IDentity 4100

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IDentity 4100
User Guide

IDentity
4100

by sirit

ID*entity* 4100
User Guide

V3.2(b)
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FCC Notice (4100 Reader)

This equipment has been tested and found to comply with the limits for a Class A 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 FSTech-Sirit or an experienced radio/TV technician for help.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

FCC Notice (Wiegand Interface Module)

The Wiegand Interface Module 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.

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About Sirit

Sirit Technologies designs, develops, manufactures and sells Radio Frequency Identification (RFID) technology. Targeted at a diverse set of markets RFID technology has become a core technology for applications including: electronic toll collection, access control, cashless payment systems, product identification, and supply chain management systems including logistics, warehousing and manufacturing, and asset management.

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Preface

Intended audience

This document is intended for professional installers setting up and installing the ID*entity* 4100 reader. Before attempting to install, configure, and operate this product, you should be familiar with the following:

➤ Microsoft® Windows® based software installation and operation
➤ Device communication parameters including Ethernet and serial communications
➤ RFID reader configuration including antenna placement
➤ Basic digital input/output control

What's in this guide

The information in this guide is presented as follows:

Chapter 1 – Reader Overview – This chapter provides a brief overview of the ID*entity* 4100 hardware and software.

Chapter 2 – Reader Equipment Installation – This chapter describes how to mechanically and electrically install the reader.

Chapter 3 – Reader Startup Tool (RST) Software Installation – This chapter describes how to install the Microsoft Windows based RST application.

Chapter 4 – Reader Operation – This chapter describes how to initially test a reader and how to operate deployed readers.

Chapter 5 – Reader Startup Tool (RST) – This chapter describes the RST and the various functions you can perform with this Microsoft Windows based application.

Chapter 6 – Embedded Reader Configuration Tool (RCT) – This chapter describes the RCT and the functions performed with this reader application.

Chapter 7 – Configuring Digital Inputs and Outputs – This chapter describes how to setup the reader's digital inputs and outputs.

Chapter 8 – Specifications – This chapter detailed mechanical, electrical, and environmental specifications for the ID*entity* 4100.

Chapter 9 – Safety Instructions – This chapter provides important safety information about the ID*entity* 4100. All users must read this section before installing or operating this reader.

Appendix A – Using the Wiegand Interface – This appendix provides instruction for installing and configuring the Wiegand Interface Module.

Appendix B – AVI Lane Mapper – This appendix provides instruction for using the AVI Lane Mapper application to characterize a toll lane.

Appendix C – Disposal of the ID*entity* 4100 Reader – This appendix provides instruction for removing the battery and disposing of the reader.

Appendix D – Reader Maintenance – This appendix provides instruction for performing any reader maintenance activities.

Appendix E – Error Handling – This appendix lists ID*entity* 5100 errors and warnings. Corrective actions are provided where applicable.

What's New in this Version

Version 3.2 updates the Reader Setup Wizard, Reader Startup Tool, Reader Test Tool, Reader Diagnostic Tool, and the Reader Configuration Tool. An Error handling appendix has also been added and the Wiegand Module information has been updated.

Conventions used in this manual

The following conventions are used in this manual:

`Bold courier` font indicates code entered by the user

`(values)` within parentheses indicate parameters

NOTES

Important information and other tips are presented in light blue boxes to the left of the applicable section.

`(values)` in italics indicate user defined variables.

`<n>` indicates a variable number used in a function that can apply to several different devices such as antennas or I/O ports.

WARNING: *Warnings advise the reader that a hazardous condition can be created by a particular action that can cause bodily injury or extreme damage to equipment*

ATTENTION: *This warning indicates that the device is susceptible to Electro Static Discharge and appropriate precautions must be taken to avoid equipment damage.*

Caution: *Cautions advise the reader that a condition can be created by a particular action that can cause equipment damage or result in equipment operation that violates regulatory requirements.*

Table of Contents

Reader Overview

Reader Hardware

The ID*entity* 4100 is a multi-protocol, multi-regional Radio Frequency Identification (RFID) System that operates in the 860 – 960 MHz UHF band.

The IDentity 4100 is an integrated high performance, multi-protocol, multi-regional Radio Frequency Identification (RFID) Reader System that operates in the 860 - 960 MHz UHF band. The reader is configured at the factory to operate within a specific regulatory region (for example: FCC in the 902-928 MHz ISM band or ETSI 865-870 MHz).

Figure 1   ID*entity* 4100 UHF Reader with Universal Mount

As shown in the following figure, the ID*entity* 4100 reader contains one integrated antenna and supports one additional Tx/Rx antenna. The reader is equipped with both RS-232 serial and Ethernet interfaces.

Power, RS-232 Serial, and
Ethernet Interface

Auxiliary Antenna
RF Connector
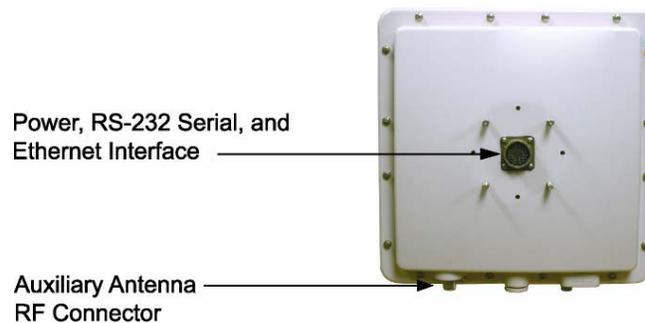
Figure 2   ID*entity* 4100 Power and I/O Connections (FCC reader shown)

Reader Software

The ID*entity* 4100 is shipped with two software applications that you can use to configure and control the reader.

Reader Startup Tool (RST)

The RST is a Microsoft Windows based application you install on your computer. With RST, you can view all readers on your network. After selecting a reader, you can modify its communication, network, and operational parameters. You can also read tags, review tag data, perform diagnostics, and upload new software. This RST is primarily intended for initially configuring a reader prior to deployment. After deployment, use the Embedded Reader Configuration Tool (RCT). Detailed information on the RST is provided in Chapter 5.

Embedded Reader Configuration Tool (RCT)

This RCT is an embedded reader application that allows you to access your readers across a LAN or WAN. Enter the IP address of the reader into your Web browser and the RCT allows you to fully modify and operate the reader. With the same functionality as the RST, this application allows you to modify the reader's communication, network, and operational parameters. You can also read tags, review tag data, perform diagnostics, and upload new software. This application is primarily intended for configuring and managing deployed readers. Detailed information on the RCT is provided in Chapter 6.

Reader Equipment Installation

Mechanical Installation

Mounting the Reader

The ID*entity* 4100 is available with a universal mount suitable for most applications. Any mounting surface must be able to support a minimum static load of 15.0 pounds (6.8 kg) plus any additional live load due to environmental conditions.
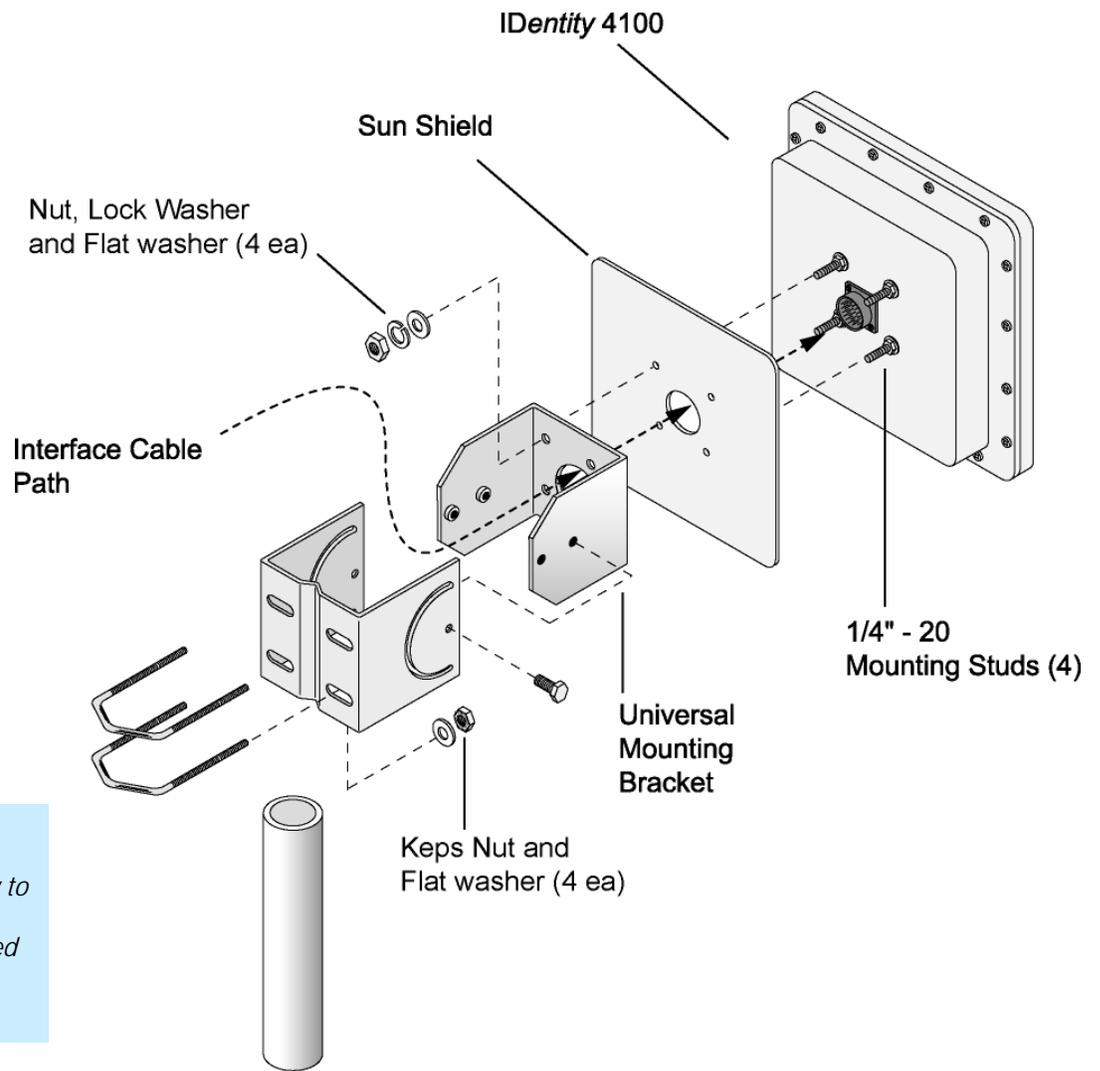
Installation Notice
Installation of the IDentity 4100 is only to be performed by trained, Sirit approved personnel.

Figure 3   ID*entity* 4100 Universal Reader Mount

To mount the ID*entity* 4100 reader assembly, refer to Figure 3 and perform the following:

1   Locate the Universal Mounting Bracket assembly and the Sun Shield.

2   Disassemble the Universal Mounting bracket. Retain all hardware.

3   Locate the Interface Cable.

4   Snake the bulkhead connector end of the Interface Cable through the Universal Mounting Bracket and then through the Sun Shield.

5   Connect the cable to the reader's bulkhead connector and twist to lock in place.

6   For outside applications, install the Sun Shield on the four ¼"-20 studs located on the rear of the reader. The Sun Shield will be spaced off the rear approximately 1/2" to allow for air flow.

7   Install the Universal Mounting Bracket on the four ¼"-20 studs.

8   Secure the Universal Mounting Bracket and Sun Shield to the reader with the four ¼"-20 nuts, lock washers, and flat washers.

9   Install the Pole Mount Bracket to the Mounting Pole using the two U-Bolts, four Keps Nuts, and four Flat Washers.

10   Adjust the Pole Mount to the proper height and tighten the hardware.

11   Assemble the Universal Mounting Bracket/reader assembly to the Pole Mount.

12   Adjust the angle of the reader and tighten the hardware.

⚠ **WARNING:**   *FCC Radiation Exposure Statement. The antennas used for this transmitter must be installed to provide a separation distance of at least 1 meter from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.*

ETSI Radiation Exposure Statement. The antennas used for this transmitter must be installed to provide a separation distance of at least 25 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Electrical Installation

A general installation diagram is shown in the following figure. Refer to Chapter 7 – *Specifications* for specific information.
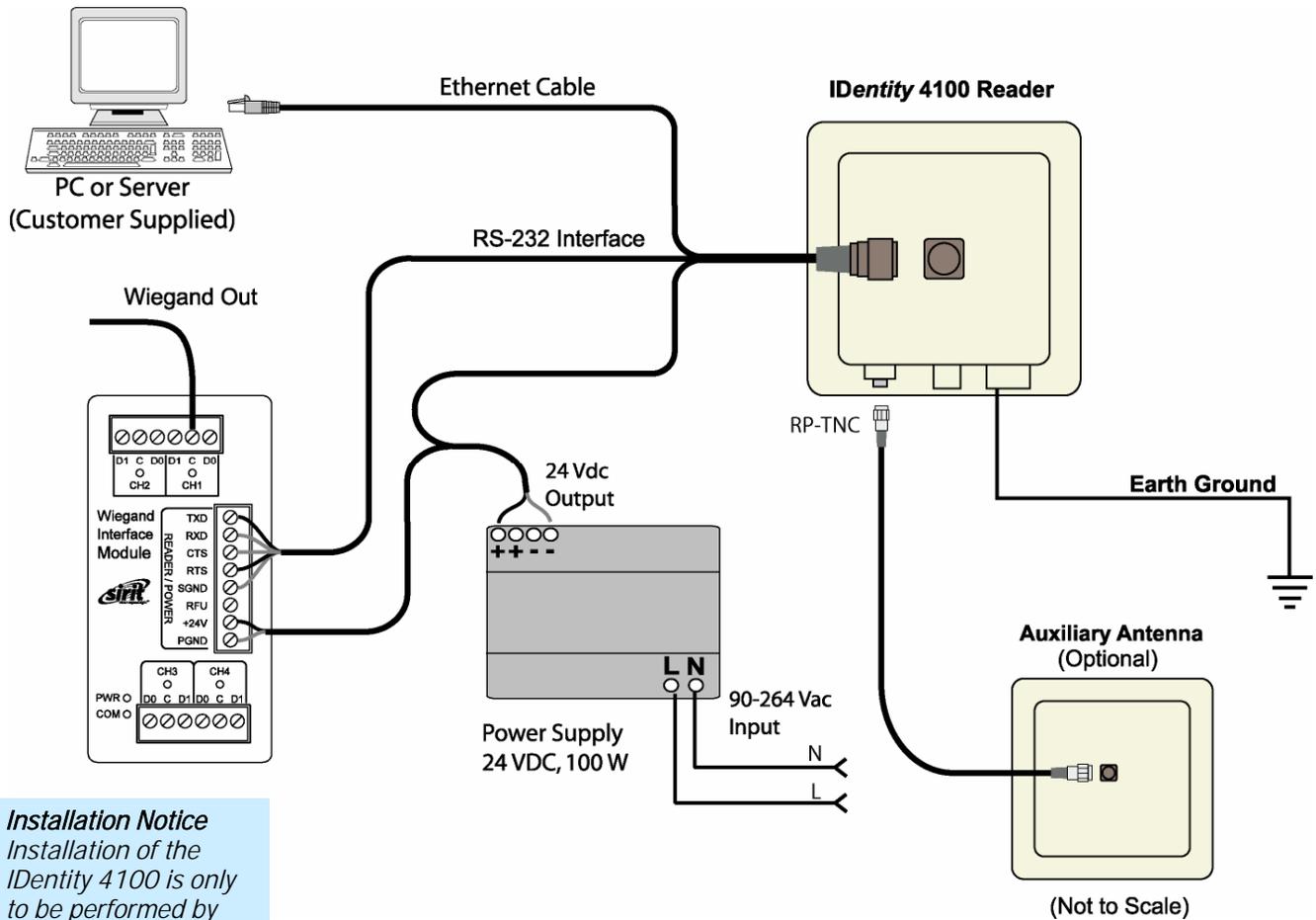
Installation Notice
Installation of the IDentity 4100 is only to be performed by trained, Sirit approved personnel.

Figure 4   ID*entity* 4100 Electrical Connections

⚠	Caution:	The IDentity 4100 is designed to meet the regulatory requirements in those jurisdictions in which it is offered. Changes or modifications not expressly approved by Sirit Technologies for compliance could void the user's authority to operate the equipment.
⚠	ATTENTION	IDentity 4100 antenna ports may be susceptible to damage from static discharge or other high voltage. Use proper Electrostatic Discharge (ESD) precautions to avoid static discharge when handling or making connections to the IDentity 4100 reader antenna or communication ports. Equipment failure can result if the antenna or communication ports are subjected to ESD.

Connecting the Serial Port

The ID*entity* 4100 RS-232 serial port provides communication up to 115200 Baud. This port is accessed through the bulkhead connector located on the rear of the reader. If you are using the serial port for reader communication, connect a serial cable from the COM port on your PC to the serial port on the reader. See Figure 2 for location of the connector.

Refer to the Chapter 8 – *Specifications* for details on the bulkhead connector.

Connecting the Wiegand Interface Module

Refer to Appendix A for information on connecting and configuring the Wiegand Interface Module.

Connecting and Configuring the Ethernet Port

Ethernet Cables

In most cases, you will connect the IDentity 4100 to a network hub or router. However, if you are connecting directly to a PC or other computer, you will need a Crossover Cable that swaps the Tx and Rx signals.

The ID*entity* 4100 Ethernet port is accessed through the bulkhead connector located on the rear of the reader. If you are communicating with your reader across a Local Area Network (LAN), connect an Ethernet cable from your hub or router to the bulkhead connector. If you are connecting the reader directly to a PC, you must use a crossover cable. See Note to the left.

By default, the reader is configured to use a DHCP server to obtain its IP address and related information. In the event a DHCP server is unavailable, the reader will boot with an IP address in the 169.254.x.x subnet.

In the absence of other readers on the same network, and if no other network traffic is observed which references 169.254.1.1, the reader will select that address; otherwise, it will select a random address on the 169.254.x.x subnet.

IP address settings can be changed using RST. Refer to the *View or Change the Reader's Network Settings* section in Chapter 5.

Refer to the Chapter 8 – *Specifications* for details on the bulkhead connector.

Connecting the External Antenna

The ID*entity* 4100 supports one auxiliary external Tx/Rx antenna. The maximum antenna cable length is 10 meters for models ID4100-001. Connect the antenna to the antenna port located on the bottom of the reader.

Refer to Chapter 7 – Specifications for specific information regarding the external antenna and antenna cable.

⚠	*Caution:*	*The IDentity 4100 is equipped with one (1) auxiliary RF port which is inactive when shipped from the factory. If activated, this RF port must be properly terminated with a 50 ohm load or a functional UHF antenna before power up. Always power down the reader before removing an antenna or load from an RF port.*
		The maximum antenna cable length is 10 meters for models ID4100-001.

⚠	*ATTENTION*	*The IDentity 4100 antenna port may be susceptible to damage from static discharge or other high voltage. Use proper Electrostatic Discharge (ESD) precautions to avoid static discharge when handling or making connections to the IDentity 4100 reader antenna or communication ports. Equipment failure can result if the antenna or communication ports are subjected to ESD.*

Connecting Digital Inputs/Outputs

The ID*entity* 4100 is equipped with a general purpose digital input/output (I/O) port that provides four optically isolated 5-24 VDC input signals and four open-collector output signals. The digital inputs can be used as general purpose inputs or to trigger the reader for tag reading. These inputs can be configured to provide an external read trigger from proximity sensors, photo switches, or other devices.

The digital outputs can be used as general purpose outputs, to indicate tag reading activity, or to indicate the reader is transmitting (RF On). The outputs can also be configured to trigger gates or other access control devices.

Connecting the Power

The ID*entity* 4100 operates on 24 VDC provided through the bulkhead connector on the rear of the reader. Connect the power supply to the reader and connect the power supply to your 100–240 VAC, 50-60 Hz power source. Allow 30 seconds for the reader to initialize.

Refer to the Chapter 8 – *Specifications* for details on the bulkhead connector.

Two power cables rated for usage at 24V are available for the ID*entity* 4100:

➤ PN S3114-019 – IDMaX-ID5100 20' Cable with RJ-45 Connector

➤ PN S3114-011 – IDMAX-ID5100 7' Cable with RJ-45 Connector

⚠	*Caution:*	*The Sirit supplied power/data cable is only to be used with the Sirit 24 VDC power supply. Use of these cables with power supplies providing lesser voltages may result in cable and/or reader damage.*

Reader Startup Tool (RST) Software Installation

Installing RST Software

The ID*entity* 4100 is delivered with a Microsoft Windows based application called Reader Startup Tool (RST). You can use this application to initially configure your reader as well as read and display tag data.

NOTE: *The product CD provided with your reader contains two setup files:* `setup.exe` *and* `IDentity_4100_RSTInstaller.msi`. *The first file,* `setup.exe`, *will fully check your system configuration and load all required software including Microsoft .Net 2.0. If you only want the RST application, use the* `IDentity_4100_RSTInstaller.msi` *installation file. Note, however, the installation may abort if the required files are not found on your system.*

Install RST

1 To install RST, load your product CD and double-click the `setup.exe` or `IDentity_4100_RSTInstaller.msi` file:

RST	**RST**
Welcome to the RST Setup Wizard	License Agreement
The installer will guide you through the steps required to install RST on your computer.	Please take a moment to read the license agreement now. If you accept the terms below, click "I Agree", then "Next". Otherwise click "Cancel".
	Sirit Technologies End User License Agreement This End User License Agreement is a binding, contractual agreement ("Agreement") between You and Sirit Technologies ("Licensor"). For purposes of this Agreement "You" shall mean an employee employed by an entity that has purchased a Sirit Radio Frequency Identification Tag Reader pursuant to a separate agreement, or an individual that has purchased a Sirit
WARNING: This computer program is protected by copyright law and international treaties. Unauthorized duplication or distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extent possible under the law.	○ I Do Not Agree ⦿ I Agree
Cancel < Back Next >	Cancel < Back Next >

2 Press **Next>**

3 Read the License Agreement. Select **I Agree** and press **Next>**
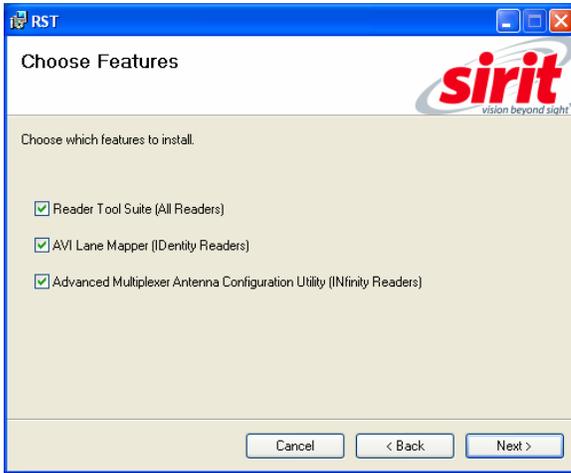
4   Select if you want to install RST, the RAPID SDK, or both.
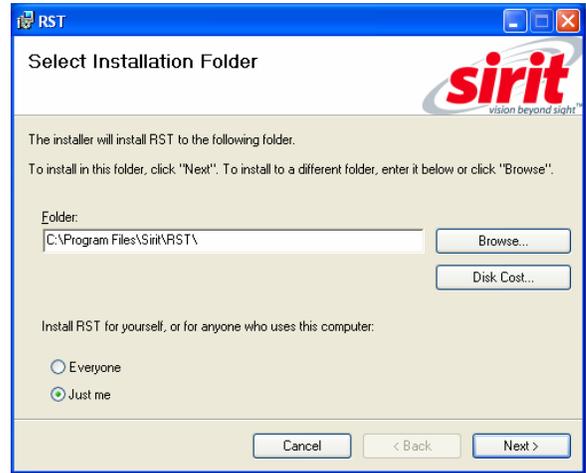
5   Verify the path and folder where RST will be installed. Press **Next>**.
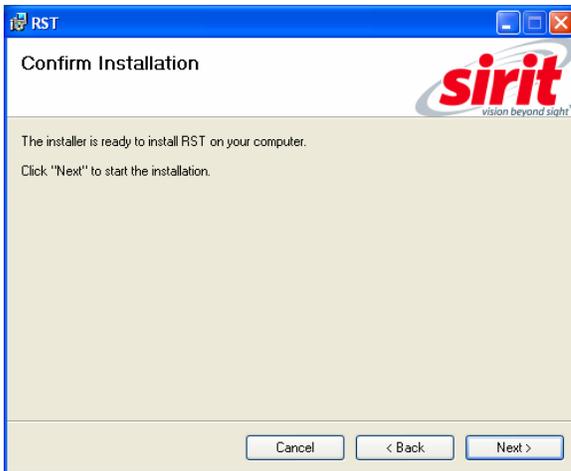
5   Press **Next>**.
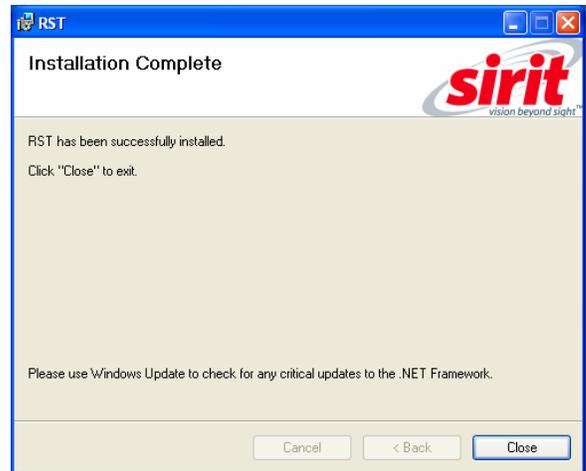
6   After the installation completes, press **Close.**

Windows 7 Setup

If you have a Windows 7 operating system, your firewall may block UDP traffic and consequently RST may not discover your readers. Perform the following to configure your system:

For Microsoft Firewall

2   Log into your computer as Administrator.

3   Navigate to the Control Panel and select
Control Panel → System and Security.

4   Select **Allow a program through Windows firewall**.

5   Scroll down the list and locate **Startup Tool**, check it, and press **OK**.

6   If Startup Tool is not in the list, press **Allow another program**.

7   Locate **Startup Tool**, check it, and press **OK**.

8   Restart RST and it should discover readers.

For Third-Party Firewalls

9   Log into your computer as Administrator.

10 Set your firewall to allow RST to receive UDP traffic on port 50000 and 50001.

Reader Startup

To begin using your reader, open the RST application.

Open RST

1   From your Windows desktop, select:

   Start→Programs→Sirit→IDentity 4100→Reader Startup Tool (RST)
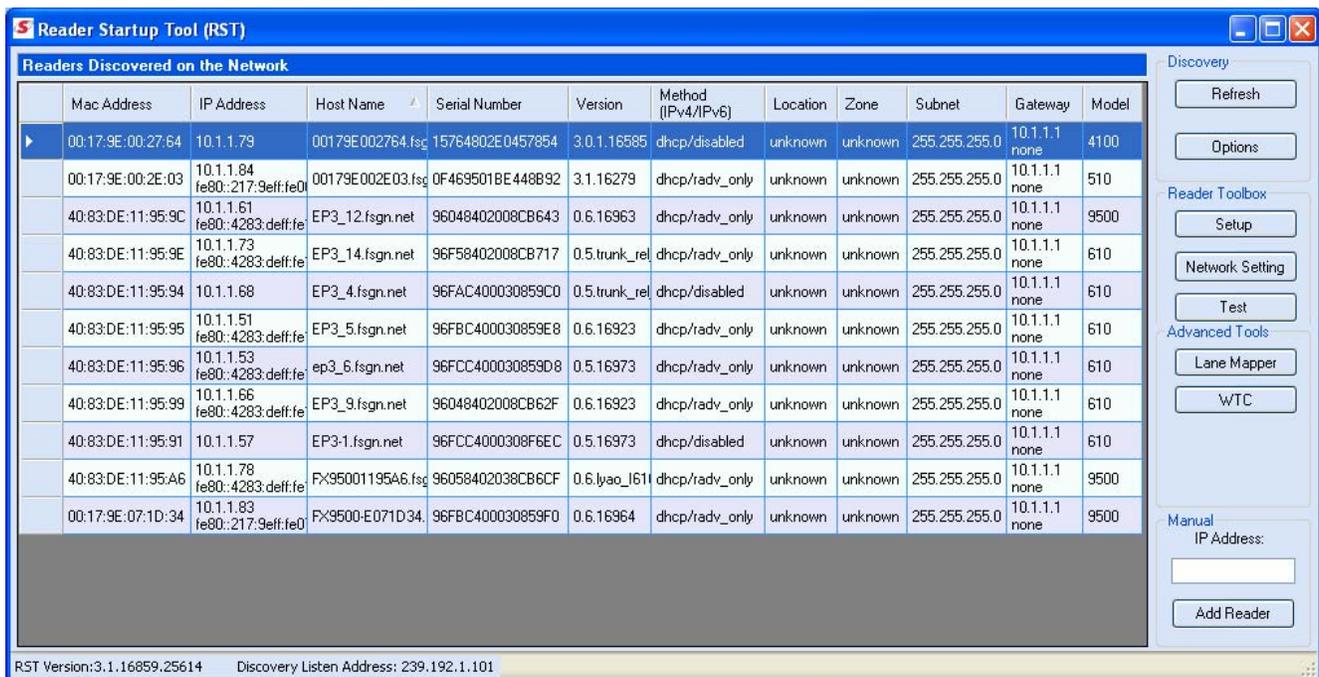
2   If this is the first time starting the RST application, you may receive a Windows Security Alert. This warning indicates that the firewall is blocking the RST application.

3   If the warning window is hidden under the RST windows, collapse the RST window.

NOTE:

Earlier versions of Microsoft Windows™ may not provide the Security Alert popup. IF RST does not discover your reader, check your Windows Firewall/Security settings.

4   Press **Unblock**.

5   Press **Refresh** on the RST

6   The RST main page will display any readers currently connected to the network.

Initial Reader Setup

To configure a specific reader, perform the following:

Reader Setup

1   Select the reader on the main RST page by clicking the button to the left of the reader Mac address.

Mac Address ▲	IP Address	Host Name	Serial Number
00:17:9E:00:01:47	10.1.1.64	00179E000147.	0B067200FC439853
▶ 00:17:9E:00:01:48	10.1.1.65	00179E000148.	0F666900CD43F3B6
00:17:9E:00:2D:F7	10.1.1.59	00179E002DF7.	0A469501BE448D92

2   Press the Setup Wizard button on the RST tool bar or select **Setup Wizard** from the **Tools** pull-down menu.

Setup Wizard ...
Network Settings ...
Test ...
Configure ...
Diagnose ...

3   The ID*entity* 4100 Reader Setup Wizard (RSW) is displayed.

IDentity 4100: Reader Setup Wizard (10.1.1.79)

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Welcome to the IDentity 4100 Setup Wizard

This Wizard will guide you through the inital setup of the IDentity 4100 reader.

To continue, click Next>.

< Back   Next >   Cancel   Help
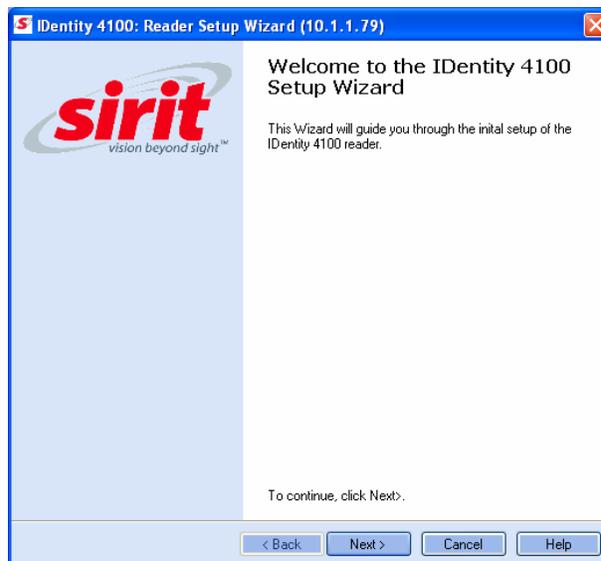
4   Press **Next>**

5   Readers leave the factory with a default login level set to `admin`. If your reader has a default login level set to `guest`, you will see the following screen. Enter the Login (`admin`) and Password. If this is the first time configuring your reader, enter: `readeradmin`.

Login Page

The reader Login Page is only displayed when the default login is set to `guest`. Readers leave the factory with a default login of `admin`. Therefore, you will not see the login screen if you have not configured your reader.
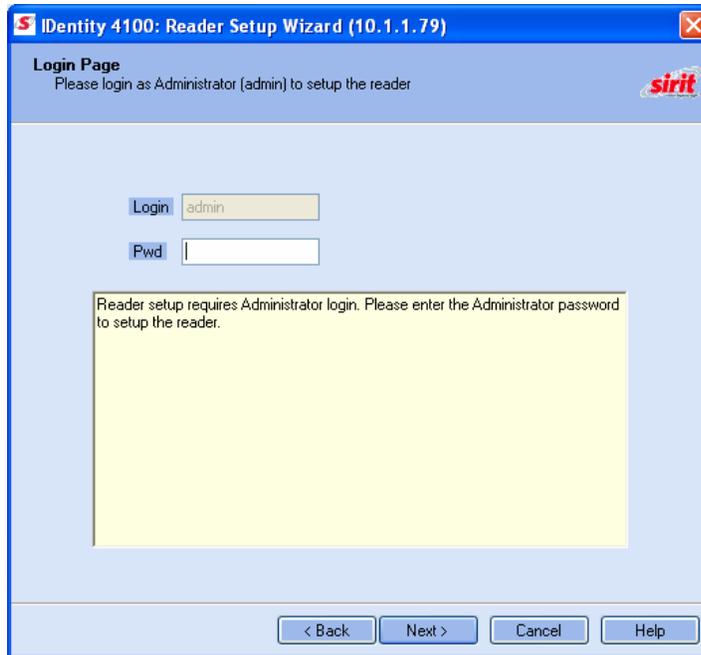
6   After entering your Login and Password, press **Next>**.

Region Selection

The reader is configured at the factory to operate within a specific regulatory region. As a result your region selections may be different from those shown in this manual.

Note that Region Selection is not user configurable.
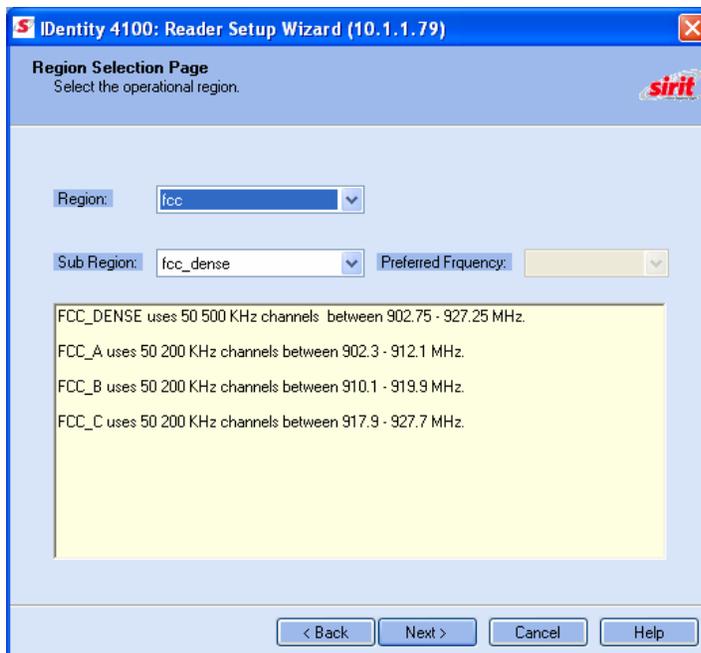
7   Select your Region and Sub Region and press **Next>**.

Protocols

Only those protocols enabled in the reader will be active on the Protocol Selection page.
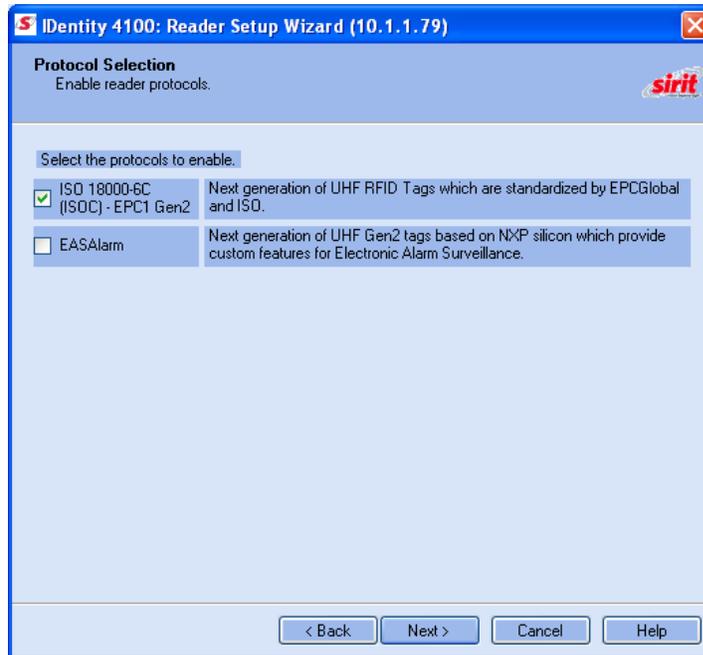
8   Select the protocols to read and press **Next>**.
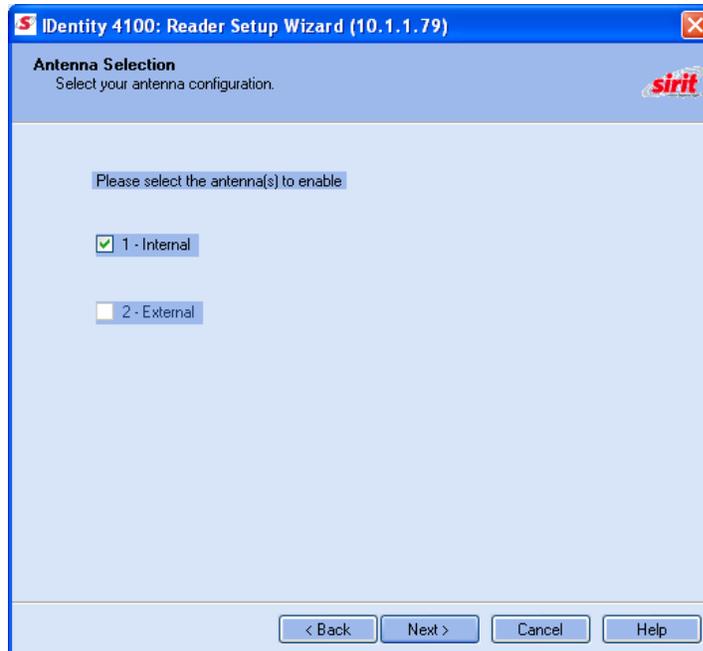
9   Select the antennas you will be using and press **Next>**.
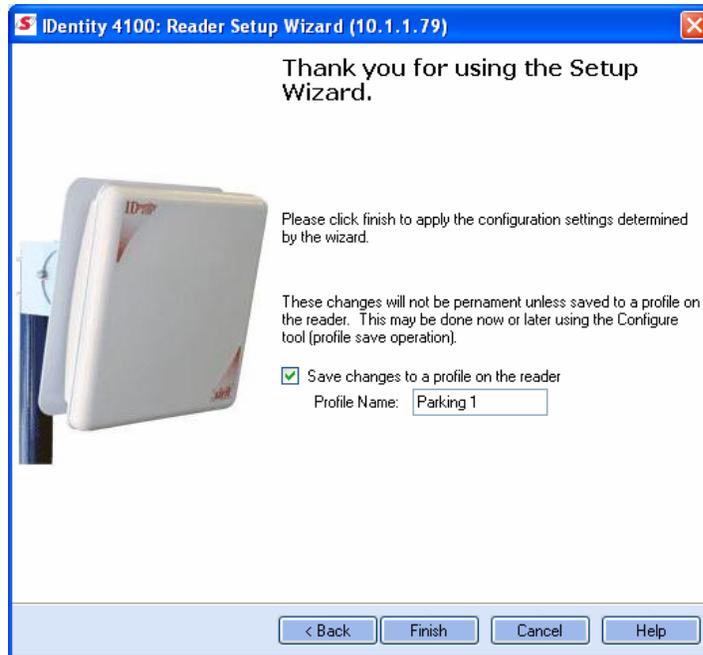
10 It is recommended that you save the reader setup as a profile.

Select **Save changes to a profile…**, enter a **Profile Name**, and press **Finish** to complete the initial reader setup. See *Manage Profiles* in Chapter 6.

Converting Translation Tables for use with IDentity 4100

If you have translation tables, such as those developed for IDentity MaX readers, these tables can be converted for use with the IDentity 4100 and Wiegand Interface Module. Refer to Appendix A for instructions on converting these translation tables.

Reader Operation

Basic Operation with RST

The ID*entity* 4100 can be operated either from the RST application or by logging directly into the reader's embedded Reader Configuration Tool (RCT). To operate the reader from RST, perform the following:

Open RST

1   From your Windows desktop, select:

Start→Programs→Sirit→IDentity4100→Reader Startup Tool (RST)

2   Select a specific reader and press **Test**.

3   The Reader Test Tool (RTT) is displayed.

4   Login to the reader as administrator. From the pull-down menu, select:

Reader → **Login**

The login is **admin** and the initial password (**Pwd**) is **readeradmin**. See the Advanced Setup section for details on changing the password.

Customize the display

Customize your RST display by clicking and dragging the columns. You can also sort by column.
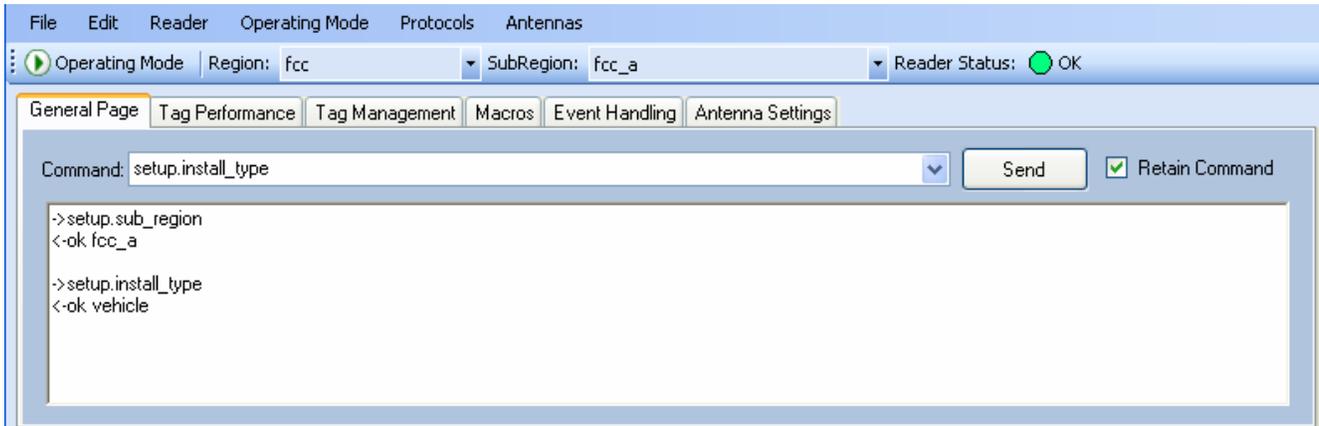
5   Verify the **Operating Mode** is set to **Active Mode**. Select:

Operating Mode → Active

6   Select the **Tag Performance** tab and press **Start**.

7   Place your tags in front of the antenna and verify the tags are read and displayed as shown in the following figure.
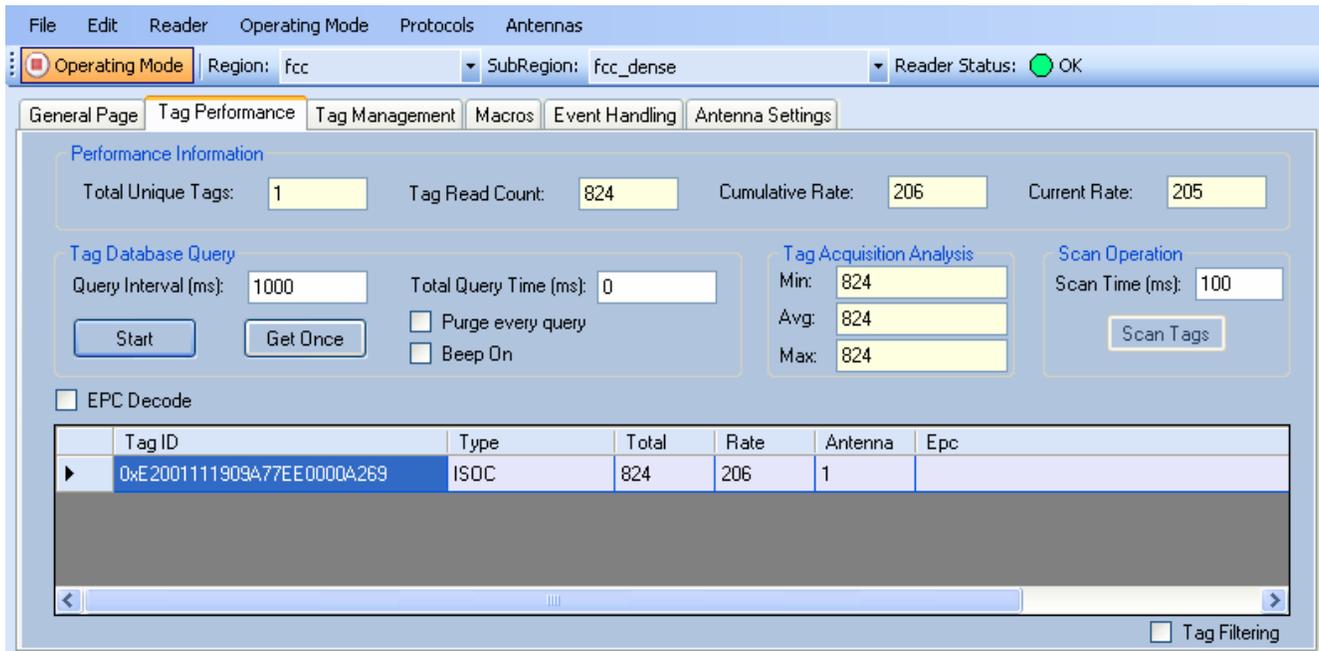
Deployed Reader Operation with RCT

Once your readers are deployed, you can access them directly using the embedded Reader Configuration Tool (RCT). To access a particular reader, perform the following:

11 Enter the reader's IP address into your Web browser or press the
    | Configure | button on the main RST page.

12 The reader's RCT interface is displayed.

13 Log into the reader. Press **Login** for the login screen.

14 The default login is **guest**. If you need administrator privileges, login as **admin** and enter **readeradmin** as the password.

15 Press **Submit**.

16 Select **Basic Configuration** →**Setup Antenna/Cables** to configure the antennas, gain, and power settings.

17 Select **Advanced Functions** →**Change Operating Mode** to verify the reader is in the proper mode.

18 Select **Basic Configuration** →**Set Tag Protocol** to verify the reader is configured for the proper tag protocol.

19 Press **System Status** →**View Tags** to view tag data.

20 Press **Start**.

Unique Tags: 6					
Tag ID	Protocol	Antenna	Repeat Counts	First Read Time	Last Read Time
0x300833B2DDD9014028050000	ISOC	1	216	2011-03-29T20:43:13.801	2011-03-29T20:56:01.705
0xE2003412DC01098400079733	ISOC	1	1261	2011-03-29T20:43:13.195	2011-03-29T21:16:22.864
0xE20080425002003621903838C	ISOC	1	23095	2011-03-29T20:43:13.066	2011-03-29T21:16:26.971
0xE2003411B802011383081610	ISOC	1	5	2011-03-29T20:55:33.866	2011-03-29T20:55:35.026
0xBE0000000000000000000040	ISOC	1	1	2011-03-29T20:55:33.415	2011-03-29T20:55:33.415
0xA1A050803A154100AA010102	ISOC	1	374	2011-03-29T20:43:16.236	2011-03-29T21:16:19.041

Polling Period (seconds): 5   Start Stop Get Once Purge

21 If you need to configure your reader, refer to *Chapter 7 – Reader Configuration Tool* for information on using RCT to adjust configuration variables and parameters.

Reader Startup Tool (RST)

The Reader Startup Tool (RST) provides an easy-to-use interface for the ID*entity* 4100 configuration and operation functions. This Microsoft Windows based application allows you to perform the following:

➤ View all readers on the network

➤ Launch the **Reader Setup Wizard** to initially configure a reader

➤ View and change a reader's network settings

➤ Add a new reader to the network

➤ Launch **Reader Test Tool** to perform basic reader/tag operations

➤ Launch **Reader Diagnostic Tool** to view statistics, alarms, and reports

➤ Launch **Reader Configuration Tool** to perform detailed reader configuration

View Readers on the Network

When RST starts up, all readers currently connected to the network and powered up are displayed.

Configure Reader with the Setup Wizard

The Reader Setup Wizard is used to initially configure your reader for operation. With this application, you can select the following:

➤ Regulatory region (fixed at factory) and sub-region
➤ Preferred Frequency (depending on regulatory settings)
➤ Number of antennas

To initially configure your reader perform the following:

22 From the RST main page, press the [Setup] button. The Setup Wizard is launched as shown.
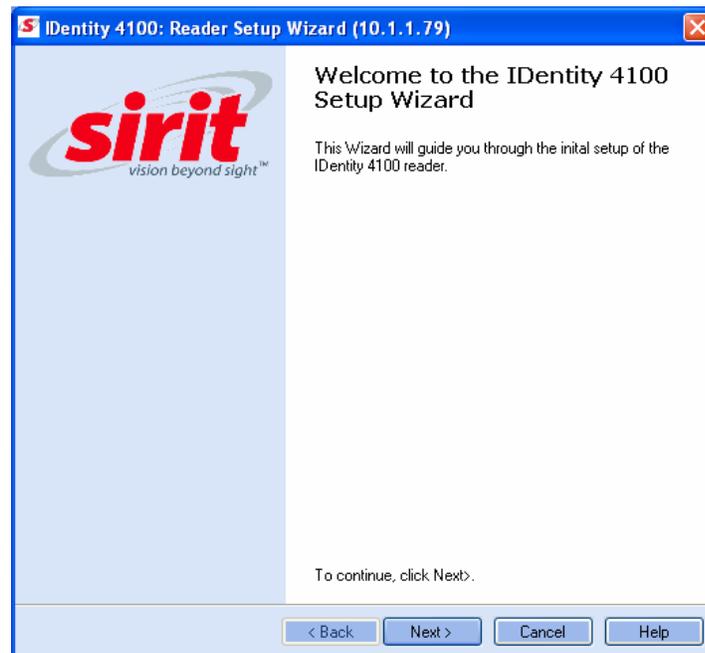
23 Refer to Chapter 2 – *Reader Configuration* for detailed instructions on using the Reader Setup Wizard.

Customize Discovery Options

You can customize the reader discovery options including the Listen Address and Request Multicast Address.

➤ Listen Address – Address that RMT uses to listen for UDP discovery packets from the reader. With Version 2.0 this is customizable on the reader.

➤ Request Multicast Address –Address used by RMT to send out the UDP update request packets. With 2.0 this is now customizable on the reader.

In addition, you can select if you want a secure connection for the Test, Configure, and Diagnostic Tools. This connection uses the HTTPS protocol and any data transferred between devices is encrypted.

1 On the RST tool bar select **Options** from the **Discovery** pull-down menu.
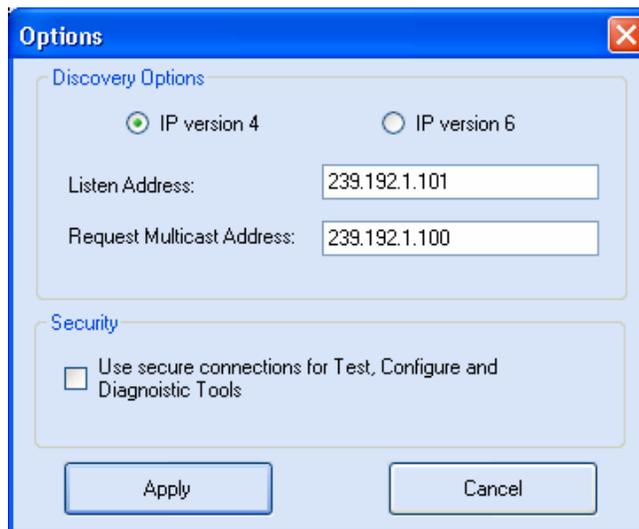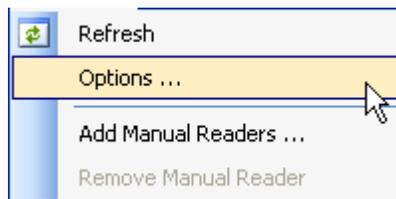
2 Select either **IP version 4** or **IP version 6**.

3 Enter the **Listen Address** and **Request Multicast Address** as required.

4 Select whether you require a secure connection for the Test, Configure, and Diagnostic Tools.

5 Press **Apply**.

View or Change the Reader's Network Settings

The Network Settings dialog allows you to change the IP Address, Subnet, and Default Gateway of your reader. For readers with firmware version 2.0 or later, a password is required to make any changes.

1   From the RST main page, press the [Network Setting] button.

2   Verify the **IP Address**, **Subnet**, and **Default Gateway** are correct.

3   If **Enable DHCP** is selected these fields will be locked.

4   If changes are required, enter your **Login** and **Password** (V2.0 and later).

5   Change the values and press **Apply**.

Reader Test Tool (RTT)

The Reader Test Tool (RTT) is primarily designed for new users to test reader operation and perform a few basic reader functions. With RTT, you can perform the following:

➤ Read tags

➤ Issue commands to the reader and view the responses

➤ Run macros

➤ Observe reader events

➤ To access the Reader Test Tool, select a reader and press [Test] on the RST tool bar or select **Test** from the **Tools** pull-down menu.
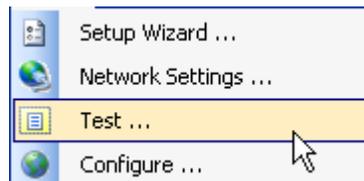
General Page

The **General Page** allows you to issue commands to the reader and view any responses. From the pull-down menus, you can also login to the reader, change the operating mode, select another protocol, and select which antennas are active.
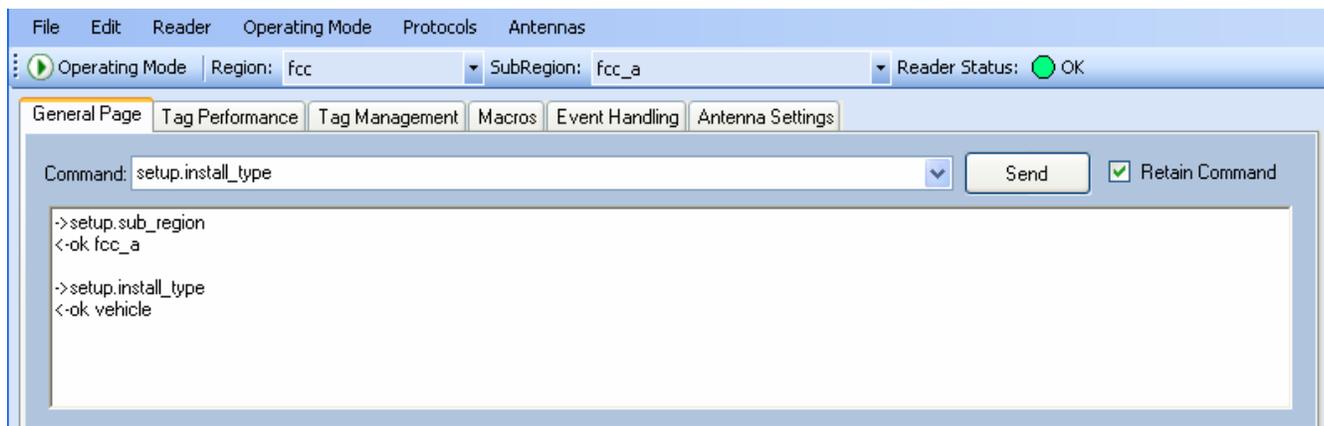
Login to Reader

To login to the reader, perform the following:

6   From the pull-down menu, select **Reader→Login…**.

7   Select the type of **Login** from the pull down. The default login is **guest**. If you need administrator privileges, login as **admin**.

8   Enter your **Password**. Enter **readeradmin** if you logged in as **admin**.

9   Press **OK**.

Select Operating Mode

From the pull-down menu, select **Operating Mode→<Active | Standby>**

or, press the Operating Mode select button on the left side of the tool bar.

➤ **Active** – Reader is continuously attempting to singulate tags and automatically reports any singulated tag via an asynchronous event notification on the event channel.

➤ **Standby** – Reader is not transmitting any RF energy, unless processing a tag related command. The transmitter is enabled at the beginning of the command processing, protocol operations required for the command are performed, and then the RF transmitter is turned off.

Select Protocol

You can activate one or more protocols on the ID*entity* 4100 using RST. From the pull-down menu, select **Protocols→<protocol>**. Active protocols are indicated by ☑.

☑	ISO 18000-6C (ISOC) Gen2
	EASAlarm
	ISO 10374
	ISO 18000-6B (ISOB)
	Supertag
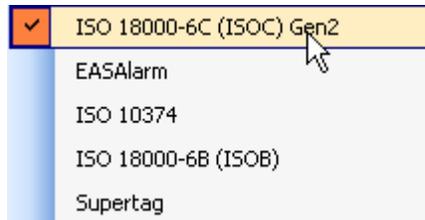
Antenna Selection

You can select the ports that have antennas connected and which antennas are active. Perform the following:

10 From the pull-down menu, select **Antennas→<n>.** Active antennas are indicated by ☑.

	Mux Sequence ...
	Perform Antenna Check
✓	1
	2
	3
	4
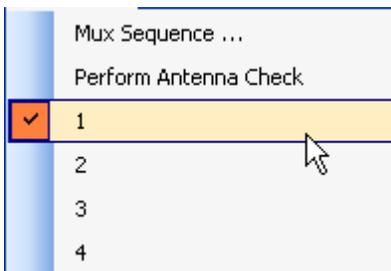
11 You can also select the order in which antennas are activated. From the pull-down menu, select **Antennas→Mux sequence....**

Set Antenna Mux Sequence

Please enter the antenna order to use for any operations. The list is comprised of the antenna numbers separated by a space.

2 1

OK   Cancel
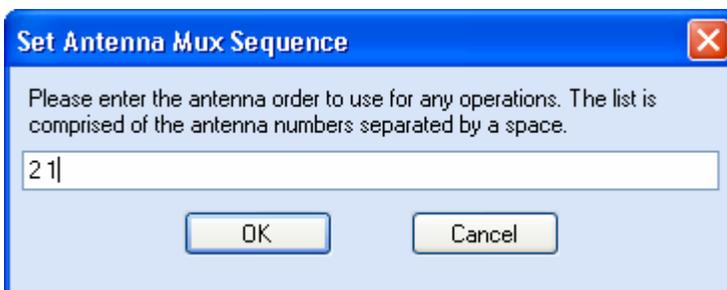
12 Enter the antenna numbers in the order to be activated.

13 Press **OK**.

Set Reader Options

You can setup other reader options including help type macro highlighting.

From the pull-down menu, select **Edit→Options**.
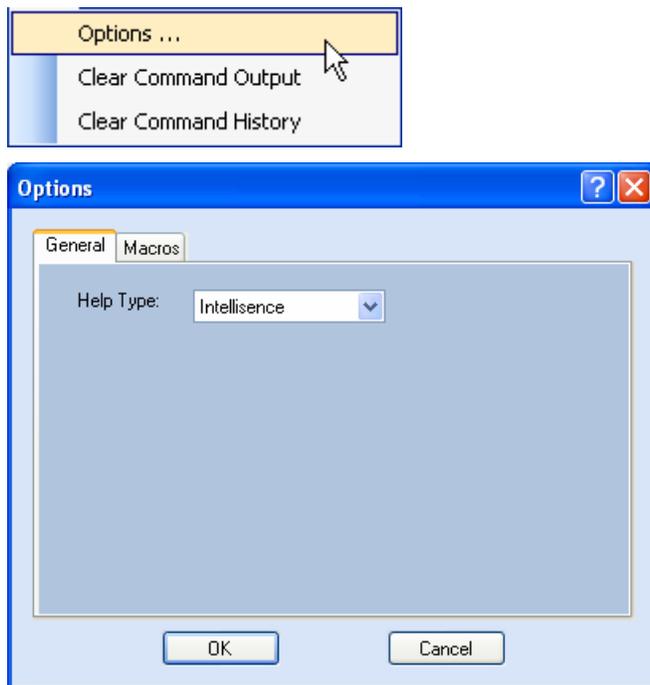
RTT - Tag Performance Page

The **Tag Performance** page is used to test the reader performance. This page is useful for range (distance) testing and to verify the RF field size.

To initiate a timed test, enter the length of test (in ms) into the **Total Query Time** field. For example, to verify to number of tags read in a 30-second interval, select **Active** Operating Mode, enter 30000, and press the **Start** button. The test will complete after 30 seconds and the output statistics are updated for the poll time.

Output statistics are read-only and include: Total Unique Tags, Tag Read Count, Cumulative Rate, Current Rate.
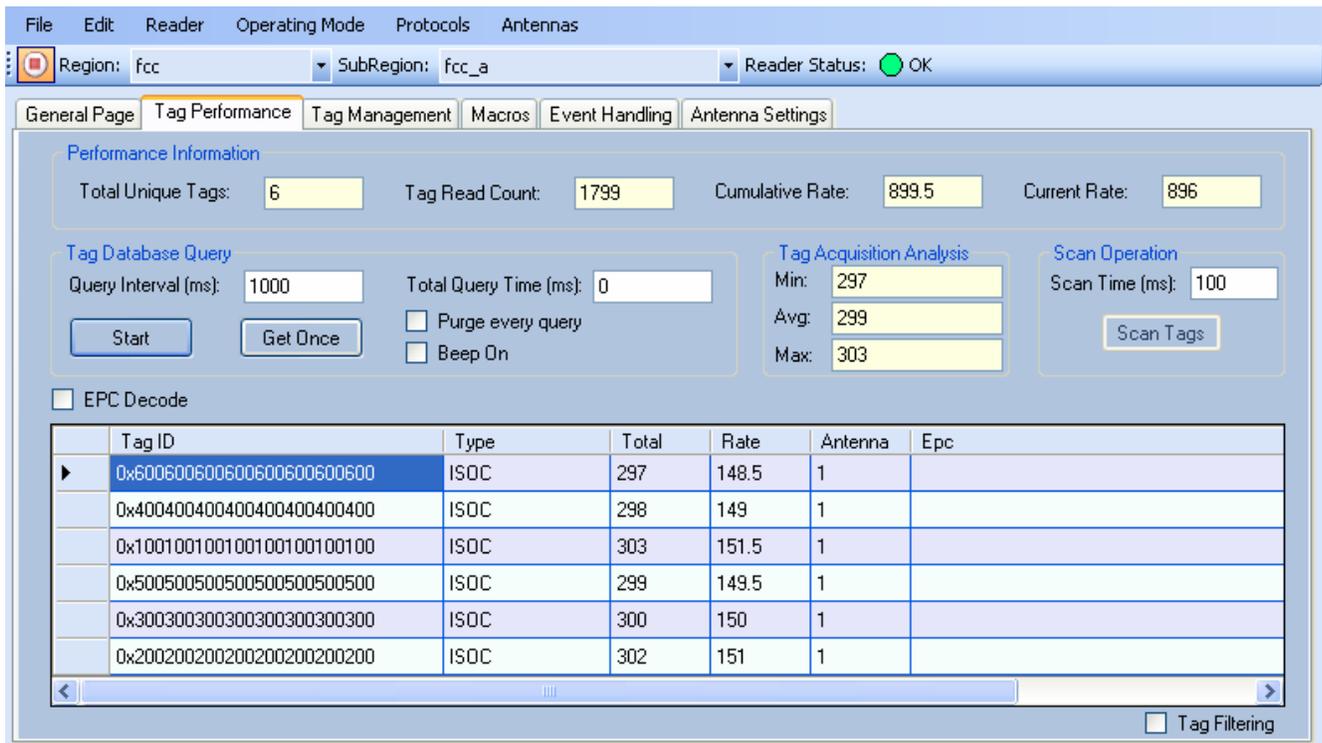
Detailed descriptions of the various **Tag Performance** fields and functions are provided in the following sections.

Tag and reader performance data is provided in the **Performance Information** and **Tag Acquisition Analysis** blocks.

Performance Information

Total Unique Tags – Number of unique tags in the tag database.

Tag Read Count – Total number of tags read (including repeat reads).

Cumulative Rate – Cumulative read rate in tags/second since the **Start** button was pressed.

Current Rate – Current read rate in tags/second.

Tag Database Query Controls
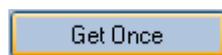
Get Once	Click to retrieve the current information from reader's tag database.
Start	Click to query the tag database every **Query Interval (ms)** for a total time of **Total Query Time (ms)**. Do not set the interval less than 500. If Total Query Time is set to 0, query continues indefinitely.
Stop	Click to stop automatic query.
☑ Beep On	Indicates current read rate with audible tone.
☑ Purge every query	Check to purge the reader's tag database after each query. Refer to the *IDentity 4100 Protocol Reference Guide* for more information on the tag database.

Tag Acquisition Analysis

The **Tag Acquisition Analysis** fields provide the minimum, maximum, and average number of times each tag was read. For example, assume five tags (A, B, C, D, and E) are read 107, 59, 223, 187, and 94 times respectively. The displayed values are as follows:

Min = 59

Avg = 134

Max = 223

Scan Operation

Scan time (ms) – Enter the duration of reader operation in milliseconds. After this time expires, the tag information is displayed.
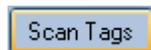
Scan Tags Press this button to activate the reader.

Purge and Clear Reader Statistics

Select the reader and then select **Edit→Purge and Clear Statistics**.

Options …
Purge and Clear Statistics
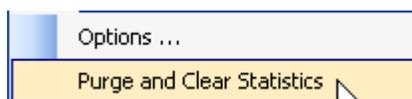
RTT - Tag Management Page

The **Tag Management** page is used for reading individual fields on a single tag. The **Read** button will cause the reader to singulate and read a tag in the selected antennas' RF field. You can also write the Access Password, User Data, and Tag ID. Specific fields you can read and write include:

➤ Kill Code

➤ Access Code

➤ Tag ID

➤ TID

➤ User Data
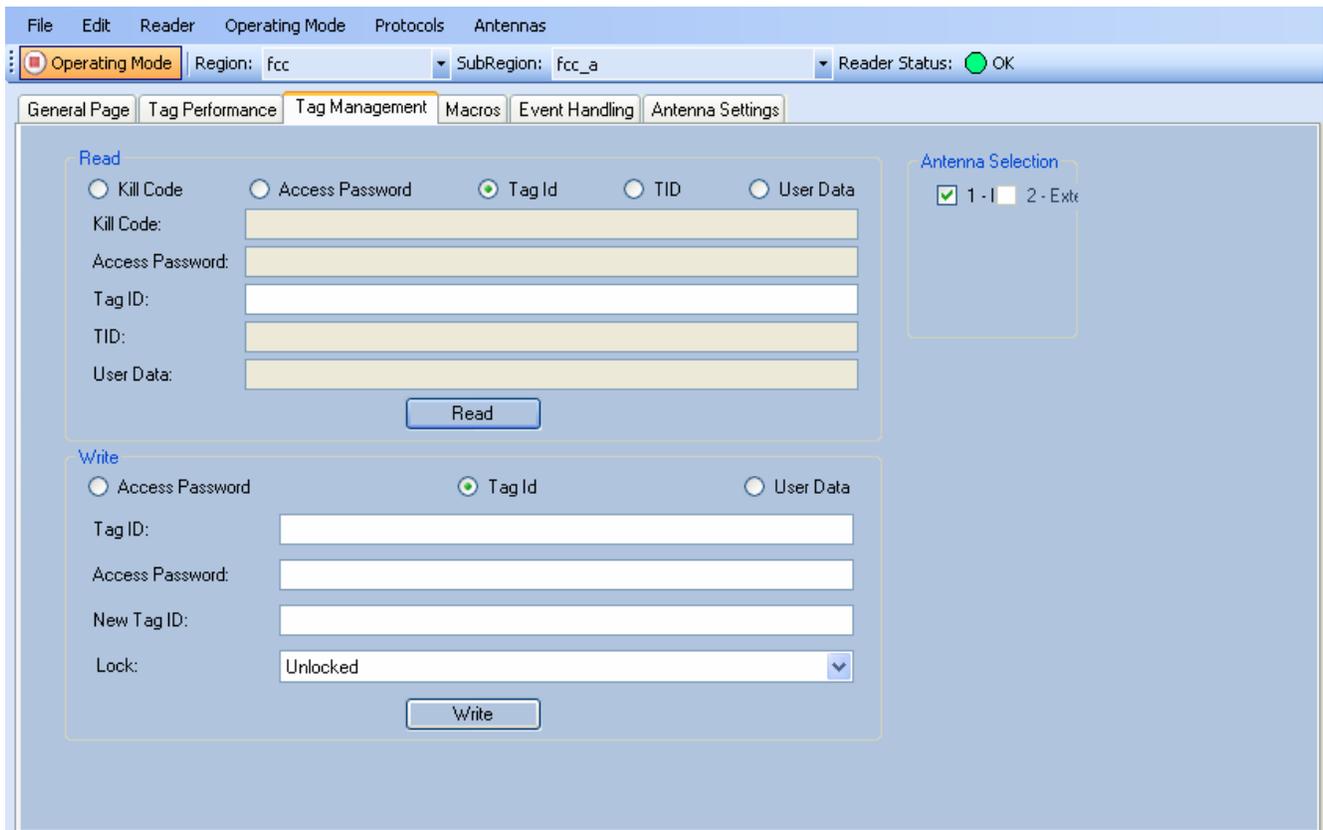
Clear Read and Write Fields

To clear the Read or Write fields, select **Edit→Clear…**.

RTT - Macros Page

The **Macros** page allows the reader to manage macro files. The macros are provided by Sirit or can be written by the end user. Some of the macros provided are dependent on the operating region of the reader.
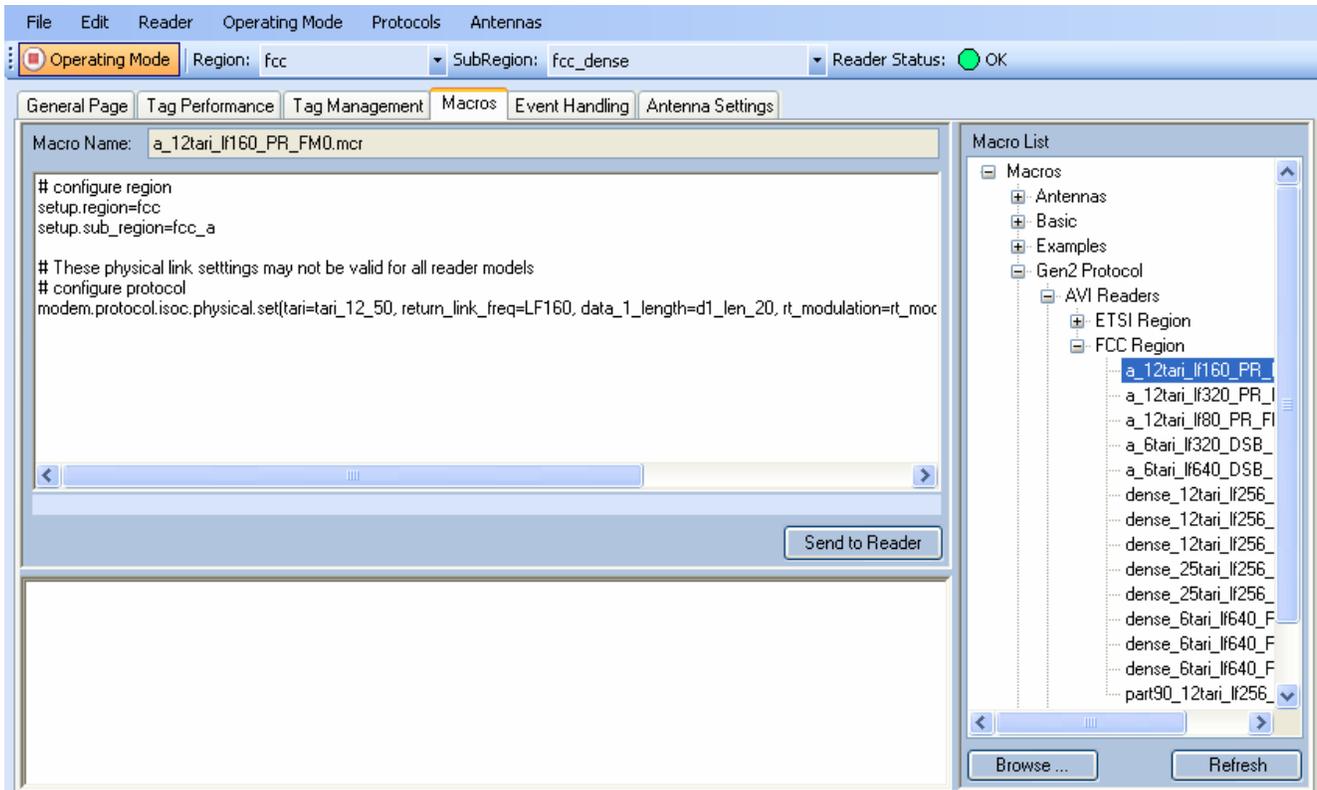
A macro (script or command file) is a text file that contains one or more reader commands. These commands are used to configure the reader to a known configuration. The Macros can contain variables. These variables are resolved by a dialog box (**Macro Variables**) that appears when the **Send to Reader** button is selected. The syntax of a variable is:

    [$variable_name]

During execution, the variable is replaced with user entries in the **Macro Variables** dialog box. Macros can be edited with any text editor including Windows Notepad.

Macro Input sub-window

The **Macro Input** window shows the current script that will be sent to the reader when the **Send to Reader** button is selected. The text in the **Macro Input** window can be edited prior to being sent to the reader.

Macro Output sub-window

The **Macro Output** window is updated after the **Send to Reader** button is selected. Look at this window to verify that each command line in a script executed correctly. Look for the **-->> ok** response from the reader for each command line.

Macro Variables Dialog box

When a macro is sent to the reader, the values for variables must be resolved via this Windows Dialog box. You can **[tab]** to each value field and enter the desired value.

For example, one macro can be used for two different applications by using variables for antenna selection and transmit power.
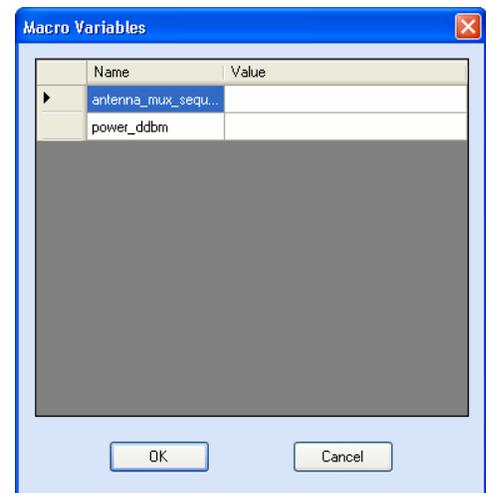
Macro Example

To configure the reader for FCC, Part 90 Dense operation, send the following macro (**part90_6tari_lf640_PR_M2.mcr**):

```
# configure region
setup.region=fcc
setup.sub_region=fcc_part90

# set frequency
setup.advanced.preferred_frequencies=915950

# configure protocol
modem.protocol.isoc.control.auto_phy.enable=false
modem.protocol.isoc.physical.set(tari=tari_06_25,
return_link_freq=LF640, data_1_length=d1_len_20,
rt_modulation=rt_mod_pr,
tr_encoding=tr_enc_miller_2,interrogator_mode=dense)
```

RTT - Event Handling Page

The **Event Handling** page allows you to register for Reader Events. After registration, events will be displayed as they occur in the window. Individual events or a group of events can be registered. Events are displayed with the newest event on the bottom and scrolled up as new events are added to the window. The least recent event will scroll to the top of the window.

For detailed information on individual events, refer to *Chapter 18 – Events Namespace* of the **ID***entity* **4100 Protocol Reference Guide**.
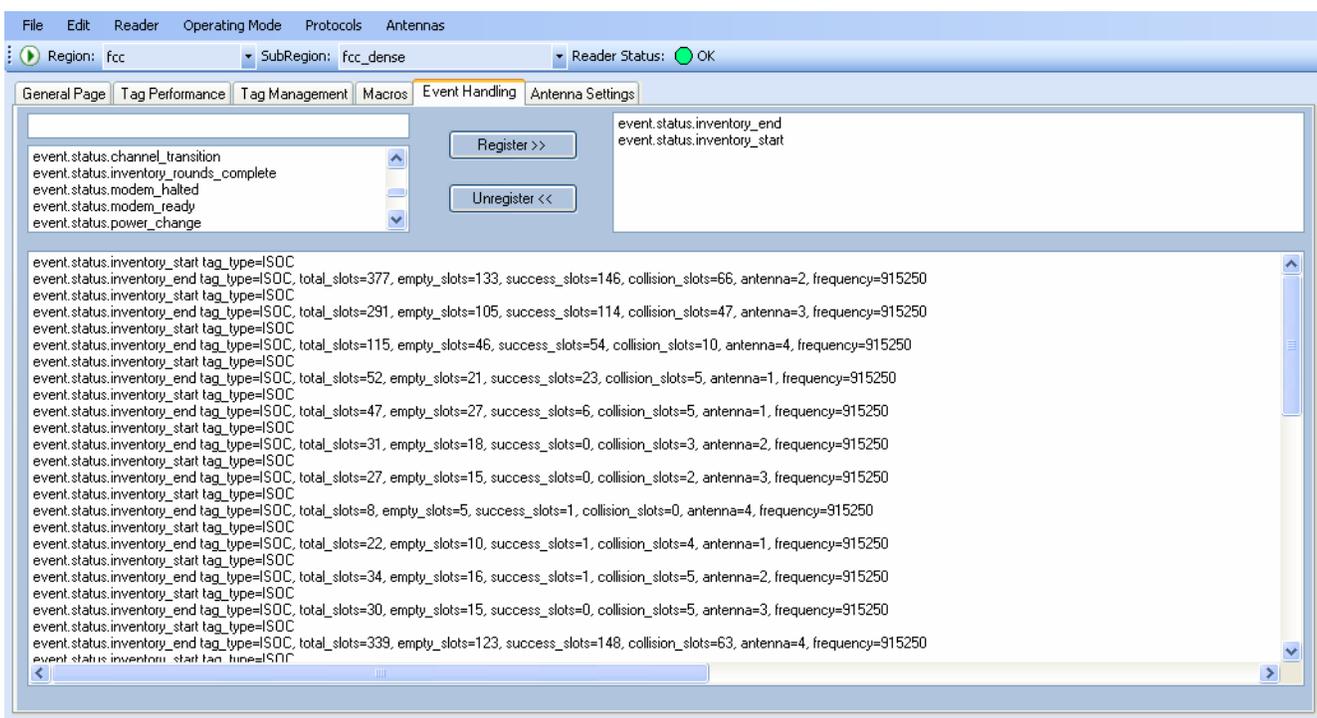
Registering for an individual event

To register for an individual event, either type the event name or select an event from a pull-down list.

Registering for a group of events

Registering for **event.error** events, will cause the reader to autonomously send all events in the **event.error** namespace to the RTT program and be displayed in the window of this page. Enter **event.error** in the **Events:** field and press the **Register** button. The **Clear** button can be selected at any time to clear the window.

RTT - Antenna Settings Page

The **Antenna Settings** page allows you to adjust the power settings for each antenna. Only the controls for those antennas that are connected are activated.
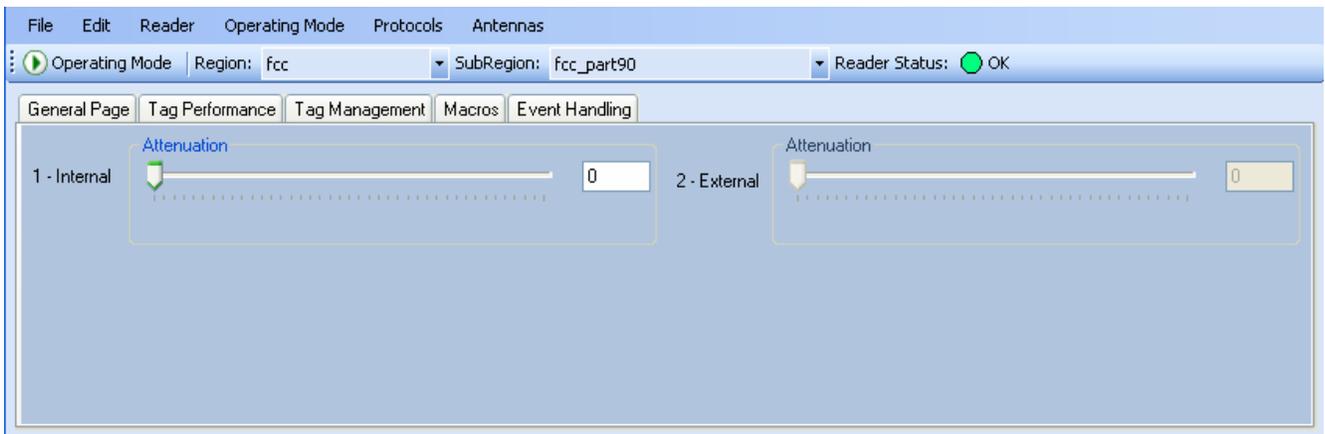
Reader Diagnostics Tool (RDT)

The Reader Diagnostic Tool (RDT) is to be used by Sirit trained technicians to troubleshoot and diagnose various reader issues. Administrator login is required.

To use RDT, you must login as an administrator, perform the following. When you first start RDT, the following login will appear:

Enter your **Password**. Enter **readeradmin** or your current administrator password. Press **OK**.

Channel Statistics

The **Channel Stats** page shows details of channel changes. This page is typically used to observe regional behavior.

RDT - Alarms

The **Alarms** page is used to capture autonomous alarms generated by the reader during normal operation. The alarms are defined as autonomous reader events for the following namespaces:

```
event.error

event.warning
```
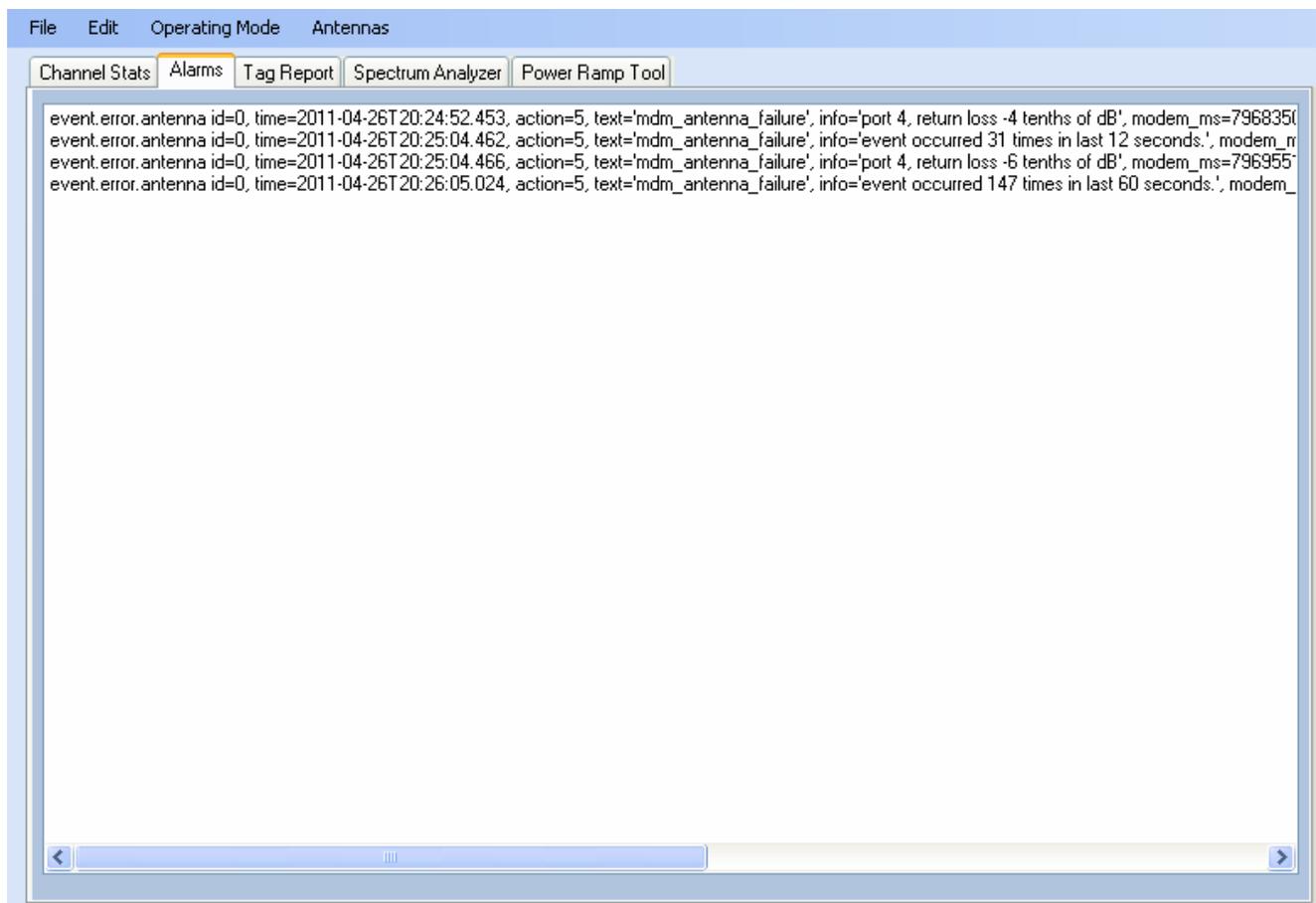
RDT - Tag Report

The Tag Report page is used to view specific information for each tag singulation. This feature provides detailed attributes of tag singulations such as tag power (RSSI) and on which antenna that tag singulated.

⚠	**Caution:**	*Use of this tool can adversely affect tag reader performance, particularly if many tag fields are enabled. Use the* **RTT->Tag Performance** *page for normal tag performance testing.*
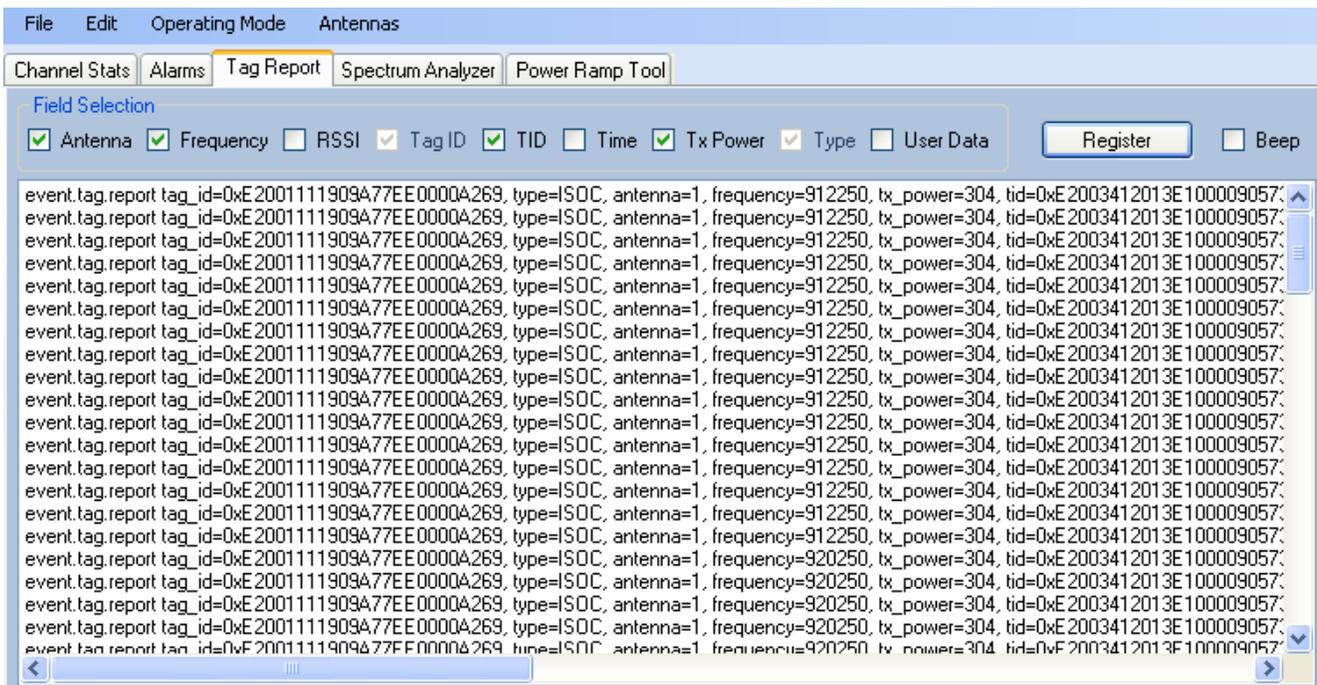
RDT - Spectrum Analyzer

The Spectrum Analyzer allows you to examine the spectral composition of the radio waves in your surrounding environment. This feature provides a graphical representation of the current spectral RF noise in units of dBm with a range of 0 to -120 dBm. This feature is intended for expert users to verify RF environmental conditions during an installation.

Set the **Center Frequency** and **Span** fields to view the desired range of frequencies. The Spectrum Analyzer settings are saved and are recalled when RDT is restarted the next time.

> ⚠️ **Caution:** *Using this feature during normal reader operation can significantly degrade tag reading performance.*
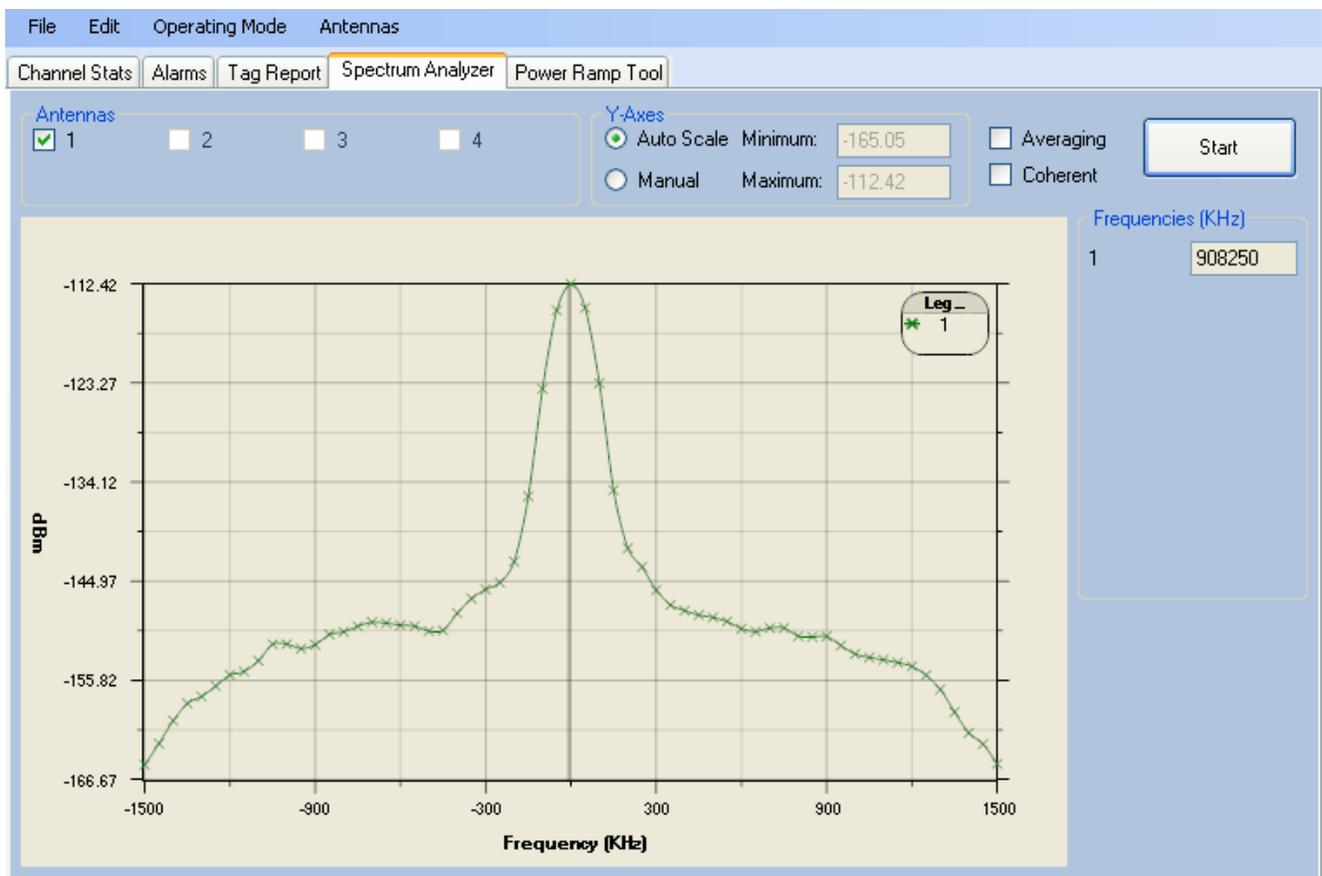
Power Ramp Tool

The Power Ramp Tool determines the minimum power to activate a tag and can help determine tag quality. This activation power level can help determine the read range at various attenuation levels and, for AVI applications, can help determine the "read-zone" or an antenna pattern.

The tool starts by configuring the reader to start transmitting at a high attenuation level (usually maximum allowed for reader) and decrements the level until it observes a response from the tag. The transmitter is turned off and the minimum value to activate the tag for a given antenna and distance is reported.
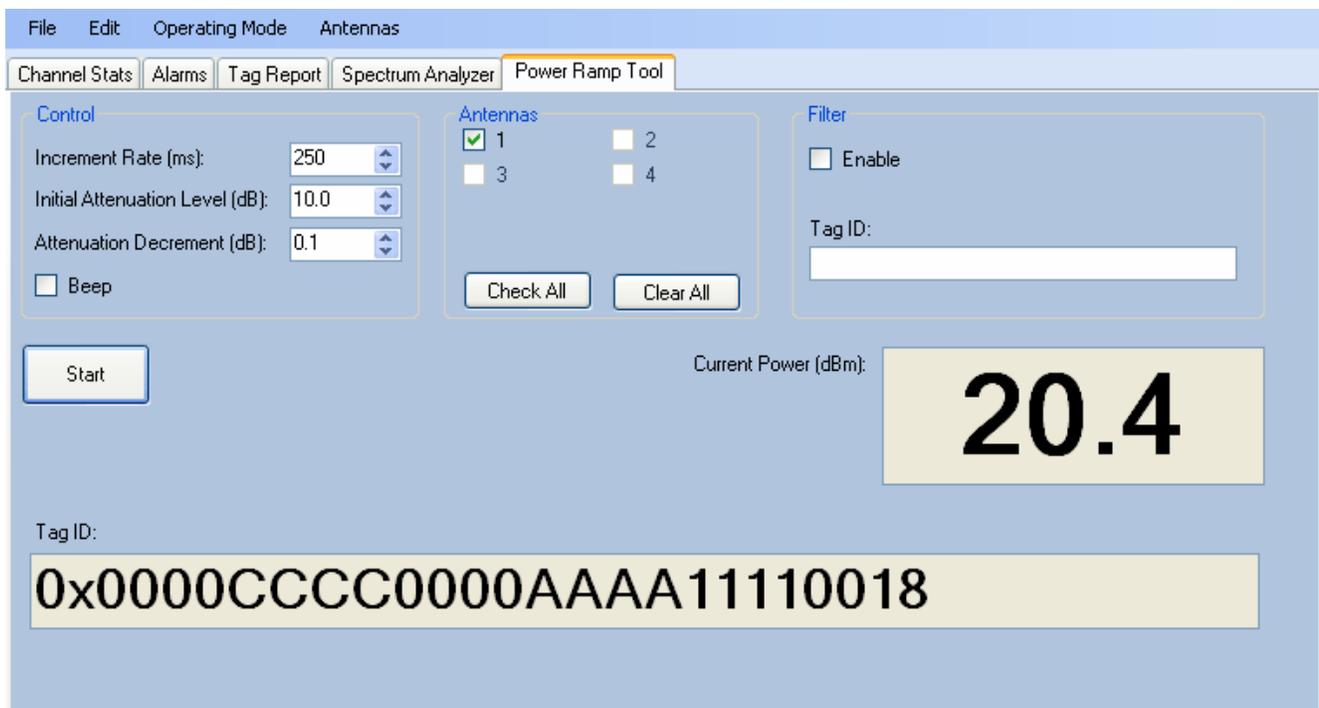
The Power Ramp controls include:

➤ **Increment Rate (ms)** – Time tool stays at a particular power level before incrementing to the next power level.
➤ **Initial Attenuation Level (dBm)** – Starting attenuation level.
➤ **Attenuation Decrement (dBm)** – Step-size for attenuation decrement.
➤ **Antennas** section allows you to select which antenna(s) to test with.
➤ **Filter** section allows you to apply a filter to only look for a particular tag.

AVI Lane Mapper

The AVI Lane Mapper application determines the tag read rate and the signal strength of tags in toll lane antenna field. This helps identify weak and strong areas within the antenna field.

Please refer to Appendix A for information on using the AVI Lane Mapper application.

Embedded Reader Configuration Tool (RCT)

The Embedded Reader Configuration Tool (RCT) allows you to access your
reader across a LAN or WAN by entering the reader's IP address into your
web browser. With the RCT, you can fully configure your reader for operation
in a variety of applications and environments. With this application, you can
perform the following:

➤ Basic Configurations
➤ Advanced Configurations
➤ Check System Status
➤ Access the online Help

To access the RCT, press the [Configure] button on the main RST page.

Basic Configuration

With the Basic Configuration functions you can perform the following:

➤ Manage reader profiles
➤ Set tag protocols
➤ Setup the Ethernet/LAN configuration
➤ Setup the serial port
➤ Setup digital accessories
➤ Setup antennas/cables
➤ Set regulatory modes
➤ View setup summary

Configuration Page Header

Each page displayed by the RCT has the following header.

This header provides pull-down menus for each of the configuration function categories. Additional functions include the user login and the currently loaded reader profile.

Login

The reader's default user level is **guest**. However, a user can login as **admin**. If not logged in as **admin**, the default level is always **guest**.

The guest login level provides read-only access to the reader. Clients that login in at the guest level can read the settings of the reader and can access the tags that the reader has inventoried. Clients at this level cannot change the configuration of the reader.

The admin login level provides read-write access to the reader. Clients that login in at the admin level can read and write the settings of the reader and can access the tags that the reader has inventoried.

Logout

After logging in as **admin**, the **Logout** button logs you out of the reader. Logging out automatically sets the login level to guest.

Profile

Profile is the currently active profile in the reader. Refer to the *Manage Profiles* section for detailed information on reader profiles.

Save

The Save button saves the reader's current configuration to the specified profile. Refer to the *Manage Profiles* section for detailed information on reader profiles.

Manage Profiles

This link allows you to list, save, and delete profiles. Refer to the *Manage Profiles* section for detailed information on reader profiles.

Manage Profiles

The reader's configuration is stored in a profile. A profile contains the setting of all the configuration variables in the reader. The reader can support up to 8 unique profiles. Detailed information about reader profiles is provided in *Chapter 4 – Reader Behavior* of the **IDentity 4100 Protocol Reference Guide**.

The **Manage Profiles** page provides a list of all profiles stored in the reader.

Save a Profile

To save your current reader configuration under a new profile, enter a profile name and press **Save**. The new profile will appear in the Profile Name list. Profile names must consist of the characters A - Z, a - z, 0 - 9, '-' or '_' and must be between 1 and 32 characters in length. The reader can store up to 8 different profiles.

Profile Names

*The profile name **factory** is reserved and cannot be used. This profile is a read only profile.*

Activate a Profile

To activate a previously saved profile, press the **Activate** button beside the profile name. The selected profile will be loaded into the reader.

Delete a Profile

To delete a previously saved profile, press the **Delete** button beside the profile name. This is a destructive operation. Once a profile is deleted, it cannot be recovered.

Reset to Factory Default

In addition to managing reader profiles, you can also reset the reader back to its factory default configuration. From the Profiles page select one or more of the following:

➤ **Stop All Embedded Applications** – This option terminates any embedded applications currently running on the reader.

➤ **Reset Serial Port** – This option resets the serial port configuration to the factory default settings.

➤ **Reset Network Interface Configuration** – This option resets the network configuration to factory defaults.

Set Tag Protocol

Basic Configuration
- Manage Profiles
- Set Tag Protocol
- Setup Ethernet/LAN
- Setup Serial Port
- Setup Digital Accessories
- Setup Antenna/Cables
- Set Regulatory Mode (Region)

This **Set Tag Protocol** page consists of two forms. The first form (top) allows you to select which type of tags the reader will acquire or the type of protocol(s) to utilize on the air interface. Currently, the reader can operate with either ISO18000-6C (ISOC), ISO18000-6B (ISOB), SuperTag, ISO10374, EASALARM, Flex, ISOB_80K, or any combination.

Protocols: ☑ ISOC ☑ ISOB ☑ SUPERTAG ☑ EASALARM ☑ ISO10374 [Enable Selected Protocols]

Select Protocol to Configure:

| ISOC/EASALARM | ISOB | SUPERTAG | ISO10374 |

[Submit Reset]

Protocol Licenses

Some protocols requirespecific licenses or are only available with certain reader configurations. Contact Sirit Customer Service for more information

Select the check box for the protocol(s) to enable and then press **Enable Selected Protocols** to activate the protocol.

To configure protocol level parameters, select the protocol button [ISOC].

The protocol level parameters are divided into two categories: control and physical. Control parameters configure the protocol control. Physical parameters configure the physical air interface for the protocol.

Control

Name	Value	?
Command Retried	3	?
Display Tag CRC	false	?
Mem Bank For Selection	membank_epc	?
Number Slots Q	0	?
Select Cmd Period	1	?
Session ID	session_0	?
Transmit Attenuation	0	?
User Block Write	false	?

Physical

Name	Value	?
Data 1 Length	d1_len_20	?
Interrogator Mode	dense	?
Modulation Depth	90	?
Pilot Tone	true	?
Return Link Freq	lf640	?
Reader to Tag Modulation	rt_mod_pr	?
Tari	tari_06_25	?
Tag to Reader Encoding	tr_enc_miller_8	?

For detailed information on each of the Control and Physical parameters, refer to *Chapter 15 – Modem Namespace* of the **ID***entity* **4100 Protocol Reference Guide.** Parameter descriptions are provided in the `modem.protocol.isoc.control` and `modem.protocol.isoc.physical` configuration variable sections.

Setup Ethernet/LAN

The Setup Ethernet/LAN page allows you to configure the network interface of the reader.

Basic Configuration
- Manage Profiles
- Set Tag Protocol
- Setup Ethernet/LAN
- Setup Serial Port
- Setup Digital Accessories
- Setup Antenna/Cables
- Set Regulatory Mode (Region)
- Setup Summary

NOTE:

Always record the IP, Mac, subnet, and default gateway addresses for your readers and keep this data in a safe location. You can use this data to reconfigure the network in the event of application failure or data loss.

General Settings

Name	Value	?
Host Name	ABCDEFG	?
Command Port	50007	?
Event Port	50008	?
Domain Name	sirit.com	?
Mac Address	00:17:9E:00:01:34	?

IPv4 Settings

Name	Value	?
Method	dhcp	?
IP Address	10.1.1.54	?
Subnet Mask	255.255.255.0	?
Default Gateway	10.1.1.1	?

IPv6 Settings

Name	Value	?
Method	static	?
IP Addresses	aa::205/64	?
Default Gateway	none	?

Other Settings

Name	Value	?
NTP Servers	Platfom 1	?
DNS Servers	10.1.1.2 10.1.1.18	?
Domain List	sirit.com	?

General Settings allow you to specify the host and domain name of the reader. The Command and Event Ports are also shown and are read-only. You can also select your domain name in this window.

IPv4/IPv6 Settings allow you to configure the reader's IP address. If the reader is to automatically acquire its IP address, subnet mask and default gateway from a DHCP server, select **Enable DHCP**. To manually specify this information, deselect **Enable DHCP** and fill in the desired IP address, subnet mask and default gateway.

Other Settings allow you to configure the NTP servers the reader can contact to obtain the current time, DNS servers the reader can contact for domain name resolution, and the Domain list to resolve names to IP addresses.

Enter all the required information and press **Submit**.

Setup Serial Port

The Setup Serial Port function allows you to configure the serial port parameters. These parameters include:

➤ Baud rate
➤ Data bits
➤ Parity
➤ Echo
➤ Stop bits

Name	Value	?
Baudrate	115200 ▾	?
Data Bits	8 ▾	?
Parity	NONE ▾	?
Echo	true ▾	?
Stopbits	1 ▾	?
	Submit Reset	

Use the pull-down menus to select a value and press **Submit** to update the reader.

Setup Digital Accessories

The Setup Digital Accessories function allows you to configure the Digital Inputs and Outputs on the reader.

Basic Configuration
- Manage Profiles
- Set Tag Protocol
- Setup Ethernet/LAN
- Setup Serial Port
- Setup Digital Accessories
- Setup Antenna/Cables
- Set Regulatory Mode (Region)

Digital Input

Name	Current Value	Debounce	[?]
1	true	30	?
2	true	30	?
3	true	30	?
4	true	30	?

Digital Output

Name	Current Value	[?]
1	false	?
2	false	?
3	false	?
4	false	?

Submit Reset

Digital Input

The status of the four digital input values (1–4) can be seen in this window. The **Current Value** is not configurable and is shown as **true** or **false**. The Debounce value can be set and is in milliseconds.

Digital Output

The output value for each digital output can be set to **true** or **false**. Press the **Submit** button to send the appropriate commands to the reader to update the digital inputs and outputs.

Refer to the **IDentity 4100 Protocol Reference Guide** for more information on configuring the digital inputs and outputs.

Setup Antenna/Cables

Basic Configuration
- Manage Profiles
- Set Tag Protocol
- Setup Ethernet/LAN
- Setup Serial Port
- Setup Digital Accessories
- Setup Antenna/Cables
- Set Regulatory Mode (Region)

This page allows you to configure the properties of the reader's antenna configuration. For detailed description of each of the antenna and cable variables, refer to Antenna Configuration in *Chapter 4 – Reader Behavior* of the **IDentity 4100 Protocol Reference Guide**.

Enter the appropriate values for each antenna parameter and press the **Submit** button to update the antenna and cable configuration.

Name	Value	?
Detected Antennas	1 2	?
Port Count	2	?
Mux Sequence	2	?

This table provides information related to the individual antennas.

Name	Antenna 1	Antenna 2	?
Conducted Power	0	0	?
Attenuation	0	0	?
Cable Loss	3	18	?
Gain	130	130	?
Gain Units	dbi	dbi	?
Computed Conducted Power	233 (ddBm), 0.21 (W)	248 (ddBm), 0.3 (W)	?

Antenna Gain

Antenna gain may differ, depending on the specific regulatory region.

Antenna Setup

The reader is configured at the factory to operate with specific antennas.

Set Regulatory Mode (Region)

This page allows the user to configure the reader to meet the regulatory requirements for the geographic region where the reader is deployed. The sub-region sets the secondary regulatory mode for the geographic region where the reader is deployed.

Basic Configuration
- Manage Profiles
- Set Tag Protocol
- Setup Ethernet/LAN
- Setup Serial Port
- Setup Digital Accessories
- Setup Antenna/Cables
- Set Regulatory Mode (Region)

Region Selection

The reader is configured at the factory to operate within a specific regulatory region. As a result your region selections may be different from those shown in this manual.

Note that Region Selection is not user configurable.

Name	Value	?
Region	fcc	?
Sub Region	fcc_b	?

Submit Reset

For detailed information on each of these parameters, refer to the **ID*entity* 4100 Protocol Reference Guide**. Descriptions are provided in the `setup.region` and `setup.sub_region` configuration variable sections.

Setup Summary

This page allows you to quickly setup the basic operational parameters of the reader.

Setup Summary

Name	Value	?
Region	fcc	?
Sub Region	fcc_dense	?
Install Type	vehicle	?
Protocols	☑ ISOC ☐ EASALARM	?

Antenna Selection

Name	Value	?
Antennas	☑ 1 ☐ 2	?

Advanced Functions

With the Advanced Functions you can perform the following:

➤ Firmware Management

➤ Import/Export Configuration

➤ Command Line operations

➤ Expert Configuration

➤ User Application Management

➤ Change Operating Mode

➤ Restart

➤ View and edit the Wiegand Translation Table

Firmware Management

This page allows you to perform the following:

➤ Read the current reader firmware version

➤ Upgrade the reader firmware files

➤ Rollback to the previous reader firmware version

➤ Upgrade Wiegand component firmware files (note you can not rollback
the Wiegand firmware)

Enter the name of the Sirit provided firmware file in the **Firmware File** field.
Use the **Browse** button to help locate the file.

The **Rollback Firmware** button will roll back the reader firmware to the
previous version.

Import/Export Configuration

This page allows you to transfer reader configurations, license files, security keys, and Wiegand translation tables to or from your host computer. This is useful for configuring a reader to a known state.

Advanced Functions
- Firmware Management
- Import/Export Configuration
- Command Line
- Expert Configuration
- User Application Management
- Change Operating Mode
- Restart

Import Configuration to Reader

Configuration File: [_____] Browse... **?**

◉ XML File ○ Text File

[Import Configuration]

Export Configuration from Reader

[XML Format] [Text Format]

Import Licenses

This section is for importing of reader feature license files to the reader.

License File: [_____] Browse... **?**

[Import License]

Import Security Keys

This section is for importing of reader security keys to the reader.

Key File: [_____] Browse... **?**

[Import Security Keys]

Import Wiegand Translation Table

Translation
Table File: [Browse...]   **?**

[Import Table]

Export Wiegand Translation Table

This section is for exporting of the Wiegand Translation Table from the reader.

[Export Table]

Import Application Package

Click below to import a previously saved application package file. Note that importing this package will overwrite any scripts with the same names as scripts in the package, and will overwrite all autostart information.

Package File: [Browse...]   **?**

[Import Package]

Export Application Package

Click below to export a package which includes all applications stored on the reader, as well as their autostart status & arguments. This package can be imported to another reader in order to replicate the application environment.

[Export Package]

Import Configuration to Reader

Enter the name of a saved configuration file in the **Configuration file** field. Select the **XML File** option and press the **Transfer Configuration to Reader** button to send the profile to the reader.

Export Configuration from Reader

This function is used to export the current reader settings for later uploading. Press the **XML Format** button to view the XML file in the browser. Save this file to your computer if you wish retain it for future.

If you wish to view the current configuration parameters for a reader, press **Text Format** button.

Import Licenses

This function is used to import a feature license file. Navigate to the license file and press **Import License** to load the file into the reader.

Import Security Keys

This function is used to import reader security keys to the reader. Navigate to the key file and press **Import Security Keys** to load the file into the reader.

Export Security Keys

This function is used to export reader security keys from the reader. Enter the commissioning password and the mac address file containing a list of readers (each number followed by a carriage return) to allow import of these keys. Navigate to the mac address file and press **Export Security Keys** to load the file into the reader.

Import Wiegand Translation Table

This function is used to import a Wiegand translation table to the reader. The file will typically have a `.csv` extension.

Export Wiegand Translation Table

This function is used to export a Wiegand translation table from the reader. The file extension will default to `.csv`.

Import Application Package

This function is used to import a set of user applications, along with each application's arguments and autostart status.

Export Application Package

This function is used to export the user applications, along with each application's arguments and autostart status.

Command Line

Advanced Functions
- Firmware Management
- Import/Export Configuration
- Command Line
- Expert Configuration
- User Application Management
- Change Operating Mode
- Restart

This page allows you to directly enter reader commands from your web browser.To directly enter commands from the Command Line Interface (CLI), refer to the **ID***entity* **4100 Protocol Reference Guide**.

```
Command : reader.check_status()          [ Send ]
Response
ok
reader_uptime = 24183,
in_use_memory = 61427712,
free_memory = 2076672,
cpu_load = 2,
modem_alive = true,
modem_uptime = 24075,
antenna_status = ok,
tx_interlock = false,
synth_locked = true,
ps_fault = true
```

Expert Configuration

The Expert Configuration functions allow you to configure low-level functions within the reader. These functions should only be accessed by expert users. Expert configurations include:

➤ Setup

➤ Tag

➤ Version

➤ Information

➤ Communication

➤ Antennas

➤ Digital I/O

➤ Modem

Expert Configuration – Setup

This page allows you to set the basic operating parameters of the reader including region, sub region, mode, and active protocols. You can also view the valid protocols and regions.

Name	Value	?
setup.default_login_level	admin	?
setup.install_type	vehicle	?
setup.operating_mode	active	?
setup.protocols	isoc	?
setup.region	fcc	?
setup.sub_region	fcc_dense	?
setup.sub_region_class	na	?
setup.tag_volume	1	?
setup.valid_protocols	isoc easalarm iso10374 isob supertag	?
setup.valid_regions	fcc	?
setup.valid_sub_regions	fcc_dense fcc_a fcc_b fcc_c	?
setup.advanced.preferred_frequencies	0	?

Expert Configuration – Tag

Advanced Functions
- Firmware Management
- Import/Export Configuration
- Command Line
- Expert Configuration
- User Application Management
- Change Operating Mode
- Restart

This page allows you to configure how the reader reports tags.

The ID*entity* 4100 supports the ability to filter tags. Filtering tags means to eliminate tags from being reported based on the conditions specified in the filter configuration variables. The reader supports eight filters and each filter is specified by the following configuration variables:

➤ **name** – Name given to the tag filter

➤ **pattern** – Pattern (as an array of hex bytes) for the tag filter

➤ **enabled** – Enables or disables the filter.

➤ **inclusive** – Indicates to either include tags that match (Inclusive) or include tags that do not match (Exclusive) the tag filter.

➤ **mask** – Mask (as an array of hex bytes) for the tag filter.

The following figure shows only a small sample of the available tag configuration variables.

Name	Value	?
tag.db.create_entry_on_arrival	false	?
tag.db.max_count	50000	?
tag.db.max_user_data	64	?
tag.filter.1.enabled	false	?
tag.filter.1.inclusive	true	?
tag.filter.1.mask	00	?
tag.filter.1.name		?
tag.filter.1.pattern	00	?
tag.filter.antenna_cross.enabled	false	?
tag.filter.antenna_cross.max_speed	10	?
tag.filter.antenna_cross.performance_metric	10	?
tag.filter.portal_cross.enabled	false	?
tag.filter.portal_cross.1.threshold	100	?
tag.filter.portal_cross.2.threshold	100	?
tag.reporting.antenna_cross_fields	tag_id antenna	?
tag.reporting.arrive_fields	tag_id	?
tag.reporting.arrive_generation	no_wait	?

Expert Configuration – Version

This page displays the version of reader hardware and reader software within the reader. The version numbers are read-only and will be needed if you contact Sirit for technical support.

Name	Value	?
version.hw	C	?
version.hw_detail	hw = 0x0003, rf_assembly = KX0070, rf_serial_number =	?
version.rollback	3.0.12859	?
version.sw	3.0.12959	?
version.sw_detail	sw = 3.0.12959, fw = 12959, dsp = 0.4, fpga = 0x3027	?

Expert Configuration – Information

This page allows you to customize the reader's identity. You can assign each reader a name, description, location, and zone. You can also set how the reader reports timestamps.

Name	Value	?
info.description	Reader Entry 12B	?
info.location	Parking 103	?
info.make	INfinity	?
info.manufacturer	Sirit	?
info.manufacturer_description	Sirit IDentity 4100 Reader	?
info.model	4100	?
info.name	unknown	?
info.serial_number	15764802E0457854	?
info.sub_model	1	?
info.time	2009-12-17T22:12:44.947	?
info.time_reporting	local	?
info.time_zone	GMT	?
info.zone	unknown	?

Expert Configuration – Communication

Advanced Functions
● Firmware Management
● Import/Export Configuration
● Command Line
● Expert Configuration
● User Application Management
● Change Operating Mode
● Restart

This page allows you to customize the reader's communication parameters. Refer to the **Setup Ethernet/LAN** and **Setup Serial Port** sections for additional information.

The following figure shows only a small sample of the available reader communication variables.

Name	Value	?
com.event.overflow_backoff_time	3	?
com.network.dns_servers	10.1.1.2 10.1.1.18	?
com.network.domain_list	sirit.com	?
com.network.domainname	sirit.com	?
com.network.hostname	00179E002764	?
com.network.ntp_servers	10.2.0.1	?
com.network.tcpkeepalive	true	?
com.network.1.default_gateway	10.1.1.1	?
com.network.1.ip_address	10.1.1.60	?
com.network.1.ipv6_address	fe80::217:9eff:fe00:2764/64	?
com.network.1.ipv6_default_gateway	none	?
com.network.1.ipv6_method	radv_only	?
com.network.1.mac_address	00:17:9E:00:27:64	?
com.network.1.method	dhcp	?
com.network.1.settings	method=dhcp, ipv6_method=radv_only	?
com.network.1.subnet_mask	255.255.255.0	?

Expert Configuration – Antennas

Advanced Functions
- Firmware Management
- Import/Export Configuration
- Command Line
- Expert Configuration
- User Application Management
- Change Operating Mode
- Restart

This page allows you to configure the properties of the reader's antenna configuration. For detailed description of each of the antenna and cable variables, refer to the Antenna Configuration section in *Chapter 4 – Reader Behavior* of the **ID***entity* **4100 Protocol Reference Guide**.

Name	Value	?
antennas.configuration	all_monostatic	?
antennas.detected	1 2	?
antennas.max_computed_conducted_power	330	?
antennas.max_set_conducted_power	300	?
antennas.mux_sequence	1 2	?
antennas.part90_computed_conducted_power_increase	10	?
antennas.port_count	4	?
antennas.tx_limit	15	?
antennas.1.conducted_power	0	?
antennas.1.label	unknown	?
antennas.1.position	0 366	?
antennas.1.rssi_spread	200	?
antennas.1.advanced.attenuation	0	?
antennas.1.advanced.cable_loss	18	?
antennas.1.advanced.computed_conducted_power	248	?
antennas.1.advanced.gain	130	?
antennas.1.advanced.gain_units	dbi	?
antennas.check.time	10000	?
antennas.check.type	timed	?
antennas.lbt.listen_port	lbt_antenna_all	?
antennas.tx_limit.enabled	false	?

Expert Configuration – Digital I/O

Advanced Functions
- Firmware Management
- Import/Export Configuration
- Command Line
- Expert Configuration
- User Application Management
- Change Operating Mode
- Restart

This page allows you to configure the digital inputs and output behavior. You can set the digital input debounce time (in milliseconds), as well as the input and output pin values. Refer to the **ID*entity* 4100 Protocol Reference Guide** for detailed information on each of these variables.

Name	Value	?
dio.debounce.1	30	?
dio.debounce.2	30	?
dio.debounce.3	30	?
dio.debounce.4	30	?
dio.in.1	1	?
dio.in.2	1	?
dio.in.3	1	?
dio.in.4	1	?
dio.in.all	0xF	?
dio.in.alarm.logic_level.1	1	?
dio.in.alarm.logic_level.2	1	?
dio.in.alarm.logic_level.3	1	?
dio.in.alarm.logic_level.4	1	?
dio.in.alarm.timeout.1	0	?
dio.in.alarm.timeout.2	0	?
dio.in.alarm.timeout.3	0	?
dio.in.alarm.timeout.4	0	?
dio.out.1	0	?
dio.out.2	0	?
dio.out.3	0	?
dio.out.4	0	?
dio.out.all	0x0	?

Expert Configuration – Modem

Advanced Functions
- Firmware Management
- Import/Export Configuration
- Command Line
- Expert Configuration
- User Application Management
- Change Operating Mode
- Restart

This page allows you to set the reader's modem control variables. These variables control functions such as EPC link, modulation depth, return link frequency, and others. Refer to the **ID*entity* 4100 Protocol Reference Guide** for detailed information on each of these variables.

The following figure shows only a small sample of the available modem configuration variables.

Name	Value	
modem.control.low_power	fullpower	?
modem.debug.db0	0	?
modem.debug.db1	0	?
modem.debug.db2	0	?
modem.protocol.iso10374.control.dwell_time	100	?
modem.protocol.iso10374.control.max_reads_per_dwell	0	?
modem.protocol.iso10374.control.min_dwell_time	5	?
modem.protocol.iso10374.control.tx_atten	0	?
modem.protocol.isob.control.auto_quiet	false	?
modem.protocol.isob.control.cmd_retries	3	?
modem.protocol.isob.control.tx_atten	0	?
modem.protocol.isob.control.ucode_epc_mode.enable	false	?
modem.protocol.isoc.physical.settings	tari=tari_12_50, data_1_length=d1_len_20, return_link_fr	?
modem.protocol.isoc.physical.tari	tari_12_50	?
modem.protocol.isoc.physical.tr_encoding	tr_enc_miller_4	?
modem.radio.idle_cw	false	?
modem.radio.lbt.enabled	false	?

User Application Management

Advanced Functions
- Firmware Management
- Import/Export Configuration
- Command Line
- Expert Configuration
- User Application Management
- Change Operating Mode
- Restart

This page lists any user applications currently available on the reader and if any applications are running. This page also allows you to upload scripts to the reader.

Running User Applications

There are no user applications running on the reader.

Application Transfer

Application to Transfer: [_____] [Browse...]
[Transfer File]

Applications available on the reader

Application Name	View	Delete
display_rs232.py	[View]	[Delete]

Start Applications

Type	Name	Options			Autostart	Submit
Python Applications	display_rs232.py	Arguments: [_____]			False	[Go]
Java Applications	TowersOfHanoi	Arguments: [_____] Class Path: [_____] Jar: [_____]			False	[Go]

➤ **Running User Applications** – Lists any user applications currently running on the reader. The application name, process ID, configuration, and status are provided. Controls are provided to view the application file and stop the application.

➤ **Application Transfer** – This function allows you to load custom user applications onto the reader.

➤ **Applications available on the reader** – This function allows you to view a list of all user applications stored on the reader. Controls are provided to view the application and delete it from the reader.

➤ **Start Applications** – This function allows you to start Python and Java applications.

Change Operating Mode

This page allows you to configure the operational mode of the reader.

The reader supports the following operational modes:

➤ **Active Mode** - Reader is continuously attempting to singulate tags and automatically reports any singulated tag via an asynchronous event notification on the event channel.

➤ **Stand By Mode** - Reader is not transmitting any energy, unless processing a tag related command. The RF transmitter is enabled at the beginning of the command processing, any protocol operations required for the command are performed, and then the RF transmitter is turned back off.

View Tags

All tags read by the reader are stored in a database on the reader. This page allows you to view the tags in the database as well as change the current Operating Mode (**Active** or **Stand By**).

Press **Start** to begin displaying the tag database. This page is automatically refreshed every five seconds. Press **Get Once** to update the database one time (refresh is off). Press **Purge** to purge all tags from the database.

Clicking on any of the column headers will sort the tag database display by that parameter.

Select	Operating Mode	?
⦿	Active Mode	?
○	Stand By Mode	?

Tag Database Display

Click on the 'Start' button to begin a display of the reader tag database and continuously refresh the display for the specified polling period. The 'Stop' button stops updating the display of the reader tag database. The 'Get Once' button can be used to display the reader tag database a single time. The 'Purge' button purges all tags from the reader tag database.

Tag ID	Protocol	Antenna	Repeat Counts	First Read Time	Last Read Time
0x1111222233334444455556666	ISOC	2	8327626	2009-09-15T20:33:46.088	2009-09-16T21:18:02.295

Polling Period (seconds): 5   Start | Stop | Get Once | Purge

Check Reader Status

This page allows you to view the reader status. This information can be used by Sirit Technical Support to verify reader operation.

System Status
- View Tags
- Check Reader Status
- Review Logs

System Status

This table shows the current status of the system.

Name	Value	Status	?
in_use_memory	44404736	INFO	?
modem_uptime	3382	INFO	?
reader_uptime	3418	INFO	?
free_memory	18812928	INFO	?
cpu_load	15%	INFO	?
filesystem:/apps	32%	INFO	?
filesystem:/	60%	INFO	?
filesystem:/tmp	1%	INFO	?
tx_interlock	false	NORMAL	?
synth_locked	true	NORMAL	?
ps_fault	true	NORMAL	?
antenna_status	ok	NORMAL	?
modem_alive	true	NORMAL	?

In addition, you can also view the status of the following:

➤ Services such as discovery, sshd, and console.

➤ Licensed Features such as Antenna Crossing, Stray Tag Elimination, and tag Phase Reporting

➤ Components such as the Wiegand Interface Module.

Services

This table shows the current status for the services running on the reader.

Name	Status	?
discovery	alive	?
sshd	alive	?
ssl_cmd_evt	alive	?
ntpd	stopped	?
c1.py	stopped	?
console	alive	?
snmpd	alive	?
wsd	stopped	?

Licensed Features

This table shows the current license state for the given features.

Name	License State	?
Antenna Crossing Feature	Not Licensed	?
Stray Tag Elimination Feature	Not Licensed	?
Tag Phase Reporting Feature	License Unlimited	?
Secure Reader Feature	License Unlimited	?
CalTrans Title 21 Protocol Feature	Not Licensed	?

Components

This table list the firmware components and their version.

Name	Version	?
Wiegand Interface Component	or.flash.read_failure	?

Review Logs

This page allows you to view the reader logs. These logs can be used by Sirit Technical Support to verify reader operation. The reader logs include:

➤ **Reader level Logs** – System level reader operation

➤ **System Level Logs** – Linux logs

➤ **Firmware Update Log** – System level

➤ **Reader Applications Log** – User application logs

➤ **Command History Log** – Recent commands sent to the reader

➤ **Wiegand Translation Logs** – Logs associated with the translation tables for the Wiegand Interface Module

System Status

This page shows current status of the system.

Number	Log Type
1	Reader level Logs
2	Reader level Logs (Previous)
3	System Level Logs
4	Firmware Update Log
5	Reader Applications Log
6	Command History Log
7	Wiegand Transaction Logs: 1 2 3 4 5 6 7 8 9 10

Wiegand Translation Table

This page allows you to view and edit the Translation Table used for Wiegand operation and also for the Standalone Access Control script.

The table is only displayed when the Wiegand component is active (when com.wiegand.enable is set to true). Buttons allow you to edit existing translation table entries, add new entries, or delete existing entries. You must click **Submit** to save table changes to the reader.

Configuring Digital Inputs and Outputs

Digital input and output signals are provided via the bulkhead connector. Refer to Chapter 8 – Specifications for the connector pin out. Refer to Figure 5 for in this chapter for an example input/output circuit.

This chapter describes how to configure the digital inputs and outputs.

Digital Inputs

The digital inputs (DIN1 – DIN4) can be used as general purpose inputs or to trigger the reader for tag reading. Unused or open digital inputs are floating inside the reader.

To activate the input, pull it low (0 VDC) with an external device or connection to ground that can sink 2.5 mA. No voltage higher than +24 VDC or lower than 0 VDC should ever be connected to the input. See Figure 5 for an example of a typical motion sensor installed as a tag read trigger device.

Digital Outputs

The digital outputs (DOUT1 – DOUT4) can be used as general purpose outputs, to indicate tag reading activity, or to indicate the reader is transmitting (RF On). Digital outputs can be pulled high.

No voltage higher than +40 VDC or lower than 0 VDC should ever be connected to a digital output. The reader activates the output by pulling it low (0 VDC) and can sink current such that power dissipation is ≤ 1 W.

Digital I/O Monitoring and Control Scripts

Several digital I/O monitoring and control scripts are provided with the reader to allow you to monitor the digital I/Os and take specific actions. These Python application scripts can be used as is or modified to suit your particular application. For detailed information on loading Python scripts, refer to *Chapter 5 – Embedded Reader Applications* of the **ID***entity* **4100 Protocol Reference Guide**.

scan_trigger.py

This routine monitors the state of the digital input pin specified as the input parameter. If the state of the pin is low, the operating mode is set to standby. If the I/O pin state changes to high, the operating mode is set to polled.

Inputs: *<pin>* – (optional) Input pin number (1–4). Default is digital in 1.

<trigger logic level> –(optional) 0 or 1. Default is trigger on 1.

Examples:

`scan_trigger.py`	Monitors digital input pin 1
`scan_trigger.py 1`	Monitors digital input pin 1
`scan_trigger.py 4`	Monitors digital input pin 4
`scan_trigger.py 3 0`	Monitors digital input pin 3, trigger on 0

scan_trigger_timer.py

This routine monitors the I/O pin. When the pen goes high, the timer is started and the operating mode is set to *polled*. While the timer is running, I/O pin state changes are ignored. When the timer expires, the operating mode is set to standby. The minimum value for the timer is 10 milliseconds (ms).

Inputs: *<pin>* – (optional) Output pin number (1–4). Default is output 1.

<time> – (optional) Time, in ms for timer to run. Default is 1000 ms.

<trigger logic level> –(optional) 0 or 1. Default is trigger on 1.

Examples:

`scan_trigger_timer.py`	Monitors input 1, timer 1000 ms, trigger on 1
`scan_trigger_timer.py 2`	Monitors input 2, timer 1000 ms, trigger on 1
`scan_trigger_timer.py 4 2000`	Monitors input 4, timer 2000 ms, trigger on 1
`scan_trigger_timer.py 3 4000 0`	Monitors digital input 3, timer 4000 ms, trigger on 0

standalone_acs.py

This routine implements a simple standalone access control system. It is described in the Stand Alone Reader Operation Application Note.

signal_read.py

This routine will activate a digital output if a tag is successfully read. The optional output pin number can be specified on the command line. If not specified, output pin 1 is selected and a default value of 1000 milliseconds is used. The output will remain high for n ms, where n is either the default of 1000 ms, or the value supplied on the command line. Minimum value for n is 10 ms.

Inputs: *<pin>* – (optional) Output pin number (1–4). Default is output 1.

<time> – (optional) Time, in ms, to keep the output high. Default is 1000 ms (1 sec).

<logic level> – (optional) Logic level for digital out *On*. 0 or 1. Default is 1 (*On*).

Examples:

signal_read.py	Turns on output 1 for 1000 ms on tag reads
signal_read.py 2	Turns on output 2 for 1000 ms on tag reads
signal_read.py 1 5000	Turns on output 1 for 5000 ms on tag reads
signal_read.py 1 500	Turns on output 1 for 500 ms on tag reads
signal_read.py 1 800 0	Turns on digital output 1,logic level 0, for 800 ms on tag reads

signal_read_crc_error.py

This routine will turn on a digital output if a tag read CRC error is detected. The output pin number can be specified on the command line. If not specified, output pin 1 is used. The output pin will remain high for n ms, where n is either the default of 1000 ms or the value supplied on the command line. Minimum value for n is 10 ms.

Inputs: *<pin>* – (optional) Output pin number (1–4). Default is output 1.

<time> – (optional) Time, in ms, to keep the output high. Default is 1000 ms.

<logic level> – (optional) Logic level for digital out *On*. 0 or 1. Default is 1 (*On*).

Examples:

signal_read_crc_error.py   Turns on output 1, logic level 1 for on for 1000 ms on tag read CRC error.

signal_read_crc_error.py 2   Turns on output 2, logic level 1 for on for 1000 ms on tag read CRC error.

signal_read_crc_error.py 1 5000   Turns on output 1, logic level 1 for on for 5000 ms on tag read CRC error.

signal_read_crc_error.py 1 500   Turns on output 1, logic level 1 for on for 500 ms on tag read CRC error.

signal_read_crc_error.py 1 800 0 Turns on output 1, logic level 0 for on, for 800 ms on tag CRC error.

rf_mon.py

This routine will monitor the state of the transmitter. If the transmitter is on, it sets the appropriate output pin high. If low, it sets the output pin low.

Inputs: *<pin>* – (optional) Output pin number (1–4). Default is output 1.

<logic level> – (optional) Logic level for digital out *On*. 0 or 1. Default is 1 (*On*).

Examples:

rf_mon.py   Monitors RF status, set/clear output 1 on change, logic level 1 for on

rf_mon.py 1   Monitors RF status, set/clear output 1 on change, logic level 1 for on

rf_mon.py 2   Monitors RF status, set/clear output 2 on change, logic level 1 for on

rf_mon.py 3 0   Monitors RF status, set/clear output 3 on change, logic level 0 for on

Digital Input Alarm Generation

The IDentity 4100 can be configured to generate an alarm when a digital input is disconnected or sensor failure is detected. The alarm is triggered when the signal level on the digital input stays in the specified state longer than the specified alarm timeout. This behavior can be configured independently for each digital input.

The configuration variable **dio.in.alarm.logic_level.<N>** (where <N> is 1,2,3,4) sets whether the alarm is coupled to a input logic level of 0 (low) or 1 (high).

The configuration variable **dio.in.alarm.timeout.<N>** (where <N> is 1,2,3,4) sets the amount of time, in seconds, to wait for a signal state change. A value of 0 (default) disables alarm generation.

The digital input logic level is used along with the corresponding digital input pin timeout value to determine if an alarm (in the form of an event) should be generated. If a timeout value is set, the input pin is monitored. If the input pin value does not change during the timeout period AND the input pin value matches the alarm logic level, the event **event.dio.in.alarm.timeout.n** (where n is the pin number) is generated. This alarm event generation can be helpful in alerting to the loss of digital inputs to the reader.

Digital I/O Hardware Connection

Figure 5 shows a typical sensor/indicator connection to the digital I/Os.
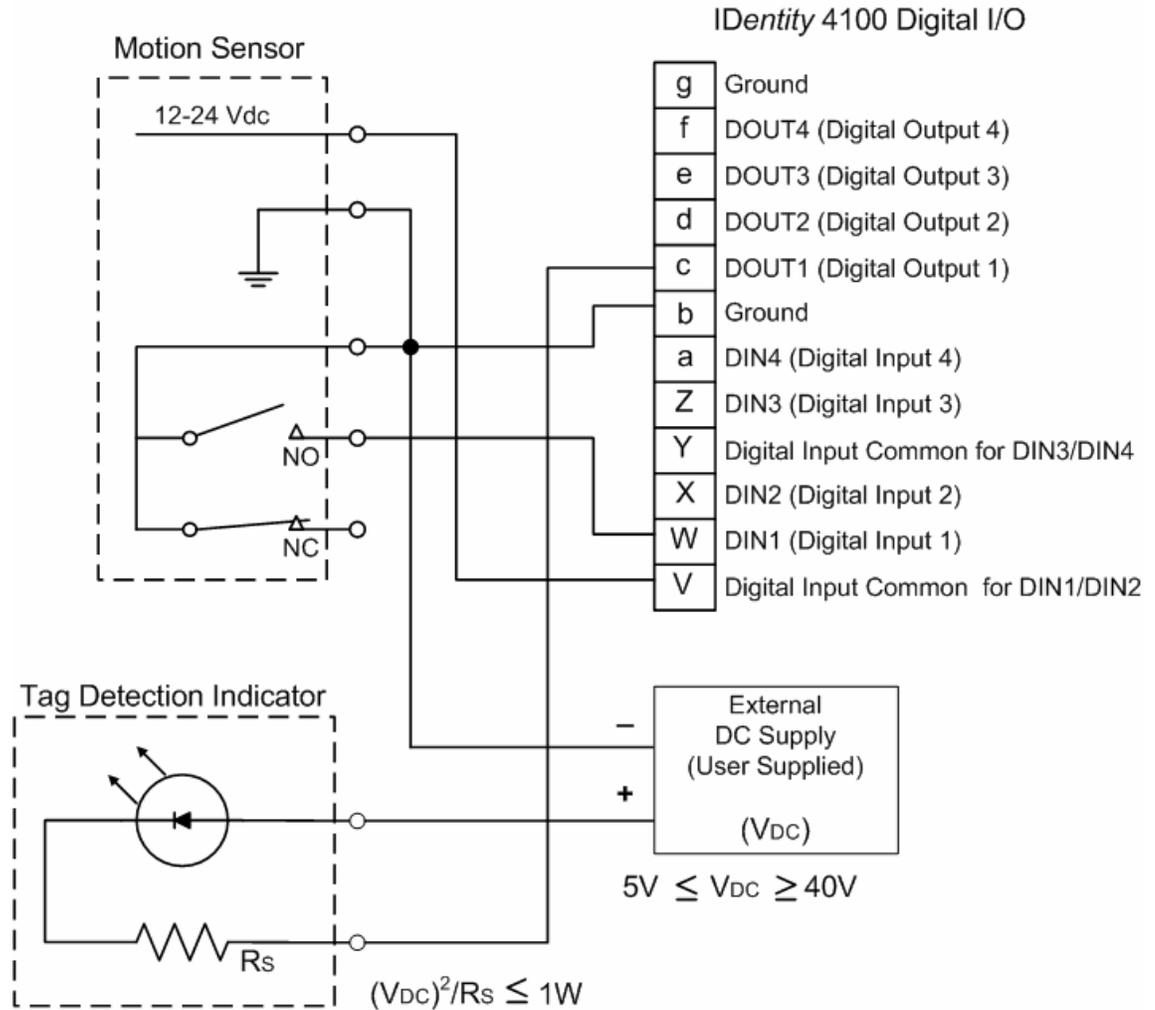
Figure 5　　　Example Motion Detector and Indicator connected to the Digital I/O

Specifications

Reader Specifications (General)

Dimensions	12.0 x 12.0 x 4.1 in (305 x 305 x 105 mm)
Weight	4.8 kg (10.5 lbs)
Frequency Range	860–960 MHz (Factory configured for specific region)
Connectors	RS-232, Digital I/O, Ethernet LAN
Input Voltage	24 VDC, 60 W
Input Current	2.5 A maximum at 24 VDC

> ⚠ **Caution:** The Sirit supplied power cable is only rated at 24V. Input power less than 24V while using Sirit supplied cables may result in cable and/or reader damage.

Reader Ordering Information

FCC Part 15 and Industry Canada RSS 210

Reader Model	Ordering Part #	Description
ID4100-001	ID4100-001	ID4100 without Weigand Interface
ID4100-001	ID4100-002	ID4100 with Weigand Interface

FCC Part 90 and Industry Canada RSS 137

Reader Model	Ordering Part #	Description
ID4100-90	ID4100-901	ID4100 without Weigand Interface
ID4100-90	ID4100-902	ID4100 with Weigand Interface

Reader Specifications – FCC Part 15, Industry Canada RSS 210 (Model ID4100-001)

Frequency Range	
FCC Part 15	902–928 MHz
RF Power	10 mW – 0.871 W conducted (10 – 29 dBm)
Power Consumption	13 W (typical while idle) 32 W (typical at 29 dBm conducted output power) 38 W (maximum at 29 dBm conducted output power)

Reader Specifications – FCC Part 90, Industry Canada RSS 137 (Model ID4100-90)

Frequency Range	
FCC Part 90	911.250, 911.750, 912.250, 912.750, 913.250, 913750, 914.250, 914.750, 915.250, 915.750, 916.250, 916.750, 917.250, 917.750, 918.250, 918.750, 919.250, 919.750, 920.250 MHz
RF Power	10 mW – 2 W conducted (10 – 33 dBm)
Power Consumption	13 W (typical while idle) 32 W (typical at 29 dBm conducted output power) 38 W (maximum at 29 dBm conducted output power)

Reader Specifications – ETSI (ID4100-001-ETSI and -002-ETSI)

Frequency Range	865–868 MHz (Factory configured for specific region)
RF Power	10 mW – 560 mW conducted (10 – 27.5 dBm)
Power Consumption	13 W (typical while idle) 30 W (typical at 27.5 dBm conducted output power) 36 W (maximum at 27.5 dBm conducted output power)
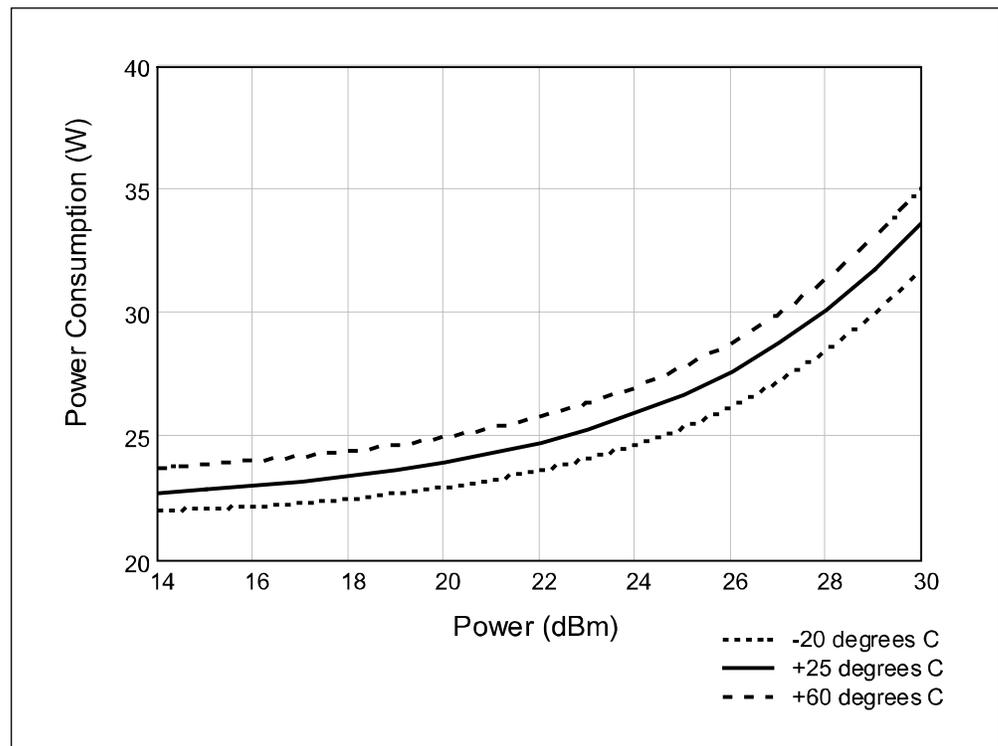
Figure 6   Typical Power Consumption versus Conducted Output Power at 910 MHz

Environmental Specifications

Operating Temperature	-40 °F to 131 °F (-40 °C to 55 °C)
Storage Temperature	-40 °F to 185 °F (-40 °C to 85 °C)
Maximum Shock	1 foot (0.3 meter) drop to any corner
Relative Humidity	100 %, condensing
International Protection Rating	IP65

Power Supply Specifications

Model	Lambda DSP100-24
Input Voltage	90 – 264 VAC,
Input Frequency	47 to 63 Hz
Power	100.8 W
Holdup Time	10 ms (115 VAC)
Output Voltage	24 VDC
Output Current	4.2 A

RS-232 Specifications

Connector	DB-9S
Baud rate	1200 - 115200 (Default = 115200)
Parity	None
Data bits	8
Stop bits	1
Signals	Pin 1 - NC Pin 2 - TXD Pin 3 - RXD Pin 4 - Connected to Pin 6 Pin 5 - GND Pin 6 - Connected to Pin 4 Pin 7 - CTS Pin 8 - RTSA Pin 9 - NC

Ethernet LAN Specifications

Connector	RJ-45
Ethernet	10/100 BaseT
Indicators	Yellow - Indicates link is operational Green - Indicates network traffic detected.
Signals	Pin 1 – TXD+ (Transmit Data +) Pin 2 – TXD- (Transmit Data -) Pin 3 – RXD+ (Receive Data +) Pin 4 – NC Pin 5 – NC Pin 6 – RXD- (Receive Data -) Pin 7 – NC Pin 8 – NC

Antenna Cable Specifications

Manufacturer	Time Microwave Systems
Part No.	LMR-400 (replacement for RG-8/9913)
Connector Type	RP-TNC
Impedance	50 ohms
Attenuation	3.9 dB/100 ft (12.8 dB/100 m)

Internal Antenna Specifications (FCC)

Type	PATCH
Frequency (FCC)	902 – 928 MHz
Polarization	Circular
Gain	9.5 dBiC
VSWR, maximum	1.5:1
Input impedance	50 ohm (nominal)
Power Handling	6 W
Size (FCC)	12.0 x 12.0 x 1.4 in (305 x 305 x 36 mm)

Internal Antenna Specifications (ETSI)

Type	PATCH
Frequency (ETSI)	865 – 868 MHz
Polarization	Circular
Gain	9 dBiC
VSWR, maximum	1.3:1
Input impedance	50 ohm (nominal)
Power Handling	6 W
Size (ETSI)	305 x 305 x 36 mm (12 x 12 x 1.4 in)

Battery Specifications (Optional)

Battery	Lithium/Manganese Dioxide
Designation	ANSI/NEDA 5012LC / IEC-CR1220
Voltage	3 V
Average capacity	40 mAh to a terminal voltage of 2 V

External Antenna Specifications (FCC)

Part No.	ANTENNA–018-E
Frequency range	902–928 MHz
Antenna type	Patch
Impedance	50 Ω, nominal
Gain	9.5 dBic
Beam width (-3 dB)	63°, nominal
Polarization	RH circular
F/B ratio	-18 dB, typical
Side lobes level	-16 dB, typical @ 90°
Power input	37 dBm (5 W)
Return loss	-14 dB, minimum
Connector type	N type Female (Jack)
Size (height x width x thickness)	12.0 x 12.0 x 0.98 in (305 x 305 x 25 mm)
Weight	2.65 lbs (1.2 kgs)

⚠ **Caution:** *For Model ID4100-001*

This device is designed to operate with a 9.5 dBiC (9.0 dBiC for ETSI) gain internal and external antenna and conducted power is factory set to 23 dBm (200 mW). When conducted power is set to 29 dBm (0.871 W), the antenna gain cannot exceed 9.5 dBiC. Antenna having a higher gain is strictly prohibited per FCC and Industry Canada regulations when utilizing maximum power. Power into the antenna must decreased to compensate for any increased antenna gain. The required antenna impedance is 50 ohms.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit an RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website.

External Antenna Specifications (ETSI)

Part No.	ANTENNA–019-E
Frequency range	865–870 MHz
Antenna type	Patch
Impedance	50 Ω, nominal
Gain	9.0 dBic
Beam width (-3 dB)	63°, nominal
Polarization	RH circular
F/B ratio	-18 dB, typical
Side lobes level	-16 dB, typical @ 90°
Power input	37 dBm (5 W)
Return loss	-17 dB, minimum
Connector type	N type Female (Jack)
Size (height x width x thickness)	12.0 x 12.0 x 0.98 in (305 x 305 x 25 mm)
Weight	2.65 lbs (1.2 kgs)

Site License – Customer Disclaimer	*For Models ID4100-90*
	Customer (end user) acknowledges that a site license is required for each reader system location. It is the customer's responsibility to file for the site license and submit the appropriate filing payment. Sirit can assist with the completion of forms. United States filings require completion and submission of FCC Form 601 with Schedule D and H. Canadian filings require completion and submission of Industry Canada Forms IC2365BB and IC2430BB.
	Licence d'Etat-client Avertissement *Client (utilisateur final) reconnaît que le site d'une licence est requise pour chaque lecteur emplacement du système. Il incombe au client de déposer pour la licence d'exploitation et soumettre le paiement du dépôt approprié. Sirit peut aider à la réalisation de formes. Unis dépôts États exigent l'achèvement et la soumission du formulaire FCC 601 à l'annexe D et H. dépôts canadiennes exigent l'achèvement et la soumission de Industrie Canada Formulaires IC2365BB et IC2430BB*

	Caution:	**For Models ID4100-90**

> ⚠️ **Caution:** **For Models ID4100-90**
>
> *This equipment complies with FCC Part 90 and Industry Canada.RSS-137 rules.*
>
> *This device complies with FCC Part 15 and Industry Canada license exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.*
>
> *Cet appareil est conforme à FCC Partie15 de Industrie Canada RSS standard exempts de licence (s). Son utilisation est soumise à Les deux conditions suivantes: (1) cet appareil ne peut pas provoquer d'interférences et (2) cet appareil doit accepter Toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement du dispositif.*
>
> *Any changes or modifications not expressly approved by Sirit could void the user's authority to operate the equipment.*
>
> *The professional installer will need to calculate and verify the reader's power output allowable based on the antenna (gain) used and cabling (loss) effects. This value will be used in the user's submission of their site license application. The maximum antenna gain plus cable effects for a given output power can be calculated by:*
>
> **`44.8 dBm (ERP) - Pout`**
>
> *where* **`Pout`** *is the measured RF output power (dBm)*
>
> *Reader output power is limited to a maximum of 2W under all conditions. When operating at that power level, the maximum permissible antenna gain is 11.2dBd.*

> ⚠️ **WARNING:** **For Models ID4100-001, ID4100-90**
>
> **FCC Radiation Exposure Statement.** *The antennas used for this transmitter must be installed to provide a separation distance of at least 1 meter from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.*
>
> *This device complies with Health Canada's Safety Code. The installer of this device should ensure that RF radiation is not emitted in excess of the Health Canada's requirement. Information can be obtained at:*
>
> *http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio_ guidelignes_direct-eng.php*
>
> *Cet appareil est conforme avec Santé Canada Code de sécurité 6. Le programme d'installation de cet appareil doit s'assurer que les rayonnements RF n'est pas émis au-delà de l'exigence de Santé Canada. Les informations peuvent être obtenues:*
>
> *http://www.hc-sc.gc.ca/ewhsemt/pubs/radiation/radio_ guide-lignes_direct-eng.php*

Bulkhead Connector/Interface Cable Pinout
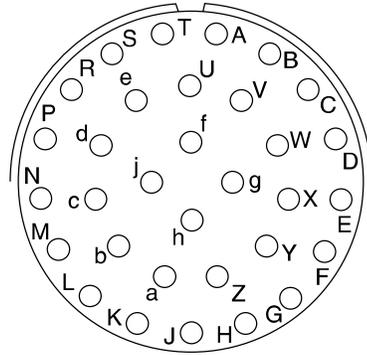
Note: Drawing is for cable socket on reader.

> ⚠ **WARNING:** Do not place ID4100 or ID5100 on wire harness for existing ID-MAX installations. Power pins have been moved!
>
> Verify power wiring prior to first powering up unit!

Pair	Pin	Color	Pin Name	Function
1	A	Black	**Tx+**	**Ethernet**
	B	Green	**Tx-**	**Ethernet**
2	C	Black	**Rx+**	**Ethernet**
	D	Orange	**Rx-**	**Ethernet**
3	E	Blue	**VC2+**	**Ethernet**
	F	Black	**VC2-**	**Ethernet**
4	G	Black	**VC2+**	**Ethernet**
	H	Brown	**VC2-**	**Ethernet**
5	J	Black	RS-232 TXD (to WIM RXD)	Serial or WIM Port
	K	Red	RS-232 RXD (to WIM TXD)	Serial or WIM Port
6	L	Black	DTR (Short to Pin N DSR)	Serial or WIM Port
	M	White	RS-232 GND (to WIM SGND)	Serial or WIM Port
7	N	Black	DSR (Short to Pin L DTR)	Serial or WIM Port
	P	Yellow	RS-232 CTS (to WIM RTS)	Serial or WIM Port
8	R	Red	RS-232 RTS (to WIM CTS)	Serial or WIM Port
	S	White	No Connect	Not Applicable
9	T	Red	**+24 VDC**	**Power**
	U	Green	**24 VDC GND**	**Ground**
10	V	Red	**DIN Ref 1 To (+5 to +24)VRef**	**Digital Input Common**
	W	Blue	**DIN1**	**Digital Input 1**
11	X	Red	**DIN2**	**Digital Input 2**
	Y	Yellow	**DIN Ref 2 To (+5 to +24)VRef**	**Digital Input Common**

Pair	Pin	Color	Pin Name	Function
12	Z	Red	**DIN3**	**Digital Input 3**
	a	Brown	**DIN4**	**Digital Input 4**
13	b	Red	**GND**	**Ground (Reader)**
	c	Orange	**DOUT1**	**Digital Output 1**
14	d	Green	**DOUT2**	**Digital Output 2**
	e	White	**DOUT3**	**Digital Output 3**
15	f	Green	**DOUT4**	**Digital Output 4**
	g	Blue	**GND**	**Ground (Reader)**
16	h	No Connect	Not Applicable	Not Applicable
	j	No Connect	Not Applicable	Not Applicable

Safety and Regulatory Information

Power Disconnect Device

The plug on the power supply cord is intended to be the power disconnect device. As a result, the power source (socket or outlet) shall be located near the equipment and shall be easily accessible.

FCC Notice (IDentity 4100)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Notice (Wiegand Interface Module)

The Wiegand Interface Module 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.

RF Safety

WARNING: **FCC Radiation Exposure Statement (Models ID4100-001, ID4100-90)**. *The antennas used for this transmitter must be installed to provide a separation distance of at least 1 meter from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.*

ETSI Radiation Exposure Statement (Models ID4100-001-ETSI, -002-ETSI. *The antennas used for this transmitter must be installed to provide a separation distance of at least 25 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.*

Caution: *The IDentity 4100 UHF Reader is equipped with two (2) RF ports and is factory configured to operate on the internal RF port (1). To prevent reader damage, the external RF Port (2) must be properly terminated with a 50 ohm load or a functional UHF antenna before power up if the reader has been configured to use this port. Never power up the reader unless the appropriate loads or antennas are connected. Always power down the reader before removing an antenna or load from an RF port.*

The maximum antenna cable length is 10 meters.

Electrostatic Discharge

ATTENTION *IDentity 4100 antenna ports may be susceptible to damage from static discharge or other high voltage. Use proper Electrostatic Discharge (ESD) precautions to avoid static discharge when handling or making connections to the IDentity 4100 reader antenna or communication ports. Equipment failure can result if the antenna or communication ports are subjected to ESD.*

Regulatory Compliance

Caution: *The IDentity 4100 is designed to meet the regulatory requirements in those jurisdictions in which it is offered. Changes or modifications not expressly approved by Sirit Technologies for compliance could void the user's authority to operate the equipment.*

Power/Data Cable Size

Caution: *The Sirit supplied power/data cable is only to be used with the Sirit 24 VDC power supply. Use of these cables with power supplies providing lesser voltages may result in cable and/or reader damage.*

A   Using the Wiegand Interface

A.1.   Overview

The Sirit Wiegand Interface Module (WIM) is a serial (RS-232) to 4-channel Wiegand module designed to interface with the ID4100 UHF RFID reader. Currently, 2 Wiegand channels are used, corresponding to the 2 antennas available on the ID4100. Channel 1 is associated with the Internal antenna. Channel 2 is associated with the External antenna.

Channels 3 and 4 can be configured to act as open-collector, digital pulse outputs under software control. This requires an additional custom script file to define the output function. Contact your local Sirit Representative for further information.

A.2.   Wiegand Protocol

The Wiegand communication protocol is a 3-wire communications scheme comprising:

➤ Data One line
➤ Data Zero line
➤ Ground line

These three lines constitute a Wiegand Channel.

Data is transmitted in a serial manner over these lines by pulsing the Data One line low for a logic **1**, and pulsing the Data Zero line low for a logic **0**.

Two parameters define the behavior of bit-wise transmission:

➤ Pulse Width Time (Tpw) is the duration of the pulse.
➤ Pulse Interval Time (Tpi) is the interval between the end of a pulse and the start of the next pulse.

Based on this, the total bit time is Tpw + Tpi.

A Wiegand frame consists of a string of bits transmitted in the Wiegand format. Typically, this is 26 bits (including two parity bits). Following the transmission of a Wiegand frame, a hold-off time (Thold) is asserted where the Wiegand interface will not transmit. This mechanism is used to separate adjacent Wiegand frames.

The unit, by default, outputs a 26-bit Wiegand frame (24 data bits , 2 parity bits). Data lengths of up-to 128 bits can be accommodated. The current default values for the Wiegand are as follows:

Parameter	Value
TPW Pulse Width Time	50 μs
TPI Pulse Interval Time	2000 μs
Inter Frame Message Delay Time	250 ms
Data bits	24
Parity	Standard
Bit format	MSB first

For more information, refer to the AC-01 Wiegand Specification: "Access Control Standard Protocol For The 26-Bit Wiegand Reader Interface".

A.3. Wiegand Applications

Many access control panels incorporate a Wiegand Interface, and in many applications a host reader will communicate with an access control panel via the Wiegand Interface. Many Wiegand-enabled panels are configured to receive Facility Code information and Serial Number information in Wiegand format.

In an RFID-based access control system, the Facility Code and Serial Number may be embedded into a data string known as a Translated ID. In some applications, an actual tag ID may be mapped to a Translated ID via some form of look-up table.

This ID4100 Wiegand application primarily uses secure tags for authentication. The reader will read such tags and derive a Translated ID from the tag. This Translated ID is then sent to the Wiegand Interface Module (WIM) for transmission over a Wiegand Interface to a Wiegand panel. However, a translation table facility is incorporated for managing standard legacy tags.

A.4. Mechanical Installation

The WIM is housed in a plastic enclosure and should be located in your control panel. Mount the module in a ventilated area on a flat panel and ensure that the module is protected from water and moisture ingress, and is not mounted directly above a heat source.

Secure the module in place with two #8 (M4) flat-head type screws. Figure 7 shows the location of the mounting flanges.
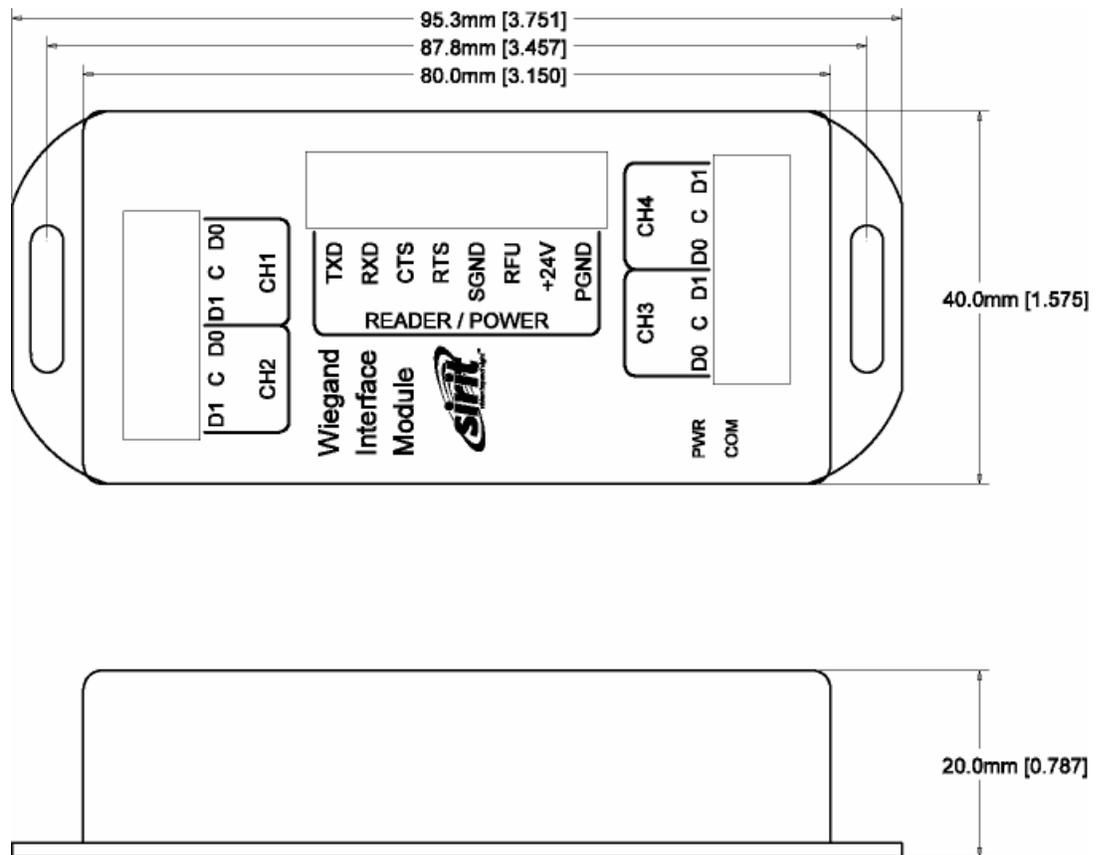
Figure 7   Wiegand Interface Mounting Flanges

A.5.   Electrical Installation

Power for the WIM is supplied by the 24 VDC ID4100 reader power supply. The ID4100 serial port is used to communicate with the WIM and is therefore not available for standard serial communications. Connections to the WIM are made via pluggable screw terminal blocks.
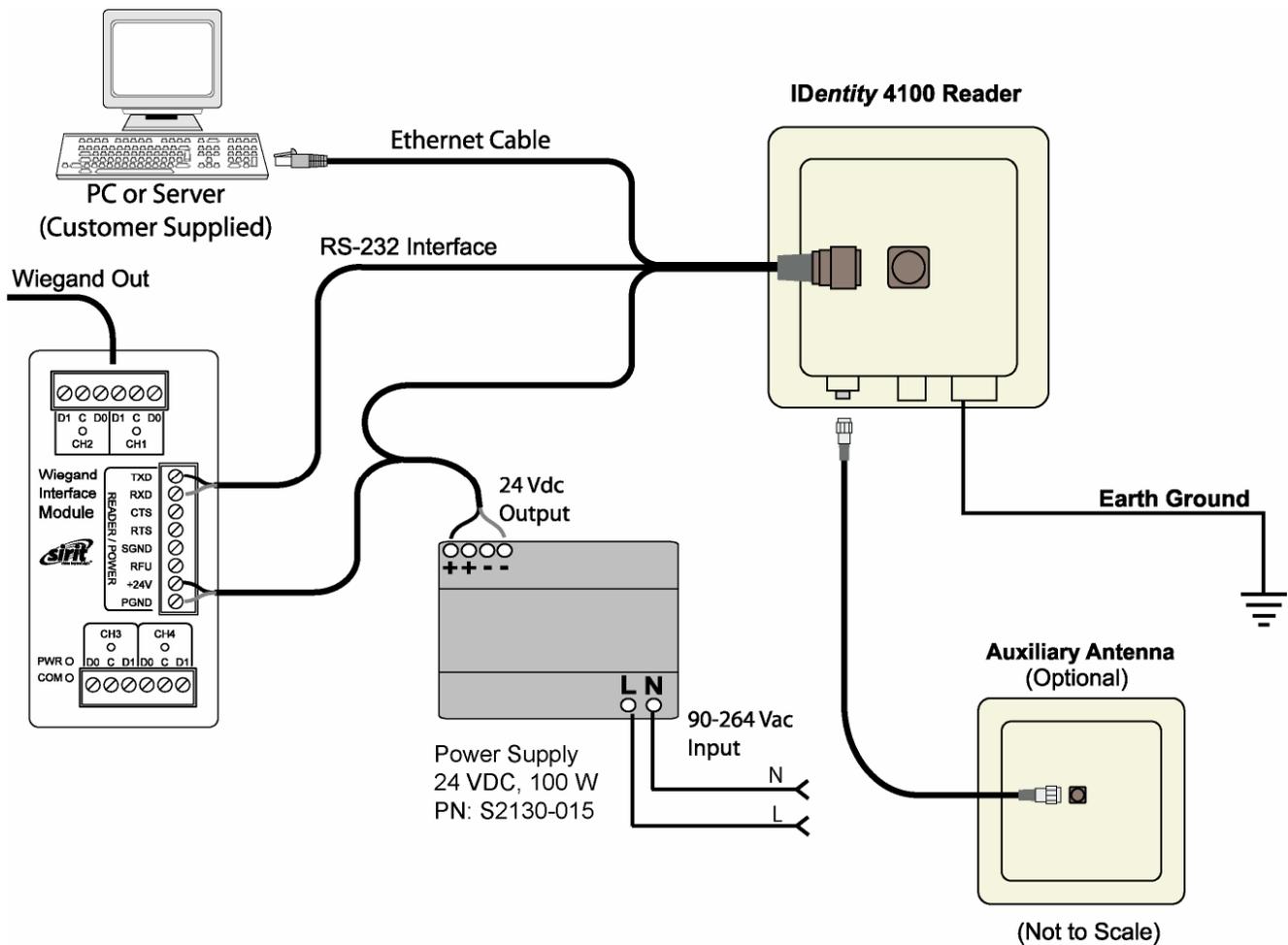
Figure 8   ID*entity* 4100 Electrical Connections (Wiegand Interface Module)

Refer to Figure 9 for actual Wiegand Module power and RS-232 wiring.
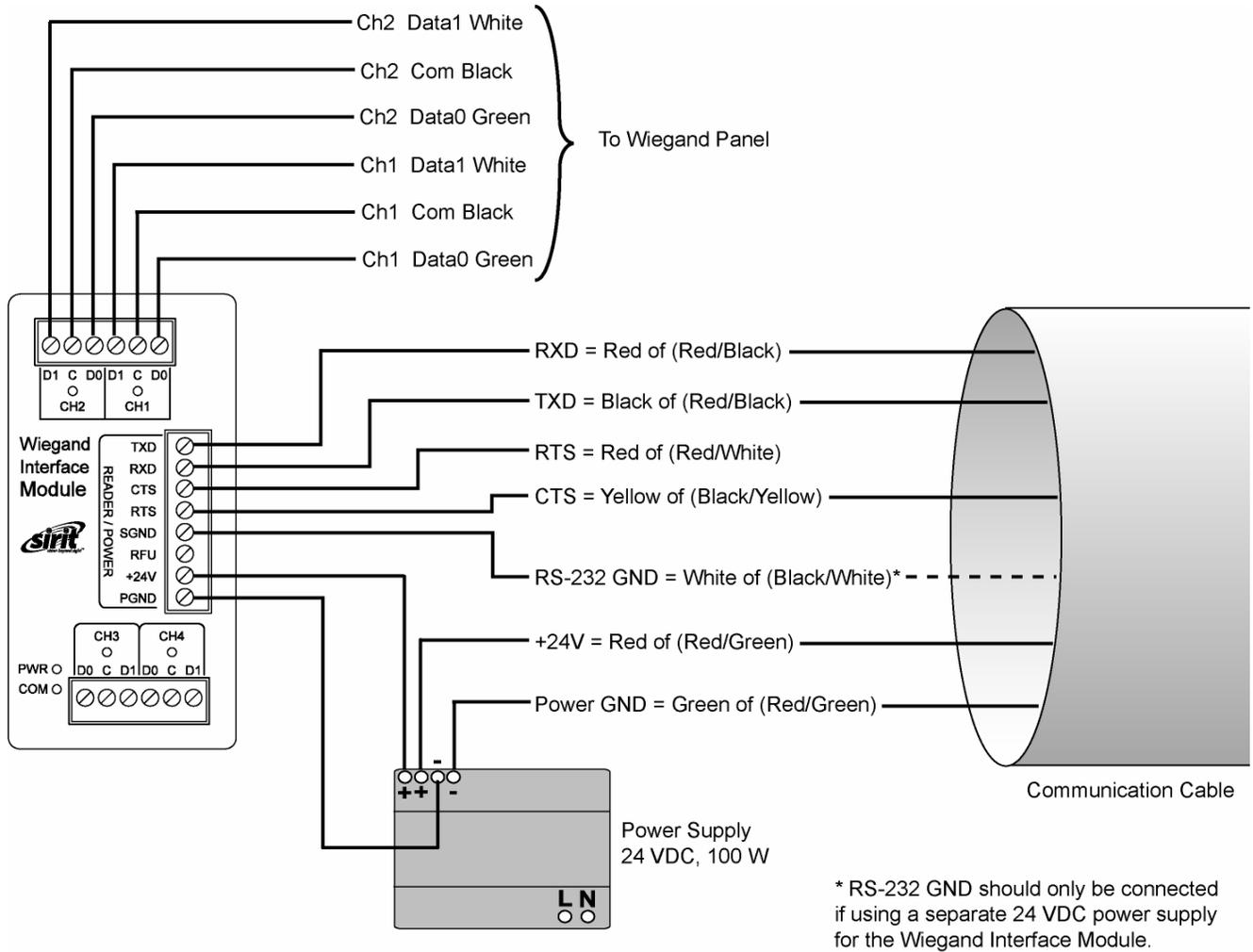
Figure 9   Wiegand Interface Module Electrical Connections

Connect the Serial Port

To connect the serial port, perform the following:

1 Terminate the reader umbilical cable using a suitable cable gland or equivalent method.

2 Identify the serial interface wires and terminate these five wires on the **READER/POWER** connector.

3 Use care when performing the termination to avoid Pin 3 (**RFU**) on this connector.

Connect the Wiegand Outputs

Optically-isolated open-collector outputs are provided to meet the requirements of the AC01 Wiegand specification. These are protected by 5V transient voltage-suppression diodes.

To connect the Wiegand outputs, perform the following:

1   When using the single Internal antenna of the ID4100, connect CH1 (3 wires) of the WIM to the Wiegand panel.

2   If using the External antenna, connect CH2 (3 wires) of the WIM to the Wiegand panel.

3   Refer to Figure 9 for the standard Wiegand color code as defined in the AC-01 Wiegand specification.

Connect the 24V Power

To connect 24V power, perform the following:

1   Using the black and red power harness supplied, connect one end of the black wire to Terminal 1 (**PGND**).

2   Connect one end of the red wire to Terminal 2 (**+24V**) of the **READER/POWER** connector.

3   Connect the remaining end of the red wire to the **+** output terminal.

4   Connect the remaining end of the black wire to the **–** output terminal of the PSU

5   Verify the connections.

Initial Testing

Initial testing is optional, but recommended. The purpose is to verify that the 24V PSU and Wiegand module power supply are operating correctly. Perform the following:

1   Ensure that the reader is disconnected from the umbilical cable by unlocking and removing the connector at the reader end.

2   Apply AC power to the PSU Module.

3   Using a Digital Multimeter (DMM) confirm that the output of the PSU lies in the range 21.6 to 26.4 VDC

4   Check that the **PWR LED** on the module is illuminated.

5   Using the DMM, measure the DC voltage between **PGND** and **RFU** on the **READER/POWER** connector. For correct operation, this should be between 4.75 and 5.25 VDC.

6   Disconnect the PSU and reconnect the umbilical cord to the reader.

A.6.   Disconnecting the Wiegand Interface Module

In the event you wish to disconnect the WIM, perform the following:

1 Remove AC power from the PSU.

2 Disconnect the serial cable from the reader.

3 Restart the console service for the reader command line interface by sending the following command to the reader:

```
com.serial.console(program=cli)
```

A.7. Using RCT to Configure the Wiegand Interface Module

You can use the embedded Reader Configuration Tool to configure the WIM parameters. Perform the following:

Open RST

1 From your Windows desktop, select:

Start→Programs→Sirit→IDentity4100→Reader Startup Tool (RST)

2 Select a specific reader and press **Configure**.

3 The Reader Configuration Tool (RCT) is displayed.

4   Press **Login** and log into the reader as `admin`. The initial password is `readeradmin`.

5   Select **Advanced Functions** → **Expert Configuration**.

6   Select the **Communication** tab.

7   Set **com.wiegand.enable** to **true** and press **Submit**.

8   Press the Back key to return to **Expert Configuration** screen.

Expert Configuration

| Setup | Tag | Version | Information | Communication | Antennas | Digital IO | Modem |

This page provides acess to all the configuration information to the user. This page should only be used by an expert user. Assigning incorrect parameters on this page may cause your reader not to function properly.

Name	Value	?
com.event.overflow_backoff_time	3	?
com.network.dns_servers	10.1.1.2 10.1.1.18	?

		?
com.wiegand.enable	true	?
com.wiegand.info		?
com.wiegand.1.control.send_data		?
com.wiegand.1.frame.data_index	24	?
com.wiegand.1.frame.data_length	24	?
com.wiegand.1.frame.endian_type	big_endian	?
com.wiegand.1.frame.format	standard_parity	?

9   Select the **Setup** tab.

10 Set **setup.operating_mode** to **active** and press **Submit**.

11 Press the Back key to return to **Expert Configuration** screen.

Name	Value	?
setup.default_login_level	admin	?
setup.install_type	vehicle	?
setup.operating_mode	active	?

Save Reader Setup

Save reader setup information as a profile. If you need to reboot or power down a reader, the reader setup can be quickly reloaded by loading the profile.

12 Once setup is complete, save your settings in a **Profile**.

13 In the configuration header, press **Manage Profiles**.

14 The profile management page is displayed
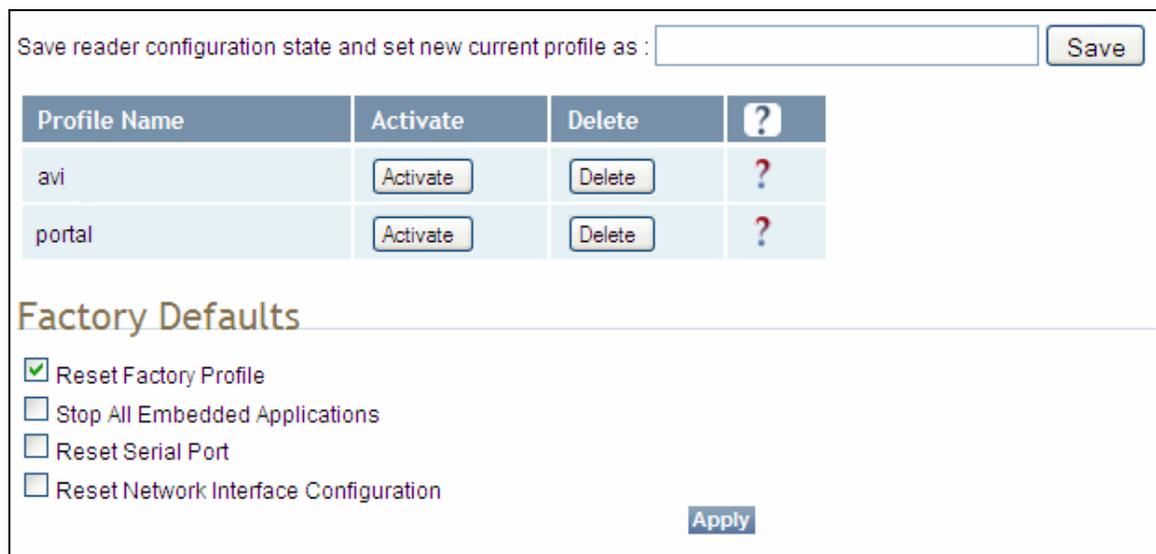
15 Enter a profile name in the box and press **Save**.

16 Your reader configuration will be saved under this profile name and can be quickly reloaded if the reader reboots or you lose your reader configuration.

17 To load a profile, press the **Activate** button next to the **Profile Name**.

A.8.   Converting Translation Tables for use with IDentity 4100

If you have translation tables, such as those developed for IDentity MaX readers, these tables can be converted for use with the IDentity 4100 and Wiegand Interface Module.

For a Single Translation Table

1   From your Windows desktop, select:

Start→Programs→Sirit→IDentity4100→Reader Startup Tool (RST)
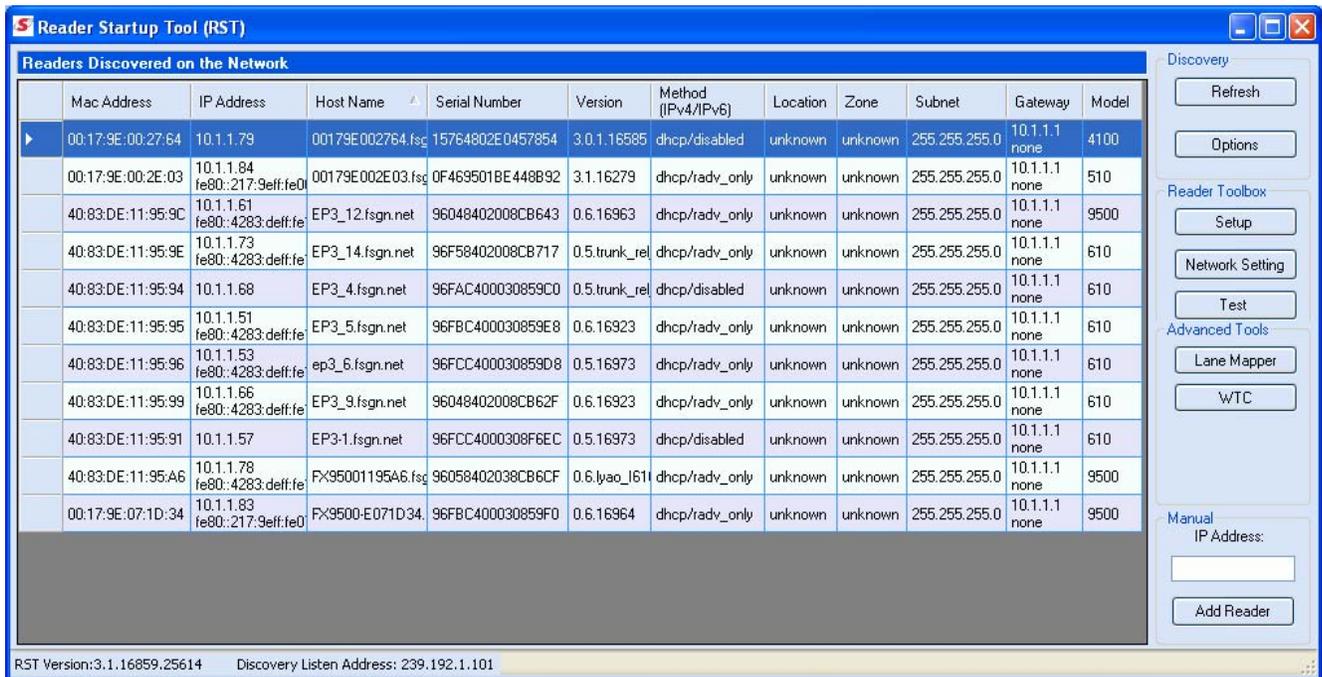
2   Press the **WTC** button under **Advanced Tools**.
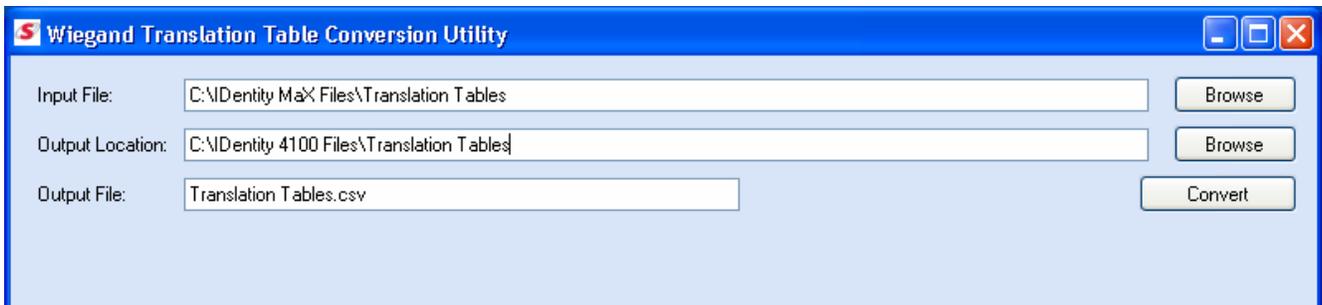
3   Enter the location and name of your input file, output file location, and output file name.

4   Press **Convert**.

For Multiple Translation Tables

1   If you have multiple translation tables to convert, perform the previous procedure for each table.

2   Create a new document using a text editor such as *Notepad*. This will be the main file used to build the combined translation table.

3   Start another session of the text editor (such as *Notepad*) to open one of the converted translation tables.

4   Copy the contents and paste them into the main file. (The converted translation tables have a **.csv** extension. Do not open these by double-clicking, as this will invoke Excel).

5   Repeat Step 3 for all converted tables.

6   Use care to not replicate the same information multiple times. Edit the main file if necessary to eliminate duplications.

7   Save the main file, giving it a **.csv** extension.

A.9.   Importing/Exporting a Translation Table

To load or import a translation table, perform the following:

1   Under the **Advanced Functions**, select **Import/Export Configuration**.

2   Under Import **Wiegand Translation Table**, press **Browse** and navigate to the location of your translaitons tables.

3   Select the translation table file name and press **Import Translation Table**.

4   To export the translation table, press **Export Translation Table**.

5   Save the file as needed.

A.10. Programming the Wiegand Interface

The WIM may be configured in hardware to contain two or four Wiegand channels. Each channel can be individually configured and controlled.

In the following variable and function descriptions **<n>** will refer to a generic Wiegand channel. Valid values include **1,2** (Wiegand channels 1, 2) for all systems and **3,4** (Wiegand channels 3, 4) for four channel modules. (See Module Type 0x14 in the **com.wiegand.info** variable description). A channel value falling out of range should generate an error.

For this system, Wiegand channel **1** is associated with the Internal antenna and Wiegand channel **2** is associated with the External antenna.

com.wiegand.dealer_code_list

This variable is used to configure a string of dealer codes.

A Dealer Code List can be configured with one or more Dealer Codes, each separated by a "space". Authenticated secure tags containing a Dealer Code which matches a value in the Dealer Code List will be forwarded to the Wiegand interface. Authenticated secure tags containing a Dealer Code that does not match a value in the Dealer Code List will be blocked. Dealer Code filtering does not apply to legacy tags. Dealer Code filtering can be disabled by specifying a blank Dealer Code List.

Type	var
Permissions	guest=r,admin=rw
Data Type	string
Default	""

com.wiegand.dealer_code_list

This variable provides a space-separated list of dealer codes used by Wiegand application to filter out tags. Empty list means no dealer code is used.

Type	var
Permissions	guest=r,admin=rw
Data Type	string
Default	""

com.wiegand.enable

This variable enables/disables the WIM.

Type	var
Permissions	guest=r,admin=rw
Data Type	bool
Default	false

com.wiegand.events_only

If this variable is set to true, WIMApp will run and use the translation table, but will not actually communicate with a Wiegand Interface Module over the serial port. event.wim.report events are generated, and this is the only output from WIMAPP.

This mode is intended to be used in order to allow WIMAPP to perform access control functionality using the translation table as a whitelist. When false, WIMAPP attempts to communicate with the Wiegand Interface Module on the serial port and will not function properly if this communication is impossible.

Type	var
Permissions	guest=r,admin=rw
Data Type	bool
Default	true

com.wiegand.export_table

Export translation table of the Wiegand module to /tmp/wim/table.

Type	function
Permissions	guest=-,admin=x

com.wiegand.import_table

Import translation table of the Wiegand module.

Type	function
Permissions	guest=-,admin=x
Parameters	file (string)

com.wiegand.info

This variable returns a string containing information about the WIM, such as number of channels (channels), firmware version number (firmware_version) and serial number (serial_no).

```
>>> com.wiegand.info()

ok channels=4, firmware_version=0.25,
serial_no=0x1122334455667788
```

Type	var
Permissions	guest=r,admin=rw
Data Type	string
Default	""

com.wiegand.reset

This function resets the WIM.

Type	function
Permissions	guest=-,admin=x

com.wiegand.retransmission_interval

This variable provides the facility for a Wiegand stream to be retransmitted at defined periodic intervals for the time a tag resides in the RF field. This variable defines the interval in seconds. A value of 0 disables the retransmission mechanism.

Type	var
Permissions	guest=r,admin=rw
Data Type	int
Default	0
Min	0
Max	300

com.wiegand.<n>.control.send_data

This variable sends data to the Wiegand interface. The data is specified in hexadecimal form (for example, 0xXXXXXXXXXXXXXXXX) and represents a value of up-to 8 bytes. The data will typically represent a translated ID. n = 1 to 4.

Type	var
Permissions	guest=r,admin=rw
Data Type	string
Default	""

com.wiegand.<n>.control.send_test_pattern

Send a fixed, predetermined test pattern to the Wiegand channel. n = 1 to 4.

Type	function
Permissions	guest=-,admin=x

com.wiegand.<n>.frame.data_index

This variable sets or interrogates the data index. This is the index, in bits, where serialization of the translated ID begins (for discarding unused/redundant translated ID bits, for example Dealer Code). n = 1 to 4.

Type	var
Permissions	guest=rw,admin=rw
Data Type	int
Default	24
Min	0
Max	255

com.wiegand.<n>.frame.data_length

This variable sets or interrogates the data length of the Wiegand frame. This defines the total number of bits (excluding parity bits) of a translated ID that will be transmitted over the Wiegand interface. n = 1 to 4.

Type	var
Permissions	guest=r,admin=rw
Data Type	int
Default	24
Min	1
Max	112

com.wiegand.<n>.frame.endian_type

This variable sets or interrogates the endian type of the Wiegand output frame. This defines whether the most-significant, or least- significant bit of the selected portion of the translated ID will be transmitted first. n = 1 to 4.

Type	var
Permissions	guest=r,admin=rw
Data Type	enum
Default	BIG_ENDIAN
Enum	BIG_ENDIAN LITTLE_ENDIAN

com.wiegand.<n>.frame.format

This variable sets or interrogates the frame format of the Wiegand output. n = 1 to 4.

Type	var
Permissions	guest=r,admin=rw
Data Type	enum
Default	STANDARD_PARITY
Enum	STANDARD_PARITY REVERSE_PARITY CHECKSUM RAW_DATA

com.wiegand.<n>.physical.thold

This variable is used to set or to interrogate the inter-frame hold-off time (Thold), where the inter-frame hold-off time is specified in milliseconds. Values of 50 to 20,000 ms are valid. The default value is 250 ms. The variable will return a value in the range 50 to 20,000 ms. n = 1 to 4.

Note that the WIM has a granularity of 50 ms and hold-off times will be truncated to the nearest 50 ms.

Type	var
Permissions	guest=r,admin=rw
Data Type	int
Default	5
Min	50
Max	20000

com.wiegand.<n>.physical.tpi

This variable is used to set or interrogate the pulse interval time, where the pulse interval time is specified in microseconds. Values of 200 μs to 20,000 μs are valid. The default value is 2000 μs. The variable will return a value in the range 200 to 20,000 μs. n = 1 to 4.

Note that the WIM has a granularity of 200 μs. Therefore, pulse_interval_times will be truncated to the nearest 200 μs.

Type	var
Permissions	guest=r,admin=rw
Data Type	int
Default	2000
Min	200
Max	20000

com.wiegand.<n>.physical.tpw

This variable is used to set or to interrogate the pulse width time (Tpw), where the pulse width time is specified in microseconds. Values of 40 to 250 µs are valid. The default value is 50 µs. The variable will return a value in the range 40 to 250 µs. n = 1 to 4.

Note that the WIM has a granularity of 5 µs and pulse_width_times will be truncated to the nearest 5 µs.

Also note that these are nominal time values for 470Ω pull-up loads on the Wiegand outputs. The pulse width time lengthens for higher values of pull-ups, and shortens for lower values. This phenomenon is caused by Miller capacitance on the loads. The 5 µs granularity on the pulse_width_time can be used to tailor the pulse width to the required value.

Type	var
Permissions	guest=r,admin=rw
Data Type	int
Default	50
Min	40
Max	255

error.wiegand.failure

This response indicates WIM function failed.

event.wim.report

This event is generated each time data is sent to the WIM interface. The event returns the translated ID, timestamp, and antenna value

Type	event
Permissions	guest=rw,admin=rw
Return Values	id (int) time (string) text (string)

definitions.enum.wiegand.frame.endian_type

This variable sets wiegand module ouput frame endian type.

Type	var
Permissions	guest=,admin=
Data Type	enum
Default	BIG_ENDIAN
Enum	BIG_ENDIAN LITTLE_ENDIAN

definitions.enum.wiegand.frame.format

This variable sets wiegand module ouput frame format.

Type	var
Permissions	guest=,admin=
Data Type	enum
Default	STANDARD_PARITY
Enum	STANDARD_PARITY REVERSE_PARITY CHECKSUM RAW_DATA

A.11. Programming the Translation Table

The ID4100 has a translation table facility that allows a translation table to be imported into the reader. This facility serves three primary functions:

➤ Support the use of legacy tags.

➤ Manage exceptions, such as the black-listing of tags.

➤ Serve as the list of allowed (and/or black-listed) tags for a standalone access control system (See Standalone Reader Operation Application Note).

Translation Table Format

The translation table uses a comma-separated variable (csv) format and will typically have a .csv extension. The first line of the file must contain the version number of the file format. Currently the file format version is 1.0. Each subsequent line of the file represents a sequence of tags and has the following format:

`[StartID],[TagType],[StartXlateID],[Entries],[Handler]<CR><LF>`

where:

`[StartID]` is the first tag ID of a sequence of tag IDs. In most cases, this is a hexadecimal number, preceded by `0x`. If the tag protocol is configured to display tag IDs in 6 bit ASCII format, this is the ASCII string representing the starting tag ID. In the ASCII tag case, this is typically a 4 letter identifier followed by a 8 digit decimal number.

`[TagType]` is the tag protocol type. This must be one of the protocols supported by the reader, for example, ISOC or ISOB.

`[StartXlateID]` is the first translated ID (in hex) of a sequence of translated IDs. The number is preceded by `0x`.

`[Entries]` is presented as a decimal number representing the number of tags in the sequence.

`[Handler]` determines how the ID4100 should process a tag and is a decimal number (between 0 and 255) that applies to all tags in the sequence. Where:

Bit 7:   Password Authentication Indicator

1 = Password Authenticated
0 = Not Password Authenticated

Bit 6:   Blacklist Indicator

1 = Blacklisted
0 = not Blacklisted

Bit 5:   TID Authentication Indicator

1 = TID Authenticated
0 = Not TID Authenticated

Bit 4:   RFU (0)

Bit 3:   RFU (0)

Bit 2:   RFU (0)

Bit 1:   RFU (0)

Bit 0:   Handler value

1 = Pass Translated ID to WIM
0 = Do not pass translated ID to WIM

Typical Handler values

➤ 1 – Legacy tag whose data is to be passed through the system to the Wiegand interface (00000001b)

➤ 64 – Black-listed Legacy tag (01000000b).

➤ 33 – TID-Authenticated Tag whose data is to be passed through the system to the Wiegand interface (00100001b).

➤ 96 – Black-listed TID-Authenticated tag (01100000b).

➤ 129 – Password-Authenticated Tag whose data is to be passed through the system to the Wiegand interface (10000001b).

➤ 192 – Black-listed Password-Authenticated tag (11000000b).

Example Table Entry

The following is a typical translation table entry.

```
0x00000000000000000010000,ISOC,
0x000A0100,1000,1<CR><LF>
```

This entry indicates:

➤ 1000 ISOC protocol tags in the sequence

➤ Each with a handler value of 1 (legacy tag passed through system)

➤ Actual tag IDs range from `0x00000000000000000010000` to `0x000000000000000000103E7`

➤ Corresponding translated IDs would range from `0x000A0100` to `0x000A04E7`

A.12. Interaction between Translation Table and Wiegand-Encoded Tags

Some tags are encoded with Wiegand data directly on them. The IDentity 4100 supports these direct Wiegand encoded tags of the following format:

➤ Secure ISOC
➤ ISOB
➤ ISO10374 (if supported by your model of IDentity 4100)
➤ Flex (if supported by your model of IDentity 4100)

Because of the security features present on direct Wiegand encoded Secure ISOC tags, they can be positively identified, and the Wiegand data encoded on the tag is transmitted via the WIM. For each of the other protocols, some C2 variables are used to enable the direct Wiegand feature on a protocol-by-protocol basis:

➤ modem.protocol.isob.control.wiegand.enabled
➤ modem.protocol.iso10374.control.wiegand.enabled
➤ modem.protocol.flex.control.wiegand.enabled

When these variables are set to "true", WIMapp will perform the following actions when a tag is read:

1. The standard tag ID will be looked up in the translation table (described above). If there is an entry matching the tag ID in the translation table, the action specified by the translation table entry will be performed.

2. If the tag ID is not present in the translation table, and if the direct Wiegand feature is enabled via the variables above, then the Wiegand data encoded on the tag will be transmitted via the WIM.

Although the default values are correct for most installations, and should not be changed without consulting Sirit technical support, it is possible to modify the areas in tag memory from which the Wiegand data is extracted by changing the following variables:

➤ modem.protocol.isob.control.wiegand.length

➤ modem.protocol.isob.control.wiegand.offset

➤ modem.protocol.iso10374.control.wiegand.length

➤ modem.protocol.iso10374.control.wiegand.offset

➤ modem.protocol.flex.control.wiegand.length

➤ modem.protocol.flex.control.wiegand.offset

A.13. Transaction Log

A transaction log is used to record information on tag arrivals. Each entry in the log contains the following information:-

`[time]` – provides the date and time of the tag arrival.

`[tag_id]` – ID of the tag.

`[antenna]` – states the antenna where the tag was read.

`[handle]` – 8-bit values that provide information about a tag upon its arrival. The bit values are defined as:

  Bit 7 Password Authentication

     1 = Password Authenticated

     0 = Not Password Authenticated

  Bit 6 Blacklist Indicator

     1 = Blacklisted

     0 = Not Blacklisted

  Bit 5 TID-Authentication

     1 = TID Authenticated

     0 = Not TID Authenticated

  Bit 4 User Data Read Failure

     1 = Failed To Read User Data

     0 = User Data Read (for authenticated tag)

      (or) Not Applicable (for legacy tag)

  Bit 3 Dealer Code Mismatch

     1 = Dealer Code Mismatch

     0 = Dealer Code Match (for authenticated tag)
      (or) Not Applicable (for legacy tag)

  Bit 2 RFU

  Bit 1 RFU

  Bit 0 Wiegand Access

     1 = Translated ID passed to Wiegand interface.

     0 = No data passed to Wiegand interface.

`[type]` – tag protocol type

`[translated_id]` – hexadecimal value of the translated tag ID (result of the translation table lookup).

A.14. Module Specifications

Operating Temperature Range	-40C to +60C
Storage Temperature Range	-40C to +85C
DC Power Input	12V-28V DC reverse polarity protected
Total Power Consumption	<1.25W (equivalent to <60mA @ 24VDC)
RS-232 Serial Port	115,200 Baud, 8 Bits, No Parity, 1 Stop Bit
Wiegand Port	Data Zero and Data One outputs
Configuration type	5Y (See App A of AC-01 Wiegand Specification)
Outputs	Optically isolated open-collector outputs capable of sinking 25mA

These outputs will need to be pulled up to 5V at the inputs of the terminating Wiegand panel. Optimum pull-up resistor values lie in the range 470Ω to 1kΩ. |
Tpw (Output Pulse Width)	40 µs -255µs in 5µs increments (with 470Ω pull-up resistor)
Tpi (Output Pulse Interval)	200µs to 20ms in 200µs steps
Hold-off time	50ms-20s in 50ms steps

B   AVI Lane Mapper

B.1.   Overview of the AVI Lane Mapper

The AVI Lane Mapper application determines the tag read rate and the signal strength of tags in a toll lane antenna field. This helps identify weak and strong areas within the antenna field.

The lane in the antenna field is divided into a grid. A tag is placed within each grid square and measurements are taken including the number of times the tag is read and the RSSI of each read for a given length of time (polling interval). One set of polling intervals is called a monitoring session.

There are three types of monitoring sessions:

➤ Prompt
➤ Automatic
➤ User Select

Prompt and Automatic index through the grid sequentially while User Select allows the user to select the squares in any order. The type of Monitoring Session to be run is defined on the **Options** dialog. The default Monitoring Session type is Prompt.
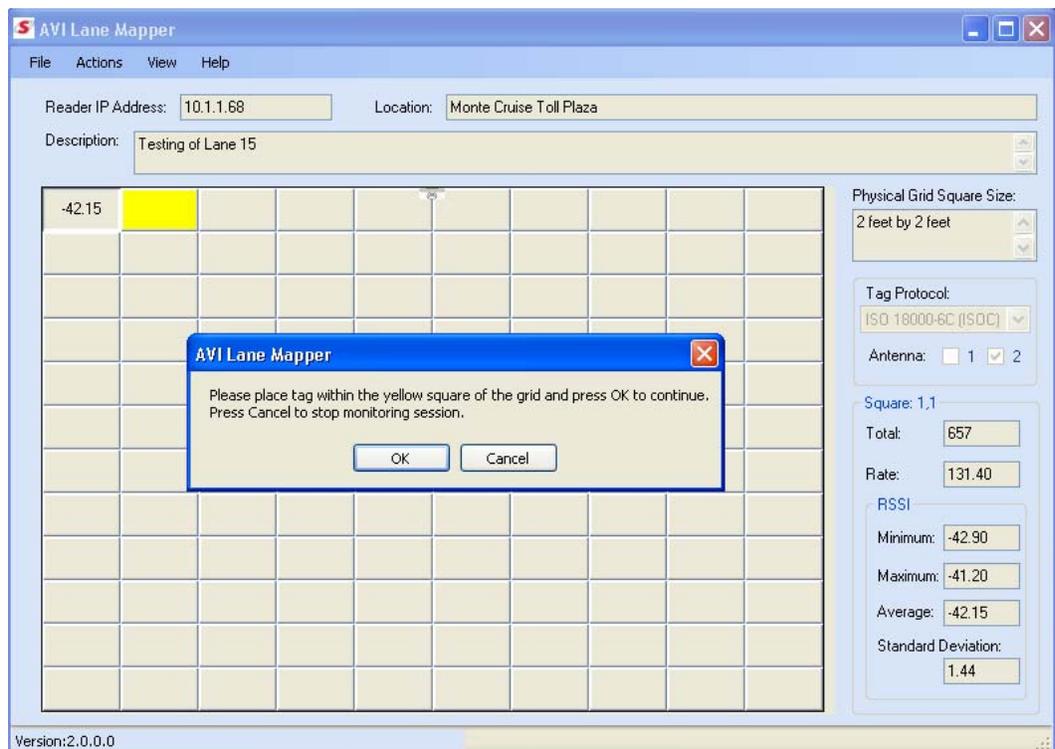
Prompt Monitoring Session

During a Prompt monitoring session, the user is prompted with a Message Box at the start of the session and in between each polling interval. This method allows for an unlimited time to setup the next grid square. The user will need to press *OK* on the Message box before the next polling interval begins.

When a Prompt Monitoring Session starts the first available grid in the square is highlighted yellow. The utility gets the current reader configuration before the first polling interval starts. A Message box is displayed prompting the user to place a tag in the highlighted grid square.

After placing the tag within the specified grid square, a polling interval will start. A progress bar is displayed during a polling interval.

At the end of the polling interval, the following results are calculated for the given grid square.

➤ Total number of tag reads
➤ The tag read rate per second
➤ The minimum RSSI sent by the reader
➤ The maximum RSSI sent by the reader
➤ The average RSSI seen during the polling interval.
➤ Standard Deviation of the RSSI sent by the reader.

These results are displayed to the left of the main screen for that grid square. One of the following results maybe displayed in the grid square, if there is room, the Tag read rate, Total number of tags read, or the average RSSI. Which one maybe selected from the *View* menu.

The application verifies that only one tag was seen during the polling period. If more than one tag is found, the square is highlighted in orange. Hovering over a square with a warning will display a popup describing the warning.

A check is also made for a large variance in the standard deviation. This check uses the values specified on the Options Dialog to determine a large variance condition. If the condition is true, the grid square is highlight in red.

After displaying the read data, a message box is again displayed prompting you to move the tag to the next grid square. An optional sound can be played when this message box is displayed.

Automatic Monitoring Session

The Automatic Monitoring Session the application waits a specified length of time to setup the next grid square before beginning the polling interval. This length of time is defined on the **Options** dialog. A sound is played at the end of each polling interval.

When an Automatic Monitoring Session starts, the first available grid in the square is highlighted yellow. The application obtains the current reader configuration before the first polling interval starts. A progress bar is displayed while the application is waiting to start the first polling interval.

When the waiting period has expired, the polling interval starts. A progress bar is displayed whenever a polling interval is currently running.

The same results are displayed as the Prompt Monitoring Session and a sound is played at the end of the polling interval before the next waiting period begins.

User Select Monitoring Session

During this monitoring session, the user is prompted with a dialog at the start of the session and in between each polling interval. This method allows the you to select the next grid square to be polled and for an unlimited time to setup the next grid square. This method can be used for taking sampling data from just specific squares in the grid. You must press **OK** on the dialog before the next polling interval begins.

When a User Select Monitoring Session starts, the reader's configuration is retrieved from the reader. A dialog is displayed prompting you to select the next grid to be polled.
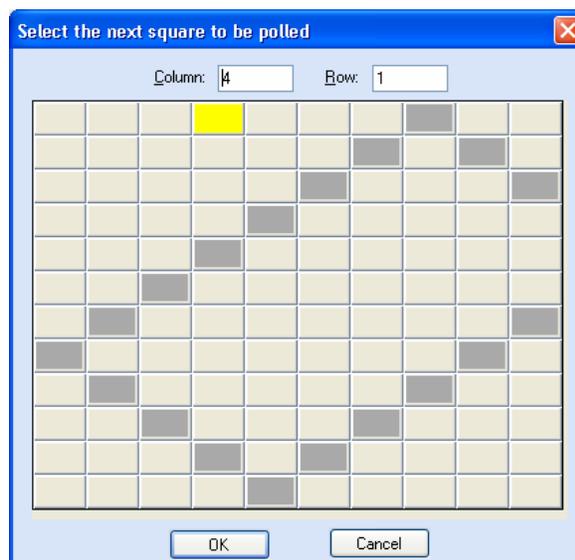
Enter the column and row of the square or click the square to automatically fill in the column and row. The currently selected square is highlighted in yellow. Squares that contain polling interval data will be highlighted in dark gray. Only squares that do not contain polling interval data may be selected from this dialog. Double clicking on a square will select that square, close the dialog, and then start the next polling interval.

Select **OK** on this dialog will start the polling interval. A progress bar is displayed while the application is waiting to start the first polling interval.
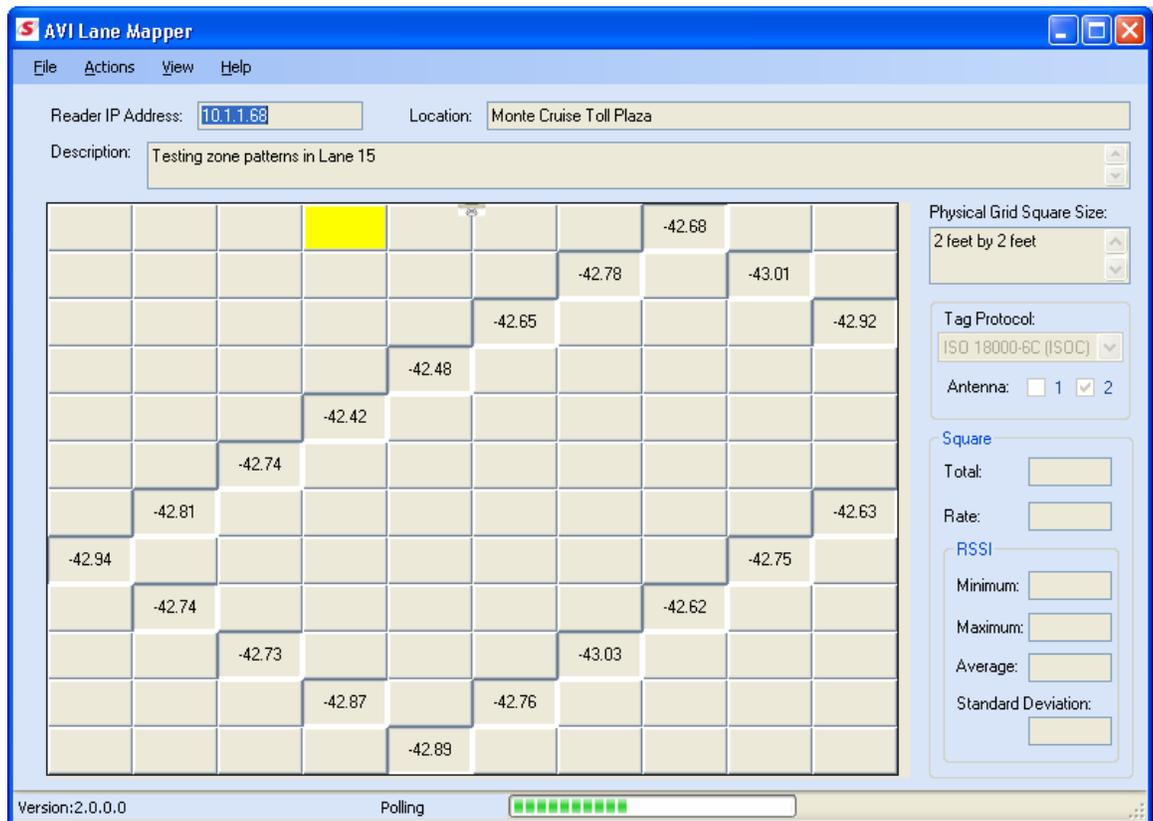
The same results are displayed as the Prompt Monitoring and **the Select next square to be polled** screen is displayed again. An optional sound bite maybe played when this dialog is displayed. You can press **OK** to continue the monitoring session or **Cancel** to stop the current session.

B.2. AVI Lane Mapper Operation

Start a Monitoring Session

1   To start a monitoring session, select:

Actions → Start Monitoring Session

2   The following dialog is displayed.

3   Enter the reader IP address, monitor parameters, and descriptive information. If there are results from a previous monitoring session, you may be prompted to save those results before starting a new monitoring session.

- **IP Address** – IP Address of the reader. This field is required and if an invalid or no address is specified, the application will display an error. This value is displayed on the main screen when the monitoring session is started.

- **Tag Protocol** – Protocol of tag used in the test. This will set the reader only to use this tag protocol.

- **Antenna** – Antenna(s) to be used in the test. The checkboxes refer to the antenna port on the reader. For IDentity 5100, 1 refers to the internal antenna and 2 refers to the external antenna.

- **Polling Interval** – Length of a polling interval in seconds. This value needs to be greater than 1. This field will automatically be filled in with the value specified on the *Options* dialog.

- **Number of Columns** – The number of columns displayed in the grid. This value should be the same as the number of columns in the physical grid. The valid range for this value is between 1 and 100. This field will automatically be filled in with the last value specified.

- **Number of Rows** – The number of rows displayed in the grid. This value should be the same as the number of rows in the physical grid. The valid range for this value is between 1 and 65. This field will automatically be filled in with the last value specified.

- **Antenna Orientation** – Specifies the location of the antenna relative to the grid. A graphic of an antenna will be displayed on the grid for the specified orientation.

  - Top - Antenna is centered horizontally in front of the first row.

  - Bottom - Antenna is centered horizontally behind the last row.

  - Left - Antenna is centered vertically in front of the first column.

  - Right - Antenna is centered vertically behind the last column.

  - Square - Antenna is placed within a given square of the grid. This will allow areas all around the antenna to be tested. . This field will automatically be filled in with the value specified on the Options dialog.

- **Location** – Any information about the location where the monitoring session is being executed. This field is optional and used for informational purposes only. It will be stored with the monitor session results. This value will be displayed on the main screen when the monitoring session is started.

- **Description** – Descriptive information about the monitoring session, such as reader or antenna settings. This field is optional and used for informational purposes only. It will be stored with the monitor session results. This value will be displayed on the main screen when the monitoring session is started.

- **Physical Grid Square Size** – Dimensions of a square in the physical grid being monitor, such as 2'x2'. This field is optional and used for informational purposes only. It will be stored with the monitor session results. This value will be displayed on the main screen when the monitoring session is started.

Stop a Monitoring Session

1 To stop a monitoring session at any time, select:

> **Actions → Stop Monitoring Session**

2 Or, to stop a Prompt or User Select Monitoring session, press the **Cancel** button on the message box or dialog displayed between polling intervals.

Restart Monitoring Session

1 To restart a stopped monitoring session or start a session that was loaded from a file, select:

> **Actions → Restart Monitoring Session**

2 The following dialog is displayed:

This dialog is the same as shown when starting a new monitoring session, except only the Location, Description, and Physical Grid Square Size maybe edited.

If the session does not have the reader's configuration information, the utility will retrieve it from the reader before restarting the monitoring session.

Clear Session Data

1   To clear the results from a previous monitoring session, select:

        Actions → Clear Session Data

2   If prompted, save the results before clearing the data.

Rerun Polling Interval (Method 1)

1   To rerun a polling interval for any given square, select:

        Actions → Rerun Polling Interval

Note: A polling interval may only be rerun when there is no monitoring session being executed.
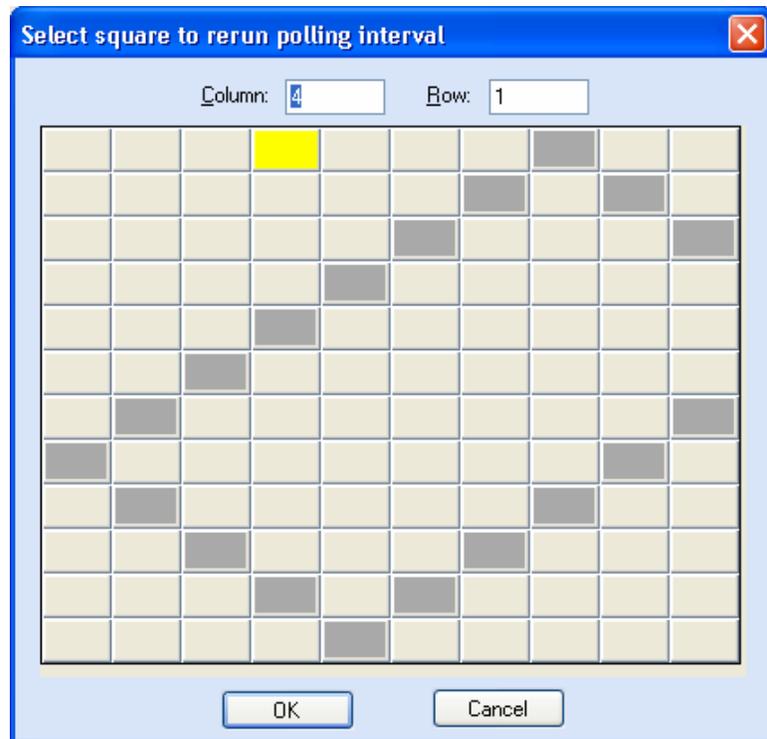
2   The following dialog is displayed.

3   Enter the column and row of the square or click the square to automatically fill in the column and row.

        The current selected square is highlighted in yellow. Squares that contain polling interval data will be highlighted in dark gray. Only squares that contain polling interval data may be selected from this dialog.

4   Double click a square to select that square, close the dialog, and restart the polling interval for that square.

Rerun Polling Interval (Method 2)

An alternate method to rerun a polling interval is as follows:

1 Double click on the desired square.

2 In the message box, press **Yes** to confirm rerunning the polling interval for the selected square.

3 The polling period will start for that square. The data from the previous polling interval will be lost when the polling interval is complete.

Changing the data displayed in a grid square

If a grid square is large enough, three types of data can be displayed in the square:

➤ Tag read rate

➤ Total number of tags read

➤ Average RSSI.

You select which data is displayed from the **View** menu. Check marks are displayed next to the selections. The selection can be changed at any time and will be saved when exiting the application.
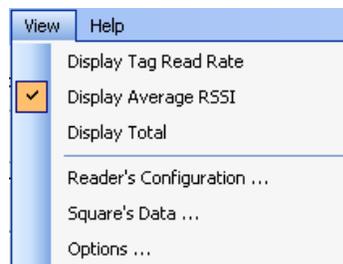
View the Reader's Configuration

To view the Reader's Configuration dialog, select:

View → Reader's Configuration

The configuration is retrieved from the reader at the start of the Monitoring Session or after a restart if the session data does not have any reader configuration information. This information is saved with the test results and also with exported results. The dialog values can not be modified.

Property	Value
setup.install_type	point_of_sale
setup.protocols	isoc
setup.region	fcc
setup.sub_region	fcc_a
setup.tag_volume	1
setup.advanced.preferred_frequencies	0

Displaying the data from a given grid square

There are two ways for displaying the data from a polling interval for any given grid square:

1   Click the square in the grid

2   Select **View → Square's Data**.

3   This will display the following dialog.
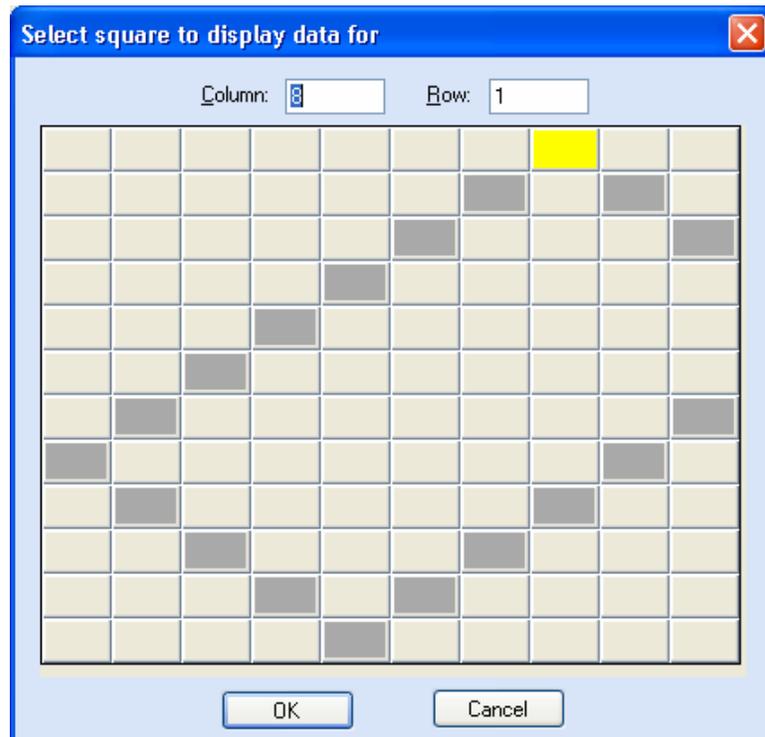
4   Enter the column and row of the square or click the square to automatically fill in the column and row.

The current selected square is highlighted in yellow. Squares that contain polling interval data will be highlighted in dark gray. Only squares that contain polling interval data may be selected from this dialog.

5   Double click a square to select that square, close the dialog, and display the square's data.

6   The data is displayed in the boxes to the right of the main screen. If a square has no data, these boxes will be emptied. If there is a monitoring session currently running, the screen will be updated with the last square's data after a polling interval.

Options

This is the dialog to modify the options used by the application. To view the **Options** dialog, select **View → Options**. These values will be saved across application closings.

➤ **Login** – Login level to log into the reader as. This needs to be at least admin. If this value is not specified or is incorrect, the application will fail to start a monitoring session. The default Login is `admin`.

➤ **Password** – Password to use when logging into the reader. If this value is not specified or is incorrect, the application will fail to start a monitoring session. The default Password is `readeradmin`.

➤ **Wav File to Play** – Lists the sound file (.wav file) that is played when **Play sound with prompt message** is checked for Prompt and User Select Monitoring Sessions or for Automatic Monitoring Sessions. If this value is empty, no sounds are played. If a .wav file is specified, it needs to currently exist. The default file `ding.wav`.

➤ **Play sound with prompt message** – Tells the application to play the sound when the message box is displayed for a Prompt Monitoring Session or when the dialog is displayed for User Select Monitoring Session. The sounds is specified in the **Wav File to Play** field.

➤ **Maximum Standard Deviation** – Contains the maximum standard deviation allowed based on the Average RSSI to determine a large variance condition for a grid square. When the standard deviation is greater than the value specified for the average RSSI, the square is highlighted in red. The default values are listed in the table below.

Average RSSI	Maximum Standard Deviation
> -45	2
-45 < and > -55	4
-55 < and > -65	6
-65 <	8

➤ **Prompt between Polling Intervals** – Selects a Prompt Monitoring Session. A message box to displayed at the start of the session and between each polling interval. Press **OK** on the message box to start the next polling interval. This is the default Monitoring Session type.

➤ **Automatic** – Selects an Automatic Monitoring Session. When the monitoring session starts, the application waits for the amount of time specified in the **Next Interval Wait Time** field before starting the polling interval for the first grid square. If a sound file is specified, it will sound at the end of the polling interval and the applications will wait again until the next polling interval is started.

➤ **Next Interval Wait Time** – Amount of time the application will wait between polling intervals in seconds. This value needs to be greater than 1. The default for this option is 15.

➤ **Select next square to be polled** – Selects the User Selects Monitoring Session. A dialog is displayed at the start of the session and between each polling interval to allow you to select the next square to be polled. Press **OK** on the dialog to start the next polling interval.

<div style="text-align:center">

C   # Disposal of the IDentity 4100 Reader

</div>

Prior to disposing of the ID*entity* 4100 Reader, the battery must be removed. The battery used in the ID*entity* 4100 is a Lithium / Manganese Dioxide (Li/MnO2) type. This battery contains no measurable amounts of mercury, lead, or cadmium.

> ⚠️ **Caution:** *The procedure outlined in this appendix requires opening the IDentity 4100 Reader case in order to remove the battery prior to disposal. Opening the case of the IDentity 4100 will void the warranty. In addition, opening the case may adversely affect any future operation of the reader.*
>
> *Never open the case of the IDentity 4100 Reader unless you are going to remove the battery and dispose of the unit.*
>
> *All disposal operations must be performed within local guidelines and laws. It is the responsibility of the reader owner to ensure all local and regional laws and regulations are followed for proper reader disposal.*

To remove the battery, perform the following:

1   Remove the reader from service and disconnect any power, antenna, and communication cables.

2   Remove the 16 Philips head screws securing the reader enclosure to the antenna.

3   Separate the reader and antenna. An RF cable connects the two units.

4   Using an SMA connector wrench, remove the cable from the antenna and set the antenna aside.

5   Remove the serial, digital I/O, and Ethernet cables from the digital board.

6   Remove the nine screws securing the shield can to the digital board.

7   Remove the remaining screw securing the digital board to the chassis.

8   Remove the digital board from the enclosure and locate the battery next to the LEDs.

9   Use a small flat-blade screwdriver to push the battery out of the holder.

10   Properly dispose of battery according to local and regional laws and regulations.

11   Properly dispose of reader according to local and regional laws and regulations.

D   # Reader Maintenance

D.1.   Antenna Radome Maintenance

The Sirit IDentity 4100 UHF RFID reader is a low maintenance device. However, the user must ensure that any reader antenna radomes are kept clean. Any build-up of foreign substances, water, or snow will degrade the performance of the unit

<div align="right">E   **Error Handling**</div>

This appendix provides a listing of errors and warnings. Where applicable, a corrective action has been provided. Errors and warnings are listed by severity (critical, major, warning) and then alphabetically. If an issue does not resolve itself after taking the recommended corrective action, contact Sirit support.

E.1. Critical Errors

Critical errors are those errors that are likely to result in loss or severe degradation of service. These errors must be addressed immediately.

Critical Error	Event	Description	Corrective Action
MDM_ANTENNA_ FAILURE	event.error. antenna	Failed to set or change antenna. Probably due to un-terminated antenna port.	Check condition of antennas, connectors, and coax. Use **modem.antennas.perform_check()** to perform antenna check function to determine if issue has been located.
MDM_CLOSED_LOOP_ POWER_CTL_FAIL	event.error. radio	Internal RF power control failed. May cause inaccurate antenna power output.	Perform reader reboot. If condition persists, contact Sirit support.
MDM_OVERTEMP_ FAULT	event.error. environmental	High temperature measured at modem	Determine cause of excessive reader temperature and correct.
MDM_RC_CANT_SET_ FREQUENCY	event.error. radio	Synthesizer problem tuning to desired frequency.	Perform reader reboot. If condition persists, contact Sirit support.
MDM_RC_NO_ ANTENNA	event.error. antenna	Failed to detect antenna. Probably due to antenna disconnected.	Check antenna connections, then perform antenna check function.
MDM_SPI_NO_ RESPONSE	event.error. communication	Modem has attempted to communicate with a SPI bus peripheral and received no response.	Perform reader reboot. If condition persists, contact Sirit support.
MDM_SYNTHESIZER_ LOCK_FAIL	event.error. radio	Synthesizer can't lock to desired frequency.	Perform reader reboot. If condition persists, contact Sirit support.
MDM_TEMPERATURE_ SENSOR_FAIL	event.error.hw	Temperature sensor unable to detect temperature.	Perform reader reboot. If condition persists, contact Sirit support.
READER_INIT_FAILURE	event.error.sw	Main processor has failed to successfully complete the initialization process.	Perform reader reboot. If condition persists, contact Sirit support.
SEEPROM_UNABLE_ TO_WRITE	event.error.hw	Unable to write to SEEPROM.	Perform reader reboot. If condition persists, contact Sirit support.

E.2. Major Errors

Major errors are those errors that may result in loss or degradation of service. These errors must be addressed as soon as possible.

Major Error	Event	Description	Corrective Action
CHUNK_TOO_LARGE	event.error.sw	Unable to find enough space in the SEEPROM.	Perform reader reboot. If condition persists, contact Sirit support.
CHUNK_INVALID	event.error.sw	Unable to find valid data in the SEEPROM.	Perform reader reboot. If condition persists, contact Sirit support.
SEEPROM_INVALID_SIZE	event.error.sw	Unable to access SEEPROM due to invalid size.	Perform reader reboot. If condition persists, contact Sirit support.
CHUNK_NOT_ FOUND	event.error.sw	Unable to find valid data in the SEEPROM.	Perform reader reboot. If condition persists, contact Sirit support.
DATA_FORMAT_ ERROR	event.error.sw	An error is detected in the data format.	Perform reader reboot. If condition persists, contact Sirit support.
DEVICE_INIT_ FAILURE	event.error.sw	Error initializing a device in the system.	Perform reader reboot. If condition persists, contact Sirit support.
DEVICE_OPEN_ FAILURE	event.error.sw	Unable to open device or piped command.	Check memory and disk usage via "Check Reader Status" webpage. If "free_memory" is lower then 10 MBytes or if filesystem:/apps or filesystem:/tmp is higher than 90%, determine if embedded application is improperly using memory. If condition persists, contact Sirit support.
INDEX_OUT_OF_ BOUNDS	event.error.sw	Software is indexing beyond end of array.	If condition persists, contact Sirit support.
INVALID_ ARGUMENT	event.error.sw	Argument of an internal command is invalid.	If condition persists, contact Sirit support.
IOP_CONMGR_ INVALID_CMDRESP_ FD	event.error. communication	Unknown command channel being closed.	Perform reader reboot. If condition persists, contact Sirit support.
IOP_CONMGR_ INVALID_EVENT_FD	event.error. communication	Unknown event channel being closed.	Perform reader reboot. If condition persists, contact Sirit support.
IOP_HB_MODEM_ NOT_RESPONDING	event.error.hw	Modem not responding to keepalives from main processor.	If condition persists, contact Sirit support.

Major Error	Event	Description	Corrective Action
IOP_IPRC_CRC_ERROR	event.error.communication	Communication from modem processor had a CRC error. May see at bootup, since extra bytes are sent from modem processor during its boot squence.	Usually caused by excessive processing loading on the reader by external entities. Determine if any external process is continuously sending command requests to the reader at a high rate. If running an embedded application, ensure that it is not monopolizing the processor. If condition persists, contact Sirit support.
IOP_IPRC_TIMEOUT	event.error.communication	Communication to modem processor timed out. May see at boot up, since modem processor may take a few seconds to boot.	Perform reader reboot. If condition persists, contact Sirit support.
IOP_IPRC_TRY_AGAIN	event.error.communication	No data available from the modem processor.	Perform reader reboot. If condition persists, contact Sirit support.
IOP_SPI_BAD_FILE	event.error.file_handling	Unable to open the firmware file to be written to the SPI FLASH.	Perform reader reboot. If condition persists, contact Sirit support.
IOP_SPI_BAD_VERIFY	event.error.communication	Verification of data in SPI FLASH failed.	Contact Sirit support.
IOP_SPI_INVALID_FILE_FORMAT	event.error.file_handling	The firmware file to be written to the SPI FLASH does not appear to be in the proper hex format.	Contact Sirit support.
LICENSE_ERROR	event.error.sw	The main processor has attempted a license operation or import that has failed.	Verify license file contains MAC address of this specific unit. Verify the license file has not been imported previously. If condition persists, contact Sirit support.
MDM_ADC_DEVICE_FAILURE	event.error.hw	The ADC device on the modem has generated an error.	If condition persists, contact Sirit support.
MDM_ANTENNA_CHECK_FAILURE	event.error.antenna	The reader cannot perform an antenna check.	If condition persists, contact Sirit support.
MDM_CALIBRATION_DATA_MISSING	event.error.hw	Unable to find valid calibration data from the reader SEEPROM.	Contact Sirit support.
MDM_CALIBRATION_DATA_CORRUPT	event.error.hw	Invalid calibration data found on the reader SEEPROM.	Contact Sirit support.
MDM_RECEIVER_FAILED_SELFTEST	event.error.hw	Reader self test failed.	Contact Sirit support.
MDM_CNR_CLOSED_LOOP_FAILED	event.error.radio	CNR closed loop control failed.	If condition persists, contact Sirit support.

Major Error	Event	Description	Corrective Action
MDM_CNR_UPDATE_WITH_TXOFF	event.error.sw	An error is occurred when CNR update with transmission turned off.	If condition persists, contact Sirit support.
MDM_FPGA_LOAD_FAILURE	event.error.hw	Unable to load FPGA device on the modem.	If condition persists, contact Sirit support.
MDM_FPGA_RAMTEST_FAILURE	event.error.hw	FPGA device on the modem failed RAM test.	If condition persists, contact Sirit support.
MDM_FPGA_RESET_FAILURE	event.error.hw	FPGA device on the modem cannot be reset.	If condition persists, contact Sirit support.
MDM_FPGA_TIMEOUT_FAILURE	event.error.hw	PPI bus stopped unexpectedly	If condition persists, contact Sirit support.
MDM_FPGA_TIMEOUT_WARNING	event.error.hw	Timeout waiting on FPGA SPI bus.	If condition persists, contact Sirit support.
MDM_ICM_ERROR	event.error.communication	An inter-core message response on the modem has an error.	Contact Sirit support.
MDM_ICM_TIMEOUT	event.error.communication	An inter-core message response on the modem has timed out.	Contact Sirit support.
MDM_INVALID_RX_COMB_LENGTH	event.error.sw	Invalid receiver filter length is detected.	Contact Sirit support.
MDM_INVALID_RX_Q_CHANNEL_COEFS	event.error.sw	Invalid receiver filter coefficient is detected.	Contact Sirit support.
MDM_IPRC_CRC_ERROR	event.error.communication	Modem has received communication from main processor which fails CRC check. May see at boot up, since processors may come up (and start sending messages) at slightly different times.	Contact Sirit support.
MDM_IPRC_OVERFLOW	event.error.communication	Modem communication buffer that receives data from the main processor has overflowed and data has been lost.	Contact Sirit support.
MDM_IPRC_TRY_AGAIN	event.error.communication	Modem communication buffer that receives data from the main processor has no full message yet.	Contact Sirit support.
MDM_L1_TX_PACKET_TIMEOUT	event.error.communication	Lowest level physical layer transmit process timed out.	Contact Sirit support.

Major Error	Event	Description	Corrective Action
MDM_LOW_VOLTAGE _FAULT	event.error. environmental	Low voltage on digital portion of modem.	Verify correct operational voltage is being supplied to reader. Verify power supply voltages meet Sirit specifications. If condition persists, contact Sirit support.
MDM_MINIMUM_ GAIN_LIMIT	event.error.sw	Receiver gain limit is exceeded.	Contact Sirit support.
WIEGAND_FAILURE	event.error.sw	The main processor has detected a failure related to Wiegand application.	If condition persists, contact Sirit support.
MDM_PPI_DEVICE_ FAILURE	event.error.hw	The PPI interface has generated an error.	Contact Sirit support.
MDM_RESET_ COMPLETE_MDM_ DOWN	event.error.hw	The main processor has reset the modem, but has been unable to communicate with it.	Perform reader reboot. If condition persists, contact Sirit support.
MDM_RF_VOLTAGE_ FAULT	event.error.hw	RF subsystem voltage below acceptable level. (May be seen when unit powered off.)	Verify correct operational voltage is being supplied to reader. Verify power supply voltages meet Sirit specifications. If condition persists, contact Sirit support.
MDM_RX_TRAIN_ TIMEOUT	event.error.sw	The modem has exceeded the receiver training time limit.	If condition persists, contact Sirit support.
MDM_UNKNOWN_ PROTOCOL	event.error.sw	The modem detected an unsupported protocol.	If condition persists, contact Sirit support.
MDM_UNKNOWN_ TX_INTERP_RATE	event.error.sw	The modem detected an unsupported transmit interpolation rate.	Contact Sirit support.
MDM_UNKNOWN_ TX_TEST_MODE	event.error.sw	The modem detected an unsupported transmit test mode.	Contact Sirit support.
MDM_UNKNOWN_TX _WAVEFORM_TYPE	event.error.sw	The modem detected an unsupported transmit waveform.	Contact Sirit support.
SPARSE_ARRAY_ BOUNDS_CHECK	event.error.sw	Software attempted to index beyong the limits of the sparse array.	Contact Sirit support.
SYSLOG_INVALID_ LOG_LEVEL	event.error.sw	Invalid level specified in C2 command for remote syslog.	Verify the correct logging level of syslog messages sent to the specified remote syslog file server. If condition persists, contact Sirit support.

E.3. Warnings

Warnings indicate that the system has detected an abnormality. Although no action is required, the system should be monitored for further issues.

Warnings	Event	Description	Corrective Action
IOP_CONFIG_FILE_CORRUPT	event.warning.file_handling	During the loading of a profile or auxiliary configuration file, a file has been determined to be corrupt.	None required.
IOP_EVENT_INVALID_FORMAT	event.warning.communication	Indicates an event with invalid format being sent to the main processing system.	None required.
IOP_FILE_TRANSFER_ERROR	event.warning.file_handling	An attempt to move files in the main processing system has failed.	None required.
IOP_SOCKET_CREATE_FAILURE	event.warning.communication	Indicates a failure to connect to the modem.	None required.
IOP_SPI_NO_ANSWER	event.warning.communication	Indicates a failure to connect to the SPI bus.	None required.
IOP_TMR_NO_MORE_TIMERS	event.warning.sw	Indicates a failure to find valid timers.	None required.
KERNEL_FN_FAILURE	event.warning.sw	Indicates a failure in accessing the kernel drivers.	None required.
LICENSE_EXPIRED	event.warning.license	A temporary license has expired. The licensed feature has been disabled.	None required.
LICENSE_EXPIRING	event.warning.license	A temporary license is near expiration. The licensed feature is still enabled.	None required.
LICENSE_WARNING	event.warning.license	A minor problem occurred during a license import.	None required.
MALLOC_FAIL	event.warning.sw	Indicates a failure in allocating memory.	None required.
MDM_ALL_CHANNELS_BUSY	event.warning. radio	The modem is unable to find valid channels.	None required.
MDM_LBT_CHANNEL_IS_OCCUPIED	event.warning. radio	The selected channel is occupied.	None required.
MDM_NO_AVAILABLE_FREQUENCIES	event.warning. radio	There are no frequencies available for transmission which meet the LBT and/or minimum-off-time requirements.	None required.
MDM_OVER_TEMP	event.warning.hw	The measured temperature is higher than the warning threshold, but not high enough to cross fault threshold.	None required.
MDM_POWERMEASURE_CLIPPED	event.warning. radio	An error is detected in the power reading process.	None required.

Warnings	Event	Description	Corrective Action
MDM_RC_NO_ AVAILABLE_ FREQUENCIES	event.warning. radio	The modem is unable to find valid frequencies.	None required.
MDM_REFLECTED_ POWER	event.warning. antenna	An antenna's return loss is lower than the warning threshold, but not low enough to cross the fault threshold.	None required.
MODULE_NOT_ INITIALIZED	event.warning.sw	Indicates a failure in module initialization.	None required.
NULL_POINTER	event.warning.sw	Indicates a failure in the pointer.	None required.
SPARSE_ARRAY_ NULL	event.warning.sw	Indicates a non-existent sparse array.	None required.
SYMBOL_TABLE_ DEFAULT_INVALID	event.warning.sw	Default value is invalid for the symbol.	None required.
SYMBOL_TABLE_ FAILED_TO_ RESTORE	event.warning. configuration	Indicates a failure in restoring the configurations.	None required.
SYMBOL_TABLE_ FAILED_TO_SAVE	event.warning. configuration	Indicates a failure to save the configurations.	None required.
SYMBOL_TABLE_ OVER_ REGISTRATION	event.warning.sw	Indicates duplicated registrations of the symbol.	None required.
SYMBOL_TABLE_ WRONG_TYPE	event.warning.sw	Data type is invalid for the symbol.	None required.

E.4. Informational Messages

Informational messages describe various system events.

Message	Event	Description
AUX_PROCESS_FAILURE	event.info	The main processor has detected an error in an auxiliary process.
IOP_EVENTS_DROPPED	event.info	The main processor has detected events being dropped.
IOP_TAG_DB_OVERFLOW	event.info	The main processor has detected an overflow in the tag database.
IOP_TMR_NO_EVENTS_ PENDING	event.info	Indicates a timer signaled attention, but there were no timer events pending.
IOP_TMR_NOT_ACTIVE	event.info	Indicates a timer operation is being performed on an expired timer.
ITEM_NOT_FOUND	event.info	Indicates a search failure.
MDM_RESET_COMPLETE	event.info	Modem reset is complete.
MDM_TEMP_RESUME	event.info	Indicates temperature reaching resume value.
NO_AVAILABLE_CONNECTIONS	event.info	Indicates the maximum number of command/response or event channels have been exceeded.
OUT_OF_MEMORY	event.info	Indicates the maximum number of events allowed for registration has been reached.
READER_ENTER_DUTY_CYCLE	event.info	Indicates the reader entering the duty cycle.
READER_INIT_SUCCESS	event.info	Indicates the reader successfully initialized.
READER_RECOVERY	event.info	Indicates the reader recovery being performed.