

# AY-U900

**UHF Integrated Long-Range Reader**  
Installation and User Manual



**ROSSLARE**  
SECURITY PRODUCTS

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# Notice and Disclaimer

This manual's sole purpose is to assist installers and/or users in the safe and efficient installation and usage of the system and/or product, and/or software described herein.

**BEFORE ATTEMPTING TO INSTALL AND/OR USE THE SYSTEM, THE INSTALLER AND THE USER MUST READ THIS MANUAL AND BECOME FAMILIAR WITH ALL SAFETY REQUIREMENTS AND OPERATING PROCEDURES.**

- The system must not be used for purposes other than those for which it was designed.
- The use of the software associated with the system and/or product, if applicable, is subject to the terms of the license provided as part of the purchase documents.
- ROSSLARE exclusive warranty and liability is limited to the warranty and liability statement provided in an appendix at the end of this document.
- This manual describes the maximum configuration of the system with the maximum number of functions, including future options. Therefore, not all functions described in this manual may be available in the specific system and/or product configuration you purchased.
- Incorrect operation or installation, or failure of the user to effectively maintain the system, relieves the manufacturer (and seller) from all or any responsibility for consequent noncompliance, damage, or injury.
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- All graphics in this manual are for reference only, some deviation between the image(s) and the actual product may occur.
- All wiring diagrams are intended for reference only, the photograph or graphic of the PCB(s) are intended for clearer illustration and understanding of the product and may differ from the actual PCB(s).

# 1. Introduction

The AY-U900 is a UHF reader that is compatible with multiple protocols and can read multiple tag formats.

The reader is waterproof and is suitable for use in a wide range of RFID applications, such as transport management, vehicle management, car parking, production process control, and access control.

**Figure 1: AY-U900 Reader**



The AY-U900 series includes the following three models:

- AY-U900US: 902–928 MHz (America)
- AY-U900CH: 920–925 MHz (China)
- AY-U900EU: 865–868 MHz (Europe)

### 1.1 Installation Kit

The AY-U900 package includes:

- 1 installation and user manual
- 1 AY-U900 reader
- 1 switching power supply: 9 VDC, 3 A
- 1 RS-232 cable
- 1 DATA communication cable
- 1 installation bracket kit

## 2. Technical Specifications

<b>Electrical Characteristics</b>	
<b>Operating Voltage Range</b>	9 to 12 VDC (2 A)
<b>Input Current</b>	Standby: 0.2 A max
	Read: 1.2 A max
<b>Credential Read Distance*</b>	1.2 to 12 m (3.9 to 39.4 ft) (adjustable)
<b>Transmission Protocol</b>	Wiegand 26-Bit (Custom: Wiegand 34-Bit)
<b>Maximum Cable Distance</b>	150 m (500 ft)
<b>Frequency</b>	AY-U900US: 902–928 MHz (America) AY-U900CH: 920–925 MHz (China) AY-U900EU: 865–868 MHz (Europe)
<b>Modulation Type</b>	ASK
<b>Read Sensitivity</b>	Dual polarization read mode
<b>Cards and Tags</b>	Rosslare’s AT-T910 and AT-T911 cards ISO18000-6B Tags EPC GEN2 (ISO18000-6C) Tags
<b>Environmental Characteristics</b>	
<b>Operating Temp. Range</b>	-20°C to 80°C (-4°F to 176°F)
<b>Operating Humidity Range</b>	0 to 95% (non-condensing) Suitable for outdoor use (IP 54)
<b>Dimensions</b>	
<b>Height x Width x Depth</b>	44.5 x 44.5 x 6.7 cm (17.5 x 17.5 x 2.6 in.)
<b>Weight</b>	2.32 kg (5.1 lb)

\* Read range was tested with Rosslare’s AT-T910 card.

### 3. Installation



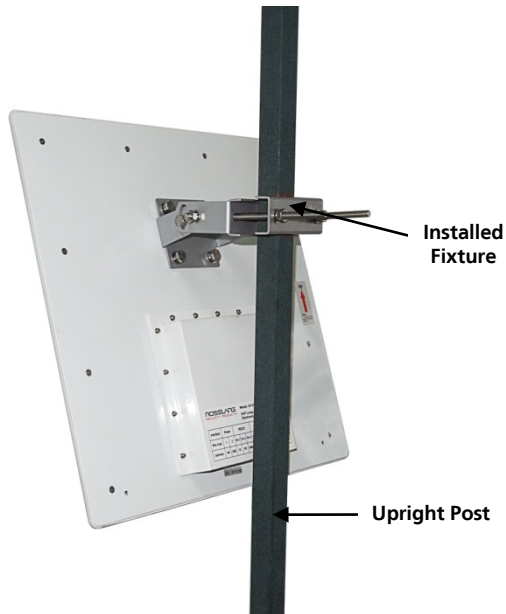
Note

Installation of an RFID reader adjacent to metallic surfaces might alter the reader's specifications. To diminish this interference, use a plastic spacer when mounting the reader.

#### 3.1 General

Figure 2 shows the structure of the reader.

**Figure 2: Reader Components**

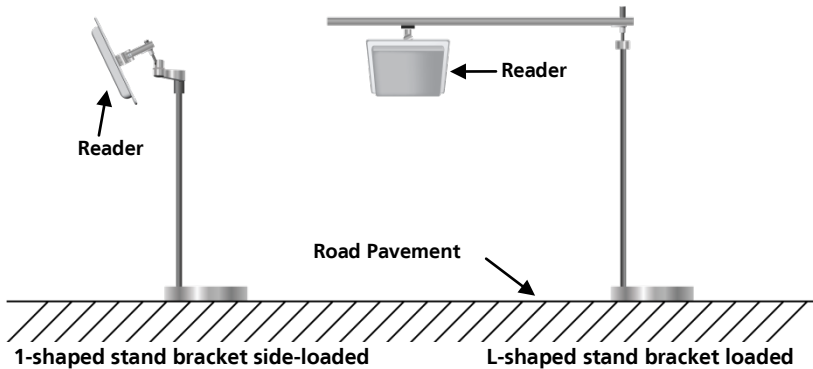


There are two ways to install the stand-bracket of the AY-U900 reader as shown in Figure 3:

- 1-shaped stand bracket side-loaded
- L-shaped stand bracket loaded



**Figure 3: Reader Fixing Mode**



Each installation method is selected based on application requirements and actual location. The user can use the provided template to install AY-U900 reader in more convenient and easier way, but the read distance is a little short; the situation becomes opposite if using the latter.

### 3.1.1 1-Shaped Stand Bracket Side-Loaded

In this method, the stand pole installed to the AY-U900 reader should have a diameter of between 50 and 60 mm and the length of 2.2 m. The pole should be made of stainless steel with a thickness of more than 1.20 mm.

Use the fastener contained in package box to mount AY-U900 reader to the top of the stand pole according to actual vehicle type (mainly large car and small car) and then adjust the height from the center of AY-U900 reader to lane level to be around 2.0 m (between 1.8 and 2.2 m).

### 3.1.2 L-Shaped Stand Bracket Top-Loaded

In this method, the L-shaped stand pole (or dragon shape) installed to AY-U900 reader should have a diameter of between 60 to 80 mm. The pole should be made of stainless steel with the thickness of more than 1.20 mm.

Use the fastener contained in package box to mount AY-U900 reader to the rail near the center of the lane.

Adjust the height between the rail and the ground to between 3.5 to 4.0 m, depending on the height of vehicle.

## 3.2 Adjusting the Azimuth Angle of Antenna

The angle of inclination with the ground plane of the antenna should be approximately 60° to 75°, while the deviation angle of the antenna should be biased towards the lane direction (Figure 4).

Figure 4: Antenna Angle Top View

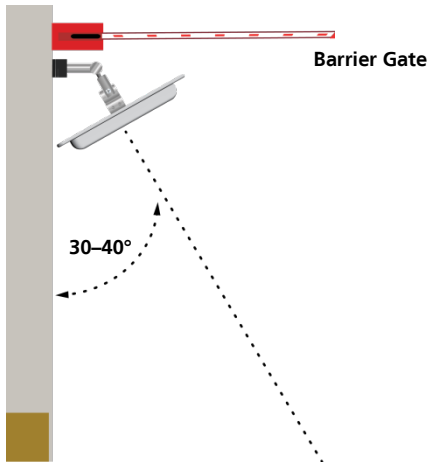
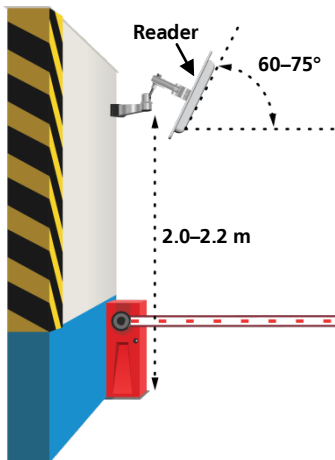


Figure 5: Antenna Angle Side View



## 4. Wiring

The unit has three interfaces (Figure 6):

- 2-pin power interface
- RS-232 interface
- 7-pin interface

**Figure 6: Interfaces**



The unit operation voltage is 9–12 VDC, by an independent power supply connected to the 2-pin power interface.

The RS-232 serial connection is used to configure the reader through the included software (see Chapter 6).

The functions and wiring instructions for the 7-pin interface are shown in Table 1.

**Table 1: Wiring**

<b>Function</b>	<b>Wire Color</b>	<b>Output</b>
<b>Wiegand Output</b>	Green	Data 0/Data
	White	Data 1/Clock
	Blue	GND
<b>Trigger Mode</b>	Red	Trigger
	Black	GND
<b>RS-485 Output</b>	Brown	RS-485-A+
	Yellow	RS-485-B-

# 5. Operation Instructions

After wiring the unit to a power supply and a controller (Wiegand output, D0, D1, GND), you should test the AY-U900 long-range UHF reader.

***To test the reader:***

1. Power up the reader. One beep is emitted and then it begins an auto-calibration procedure. After 2 seconds, the reader enters working mode.
2. Present the appropriate type of credential to the reader. A short beep is emitted, indicating that the credential is read properly.

## 6. Software Installation and Configuration

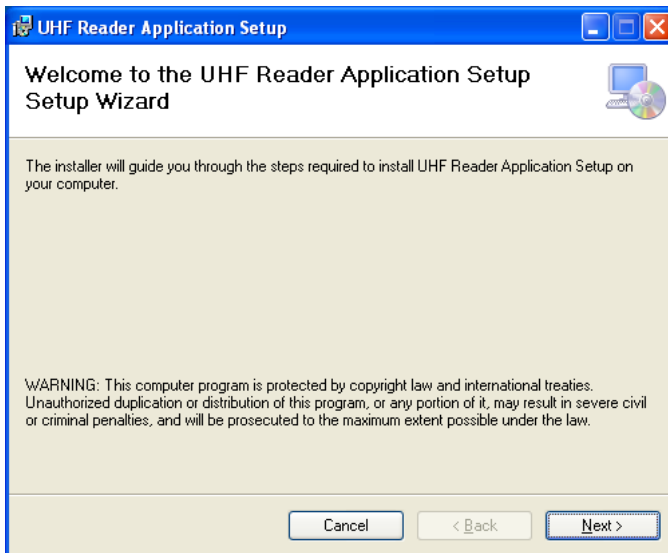
### 6.1 Installing the Software

The UHF Reader Setup Application v1.1 is used to configure the reader.

***To install the UHF Reader Setup Application:***

1. Insert the CD into the computer's CD drive.
2. If the Autoloader does not initiate the installation, open My Computer, double-click on the CD drive icon and then double-click the setup file.

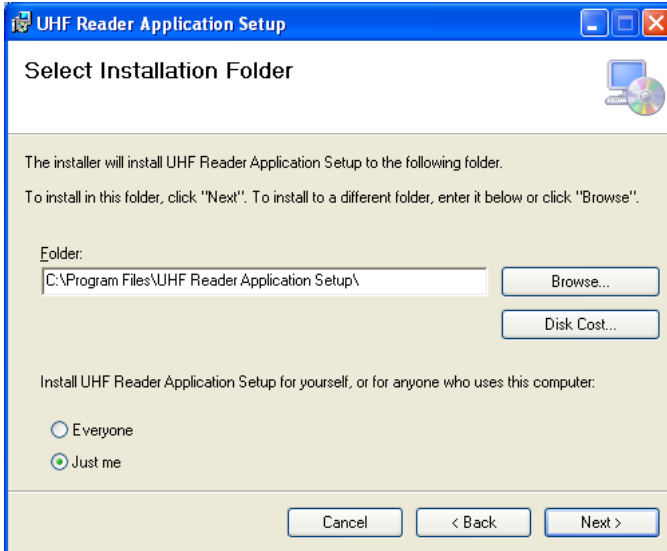
The installation package extracts the installation files. After the files are extracted, the *Welcome to the UHF Reader Application Setup Wizard* screen opens.



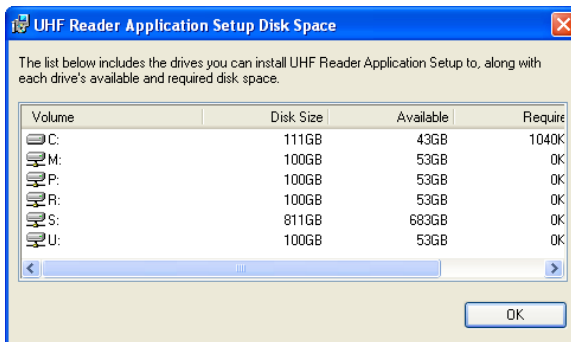
3. Click **Next**.

## Software Installation and Configuration

The *Select Installation Folder* screen opens.

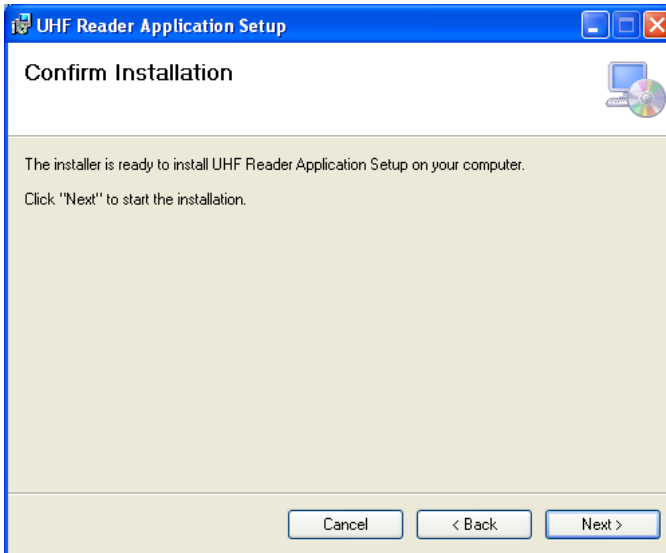


- [Optional] Click **Disk Cost...** to ensure the computer has sufficient space. The *UHF Reader Application Setup Disk Space* window opens.



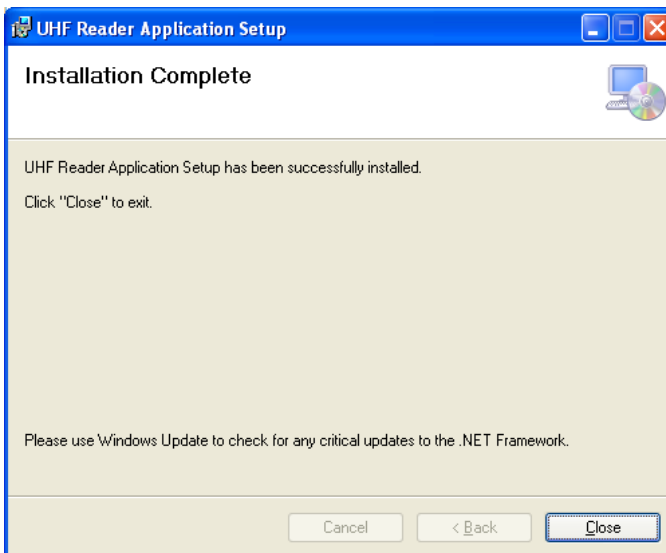
- Select the users allowed to use the program, **Everyone** or **Just me**. For security purposes it is suggested that **Just me** is selected.
- [Optional] You can change the destination folder of the installation:
  - Click **Browse**.  
The standard Windows Explorer window opens.
  - Navigate to and select the required folder.
- Click **Next** to continue the installation process.

The *Confirm Installation* screen opens.



8. Click **Next**.

The installation process is initiated. When the process finishes, the *Installation Complete* screen opens.



9. Click **Close** to complete the installation process.

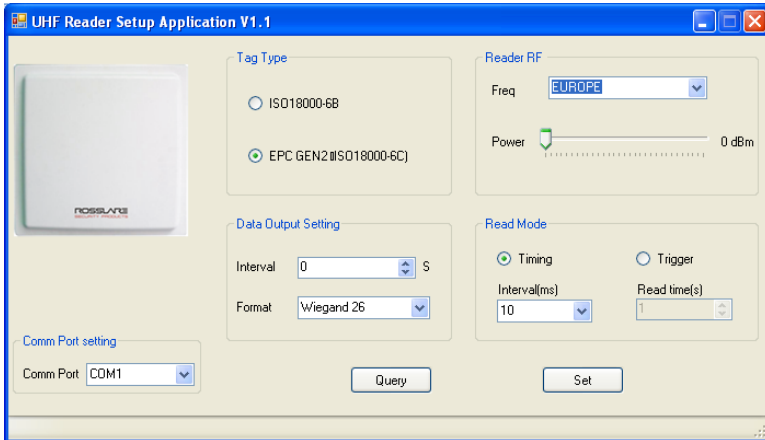
## Software Installation and Configuration

### 6.2 Connecting the Reader

Once you've installed the UHF Reader Setup Application, you must verify that there is a connection between the reader and the software.

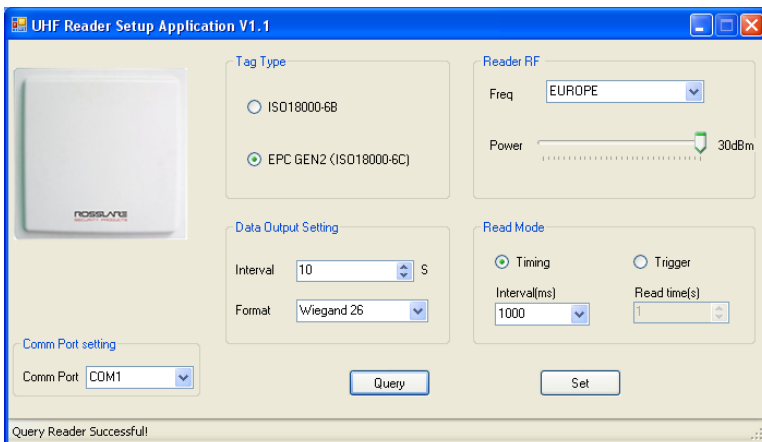
*To connect the AY-U900:*

1. Connect the UHF reader to the PC using a RS-232 cable
2. Click the *UHF Reader Setup* icon on the desktop or select the program from the Rosslare folder in the **Start** menu. The application opens.



3. From the **Comm Port** dropdown, select the correct COM port.
4. Click **Query**.

If the connection is successful, the software displays information on the bottom left of the screen to indicate the connection is successful.



The current parameters in the reader are displayed.



### 6.3 Configuring the Reader

There are four main sections in the software interface to be configured: Tag Type, Reader RF, Data Output Setting, and Read Mode.

#### *To configure the reader:*

1. Configure the four sections as needed according to the field descriptions in the subsections below.
2. Click **Set** to save the settings.

#### 6.3.1 Tag Type

Select one of the two types of credentials:

- ISO 18000-6B
- EPC GEN2 (ISO 18000-6C)

#### 6.3.2 Reader RF

There are two parameters in this section.

- **Frequency:** Select one of the three kinds of frequencies for the different regions: America, China, or Europe.
- **Power:** Use the Power slider to choose a power between 0 and 30 dBm.

#### 6.3.3 Data Output Setting

There are two parameters in this part.

**Interval:** Select the rate that the reader uploads credential information to controller (between 0 to 255 seconds). For example, if you set the interval time to 5 seconds, the reader uploads the credential information to the controller every 5 seconds, even if the reader reads the credential many times during those 5 seconds.

**Format:** Select either Wiegand 26 or Wiegand 34.

#### 6.3.4 Read Mode

The software can configure the reader to work in one of two modes:

**Timing mode:** The reader reads a credential continually at a reading rate according to the interval time.

**Trigger mode:** The reader starts to read a credential by connecting a red wire (trigger) and a black wire (ground) at a reading rate according to the interval time. The reader stops after the indicated time as set in the **Read time(s)** spin box.

# 7. UHF Credential Programming

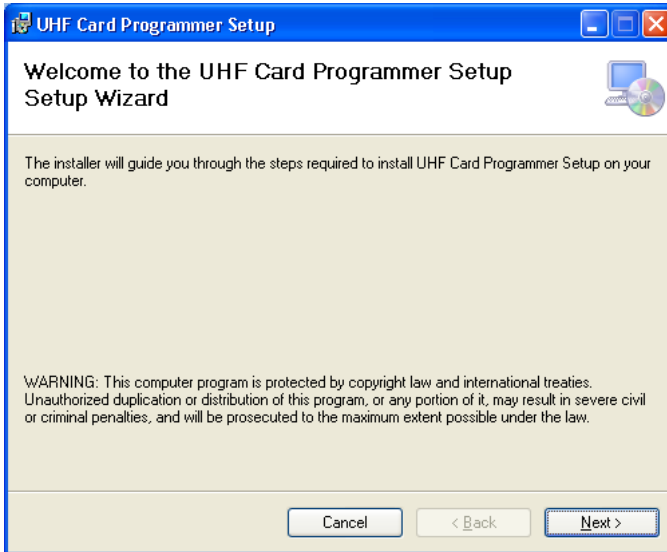
The AY-U900 can be used to program UHF credentials using the *UHF Card Programmer* application.

### 7.1 Installing the Card Programming Software

*To install the UHF Card Programmer software:*

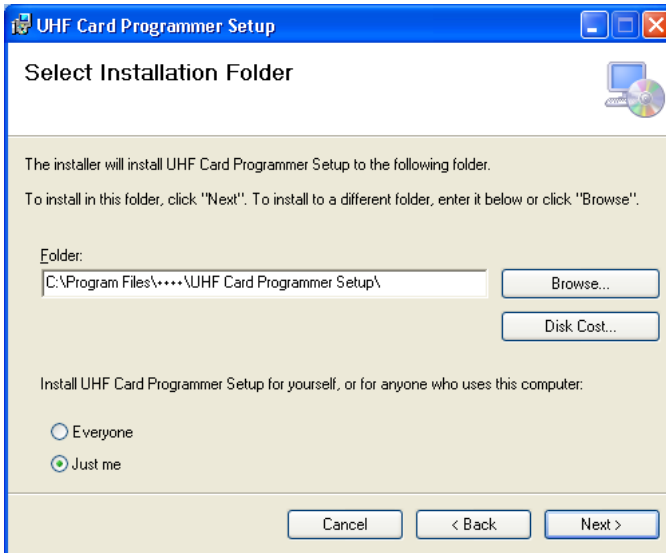
1. Download the installation setup file from the Rosslare site.
2. Double-click the setup file.

The installation package extracts the installation files. After the files are extracted, the *Welcome to the UHF Card Programming Setup Wizard* screen opens.

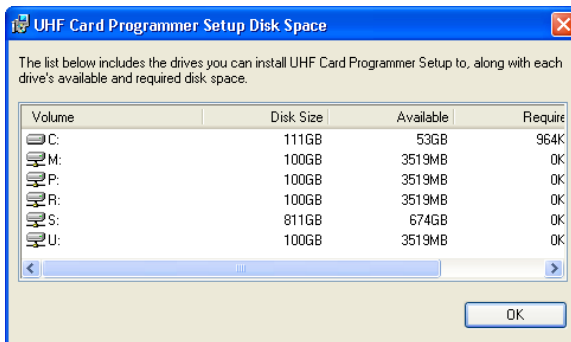


3. Click **Next**.

The *Select Installation Folder* screen opens.



4. [Optional]Click **Disk Cost...** to ensure the computer has sufficient space. The *UHF Card Programmer Setup Disk Space* window opens.

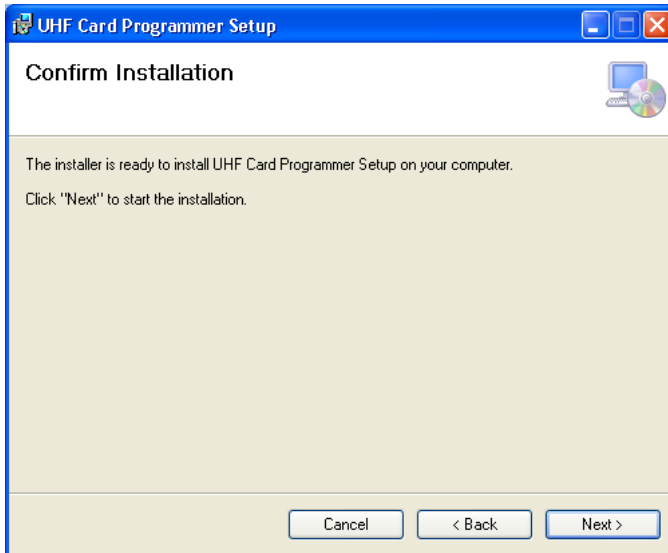


5. Select the users allowed to use the program, **Everyone** or **Just me**. For security purposes it is suggested that **Just me** is selected.
6. [Optional] You can change the destination folder of the installation:
  - a. Click **Browse**.  
The standard Windows Explorer window opens.
  - b. Navigate to and select the required folder.
7. Click **Next** to continue the installation process.

## UHF Credential Programming

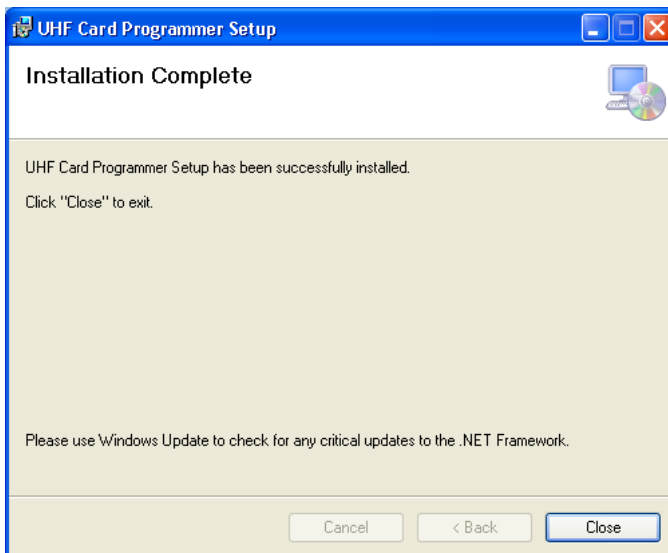
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The *Confirm Installation* screen opens.



8. Click **Next**.

The installation process is initiated. When the process finishes, the *Installation Complete* screen opens.

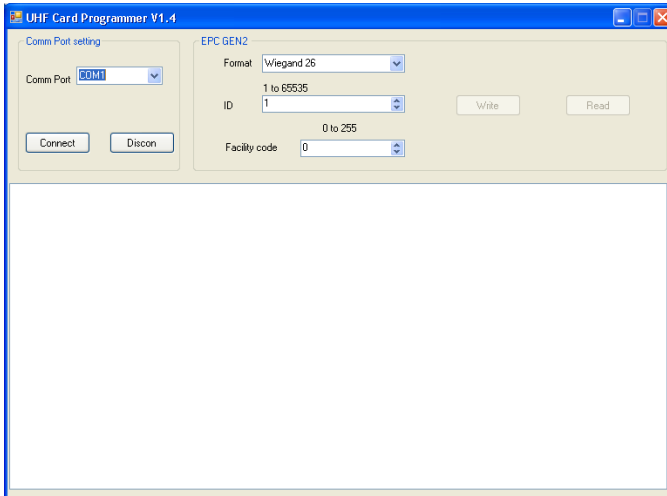


9. Click **Close** to complete the installation process.

## 7.2 Programming a UHF Credential

The UHF Card Programmer GUI consists of three areas:

- Comm port setting
- EPC GEN2
- Display area



### *To program a UHF credential:*

1. Connect the UHF reader to the PC using a RS-232 cable.
2. Power on the reader.
3. From the **Comm Port** dropdown in *Comm Port setting*, select the correct COM port.
4. Click **Connect** to connect the programmer via RS-232 cable.
5. If the connection is successful, the software displays "Connect reader success" in the display area.
6. From the **Format** dropdown In *EPC GEN2*, choose the card ID format you want, Wiegand 26 or Wiegand 34.  
For Wiegand 26, the card ID range is 1 to 65535, and the Facility code range is 0 to 255. For Wiegand 34, the ID range is 1 to 4294967295.
7. In the **ID** spin box, enter the ID you want to assign to the credential.
8. If needed, in the **Facility code** spin box, enter the Facility code.
9. Present the credential to the reader and click **Write**.

If the credential is written successfully, the software displays "write success!" in the display area and the reader emits a beep. The Card ID in the programmer adds 1 automatically.

## UHF Credential Programming

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If the credential is written unsuccessfully, the software displays “write fail!” in the display area. The Card ID in the programmer does not add 1 automatically.

10. When finished programming, click **Disconnect**.

### *To read a UHF Card ID:*

1. Present the credential to the reader.
2. Click **Read** icon.

If the credential is read successfully, the software displays “Read success!” followed by the card ID in the display area.

If the credential is read unsuccessfully, the software displays “Read fail!” in the display area.

3. When finished reading, click **Disconnect**.

### A. Limited Warranty

The full ROSSLARE Limited Warranty Statement is available in the Quick Links section on the ROSSLARE website at [www.rosslaresecurity.com](http://www.rosslaresecurity.com).

Rosslare considers any use of this product as agreement to the Warranty Terms even if you do not review them.



AY-U900

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