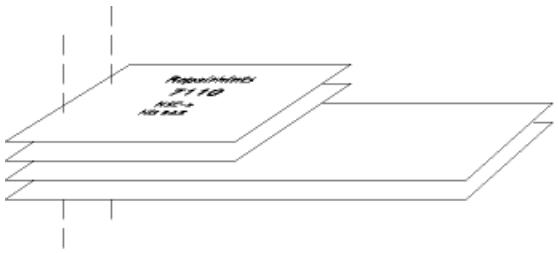
# Repairhints

# Communicator
# 9210
# RAE-3

## General



**- How to use this document**

Place the schematics behind this manual.
Now you are able to follow these specifictions with graphical layouts and it is easier for you to find the components and measuring points.

**- General handling**

All screws must be screwed with a **torque of 16Ncm**. If a higher torque is used, the cover might be damaged.
If it is necessary to make a **backup**, be sure that the data are ok, otherwise it is possible that the **corrupt files** are responsible for the same faults as before reinstalling the backup.

**- µBGA components and broken balls**

Special attention to µBGA components:
All µBGA´s with the exception of MADLINDA D300 are replaceable and must be renewed after removing. Reflow by hot air fan is not allowed.
Check soldering points, remove oxidated solderings (broken balls) carefully by enclosing a few new solders before placing new components. The only allowed way to change µBGA components is to use µBGA rework maschines, approved from NMP (e.g. ZEVAC/ OK International). Only use recommended Fluxtype and an appropriate amount of it.

**- Component charactaristics**

Some components contain important data.
Several described steps are only practicable if you are able to reflash/ realign the Communicator 9210 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 Communicator 9210.
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 | : WinTesla 6.43 |
| Service SW DLL version | : 04.00.00 |
| Flash SW | : 4.13 |
| Memory Card Image | : All_memory_card_data.SIS for SW 4.13 |
| Nokia Jig | : MJS-14 |
| Digital Multimeter | : Fluke 73 |
| Oscilloscope | : Fluke PM 3380A/B |
| Spectrum Analyser | : 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:**
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Page(s) and/or Figure(s) of error.

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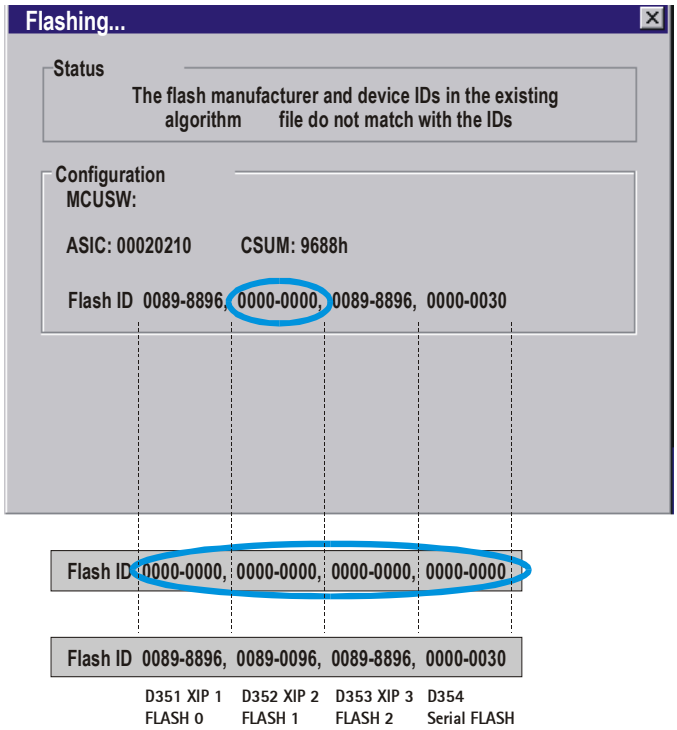
# Contents

## Flash faults

**PDA does not start/ or Phone backlight is blinking.**
**PDA backlight is working but nothing on PDA display.**

**Note! If the communictator does not boot up after connecting the battery, pay attention to the Phone display. If the Phone backlight is blinking, refer to the service manual/ Troubleshooting/ Memory Test and/ or Memory troubleshooting, (See blink code table below) otherwise try to flash the phone first.**

- If nothing is on PDA display, interchange the **BL8** and **UL2** modules with working onces, to find out which is faulty.
- If the flash update failed, pay attention to the Flash ID´s **(See picture below)**




1) **Corrupt**
FLASH 1 (D352) defect

2) **Corrupt**
FLASH 0 (D351) defect

3) **OK**

**Blink code table**

2* blinks = Flash 0 or 1 or 2 faulty
3* blinks = SDRAM faulty
4* blinks = Serial Flash faulty

The blinks repeating after 2 seconds. It is not easy to see.

If the flash 0 is faulty, it is possible that no blinking sequence is shown on the phone display and the communicator does not boot up.

To **1)** - The flash 1 (D352) is faulty. This can be seen at the second flash ID **(0000-0000)** in the first case.
To **2)** - In the most cases D351 is faulty, but also the whole Flash (D351- D354) or D300 MADLINDA could be faulty.
To **3)** - In this case all flash IDs and MADLINDA are OK.

- If one of the IDs is **0000-0000**, check Vcore = 1.8 VDC and VBB = 2.8 VDC at following components:

| | | |
|---|---|---|
| D351 | Vcore at C360/C361 | VBB at C353/C354 |
| D352 | Vcore at C362/C363 | VBB at C355/C356 |
| D353 | Vcore at C366/C370 | VBB at C364/C365 |
| D354 | --- | VBB at C369 |

- If Vcore is not ok, check Vcore = 1.8 VDC Pin 4 and Vbatt = 4 VDC at Pin 3 of V105 (VBatt depends on settings of power supply at the workbench). **(Note! VBatt = VB)** Also check surrounding components for shorts or disconnections and resolder or change faulty ones if necessary.
- If VBB is not ok, check VBB = 2.8 VDC at C111. If not ok, check VB = 4VDC at Pin 6 of N102.
- If VB is ok, check N102 and surrounding components for shorts or disconnections and resolder or change the faulty ones if necessary.
- If all voltages are ok, change the faulty Flash and flash the phone.
- If the fault persists, probably the MADLINDA (D300) is faulty. Up to HW 4.00, the D300 is not changeable because of underfill. From HW-ID 4.23 with OSP, the MADLINDA is changeable. **(See SB-027)**

## D354 Serial Flash faults

**- SW update not successful (Set Phone power on)**
**- PDA hangs up**
**- Error messages appears on PDA display**

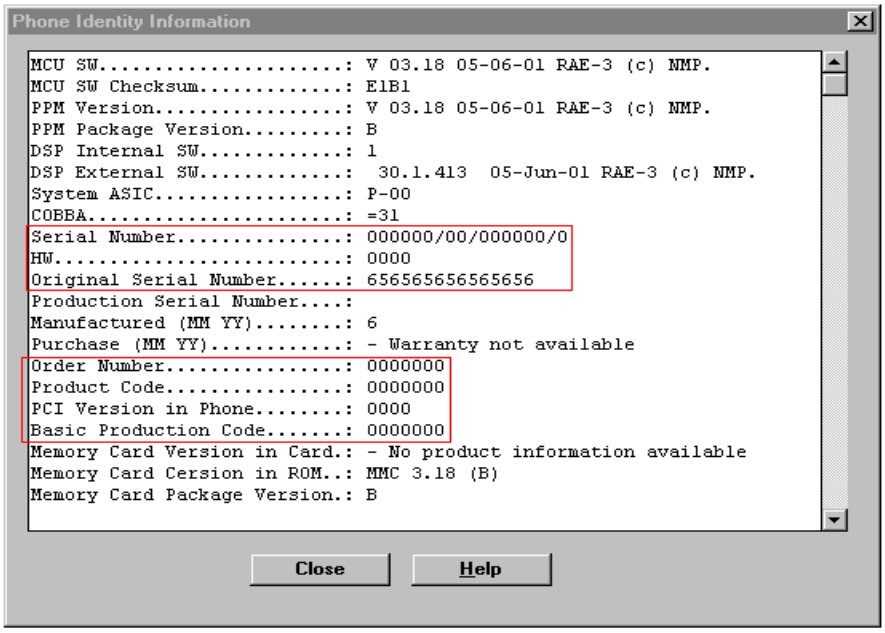
- If, at the end of flash update, the message "Set phone power on" appears on display (Flash IDs must be correct; see picture at chapter Flash faults), probably the D354 Serial Flash is faulty and has to be changed.
- If the PDA often hangs up or error messages are appearing on PDA display, try to flash the phone.
- If the same faults persist after flashing, the D354 Serial Flash is faulty and has to be changed.

## D353 Flash faults

**Emulated EEPROM at D353 Flash faulty**

**- Product Code and HW version not rewriteable**
**- IMEI 15*0 / Original Serial Number = 656565656565656**
**- Flashing Error message "Can´t Set factory counter"**

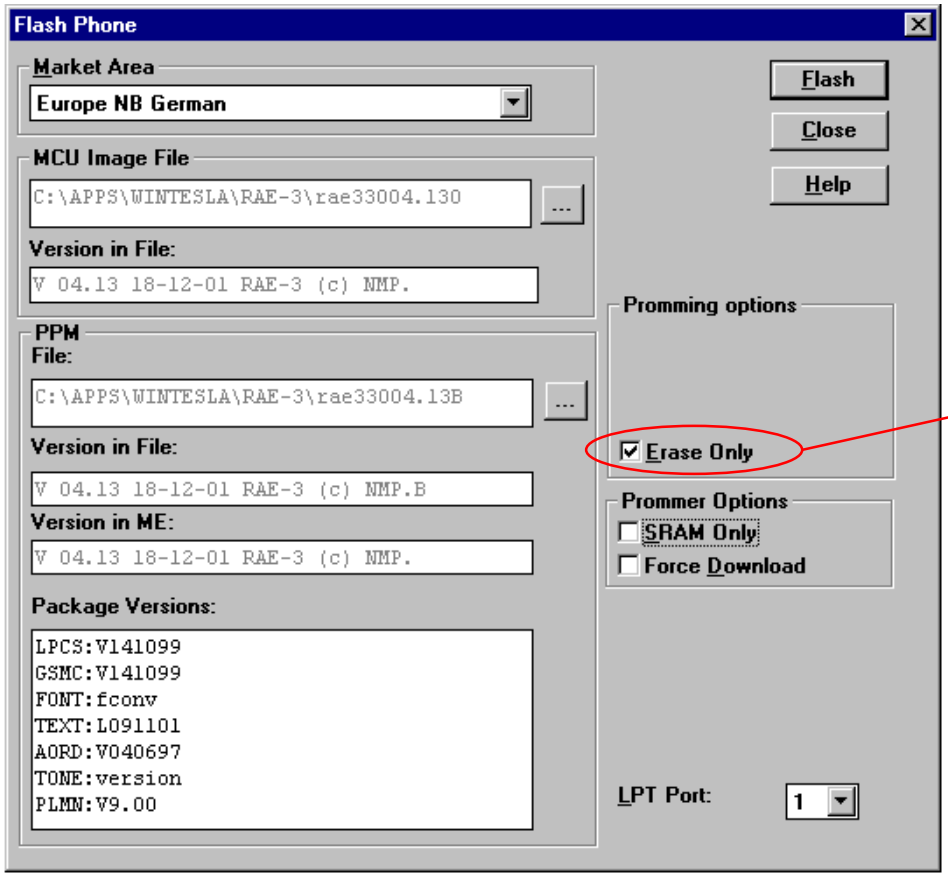
- Check which fault has happened using WinTesla menu Testing/ Selftest (e.g. MCU ROM Checksum).
- If one of the EEPROM faults occured, open menu View/ Phone Information and take a look the marked values.**(See picture)**




Try to flash the communicator with SW 4.13 and promming option **Erase Only**. Also the memory card has to be updated. If the MMC is not updated some applications do not working well. **(See SB-023)**
For a faster MMC-image update it is a good solution to use ext. drive for MMC. (See SB-018)
**For Erase Only it is necessary to use the dll version 04.00.00 and the modified RAE3.ini file. (See SB-025)**

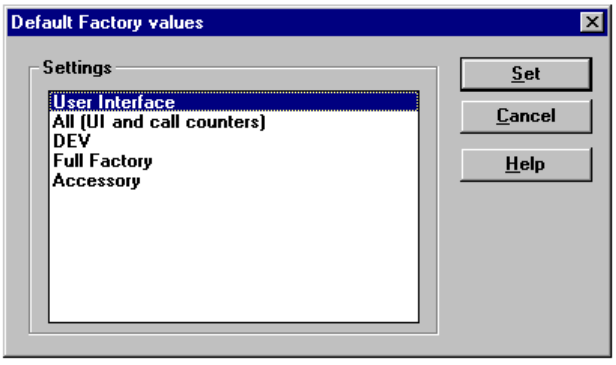
(Note! Copy the modified RAE3.ini in the WinTesla/RAE-3 directory. If the RAE3.ini file is not in the right directory the erase only button in the flash menu is not free to choose.)

**Flash menu with modified RAE3.ini file**




Choose **Erase Only** to reset the flash D353

- After erasing the emulated eeprom, part of the XIP flash D353, the display shows contact service.
- Now flash the phone **without marking erase only.**
- **After flash update** set **Full Factory** and **Accessory** (for Accessory see also chapter 4 "Connection with any kind of accessory not possible") under menu software/ Set Factory values (**See picture below**), also rewrite product code and HW-ID.




- **Rewrite IMEI and SIMlock data if the procedure is permitted to you and tune the phone**
- If the erase only procedure not works change the D353 flash.
- After changing the D353 Flash EEPROM, flash the phone. If the SW update was successful, make a full factory and Accessory set, then rewrite the product code and the HW-ID. After that, rewrite IMEI and SIMlock data.
- If the sw update is not successful, probably D300 MADLINDA is faulty. Up to HW 4.00, the D300 is not changeable because of underfill. From HW-ID 4.23 with OSP, the MADLINDA is changeable. (**See SB-027**)

**(Note! Everytime when it is necessary to change the D353 EEPROM or erase the EEPROM, a Full Factory set and Asseccory set must be done!**

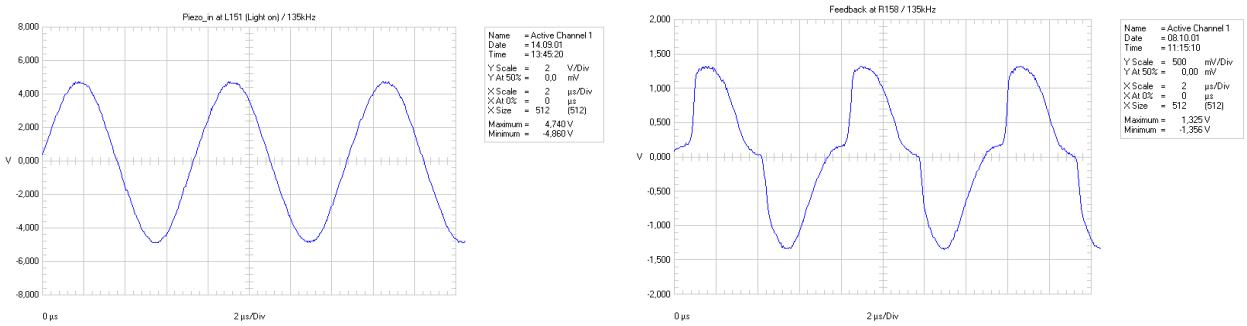
**Note! Rewrite SIMlock and IMEI data by use of NOKIA SECURITY PASSWORD and make a SW-update again, if the procedure is permitted to you. (See SB-037)**

## PDA display dark

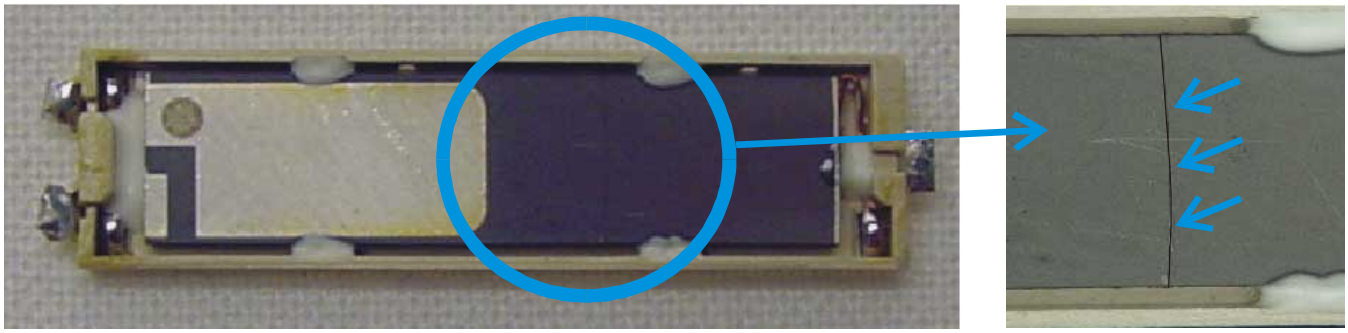
### CCFT Lamp and Piezo unit faulty

- If the PDA starts up (startup logo is seen), but the illumation is off, probably the piezo is broken or the backlight circuit is faulty.
- Check **Piezo_in** frequency around 135kHz (Vpp = 10 VAC) at L151 and **Feedback** frequency around 135kHz (Vpp = 2.7 VAC) at R158. **(See picture below)**

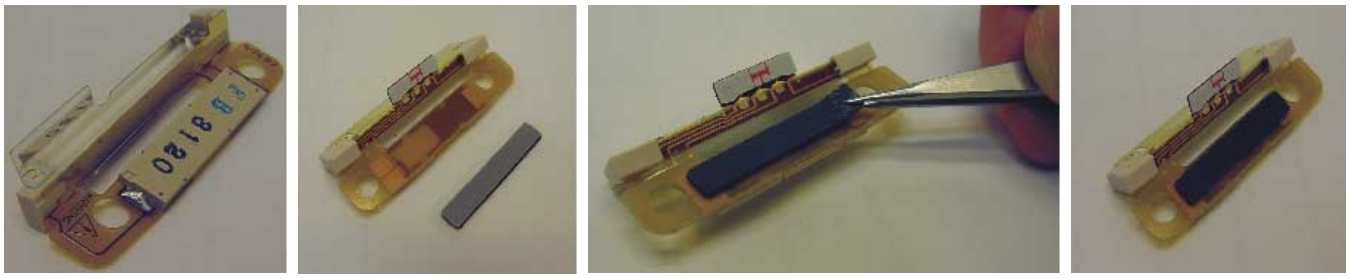
**Piezo_in** **Feedback**




- If **Feedback** frequency is around 0Hz or **Piezo_in** frequency is around 100kHz, change CCFT **(See SB-014)**, because the piezo is broken **(see pictures below)**



- If changing the CCFT, do not forget to paste the damper (9480703) on the CCFT Lamp and Piezo unit to prevent noises and damages. **(See picture below)**



- If the fault persits, probably the UL2 module can also be faulty. (Refer to Service Manual/ Troubleshooting/ BL8 related PDA UI problems

## Connection with any kind of accessory not possible

**Accessory set**

If the communicator does not connect to any kind of accessory it can be possible that the flash D353 has been changed or the EEPROM has been erased without making an Accessory Set. Open under WinTesla menu Software/ Set Factory values/ and set **Accessory** than try to connect the phone again.
**Note! Sometimes it is possible that the connection takes a while.**

## MMC not formatable

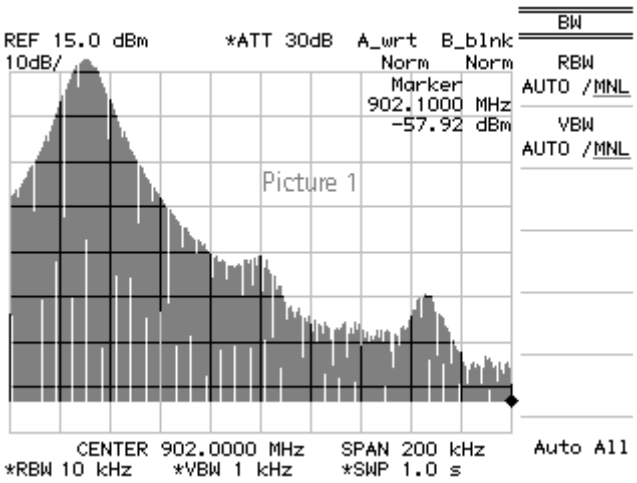
If the communicator hangs up while formating the MMC, it is necessary to flash the phone with newes sw 4.13.
**Note! When updating the phone sw, it is also necessary to update the MMC with the newes image. (See SB-023)**
For a faster MMC-image update it is a good solution to use ext. drive for MMC. (See SB-018)

## RF faults

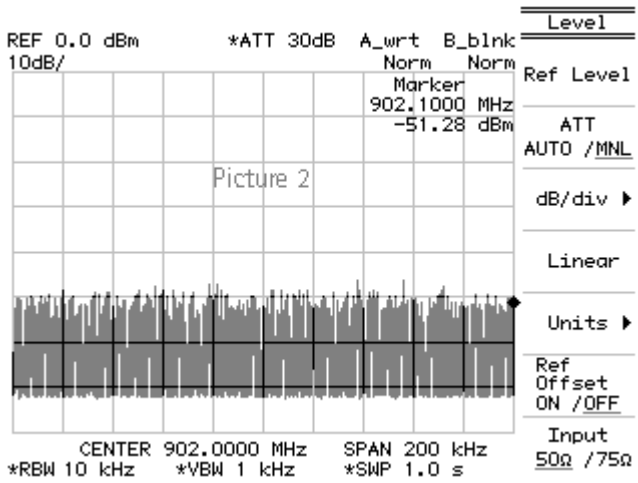
**No service**

**G800 SHF oscillator faulty**

- Check TX I/Q EGSM, Ch: 60 with WinTesla menu Tuning/ TX I/Q. **(See picture below)**



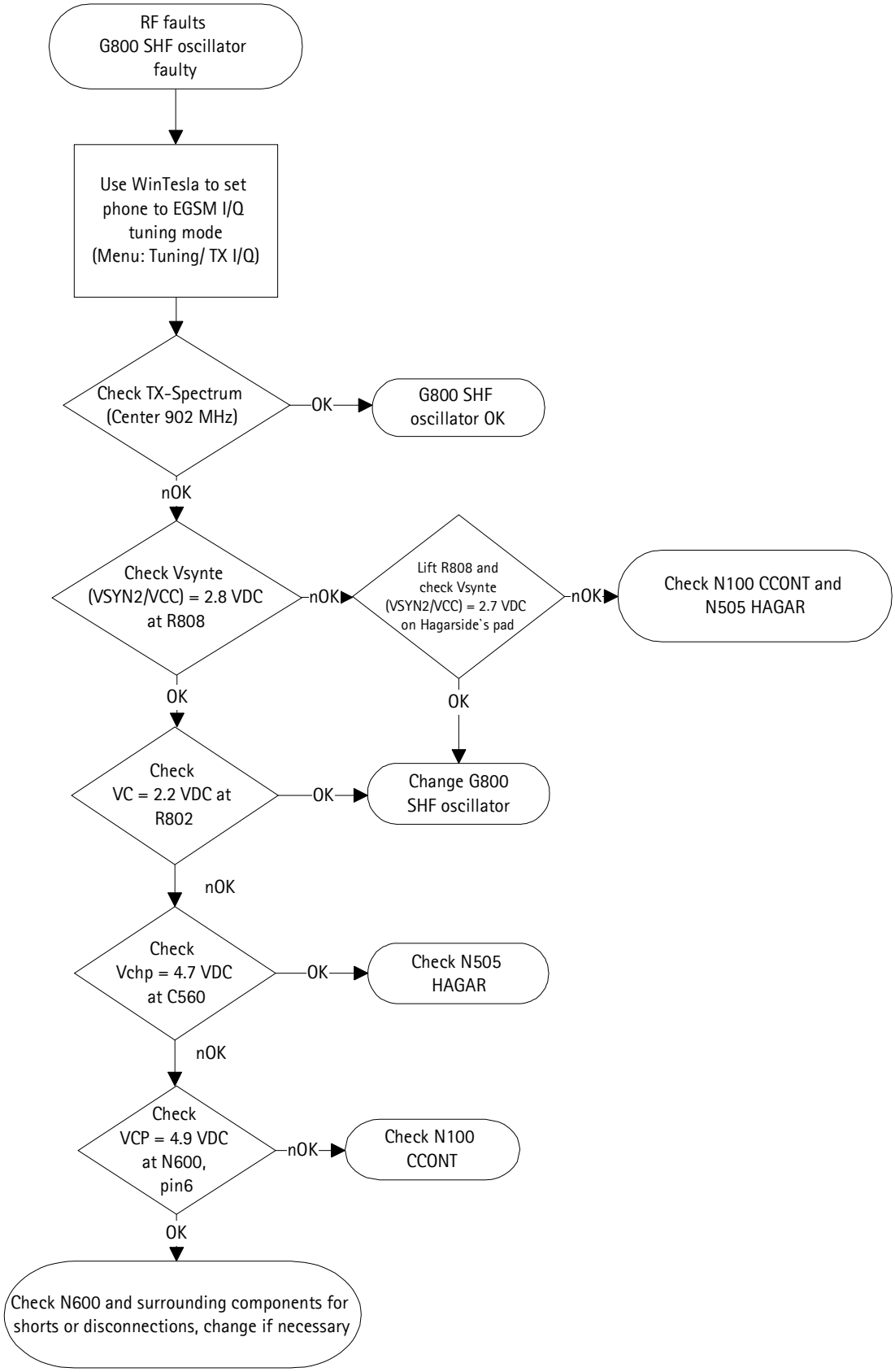

**The G800 SHF Oscillator is working well**




**The Oscillator is not working**

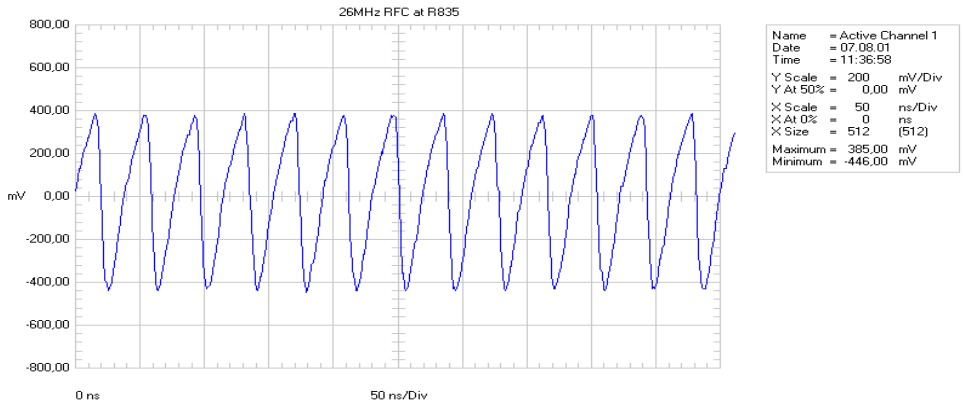
- If Picture 2 is appearing on spectrum analyser, check following voltages:
- Check Vsynte (VSYN_2/VCC) = 2.8 VDC at R808. If not ok, lift R808 and measure the voltage on the pad to HAGER`s side. If Vsynte is ok, check G800 SHF oscillator and surrounding components for shorts or cold soldering and change or resolder the faulty ones.
- If Vsynte (VSYN_2/VCC) is not ok after lifting R808, check N100 CCONT.
- Check VC = 2.2 VDC at R802.
- Check Vchp = 4.7 VDC at C560. If not ok, check VCP = 4.9 VDC at N600 Pin 6. If not ok either, check N100 CCONT.
- If VCP is ok, check N600 voltage regulator and surrounding components for shorts or disconnections and change the faulty ones. If the surrounding components are ok, change G800 SHF oscillator.
- If VC is not ok, **refer to N505 HAGAR faulty**.

## G800 SHF oscillator faulty

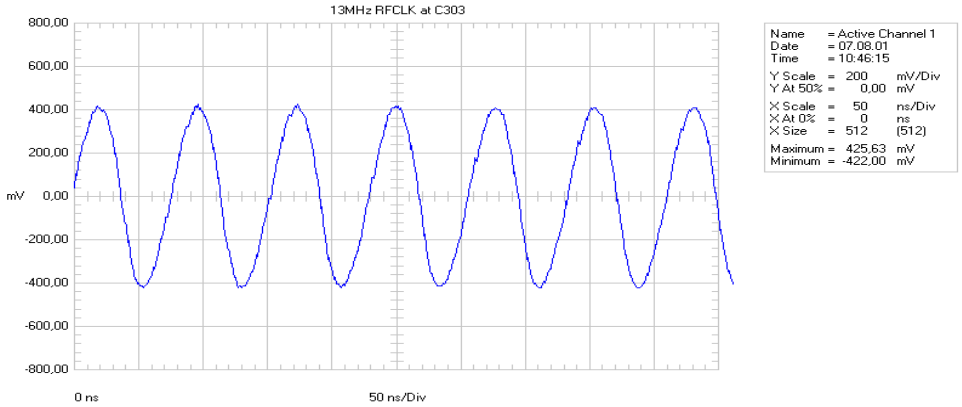


**N505 HAGAR faulty**

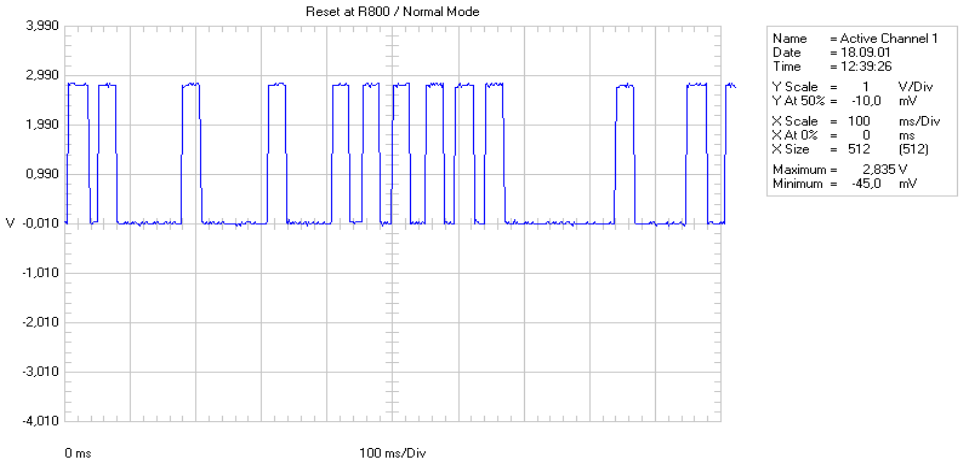
- Check VTCXO (VXO) = 2.8 VDC at C553. If not ok, check N100 CCONT.
- Check 26MHz (Vpp = 800mV AC) at R835, frequency deviation ±100Hz (**See picture below**).
- If not ok, check G830 oscillator circuit.



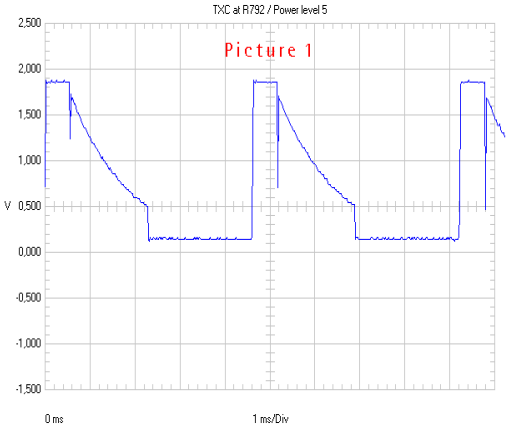

- Check RFC = 13MHz (Vpp = 800 mVAC) at L800, frequency deviation ±50Hz (**See picture below**)
- If not ok, check V800 and surrounding components for shorts or disconnections and change the faulty ones, otherwise probably N505 HAGAR circuit is faulty.

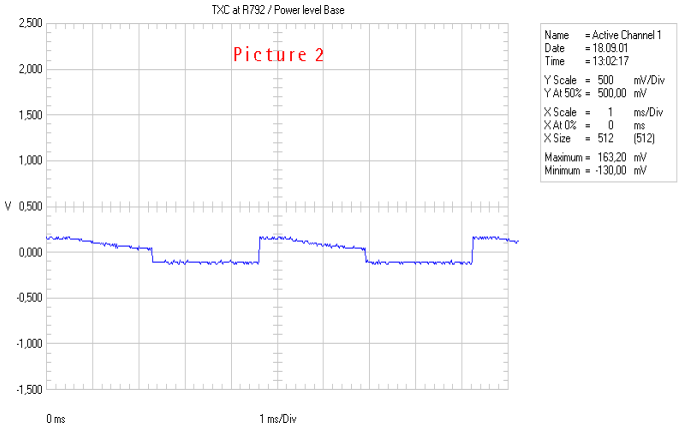



- Check Vsynte (VSYN_2) = 2.8 VDC at C561. If not ok, check N100 CCONT.
- Check VREF_2 = 1.5 VDC at R564. If not ok, check N100 CCONT.
- Check Vchp = 4.7 VDC at C560. If not ok, refer to G800 SHF oscillator faulty
- Check Vrxrf (VRX) = 2.8 VDC (RX active). If not ok, check N100 CCONT.
- Check Reset = 2.8 VDC (in Local Mode) and 2.8V pulse (in Normal Mode / one part (RX/TX) active) at R800 (**See picture below**)



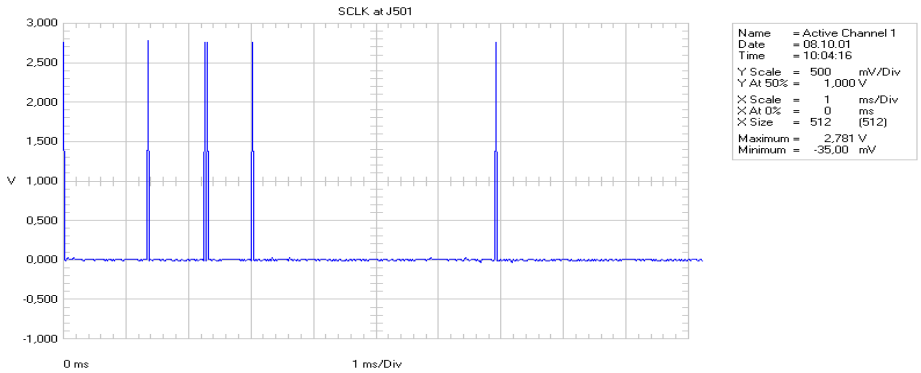
- Check Vmod (VTX) = 2.8V at R700. If not ok, check N100 CCONT.
- Check TXC (TX active) at power level 5 **(picture 1)** and at power level base **(picture 2)** at R792. If not ok, check N200 COBBA.



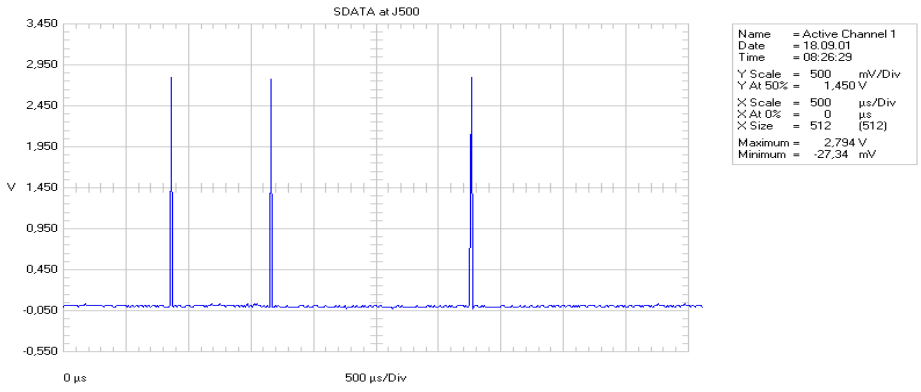




- Check SCLK at J501, SDATA at J500 and SENA at J502. (**See picture below**)
- If one or all three signals are not ok, probably the D300 MADLINDA is faulty.

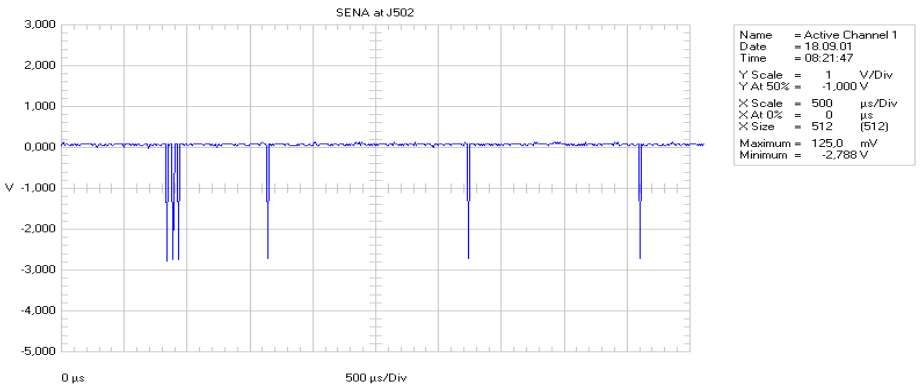
**SCLK**



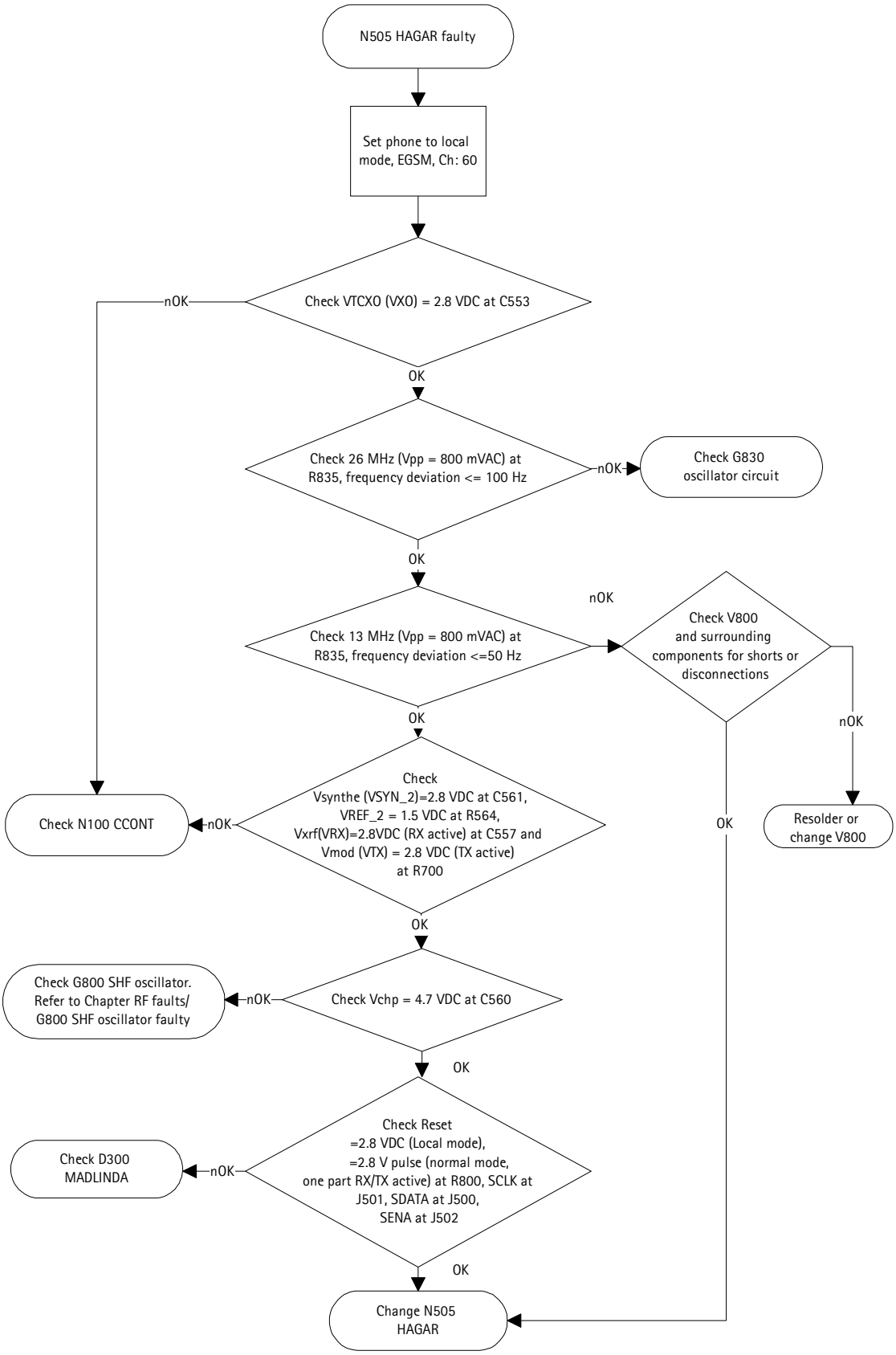

**SDATA**




**SENA**



## N505 HAGAR faulty



## Mechanical faults

### Coaxial cable crushed

- When assembling the RAE-3 communicator pay attention to the coaxial cable. Be very carefull when closing the back cover. Make sure that the coaxial cable is routed correctly as shown in **figure 3** and **4** below. If the routing is not correct the coaxial cable can be crushed **(Figure 1 and 2 below)**.

**False**

Figure 1

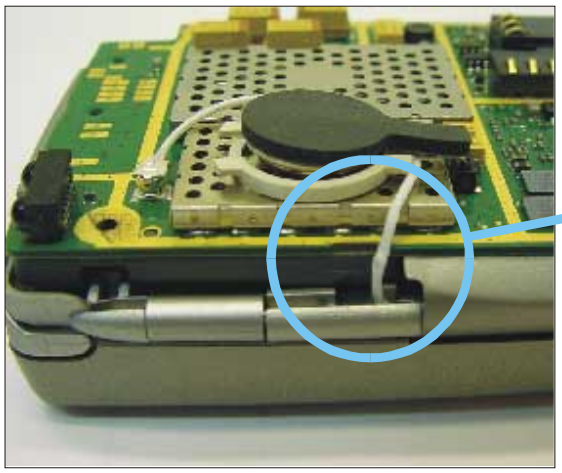
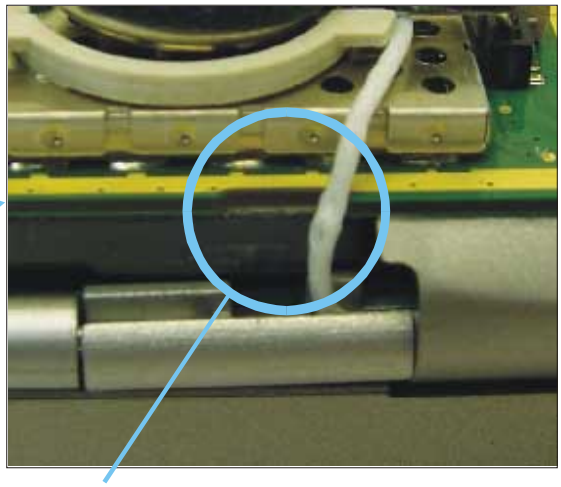


Figure 2



Coaxial cable crushed because wrong routed

**Correct**

Figure 3

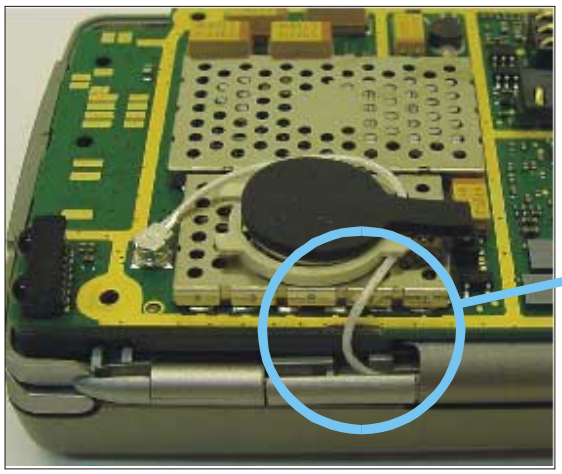
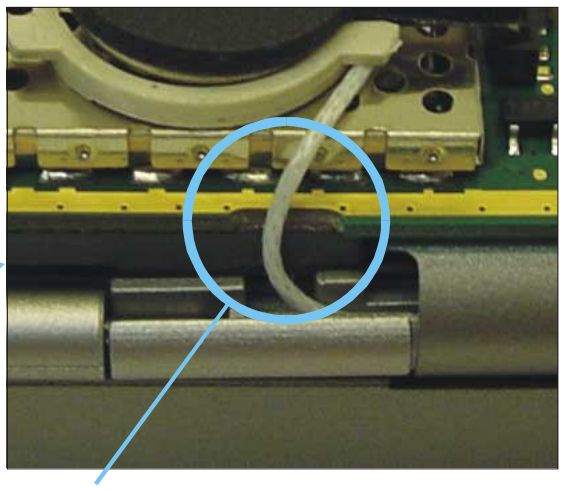


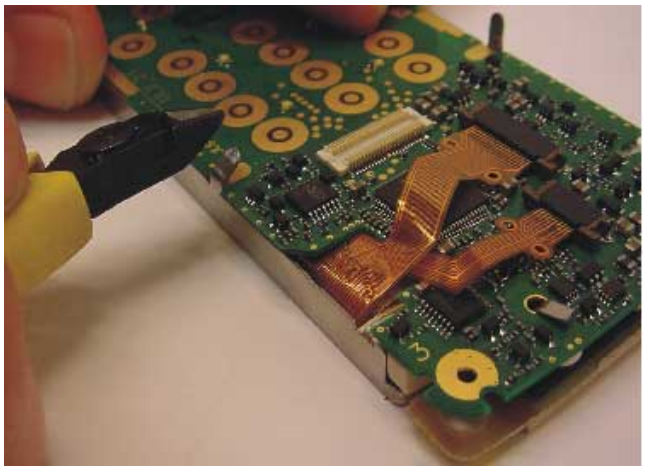
Figure 4

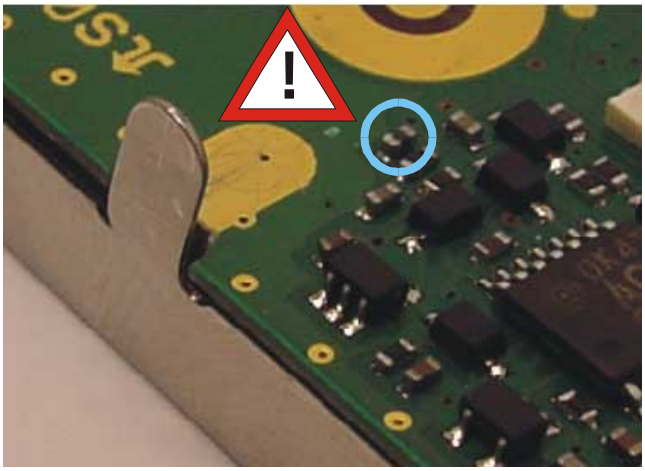


Coaxial cable must be routed in center of leave out

**PDA display change**

- When the changing of the PDA display is necessary be very carefull when closing the metal clips of the changed PDA display. You may slip down and scratch the PCB or may lift some components, e.g. L051 (SCLK for display). See pictures below. A good solution is the use of a small sidecutter for bending the clips down gently.



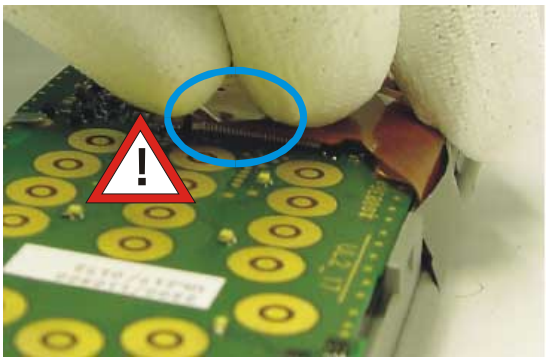


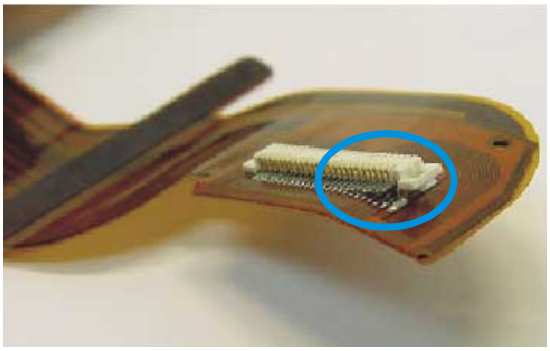
**I024 Qwertyflex damaged**

- When opening the Qwertyflex connector on UI module be very careful because it could be damged.

Do not open the Qwertyflex connector by lifting it from the side. (See picture below)

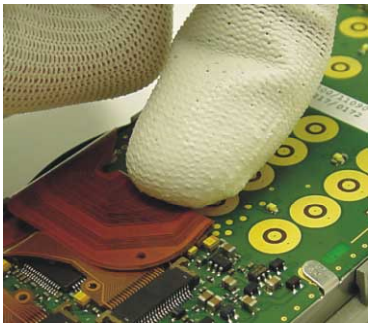
Not OK





Open the connector by lifting from the middle only. (See picture below)

OK



## Assembling-dissassembling notes

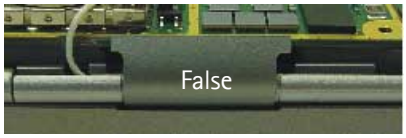
### A-Cover snaps damaged

Be careful when **disassembling the A-Cover** because it is possible to damage the snaps of the A-Cover. In this case the A-cover must always be changed. **(See pictures below)**.



### Flex cover assembling

When **assembling the BL8 modul** do not press the µBGAs while connecting because the components could be damaged. It is also important to put the Flex-Cover between Chassis and BL8 modul otherwise a creak tone is to be heard when opening the lid.




## Change History

| Originator | Status | Version | Date | Comment |
|---|---|---|---|---|
| CC Training Group | Draft | 0.1 | 02.10.2001 | First version for the repair group |
| CC Training Group | Approved | 1.0 | 30.10.2001 | First approved version |
| CC Training Group | Draft | 1.5 | 01.03.2002 | Chapter Flash faults comments changed, information MMC modified |
| CC Training Group | Draft | 1.7 | 11.03.2002 | Comments of Repairgroup added |
| CC Training Group | Approved | 2.0 | 13.03.2002 | |