

# SIM Provisioning GUI for sysmoUSIM-SJS1

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## 1. Brief Introduction

This application is a Graphical User Interface for SIM card Provisioning of sysmoUSIM-SJS1 SIM cards, it is used to program parameters of a SIM card e.g IMSI, ICCID, KI, OP, OPC, etc. It is composed of sysmo-usim-tool and pySim tools running in the background to program parameters of the SIM card. This application is a Linux(Ubuntu) based desktop application.

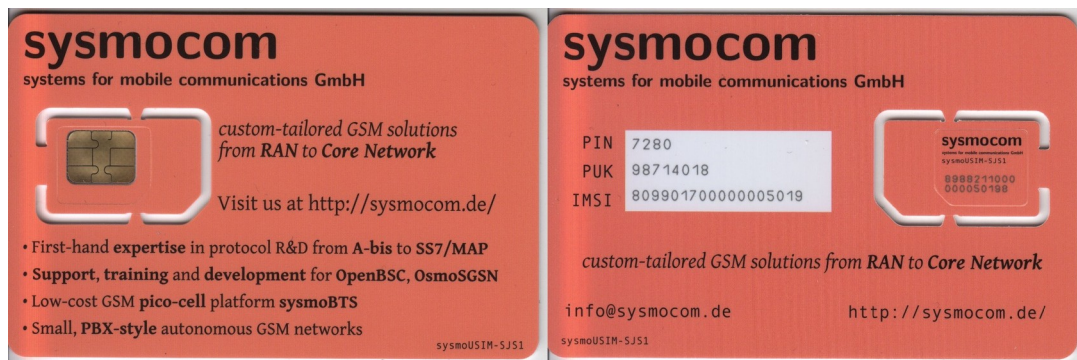


Figure 1.1 : sysmoUSIM-SJS1 SIM card

## 2. Dependencies & Application installation

*(Note for Windows users) – If you are on windows you can install VMware Workstation Player, install ubuntu on a VM & then continue with this dependencies & application installation instructions on that ubuntu VM.*

### 2.1 Dependencies installation

(Run the following commands in Ubuntu terminal)

- `sudo apt-get install pcscd pcsc-tools libccid libpcsclite-dev`
- `sudo apt-get install python3-pyserial python3-pip`
- `pip3 install pytlv cmd2 jsonpath-ng construct bidict gsm0338 pyyaml pycrypto`

### 2.2 Application installation

- Copy pysim and sysmo-usim-tool folders to your Home directory in Ubuntu

**IMPORTANT:** It is crucial that these two folders are placed in the HOME directory because this application references this path. Your Home directory path should be “/home/<your-username>/”.

- Copy the simwriting-1.0.deb debian package to any folder in your PC and open the terminal from the folder where you copied this debian package and execute the following command to install the application:  
`sudo dpkg -i simwriting-1.0.deb`
- To open the application click “Activities” on the top left corner and search “simwriting”, the application icon should appear, you can open by clicking that icon.

### 3. How to use the application

Figure 3.1 below shows the first interface you will see when you open your application. SIM card parameters will appear as shown in the figure, some of these parameters will be needed when writing/reading the card. When you hover the mouse over a parameter input field, a helper message will appear explaining more details about that parameter.

The screenshot displays the 'SIM CARD PROVISIONING APPLICATION' window. At the top, there is a 'Select reader:' dropdown menu with a refresh icon. Below this, the interface is divided into two columns of input fields for various SIM card parameters. The left column includes fields for ADM PIN (with a warning: 'Card will be blocked after 3 incorrect ADM PIN'), OP, OPC, KI, ACC, Baud (set to 9600), Type, SPN (set to 'Magic'), NUM, and Batch Mode (radio buttons for True, False, and a Default checkbox). The right column includes fields for ICCID, IMSI, SQN, CC (set to 1), MCC (set to 901), MNC (set to 55), SMSC (set to '{00 + CC + 5555}'), SMSP, and STR. Each field has a corresponding checkbox for 'Randomize', 'Default', 'Enable', or 'Autogen From NUM'. At the bottom, there are five buttons: 'Basic Read', 'Admin Read', 'Write', 'Save', and 'Load'. On the far right, there is a 'Fine-Tuning' toggle switch currently set to 'OFF'.

Figure 3.1 : SIM card provisioning Graphical User Interface application

### **3.1 Reading Card**

Number **1** in the figure 3.2 below shows the SIM card icon. If any SIM card is detected in any inserted reader, this icon will remain as it is in the below picture but if no SIM card was detected then this SIM card icon will appear with a diagonal slash over it showing that no SIM card was detected.

Number **2** in the figure 3.2 below shows the drop-down menu you must click to view all available readers with SIM cards in them.

Number **3** in figure 3.2 below shows a refreshing icon that you must click to refresh & search for available readers.

Number **4** in figure 3.2 below shows the parameter that have been read from the card after clicking the read button.

Number **5** in figure 3.2 below shows the basic read button you must click in order to read basic or non-administrative information about the card that you selected in **2**. Number **6** shows an admin read button that you must click in order to read card information including administrative information (OPC & KI), to use this read button you must provide an ADM PIN first. If you click the read button without selecting a reader you'll get an error. If the reader is selected then a dialogue (Shown in Figure 3.3) with card information will appear and some card parameters will be populated in the main window.

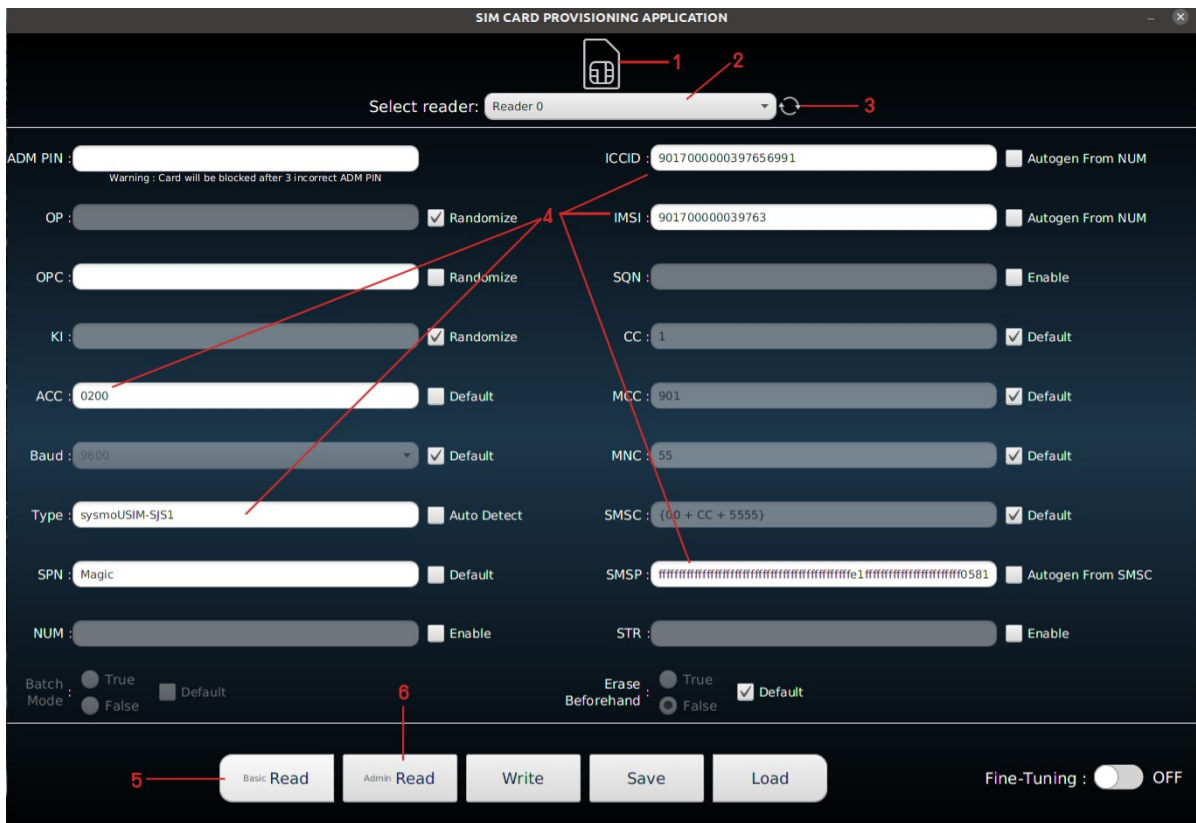


Figure 3.2 : GUI Showing how to read card



Figure 3.3 : Dialogue with Card Information

## 3.2 Writing Card

There are two modes that can be used to provision SIM card parameters :

### 1. Fine-Tuning OFF

This mode allows bulk provisioning of parameters, i.e. you have to specify all the parameters & some of them if not specified they can either be randomized/default/Auto-generated. ADM PIN & OP or OPC are compulsory in this mode. Figure 3.4 shows sample of how parameters looks like when fine-tuning mode is turned OFF

### 2. Fine-Tuning ON

This mode allows you to fine-tune or tweak specific parameters. At this point, only 6 parameters can be fine-tuned(OP, OPC, KI, ICCID, IMSI, SQN). Please note it is possible to fine-tune other parameters as well, but in this application version only these ones can be fine-tuned. ADM PIN is compulsory in this mode. You will notice that other parameters that cannot be fine-tuned are disabled & you cannot edit them. Figure 3.5 shows sample of how parameters looks like when fine-tuning mode is turned ON

You can turn on/off fine-tuning by clicking the switch on the bottom right corner.

**IMPORTANT:** It is VERY crucial that you use the correct ADM PIN. Attempting to program with an invalid key can **BRICK** your card, rendering it useless!!!

The screenshot shows the 'SIM CARD PROVISIONING APPLICATION' window. At the top, there's a 'Select reader:' dropdown set to 'Reader 0'. Below this, a warning message states: 'Warning: Card will be blocked after 3 incorrect ADM PIN'. The interface is divided into two columns of input fields. The left column includes: ADM PIN (98907517), OP (with a 'Randomize' checkbox checked), OPC (398153093661279FB1FC74BE07059FEF), KI (with a 'Randomize' checkbox checked), ACC (with a 'Default' checkbox checked), Baud (9600), Type (with an 'Auto Detect' checkbox checked), SPN (Magic), and NUM. The right column includes: ICCID (9017000000397656991), IMSI (901700000039763), SQN (with an 'Enable' checkbox), CC (1), MCC (10), MNC (100), SMSC ((00 + CC + 5555)), SMSP (with an 'Autogen From SMSC' checkbox checked), and STR. At the bottom, there are buttons for 'Basic Read', 'Admin Read', 'Write', 'Save', and 'Load'. A 'Fine-Tuning' toggle switch is located at the bottom right, currently set to 'OFF'.

Figure 3.4 Fine-Tuning Mode OFF

The screenshot shows the same 'SIM CARD PROVISIONING APPLICATION' window, but with 'Fine-Tuning' mode turned ON. The 'ADM PIN' field remains 98907517. The 'Warning' message is still present. In this mode, only six parameters are enabled for editing: OP (398153093661279FB1FC74BE07059FEF), OPC, KI, ICCID (901700000039763), IMSI (901700000039763), and SQN. All other parameters (ACC, Baud, Type, SPN, NUM, CC, MCC, MNC, SMSC, SMSP, STR) are disabled, indicated by greyed-out input fields. The 'Fine-Tuning' toggle switch at the bottom right is now turned ON, shown as a green switch.

Figure 3.5 Fine-Tuning Mode ON

Figure 3.6 and Figure 3.7 below shows the results of after you clicked the write button on the above Figure 3.4 and Figure 3.5 respectively. Figure 3.6 shows the results of when Fine-Tuning mode is OFF and the ADM PIN is invalid. Figure 3.7 shows the results of when Fine-Tuning mode is ON and the ADM PIN is valid and we are Fine-Tuning the IMSI.



Figure 3.6 : Invalid ADM PIN

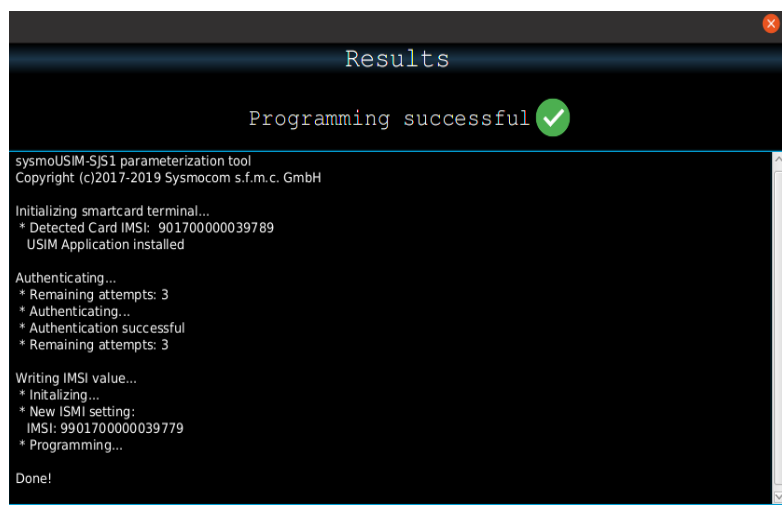


Figure 3.7 : Valid ADM PIN

### 3.3 Save Data

This feature allows you to save the values of the parameters that you have inserted in the input field of all the parameters. This data will be saved in a .txt file with a name of your choice. This allows you to use this data at a later stage by loading the saved file into the application (You will see in 3.4). Figure 3.8 below shows the interface that appears when you click the save button, you can name your file and choose a location to save your file.

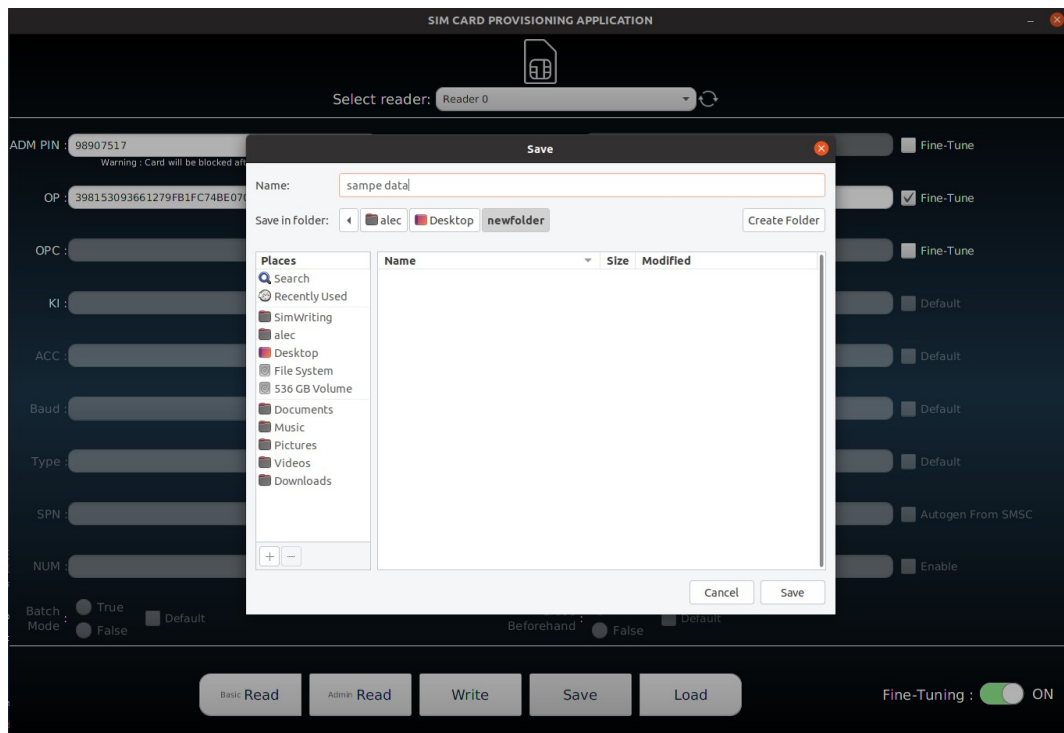


Figure 3.8 : Saving a file GUI

### 3.4 Load Data

This feature allows you to load up data from the file you have saved earlier (refer to 3.3). This will allow you to navigate to a folder where you would have saved your files, it will list all .txt files available in that selected folder. After you click open on that file, it will populate data from the file to the input field of every parameters that was saved in that file. Please note that you can only load files that you have saved using this Application only. Figure 3.9 below shows the interface that appears when you click the Load button.

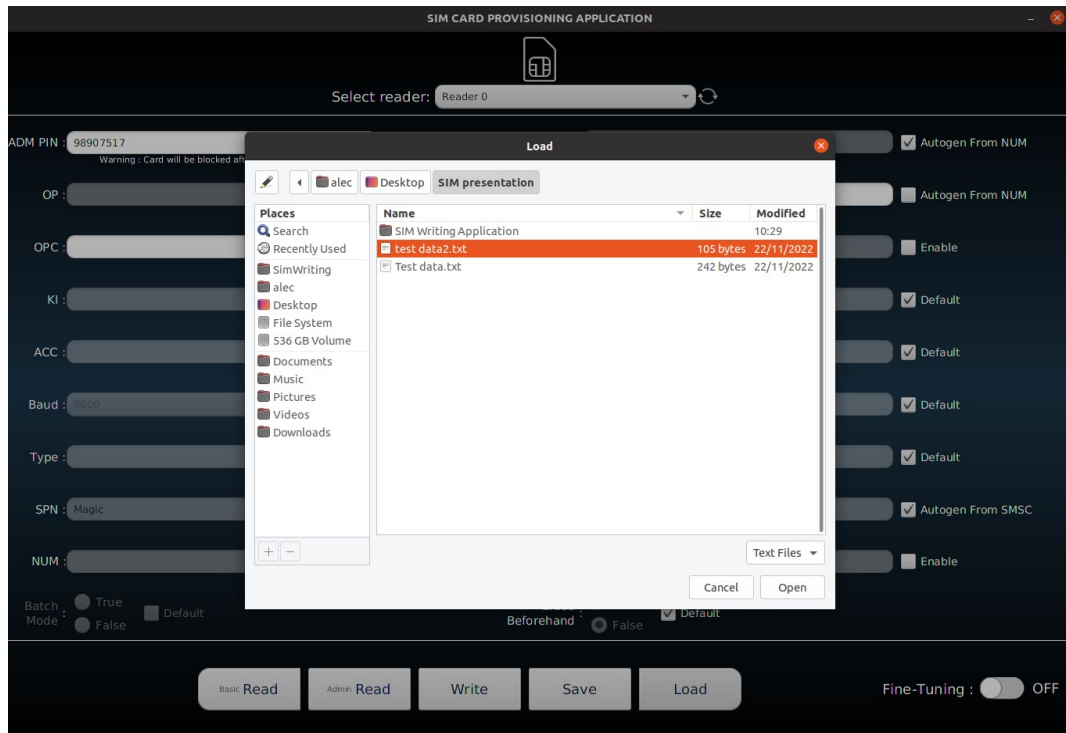


Figure 3.9 : Loading a file GUI

## 4. Development Framework

- Java 8
- JavaFx Framework
- SceneBuilder
- NetBeans (IDE)

## 4. Future Features

- Help button – This feature will give you a brief explanation of SIM card parameters & how to use this application