



Advanced Card Systems Ltd.
Card & Reader Technologies

ACR122U NFC Reader

SDK User Manual





Table of Contents

1.0.	Introduction	3
1.1.	Typical Applications	3
2.0.	Installation Guide	4
2.1.	Requirements	4
2.2.	Installing the Device.....	4
2.2.1.	Installing ACS CCID Driver	5
2.2.2.	Enabling PCSC Escape Command	7
2.3.	Installation of SDK Components.....	10
3.0.	SDK Components.....	16
3.1.	Multi-Application Demo.....	16
3.1.1.	Visitor Management System	16
3.1.2.	NFC Peer to Peer Demo.....	17
3.2.	Sample Codes	18
3.3.	Tools and Utilities	18
3.3.1.	ACR122U NFC Reader Tool.....	18
3.3.2.	ACS Easy Key.....	19
3.3.3.	ACR122U PCSC Scripting Tool.....	19
3.3.4.	ACS QuickView	19
3.4.	User Manuals and Reference Materials	20

Figures

Figure 1:	Connection Diagram.....	4
Figure 2:	Registration Module	16
Figure 3:	Exhibitor Module.....	16
Figure 4:	Smart Poster Application.....	17
Figure 5:	Cinema Entrance Application	17
Figure 6:	ACR122U Tool	18
Figure 7:	ACS Easy Key	19
Figure 8:	ACR122U PCSC Scripting Tool	19



1.0. Introduction

The ACR122U is a PC-linked contactless smart card reader/writer developed on the 13.56 MHz contactless technology. This device is designed to support not only Mifare and ISO 14443 Type A and B cards but also FeliCa and NFC tags.

This reader follows the CCID Standard which allows Windows operating systems to use the Microsoft CCID drivers. Nevertheless, Advanced Card Systems Ltd. (ACS) also provides WHQL drivers which can be installed in your machine. Read and write operations on contactless tags are also faster and more efficient since the device makes use of high-speed card access and full USB speed of 12 Mbps.

The ACR122U NFC Reader SDK provides the user sample applications, sample codes, and tools and utilities that can be used to examine the features and capabilities of the ACR122U. This manual gives a summary on how to install the SDK and what can be found in the SDK.

Together with its compact size, trendy design, and various features, the ACR122U offers users a different experience of convenience for applications such as payment, mass transit, physical access control, and time and attendance.

1.1. Typical Applications

- Network Access Control
- Micropayment
- NFC Mobile Tag
- Public Transportation Terminals
- Automatic Fare Collection
- Physical Access Control
- Customer Loyalty
- Time and Attendance
- Contactless Public Phones
- Vending Machines

2.0. Installation Guide

2.1. Requirements

You need to install the .NET Framework to use the ACR122U Tool and Demo Applications.

For XP (x86) users, please download the .NET platform at
<http://www.microsoft.com/downloads/details.aspx?FamilyID=0856EACB-4362-4B0D-8EDD-AAB15C5E04F5&displaylang=en>

For XP (x64) users, please download the .NET platform at
<http://www.microsoft.com/downloads/details.aspx?familyid=B44A0000-ACF8-4FA1-AFFB-40E78D788B00&displaylang=en>

For Vista users, the .NET platform is pre-installed in the OS so you can use the application right away.

Note: To use the P2P demo, you need to have two ACR122U devices. You may purchase a second ACR122U unit separately.

2.2. Installing the Device

Connect the device as shown below:

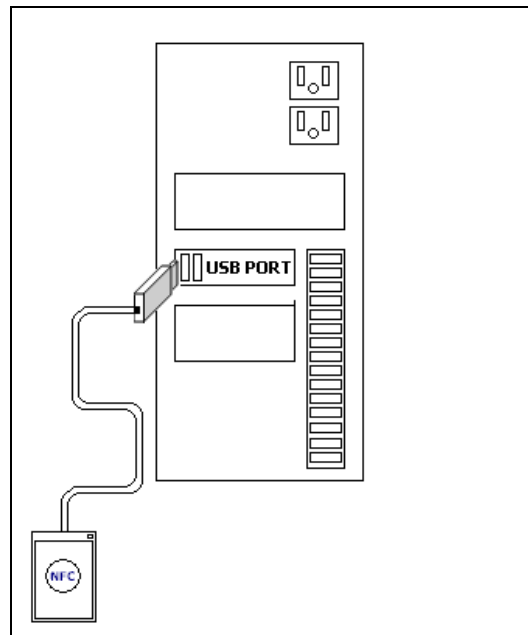


Figure 1: Connection Diagram

The ACR122U is a CCID-compliant device. Windows Vista has a built-in Microsoft CCID driver while for Windows 2000 and XP, the driver is downloaded via Windows Update automatically upon smart card reader plug-in. To know more about setting Automatic Updates in your PC, visit <http://update.microsoft.com/microsoftupdate/>.

Check the device manager if the reader is detected by the computer.



You can also use the ACS CCID Driver if you do not have access to the Internet.

2.2.1. Installing ACS CCID Driver

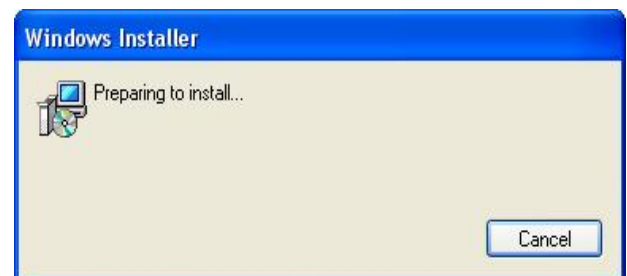
1. Click on “Install ACS CCID Driver”.



2. Select the language of your choice and then click “OK”.



3. Please wait while the Windows Installer prepares the installation.





4. Click “**Next**” to continue with the installation.

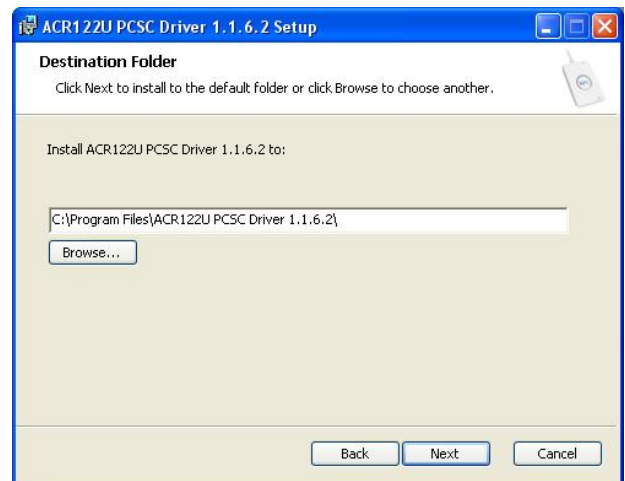


5. Choose Destination Location.

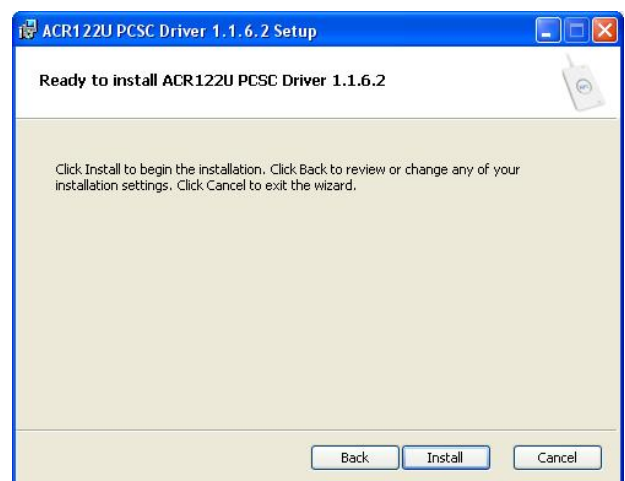
Setup will install ACS CCID PCSC driver in the following folder x:\Program Files\ACR122U PCSC Driver 1.1.6.2\ where x is the driver letter of your local Windows drive.

To install this folder, click “**Next**”.

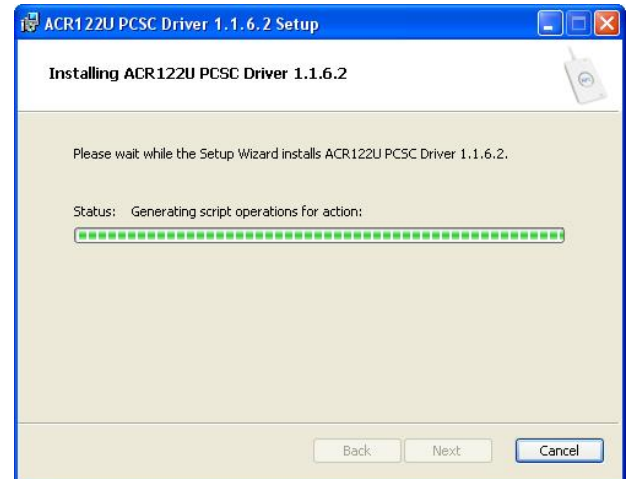
To install to a different folder, click “**Browse**” and select another folder then click “**Next**”.



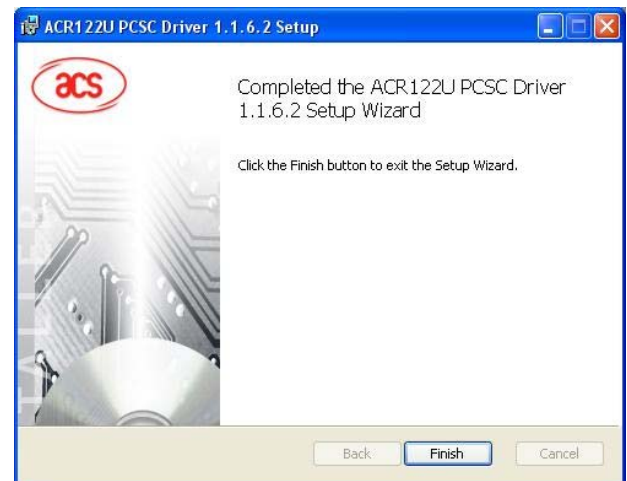
6. Click “**Install**”.



7. Wait for setup to be completed.



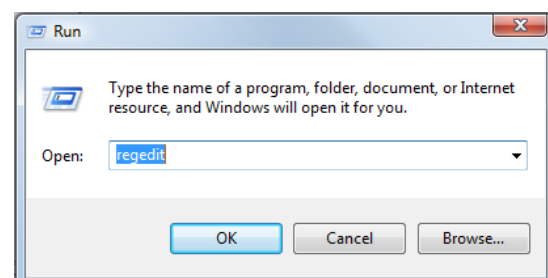
8. Please plug in the reader then click on “**Finish**” to exit the program.



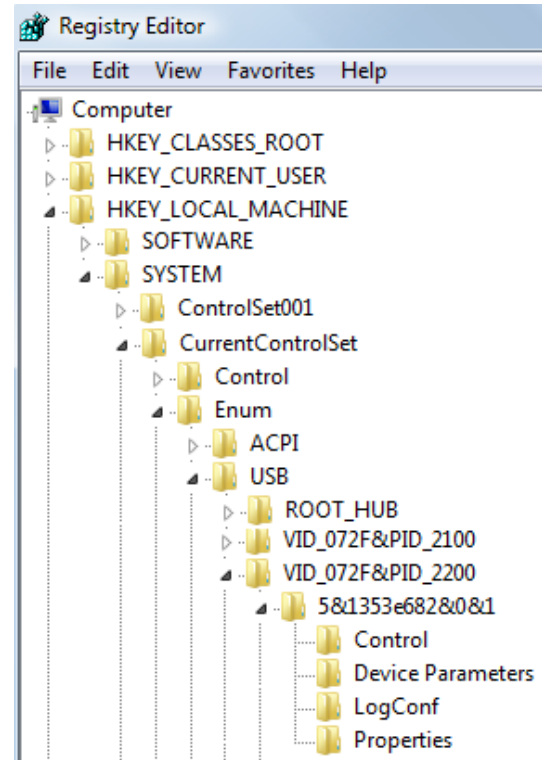
2.2.2. Enabling PCSC Escape Command

1. To use the product, you need to enable the PCSC Escape Command. This can be done by modifying the Registry Settings of the Device after it has been successfully installed.

Run **RegEdit** in the **Run Command Menu** of Windows.

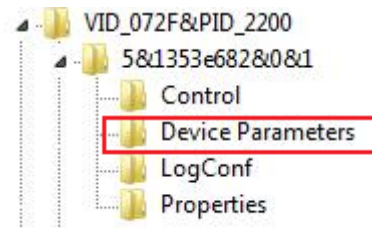


2. Add a DWORD
“**EscapeCommandEnable**” under
HKey_Local_Machine\SYSTEM\Current
ControlSet\Enum\USB\Vid_072F&Pid_2
200\Device Parameters

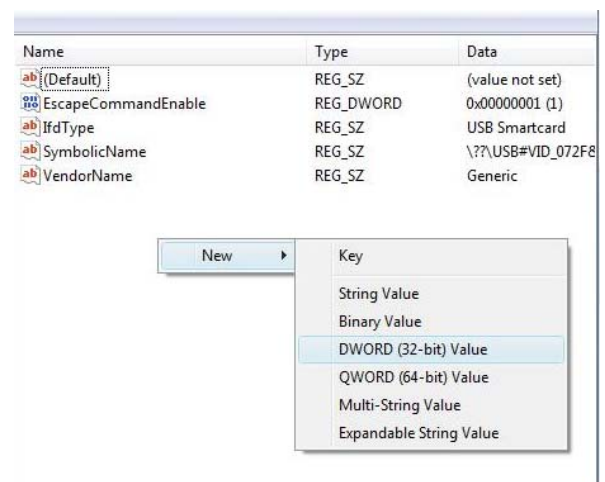


3. Look for: **VID_072F&PID_2200**

Then expand the node. This will list the
USB port where you have plugged the
reader. Choose one port. Look under
Device parameters

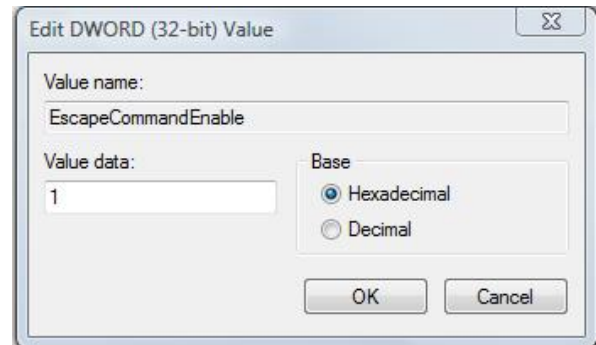


4. Create a DWORD entry (32-bit) with
the name:
EscapeCommandEnable





5. To Modify the value of the EscapeCommandEnable, double click on the entry and input **1** in the Value data with the base set in **Hexadecimal**



Note: Repeat the above steps (including the PCSC Enable Command for the other ACR122U Devices connected in other USB ports).



2.3. Installation of SDK Components

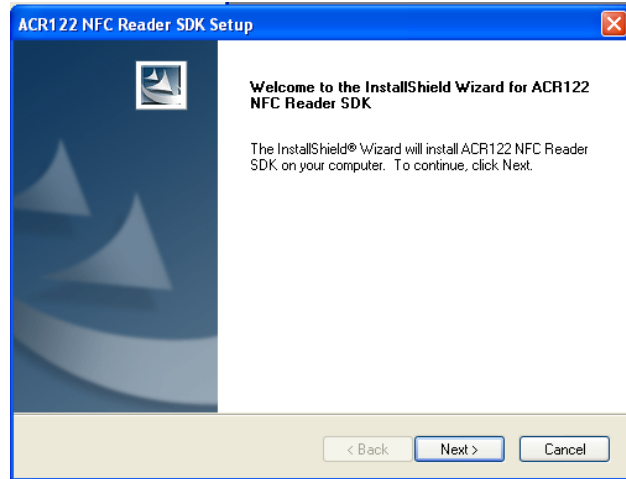
1. You can click on the “**Getting Started**” Option to check the procedure on how to install the ACR122U SDK components.



2. Click on “**Install SDK components**”.



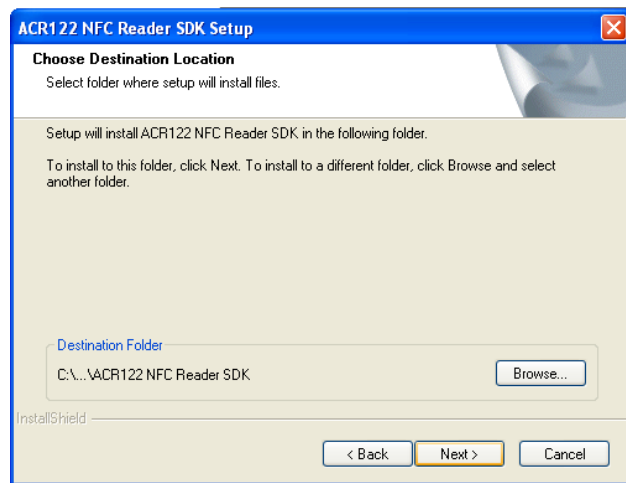
3. Click on “**Next**”.



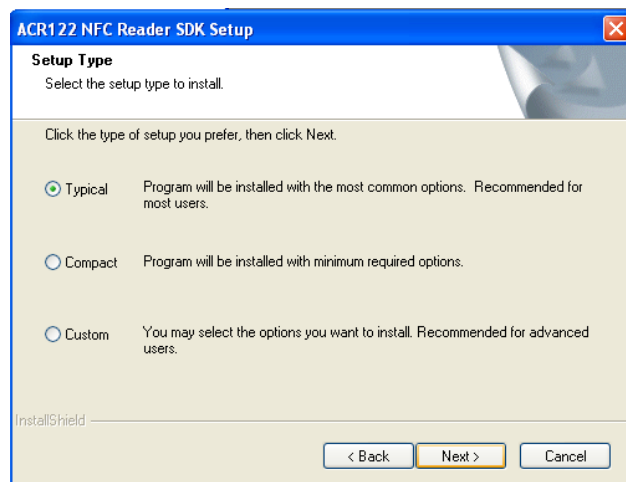
4. You can choose the destination where you want to save the SDK or you can leave it as is for it to save on its default location.

x:\Program Files\Advanced Card Systems Ltd\ACR122 NFC Reader SDK where x is the drive letter of your local Windows Drive.

Click on “**Next.**”



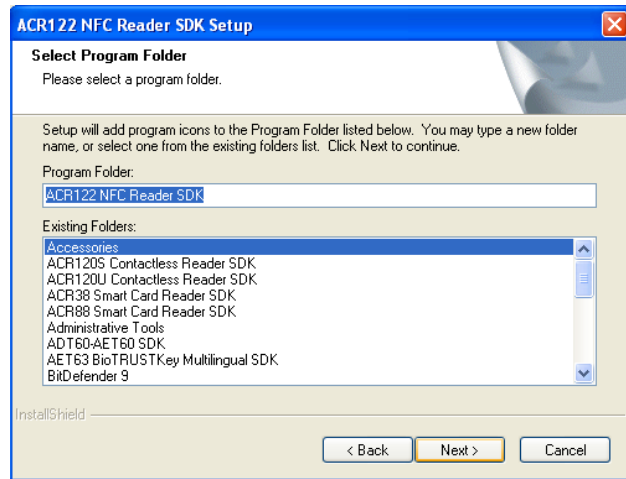
5. Choose **Typical Install**. Click on “**Next**”.



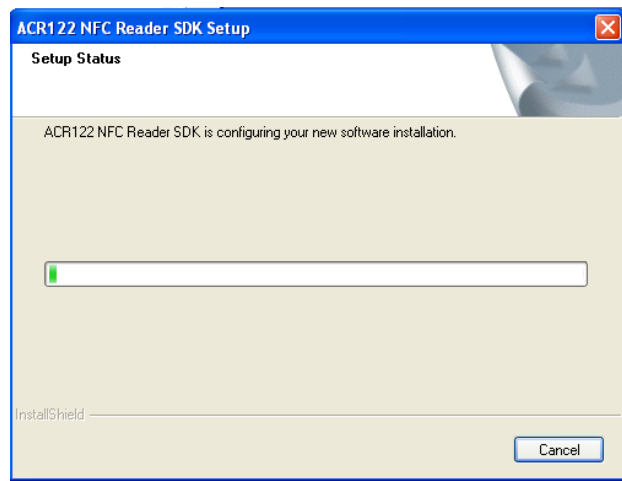


6. You can change the folder name or leave the default name as is.

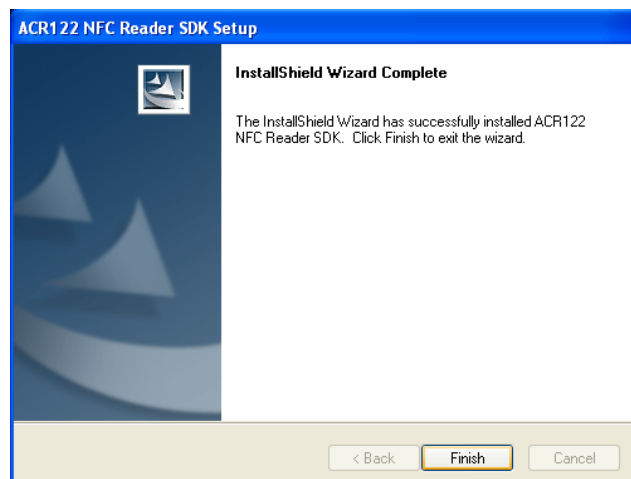
Click on **“Next”**.



7. Wait for setup to be completed.



8. Once completed, click on **“Finish”**.





9. Click on **“Install Multi-Application Demo”**.

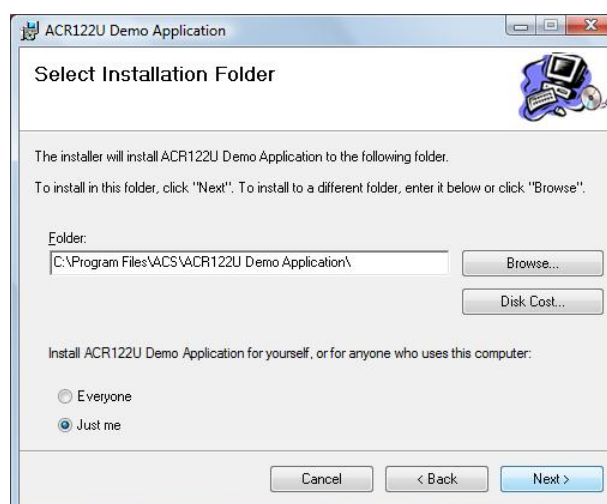


10. Click on **“Next”**.



11. You can choose to leave the default installation path or specify the folder where you want to install the Demo Application.

Click on **“Next”**.

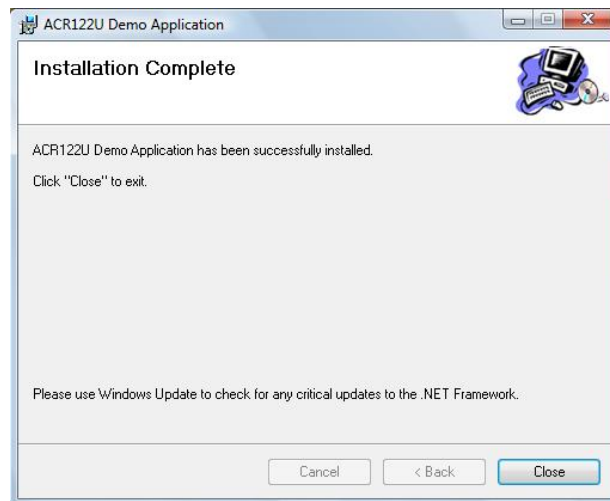




12. Click on **“Next”** to confirm installation.



13. Click on **“Close”** once installation is complete.



14. If you have not installed **Adobe Acrobat** in your workstation, click on this option. You need this to view the manuals and other reference materials.





15. Click on this option to exit the application.



3.0. SDK Components

3.1. Multi-Application Demo

3.1.1. Visitor Management System

This application simulates a Visitor Management System (VMS) which can be used for trade shows, conferences, exhibitions, and other events that require a registration system. The application is divided into two modules, namely the Registration and Exhibitor modules. Since the ACR122U supports ISO 18092 tags and ISO 14443 tags, you can choose from a wide variety of contactless cards for your application. However, for this specific application, a Mifare 1K card will be used. You may view the Help Menu in the program for instructions on how to use the VMS.



Figure 2: Registration Module



Figure 3: Exhibitor Module

Note: This SDK includes only the demo version of the VMS. Please contact ACS if you want to get the full version which gives you access to all features of the VMS.

3.1.2. NFC Peer to Peer Demo

The ACR122U NFC Reader can be used in a wide range of applications and this demonstration program simulates a Smart Poster/NFC Device setting. The application shows conventional functions such as gathering information from a Smart Poster on the go and purchasing Cinema tickets by just tapping onto the poster. This application highlights the NFC capabilities of the ACR122U NFC Reader.



Figure 4: Smart Poster Application

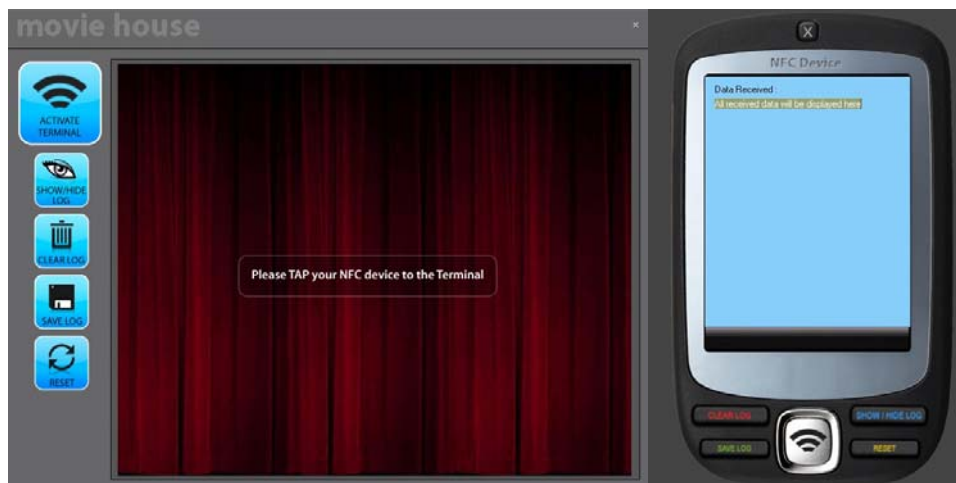


Figure 5: Cinema Entrance Application

3.2. Sample Codes

Sample codes written in different programming languages are provided

- Java
- Delphi 7
- Visual Basic 6
- Visual C++ 6
- Visual C++ 2005 (x64)
- Visual C # 2005
- Visual Basic .Net 2005

The sample codes show the different capabilities of the ACR122U and showcases how to control the ACR122U peripherals and how to communicate with a contactless tag.

3.3. Tools and Utilities

3.3.1. ACR122U NFC Reader Tool

The ACR122U Tool is an application utility tool that enables the user to perform reader and card-related commands. This tool is compatible with the ACR122U PCSC version and supports a variety of cards and can properly detect ISO 14443 and ISO 18092 cards. Moreover, this tool also allows the user to perform a simple peer to peer communication between two ACR122U devices, showing the NFC capabilities of the device.

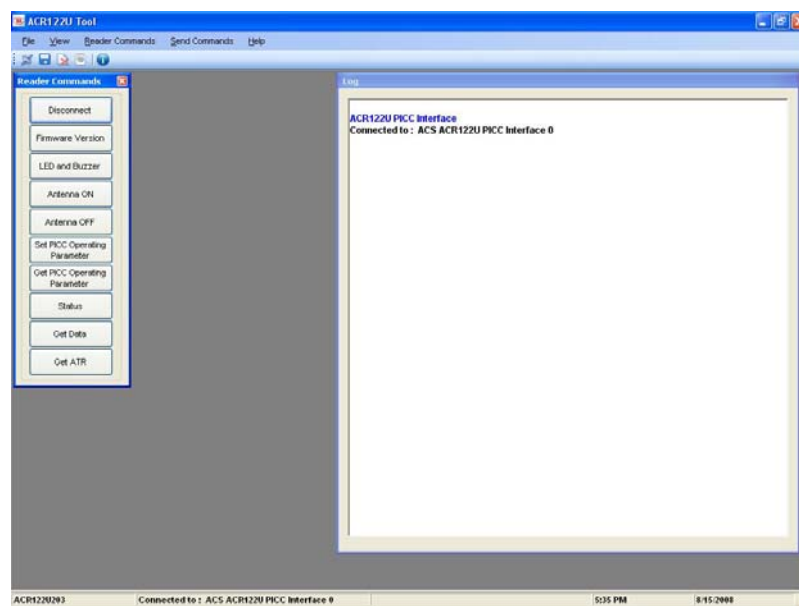


Figure 6: ACR122U Tool

3.3.2. ACS Easy Key

ACS Easy Key is a utility program for changing Mifare security settings. Please refer to the Mifare Card Reference Manual to efficiently utilize the ACS Easy Key.

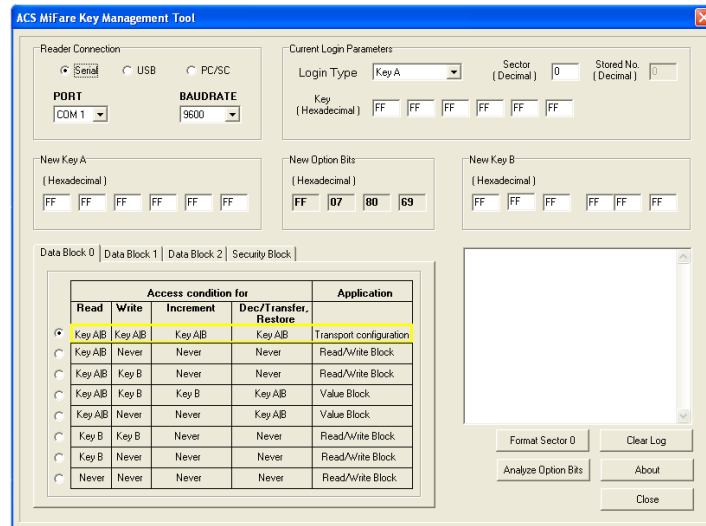


Figure 7: ACS Easy Key

3.3.3. ACR122U PCSC Scripting Tool

The ACR122U PCSC Scripting tool is a demonstration application that gives the user the capability to use scripts for the ACR122U for establishing communication with contactless tags.

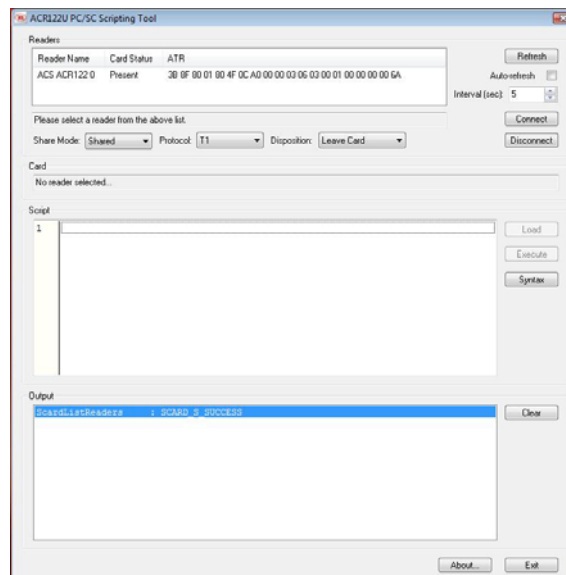
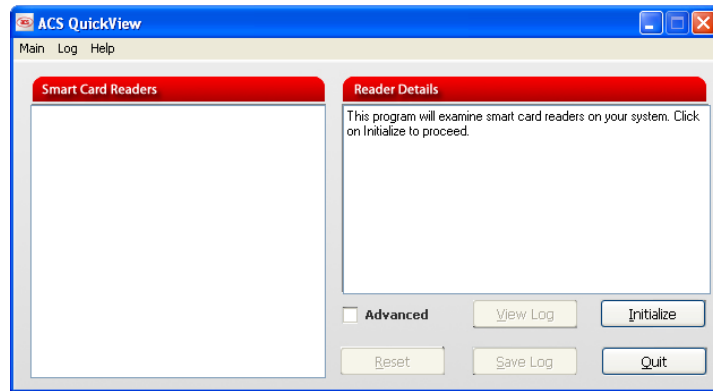


Figure 8: ACR122U PCSC Scripting Tool

3.3.4. ACS QuickView

The ACS QuickView is a utility program that checks if the user has properly installed the ACR122U device. For a detailed explanation on how to use the tool, you may check the Help Menu in the program.



3.4. User Manuals and Reference Materials

- ACR122U NFC Reader SDK User Manual
- ACR122U NFC Reader API
- ACR122U NFC Reader Technical Specifications
- ACR122U NFC Reader Peer to Peer Demo Manual
- ACR122T NFC Reader Token API
- ACR122T NFC Reader Token Technical Specifications
- Mifare Card Specification (1K)
- Mifare Card Specification (4K)
- Mifare Card Specification (Ultralight)
- Topaz Card Specification

To know more about the PCSC standard, you can click this link to download reference materials:
[PCSC Specifications](#)