

# Equipment List, Electrical

Applicable for G502

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## 1 General

This document describes the minimum required equipments for the Electrical Repair Process of the G502 mobile phone. Equipment listed without a part number is not orderable from Sony Ericsson and must be bought locally.

## 2 Column Definitions

The matrix in the end of the equipment tables describe where the actual equipment is needed (marked with an X) or may be needed/optional (marked with a Z).

Flash upgrade:	Equipment for downloading software to the unit, both signalling and test-program.
Manual test:	Equipment necessary to perform a manual test.
Repair:	Equipment necessary for replacing components.
Go/No Go test:	Equipment necessary for Go/No Go test.
Calibration with SERP:	Equipment necessary to perform a calibration with SERP. Calibration can only be done by authorized repair centers.

The column that assist a specifying and/or clarifying the equipment needed are considered description type columns.

- Description The name of the equipment
- Part Number The Sony Ericsson part number to use when ordering from Sony Ericsson.
- Description Additional information that helps to specify the equipment.

## 3 Repair Equipment

Some of the required equipment will be provided by Sony Ericsson and some equipment has to be sourced locally. This chapter will separate these equipments.

### 3.1 Sony Ericsson Provided Repair Equipment

Description	Part Number	Comments	Flash Upgrade	Go/No Go Test	Manual Test	Calibration in SERP	Repair
SonyEricsson programming interface - SEPI	LTN 214 1484	USB/Interface Box+CD	X			X	
USB cable DCU-65	RPM 13112R1	Used for SonyEricsson programming interface cable - SEPI	X			X	
SonyEricsson programming interface cable	KRY 101 1119	SEPI cable				X	
Torque Screwdriver *	NTZ 112 459	Torque set to 18 Ncm +/- 1 Ncm					X
Front opening tool	NTZ 112 302/2	Opening tool					X
Bits/Torx/T6	NTZ 112 288	Spare part to screwdriver					X
Flex film assembly tool	NTZ 112 521	Tweezers					X
Shield Fence Plier	NTZ 112 537	For use when repair under shield fence is necessary					X
Lead-free labels (sheet of 24)	SVF 930 1379	These lead-free labels must be applied to all materials and tools that contact the solder.					X
Battery Eliminator	NTZ 112 533	Dummy Battery (BST-33 Hans)	Z			X	
Rework fixture	LTD 260 273	For PBA (Printed Board Assembly)					X
RF Test Cable Flexible 1M	RPM 119 855	This is the only approved RF cable!		Z		X	

Description	Part Number	Comments	Flash Upgrade	Go/No Go Test	Manual Test	Calibration in SERP	Repair
SMK RF Probe	SXA 109 6356	SMK RF Probe		Z		X	
MEGA Pixel Camera Tool	NTZ 112 1067	Camera removal tool					X
USB Activation Dongle	NTZ 112 1071		X				
256MB Memory Stick Micro(M2)	KDR 109 171/256	This item is needed to test the applicable product's memory slot.			X		
Plectrum Tool	NTZ 112 590	Guitar Pick			X		

## 3.2 Picture of equipments orderable from Sony Ericsson

Pictures of tools that is orderable from Sony Ericsson.


				
<i>LTN 214 1484</i>	<i>KRY 101 1119</i>	<i>NTZ 112 1071</i>	<i>KDR 109 171/256</i>	<i>SVF 930 1379</i>
				
<i>NTZ 112 302/2</i>	<i>SXA 109 6356</i>	<i>NTZ 112 459</i>	<i>NTZ 112 288</i>	<i>NTZ 112 1067</i>

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NTZ 112 590	NTZ 112 521	NTZ 112 533	LTD 260 273	RPM 119 855
				
KRY 101 1413	NTZ 112 537			

### 3.3 Equipment Provided by Other Supplier

This is the list of equipments provided by other suppliers than Sony Ericsson

Pos	Description	Comments	Picture	Test	Repair
27	Battery Charger (Standard SEMC charger applicable for G502)	The battery charger needs to be connected to the Sony Ericsson Programming Interface Cable during calibration.			X
43	USB Computer Cable	Type A to Type B USB cable.  This is part of the hardware needed for performing calibration.			X

Pos	Description	Comments	Picture	Test	Repair
	<b>Agilent 8960</b> Required Components: <ul style="list-style-type: none"> <li>• E5515C (8960 Series 10 Mainframe)</li> <li>• Option E5515C-002 (2<sup>nd</sup> RF source)</li> <li>• Option E5515C-003 WCDMA HW Option</li> </ul> Required Software <ul style="list-style-type: none"> <li>• E1985B or E1987A TA Fast Switching</li> <li>• E1963A WCDMA Test Application</li> <li>• E1968A-101 GSM Test Application</li> <li>• E1968A-410 Application</li> </ul> <b><i>required for GSM Calibration</i></b>	Some older versions of the 8960 Series 10 mainframes may need to have a hardware upgrade in order to have WCDMA capabilities. See your local Agilent representative for details.  <b>Note: It is strongly recommended that the instrument vendor be contacted before ordering this setup to ensure that the options stated are still valid or that no part numbers have changed.</b>		X	X



Pos	Description	Comments	Picture	Test	Repair
	<b>Willtek 4403/4405</b>  Required Components: <ul style="list-style-type: none"> <li>• 440x (4403 or 4405)</li> <li>• Option 4460 GSM/GPRS/EDGE HW</li> <li>• Option 4457 GSM Call Mode</li> <li>• Option 4458 GSM Non-Call Mode</li> <li>• Option 4468 EDGE Call Mode</li> <li>• Option 4449 EDGE Non-Call Mode</li> <li>• Option 4475 ACPM for 440x</li> <li>• Option 4479 Baseband processing HW</li> <li>• Option 4466 WCDMA/UMTS Non-Call Mode</li> <li>• Option 4467 WCDMA/UMTS Call Mode</li> <li>• WMain 52 MHZ clock for 4400/3100</li> <li>• Firmware Version 14.00 or higher</li> </ul>	Note: It is strongly recommended that the instrument vendor be contacted before ordering this setup to ensure that the options stated are still valid or that no part numbers have changed.		X	X

Pos	Description	Comments	Picture	Test	Repair
	<b>Rohde &amp; Schwarz CMU200</b> Required Components <ul style="list-style-type: none"> <li>• CMU200 mainframe (Base Unit)</li> <li>• Options CMU-B11, CMU-B21, CMU-B52, CMU-B54, CMU-B56, CMU-B68, CMU-B95 and CMU-U65</li> <li>• Required SW package: CMU-PK100</li> </ul>	<b>Note:</b> It is strongly recommended that the instrument vendor be contacted before ordering this setup to ensure that the options stated are still valid or that no part numbers have changed.		X	X
77	Power Supply (w/digital readout)  <b>NOTE!</b> If using the Power Supply in conjunction with the Battery Eliminator (Dummy Battery) to power the phone during the GNG test or Calibration routine a high quality DC source that meets the following requirements <u>must</u> be used.	Device Requirements: <ul style="list-style-type: none"> <li>• Output Voltage: 0-5 volt minimum.</li> <li>• Output Current: 0-2 amps minimum.</li> <li>• Transient response time: &lt; 100 <math>\mu</math>s</li> </ul> Some examples of Power Supplies that meet these requirements are as follows: <ul style="list-style-type: none"> <li>• Agilent 66xx series</li> <li>• Agilent 663x series</li> </ul>		Z	Z

Pos	Description	Comments	Picture	Test	Repair
78	Small Convection (Hot Air) Device	Device Requirements: <ul style="list-style-type: none"> <li>The device should allow variable adjustment over a temperature range.</li> <li>The device should be capable of reaching an upper temperature of 426.7°C (800°F) or more.</li> </ul> The range of airflow the device is capable of generating should fall under 20 litre/minute.			X
79	Large Convection (Hot Air) Device	<b>Certain components on the parts list can only be replaced using this device. These parts are specified in the parts list.</b> <ul style="list-style-type: none"> <li>The device should allow variable temperature adjustment and be capable of reaching an upper temperature of 426.7°C (800°F) or more.</li> <li>The range of airflow the device is capable of generating should be above 20 litre/minute.</li> </ul>			X

Pos	Description	Comments	Picture	Test	Repair
80	Nozzles for Large Convection (Hot Air) Device	NOTE: Only necessary if you have a large convection device.			X
81	Digital Multi-meter	Used for troubleshooting failures			Z
82	Microscope	Minimum magnification required is 10x			X
83	GPIB Card	National Instruments or Keithley  NOTES: <ul style="list-style-type: none"> <li>• Drivers are required and should be supplied with a card.</li> <li>• A GPIB card is not required if testing is being performed using the Willtek 420x instrument.</li> </ul>		Z	X
84	GPIB Cable	This cable is only required if a GPIB card is used.		Z	X

Pos	Description	Comments	Picture	Test	Repair
88	Power cable – Red  <b>NOTE: Only necessary if using the Battery Eliminator (Dummy Battery).</b>	Cable Requirements: <ul style="list-style-type: none"><li>• Minimum cross sectional area of conductor = 1.2mm<sup>2</sup></li><li>• Maximum length = 1.5 m</li><li>• One end of cable must have a male banana-type connector to be able to interface with the battery eliminator.</li><li>• The other end of the cable needs whatever connection is necessary to connect to the power supply that you have.</li></ul>		Z	Z
89	Power cable – Black  <b>NOTE: Only necessary if using the Battery Eliminator (Dummy Battery).</b>	Cable Requirements: <ul style="list-style-type: none"><li>• Minimum cross sectional area of conductor = 1.2mm<sup>2</sup></li><li>• Maximum length = 1.5 m</li><li>• One end of cable must have a male banana-type connector to be able to interface with the battery eliminator.</li><li>• The other end of the cable needs whatever connection is necessary to connect to the power supply that you have.</li></ul>		Z	Z


Pos	Description	Comments	Picture	Test	Repair
90	Component baking oven	<p>Temperature requirements: 125°C +5°C/-0°C Required for drying moisture sensitive components.</p> <p>Below are links to several companies that sell convection ovens.</p> <p><a href="http://www.cascadetek.com/forcedlist.php">http://www.cascadetek.com/forcedlist.php</a></p> <p><a href="http://www.wisoven.com/lab1.htm">http://www.wisoven.com/lab1.htm</a></p> <p><a href="http://www.shellab.com/products.html">http://www.shellab.com/products.html</a></p> <p><a href="http://www.terrauniversal.com/products/ovens/imperiaivmechcon.php">http://www.terrauniversal.com/products/ovens/imperiaivmechcon.php</a></p> <p><a href="http://www.labsynergy.com/products_laboratoryovens.asp?keyword=*laboratoryovens">http://www.labsynergy.com/products_laboratoryovens.asp?keyword=*laboratoryovens</a></p>			X

Pos	Description	Comments	Picture	Test	Repair
91	<p>RF Shield Package</p> <p><b>Rohde&amp;Schwarz RF Shield Package</b></p> <ul style="list-style-type: none"> <li>CMU-Z10 – Antenna Coupler (Partnr: 1150.0801.10)</li> <li>CMU-Z11 – RF Shield Cover (Partnr. 1150.1008.02)</li> </ul>	<p>Using an RF shield package is one of the options for testing the applicable product(s). Testing of the applicable product(s) can also be performed by using the combination of an RF Probe and an RF cable.</p> <p><i>Spare parts for mobile phone fixation for R&amp;S CMU-Z10 are available for purchase from Rohde&amp;Schwarz:</i></p> <ul style="list-style-type: none"> <li>Grid Positioning Plate – 1158.9789.00</li> <li>L-shaped bracket – 1158.9808.00</li> <li>Stabilizing pieces – 1158.9820.00</li> </ul> <p><b>NOTE: The Rohde &amp; Schwarz package will require the use of a precision N-type male to SMA female RF adapter to mate with the SEMC RF cable.</b></p> <p><b>NOTE: If you are using a different RF Shield Package than Rohde &amp; Schwartz, special attenuation factors for Go/No-Go test are required.</b></p>		Z	

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Pos	Description	Comments	Picture	Test	Repair
92	Flux	Lead-free solder does not require a special flux. The “No Clean” flux used with leaded products is acceptable. Although some manufacturers are developing fluxes specially made for use with lead-free solder (higher evaporation temperatures, less smoke, etc.), these are not required.			X
93	Low Static Heat Protection Tape	This tape is required to protect adjacent components from hot air.			X
96	Computer	<p>One of the following operating systems must be used:</p> <ul style="list-style-type: none"> <li>Windows 2000 with service pack 2 or higher</li> <li>Windows XP</li> </ul> <p>Minimum Requirements:</p> <ul style="list-style-type: none"> <li>One unused PCI slot for GPIB card</li> <li>3 USB Ports</li> <li>The processor and RAM of the computer should at least meet the the minimum requirements specified by the operating system’s manufacturer.</li> </ul>		Z	X



Pos	Description	Comments	Picture	Test	Repair
99	Test U-SIM	According to your Instrument supplier		X	
109	Printer	<b>Optional, but recommended</b>		Z	Z
110	RF adapter for RF shield box <ul style="list-style-type: none"> <li>The adapter for a Rohde &amp; Schwarz Shield box must be a <b>precision</b> N-type male to SMA female adapter.</li> </ul>	<p>This adapter is used to connect the RF shield box to the RF cable and is only required if a shield package is going to be used for testing.</p> <p>Recommended source:</p> <ul style="list-style-type: none"> <li>Pasternack Enterprises – (949) 261-1920 or <a href="http://www.pasternack.com">www.pasternack.com</a></li> <li>Part number: PE9430</li> </ul>		Z	
111	Cutting Pliers				Z
112	ESD Gloves				Z
113	ESD Wristband				Z
114	Nylon Pointer				Z

Pos	Description	Comments	Picture	Test	Repair
115	Zebra Printer	<b>Current Model Options:</b> <ul style="list-style-type: none"> <li>• <b>110XIIIPlus</b> or <b>Z4Mplus</b></li> </ul> These models use a DB9 Male-DB9 Female Null Modem  <b>Discontinued Model Options:</b> <b><i>NOTE – The following models may also be used, but Zebra has discontinued selling them.</i></b> <ul style="list-style-type: none"> <li>• 90xi Series</li> <li>• Z4M</li> <li>• Z4000 deluxe</li> </ul> These models use a DB25 Male-DB9 Female Null Modem			Z




Pos	Description	Comments	Picture	Test	Repair
116	Null Modem Cable	<p>This cable connects the Zebra printer to the computer. Two companies that carry this type of cable are CDW (www.cdw.com) and QVS (www.qvs.com). Part numbers for the <b>DB9 Male-DB9 Female version:</b>  <b>CDW – 361875</b> (6 Feet Long)</p> <p>Part numbers for the <b>DB25 Male-DB9 Female version:</b>  <b>CDW – 375939</b> (6 Feet Long)  <b>QVS – CC314-06</b> (6 Feet Long)  <b>QVS – CC314-10</b> (10 Feet Long)</p>			Z
117	<b>Willtek 4921 Shield Enclosure</b>  With modified rear panel and N terminator <ul style="list-style-type: none"> <li>248718 (Wiltek Part number)</li> </ul>	Used for WCDMA or GSM Calibration Used for WCDMA or GSM Calibration. A Service Tool Test Interface (1206-9888) is also required.		Z	
118	<b>Modified rear panel and N terminator</b>  <b>Willtek</b> <ul style="list-style-type: none"> <li>300872 (Wiltek Part number)</li> </ul>	Used with existing Willtek Shield boxes Replace rear panel with modified rear panel and place N terminator on RF connection. Remove RF coupler. A Service Tool Test Interface (1206-9888) is also required.		Z	





				Test	Repair
Pos	Description	Comments	Picture		
119	Metal Cutters	<p>Use these to trim shield can fences when they obstruct access to parts.</p> <p>Cutters should be small enough to cut fences without damaging parts on the board.</p> <p>Cutters should be sharp enough to cut fences without twisting or pulling the fence.</p> <p>Recommended cutters available at <a href="http://www.MSCDirect.com">www.MSCDirect.com</a>:</p> <p>Knipex (left) - <b>Mfr Part #:</b> KN7803-5, <b>MSC #:</b> 32997462</p> <p>Xuron (right) - <b>Mfr Part #:</b> 2175AS, <b>MSC #:</b> 88356431</p>			Z

The matrix describes where the actual equipment is needed, marked with an X, or may be needed/option, marked with a Z.

### 3.4 Lead-free Solder Equipment

The items in this table, and any other soldering tools or material that make physical contact with the solder, must remain lead-free. They must be adequately labelled to make their lead-free status clearly and easily recognized.

Pos	Description	Comments	Picture	Test	Repair
	Lead-free Solder  Note: The solder must be composed of Tin, Silver, and Copper, and nothing else. The exact composition ratio may vary, but it must be Tin, Silver, and Copper only. This composition may also be known as SnAgCu or SAC.	Manufacturers of LF Solder: - Tamura ( <a href="http://www.tamura-kaken.co.jp">www.tamura-kaken.co.jp</a> ) Part # TLF-206-93F - Multicore ( <a href="http://www.multicore.com">www.multicore.com</a> ) Part # 96SC - Senju ( <a href="http://www.senju-m.co.jp">www.senju-m.co.jp</a> ) Part # M705			X
	Lead-free labels (sheet of 24)  SEMC Part # SVF9301379 (These labels are available from the Sony Ericsson Parts and Tools Warehouse.)	Required for labeling all soldering tools and materials that contact the solder.			X
	Soldering Tips				X

Pos	Description	Comments	Picture	Test	Repair
	<b>Soldering Iron</b> If one work bench is divided to accommodate both leaded and lead-free solder, then each side of the bench should have its own iron.	<ul style="list-style-type: none"> <li>The device should allow variable temperature adjustment and be capable of reaching an upper temperature of 426.7°C (800°F) or more.</li> </ul>			X
	<b>Wicking Tape</b>				X
	<b>Tip Tinner</b>				X
	<b>Tip Cleaner (steel wool)</b>				X

## 4 Revision History

Rev.	Date	Changes / Comments
1	2008-05-26	1 <sup>st</sup> version