Local Service Organization Service Manual

BE INSPIRED

S X 1

Menu

Telephone   Internet   Camera

Records   Messages   Organiser

Music   Contacts   Games

Options   Exit

SIEMENS

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.
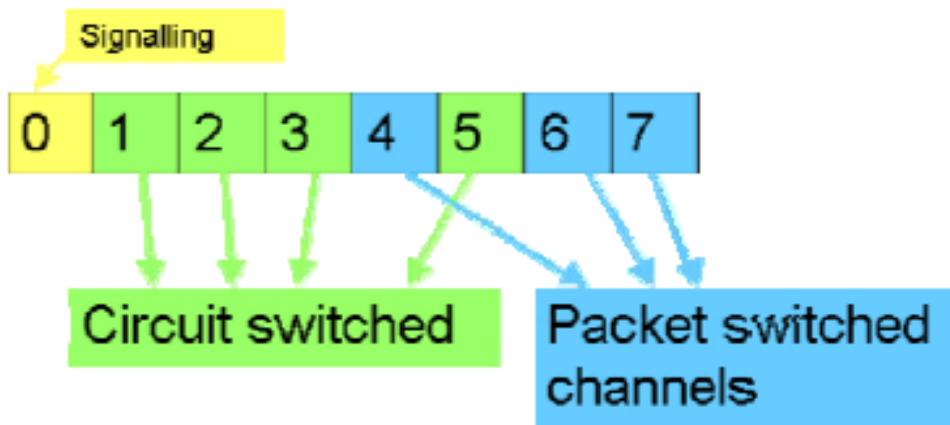

Figure1. Example of GPRS data transmission

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	• Tri Band E-GSM 900 / GSM 1800 / GSM 1900

	• GPRS Multi Class 10
Battery	• Lithium Polymer Battery Pack • Nominal Voltage : 3.7V • Nominal Capacity : 1000 mAh • GSM Capacity : 700 mAh • Power Input : 1.8A (0.6 ms) / (4 ms) • Cut-off Threshold : 3.2V
Stand-by Time	> 200 h (actual performance is dependent on network environment)
Talk Time	> 240 min with standard battery (actual performance is dependent on the network environment)
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.
Application Platform	• *Symbian* open OS • Customisable Series 60 user interface • Java J2ME™ MIDP 1.0 compliant

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 AMR
Temperature Range	• -10°C to +55°C (Normal operation) • -30°C to +85°C (Storage capability)
Display	• AM-TFD Transflective • Resolution: 101 x 80 Pixel • High resolution 65K (16 bit) color TFD: 176 X 220 pixels • Backlight: 4 White LED's • Contrast: Adjustable
Keypad	• Keyboard as edge keys • 7 Menu keys (2 soft keys, send and end keys, shift, clear, and application key) • ON/OFF key combined with the END key; the symbol _ (I inside O) is used as a symbol for ON/OFF. • 2 Side keys (voice and camera) • 5-way Joystick navigation key • Illumination color : Blue
Acoustics	• 16 mm electro-dynamic speaker (performs: receiving, hands-free, and ringing functions) • Unidirectional microphone
Camera and Video	• Integrated for Still and Video clips • Optical format: ¼ Inch VGA Sensor • Resolution: 640 x 480 and 160 x 120 • Resolution of video capture: 176 x 144 (QCIF) • Image formats: VGA, QVGA, CIF, QQVGA, QCIF • Real Player application file format : MPEG4, H.263, AMR, Real Audio, Real Video
Audio Player	• Music player format: MP3 • FM Radio: 87.5 to 108 MHz, 6 station keys • Power output: 2 x 7.5 mW
External Memory	• MMC^{TM} slot for memory extension

Wireless Connectivity	• Bluetooth • Infrared • GPRS
Wired Connectivity	• USB cable • Stereo Headset • Charger • RF Antenna connector
Mobile Internet Access	• xHtml browser

4   Accessories

For SX1, the following accessories will be available.

Description	Product Code	Part number
Li-Ion battery	EBA-540	L36880-N6501-A100

Car Charger	ECC-500	L36880-N5601-A106
Travel Charger (Euro)	ETC-500	L36880-N5601-A104
Travel Charger (UK)	ETC-510	L36880-N5601-A105
Headset with PTT	HHS-510	L36880-N5601-A108
Headset with PTT	HHS-550	L36880-N6501-A101
Headset with PTT Bluetooth (EU)	HHB-505	L36880-N6501-A109
Headset with PTT Bluetooth (UK)	HHB-515	L36880-N6501-A110
Headset with PTT Bluetooth (AUS)	HHB-525	L36880-N6501-A111
Car Charger	ECC-500	L36880-N5601-A106
Mobile Holder Antenna	HMH-530	L36880-N6501-A104
Car Kit Portable	HKP-500	L36880-N5601-A109
Basic Car Pack (Headset, Car Charger, Y-Adapter)	HKB-500	L36880-N5601-A118
Car Kit Comfort	HKC-530	L36880-N6501-A105
Car Kit Upgrade	HKO-540	L36880-N6501-A107
Data Link Cable USB	DCA-540	L36880-N6501-A102
Sync Station	DSC-510	L36880-N6501-A103
Belt Case	FCL-510	L36880-N6501-A108

5   SX 1 interface to accessories

The I/O Connector of SX 1 is the slim Lumberg (identical to SL55, S55/57, C55/2128, A55/52, M55, A60, C60, and MC 60).

It is the only electrical interface to the Accessories. Also it has only one mechanical interface which is integrated in the design parts.

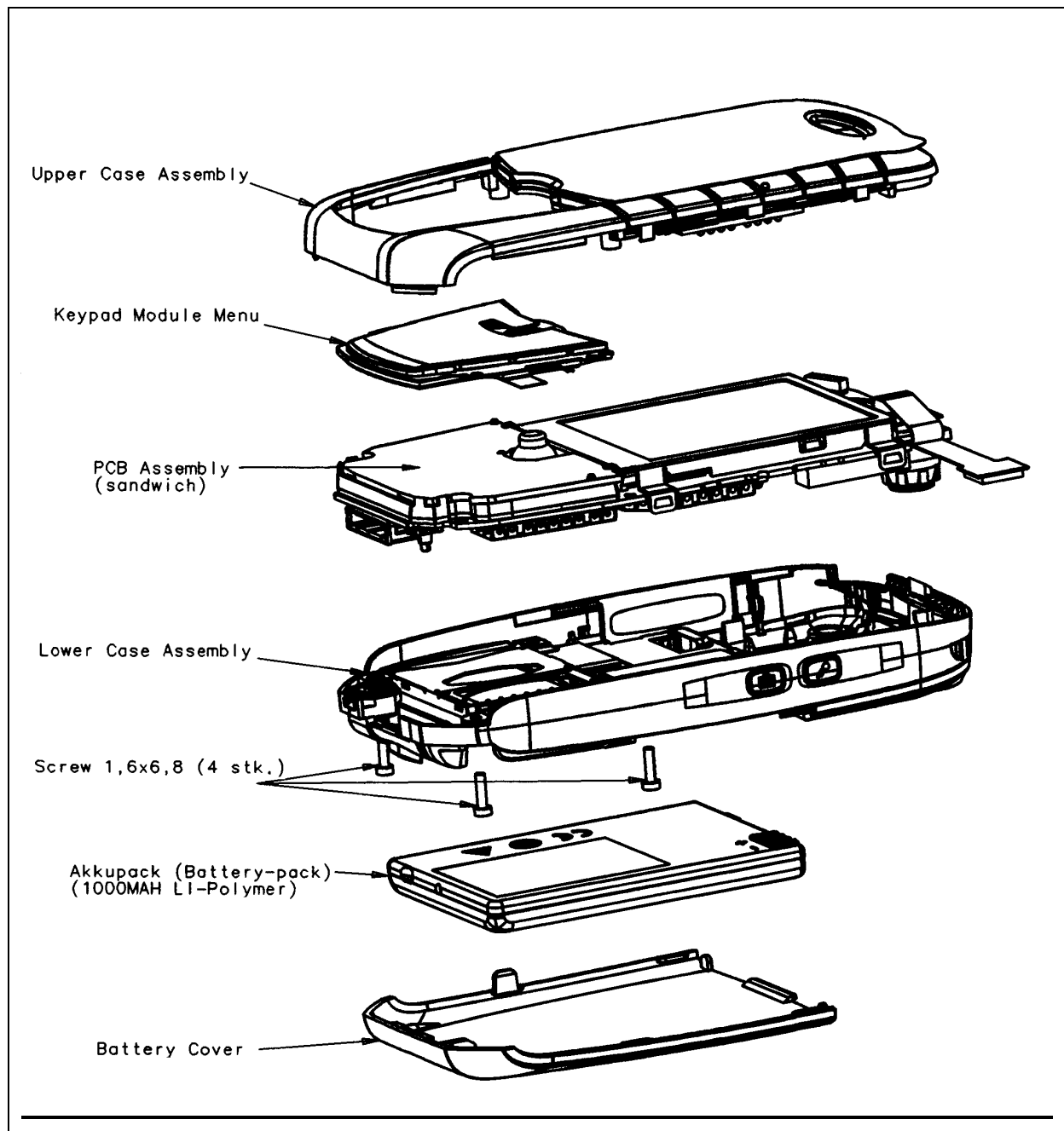Slim Lumberg I/O Connector

6   Unit Description of SX 1

The SX 1 is the first Siemens mobile phone to combine built-in video player, camcorder, music player and FM radio; rich unlimited gaming supported by Series60 or Java (J2ME); full set of business applications directly comparable to a normal PDA, including local and wireless synch.
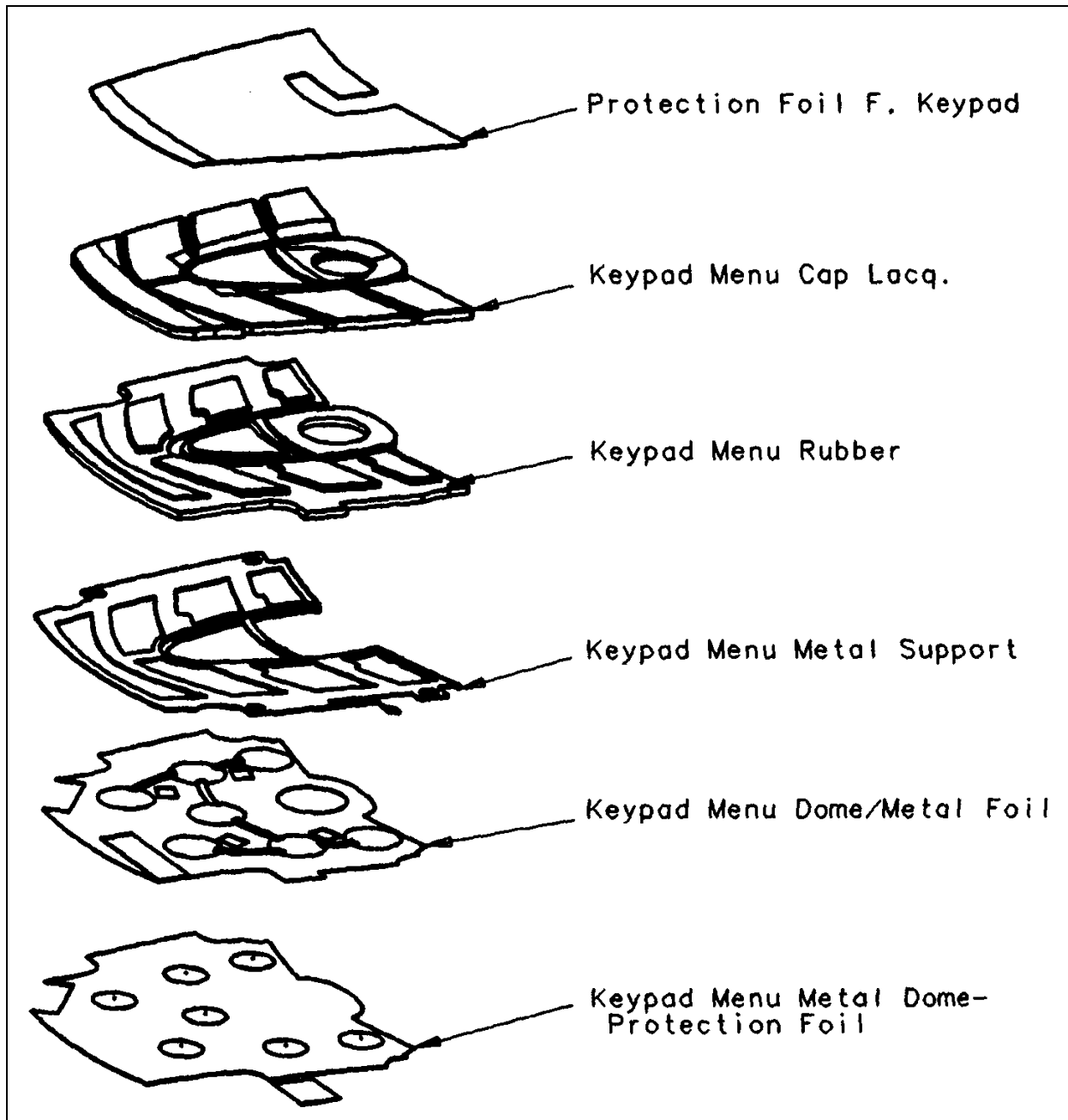
The SX 1 has strips of keys built in to each side of the phone, instead of an ordinary keypad, to give it a sleek shape. It has a 64K color high-resolution screen into the center of the device without compromising overall size as the SX 1 only weighs 110 grams. Embedded discreetly underneath the screen are a five way navigation keys which help make the features of the SX 1 even easier to navigate in the usual portrait mode or, if the application supports it, in landscape mode.
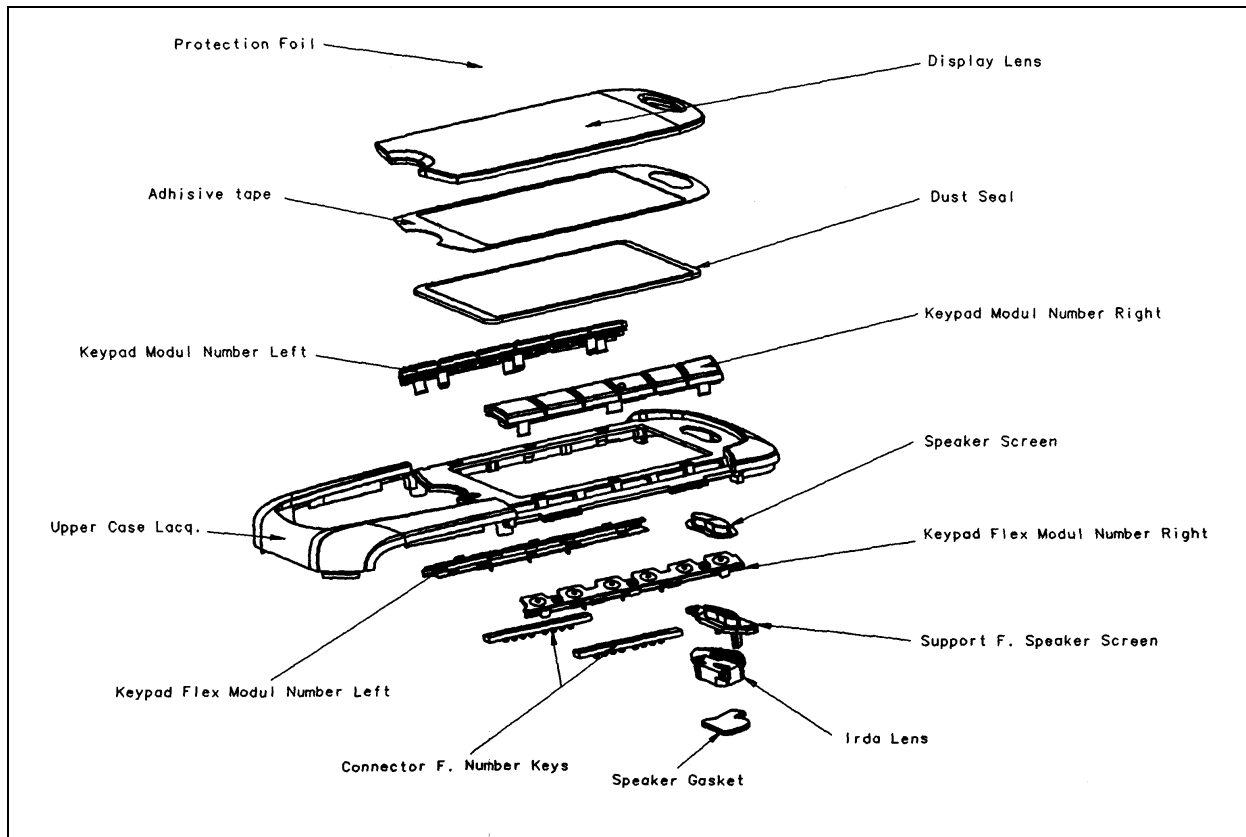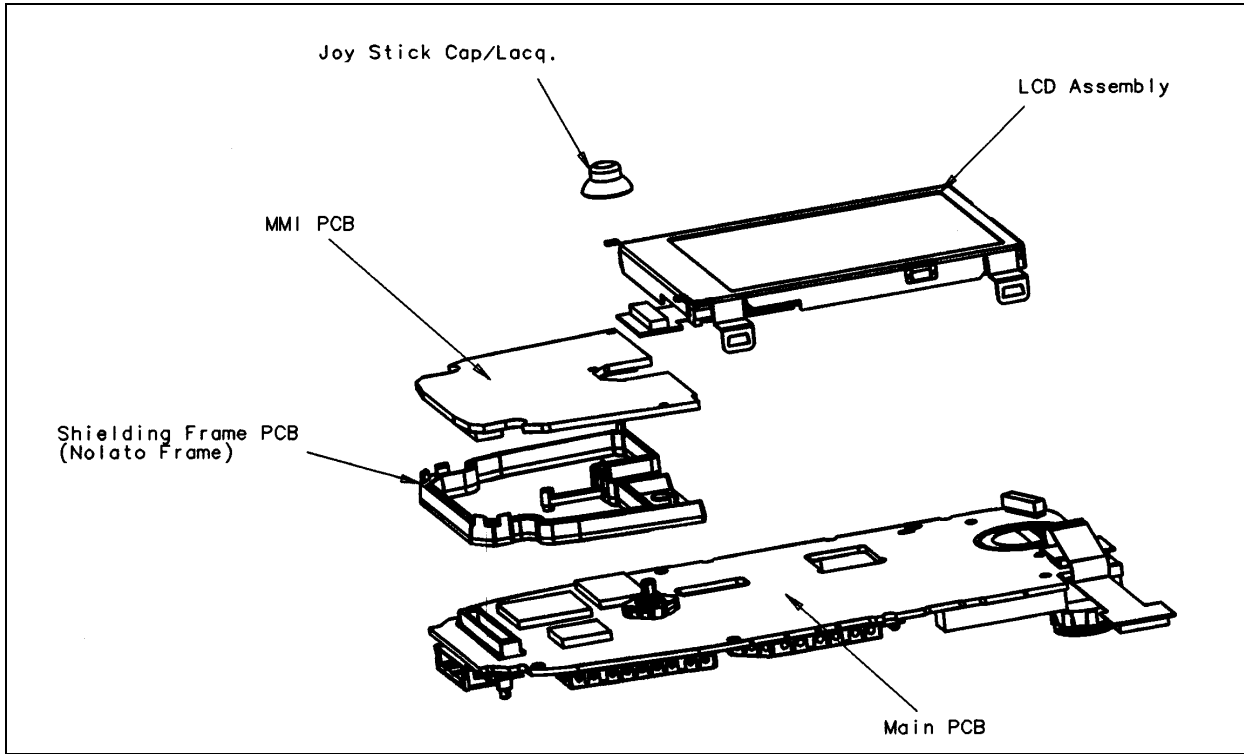
6.1 Exploded View of SX 1

Upper Case Assembly

Keypad Module Menu

PCB Assembly
(sandwich)

Lower Case Assembly

Screw 1,6x6,8 (4 stk.)

Akkupack (Battery-pack)
(1000MAH LI-Polymer)

Battery Cover

Keypad Module Menu

Protection Foil F. Keypad

Keypad Menu Cap Lacq.

Keypad Menu Rubber

Keypad Menu Metal Support

Keypad Menu Dome/Metal Foil

Keypad Menu Metal Dome-
Protection Foil

Upper Case Assembly

Protection Foil — Display Lens

Adhisive tape — Dust Seal

Keypad Modul Number Left — Keypad Modul Number Right

Upper Case Lacq. — Speaker Screen

Keypad Flex Modul Number Right

Support F. Speaker Screen

Keypad Flex Modul Number Left

Irda Lens

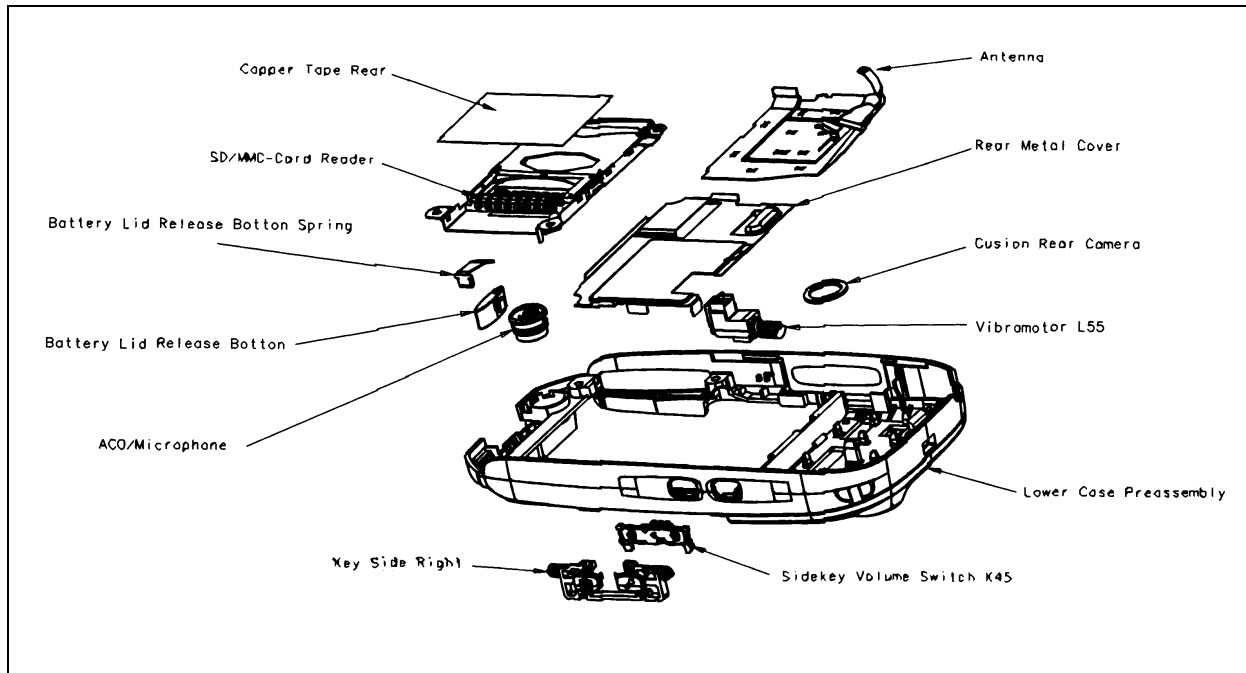Connector F. Number Keys

Speaker Gasket

Upper Side PCB Assembly

Lower Side PCB Assembly

Lower Case Assembly

Copper Tape Rear
Antenna
SD/MMC-Card Reader
Rear Metal Cover
Battery Lid Release Botton Spring
Cusion Rear Camera
Battery Lid Release Botton
Vibromotor L55
ACO/Microphone
Lower Case Preassembly
Key Side Right
Sidekey Volume Switch K45

Keypad Flex Module Number Left

Keypad Number Dome/Adhesive Tape Left

Keypad Number Flex Left
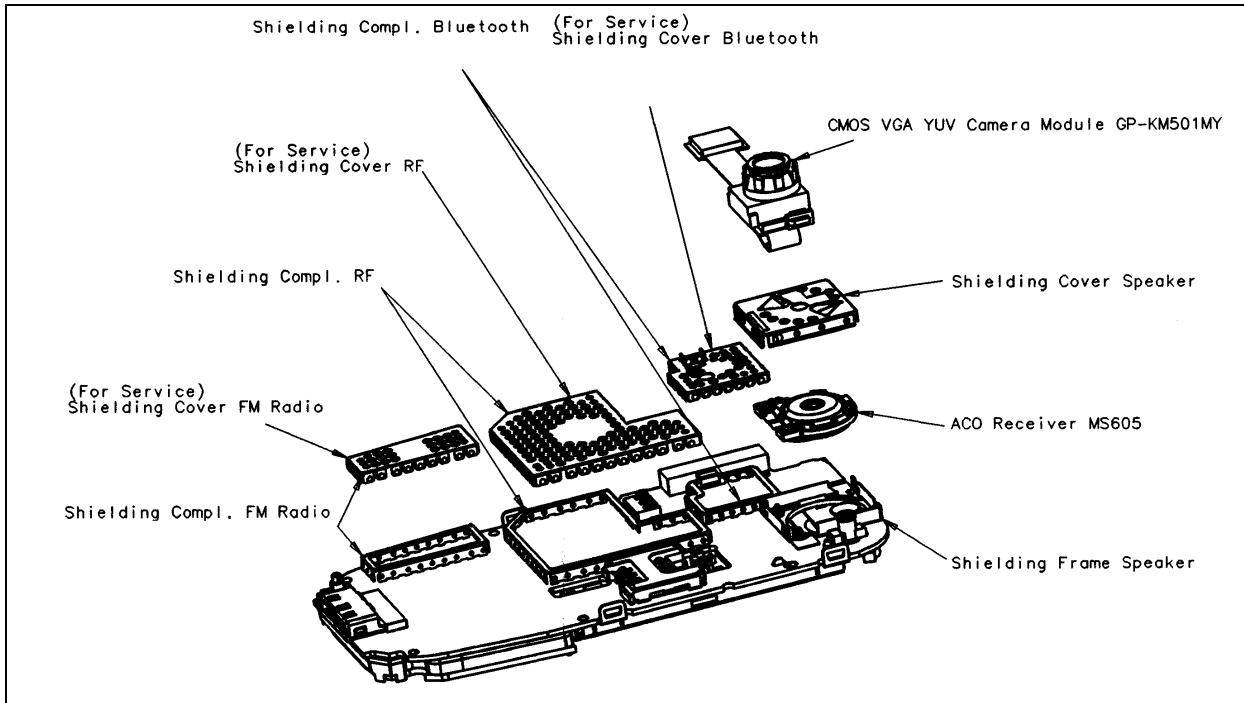
Keypad Number Support F. Flex Left

Keypad Flex Module Number Right

Keypad Number Dome/Adhesive Tape Right

Keypad Number Support F. Flex Right

Keypad Number Flex Right

Keypad Module Number Left

Keypad Number Cap Left

Keypad Number Rubber Left

Keypad Number IML Left
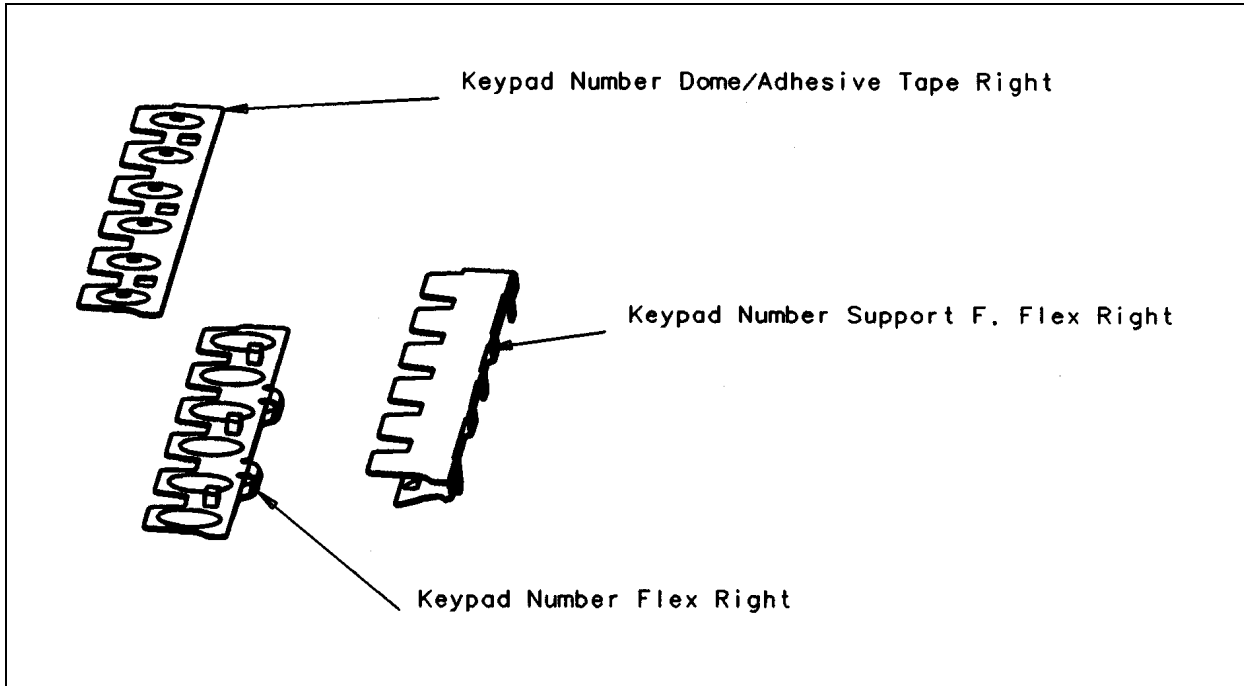
Keypad Number Support F. Module Left

Keypad Module Number Right

Keypad Number Cap Right

Keypad Number Rubber Right

Keypad Number IML Right
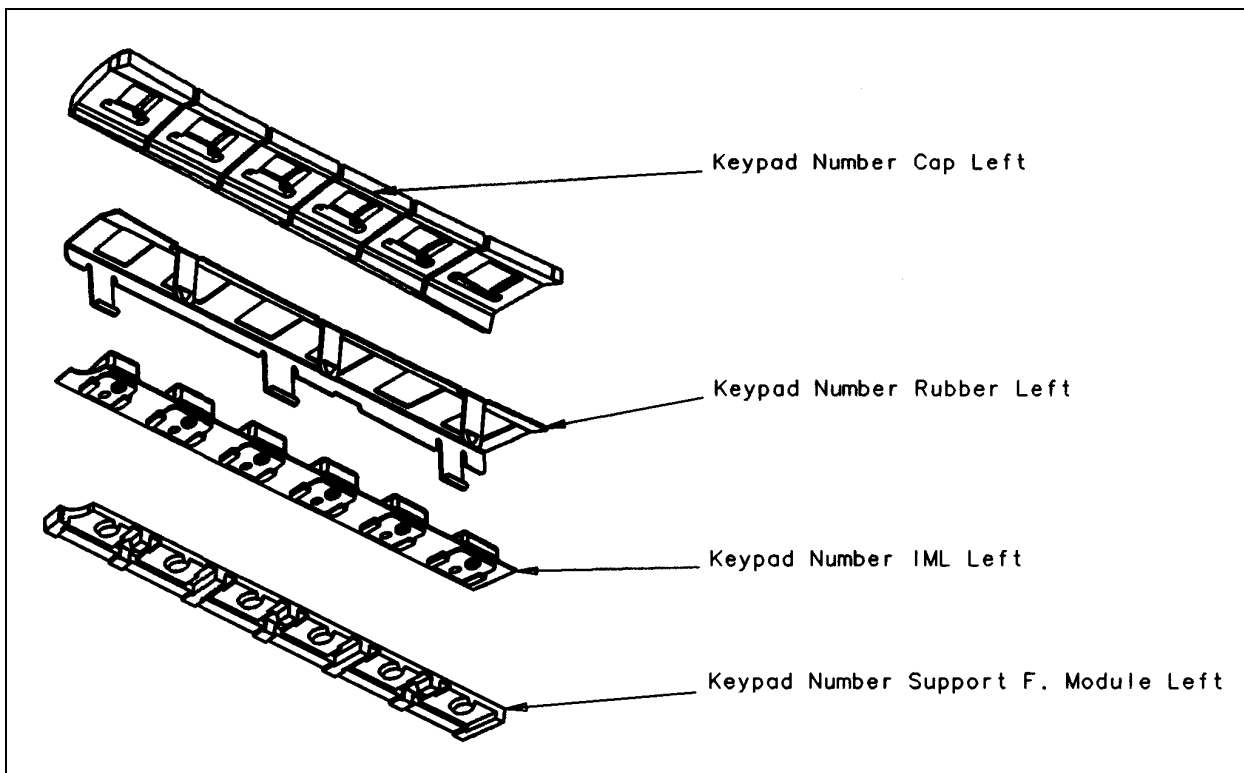
Keypad Number Support F. Module Right
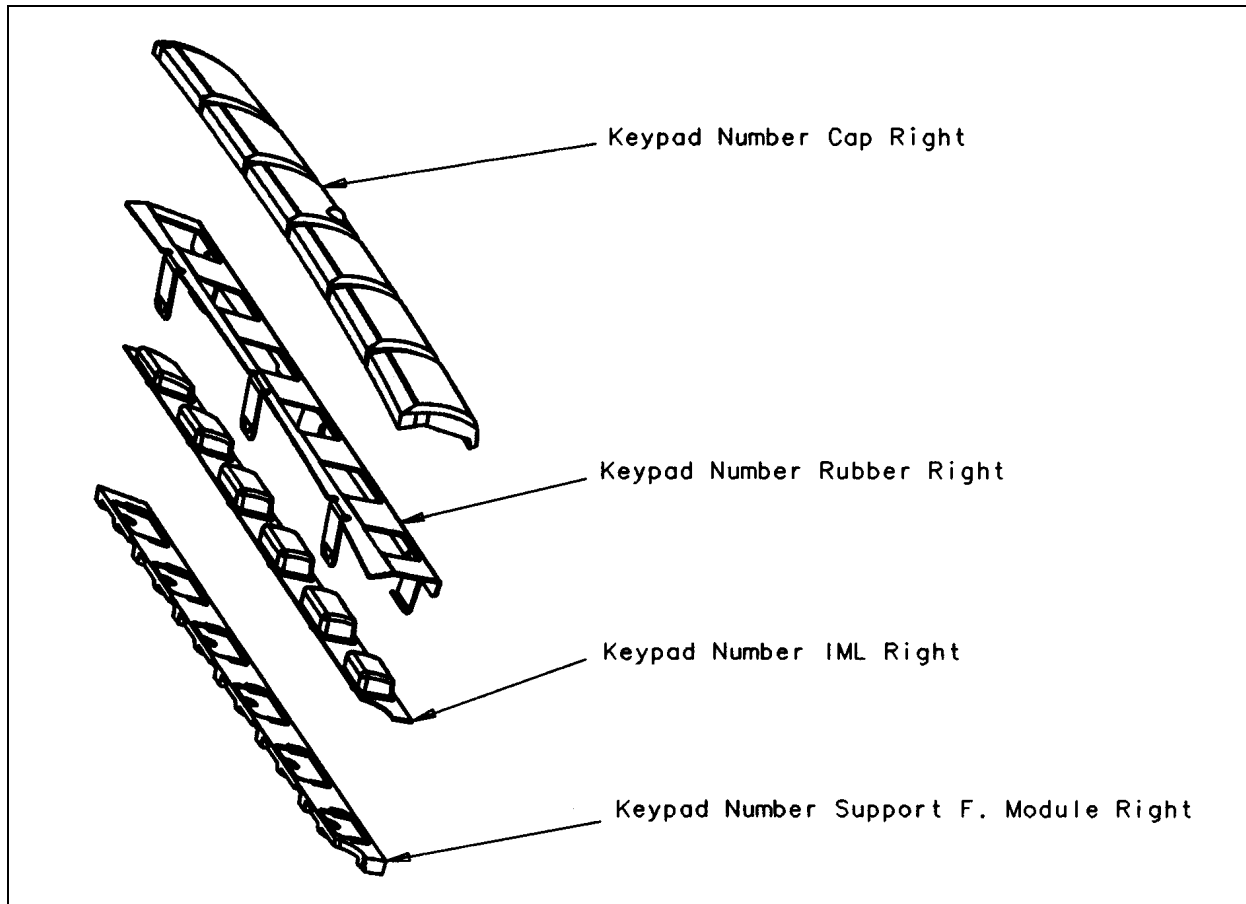
7   Disassembly of SX 1

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 M55.

Step 1	Step 2
Front view of SX1	Rear View of SX1
Step 3	**Step 4**
Remove the back cover by pressing down the lock (**1**) and slide it outwards (**2**) as shown by the arrow	Hold the lower ends of the battery and pull it upwards as shown.
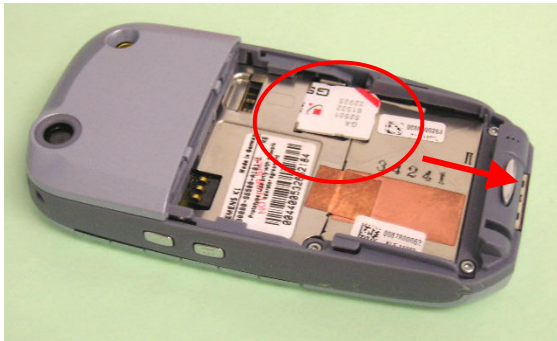
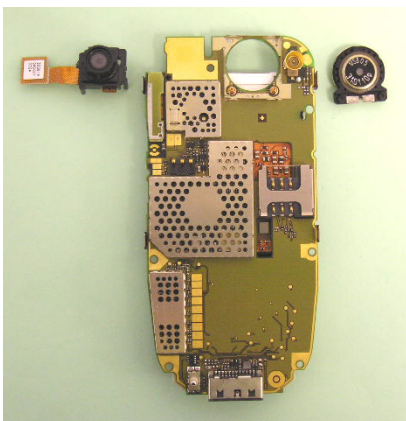| Step 5	Step 6
To remove the SIM card, push the SIM card from the holder outwards as shown	Unscrew the four screws with a **T5 Plus** Torx screwdriver.
Step 7	**Step 8**
Separate the Upper case from the Lower case with a case opener.	Remove the Vibra motor, Microphone, and Side keys from the Lower case.
Step 9	**Step 10**
Remove the Camera module and Speaker.	Remove the IRDA Lens and the Metal Spring connectors for the front Number Keys.
	Step 12
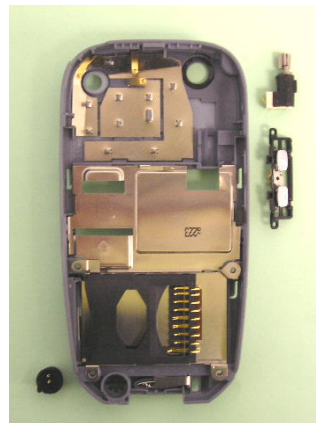
Step 11
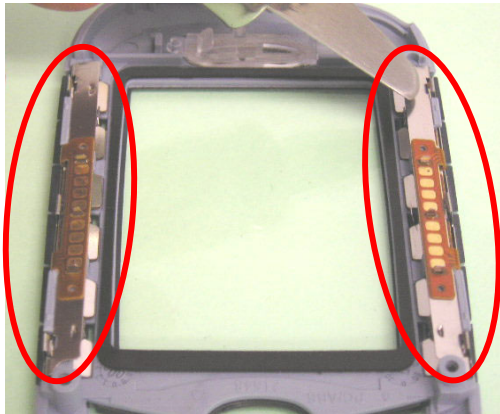
Release the clip joining the left and right Keypad Module Number and the Keypad Flex Module Number using an opening tool.
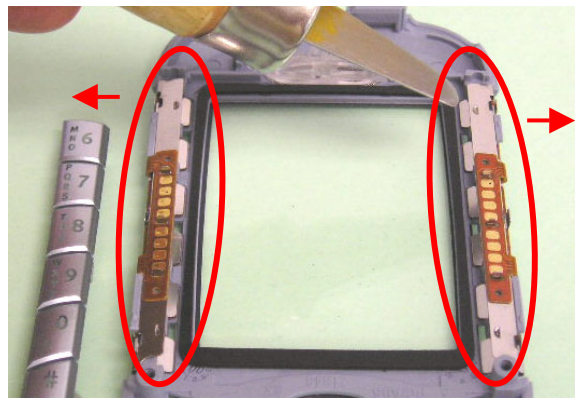
Push the metal tabs to release the left and right Keypad Flex Module Number outwards as shown.

Step 11

Fully disassembled Keypad Module Number

Step 12

Remove the Vibrator motor, Side key, and MIC from the Lower Mounting Frame.

Step 13
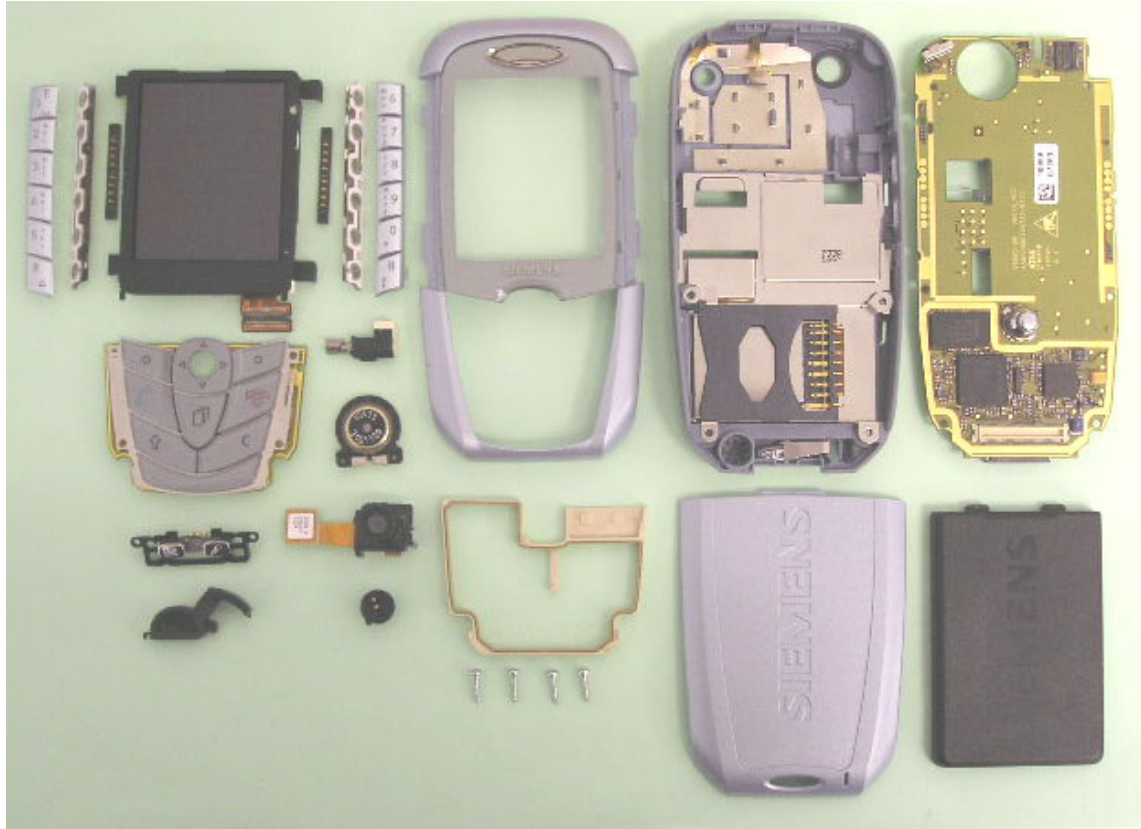
Fully disassembled SX1

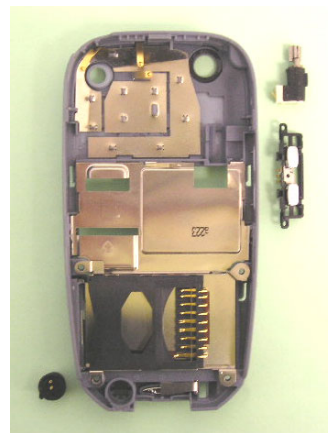## 8 Reassembly of SX 1

For the reassembly of the SX 1, reverse the disassembly procedures from Step 12 to Step 1. However there are some areas to be taken note of during reassembling of the phone.

Insert SIM card in the opening with contacts pointing downwards. First (**1**) push at the phones edge, then (**2**) push gently until it engages (make sure the angled corner is in the correct position).
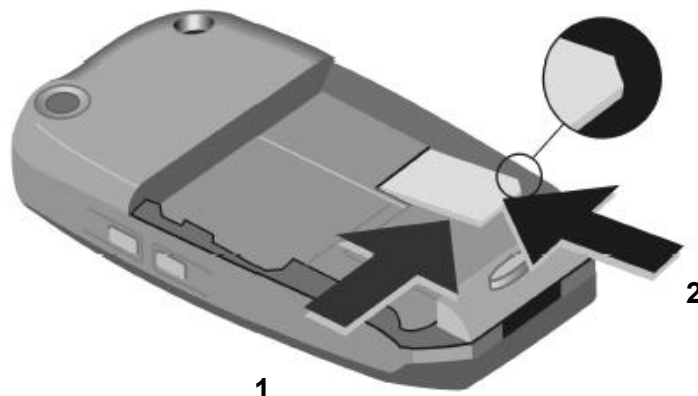
2. Make sure the battery cover is properly closed or an error will appear on the Display.

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.

Software update of the SX1 is different. SX1Service-Software consists of only 1 file, to do the "Common SW- Update" plus the "Customization"

Figure 1. SX 1 Software Programming Setup

9.1   Mobile Software Updating

The software of the mobile, SX1 is loaded from a PC directly. Hardware interconnection between the mobile and the PC is shown in Figure 1. Table 1 listed all the hardware requirements.
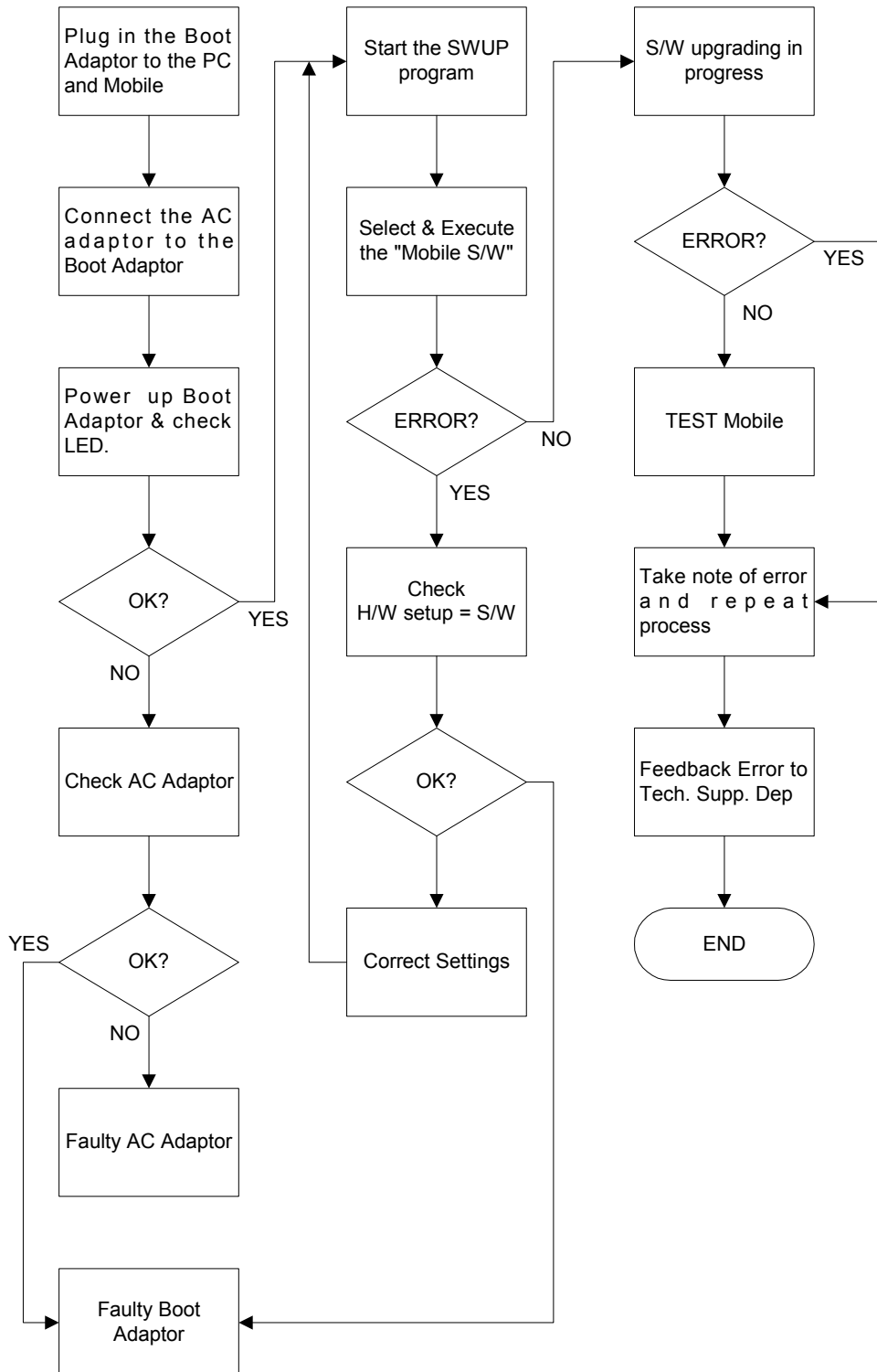
Make sure the battery is recharged before performing the software update.

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

Description	Part No.
IBM Compatible PC – Pentium	-
USB cable	L36880-N6501-A102

TABLE 1. EQUIPMENT LIST FOR SOFTWARE PROGRAMMING

9.2 Flow Chart for Software Upgrading

```
Plug in the Boot          Start the SWUP            S/W upgrading in
Adaptor to the PC         program                   progress
and Mobile
     |                         |                         |
     v                         v                         v
Connect the AC            Select & Execute          < ERROR? >  --YES-->
adaptor to the            the "Mobile S/W"               |
Boot Adaptor                   |                         NO
     |                         v                         |
     v                    < ERROR? > --NO-->             v
Power up Boot                  |                    TEST Mobile
Adaptor & check                YES                       |
LED.                           |                         v
     |                         v                    Take note of error
     v                    Check                     and repeat
 < OK? > --YES-->         H/W setup = S/W           process
     |                         |                         |
     NO                        v                         v
     |                    < OK? >                   Feedback Error to
     v                         |                    Tech. Supp. Dep
Check AC Adaptor               v                         |
     |                    Correct Settings               v
     v                                                ( END )
 < OK? > --YES-->
     |
     NO
     |
     v
Faulty AC Adaptor
     |
     v
Faulty Boot
Adaptor
```

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 , CTS30/55 or CMU200GSM test set.

There is also test software under development for testing with the Wavetek 4201S / 44xx and the 4107 GSM test set.

10.1 Siemens Service Software GR-Tool

!! Please not that from the availability of the GR-Tool onwards

Mobile Phones have to be tested with this GR-Tool Software !!

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)
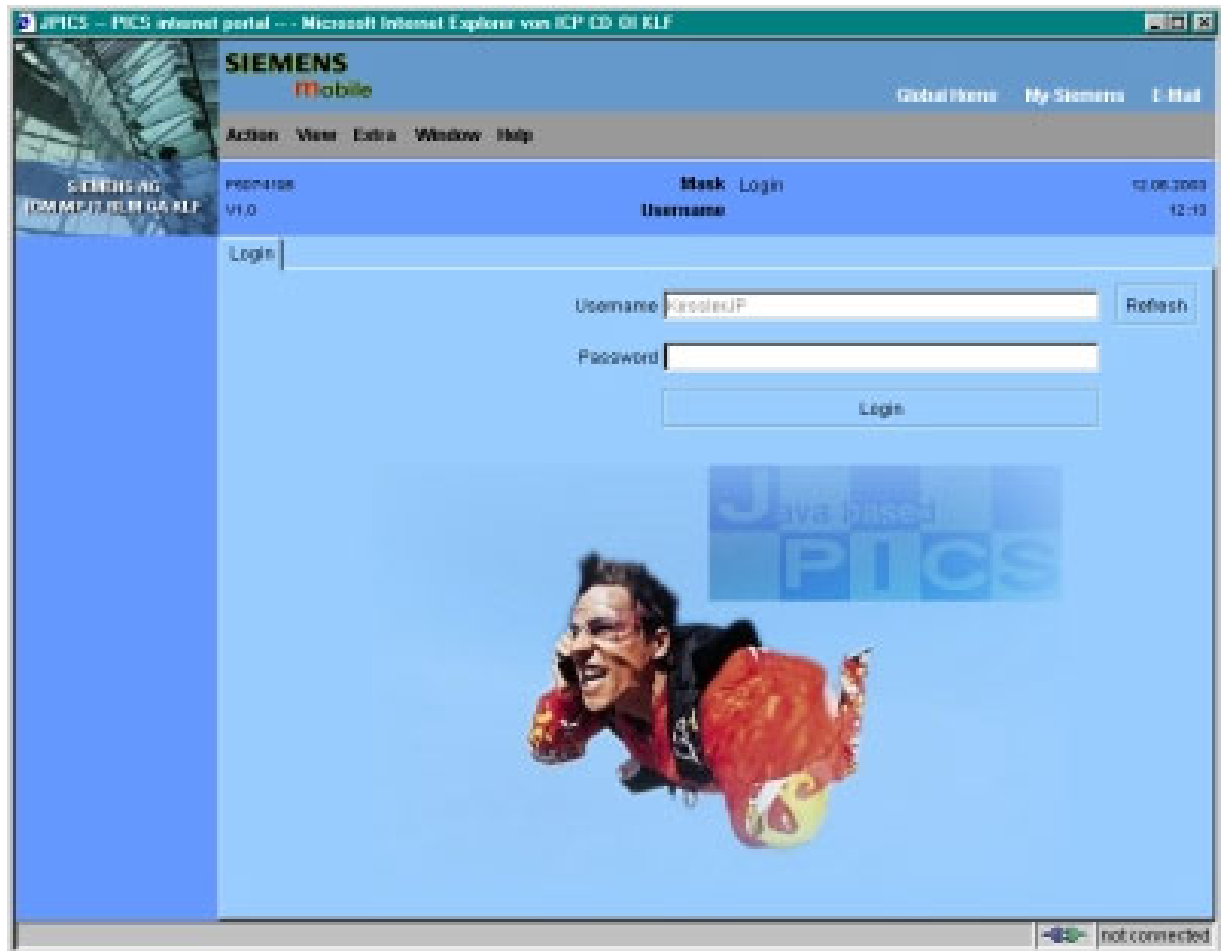

Figure 1. JPICS log-in page

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

Figure 2. Successful Log-in page

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.
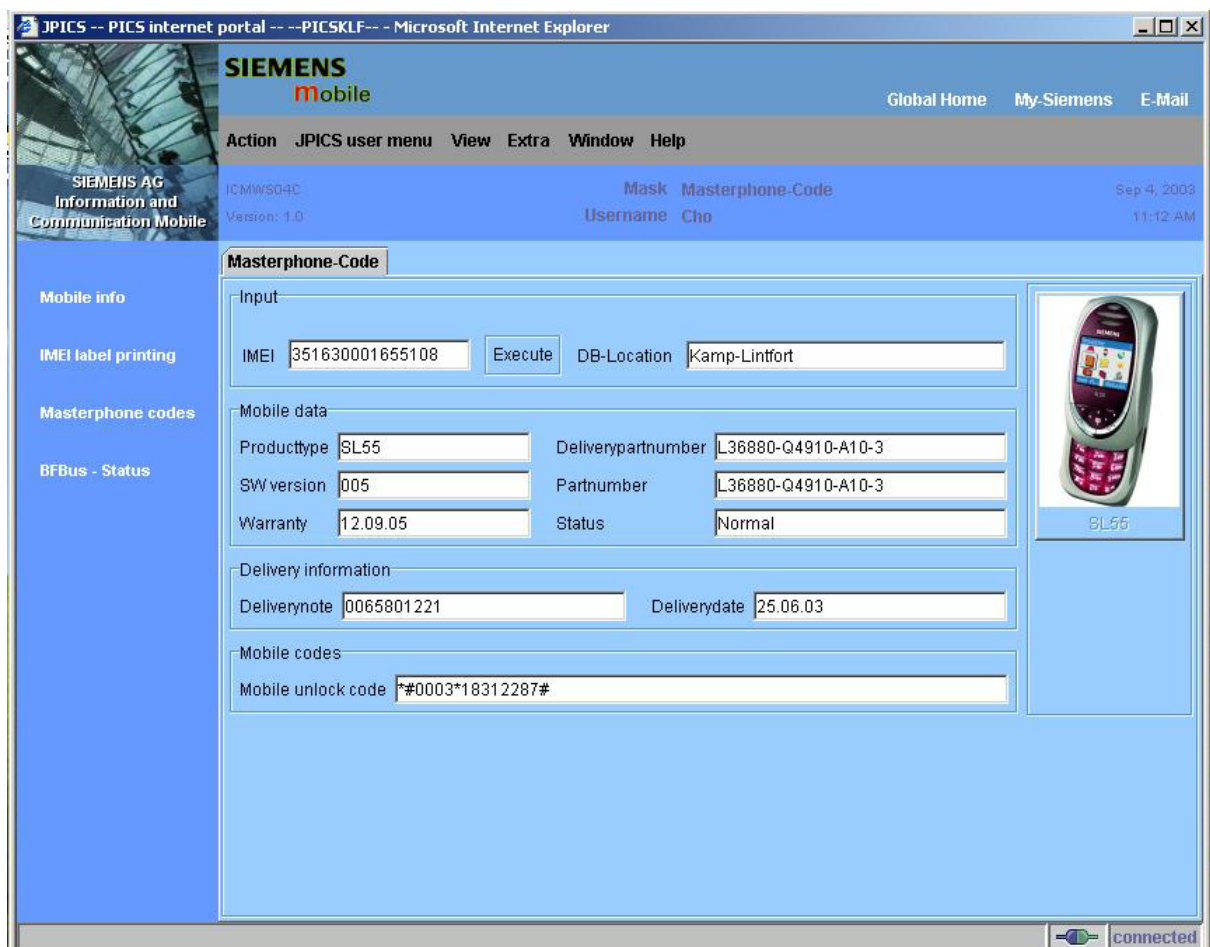

Generate Codes

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

- **Master phone codes**

- **Simlock Unlock – Codes**

Master phone codes

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.

Figure 3. Master phone code page

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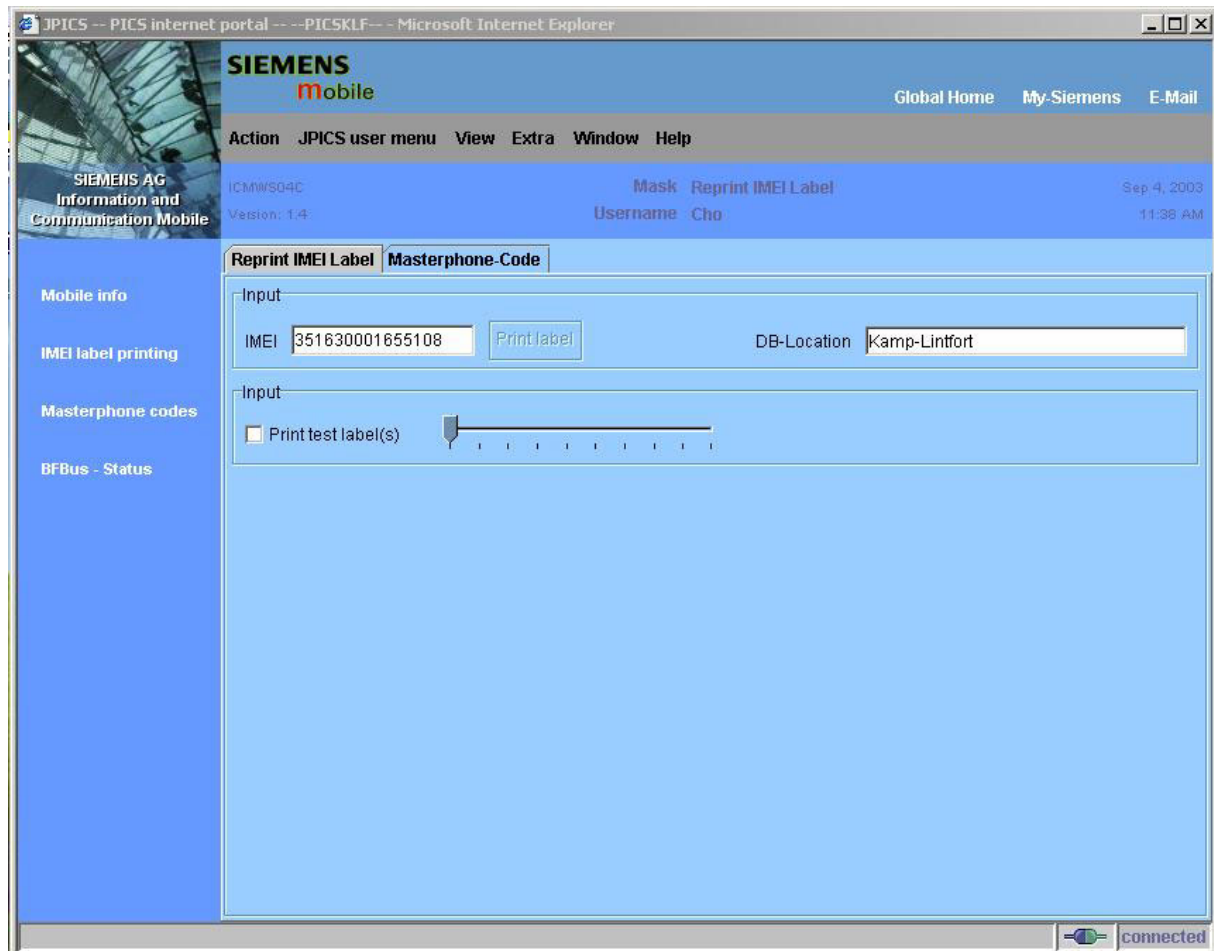
You are able to print 1 label in just one step.

To prevent that misaligned labels are being printed, the setting "test printer = Yes" is activated as default. After having printed a well-aligned test label you can switch setting to "No" 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 SX 1 is S30880-S6500-Axxx where the last 4 letters specify the housing and software variant.

SX 1 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: **R6**

C O D E	Y E A R	M O N T H	C O D E
M	2 0 0 0	M A R C H	3
N	2 0 0 1	A P R I L	4
P	2 0 0 2	M A Y	5
R	2 0 0 3	J U N E	**6**

TABLE 2.3   DIN EN 60062 DATE CODE

To display the IMEI number, press: *#06#. SW version, press: *#0000#.

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.

- Check **Bluetooth** and **IRDA-**Function with an other mobile phone

- Check **FM Radio-Function** by personal evaluation

- Check **MMC-Function** and **MP3 Player** by personal evaluation

- Check **Camera-Functions** by personal evaluation of Movies and Pictures

- Perform a **GSM Test** as described on page 34.

Check the charging 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.

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
Date code example ⟶ N 9 B VA

Year (N:2001, O:2002...)
Month (1:Jan, 2:Feb,…9:Sep, O:Oct, N:Nov, D:Dec)
Revision Letter (A, B,…)

Supplier Code
(Maker's marking)

Hitachi / Maxwell
Date code example ⟶ N 9 A MX

Year (N:2001, O:2002...)
Month (1:Jan, 2:Feb,…9:Sep, O:Oct, N:Nov, D:Dec)
Revision Letter (A, B,…)

Supplier Code
(Maker's marking)

Sanyo
Date code example ⟶ N 9 A SY

Year (N:2001, O:2002...)
Month (1:Jan, 2:Feb,…9:Sep, O:Oct, N:Nov, D:Dec)
Revision Letter (A, B,…)

Supplier Code
(Maker's marking)

NEC
Date code example ⟶ N 8 A NT

Year (N:2001, O:2002...)
Month (1:Jan, 2:Feb,…9:Sep, O:Oct, N:Nov, D:Dec)
Revision Letter (A, B,…)

Supplier Code
(Maker's marking)

Panasonic
Date code example ⟶ O N A PAN

Year (N:2001, O:2002...)
Month (1:Jan, 2:Feb,…9:Sep, O:Oct, N:Nov, D:Dec)
Revision Letter (A, B,…)

Supplier Code
(Maker's marking)

Sony
Date code example ⟶ P N A SO

Year (O:2002, P:2003...)
Month (1:Jan, 2:Feb,…9:Sep, O:Oct, N:Nov, D:Dec)
Revision Letter (A, B,…)

Supplier Code
(Maker's marking)