

Repair Hints

Service-Level 3 & 4

6610/7210/7250



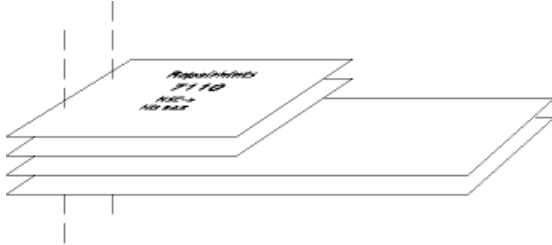
NHL-4u

NHL-4

NHL-4j



GENERAL



-How to use this document

Put the colored 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.

-Component characteristics

Some components contain important data as tuning values or security data, therefore several steps described are only feasible if you are able to reflash/ realign the phone and/or rewrite IMEI/SIMlock in certain cases. Please pay attention to separate notes.

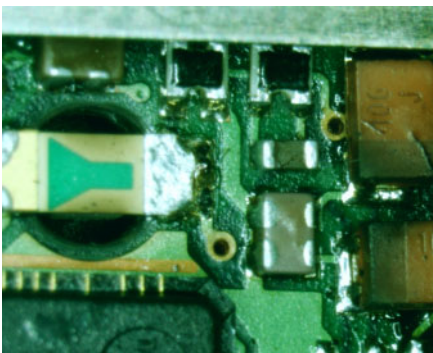
-Broken balls / underfill, μ BGAs

All replaceable (not underfilled) μ BGA components must be renewed after removing. Reflow with uncontrolled hot air fan is strictly forbidden! μ BGA must only be soldered with NMP approved μ BGA rework machines (e.g. Zevac/ OK-Metcal/ Martin) to get durable solder joints.

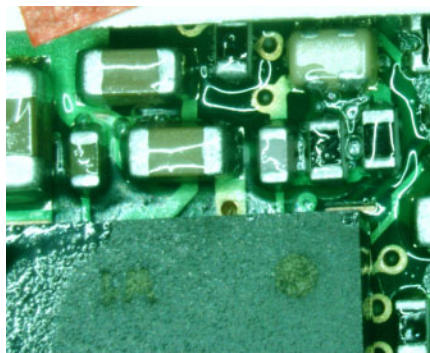
After removing a μ BGA check soldering points, if necessary rework oxidated solderings (broken balls) carefully by tinplating these areas with few flux and a hot soldering iron. Before placing a new component remove the tin and clean the PCB, e.g. with help of solder wick and flux cleaner such as "Kontakt LR".

Use only recommended fluxtype and an appropriate amount of it – avoid drowning the PCB in flux as this will result in additional faults!

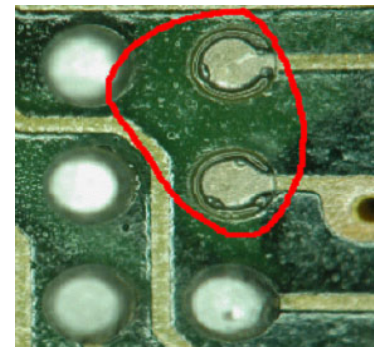
Also check underfilled parts for broken underfill material below. In this case carefully evaluate possible repair actions as the phone probably was exposed to strong mechanical stress.



"rework" done with uncontrolled hot air



PCB drowned in flux



oxidated solderings

-PCB handling & cleaning

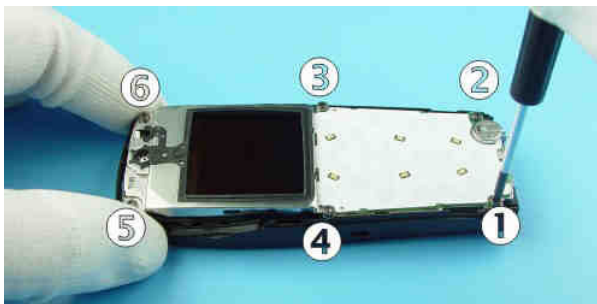
To avoid damages of PCB and/ or components through electrostatic discharging, handle the module in ESD-suitable cases only. When handling PCBs outside an ESD-bag always wear ESD-bracelets, which must be connected to earth bonding point. Damage by electrostatic discharge often leads to a module not failing directly but in a short period of time!

For cleaning use only appropriate materials, do not use scratching or rubbing tools. Useful tools for cleaning are flux cleaners such as "Kontakt LR" or "Electrolube FLU" in connection with ionized compressed air.

-Shieldings, screw torques

To avoid RF-problems it is not allowed to reuse any shielding that once has been removed from PCB. Always use new shieldings after successful repair!

To disassemble the phone, use a T6 screwdriver. Unscrew the 6 screws in the order shown in the picture below. To assemble the phone, use the reverse order with a Torx T6 Plus screwdriver and **torque of 17Ncm** for NHL-4/4u and **torque of 22Ncm** for NHL-4j.



Disassembling (1-6) and assembling (6-1) order

-Realign after repair

Characteristics of replacement parts may vary.

To prevent additional faults after repair (e.g. low standby time, losing network etc.) it is necessary to retune phone values after repair, but never try to cover up a fault by justing the phone settings!

-Fault report in fault log (Phoenix)

It is very important to report all found failures in fault log after finishing the complete phone repair.

The report content should **only** contain the self-observed fault symptom, except "no fault found".

In this case the report content should contain the symptom code that is given from the customer (e.g 2101) and the fault code "no fault found"(470).

If the symptom code from the customer is not the same as the observed symptom, use always the self-observed symptom.

INTRODUCTION

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 NOKIA 6610/7210/7250 phones. It contains a lot of collected tips and hints to find faults and repair solutions easily.

It also will give support to inexperienced technicians.

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

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

The document is to be used additionally to the service manual and other service information such as Service Bulletins. For that reason it does not contain any circuit or schematic diagrams.

All measurements are made using following equipment:

Nokia repair SW:	Phoenix / version A7 2003.9.7.8
MCU SW / Data Package:	6610 (4.18 / 2.00), 7210 (4.18 / 5.00), 7250 (3.12 / 2.00)
Nokia module jig:	MJS – 38
Docking station:	JBV-1
Docking station adapter:	MJF-13
Digital multimeter:	Fluke 73
Oscilloscope:	Fluke PM 3380A/B
Spectrum Analyzer:	Advantest R3131 with an analog probe
RF-Generator / GSM Tester:	Rohde & Schwarz CMU 200

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Phone hangs up when sending SMS (O-Code: 0110)

Pre-check:

Take the phone, insert a SIM card and try to send an SMS through network.

- If the phone hangs up, follow repair instructions:

"Phone hangs up when sending SMS (O-Code: 0110)"

Phone hangs up when sending SMS (O-Code: 0110)

While sending, reading or handling of SMS the phone locks up; try to flash the phone with the latest SW version.

- If an error message from the flash prommer is shown, follow repair instructions:

"Phone is totally dead"

Note! New CCT reference code table for SW application failures has been implemented. **Refer to page 21.**

Phone locks up, reboots or no response (0-Code: 0901)

Pre-check:

Take the phone and insert a SIM card.

- If the phone locks up, follow repair instructions:

"Phone locks up, reboots or no response (0-Code: 0901)"

- If the display light turns off when playing a game, follow repair instructions:

"LEDs flickering"

Phone locks up, reboots or no response (0-Code: 0901)

If the phone locks up after a while or does not respond, reboot or restart without asking the PIN code when starting an application, (e.g. a game or the organizer), try to flash the phone.

- If an error message from the flash prommer is shown, follow repair instructions:

"Phone is totally dead"

Note! New CCT reference code table for SW application failures has been implemented. **Refer to page 21.**

Phone is totally dead

Pre-check:

Try to turn on the phone.

- If nothing happens, follow repair instructions:

“Phone is totally dead”

- If the phone powers up but shuts down automatically, follow repair instructions:

“Phones powers down”

- If a loose battery causes the symptom “powers down”, follow repair instructions:

“Phone powers down”

Phone is totally dead

If the phone is totally dead, try to flash the phone.

If an error message from the flash prommer is shown e.g.:

- Boot serial line fail
- Phone fail response received
- Vpp voltage level fail
- Data block NAK
- Fiasco general

check VIO = 1.8V DC at C405. If the voltage is not ok, check components in VIO line from Flash D450 to UEM D200 for shorts or interruptions and change or resolder faulty components.

Check Vcore = 1.8V DC at C403. If the voltage is not ok, check components in Vcore line from UPP D400 to UEM D200 for shorts or interruptions and change or resolder faulty components.

If both voltages are ok, check general signals,

- RFCLK 26MHz at C420.
- 32kHz SleepClk at J404

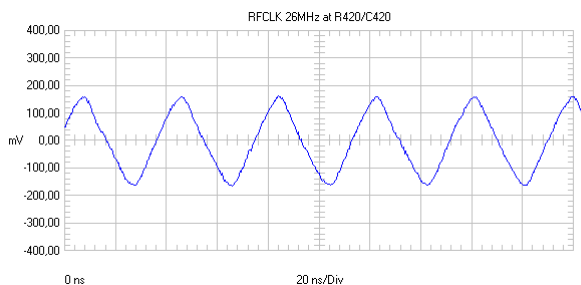


Figure 1 RFClk 26MHz

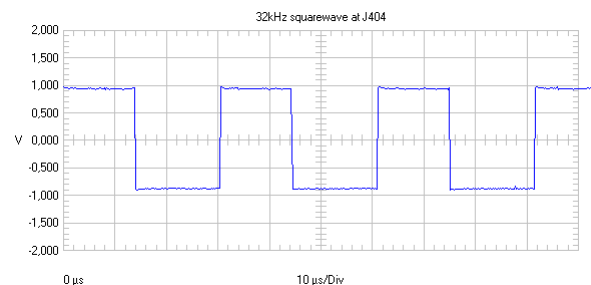


Figure 2 32kHz SleepClk

If both signals are ok, probably the D450 Flash is faulty and has to be changed. After changing it is necessary first to flash the phone and then rebuilt IMEI/ESN and tune the phone.

Note! These signals are only measurable for about 5 – 10 seconds after connecting the phone to power.

Phone powers down

Pre-check:

Put a battery in the housing and try to turn on phone.

- If the phone is on and shuts down automatically, follow repair instructions:

“Phone powers down”

- If the battery is loose in housing, follow repair instructions:

“Phone powers down”

Phone powers down

Disassemble the phone and put the PWB into the MJS-38 repair jig. Set power supply for the jig to 4V DC and check following voltages:

PWRONX = 3.8V DC at UEM side of S302. If there is no voltage; check R305, R306 and C310 for shorts or disconnections and change faulty component; otherwise check voltage at C202 and L261.

If voltage is ok, probably UEM D200 is faulty and has to be changed.

The voltage decreases (0V) while pressing the S302 button. If not, check the resistance with ohm-meter between ground side and UEM side of S302:

- button pressed = 0 Ohm
- button not pressed > 350k Ohm

If the resistance does not change when pressing the button, change S302.

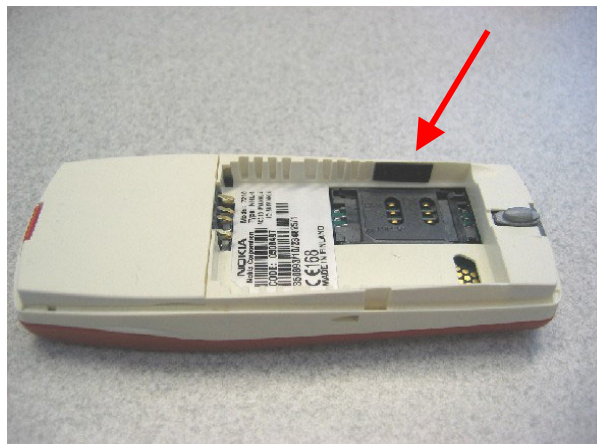
Also for “phone powers down” it is risky if the phone loses contact to the battery for a couple of milliseconds; the phone powers off. By placing the battery gasket (NMP Code 9460594) on the C-cover, the battery will be fixed more tightly to the housing as shown in picture below *. The battery gasket must be installed to all NHL-4u/4j phones brought to service.

To ensure good contact between battery (BLD-3) and phone, the battery pads on the battery must be cleaned with isopropyl alcohol and a cotton bud each time the phone is brought to service.

For 6610 see SB-012.

For 7210 see SB-018.

For 7250 see SB-009.



Place for battery gasket

Note: Battery gaskets are delivered in sheets. Ordering one piece means one sheet, which includes 72 pc of gaskets.

*) The phone in the picture is an NHL-4, but the place for the gasket in NHL-4j/4u is exactly the same as in NHL-4.

Insert SIM card

Pre-check:

Put a SIM card into the phone and turn it on.

- If "Insert SIM card" still appears on display after a few seconds, follow repair instructions:

"Insert SIM card"

Insert SIM card

There are two ways to check the SIM lines. See below:

First way:

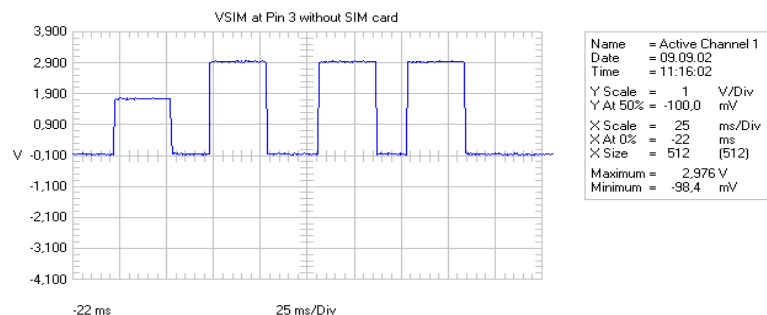
Set the repair jig MJS-38 to local mode, the power supply to 4VDC, and the oscilloscope to 500mV/div. Hold the probe on Pin 1. Now connect the power supply to the jig. For a short moment the flat line jumps up. Repeat this procedure with pin 2,3 and 6. Do not forget to disconnect the power supply after every measurement.

If one or all four lines do not react when connecting the power supply, continue with fault finding as described in the second way.

Second way:

Note! This signal is only measurable with digital oscilloscope and a removed SIM card directly after switching on the phone.

Check VSIM = 3VDC at X386 Pin3.



VSIM **Figure 3**
Delay: 22ms singel shot activ

If not ok, check R386, C203, C390 and X386 for shorts, disconnetions and mechanical damages, and change or resolder faulty components if necessary.

If the upper listed components are ok, check resistance of VSIM line = 10 Ohm between C203 and X386 Pin3.

If the resistance is much higher, check R386 if broken and change it if necessary; otherwise change PWB.

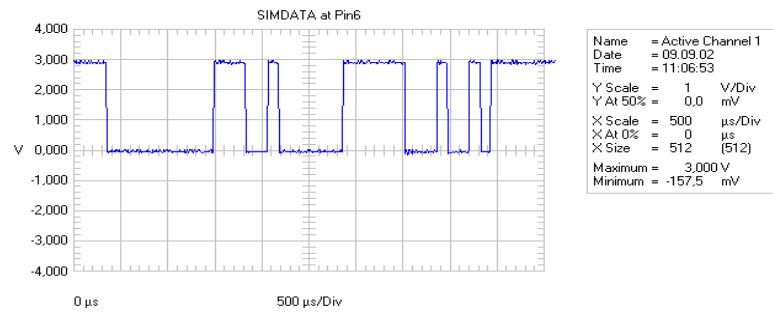
If the line is ok, change R388. If the fault persists, change UEM D200.

If VSIM is ok, check following signals with inserted SIM card:

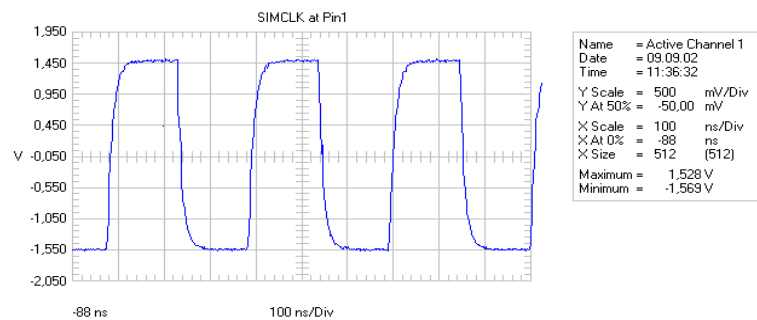
SIMCLK = 3.25MHz at X386 Pin1

SIMRST = 3VDC at X386 Pin2

SIMDATA at X386 Pin6



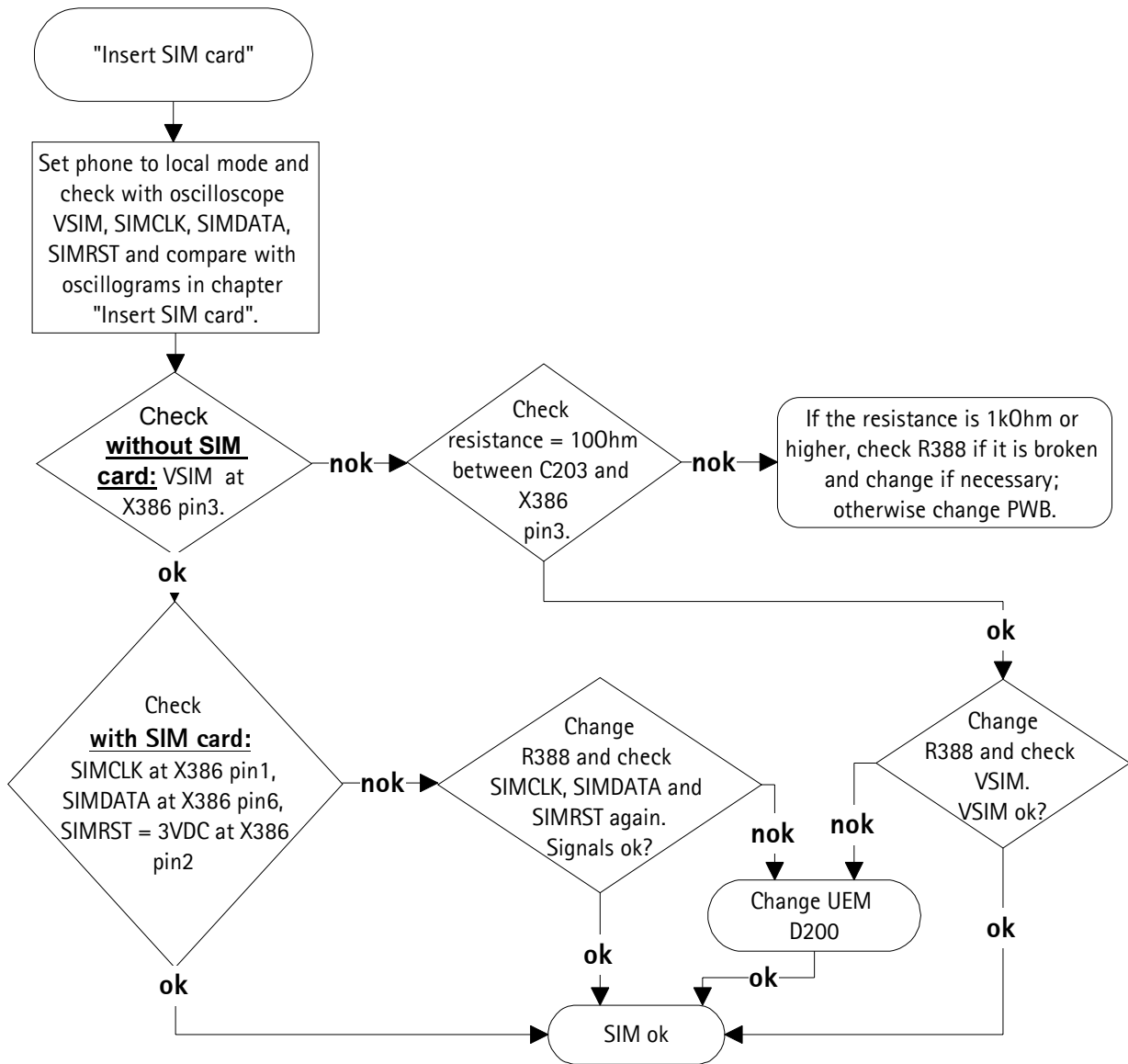
SIMDATA (example) Figure 4



SIMCLK Figure 5

If any of the signals above is not measurable, change R388. If the fault persists after changing R388, change UEM D200.

Flowchart "Insert SIM card"



Black display

Pre-check:

Turn on the phone.

- If there is nothing to be seen on the display, follow repair instructions:

“Black display”

Black display

Check voltage VIO = 1.8V DC. If not ok, check C207 for shorts and change component if necessary.

Check voltage VFLASH1 = 2.8V DC. If not ok, check C205 for shorts and change component if necessary.

If one or both have the voltages are not ok change UEM.

If both voltages are ok, check X302 connector for shorts, disconnections, mechanical damages, resolder or change the faulty component. If the connector is ok, change the LCD module I004.

LEDs flickering

Pre-check:

Turn on the phone.

- If the phones turn on, the LEDs are flickering and then lights turn off. The LEDs do not turn on again, e.g. when pressing a key, then follow repair instructions:

“LEDs flickering”

LEDs flickering

In this case check if C302 is assembled. If not, reassemble the component.

If the C302 is assembled, check N300 and surrounding components L300, V300, R300 and R307 for disconnections or shorts; change or resolder faulty components.

If all above described components are ok, probably D200 UEM is faulty.

Missing lines or segments and blizzard

Pre-check:

Switch the phone on.

- If the phone is switched on and lines or segments are missing or blizzard is appearing continuously or only temporarily. Follow repair instructions:

“Missing lines or segments and blizzard”

Missing lines or segments and blizzard

If one of the faults shown in the pictures below appears on the display, change the color display (LCD module I004)



Missing line



missing segments



blizzard

One way communication / low, poor or no speech

Pre-Check:

Try to test all audio functions of the phone, e.g. internal, external audio. Make a call between the faulty phone and the tester, e.g. CMU.

- If during a test call only a one way communication is possible or low, poor, no speech to be heard or a high current consumption in connection with no audio on the docking station adapter MJF-13 follow repair instructions:

"One way communication / low, poor or no speech"

One way communication / low, poor or no speech

If one of the above mentioned faults appear connect headset and use the volume side keys S300 and S301 to change the volume. If the change can be seen on the display but is not audible, check following signals: Check Vbat at C167. If not ok, check C167 for shorts. Change component if necessary. If VBAT is ok, check with oscilloscope ENA, CLK, DATA at J152-J154. These signals are only short peaks.

Note! These signals are only measureable when pressing a volume key.

If one of the signals is missing, probably the UPP is not working and has to be changed; or there is an interruption inside of PWB and this has to be changed.

If the IHF (internal handsfree speaker) is activated (phone call or FM-Radio on) but there is nothing to be heard, check C164, R161, R162, L151, L152 for shorts or disconnections; resolder or change faulty component.

If the components are ok, check resistance on spring contacts of the I020 IHF speaker. A good value is around 7 ohm. If the value is much higher, change the C-cover I021. The speaker cannot be changed separately.

Also check the spring contacts for dirt or bending and clean the contact if necessary; or change C-cover if the contacts are bent.

If the IHF speaker way is ok, connect headset to the phone and check external audio.

If there is nothing to be heard or if the signal is poor or low and not changeable, check R164-R167, C157, C158 for shorts or interruptions; resolder or change faulty components.

If these components are ok, change N150 IHF audio amplifier.

No sound on one of the headset earpieces

Pre-check:

Turn on the phone, connect the headset and activate the FM radio.

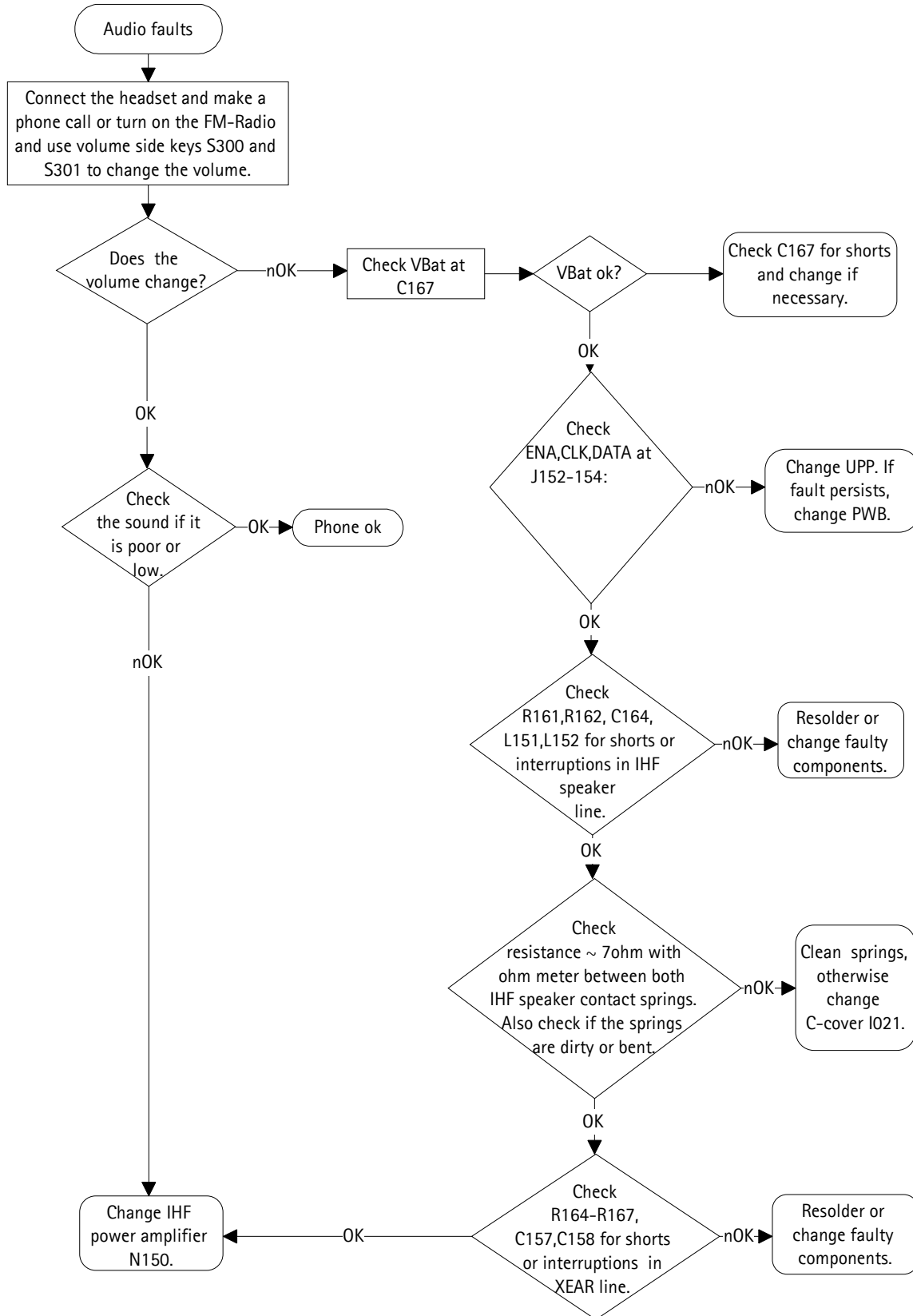
- If no stereo sound is audible, follow repair instructions:

"No sound on one of the headset earpieces"

No sound on one of the headset earpieces

If no stereo sound is audible; **expecially no sound on left side**; check C162 if not assembled or broken.
In this case reassemble or change C162.
If the fault persists, change N150.

Flowchart audio faults



CCT reference failure codes for software applications

	01xx - Communication
0101	Call divert
0102	Call register
0103	Chat
0104	Fax
0105	Mail
0106	Imaging
0107	Multimedia
0108	Profiles
0109	Remote synchronization
0110	Short message service
0111	WAP browser
0112	WWW browser / Internet
	02xx - Personal apps
0201	Audio player
0202	Calculator
0203	Calendar / Organizer / To-do list
0204	Clock / Timer
0205	Composer
0206	FM radio
0207	Note pad/Word
0208	Phone Book / Contacts
0209	Presentation viewer
0210	Recorder / Voice commands
0211	Sheet
0212	Tones
0213	Video player
0214	Wallet
0215	Count down timer
0216	Stop watch

	04xx - Games
0401	9 More Lives
0402	Bantumi
0403	Bounce
0404	Bumper
0405	Card Deck
0406	Golf
0407	Logic
0408	Memory
0409	Opposite
0410	Pairs II
0411	Racket
0412	Rotation
0413	Snake
0414	Snake EX
0415	Snake II
0416	Snowboard
0417	Soccer
0418	Space Impact
0419	TriplePop
0499	Other game
	09xx - Others
0901	Other application/feature
0902	Back up / Restore
0903	File manager
0904	Settings
0905	Language package
0906	Cursor

CHANGE HISTORY

Originator	Status	Version	Date	Comment
TS Training Group	Draft	0.1	03.09.2002	First draft version for the repair group
TS Training Group	Approved	1.0	20.12.2002	First approved version
TS Training Group	Approved	2.0	10.02.2003	6610 repair information and SW faults added.
TS Training Group	Approved	3.0	21.05.2003	7250 repair information and display faults added