Local Service Organization Service Manual

BE INSPIRED

CX 65

Our innovation shapes the future

Table of Contents

1 GPRS (General Packet Radio Service)

GPRS is a new non-voice value added services that allows information to be sent and received across a GSM mobile telephone network. It supplements today's Circuit Switched Data (CSD) and Short Message Services (SMS). GPRS involves overlaying a packet based air interface on the existing circuit switched GSM network. This gives the option to use a packet-based data service. The information is split into separated but related "packets" before being transmitted and reassembled at the receiving end. Theoretically, maximum speeds of up to 171.2 kilobits per second (kbps) are achievable with GPRS using all eight timeslots at the same time. This is about 3 times as fast as the data transmission speed possible over today's fixed telecommunications networks and 10 times as fast as current Circuit Switched Data services on GSM networks.

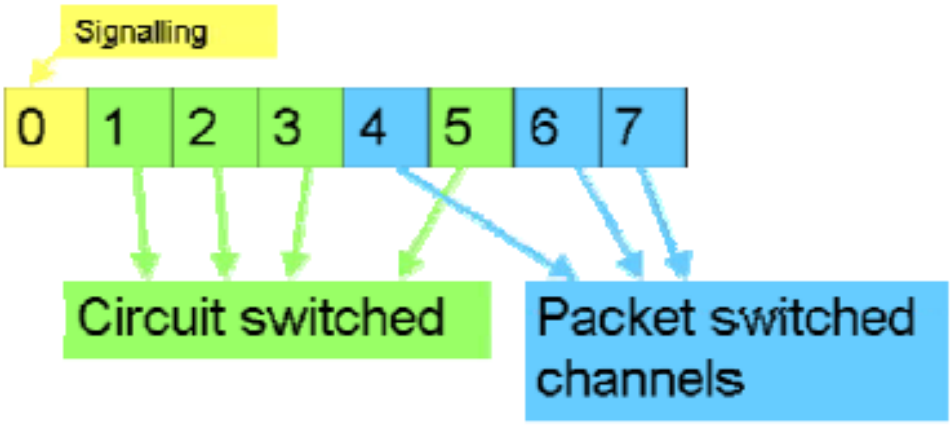


Figure1. Example of GPRS data transmission

Example: Cell with 1 Frequency channel:
1 physical channel for signaling, 4 physical channels for Circuit switched and 3 physical channels for Packet switched.

2 K-Java Application

Java-based game system		
Java Application Manager (JAM)	Application launcher and download manager. Supports HTTP-based OTA download of applications over GPRS and CSD.	yes
RAM for Java applications	Available RAM for Java applications (i.e. Program code and data) during application runtime: Minimum 100 Kbytes (Has to be taken as working assumption for application development). Goal: 145 Kbytes as SL45i (not committed)	yes
MIDP 1.0, CLDC 1.0	As SL45i, including performance optimizations from SL45i-Infusio.	yes
'OEM extensions'	Proprietary API extension as SL45i. Including 'Siemens Game API'	yes
HTTP API over GPRS	Sl45i: only CSD	yes

3 Key Features

Bands	• Triple Band E-GSM 900 / GSM 1800 / GSM 1900 • GPRS Multi Class 10
Battery	• Li-Ion Battery Pack • Nominal Voltage : 3.7V • Nominal Capacity : 800 mAh • GSM Capacity : 700 mAh • Power Input : 1.8A (0.6 ms) / (4 ms) • Cut-off Threshold : 3.2V
Stand-by Time	• Approx. 250 h / Li-Ion (measured at BSPAMFRMS = 9; Number of neighboring cells = 0)
Talk Time	• Best case approx. 5 hours (lowest output level with DTX • Worst case approx. : 2.0 hours (highest output level with DTX) Condition for DTX : 40% user talk time
SIM Card	• Small (”Plug In”) 3V SIM card (Phase II) • To insert the SIM card, the battery pack must be removed.
GSM Antenna	• A triple band PIFA antenna will be an integral part of the mobile phone.
Receiver Sensitivity	• EGSM: -102 dBm (-104dBm-15.2) (Specification; static & with fading) • PCN : -102 dBm (Specification; static & with fading) The reception sensitivity must comply with the corresponding GSM recommendations in all operating conditions (temperature, battery level ...). • EGSM: measurements according typical sensitivity are not yet available. • PCN: measurements according typical sensitivity are not yet available Measurement values are referred to the external antenna connector.

Transmitter Power	• EGSM: nominal 2W (Specification: Class 4 Mobile phone) • PCN: nominal 1W (Specification: Class 1 Mobile phone)

	Transmitter output characteristics is according to GSM 11.10 specification implying all specified operating conditions (temperature, battery level ...). Transmitter set points will be specified for GSM and PCN when typical values and statistical values become available.
Speech Codec	• Triple Rate (HR/FR/EFR) and Adaptive Multi Rate are available as standard
Temperature Range	• -10^0C to $+55^0$C (Normal operation) • -30^0C to $+85^0$C (Storage capability)
Display	• Type: Full Graphic • Resolution: 132 x 176 Pixel • Color depth: 65K • Technology: TFT • Active area / mm: 29.5 x 20.0 • Visible area / mm: max. 33.0 x 23.2 • Illumination: White LED • Contrast: Adjustable • Frame rate: 15 frames/seconds
Keypad	• Partially bridgeless • 12-digit block (0-9, #, *) and two function keys (SEND, END) in one block with small letters. • ON/OFF key combined with the END key; the symbol _ (I inside O) is used as a symbol for ON/OFF. • 2 soft keys • Illumination color : White LED • 6 white LEDs for keypad (2 white LEDs for night-design)
Acoustics	• Comfortable earpiece • Omni-directional microphone
Internet Access	• Wap 2.0 Dual stack
Camera	• Integrated camera with attachable flash • Sensor with VGA resolution: Choice of two resolutions:- 160 x 120 pixels and 640 x 480 pixels • Photo can be viewed on the mobile's display
Connectivity	• USB, Serial, and IrDA

4 Comparison with Previous Product

Feature	L55 Tuna	R65 Ulysses
Supported Systems	Triple Band – EGSM 900 / 1800 / 1900	Triple Band – EGSM 900 / 1800 / 1900
Stand-by Time	Up to 250 H	Up to 300 H

Talk Time	Up to 5 H	Up to 6 H
Battery Type / Capacity	Li-Ion Battery Pack Nominal Cap. : 700 mAh	Li-Ion Battery Pack Nominal Cap.: 800 mAh
Weight	Approx. 84 g	Approx. 90 g
Volume	Approx. 69 cm^3	Approx. 80 cm^3
Length	101 mm	108mm
Width	44 mm	45 mm
Thickness	18 mm	18 mm
SIM	Plug-in 1.8V/3 V	Plug-in 1.8V/3 V
Antenna	Integrated	Integrated
Full Rate	Yes	Yes
Half Rate	Yes	Yes
Enhanced Full Rate	Yes	Yes
AMR	Yes	Yes
Fax / Data	Yes	Yes
GPRS	Yes, Class 8	Yes, Class 10
Keypad Illumination	Yes	Yes
Display	FSTN full dot matrix, 5 lines graphic	TFT
Display Illumination	Amber	White
Ringer Volume Level	Min. 95 dB(A) @ 5 cm Typ. > 100 dB(A) @ 5 cm	Min. 95 dB(A) @ 5 cm Typ. > 100 dB(A) @ 5 cm

5 Accessories

For CX65, the following accessories will be available.

Description	**Part number**
Power Supply EU	L36280-Z4-C404

Travel Charger EU	L36280-Z4-C410
CD ROM CX65	L36453-Z5-C281
Travel Charger (UK) ETC-500	L36880-N5601-A104
Travel Charger (UK) ETC-510	L36880-N5601-A105
Headset with PTT HHS-510	L36880-N5601-A108
Data Cable USB DCA-510	L36880-N5601-A111
Tour Case FCT-650 C60/A60/CF65/CX65/CXT65	L36880-N5601-A149
Data Cable USB DCA-540 SX1/CX65/CXT65/CXV65	L36880-N6501-A102

Note: Visit the Communication Market for updated accessories:

https://communication-market.siemens.de/

5.1 CX65 Interface to accessories

The phone has a fully compatible interface to accessories. The connectors (I/O and RF) are identical to the L55 Family (C55, S55, A55/52, SL55, M55, and MC60).

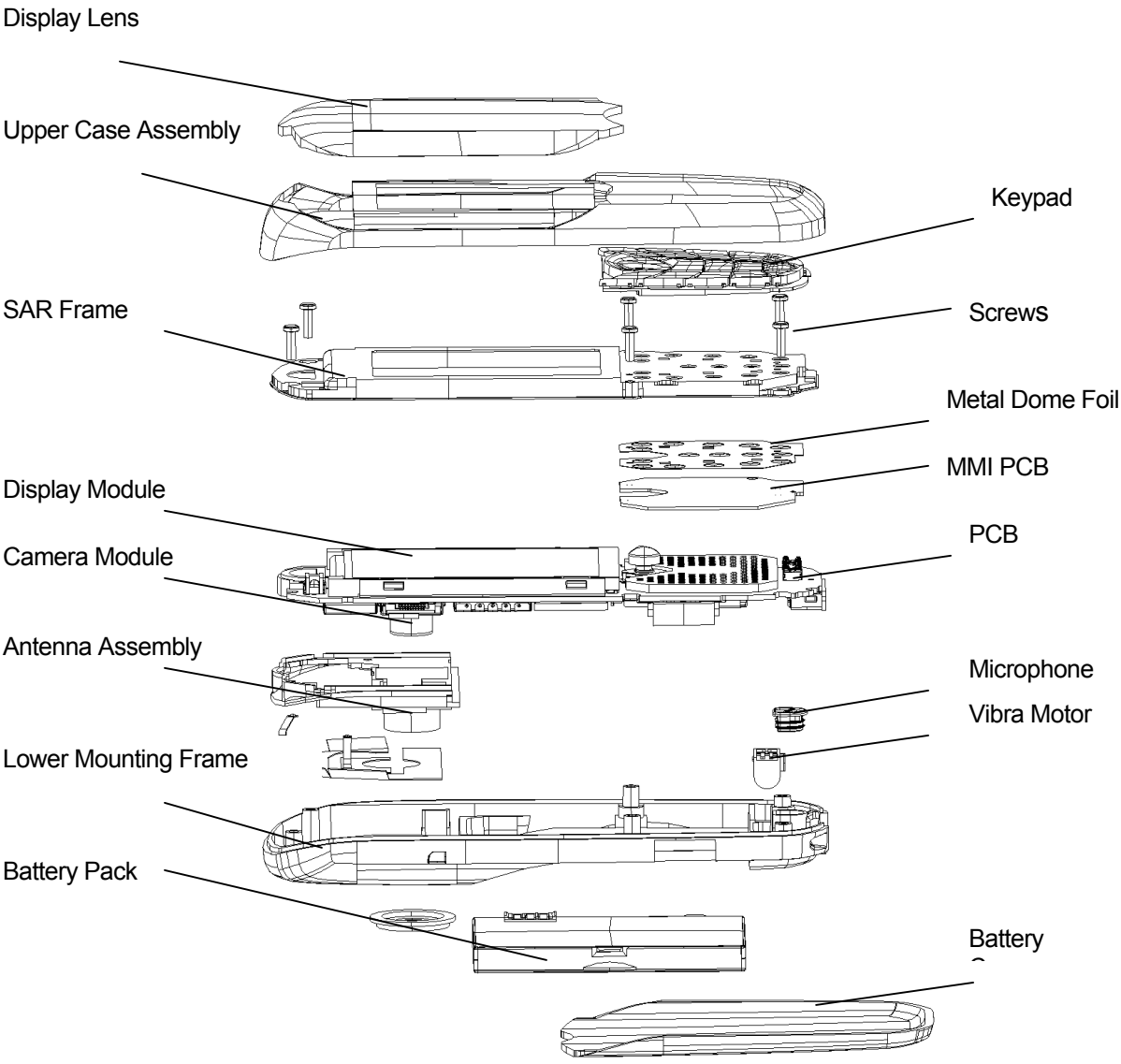
Mechanical interfaces are defined on the mobile phone to make sure that the accessories are compatible across the whole L55 platform.

Slim Lumberg I/O Connector

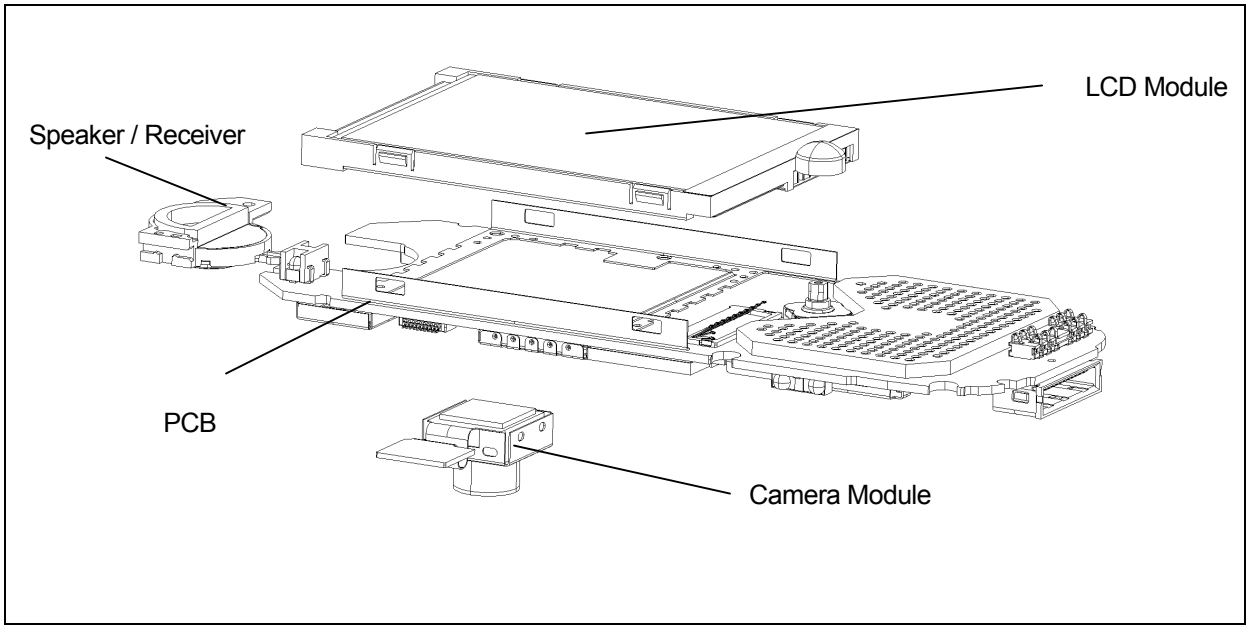
6 Unit Description of CX65

The CX65 Ulysses is designed as a two-PCB phone with exchangeable upper-cover, exchangeable battery-cover and exchangeable keypad. The upper- and the battery-cover are lacquered plastic-parts (1-shot-molding; 1 colour), Lower-Case will not be lacquered (1-shot-molding).

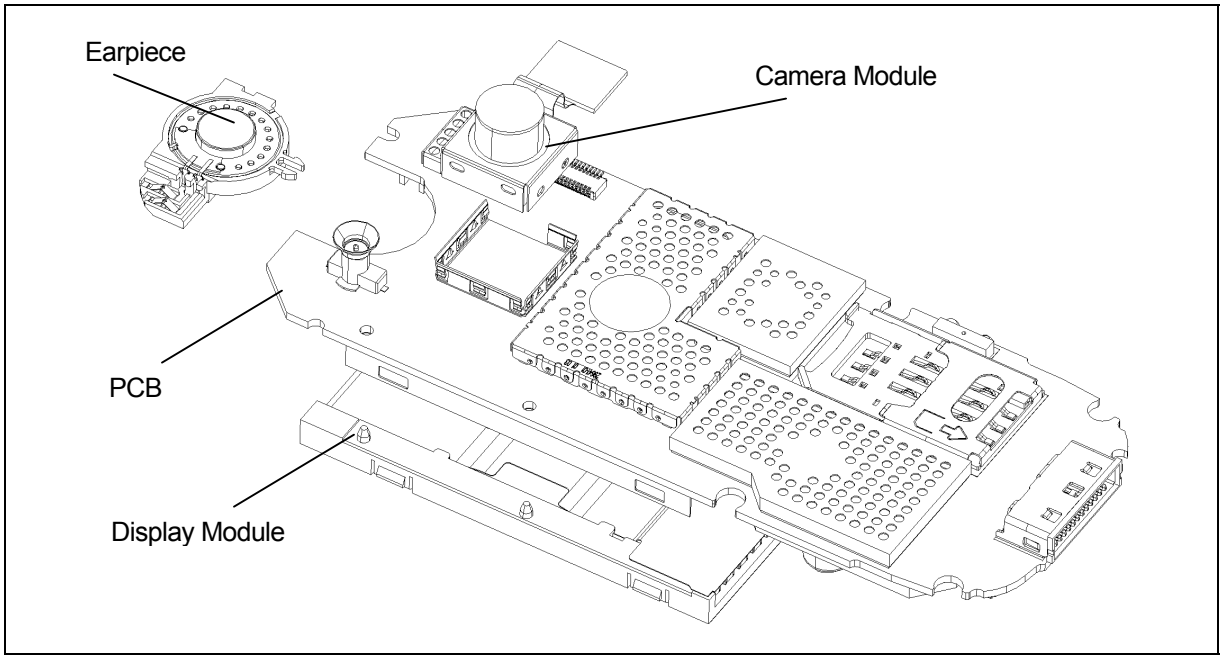
6.1 Exploded View of CX65



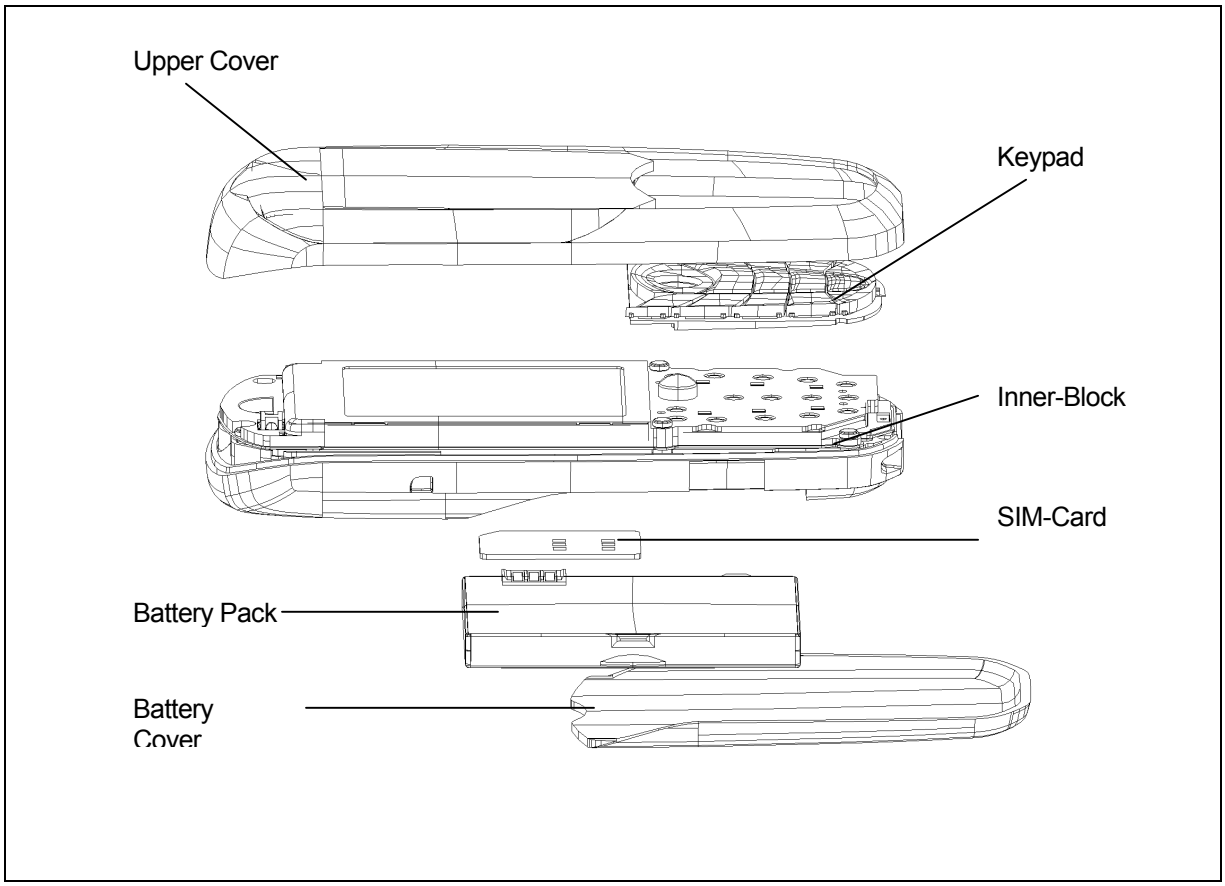
PCB Top Side



PCB Top Side



CX65 Final Assemblies:



7 Disassembly of CX65

Note: ESD concept; the internal circuits will be more susceptible to ESD because of the use of exchangeable housing. The construction of the internal block must be/is designed, in the best possible way, to protect the circuit against sparks.

The keypad must be completely closed to prevent any occurrence of an ESD disruptive discharge.

The SIM contacts may be open, thus reachable for ESD contact discharge. This could lead to damage or destruction of the E-Gold pins.

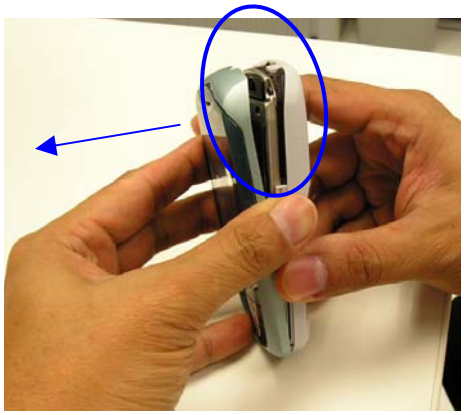
It is a requirement for the service personnel to observe ESD protection rules while performing servicing the C60.

Step 1  Front view of the CX 65	**Step 2**  Back View of the CX 65
Step 3  To remove the battery, lift the battery tab using your thumb as shown.	**Step 4**  Push the SIM card upwards as indicated by the arrow.

Step 5

Remove the front cover using an opening tool.

Step 6

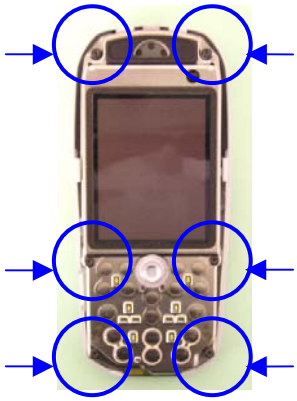


To remove the Upper cover, gently pull the cover upwards from the side of the phone while holding firmly the lower case as shown.

Step 7

The keypad can be separated from the front cover.

Step 8



To remove the SAR frame and Light Guide assembly from the lower mounting frame, unscrew the 6 screws (as indicated) with a T5 Plus screw driver (set Torque = 16 cNm).

Step 9

The RF board (PCB) can be seen after removing the SAR Frame and Light Guide assembly.

Step 10

Separate Display module from the RF board and place it on an ESD safe material

Step 11

Separate the Earpiece and the Camera module from the RF board.

Step 12

Remove the Vibra motor and MIC from the lower housing.

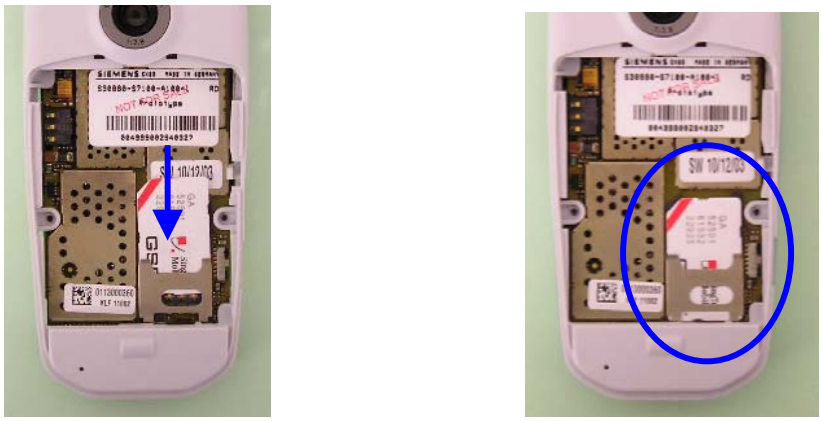
Step 13

Fully disassembled CX65

8 Reassembly of CX65

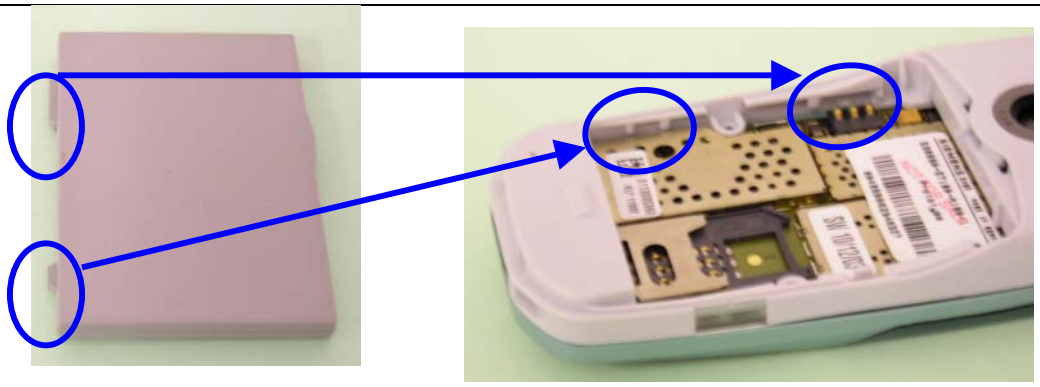
For the reassembly of the CX65, reverse the disassembly procedures from Step 13 to Step 1. However there are some areas to be taken note of during reassembling of the phone.

During the installation of the SIM card, make sure that the SIM card is inserted properly and that the golden contact area is facing downwards. Insert the SIM card downwards to lock the SIM card into position.



Installation of the SIM card

During the installation of the battery, make sure that the hinges are properly in place (See picture below). Otherwise the battery will not be able to fit into the phone properly.



9 Mobile Software Programming

The common mobile software available is divided into language groups. However, this software does not contain the specific settings, such as ringing tones, greeting text, and short dial list etc., required by the operator or service provider. Therefore, it is common to have some menu item(s) differ in different variants or are not visible at all. These settings are stored in different memory area of the mobile and will be activated depending on the customer specific model or variant of the phone by a separate test step during the production process.

Due to this separation of common mobile software and customer specific initialization, it is possible to fulfil the demands of the market requiring customization and flexibility. As a consequence the software programming process in the LSO is divided into two different steps as followed:

- Software update to actual version and appropriate language group
- Programming of CUSTOMER SPECIFIC INITIALIZATION

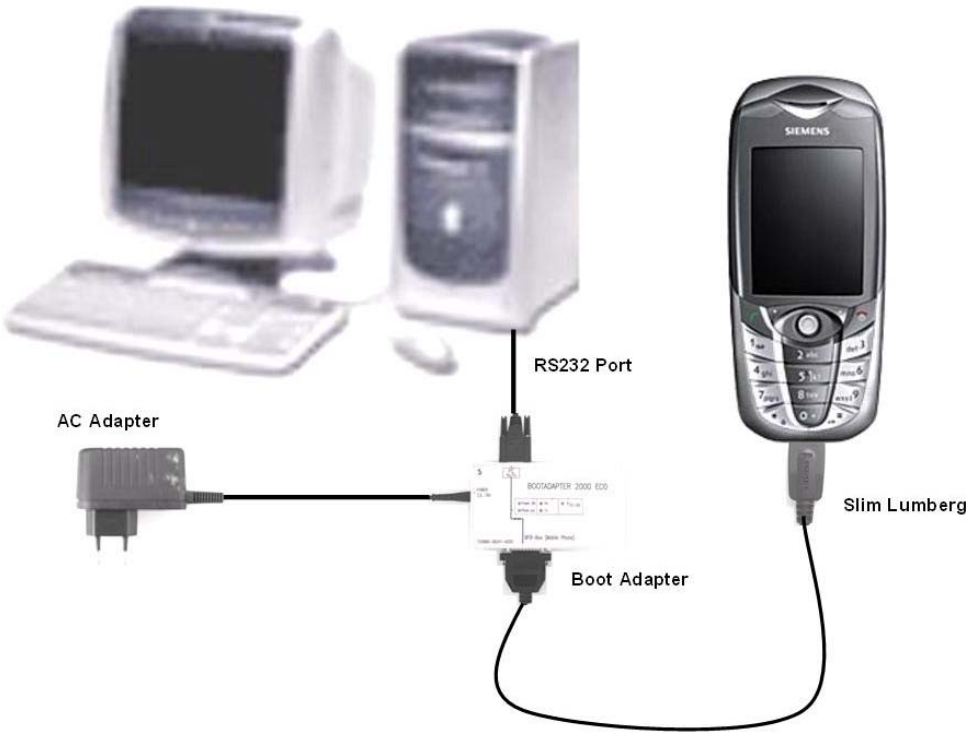


Figure 1. CX65 Software Programming Setup

9.1 Mobile Software Updating

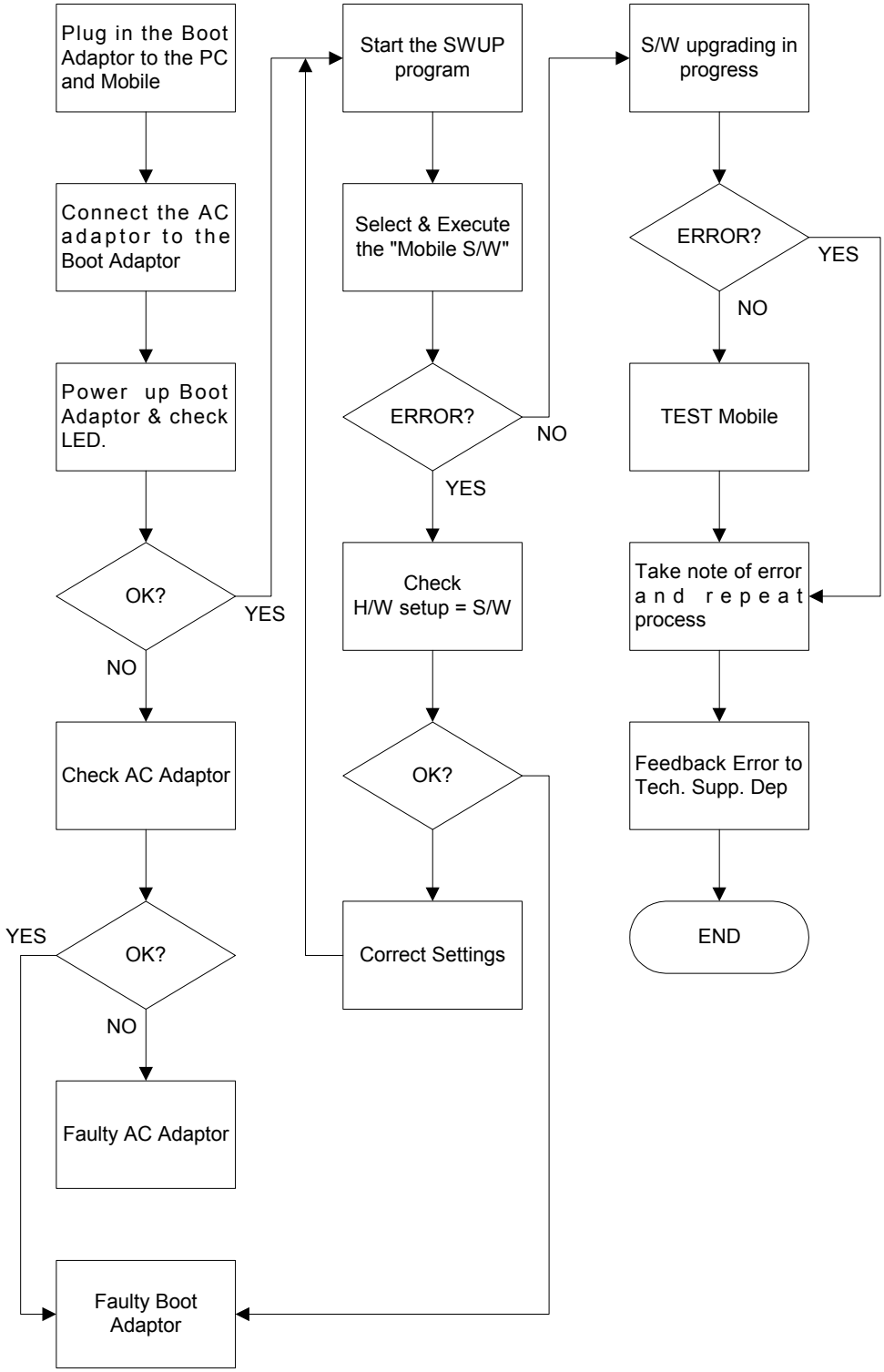
The software of the mobile, R65 series is loaded from a PC directly. Hardware interconnection between the mobile and the PC is shown in Figure 1. Because of the new type of external connector used in X55 series (Slim-Lumberg type) an additional adaptor cable between mobile and boot adaptor is required. Table 1 listed all the hardware requirements

If you use the battery dummy, make sure that the power supply voltage is correctly adjusted.

Description	Part No.
Bootadapter 2000 incl. AC-Adapter, serial cable and mobile connection cable	L36880-N9241-A200
IBM Compatible PC – Pentium	-
Adapter cable – Slim Lumberg to Old	F30032-P226-A1

TABLE 1. EQUIPMENT LIST FOR SOFTWARE PROGRAMMING

9.2 Flow Chart for Software Upgrading



FLOW CHART FOR S/W PROGRAMMING PROCESS

10 Siemens Service Equipment User Manual

Introduction

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

Siemens Mobile Service Equipment

Using this system vastly simplifies the repair of the phones and will make sure that:

1. All possible faults are detected
2. Sets, which pass the test, will be good enough to return to customer.

Starting from the P35 Series, Siemens will introduce a simpler and faster testing platform for testing a repaired Siemens mobile phone. The testing platforms are either base on R&S CMD 53/55 or CTS55 GSM test set.

There is also test software under development for testing with the Wavetek 4201S and the 4107 GSM test set.

Level 2.5 service software is also under development for more elaborate testing for the repair for the L55 series mobile phone.

THE LSO WILL HAVE TO PURCHASE THE SYSTEM, CHOOSING BETWEEN THE COMPLETE PACKAGE AND SUB-SET OF IT.

A FULLY AUTOMATIC TEST PROCEDURE IS ONLY POSSIBLE IF THE COMPLETE SYSTEM IS INSTALLED.

Make sure that your CTS firmware is Version 3.01 or higher. For CMD 55 it must be Version 4.03 and higher. Please check with the Service Info SB_0500 for the CTS/CMD Hardware Options.

11 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
- Lock, Unlock and Test the BF-Bus

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 chip card. These chip 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 chip cards or administration of the databases please ask your responsible Siemens Customer Care Manager.

Installation overview

The following installation description assumes that a web browser is already installed. JPICS is tested with the following browsers

1. Internet Explorer Version 5.5 and higher
2. 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!

1. Card reader (Omnikey)
2. CardOS interface (Siemens)
3. JPICS Certificates
4. Java Plugin JVM/JRE (Sun)
5. Java additional components

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

For installation and further access you need the following:

1. The JPICS Installation-CD

2. A chip card. Chip cards can be ordered via your responsible Customer Care Manager within Siemens.

3. A supported chip card reader (Smarty or Siemens B1) in order to access your chip card.

Remark:

We recommend using Siemens B1 reader. Similar device to B1 is Cardman 9010.

In the module "**Generate Codes**"you can choose to generate:

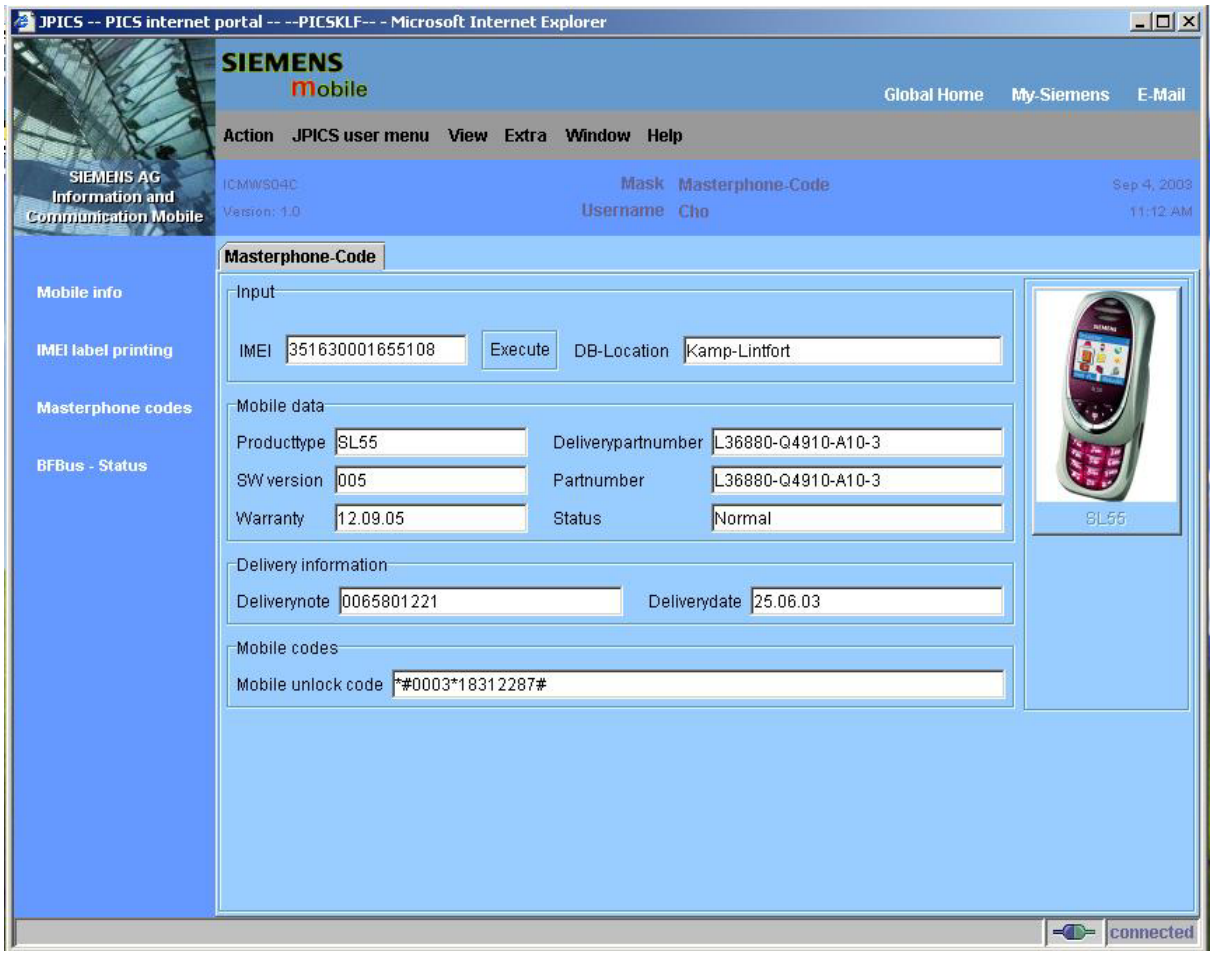
- Master – Phonecodes

- Simlock Unlock – Codes

Master - Phonecodes

The **Master – Phonecode** is used to unlock blocked mobiles.

Master – Phonecodes can only be supplied for mobiles which have been delivered in a regular manner.

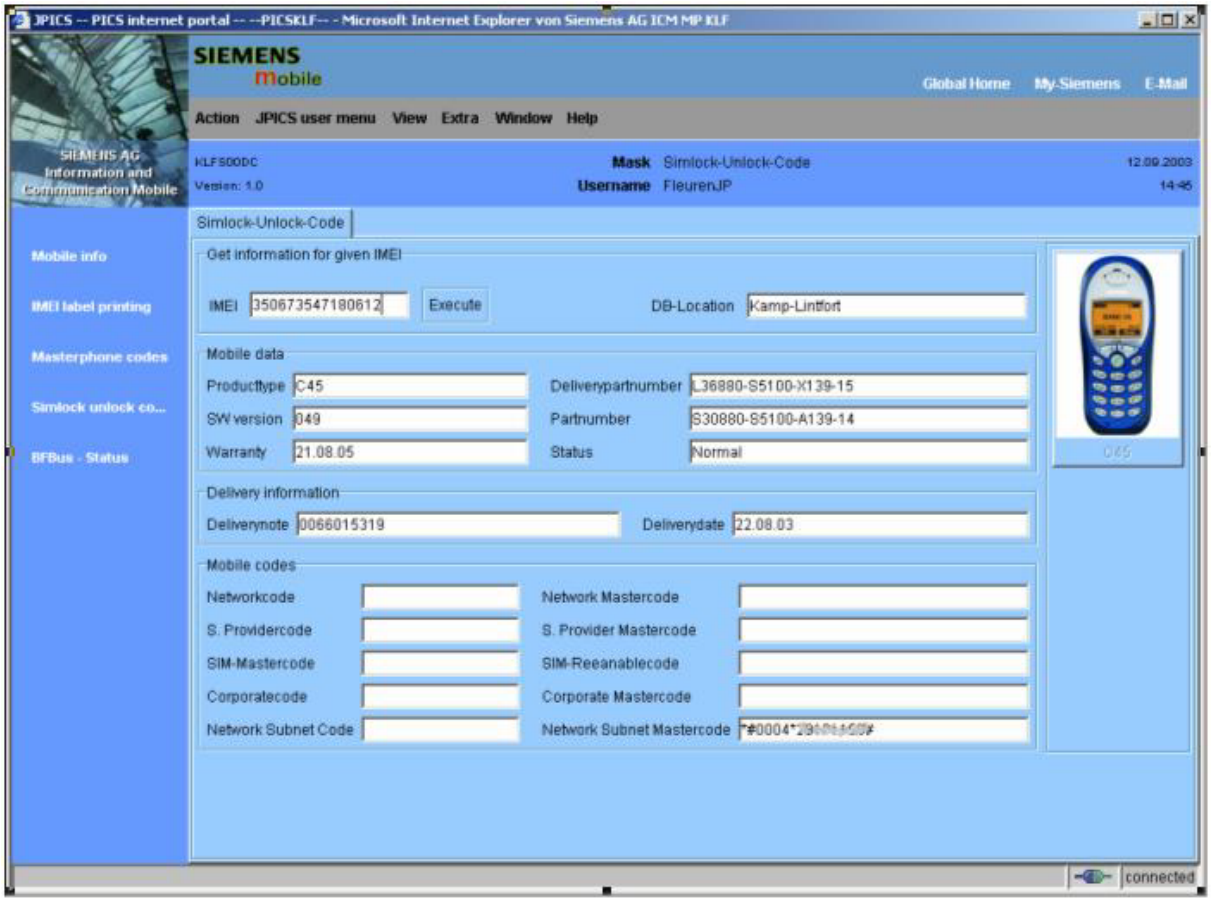


Simlock Unlock - Code

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

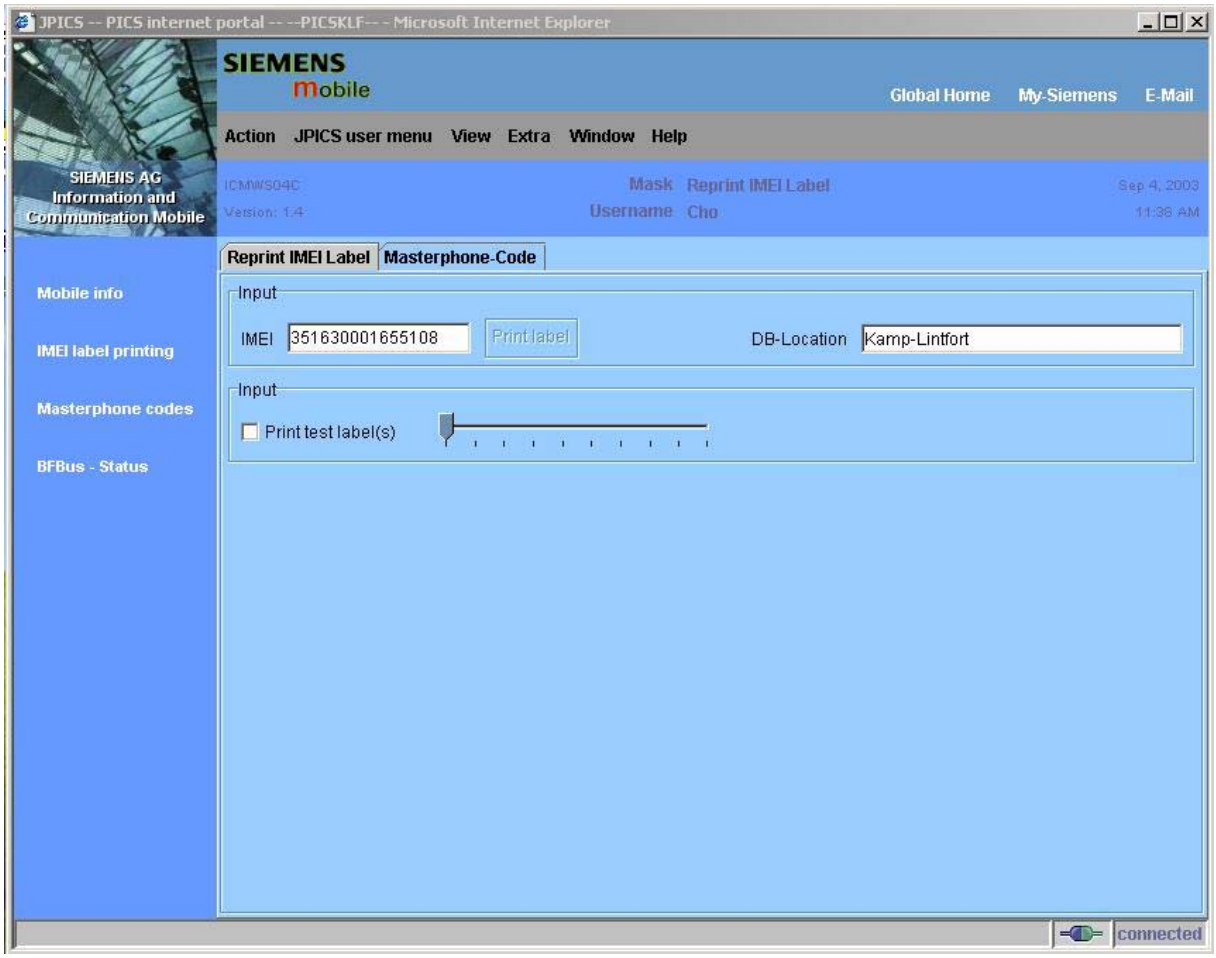
- Mobile must have an active **Simlock** inside.

- 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 "**Print 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 as 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.

12 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.

The part number for the C60 is S30880-S5850-Axx-x where the last 4 letters specify the housing and software variant.

C60 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, Siemens has also includes the date code for production or service, which conforms to the industrial standard DIN EN 60062. The date code comprises of 2 characters: first character denotes the Year and the second character denotes the Month.

For example: **M3**

CODE	YEAR	MONTH	CODE
M	2000	MARCH	**3**
N	2001	APRIL	4
P	2002	MAY	5
R	2003	JUNE	6
S	2004	JULY	7

TABLE 2 DIN EN 60062 DATE CODE

To display the IMEI number, exit code and SW/HW version, key: *#06#.

13 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 Siemens AG authorized level 2 up to 2.5e 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.

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 function of all **keys** including **side keys.**
  - Check the **display** for error in line and row, and for illumination.
  - Check the **ringer/loudspeaker** acoustics by individual validation.
  - Perform a **GSM Test** as described on page 34.

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:

- Connect the mobile/board via internal antenna (antenna coupler) and external antenna (car cradle) to a GSM tester.
- Use a Test SIM.
- Skip GSM 900/GSM1800 or GSM1900 test cases if not performed by the mobile phone.

Internal Antenna			
Test case	**Parameter**	**Measurements**	**Limits**
1 Location Update	• GSM900 • BS Power = -55 dBm • middle BCCH	• Display check	• individual check
2 Call from BS	• low TCH • PCL 5 • BS Power = -55 dBm • middle BCCH	• Ringer/Loudspeaker check	• individual check
3 TX GSM900	• low TCH • PCL 5 • BS Power = -55 dBm • middle BCCH	• Frequency Error • Phase Error RMS • Phase Error Peak • Average Power • Power Time Template	• GSM Spec.
4 Handover to GSM1800 Including Handover Check			
5 TX GSM1800	• low TCH • PCL 0 • BS Power = -55 dBm • middle BCCH	• Frequency Error • Phase Error RMS • Phase Error Peak • Average Power • Power Time Template	• GSM Spec.
6 Handover to GSM1900 Including Handover Check			
7 TX GSM1900	• low TCH • PCL 0 • BS Power = -55 dBm • middle BCCH	• Frequency Error • Phase Error RMS • Phase Error Peak • Average Power • Power Time Template	• GSM Spec.
8 Call relaese from BS			

External Antenna			
Test case	**Parameter**	**Measurements**	**Limits**
9 Call from MS	• GSM900 • high TCH • PCL 6 • BS Power = -55 dBm • middle BCCH	• Keyboard check	• individual check
10 TX GSM900	• high TCH • PCL 6 • BS Power = -55 dBm • middle BCCH	• Frequency Error • Phase Error RMS • Phase Error Peak • Average Power • Power Time Template	• GSM Spec.
11 RX GSM900	• high TCH • BS Power = -102 dBm • 50 Frames • middle BCCH	• RX Level • RX Qual • BER Class Ib • BER Class II • BER Erased Frames	• GSM Spec.
12 Handover to GSM1800 Including Handover Check			
13 TX GSM1800	• high TCH • PCL 1 • BS Power = -55 dBm • middle BCCH	• Frequency Error • Phase Error RMS • Phase Error Peak • Average Power • Power Time Template	• GSM Spec.
14 RX GSM1800	• high TCH • BS Power = -102 dBm • 50 Frames • middle BCCH	• RX Level • RX Qual • BER Class Ib • BER Class II • BER Erased Frames	• GSM Spec.
15 Call relaese from MS			

16	Handover to GSM1900 Including Handover Check			
17	TX GSM1900	• high TCH • PCL 1 • BS Power = -55 dBm • middle BCCH	• Frequency Error • Phase Error RMS • Phase Error Peak • Average Power • Power Time Template	• GSM Spec.
18	RX GSM1900	• high TCH • BS Power = -102 dBm • 50 Frames • middle BCCH	• RX Level • RX Qual • BER Class Ib • BER Class II • BER Erased Frames	• GSM Spec.
19	Echo Test	• high TCH • PCL 1 • BS Power = -70 dBm • middle BCCH		• individual check

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.

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”**

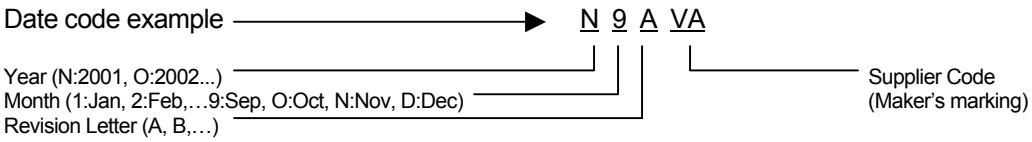
   Pin 1 number: 1234
   PUK : 76543210

   Pin 2 number: 5678
   PUK 2 : 98765432

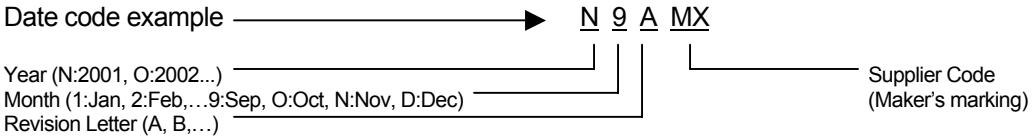
Annex 2

Battery Date Code overview

Varta



Hitachi / Maxwell



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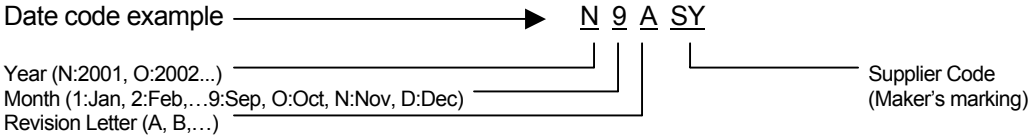

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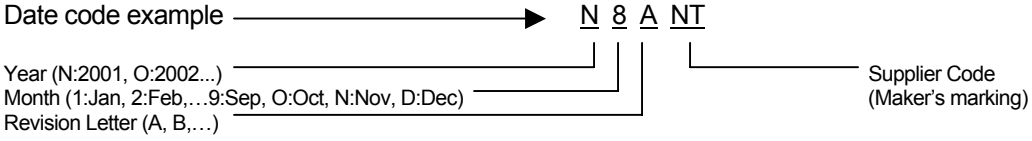
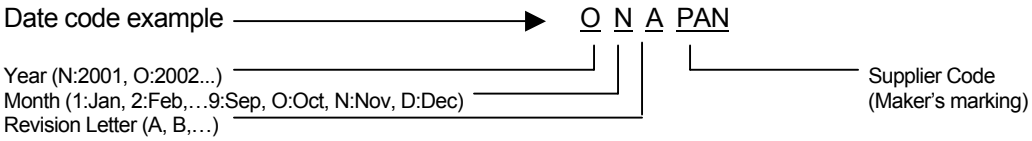


Panasonic



Sony