



RSWR-400

UHF RFID READER

User Manual & Developer's Guide



This document is to serve as a guide on how to setup and work with [Radiant Sensors RSWR-400 UHF RFID Reader](#). It provides useful information on how to install, connect, configure, operate and upgrade **RSWR-400 UHF RFID Reader**. Please read it carefully before and during using **RSWR-400**. Keep this user manual handy for future use.

Feedback from User

Thanks for using **RSWR-400**. As always, our goal is to deliver the most productive possible experience, and your constructive comments and feedback are highly appreciated. Please share your thoughts, comments, suggestion and ideas with us. Tell us what you like or dislike about software, hardware and even the datasheet of **RSWR-400**. You can contact us by any of the following ways. We look forward to hearing from you.

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- Warranty does not cover freight cost for both ways.

Intended Audience

This user manual includes useful information about software, hardware, installation, configuration and operational modes of **RSWR-400**. It is for anyone in charge of setting up, configuring, troubleshooting and maintaining **RSWR-400**. The user is supposed to have basic knowledge and experience of the following fields:

- Network connectivity
- Hardware system integration
- Software development

The user is also assumed to have a good command of RFID systems and basic knowledge of EPCglobal Gen 2 specifications.

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RSWR-400 UHF RFID Reader



RSWR-400 is a Gen 2 UHF RFID Reader from [Radiant Sensors](#) that utilizes the latest RFID technology to provide connectivity between RFID tags and enterprise system software. With its powerful, intuitive and undemanding software and hardware, **RSWR-400** helps you keep an eye on your retail floor, warehouse, home, office and any environment that needs high levels of access control and monitoring.

Up to four adjustable UHF antennas, embedded RFID tag reader and removable Wi-Fi antenna cooperate to give **RSWR-400** the means to simultaneously read dozens of RFID tags and send their EPC securely to a host via Internet or a local network, or enable it to independently make decision and issue appropriate reactions. **RSWR-400** shall be configured to send comprehensive reports of the scanned tags and their transactions to an IoT cloud.

Equipped with general purpose input output ports, **RSWR-400** can interchange digital data with external devices for making more intelligent decisions. Relay interfaced output ports enable **RSWR-400** to integrate with a broad range of devices resulting in more elaborate systems.

RSWR-400 affords you matchless, unsurpassed and unprecedented security, monitoring and convenience.

Features

- Reduced development time provided by powerful embedded software
- Highly versatile and flexible
- Ethernet and Wi-Fi network connectivity
- Access Point and Client mode support
- Orientation-insensitive design resulting in faster and more accurate tag reads
- Fast read rate for demanding applications
- Region-free application
- Best-in-class receive sensitivity
- Enhanced interference rejection
- Expansive read range settings
- Rugged yet compact and lightweight for effortless usage
- Low cost for high volume deployment
- Low power usage
- Extensive data import/export capability allowing integration with other systems
- Two digital input ports
- Four digital output ports
- Two pairs of relay-interfaced output ports
- Four independent, bidirectional, full duplex TX/RX UHF antennas
- Built-in activity indicator buzzer
- Wi-Fi, input/output and power indicator LEDs
- Browser-based intuitive setup software
- Configurable on Reading, Anti-Theft or Auto mode

Applications

- Retail
- Supply chain
- Manufacturing
- Mobile asset tracking
- Office/home security
- Personal identification
- Access control
- Access management
- Anti-forgery

And any other applications requiring secure and controlled access to different environments.



Specifications

Table 1, RSWR-400 Specifications

Model No.	RSWR-400
Description	4 Port Wi-Fi UHF RFID Reader
Antenna Ports	4 high performance monostatic antenna ports (RP TNC Connectors)
Air Interface Protocol	EPC global UHF Class 1 Gen 2 / ISO 18000-6C
Supported Regions	840-960 MHz, EU, US, Canada, JP and other worldwide regions. Region is user selectable.
Transmission Power Range	+15.0 to +30.0 dBm
Stepping Interval	1-2 dBm
Max Reading Range	24 Meters using 12 dBi Antenna
Max Receive Sensitivity	-82 dBm
Reading Rate	Over 400 tags per second
Min Return Loss	10 dB
Application Interface	EPCglobal Low Level Reader Protocol (LLRP) v 1.0.1, Radiant Sensors SDK
Built-in Applications	Anti-theft, Middleware
Network Connectivity	Wi-Fi, 10/100BASE-T auto-negotiate (full/half) with auto-sensing MDI/MDX for auto crossover (RJ-45)
IP Address Configuration	DHCP, Static
Management Interfaces	Radiant Sensors Web Management User Interface
GPIO	<ul style="list-style-type: none"> • 4 inputs, optically isolated, 3-15V • 4 digital outputs, optically isolated • 2 Relay outputs • 5 Volts output
Power Supply	+12 VDC @ 2000mA via external universal power supply
Environmental Sealing	IEC IP51
Operating Temperature	-20 °C to +60 °C
Storage Temperature	-40 °C to +85 °C
Humidity Range	10% to 90% RH
Dimensions	18 x 14.5 x 3.7 cm (7 x 5.7 x 1.4 in)
Weight	570 Grams
Colour	Silver
Material	Aluminium

Included in the Package

Your **RSWR-400** package is shipped along with the following items. Please verify the content of your package before assembling and setting it up.



RSWR-400 UHF RFID Reader



Wi-Fi Antenna



DC Adaptor

Figure 1, Included in the Package of RSWR-400

Indicator LEDs

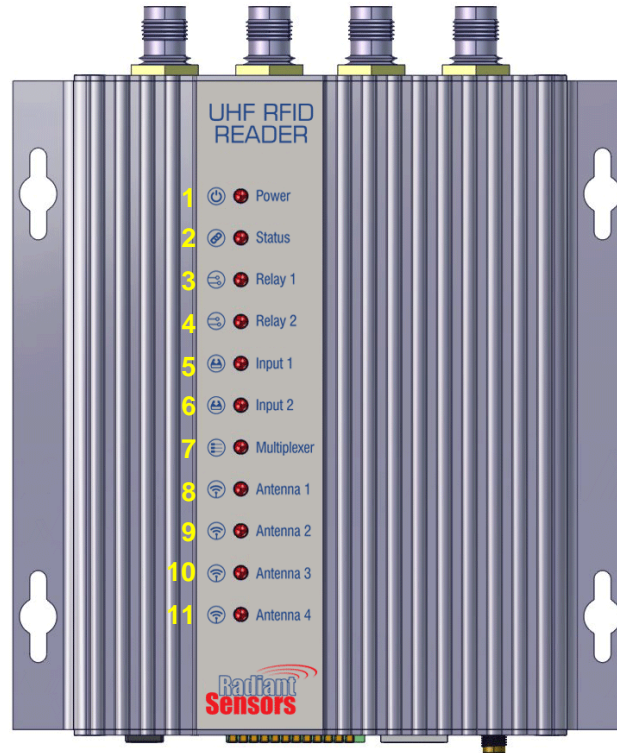


Figure 2, RSWR-400 Top Panel

Table 2, RSWR-400 Indicator LEDs

No.	Name	Status	Description
1	Power	Solid Light	Turns on when RSWR-400 boots completely.
2	Status	Solid Light	Solid light indicates that RSWR-400 is in a valid Wi-Fi network, in Access Point mode, or connected to a network via Ethernet port.
3	Relay 1	Solid Light	Turns on when Relay 1 is closed.
4	Relay 2	Solid Light	Turns on when Relay 2 is closed.
5	Input 1	Solid Light	Turns on when there is a digital logic 1 on Input 1.
6	Input 2	Solid Light	Turns on when there is a digital logic 1 on Input 2.
7	Multiplexer	Not applied for this device.	
8	Antenna 1	Blinking	Blinks when antenna 1 is reading tags.
9	Antenna 2	Blinking	Blinks when antenna 2 is reading tags.
10	Antenna 3	Blinking	Blinks when antenna 3 is reading tags.
11	Antenna 4	Blinking	Blinks when antenna 4 is reading tags.

Connector/ Ports

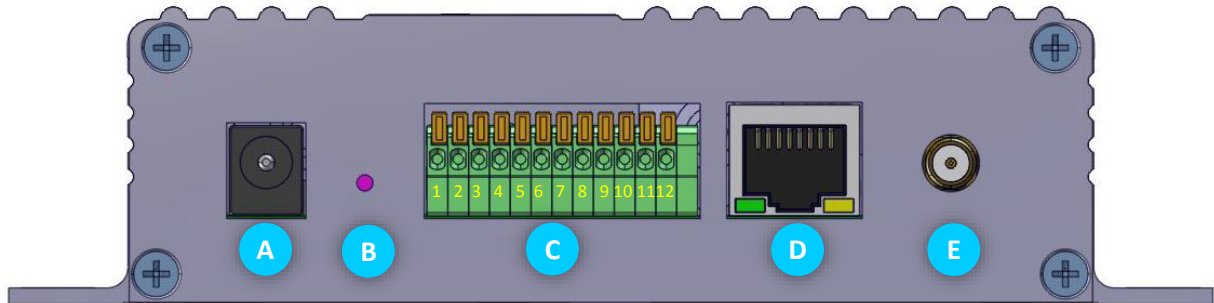


Figure 3, RSWR-400 Front Panel

Table 3, RSWR-400 Ports/Connectors

Category	Position	Label	Name & Details			
Power	Front	A	12 Volts DC @ 2A			
Reset	Front	B	Reset Device			
GPIO	Front	C-1	Out Relay 1	Output of Relay 1		
		C-2	In Relay 1	Input of relay 1		
		C-3	Out Relay 2	Output of Relay 2		
		C-4	In Relay 2	Input of relay 2		
		C-5	Input 1	Digital Input 1	Min	Max
		C-6	Input 2	Digital Input 2	V _{in}	0 V 5 V
				I _f	3 mA	5 mA
		C-7	Ground	Provides Ground for external devices.		
		C-8	VCC	Provides +5 Volts for external devices.		
		C-9	Out 1	Digital Output 1	Min	Max
		C-10	Out 2	Digital Output 2	V _{out}	0 V 5 V
		C-11	Out 3	Digital Output 3	I _{o source}	- 40 mA
		C-12	Out 4	Digital Output 4	I _{o sink}	- 60 mA
Ethernet	Front	D	Ethernet Connector; Provides capability of being connected to Ethernet.			
Wi-Fi	Front	E	Wi-Fi Antenna Connector; Provides capability of being connected to the Internet or local networks.			
UHF	Rear	F to I	UHF Antenna Connectors			

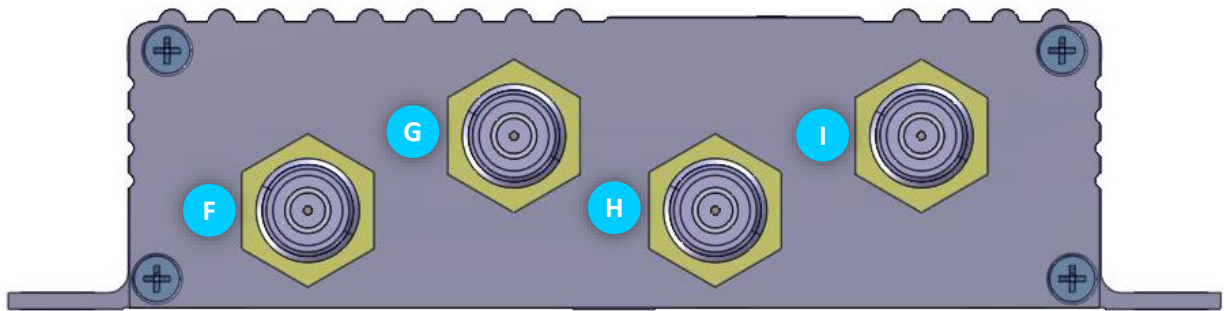


Figure 4, RSWR-400 Rear Panel

Reset Button

Reset button has two functions; it is used to reboot **RSWR-400**, or to restore its default factory settings.


Reboot

To reboot **RSWR-400**, keep the reset button down for 5 seconds. Release the button when you hear a single beep and **RSWR-400** will reboot. Please keep in mind that you should not keep the button down for more than 5 seconds since it will start to Factory Reset.

Factory Reset

Perform the following procedure to reconfigure **RSWR-400** to its default settings.

- 1- Press and hold the reset button. At the 5th second you will hear a single beep.
- 2- Keep holding the button down until you hear a triple beep at about the 10th second.
- 3- Release the button and **RSWR-400** will be reinstated to its default settings;
 - Wi-Fi mode: *Access point*
 - Wi-Fi IP: *192.168.1.1*
 - User name: *admin*
 - Password: *admin*

 Factory Resetting **RSWR-400** will erase all of your settings (including Wi-Fi mode, Wi-Fi IP, User name, Password, SSID and mDNS hostname) and replace them with the factory defaults. Do not reset **RSWR-400** if you want to retain these settings.

Set up

The following procedure outlines the steps to set up **RSWR-400**.

- 1- Connect UHF antennas, Ethernet Connector, Wi-Fi antenna and other input/output devices, if any, to their associate connectors on the reader.

⚠ It is highly recommended that you get done with all the hardware connections before powering **RSWR-400** up. Failure to do so may result in your device to damage due to voltage fluctuations.

- 2- Plug the DC adaptor into **RSWR-400**'s power socket. It takes about 30 seconds for **RSWR-400** to load completely. Meanwhile, all LEDs show a chasing effect, announcing that the device is booting.
- 3- When **RSWR-400** is completely loaded, the *Power* LED changes to solid light and you will hear a double beep.
- 4- If the boot process fails due to any reasons, **RSWR-400** makes 5 long beeps.
- 5- [Restart](#) **RSWR-400** to its default factory settings.
- 6- After the device boots successfully, Power and Status (Network) LEDs will illuminate. You will also hear a double beep.
- 7- If you hear 5 short beeps, there is definitely a hardware problem with **RSWR-400** or its connections. Contact [Radiant Sensors](#) support team to figure out the problem.

ℹ **RSWR-400** is by default in *Access Point* mode with its SSID in this format: "RSWR-400_XXXXXX" and no password is needed.

ℹ **RSWR-400** is by default in *Access Point* mode, you can connect to it via Wi-Fi or Ethernet connection.

Web Application

As previously highlighted, **RSWR-400** comes with a browser-based intuitive setup application which shall be used to configure its settings. In this section we will give you a comprehensive representation of the web application and the way to use it.

- 1- Power **RSWR-400** up. You will hear a double beep once the device is turned on.
- 2- In your Wi-Fi connection list, connect to RSWR-400_xxxxxx (xxxxxx is the last six characters of **RSWR-400**'s MAC address).
- 3- Launch your browser and in its address field type <http://192.168.1.1> to proceed to the login page. If you can see the login page as per Figure 5, it means that you can connect to **RSWR-400**. Otherwise, contact [Radiant Sensors](#) support team to resolve the problem.
- 4- Enter the following credentials to log in;
 Username: *admin*
 Password: *admin*

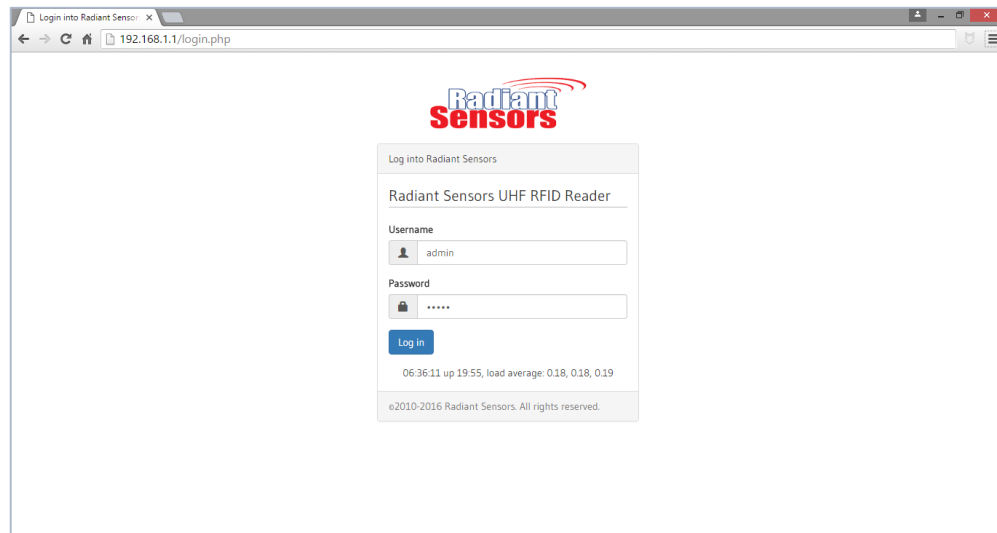


Figure 5, Login Page

- 5- If you see “*Diagnosis Failed!*” message (Figure 6), it means that there exist problems with **RSWR-400**'s hardware or start-up process. In this case, **RSWR-400** makes 5 short beeps. Contact [Radiant Sensors](#) support team to figure out the problem.

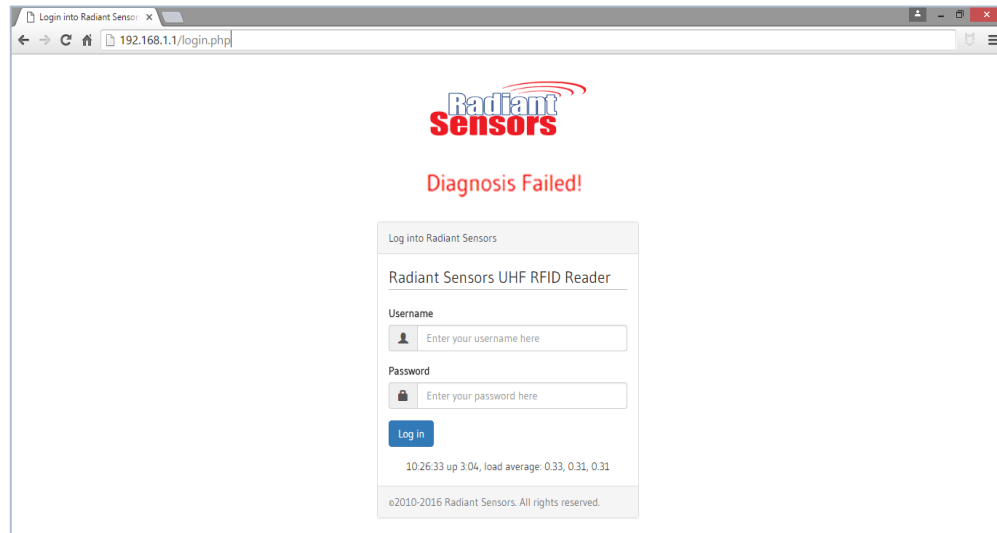


Figure 6, Login Page (Connection Failed)

After signing in to the system, you enter **RSWR-400's** web application. The application is used to configure **RSWR-400's** settings. In the next sections, we will explain the different menus of the application in more details.

Home

In the Home page, you can see some basic information about **RSWR-400** (Figure 7 and Table 4).

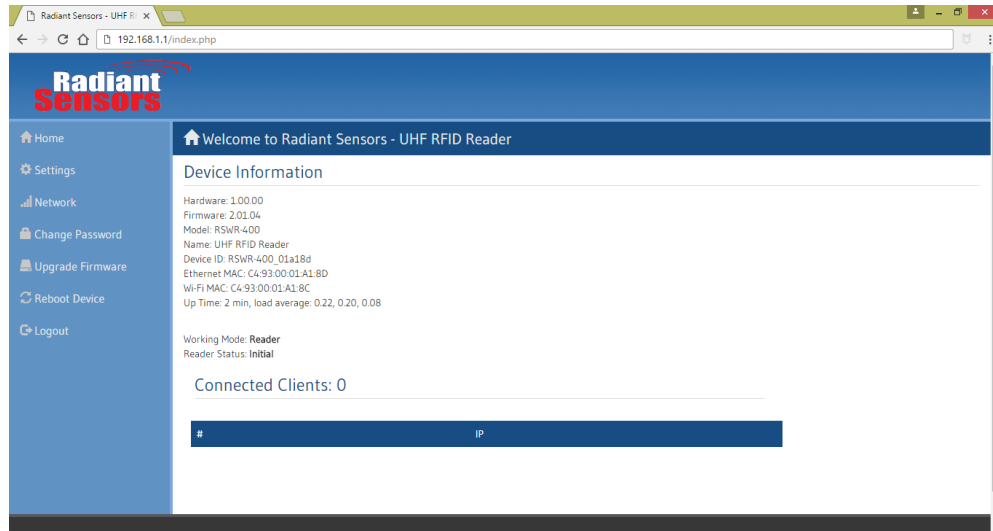


Figure 7, Home Page

Table 4, Home page Fields

Field	Description
Hardware	RSWR-400's Hardware Version
Firmware	RSWR-400's Firmware Version
Model	RSWR-400's Model
Name	RSWR-400's Description
Device ID	RSWR-400's ID (composed of its name plus the last six characters of its MAC address.)
Ethernet MAC	The MAC address of RSWR-400 's Ethernet Interface
Wi-Fi MAC	The MAC address of RSWR-400 's Wi-Fi Interface
Up Time	RSWR-400's notion of passing of time from the moment of booting
Load Average	An indication of how much RSWR-400 is busy
Working Mode	<ul style="list-style-type: none"> Reader Anti-Theft Auto
Reader Status	<ul style="list-style-type: none"> Initial: RSWR-400 is working with its default settings. Reading: RSWR-400 is already reading tags. Stopped: Clients have stopped asking RSWR-400 to read tags or the connection is cut off.
Connected Clients (Reader)	IP of the connected clients (Reader Mode)
Last 10 Matched Tags (Anti-theft, Auto Mode)	The EPC of the last 10 tags which their EPC matched the predefined pattern.
Last 20 Registered Tags (Anti-Theft with POS)	20 most recent received tag EPCs

Connected Clients (Reading Mode, Anti-theft Master)	The IP of the connected clients
Connected Master (Anti-theft Slave)	The IP of the Master to which RSWR-400 is already connected (if any).

Settings

In this page, you can set **RSWR-400**'s time and working mode (Figure 8). **RSWR-400** works in three different modes; *Reader*, *Anti-Theft* and *Auto Mode*. Each mode has its own capabilities, and thus, its own specific configuration settings. We will delineate the specific features of each mode in the upcoming sections.

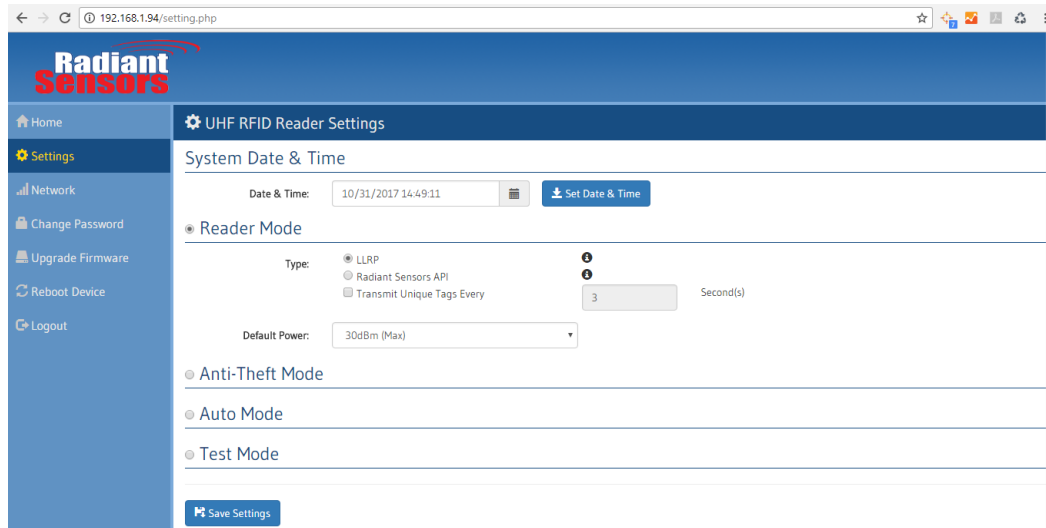


Figure 8, Settings Page

System Date & Time

Select your desired date and time for this field and click the *Set Date & Time* button.

! For Date & Time settings to be saved on **RSWR-400**, you should reboot it. Never forget to reboot **RSWR-400** after setting the date and time, or it will work inconsistently.

Reader Mode

In this mode, **RSWR-400** works like a server and waits for clients to get connected to it. For example, suppose that you have an inventory management software in your department store which is already working with barcode. You may want to elevate your current system to work with RFID. To achieve this goal, your current software should connect to **RSWR-400** as a client. **RSWR-400** acts as a pathway between your inventory management software and RFID tags, it will read the RFID tags and send the tag EPCs to your inventory management software. In the *Reader* mode, user should select one of the following options:

- LLRP
- Radiant Sensors API

LLRP Reading


In this mode **RSWR-400** scans the RFID tags and sends their EPC to a host as long as they are in its interrogation range. It means that the EPC of a tag may be sent to the host over and over. In LLRP Reading, **RSWR-400** uses the LLRP protocol to exchange data with the host. In this mode, **RSWR-400** supports just one client at a time, excess clients are automatically rejected.

While configuring LLRP settings, if the user does not set a value for the power, the system picks the **Default Power** as the base power for the system.

Radiant Sensors API

Radiant Sensors API mode's function is similar to LLRP Reading mode. In this mode communication occurs according to [Radiant Sensors'](#) protocol.

In *Radiant Sensors API* mode, **RSWR-400** supports up to 10 clients simultaneously, excess clients are rejected automatically.

 If you select the *Transmit Unique Tags* checkbox, **RSWR-400** will filter duplicate tags for your desired time duration. It means that, **RSWR-400** sends duplicate RFID tags each 3 seconds by default. This leads to a drastic cut down in the network traffic, and consequently results in a much more effective use of the network bandwidth.

Anti-Theft Mode

This mode, as the name implies, is used to prevent unauthorized removal of tagged items from a controlled area. **RSWR-400** has two paradigms to approach the task. Once *Anti-Theft* mode is selected, user can see the following options (Figure 9);

- Anti-Theft
- Anti-Theft with POS

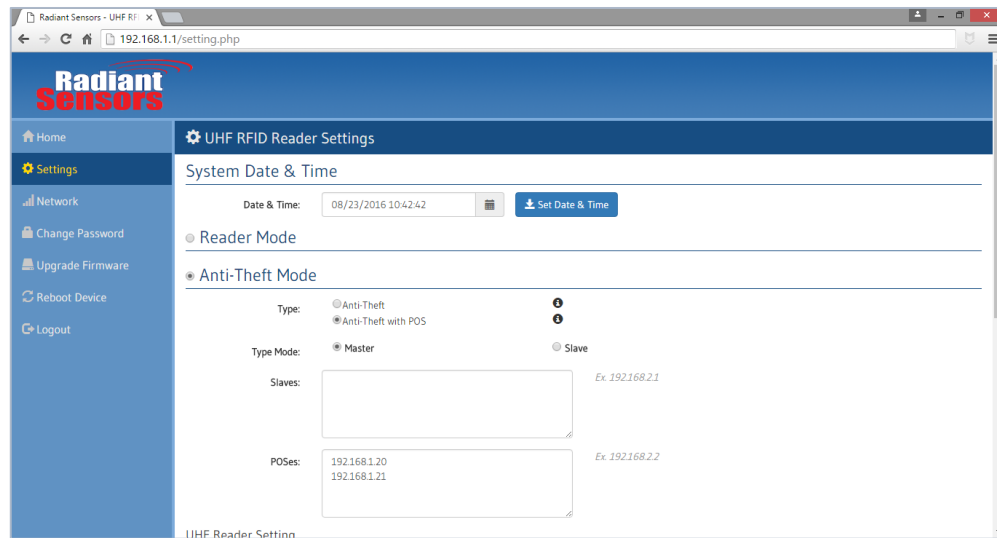


Figure 9, Anti-theft Mode

Anti-Theft

In this mode **RSWR-400** makes an alarm upon reading every tag whose EPC matches a predetermined pattern.

Initially, no item is permitted to leave the controlled area. Once an item is allowed to depart, Radiant Sensors' RSPOS-700E, RSPDP-100 or any devices with the capability of encoding RFID tags (herein after referred to as cooperative device) is used to change the item EPC to a predetermined pattern. When the items are about to exit, **RSWR-400** checks to see if the bits correspond the pattern. If the condition doesn't meet, then an alarm arises indicating that the leaving item is not allowed to depart.

UHF Reader Setting

Table 5, UHF Reader Settings

Field	Description
Region	Channel frequency of the workspace region
Power	Power of the UHF Antenna
Antennas	Select the antenna ports into which UHF antenna is plugged.

! The *Region* field must be filled in accordance with the country/region of operation to comply with local laws and regulations. The user is responsible to conform operation to the correct RF settings. Also, the user is the only one responsible for any fines and damages due to incorrect or non-compliant country/region settings on the Reader.

! **RSWR-400** may be damaged if you don't connect antenna to a port and try to send data to that port!

Matching Condition

As a preamble for this section, it is reminded that each code number on the RFID tags is composed of 2 parts; 16 bits long PC and 96 bits long EPC, the abbreviation for Product Code and Electronic Product Code respectively (Figure 10). The code is represented in hex, and each group of digits act for something. For example the first 8 bits is called Header, incorporating the length, type, structure, version and generation of the EPC. For more information about RFID tags refer to [EPC Gen2 document](#).



Figure 10, RFID Code Number

It was mentioned earlier that the most prominent feature of Anti-Theft mode is that, in this mode, **RSWR-400** can distinguish those items which are permitted to leave the controlled area from non-permitted ones. To achieve this goal, some bits of the EPC of any item, which is being permitted to leave, is changed to a predefined pattern, by means of the cooperative device. Whenever any item is going to exit, **RSWR-400** checks those bits to see whether they match the pattern, and alarms if the condition doesn't hold. A filter with three parameters is designed to check the leaving tags.

Filter Start Bit

This parameter specifies the index of the bit from which the filter will start. Actually we specify the bit position, from which the cooperative device starts changing. For example if you set this bit to 12, it begins from the 12th bit, and if you set it to 16, it starts from the first bit of EPC (The 16th bit of the code) (Figure 10).

Filter Length

Specifies the number of bits that the filter will use for pattern matching (64 bits at most). In fact it is the number of bits that the cooperative device changes.

Filter Pattern

In this field we determine the pattern with which the filter bits must be compared. When you set the filter length to 4 for example, a 4 bit pattern must be given to **RSWR-400**. Hence, four boxes appear on the page to be filled. You can fill each box by 0, 1 or x. Note that the pattern must be completely different from tag's initial code number, or some items may be wrongly permitted to depart.

We end this section with some examples to provide a more comprehensive picture of the way Anti-theft mode works.

Example 1

Consider a filter with the following parameters:

Filter Start Bit	Filter Length	Filter Pattern
7	4	1001

When items are being permitted to leave, bits 7-10 (four bits) of their tag number is changed to 1001. At the exit, bits 7, 8, 9 and 10 are checked to be 1, 0, 0 and 1 respectively. Otherwise, **RSWR-400** alarms!

In the *Filter Pattern* field, x means *don't care*; it is compatible with both 0 and 1. In example 1, if the filter pattern is 100x, both 1000 and 1001 pass through the filter, i.e. they are allowed to exit!

Example 2

Consider the following filter:

Filter Start Bit	Filter Length	Filter Pattern
0	1	x

The starting bit of the leaving tags is checked to be either 1 or 0. If we configure the system to beep whenever an item exits, we hear a beep as each tag is read.

This example is an interesting application of using x in filter patterns, when we want to just make sure that the Reader is reading tags.

Example 3

As a more comprehensive example, suppose that you have 3 tags with their codes as in Table 6:

Table 6, Sample RFID Tag IDs

No.	PC	EPC
Tag 1	3000	8030a00829000000000950d2
Tag 2	31fa	8030a0082900000000092a42
Tag 3	3256	8030a00829000000000947c2

These numbers are in HEX. Their binary equivalent is provided in Table 7.

Table 7, Binary Equivalents of Sample RFID Tag IDs

No.	PC	EPC
Tag 1	0011,0000, 0000,0000	1000,0000,0011,0000,1010,0000,0000,1000,0010,1001,0000,0000, 0000,0000,0000,0000,0000,0000,0000,1001,0101,0000,1101,0010
Tag 2	0011,0001, 1111,1010	1000,0000,0011,0000,1010,0000,0000,1000,0010,1001,0000,0000, 0000,0000,0000,0000,0000,0000,0000,1001,0010,1010,0100,0010
Tag 3	0011,0010, 0101,0110	1000,0000,0011,0000,1010,0000,0000,1000,0010,1001,0000,0000, 0000,0000,0000,0000,0000,0000,0000,1001,0100,0111,1100,0010

There are usually a number of common digits among codes, the filter is better to be selected from the most common digits. There are 16 common digits among these tags which can be selected as filter bits. The maximum length of this filter can be 64 bits (16 hex numbers).

For this example we can set these values:

Filter Start Bit	Filter Length	Filter Pattern
16	8	10011001

Bits 16-23 of the leaving tag are checked to comply with 10011001.

If we change the parameters as:

Filter Start Bit	Filter Length	Filter Pattern
7	3	101

Bits 7, 8, 9 of the code number are checked to be equal to 101.

Anti-Theft with POS

In this mode, **RSWR-400** works in collaboration with Radiant Sensors' RSPOS-300. If more than one **RSWR-400** is required for an application, one should be configured as Master and the others as Slave (Figure 11).

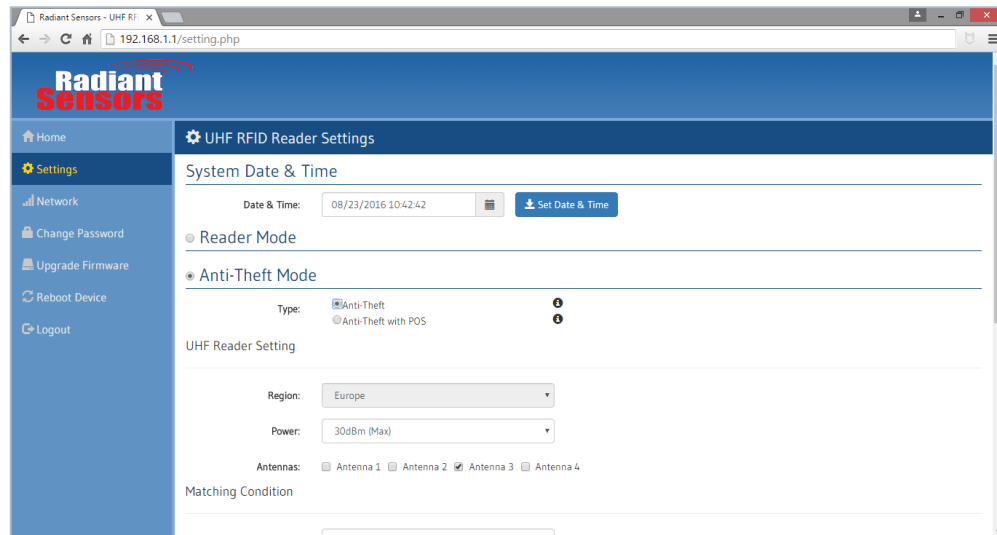


Figure 11, Configuring RSWR-400 in Anti-Theft Mode

Table 8, Anti-theft with POS- Slave

Field	Description
Type Mode	<ul style="list-style-type: none"> Slave
Master IP Address	The IP of the Master Reader
Region	Channel frequency of the workspace region
Power	Power of the UHF Antennas
Antennas	Select which UHF antennas are connected to RSWR-400 .

Table 9, Anti-theft with POS- Master

Field	Description
Type Mode	<ul style="list-style-type: none"> Master
Slaves	IP of the authorized Slave Readers.
POSes	IP of the authorized RSPOS-300s.
Region	Channel frequency of the workspace region
Power	Power of the UHF Antennas
Antennas	Select which UHF antennas are connected to RSWR-400 .

In what follows, we have outlined the steps to deploy **RSWR-400** in *Anti-Theft with POS* mode.

1. At each Exit of the controlled area, there exists an **RSWR-400**.
2. One **RSWR-400** is configured as Master and others, if any, as Slave.
3. There exists at least one RSPOS-300 which communicates with the Master via facility's existing Wi-Fi.
4. An item is taken out from its designated location.
5. Holding the *IN* button down, the user scans the item using RSPOS-300.
6. The item EPC is sent to the Master via Wi-Fi.
7. The Master broadcasts the EPC to the Slaves.
8. Master and Slaves add the EPC to their *Registered Tags List* and get wary of the item.
9. Once any item is about to exit from the controlled area, the corresponding **RSWR-400** makes an alarm.
10. If the item is to be authorized to depart, it is scanned once again but with the *OUT* button pushed down on RSPOS-300.
11. RSPOS-300 emits the EPC to the Master and Master broadcasts it to the Slaves.
12. Master and Slaves remove the item from their *Registered Tags List*.
13. The item is authorized to leave the controlled area.

Action

Action is about the reaction of **RSWR-400** in Anti-theft mode (Table 10).

Table 10, Action Fields

Field	Description
Beep Mode	<ul style="list-style-type: none"> • <i>None</i>: RSWR-400 makes no alarm when theft occurs. • <i>Single</i>: RSWR-400 repeats single beeps when theft occurs. • <i>Double</i>: RSWR-400 repeats double beeps when theft occurs.
Relay Active Time	In Millisecond. The time duration at which the relay is kept closed.

Auto Mode

In the Auto Mode, **RSWR-400** scans all the RFID tags in its interrogation range and sends their EPC to a cloud (Figure 12 and Table 11).

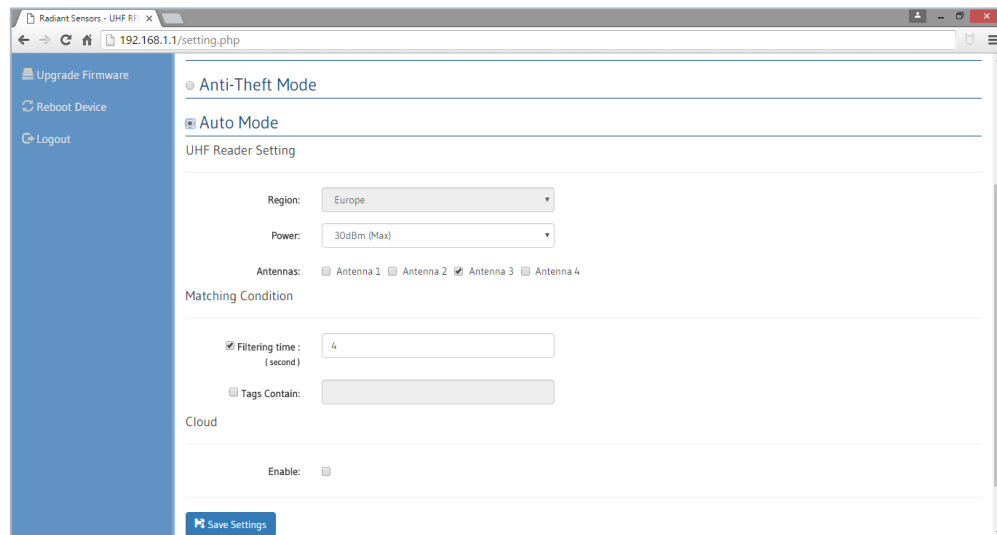


Figure 12, Auto Mode

Table 11, Auto Mode Fields

Field	Description
Region	Channel frequency of the workspace region
Power	Power of UHF Antenna
Antennas	Select which UHF antennas are connected to RSWR-400 .
Filtering Time	Tag EPCs are sent to the cloud every Filtering Time seconds.
Tags Contain	RSWR-400 sends the EPCs, containing the pattern in Tags Contain field, to the cloud.

⚠ The *Region* field must be filled in accordance with the country/region of operation to comply with local laws and regulations. The user is responsible to conform operation to the correct RF settings. Also, the user is the only one responsible for any fines and damages due to incorrect or non-compliant country/region settings on the Reader.

⚠ **RSWR-400** may be damaged if you don't connect antenna to a port and try to send data to that port!

Cloud

RSWR-400 can be configured to send captured tags and their transactions to an IoT Cloud (Figure 13). From the **Mode** dropdown list, you can disable the **Cloud** function entirely; or you can select the **DominateRFID Software** or **Custom** modes.

If you select the **DominateRFID Software** mode, you need to enter the software's URL in the associated field appearing right under the **Mode** dropdown list, and click on the **Save Settings** button at the bottom of the page to save your settings.

In case you select the **Custom Mode**, you need to enter your required hash signed values in the body part. The following provides a sample script to be entered in the body part.

```
{"content":{"rssi": #RSSI#, "epc": "#EPC#", "antenna": #ANTENNA#, "rel": #RELTIME#, "time": #LASTSEEN#}}
```

Hash signs to be used in the script include:

#EPC#

#ANTENNA#

#RSSI#

#LASTSEEN#

#RELTIME#

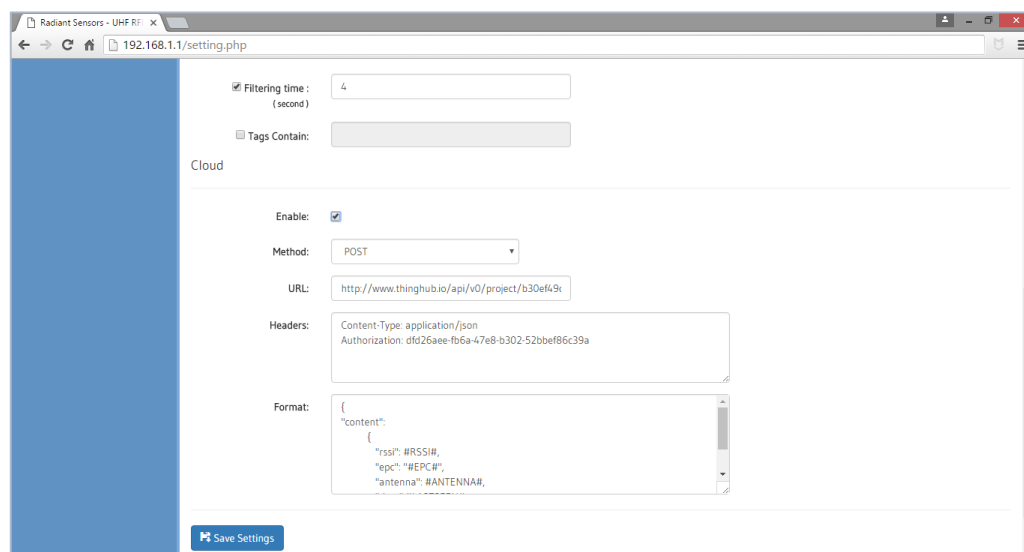


Figure 13, Cloud Settings

Table 12, Cloud Fields

Field	Description
Method	<ul style="list-style-type: none"> GET, to get information from cloud. POST, to post reports to cloud. PUT, to edit the reports sent to cloud.
URL	URL of the IoT.

Headers	Header of the GET, POST or PUT request.
Format	Body of the GET, POST or PUT request.

Once you have provided your sample script (as in Figure 13), click on the **Save Settings** button to save the settings.

Test Mode

The **Test Mode** is designed to help the user quickly test the reader, and diagnose any possible problems that may exist.

If you set the reader on the **Test Mode**, all of its 4 antennas will work at their full capacity. Anytime a tag appears in the reader's range, it will double beep. This mode will terminate automatically after 5 minutes.

Network

RSWR-400 has two types of connection: Ethernet and Wi-Fi (Figure 14).

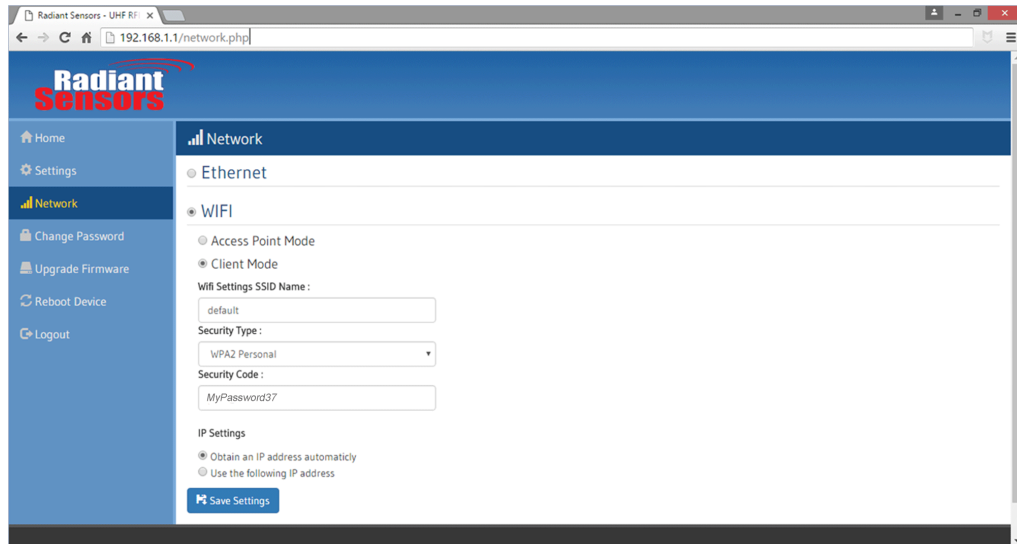


Figure 14, Network Page

Ethernet

RSWR-400 may connect to a local network via its Ethernet connector. It can be set to obtain an IP in two ways:

- Automatically, using network DHCP
- Manually, selecting “Use the following IP address” and then entering a static IP address, subnet mask and gateway.

Wi-Fi

Wi-Fi mode has two types: Access Point Mode and Client Mode.

Access Point Mode

Table 13, Access Point Mode Fields

Field	Description
SSID Name	SSID name of RSWR-400 in access point
Security Type	Security Type
Security Code	Password of RSWR-400 in access point
Reader IP	IP of RSWR-400
Subnet Mask	Subnet Mask
Gateway	Gateway
Start IP	If you set the Start IP as 192.168.1.20 for example, RSWR-400 will randomly get an IP in the range of 192.168.1.20 to 192.168.1.255
Limit	Maximum number of clients that can connect to RSWR-400

Client Mode

When **RSWR-400** is supposed to be in a network as a client, this mode is activated. The fields are as per Table 14.

Table 14, Client Mode Fields

Field	Description
SSID Name	The SSID name of the wireless network to which RSWR-400 is going to be connected.
Security Type	The security protocol of the wireless network to which RSWR-400 is going to be connected.
Security Code	The Password of the wireless network to which RSWR-400 is going to be connected.
IP Settings	Set RSWR-400 to automatically obtain IP or manually configure its IP settings.
IP Address	IP of RSWR-400
Subnet Mask	Subnet Mask
Gateway	Gateway

Change Password

In this page you can change the web application's password (Figure 15). If you forget your password, you can reset **RSWR-400** to its factory defaults (See the [Reset Button](#) section).

Figure 15, Change Password Page

Upgrade Firmware

In order to upgrade **RSWR-400**, you need to download the upgrading file in advance. Browse the upgrading file and then click on The **Upgrade Firmware** button. It takes a few minutes for **RSWR-400** to complete the upgrading. Meantime, you should see the chasing effect on the indicator LEDs. Once done with upgrading, **RSWR-400** will restart twice.

RSWR-400 is prone to damage if you mishandle the upgrading option. There are some points to keep in mind before upgrading **RSWR-400**:

- ⚠ Don't upgrade the device until it is really necessary.
- ⚠ Always upgrade the device to a higher version.
- ⚠ Don't power off the device while upgrading is in progress.

Reboot Device

In this page you can reboot RSWR-400.

Logout

To exit from **RSWR-400**'s web application, just click logout!

API

An outstanding feature of **RSWR-400** is its capability to integrate with enterprise software, hardware and other components. **RSWR-400** renders these components the connectivity with RFID tags. For the components to be able to connect, configure and command **RSWR-400**, they must be able to exchange data with it in a standard format.

[Radiant Sensors](#) software team has provided developers with standard, easy-to-use APIs to use all capabilities of **RSWR-400**. The API expresses **RSWR-400** in terms of its operations, inputs, outputs, and underlying types. RSUHF Reader Tester is an application that can connect to **RSWR-400** and test its capabilities.

This section introduces RSUHF Tester and the generic usage of its methods. It gives software developers control over **RSWR-400**.

RSUHF Reader Tester application

Run “RSUHFReaderTester.exe” and you will see the page as per Figure 16.

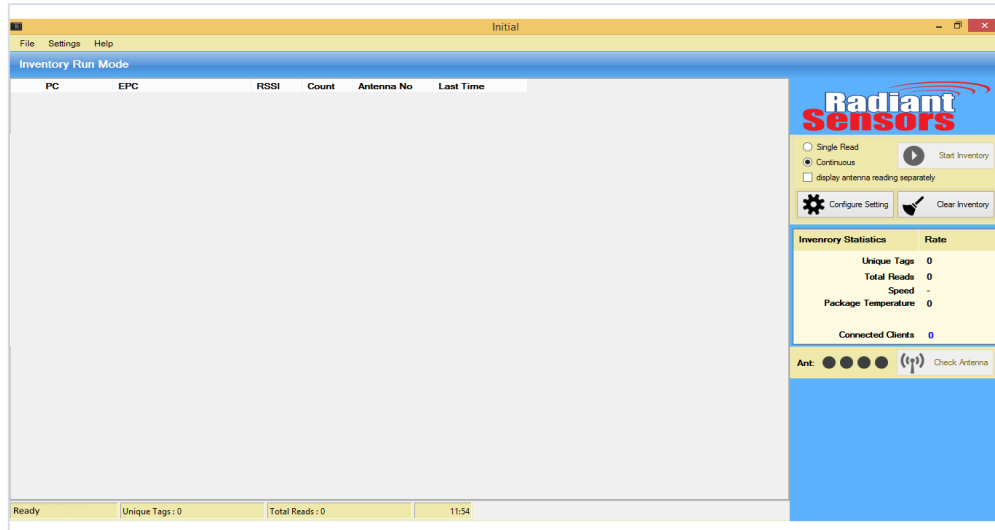


Figure 16, RSUHF Tester Application Main Page

Table 15, RSUHF Main Page Fields

Category	Field	Description
Inventory Read Mode	Single Read	RSWR-400 reads a single tag in each step. User must click the <i>Start Inventory</i> button to read the next tag.
	Continuous Read	RSWR-400 reads all in-range tags continually.
	Clear Inventory	Clears the history of all scanned tags.
	Display antenna reading separately	If not selected, you will see the ID of the last antenna which has read the tag in <i>Antenna Number</i> field. Otherwise, each time a tag is read, an entry is added to the <i>Inventory Run Mode</i> .
Configure Setting	Opens settings page (Figure 17).	
Inventory Run Mode	PC	PC of the scanned tags
	EPC	EPC of the scanned tags
	RSSI	RSSI of the scanned tags
	Count	Record of the times the tag has been scanned
	Antenna Number	ID of the antenna that has scanned the tag
	Last Time	The last time at which the tag has been scanned
Inventory Statistics	Unique Tags	Number of unique scanned tags
	Total Reads	Total number of tag scans
	Speed	Number of scanned tags per second
	Package Temperature	The current temperature of RSWR-400
	Connected Clients	Number of connected clients
Ant	Check Antenna	A visual indicator of connected antennas

Connection

In this page user should enter network connection settings (Figure 17 and Table 16).

Figure 17, Configure Setting Page

Table 16, RSWR-400 Network Connection Settings

Field	Description
IP Address	IP of RSWR-400
Operating Region	Channel frequency of the workspace region
Enable Antenna Monitoring	If selected, RSWR-400 consistently monitors status of UHF antennas and alarms if any of them disconnects.
Reader Info	Complementary information about network connection status of RSWR-400

⚠ The *Region* field must be filled in accordance with the country/region of operation to comply with local laws and regulations. The user is responsible to conform operation to the correct RF settings. Also, the user is the only one responsible for any fines and damages due to incorrect or non-compliant country/region settings on the Reader.

Click Connect when you are done with the settings in this section. If the application successfully connects to RSWR-400, you will see a message as per Figure 18.



Figure 18, RSUHF Tester Application Successfully Connected to RSWR-400

Click OK and press the *Start Inventory* button.

If you face an error message as per Figure 19, contact [Radiant Sensors](#) support team.

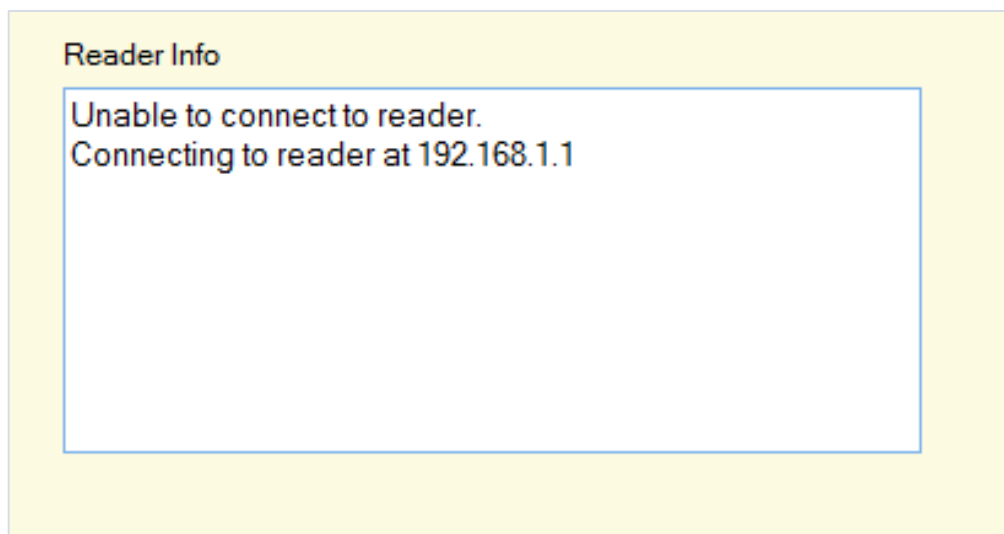


Figure 19, Connection to RSWR-400 Failed

Antenna, Power

In this page you can enable UHF antennas and set their power (Figure 20).

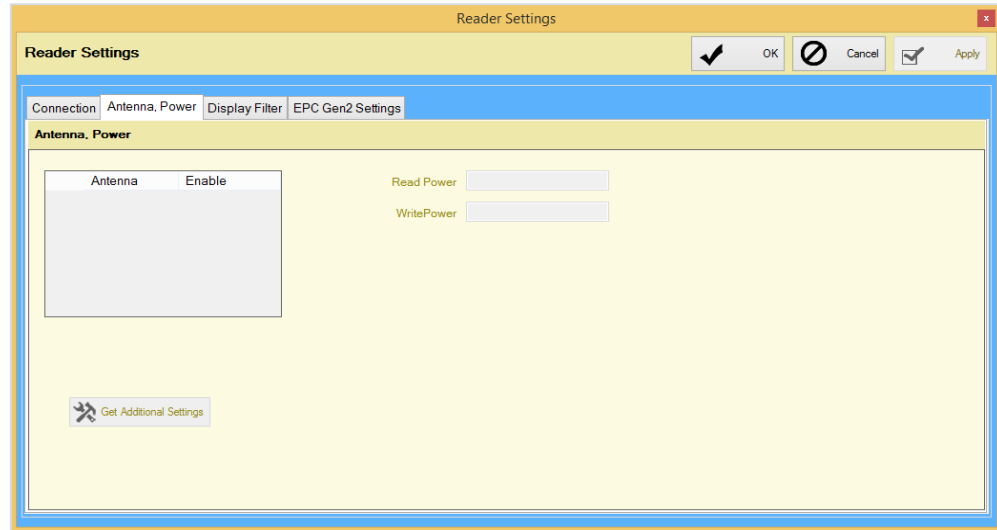


Figure 20, Setting Antenna Power in RSUHF Tester

Display Filter

You can configure **RSWR-400** to filter tags based on their EPC. For example, the EPC of a particular product may start with 10011001. When auditing the inventory, you can prompt **RSWR-400** to display items whose EPC starts with 10011001 (Figure 21).

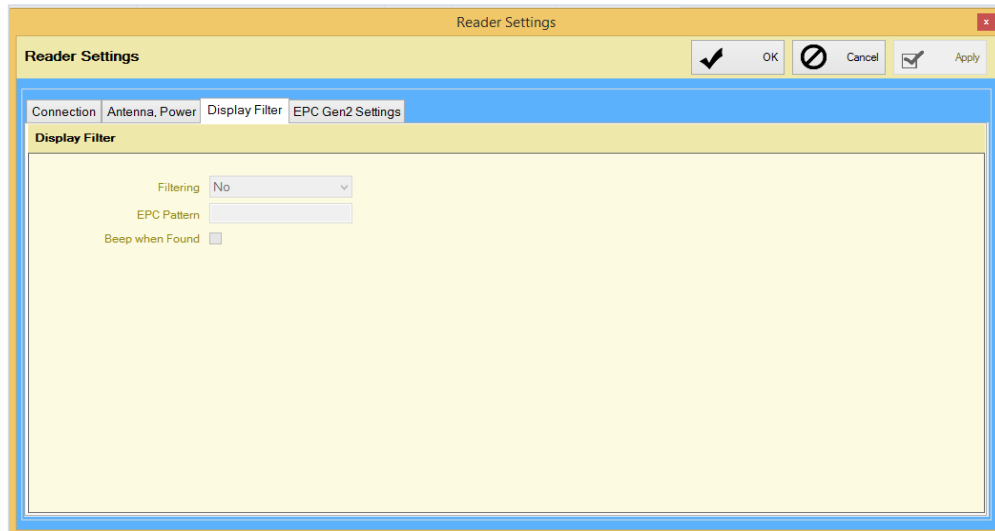


Figure 21, Setting Filter in RSUHF Tester

EPC Gen2 Settings

Read [EPC Gen2 document](#) for more information.

Records of Revision

This page keeps record of changes to this document. The document was originally released as Revision A.

REV	NAME	DESCRIPTION OF REVISION
A	Gwen Daniel	Initial Release



Radiant Sensors is addressing the challenges of global intricacy in today's omnipresent digital devices, granting its customers to create novel experiences for end users.

Radiant Sensors designs, develops, and manufactures passive and active RFID hardware products as well as IoT sensor devices for short and long range wireless identification technology.

Radiant Sensors is positioned as a major player in the worldwide market for sub gigahertz UHF (Ultra-High Frequency) and Active radio-frequency identification (2.45 GHz) technologies. Our devices are field proven and have been in operation for many years throughout the world.

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