Troubleshooting Guide Z3---Level 3

MOTORIZR™ Z3

Digital Wireless Telephone

GSM 850/900/1800/1900 MHz, EDGE, GPRS

This document was created to assist analyzers troubleshooting on Motorola GSM Phones. All information was collected during the repair in the Repair Entitlement Group Flensburg

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Revision history:

Date	Version	Comment
2007-06-18	1.0	Initial release of document

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1. Requirements

1.1. System requirements

- Power supplies, Oscilloscope, Spectrum Analyzer, Test Set
- Preheater for lead free soldering/ solder machine for BGA´ s
- Microscope
- RepairStudio/Radiocomm,
- FASTT
- Block diagrams/Schematics
- PinNetFinder FLVIEW

1.2. Basic information on troubleshooting Motorola Phone

- make sure all contacts are clean
- use latest approved Software
- RESET/MASTERCLEAR can fix some issues
- do a visual inspection on customer abuse/liquid contamination

1.3. Advice on working with lead free soldering

- work very carefully because of underfilled U800/U700/U301/U5000/U8096/U900
- use protection shields/air cooling devices
- use flux for lead free soldering
- use preheater (HAKKO 853)

preheater HAKKO 853

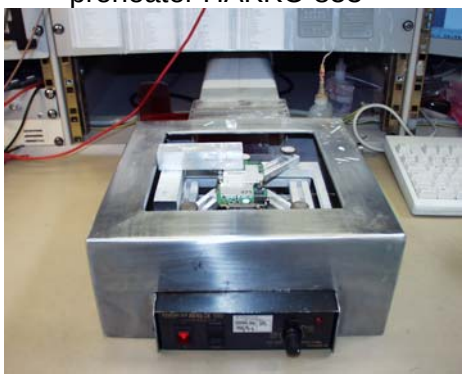

Figure 1

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Z3
Multitast Part no. 946110 Teflon set 8 pcs for U5000/U700/U800/U900/J400 /VIB shield protection (Figure 2 – Figure 5)

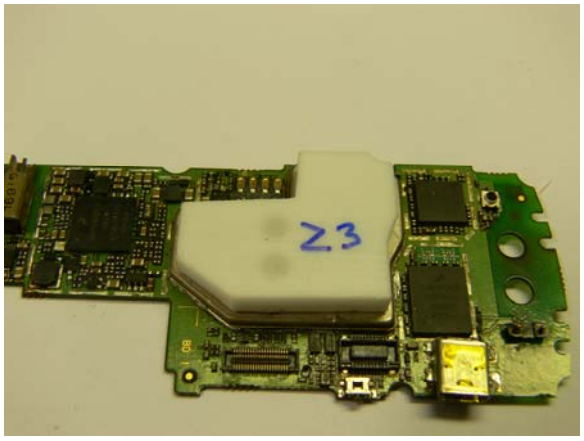

Figure 2

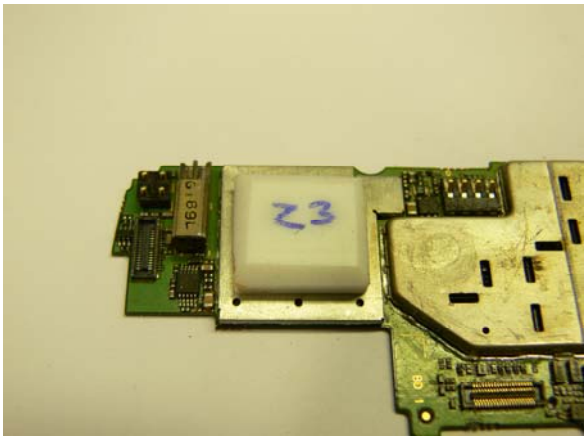

Figure 3

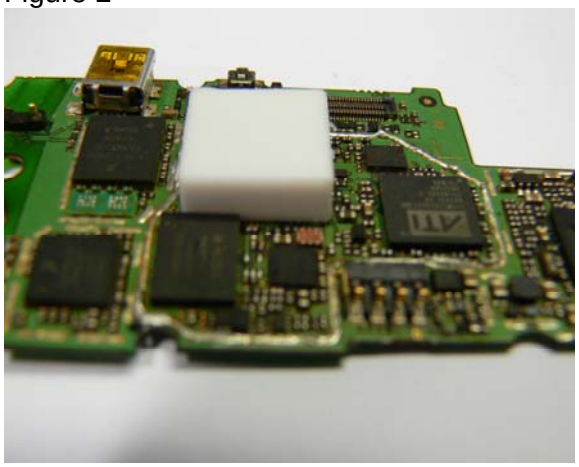
Figure 4

Figure 5

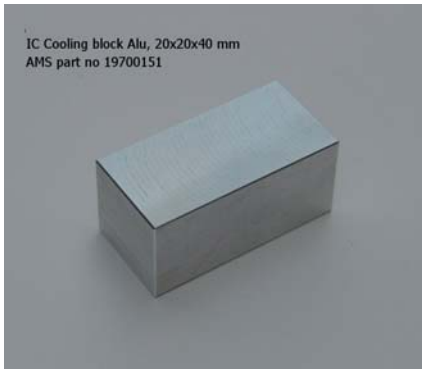

Figure 6 IC cooling block Alu,
20x20x40 mm
AMS part no. 19700151

Figure 7 IC cooling blocks Alu,
set of 2pcs
1 pcs 5x20x80 mm
1 pcs 5x20x100 mm
AMS part no. 19700156

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Z3 AMS Part no.19501980

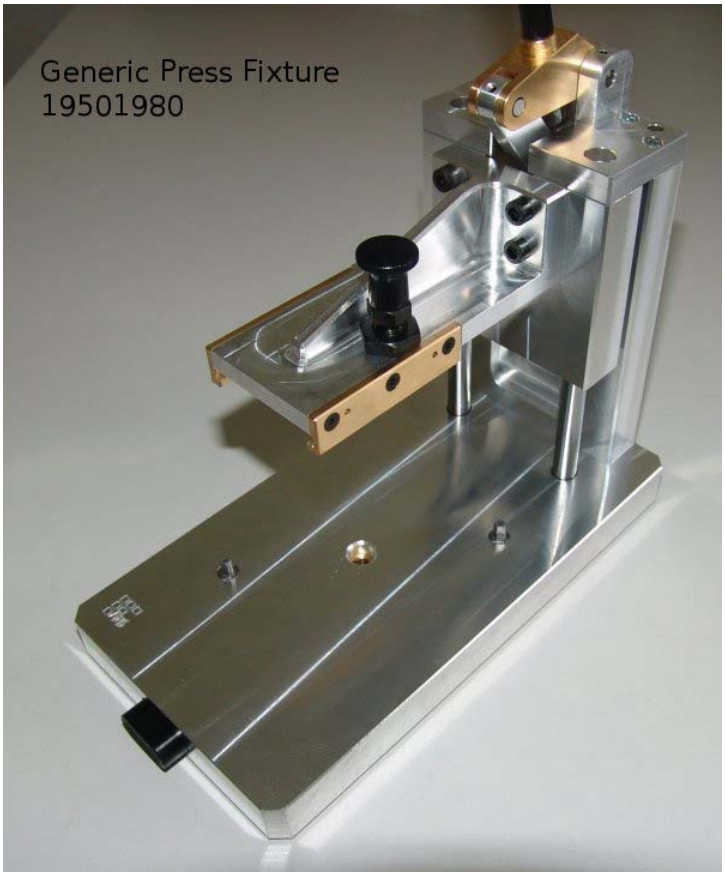

Figure 8

Z3 EL-Panel alignment/press tool Part no.0-00-00-40858

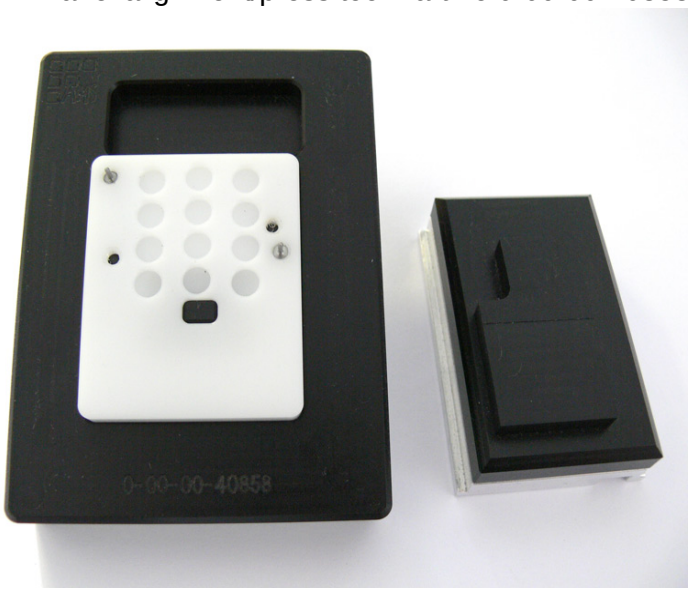

Figure 9

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2. Top ten defect part

Following is an analysis summery of the Z3 repaired during NPI process by the Repair Entitlement Group CSS Flensburg

Level 2 repair

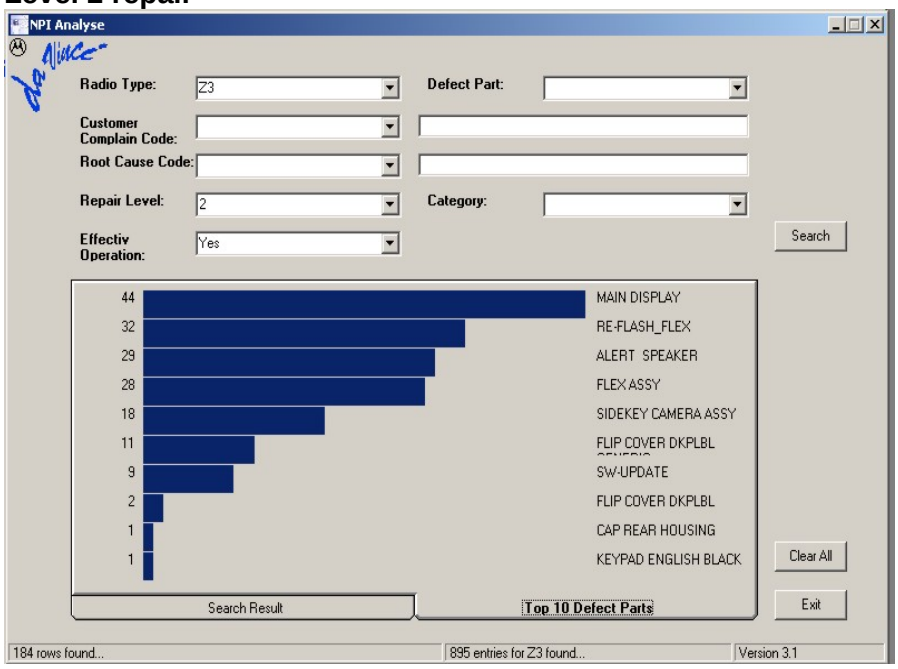

Figure 10

Level 3 repair

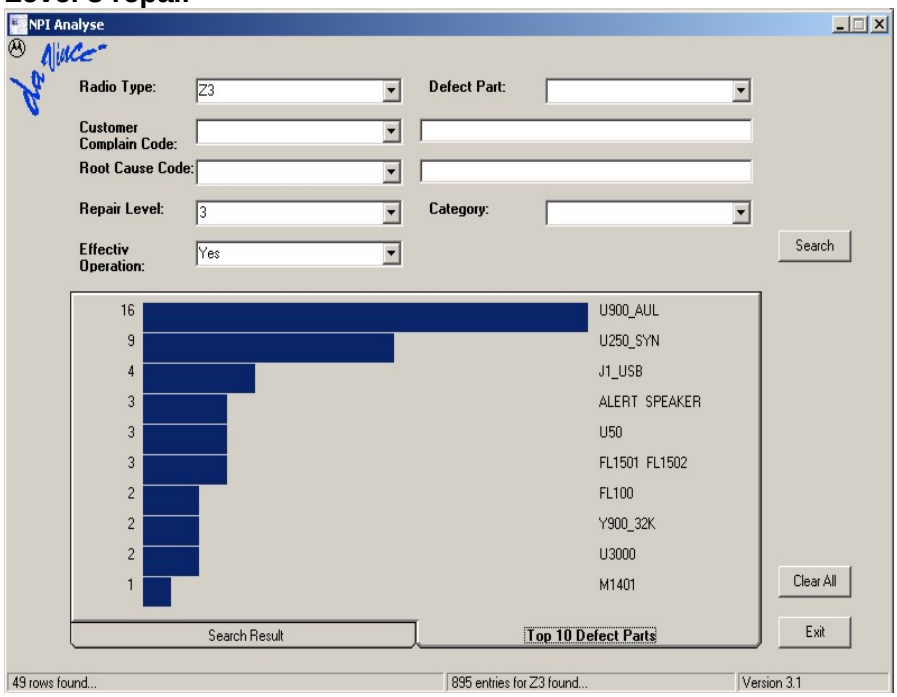

Figure 11

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3. Troubleshooting guide

3.1. First step

Make sure on any problem, that it is not software related one by simply doing a 1FF reflash with a Master reset/Master clear afterwards. In many cases a simple Master reset can already fix the problem.
The following section is meant to be a help in troubleshooting problems which are already identified as PCB related problems.

3.2. ALTxx

ALT01 – Alert – Ring tone, no
ALT02 – Alert – Ring tone, low
ALT03 – Alert – Ring tone, noise/distortion

We have seen some phones which are unable to play ring tones via the multimedia menu. After selecting a ring tone the phone goes into playback mode, but freezes – the timer is not counting, or the melody plays to fast. In those cases, if a Master reset/Master clear does not fix the issue it is most likely a problem with the PCAP (U900).

Check ALERTP+ (M1401-1) and ALERTM- (M1401-2) – both should have around 2.2Vdc
- **if not** check L1422/L1423 for high impedance/misplaced part; C1065/C1067/C1064/C1066/C7650/C7651for low resistance/misplaced part
- ALERTP and ALERTM was generated at U900
- **if ok**, change PCAP2 (U900)

The alert signal is amplified by the PCAP2 (U900) and generated by the U800, so if the PCAP2 (U900) alert audio path is ok there could be a problem with the U800 not generating the alert signals. **Then send the PCB to an authorized level 4 service center.**
.

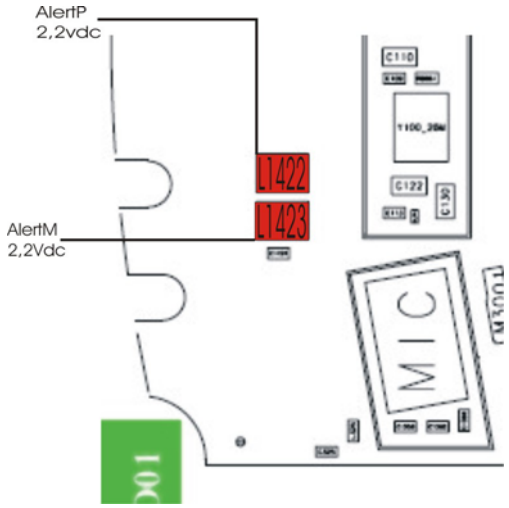

Figure 12

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ALT11 – Alert – Vibrator, no
ALT12 – Alert – Vibrator, weak

Turn on vibrator using Repair Studio/Radiocomm. Measure V_VIB – should be about 1.3 Vdc. V_VIB is provided via D3200 by the PCAP (U900). To verify if the vibrator is defective a simple method is to provide a supply voltage (1Vdc should be enough) via test probes directly on the vibrator VIB (radio in off state!). It should be rotating, if not change the vibrator VIB. Otherwise change PCAP (U900).

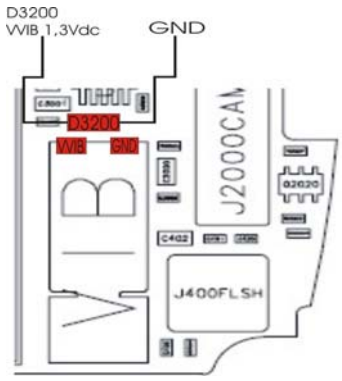

Figure 13

3.3. AUDxx

AUD01 – Audio – Earpiece, no
AUD02 – Audio – Earpiece, low
First step on every audio related problem is to identify which audio paths are affected.
If audio signals in loop are ok, there could be an audio problem in a network call. Then it is most likely a problem with the U800. **Then send the PCB to an authorized level 4 service center.**

Check SPKRP- at R1012 and SPKRM+ at R1013 – both should have around 1.5Vdc

- **if not** check J600 for solder shorts, C1012/C1013 for low resistance
- **if ok**, check Flip assembly connector J600 for bad soldered pins/damaged part
- **if ok**, change PCAP2 (U900)
- mostly audio problems are found by damaged flex-assy

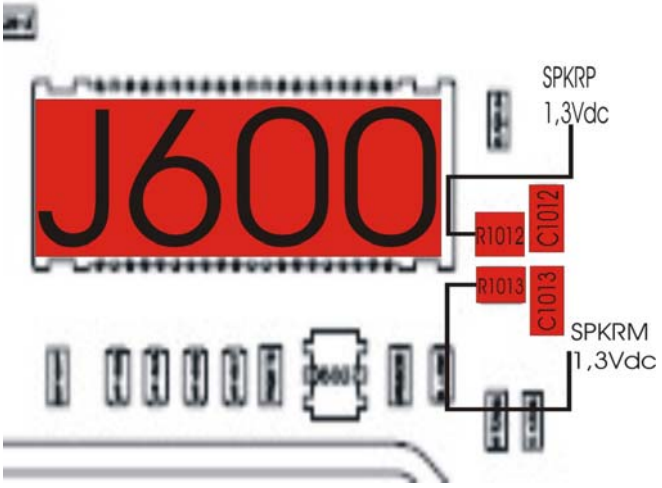

Figure14

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AUD07 – Audio – Mic, no
AUD08 – Audio – Mic, low

Check the MIC BIAS at C8083 – both should have around 1,7Vdc
- **if not** check C8083/C968/C969/C1203/C1202 for low resistance
- **if ok** check MIC
- **if ok** change U900

Check MICUNM at C1201 – both should have around 2,3Vdc
- **If not** check C1201/C967/C966/C1200 for low resistance
- **if ok** check MIC
- **if ok** change U900

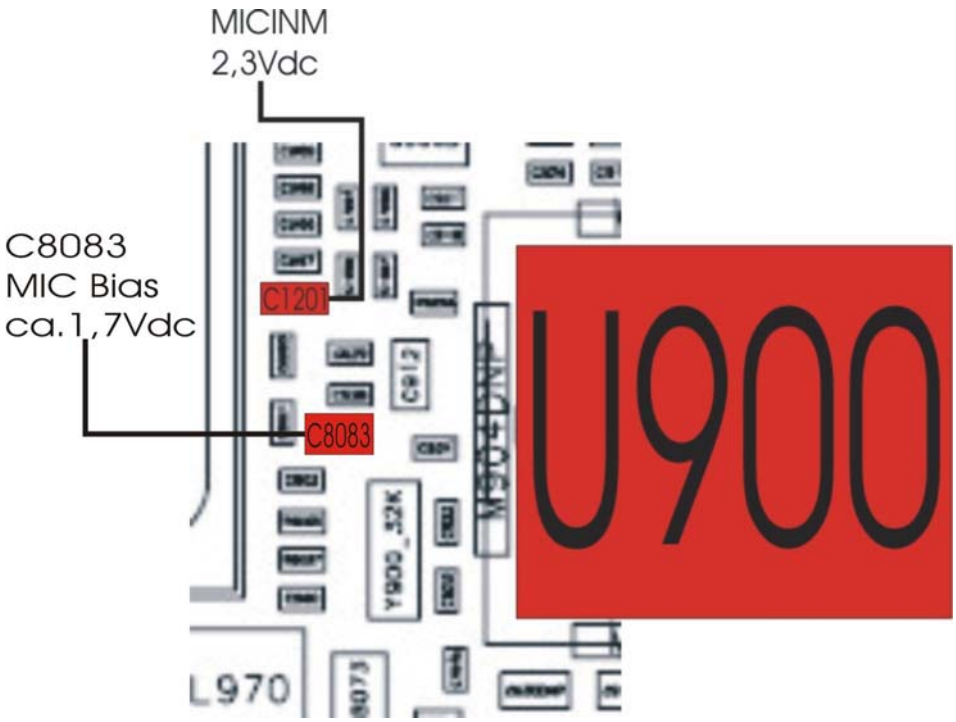

Figure 15

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3.4. BAT04 – Invalid battery

- verify BATT_THERM (J3 BATT-2) while PCB is connected to USB cable. It should be 2.775Vdc. If it is low
- check VR1201 for low impedance, R8036/R8037 (39k/20k).
- **if ok** check TOUT 12 at R8036-1. It should be 2,775Vdc
- **if not ok** **Then send the PCB to an authorized level 4 service center.**

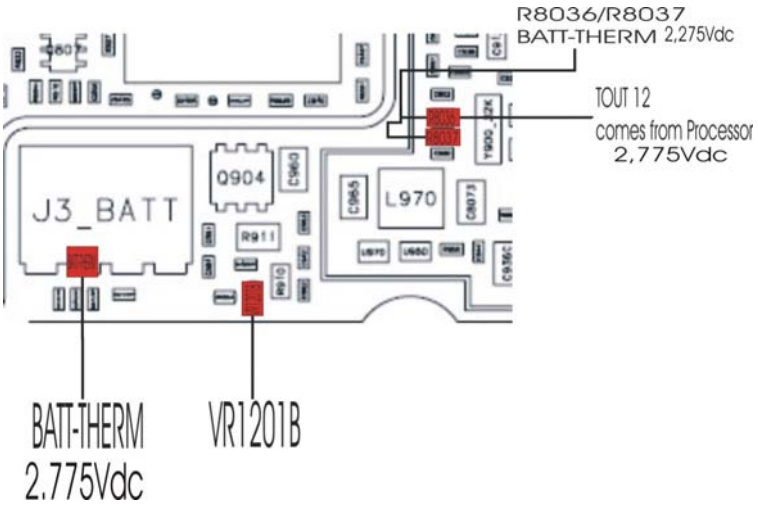

Figure 16

3.5. CHG01 – Does not charge

Customer complaint: no charging

- check J1 USB connector for bent pin

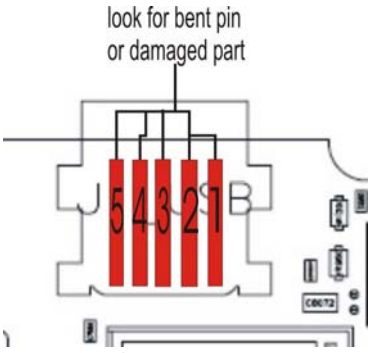

Figure 17

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3.6. CPRxx3

CPR01 – Voice call – Can't make
CPR02 – Voice call – Can't receive call
CPR03 – Voice call – No service
First step in every call related problem should be to figure out whether there is a receiving problem or a transmitting problem and which bands are affected

No TX GSM 900

Make sure, that the RF connector (J10_RF) is cleaned (with cleaner or alcohol) before making a phasing/call-processing test or if the test fails!

Let radio transmit on GSM 900 using Repair Studio/Radiocomm. Make sure to provide a battery voltage via micro clamp-type test probes to battery contacts J3 BATT.

- check TX_LB from U250 at C60
- **if ok** in size and form
- check U50 TX_out at C12
- **if ok** check J10_RF
- **if not ok** check VCO_REG 2,775Vdc at RS 79,check VRAMP at C85
- check TX_EN at C80
- **if ok** change U50

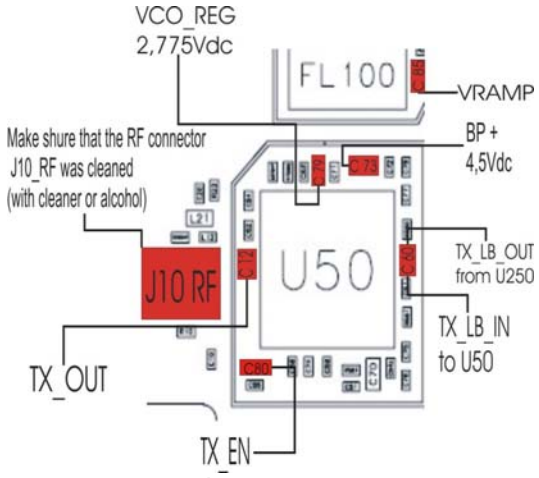

Figure 18

Signal TX_LB_Out from U250

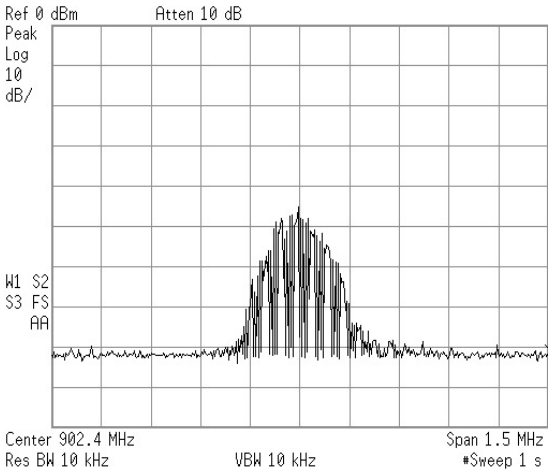

Figure 19

Very important!

To change U250 or U50 you should work with the tool for resolder.
Use Teflon kit, if you change the U250 or U50 to protect U800/U700

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No RX GSM 900

Inject a RF from Test Set. Check RF_OUT_1 at C12.
There are no test points to measure the RX-signal, because the signals go directly to U250_SYNTH.

So you can only check the signals from U250_SYNTH.

- VCO_REG at C1000 2,75 Vdc
- RF_REG at C115 2,75Vdc
- IO_REG at C121 2,75Vdc
- REF_1P2 at C118 1,2Vdc

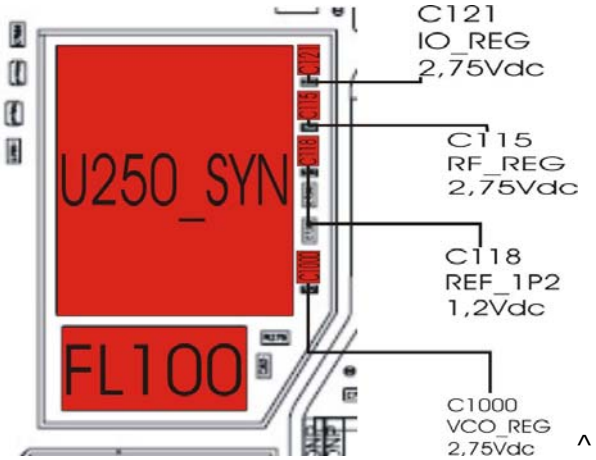

Figure 20

3.7. DAP11 – Data application – Can't upgrade software
OPR03 – Operation – Error message

Make sure, that you have adjusted 5Vdc on your power supply for the EMU cable.
If you have an error message on display, then reflash with the latest 1FF-file.
If the phone starts in flash-mode, make a reflash with the latest 1FF-file.
If the reflash fails, **then send the PCB to an authorized level 4 service center**.

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3.8. DIMxx

DIM01 – Display Main – No display
DIM08 – Display Main – No backlight
DIM09 – Display Main – Low/Dim backlight

Make sure that the problem is not located in the flip assembly, by testing PCB with a good one and do a visual check of J600
The following supply voltages for the flip assembly should be present:

- . VBUCK_1.9Vdc at R2022
- VBOOST_5Vdc at SH3005

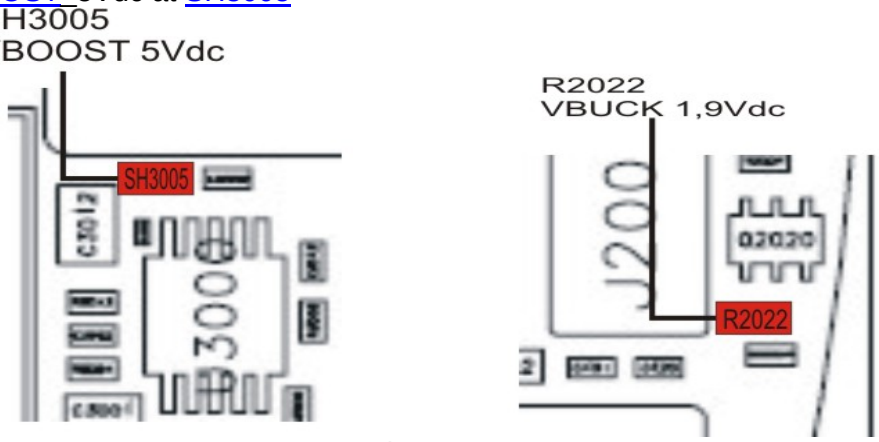

Figure 21

3.9. MKPxx

MKP01 – Main Keypad – No function/hangs
SIK01 – Side Keys – No function

Due to the keypad matrix architecture with 8 rows in 3 columns it is quite useful to verify which keys (if not all) are affected. By knowing which keys are not working it is possible to find out which row or column is affected. By using the FLViewer it can be tracked which filters/capacitors the signal passes until it reaches the U800.
In practice the defective part very often can be found just by visual inspection. Check:

- FL1501
- FL1502

If keypad connector/filters are ok, it's probably a problem with the U800, **then sends the PCB to an authorized level 4 service center.**

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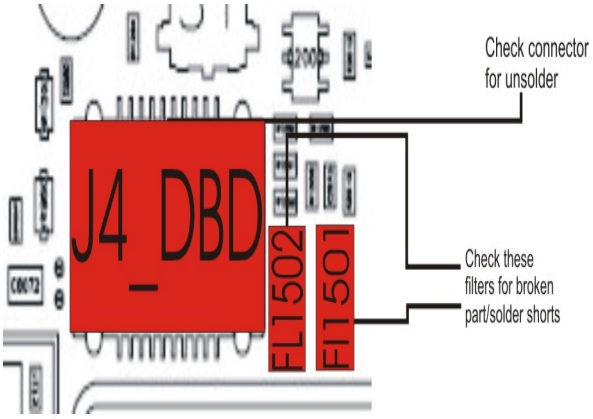

Figure 22

MKP05 – Main Keypad – No/Dim backlight

The backlight driver (U3000) is on the PCB. The following voltages are present

- VBOOST_5Vdc
- EL_NAV_EN_2Vdc is backlight activated
- EL_COM_195Vdc is backlight activated

If not - change U3000

- **send the PCB to an authorized level 4 service center**

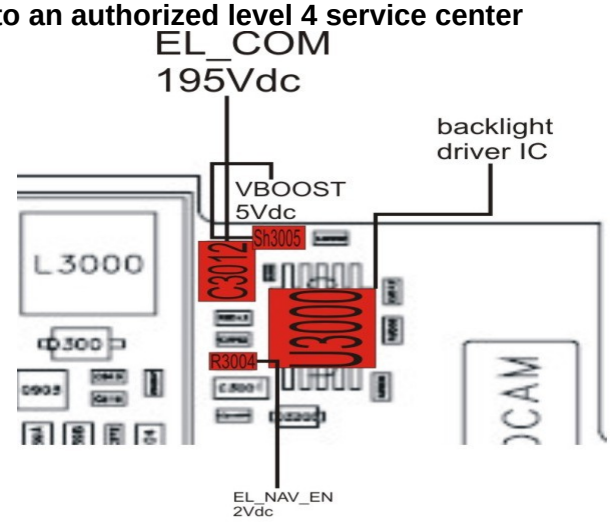

Figure 23

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3.10. SIM01 – SIM card – Check card/insert SIM

Measurement on the SIM interface is a little bit difficult, as no signals will be present until a SIM card and a battery are inserted. In the most cases it should be possible to figure out which part is defective by simply measure with an ohm meter following signals to GND:

- VSIM at J4_DBD - 6, - if far less than 30 kOhm to GND it is probably because of a defective PCAP (U900)
- SIM_DIO at J4_DBD - 8
- SIM_CLK at J4_DBD - 2

SIM_RST at J4_DBD - 4 - if any of these has far less than 30 kOhm to GND it is most likely because of a defective processor (U800), **then send the PCB to an authorized level 4 service center.**

Before changing the PCAP (U900), make sure that none of the according capacitors/diodes have low resistance to GND.

Make sure, that the daughter-board is ok and the connector J4_DBD is good soldered!

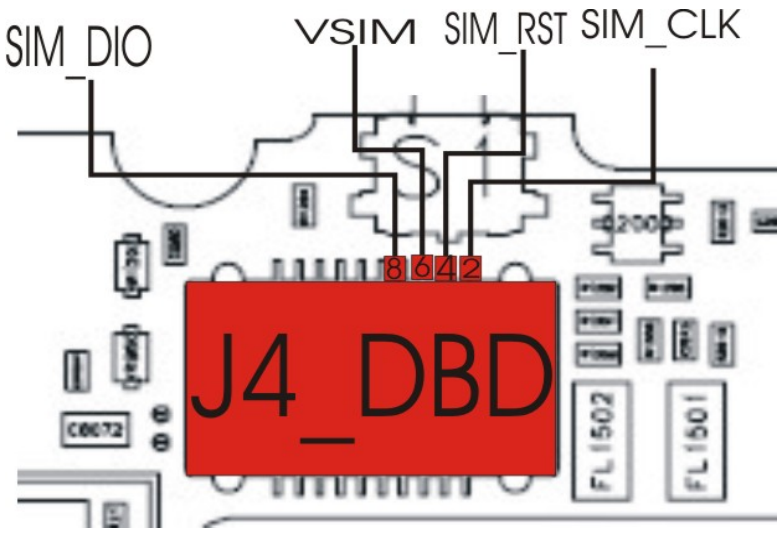

Figure 24

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3.11. TONxx

TON01 – Turn on/off – No turn on

Verify if radio doesn't turn on (assembled with display). If it does, but doesn't enumerate via EMU connector at RSD/Repair studio there should be a problem with the USB connection. In some cases a 1FF SW reflash in FORCED FLASH MODE (by connecting EMU connector to radio while "*" and "#" are pressed) can fix this issue.

- **if not**, visually check EMU connector for mechanical defects or contamination on contacts, bad soldered pins or solder shorts

The USB interface is located in the PCAP U900.

If the phone attempts to start (you can sometimes see "Hellomoto" or a white screen), but always power cycles instead of fully powering up, it is most likely a problem with the software.
A reflash/flex with a latest full 1-FF file can fix the problem.

- **if not then send the PCB to an authorized level 4 service center.**

Note: Watchdog

In case the phone draws current but switches off after a few seconds, you can force the phone not to switch off, by setting the **Watchdog R987DNP**. By placing a short resistor as R987 or by just solder across the pads of R987 the WATCHDOG signal will be pulled to HIGH level (IO_REG_2,775Vdc) and the PCAP (U900) will not switch off its power regulators. Thereby you will be able to measure or to do a thermal troubleshooting using a coolant spray.

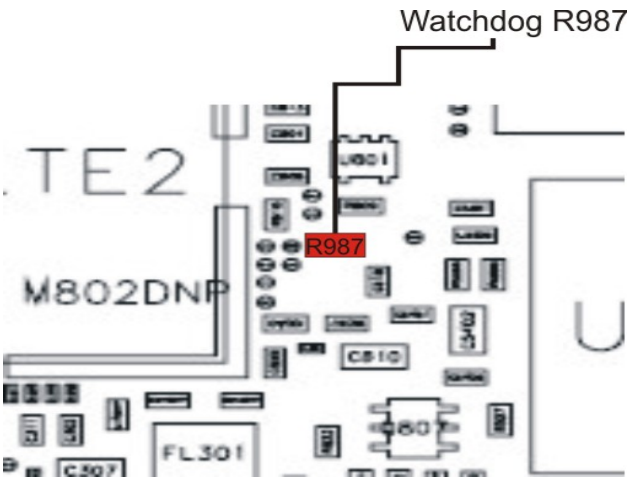

Figure 25

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If the current consumption is in normal range (40mA to 300mA)

- try doing a 1FF SW reflash in FORCED FLASH MODE. If radio enters the forced flash mode or starts in flash mode by itself the main supply voltages for the logic section should be ok – Most likely the trouble can be found in the logic section (processor/flash memory), **then send the PCB to an authorized level 4 service center.**
- if unsuccessful, a flash log file generated by Repair Studio/RSD can be viewed. There you will find the reason why the flash operation failed. However, this information can be ignored, as in almost every case the next step will be
- **send the PCB to an authorized level 4 service center.**

TON03 – Turn on/off – Auto power down in standby

If radio stores panic: DSM_MEASUREMENT_ERROR there is most likely a problem with the 32.768 kHz clock, on which the radio is running when entering the deep sleep mode.

- change Y900 and test radio with a network SIM card and let radio entering deep sleep mode
- if radio still powers down, change PCAP (U900)

The main problems on the Slider Z3 are surely the underfilled *U800*, *U700*, *U8096*, *U5000*, *U900* and *U301*. So it is very important to use the special cooling equipment for solder actions on the PCB!

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4. Flash procedures

Note: It is very important to do a restart after every flash process! Otherwise the phone may start in flash mode again.

4.1. For Software update

Following steps are necessary to update the software to latest approved software:

- unlock the phone (if subsidy locked)
- start flash customer specific 1FF SW-file

4.2 For recovering Flash Memory

If the phone doesn't start because of corrupted software it might be possible to recover it:

- connect phone to EMU connector while pressing "*" and "#"

The phone should start in flash mode now:
flash 1FF superfile (example: **DC one File Flash:**
R452B_G_08.01.02R_PDS009_LP0039_DRM0101_VSTG
_30C_08_JPJAVA_G_08_R452B_06_00_22R_GSTCPRIRTDE086_1FF.sbf)

- after restart:
- do Master reset/Master clear
-

If the phone doesn't start in flash mode or as: S Blank Z3, there is a problem. Please follow troubleshooting instructions as described in the TON01 section of this document.

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