

Repairhints

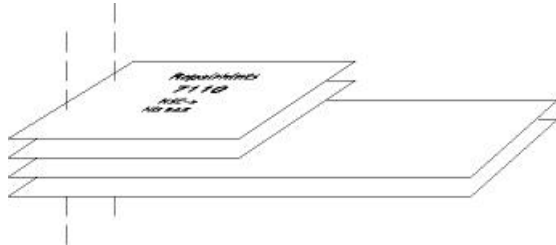
Service-Level 3 & 4

6310

NPE-4



General



-How to use this document

Place the schematics behind this manual.

Now you are able to follow these specifications with graphical layouts and it is easier for you to find the components and measuring points.

-General handling

Be very careful when disassembling the NPE-4 while removing the A-Cover from the Back-Cover. Refer to disassembling instructions at the service manual of NPE-4.

-μBGA components and broken balls

Special attention to μBGA components:

All replaceable μBGAs must be renewed after removing. Reflow using a hot air fan is not allowed.

Check soldering points and remove oxidated solderings (broken balls) carefully by enclosing a few new solders before placing new components. The only allowed way changing μBGA components is to use μBGA rework machines, approved from NMP (e.g. ZEVAC/ OK International). Use recommended Fluxtype and an appropriate amount of it only.

-PCB handling & cleaning

To avoid damages of PCB and/or components through electrostatic discharging, handle the module in ESD-suitable cases only. Always wear ESD-bracelets, which must be connected to earth bonding point.

Do not make any loose wiring connections or do some other unqualified rework anywhere.

For cleaning use appropriate materials only. Do not use scratching or rubbing tools.

Because of organic surface protection (OSP), cleaning must only be done with a lint-free cloth, which may be moistening with DI-water. IPA or other solvent like ethanol should only be used to clean gold pads for spring contacts without affecting the surrounding copper layers.

-Component characteristics

Some components contain important data.

Several described steps are practicable only if you are able to reflash/ realign the phone and/ or rewrite IMEI/ SIMlock in certain cases. Please pay attention to separate notes.

-Realign after repair

Characteristics of replacement parts are different.

To prevent additional faults after repair (RX quality, TX power etc.) it is necessary to retune phone values.

IMPORTANT:

This document is intended for use by authorized NOKIA service centers only.

The purpose of this document is to provide some further service information for NPE-4 6310.

It contains a lot of collected tips and hints to find failures and repair solutions easily.

It also will give support to the inexperienced technicians.

Saving process time and improving the repair quality is the aim of using this document.

We have built it up based on fault symptoms (listed in "Contents") followed by detailed description for further analysis.

It is to be used additionally to the service manual and other service information like Service bulletins, for that reason it does not contain any circuit descriptions or schematics.

All measurements are made using following equipment:

Nokia repair SW	: Phoenix
Phoenix Application	: 3.60.00
Flash SW (CMT)	: 4.20
Test Jig	: MJS-40
Docking station	: JBV-1
Docking Adapter	: MJF-9
Digital Multimeter	: Fluke 73
Oscilloscope	: Fluke PM 3380A/B
Spectrum Analyzer	: Advantest R3162 with an analogue probe
RF-Generator /	: CMU 200
GSM Tester	

While every endeavour has been made to ensure the accuracy of this document, some errors may exist. If the reader finds any errors, NOKIA should be notified in writing, using following procedure:

Please state:

Title of the Document + Issue Number/Date of publication.

Page(s) and/or Figure(s) of error.

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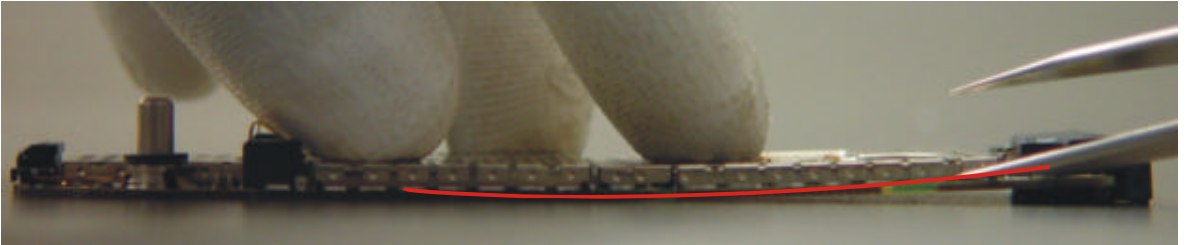
Additional Information

BB shield disassembly instructions

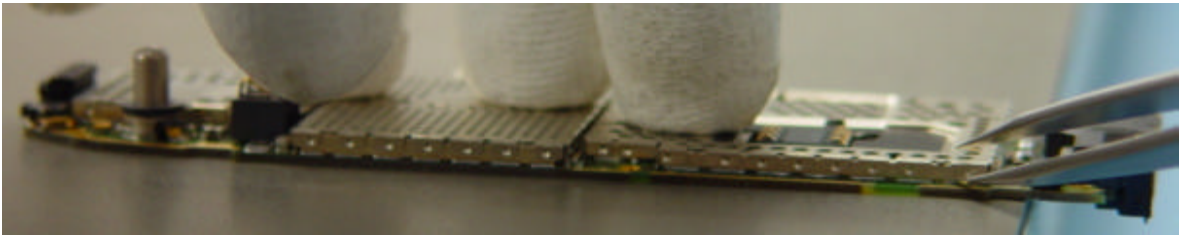
For disassembly it is important to lay the PWB on a plane underground so that the bottom connector is hanging free to prevent bending of PWB and cracking of the connector's solderings (See pictures below).



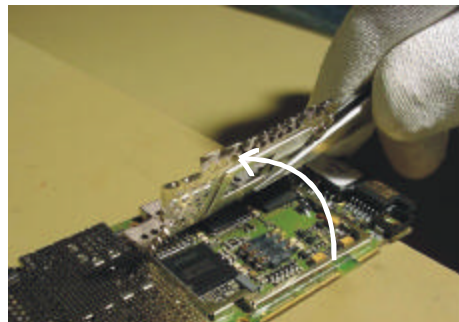
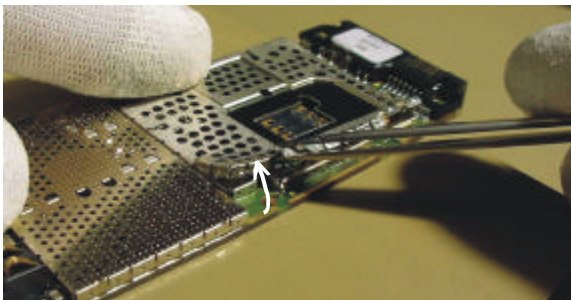
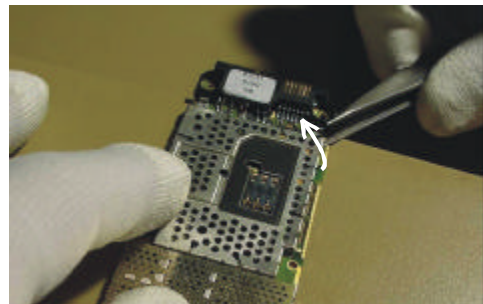
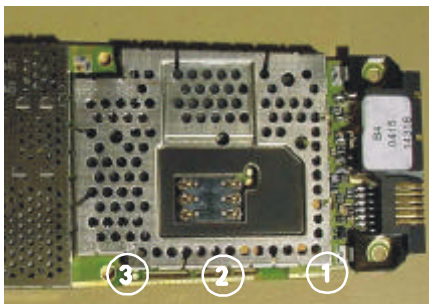
Wrong



Correct



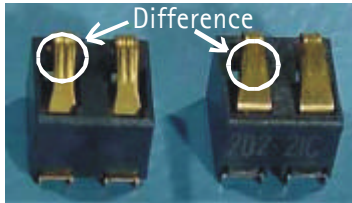
When disassembling the BB shield be very careful because Flash D450 could be damaged. Start by lifting and bending the lid with a tweezer at the marked points 1- 3 (see pictures below). Do not use too much force on the frame because it could be damaged and the PWB also could be mechanical stressed.



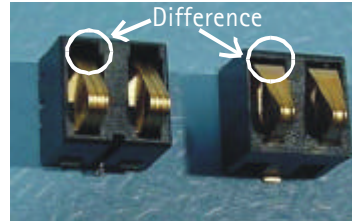
Different battery connectors

There are two different battery connectors under the same part code (5400239). (See pictures below). If it is necessary to exchange the battery connector X101/ X102 take care that you use the same one. The mixed replacement causes switch-off trouble

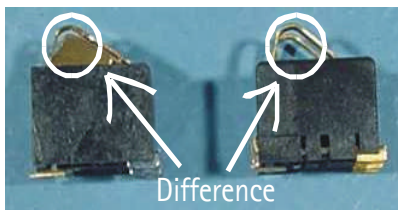
Different surface and width of. spring contacts



Different position of spring contacts



Differences of spring contacts



Note! It is not allowed to use the battery connectors of NPE-3 (part code 5469069) because of smaller size.

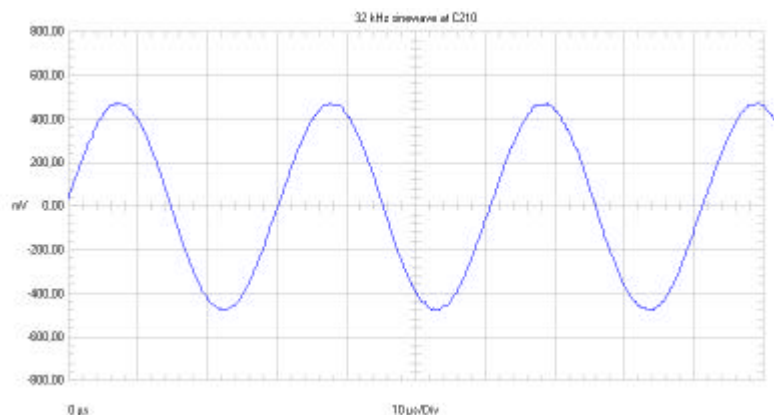
Electrical faults

Totally dead

Check VBATIN=3.6 VDC at L260 (depends on workbench supply). If not ok, check X101, X102 battery connectors for mechanical damages or cold solderings. **Refer also to chapter "Additional Information/Different battery connectors".** Check 32.768 kHz sinewave, Vpp = 800 mV at C209 (See picture below).

Oscilloscope settings:

Ampl: 200mV
Time/Div: 10µs/Div
AC/DC/GND: AC



If there is no signal, check B200 circuit for shorts or disconnection and change faulty components.

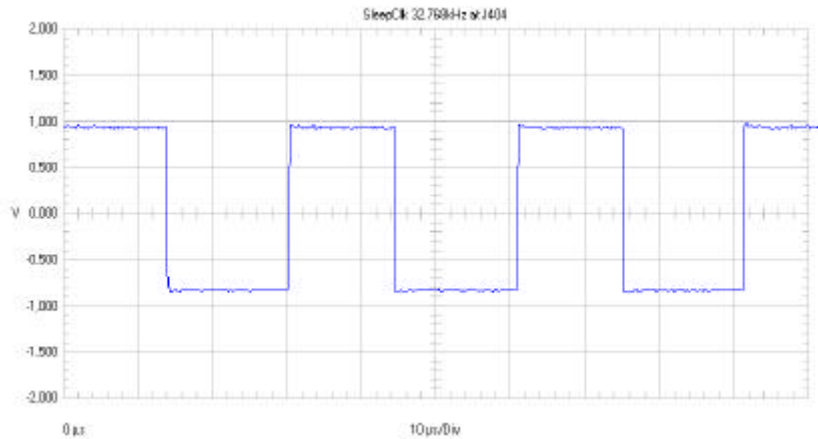
Check PWRONX at S300 pin 2/ 4:

Key not pressed = 3.6 VDC (Depends on Workbench supply voltage)
Key pressed = 0 VDC

If not ok, check PWRONX-line from S300 to UPP D400 for shorts or disconnections.
Check SleepClk = 32.768 kHz, Vpp = 1.8 V square wave at J404. (See picture below)

Oscilloscope settings:

Ampl: 500mV
Time/Div: 10µs/Div
AC/DC/GND: AC

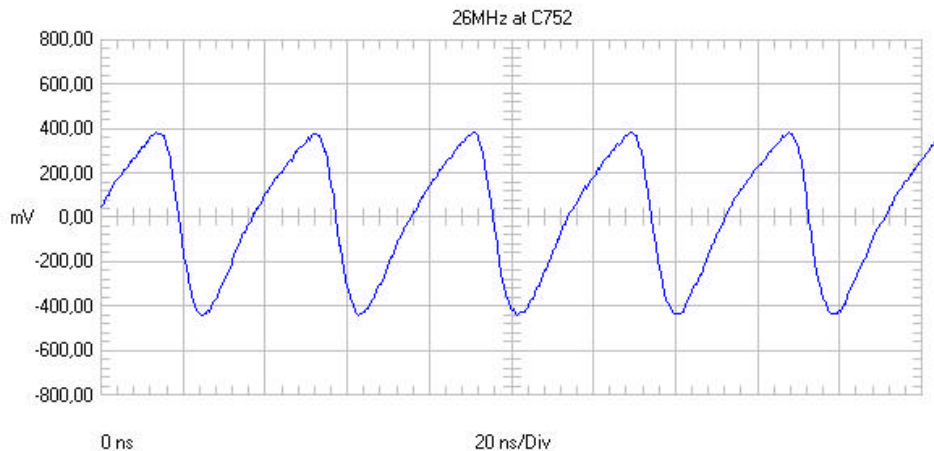


If not ok, check B200 circuit for shorts or disconnections.

Check VCORE = 1.8 VDC at C400. If not ok, check UEM D200
Check PURX = 1.8 VDC at V130 Pin 44. If not ok, check UEM D200
Check System Clk = 26 MHz, Vpp = 800 mV at C752 (See picture below)

Oscilloscope settings:

Ampl: 500mV
Time/Div: 20ns/Div
AC/DC/GND: AC



If not ok, check 26 MHz G740 circuit. Refer also to chapter Drop calls

Check RFClk = 13 MHz, Vpp = 600 mV at C424. If not ok, refer to No service/ No RSSI.
Check VIO = 1.8 VDC at C450. If not ok, check VIO line to UEM D200 for shorts or disconnections and change faulty components.

If all above mentioned signals are ok, change D450 Flash.
After changing the Flash D450, rewrite product code, HW-ID, IMEI and SIMlock settings.

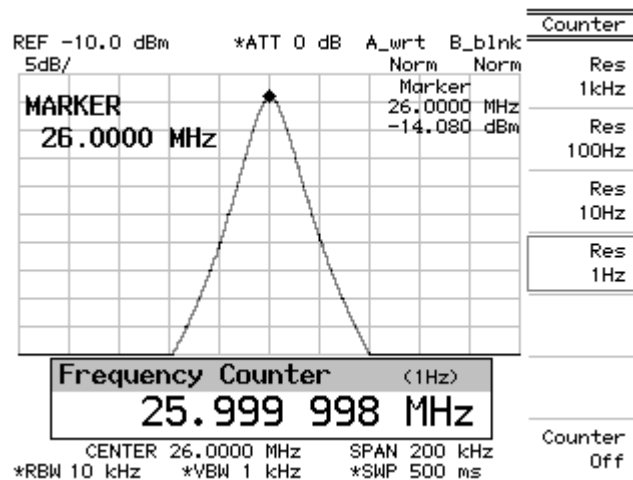
Note! Rewrite SIMlock and IMEI data by use of NOKIA SECURITY PASSWORD and tune the phone again, if the procedure is permitted to you. (See General SB-037)

Drop calls

Disassemble the NPE-4 and the RF- shield, then connect the PWB to the MJS-40 jig.
Insert a SIMcard and connect the coaxial cable to the tester (e.g. CMD/Wavetec). Now start a call.
If the call is established, check the analyzer display from tester (e.g. CMD/Wavetec) if a frequency error appears.
If fault does not appear or appears intermittently only, press on 26MHz oscillator G740 with non-metallic item.

If the frequency error appears or increases in this case, probably the 26MHz circuit is faulty.

Open the Phoenix menu Testing/ RF controls and activate local mode RX GSM900
Check 26MHz +/- 100Hz between C752 and R752 with spectrum analyzer and active frequency counter (See picture below)



If the frequency drift is higher than +/- 100Hz, check VR3 (VCC) = 2.8 VDC at R740.- If not ok, check UEM D200.

Check AFC (around 1.3 VDC) at G740. Check also if VR3 (VCC = 2.8 VDC) is ok with an Oscilloscope.- If not ok, check UEM D200

If both voltages are ok but the frequency drift is higher than +/- 100Hz and the fault is getting stronger when pressing the top of the 26MHz oscillator G740, change the faulty component.

No service

Set phone to local mode with Phoenix
Open menu Maintenance/Tuning/RX Calibration
Check RX calibration in GSM/PCN.

If not ok, refer to chapter No Service/No RX

If RX calibration is ok, open menu Maintenance/Tuning/TX power
Check TX power in GSM/PCN.

If not ok, refer to chapter No Service/No TX

If TX power is ok, insert Test-SIM and set phone to normal mode.
Start a Test call

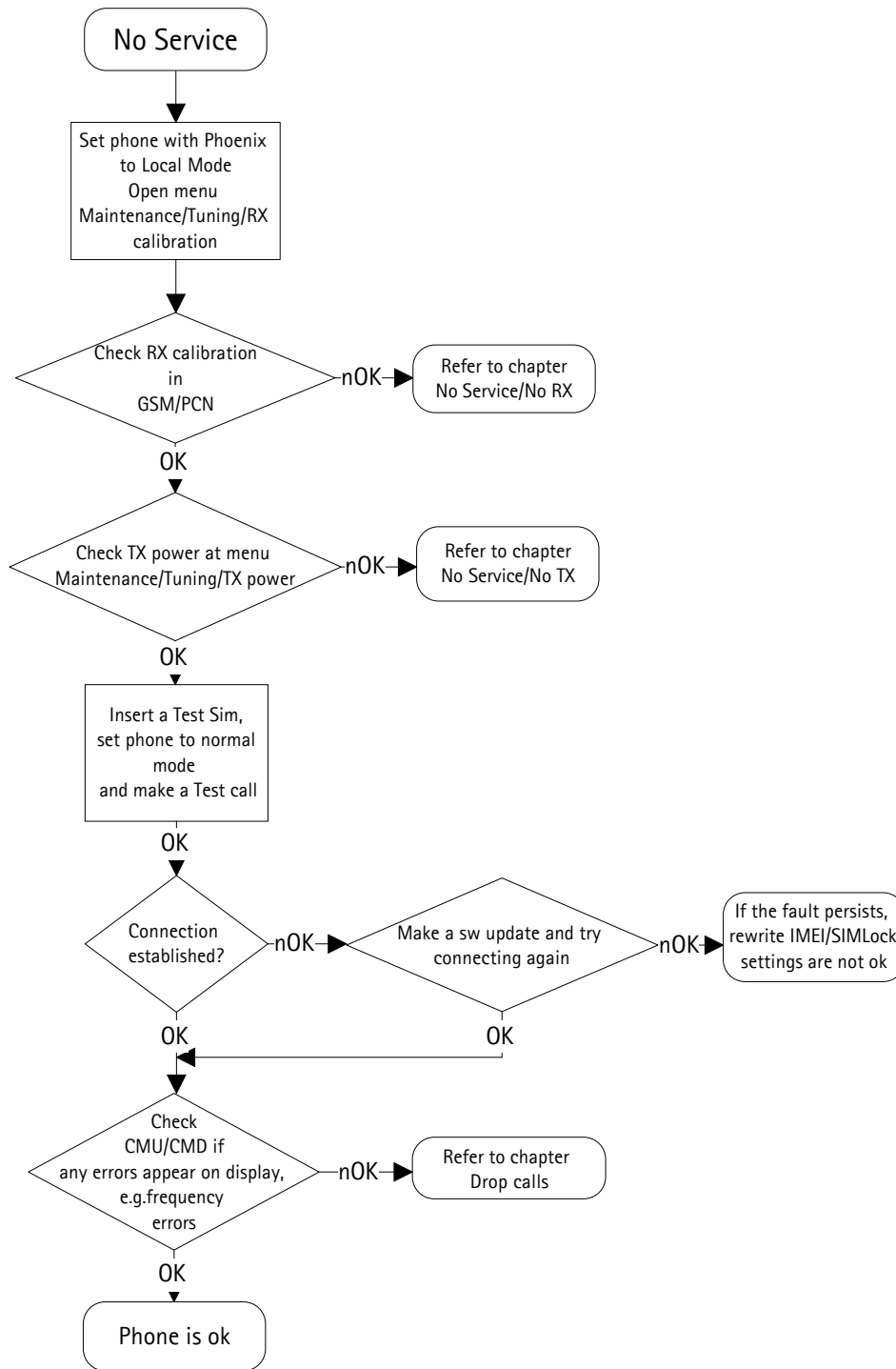
If not ok, make a SW update and try connecting again.

If the fault persists after SW update, rewrite IMEI and SIMLock settings.

Note! Rewrite SIMlock and IMEI data by use of NOKIA SECURITY PASSWORD and make a SW-update again, if the procedure is permitted to you. (See General SB-037)

If the connection is established, check with tester (e.g. CMD/Wavetec) if any errors appears on display (e.g. frequency error).
If a frequency error appears, refer to chapter Drop calls.

Flowchart – No service

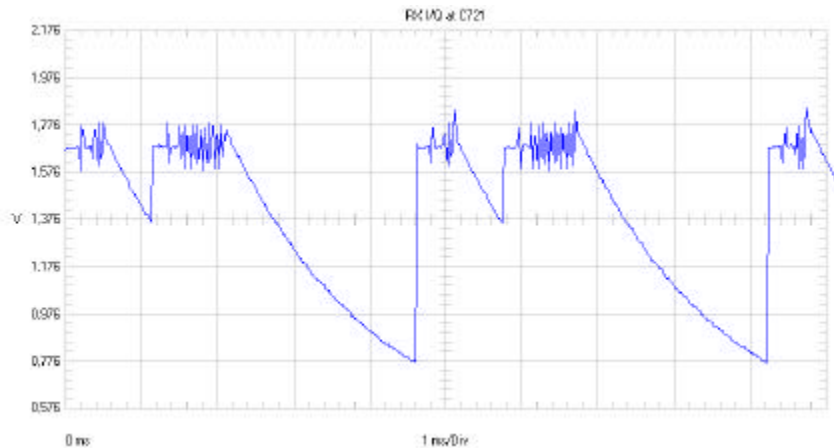


No Service ® no RSSI

Set the RF generator to GSM 942.4 MHz at channel 37, RF level -55 dBm and also the phone to same frequency and channel.
Check RX I/Q signals at C721, C722 (See picture below)
Always measure in burst mode (with an oscilloscope in DC mode).

Oscilloscope settings:

Ampl: 200mV
Time/Div: 1ms/Div
AC/DC/GND: DC

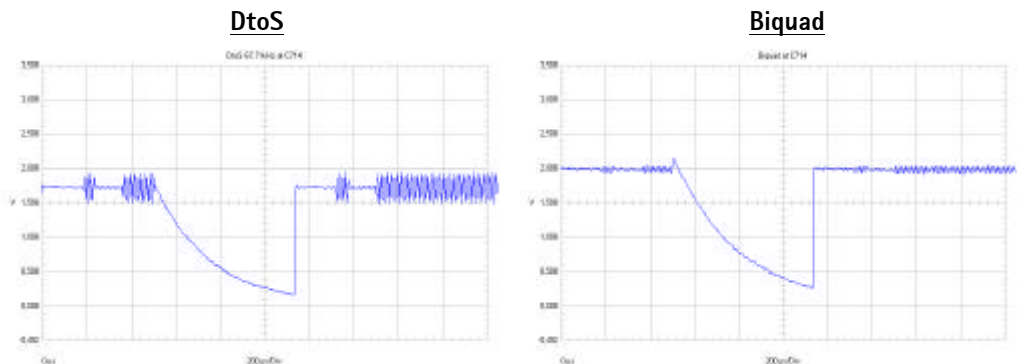


If not ok, check 67.71 kHz at C714 (Dtos and Biquad filter).
Measurement points at C714 count from N600 Hagar side: At first pins (3/4)= Dtos I/Q;
and then pins (1/2)= Biquad (CM_F and CP_F I/Q).

All measurements made in Burst Mode (with an oscilloscope in DC mode).

Oscilloscope settings:

Ampl: 500mV
Time/Div: 200µs/Div
AC/DC/GND: DC



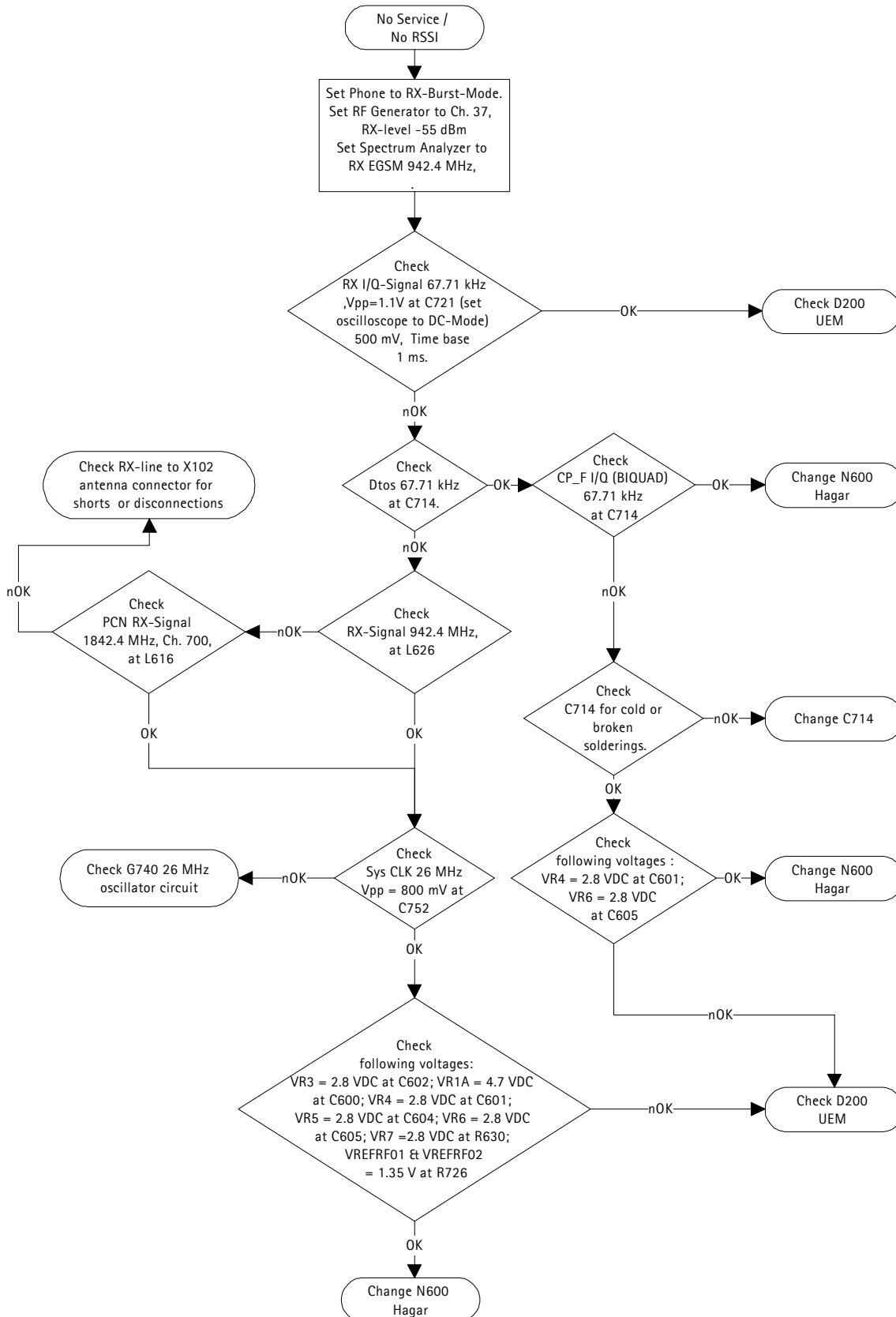
If the signal is not ok, in GSM check RX signal 942.4 MHz at channel 37, RF level -55 dBm at L626.
If the signal is not ok, in PCN check RX signal 1842.4 MHz at channel 700, RF level -55 dBm at L616
If both RX signals not ok, check RX lines from N600 Hagar to X802 antenna connector for shorts or disconnections.

If the RX signals are ok, check System Clk = 26 MHz at C752 (See picture at chapter "Electrical faults"/ Totally dead)
If also the System Clk is ok, check following voltages:

- Check VR3 = 2.8 VDC at C602.
- Check VR4 = 2.8 VDC at C601
- Check VR5 = 2.8 VDC at C604
- Check VR6 (VBB) = 2.8 VDC at C605
- Check VR1A (VCP) = 4.7 VDC (supply for control voltage VC for SHF oscillator) at C600
- Check VR7 = 2.8 VDC at C299 (supply voltage VCC for SHF oscillator)
- Check VREF01 and VREF02 = 1.35 VDC at R726

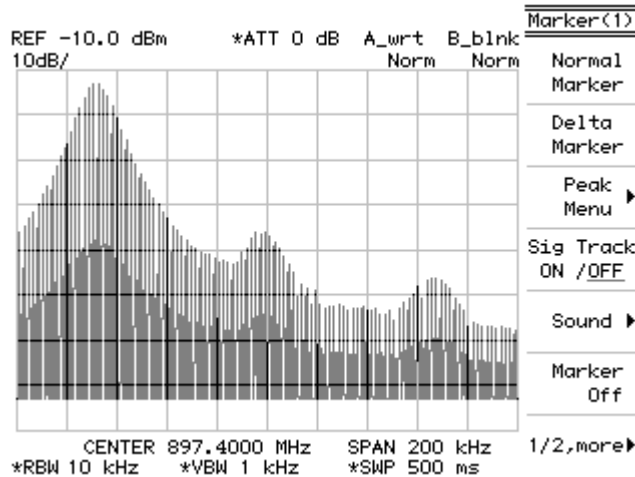
If one of the upper described voltages is not ok, check UEM D200.
If all voltages are ok, change N600 Hagar.

Flowchart - No service ® no RX



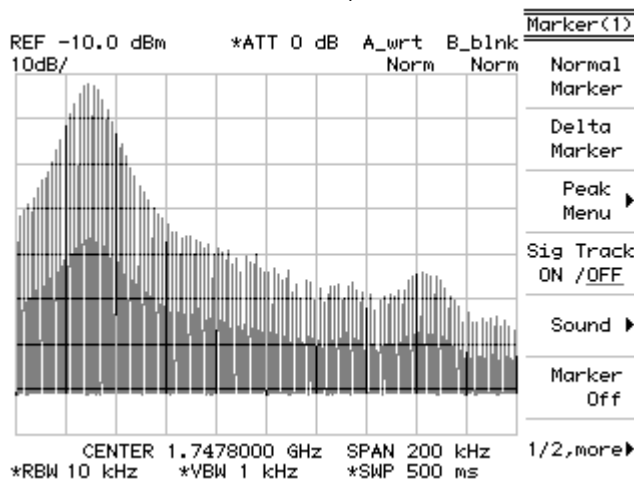
No service ® no TX

Check EGSM TX signal at R656 / R657 (See picture below)
Set spectrum analyzer to TX EGSM 897.4 MHz, channel 37.
Set phone to TX mode, EGSM 897.4 MHz, channel 37 and power level 10.



If there is no signal measurable, check PCN TX signal at L662 (See picture below)

Set spectrum analyzer to TX PCN 1747.8 MHz, channel 700.
Set phone to TX mode, PCN 1747.8 MHz, channel 700 and power level 10.

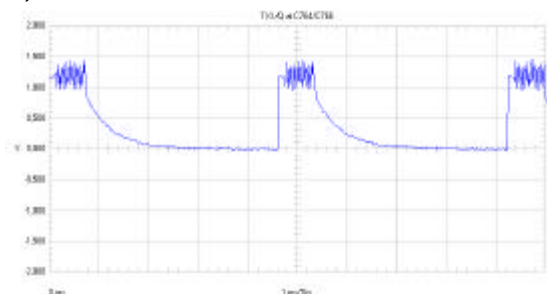


If both TX signals ok, check EGSM/ PCN TX lines between Hagar N600 and antenna connector X802 for shorts or disconnections

If there is no TX signal at L662 measurable, check TX I/Q at C764 and C766 on both sides of capacitors.
(See picture below)

Oscilloscope settings:

Ampl: 500mV
Time/Div: 1ms/Div
AC/DC/GND: DC



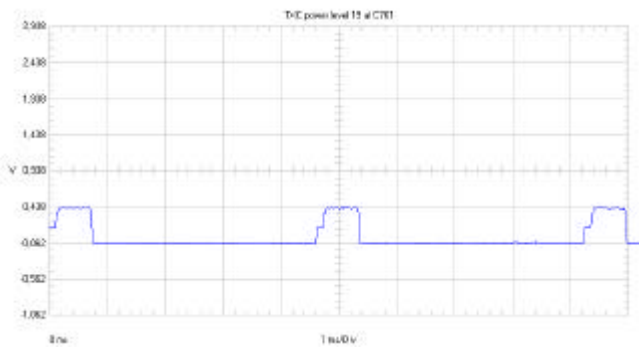
If the TX I/Q signal is not ok, check UEM D200

Check TXC at C761, power level 19 and 5. (See picture below)

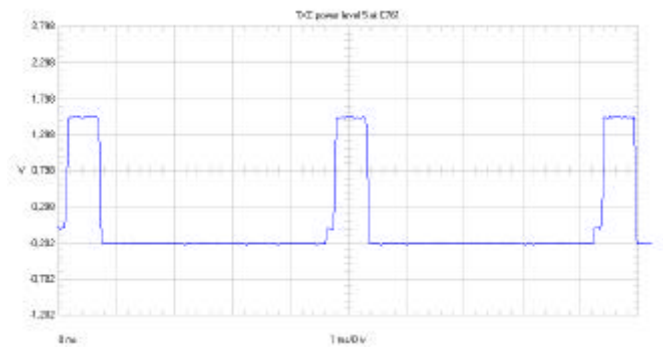
Oscilloscope settings:

Ampl: 500mV
Time/Div: 10ms/Div
AC/DC/GND: AC

Power level 19



Power level 5

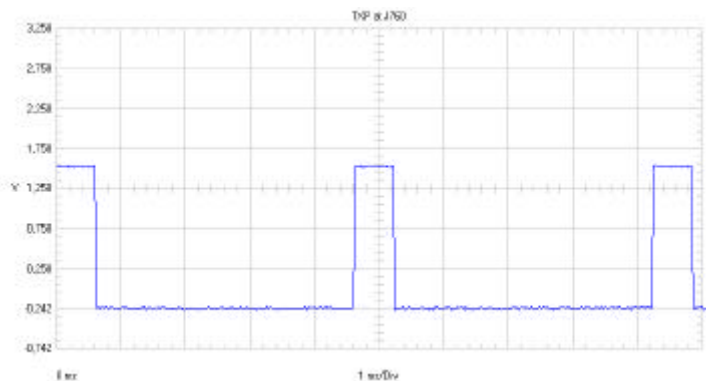


If the TXC signals are not ok, check UEM D200

Check TXP signal at J760. (See picture below)

Oscilloscope settings:

Ampl: 500mV
Time/Div: 1ms/Div
AC/DC/GND: AC



If the TXP signal is not ok, check UPP D400.

Check System Clk = 26 MHz at C752 (See picture at chapter Electrical faults/ Totally dead)

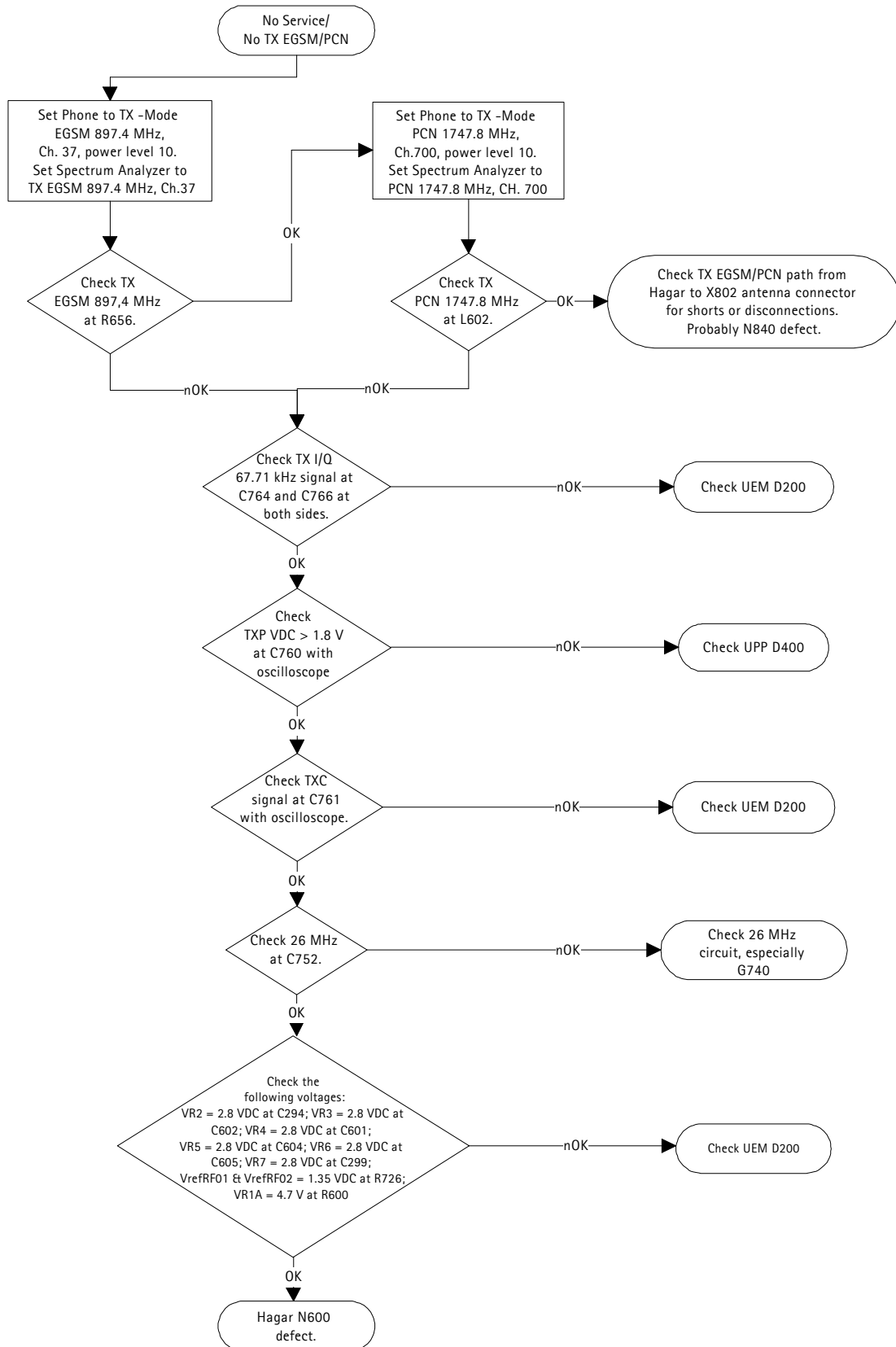
If also the Sys Clk is ok, check following voltages:

- Check VR3 = 2.8 VDC at C602 (supply voltage for 26 MHz oscillator G740).
- Check VR4 = 2.8 VDC at C601
- Check VR5 = 2.8 VDC at C604
- Check VR6 (VBB) = 2.8 VDC at C605
- Check VR1A (VCP) = 4.7 VDC at C600 (control voltage VC for SHF oscillator).
- Check VR7 = 2.8 VDC at C299 (supply voltage VCC for SHF oscillator).
- Check VREF01 and VREF02 = 1.35 VDC at R726

If one of the upper described voltages is not ok, check UEM D200.

If all voltages are ok, change Hagar N600.

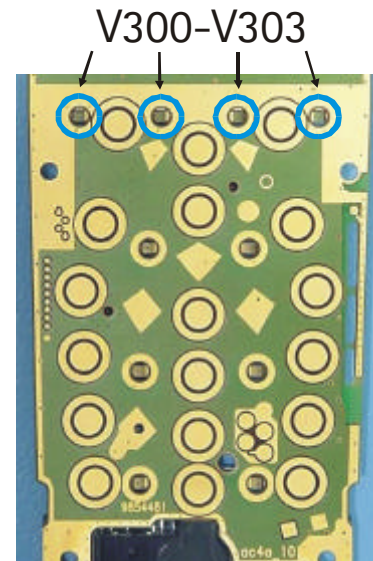
Flowchart - No service ® no TX



Display too dark/ bright

When turning on the phone, the display LED's V300 – V303 (See picture below) shines in different brightness. This is caused by use of different LEDs. In this case change all LEDs and assemble the right one with **spare part code 4864293**.

Note! When changing the LEDs, the RF frame has to be removed at first. Be very careful when lifting the frame. A little drift byside and some small components might be pushed away.

**Tuning problems with Phoenix SW 3.55****Battery calibration – "Low battery" when making a call**

After tuning the phone under menu "*maintenance/tuning/energy management*" it is important to reset the phone. Disconnect and connect the power supply before making a call. Otherwise "battery low" and "charging" will appear on display.

With Phoenix SW 3.60 the problem is solved.

Note! If the NPE-4 is connected to FPS-8 Flashbox via FBUS-cable, the reset does not work. When closing the energy management calibration window, Phoenix tries to reset the phone. The NPE-4 goes in off state and does not start automatically again. In this case the phone has to be switched on manually.

RX Channel Select Filter calibration all measurements = "0"

If all values are "0" after tuning the "*RX Channel Select Filter calibration*" under menu "*Tuning/RX Channel Select Filter calibration*", following problem has happened.

This fault is a result of old phone-SW version 4.15. Update the phone to SW version 4.20 and the problem will be solved.

TX tuning problem

When starting TX tuning without connected coaxial cable to X802 antenna connector and going to power level 8 or higher, the phone goes in reset state.

Everytime when tuning the phone at first connect the coaxial cable and then start the tuning procedure.

SW faults

Totally dead

Phone jammed

No memory access/ hangs up

No service

If one of the above mentioned faults happens, first try to flash the phone with SW version 4.20 or newer.

If the fault persists refer to **chapter Electrical faults/ totally dead**

Hookswitch problems

(Also see SB 024)

Sometimes not possible to release "incoming call"**No voice dial possible**

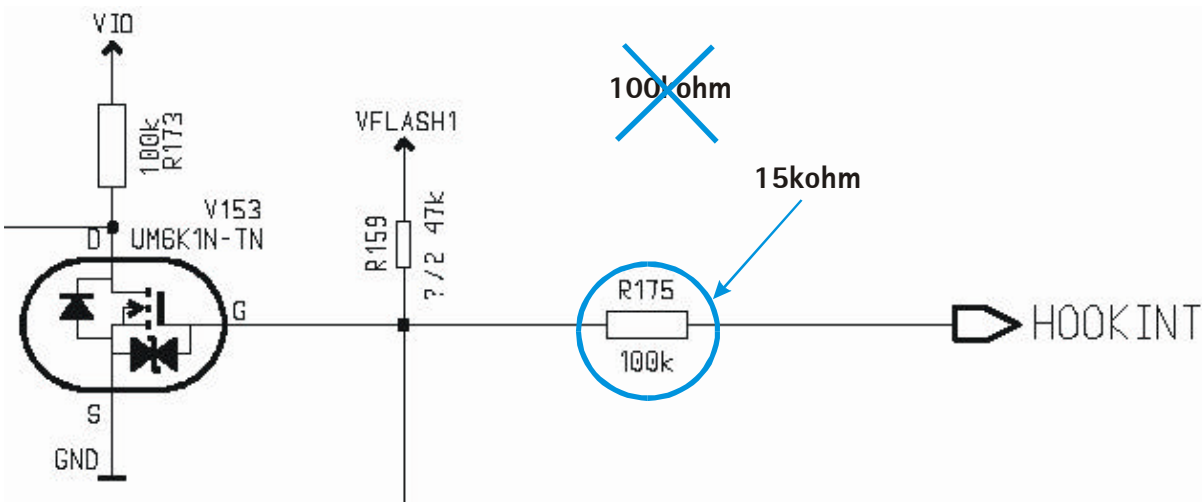
When the headset HDC-9P is connected to the bottom connector of NPE-4 and a call is coming in, often it is not possible to release the call by pressing the hookswitch.

Often it is not possible to initiate the voice call by pressing the hookswitch.

If one of the above mentioned problems occurs, the change of R175 can solve the problem.

Open the BB-shield and measure the resistor **R175=100k Ω** .

If **R175=100k Ω** , change the resistor to **15k Ω** . (See picture below).



CHANGE HISTORY

Originator	Status	Version	Date	Comment
TS Training Group	Draft	0.1	17.04.2002	First draft version for the repair group
TS Training Group	Approved	1.0	27.05.2002	First approved version