

# AY-U910

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



**ROSSLARE**  
SECURITY PRODUCTS

## **Copyright © 2016 by Rosslare. All rights reserved.**

This manual and the information contained herein are proprietary to ROSSLARE ENTERPRISES LIMITED and/or its related companies and/or subsidiaries' (hereafter: "ROSSLARE"). Only ROSSLARE and its customers have the right to use the information.

No part of this manual may be re-produced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without the express written permission of ROSSLARE.

ROSSLARE owns patents and patent applications, trademarks, copyrights, or other intellectual property rights covering the subject matter in this manual.

TEXTS, IMAGES, AND ILLUSTRATIONS INCLUDING THEIR ARRANGEMENT IN THIS DOCUMENT ARE SUBJECT TO THE PROTECTION OF COPYRIGHT LAWS AND OTHER LEGAL RIGHTS WORLDWIDE. THEIR USE, REPRODUCTION, AND TRANSMITTAL TO THIRD PARTIES WITHOUT EXPRESS WRITTEN PERMISSION MAY RESULT IN LEGAL PROCEEDINGS.

The furnishing of this manual to any party does not give that party or any third party any license to these patents, trademarks, copyrights or other intellectual property rights, except as expressly provided in any written agreement of ROSSLARE.

ROSSLARE reserves the right to revise and change this document at any time, without being obliged to announce such revisions or changes beforehand or after the fact.

# Table of Contents

- 1. Introduction..... 6**
- 1.1 Installation Kit..... 6
- 2. Technical Specifications ..... 7**
- 3. Installation ..... 8**
- 3.1 General ..... 8
- 3.1.1 1-Shaped Stand Bracket Side-Loaded ..... 9
- 3.1.2 L-Shaped Stand Bracket Top-Loaded ..... 9
- 3.2 Adjusting the Azimuth Angle of Antenna..... 10
- 4. Wiring..... 11**
- 5. Operation Instructions ..... 12**
- 6. UHF Reader Application..... 13**
- 6.1 Installing the Software ..... 13
- 6.2 Connecting the Reader ..... 15
- 6.3 Configuring the Reader..... 16
- 6.3.1 Tag Type ..... 16
- 6.3.2 Reader Power..... 16
- 6.3.3 RF Frequency..... 16
- 6.3.4 Data Output Setting ..... 16
- 6.3.5 Read Mode ..... 17
- 7. UHF Credential Programming..... 18**
- 7.1 Installing the Card Programming Software ..... 18
- 7.2 Programming a UHF Credential..... 20
- A. Declaration of Conformity..... 22**
- B. Limited Warranty ..... 23**

# List of Figures

Figure 1: Reader Components .....	8
Figure 2: Reader Fixing Mode .....	9
Figure 3: Antenna Angle Top View .....	10
Figure 4: Antenna Angle Side View .....	10
Figure 5: Interfaces .....	11
Figure 6: Wiring .....	11

# 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.
- The text, images and graphics contained in the manual are for the purpose of illustration and reference only.
- All data contained herein subject to change without prior notice.
- In no event shall manufacturer be liable for any special, direct, indirect, incidental, consequential, exemplary or punitive damages (including, without limitation, any and all damages from business interruption, loss of profits or revenue, cost of capital or loss of use of any property or capital or injury).
- 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-U910 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.

The AY-U910 series includes the following three models:

- AY-U910US: 902–928 MHz (America)
- AY-U910CH: 920–925 MHz (China)
- AY-U910EU: 865–868 MHz (Europe)

### **1.1 Installation Kit**

The AY-U910 package includes:

- 1 installation and user manual
- 1 AY-U910 reader
- 1 switching power supply: 12 VDC, 4 A
- 1 DB-15 with RS-232 cable
- 1 installation bracket kit

## 2. Technical Specifications

<b>Electrical Characteristics</b>	
<b>Operating Voltage Range</b>	12 VDC (4 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 (default) Wiegand 34-Bit
<b>Maximum Cable Distance</b>	150 m (500 ft)
<b>Frequency</b>	AY-U910US: 902–928 MHz (America) AY-U910CH: 920–925 MHz (China) AY-U910EU: 865–868 MHz (Europe)
<b>Modulation Type</b>	ASK
<b>Read Sensitivity</b>	Dual polarization read mode
<b>Cards and Tags</b>	<ul style="list-style-type: none"> <li>• Rosslare’s AT-T910 and AT-T911 cards</li> <li>• ISO18000-6B Tags</li> <li>• EPC GEN2 (ISO18000-6C) Tags</li> </ul>
<b>Environmental Characteristics</b>	
<b>Operating Temp. Range</b>	-20°C to 60°C (-4°F to 140°F)
<b>Operating Humidity Range</b>	0 to 95% (non-condensing) Suitable for outdoor use (IP 54)
<b>Physical Characteristics</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>	3.4 kg (7.5 lb)

\* Measured using a Rosslare proximity card or equivalent.

### 3. Installation



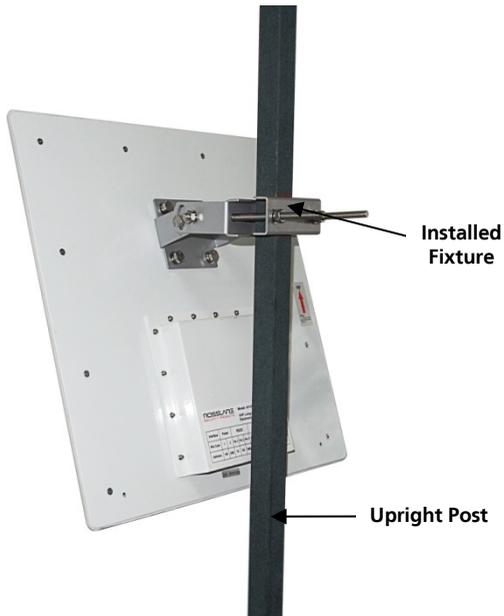
Note

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 1 shows the structure of the reader.

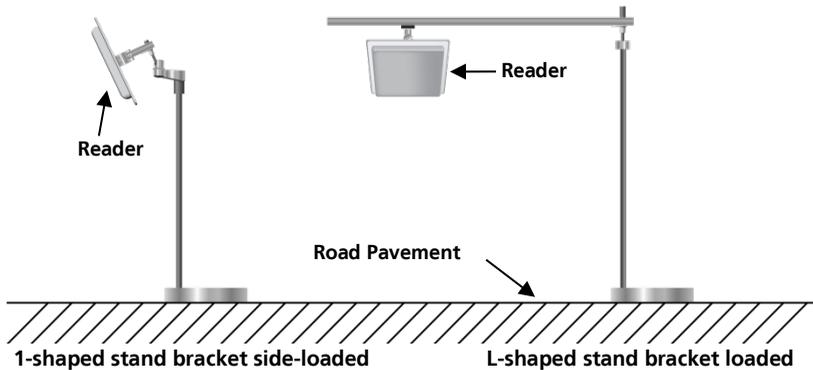
**Figure 1: Reader Components**



There are two ways to install the stand-bracket of the AY-U910 reader as shown in Figure 2:

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

**Figure 2: 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-U910 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-U910 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-U910 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-U910 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-U910 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-U910 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.

## Installation

### 3.2 Adjusting the Azimuth Angle of Antenna

The angle of inclination with the ground plane of the antenna should be approximately  $60^\circ$  to  $75^\circ$ , while the deviation angle of the antenna should be biased towards the lane direction (Figure 3).

Figure 3: Antenna Angle Top View

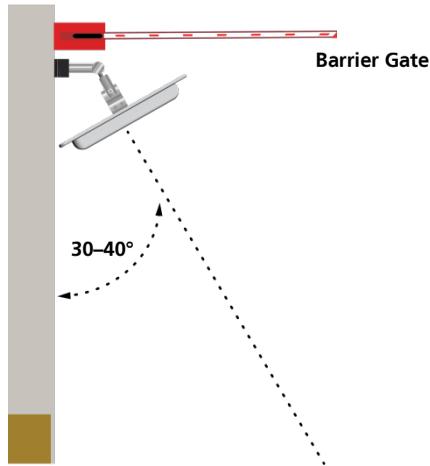
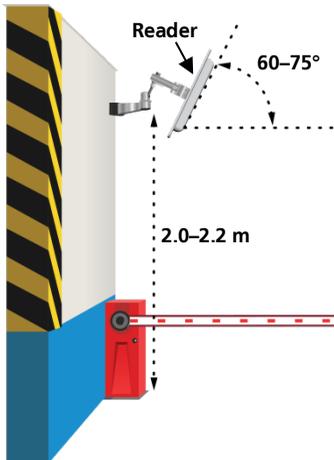


Figure 4: Antenna Angle Side View



## 4. Wiring

The unit has two interfaces (Figure 5):

- Power interface
- DB-15 interface

**Figure 5: Interfaces**

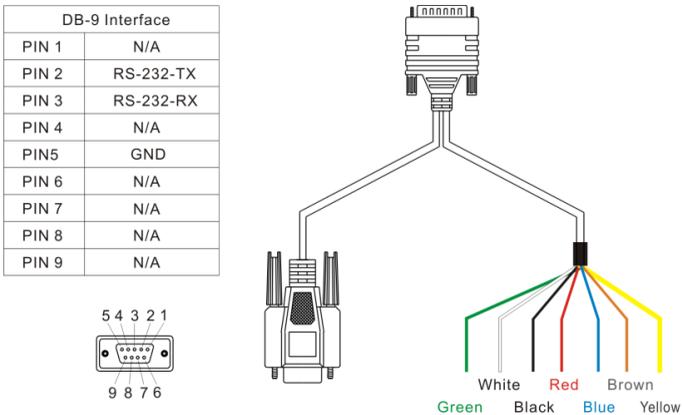


The unit operation voltage is 9–12 VDC, by an independent power supply connected to the 2-pin power interface.

The DB-15 with RS-232 cable serial connection is used to configure the reader through the included software (see Chapter 6).

The functions and wiring instructions for the interface are shown in Figure 6.

**Figure 6: Wiring**



Power		Interface	Wiegand		Trigger		RS-485		GND
+ -		PIN/Wire Color	Green	White	Red	Black	Brown	Yellow	Blue
9-12VDC	GND	Description	D0	D1	Trigger	GND	A+	B-	GND

# 5. Operation Instructions

After wiring the unit to a power supply and a controller (Wiegand output, D0, D1, GND), you should test the AY-U910 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. UHF Reader Application

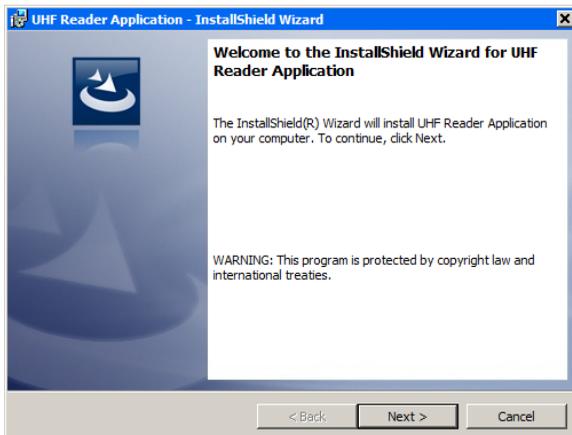
### 6.1 Installing the Software

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

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

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 screen to the UHF Reader Application setup opens.

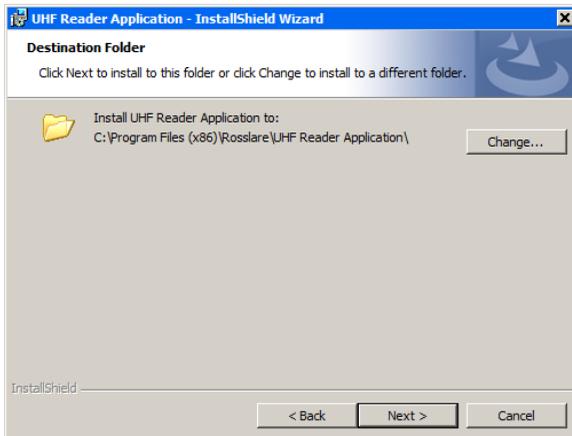


3. Click **Next**.

## UHF Reader Application

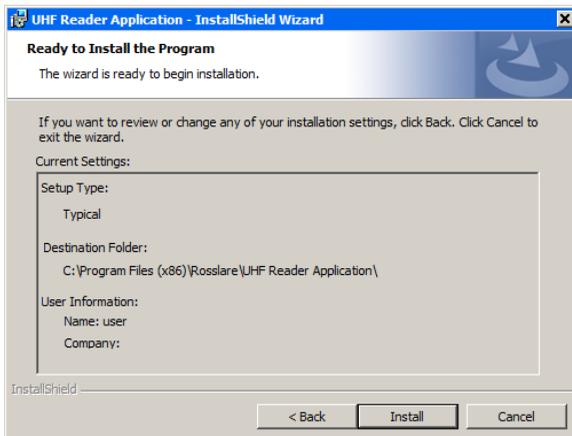
---

The *Select Installation Folder* screen opens.

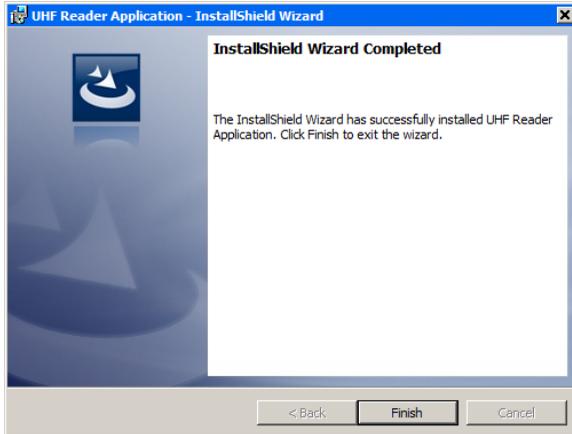


4. Select the required installation location by clicking **Change** or click **Next** to use the default destination.
5. Click **Next**.

The *Ready to Install Program* screen opens.



- Click **Install**. After a few moments, the *InstallShield Wizard Completed* screen opens.



- Click **Finish**.

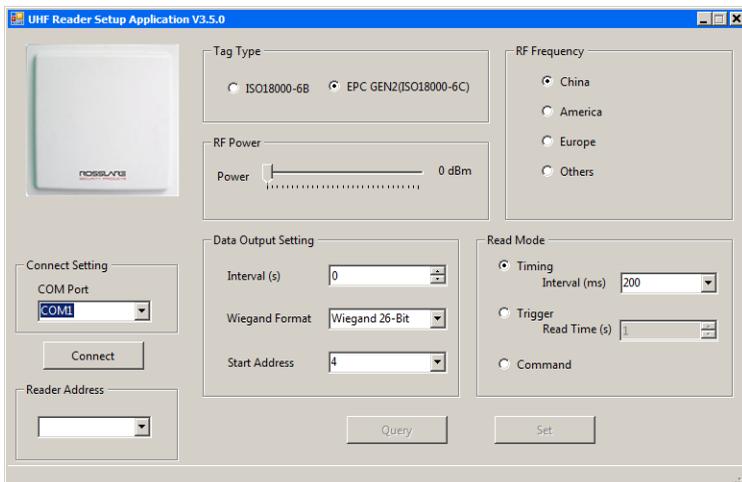
## 6.2 Connecting the Reader

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-U910:*

- Connect the UHF reader to the PC using a DB-15 with RS-232 with cable.
- Click the *UHF Reader Setup* icon on the desktop or select the program from the Rosslare folder in the **Start** menu.

The application opens.



## UHF Reader Application

---

3. From the *Card Reader Address* dropdown, select the .
4. From the *COM Port* dropdown, select the correct COM port.
5. Click **Connect**.

If the connection is successful, the software indicates on the bottom left of the screen that the connection was successful. The current parameters in the reader are displayed.



Clicking **Query** also displays the current parameters on the reader.

### 6.3 Configuring the Reader

Once you have connected to the reader, there are six sections in the software interface to be configured.

#### *To configure the reader:*

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

#### 6.3.1 Card Reader Address

From *Address* dropdown, select the reader address used for RS-232/RS-485 communication.

The range is 1 to 255.

#### 6.3.2 Tag Type

Select one of the two types of credentials:

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

#### 6.3.3 Reader Power

Move the slider to choose a power level between 0 and 30 dBm.

#### 6.3.4 RF Frequency

Select one of the three different regions – *China*, *America*, or *Europe* – or select *Others* and then select up to 50 various frequencies from the available checkboxes.

#### 6.3.5 Data Output Setting

There are three parameters in this part.

##### 6.3.5.1 Interval

Select the rate that the reader uploads credential information to controller. 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.

The default value is 1 and the range is 0 to 255.

### 6.3.5.2 Wiegand Format

Select either Wiegand 26-Bit or Wiegand 34-Bit.

### 6.3.5.3 Start Address

The Start Address is the address (or byte) from which the reader begins to read the UHF card to determine the output ID.

The default Start Address is 4 and the range is 0 to 9.

### 6.3.6 **Read Mode**

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

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

You can either select a value from the *Interval* dropdown or manually enter a value.

The default value is 200 and the range is 10 to 2550 and must be a multiple of 10.

**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 in Section 6.3.4.1. The reader stops after the indicated time as set in the

**Read Time** spin box.

The default value is 1 and the range is 0 to 255.

**Command Mode:** The AY-U910 must be set to Command mode when a data converter (MD-81) is connected between the AY-U910 and the controller in order to convert data to a Wiegand format (see the *MD-81 Hardware Installation Manual*).

# 7. UHF Credential Programming

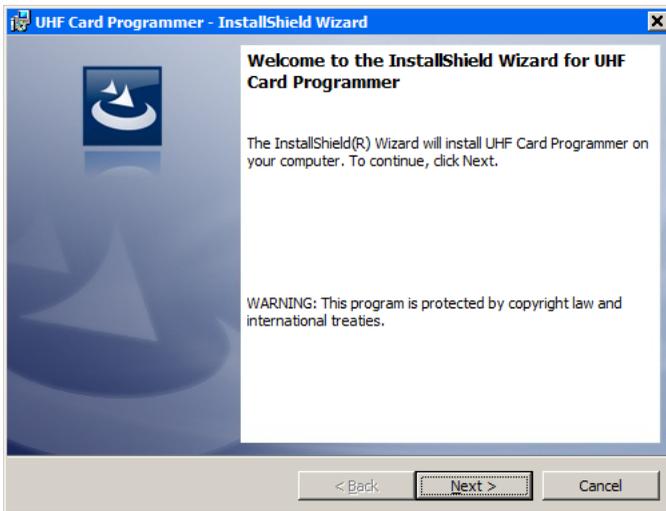
The AY-U910 can be used to program UHF credentials using the *UHF Card Programmer* application.

### 7.1 Installing the Card Programming Software

*To install the UHF Card Programmer software:*

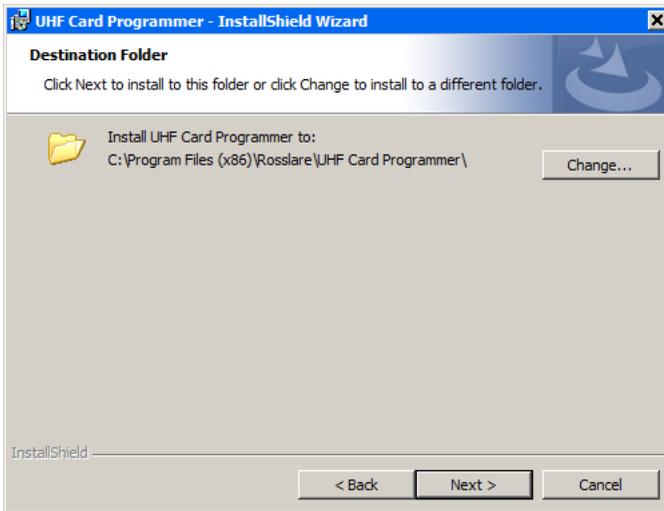
1. Download the installation setup file from the Rosslare site.
2. Double-click the setup file.

The installation package extracts the installation files. After the files are extracted, the welcome screen to the UHF Card Programming setup opens.



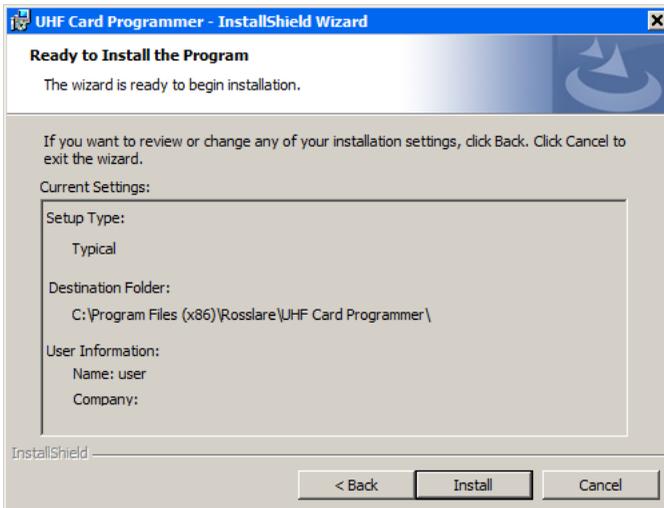
3. Click **Next**.

The *Destination Folder* screen opens.



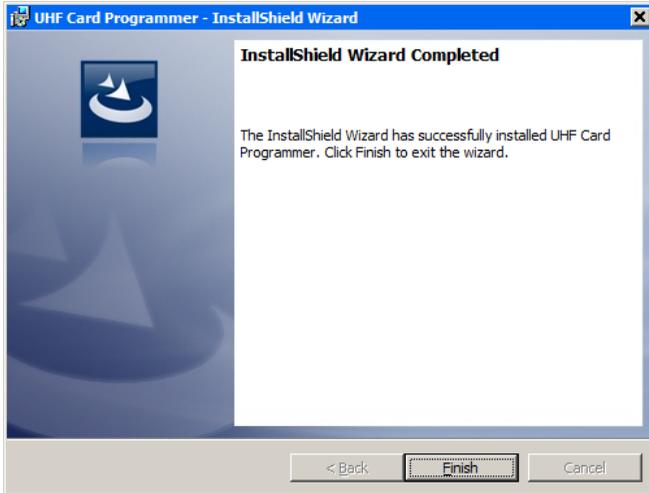
4. Select the required installation location by clicking **Change** or click **Next** to use the default destination.
5. Click **Next**.

The *Ready to Install Program* screen opens.



## UHF Credential Programming

- Click **Install**. After a few moments, the *InstallShield Wizard Completed* screen opens.

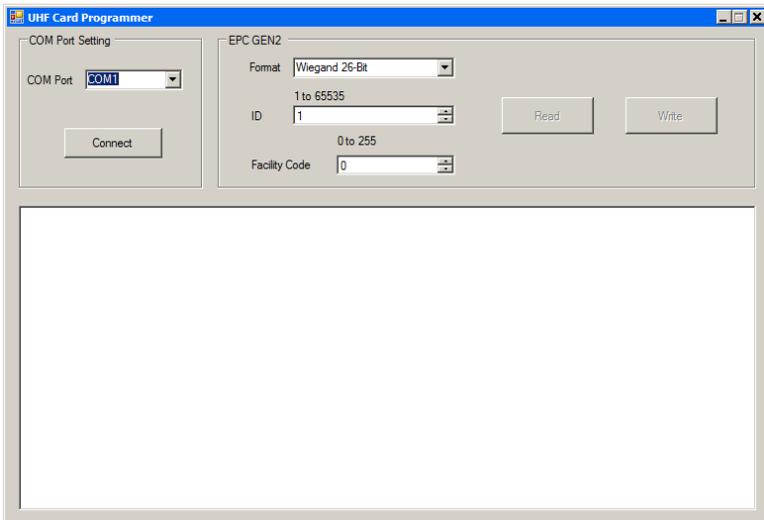


- Click **Finish**.

### 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 DB-15 with RS-232 cable.
2. Power on the reader.
3. From the *COM Port* dropdown, select the correct COM port.
4. Click **Connect** to connect the programmer via DB-15 with RS-232 cable.
5. If the connection is successful, the software displays a success message in the display area.
6. From the *Format* dropdown In *EPC GEN2*, choose the card ID format you want – Wiegand 26-Bit or Wiegand 34-Bit
7. In the **ID** spin box, enter the ID number you want to assign to the credential.  
For Wiegand 26, the card ID range is 1 to 65535. For Wiegand 34, the ID range is 1 to 4294967295.
8. For the Wiegand 26-Bit format, enter the Facility code value in the *Facility Code* spin box.  
The Facility Code range is 0 to 255.
9. Present the credential to the reader and click **Write**.  
If the credential is written successfully, the software displays a success message in the display area and the reader emits a beep. The Card ID in the programmer adds 1 automatically.  
If the credential is written unsuccessfully, the software displays a failure message 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 a success message followed by the card ID in the display area.  
If the credential is read unsuccessfully, the software displays a failure message in the display area.
3. When finished reading, click **Disconnect**.

### A. Declaration of Conformity

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

## B. 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-U910

### 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  
Tel: +54-11-4001-3104  
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



0706-0960606+02