# 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 ENTERPRISES LIMITED and/or its related companies and/or subsidiaries' (hereafter:"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

| | |
|---|---|
| **Electrical Characteristics** | |
| **Operating Voltage Range** | 9 to 12 VDC (2 A) |
| **Input Current** | Standby: 0.2 A max |
| | Read: 1.2 A max |
| **Card Read Distance*** | Up to 12 m (39.4 ft) (adjustable) |
| **Transmission Protocol** | Wiegand 26-Bit<br>(Custom: Wiegand 34-Bit) |
| **Maximum Cable Distance** | 150 m (500 ft) |
| **Frequency** | AY-U900US: 902–928 MHz (America)<br>AY-U900CH: 920–925 MHz (China)<br>AY-U900EU: 865–868 MHz (Europe) |
| **Read Sensitivity** | Dual polarization read mode |
| **Cards and Tags** | Rosslare's AT-T910 and AT-T911 cards<br>ISO18000-6B Tags<br>EPC GEN2 (ISO18000-6C) Tags |
| **Environmental Characteristics** | |
| **Operating Temp. Range** | -20°C to 80°C (-4°F to 176°F) |
| **Operating Humidity** | 0 to 95% (non-condensing)<br>Suitable for outdoor use (IP 54) |
| **Dimensions** | |
| **Height x Width x Depth** | 44.5 x 44.5 x 6.7 cm (17.52 x 17.52 x 2.64 in.) |
| **Weight** | 2.32 kg (5.11 lb) |

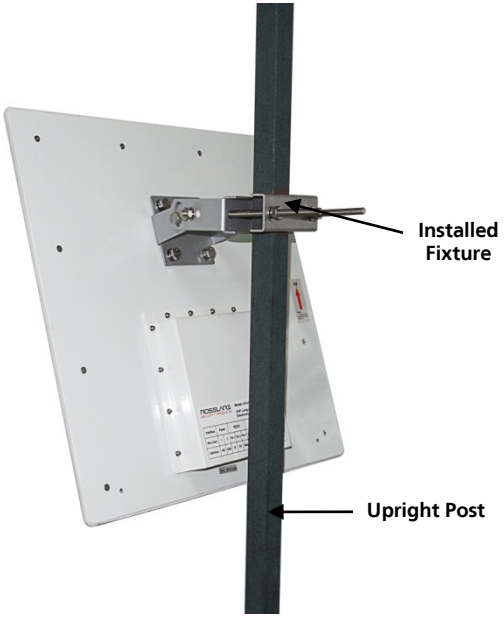
* Read range was tested with Rosslare's AT-T910 card.

# 3. Installation

## 3.1 General

Figure 2 shows the structure of the reader.

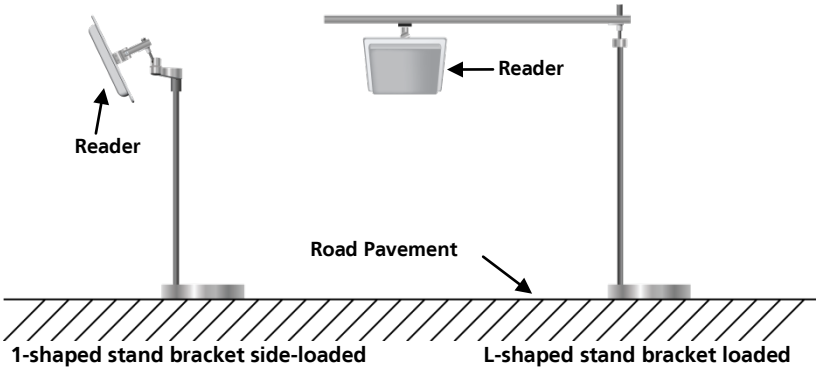
**Figure 2: Reader Components**




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

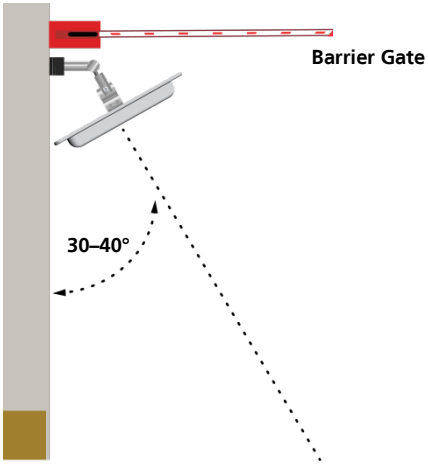
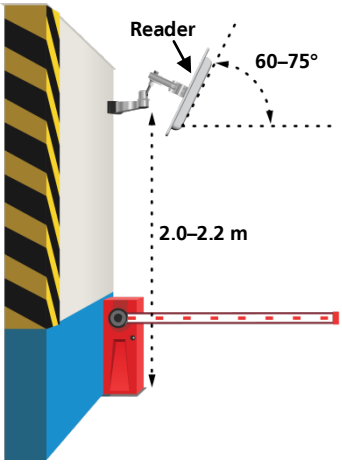



Figure 5: Antenna Angle Side View



# 4. 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 proximity card to the reader. A short beep is emitted, indicating that the card is read properly.

# 5. Software Installation and Configuration

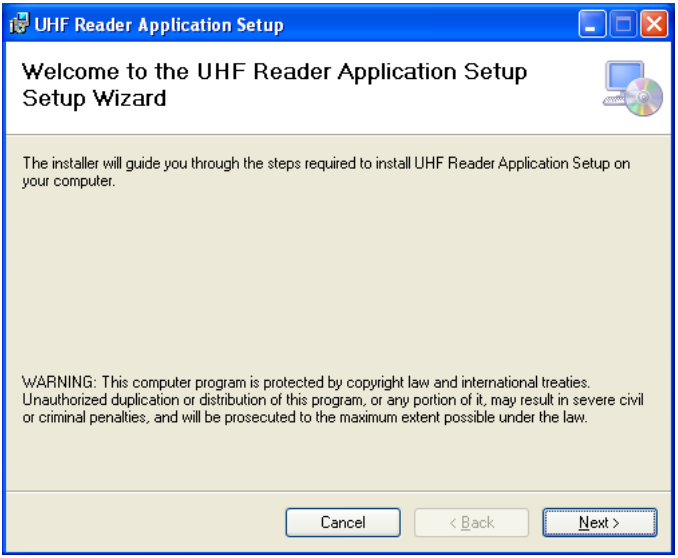
## 5.1 Installing the Software

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

*To install the UHF Reader Setup Application:*

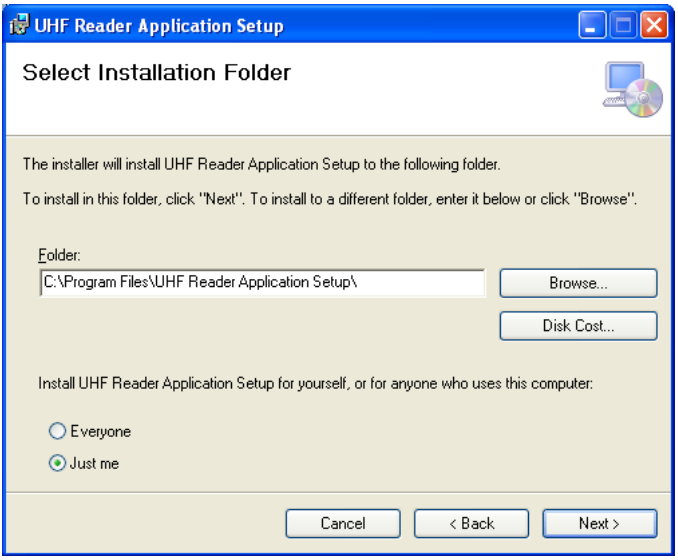
1. Insert the CD into the computer's CD drive.
2. If the Autoloader does not initiate the installation, open My Computer, double-click on the CD drive icon and then double-click the setup file.

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

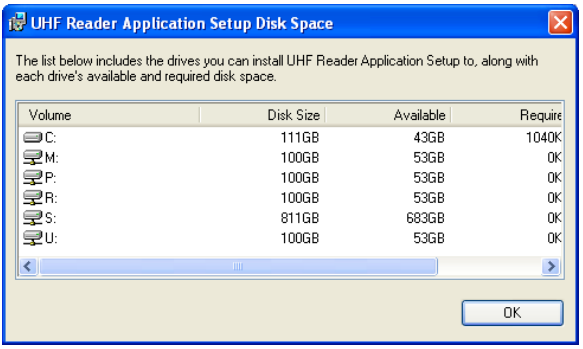



3. Click **Next**.

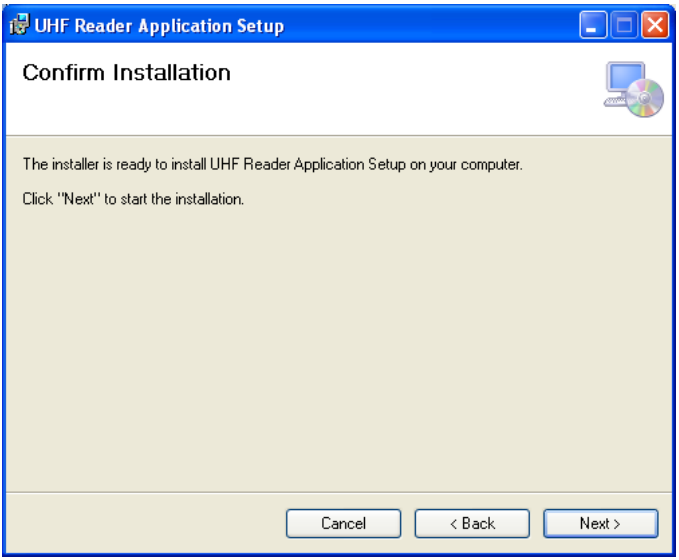
   The *Select Installation Folder* screen opens.




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

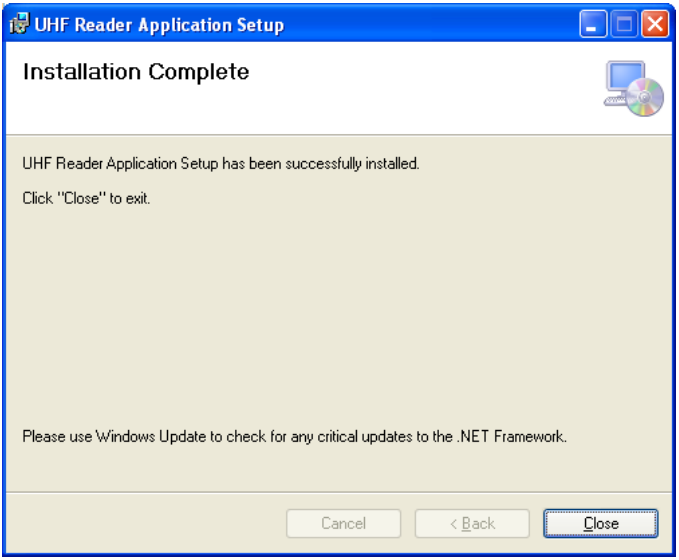



5. Select the users allowed to use the program, **Everyone** or **Just me**.
   For security purposes it is suggested that **Just me** is selected.
6. [Optional] You can change the destination folder of the installation:
   a. Click **Browse**.
      The standard Windows Explorer window opens.
   b.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




8. Click **Next**.

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



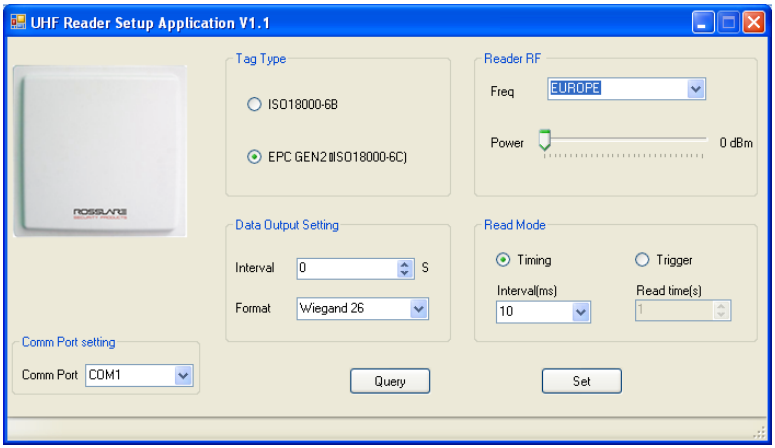

9. Click **Close** to complete the installation process.

## 5.2 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.

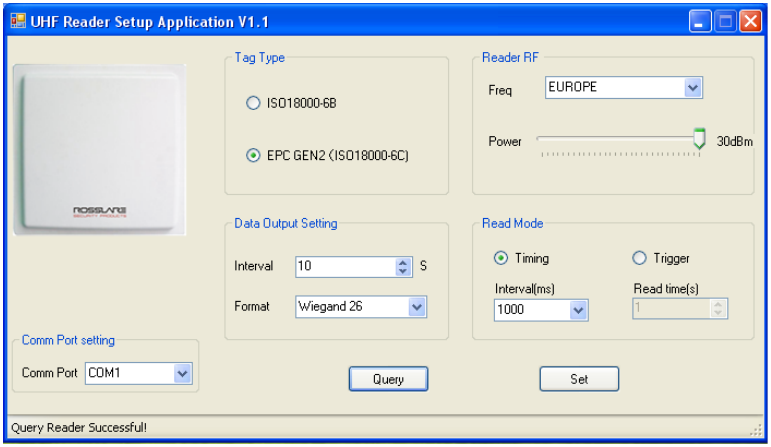
*To connect the AY-U900:*

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.

## 5.3 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.

### 5.3.1 Tag Type

Select one of the two types of cards:

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

### 5.3.2 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.

### 5.3.3 Data Output Setting

There are two parameters in this part.

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

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

### 5.3.4 Read Mode

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

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

**Trigger mode**: The reader starts to read a card 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.

# 6. UHF Card Programming

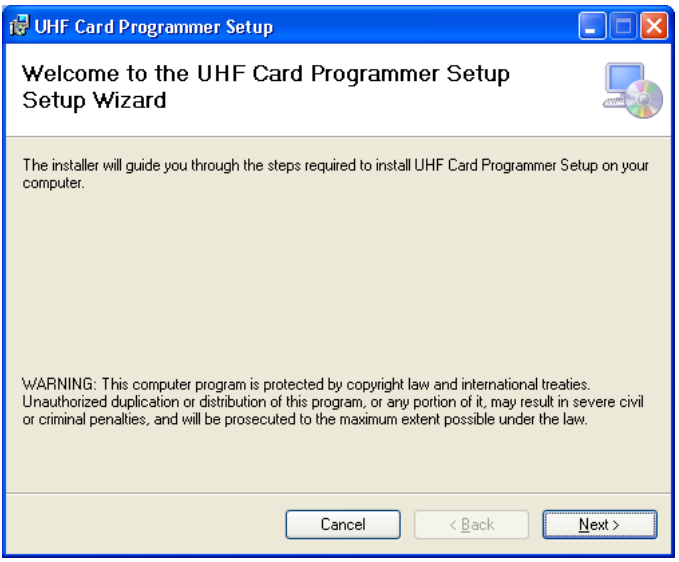
The AY-U900 can be used to program UHF cards using the *UHF Card Programmer* application.

## 6.1 Installing the Card Programming Software

*To install the UHF Card Programmer software:*

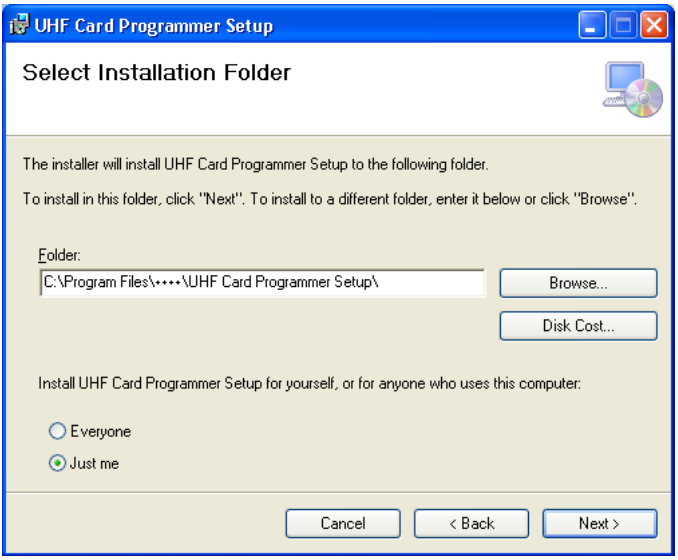
1. Download the installation setup file from the Rosslare site.
2. Double-click the setup file.

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

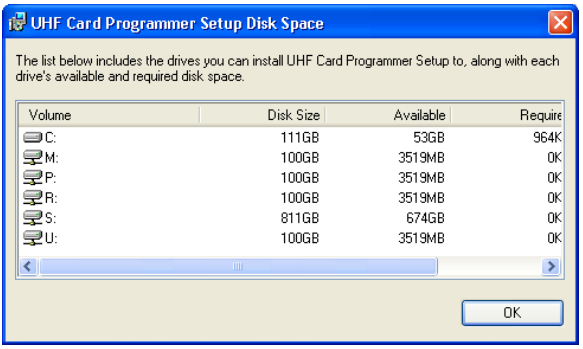



3. Click **Next**.

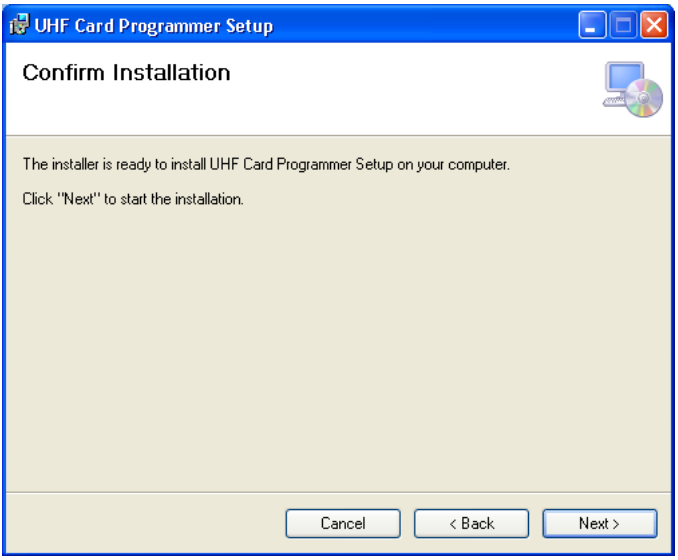
   The *Select Installation Folder* screen opens.




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

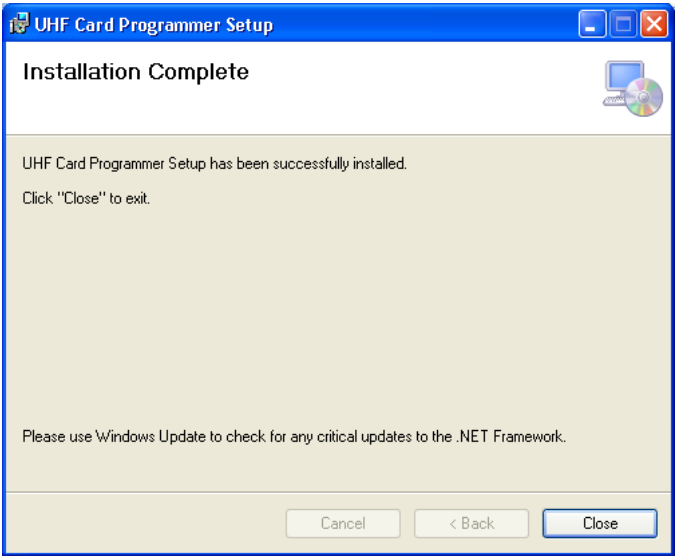



5. Select the users allowed to use the program, **Everyone** or **Just me**.
   For security purposes it is suggested that **Just me** is selected.
6. [Optional] You can change the destination folder of the installation:
   a. Click **Browse**.
      The standard Windows Explorer window opens.
   b.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




8. Click **Next**.

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

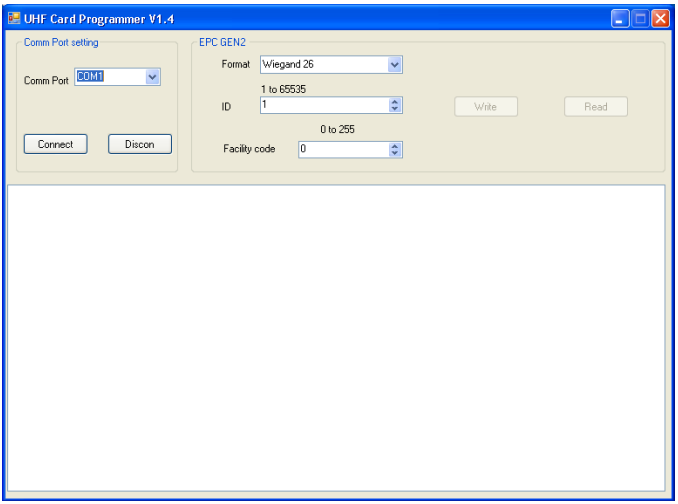



9. Click **Close** to complete the installation process.

## 6.2 Programming a UHF Card

The UHF Card Programmer GUI consists of three areas:

- Comm port setting
- EPC GEN2
- Display area




*To program a UHF card:*

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 card.
8. If needed, in the **Facility code** spin box, enter the Facility code.
9. Present the card to the reader and click **Write**.

   If the card 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.

If the card 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 card to the reader.
2. Click **Read** icon.

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

   If the card is read unsuccessfully, the software displays "Read fail!" in the display area.
3. When finished reading, click **Disconnect**.

# A. Limited Warranty

ROSSLARE'S FIVE-YEAR LIMITED WARRANTY is applicable worldwide. This warranty supersedes any other warranty. ROSSLARE'S FIVE-YEAR LIMITED WARRANTY is subject to the following conditions:

### WARRANTY

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ROSSLARE warrants the AY-U900 UHF Integrated Long-Range Reader to be free from defects in materials and assembly in the course of normal use and service. The warranty period commences with the date of shipment to the original purchaser and extends for a period of 5 years (60 months).

### WARRANTY REMEDY COVERAGE

In the event of a breach of warranty, ROSSLARE will credit Customer with the price of the Product paid by Customer, provided that the warranty claim is delivered to ROSSLARE by the Customer during the warranty period in accordance with the terms of this warranty. Unless otherwise requested by a ROSSLARE representative, return of the failed product(s) is not immediately required.

If ROSSLARE has not contacted the Customer within a sixty (60) day holding period following the delivery of the warranty claim, Customer will not be required to return the failed product(s). All returned Product(s), as may be requested at ROSSLARE'S sole discretion, shall become the property of ROSSLARE.

To exercise the warranty, the user must contact ROSSLARE Enterprises Ltd. to obtain an RMA number after which, the product must be returned to the Manufacturer freight prepaid and insured.

In the event ROSSLARE chooses to perform a product evaluation within the sixty (60) day holding period and no defect is found, a minimum US$ 50.00 or equivalent charge will be applied to each Product for labor required in the evaluation.

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This warranty does not cover expenses incurred in the transportation, freight cost to the repair center, removal or reinstallation of the product, whether or not proven defective.

Specifically excluded from this warranty are any failures resulting from Customer's improper testing, operation, installation, or damage resulting from use of the Product in other than its normal and customary manner, or any maintenance, modification, alteration, or adjustment or any type of abuse, neglect, accident, misuse, improper operation, normal wear, defects or damage due to lightning or other electrical discharge. This warranty does not cover repair or replacement where normal use has exhausted the life of a part or instrument, or any modification or abuse of, or tampering with, the Product if Product disassembled or repaired in such a manner as to adversely affect performance or prevent adequate inspection and testing to verify any warranty claim.

ROSSLARE does not warrant the installation, maintenance, or service of the Product. Service life of the product is dependent upon the care it receives and the conditions under which it has to operate.

In no event shall ROSSLARE be liable for incidental or consequential damages.

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AY-U900

## Asia Pacific, Middle East, Africa

Rosslare Enterprises Ltd.
Kowloon Bay, Hong Kong
Tel: +852 2795-5630
Fax: +852 2795-1508
support.apac@rosslaresecurity.com

## United States and Canada

Rosslare Security Products, Inc.
Southlake, TX, USA
Toll Free: +1-866-632-1101
Local: +1-817-305-0006
Fax: +1-817-305-0069
support.na@rosslaresecurity.com

## Europe

Rosslare Israel Ltd.
Rosh HaAyin, Israel
Tel: +972 3 938-6838
Fax: +972 3 938-6830
support.eu@rosslaresecurity.com

## Latin America

Rosslare Latin America
Buenos Aires, Argentina
support.la@rosslaresecurity.com

## China

Rosslare Electronics (Shenzhen) Ltd.
Shenzhen, China
Tel: +86 755 8610 6842
Fax: +86 755 8610 6101
support.cn@rosslaresecurity.com

## India

Rosslare Electronics India Pvt Ltd.
Tel/Fax: +91 20 40147830
Mobile: +91 9975768824
sales.in@rosslaresecurity.com

ROSSLARE
SECURITY PRODUCTS
www.rosslaresecurity.com

0706-0960473+02

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