Features of CX830

1. Wave Type

- CELLULAR : G7W
- PCS: G7W

2. Frequency Scope

Transmit Frequency (MHz)		Receive Frequency (MHz)		
CELLULAR	**PCS**	**CELLULAR**	**PCS**	**GPS**
824.82 ~ 848.19	1850~1910	869.82~893.19	1930~1990	1575.42

3. Rated Output Power : CELLULAR = 0.25W

PCS = 0.25W

4. Output Conversion Method : This is possible by correcting the key board channel.

5. Voltage and Current Value of Termination Part Amplifier (Catalogue included)

MODE	Part Name	Voltage	Current	Power
CELLULAR	AWT6307R	4.2V	400mA	0.25W
PCS	AWT6308R	4.2V	400mA	0.25W

6. Functions of Major Semi-Conductors

Classification	Function
MSM6500	Terminal operation control and digital signal processing
Memory MCP (TY9000A000BMGF)	Flash Memory (1024Mbit) + SDRAM (512Mbit) Storing of terminal operation program
RFR6500	Converts Rx RF signal to baseband signal
RFT6150	Converts baseband signal to Tx RF signal

7. Frequency Stability

- CELLULAR : ±0.5PPM
- PCS : ±0.1PPM

CDMA Mobile Subscriber Unit
CX830

SERVICE MANUAL

DUAL BAND CDMA
[PCS/Cellular/w/GPS]
CDMA MOBILE PHONE

Table of Contents

General Introduction

The CX830 phone has been designed to operate on the latest digital mobile communication technology, Code Division Multiple Access (CDMA). This CDMA digital technology has greatly enhanced voice clarity and can provide a variety of advanced features. Currently, CDMA mobile communication technology has been commercially used in Cellular and Personal Communication Service (PCS). The difference between them is the operating frequency spectrum. Cellular uses 800MHz and PCS uses 1.9GHz. The CX830 support GPS Mode, we usually call it tri-band phone. Also, CX830 works on Advanced Mobile Phone Service (S-GPS). We call it dual-mode phone. If one of the Cellular, PCS base stations is located nearby, Call fail rate of triple-mode phone is less than dual-mode phone or single-mode phone.

The CDMA technology adopts DSSS (Direct Sequence Spread Spectrum). This feature of DSSS enables the phone to keep communication from being crossed and to use one frequency channel by multiple users in the same specific area, resulting that it increases the capacity 10 times more compared with that in the analog mode currently used. Soft/Softer Handoff, Hard Handoff, and Dynamic RF power Control technologies are combined into this phone to reduce the call being interrupted in a middle of talking over the phone.

Cellular and PCS CDMA network consists of MSO (Mobile Switching Office), BSC (Base Station Controller), BTS (Base station Transmission System), and MS (Mobile Station). The following table lists some major CDMA Standards.

CDMA Standard	Designator	Description
Basic air interface	TIA/EIA/IS-95-A/B/C ANSI J-STD-008	Protocol between MS and BTS for Cellular & AMPS Protocol between MS and BTS for PCS
Network	TIA/EIA/IS-634 TIA/EIA/IS/651 TIA/EIA/IS-41-C TIA/EIA/IS-124	MAS-BS PCSC-RS Intersystem operations Nom-signaling data comm.
Service	TIA/EIA/IS-96-B TIA/EIA/IS-99 TIA/EIA/IS-637 TIA/EIA/IS-657	Speech CODEC Assign data and fax Short message service Packet data
Performance	TIA/EIA/IS-97 TIA/EIA/IS-98 ANSI J-STD-018 ANSI J-STD-019 TIA/EIA/IS-125	Cellular base station Cellular mobile station PCS personal station PCS base station Speech CODEC

* TSB –74: Protocol between an IS-95A system and ANSI J-STD-008

Chapter1. System Introduction

1. CDMA Abstract

The CDMA mobile communication system has a channel hand-off function that is used for collecting the information on the locations and movements of mobile telephones from the cell site by automatically controlling several cell site through the setup of data transmission routes, and then enabling one switching system to carry out the automatic remote adjustment. This is to maintain continuously the call state through the automatic location confirmation and automatic radio channel conversion when the busy subscriber moves from the service area of one cell site to that of another by using automatic location confirmation and automatic radio channel conversion functions. The call state can be maintained continuously by the information exchange between switching systems when the busy subscriber moves from one Cellular system area to the other Cellular system area.

In the Cellular system, the cell site is a small-sized low output type and utilizes a frequency allocation system that considers mutual interference, in an effort to enable the re-use of corresponding frequency from a cell site separated more than a certain distance.

Unlike the time division multiple access (TDMA) or frequency division multiple access (FDMA) used in the band limited environment, the Code Division Multiple Access (CDMA) system which is one of digital Cellular systems is a multi-access technology under the interference limited environment. It can process more number of subscribers compared to other systems (TDMA system has the processing capacity three times greater than the existing FDMA system whereas CDMA system, about 12~15 times of that of the existing system).

CDMA system can be explained as follows; TDMA or CDMA can be used to enable each person to talk alternately or provide a separate room for each person when two persons desire to talk with each other at the same time, whereas FDMA can be used to enable one person to talk in soprano, whereas the other in bass (one of the two talkers can carry out synchronization for hearing in case there is a bandpass filter function in the area of the hearer). Another available method is to make two persons to sing in different languages at the same time, space, and frequency when wishing to let the audience hear the singing without being confused. This is the characteristic of CDMA.

On the other hand, when employing the CDMA technology, each signal has a different pseudo-random binary sequence used to spread the spectrum of carrier. A great number of CDMA signals share the same frequency spectrum. In the perspective of frequency area or time area, several CDMA signals are overlapped. Among these types of signals, only desired signal energy is selected and received through the use of pre-determined binary sequence; desired signals can be separated, and then received with the correlators used for recovering the spectrum into its original state. At this time, the spectrums of other signals that have different codes are not recovered into its original state, and appears as the self-interference of the system.

2. Features and Advantages of CDMA Mobile Phone

2.1 Various Types of Diversities

When employing the narrow band modulation (30kHz band) that is the same as the analog FM modulation system used in the existing Cellular system, the multi-paths of radio waves create a serious fading. However, in the CDMA broadband modulation (1.25MHz band), three types of diversities (time, frequency, and space) are used to reduce serious fading problems generated from radio channels in order to obtain high-quality calls.

Time diversity can be obtained through the use of code interleaving and error correction code whereas frequency diversity can be obtained by spreading signal energy to wider frequency band. The fading related to normal frequency can affect the normal 200~300KHz among signal bands and accordingly, serious effect can be avoided. Moreover, space diversity (also called path diversity) can be realized with the following three types of methods. First, it can be obtained by the duplication of cell site receive antenna. Second, it can be obtained through the use of multi-signal processing device that receives a transmit signal having each different transmission delay time and then, combines them. Third, it can be obtained through the multiple cell site connection (Soft Handoff) that connects the mobile station with more than two cell sites at the same time.

2.2 Power Control

The CDMA system utilizes the forward (from a base station to mobile stations) and backward (from the mobile station to the base station) power control in order to increase the call processing capacity and obtain high-quality calls. In case the originating signals of mobile stations are received by the cell site in the minimum call quality level (signal to interference) through the use of transmit power control on all the mobile stations, the system capacity can be maximized. If the signal power of mobile station is received too strong, the performance of that mobile station is improved. However, because of this, the interference on other mobile stations using the same channel is increased and accordingly, the call quality of other subscribers is reduced unless the maximum accommodation capacity is reduced.

In the CDMA system, forward power control, backward open loop power control, and closed loop power control methods are used. The forward power control is carried out in the cell site to reduce the transmit power on mobile stations less affected by the multi-path fading and shadow phenomenon and the interference of other cell sites when the mobile station is not engaged in the call or is relatively nearer to the corresponding cell site. This is also used to provide additional power to mobile stations having high call error rates, located in bad reception areas or far away from the cell site.

The backward open loop power control is carried out in a corresponding mobile station; the mobile station measures power received from the cell site and then, reversely increases/decreases transmit power in order to compensate channel changes caused by the forward link path loss and terrain characteristics in relation to the mobile station in the cell site. By doing so, all the mobile transmit signals received by the base station have same strength.

Moreover, the backward closed loop power control used by the mobile station is performed to control power using the commands issued out by the cell site. The cell site receives the signal of each corresponding mobile station and compares this with the pre-set threshold value and then, issues out power increase/decrease commands to the corresponding mobile station every 1.25msec (800 times per second). By doing so, the gain tolerance and the different radio propagation loss on the forward/backward link are complemented.

2.3 Voice Encoder and Variable Data Speed

The bi-directional voice service having variable data speed provides voice communication which employs voice encoder algorithm having power variable data rate between the base station and the mobile station. On the other hand, the transmit voice encoder performs voice sampling and then, creates encoded voice packets to be sent out to the receive voice encoder, whereas the receive voice encoder demodulates the received voice packets into voice samples.
One of the two voice encoders described in the above is selected for use depending on inputted automatic conditions and message/data; both of them utilize four-stage frames of 9600, 4800, 2400, and 1200 bits per second for Cellular and 14400,7200,3600,1800 bits per second for PCS, so PCS provide relatively better voice quality (almost twice better than the existing cellular system). In addition, this type of variable voice encoder utilizes adaptive threshold values on selecting required data rate. It is adjusted in accordance with the size of background noise and the data rate is increased to high rate only when the voice of caller is inputted.
Therefore, background noise is suppressed and high-quality voice transmission is possible under the environment experiencing serious noise. In addition, in case the caller does not talk, data transmission rate is reduced so that the transmission is carried out in low energy. This will reduce the interference on other CDMA signals and as a result, improve system performance (capacity increased by about two times).

2.4 Protecting Call Confidentiality

Voice privacy is provided in the CDMA system by means of the private long code mask used for PN spreading. Voice privacy can be applied on the traffic channels only. All calls are initiated using the public long code mask for PN spreading. The mobile station user may request voice privacy during call setup using the origination message or page response message, and during traffic channel operation using the long code transition request order.
The Transition to private long code mask will not be performed if authentication is not performed. To initiate a transition to the private or public long code mask, either the base station or the mobile station sends a long code transition request order on the traffic channel.

2.5 Soft Handoff

A handoff in which the mobile station commences communications with a new base station without interrupting communications with the old base station. Soft handoff can only be used between CDMA channels having identical frequency assignments.

2.6 Frequency Re-Use and Sector Segmentation

Unlike the existing analog Cellular system, the CDMA system can reuse the same frequency at the adjacent cell. there is no need to prepare a separate frequency plan. Total interference generated on mobile station signals received from the cell site is the sum of interference generated from other mobile stations in the same cell site and interference generated from the mobile station of adjacent cell site. That is, each mobile station signal generates interference in relation to the signals of all the other mobile stations.

Total interference from all the adjacent cell sites is the ratio of interference from all the cell sites versus total interference from other mobile stations in the same cell site (about 65%). In the case of directional cell site, one cell normally uses a 120° sector antenna in order to divide the sector into three. In this case, each antenna is used only for 1/3 of mobile stations in the cell site and accordingly, interference is reduced by 1/3 on the average and the capacity that can be supported by the entire system is increased by three times.

2.7 Soft Capacity

The subscriber capacity of the CDMA system is flexible depending on the relation between the number of users and service classes. For example, the system operator can increase the number of channels available for use during the busy hour despite the drop in call quality. This type of function requires 40% of normal call channels in the standby mode during the handoff, in an effort to avoid call disconnection resulting from the lack of channels.

In addition, in the CDMA system, services and service charges are classified further into different classes so that more transmit power can be allocated to high class service users for easier call set-up; they can also be given higher priority of using hand-off function than the general users.

3. Structure and Functions of tri-band CDMA Mobile Phone

The hardware structure of CDMA mobile phone is made up of radio frequency (RF) part and logic part. The RF part is composed of Receiver part (Rx), Transmitter part (Tx) and Local part (LO). For the purpose of operating on tri-band, It is necessary dual Tx path, tri Rx path, dual PLL and switching system for band selection. The mobile phone antenna is connected with the frequency separator which divide antenna input/output signals between Cellular frequency band (824~894 MHz) and PCS frequency band (1850~1990MHz). Each separated path is linked with the Cellular duplexer and PCS duplexer. Duplexer carries out separating Rx band and Tx band. The Rx signals from the antenna are converted into intermediate frequency(IF) band by the frequency synthesizer and frequency down converter. And then, pass SAW filter which is a band pass filter for removing out image frequency. The IF output signals that have been filtered is converted into digital signals via Analog-to-Digital Converter (ADC). In front of the ADC, switching system is required to choose which band path should be open. The digital signals send to 5 correlators in each CDMA de-modulator. Of these, one is called a searcher whereas the remaining 4 are called data receivers (fingers). Digitalized IF signals include a great number of call signals that have been sent out by the adjacent cells. These signals are detected with pseudo-noise sequence (PN Sequence). Signal to interference ratio (C/I) on signals that match the desired PN sequence are increased through this type of correlation detection process, but other signals obtain processing gain by not increasing the ratio. The carrier wave of pilot channel from the cell site most adjacently located is demodulated in order to obtain the sequence of encoded data symbols. During the operation with one cell site, the searcher searches out multi-paths in accordance with terrain and building reflections. On three data receivers, the most powerful 3 paths are allocated for the parallel tracing and receiving. Fading resistance can be improved a great deal by obtaining the diversity combined output for de-modulation. Moreover, the searcher can be used to determine the most powerful path from the cell sites even during the soft handoff between the two cell sites. Moreover, 3 data receivers are allocated in order to carry out the de-modulation of these paths. Output data that has been demodulated changes the data string in the combined data row as in the case of original signals(deinterleaving), and then, are demodulated by the forward error correction decoder which uses the Viterbi algorithm.

Mobile station user information send out from the mobile station to the cell site pass through the digital voice encoder via a mike. Then, they are encoded and forward errors are corrected through the use of convolution encoder. Then, the order of code rows is changed in accordance with a certain regulation in order to remove any errors in the interleaver. Symbols made through the above process are spread after being loaded onto PN carrier waves. At this time, PN sequence is selected by each address designated in each call.

Signals that have been code spread as above are digital modulated (QPSK) and then, power controlled at the automatic gain control amplifier (AGC Amp). Then, they are converted into RF band by the frequency synthesizer synchronizing these signals to proper output frequencies.

Transmit signals obtained pass through the duplexer filter and then, are sent out to the cell site via the antenna.

4. Specification

4.1 General Specification

4.1.1 Transmit/Receive Frequency Interval :

1)CELLULAR : 45 MHz
2)PCS : 80 MHz

4.1.2 Number of Channels (Channel Bandwidth)

1)CELLULAR : 20 Channels
2) PCS : 48 Channels

4.1.3 Operating Voltage : DC 3.3~4.2V

4.1.4 Battery Power Consumption : DC 3.7V

	SLEEP	IDLE	MAX POWER
CELLULAR	1.1 mA	110~180mA	700 mA (24 dBm)
PCS	1.1 mA	120~180 mA	700 mA (24 dBm)

4.1.5 Operating Temperature : -0°C ~ +60°C

4.1.6 Frequency Stability

1)CDMA : ±0.5PPM
2)PCS : ±0.1PPM

4.1.7 Antenna : Press Type (PIFA), 50

4.1.8 Size and Weight

1)Size : 101.87(H) * 52(W) * 14.95(D) mm
2)Weight : 126.8 g (Approximately with standard battery)

4.1.9 Channel Spacing

1)CELLULAR : 1.25MHz
2)PCS: 1.25 MHz

4.1.10 Battery Type, Capacity and Operating Time. Unit = Hours : Minutes

	Standard (800mAh)	
Standby Time	CELLULAR	About 165 Hours (SCI=2)
	PCS	About 165 Hours (SCI=2)
Talk time	CELLULAR	140 Minutes (-92dBm input)
	PCS	140 Minutes (-92dBm input)

4.2 Receive Specification

4.2.1 Frequency Range

CELLULAR : 869.820 MHz ~ 893.190 MHz

PCS : 1930 MHz ~ 1990 MHz

GPS : 1575.42 MHz

4.2.2 Local Oscillating Frequency Range :

CELLULAR : 1738.08MHz ~ 1787.94MHz

PCS : 1715.56MHz ~ 1768.89MHz

GPS : 3150.84MHz

4.2.3 Sensitivity

CELLULAR : -104dBm (C/N 12dB or more)

PCS : -104dBm (C/N 12dB or more)

GPS : -148.5dBm (without SA mode)

4.2.4 Selectivity

CELLULAR : 3dB C/N Degration (With Fch±1.25 kHz : -30dBm)

PCS : 3dB C/N Degration (With Fch±1.25 kHz : -30dBm)

4.2.5 Spurious Wave Suppression : Maximum of -80dB

4.2.6 CDMA Input Signal Range

Dynamic area of more than -104~ -25 dB: 79dB at the 1.23MHz band.

4.3 Transmit Specification

4.3.1 Frequency Range

CELLULAR : 824.820MHz ~ 848.190MHz

PCS : 1850 MHz ~ 1910 MHz

4.3.2 Output Power

CELLULAR : 0.224W

PCS: 0.224W

4.3.3 Interference Rejection

Single Tone : -30dBm at 900 kHz (CELLULAR), -30dBm at 1.25MHz(PCS)

Two Tone : -43dBm at 900 kHz & 1700kHz(CELLULAR), -43dBm at 1.25 MHz & 2.05 MHz (PCS)

4.3.11 CDMA TX Frequency Deviation :

1) CELLULAR: ±300Hz or less

2) PCS: ± 150Hz

4.3.12 CDMA TX Conducted Spurious Emissions

1) CELLULAR: 900kHz : - 42 dBc/30kHz below
1.98MHz : - 54 dBc/30kHz below

2) PCS: 1.25MHz: - 42 dBc/30kHz below
1.98MHz : - 50 dBc/30kHz below

4.3.13 CDMA Minimum TX Power Control

1) CELLULAR: - 50dBm below

2) PCS: -50dBm below

4.4 MS (Mobile Station) Transmitter Frequency

4.4.1 CELLULAR mode

Ch #	Center Freq. (MHz)	Ch #	Center Freq. (MHz)
1011	824.640	404	837.120
29	825.870	445	838.350
70	827.100	486	839.580
111	828.330	527	840.810
152	829.560	568	842.040
193	830.790	609	843.270
234	832.020	650	844.500
275	833.250	697	845.910
316	834.480	738	847.140
363	835.890	779	848.370

4.4.2 PCS mode

Ch #	Center Freq (MHz)	Ch #	Center Freq (MHz)	Ch #	Center Freq (MHz)
25	1851.25	425	1871.25	825	1891.25
50	1852.50	450	1872.50	850	1892.50
75	1853.75	475	1873.75	875	1893.75
100	1855.00	500	1875.00	900	1895.00
125	1856.25	525	1876.25	925	1896.25
150	1857.50	550	1877.50	950	1897.50
175	1858.75	575	1878.75	975	1898.75

200	1860.00	600	1880.00	1000	1900.00
225	1861.25	625	1881.25	1025	1901.25
250	1862.50	650	1882.50	1050	1902.50
275	1863.75	675	1883.75	1075	1903.75
300	1865.00	700	1885.00	1100	1905.00
325	1866.25	725	1886.25	1125	1906.25
350	1867.50	750	1887.50	1150	1907.50
375	1868.75	775	1888.75	1175	1908.75

4.5 MS (Mobile Station) Receiver Frequency

4.5.1 CELLULAR mode

Ch. #	Center Freq. (MHz)	Ch. #	Center Freq. (MHz)
1011	869.640	404	882.120
29	870.870	445	883.350
70	872.100	486	884.580
111	873.330	527	885.810
152	874.560	568	887.040
193	875.790	609	888.270
234	877.020	650	889.500
275	878.250	697	890.910
316	879.480	738	892.140
363	880.890	779	893.370

4.5.2 PCS mode

Ch #	Center Freq (MHz)	Ch #	Center Freq (MHz)	Ch #	Center Freq (MHz)
25	1931.25	425	1951.25	825	1971.25
50	1932.50	450	1952.50	850	1972.50
75	1933.75	475	1953.75	875	1973.75
100	1935.00	500	1955.00	900	1975.00
125	1936.25	525	1956.25	925	1976.25
150	1937.50	550	1957.50	950	1977.50
175	1938.75	575	1958.75	975	1978.75
200	1940.00	600	1960.00	1000	1980.00
225	1941.25	625	1961.25	1025	1981.25

250	1942.50	650	1962.50	1050	1982.50
275	1943.75	675	1963.75	1075	1983.75
300	1945.00	700	1965.00	1100	1985.00
325	1946.25	725	1966.25	1125	1986.25
350	1947.50	750	1967.50	1150	1987.50
375	1948.75	775	1968.75	1175	1988.75

4.5.3 GPS mode : 1575.42 MHz

4.5.4 Bluetooth mode : 2400 MHz ~ 2483.5 MHz

4.6 AC Adaptor : See Appendix

4.7 Cigar Lighter Charger : See Appendix

5. Installation

5.1 Installing a Battery Pack

1) The Battery pack is keyed so it can only fit one way. Align the groove in the battery pack with the rail on the back of the phone until the battery pack rests flush with the back of the phone.
2) Slide the battery pack forward until you hear a “click”, which locks the battery in place.

5.2 For Adapter Use

1) Plug the adapter into a wall outlet. The adapter can be operated from a 110V source. When AC power is connected to the adapter.
2) Insert the adapter IO plug into the phone with the installed battery pack.
Red light indicates battery is being charged.. Green light indicates battery is fully charged.

5.3 For Mobile Mount

5.3.1 Installation Position

In order to reduce echo sound when using the Hands-Free Kit, make sure that the speaker and microphone are not facing each other and keep microphone a generous distance from the speaker.

5.3.2 Cradle Installation

Choose an appropriate flat surface where the unit will not interface with driver’s movement or passenger’s comfort. The driver/user should be able to access the phone with ease. Using the four self-tapping screws provided, mount the supplied bracket on the selected area. Then with the four machine screws provided, mount the counterpart on the reverse side of the reverse side of the cradle. Secure the two brackets firmly together by using the two bracket joint screws provide. The distance between the cradle and the interface box must not exceed the length of the main cable.

5.3.3 Interface Box

Choose an appropriate flat surface (somewhere under the dash on the passenger side is preferred) and mount the IB bracket with the four self-tapping screws provided. Clip the IB into the IB bracket.

5.3.4. Microphone Installation

Install the microphone either by clipping I onto the sunvisor (driver’s side) or by attaching it to door post (driver’s side), using a velcro adhesive tape (not included).

5.3.5 Cable Connections

5.3.5.1 Power and Ignition Cables

Connect the red wire to the car battery positive terminal and the black wire to the car ground. Connect the green wire to the car ignition sensor terminal. (In order to operate HFK please make sure to connect green wire to ignition sensor terminal.) Connect the kit's power cable connector to the interface box power receptacle.

5.3.5.2 Antenna Cable Connection

Connect the antenna coupler cable connector from the cradle to the external antenna connector. (Antenna is not included.)

CHAPTER 2. NAM Input Method (Inputting of telephone numbers included)

1. NAM Programming Method and Telephone Number Input Method

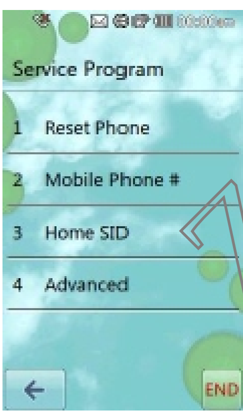
1. Press ##2342# (##CDG2#)

2. Enter Service Code "000000".

3. You can see following Menu

4. Press "1" key or Touch 'Service Program' list.

You can see following submenus.



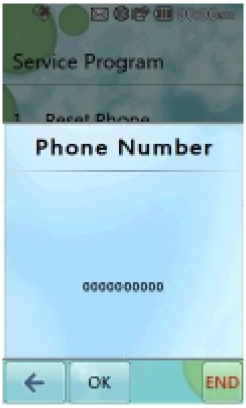
4-1) Press "1" key or Touch 'Reset Phone' list.

You can reset the phone

4-2) Press "2" key or Touch 'Mobile Phone #' list.

Input Mobile Phone Number and press softkey "OK" to save the change.

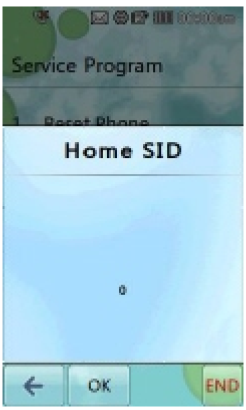
Press softkey "🡐" to go back to the list.



4-3) Press "3" key or Touch 'Home SID' list.

Input the Home SID and press softkey "OK" to save the change.

Press softkey "🡐" to go back to the list.



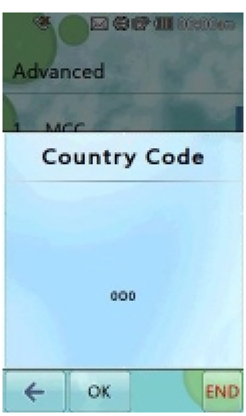
4-4) Press "4" key or Touch 'Advanced' list.

There are eleven submenus as below.

4-4.1) Press "1" key or Touch 'MCC' list.

Input the Mobile Country Code and press softkey "OK" to save the change.

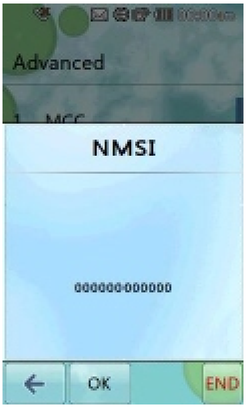
Press softkey "🡐" to go back to the list.



4-4.2) Press “2” key or Touch ‘NMSI’ list.

Input the NMSI and press softkey “OK” to save the change.

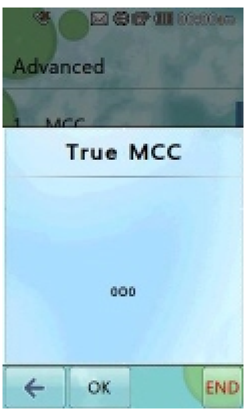
Press softkey “🡐” to go back to the list.



4-4.3) Press “3” key or Touch ‘True MCC’ list.

Input the True MCC and press softkey “OK” to save the change.

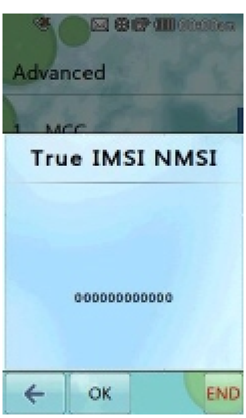
Press softkey “🡐” to go back to the list.



4-4.4) Press “4” key or Touch ‘True IMSI NMSI’ list.

Input the True IMSI NMSI and press softkey “OK” to save the change.

Press softkey “🡐” to go back to the list.



4-4.5) Press “5” key or Touch ‘Home NID’ list.

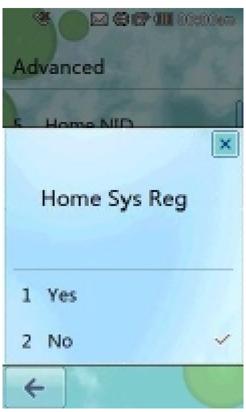
Input the Home NID and press softkey “OK” to save the change.

Press softkey “🡐” to go back to the list.

4-4.6) Press “6” key or Touch ‘Home Sys Reg’ list.

Select one what you want and touch it.

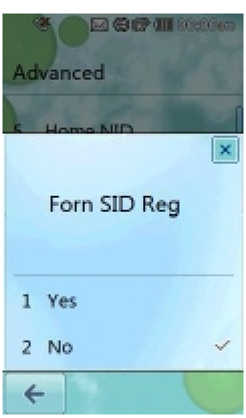
Press softkey “🡐” to go back to the list.



4-4.7) Press “7” key or Touch ‘Forn SID Reg’ list.

Select one what you want and touch it.

Press softkey “🡐” to go back to the list.



4-4.8) Press "8" key or Touch 'Forn NID Reg' list.

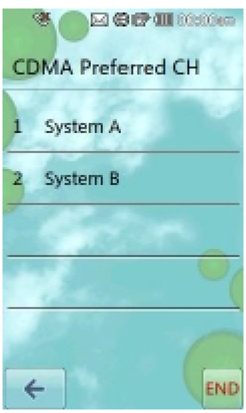
Select one what you want and touch it.

Press softkey "🡐" to go back to the list.

4-4.9) Press "9" key or Touch 'CDMA Preferred CH' list.

Select one what you want to edit, and touch it.

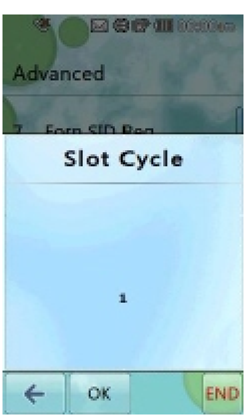
Press softkey "🡐" to go back to the list.



4-4.10) Press "0" key or Touch 'Slot Cycle Idx' list.

Input the Slot Cycle and press softkey "OK" to save the change.

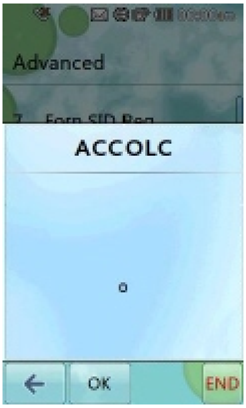
Press softkey "🡐" to go back to the list.



4-4.11) Press "*" key or Touch 'Acc Ovld Class' list.

You can see the Access Overload Class that is automatically set according to IMSI_M

Press softkey "🡐" to go back to the list.



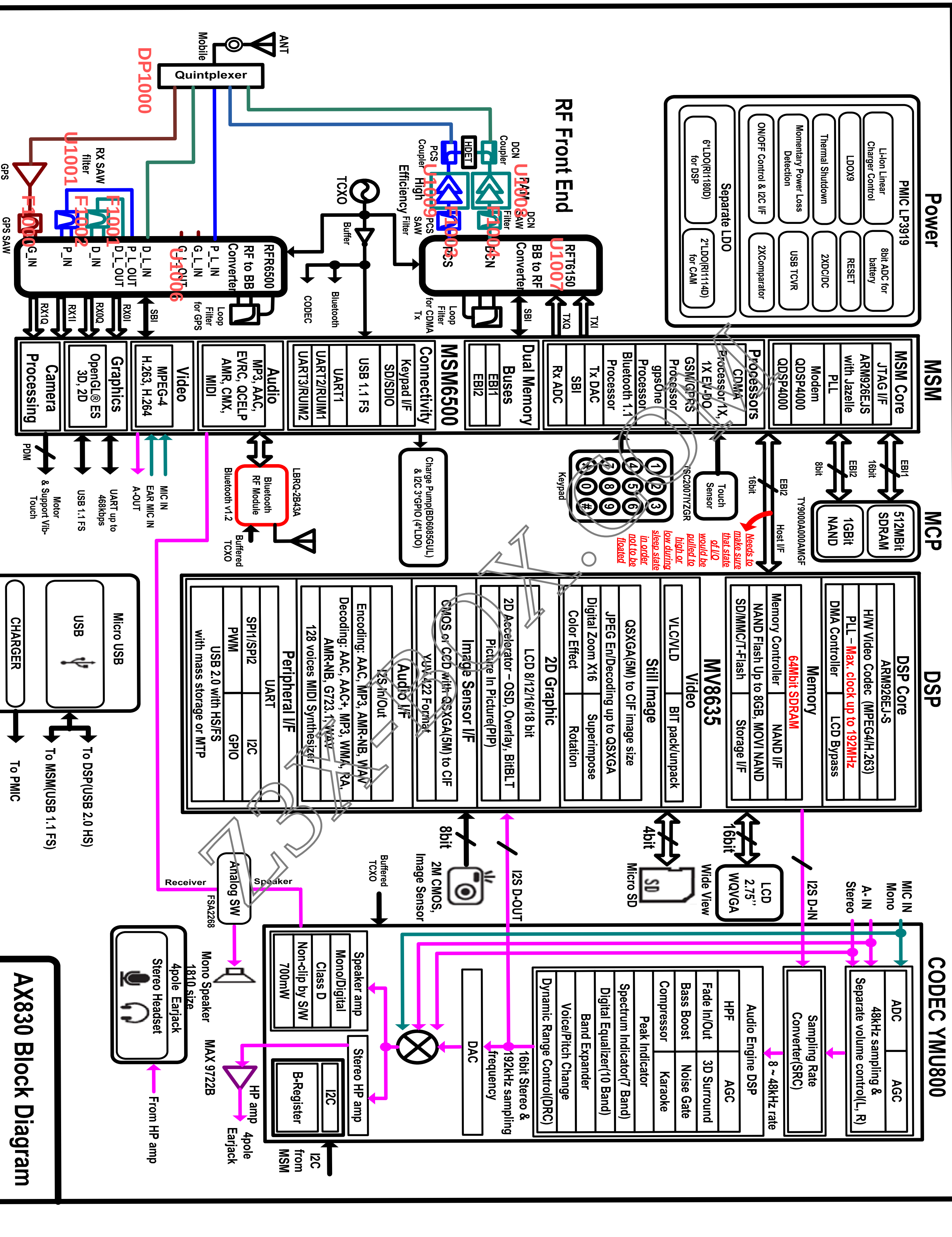
CHAPTER 3. Circuit Description

1. RF Transmit/Receive Part

1.1 Overview

The TX and RX part employs the Direct-Conversion system. The TX and RX frequencies are respectively 824.04~848.97 and 869.04~893.97 for cellular and 1850~1910 and 1930~1990 for PCS. The block diagram is shown in [Figure 1-1]. CDMA RF signals received through the antenna are separated by the Diplexer.
RF Signal fed into the low noise amplifier in RFR6500(LNA) through the duplexer. Then, they are fed into Mixer in RFR6500. In RFR6500, the RF signal is changed into baseband signal directly. Then, this signal is changed into digital signal by the analog to digital converter (ADC, A/D Converter), and the digital circuit part of the MSM(Mobile Station Modem) 6500 processes the data from ADC. The digital processing part is a demodulator.
In the case of transmission, RFT6150 receives OQPSK-modulated analog signal from the MSM6500.
The RFT6150 connects directly with MSM6500 using an analog baseband interface. In RFT6150, the baseband quadrature signals are upconverted to the Cellular or PCS frequency bands and amplified to provide signal drive capability to the power amp.
After that, the RF signal is amplified by the Power Amp in order to have enough power for radiation. Finally, the RF signal is sent out to the cell site via the antenna after going through the duplexer.

[Figure 1-1] RF Block Diagram of CX830



1.2 Description of RX Part Circuit

1.2.1 Quintiplexer(DP1000)

The Quintplexer combines PCS, and Cellular duplexer functions with a GPS filter. Each duplexer consists of the Rx bandpass filter (BPF) and the Tx BPF which has the function of separating Tx and Rx signals in the full duplex system for using the common antenna. The Tx part BPF is used to suppress noises and spurious out of the Tx frequency band. The Rx BPF is used to receive only Rx signal coming from the antenna, which is usually called preselector. It’s main function is to limit the bandwidth of spectrum reaching the LNA and mixer, attenuate receiver spurious response and suppress local oscillator energy. As a result frequency sensitivity and selectivity of mobile phone increase. The specification of LG-CX830 quintplexer is described below ;

● PCS Duplexer

	Tx	Rx	Tx to Rx (min)
Pass Band	1850~1910 MHz	1930~1990 MHz	
Insertion Loss	3.0dB max	3.2dB max	
Return Loss	9.5dB min	12dB min	
Attenuation	45dB min (1930~1990MHz)	55dB min (1850~1910MHz)	60dB (1850~1910MHz) 50dB (1930~1990MHz)

● Cellular Duplexer

	Tx	Rx	Tx to Rx (min)
Pass Band	824~849MHz	869~894 MHz	
Insertion Loss	2.0dB max	2.5dB max	
Return Loss	12dB min	12dB min	
Attenuation	48dB min (869~894MHz)	60dB min (824~849MHz)	60dB (824~849MHz) 50dB (869~894MHz)

● GPS Filter

	MAX.	TYP.	MIN.	UNIT
Insertion Loss	2.0			dB
Return Loss			9	dB
ISOLATION	40 ~ 46			dB

1.2.3 RFR6500 – LNA part (U1006)

The RFR6500 has cellular, and PCS LNA, respectively. The characteristics of Low Noise Amplifier (LNA) are low noise figure, high gain, high intercept point and high reverse isolation. The frequency selectivity characteristic of mobile phone is mostly determined by LNA.
The specification of CX830 LNA is described below:

Parameter	Low gain		Middle gain		High gain		Units
	Cellular	PCS	Cellular	PCS	Cellular	PCS	
Gain	-19	-20	3	-3	14	15	dB
Noise Figure	20	20	4.5	6	1.3	1.1	dB
Input IP3	10	10	5	10	7	3	dBm

1.2.4 GPS LNA(U1001)

The characteristics of Low Noise Amplifier (LNA) are low noise figure, high gain, high intercept point and high reverse isolation. The frequency selectivity characteristic of mobile phone is mostly determined by LNA.
The specification of CX830 GPS LNA is described below

Parameter	GPS Band	Units
Gain	14.3	dB
Noise Figure	0.8	dB
1dB compression point	1.8	dBm
IIP3	+4.7	dBm

1.2.5 RX RF SAW FILTER(F1001, F1002)

The main function of RX RF SAW filter is to attenuate mobile phone spurious frequency, attenuate noise amplified by the LNA and suppress second harmonic originating in the LNA.

1.2.6 RFR6500 - Down-converter Mixers part (U1006)

The RFR6500 device performs signal down-conversion for Cellular, PCS and GPS tri-band applications. It contains all the circuitry (with the exception of external filters) needed to support conversion of received RF signals to Base-band signals. The three down-converting Mixers (Cellular, PCS and GPS), and a programmable PLL for generating RX LO frequency and an RX LO Buffer Amplifier and RX Voltage Controlled Oscillator. The GPS LNA & mixers offer the most advanced and integrated CDMA RX solution designed to meet cascaded Noise Figure (NF) and Third-order Intercept Point (IIP3) requirements of IS-98D and J-STD-018 specifications for Sensitivity, Two-Tone Inter-modulation, and Single-tone Desensitization.
Operation modes and band selection are specially controlled from the Mobile Station Modem MSM6500.
The specification of CX830 Mixers is described below:

Parameter	Low gain		High gain		Units
	Cellular	PCS	Cellular	PCS	
Noise Figure	25	27	7.9	12	dB
Input IP3	−5	−11	4	4	dBm
Input IP2	30	30	56	56	dBm

1.3 Description of Transmit Part Circuit

1.3.1 RFT6150 (U1007)

The RFT6150 Base-band to RF Transmit Processor performs all TX signal-processing functions required between digital Base-band and the Power Amplifier Modulator (PAM). The Base-band quadrate signals are up-converted to the Cellular or PCS frequency bands and amplified to provide signal drive capability to the PAM. The RFT6100 includes mixers for up-converting analog Base-band to RF, a programmable PLL for generating TX LO frequency a TX LO Buffer Amplifier and TX Voltage Controlled Oscillator, cellular and PCS driver amplifiers and TX power control through an 85 dB VGA. As added benefit, the single sideband up-conversion eliminates the need for a band pass filter normally required between the up-converter and driver amplifier.

I, I/, Q and Q/ signals proceed from the MSM6500 to RFT6150 are analog signal. In CDMA mode, These signals are modulated by Offset Quadrature Phase Shift King (OQPSK). I and Q are 90 deg. out of phase, and I and I/ are 180 deg. The mixers in RFT6150 converts baseband signals into RF signals. After passing through the upconverters, RF signal is inputted into the Power AMP.

•RF6130 Cellular and PCS CDMA RF Specifications

Parameter	Condition	Min.	Type.	Max.	Units
Rated Output Power	Average CDMA Cellular Average CDMA PCS		7 9		dBm dBm
Min Output Power	Average CDMA Cellular Average CDMA PCS		-75 -75		dBm dBm
RX band noise power	CDMA Cellular CDMA PCS		-136 -133		dBm/Hz
ACPR	Cellular: Fc±885kHz PCS : Fc±1.25MHz		-56 -57		dBc/30kHz

1.3.2 Power Amplifier(U1008, U1009)

The Dual power amplifier that can be used in the PCS and CDMA mode has linear amplification capability and high efficiency. For higher efficiency, it is made up of one MMIC (Monolithic Microwave Integrated Circuit) for which RF input terminal and internal interface circuit are integrated onto one IC after going through the AlGaAs/GaAs HBT (heterojunction bipolar transistor) process. The module of power amplifier is made up of an output end interface circuit including this MMIC. The maximum power that can be inputted through the input terminal is +10dBm and conversion gain is about 26.5dB. RF transmit signals that have been amplified through the power amplifier are sent to the duplexer.

.

1.4 Description of Frequency Synthesizer Circuit

1.4.1 Voltage Control Temperature Compensation Crystal Oscillator (VCTCXO, X1000)

The temperature variation of mobile phone can be compensated by VCTCXO. The reference frequency of a mobile phone is 19.2 MHz. The receiver frequency tuning signals called TRK_LO_ADJ from MSM as 0.5 V~2.5 V DC via R and C filter in order to generate the reference frequency of 19.2 MHz and input it into the frequency synthesizer. Frequency stability depending on temperature is ±2.0 ppm.

2. Digital/Voice Processing Part

2.1 Overview

The digital/voice processing part processes the user's commands and processes all the digital and voice signal processing in order to operate in the phone. The digital/voice processing part is made up of a main keypad/touch keypad/LCD, receptacle part, voice processing part, mobile station modem part, memory part, and power supply part.

2.2 Configuration

2.2.1 Keypad/LCD and Receptacle Part

This is used to transmit keypad signals to MSM6500. It is made up of a keypad backlight part that illuminates the keypad, LCD part that displays the operation status onto the screen, and a receptacle that receives and sends out voice and data with external sources.

2.2.2 Voice Processing Part

The voice processing part is made up of an audio codec used to convert MIC signals into digital voice signals and digital voice signals into analog voice signals, amplifying part for amplifying the voice signals and sending them to the ear piece, amplifying part that amplifies ringer signals coming out from MSM6500, and amplifying part that amplifies signals coming out from MIC and transferring them to the audio processor.

2.2.3 MSM (Mobile Station Modem) 6500 Part

MSM is the core elements of CDMA terminal and carries out the functions of CPU, encoder, interleaver, deinterleaver, Viterbi decoder, Mod/Demod, and vocoder.

2.2.4 Memory Part

The memory part is made up of a NAND Flash memory and a SDRAM for storing data.

2.2.5 Power Supply Part

The power supply part is made up of circuits for generating various types of power, used for the digital/voice processing part.

2.3 Circuit Description

2.3.1 Keypad/LCD and Receptacle Part

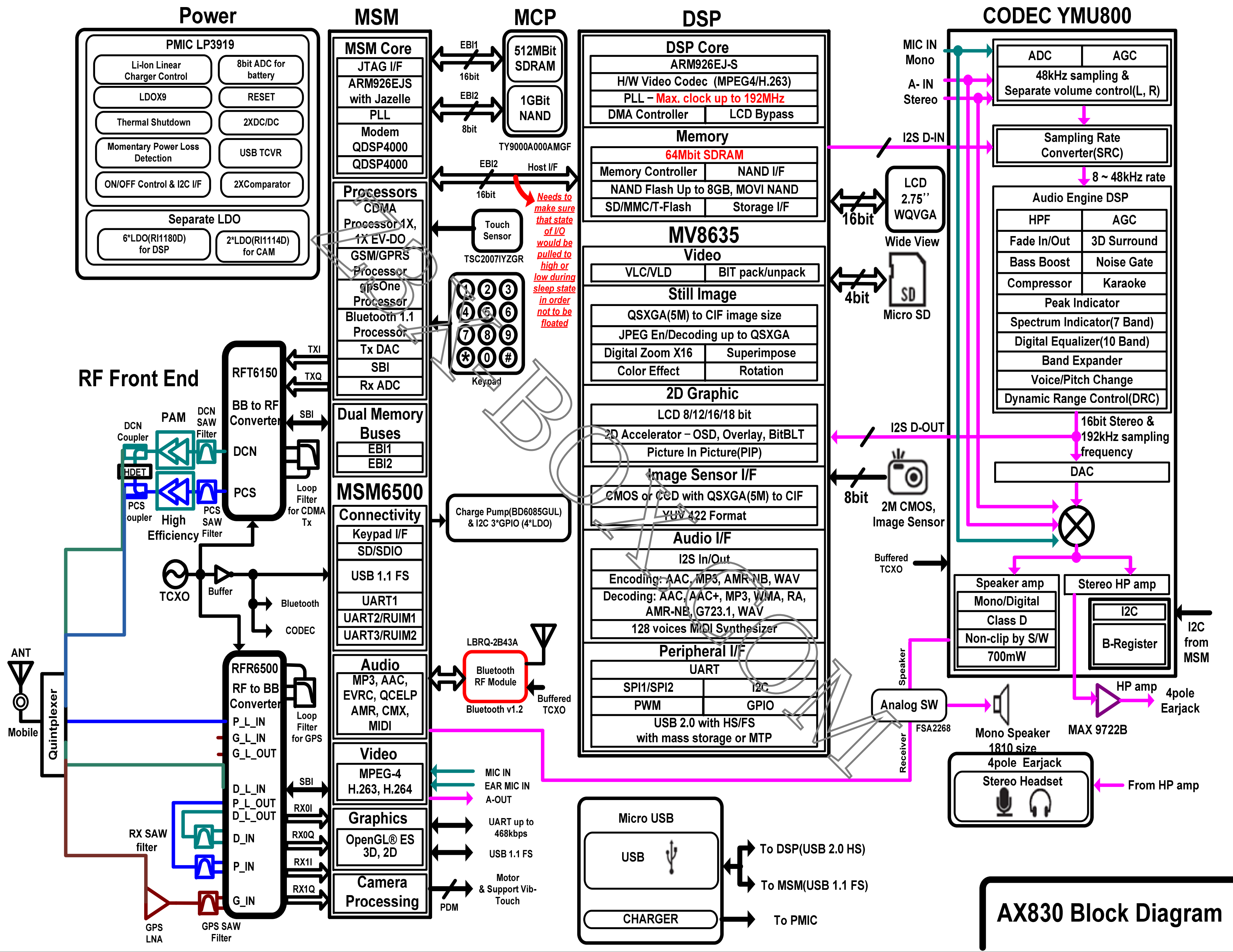
Once the main keypad is pressed, the key signals are sent out to MSM6500 for processing. Touch keypad is pressed, I2C and Ack signals of U101(touch IC) are sent out to MSM6500 for processing. In addition, when the key is pressed, the keypad/LCD lights up through the use of 19 LEDs. The terminal status and operation are displayed on the screen for the user with the characters and icons on the LCD.
Moreover, it exchanges audio signals and data with external sources through the receptacle, and then receives power from the battery or external batteries.

2.3.2 Audio Processing Part

MIC signals are amplified through OP AMP, inputted into the audio codec (included in MSM6500) and converted into digital signals. Oppositely, digital audio signals are converted into analog signals after going through the audio codec. These signals are amplified at the audio amplifier and transmitted to the ear-piece. The signals from MSM6500 activate the ringer by using signals generated in the timer in MSM6500.

2.3.3 MSM Part

MSM6500 is the core element of CDMA system terminal that includes ARM926EJ-S microprocessor core. It supports both CDMA and Digital FM, operating in both the cellular and PCS spectrums. The subsystems within the MSM6500 include a CDMA processor, a DFM processor, a multi-standard Vocoder, an integrated CODEC with earpiece and microphone amplifiers, general-purpose ADC for subsystem monitoring, an ARM926EJ-S microprocessor, and an RS-232 serial interfaces supporting forward and reverse link MDR data communications of 230.4 Kbps simultaneously. And it also contains complete digital modulation and demodulation systems for both CDMA and AMPS cellular standards, as specified in IS-95-A/B/C.
In MSM, coded symbols are interleaved in order to cope with multi-path fading. Each data channel is scrambled by the long code PN sequence of the user in order to ensure the confidentiality of calls. Moreover, binary quadrature codes are used based on Walsh functions in order to discern each channel. Data created thus are 4-phase modulated by one pair of Pilot PN code and they are used to create I and Q data.
When received, I and Q data are demodulated into symbols by the demodulator, and then de-interleaved in reverse to the case of transmission. Then, the errors of data received from Viterbi decoder are detected and corrected. They are voice-decoded at the Vocoder in order to output digital voice data.



AX830 Block Diagram
Power
PMIC LP3919
Li-Ion Linear Charger Control
8bit ADC for battery
LDOX9
RESET
Thermal Shutdown
2XDC/DC
Momentary Power Loss Detection
USB TCVR
ON/OFF Control & I2C I/F
2XComparator
Separate LDO
6*LDO(RI1180D) for DSP
2*LDO(RI1114D) for CAM
MSM
MSM Core
JTAG I/F
ARM926EJS with Jazelle
PLL
Modem
QDSP4000
QDSP4000
Processors
CDMA Processor 1X, 1X EV-DO
GSM/GPRS Processor
gpsOne Processor
Bluetooth 1.1 Processor
Tx DAC
SBI
Rx ADC
Dual Memory Buses
EBI1
EBI2
MSM6500
Connectivity
Keypad I/F
SD/SDIO
USB 1.1 FS
UART1
UART2/RUIM1
UART3/RUIM2
Audio
MP3, AAC, EVRC, QCELP AMR, CMX, MIDI
Video
MPEG-4 H.263, H.264
Graphics
OpenGL® ES 3D, 2D
Camera Processing
MCP
512MBit SDRAM
1GBit NAND
TY9000A000AMGF
EBI1
16bit
EBI2
8bit
EBI2
16bit
Host I/F
Needs to make sure that state of I/O would be pulled to high or low during sleep state in order not to be floated
Touch Sensor
TSC2007IYZGR
Keypad
Charge Pump(BD6085GUL) & I2C 3*GPIO (4*LDO)
DSP
DSP Core
ARM926EJ-S
H/W Video Codec (MPEG4/H.263)
PLL – Max. clock up to 192MHz
DMA Controller
LCD Bypass
Memory
64Mbit SDRAM
Memory Controller
NAND I/F
NAND Flash Up to 8GB, MOVI NAND
SD/MMC/T-Flash
Storage I/F
MV8635
Video
VLC/VLD
BIT pack/unpack
Still Image
QSXGA(5M) to CIF image size
JPEG En/Decoding up to QSXGA
Digital Zoom X16
Superimpose
Color Effect
Rotation
2D Graphic
LCD 8/12/16/18 bit
2D Accelerator – OSD, Overlay, BitBLT
Picture In Picture(PIP)
Image Sensor I/F
CMOS or CCD with QSXGA(5M) to CIF
YUV 422 Format
Audio I/F
I2S In/Out
Encoding: AAC, MP3, AMR-NB, WAV
Decoding: AAC, AAC+, MP3, WMA, RA, AMR-NB, G723.1, WAV
128 voices MIDI Synthesizer
Peripheral I/F
UART
SPI1/SPI2
I2C
PWM
GPIO
USB 2.0 with HS/FS with mass storage or MTP
LCD 2.75'' WQVGA
Wide View
16bit
4bit
Micro SD
8bit
2M CMOS, Image Sensor
I2S D-IN
I2S D-OUT
CODEC YMU800
MIC IN Mono
A- IN Stereo
ADC
AGC
48kHz sampling & Separate volume control(L, R)
Sampling Rate Converter(SRC)
8 ~ 48kHz rate
Audio Engine DSP
HPF
AGC
Fade In/Out
3D Surround
Bass Boost
Noise Gate
Compressor
Karaoke
Peak Indicator
Spectrum Indicator(7 Band)
Digital Equalizer(10 Band)
Band Expander
Voice/Pitch Change
Dynamic Range Control(DRC)
16bit Stereo & 192kHz sampling frequency
DAC
Buffered TCXO
Speaker amp
Mono/Digital
Class D
Non-clip by S/W
700mW
Stereo HP amp
I2C
B-Register
I2C from MSM
HP amp
MAX 9722B
4pole Earjack
Analog SW
FSA2268
Speaker
Receiver
Mono Speaker 1810 size
4pole Earjack
Stereo Headset
From HP amp
Micro USB
USB
CHARGER
To DSP(USB 2.0 HS)
To MSM(USB 1.1 FS)
To PMIC
RF Front End
RFT6150
BB to RF Converter
DCN
PCS
TXI
TXQ
SBI
Loop Filter for CDMA Tx
PAM
DCN SAW Filter
DCN Coupler
HDET
PCS Coupler
High Efficiency
PCS SAW Filter
TCXO
Buffer
Bluetooth
CODEC
RFR6500
RF to BB Converter
P_L_IN
G_L_IN
G_L_OUT
D_L_IN
P_L_OUT
D_L_OUT
D_IN
P_IN
G_IN
Loop Filter for GPS
SBI
RX0I
RX0Q
RX1I
RX1Q
RX SAW filter
GPS LNA
GPS SAW Filter
ANT
Mobile
Quintplexer
LBRQ-2B43A
Bluetooth RF Module
Bluetooth v1.2
Buffered TCXO
MIC IN
EAR MIC IN
A-OUT
UART up to 468kbps
USB 1.1 FS
Motor & Support Vib-Touch
PDM

2.3.4 Memory Part

MCP contents 1Gbits NAND FLASH memory and 512Mbits SDRAM. In the NAND Flash Memory part of MCP are programs used for terminal operation. The programs can be changed through downloading after the assembling of terminals. On the SDRAM data generated during the terminal operation are stored temporarily.

2.3.5 Power Supply Part

When the battery voltage (+4.0V) is fed and the PWR key of keypad is pressed, U303(PMIC) is activated by the PWR_ON_SW signal, and The PWRON signal is held high, Buck and LDO1,2,3 are turned on; when LDO1 reaches 87% of its final value a 60ms reset timer is started at after which RESET\ is asserted high. Now the BB Processor is initialized and will assert PWRHOLD high. PWRHOLD maintains the power on.

The Buck/LDO1,2,4 are generating the +1.4V_MSMC, +2.6V_MSMA, +1.8V_MSMP1 ,+2.6V_MSMP2 and +2 .8V_LCD respectively.

The Rx part LDO(Out3) is operated by the control signal SLEEP/ from MSM6500

The Tx part LDO(Out6) is operated by the control signal IDLE/ from MSM6500.

The TCXO part LDO(Out5) is operated by the control signal TCXO_EN/ from MSM6500.

2.3.6 Logic Part

The logic part consists of internal CPU of MSM, RAM, MCP. The MSM6500 receives TCXO (=19.2MHz) from the X1000 and controls the phone in CDMA modes. The major components are as follows:

CPU

The ARM926J-S microprocessor includes a 3 stage pipelined RISC architecture, both 32-bit ARM and 16-bit THUMB instruction sets, a 32-bit address bus, and a 32-bit internal data bus. It has a high performance and low power consumption.

MCP

NAND Flash is used to store the terminal's program. Using the down-loading program, the program can be changed even after the terminal is fully assembled.

SDRAM is used to store the internal flag information, call processing data, and timer data.

KEYPAD

For key recognition, key matrix is setup using KYPD[1][3][5][7][9][11][13][15][17]signal from MSM6500. 2 LEDs and backlight circuitry are included in the keypad for easy operation in the dark.

TOUCH WINDOW

For key recognition, U100 communicates with MSM6500 by using TOUCH_DATA, TOUCH_CLK, TOUCH_PENIRQ/. Touch window also supports vibe-touch function when pressing is recognized.

LCD MODULE

LCD module contains a controller which will display the information onto the LCD by 16-bit data from the MSM6500. It is also supplied stable +2.8V_LCD by Out2 in U6000 for fine view angle and LCD reflects to improve the display efficiency. 5 LEDs is used to display LCD backlight.

2.3.7 DSP (Multimedia processor) Part

DSP is a specialized integrated circuit that encompasses efficient camera functions, MPEG4 simple profile level 3 compliant codec functions. The host's register setting by executed with 2-bit address bus, 1-bit chip select signal, 1-bit write enable signal, 1-bit read enable signal and 16-bit data bus from the host(MSM6500). DSP contained the advanced ARM9. ARM9 is a member of the ARM family of general-purpose 32-bit microprocessors.

LCD

In the bypass mode, MSM has complete control over all LCD operations, excluding camera processing function. In other words, it indicates when LCD is initialized and GUI of system is displayed on the LCD.

CAMERA

DSP provides clock to operate sensor and controls internal register of sensor through the I2C master embedded in DSP to make sensor operate normally. After completion of internal register setting, sensor supplies YUV422 image data, synchronous signal and pixel clock synchronized with pixel of image data to DSP. VSYNC is a synchronized signal to differentiate frames and HREF is a synchronized signal to differentiate lines. These signals are synchronized with the pixel clock. Input image data through the sensor interface is previewed on the LCD up to 30fps through the IMAGE ENHANCER.

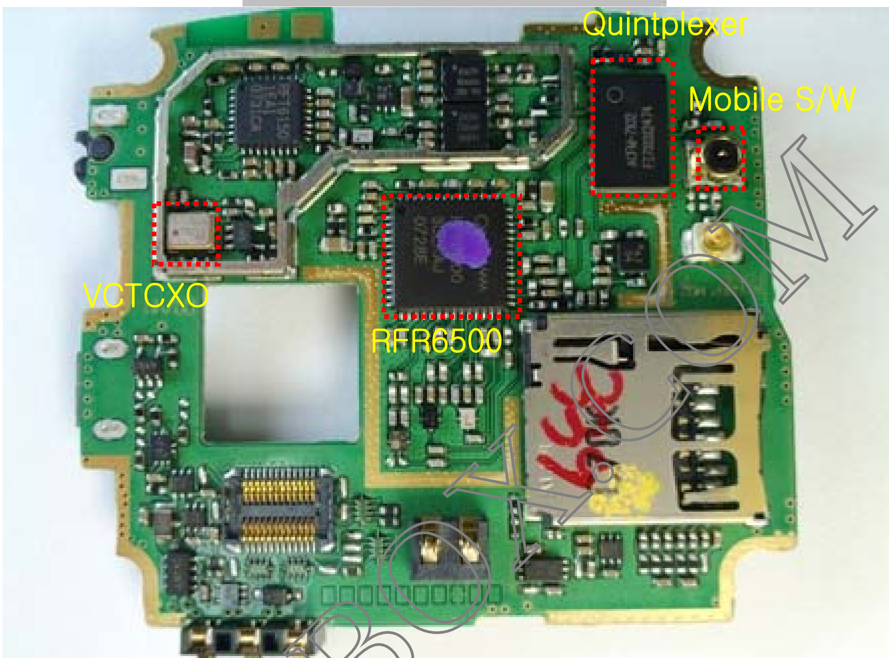
EXTERNAL CODEC

Normally codec bypass signal from MSM6500 to Speaker, Receiver or Headset. However, when we listen to the music in "My Music" folder codec performs 3-D sound enhancement and automatic level control for microphone or line input. The on-chip ADC and DAC are of a high quality using a multi-bit, low-order oversampling architecture to deliver optimum performance with low power consumption. It supports I2S audio data format between DSP and codec. A speaker amplifier, using digital amplifier system, realizes low power consumption than that of linear amplifier. In addition, power-down mode is available to minimize the current consumption when used.

4.1 Rx Part Trouble

4.1.1 DCN Rx

Test Point



Check flow

Start

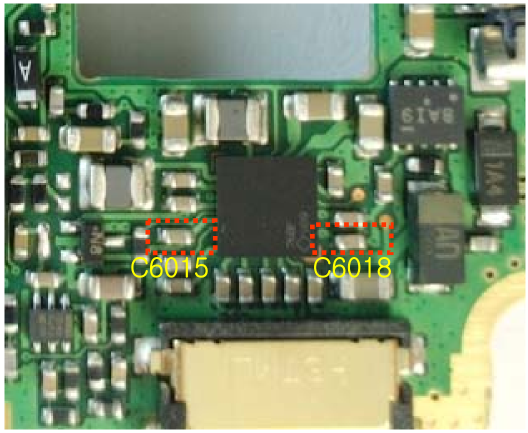
Rx TEST SETUP (HHP)
- Test Channel: 384
- Test Band : US Cellular
- SID: 2004
- Sector Power: -30 dBm Spectrum Analyzer Setting

Oscilloscope Setting

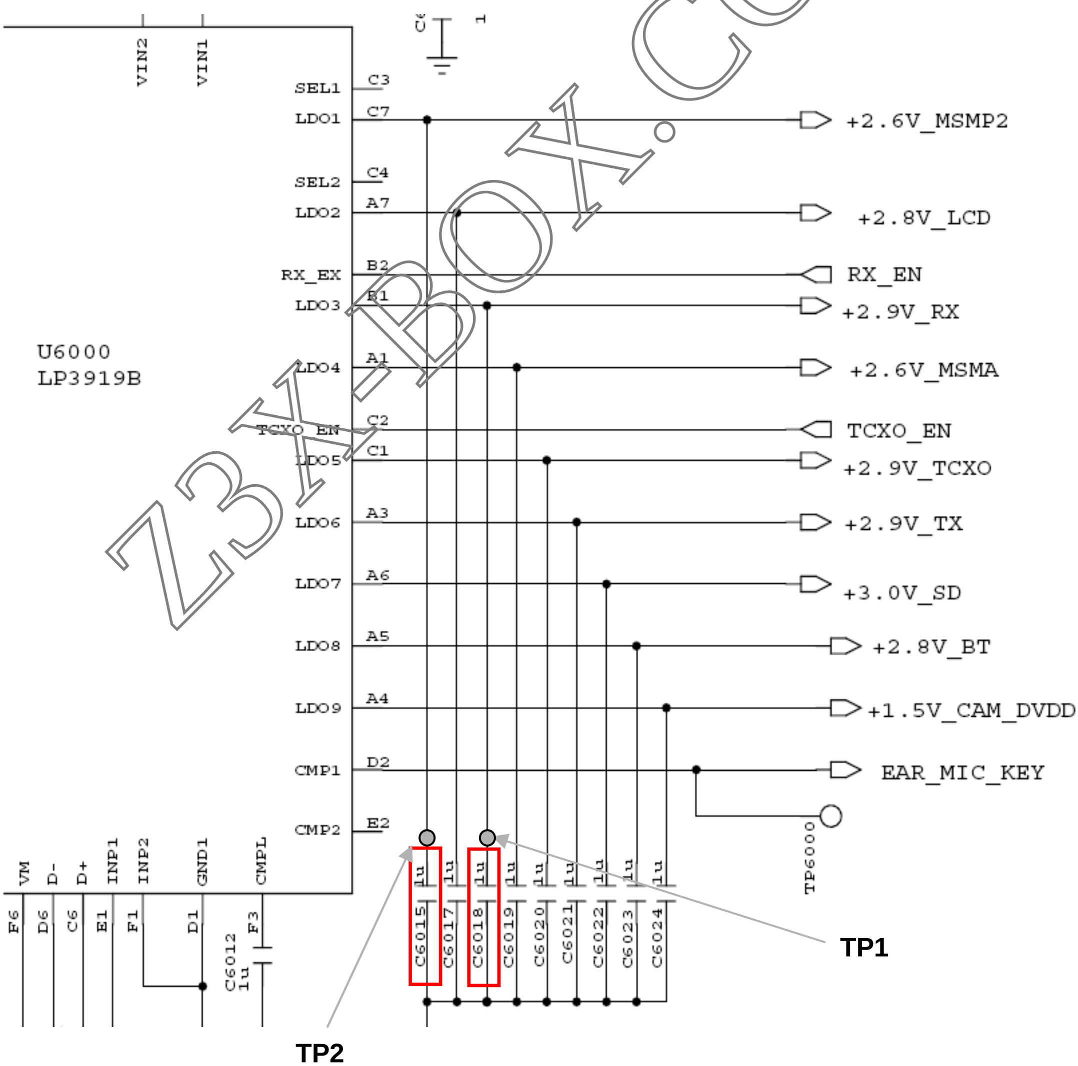
1. Check DC Power Supply circuit
2. Check VCTCXO
3. Check Control signal
4. Check RF Signal path
5. Check Rx I/Q data

4.1.1.1 Checking DC Power supply circuit (PMIC)

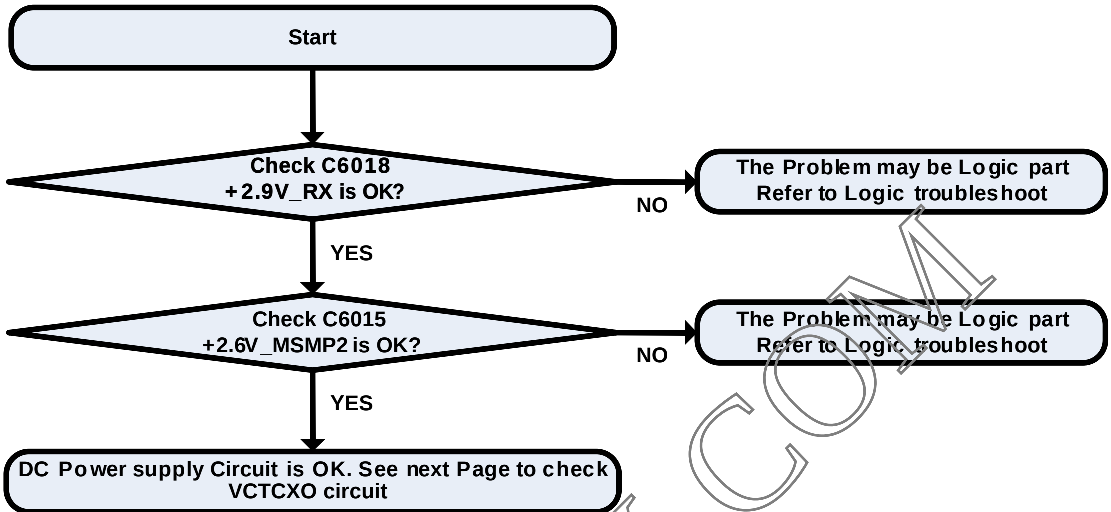
Test Point



Circuit Diagram

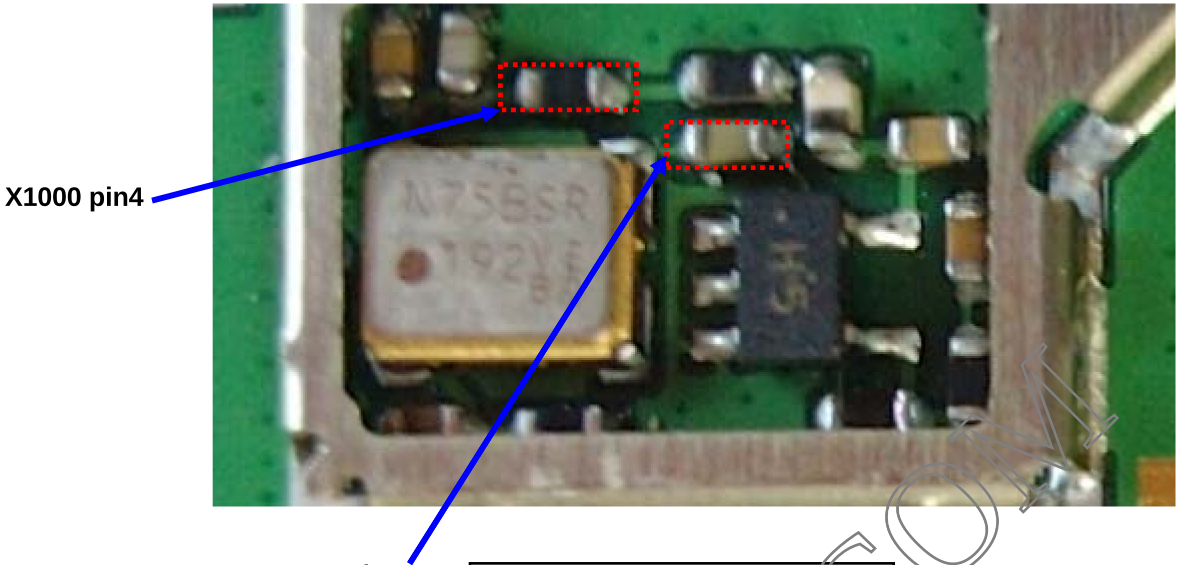


Checking Flow

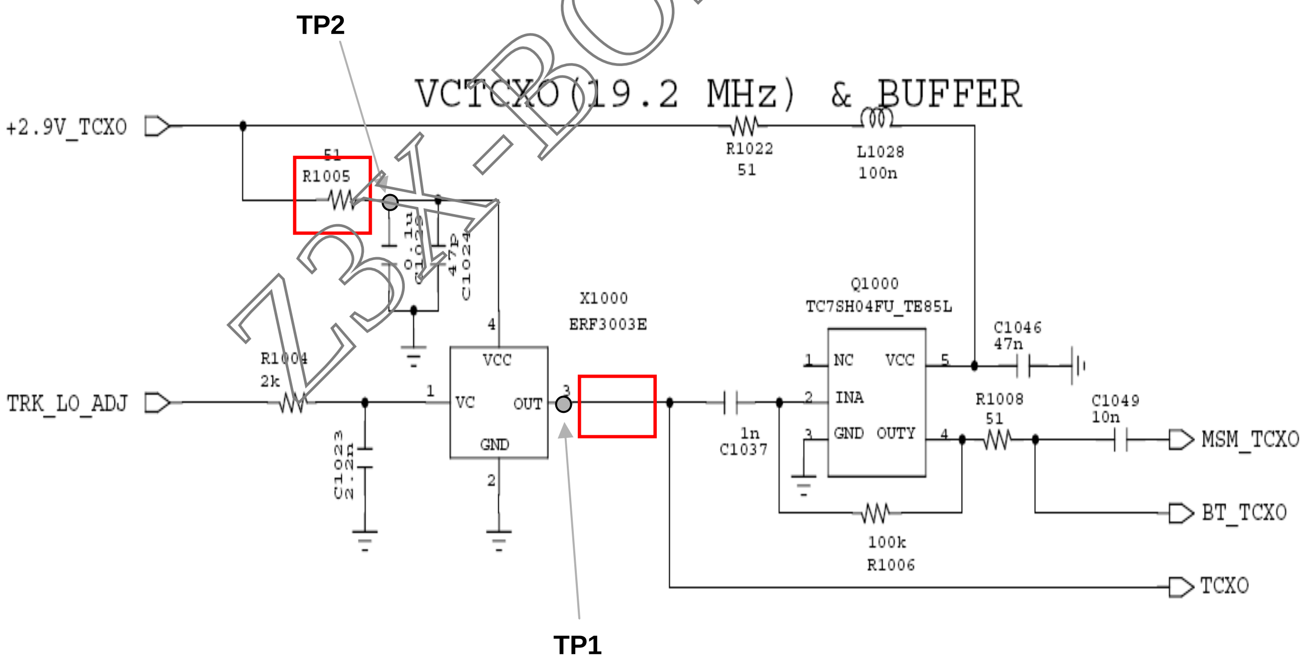


4.1.1.2 Checking VCTCXO circuit

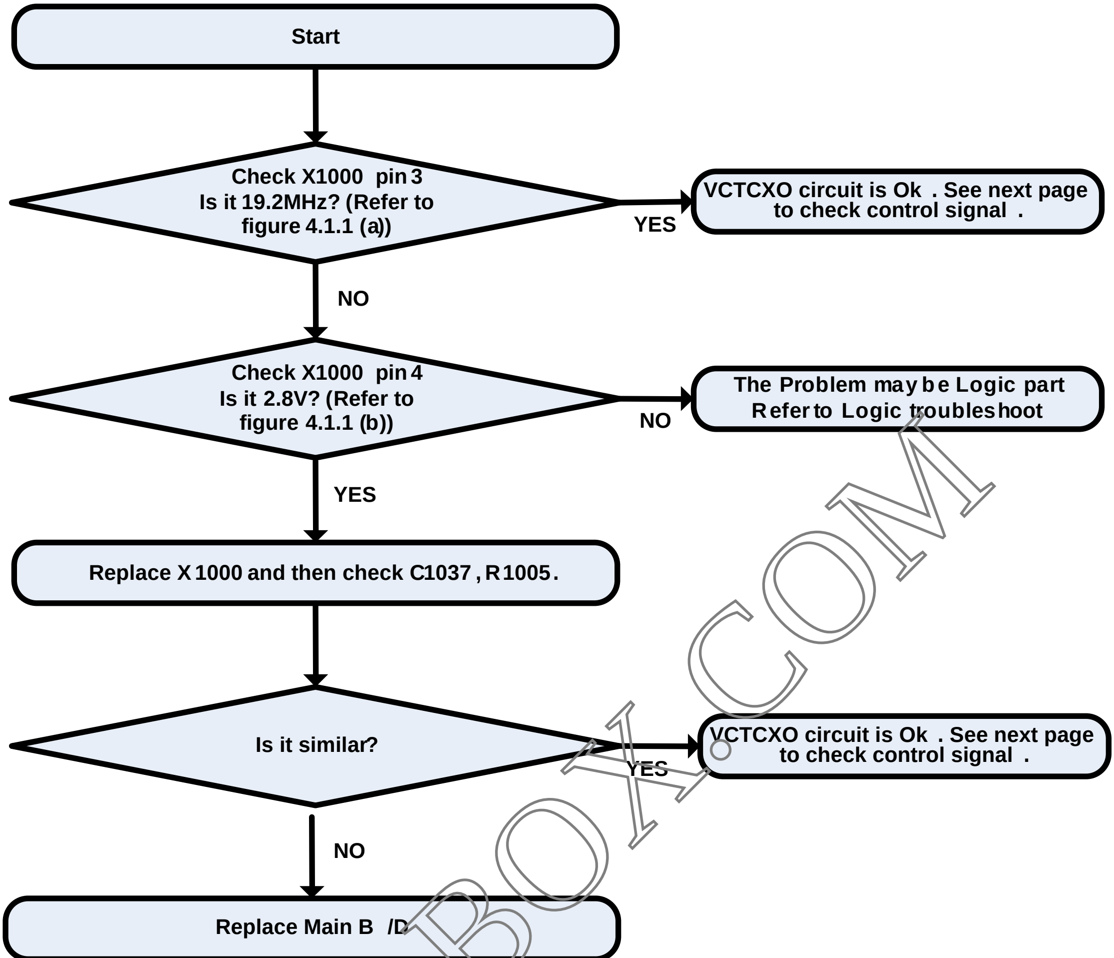
Test Point



Circuit Diagram



Checking Flow



Waveform

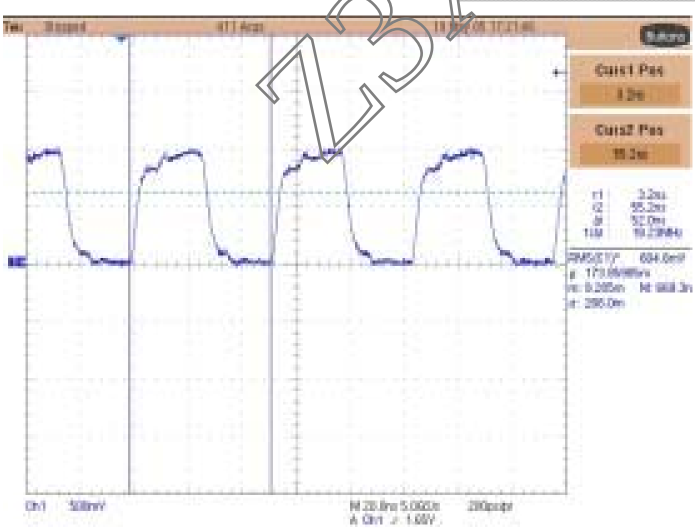


Figure 4.1.1 (a)

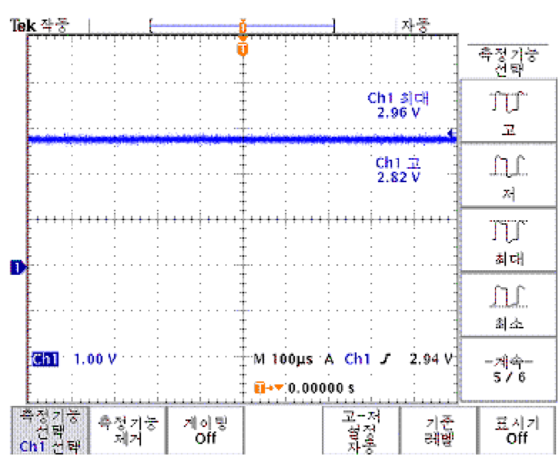
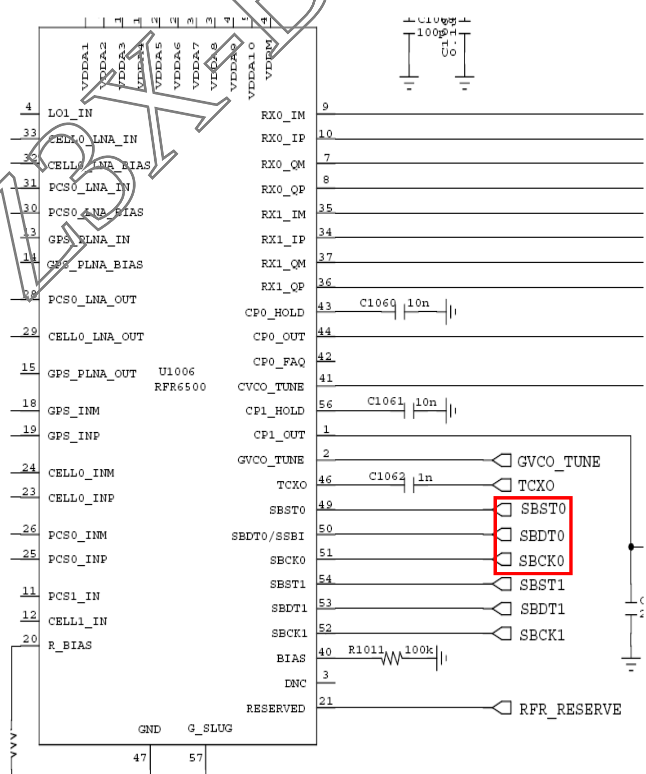


Figure 4.1.1 (b)

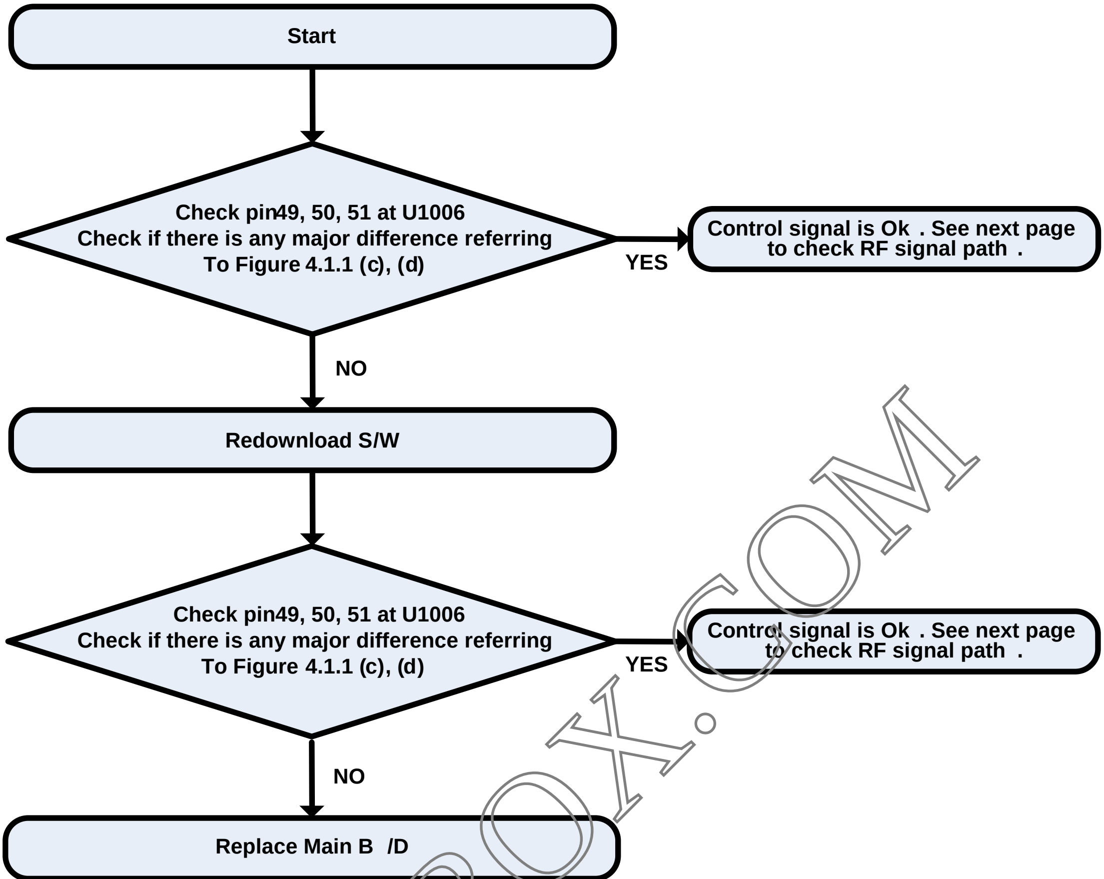
4.1.1.3 Checking Control signal

Test Point

Circuit Diagram



Checking Flow



Waveform

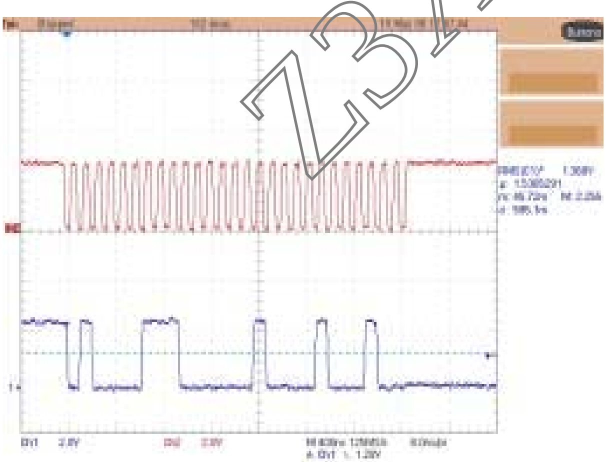


Figure 4.1.1 (c)

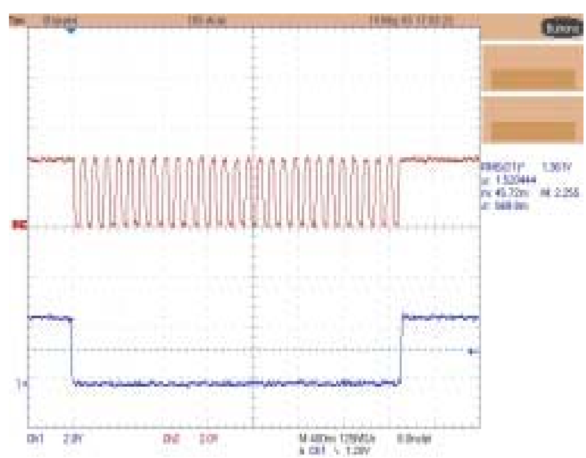
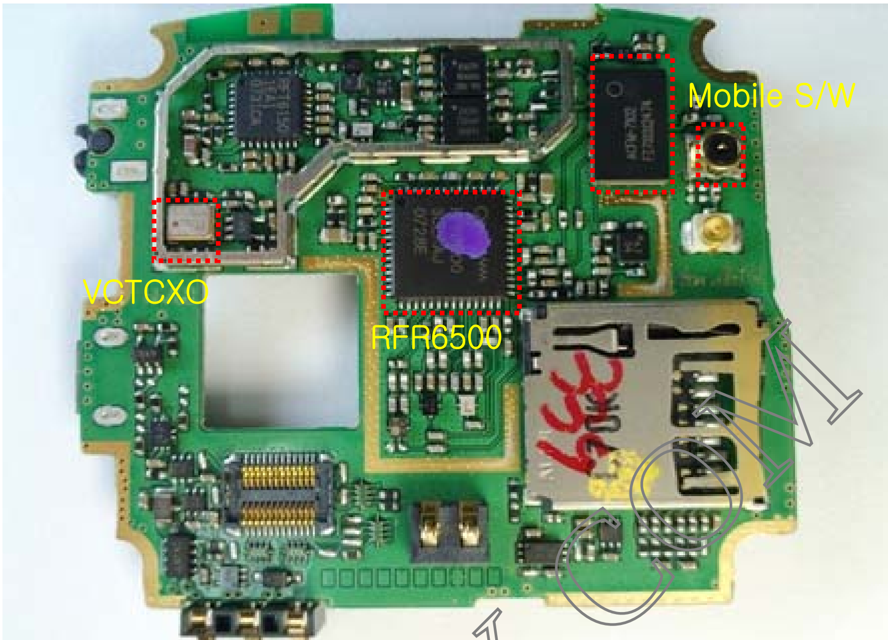


Figure 4.1.1 (d)

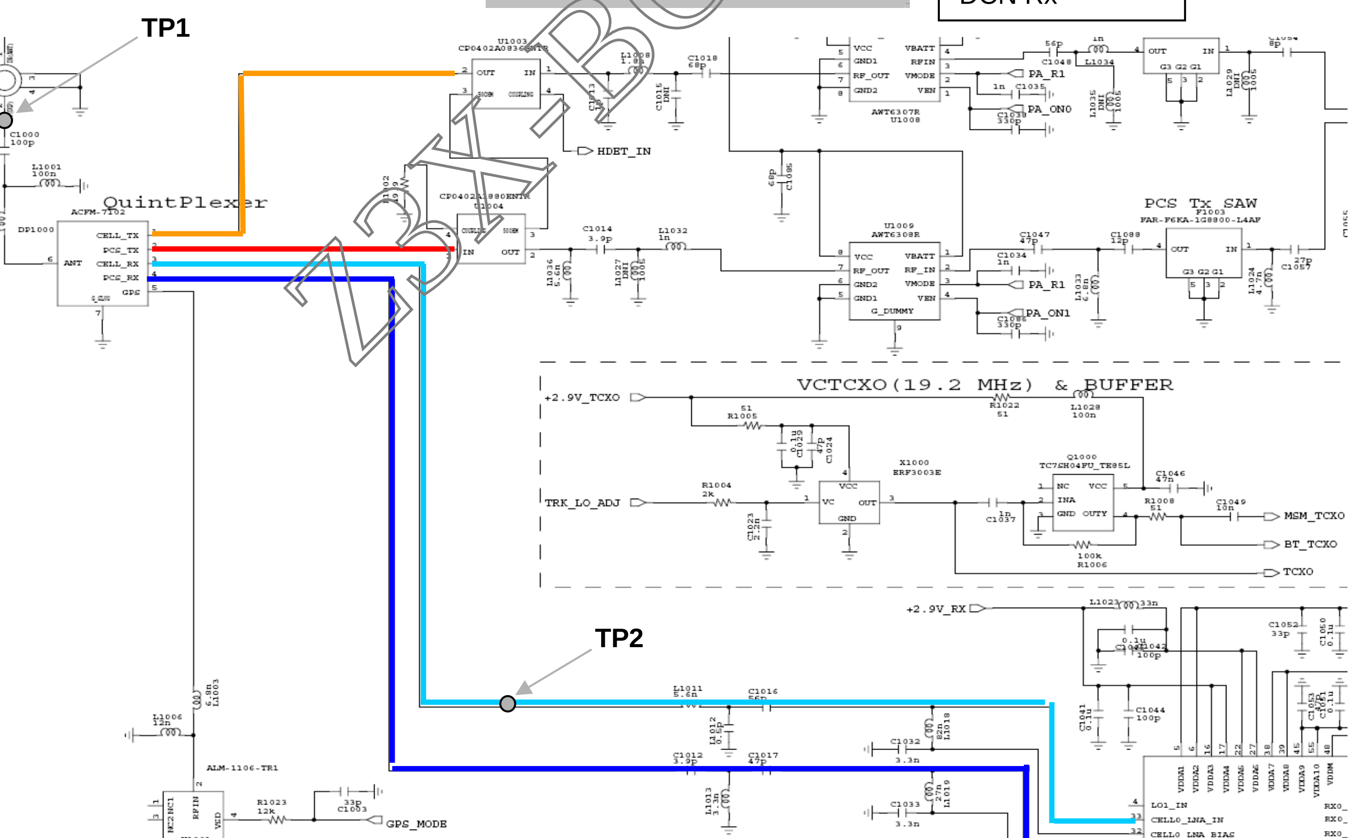
4.1.1.4 Checking RF signal path (Mobile S/W, Diplexer, Duplexer)

Test Point

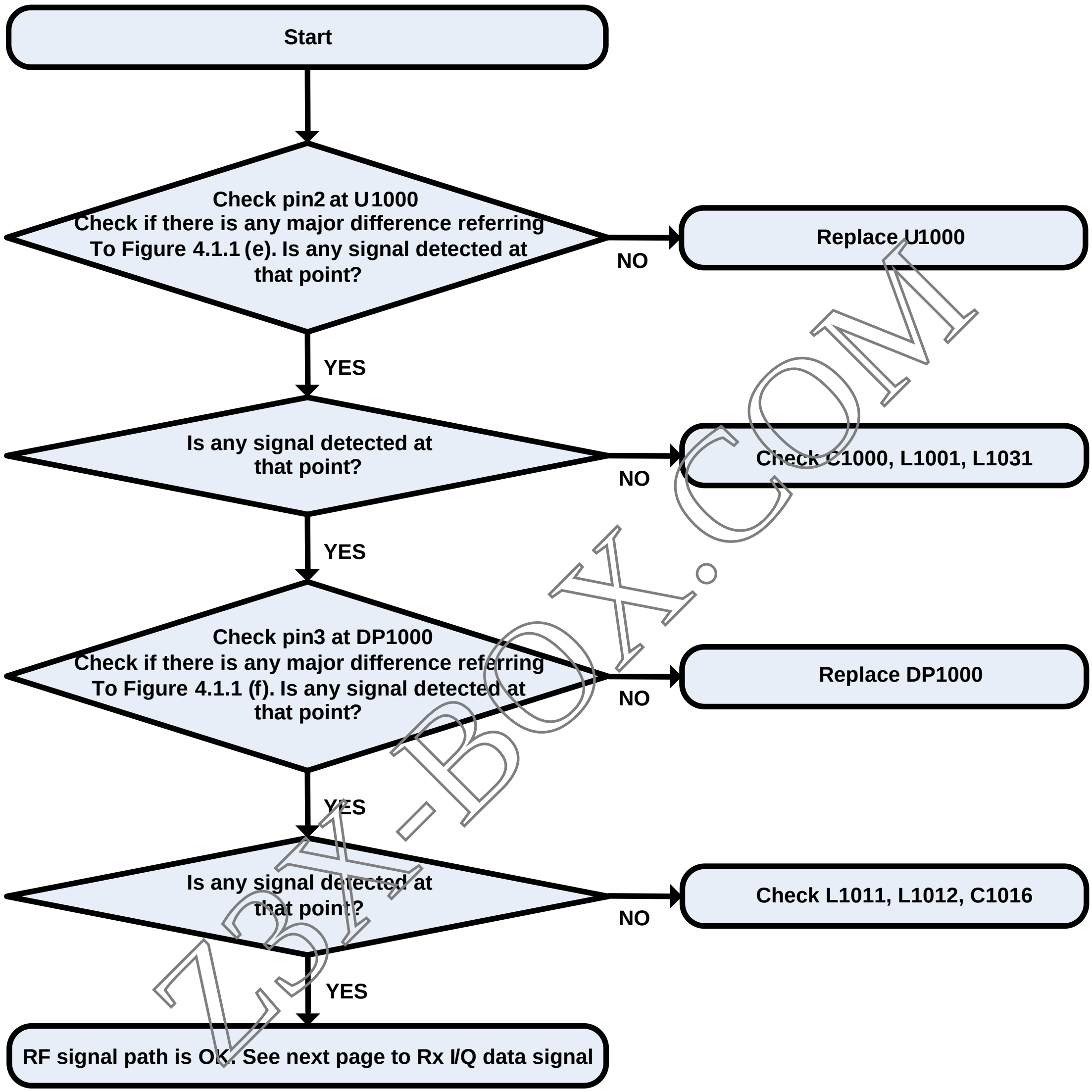


Circuit Diagram

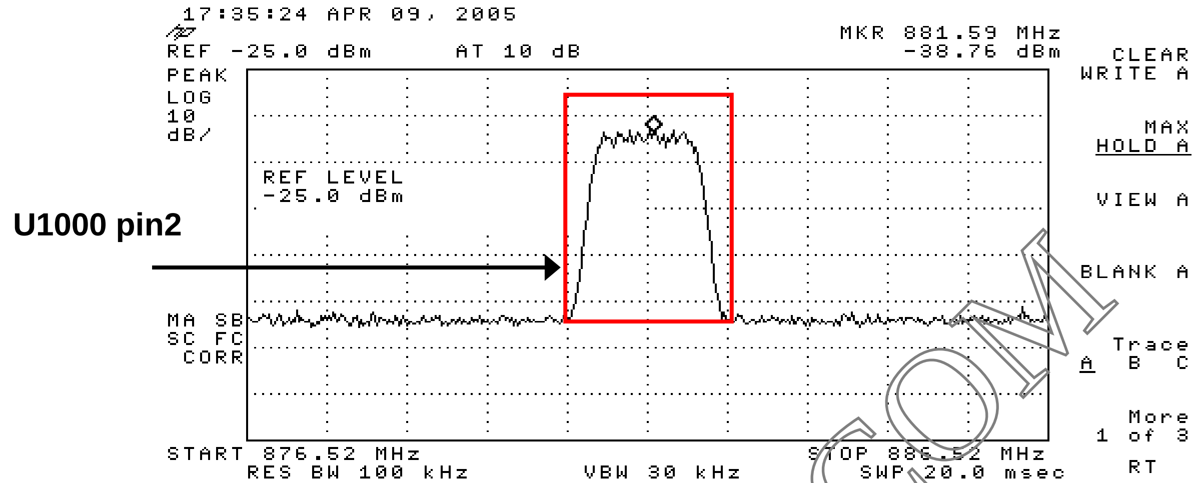
PCS Tx
DCN Tx
PCS Rx
DCN Rx



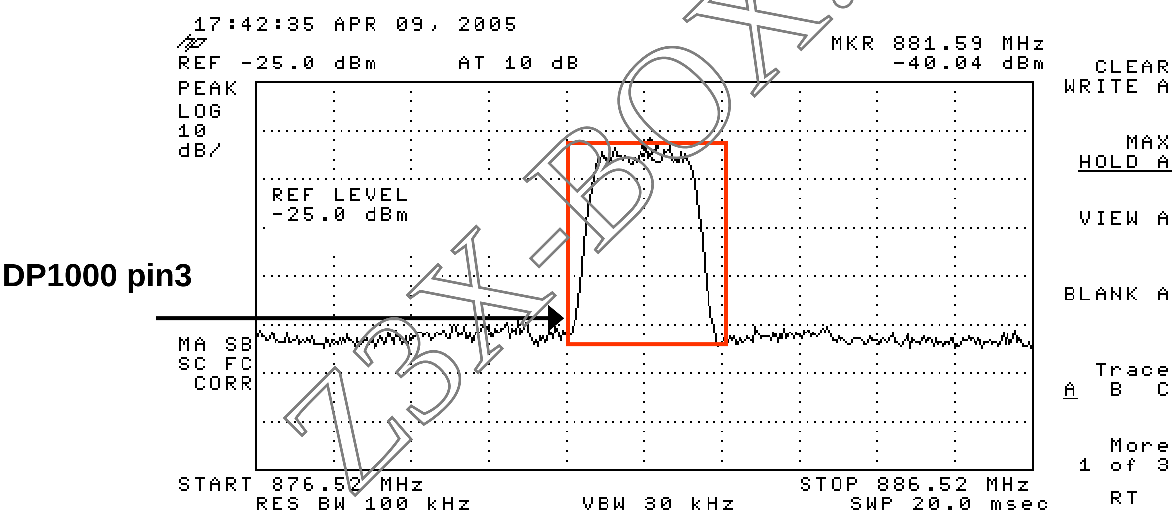
Checking Flow



Waveform



4.1.1 (e)

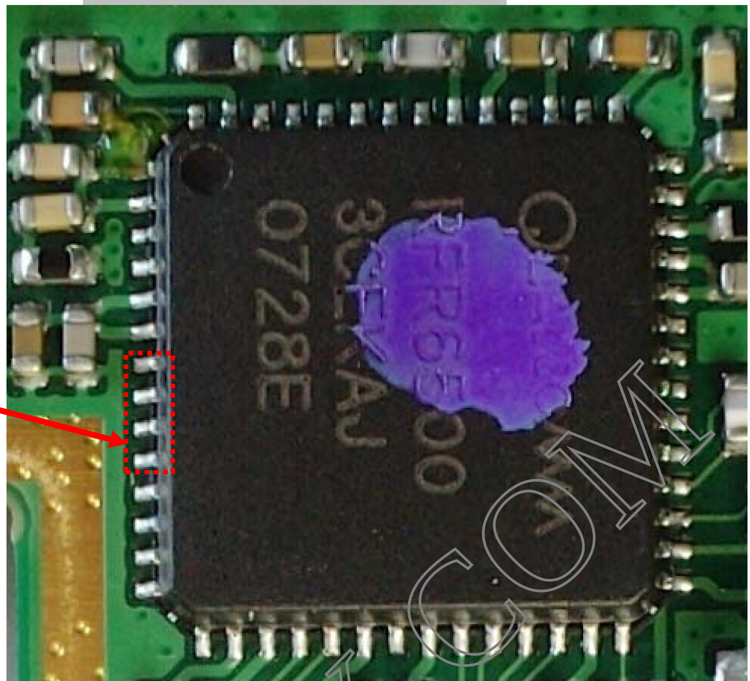


4.1.1 (f)

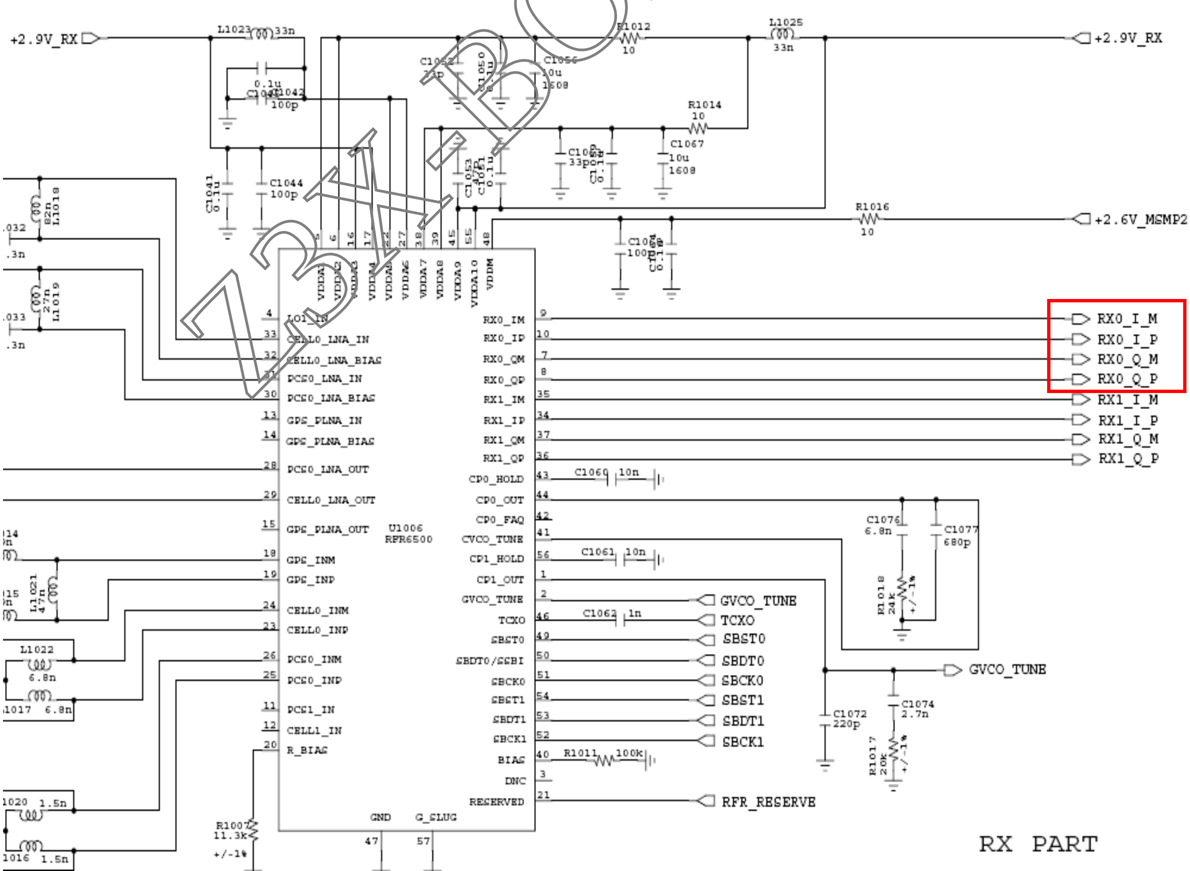
4.1.1.3 Checking Rx I/Q data

Test Point

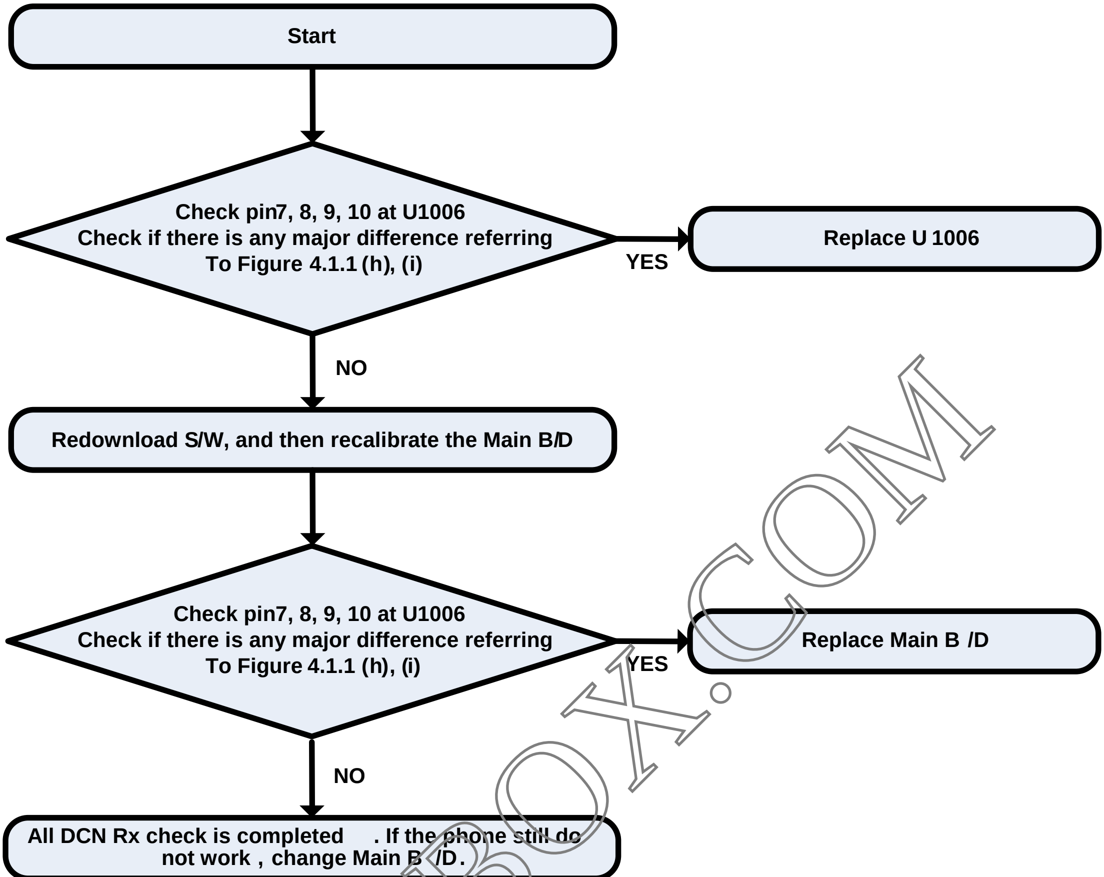
U1006 Pin7 (RX0_QM)
Pin8 (RX0_QP)
Pin9 (RX0_IM)
Pin10 (RX0_IP)



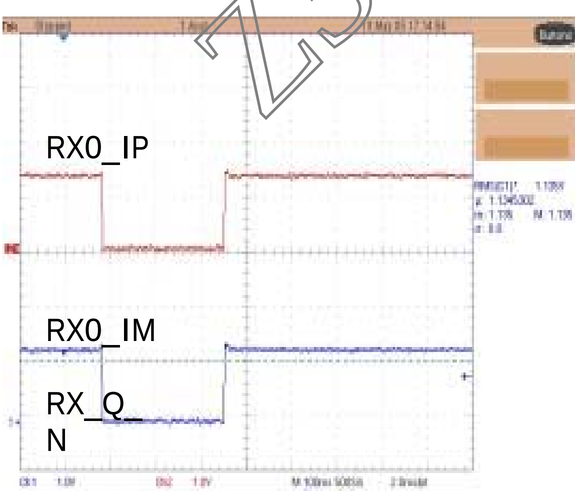
Circuit Diagram



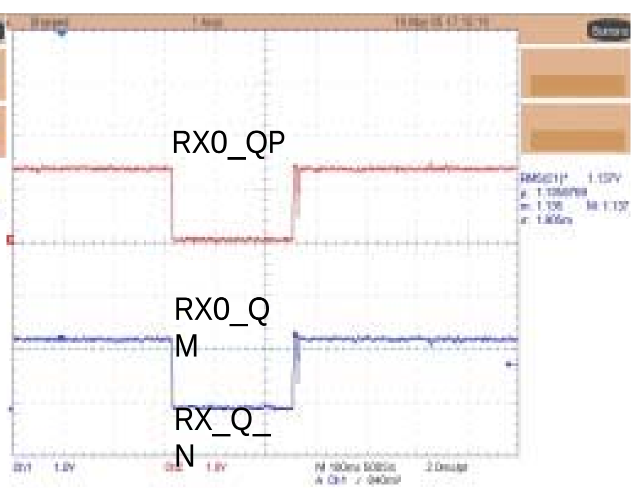
Checking Flow



Waveform



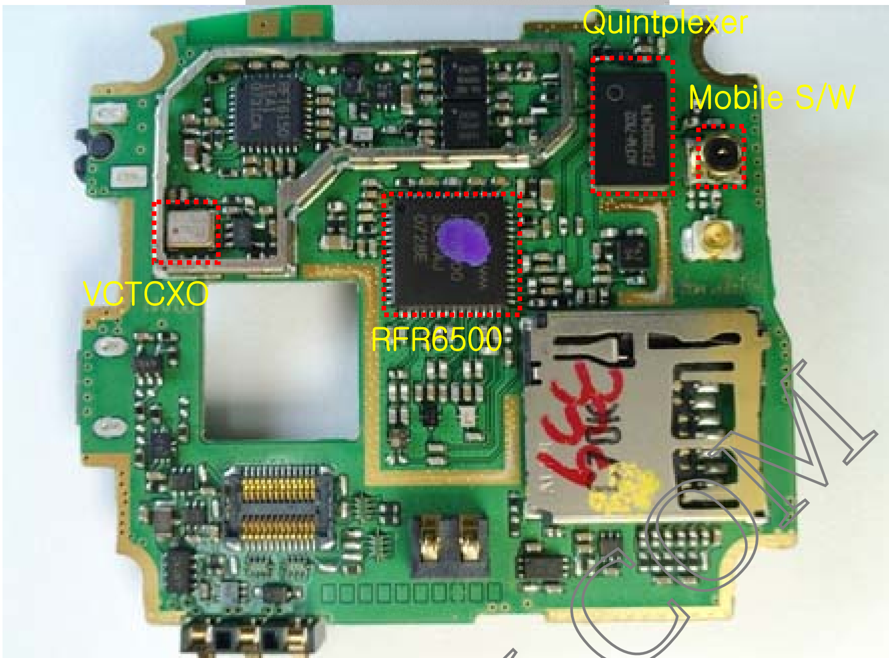
Graph 4.1.1(h)



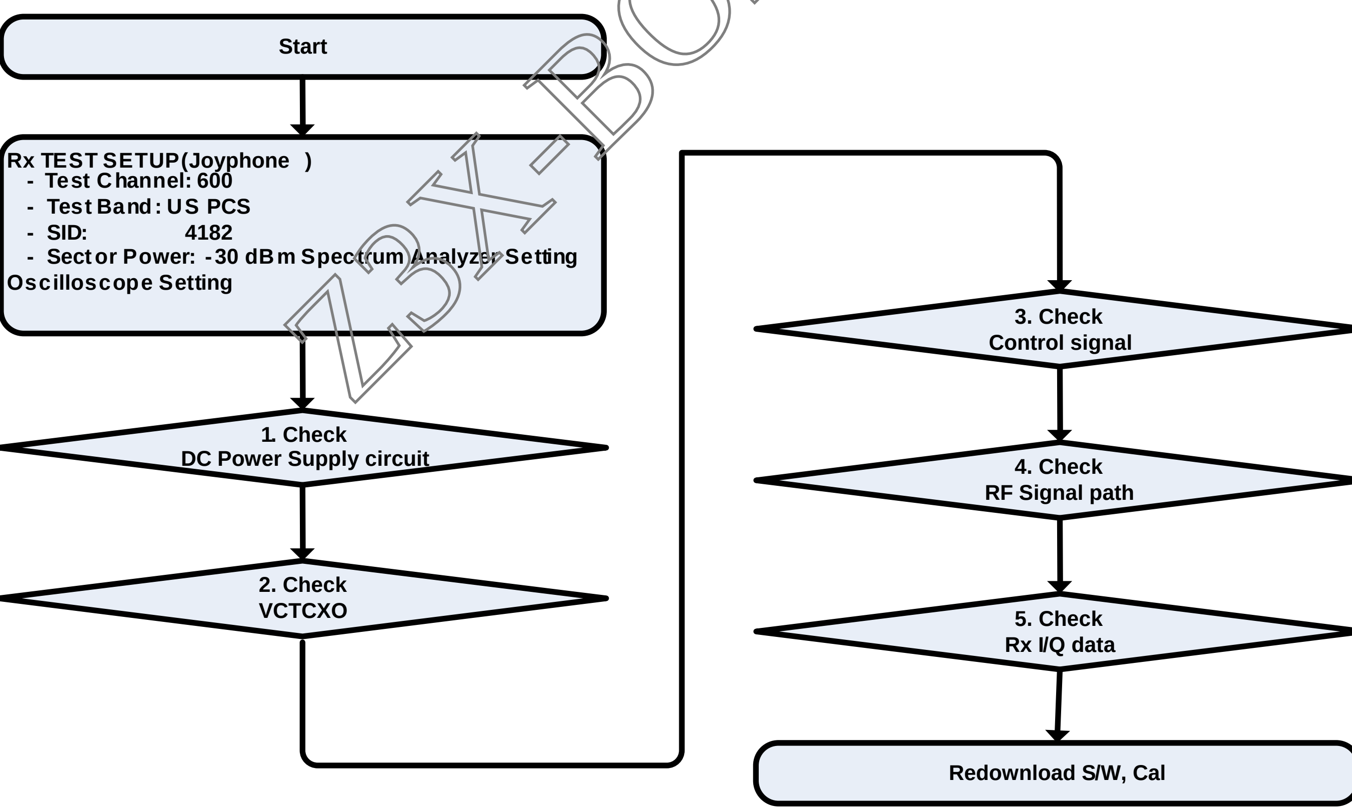
Graph 4.1.1(i)

4.1.2 PCS Rx

Test Point

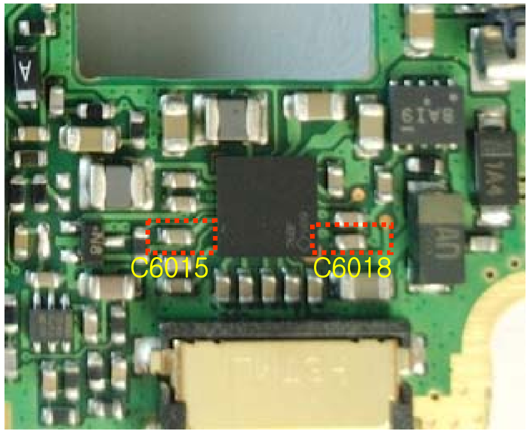


Checking Flow

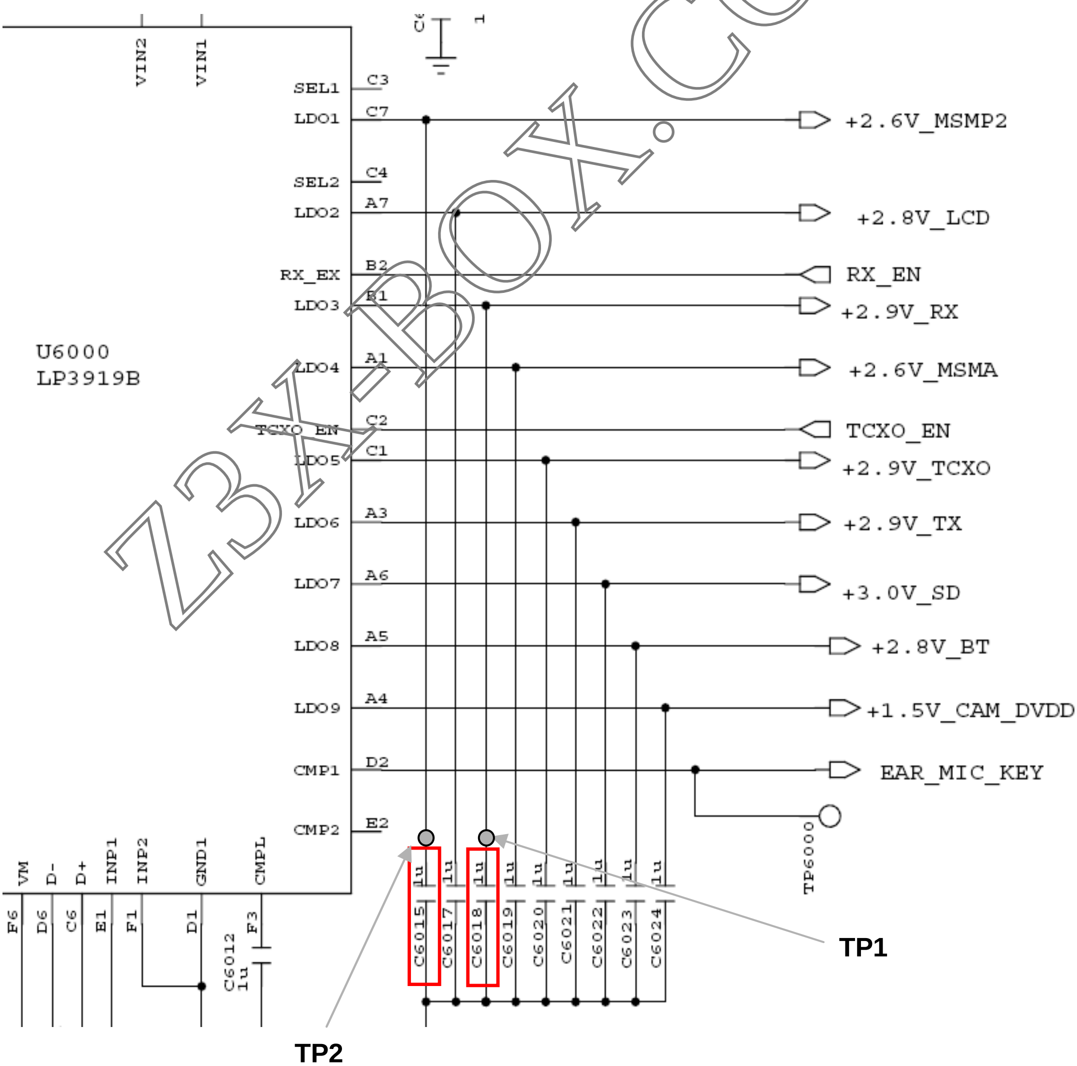


4.1.2.1 Checking DC Power supply circuit (PMIC)

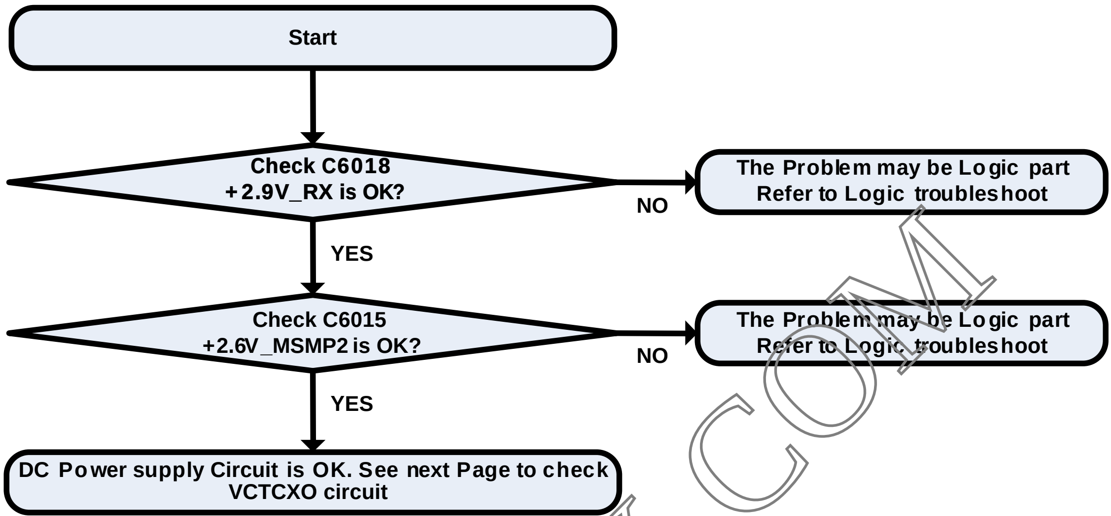
Test Point



Circuit Diagram

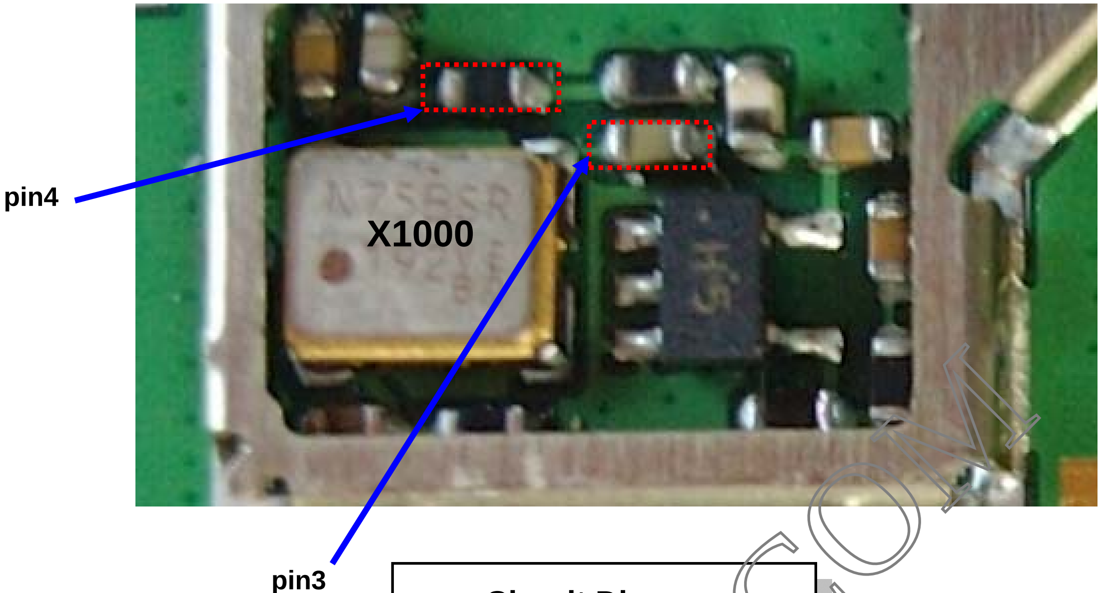


Checking Flow

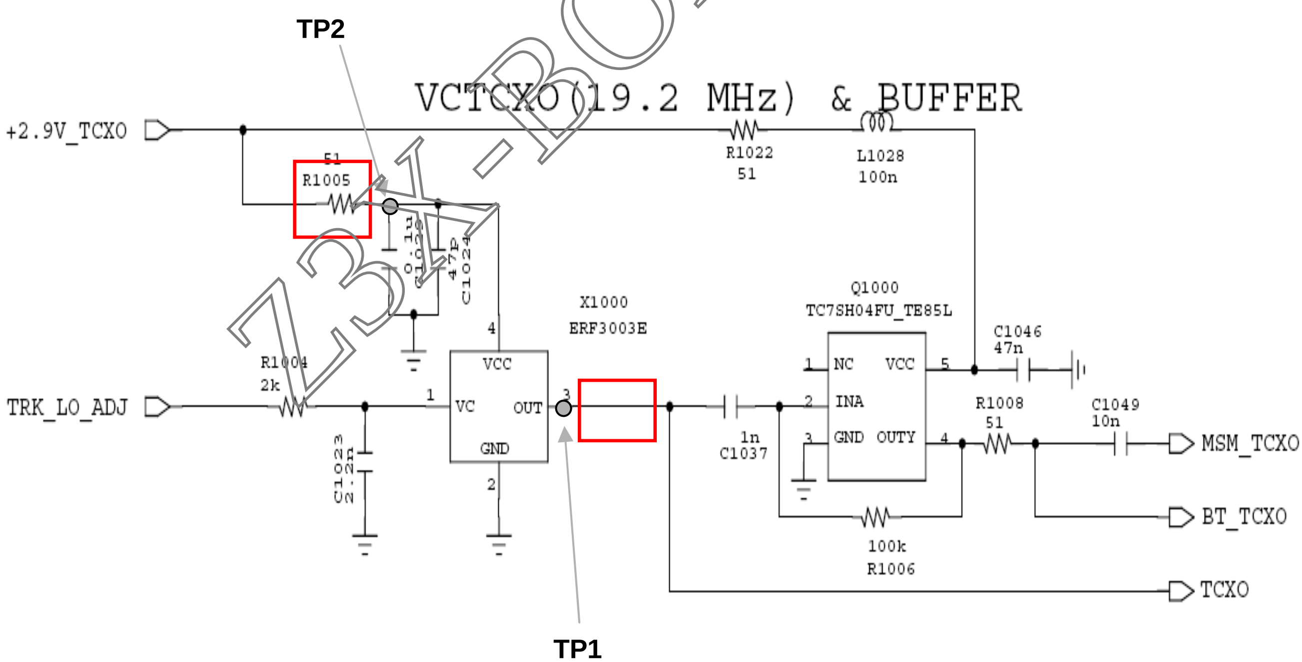


4.1.2.2 Checking VCTCXO circuit

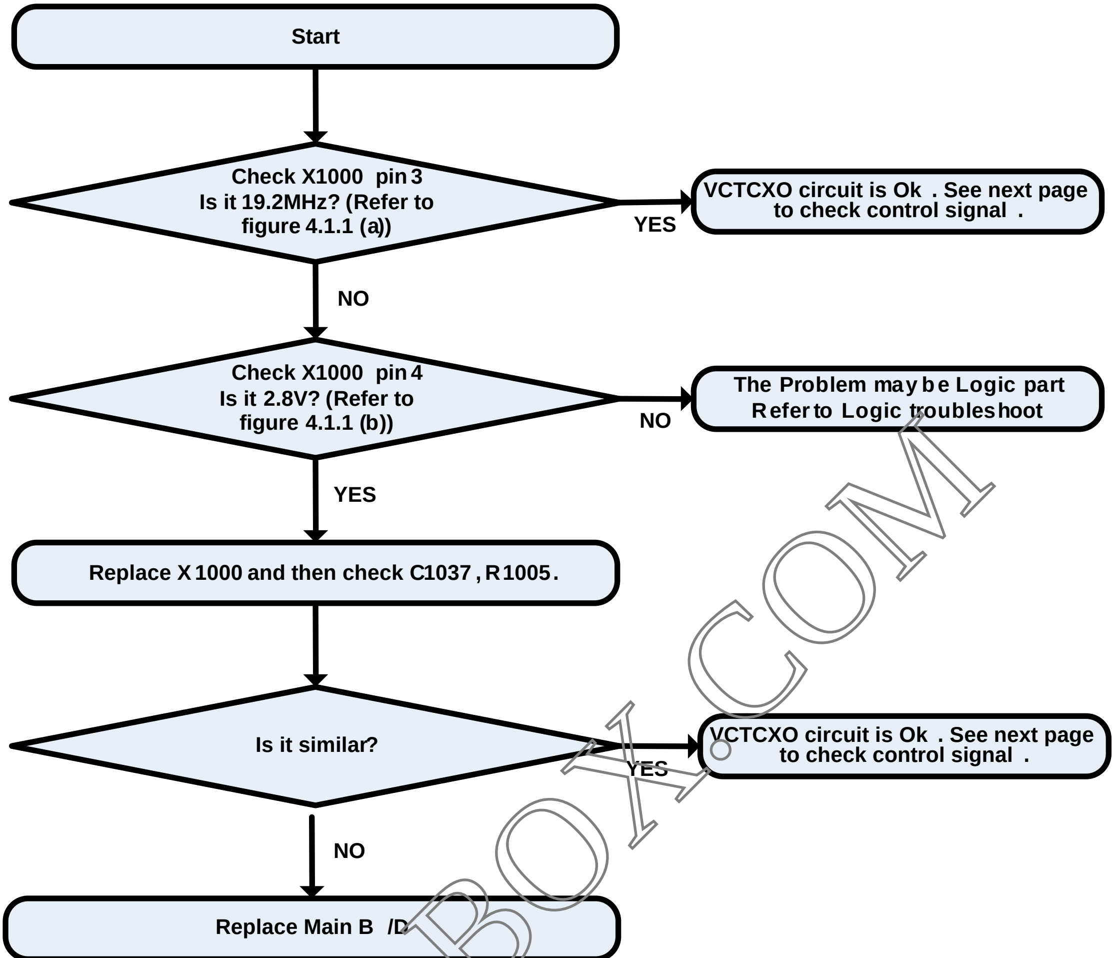
Test Point



Circuit Diagram



Checking Flow



Waveform

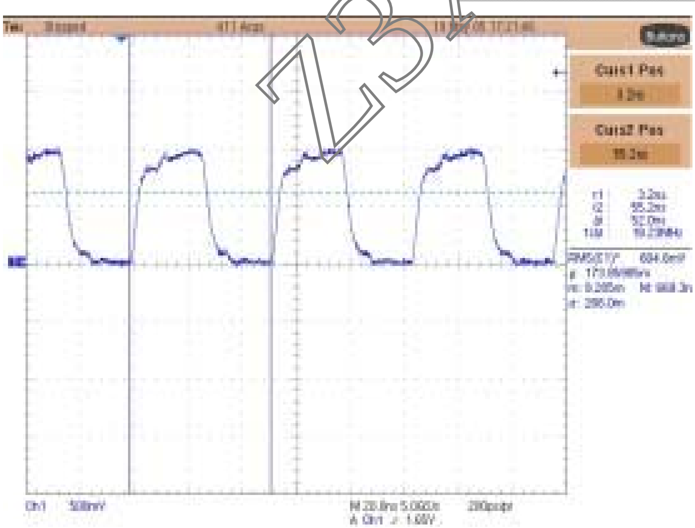


Figure 4.1.1 (a)

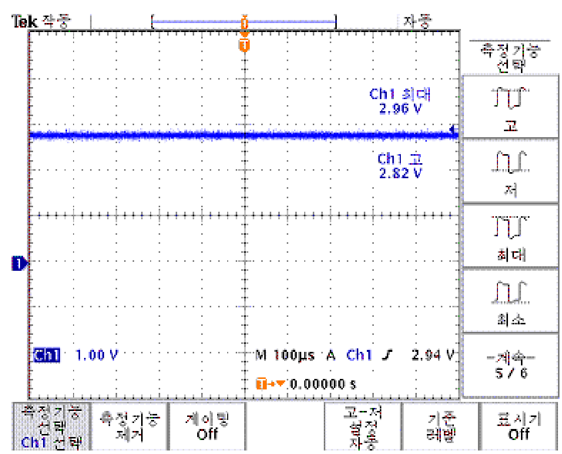
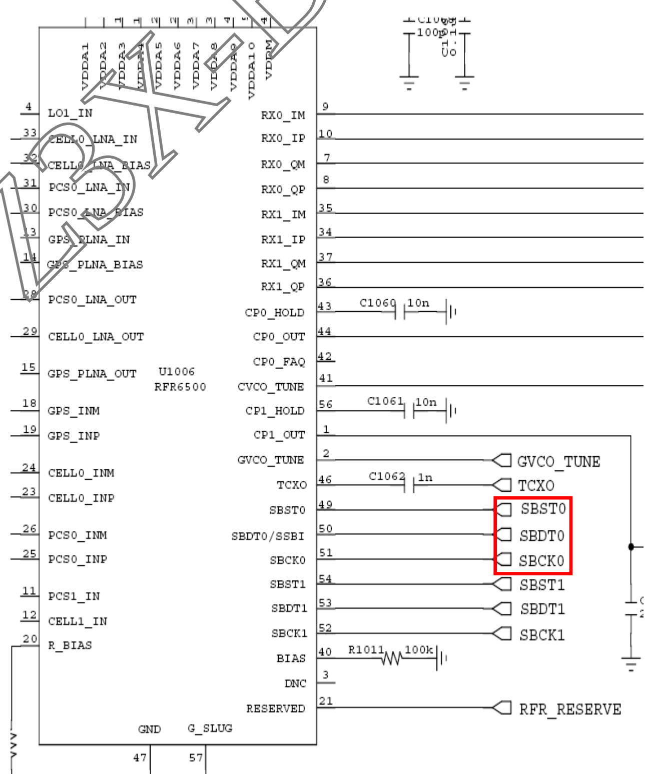


Figure 4.1.1 (b)

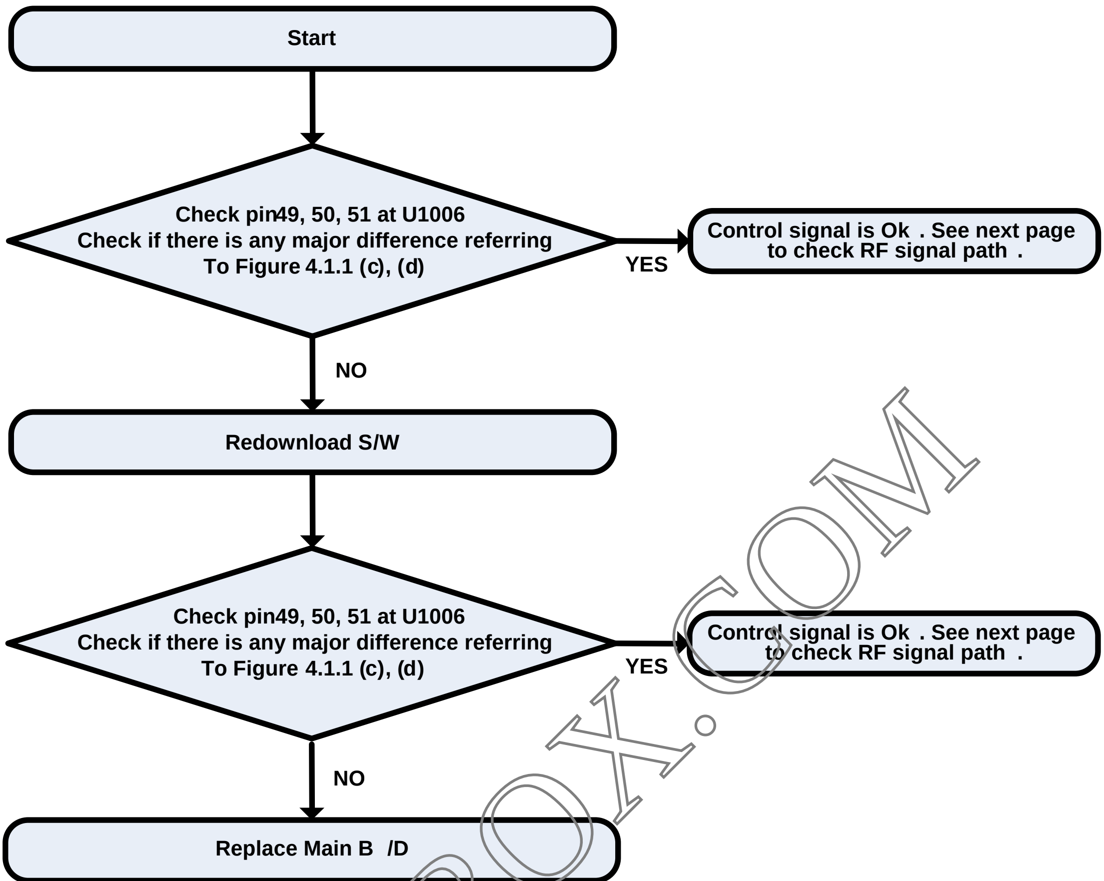
4.1.2.3 Checking Control circuit

Test Point

Circuit Diagram



Checking Flow



Waveform

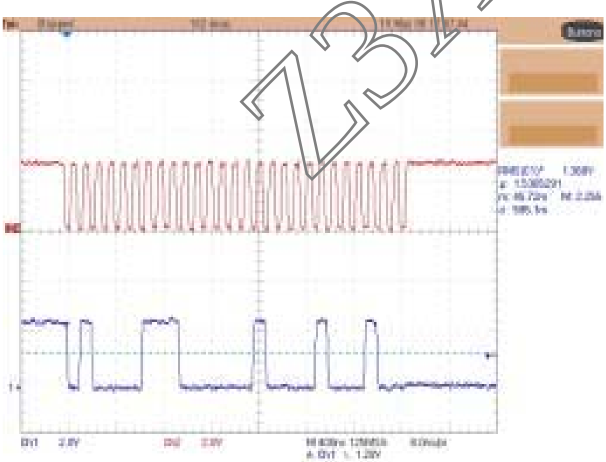


Figure 4.1.1 (c)

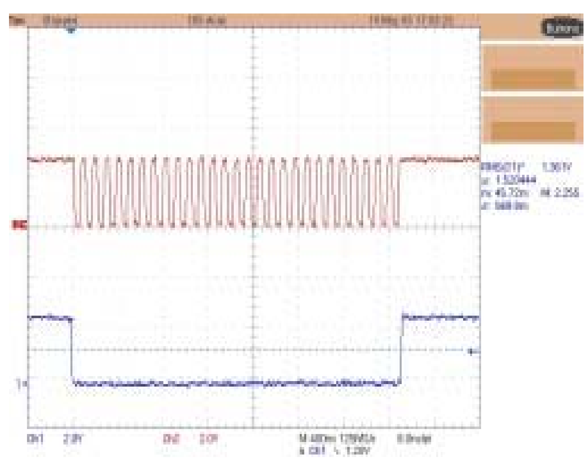
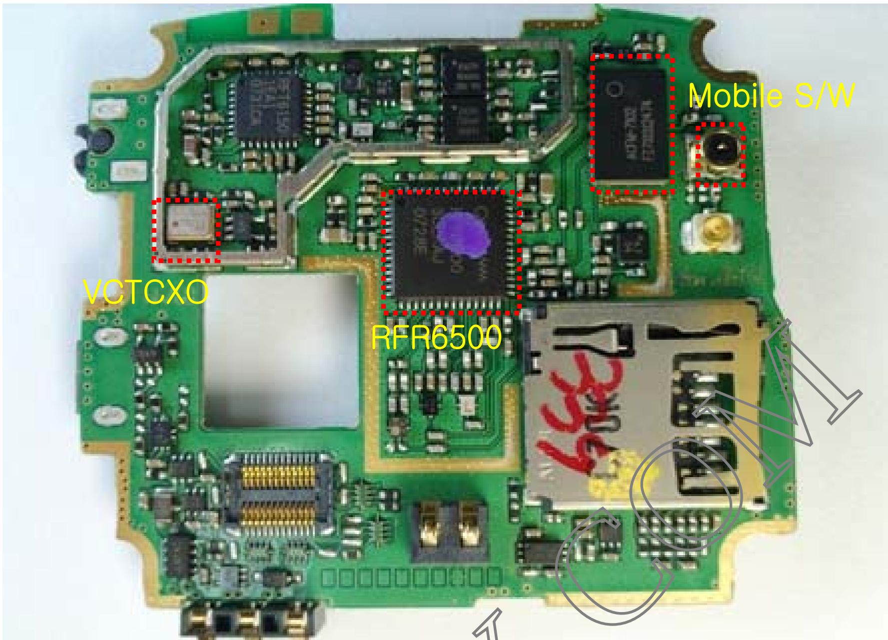


Figure 4.1.1 (d)

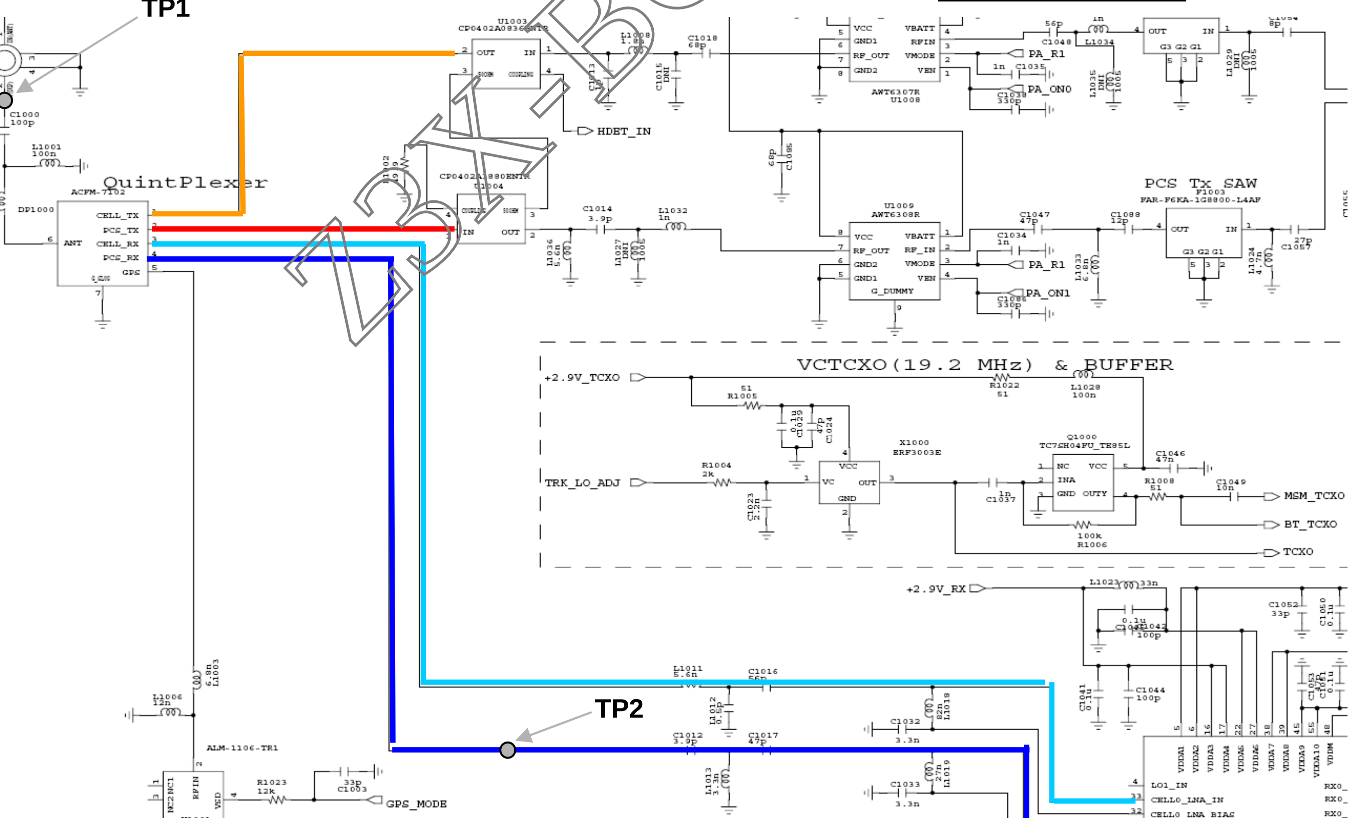
4.1.2.4 Checking RF signal path (Mobile S/W, Quintplexer)

Test Point

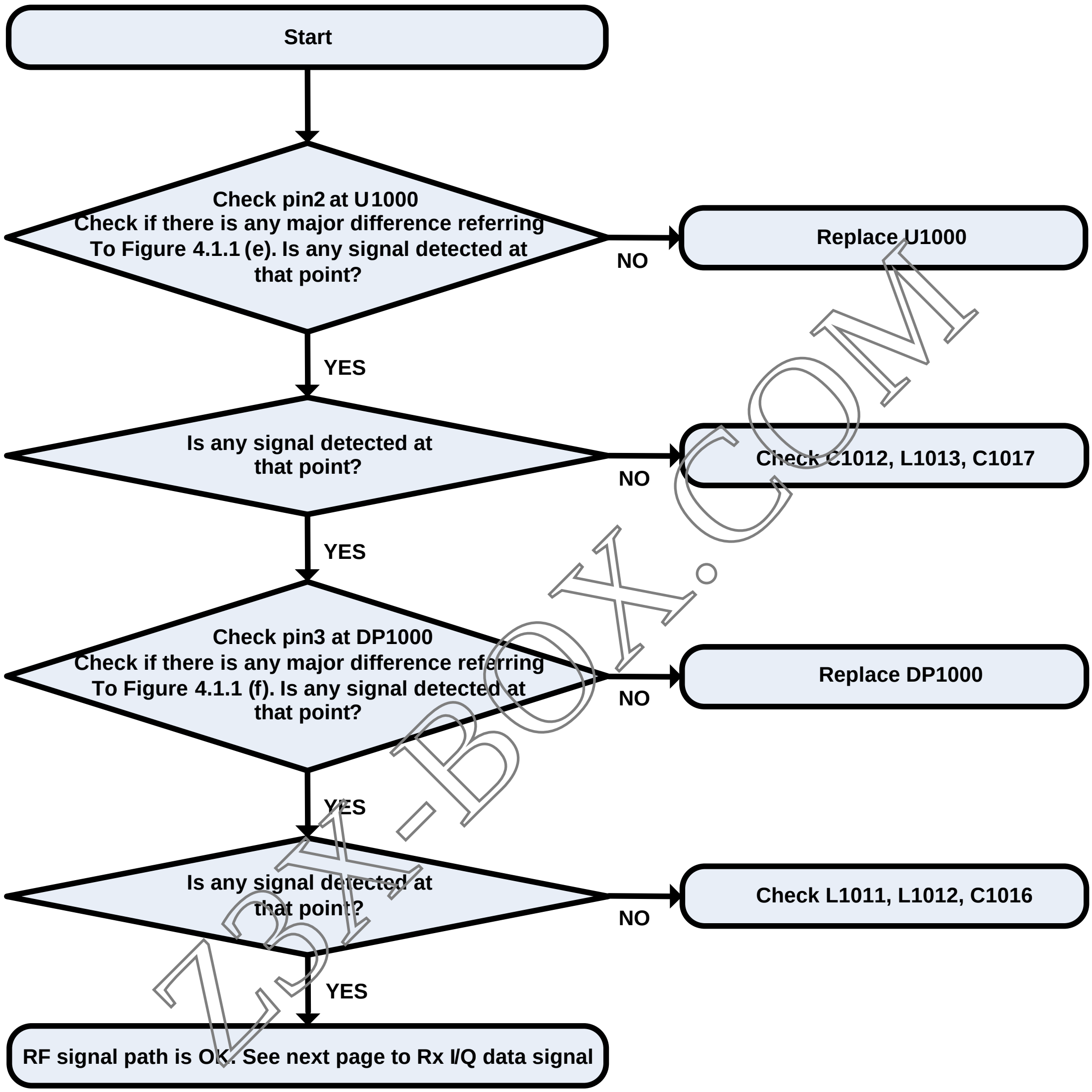


Circuit Diagram

- PCS Tx
- DCN Tx
- PCS Rx
- DCN Rx

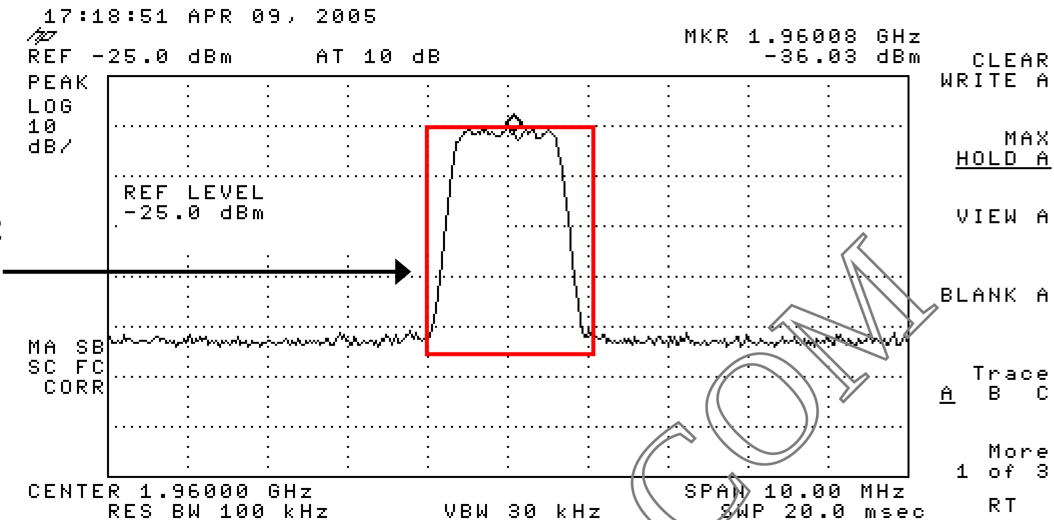


Checking Flow

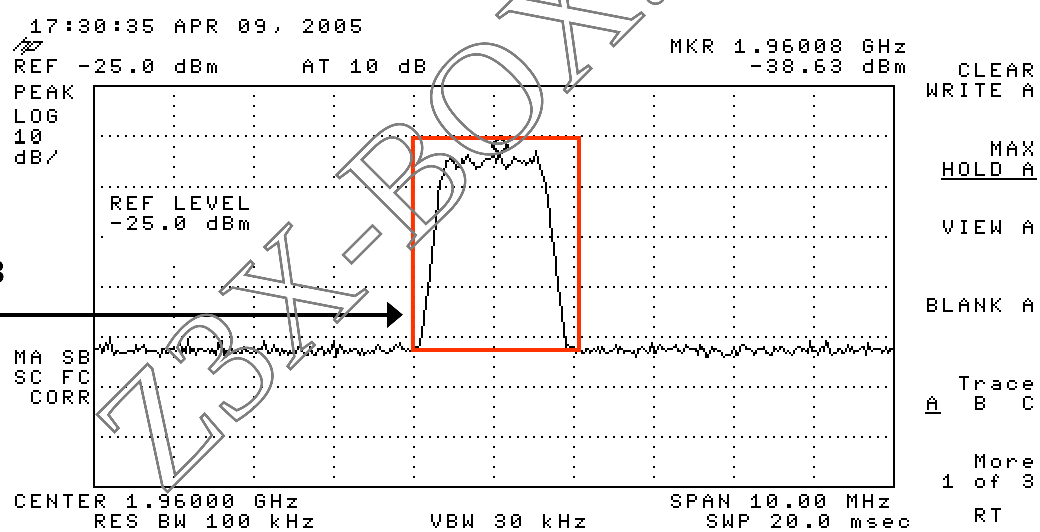


Waveform

U1000 pin2



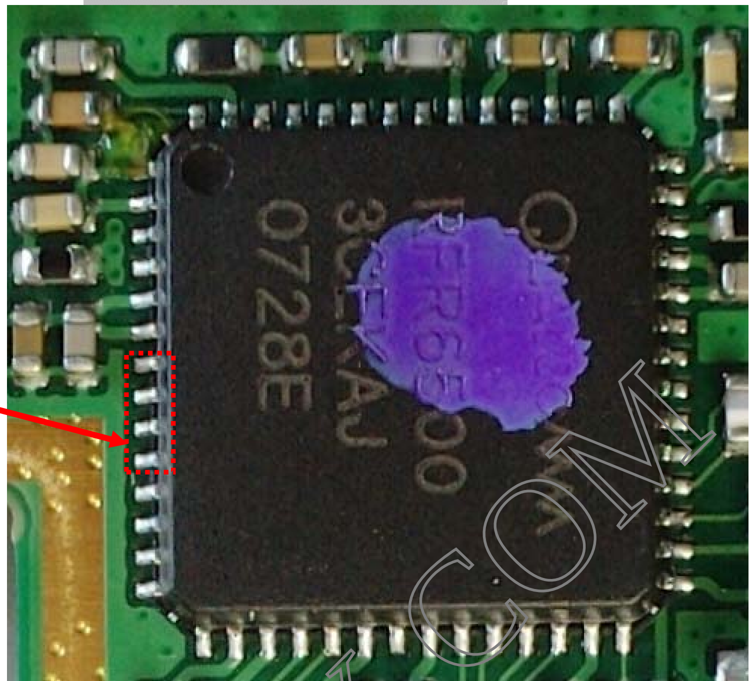
DP1000 pin3



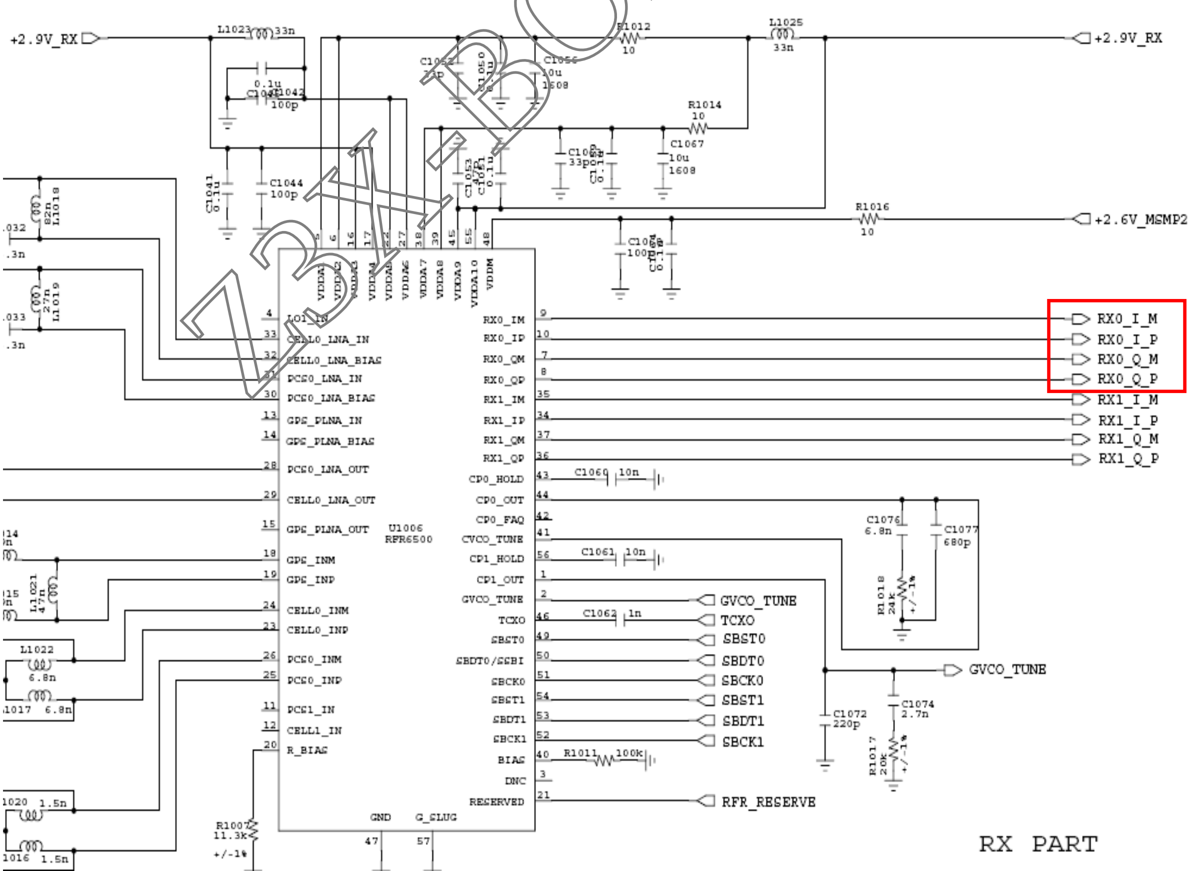
4.1.2.5 Checking Rx I/Q data

Test Point

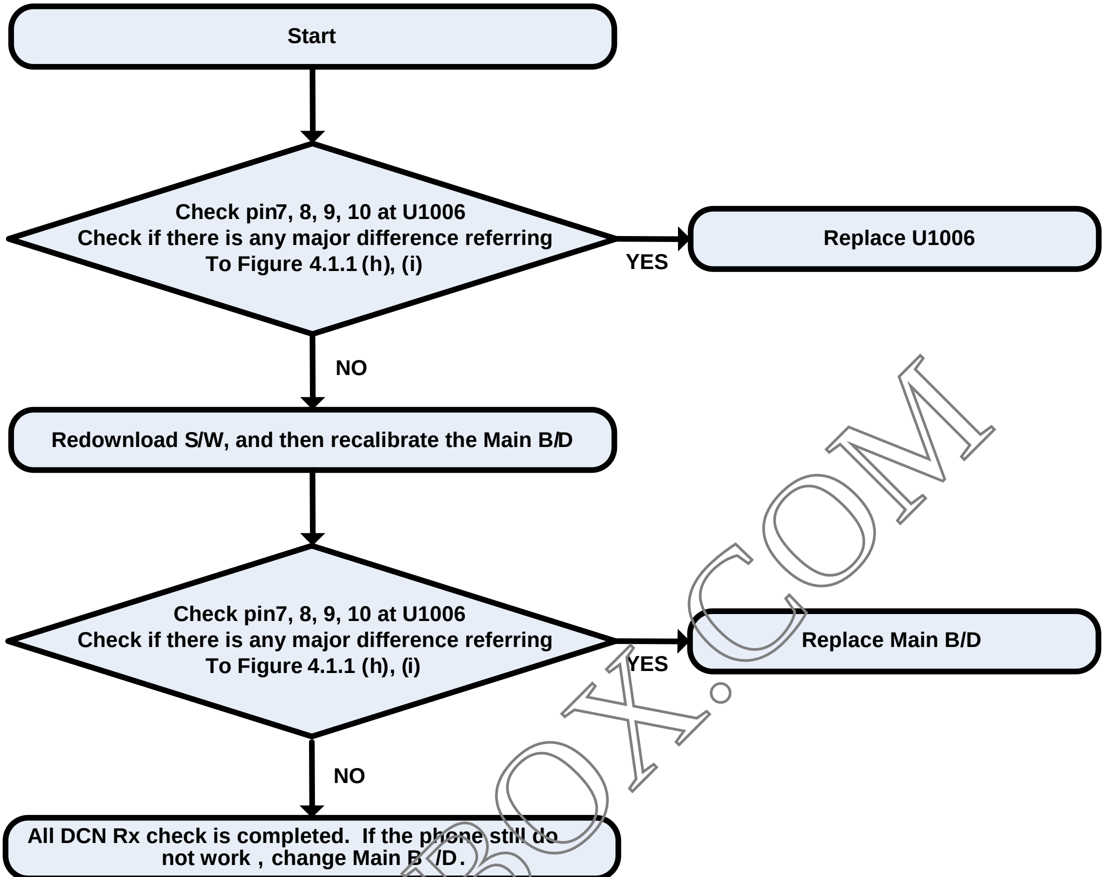
U1006 Pin7 (RX0_QM)
Pin8 (RX0_QP)
Pin9 (RX0_IM)
Pin10 (RX0_IP)



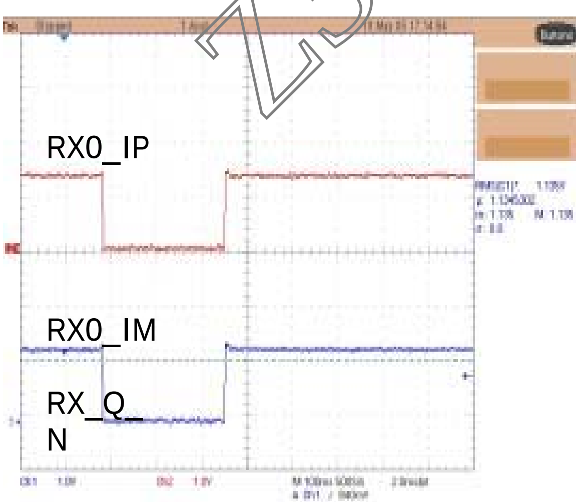
Circuit Diagram



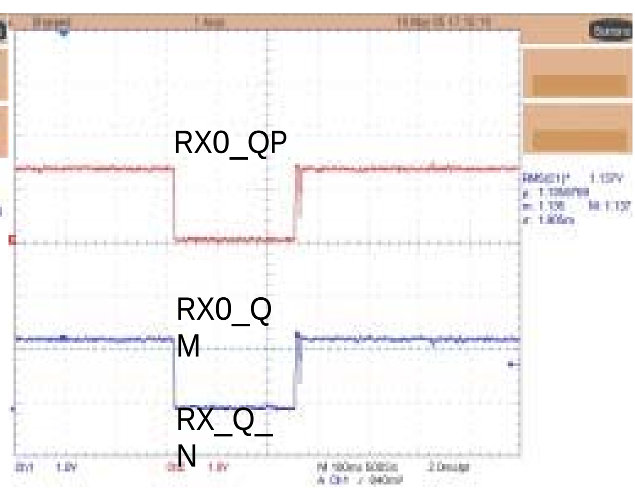
Checking Flow



Waveform



Graph 4.1.1(h)

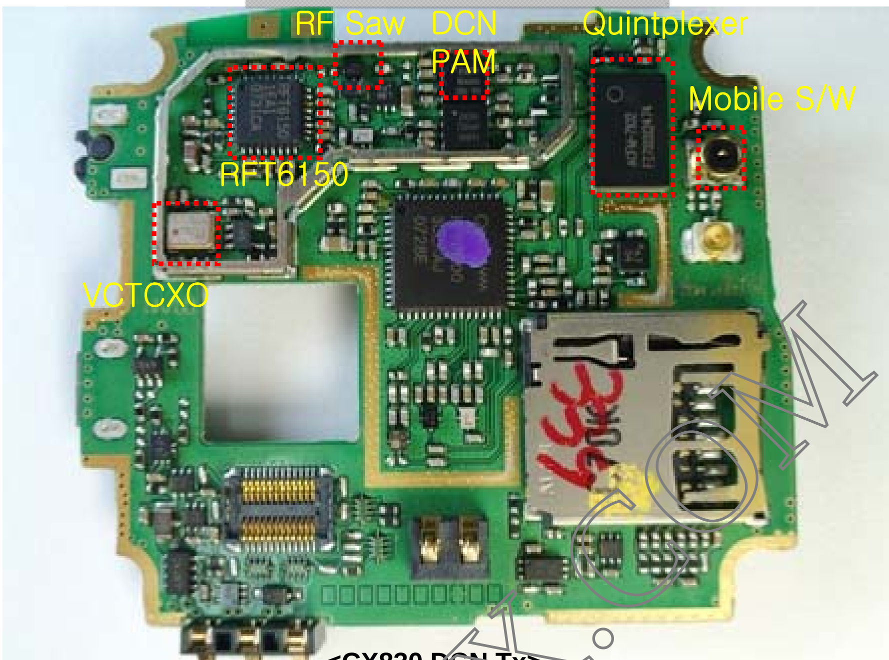


Graph 4.1.1(i)

4.2 Tx Part Trouble

4.2.1 DCN Tx

Test Point



<CX830 DCN Tx>

Checking Flow

Start

Press “##5473784236368” + “SEND” key + “000000” in Phone idle state.
- ? Press “5” to enter FCC Test
- ? Press “2” to enter CDMA FCC mode
  - Set channel to 384 and AGC to 360
- ? Measure frequency domain waveform with Spectrum analyser
- ? Measure time domain waveform with Oscilloscope

1. Check DC Power Supply circuit

2. Check VCTCXO

3. Check RFT6150

4. Check RF SAW

5. Check DCN PAM

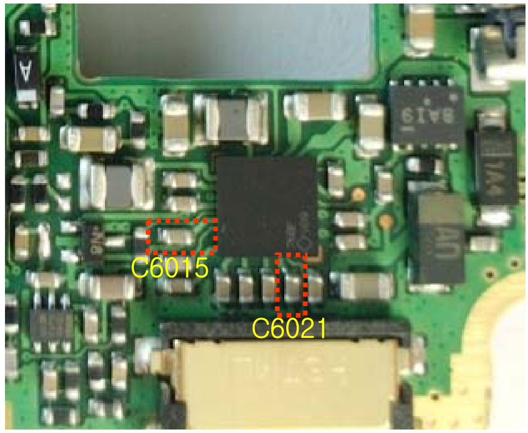
6. Check Quintplexer

7. Check Mobile Switch

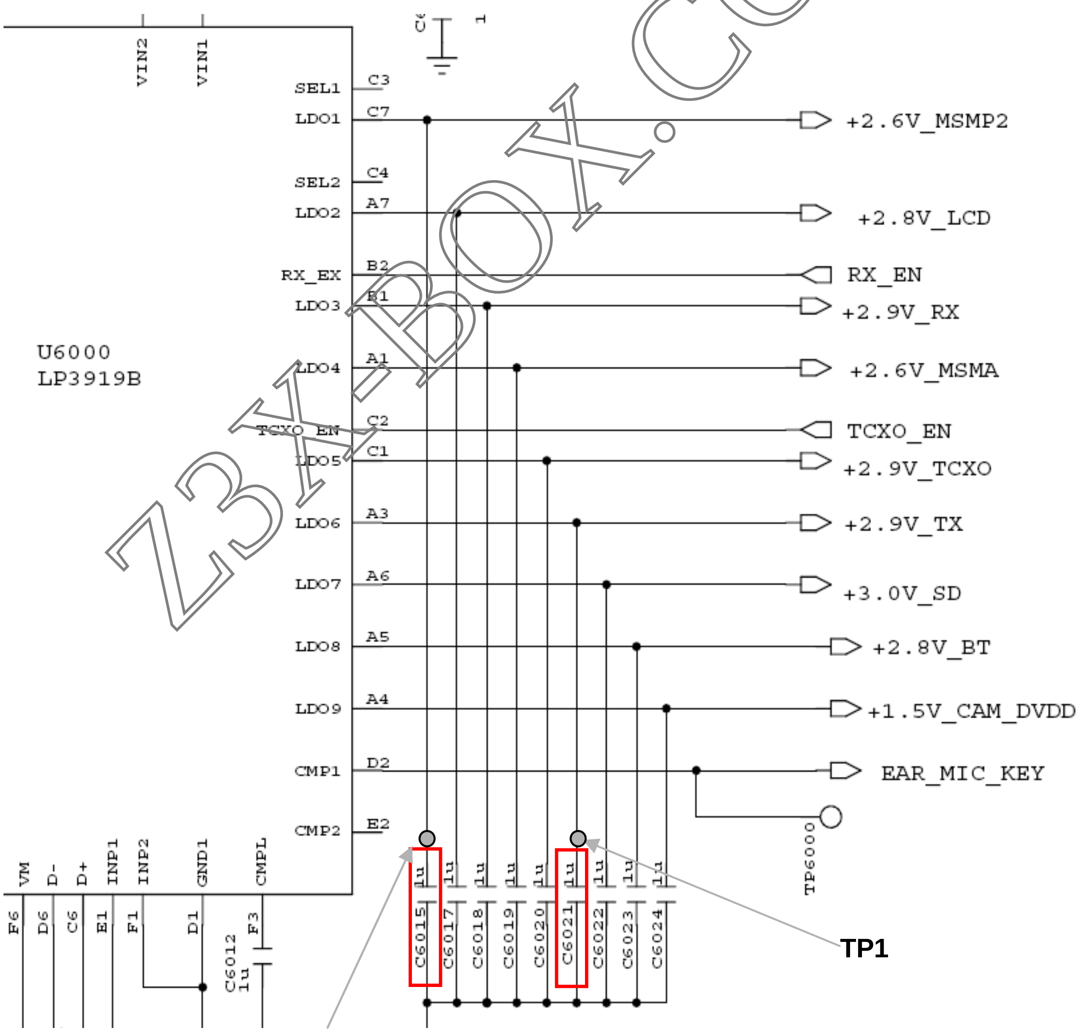
Redownload S/W, Cal

4.2.1.1 Checking DC Power supply circuit (PMIC)

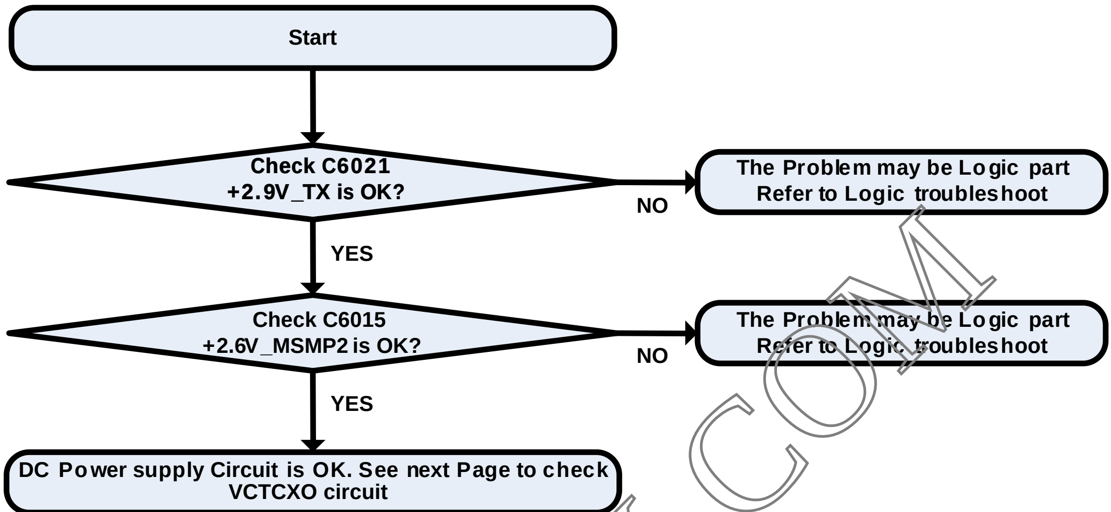
Test Point



Circuit Diagram

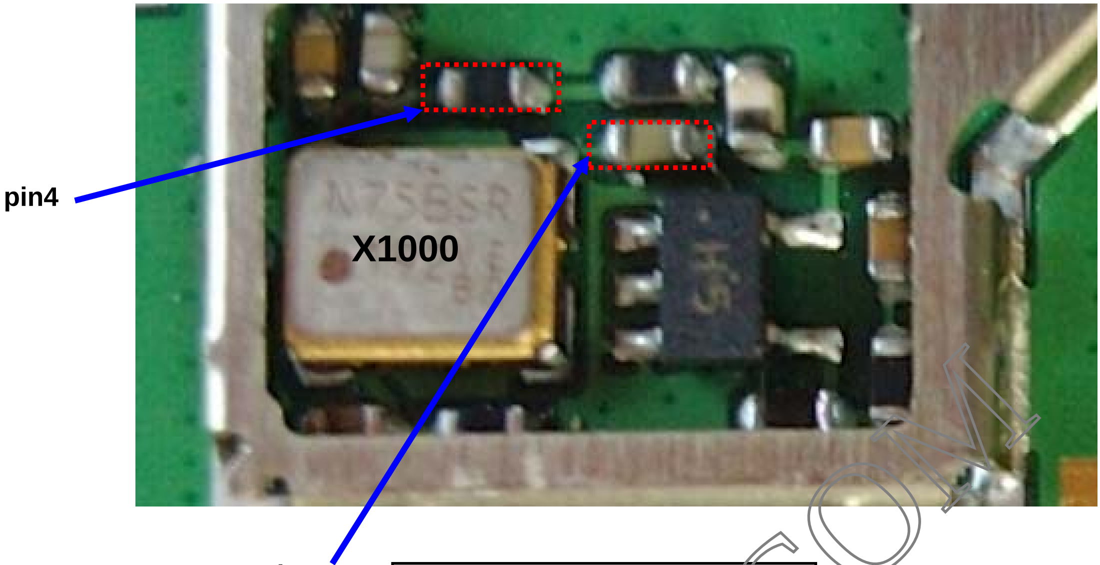


Checking Flow

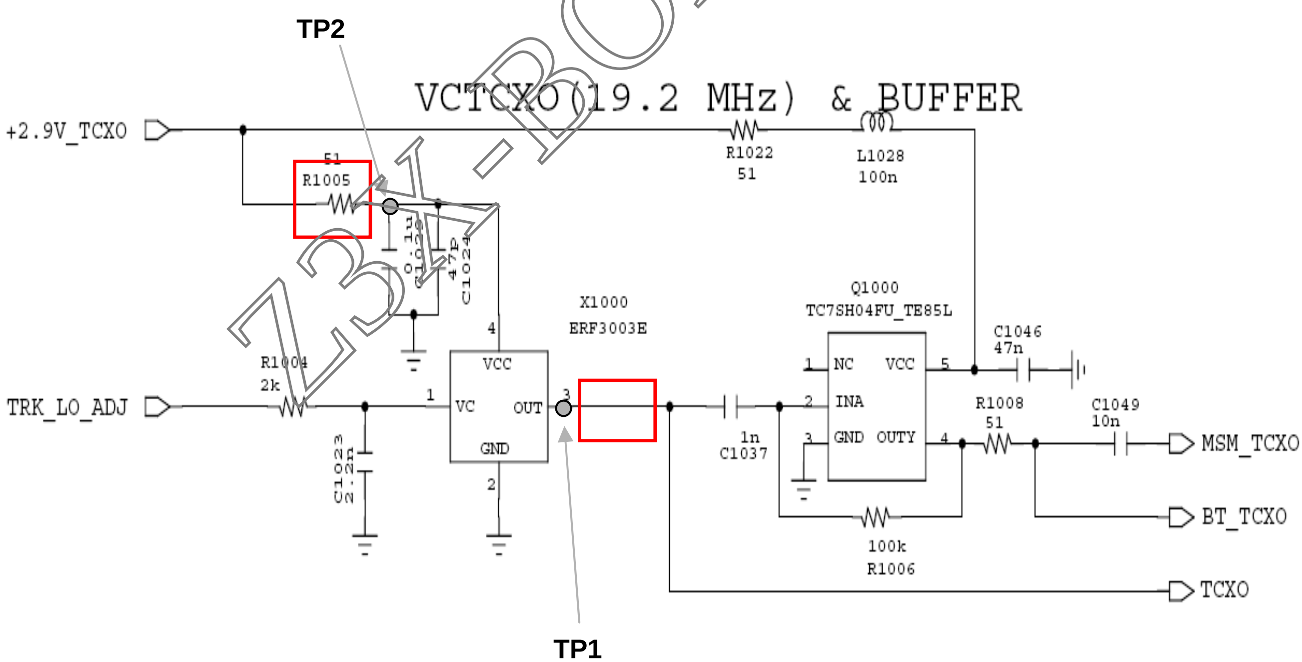


4.2.1.2 Checking VCTCXO circuit

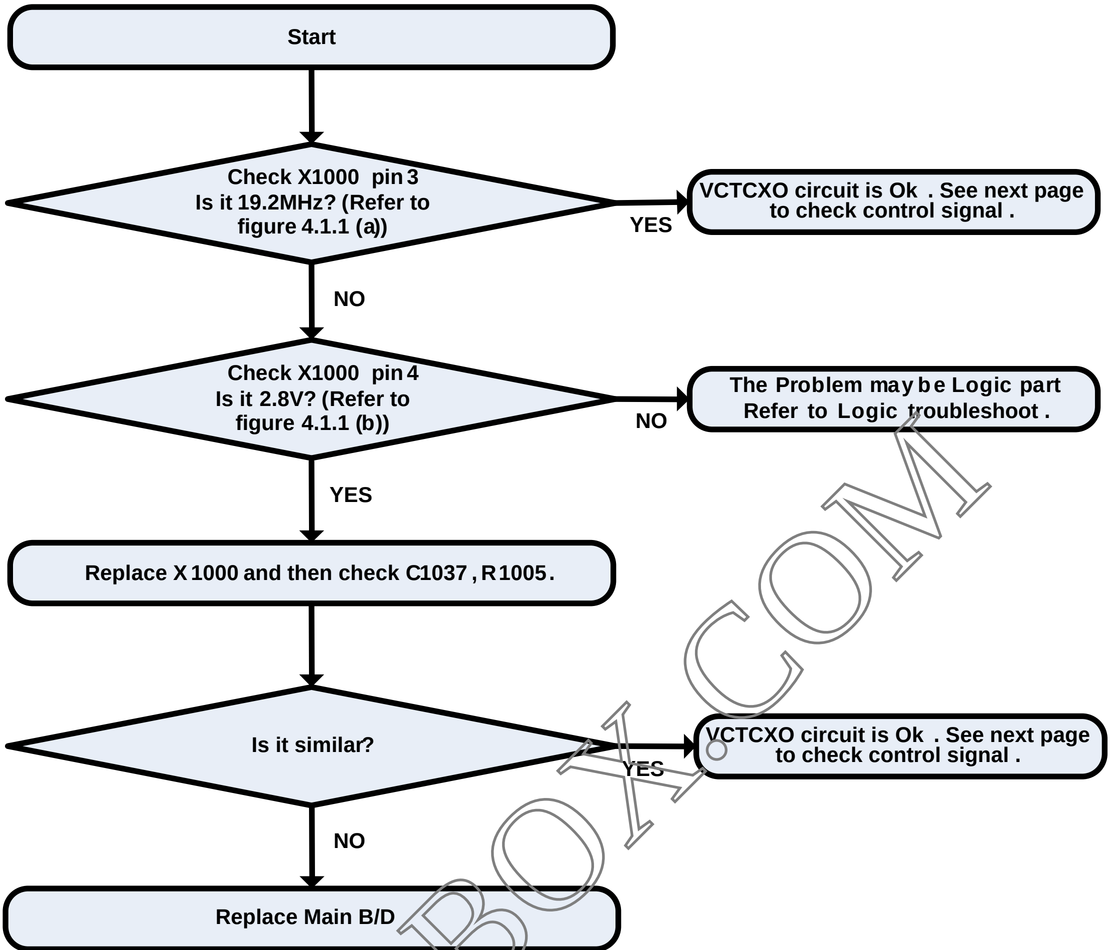
Test Point



Circuit Diagram



Checking Flow



Waveform

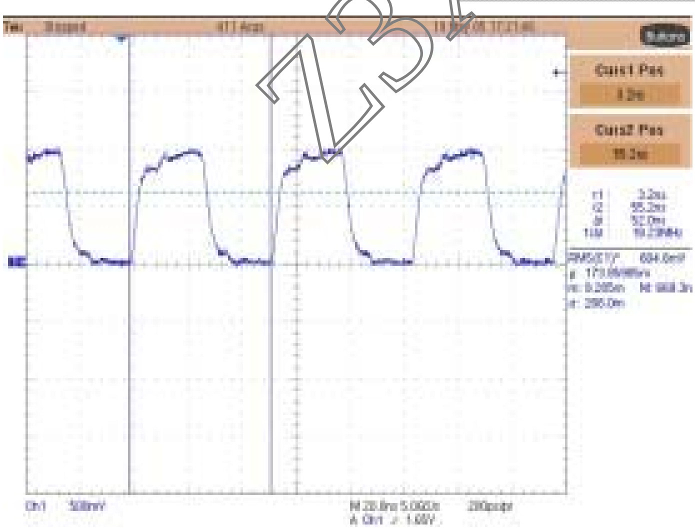


Figure 4.1.1 (a)

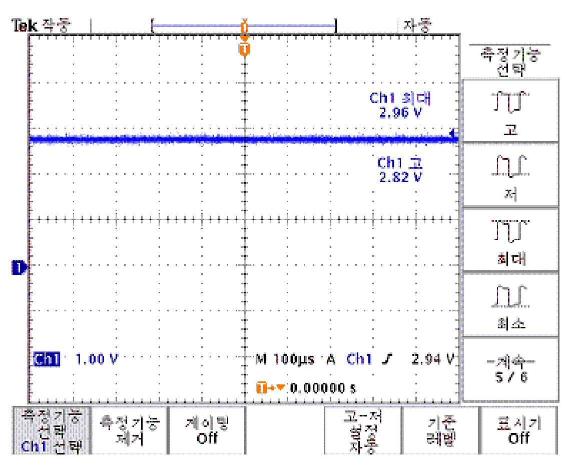
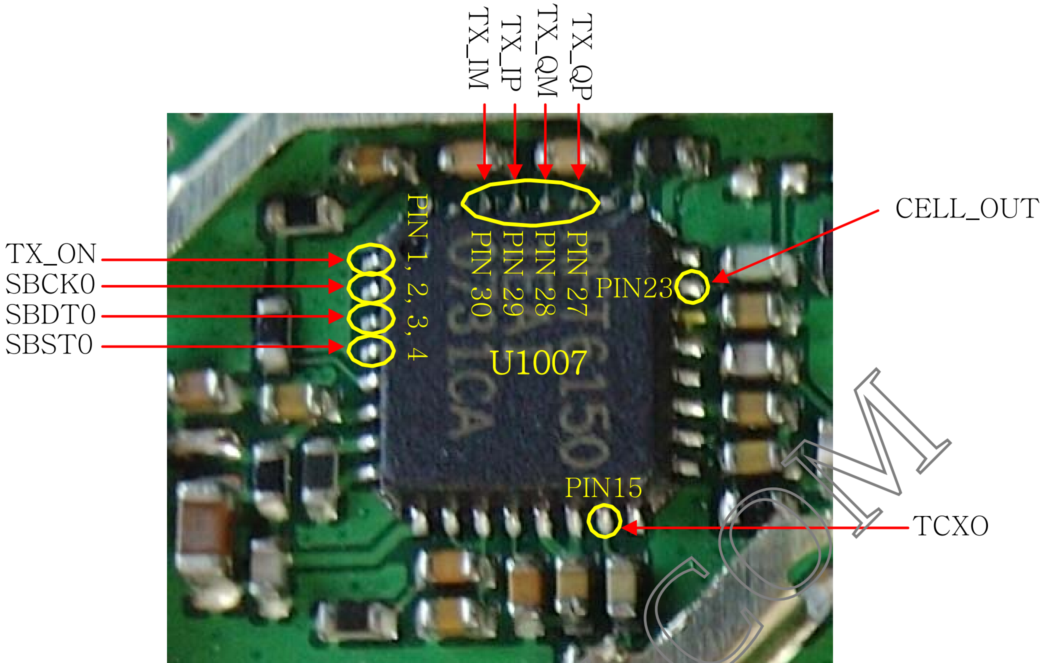


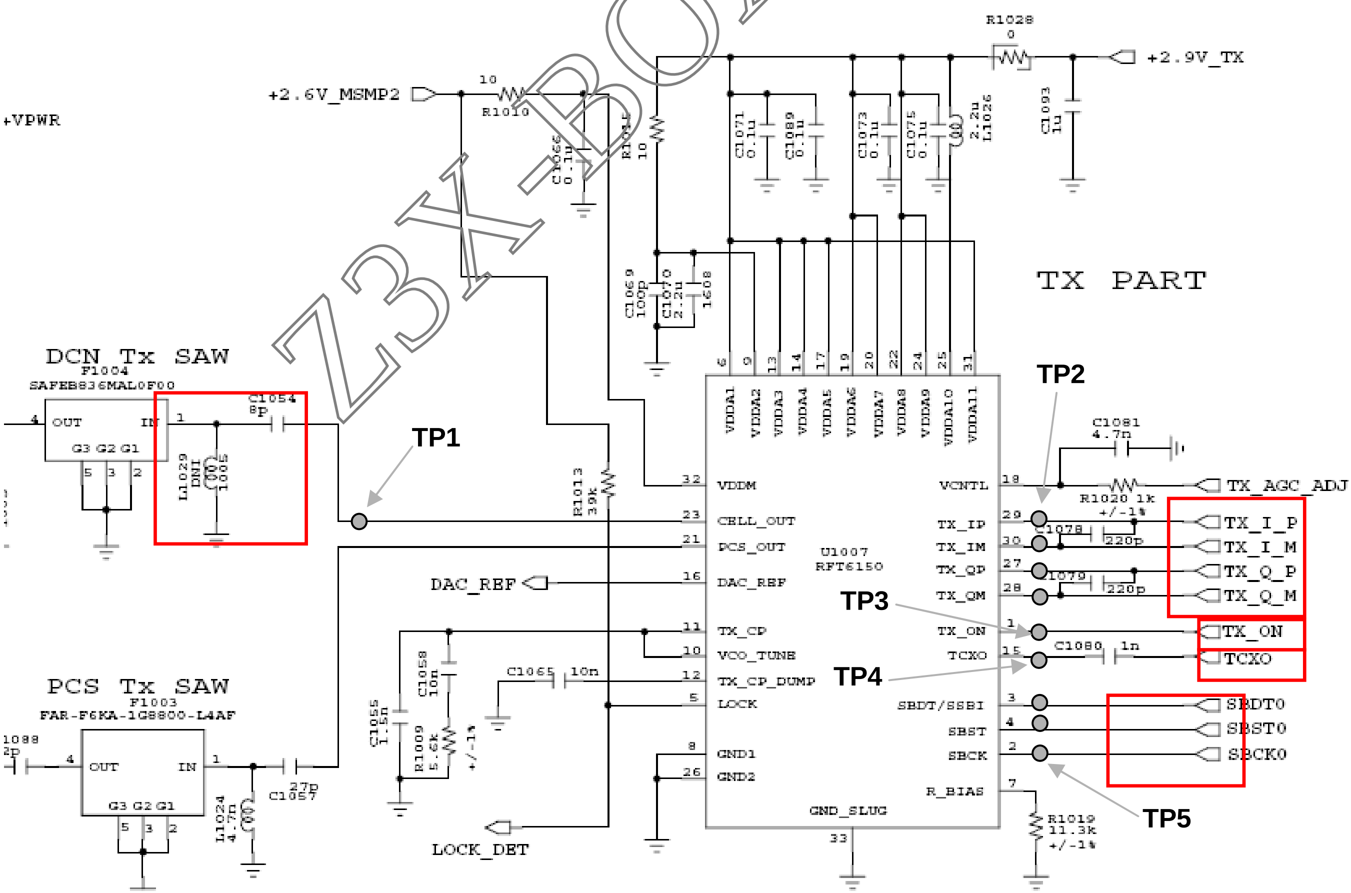
Figure 4.1.1 (b)

4.2.1.3 Checking RFT6150 circuit

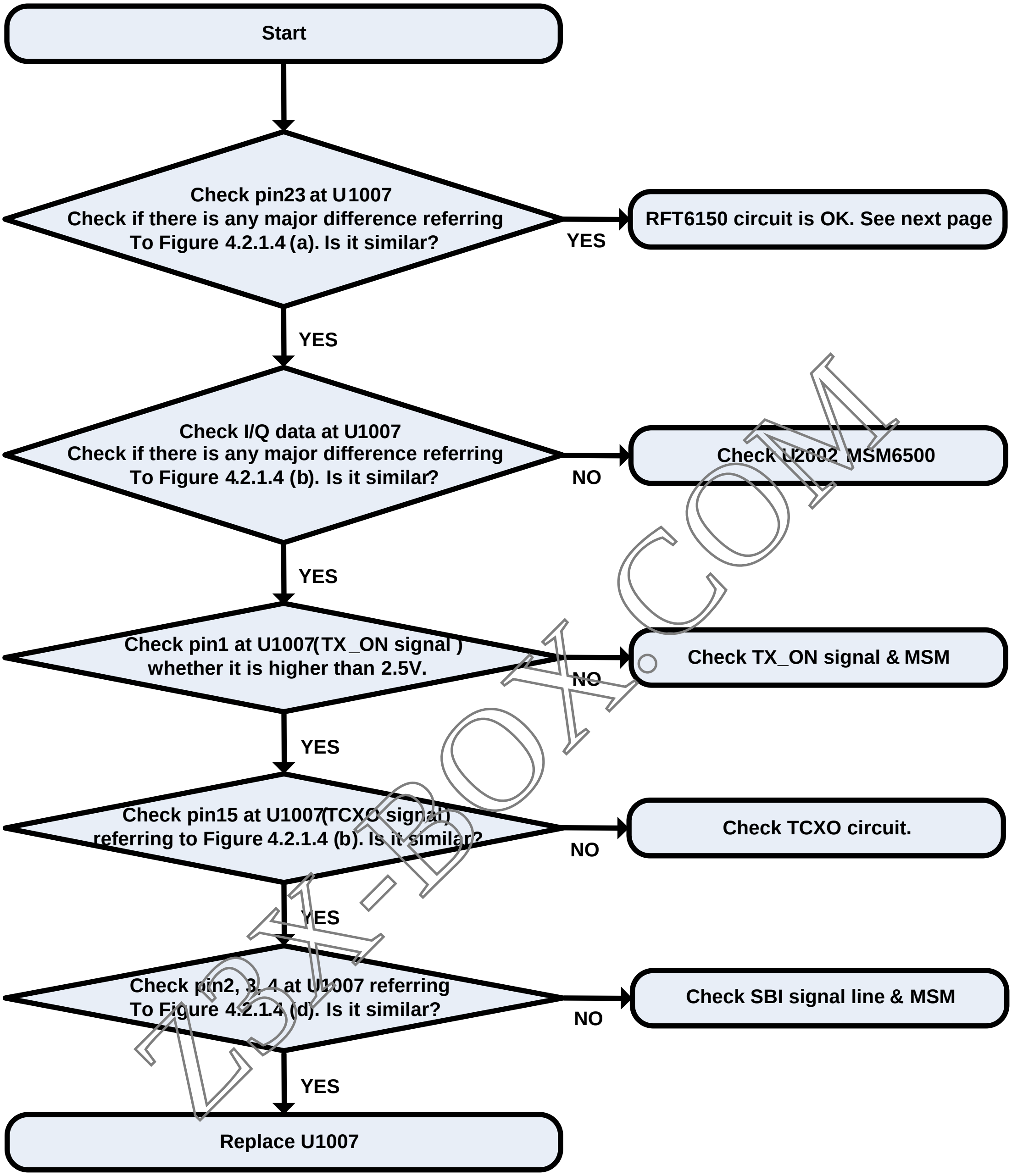
Test Point



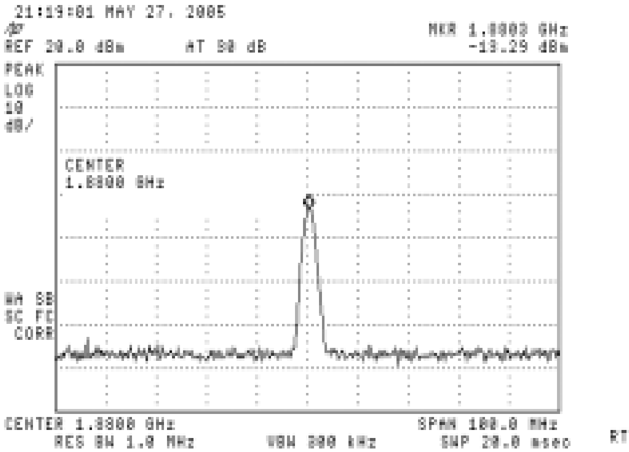
Circuit Diagram



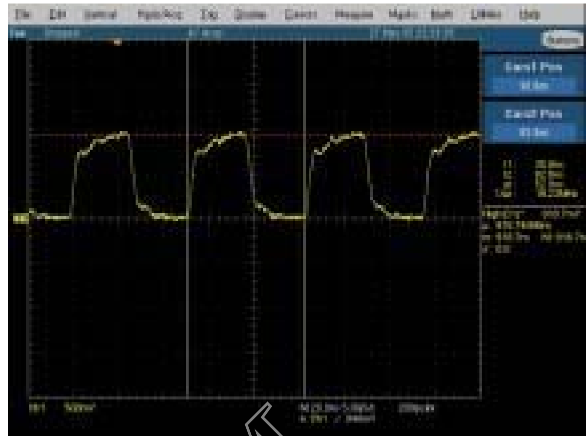
Checking Flow



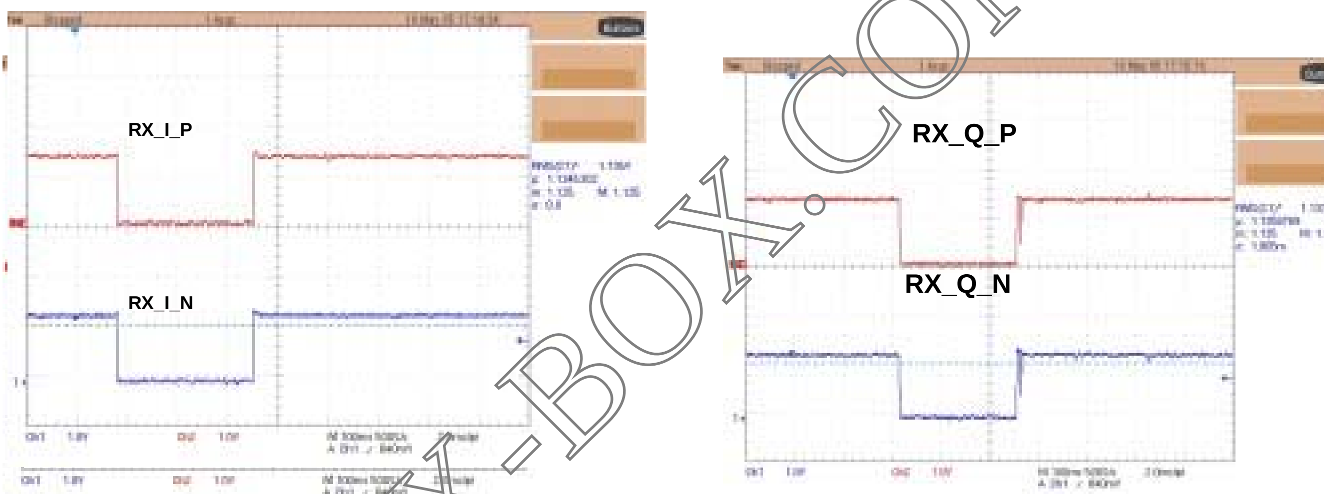
Waveform



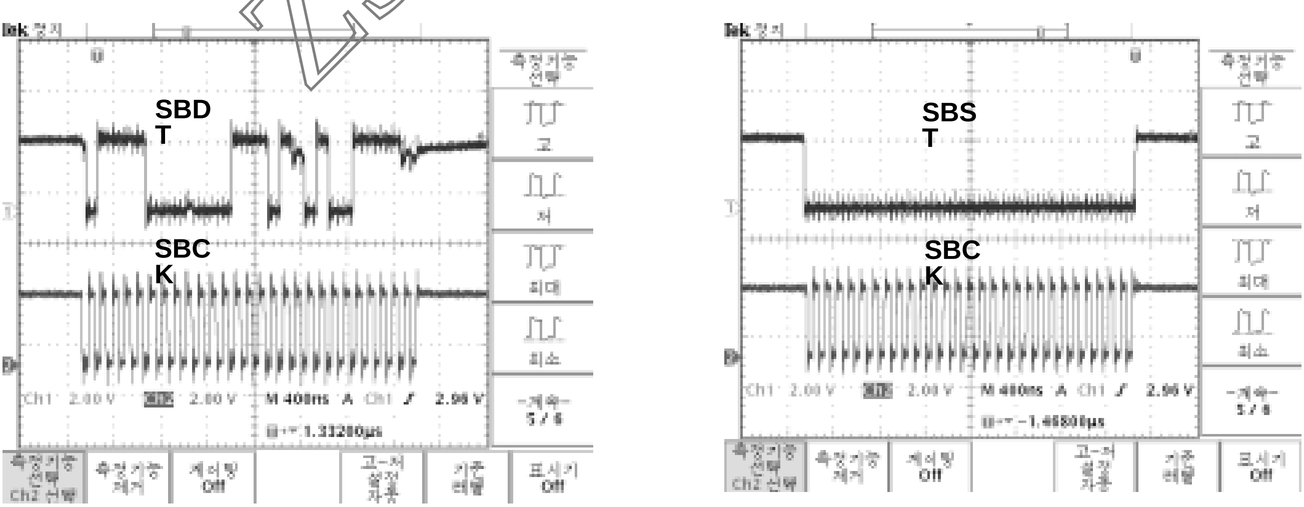
Graph 4.2.1.4(A)



Graph 4.2.1.4(C)



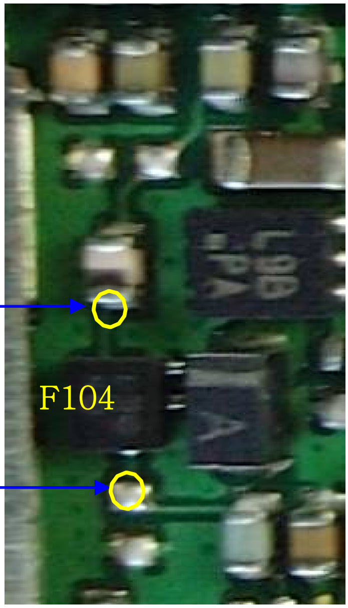
Graph 4.2.1.4(B)



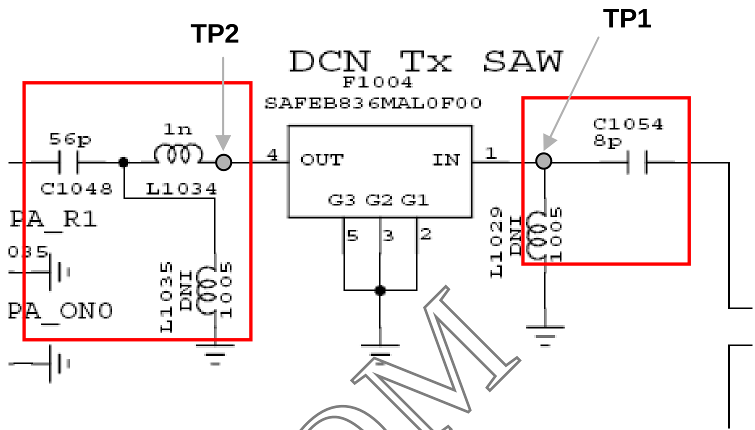
Graph 4.2.1.4(D)

4.2.1.4 Check DCN RF Tx SAW

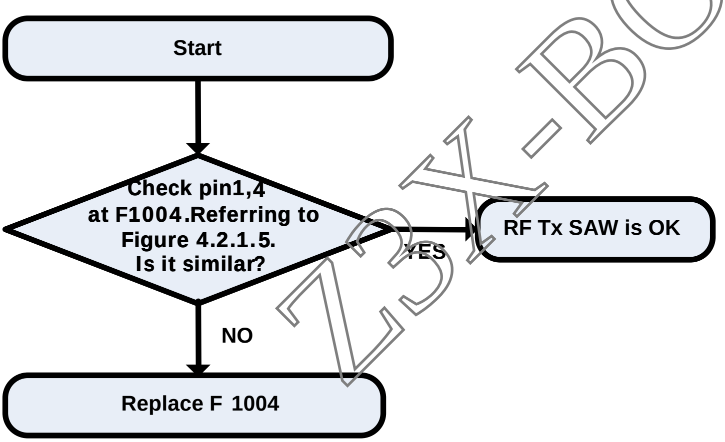
Test Point



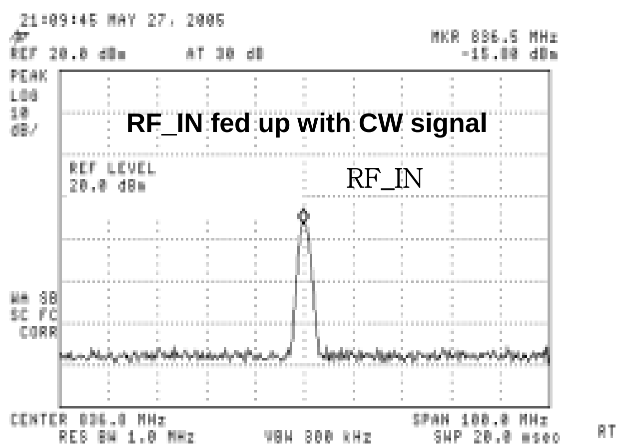
Circuit Diagram

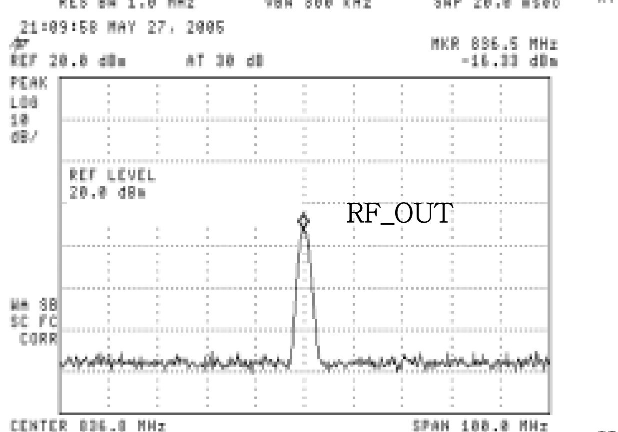


Checking Flow



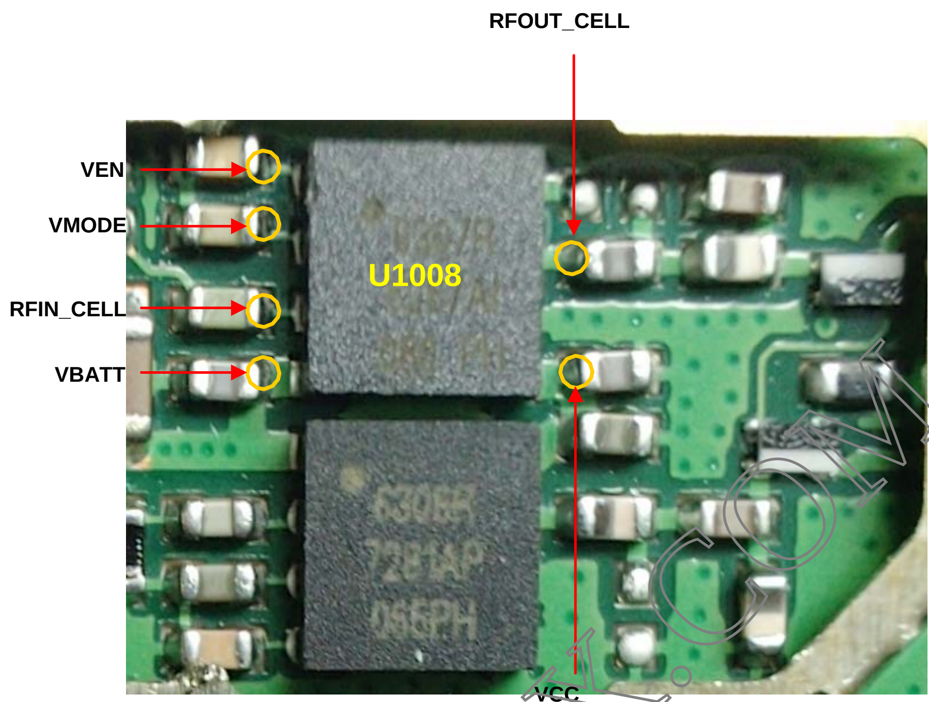
Waveform



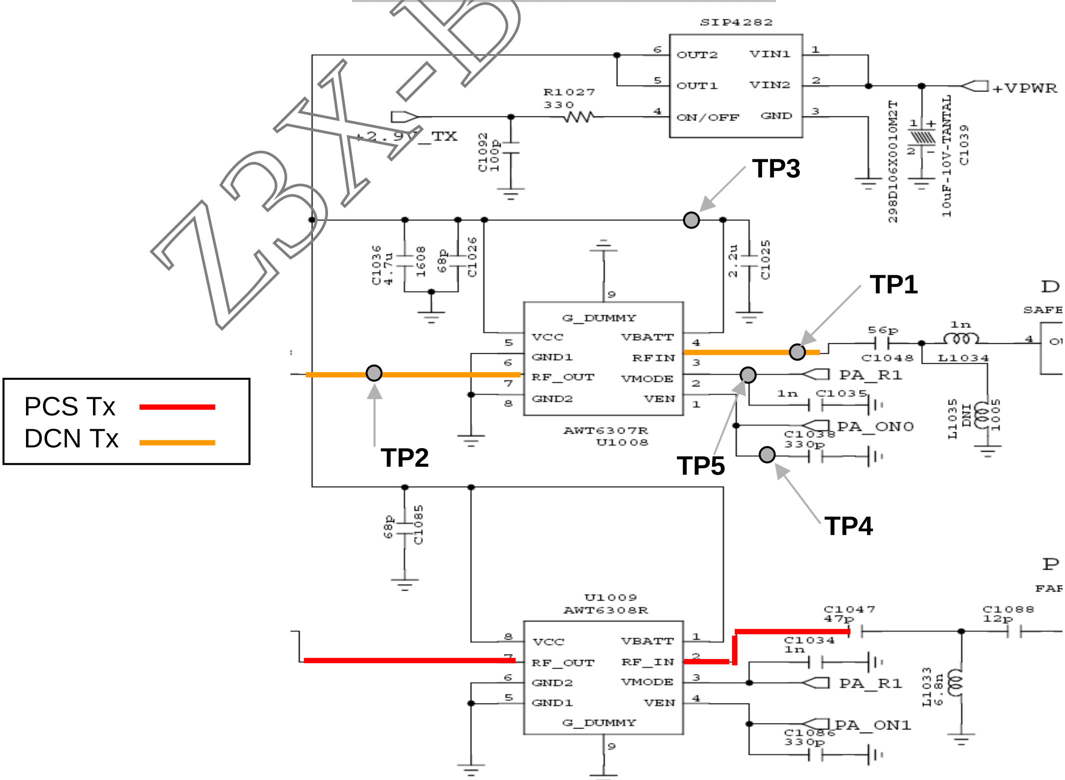


4.2.1.5 Check DCN PAM circuit

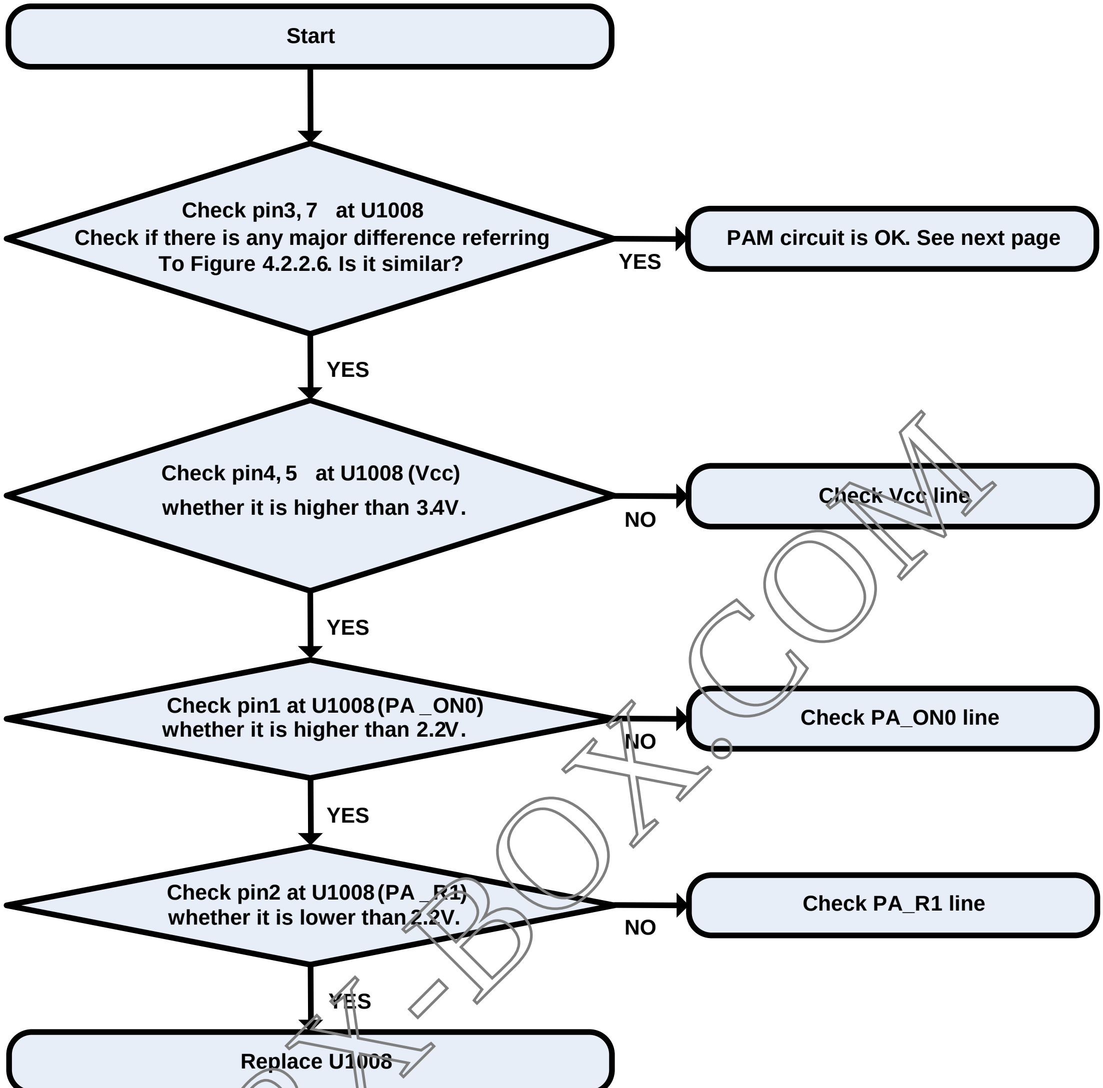
Test Point



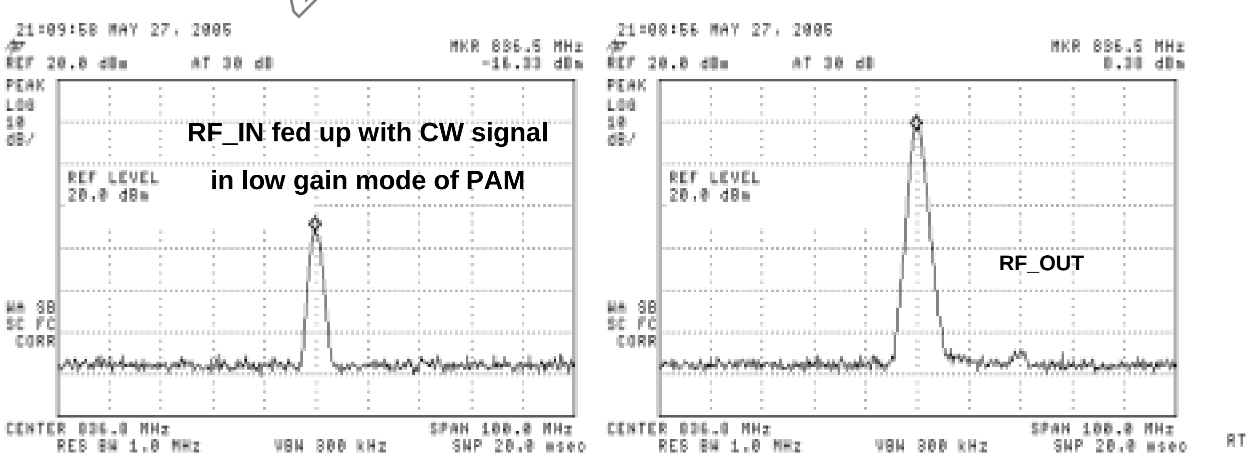
Circuit Diagram



Checking Flow

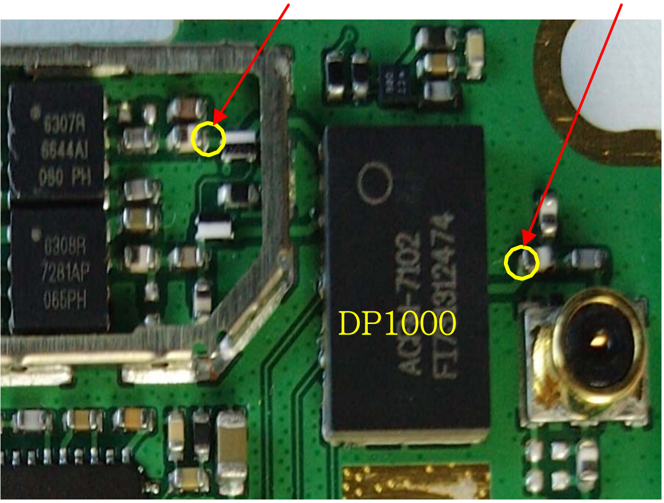


Waveform

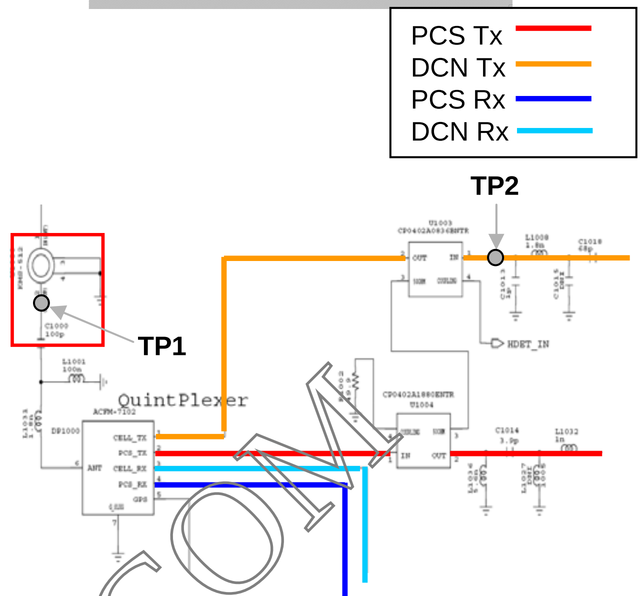


4.2.1.7 Check Quintplexer

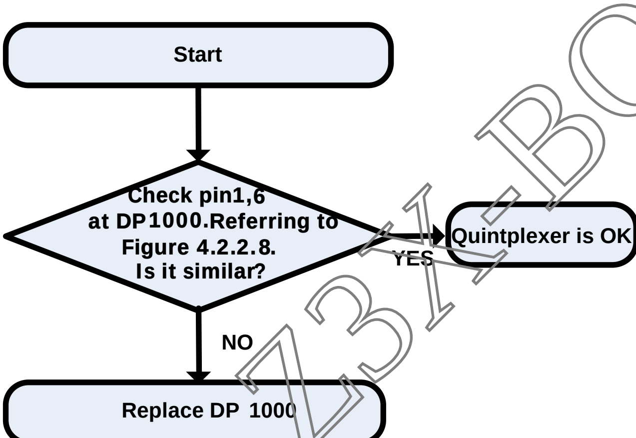
Test Point



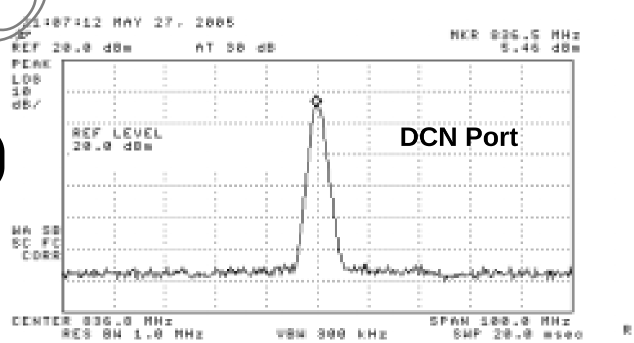
Circuit Diagram

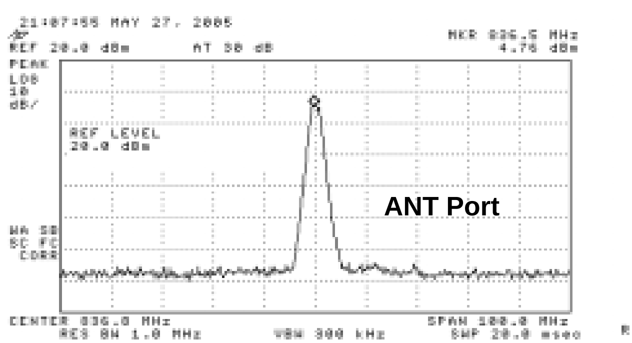


Checking Flow



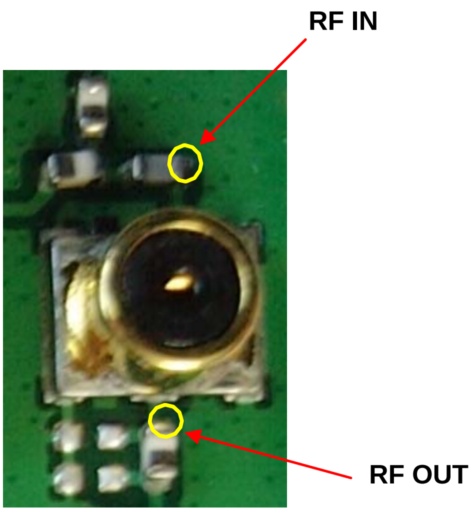
Waveform



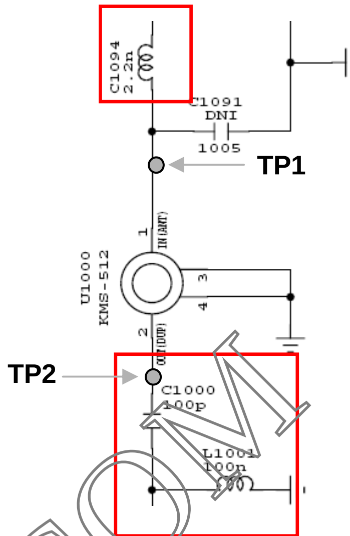


4.2.1.8 Check Mobile S/W

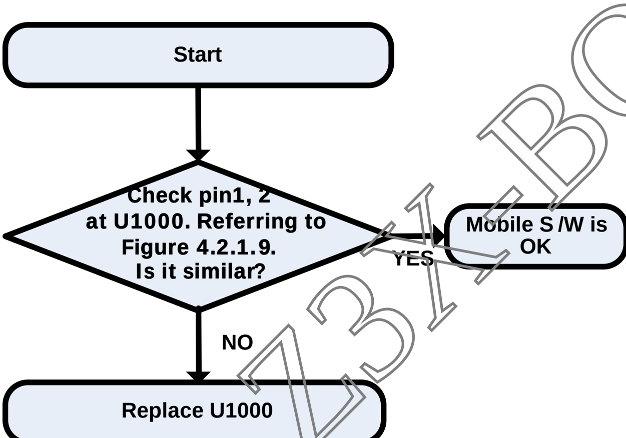
Test Point



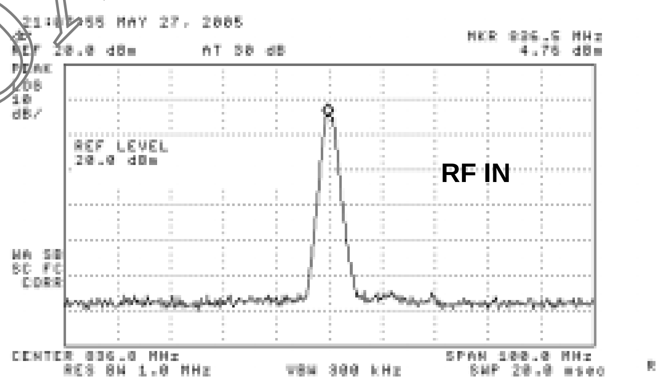
Circuit Diagram



Checking Flow



Waveform



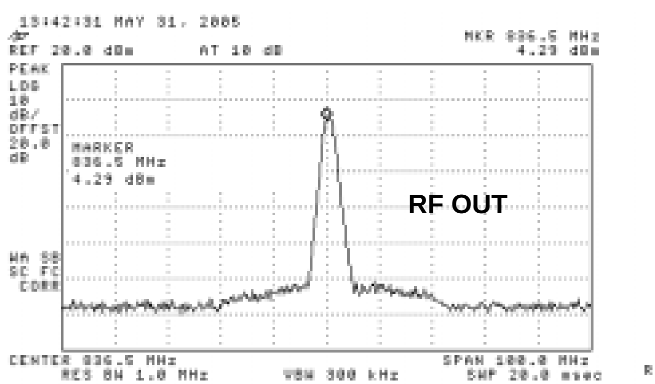
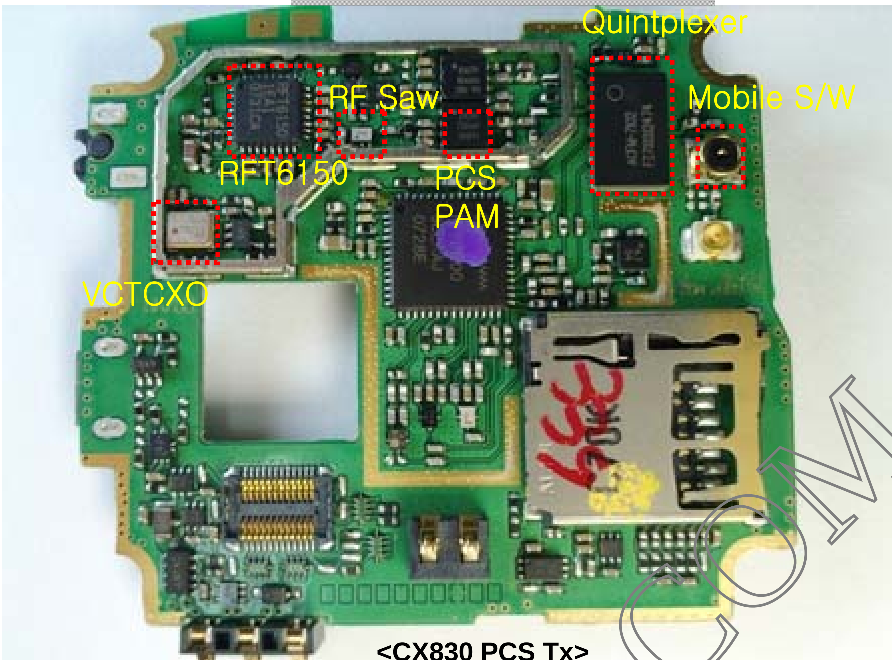


Figure 4.2.1.9

Test Point



<CX830 PCS Tx>

Circuit Diagram

Start

Press “##5473784236368” + “SEND” key + “000000” in Phone idle state.
? Press “5” to enter FCC Test
? Press “2” to enter PCS FCC mode
- Set channel to 600 and AGC to 360
? Measure frequency domain waveform with Spectrum analyser
? Measure time domain waveform with Oscilloscope

1. Check DC Power Supply circuit

2. Check VCTCXO

3. Check RFT6150

4. Check RF SAW

5. Check PCS PAM

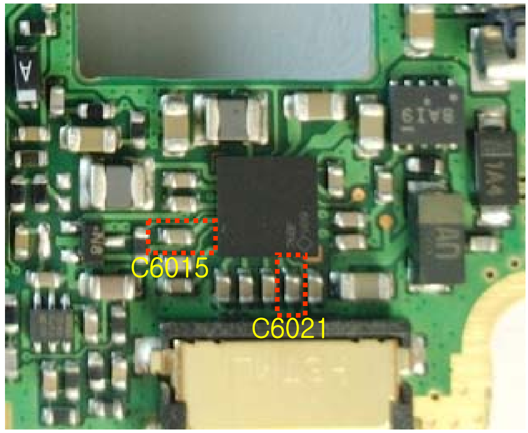
6. Check Quintplexer

7. Check Mobile Switch

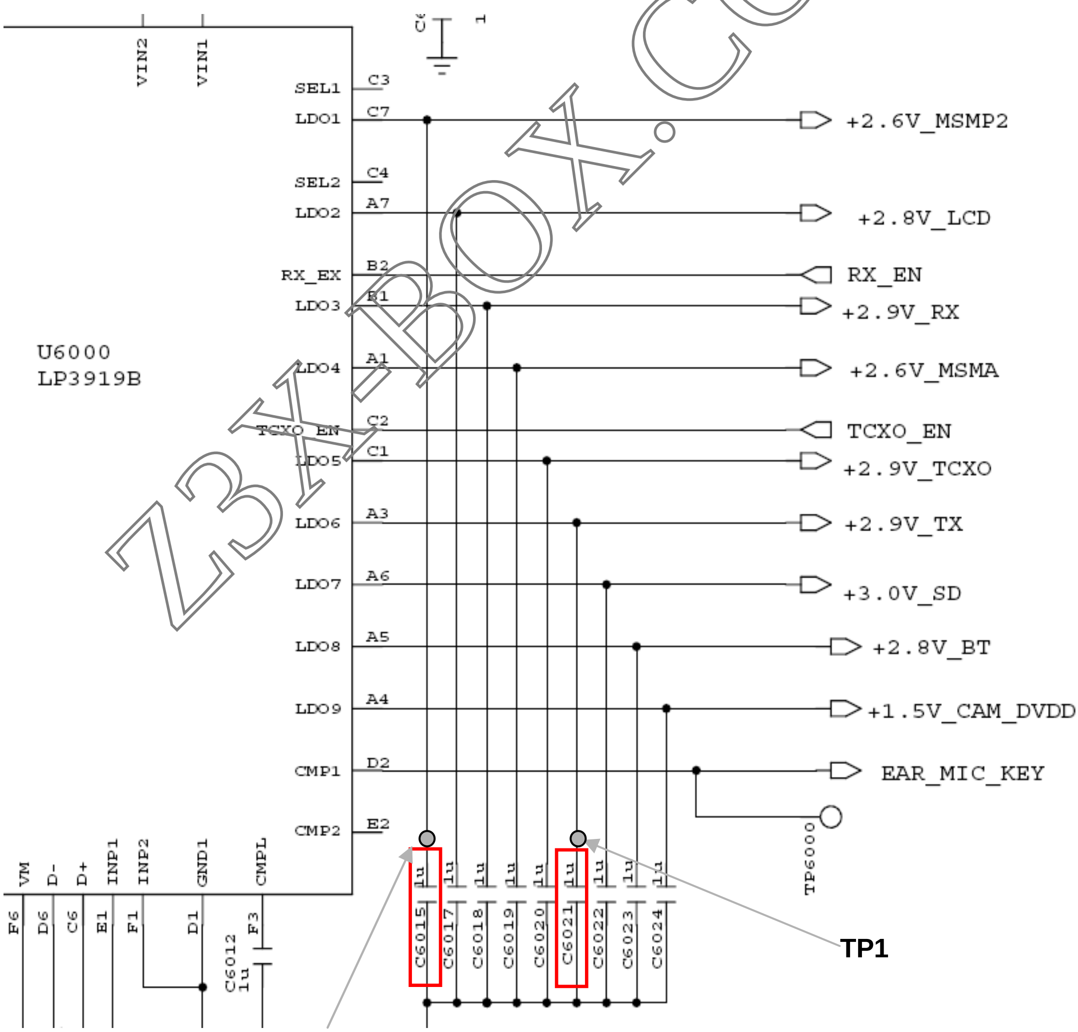
Redownload S/W, Cal

4.2.2.1 Checking DC Power supply circuit (PMIC)

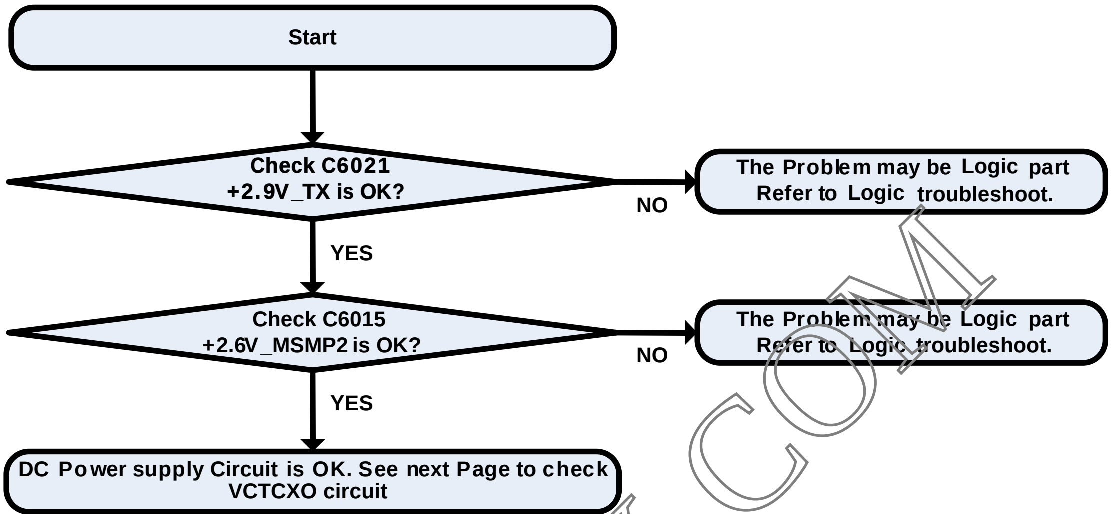
Test Point



Circuit Diagram

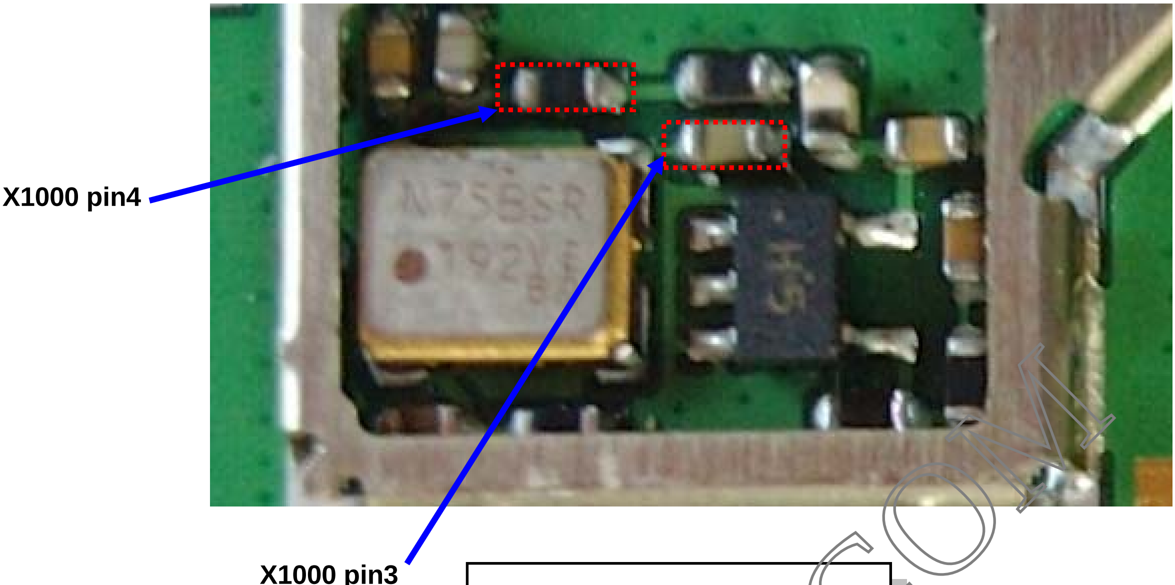


Checking Flow

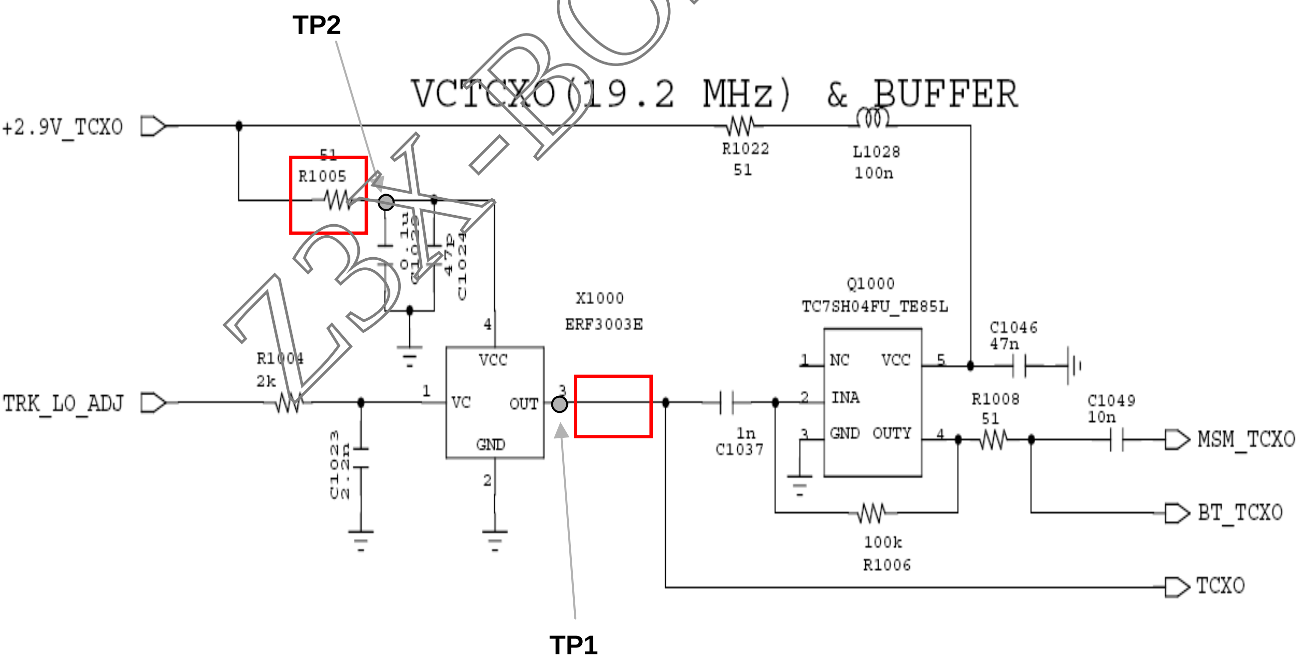


4.2.2.2 Checking VCTCXO circuit

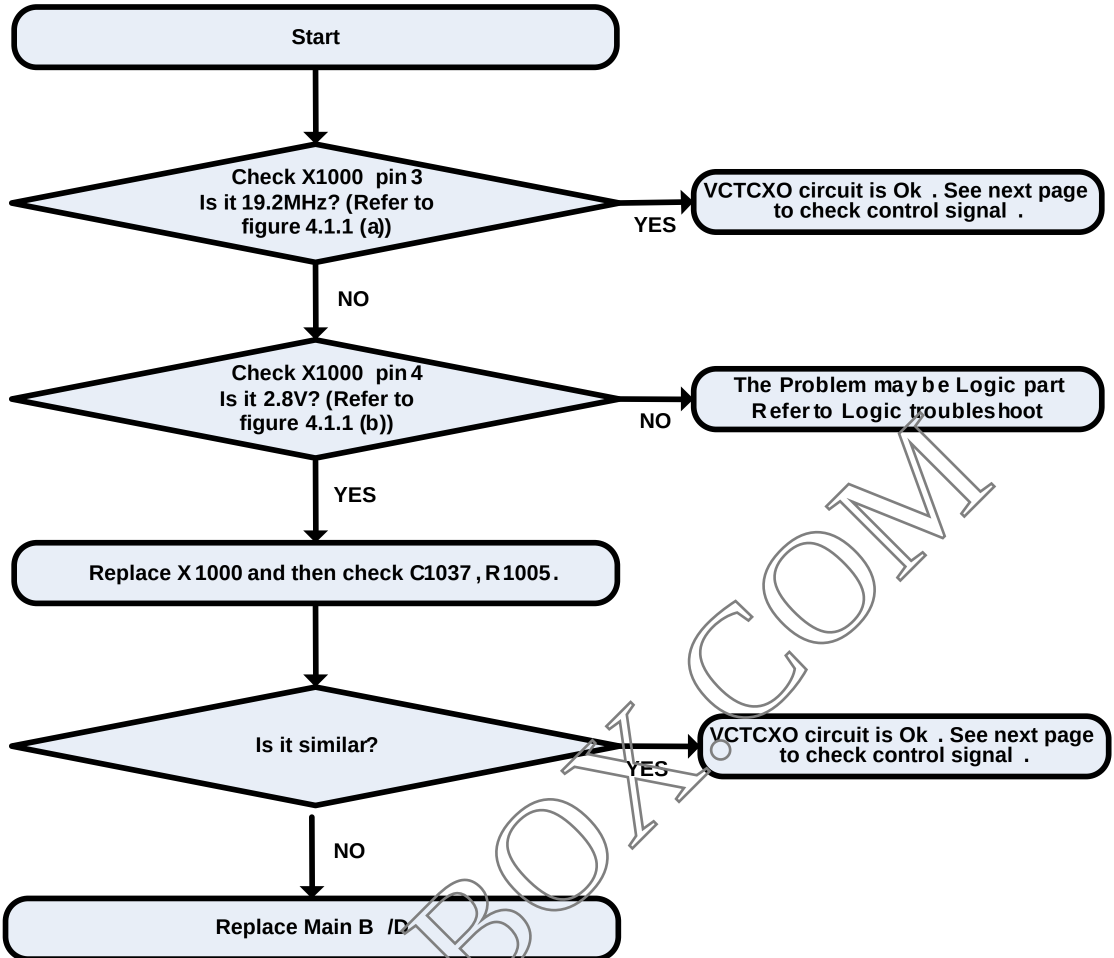
Test Point



Circuit Diagram



Checking Flow



Waveform

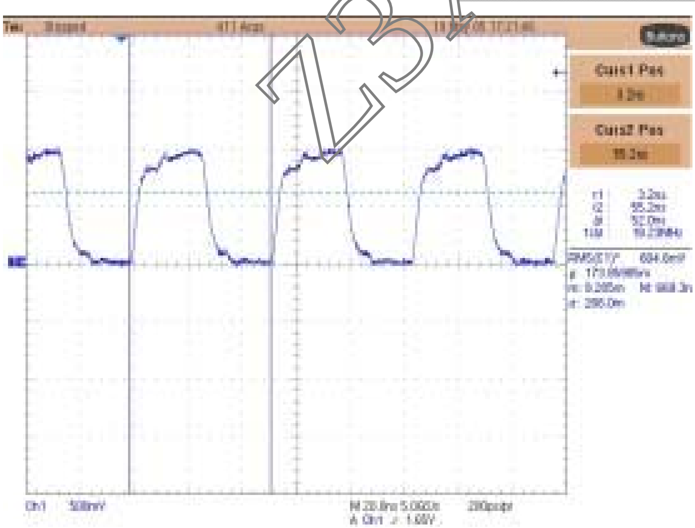


Figure 4.1.1 (a)

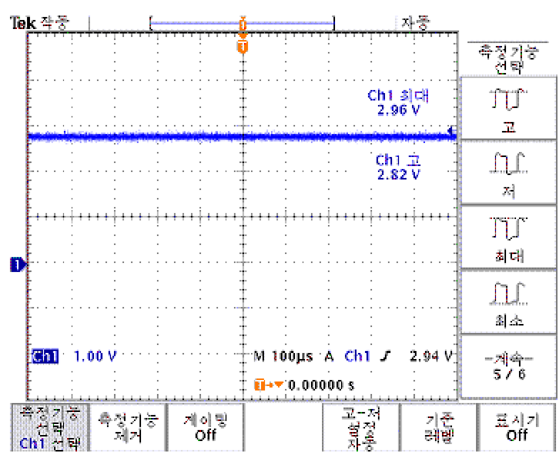
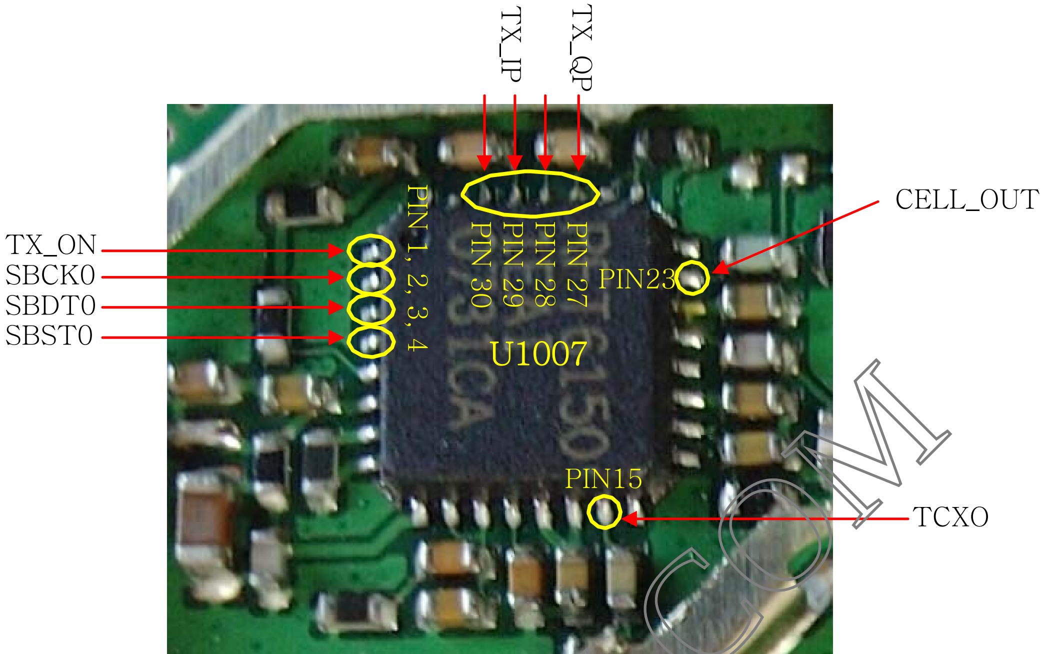


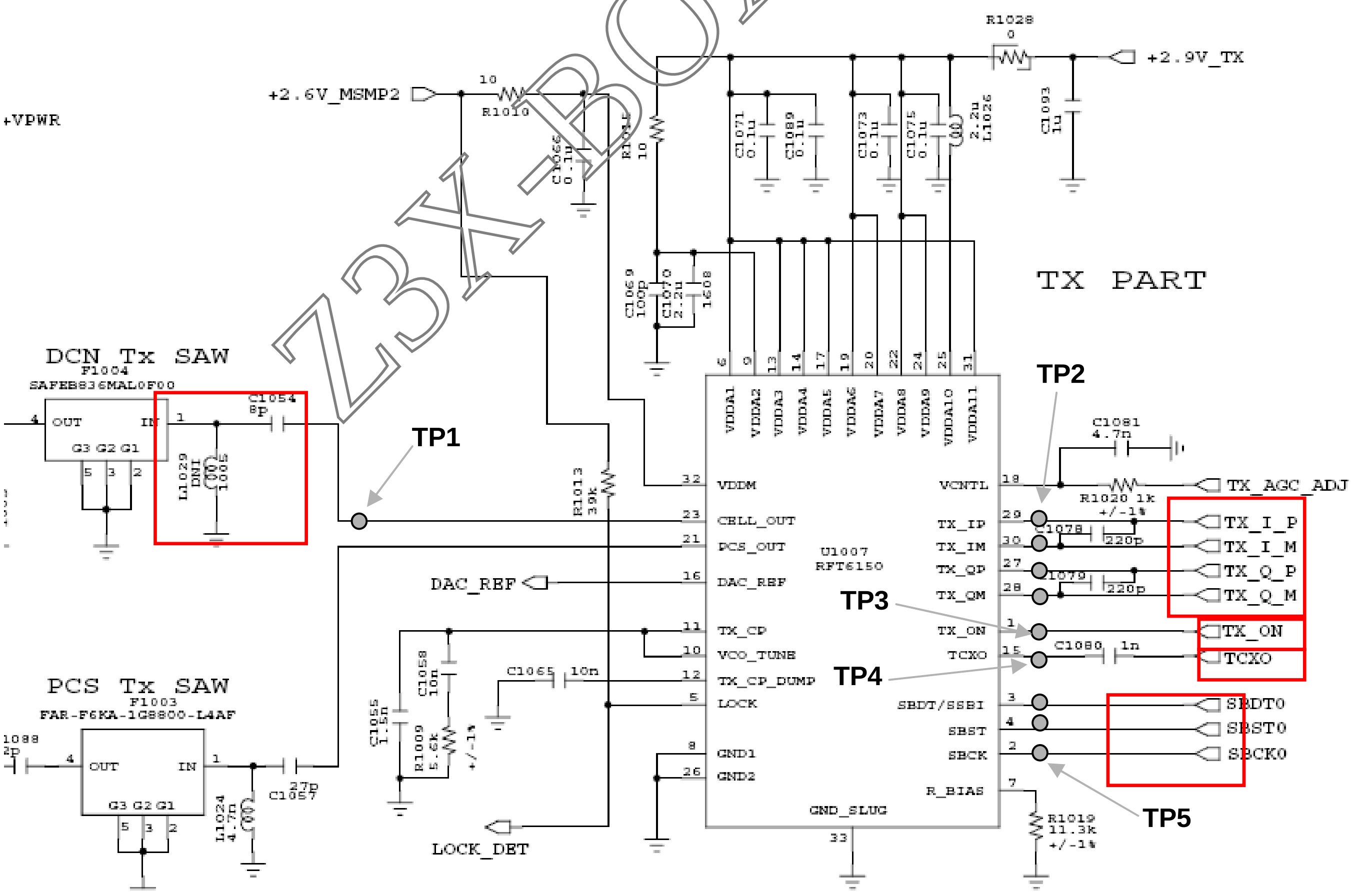
Figure 4.1.1 (b)

4.2.2.3 Checking RFT6150 circuit

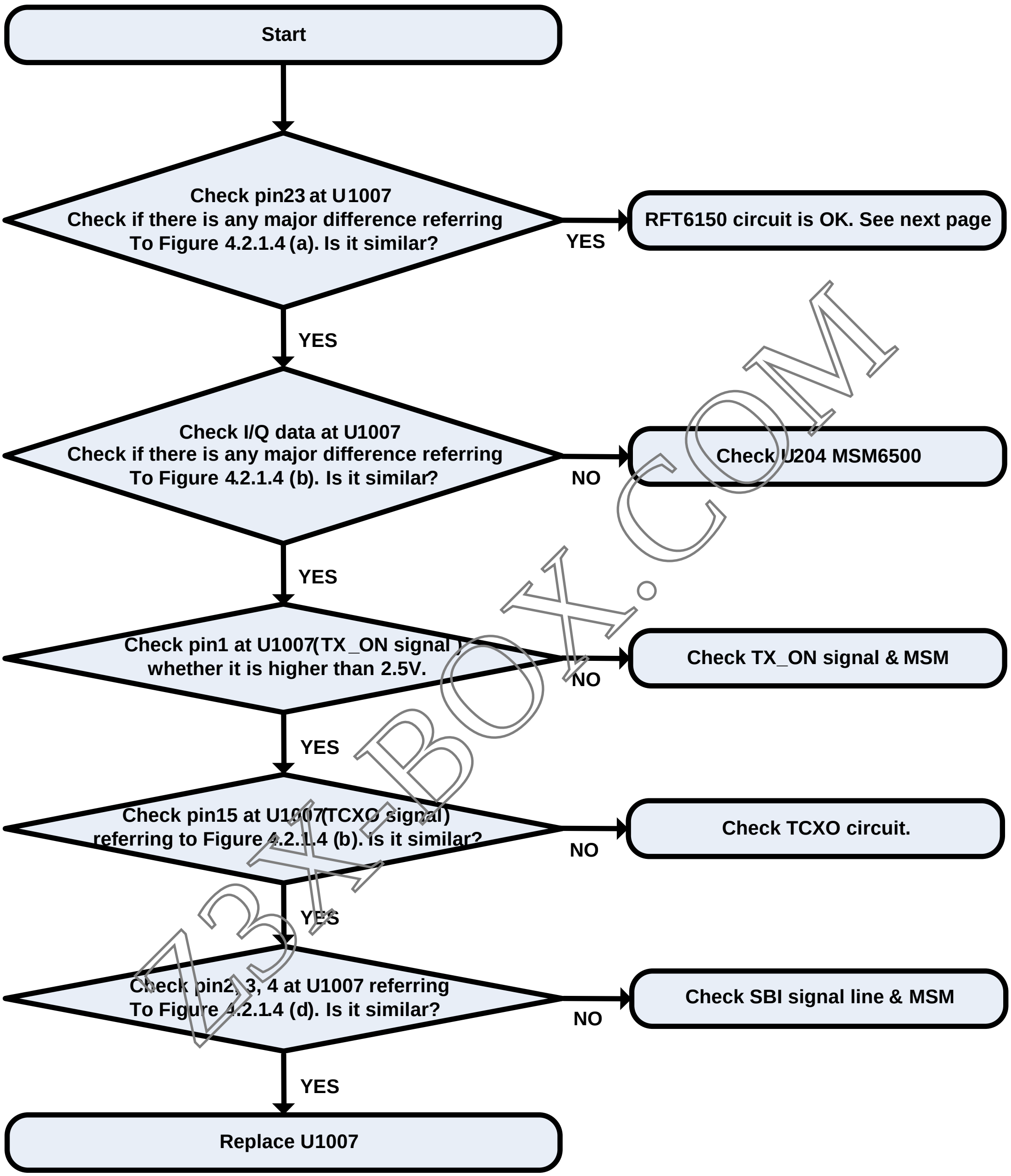
Test Point



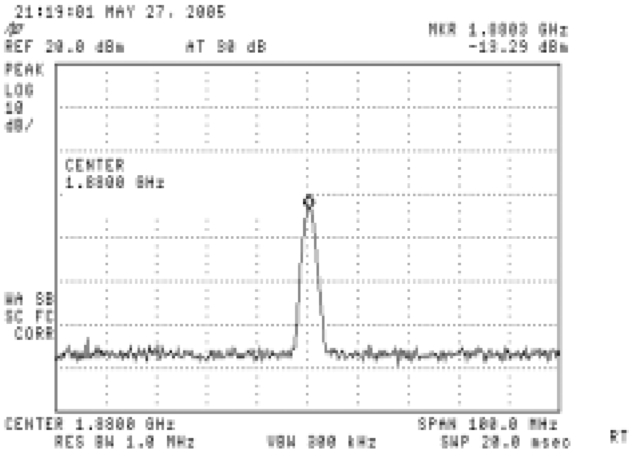
Circuit Diagram



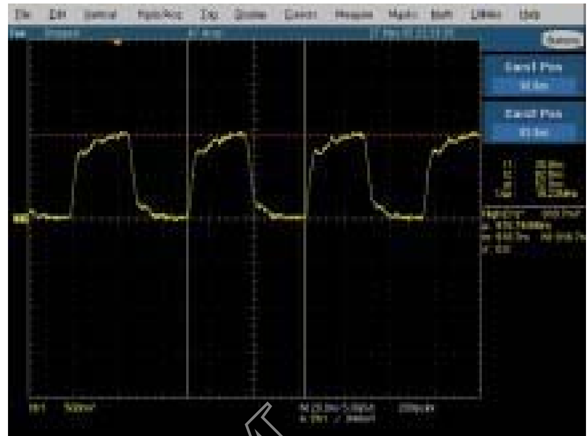
Checking Flow



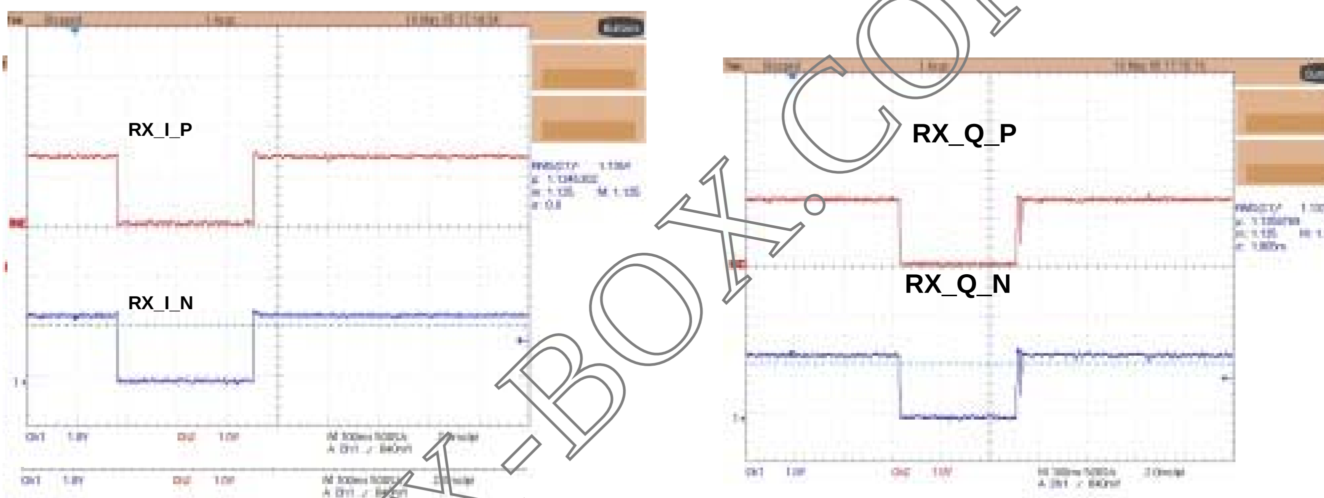
Waveform



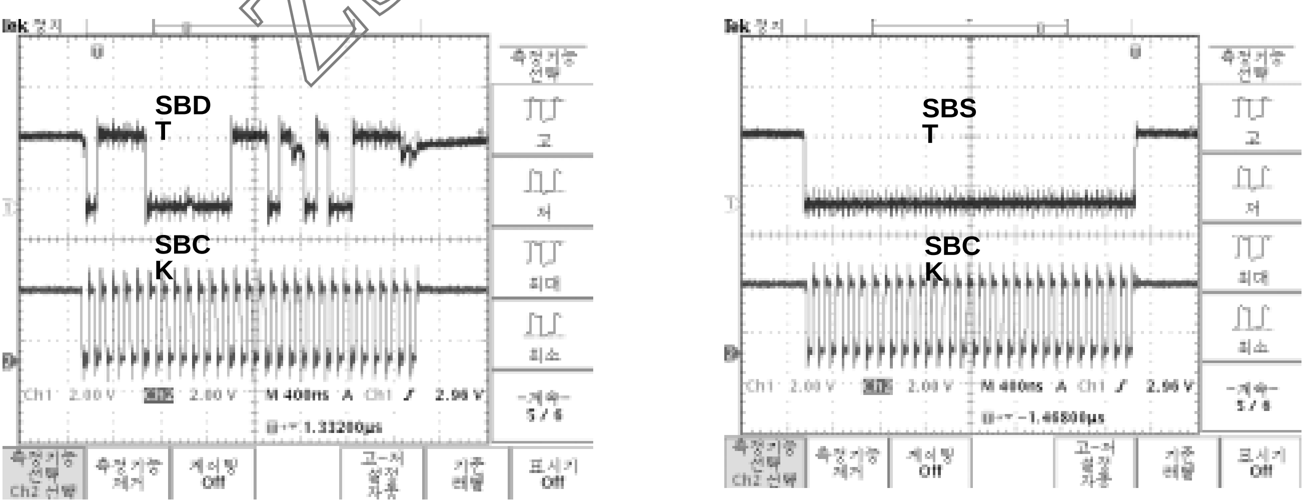
Graph 4.2.2.4(A)



Graph 4.2.2.4(C)



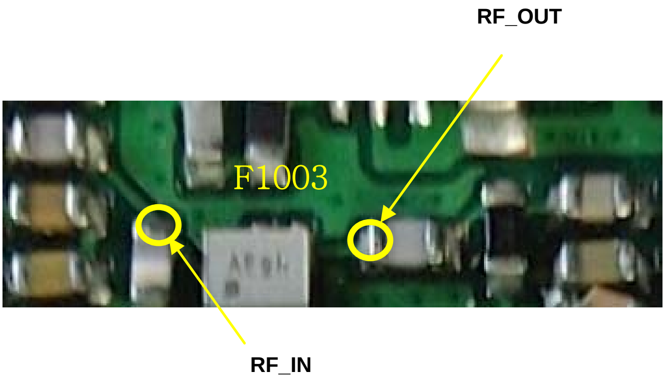
Graph 4.2.2.4(B)



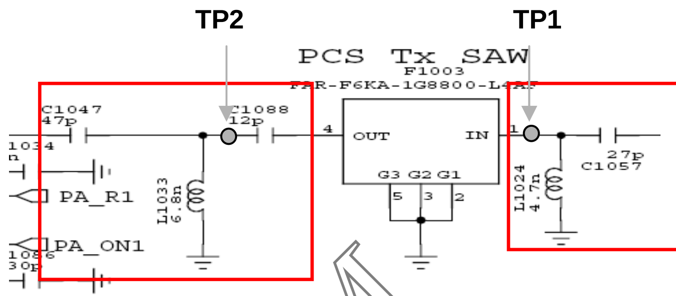
Graph 4.2.2.4(D)

4.2.2.4 Check PCS RF Tx SAW

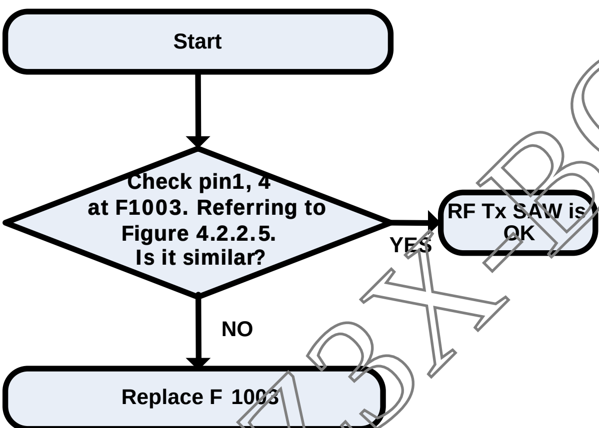
Test Point



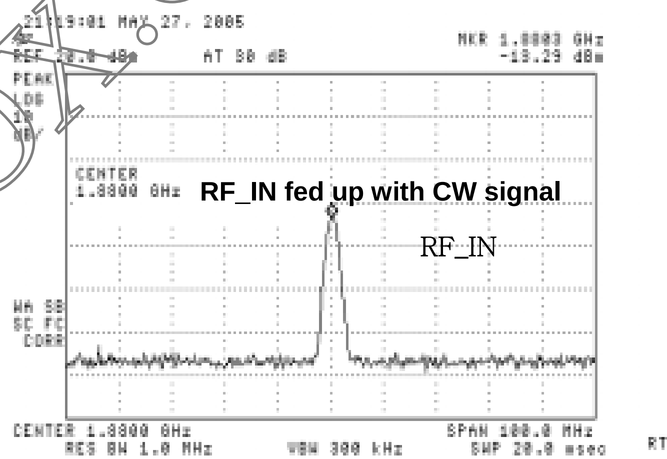
Circuit Diagram

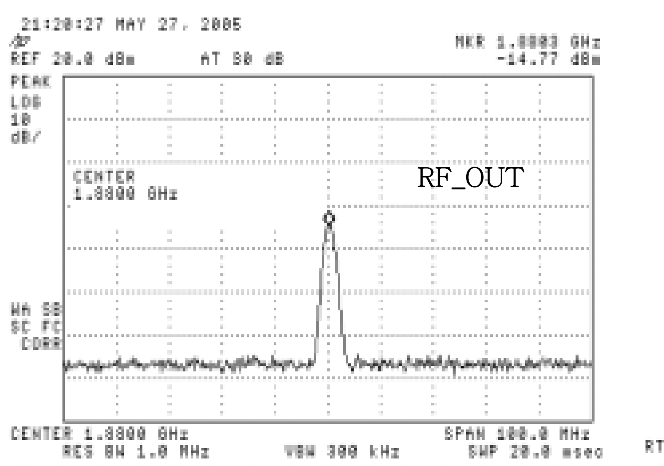


Checking Flow



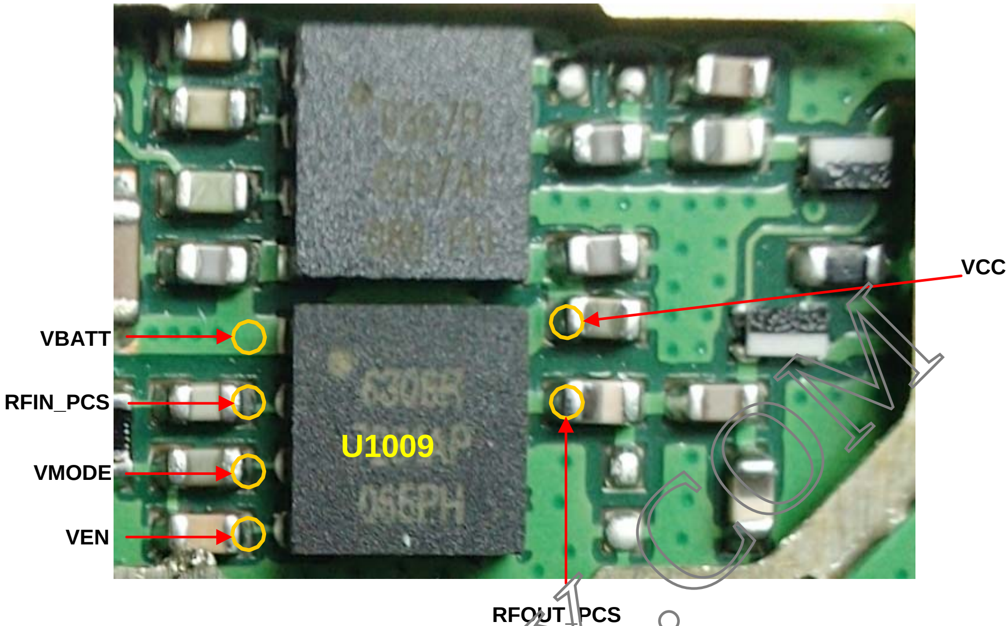
Waveform



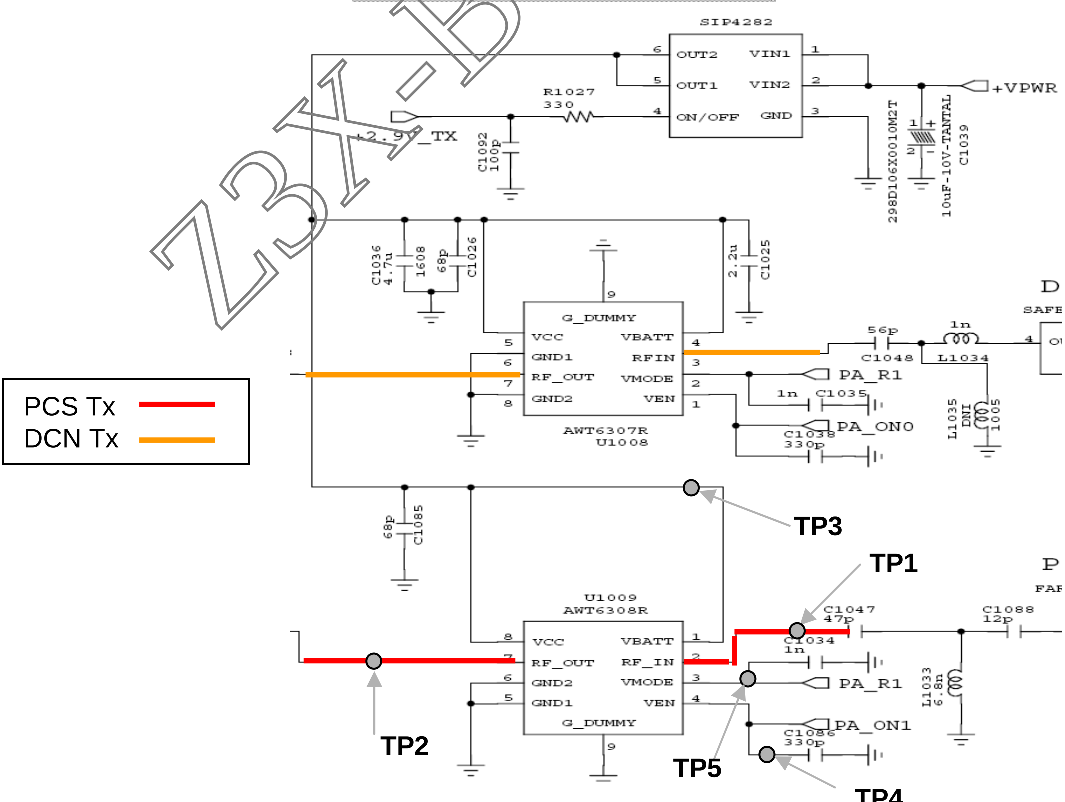


4.2.2.5 Check PCS PAM circuit

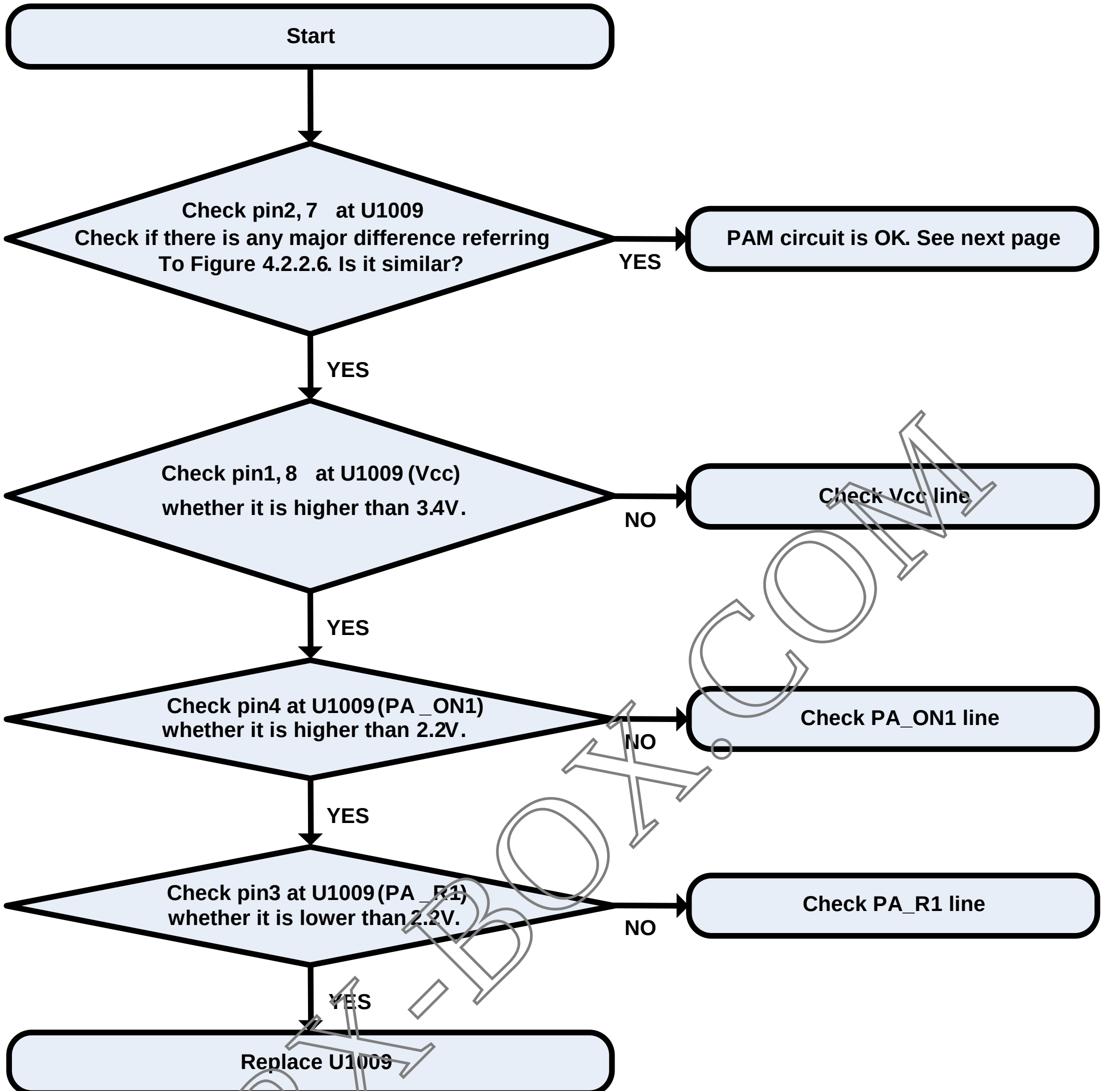
Test Point



Circuit Diagram



Checking Flow



Waveform

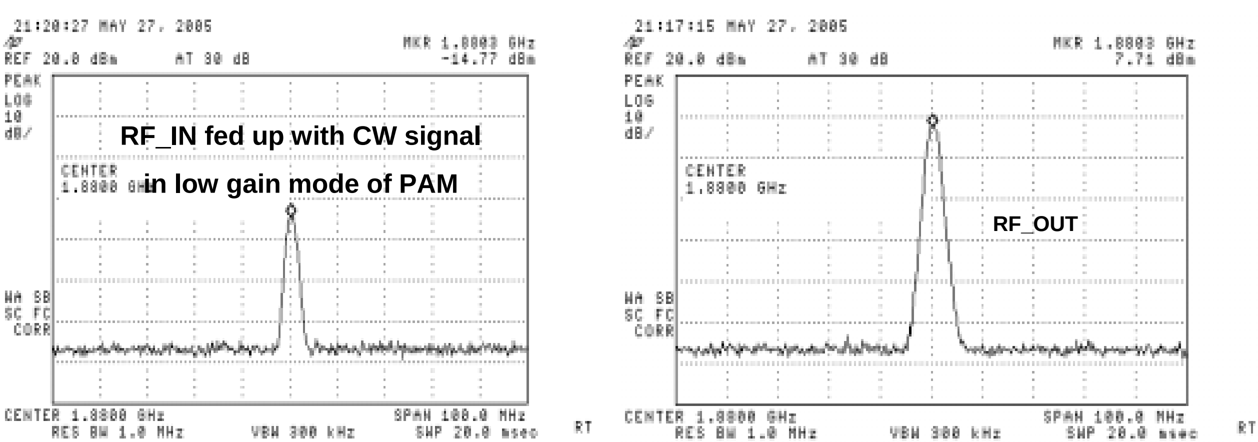
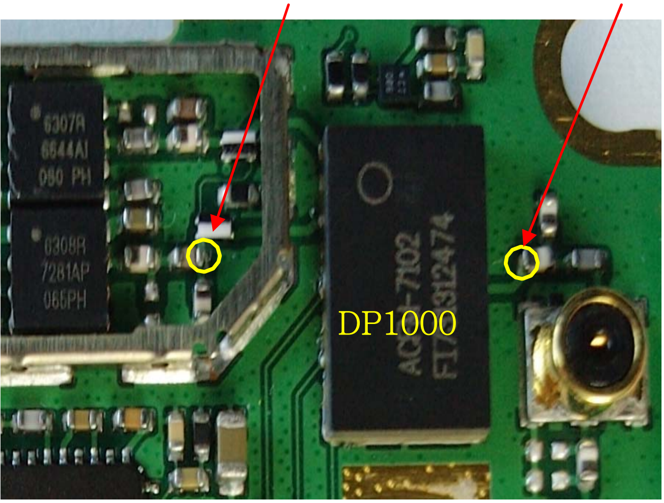


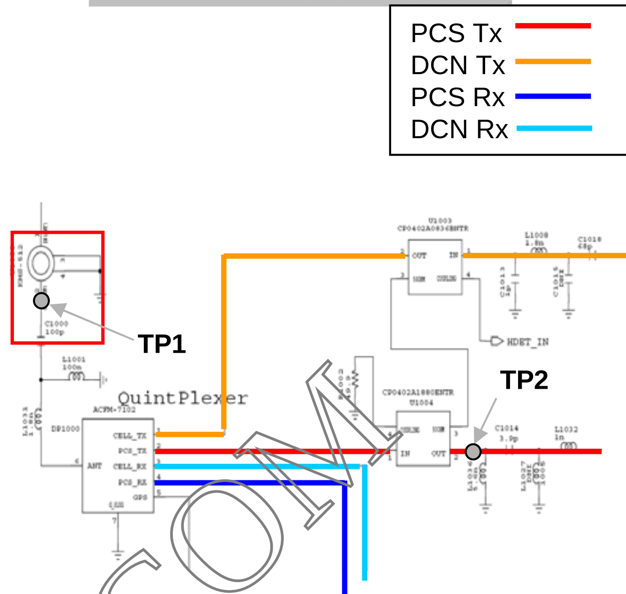
Figure 4.2.2.6

4.2.2.7 Check Quintplexer

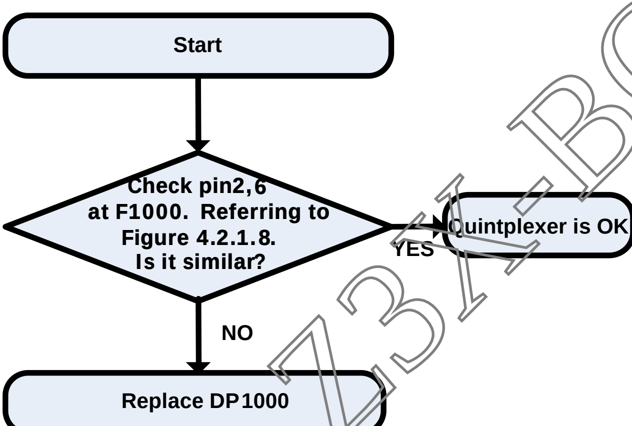
Test Point



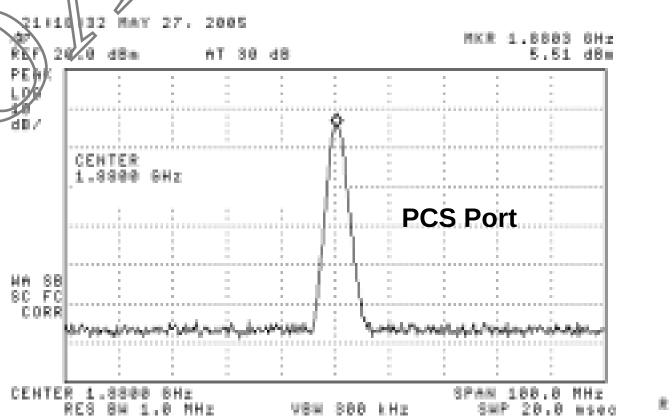
Circuit Diagram



Checking Flow



Waveform



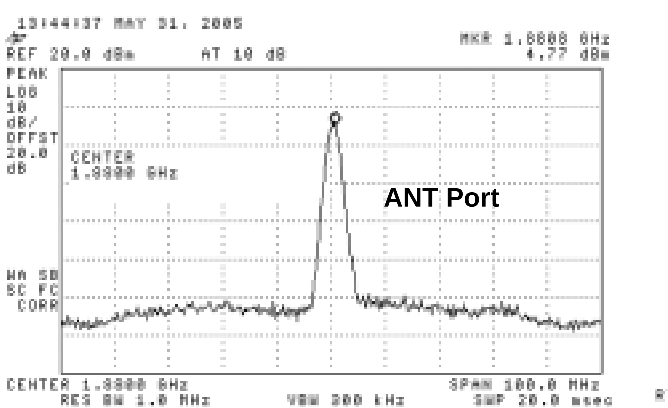
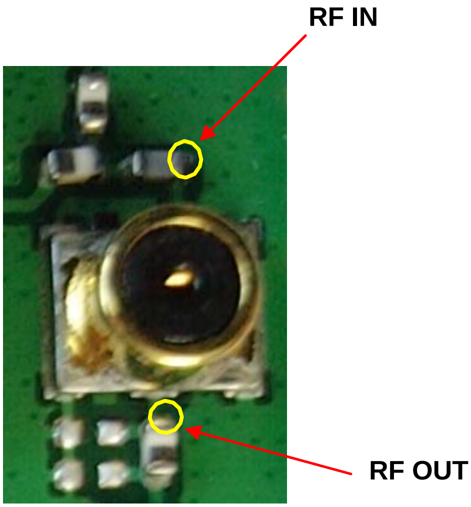


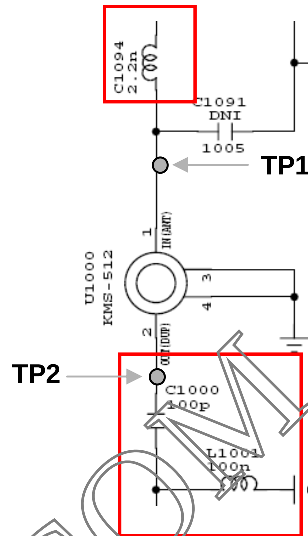
Figure 4.2.2.8

4.2.2.8 Check Mobile S/W

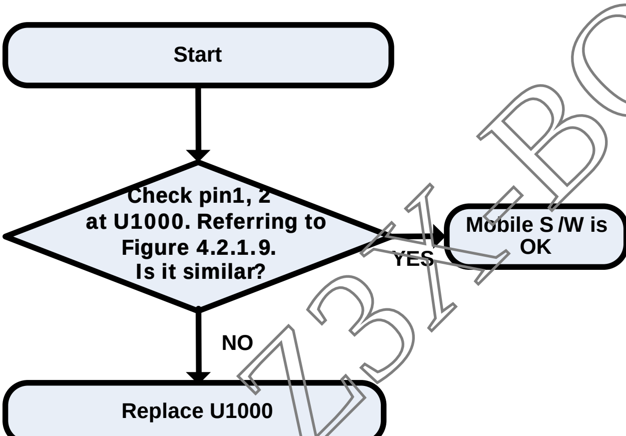
Test Point



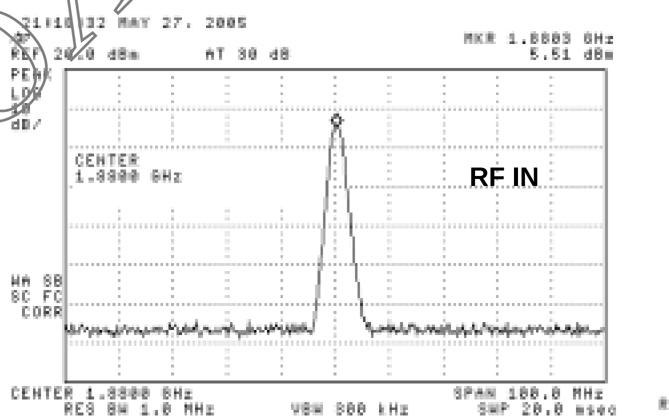
Circuit Diagram



Checking Flow



Waveform



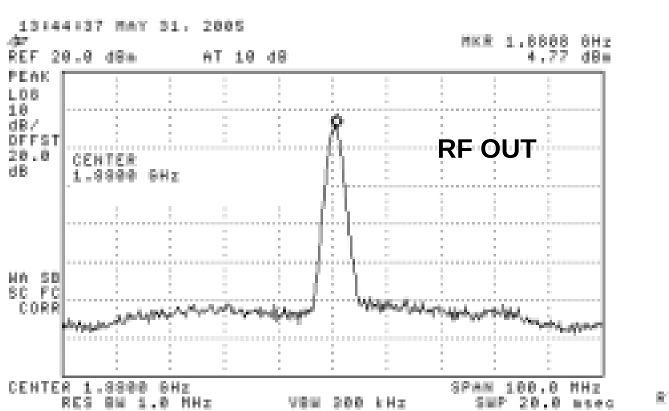


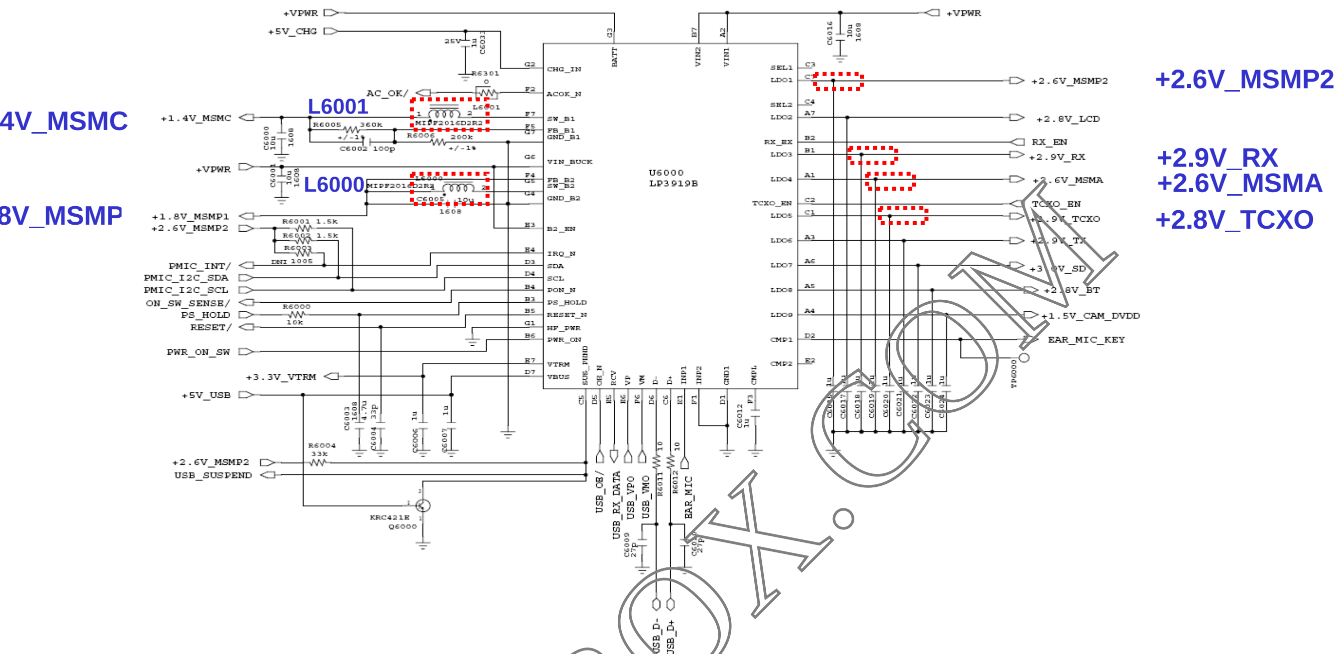
Figure 4.2.2.8

4.3 Logic Part Trouble

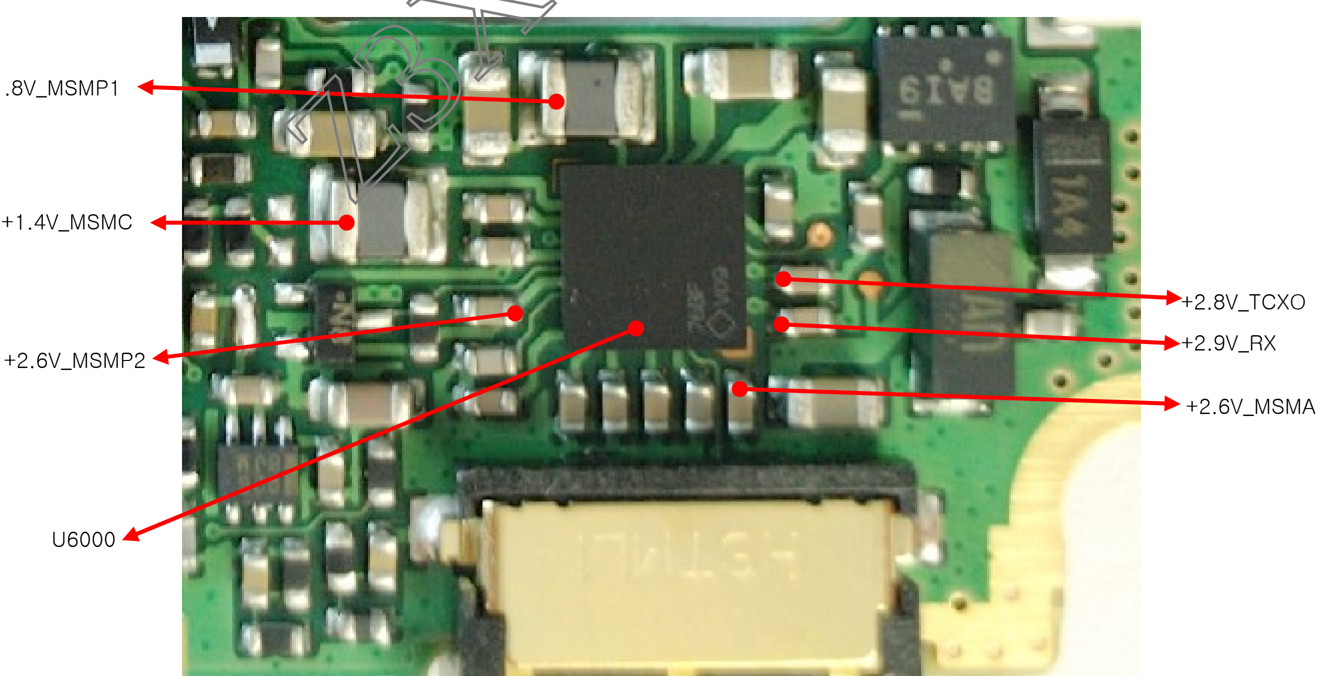
4.3.1 Power

4.3.1.1 Power-On Trouble

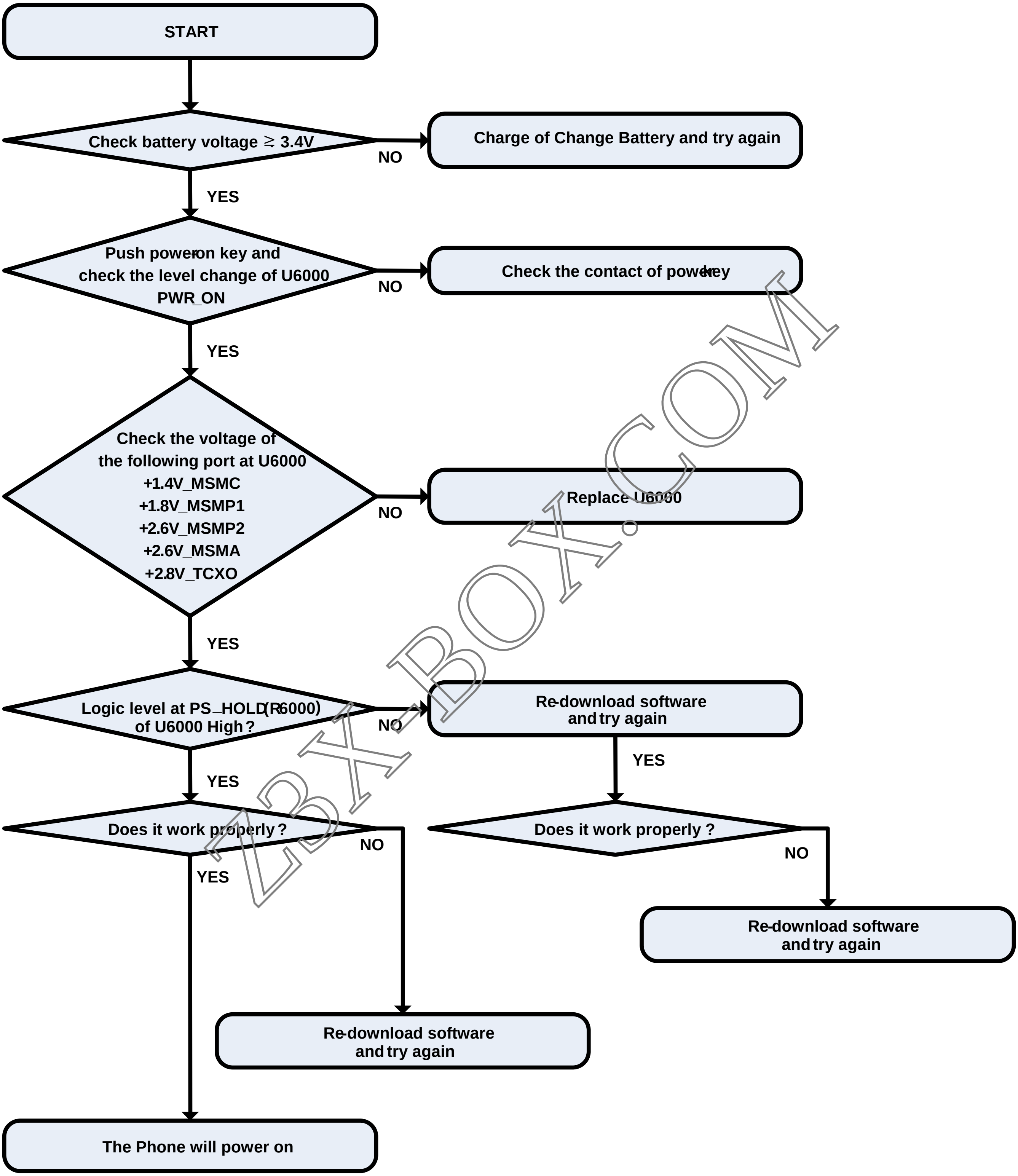
Circuit Diagram



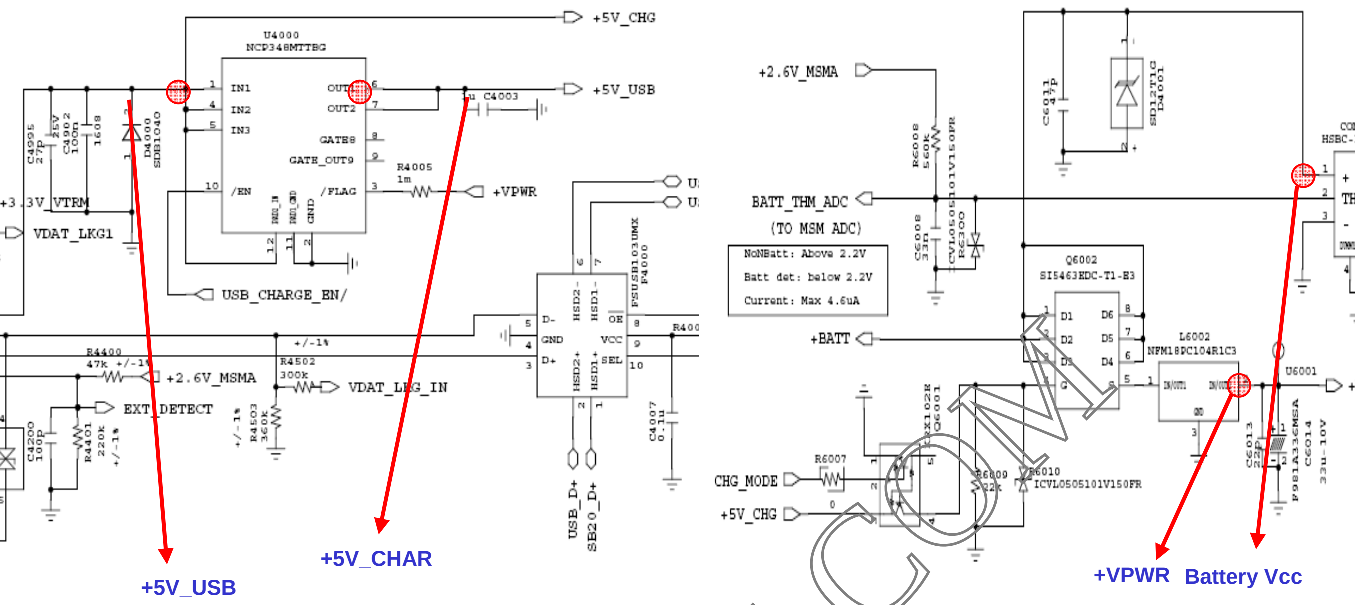
Test point



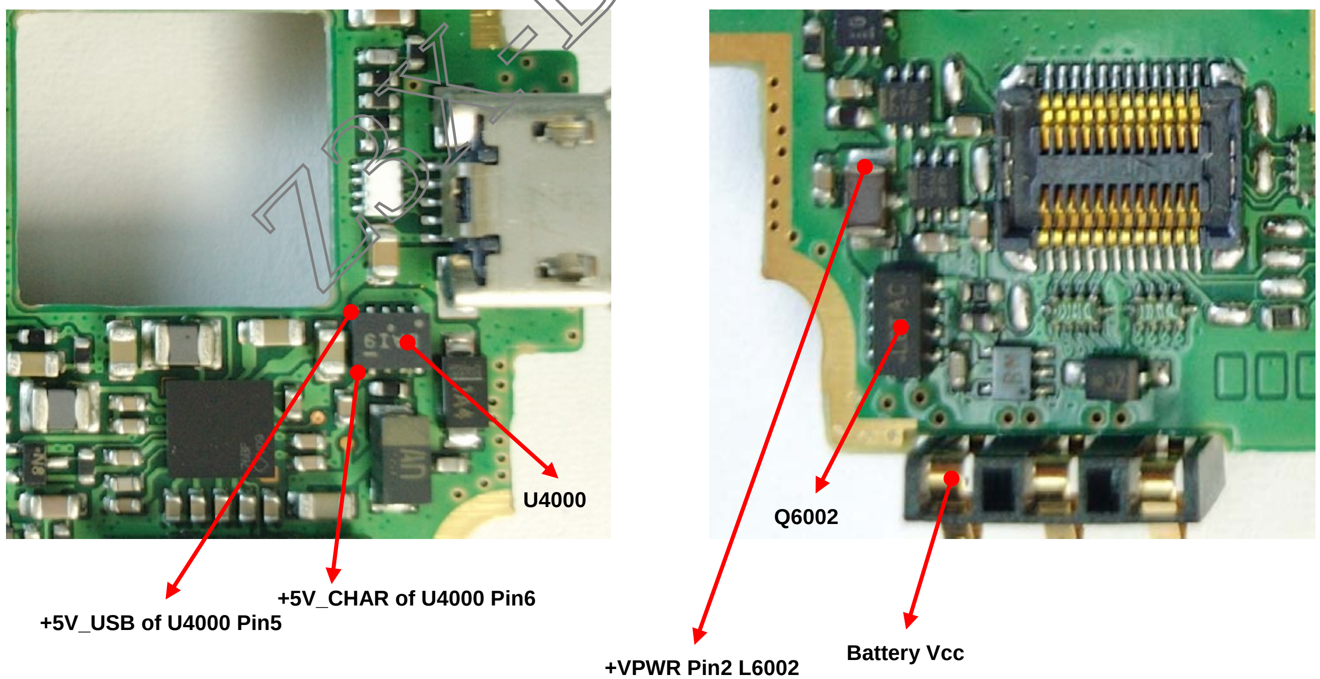
Checking Flow



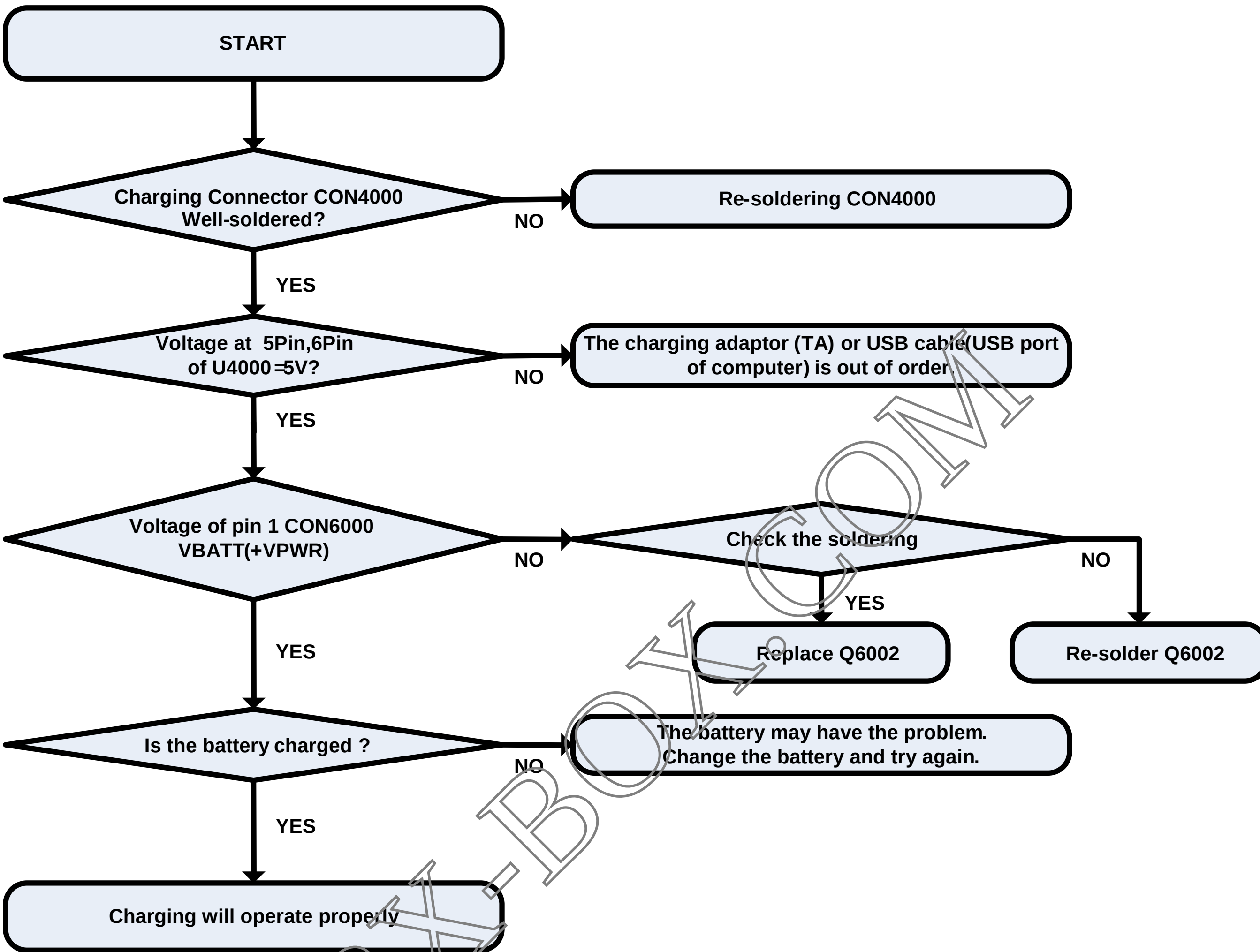
Circuit Diagram



Test point

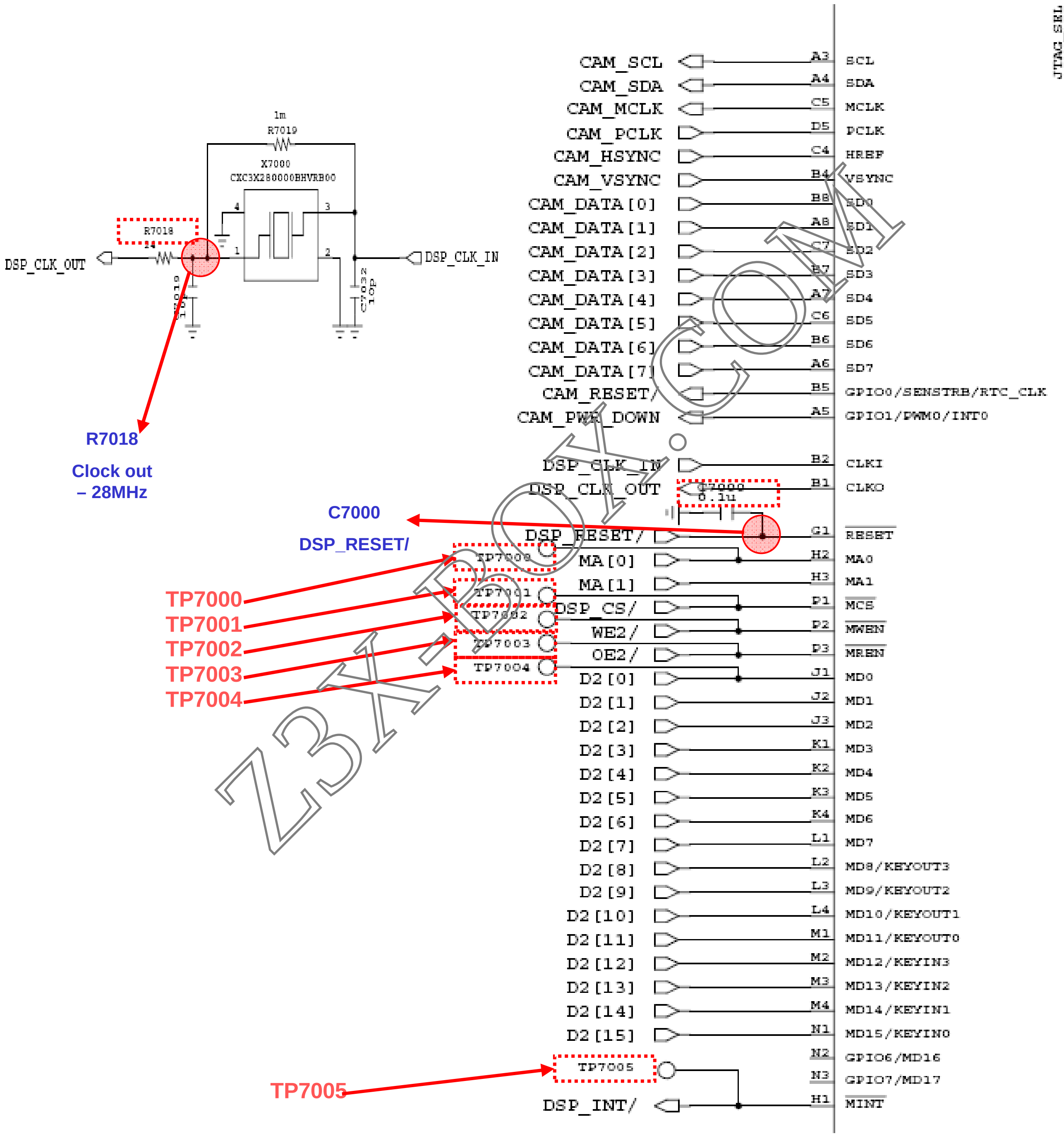


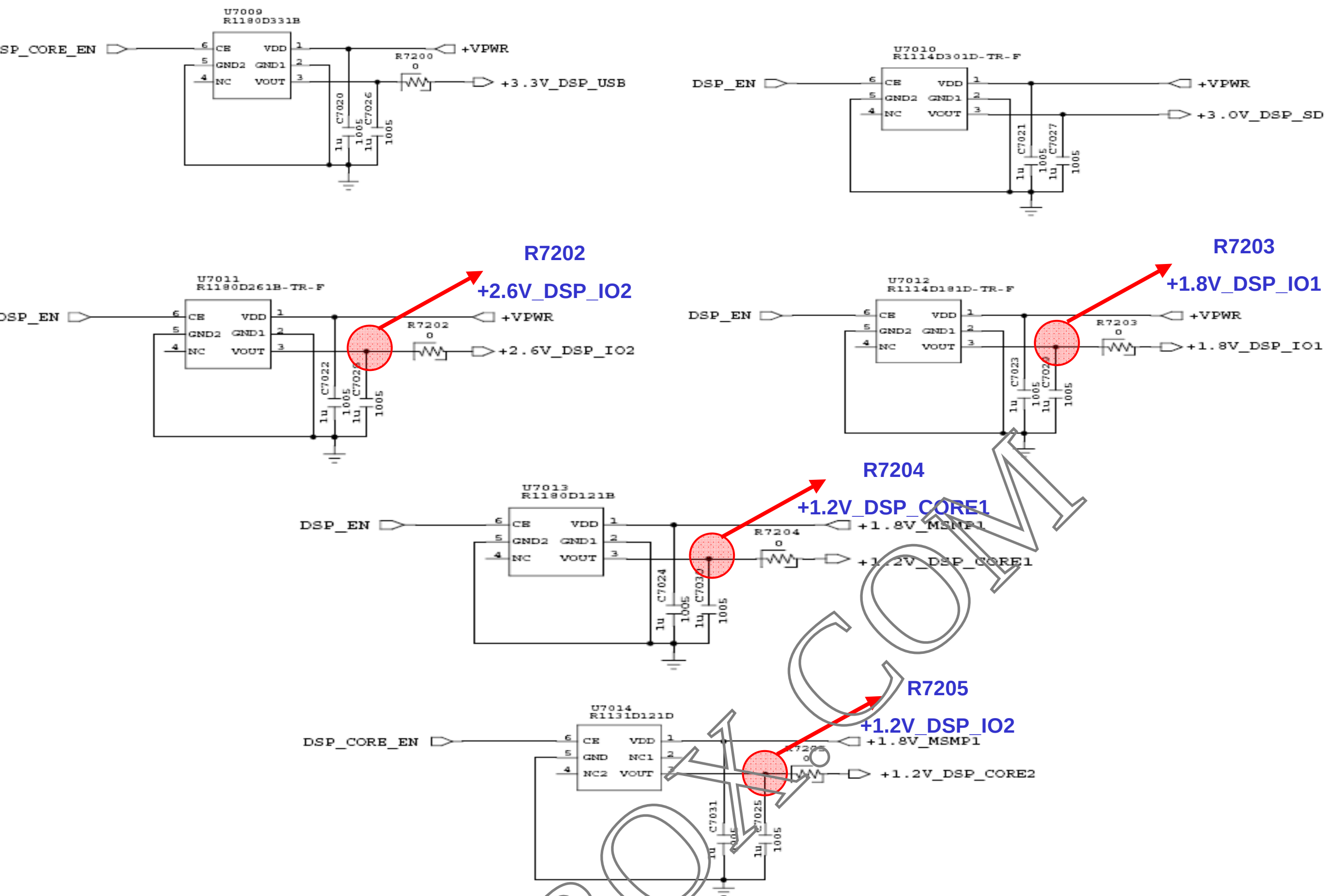
Checking Flow



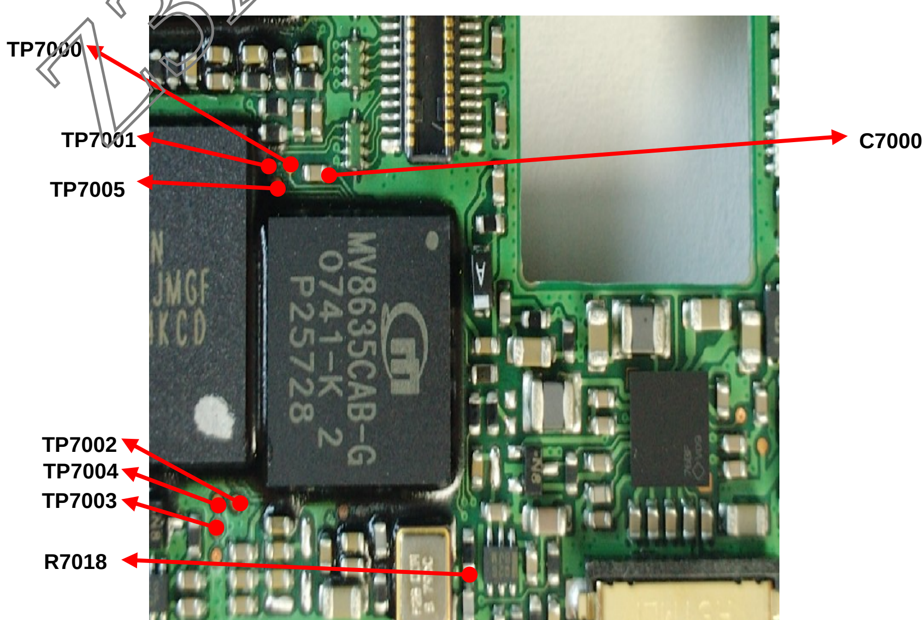
4.3.2.1 DSP Trouble

Circuit Diagram

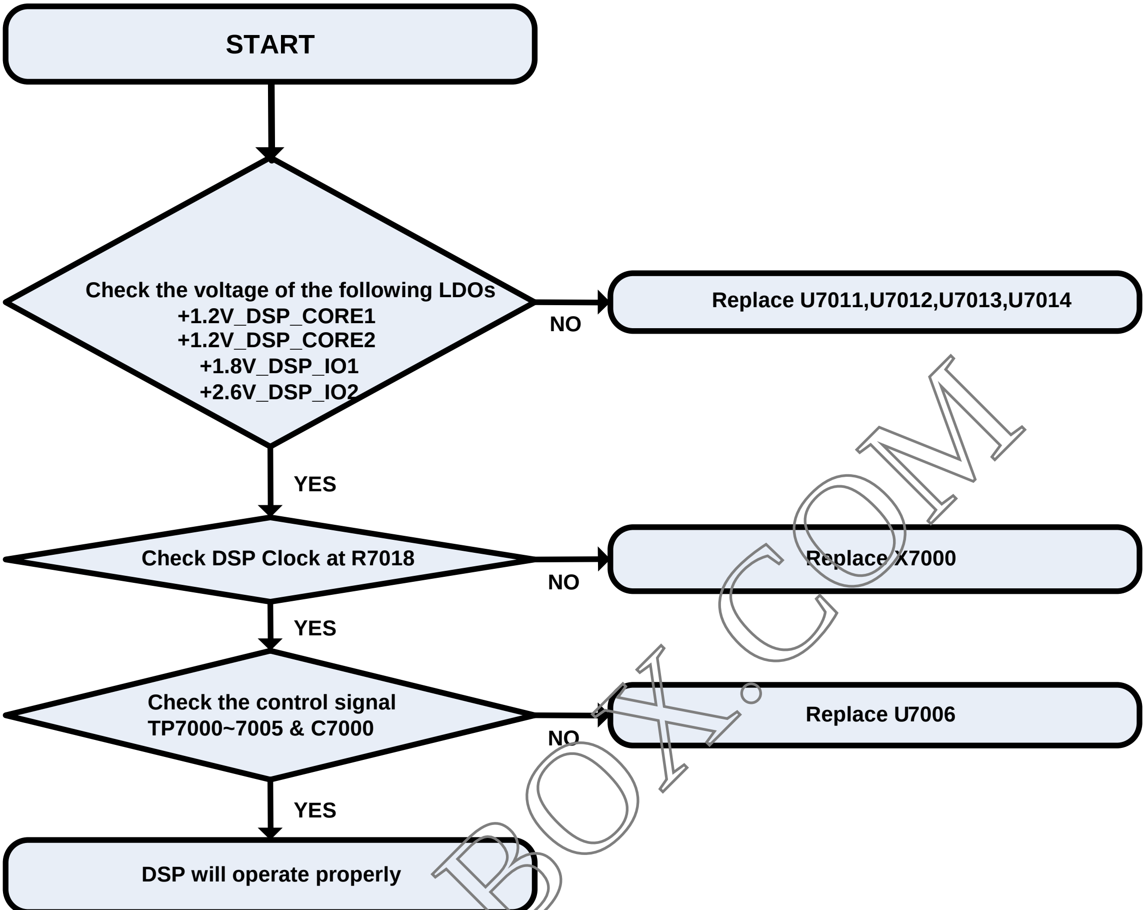



U7009
R1180D331B
SP_CORE_EN
CE
GND2
NC
VDD
GND1
VOUT
+VPWR
R7200
0
+3.3V_DSP_USB
C7020
1u
1005
C7026
1u
1005
U7010
R1114D301D-TR-F
DSP_EN
+VPWR
+3.0V_DSP_SD
C7021
C7027
R7202
+2.6V_DSP_IO2
U7011
R1180D261B-TR-F
C7022
C7028
R7203
+1.8V_DSP_IO1
U7012
R1114D181D-TR-F
C7023
C7029
R7204
+1.2V_DSP_CORE1
U7013
R1180D121B
+1.8V_MSMP1
C7024
C7030
R7205
+1.2V_DSP_IO2
U7014
R1131D121D
DSP_CORE_EN
NC1
NC2
GND
+1.2V_DSP_CORE2
C7031
C7025

Test point


TP7000
TP7001
TP7005
C7000
TP7002
TP7004
TP7003
R7018

Checking Flow

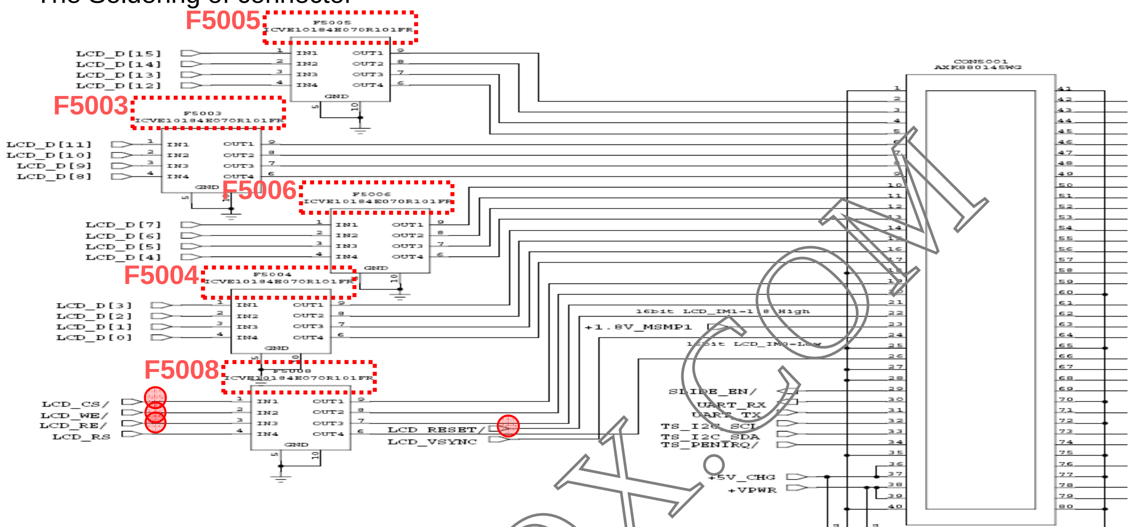


4.3.3.1 LCD Trouble

Circuit Diagram

Check point

- The assembly status of the LCD Module
- The assembly status of the main connector
- The Soldering of connector

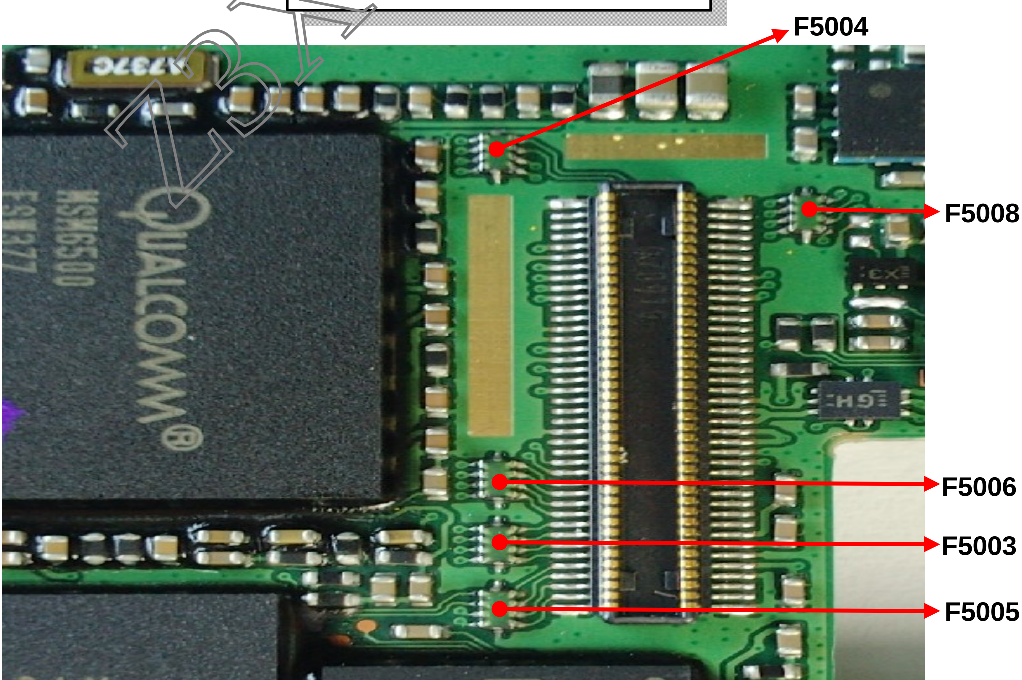


LCD Control signals

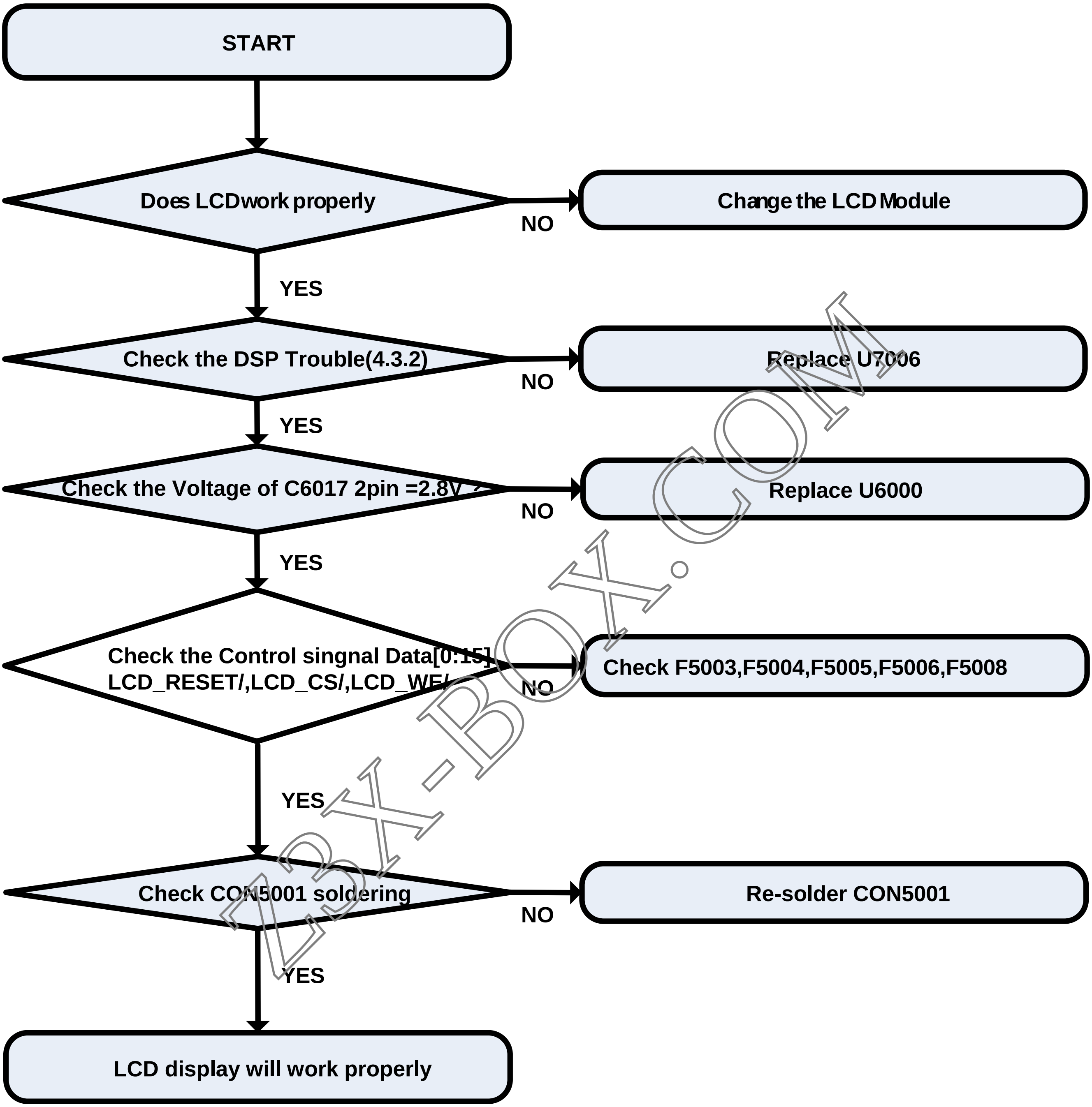
From DSP : LCD_D[0:15], LCD_CS/, LCD_WE/, LCD_ID,

From MSM : LCD_RESET/

Test point



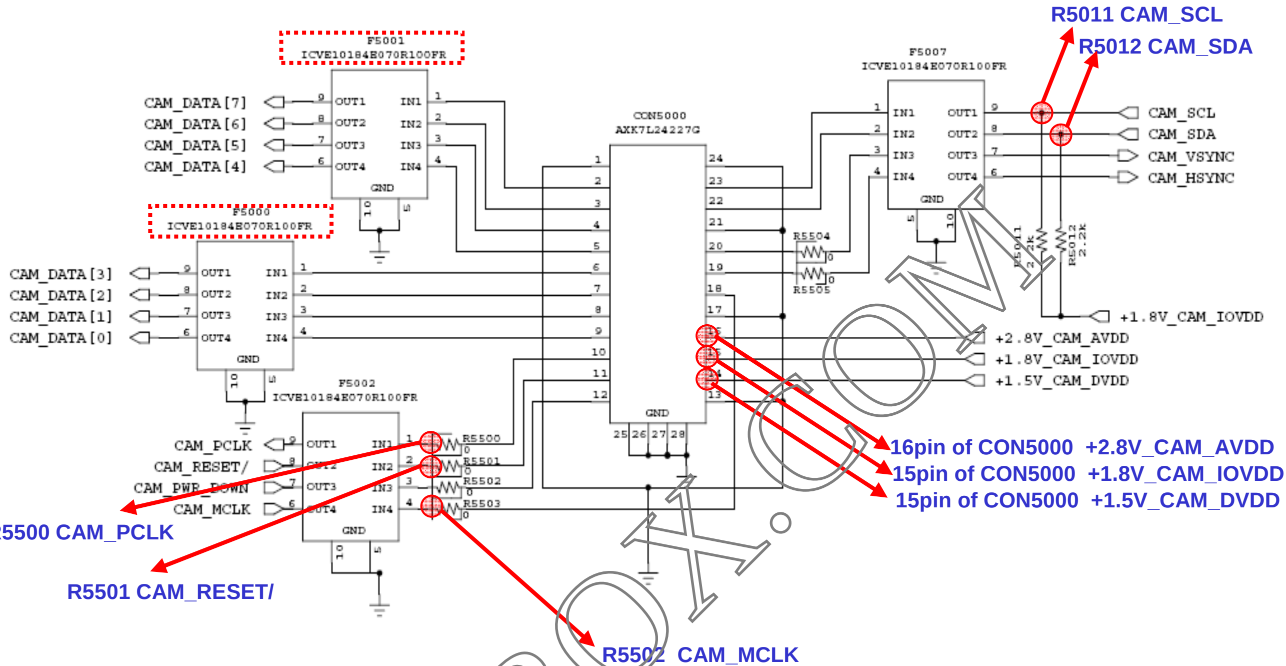
Checking Flow



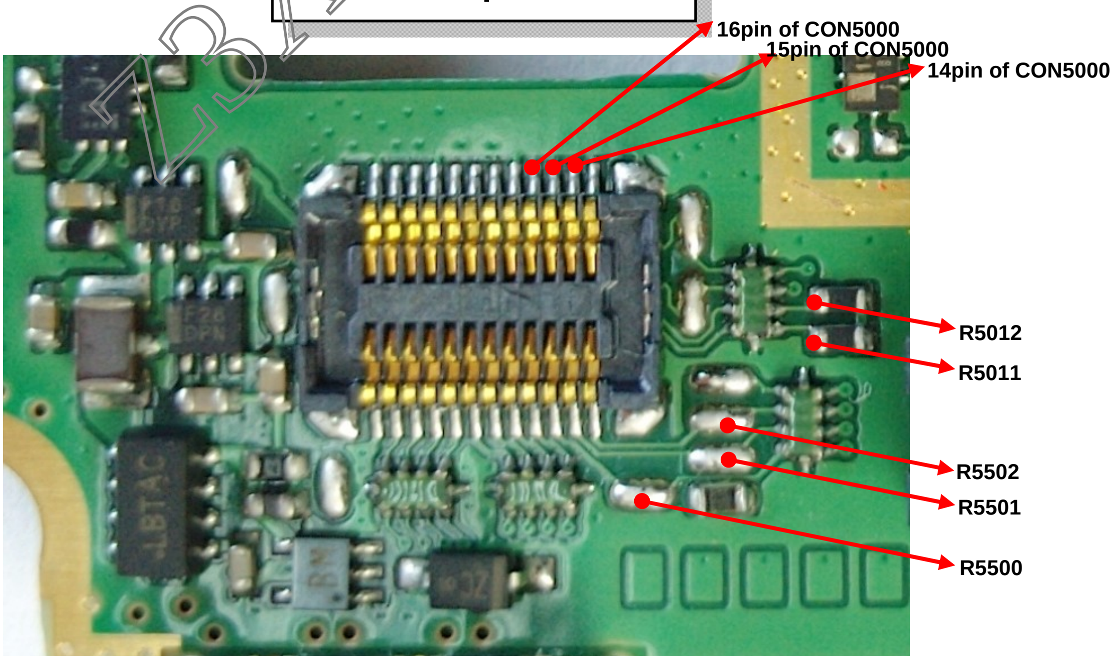
4.3.4 Camera

4.3.4.1 Camera Trouble

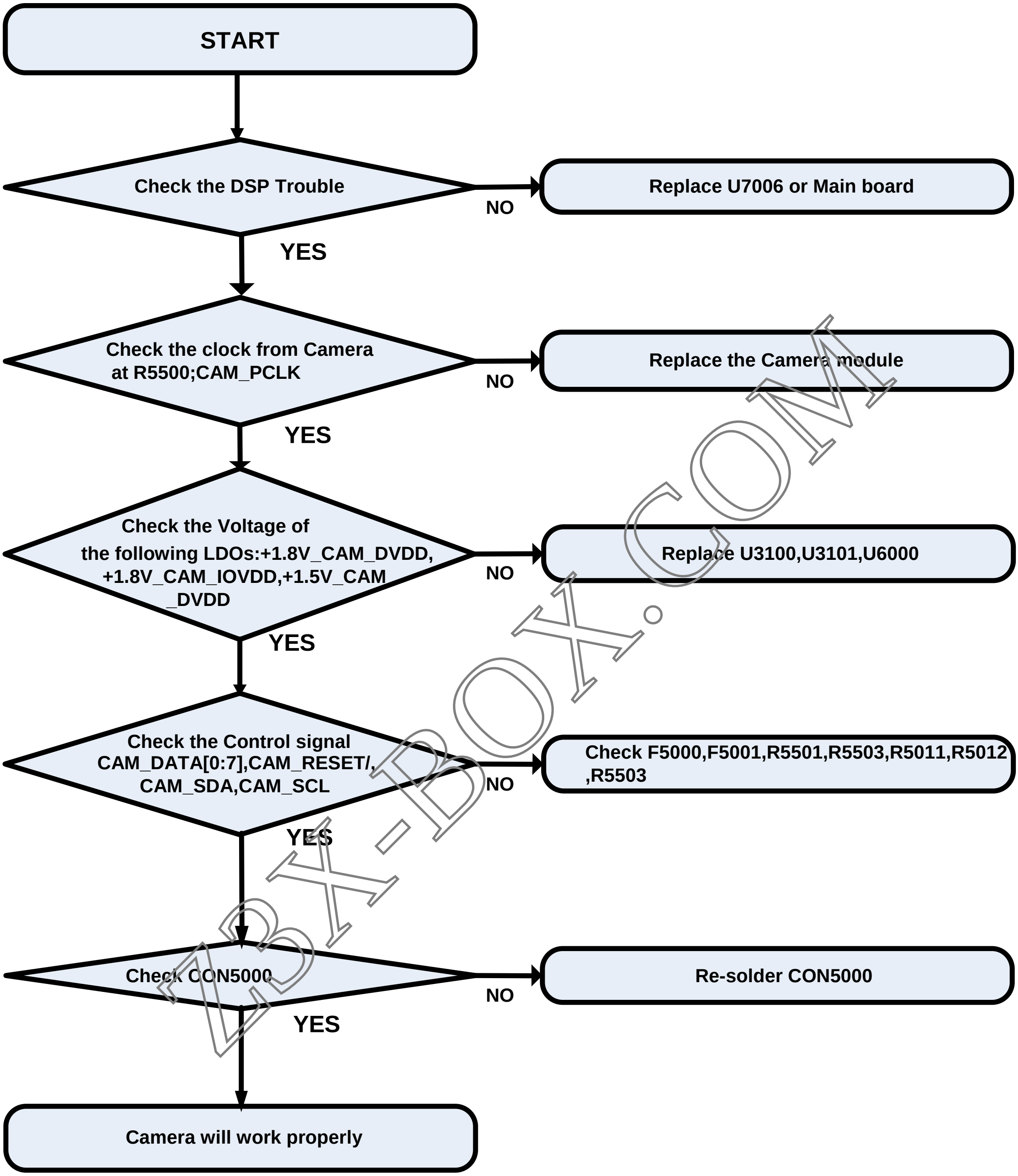
Circuit Diagram



Test point



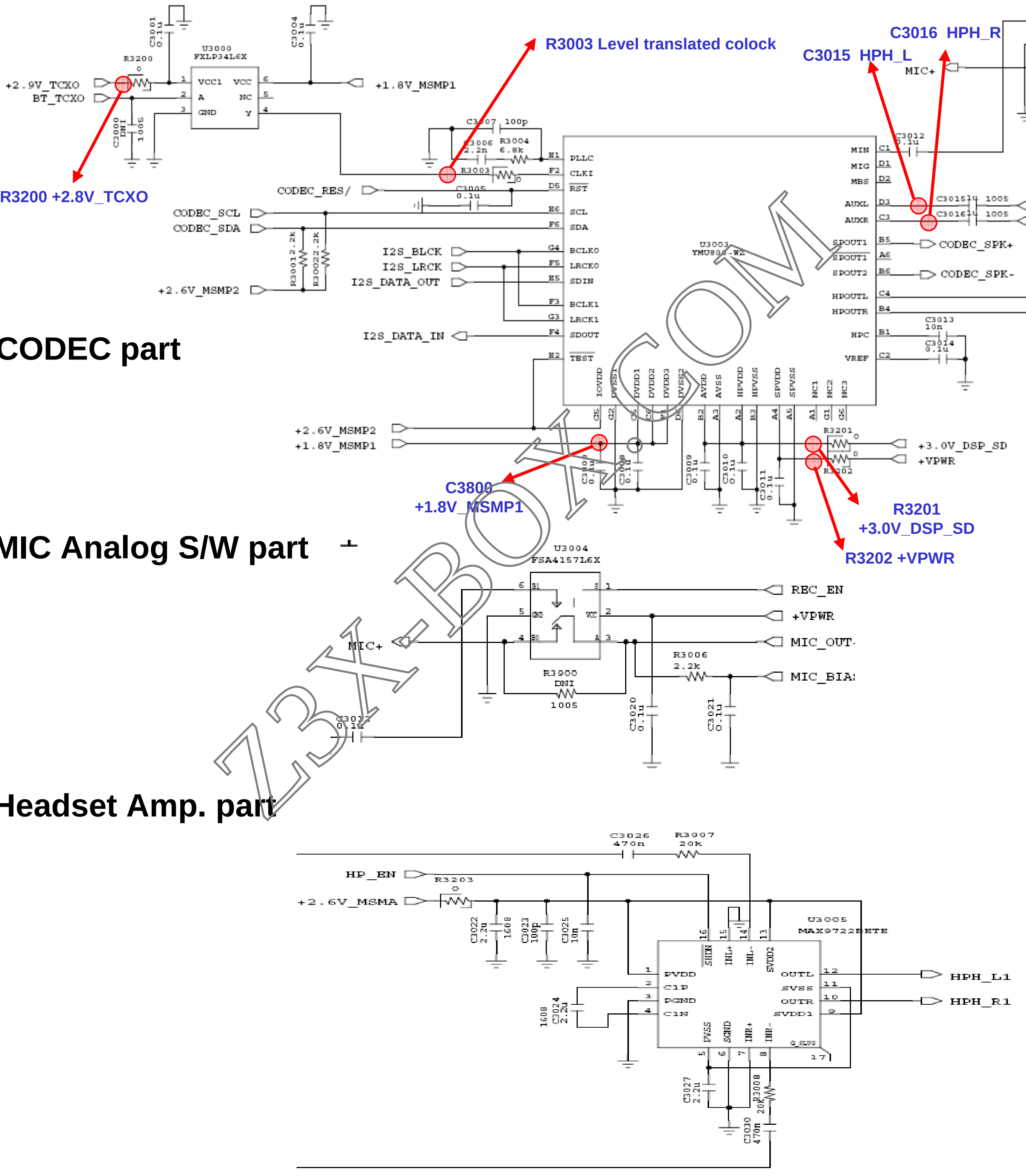
Checking Flow



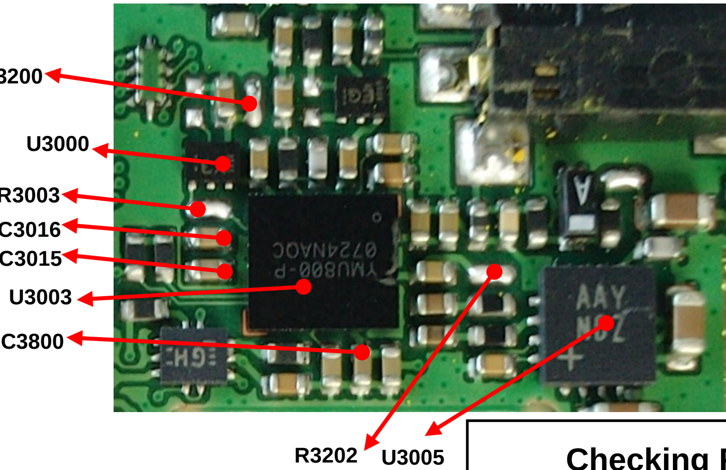
4.3.5 Audio

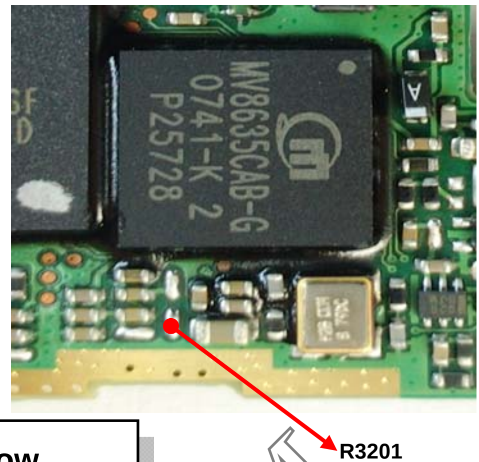
4.3.5.1 Speaker/Receiver Trouble

Circuit Diagram

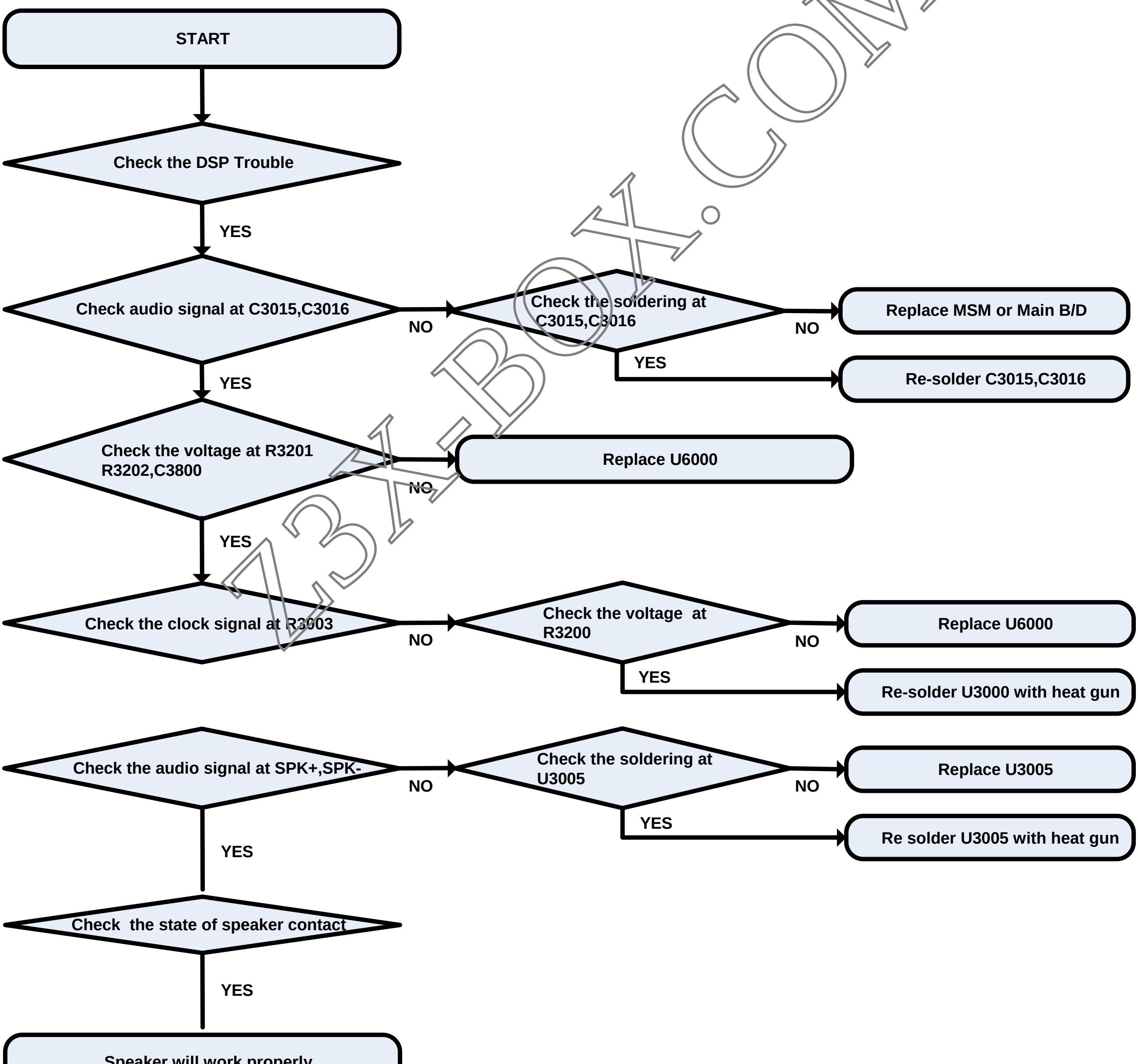


Test point



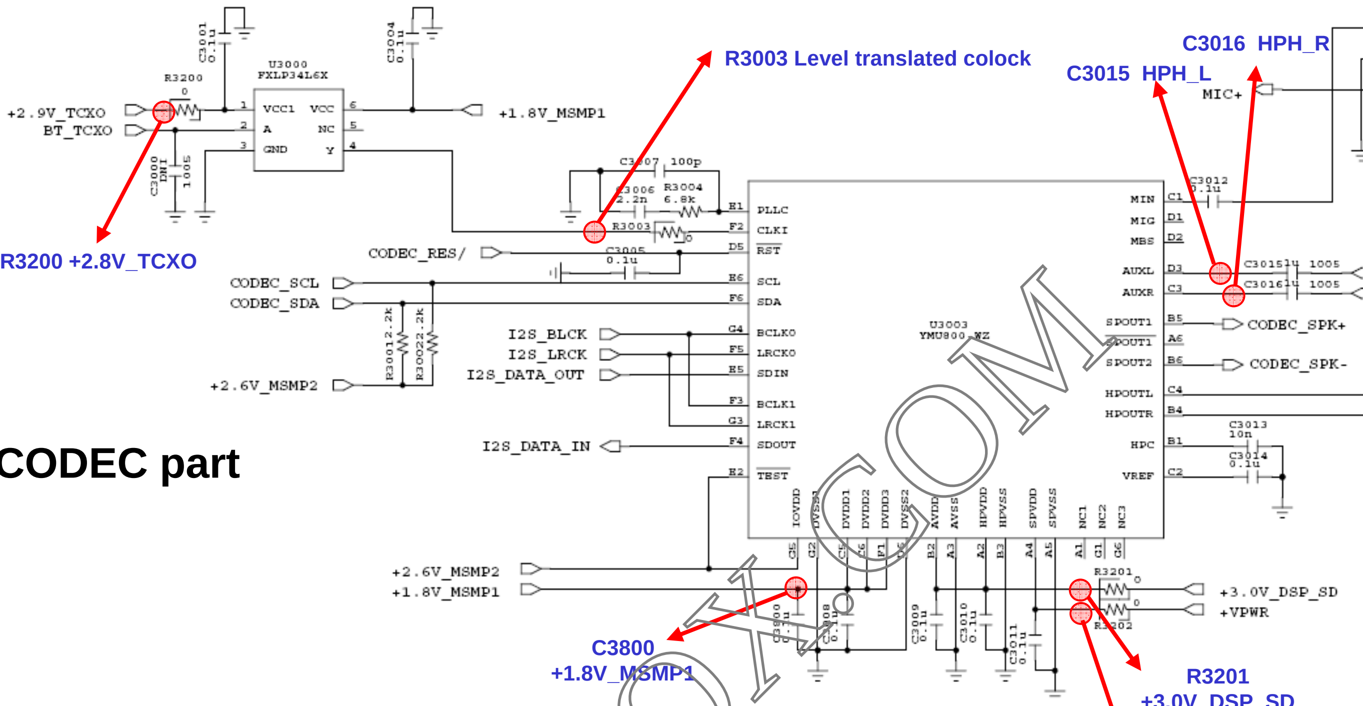


Checking Flow

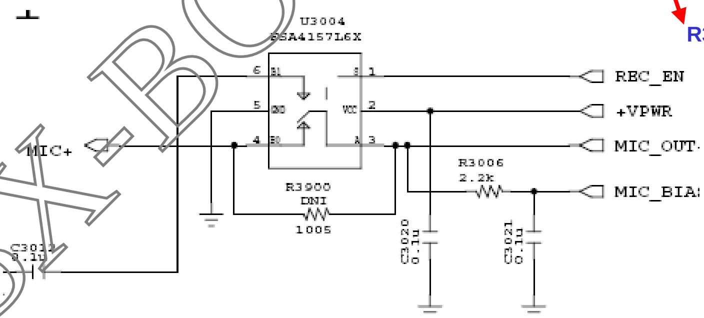


Circuit Diagram

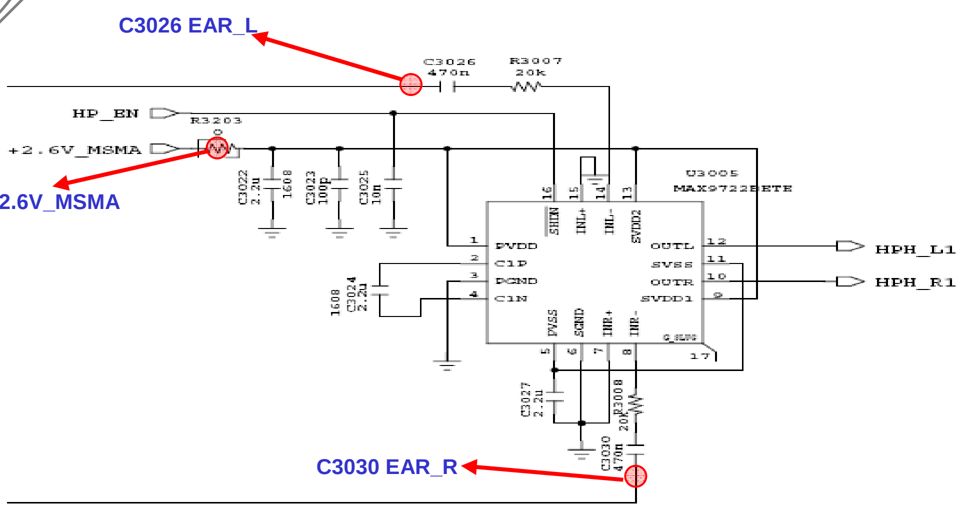
CODEC part



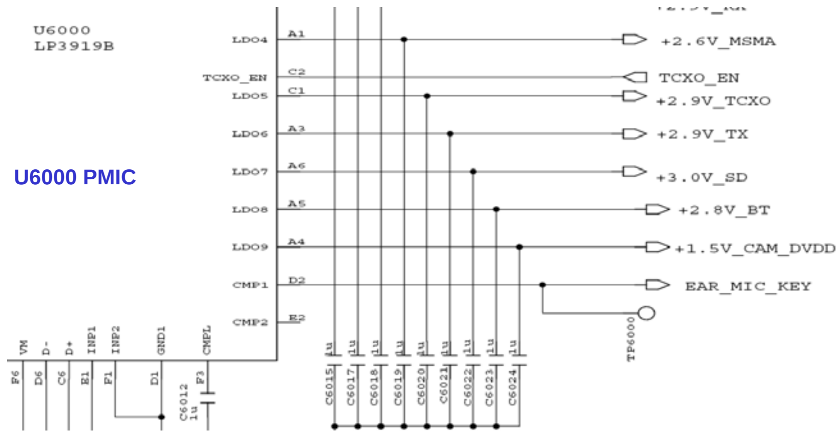
MIC Analog S/W part



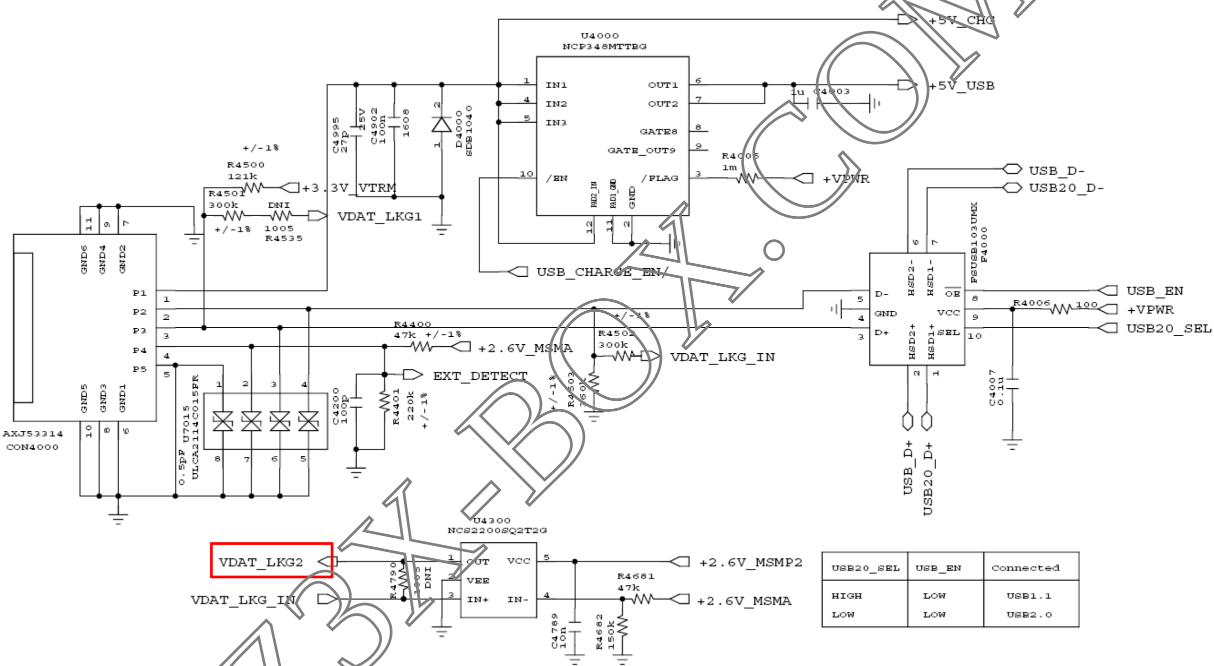
Headset Amp. part



EAR_MIC_KEY part

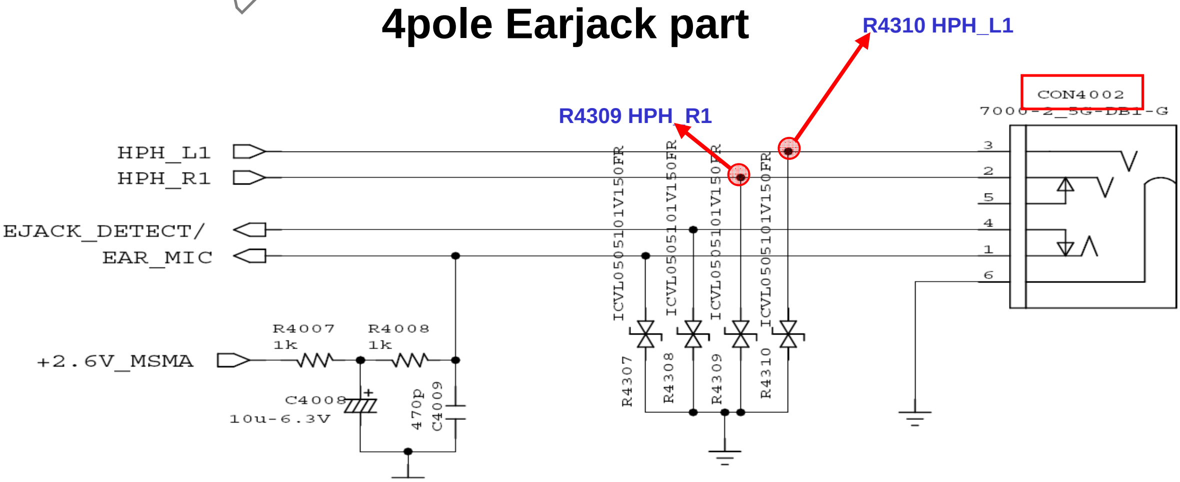


Receptacle part

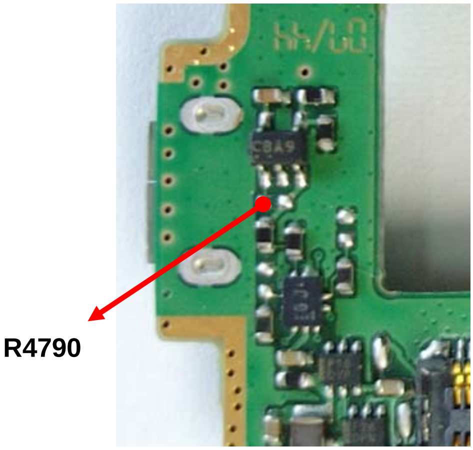


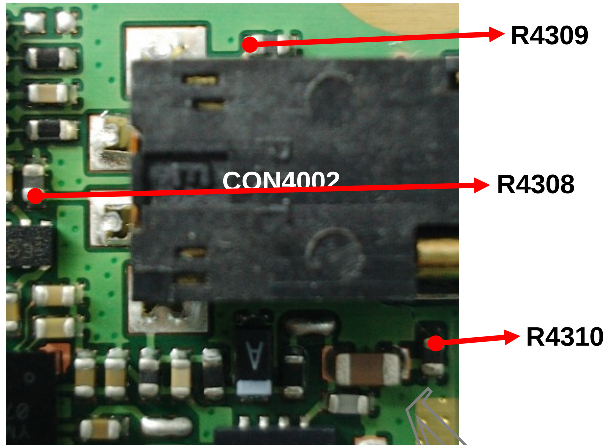
USB20_SEL	USB_EN	Connected
HIGH	LOW	USB1.1
LOW	LOW	USB2.0

4pole Earjack part

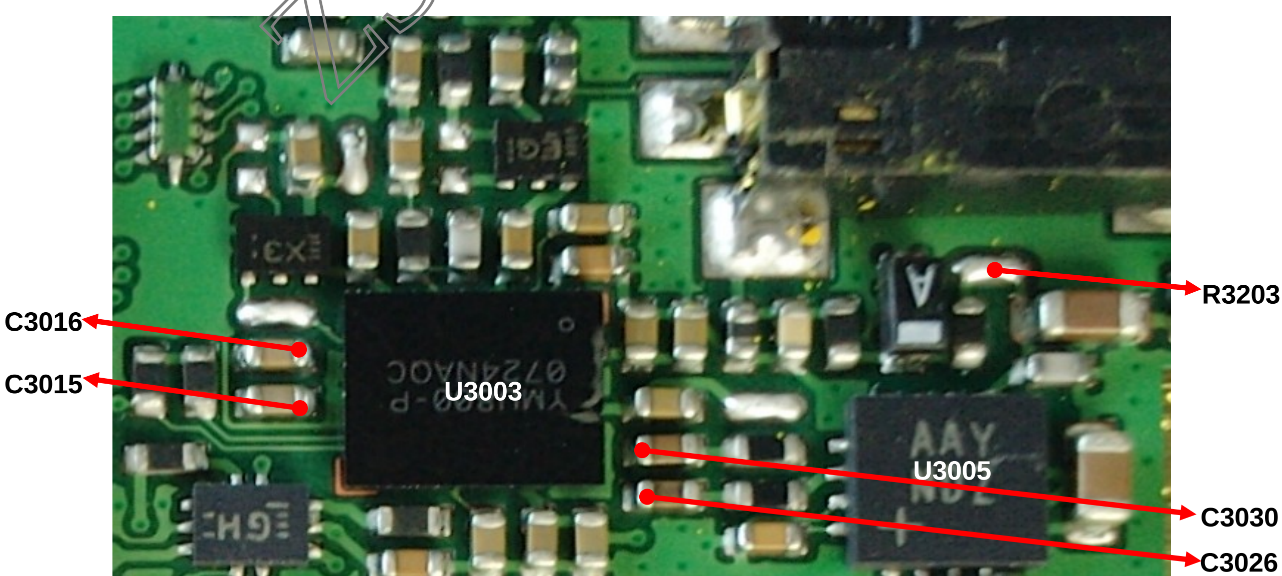


Test point

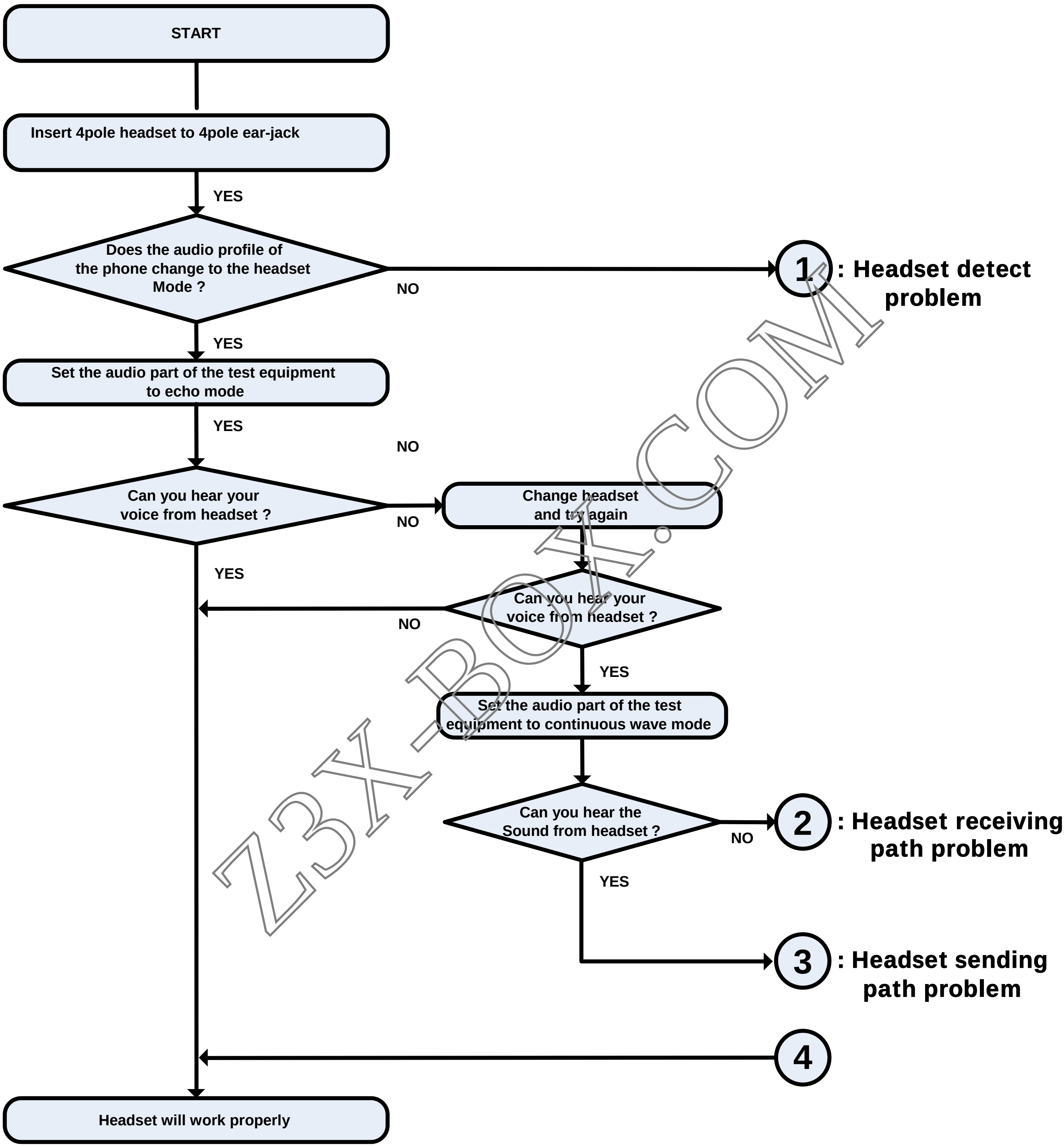

R4790


R4309
CON4002
R4308
R4310

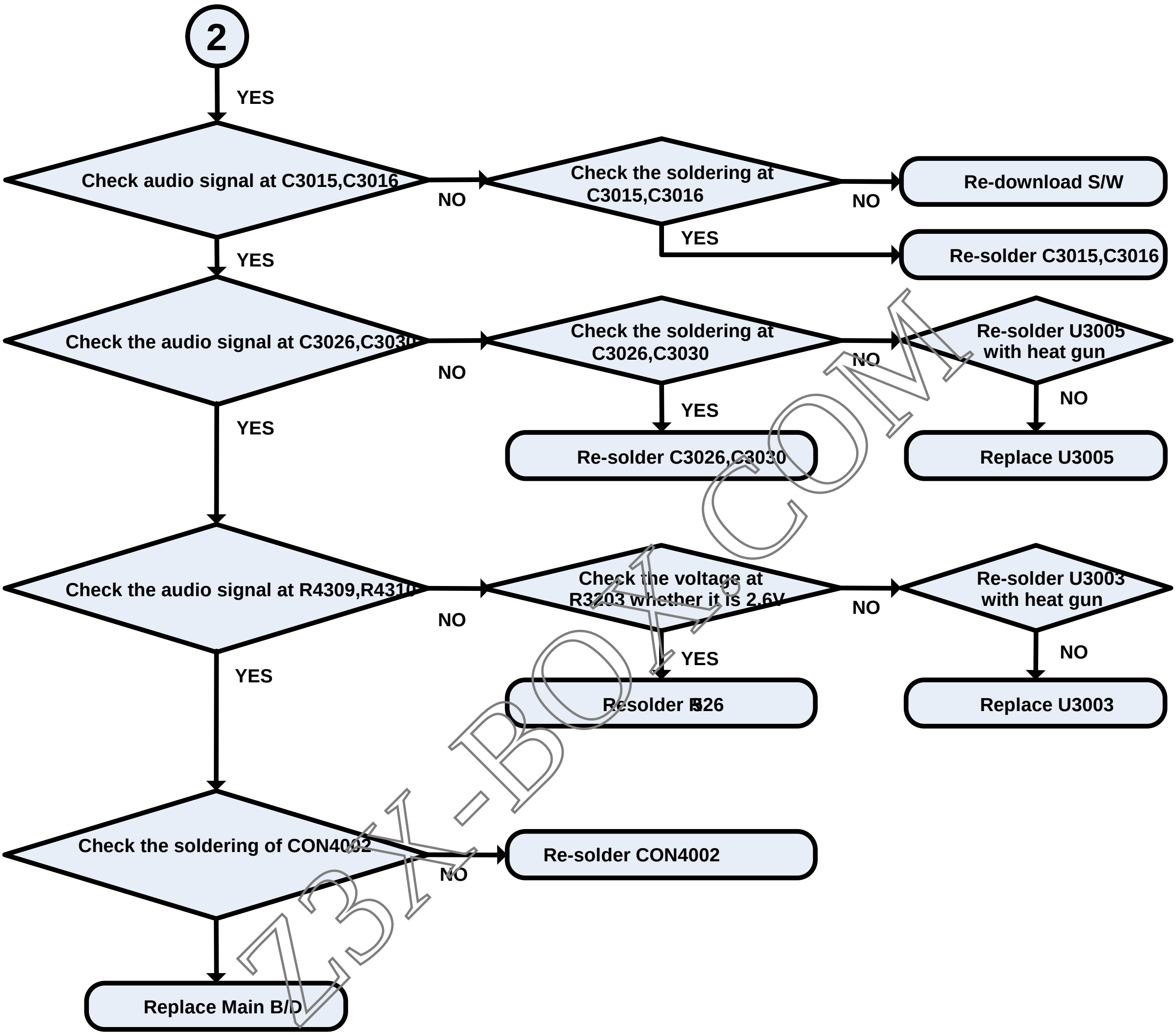

U6000


C3016
C3015
U3003
R3203
U3005
C3030
C3026

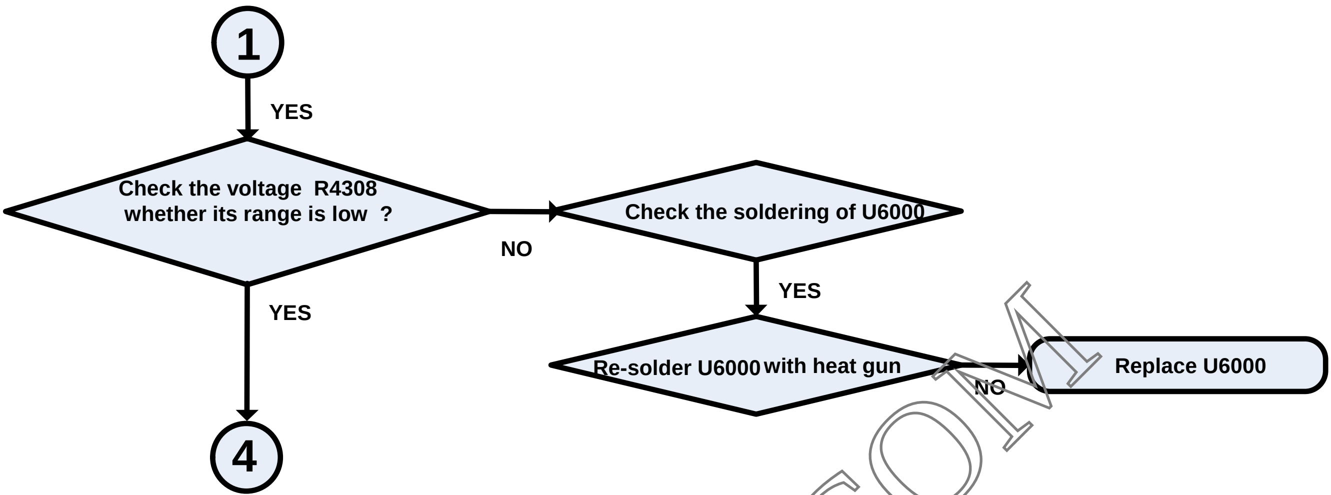
Checking Flow



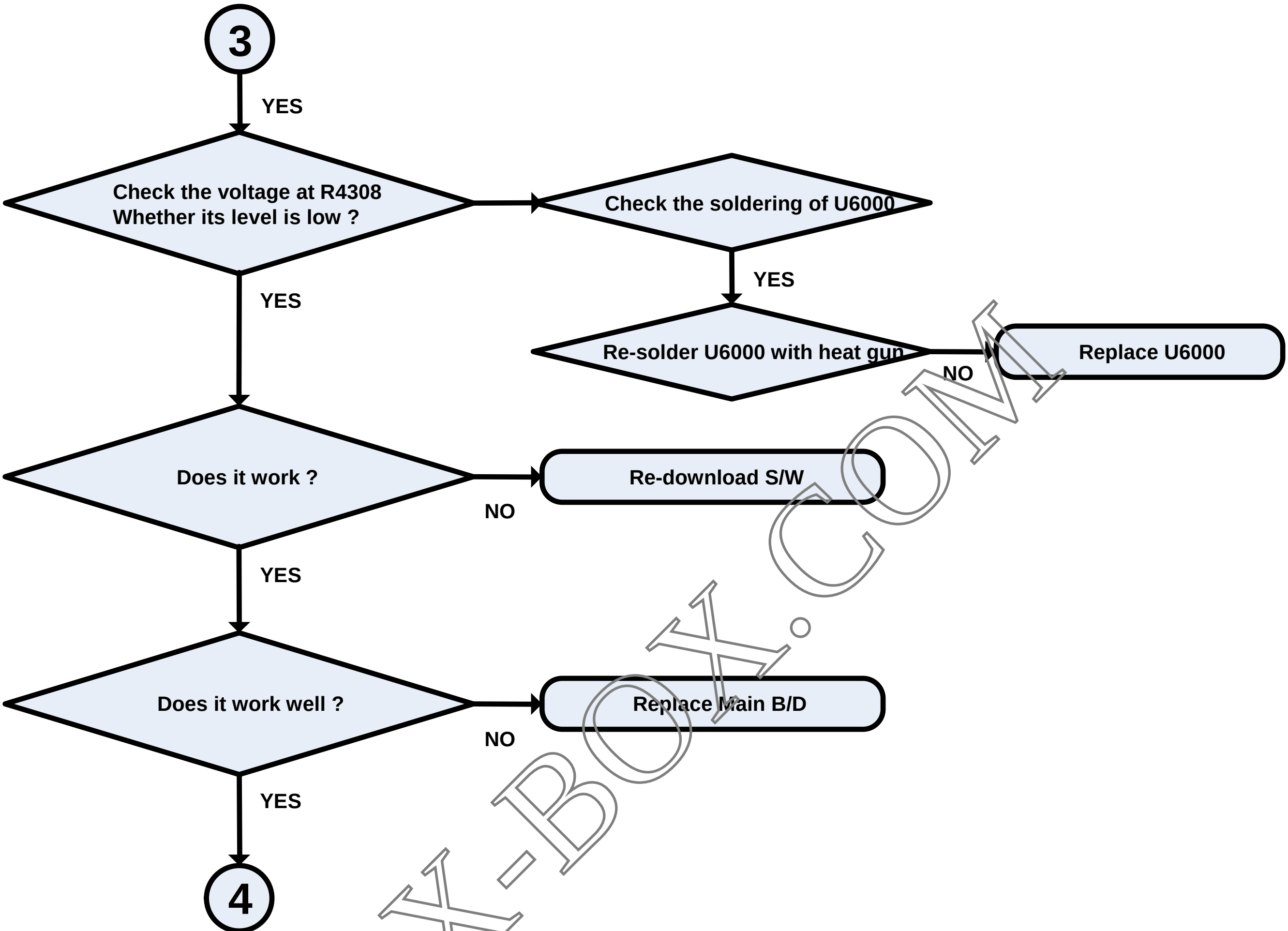
Checking Flow: Headset receiving path problem



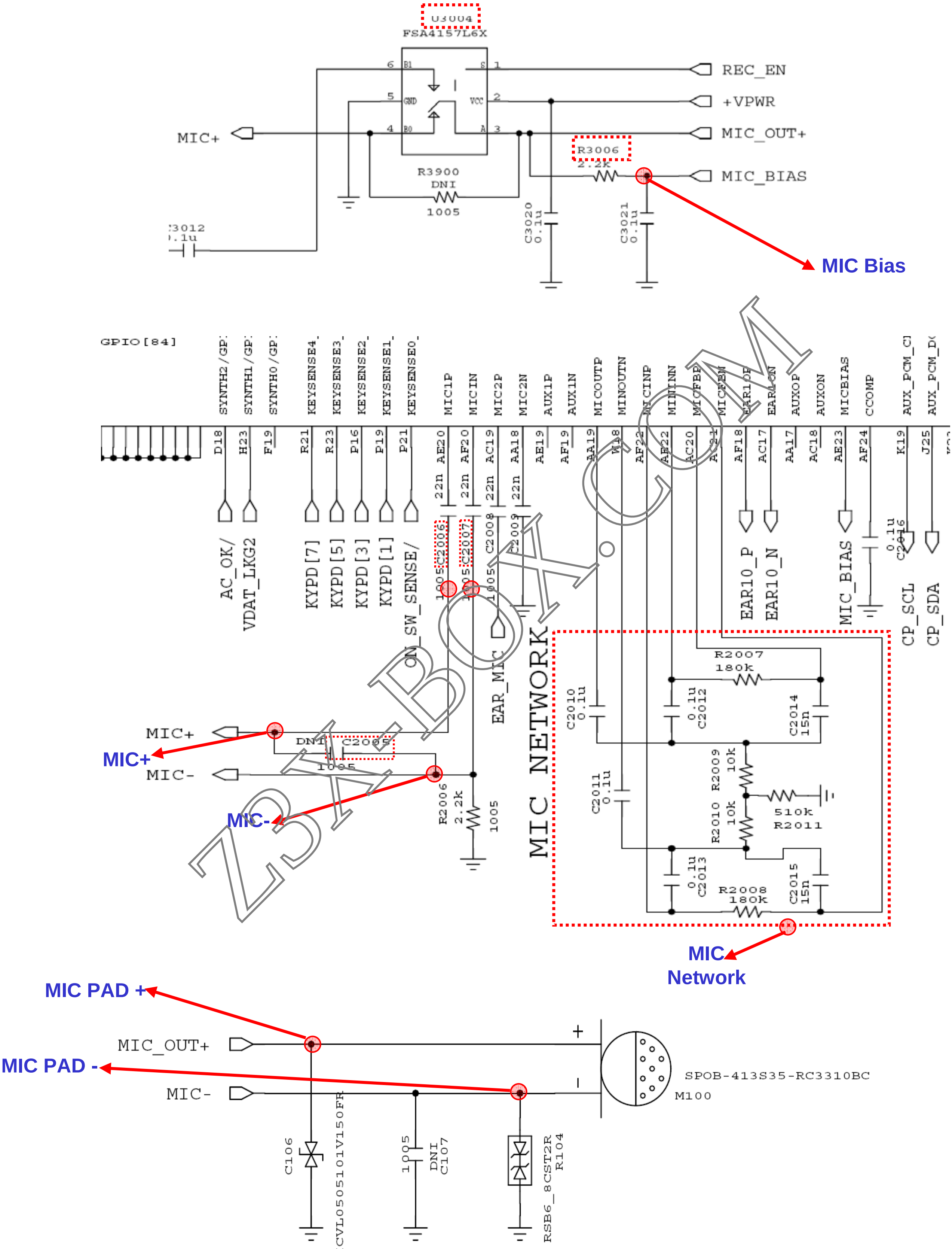
Checking Flow: Headset detect problem



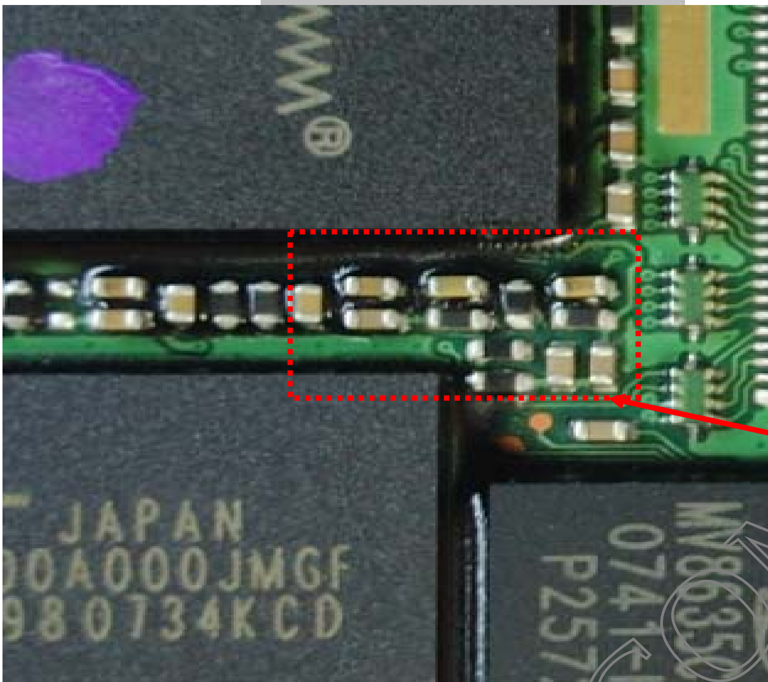
Checking Flow: Headset sending path problem



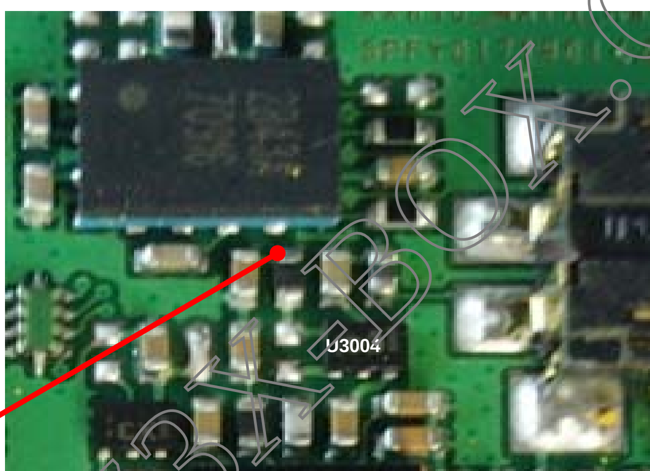
Circuit Diagram



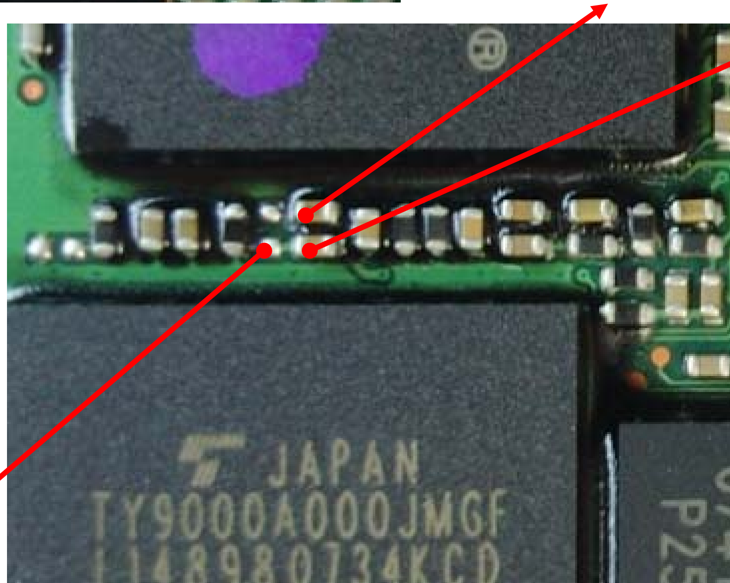
Test point



MIC network



R3006



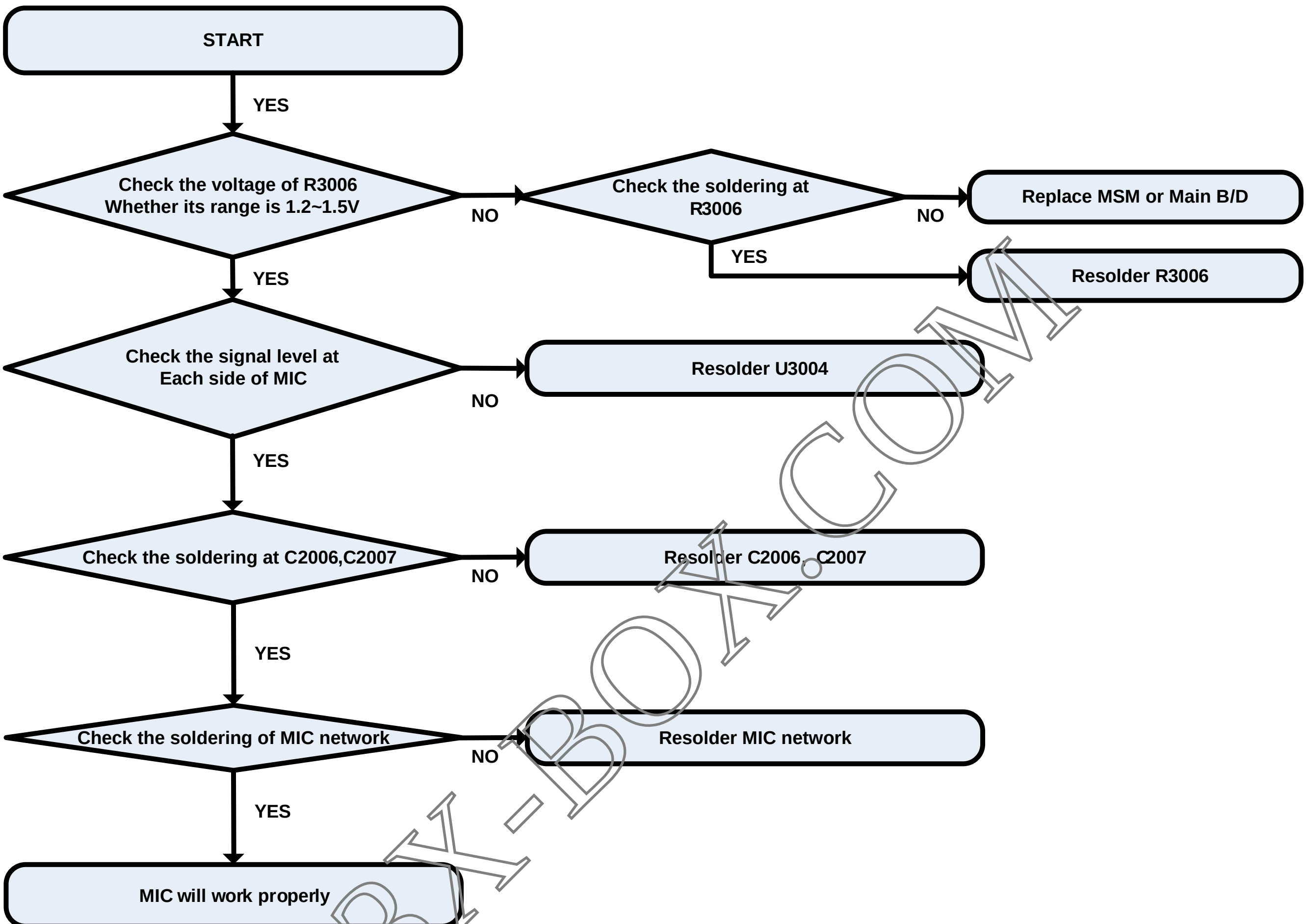
C2007

C2006

C2005

Checking Flow

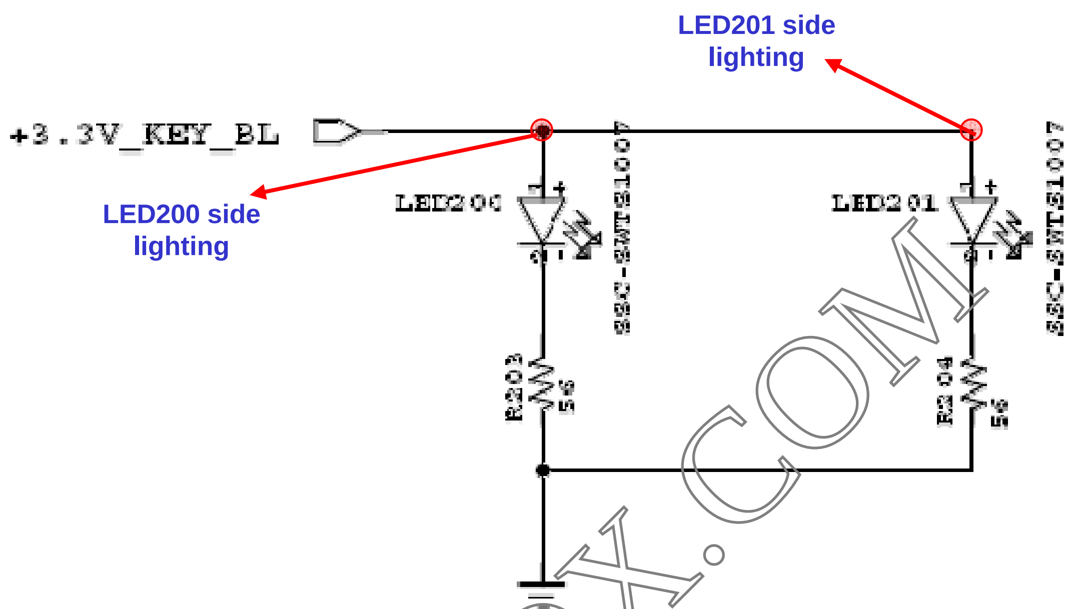
➢ **Setting: After initialize 5515C,and then test handset.**



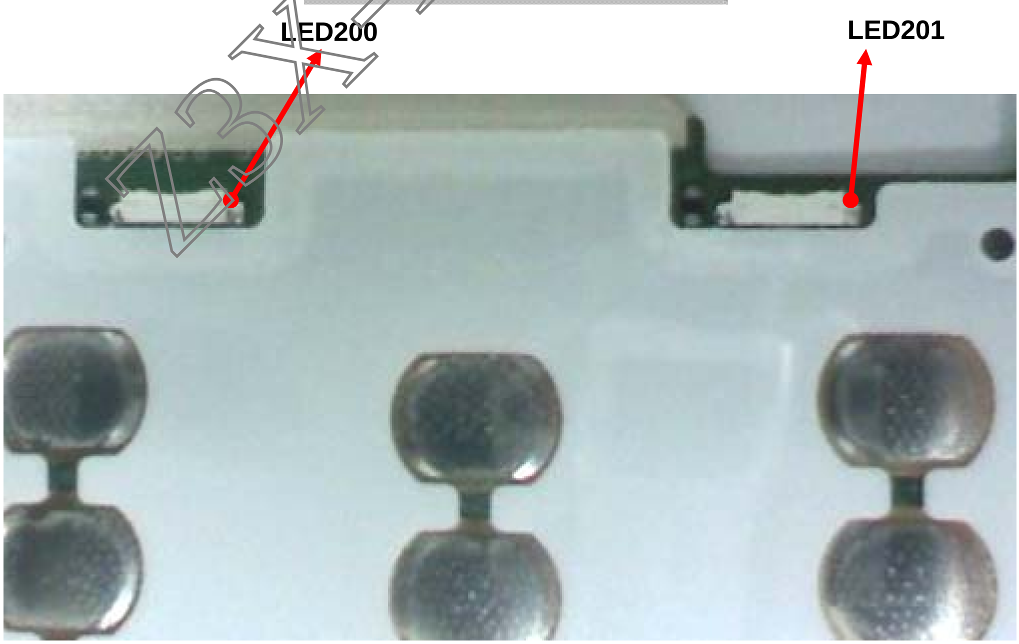
4.3.6 Backlight

4.3.6.1 Numeric key backlight

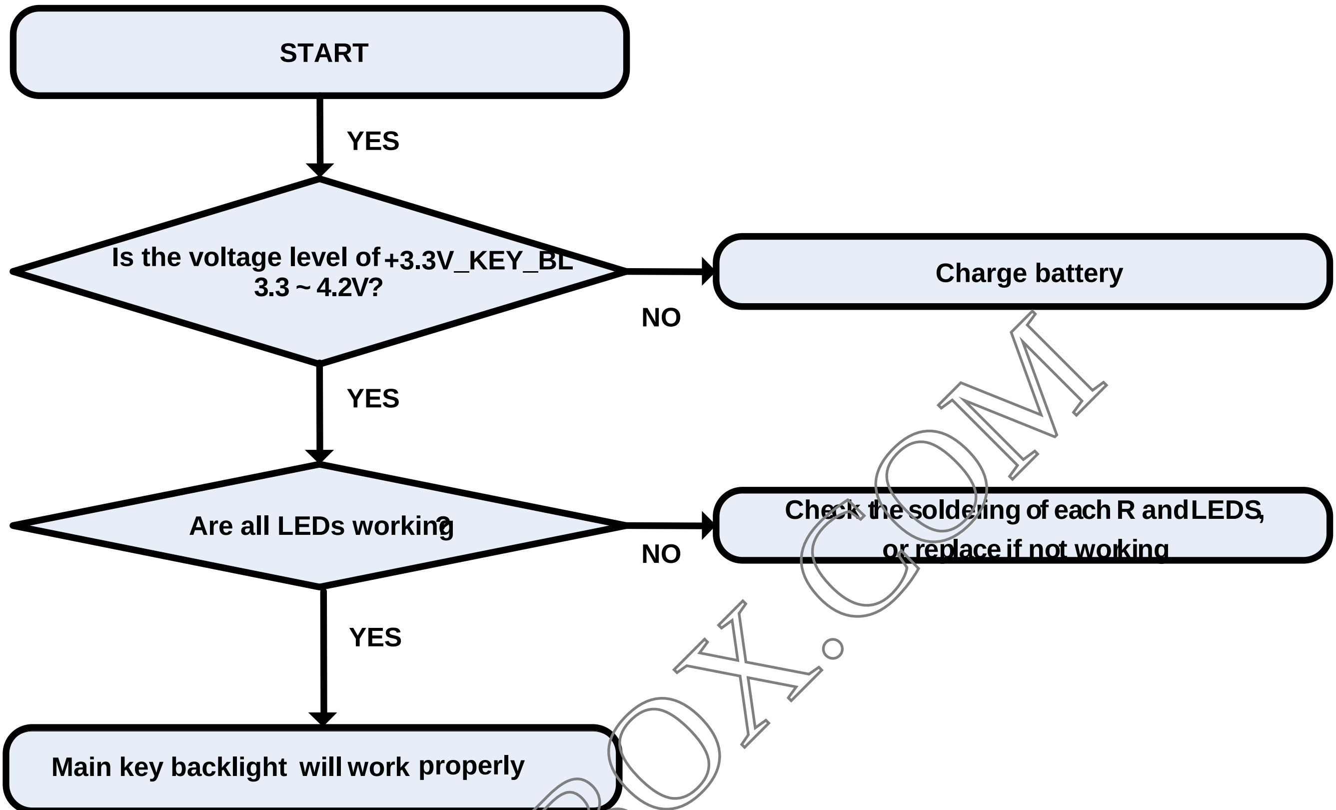
Circuit Diagram



Test point

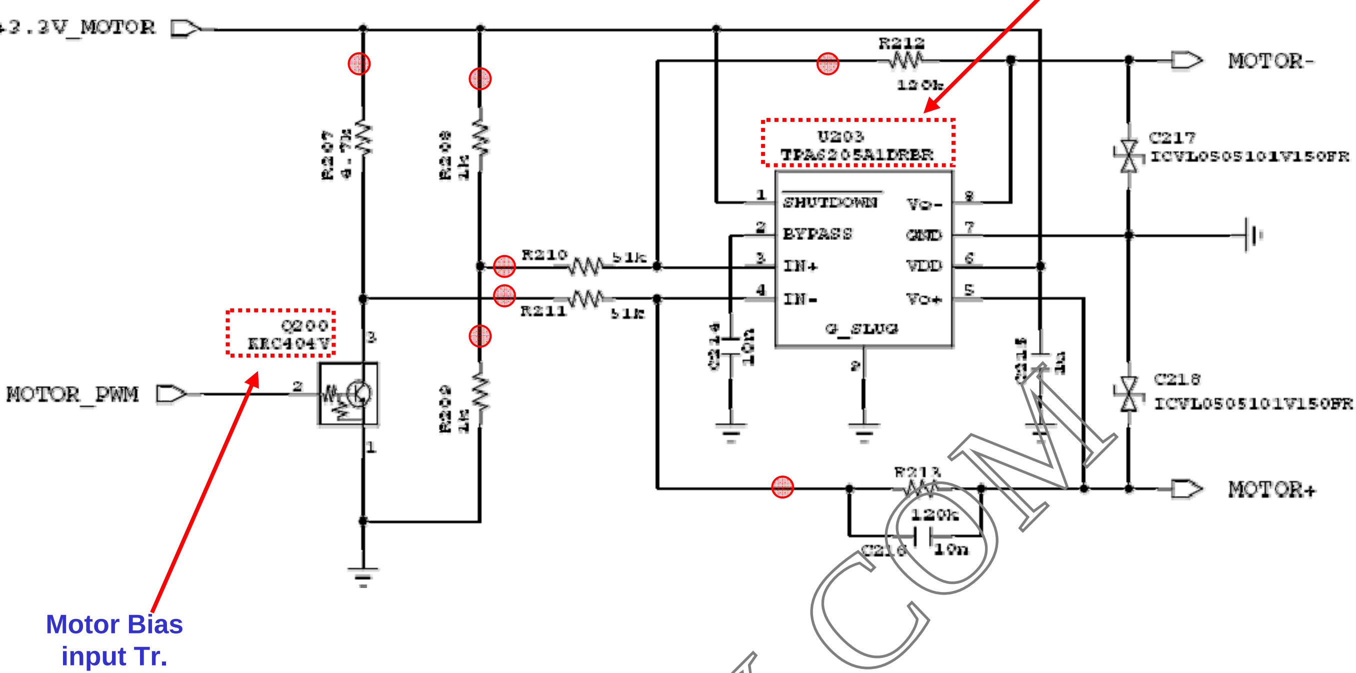


Checking Flow

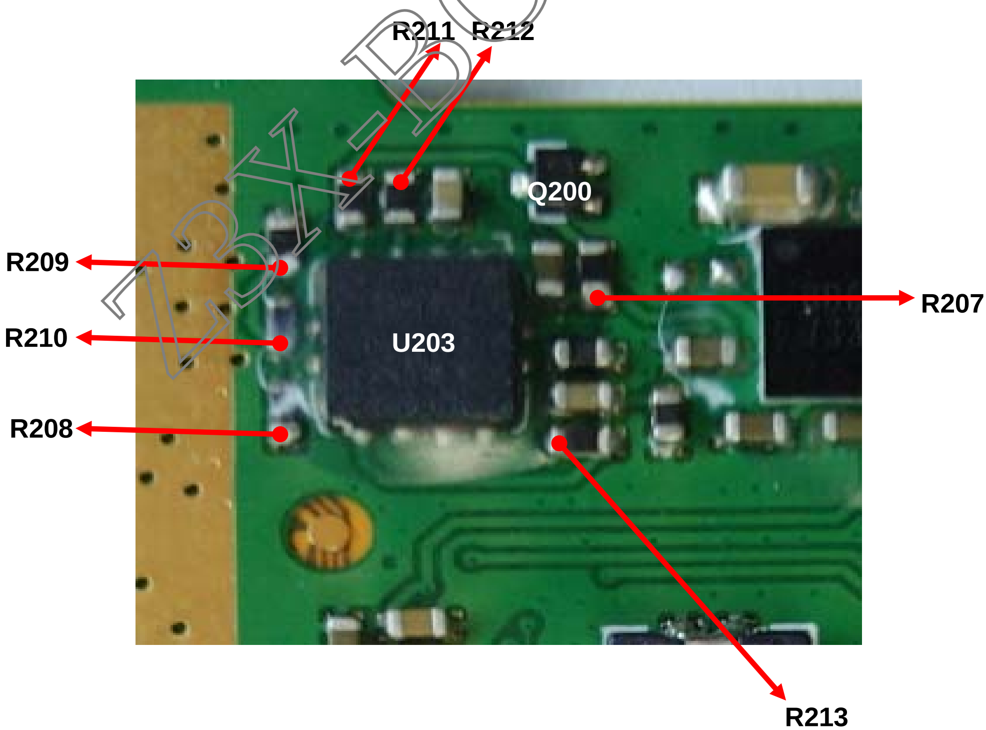


Vibrator

Circuit Diagram

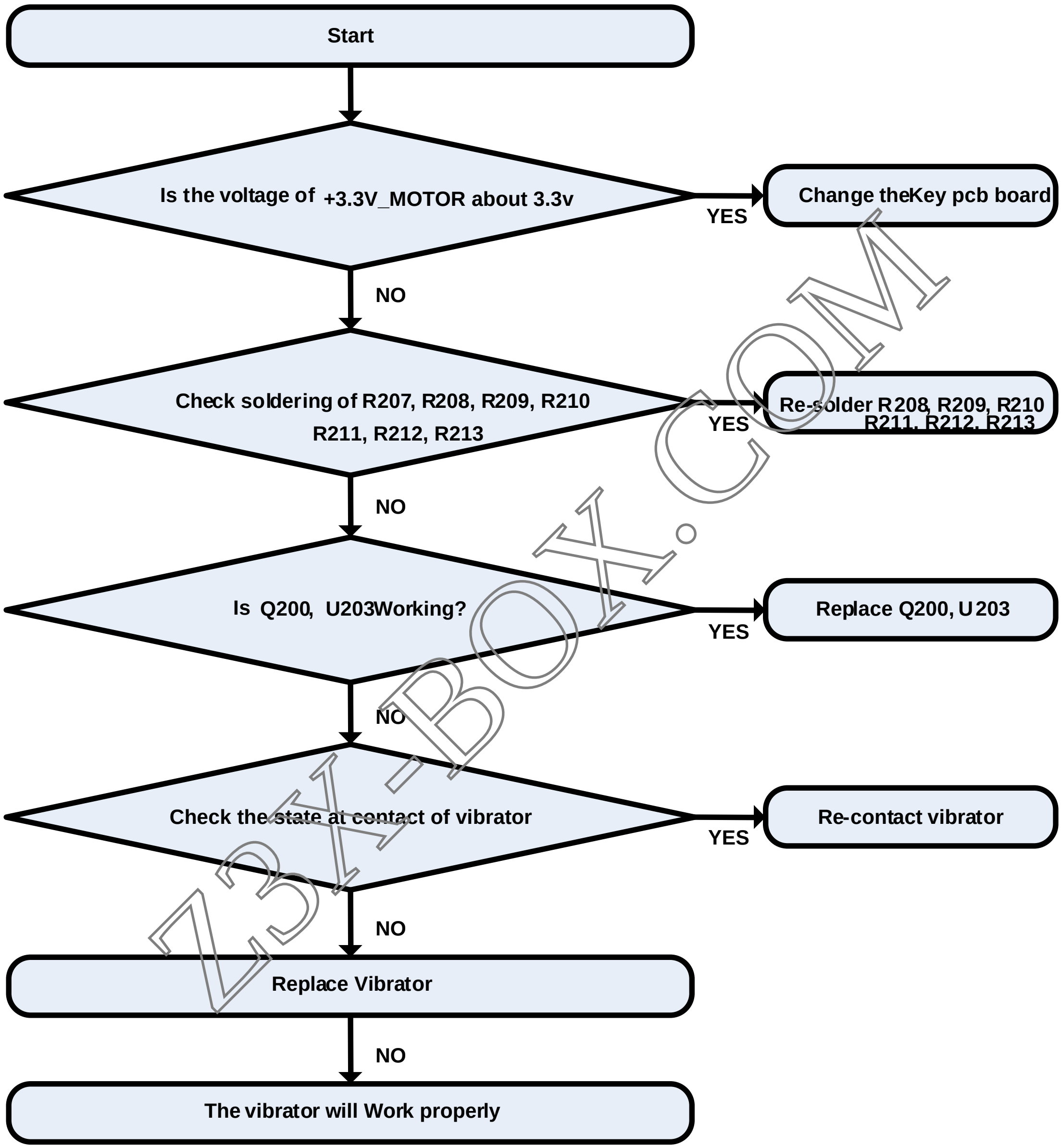


Test point



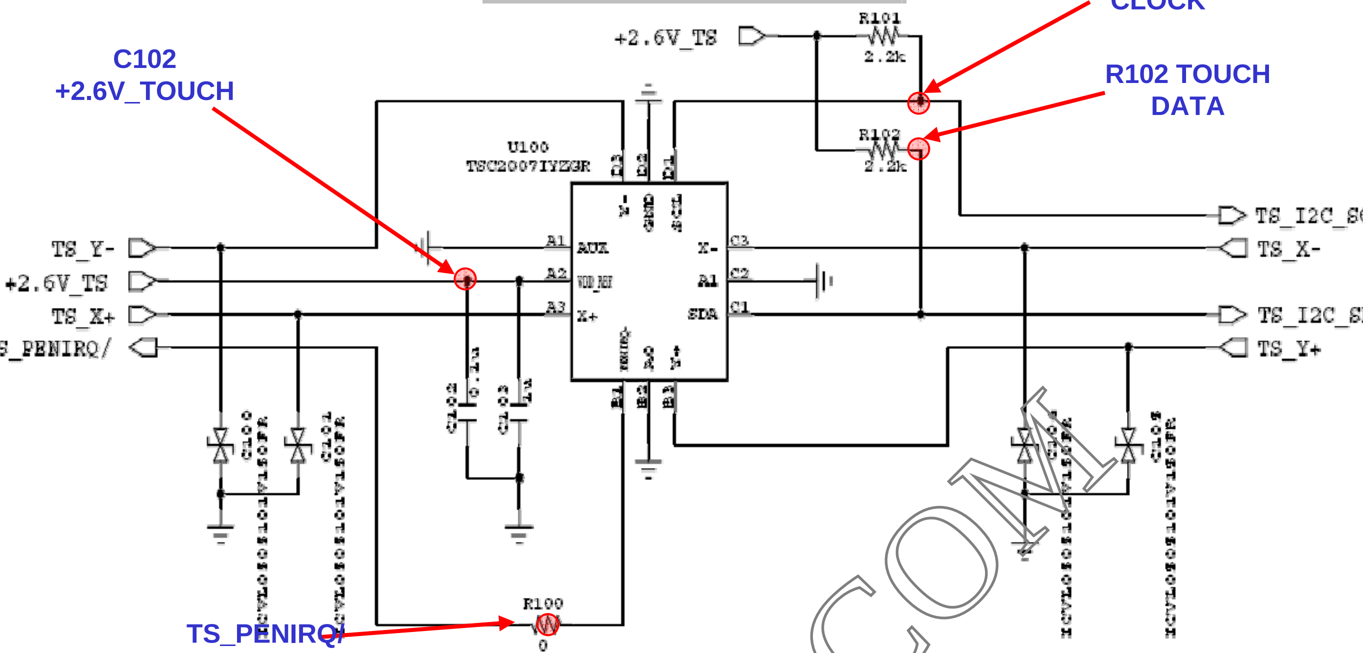
Checking Flow

➢ Setting: “ON” at the motor test of “test mode”

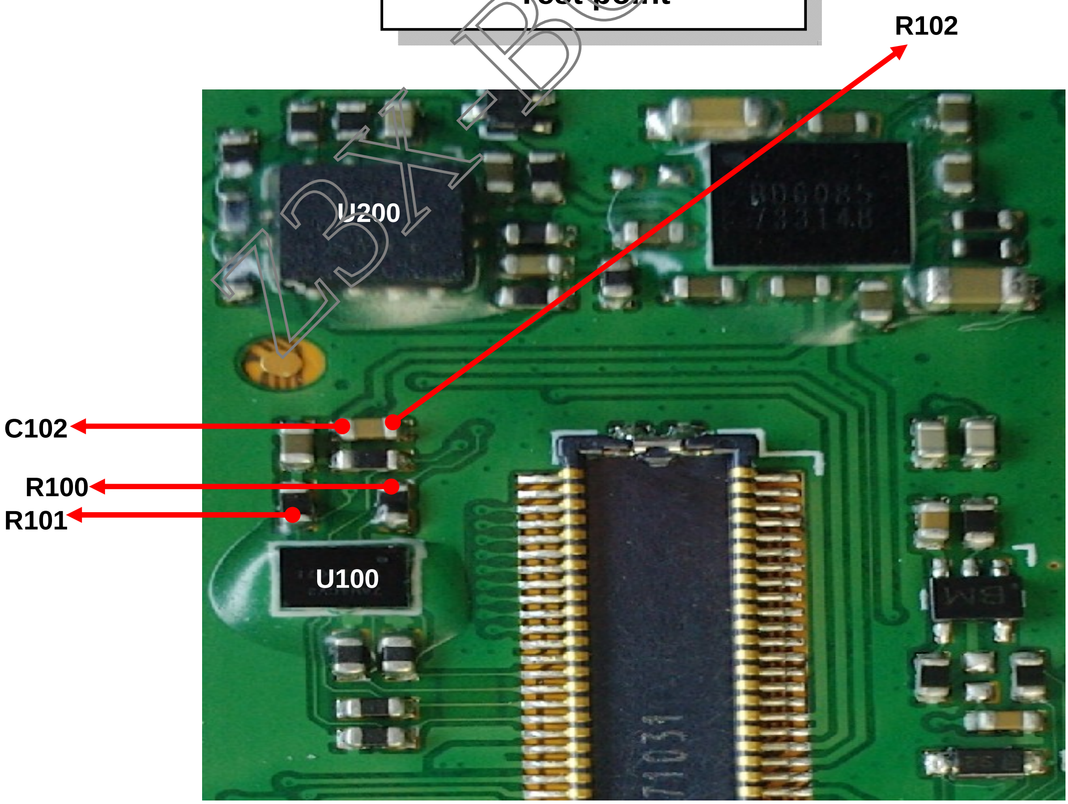


4.3.3 Touch window

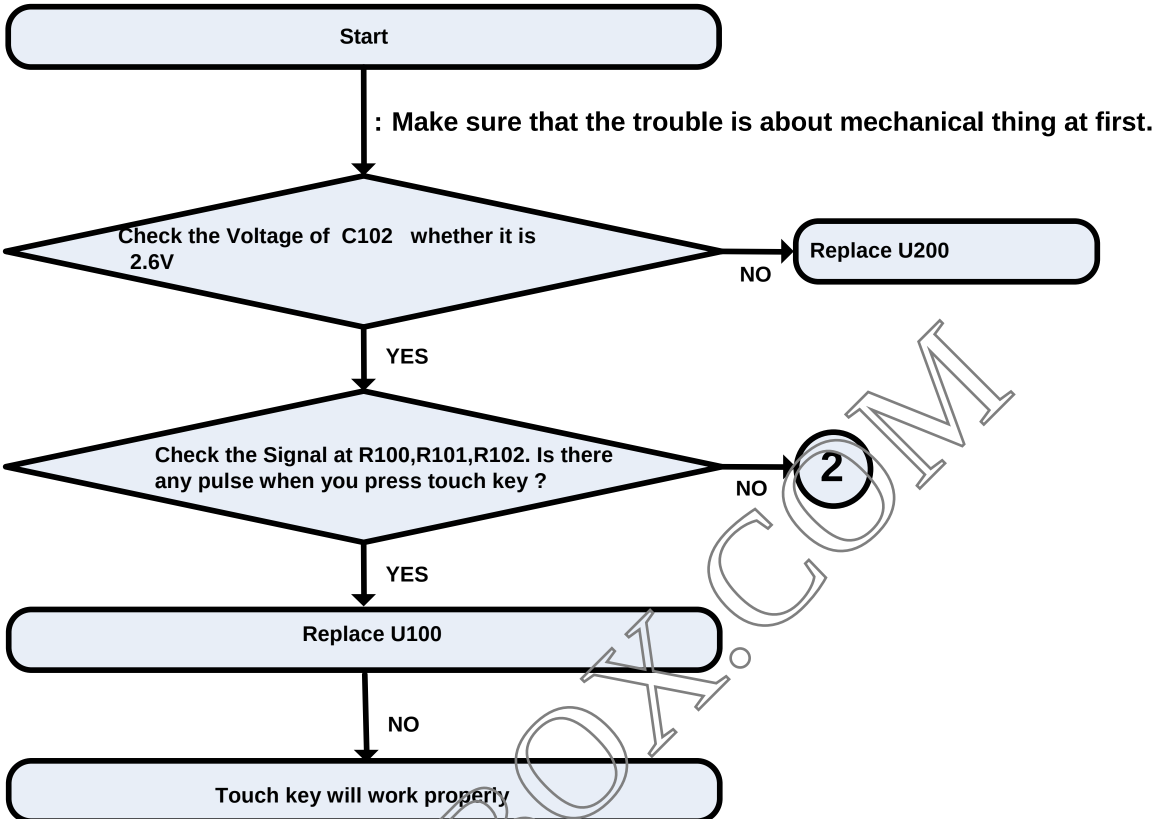
Circuit Diagram



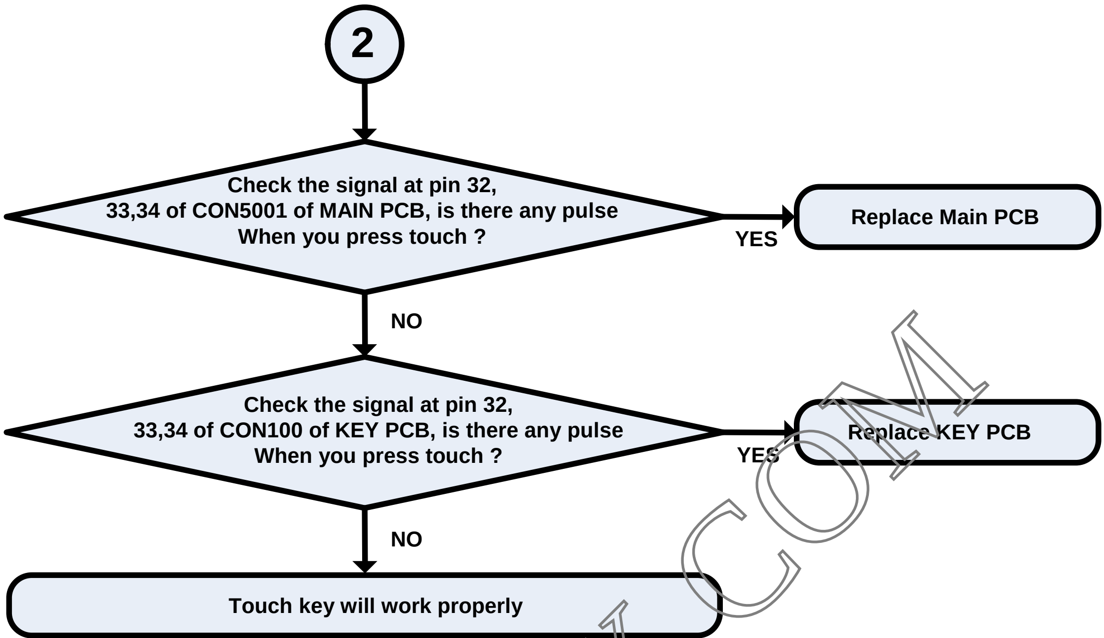
Test point



Checking Flow #1



Checking Flow #2



CHAPTER 5. Safety

▣ IMPORTANT

Read This Information Before Using Your Hand-Held Portable Cellular Telephone

First introduction in 1984, the hand-held portable Cellular telephone is one of the most exciting and innovative electronic products ever developed.

With it you can stay in contact with your office, your home, emergency service, and others. For the safe and efficient operation of your phone, observe these guidelines.

Your Cellular phone is a radio transmitter and receiver. When it is ON, it receives and also sends out radio frequency (RF) energy. The phone operates in the frequency range of 824 MHz to 894 MHz and employs commonly used frequency modulation (FM) techniques. When you use your phone, the Cellular system handling your calls controls the power level at which your phone transmits. The power level can range from 0.006 of a watt to .6 of a watt.

▣ Exposure to Radio Frequency Energy

In 1991 the Institute of Electrical and Electronics Engineers (IEEE), and in 1992 the American National Standards Institute (ANSI) updates the 1982 ANSI Standard for safety levels with respect to human exposure to RF energy. Over 120 scientists, engineers, and physicians from universities, government health agencies, and industry, after reviewing the available boy of research, developed this updated Standard. In March, 1993, the US Federal Communications Commission (FCC) proposed the adoption of this updated Standard.

The design of your phone complies with this updated Standard. Of course, if you want to limit RF exposure even further than the updated ANSI Standard, you may choose to control the duration of your calls and operation your phone in the most power efficient manner.

▣ Efficient Phone Operation

For your phone to operate at the lowest power level, consistent with satisfactory call quality, please observe the following guidelines:

If your phone has an extendable antenna, extend it fully. Some models allow you to place a call with the antenna retracted. However, your phone operates more efficiently with the antenna fully extended.

Hold the phone as you would any other telephone. While speaking directly into the mouthpiece, position the antenna up and over your shoulder.

Do not hold the antenna when the phone is “IN USE”. Holding the antenna affects call quality and may cause the phone to operated at a higher power level than needed.

▣ Antenna Care and Replacement

Do not use the phone with a damaged antenna. If a damaged antenna comes into contact with skin, a minor bum may result. Replace a damaged antenna immediately. Consult your manual to see if you may change your antenna yourself. If so, use only a manufacture approves antenna. Otherwise, take your phone to a qualifies service center for repair.

Use only the supplied or approved antenna. Non-approved antennas, modifications, or attachments, could impair call quality, damage the phone, and violate FCC regulations.

▣ Driving

Check the laws and regulations on the use of Cellular telephones in the areas where you drive. Always obey them. Also, when using your phone while driving, please:

Give full attention to the driving. Use hands-free operation, if available, and pull off the road and park before making or answering a call if driving conditions require.

▣ Electronic Devices

Most modem electronic equipment is shielded from RF energy. However, RF energy from Cellular telephones may affect inadequately shielded electronic equipment.

RF energy may effect improperly installed or inadequately shielded electronic operating and entertainment system in motor vehicles. Check with the manufacturer or its representative to determine if these systems are adequately shielded from external RF energy. You should check with the manufacturer of any equipment that has been added to your vehicle.

Consult the manufacturer of any personal medical devices (such as pacemakers, hearing aids, etc.) to determine if they are adequately shielded from external RF energy.

Turn your phone OFF in health care facilities. When any regulations posted in the areas instruct you to do so. Hospitals or health care facilities may be using equipment that could be sensitive to external RF energy.

▣ Aircraft

Turn your phone OFF before boarding any aircraft.

Use it on the ground only with crew permission. Do not use it in the air.

To prevent possible interference with aircraft systems, US Federal Aviation Administration (FAA) regulations require you to have permission from a crew member to use your phone while the plane is on the ground. Using your phone while the plane is in the air.

▣ Children

Do not allow children to play with your phone. It is not a toy. Children could hurt themselves or others (by poking themselves or others in the eye with the antenna, for example). Children also could damage the phone, or make calls that increase your telephone bills.

▣ Blasting Areas

To avoid interfering with blasting operations, turn you unit OFF when in a “blasting area” or in areas posted “Turn off two-way radio”. Construction crews often use remote control RF devices to set off explosives.

▣ Potentially Explosive Atmospheres

Turn your phone OFF when in any area with a potentially explosive atmosphere. It is rare, but your phone or accessories could generate sparks. Sparks in such area could cause an explosion or fire resulting in bodily injury or even death.

Areas with a potentially explosive atmosphere are often, but not always, clearly marked. They include fueling areas such as gas station; below deck on boats; fuel or chemical transfer or storage facilities; areas where the air contains chemical or particles, such as grain, dust, or metal powders; and any other area where you would normally be advised to turn off your vehicle engine.

Do not transport or store flammable gas, liquid, or explosives in the compartment of your vehicle which contains your phone or accessories.

Vehicles using liquefied petroleum gas (such as propane or butane) must compl7y with the National Fire Protection Standard (NFPA-58). For a copy of this standard, contact the National Fire Protection Association, One Battery march Park, Quincy, MA 02269, Attn: Publication Sales Division.

Rule of Thumb: Using common sense at all times when handling, installing or using the phone. Any questions should be directed to you nearest Service Center or authorized service technician or electrician.

CHAPTER 6. Glossary

General Terms

Abbreviated Alert. An abbreviated alert is used to remind the mobile station user that previously selected alternative routing features are still active.

AC. See Authentication Center.

Access Attempt. A sequence of one or more access probe sequences on the Access Channel containing the same message. See also Access Probe and Access Probe Sequence.

Access Channel. A Reserve CDMA Channel used by mobile stations for communicating to the base station. The Access Channel is used for short signaling message exchanges such as call origination's, responses to pages, and registrations. The Access Channel is a slotted random access channel.

Access Channel Message. The information part of an access probe consisting of the message body, length field, and CRC.

Access Channel Message Capsule. An Access Channel message plus the padding.

Access Channel Preamble. The preamble of an access probe consisting of a sequence of all-zero frames that is sent at the 4800bps rate.

Access Channel Request Message. An Access Channel message that is autonomously generated by the mobile station. See also Access Channel Response Message.

Access Channel Response Message. A message on the Access Channel generated to reply to a message received from the base station.

Access Channel Slot. The assigned time interval for an access probe. An Access Channel slot consists of an integer number of frames. The transmission of an access probe is performed within the boundaries of an Access Channel slot.

Access Probe. One Access Channel transmission consisting of a preamble and a message. The transmission is an integer number of frames in length and transmits one Access Channel message. See also Access Probe Sequence and Access Attempt.

Access Probe Sequence. A sequence of one or more access probes on the Access Channel. The same Access Channel message is transmitted in every access probe of an access attempt. See also Access Probe and Access Attempt.

Acknowledgement. A Layer 2 response by the mobile station or the base station confirming that a signaling message was received correctly.

Action Time. The time at which the action implied by a message should take effect.

Active Set. The set of pilots associated with the CDMA Channels containing Forward Traffic Channels assigned to a particular mobile station.

Aging. A mechanism through which the mobile station maintains in its Neighbor Set the pilots that have been recently sent to it from the base station and the pilots whose handoff drop timers have recently expired.

A-key. A secret, 64-bit pattern stored in the mobile station. It is used to generate update the mobile station's Shared Secret Data. The A-key is used in the mobile station authentication process.

Analog Access Channel. An analog control channel used by a mobile station to access a system to obtain service.

Analog Color-Code. An analog signal (see Supervisory Audio Tone) transmitted by a base station on an analog voice channel and used to detect capture of a mobile station by an interfering base station or the capture of a base station by an interfering mobile station.

Analog Control Channel. An analog channel used for the transmission of digital control information from a base station to a mobile station or from a mobile station to a base station.

Analog Paging Channel. A forward analog control channel that is used to page mobile stations and send orders.

Analog Voice Channel. An analog channel on which a voice conversation occurs and on which brief digital messages may be sent from a base station to a mobile station or from a mobile station to a base station.

Authentication. A procedure used by a base station to validate a mobile station's identity.

Authentication Center (AC). An entity that manages the authentication information related to the mobile station.

Authentication Response (AUTHR). An 18-bit output of the authentication algorithm. It is used, for example, to validate mobile station registrations, origination and terminations. A method of registration in which the mobile station registers without an explicit command from the base station.

AWGN. Additive White Gaussian Noise.

Bad Frames. Frames classified as erasures (frame category 10) or9600bps frames, primary traffic only with bit errors (frame category 9). See also Good Frames.

Base Station. A station in the Domestic Public Cellular Radio Telecommunications Service, other than a mobile station, used for communicating with mobile stations. Depending upon the context, the term base station may refer to a cell, a sector within a cell, an MSC, or other part of the Cellular system. See also MSC.

Base Station Authentication Response (AUTHBS). An 18-bit pattern generated by the authentication algorithm. AUTHBS is used to confirm the validity of base station orders to update the Shared Secret Data.

Base Station Random Variable (RANDBS). A 32-bit random number generated by the mobile station for authenticating base station orders to update the Shared Secret Data.

BCH Code. See Bose-Chaudhuri-Hocquenghem Code.

Busy-Idle Bits. The portion of the data stream transmitted by a base station on a forward analog control channel that is used to indicate the current busy-idle status of the corresponding reverse analog control channel.

Call Disconnect. The process that releases the resources handling a particular call. The disconnect process beings either when the mobile station user indicates the end of the call by generating an on-hook condition or other call release mechanism, or when the base station initiates a release.

Call History Parameter (COUNT). A modulo-64 event counter maintained by the mobile station and Authentication Center that us used for clone detection.

Candidate Set. The set of pilots that have been received with sufficient strength by the mobile station to be successfully demodulated, but have not been placed in the Active Set by the base station. See also Active Set. Neighbor Set, and Remaining Set.

. See Code Division Multiple Access

CDMA Channel. The set of channels transmitted between the base station within a given CDMA frequency assignment. See also Forward CDMA Channel and Reverse CDMA Channel.

CDMA Channel Number. An 11-bit number corresponding to the center of the CDMA frequency assignment.

CDMA Frequency Assignment. A 1.23MHz segment of spectrum centered on one of the 30KHz channels of the existing analog system.

Code Channel. A subchannel of a Forward CDMA Channels. A Forward CDMA Channel contains 64 code channels. Code channel zero is assigned to the Pilot Channel. Code channels 1 through 7 may be assigned to the either Paging Channels or the Traffic Channels. Code Channel 32 may be assigned to either a Sync Channel or a Traffic Channel. The remaining code channels may be assigned to Traffic Channels.

Code Division Multiple Access (CDMA). A technique for spread-spectrum multiple-access digital communications that creates channels through the use of unique code sequences.

Code Symbol. The output of an error-correcting encoder. Information bits are input to the encoder and code symbols are output from the encoder. See Convolutional Code.

Continuous Transmission. A mode of operation in which Discontinuous Transmission is not permitted.

Control Mobile Attenuation Code (CMAC). A 3-bit field in the Control-Filler Message that specifies the maximum authorized power level for a mobile transmitting on an analog reverse control channels.

Convolution Code. A type of error-correcting code. A code symbol can be considered as the convolution of the input data sequence with the impulse response of a generator function.

CRC. See Cyclic Redundancy Code.

Cyclic Redundancy Code (CRC). A class of linear error detecting codes which generate parity check bits by finding the remainder of a polynomial division.

Data Burst Randomizer. The function that determines which power control groups within a frame are transmitted on the Reverse Traffic Channel when the data rate is lower than 9600 bps. The data burst randomizer determines, for each mobile station, the pseudo random position of the transmitted power control groups in the frame while guaranteeing that every modulation symbol is transmitted exactly once.

DBc. The ratio (in dB) of the sideband power of a signal, measured in a given bandwidth at a given frequency offset from the center frequency of the same signal, to the total inband power of the signal. For CDMA, the total inband power of the signal is measured in a 1.23MHz bandwidth around the center frequency of the CDMA signal.

DBm. A measure of power expressed in terms of its ration (in dB) to one milliwatt.

DBm/Hz. A measure of power spectral density. DBm/Hz is the power in one Hertz of bandwidth. Where power is expressed in units of dBm.

DBW. A measure of power expressed in terns of its ration (in dB) to one Watt.

Dedicated Control Channel. An analog control channel used for the transmission of digital control information from either a base station or a mobile station.

Deinterleaving. The process of unpermuting the symbols that were permuted by the interleaver.. Deinterleaving is performed on received symbols prior to decoding.

Digital Color Code (DCC). A digital signal transmitted by a base station on a forward analog control channel that is used to detect capture of a base station by an interfering mobile station.

Dim-and-Burst. A frame in which primary traffic is multiplexed with either secondary traffic or signaling traffic.

Discontinuous Transmission (DTX). A mode of operation in which a mobile station transmitter autonomously switches between two transmitter power levels while the mobile station is in the conversation state on an analog voice channel.

Distance-Based Registration. An autonomous registration method in which the mobile station registers whenever it enters a cell whose distance from the cell in which the mobile station last registered exceeds a given threshold.

DTMF. See Dual Tone Multifrequency.

Dual-Tone Multifrequency (DTMF). Signaling by the simultaneous transmission of two tones, one from a group of low frequencies and another from a group of high frequencies. Each group of frequencies consists of four frequencies.

Eb. The energy of an information bit.

Ec/I0. The ratio in (dB) between the pilot energy accumulated over one PN chip period (Ec) to the power spectral density in the received bandwidth (Io).

Effective Radiated Power (ERP). The transmitted power multiplied by the antenna gain referenced to a half wave dipole.

Electronic Serial Number (ESN). A 32-bit number assigned by the mobile station manufacturer, uniquely identifying the mobile station equipment.

Encoder Tail Bits. A fixed sequence of bits added to the end of a block of data to reset the convolutional encoder to a known state.

ERP. See Effective Radiated Power.

ESN. See Electronic Serial Number.

Extended Protocol. An optional expansion of the signaling message between the base station and mobile station to allow for the addition of new system features and operational capabilities.

Fade Timer. A timer kept by the mobile station as a measure of Forward Traffic Channel continuity. If the Fade timer expires, the mobile station drops the call.

Flash. An indication sent on an analog voice channel or CDMA Traffic Channel indicating that the user Directed the mobile station to invoke special processing.

Foreign NID Roamer. A mobile station operating in the same system (SID) but a different network (NID)Form the one in which service was subscribed. See also Foreign SID Roamer and Roamer.

Foreign SID Roamer. A mobile station operating in a system (SID) other than the one from which service was subscribed. See also Foreign NID Roamer and Roamer.

Forward Analog Control Channel (FOCC). An analog voice channel used from a base station to a mobile station.

Forward Analog Voice Channel (FVC). An analog voice channel used from a base station to a mobile station.

Forward CDMA Channel. A CDMA Channel form a base station to mobile stations. The Forward CDMA Channel contains one or more code channels that are transmitted on a CDMA frequency assignment using a Particular pilot PN offset. The code channels are associated with the Pilot Channel, Sync Channel, Paging Channels, and Traffic Channels. The Forward CDMA Channel always carries a Pilot Channel and may carry up to one Sync Channel, up to seven Paging Channels, and up to 63 Traffic Channels, as long as the total number of channels, including the Pilot Channel, is no greater than 64.

Forward Traffic Channel. A code channel used to transport user and signaling traffic from the base station to the mobile station.

A basic timing interval in the system. For the Access Channel, Paging Channel, and Traffic Channel, a frame is 20 ms long. For the Sync Channel, a frame is 26.666…ms long.

Frame Category. A classification of a received Traffic Channel frame based upon transmission data rate, the Frame contents (primary traffic, secondary traffic, or signaling traffic), and whether there are detected error in the frame.

Frame Offset. A time skewing of Traffic Channel frames from System Time in integer multiples of 1.25 ms. The maximum frame offset is 18..75 ms..

Frame Quality Indicator. The CRC check applied to 9600 bps and 4800 bps Traffic Channel frames.

Global Positioning System (GPS). A US government satellite system that provides location and time Information to users. See Navstar GPS Space segment / Navigation User interfaces ICD-GPS-200 for Specifications.

Half Frame. A 10 ms interval on the paging Channel. Two half frames comprise a frame, the first half frame begins at the same time as the frame.

Handoff. The of transferring communication with a station mobile station from one base station to another.

Hard Handoff. A handoff characterized by a temporary disconnection of the Traffic Channel. Hard handoffs Occur when the mobile station is transferred between disjoint Active Sets, the CDMA frequency assignment changes, the frame offset changes, or the mobile station is directed from a CDMA Traffic Channel to an analog voice channel, See also Soft Handoff.

Hash Function. A function used by the mobile station to select one out of N available resource. The hash function distributes the available resources uniformly among a random sample of mobile stations.

HLR. See Home Location Register.

Home Location Register (HLR). The location register to which a MIN is assigned for record purposes such as subscriber information.

Home System. The Cellular system in which the mobile station subscribes for service.

Idle Handoff. The act of transferring reception of the Paging Channel from one bass station to another, when the mobile station is in the ***Mobile Station Idle State.***

Implicit Registration. A registration achieved by a successful transmission of an origination or page response on the Access Channel.

Interleaving. The process of permuting a sequence of symbols.

kHz. Kilohertz (103 Hertz).

ksps. Kilo-symbols per second (103 symbols per second).

Layer 1. See Physical Layer.

Layer 2. Layer 2 provides for the correct transmission and reception of signaling messages, including partial duplicate detection. See also Layering and Layer 3.

Layer 3. Layer 3 provides the control of the Cellular telephone systems. Signaling messages originate and terminate at layer 3. See also Layering and Layer 2.

Local Control. An optional mobile station feature used to perform manufacturer-specific functions.

A PN sequence with period 242-1 that is used for scrambling on the Forward CDMA Channel and spreading on the Reverse CDMA Channel. The long code uniquely identifies a mobile station on both the Reverse Traffic Channel and the Forward Traffic Channel. The long code provides limited privacy. The long code also separates multiple Access Channels on the same CDMA channel. See also Public Long Code and Private Long Code.

Long Code Mask. A 42-bit binary number that creates the unique identity of the long code. See also Public Long Code, Private Long Code, Public Long Code Mask, and Private Long Code Mask.

LSB. Least significant bit.

Maximal Length Sequence (m-Sequence). A binary sequence of period 2n-1, n a positive integer, with no internal periodicities. A maximal length sequence can be generated by a tapped n-bit shift register with linear feedback.

Mcps. Megachips per second (106 chips per second).

Mean Input Power. The total received calorimetric power measured in a specified bandwidth at the antenna connector, including all internal and external signal and noise sources.

Mean Output Power. The total transmitted calorimetric power measured in a specified bandwidth at the antenna connector when the transmitter is active.

Message. A data structure that conveys control information or application information. A message consists of a length field (MSG_LENGTH), a message body (the part conveying the information), and a CRC.

Message Body. The part of the message contained between the length field (MSG_LENGTH) and the CRC field.

Message Capsule. A sequence of bits comprising a single message and padding. The padding always follows the message and may be of zero length.

Message CRC. The CRC associated with a message. See also Cyclic Redundancy Check.

Message Field. A basic named element in a message. A message field may consist of zero or more bits.

Message Record. An entry in a message consisting of one or more field that repeats in the message.

MHz. Megahertz.(106 Hertz)

MIN. See Mobile Station Identification Number.

Mobile Protocol Capability Indicator (MPCI). A 2-bit field used to indicate 속 mobile station's capabilities.

Mobile Station. A station in the Domestic Public Cellular Radio Telecommunications Service intended to be used while in motion or during halts at unspecified points. Mobile station include portable units (e.g., handheld personal units) and units installed in vehicles.

Mobile Station Class. Mobile station classes define mobile station characteristics such as slotted operation and transmission power.

Mobile Station Identification Number (MIN). The 34-bit number that is a digital representation of the 10-digit directory telephone number assigned to a mobile station.

Mobile Station Originated Call. A call originating from a mobile station.

Mobile Station Terminated Call. A call received by a mobile station (not to be confused with a disconnect or call release).

Mobile Switching Center (MSC). A configuration of equipment that provides Cellular radiotelephone service. Also called the Mobile Telephone Switching Office (MTSO)

Modulation Symbol. The output of the data modulator before spreading. On the Reverse Traffic Channel, 64-ary orthogonal modulation is used and six code symbol (when the data rate is 9600bps) or each repeated code symbol (when the data rate is less than 9600bps) is one modulation symbol.

Ms. Millisecond.

MSB. Most significant bit.

MSC. See Mobile Switching Center.

Multiplex Option. The ability of the multiplex sublayer and lower layer to be tailored to provide special capabilities. A multiplex option defines such characteristics as the frame format and the rate decision rules. See also Multiplex Sublayer.

Multiplex Sublayer. One of the conceptual layers of the system that multiplexes and demultiplexes primary traffic, secondary traffic, and signaling traffic.

NAM. See Number Assignment Module.

Narrow Analog. A type of voice channel that uses 10kHz channel spacing and subaudible signaling.

Neighbor Set. The set of pilots associated with the CDMA Channel that are probable candidates for handoff. Normally, the Neighbor Set consists of the pilots associated with CDMA Channel that cover geographical areas near the mobile station. See also Active Set, Candidate Set, and Remaining Set.

A network is a subset of a Cellular system, such as an area-wide Cellular network, a private group of base stations, or a group of base stations set up to handle a special requirement. A network can be as small or as large as needed, as long as it is fully contained within a system. See also System.

Network Identification (NID). A number that uniquely identifies a network within a Cellular system. See also System Identification.

NID. See Network Identification.

Non-Autonomous Registration. A registration method in which the base station initiates registration. See also Autonomous Registration.

Non-Slotted Mode. An operation mode of the mobile station in which the mobile station continuously monitors the Paging Channel when in the Mobile Station Idle State.

Ns. Nanosecond.

NULL. Not having any value.

Null Traffic Channel Data. One or more frames of 16 ‘1’s followed by eight ‘0’s sent at the 1200bps rate. Null Traffic Channel data is sent when no service option is active and no signaling message is being sent. Null Traffic Channel data serves to maintain the connectivity between the mobile station and the base station.

Number Assignment Module (NAM). A set of MIN-related parameters stored in the mobile station.

Numeric Information. Numeric information consists of parameters that appear as numeric fields in message exchanged by the base station and the mobile station and information used to describe the operation of the mobile station.

OLC. See Overload Class (CDMA) or Overload Control (analog).

Optional Field. A field defined within a message structure that is optionally to the message recipient.

Order. A type of message that contains control codes for either the mobile station or the base station.

Ordered Registration. A registration method in which the base station orders the mobile station to send registration related parameters.

Overhead Message. A message sent by the base station on the Paging Channel to communicate base-station-specific and system-wide information to mobile station.

Overload Class. The means used to control system access by mobile stations, typically in emergency or other overload conditions. Mobile station are assigned one (or more) of sixteen overload classed, Access to the CDMA system can then be controlled on a per class basis by persistence values transmitted by the base station.

Overload Control (OLC). A means reverse analog control channel accesses by mobile stations. Mobile station are assigned one(or more) of sixteen control levels. Access is selectively restricted by a base station setting one or more OLC bits in the Overload Control Global Action Message.

Packet. The unit of information exchanged between the service option applications of the base station and the mobile station.

Padding. A sequence of bits used to fill from the end of a message to the end of a message capsule, typically to the end of the frame or half frame. All bits in the padding are '0'.

Paging. The act of seeking a mobile station when a call has been placed to that mobile station.

Paging Channel (Analog). See Analog Paging Channel.

Paging Channel (CDMA). A code channel in a Forward CDMA Channel used for transmission of control information and pages from a base station to a mobile station.

Paging Channel Slot. An 80ms interval on the Paging Channel. Mobile station operating in the slotted mode are assigned specific slots in which day monitor messages from the base station.

Parameter-Change Registration. A registration method in which the mobile station registers when certain of its stored parameters change.

Parity Check Bits. Bits added to a sequence of information bits to provide error detection, correction, or both.

Persistence. A probability measure used by the mobile station to determine if it should transmit in a given Access Channel Slot.

Physical Layer. The part of the communication protocol between the mobile station and the base station that is responsible for the transmission and reception of data. The physical layer in the transmitting station is presented a frame by the multiplex sublayer and transforms it into an over-the-air waveform. The physical layer in the receiving station transforms the waveform back into a frame and presents it to the multiplex sublayer above it.

Pilot Channel. An unmodulated, direct-sequence spread spectrum signal transmitted continuously by each CDMA base station. The Pilot Channel allows a mobile station to acquire the timing of the Forward CDMA Channel, provides a phase reference for coherent demodulation, and provides a means for signal strength comparisons between base station for determining when to handoff.

Pilot PN Sequence. A pair of modified maximal length PN sequences with period 215 used to spread the Forward CDMA Channel and the Reserve CDMA Channel. Different base station are identified by different pilot PN sequence offsets.

Pilot PN Sequence Offset Index. The PN offset in units of 64 PN chips of a pilot, relative to the zero offset pilot PN sequence.

PN Chip. One bit in the PN sequence.

PN Sequence. Pseudonoise sequence. A periodic binary sequence.

Power Control Bit. A bit sent in every 1.25ms interval on the Forward Traffic Channel to signal the mobile station to increase or decrease its transmit power.

Power Control Group. A 1.25ms interval on the Forward Traffic Channel and the Reverse Traffic Channel. See also Power Control Bit.

Power-Down Registration. Au autonomous registration method in which the mobile station registers on power up.

PPM. Parts per million.

Preamble. See Access Channel Preamble and Traffic Channel Preamble.

Primary CDMA Channel. A CDMA Channel at a pre-assigned frequency assignment used by the mobile station for initial acquisition. See also Secondary CDMA Channel.

Primary Paging Channel (CDMA). The default code channel (code channel 1) assigned for paging on a CDMA Channel.

Primary Traffic. The main traffic stream carried between the mobile station and the base station, supporting the active primary service option, on the Traffic Channel. See also Secondary Traffic, Signaling Traffic, and Servic3e Option.

Private Long Code. The long code characterized by the private long code mask. See also Long Code.

Private Long Code Mask. The long code mask used to form the private long code. See also Public Long Code Mask and Long Code.

Public Long Code. The long code characterized by the public long code mask.

Public Long Code Mask. The long code mask used to form the private long code. The mask contains the ESN of the mobile station. See also Private Long Code Mask and Long Code.

Punctured Code. An error-correcting code generated from another error-correcting code by deleting (i.e., puncturing) code symbols from the code output.

Quick Repeats. Additional transmissions of identical copies of a message within a short interval to increase the probability that the message is received correctly.

Receive Objective Loudness Rating (ROLR). A perceptually weighted transducer gain of telephone receivers relating electrical excitation from a reference generator to sound pressure at the earphone. The receive objective loudness tating is normally specified in dB relative to one Pascal per millivolt. See IEEE Standard 269-1992, IEEE Standard 661-1979, CCITT Recommendation P.76, and CCITT Recommendation P.79.

Registration. The process by which a mobile station identifies its location and parameters to a base station.

Registration Zone. A collection of one or more base stations treated as a unit when determining whether a mobile station should perform zone-based registration.

Release. A process that the mobile station and base station use to inform each other of call disconnect.

The set of all allowable pilot offsets as determined by PILOT_INC, excluding the pilot offsets of the pilots in the Active Set, Candidate Set, and Neighbor Set. See also Active Set, Candidate Set, and Neighbor Set.

Request. A layer 3 message generated by either the mobile station or the base station to retrieve information, ask for service, or command an action.

Response. A layer 3 message generated as a result of another message, typically a request.

Reverse Analog Control (RECC). The analog control channel used from a mobile station to a base station.

Reverse Analog Voice Channel (RVC). The analog voice channel used from a mobile station to a base station.

Reverse CDMA Channel. The CDMA Channel from the mobile station to the base station. From the base station's perspective, the Reverse CDMA Channel is the sum of all mobile station transmissions on a CDMA frequency assignment.

Reverse Traffic Channel. A Reverse CDMA Channel used to transport user and signaling traffic from a single mobile station to one or more base stations.

Roamer. A mobile station operating in a Cellular system (or network) other than the one from which service was subscribed. See also Foreign NID Roamer and Foreign SID Roamer.

ROLR. See Receive Objective Loudness Rating.

SAT. See Supervisory Audio Tone.

Scan of Channels. The procedure by which a mobile station examines the signal strength of each forward analog control channel.

SCI. Synchronized Capsule Indicator bit.

Search Window. The range of PN sequence offsets that a mobile station searches for a pilot.

Secondary CDMA Channel. A CDMA Channel at a preassigned frequency assignment used by the mobile station for initial acquisition. See also Primary CDMA Channel.

Secondary Traffic. An additional traffic stream that can be carried between the mobile station and the base station on the Traffic Channel. See also Primary Traffic and Signaling Traffic.

Seizure Precursor. The initial digital sequence transmitted by a mobile station to a base station on a reverse analog control channel.

Seizure Option. A service capability of the system. Service options may be applications such as voice, data, or facsimile.

Shard Secret Data (SSD). A 128-bit pattern stored in the mobile station (in semi-permanent memory) and known by the base station. SSD is a concatenation of two 64-bit subsets: SSD_A, which is used to support the authentication procedures and SSD_B, which serves as one of the inputs to the process generating the encryption mask and private long code.

Short Message Services (SMS). A suite of services which include SMS Text Delivery, Digital Paging (i.e., Call Back Number – CBN), and Voice Mail Notification (VMN).

SID. See System Identification.

Signaling Tone. A 10kHz tone transmitted by a mobile station on an analog voice channel to: 1) confirm orders, 2)signal flash requests, and 3) signal release requests.

Signal Traffic. Control message that are carried between the mobile station and base station on the Traffic Channel. See also Primary Traffic and Secondary Traffic.

Slot Cycle. A periodic interval at which a mobile station operating in the slotted monitors the Paging Channel.

Slotted Mode. An operation mode of the mobile station in which the mobile station monitors only selected slots on the Paging Channel when in the Mobile Station Idle State.

Soft Handoff. A handoff occurring while the mobile station is in the Mobile Station Control on the Traffic Channel State. This handoff is characterized by commencing communications with a new base station on the same CDMA frequency assignment before terminating communications with the old base station. See also Hard Handoff.

SOM. Start-of-Message Bit.

SPS. Symbols per second.

- An identification of certain characteristics of a mobile station. Classes are defined in Table 2.3.3-1.

Status Information. The following status information is used to describe mobile station operation when using the analog system.

■Serving-System Status. Indicates whether a mobile station is turned to channels associated with System A or System B.

■ First Registration ID Status. A status variable used by the mobile station in association with its processing of received Registration ID messages.

■ First Location Area ID Status. A status variable used by the mobile station in association with its processing of received Location Area ID messages.

■ Location Registration ID Status. A status variable used by the mobile station in association with its processing of power-up registration and location-based registration.

■ First Idle ID Status. A status variable used by the mobile station in association with its processing of the Idle Task.

■ Local Control Status. Indicates whether a mobile station must respond to local control messages.

■ Roam Status. Indicates whether a mobile station is in its home system.

■ Termination Status. Indicates whether a mobile station must terminate the call when it is on an analog voice channel.

Supervisory Audio Tone (SAT). One of three tones in the 6 kHz region that is transmitted on the forward analog voice channel by a base station and transponder on the reverse analog voice channel by as mobile station.

Supplementary Digital Color Code (SDCC1, SDCC2). Additional bits assigned to increase the number of color codes from four to sixty four, transmitted on the forward analog control channel.

Symbol. See Code Symbol and Modulation Symbol.

Sync Channel. Code channel 32 in the Forward CDMA Channel which transports the synchronization message to the mobile station.

Sync Channel Superframe. An 80ms interval consisting of three Sync Channel frames (each 26.666…ms in length).

System. A system is a Cellular telephone service that covers a geographic area such as a city. Metropolitan region, country, or group of countries. See also Network.

System Time. The time reference used by the system. System Time is synchronous to UTC time (except for leap seconds) and used the same time origin as GPS time. Offset by the propagation delay from the base station to the mobile station. See also Universal coordinated Time.

Timer-Based Registration. A registration method in which the mobile station registers whenever a counter reaches a predetermined value. The counter is incremented an average of once per 80 ms period.

Time Reference. A reference established by the mobile station that is synchronous with the earliest arriving multipath component used for demodulation.

TOLR. See Transmit Objective Loudness Rating.

Traffic Channel. A communication path between a mobile station and base station used for user and signaling traffic. The term Traffic Channel implies a Forward Traffic Channel and Reverse Traffic Channel pair. See also Forward Traffic Channel and Reverse Traffic Channel.

Traffic Channel Preamble. A sequence of all-zero frames that is sent at the 9600 bps rate by the mobile station on the Reverse Traffic Channel. The Traffic Channel preamble is sent during initialization of the Traffic Channel.

Transmit Objective Loudness Rating (TOLR). A perceptually weighted transducer gain of telephone transmitters relation sound pressure at the microphone to voltage at a reference electrical termination. It is normally specified in dB relative to one millivolt per Pascal. See IEEE Standard 269-1992, IEEE Standard 661-1979, CCITT Recommendation P.76 , and CCITT Recommendation. P.79

Unique Challenge-Response Procedure. An exchange of information between a mobile station and a base station for the purpose of confirming the mobile station's identity. The procedure is initiated by the base station and is characterized by the use of a challenge-specific random number (i.e., RANDU) instead of the random variable broadcast globally (RAND).

Unique Random Variable (RANDU). A 24-bit random number generated by the base station in support of the Unique Challenge-Response procedure.

Universal Coordinated Time (UTC). An internationally agreed-upon time scale maintained by the Bureau International de l'Heure (BIH) used as the time reference by nearly all commonly available time and frequency distribution systems i.e., WWW, WWVH, LORAN-C, Transit, Omega, and GPS.

UTC. Universal Temps Coordine. See Universal Coordinated Time.

Voice Channel. See Analog Voice Channel.

Voice Mobile Attenuation Code (VMAC). A 3-bit field in the Extended Address Word commanding the initial mobile power level when assigning a mobile station to an analog voice channel.

Voice Privacy. The process by which user voice transmitted over a CDMA Traffic Channel is a afforded a modest degree of protection against eavesdropping over the air.

Walsh Chip. The shortest identifiable component of a Walsh function. There are 2N Walsh chips in one Walsh function where N is the order of the Walsh function. On the Forward CDMA channel one Walsh chip equals 1/1.2288MHz, or 813.802…ns. On the Reverse CDMA Channel, one Walsh chip equals 4/1.2288MHz, or 3.255…μs.

Walsh Function. One of 2N time orthogonal binary functions (note that the functions are orthogonal after mapping '0' to 1 and '1' to –1).

Zone-Based Registration. An autonomous registration method in which the mobile station registers whenever it enters a zone that is not in the mobile station's zone list.

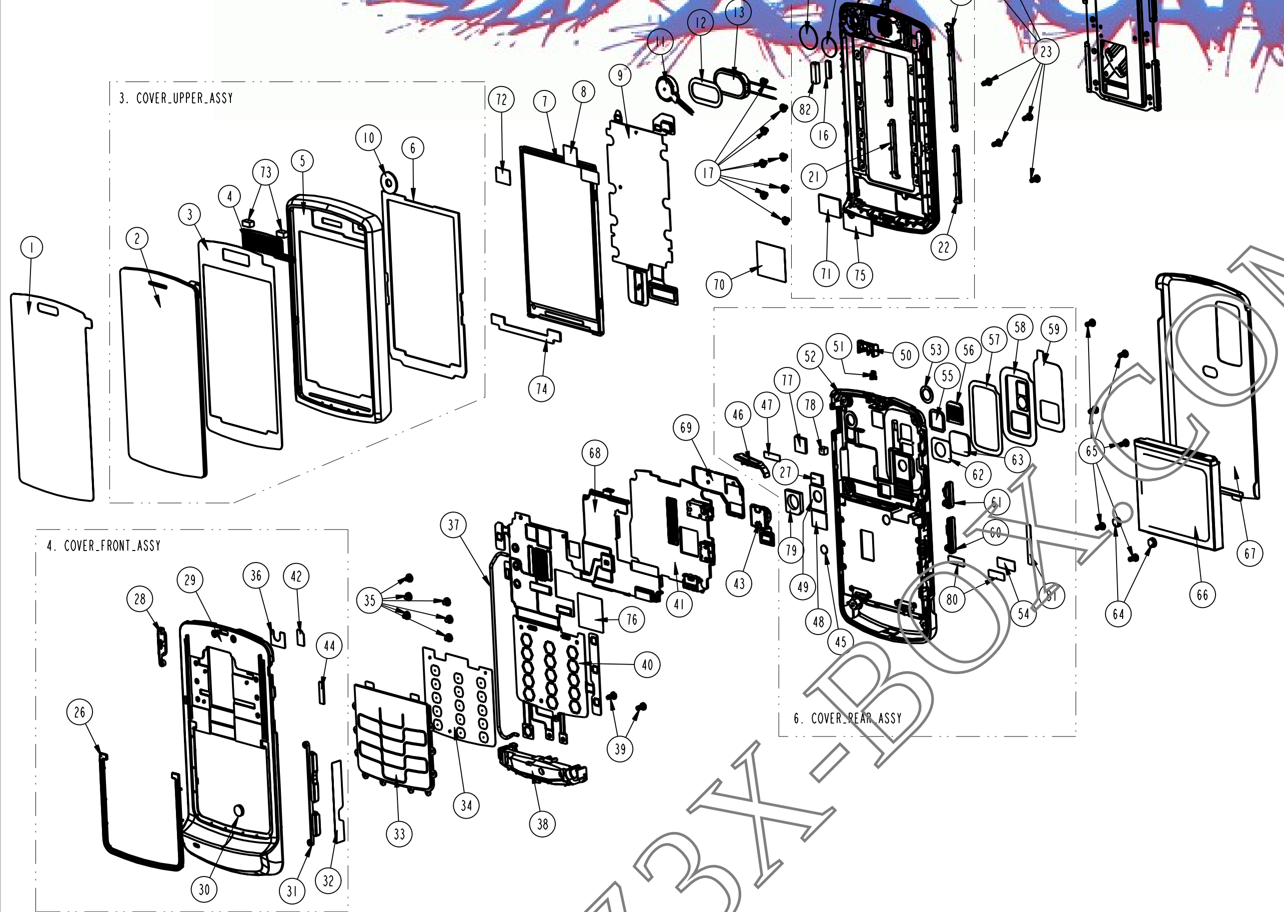
μs. Microsecond

Appendix

1. Assembly and Disassembly diagram
2. Block and Circuit diagram
3. Part List
4. Component Layout
5. Accessories
   - AC adaptor
   - Cigar Light Charger
   - USB Cable
6. WLPST(LGE Product Support Tool for WIN98, 2000, XP)

NO	DESCRIPTION	Q'TY	DRAWING NO.	REMARK
1	PHONE	1	APEY0451002	
2	COVER ASSY,SLIDE	1	ACGQ0020101	
3	COVER ASSY,UPPER	1	ACGS0014601	
4	COVER ASSY, FRONT	1	ACGK0094401	
5	COVER ASSY, LOWER	1	ACGR0012501	
6	COVER ASSY, REAR	1	ACGM0093701	

REVISION				
ISSUE	CONTENTS	ENGINEER	APPROVER	DATE
1.0	초도발행	조기호	강재혁	071213



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58	DECO, CAMERA	1	MDAD0033201	
57	TAPE, DECO CAMERA	1	MTAA0150501	
56	LENS, FLASH	1	MLCE0008101	
55	SHEET, FLASH	1	MSAZ0052001	
54	LABEL, QUALCOMM	1	MLAN0000603	
53	CAP, SHEET M/S	1	MCCF0049801	
52	COVER, REAR	1	MCJN0072001	
51	SPRING, LOCKER	1	MSDB0003701	
50	LOCKER	1	MLEA0040701	
49	PAD, CAMERA	1	MPBT0047101	
48	PAD, CAMERA CONN.	1	MPBZ0192301	
47	TAPE, BLT	1	MTAZ0202301	
46	ANTENNA, BLT	1	SNMF0035801	
45	LABEL, A/S	1	MLAB0000601	
44	GASKET, SHIELD FORM(USB)	1	MGAD0153401	
43	CAMERA, MODULE	1	SVCY0015901	
42	TAPE, SHIELD (Front)	1	MTAC0060801	
41	PCB, MAIN	1	SAFF0144203	
40	KEYPCB	1	SAEE0029301	
39	SCREW	2	GMZZ0024201	
38	INTENNA, ASSY	1	SNMF0035901	
37	CABLE, RF	1	SWCC0004401	
36	TAPE, KEYPCB CONTACT	1	MTAZ0202401	
35	SCREW	6	GMZZ0023501	
34	DOME ASSY, METAL	1	ADCA0070201	
33	KEYPAD	1	MKAG0002101	
32	TAPE, BUTTON VOL.	1	MTAB0187501	
31	BUTTON, VOLUME	1	MBJL0045501	
30	FILTER, MIC	1	MFBD0027801	
29	COVER, FRONT	1	MCJK0075901	
28	BUTTON, HOLD	1	MBJL0045601	
27	GASKET, SHIELD BLT	1	MGAD0159101	
26	RAIL, SLIDE (FRONT)	1	MGDC0000401	
25	HINGE, SLIDE	1	MRAA0004803	
24	CAP, SCREW (LOWER)	1	MCCH0112301	
23	SCREW	6	GMEY0011201	
22	RAIL, SLIDE (LEFT DN)	1	MGDB0006201	
21	RAIL, SLIDE (RIGHT DN)	1	MGDB0006301	
20	RAIL, SLIDE (LEFT UP)	1	MGDA0011001	
19	RAIL, SLIDE (RIGHT UP)	1	MGDB0006001	
18	COVER, LOWER	1	MCJV0013001	
17	SCREW	8	GMZZ0020501	
16	MAGNET	1	MMAA0008801	
15	TAPE, SPK	1	MPBN0047101	
14	TAPE, MOTOR	1	MTAF0015101	
13	SPEAKER	1	SUSY0027101	
12	PAD, SPEAKER(TOP)	1	MPBN0049501	
11	MOTOR	1	SJMY0007105	
10	PAD, MOTOR	1	MPBJ0049501	
9	FPCB, LCD	1	SACY0061801	
8	INSULATOR, WINDOW CONNECTOR	1	MIDZ0150801	
7	LCD, MODULE	1	SVLM0026201	
6	PAD, LCD	1	MPBG0065901	
5	COVER, UPPER	1	MCJW0015001	
4	FILTER,SPEAKER	1	MFBC0034001	
3	TAPE, WINDOW (MAIN)	1	MTAD0073901	
2	WINDOW,LCD	1	MWAC0083501	
1	TAPE, WINDOW PRPTECT	1	MTAB0187601	

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82	PAD, MAGNET	1	MPBZ0192501	
81	SHEET, REAR_SIDE	1	MSAZ0053201	
80	SHEET, REAR_BOTTOM	2	MSAZ0053301	
79	PAD, CAMERA_CAP	1	MPBT0053301	
78	GASKET, SHIELD_DECO	1	MGAD0157401	
77	GASKET, SHIELD_REAR	1	MGAD0157301	
76	INSULATOR, KEYPCB_LED	1	MIDZ0144401	
75	PAD, LCD_CONNECTOR	1	MPBU0018701	
74	PAD, LCD_DR_IC	1	MPBZ0198201	
73	PAD, UPPER_BOSS_HOLE	2	MPBN0051601	
72	INSULATOR, FPCB HOLE	1	MIDZ0151001	
71	PAD, LCD BOTTOM	1	MPBU0015601	
70	INSULATOR, LCD CONNECTOR	1	MIDZ0144301	
69	CAN, SHIELD (TOP)	1	MCBA0021601	
68	CAN, SHIELD (BOTTOM)	1	MCBA0022001	
67	COVER, BATTERY	1	MCJA0049301	
66	BATTERY	1	SBPL0085701	
65	SCREW	6	GMEY0009201	
64	CAP, SCREW (REAR)	2	MCCH0112401	
63	WINDOW, CAMERA	1	MWAE0028701	
62	TAPE, WINDOW CAMERA	1	MTAD0074101	
61	CAP, EARJACK	1	MCCC0047701	
60	CAP, USB	1	MCCE0039701	
59	TAPE, PROTECTION DECO	1	MTAB0187801	

* Phone Assy 후 상단 및 측면 Gap
- Max. 0.7mm, Min. 0.2 관리

허 용 공 차		UNIT	SCALE
치 수	공 차	mm	1:2
~10 미만	±0.05	TOLERANCE	
10~30 미만	±0.08		
30~50 미만	±0.15	FINISH	
50~150 미만	±0.2		
각 도	0	F/N	

PARTS INDEX

	DATE	NAME
APP.	071213	강재혁
CHEC.		
DESG.	071213	조기호

재 질 MATERIAL	
관련도번 REL DWG	
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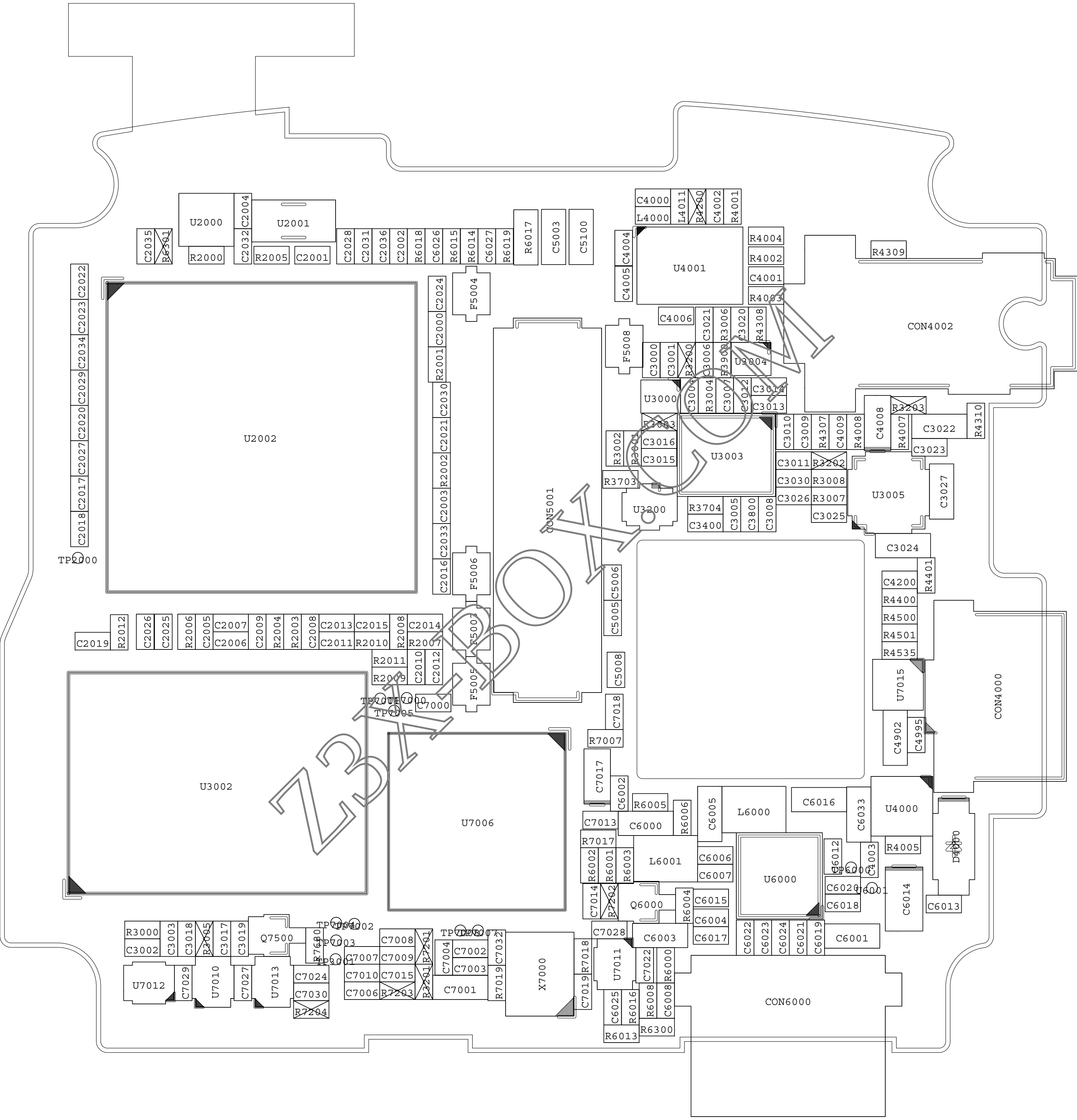
도 번 DWG NO.	APEY0451002-MP

SIZE A3

LGE LG Electronics, Inc.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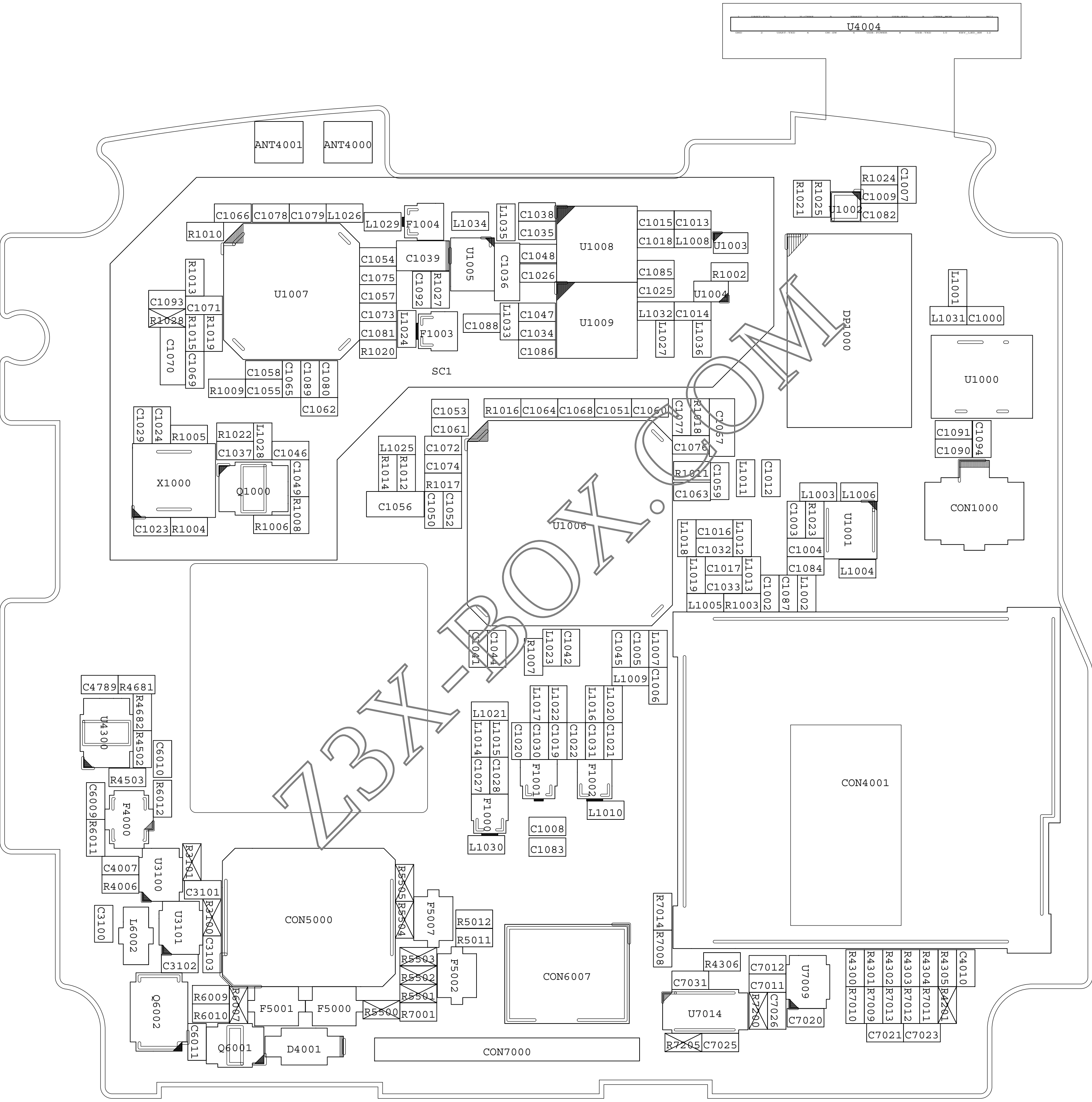
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C1029
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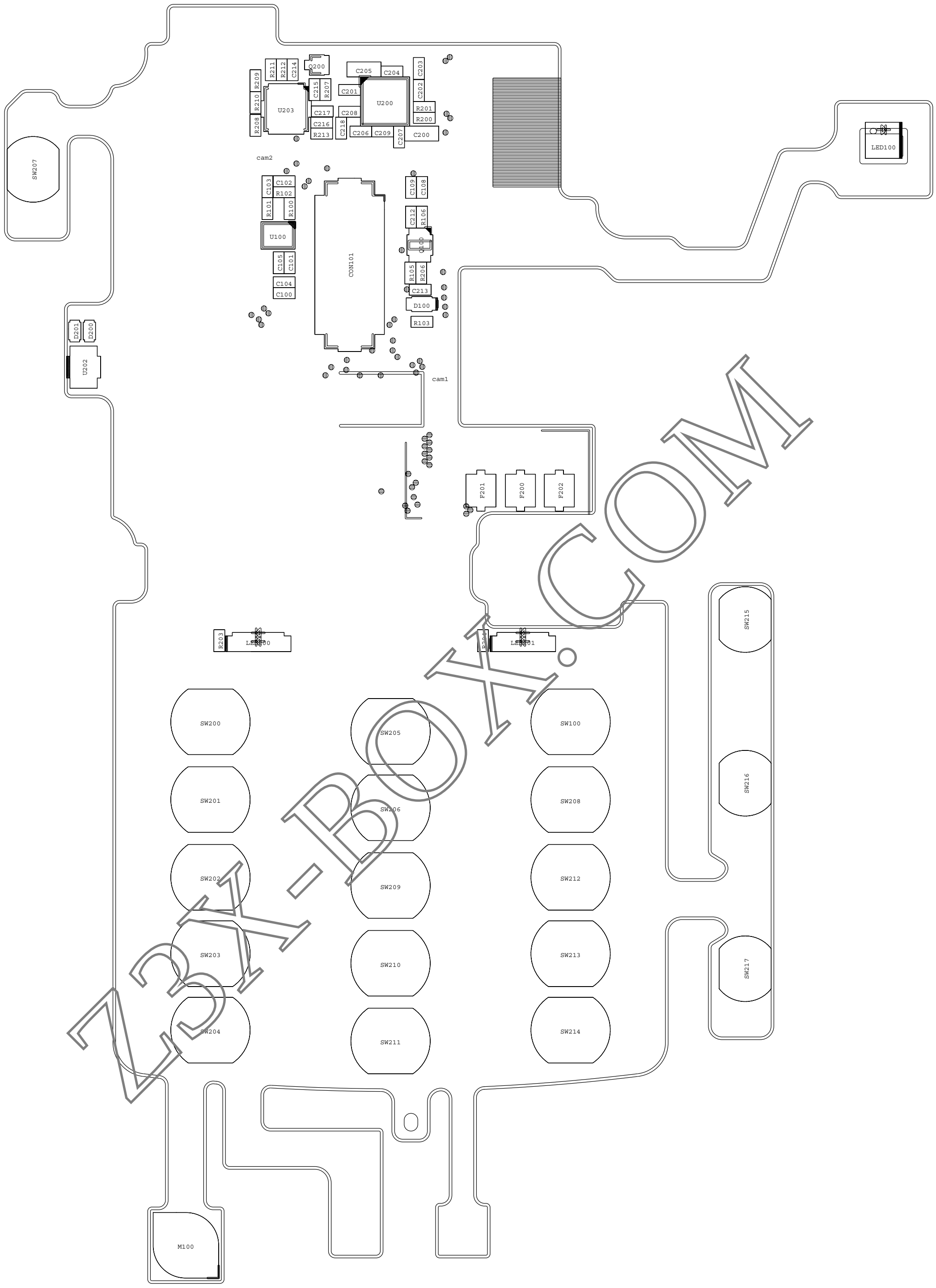
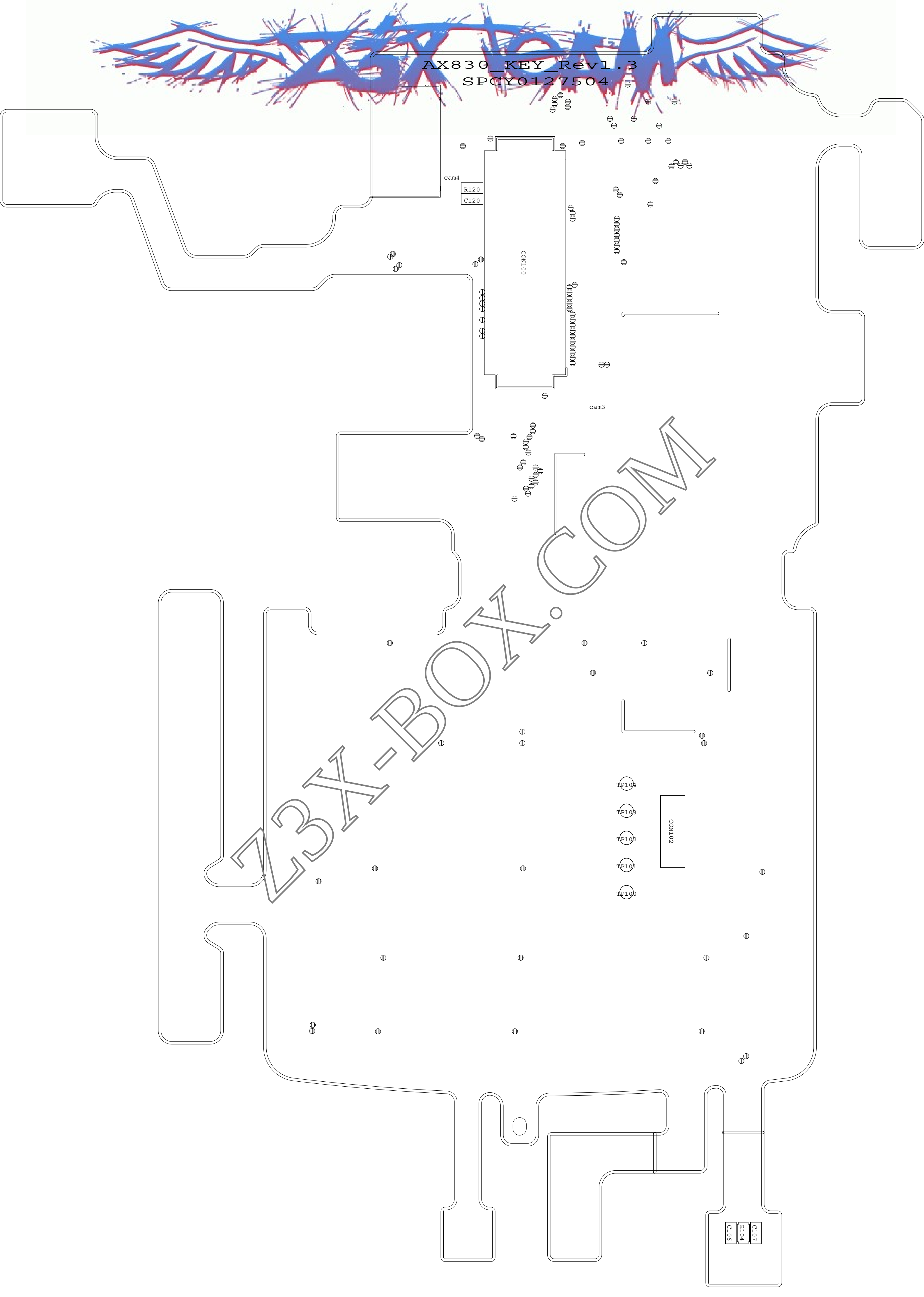
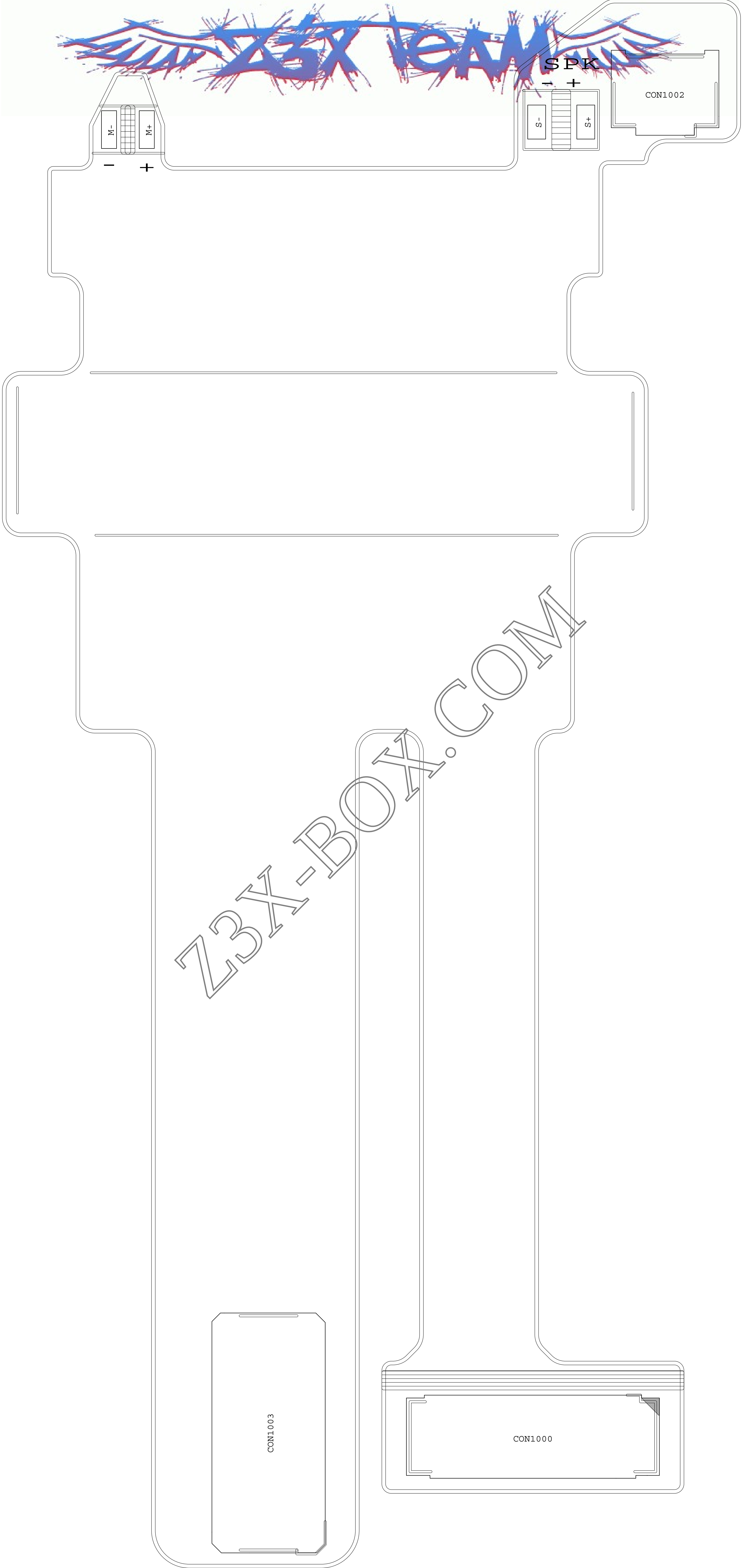
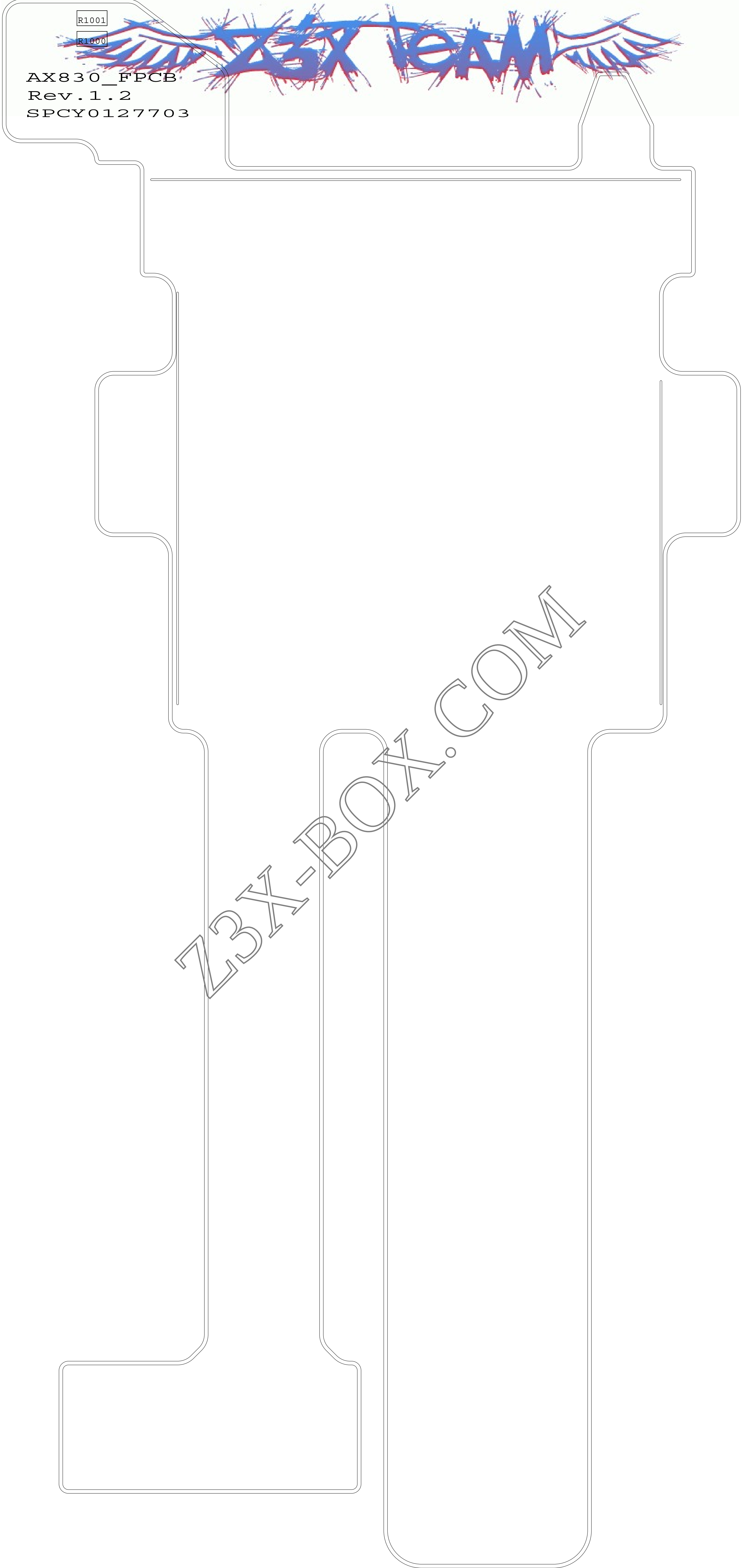
C1033
C1002
C1087
L1002
L1005
R1003
C1041
C1044
R1007
L1023
C1042
C1045
C1005
L1007
L1009
C1006
C4789
R4681
U4300
R4682
R4502
C6010
R4503
C6009
R6011
F4000
R6012
L1021
L1011
L1014
L1015
C1027
C1028
F1000
L1030
L1017
C1030
L1022
C1019
C1020
C1022
F1001
C1008
C1083
L1016
C1031
L1020
C1021
F1002
L1010
CON4001
C4007
R4006
U3100
R3701
C3101
C3100
L6002
U3101
R3700
C3103
C3102
CON5000
R5505
R5504
F5007
R5012
R5011
R5503
R5502
R5501
F5002
R7001
R5500
F5001
F5000
R6009
R6010
R6007
Q6002
C6011
Q6001
D4001
CON6007
CON7000
R7014
R7008
R4306
C7031
C7012
C7011
U7009
U7014
R7200
C7026
C7020
R7205
C7025
R4300
R4301
R4302
R4303
R4304
R4305
C4010
R7010
R7009
R7013
R7012
R7011
R4201
C7021
C7023



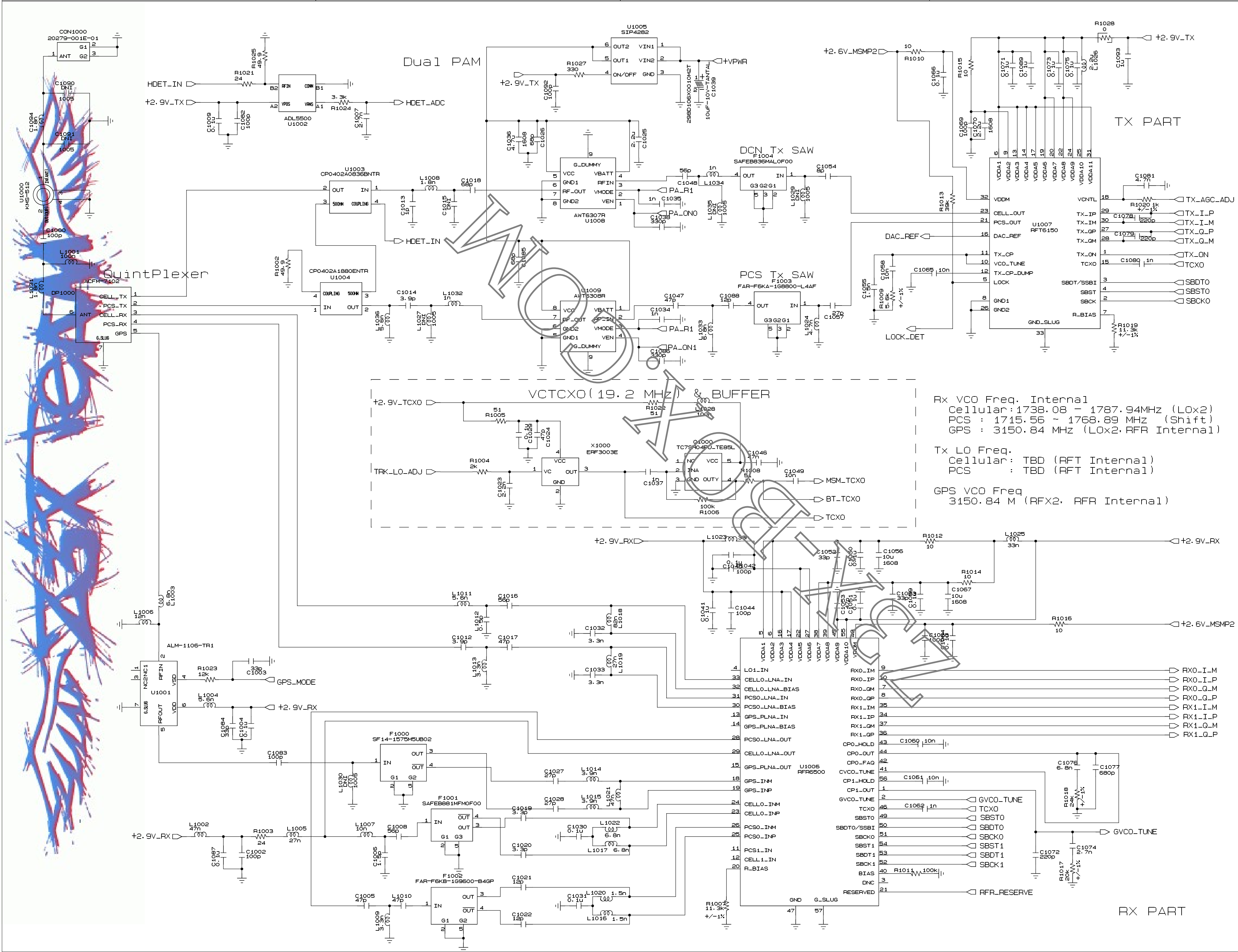
SHIELD FORM-B


AX830_KEY_Rev1.3
SPCY0127504
cam4
R120
C120
CON100
cam3
TP104
TP103
TP102
TP101
TP100
CON102
C106
R104
C107


SPK
S-
S+
M-
M+
CON1002
CON1003
CON1000


R1001
R1000
AX830_FPCB
Rev.1.2
SPCY0127703

Doc. Name	AX830 MAIN	Doc. Number	

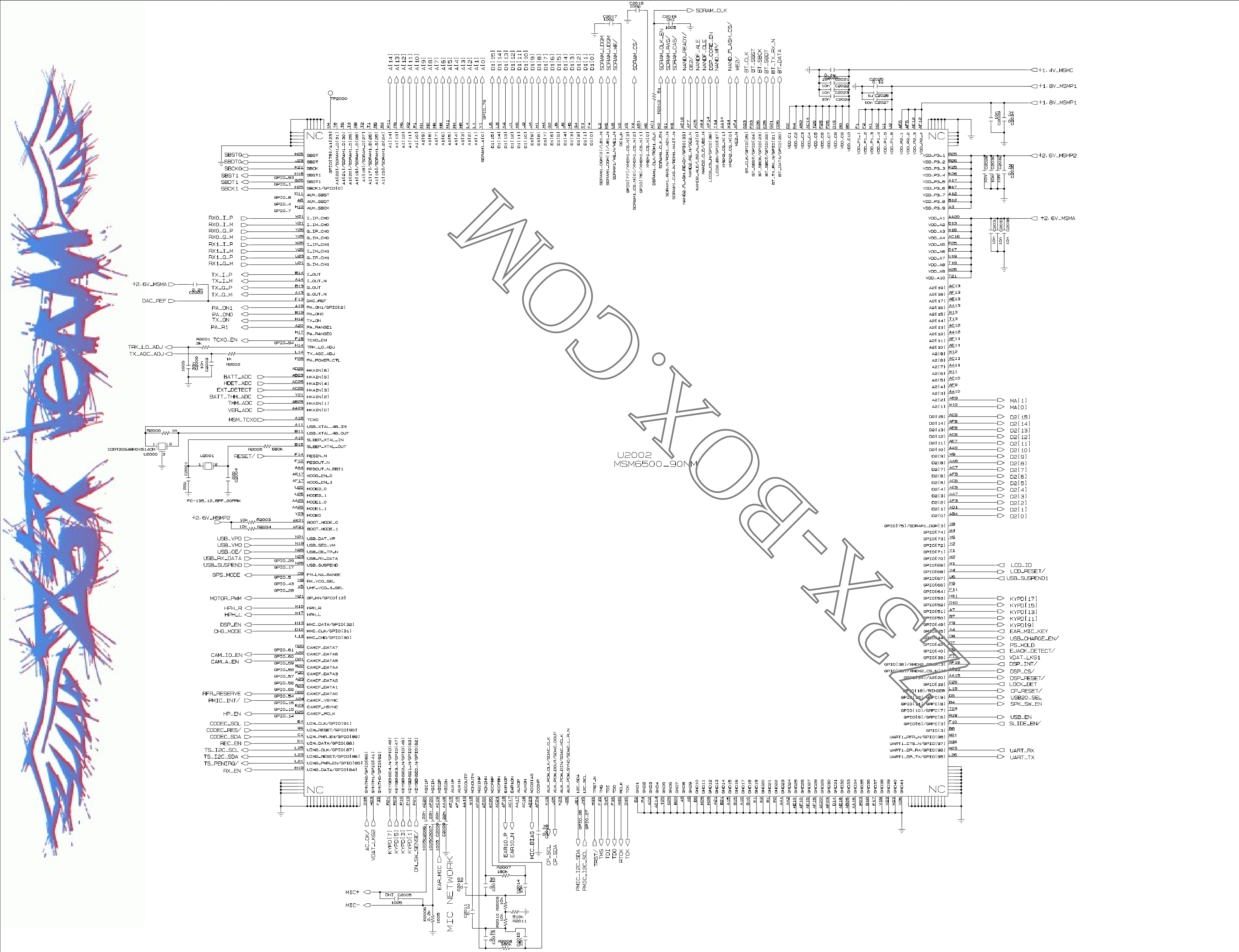


SHEET	: 1 of 7
DRAW	: Y.C.CHOI
DATE	2008/02/12
CHKD	
APRD	S.M.Park
REF	
MAN	
ISSUE	: Rev1.1
CONTENT	: 4M

C1094 2.2n —> 1.8n revised

LGE

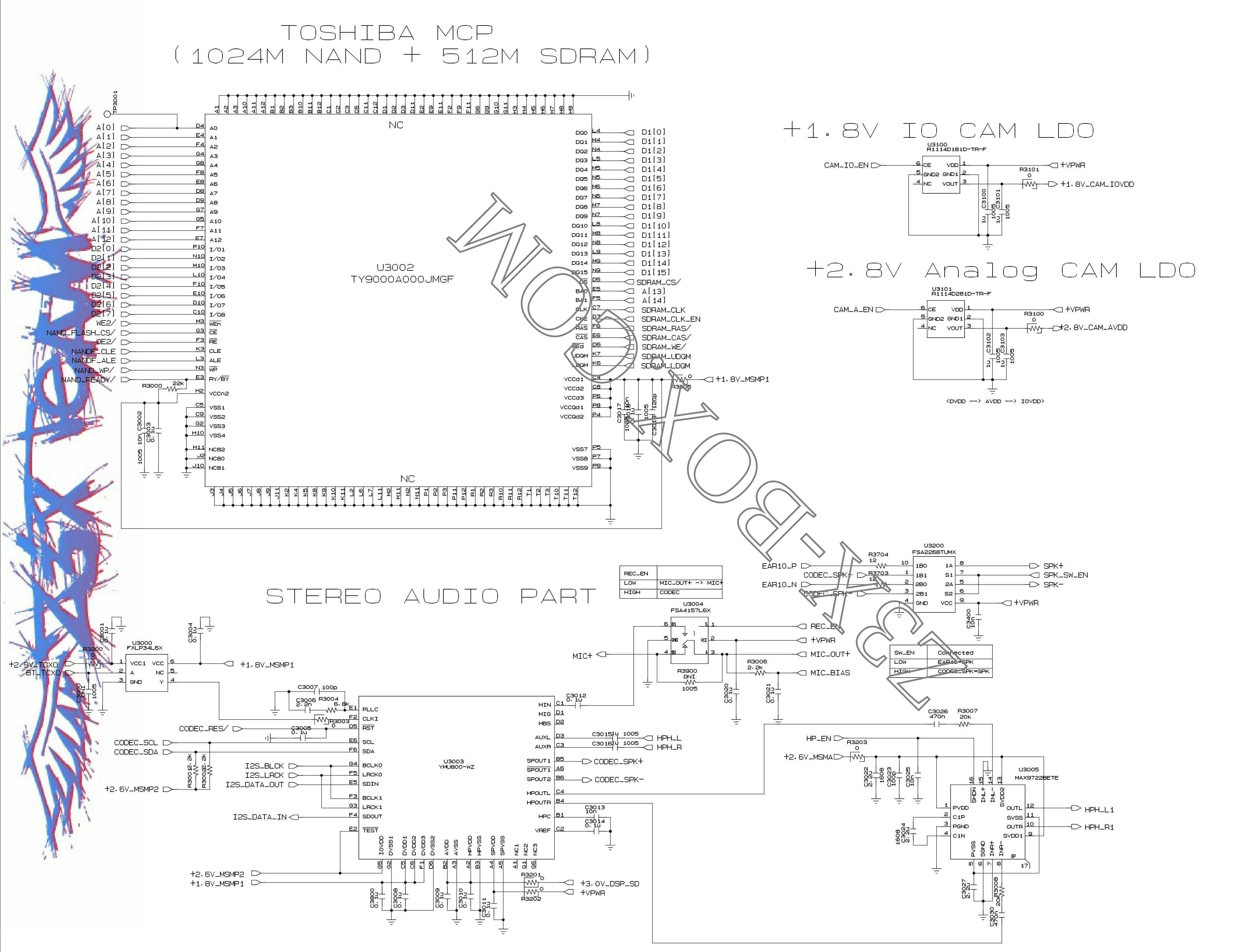
Doc. Name	LG-AX830 MAIN	Doc. Number



SHEET	2 OF 7
DRAW	W. Y. SUNG
DATE	2008/02/12
CHKD	
APRD	S. M. Park
REF	
MAN	
ISSUE	Rev1.1
CONTENT	4M

LGE

Doc. Name	LG-AX830 MAIN	Doc. Number	

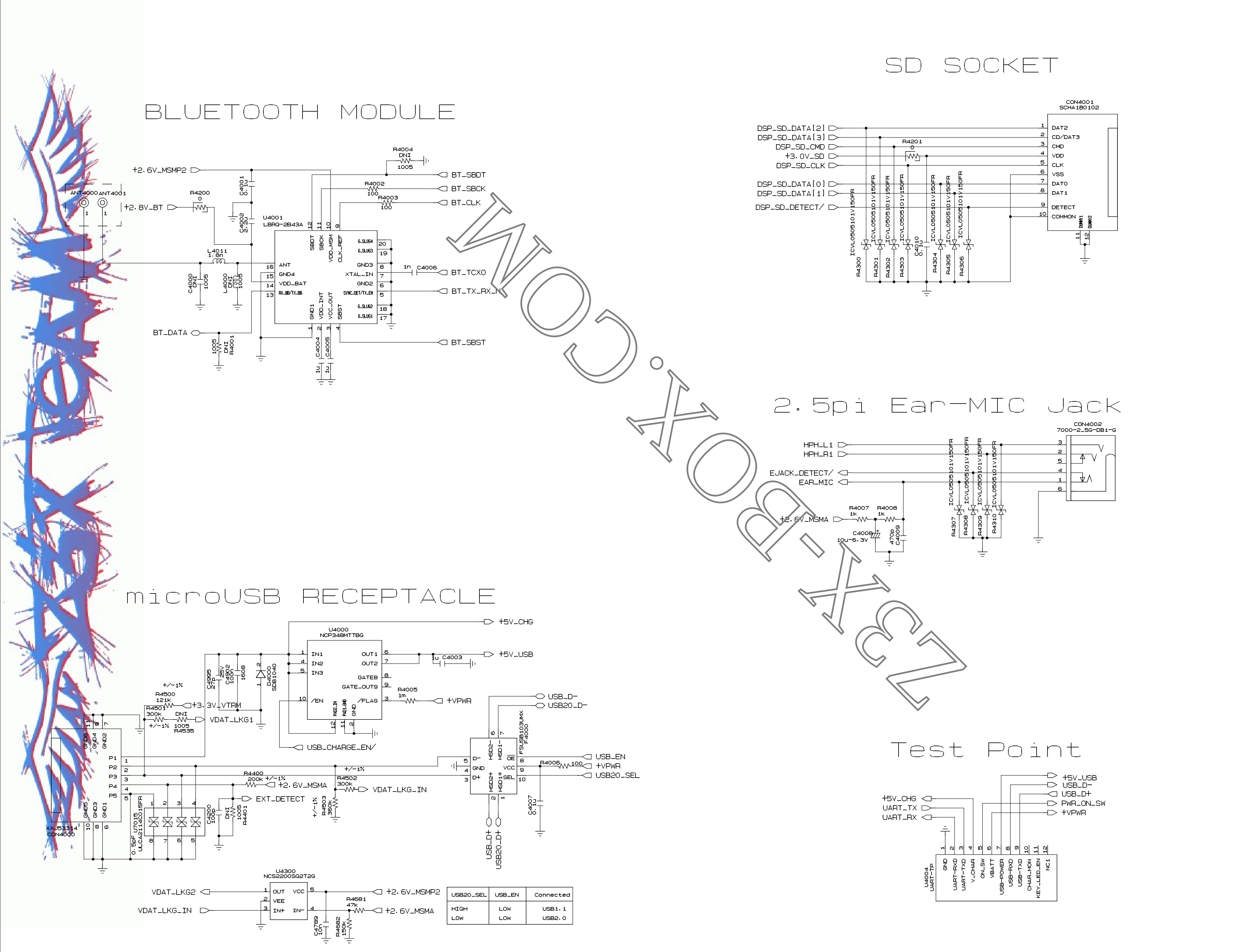


SHEET	: 3 of 7
DRAW	: W.Y.SUNG
DATE	2008/02/12
CHKD	
APRD	S.M.PARK
REF	
MAN	
ISSUE	: Rev1.1
CONTENT	: 4M

U3200 VCC 2.6V_MSMA -->VPWR

LGE

Doc. Name	LG-AX830 MAIN	Doc. Number	



USB20_SEL	USB_EN	Connected
HIGH	LOW	USB1.1
LOW	LOW	USB2.0

SHEET	: 4 of 7
DRAW	: W.Y.SUNG
DATE	2008/02/12
CHKD	
APRD	S.M.PARK
REF	
MAN	
ISSUE	: Rev1.1
CONTENT	: 4M

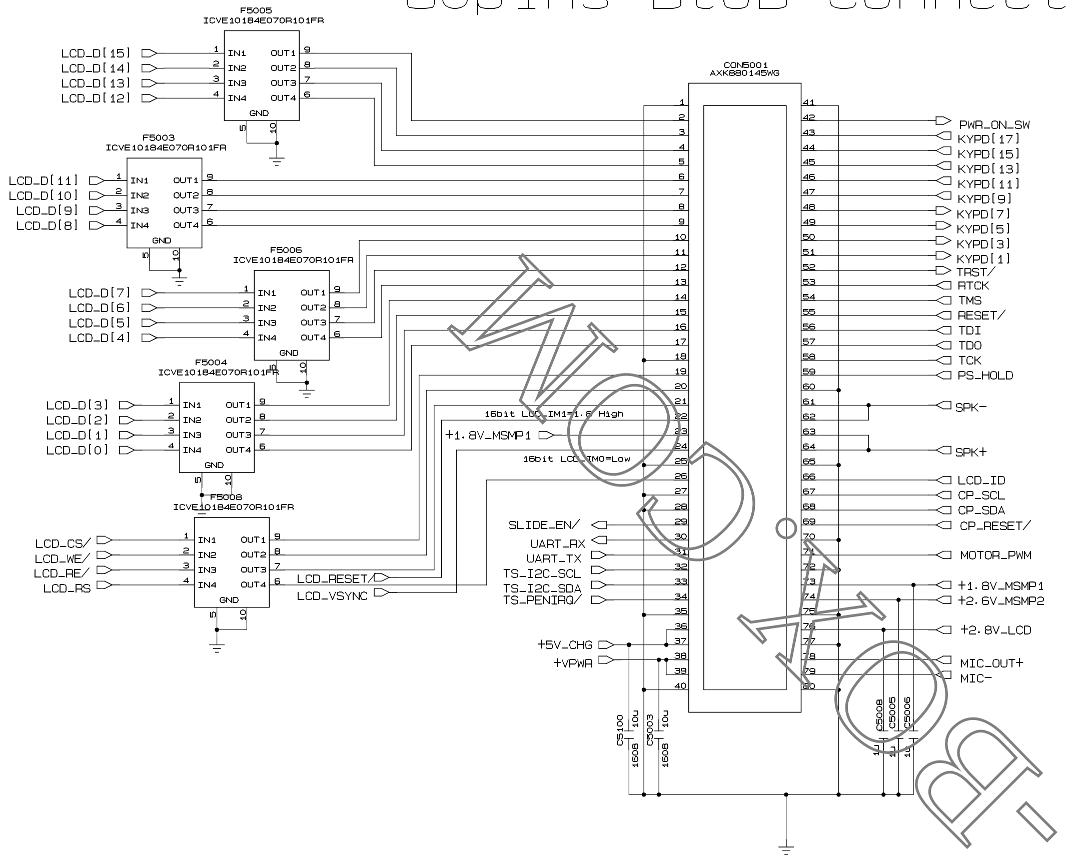
R4400 47K --> 200K
R4401 220K --> DNI
R4901 DNI --> delete

LGE

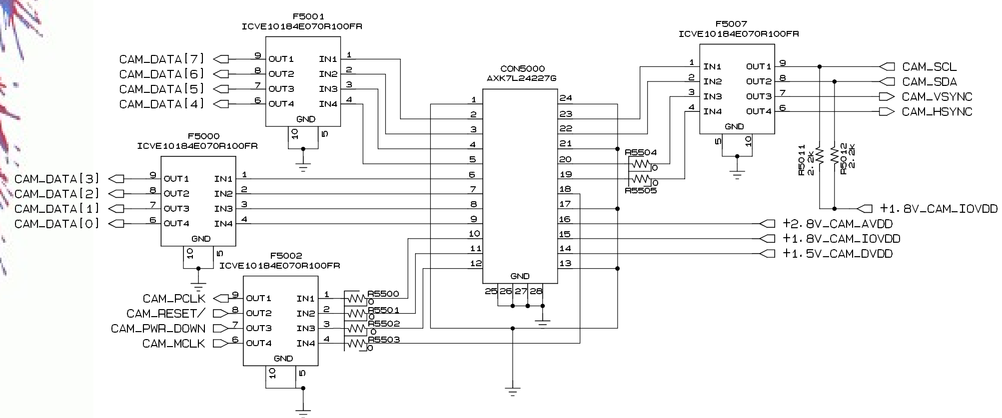
Doc. Name	LG-AX830 MAIN	Doc. Number	

SHEET	: 5 of 7
DRAW	: W.Y.SUNG
DATE	2008/02/12
CHKD	
APRD	S.M.PARK
REF	
MAN	
ISSUE	: Rev1.1
CONTENT	: 4M

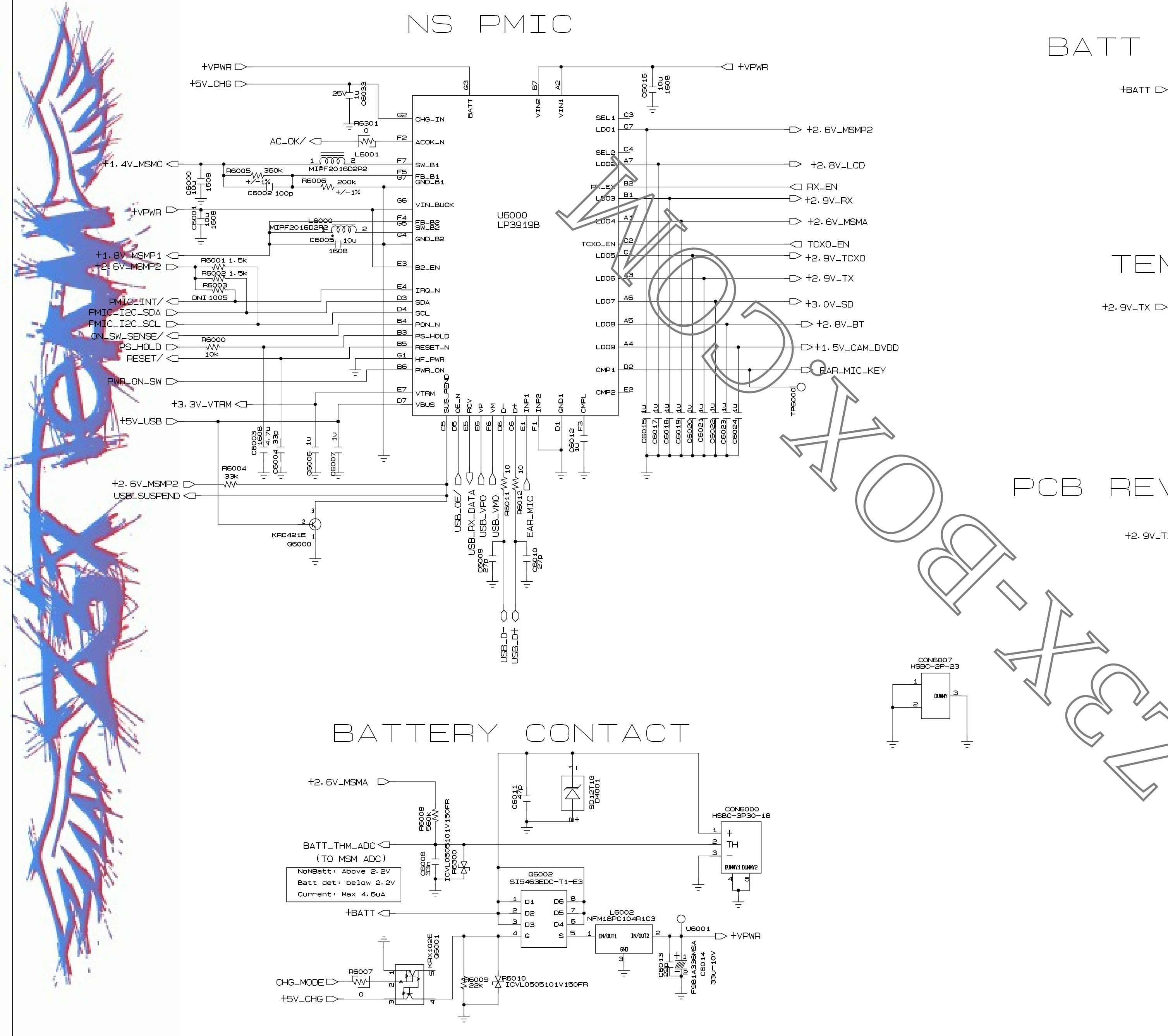
80pins BtoB Connector

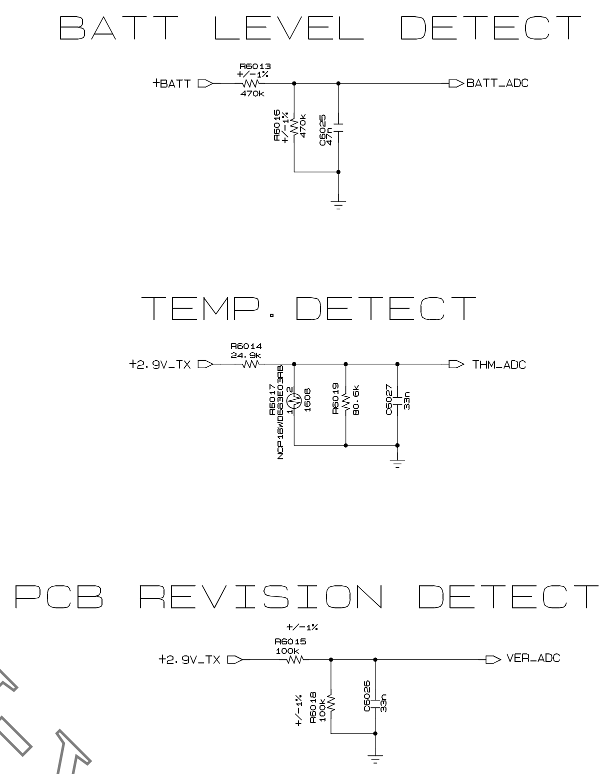


24pins 2.0M Camera Conn.



LGE





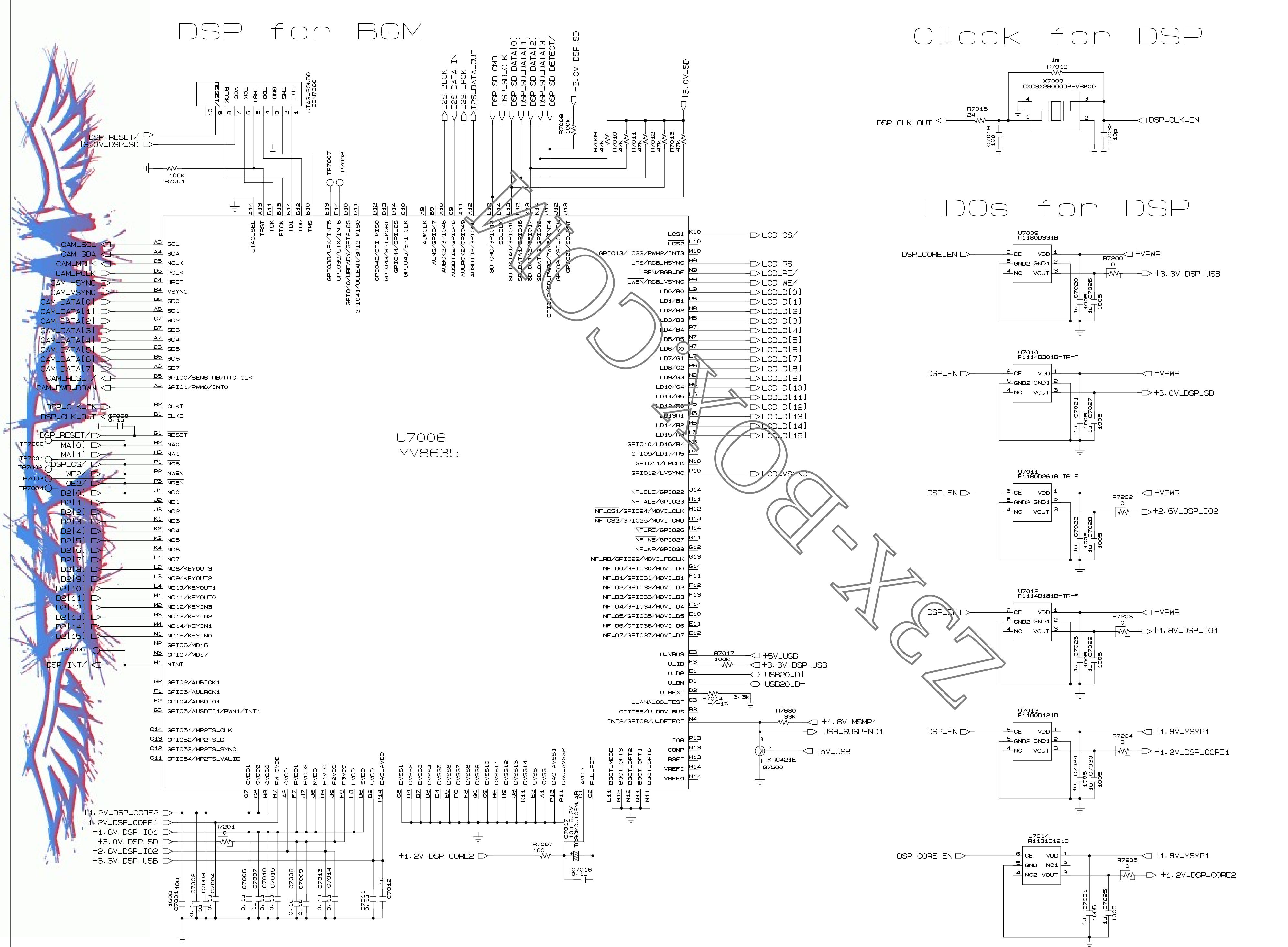
Revision	R6015	R6018	ADC_HEX
A	100K	5.6K	07,15
B	100K	12K	16,25
C	100K	19.1K	26,34
D	100K	27K	35,43
E	100K	36K	44,53
F	100K	47K	54,60
G	100K	56K	61,70
1.0	100K	75K	71,83
1.1	100K	100K	84,97
1.2	100K	130K	98,AC
1.3	100K	180K	AD,C1
1.4	100K	240K	C2,D5
1.5	100K	360K	D6,EA
1.6	100K	560K	EB,F9

SHEET : 6 of 7
DRAW : W.Y.SUNG
DATE 2008/02/12
CHKD
APRD S.M.PARK
REF
MAN
ISSUE : Rev 1.1
CONTENT : 4M

R6301 0ohm added
R6018 100kohm PCB Rev 1.1 dis

LGE

Doc. Name	LG-AX830 MAIN	Doc. Number	

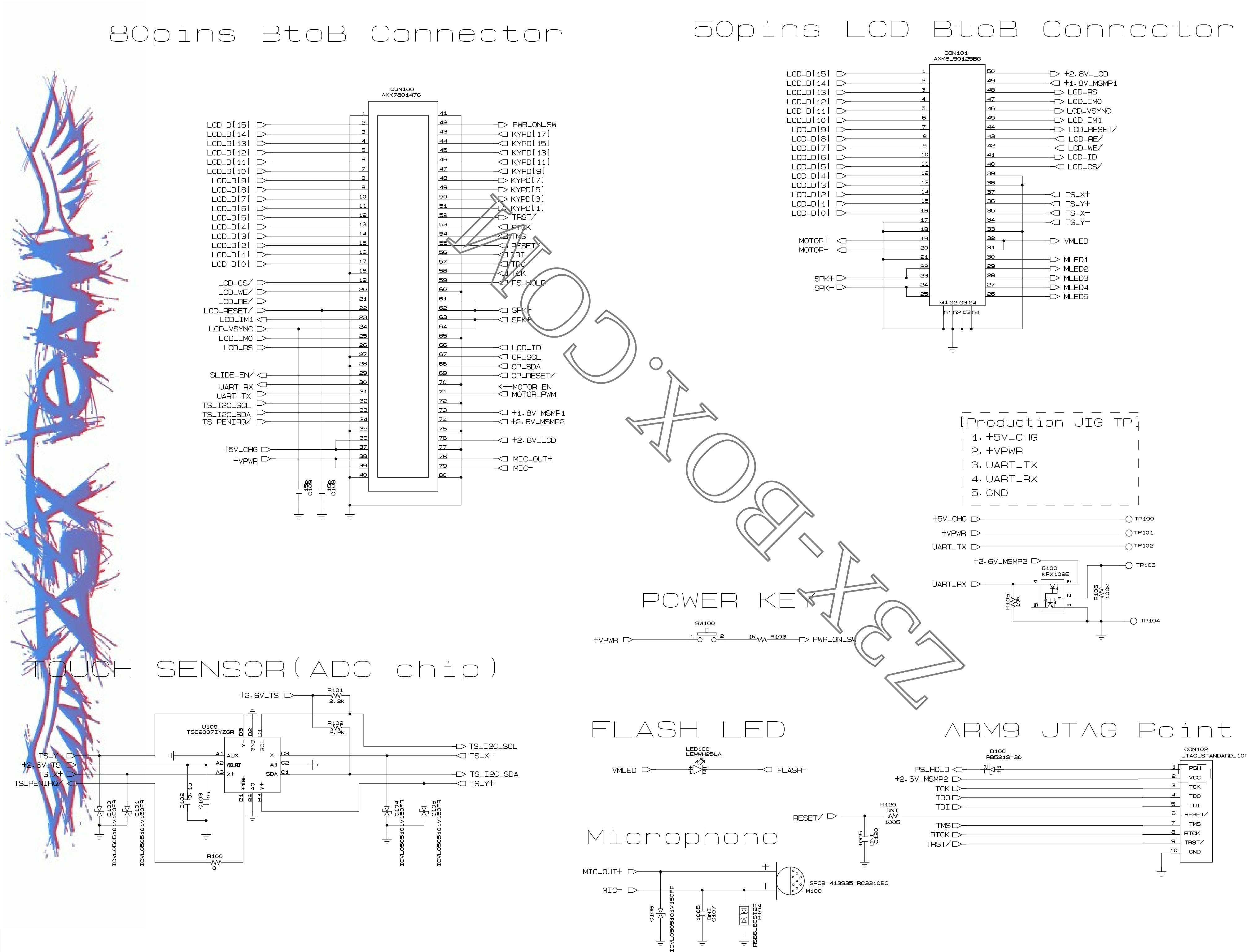


SHEET	: 7 of 7
DRAW	: W. Y. SUNG
DATE	2008/02/12
CHKD	
APRD	S. M. PARK
REF	
MAN	
ISSUE	: Rev1.1
CONTENT	: 4M

U7010 R1114D301D-TR Revised

LGE

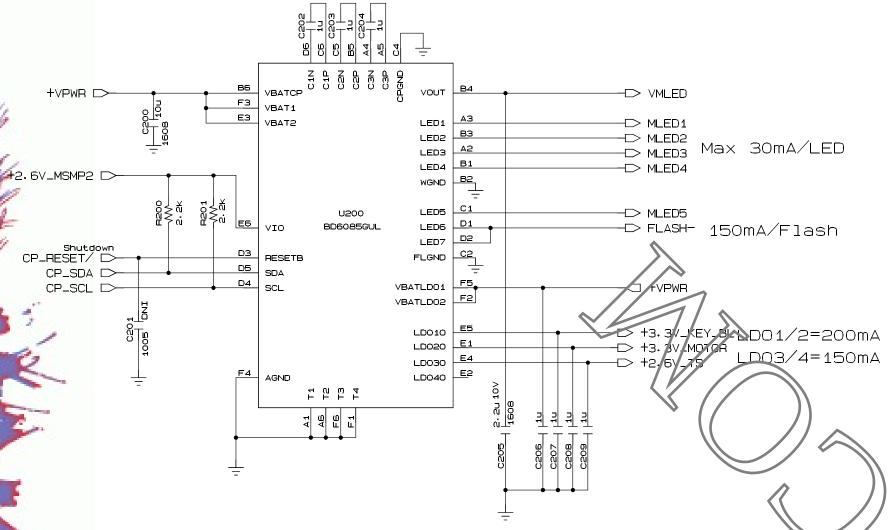
Doc. Name | LG-AX830 KEY | Doc. Number



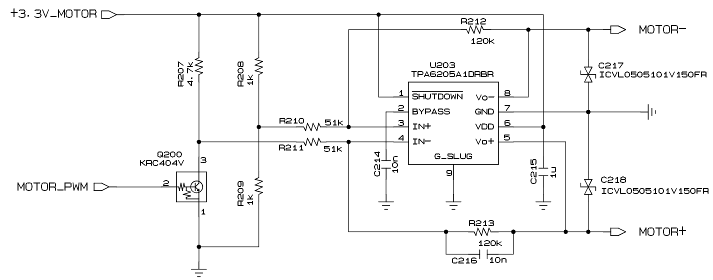
SHEET :	1 of 2
DRAW :	E. J. AHN
DATE	2008/02/12
CHKD	
APRD	S. M. PARK
REF	
MAN	
ISSUE :	Rev1.3
CONTENT :	

LGE

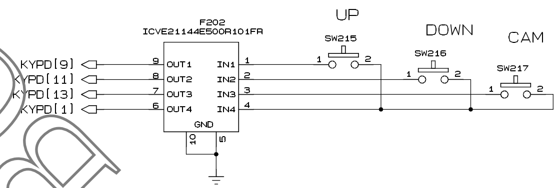
Backlight CHARGE PUMP



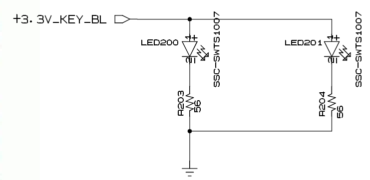
Touch Vibration Function



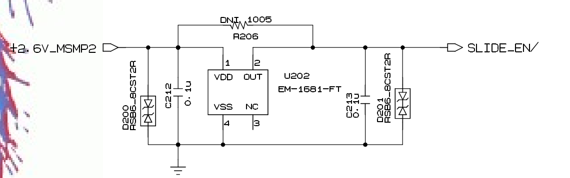
UP/DOWN/CAM SIDE KEY PAD



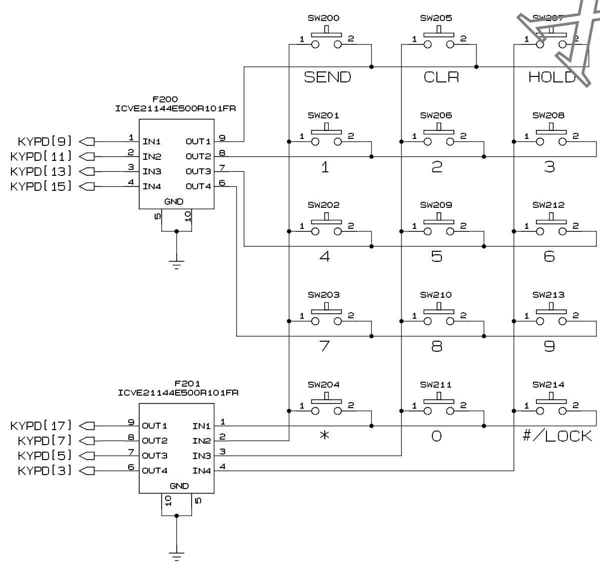
KEY BACKLIGHT



FLIP SWITCH



MAIN KEY



KEY MATRIX

	KEY07	KEY05	KEY03	KEY01	
KEY09	SEND	CLR	HOLD(S)	UP(S)	
KEY11	1	2	3	DOWN(S)	
KEY13	4	5	6	CAM(S)	
KEY15	7	8	9		
KEY17	*	0	#		
KEY19					
KEY21					

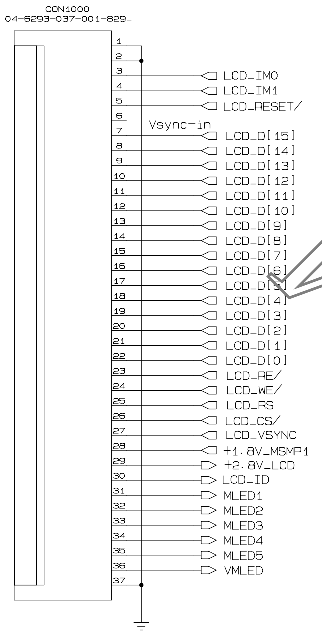
SHEET : 2 of 2
DRAW : E.J.AHN
DATE 2008/02/12
CHKD
APRD S.M.PARK
REF
MAN
ISSUE : Rev1.3
CONTENT :

LGE

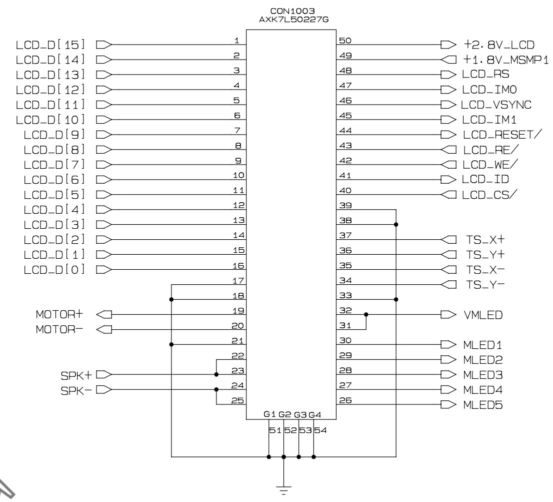
Doc. Name	LG-AX830 LCD_FPCB	Doc. Number	

SHEET :	1 of 1
DRAW	: W. Y. SUNG
DATE	2008/02/12
CHKD	
APRD	S. M. PARK
REF	
MAN	
ISSUE :	Rev1.2
CONTENT :	

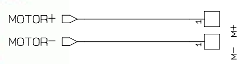
37pins ZIF Connector



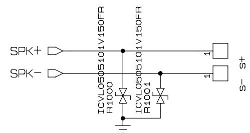
50pins LCD BtoB Connector



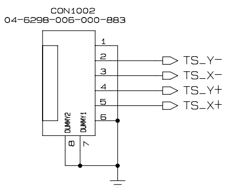
Motor PAD



Speaker PAD

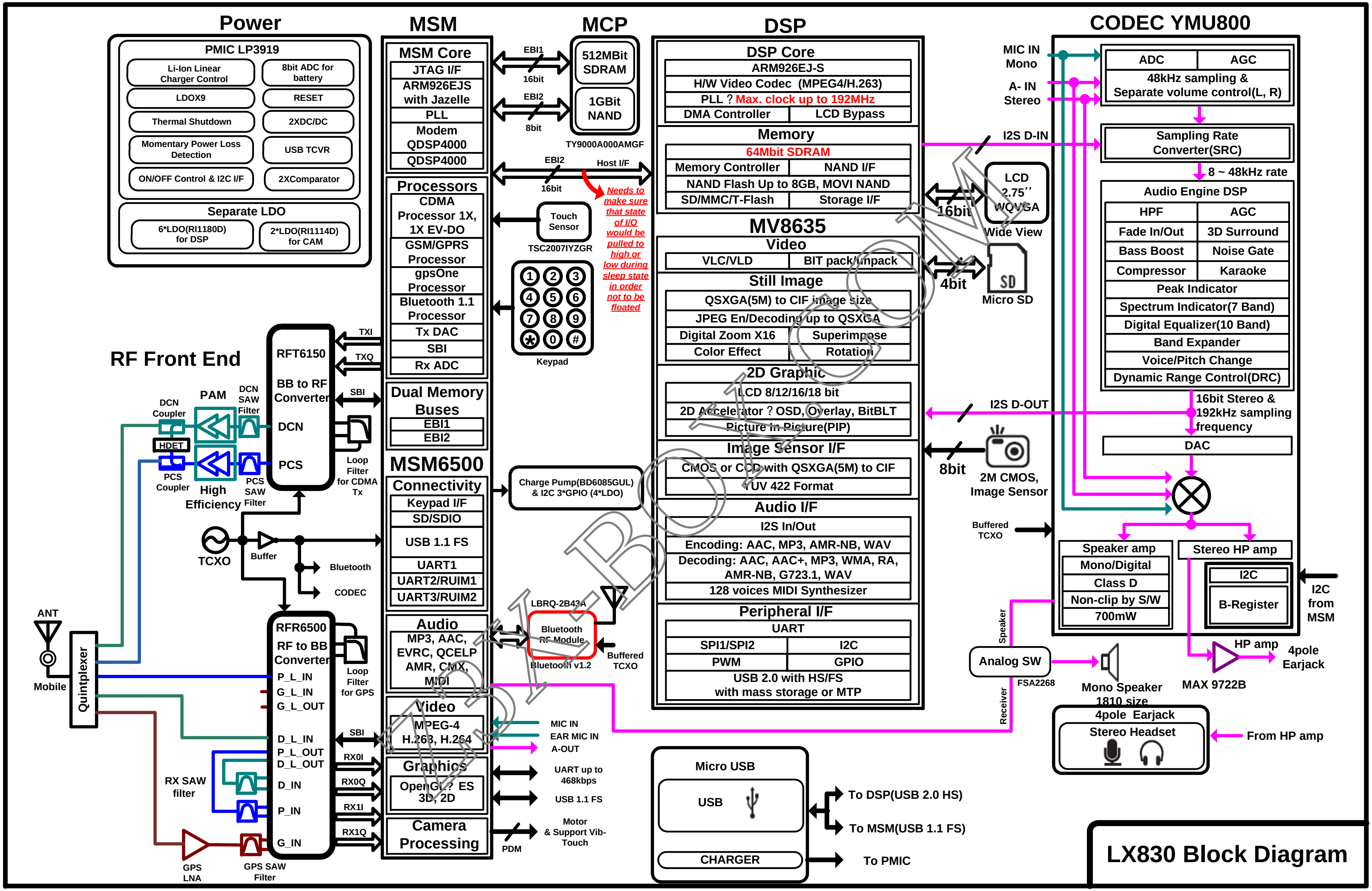


6pins TouchSensor Connector



LX830	2	3	4	5
HanTouch	Back	Left	Top	Right
LX830	Y-	X-	Y+	X+

LGE


LX830 Block Diagram
Power
PMIC LP3919
Li-Ion Linear Charger Control
8bit ADC for battery
LDOX9
RESET
Thermal Shutdown
2XDC/DC
Momentary Power Loss Detection
USB TCVR
ON/OFF Control & I2C I/F
2XComparator
Separate LDO
6*LDO(RI1180D) for DSP
2*LDO(RI1114D) for CAM
MSM
MSM Core
JTAG I/F
ARM926EJS with Jazelle
PLL
Modem QDSP4000
QDSP4000
Processors
CDMA Processor 1X, 1X EV-DO
GSM/GPRS Processor
gpsOne Processor
Bluetooth 1.1 Processor
Tx DAC
SBI
Rx ADC
Dual Memory Buses
EBI1
EBI2
MSM6500
Connectivity
Keypad I/F
SD/SDIO
USB 1.1 FS
UART1
UART2/RUIM1
UART3/RUIM2
Audio
MP3, AAC, EVRC, QCELP AMR, CMX, MIDI
Video
MPEG-4 H.263, H.264
Graphics
OpenGL? ES 3D, 2D
Camera Processing
MCP
512MBit SDRAM
1GBit NAND
TY9000A000AMGF
EBI1
16bit
EBI2
8bit
EBI2
16bit
Host I/F
Needs to make sure that state of I/O would be pulled to high or low during sleep state in order not to be floated
Touch Sensor
TSC2007IYZGR
Keypad
Charge Pump(BD6085GUL) & I2C 3*GPIO (4*LDO)
LBRQ-2B43A
Bluetooth RF Module
Bluetooth v1.2
Buffered TCXO
MIC IN
EAR MIC IN
A-OUT
UART up to 468kbps
USB 1.1 FS
Motor & Support Vib-Touch
PDM
DSP
DSP Core
ARM926EJ-S
H/W Video Codec (MPEG4/H.263)
PLL ? Max. clock up to 192MHz
DMA Controller
LCD Bypass
Memory
64Mbit SDRAM
Memory Controller
NAND I/F
NAND Flash Up to 8GB, MOVI NAND
SD/MMC/T-Flash
Storage I/F
MV8635
Video
VLC/VLD
BIT pack/unpack
Still Image
QSXGA(5M) to CIF image size
JPEG En/Decoding up to QSXGA
Digital Zoom X16
Superimpose
Color Effect
Rotation
2D Graphic
LCD 8/12/16/18 bit
2D Accelerator ? OSD, Overlay, BitBLT
Picture In Picture(PIP)
Image Sensor I/F
CMOS or CCD with QSXGA(5M) to CIF
YUV 422 Format
Audio I/F
I2S In/Out
Encoding: AAC, MP3, AMR-NB, WAV
Decoding: AAC, AAC+, MP3, WMA, RA, AMR-NB, G723.1, WAV
128 voices MIDI Synthesizer
Peripheral I/F
UART
SPI1/SPI2
I2C
PWM
GPIO
USB 2.0 with HS/FS with mass storage or MTP
Micro USB
USB
CHARGER
To DSP(USB 2.0 HS)
To MSM(USB 1.1 FS)
To PMIC
LCD 2.75'' WQVGA
Wide View
16bit
4bit
Micro SD
8bit
2M CMOS, Image Sensor
Buffered TCXO
CODEC YMU800
MIC IN Mono
A- IN Stereo
I2S D-IN
ADC
AGC
48kHz sampling & Separate volume control(L, R)
Sampling Rate Converter(SRC)
8 ~ 48kHz rate
Audio Engine DSP
HPF
AGC
Fade In/Out
3D Surround
Bass Boost
Noise Gate
Compressor
Karaoke
Peak Indicator
Spectrum Indicator(7 Band)
Digital Equalizer(10 Band)
Band Expander
Voice/Pitch Change
Dynamic Range Control(DRC)
I2S D-OUT
16bit Stereo & 192kHz sampling frequency
DAC
Speaker amp
Mono/Digital
Class D
Non-clip by S/W
700mW
Stereo HP amp
I2C
B-Register
I2C from MSM
Speaker
Receiver
Analog SW
FSA2268
Mono Speaker 1810 size
HP amp
MAX 9722B
4pole Earjack
4pole Earjack
Stereo Headset
From HP amp
RF Front End
RFT6150
BB to RF Converter
DCN
PCS
TXI
TXQ
SBI
Loop Filter for CDMA Tx
PAM
DCN SAW Filter
DCN Coupler
HDET
PCS Coupler
PCS SAW Filter
High Efficiency
TCXO
Buffer
Bluetooth
CODEC
RFR6500
RF to BB Converter
Loop Filter for GPS
P_L_IN
G_L_IN
G_L_OUT
D_L_IN
P_L_OUT
D_L_OUT
D_IN
P_IN
G_IN
SBI
RX0I
RX0Q
RX1I
RX1Q
ANT
Mobile
Quintplexer
RX SAW filter
GPS LNA
GPS SAW Filter

No.	Desig-No.	Component-Name	Desc./Remark	Maker	New-ItemNo.	Qty	SMT	Size	Value	Tolerance
1	R1028,R3003,R3005,R3100,R3101,R3200,R3201,R3202,R3203,R4200,R4201,R5500,R5501,R5502,R5503,R5504,R5505,R6007,R6301,R72	0OHM_1005	RESISTOR	NONE	SAFP000050	25	OK	1005	0	+/-5%
2	C1015,C1090,C1091,C2005,C2019,C3000,C	1005C	1005C-DNI	NONE	TEST	7	NG	1005	DNI	
3	L1007	1005GC2T10NJ00	CHIP-INDUCTOR	PILKOR	ELCH000470	1	OK	1005	10n	+/-5%
4	L1032,L1034	1005GC2T1N0S00	MULTILATER-CHIP	PILKOR	ELCH000470	2	OK	1005	1n	+/-0.3n
5	C1094,L1008,L1031,L401	1005GC2T1N8S00	MULTILATER-CHIP	PILKOR	ELCH000472	4	OK	1005	1.8n	
6	L1005,L1019	1005GC2T27NJ00	CHIP-INDUCTOR	PILKOR	ELCH000471	2	OK	1005	27n	+/-5%
7	L1023,L1025	1005GC2T33NJ00	MULTILATER-CHIP	PILKOR	ELCH000473	2	OK	1005	33n	+/-5%
8	L1013	1005GC2T3N3S00	MULTILATER-CHIP	PILKOR	ELCH000470	1	OK	1005	3.3n	+/-0.3n
9	L1011,L1036	1005GC2T5N6S00	CHIP-INDUCTOR	PILKOR	ELCH000471	2	OK	1005	5.6n	+/-0.3n
10	L1001,L1028	1005GC2TR10J00	MULTILATER-CHIP	PILKOR	ELCH000472	2	OK	1005	100n	+/-5%
11	L1027,L1029,L1030,L1035,L400	1005L	1005L-DNI	TEST	TEST	5	NG	1005	DNI	
12	R3900,R4001,R4004,R4401,R4535,R60	1005R	1005R-DNI	TEST	TEST	6	NG	1005	DNI	
13	CON1000	20279-001E-01	RF-S/W	I-PEX	ENWY000550	1	OK	2.6X2.6X1.2		
14	C1039	298D106X0010M2T	10uF-10V-TANTAL	VISHAY	ECTH000560	1	OK	1608		+/-20%
15	CON4002	7000-2_5G-DB1-G	EAR-JACK	POWERNET	ENJE000430	1	OK			
16	DP1000	ACFM-7102	CDMA-USPCS-GP	AGILENT-TEC	SMZY001470	1	OK	5.0X8.0X1.1		
17	U1002	ADL5500	HDET-POWER-DE	ANALOG-DEV	EUSY028050	1	OK	1.0X1.0X0.6		
18	U1001	ALM-1106-TR1	LNA	AGILENT-TEC	EUSY026550	1	OK	2.0X2.0X1.1		
19	ANT4000,ANT400	ANT_1_8X2_1	ANT_1.8_2.1	NONE	TEST	2	NG	1.8X2.1		
20	U1008	AWT6307R	PAM	ANADIGICS	SMPY001460	1	OK	3.0X3.0X1.1	28dBm,20%,-47dBc,17dB	
21	U1009	AWT6308R	PAM	ANADIGICS	SMPY001390	1	OK	3.0X3.0X1.1	28dBm,39%,16mA,-50dBc,27dB	
22	CON4000	AXJ53314	MINI-USB	MATSUSHITA	ENRY000720	1	OK			
23	CON5000	AXK7L24227G	24PIN-CONNECTO	MATSUSHITA	ENBY002040	1	OK			
24	CON5001	AXK880145WG	80PIN-CONNECTO	MATSUSHITA	ENBY001980	1	OK		HEADER	
25	C1013	C1005C0G1H010C	CHIP-CAPACITOR	TDK	ECZH000080	1	OK	1005	1p	+/-0.25p
26	C1000,C1002,C1042,C1044,C1068,C1069,C1082,C1083,C1092,C2017,C2018,C3007,C302	C1005C0G1H101J	CHIP-CAPACITOR	TDK	ECZH000081	15	OK	1005	100p	+/-5%
27	C1021,C1022,C108	C1005C0G1H120J	CHIP-CAPACITOR	TDK	ECZH000081	3	OK	1005	12p	+/-5%
28	C1006	C1005C0G1H1R5C	CHIP-CAPACITOR	TDK	ECZH000082	1	OK	1005	1.5p	+/-0.25p
29	C4995,C6009,C601	C1005C0G1H270J	CHIP-CAPACITOR	TDK	ECZH000082	3	OK	1005	27p	+/-5%
30	C1003,C1052,C1063,C1084,C60	C1005C0G1H330J	CHIP-CAPACITOR	TDK	ECZH000083	5	OK	1005	33p	+/-5%
31	C1008,C1016,C104	C1005C0G1H560J	CHIP-CAPACITOR	TDK	ECZH000084	3	OK	1005	56p	+/-5%
32	C1018,C1026,C108	C1005C0G1H680J	CHIP-CAPACITOR	TDK	ECZH000084	3	OK	1005	68p	+/-5%
33	L1012	C1005CH1H0R5BB	CHIP-CAPACITOR	TDK	ECZH000100	1	OK	1005	0.5p	+/-10%
34	C1093,C2026,C3015,C3016,C3100,C3101,C3102,C3103,C4003,C4004,C4005,C5005,C5006,C5008,C6006,C6007,C6012,C6015,C6017,C6018,C6019,C6020,C6021,C6022,C6023,C6024,C7003,C7007,C7012,C7020,C7021,C7022,C7023,C7024,C7025,C7026,C7027,C7028,C7029,C70	C1005X5R1A105K	CHIP-CAPACITOR	TDK	ECZH000121	41	OK	1005	1u	+/-10%
35	C1046,C602	C1005X5R473KDT	CHIP-CAPACITOR	TDK	ECCH00001	2	OK	1005	47n	+/-10%
36	C1076	C1005X7R1E682K	CHIP-CAPACITOR	TDK	ECZH00011	1	OK	1005	6.8n	+/-10%
37	C1072,C1078,C107	C1005X7R1H221K	CHIP-CAPACITOR	TDK	ECCH00001	3	OK	1005	220p	+/-10%
38	C1007,C107	C1005X7R1H272K	CHIP-CAPACITOR	TDK	ECZH00011	2	OK	1005	2.7n	+/-10%
39	C1038,C108	C1005X7R1H331K	CHIP-CAPACITOR	TDK	ECCH00001	2	OK	1005	330p	+/-10%
40	C4009	C1005X7R1H471K	CHIP-CAPACITOR	TDK	ECZH000112	1	OK	1005	470p	+/-10%
41	C1077	C1005X7R1H681K	CHIP-CAPACITOR	TDK	ECZH000112	1	OK	1005	680p	+/-10%
42	C3026,C303	C1005Y5V1A474Z	CHIP-CAPACITOR	TDK	ECZH000121	2	OK	1005	470n	+80~-20%
43	SC1	CAN_LX830	LX830_SHIELD_CA	NONE	ACKA000490	1	OK			
44	L1006	CIH05T12NJNC	CHIP-INDUCTOR	SAMSUNG	ELCH000581	1	OK	1005	12n	+/-5%
45	L1016,L1020	CIH05T1N5SNC	CHIP-INDUCTOR	SAMSUNG	ELCH000580	2	OK	1005	1.5n	+/-0.3nH
46	L1009	CIH05T3N3SNC	CHIP-INDUCTOR	SAMSUNG	ELCH000580	1	OK	1005	3.3n	+/-0.3nH
47	L1014,L1015	CIH05T3N9SNC	CHIP-INDUCTOR	SAMSUNG	ELCH000580	2	OK	1005	3.9n	+/-0.3nH
48	L1024	CIH05T4N7SNC	CHIP-INDUCTOR	SAMSUNG	ELCH000580	1	OK	1005	4.7n	+/-0.3nH
49	L1003,L1017,L102	CIH05T6N8SNC	CHIP-INDUCTOR	SAMSUNG	ELCH000582	3	OK	1005	6.8n	+/-0.3nH
50	L1018	CIH05T82NJNC	CHIP-INDUCTOR	SAMSUNG	ELCH000582	1	OK	1005	82n	+/-5%
51	C1025,C400	CL05A225MQ5NNN	CHIP-CAPACITOR	SAMSUNG	ECCH000019	2	OK	1005	2.2u	+/-20%
52	U1003	CP0402A0836BNTR	COUPLER	AVX/KYOCER	SCDY000340	1	OK	0.6X1.0X0.4	824M~849M	
53	U1004	CP0402A1880ENTR	COUPLER	AVX/KYOCER	SCDY000340	1	OK	0.6X1.0X0.4	1850M~1910M	
54	C1036,C600	CV105X5R475M10	CHIP-CAPACITOR	TDK	ECCH000780	2	OK	1608	4.7u	+/-20%
55	X7000	CXC3X280000BHV	28MHz,50PPM,10p	PARTRON	EXXY002420	1	OK	2.5X3.2X0.7		
56	L1033	ELJRF6N8JF	CHIP-INDUCTOR	PANASONIC	ELCH000100	1	OK	1005	6.8n	+/-5%
57	X1000	ERF3003E	VCTCXO	NIHON-DEMP	EXSK000480	1	OK	3.2X2.5X1.2	19.2MHz_1.5PPM_2.8V	
58	C6014	F981A336MSA	S-TYPE	NICHICON	ECTH000200	1	OK	2012	33u-10V	+/-20%
59	F1003	FAR-F6KA-1G880	SAW-FILTER	FUJITSU-ME	SFSY003250	1	OK	1.2X1.4X0.5	1880MHz	
60	F1002	FAR-F6KB-1G960	SAW-FILTER	FUJITSU-ME	SFSY003260	1	OK	1.0X1.4X0.5	1960MHz	
61	U2001	FC-135_12_5PF_2	RESONATOR	SEIKO-EPSO	EXXY001870	1	OK			
62	U3200	FSA2268TUMX	ANALOG_SWITCH	FAIRCHILD	EUSY034030	1	OK	1.4X1.8X0.8	typ_Rdson_0.4ohm_Analog_Switch	
63	U3004	FSA4157L6X	SPDT-ANALOG-S	FAIRCHILD	EUSY018650	1	OK	.0X1.45X0.5		
64	F4000	FSUSB103UMX	HIGH_SPEED_USB	FAIRCHILD	EUSY033830	1	OK	1.4X1.8X0.5	3.7pF_6.5ohm	
65	U3000	FXLP34L6X	BIT_UNIT_DIRECTI	FAIRCHILD	EUSY024000	1	OK	.0X1.45X0.5		
66	C1056,C1067,C5003,C5100,C6000,C6001,C6005,C6016,C700	GRM188R60J106M	CHIP-CAPACITOR	MURATA	ECCH000560	9	OK	1608	10u	+/-20%
67	C1019,C102	GRM36C0G3R3C5	CHIP-CAPACITOR	MURATA	ECCH000018	2	OK	1005	3.3p	+/-5%
68	C1012,C101	GRM36C0G3R9C5	CHIP-CAPACITOR	MURATA	ECCH000019	2	OK	1005	3.9p	+/-0.25p
69	C2006,C2007,C2008,C20	GRM36X5R223K16	CHIP-CAPACITOR	MURATA	ECCH000017	4	OK	1005	22n	+/-10%
70	C1004,C1009,C1029,C1030,C1031,C1041,C1045,C1050,C1051,C1059,C1064,C1066,C1071,C1073,C1075,C1087,C1089,C2010,C2011,C2012,C2013,C2016,C2020,C2025,C2034,C2035,C3001,C3003,C3004,C3005,C3008,C3009,C3010,C3011,C3012,C3014,C3018,C3020,C3021,C3800,C4001,C4007,C4010,C7000,C7002,C7004,C	GRM36X7R104K10	CHIP-CAPACITOR	MURATA	ECZH000310	55	OK	1005	0.1u	+/-10%
71	C6033	GRM39X5R105K25	CHIP-CAPACITOR	MURATA	ECZH000350	1	OK	1608	1u	+/-10%
72	C1070,C3022,C3024,C30	GRM39X5R225K10	CHIP-CAPACITOR	MURATA	ECCH000560	4	OK	1608	2.2u	+/-10%
73	C4902	GRM39X7R104K25	CHIP-CAPACITOR	MURATA	ECZH000350	1	OK	1608	100n	+/-10%
74	CON6001	HSBC-2P-23	2PIN-TERMINAL	HANSHIN-TE	ENZY001670	1	OK	4.0X5.1X2.4		
75	CON6000	HSBC-3P30-18	BATT-CONNECTOR	HANSHIN-TE	ENZY001940	1	OK	6.1X9.0X2.0		
76	U2000	ICRT20S48M0X514	RESONATOR	INNOCHIPS-T	EXRY000240	1	OK	1.2X2.0X0.7	48MHz	
77	F5000,F5001,F5002,F500	ICVE10184E070R1	EMI-FILTER	INNOCHIPS-T	SFEY001170	4	OK	0.8X1.6X0.5	10Ohm,7.5pF	
78	F5003,F5004,F5005,F5006,F50	ICVE10184E070R1	EMI-FILTER	INNOCHIPS-T	SFEY001140	5	OK	0.8X1.6X0.5	100Ohm,7.5pF	
79	R4300,R4301,R4302,R4303,R4304,R4305,R4306,R4307,R4308,R4309,R4310,R6010,R63	ICVL0505101V150	VARISTOR	INNOCHIPS-T	SEVY000360	13	OK	1005	5.6V-100p	
80	CON7000	JTAG_SON50	JTAG_SON50	NONE	TEST	1	NG			
81	U1000	KMS-512	MOBILE-S/W	HIROSE	ENWY000230	1	OK	3.0X3.8X2.3		
82	Q6000,Q7500	KRC421E	TRANSISTOR	KEC	EQBN001880	2	OK	1.6X1.6X0.8	NPN	
83	Q6001	KRX102E	TRANSISTOR	KEC	EQBA000060	1	OK			
84	U4001	LBRQ-2B43A	BLUETOOTH	LG-INNOTEK	SMZY001260	1	OK	3.2X4.5X1.2		

85	L1026	LK10052R2K-T	CHIP-INDUCTOR	TAIYO-YUDE	ELCH001040	1	OK	1005	2.2u	+/-20%
86	L1002,L102	LL1005-FHL47NJ	CHIP-INDUCTOR	TOKO	ELCH000142	2	OK	1005	47n	+/-5%
87	L1004	LL1005-FHL5N6J	COIL-INDUCTOR	TOKO	ELCH000142	1	OK	1005	5.6n	5%
88	U6000	LP3919B	PMIC	N.S.	EUSY034430	1	OK	.5X3.5X0.72		
89	U3005	MAX9722BETE	Stereo_Headphone	MAXIM	EUSY030390	1	OK	3.0X3.0X0.8	130mW_Capless	
90	C1081	MCH152CN472KK	CHIP-CAPACITOR	ROHM	ECCH00001	1	OK	1005	4.7n	+/-10%
91	C1049,C1058,C1060,C1061,C1065,C2003,C2021,C2022,C2023,C2024,C2027,C2028,C2029,C2030,C2031,C2032,C2033,C2036,C3002,C3	MCH153CN103KK	CHIP-CAPACITOR	ROHM	ECCH00001	24	OK	1005	10n	+/-10%
92	C2014,C201	MCH153CN153KK	CHIP-CAPACITOR	ROHM	ECCH00001	2	OK	1005	15n	+/-10%
93	C2000,C6008,C6026,C60	MCH153CN333KK	CHIP-CAPACITOR	ROHM	ECCH00001	4	OK	1005	33n	+/-10%
94	C1054	MCH155A080DK	CHIP-CAPACITOR	ROHM	ECCH00001	1	OK	1005	8p	+/-0.5p
95	C7019,C703	MCH155A100D	CHIP-CAPACITOR	ROHM	ECCH00001	2	OK	1005	10p	+/-0.5pF
96	C3019	MCH155A121JK	CHIP-CAPACITOR	ROHM	ECCH00001	1	OK	1005	120p	+/-5%
97	C2001,C2004,C601	MCH155A220JK	CHIP-CAPACITOR	ROHM	ECCH00001	3	OK	1005	22p	+/-5%
98	C1005,C1017,C1024,C1047,C1053,C6011,L	MCH155A470JK	CHIP-CAPACITOR	ROHM	ECCH00001	7	OK	1005	47p	+/-5%
99	C1027,C1028,C105	MCH155C270J	CHIP-CAPACITOR	ROHM	ECCH00001	3	OK	1005	27p	+/-5%
100	C1034,C1035,C1037,C1062,C1080,C4	MCH155CN102KK	CHIP-CAPACITOR	ROHM	ECCH00001	6	OK	1005	1n	+/-10%
101	C1055	MCH155CN152KK	CHIP-CAPACITOR	ROHM	ECCH00001	1	OK	1005	1.5n	+/-10%
102	C1023,C2002,C300	MCH155CN222KK	CHIP-CAPACITOR	ROHM	ECCH00001	3	OK	1005	2.2n	+/-10%
103	C1032,C103	MCH155CN332KK	CHIP-CAPACITOR	ROHM	ECCH00001	2	OK	1005	3.3n	+/-10%
104	R4002,R400	MCR01MZSF1000	RESISTOR	ROHM	ERHZ000020	2	OK	1005	100	+/-1%
105	R1020	MCR01MZSF1001	RESISTOR	ROHM	ERHY000320	1	OK	1005	1k	+/-1%
106	R1011,R6015,R601	MCR01MZSF1003	RESISTOR	ROHM	ERHZ000020	3	OK	1005	100k	+/-1%
107	R1010,R101	MCR01MZSF10R0	RESISTOR	ROHM	ERHZ000020	2	OK	1005	10	+/-1%
108	R1007,R101	MCR01MZSF1132	RESISTOR	ROHM	ERHZ000320	2	OK	1005	11.3k	+/-1%
109	R4500	MCR01MZSF1213	RESISTOR	ROHM	ERHZ000420	1	OK	1005	121k	+/-1%
110	R1004	MCR01MZSF2001	RESISTOR	ROHM	ERHZ000023	1	OK	1005	2k	+/-1%
111	R1017	MCR01MZSF2002	RESISTOR	ROHM	ERHZ000023	1	OK	1005	20k	+/-1%
112	R4400,R600	MCR01MZSF2003	RESISTOR	ROHM	ERHZ000023	2	OK	1005	200k	+/-1%
113	R1018	MCR01MZSF2402	RESISTOR	ROHM	ERHZ000032	1	OK	1005	24k	+/-1%
114	R6014	MCR01MZSF2492	RESISTOR	ROHM	ERHZ000025	1	OK	1005	24.9k	+/-1%
115	R4501,R450	MCR01MZSF3003	RESISTOR	ROHM	ERHZ000026	2	OK	1005	300k	+/-1%
116	R1027	MCR01MZSF3300	RESISTOR	ROHM	ERHZ000032	1	OK	1005	330	+/-1%
117	R7014	MCR01MZSF3301	RESISTOR	ROHM	ERHZ000026	1	OK	1005	3.3k	+/-1%
118	R4503,R600	MCR01MZSF3603	RESISTOR	ROHM	ERHZ000027	2	OK	1005	360k	+/-1%
119	R1013	MCR01MZSF3902	RESISTOR	ROHM	ERHZ000027	1	OK	1005	39k	+/-1%
120	R6013,R601	MCR01MZSF4703	RESISTOR	ROHM	ERHZ000028	2	OK	1005	470k	+/-1%
121	R1002,R102	MCR01MZSF49R9	RESISTOR	ROHM	ERHZ000029	2	OK	1005	49.9	+/-1%
122	R1009	MCR01MZSF5601	RESISTOR	ROHM	ERHZ000029	1	OK	1005	5.6k	+/-1%
123	R6008	MCR01MZSF5603	RESISTOR	ROHM	ERHZ000030	1	OK	1005	560k	+/-1%
124	R6019	MCR01MZSF8062	RESISTOR	ROHM	ERHZ000031	1	OK	1005	80.6k	+/-1%
125	R1012,R1014,R1016,R6011,R60	MCR01MZSJ100	RESISTOR	ROHM	ERHZ000040	5	OK	1005	10	+/-5%
126	R4006,R700	MCR01MZSJ101	RESISTOR	ROHM	ERHY000330	2	OK	1005	100	+/-5%
127	R2002,R4007,R400	MCR01MZSJ102	RESISTOR	ROHM	ERHZ000040	3	OK	1005	1k	+/-5%
128	R2003,R2004,R2009,R2010,R60	MCR01MZSJ103	RESISTOR	ROHM	ERHZ000040	5	OK	1005	10k	+/-5%
129	R1006,R7001,R7008,R70	MCR01MZSJ104	RESISTOR	ROHM	ERHZ000040	4	OK	1005	100k	+/-5%
130	R2000,R4005,R701	MCR01MZSJ105	RESISTOR	ROHM	ERHZ000040	3	OK	1005	1m	+/-5%
131	R3703,R370	MCR01MZSJ120	RESISTOR	ROHM	ERHZ000041	2	OK	1005	12	+/-5%
132	R1023	MCR01MZSJ123	RESISTOR	ROHM	ERHZ000240	1	OK	1005	12k	+/-5%
133	R6001,R600	MCR01MZSJ152	RESISTOR	ROHM	ERHZ000052	2	OK	1005	1.5k	+/-5%
134	R4682	MCR01MZSJ154	RESISTOR	ROHM	ERHZ000042	1	OK	1005	150k	+/-5%
135	R2007,R200	MCR01MZSJ184	RESISTOR	ROHM	ERHZ000043	2	OK	1005	180k	+/-5%
136	R2001	MCR01MZSJ202	RESISTOR	ROHM	ERHZ000043	1	OK	1005	2k	+/-5%
137	R3007,R300	MCR01MZSJ203	RESISTOR	ROHM	ERHZ000043	2	OK	1005	20k	+/-5%
138	R2006,R3001,R3002,R3006,R5011,R5	MCR01MZSJ222	RESISTOR	ROHM	ERHZ000044	6	OK	1005	2.2k	+/-5%
139	R3000,R600	MCR01MZSJ223	RESISTOR	ROHM	ERHZ000044	2	OK	1005	22k	+/-5%
140	R1024	MCR01MZSJ332	RESISTOR	ROHM	ERHZ000046	1	OK	1005	3.3k	+/-5%
141	R6004,R768	MCR01MZSJ333	RESISTOR	ROHM	ERHZ000046	2	OK	1005	33k	+/-5%
142	R4681,R7009,R7010,R7011,R7012,R7	MCR01MZSJ473	RESISTOR	ROHM	ERHZ000048	6	OK	1005	47k	+/-5%
143	R1005,R1008,R1022,R20	MCR01MZSJ510	RESISTOR	ROHM	ERHZ000049	4	OK	1005	51	+/-5%
144	R2011	MCR01MZSJ514	RESISTOR	ROHM	ERHZ000049	1	OK	1005	510k	+/-5%
145	R3004	MCR01MZSJ682	RESISTOR	ROHM	ERHZ000050	1	OK	1005	6.8k	+/-5%
146	R2005	MCR01MZSJ684	RESISTOR	ROHM	ERHZ000050	1	OK	1005	680k	+/-5%
147	R1003,R1021,R701	MCR01MZSJX240	RESISTOR	ROHM	ERHZ000052	3	OK	1005	24	+/-5%
148	L6000,L600	MIPF2016D2R2	POWER-INDUCTOR	TDK	ELCP001000	2	OK	1.6X2.0X1.0	2.2u	+/-30%
149	U2002	MSM6500_90NM	MSM6500_90NM	QUALCOMM	EUSY017090	1	OK	1.4X1.4X1.2		
150	U7006	MV8635	CAMERA-MULTIM	MTEK-VISION	EUSY033080	1	OK	8.0X8.0X1.4		
151	R6017	NCP18WD683E03	THERMISTOR	MURATA	SETY000140	1	OK			
152	U4000	NCP348MTTBG	OVERVOLTAGE_P	ON-SEMICON	EUSY031920	1	OK	2.0X2.5X0.8		
153	U4300	NCS2200SQ2T2G	Comparator	ON-SEMICON	EUSY025050	1	OK	2.0X2.1X1.1		
154	L6002	NFM18PC104R1C3	EMI-FILTER	MURATA	SFEY001530	1	OK	0.8X1.6X0.7		
155	U3100,U701	R1114D181D-TR-	LDO	RICOH	EUSY029470	2	OK	1.6X1.6X0.6	1.8V-150mA	
156	U3101	R1114D281D-TR-	LDO	RICOH	EUSY023281	1	OK	1.6X1.6X0.6	2.8V-150mA	
157	U7014	R1131D121D	LDO	RICOH	EUSY033310	1	OK	1.6X3.0X0.8	1.2V-300mA	
158	U7013	R1180D121B	LDO	RICOH	EUSY033330	1	OK	1.6X1.6X0.6	1.2V-150mA	
159	U7011	R1180D261B-TR-	LDO	RICOH	EUSY029500	1	OK	1.6X1.6X0.6	2.6V-150mA	
160	U7010	R1180D301B-TR-	LDO	RICOH	EUSY030870	1	OK	1.6X1.6X0.6	3.0V-150mA	
161	U7009	R1180D331B	LDO	RICOH	EUSY033300	1	OK	1.6X1.6X0.6	3.3V-150mA	
162	U1006	RFR6500	RFR6500	QUALCOMM	EUSY025770	1	OK	8.0X8.0X0.9		
163	U1007	RFT6150	RFT6150	QUALCOMM	EUSY025780	1	OK			
164	F1004	SAFEB836MAL0F0	SAW-FILTER	MURATA	SFSY002990	1	OK	.05X1.35X0	836.5MHz,DCN_Tx_SAW	
165	F1001	SAFEB881MFM0F0	SAW-FILTER	MURATA	SFSY003000	1	OK	.05X1.35X0	881.5MHz,DCN_Rx_SAW	
166	CON400	SCHA1B0102	Trans-Flash-Sock	ALPS	ENSY001580	1	OK	4.0X16.0X1.9		
167	D4001	SD12T1G	TVS-DIODE	ON-SEMICON	EDTY000740	1	OK			
168	D4000	SDB1040	SCHOTTKY_BARRI	AUK	EDSY001770	1	OK	1.6X2.7X0.8		
169	F1000	SF14-1575M5UB0	SAW-FILTER	KYOCERA	SFSY003240	1	OK	1.1X1.4X0.6	1575.42MHz	
170	Q6002	SI5463EDC-T1-E3	P-MOSFET	VISHAY	EQFP000480	1	OK			
171	U1005	SIP4282	Load-Switch	VISHAY	EQFP000900	1	OK	1.6X1.6X0.8		
172	Q1000	TC7SH04FU_TE85	INVERTER	TOSHIBA	EUSY007340	1	OK			
173	C4008,C701	TCSCM0J106MJAR	TANTAL-CAPACIT	SAMSUNG	ECTH000370	2	OK	1608	10u-6.3V	+/-20%
174	U3002	TY9000A000JMGF	MEMORY	TOSHIBA	EUSY032200	1	OK	0.0X13.5X1.		
175	TP2000,TP3001,TP6000,TP7000,TP7001,TP7002,TP7003,TP7004,TP7005,TP7007,TP7008	Tp_0_5	TEST-POINT	TEST	TEST	12	NG			
176	U4004	UART-TP	UART-TP-CDMA	TEST	TEST	1	NG			
177	U7015	ULCA2114C015FR	VARISTOR	INNOTECH	SEVY000880	1	OK	2.0X1.2X0.5	0.5p_14V	
178	U3003	YMU800-WZ	AUDIO_CODEC	YAMAHA	EUSY030640	1	OK	.45X4.15X1.		

No.	Desig-No.	Component-Name	Desc./Remark	Maker	New-ItemNo.	Qty	SMT	Size	Value	Tolerance
1	C107,C201,C120	1005C	1005C-DNI	NONE	TEST	3	NG	1005	DNI	
2	R120,R206	1005R	1005R-DNI	TEST	TEST	1	NG	1005	DNI	
3	CON100	AXK780147G	80-PIN-CONNECT(	MATSUSHITA	ENBY001990	1	OK		SOCKET	
4	CON101	AXK8L50125BG	50PIN-CONNECTO	MATSUSHITA	ENBY002240	1	OK		HEADER	
5	U200	BD6085GUL	4LDO	ROHM.	EUSY023010	1	OK	3.3X3.3X0.55		
6	C103,C202,C203,C204,C206,C207,C208,C20	C1005X5R1A105KT	CHIP-CAPACITOR	TDK	ECZH000121	9	OK	1005	1u	+/-10%
7	U202	EM-1681-FT	HALL-EFFECT-SW	ASAHI-KASEI	EUSY025000	1	OK	2.1X2.1X0.65		
8	C200	GRM188R60J106MI	CHIP-CAPACITOR	MURATA	ECCH000560	1	OK	1608	10u	+/-20%
9	C102,C212,C213	GRM36X7R104K10I	CHIP-CAPACITOR	MURATA	ECZH000310	3	OK	1005	0.1u	+/-10%
10	C205	GRM39X5R225K10	CHIP-CAPACITOR	MURATA	ECCH000560	1	OK	1608	2.2u	+/-10%
11	F200,F201,F202	ICVE21144E500R1(	EMI-FILTER	INNOCHIPS-T	SEVY000580	3	OK			
12	C100,C101,C104,C105,C106,C217,C218	ICVL0505101V150F	VARISTOR	INNOCHIPS-T	SEVY000360	8	OK	1005	5.6V-100p	
13	CON102	JTAG_STANDARD_	JTAG_STANDARD_	TEST	TEST	1	NG			
14	SW207,SW215,SW216,SW217	KEY_DOME_4_0_3_	KEY_DOME_4.0_3.(	NONE	TEST	4	NG	3.8X4.8		
15	SW100,SW200,SW201,SW202,SW203,SW204 ,SW205,SW206,SW208,SW209,SW210,SW21	KEY_DOME_5_0_4_	KEY_DOME_5.0_4.	NONE	TEST	15	NG	4.8X5.8		
16	Q200	KRC404V	TRANSISTOR	KEC	EQBN001410	1	OK			
17	Q100	KRX102E	TRANSISTOR	KEC	EQBA000060	1	OK			
18	LED100	LEWWH25LA	LED	LG-INNOTEK	EDLM000860	1	OK	.5X2.0X0.45		
19	C214,C216	MCH153CN103KK	CHIP-CAPACITOR	ROHM	ECCH000015	2	OK	1005	10n	+/-10%
20	C108,C109	MCH155C150J	CHIP-CAPACITOR	TDK	ECCH000011	2	OK	1005	15p	+/-5%
21	R103,R208,R209	MCR01MZSF1001	RESISTOR	ROHM	ERHY000320	3	OK	1005	1k	+/-1%
22	R212,R213	MCR01MZSF1203	RESISTOR	ROHM	ERHZ000021	2	OK	1005	120k	+/-1%
23	R210,R211	MCR01MZSF5102	CHIP-RESISTOR	ROHM	ERHZ000029	2	OK	1005	51k	+/-1%
24	R100	MCR01MZSJ000	RESISTOR	ROHM	ERHZ000040	1	OK	1005	0	+/-5%
25	R105	MCR01MZSJ103	RESISTOR	ROHM	ERHZ000040	1	OK	1005	10k	+/-5%
26	R106	MCR01MZSJ104	RESISTOR	ROHM	ERHZ000040	1	OK	1005	100k	+/-5%
27	R101,R102,R200,R201	MCR01MZSJ222	RESISTOR	ROHM	ERHZ000044	4	OK	1005	2.2k	+/-5%
28	R207	MCR01MZSJ472	RESISTOR	ROHM	ERHZ000048	1	OK	1005	4.7k	+/-5%
29	R203,R204	MCR01MZSJ560	RESISTOR	ROHM	ERHZ000049	2	OK	1005	56	+/-5%
30	D100	RB521S-30	Z-DIODE	ROHM	EDSY001190	1	OK			
31	D200,D201,R104	RSB6_8CST2R	TVS-DIODE	ROHM	EDTY000940	3	OK	0.6X1.0X0.56		
32	M100	SPOB-413S35-RC	MIC	BSE	SUMY001051	1	OK	4.2X4.2X1.6		
33	LED200,LED201	SSC-SWTS1007	SIDE_VIEW_LED	SEOUL_SEMI(	EDLH001340	2	OK	0.95X3.8X0.(	WHITE	
34	U203	TPA6205A1DRBR	AMP	T.I.	EUSY033570	1	OK	3.0X3.0X1.0	1.2W	

35	U100	TSC2007IYZGR	Touch_screen_cont	T.I.	EUSY033710	1	OK	2.0X2.5X0.63		
36	TP100,TP101,TP102,TP103,TP104	Tp_1_0	TEST-POINT	TEST	TEST	5	NG			

No.	Desig-No.	Component-Name	Desc./Remark	Maker	New-ItemNo.	Qty	SMT	Size	Value	Tolerance
1	CON1000	04-6293-037-001-	37PIN-CONNECTO	KYOCERA/EL	ENQY001430	1	OK	.7X13.0X0.9	SLIDE-TYPE	
2	CON1002	04-6298-006-000-	6PIN-CONNECTOR	ELCO	ENQY000860	1	OK	3.7X5.4X1.0		
3	CON1003	AXK7L50227G	50PIN-CONNECTO	MATSUSHITA	ENBY002250	1	OK		SOCKET	
4	R1000,R1001	ICVL0505101V150F	VARISTOR	INNOCHIPS-T	SEVY000360	2	OK	1005	5.6V-100p	
5	M+,M-	PAD_0_8X2_0	PAD_0.8_2.0	NONE	TEST	2	NG	0.8X2.0		
6	S+,S-	PAD_0_95X1_8	PAD_0.95_1.8	NONE	TEST	2	NG	0.95X1.8		