



Trouble Shooting Guide, Electrical

Applicable for S500, W580

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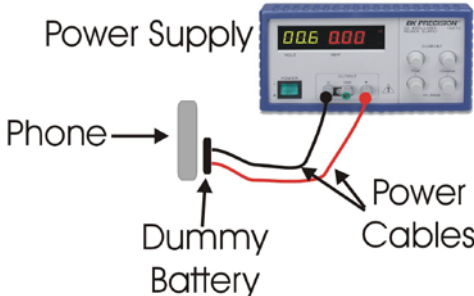


1 General

The purpose of this document is to indicate the electrical level repair actions associated with the different failure symptoms.

For symptoms that have multiple repair actions, the repair actions are listed in order of their probability of creating a successful repair. The first action has the highest probability, and subsequent actions have lower probabilities. The intention is for the repair technician to implement the first repair action and then retest the phone. If the phone continues to fail the same test, then the technician should continue to the second repair action. If the phone continues to fail the same test after all of the repair actions are exhausted, then the phone will be considered not repairable at this level.

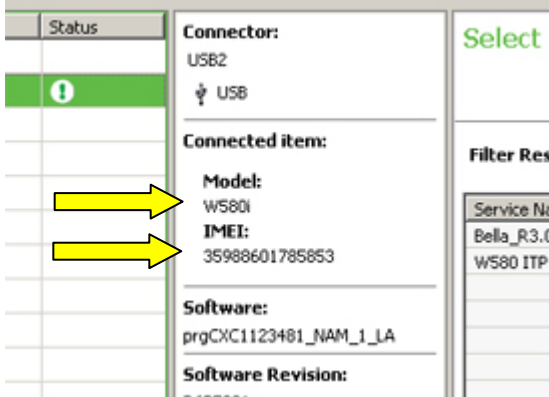
This document should be used only after the actions from the Mechanical Trouble Shooting Guide have been exhausted for the specific symptom.

Voltage, current, and resistance information is provided for some symptoms to enable faster repairs. Purchasing this equipment and performing these measurements is optional but recommended.

<p>Measure Current in Milliamps (mA)</p>  <p>Power Supply</p> <p>Phone</p> <p>Dummy Battery</p> <p>Power Cables</p>	<p>Perform current measurements using a dummy battery and power supply with digital current display. The phone should be fully assembled.</p>
<p>Measure Diode Voltage (VDC →)</p>  <p>Multimeter</p>	<p>Perform voltage measurements with a multimeter.</p>
<p>Measure Resistance in Ohms (Ω)</p>  <p>Multimeter</p>	<p>Perform resistance measurements with a multimeter.</p>



2 Repair Actions for Manual Test Failures

Failure	Failure Symptom	Repair Action
2.1 Power On / Off	Current draw when powered off	<ul style="list-style-type: none"> N200 N201
	Sustained current draw greater than 300 mAmps	<ul style="list-style-type: none"> N201 N2005 N2000
	Will not power on AND will not flash	<ul style="list-style-type: none"> B100 N101
	Hangs with vibrator on	<ul style="list-style-type: none"> B300
	Phone hangs in menus	<ul style="list-style-type: none"> D1000
	Current draw is 60 to 80 mAmps when pressing power key, but current returns to 0 when power key is released.	<ul style="list-style-type: none"> No Repair Action
	Powers On BUT will not power off	<ul style="list-style-type: none"> V1900
	Other symptoms	<ul style="list-style-type: none"> Replace X600 if damaged Replace S1900 if damaged
2.2 Software Flash	EMMA gives “unrecognized device” error and phone powers on	<ul style="list-style-type: none"> D1500
	Phone hangs when connected to Computer with USB cable	<ul style="list-style-type: none"> D1500
	EMMA gives no response at all and phone powers on	<ul style="list-style-type: none"> N2000
	EMMA does not respond, but the computer operating system recognizes “new hardware”	<ul style="list-style-type: none"> B300
	EMMA recognizes the IMEI and Model numbers, starts to load software, and then fails. 	<ul style="list-style-type: none"> No Repair Action - Escalate



2.3 Charging	Charging from power outlet	<ul style="list-style-type: none"> V602, V604
	If Charging from power outlet fails AND Installing a hands-free connection causes the phone to power off	<ul style="list-style-type: none"> C1512
	Charging from computer via USB Measure V607 from pin 1 to pin 3 with positive lead on pin 1 VDC should equal 0.20 to 0.23.	<ul style="list-style-type: none"> If VDC is outside of range, then replace V607 N2000
2.4 Hands-Free connection (PHF)	Hands-free mic or speaker fail	N2002 N2000
	Installing a hands-free connection causes the phone to power off	C1512
2.5 SIM		<ul style="list-style-type: none"> Replace X1402 if damaged N2000
2.6 Display		<ul style="list-style-type: none"> Replace X1900 if damaged N1800 and V1800
2.7 Display Illumination		<ul style="list-style-type: none"> Replace X1900 if damaged V1800, L1800 N1800 N2000
2.8 Slider Keypad LEDs		<ul style="list-style-type: none"> N1800
2.9 Slider Side LEDs		<ul style="list-style-type: none"> N1800
2.10 Vibrator		<ul style="list-style-type: none"> Replace X1900 if damaged N2000
2.11 Earphone (Receiver)		<ul style="list-style-type: none"> Replace X1900 if damaged N2000
2.12 Polyphonic Speaker (Loudspeaker)		<ul style="list-style-type: none"> Replace X1900 if damaged N2001, N2005 N2000
2.13 Microphone		<ul style="list-style-type: none"> Replace X1900 if damaged N2000
2.14 Real Time Clock		<ul style="list-style-type: none"> B300
2.15 Camera	Camera display is solid grey	<ul style="list-style-type: none"> N700
	Camera display has colored horizontal lines	<ul style="list-style-type: none"> N702
	Camera display is solid black	<ul style="list-style-type: none"> N701
	Other symptoms	<ul style="list-style-type: none"> Replace X1900 if damaged
2.16 Slider Sensor		<ul style="list-style-type: none"> B1200
2.17 Bluetooth		<ul style="list-style-type: none"> D1000 N2000
2.18 Memory Card Reader		<ul style="list-style-type: none"> Replace X1900 if damaged
2.19 FM Radio W580 ONLY		<ul style="list-style-type: none"> N900 N901 N2000
2.20 Accelerometer W580 ONLY		<ul style="list-style-type: none"> N1300



3 Keypad

Power to all keys is provided through X1900, but X1900 is difficult to replace without displacing surrounding parts, and replacing this part does not always fix the key failure. Before changing the connector, perform voltage measurements as explained below.

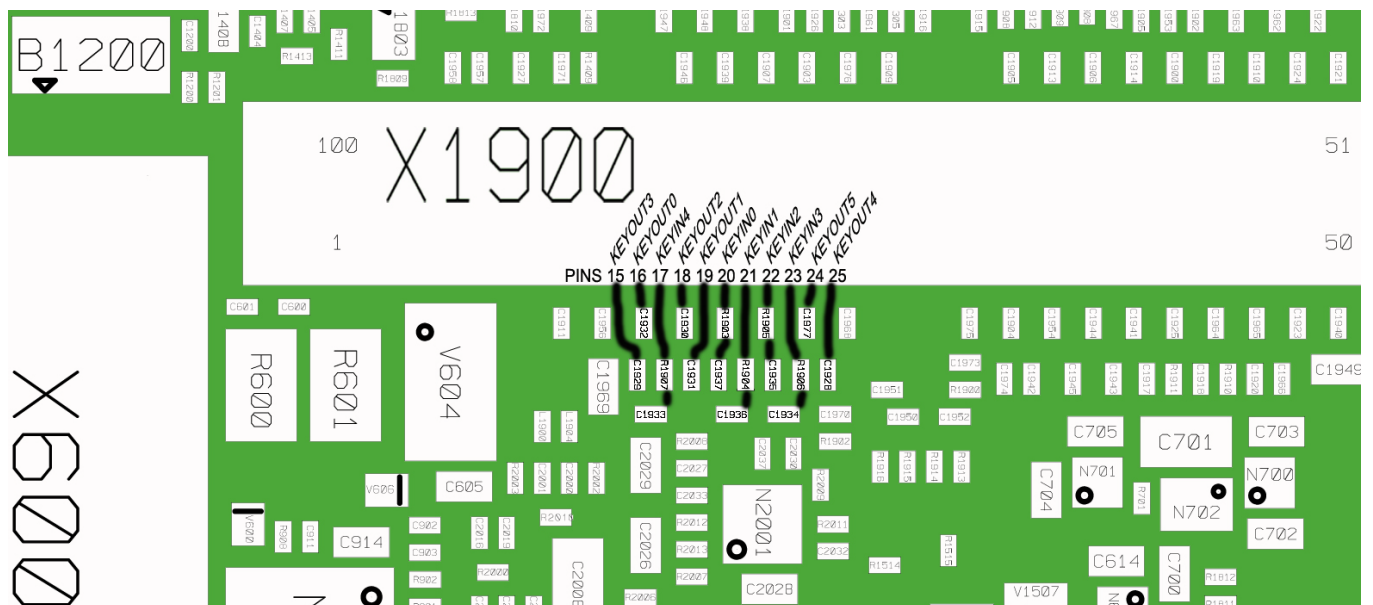
If voltage measurements are outside of the range	<ul style="list-style-type: none">• No Repair Action
If voltage measurements are inside of the range	<ul style="list-style-type: none">• Carefully inspect pins and leads on all six connectors (Bonzer flex, both ends of half-half, main keypad off of half-half, main keypad, and main board X1900)
If all connectors appear OK	<ul style="list-style-type: none">• Replace X1900
If keys still fail after replacing X1900	<ul style="list-style-type: none">• No Repair Action

Voltage Measurements

With the meter set to the diode scale, connect the black test probe to ground and the red test probe to the each of the capacitors shown below, and measure the voltage. Also, if only some keys fail, then check the key matrix below for a pattern that suggests a specific KEYOUT or KEYIN signal is damaged.

KEYOUT Vdc = 0.7 – 1.3

KEYIN Vdc = 1.0 – 1.5





Key Matrix

Check the key matrix below for a pattern that suggests a specific KEYOUT or KEYIN signal is damaged.

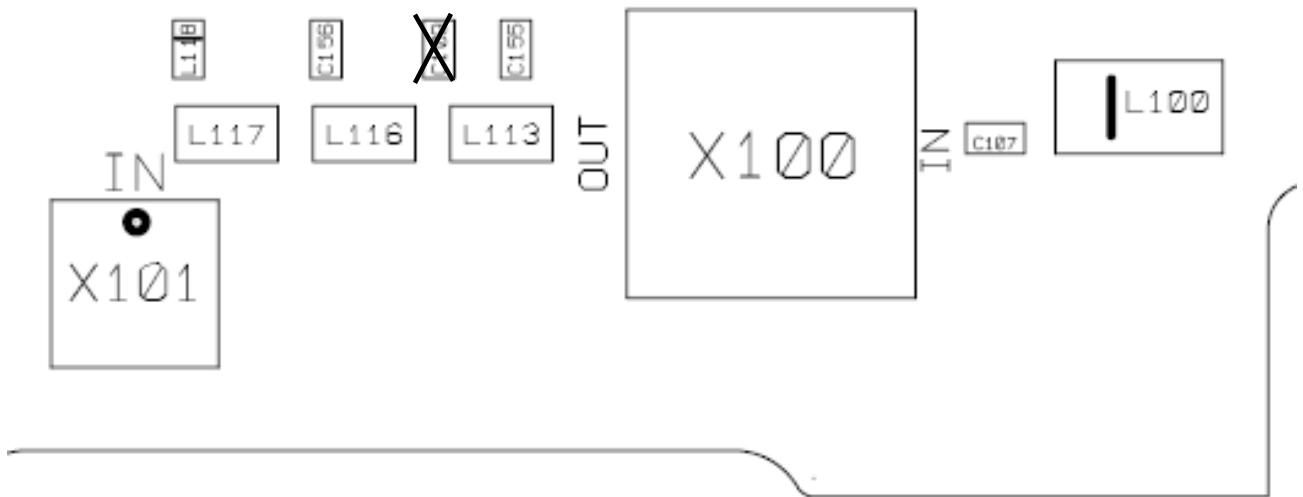
	KEYIN0 C1937, R1903, Pin20	KEYIN1 C1936, R1904, Pin21	KEYIN2 C1935, R1905, Pin22	KEYIN3 C1934, R1906, Pin23	KEYIN4 C1933, R1907, Pin17
KEYOUT0 C1932, Pin16	3	6	1		Internet or Walkman
KEYOUT1 C1931, Pin19	8	select right	back	C	Activity or Menu
KEYOUT2 C1930, Pin18	2	0	select left	5	
KEYOUT3 C1929, Pin15	9	4	7	*	#
KEYOUT4 C1928, Pin25		volume down			volume up
KEYOUT5 C1977, Pin24	navigation down	navigation left	navigation up	navigation select	navigation right

Failure	Repair Action
3.1 Slider Keypad LEDs	<ul style="list-style-type: none"> Replace X1900 if damaged N1800
3.2 Slider Side LEDs	<ul style="list-style-type: none"> Replace X1900 if damaged N1800
3.3 Main Keypad LEDs	<ul style="list-style-type: none"> Replace X1900 if damaged
3.4 Main Keypad Keys	<ul style="list-style-type: none"> Replace X1900 if damaged
3.5 Slider Keys	<ul style="list-style-type: none"> Replace X1900 if damaged
3.6 Volume Keys	<ul style="list-style-type: none"> Replace X1900 if damaged



4 Repair Actions for Go/No Go Test Failures

NOTE! Before replacing any parts to address RF problems, inspect the parts adjacent to X100 and X101 to make sure none of them are damaged. There should not be a part at position C109.



4.1 Network Connection

Phone fails to lock on to network during radiated (wireless) Go / No Go test	<ul style="list-style-type: none">• Use RF probe and fixture to perform conducted Go / No Go test
Phone fails conducted (RF probe) Go / No Go test	<ul style="list-style-type: none">• Run Calibration Routine
	<ul style="list-style-type: none">•
Phone passes conducted (RF cable) Go / No Go test	<ul style="list-style-type: none">• Note: Use 10 Ncm when Rear frame screw are installed• Replace Antenna/Coaxial Cable Assembly and repeat radiated test
Phone still fails radiated (wireless) Go / No Go test	<ul style="list-style-type: none">• Replace X101 and repeat radiated test
Phone still fails radiated (wireless) Go / No Go test	<ul style="list-style-type: none">• Replace X100 and repeat radiated test

4.2 Other Failures

Phone fails any other portion of Go/No Go testing	<ul style="list-style-type: none">• Run Calibration Routine
Phone that failed Go/No Go test passes calibration	<ul style="list-style-type: none">• Repeat radiated (wireless) Go/No Go test



5 Repair Actions for Calibration Routine Failures

5.1 GSM 850, 900, 1800, or 1900

The variable **F** in the table below will be replaced by one of the different frequencies (GSM850, GSM900, etc.).

Routine	Repair Action
F_Calibrate_RXVCO	<ul style="list-style-type: none">• N101
F_Calibrate_TXVCO	<ul style="list-style-type: none">• N101
F_Calibrate_TXCHVCO	<ul style="list-style-type: none">• N101
F_Check_Output_Power	<ul style="list-style-type: none">• N201• N2000• X100• Z102
F_Calculate_POWTX_Value	<ul style="list-style-type: none">• N201
Calibrate_VCXO	<ul style="list-style-type: none">• B100
F_Measure_Multiframe	<ul style="list-style-type: none">• N201• Z102
F_RSSI_Calibration	<ul style="list-style-type: none">• N101• Z102

5.2 EDGE 850, 900, 1800, or 1900

The variable **F** in the table below will be replaced by one of the different frequencies (EDGE850, EDGE900, etc.).

The variable **X** in the table below will be replaced by one of the different levels (1, 2, or 3).

Routine	Repair Action
F_Check_Output_Power	<ul style="list-style-type: none">• N201• N2000
F_Get_POWTX_Value_For_PLX	<ul style="list-style-type: none">• N201
F_Calibrate_VGAGAINX	<ul style="list-style-type: none">• N201• N101
F_Calibrate_PowerX	<ul style="list-style-type: none">• N201• N101



6 Revision History

Rev.	Date	Changes / Comments
A	2007-May-17	Initial Release
B	2007-Jul-18	Added Illumination changes due to improved understanding of flex circuits.
C	2007-Sep-14	Added D1000, Bluetooth, to Power on section with Phone hangs symptom. Added N2005 to Power on section with excessive current draw. Added damaged part inspection to Go / No Go section. Added N700 to Camera section. Added V1800 to Display section. Added N2000 to several sections.
D	2008-Jan-11	Added phone hangs symptom to SW Flash
5	2008-Apr-02	Add N900 for FM radio. Changed document number and revision to new format.
6	2008-Jun-05	Added new symptoms and parts to camera section.
7	2008-Jul-07	Added additional failure symptom in the Software Flash section.
8	2008-Aug-12	Added new repair action for On/Off symptom. Added keypad section.
9	2008-Aug-20	Added C1512 for charging and PHF failures. Added L1800 for display illumination failures.
10	2009-06-23	Use 10 Ncm when Rear frame screw are installed are added to network Connection
11	2009-12-04	Do not replace L600 or V605 removed from power on /off