# iCLASS SE U90 Reader User Guide

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## Revision History

| Date | Description | Version |
|---|---|---|
| 10/30/14 | Initial release. | A.1 |
| 10/10/14 | Beta release. | A.0 |

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# Contents

# 1 Overview

The iCLASS SE U90™ Reader is a long-range Ultra High Frequency (UHF) reader that supports all EPC Global Class 1, Gen 2 compliant credentials. Together with HID's multi-CLASS tri-technology UHF credential, the U90 is part of a complete Physical Access Control System (PACS) for gated or monitored parking applications.

## 1.1 Features

- Autonomously identifies the driver/vehicle for access privileges
- SE enabled reader applying state-of-the-art security to verify the identity using password access and HID's Secure Identity Object (SIO)
- Supports Security Industry Association (SIA) Wiegand communication standard, including Hold functionality
- Supports SIA OSDP communication standard, v2.1
- Includes 3 each dry relays for operating external audio and visual indicators. Rated 30VDC, 2A Resistive.
- Flexible configuration using Ethernet port and local web portal
- IP65 and UL294 outdoor ratings

## 1.2 Specifications

| Product | Base Part # | Input Voltage (VDC) | Current | | | Operating Temp | Cable Length | UL Ref # |
|---|---|---|---|---|---|---|---|---|
| | | | Standby AVG[1] | Max AVG[2] | Peak[3] | | | |
| U90 | RDRSEU90**8** (865MHz to 868MHz) | 12 VDC | 320mA | 400mA | 1.0 Amp | -30° to 150° F (-35° to 65° C) | Power Supply Lines<br>40 ft (30 m)- 22 AWG<br>100 ft (76 m)- 18 AWG<br>Communication Lines<br>Wiegand / Clock-and-Data<br>500 ft (152 m) - 22 AWG<br>RS-485<br>4,000 ft (1,219 m) - 24 AWG | U90A$x_1x_2x_3$ |
| | | 24 VDC | 160mA | 200mA | 0.5 Amp | | | |
| U90 | RDRSEU90**9** (902MHz to 928MHz) | 12 VDC | 320mA | 400mA | 1.0 Amp | -30° to 150° F (-35° to 65° C) | Power Supply Lines<br>40 ft (30 m)- 22 AWG<br>100 ft (76 m)- 18 AWG<br>Communication Lines<br>Wiegand / Clock-and-Data<br>500 ft (152 m) - 22 AWG<br>RS-485<br>4,000 ft (1,219 m) - 24 AWG | U90A$x_1x_2x_3$ |
| | | 24 VDC | 160mA | 200mA | 0.5 Amp | | | |

[1] Standby AVG - RMS current draw without a card in the RF field.
[2] Maximum AVG - RMS current draw during continuous card reads. Not evaluated by UL.
[3] Peak - highest instantaneous current draw during RF communication.

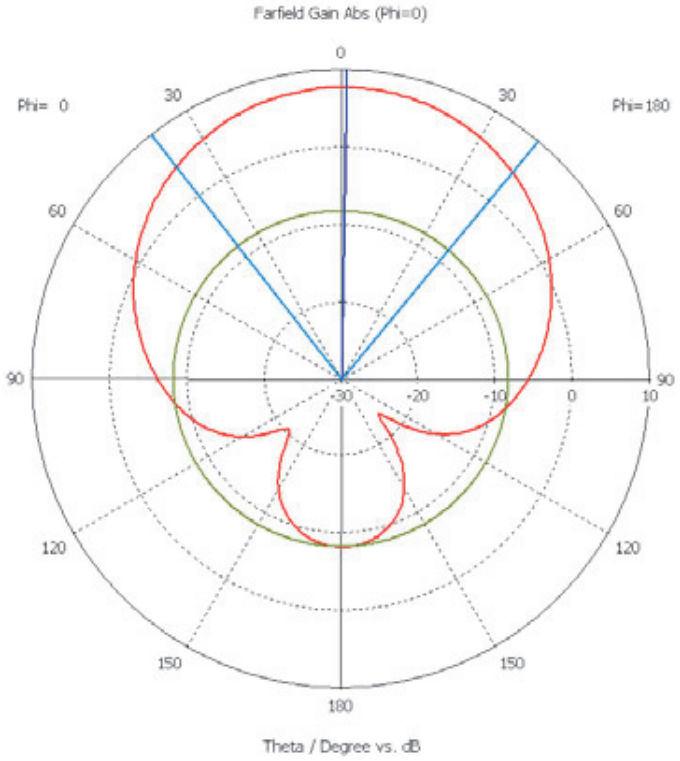
UL Reference Number Deciphering
$x_1$ Reader Colors: K = Black
$x_2$ Wiring: T = Terminal
$x_3$ Communications: N = No Module

# 2 Planning

## 2.1 Installation Planning

- By design, the reader has a directional radiation pattern where power and sensitivity are maximized between 3m to 5m along the front axis of the reader and are minimized behind and to the sides of the reader.

**Top View of Antenna Radiation Pattern**




- The front radiation lobe is still pretty wide and there is a small radiation lobe at the back of the reader
- Many surfaces including concrete, glass, and metal will reflect radiated energy which can have the effect of boosting power or sensitivity along any number of axes
- The combination of the characteristics listed above lead to the following ideal installation environment

**Ideal Installation Environment**

- Reader is suspended between 6and 8feet off the ground centered along the lane
- There is no reflecting surface behind the reader
- Reader is positioned either above or slightly ahead of the gate controller (when one exists)
- Reader is angled down approximately 20 degrees from the horizontal
- Power and sensitivity are adjusted to result in 3m to 5m of range with an HID multi-CLASS tri-technology card mounted in a vehicle windshield (see section 6)

- The ideal installation environment described above is intended to ensure that the reader does not read a vehicle in an adjacent lane or read vehicles that are behind a vehicle sitting at the gate
- It is also intended to result in an experience where the driver can go through a gate at a rolling stop instead of coming to a full stop
- If the reader must be mounted on a wall, it should be extended as far away from the wall as is practical.
- If the reader must be located along the side of a lane, then angle the reader as appropriate (see lane drawing).
- Avoid mounting two readers too close back to back, as shown in *Section 2.1.1.2: Lane Configuration*. This could result in one reader interfering with the other.

### 2.1.1 Location

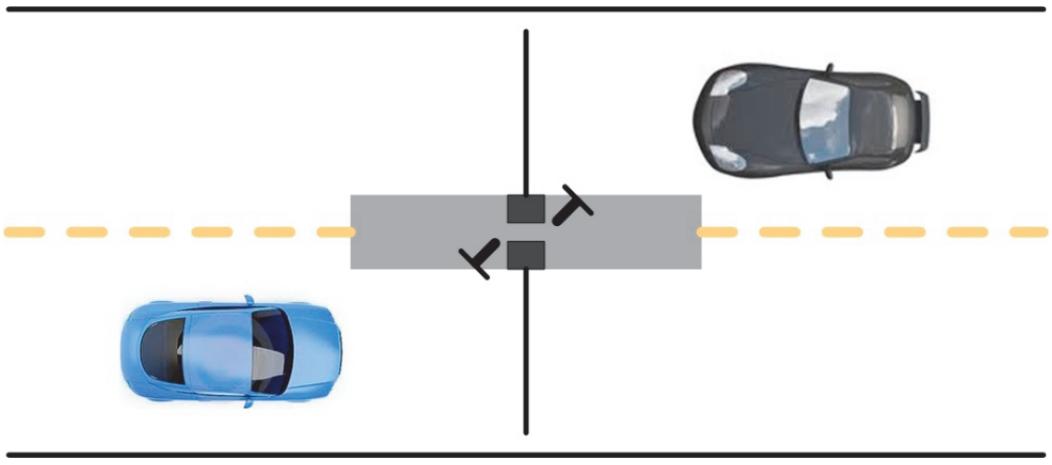
There are many items that need to be taken into consideration and planned out in detail, before the installation will take place. The following sections cover each item.

#### 2.1.1.1 Environment (garage, gates, etc.)

- Where will the reader be required to be installed?
- What items could cause interference?
- Exposed to weather
- Obstruction free area

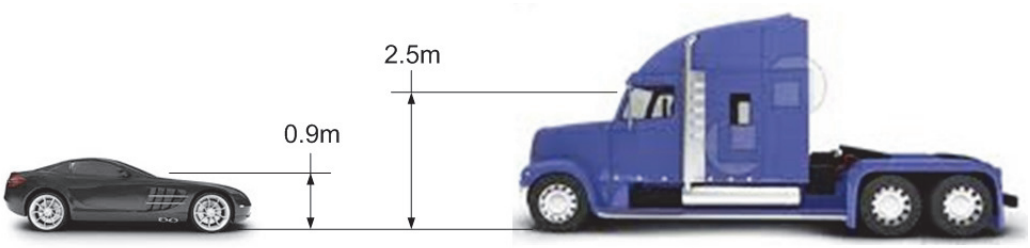
#### 2.1.1.2 Lane Configuration

There are many possible lane configurations that can be considered. One Possible lane configuration is shown below:



### 2.1.1.3 Car Heights

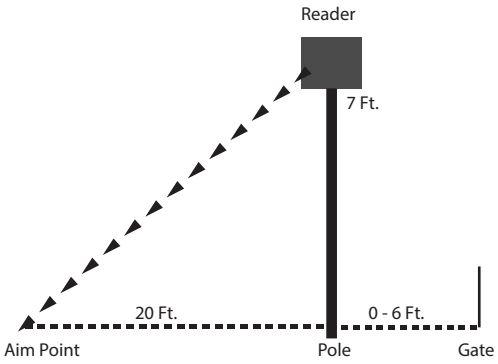
There are many possible car heights that need to be taken into consideration:




### 2.1.1.4 Mounting Type

The reader will need to be installed at a optimal hight and angle to read the cards properly.

- Wall
- Post




### 2.1.1.5 Interference (objects/radio/lights)

An obstruction free area is required for optimal performance.

## 2.1.2 Tools Needed

- Ladder
- Ethernet cable
- Drill
- Scissors
- Laptop with Ethernet connector
- Ethernet cable (to connect from the laptop to the reader)

# 3 Physical Installation

Once an installation plan has been defined, the following installation can begin.

## 3.1 Reader Position

Reader is positioned within 2 meters (~6 feet) of the access gate. Distances greater than this could allow a vehicle to be positioned past the reader's RF field and therefore the tag can not be read. Positioning the reader at or behind the gate will affect the perceived read range and driving habits. The reader is intended to have a 3 to 5 meter read range measured from the reader to the tag. The typical type and size of vehicle as well as the credential location with respect to the front bumper should be considered when positioning the reader.

The reader should be positioned 1.8 to 2.4 meters (6 to 8 feet) above the lane when space permits. This height provides excellent performance in open air applications with a mix of cars and full-size trucks.

The reader should be positioned near the edge of the vehicle lane but located such that it cannot be struck by passing vehicles. The reader can be mounted to a flat surface or post. A typical mounting post is the PS094-AVIB from The Housing Company and allows for additional adjustments to reader position through the curved design.

The use of an adjustable mounting bracket is recommended. Mounts are commercially available for flat surfaces and round posts:

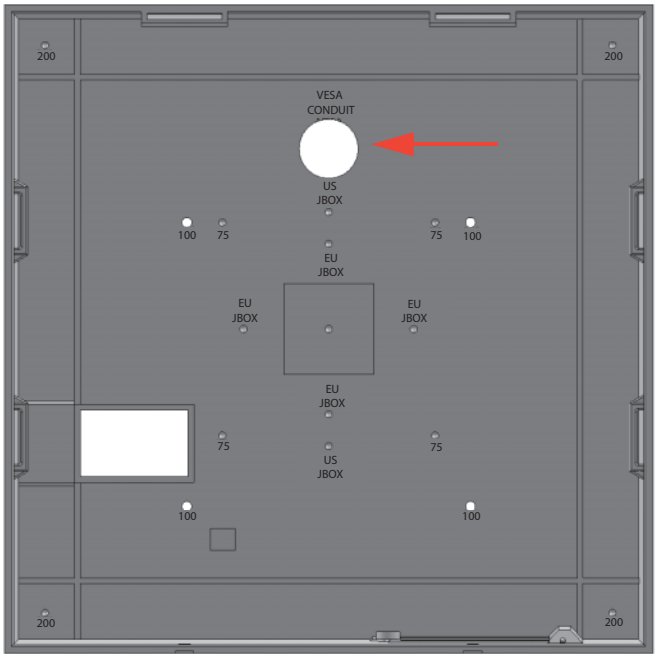
- The reader mounting box has drill points integrated for Video Electronics Standards Association (VESA) style brackets on 75mm, 100mm, and 200mm centers. Mounts of this type are available from many manufacturers and provide adequate articulation for reader aiming.

- For mounting to a round post, an AVI Clamp from The Housing Company or similar style mount has been successfully implemented in the field during product testing. The mounting box can be drilled as required to mate to the mount as it may not provide VESA mounting hole locations.

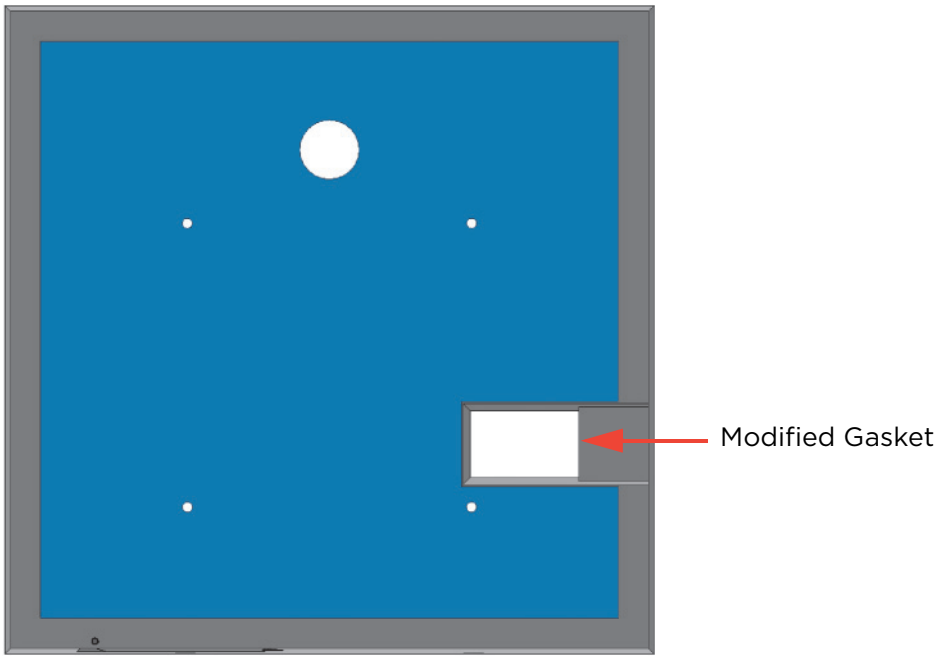
## 3.2 Installation to the Mounting Surface

**Note:** Many of the steps below can be done before going to the installation site.

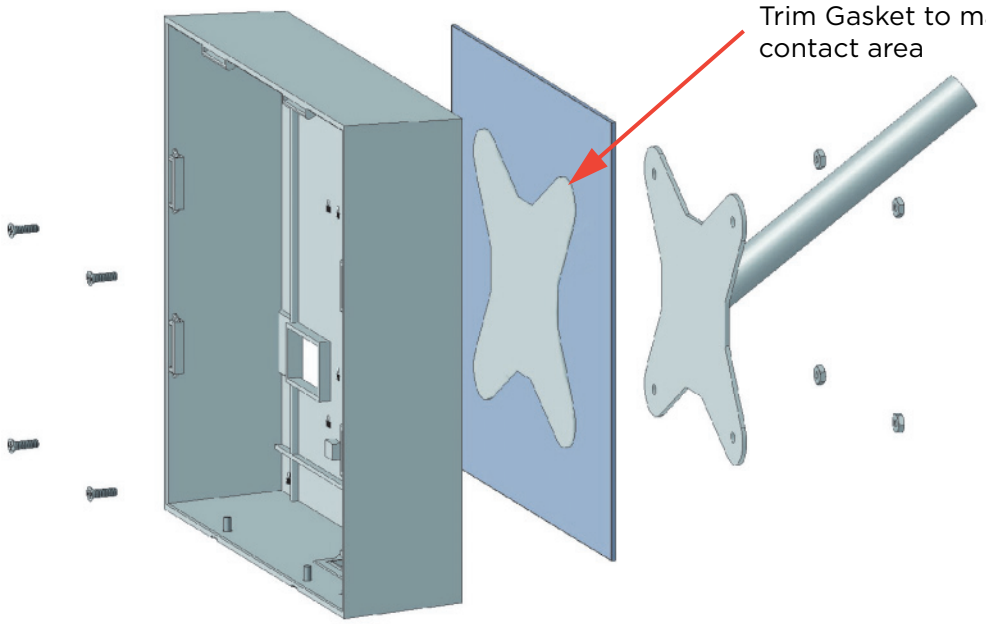
1. Remove the reader from the backbox.
2. Mounting holes need to be drilled in the back plate to mate with the mount selected for the site. **Note:** Basic holes are marked and labeled.
3. Drill the hole for the conduit, identified below.
   **Note:** The conduit nut is intended to create an airtight and water tight seal to the outside elements.



4. The gasket must be modified to match the holes created on this backbox. At a minimum the gasket must not cover the square opening shown below.
   **Note:** This is done with scissors.




5. It is recommended that the gasket be modified to match the area between the mount and the box, to create a seal against the elements (example below). Attach the backbox with the gasket to the mount with the 4 screws provided as shown below.



## 3.3 Wiring

After the cable is brought through the backbox (conduit hole) and connected to the reader the hole must be sealed with RTV silicone to weatherproof the reader.

**Note:** We recommend the use of liquid tight conduit and fittings. RTV silicone can also be used an alternative.



**ATTENTION**
Observe precautions for handling
ELECTROSTATIC SENSITIVE DEVICES

| Terminal | Description | Terminal | Description | Terminal | Description |
|---|---|---|---|---|---|
| P1-1 | Beeper Input (BEEP) | P2-1 | GPIO4 (RS485-Y / TXA) | P3-1 | Functional Earth Ground (symbol) |
| P1-2 | LED Input (GRN) | P2-2 | GPIO3 (RS485-Z / TXB) | P3-2 | Normally Closed (NC) - Relay 1 |
| P1-3 | Ground (GND) | P2-3 | **Wiegand Data 0 / Data (DATA0/DATA) | P3-3 | Common (COM) - Relay 1 |
| P1-4 | +VDC | P2-4 | **Wiegand Data 1 / Clock (DATA1/CLK) | P3-4 | Normally Open (NO) - Relay 1 |
| P1-5 | Unused (DRAIN) | P2-5 | *Open Collector Output / Tamper (OC/TMPR) | P3-5 | Normally Closed (NC) - Relay 2 |
| P1-6 | LED Input (RED) | P2-6 | GPIO2 (RS232-R / RS485-RXB) | P3-6 | Common (COM) - Relay 2 |
| P1-7 | Hold Input (HOLD) | P2-7 | GPIO1 (RS232-T / RS485-RXA) | P3-7 | Normally Open (NO) - Relay 2 |
| | | | | P3-8 | Normally Closed (NC) - Relay 3 |
| | | | | P3-9 | Common (COM) - Relay 3 |
| | | | | P3-10 | Normally Open (NO) - Relay 3 |

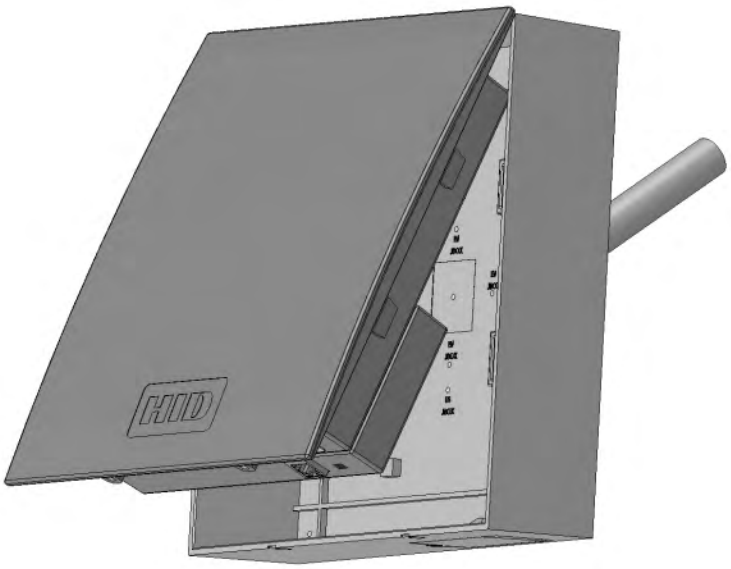
* Tamper Output - When activated, output synchronizes to ground (default).

** Dependent upon reader configuration. See the HTOG for Wiegand and Clock-in-Data configurations.

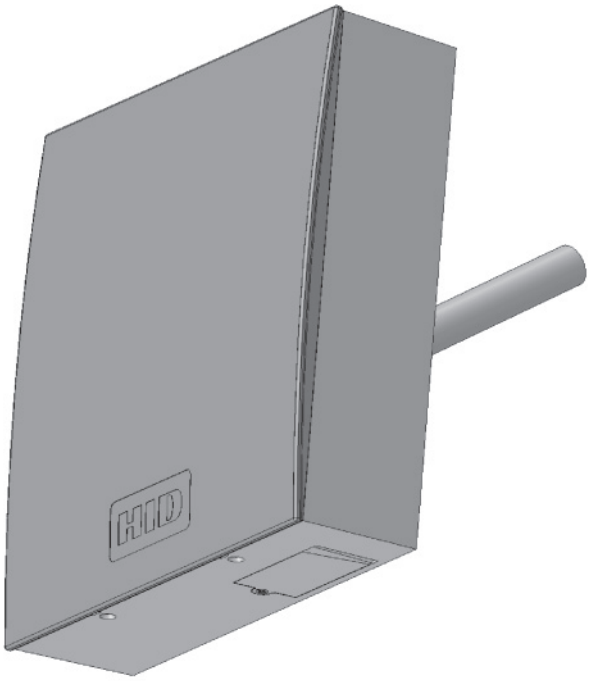
**OSDP:** GPIO1 and GPIO2 are RE-485 lines that carry OSDP messages. GPIO3 and GPIO4 are an auxiliary input and output respectively, which can be monitored/controlled via OSDP.

## 3.4 Installing the Reader to the Backbox

1. Install the reader to the backbox. It is hinged on the top and should fit snugly at the bottom.
   **Note:** The sides of the Reader will snap as the features align.



2. Use the 2 screws that were removed earlier to secure at the bottom of the assembled piece.



## 3.5 Initial Aiming

The Reeder should be aimed at a point in the center of the vehicle lane 6meters (20 feet) from the reader. This will result in approximately a 20° downward angle. This setting will work in most applications. Fine adjustments can be made during performance testing.

## 3.6 Installation Examples

The following is an example of a U90 installation.

# 4 U90 Reader Management Configuration

The U90 Reader Management GUI is provided for configuration of the U90 Reader. The following is the instructions for this process.

## 4.1 Preparation

Before configuring the reader the following items are required.

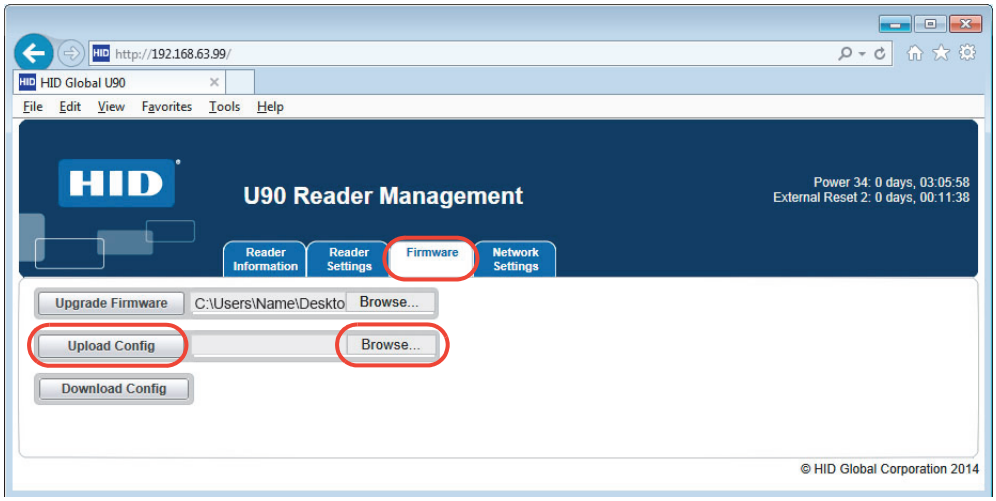
- Laptop with an Ethernet connector
- Required files for configuration (firmware updates, configuration files) loaded on the laptop
- Ethernet cable for connection between laptop and Reader (adequate length to reach reader)

## 4.2 Configuration

1. The reader must be installed and powered up.
2. Connect an Ethernet cable from a laptop to the U90 reader (located on the bottom of the unit under the access door).
3. Enter the following IP address on a web browser: **192.168.63.99**.
4. The U90 Reader Management GUI will display.
5. Login to the U90 Reader Management application. See *Section 4.5: Login Window* for more information.

## 4.3 Update Firmware

1. After the user has completed section 4.1 and 4.2 above.
2. Select the **Firmware** tab.
3. Click **Browse** and locate the firmware file.
4. Click **Upgrade Firmware**.




5. The firmware will update, and the Login window will appear. Verify the Firmware Version displays the correct updated version. See *Section 4.5: Login Window*.

## 4.4 General Information

As field values are modified, the color of the field name will change from black to the following:

Green: Indicates the field has been modified to an acceptable value, but has not been saved.

Red: Indicates that the field has been modified to a value that is out of range or not acceptable.

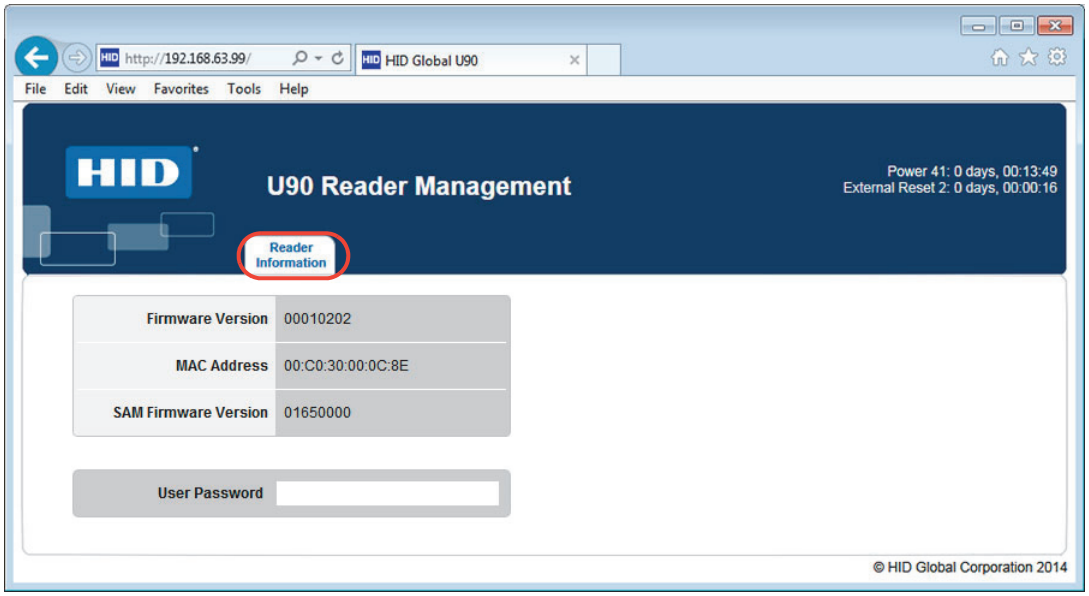
Blue: Indicates that the value has not been accepted yet, or that the U90 Reader Management has lost communication with the reader.

## 4.5 Login Window

The Login window allows the user to view the basic Reader Information and to log into the U90 Reader Management configuration GUI.

Default login: **u90pwd**

**Note:** This password should be changed as soon as possible for security reasons. See *Section 4.7: Reader Information Tab* for information on this process.

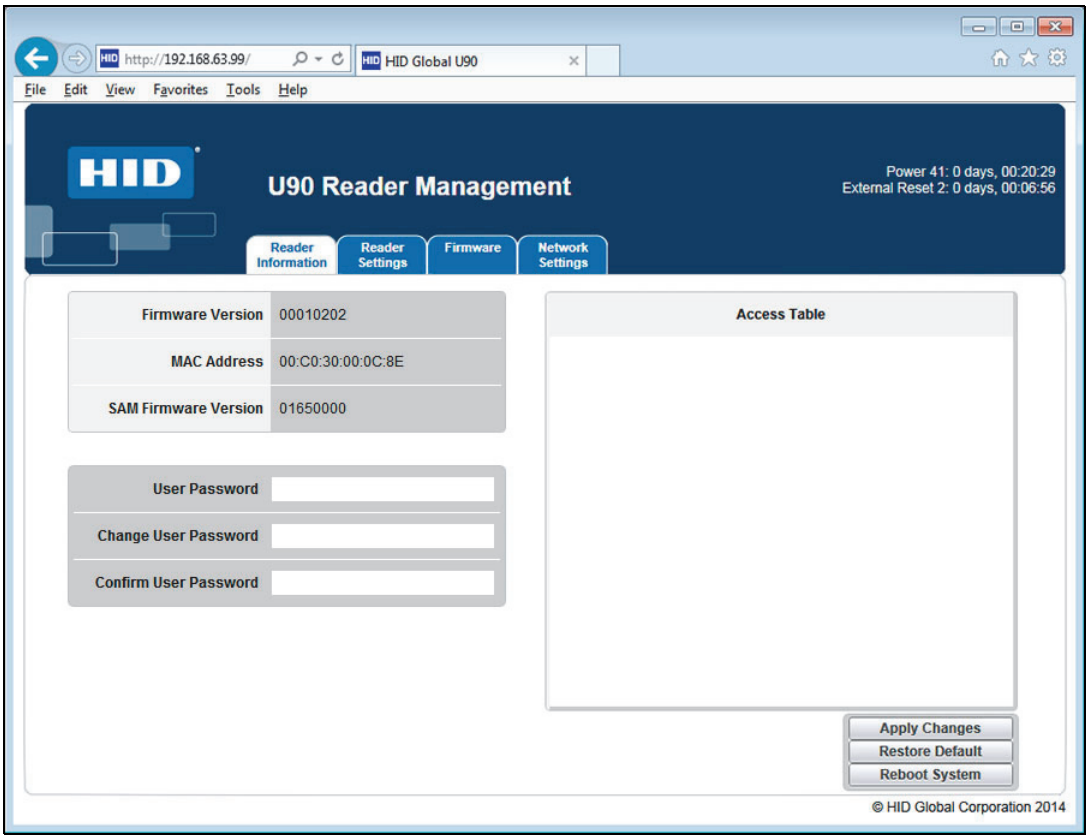



**Note:** If this GUI is inactive for more than a few minutes, the user will be automatically logged out and returned to this Login window.

## 4.6 Main Window

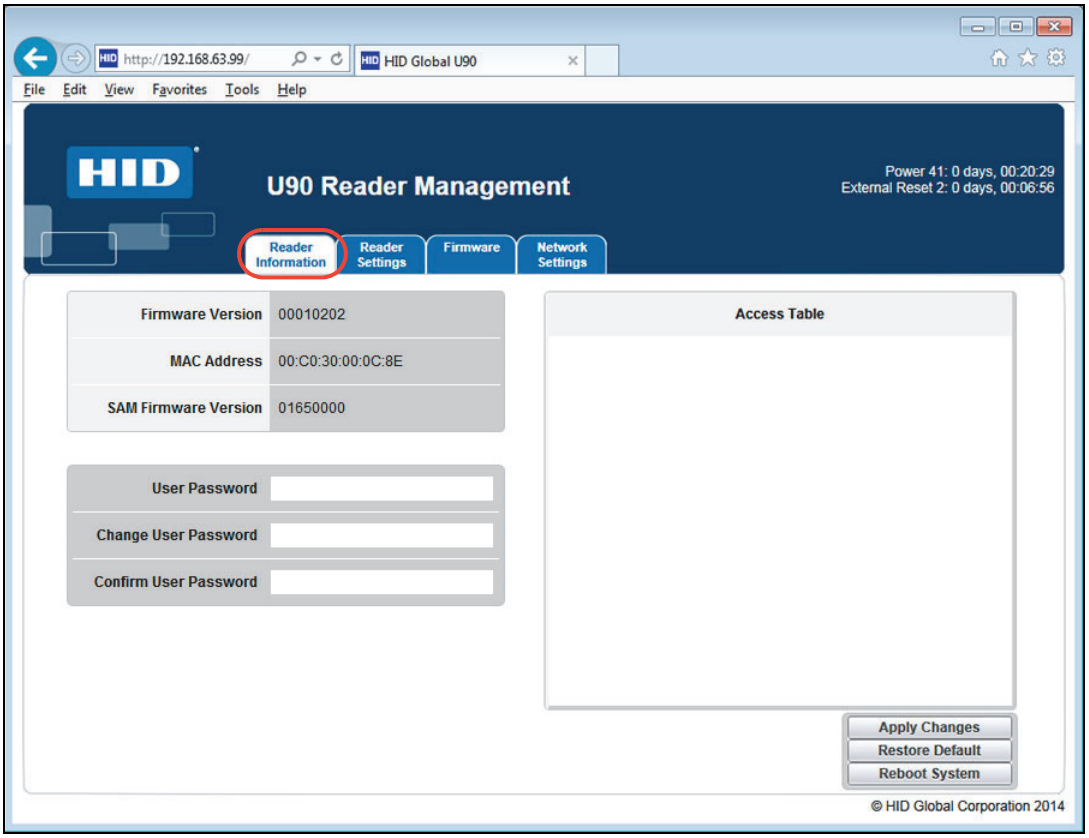
The U90 Reader Management GUI consists of the following tabbed Sections:
**Note:** The following are links to the sections in this guide.

- **Reader Information Tab**
- **Reader Settings Tab**
  - **Comms Tab**
  - **I/O Tab**
  - **Region/Tuning Tab**
  - **OSDP**
- **Firmware Tab**
- **Network Settings Tab**



## 4.7 Reader Information Tab

The Reader Information tab provides basic reader information such as firmware versions and a table of any tags within the readers field.




| Field | Description |
|---|---|
| **Firmware Version** | Displays the current core firmware version running on this unit. |
| **MAC Address** | Displays the MAC address of this unit. |
| **SAM Firmware Version** | Displays the current Secure Application Module (SAM) firmware version. |
| **User Password**<br>**Change User Password** | This field allows the user to change the User Password. The user will enter the new password (twice). |
| **Access Table** | Displays the access tags that have been read by the Reader. Tags will be removed from the table when the Grant Access APB time has expired on the specific tag. |
| **Apply Changes** | The Apply Changes button will apply any of the changes that have been made to the configuration (fields will be green) and save them to the configuration. Once saved the green fields should turn back to black. |
| **Restore Default** | The Restore Defaults button will reset the reader configuration back to the factory default settings. |
| **Reboot System** | The Reboot System will initiate a soft reset of the U90 reader. |

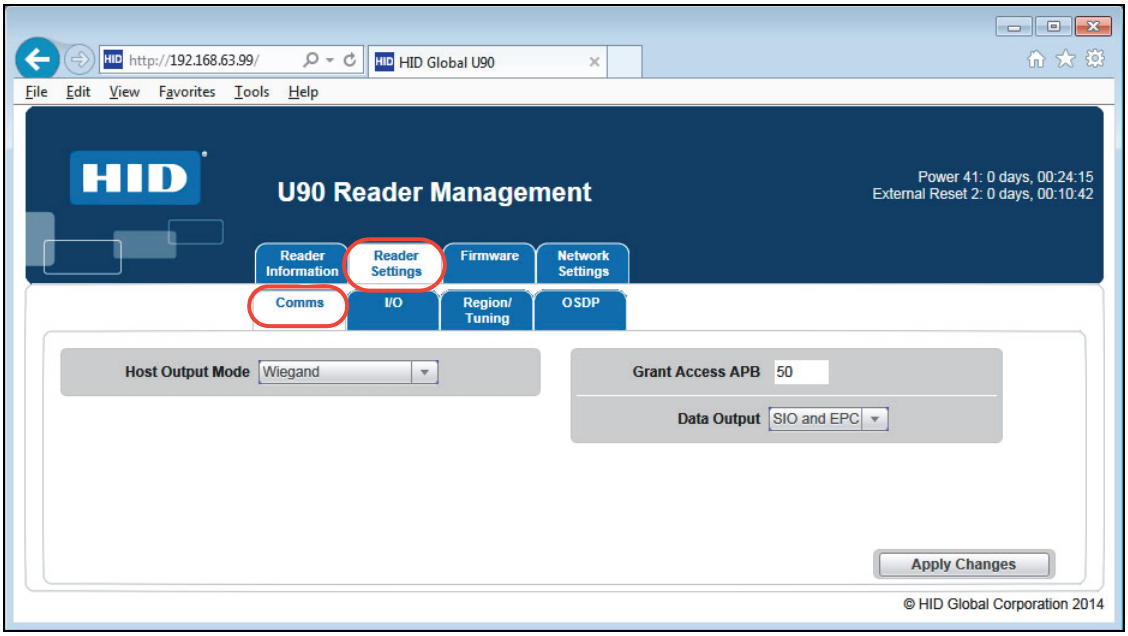
## 4.8 Reader Settings Tab

The Reader Settings tab provides all available settings for the configuration of the reader. The settings consist of configuration for communications, I/O, Region/Tuning, and OSDP.

**Note:** This tab has many sub tabs that will require configuration by the customer.

### 4.8.1 Comms Tab

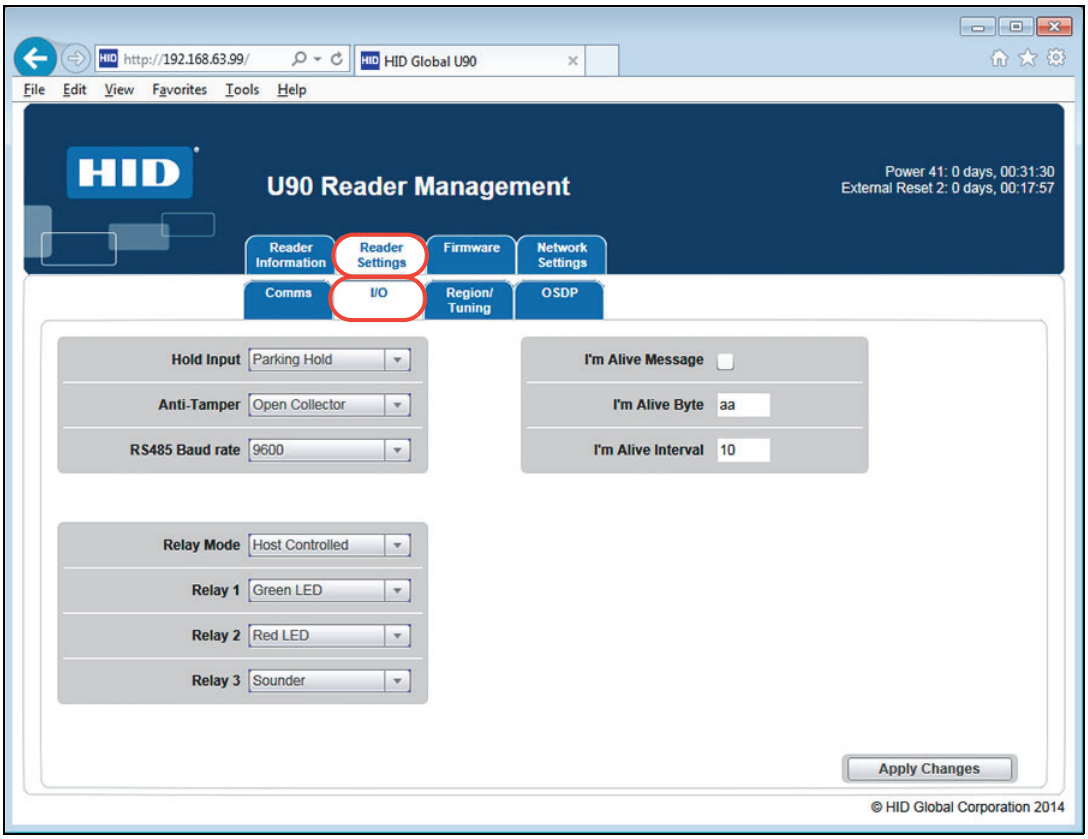
The Comms (Communication) tab is configurable for either Wiegand or Clock and Data communication. This communication must meet the requirements of the PACS.




| Field | Description |
|---|---|
| **Host Output Mode** | Sets the Host Output mode.<br>• Wiegand (Default)<br>• Clock & Data |
| **Grant Access APB** | Set the Anti-Passback for n polling. Range: 0-255. Default: 50.<br>**Note:** The reader will only send data to the PACS once for the period of time that the tag is read plus the time defined in this field. A tag that leaves and re-enters the field while APB is still active will not be reported and will reset the timer to the defined value. All tags that have been read and are active in the APB timer will be displayed in the *Access Table* on the *Reader Information* tab. |
| **Data Output** | • SIO and EPC (Default)<br>• SIO Only<br>• EPC Only |
| **Apply Changes** | The Apply Changes button will apply any of the changes that have been made to the configuration (fields will be green) and save them to the configuration. Once saved the green fields should turn back to black. |

## 4.9 I/O Tab

The I/O tab is used for optional settings such as anti-tamper, external relays, and I'm alive signal.

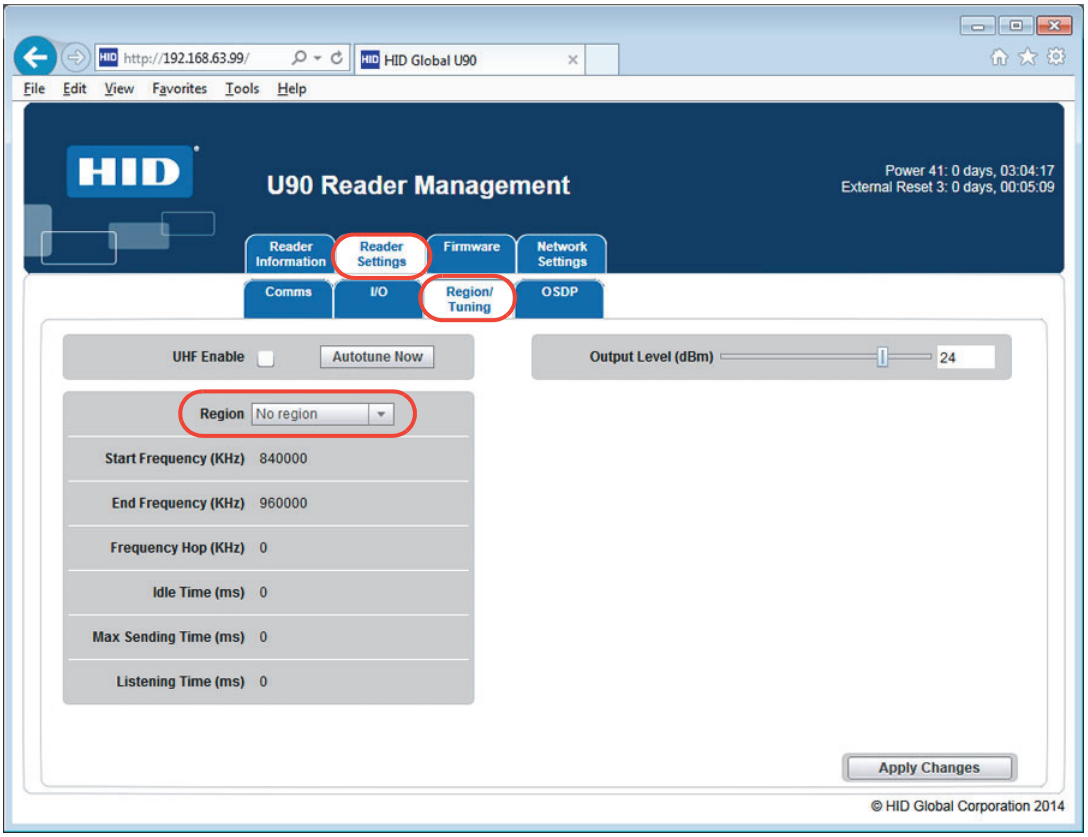



| Field | Description |
|---|---|
| **Hold Input** | The reader allows for a hold feature to be used. When hold is active, the reader will not report data.<br>• **No Hold** - Reader will continuously poll and report data per the Grant Access settings.<br>• **Parking Hold** (Default) - Reader will not poll and therefore not report tag data unless the hold line is high (Released).<br>• **Wiegand Hold** - Reader will continuously poll, but only report tag data over the communication lines when the hold line is high (Released). |
| **Anti-Tamper** | The selection of the following option, depends on how this device is used.<br>• **No Tamper**<br>• **Open Collector (Default)**<br>• **OSDP Message**<br>• **Invert "I'm Alive"** |

| Field | Description |
|---|---|
| **RS485 Baud Rate** | Set this field based on the panel requirements.<br>• **9600 (Default)**<br>• **19200**<br>• **38400**<br>• **57600**<br>• **115200** |
| **Relay Mode** | There are three (3) relays used for visual and audible indicators.<br>• **Reader Controlled** - The relays will trigger based on the readers output.<br>• **Host Controlled** - The relays will trigger based on the input lines from the PACS. The relays can perform any function related to audio or visual indicators. The terminal and drop-down labels represent typical use cases.<br>**Important: The relays must not be used for access control.** |
| **Relay (1, 2 and 3)** | Sets the LED indicators for each of the relays. Customer will set as needed.<br>• **None** - Relay will not trigger.<br>• **Green LED** - The relay will either trigger on an input on the GRN terminal pin (Host Controlled), or when the diagnostic LED is green (Reader Controlled), indicating an SIO has been read.<br>• **Red LED** - The relay will either trigger on an input on the RED terminal pin (Host Controlled), or when the diagnostic LED is red (Reader Controlled).<br>• **Blue LED** - The relay will trigger when the diagnostic LED is blue (Reader Controlled), indicating an EPC has been read.<br>• **Sounder** - The relay will trigger on an input on the BEEP terminal (Host Controlled). |
| **I'm Alive Message** | Select this option to enable I'm alive messaging. |
| **I'm Alive Byte** | Default: aa. |
| **I'm Alive Interval** | I'm Alive interval in units of 100ms. Range: 0 - 65535. Default: 10. |
| **Apply Changes** | The Apply Changes button will apply any of the changes that have been made to the configuration (fields will be green) and save them to the configuration. Once saved the green fields should turn back to black. |

### 4.9.1 Region/Tuning Tab

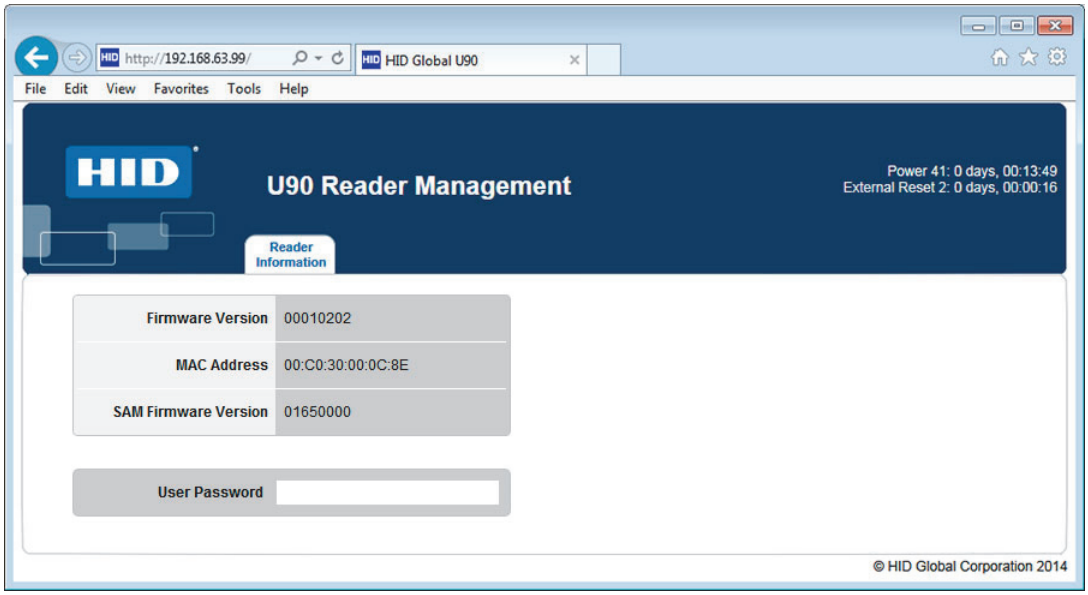
The Region/Tuning tab is used to set the RF field for distinct regions, adjust power output level, tuning, and turning the RF field on/off.



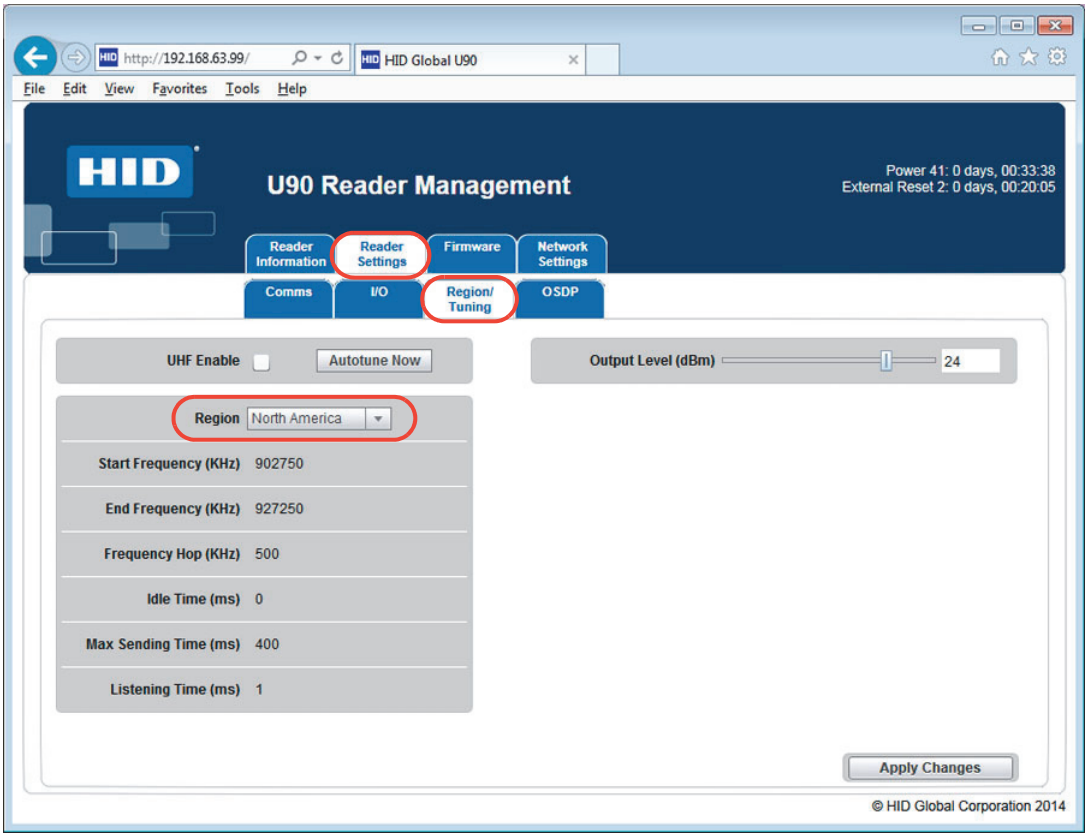

| Field | Description |
|---|---|
| **UHF Enable** | Select this option to enable UHF.<br>**Note:** The reader must have a region properly configured before the UHF field can be enabled. |
| **Region** | The region pull-down menu, has the following options:<br>No region, Europe, USA, Brazil, India and China. Default is No region.<br>Select the region that applies to the site location.<br>**Note:** All changes that have not been saved (with *Apply Changes*) will be lost when the region is applied. If unsure of the appropriate region, please contact HID technical support. See *Section 4.9.1.1: Region Groups* for information on the countries supported in each Region. |
| **Start Frequency (KHz)** | The fields will display the settings for the region selected. |
| **End Frequency (KHz)** | |
| **Frequency Hop (KHz)** | |
| **Idle Time (ms)** | |
| **Max Sending Time (ms)** | |
| **Listening Time (ms)** | |

| Field | Description |
|---|---|
| **UHF Autotune Enable** | When this option is enabled, the reader will automatically autotune the antenna circuit each time the power is cycled on.<br>It is recommended that the customer not change this field from the default setting. **Note:** It is not required for most installation environments. |
| **Autotune Now** | This option will immediately run the autotune function. The diagnostic LED is blue while Reader is Autotunning, and Red when Complete.<br>**Note:** UHF Autotune Enable must be selected to use this option. |
| **Output Level** | Set the output level (the customer will need to set/adjust this field).<br>Range: 2 - 30 by 2dBm steps. Default: 24. **Note:** 30 dBm = 1 watt<br>**Note:** The output level is used to adjust the RF field strength. When setting the output level, it is recommended that the installer begins with 24dBm. An increase in power will increase the read range for a tag but also increase the possibility of inadvertent reads from tailing vehicles, vehicles passing through adjacent gates, or tag reflections. Installer must test these conditions and ensure proper function through output level. |
| **Receiver Sensitivity** | Range 48 - 90. Default: 88. Recommended the customer not change this field. |
| **Apply Changes** | The Apply Changes button will apply any of the changes that have been made to the configuration (fields will be green) and save them to the configuration. Once saved the green fields should turn back to black. |

Once a region has been entered, the system will reset and the window will return to the home screen. The user will need to enter a password again to enter the application.



The **Reader Settings >Region/Tunning** window will now display the region entered., and the associated settings for that region.



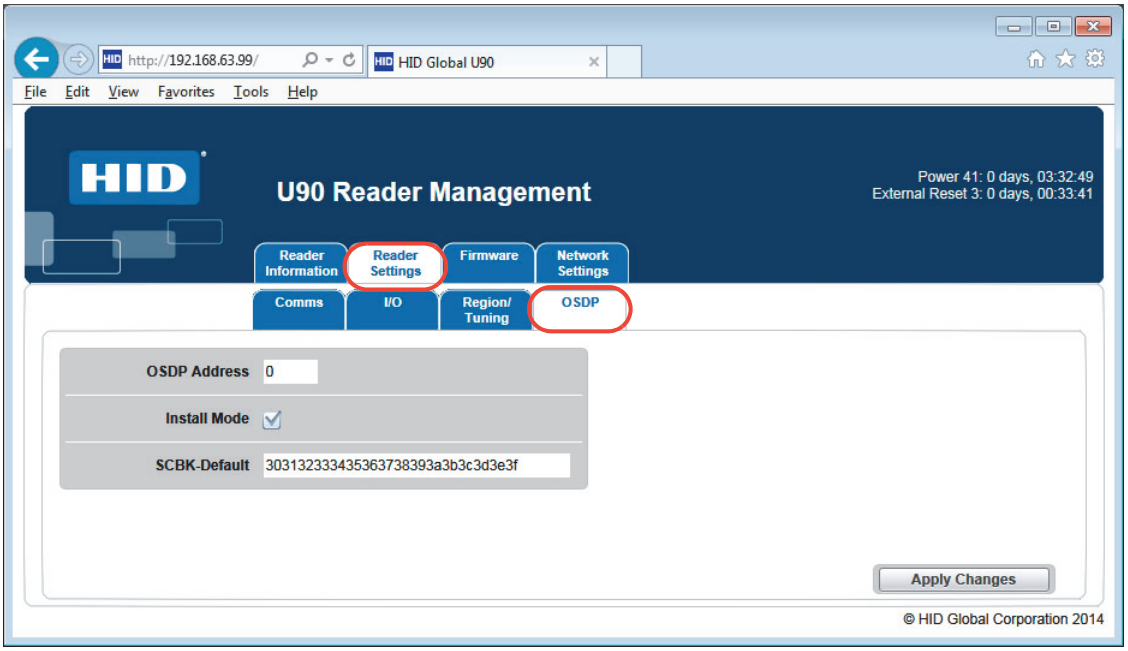
#### 4.9.1.1 Region Groups

The following countries are supported by the U90. To set the region for the correct Country, select the Region for the associated Country from the drop-down menu.

| Country | Region |
|---|---|
| Austria | Europe |
| Belgium | Europe |
| Brazil | Brazil |
| Bulgaria | Europe |
| Canada | North America |
| China | China |
| Croatia | Europe |
| Cyprus | Europe |
| Czech Republic | Europe |
| Denmark | Europe |
| Estonia | Europe |
| Finland | Europe |
| France | Europe |
| Germany | Europe |
| Greece | Europe |
| Hungary | Europe |
| India | India |
| Ireland | Europe |
| Italy | Europe |
| Latvia | Europe |
| Lithuania | Europe |
| Luxembourg | Europe |
| Malta | Europe |
| Mexico | North America |
| Netherlands | Europe |
| Poland | Europe |
| Portugal | Europe |
| Romania | Europe |
| Slovakia | Europe |
| Slovenia | Europe |
| Spain | Europe |
| Sweden | Europe |
| United Arab Emirates | United Arab Emirates |
| United Kingdom | Europe |
| United States | North America |

### 4.9.2 OSDP

The OSDP tab allows the configuration of Open Supervised Device Protocol. See the SIA OSDP Specification, V2.1.6 for detailed information on OSDP.

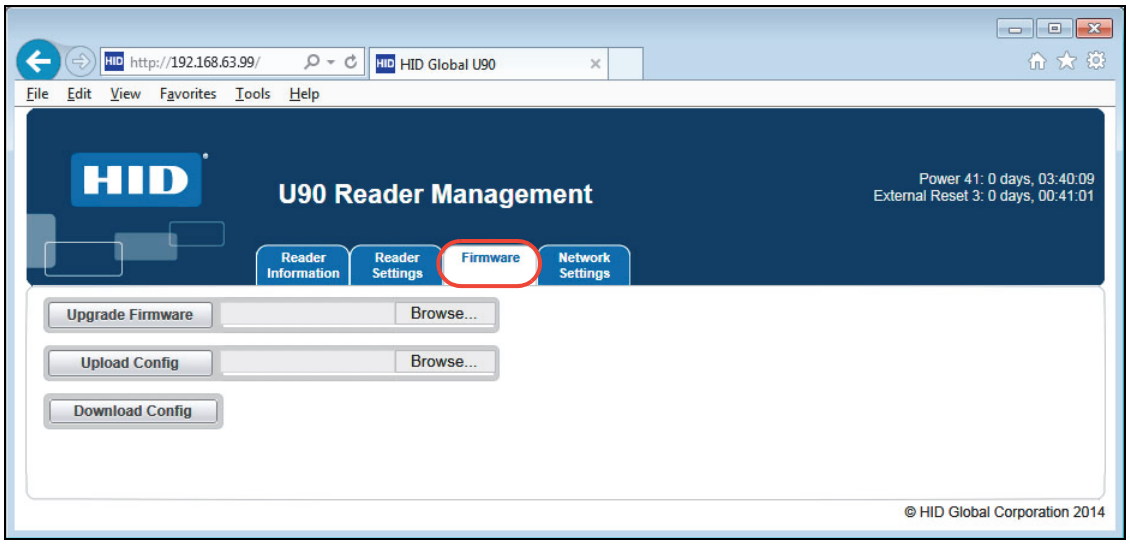



**Note:** The OSDP baud rate can be set using the baud rate field in the I/O tab. The baud rate can also be changed via an OSDP command.

| Field | Description |
|---|---|
| **OSDP Address** | Sets the OSDP address. Range: 0 - 126. Default: 0.<br>**Note:** This can also be changed via an OSDP command. |
| **Install Mode** | Enables and disables the Install Mode. Default: enabled (checked). |
| **SCBK-Default** | Secure Channel Base Key-Default. See SIA OSDP Specification, Appendix D.<br>This field requires the **Install Mode** to be enabled.<br>The SCBK-D can be used as a key to initiate a Secure Channel Session.<br>Once a successful OSDP KEYSET command has been executed, the reader will disable the **Install Mode**, and the SCBK-D can no longer be used to initiate a Secure Channel Session.<br>**Note:** Apart from manually enabling Install Mode again via the checkbox. |
| **Apply Changes** | The Apply Changes button will apply any of the changes that have been made to the configuration (fields will be green) and save them to the configuration. Once saved the green fields should turn back to black. |

## 4.10 Firmware Tab

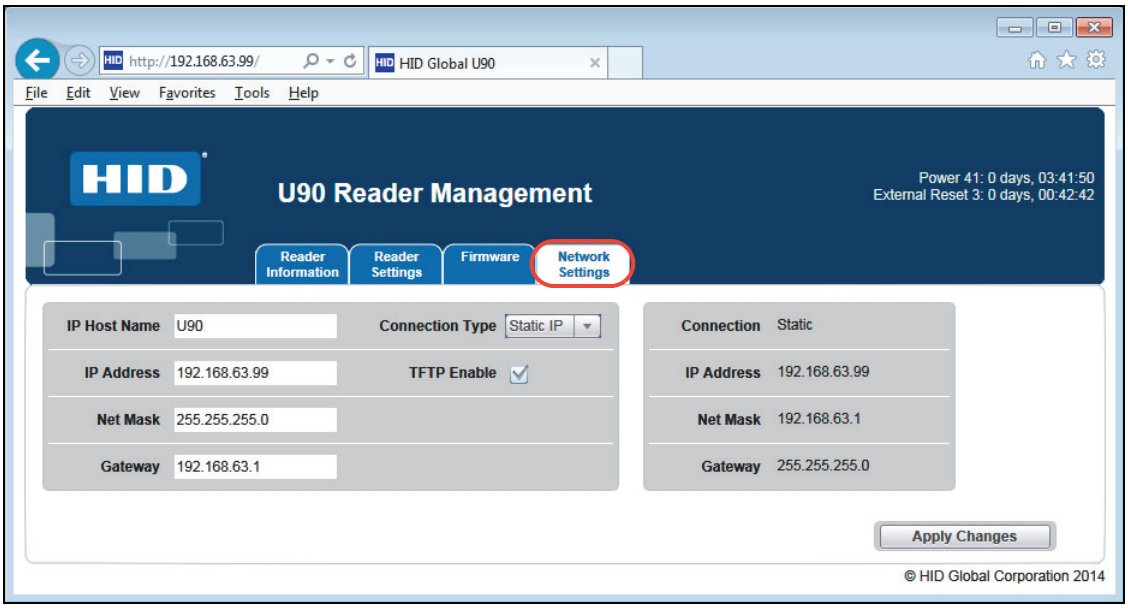
The Firmware tab provides the ability to update firmware and download or upload configuration files.




| Field | Description |
|---|---|
| **Upgrade Firmware** | Click **Browse** to locate the upgrade firmware file. Click **Upgrade Firmware** to begin the upgrade process. See *Section 4.3: Update Firmware* for detailed update information. |
| **Upload Config** | Click **Browse** to locate the upgrade config file. Click **Upload Config** to begin the upgrade process. |
| **Download Config** | Click **Download Config** to save the configuration file for this reader. |

## 4.11 Network Settings Tab

The Network Settings tab provides the ability to adjust network settings for a specific installation.

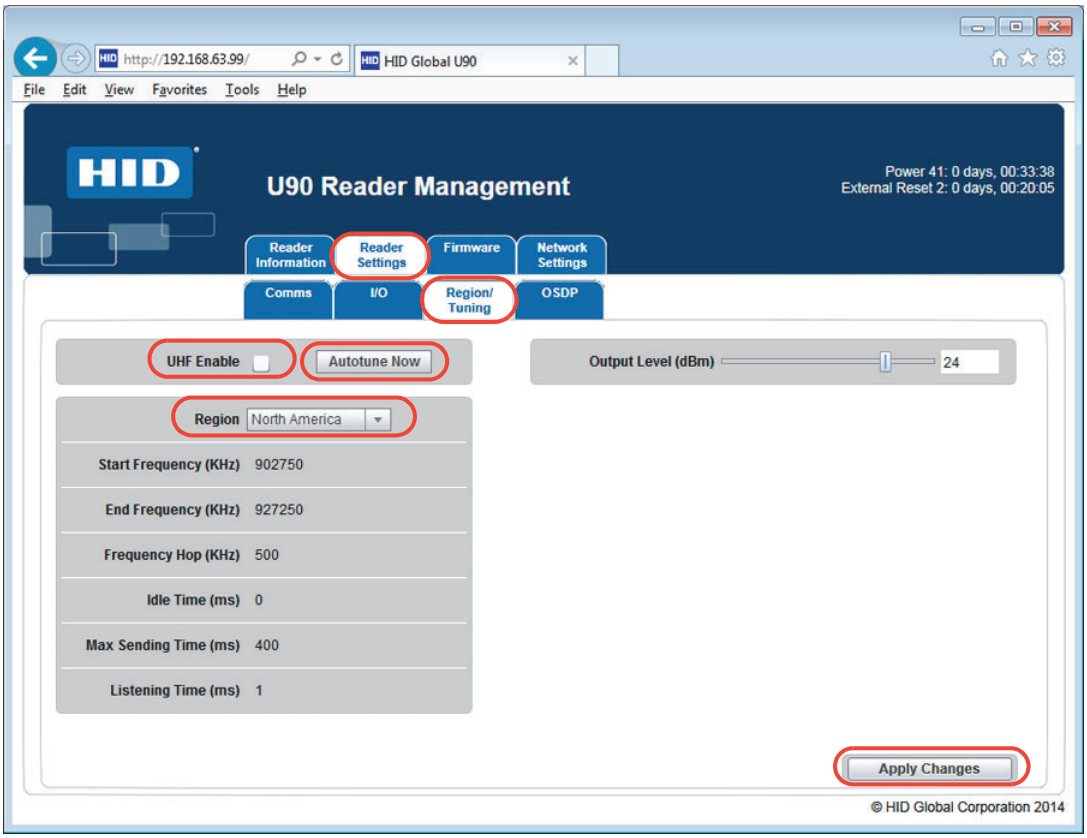



| Field | Description |
|---|---|
| **IP Host Name** | Host name for use with multicast DNS (local) and DHCP Client. Default U90. |
| **Connection Type** | Enable the DHCP Client to receive an IP address from an external DHCP Server for the U90. |
| **IP Address** | IP address of the reader, used if DHCP is not enabled. |
| **TFTP Enabled** | Enables/disables the TFTP server for firmware and configuration. |
| **IP Address** | Displays the current IP address. |
| **Net Mask** | Net Mask of the reader, used if DHCP is not enabled. |
| **Gateway** | Default Gateway for the reader, used if the DHCP is not enabled. |
| **Connection** | Displays the current connection type. |
| **IP Address** | IP address of the reader, used if DHCP is not enabled. |
| **Net Mask** | Displays the current Net Mask. |
| **Gateway** | Displays the current Gateway address. |
| **Apply Changes** | The Apply Changes button will apply any of the changes that have been made to the configuration (fields will be green) and save them to the configuration. Once saved the green fields should turn back to black. |

# 5 Setup and Testing of the Reader

Once the Physical installation is complete, the reader is powered up and connected to a laptop, and the U90 Reader Management GUI is displayed, the perform the following steps to configure the reader:

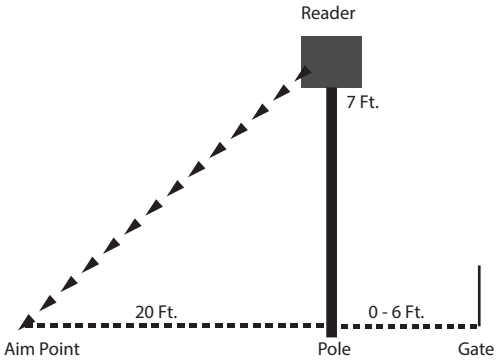
1. Enter the User password to access to the **Reader Settings** tab. See *Section 4:* ***U90 Reader Management Configuration*** for detailed information on the GUI configuration windows.
2. Select the **Region/Tuning** tab, and select the appropriate region from the **Region** drop-down list.
3. Re-enter the User password.
4. Select the **UHF Enable** option.




5. Click **Autotune Now** to immediately run the autotune function.
   **Note:** The diagnostic LED is Blue while reader is autotunning, and Red when complete.
6. Click **Apply Changes**.

The final setup of the reader installation area may take some custom setup for optimum performance. Since there are many installation configurations, a basic example will be used.

1. The reader must be installed and adjusted to an angle to properly read credentials located on the vehicles windshields.




2. Once the reader is properly angled, it must be tested. Initially, you could walk through the lane with a credential to perform an initial test. However, it is recommended to run a test with a car and a truck to verify that the credentials can be read at different heights to allow a range of vehicles to gain proper access to the site.

# 6 Restore Default Settings

The following two procedures are the same, except for placing the jumpers on different pins. The graphic below shows the pins for resenting the user name and password for the U90 Reader Management GUI.

To restore the reader default settings:

1. Remove power from the reader.
2. Place the jumper between pins P1101:5 (**OC/TMPR**) and P1102:2 (**GRN**).
3. Restore power to reader.
4. Remove jumper.

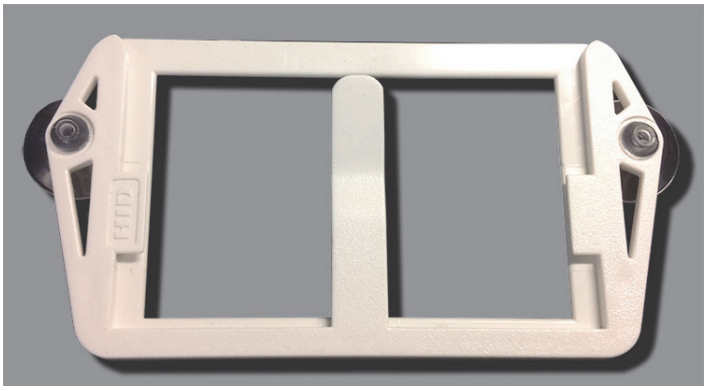
To reset the user name and password for access to the U90 Reader Management GUI:

1. Remove power from the reader.
2. Place the jumper between pins P1101:5 (**OC/TMPR**) and P1102:6 (**RED**).
3. Restore power to reader.
4. Remove jumper.


# 7 Credential Location

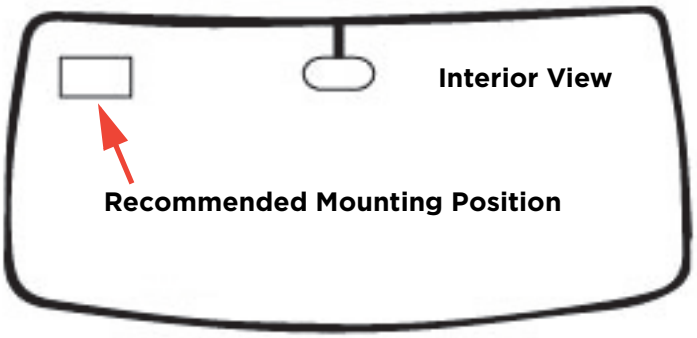
The Windshield Card Mount is a simple card carrier designed to attach on the inside of a vehicle windshield and hold a UHF card in a fixed position, that can be easily read by a UHF reader at a vehicle gate.

The following information covers the installation of a card mount.



## 7.1 Installation

1. Select a location on the windshield.
   **Note:** Place the Mount in the windshield location as seen in the graphic below, with a minimum of 2 inches from the edge of the windshield.




2. Clean and dry the windshield before installation.
3. Press the suction cups firmly against the windshield so a vacuum seal is formed.
4. Slide the card into the mount.

**Special Note:**

**Tinted Windshields:** Some vehicles have a conductive tinted area across the top of the windshield that may interfere with reading the access card. If your windshield has this tint, you must install the credential holder at least 2 inches below the tinted area. Nonconductive tint does not affect performance.

See the vehicle Owner's Manual for guidelines for label and sticker placement on the windshield.

**Sun Screens:** A reflective windshield sun shade, should not be used when the credential is in the card holder. The heat generated between the sun shade and the window can damage the credential.

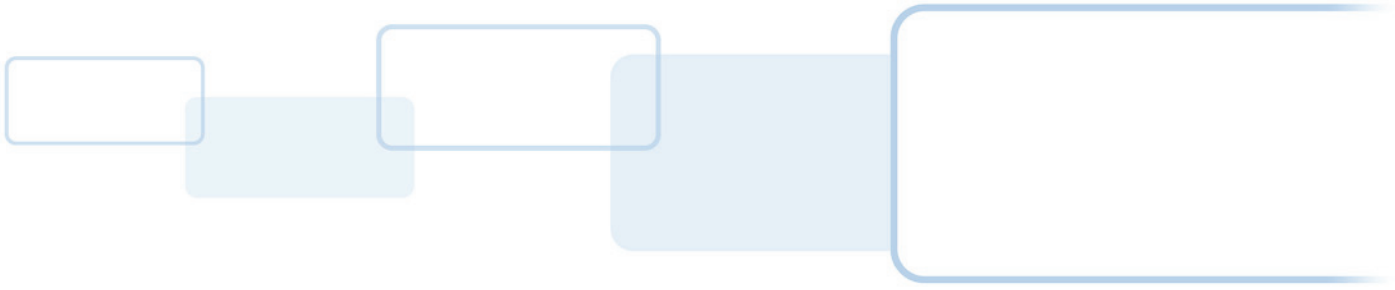
# 8 Installation Checklist

| Task | | Complete |
|---|---|---|
| 1. | Optimal mounting location determined | |
| 2. | Reader mounting box secured with appropriate hardware | |
| 3. | Reader wiring complete | |
| 4. | Reader mounted in mounting box | |
| 5. | Reader Configuration | |
| | • Host Output Mode defined | |
| | • Data Output defined | |
| | • I/O configuration completed | |
| | • Region for operation defined | |
| | • UHF enabled | |
| | • Reader autotuned | |
| 6. | Reader/Application Testing | |
| | • Output level has been optimized for the application | |
| | • Grant Access settings have been checked for proper data reporting | |
| 7. | Ensure all mounting hardware is fully tightened to prevent movement | |
| | • Remove Ethernet cable and close access door | |

# 9 Troubleshooting

| Item | Symptom | Cause | Solution |
|---|---|---|---|
| Diagnostic LED | No RED light | Reader does not have power | Measure voltage on +VDC terminal, must be between 12 and 24VDC |
| | | Firmware has been corrupted | Reader needs to be re-flashed (e.g. with SAMBA) |
| | Continuous RED light even when card is presented. | RF field is deactivated | Connect to reader through Ethernet port and navigate to the READER SETTINGS tab and then REGION / TUNING subtab. Ensure ENABLE UHF box is checked. |
| | | No region is configured | Connect to reader through Ethernet port and navigate to the READER SETTINGS tab and then REGION / TUNING subtab. Ensure the correct Region is configured. |
| | | Power supply is current-limiting | Make sure the power supply can source at least 2A. |
| | | Wrong Antenna port configured | In the GUI, make sure the Active Antenna selection is Antenna 2. (Reader Settings, Advanced/Tuning) |
| | | Reader is not properly tuned | Refer to section |
| | | Card has already been read and is in Anti-Passback | Remove card from RF field for the duration of the Anti-Passback setting and re-present. A card that is in Anti-Passback will be shown in the ACCESS Table on the READER INFORMATION screen after applying the reader's password. The ACCESS TABLE will only display the credentials Public EPC value. |
| | Diagnostic LED only flashes BLUE when a credential is presented | Reader is configured to only read the EPC | Connect to reader through Ethernet port and navigate to the READER SETTINGS tab and then Comms subtab. Ensure the 'Data Output' box shows that EPC is selected. |
| | | The credential is not a Genuine HID credential with an SIO | Obtain correct credential by contacting HID customer service at 303-404-6700 |
| | The Diagnostic LED only flashes GREEN when a credential is presented | Reader is configured to only read the SIO | Connect to reader through Ethernet port and navigate to the READER SETTINGS tab and then Comms subtab. Ensure the 'Data Output' box shows that SIO is selected. |
| | Continuous BLUE light | Reader is Autotuning | Wait for Autotune to finish. Typically, this only takes a couple minutes or less, but it may take as long as 20 minutes. Upon completion, the light will turn back to Red. |

| Item | Symptom | Cause | Solution |
|---|---|---|---|
| Read Range Performance | Read range too low | Credential is in the wrong orientation | |
| | | Approach speed too fast | Slow down approach |
| | | Line of sight is obstructed. | Make sure you don't hold your hand in front of the credential. |
| | | Credential location may need adjustment for different vehicle types | Adjust credential location in the windshield a few centimeters left/right and/or up/down. |
| | | Reader output power too low | Turn up output level |
| | | Reader not properly tuned | Re-run the autotuner. Make sure nothing is near the face of the reader for the duration of the autotune. |
| | | Reader not properly mounted | Re-run the autotuner. Make sure nothing is near the face of the reader for the duration of the autotune. |
| | | Fingers covering credential antenna | If holding credential, hold on edges. |
| | | Environment conditions are adversely affecting performance | Turn up output level |
| | Read range too high. Reader is reading credential from vehicle not at the gate, including adjacent lanes. | Output level too high | Turn down output level |
| Graphic User Interface (GUI) | Computer will not connect to reader | Computer has not established a connection with the reader | Allow 60 seconds to pass after reader is powered up and Ethernet cable is connected directly between the PC to the reader. |
| | | IP address is incorrect | For a direct connection, make sure the IP address is 192.168.63.99 |
| | Changes in the GUI are lost | Changes are not applied prior to disconnecting or resetting the reader | Connect to reader through Ethernet port and navigate to the READER SETTINGS tab and then Comms subtab. elect the ApplyChanges. |
| | Session is terminated and password must be re-entered | The region for operation has been changed and the reader has reset | This is normal operation, Re-enter Password |
| | | The session has timed out | This is normal operation, Re-enter Password |
| Communication | Control panel not acknowledging Wiegand data stream | The Wiegand PULSE WIDTH and PULSE SPACE is not appropriate for the panel in use. | Refer to the Panel manufacturer for proper settings and enter correct settings in the GUI. |
| | Control panel not acknowledging Wiegand data stream or intermittent acknowledgments. | The Wiegand voltage levels at the panel are not correct. | Supply reader power from the panel (not an independent supply) so that the Wiegand lines at the reader and the panel have the same ground reference. |
| Relays | Not working | Relay Mode configuration incorrect | Make sure Relay Mode is set for Reader Controlled, if desired performance is to map the relay functionality to the Diagnostic LED.<br>Make sure Relay Mode is set for Host Controlled, if desired performance is to control the relays via the input control lines. |



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