

UM10464

PR533 - PCSC Tool

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User manual
COMPANY PUBLIC

Document information

| Info | Content |
|-----------------|---|
| Keywords | PR533, CCID, PCSC, APDU |
| Abstract | This document describes the PCSC Tool software which demonstrates the capabilities of PR533 device. |



Revision history

| Rev | Date | Description |
|-----|----------|--|
| 1.2 | 20171107 | Security status changed into Company public, no content change |
| 1.1 | 20121004 | License section updated |
| 1.0 | 20120503 | Initial version |

Contact information

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1. Software installation

Software is installed with the product support package when provided with an installer.

If provided in an archive file, no installation is needed.

User can start the application by executing the following file:

PcscTool.exe

Once this application is running the following window should appear:

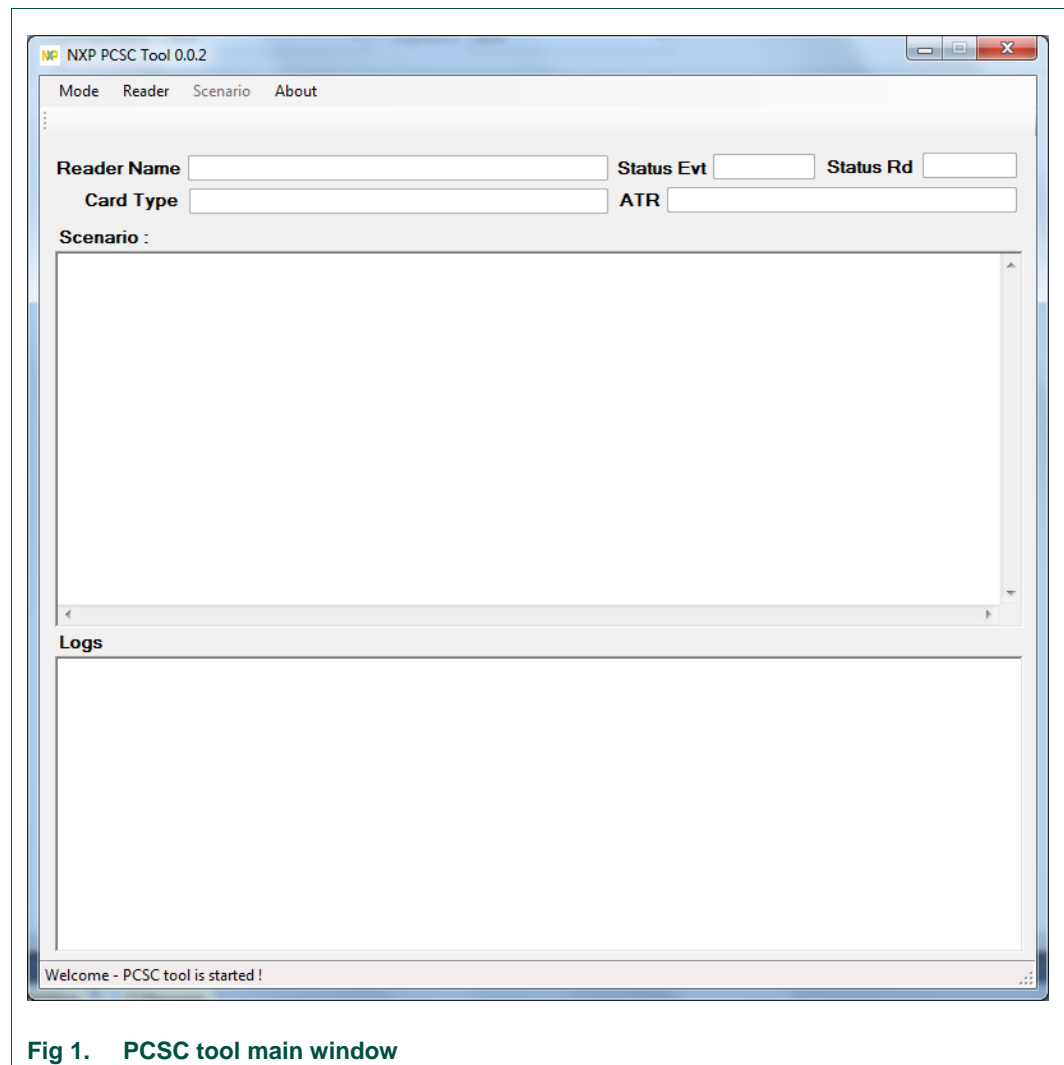


Fig 1. PCSC tool main window

2. PC/SC driver installation

The PR533 will be automatically detected by the operating system. The device uses the Smartcard class driver implemented by Microsoft.

Procedure:

- 1) Plug the PR533 device;
- 2) Open device manager;

The device is listed under the Smart card reader category.

If the O.S. is not able to install the driver, it will propose to search the driver on the Microsoft Update website. The user has to accept this procedure.

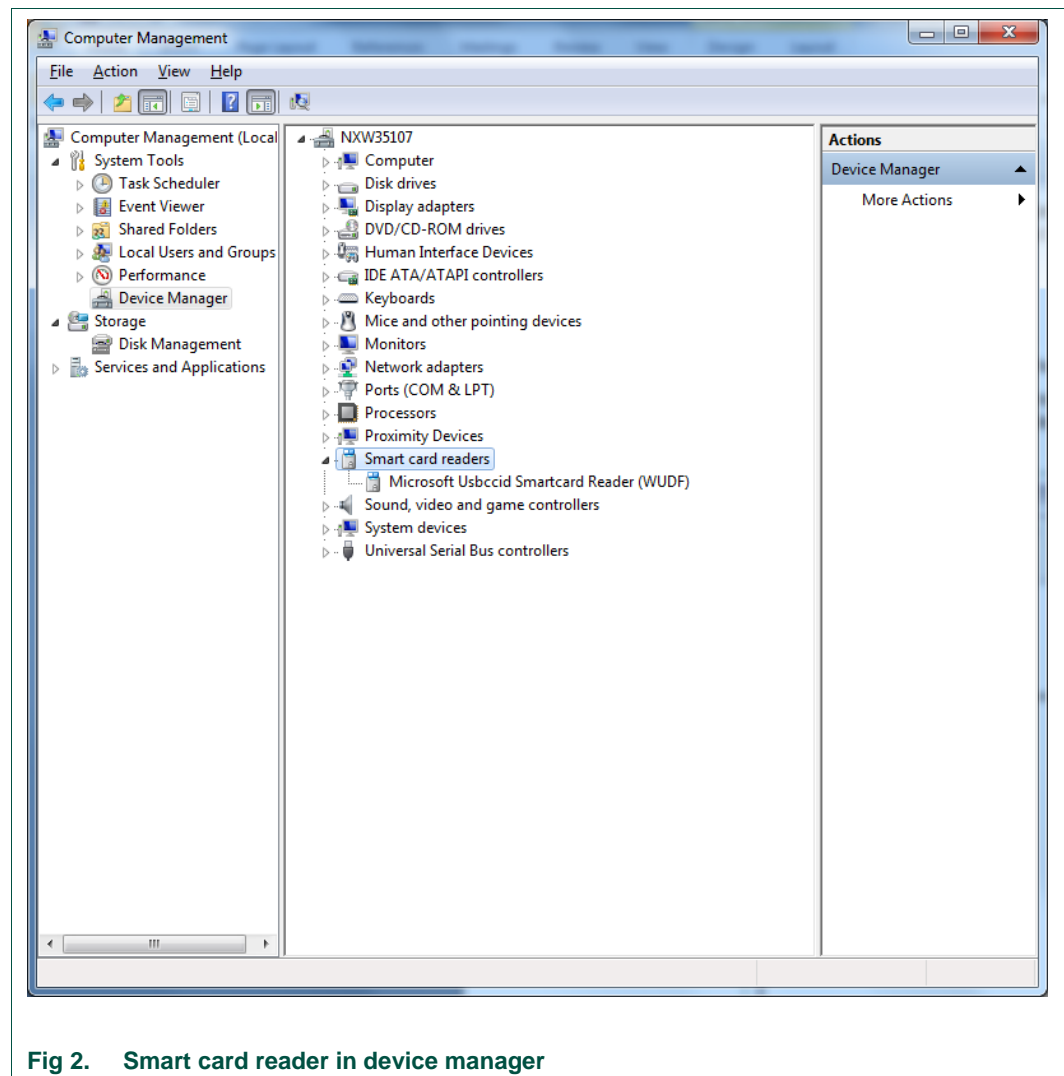


Fig 2. Smart card reader in device manager

2.1 Enable ESCAPE IOCTL

This IOCTL is mandatory for `sCardControl` routines. The purpose of this chapter is to check that it is enabled.

1) Open the Registry Editor:

- Click on the Start button;
- Click on the Execute button;
- Type `regedit` and click on the OK button in the new window;

3) Open the PR533 directory:

Under Windows XP, the following key must be opened:

```
> HKEY_LOCAL_MACHINE;  
> SYSTEM;  
> ControlSet001;  
> Enum;  
> USB;  
> Vid_1fc9&Pid_010b;  
> 3.60;  
> Device Parameters.
```

Under Windows 7, it is mandatory to go to the next directory:

```
> WUDFUsbccidDriver.
```

In this folder, the `REG_DWORD EscapeCommandEnable` has to be created and equal to `0x01`.

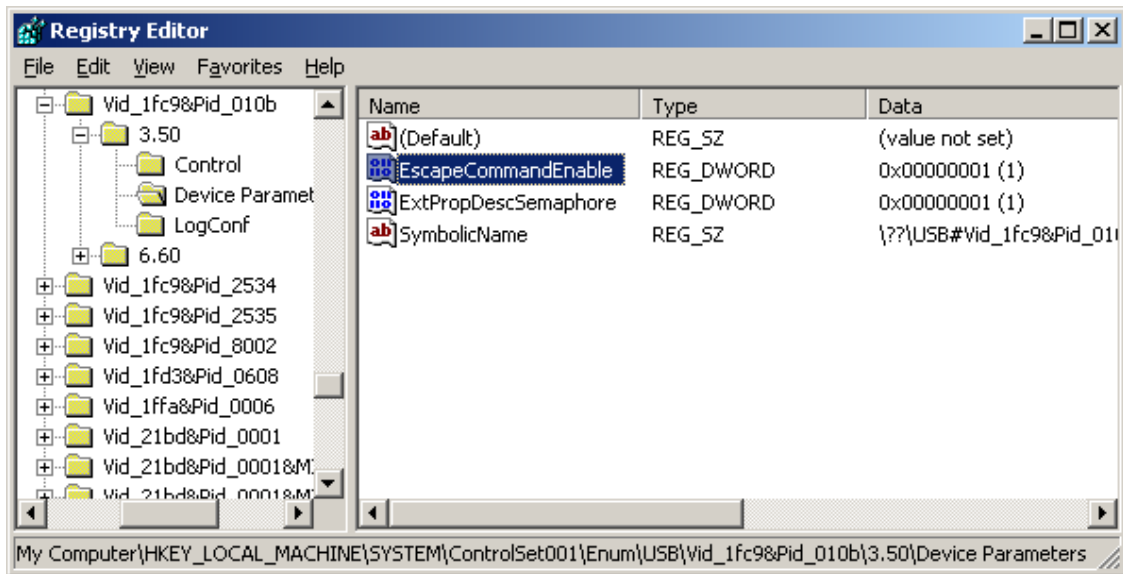


Fig 3. Enable the Escape IOCTL in Windows driver for Windows XP

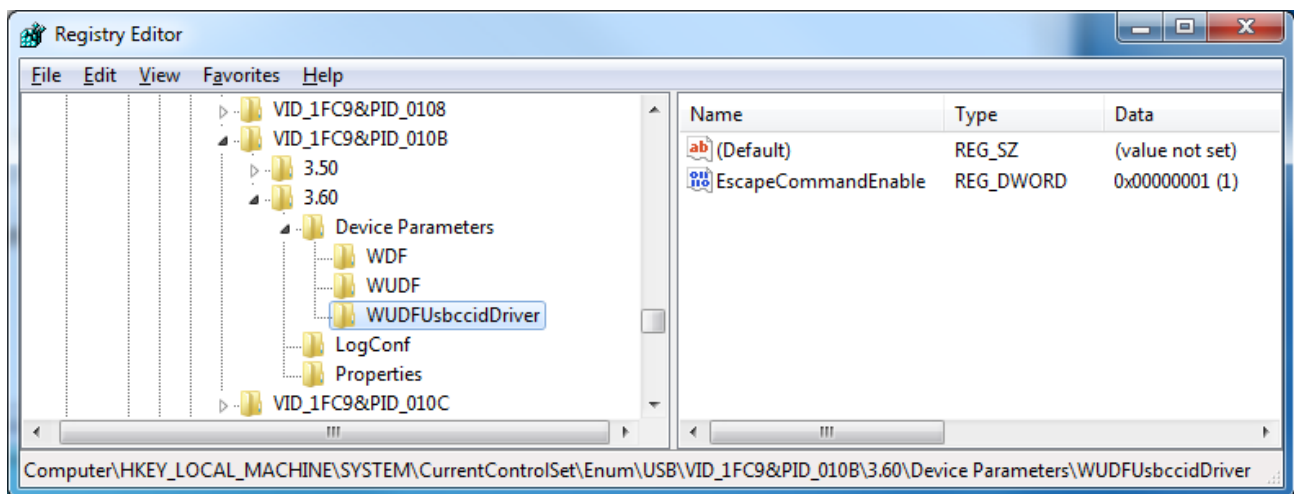


Fig 4. Enable the Escape IOCTL in Windows driver for Windows 7

- 3) If this key does not exist, add it:
 - Right click on the window;
 - Select DWORD value;
 - Set the name: **EscapeCommandEnable** and value "1"; Click on OK;

- 4) Close the Registry Editor and restart the computer;

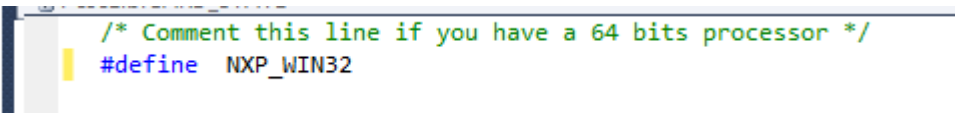
3. Source code

The full source code is delivered with the application to give an example of Smart Card management under Windows.
This application is developed in C#.

3.1 Version x86 or 64 bits

To rebuild the application, and according to the processor, CardNative.cs can be modified.

For a X86 processor the below line must be uncommented. This line is at the beginning of the CardNative.cs file. Then the entire solution must be recompiled.



```
/* Comment this line if you have a 64 bits processor */  
#define NXP_WIN32
```

Fig 5. Compatibility according to the processor

For a 64 bits processor, comment this line and re-compile the entire solution.

4. Application description

4.1 Introduction

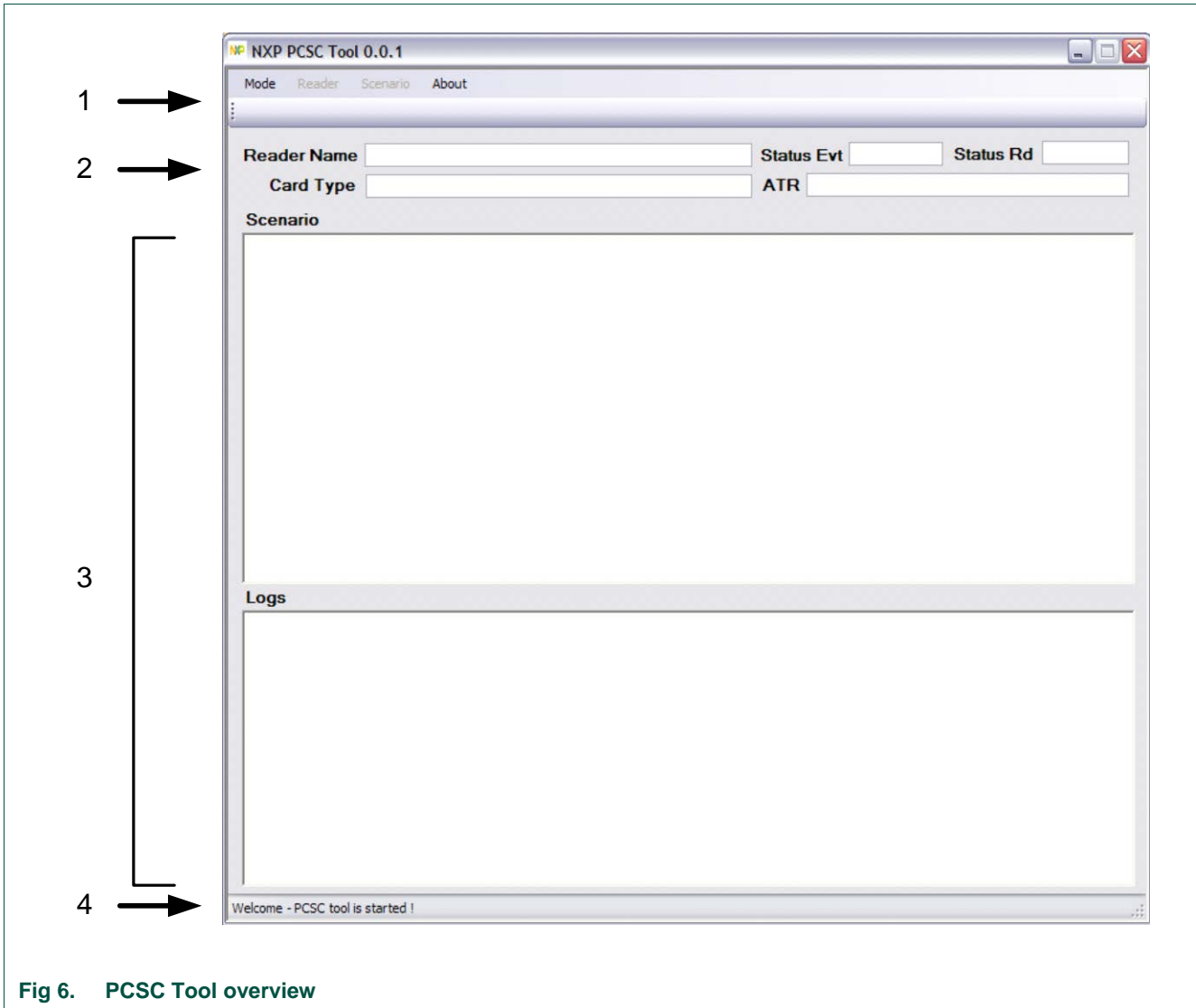


Fig 6. PCSC Tool overview

The PCSC tool allows communicating with smart card reader through the PC/SC interface.

The windows can be split in 4 different views:

- (1) Tool bar;
- (2) Common information view;
- (3) Script and log windows;
- (4) Status bar.

4.2 How to use this application

Two different modes have to be differentiated: AUTOMATIC mode and MANUAL mode.

The purpose of the automatic mode is to check the card discovery of the PR533. As soon as the device is plugged, it will try to activate a card in the field.

When a card is discovered (or lost) the device will share a message with the driver (see [CCID]). The application will automatically show if a card is in the field or not.

The purpose of the Manual mode is to offer possibilities to:

- Connect (or disconnect) to the WinScard API in DIRECT, EXCLUSIVE or SHARED modes;
- send APDU to the reader (by using either `sCardTransmit` or `sCardControl` routines of WinScard);

5. Getting started

5.1 Introduction

This section will describe how to use the application in MANUAL and AUTOMATIC modes.

5.2 Automatic mode

1 - To enable the automatic mode, Click on **Automatic** in the **Mode** item

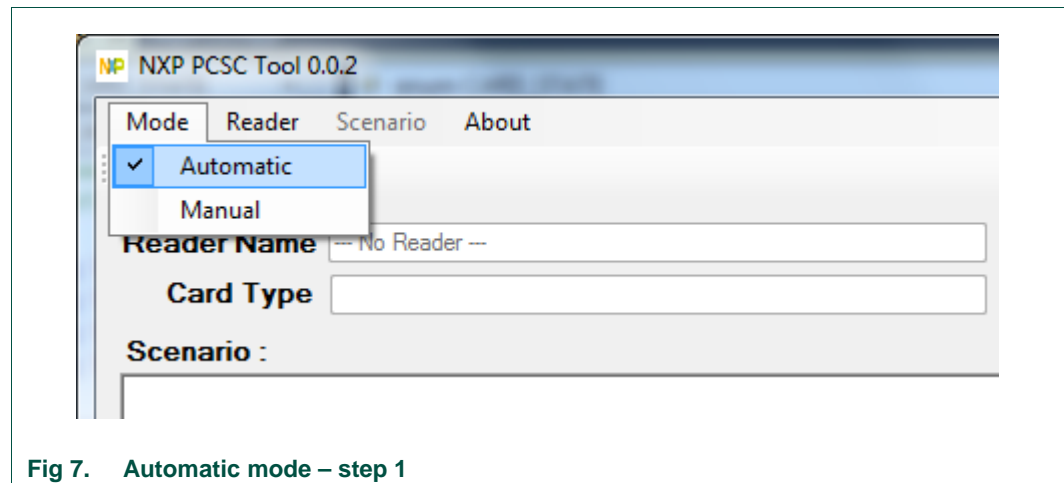


Fig 7. Automatic mode – step 1

2 – Click on **select a Reader** in the **Reader** item

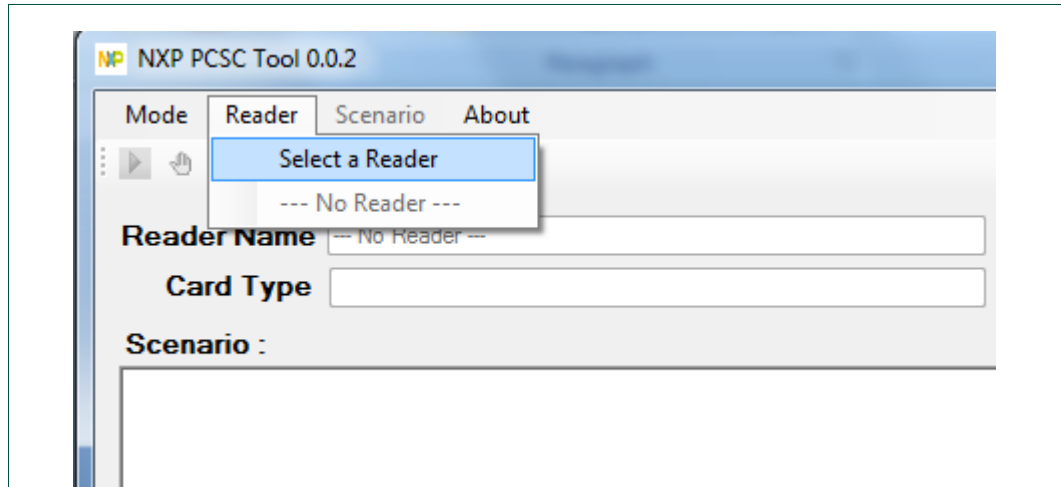


Fig 8. Automatic mode – step 2

3 – A new window will appear. Select the PC/SC reader and click on the **OK** button

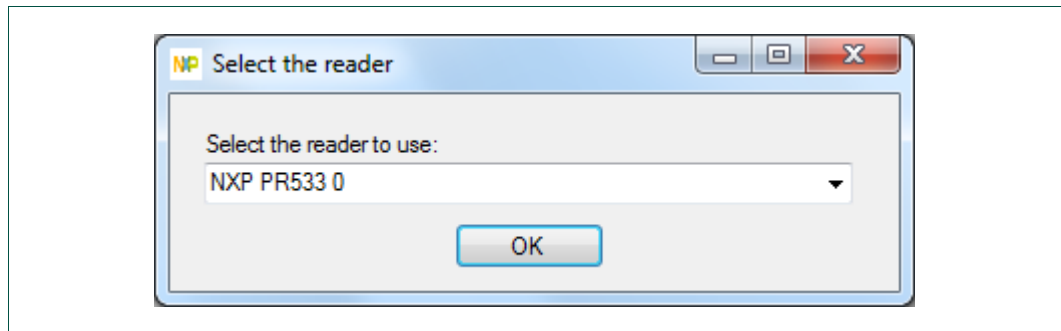


Fig 9. Automatic mode – step 3

4 – To enable this mode, click on the **start** button;

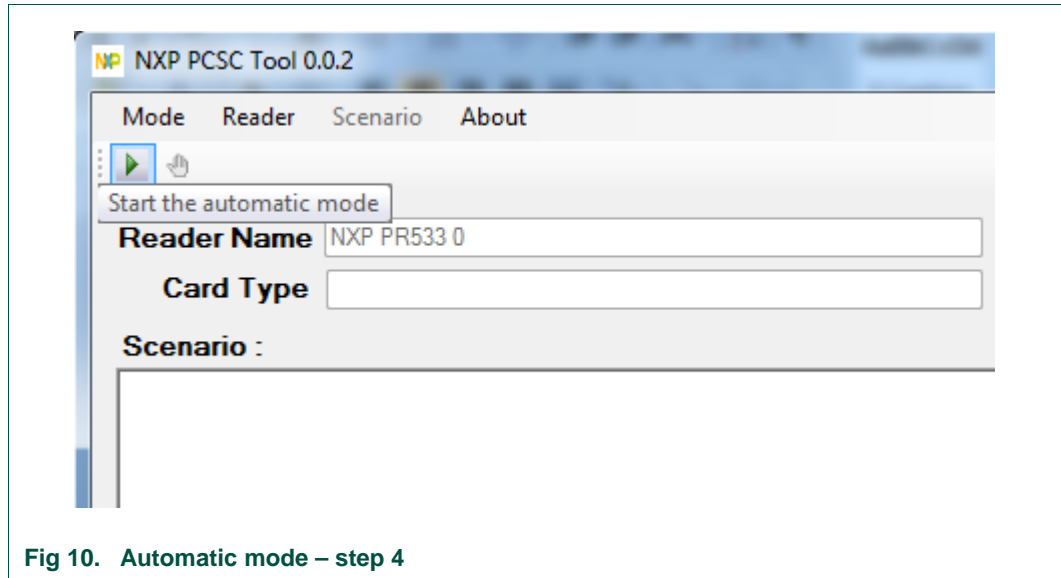


Fig 10. Automatic mode – step 4

5 – When a card is put on or removed from the PR533 antenna, the **Card Type** and **ATR** fields are updated automatically.

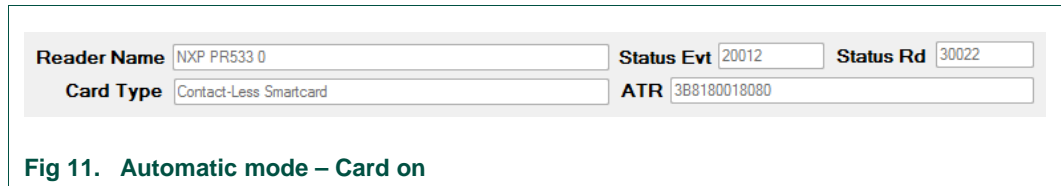


Fig 11. Automatic mode – Card on

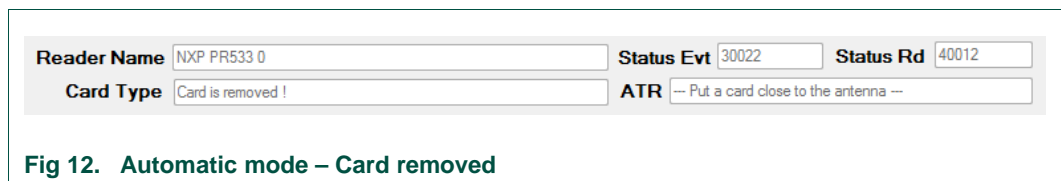


Fig 12. Automatic mode – Card removed

6 - To disable this mode, click on the **stop** button

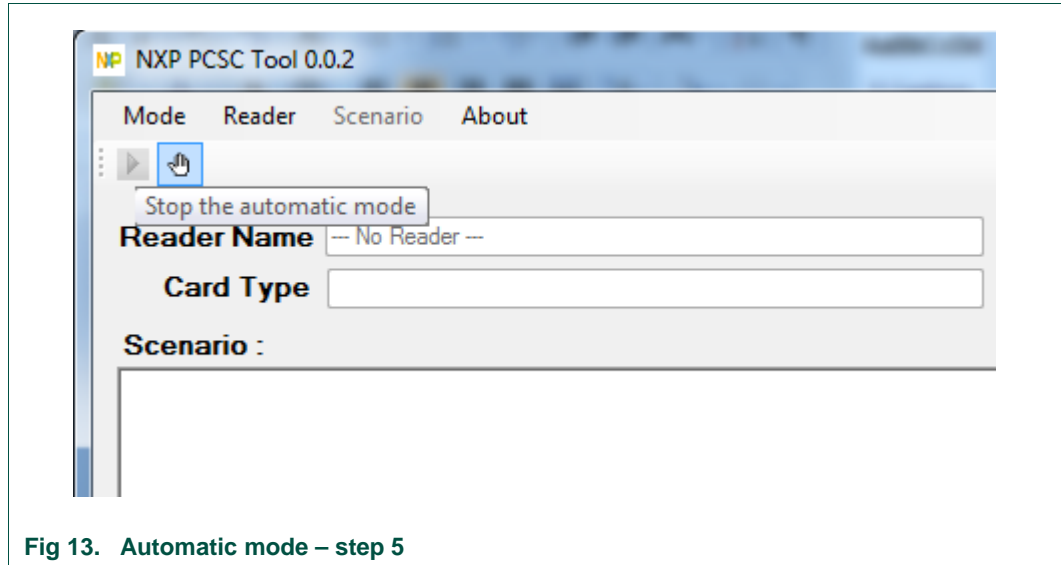


Fig 13. Automatic mode – step 5

5.3 Manual mode

1 - To enable the manual mode, Click on **Manua1** in the **Mode** item

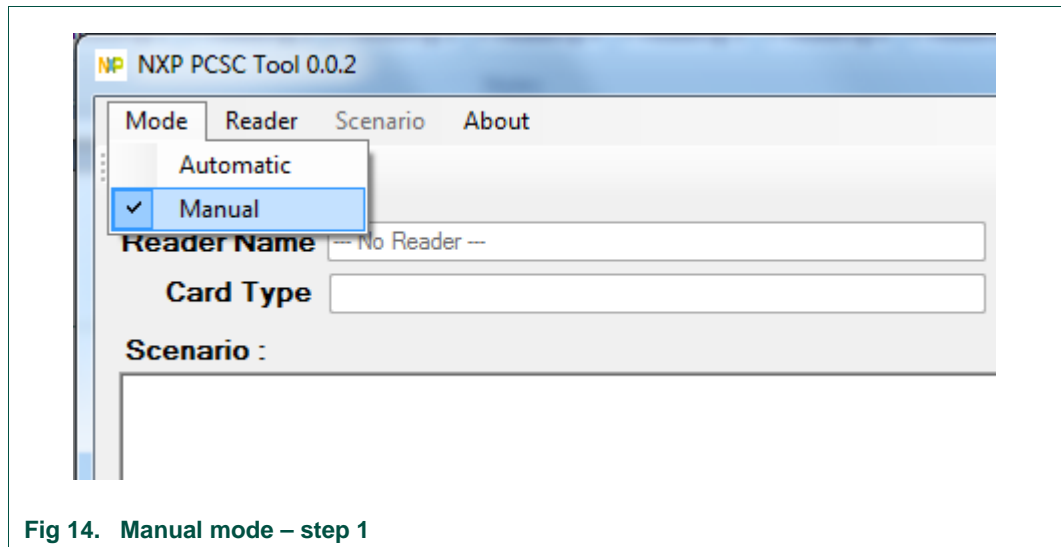


Fig 14. Manual mode – step 1

2 – Click on **Select a Reader** in the **Reader** item

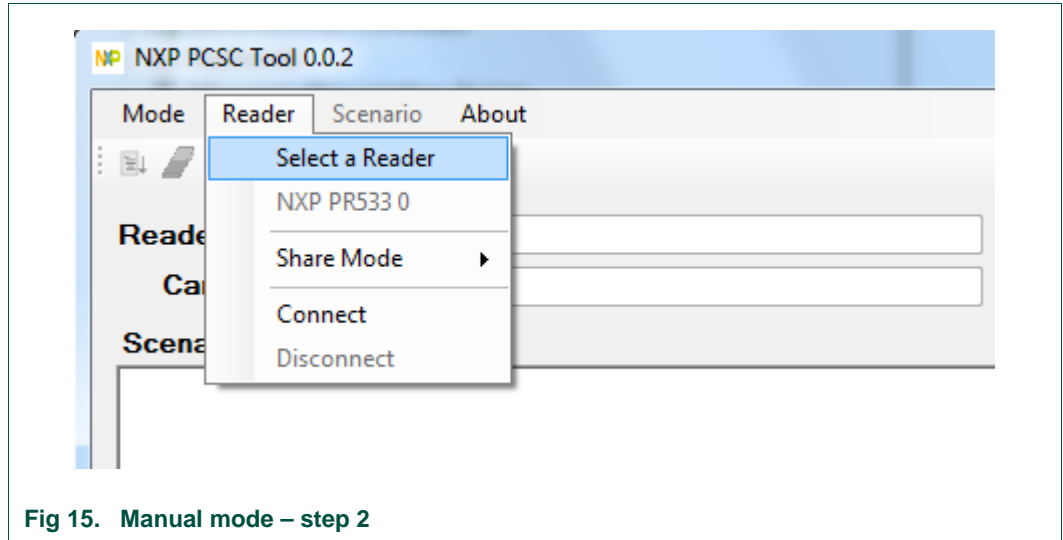


Fig 15. Manual mode – step 2

3 – A new window will appear. Select the PC/SC reader and click on the **OK** button

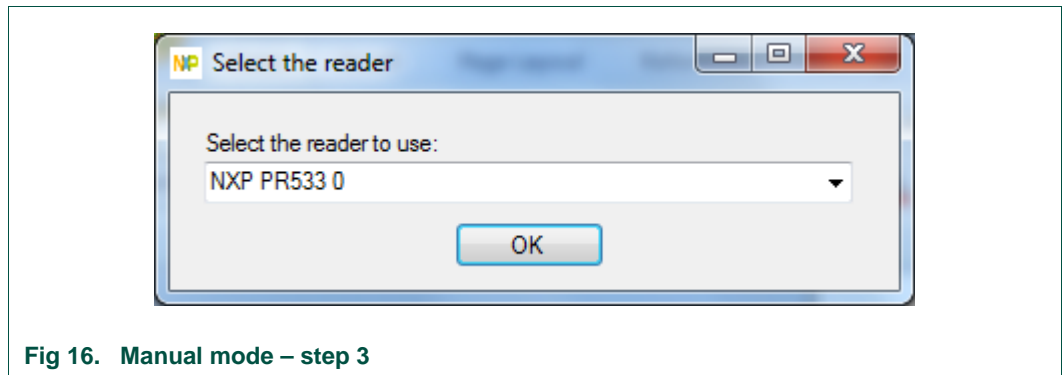


Fig 16. Manual mode – step 3

4 – Open the Reader sub-menu; Select the **Shared Mode** for the connection and click on **Connect**; The status of the connect appears in the **status bar**, and if the status is success, the card type and card ATR appear in the information view

Note: In Exclusive or Shared modes, the connection is success only if there is a card on the antenna

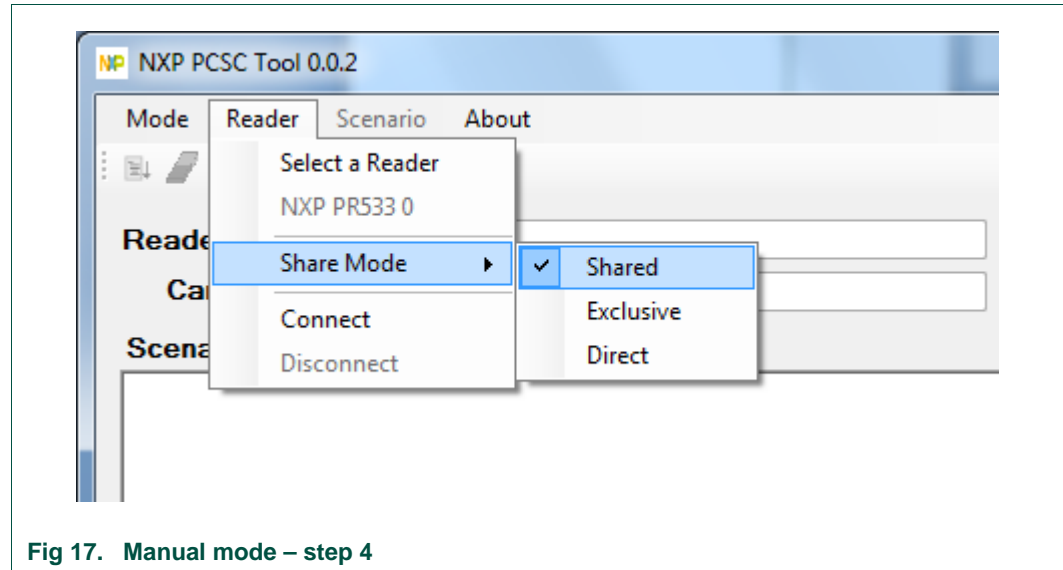


Fig 17. Manual mode – step 4

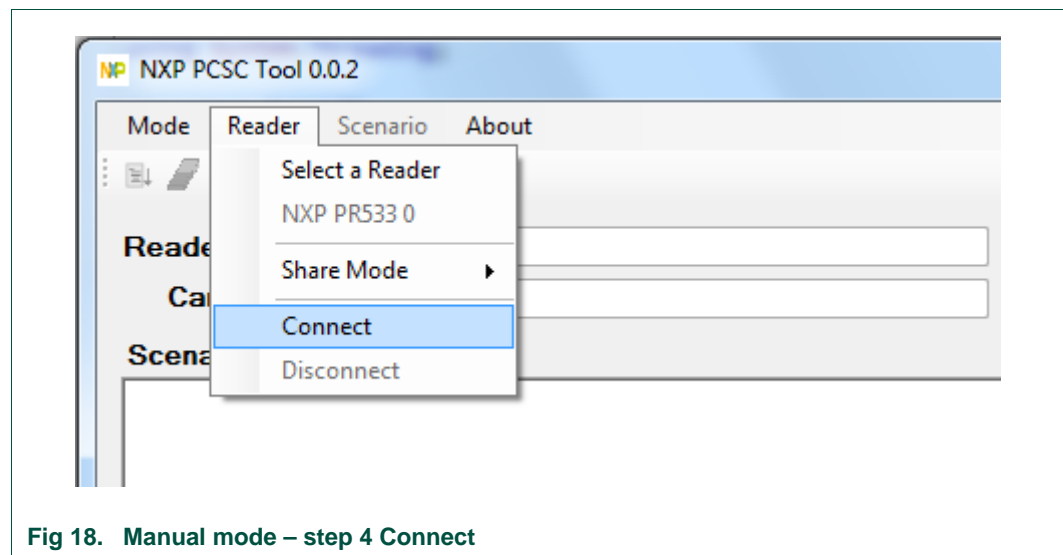


Fig 18. Manual mode – step 4 Connect

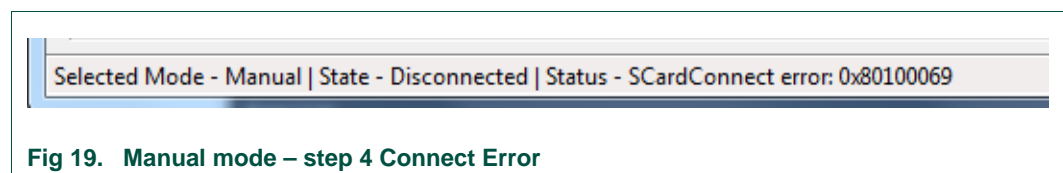


Fig 19. Manual mode – step 4 Connect Error

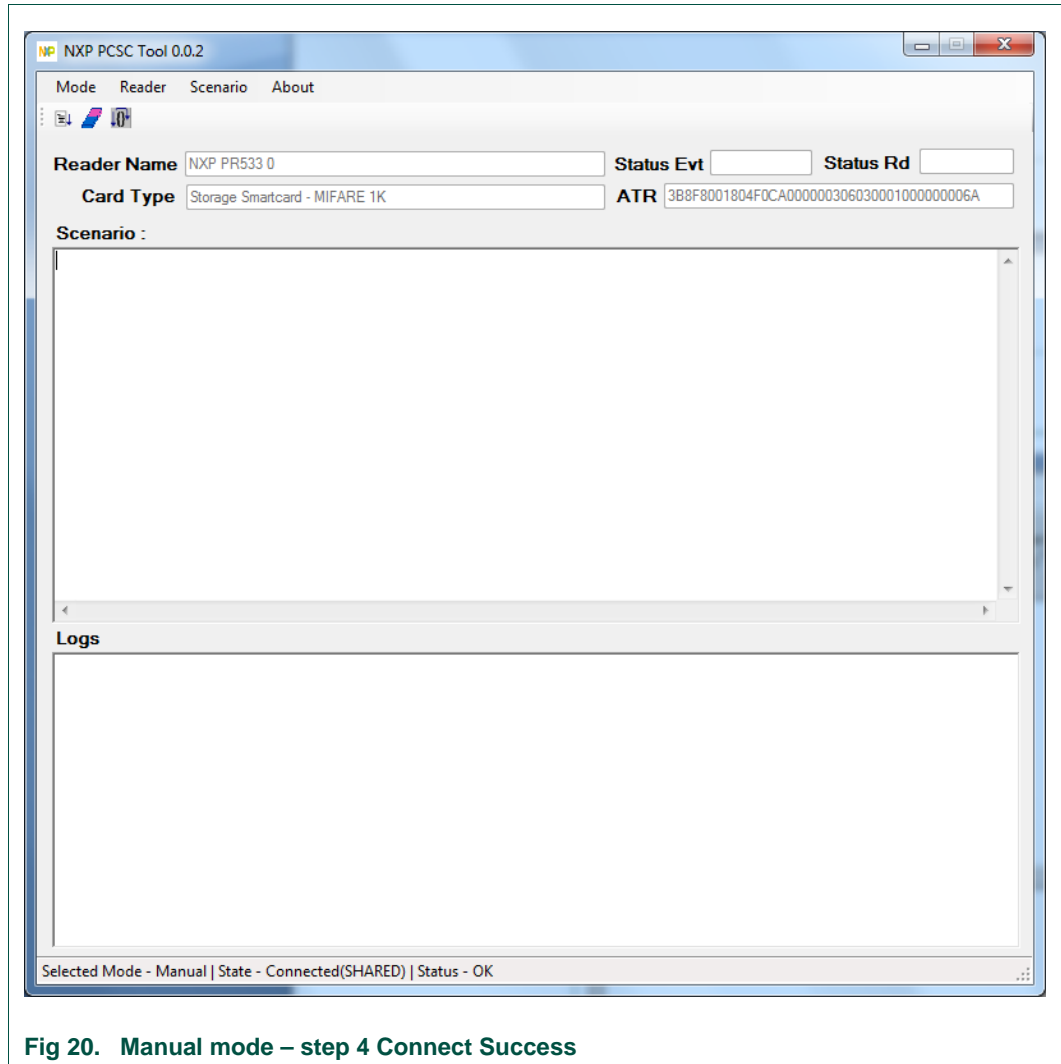


Fig 20. Manual mode – step 4 Connect Success

5 – To open a scenario, click on **Load** in the **Scenario** item or use the shortkey “Control +O”; Select the script with the new dialog box

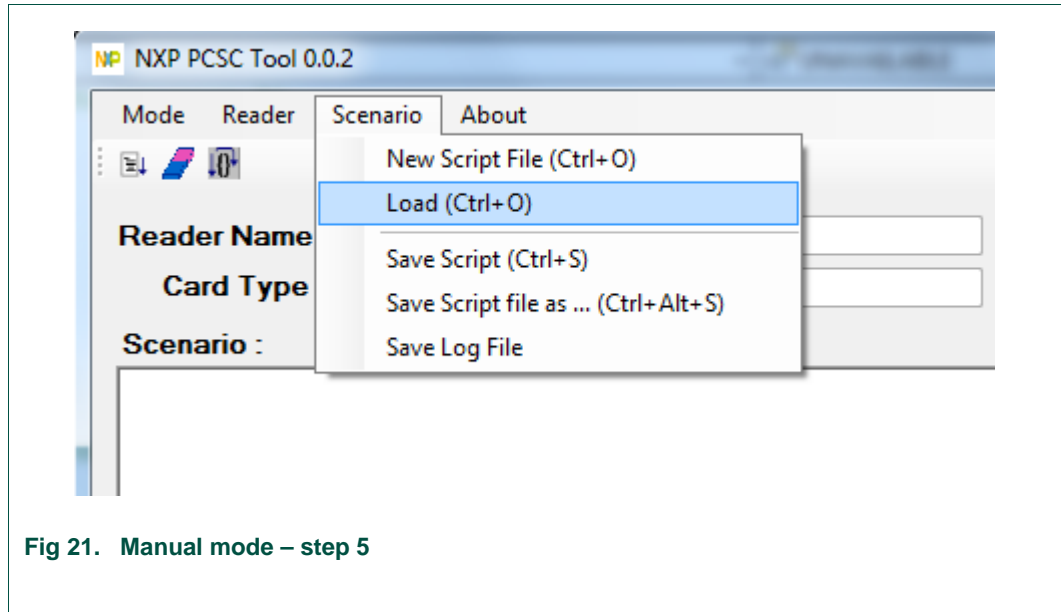


Fig 21. Manual mode – step 5

6 – The script window is updated with the content of the script file (for more information on the script format, see chapter 21 Script file description) and next to the label file, see the path of your scenario file; To execute the script click on the **Execute** button or use the shortcutkey “F5”

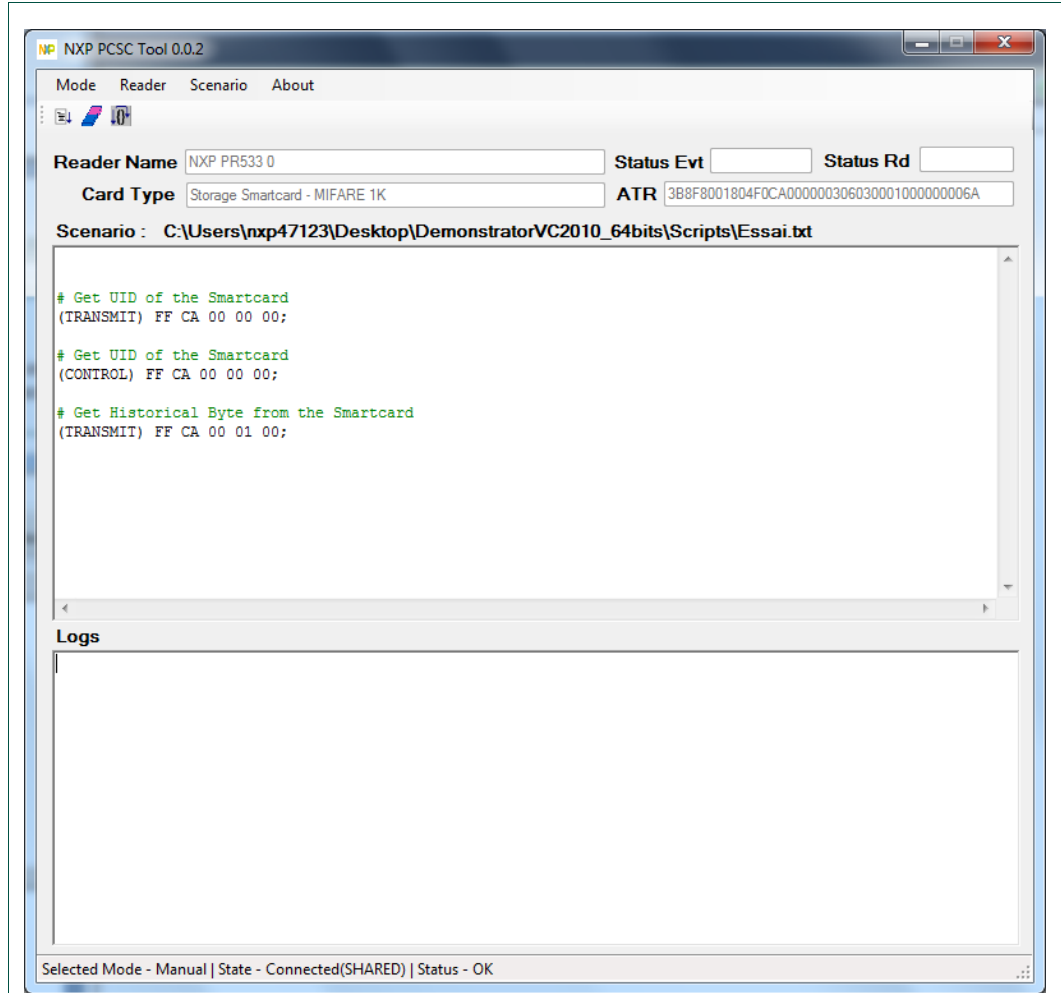


Fig 22. Manual mode – step 6

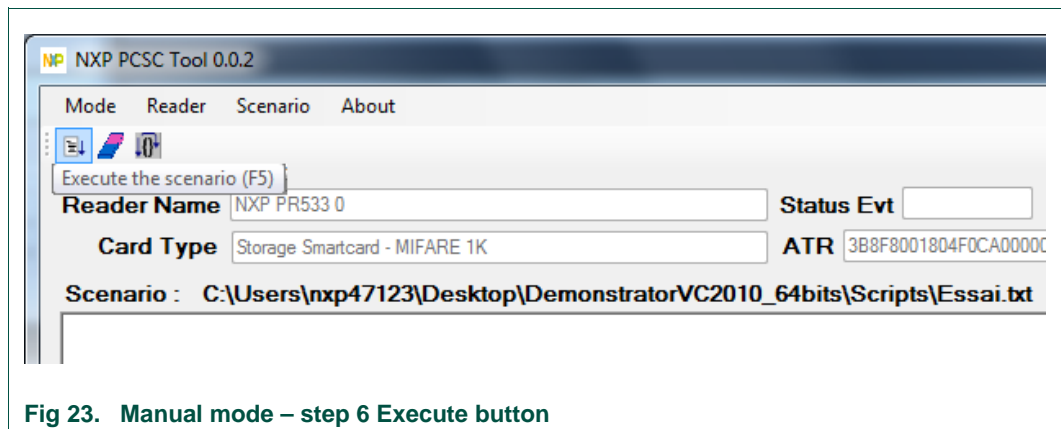


Fig 23. Manual mode – step 6 Execute button

You can also execute command one by one using the next step button or using shortcut "F10". To do that you must select command to be executed with a double click on the command line. This manipulation will color the line if it's a valid command. If no command was selected, the application will select the first valid command. After execution of a selected line, the next command will be selected. To deselect a command, you must double click on it.

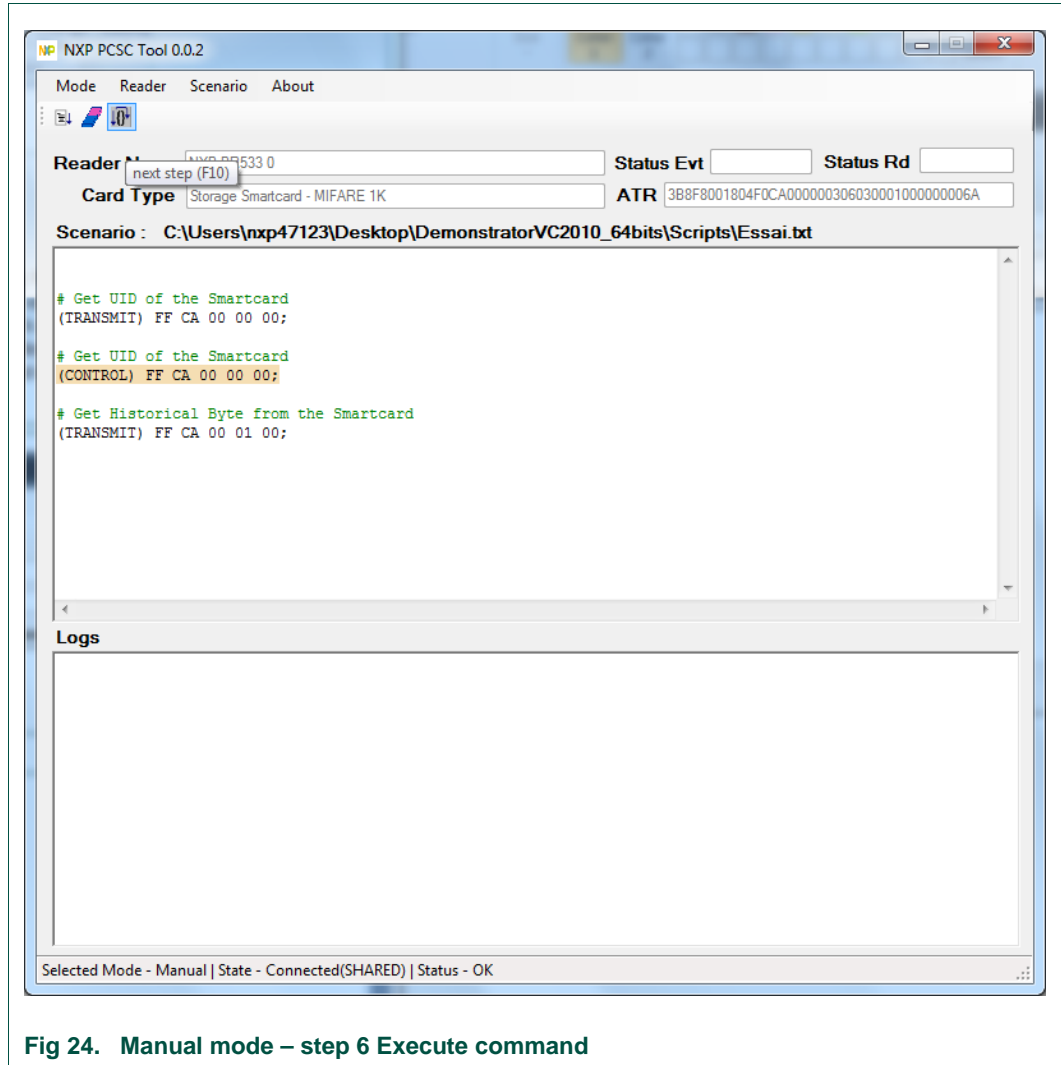


Fig 24. Manual mode – step 6 Execute command

After pressing “F10” or clicking on the next step button

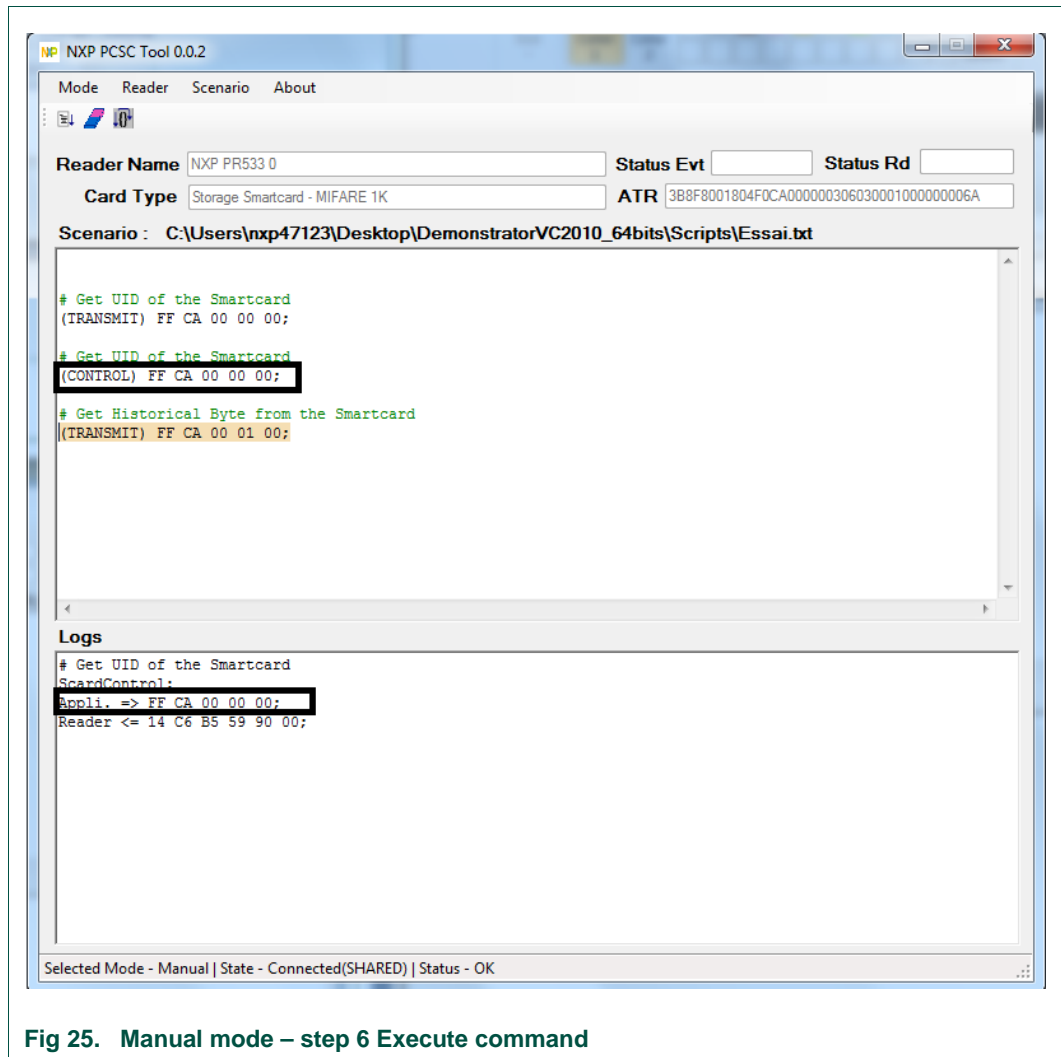


Fig 25. Manual mode – step 6 Execute command

7 – The result of the test is written in the **log window**; To clear this window: Click on the **Erase** button

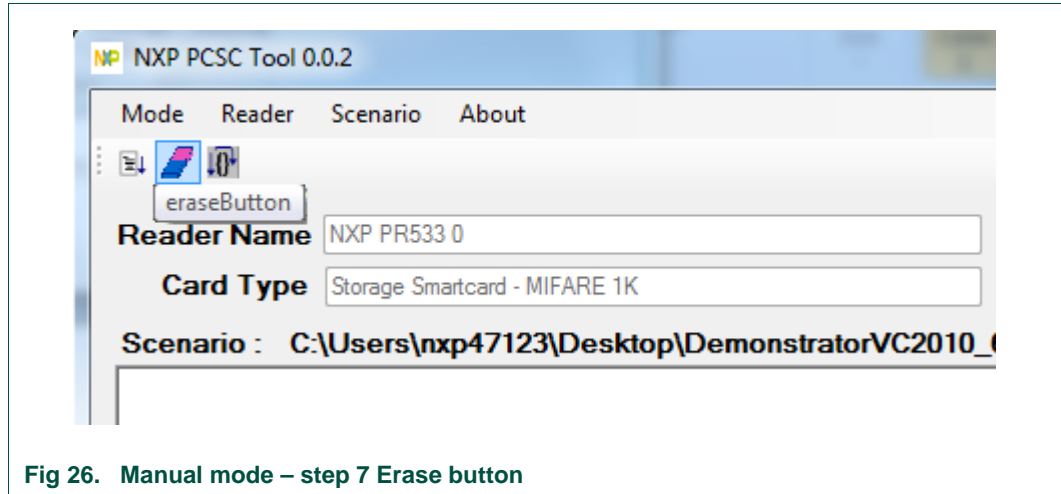


Fig 26. Manual mode – step 7 Erase button

8 – Lastly to disconnect the application from the reader, click on **Disconnect** in the **Reader** sub-menu

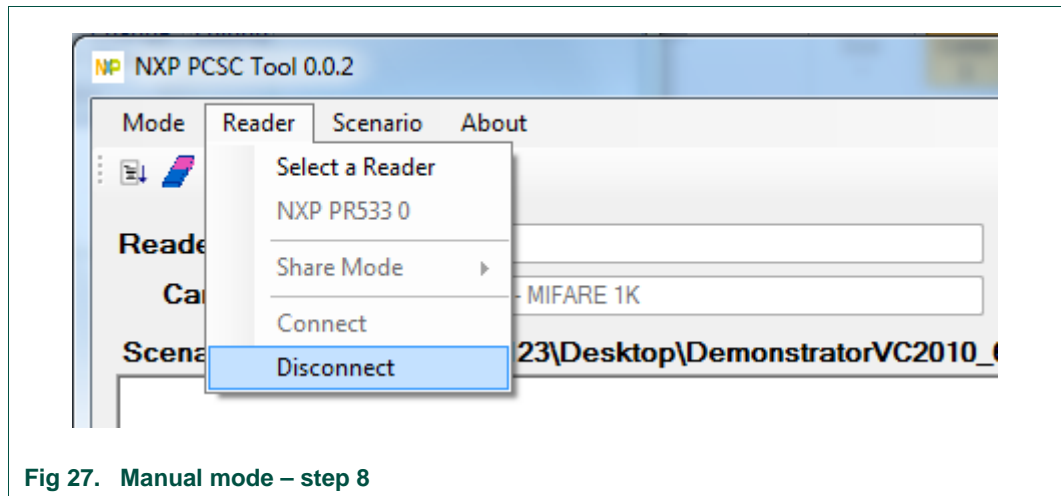


Fig 27. Manual mode – step 8

6. Script file description

A script is composed of:

- Comments;
- SCardTransmit commands;
- SCardControl commands.

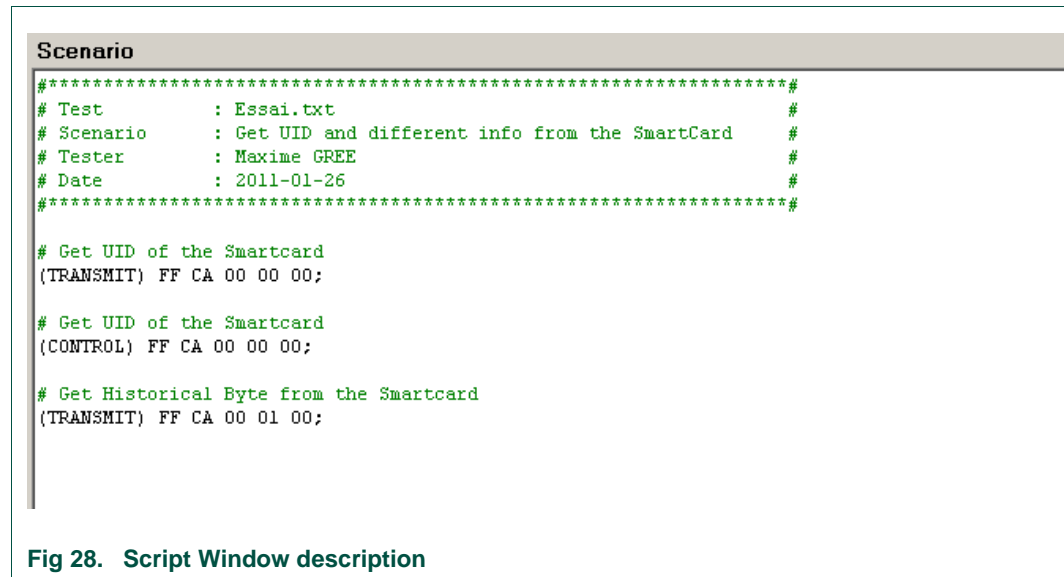


Fig 28. Script Window description

6.1 Comments

A comment is not considered by the application. Its purpose is just to explain each command. It begins with a specific character “#” and is colored with green color.

6.2 SCardTransmit command

The purpose of this command is to perform a call to the SCardTransmit routine of the WinSCard API.

The APDU has to be coded on one line and preceded by the symbol “(TRANSMIT) “

Note: This call is accepted by the API only if we are connected in SHARED or EXCLUSIVE mode.

6.3 SCardControl command

The purpose of this command is to perform a call to the SCardControl routine of the WinSCard API.

The APDU has to be coded on one line and preceded by the symbol “(CONTROL) “

Note: In Microsoft Windows driver, the SCardControl is not enabled by default (see chapter 2.1 Enable ESCAPE IOCTL).

7. Document management

7.1 Abbreviations and terminology

Table 1. Abbreviations and terminology

| Abbreviation | Description |
|--------------|---|
| APDU | Application Protocol Data Unit |
| ATD | Automatic Tag Discovery |
| C-APDU | Command APDU |
| CL | ContactLess |
| IC | Integrated Circuit |
| N/A | Not Applicable |
| N/I | Not Implemented |
| N/U | Not Used |
| PCD | Proximity Coupling Device (Contactless PCD) |
| R-APDU | Response APDU |
| RFU | Reserved for Future Use |
| TBD | To Be Defined |
| TLV | Encoding method (Type, Length, Value) |
| T=CL | ISO/IEC14443-4 protocol |
| USB | Universal Serial Bus |

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