (Receiver, Loud, Headset).

MODE	Device	Detail MODE
Voice Call (GSM & WCDMA)	Receiver Mode	Receiver Voice Call
	Loud Mode	Speaker Phone
	Head_Set	Head_Set Voice Call
Video Telephony (Only WCDMA)	Loud Mode	Speaker Phone Video Telephony
	Head_Set	Head_Set Video Telephony
MIDI	Loud Mode	Speaker MIDI Bell
	Head_Set	Head_Set MIDI Bell
MP3	Loud Mode	Speaker MP3
	Head_Set	Head_Set MP3

Table 3.10.11.3-1 Audio Mode

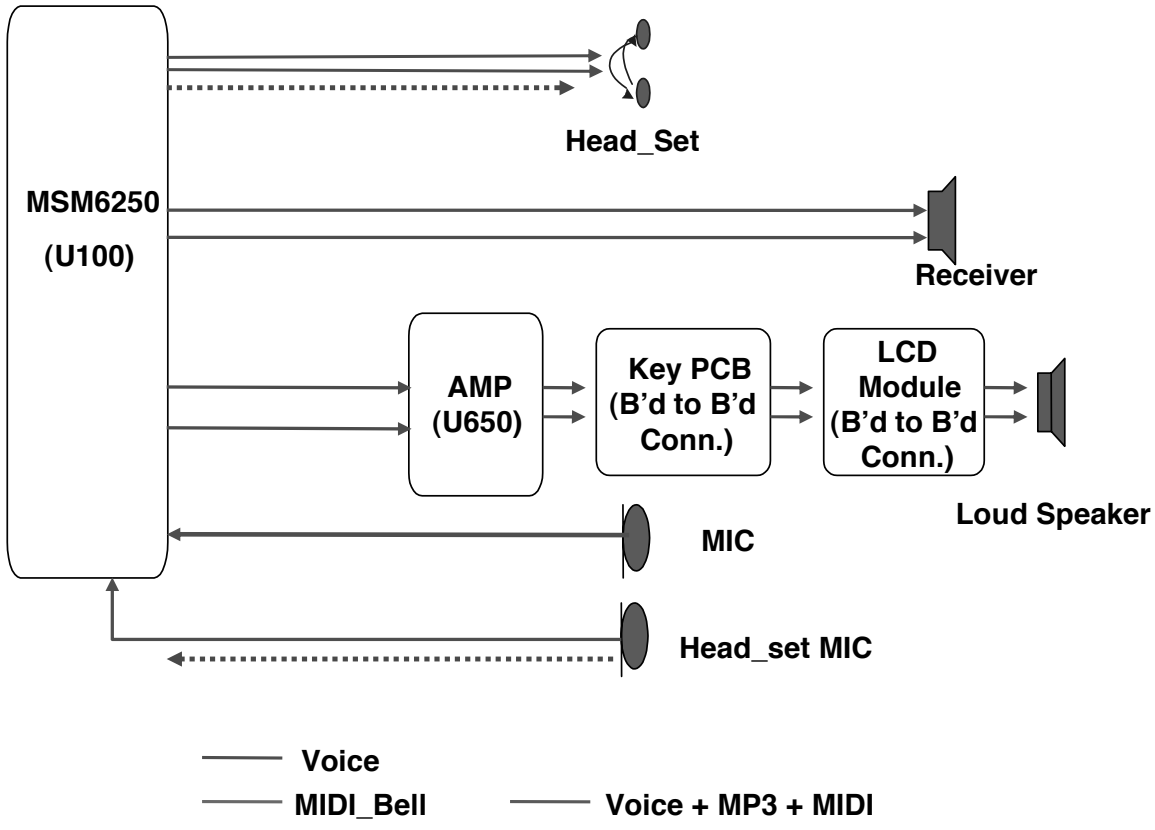
Voice Call Receiver Mode Path



=> Voice Call Receiver Mode is Implemented as bellow

C621,C622(MSM6250 EAR1ON,EAR1OP) -> B'd to B'd Connector -> Key PCB -> B'd to B'd Connector -> LCD Module -> Receiver

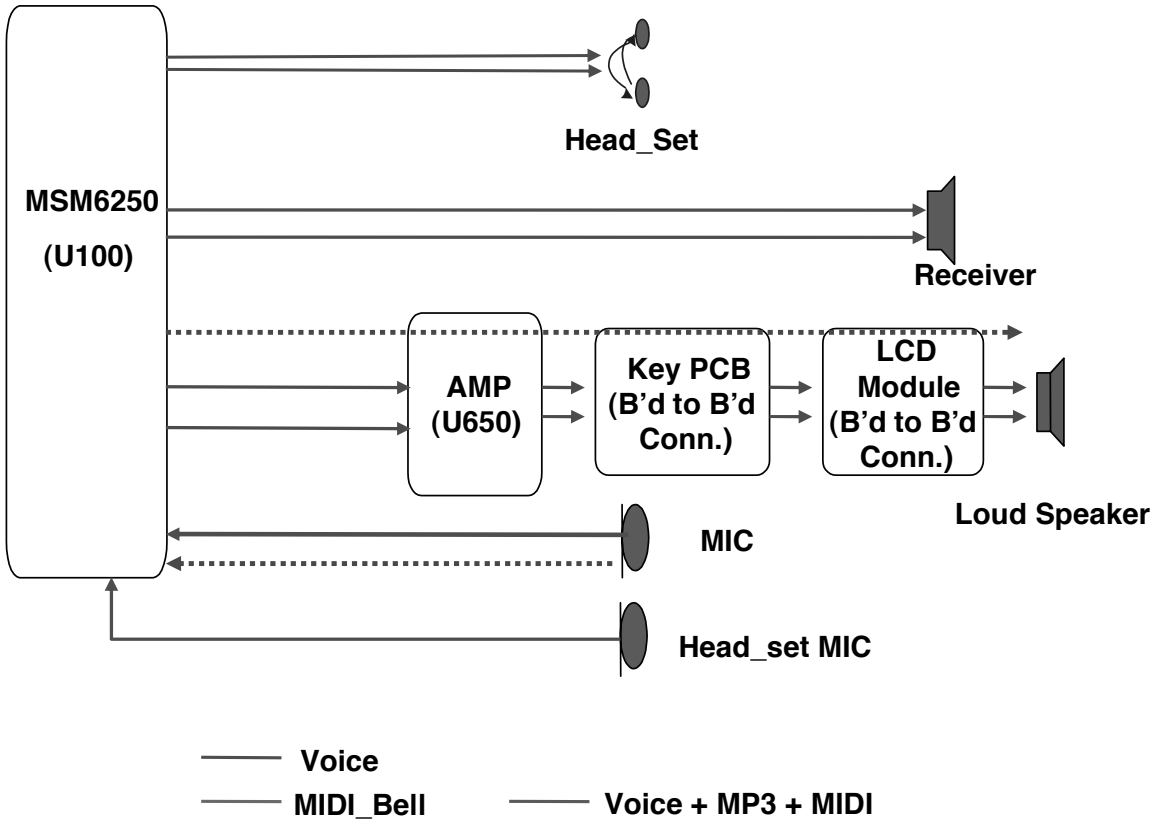
Voice Call Head_Set Mode Path & Head video Telephony Mode



=> Voice Call Head_Set Mode is Implemented as bellow

MSM6250 (HPH_L, HPH_R) -> C626, C627 -> Ear_Jack -> Head_Set

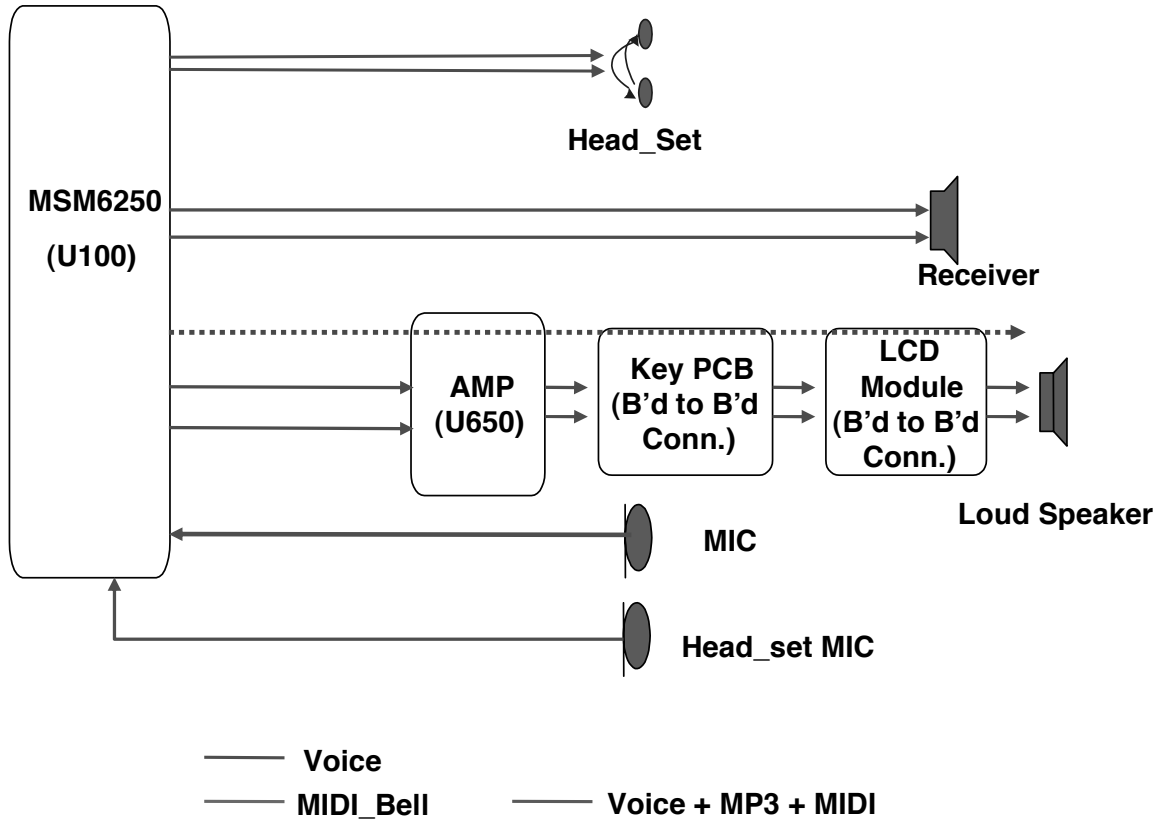
Voice Call Speaker Phone Mode & Video Telephony Mode



=> Voice Call Speaker Phone Mode is Implemented as bellow

MSM6250 (HPH_L, HPH_R) -> R648, R649 -> C633, C634 -> R622, R623-> AMP(U605) -> B'd to B'd Connector -> Key PCB -> B'd to B'd Connector -> LCD Module -> Loud Speaker

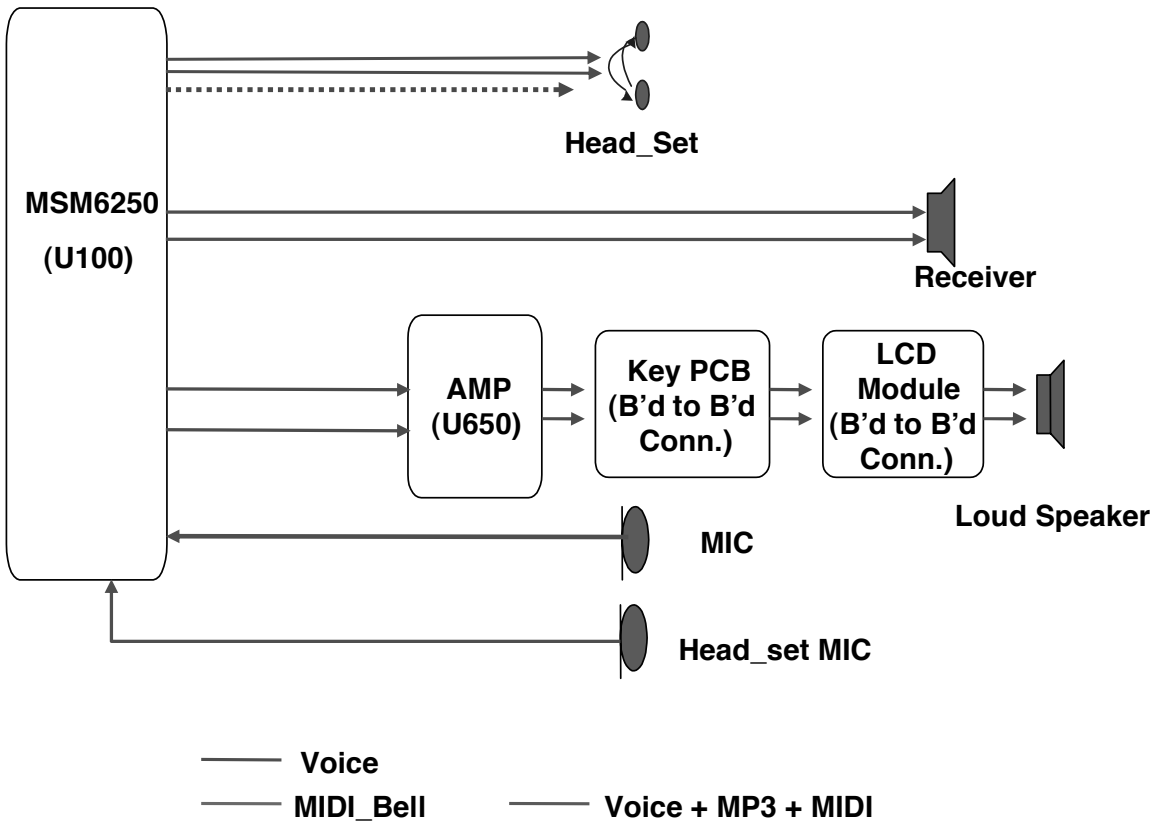
MIDI Ring Tone (Speaker)



=> MIDI Ring tone for speaker

MSM6250 (HPH_L, HPH_R) -> R648, R649 -> C633, C634 -> R622, R623-> AMP(U605) -> B'd to B'd Connector -> Key PCB -> B'd to B'd Connector -> LCD Module -> Loud Speaker

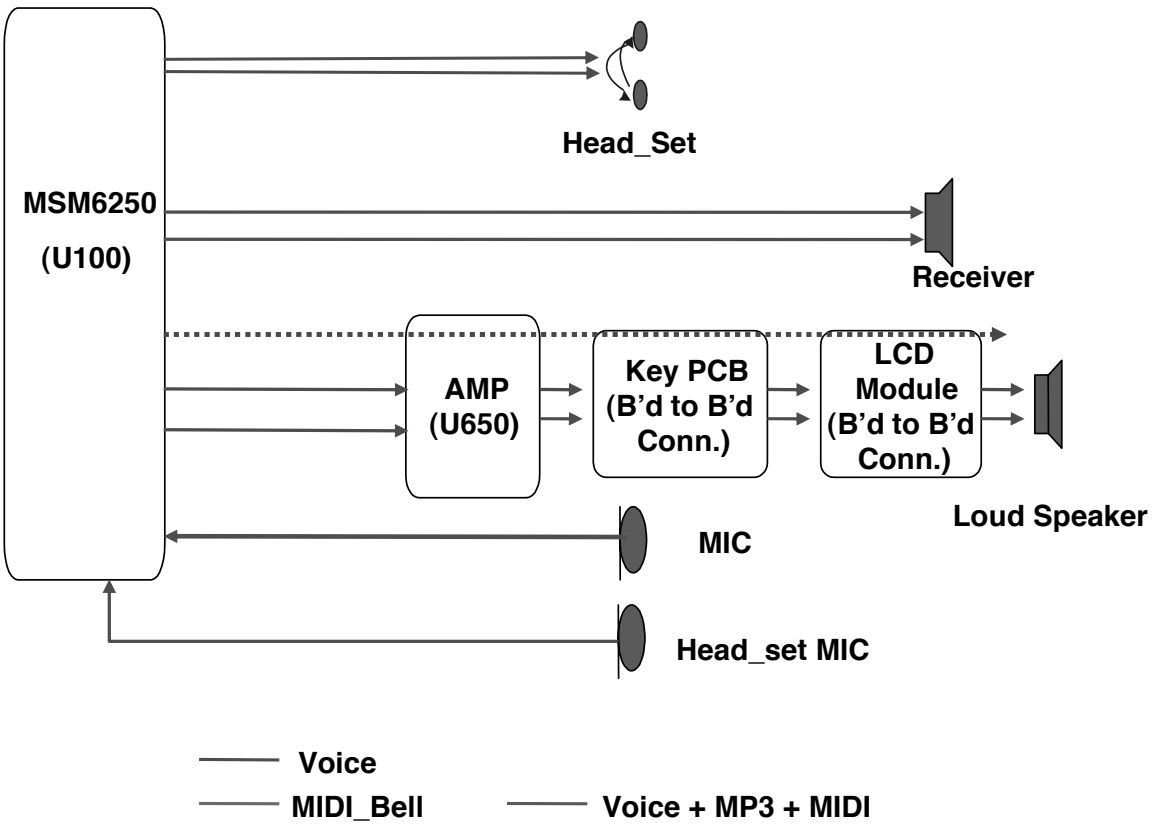
MIDI Ring Tone (Head_Set)



=> MIDI Ring tone for head_set

MSM6250 (HPH_L, HPH_R) -> C626, C627 -> Ear_Jack -> Head_Set

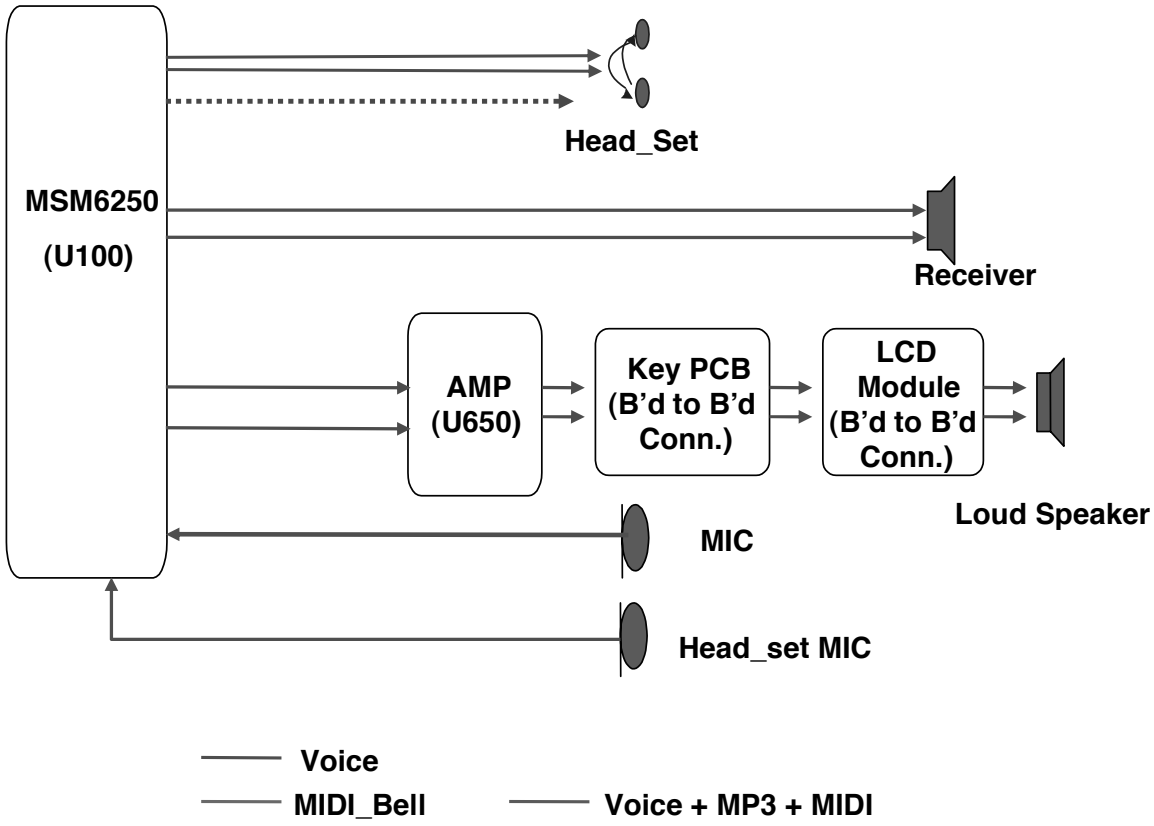
MP3 Play (Speaker)



=> MP3 play path for speaker

MSM6250 (HPH_L, HPH_R) -> R648, R649 -> C633, C634 -> R622, R623-> AMP(U605) -> B'd to B'd Connector -> Key PCB -> B'd to B'd Connector -> LCD Module -> Loud Speaker

MP3 Play (Head_set)



=> MP3 play path for speaker

MSM6250 (HPH_L, HPH_R) -> C626, C627 -> Ear_Jack -> Head_Set

Audio & Sound Main Component

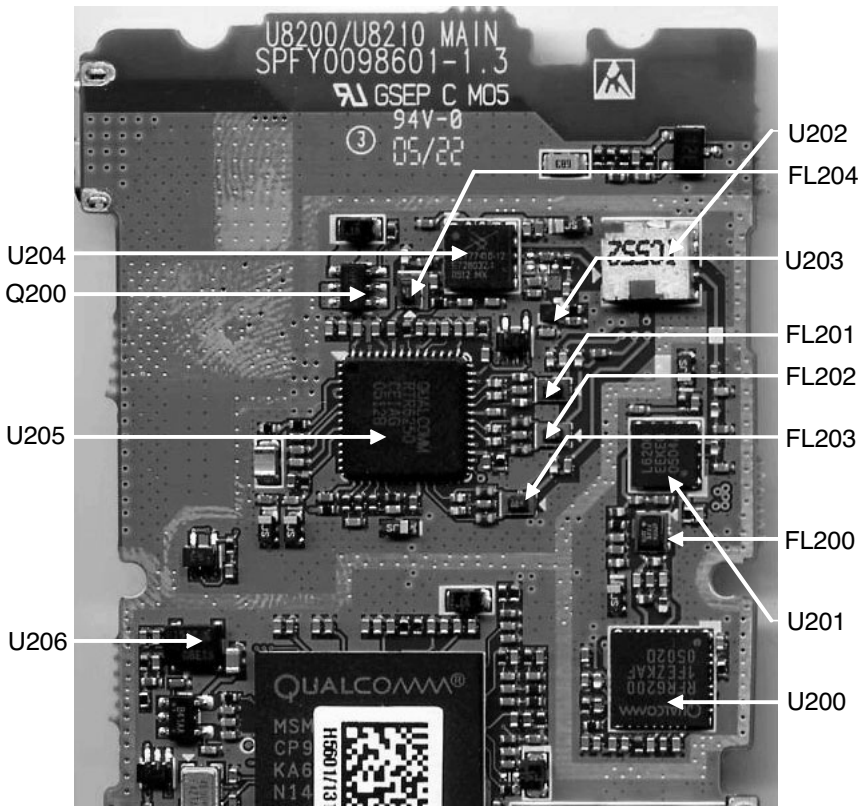
There are 6 components in U8290 schematic Diagram. Part Number marked on U8290 Schematic Diagram.

	Component	Design No.	Maker Part No.	Note
1	MSM6250	U100	MSM6250	Base-Band Modem
2	TPA2005D	U605	TPA2005D1ZQYR	Differential Audio Amp
3	Loud Speaker		EMD1740C DP1P	8ohm Speaker
4	Receiver		EMD1740C DP1P	32ohm Speaker
5	MIC	MIC1	OBG-415S42-C1033	
6	Head_Set		EM-LG911ST	Stereo Head_Set

Tabel 3.10.11.3-2 Audio Component List

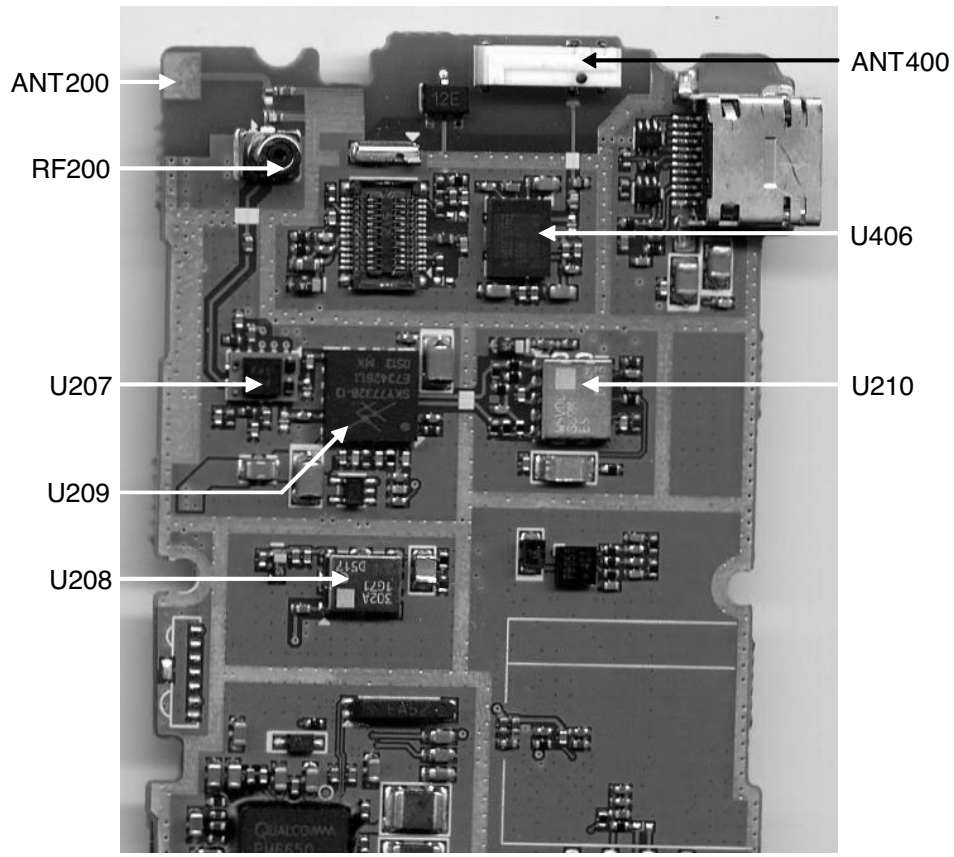
4. TROUBLE SHOOTING

4.1 RF Component



RF component (Top)

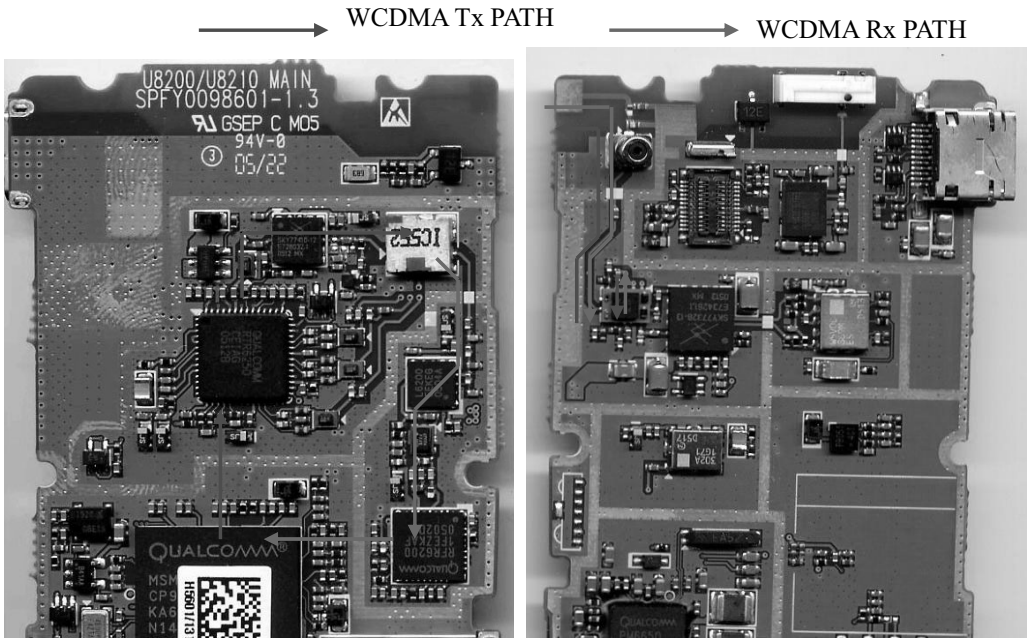
Reference	Description	Reference	Description
U200	WCDMA Receiver IC	Q200	WCDMA PAM Vcc Switch
U201	WCDMA Rx LNA IC	FL200	WCDMA Rx SAW Filter
U202	WCDMA Duplexer	FL201	GSM Rx SAW Filter
U203	WCDMA HDET IC	FL202	DCS Rx SAW Filter
U204	WCDMA Tx PAM	FL203	PCS Rx SAW Filter
U205	WCDMA/GSM Transceiver IC	FL204	WCDMA Tx SAW Filter
U206	VCTCXO(19.2MHz)		

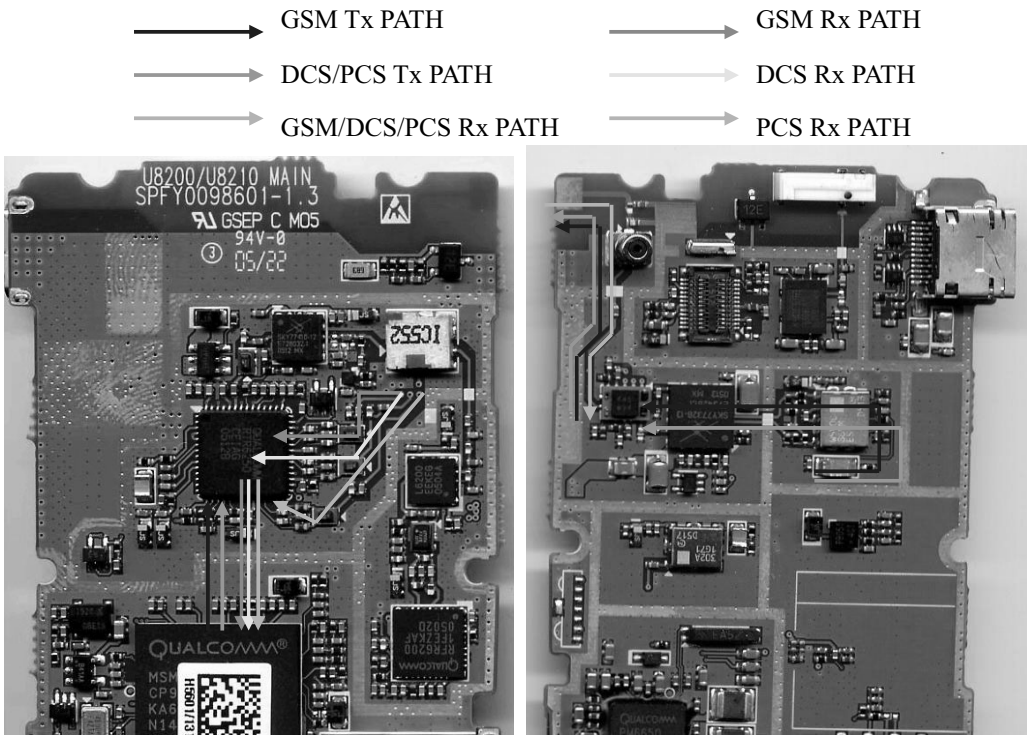


RF component (Bottom)

Reference	Description	Reference	Description
ANT200	ANT. Contact point	U209	EGSM/DCS Tx Dual PAM
RF200	Test Connector	U210	EGSM/DCS TX Dual VCO
U207	ANT. Switch Module	U406	Bluetooth RF Module
U208	WCDMA Rx VCO	ANT400	Bluetooth ANT.

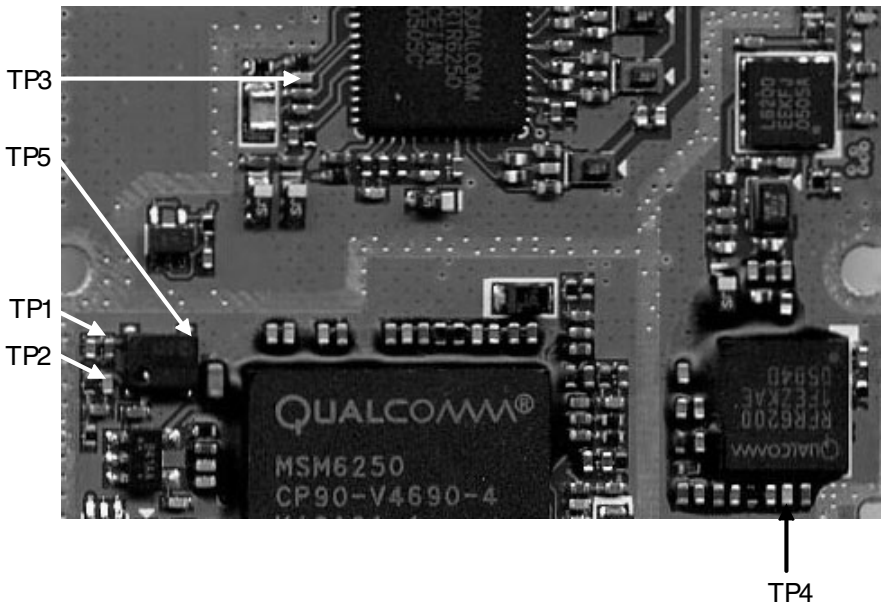
4.2 SIGNAL PATH



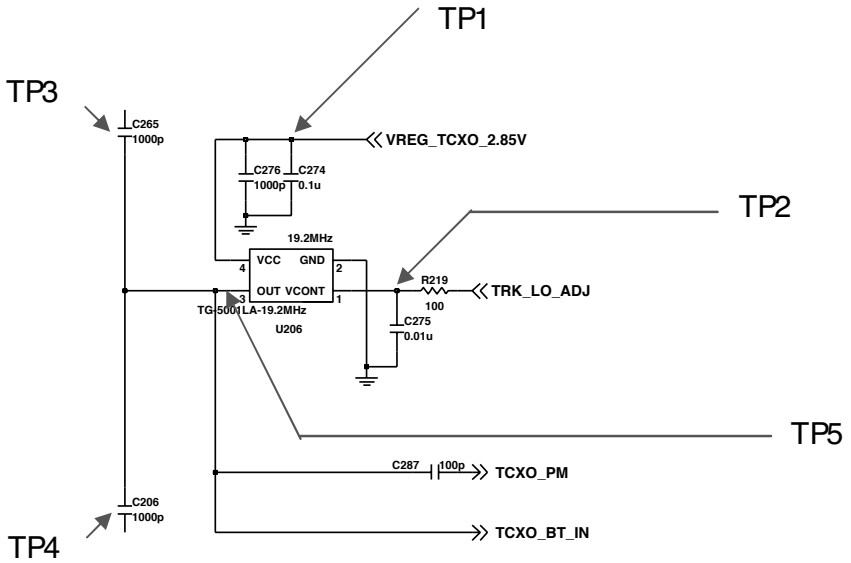


4.3 Checking VCXO(19.2MHz) Block

The reference frequency (19.2MHz) from U206 (VCXO) is used WCDMA TX part, GSM part and BB part.

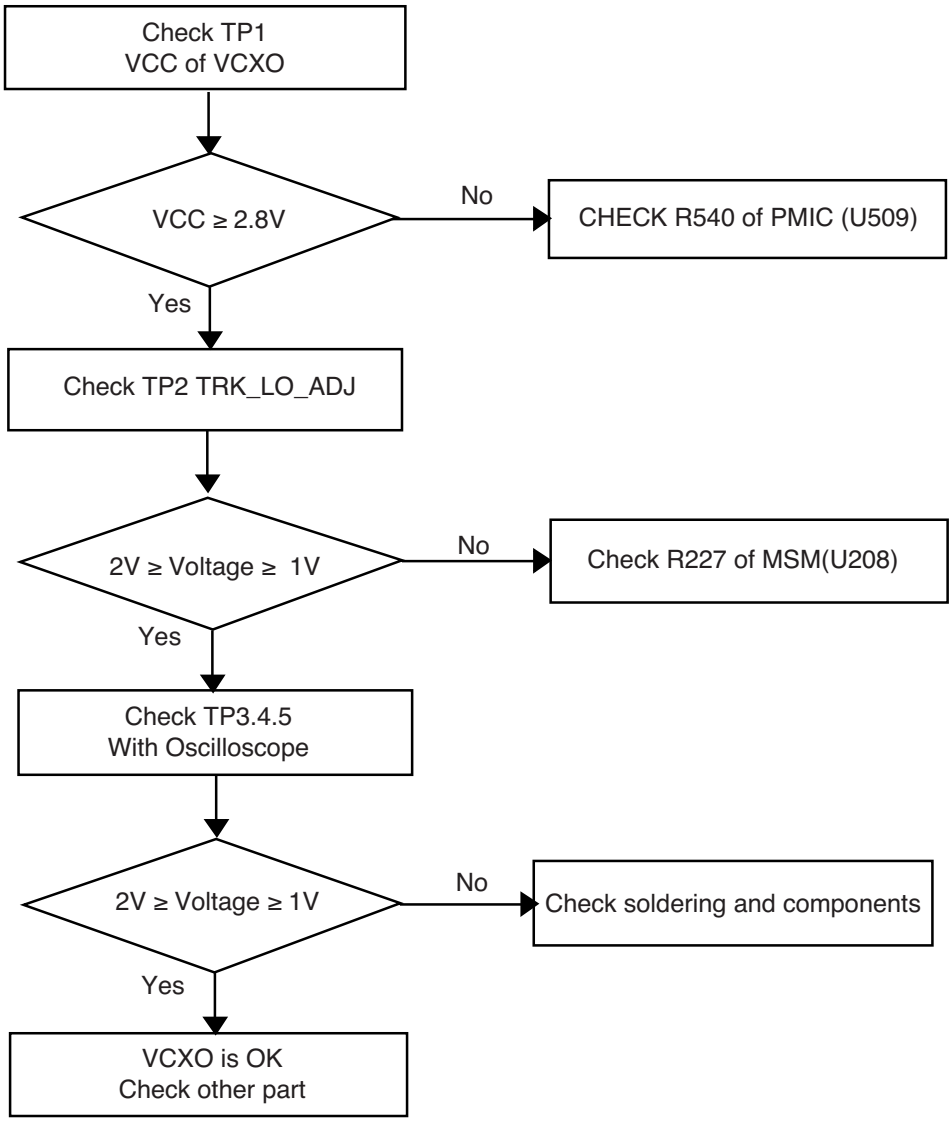


Test Point (Crystal Part)

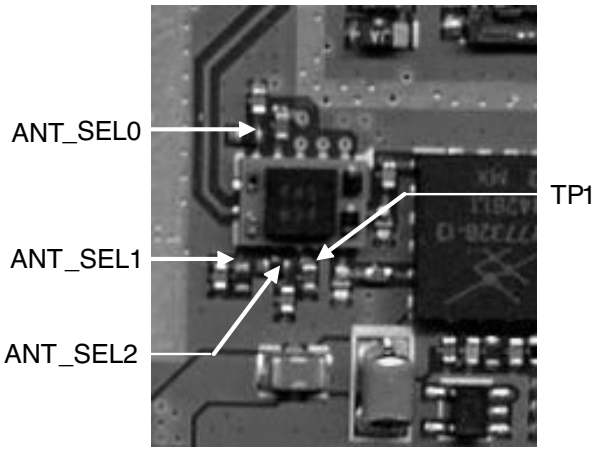


Schematic of the Crystal Part

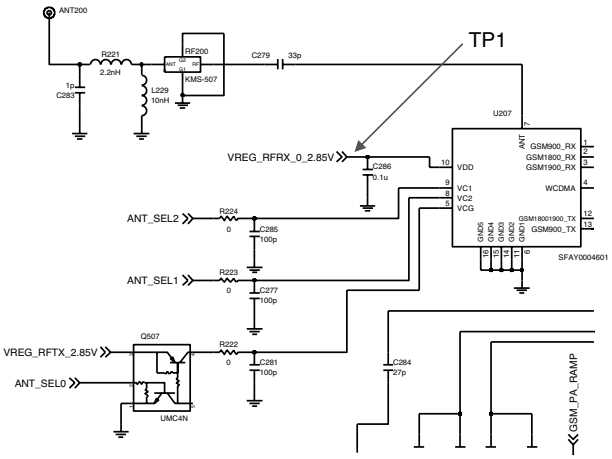
4. TROUBLE SHOOTING



4.4 Checking Ant. SW Module Block



Antenna Switch Block(Bottom)

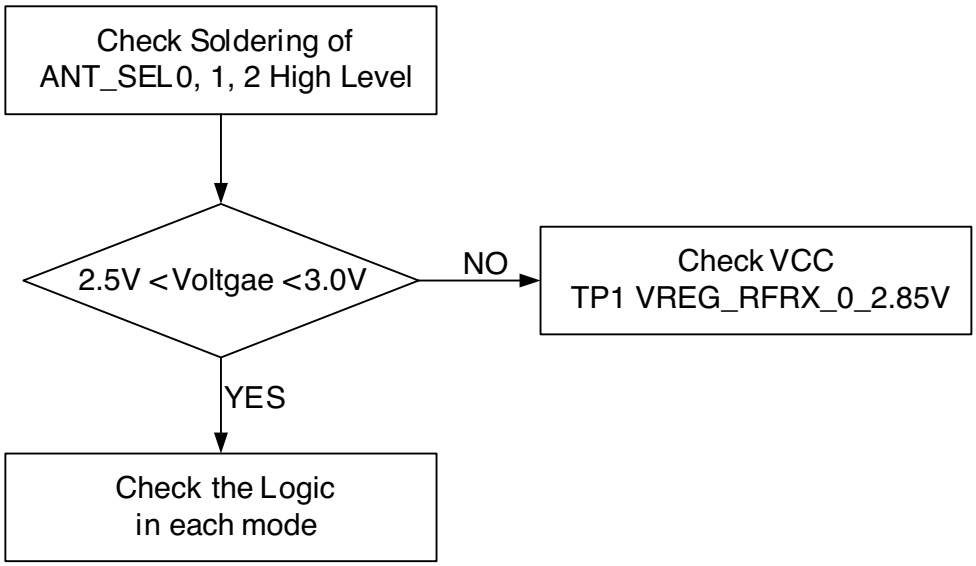


Schematic of the Antenna Switch Block

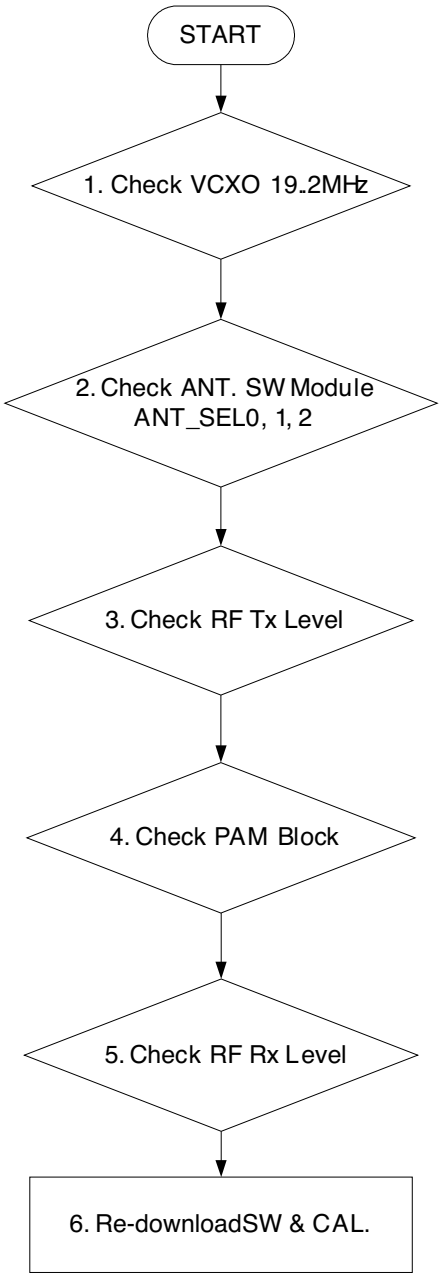
	ANT_SEL2	ANT_SEL1	ANT_SEL0
GSM 900 TX	LOW	LOW	HIGH
GSM 900 RX/WCDMA	LOW	LOW	LOW
DCS1800/PCS1900 TX	HIGH	HIGH	LOW
DCS 1800 RX	LOW	HIGH	LOW
PCS 1900 RX	HIGH	LOW	LOW

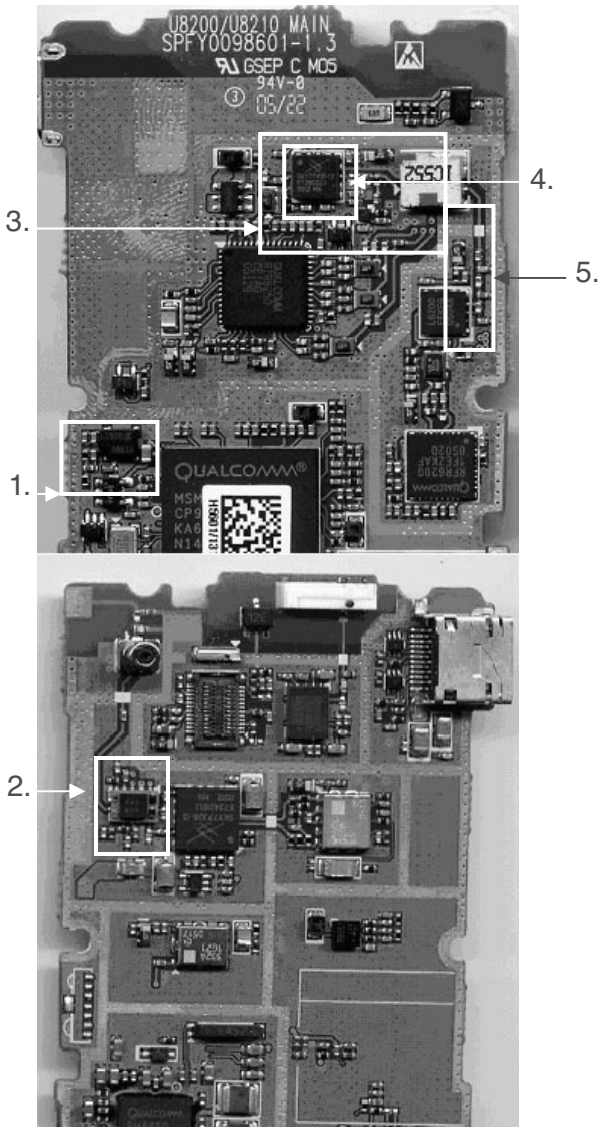
Logic Table of the Antenna Switch

Checking Switch Block power source



4.5 Checking WCDMA Block





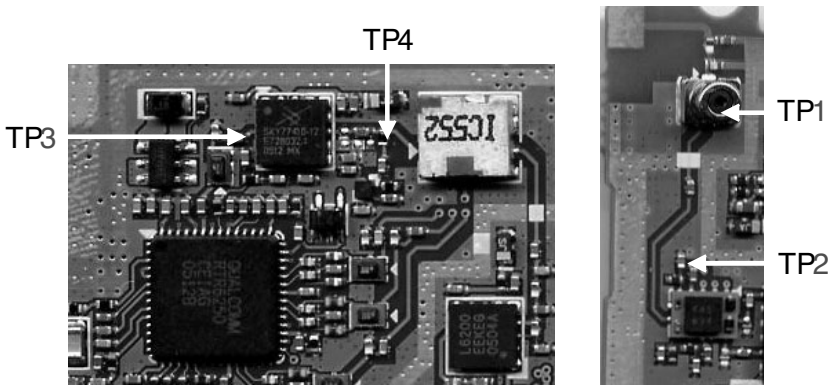
4.5.1 Checking VCXO Block

Refer to 4.3

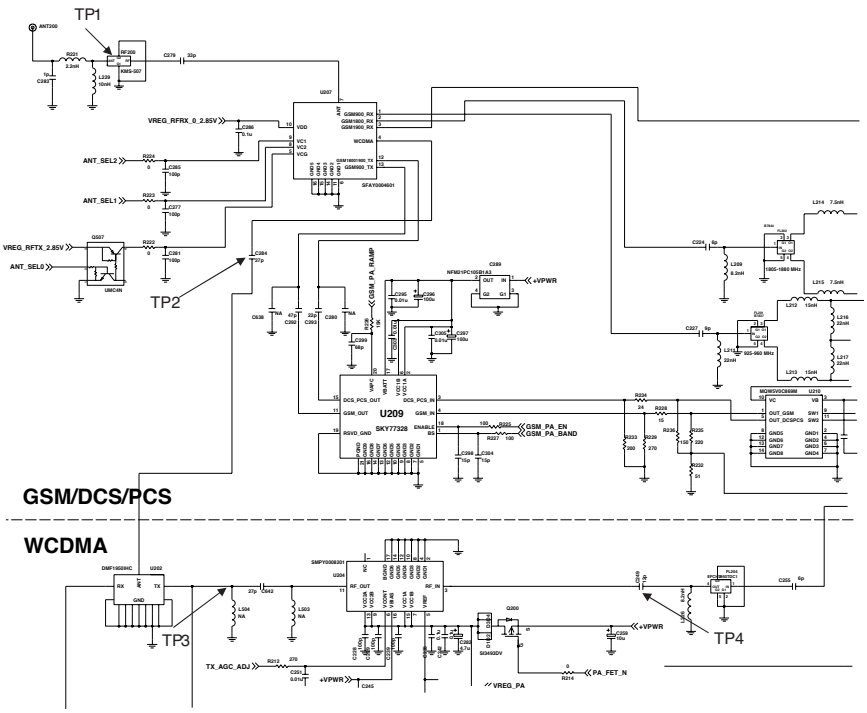
4.5.2 Checking Ant. SW module

Refer to 4.4

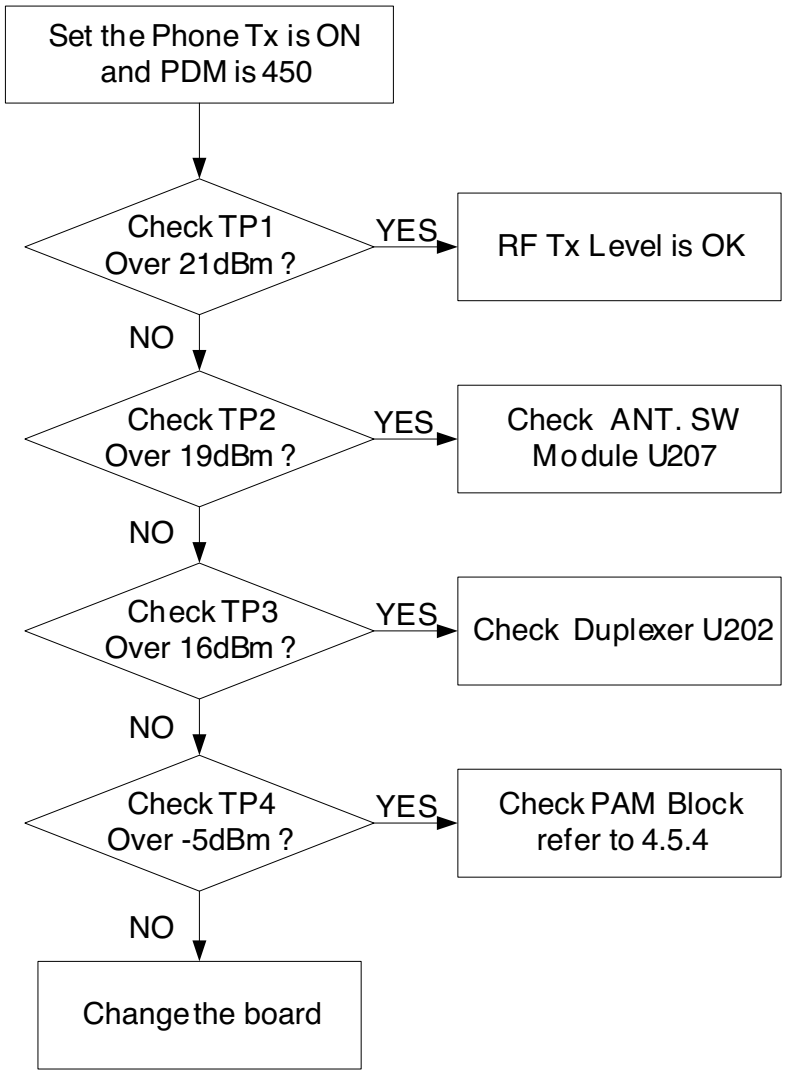
4.5.3 Checking RF TX Level



Test Point (RF TX Level)



For testing, Max power output is needed.



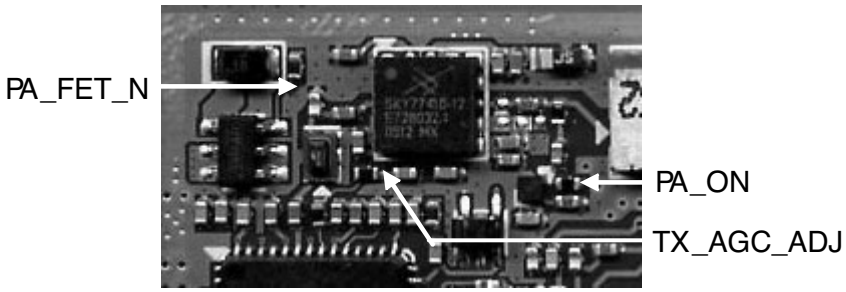
4.5.4 Checking PAM Block

PAM control signal

PA_ON : WCDMA Tx Power Detect IC(U203:HDET) Enable

PA_FET_N : WCDMA PAM Vcc Control Signal (Q200)

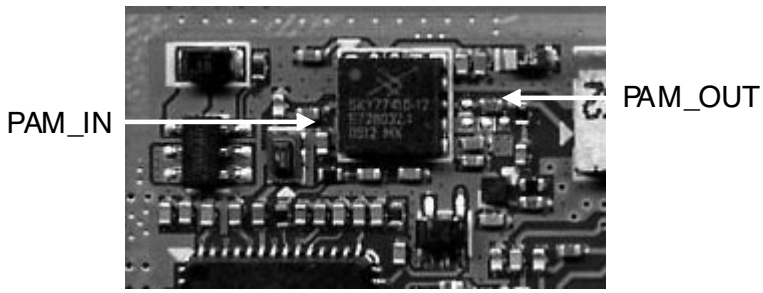
TX_AGC_ADJ : WCDMA Tx Power Amp Gain Control



PA_ON must be HIGH(over 2.5V)

PA_FET_N must be LOW if the max Tx power is set (lower than 0.5V)

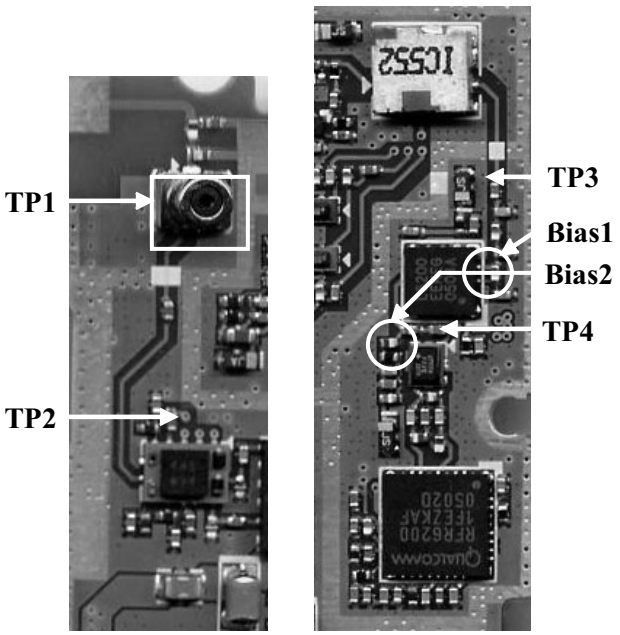
PAM IN/OUT Signal



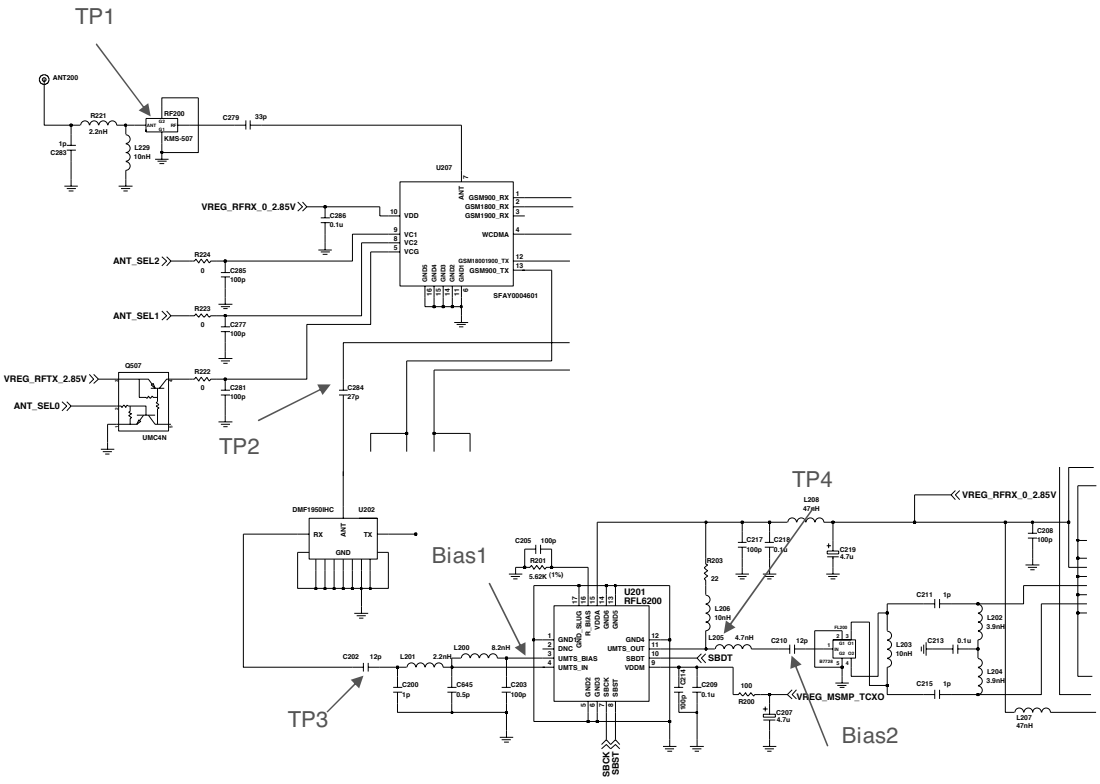
PAM OUT must be over 16dBm

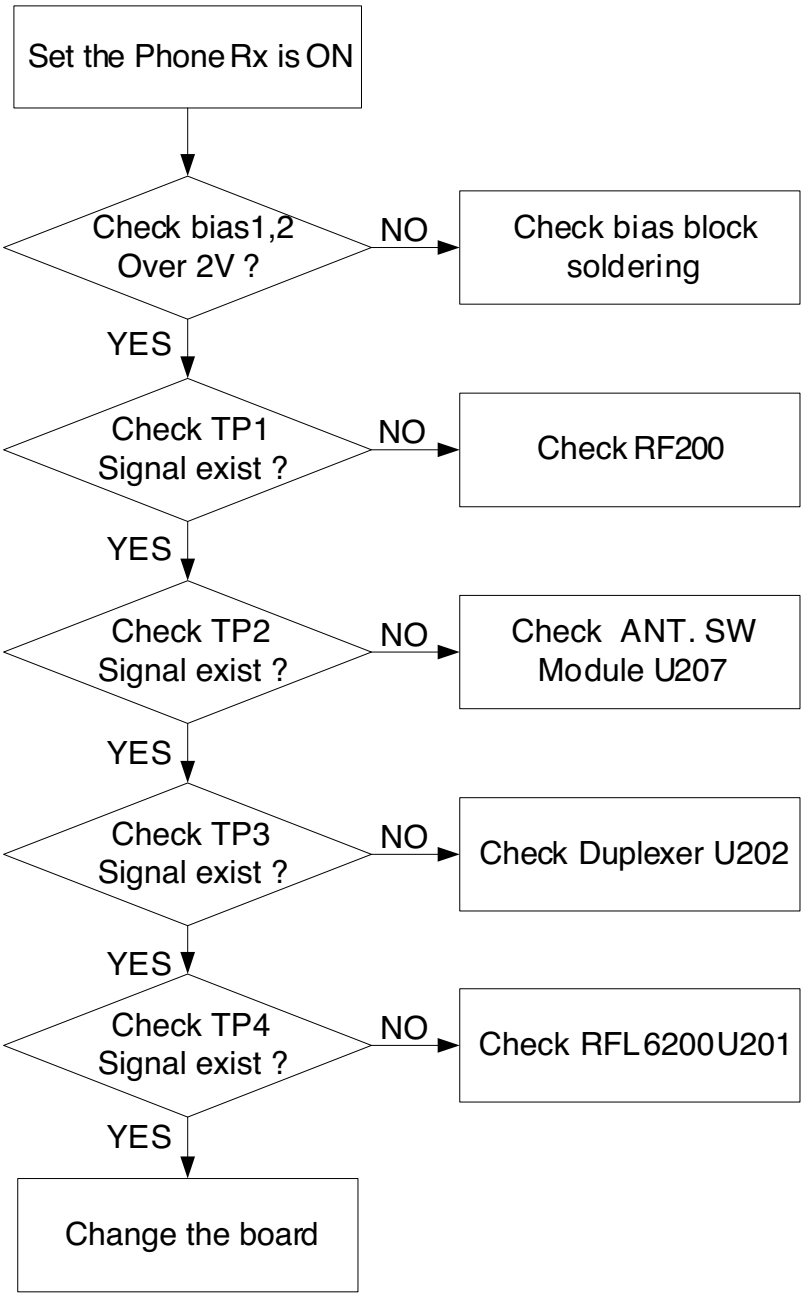
PAM IN must be over -5dBm

4.5.5 Check RF Rx Level

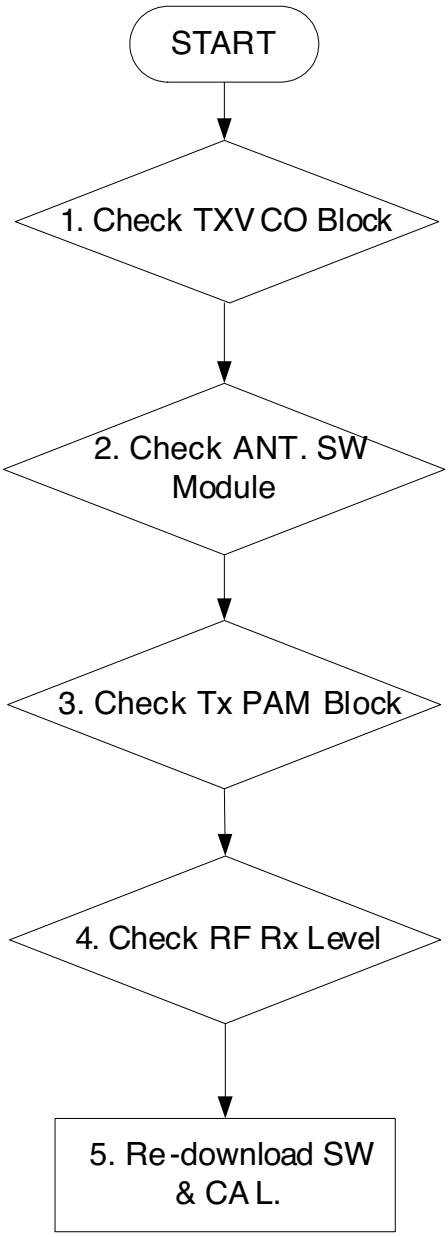


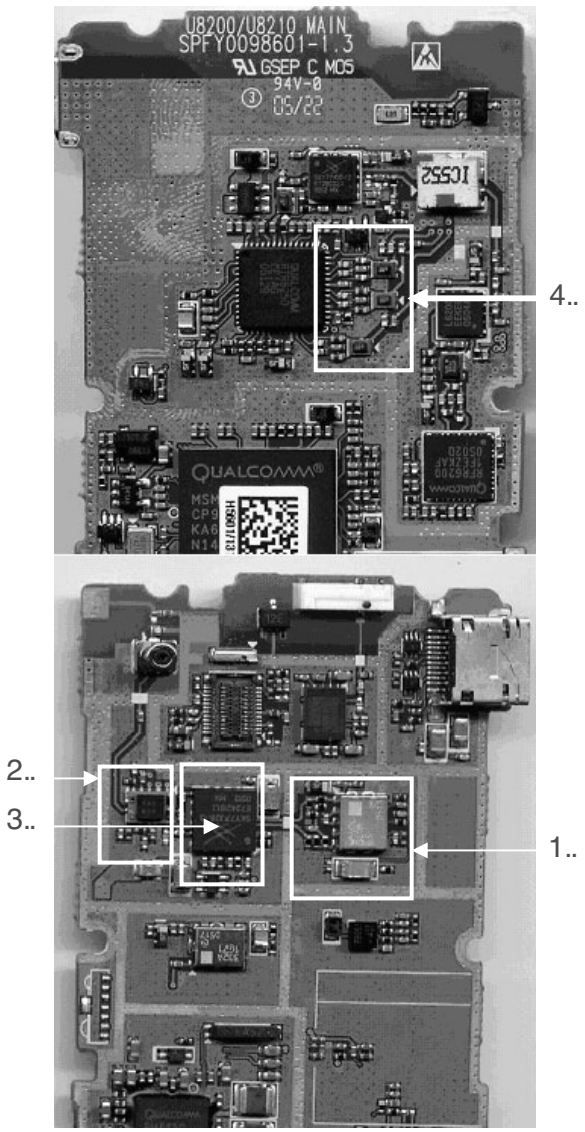
Test Point (RF Rx Level)



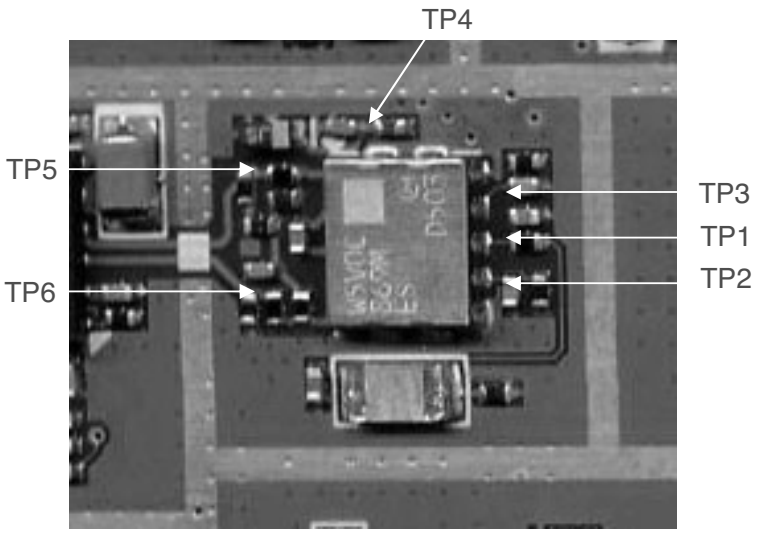

Set the Phone Rx is ON
Check bias1,2 Over 2V ?
NO
Check bias block soldering
YES
Check TP1 Signal exist ?
NO
Check RF200
YES
Check TP2 Signal exist ?
NO
Check ANT. SW Module U207
YES
Check TP3 Signal exist ?
NO
Check Duplexer U202
YES
Check TP4 Signal exist ?
NO
Check RFL6200 U201
YES
Change the board

4.6 Checking GSM Block

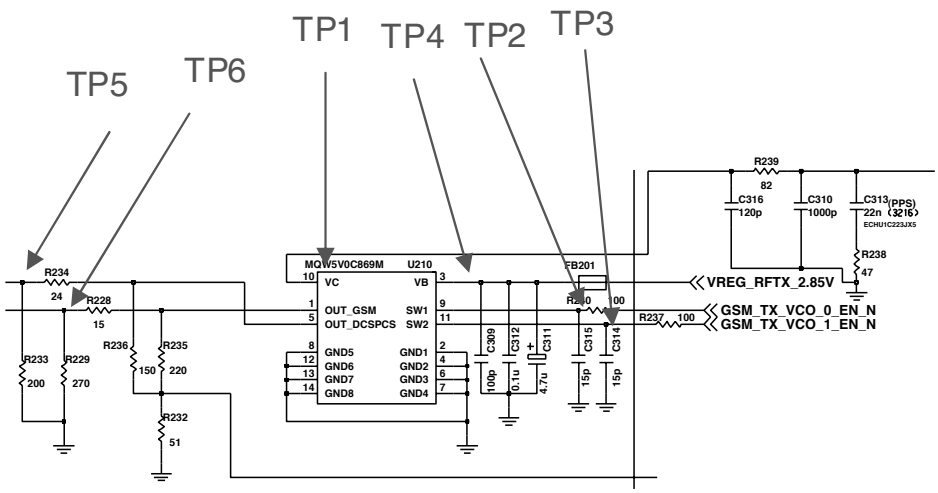




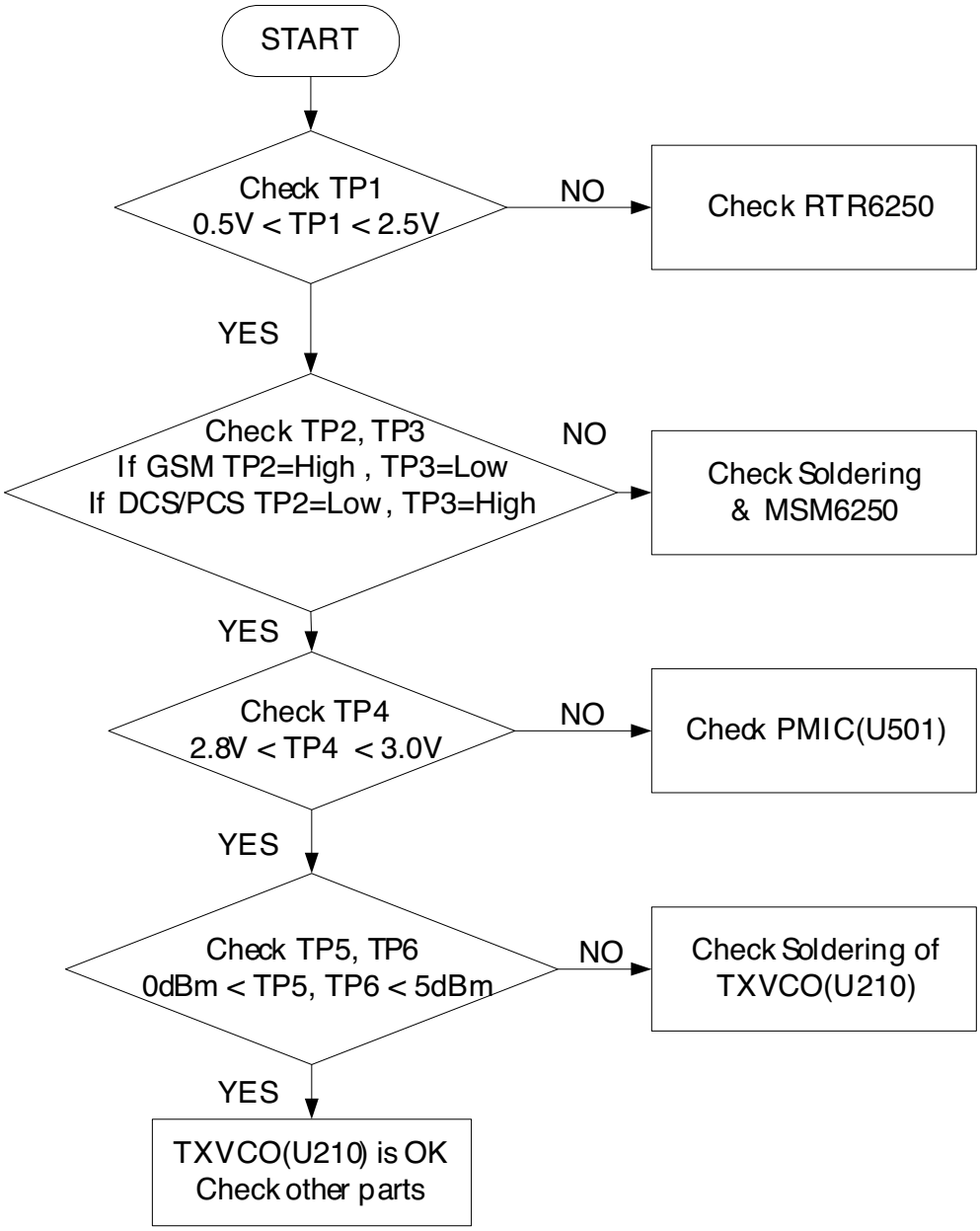
4.6.1 Checking TXVCO Block



Test Point (TXVCO Level)



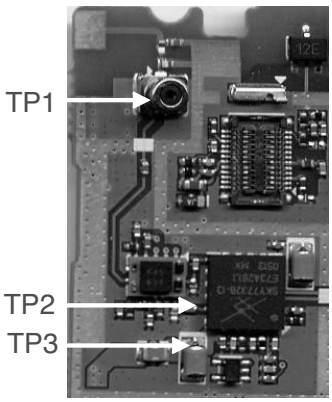
Schematic of RF TXVCO


START
Check TP1
0.5V < TP1 < 2.5V
NO
Check RTR6250
YES
Check TP2, TP3
If GSM TP2=High , TP3=Low
If DCS/PCS TP2=Low, TP3=High
NO
Check Soldering
& MSM6250
YES
Check TP4
2.8V < TP4 < 3.0V
NO
Check PMIC(U501)
YES
Check TP5, TP6
0dBm < TP5, TP6 < 5dBm
NO
Check Soldering of
TXVCO(U210)
YES
TXVCO(U210) is OK
Check other parts

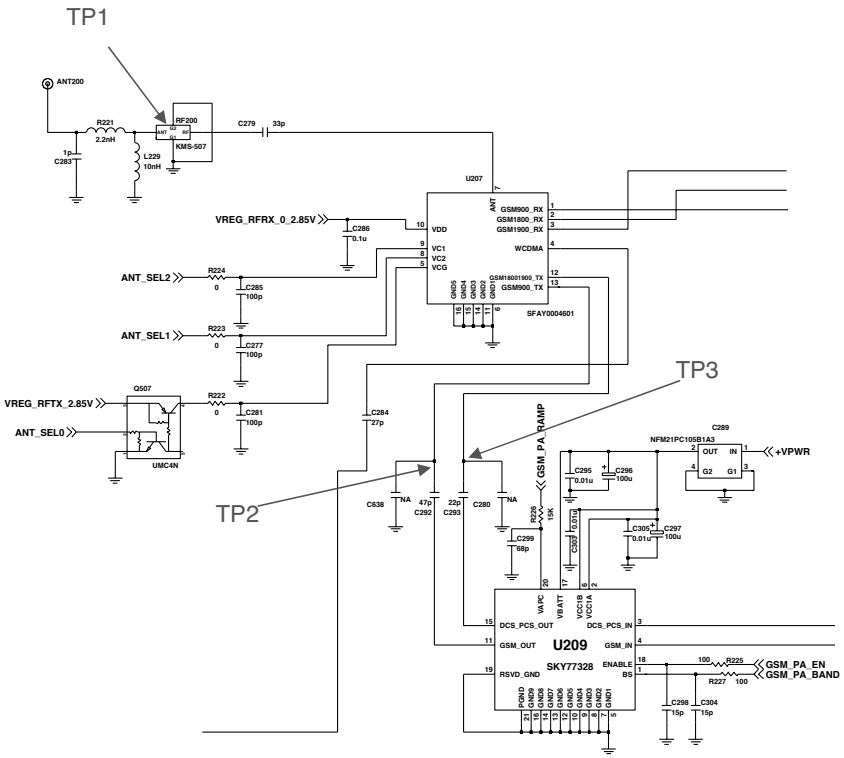
4.6.2 Checking Ant. SW Module

Refer to chapter 4.4

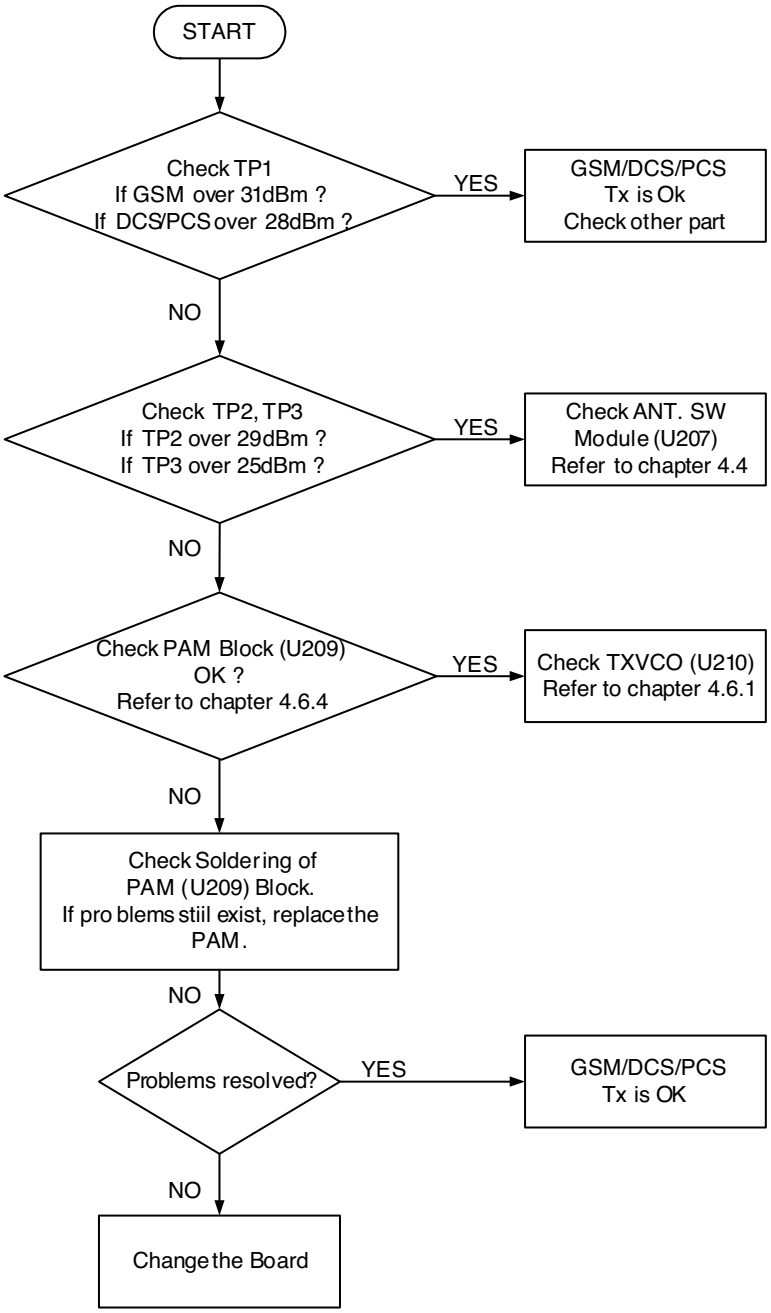
4.6.3 Checking RF Tx level



Test Point (RF Tx Level)



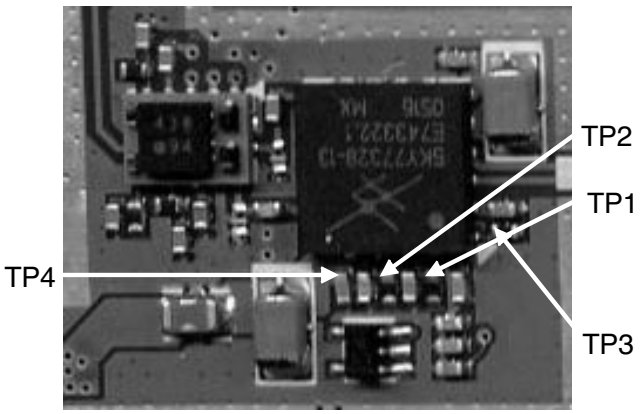
Schematic of RF Tx Level


START
Check TP1
If GSM over 31dBm ?
If DCS/PCS over 28dBm ?
YES
GSM/DCS/PCS
Tx is Ok
Check other part
NO
Check TP2, TP3
If TP2 over 29dBm ?
If TP3 over 25dBm ?
YES
Check ANT. SW
Module (U207)
Refer to chapter 4.4
NO
Check PAM Block (U209)
OK ?
Refer to chapter 4.6.4
YES
Check TXVCO (U210)
Refer to chapter 4.6.1
NO
Check Soldering of
PAM (U209) Block.
If problems stiil exist, replace the
PAM.
NO
Problems resolved?
YES
GSM/DCS/PCS
Tx is OK
NO
Change the Board

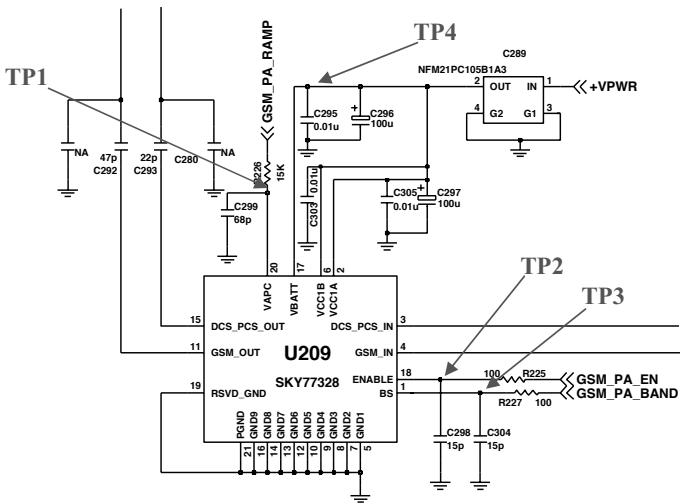
4.6.4 Checking PAM Block

PAM Control Signal

TP1. GSM_PA_RAMP : Power Amp Gain Control. typically, 0.5V < Vapc < 2.6V,
TP2. GSM_PA_EN : Power Amp Enable
(Power ON : higher than 2.5V , Power OFF : lower than 0.7V)
TP3. GSM_PA_BAND : Power Amp Band Selection Control
(GSM Mode : lower than 0.7V , DCS/PCS Mode : higher than 2.5V)
TP4. +VPWR : PAM Supply Voltage Vcc higher than 3.28V



Test Point (RF Tx Level)



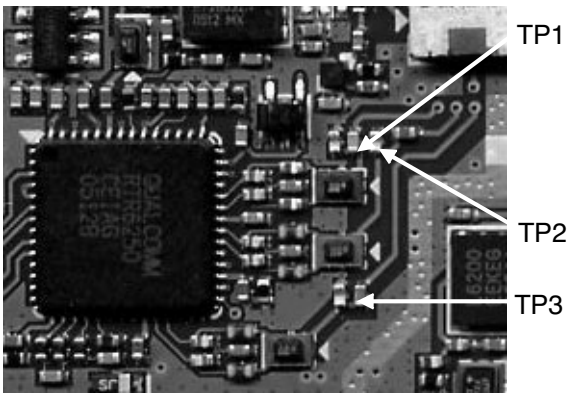
Schematic of PAM block

4.6.5 Checking RF Rx Block

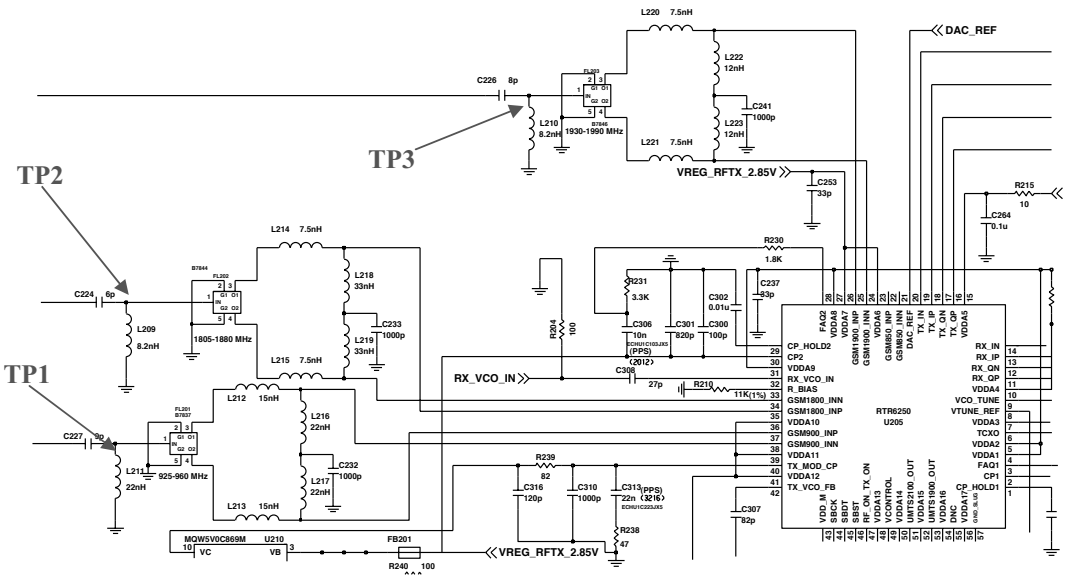
TP1. GSM Rx SAW Input

TP2. DCS Rx SAW Input

TP3. PCS Rx SAW Input

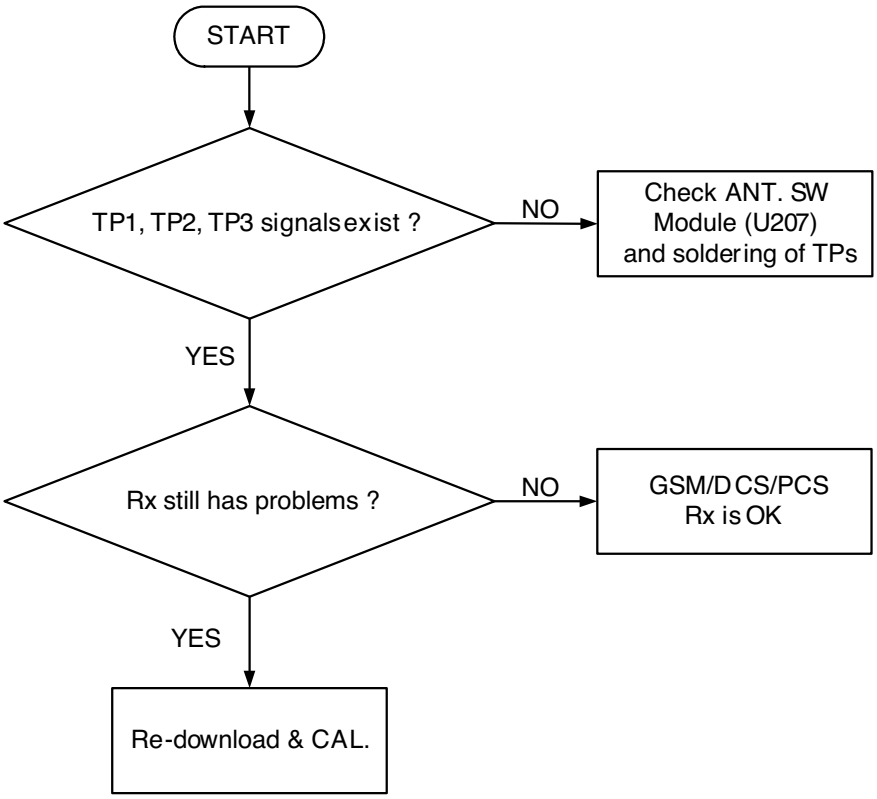


Test Point (RF Rx Level)



Schematic of GSM/DCS/PCS Rx Block

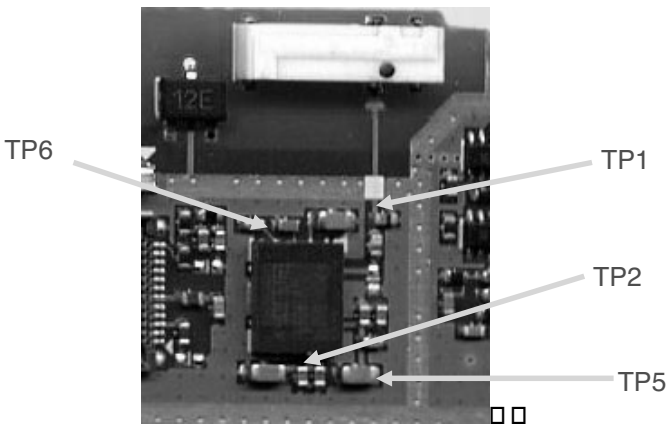
4. TROUBLE SHOOTING

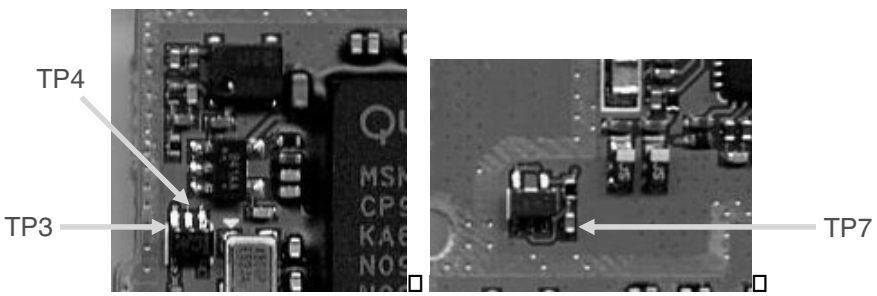


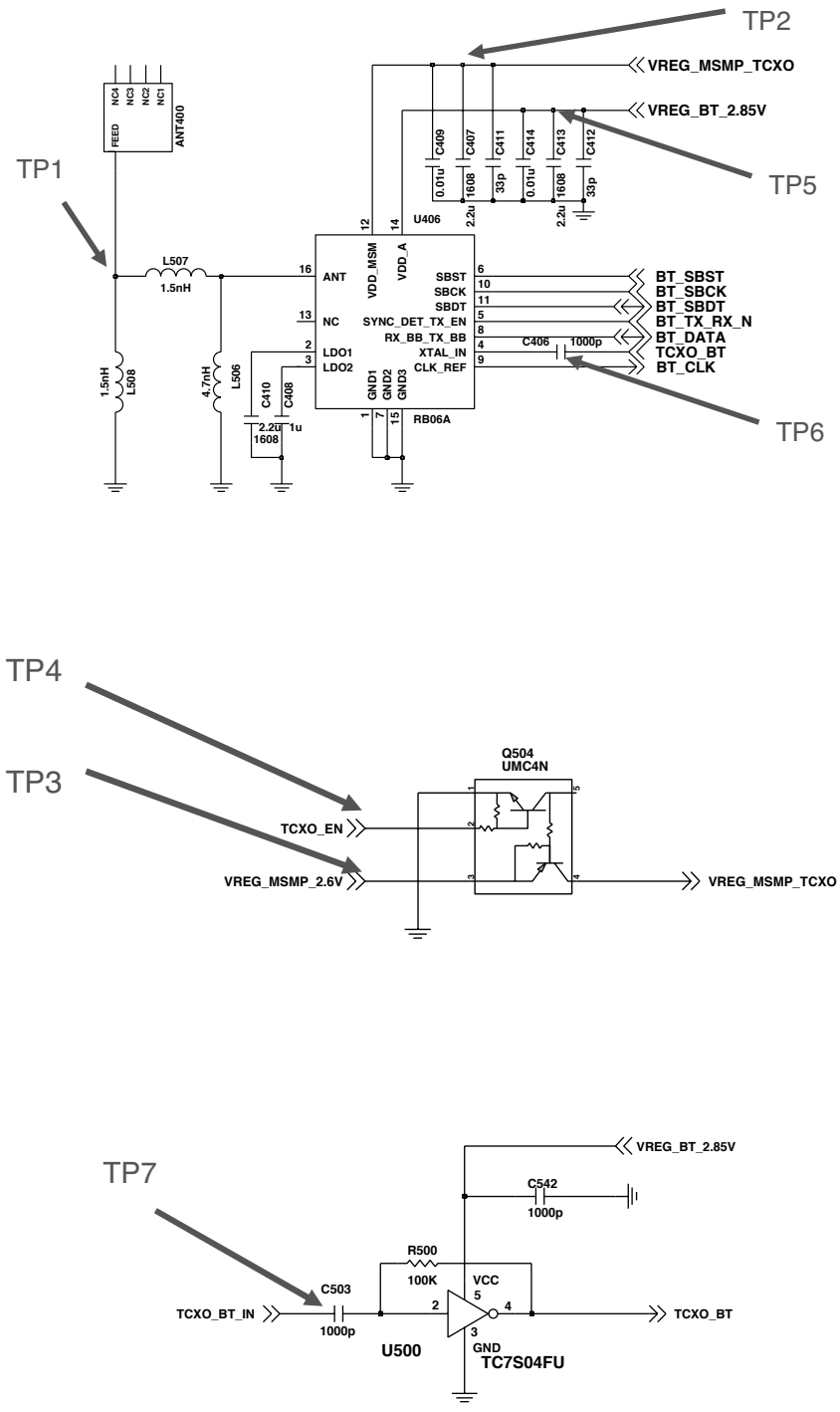
4.7 Bluetooth RF Block

TC-3000A (Bluetooth Tester)

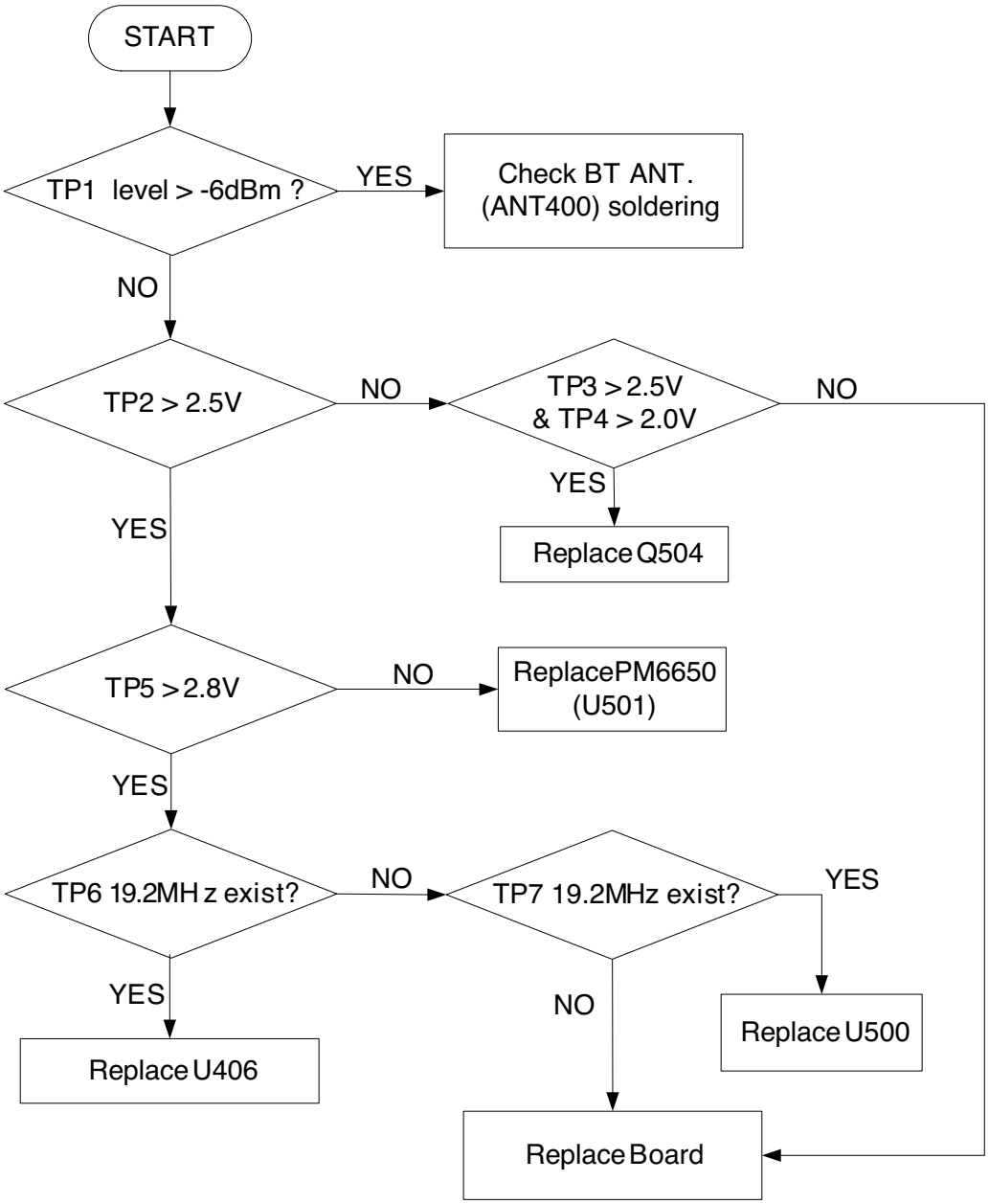
1. Set phone to bluetooth test-mode
   : Enter Test Mode(277634#*#) → Module Test Set → BT DUT → BT DUT ON
2. Connect phone to bluetooth tester
3. Set channel to 39
4. Measure output-power
5. Check TP1 : output-power > -6 dBm







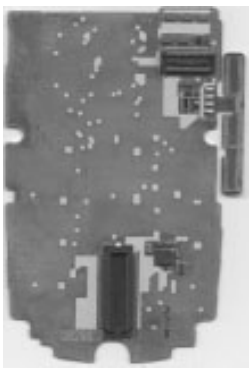
Schematic of Bluetooth RF Block

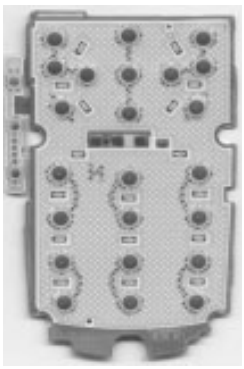

START
TP1 level > -6dBm ?
YES
Check BT ANT.
(ANT400) soldering
NO
TP2 > 2.5V
NO
TP3 > 2.5V
& TP4 > 2.0V
NO
YES
Replace Q504
YES
TP5 > 2.8V
NO
ReplacePM6650
(U501)
YES
TP6 19.2MH z exist?
NO
TP7 19.2MHz exist?
YES
YES
Replace U406
NO
Replace U500
Replace Board

4.8 LG-U8290 Main features

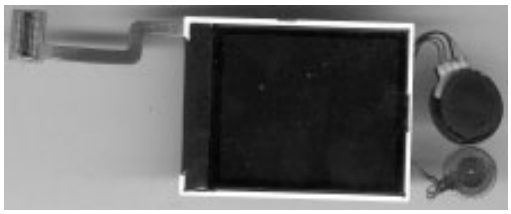
- Folder Type
- WCDMA + GSM(900,1800) + PCS(1900) Triple mode
- Dual color LCD(Main:260K TFT, Sub:65K STN)
- 1.3M Pixel CMOS VGA Camera
- 17 pi single way speaker
- Stereo Head_set
- Video telephony in WCDMA with camera
- Loud Speaker phone(in GSM and WCDMA)
- 64 Poly Sound
- MP3/AAC decoder and play
- MPEG4 encoder/decoder and play/save
- JPEG en/decoder
- Support Bluetooth, USB
- 89.5 X 47.5 X 24.5 mm
- 1,400 mAh(Li-Poly)

4.9 LG-U8290 Main Component





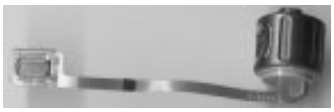
Key B'd Bottom Side & Top Side

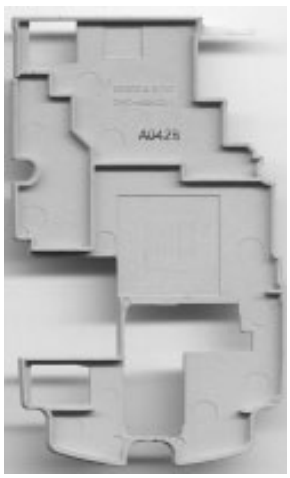


Dual Color LCD Module
(LCD, 17 Pi Speaker, 12 Pi Motor)

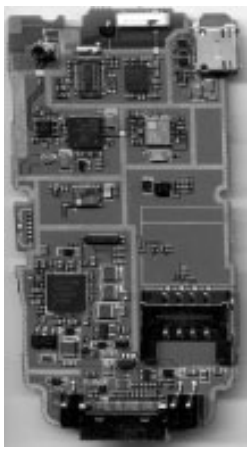
Stereo Head_Set

1.3M Camera

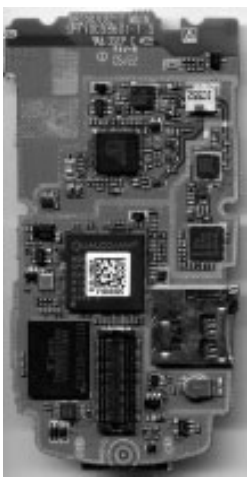




Shied Frame



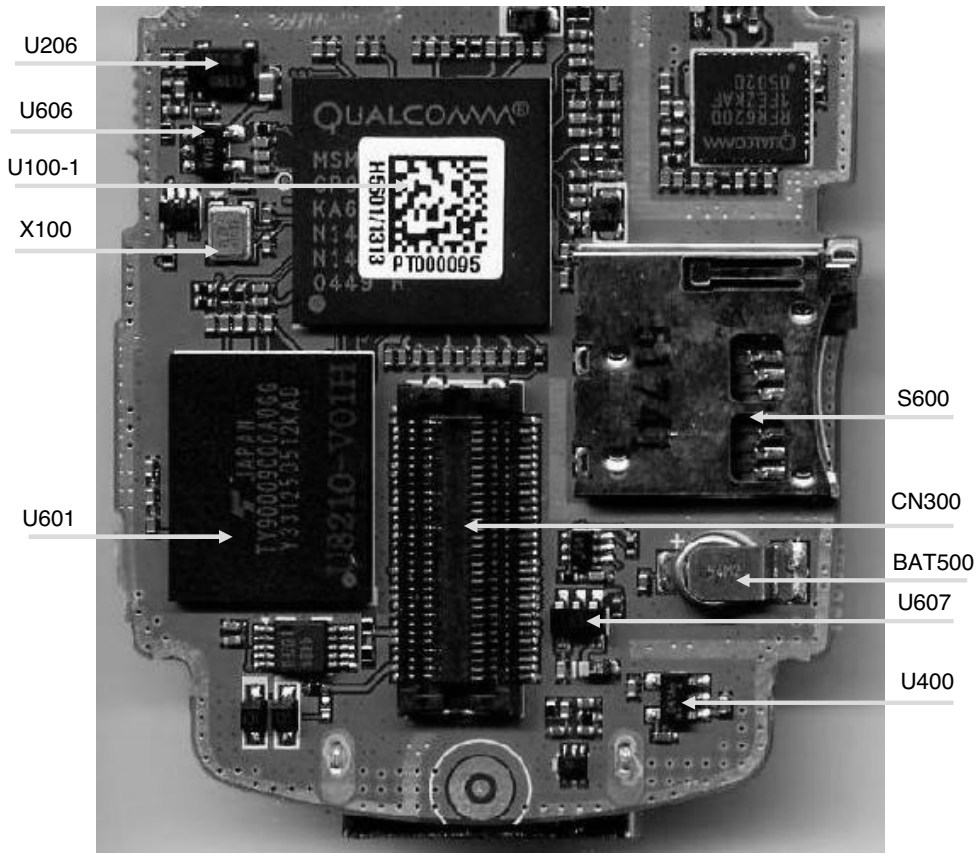
Main B□dBottom Side



Main B'd Top Side

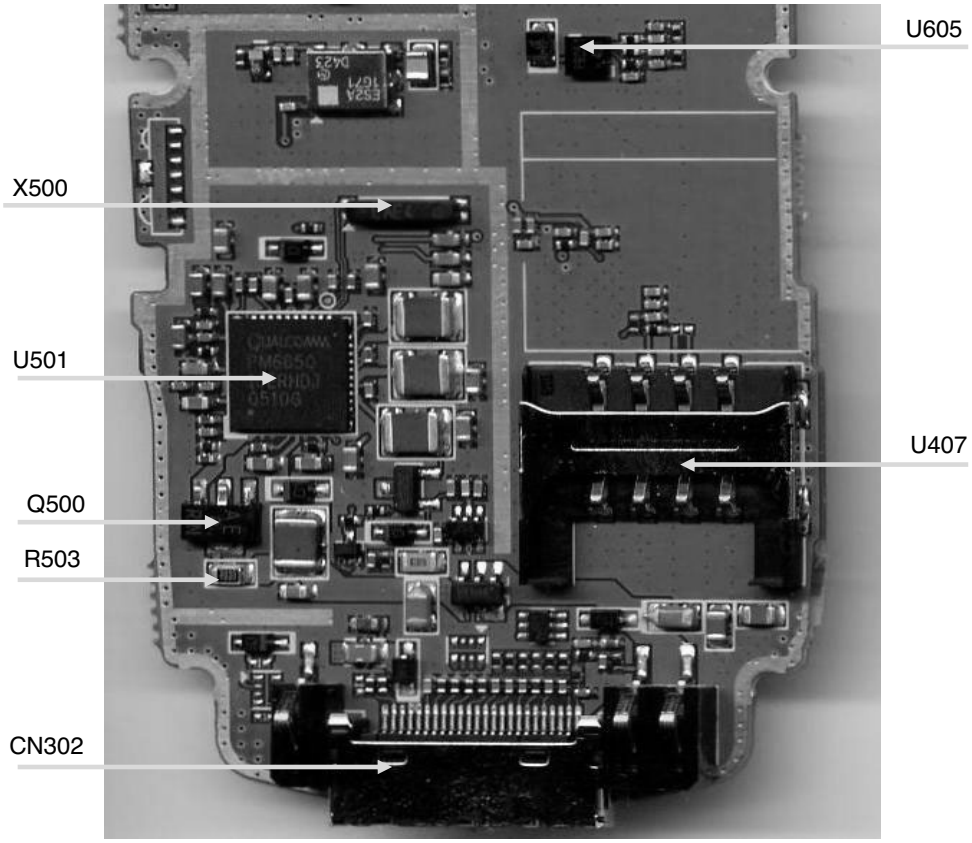
4. TROUBLE SHOOTING

TOP Side



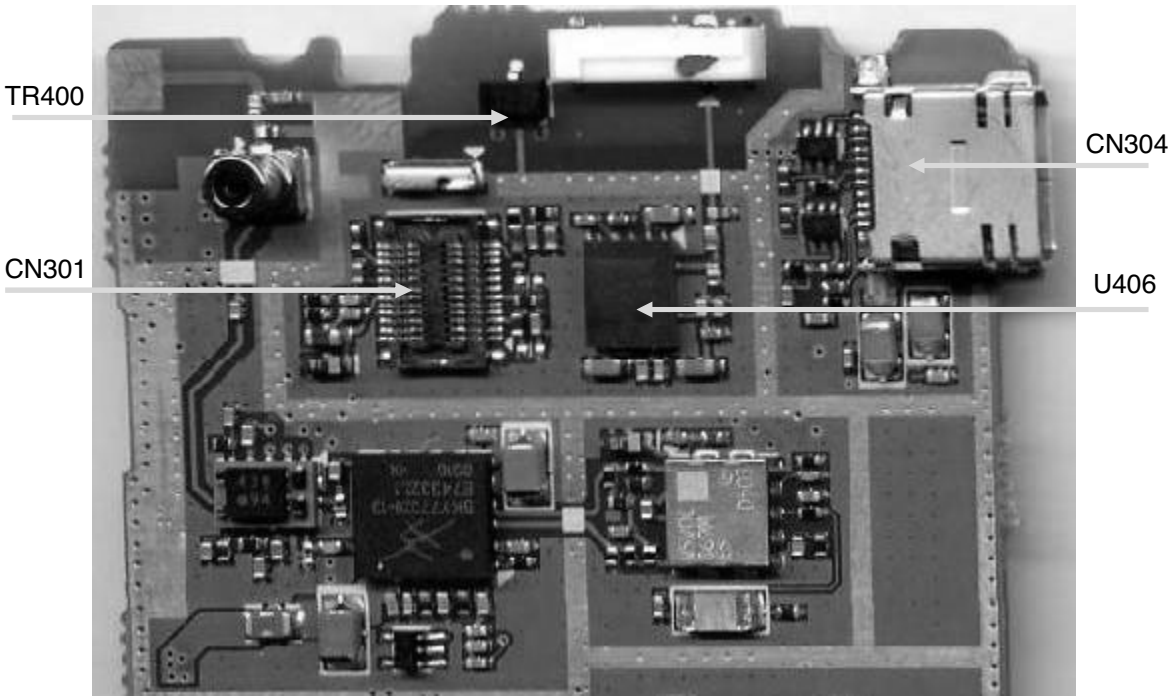
Reference	Description	Reference	Description
X100	USB Clock(48Mhz)	U606	Camera LDO
U100-1	MSM6250	U607	LCD LDO
U601	NAND Flash+SDRAM (64M + 64M)	U400	MIC bias LDO
U206	TCXO (19.2Mhz)	CON300	KEY PCB Connector
S600	T-Flash Socket	BAT500	Coin-cell battery

BOTTOM Lower Side



Reference	Description	Reference	Description
U501	PM6650 (PMIC)	X500	Sleep X-tal (32.768Khz)
U605	Audio AMP	Q500	Charger TR
CN302	IO Connector	U407	USIM Connector
R503	Current Sensing R		

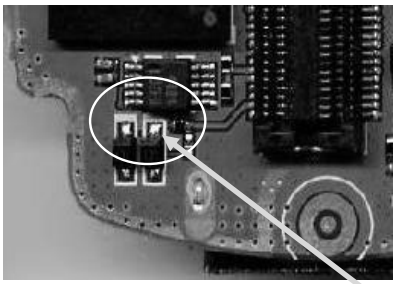
BOTTOM Upper Side

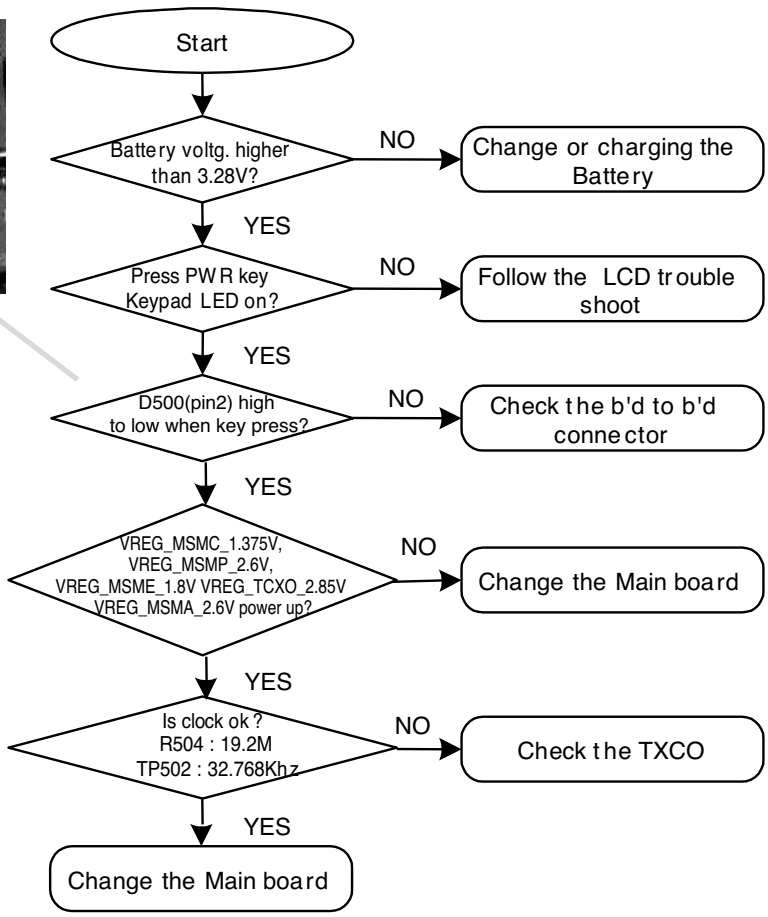


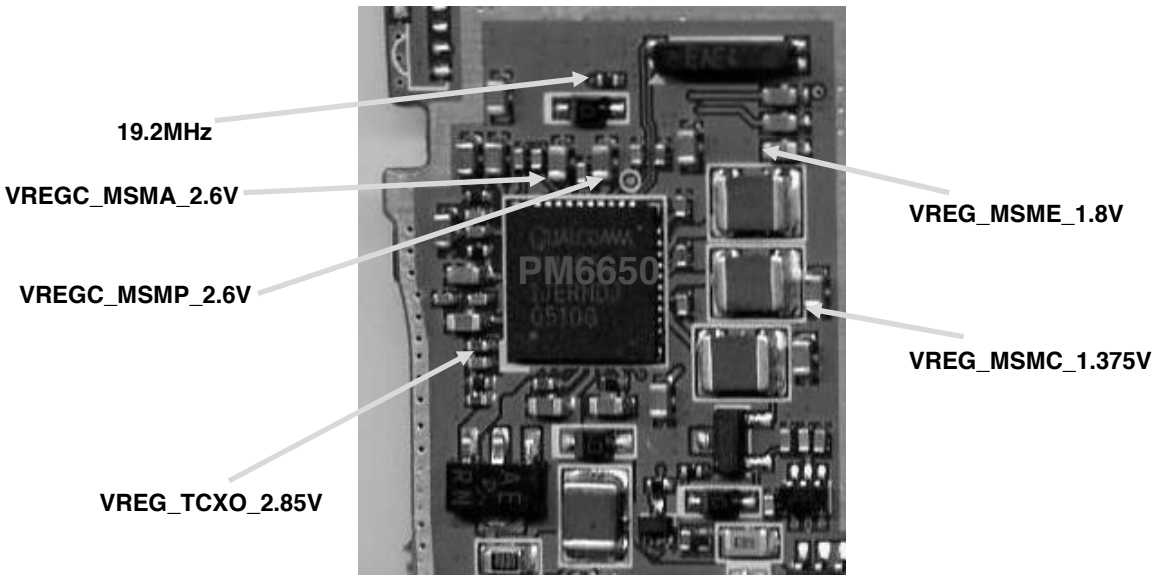
Reference	Description	Reference	Description
CN301	Camera Connector	CN304	Head_Set Jack
TR400	Camera Direction Sense TR	U406	Bluetooth Module

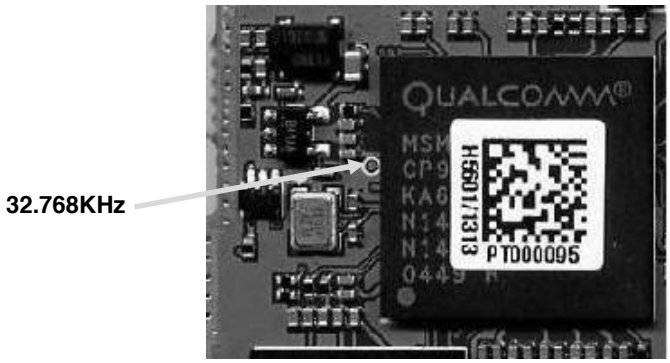
4.10 Power ON Trouble

Power On sequence of U8290 is :
PWR key press(Key PCB) → On_SW_PM* go to low(D500),PM6650 KPDPWR_N pin(24) → PM6650 Power Up → VREG_MSMC_1.375V(C539), VREG_MSME_1.8V(C537), VREG_MSMP_2.6V(C522), VREG_MSMA_2.6V(C520) VREG_TCXO_2.85V(C512) power up and system reset assert to MSM → Phone booting and PS_HOLD(U100) assert to PMIC



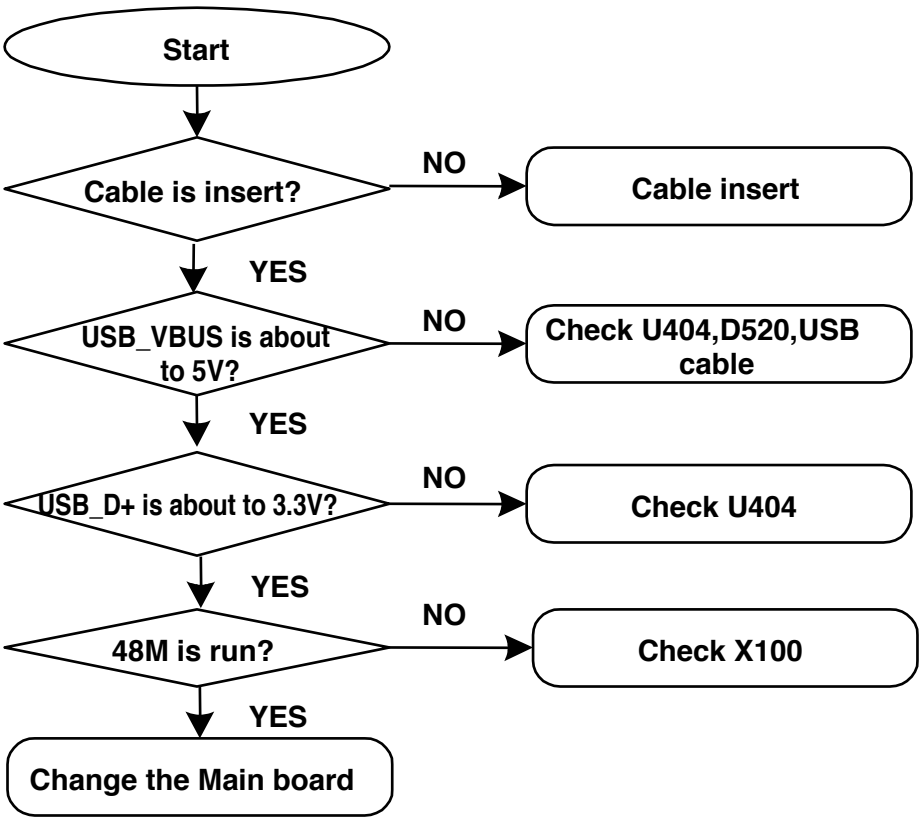



19.2MHz
VREGC_MSMA_2.6V
VREGC_MSMP_2.6V
VREG_TCXO_2.85V
VREG_MSME_1.8V
VREG_MSMC_1.375V
PM6650

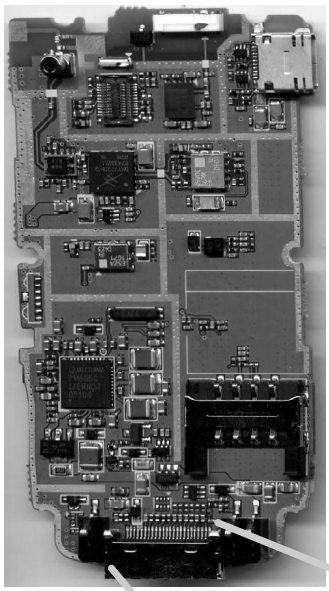

32.768KHz
QUALCOMM
H5601/1313
PTD00095

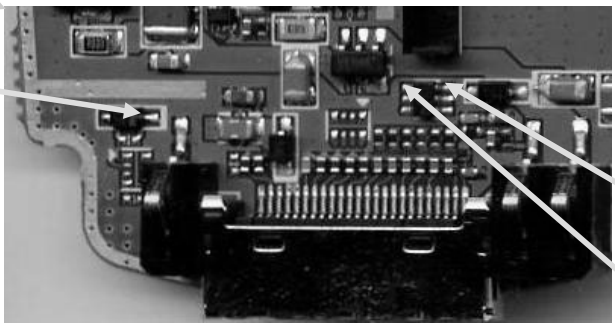
4.11 USB Trouble

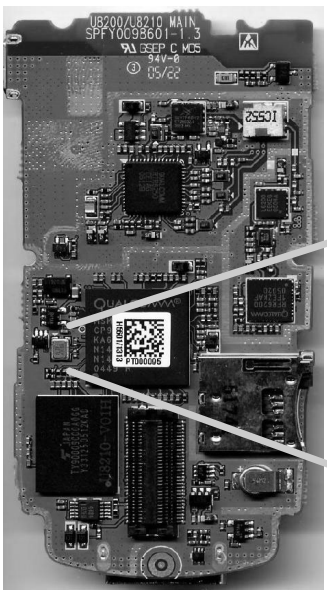
USB Initial sequence of U8290 is :
USB connected to U8290 → USB_VBUS(D520) go to 5V → USB_D+ go to 3.3V → 48M Crystal on → USB_VP and USB_VN is triggered → USB work.

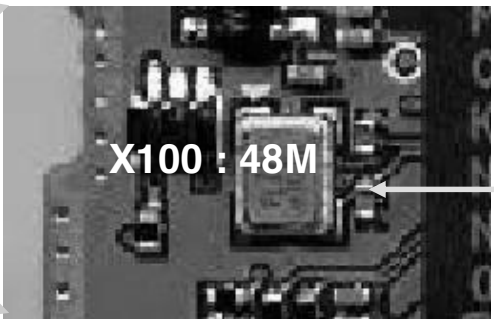


4. TROUBLE SHOOTING



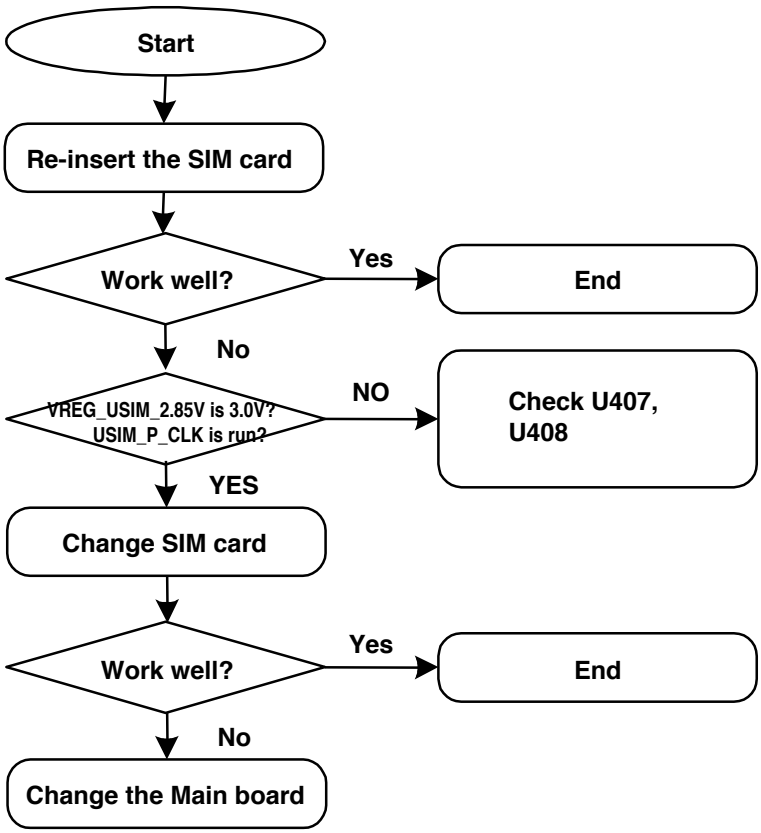


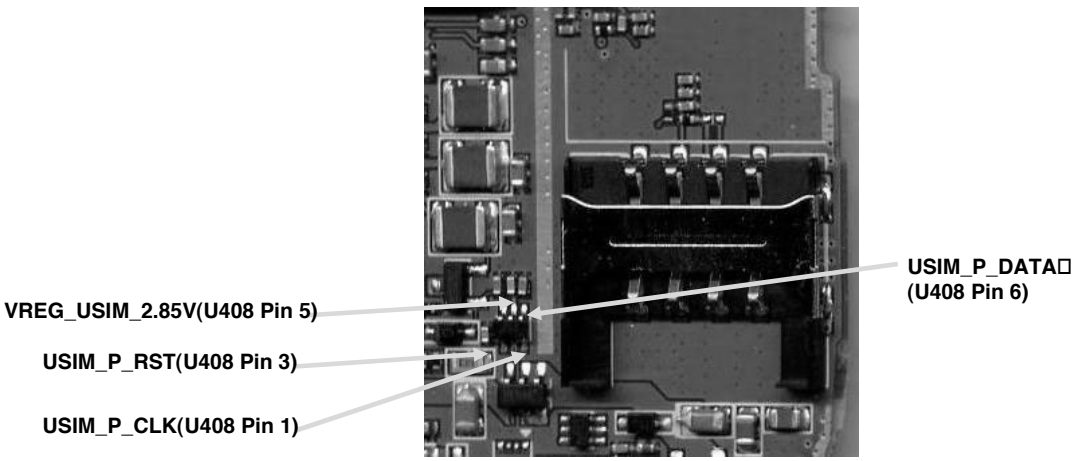




4.12 SIM Detect Trouble

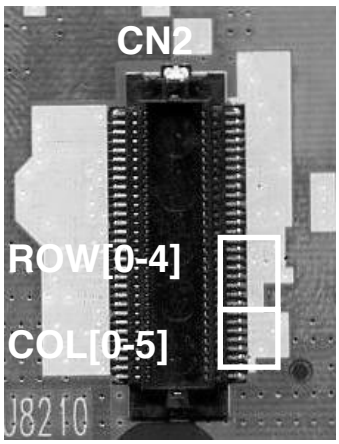
USB Initial sequence of U8290 is :
USIM_CLK,USIM_RST,USIM_DATA triggered → VREG_USIM_2.85V go to 3.0V → USIM IF work

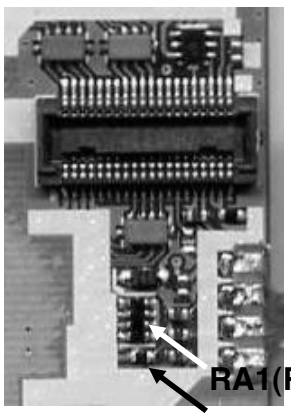


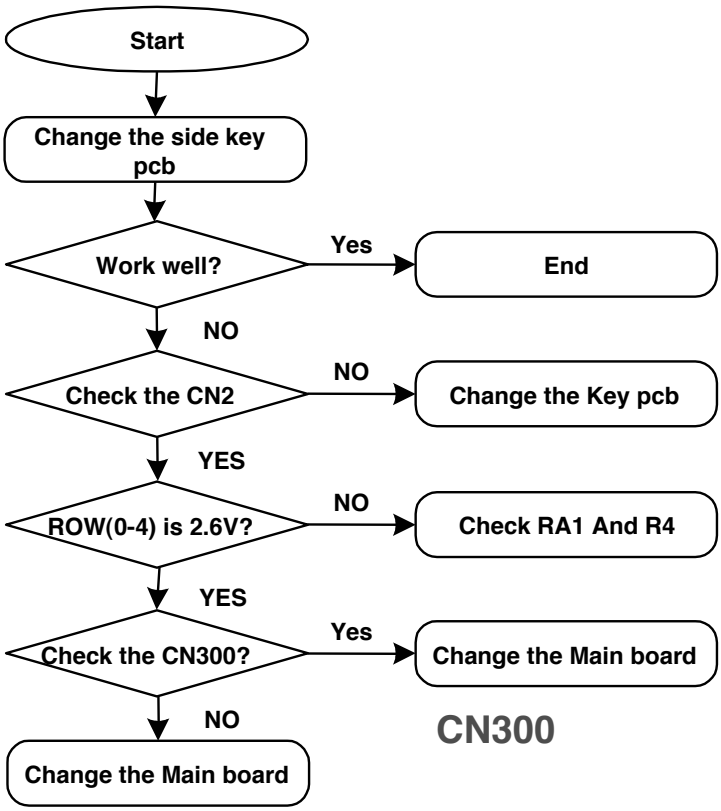


4.13 Key Sense Trouble

Key Sense sequence of U8290 is :
Default condition ROW(0-4) is 2.6V → Press the key → Corresponding row(x) go to 0V → Key sensing

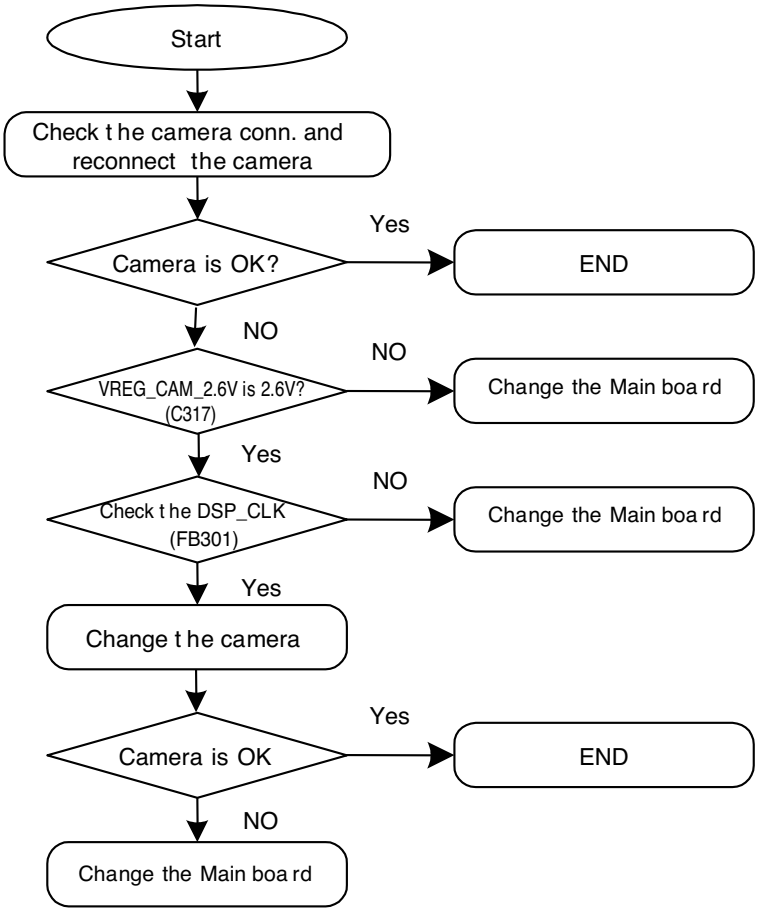


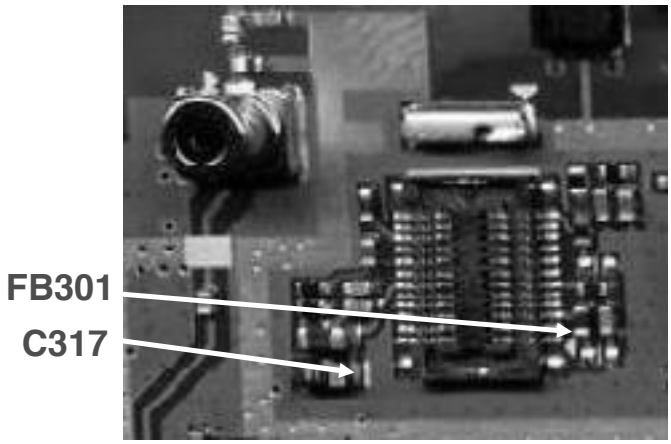




4.14 Camera Trouble

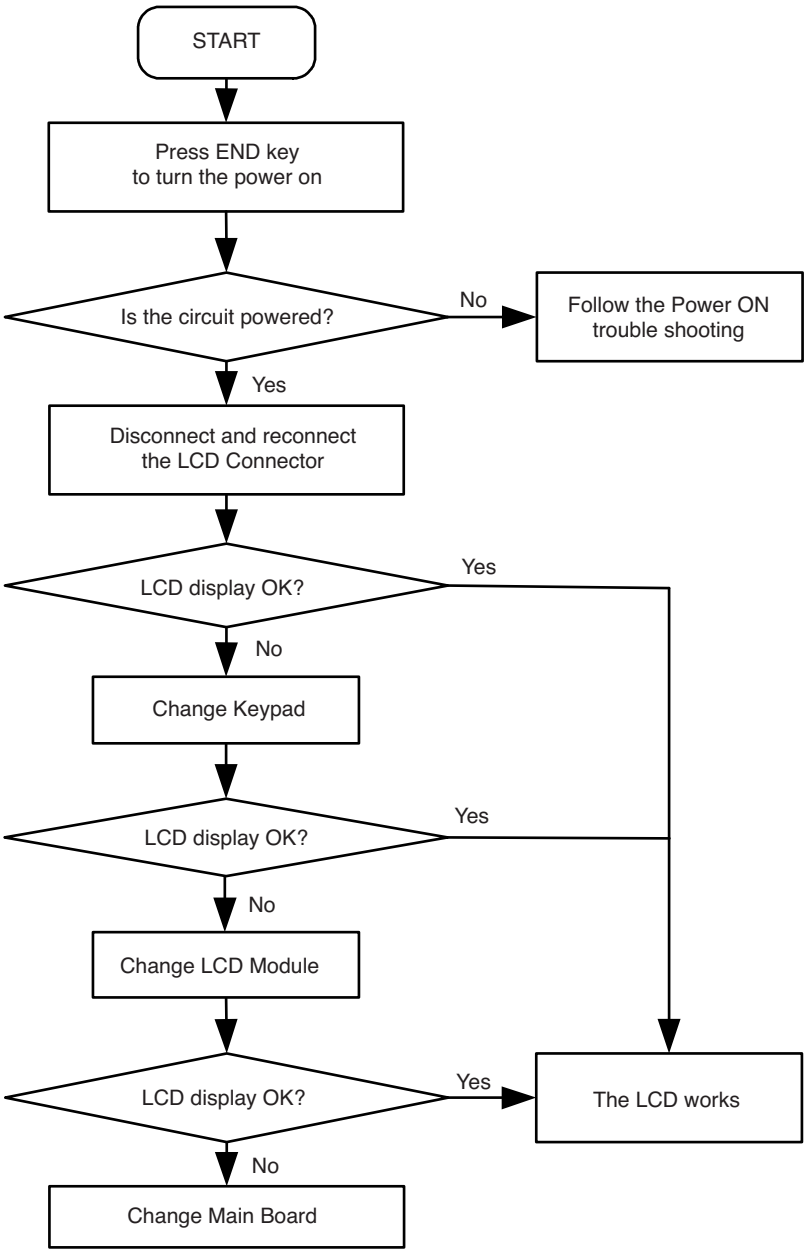
Camera control signals are generated by MSM6250.



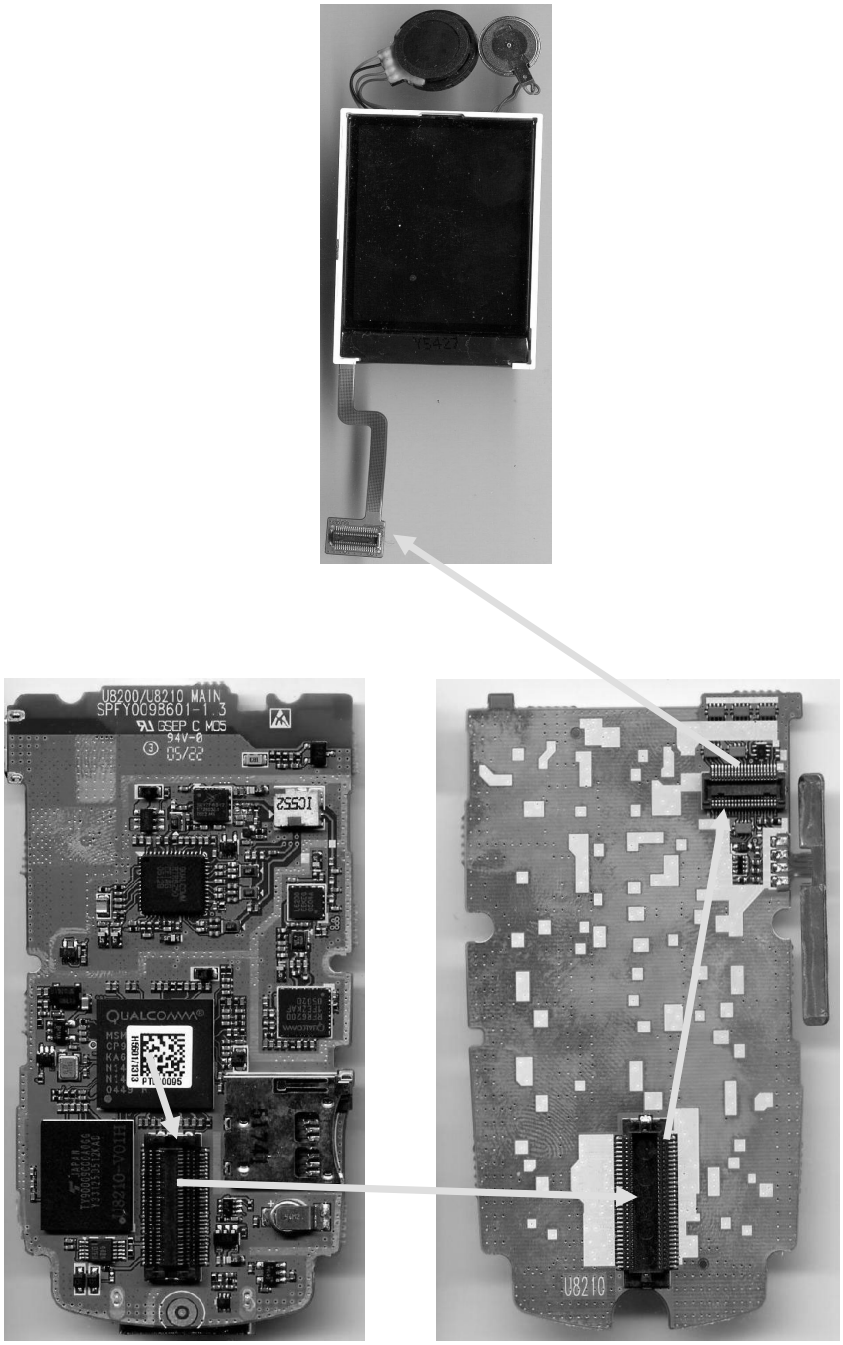


4.15 Main LCD Trouble

Main LCD control signals are generated by MSM6250. Those signal's path are :
MSM6250 → MAIN B'd → CN300 → CN2 → Key Pcb → CN1 → LCD Module

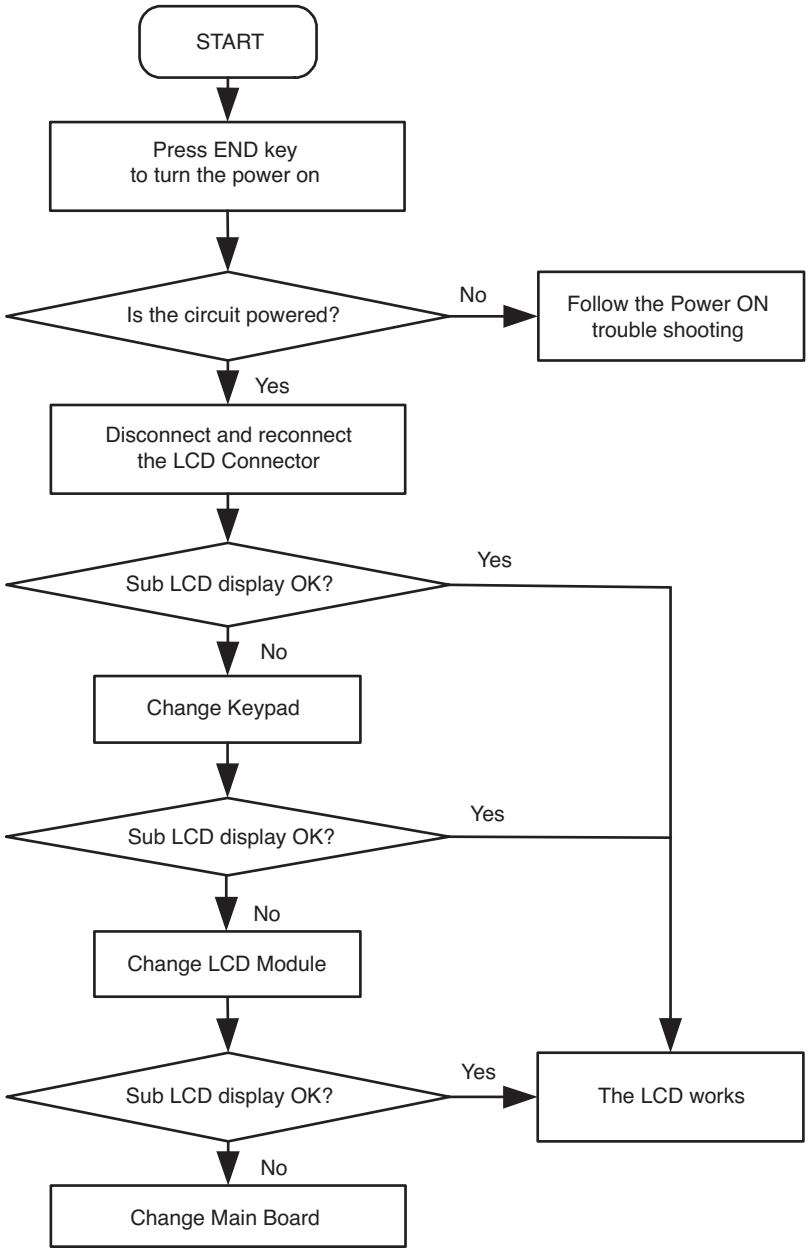


LCD Control data flow

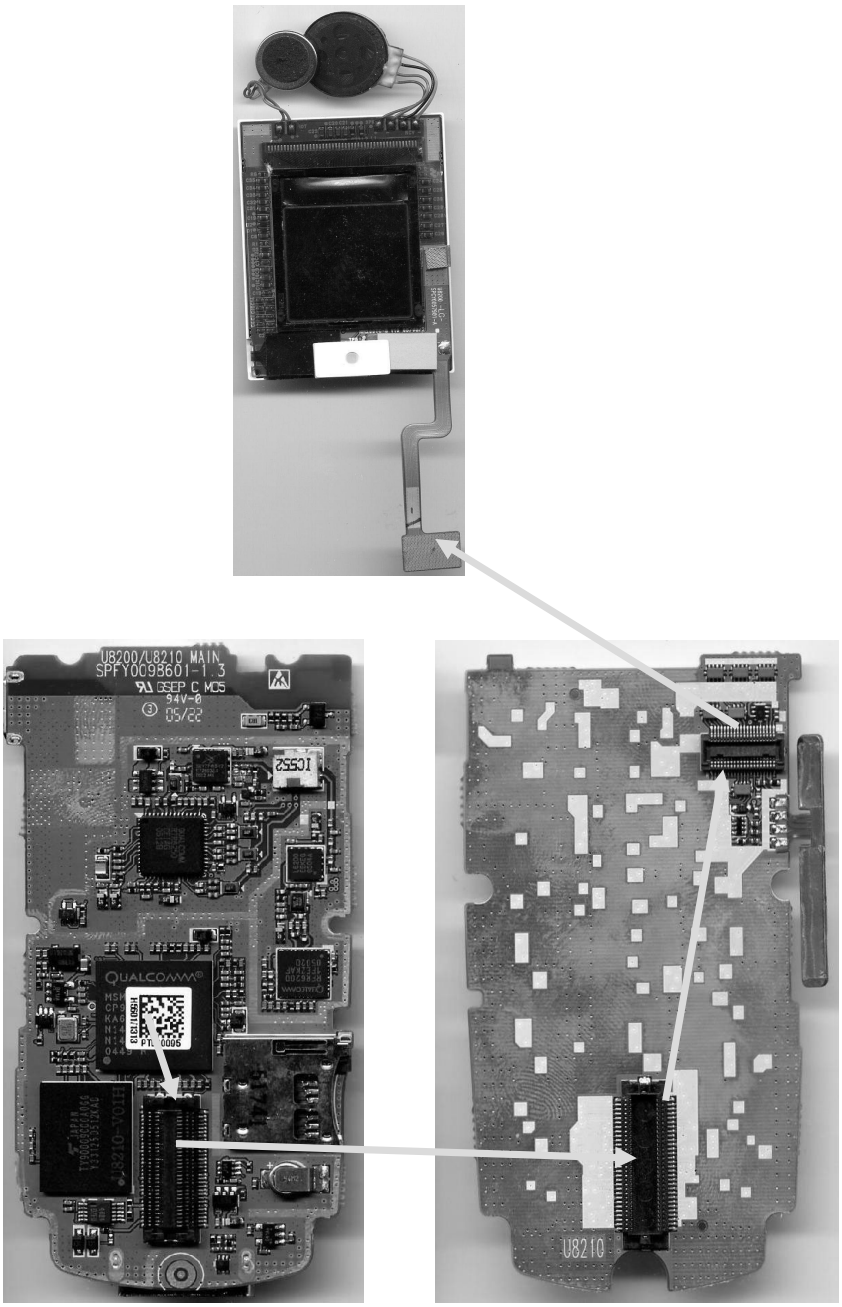


4.16 Sub LCD Trouble

Sub LCD control signals are generated by MSM6250. Those signal's path are :
MSM6250 → MAIN B'd → CN300 → CN2 → Key Pcb → CN1 → LCD Module

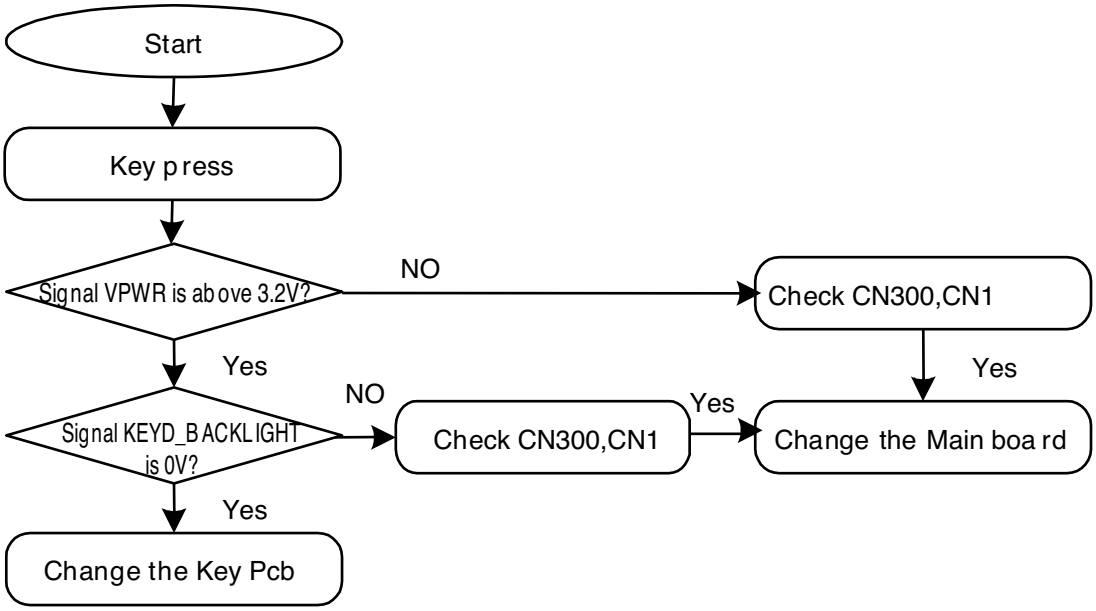


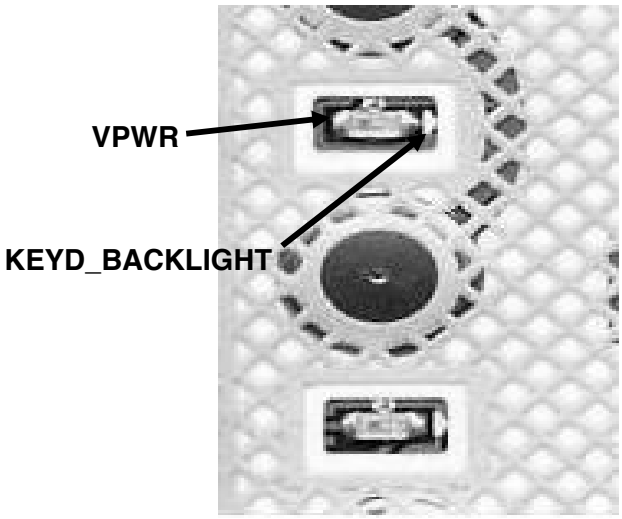
LCD Control data flow



4.17 Keypad Backlight Trouble

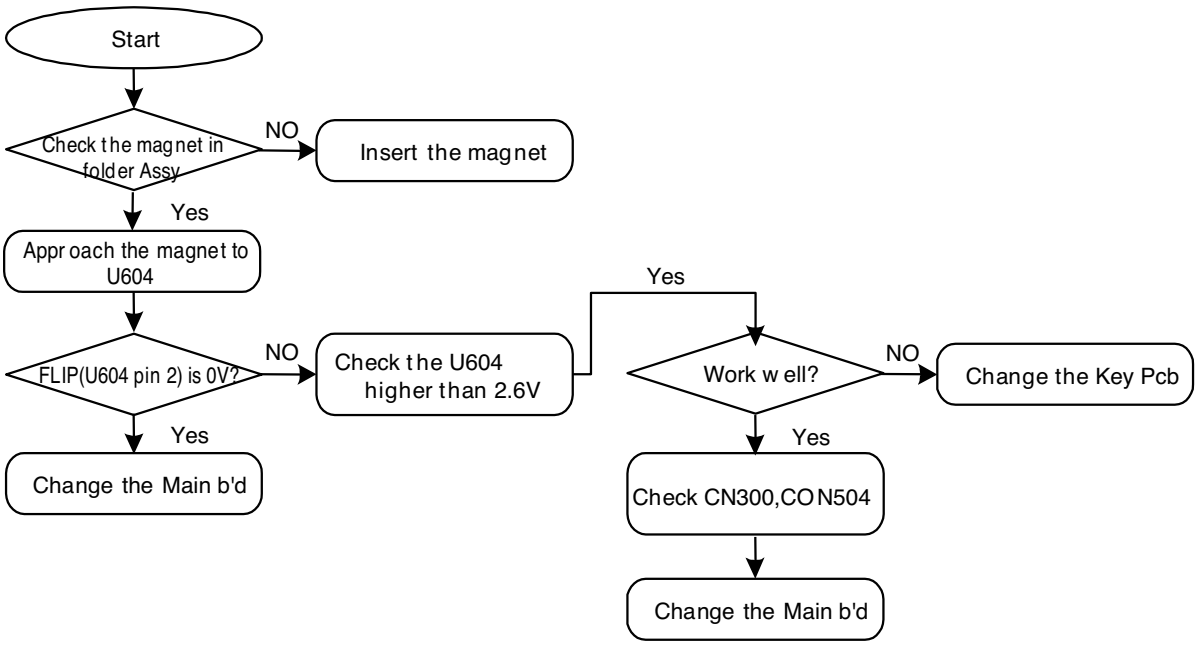
Key Pad Back Light is on as below :
Key pressing → KEYD_BACKLIGHT go to 0V → B'd to B'd connector → LED On



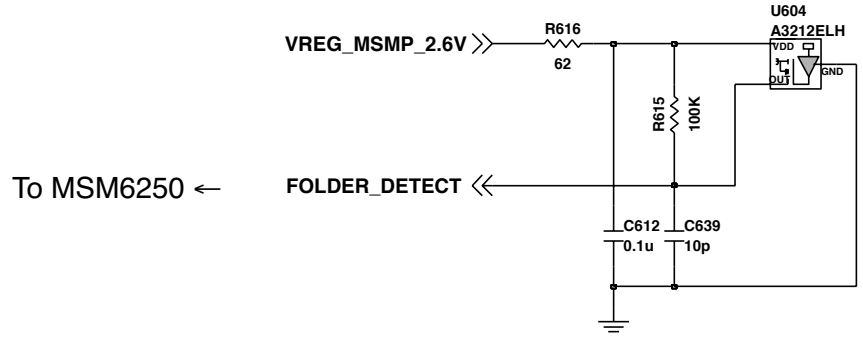


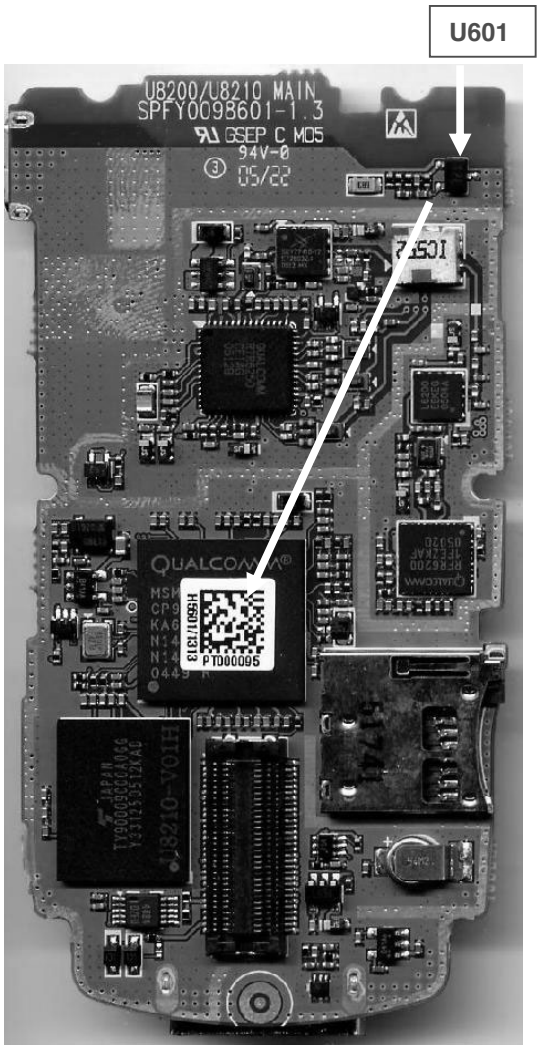
4.18 Folder ON/OFF Trouble

Folder On/Off is worked as below :
Folder On/Off Event → Flip(U604 pin 2) is triggered(On : about 2.1V, Off : 0V) → MSM6250 Sense the Folder Event



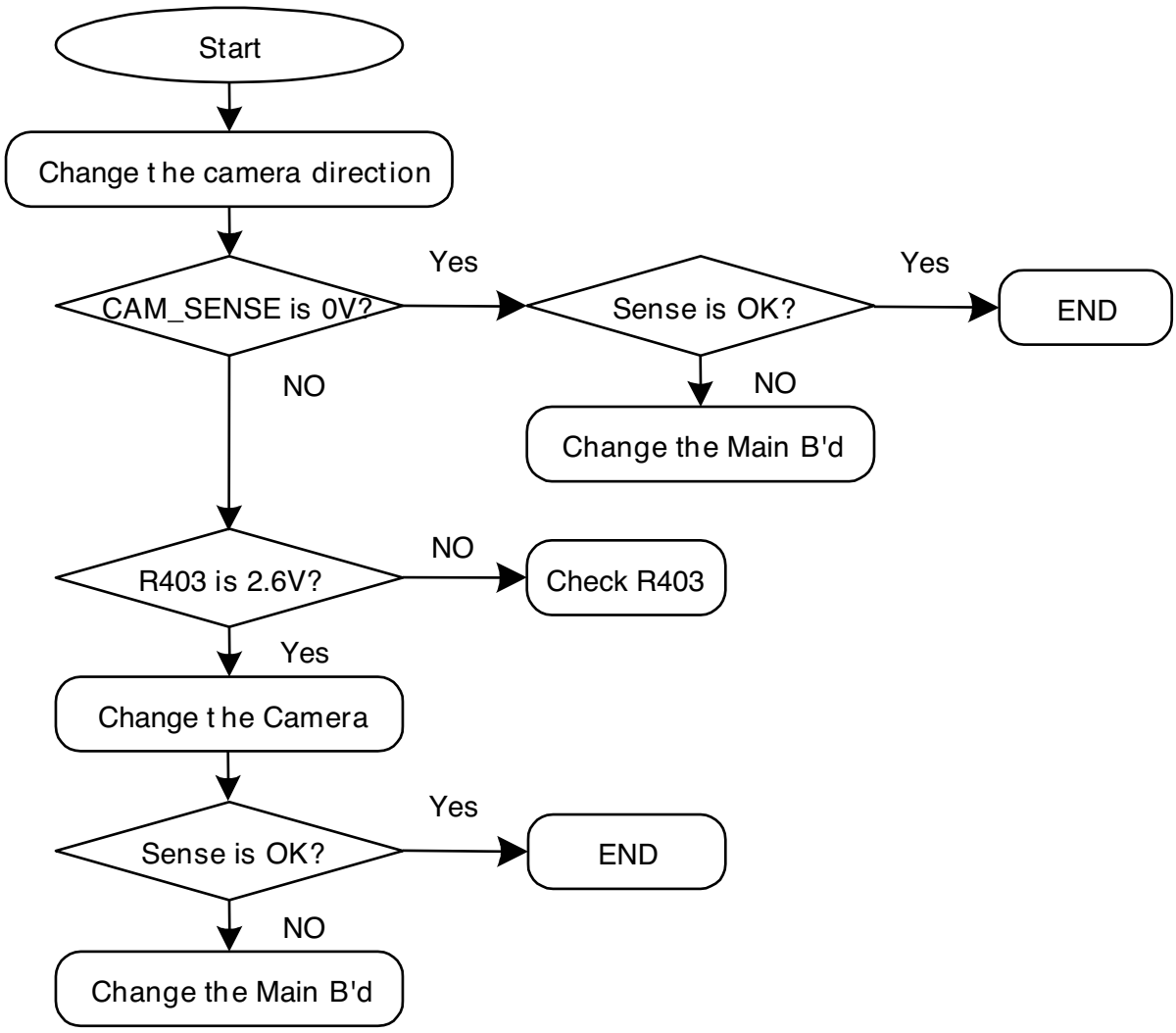
FOLDER DETECT

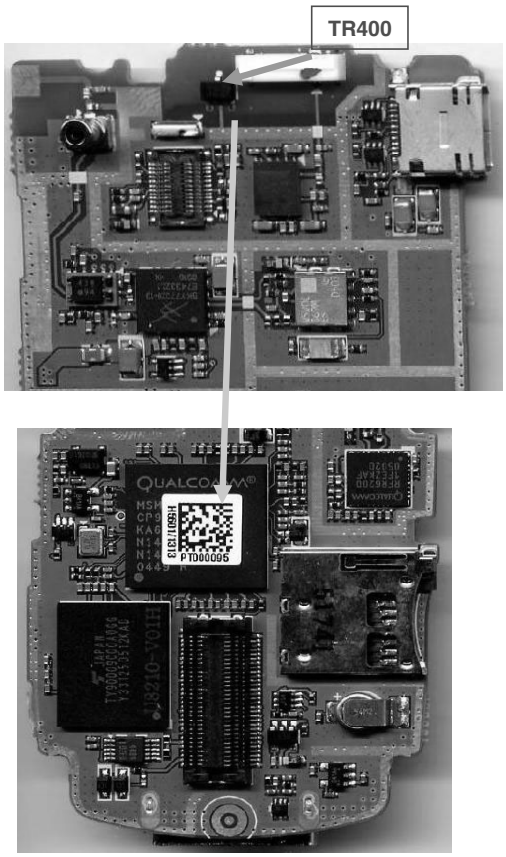




4.19 Camera Direction Detection Trouble

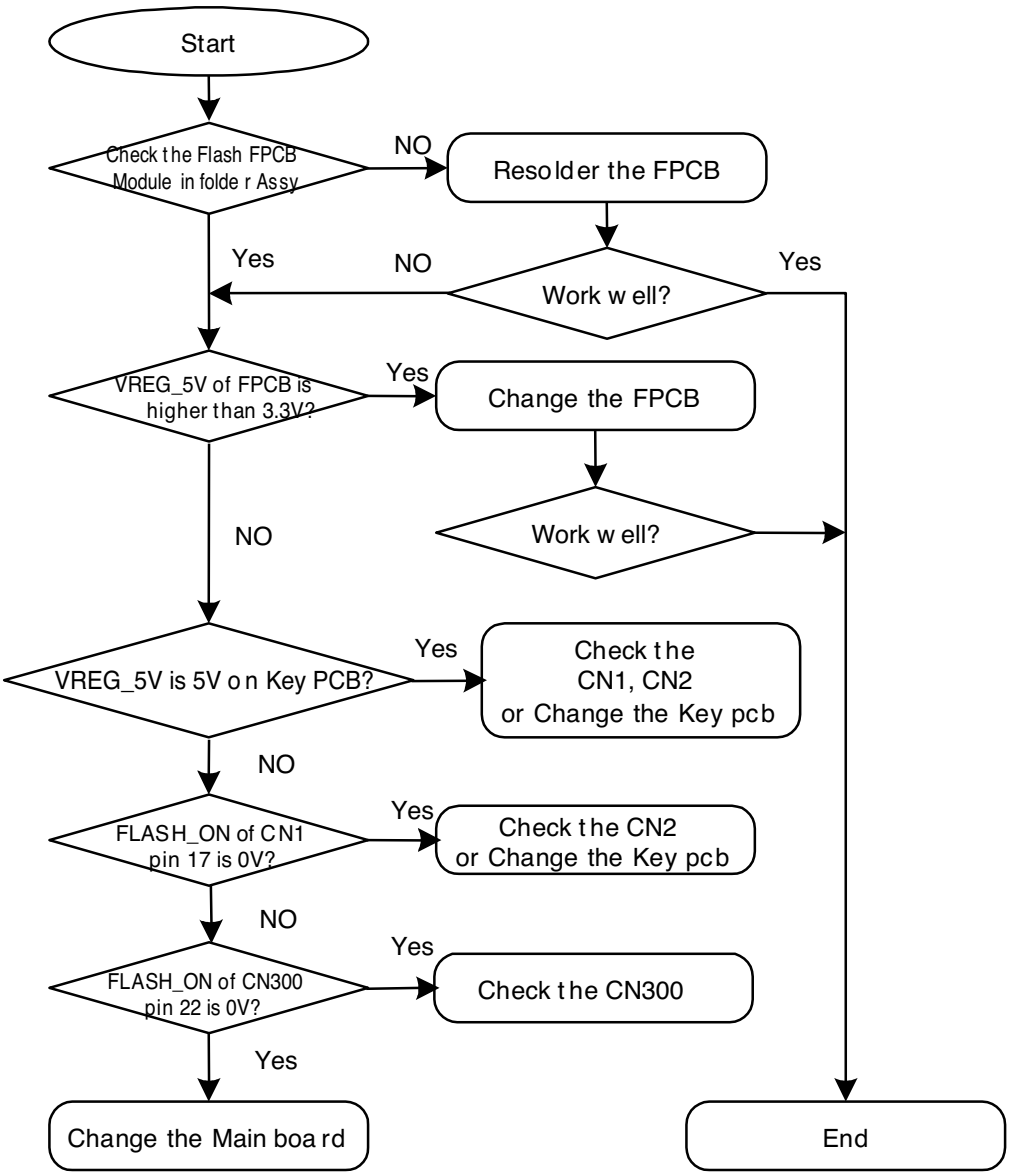
Camera direction detection is worked as below :
Camera direction change Event → CAM_SENSE(TR400 pin 2) is triggered(On : about 2.1V, Off : 0V)
→ MSM6250 Sense the Camera direction change Event

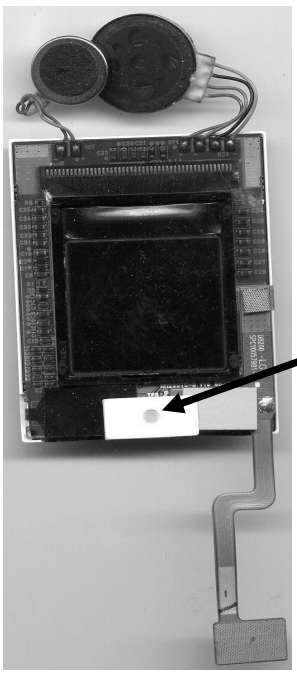



TR400

4.20 Camera Flash Trouble

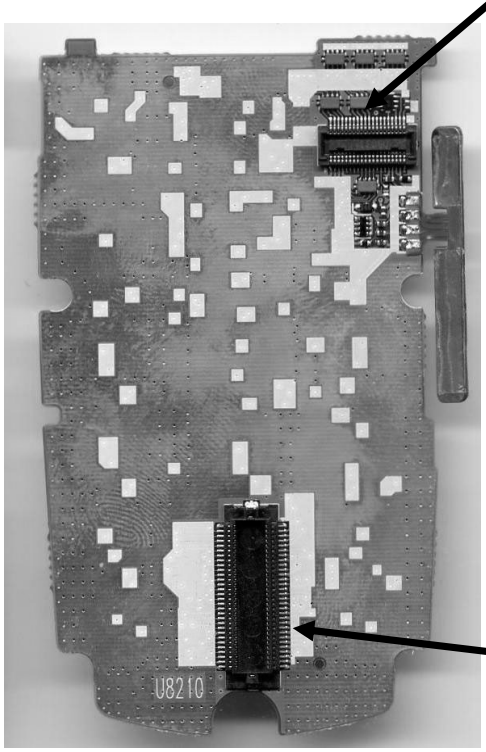
Camera Flash is worked as below :
PM6650 control the camera flash in Folder Assy → PM6650 Port 8(FLSH_DRV_N) → CN300(Flash_On) → CN2(Flash_On) → CN1 → LCD Module → FLASH LED FPCB Module





Flash LED

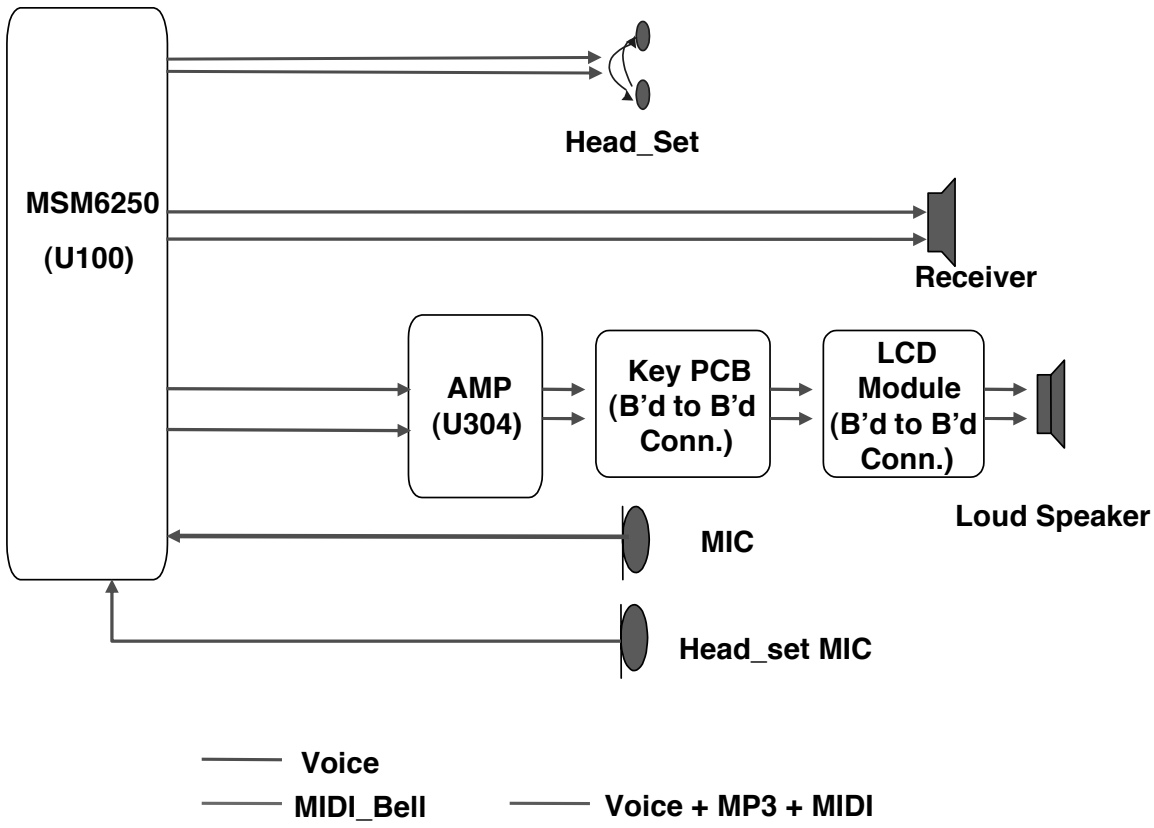
CN1



FLASH_ON from
Main B'd PM6650

4.21 Audio Trouble Shooting

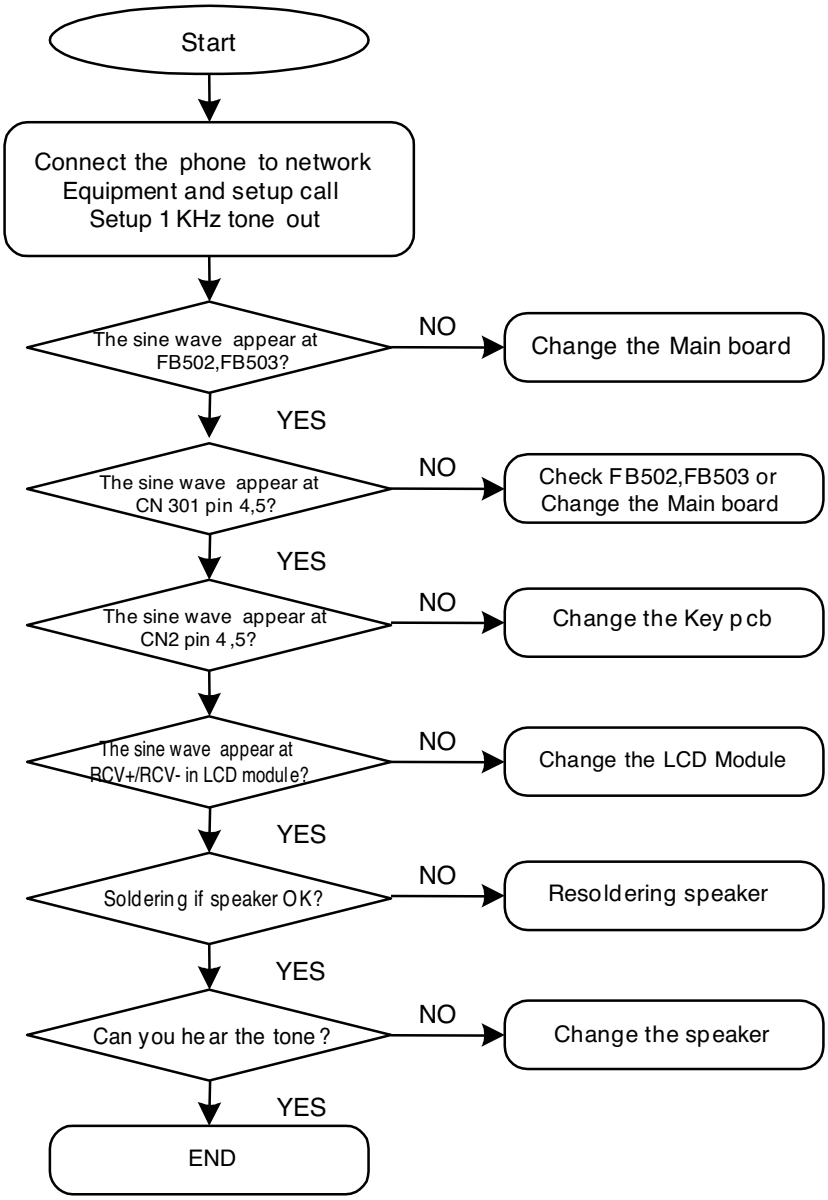
Audio & Sound Signal Path are followed as below figure.
We can check the trouble point corresponded error audio & sound mode.

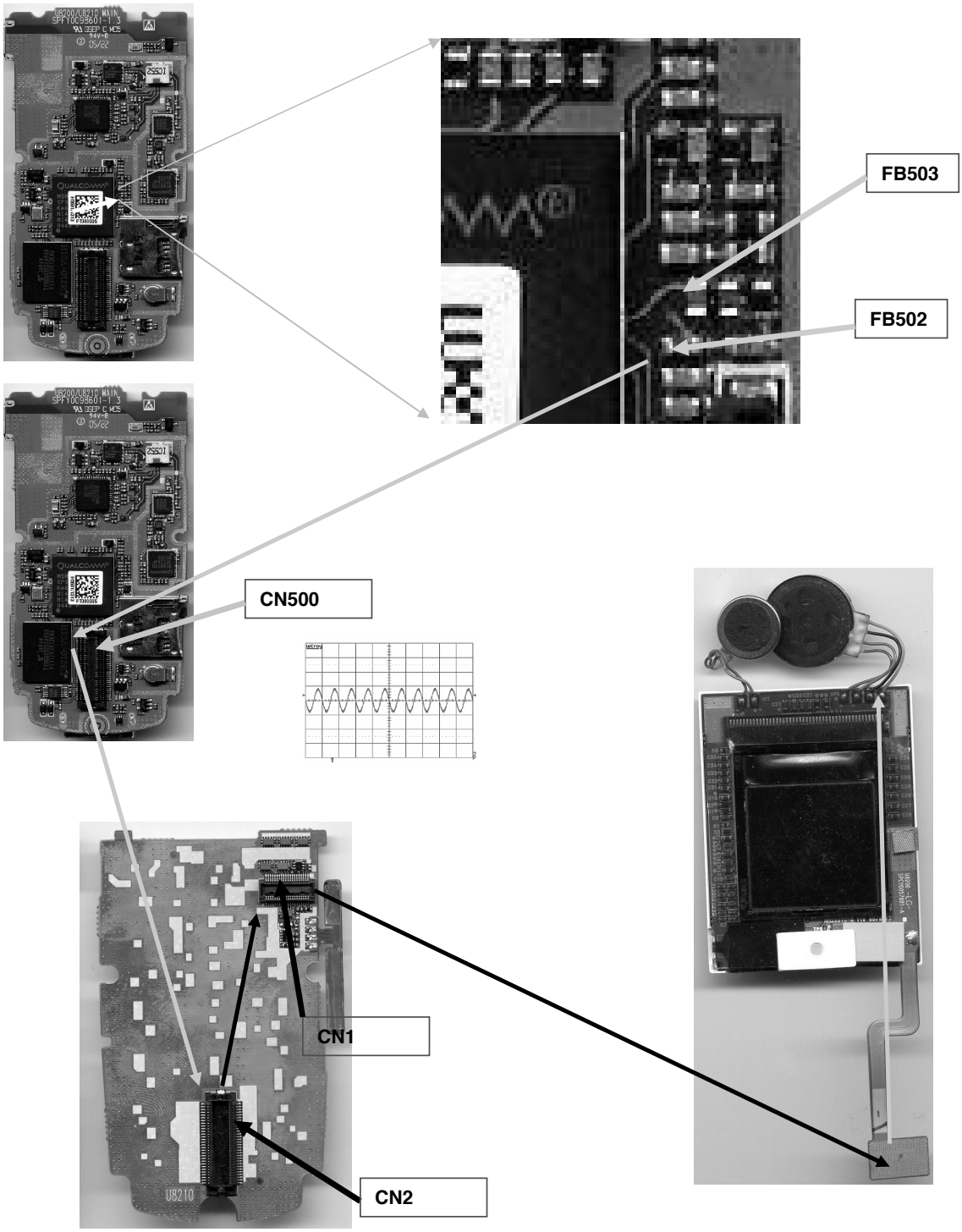


♣ Note : It is recommended that engineer should check the soldering of R, L, C along the corresponding path before every step.

Receiver Path

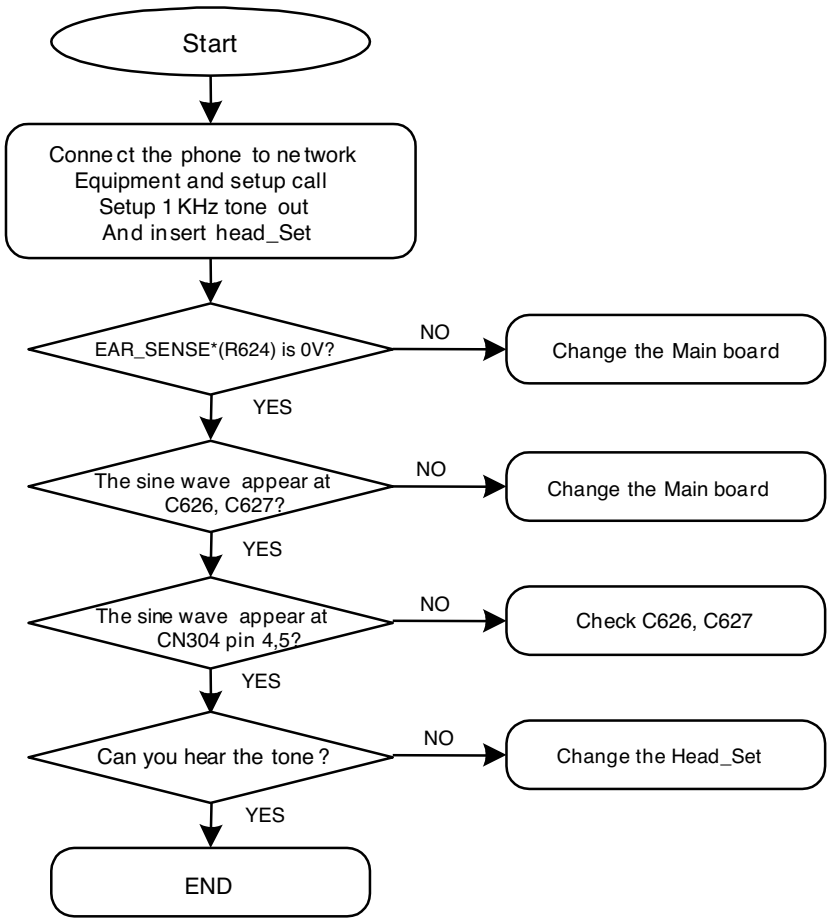
Voice Receiver path as below:
MSM6250 Ear1ON/Ear1OP → CN300(b'd to b'd connector) → CN2(b'd to b'd connector) → CN1(LCD b'd to b'd connector) → LCD module → Speaker

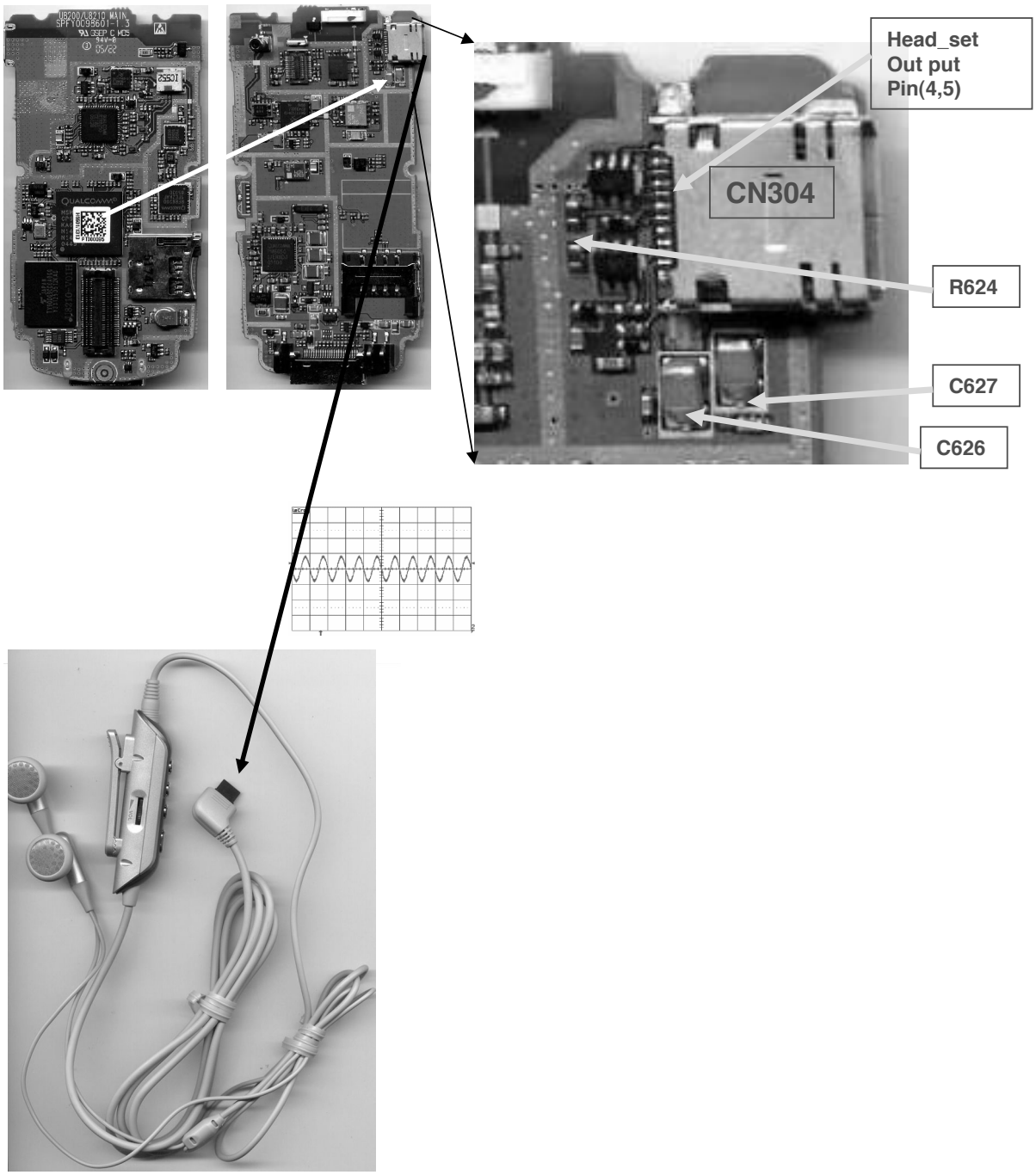



FB503
FB502
CN500
CN1
CN2

Receiver Path for Head_set

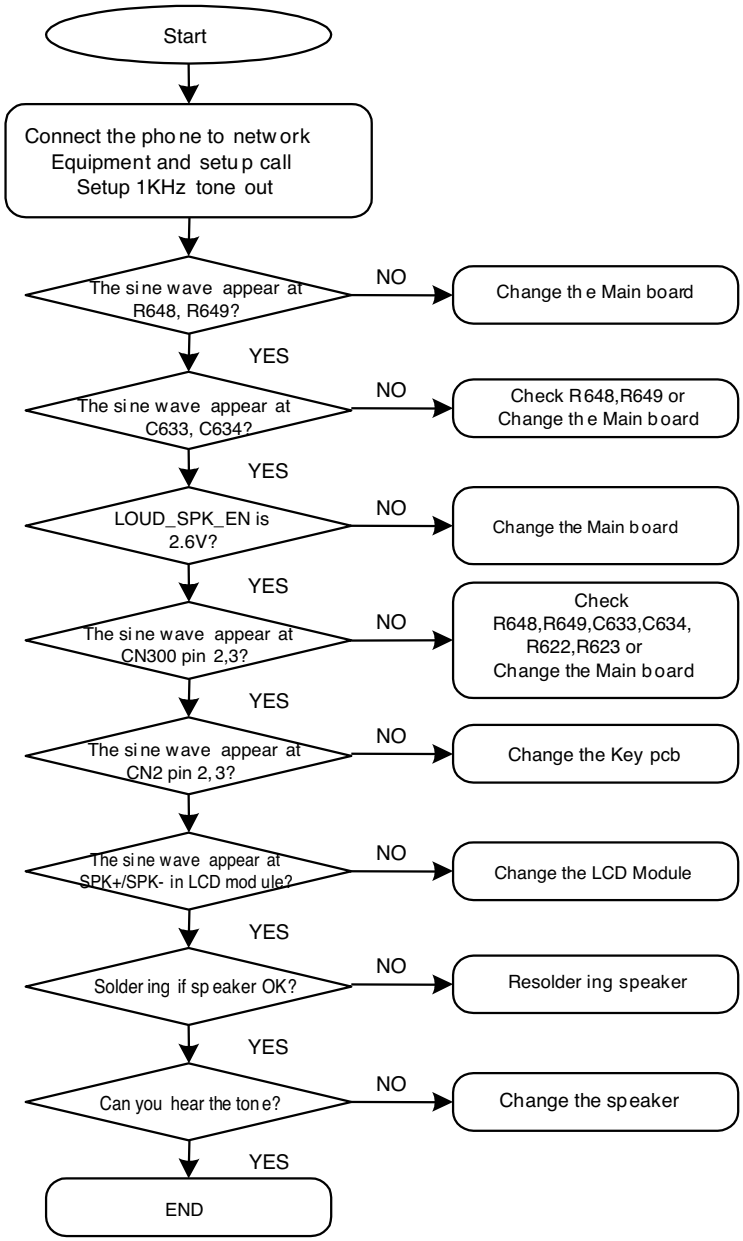
Voice Receiver & video telephony path for Head_Set as below:
MSM6250 HPH_R, HPH_L → C626, C627 → CN304(Head_Set Jack)

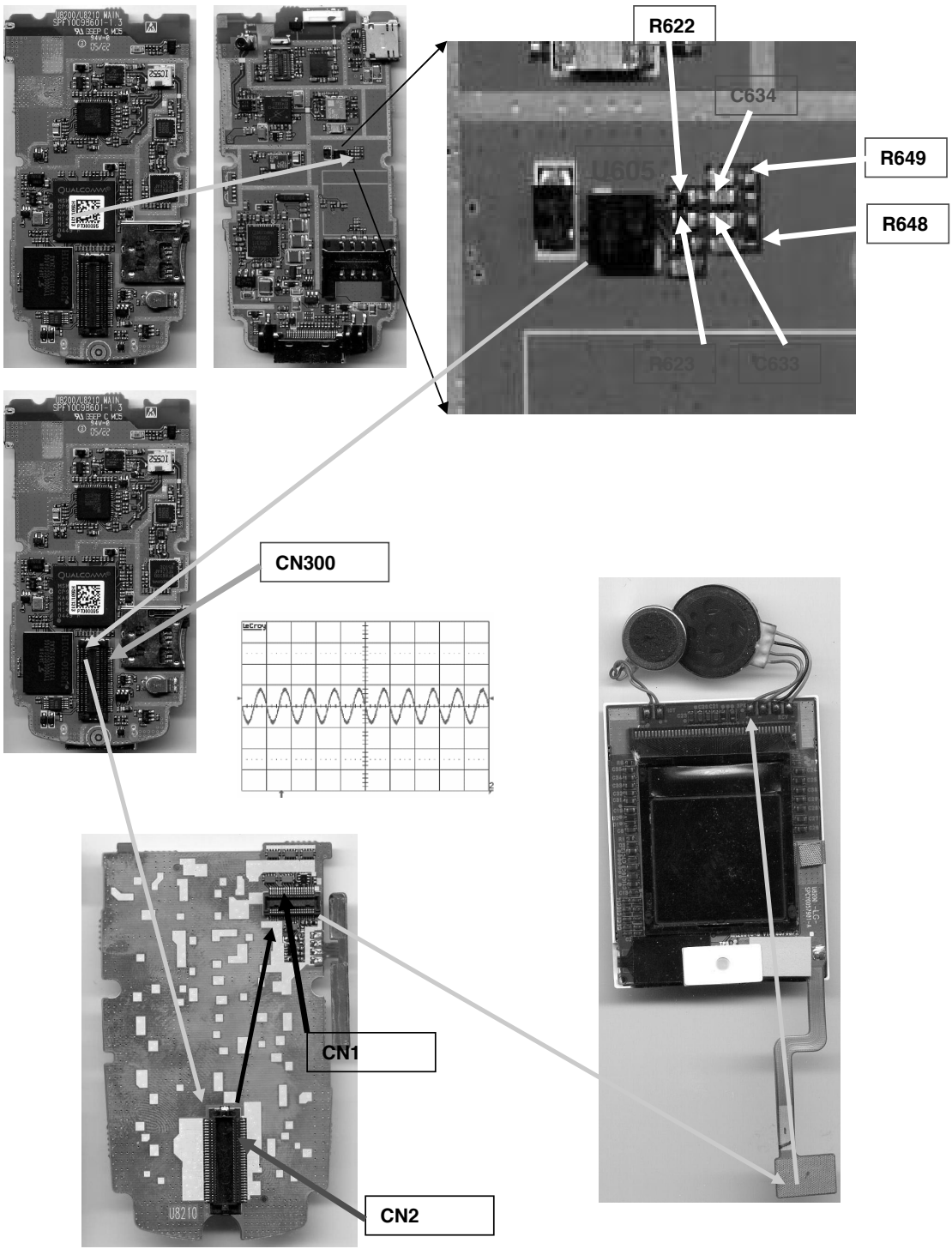



Head_set
Out put
Pin(4,5)
CN304
R624
C627
C626

Voice Speaker Phone & Video telephony path

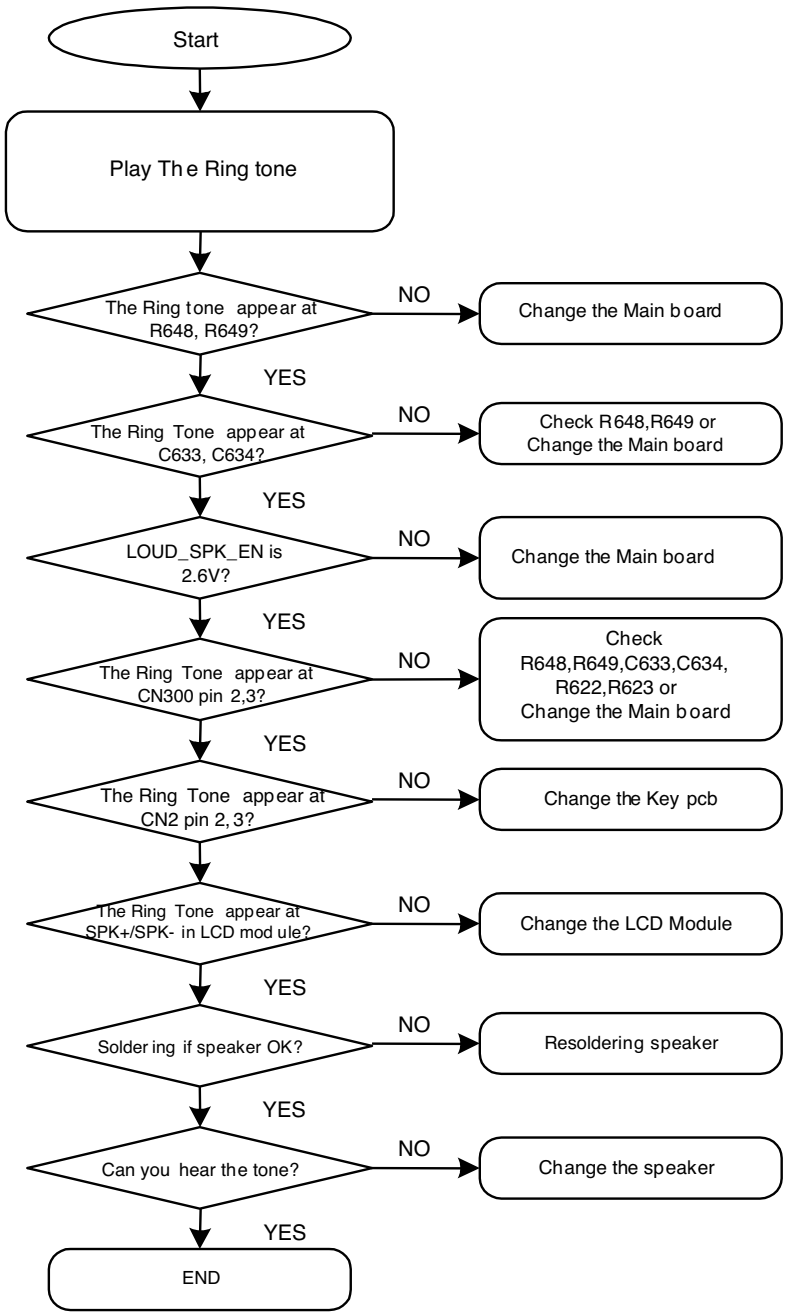
Voice Speaker Phone & Video telephony path as below:
MSM6250 HPH_R, HPH_L → R648, R649 → C633, C634 → R622, R623 → U605(Amp) → CN300 → CN2 → CN1 → LCD module → speaker

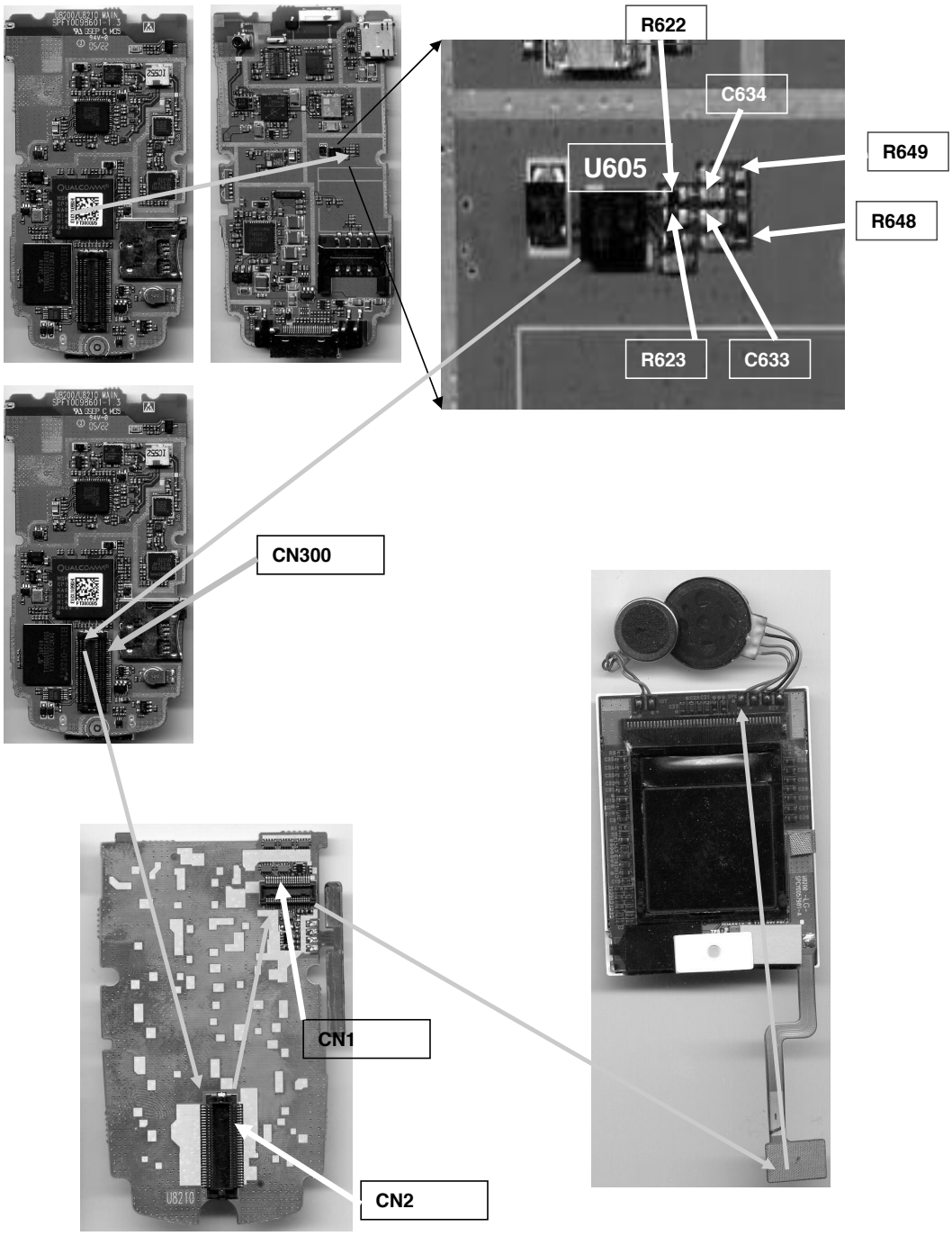



R622
C634
R649
R648
U605
R623
C633
CN300
CN1
CN2
U8210

MIDI Ring tone for speaker

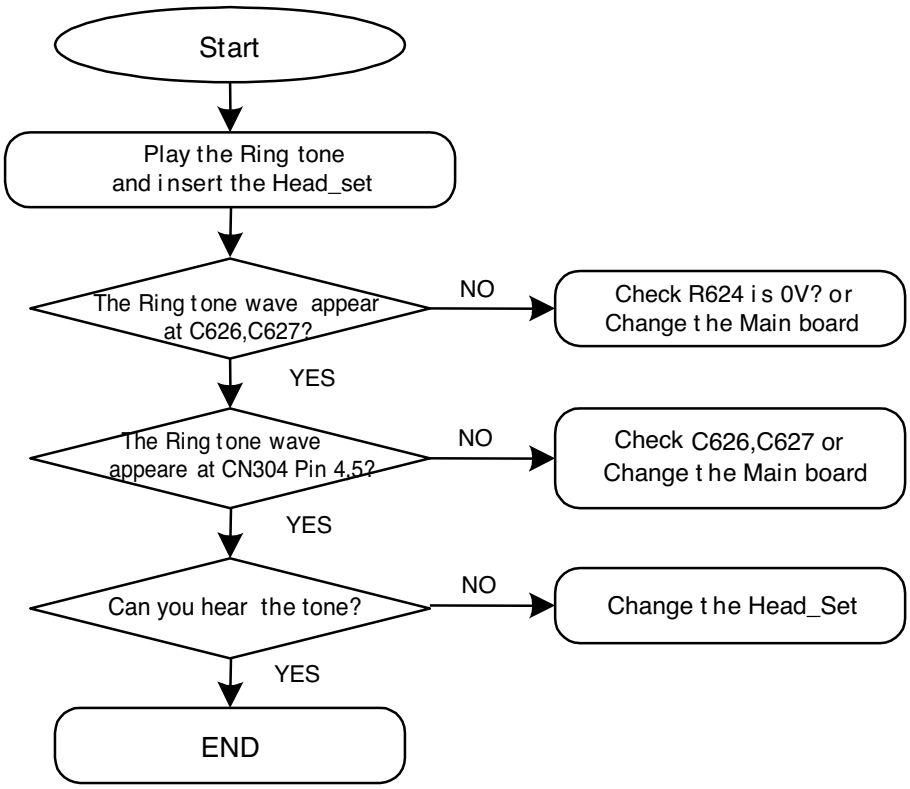
MIDI Ring tone speaker path as below:
MSM6250 HPH_R, HPH_L → R648, R649 → C633, C634 → R622, R623 → U605(Amp) → CN300 → CN2 → CN1 → LCD module → speaker

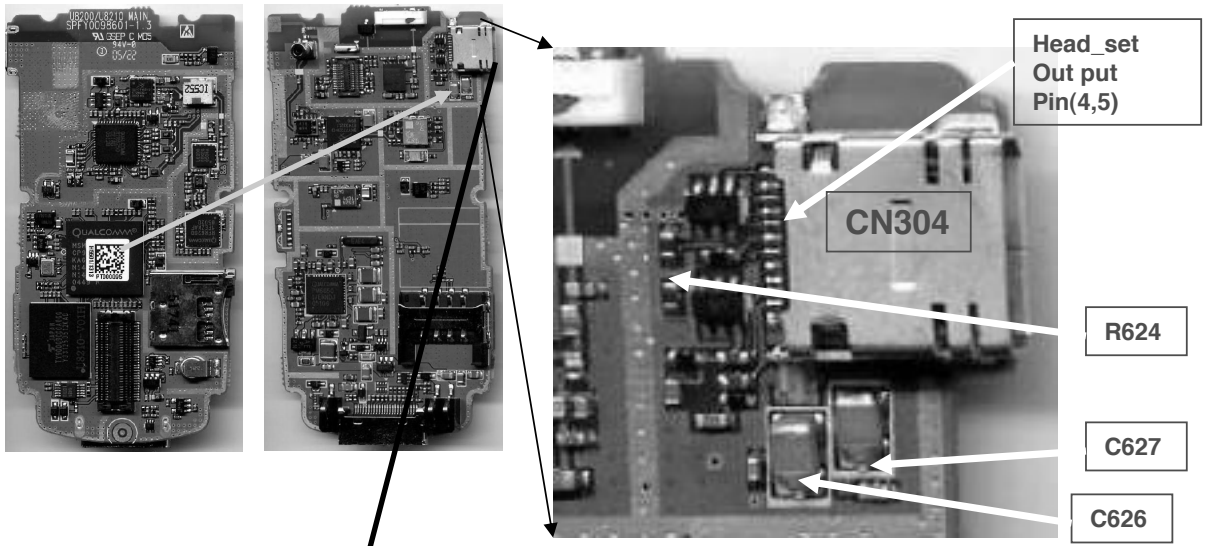


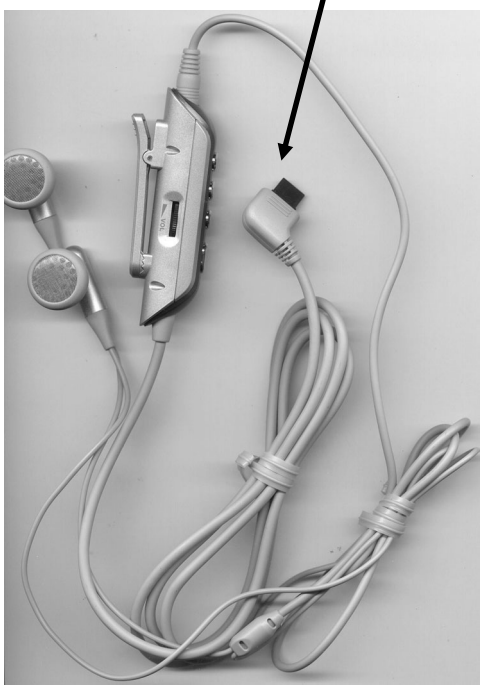

R622
C634
U605
R649
R648
R623
C633
CN300
CN1
CN2

MIDI Ring tone for Head_Set

MIDI Ring tone Head_Set path as below:
Voice Receiver & video telephony path for Head_Set as below:
MSM6250 HPH_R, HPH_L → C626, C627 → CN304(Head_Set Jack)

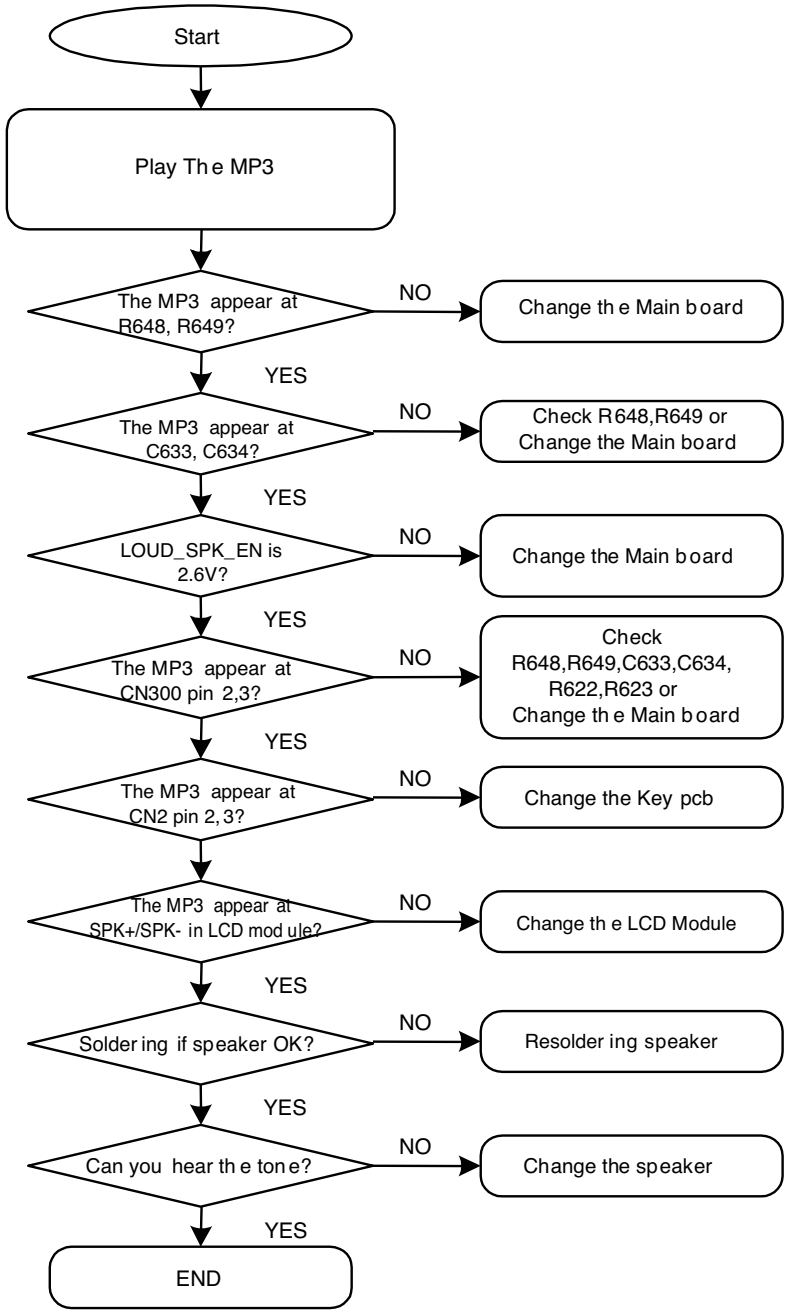


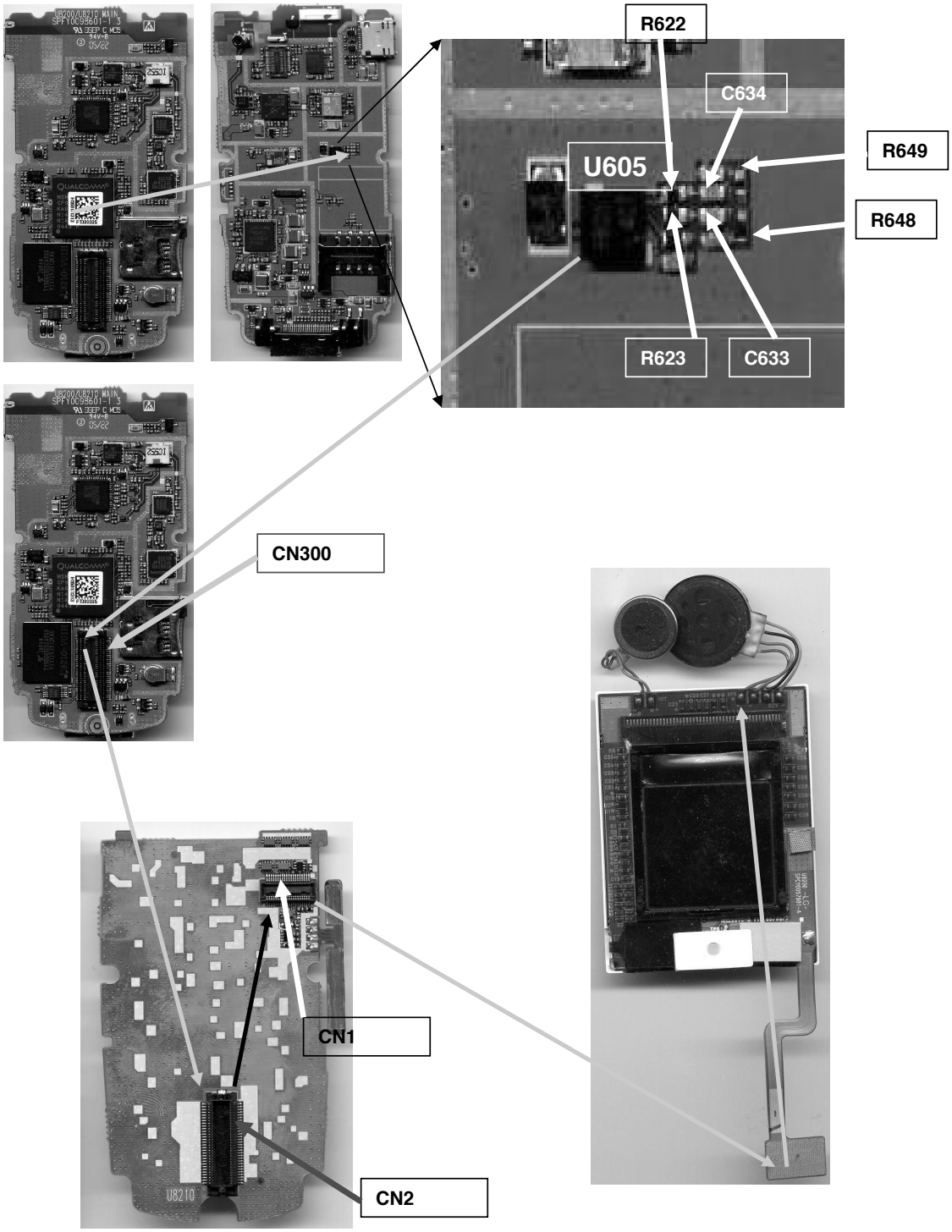

Head_set
Out put
Pin(4,5)
CN304
R624
C627
C626



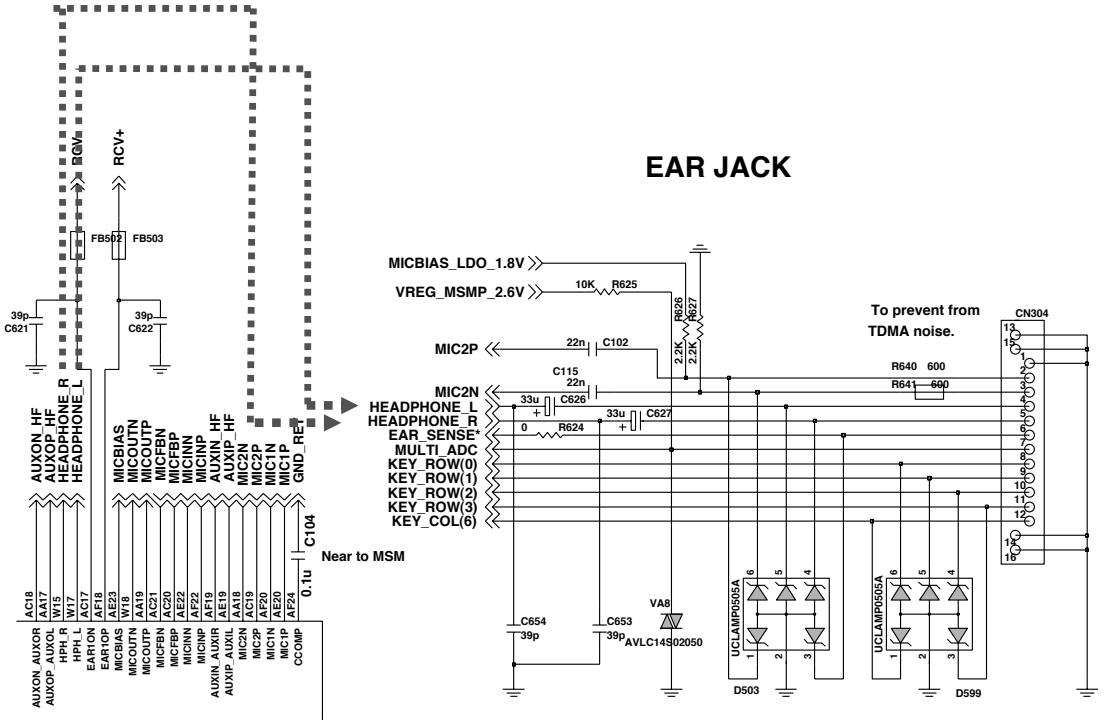
MP3 play for speaker

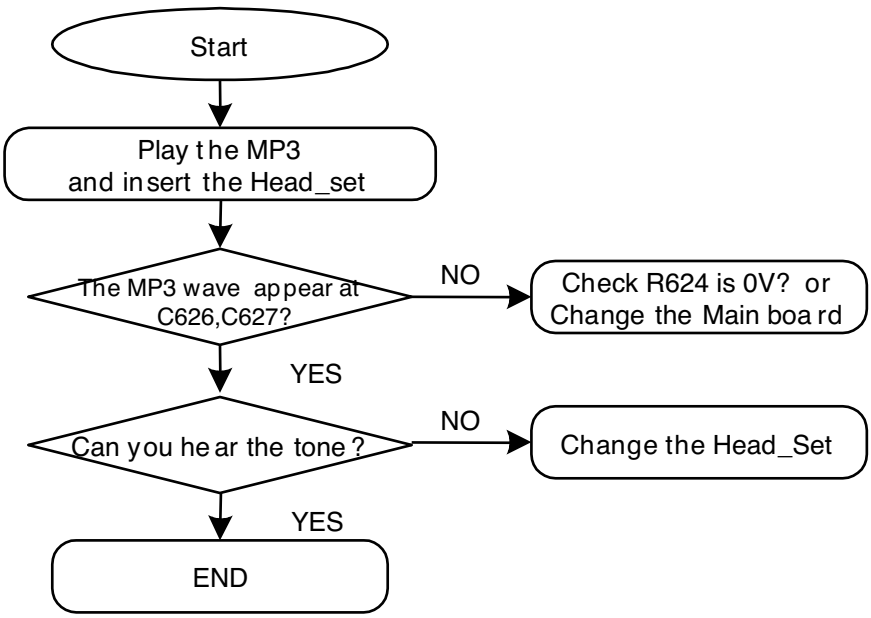
MP3 play for speaker path as below:
MSM6250 HPH_R, HPH_L → R648, R649 → C633, C634 → R622, R623 → U605(Amp) → CN300 → CN2 -> CN1 → LCD module → speaker

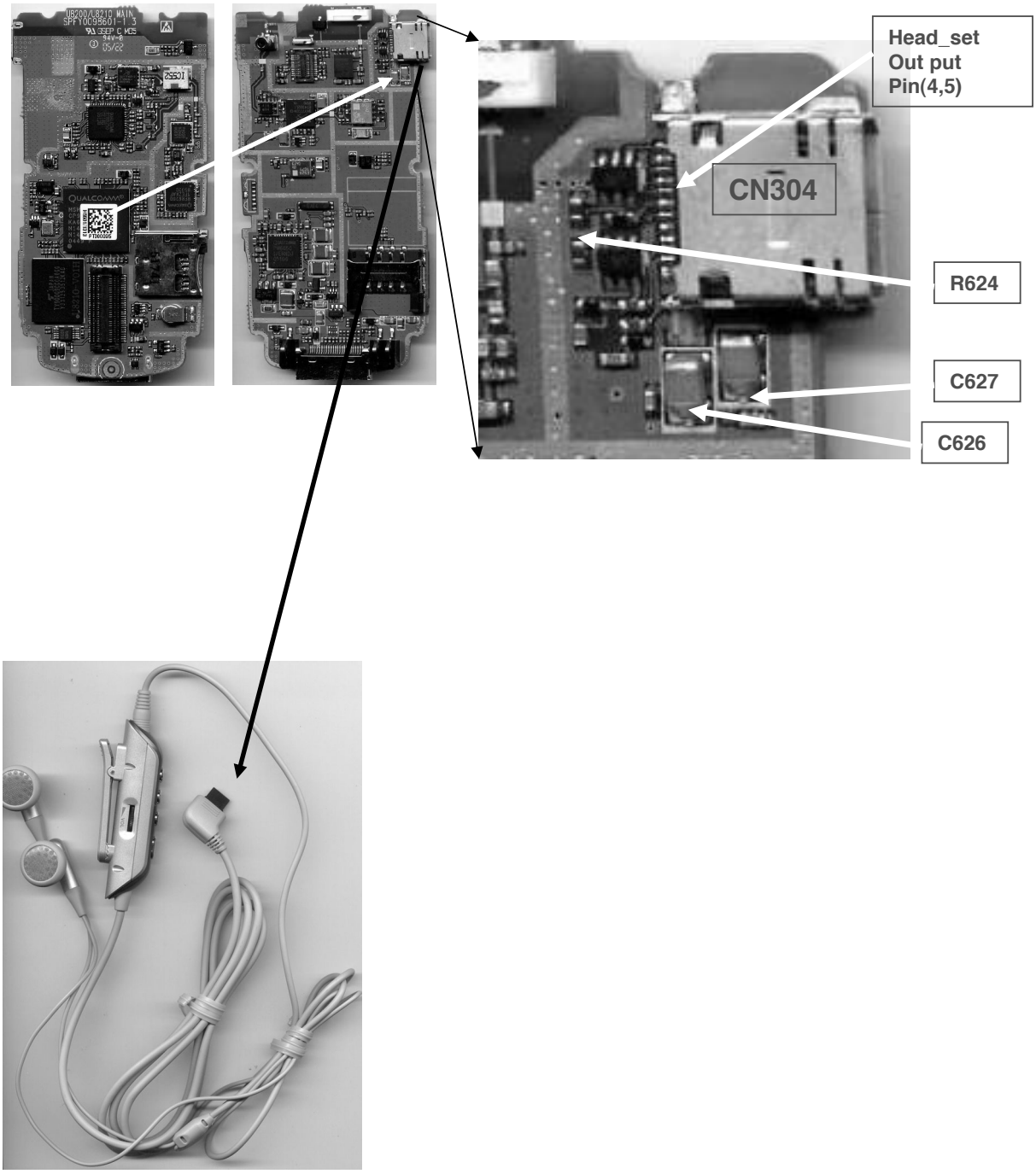



R622
C634
U605
R649
R648
R623
C633
CN300
CN1
CN2

MP3 play for Head_Set

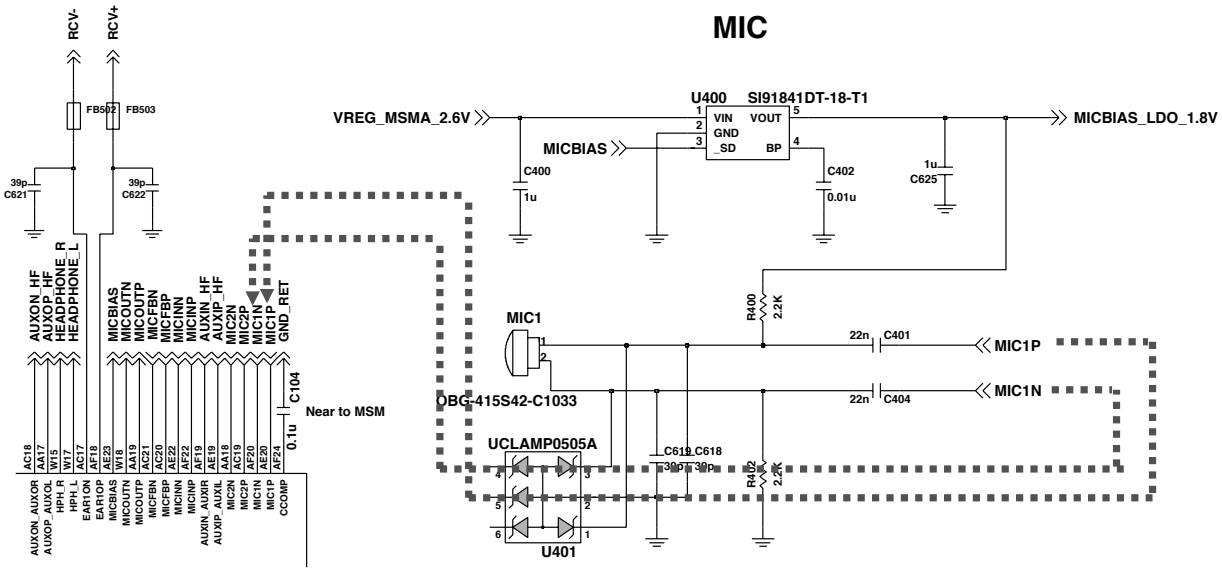


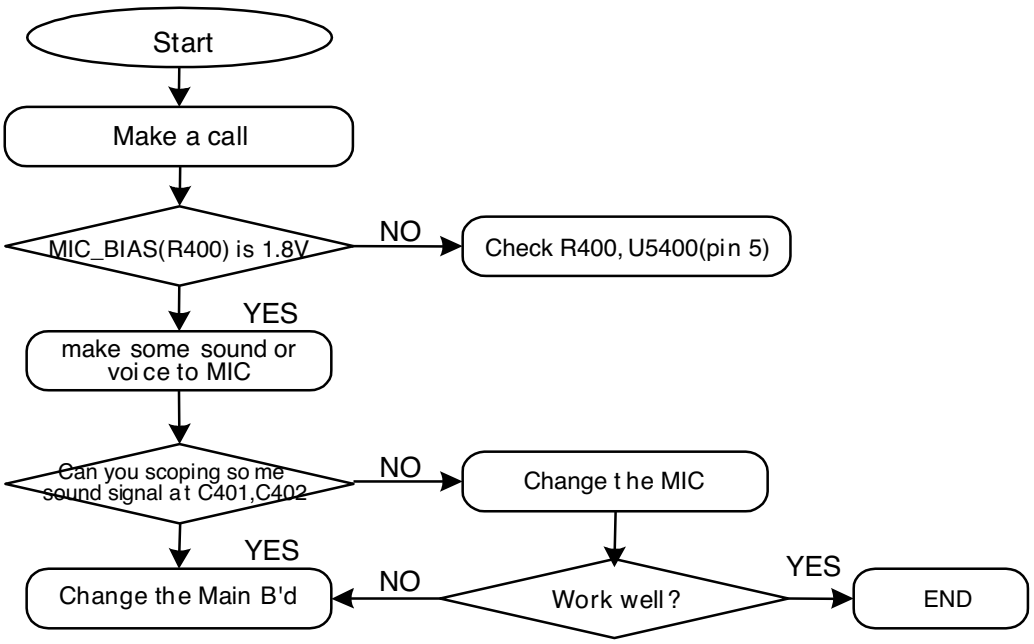


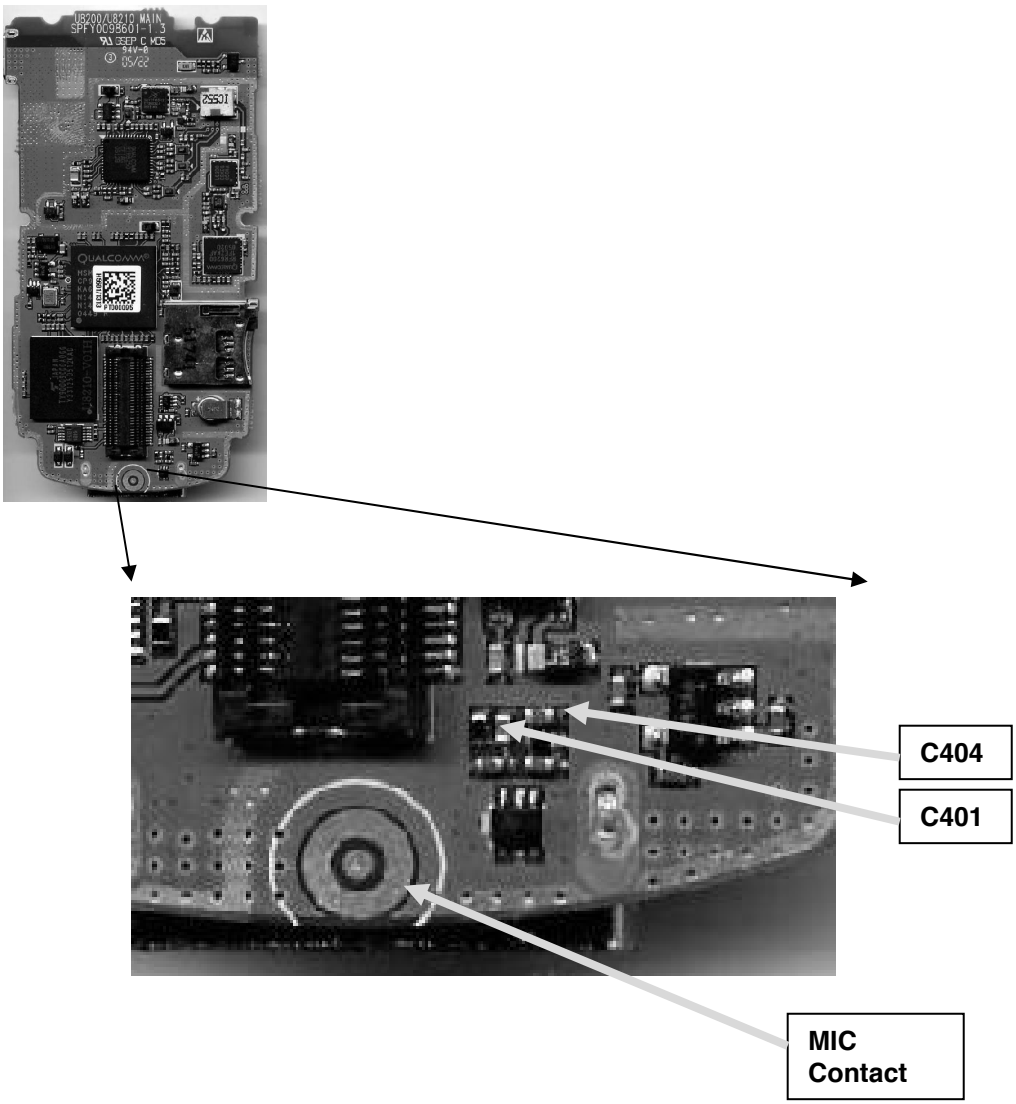

Head_set
Out put
Pin(4,5)
CN304
R624
C627
C626

Microphone for Main MIC

Main Microphone path as below:
MIC → MIC pad(MIC1) → C401,C402 → MSM6250 → MIC feed back gain logic → MSM internal CODEC



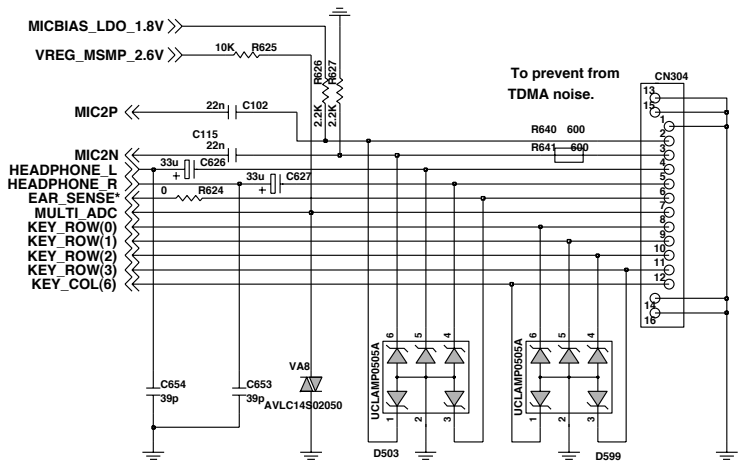


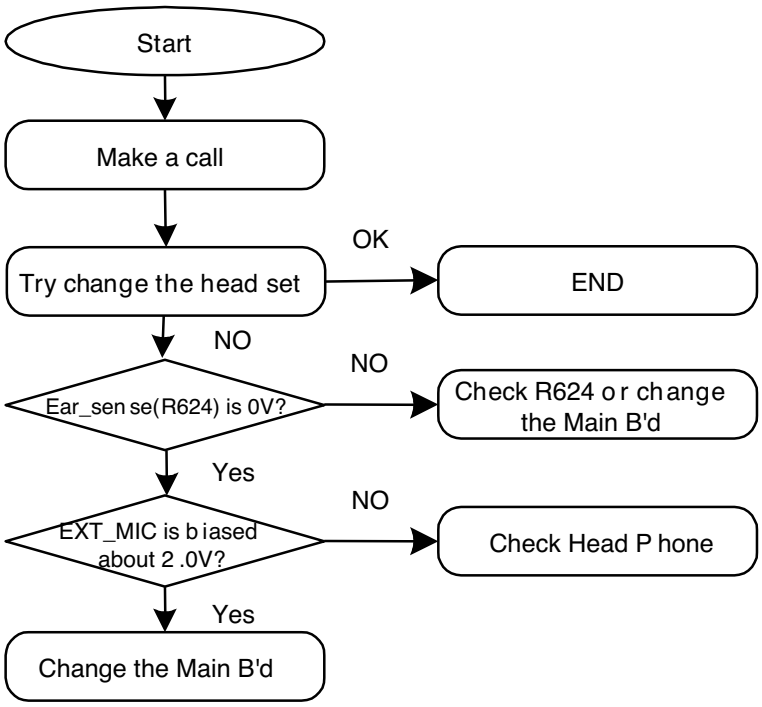

C404
C401
MIC
Contact

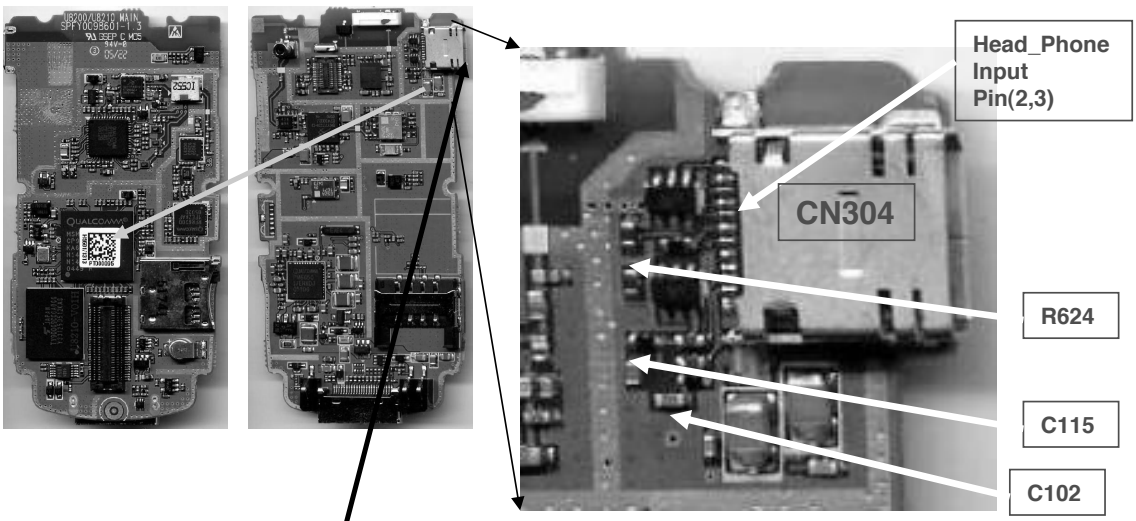
Microphone for Head_Set

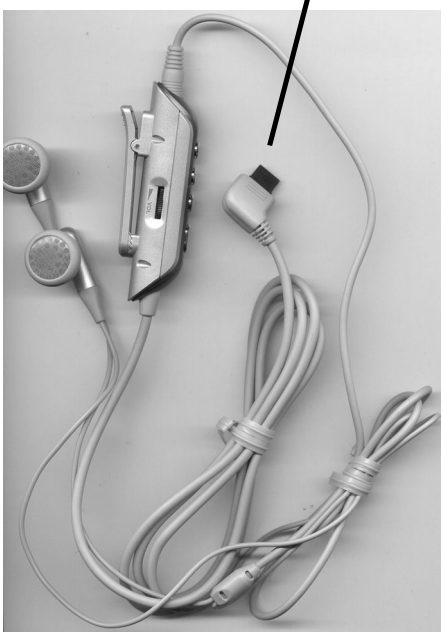
MIC for Head_Set path as below:
Insert Headset → Ear_Sense(R624) go 0V → MSM6250 sense Head_Set insertion → MIC signal go to MSM(C102, C115)

EAR JACK

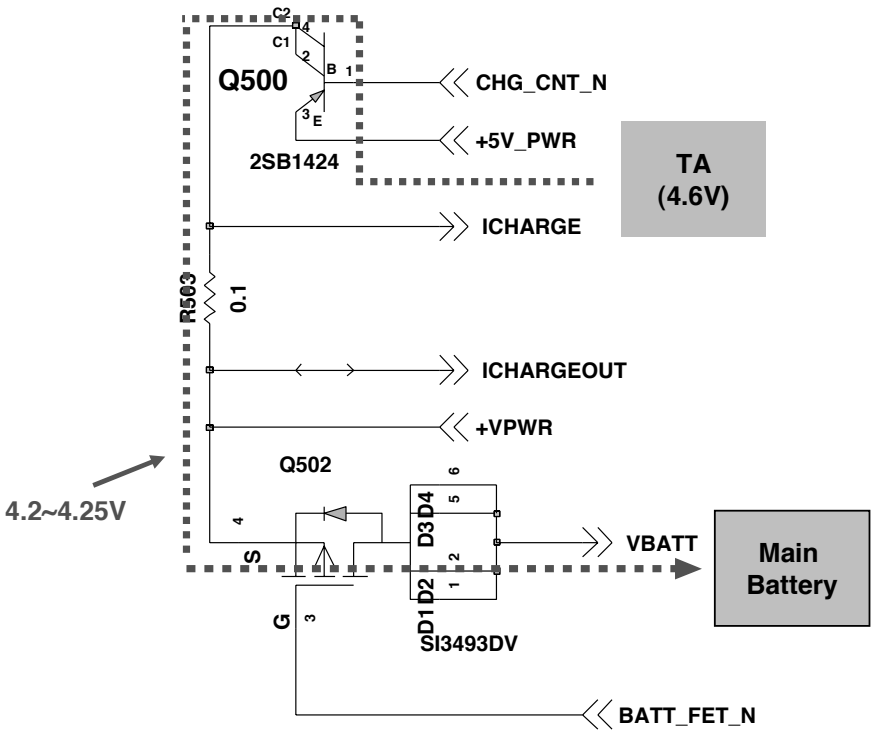





Head_Phone
Input
Pin(2,3)
CN304
R624
C115
C102



4.22 Charger Trouble Shooting



Charging Procedure

- Connecting TA
- Control the charging current by PM6050 IC
- Charging Current flows into the battery

Check Point

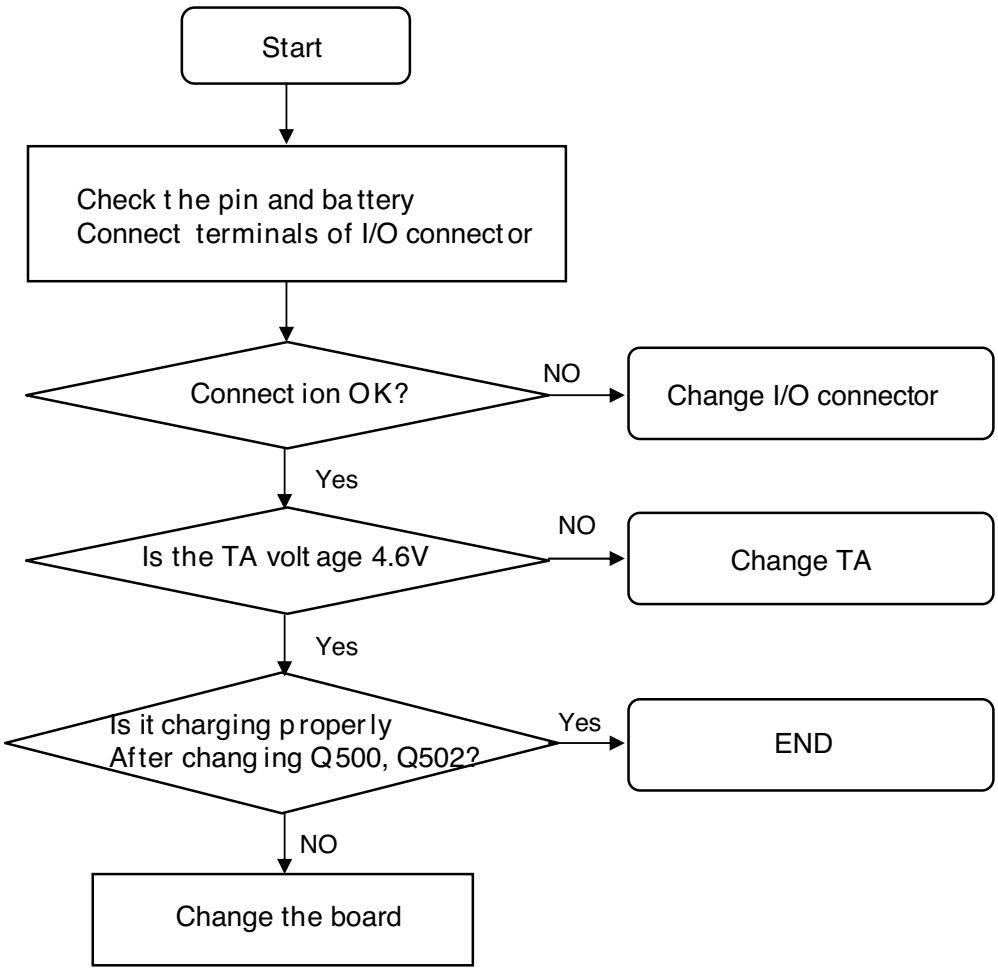
- Connection of TA
- Charging current path
- Battery

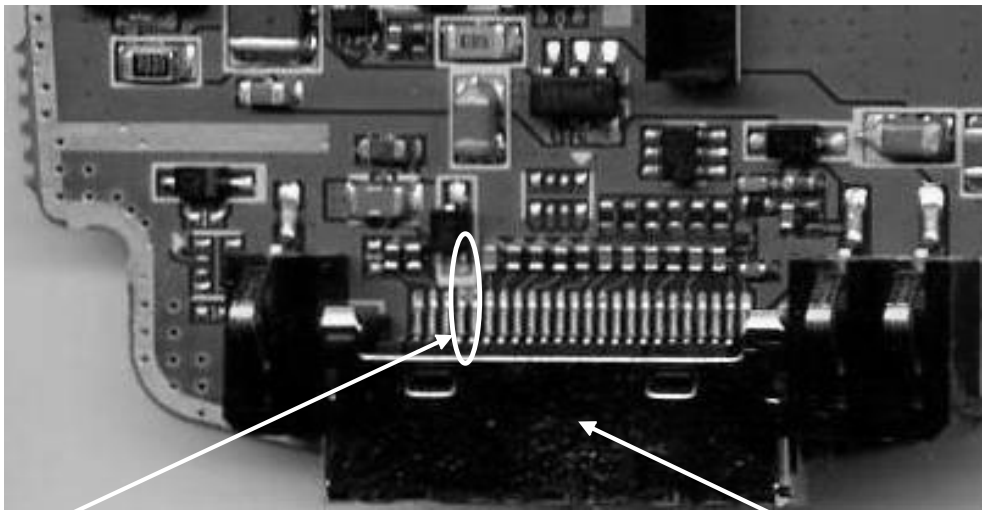
Trouble Shooting Setup

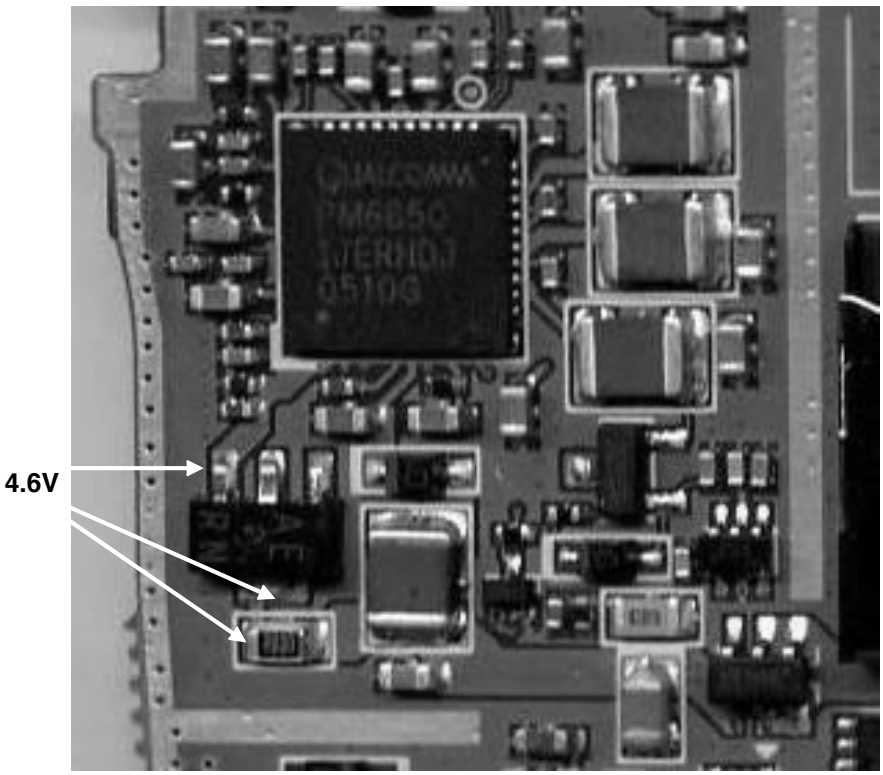
- Connect TA and battery to the phone

Trouble Shooting Procedure

- Check the charger connector
- Check the charging current Path
- Check the battery


Start
Check the pin and battery
Connect terminals of I/O connector
Connection OK?
NO
Change I/O connector
Yes
Is the TA voltage 4.6V
NO
Change TA
Yes
Is it charging properly
After changing Q500, Q502?
Yes
END
NO
Change the board

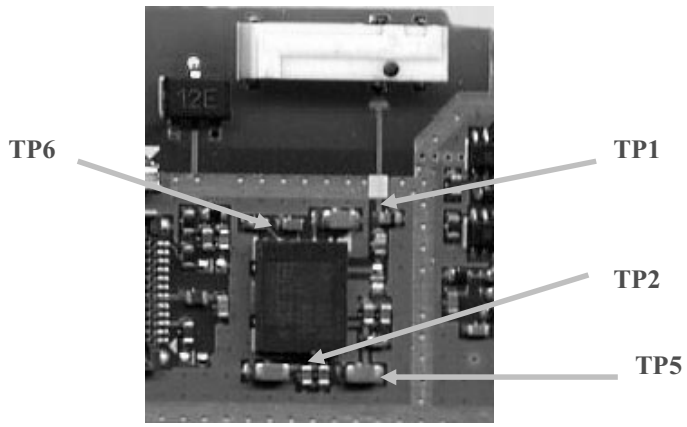

4.6V
Receptacle

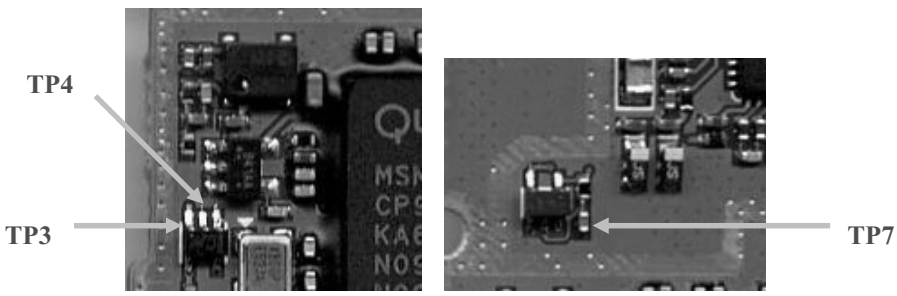

4.6V

4.23 Bluetooth RF Block

TC-3000A (Bluetooth Tester)

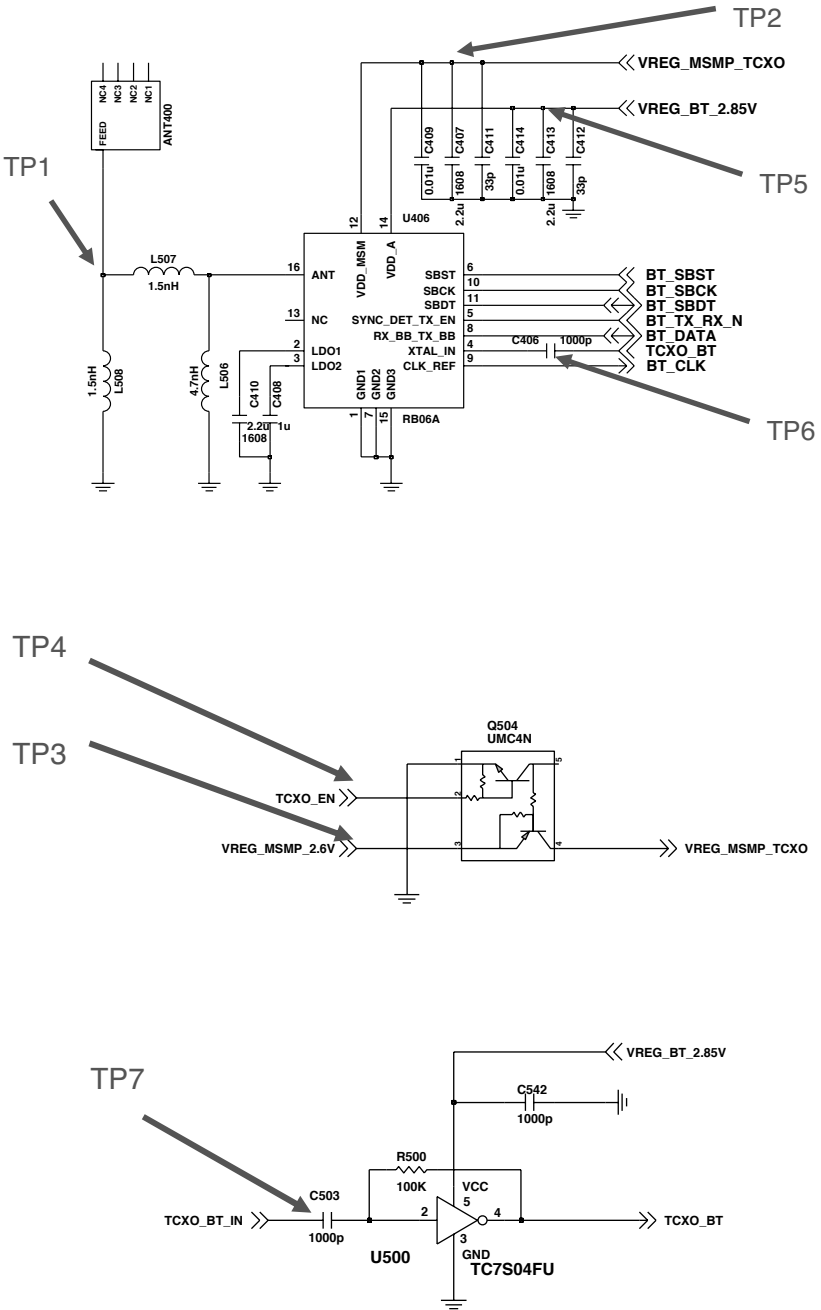
1. Set phone to bluetooth test-mode
   : Enter Test Mode(277634#*#) → Module Test Set → BT DUT → BT DUT ON
2. Connect phone to bluetooth tester
3. Set channel to 39
4. Measure output-power
5. Check TP1 : output-power > -6 dBm



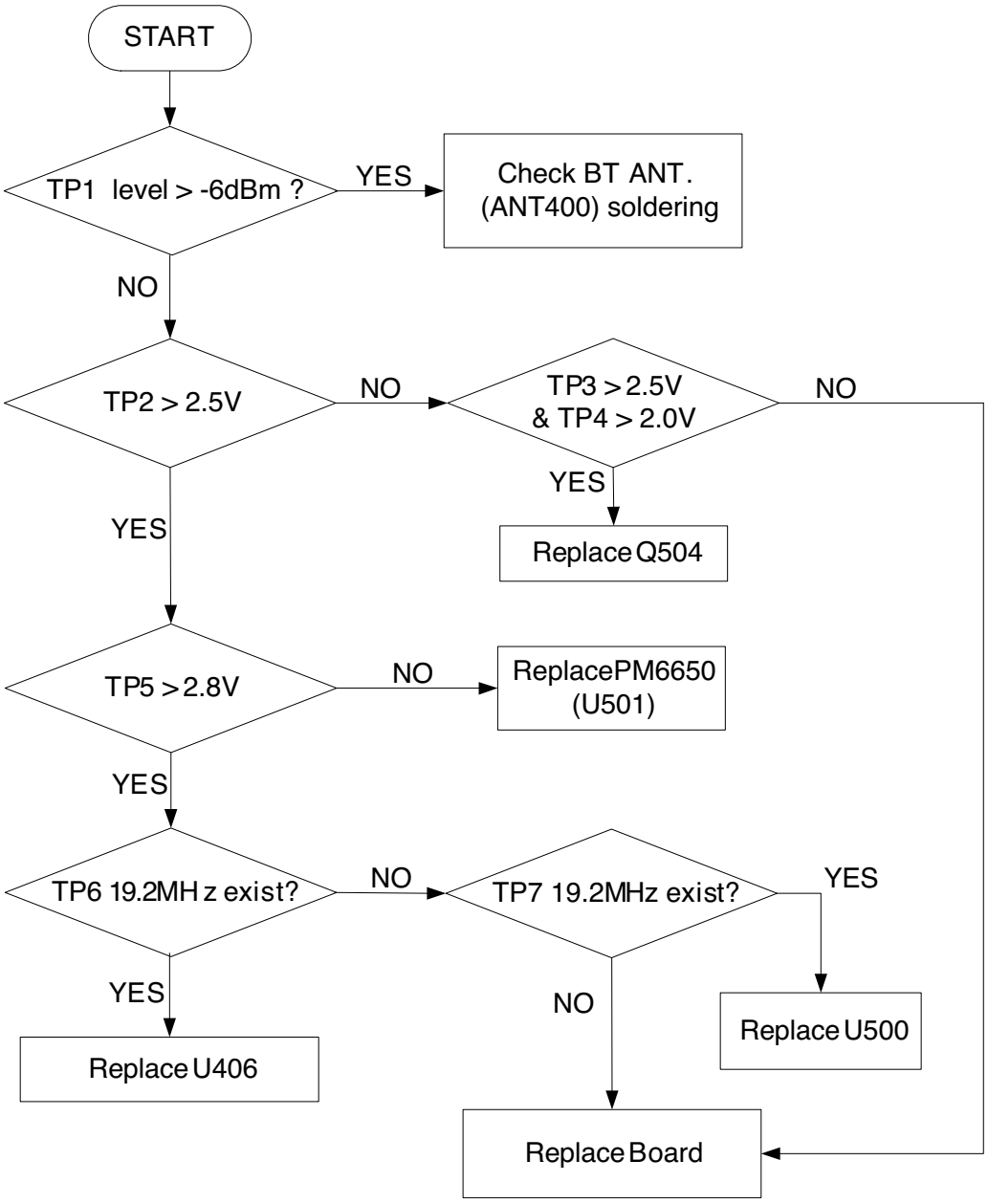


4. TROUBLE SHOOTING

Test Point (Bluetooth Block)



Schematic of Bluetooth RF Block


START
TP1 level > -6dBm ?
YES
Check BT ANT.
(ANT400) soldering
NO
TP2 > 2.5V
NO
TP3 > 2.5V
& TP4 > 2.0V
NO
YES
Replace Q504
YES
TP5 > 2.8V
NO
ReplacePM6650
(U501)
YES
TP6 19.2MHz exist?
NO
TP7 19.2MHz exist?
YES
YES
Replace U406
NO
Replace U500
Replace Board

5. BLOCK DIAGRAM

5.1 GSM & WCDMA RF Block

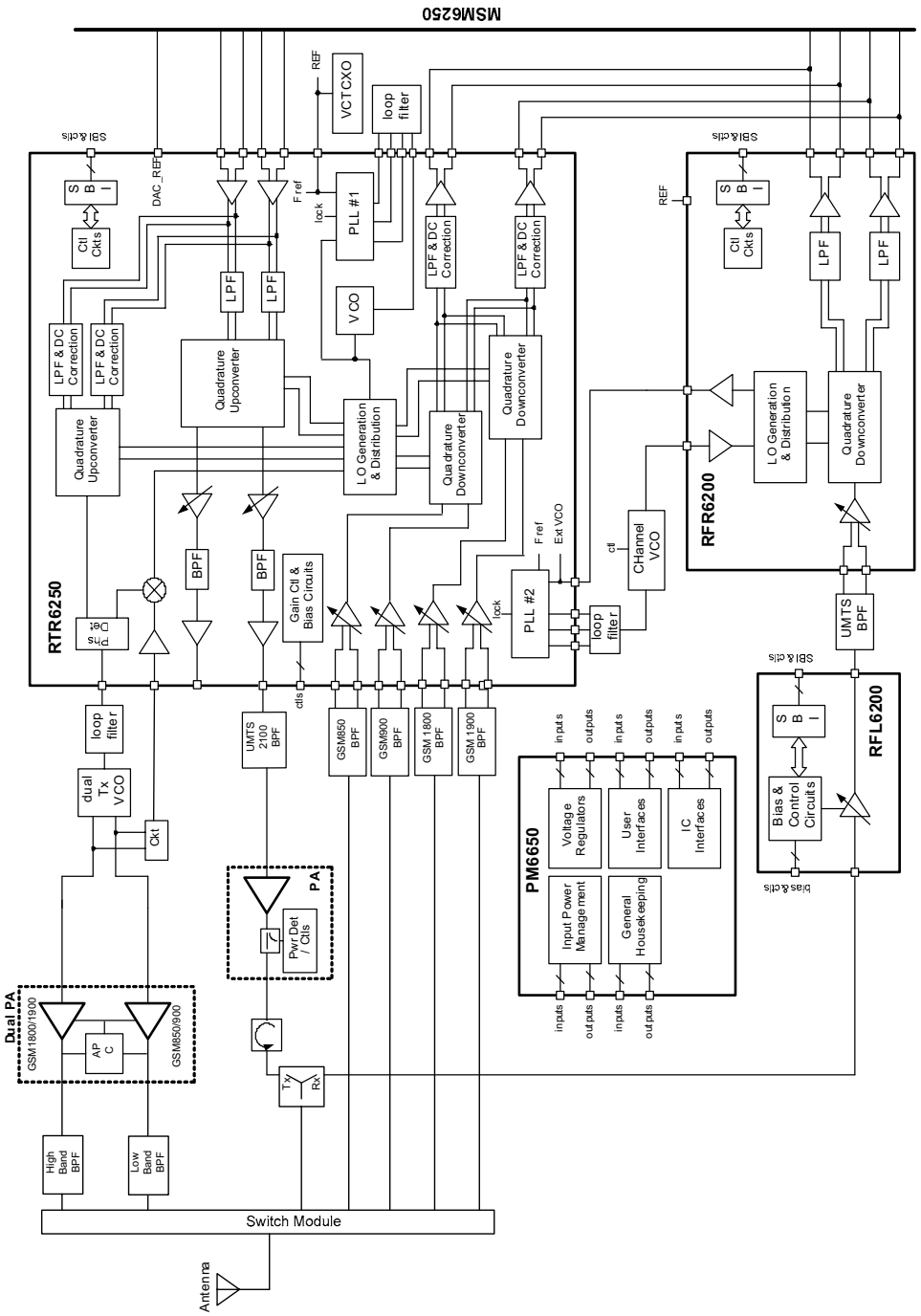
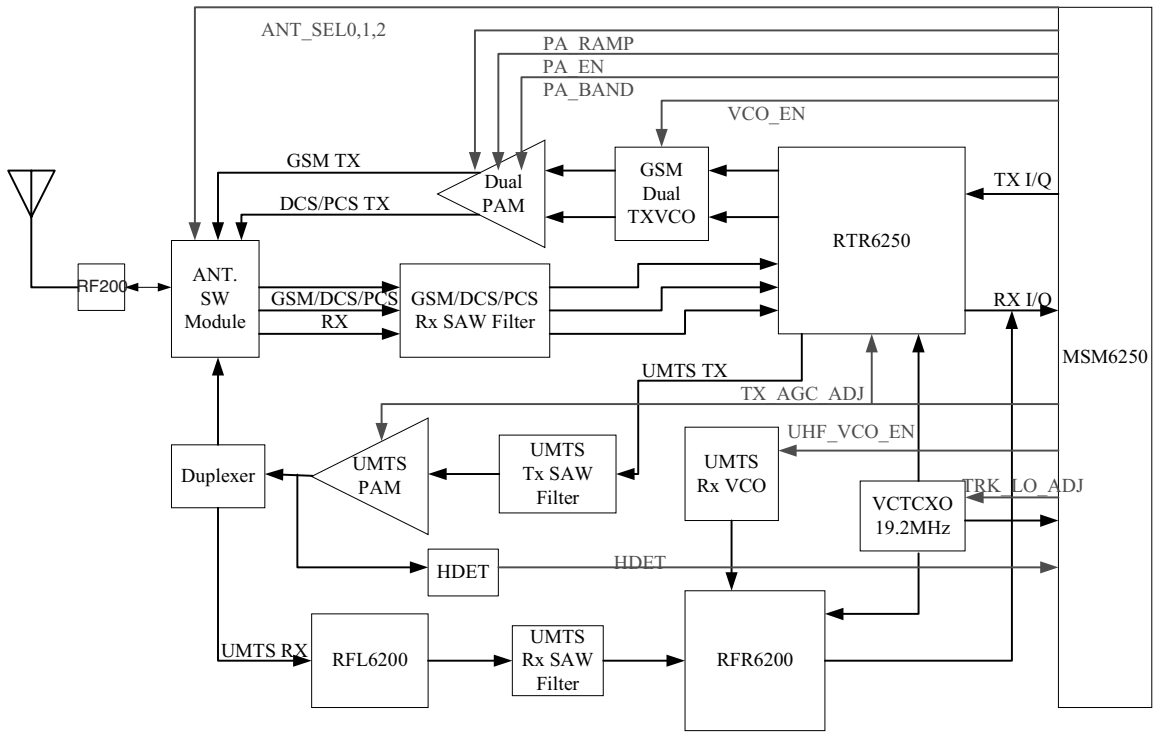


Fig 5.1-1.UMTS-2100 + EGSM-900/DCS-1800/PCS-1900 RF Functional Block Diagram

Block	Ref. Name	Part Name	Function	Comment
Common	U207	SFAY0004601	Switch	Band select
	RF200	KMS-507	Test Connector	Calibration, etc
	U206	TG-5001LA-19.2MHz	VCTCXO	19.2MHz
Bluetooth	U406	LBDA254AN0	Bluetooth RF Transceiver	Bluetooth TRX
	ANT400	LDA31	Antenna	Bluetooth antenna
WCDMA	U202	DMF1950IHC	Duplexer	TRX
	U201	RFL6200	RF LNA IC	RX
	FL200	B7728	RX SAW Filter	RX
	U200	RFR6200	RF Receiver IC	RX
	FL204	WTDA1	TX SAW Filter	TX
	U204	SKY77410	TX PAM	TX
	U208	MQL302A1G71	VCO	UMTS Rx CH VCO
	U205	RTR6250	RF Transceiver IC	TRX
	U203	LMV225TLX	Power Detect	TX
GSM	U209	SKY77328	TX Dual PAM	TX
	U210	MQW5V0C869M	VCO	Dual TX VCO
	FL201	B7837	RX SAW Filter	EGSM RX
	FL202	B7844	RX SAW Filter	DCS RX
	FL203	B7846	RX SAW Filter	PCS RX

Table 5.1-1. RF Block Component

5.2 Interface Diagram



U8290 Interface Diagram

Main RF signal (black)

GSM TX : GSM Tx RF signal

GSM RX : GSM Rx RF signal

DCS TX : DCS Tx RF signal

DCS RX : DCS Rx RF signal

PCS TX : PCS Tx RF signal

PCS RX : PCS Rx RF signal

UMTS TX : UMTS Tx RF signal

UMTS RX : UMTS Rx RF signal

TX_I/Q : I/Q for Tx of RF

RX_I/Q : I/Q for Rx of RF

Control signal(red)

ANT_SEL 0,1,2 : Ant Switch Module Mode Selection
(WCDMA, GSM Tx/Rx, DCS Tx/Rx, PCS Tx/Rx)

GSM PA_CTL signal

GSM_PA_BAND : DCS or PCS /GSM Mode Selection

GSM_PA_EN : Power Amp Gain Control Enable

GSM_PA_RAMP : Power Amp Gain Control

GSM/DCS_VCO_EN

GSM_VCO_EN : GSM band Tx VCO Enable

DCS_VCO_EN : DCS band Tx VCO Enable

UMTS PA_CTL signal

PA_ON : WCDMA Tx Power Amp Enable

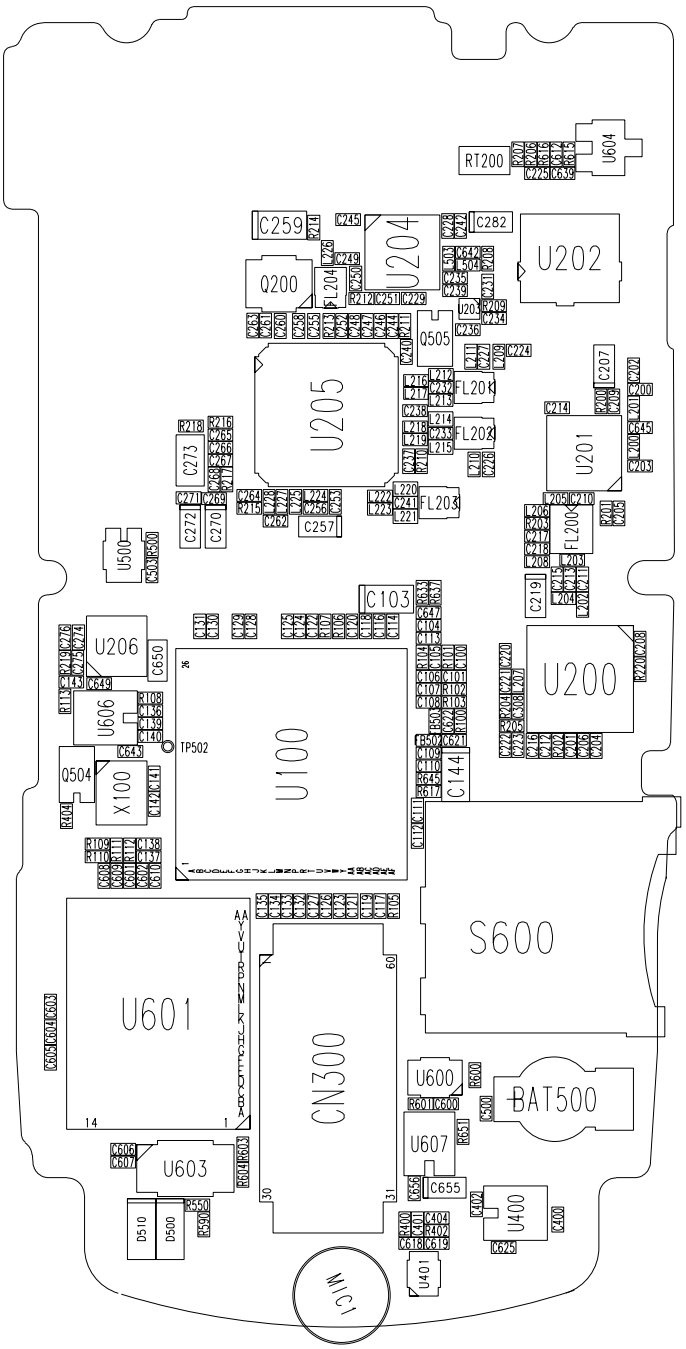
PA_RANGE0 : WCDMA Tx Power Amp Gain Control

TRK_LO_ADJ : TCXO(19.2M) Control

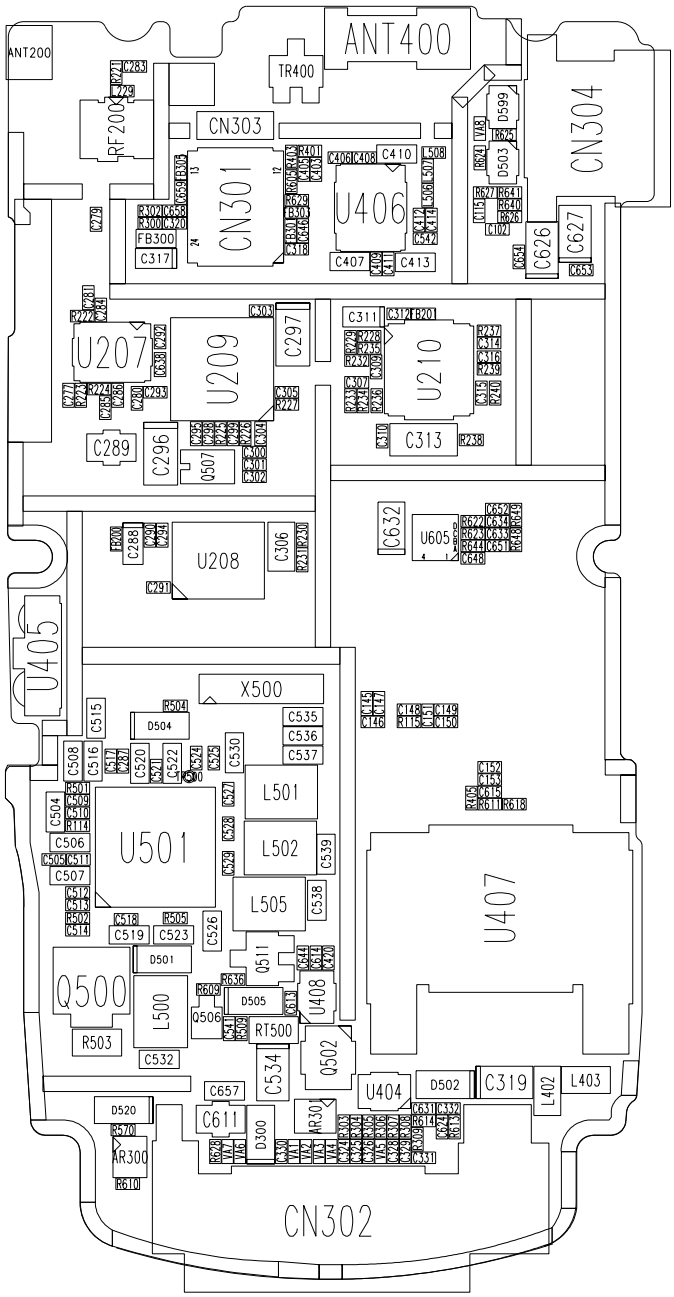
UHF_VCO_BAND_SEL : WCDMA(3G)/GSM(2G) VCO Band Selection of UHF VCO

5. BLOCK DIAGRAM

Top Side



Bottom Side


ANT200
ANT400
TR400
RF200
CN303
CN301
U406
CN304
D599
D503
C626
C627
FB300
C317
C407
C413
U207
U209
C297
C311
FB201
U210
C313
C289
C296
Q507
U208
C306
C632
U605
U405
X500
D504
C535
C536
C537
L501
L502
L505
U501
U407
Q500
L500
R503
C532
C534
Q502
U404
D502
C319
L402
L403
C657
C611
D300
D520
AR300
AR301
RT500
Q506
Q511
U408
D501
D505
CN302

6. DOWNLOAD

6.1 Introduction

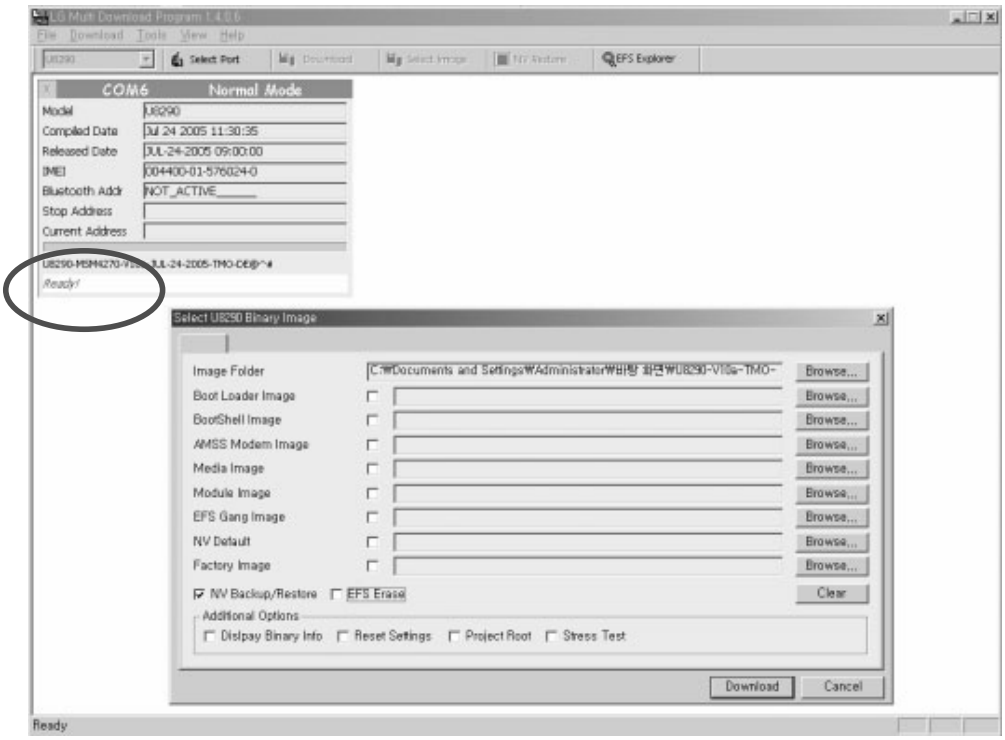
LGMDP(Ver 1.4)is a software for downloading image files to the phone from Microsoft Windows 2000 or Microsoft Windows XP where the LG USB Modem driver (Ver 4.5 or later) is installed.

6.2 Downloading Procedure

1) Connecting to PC

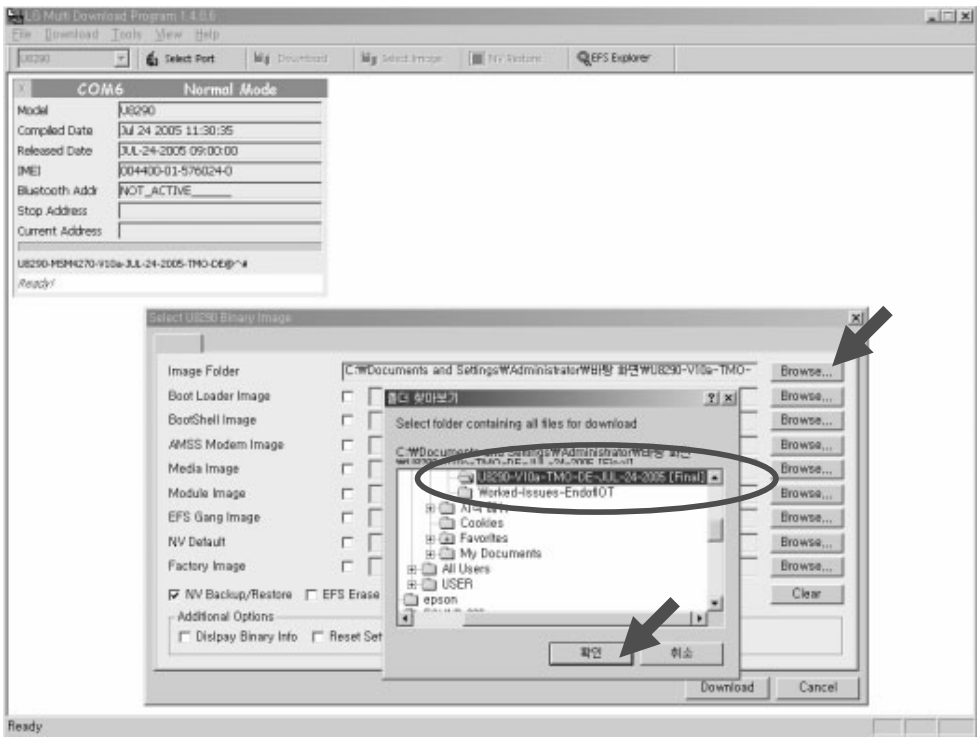
1. Connect the phone to your desktop PC using the L/T cable and execute the LGMDP application.
2. Click on ‘Select Port’ and check if state shows “Enable” for the port in the “Select Port” window. Then click on ‘Connect’. (The port number(COM4) can be different from yours.)

1-2) It is ready for downloading.



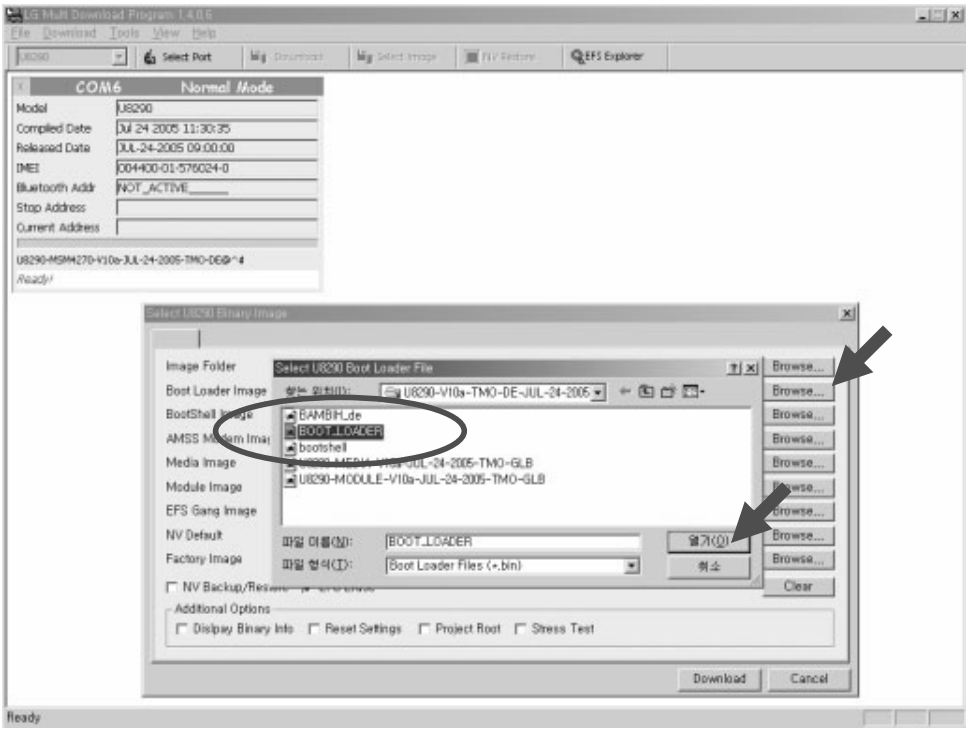
1-3) Choosing image folder

Choose a Image folder after clicking on ‘Browse’.

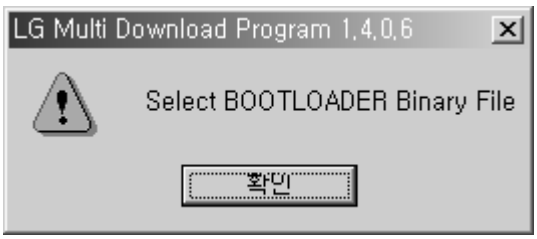


2) Choosing image files

1. Choose a Boot loader Image file after clicking on 'Browse'. (The file name can be different from yours.)
   • It's very important to choose the correct file. The phone NEVER can work with the wrong bootloader file.

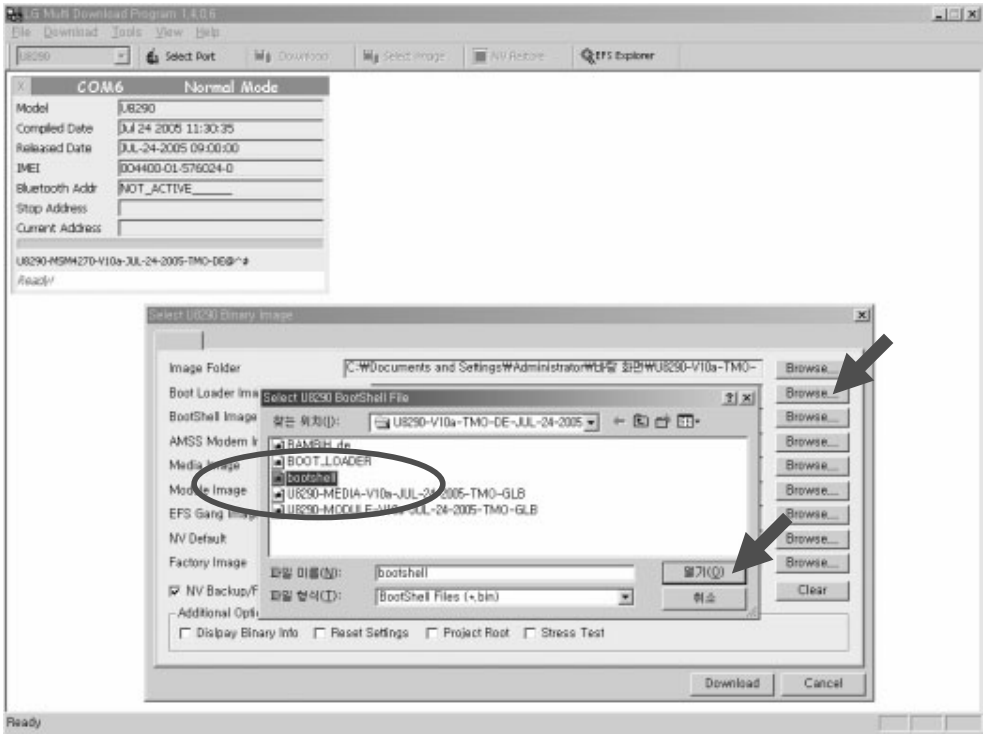


Caution) Error message will show if you choose improper file.

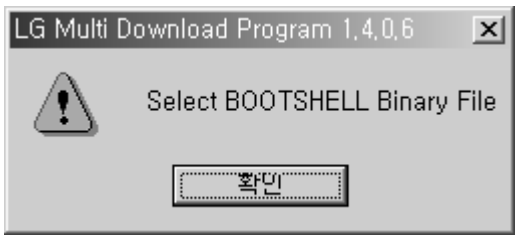


2. Choose a Boot shell file after clicking on 'Browse'. (The file name can be different from yours.)

• It's very important to choose the correct file. The phone NEVER can work with the wrong bootlshell file.

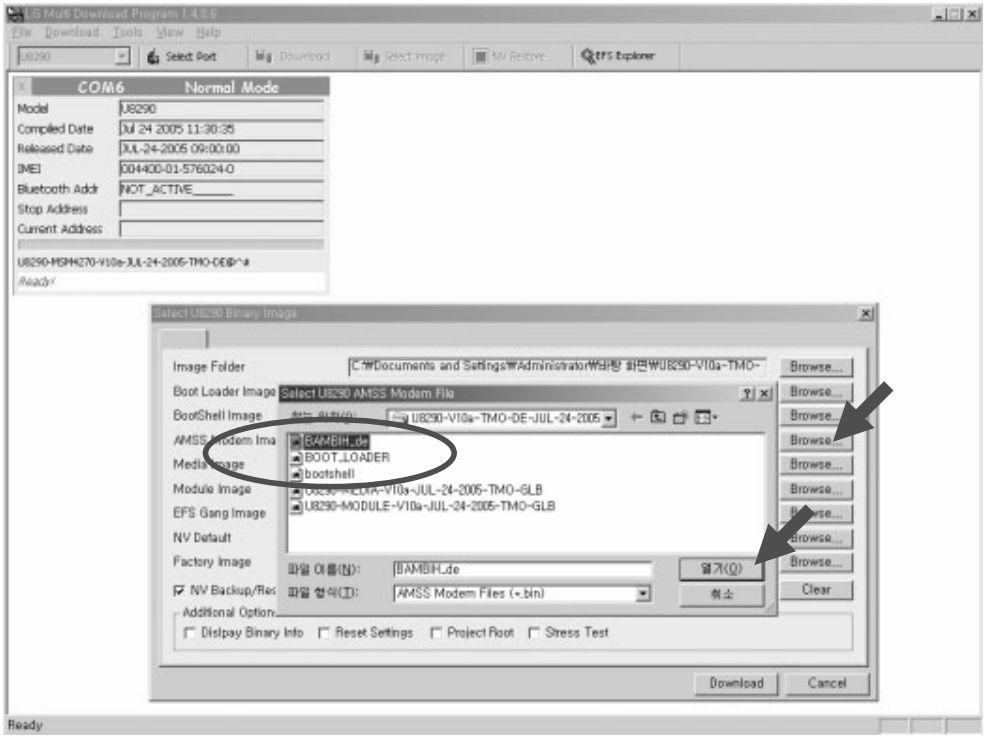


Caution) Error message will show if you choose improper file.



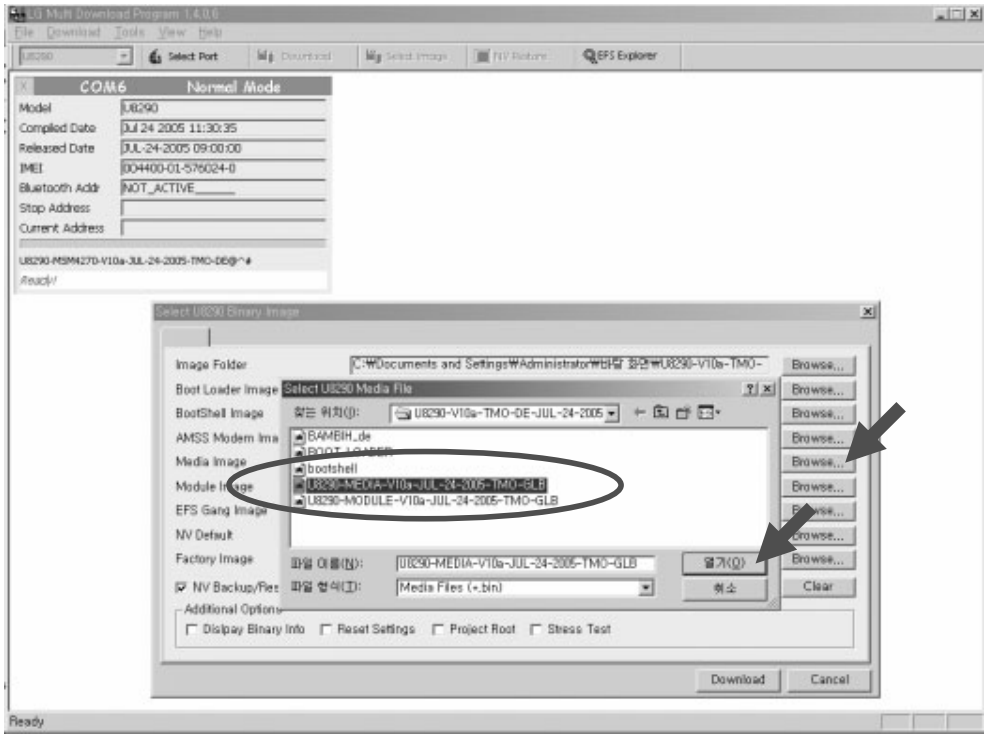
6. DOWNLOAD

3. Choose a AMSS Modem Image file after clicking on ‘Browse’.
   (The file name can be different from yours.)



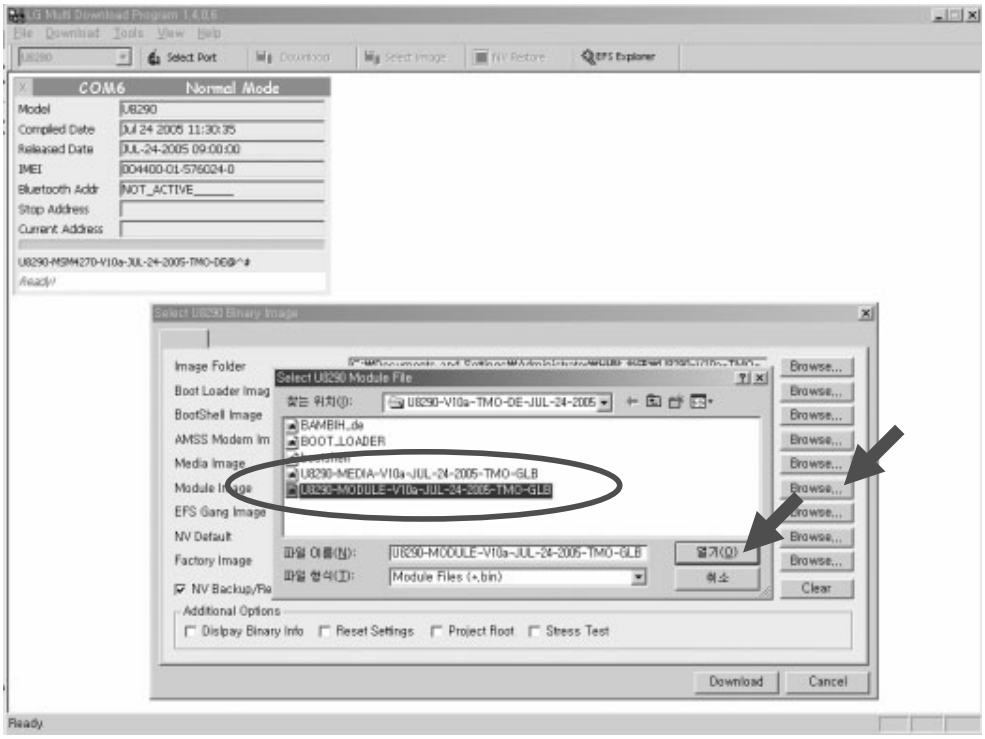
Caution) Error message will show if you choose improper file.

4. Choose a Media Image after clicking on ‘Browse’. (The file name can be different from yours.)



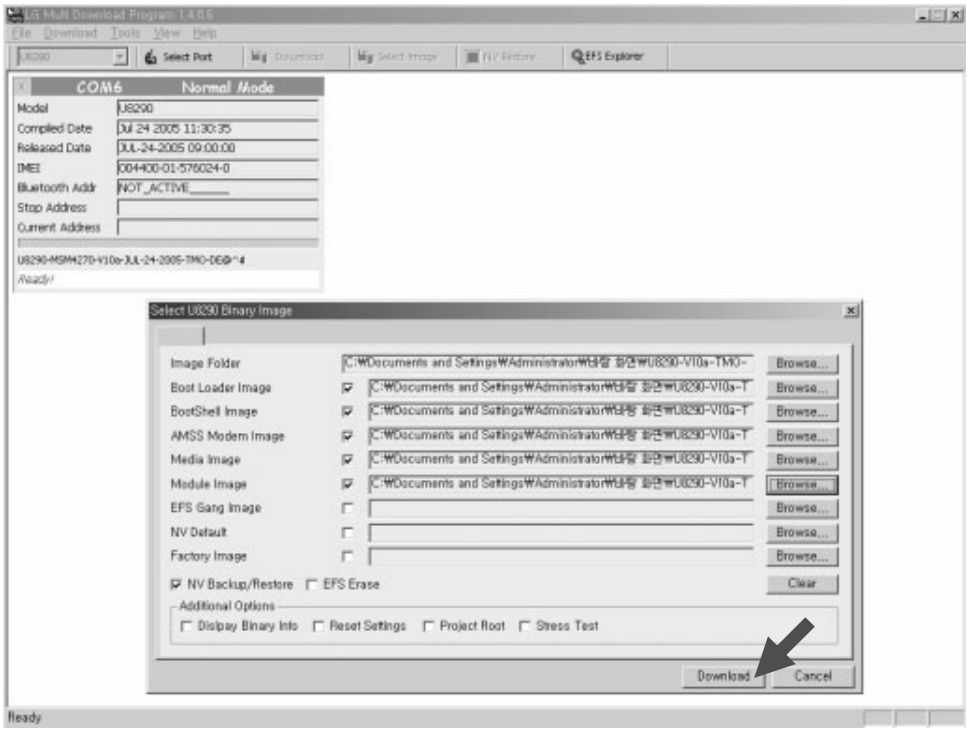
Caution) Error message will show if you choose improper file.

5. Choose a Module Image file after clicking on ‘Browse’.
   (The file name can be different from yours.)



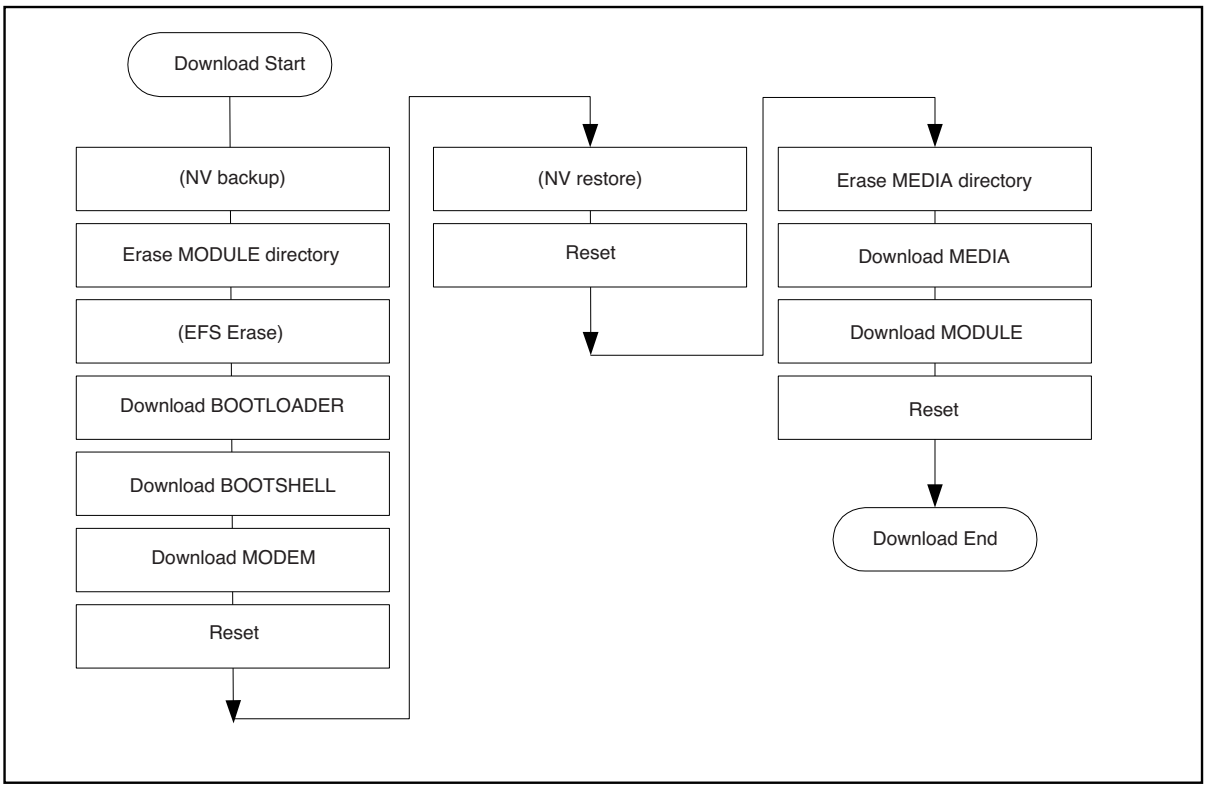
Caution) Error message will show if you choose improper file.

6. Click on ‘Download’ to download.



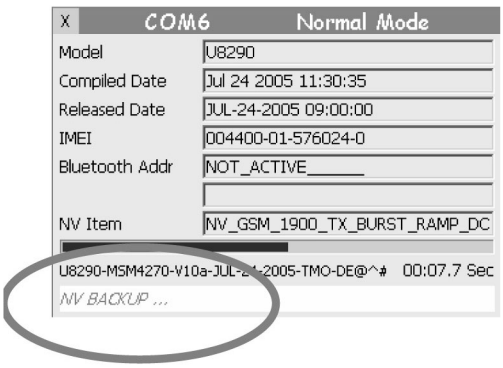
3) Downloading

This is whole process for downloading. You will see pictures for each step from the next .

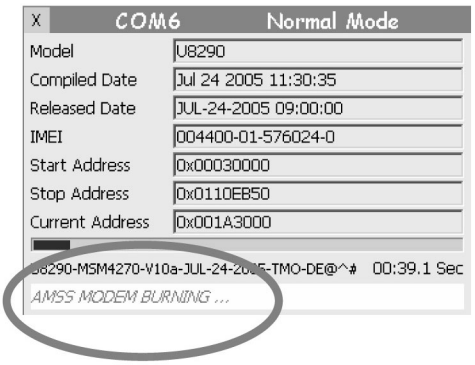


< Download process>

- **A message box which informs a new file for NV backup is created in the local directory is shown.**

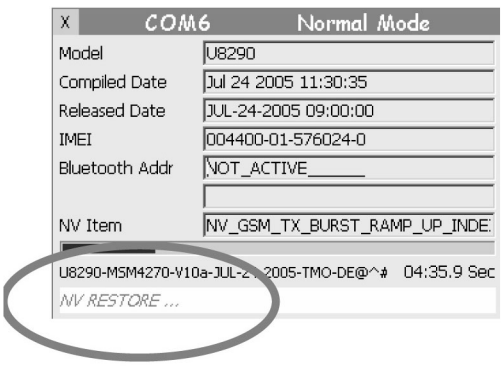


- **Doing NV backup.**



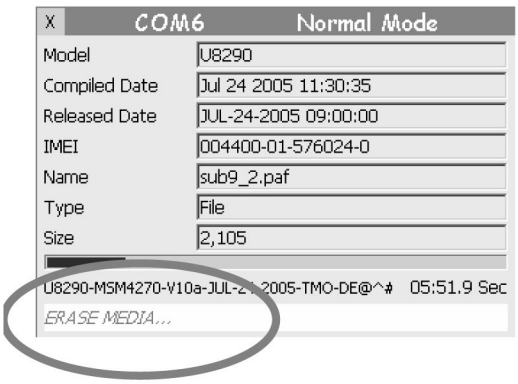
- **Downloading the AMSS Modem image followed by the Bootloader and Bootshell images.**

- **Rebooting and waiting for a while.**
- **Unless the UE reboots, you should reboot by yourself**

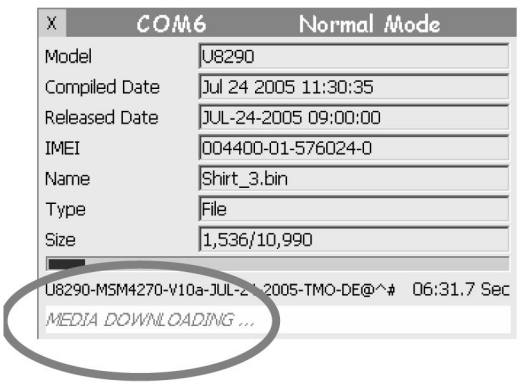


- **Doing NV restore.**

• **Rebooting and wating for a while.**

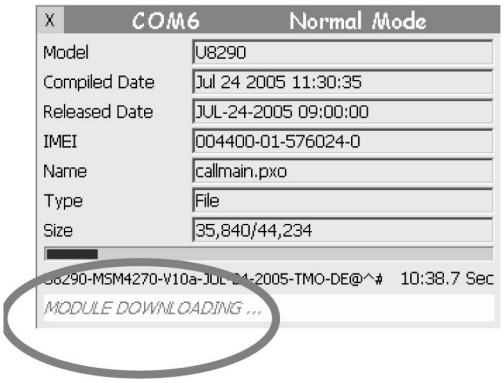


• **Erasing the existing directory and files for the Media Image.**

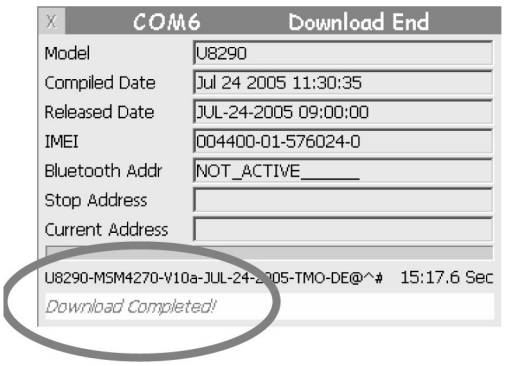


• **Downloading the Media image.**

6. DOWNLOAD



• Downloading the Module image.



• Finally Download has been complete.

6.3 Troubleshooting Download Errors

1) When the phone does not work after downloading

2) Media Erasing Error

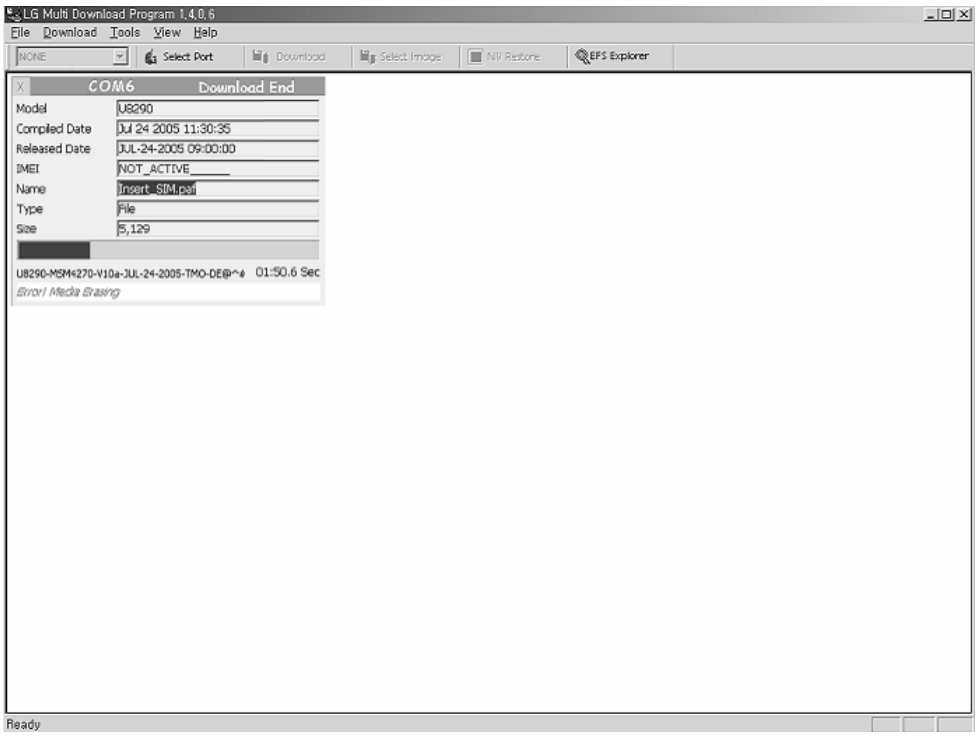
3) NV Restore Error

→ Reboot the phone as the emergency mode (keep pressing “2” and “5” key while the phone is being booted). and then try to download the images again.

• The phone supports a special mode named emergency mode. In this mode, minimum units for downloading is running so that users can download the images again in case of emergency situation. (AMSS Modem, Media and Module Images don’t be running in this mode.)

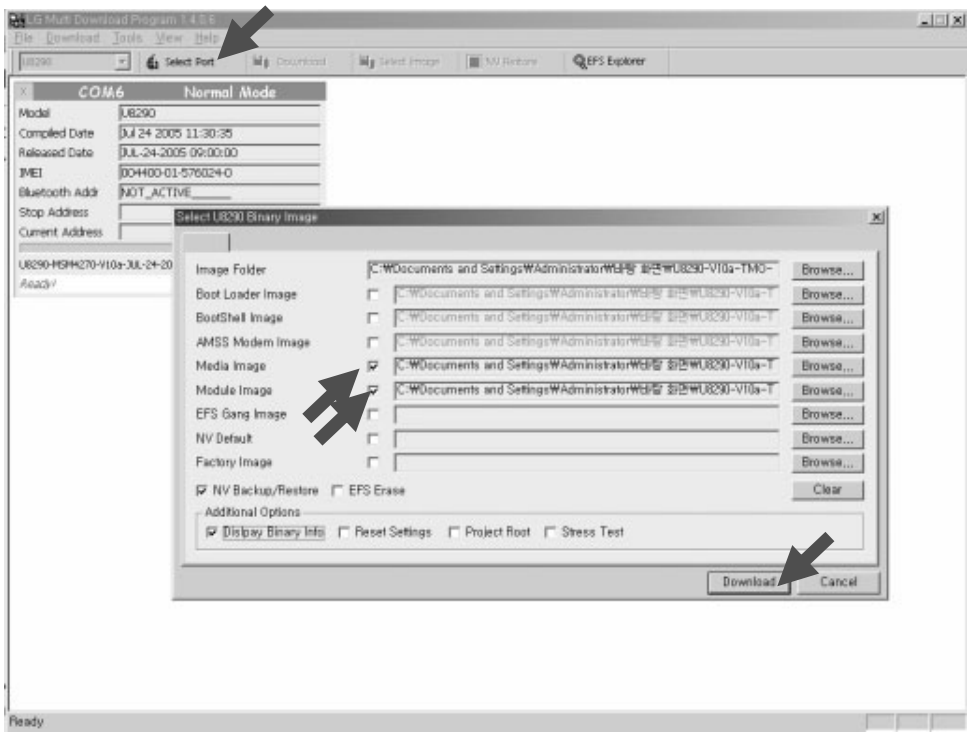
6. DOWNLOAD

When you meet the “MEDIA Erasing error” before downloading Media Image,

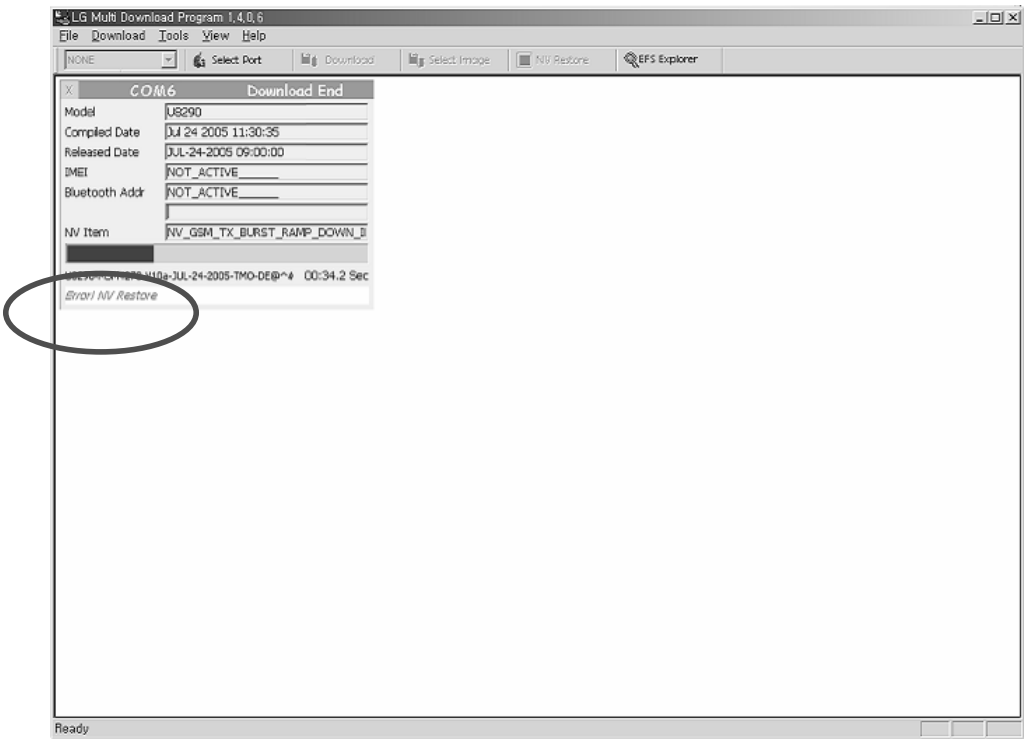


→ Reboot the phone and then try to download the Media Image again with Module Image.

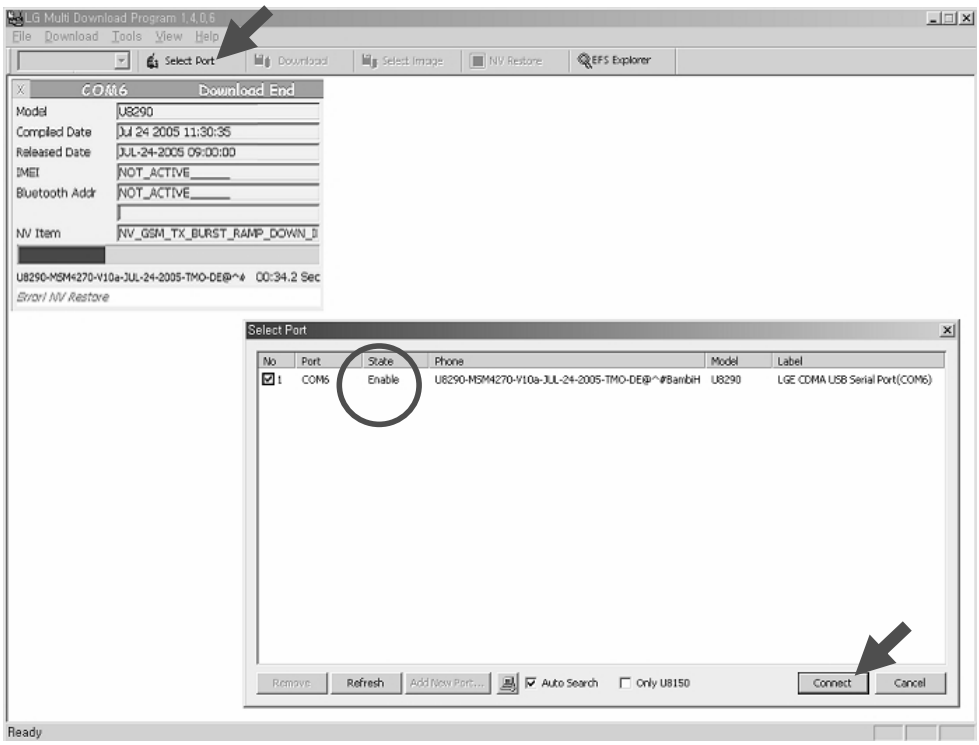
• Both have to be downloaded at the same time.



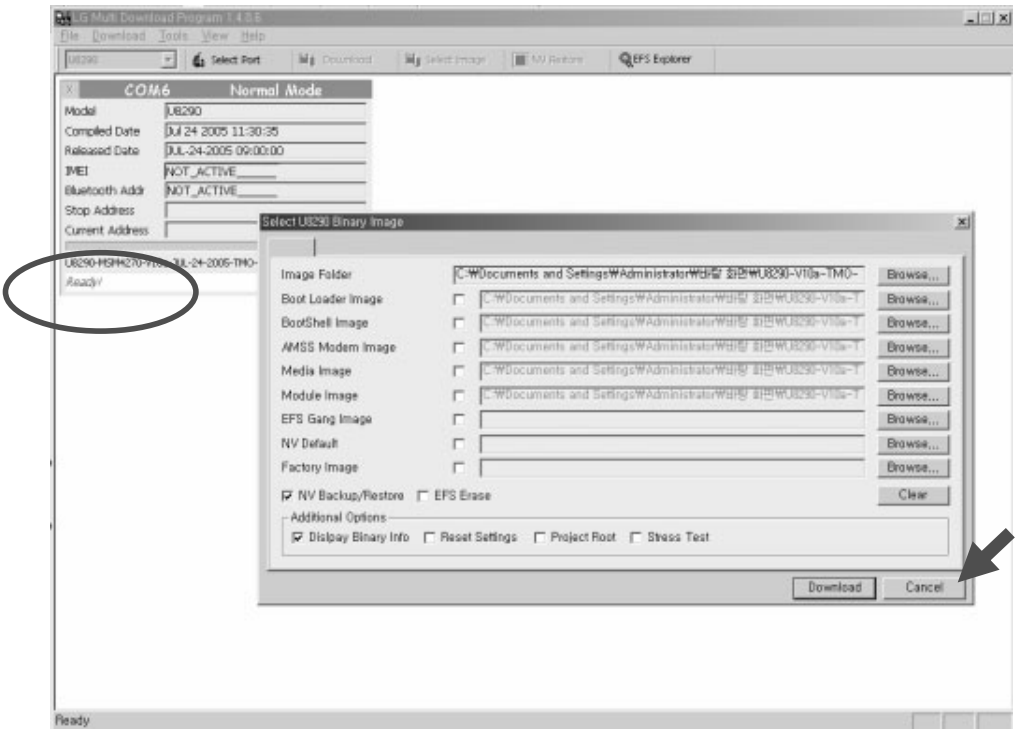
When you meet the “NV Restore error”,



→ Connect to the phone.

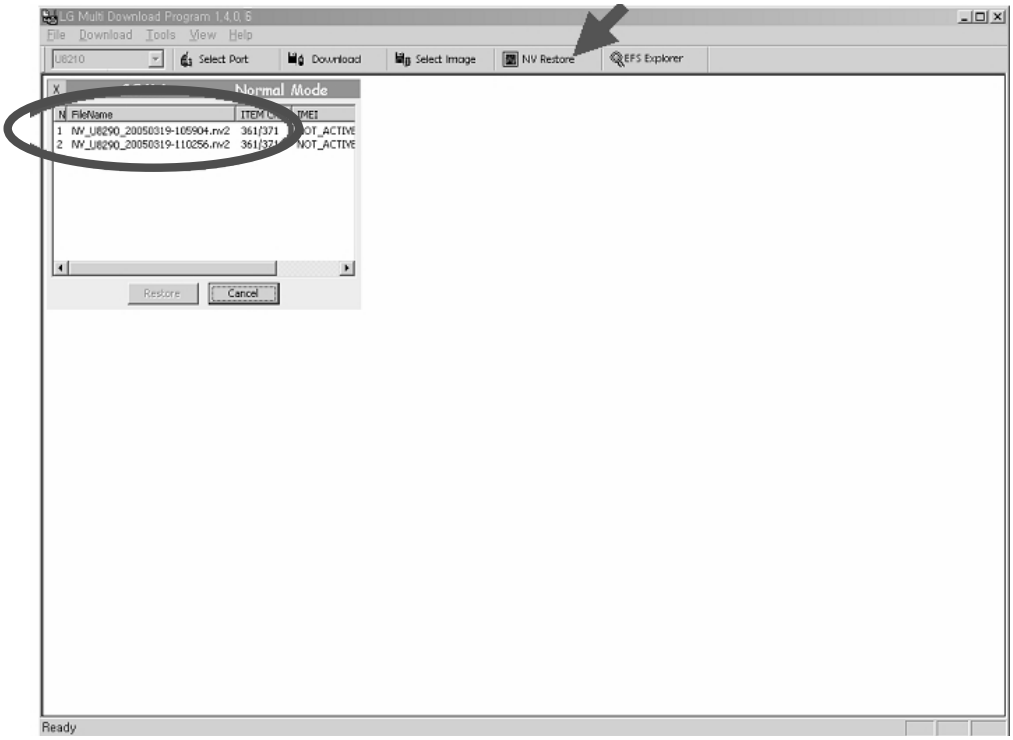


→ Click on ‘Cancel’.

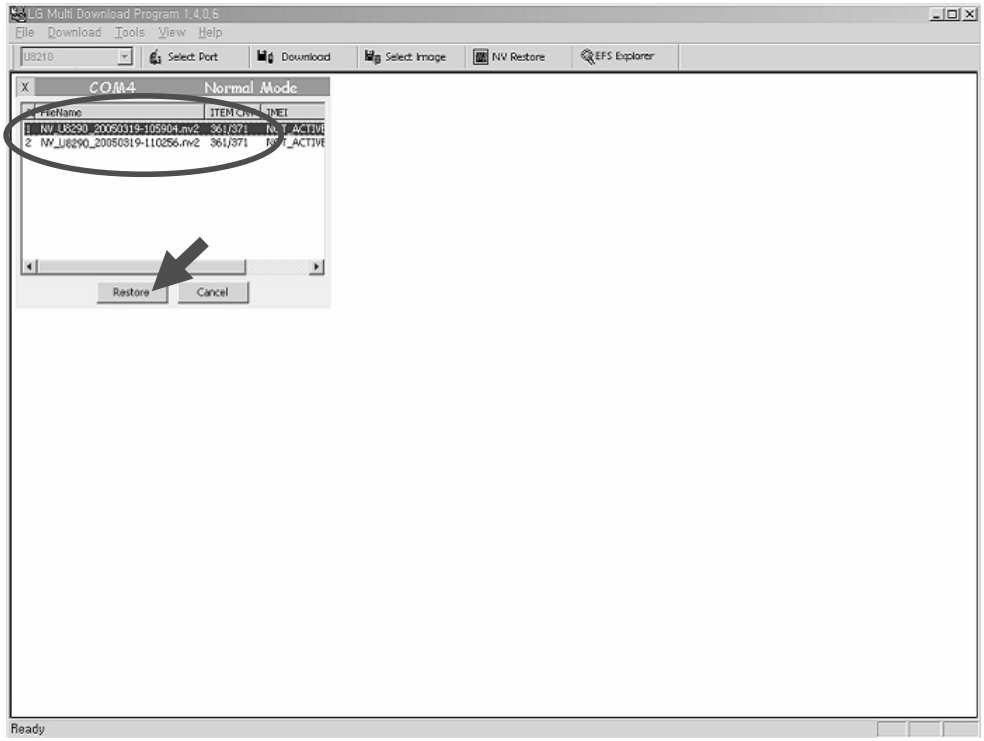


→ Click on ‘NV Restore’ then several NV Backup files(*.nv2) are shown.

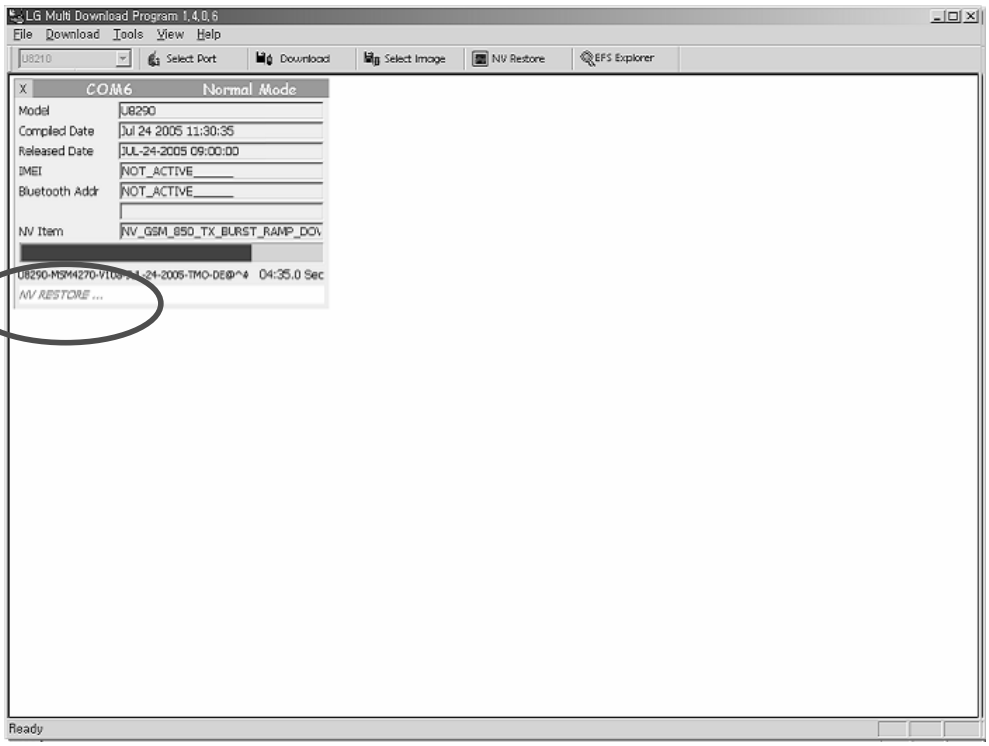
• The files are saved every NV Backup. The name is based on the time when NV Backup is done.)



→ Select the proper file and click on ‘Restore’.



→ Reading the NV file and restore NV.



6.4 Caution

1) Multi-downloading using the USB hub is not recommendable.

2) The Module and Media Image have to be downloaded at the same time.

3) 'EFS Erase' option will be erase everything (media, module, NV Items and user data) in EFS area.

7. CALIBRATION

7.1 General Description

This document describes the construction and the usage of the software used for the calibration of LG's GSM/GPRS/WCDMA Multimedia Mobile Phone (U8290). The calibration menu and their results are displayed in PC terminal by Mobile phone.
This calibration software includes GSM, DCS, PCS, WCDMA Band RF parts calibration. This calibration software was called "Pegasus". From now on, the calibration software will be called Pegasus in this document.

7.2 Pegasus Environment

7.2.1 H/W Environment

- PC with RS-232 Interface & GPIB card installed
- GSM/GPRS/WCDMA Multimedia Mobile Phone (U8290)
- Agilent 8960 Series 10 E5515C Instrument (E1985B Ver B.06.25)
- Power Supply
- ETC (GPIB cable, Serial cable, RF cable, Power cable, Dummy battery)

7.2.2 S/W Environment

- National Instrument GPIB & VISA (Ver 2.60 full) driver install
- Agilent 8960 VXI driver(E1960) install
- PEGASUS.EXE, CalInit.cfg, and dacTable.cfg files (Three files should be located in the same folder)
- OS : Window98, Window2000, WindowXP
- Serial port configuration :
  Baud rate: 115200 / Char length: 8bit / No Parity/ No Flow control Stop bits: 1 bit

7.2.3 Configuration Diagram of Calibration Environment

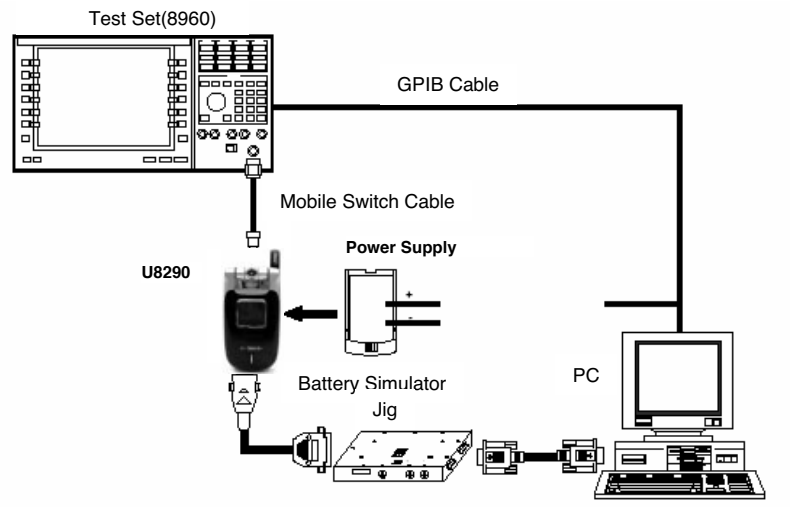


Figure 7-1. Calibration Configuration

7.3 Calibration Explanation

7.3.1 Overview

In this section, it is explained each calibration item in the Pegasus. Also the explanation includes technical information such as basic formula of calibration and settings for key parameters related with Pegasus's internal calibration process.
At first, when any of calibration process is done, the results are displayed in the Pegasus result window. Then, output from the calibration process is stored in non-volatile (NV) memory.

7.3.2 Calibration Items

A. EGSM 900 Band

- GSM Ramp Up/Down Calibration
- GSM Freq. Comp. Calibration
- GSM RX Gain Range Calibration

B. DCS 1800 Band

- DCS Ramp Up/Down Calibration
- DCS Freq. Comp. Calibration
- DCS RX Gain Range Calibration

C. PCS 1900 Band

- PCS Ramp Up/Down Calibration
- PCS Freq. Comp. Calibration
- PCS RX Gain Range Calibration

D. WCDMA Band

- TX Linearity Calibration
- TX HDET Calibration
- TX Freq. Comp. Calibration
- TX Freq. Limit Calibration
- RX Linearity Calibration
- RX Freq. Calibration
- RX LNA Calibration
- RX LNA Freq. Calibration

7.3.3 EGSM 900 Calibration Items

A. GSM Ramp Up/Down Calibration

- Purpose

This item contains the GSM normal Tx burst up/down-ramp DAC values for each power level.
When a GSM Tx burst is generated, it shall pass the ETSI standard power mask as well as Output RF Spectrum due to Modulation and Switching (OSRF).

- Procedure Proposal

1. Set phone to GSM mode. Determine the DAC codes for each power level during steady state (flat part of the burst). Each power level has a tolerance limit as shown in Table 7-1.
2. Let's call X the power levels and Y(x) (i) the up ramp DAC value of X power level at iteration i (we have 30). We then have the following:

   NV_GSM_TX_BURST_UP_RAMP_INDEX_X = (X, Y(x) (i)), where X is a power level For Power Control Level X= 5 to 19
   For i = 1 to 30 (Number of step for Ramp Up)
   NV_GSM_TX_BURST_UP_RAMP_INDEX_X[X, Y(x) (i)] = GSM_PA_DAC_CODE[X] - DAC Table [X,Y(x) (i)]
   Next i
   Next x

3. Turn PA off
4. Write NV_GSM_TX_BURST_UP_RAMP_INDEX_X[X, Y(x) (i)] to an NV file.

Power Control Level	Passing Limits (tolerances)	PA DAC code[x] (RF Cal Station)
5 (33 dBm)	±0.2 dB	x
6 (31 dBm)	±0.4 dB	x
7 (29 dBm)	±0.4 dB	x
8 (27 dBm)	±0.4 dB	x
9 (25 dBm)	±0.4 dB	x
10 (23 dBm)	±0.4 dB	x
11 (21 dBm)	±0.4 dB	x
12 (19 dBm)	±0.4 dB	x
13 (17 dBm)	±0.4 dB	x
14 (15 dBm)	±0.4 dB	x
15 (13 dBm)	±0.4 dB	x
16 (11 dBm)	±0.5 dB	x
17 (9 dBm)	±0.5 dB	x
18 (7 dBm)	±0.5 dB	x
19 (5 dBm)	±0.5 dB	x

Table 7-1. Tolerances for each power level

B. GSM Freq. Comp. Calibration

- Purpose

This item contains the change in Tx power of 7 ARFCN (Absolute Radio Frequency Channel Number) relative to a reference ARFCN (channel 49).

NOTE 7 ARFCN + 1 ref channel = 8 channels.

- Procedure Proposal

1. Load the highest DCS power as defined in the standard.
2. Measure frequency response of the phone across 8 different ARFCN.
3. The data structure for all Tx frequency-compensated NV items are laid out as in the following example.

NV_GSM_TX_FREQ_COMP
-8,-2,0,3,5,5,-7,-6

NOTE The first data index will correspond to channel index 0 and so on until the last index is reached for all channels. The data point for the reference channel will always be 0.

C. GSM RX Gain Range Calibration

- Purpose

This item specifies the RX gain from the antenna to the MSM for 8 frequencies in the GSM band.

- Procedure Proposal

1. Command the signal generator to output a signal level, Pin (recommended value is -65 dBm) at the phone antenna port.
2. Command the signal generator to one of the 8 specified channels plus an offset of 33 kHz.
3. Command the phone to one of the 8 specified channels.
4. Command the phone to set up gain range 0 (1, 2, or 3).
5. Command the phone to retrieve RSSI. Let's call this value Xrssi.
6. Calculate and record (in 1/16 dB units) the absolute gain from antenna to MDSP using the following equation.

   NV_GSM_RX_GAIN_RANGE_1_FREQ_COMP = 16*(10Log(xrssi) - Pin)

7. Repeat steps above for the next ARFCN in the NV_GSM_CAL_ARFCN item.
8. The data structure for all Rx frequency-compensated NV items are laid out as in the following example.

   NV_GSM_RX_GAIN_RANGE_1_FREQ_COMP

   2036,2039,2035,2039,2036,2026,2031,2037

NOTE The first data index will correspond to channel index 0 and so on until the last index is reached for all channels. Rx frequency-compensated NV items are absolute measurement, not relative measurement like Tx NV items.

7.3.4 DCS 1800 Calibration Items

A. DCS Ramp Up/Down Calibration

- Purpose

This item contains the DCS normal Tx burst up/down-ramp DAC values for each power level.
When a DCS Tx burst is generated, it shall pass the ETSI standard power mask as well as Output RF Spectrum due to Modulation and Switching (OSRF).

- Procedure Proposal

1. Set phone to DCS mode. Determine the DAC codes for each power level during steady state (flat part of the burst). Each power level has a tolerance limit as shown in Table 7-2.
2. Let's call X the power levels and Y(x) (i) the up ramp DAC value of X power level at iteration i (we have 30). We then have the following:

   NV_DCS_TX_BURST_UP_RAMP_INDEX_X = (X, Y(x) (i)), where X is a power level For Power Control Level X= 5 to 19
   For i = 1 to 30 (Number of step for Ramp Up)
   NV_DCS_TX_BURST_UP_RAMP_INDEX_X[X, Y(x) (i)] = DCS_PA_DAC_CODE[X] - DAC Table [X,Y(x) (i)]
   Next i
   Next x

3. Turn PA off
4. Write NV_DCS_TX_BURST_UP_RAMP_INDEX_X[X, Y(x) (i)] to an NV file.

Power Control Level	Passing Limits (tolerances)	PA DAC code[x] (RF Cal Station)
0 (30 dBm)	±3 dB	x
1 (28 dBm)	±3 dB	x
2 (26 dBm)	±3 dB	x
3 (24 dBm)	±3 dB	x
4 (22 dBm)	±3 dB	x
5 (20 dBm)	±3 dB	x
6 (18 dBm)	±3 dB	x
7 (16 dBm)	±3 dB	x
8 (14 dBm)	±3 dB	x
9 (12 dBm)	±4 dB	x
10 (10 dBm)	±4 dB	x
11 (8 dBm)	±4 dB	x
12 (6 dBm)	±4 dB	x
13 (4 dBm)	±4 dB	x
14 (2 dBm)	±5 dB	x
15 (0 dBm)	±5 dB	x

Table 7-2. Tolerances for each power level

B. DCS Freq. Comp. Calibration

- Purpose

This item contains the change in Tx power of 15 ARFCN (Absolute Radio Frequency Channel Number) relative to a reference ARFCN (channel 663).

NOTE 15 ARFCN + 1 ref channel = 16 channels.

- Procedure Proposal

1. Load the highest DCS power as defined in the standard.
2. Measure frequency response of the phone across 16 different ARFCN.
3. The data structure for all Tx frequency-compensated NV items are laid out as in the following example.

NV_DCS_TX_FREQ_COMP
-8,-2,0,3,5,5,-7,-6

NOTE The first data index will correspond to channel index 0 and so on until the last index is reached for all channels. The data point for the reference channel will always be 0.

C. DCS RX Gain Range Calibration

- Purpose

This item specifies the RX gain from the antenna to the MSM for 16 frequencies in the DCS band.

- Procedure Proposal

Same as in previous section in GSM except this time set the gain range and phone mode to DCS with injected power of -65 dBm. In DCS we will frequency compensate over 16 channels.

7.3.5 PCS 1900 Calibration Items

A. PCS Ramp Up/Down Calibration

- Purpose

This item contains the PCS normal Tx burst up/down-ramp DAC values for each power level.
When a PCS Tx burst is generated, it shall pass the ETSI standard power mask as well as Output RF Spectrum due to Modulation and Switching (OSRF).

- Procedure Proposal

1. Set phone to PCS mode. Determine the DAC codes for each power level during steady state (flat part of the burst). Each power level has a tolerance limit as shown in Table 7-1.
2. Let's call X the power levels and Y(x) (i) the up ramp DAC value of X power level at iteration i (we have 30). We then have the following:

NV_GSM_1900_TX_BURST_UP_RAMP_INDEX_X = (X, Y(x) (i)), where X is a power level
For Power Control Level X= 5 to 19
For i = 1 to 30 (Number of step for Ramp Up)
NV_GSM_1900_TX_BURST_UP_RAMP_INDEX_X[X, Y(x) (i)] = DCS_PA_DAC_CODE[X] - DAC Table [X,Y(x) (i)]
Next i
Next x

3. Turn PA off
4. Write NV_GSM_1900_TX_BURST_UP_RAMP_INDEX_X[X, Y(x) (i)] to an NV file.

B. PCS Freq. Comp. Calibration

- Purpose

This item contains the change in Tx power of 15 ARFCN (Absolute Radio Frequency Channel Number) relative to a reference ARFCN (channel 633).

NOTE 15 ARFCN + 1 ref channel = 16 channels.

- Procedure Proposal

1. Load the highest PCS power as defined in the standard.
2. Measure frequency response of the phone across 16 different ARFCN.
3. The data structure for all Tx frequency-compensated NV items are laid out as in the following example.

NV_GSM_1900_TX_FREQ_COMP
-8,-2,0,3,5,5,-7,-6

NOTE The first data index will correspond to channel index 0 and so on until the last index is reached for all channels. The data point for the reference channel will always be 0.

C. PCS RX Gain Range Calibration

- Purpose

This item specifies the RX gain from the antenna to the MSM for 16 frequencies in the PCS band.

- Procedure Proposal

Same as in previous section in GSM except this time set the gain range and phone mode to PCS with injected power of -65 dBm. In DCS we will frequency compensate over 16 channels.

7.3.6 WCDMA Calibration Items

A. TX Linearity Calibration

- Purpose

This item contains the TX_AGC_ADJ PDM values that make up the Tx Master Linearizer for low (or high) PA gain state (PA Range 0 or 1). The linearizer is made up of 37 values for 37 equally spaced Tx power levels, 33 points over the phone true dynamic range, 2 points on the high side of the dynamic range, and 2 points on the low side of the dynamic range. These values represent 9 bits unsigned PDM values (0 to 511) that produce the correct Tx AGC amplifier gain corresponding to the transmit power of interest (see Figure 7-2).

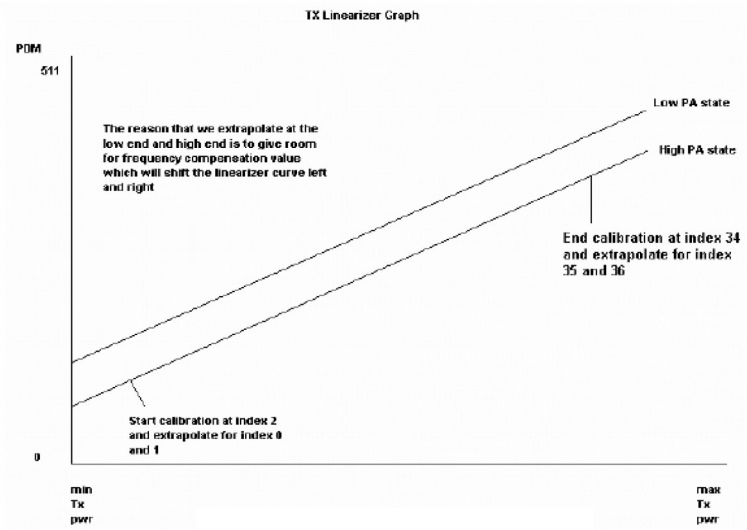


Figure 7-2. TX_AGC_ADJ PDM values

- Procedure Proposal

1. Set phone in WCDMA mode.
2. Set phone to a reference channel.
3. Set the spectrum analyzer to that reference channel's frequency.
4. Turn on PA.
5. Set PA to low-gain (or high-gain) state.
6. Turn on WCDMA Tx waveform.
7. Adjust TX_AGC_ADJ PDM for each of the 32 (start at index = 2) Tx power levels (Dynamic Range/32)
8. Extrapolate for the 2 lowest power points and 2 highest power points, index = 0, 1, ... 35, 36
9. At each power level (i) store TX_AGC_ADJ PDM in item NV_WCDMA_TX_LIN_MASTER0[i]
   NOTE Index zero (0) is the lowest Tx power.

B. TX HDET Calibration

- Purpose
This item is for building a lookup table, which indexes Tx power estimation via a scaled TX_GAIN_CTL (representing the desired Tx power), to associated HDET circuit values at reference temperature and the reference frequency.

- NV Items
There are three NV items stored in non-volatile (NV) memory as following
1. NV_WCDMA_EXP_HDET_VS_AGC_I
2. NV_WCDMA_HDET_OFF_I
3. NV_WCDMA_HDET_SPN_I

C. TX Freq. Comp. Calibration

- Purpose
This item contains the change in Tx power of 15 channels relative to a reference channel, for the lowest PA gain state. These values should be considered as 8-bit signed values, stored in 1/12 dB resolution.

- Procedure Proposal
1. Set phone in WCDMA mode.
2. Set phone to a reference channel.
3. Set the spectrum analyzer to that of the reference channel's frequency.
4. Turn on PA.
5. Set PA to low (or high) gain state.
6. Turn on WCDMA Tx waveform.
7. Adjust TX_AGC_ADJ PDM to reach desired Tx reference power level and store it in a variable called Tx_Reference_Power.
8. Step through all 15 frequencies and read Tx power. Remember to change the spectrum analyzer's frequencies accordingly.
9. Store NV_WCDMA_TX_COMP_VS_FREQ_0[i] = (Tx Power(i) - Tx_Reference_Power) (1024/Dynamic Range)

D. TX Freq. Limit Calibration

- Purpose
The NV item NV_CDMA_TX_LIM_VS_FREQ contains a table of 16 adjustment values for the Tx power limit, based on frequency. The Tx power limit is heavily based on the feedback from the HDET circuit. Because the ADC readings of the HDET circuit may have some frequency dependencies, this NV item can be used to compensate for such dependencies.
- Procedure Proposal
1. Adjust the TX_AGC_ADJ PDM and write a value to the PDM causing the phone to produce a large output power, near or at the power level where limiting should occur.
2. Keep the PDM value constant. At reference frequency, measure the output power at the antenna (in units of dBm). Let's call this power level PowerRef. Also measure the HDET reading from the appropriate ADC. Let's call this reading HdetRef.

3. Store the NV item such that: NV_CDMA_TX_LIM_VS_FREQ[i] = 12*(PowerRef - Power[i])
   Note that the first index will correspond to the lowest frequency.

E. RX Linearity Calibration

- Purpose

This item contains the DVGA gain value that makes the RSSI of the DVGA equal to the corresponding power levels at the antenna port, at ambient temperature, and reference frequency. This value is represented by a 10-bit signed two's complement number in 1/12 dB units. Once calibrated, our DVGA gain value will have an ideal mapping of min RSSI to -512 and max RSSI to 511 (see Figure 7-3).

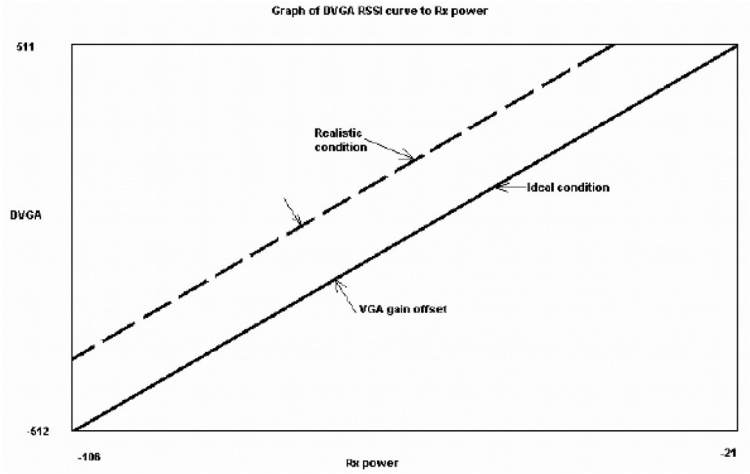


Figure 7-3. DVGA gain value

- Procedure Proposal

1. Set phone in WCDMA mode.
2. Set phone to a reference channel (a reference channel usually is in the middle of the band).
3. Set signal generator frequency to a reference channel plus an offset of 685 kHz.
4. Set to highest LNA gain state.
5. Set LNA offset 1,2 and 3 to zero.
6. Set input power to recommended value of -80 dBm, let's call this value 'rxInput'
7. Set VGA gain offset to 0.
8. Read RSSI.
9. vgaGainOffset = { RSSI - [-512 - (RxLinMinPwr - rxInput) * (1024/dynamicRange)] }
10. Set VGA gain offset to vgaGainOffset
11. Read RSSI again and we should see a value of approximately -200.
    NV_WCDMA_VGA_GAIN_OFFSET = vgaGainOffset

NOTE Assuming a dynamic range of 85.3 dB, RxLinMinPwr = -106 dBm, we have -200 = -512 - -(-106 - (-80)) * (1024/85.3).

F. RX Freq. Calibraion

- Purpose
This item contains 15 VGA gain offset values relative to a reference frequency. These values are represented by an 8-bit signed number. The values are the change between the reference frequency VGA gain offset value and the VGA gain offset value at the frequency of interest. These values, once calibrated, ensure that the RSSI will align with received frequency.
- Procedure Proposal
1. Complete all the steps in previous section
2. Change the phone's channel and the signal generator frequency to match that of the phone's channel + 685 kHz and read RSSI

If channel = reference channel, make
NV_WCDMA_VGA_GAIN_OFFSET_VS_FREQ[refChannelIndex] value = 0 Else

NV_WCDMA_VGA_GAIN_OFFSET_VS_FREQ[ChannelIndex] = RSSI[ChannelIndex] - theoretical RSSI (i.e -200 for our case, refer to previous section to see how -200 was obtained)

NOTE Reference frequency will have a 0 value at index 7, assuming counting from 0. This will be applied to every frequency compensated NV item in this document.

Recommended channels for calibration are:
Channel_index_0 = 9609, Channel_index_1 = 9628, Channel_index_2 = 9646,
Channel_index_3 = 9664, Channel_index_4 = 9685, Channel_index_5 = 9703,
Channel_index_6 = 9720, Channel_index_7 = 9739 (reference channel)

NOTE Reference channel is changeable, but ensure that its value is always on the 8th index for any frequency compensated NV item.

G. RX LNA Calibration

- Purpose
This item contains the gain step for LNA state low (mid or high) gain to mid (or high) gain.
This value is represented by a 16-bit signed 2's complement number in 1/12 dB unit.

- Procedure Proposal
1. Set WCDMA RX input power at a reference frequency to a value equal to NV_WCDMA_LNA_RANGE_RISE_[i] value.
2. Set phone mode to WCDMA.
3. Set to the reference channel.
4. Call the FTM Command Get LNA Offset with index [i].
5. Store the return value as NV_WCDMA_LNA_RANGE_OFFSET_[i].

H. RX LNA Freq. Calibration

- Purpose

This item contains 15 adjustment values relative to the reference frequency for the NV_WCDMA_LNA_RANGE_OFFSET item. These NV values should be considered as adjustments for gain variation of the LNA gain step based on the frequency index. These values are represented by an 8-bit signed number. The values are the change between the reference frequency LNA gain-step and the LNA gain-step at the frequency index of interest.

- Procedure Proposal

1. Set phone in WCDMA mode.
2. Set LNA offset 1 to zero.
3. Set phone to a reference channel (a reference channel usually is in the middle of the band).
4. Set signal generator frequency to a reference channel plus an offset of 685 kHz.
5. Set Rx Power at phone antenna connector to the mid-point of LNA_RISE_1 and LNA_FALL _1 ((LNA_RISE_1 + LNA_FALL_1)/2).
    a. Load calibrated and frequency compensated DVGA for index [i]
    b. Set LNA in state 0.
    c. Read and store RSSI in (A[i])
    d. Set LNA in state 1.
    e. Read and store RSSI in (B[i])
    f. Store NV_WCDMA_LNA_OFFSET_VS_FREQ[i] = (A[i]-B[i]) - NV_WCDMA_LNA_RANGE_OFFSET
6. Repeat steps
    a. through f. for all 15 frequencies and set reference frequency to a value of 0

Reference documents

QUALCOMM, MSM6200 WCDMA RF NV Items (80-V5216-3 Rev. C)
QUALCOMM, MSM6200 GSM RF NV Items (80-V5216-2 Rev. A)
QUALCOMM, MSM6250¢, RF NV Items (80-V4690-25 Rev. C)

7.4 Program Operation

7.4.1 Pegasus Program Overview

When you try to calibrate the U8290 mobile phone, you should make a configuration of calibration environment as shown in Figure 7-1. And if you finish making configuration, please execute the Pegasus program. Running the Pegasus program, you should show Pegasus program window like shown in Figure 7-4.
When Pegasus program would be executed, it checks the connection of instruments and initializes them automatically.

Pegasus supports three functions.
- Calibration of EGSM 900, DCS 1800, PCS1900, and WCDMA band
- Agilent8960 control
- UART communication with U8290 mobile phone

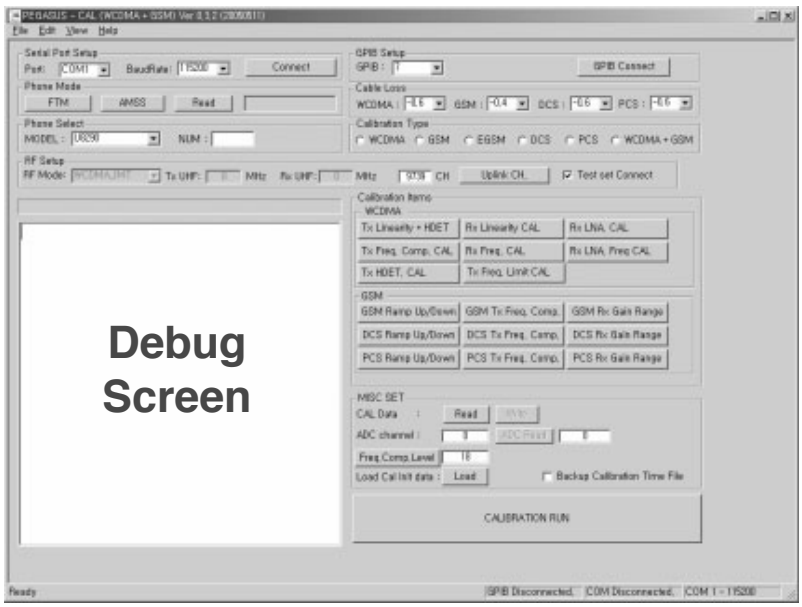


Figure 7-4. Pegasus Window

7.4.2 Pegasus Function Description

Pegasus window is classified into 9 functional sections: Serial Port Setup, Phone Mode, Phone Select, RF Setup, GPIB Setup, Cable Loss, Calibration Type, Calibration Items, and MISC Set. NOTE Most of functions are not recommended to operate directly .

A. Serial Port Setup

- Function

As shown in Figure 7-5, Serial Port Setup section supports setting the connection between PC and U8290.

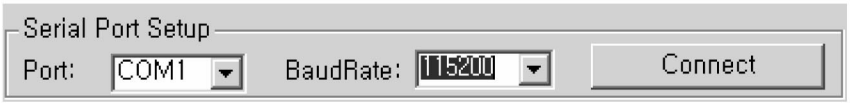


Figure 7-5. Serial Port Setup

- Procedure Proposal

1. First you have to setup your hardware: connect interface cable to one of the serial communication ports (so COM1, COM2, COM3, or COM4) of your PC.
2. Setup the port number of PC.
3. Setup the baud-rate of 115200 bps (recommended value).
4. Click the 'Connect' button.

B. Phone Mode

- Function

As shown in Figure 7-6, Phone Mode Setup section supports the switching Advanced Mode Subscriber Software (AMSS) mode and Factory Test Mode (FTM) mode. FTM is a mode of operation that allows a user to perform diagnostic or design verification functionality by exposing functions not discretely available to the user in AMSS mode. FTM does not provide the ability to make phone calls and is not driven by the Advanced Mode Subscriber Software Call Processing State Machine.

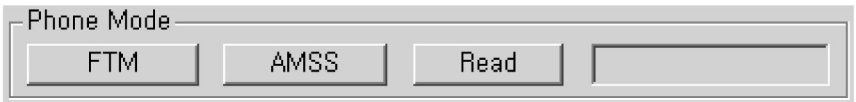


Figure 7-6. Phone Mode Setup

- Procedure Proposal

1. Make sure the phone's connection to PC.
2. To run calibration process, you should switch the phone mode of FTM mode. To switch FTM mode, click the 'FTM' button. When the switching is done, the massage, "Set Phone FTM Status = SUCCESS!" on debug screen blow and "FTM MODE" on status box near 'Read' button is displayed. If the mode switching is fail, the message, "Set Phone FTM Status = FAIL!" is displayed on debug screen.
3. To make phone calls, you should switch the phone mode of AMSS mode. To switch AMSS mode, click the 'AMSS' button. When the switching is done, the massage, "Set Phone AMSS Status = SUCCESS!" on debug screen blow and "AMSS MODE" on status box near 'Read' button is displayed. If the mode switching is fail, the message, "Set Phone AMSS Status = FAIL!" is displayed on debug screen.
4. To know phone's mode, click the 'Read' button. The status box displays phone's mode. When disconnected phone and PC, the status box displays "UNKOWN MODE".

C. Phone Select

- Function

As shown in Figure 7-7, Phone Select Setup section supports selecting phone's model to calibrate.

- Procedure Proposal

1. Select phone's model (default: U8290) to calibrate phone.

Figure 7-7. Phone Select Setup

2. To backup calibrated NV items, type in your phone's serial number on 'NUM' box. Typed number would be the file name of backup data (NUM_[time].xls).

D. RF Setup

- Function

As shown in Figure 7-8, Phone Select Setup section supports switching RF mode of phone.

- Procedure Proposal

1. Setup RF mode (band): WCDMA_IMT (default), WCDMA_1900A, WCDMA_1900B, GSM900, DCS1800, or PCS1900.

Figure 7-8. RF Setup

2. Setup uplink channel. Downlink channel would be automatically changed.
3. Check the checkbox, 'Test set Connect'.

E. GPIB Setup

- Function

As shown in Figure 7-9, General Purpose Interface Bus (GPIB) Setup section supports switching phone's GPIB address. GPIB provides a standard interface for communication between instruments from different sources.

Figure 7-9. GPIB Setup

- Procedure Proposal

1. Turn on the test set (Agilent 8960). If it is already on, we recommend you reset the test set by pressing the blue 'SHIFT' key and then the green 'Preset' key.
2. Press the 'SYSTEM CONFIG' key.
3. Read GPIB address on SYSTEM CONFIG SCREEN of test set.
4. Switch GPIB address that you read (Address 7 is recommended for Pegasus).

Note You can also set test set's GPIB address by pressing 'Instrument Setup' (F1) key.

F. Cable Loss

- Function

As shown in Figure 7-10, Cable Loss Setup section supports selecting test RF cable loss between phone and test set (Agilent 8960).

Figure 7-10. Cable Loss

- Procedure Proposal

1. Select cable loss of each band.
2. Using recommended RF cable(Hirose co., 30cm), the recommended values are shown in Figure 7-10 (WCDMA: -0.6, GSM: -0.4, DCS: -0.6, and PCS: -0.6).

G. Calibration Type

- Function

As shown in Figure 7-11, Calibration Type Setup section supports selecting calibration band.

Figure 7-11. Calibration Type

- Procedure Proposal

1. Check the radio button to calibrate band.

Note To calibrate U8290, check 'WCDMA+GSM' is recommended.

H. Calibration Items

- Function

As shown in Figure 7-12, Calibration Items Setup section supports running calibration process for single NV item.

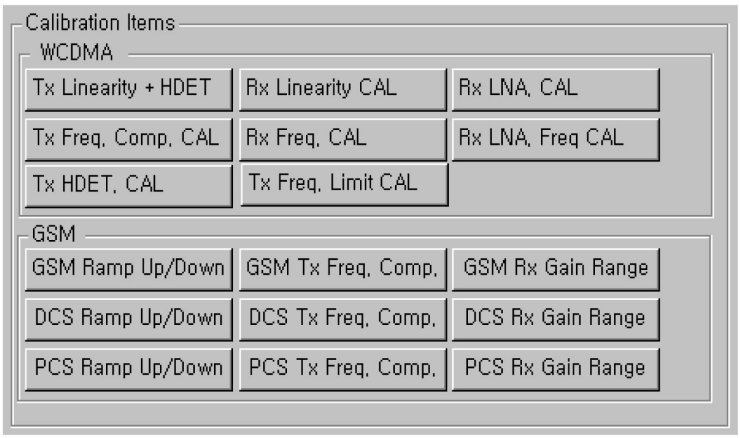


Figure 7-12. Calibration Type

- Procedure Proposal

1. Click wanted single calibration NV item on Calibration Items section.

I. MISC Set

- Function

As shown in Figure 7-13, MISC Set section supports calibration data backup and manual setting of specified NV items related to temperature.

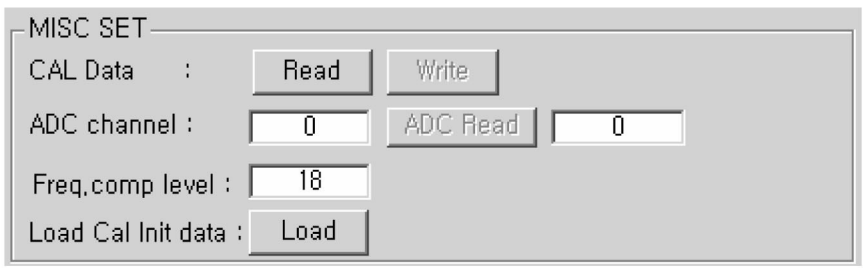


Figure 7-13. MISC Set

- Procedure Proposal

1. Click ‘Read’ button to save calibration data. Saved data file is stored in ‘CalData’ folder.
2. Temperature or battery power (depends on ADC’s channel) may be converted into specified values and displayed in ‘ADC’ box.
3. If you click ‘Load’ button, Pegasus loads initialized NV constant values related with temperature. It is not recommend to click this button without H/W engineer’s approval.

7.4.3 Calibration Procedure

Calibration procedure of Pegasus was the same as below procedure.

1. Setup instruments and U8290 mobile phone as depicted in Figure 7-1.
2. Turn on all instruments and U8290 mobile phone.
3. Setup Com ‘Port’ and ‘Baudrate’. Then, click ‘Connect’ button to setup serial port connection from PC to U8290 in Serial Port Set section.
4. Setup ‘Phone Model’ as U8290 in Phone Select section
5. Setup ‘GPIB’ address and click ‘GPIB connect’ button in GPIB Setup section.
6. Setup ‘Cable Loss’. Recommended values: WCDMA -0.6, GSM -0.4, DCS -0.6, and PCS - 0.6 in Cable Loss section.
7. Check ‘WCDMA+GSM’ radio button in Calibration Type section.
8. Click ‘Calibration Run’ button as shown in Figure 7-14. If you would follow 1 to 7 steps, you may not setup configuration step (1 to 7) next time, NOTE Most of functions (buttons) are not recommended to operate (clicked) directly .

Figure 7-14. Calibration Run button

7.4.4 Calibration Result Message

If the calibration is over without error, “PASS” message window would appear like depicted Figure 8-15 (a). On the contrary, if the calibration is over with some error, “FAIL” message window will appear like depicted Figure 7-15 (b).

Additionally, in all of the cases, it is possible to check the calibration result with Debug Screen.

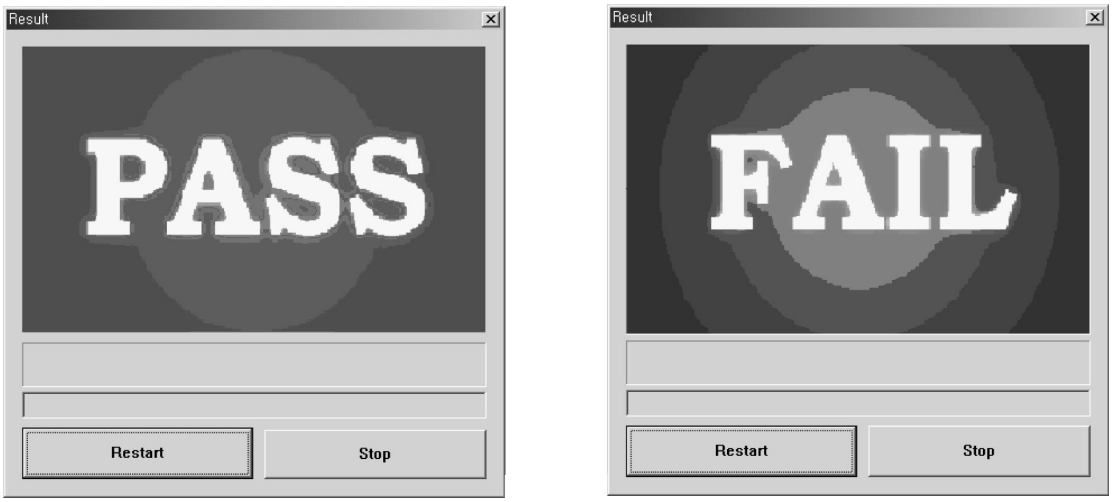


Figure 7-15. (a) Calibration PASS Message Window and (b) Calibration FAIL Message Window

7.4.5 Pegasus Configuration File Format

A. “CalInit.cfg” file

The initial values of Pegasus can be set by changing configuration file (CalInit.cfg). Therefore, the configuration file should be located with Pegasus in the same folder. The configuration file includes items related to Pegasus’s internal variables such as default channel, default cable loss, temperature offset values and etc. The configuration file format is shown below. For example, in case of changing initial cable loss of WCDMA band from -0.6 to -0.8, you just changing ‘m_strWCableLoss’ values as -0.8. The character ‘W’ in ‘m_strWCableLoss’ means WCDMA. Similarly, the character ‘G’ means GSM, the character ‘D’ means DCS, and the character ‘P’ means PCS.

```
// U8210
m_fWCalChannel:9739
m_fGCalChannel:49
m_fDCalChannel:663
m_fPCalChannel:633
m_strWCableLoss:-0.6
m_strGCableLoss:-0.4
m_strDCableLoss:-0.6
m_strPCableLoss:-0.6
m_iGsmLeftDac:150       // 320
m_iDcsLeftDac:115       // 370
m_iPcsLeftDac:115       // 370
m_iGsmInitDac:630
m_iDcsInitDac:600
m_iPcsInitDac:600
m_fGsmMaxPower:32.5
m_fDcsMaxPower:29.5
m_fPcsMaxPower:29.5
m_fGsmFreqSet:32.5
m_fDcsFreqSet:29.5
m_fPcsFreqSet:29.5
model_length:5
m_strPhoneModel:U8210
m_uAdcId:0
m_uHdetId:3
m_uVbattId:1
m_iTempLim:192,192,192,192,192,192,192,192  //(ES3차_22.6dBm)
m_iTempLin0:-12, -6, -2,  1,  4,  6,  8, 11 //-11,-8, -4,  0, 3,  4, 11, 24
m_iTempLin1:-13, -7, -2,  1,  4,  6,  8, 12 //-31,-12, -6,  0, 4,  8, 12, 16
```

Figure 7-16. Pegasus Configuration “CalInit.cfg” file format

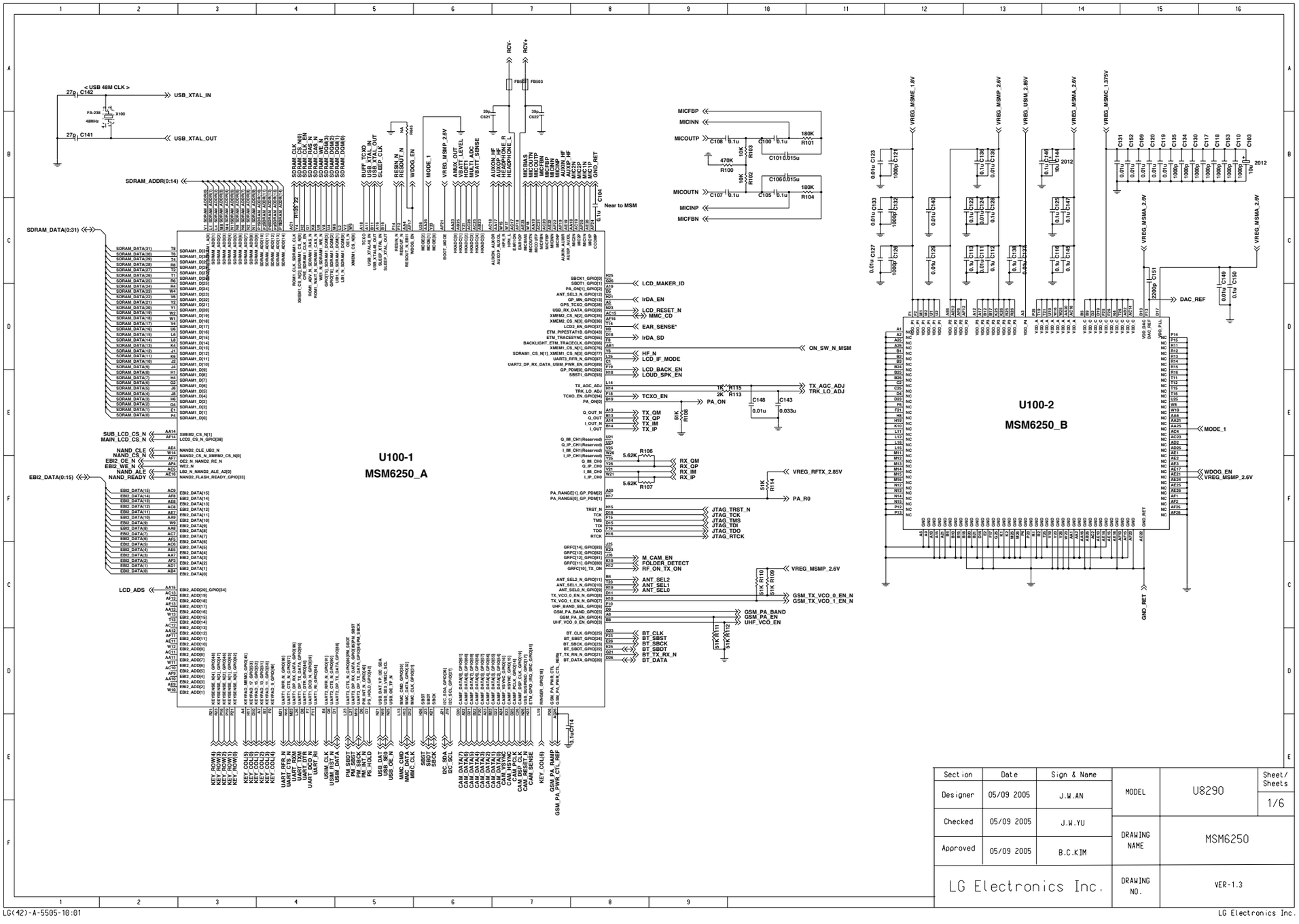
B. “dacTable.cfg” file

The format of “dacTable.cfg” file is shown below. The values of this file make the characteristic of “Power vs Time” shape for GSM(ESGM/DCS/PCS) Modes to let the ETSI standard specification passed. Therefore it is not recommend to change this values without H/W engineer’s approval.

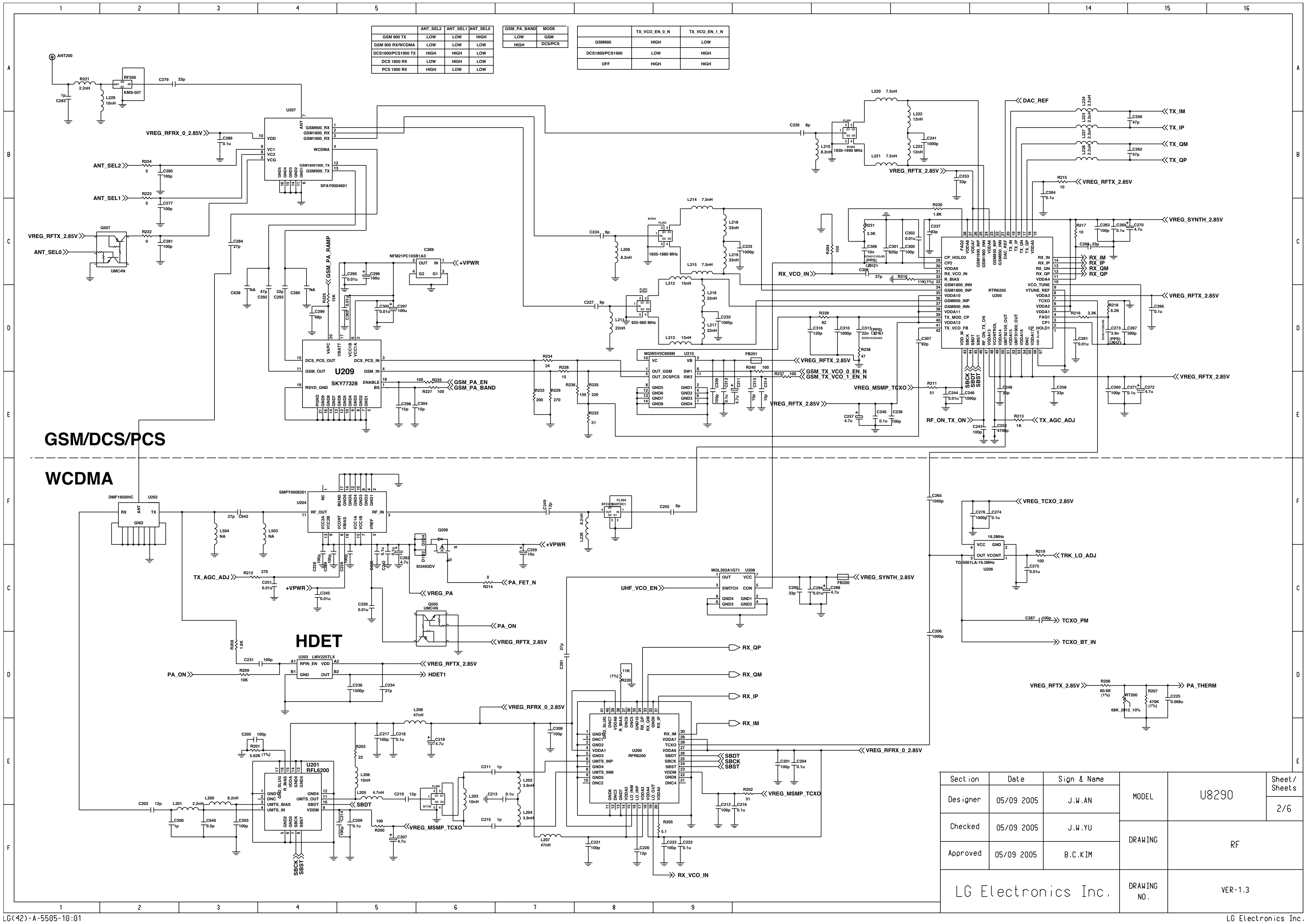
```
// GSM DAC Table  (Bambi-Q-F_REV-G_ES3차)
m_upGsmDacTable0:147,147,147,147,147,147,147,147,147,147,147,147,147,147,147,147,147, 80, 80, 80, 80, 50, 41, 31, 19,  9,  2,  0,  0
m_upGsmDacTable1:159,159,159,159,159,159,159,159,159,159,159,159,159,159,159,159,159, 92, 92, 92, 92, 60, 51, 38, 23, 11,  3,  0,  0
m_upGsmDacTable2:173,173,173,173,173,173,173,173,173,173,173,173,173,173,173,173,173,106,106,106,106,106, 73, 62, 45, 28, 13,  3,  0,  0
m_upGsmDacTable3:190,190,190,190,190,190,190,190,190,190,190,190,190,190,190,190,190,123,123,123,123,123, 89, 75, 54, 33, 15,  4,  0,  0
m_upGsmDacTable4:209,209,209,209,209,209,209,209,209,209,209,209,209,209,209,209,209,142,142,142,142,142,107, 89, 63, 38, 17,  4,  0,  0
m_upGsmDacTable5:231,231,231,231,231,231,231,231,231,231,231,231,231,231,231,231,231,164,164,164,164,164,127,104, 73, 43, 20,  5,  0,  0
m_upGsmDacTable6:256,256,256,256,256,256,256,256,256,256,256,256,256,256,256,256,256,189,189,189,189,189,150,121, 84, 50, 23,  6,  0,  0
m_upGsmDacTable7:284,284,284,284,284,284,284,284,284,284,284,284,284,284,284,284,284,217,217,217,217,217,176,140, 96, 56, 25,  6,  0,  0
m_upGsmDacTable8:315,315,315,315,315,315,315,315,315,315,315,315,315,315,315,315,315,249,249,249,249,249,204,159,108, 63, 29,  7,  0,  0
m_upGsmDacTable9:350,350,350,350,350,350,350,350,350,350,350,350,350,350,350,350,350,283,284,284,284,284,242,207,161,115, 75, 43, 19,  5,  0,  0
m_upGsmDacTable10:389,389,389,389,389,389,389,389,389,389,389,389,389,389,389,389,389,322,322,322,322,322,278,234,180,129,  84,  48,  21,  5,  0,  0
m_upGsmDacTable11:432,432,432,432,432,432,432,432,432,432,432,432,432,432,432,432,432,365,365,365,365,365,316,263,201,143,  93,  53,  24,  6,  0,  0
m_upGsmDacTable12:478,478,478,478,478,478,478,478,478,478,478,478,478,478,478,478,478,363,363,363,363,363,339,281,215,153,  99,  56,  25,  6,  0,  0
m_upGsmDacTable13:530,530,530,530,530,530,530,530,530,530,530,530,530,530,530,530,530,414,414,414,414,414,384,315,239,169,109,  62,  28,  7,  0,  0
m_upGsmDacTable14:562,562,562,562,562,562,562,562,562,562,562,562,562,562,562,562,562,446,446,446,446,446,446,446,447,392,288,189,107,  48,  12,  0,  0

m_upGsmPedsStartPeriod0:18      // 19 level
m_upGsmPedsStartPeriod1:18      // 18 level
m_upGsmPedsStartPeriod2:18      // 17 level
m_upGsmPedsStartPeriod3:18      // 16 level
m_upGsmPedsStartPeriod4:18      // 15 level
m_upGsmPedsStartPeriod5:18      // 14 level
m_upGsmPedsStartPeriod6:18      // 13 level
m_upGsmPedsStartPeriod7:18      // 12 level
m_upGsmPedsStartPeriod8:18      // 11 level
m_upGsmPedsStartPeriod9:16      // 10 level
m_upGsmPedsStartPeriod10:16     // 9 level
m_upGsmPedsStartPeriod11:16     // 8 level
m_upGsmPedsStartPeriod12:15     // 7 level
m_upGsmPedsStartPeriod13:15     // 6 level
m_upGsmPedsStartPeriod14:14     // 5 level

m_upGsmRampStartPeriod0:21      // 19 level
m_upGsmRampStartPeriod1:21      // 18 level
m_upGsmRampStartPeriod2:21      // 17 level
m_upGsmRampStartPeriod3:21      // 16 level
m_upGsmRampStartPeriod4:21      // 15 level
m_upGsmRampStartPeriod5:21      // 14 level
m_upGsmRampStartPeriod6:21      // 13 level
m_upGsmRampStartPeriod7:21      // 12 level
m_upGsmRampStartPeriod8:21      // 11 level
m_upGsmRampStartPeriod9:19      // 10 level
m_upGsmRampStartPeriod10:19     // 9 level
m_upGsmRampStartPeriod11:19     // 8 level
m_upGsmRampStartPeriod12:19     // 7 level
m_upGsmRampStartPeriod13:19     // 6 level
m_upGsmRampStartPeriod14:21     // 5 level
```

Figure 7-16. Pegasus Configuration “dacTable.cfg” file format

8. CIRCUIT DIAGRAM



8. CIRCUIT DIAGRAM



	ANT_SEL2	ANT_SEL1	ANT_SEL0
GSM 900 TX	LOW	LOW	HIGH
GSM 900 RX/WCDMA	LOW	LOW	LOW
DCS1800/PCS1900 TX	HIGH	HIGH	LOW
DCS 1800 RX	LOW	HIGH	LOW
PCS 1900 RX	HIGH	LOW	LOW

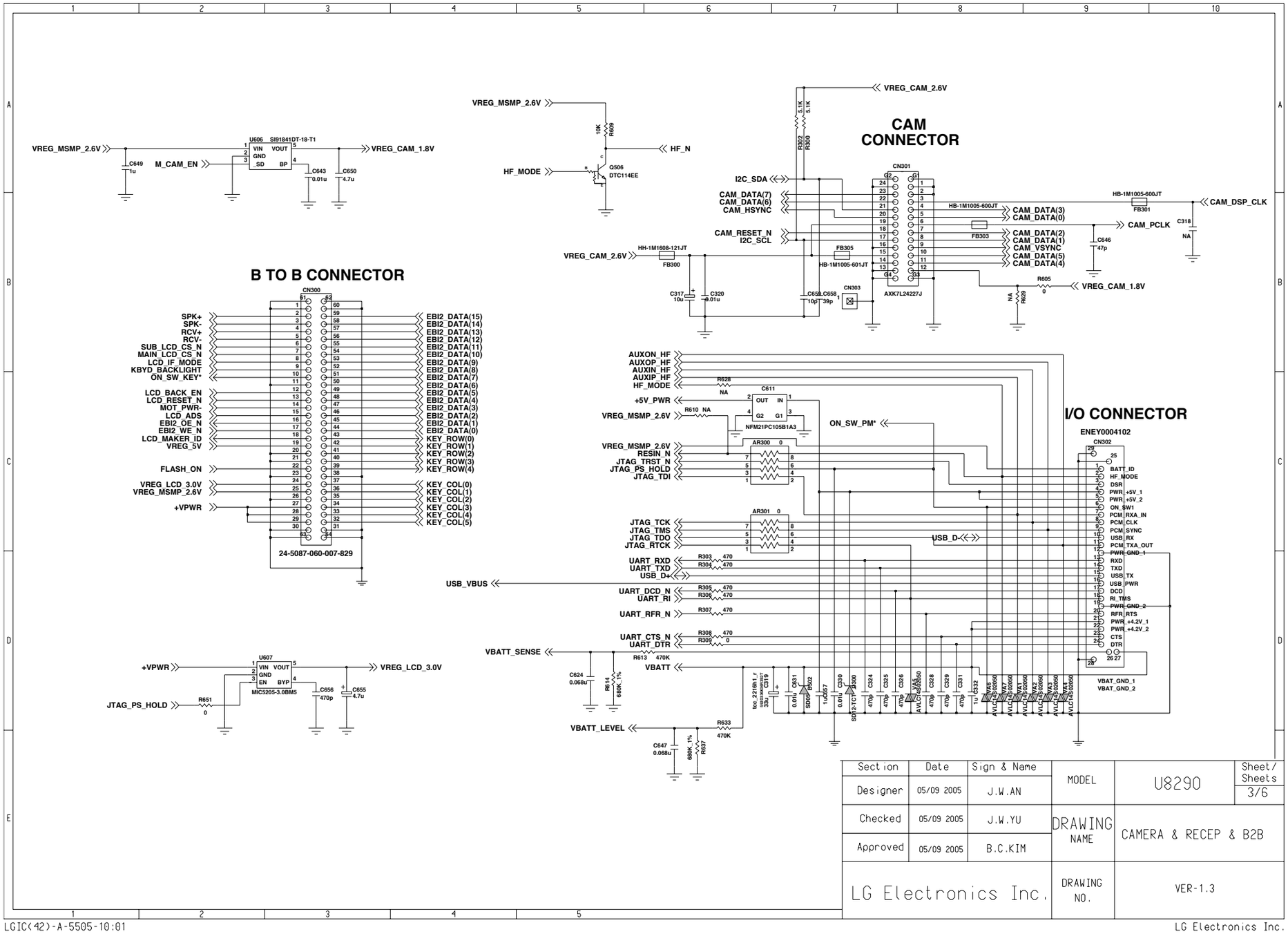
GSM_PA_BAND	MODE
LOW	GSM
HIGH	DCS/PCS

	TX_VCO_EN_0_N	TX_VCO_EN_1_N
GSM900	HIGH	LOW
DCS1800/PCS1900	LOW	HIGH
OFF	HIGH	HIGH

Section	Date	Sign & Name			
Designer	05/09 2005	J.W.AN	MODEL	U8290	Sheet/ Sheets 2/6
Checked	05/09 2005	J.W.YU	DRAWING	RF	
Approved	05/09 2005	B.C.KIM			
LG Electronics Inc.			DRAWING NO.	VER-1.3	

LG Electronics Inc.

8. CIRCUIT DIAGRAM

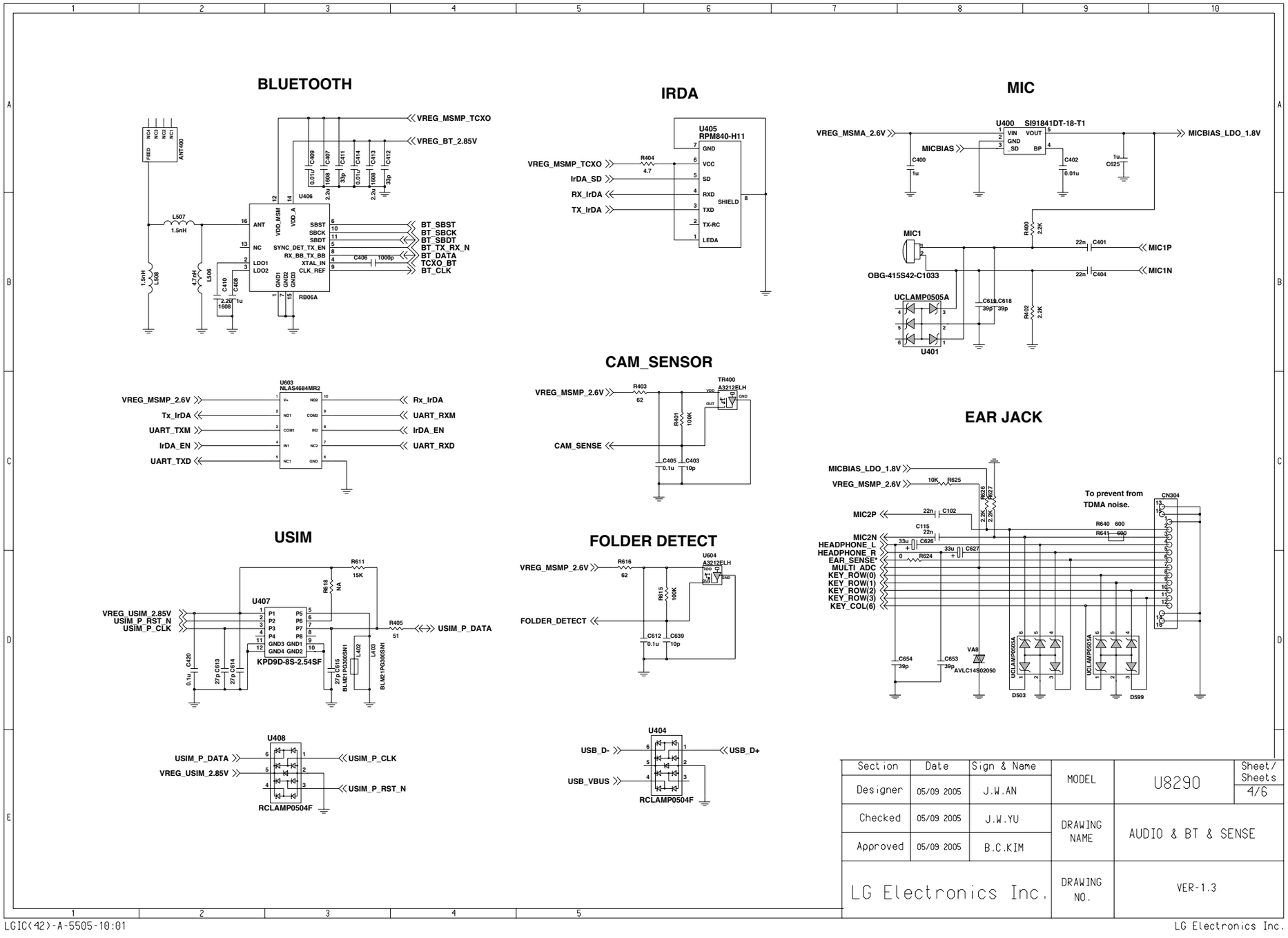


Section	Date	Sign & Name	MODEL	U8290	Sheet/ Sheets
Designer	05/09 2005	J.W.AN			3/6
Checked	05/09 2005	J.W.YU	DRAWING NAME	CAMERA & RECEP & B2B	
Approved	05/09 2005	B.C.KIM			
LG Electronics Inc.			DRAWING NO.	VER-1.3	

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

LG Electronics Inc.

8. CIRCUIT DIAGRAM

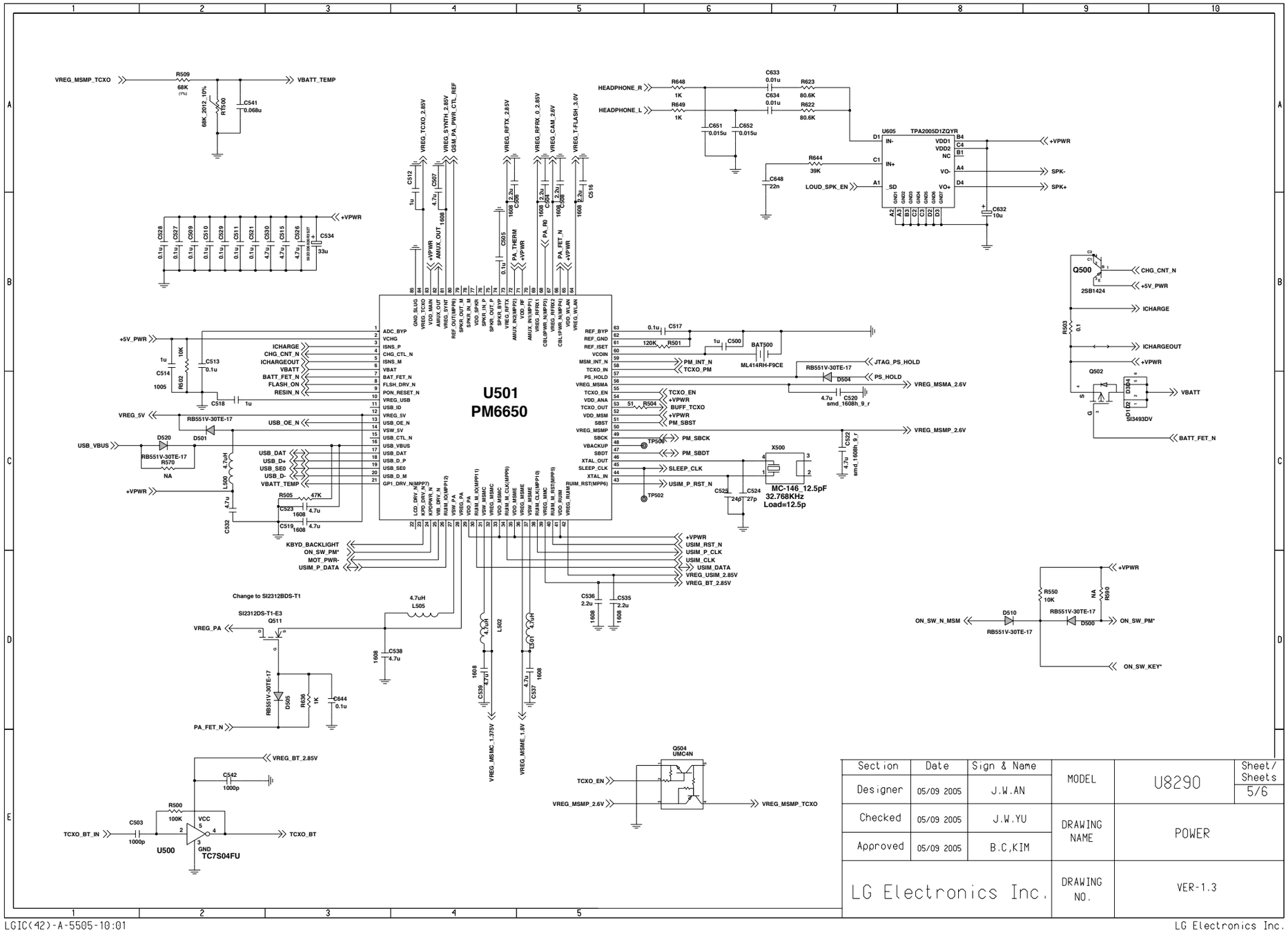


Section	Date	Sign & Name			Sheet/Sheets
Designer	05/09 2005	J.W.AN	MODEL	U8290	4/6
Checked	05/09 2005	J.W.YU	DRAWING NAME	AUDIO & BT & SENSE	
Approved	05/09 2005	B.C.KIM			
LG Electronics Inc.			DRAWING NO.	VER-1.3	

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

LG Electronics Inc.

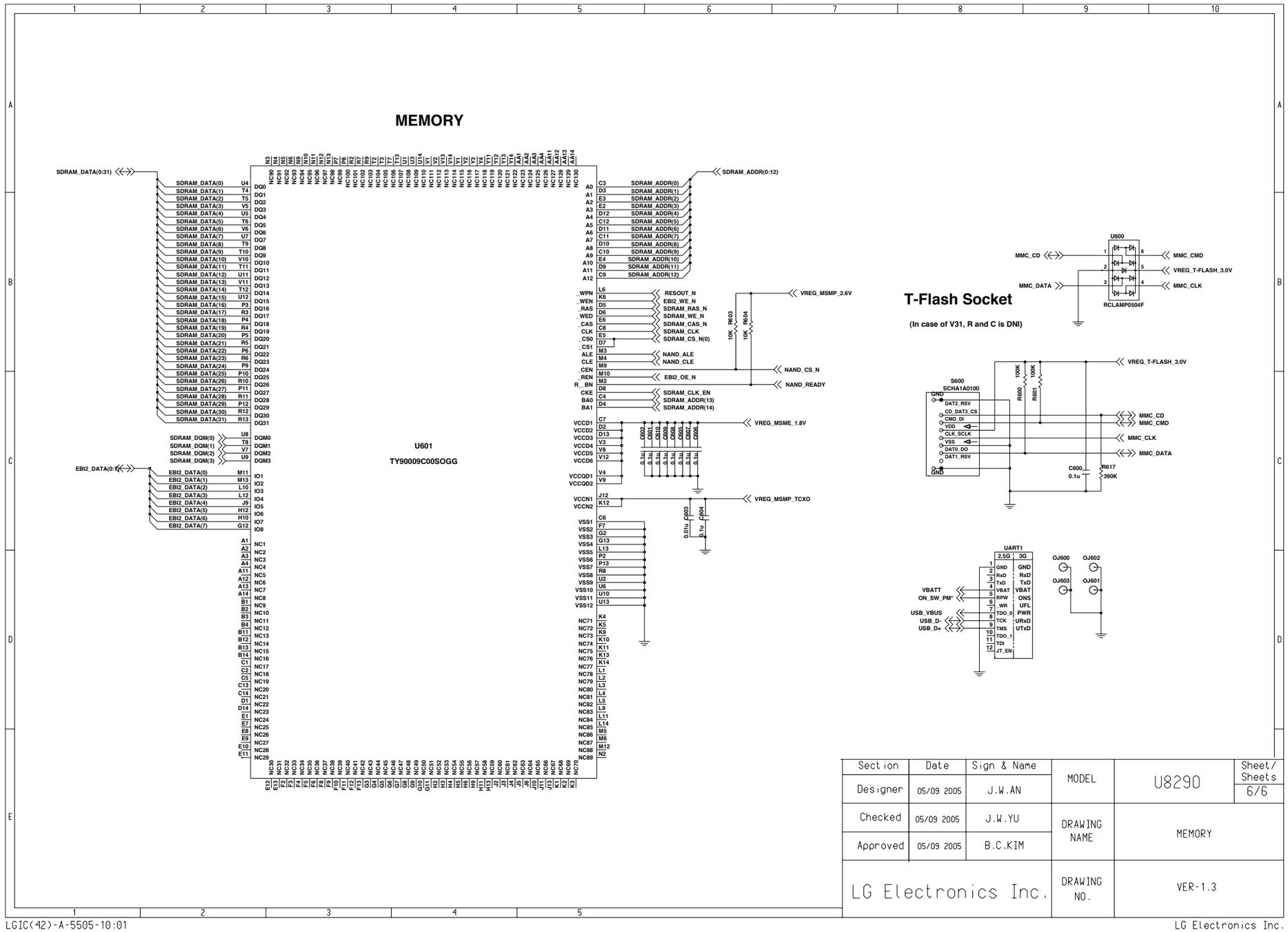
8. CIRCUIT DIAGRAM



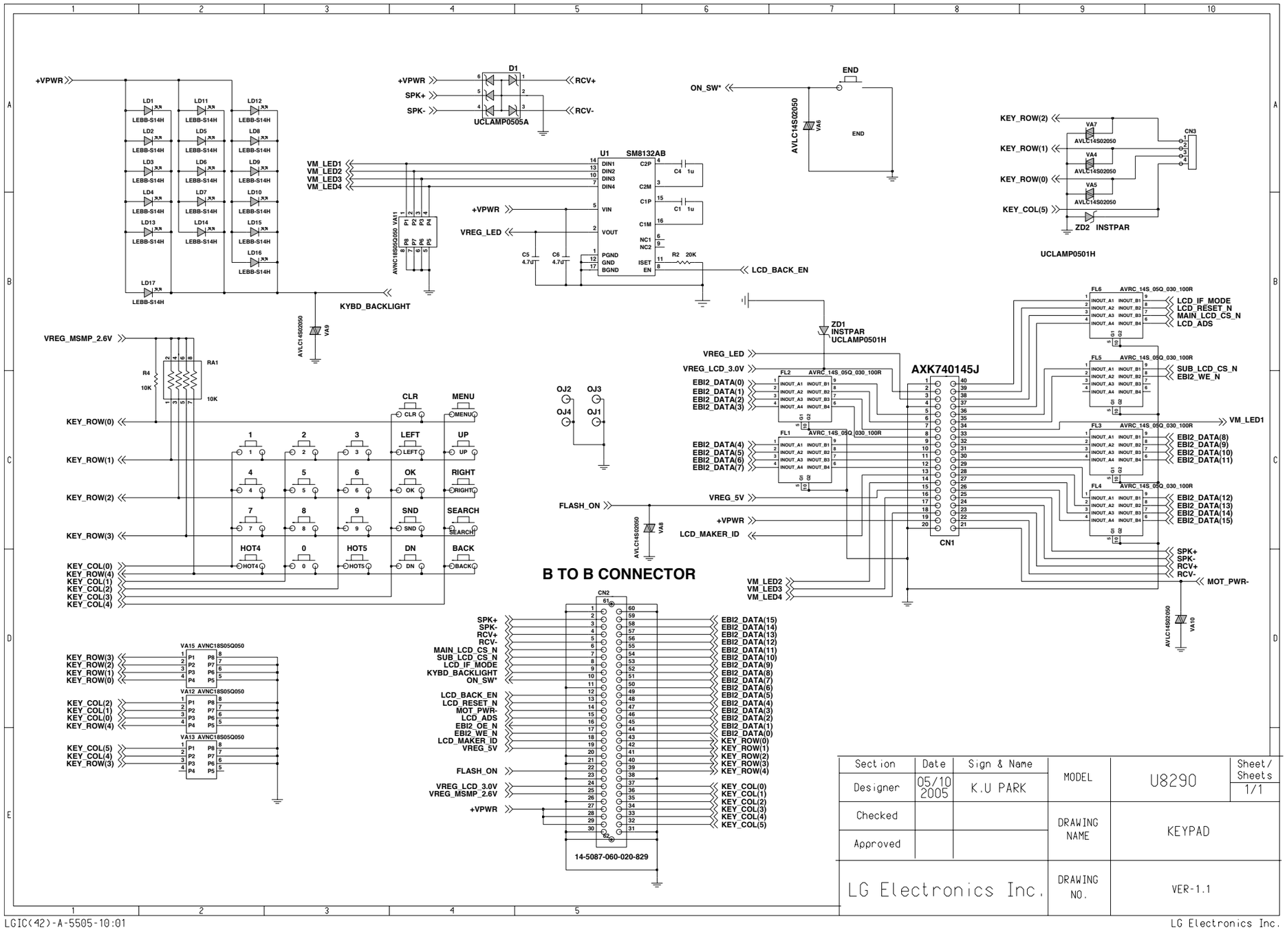
LGIC(42)-A-5505-10:01

LG Electronics Inc.

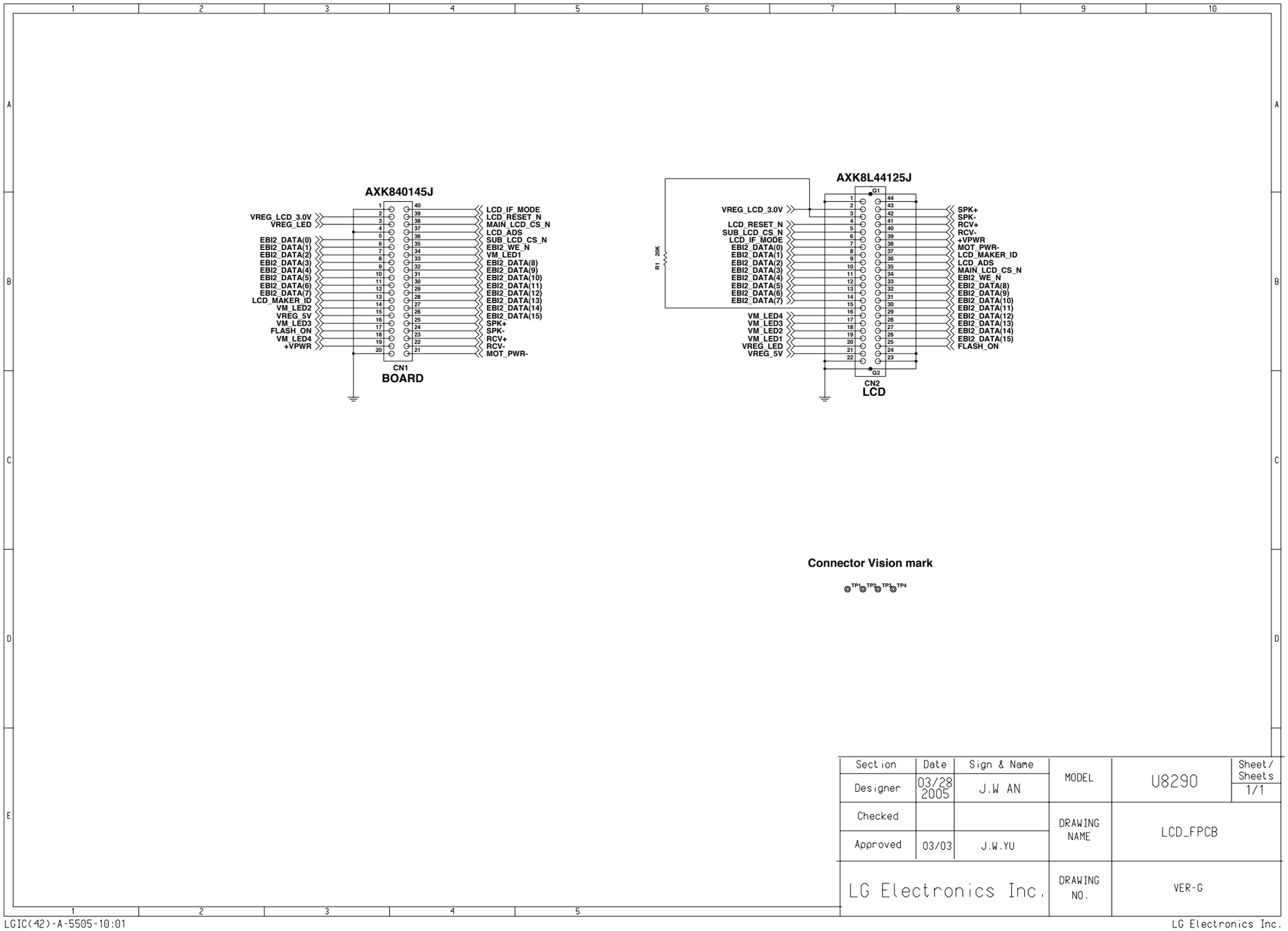
8. CIRCUIT DIAGRAM



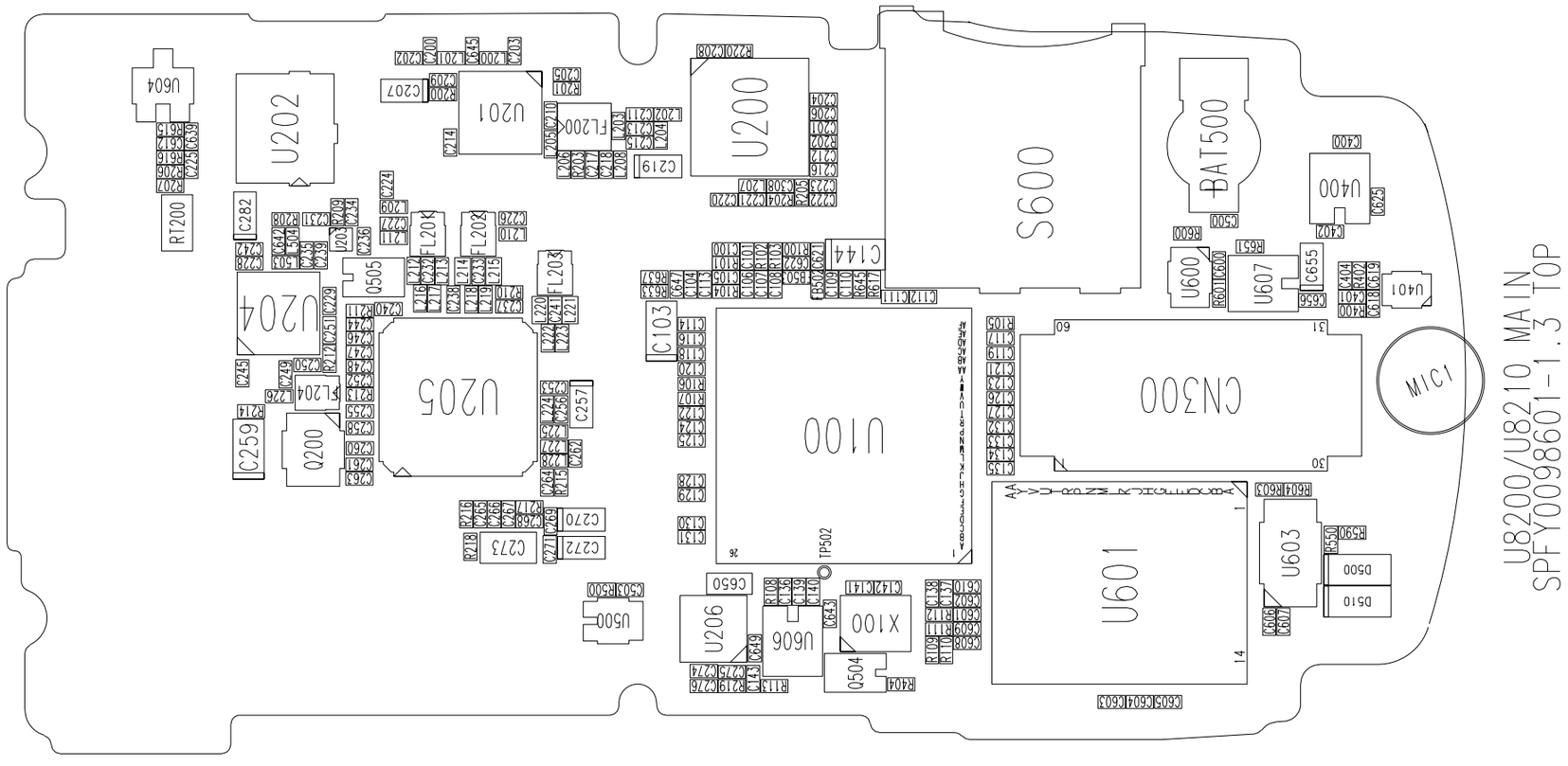
8. CIRCUIT DIAGRAM



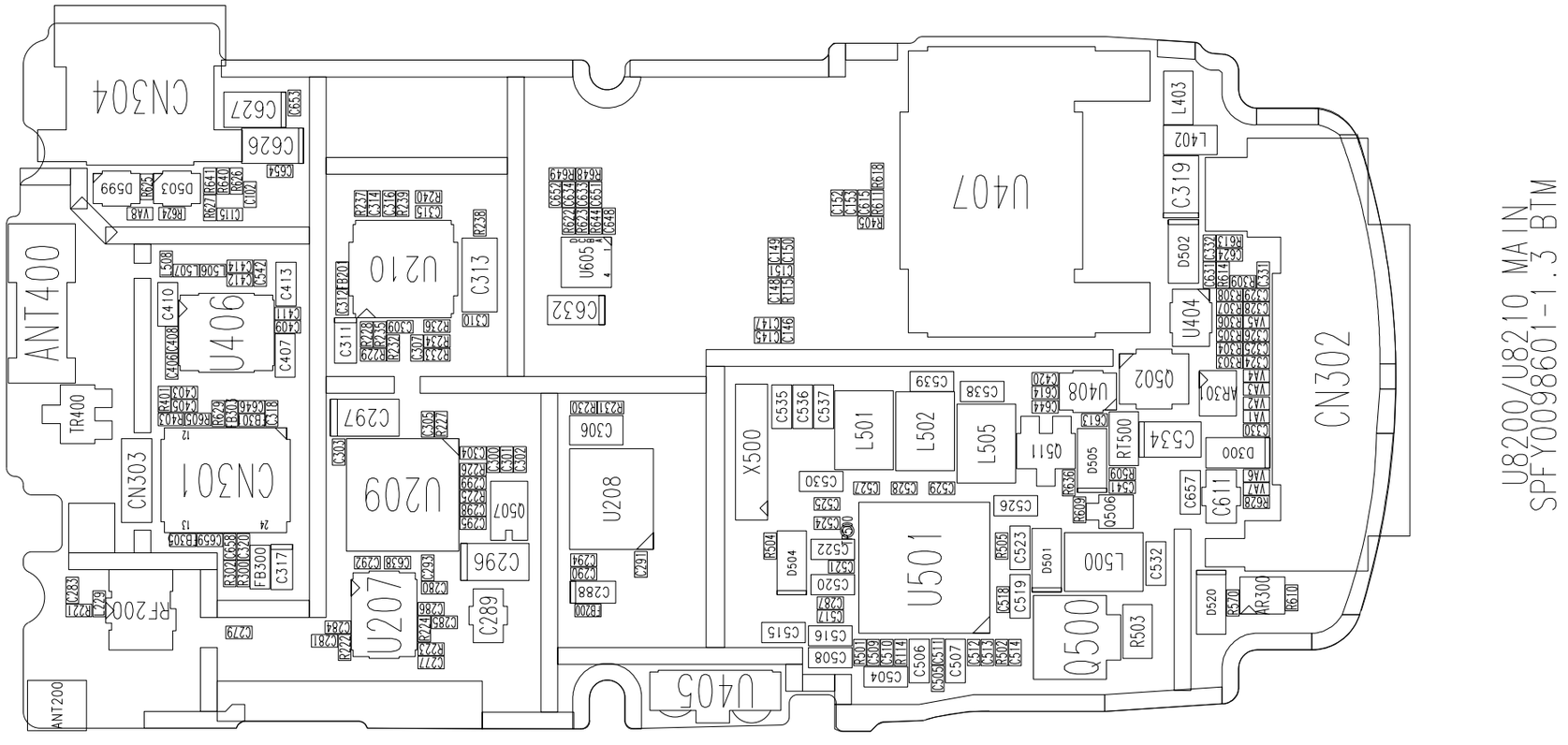
8. CIRCUIT DIAGRAM



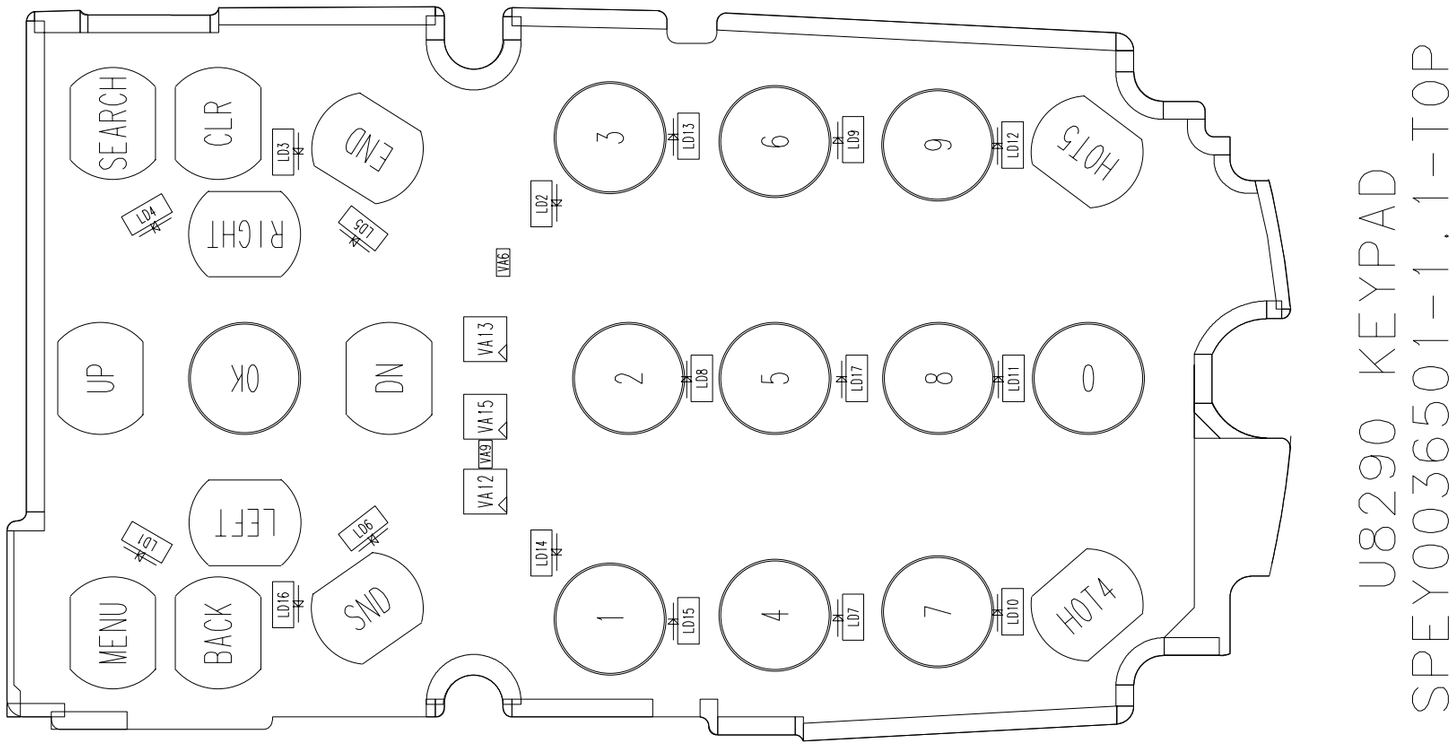
9. PCB LAYOUT


U8200/U8210 MAIN
SPFY0098601-1.3 TOP
U202
U201
U200
S600
BAT500
U400
U600
U607
U601
U603
U100
U205
U204
U206
U606
X100
Q200
Q505
Q504
CN300
MIC1
TP502
RT200
U604
U500

9. PCB LAYOUT


U8200/U8210 MAIN
SPFY0098601-1.3 BTM
CN304
C627
C626
D599
D503
U406
ANT400
TR400
CN303
CN301
U210
C313
C632
U605
U407
L403
L402
C319
D502
U404
U408
Q502
C534
D300
C611
CN302
X500
L501
L502
L505
Q511
RT500
D505
Q506
C657
U209
C297
C296
U207
C289
U208
C306
U501
L500
Q500
R503
D520
AR300
R610
RF200
ANT200
U405

9. PCB LAYOUT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END
RIGHT
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6
9
HOT5
UP
OK
DN
2
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LEFT
MENU
BACK
SND
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4
7
HOT4
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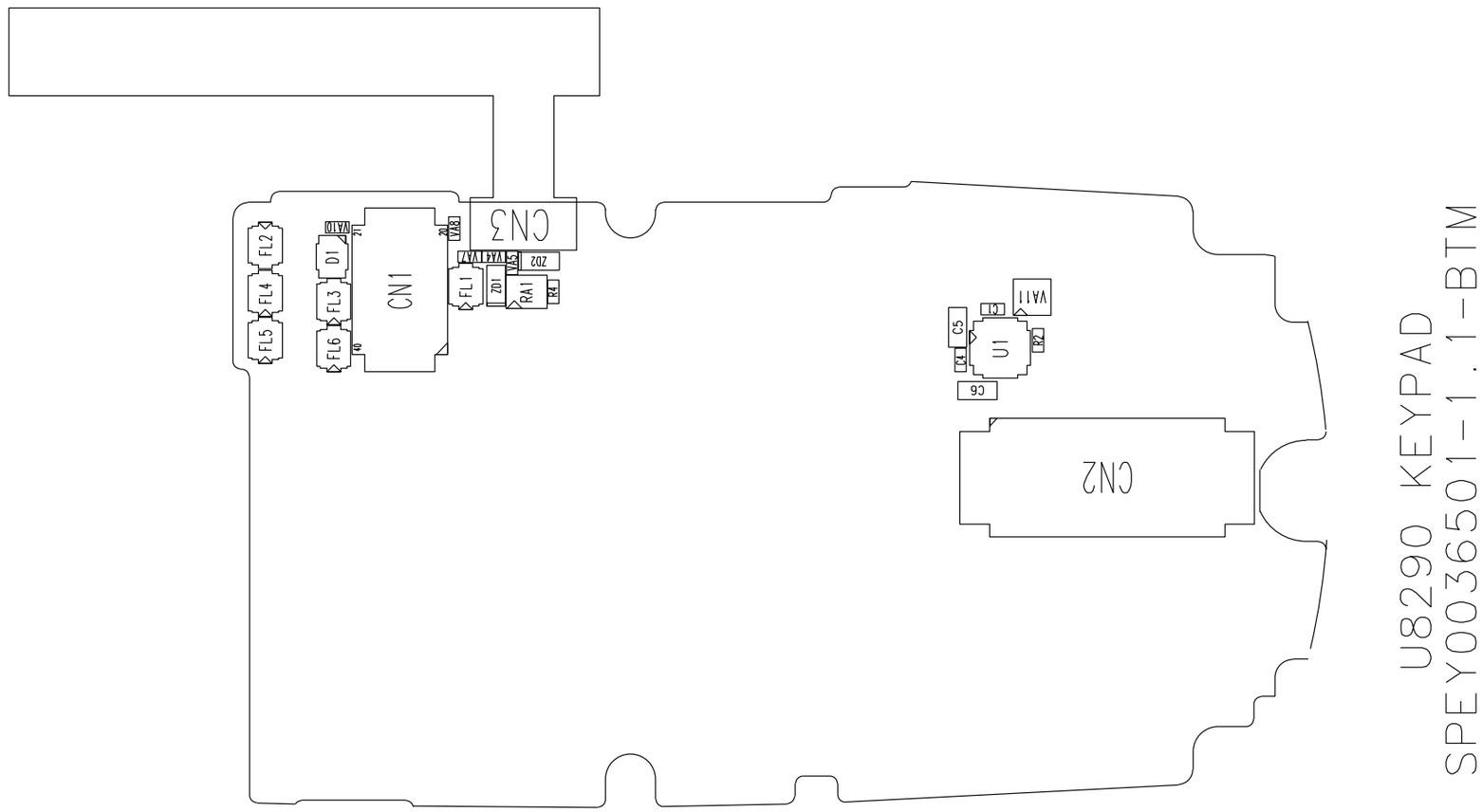
SPEY003650 1-1.1-TOP

9. PCB LAYOUT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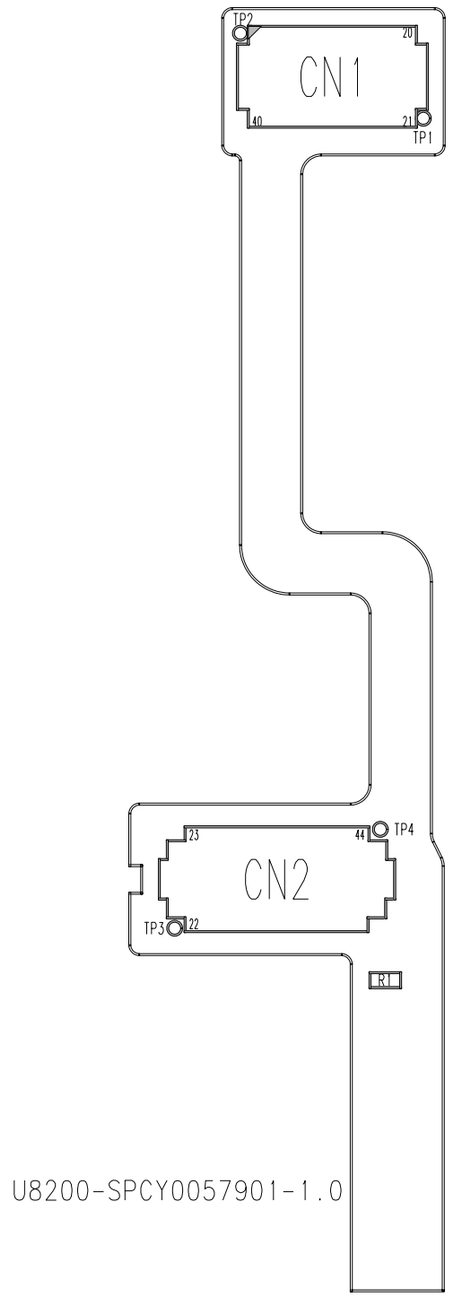
CN1
FL2
FL4
FL5
D1
FL3
FL6
FL1
ZD1
ZD2
RA1
R4
VA11
C5
C1
U1
C2
C4
C6
CN2
U8290 KEYPAD
SPEY003650 1-1.1-BTM

9. PCB LAYOUT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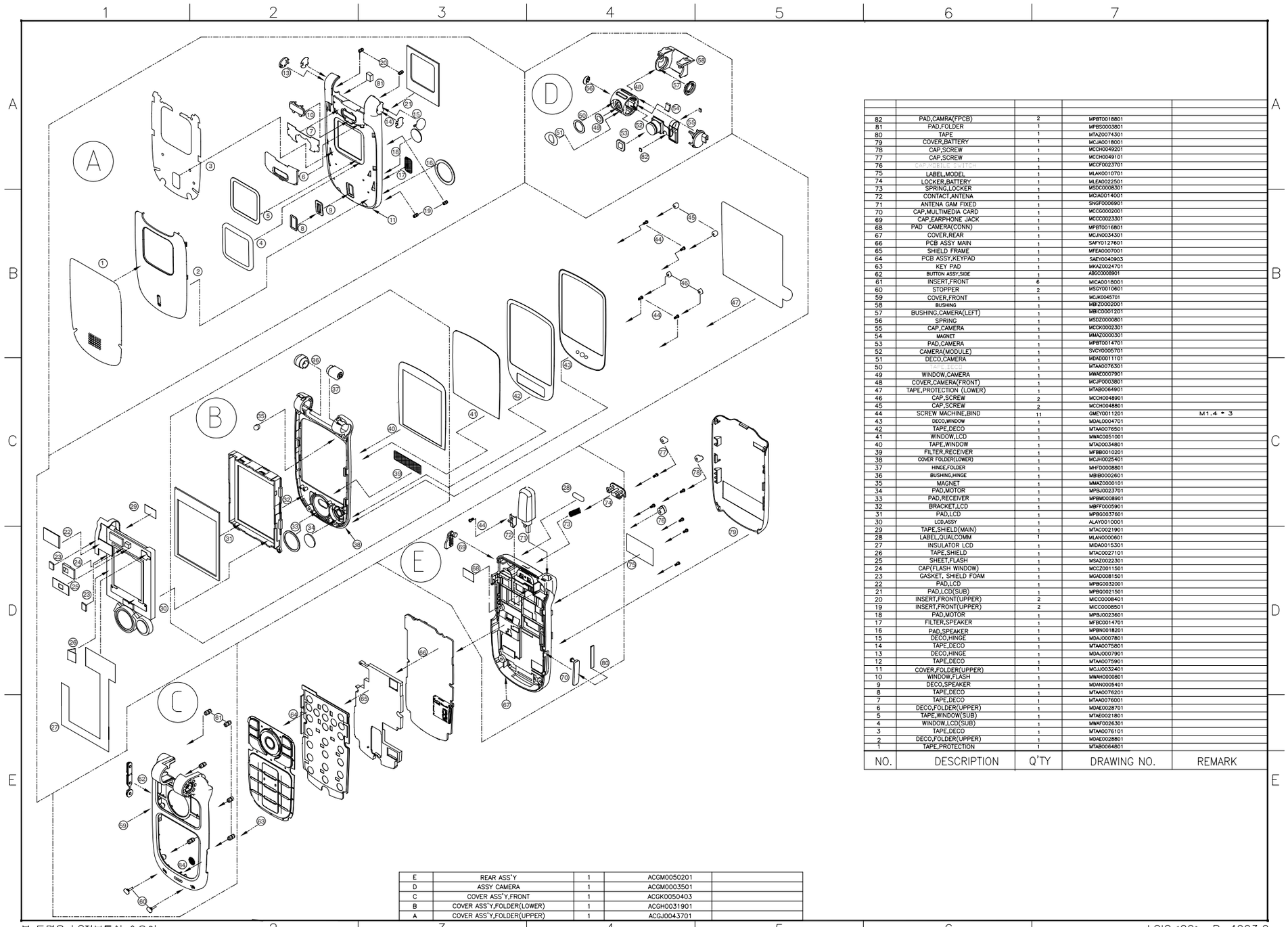
CN1
40
21
TP1
23
44
TP4
CN2
TP3
22
R1
U8200-SPCY0057901-1.0

10. EXPLODED VIEW & REPLACEMENT PART LIST

10.1 EXPLODED VIEW



NO.	DESCRIPTION	Q'TY	DRAWING NO.	REMARK
82	PAD,CAMRA(FPCB)	2	MPBT0018801	
81	PAD,FOLDER	1	MPBS0003801	
80	TAPE	1	MTAZ0074301	
79	COVER,BATTERY	1	MCJA0018001	
78	CAP,SCREW	1	MCCH0049201	
77	CAP,SCREW	1	MCCH0049101	
76	CAP,SIDE(L),SWITCH	1	MCCF0023701	
75	LABEL,MODEL	1	MLAK0010701	
74	LOCKER,BATTERY	1	MLEA0022501	
73	SPRING,LOCKER	1	MSDC0008301	
72	CONTACT,ANTENA	1	MCIA0014001	
71	ANTENA CAM FIXED	1	SNGF0006901	
70	CAP,MULTIMEDIA CARD	1	MCCG0002001	
69	CAP,EARPHONE JACK	1	MCCC0023301	
68	PAD CAMERA(CONN)	1	MPBT0016801	
67	COVER,REAR	1	MCJN0034301	
66	PCB ASSY MAIN	1	SAFY0127601	
65	SHIELD FRAME	1	MFEA0007001	
64	PCB ASSY,KEYPAD	1	SAEY0040903	
63	KEY PAD	1	MKAZ0024701	
62	BUTTON ASSY,SIDE	1	ABGC0008901	
61	INSERT,FRONT	6	MICA0018001	
60	STOPPER	2	MSGY0010601	
59	COVER,FRONT	1	MCJK0045701	
58	BUSHING	1	MBIZ0002001	
57	BUSHING,CAMERA(LEFT)	1	MBIC0001201	
56	SPRING	1	MSDZ0000801	
55	CAP,CAMERA	1	MCCK0002301	
54	MAGNET	1	MMAZ0000301	
53	PAD,CAMERA	1	MPBT0014701	
52	CAMERA(MODULE)	1	SVCY0005701	
51	DECO,CAMERA	1	MDAD0011101	
50		1	MTAA0076301	
49	WINDOW,CAMERA	1	MWAE0007901	
48	COVER,CAMERA(FRONT)	1	MCJP0003801	
47	TAPE,PROTECTION (LOWER)	1	MTAB0064901	
46	CAP,SCREW	2	MCCH0048901	
45	CAP,SCREW	2	MCCH0048801	
44	SCREW MACHINE,BIND	11	GMEY0011201	M1.4 * 3
43	DECO,WINDOW	1	MDAL0004701	
42	TAPE,DECO	1	MTAA0076501	
41	WINDOW,LCD	1	MWAC0051001	
40	TAPE,WINDOW	1	MTAD0034801	
39	FILTER,RECEIVER	1	MFBB0010201	
38	COVER FOLDER(LOWER)	1	MCJH0025401	
37	HINGE,FOLDER	1	MHFD0008801	
36	BUSHING,HINGE	1	MBIB0002601	
35	MAGNET	1	MMAZ0000101	
34	PAD,MOTOR	1	MPBJ0023701	
33	PAD,RECEIVER	1	MPBM0008901	
32	BRACKET,LCD	1	MBFF0005901	
31	PAD,LCD	1	MPBG0037601	
30	LCD,ASSY	1	ALAY0010001	
29	TAPE,SHIELD(MAIN)	1	MTAC0021901	
28	LABEL,QUALCOMM	1	MLAN0000601	
27	INSULATOR LCD	1	MIDA0015301	
26	TAPE,SHIELD	1	MTAC0027101	
25	SHEET,FLASH	1	MSAZ0022301	
24	CAP(FLASH WINDOW)	1	MCCZ0011501	
23	GASKET, SHIELD FOAM	1	MGAD0081501	
22	PAD,LCD	1	MPBG0032001	
21	PAD,LCD(SUB)	1	MPBQ0021501	
20	INSERT,FRONT(UPPER)	2	MICC0008401	
19	INSERT,FRONT(UPPER)	2	MICC0008501	
18	PAD,MOTOR	1	MPBJ0023601	
17	FILTER,SPEAKER	1	MFBC0014701	
16	PAD,SPEAKER	1	MPBN0018201	
15	DECO,HINGE	1	MDAJ0007801	
14	TAPE,DECO	1	MTAA0075801	
13	DECO,HINGE	1	MDAJ0007901	
12	TAPE,DECO	1	MTAA0075901	
11	COVER,FOLDER(UPPER)	1	MCJJ0032401	
10	WINDOW,FLASH	1	MWAH0000801	
9	DECO,SPEAKER	1	MDAN0005401	
8	TAPE,DECO	1	MTAA0076201	
7	TAPE,DECO	1	MTAA0076001	
6	DECO,FOLDER(UPPER)	1	MDAE0028701	
5	TAPE,WINDOW(SUB)	1	MTAE0021801	
4	WINDOW,LCD(SUB)	1	MWAF0026301	
3	TAPE,DECO	1	MTAA0076101	
2	DECO,FOLDER(UPPER)	1	MDAE0028801	
1	TAPE,PROTECTION	1	MTAB0064801	

E	REAR ASS'Y	1	ACGM0050201	
D	ASSY CAMERA	1	ACGM0003501	
C	COVER ASS'Y,FRONT	1	ACGK0050403	
B	COVER ASS'Y,FOLDER(LOWER)	1	ACGH0031901	
A	COVER ASS'Y,FOLDER(UPPER)	1	ACGJ0043701	

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10.2 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	Specification	Color	Remark
1		IMT,FOLDER	TIFF0010601		Silver Snow	
2	AAAY00	ADDITION	AAAY0118401		Black	
3	MCJA	COVER,BATTERY	MCJA0018001		Black	79
3	MLAC00	LABEL,BARCODE	MLAC0003001	LABEL,BARCODE(for IMEI 4piece)	Metal Silver	
2	APEY00	PHONE	APEY0230501		Silver Snow	
3	ACGG00	COVER ASSY,FOLDER	ACGG0056903		Black	
4	ACGH00	COVER ASSY, FOLDER(LOWER)	ACGH0031901		Silver Snow	
5	MBFF00	BRACKET,LCD	MBFF0005901		Without Color	32
5	MBIB00	BUSHING,HINGE	MBIB0002601		Without Color	36
5	MCJH00	COVER,FOLDER(LOWER)	MCJH0025401		Silver Snow	38
5	MFBB00	FILTER,RECEIVER	MFBB0010201		Without Color	39
5	MMAZ00	MAGNET	MMAZ0000101	D3*1.5t		35
5	MPBG00	PAD,LCD	MPBG0037601		Without Color	31
5	MPBJ00	PAD,MOTOR	MPBJ0023701		Without Color	34
5	MPBN00	PAD,RECEIVER	MPBM0008901		Without Color	33
5	MTAD00	TAPE,WINDOW	MTAD0034801		Without Color	40
4	ACGJ00	COVER ASSY, FOLDER(UPPER)	ACGJ0043701		Silver Snow	
5	MCJJ00	COVER,FOLDER(UPPER)	MCJJ0032401		Silver Snow	11
5	MDAE00	DECO,FOLDER(UPPER)	MDAE0028701		Silver	6
5	MDAE01	DECO,FOLDER(UPPER)	MDAE0028801		Black	2
5	MDAJ00	DECO,HINGE	MDAJ0007801		Silver	15
5	MDAJ01	DECO,HINGE	MDAJ0007901		Silver	13
5	MDAN00	DECO,SPEAKER	MDAN0005401		Silver	9
5	MFBC00	FILTER,SPEAKER	MFBC0014701		Without Color	17
5	MICC00	INSERT,FRONT(UPPER)	MICC0008401		Without Color	20

10. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Specification	Color	Remark
5	MICC01	INSERT,FRONT(UPPER)	MICC0008501		Without Color	19
5	MPBJ00	PAD,MOTOR	MPBJ0023601		Without Color	18
5	MPBN00	PAD,SPEAKER	MPBN0018201		Without Color	16
5	MPBQ00	PAD,LCD(SUB)	MPBQ0021501		Without Color	21
5	MPBS00	PAD,FOLDER	MPBS0003801		Silver	81
5	MTAA00	TAPE,DECO	MTAA0075801		Without Color	14
5	MTAA01	TAPE,DECO	MTAA0075901		Without Color	12
5	MTAA02	TAPE,DECO	MTAA0076001		Without Color	7
5	MTAA03	TAPE,DECO	MTAA0076101		Without Color	3
5	MTAA04	TAPE,DECO	MTAA0076201		Without Color	8
5	MTAE00	TAPE,WINDOW(SUB)	MTAE0021801		Without Color	5
5	MWAH00	WINDOW,FLASH	MWAH0000801		Without Color	10
4	ACGK00	COVER ASSY,FRONT	ACGK0050403		Silver Snow	
5	ABGC00	BUTTON ASSY,SIDE	ABGC0008901		Without Color	62
5	MCJK00	COVER,FRONT	MCJK0045701		Silver Snow	59
5	MICA00	INSERT,FRONT	MICA0018001		Without Color	61
5	MSGY01	STOPPER	MSGY0010602		Silver	60
4	ALAY00	LCD ASSY	ALAY0010001		Aqua Silver	30
5	SACY00	PCB ASSY,FLEXIBLE	SACY0035301			
6	SACE00	PCB ASSY,FLEXIBLE,SMT	SACE0031101			
7	ENBY00	CONNECTOR,BOARD TO BOARD	ENBY0013004	40 PIN,0.4 mm,ETC ,Au over Ni ,		
7	ENBY01	CONNECTOR,BOARD TO BOARD	ENBY0030001	44 PIN,0.4 mm,ETC , ,H=0.9		
7	ERHY00	RES,CHIP	ERHY0000131	20K ohm,1/16W,F,1005,R/TP		
7	SPCY00	PCB,FLEXIBLE	SPCY0057901	POLYI ,0.5 mm,MULTI-5 ,Silver Coating		
5	SVLM00	LCD MODULE	SVLM0011601	MAIN ,M:2.0"(176*220) S:1.04"(96*96) ,38.95*52.15*4.9(5.54) ,65k ,TFT ,TM ,M_HD66789R , S_ST7624 ,TFT + 65K CSTN		
4	AWAZ00	WINDOW ASSY	AWAZ0006301		Without Color	

Level	Location No.	Description	Part Number	Specification	Color	Remark
5	BFAA00	FILM,INMOLD	BFAA0028901	U8200	Aluminum Silver	
5	MWAF00	WINDOW,LCD(SUB)	MWAF0026301		Without Color	4
4	GMEY00	SCREW MACHINE,BIND	GMEY0011201	1.4 mm,3 mm,MSWR3(BK) ,N ,+ ,NYLOK	Without Color	
4	MCCH00	CAP,SCREW	MCCH0048801		Color Unfixed	45
4	MCCH01	CAP,SCREW	MCCH0048901		Color Unfixed	46
4	MCCZ00	CAP	MCCZ0011501		Without Color	24
4	MDAL00	DECO,WINDOW	MDAL0004701		Color Unfixed	43
4	MGAD01	GASKET,SHIELD FORM	MGAD0081501		Without Color	23
4	MHFD00	HINGE,FOLDER	MHFD0008801		Color Unfixed	37
4	MIDA02	INSULATOR,LCD	MIDA0015301		Without Color	27
4	MIDZ00	INSULATOR	MIDZ0051201		Blue Green	
4	MKAZ00	KEYPAD	MKAZ0024701		Color Unfixed	63
4	MPBG00	PAD,LCD	MPBG0032001		Without Color	22
4	MSAZ00	SHEET	MSAZ0022301		Without Color	25
4	MTAA00	TAPE,DECO	MTAA0076501		Without Color	42
4	MTAB00	TAPE,PROTECTION	MTAB0064801		Without Color	1
4	MTAB01	TAPE,PROTECTION	MTAB0064901		Without Color	47
4	MTAC00	TAPE,SHIELD	MTAC0027101		Without Color	26
4	MTAC01	TAPE,SHIELD	MTAC0021901		Color Unfixed	29
4	MWAC00	WINDOW,LCD	MWAC0051001		Color Unfixed	41
4	SJMY00	VIBRATOR,MOTOR	SJMY0002602	3.0 V,80 mA,12*3.4 ,		
4	SUVT00	TWO-WAY MODE SPEAKER	SUVT0005601	8 ohm,32 ohm,89 dB,115 dB,17 mm,		
3	ACGM00	COVER ASSY,REAR	ACGM0050201		Color Unfixed	
4	GMEY00	SCREW MACHINE,BIND	GMEY0011201	1.4 mm,3 mm,MSWR3(BK) ,N ,+ ,NYLOK	Without Color	44

10. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Specification	Color	Remark
4	MCCC00	CAP,EARPHONE JACK	MCCC0023301		Color Unfixed	69
4	MCCG00	CAP,MULTIMEDIA CARD	MCCG0002001		Color Unfixed	70
4	MCIA00	CONTACT,ANTENNA	MCIA0014001		Without Color	72
4	MCJN00	COVER,REAR	MCJN0034301		Color Unfixed	67
4	MICZ	INSERT	MICZ0014901		Color Unfixed	
4	MLAN00	LABEL,QUALCOMM	MLAN0000601	Black,95C	Transparent	28
4	MLEA00	LOCKER,BATTERY	MLEA0022501		Without Color	74
4	MPBT00	PAD,CAMERA	MPBT0016801		Black	68
4	MSDC00	SPRING,LOCKER	MSDC0008301		Without Color	73
4	MTAZ00	TAPE	MTAZ0074301		Without Color	80
4	SNGF00	ANTENNA,GSM,FIXED	SNGF0006901	3.0 ,-2.0 dBd,black_silver ,fixed, GSM/DCS/PCS/WCDMA2100		71
3	ACGN00	COVER ASSY,CAMERA	ACGN0003501		Silver Snow	
4	ACGP00	COVER ASSY, CAMERA(FRONT)	ACGP0002201		Silver Snow	
5	MCJP00	COVER,CAMERA(FRONT)	MCJP0003801		Silver Snow	48
5	MMAZ00	MAGNET	MMAZ0002001		Without Color	
5	MTAA00	TAPE,DECO	MTAA0076301		Without Color	50
4	MBIC00	BUSHING,CAMERA(LEFT)	MBIC0001201		Without Color	57
4	MBIZ00	BUSHING	MBIZ0002001		Silver Snow	58
4	MCCK00	CAP,CAMERA	MCCK0002301		Without Color	55
4	MDAD00	DECO,CAMERA	MDAD0011101		Silver	51
4	MPBT00	PAD,CAMERA	MPBT0014701		Without Color	53
4	MPBT01	PAD,CAMERA	MPBT0018801		Without Color	82
4	MSDZ00	SPRING	MSDZ0000801	0.15t	Gold	56
4	MWAE00	WINDOW,CAMERA	MWAE0007901		Without Color	49
3	GMEY00	SCREW MACHINE,BIND	GMEY0011201	1.4 mm,3 mm,MSWR3(BK) ,N ,+ ,NYLOK	Without Color	
3	MCCF00	CAP,MOBILE SWITCH	MCCF0023701		Silver	76
3	MCCH00	CAP,SCREW	MCCH0049101		Silver	77

Level	Location No.	Description	Part Number	Specification	Color	Remark
3	MCCH01	CAP,SCREW	MCCH0049201		Silver	78
3	MFEA00	FRAME,SHIELD	MFEA0007001		Without Color	65
3	MLAK00	LABEL,MODEL	MLAK0010701	G7200 (CE0889)	White	75
5	ADCA00	DOME ASSY,METAL	ADCA0039401		Without Color	

10. EXPLODED VIEW & REPLACEMENT PART LIST

10.2 Replacement Parts <Main component>

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

Level	Location No.	Description	Part Number	Specification	Color	Remark
4	SVCY02	CAMERA	SVCY0005701	CMOS ,MEGA ,1.3M Omnivision Sensor		52
3	SAEY00	PCB ASSY,KEYPAD	SAEY0040903			64
4	SAEB00	PCB ASSY, KEYPAD,INSERT	SAEB0011002			
5	SAKY00	PCB ASSY,SIDEKEY	SAKY0005601			
4	SAEE00	PCB ASSY,KEYPAD,SMT	SAEE0011202			
5	SAEC00	PCB ASSY,KEYPAD,SMT BOTTOM	SAEC0009202			
6	C1	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C4	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C5	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C6	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	CN1	CONNECTOR,BOARD TO BOARD	ENBY0016801	40 PIN,0.4 mm,STRAIGHT ,AU ,FEMALE		
6	CN2	CONNECTOR,BOARD TO BOARD	ENBY0004202	60 PIN,0.5 mm,STRAIGHT ,Au ,B to B CNT(Header)		
6	D1	DIODE,TVS	EDTY0007601	SC-89 ,5 V,100 W,R/TP ,5 Channel Array , Vc 12V , 75pF , 1.6*1.625*0.58		
6	FL1	FILTER,EMI/POWER	SFEY0009401	SMD ,100ohm,30pF(total capacitance), Pb-free		
6	FL2	FILTER,EMI/POWER	SFEY0009401	SMD ,100ohm,30pF(total capacitance), Pb-free		
6	FL3	FILTER,EMI/POWER	SFEY0009401	SMD ,100ohm,30pF(total capacitance), Pb-free		
6	FL4	FILTER,EMI/POWER	SFEY0009401	SMD ,100ohm,30pF(total capacitance), Pb-free		
6	FL5	FILTER,EMI/POWER	SFEY0009401	SMD ,100ohm,30pF(total capacitance), Pb-free		
6	FL6	FILTER,EMI/POWER	SFEY0009401	SMD ,100ohm,30pF(total capacitance), Pb-free		
6	R2	RES,CHIP	ERHY0000131	20K ohm,1/16W,F,1005,R/TP		
6	R4	RES,CHIP	ERHY0000261	10K ohm,1/16W,J,1005,R/TP		
6	RA1	RES,ARRAY,R	ERNR0000403	10000 ohm, ohm,8 PIN,J ,1/32 W ,SMD ,R/TP		
6	U1	IC	EUSY0253801	QFN ,16 PIN,R/TP ,4X20mALED CHARGEPUMP		
6	VA10	VARISTOR	SEVY0001001	14 V, ,SMD ,50pF, 1005		
6	VA11	VARISTOR	SEVY0006301	18 V, ,SMD ,50pF, 2012, 4 ARRAY VARISTOR		
6	VA14	DIODE,TVS	EDTY0007301	SOD-523 ,5 V,240 W,R/TP ,SINGLE LINE TVS DIODE FOR ESD		
6	VA4	VARISTOR	SEVY0001001	14 V, ,SMD ,50pF, 1005		
6	VA5	VARISTOR	SEVY0001001	14 V, ,SMD ,50pF, 1005		

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	VA7	VARISTOR	SEVY0001001	14 V, ,SMD ,50pF, 1005		
6	VA8	VARISTOR	SEVY0001001	14 V, ,SMD ,50pF, 1005		
6	ZD1	DIODE,TVS	EDTY0007301	SOD-523 ,5 V,240 W,R/TP ,SINGLE LINE TVS DIODE FOR ESD		
5	SAED00	PCB ASSY,KEYPAD,SMT TOP	SAED0009502			
6	LD1	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD10	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD11	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD12	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD13	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD14	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD15	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD16	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD17	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD2	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD3	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD4	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD5	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD6	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD7	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD8	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD9	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	VA12	VARISTOR	SEVY0006301	18 V, ,SMD ,50pF, 2012, 4 ARRAY VARISTOR		
6	VA13	VARISTOR	SEVY0006301	18 V, ,SMD ,50pF, 2012, 4 ARRAY VARISTOR		
6	VA15	VARISTOR	SEVY0006301	18 V, ,SMD ,50pF, 2012, 4 ARRAY VARISTOR		
6	VA6	VARISTOR	SEVY0001001	14 V, ,SMD ,50pF, 1005		
6	VA9	VARISTOR	SEVY0001001	14 V, ,SMD ,50pF, 1005		
5	SPEY00	PCB,KEYPAD	SPEY0036501	FR-4 ,0.5 mm,BuildUp4 ,U8290 KEYPAD PCB		
3	SAFY00	PCB ASSY,MAIN	SAFY0127602			66
4	SAFB00	PCB ASSY,MAIN,INSERT	SAFB0042502			
4	SAFF00	PCB ASSY,MAIN,SMT	SAFF0054101			
5	MLAB00	LABEL,A/S	MLAB0000601	HUMIDITY STICKER	Without Color	
5	MLAC00	LABEL,BARCODE	MLAC0003301	EZ LOOKS(use for PCB ASSY MAIN(hardware))	Without Color	

10. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Specification	Color	Remark
5	SAFC00	PCB ASSY,MAIN,SMT BOTTOM	SAFC0057101			
6	ANT400	ANTENNA,MOBILE,FIXED	SNMF0015901	2.1 ,-3.2 dB,Chip_Bluetooth_Ceramic(9*2.5*2)		
6	C102	CAP,CERAMIC,CHIP	ECCH0000179	22 nF,16V ,K ,X5R ,HD ,1005 ,R/TP		
6	C115	CAP,CERAMIC,CHIP	ECCH0000179	22 nF,16V ,K ,X5R ,HD ,1005 ,R/TP		
6	C145	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C146	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C147	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C148	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C149	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C150	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C151	CAP,CERAMIC,CHIP	ECCH0000147	2.2 nF,50V,K,X7R,HD,1005,R/TP		
6	C152	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C153	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C277	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C279	CAP,CERAMIC,CHIP	ECCH0000186	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C281	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C283	CAP,CERAMIC,CHIP	ECCH0000102	1 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C284	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C285	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C286	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C287	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C288	CAP,TANTAL,CHIP	ECTH0002202	4.7 uF,10V ,M ,STD ,1608 ,R/TP		
6	C289	FILTER,EMI/POWER	SFEY0006501	SMD ,3 TERMINAL EMI FILTER		
6	C290	CAP,CERAMIC,CHIP	ECCH0000186	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C291	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C292	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP		
6	C293	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C294	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C295	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C296	CAP,TANTAL,CHIP,MAKER	ECTZ0004204	100 uF,6.3V ,M ,STD ,3216 ,R/TP		
6	C297	CAP,TANTAL,CHIP,MAKER	ECTZ0004204	100 uF,6.3V ,M ,STD ,3216 ,R/TP		
6	C298	CAP,CERAMIC,CHIP	ECCH0000112	15 pF,50V,J,NP0,TC,1005,R/TP		
6	C299	CAP,CERAMIC,CHIP	ECCH0000126	68 pF,50V,J,NP0,TC,1005,R/TP		
6	C300	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	C301	CAP,CERAMIC,CHIP	ECCH0000142	820 pF,50V,K,X7R,HD,1005,R/TP		
6	C302	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C303	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C304	CAP,CERAMIC,CHIP	ECCH0000112	15 pF,50V,J,NP0,TC,1005,R/TP		
6	C305	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C306	CAP,FILM,MPP	ECFD0000103	10 nF,16V ,J ,NI ,SMD ,2012 mm,R/TP		
6	C307	CAP,CERAMIC,CHIP	ECCH0000127	82 pF,50V,J,NP0,TC,1005,R/TP		
6	C309	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C310	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C311	CAP,TANTAL,CHIP	ECTH0002202	4.7 uF,10V ,M ,STD ,1608 ,R/TP		
6	C312	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C313	CAP,FILM,MPP	ECFD0000102	22000 pF,16V ,J ,NI ,SMD ,3216 mm,R/TP		
6	C314	CAP,CERAMIC,CHIP	ECCH0000112	15 pF,50V,J,NP0,TC,1005,R/TP		
6	C315	CAP,CERAMIC,CHIP	ECCH0000112	15 pF,50V,J,NP0,TC,1005,R/TP		
6	C316	CAP,CERAMIC,CHIP	ECCH0000129	120 pF,50V,J,NP0,TC,1005,R/TP		
6	C317	CAP,TANTAL,CHIP	ECTH0002201	10 uF,6.3V ,M ,STD ,1608 ,R/TP		
6	C319	CAP,TANTAL,CHIP,MAKER	ECTZ0005601	33 uF,6.3V ,M ,L_ESR ,ETC ,R/TP		
6	C320	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C324	CAP,CERAMIC,CHIP	ECCH0000139	470 pF,50V,K,X7R,HD,1005,R/TP		
6	C325	CAP,CERAMIC,CHIP	ECCH0000139	470 pF,50V,K,X7R,HD,1005,R/TP		
6	C326	CAP,CERAMIC,CHIP	ECCH0000139	470 pF,50V,K,X7R,HD,1005,R/TP		
6	C328	CAP,CERAMIC,CHIP	ECCH0000139	470 pF,50V,K,X7R,HD,1005,R/TP		
6	C329	CAP,CERAMIC,CHIP	ECCH0000139	470 pF,50V,K,X7R,HD,1005,R/TP		
6	C330	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C331	CAP,CERAMIC,CHIP	ECCH0000139	470 pF,50V,K,X7R,HD,1005,R/TP		
6	C332	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C403	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C405	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C406	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C407	CAP,CERAMIC,CHIP	ECCH0005801	2.2 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C408	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C409	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C410	CAP,CERAMIC,CHIP	ECCH0005801	2.2 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C411	CAP,CERAMIC,CHIP	ECCH0000186	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		

10. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	C412	CAP,CERAMIC,CHIP	ECCH0000186	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C413	CAP,CERAMIC,CHIP	ECCH0005801	2.2 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C414	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C420	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C504	CAP,CERAMIC,CHIP	ECCH0005801	2.2 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C505	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C506	CAP,CERAMIC,CHIP	ECCH0005801	2.2 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C507	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C508	CAP,CERAMIC,CHIP	ECCH0005801	2.2 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C509	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C510	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C511	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C512	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C513	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C514	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C515	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C516	CAP,CERAMIC,CHIP	ECCH0005801	2.2 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C517	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C518	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C519	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C520	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C521	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C522	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C523	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C524	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C525	CAP,CERAMIC,CHIP	ECCH0000116	24 pF,50V,J,NP0,TC,1005,R/TP		
6	C526	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C527	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C528	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C529	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C530	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C532	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C534	CAP,TANTAL,CHIP,MAKER	ECTZ0005601	33 uF,6.3V ,M ,L_ESR ,ETC ,R/TP		
6	C535	CAP,CERAMIC,CHIP	ECCH0005801	2.2 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	C536	CAP,CERAMIC,CHIP	ECCH0005801	2.2 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C537	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C538	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C539	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C541	CAP,CERAMIC,CHIP	ECCH0000165	68 nF,6.3V,K,X5R,HD,1005,R/TP		
6	C542	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C611	FILTER,EMI/POWER	SFEY0006501	SMD ,3 TERMINAL EMI FILTER		
6	C613	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C614	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C615	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C624	CAP,CERAMIC,CHIP	ECCH0000165	68 nF,6.3V,K,X5R,HD,1005,R/TP		
6	C626	CAP,TANTAL,CHIP,MAKER	ECTZ0005601	33 uF,6.3V ,M ,L_ESR ,ETC ,R/TP		
6	C627	CAP,TANTAL,CHIP,MAKER	ECTZ0005601	33 uF,6.3V ,M ,L_ESR ,ETC ,R/TP		
6	C631	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C632	CAP,TANTAL,CHIP,MAKER	ECTZ0001302	10 uF,6.3V ,M ,STD ,2012 ,R/TP		
6	C633	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C634	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C644	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C646	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP		
6	C648	CAP,CERAMIC,CHIP	ECCH0000179	22 nF,16V ,K ,X5R ,HD ,1005 ,R/TP		
6	C651	CAP,CERAMIC,CHIP	ECCH0000157	15 nF,16V,K,X7R,HD,1005,R/TP		
6	C652	CAP,CERAMIC,CHIP	ECCH0000157	15 nF,16V,K,X7R,HD,1005,R/TP		
6	C653	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C654	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C657	CAP,CERAMIC,CHIP	ECCH0007701	1 uF,10V ,K ,X5R ,TC ,1608 ,R/TP		
6	C658	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C659	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	CN301	CONNECTOR,BOARD TO BOARD	ENBY0020401	24 PIN,0.4 mm,ETC , ,H=0.9, Socket		
6	CN302	CONN,RECEPTACLE	ENEY0004102	24 PIN,24 ,3 ,MOULD+SHIELD		
6	CN303	CONNECTOR,ETC	ENZY0013006	1 PIN,4.2 mm,ETC ,SN ,TERMINAL GROUND(4.2*1.6)		
6	CN304	CONN,JACK/PLUG, EARPHONE	ENJE0003602	12 ,12 PIN,MMIC CONN.12P		
6	D300	DIODE,TVS	EDTY0006201	SOD-323 ,12 V,350 W,R/TP ,Single Line TVS Diode for ESD		
6	D501	DIODE,SWITCHING	EDSY0010001	UMD2 ,30 V,2 A,R/TP ,SCHOTTKY BARRIER DIODE		

10. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	D502	DIODE,TVS	EDTY0001901	SOD-323 ,6 V,350 W,R/TP ,Junction capacitance:350 pF		
6	D503	DIODE,TVS	EDTY0007601	SC-89 ,5 V,100 W,R/TP ,5 Channel Array , Vc 12V , 75pF , 1.6*1.625*0.58		
6	D504	DIODE,SWITCHING	EDSY0010001	UMD2 ,30 V,2 A,R/TP ,SCHOTTKY BARRIER DIODE		
6	D505	DIODE,SWITCHING	EDSY0010001	UMD2 ,30 V,2 A,R/TP ,SCHOTTKY BARRIER DIODE		
6	D520	DIODE,SWITCHING	EDSY0010001	UMD2 ,30 V,2 A,R/TP ,SCHOTTKY BARRIER DIODE		
6	D599	DIODE,TVS	EDTY0007601	SC-89 ,5 V,100 W,R/TP ,5 Channel Array , Vc 12V , 75pF , 1.6*1.625*0.58		
6	FB200	FILTER,BEAD,CHIP	SFBH0000903	600 ohm,1005 ,		
6	FB201	FILTER,BEAD,CHIP	SFBH0000903	600 ohm,1005 ,		
6	FB300	FILTER,BEAD,CHIP	SFBH0001501	120 ohm,1608 ,		
6	FB301	FILTER,BEAD,CHIP	SFBH0000909	60 ohm,1005 ,		
6	FB303	FILTER,BEAD,CHIP	SFBH0000909	60 ohm,1005 ,		
6	FB305	FILTER,BEAD,CHIP	SFBH0000903	600 ohm,1005 ,		
6	L229	INDUCTOR,CHIP	ELCH0001001	10 nH,J ,1005 ,R/TP ,Pb Free		
6	L402	FILTER,BEAD,CHIP	SFBH0008901	30 ohm,2012 ,3000mA, BEAD for LARGE CURRENT		
6	L403	FILTER,BEAD,CHIP	SFBH0008901	30 ohm,2012 ,3000mA, BEAD for LARGE CURRENT		
6	L500	INDUCTOR,SMD,POWER	ELCP0006702	4.7 uH,M ,3.2 * 2.6 * 1.0 ,R/TP ,		
6	L501	INDUCTOR,SMD,POWER	ELCP0006702	4.7 uH,M ,3.2 * 2.6 * 1.0 ,R/TP ,		
6	L502	INDUCTOR,SMD,POWER	ELCP0006702	4.7 uH,M ,3.2 * 2.6 * 1.0 ,R/TP ,		
6	L505	INDUCTOR,SMD,POWER	ELCP0006702	4.7 uH,M ,3.2 * 2.6 * 1.0 ,R/TP ,		
6	L506	INDUCTOR,CHIP	ELCH0005013	4.7 nH,S ,1005 ,R/TP ,		
6	L507	INDUCTOR,CHIP	ELCH0005011	1.5 nH,S ,1005 ,R/TP ,		
6	L508	INDUCTOR,CHIP	ELCH0005011	1.5 nH,S ,1005 ,R/TP ,		
6	Q500	TR,BJT,PNP	EQBP0008701	SC-62 ,0.6 W,R/TP ,PNP TRANSISTOR		
6	Q502	TR,FET,P-CHANNEL	EQFP0004701	TSOP6 ,1.5 W,20 V,-5 A,R/TP ,P-CHANNEL 20-V(D-S) MOSFET, Pb free		
6	Q506	TR,BJT,NPN	EQBN0003901	EM3,0.15W,R/TP		
6	Q507	TR,BJT,ARRAY	EQBA0000301	SC-88A,0.15W,R/TP,NPN/PNP DUAL		
6	Q511	TR,FET,N-CHANNEL	EQFN0007002	SOT-23 ,0.75 W,20 V,4.9 A,R/TP ,0.33 at Vgs=4.5V, Pb Free		
6	R114	RES,CHIP	ERHY0000274	51K ohm,1/16W,J,1005,R/TP		
6	R115	RES,CHIP	ERHY0000112	1K ohm,1/16W,F,1005,R/TP		
6	R221	INDUCTOR,CHIP	ELCH0001427	2.2 nH,S ,1005 ,R/TP ,Pb Free		
6	R222	RES,CHIP	ERHY0000201	0 ohm,1/16W,J,1005,R/TP		
6	R223	RES,CHIP	ERHY0000201	0 ohm,1/16W,J,1005,R/TP		
6	R224	RES,CHIP	ERHY0000201	0 ohm,1/16W,J,1005,R/TP		

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	R225	RES,CHIP	ERHY0000220	100 ohm,1/16W,J,1005,R/TP		
6	R226	RES,CHIP	ERHY0000263	15K ohm,1/16W,J,1005,R/TP		
6	R227	RES,CHIP	ERHY0000220	100 ohm,1/16W,J,1005,R/TP		
6	R228	RES,CHIP	ERHY0000205	15 ohm,1/16W,J,1005,R/TP		
6	R229	RES,CHIP	ERHY0000228	270 ohm,1/16W,J,1005,R/TP		
6	R230	RES,CHIP	ERHY0000245	1.8K ohm,1/16W,J,1005,R/TP		
6	R231	RES,CHIP	ERHY0000250	3.3K ohm,1/16W,J,1005,R/TP		
6	R232	RES,CHIP	ERHY0000214	51 ohm,1/16W,J,1005,R/TP		
6	R233	RES,CHIP	ERHY0000225	200 ohm,1/16W,J,1005,R/TP		
6	R234	RES,CHIP	ERHY0008201	24 ohm,1/16W ,J ,1005 ,R/TP		
6	R235	RES,CHIP	ERHY0000226	220 ohm,1/16W,J,1005,R/TP		
6	R236	RES,CHIP	ERHY0000223	150 ohm,1/16W,J,1005,R/TP		
6	R237	RES,CHIP	ERHY0000220	100 ohm,1/16W,J,1005,R/TP		
6	R238	RES,CHIP	ERHY0000213	47 ohm,1/16W,J,1005,R/TP		
6	R239	RES,CHIP	ERHY0000218	82 ohm,1/16W,J,1005,R/TP		
6	R240	RES,CHIP	ERHY0000220	100 ohm,1/16W,J,1005,R/TP		
6	R300	RES,CHIP,MAKER	ERHZ0000530	5.1 Kohm,1/16W ,J ,1005 ,R/TP		
6	R302	RES,CHIP,MAKER	ERHZ0000530	5.1 Kohm,1/16W ,J ,1005 ,R/TP		
6	R303	RES,CHIP	ERHY0000233	470 ohm,1/16W,J,1005,R/TP		
6	R304	RES,CHIP	ERHY0000233	470 ohm,1/16W,J,1005,R/TP		
6	R305	RES,CHIP	ERHY0000233	470 ohm,1/16W,J,1005,R/TP		
6	R306	RES,CHIP	ERHY0000233	470 ohm,1/16W,J,1005,R/TP		
6	R307	RES,CHIP	ERHY0000233	470 ohm,1/16W,J,1005,R/TP		
6	R308	RES,CHIP	ERHY0000233	470 ohm,1/16W,J,1005,R/TP		
6	R309	RES,CHIP	ERHY0000201	0 ohm,1/16W,J,1005,R/TP		
6	R401	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP		
6	R403	RES,CHIP	ERHY0008202	62 ohm,1/16W ,J ,1005 ,R/TP		
6	R405	RES,CHIP	ERHY0000214	51 ohm,1/16W,J,1005,R/TP		
6	R501	RES,CHIP	ERHY0000154	120K ohm,1/16W,F,1005,R/TP		
6	R502	RES,CHIP	ERHY0000125	10K ohm,1/16W,F,1005,R/TP		
6	R503	RES,CHIP,MAKER	ERHZ0003901	.1 ohm,1/4W ,F ,2012 ,R/TP		
6	R504	RES,CHIP	ERHY0000214	51 ohm,1/16W,J,1005,R/TP		
6	R505	RES,CHIP	ERHY0000273	47K ohm,1/16W,J,1005,R/TP		
6	R509	RES,CHIP	ERHY0000149	68K ohm,1/16W,F,1005,R/TP		

10. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	R605	RES,CHIP	ERHY0000201	0 ohm,1/16W,J,1005,R/TP		
6	R609	RES,CHIP	ERHY0000261	10K ohm,1/16W,J,1005,R/TP		
6	R611	RES,CHIP	ERHY0000263	15K ohm,1/16W,J,1005,R/TP		
6	R613	RES,CHIP	ERHY0000169	470000 ohm,1/16W ,F ,1005 ,R/TP		
6	R614	RES,CHIP	ERHY0000199	680 Kohm,1/16W ,F ,1005 ,R/TP		
6	R622	RES,CHIP	ERHY0000151	80.6K ohm,1/16W,F,1005,R/TP		
6	R623	RES,CHIP	ERHY0000151	80.6K ohm,1/16W,F,1005,R/TP		
6	R624	RES,CHIP	ERHY0000201	0 ohm,1/16W,J,1005,R/TP		
6	R625	RES,CHIP	ERHY0000261	10K ohm,1/16W,J,1005,R/TP		
6	R626	RES,CHIP	ERHY0000247	2.2K ohm,1/16W,J,1005,R/TP		
6	R627	RES,CHIP	ERHY0000247	2.2K ohm,1/16W,J,1005,R/TP		
6	R636	RES,CHIP	ERHY0000241	1K ohm,1/16W,J,1005,R/TP		
6	R640	FILTER,BEAD,CHIP	SFBH0000903	600 ohm,1005 ,		
6	R641	FILTER,BEAD,CHIP	SFBH0000903	600 ohm,1005 ,		
6	R644	RES,CHIP	ERHY0000141	39K ohm,1/16W,F,1005,R/TP		
6	R648	RES,CHIP	ERHY0000112	1K ohm,1/16W,F,1005,R/TP		
6	R649	RES,CHIP	ERHY0000112	1K ohm,1/16W,F,1005,R/TP		
6	R652	RES,CHIP	ERHY0000274	51K ohm,1/16W,J,1005,R/TP		
6	RF200	CONN,RF SWITCH	ENWY0003001	STRAIGHT ,SMD ,0.6 dB,3.8X3.0X3.6T		
6	RT500	THERMISTOR	SETY0000903	NTC ,68000 ohm,SMD ,+/- 10% / 2012 SIZE, Pb Free		
6	TR400	IC	EUSY0129501	SC-74A ,3 PIN,R/TP ,HALL-EFFECT SWITCH, Pb Free		
6	U207	FILTER,SEPERATOR	SFAY0004601	, , dB, dB, dB, dB,ETC ,16 PIN / 4.2*3.5*1.4 / GSM-WCDMA SP6T		
6	U208	VCO	EXSC0008301	1712 MHz, PPM,22 pF,SMD ,5.0*4.0*1.3 ,1688MHz ~ 1736MHz, 8pin		
6	U209	PAM	SMPY0008301	35 dBm,53 %,0.0000025 A, dBc,50 dB,6.0*6.0*1.2 ,SMD ,FOR QUAD BAND GSM AND GPRS		
6	U210	VCO	EXSC0009201	MHz, PPM, pF,SMD ,5.5*4.8*1.5 ,824MHz ~ 915MHz, 1710MHz ~ 1910MHz, 14pin		
6	U404	DIODE,TVS	EDTY0007801	SC-70 ,5 V,150 W,R/TP ,LOW CAPACITANCE TVS ARRAY		
6	U406	MODULE,ETC	SMZY0009501	Bluetooth RF Module, 5.0*4.0*1.1		
6	U407	CONN,SOCKET	ENSY0009901	8 PIN,ETC ,SMD ,2.54 mm,2.2T UIM CONNECTOR WITH BRIDGE		
6	U408	DIODE,TVS	EDTY0007801	SC-70 ,5 V,150 W,R/TP ,LOW CAPACITANCE TVS ARRAY		
6	U501	IC	EUSY0203701	BCC ,84 PIN,R/TP ,POWER MANAGEMENT IC		
6	U605	IC	EUSY0160001	MicroStar Junior ,15 PIN,R/TP ,1.1W Class-D Mono Audio AMP		

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	VA1	VARISTOR	SEVY0001001	14 V, ,SMD ,50pF, 1005		
6	VA2	VARISTOR	SEVY0001001	14 V, ,SMD ,50pF, 1005		
6	VA3	VARISTOR	SEVY0001001	14 V, ,SMD ,50pF, 1005		
6	VA4	VARISTOR	SEVY0001001	14 V, ,SMD ,50pF, 1005		
6	VA5	VARISTOR	SEVY0001001	14 V, ,SMD ,50pF, 1005		
6	VA6	VARISTOR	SEVY0001001	14 V, ,SMD ,50pF, 1005		
6	VA7	VARISTOR	SEVY0001001	14 V, ,SMD ,50pF, 1005		
6	VA8	VARISTOR	SEVY0001001	14 V, ,SMD ,50pF, 1005		
6	X500	X-TAL	EXXY0004602	.032768 MHz,20 PPM,12.5 pF,65000 ohm,SMD ,6.9*1.4*1.3 ,		
5	SAFD00	PCB ASSY,MAIN,SMT TOP	SAFD0055001			
6	BAT500	BATTERY,CELL,LITHIUM	SBCL0001305	3 V,1 mAh,COIN ,SMT Temp.260 degree. PB-Free B/B		
6	C100	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C101	CAP,CERAMIC,CHIP	ECCH0000157	15 nF,16V,K,X7R,HD,1005,R/TP		
6	C103	CAP,TANTAL,CHIP,MAKER	ECTZ0001302	10 uF,6.3V ,M ,STD ,2012 ,R/TP		
6	C104	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C105	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C106	CAP,CERAMIC,CHIP	ECCH0000157	15 nF,16V,K,X7R,HD,1005,R/TP		
6	C107	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C108	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C109	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C110	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C111	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C112	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C113	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C114	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C116	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C117	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C118	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C119	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C120	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C121	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C122	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C123	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C124	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		

10. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	C125	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C126	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C127	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C128	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C129	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C130	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C131	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C132	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C133	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C134	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C135	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C136	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C137	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C138	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C139	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C140	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C141	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C142	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C143	CAP,CERAMIC,CHIP	ECCH0000161	33 nF,16V,K,X7R,HD,1005,R/TP		
6	C144	CAP,TANTAL,CHIP,MAKER	ECTZ0001302	10 uF,6.3V ,M ,STD ,2012 ,R/TP		
6	C200	CAP,CERAMIC,CHIP	ECCH0000102	1 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C201	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C202	CAP,CERAMIC,CHIP	ECCH0000111	12 pF,50V,J,NP0,TC,1005,R/TP		
6	C203	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C204	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C205	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C206	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C207	CAP,TANTAL,CHIP	ECTH0002202	4.7 uF,10V ,M ,STD ,1608 ,R/TP		
6	C208	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C209	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C210	CAP,CERAMIC,CHIP	ECCH0000111	12 pF,50V,J,NP0,TC,1005,R/TP		
6	C211	CAP,CERAMIC,CHIP	ECCH0000102	1 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C212	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C213	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	C214	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C215	CAP,CERAMIC,CHIP	ECCH0000102	1 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C216	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C217	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C218	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C219	CAP,TANTAL,CHIP	ECTH0002202	4.7 uF,10V ,M ,STD ,1608 ,R/TP		
6	C220	CAP,CERAMIC,CHIP	ECCH0000111	12 pF,50V,J,NP0,TC,1005,R/TP		
6	C221	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C222	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C223	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C224	CAP,CERAMIC,CHIP	ECCH0000107	6 pF,50V,D,NP0,TC,1005,R/TP		
6	C225	CAP,CERAMIC,CHIP	ECCH0000165	68 nF,6.3V,K,X5R,HD,1005,R/TP		
6	C226	CAP,CERAMIC,CHIP	ECCH0000109	8 pF,50V,D,NP0,TC,1005,R/TP		
6	C227	CAP,CHIP,MAKER	ECZH0002909	9 pF,50V ,D ,NP0 ,TC ,1005 ,R/TP		
6	C228	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C229	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C231	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C232	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C233	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C234	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C235	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C236	CAP,CERAMIC,CHIP	ECCH0000145	1.5 nF,50V,K,X7R,HD,1005,R/TP		
6	C237	CAP,CERAMIC,CHIP	ECCH0000186	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C238	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C239	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C240	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C241	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C242	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C244	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C245	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C246	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C247	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C248	CAP,CERAMIC,CHIP	ECCH0000186	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C249	CAP,CERAMIC,CHIP	ECCH0000111	12 pF,50V,J,NP0,TC,1005,R/TP		

10. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	C250	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C251	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C252	CAP,CERAMIC,CHIP	ECCH0000151	4.7 nF,25V,K,X7R,HD,1005,R/TP		
6	C253	CAP,CERAMIC,CHIP	ECCH0000186	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C255	CAP,CERAMIC,CHIP	ECCH0000107	6 pF,50V,D,NP0,TC,1005,R/TP		
6	C256	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP		
6	C257	CAP,TANTAL,CHIP	ECTH0002202	4.7 uF,10V ,M ,STD ,1608 ,R/TP		
6	C258	CAP,CERAMIC,CHIP	ECCH0000186	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C259	CAP,TANTAL,CHIP,MAKER	ECTZ0001302	10 uF,6.3V ,M ,STD ,2012 ,R/TP		
6	C260	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C261	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C262	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP		
6	C263	CAP,CERAMIC,CHIP	ECCH0000128	100 pF,50V,J,NP0,TC,1005,R/TP		
6	C264	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C265	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C266	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C267	CAP,CERAMIC,CHIP	ECCH0000138	390 pF,50V,K,X7R,HD,1005,R/TP		
6	C268	CAP,CERAMIC,CHIP	ECCH0000186	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C269	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C270	CAP,TANTAL,CHIP	ECTH0002202	4.7 uF,10V ,M ,STD ,1608 ,R/TP		
6	C271	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C272	CAP,TANTAL,CHIP	ECTH0002202	4.7 uF,10V ,M ,STD ,1608 ,R/TP		
6	C273	CAP,FILM,MPP	ECFD0000703	3900 pF,16V ,J ,NI ,SMD ,2012 mm,R/TP		
6	C274	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C275	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C276	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C282	CAP,TANTAL,CHIP	ECTH0002202	4.7 uF,10V ,M ,STD ,1608 ,R/TP		
6	C308	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C400	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C401	CAP,CERAMIC,CHIP	ECCH0000179	22 nF,16V ,K ,X5R ,HD ,1005 ,R/TP		
6	C402	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C404	CAP,CERAMIC,CHIP	ECCH0000179	22 nF,16V ,K ,X5R ,HD ,1005 ,R/TP		
6	C500	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C503	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	C600	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C601	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C602	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C603	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C604	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C605	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C606	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C607	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C608	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C609	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C610	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C612	CAP,CERAMIC,CHIP	ECCH0000167	0.1 uF,6.3V,K,X5R,HD,1005,R/TP		
6	C618	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C619	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C621	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C622	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C625	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C639	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C642	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C643	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C645	CAP,CERAMIC,CHIP	ECCH0000101	.5 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C647	CAP,CERAMIC,CHIP	ECCH0000165	68 nF,6.3V,K,X5R,HD,1005,R/TP		
6	C649	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C650	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C655	CAP,TANTAL,CHIP	ECTH0002202	4.7 uF,10V ,M ,STD ,1608 ,R/TP		
6	C656	CAP,CERAMIC,CHIP	ECCH0000139	470 pF,50V,K,X7R,HD,1005,R/TP		
6	CN300	CONNECTOR,BOARD TO BOARD	ENBY0004302	60 PIN,0.5 mm,STRAIGHT ,Au ,B to B CNT(Socket)		
6	D500	DIODE,SWITCHING	EDSY0010001	UMD2 ,30 V,2 A,R/TP ,SCHOTTKY BARRIER DIODE		
6	D510	DIODE,SWITCHING	EDSY0010001	UMD2 ,30 V,2 A,R/TP ,SCHOTTKY BARRIER DIODE		
6	FB502	FILTER,BEAD,CHIP	SFBH0000903	600 ohm,1005 ,		
6	FB503	FILTER,BEAD,CHIP	SFBH0000903	600 ohm,1005 ,		
6	FL200	FILTER,SAW	SFSY0016901	2140 MHz,2.5*2.0*0.8 ,SMD ,WCDMA RX RF SAW FILTER		
6	FL201	FILTER,SAW	SFSY0021701	942.5 MHz,2.0*1.4*0.68 ,SMD ,5pin, Unbal-Bal, 50//150		

10. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	FL202	FILTER,SAW	SFSY0021801	1842.5 MHz,2.0*1.4*0.68 ,SMD ,5pin, Unbal-Bal, 50//150		
6	FL203	FILTER,SAW	SFSY0025501	1960 MHz,2.0*1.4*0.68 ,SMD ,Balanced Output (150ohm)		
6	FL204	FILTER,SAW	SFSY0023001	1950 MHz,2.0*1.4*0.8 ,SMD ,5pin, Unbal-Unbal, 50//50		
6	L200	INDUCTOR,CHIP	ELCH0001004	8.2 nH,J ,1005 ,R/TP ,Pb Free		
6	L201	INDUCTOR,CHIP	ELCH0001427	2.2 nH,S ,1005 ,R/TP ,Pb Free		
6	L202	INDUCTOR,CHIP	ELCH0005012	3.9 nH,S ,1005 ,R/TP ,		
6	L203	INDUCTOR,CHIP	ELCH0001001	10 nH,J ,1005 ,R/TP ,Pb Free		
6	L204	INDUCTOR,CHIP	ELCH0005012	3.9 nH,S ,1005 ,R/TP ,		
6	L205	INDUCTOR,CHIP	ELCH0005013	4.7 nH,S ,1005 ,R/TP ,		
6	L206	INDUCTOR,CHIP	ELCH0001001	10 nH,J ,1005 ,R/TP ,Pb Free		
6	L207	INDUCTOR,CHIP	ELCH0005119	47 nH,J ,1005 ,R/TP ,		
6	L208	INDUCTOR,CHIP	ELCH0005119	47 nH,J ,1005 ,R/TP ,		
6	L209	INDUCTOR,CHIP	ELCH0001004	8.2 nH,J ,1005 ,R/TP ,Pb Free		
6	L210	INDUCTOR,CHIP	ELCH0001004	8.2 nH,J ,1005 ,R/TP ,Pb Free		
6	L211	INDUCTOR,CHIP	ELCH0005004	22 nH,J ,1005 ,R/TP ,		
6	L212	INDUCTOR,CHIP	ELCH0005113	15 nH,J ,1005 ,R/TP ,		
6	L213	INDUCTOR,CHIP	ELCH0005113	15 nH,J ,1005 ,R/TP ,		
6	L214	INDUCTOR,CHIP	ELCH0009301	7.5 nH,S ,1005 ,R/TP ,COIL		
6	L215	INDUCTOR,CHIP	ELCH0009301	7.5 nH,S ,1005 ,R/TP ,COIL		
6	L216	INDUCTOR,CHIP	ELCH0005004	22 nH,J ,1005 ,R/TP ,		
6	L217	INDUCTOR,CHIP	ELCH0005004	22 nH,J ,1005 ,R/TP ,		
6	L218	INDUCTOR,CHIP	ELCH0005006	33 nH,J ,1005 ,R/TP ,		
6	L219	INDUCTOR,CHIP	ELCH0005006	33 nH,J ,1005 ,R/TP ,		
6	L220	INDUCTOR,CHIP	ELCH0009301	7.5 nH,S ,1005 ,R/TP ,COIL		
6	L221	INDUCTOR,CHIP	ELCH0009301	7.5 nH,S ,1005 ,R/TP ,COIL		
6	L222	INDUCTOR,CHIP	ELCH0005003	12 nH,J ,1005 ,R/TP ,		
6	L223	INDUCTOR,CHIP	ELCH0005003	12 nH,J ,1005 ,R/TP ,		
6	L224	INDUCTOR,CHIP	ELCH0010401	2.2 uH,M ,1005 ,R/TP ,		
6	L225	INDUCTOR,CHIP	ELCH0010401	2.2 uH,M ,1005 ,R/TP ,		
6	L226	INDUCTOR,CHIP	ELCH0005014	5.6 nH,S ,1005 ,R/TP ,		
6	L227	INDUCTOR,CHIP	ELCH0010401	2.2 uH,M ,1005 ,R/TP ,		
6	L228	INDUCTOR,CHIP	ELCH0010401	2.2 uH,M ,1005 ,R/TP ,		
6	Q200	TR,FET,P-CHANNEL	EQFP0004701	TSOP6 ,1.5 W,20 V,-5 A,R/TP ,P-CHANNEL 20-V(D-S) MOSFET, Pb free		
6	Q504	TR,BJT,ARRAY	EQBA0000301	SC-88A,0.15W,R/TP,NPN/PNP DUAL		

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	Q505	TR,BJT,ARRAY	EQBA0000301	SC-88A,0.15W,R/TP,NPN/PNP DUAL		
6	R100	RES,CHIP	ERHY0000169	470000 ohm,1/16W ,F ,1005 ,R/TP		
6	R101	RES,CHIP	ERHY0000160	180K ohm,1/16W,F,1005,R/TP		
6	R102	RES,CHIP	ERHY0000125	10K ohm,1/16W,F,1005,R/TP		
6	R103	RES,CHIP	ERHY0000125	10K ohm,1/16W,F,1005,R/TP		
6	R104	RES,CHIP	ERHY0000160	180K ohm,1/16W,F,1005,R/TP		
6	R105	RES,CHIP	ERHY0000208	22 ohm,1/16W,J,1005,R/TP		
6	R106	RES,CHIP	ERHY0005902	5.62 Kohm,1/16W ,F ,1005 ,R/TP		
6	R107	RES,CHIP	ERHY0005902	5.62 Kohm,1/16W ,F ,1005 ,R/TP		
6	R108	RES,CHIP	ERHY0000274	51K ohm,1/16W,J,1005,R/TP		
6	R109	RES,CHIP	ERHY0000274	51K ohm,1/16W,J,1005,R/TP		
6	R110	RES,CHIP	ERHY0000274	51K ohm,1/16W,J,1005,R/TP		
6	R111	RES,CHIP	ERHY0000274	51K ohm,1/16W,J,1005,R/TP		
6	R112	RES,CHIP	ERHY0000274	51K ohm,1/16W,J,1005,R/TP		
6	R113	RES,CHIP	ERHY0000246	2K ohm,1/16W,J,1005,R/TP		
6	R200	RES,CHIP	ERHY0000220	100 ohm,1/16W,J,1005,R/TP		
6	R201	RES,CHIP	ERHY0005902	5.62 Kohm,1/16W ,F ,1005 ,R/TP		
6	R202	RES,CHIP	ERHY0000214	51 ohm,1/16W,J,1005,R/TP		
6	R203	RES,CHIP	ERHY0000208	22 ohm,1/16W,J,1005,R/TP		
6	R204	RES,CHIP	ERHY0000106	100 ohm,1/16W,F,1005,R/TP		
6	R205	RES,CHIP	ERHY0008204	5.1 ohm,1/16W ,J ,1005 ,R/TP		
6	R206	RES,CHIP	ERHY0000151	80.6K ohm,1/16W,F,1005,R/TP		
6	R207	RES,CHIP	ERHY0000169	470000 ohm,1/16W ,F ,1005 ,R/TP		
6	R208	RES,CHIP	ERHY0000182	1.8 Kohm,1/16W ,F ,1005 ,R/TP		
6	R209	RES,CHIP	ERHY0000261	10K ohm,1/16W,J,1005,R/TP		
6	R210	RES,CHIP	ERHY0011601	11 Kohm,1/16W ,F ,1005 ,R/TP		
6	R211	RES,CHIP	ERHY0000214	51 ohm,1/16W,J,1005,R/TP		
6	R212	RES,CHIP	ERHY0000228	270 ohm,1/16W,J,1005,R/TP		
6	R213	RES,CHIP	ERHY0000241	1K ohm,1/16W,J,1005,R/TP		
6	R214	RES,CHIP	ERHY0000201	0 ohm,1/16W,J,1005,R/TP		
6	R215	RES,CHIP	ERHY0000203	10 ohm,1/16W,J,1005,R/TP		
6	R216	RES,CHIP	ERHY0000250	3.3K ohm,1/16W,J,1005,R/TP		
6	R217	RES,CHIP	ERHY0000203	10 ohm,1/16W,J,1005,R/TP		
6	R218	RES,CHIP	ERHY0000256	6.2K ohm,1/16W,J,1005,R/TP		

10. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	R219	RES,CHIP	ERHY0000220	100 ohm,1/16W,J,1005,R/TP		
6	R220	RES,CHIP	ERHY0011601	11 Kohm,1/16W ,F ,1005 ,R/TP		
6	R400	RES,CHIP	ERHY0000247	2.2K ohm,1/16W,J,1005,R/TP		
6	R402	RES,CHIP	ERHY0000247	2.2K ohm,1/16W,J,1005,R/TP		
6	R404	RES,CHIP	ERHY0000202	4.7 ohm,1/16W,J,1005,R/TP		
6	R500	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP		
6	R550	RES,CHIP	ERHY0000261	10K ohm,1/16W,J,1005,R/TP		
6	R600	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP		
6	R601	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP		
6	R603	RES,CHIP	ERHY0000261	10K ohm,1/16W,J,1005,R/TP		
6	R604	RES,CHIP	ERHY0000261	10K ohm,1/16W,J,1005,R/TP		
6	R615	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP		
6	R616	RES,CHIP	ERHY0008202	62 ohm,1/16W ,J ,1005 ,R/TP		
6	R617	RES,CHIP	ERHY0006102	390 Kohm,1/16W ,J ,1005 ,R/TP		
6	R633	RES,CHIP	ERHY0000169	470000 ohm,1/16W ,F ,1005 ,R/TP		
6	R637	RES,CHIP	ERHY0000199	680 Kohm,1/16W ,F ,1005 ,R/TP		
6	R651	RES,CHIP	ERHY0000201	0 ohm,1/16W,J,1005,R/TP		
6	R653	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP		
6	R654	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP		
6	R655	RES,CHIP	ERHY0000280	100K ohm,1/16W,J,1005,R/TP		
6	RT200	THERMISTOR	SETY0000903	NTC ,68000 ohm,SMD ,+/- 10% / 2012 SIZE, Pb Free		
6	S600	CONN,SOCKET	ENSY0014101	8 PIN,ETC , ,1.1 mm,T-Flash Memory Socket		
6	U100	IC	EUSY0202101	BALL CSP ,409 PIN,R/TP ,WCDMA/GSM/GPRS MODEM		
6	U200	IC	EUSY0161001	BCCP ,40 PIN,R/TP ,WCDMA RF TO B/B RECEIVER IC		
6	U201	IC	EUSY0160901	BCCP ,16 PIN,R/TP ,WCDMA LNA IC		
6	U202	DUPLEXER,IMT	SDMY0000802	1950 MHz,2140 MHz,1.2 dB,1.5 dB,60 dB,48 dB,5.5*5.1*1.66 ,SMD ,Dielectric Duplexer		
6	U203	IC	EUSY0186101	4-Bump micro SMD ,4 PIN,R/TP ,RF POWER DETECTOR FOR CDMA/WCDMA		
6	U204	PAM	SMPY0008201	28 dBm,42.0 %,0.07 A,-52.0 dBc,27.5 dB,4*4*1.5 ,SMD ,LOAD INSENSITIVE PAM FOR WCDMA (1850-1980M)		
6	U205	IC	EUSY0203801	QFN ,56 PIN,R/TP ,GSM/WCDMA TRANSMITTER & GSM RECEIVER		
6	U206	VCTCXO	EXSK0005003	19.2 MHz,2 PPM,10 pF,SMD ,3.2*2.5*1.1 ,		
6	U400	IC	EUSY0176902	SOT23-5 ,5 PIN,R/TP ,1.8V 150mA LDO		
6	U401	DIODE,TVS	EDTY0007601	SC-89 ,5 V,100 W,R/TP ,5 Channel Array , Vc 12V , 75pF , 1.6*1.625*0.58		

Level	Location No.	Description	Part Number	Specification	Color	Remark
6	U500	IC	EUSY0084701	SSOP5-P-A ,6 PIN,R/TP ,Inverter, Pb Free		
6	U600	DIODE,TVS	EDTY0007801	SC-70 ,5 V,150 W,R/TP ,LOW CAPACITANCE TVS ARRAY		
6	U601	IC	EUSY0216702	TFBGA ,225 PIN,ETC ,512M(X8) NAND+512M(256*2/32 BITS IO) SDRAM / LEAD FREE		
6	U603	IC	EUSY0119001	10 uMAX ,10 PIN,R/TP ,DUAL SPDT ANALOG SWITCH, Pb Free		
6	U604	IC	EUSY0129501	SC-74A ,3 PIN,R/TP ,HALL-EFFECT SWITCH, Pb Free		
6	U606	IC	EUSY0176902	SOT23-5 ,5 PIN,R/TP ,1.8V 150mA LDO		
6	U607	IC	EUSY0008901	SOT-23-5 ,5 PIN,R/TP ,REGULATOR, PBFREE		
6	X100	X-TAL	EXXY0015501	48 MHz,50 PPM,12 pF,40 ohm,SMD ,3.2*2.5*0.7 ,		
5	SPFY	PCB,MAIN	SPFY0098601	FR-4 ,0.85 mm,STAGGERED-8 ,3-6BVH		
3	SUMY00	MICROPHONE	SUMY0010701	UNIT ,42 dB,4*1.5 ,Spring type		

10.3 Accessory

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

Level	Location No.	Description	Part Number	Specification	Color	Remark
3	MHBY00	HANDSTRAP	MHBY0002101	T5100 RUSSV Square Coupling, Cow Leather	Metal Silver	
3	SBPL00	BATTERY PACK,LI-ION	SBPL0072221	3.7 V,1400 mAh,1 CELL,PRISMATIC ,U8130 BATTERY(Li-Polymer) 1400mA(Typical)	Silver	
3	SGDY00	DATA CABLE	SGDY0005601	DK-40G ,K8000 24PIN I/O + USB A TYPE		
3	SGEY00	EAR PHONE/EAR MIKE SET	SGEY0005504	U8200,8210 ,REMOCON E-MIC		
3	SSAD00	ADAPTOR,AC-DC	SSAD0007848	FREE ,50 Hz,4.6 V,0.8 A,CE ,3G		