

# ACR3901U-S1 Secure Bluetooth Contact Card Reader

User Manual V1.01





# **Table of Contents**

1.0. Ir	troduction	.3
2.0. F	or iOS	.4
2.1. 2.2. 2.2.1. 2.2.2. 2.2.3. 2.2.4. 2.2.5. 2.2.6.	Install the Bluetooth demo application Using the ACS Bluetooth demo application Connect a device Get the device information Get the battery status Get the card's ATR (Answer ToReset) Transmit an APDU command Transmit an escape command	.5 .5 .7 .8 .9
3.0. F	or Android1	13
3.1. 3.2. 3.2.1. 3.2.2. 3.2.3. 3.2.4. 3.2.5. 3.2.6.	Install the Bluetooth demo application	16 18 19 20 21 22
4.0. F	or Windows®	23
4.1. 4.2. 4.3. 4.4. 4.4.1.	Install ACS Unified Bluetooth driver	26 28 29 29
4.4.2. 4.5.	Uninstall a device	



# **1.0. Introduction**

ACR3901U-S1 Secure Bluetooth Contact Card Reader combines the latest technology in the world of smart card readers with Bluetooth® connectivity. This compact and wireless smart card reader brings together sophisticated technology with fresh design to meet different requirements in various smart card-based applications using Bluetooth-enabled devices, such as smart phones and tablets.

This document provides general procedures for installation of drivers and applications when using ACR3901U-S1 Secure Bluetooth Contact Card Reader.

Topics covered in this user manual are as follows:

- Section <u>2.0</u> provides procedures on how to install and use Bluetooth (BT) demo application with ACR3901U-S1 using iOS device and library
- Section <u>3.0</u> provides procedures on how to install and use Bluetooth (BT) demo application with ACR3901U-S1 using Android device and library
- Section <u>4.0</u> provides procedures on how to install ACS Bluetooth driver, pair Bluetooth devices and use the ACS Bluetooth Device Management Tool

Page 3 of 34



# 2.0. For iOS

# 2.1. Install the Bluetooth demo application

- 1. You can access the device library when you download the **<u>iOS & Mac EVK</u>** from the ACS website.
- 2. Using XCode application, open **BTDemo.xcodeproj**.

00		🚞 BTDer	no		R
		• 🔅 • 🖻			
FAVORITES					
All My Files					
AirDrop			PRAL		
Applications	ACSBluetooth	BTDemo	BTDemo.xcodeproj	BTDemoTests	
Desktop					
🖻 Documents					
Downloads					
DEVICES					
Mountain Li					
Remote Disc					
SHARED					
hkoesx(SMB)					
<u>–</u> All					
TAGS					
🔴 Red					
😑 Orange					
- Vellow					

3. Transfer **BTDemo.xcodeproj** to your mobile device. Choose your mobile device, and then click **Play**.

Note: Make sure that your mobile device is connected to your computer.

00		B	TDemo		
BTDemo ) 🚺 iPhone Ret	tina (3.5-inch) B1	Demo: Ready   Today at 11:52 am		No Issues	
	IIII   🔺 🕨 🔂 BTDemo				
BTDemo	General General	Capabilities Info	Build Settings Build Pha	ses Build Rules	Quick Help
2 targets, iOS SDK 7.1      ACSBluetooth      BTDemo	PROJECT	▼ Identity			No Quick Help
BTDemoTests	TARGETS	Bundle Identifier	com.acs.BTDemo		
Frameworks     Products	A BTDemo	Version	1.0		
	BTDemoTests	Build			
		Bullu	1.0		
		Team	None	•	
		▼ Deployment Info			
		Deployment Target	7.1	¥	
		Devices	iPhone	\$	
		Main Interface	Main	¥	
		Device Orientation	Service Portrait		
		Status Bar Style	Upside Down  Landscape Left  Landscape Right  Default  Hide during application launch	•	
		▼ App Icons			
			Source Applcon	÷ 0	
		▼ Launch Images			D {} 🏟 🖩
			Source LaunchImage	÷ 0	Push Button - Intercepts mouse-down events and sends an action message to a target
		Linked Frameworks and Lib Name	raries	Status	Gradient Button - Intercepts mouse-down events and sends an action message to a target
		libACSBluetooth.a		Requ	Rounded Rect Button -
		CoreGraphics.framewor	k	Requ	Intercepts mouse-down events
		G UIKit.framework		Requ	· · · · · · · · · · · · · · · · · · ·
+   @ @ (=		Boundation.framework		Requ	

Page 4 of 34

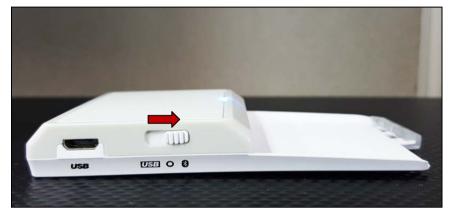


# 2.2. Using the ACS Bluetooth demo application

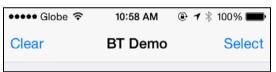
This section provides a simple step-by-step procedure on how to use the ACR3901U-S1 Bluetooth Card Reader using the BT Demo application.

#### 2.2.1. Connect a device

1. Turn on the Bluetooth mode of ACR3901U-S1 to make it discoverable. To do this, slide the toggle switch to the right.



- 2. Turn on your device's Bluetooth by going to Settings > Bluetooth.
- 3. Open **BT Demo application**.
- 4. Tap Select.



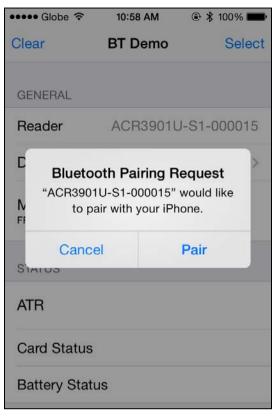
5. Choose the reader to pair your iOS device with, then tap **Done**.



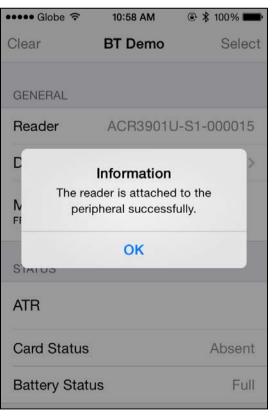
Page 5 of 34



6. Tap Pair to continue.



7. When the pairing is successful, tap **OK** to close the prompt.



Page 6 of 34



## 2.2.2. Get the device information

To get the reader's information, tap **Device Information**.

●●●●● Globe 🗢	10:58 AM	🖲 🖇 100% 페)		
<b>&lt;</b> BT Demo Device Information				
Manufacturer		ACS		
Firmware Revisi	on	V0.01		
Model Number		ACR3901U-S1		
Serial Number		305-000015		

Page 7 of 34



## 2.2.3. Get the battery status

To get the battery status, tap Get Battery Status.

●●●● Globe 穼	10:59 AM	🖲 🖇 100% 페 ·
Clear	BT Demo	Select
STATUS		
ATR		
Card Status		
Battery Statu	IS	Full
APDU		
Command A 80 84 00 00 08	PDU	
Response A	PDU	

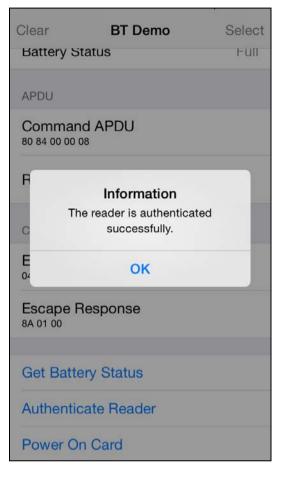
Page 8 of 34



## 2.2.4. Get the card's ATR (Answer ToReset)

To get the ATR of the card:

- 1. Insert smart card into the ACR3901U-S1 reader.
- 2. In the demo application, tap Authenticate Reader.
- 3. When the authentication is successful, tap **OK** to close the prompt.



Page 9 of 34



- 4. Tap Power On Card.
- 5. The card's ATR will be displayed.

••••• Globe 夺	10:59 AM	® \$ 100% <b>■</b>
Clear	BT Demo	Select
STATUS		
ATR 3B BE 11 00 00 41 01 90 00	1 01 38 00 00 00	00 00 00 00 00
Card Status		
Battery Statu	S	
APDU		
Command A 80 84 00 00 08	PDU	
Response Al	PDU	

Page 10 of 34



## 2.2.5. Transmit an APDU command

To transmit APDU command:

- 1. Insert smart card into the ACR3901U-S1 reader.
- 2. In the demo application, tap Authenticate Reader.
- 3. Tap Transmit APDU.
- 4. The Response APDU will be displayed.

••••• Globe 穼	10:59 AM	@ 🖇 100% 페)			
Clear	BT Demo	Select			
APDU					
Command A 80 84 00 00 08	APDU				
Response A 8F 13 67 44 47 E					
CONTROL					
Escape Command					
Escape Res	ponse				
Get Battery Status					
Authenticate	e Reader				

Note: You can edit the APDU command by tapping Command APDU.

Page 11 of 34



#### 2.2.6. Transmit an escape command

To transmit an escape command:

- 1. Insert smart card into the ACR3901U-S1 reader.
- 2. In the demo application, tap Authenticate Reader.
- 3. Tap Power On Card, and then tap Transmit Escape Command.
- 4. The Escape Response will be displayed.

🚥 Globe 🗟	10:59 AM	🛯 🛠 100% 🗩			
Clear	BT Demo	Select			
CONTROL					
Escape Cor	nmand				
Escape Res 84 05 56 30 2E 3					
Get Battery	Status				
Authenticate	e Reader				
Power On C	ard				
Power Off Card					
Get Card St	atus				
Transmit AP	ווחי				

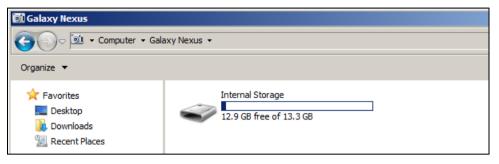
Page 12 of 34



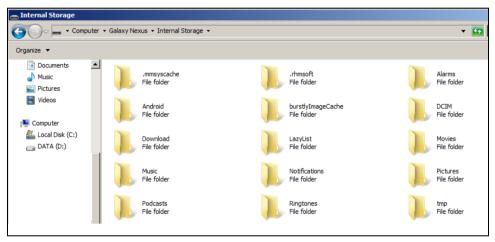
# 3.0. For Android

# 3.1. Install the Bluetooth demo application

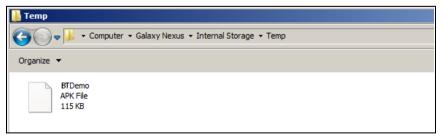
1. Connect your mobile device to the computer.



2. In the internal storage of your device, create a folder where the ACR3901U-S1 BTdemo will be placed.



- 3. You can access the device library when you download the <u>Android EVK</u> from the ACS website.
- 4. In the Android library, copy the BTDemo.apk file to the previously created folder.



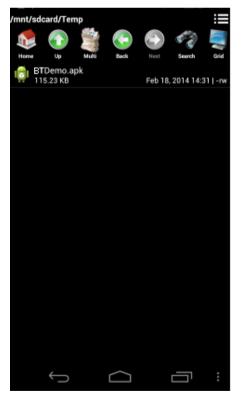
Page 13 of 34



5. Disconnect your mobile device from the computer. Locate the **BTDemo.apk** using a file manager application.



6. To start the installation, tap the **BTDemo.apk** file.



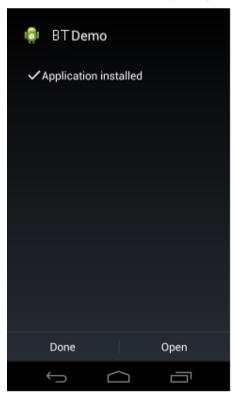
Page 14 of 34



7. Complete the action using **Package Installer**.



- 8. A prompt will ask for hardware control access. Tap Install to proceed.
- 9. Once the installation is complete, you can now open the BT demo application.



Page 15 of 34



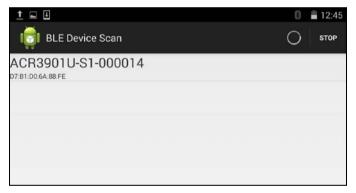
# **3.2.** Using the ACS Bluetooth demo application

#### 3.2.1. Connect a device

1. Turn on the Bluetooth mode of ACR3901U-S1 to make it discoverable. To do this, slide the toggle switch to the right.



- 2. Turn on your device's Bluetooth by going to Settings | Bluetooth.
- 3. Open ACS BT Demo application.
- 4. Choose the reader to pair your Android device with, and then tap **Done**.



Page 16 of 34



5. On the right top corner, click **Connect**. The reader and mobile device will start bonding.

■ 8	0 🛢 12:25
( 1001 ACR3901U-S1-000014	
Status change notifications Connection status: BOND BONDING Card status: Battery status: Authentication Key	
FF	F FF FF FF FF
ATR	
Card Status	
APDU command	
80 84 00 00 08	
Es ACR3901U-S1	
De Bonding	
Model Num. Serial Num:	
FW revision: Battery service	
Battery status	
Clea	ar
Authent	licate
Power O	n Card
Power Of	ff Card
Get Card	Status
Teanomit	ADDU

6. Once the bonding is complete, ACR3901U-S1 is now ready to be used with the mobile device.



Page 17 of 34



# 3.2.2. Getting the device information

To get the reader's information, tap Get Device Info.

🖬 İ 🗉				6 🔒 2:38
< 100 ACR390	01U-S1-0000	14		DISCONNECT
ATR				
Card Status				
APDU comman	d			
80 84 00 00 0	8			
Escape Comma	and			
02				
Device Info				
Manufacturer: . Model Num:	ACS ACR3901U-S1			
Serial Num:	305-000014 V0.01			
Battery service				
Battery status:				
		Clear		
		Authenticate		
		Power On Card		
		Power Off Card		
		Get Card Status	1	
		Transmit APDU	I.	
	Tran	smit Escape Con	nmand	
		Get Device Info	í.	
		Get Battery Statu	IS	
	÷	$\Box$	Ē	

Page 18 of 34



# 3.2.3. Getting the battery status

To get the battery status, tap Get Battery Status.

1 🖬 🗉		0 🛢 2:43
< 🤖 ACR3	901U-S1-000014	DISCONNECT
ATR		
Card Status		
APDU comm	and	
80 84 00 00	08	
Escape Com	nand	
02		
Device Info		
Manufacturer:	ACS	
Model Num:	ACR3901U-S1	
Serial Num: FW revision:	305-000014 V0.01	
Battery service Battery status:	e The battery is full.	
	Clear	
	Authenticate	
	Power On Card	
	Power Off Card	
	Get Card Status	
	Transmit APDU	
	Transmit Escape Comm	nand
	Get Device Info	
	Get Battery Status	
	Ú Ú	ā

Page 19 of 34



## 3.2.4. Get the card's ATR (Answer To Reset)

To get the ATR of the card:

- 1. Insert smart card into the ACR3901U-S1 reader.
- 2. In the demo application, tap Authenticate.
- 3. Once it is finished, it will show an Authentication Success message.
- 4. Tap **Power On Card** to display ATR.

1 🖬 🗉				0 🛢 3:08
< interior and the contract of	901U-S1-00001	4		DISCONNECT
Connection statu		inactive.		
FF FF FF FF	FF FF FF FF FF	F FF FF FF FF	FF FF FF	
Authentication S ATR 38 BE 11 00 00 4 Card Status APDU comm 80 84 00 00	11 01 38 00 00 00 00 and	0 00 00 00 00 01	90 00	
Escape Com	mand			
Device Info Manufacturer: Model Num: Serial Num: FW revision: Battery status:	ACS ACR3901U-S1 305-000014 V0.01 Ce The battery is full	L		
		Clear		
		Authentical	te	
		Power On Ca	ard	
		Power Off Ca	ard	
		Get Card Sta	tus	
		Tropomit AD	DU	
	Ĵ	$\Box$		1

Page 20 of 34



## 3.2.5. Transmit APDU command

To transmit APDU command:

- 1. Insert smart card into the ACR3901U-S1 reader.
- 2. In the demo application, tap Authenticate.
- 3. Once it is finished, it will show Authentication Success message.
- 4. Tap Transmit APDU, and response APDU will be displayed under APDU command.
- 5. The APDU command response will be displayed.



Note: You can edit the APDU command by tapping Command APDU.

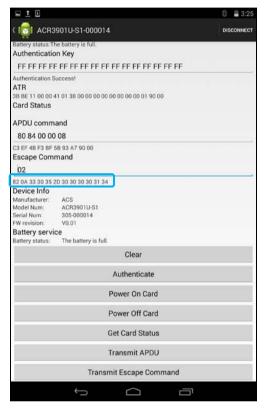
Page 21 of 34



#### 3.2.6. Transmit escape command

To transmit an escape command:

- 1. Insert smart card into the ACR3901U-S1 reader.
- 2. In the demo application, tap Authenticate.
- 3. Once it is finished, it will show an Authentication Success message.
- 4. Tap Power On Card, and then tap Transmit Escape Command.
- 5. The Escape Response will be displayed.



Page 22 of 34



# 4.0. For Windows®

# 4.1. Install ACS Unified Bluetooth driver

To install the driver:

- 1. Run the ACS Unified Bluetooth Driver.
- 2. The Setup Wizard will show. To start the installation, click Next.

🖶 ACS Unified Bluetooth Driver 1.0.0.6 Setup			
acs	Welcome to the ACS Unified Bluetooth Driver 1.0.0.6 Setup Wizard		
	The Setup Wizard will install ACS Unified Bluetooth Driver 1.0.0.6 on your computer. Click Next to continue or Cancel to exit the Setup Wizard.		
	Back Next Cancel		

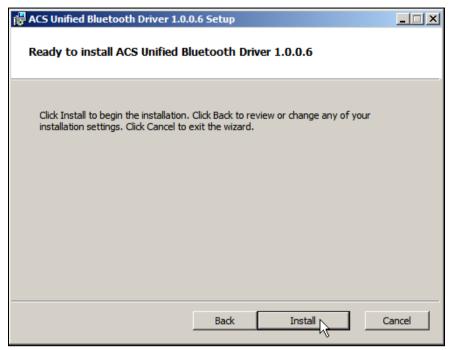
 Click Next to install the driver to the default destination, located at X:\Program Files\Advanced Card Systems Ltd\ACS Unified Bluetooth Driver 1.0.0.6\, with X as your local Windows drive.

🙀 ACS Unified Bluetooth Driver 1.0.0.6 Setup	
Destination Folder	
Click Next to install to the default folder or click Change to choose another.	
Install ACS Unified Bluetooth Driver 1.0.0.6 to:	
C:\Program Files\Advanced Card Systems Ltd\ACS Unified Bluetooth Driver 1.0.0.6\	
Change	
Back Next Ca	ancel

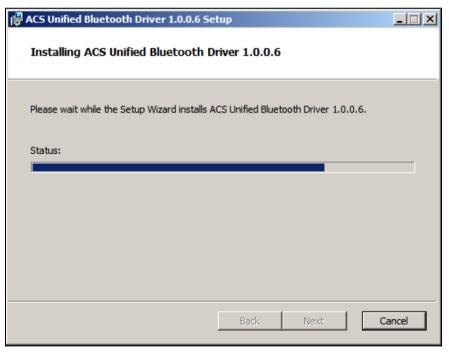
Page 23 of 34



4. Click Install.



5. Wait while the driver installs.





6. Once the installation is complete, click **Finish**.

🐺 ACS Unified Bluetooth Driver 1.0.0.6 Setup				
acs	Completed the ACS Unified Bluetoot Driver 1.0.0.6 Setup Wizard	h		
	Click the Finish button to exit the Setup Wizard.			
	Back Finish	ancel		

7. You will need to restart your computer for the changes to take effect. Click Yes to restart.

🔂 ACS Ur	🙀 ACS Unified Bluetooth Driver 1.0.0.6 Setup		
i	changes made to ACS U	ystem for the configuration nified Bluetooth Driver 1.0.0.6 to restart now or No if you plan	
	Yes	No	



# 4.2. Set up device pairing with built-in Bluetooth adapter

**Note:** This procedure only applies to Windows 8 and later. Windows 7 does not support devices using Bluetooth 4.0/Bluetooth Low Energy interface.

To pair using this setup:

1. Enable the Bluetooth mode of ACR3901U-S1 to make it discoverable. To do this, slide the toggle switch to the right.



2. Go to **PC Settings** , choose **PC and devices**, and then click **Bluetooth**.

• PC and devices	م
Lock screen	
Display	
Bluetooth	
Devices	
Mouse and touchpad	

3. Turn on Bluetooth.

Manage Bluetooth dev	ices
Bluetooth On	

Page 26 of 34



4. Select ACR3901U-S1, and then click **Pair**.

Manage Bluetooth devices
Bluetooth On
Your PC is searching for and can be discovered by Bluetooth devices.
ACR3901U-S1-000277 Ready to pair
Pair

5. The pairing is complete when you see ACR3901U-S1 is connected.

Manage Bluetooth devices			
Bluetooth On			
Your PC is searching for and can be discovered by Bluetooth devices.			
ACR3901U-S1-000277 Connected			

6. To complete the installation of the Bluetooth card reader, go to <u>ACS Bluetooth Device</u> <u>Management Tool</u>.



# 4.3. Set up device pairing with Bluetooth USB dongle

**Note:** This procedure will use the TI USB dongle as the Bluetooth adapter. Make sure that you have installed the ACS Bluetooth driver before performing this procedure (see **Install ACS Unified Bluetooth driver**).

To pair using this set up:

- 1. Plug in the TI Bluetooth USB dongle to your computer.
- 2. Windows will automatically install the device driver, indicated by the tooltip notification.

Installing device driver software X Click here for status.	
 *	Pþ

- 3. Wait while the device driver installs.
- 4. When it is ready to use, click Close.

🗊 Driver Software Installation		×
TI CC2540 USB CDC Serial Port (COM7) i	nstalled	
TI CC2540 USB CDC Serial Port (COM7)	Ready to use	
		Close

5. When you open the <u>ACS Bluetooth Device Management Tool</u>, it automatically pairs the dongle to your system.

Page 28 of 34



# 4.4. Using the ACS Bluetooth Device Management Tool

ACS Bluetooth Device Management Tool is an application that enables you to easily manage device pairings between ACS Bluetooth card readers and computers.

#### 4.4.1. Install a device

To establish full connection, you must install the Bluetooth card reader in the ACS Bluetooth Device Management Tool.

**Note:** The TI USB dongle can only work on a one-to-one connection with an installed ACS Bluetooth card reader. If there is a previously installed Bluetooth card reader in the tool, uninstall it first (see **Uninstall the device**).

To begin:

1. Turn on the Bluetooth mode of ACR3901U-S1 and make it discoverable. To do this, slide the toggle switch to the right.



- 2. Run the ACS Bluetooth Device Management Tool.
- Wait while the tool scans for Bluetooth devices within range.
   Note: If the device is not immediately discovered, click Refresh.
- 4. Once the tool discovers ACR3901U-S1, it will show in the list.

le Option				[ a		[n.:.
eader Name	Serial Number	Bluetooth Address	FW Version	Status	BT Adapter	Pairing
CR3901U-S1	305-000277	FE8EB424FFF2	V1.09	Installed	TI Dongle	Paired

Page 29 of 34



5. In the **Option** menu, click **Install**.

🙉 A	🐵 ACS Bluetooth Device Management Tool				
File	Option	_			
Rea	Install	al Number	Bluetooth Address		
ACR	Uninstall	-000277	FE8EB424FFF2		
	Authenticate				
	Bluetooh Adapter	•			
		_			

An alternative way to do this is to right-click on the device, and then click Install.

🐵 ACS Bluetooth Device Management Tool							
File Option							
Reader Name	Serial Nu	umber	Bluetooth Address				
ACR3901U-S1	Install 277 Uninstall	277	FE8EB424FFF2				
	Switch to 🕨						

6. Type in a 16-byte hexadecimal key for authentication, or use the default value. Click Install.

Driver Installation - Device Key					
⊂ Enter 16 byte key for Smart Card Reader Authentication (HEX):					
00 00 00 00 00 00 00 00 00 00 00 00 00					
Use Default Value					
Install					

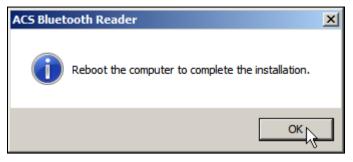
- 7. Wait while the application installs the driver.
- 8. A message will appear confirming a successful installation. Click **OK**, and then reset your device.



Page 30 of 34



9. A message will appear reminding you to restart your computer. Click **OK**, and then restart your computer.



10. After a successful driver installation, you can now use ACR3901U-S1 with various smart card applications. Below is a sample of ACR3901U-S1 connected in **QuickView**.

8	QuickView			
Ma	ain Log Help			
	Smart Card Readers	Reader Details		
	<ul> <li>ACS Proprietary Readers</li> <li>PC/SC Readers</li> <li>Installed</li> <li>Connected</li> <li><u>ACS ACR3901 BLE ICC Reader 0</u></li> </ul>	Reader Name: ACS ACR3901 BLE ICC Reader O ACS ACR3901 BLE ICC Reader O is present in the system Card is detected on reader		
		Advanced View Log Initialize		
		Reset Save Log Quit		

Page 31 of 34



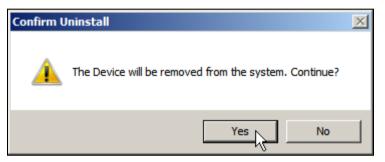
## 4.4.2. Uninstall a device

To uninstall a device:

1. Right-click on the device, and then click **Uninstall**.

ACS Bluetooth Device Management Tool					
File Option					
Reader Name	Serial Number				
ACR3901U-S1	Install 77				
	Uninstall				
	Switch to 🕨				

2. Click Yes to confirm uninstallation.



3. The device will be removed from the reader list.

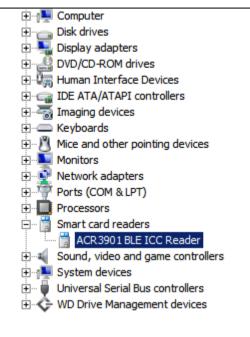
**Note:** Since the TI USB dongle can only work on a one-to-one connection with a Bluetooth card reader, you must first uninstall the previous device to connect to another one.

Page 32 of 34



# 4.5. Check if Bluetooth card reader is installed correctly

- 1. Go to the Device Manager.
- 2. Under Smart card readers, the ACR3901U-S1 reader should show as ACR3901 BLE ICC Reader.



3. Right-click on the device, and then click Properties.





The Bluetooth reader and driver are installed correctly if the sevice status shows "This device 4. is working properly".

1	ACR3901 BLE ICC Reader Properties						
	General Driver Details						
	ACR3901 BLE ICC Reader						
		Device type:	Smart card readers				
		Manufacturer:	Advanced Card Systems Ltd.				
		Location:	Unknown				
		e status device is working pr	operly.	×			
			ок	Cancel			

Android is a trademark of Google Inc. The *Bluetooth*® word, mark and logos are registered trademarks owned by Bluetooth SIG, Inc. and any use of such marks by Advanced Card Systems Ltd. is under license. Windows is a registered trademark of Microsoft Corporation in the United States and/or other countries.

Page 34 of 34