# Service Manual
# Level 1-2
# for

**BenQ mobile**

# E71



| Release | Date | Department | Notes to change |
|---------|------|------------|-----------------|
| R 1.0 | 18.09.2006 | ISC S CES | New document |
| | | | |
| | | | |

# Table of Content

# 1. Key Feature E71

## System Standards

- Tri-band GSM 900/1800/1900
- EDGE/GPRS  class 10

## Technical Profile

- Dimensions:       104  x 46 x 15mm (L x W x H)
- Volume:           72 cm3
- Weight:           81g
- Standby time:     550 h
- Talktime:         450 min
- Music playtime:   400 min at medium volume
- Battery:          Li-Ion 730 mAh
- Charging time:    2 h for 100%
- Antenna:          internal
- Display:          320 x 240 pixels, 262,144 colors, TFT
- Camera:           1.3 megapixel camera; camera side key.
- Storage:          16 MB internal memory plus microSD™ card slot
- Connectivity:     USB 2.0, Bluetooth®



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## Features

- Full multimedia feature set :
- News2Mobile/Podcast client
- Branded 3D multimedia games
- FM radio and media player for music and videos
- 1.3 megapixel camera
- Business functionalities such as address book, organizer, reminder, synchronization with Outlook, and connectivity (Bluetooth® & USB)
- Music Cable and wide range of headsets and car kits with Bluetooth® technology as accessories

## Color Variants

**Dark Silver***          **Onyx Black***

## 2. Spare Part Overview of E71



| No. | Description CM | Order Number |
|-----|---------------|--------------|
| 1. | Battery | L50645-K1310-X335 |
| 2. | Battery Cover E71 dark silver | L50658-A184-A500 |
| 3. | Lower Case | L50658-A184-Q200 |
| 4. | Upper Case without Keypad E71 dark silver | L50658-A184-A1 |
| 5. | RF Control Board E71 | L36880-Q3340-A10 |
| 6. | Keypad Latin E71 dark silver | L50658-A184-A700 |
| 7. | MMI Board MDS E71 | L50658-A184-A780 |
| 8. | Display Lens E71 | L50658-A184-B50 |
| 9. | Displaymodule LCD E71 | L50651-Z1508-A175 |
| 10. | Speaker Acoustic High E71 | L50612-Z3-C57 |
| 11. | Microphone | L36254-Z6-C104 |
| 12. | Side Key Switch SK65/E71 | L50615-Z77-C223 |
| 13. | Button Side Key | L50658-A184-B750 |
| 14. | Vibra-Alert | L36453-Z5-C277 |
| 15. | Camera Module | L50653-Z5-C301 |
| 16. | Screw 1,6 x 5,8 | L50697-F5844-F306 |

# 3. Disassembling of E71

All repairs as well as disassembling and assembling have to be carried out in an ESD protected environment and with ESD protected equipment/tools. For all activities the international ESD regulations have to be considered.

For more details please check information in c – market

**https://market.benqmobile.com/SO/welcome.lookup.asp**

There you can find the document "ESD Guideline".

| | |
|---|---|
| **Step 1**  | |
| **Step 2**  | Remove Battery Cover. |

| Step 3 | |
|---|---|
|  | Remove Battery Cover |
| **Step 4** | |
|  | Remove Battery |
| **Step 5** | |
|  | Remove screws by using the Torque – Screwdriver T5+.  . |

| | |
|---|---|
| **Step 6**<br> | Disconnect Lower Case<br><br>from Upper Case |
| **Step 7**<br> | |
| **Step 8**<br> | Remove vibra alert<br><br>by using Tweezers |

| | | |
|---|---|---|
| **Step 9** |  | |
| **Step 10** |  | Remove Speaker Acoustic High by using the Alternative Opening Tool. |
| **Step 11** |  | |

| Step 12 | Take out the Button Side Key by pushing it outside the frame. |
|---|---|
| Step 13 | Remove the Side Key Switch |
| Step 14 | Remove Microphone by using Tweezers |

| | |
|---|---|
| **Step 15**  | Dissembled Lower Case |
| **Step 16**  | Put the Camera Ejector Jig through the four edges between the Camera and the Camera Connector. Now push the Ejector Jig and pull out the Camera carefully |
| **Step 17**  | |

| | |
|---|---|
| **Step 18**  | To avoid scratches it is mandatory to place a protection foil onto the Display!!! |
| **Step 19**  | Remove Display connector by using the Alternative Opening Tool . |
| **Step 20**  | Remove Display from PCB by using Alternative Opening Tool very carefully |

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| Step 21 | |
|---|---|
|  | |
| **Step 22**  | Remove the Keypad MMI by using the Alternative Opening Tool. |
| **Step 23**  | Remove the Keypad |

| **Step 24** | | Remove the display cover<br><br>. |
|---|---|---|
| **Step 25** | | Disassembled Upper Case |
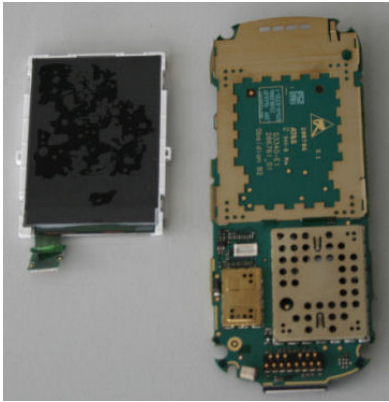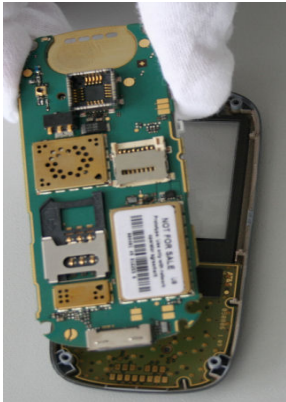
# 4. Assembling of E71

| Step 1 | | Assemble the display cover |
|---|---|---|
| Step 2 | | Assemble the Keypad.. |
| Step 3 | | Assemble the Keypad MMI |

| **Step 4** |  | Assemble Display. |
| **Step 5** |  | Assemble  Display connector by using the Alternative Opening Tool |
| **Step 6** |  | Before assembling the PCB in the Upper Case, it is mandatory to remove the Display Foil |

| **Step 7** | Assemble the PCB into the Upper Case. |
|---|---|
| **Step 8** | Assemble Camera |
| **Step 9** | Assemble Microphone by using Tweezers |

| | |
|---|---|
| **Step 10**  | Now fix the Side Key Switch into the Side Key frame. |
| **Step 11**  | Assemble the Button Side Key |
| **Step 12**  | Assemble Speaker Acoustic High |

| | | |
|---|---|---|
| **Step 13** |  | Assemble Vibra Alert |
| **Step 14** |  | Assemble the Lower Case with the before assembled Upper Case. |
| **Step 15** |  | Place screws by using the Torque – Screwdriver T5+. |

| **Step 16** |  | Plug in the Battery |
|---|---|---|
| **Step 17** |  | Assemble Battery Cover |
| **Step 18** |  | |

# 5. Required BenQ Service Equipment

**Introduction**

Every LSO repairing BenQ handset must ensure that the quality standards are observed. BenQ has developed an automatic testing system that will perform all necessary measurements. This testing system is known as:

**BenQ Mobile Service Equipment**

- **For disassembling / assembling**

| | |
|---|---|
| | **Torque – Screwdriver**<br>**Part Number: F 30032 – P 228 – A1** |
| | **Opening tool**<br>**(Case opening without destroying)**<br>**Part Number: F 30032 – P 38 – A1** |
| | **Alternative Opening Tool**<br>**Part Number: F30032 – P583 – A1** |
| | **Tweezers** |
| | **Camera Removal Tool professional**<br>**Part Number: F30032-P507-A1** |

- **For SW update**

| | |
|---|---|
| | **Bootadapter 2000 Service**<br>**Part Number: F30032 – P583 – A1**<br>**and**<br>**Adapter cable to Lumberg NANO**<br>**Part Number: F30032 – P226 – A2 or**<br>**Part Number: F30032 – P226 – A3** |
| | **USB Bootcable**<br>**and**<br>**Adapter cable to Lumberg NANO**<br>**Part Number: F30032 – P226 – A3** |

**All mobile phones have to be tested with the GRT – Software. The service partner is responsible to ensure that all required hardware is available.**

For additional Software and Hardware options as well as the supported GRT equipment, please check the GRT User manual.

## 6. GRT Software: Functionality Configuration

**Sep 1:** Select „Settings  >>  SWUP / JPICS"
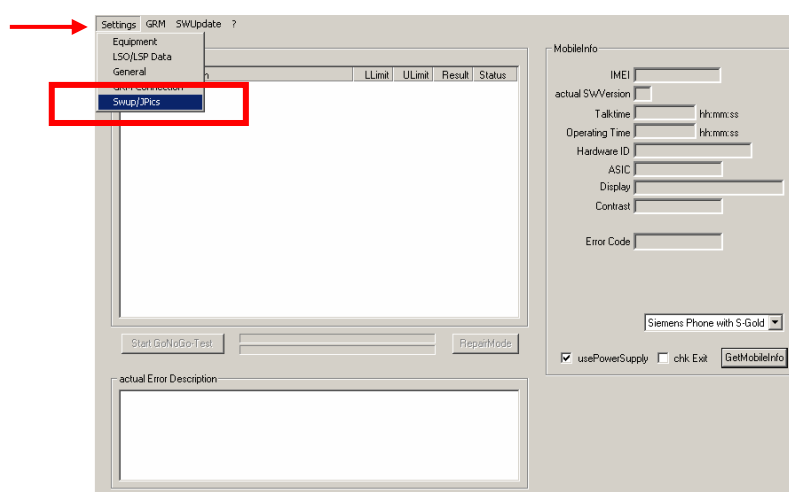
**Step 2:** Proceed as follows:

- Select all required Variants you need to repair (click onto the "+" in front of the product name.
- Check Com-Port setting. If necessary change it
- Check speed setting. Select always the lowest speed if your PC does not have a fast serial card
- Enter the value for "JPICS Server Timeout". Be careful, this value defines how long GRT tries to reach the server until you get an error message. Do not select a very long time
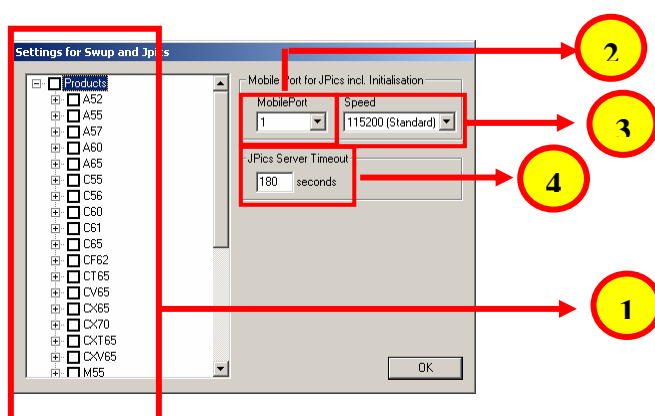


**Step 3:** Connect to GRM Server

- Choose in the section „GRM" the „Connect to GRM Database" functionality
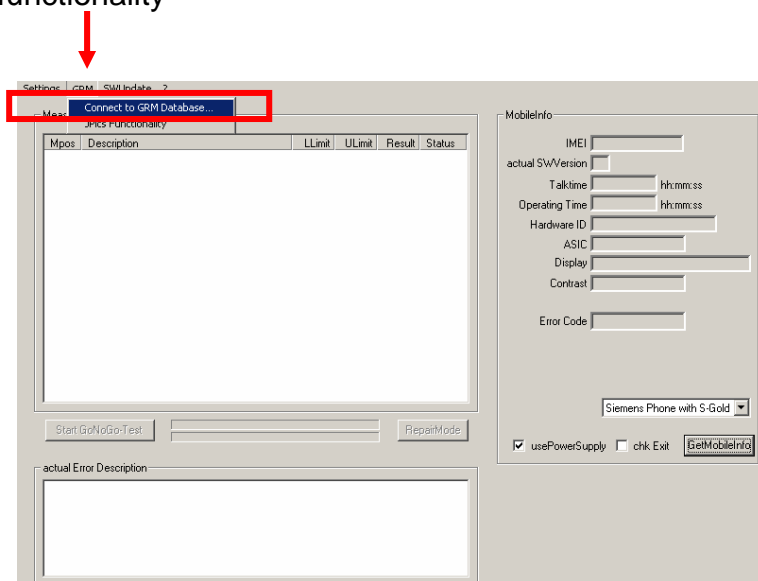
| | Enter your GRT-Username and Password into this fields |
|---|---|

**1**

| | Activate always both boxes if you connect to the database. Start with "Connect" |
|---|---|

**2**

| | It you IT infrastructure parameter have changed, use this button to move to the configuration mask |
|---|---|

**3**
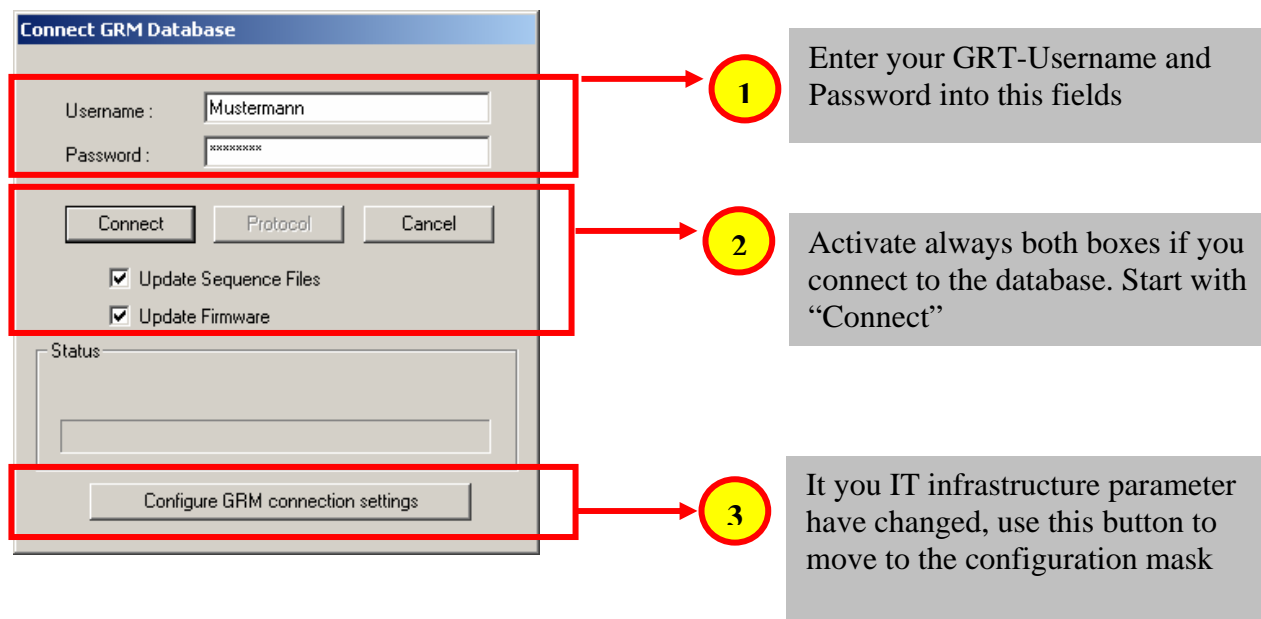
- End the connection with a click onto the „Exit button" (appearing after successful data exchange)

**GRT Software has now finished all required settings and configuration tasks. All files have been down- and uploaded. In dependency of the selected number of mobile phones and variants the volume of transferred date could be (~100MB)**

# 7. GRT Software: Regular Usage

**Step 1:** Select the section SWUpdate
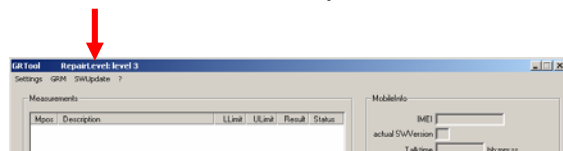


**Step 2:** Choose the area you want to work with
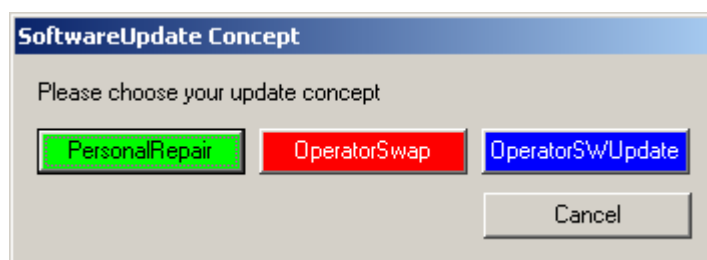


- **Personal Repair**
  Personal Repair is always accessible. Basis for the decision if a SW-Update is authorised by Siemens is the so called Service Release-Table.

  **Example:** Mobile Phone has already SW50. Service -Release-Table shows SW50.In this case SW-Update is not necessary and therefore not authorized. In any case customer data can be erased on request. (xfs and mapping have to be activated) Of course **JPICS** hardware and authorisation have to be available.

- **Operator SWAP**
  This area is only accessible if you are released by the service management to perform SW-Updates for Net-Operators. Basis for the decision if a SW-Update is authorised by Siemens is the so called Master-Table.

  Customer data will be erased without any exception and any chance to influence by the user. **JPICS** hardware and authorisation have to be available.

- **Operator SWUpdate**
  This area is only accessible if you are released by the service management to perform SW-Updates for Net-Operators. Basis for the decision if a SW-Update is authorised by Siemens is the so called Master-Table.

  Like in "Personal Repair" customer data can be erased on request. (xfs and mapping have to be activated) Of course **JPICS** hardware and authorisation have to be available.

## 7.1. Window explanation

This general explanation is valid for all SW-Update channels
(**Personal Repair**, **Operator SWAP**, **Operator SWUpdate**)

After using „Check Variant" Phone IMEI-Number will be shown here

Window to select the mobile phone CPU

Shows the different SW –Versions
a)  SW inside the mobile phone
b) Version of Service Release Table SW
c) Version of Master Table SW

Start button for SW-Update

Stop / leave SW-Update

Automatic read out function of  phone type/Variant. Appearing in the window above.

Select boxes for:
Content = xfs
Settings = mapping
Attention:
Activation of the boxes will cause erase of customer date while SW-Update

**Remarks:**

**In case of malfunction please check**

- Is the correct phone type selected
- Is the correct COM-Port selected
- If a variant is missing, move back to  Settings select the missing variant and conncet the GRM Server. Then continue with SW-Update.

## 7.2. Case 1: Personal Repair (green)

**Step 1:** Carry out step 1 – 4 to start SW-Update.



**Select the mobile phone CPU type** (1)

**Start SW-Update** (4)

**Choose if customer data shall be erased. If "Yes" activate the boxes in front of xfs and mapping** (3)

**Read out phone type/Variant. >>Appears in the window above.** (2)

**Remarks:**

- The decision about a Siemens authorised SW-Update depends only on the <u>Service Release-Table</u> .
- The SW which is booted by GRT can be below the SW mentioned in the <u>Service Release Table</u>, if this SW is not released for the Net-Operator
- If **xfs** and **mapping** are activated, GRT will erase in any case the customer data even if the action is cancelled.
- If the user wants to download another variant then the automatically identified one, he has simply to select another variant from the list. Afterwards he has to start the SW-Update

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## 7.3.    Case 1: Operator SWAP (red)

**Step 1:** Carry out step 1 – 4 to start SW-Update.
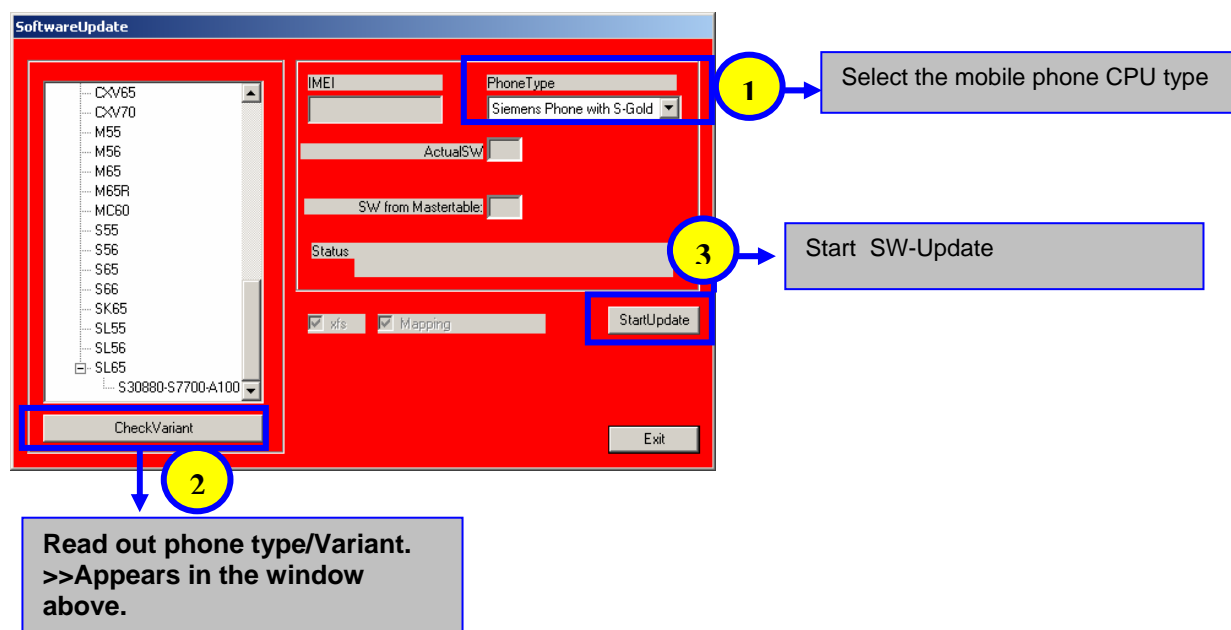
**1** Select the mobile phone CPU type

**3** Start  SW-Update

**2** **Read out phone type/Variant. >>Appears in the window above.**

**Remarks:**

- The decision about a Siemens authorised SW-Update depends only on the Master-Table .
- The user has no chance to influence the decision
- **Xfs** and **mapping** are always activated there is no chance to deactivate them. GRT will erase in any case the customer data even if the action is cancelled.
- If the user wants to download another variant then the automatically identified one, he has simply to select another variant from the list. Afterwards he has to start the SW-Update

## 7.4. Case 3 Operator SWUpdate (blue)

**Step 1:** Carry out step 1 – 4 to start SW-Update.



**Remarks:**

- The decision about a Siemens authorised SW-Update depends only on the Master-Table .
- The user has no chance to influence the decision
- **Xfs** and **mapping** can be activated on demand. GRT will erase in any case the customer data even if the action is cancelled.
- If the user wants to download another variant then the automatically identified one, he has simply to select another variant from the list. Afterwards he has to start the SW-Update

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## 8. JPICS (Java based Product Information Controlling System)
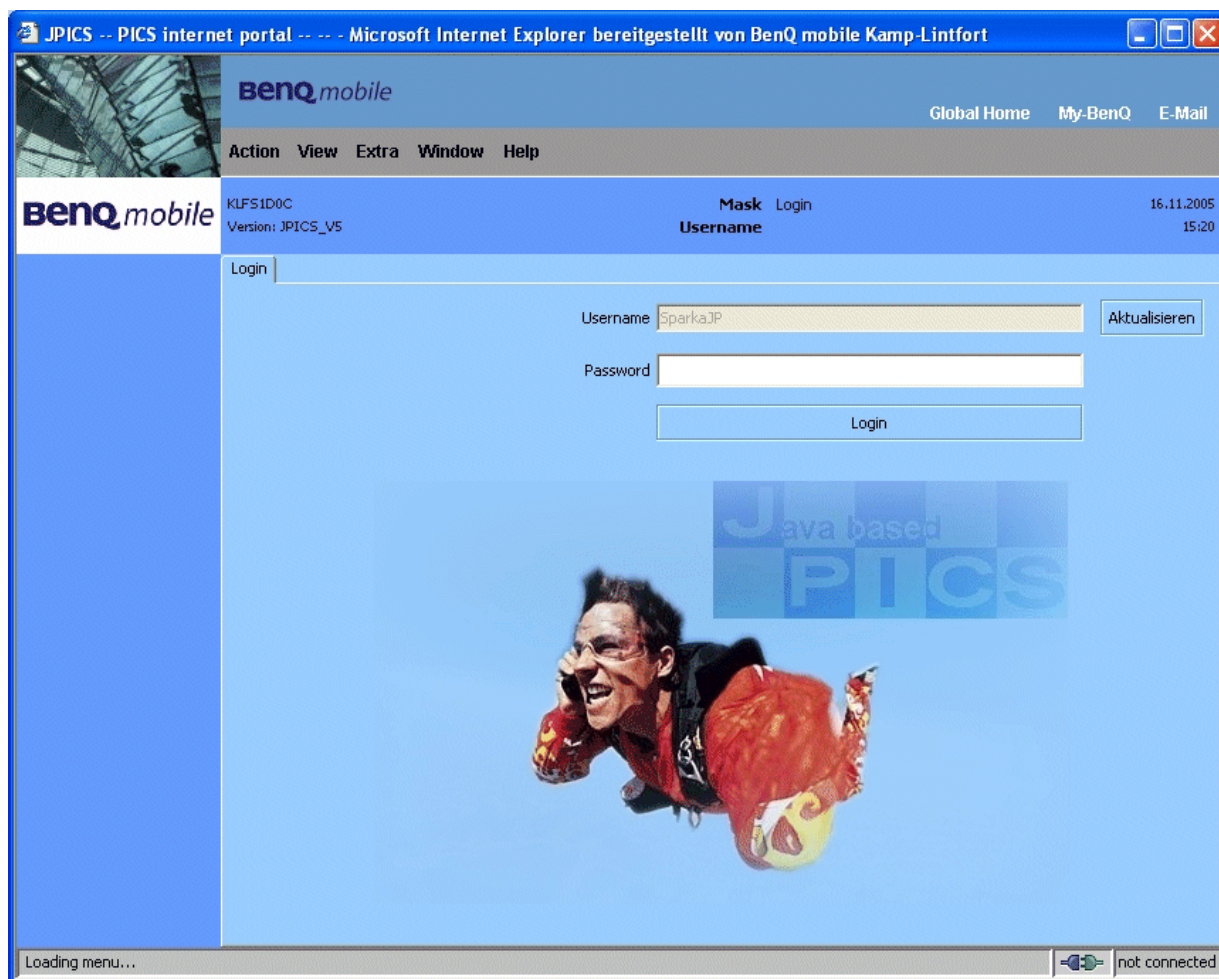


**Overview**

The following functions are available for the LSO:

- General mobile information

- Generate PINCODE

- Generate SIMLOCK – UNLOCK – Code

- Print IMEI labels
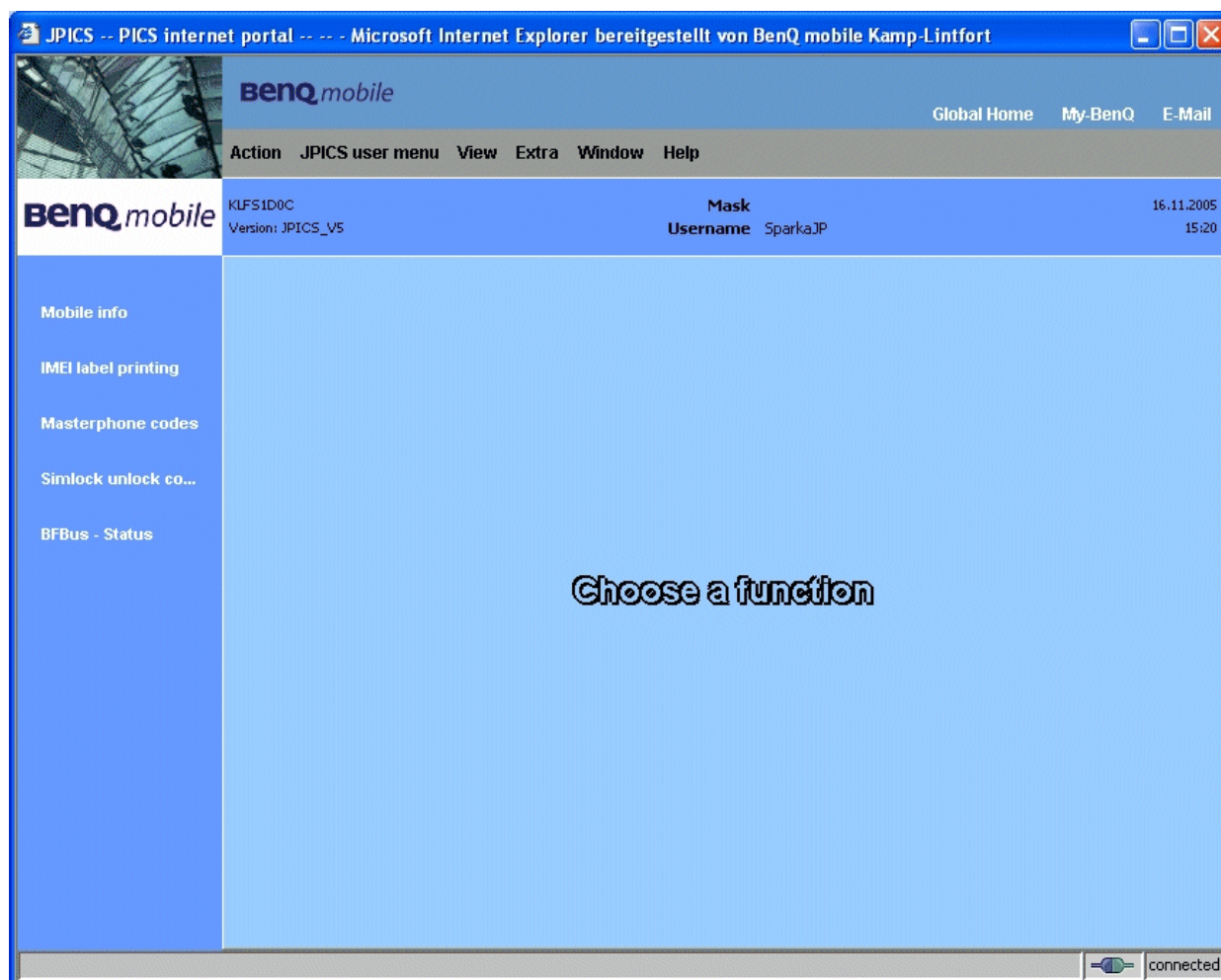
The access to the JPICS server which is located in Kamp – Lintfort is protected by chip card and in addition using secure socket layer (SSL) connection.

The JPICS server is only available for authorized users with a specially coded smart card. These smart cards and the administration of the JPICS web server and the PICS database – server can only be provided by the JPICS – TRUST – Center of the responsible department in Kamp – Lintfort.

In case of any questions or requests concerning smart cards or administration of the databases please ask your responsible BenQ Customer Care Manager.

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**Installation overview**

The following installation description assumes that a web browser is already installed.

JPICS is tested with the following browsers:

Internet Explorer Version 5.5 and higher

Netscape Version 6 and higher

For further information regarding supported browsers, browser version and supported operating systems, see the Sun FAQ's.


Here is a step by step instruction to install all the required components:

**It is necessary to follow this order!**

Smart Card Reader (Omnikey: Cardman 2020 USB or Cardman 3121 USB)

CardOS interface (Siemens Version 3.0 B)

Java Runtime Environment (Sun)

Java additional components


**Every user is responsible for a proper installation matching the license agreements.**


For installation and further access you need the following:

The JPICS Installation – CD

The Smart Card JPICS.


Remark: We recommend using Cardman 2020 USB or Cardman 3121 USB. Serial card readers are not supported!!!

## Generate Codes

In the JPICS application you can choose to generate:

- **Masterphone codes**
- **Simlock – Unlock – Codes**

## Masterphone codes

The **Masterphone code** is used to unlock blocked mobiles.

**Masterphone codes** can only be supplied for mobiles which have been delivered in a regular manner.

## Simlock – Unlock – Code

The **Simlock – Unlock – Codes** can only be generated if the following conditions are given:

- Mobile must have an active **Simlock** inside.
- The user must be given the authorization to obtain **Simlock – Unlock – Codes** for the variant of the operator to which the mobile was delivered last time.

**Printing IMEI label**

The module **"printing IMEI label"** offers the possibility to re-print IMEI labels for mobiles again.
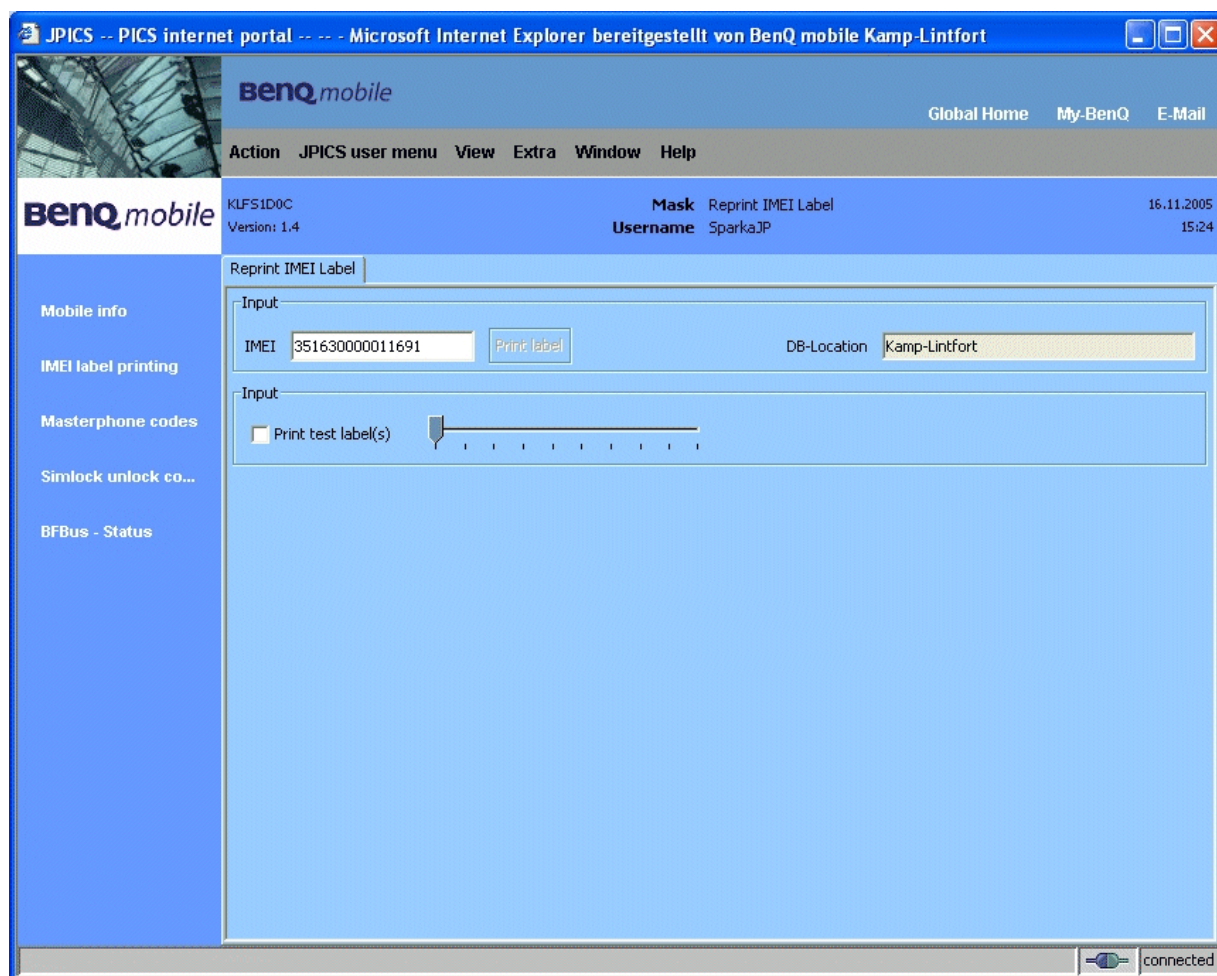


You are able to print 1 label in just one step.

To prevent that misaligned labels are being printed, the setting "Print test labels = ✓" is activated by default. After having printed a well aligned test label you can uncheck the setting and print the correct label.

**Hint:**

For correct printing of IMEI labels you must have a **Zebra – label printer** with special material that fits for label printing. This printer has to be connected to local LPT1 printer port

(also see Installation of IMPRINT) and MUST feature a printing resolution of 300dpi.

## 9. International Mobile Equipment Identity, IMEI

The mobile equipment is uniquely identified by the International Mobile Equipment Identity, IMEI, which consists of 15 digits. Type approval granted to a type of mobile is allocated 6 digits. The final assembly code is used to identify the final assembly plant and is assigned with 2 digits. 6 digits have been allocated for the equipment serial number for manufacturer and the last digit is spare.

E71 series IMEI label is accessible by removing the battery.

Re – use of IMEI label is possible by using a hair – dryer to remove the IMEI label.

On this IMEI label, BenQ has also includes the data code for production or service, which conforms to the industrial standard DIN EN 60062. The data code comprises of 2 characters: first character denotes the year and the second character denotes the month.

For example: S5

| CODE | Year | Month | CODE |
|------|------|-------|------|
| P | 2 0 0 2 | M A R C H | 3 |
| R | 2 0 0 3 | A P R I L | 4 |
| S | 2 0 0 4 | M A Y | 5 |
| T | 2 0 0 5 | J U N E | 6 |
| U | 2 0 0 6 | J U L Y | 7 |

To display the IMEI number, exit code and SW/HW version, key: * # 0 6 #

# 10. General Testing Information

**General Information**

The technical instruction for testing GSM mobile phones is to ensure the best repair quality.

**Validity**

This procedure is to apply for all from BenQ mobile authorized level 2 up to 3 workshops.

**Procedure**

All following checks and measurements have to be carried out in an ESD protected environment and with ESD protected equipment/tools. For all activities the international ESD regulations have to be considered.

**Get delivery:**

➢ Ensure that every required information like fault description, customer data a.s.o. is available.

➢ Ensure that the packing of the defective items is according to packing requirements.

➢ Ensure that there is a description available, how to unpack the defective items and what to do with them.

**Enter data into your database:**

(Depends on your application system)

➢ Ensure that every data, which is required for the IRIS-Reporting is available in your database.

➢ Ensure that there is a description available for the employees how to enter the data.

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## Incoming check and check after assembling:

### !! Verify the customers fault description!!

- ➢ After a successful verification pass the defective item to the responsible troubleshooting group.
- ➢ If the fault description can not be verified, perform additional tests to save time and to improve repair quality.
  - Switch on the device and enter PIN code if necessary unblock phone.
  - Check the <u>function</u> of all **keys** including **side keys.**
  - Check the **display** for error in <u>line and row</u>, and for <u>illumination.</u>
  - Check the **ringer/loudspeaker** acoustics by individual validation.
  - Perform a **GSM Test** as described on page 36.

## Check the storage capability:

- ➢ Check internal resistance and capacity of the battery.
- ➢ Check battery charging capability of the mobile phone.
- ➢ Check charging capability of the power supply.
- ➢ Check current consumption of the mobile phone in different mode.

## Visual inspection:

- ➢ Check the entire board for liquid damages.
- ➢ Check the entire board for electrical damages.
- ➢ Check the housing of the mobile phone for damages.

## SW update:

- ➢ Carry out a software update and data reset according to the master tables and operator/customer requirements.

### Repairs:

**The disassembling as well as the assembling of a mobile phone has to be carried out by considering the rules mentioned in the dedicated manuals. If special equipment is required the service partner has to use it and to ensure the correct function of the tools.**
**If components and especially soldered components have to be replaced all rules mentioned in dedicated manuals or additional information e.g. service information have to be considered**

GSM Test:

**With the availability of the GRT Test /Alignment software, this tool has to be used to perform the outgoing test!**

>Connect the mobile/board via internal antenna (antenna coupler) and external antenna

 (car cradle/universal antenna clip) to a GSM tester

>Use a Test SIM

For Triple Band phones use a separate test case, if the test software allows only one

handover.

Skip the GSM Band test cases if not performed by the mobile phone

Example:          1. Test file          Band 1 = GSM900 / Band 2 = GSM1800
                  2. Test file          Band 1 = GSM1900

| Internal Antenna | | | |
|---|---|---|---|
| | | | |
| Test case | Parameter | Measurements | Limits |
| 1  Location Update | • GSM Band 1<br>• BS Power = -55 dBm<br>• middle BCCH | • Display check | • individual check |
| 2  Call from BS | • low TCH<br>• highest PCL<br>• BS Power = -75 dBm<br>• middle BCCH | • Ringer/Loudspeaker check | • individual check |
| 3  TX GSM Band 1 | • low TCH<br>• highest PCL<br>• BS Power = -75 dBm<br>• middle BCCH | • Frequency Error<br>• Phase Error RMS<br>• Phase Error Peak<br>• Average Power<br>• Power Time Template | • GSM Spec. |
| 4  Handover to GSM Band 2 Including Handover Check | | | |
| 5  TX GSM Band 2 | • low TCH<br>• highest PCL0<br>• BS Power = -75 dBm<br>• middle BCCH | • Frequency Error<br>• Phase Error RMS<br>• Phase Error Peak<br>• Average Power<br>• Power Time Template | • GSM Spec. |
| 6  Call release from BS | | | |

| External Antenna | | | | |
|---|---|---|---|---|
| 7 | Call from MS | • GSM900<br>• high TCH<br>• second highest PCL<br>• BS Power = -75 dBm<br>• middle BCCH | • Keyboard check | • individual check |
| 8 | TX GSM Band 1 | • high TCH<br>• second highest PCL<br>• BS Power = -75 dBm<br>• middle BCCH | • Frequency Error<br>• Phase Error RMS<br>• Phase Error Peak<br>• Average Power<br>• Power Time Template | • GSM Spec. |
| 9 | RX GSM Band 1 | • high TCH<br>• BS Power = -102 dBm<br>• 50 Frames<br>• middle BCCH | • RX Level<br>• RX Qual<br>• BER Class Ib<br>• BER Class II<br>• BER Erased Frames | • GSM Spec. |
| 10 | Handover to GSM Band 2 Including Handover Check | | | |
| 11 | TX GSM Band 2 | • high TCH<br>• second highest PCL<br>• BS Power = -75 dBm<br>• middle BCCH | • Frequency Error<br>• Phase Error RMS<br>• Phase Error Peak<br>• Average Power<br>• Power Time Template | • GSM Spec. |
| 12 | RX GSM Band2 | • high TCH<br>• BS Power = -102 dBm<br>• 50 Frames<br>• middle BCCH | • RX Level<br>• RX Qual<br>• BER Class Ib<br>• BER Class II<br>• BER Erased Frames | • GSM Spec. |
| 13 | Call release from MS | | | |

**Final Inspection:**

The final inspection contains:

1) A 100% network test (location update, and set up call).

2) Refer to point 3.3.

3) A random sample checks of:

- Data reset (if required)

- Optical appearance

- complete function

4) Check if PIN-Code is activated (delete the PIN-Code if necessary).

Basis is the international standard of **DIN ISO 2859**.

Use Normal Sample Plan Level II and the Quality Border 0,4 for LSO.

**Remark**: All sample checks must be documented.

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# Annex 1

Test SIM Card

There are two different "Test SIM Cards" in use:

1) Test SIM Card from the company **"ORGA"**

   Pin 1 number:          0000
   PUK 1          :          12345678

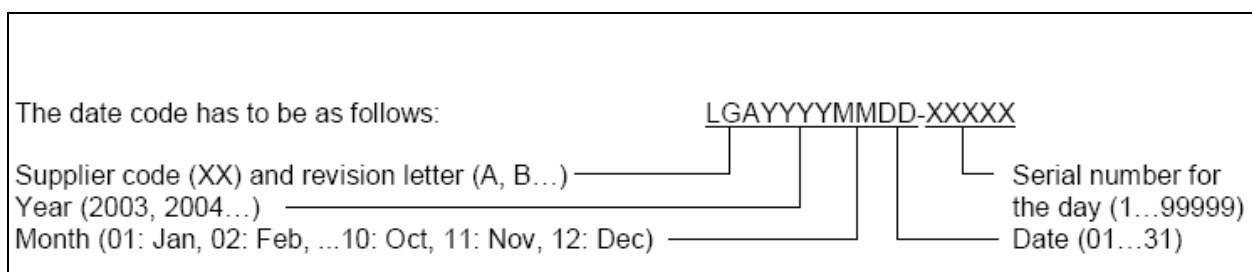   Pin 2 number:          0000
   PUK 2          :          23456789

2) Test SIM Card from the company **"T-D1"**

   Pin 1 number:          1234
   PUK            :          76543210

   Pin 2 number:          5678
   PUK 2          :          98765432

# Annex 2

**Battery Date Code**



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