Approved according to 1776-2/FEA 209 544

Trouble-shooting instruction

I 888

Standard electrical repairs

Table of contents

1 Conditions

1.1 Component classifications.

After each component, which fault can be verified by the troubel-shooting guides in this folder, is the components classification written. The components are divided in four classes, A,B,C and D. The classes are seperated depending on how much of the phone´s prestanda that is affected by changing the component.

Class A and B: Changing the component doesn´t affect the prestanda that much, you only have to do a test call toward a real network before you perform a function test after replacing it.

Class C: The phone has to be calibrated at station level after changing the component, since the components tolerances are so large it can affect the prestanda of the phone.

Class D: It demands advanced equipment and calibration at board level and because of that class D-components can´t be replaced.

1.2 Abbreviations used in the trouble-shooting instructions.

B: Crystal

C: Capacitor

D: Digital circuit

F: Overload protection

H: Buzzer, ligth diodes, pads to the display

J: Connection

L: Coil

N: Analouge circuit

R: Resistor

U: BALUN. Component that converts a balanced signal to a nonbalanced or the opposit direction.

V: Transistor, diode

X: Antenna connection, contact point on the board.

Z: Filter

AGND:	Ground to analouge signal
DCIO:	Direct current through the system connector for charging the battery.
DCON:	Logical signal from the processor that keeps the phone powered on after releasing the On/Off-button.
GND:	Ground
LED3K:	Logical signal that activates the illumination.
ONSRQ:	Voltage from the On/Off-button that power on the phone.
REGON:	Logical signal that activates the regulator for the voltage.
RTC:	Real time clock. The clock that shows the time.
SIMCONCLK:	Signal from the processor that is used for communication to SIM, clock.
SIMCONDAT:	Signal from the processor that is used for communication to SIM,data.
SIMCONRST:	Signal from the processorn that is used for communication to SIM,reset.
SIMVCC:	Feed voltage to SIM.
SWDC:	Switch VBATT
VANA:	Voltage to the analouge part of the logical circuit (N800).

VBATT:	Voltage of the battery.
VDIG:	Voltage to processor and memories (3.2V).
VDSP:	Voltage to DSP (Digital Signal Processor) (3.2V).
VDSPC:	Voltage to DSP (Digital Signal Processor) (2.5V).
VLCD:	Negative voltage to the display that controlls the contrast (-2.7V).
VDLCD:	Feed voltage to the display.
VRAD:	Voltage to the radiopart except the synthesizer.
VRPAD:	Voltage to the radiopart in D600 (used to top indicator and buzzer).
VRTC:	Voltage to the real time clock.
VVCO:	Voltage to the syntesizer.

I2C:	Communication standard for two-way communication using only 2 wires, for clock and data.
LO:	Local oscillator.
PWM:	Puls width modulation.

2 No serv or can´t place call.

2.1 Find out if the fault is related to Rx(reciever) or Tx(transmitter).

Connect the phone (with signaling program) to a GSM test instrument and try to get serv at -68.5 dBm on the input signal. If the phone gets serv proceed to section 2.2. If the phone doesn´t get serv, there is probably a fault in the LO part or too big losses in the signal path. Open the phone and check for liquid damages. Make sure the antenna connection X101 (class A) isn´t mecanically damaged, unsoldered or dirty (varnish, glue, oxide...) (Fig 2.1).

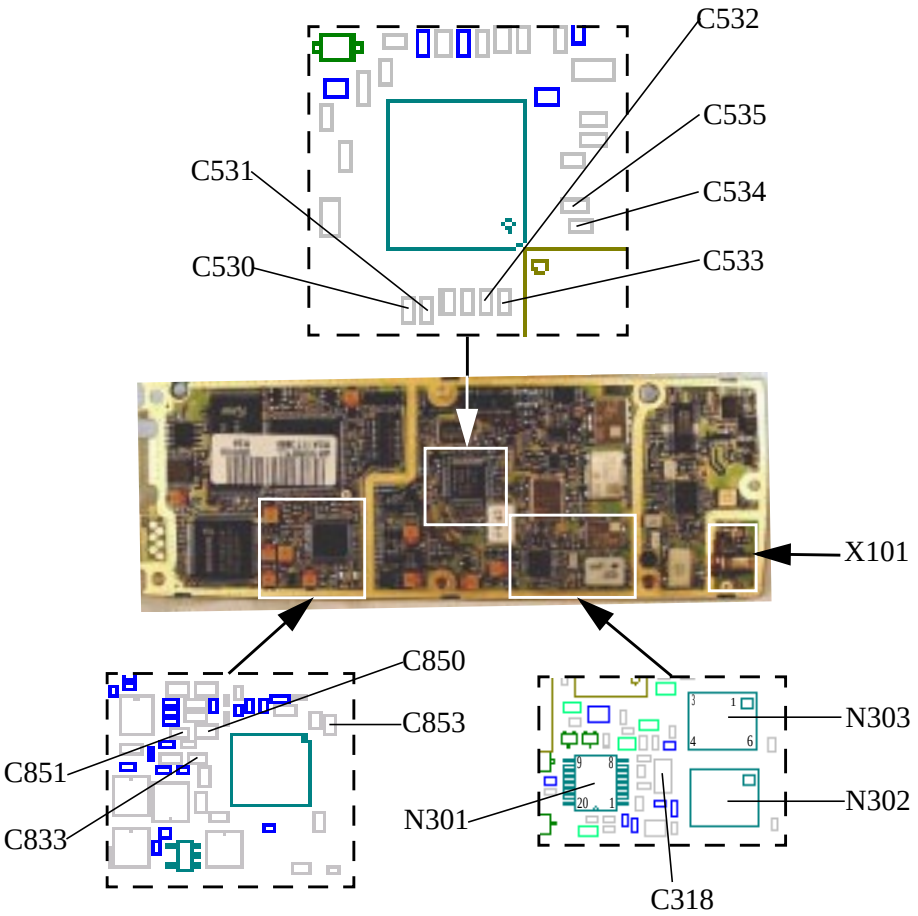


Fig 2.1

Look for soldering faults on C318 (class A), N302 and N303 (all three Fig 2.1).

Measure the resistance of C530, C531, C532, C533, C534 and C535 (>200 kOhm, all are class A, Fig 2.1).

Measure the resistance of C850 (>100 kOhm, class A, Fig 2.1), C851 (>1 kOhm, class A, Fig 2.1), C833 (>1 kOhm, class A, Fig 2.1) and C853 (>100 kOhm, class A, Fig 2.1).

Measue VVCO and VRAD (3.8V, Fig 2.2). If any of the voltages are incorrect, proceed to chapter 3 (“Doesn´t start”-fault).

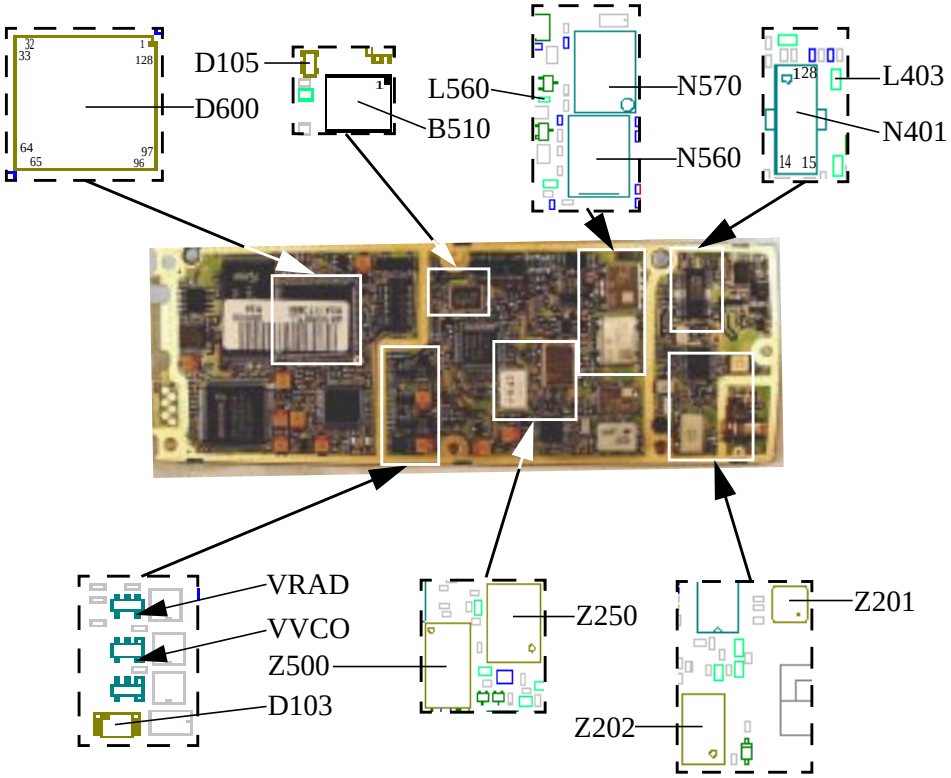


Fig 2.2

Measure the voltage on pin 4 and 6 on N303 (Fig 2.1). The voltage on pin 4 (the control voltage) should always vary between 0.8-2.8 V (usually it starts at 1.7 V). The voltage on pin (the feed voltage) is also variable, but usually it starts at 3.3 V. If the feed voltage is incorrect (often is it missing completly), check the solderings on D600:8, D600:102 and also on D105 and D103 (all at Fig 2.2). If the control voltage is incorrect (mainly 0 or 3.6 V), check the solderings on D600:8 and D600:106-108. If those are fine, replace N301 (class B, Fig 2.1).

Check the solderings on Z250, Z500, Z201 (GSM 900) and Z202 (GSM1900) (all at Fig 2.2) plus Z205 (Fig 2.3).

If the fault still remains, send the phone to the next repair level.

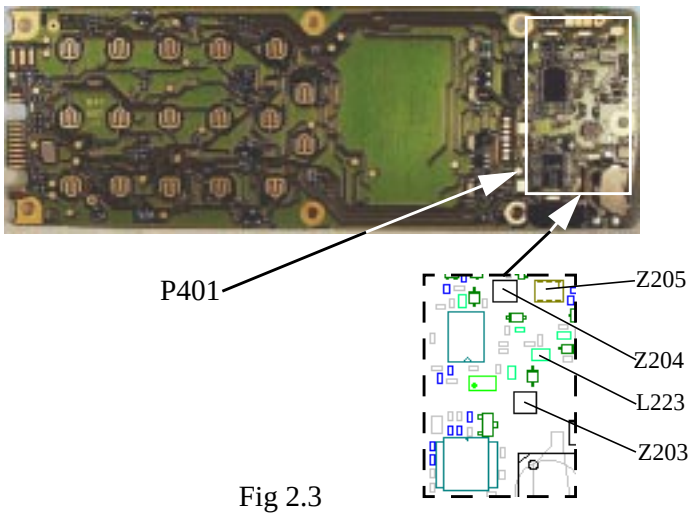


Fig 2.3

2.2 Connect a call.

To test GSM900,connect a call at power level 5 against the instrument with the input signal at -68.5 dBm. To test GSM1900 use power level 0 and an input signal at -68.5 dBm.

If it works, proceed to section 2.3. If it doesn´t work, then it probably is a TX related fault. If it is only at channel 1 (or several of the lower channels) you can´t connect a call, is it N570 (class D, Fig 2.2) that is faulty and the phone can´t be repaired at this level. Open the phone and check for liquid damages. Make sure the antenna connection X101 (class A, Fig 2.1) isn´t mecanically damaged, unsoldered or dirty (varnish, glue, oxide...).

Measure the resstance between test point P401 (Fig 2.3) and ground (or between N401:14 (Fig 2.2) and ground). The resistance should be larger than 5 kOhm. If it is

900) and Z202 (GSM1900)(all at Fig 2.2) plus Z205 (Fig 2.3). If the fault still remains, send the phone to the next repair level.

If the Rx level value is above 45 steps at input signal -68,5 dBm you need to calibrate the phone, therefore send the phone to the next repair level.

If the RX quality value is too high, send the phone to the next repair level.

If the output power is too low, check the solderings on N560 (GSM1900) and N570 (GSM900) (both Fig 2.2). Check the solderings on Z205, Z203 (GSM900) and Z204 (GSM1900)(all three Fig 2.3). If the fault still remains, send the phone to the next repair level.

3 Doesn´t start.

3.1 Find out if the phone will start by using the On/Off-button.

Attach a fully charged battery and press the On/Off-button. If the phone doesn´t start, proceed to section 3.2. If the phone starts as normal when it is complete, but shuts down in the trouble-shooting fixture, measure the current consumption. If it is >1.5 A or as high as the current limit on the power supply, then N401 (class D, fig 3.1) is faulty and the phone can´t be repaired at this repair level. (Measure the resistance between N401:14 and ground, it should be >10 kOhm, but if N401 is faulty it usually is about 200 Ohm).

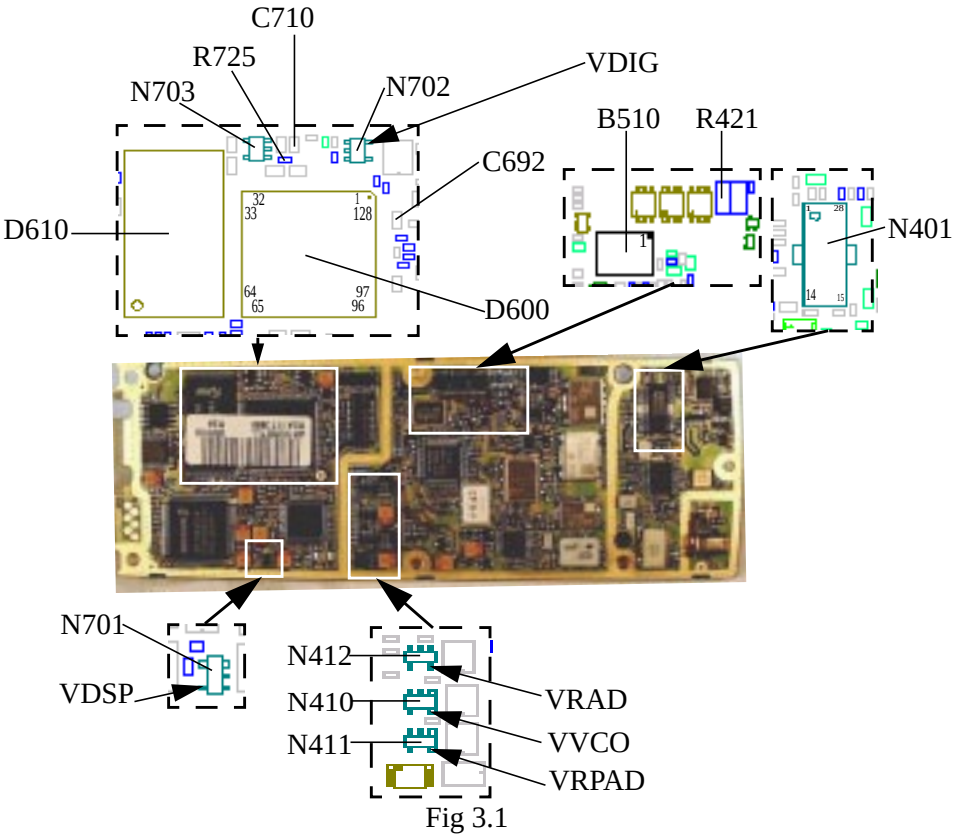


Fig 3.1

If the phone starts, check the charging function by connecting a charger at the system connector.If the charging doesn´t work, proceed to chapter 6 (“Charging”-fault). Open the phone and make a visual check of the board. The side with the components are shown in fig 3.1. Check the board for liquid damages and burned or dan-ages pads at the system connector. Measure the resistance of R421 (0,1 Ohm, class B, fig 3.1). **After every repair of the charging function, you have to verify the function using the method mentioned in section 6.1.1.** Check the solderings on D600 and D610 (Fig 3.1). As soon as the fault has been corrected, send the phone back into the normal repair flow. If the phone starts and the values above are correct, it is either without faults or there is an intermittent fault.

3.2 Visual check.

Make an outer visual check. Make sure the battery screws are fine and fully attached, the isolation plate by the battery screw is mounted, the volume buttons are mounted and the system connector isn´t dirty or liquid damaged. Proceed to section 3.3.

3.3 Current consumption with the On/Off-button pressed.

Attach a dummy battery and start the phone using the On/Off-button while you measure the current consumption.

- If the phone doesn´t use any current while pressing the On/Off-button, proceed to section 3.4.5.
- If the phone uses more than 200 mA, remove the IRDA module and the gold colored metal plate. Try to start the phone again. If the current consumption got lower it was either the IRDA-module or the plate that was faulty. If the current consumption still is too high proceed to section 3.4.3.
- If the phone uses between 1 and 200 mA, starts (asks about a SIM card, searching for a net or something like that) and works as long as the On/Off-button is being pressed, proceedto section 3.4.4.
- If the phone doesn´t start, try to program it in the flash programmer.

  * If the phone doesn´t start in the flash programmer, proceed to section 3.4.1.

  * If the phone doesn´t start after programing it or if it is troublesome in the flash programmer, proceed to section 3.4.2.

  * If the phone starts after programming it the fault is probably fixed, but to eliminate the possibility of intermittent faults, check the board for liquid damages or bad solderings at D600 and D610 (Fig 3.1).

3.4 Measuring at a powered circuit board.

3.4.1 Doesn´t start in the flash programmer.

Open the phone and check for liquid damages. Make sure the system connector pads are not burned or damaged. Measure the resistance of R421 (0,1 Ohm, class B, fig 3.1). **After every repair of the charging function, you have to verify the function using the method mentioned in section 6.1.1.** Attach the board to the fixture. Keep the board powered up with high DCIO. Check VDIG and VDSP (3.2 V, Fig 3.1). If any of the voltages are too low, measure the resistance to ground (VDIG >500 Ohm, VDSP >25 kOhm). If the resistance is correct, replace the corresponding circuit (VDIG - N702, class A and VDSP - N701, class A, fig 3.1). If the resistance is too low, send the phone to the next repair level. If any of the voltages are too high, replace the corresponding circuit. Check Powerreset (PWRRST) at C710 (>3 V, Fig 3.1). If it is lower, measure the resistance of R725 (100 kOhm, class A, fig 3.1). Is the resistance correct, replace C710 and N703, (both class A, fig 3.1.) Measure the voltages on VRAD, VVCO and VRPAD (3.8 V, fig 3.1). If one or more voltages are incorrect, measure the resistance to ground (>50 kOhm). If the resistance is correct,

replace the corresponding regulator (fig 3.1, all are class A). If the resistance is too low, send the phone to the next repair level.

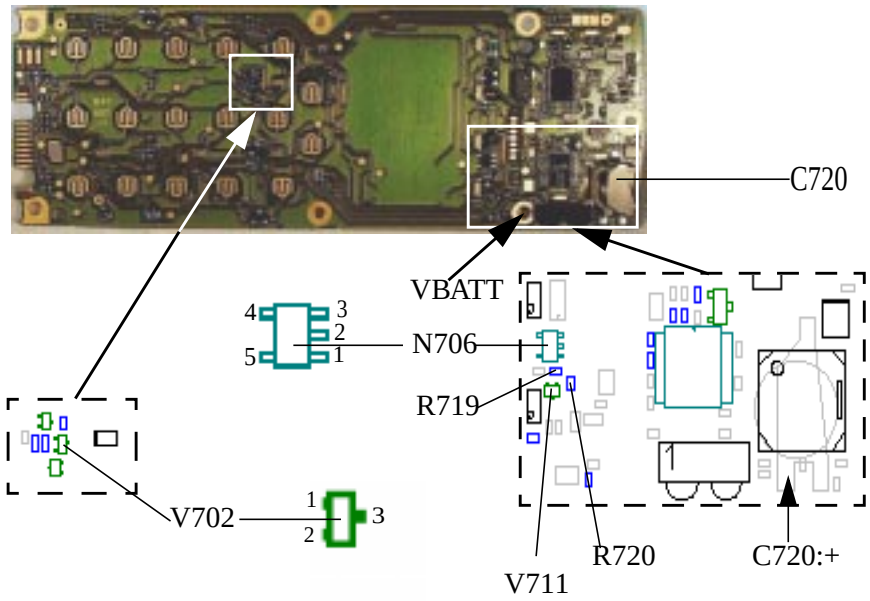


Fig. 3.2

Check the amplitude on the “clock” B510:1 (~1v t-t, class C, fig 3.1). Measure the amplitude using an oscilloscope, spectrum analyzer, frequenzy counter, diode prob... Ifthe amplitude is too low, send the phone to the next repair level. Check the solderings on D600 or D610 (fig 3.1). If they are fine and it is sure B510 is okay, then replace D600 (class B) and D610 (class A). Try to programe it in the flash programmer between each exchange.

3.4.2 Can be programmed, but doesn´t start afterwards or is troublesome during programming.

Open the phone and check for liquid damages. Make sure the system connector pads are not damaged or burned. Measure the resistance of R421 (0,1 Ohm, class B, fig 3.1). **After every repair of the charging function, you have to verify the function using the method mentioned in section 6.1.1.** Attach the board to the fixture. Keep it powered up with DCIO high. Check VDIG and VDSP (3.2 V, fig 3.1). If any of the voltages are too low, measure the resistance to ground (VDIG >500 Ohm, VDSP >25 kOhm). If the resistance is correct, replace the corresponding circuit (VDIG - N702 (class A) and VDSP - N701 (class A)). If the resistance is too low, send the phone to the next repair level. If any of the voltages are too high, replace the corresponding circuit. Check Powerreset (PWRRST) at C710 (>3 V, Fig 3.1). If it is lower, measure the resistance of R725 (100 kOhm, class A, fig 3.1). If it is correct, replace C710 and N703, (both are class A, fig 3.1). Measure the voltages on VRAD, VVCO and VRPAD (3.8 V, fig 3.1). If one or more of the voltages are oncorrect, measure the resistance to ground (>50 kOhm). If the resistance is correct, replace the corresponding regulator (fig 3.1, all are class A) . If the resistance is too low, send the phone to the next repair level. Check the solderings on D600 or D610 (fig 3.1). If they are fine, replace D610 (class A) and D600 (class B). Try to program the phone in the flash programmer between each exchange.

3.4.3 Uses more than 200 mA.

Open te phone and check for liquid damages. Make sure the system connector pads are not damaged or burned. Attach the board to the fixture. Keep it powered up with DCIO high. Check the current consumption again, if it uses less than 200 mA, make sure the gasket in the frame is fine, if it is change the display and the elastomer. Measure the resistance between VBATT and ground. It should be larger than 1MOhm, if it is lower send the phone to the next repair level. Check VDIG and VDSP (3.2 V, fig 3.1). If any of the voltages are too low, measure the resistance to ground (VDIG >500 Ohm, VDSP >25 kOhm). If the resistance is correct, replace the corresponding circuit (VDIG - N702 (class A) and VDSP - N701 (class A)). If the resistance is too low, send the phone to the next repair level. If any of the voltages are to high, replace the corresponding circuit. Measure the voltages on VRAD, VVCO and VRPAD (3.8 V, fig 3.1). If one or more of the voltages are incorrect, measure the resistance to ground (>50 kOhm). If the resistance is correct, replace the corresponding regulator (fig 3.1, all are class A). If the resistance is too low, send the phone to the next repair level.

3.4.4 The phone works as long as the On/Off-button is pressed.

Open the phone and check for liquid damages. Make sure the system connector pads are not damaged or burned. Attach the board to the fixture. Keep it powered up with DCIO high. Measure the voltage on C692 (>3.0 V, fig 3.1). If there is a voltage,check the soldering at D600:119(fig 3.1). If there isn´t a voltage, check the resistance of C692 (>200 kOhm, class A). If the resistance is correct, measure the input voltage on N706:2 (VBATT, fig 3.2) and the output voltage N706:3 (3.5 V). Make sure the ground of the regulator exist on N706:1. If VBATT or ground is missing, the board has to be discarded. If they are correct, replace N706 (class A). If the output voltage is correct, measure the voltage to ground on the backup capacitors plus side C720 (3.1 V, class A, fig 3.2). If there are no voltage, measure the resistances over R720 (180 kOhm, class A, fig 3.2) and R719 (47 kOhm, class A, fig 3.2). Are they correct, replace V711 (class A, fig 3.2). If the output voltage is correct, measure the resistance between the plus side of C720 (fig 3.2) and C692 (fig 3.1), it should be approximately 0 Ohm. If the resistance is too high, is there a foil damage and the phone has to be discarded. If the fault still remains, send the phone to the next repair level.

3.4.5 The phone uses no current while the On/Off-button is being pressed.

Open the phone and check for liquid damages. Make sure the system connector pads are not damaged or burned. Make sure the keyboard and the keyboard pads are clean and not damaged, especially the On/Off-button (fig 3.3).

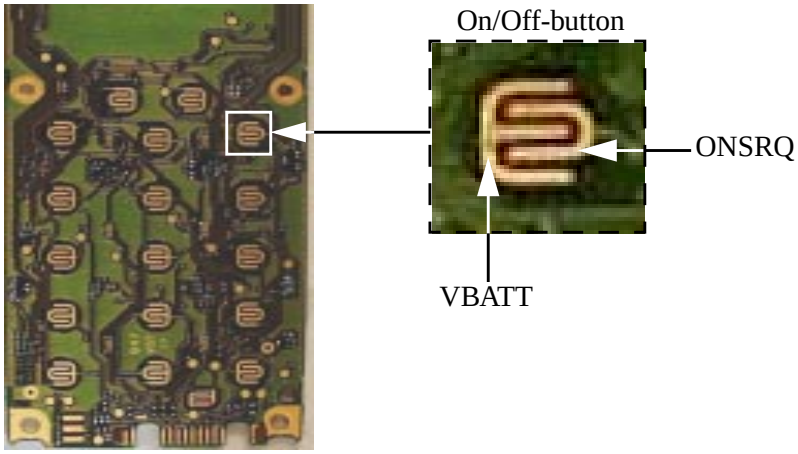


Fig. 3.3

Give the board power. Make sure VBATT exists one the marked side of the On/Off-button (fig 3.3), if it doesn´t, is there a foil damage and the phone has to be discarded. If it exists, measure the resistance from the other side of the On/Off-button, marked with ONSRQ in fig 3.3, to V702:1 (fig 3.2). It should be approximately 0 Ohm, if it is larger is there a foil damage and the board has to be discarded. Otherwise replace V702 (class A). If the fault remains, send the phone to the next repair level.

4 Audio

4.1 Type of fault.

Make a call to another phone and check the microphone and the earphone. Connect a handsfree to the phone, make a call and check external microphone and speaker.

- If only the earphone on the phone is silence or if the sound comes and goes, proceed to section 4.2.
- If the recieving part can´t hear you but you can hear the recieving part, proceed to section 4.3.
- If you can´t here anything when the handsfree is connected but the recieving part can hear you, proceed to section 4.4.
- If the recieving part can´t hear you when the handsfree ic connected but you can hear the recieving part, proceed to section 4.5.
- If neither you or the recieving part can hear anything when the handsfree is connected, proceed to section 4.6.
- If neither you or the recieving part can hear anything, but with the handsfree connected both can hear, proceed to section 4.7.
- If the sound is disturbed, distorted, noisy or something like that, proceed to section 4.8.
- If the mute function doesn´t work, proceed to section 4.9.
- If the fault doesn´t fit in to any of the points above, proceed to section 4.10.

4.2 Earphone fault.

Open the phone and check for liquid damages. If there are no, change the front cover and try again. If the fault remains, replace J810 (Fig 4.1, class A) and try again.

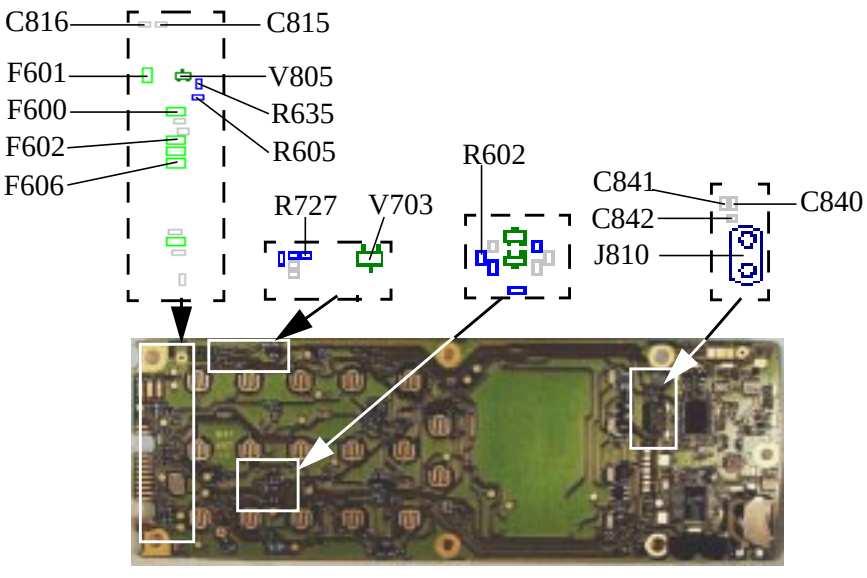


Fig. 4.1

Check the solderings on N800:24 and 26 (Fig 4.2). If they are good, measure the resistance between the connection J810 and ground and also between the two pegs on the connection. If the resistance to ground is lower than 25 kOhm, then replace C840 and C841(both class A, Fig 4.1). If the resistance between the two pegs is lower than 50 kOhm, replace C842 (class A, Fig 4.1). If the fault still remains, send the phone to next repair level.

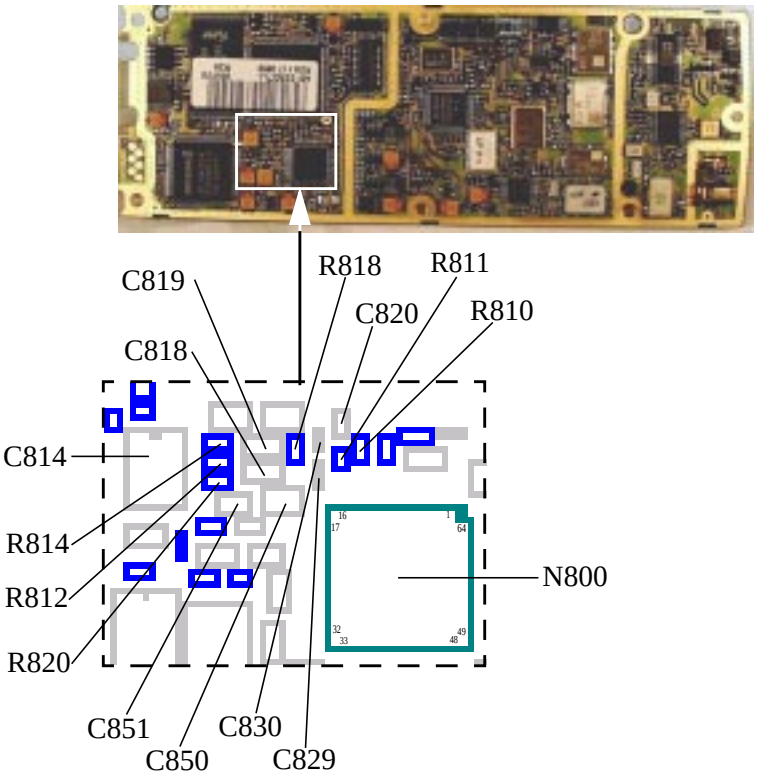


Fig 4.2

4.3 Microphone fault.

Open the phone and check for liquid damages, especially around X830 (Fig 4.3). If there are no, try to change the front cover and the elastomer and try again.

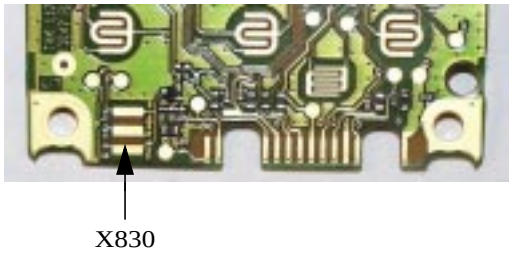


Fig 4.3

If the fault remains, check the solderings on N800:13-18(Fig 4.2). If they are good, measure the resistance of C850 (>100 kOhm, class A, Fig 4.2), C851 (>1 kOhm, class A, Fig 4.2), C829 and C830 (>100 kOhm, Both are class A, Fig 4.2) and over C818 and C819 (>100 kOhm, both are class A, Fig 4.2). Measure the resistance of C815 (Fig 4.1), if the resistance are below 50 kOhm than replace C815 and C816 (both are class A, Fig 4.1). Measure the resistance of R818 (Fig 4.2), the resistance should be larger than 10 kOhm, if it is lower replace R818 and C820 (both are class A, Fig 4.2). Measure the resistance of R810 (1 kOhm, class A, Fig 4.2), R811 (1kOhm, class A, Fig 4.2), R812 (1,5 kOhm, class A, Fig 4.2), R814 (470 ohm, class A, Fig 4.2) and R820 (1,5 kOhm, class A, Fig 4.2). If the resistance of R820 is too low after R820 has been replaced, replace V805 (class A, Fig 4.1). Measure the resistance of C814 (>100 kOhm, class A, Fig 4.2). If the fault remains, send the phone to next repair level.

4.4 Speakerfault together with handsfree.

Check the connection surface at the system connector. If they are fine, open the phone and check for liquid damages, especially at the system connector pads. Check the solderings on N800:22 (Fig 4.2). Measure the resistance of R804 (Fig 4.4), if the resistance is lower than 50 kOhm replace F601 (class A, Fig 4.1). If that doesn´t work then replace R804 (class A, Fig 4.4). Measure the resistance of R806 (100 Ohm, class A, Fig 4.4) and C813 (>100 kOhm, class A, Fig 4.4). If the fault remains, send the phone to next repair level.

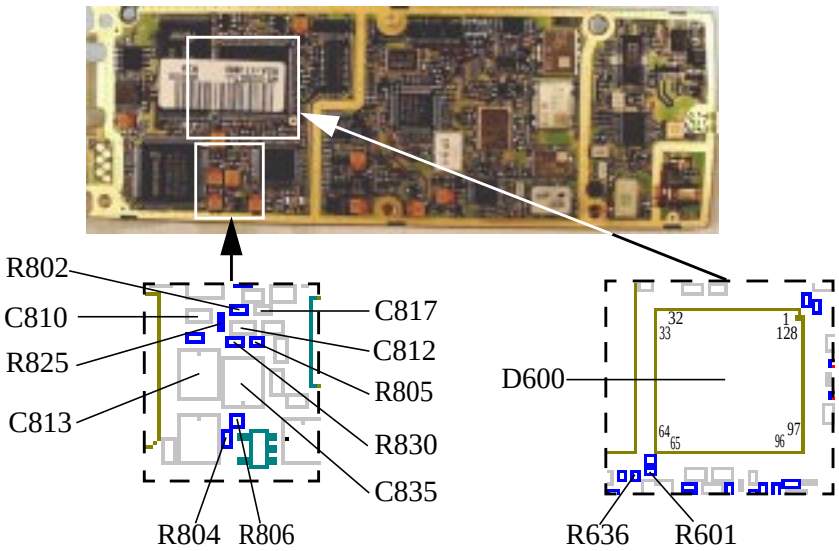


Fig 4.4

4.5 Microphone fault together with handsfree.

Check the connection surface at the system connector. If they are fine, open the phone and check for liquid damages, especially at the system connector pads. Check the solderings on N800:19 (Fig 4.2). Measure the resistance of R825 (3.3 kOhm, class A, Fig 4.4), R830 (470 Ohm, class A, Fig 4.4), R802 (3.9 kOhm, class A, Fig

4.4) and R805 (15 kOhm, class A, Fig 4.4). Measure the resistance of C835 (>1 kOhm, class A, Fig 4.4) och C817 (>100 kOhm, class A, Fig 4.4), C810 (>10 kOhm, class A, Fig 4.4) and C812 (>100 kOhm, class A, Fig 4.4). If the fault remains, send the phone to next repair level.

4.6 The handsfree is not detected.

Check the connection surface at the system connector. If they are fine, open the phone and check for liquid damages, especially at the system connector pads. Chekc the solderings on D600:67 and 70 (Fig 4.4). Measure the resistance of R635 (22 kOhm, class A, Fig 4.1) and R636 (22 kOhm, class A, Fig 4.4). Measure the resistance of R601 (1 kOhm, class A, Fig 4.4) and R605 (1 kOhm, class A, Fig 4.1). If the fault remains replace D600 (class B, Fig 4.4), if that doesn´t help - send the phone to next repair level.

4.7 Microphone and earphone fault.

Check the connection surface at the system connector. If they are fine, open the phone and check for liquid damages, especially at the system connector pads. Check the solderings on D600:67 and 70 (Fig 4.4). Measure the resistance of EXTAUD (Fig 4.5) to ground, if the resistance is lower than 10 kOhm, replace F600 (class A, Fig 4.1).

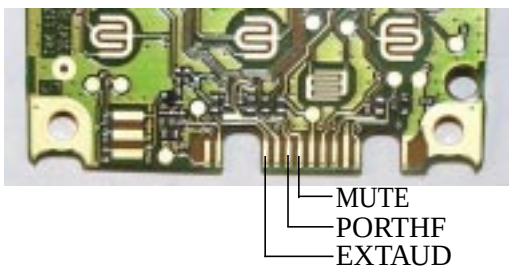


Fig 4.5

Measure the resistance of PORTHF (Fig 4.5) to ground, if the resistance is lower than 10kOhm, replace F602 (class A, Fig 4.1). Measure the resistance of R635 (22 kOhm, class A, Fig 4.1) and R636 (22 kOhm, class A, Fig 4.4). Measure the resistance of R601 (1 kOhm, class A, Fig 4.4) and R605 (1 kOhm, class A, Fig 4.1). If the fault still remains, replace D600 (class B, Fig 4.4). If that doesn´t help, send the phone to next repair level

4.8 Signal treatment fault.

Open the phone and check for liquid damages. Power up the board. Check VDIG and VDSP (both should be 3.2V, Fig 4.6). If one of the values are incorrect then proceed to chapter 3 (“Doesn´t start”-fault). Check VDSPC (should be 2,5V, Fig 4.2). If

VDSPC is too low, then measure the resistance to ground. If the value is lower than 10 kOhm, then replace, one by one and check the resistance between, C903 (Fig 4.6), C904 (Fig 4.6), C905 (Fig 4.6), R727 (Fig 4.1) and D900 (Fig 4.6), all of them are class A. If VDSPC is too low and the resistance to ground are larger than 10 kOhm, then replace V703 (class A, Fig 4.1). If the feed voltages are correct, then check the solderings on D600 (Fig 4.4), D900 (Fig 4.6) and N800(Fig 4.2). If the solderings are correct, then first replace D900 (class A, Fig 4.6) and try again. If that didn´t help, then replace D600 (class B, Fig 4.4). If the fault still remains, send the phone to next repair level.

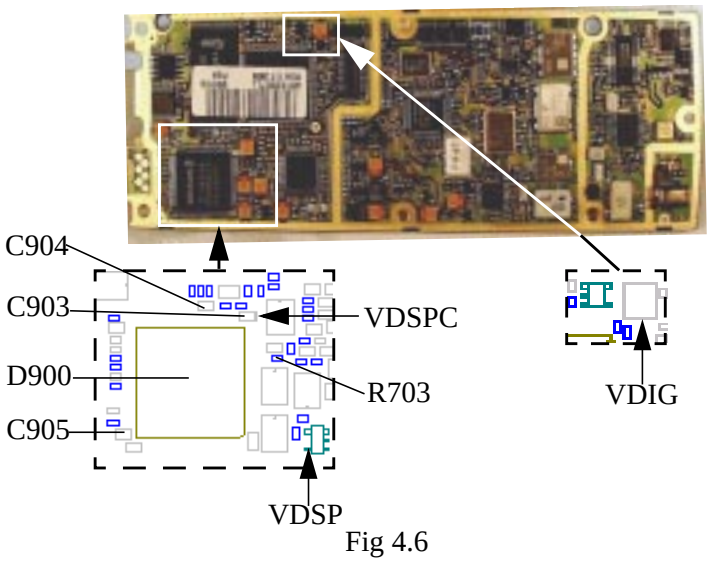


Fig 4.6

4.9 Music mute fault.

Check the connection surface at the system connector. If they are fine, open the phone and check for liquid damages, especially at the system connector pads. Check the solderings on D600:69 (Fig 4.4). Measure the resistance of R602 (470 ohm, class A, Fig 4.1). Measure the resistance MUTE (Fig 4.5) to ground. If the resistance is lower than 100 kOhm, then replace F606 (class A, Fig 4.1). If the resistance is correct, then replace D600 (class B, Fig 4.4). If the fault remains, send the phone to next repair level.

4.10 Audio fault.

Check the connection surface at the system connector. If they are fine, open the phone and check for liquid damages, especially at the system connector pads. Power up the borad. Check VDIG and VDSP (both should be 3.2V, Fig 4.6). If any of the voltages incorrect, proceed to chapter 3 (“Doesn´t start”-fault). Check VDSPC (Should be 2.5V, Fig 4.6). If VDSPC is too low then measure the resistance to ground. If the value is lower than 10 kOhm, then replace, one by one and check the resistance between, C903 (Fig 4.6), C904 (Fig 4.6), C905 (Fig 4.6), R727 (Fig 4.1) and D900 (Fig 4.6), all of them are class A. If VDSPC is too low and the resistance to ground is larger than 10 kOhm, then replace V703 (class A, Fig 4.1). If the feed

voltages are correct then check the solderings on D600 (Fig 4.4), D900 (Fig 4.6) and N800 (Fig 4.2). Measure the resistance of R703 (0 ohm, class A, Fig 4.6) and C850 (>100 kOhm, class A, Fig 4.2), C851 (>1 kOhm, class A, Fig 4.2). If the fault remains, send the phone to next repair leve.

5 Display fault

5.1 Type of fault.

Start the phone with a fully charged battery using the On/Off-button.

- If the phone doesn´t start, proceed to chapter 3 (“Doesn´t start”-fault).
- If the display missis one or more segments, proceed to section 5.2.
- If the display shows nothing at all, proceed to section 5.3.

5.2 One or more segments are missing.

Open the phone and check for liquid damages. If there are no, change the display and try again.

5.3 The display shows nothing at all.

Start the phone with a dummy battery and check the current consumption (should be lower than 200 mA). Open the phone and check for liquid damages or if the display is mecanically damaged. If there are no damages, replace the elastomer and try again. If that didn´t make it , change the display and try again. If the current consumption is larger than 200 mA, then proceed to chapter 3 (“Doesn´t start”-fault).

Give the board power and start it up without the display. Measure the voltages on the display pads H623, Fig 5.1.

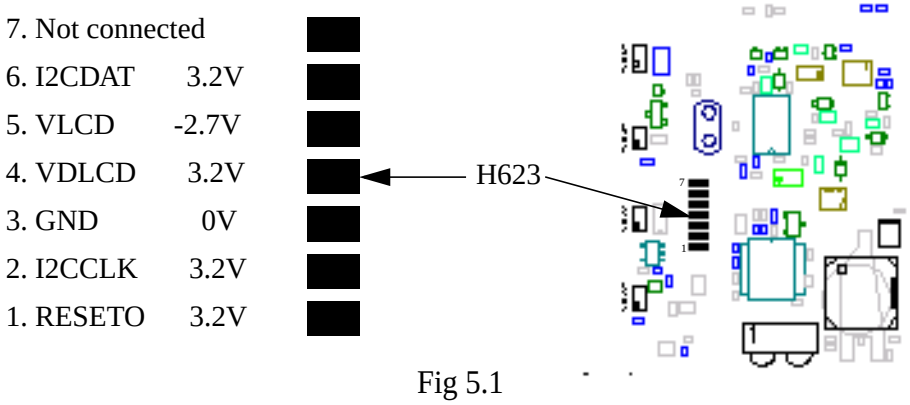


Fig 5.1

If one or more of the voltages are incorrect, proceed to the corresponding section below. To see the components placing go to Fig 5.2.

RESETO: If the value is incorrect, measure the resistance between the pad and D600:77, check also the soldering at the same pin. It should be 0 ohm, if it is considerable larger is there a foil damage and the phone has to be discarded. If the resistance is correct, replace D600 (class B).

I2CCLK: If the value is incorrect, measure the resistance between the pad and D600:4. It should be 10 kOhm, if it is larger measure the resistance of R615 (10 kOmh). If R615 is faulty, replace it (class A). If R615 is correct is there a foil dam-

age and the phone has to be discarded. Check VDIG on R620 (2,2 kOhm, class A), if it is lower than 3,2 volt proceed to chapter 3 (“Doesn´t start”-fault). If the things above are correct replace D600 (class B).

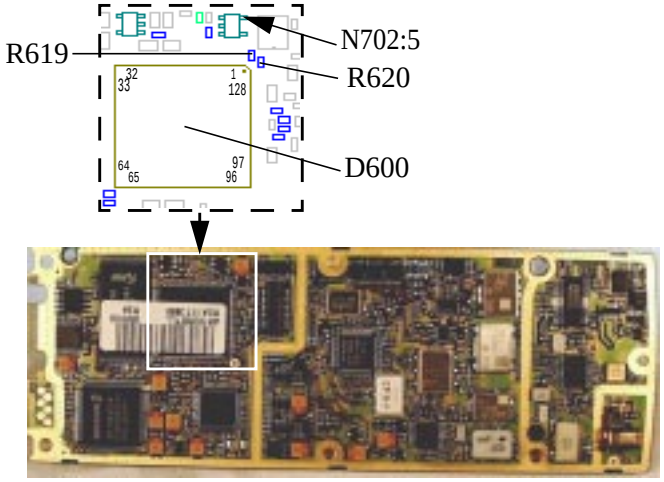
Is ground and should be 0 volt.(Measure the resistance to another ground point.)

VDLCD: If the value is incorrect, measure the resistance between the pad and D600:45, it should be 0 Ohm. If it is correct, measure the resistance between the pad and ground it should be larger than 2,5 MOhm. If it isn´t, replace C615 and C674 (both are class A). If that didn´t make it, replace D 600 (class B).

VLCD: If the value is incorrect, measure VDIG at N702:5, it should be 3,2 volt. Measure the resistance between the pad and V611:1, it should be 0 Ohm, otherwise is there a foil damage and the phone has to be discarded. Check the solderings on D600:95 and D600:96. Measure the voltages on V611 pin 1=-2,7 V, pin 2=-1,6 V and pin 3=-2,5 V. Do the same on V608 pin 1=-1,6 V, pin 2=0 V and pin 3=-1,0 V. If any of the voltages are incorrect, replace the diode (or both) and try again. If the fault still remains, measure the resistance of C632, C634 and C636, they should be larger than 2,5 MOhm. Measure the resistance of C631 and C633, they should be larger than 100 kOhm. Measure the resistance of C824, it should be larger than 25 kOhm. If any of the capacitors are faulty, replace it (they are all class A).Measure also the resistance of R616 and R639 (100 kOhm), R807 (82 kOhm) and R808 (33 kOhm). If anyone is incorrect, replace it (they are all class A).If the fault still remains, replace D600 (class B).

I2CDAT: If the value is incorrect, measure the resistance between the pad and D600:3, it should be 10 kOhm. Is it larger, then measure the resistance of R614 (10 kOhm). If R614 is faulty, replace it (class A), is R614 correct then there is a foil damage and the phone has to be discarded. Measure VDIG on R619 (2,2 kOhm, class A), if it is lower than 3,2 volt, proceed to chapter 3 (“Doesn´t start”-fault). If the things above are correct, replace D600 (class B).

If the fault still remains, send the phone to the next repair level.


R619
N702:5
R620
D600

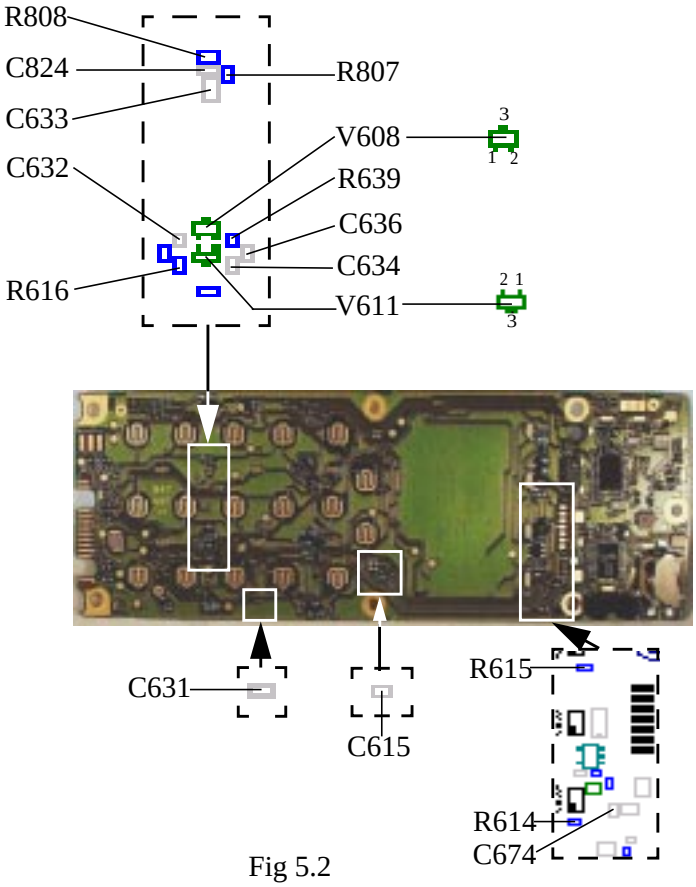

R808
C824
C633
C632
R616
R807
V608
R639
C636
C634
V611
C631
C615
R615
R614
C674

Fig 5.2

6 Charging fault

6.1 Type of charging fault.

Do a visual check of the battery screws and the system connector. Change if necessary. Start the phone with the On/Off-button and a fully charged battery.

- If it doesn´t start, proceed to chapter 3 (“doesn´t start”-fault).
- If the phone starts and shows charging at once, proceed to section 6.2.
- If the phone doesn´t show charging, turn it of and connect a charger to the system connector. If it indicates charging in the display and the red top indicator shines, the phone is okay. If it doesn´t show anything in the display and the red top indicator doesn´t shine, proceed to section 6.3.
- If the battery doesn´t charge, even if the phone shows it does, proceed to section 6.4.
- If the phone starts and shows charging, but the red top indicator doesn´t shine, proceed to chapter 9 (“Illuminatin and buzzer”-fault).

6.1.1 Verification of the charging function.

Attach a real battery to the phone. The batterys voltage must be high enough to get the phone started, otherwise will not the charging begin at once. Cut a piece of cable from a charger and make a charging test cable. Connect the charging test cable to a power supply that shows the current consumption. Make sure the positive side from the power supply connects to DCIO (the lonely pin on the system connector, pin 12). You can also use a normal charger with an ammeter connected in serie. Set the power supply on 7.6 V and current limitation on 700 mA. Connect the charging cable to the phones system connector and check the current consumption.

If the phone starts and shows charging in the display and the current consumption on the power supply varies between ~700 mA (the solution with a normal charger and a ammeter gives ~500-800 mA depending on what kind of charger you use) and ~5 mA with a few seconds interval, is there no charging fault.

After every repair of the charging function, you have to verify the function using the method mentioned above.

6.2 Shows charging without a charger connected.

Open the phone and check for liquid damages. Give the board power and start it with the On/Off-button.

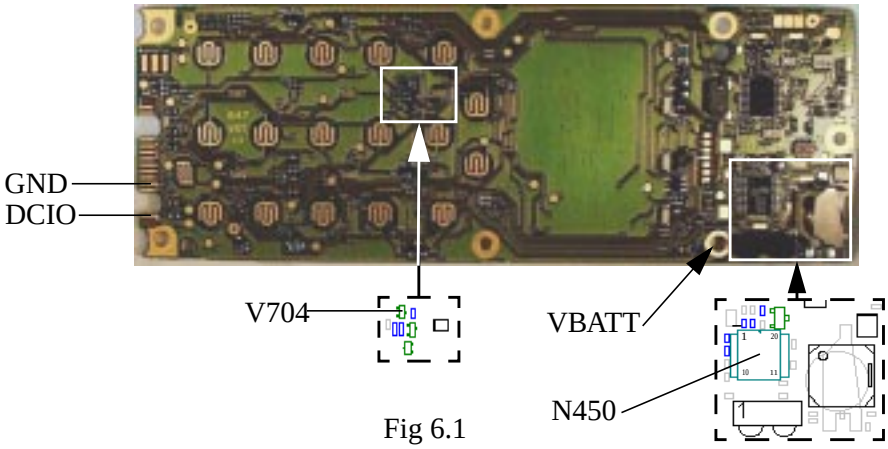


Fig 6.1

Check the feed voltages VDIG (3.2 V) on the side that is marked of C600 (Fig 6.2) and VRAD (3.8 V) on N450:13 (Fig 6.1) and measure the resistance of R703 (class A, 0 Ohm, Fig 6.2). If any of the feed voltages ar incorrect, proceed to chapter 3 (“Doesn´t start”-fault). If the feed voltages are correct, send the phone to the next repair level.

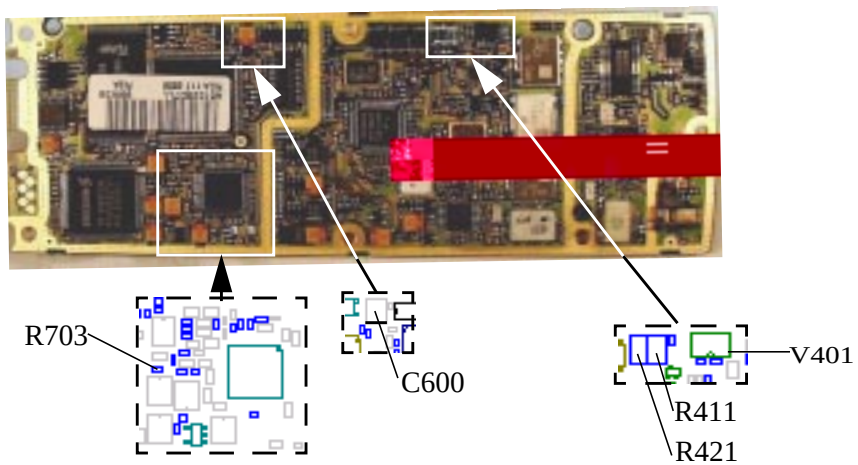


Fig 6.2

6.3 Doesn´t begin to charge.

Open the phone and check for liquid damages. Make sure the system connector pads are not burned or oxidized, especially on GND pin 10 (Fig 6.1). Measure the resistance between DCIO and VBATT (390 Ohm, Fig 6.1). If the resistance is too low, replace V401 (class A, Fig 6.2). If it is too high, measure the resistance of R421 (0.1 Ohm, class B, Fig 6.2). Measure the resistance of R411 (390 Ohm, class A, Fig 6.2). If R421 and R411 are correct and the resistance between DCIO and VBATT is still too high, is there a foil damage and the board has to be discarded. Give the board power and start it by grounding N450:6 (Fig 6.1). If it doesn´t start, replace V401 (class A). If that didn´t make it, replace V704 (class A, Fig 6.1).

After every repair of the charging function, you have to verify the function using the method mentioned in section 6.1.1.

If the fault still remains, send the phone to the next repair level.

6.4 The phone starts, but doesn´t charge, even though it shows charging.

Open the phone and check for liquid damages. Make sure the system connector pads are not burned or oxidized, especially on GND pin 10 (Fig 6.1). Measure the resistance between DCIO and VBATT (390 Ohm, Fig 6.1). If it is too high, measure the resistance of R421 (0.1 Ohm, class B, Fig 6.2). Measure the resistance of R411 (390 Ohm, class A, Fig 6.2). If R421 and R411 are correct and the resistance between DCIO and VBATT is still too high, is there a foil damage and the phone has to be discarded.

After every repair of the charging function, you have to verify the function using the method mentioned in section 6.1.1.

If the fault still remains, send the phone to the next repair level.

7 SIM fault (Insert card)

7.1 What is a SIM fault?

Attach a fully charged battery and a SIM card to the phone.

- If the phone shows **“Wrong card”** or **“Insert correct card”** when started, then the phone is SIM locked and can´t be repaired at this repair level.
- If the phone shows **“Phone lock”,** then it is locked by the customer with a personal code. The phone will be unlocked in the reset program in the normal repair flow.
- If the phone shows **“PIN?”** or **“Enter Pin”,** then the SIM card is locked with a pesonal code.
- ONLY IF IT SHOWS **“INSERT CARD”** IS IT A SIM FAULT.

Open the phone and check for liquid damages. If there are no, put the phone back together using a new SIM holder and try again. If it still doesn´t work open the phone again. Check the solderings on D600:72-75 (Fig 7.2).

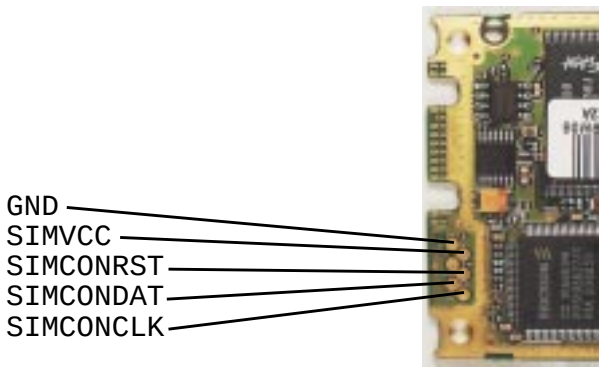


Fig. 7.1

Measure the resistance between the SIM pads in fig 7.1 and ground. Check the ground on GND by measuring the resistance between GND and another ground point. It should be approximately 0 Ohm, if it is larger the board is faulty and has to be discarded. Between SIMVCC-, SIMCONRST-, SIMCONDATA- and SIMCONCLK-pads and ground should the resistance be larger than 40 kOhm. If it isn´t, replace as follow: for SIMMVCC: C625, C626, C627 and R618, for SIMCONRST: C628, for SIMCONDAT: C630 and for SIMCONCLK: C629, all are class A,fig 7.2.

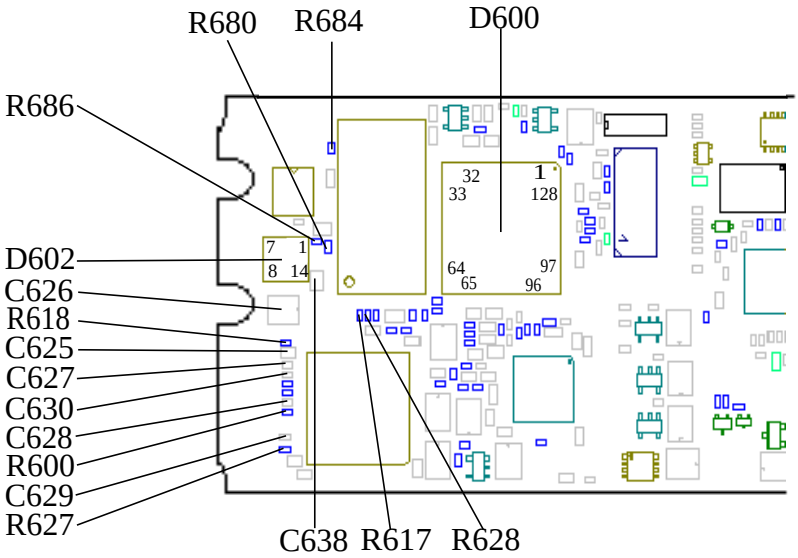


Fig. 7.2

Measure the resistance of R600 - 33 Ohm, R617 - 15 kOhm, R627 - 33 Ohm, R628 - 33 Ohm, R680 - 15 kOhm and R684 - 33 Ohm. If any resistor are incorrect, replace it, all are class A, fig 7.2.

Give the board power and start it up. Measure the voltage on D602:1 (3.2 V, class A, fig 7.2). If the voltage is lower, measure the resistance of R686 (4,7 kOhm, class A, fig 7.2). If the resistance ic correct, then VDIG is incorrect and you have to proceed to section 3: “Doesn´t start”-fault. Measure the voltages on D602:12 - 0 V and D602:13 - 3,2 V. If any of the voltages are incorrect, replace C638 (class A, fig 7.2). If that didn´t make it, replace D602 (class A, fig 7.2).

If all values are correct, replace D600 (class B, fig 7.2). If that didn´t make it, replace D602 (class A, fig 7.2).

If the fault still remains, send the phone to the next repair level.

8 Keyboard

8.1 Type of keyboard fault.

Put in a Sim card and a fully charged battery. Start the phone with the On/Off button. If it doesn´t start, proceed to chapter 3 (“Doesn´t start”-fault). Press all buttons (remember the volume buttons) and verify which doesn´t work. This is an easy way to do the verification: go to Menu/Settings/Key sound and choose Click. press the buttons 1,2,3.. ...*,0,#. You should hear a click sound and the corresponding figure shown in the display when you press each button. Then press Yes, No, Clr, ”<“ and ”>”. When pressing “Yes” the phone tries to make a call, press “No” and the phone should disconnect the call, press ”<“ or ”>” and you scroll the menues and “clr” clears the display from the figures that came up. Press the two volume buttons, you should hear a click sound each time. If one or both volume buttons are faulty, proceed to section 8.2. Close the flip over the keyboard, you should hear a click sound just before it is fully closed. If there is no click sound when you close the flip, proceed to section 8.3. If one or more of the buttons are faulty, proceed to section 8.4.

8.2 The volume buttons are faulty.

Open the phone and check for liquid damages, especially around X820 (Fig 8.1). Change the flex film for the volume buttons, put the phone together and try again.

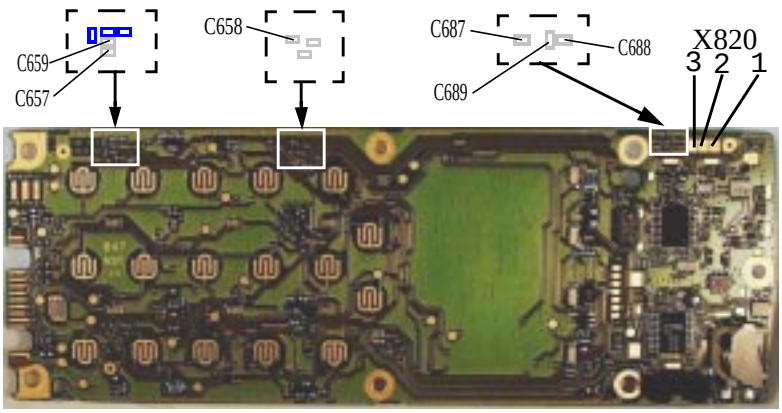


Fig 8.1

Measure the resistance between the pads on X820 to ground. All three should have a resistance larger than 1 MOhm. If the resistance is lower, proceed to point 1 otherwise proceed to point 2.

1. If the resistances are too low replace as follow; X820:1 replace C659 and C689; X820:2 replace C658 and C688; X820:3 replace C657 and C687. (all capacitors are class A, Fig 8.1). If the fault remains, replace D600 (class B, Fig 8.2).

2. Check the solderings on D600:122-123 (Fig 8.2) and D600:128. Measure the resistance on the foil between X820:1-D600:122, X820:2-D600:128 and X820:3-D600:123. If there is a damage in the foil the board has to be discarded.If no fault is found replace D600 (class B).

8.3 Flip fault.

Make sure that the little plastic “spike” that pushes the little button just below 0 and # isn´t broken. If it is broken, change the flip and try again. If the fault remains, open the fault and check for liquid damages, especially around the little button mentioned above (Fig 8.4). Wash the keyboard pad properly and put the phone together again using a new keybord. If the fault still remains, proceed to section 8.4 (the button to the flip is called Flip in Fig 8.3).

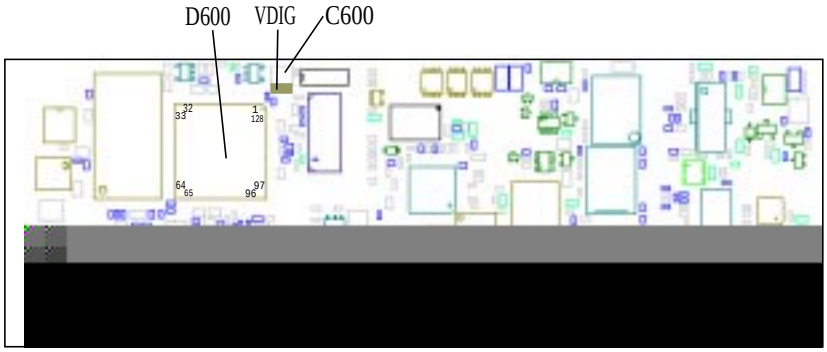


Fig 8.2

8.4 Keyboard fault.

Open the phone and check for liquid damages, especially around the buttons that don´t work. Wash the keyboard pads properly and put the phone together again using a new keyboard. Check the phone again according to section 8.2. If that didn´t work, open the phone and check the solderings on D600:1 (Fig 8.2) and D600:120-128. If they are fine, give the board power and start it up. Measure VDIG (3.2 V) on the side of C600 that is marked (Fig 8.2). If VDIG is incorrect, proceed to chapter 3 (“Doesn´t start”-fault).

Function chart is shown in Fig 8.3.

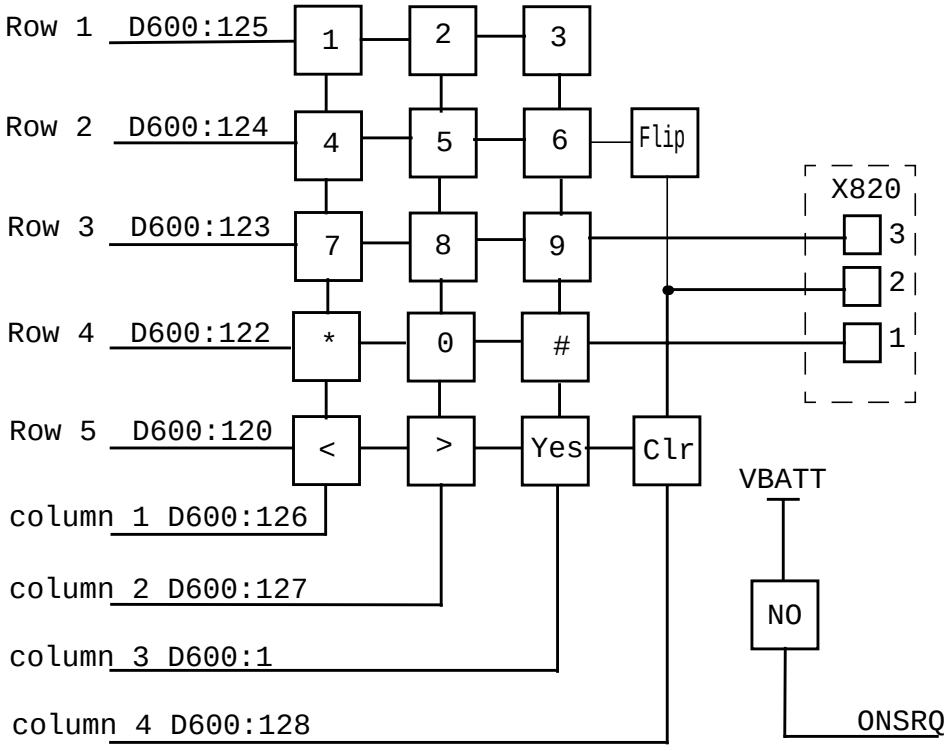


Fig 8.3

Make sure there is a voltage (3.2 V) on the faulty keyboard pads according to Fig 8.4 below. **Note!** The No button has 4.8 V and the flip button looks different.

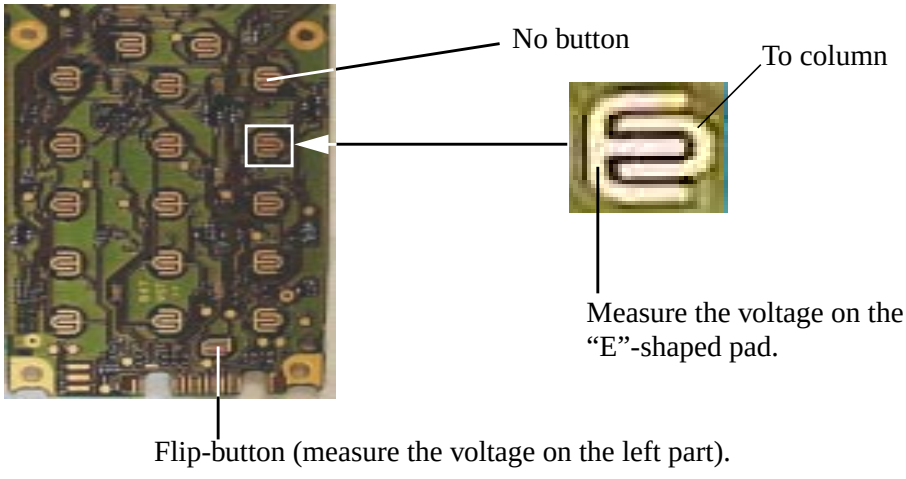


Fig 8.4

If the voltage is missing on a complete row, measure the voltage on the corresponding pin at D600 (Fig 8.3). If the voltage is correct on the pin there is a foil damage and the board has to be discarded. If the voltage is missing on the pin to, replace D600 (class B).

If the voltage is missing on a part of a row, e.g on button 2 and 3 but not on button 1, is there a foil damage and the board has to be discarded. Verify by measuring the resistance between a working pad and a faulty pad.

If a complete column is missing, measure the resistance between the pad (Fig 8.4) and the corresponding pin at D600 (Fig 8.3)(measure on the “c”-shaped side of the pad). If there is a foil damage the board has to be discarded. If the foil is okay, replace D600 (class B). If a part of a column is faulty, measure the resistance between the pads in the column to verify a foil damage.

9 Illumination and buzzer.

9.1 Type of fault.

Attach a dummy battery and a sim-card to the phone, press the On/Off-button and wait until the phone has got serv. (Against an instrument or a real network).

- If the phone doesn´t make a beep when started, go to Meny/Ring level and raise the volume to max. Try again, if it still doesn´t make a beep or if it makes a low beep, proceed to section 9.2.
- If the illumination and/or the display light isn´t lit up when started, proceed to section 9.3.
- If the top indicator doesn´t flash with green light when the phone has got serv, proceed to section 9.4.
- When the phone has got serv and flashes with green light, lower the battery voltage to 4.2V. The top indicator should start to flash with red light after a while, the battery indicator show an empty battery and warn with a beep.

  * If the battery indicator doesn´t show an empty battery and the phone doesn´t make a beep or flash with red light you will have to perform a battery calibration.

  * If the phone does show an empty battery and makes a beep but doesn´t flash with red light, proceed to sedtion 9.5.

9.2 The buzzer is faint or dead.

Open the phone and check for liquid damages. If the buzzer is faint, then check the buzzer gasket in the front cover. If it is squeezed, partly or completly covers the hole in the front cover, then change the front cover and try again. If that didn´t help, then check the buzzer, H600 (class A, Fig 9.1) for bad solderings. If the solderings are fine, replace the buzzer. Put the phone together and check the buzzer again according to section 9.1. If the fault is gone, send the phone trough the regular flow.

If the fault remains, dismount the phone and give the board power. Measure the voltage on H600:3 (4.8V). If the voltage is missing or incorrect, check the voltage on both sides of R606 (Fig 9.1). Ii it is missing on one side measure the resistance of R606 (10 Ohm, class A, Fig 9.1), if the resistance is correct, then replace C619 and C620 (class A, Fig 9.1). If the voltage is incorrect on both sides, measure VBATT (4.8V, Fig 9.1). If VBATT is incorrect, proceed to chapter 3 (“Doesn´t start”-fault). If VBATT is correct, measure the resistance to R606 (the side nearest the edge of the board), if there is an interruption (larger than approximately 0 Ohm), the phone has to be discarded. Check the soldering at D600:91 (Fig 9.2), if it is fine then measure the resistance between the same pin and V606:1 (Fig 9.1), the resistance should be 1.0 kOhm.

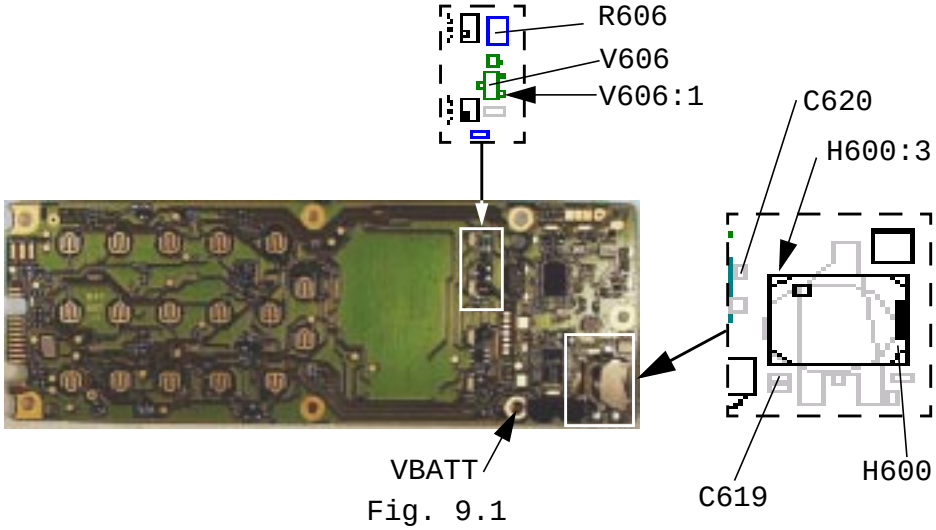


Fig. 9.1

If the resistance is incorrect, then replace R651 (class A, Fig 9.2). Didn´t that make it there is a foil damage and the phone has to be discarded. Measure the resistance from V606:1 to ground, if the resistance is lower than 2 MOhm then replace C653 (class A, Fig 9.2). If the resistance is correct, then replace V606 (class A). If that didn´t make it replace D600 (class B).

If the fault still remains, send the phone to the next repair level.

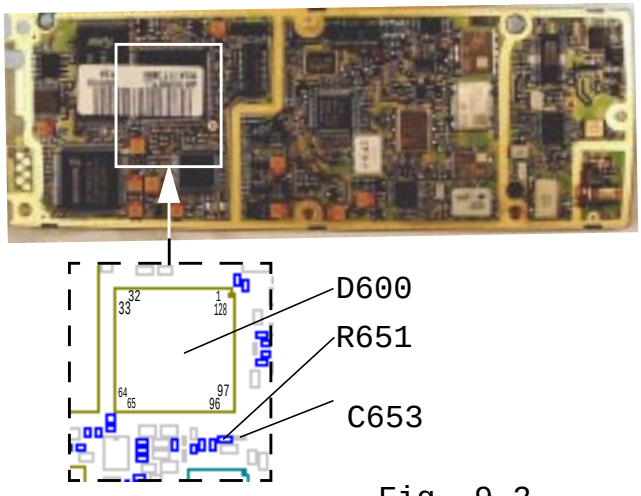


Fig. 9.2

9.3 Illumination fault.

Open the phone and check for liquid damages. Make sure all 10 LEDs H651-H660 (class A, Fig 9.1), are mounted and correct soldered.

Give the phone power and start it up. If only a few, but not all, LEDs in a group, H651-H654 (display light) or H655-H660 (keyboard illumination), are not lit replace them. If H655 and H656 are not lit, measure the resistance of R659 (33 Ohm, class A, Fig 9.3). If a complete group, H651-H654 or H655-H660, are not lit but the other group are, measure the resistance of one of the LEDs in the group. If the resistance is lower than 1 MOhm, one of the LEDs are faulty. replace them one by one until the fault is gone. If the resistance of the LEDs are correct, measure the

9.4 Green top indicator doesn´t work.

Open the phone and check for liquid damages. Make sure the double LED H650 (class A, Fig 9.4) is correctly soldered.

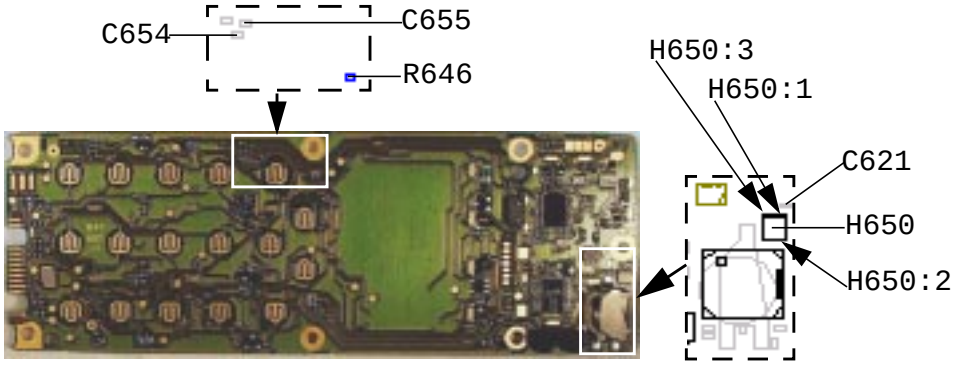


Fig. 9.4

If the soldering is fine, give the phone power and start it up. Measure the voltage on H650:2 (Fig 9.4), itshould be 3.8 V. If it is correct, replace H650 (class A). If it is missing, measure the resistance of R646 (470 Ohm, class A, Fig 9.4). If that resistance is correct, measure the resistance of C621, it should be larger than 10 kOhm, if it isn´t then replace C621, C614 and C432 (all are class A, Fig 9.4 and 9.5) one by one and check the resistance after every replace. If the resistances are correct, measure the voltage on N411:5 (Fig 9.5), it should be 3.8V. If the voltage is incorrect then replace N411 (class A). If the voltage is correct but not on H650 and the resistance of R646 (Fig 9.4) is correct there is a foil damage and the phone has to be discarded.

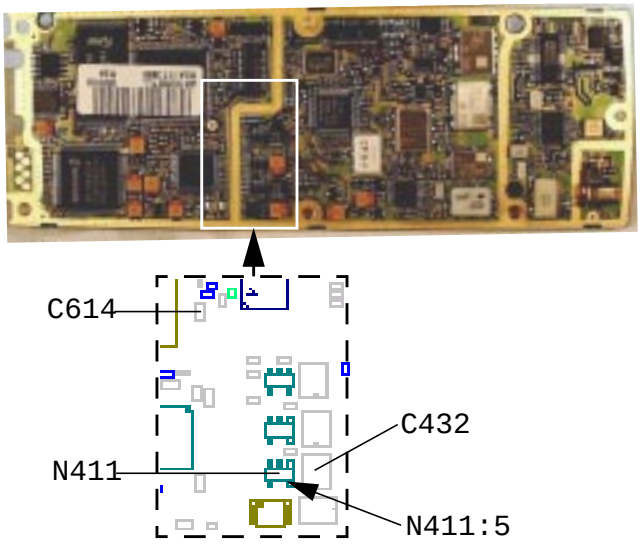


Fig. 9.5

Measure the resistance of C654 (class A, Fig 9.4), it should be larger than 1 MOhm, if not replace the capacitor. Check the soldering at D600:94 (Fig 9.2). If the soldering is fine, measure the resistance between D600:94 and H650:3. If there is a foil

damage (the value is larger than 0 Ohm) the phone has to be discarded. Otherwise replace D600 (class B).

If the fault still remains, send the phone to the next repair level.

9.5 Red top indicator doesn´t work.

Open the phone and check for liquid damages. Make sure the double LED H650 (class A, Fig 9.4) is correctly soldered.

If the soldering is fine, give the phone power and start it up. Measure the voltage on H650:2 (Fig 9.4), itshould be 3.8 V. If it is correct, replace H650 (class A). If it is missing, measure the resistance of R646 (470 Ohm, class A, Fig 9.4). If that resistance is correct, measure the resistance of C621, it should be larger than 10 kOhm, if it isn´t then replace C621, C614 and C432 (all are class A, Fig 9.4 and 9.5) one by one and check the resistance after every replace. If the resistances are correct, measure the voltage on N411:5 (Fig 9.5), it should be 3.8V. If the voltage is incorrect then replace N411 (class A). If the voltage is correct but not on H650 and the resistance of R646 (Fig 9.4) is correct there is a foil damage and the phone has to be discarded.

Measure the resistance of C655 (class A, Fig 9.4), it should be larger than 1 MOhm, if not then replace the capacitor. Check the soldering at D600:93 (Fig 9.2). If the soldering is fine, measure the resistance between D600:93 and H650:1. If there is a foil damage (the value is larger than 0 Ohm)the phone has to be discarded. Otherwise replace D600 (class B).

If the fault still remains, send the phone to the next repair level.

10 RTC (Real Time Clock)

10.1 Find out what kind of fault it is.

Start the phone with a Sim card and a fully charged battery. Set the clock for correct time. Remove the battery and connect it again after one minute.

- If the clock on the phone shows 00:00, proceed to section 10.2.
- Compare the time with a clock that is correct. If the clock on the phone is speeding or is on hold, proceed to section 10.3.

10.2 The clock shows 00:00 after removing the battery.

Open the phone and check the solderings on the backup capacitor C720 (class A, Fig 10.1).

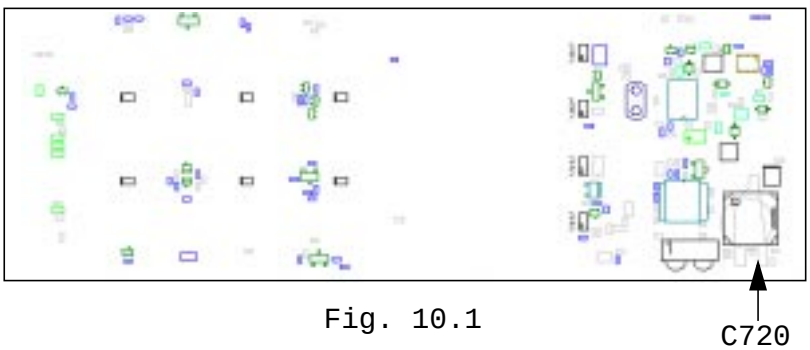


Fig. 10.1

If the solderings are fine, replace it. Put the phone back together, start it and set the correct time again. Wait a few minutes to allow the backup capacitor to be enough charged. Remove the battery and put it back on after one minute. Make sure the fault is gone. (The backup capacitor needs to be charged a couple of hours to be fully charged.) Compare it with a correct time. If the clock on the phone is speeding or is on hold, proceed to section 10.3.

10.3 The clock is speeding or on hold.

Open the phone and check the solderings on D600:117-118 (Fig 10.2). Check the solderings on the crystal B600 also. If they are fine, replace B600 (class A, Fig 10.2). Put the phone back together and compare the clock with a correct time. If that didn´t make it, replace C690 (class A, Fig 10.2) and C691 (class A, Fig 10.2). Check the clock again, if the fault remains replace D600 (class A, Fig 10.2).

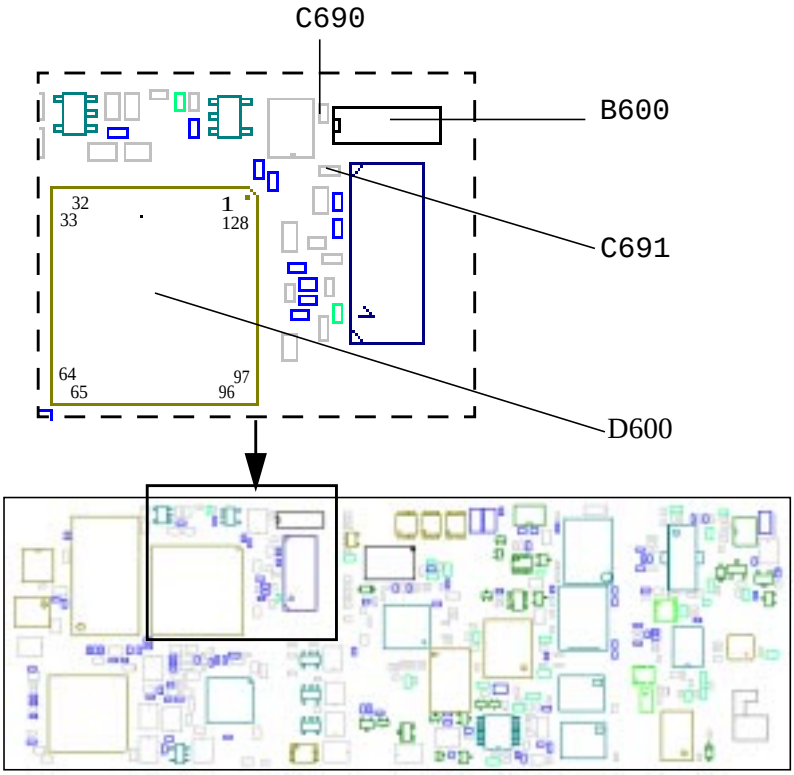


Fig. 10.2

11 IRDA fault.

11.1 Type of fault.

- If it is short range of the IRDA transmission, proceed to section 11.2.
- If the IRDA communication doesn´t work, proceed to section 11.3.

11.2 Short range.

Open the phone and check for liquid damages. Make sure the window in the front cover is clean. replace H661 (class A, Fig 11.1). If the fault remains, proceed to section 11.3.

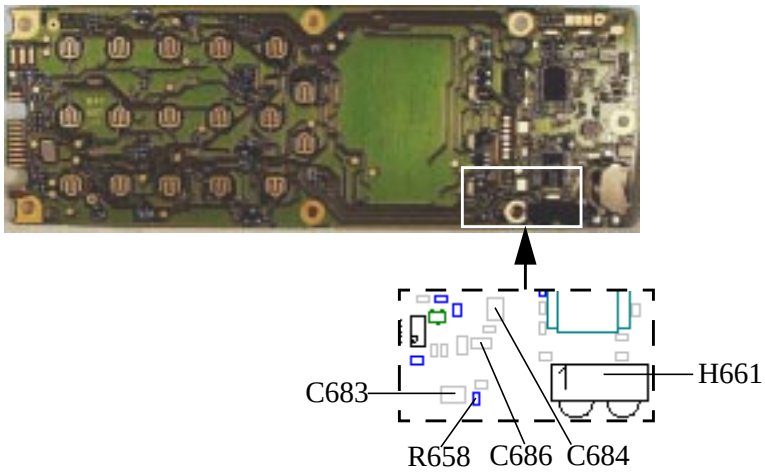


Fig. 11.1

11.3 No communication.

Replace the IRDA modul (Fig 11.2) and try again.

Fig. 11.2

If that didn´t make it , open the phone and check for liquid damages. Check the solderings on D600:47, 62, 64, 65 and 66 (Fig 11.3).

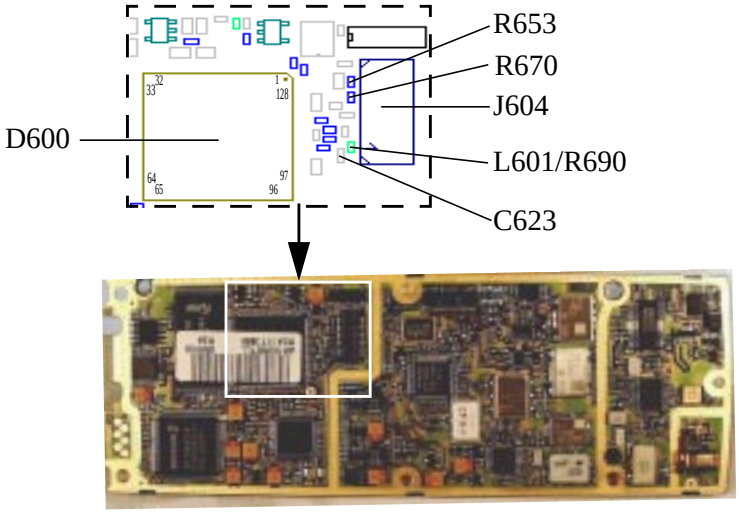


Fig. 11.3

Check the solderings on J604 (class A, Fig 11.3) and the connection pins for damages. If the solderings and the pins are fine, replace H661 (class A, Fig 11.1). If that didn´t make it, replace C683 (class A, Fig 11.1). If the fault remains, measure the resistance of R670 (100 kOhm, class A, Fig 11.3), R653 (47 Ohm, class A, Fig 11.3), L601/R690* (approximately 0/33 Ohm, class A, Fig 11.3), C623 (>1 MOhm, class A, Fig 11.3) and R658 (2.2 kOhm, class A, Fig 11.1). Measure the resistance of C686 (>100 kOhm, Fig 11.1). If the resistance are lower than that, replace C686 and C684 (both are class A, Fig 11.1). If the resistance are correct, replace D600 (class B, Fig 11.3). If that didn´t make it, send the phone to the next repair level.

*The component is changed between the revisions R1C and R2A of the board, see the sparepart list under product change.

12 Component list

Component list in document 131 22-2/fea 209 544/5