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Motorola GmbH, CSS Center, Mobile Devices

Doc. No: TSG_W220

Version: 1.0

Date: 19.12.2006

Title: Troubleshooting-Guide W220

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DEBUG GUIDE W220 LEVEL 3

Repair Support Information
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SPECIAL KEY SEQUENCE FOR SPECIAL FUNCTION

Key Sequence	Test Function/Name	Remarks
*#06#	IMEI Check	No Test Mode Required
***837# 	Flex Version/Technology/S-W Version/Readiness Status	No Test Mode Required
*#*367628# 	Erase data from the file system, such as photos, melodies, java, etc.	
*#*778337# 	Erase data from E2P, such as user's phonebook	
*#*372# 	Test Display, Melody, speaker, keypad, etc.	

Requirements

- **System Requirements**
- *Power supplies, Oscilloscope, Spectrum Analyzer, Test Set*
- *Pre-heater for lead free soldering/ solder machine for BGA's*
- *Microscope*
- *Mobile Service Tools (MST)*
- *Field Service Bulletins*
- *Block diagrams/Schematics*
- **Basic information on troubleshooting Motorola Phones**
- *Make sure all contacts are clean*
- *Use newest approved Software*
- *RESET / MASTER CLEAR can fix some issues*
- *Do a visual inspection on customer abuse/liquid contamination*
- **Advice on working with lead free soldering**
- *Work very carefully because of underfill*
- *Use protection shields*
- *Use lead free flux*
- *Use pre heater (HAKKO 853)*



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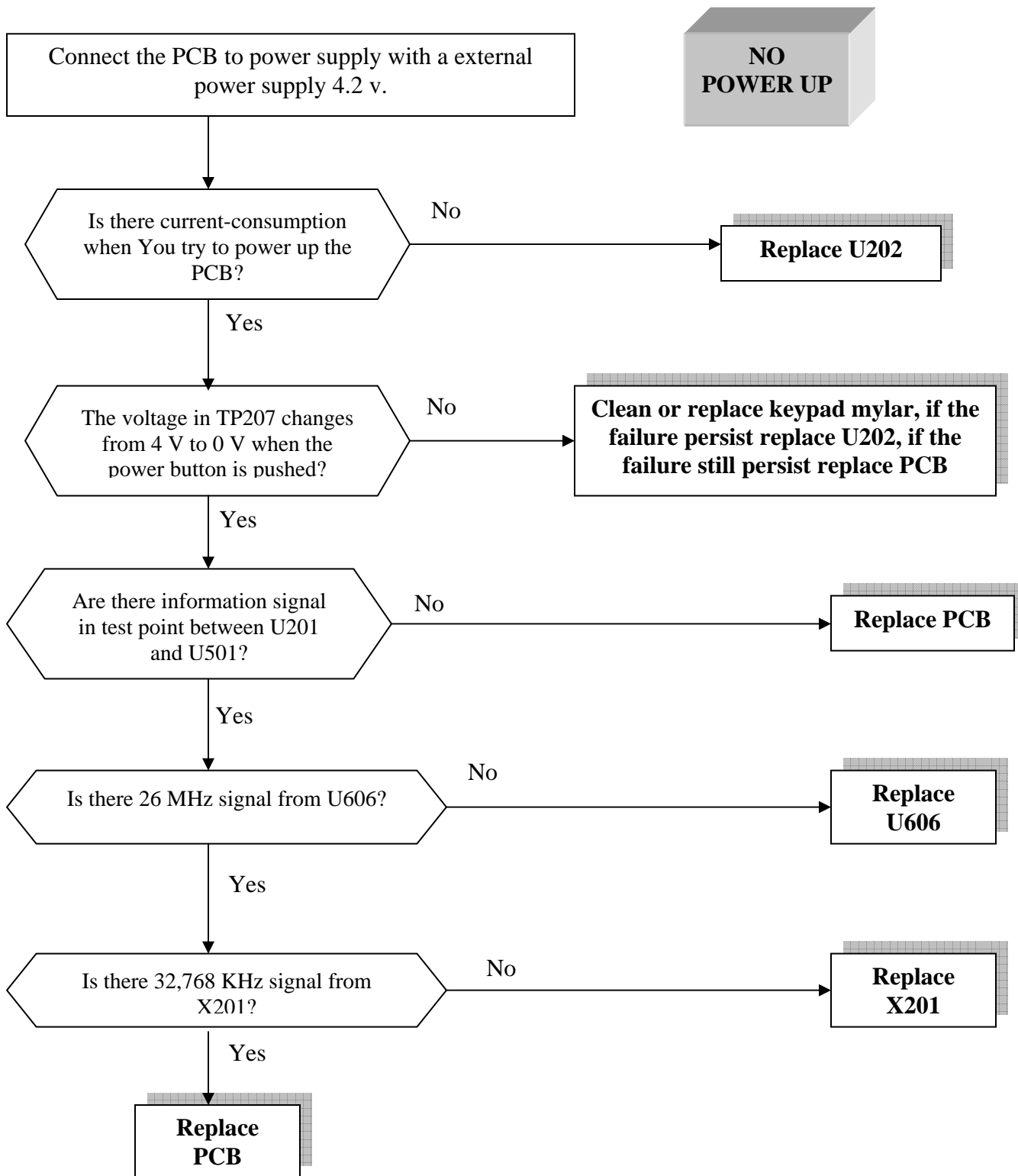
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Tools	Part-number	Picture
USB cable C115, C116, C117, C155, V170, V171	5-00-1K-10000	 <p>USB Cable C115 5-00-1K-10000</p>
RF Probe TA02 (replaces old revision 30012)	5-00-F4-10000	 <p>RF Connector TA02 (replaces 30012) 5-00-F4-10000</p>
Main Battery W220/W300	5-00-X3-10000	





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SPECIAL PROCEDURE FOR HIGH CURRENT FAILURE - EXAMPLE

In probably most cases these problems are caused by an off current. One first look should be to verify whether there is an off current. If there is an off current it should be checked whether the device draws current via battery and/or via external connector.

In case of an off current via battery there should be a low resistance (less than ~200 Ohm)/ or a short from BATT+_RAW (M5400-4) to GND.

To localize the defective part causing the short/ low resistance a simple way is to freeze the board with a coolant spray, supply a battery voltage from a power supply using micro clamp-type test probes, and see which parts are getting warm. **This is a very basic and essential method to troubleshoot off current / high current consumption failures.**

The power supply should be set to 3.6V with current limitation to 2A. We strictly recommend checking the current the PCB draws on the display of the power supply.

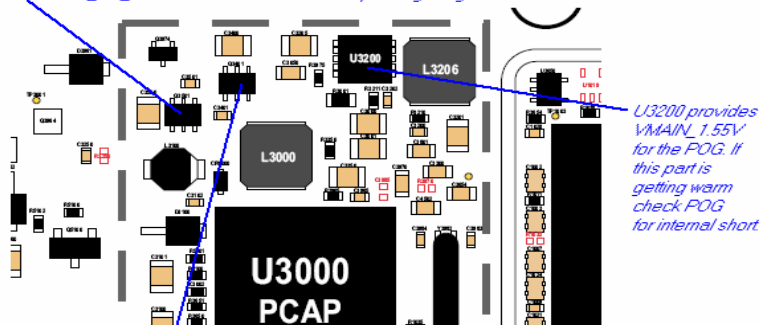
Shields covering suspected parts should be removed before freezing the PCB.

The PCB should be handled with care. After removing the shields the PCB should be given some time to cool down slowly before freezing it to far below zero to avoid physical stress to the multilayer PCB with lead free soldered parts.

In some cases the part, which is getting warm has itself an internal short. After removing this part the off current should be fixed. For verification check off current or measure resistance BATT+_RAW (M5400-4) to GND. A new part can be placed.

If the short / low resistance remains after removing the part which was getting warm, it should be checked which signals/ voltages this parts provide. In the most cases this part will provide a supply voltage to other parts from which one possibly could have an internal short and therefore is getting warm.

Q3501 provides VRF_RX_2.775V for Blue Module. If this part is getting warm check Blue Module for internal short.



Q3401 provides VRF_TX_2.775V for Rattler IC, GSM PA and WCDMA PA. If this part is getting warm check Rattler and PA's for internal short.



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To find out the defective part an easy way is to use the Flensburg Layout Viewer to follow the signal (check for Shorts Resistors after which the signals possibly could have a changed name), and to remove the parts one after another, until the short is gone.

Most frequent parts with internal shorts causing these kinds of failures are the PA's

Example:

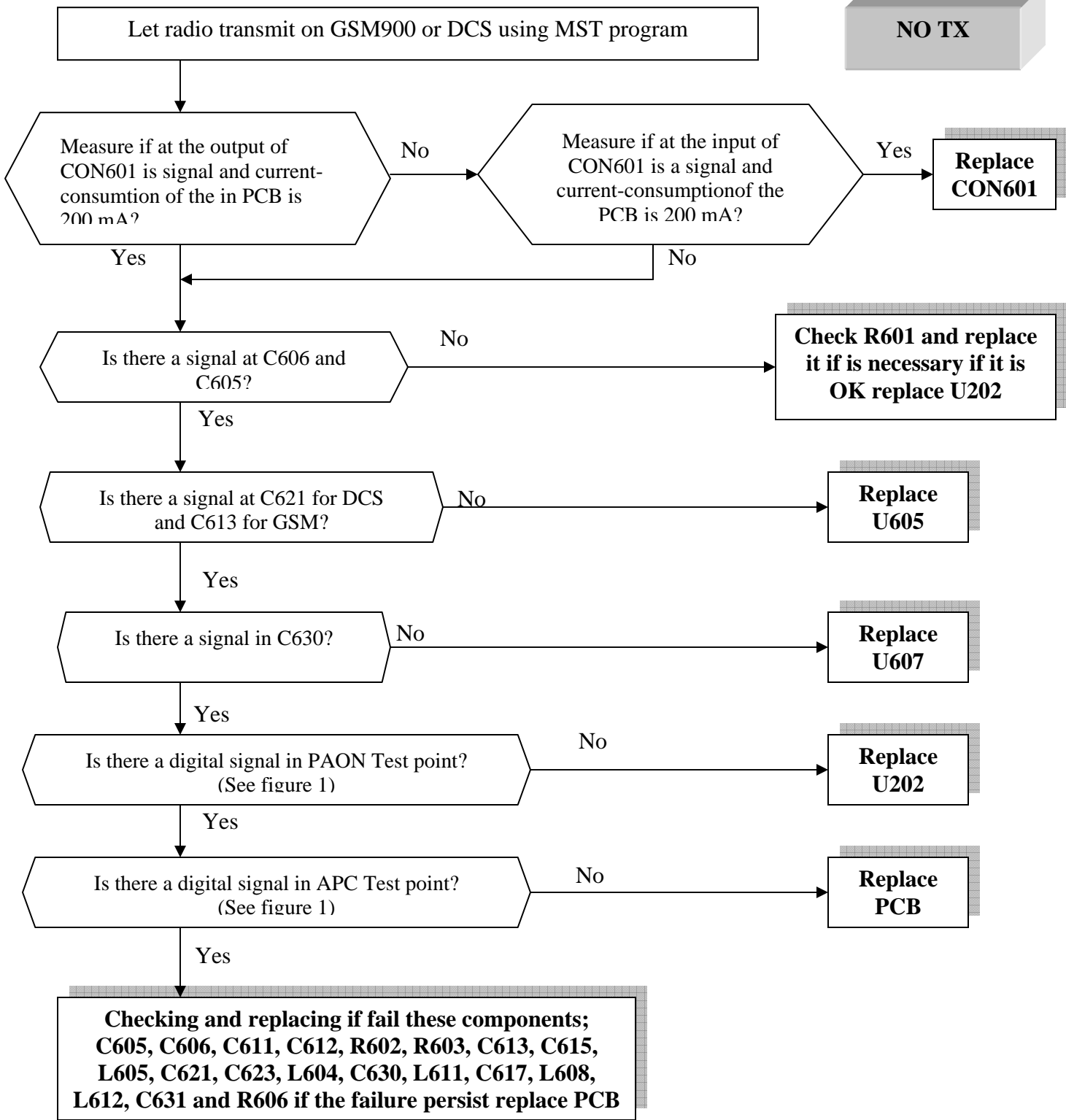
- BAT00 – radio draws about 400 mA in standby, no off current
- Q3501/U3000 are getting warm



- Q3501 provides VRF_RX_2.775V for Blue Module U900 via Short Resistor R902 (using Flensburg Layout Viewer)



- Blue Module U900 is also getting warm
- Blue Module U900 itself has an internal short. → Defective U900





	VC1	VC2
GSM_TX	H	L
DCS TX	L	H
GSM/DCS_RX	L	L

Work table for duplexer

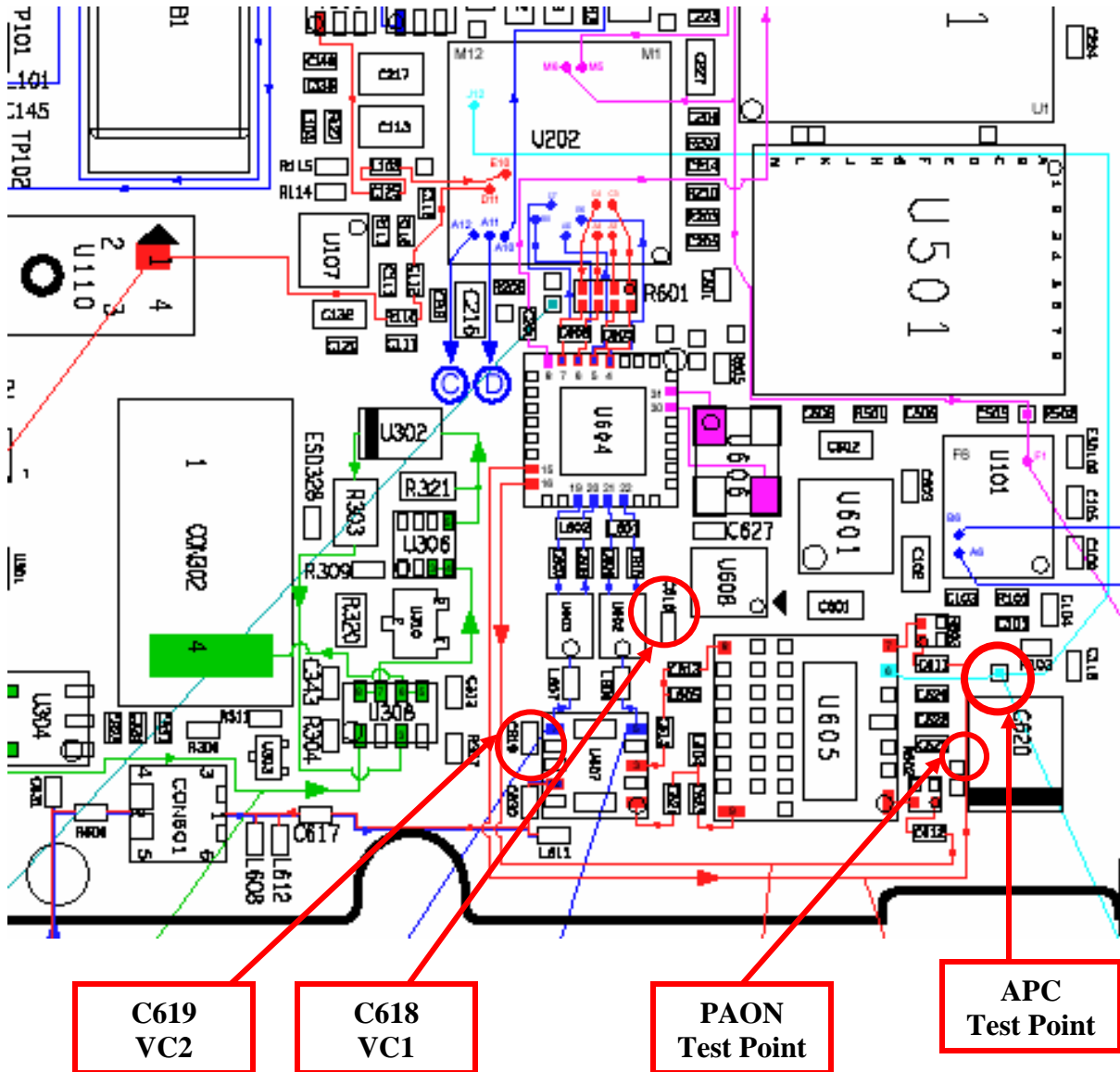
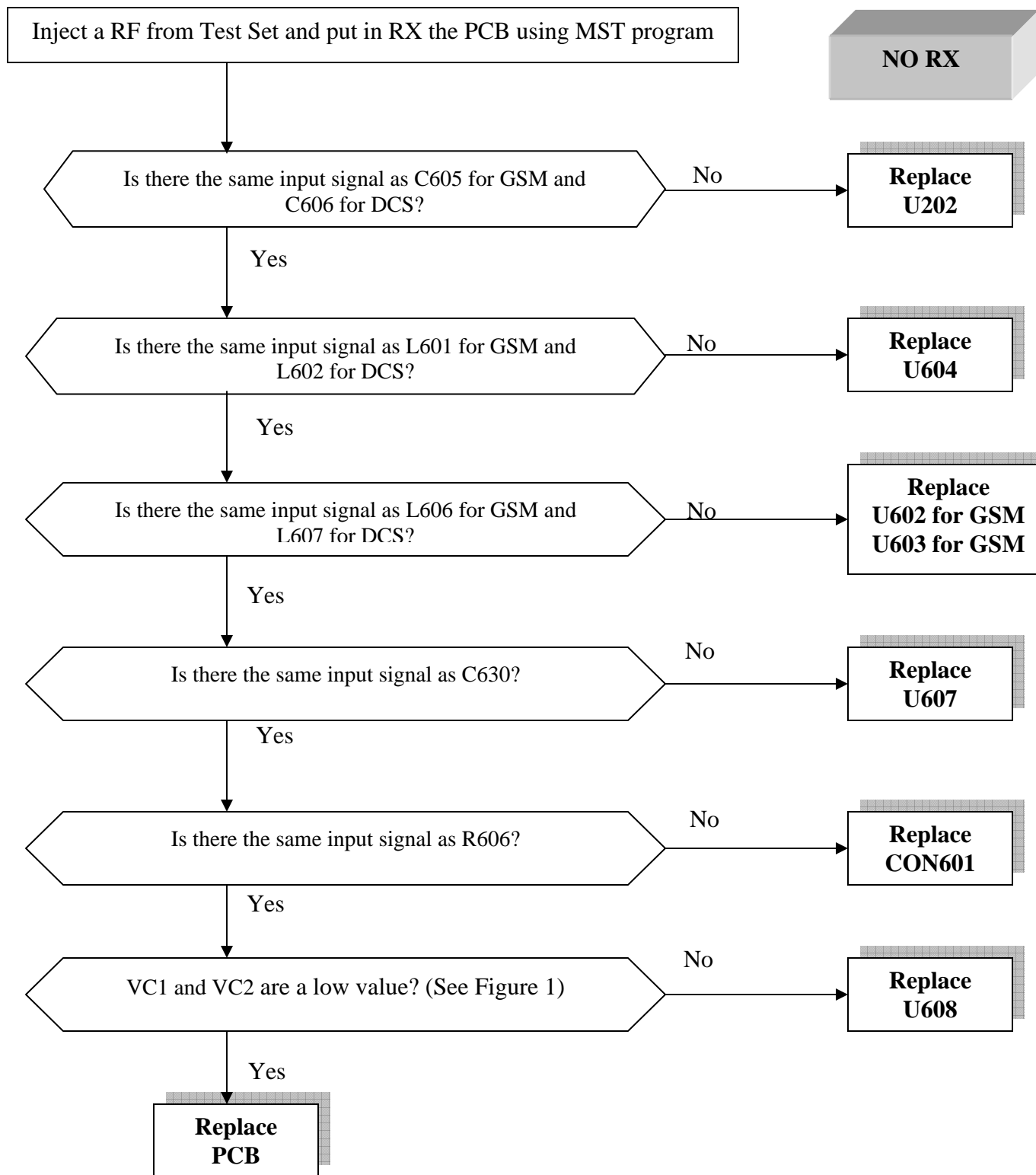



FIGURE 1



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SPECIAL NOTE

Follow up failures caused by repair action

Quite a lot of repairs which were sent to Level 4 service have a second fault, which is caused by an unsuccessful repair trial.

We stricktly recommend visually checking the PCB for skewed or tombstoned parts, soldering shorts or heating bubbles in PCB after every soldering action. Especially small parts which are located close to shields can easily be misplaced during removal or setting of the shields.

We experienced that some parts seems to be more heat sensitive than others.