

CIRCUIT DESCRIPTION

OPERATING PRINCIPLE OF THE TELEPHONE

The circuit of the telephone consists of Polarity guard circuit, Overvoltage protecting circuit. Electronic ringing tone circuit, Incoming call input circuit, Switch circuit, Dialing circuit, Decoding circuit and Speech circuit.

Basic Operating Principle:

In on-hook state, hook switch is being disconnected, only the ringing tone circuit and decoding circuit are connected with the telephone line. When there is ringing signal coming from the telephone line, it is transmitted to ringing tone circuit by C101 and C102, then drive the phone to ring. When there is incoming call signal coming in, it is transmitted to decoding circuit by C502 and C501 for decoding, then CPU sends the decoding information to LCD to display the incoming call number.

In off-hook state, hook switch and switch circuit are being closed, the feeding current is transported CPU, speech circuit and dialing circuit, now dialing and conversation and so on can be operated on the phone.

Critical Components:

The Surge suppressor RV2 (10D201K) and thunder-proof component RV1 (TPA200): Protect the phone from thunder destroyed. When the thunder happens to the phone, it can be broken down and release the high voltage out, so that the high voltage can't come into the inner circuit to avoid the phone being destroyed by it. If so, only replace the surge arrestor to resume the phone. CPU U1: Main controller with dialer, decoder, LCD driver and main function options, etc.

1.0 OVERVOLTAGE PROTECTING CIRCUIT

This part circuit contains RV1, RV2, LH1, LH2 and other accessorial components. They can short the overvoltage exceeding 200V from telephone line, so protect the phone from the overvoltage destroyed.

2.0 ELECTRONIC RINGING TONE CIRCUIT

Ring tone signal of the telephone is an output of CPU, and it is transmitted to a ringing amplifying circuit to be amplified. Ringing amplifying circuit consists mainly of these components of Q101~Q103, C101, C102, etc.

When the handset is in the cradle position, AC voltage from exchanger is rectified by a bridge rectifier (D101-D104) and is steadied by a manostat(Z101), then makes a voltage of less than 27V, which supplies power for ringing amplifying circuit(Q101~Q103, etc). After receiving the ringing identifying signal from R109 and R110, CPU makes a ringing tone output from DTMF pin. Subsequently the ringing output is transmitted to ringing amplifying circuit to be amplified by

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Q101~Q103. And finally it is transmitted to speakerphone to send ringing tone out by a coupling capacitor C105 and a ringing transformer T1.

3.0 DECODING CIRCUIT AND INCOMING CALL INPUT CIRCUIT

Decoding circuit of incoming call number consists of C501, C502, and R501, etc.

When receiving an incoming call signal from telephone line, it is coupled by the capacitors C501 and C502 and then is transmitted to U1 through the pins TIP and RING. After U1 receives the signal, the decoder starts to decode it and then puts the decoding information to LCD driver for driving the LCD to display the call number.

4.0 DIALING CIRCUIT

Dialing circuit consists of U1's dialer, key board, Q205 and its accessorial components, switch circuit (Q202-Q204) and its accessorial circuits. When hook switch is closed and Q202-Q204 are opened, dialing can be operated.

Dialing mode includes Pulse and Tone and they can be set by U1 directly.

When CPU is at Tone dialing mode, dial the phone number on key board, then the number information is sent to U1. After analyzing U1 makes an output of dual audio frequency signal from its DTMF pin. Then the signal is transmitted to telephone line after amplified by Q205.

When CPU is at Pulse dialing mode, dial the phone number on key board, then the number information is sent to U1. After analyzing U1 makes a pulse signal from its DPO pin, the pulse signal makes the level of DPO pin turn to high or low in order to control the switch transistors Q202-Q204 to open or close. The times of open and close depends on pulse quantity of pulse signal. For example, quantity of pulse is 9, then DPO has 9-times change of high and low to control the switch transistors to open and close 9 times. Then the open and close signals for the dialed numbers are transported to telephone line.

5.0 SWITCH CIRCUIT

Switch circuit consists of Q202-Q204 and its accessorial circuits. It mainly performs controlling the on-hook or off-hook of the telephone. And when the telephone is in on-hook state, the circuit supplies operating voltage for the telephone.

6.0 SPEECH CIRCUIT

Speech circuit consists of handset transmitting & receiving amplifying circuit and handsfree transmitting & receiving amplifying circuit.

a. Handset transmitting amplifying circuit

It consists of handset Microphone MIC1, primary amplifier Q303, secondary amplifier Q301 and their accessorial circuits. The handset Microphone is supplied power via R316, it can change the speech signal to electricity signal, then is coupled by C320 to Q303 to be amplified.

Subsequently it is coupled by C316 to Q301 to be amplified and changed to voltage signal, which is sent to telephone line.

b. Handset receiving amplifying circuit

It consists of Receiver REC, amplifier Q302 and their accessorial components. The voltage signal from telephone line is coupled by C311 to Q302 to be amplified, then is sent to the Receiver to be changed to speech signal. Then you can hear the other party's voice from handset.

c. Handsfree transmitting amplifying circuit

It consists of handsfree Microphone MIC2, primary amplifier Q303, secondary amplifier Q301 and their accessorial components. The handsfree Microphone is supplied power via R315, it can change the speech signal to electricity signal, then is coupled by C323 and R217 to Q303 to be amplified. Subsequently it is coupled by C316 to Q301 to be amplified and be changed to voltage signal, which is sent to telephone line.

d. Handsfree receiving amplifying circuit

It consists of power supply components of Q404 and Q405, amplifier Q302, power amplifier Q401~Q403 and their accessorial components. Q404, Q405 and their accessorial components are an active power filter, it can supply power for the OTL power amplifier (Q401~Q403). When a voltage signal from telephone line, it is coupled by C311 to Q302 to be amplified, then also is coupled by C401, C402, R401 and R403 to the OTL power amplifier to be amplified and changed to speech signal, finally it is coupled by C407 and sent to Speaker. Then you can hear the other party's voice from the speaker.

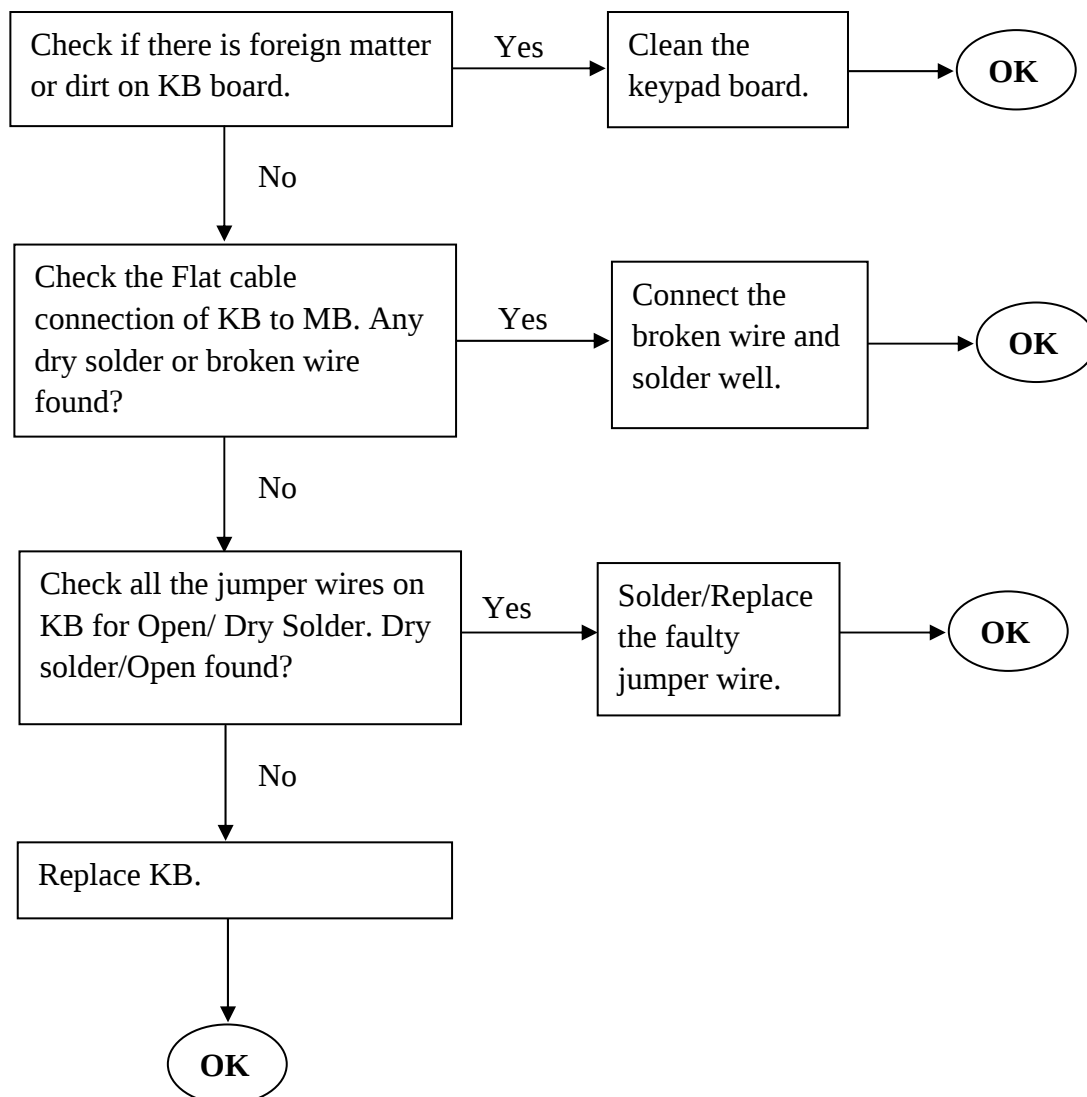
TROUBLE SHOOTING

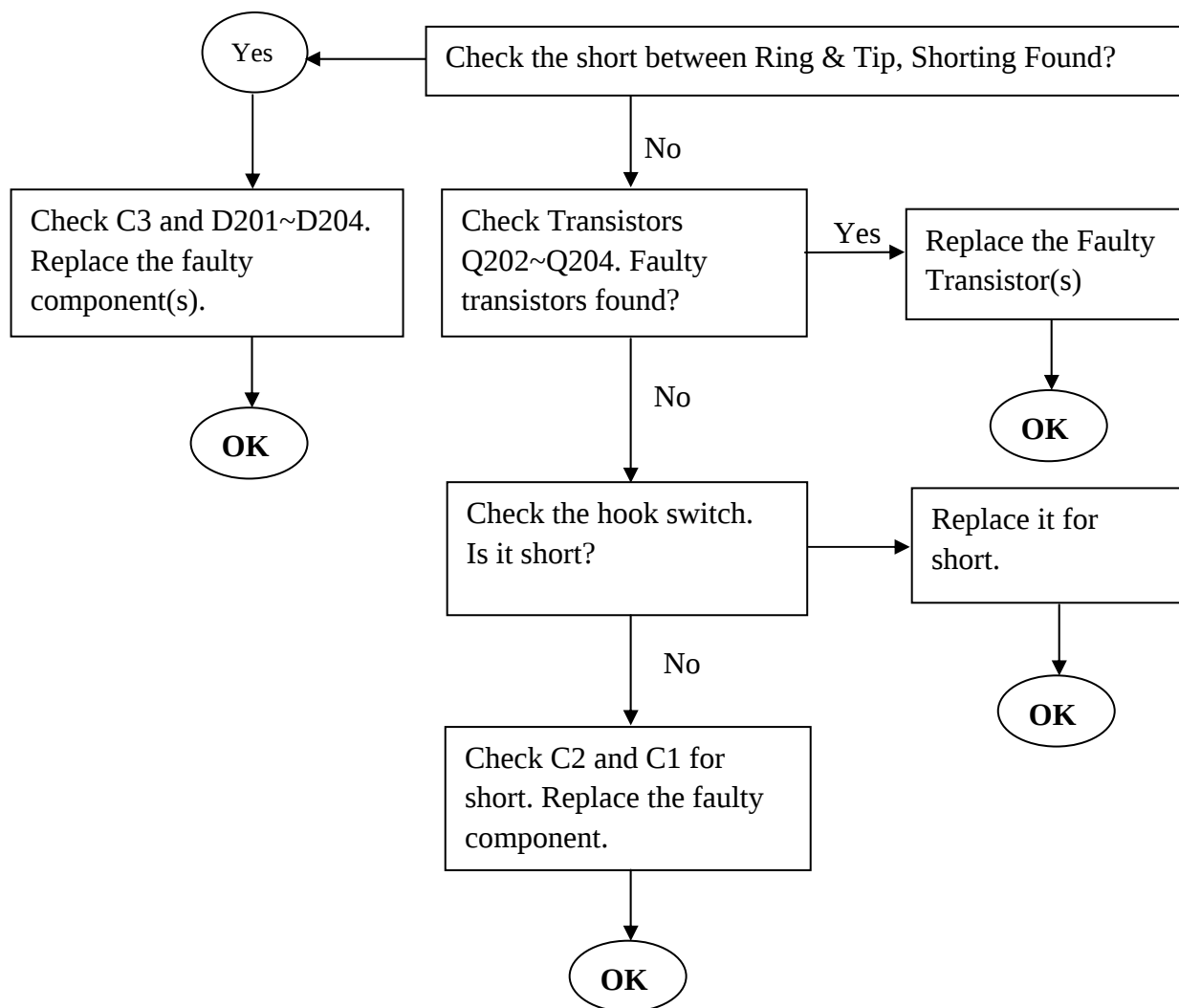
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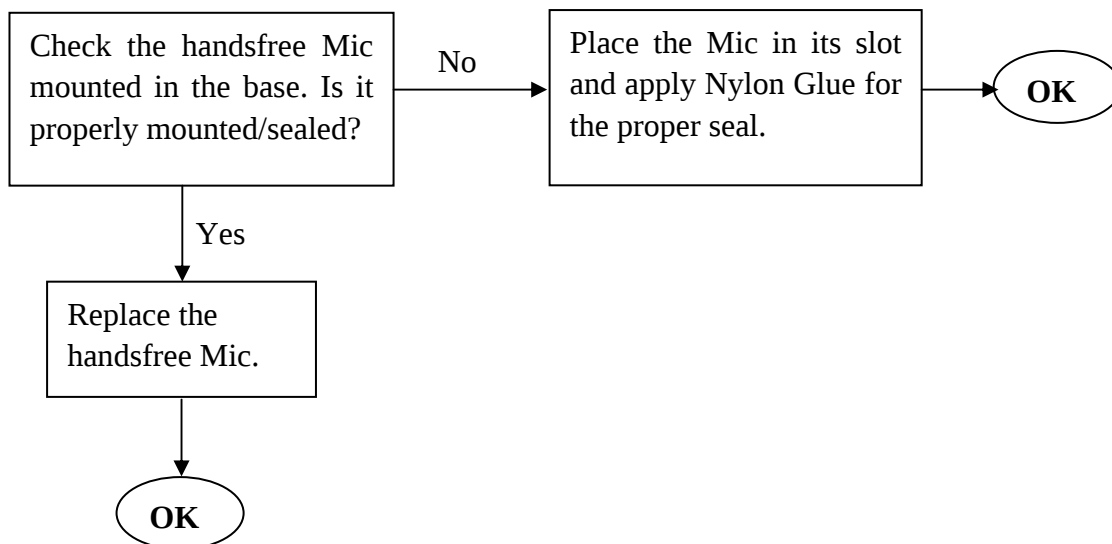
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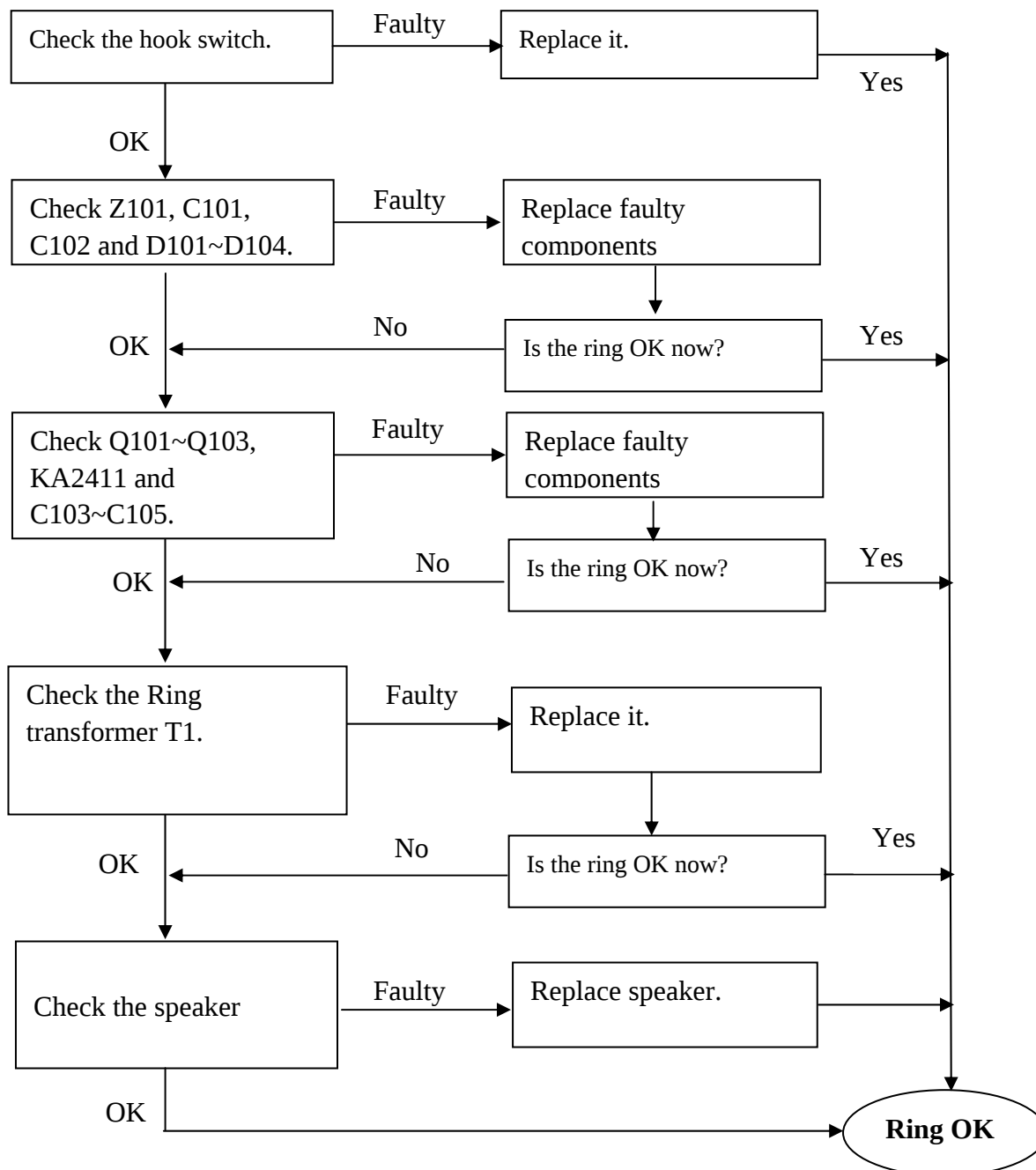
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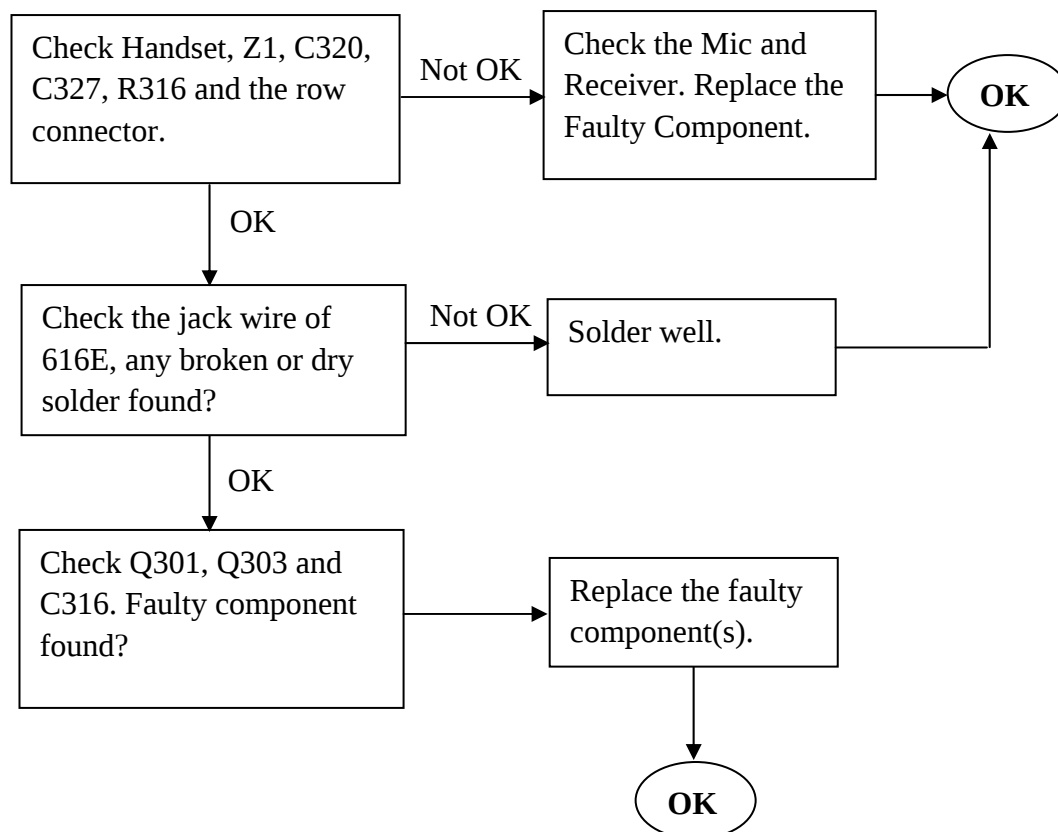
Problem 1: Partial dialing (Complete Row or Column of keypad not working)

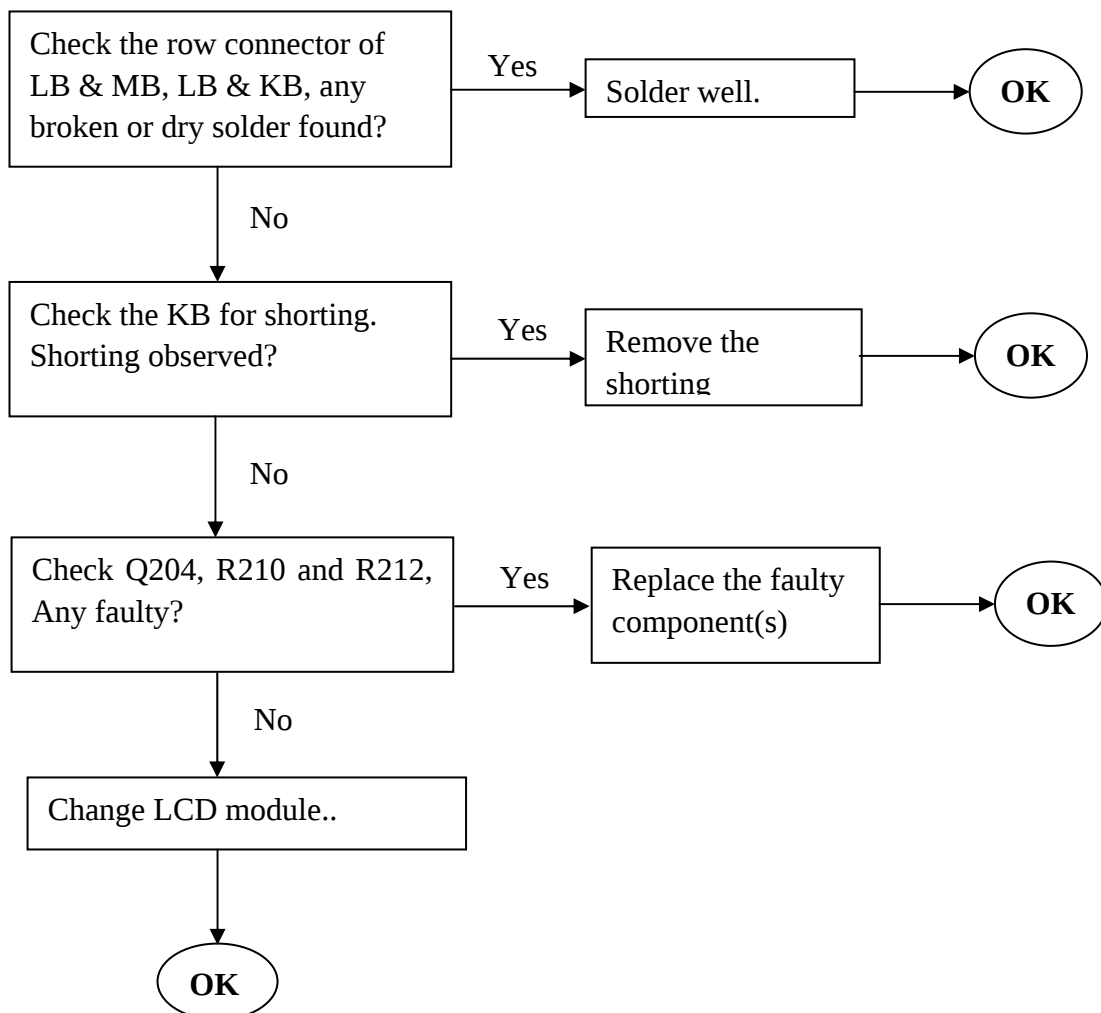


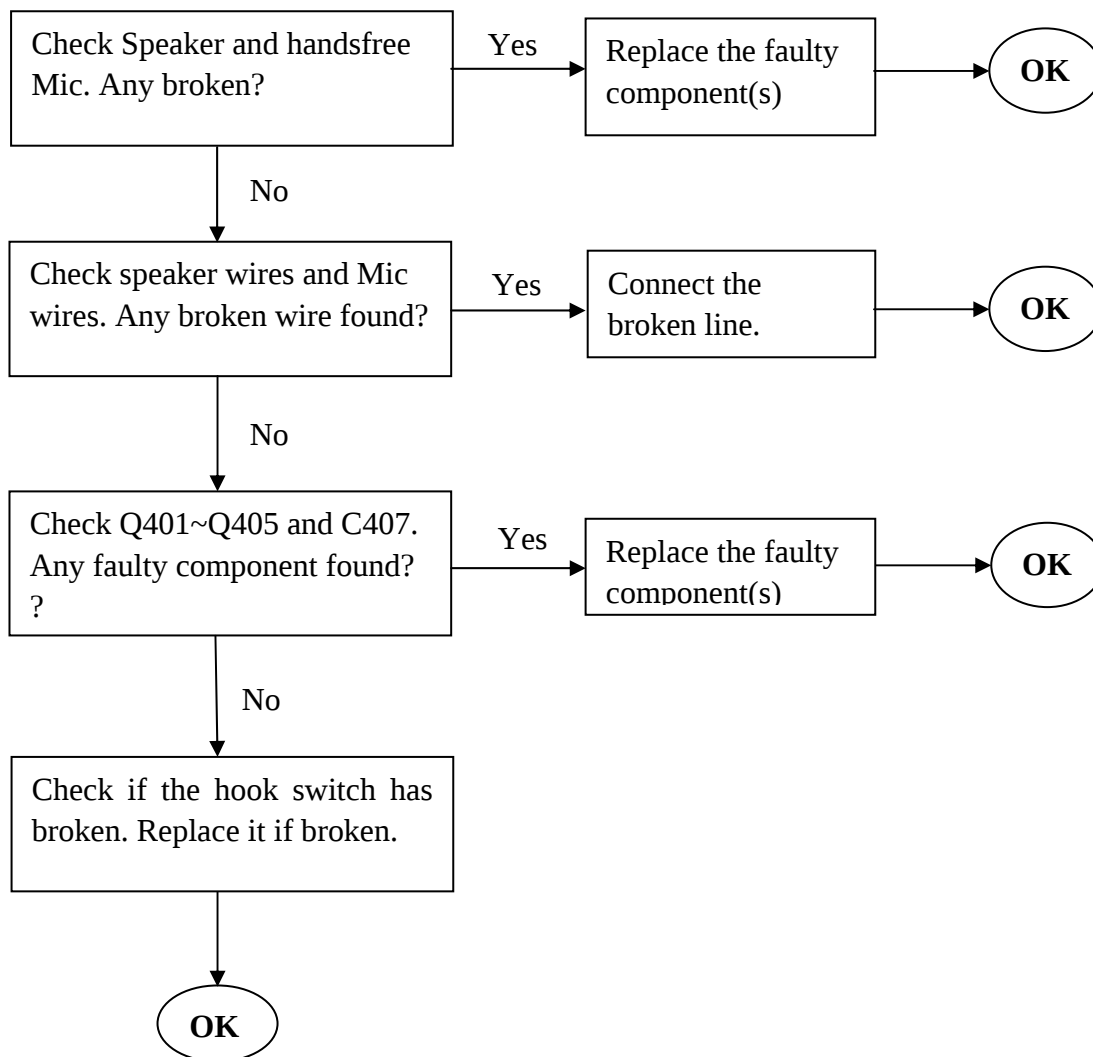
Problem 2: Phone permanent OFF - HOOK

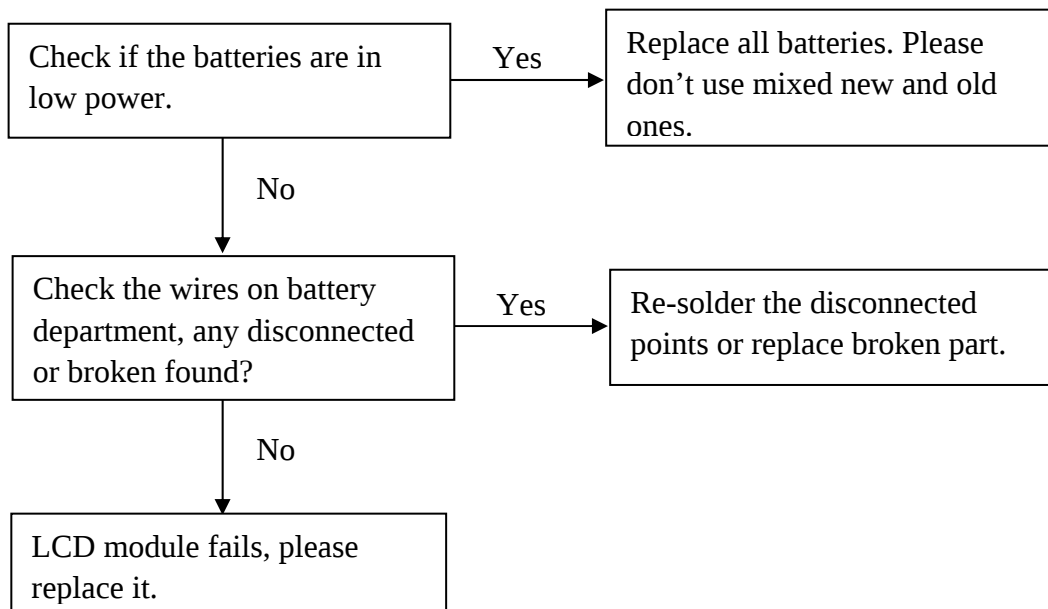
Problem 3: Whistling sound in handsfree mode

Problem 4: No ring

Problem 5: No handset receiving and transmitting.

Problem 6: No Pulse & Tone dialing

Problem 7: No transmitting & receiving in handsfree mode


**Problem 8: No display**

Problem 9: No Caller ID Number Display