



Advanced Card Systems Ltd.
Card & Reader Technologies

ACR3901T-W1

ACS Secure Bluetooth® Contact Card Reader



User Manual V1.02



Table of Contents

1.0.	Introduction	3
2.0.	For Windows®	4
2.1.	Installing ACS Unified Bluetooth driver.....	4
2.2.	Setting up device pairing with built-in Bluetooth adapter.....	7
2.3.	Setting up device pairing with Bluetooth USB dongle	9
2.4.	Using the ACS Bluetooth Device Management Tool.....	10
2.4.1.	Installing a device.....	10
2.4.2.	Uninstalling a device	13
2.5.	Checking if Bluetooth card reader is correctly installed.....	14
3.0.	For iOS (BLE Test Application)	16
3.1.	Installing the BLE Test application	16
3.2.	Using the ACS Bluetooth demo application.....	17
3.2.1.	Connecting a device.....	17
3.2.2.	Getting the battery status	19
3.2.3.	Transmitting an APDU command	20
3.2.4.	Transmitting an escape command.....	22
4.0.	For Android (BLE Test Application).....	24
4.1.	Installing the BLE Test application	24
4.2.	Using the ACS Bluetooth demo application.....	26
4.2.1.	Connecting a device.....	26
4.2.2.	Transmitting an APDU command	28
4.2.3.	Transmitting an escape command.....	30
5.0.	For iOS (BT Demo Application)	32
5.1.	Installing the Bluetooth demo application	32
5.2.	Using the ACS Bluetooth demo application.....	33
5.2.1.	Connecting a device.....	33
5.2.2.	Getting the device information	35
5.2.3.	Getting the battery status	36
5.2.4.	Getting the card's ATR (Answer To Reset)	37
5.2.5.	Transmitting an APDU command	39
5.2.6.	Transmitting an escape command.....	40
6.0.	For Android (BT Demo Application).....	41
6.1.	Installing the Bluetooth demo application	41
6.2.	Using the ACS Bluetooth demo application.....	43
6.2.1.	Connecting a device.....	43
6.2.2.	Getting the device information	44
6.2.3.	Getting the battery status	45
6.2.4.	Getting the card's ATR (Answer To Reset)	46
6.2.5.	Transmitting an APDU command	47
6.2.6.	Transmitting an escape command.....	48



1.0. Introduction

The ACR3901T-W1 ACS Secure Bluetooth® SIM-sized 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 the installation of drivers and applications when using the ACR3901T-W1 ACS Secure Bluetooth Contact Card Reader.

The topics covered in this user manual are as follows:

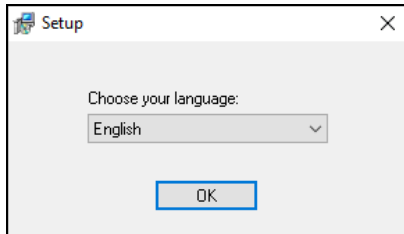
- **Section 2.0** – provides procedures on how to install the ACS Bluetooth driver, pair Bluetooth devices and use the ACS Bluetooth Device Management Tool
- **Section 3.0** - provides procedures on how to install and use the BLE demo application with the ACR3901T-W1 using an iOS device and the ACS SmartCardIO library (*with Extended APDU Support; FW6.01 and above*)
- **Section 4.0** - provides procedures on how to install and use the BLE demo application with the ACR3901T-W1 using an Android device and the ACS SmartCardIO library (*with Extended APDU Support; FW6.01 and above*)
- **Section 5.0** - provides procedures on how to install and use the BT demo application with the ACR3901T-W1 using an iOS device and the ACS library
- **Section 6.0** - provides procedures on how to install and use the BT demo application with the ACR3901T-W1 using an Android device and the ACS library

2.0. For Windows®

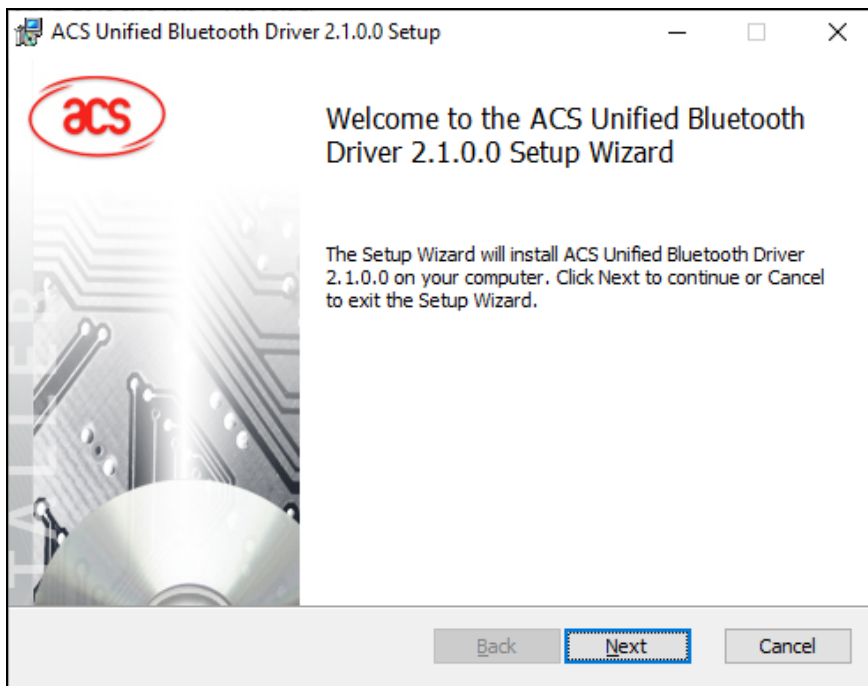
2.1. Installing ACS Unified Bluetooth driver

To install the driver:

1. Run the **ACS Unified Bluetooth Driver**.
2. The Setup Wizard will appear. To start the installation, click **OK**.

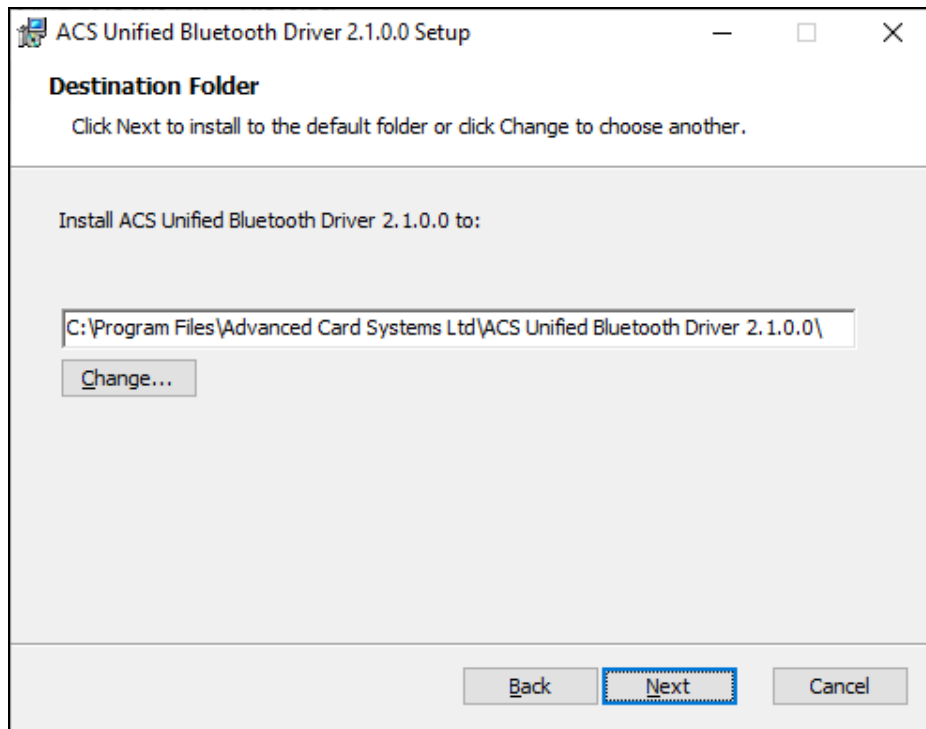


3. Then click **Next**.

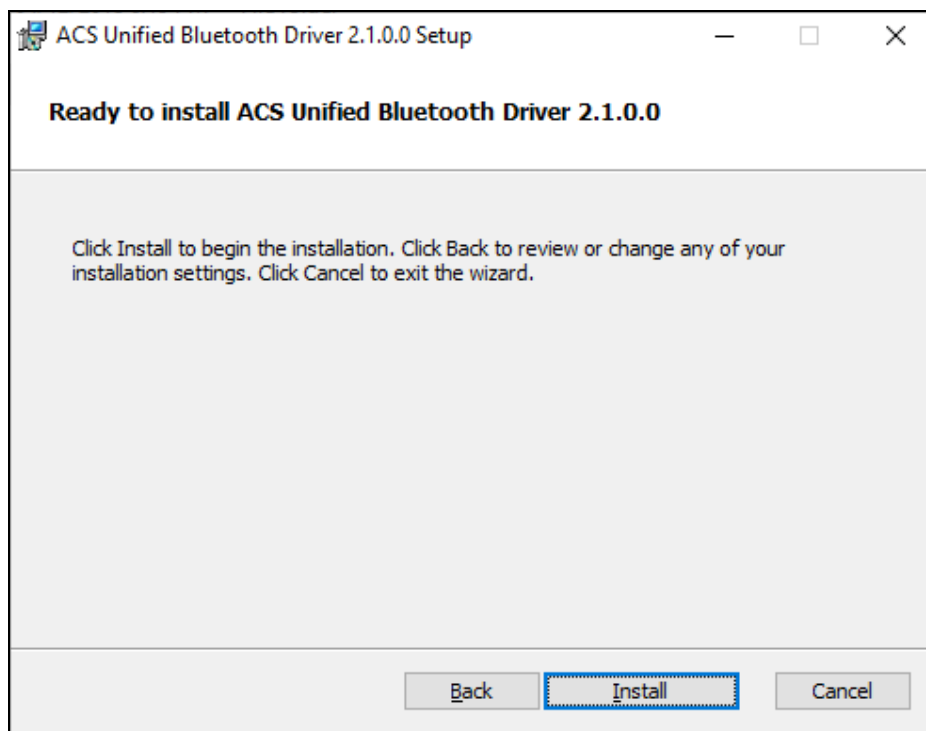




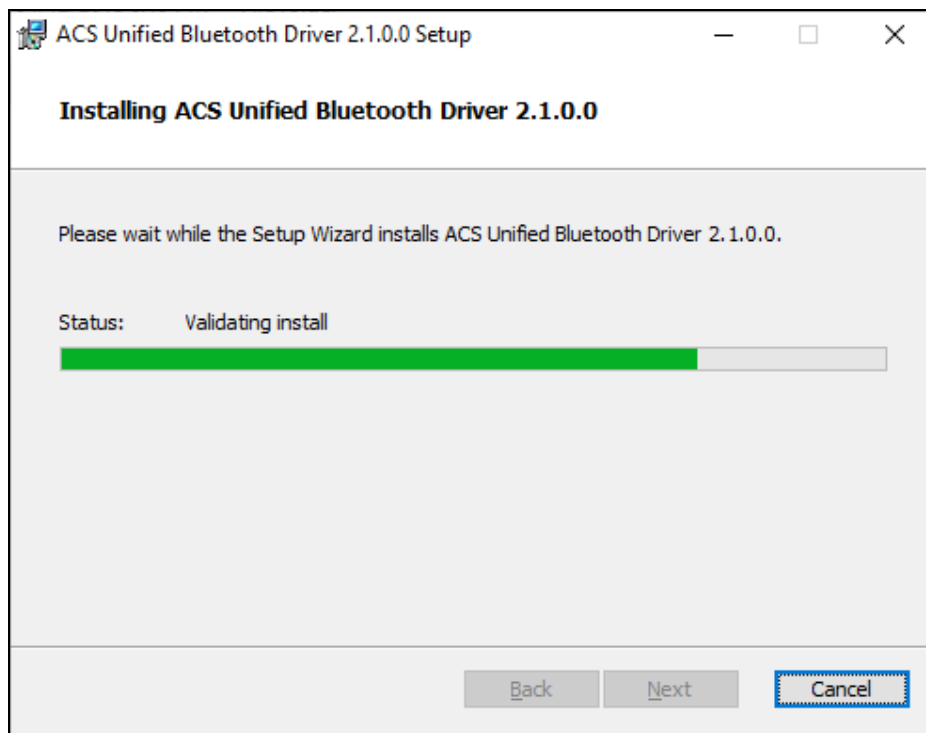
- Click **Next** to install the driver to the default destination, located at **X:\Program Files\Advanced Card Systems Ltd\ACS Unified Bluetooth Driver 2.1.0.0**, with X being your local Windows drive.



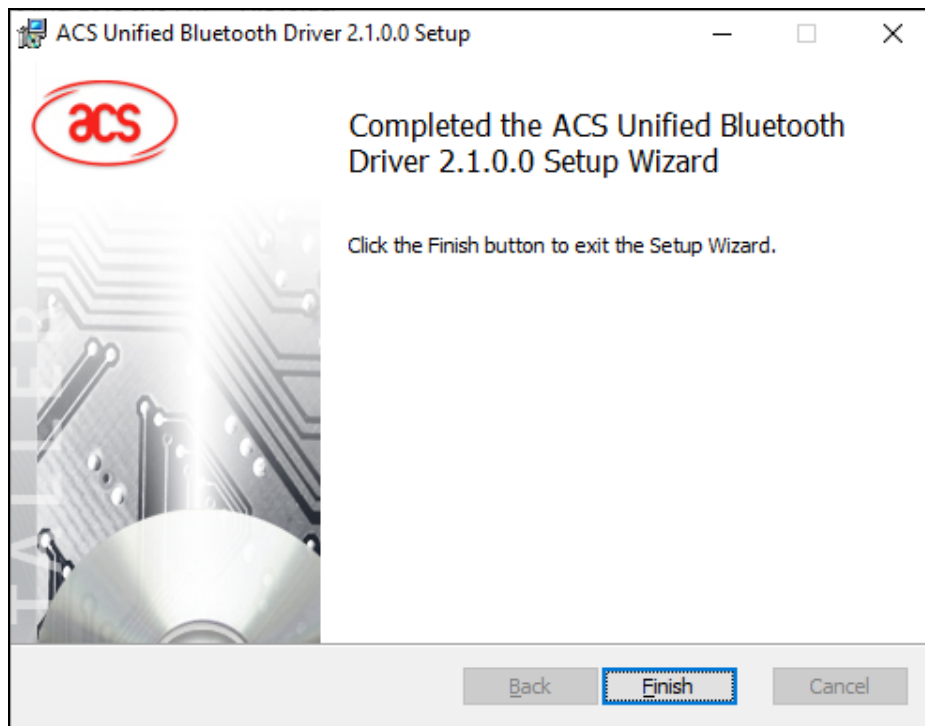
- Click **Install**.



6. Wait while the driver installs.



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



2.2. Setting up device pairing with built-in Bluetooth adapter

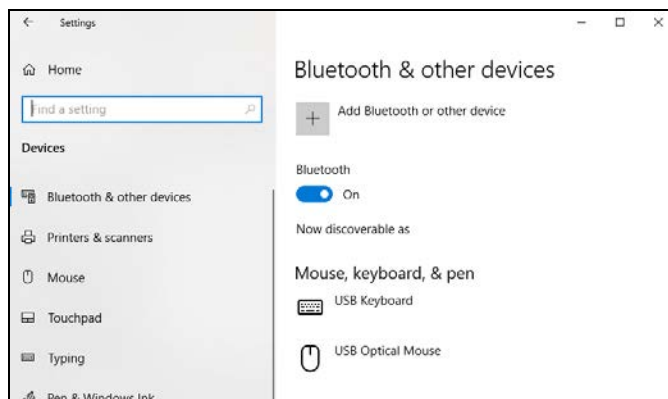
Note: This procedure only applies to Windows 8 and later. Windows 7 does not support devices using Bluetooth 4.0/Bluetooth Low Energy interface.

To pair using this setup:

1. Turn on the Bluetooth mode of the ACR3901T-W1 to make it discoverable. To do this, press the button on the top surface of the device as shown below.



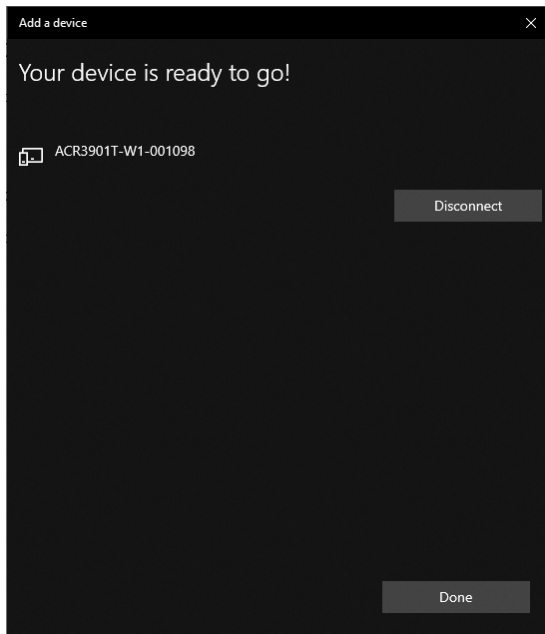
2. Go to **PC Settings** , choose **Devices**, and then click **Bluetooth & other devices**.
3. Turn on **Bluetooth**.
4. Click **Add Bluetooth or other device**



5. At the **Add a device** pane, click **Bluetooth** and select an **ACR3901T-W1** reader to pair.



6. The pairing is complete when you see that the ACR3901T-W1 is connected.



7. To complete the installation of the Bluetooth card reader, go to **ACS Bluetooth Device Management Tool**.

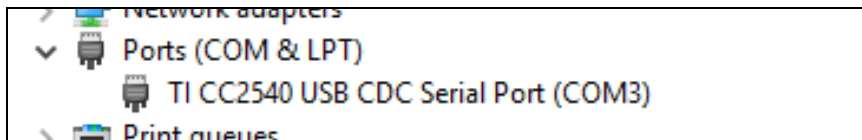


2.3. Setting up device pairing with Bluetooth USB dongle

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 [Installing 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.
3. Wait while the device driver installs.
4. When it is ready you will see the dongle in Device Manager.



5. When you open the [ACS Bluetooth Device Management Tool](#), it will automatically pair the dongle with your system.

2.4. Using the ACS Bluetooth Device Management Tool

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

2.4.1. Installing 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 **Uninstalling a device**).

To begin:

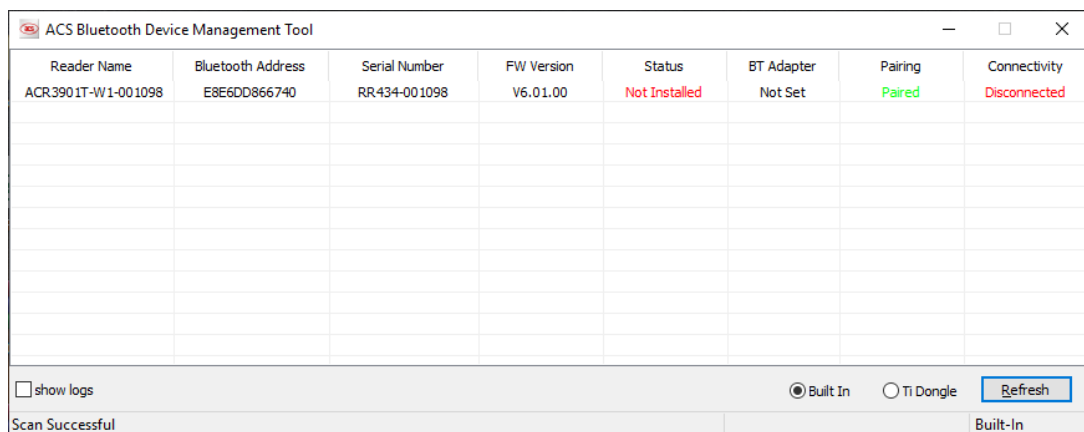
1. Turn on the Bluetooth mode of ACR3901T-W1 to make it discoverable. To do this, press the button on the top surface of the device as shown below.



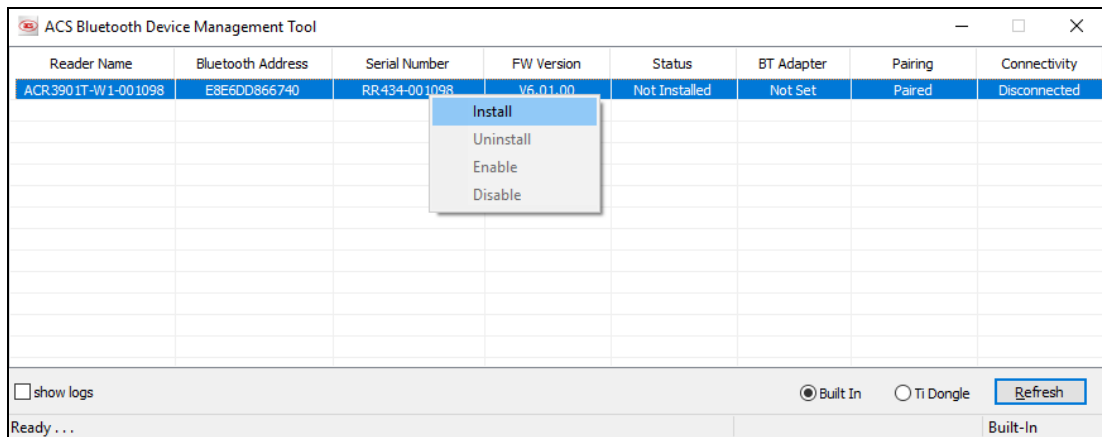
2. Run the **ACS Bluetooth Device Management Tool**.
3. Wait while the tool scans for Bluetooth devices within range.

Note: If the device is not immediately discovered, click **Refresh**.

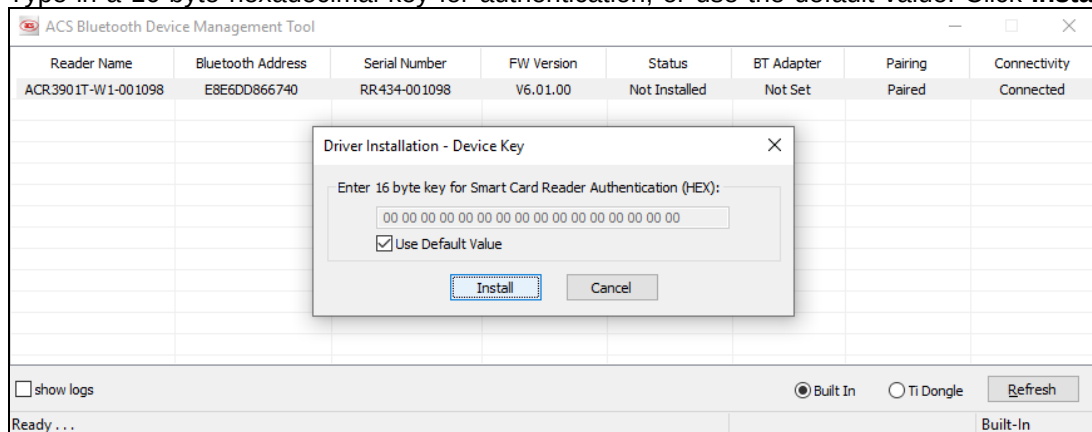
4. Once the tool discovers the ACR3901T-W1, it will appear in the list.



5. Right-click on the device, and then click **Install**.

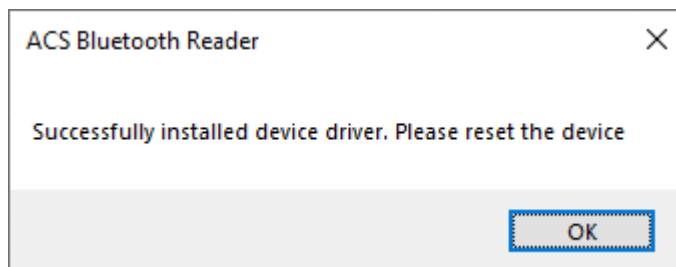


6. Type in a 16-byte hexadecimal key for authentication, or use the default value. Click **Install**.



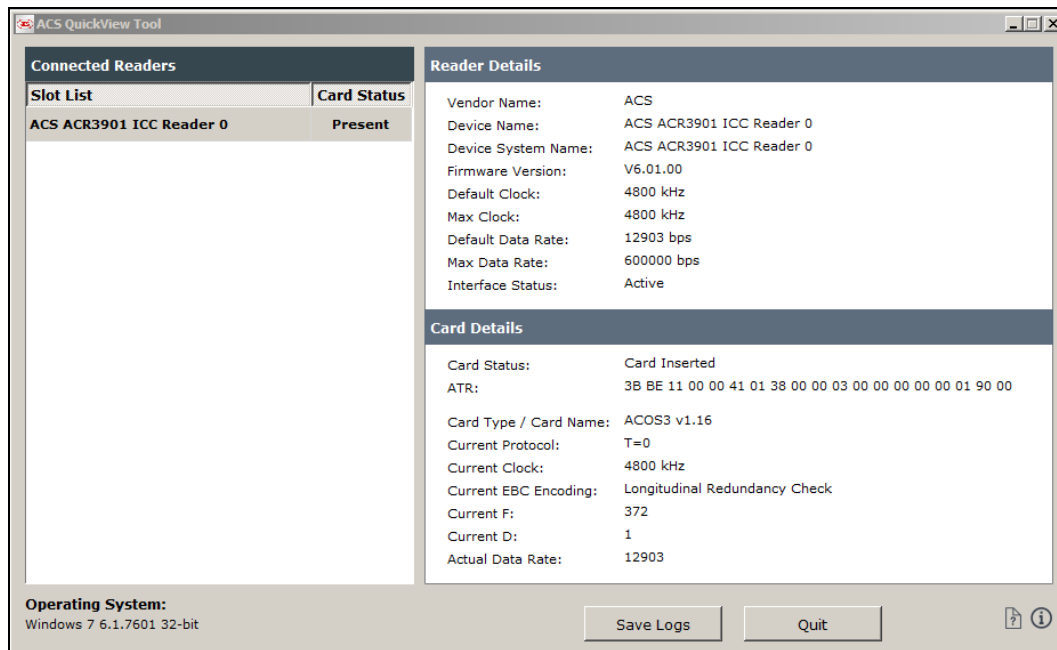
Note: The default authentication key is FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF.

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





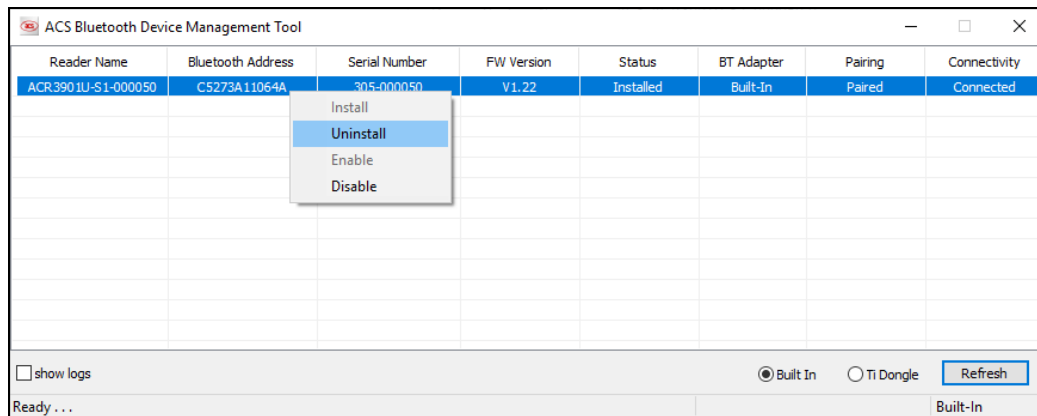
9. After a successful driver installation, you can now use the ACR3901T-W1 with various smart card applications. Below is a sample of the ACR3901T-W1 connected in **QuickView**.



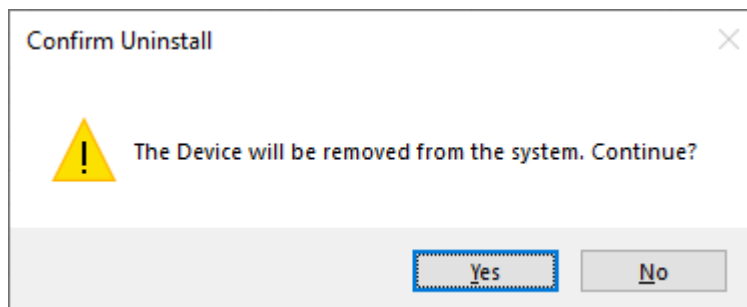
2.4.2. Uninstalling a device

To uninstall a device:

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



2. Click **Yes** to confirm uninstallation.

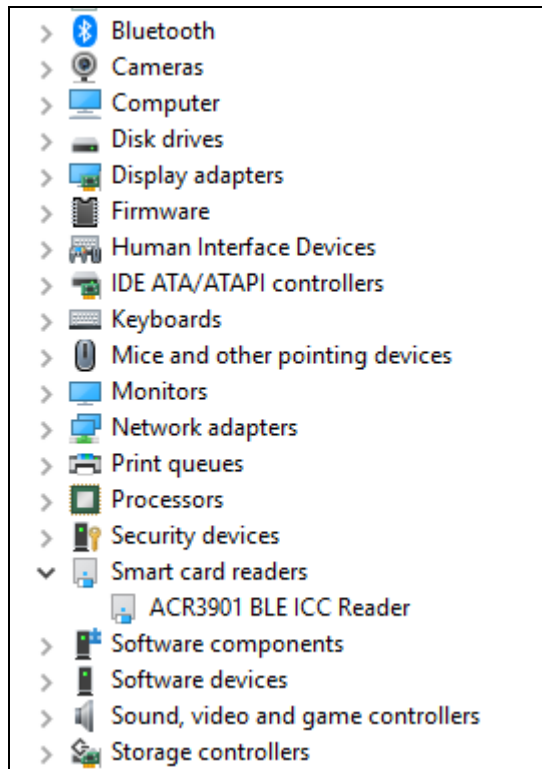


3. The device will be removed from the reader list.

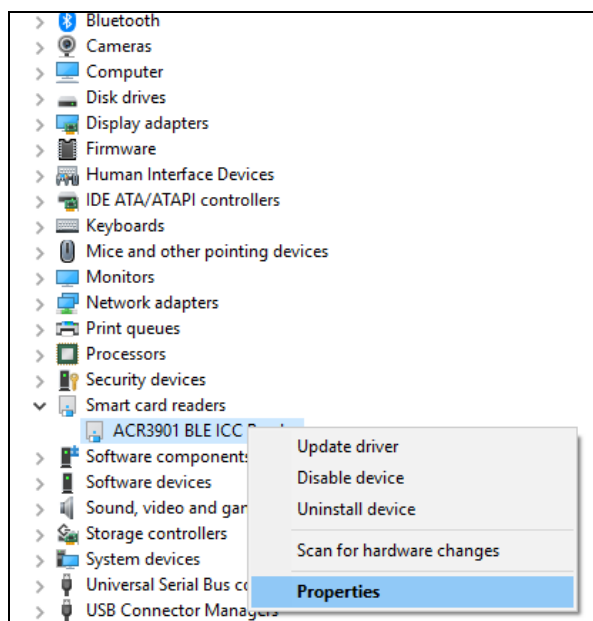
Note: The TI USB dongle will work with multiple reader pairing starting with ACS Unified Bluetooth Driver v2.1.0.0 and above ONLY.

2.5. Checking if Bluetooth card reader is correctly installed

1. Go to **Device Manager**.
2. Under **Smart card readers**, the ACR3901T-W1 reader should show as **ACR3901 ICC Reader**.

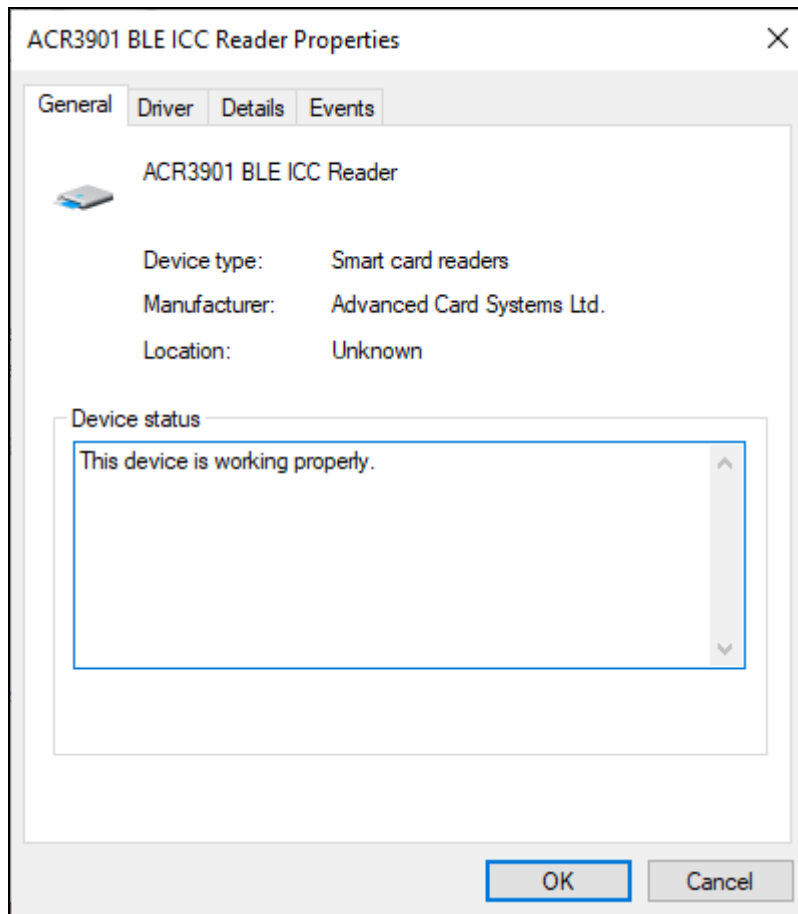


3. Right-click on the device, and then click **Properties**.





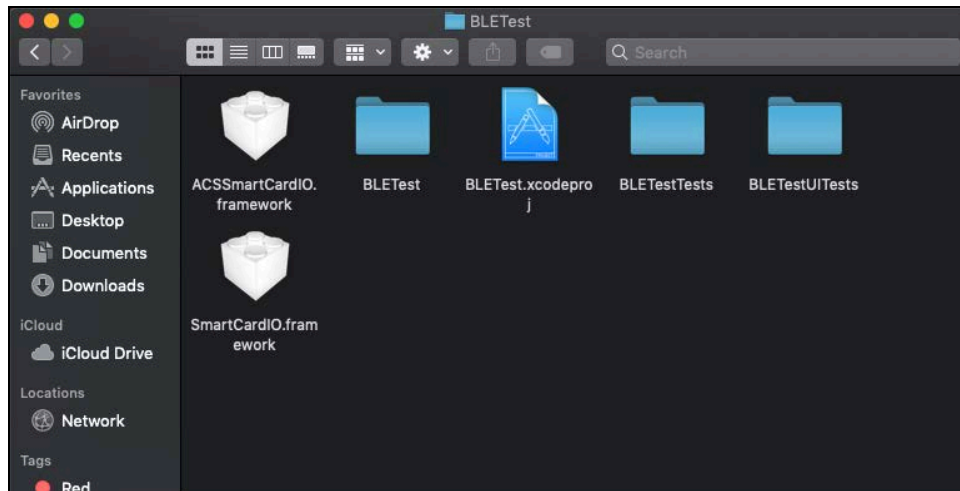
4. The Bluetooth reader and driver are installed correctly if the device status shows *"This device is working properly"*.



3.0. For iOS (BLE Test Application)

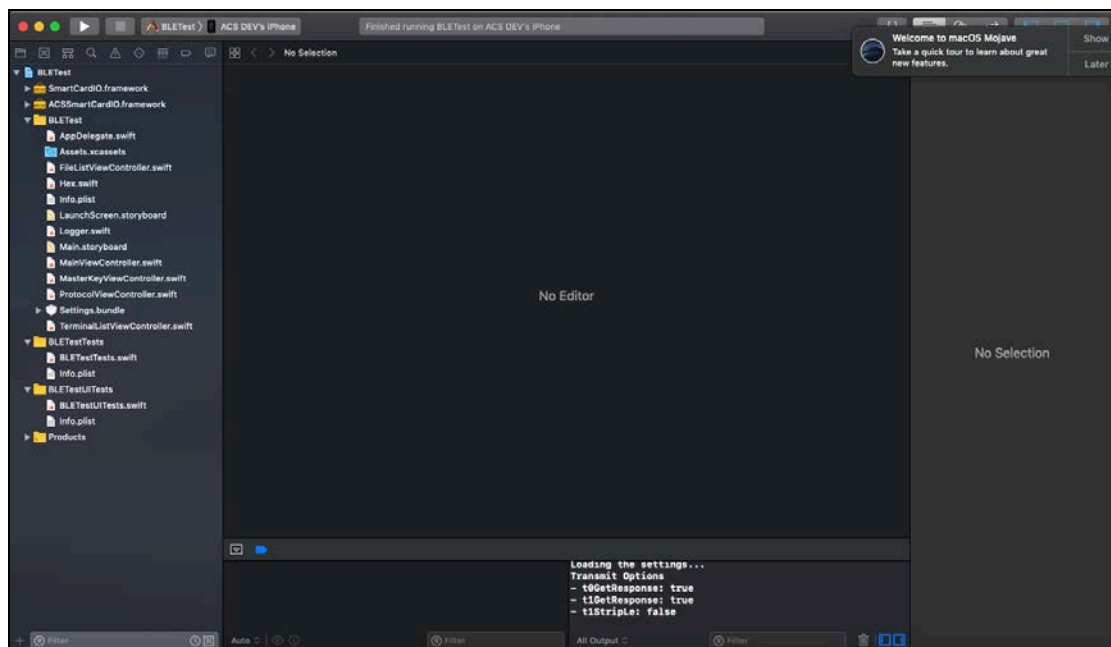
3.1. Installing the BLE Test application

1. You can access the device library by downloading the **iOS BLE EVK (SmartCardIO)** from the ACS website.
2. Using XCode application, open **BLETest.xcodeproj**.



3. Transfer **BLETest.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.



3.2. Using the ACS Bluetooth demo application

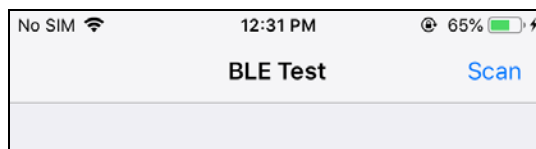
This section provides a simple step-by-step procedure on how to use the ACR3901T-W1 using the BLE Test.

3.2.1. Connecting a device

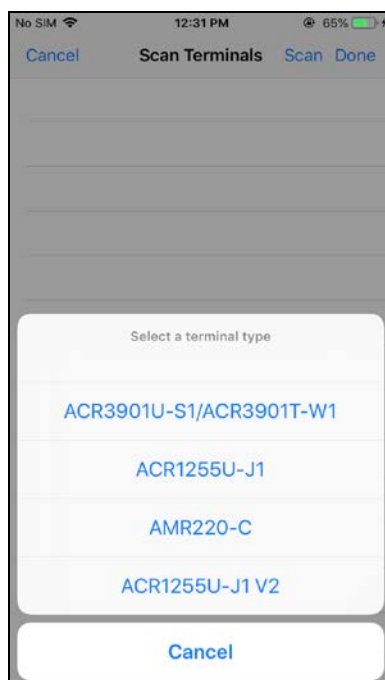
1. Turn on the Bluetooth mode of the ACR3901T-W1 to make it discoverable. To do this, press the button on the top surface of the device as shown below.



2. Turn on your device's Bluetooth by going to **Settings > Bluetooth**.
3. Open **BLE Test** application.
4. Tap **Scan**.

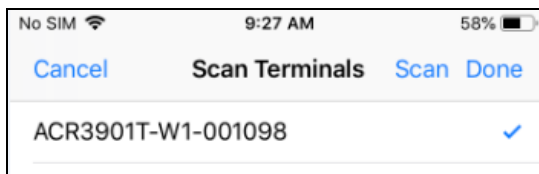


5. Select the terminal type **ACR3901U-S1/ACR3901T-W1**

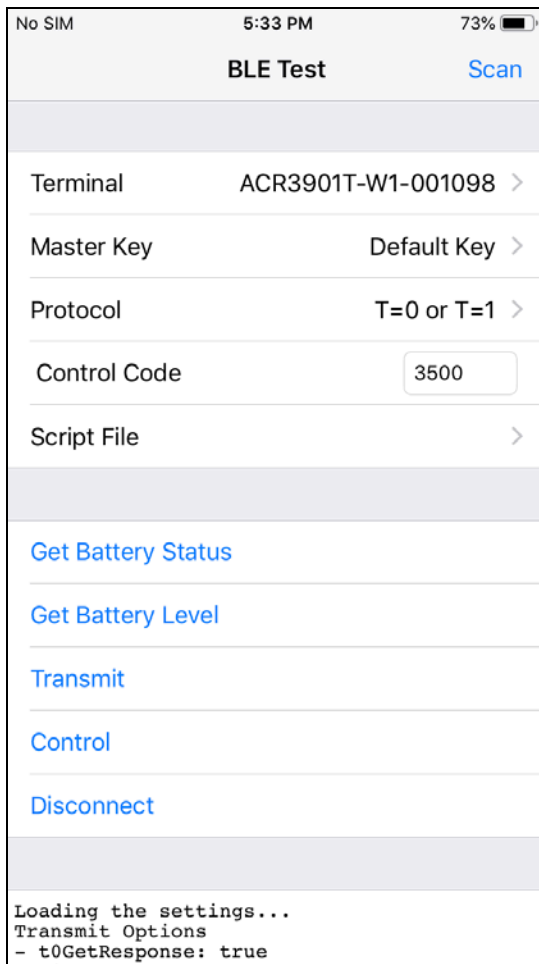




6. Choose the reader with which to pair your iOS device, then tap **Done**.



7. When the pairing is successful, the main page will be displayed.

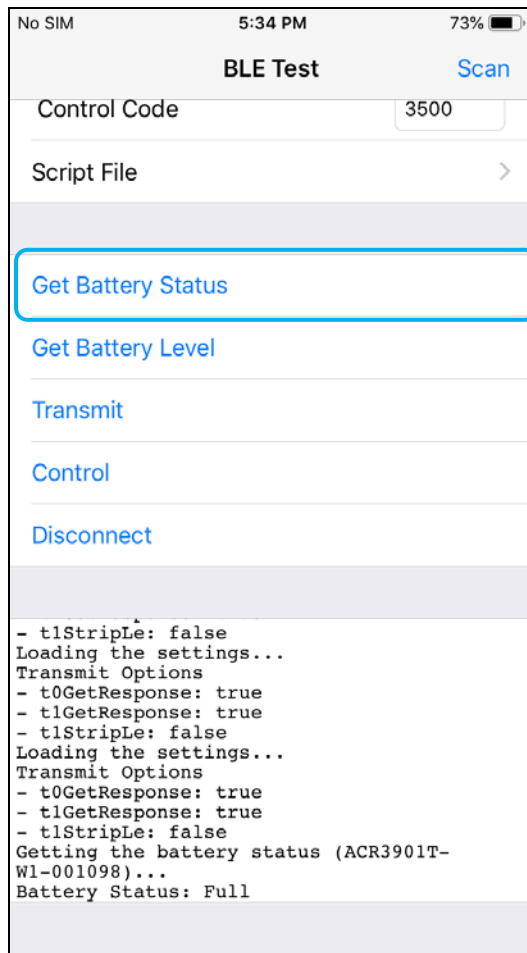




3.2.2. Getting the battery status

To get the battery status, tap **Get Battery Status**.

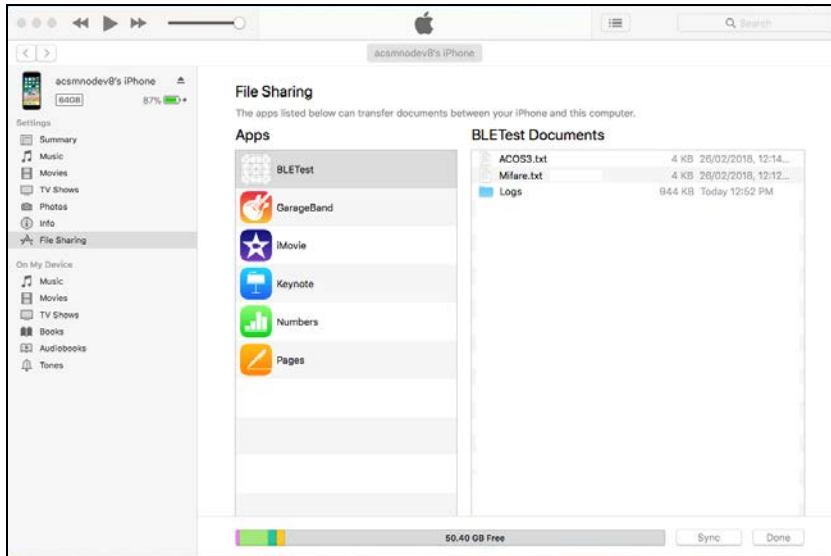
The status should be displayed as part of the logs.



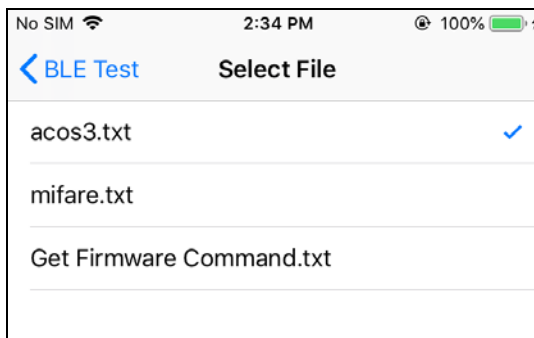
3.2.3. Transmitting an APDU command

To transmit an APDU command:

1. Connect the mobile device to iTunes and locate the File Sharing tab.
2. Under the Apps section, click on **BLETest app** and add a text file (.txt) containing the APDU commands.



3. Insert a smart card into the ACR3901T-W1 reader.
4. In the demo application on the mobile device, tap **Script File**, and then locate the .txt file to run.



5. Go back to the main page then tap **Transmit**.



6. The Response APDU will be displayed as part of the logs.

No SIM5:34 PM73%

BLE TestScan

Control Code3500

Script Fileacos3.txt >

Get Battery Status

Get Battery Level

Transmit

Control

Disconnect

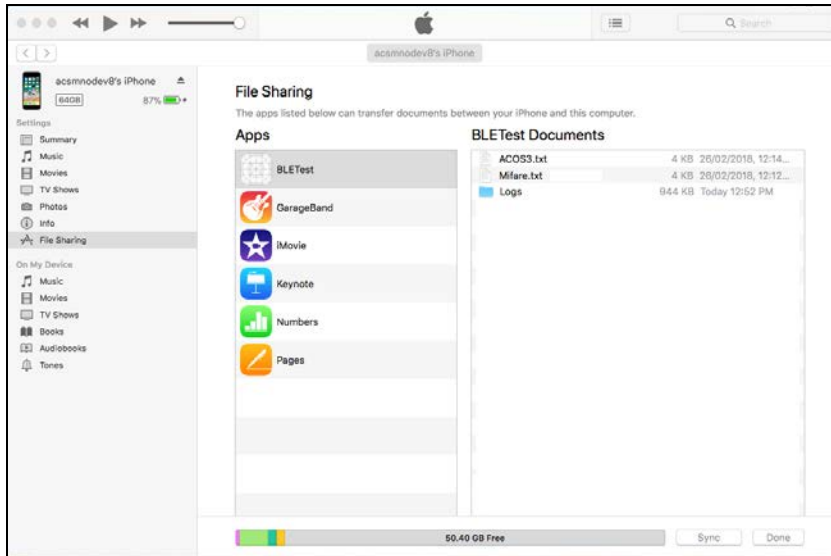
Command:
80 B2 01 00 04
Response:
12 34 56 78 90 00
Bytes Sent : 5
Bytes Received: 6
Transfer Time : 49.40 ms
Transfer Rate : 222.65 bytes/second
Expected:
12 34 56 78 90 00
Compare OK
Disconnecting the card (ACR3901T-W1-001098)...

Note: The application is designed to get the ATR of the card before sending the APDU commands.

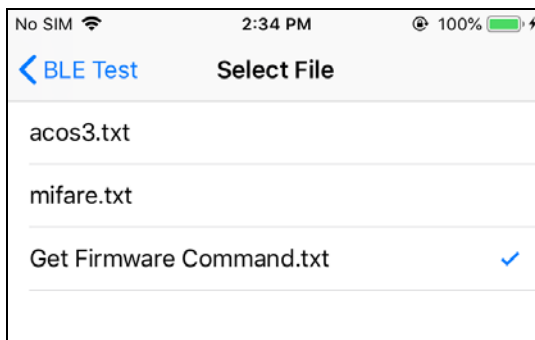
3.2.4. Transmitting an escape command

To transmit an escape command:

1. Connect the mobile device to iTunes and locate the File Sharing tab.
2. Under the Apps section, click on **BLETest app** and add a text file (.txt) containing the APDU commands.



3. In the demo application on the mobile device, tap **Script File**, and then locate the .txt file to run.



4. Go back to the main page then tap **Control**.



5. The Escape Response will be displayed as part of the logs.

No SIM

12:31 PM

62%

BLE Test

Scan

Control Code3500

Script FileGet Firmware Version.txt >

Get Battery Status

Get Battery Level

Transmit

Control

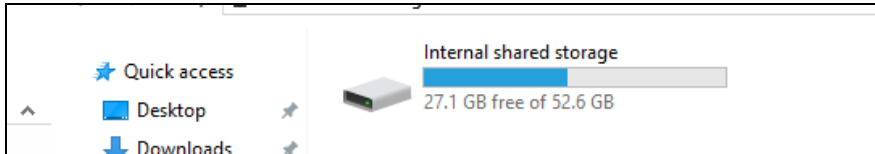
Disconnect

Command:
04 00
Response:
84 08 56 36 2E 30 31 2E 30 30
Bytes Sent : 2
Bytes Received: 10
Transfer Time : 52.27 ms
Transfer Rate : 229.59 bytes/second
Expected:
84 08 XX XX XX XX XX XX XX
Compare OK
Disconnecting the card (ACR3901T-W1-001094)...

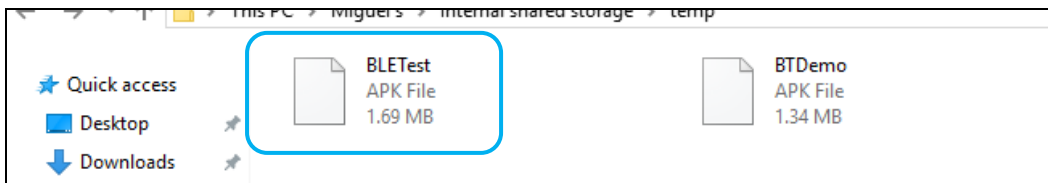
4.0. For Android (BLE Test Application)

4.1. Installing the BLE Test application

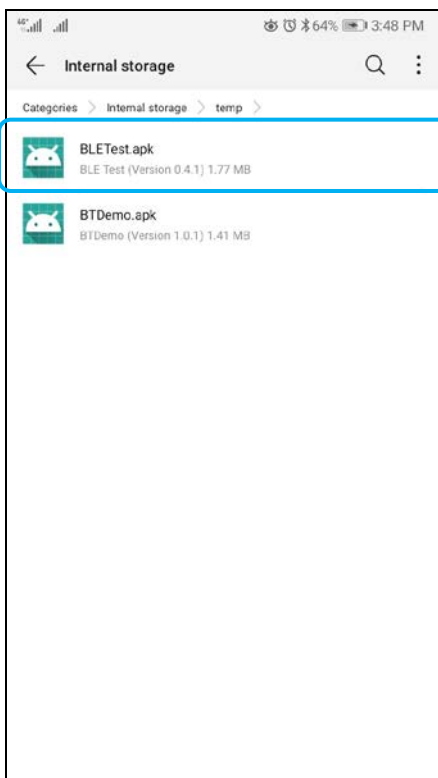
1. Connect your mobile device to the computer.



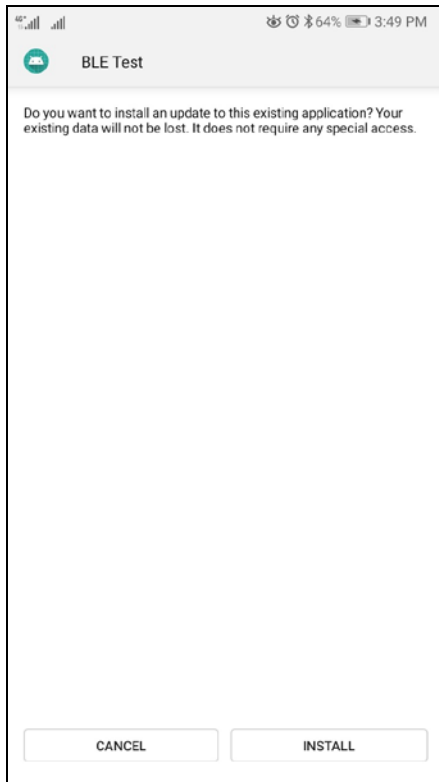
2. In the internal storage of your device, create a folder where the ACR3901T-W1 BLE Test will be placed.
3. You can access the device library by downloading the **Android BLE EVK (SmartCardIO)** from the ACS website.
4. In the Android library, copy the **BLETest.apk** and the **test scripts(.txt)** files to the previously created folder.



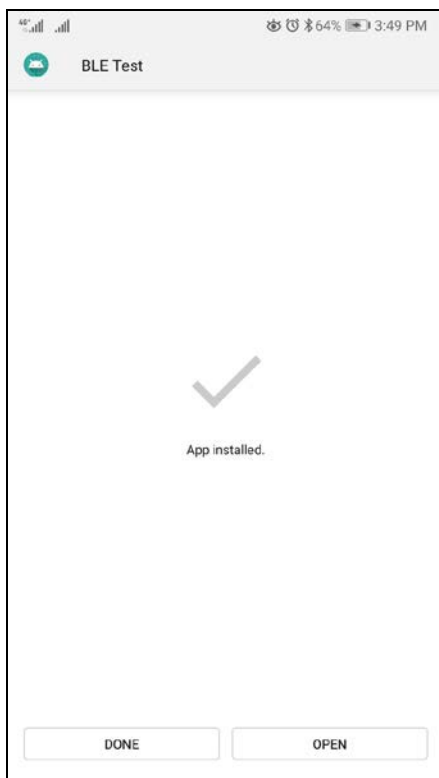
5. Disconnect your mobile device from the computer. Locate the **BLETest.apk** using a file manager application.
6. To start the installation, tap the **BLETest.apk** file.



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 BLE Test application.



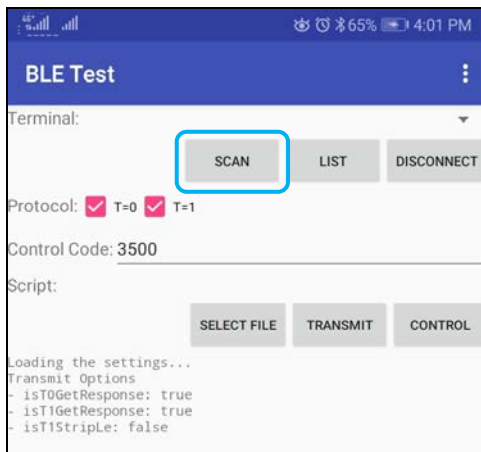
4.2. Using the ACS Bluetooth demo application

4.2.1. Connecting a device

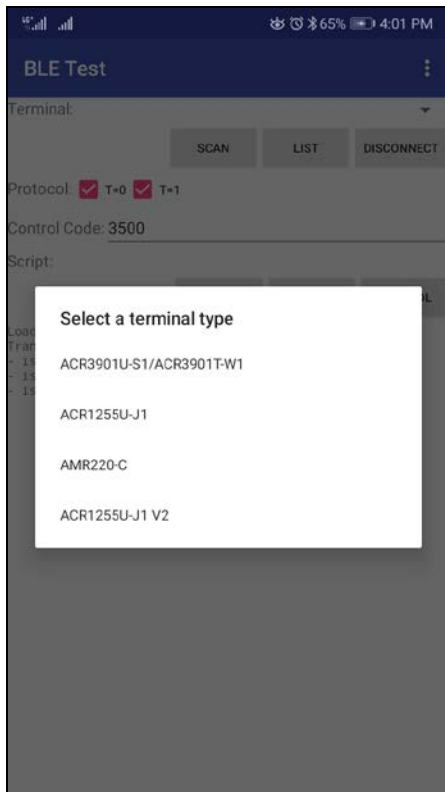
1. Turn on the Bluetooth mode of ACR3901T-W1 to make it discoverable. To do this, press the button on the top surface of the device as shown below.



2. Turn on your device's Bluetooth by going to **Settings | Bluetooth**.
3. Open **BLE Test** application.
4. Tap **Scan**.



- Select the terminal type **ACR3901U-S1/ACR3901T-W1**



- Available devices will be displayed. Tap the drop down button to show the complete list of available devices.



4.2.2. Transmitting an APDU command

To transmit APDU commands:

1. Insert a smart card into the ACR3901T-W1 reader.
2. In the demo application on the mobile device, tap **Select File**, and then locate the .txt file to run.



3. Go back to the main page then tap **Transmit**.



4. The Response APDU will be displayed as part of the logs.

The screenshot shows the 'BLE Test' application interface. At the top, the terminal ID is 'ACR3901T-W1-001094'. Below it are buttons for 'SCAN', 'LIST', and 'DISCONNECT'. The 'Protocol' section has checkboxes for 'T=0' and 'T=1', both of which are checked. The 'Control Code' field contains '3500'. Below this is a file path: 'Script:/storage/emulated/0/scripts/BLE Test Scripts/acos3.txt', with buttons for 'SELECT FILE', 'TRANSMIT', and 'CONTROL'. The main log area displays the following information:

```
Bytes Received: 2
Transfer Time : 265 ms
Transfer Rate : 41.51 bytes/second
Expected:
90 00
Compare OK
Command:
80 B2 01 00 04
Response:
12 34 56 78 90 00
Bytes Sent : 5
Bytes Received: 6
Transfer Time : 79 ms
Transfer Rate : 139.24 bytes/second
Expected:
12 34 56 78 90 00
Compare OK
Closing /storage/emulated/0/scripts/BLE Test
Scripts/acos3.txt...
Disconnecting from the card
(ACR3901T-W1-001094)...
```

Note: The application is designed to get the ATR of the card before sending the APDU commands.

4.2.3. Transmitting an escape command

To transmit an escape command:

1. In the demo application on the mobile device, tap **Select File**, and then locate the .txt file to run.



2. Go back to the main page then tap **Control**.



3. The Escape Response will be displayed as part of the logs.

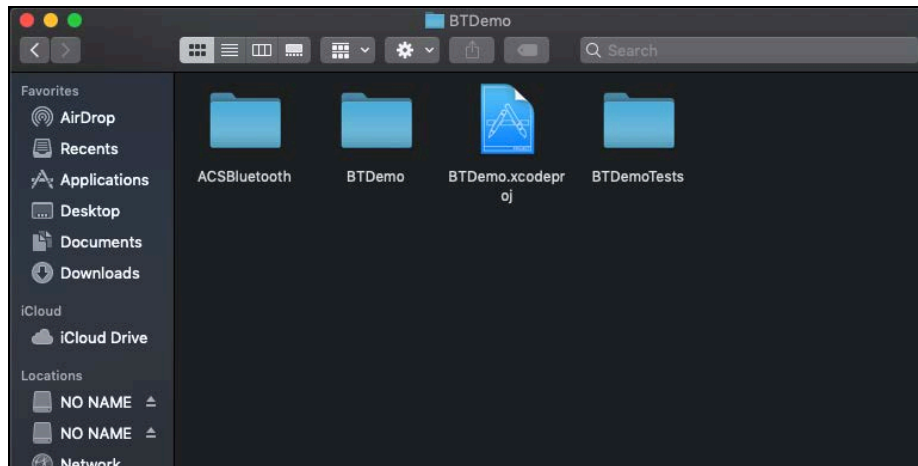
The screenshot shows the 'BLE Test' application interface. At the top, the terminal ID is 'ACR3901T-W1-001094'. Below it are buttons for 'SCAN', 'LIST', and 'DISCONNECT'. The 'Protocol' section has checkboxes for 'T=0' and 'T=1', both of which are checked. The 'Control Code' field contains '3500'. Below this, the script path is shown: '/storage/emulated/0/scripts/BLE Test Scripts/Get Firmware Version.txt'. There are buttons for 'SELECT FILE', 'TRANSMIT', and 'CONTROL'. The main log area displays the following text:

```
Connecting to the card (ACR3901T-W1-001094, direct)...\nRunning the script...\nOpening /storage/emulated/0/scripts/BLE Test Scripts/Get Firmware Version.txt...\nCommand:\n04 00\nResponse:\n84 08 56 36 2E 30 31 2E 30 30\nBytes Sent : 2\nBytes Received: 10\nTransfer Time : 66 ms\nTransfer Rate : 181.82 bytes/second\nExpected:\n84 08 XX XX XX XX XX XX XX XX\nCompare OK\nClosing /storage/emulated/0/scripts/BLE Test Scripts/Get Firmware Version.txt...\nDisconnecting from the card (ACR3901T-W1-001094)...
```

5.0. For iOS (BT Demo Application)

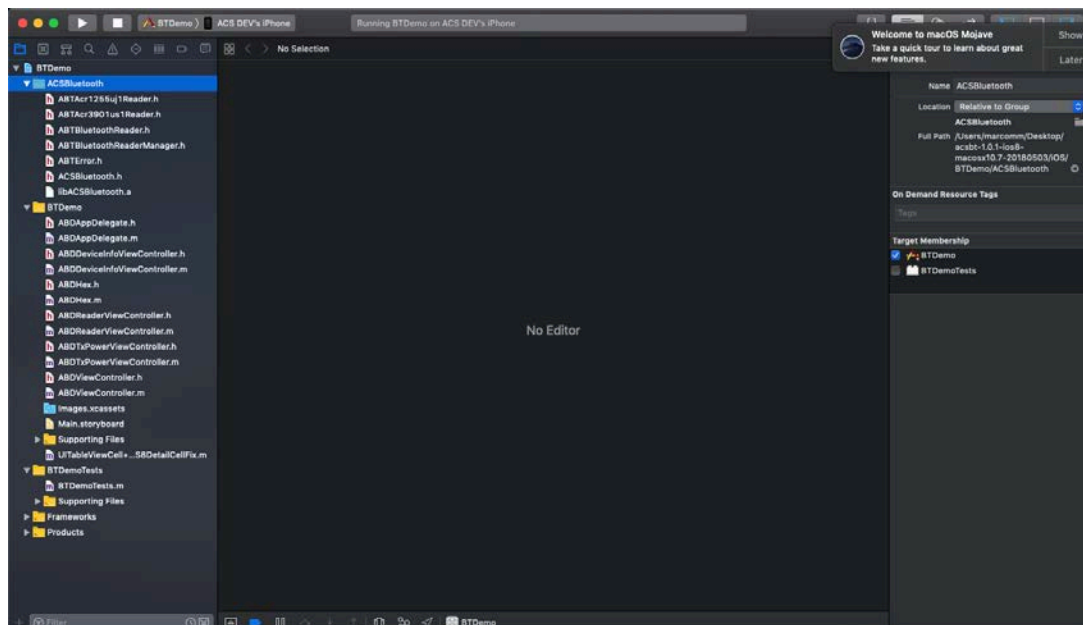
5.1. Installing the Bluetooth demo application

1. You can access the device library by downloading the **iOS & Mac BT EVK** from the ACS website.
2. Using the XCode application, open **BTDemo.xcodeproj**.



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.



5.2. Using the ACS Bluetooth demo application

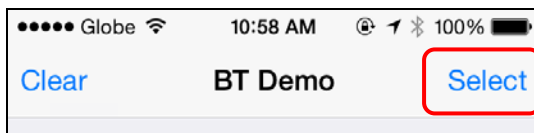
This section provides a simple step-by-step procedure on how to use the ACR3901T-W1 using the BT Demo application.

5.2.1. Connecting a device

1. Turn on the Bluetooth mode of the ACR3901T-W1 to make it discoverable. To do this, press the button on the top surface of the device as shown below.



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

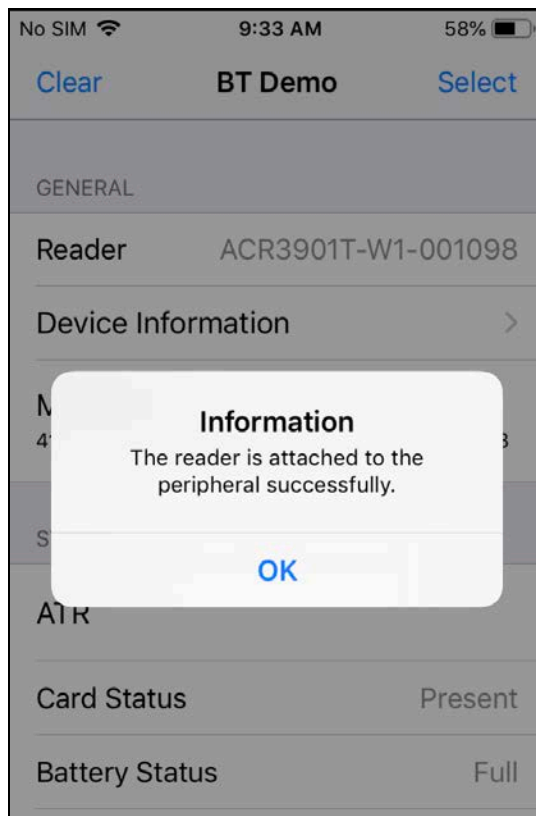


5. Choose the reader with which to pair your iOS device, then tap **Done**.





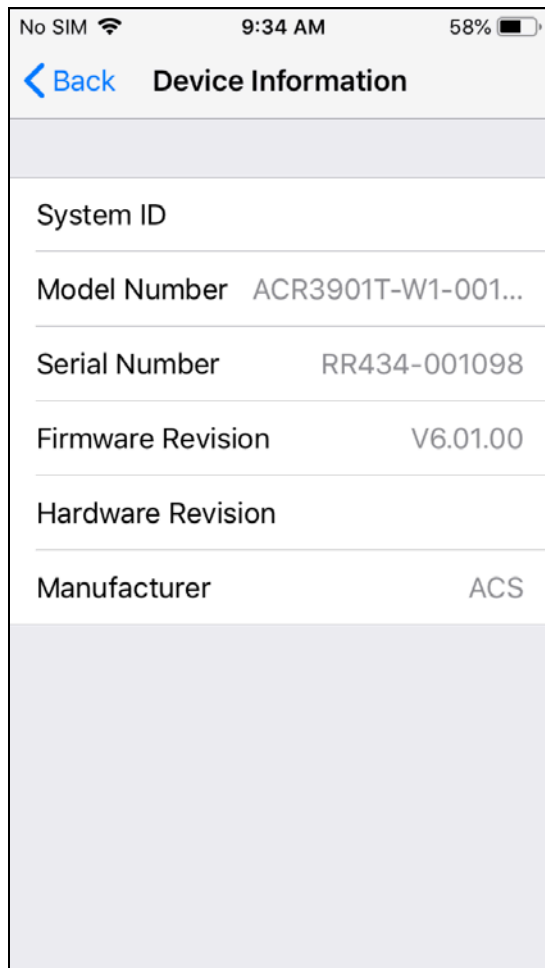
6. When the pairing is successful, tap **OK** to close the prompt.





5.2.2. Getting the device information

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





5.2.3. Getting the battery status

To get the battery status, Scroll down and tap **Get Battery Status**.

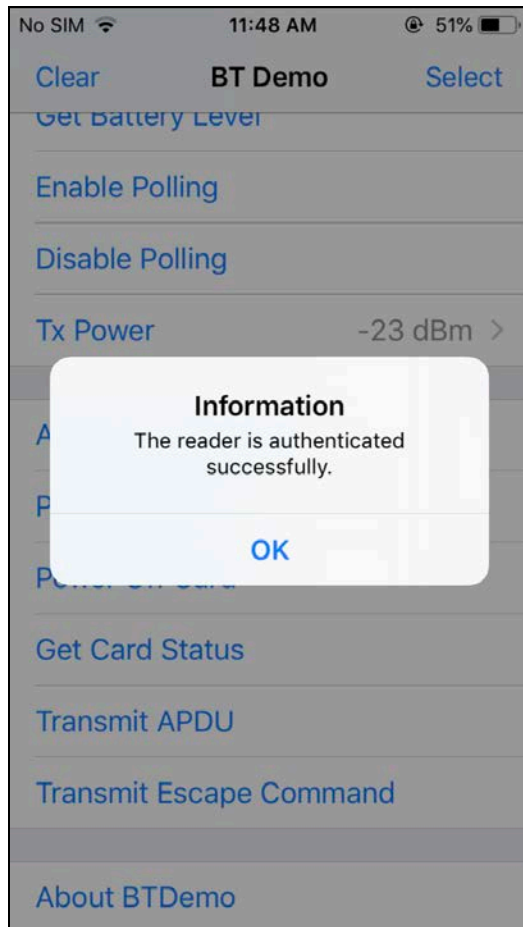
The battery status will be shown as below:

No SIM		11:49 AM		51%	
Clear		BT Demo		Select	
Master Key					
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF					
STATUS					
ATR					
3B BE 11 00 00 41 01 28 00 00 00 00 00 00 00 00 00 00 90 00					
Card Status		Present			
Battery Status		Full			
Battery Level					
APDU					
Command APDU					
80 84 00 00 08					
Response APDU					
CC 2E 58 9D 63 B2 98 C4 90 00					

5.2.4. Getting the card's ATR (Answer To Reset)

To get the ATR of the card:

1. Insert a smart card into the ACR3901T-W1 reader.
2. In the demo application, scroll down and tap **Authenticate Reader**.
3. When the authentication is successful, tap **OK** to close the prompt.





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

No SIM 11:49 AM 51%

Clear BT Demo Select

Master Key
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

STATUS

ATR
3B BE 11 00 00 41 01 28 00 00 00 00 00 00 00 00
00 90 00

Card Status Present

Battery Status Full

Battery Level

APDU

Command APDU
80 84 00 00 08

Response APDU
CC 2E 58 9D 63 B2 98 C4 90 00



5.2.5. Transmitting an APDU command

To transmit an APDU command:

1. Insert a smart card into the ACR3901T-W1 reader.
2. In the demo application, scroll down and tap **Authenticate Reader**.
3. When the authentication is successful, tap **OK** to close the prompt.
4. Tap **Power On Card**, and then tap **Transmit APDU**.
5. The Response APDU will be displayed.

The screenshot shows a mobile application interface titled "BT Demo". At the top, there are status indicators: "No SIM", signal strength, time "11:49 AM", and battery level "51%". Below the title bar, there are three buttons: "Clear", "BT Demo", and "Select". The main content area is divided into several sections:

- Master Key**: Displays a hexadecimal string "FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF".
- STATUS**: A section header.
- ATR**: Displays a hexadecimal string "3B BE 11 00 00 41 01 28 00 00 00 00 00 00 00 00 00 90 00".
- Card Status**: Displays "Present".
- Battery Status**: Displays "Full".
- Battery Level**: A section header.
- APDU**: A section header.
- Command APDU**: Displays a hexadecimal string "80 84 00 00 08".
- Response APDU**: Displays a hexadecimal string "CC 2E 58 9D 63 B2 98 C4 90 00". This section is highlighted with a blue border.

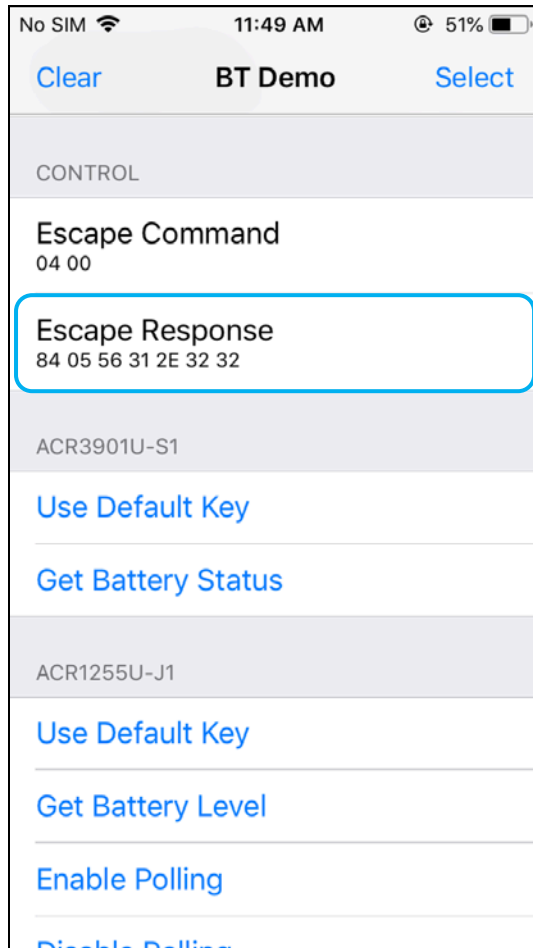
Note: You can edit the APDU command by tapping **Command APDU**.



5.2.6. Transmitting an escape command

To transmit an escape command:

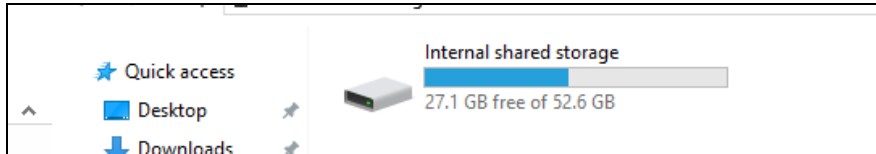
1. In the demo application, scroll down and tap **Authenticate Reader**.
2. When the authentication is successful, tap **OK** to close the prompt.
3. Tap **Transmit Escape Command**.
4. The Escape Response will be displayed.



6.0. For Android (BT Demo Application)

6.1. Installing the Bluetooth demo application

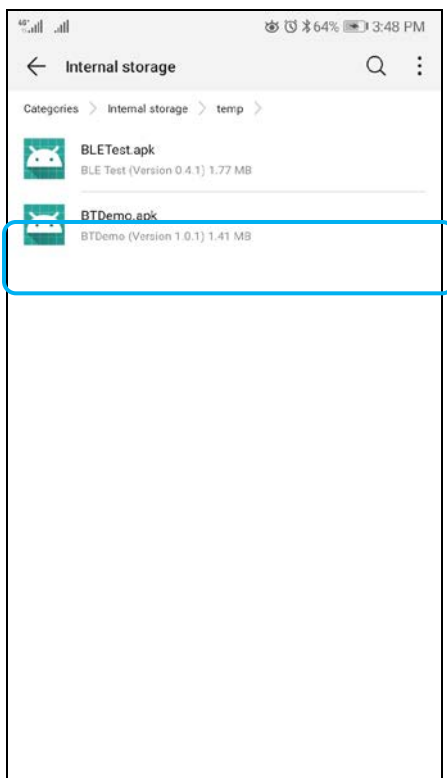
1. Connect your mobile device to the computer.



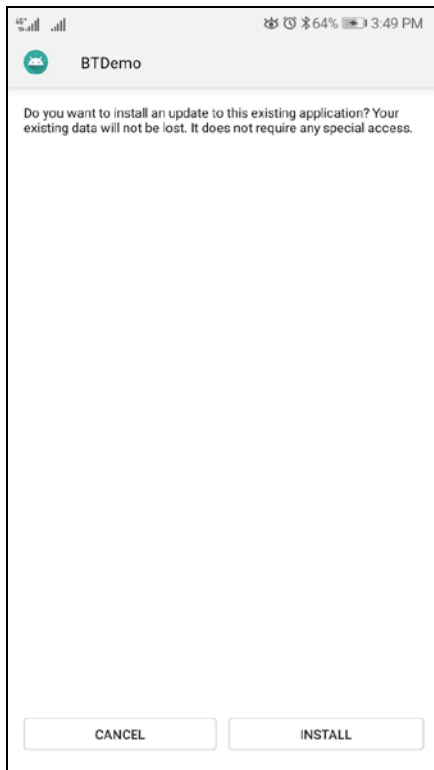
2. In the internal storage of your device, create a folder where the ACR3901T-W1 BTdemo will be placed.
3. You can access the device library by downloading the **Android BT EVK** from the ACS website.
4. In the Android library, copy the **BTDemo.apk** file to the previously created folder.



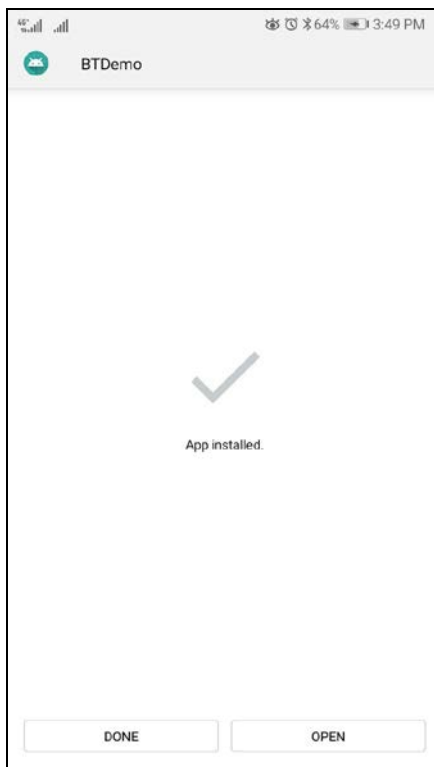
5. Disconnect your mobile device from the computer. Locate the **BTDemo.apk** using a file manager application.
6. To start the installation, tap the **BTDemo.apk** file.



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.



6.2. Using the ACS Bluetooth demo application

6.2.1. Connecting a device

1. Turn on the Bluetooth mode of the ACR3901T-W1 to make it discoverable. To do this, press the button on the top surface of the device as shown below.



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



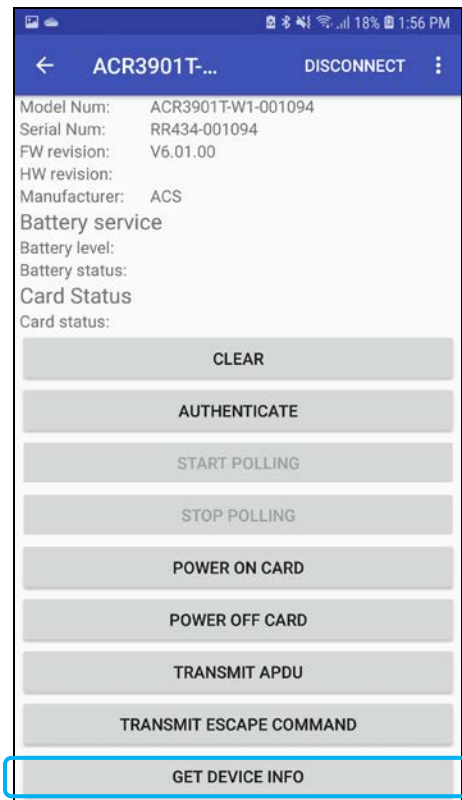
5. Once pairing is complete, the ACR3901T-W1 is now ready to be used with the mobile device.





6.2.2. Getting the device information

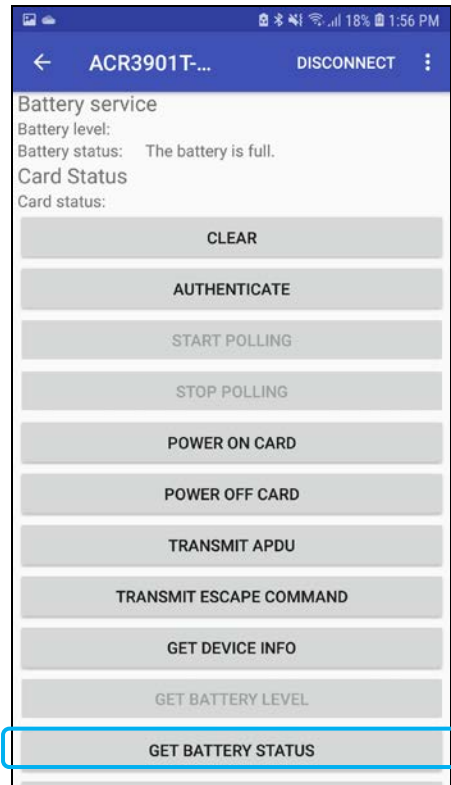
To get the reader's information, tap **Get Device Info**.





6.2.3. Getting the battery status

To get the battery status, tap **Get Battery Status**.



6.2.4. Getting the card's ATR (Answer To Reset)

To get the ATR of the card:

1. Insert a smart card into the ACR3901T-W1 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.



6.2.5. Transmitting an APDU command

To transmit an APDU command:

1. Insert a smart card into the ACR3901T-W1 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 APDU Command**.
5. The APDU command response will be displayed.



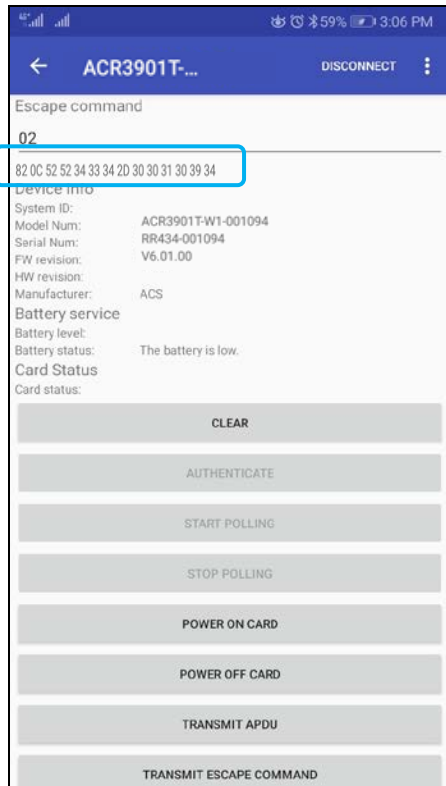
Note: You can edit the APDU command by tapping **Command APDU**.



6.2.6. Transmitting an escape command

To transmit an escape command:

1. In the demo application, tap **Authenticate**.
2. Once it is finished, it will show an **Authentication Success** message.
3. Tap **Transmit Escape Command**.
4. The Escape Response will be displayed.



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.