# INfinity 510



# User's Guide



# Preface

Sirit's INfinity 510 User's Guide is designed to allow you quickly install, configure, and operate your reader. This guide only provides instructions for a basic installation and you should refer to the INfinity 510 Developer's Guide and Protocol Reference Guide for more detailed programming, configuration, and operation instructions.

#### Information Included in this Guide

Information provided in this guide includes:

- > Safety Instructions
- Reader Overview
- Reader Equipment Installation
- Reader Software Installation
- Reader Configuration
- Reader Operation
- Specifications

#### **Intended Audience**

This document is intended for those who wish to quickly setup and operate the IN*finity* 510. Before attempting to install, configure, and operate this product, you should be familiar with the following:

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

#### 2 3 4 5 6

# **Reader Overview**

## Introduction

The IN*finity* 510 is a multiprotocol, multiregional Radio Frequency Identification (RFID) System that operates in the 860 – 960 MHz UHF band.





As shown in the following figure, this high performance reader supports up to four Tx/Rx antennas and one Listen before Talk (LBT) antenna and is equipped with both serial and Ethernet interfaces. Discrete digital inputs and outputs are also provided.





#### 2 3 4 5 6

The IN*finity* 510 is equipped with four status indicators located on the top of the enclosure. These LEDs provide indication for the following:

- > Sense Indicates reader has detected a tag in the RF field.
- > Transmit Indicates the reader's transmitter is operating (RF on).
- Fault Indicates a fault occurred.
- > Power Indicates that power is applied to the reader.



During power up, the LEDs will momentarily flash.

# **Reader Equipment Installation**

#### **Mechanical Installation**

#### **Mounting the Reader**

The INfinity 510 is equipped with two mounting flanges and slotted keyholes that accept three #8 (M4) mounting screws. Predrill any mounting surface according to the following dimensions. Any mounting surface must be able to support up to four pounds (1.8 kg).



#### **Concrete Wall Mounting**

To mount the IN*finity* 510 to a hollow concrete block wall, Sirit recommends metal sleeve type concrete anchors that accept #8 screws and flat washers.

#### Wood or Metal Wall Mounting

To mount the IN*finity* 510 to a wood or sheet metal wall, Sirit recommends either  $#8 \times 1$  inch wood screws or  $#8 \times 1$  inch sheet metal screws and washers.

#### **Drywall Mounting**

To mount the IN*finity* 510 to drywall or sheetrock, Sirit recommends either #8 toggle bolts or #8 drywall anchors.

#### **Mounting the Antennas**

The INfinity 510 supports from one to four antennas in a variety of configurations. One and two-antenna configurations are typical for most conveyor and container tracking. Four-antenna configurations are used for portals and loading dock doorways.

The optional Sirit provided antennas are for indoor use only and must be installed on a solid surface or frame to prevent damage or later misalignment. It is highly recommended that the antenna mounting be adjustable in order to obtain the best performance from the system.



**WARNING:** FCC Radiation Exposure Statement. The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

#### **Typical Antenna Pole Mount**



#### **Electrical Installation**





#### **Connecting the Ethernet Port**

#### **Ethernet Cables**

In most cases, you will connect the INfinity 510 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 maximum Ethernet cable length is 30 meters. If you are communicating with your reader across a Local Area Network (LAN), connect an Ethernet cable from your hub or router to the RJ-45 connection. See Figure 2 for location of the connector. If you are connecting the reader directly to a PC, you must use a crossover cable. See Note to the left.

#### **Connecting the Antennas**

The maximum antenna cable length is 10 meters. Connect the antenna to antenna port **1**. If you are using additional antennas connect them to Ports 2-4. If applicable, connect the LBT antenna to the Listen port



Caution:

The INfinity 510 UHF Reader is equipped with four (4) RF ports. To prevent reader damage, active RF ports must be properly terminated with a 50 ohm load or a functional UHF antenna before power up. UHF Readers are factory configured to operate on RF port 1. As a result, port 1 must be properly terminated before initially powering on the reader. Before activating any additional RF ports, they must also be properly terminated. 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.

#### **Connecting Digital Inputs/Outputs**

The INfinity 510 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, photoswitches, 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 conveyor gates or other access control and sorting devices.

#### **Connecting the Power**

Connect the 15 Vdc 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.



# **Reader Software Installation**

#### **Installing Reader Configuration Software**

The IN*finity* 510 is equipped with a Microsoft Windows PC application called Reader Startup Tool (RST). You can use this application to configure the reader as well as read and display tag data.

#### Install RST

1 To install RST, load your system CD and double-click the Setup.exe file:

🛱 Sirit Infinity 510	🛱 Sirit Infinity 510
Welcome to the Sirit Infinity 510 Setup Wizard	Select Installation Folder
The installer will guide you through the steps required to install Sirit Infinity 510 on your computer.	The installer will install Sint Infinity 510 to the following folder. To install in this folder, click "Next". To install to a different folder, enter it below or click "Browse".
	Eolder: C:\Program Files\Sint Inc\Sint Infinity 510\ Disk Cost
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.	Install Sirit Infinity 510 for yourself, or for anyone who uses this computer:  C Everyone C Just me
Cancel Sack Mext>	Cancel < <u>B</u> ack <u>Next</u> >
2 Press Next>	3 Verify the directory and path where the RST files will be installed. Press <b>Next&gt;</b>
til Sirit Infinity 510	Installation Complete
The installer is ready to install Sirit Infinity 510 on your computer. Click "Next" to start the installation.	Sirit Infinity 510 has been successfully installed. Click "Close" to exit.
	Please use Windows Update to check for any critical updates to the .NET Framework.
Cancel < Back Mext>	Cancel < Back Cose

4 Press Next>

5 Press **Close** when the installation is complete.

# **Reader Configuration**

#### **Start RST**

To start your reader configuration, open the RST application.

#### **Open RST**

**1** From your Windows desktop, select:

#### Start→Programs→Sirit→INfinity510→Reader Startup Tool

INf	inity 510: Reader :	Startup Tool (RST)					
	Мас	Host	DHCP	IP	Subnet	Gateway	General
,	00:17:9E:00:01:06	00179E000106.sam	dhop	10.1.1.58	255.255.255.0	10.1.1.254	Befresh
	00:17:9E:00:01:17	00179E000117.sam	dhop	10.1.1.65	255.255.255.0	10.1.1.254	Heilean
	00:17:9E:00:01:1D	00179E00011D.sam	dhop	10.1.1.51	255.255.255.0	10.1.1.254	
	00:0E:0C:80:00:1B	ep1_00b.samsys.co	dhop	10.1.1.222	255.255.0.0	10.1.1.1	Version
	00:17:9E:00:01:1A	00179E00011A.sam	dhop	10.1.1.151	255.255.255.0	10.1.1.254	
	00:0E:0C:80:00:15	ep1_005.samsys.co	dhop	10.1.1.235	255.255.0.0	10.1.1.1	
	00:0E:0C:80:00:12	ep1_002.samsys.co	dhop	10.1.1.232	255.255.0.0	10.1.1.1	Reader Toolbox —
	00:0E:0C:80:00:1A	ep1_00a.samsys.co	dhop	10.1.1.221	255.255.0.0	10.1.1.1	
							Diagnose
							Manual IP Address Add Reader

- 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.

Win	dows Security Alert
	To help protect your computer, Windows Firewall has blocked some features of this program.
Do you	u want to keep blocking this program?
sirit	Name: <b>RST.exe</b> Publisher: Unknown
	Keep Blocking Unblock Ask Me Later
Windov Internel unblock	vs Firewall has blocked this program from accepting connections from the ; or a network. If you recognize the program or trust the publisher, you can < it. <u>When should I unblock a program?</u>

- 4 Press Unblock.
- 5 Press Refresh on the RST
- 6 The RST main screen 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 screen by clicking the button to the left of the reader Mac address.

		00	:17:9E:00:01:06	00179E000106.sam	dhop
	43	00:	:17:9E:00:01:16	00179E000116.sam	dhcp
/					
				1	

- 2 Press the Setup button on the RST window.
- **3** The INfinity 510 Setup Wizard is displayed.



5 Enter the Login (admin) and Password. If this is the first time configuring your reader, enter: **readeradmin** 

#### 6 Press Next>.

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해 Wizard Region Selection Pag Select the operational	<b>je</b> region.	X
Region Sub Region	fcc_a	
FCC_A uses fr FCC_B uses fr FCC_C uses fr FCC_Dense us	aquencies between 902.3 - 912.1 MHz. aquencies between 910.1 - 919.9 MHz. aquencies between 917.9 - 927.7 MHz. ses frequencies between 902.75 - 927.25 MHz.	
	< Back Next > Canc	el Help



Custom Setup If your installation type differs from one of the choices shown in the Setup Wizard, you can always customize your setup later using the embedded web interface capability. See the Advanced Setup chapter in this guide for more information.

		Sim
Select the configura	ation that most closely matches your installatio	ın.
Portal		
🗢 Conveyor Belt		
C Point of Sale		
C Label Applicator	12 A	

7 Select the Region and Sub Region from the pull-downs and press Next>.

8 Select a configuration that most closely resembles your installation and press Next>.

	ओं Wizard	
•	Protocol Selection Enable reader protocols.	sirit
	Select the protocols to enable.	
	ISOC - EPC1 Gen2 protocol ISOC protocol tags are most widely used tags and are next generation tags approved by EPC Global and ISO.	
	ISOB Protocol ISOB tags are widely used in Europe and are very common in Europe.	
$\mathbf{r}$	< Back Next > Cancel	Help

9 Select the protocol of the tags you will be reading and press Next>.

📲 Wizard			
Antenna Selection Select your antenna configuration.			sirit
Please select the antenna(s) to enable			
1 - Antenna connected on Port 1.			
2 - Antenna connected on Port 2.			
✓ 3 - Antenna connected on Port 3.			
4 - Antenna connected on Port 4.			
< Back	Next>	Cancel	Help

10 Select the antennas you will be installing and press Next>.

	🚮 Wizard		
	Tag Volume Select the tag volume.		sirit
	Estimate the number of t	tags presented to the reader at any one time.	
	01	<b>64-128</b>	
	1-4	128-256	
$( \ )$	• 4-8	C 256-512	
	<ul><li>16-32</li></ul>	<ul><li>512-1024</li><li>1024-2048</li></ul>	
$\sim$	32-64	C Great than 2048	
		< Back Next > Cancel	Help

**11** Estimate the number of tags that will be presented to the reader at any one time and press **Next>**.





12 Press Finish to complete the initial reader setup.

# **Reader Operation**

#### **Basic Operation with the Reader Operation Tool**

The IN*finity* 510 can be operated either from the RST application or by logging directly into the reader's embedded web interface. To operate the reader from RST, perform the following:

1 From the RST main screen, press **Operate Reader**. The Reader Operator Tool (ROT) is displayed.



- 2 Login to the reader. The initial password (**Pwd**) is **readeradmin**. See the Advanced Setup section for details on changing the password.
- **3** Verify the Operating Mode is set to **Polled Mode**.



- 4 Select the Tag Performance tab.
- 5 Press Start.

🍓 INfinity 510: Reader Operator To	ol (ROT)				
General Page Tag Performance Tag Mar	agement Macros Event Ha	ndling			
Performance Information Total Unique Tags 2 Polling Interval(ms) 1000 Polling	Tag Read Count Total Poll Time(ms) Tag Aquisition Analysis	<mark>6864809</mark> 0	Cumm Rate 122.79 Scan Time(ms) 100	Curr Rate 122.79 Purge every poll Single Operation	Clear
Start Stop	Min 3244157	Avg 3432404	Max 3620652	Get Purge	Scan Tags
Tagld 0x4080000000000000000000000000000000000	Tag Name	Type ISOC	Total 3244157	Rate 58.03	
0x39200000000000000000000000000000000000		ISOC	3620652	64.76	
File Name : C:\Program Files\Sirit Inc\Sirit	Infinity 510\taglist.csv		417	Save	
Connected to 10.1.1.221 with mac address 00	:0E:0C:80:00:1A.				.::
		HP .			

6 Place your tags in front of the antenna and verify the tags are read and displayed as shown in the previous figure.

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#### **Advanced Setup**

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You can also customize the reader setup to more closely match your installation. This is performed by logging directly into the reader's embedded web interface. You can access this interface from RST. Perform the following:

1 From the RST main screen, press **Configure**. The IN*finity* 510 Reader Configuration Tool (RCT) is displayed.



Select the specific configuration category and follow the instructions.

#### **Reader Specifications**

1 2 3 4 5

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Frequency	860-960 MHz
RF Power	10 mW – 2W conducted
Connections	RS-232, Digital I/O, Ethernet LAN, and WiFi 802.11 (optional)
Input Voltage	12 to 24 Vdc, 60W
Input Current	2.5A maximum at 24 Vdc
	5.0A maximum at 12 Vdc

### **Environmental Specifications**

Operating Temperature	-4° F to 131° F (-20° 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	5% to 95% non-condensing
Case Material	Aluminum
Case Dimensions	8.7 x 11.8 x 2.2 in (220 x 300 x 56 mm)
Weight	4 lbs (1.8 kg)

#### **Battery Specifications (Optional)**

45519	
Battery	Lithium/Manganese Dioxide
Designation	ANSI/NEDA 5012LC / IEC-CR1220
Voltage	3.0 volts
Average capacity	40 mAh to 2.0 volts



#### Caution - Risk of Explosion

Only replace battery with same type and designation. There is risk of explosion if battery is replaced with incorrect type. Dispose of old battery according to manufacturer's instructions and local regulations.

#### **Power Supply Specifications**

Input Voltage	100 - 240 Vac	A
Input Consumption	60W maximum	
Input Frequency	50 – 60 Hz	
Output Voltage	15 VDC	
Output Current	4A maximum	

#### **RS-232 Specifications**

-	
Connector	DB-9S
Baud rate	9600 - 115200 (Default = 57600)
Parity	None
Data bits	8
Stop bits	1
Signals	
Pin 1	CNVSS
Pin 2	TXD
Pin 3	RXD
Pin 4	DTR
Pin 5	GND
Pin 6	DSR
Pin 7	CTS
Pin 8	RTSA
Pin 9	+3.3 Vdc

#### **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 – EPWR+ (Power from switch +) Pin 5 – EPWR+ (Power from switch +) Pin 6 – RXD- (Receive Data -) Pin 7 – EPWR- (Power from switch -) Pin 8 – EPWR- (Power from switch -)

Connector	Plugcon 31374112 (1x12)
Input	5 to 24 Vdc, 1 to 5 mA, Optically Isolated
Output	Open Collector (3 to 40 V, 100 mA Max)
Signals	Pin 2 – DIN1 (Digital Input 1)
-	Pin 3 – DIN2 (Digital Input 2)
	Pin 5 – DIN3 (Digital Input 3)
	Pin 6 – DIN4 (Digital Input 4)
	Pin 1, 4 – Digital input common
	Pin 8 – DOUT1 (Digital Output 1)
	Pin 9 – DOUT2 (Digital Output 2)
	Pin 10 – DOUT3 (Digital Output 3)
	Pin 11 – DOUT4 (Digital Output 4)
	Pin 7 12 – Digital output common

#### **Digital Input/Output Specifications**

#### **Antenna Specifications**

Туре	РАТСН
Frequency (FCC)	860 – 960 MHz
Polarization	Circular
Gain	7 dBi ± 1 dBi, max
VSWR, maximum	1.3:1 or less
Axial ratio	1 dB or less
Input impedance	50 Ohm (nominal)
Power Handling	10 W
Size	245 mm x 235 mm x 40 mm
Weight	470g

Caution:

This device has been designed to operate with no more than 1 Watt into the antenna and an antenna gain of no more than 6 dBic. Antenna having a higher gain is strictly prohibited per regulations of Industry Canada, unless power into the antenna is decreased to compensate for the 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 at <a href="http://www.hc-sc.gc.ca/rpb">www.hc-sc.gc.ca/rpb</a>.

Optional Sirit supplied antennas are for indoor use only.



# **Safety Instructions**

#### **Power Disconnect Device**

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



**WARNING:** FCC Radiation Exposure Statement. The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.



Caution:

The INfinity 510 UHF Reader is equipped with four (4) RF ports. To prevent reader damage, active RF ports must be properly terminated with a 50 ohm load or a functional UHF antenna before power up. UHF Readers are factory configured to operate on RF port 1. As a result, port 1 must be properly terminated before initially powering on the reader. Before activating any additional RF ports, they must also be properly terminated. 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.



**Risk of Explosion.** Only replace battery with same type and designation. There is risk of explosion if battery is replaced with incorrect type. Dispose of old battery according to manufacturer's instructions and local regulations.