



Working Instruction, Electrical

Applicable for R306

CONTENTS

1	Read this first!	2
2	Lead-free soldering	3
3	BGA equipment reflow profiles.....	5
3.1	General.....	5
3.2	Temperature Measurements	5
3.3	Reflow Profiles	6
4	Replacement of components	7
4.1	B201: Crystal 32 kHz.....	8
4.2	CON601: SIM Connector	8
4.3	CON602: Battery Connector	8
4.4	CON701: 12 p System Connector	9
4.5	ESD502: Protection Diode Speaker	9
4.6	ESD705: Zener Diode	9
4.7	ESD707: Zener Diode	10
4.8	L201: Inductor 2.2uH.....	10
4.9	U501, U502: IC Amplifier 500mA	10
4.10	U503: IC Audio Power Amplifier	11
4.11	U909: IC Linear Charge Protection 6.8V	11
4.12	U910: IC Linear Charge Protection 1.5A 26V 8pin.....	11
4.13	U911 Transistor P-Ch MOSFET 7pin	12
4.14	V201: Schottky Diode 2pin	12
4.15	Z801, Z802, Z803: IC ESD Protection 22pF 200MHz	12
5	Revision history	13

1 Read this first!

- ***Before you start replacing any components, make sure you have read and fully understood the contents of section 2 and 3!***
- ***Also make sure you have access to the mechanical Working Instruction and the equipment listed on the first page of section 4!***

2 Lead-free soldering

THIS PRODUCT IS MANUFACTURED WITH LEAD-FREE SOLDER AND LEAD-FREE COMPONENTS!

During electrical repair, it is critical to make sure that no lead is introduced. This symbol indicates that the product is lead-free.



All lead-free PBAs will be marked with this symbol.



A lead-free work area must be set up completely separated from work areas that are used to make lead repairs. The lead-free work area must also be clearly labeled with the lead free symbol as shown in the adjacent picture. The items on this desk must remain lead-free. They must be adequately labeled to make their lead-free status clearly and easily recognized.



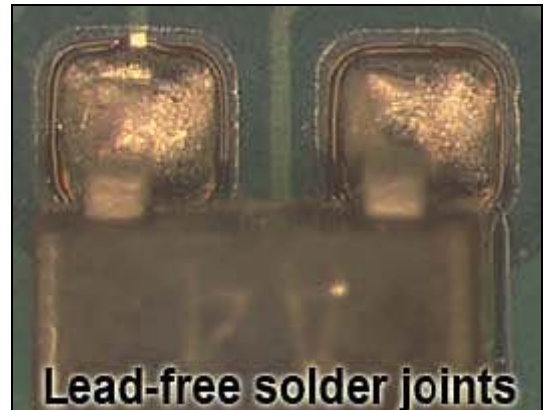
Lead-free soldering *continued*

LFS (lead-free solder paste) characteristics:

- High melting point (typically 220°C)
- Low wettability
- High surface tension
- Difficult to spread
- Recommended tip temperature = 370°C

WHEN SERVICING PBAS THAT HAVE BEEN MANUFACTURED WITH LFS (LEAD-FREE SOLDER PASTE), LFS MUST BE USED! IF NOT, THERE IS A HIGH RISK OF UNRELIABLE SOLDERING JOINTS!

Lead-free solder joints are more difficult to inspect because they do not have shiny surfaces like leaded solder joints. Also, lead-free solder does not flow as well as leaded solder, so some of the solder pad areas may remain exposed.





3 BGA equipment reflow profiles

3.1 General

This document contains reflow profile recommendations for mobile phones and similar products. They are just general recommendations and considerations have to be taken for every single product. The solder paste is secondary but could also affect the parameters. In this document one alloy is specified:
SnAgCu (Lead free) melting point 217°C

3.2 Temperature Measurements

At least four probes should be used.
They should be placed on components with the highest and lowest thermal mass.
The probes shall be located in the beginning, in the middle and at the end of the board/panel.
It is recommended that the probes are soldered on the board, but glue and capton tape can be used.
At least one probe shall be placed in the air or on top of a component.
These values are strongly depending on the BGA replacement equipment.
Nozzle type will be chosen after the outer size of the actual component.
Make sure the nozzle does not affect any nearby placed components.

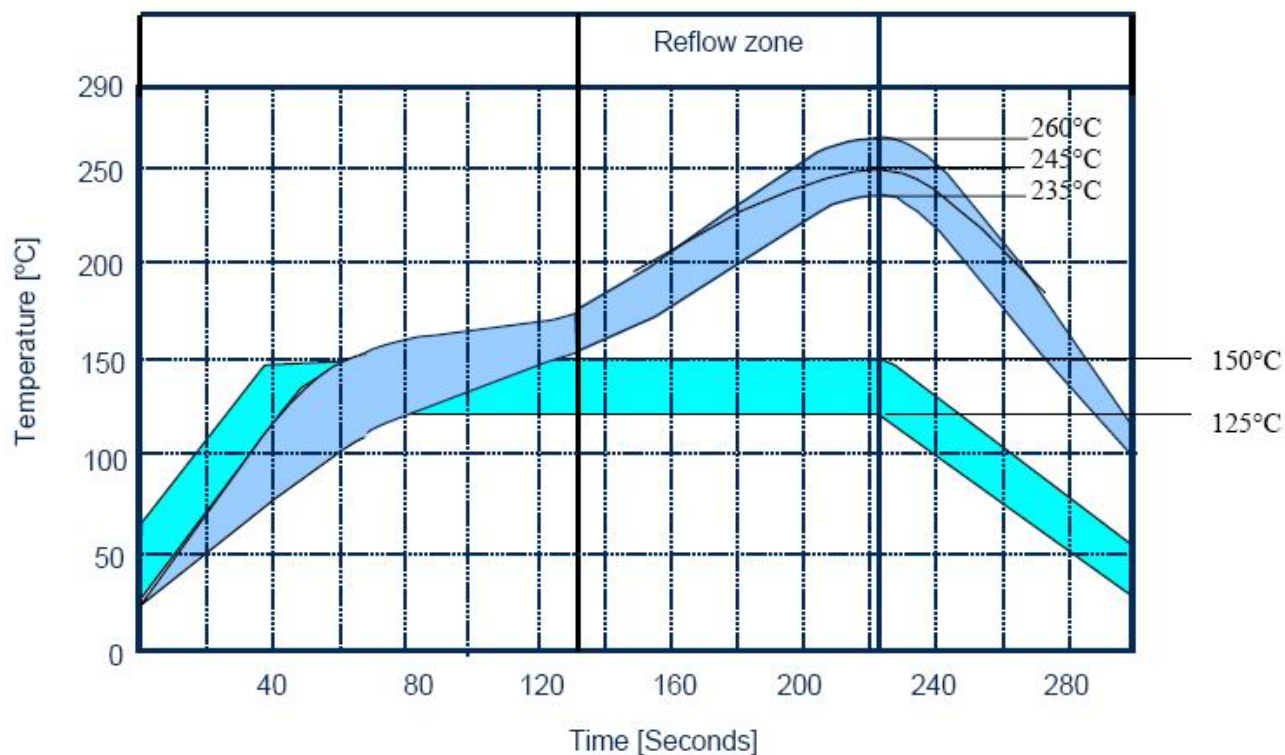
THESE VALUES ARE RECOMMENDATIONS AND MAY HAVE TO BE CHANGED DEPENDING ON THE TYPE OF EQUIPMENT!

THE MAXIMUM TEMPERATURE FOR ANY COMPONENT MUST NOT EXCEED 250°C!



3.3 Reflow Profiles

Sn/Ag/Cu (lead-free)



Ramp rate	< 4°C/sec
Ramp rate cooling zone	< 6°C/sec
Time above liquidus	60-150 sec
Minimum temperature	235°C
Maximum temperature	245°C or 260°C for 10 sec. (the higher temperature in case the board has extremely high ΔT)
Bottom heat temperature	125°C-150°C
Total time	Approx. 4-7 min

4 Replacement of components

EQUIPMENT

- Dentist hook
- ESD-gloves (cotton gloves)
- ESD-wristband
- Soldering tool
- Hot air soldering station
- BGA replacement equipment
- Pair of tweezers
- Solder cleaning wiper (tin wick)
- Solder paste lead-free (SN 96% Ag 3.5% Cu 0.5%)
- Flux, RMA no-clean flux
- Cutting pliers
- Shield fence pliers NTZ 112 537

CAUTION

- ***Keep all contact surfaces clean of dirt and hand-grease!***

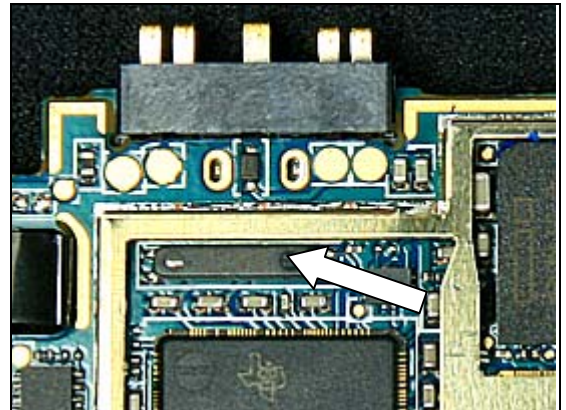
MECHANICAL INSTRUCTIONS

For all the following part replacements, disassemble and assemble the phone as described in *Working Instruction 1215-7427*.



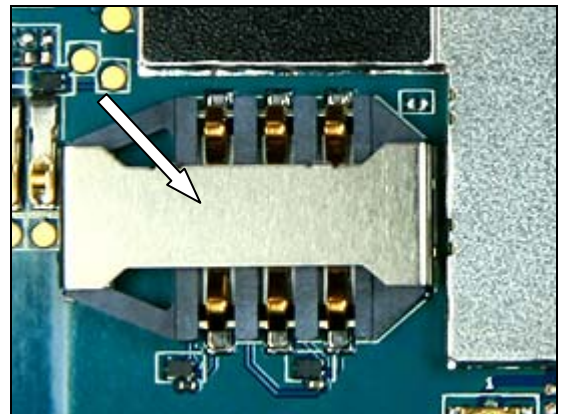
4.1 B201: Crystal 32 kHz

Remove the shield can lid.
Use hot air soldering equipment to replace *B201*.
Put back a **new** shield can lid.
Press on all sides of the lid until you hear a “click” sound.



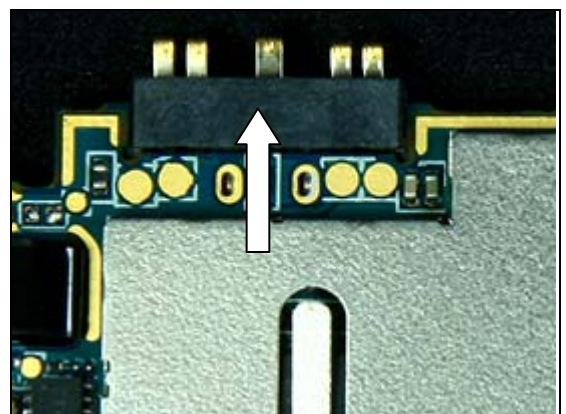
4.2 CON601: SIM Connector

Use hot air soldering equipment to replace *CON601*.



4.3 CON602: Battery Connector

Use hot air soldering equipment to replace *CON602*.

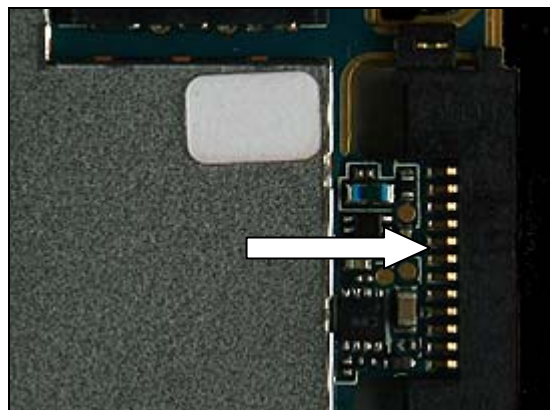


4.4 CON701: 12 p System Connector

Remove the Sponge System Connector

Use hot air soldering equipment to replace CON701.

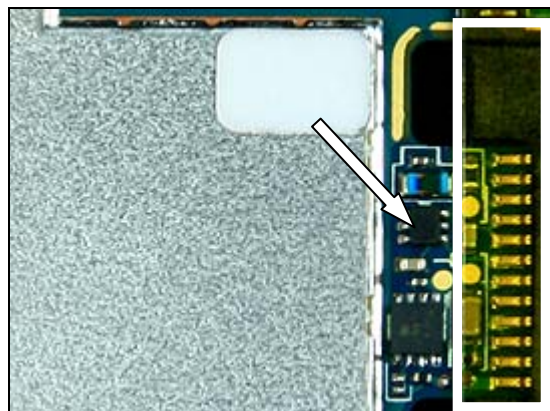
Attach a new Sponge System Connector



4.5 ESD502: Protection Diode Speaker

Use heat protection adhesive plaster to protect system connector from melt (white frame).

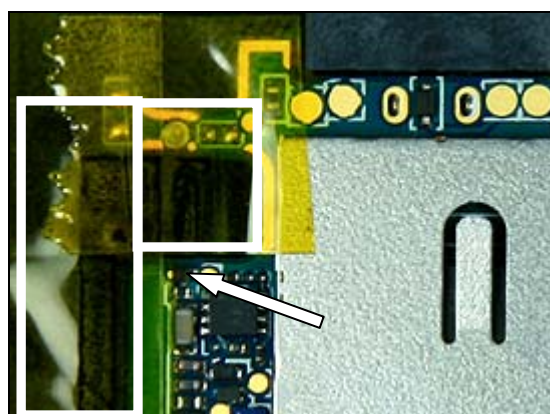
Use hot air soldering equipment to replace *ESD502*.



4.6 ESD705: Zener Diode

Use heat protection adhesive plaster to protect system connector from melt (white frame).

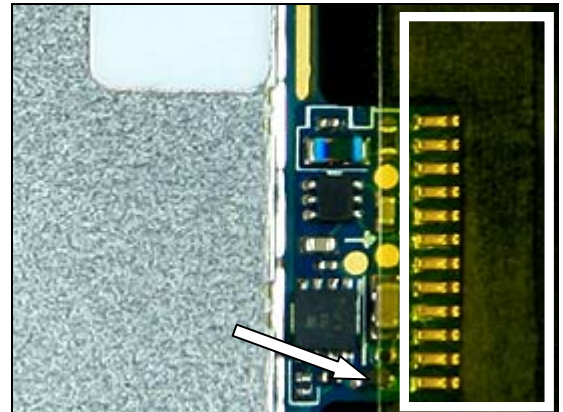
Use hot air soldering equipment to replace *ESD705*.



4.7 ESD707: Zener Diode

Use heat protection adhesive plaster to protect system connector from melt (white frame).

Use hot air soldering equipment to replace *ESD707*.



4.8 L201: Inductor 2.2uH

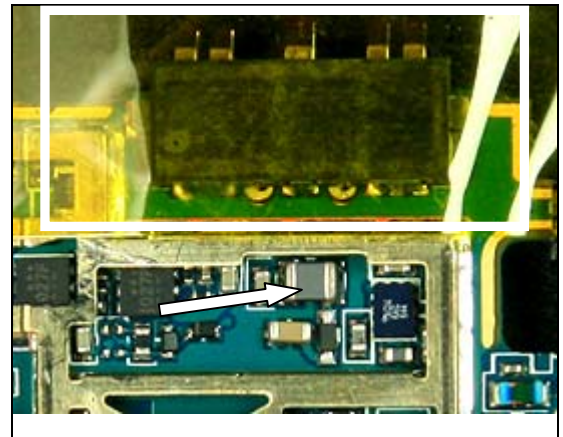
Use heat protection adhesive plaster to protect battery connector from melt (white frame).

Remove the shield can lid.

Use hot air soldering equipment to replace *L201*.

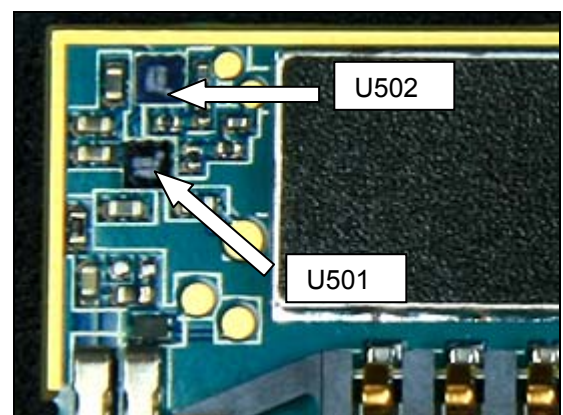
Put back a **new** shield can lid.

Press on all sides of the lid until you hear a “click” sound.



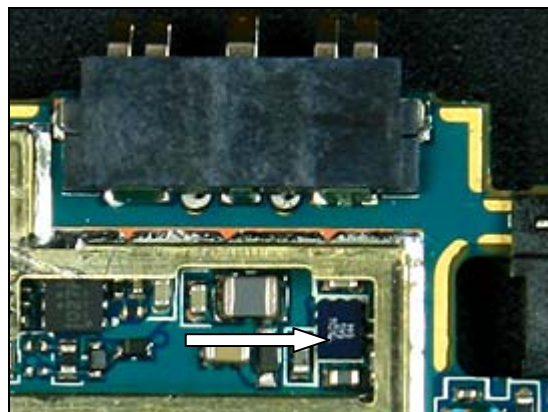
4.9 U501, U502: IC Amplifier 500mA

Use hot air soldering equipment to replace *U501, U502*..



4.10 U503: IC Audio Power Amplifier

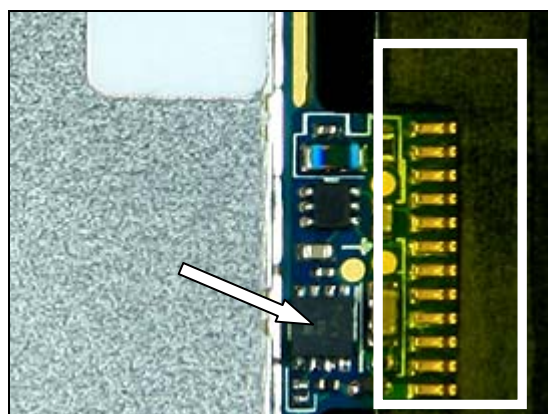
Remove the shield can lid.
 Use hot air soldering equipment to replace *U503*.
 Put back a **new** shield can lid.
 Press on all sides of the lid until you hear a "click" sound.



4.11 U909: IC Linear Charge Protection 6.8V

Use heat protection adhesive plaster to protect system connector from melt (white frame).

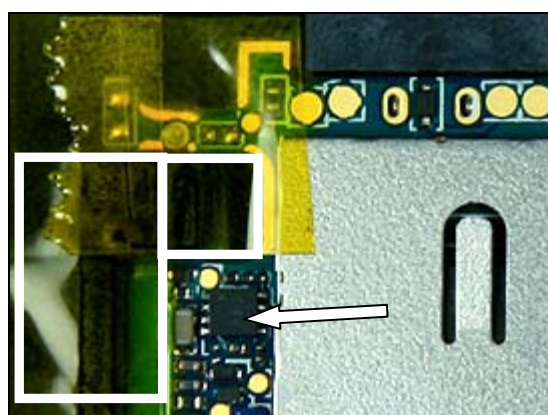
Use hot air soldering equipment to replace *U909*.



4.12 U910: IC Linear Charge Protection 1.5A 26V 8pin

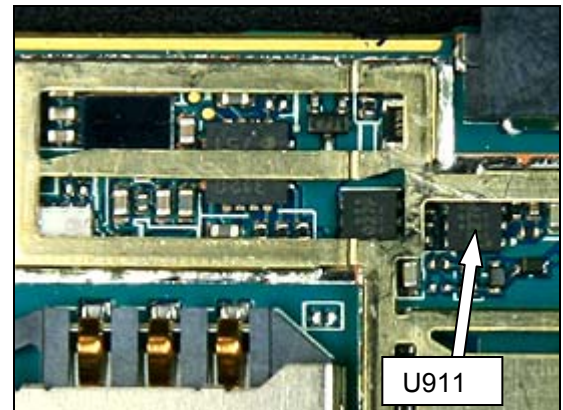
Use heat protection adhesive plaster to protect system connector from melt (white frame).

Use hot air soldering equipment to replace *U910*.



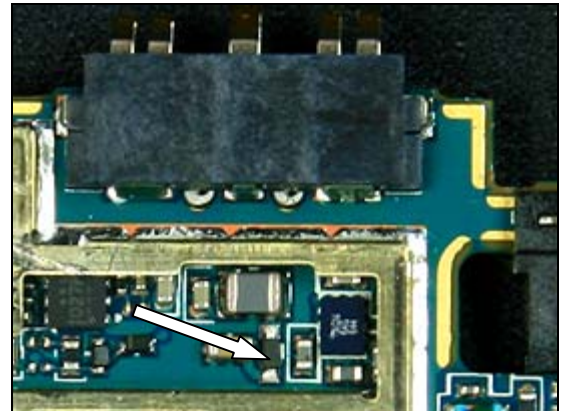
4.13 U911 Transistor P-Ch MOSFET 7pin

Remove the shield can lid.
 Use hot air soldering equipment to replace *U911*.
 Put back a **new** shield can lid.
 Press on all sides of the lid until you hear a "click" sound.



4.14 V201: Schottky Diode 2pin

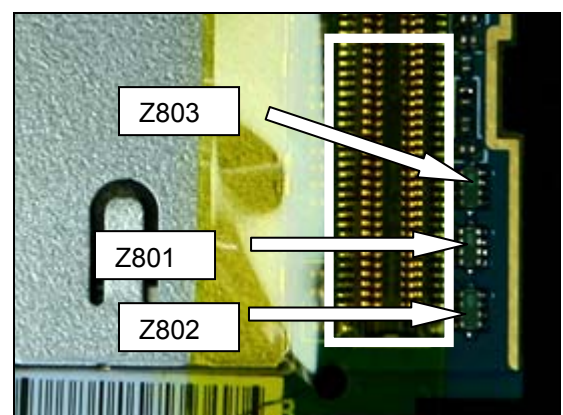
Remove the shield can lid.
 Use hot air soldering equipment to replace *V201*.
 Put back a **new** shield can lid.
 Press on all sides of the lid until you hear a "click" sound.



4.15 Z801, Z802, Z803: IC ESD Protection 22pF 200MHz

Use heat protection adhesive plaster to protect board to board connector from melt (white frame).

Use hot air soldering equipment to replace *Z801*, *Z802*, *Z803*.



5 Revision history

Rev.	Date	Changes / Comments
1	2008-08-15	1 st version
2	2008-08-25	Updated version with CON601 and CON701