

ACR1222S Serial NFC Reader

SDK User Manual

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Subject to change without prior notice



Version History

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1.0. Introduction

ACR1222S is the serial interface (RS232) reader in the ACR122 Series, which is a family of PC-linked NFC contactless smart card readers/writers. Developed based on the 13.56 MHz RFID technology and the ISO/IEC 18092 NFC standard, it supports ISO 14443 Type A and B, Mifare, FeliCa and NFC contactless technologies.

This serial NFC reader is equipped with a buzzer and two LEDs as well for rich user interaction. It also supports anti-collision and selective card polling, allowing smooth operation even when multiple cards are presented. Moreover, it is equipped with a built-in SAM slot to secure the overall contactless operation.

ACR1222S is ideal for different contactless applications, such as personal identity verification, home banking, network log-on and online micropayment transactions. It is available in module form as well, facilitating integration into POS terminals, kiosks, ticketing and vending machines.

The ACR1222S Serial NFC Reader SDK provides the user tools and utilities, sample codes and reference materials to make application development as easy as possible with ACR1222S. This manual contains the procedure on how to install the SDK and an overview of its contents.

1.1. Typical Applications

- e-Government
- e-Banking and e-Payment
- e-Healthcare
- Transportation
- Network Security
- Access Control
- Loyalty Program

This device complies with part 15 of the FCC Rules.Operation is subject to the following two conditions: This device may not cause harmful interference, and must accept any interference received, including interference that may cause undesired Operation. Changes or modifications not expressly approved by the party responsible for compliance could void the equipment.

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2.0. SDK Specifications

2.1. SDK Contents and Features

- 1 ACR1222S Serial NFC Reader
- 5 Mifare 1K Cards
- 1 ACOS6-SAM Card
- SDK CD-ROM

2.2. SDK System Requirements

- IBM Compatible Personal Computer with minimum of 1 GHz Pentium Processor or higher
- Window XP, Windows Vista, Windows 7
- Minimum of 256 MB RAM
- Minimum of 600 MB Free Hard Disk Space
- CD-ROM Drive
- Serial RS232 port
- USB port

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3.0. Installation

3.1. Requirements

If you have installed a previous version of the ACR1222S Serial NFC Reader SDK, uninstall this version first via **Add/Remove Programs** in Control Panel before installing this SDK version. Make sure that all folders have been deleted.

The Microsoft .NET Framework 3.5 is a pre-requisite to run the ACR1222S Tool. For Windows XP, Windows Vista, Windows 7 users, the Microsoft .NET Framework 3.5 Service Pack 1 can be downloaded from:

http://www.microsoft.com/downloads/en/details.aspx?FamilyID=ab99342f-5d1a-413d-8319-81da479ab0d7

3.2. Connection Diagram

Connect the device as shown below:



Figure 1: Connection Diagram of ACR1222S Serial NFC Reader

ACR1222S uses the generic COM driver, which is already installed in Windows and Linux operating systems; hence driver installation is not necessary.



3.3. Installation of SDK Components

1. Click on **Install SDK Components** button from the ACR1222S SDK Installer GUI.



- ACR1225 Serial NFC Reader SDK Setup

 Welcome to the InstallShield Wizard for
ACR122S Serial NFC Reader SDK

 The InstallShield® Wizard will install ACR122S Serial NFC
Reader SDK on your computer. To continue, click Next.
- 2. ACR1222S SDK Setup Wizard will be displayed.

Click **Next** to continue.



3. Choose the location where you want to install the ACR1222S	ACR1225 Serial NFC Reader SDK Setup Choose Destination Location Select folder where setup will install files.	×
The default location is x:\Program Files\Advanced Card Systems Ltd\ACR1222S Serial NFC Reader SDK, with x as the drive letter of the local Windows drive.	Setup will install ACR122S Serial NFC Reader SDK in the following folder. To install to this folder, click Next. To install to a different folder, click Browse and select another folder.	
	Destination Folder C:\\ACR122S Serial NFC Reader SDK InstallShield K Back Next > Cancel]

4. Choose **Complete** and click **Next**.

Note: Advanced users may choose **Custom** to install preferred components.

ACR1225 Seria	NFC Reader SDK	×
Setup Type Select the se	tup type that best suits your needs.	124
Please selec	t a setup type.	
Complete	All program features will be installed. (Requires the mos	t disk space.)
← Custom	Select which program features you want installed. Rec advanced users.	ommended for
InstallShield ——	< Back N	ext > Cancel

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5. Select a program	ACR1225 Serial NFC Reader SDK Setup	X
folder where icons will	Select Program Folder	
be placed and then click Next .	Please select a program folder.	
	Setup will add program icons to the Program Folder listed below. You may type a new folder name, or select one from the existing folders list. Click Next to continue.	
	Program Folder:	
	ACR1225 Serial NFC Reader SDK	
	Existing Folders:	
	Accessories]
	ACD Systems ACDS7 SDK	1
	Administrative Tools	1
	Adobe Adobe LiveCucle ES2	
	Avira	
	Games T	1
		-
	InstallShield	
	< Back Next > Cancel	
6. Wait for the	ACR1225 Serial NFC Reader SDK Setup	×
installation process to be completed.	Setup Status	
	ACR122S Serial NFC Reader SDK is configuring your new software installation.	
	Installing	
	U:\\Sample Lodes\MS Visual U++ 2005 (x64)\Get ATH\GetATH.ncb	

InstallShield ---

Cancel



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7. Click Finish to close the Setup Wizard window.	ACR 1225 Serial NFC Reader 5	DK Setup InstallShield Wizard Complete The InstallShield Wizard has successfully installed ACR122S Serial NFC Reader SDK. Click Finish to exit the wizard.
		< Back Finish Cancel

Installation of Adobe PDF Reader 3.4.

1. Click the Install **Adobe PDF Reader** button from the ACR1222S SDK Installer GUI.





- Card & Reader Technologies
- 2. Wait while the installation is being processed.

Click **Pause** to temporarily stop the installation or **Exit** to stop the installation.



 Choose the destination folder where you want Adobe Reader to be installed. Click Change Destination Folder to choose a preferred location.

Otherwise, click **Next** to install the Adobe Reader on the default folder location.





4. Once ready, click **Install** to begin the installation.



5. Wait for the installation process to be completed.

🙀 Adobe	Reader 9 - Setup
A	
Installin	g Adobe Reader 9
The pro	ogram features you selected are being installed.
12	Please wait while setup installs Adobe Reader 9. This may take several minutes.
	Status: Optimizing performance
	Completed 0% of process
	Estimated time remaining: 16 Sec.
Adobe	
	< Back Next >

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6.Click Finish to exit setup.	Adobe Reader 9 - Setup
	Setup Completed
	Setup has successfully installed Adobe Reader 9. Click Finish to exit setup.
	Adobe

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4.0. SDK Components

4.1. Sample Codes

The sample codes features the different capabilities of the ACR1222S, each shows how to control the ACR1222S peripherals and how to communicate with a contactless tag and SAM.

Sample codes are written in the following languages:

- Java
- MS Visual Basic (x32)
- MS Visual Basic .NET (x32)
- MS Visual Basic .NET (x64)
- MS Visual C# (x32)
- MS Visual C# (x64)
- MS Visual C++ (x32)
- MS Visual C++ (x64)
- Delphi

4.2. Tools and Utilities

4.2.1. ACR1222S Tool

The ACR1222S Tool is an application utility tool that allows the user to perform reader and cardrelated commands. This tool supports a variety of cards and can properly detect ISO 14443 and ISO 18092 cards.

ACRIEDE Tool		A REAL PROPERTY OF TAXABLE PARTY.			100
Sie New Seader O	Commanute Send Commanute Lights				
# B B * 0					
Erabel(month)	3				
1					
Disconnect	Cond Commands 2	tes			
Finishing Varian					
	Advetteda	ACR122_Open		1	
Number of Skits	Law 1	Converted to 1 CONFI			
0400.000		Number of Slots : 1			
	Vela	Fernance version: ACR1225105			
Set Device ste					
	Real Value	 Firmware version : ACR/025/105 			
Out Timeouts	Tota Value				
Sel Teneoulis		- Number of Slots : 1			
	Townert	ACR122_GetMan/Skits Soccess			
LED and Buccar		ACR122 CollinealEnte			
CO Property City	Decrement	- Baudrate : 9000			
	Casy	activity consistence account			
EC Paner OFF		ACR122 SetBandfale			
000		ACR122_SetEaudFate Success			
		ACRESS Collements		-	
C14		Status Teneout : 2000 mm			
		 Status Retries: 1 Response Tenenal: 10000 ms 			
		> Response Retries : 1			
		ACR122_GetTimeouts Success			
		ACR122_SetTeneouts			
		 Status Teneout change to: 2000 Status Bathies, change to: 5 			
		ICC Power ON			
		a Bernander Terrand sharper by 10000			
		· Response Retries change to: 1		-1	
	Annual Contra		200.000		
AC41223146	Composition to COMPI		200 PM	N N N N N N N N N N N N N N N N N N N	

Figure 2: ACR1222S Tool

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4.2.2. ACS Easy Key

The 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.

ader Con	nection		Curre	ent Login Parameters	
© Ser	a cu	8 C PC/50 BAUDRA 9600	C Lo TE (H4	ogin Type Key A Key exadecinal) FF FF	Stored No. [0 (Decimal) [0 (Decimal) [0 [FF [FF [FF [FF
n Key A exadecia FF	sal) [ff	1 FF FF	F FF	Option Bits sadecimal) 07 80 69	New Key B (Hexadecinal) [FF FF FF FF FF FF FF
a Block I	0 Data Block	1 Data Block 2	Security Block	Application	Connection to ACR1225 success Authentication success Formal sector 0 success
a Block	0 Data Block	1 Data Block 2	n for Dec/Transfer, Restore	Application	Connection to ACR1225 success Aufhentication success Formal sector 0 success
a Block Re Key	O Data Block	1 Data Block 2 Access conditio Increment Key AB	n for Dec/Transfer, Restore Key AB	Application Transpot configuration	Connection to ACR1225 success Authentication success Formal sector 0 success
a Block Re Kay	Data Block ad Write AB Key AB AB Never	1 Data Block 2 Access conditio Increment Key AB Never	Security Block	Application Transport configuration Read/Write Block	Connection to ADR1225 success Authentication success Formal sector 0 success
a Block Re Kay C Kay	Data Block	Access conditio	Security Block n for Dec/Transfer, Restore Key AB Never Never Never	Application Transport configuration Read/Wite Block Read/Wite Block	Connection to ACR1225 success Authentication success Formal sector 0 success
a Block Re Kay Kay Kay	Data Block	Access condition Increment Key AB Never Never Key B	Security Block n for Dec/Transfer, Restore Key AB Never Never Key AB	Application Transpot configuration Read/Wite Block Read/Wite Block Value Block	Connection to ACR1225 success Authentication success Formal sector 0 success
Block Re Key Key Key Key Key	ad Write AB Key AB AB Key B AB Key B AB Key B AB Key B	1 Data Block 2 Access condition Increment Key AB Never Never Never Key 8 Never	Security Block	Application Transpot configuration Read/Wite Block Read/Wite Block Value Block Value Block	Connection to ACR1225 success Authentication success Formal sector 0 success
a Block Re Key Key Key Key Key	ad Write AB Key AB AB Key AB AB Key B AB Key B AB Key B AB Never y B Key B	Access condition Increment Key AB Never Never Key B Never Never Never	Security Block	Application Transport configuration Read/Wite Block Read/Wite Block Value Block Value Block Value Block Read/Wite Block Read/W	Connection to ACR1225 success Authentication success Formal sector 0 success
a Block Re Key Key Key Key Key Key Key	ad Write AB KeyAB AB KeyAB AB Never AB KeyB AB Never yB KeyB yB Never	Access condition Increment Key AB Never Never Key B Never Never Never Never	Security Block	Application Transport configuration Read/Wite Block Read/Wite Block Value Block Value Block Value Block Read/Wite Block Read/Wite Block Read/Wite Block	Connection to ACR1225 success Authentication success Formal sector 0 success
a Block Re Key Key Key Key Key Key Key Ke	ad Write AB Key AB AB Key AB AB Key B AB Key B AB Key B AB Never y 8 Key 8 y 8 Never	Access condition Increment Key AB Never Never Key B Never Never Never Never Never Never	Security Block	Application Transport configuration Read/Wite Block Read/Wite Block Value Block Value Block Read/Wite Block Re	Connection to ACR1225 success Authentication success Formal sector 0 success

Figure 3: ACS Easy Key

4.2.3. ACS QuickView

The ACS QuickView is a utility program that checks if the user has properly installed the ACR1222S device. For a detailed explanation on how to use the tool, check the Help menu in the program.

Smart Card Readers	Reader Details
ACS Proprietary Readers Installed Ormected ACR122S in COM1 ACR122S-SAMD in COM1 ACR122S-SAMD in COM1 ACR122S-SAMD in COM1	Reader Name: ACR122S-SAM0 in COM1 Firmware version: ACR122S105 Card detected in SAM slot ATR Value: 38 BE 95 00 00 41 03 00 00 00 00 00 00 00 00 00 90 00
	Advanced View Lon Fritishte

Figure 4: ACS QuickView



4.3. User Manuals and Reference Materials

- ACR1222S API
- ACR1222S Communication Protocol
- ACR1222S SDK User Manual
- ACR1222S Technical Specifications
- Mifare 1K Reference Manual
- Mifare 4K Reference Manual
- Mifare Ultralight Reference Manual
- ACOS6-SAM Reference Manual

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5.0. ACR1222S API

An interface software to program the ACR1222S is on-hand to facilitate application development. It is supplied in the form of 32-bit and 64-bit DLL (Dynamic Link Library) which can be programmed using popular development tools like Java, Delphi, Visual Basic, Visual C++, Visual C# and Visual Basic .Net.

The DLL is a set of high-level functions provided for the application software to use. It supplies a consistent API (Application Programming Interface) for the application to operate on the ACR1222S and the corresponding presented card. The DLL communicates with the ACR1222S via the communication port facilities provided by the operating system.

The ACR1222S API defines a common way of accessing the ACR1222S. Application programs can invoke the ACR1222S through the interface functions and perform operations on the presented card.

Please note that for any ACR1222S DLL-based application to work with the ACR1222S reader, the DLL should be present in the System32 folder and/or application directory. The ACR1222S SDK installer automatically places the DLL into your System32 folder. You can also find the DLL files from C:\Program Files\Advanced Card Systems Ltd\ACR1222S Serial NFC Reader SDK\Sample Codes\Library Modules after you have installed the SDK.

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