Troubleshooting-Guide Level 3

W220

Table of contents

Date	Version	Comment
13.06.2007	1.0	Initial release of document

1   Preamble

This document was created to assist analyzers when fixing problems on Motorola W220. All information was collected during the NPI-process in the Repair Entitlement Group Flensburg.

2   General basic tips for any repair action

1. First of all try to retrace the failure on the phone.
2. Before any hardware repair try to fix the failure by a master reset/master clear and, if necessary, by a software-update/reflash. Many failures on W220 are solvable by this. Typical software-failures will be described on further.
3. When doing a software-update make always sure, that the latest versions are in use! This is important to eliminate software-issues.
4. Always check all contacts and make sure, that they are clean and proper!
5. Before you begin to change any part, make a visual inspection on the PCB.

   Check for   - liquid damage (water-indicator)
                - missing, broken and unsoldered parts
                - mechanical damage (board twisted, tracks defective,…)

   Try to consider the failure from all possible sides!

3   System requirements and equipment

- Power supply (set to 3,8 V), oscilloscope, spectrum analyzer, Agilent 8960/CMU200 testset
- Microscope
- Universal PCB-holder
- Preheater Hakko 853
- Cooling-blocks (to prevent overheat to other parts)
- Modified rear housing for measurements with ext. voltage
- Software: MST (actual version 1.2.6), MotoXPRS
- Block diagrams and layouts
- Software and flex database FASTT
- Repair-adaptors and cables (as shown on the next page)

Adaptors and cables are available via AMS or Multitast!

RF-adaptor
5-00-F4-10000
By AMS

Foxlink-cable
#5-00-1K-10000
By AMS

Battery-adaptor
5-00-X3-10000
By AMS

Hakko 853
40001021

Universal cooling shields
By Multitast

Cooling-blocks
19700150
And 19700156
By AMS
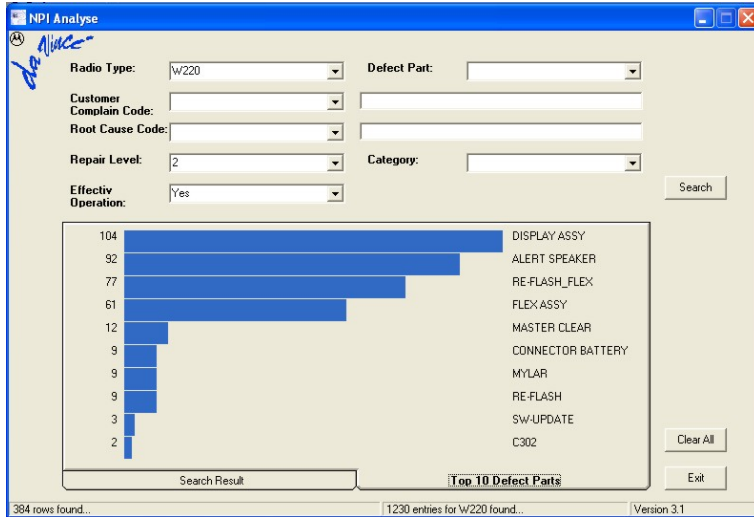

Modified rear housing
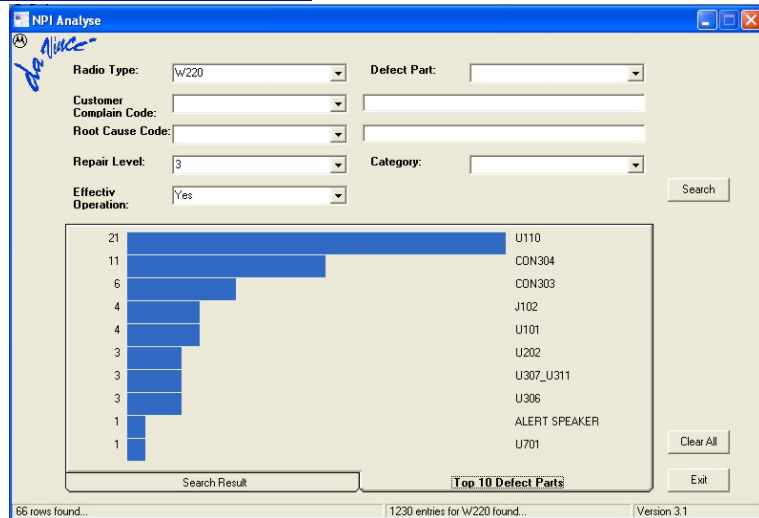*(self-prepared by Repair*
Entitlement Group
Flensburg

4 Top ten defective parts

This shows an analysis-summary of W220 repaired in NPI-process, split in repair-levels:

Level 2

Level 3

5 Setup and use of MST

5.1 Setup of MST

After <u>each</u> start of MST you have to switch to the product you want to handle.
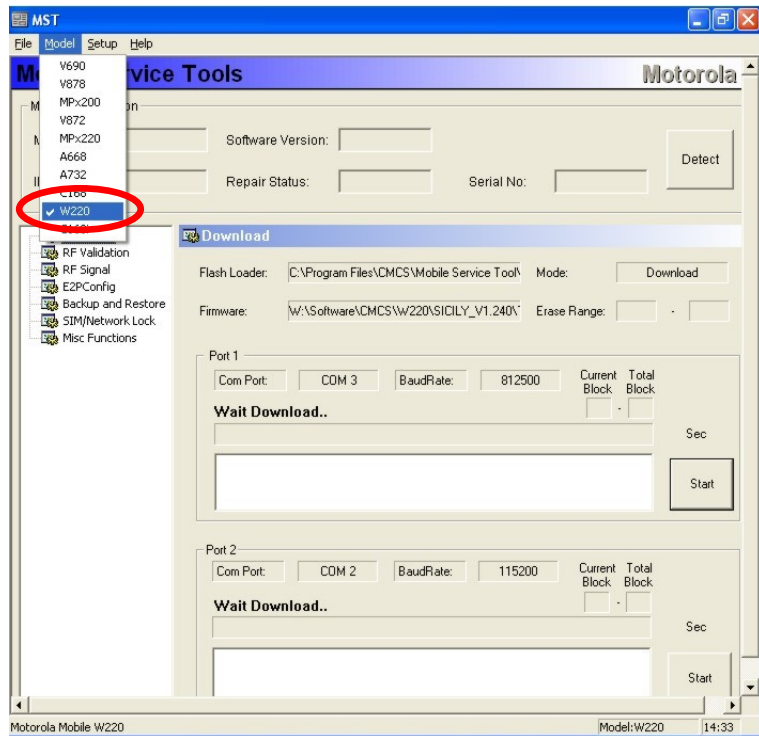
Only before the first use of MST on a PC you have to configure some general preferences in the <u>setup-menu (settings will be safed until change)</u>:

'General information'

On the tab 'general information' you can check the parameters of the connection between PC and phone.
Each time you connect the foxlink-cable to another USB-port of your PC, you have to choose the correct port ID (emulated COM-port).
Make sure, that the baud rate is set to 812500 and the clock rate to 14745600.
In the lower field the service-password of the processed mobile has to be typed in (see how to use and additional information in chapter 5.7!).
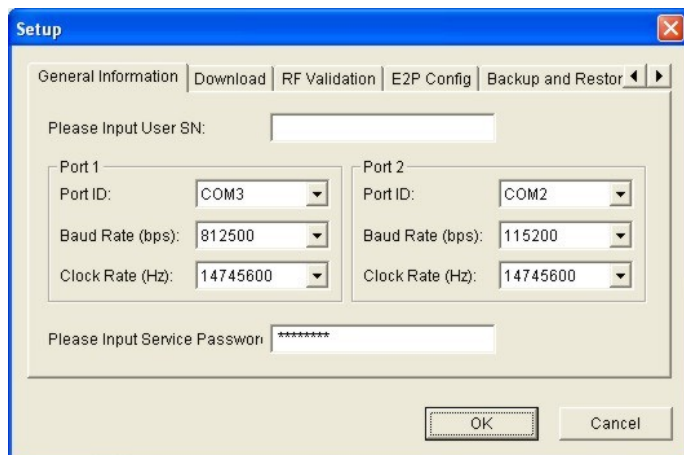
'Download'

On the tab 'Download' you have to select the flashloader file and the firmware file for the transceiver you want to flash.
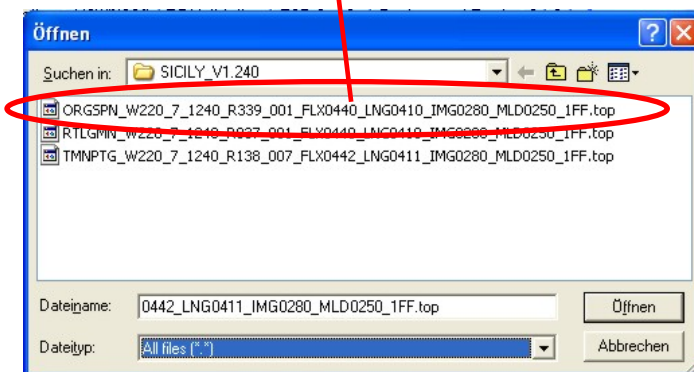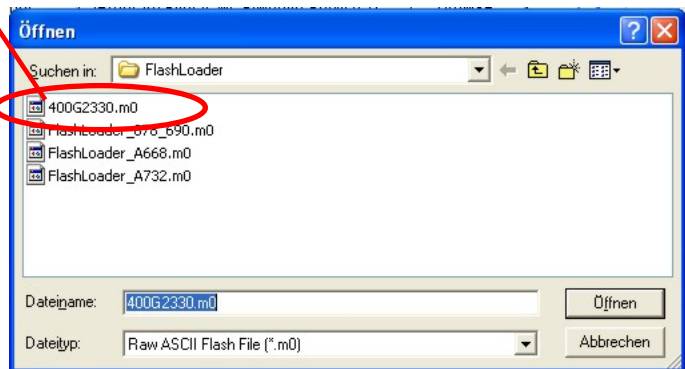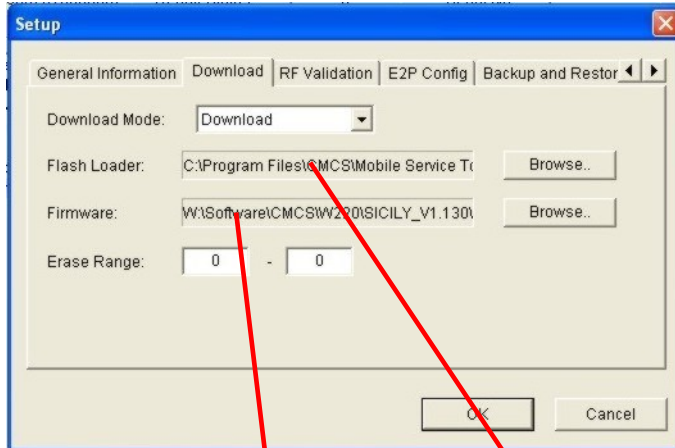
These files will remain selected until you choose other files!

The detailed procedure how to flash (upgrade) W220 is described in chapter 7!

'RF validation'

On tab 'RF validation' you have to choose the correct config files for the testset you use. The path to the config files is C:\Program Files\CMCS\Mobile Service Tool\ (the files have been created automatically while the installation of MST).
Additional you can choose an information log path for log files of each operation.

Overview of the config files for W220:

Agilent 8960:

Calibration Config File	DrtfmScy8960Ca.xml
PreTest Config File	DrtfmScy8960Pt.xml
CableLoss Config File	DrtfmScy8960Offset.xml

(To test W220 on Agilent 8960 you have to choose the application 'GSM/GPRS Mobile Test" in the application-menu of the Agilent!)

Rhode & Schwarz CMU200:

Calibration Config File	DrtfmScyCMU200Ca.xml
PreTest Config File	DrtfmScyCMU200Pt.xml
CableLoss Config File	DrtfmScyCMU200Offset.xml

'Cable loss'

Additional to this configuration a config file for the RF cable loss is needed.

You have to choose it on the tab 'Cable Loss' in the setup menu. The needed file is the correct CableLoss config file for the used testset.

5.2   Manual test commands

For troubleshooting the W220 is equipped with a manual test mode capability.
You can perform the following test functions when the phone is switched on in use of a test SIM card:

Key sequence	Test function
*#06#	IMEI check
*#**837# **SEND**	Flex-version/SW-version/technology
*#**364#	Display engineering menu
*#**266*0#	Set as data COM port
*#**266*1#	Set as log COM port
*#**797#	Display time to failure timer & power down codes
*#**367628# **SEND**	Erase data from the file system (as done at master clear)
*#**778337# **SEND**	Erase data from E2P like phonebook (as done at master clear)
*#**372# **SEND**	**CIT test (display, camera, keypad, audio,...)**

5.3   Read data of mobile

To read out the data of the mobile, click on the 'detect'-button. The 'mobile information' area is always on top while MST is running.
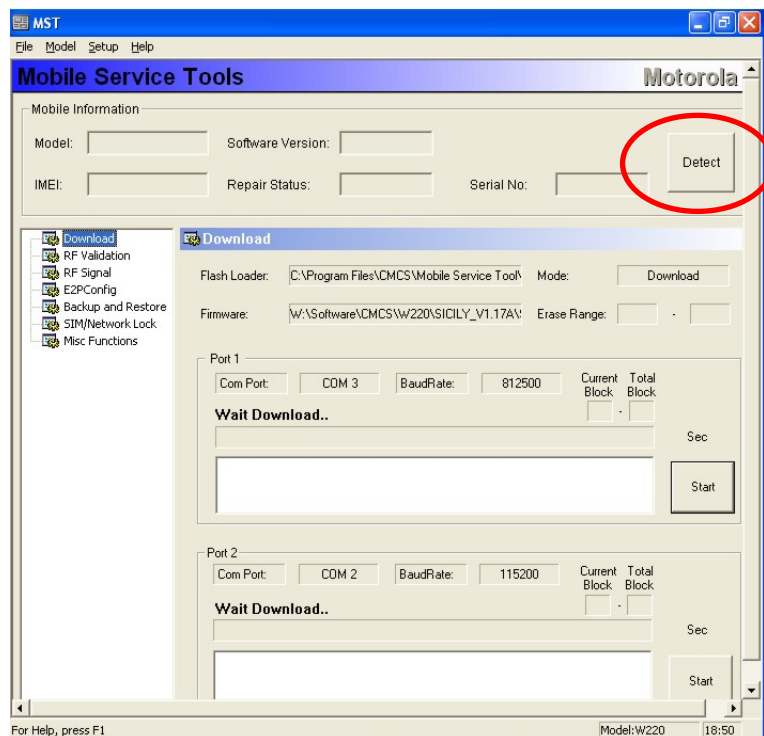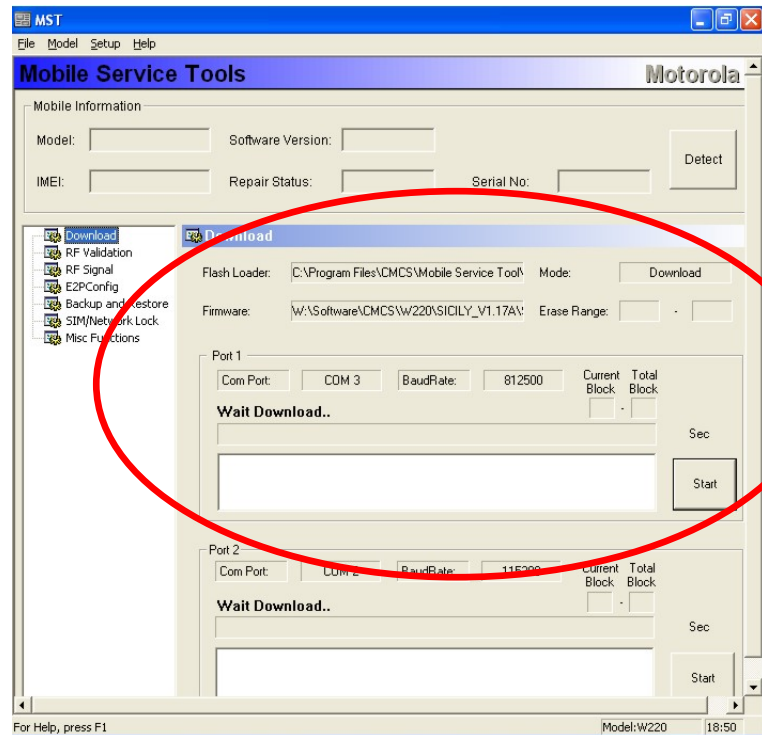
5.4 Download (software flashing)

To flash a mobile you have to choose the section 'Download'.
The detailed procedure how to flash (upgrade) W220 is described in chapter 7!

5.5 Phasing and calltest

To perform a phasing – or calltest on W220 the phone has to be connected with charger, battery-adaptor, foxlink-cable and the RF-adaptor (with a 3dB-attenuator). It's only possible to test a complete assembled phone, there's no PCB-adaptor available.

For the call processing make sure, that a test SIM-card is inserted in the mobile.

Choose the section 'RF Validation', where you can set several options:
- Selection of frequency-bands to be tested
- Optional 'Nonstop testing'
- Choose between phasing (calibration) and callprocessing (pretest)
- Option to print out test results on a local printer

We recommend performing a phasing and a callprocessing.
Make sure, that the correct application is selected on the testset!

If everything is prepared, choose the frequency-bands to test and the type of test you want to perform.

Now click on 'Initialization' and then start the test by clicking on 'Start'.

Here are the test results displayed, optional you can make a printout of the results on your local printer.
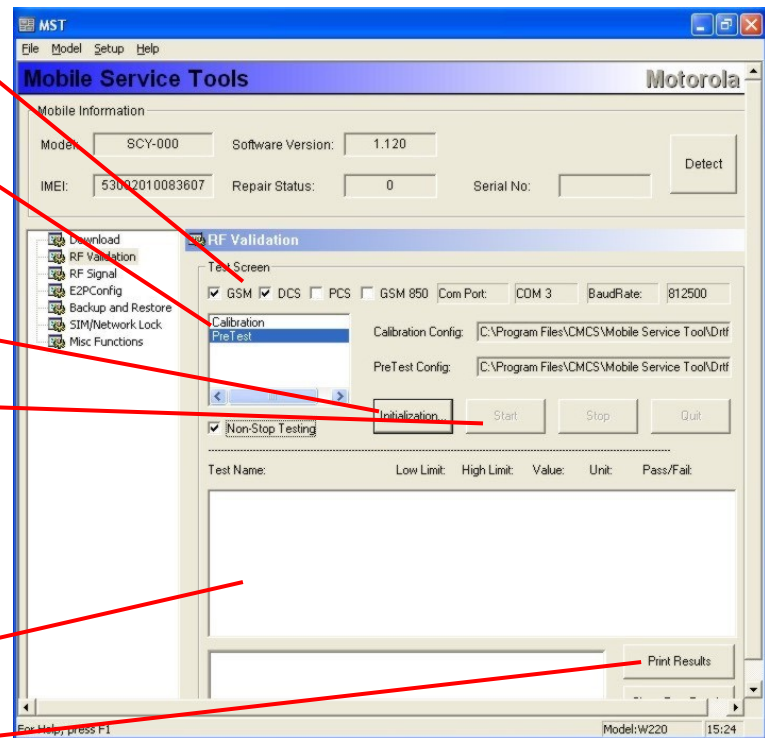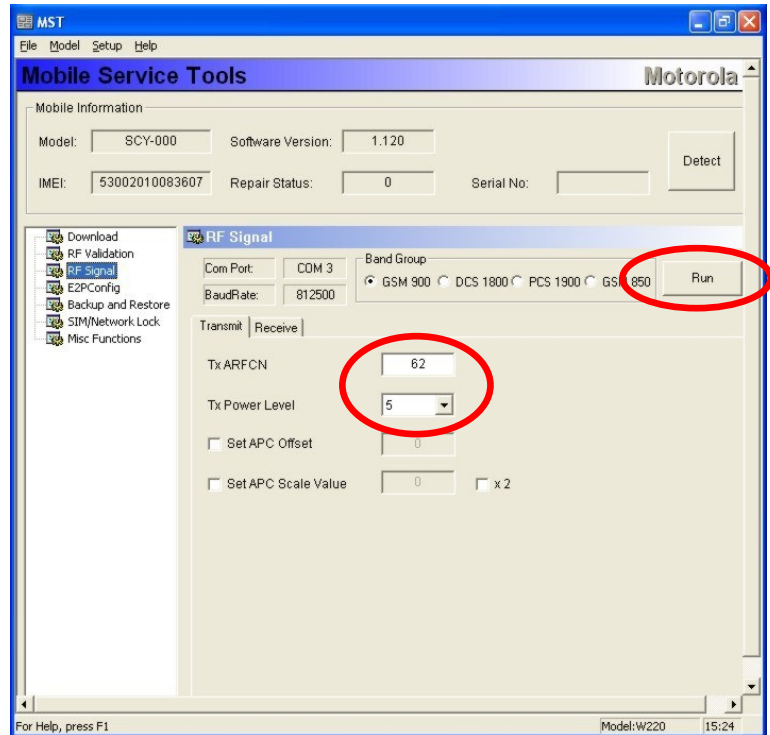
5.6 TX- and RX-measurement

To perform a phasing – or call test on W220 the phone has to be connected with charger, battery-adaptor, foxlink-cable and the RF-adaptor (with a 3dB-attenuator). It's only possible to test a complete assembled phone, there's no PCB-adaptor available. That's the reason, why measurements on W220 aren't really comfortable. To make basic measurements we found a solution, which is described in the debug guides, chapter 6.1.
The handling of MST to make RX/TX-measurements is quite simple. Just choose the section 'RF Signal' and select 'Transmit' or 'Receive' and configure the options for the measurement as shown in follow.
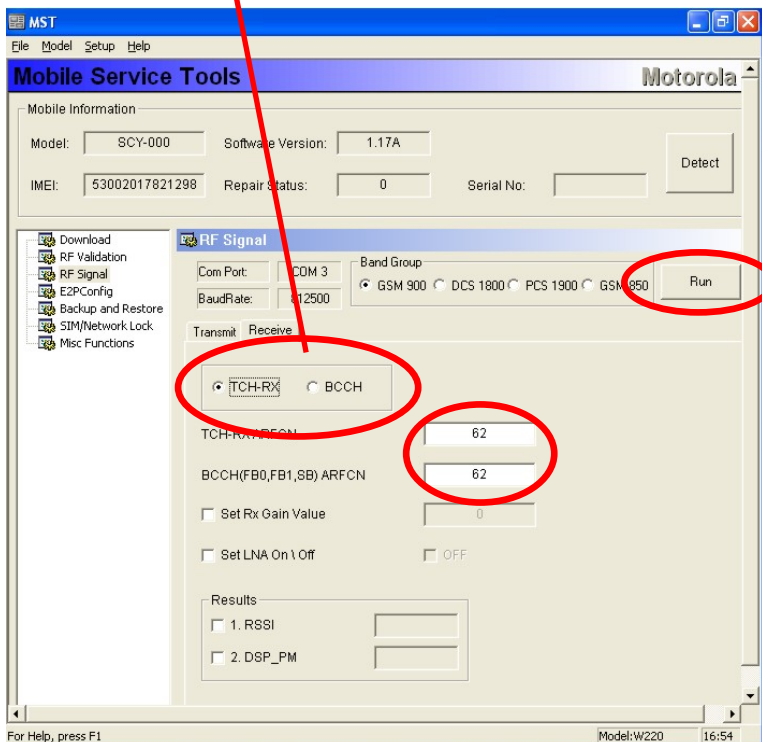At least click on 'Run' to start the signaling.

MOTOROLA

Motorola GmbH, CSS Center Flensburg, Mobile Devices

Title: Troubleshooting-Guide **W220 Level 3**

Doc. No: tsg_gsm_w220_level3
Version: 1.0
Date: 13.06.2007

Page: 12 / 36

TX

MST — Mobile Service Tools

Mobile Information

Model: SCY-000   Software Version: 1.120

IMEI: 53002010083607   Repair Status: 0   Serial No:

Detect

- Download
- RF Validation
- **RF Signal**
- E2PConfig
- Backup and Restore
- SIM/Network Lock
- Misc Functions

RF Signal

Com Port: COM 3   Band Group: GSM 900 DCS 1800 PCS 1900 GSM 850   Run

BaudRate: 812500

Transmit | Receive

Tx ARFCN: 62

Tx Power Level: 5

☐ Set APC Offset   0

☐ Set APC Scale Value   0   ☐ x 2

For Help, press F1   Model:W220   15:24

Choose between traffic-channel and broadcast-channel

RX

MST — Mobile Service Tools

Mobile Information

Model: SCY-000   Software Version: 1.17A

IMEI: 53002017821298   Repair Status: 0   Serial No:

Detect

- Download
- RF Validation
- RF Signal
- E2PConfig
- Backup and Restore
- SIM/Network Lock
- Misc Functions

RF Signal

Com Port: COM 3   Band Group: GSM 900 DCS 1800 PCS 1900 GSM 850   Run

BaudRate: 812500

Transmit | Receive

◉ TCH-RX   ○ BCCH

TCH-RX ARFCN: 62

BCCH(FB0,FB1,SB) ARFCN: 62

☐ Set Rx Gain Value   0

☐ Set LNA On \ Off   ☐ OFF

Results
☐ 1. RSSI
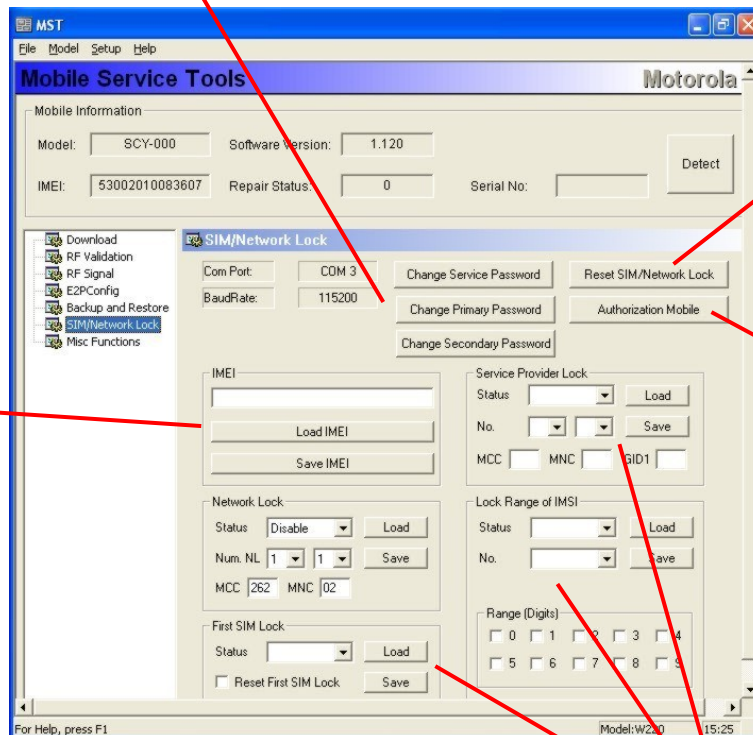☐ 2. DSP_PM

For Help, press F1   Model:W220   16:54

5.7   SIM-/Network-lock

In this section you are able to perform the following tasks:

Change subsidys and
service-password

Reset SIM-
/network-lock

Authorize
mobile

Load and
safe IMEI

Check and set
SIM-lock status

Note:

To use the functions in this section you have to type in the service-password of the
processed mobile in the setup-menu 'general information'. The service-password is
stored in HEX-digits (note: if the service-password begins with a '0', sometimes you
have to type in a '0' at the beginning of the HEX converted service-password as
well!)! If a new flash-IC is placed on the PCB, it contains a default-IMEI. The service-
password in this case is 16 digits of space.
To authorize the mobile (after replacing the flash e. g.), a rockey-key with a valid
serial-number is required. Detailed information can be found in chapter 7!

	Doc. No:	tsg_gsm_w220_level3
	Version:	1.0
	Date:	13.06.2007

MOTOROLA

Motorola GmbH, CSS Center Flensburg, Mobile Devices

| Title: Troubleshooting-Guide **W220 Level 3** | Page: | 14 / 36 |

5.8   Miscellaneous functions

The last section includes only
two useful functions:

- reset the phone code

- perform a master clear
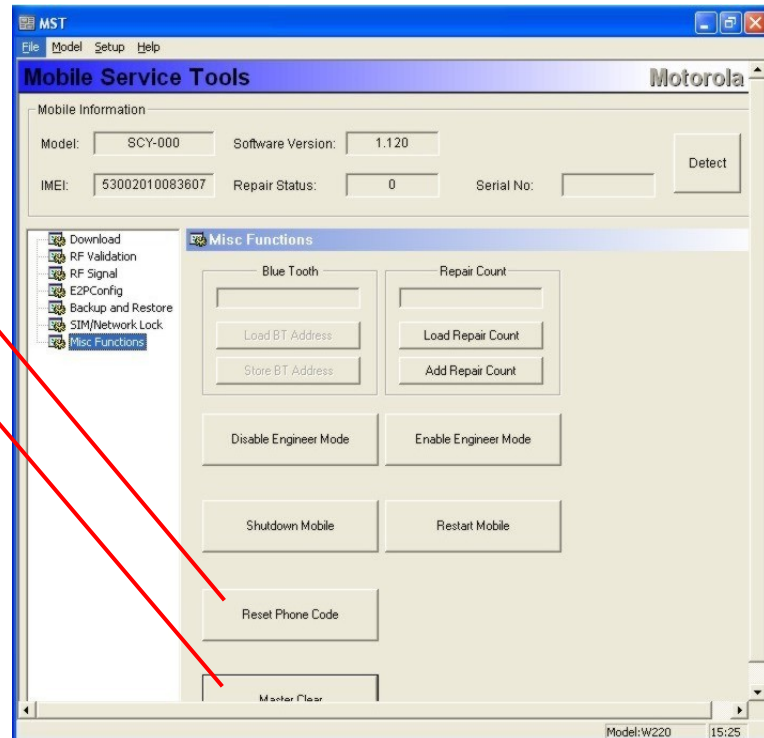
For the master clear just connect the mobile with foxlink and charger and click the
master clear-button. We recommend performing a master clear in use of the function
in the settings-menu of the mobile, because the master clear function of the MST
often doesn't work properly.

The function 'Reset Phone Code' is necessary to reset the security-code of the mobile
(see also chapter 6.1!).

6   Debug guides

6.1   Debug guides preliminary information

> At any failure you have to make sure, that the problem possibly is caused by a software failure or corrupt data in the phone. In many cases, a master clear or a software update can fix the problem.

Glued/underfilled areas on the W220 PCB:
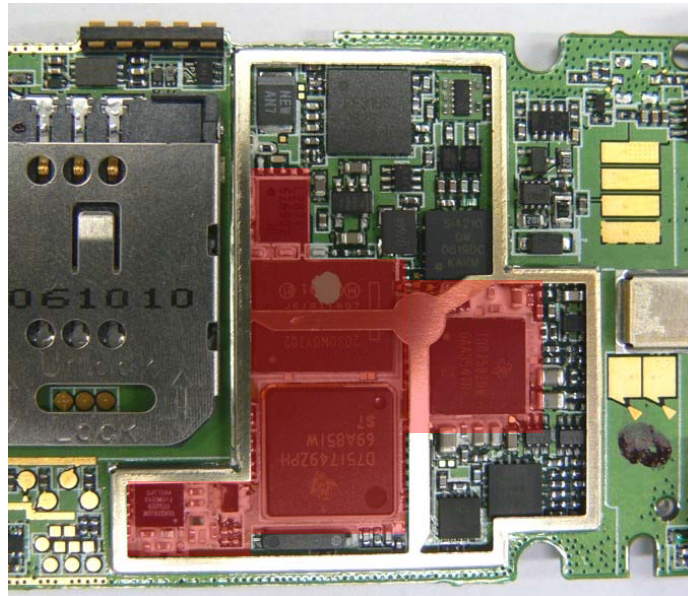
If you have to solder in underfilled areas, try to prevent other parts from heat by using cooling-blocks/-shields, because the habit of the glue causes a lift up of BGAs. When any repair-action under the clip-shield is necessary, you have to remove the bar inside the frame by cutting off.
Now it should look like this:
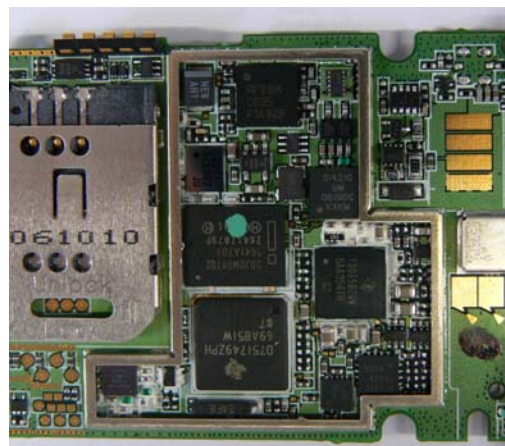
Overview of the board-layout:
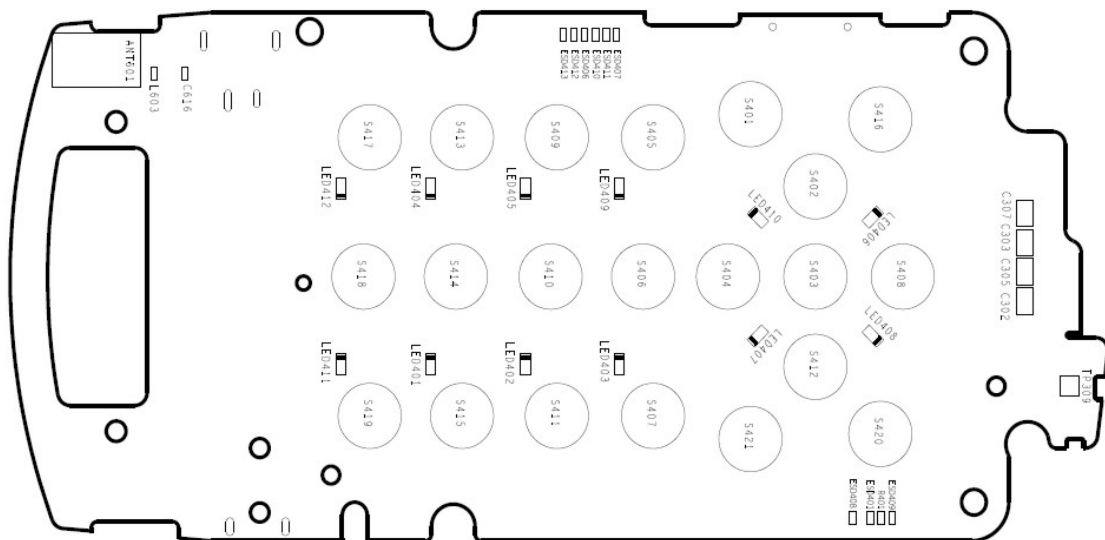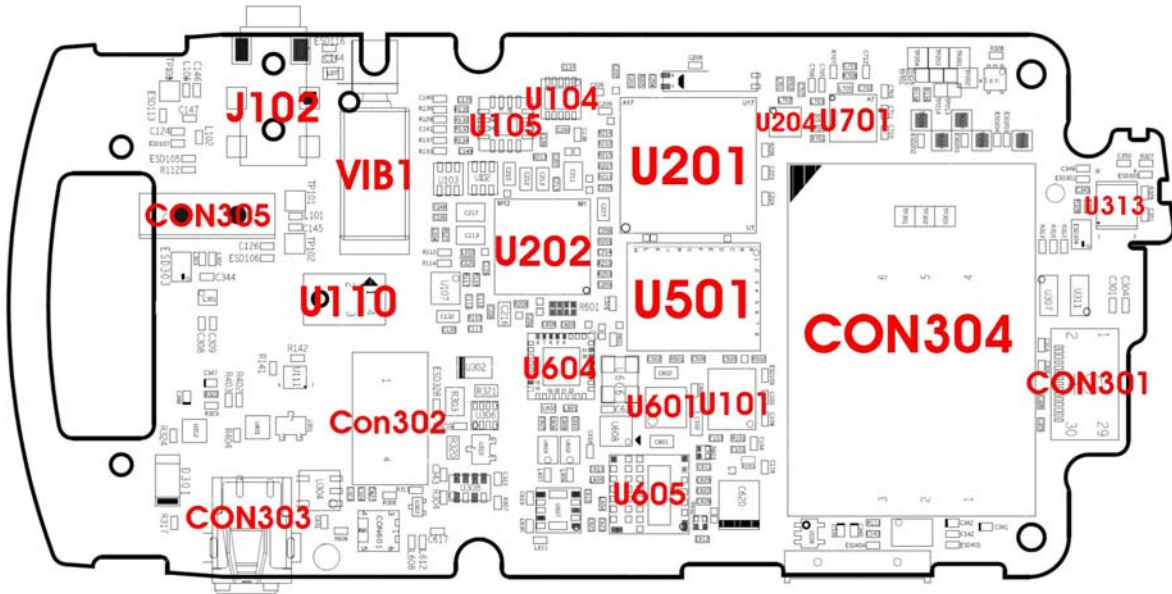
Information for the security-function of W220:

To access the security-area of W220 a security-code is needed. The default-code is '1234'. Sometimes customers change this code, so you aren't able to make a master-clear and/or –reset. Especially if the customer activated the function of 'automatic phone-lock after startup' you aren't able to use the phone. Without the correct security-code you aren't able to switch this function off as well.
To reset this code, just use the function 'reset phone code' of MST!

PCB prepared for measurements:

In most cases measurements are impossible at W220, because there are only a few testpoints and the most signals are only measurable under the placed parts.
For RX/TX-measurements we prepared a standard W220 rear housing to supply external voltage to the PCB, because the battery-connector is included in the rear housing and there's no other way to implement external voltage. Otherwise the PCB would turn off when switching it to TX due to the higher power-consumption.

It looks like this:

Voltage from power-supply

Charger
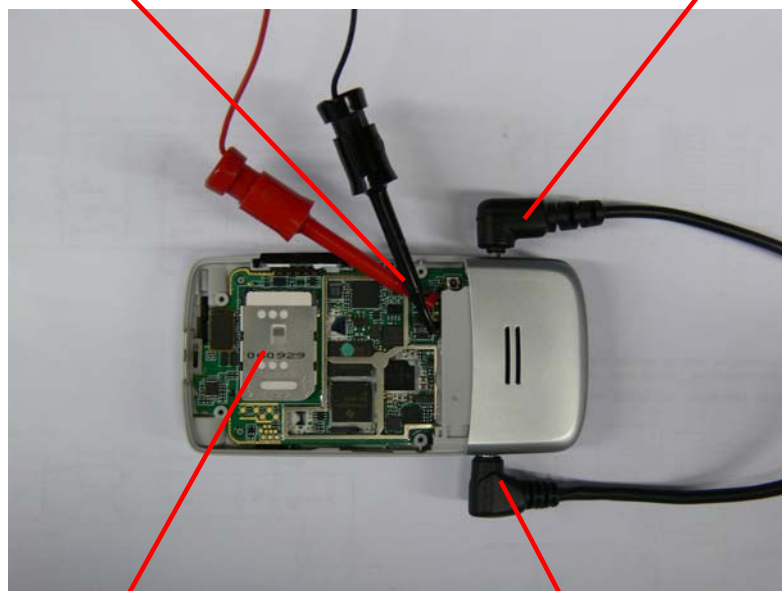
**Test SIM-card
(necessary for call-processing!)**

Foxlink-cable

6.2   ALTxx

ALT01 (no alert)

If the alert isn't working, the easiest way to isolate the failure is at first to replace the alert. It's bonded in the alert housing and really simple to replace.
If the alert is not the cause, check the parts direct to the contacts of the alert. This circuit filters out the high band noise and ESD303 is an ESD-protect. Maybe there's too less solder or a broken/tombstone part. But mostly the melody IC U101 is defective. When replacing the part please take care of the flash IC U501 placed directly beside U101, use cooling shields!
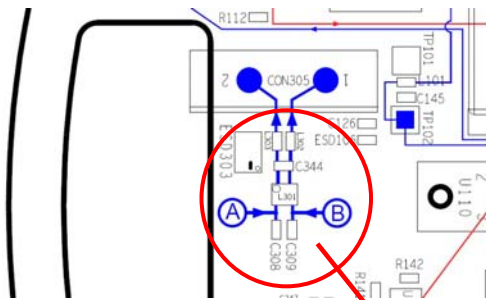
Low-pass filter and ESD-protection
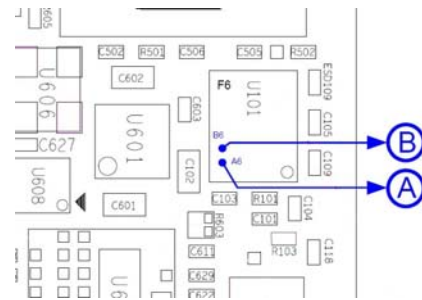
ALT02/03 (low/distorted alert)

If the sound of the alert speaker is very low and/or distorted, in the NPI-process a lot of defective alert speakers were detected. Just replace it and the failure is fixed. If the ring tone is still very low, check the circuit just as described upper and replace U101.

ALT11/12/13 (no/weak/automatic vibrator)

Only few defects related to the vibrator were detected during the NPI-process. All failure-types could be caused by the same defective part.
These failures are
- no function of vibrator
- low/weak function of vibrator
- vibrator works very low automatically after startup

The vibrator is switched on by receiving a control-signal **VIBRATOR_ON** from pin H13 of calypso U201. This signal controls the MOSFET U312, which switches contact 2 of the vibrator to GND. The voltage **MVBAT** goes to pin 1 of vibrator.
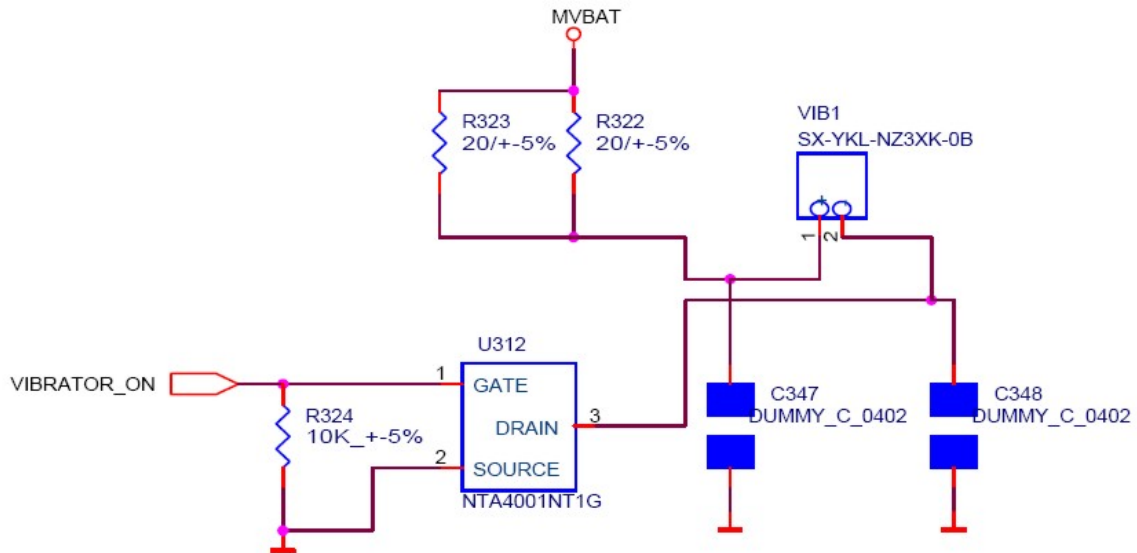

At first – of course – replace the vibrator. If the failure still exists it's useful to perform some measurements. To make this possible, place the PCB into a complete front housing and connect it with the charger and external voltage from the power-supply. It's not possible to use the modified rear housing in this case, just press the contact of + onto the battery-contact.

Now switch on the phone and choose the test 'Indication' in the CIT-menu. Now you should measure the control-signal **VIBRATOR_ON** and the **MVBAT**.

The **VIBRATOR_ON** signal should be pulsing at ~2,8 V (in the CIT the vibrator works only pulsed). If it's missing or too low, replace U201 and U501, because the signal comes directly from U201. If the signal is OK, replace U312, because the MOSFET doesn't switch contact 2 of vibrator to GND.

In the case that the vibrator works too low automatically after startup, check U312 as well. It switches the vibrator on permanently with a low voltage (permanent internal resistance).
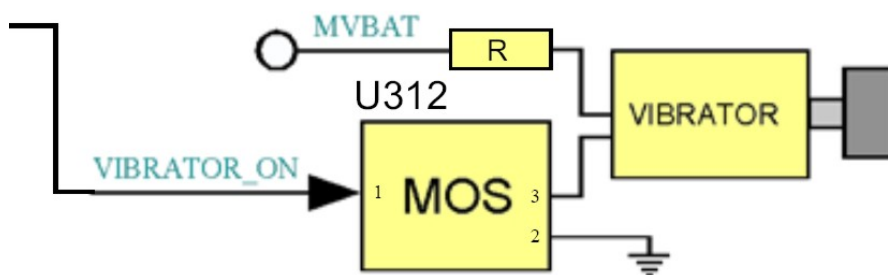
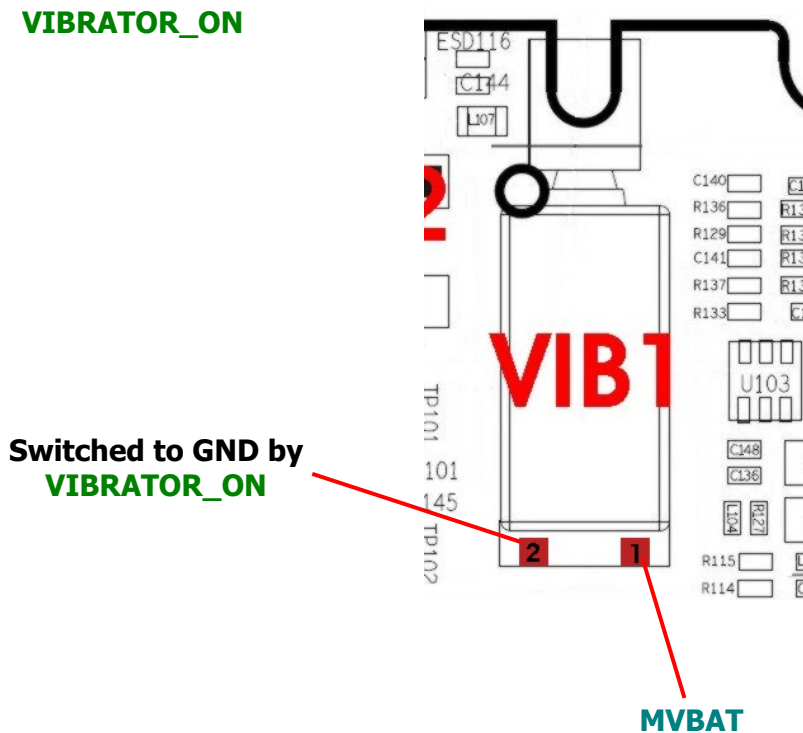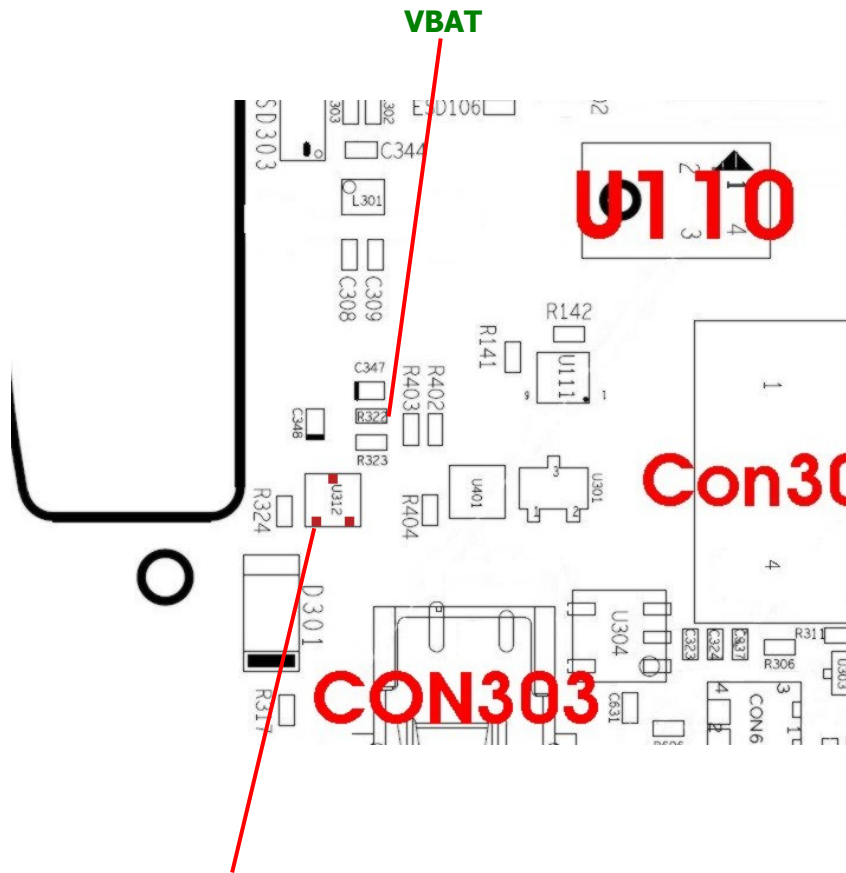## MOTOROLA

Motorola GmbH, CSS Center Flensburg, Mobile Devices

Title: Troubleshooting-Guide **W220 Level 3**

Doc. No:	tsg_gsm_w220_level3
Version:	1.0
Date:	13.06.2007
Page:	20 / 36

VBAT

VIBRATOR_ON

Switched to GND by
VIBRATOR_ON

MVBAT

6.3 AUDxx

AUD01 (no audio)

To analyze failures relating to the audio-path, we detected several failure causes and solutions.
These are:

Internal speaker doesn't work:
- defective display assy (including speaker)
- defective flex assy
- flip-connector CON301 damaged/improper
- U202 IOTA defective (direct audio-connection to CON301)

Audioloop works only via headset:
- headset-connector J102 mechanically defective (internal switch)
- electrical switch U102/U103 defective
- U202 IOTA defective

The internal audio-path goes directly from pins A11 and A12 of U202 to pins A6 and B6 of CON301. So in the most cases, when audio doesn't work at all, U202 is defective and has to be replaced. There aren't any measurements to perform.
Very often the switching between headset and internal audio doesn't work correctly. In that case assemble the PCB without rear housing first, plug in the charger and switch the phone on. Now you can measure the signal **EP_STATUS** (to U201 CalypsoLite), which is set to high (2,8 V). When inserting the headset plug, it changes to low, and the headset is activated. If not, the internal mechanical switch is defective – replace headset-connector J102!
If the switching is OK, check U102 and U103 (electrical switch) and replace them (it's more efficient to replace both at once).
If everything is working, U201 CalypsoLite is defective (forward PCB to a Level 4 Hub!).
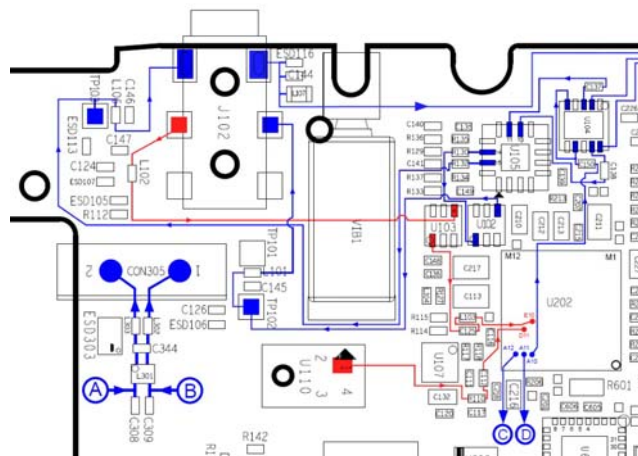
AUD07/08 (no/distorted mic)

If the internal microphone U110 works distorted and low, replace U110. We never figured out any other failure at this defect.
If the microphone doesn't work at all, the cause is generally a defect of U110 as well.
We never made any measurements, because there's no need to.

From pin C11 of IOTA U202

To pins D11 and D12 of U202 IOTA
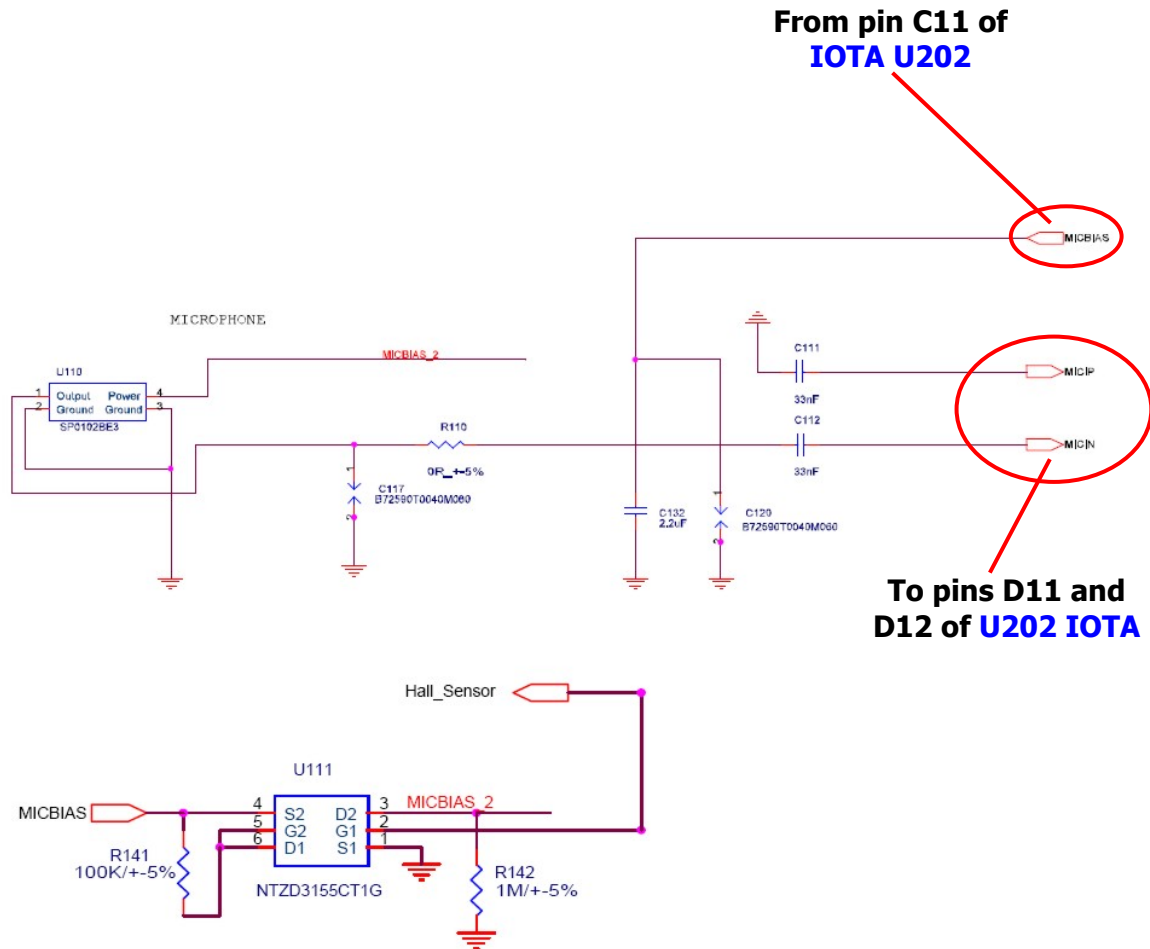
We recommend presoldering a new U110 before placing on the PCB! Make sure not to use too much solder, because the hole to receive the noise could be closed during the soldering (because U110 is placed upside down).

6.4 BATxx

BAT02/06 (battery life short/gets warm)

If the customer declares a short life battery, and/or that the battery gets hot, it's an indicator, that the PCB draws too much current. Analyzing this failure is a little difficult, because mostly it's caused by a short resistance from B+ to GND.
How to begin the analysis depends on the value of the current. Connect the PCB to external voltage via the battery-contacts and take care of the current indicator of the power supply.
At first you should make a visual check of the PCB especially for shortcuts and/or skewed parts.
If the PCB draws an excess high current, it has a short from B+ to GND. Normally this is a defect of the PA U605. To confirm this, there's an easy method to find the area on the PCB, which is responsible for the high current. Just freeze the PCB in use of cooling spray and connect it to external voltage. Now check, which area at first defrosts. There are no possibilities to perform any measurements. At a very high current you are able to measure the decrease of the voltage, but there are too many possibilities of defective parts, because nearly every section of the PCB is connected to B+.
If you suspect a defect of U605, just remove it and check the current without the PA. In the most cases, if the PA is defective, U202 IOTA got damaged as well due to the high current. Due to this check the charger circuit, too!
At a minimum higher current as normal, replace U202 IOTA first. Generally the failure could exist in each section of the PCB. The only solution is to replace the most suspicious parts.
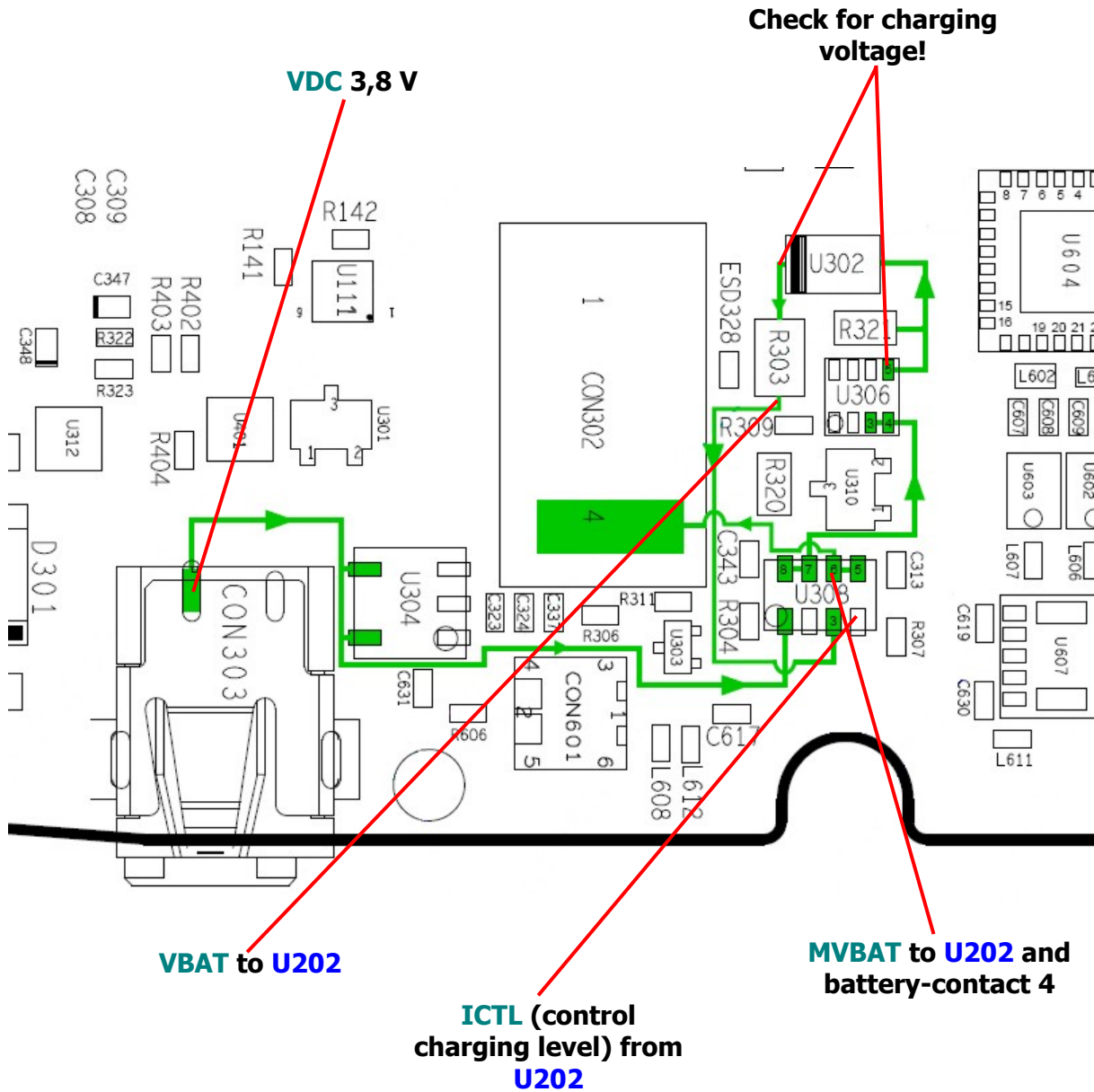
6.5 CHGxx

CHG01

Charging problems are quite easy to fix. The charger circuit is very simple and easy to measure (for sure at first check, if the charger jack is proper!).
In the layout the whole charging-path is described.
During the NPI-process mostly the over-current limiter U306 was defective; the voltage was not present at pin 5. Sometimes the diode U302 (rectifier diode to avoid reverse current) was defective as well.
If **MVBAT** is present on battery-contact 4, check **ICTL** from U202 at pin 4 of U308.
If it's not present, replace U202 IOTA!

Check for charging voltage!

VDC 3,8 V

VBAT to U202

ICTL (control charging level) from U202
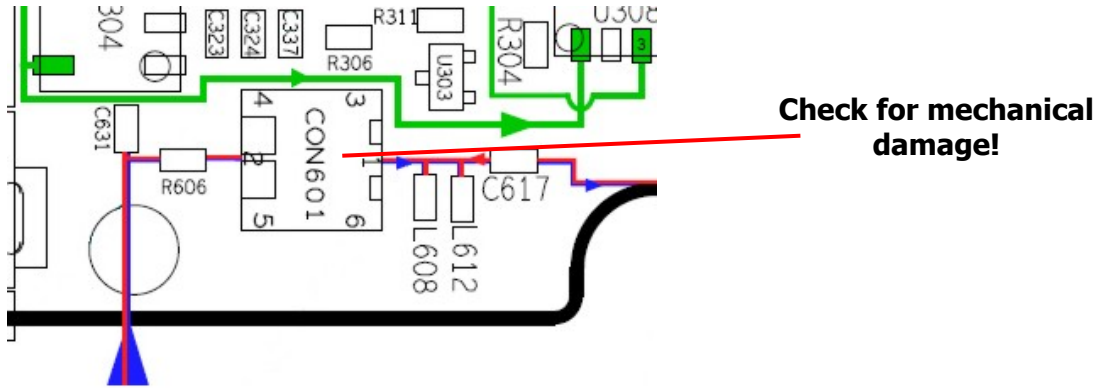
MVBAT to U202 and battery-contact 4

6.6   CPRxx

RX-TX problems are very rare at W220. We received some transceivers that failed in phasing-test, a defective PA U605 was always the cause.
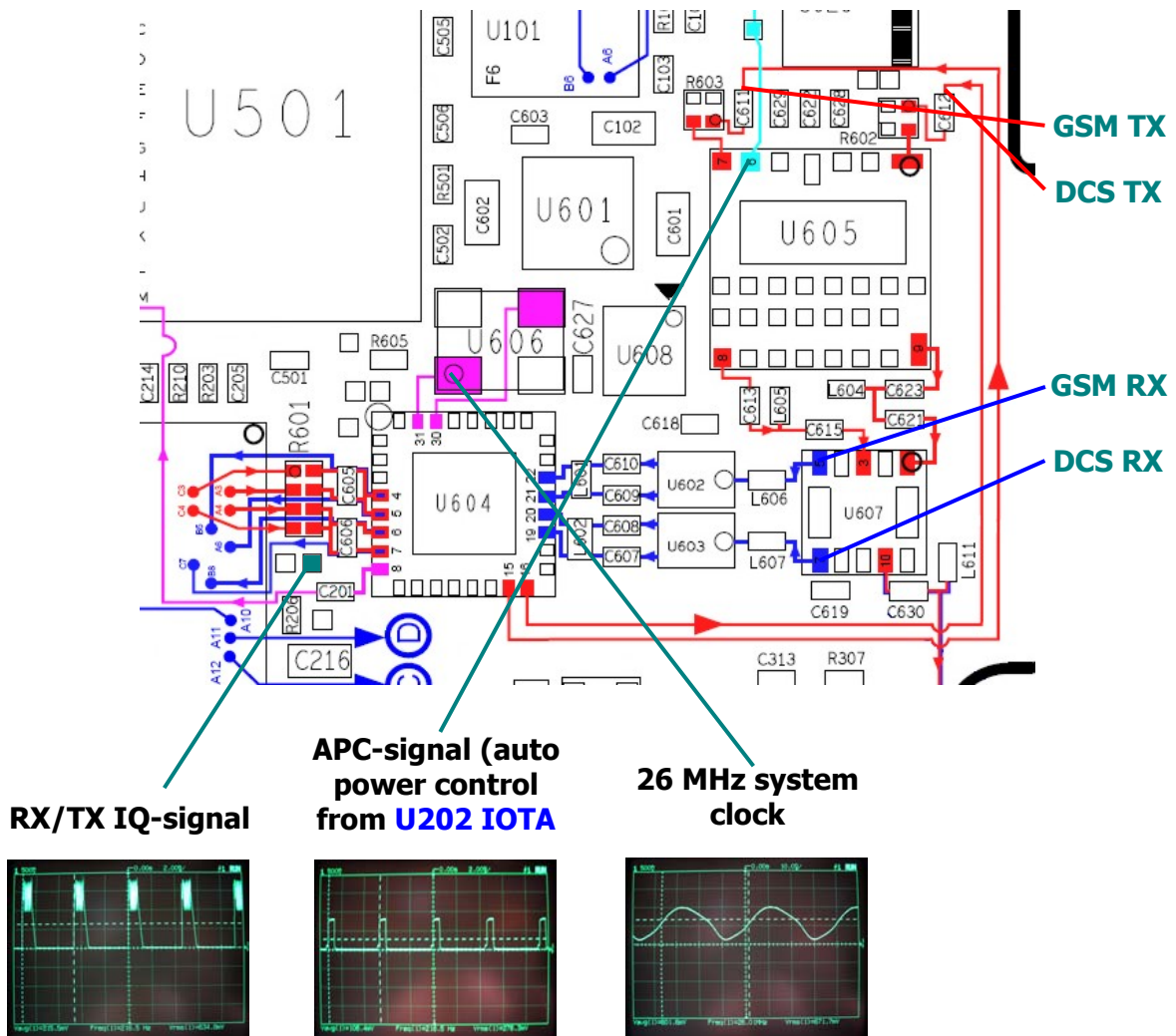In some cases the RF-connector CON601 was mechanically damaged. CON601 switches the RF-signal for testing or to the antenna-connector ANT601.
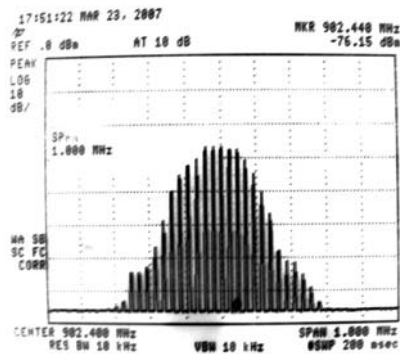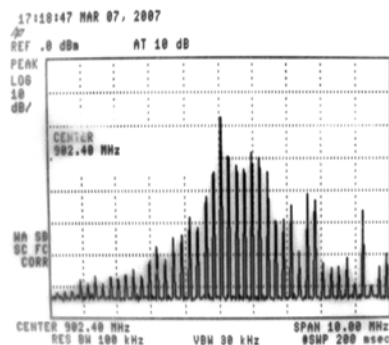The whole RF-circuit is really stable and as usual there are only a few opportunities to make measurements.

Check for mechanical damage!

Overview of the RX/TX-area with important signals:

GSM TX

DCS TX

GSM RX

DCS RX

RX/TX IQ-signal

APC-signal (auto power control from U202 IOTA

26 MHz system clock

Examples of TX-signals (EGSM channel 62 at power level 5):

TX-signal good

TX-signal bad
(defective PA U605)

When receiving a transceiver with the failure description 'no network' at first try to solve the problem with a SW-update and/or master clear. Mostly this is caused by corrupt software. In some cases we measured the signals as shown previously, but there was no fault detected. Finally, U201 CalypsoLite was defective (in this case forward PCB to a Level 4 Hub!).
We suggest this strategy for RX/TX-failures:

- If the customer declares a network problem, just make a phasing – and callprocessing-test
- If the PCB fails in phasing, check the TX-signal at the faulty channels
- If the PCB fails in callprocessing, check the RX-circuit as well, often the problem is data-based (defective U201 CalypsoLite). Check as well the frontend module U607!

6.7   DAPxx

DAP03/09 (SMS-EMS message/picture-movie transmission)

If the customer declares problems with the editing or sending/receiving of SMS/EMS, mostly the cause is a SW-problem. We found out, that the functions of messaging do not work properly. E.g. it's not possible to enter the menu of messaging.
After a SW-update (if possible the newest software) the failure is fixed.

DAP11 (cannot upgrade software)

To confirm this failure, you just have to connect the phone with charger and foxlink-cable and try to read out the phone with MST. Normally this wouldn't work!
This problem is caused by a defect of the headset-connector J102 (check!) or parts around it. Mostly the defect is visible.

Check for mechanical defect!

Check for broken/missing!
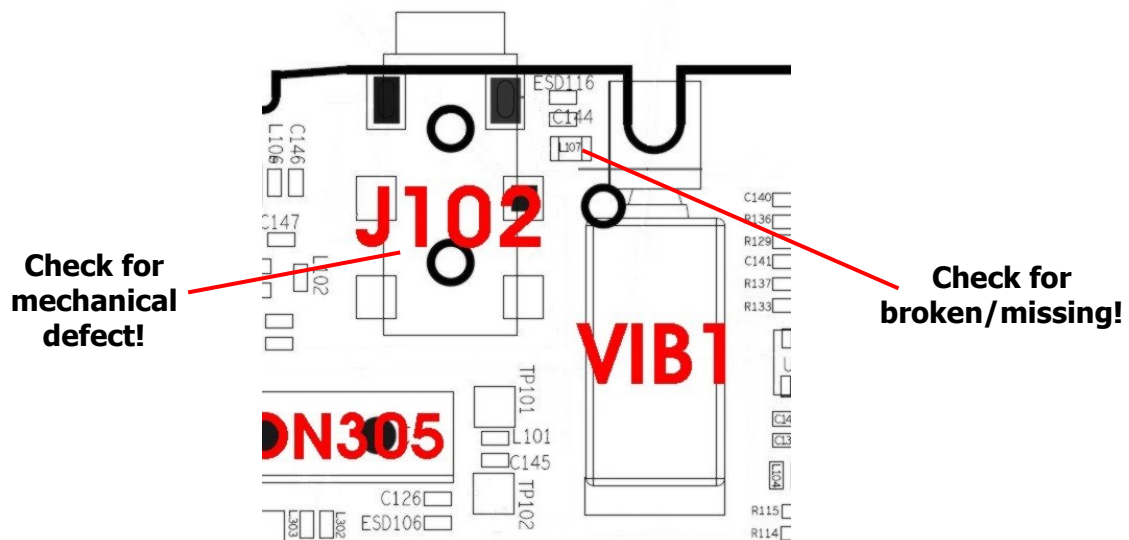
We received some transceivers that could not be detected by MST, because of a broken L107. It's placed parallel to C144 from pin 5 of J102 to GND. We suspect that L107 could be damaged when the housing gets opened.
Sometimes the SW-upgrade doesn't work because of a defect in the charger circuit.
In this case see also !

6.8   DIMxx/DISxx

DIM01 (no main display)

At first, for sure, check the flip incl. display assy and flex assy.
If the flip is OK, check the flip-connector CON301 on the PCB for damages.
Sometimes CON301 is bad soldered or some contacts are bent. In this case replace
it. If you detect a water-damage at CON301 and oxidized contacts, the PCB has to be
replaced (forward PCB to a Level 4 Hub!).
Check U307 and U311 for bad soldering or shortcuts as well. Another cause could be
an open trace in the PCB.
Just measure the impedance of the pins of CON301 to U307 and U311 as following:

CON301 Pin 15 to U307 Pin 7
CON301 Pin 16 to U307 Pin12
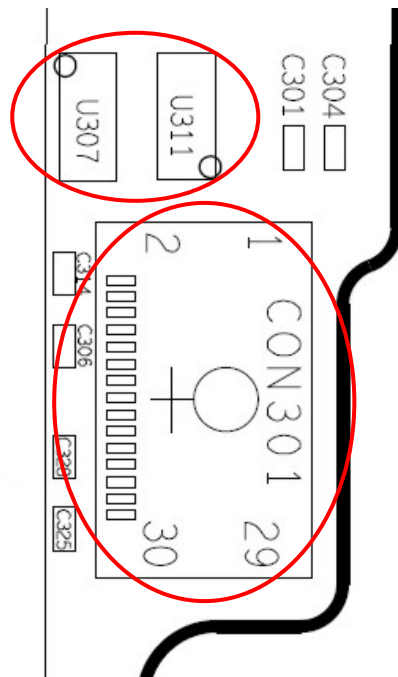CON301 Pin 20 to U307 Pin 10
CON301 Pin 23 to U311 Pin 10
CON301 Pin 25 to U311 Pin 11
CON301 Pin 27 to GND

If any connection is open ($\infty\ \Omega$), the PCB has an internal interruption and has to
replaced (forward PCB to a Level 4 Hub!).

If all possibilities are excluded, U201 CalypsoLite is defective (forward PCB to a Level
4 Hub!).

DIM02/03 (missing pixels/corrupt display)

If there's a missing line or corrupt pixels in the display, replace the display assy. It's a known internal error.

DIS01 (no secondary display)

W220 has no real 'secondary display', but status-symbols for charging, messaging and power status. If the customer declares a nonworking status-function, the function of the external status-symbols is switched off in the setup-menu. After switching it on or a master clear it works again.

6.9   FTRxx

FTR13 (FM radio)

There are two different failures we received for repair:

- FM radio has no signal
- FM radio doesn't work at all (wrong frequencies are displayed/no sound)

If no signal can be received, check the antenna-connection of the FM radio. It goes directly from the FM IC U701 to pin 5 of J102. Check the internal contact of J102 and the parts L107, C144 and ESD116. If everything is OK, replace U701. There are some parts beside U701 connected to the antenna to block DC, but these parts are glued. Just check them visually.

If the FM radio doesn't work at all, or strange frequencies are displayed, replace U701 as well. We never had the case, that the control of U701 was defective.

If you have to replace U701, you have to work very carefully! The solder contacts are very thin and the glue makes it really hard to remove the IC.

Measurements in the area of U701 are impossible as well because of glue; some parts are positioned under the frame of the shield.

If the FM radio has no sound, replace U104 (analog switch). We never received transceivers with this failure, but maybe it's useful to check.
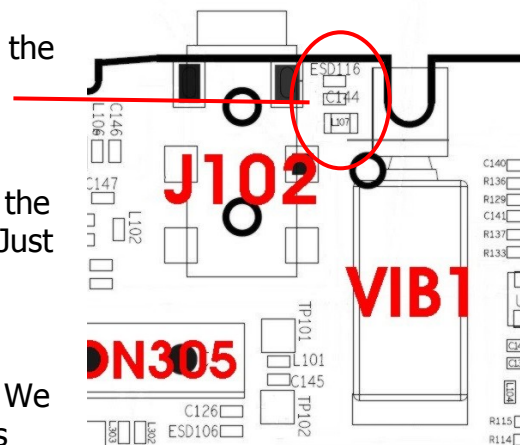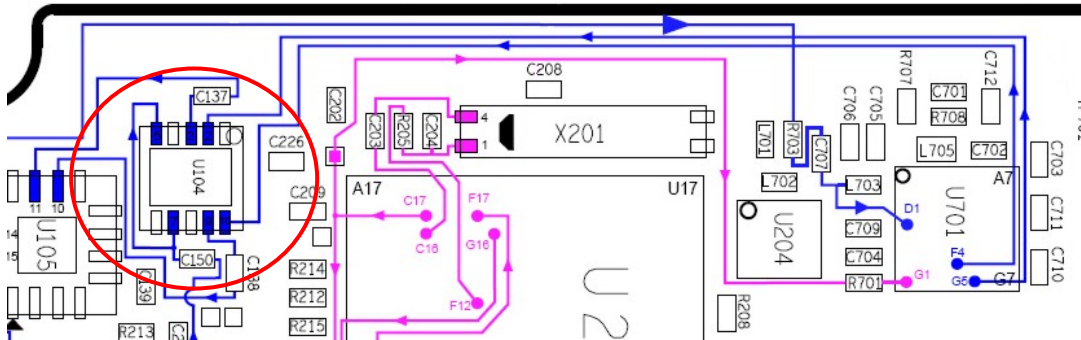
6.10 MKPxx/SIKxx

MKP01/02 (keypad no function/poor tactile)

At first check the function of the keypad and figure out, which keys aren't working and/or if only the tactile is bad. If so, just remove the mylar and check/clean the contacts. After replacing the mylar check the function again.
If some keys aren't working at all, check the keypad-matrix in the layout.

The keypad keyboard is directly connected to U201 using:
KBR (4:0) - input pins for row lines
KBC (3:0) - output pins for column lines

So if some keys are not working and you excluded a failure due to the mylar or dirty contacts, you can measure the connections in the matrix.
If there are interrupts, the PCB has an internal interruption and has to be replaced (forward PCB to a Level 4 Hub!).
If NO key is working, U201 CalypsoLite is defective (forward PCB to a Level 4 Hub!).
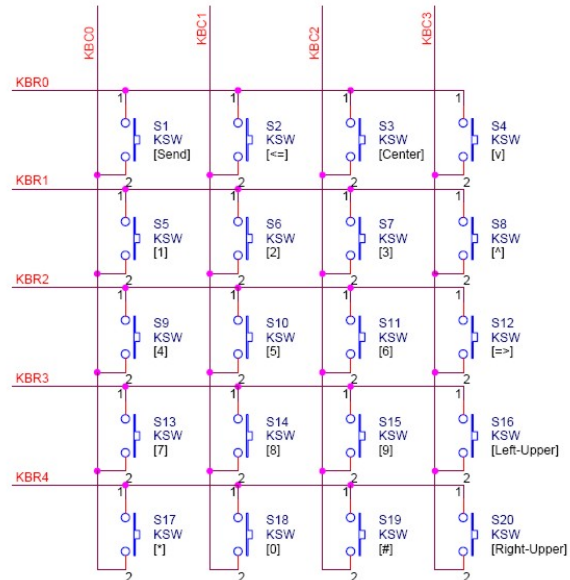
Example:
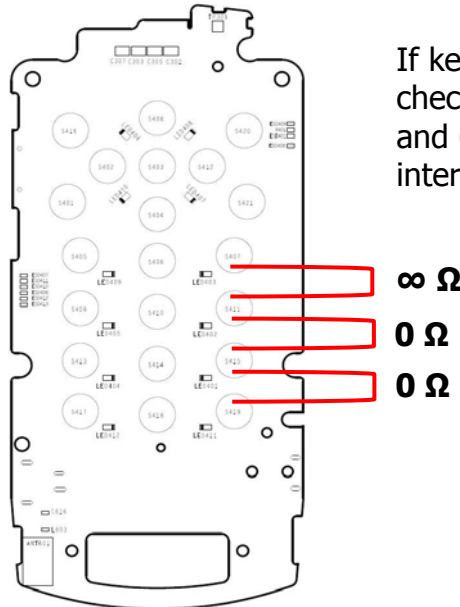
If keys 6, 9 and # aren't working, check the connection between key 3 and 6. There should be an interruption.

∞ Ω

0 Ω

0 Ω

SIK01/02 (sidekey no function/poor tactile)

If the side keys aren't working, check the connector CON401 for damage or bad soldering, if necessary resolder or replace it. If the tactile is bad, just replace the side key assy.

6.11 OPRxx

OPR04 (menu navigation)

We received a high quantity of transceivers with a corrupt function of the menu. You can recognize this failure just after the phone has started up. When the request to type in the SIM pin, there's no text displayed. The graphics appear on the screen, but if you access the menu, no text is displayed. This is a software bug!
The solution for this problem is easy – just perform a master clear.
Attention: Very often the master clear-function of MST doesn't work properly! Sometimes you have to perform the master clear via the menu of the phone. That's problematic, when the menu is corrupt, just remember this sequence:
In the main menu choose menu 'settings'. Now press 5 times the down-button and afterwards the menu-button. After that press one time up and the menu-button to choose the menu 'initial settings'. Type in the security-password (default is 1234) and press the left soft-key to affirm. After the restart the failure is fixed!

Before: **After:**
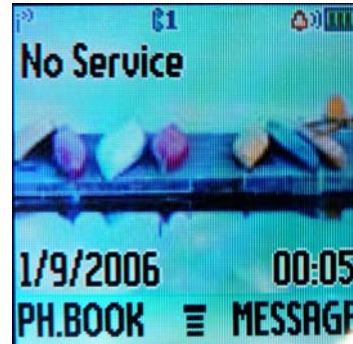
Menu options are missing!

After fixing this failure we recommend to perform a SW-update to the newest available software to eliminate such bugs!

OPR07 (hangs/freezes/locks up)

Very often we could confirm this failure; sometimes it's enough to perform a master clear, but anyway it's safe to make a SW-update to the latest version.

6.12 SIMxx

SIM01

In case of SIM-card problems very often we received transceivers with a broken SIM-card reader CON304 (SIM03) or bent pins. Check this at first! The next step is to check the signals at CON304.
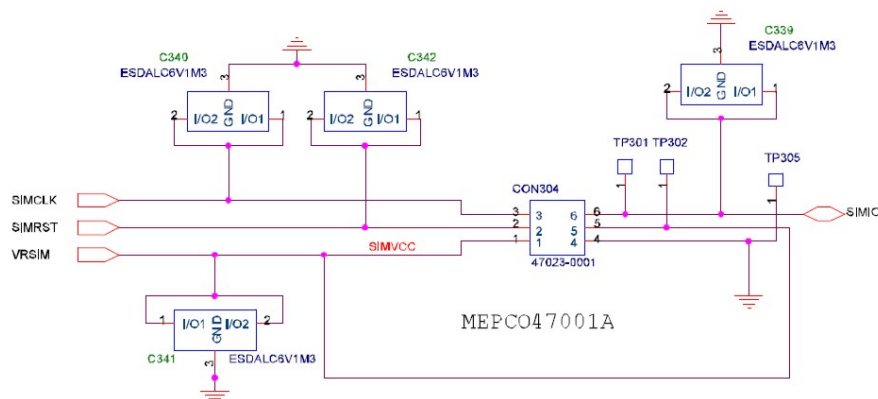
The signals of the SIM-card function are:

SIMCLK – SIM card reference clock (3,3 MHz)
SIMRST – SIM card reset (2,8V)
SIMIO   – SIM card bidirectional data line
**VRSIM**   – power supply for SIM card (2,8V)

The measurement is a little difficult; you have to assemble the PCB with the modified rear housing, because the signals are only present when a battery and a SIM-card is inserted. **SIMCLK** appears only a few seconds pulsing after startup.
If any signal or voltage is missing, and all external parts like the capacitors are proper, replace U202 IOTA due to a defect of the SIM card digital interface.
When unsuccessful, U201 CalypsoLite is defective (forward PCB to a Level 4 Hub!).
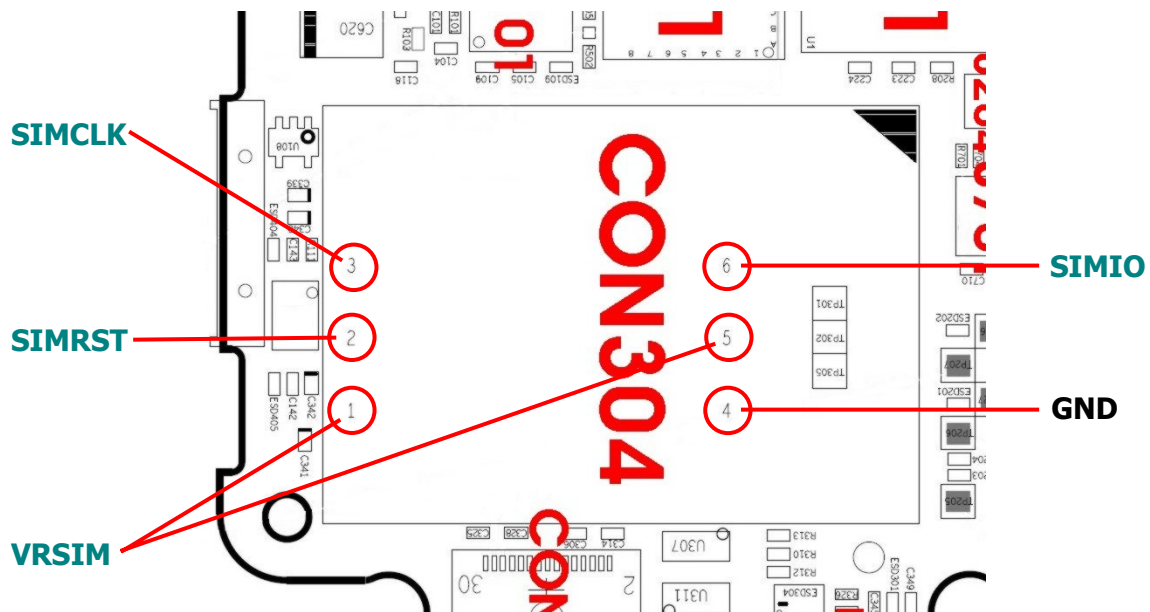
As well check these parts for defects:

C339   C340   C342   C341
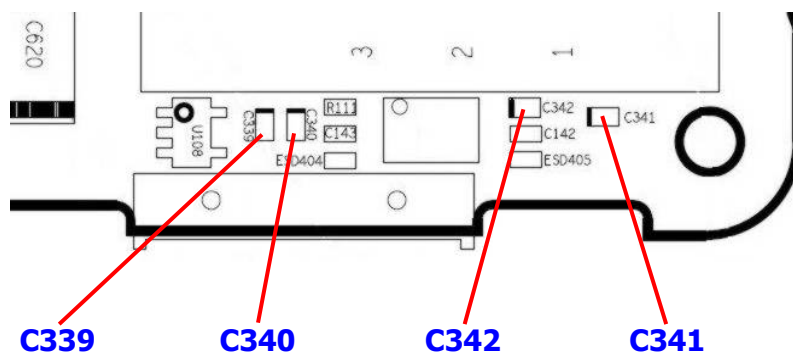
6.13 TONxx

TON01 (no turn on)

TON-failures are quite often uncomfortable to analyze. We suggest going on like the following:

- Check the failure-symptom exactly (in which condition doesn't the phone switch on? With battery, with external power,…?)
- Check all contacts (esp. battery-connector sometimes is problematic)
- Check the drawn current via battery-connector
- Ability to read the data out?

If you considered the failure, the best indicator for the analysis is the drawn current. We prepared an overview of possible causes we found out at several current-levels:

- PCB doesn't switch on, draws NO current:

Check the battery-connector for contact and /or bent pins. Clean the contacts.

- PCB doesn't switch on, draws ~ 40-60 mA:

Try to reflash PCB, when receiving a flash-error, the flash IC U501 is defective (forward PCB to a Level 4 Hub!).

- PCB doesn't switch on, draws ~ 5-20 mA:

Check the 32 kHz clock at X201, if it's not or instable working, replace X201.

- PCB doesn't switch on and draws > 60 mA:

Try to find out in use of cooling-spray which area of the PCB gets warm (simple but effective). Mostly at a higher current U202 IOTA is defective.

- PCB draws excess high current (limit of power-supply):

Try to find out in use of cooling-spray which area of the PCB gets warm (simple but effective). Mostly at an excess high current the PA U605 is defective.

| Signal	Description
CLK32K_OUT	RTC clock
CLK13M_OUT	Main clock
PWON	On button input
V-IO	2.8V, regulate output of IOTA
V-FLASH	1.8V, regulate output of IOTA
V-SRAM	1.8V, regulate output of IOTA
V-RTC	1.5V, regulate output of IOTA
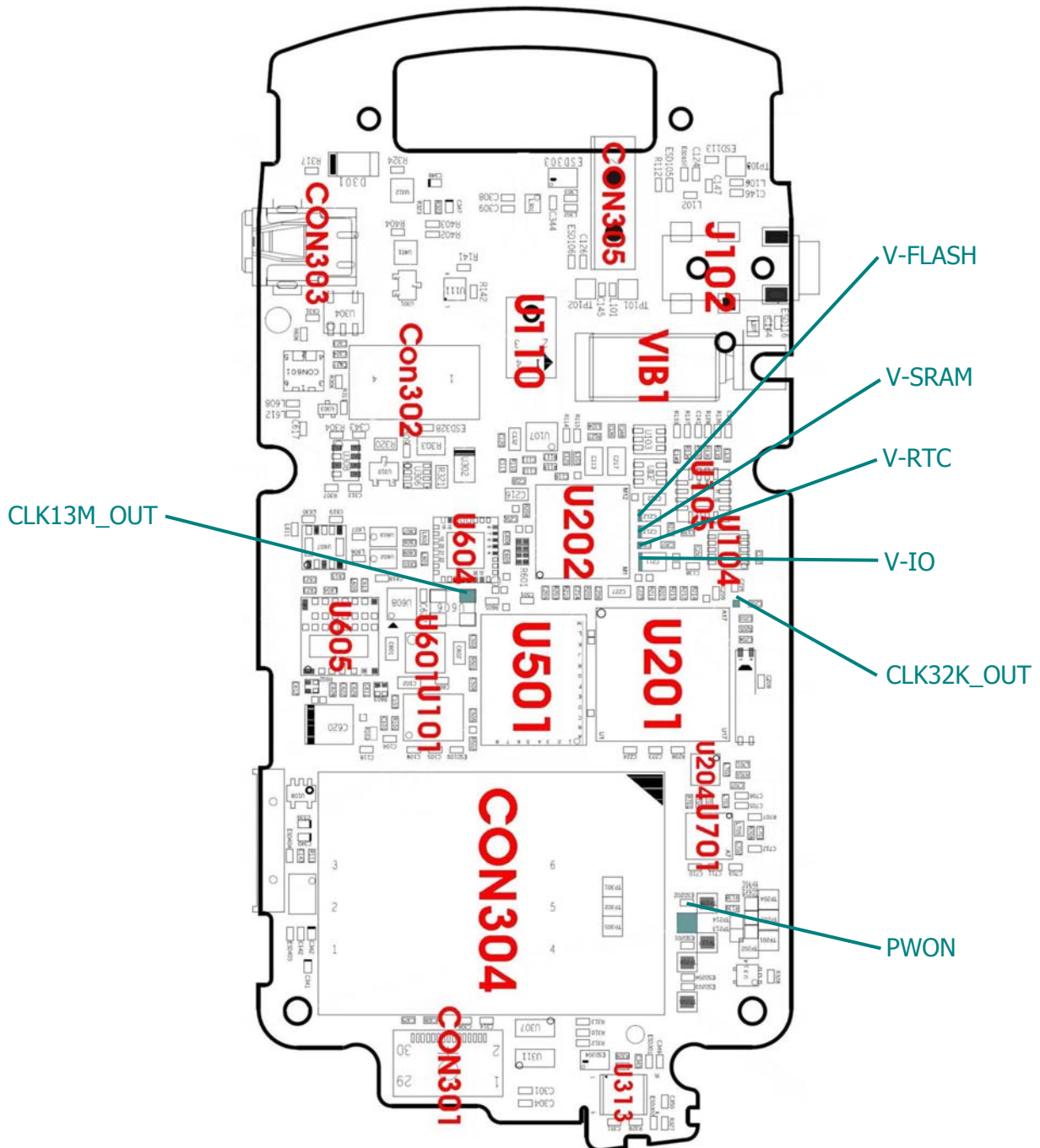
7   Flashprocedure upgrade

For the flashprocedure you only have to connect the phone with the foxlink-cable and the charger.
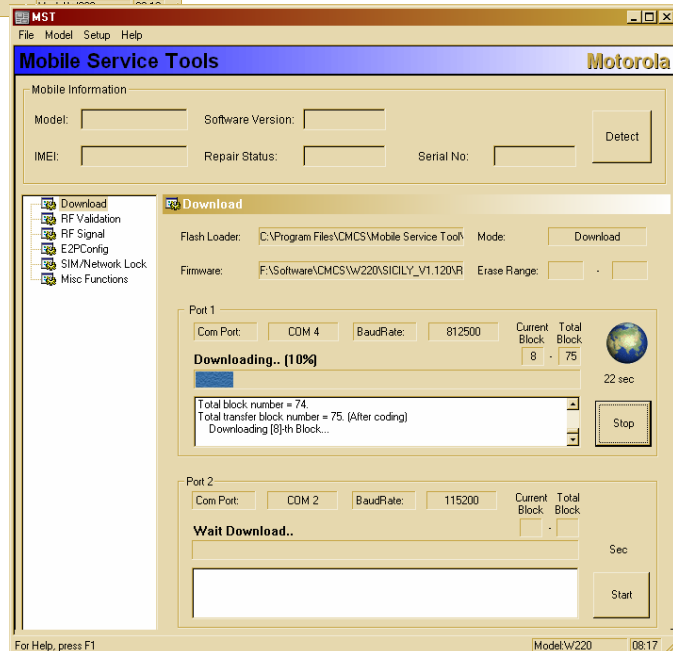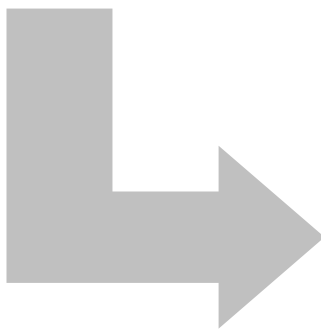After choosing the needed firmware to flash MST is prepared for the reflash.
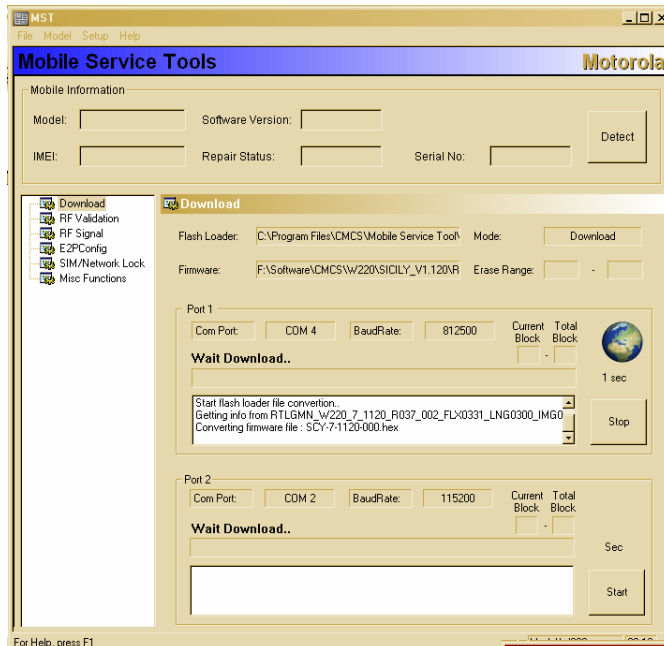
Connect the phone with the foxlink-cable.
Choose 'Download' in the menu on the left side of MST and press the start-button.

After clicking the start-button MST begins to convert the *.top-file.
After it you are asked to plug in the charger and after connecting MST begins to flash.

By receiving the message of successful download the flashprocedure is finished!