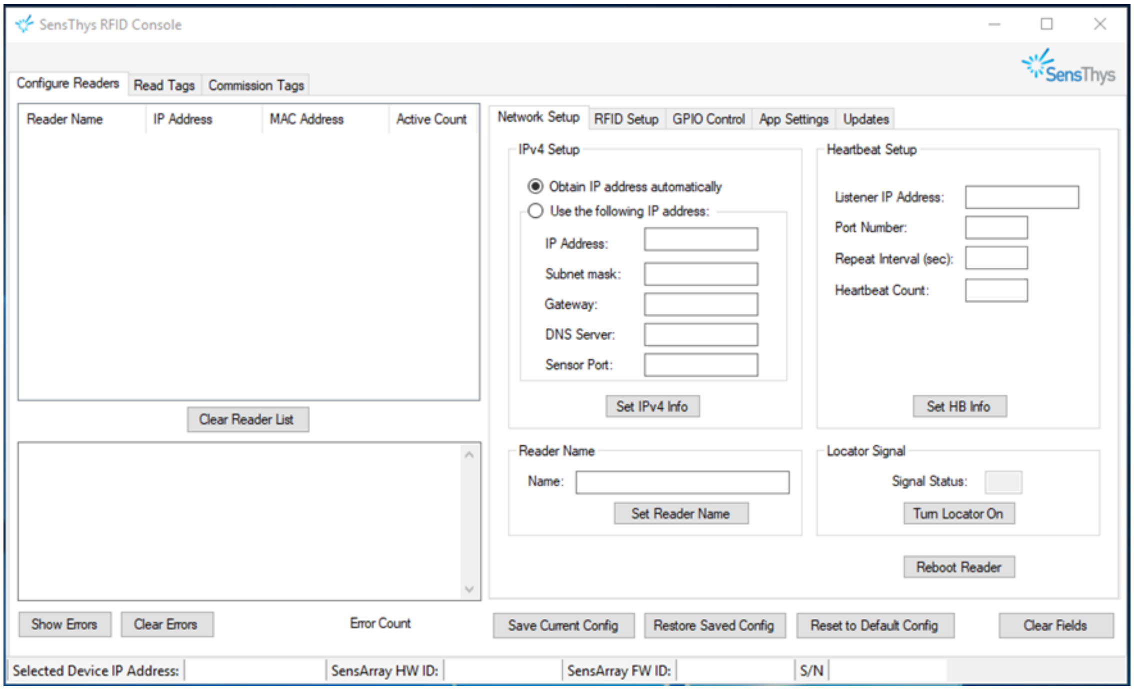
ProSens: RFID Console

INSTALL, OPERATION AND TROUBLESHOOTING

V2.2



SensThys
Sense This World

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This device complies with Industry Canada License-exempt RSS standards. 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. This device has been designed to operate with a variety of different gain (dBi). The reader maximum output power is set by the gain of the antenna. Using an antenna having a higher gain is strictly prohibited per regulations of Industry Canada. In addition, using the reader at a power exceeding the maximum output power for a given antenna is also strictly prohibited. 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.

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Cet appareil est conforme aux normes RSS exemptées de licence d'Industrie Canada. L'opération est soumise aux deux conditions suivantes: (1) cet appareil ne doit pas provoquer d'interférence et (2) cet appareil doit accepter toute interférence, y compris les interférences susceptibles de provoquer un fonctionnement indésirable de l'appareil. Cet appareil a été conçu pour fonctionner avec une variété de gains différents (dBi). La puissance de sortie maximale du lecteur est définie par le gain de l'antenne. L'utilisation d'une antenne ayant un gain plus élevé est strictement interdite par règlement d'Industrie Canada. En outre, l'utilisation du lecteur à une puissance supérieure à la puissance de sortie maximale pour une antenne donnée est également strictement interdite. L'impédance d'antenne requise est de 50 ohms. Afin de réduire les interférences radio potentielles avec d'autres utilisateurs, le type d'antenne et son gain devraient être choisis de manière à ce que la puissance éloignée isotropiquement (EIRP) équivalente soit supérieure à celle requise pour une communication réussie.

Caution
Reader antennas should be positioned so that personnel in the area for prolonged periods may safely remain at least 31 cm (12.2 in) in an uncontrolled environment from the antenna’s surface. See FCC OET Bulletin 56 “Hazards of radio frequency and electromagnetic fields” and Bulletin 65 “Human exposure to radio frequency electromagnetic fields.”

Vorsicht
Reader Antennen sollten so positioniert werden, dass das Personal im Bereich über einen längeren Zeitraum kann sicher bleiben mindestens 31 cm (12.2 Zoll) entfernt von der Antenne Oberfläche, in einer unkontrollierten Umgebung. Siehe FCC OET Bulletin 56 "Gefahren der Radiofrequenz und elektromagnetische Felder" und Bulletin 65 "Human Exposition gegenüber hochfrequenten elektromagnetischen Feldern."

Revision History

Version	Author	Date	Changes
1.0	D. Stump	August 2021	Initial Document
2.0	N. Mitchell	January 2022	Combined installation, troubleshooting and added firewall & networking troubleshooting.
2.1	B. Gaiser, J. Major, N. Mitchell	January 2022	Clean-up for public release
2.2	N. Mitchell	April 2024	Added unusual cases of network issues

1 Table of Contents

INTRODUCTION

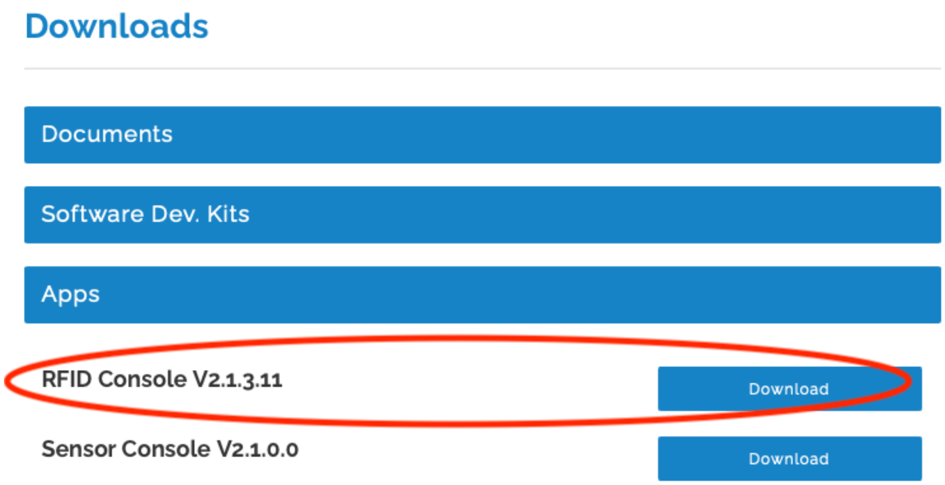
Congratulations on your purchase of a SensThys reader! These readers offer a suite of features that you can customize through the RFID Console, provided at SensThys.com, to best suit your network environment. This document walks through the console installation, details many of the features the console has to offer and suggests troubleshooting steps for common networking and operational issues SensThys has observed.

2 INSTALLING THE CONSOLE

This chapter details the menu screens that appear for the RFID Console on a Windows 11 installation (Windows 10 is similar).

1. Download the RFID Console (.zip) from the SensThys Support website and select “RFID Console”.

https://www.sensthys.com/downloads/



Downloads

Documents

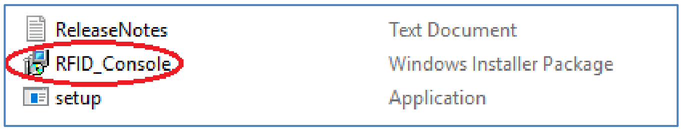
Software Dev. Kits

Apps

RFID Console V2.1.3.11 Download

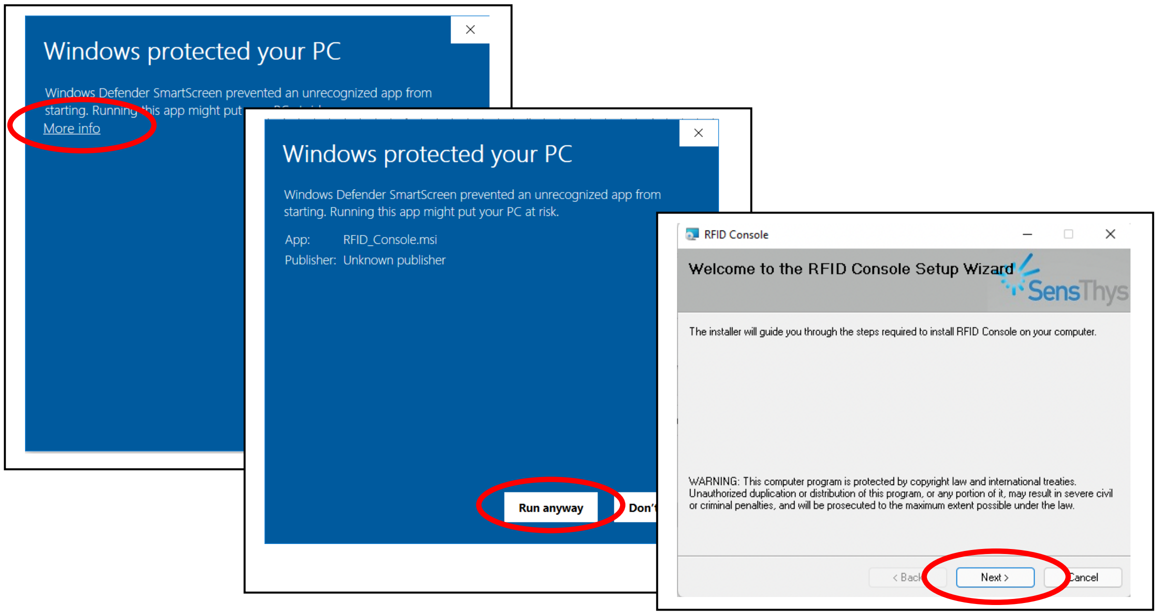
Sensor Console V2.1.0.0 Download

2. After you’ve downloaded zip file and unzipped it, you should see this…



ReleaseNotes	Text Document
RFID_Console	Windows Installer Package
setup	Application

3. Double click the `RFID Console` installer package. The Installer will display the following screens (depending on security settings you may not have the first few screen shots). Follow the instructions to completion:



Windows protected your PC

Windows Defender SmartScreen prevented an unrecognized app from starting. Running this app might put

More info

Windows protected your PC

Windows Defender SmartScreen prevented an unrecognized app from starting. Running this app might put your PC at risk.

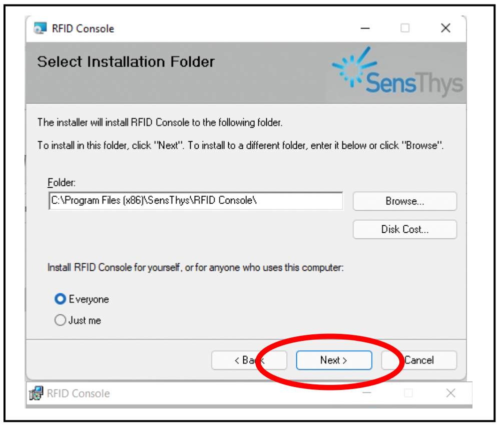
App: RFID_Console.msi
Publisher: Unknown publisher

RFID Console

Welcome to the RFID Console Setup Wizard

The installer will guide you through the steps required to install RFID Console on your computer.

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.



RFID Console

Select Installation Folder

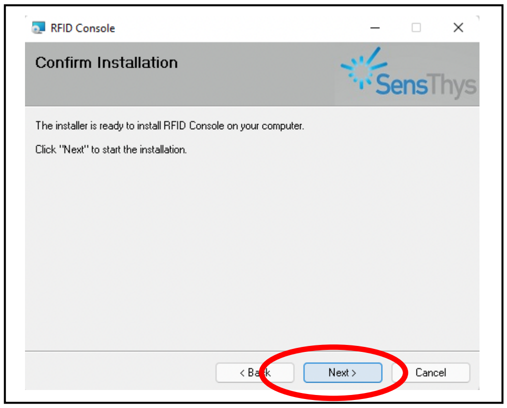
The installer will install RFID Console to the following folder.

To install in this folder, click "Next". To install to a different folder, enter it below or click "Browse".

Folder:
C:\Program Files (x86)\SensThys\RFID Console\

Install RFID Console for yourself, or for anyone who uses this computer:

● Everyone
○ Just me

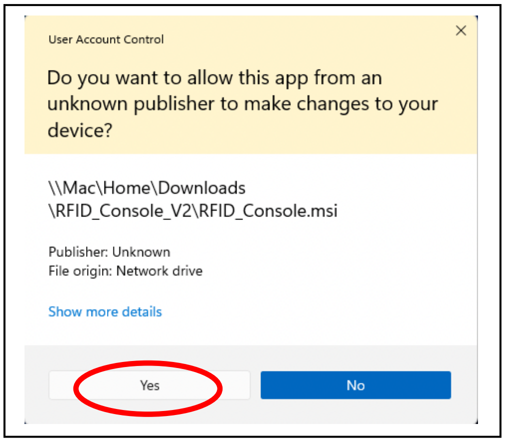


RFID Console

Confirm Installation

The installer is ready to install RFID Console on your computer.

Click "Next" to start the installation.



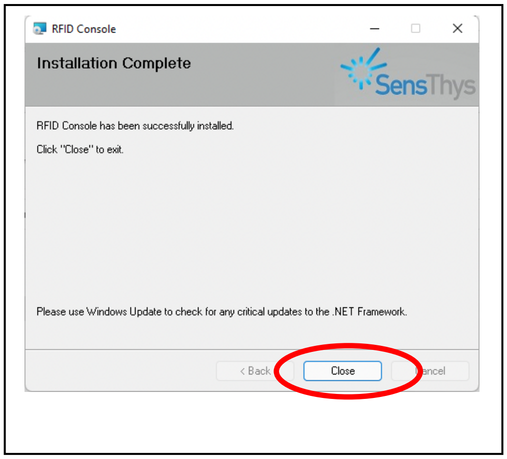
User Account Control

Do you want to allow this app from an unknown publisher to make changes to your device?

\\Mac\Home\Downloads \RFID_Console_V2\RFID_Console.msi

Publisher: Unknown
File origin: Network drive

Show more details



RFID Console

Installation Complete

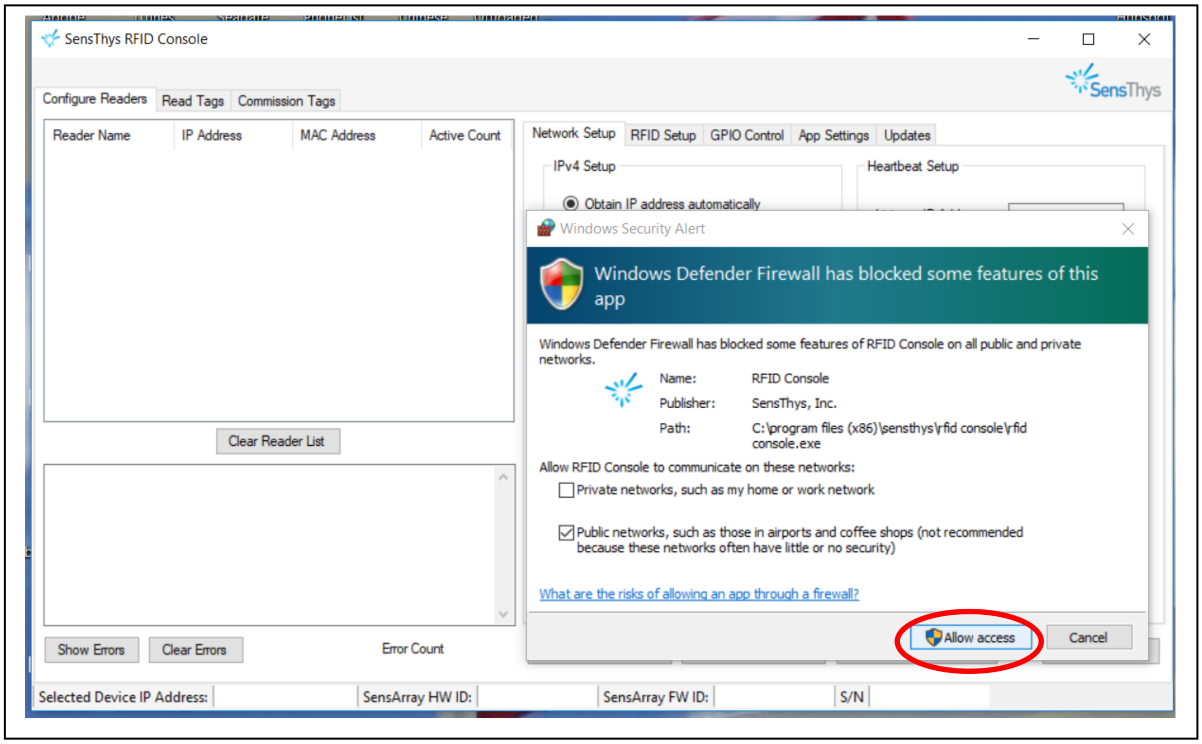
RFID Console has been successfully installed.

Click "Close" to exit.

Please use Windows Update to check for any critical updates to the .NET Framework.

4. Start RFID Console. Use the convenient desktop icon.

   For the first time, Windows Security will display warning that the Windows Defender Firewall has blocked some features of the RFID Console. **For RFID Console to communicate with readers in the same subnet, the Firewall must allow the Console to access "Public Networks". Click on "Allow Access".** RFID Console will now be able to find and populate the Reader List with readers in the same subnet.



● Obtain IP address automatically

Windows Security Alert

Windows Defender Firewall has blocked some features of this app

Windows Defender Firewall has blocked some features of RFID Console on all public and private networks.

Name: RFID Console
Publisher: SensThys, Inc.
Path: C:\program files (x86)\sensthys\rfid console\rfid console.exe

Allow RFID Console to communicate on these networks:

□ Private networks, such as my home or work network

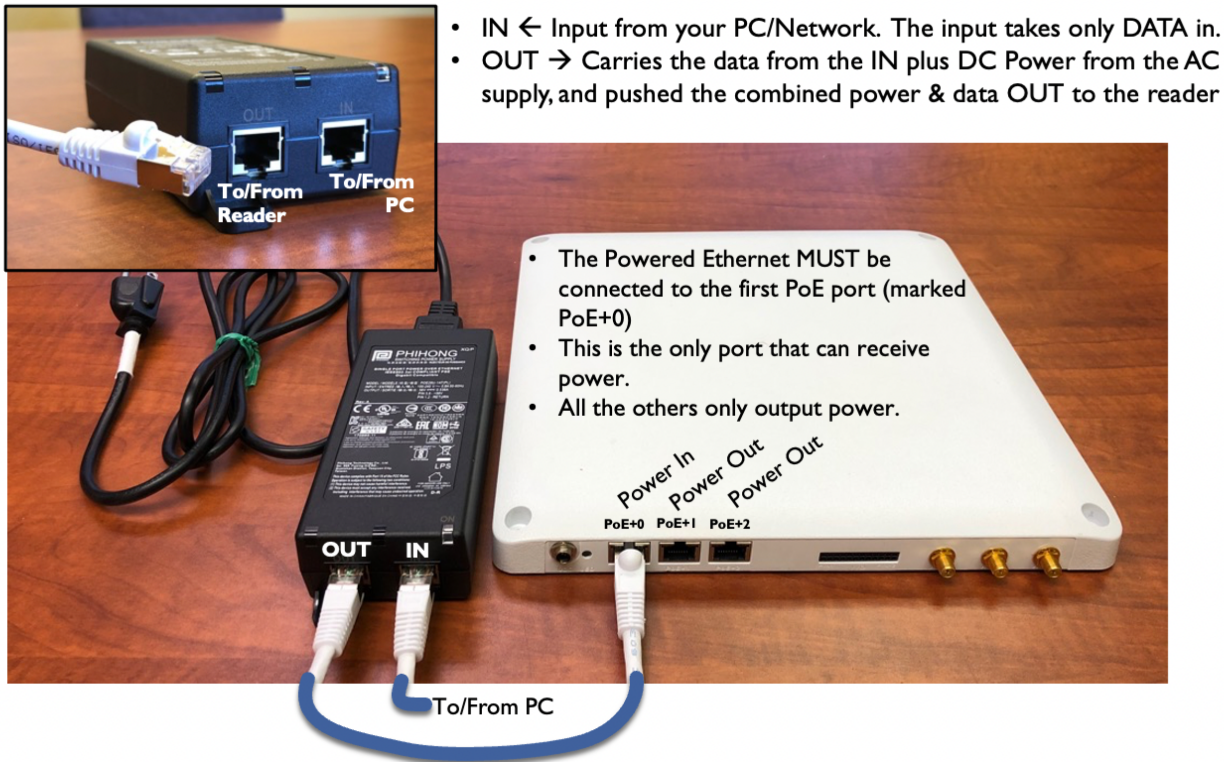
☑ Public networks, such as those in airports and coffee shops (not recommended because these networks often have little or no security)

What are the risks of allowing an app through a firewall?

You have now successfully installed the RFID Console. Now let's get your hardware ready.

3 CONNECTING THE READER

Once you have your unit, connect it to your computer by plugging a CAT5 or CAT6 ethernet cable from your computer into a power injector, then a second ethernet cable from the injector into your reader. Next, power on the unit by plugging the injector into your power supply and launch the Console application by double-clicking the file named “RFID Console.exe” that has the SensThys logo as the icon.



- IN ← Input from your PC/Network. The input takes only DATA in.
- OUT → Carries the data from the IN plus DC Power from the AC supply, and pushed the combined power & data OUT to the reader

- The Powered Ethernet MUST be connected to the first PoE port (marked PoE+0)
- This is the only port that can receive power.
- All the others only output power.

After powering your SensThys reader and launching the RFID Console, the POE switch or injector commences the hand-shaking procedure with the unit, culminating in the Enterprise or Core being fully powered. Next, the CPU boots up, setting up its power architecture and becoming ready for operation.

During the power up and boot process, the primary status indicator LED will flash red. Once booted, the LED will flash green.

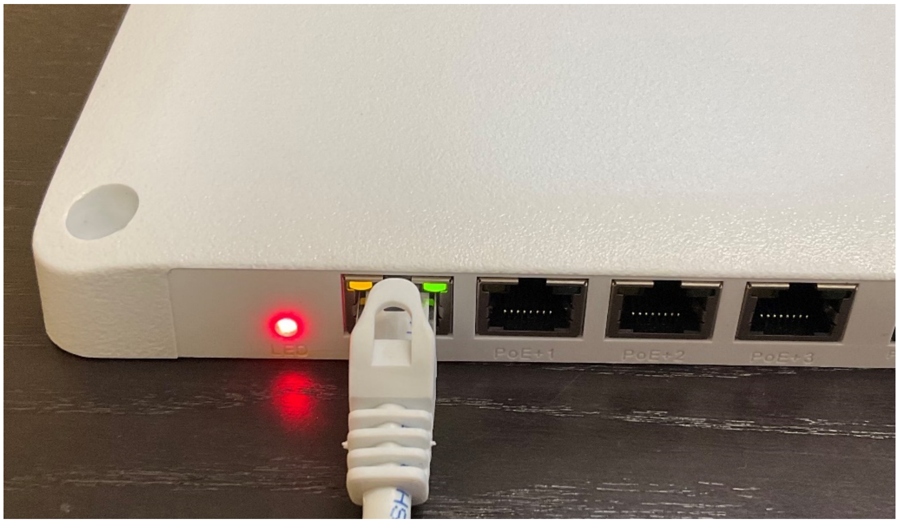


Figure 1: The Enterprise booting up

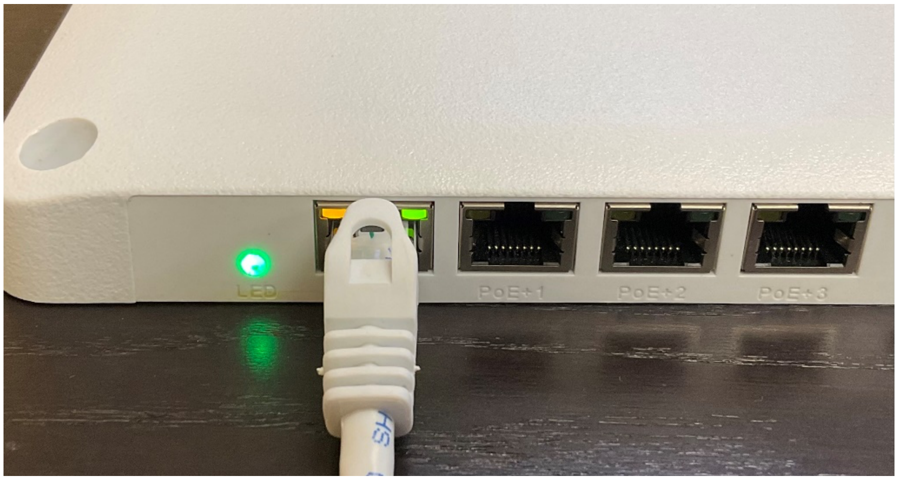


Figure 2: The Enterprise has finished booting and is ready for operation

Once the Console program is up and running, this screen shown in Figure 3 should be visible.

At this point you should connect your SensThys units to the computer. After a short period of time, less than one minute, the unit(s) will be displayed in the upper left.
Select the unit you wish to operate and control by clicking on that line. The RFID Console will then display IP address, subnet mask, etc.
The Console will display all readers on the network, populating the reader list on the left side of the Console.

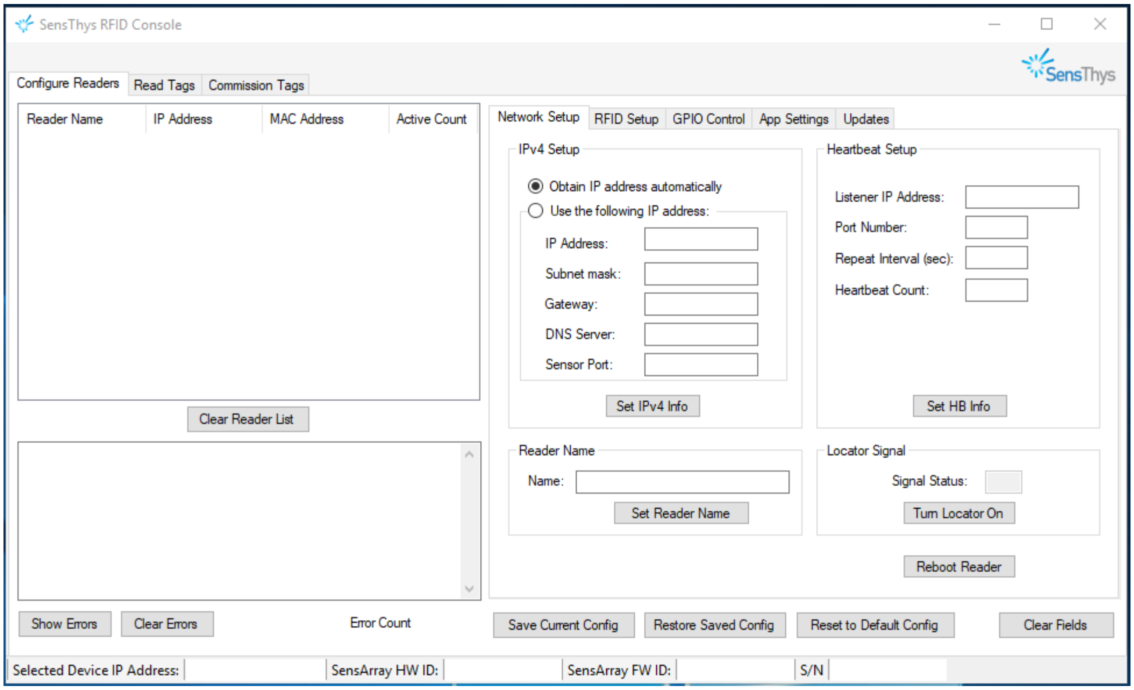
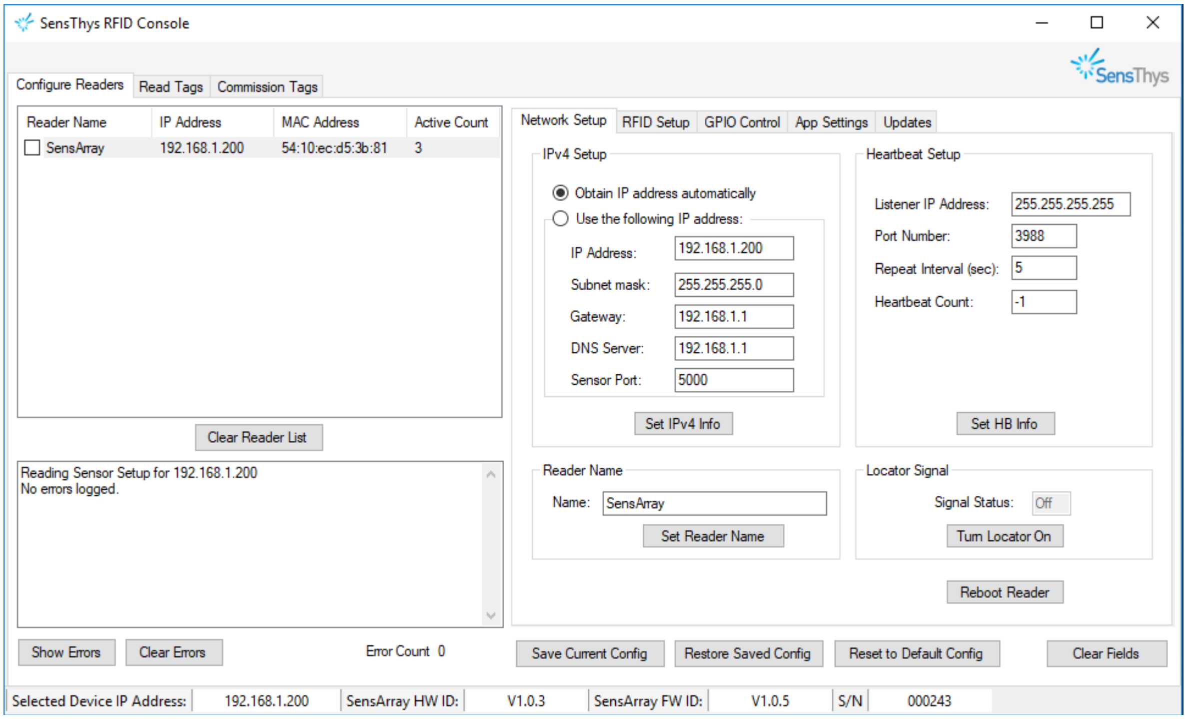


Figure 3: The main screen of the RFID Console



Reader Name	IP Address	MAC Address	Active Count
□ SensArray	192.168.1.200	54:10:ec:d5:3b:81	3

```
Reading Sensor Setup for 192.168.1.200
No errors logged.
```

Error Count 0

● Obtain IP address automatically
○ Use the following IP address:

IP Address: 192.168.1.200
Subnet mask: 255.255.255.0
Gateway: 192.168.1.1
DNS Server: 192.168.1.1
Sensor Port: 5000

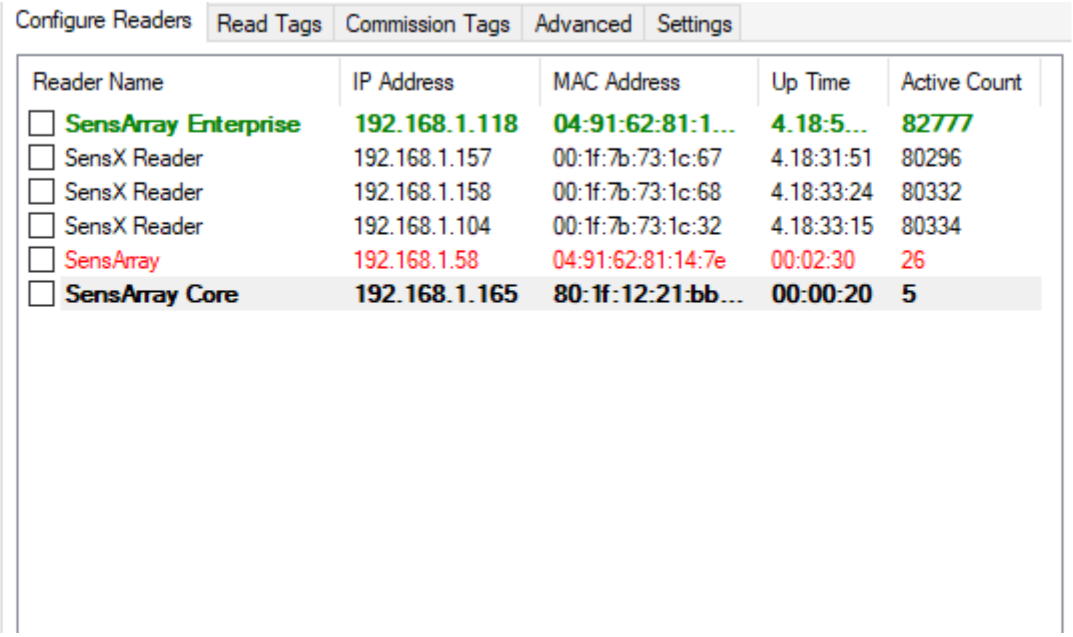
Listener IP Address: 255.255.255.255
Port Number: 3988
Repeat Interval (sec): 5
Heartbeat Count: -1

Name: SensArray

Signal Status: Off

Selected Device IP Address: 192.168.1.200 | SensArray HW ID: V1.0.3 | SensArray FW ID: V1.0.5 | S/N 000243

Figure 4: After selecting the unit, the RFID Console shows the network setup for that unit.



Reader Name	IP Address	MAC Address	Up Time	Active Count
□ **SensArray Enterprise**	**192.168.1.118**	**04:91:62:81:1...**	**4.18:5...**	**82777**
□ SensX Reader	192.168.1.157	00:1f:7b:73:1c:67	4.18:31:51	80296
□ SensX Reader	192.168.1.158	00:1f:7b:73:1c:68	4.18:33:24	80332
□ SensX Reader	192.168.1.104	00:1f:7b:73:1c:32	4.18:33:15	80334
□ SensArray	192.168.1.58	04:91:62:81:14:7e	00:02:30	26
□ **SensArray Core**	**192.168.1.165**	**80:1f:12:21:bb...**	**00:00:20**	**5**

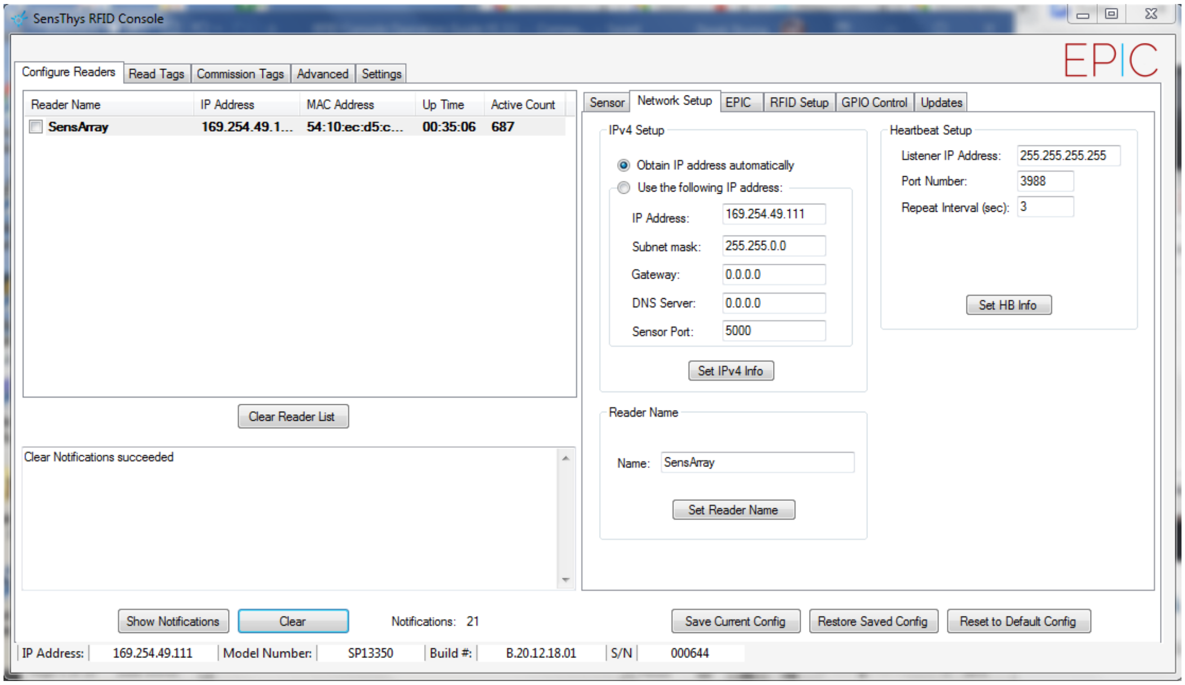
Figure 5: Showing the color scheme. A normal font means that the reader is not connected. Green shows readers connected to the Console. Red shows readers connected to another application. Black (bold) shows the connected reader selected for configuration.

4 CONFIGURE READERS

Under the Configure Readers tab, there are 4 main sections that allow for tweaking basic settings of the reader itself. The following sections go into detail about these features.

4.1 Network Setup

The Network Setup tab has settings that allow for customization of how your reader will be detected in your network configuration. In “IPv4 Setup” you can obtain the IP Address for your reader automatically or set the IP Address yourself by entering the IP Address, subnet mask, DNS gateway, DNS Server, and port you would like to use and clicking the “Set IPv4 Info” button. In “Reader Name”, you can set a customized name for the reader so that you can make the reader more easily identifiable. Type a name into the box next to “Name:” and click the “Set Reader Name” button. In “Heartbeat Setup”, you can set the target IP address and port that you want to send a heartbeat to by typing in the boxes next to “Listener IP Address” and “Port Number”. You can also set the interval, in seconds, at which you want to send a heartbeat by typing in the box next to “Repeat Interval (sec)”. Clicking the “Set HB Info” button will save this information.



Reader Name	IP Address	MAC Address	Up Time	Active Count
□ SensArray	169.254.49.1...	54:10:ec:d5:c...	00:35:06	687

Clear Notifications succeeded

Notifications: 21

IPv4 Setup

● Obtain IP address automatically
○ Use the following IP address:

IP Address: 169.254.49.111
Subnet mask: 255.255.0.0
Gateway: 0.0.0.0
DNS Server: 0.0.0.0
Sensor Port: 5000

Heartbeat Setup

Listener IP Address: 255.255.255.255
Port Number: 3988
Repeat Interval (sec): 3

Reader Name

Name: SensArray

IP Address: 169.254.49.111 | Model Number: SP13350 | Build #: B.20.12.18.01 | S/N 000644

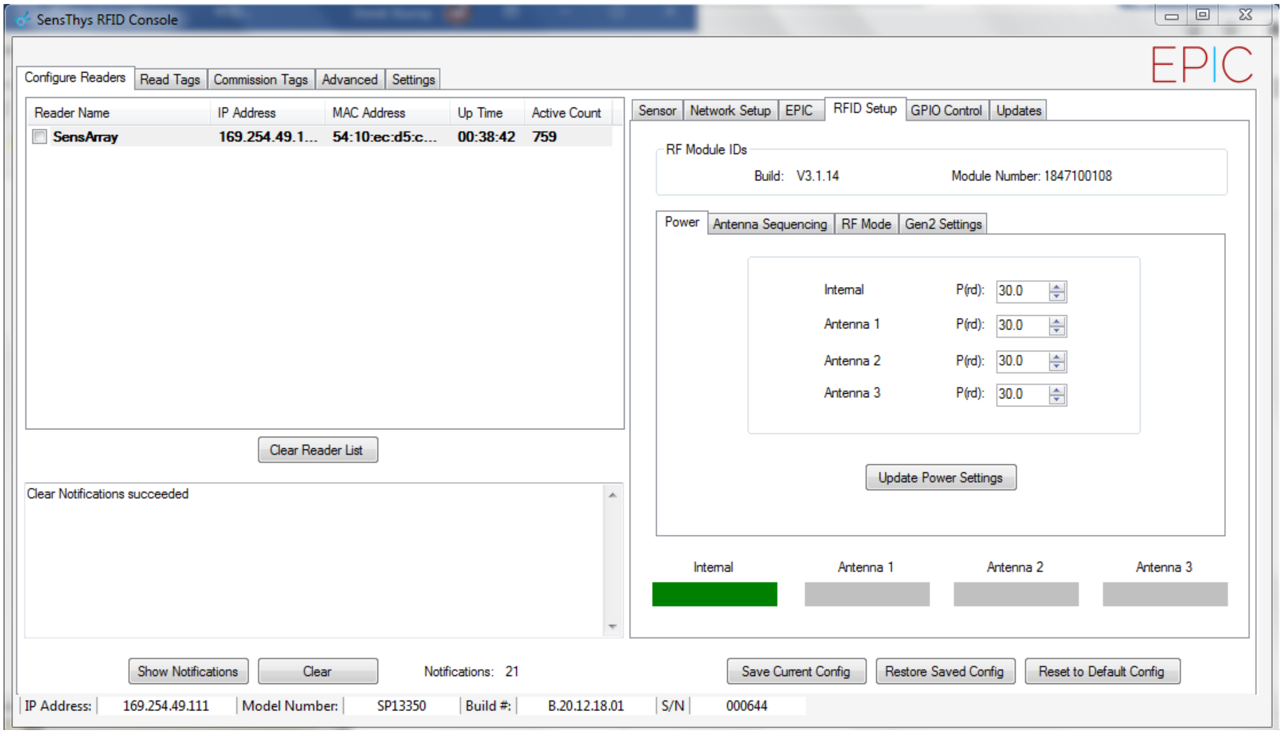
Figure 6: The Network Setup tab in the Console

4.2 RFID Setup

The RFID Setup tab has settings that offer customization of RFID features on your reader.

4.2.1 Power

This tab lets you set the power, in dBm, that the antennas on your reader use by selecting a number from a drop-down menu next to the desired antenna. The default is 30.



Reader Name	IP Address	MAC Address	Up Time	Active Count
□ SensArray	169.254.49.1...	54:10:ec:d5:c...	00:38:42	759

Clear Notifications succeeded

RF Module IDs

Build: V3.1.14 Module Number: 1847100108

Internal	P(rd):	30.0
Antenna 1	P(rd):	30.0
Antenna 2	P(rd):	30.0
Antenna 3	P(rd):	30.0

Internal	Antenna 1	Antenna 2	Antenna 3
🟩	▨	▨	▨

Notifications: 21

IP Address: 169.254.49.111 | Model Number: SP13350 | Build #: B.20.12.18.01 | S/N 000644

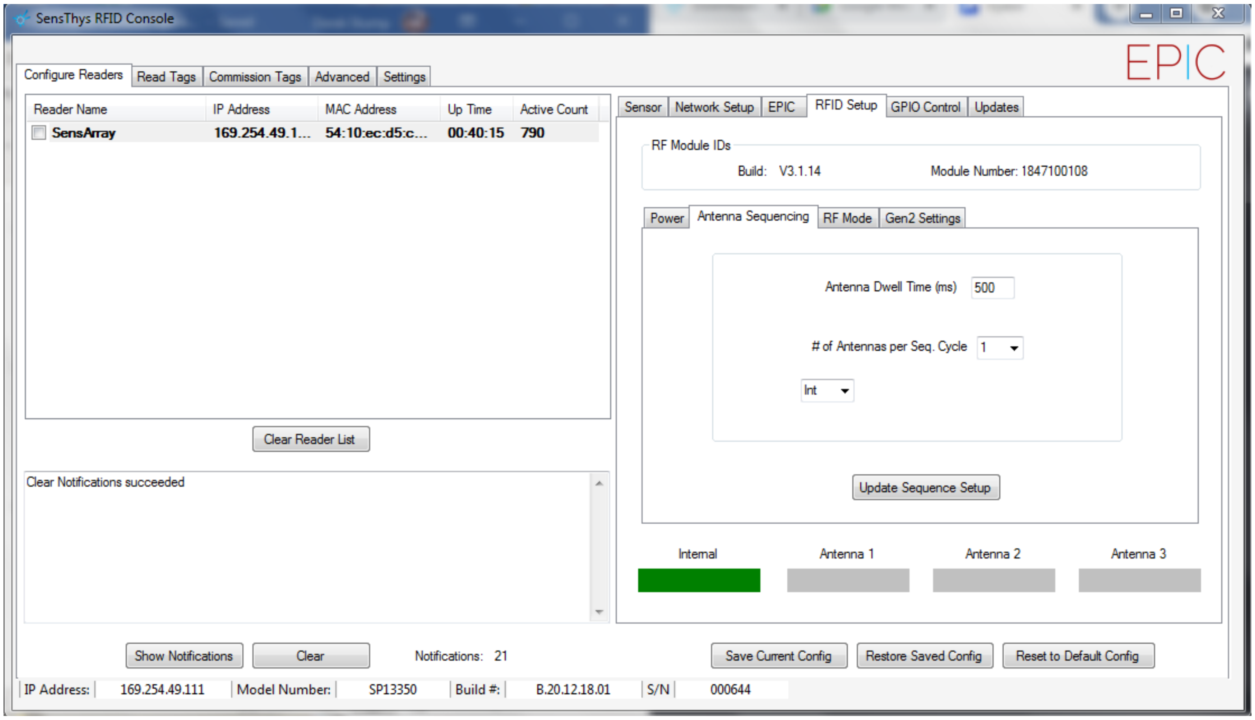
Figure 7: The Power tab in the Console

4.2.2 Antenna Sequencing

This tab has options that allow for changing the order in which antennas are used and which antennas are used. Antenna Dwell Time is the amount of time, in milliseconds, that an antenna spends reading tags before moving on to the next antenna in the sequence. The default dwell time is 500. # of Antennas per Seq. Cycle is the number of antennas that are used during a sequence of tag reads. Select the desired number of antennas in a drop-down menu next to “# of Antennas per Seq. Cycle”, which then brings up additional drop-down menus that allow you to select the antennas you would like to use.

Below the box containing these settings are four colored boxes. These boxes indicate whether an antenna is connected or not and if it is being used. Green means the antenna is connected to that port. Grey means no antenna is connected. A box fully colored in green means the antenna is connected and is active in the sequence.

STOP! Red means no antenna is connected to the port but that the port is selected to be active in the sequence.



Reader Name	IP Address	MAC Address	Up Time	Active Count
□ **SensArray**	**169.254.49.1...**	**54:10:ec:d5:c...**	**00:40:15**	**790**

Clear Notifications succeeded

RF Module IDs

Build: V3.1.14

Module Number: 1847100108

Antenna Dwell Time (ms) 500

# of Antennas per Seq. Cycle 1

Int

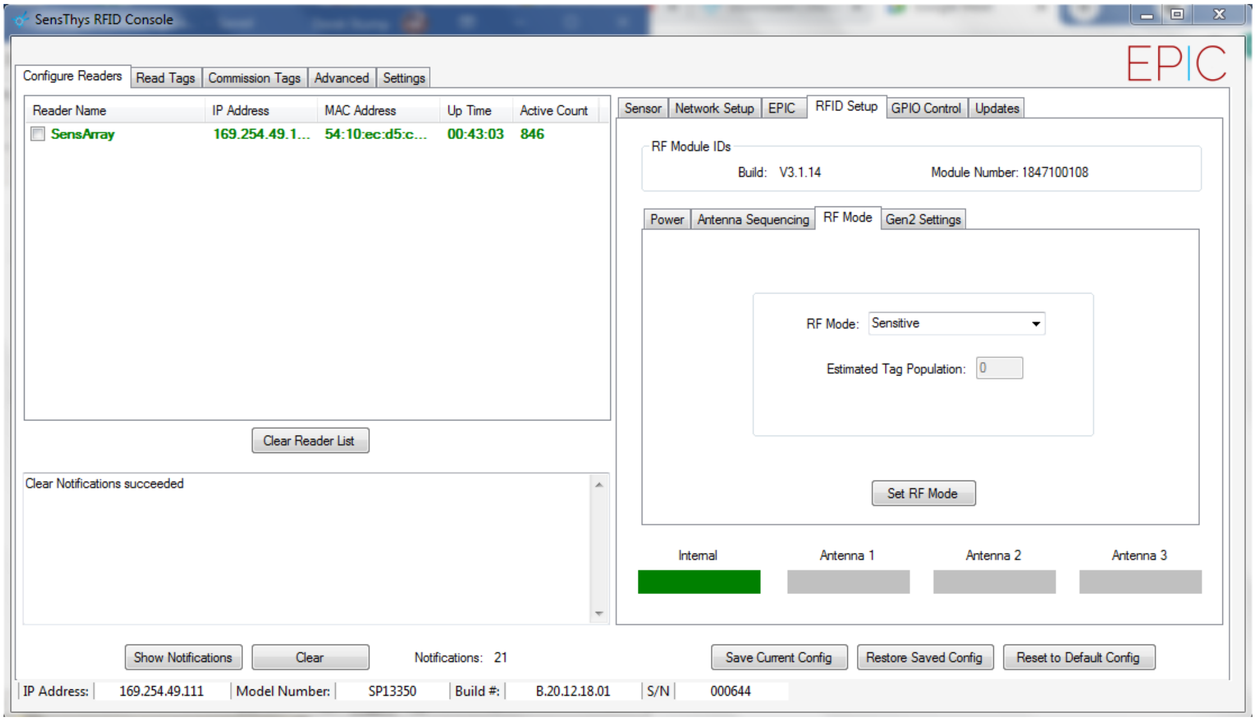
Notifications: 21

IP Address: 169.254.49.111 | Model Number: SP13350 | Build #: B.20.12.18.01 | S/N 000644

Figure 8: The Antenna Sequencing tab in the Console

4.2.3 RF Mode

This tab allows for configuring the style of RFID that the reader uses when reading tags. This is done by selecting an option from a drop-down menu next to “RF Mode”. There are 3 options available. “Sensitive” mode has the reader read tags carefully. “Fast” mode has the reader read tags in a rapid manner. “Expresso” changes the speed of the tag reads depending on the number of tags being read. Selecting the Expresso option opens a “Estimated Tag Population” box where you can set the expected number of tags that are to be read.



Reader Name	IP Address	MAC Address	Up Time	Active Count
☐ SensArray	169.254.49.1...	54:10:ec:d5:c...	00:43:03	846

Clear Notifications succeeded

Build: V3.1.14 Module Number: 1847100108

RF Mode: Sensitive

Estimated Tag Population: 0

Notifications: 21

IP Address: 169.254.49.111 | Model Number: SP13350 | Build #: B.20.12.18.01 | S/N 000644

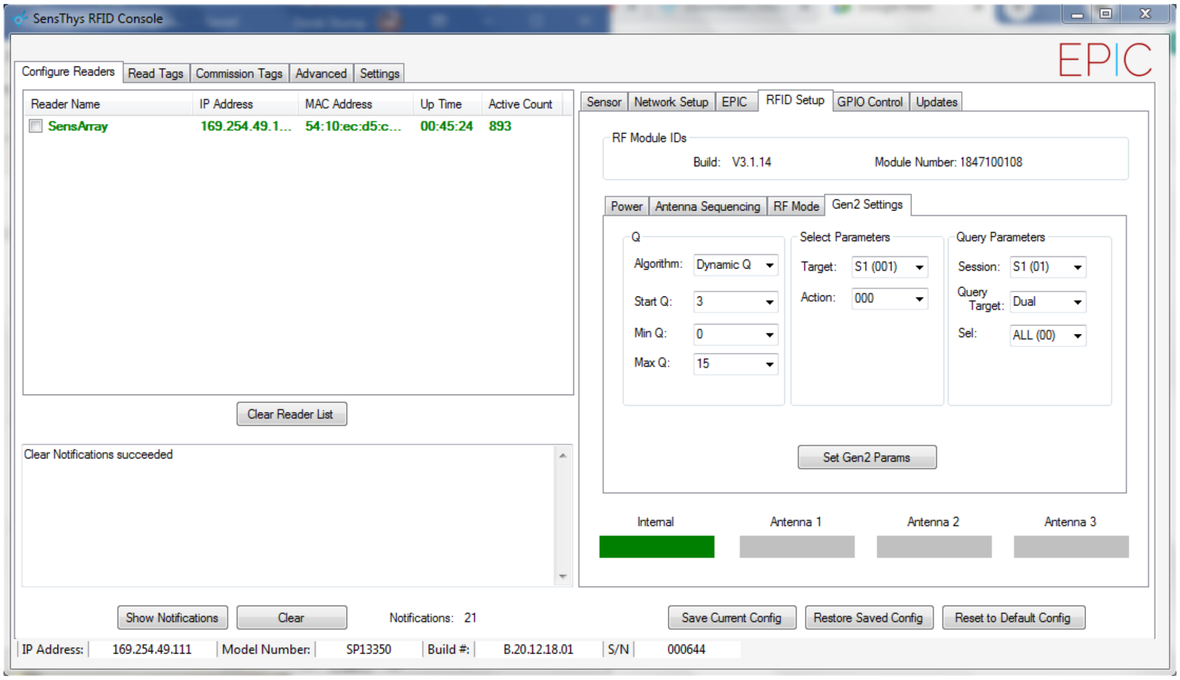
Figure 9: The RF Mode tab in the Console

4.2.4 Gen2 Settings

This tab has more technical settings that allow for customizing how tags are detected. In “Q” you can set the algorithm that the reader uses for detecting tags by selecting one of two options from a drop-down menu next to “Algorithm”.

For general operation, we recommend Dynamic Q, minimum Q of 0, maximum of 15, and starting Q of 3. Only advanced user should alter this setting.

In “Select Parameters”, the session during which tags are selected can be set by choosing S0, S1, S2, or S3 from a drop-down menu next to “Target”. In “Query Parameters”, the session during which queries are sent can be set by selecting the desired session from a drop-down menu next to “Session”. Next is the “Query Target” box. Here, the drop-down menu next to this box has two options named “A” and “B”. These options refer to two states tags can be in when they are being processed.



Reader Name	IP Address	MAC Address	Up Time	Active Count
□ SensArray	169.254.49.1...	54:10:ec:d5:c...	00:45:24	893

RF Module IDs

Build: V3.1.14 Module Number: 1847100108

Q

Algorithm: Dynamic Q

Start Q: 3

Min Q: 0

Max Q: 15

Select Parameters

Target: S1 (001)

Action: 000

Query Parameters

Session: S1 (01)

Query Target: Dual

Sel: ALL (00)

Clear Notifications succeeded

Notifications: 21

IP Address: 169.254.49.111 Model Number: SP13350 Build #: B.20.12.18.01 S/N 000644

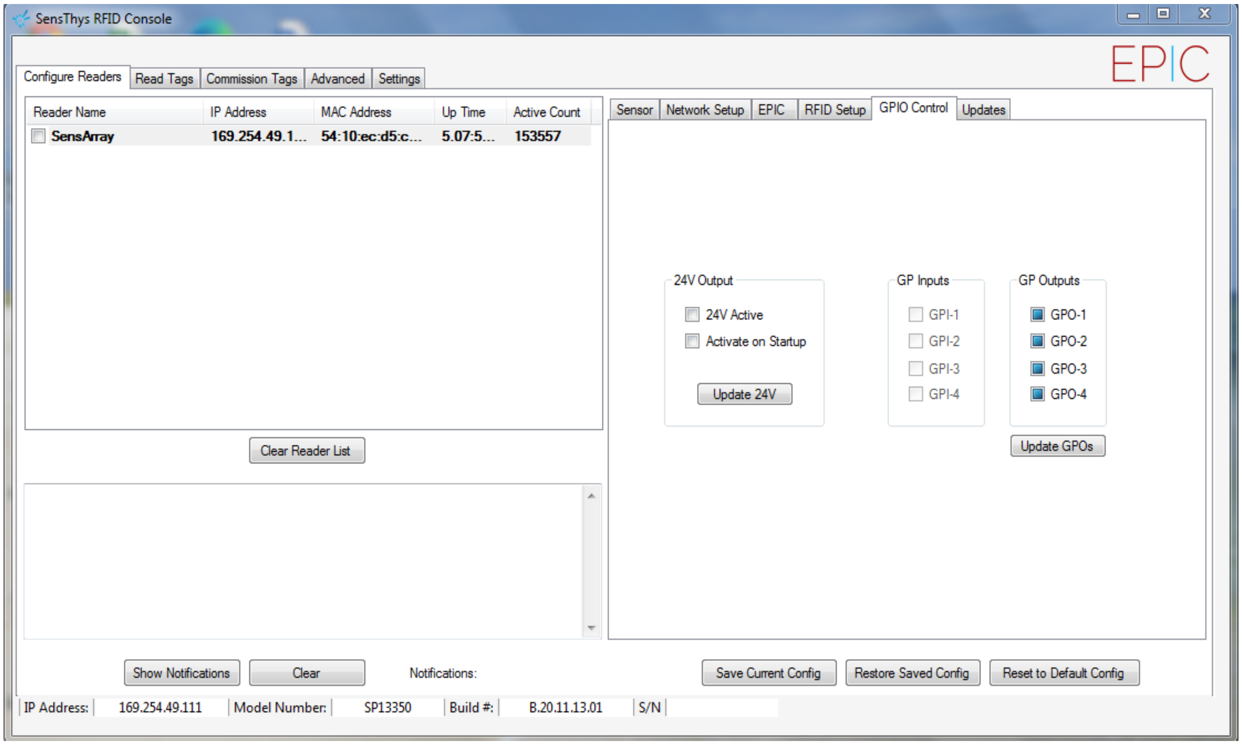
.S

Figure 10: The Gen2 Settings tab in the Console

4.3 GPIO Control

The GPIO Control tab has settings that allow for customization of the General Purpose Input Output (GPIO) ports on your reader. In “24V Output”, you can set the output to activate upon starting up the console by checking the “Activate on Startup” box or set it to be active only when you want it to by clicking the “24V Active” box. In “GP Inputs” and “GP Outputs”, you can set which input and output ports you would like to use by checking the boxes for the ports you want to use. For more detailed information on how to use GPIO, read the GPIO Deployment Guide at the following link:

GPIO Deployment Guide



Reader Name	IP Address	MAC Address	Up Time	Active Count
☐ SensArray	169.254.49.1...	54:10:ec:d5:c...	5.07:5...	153557

24V Output
☐ 24V Active
☐ Activate on Startup

GP Inputs
☐ GPI-1
☐ GPI-2
☐ GPI-3
☐ GPI-4

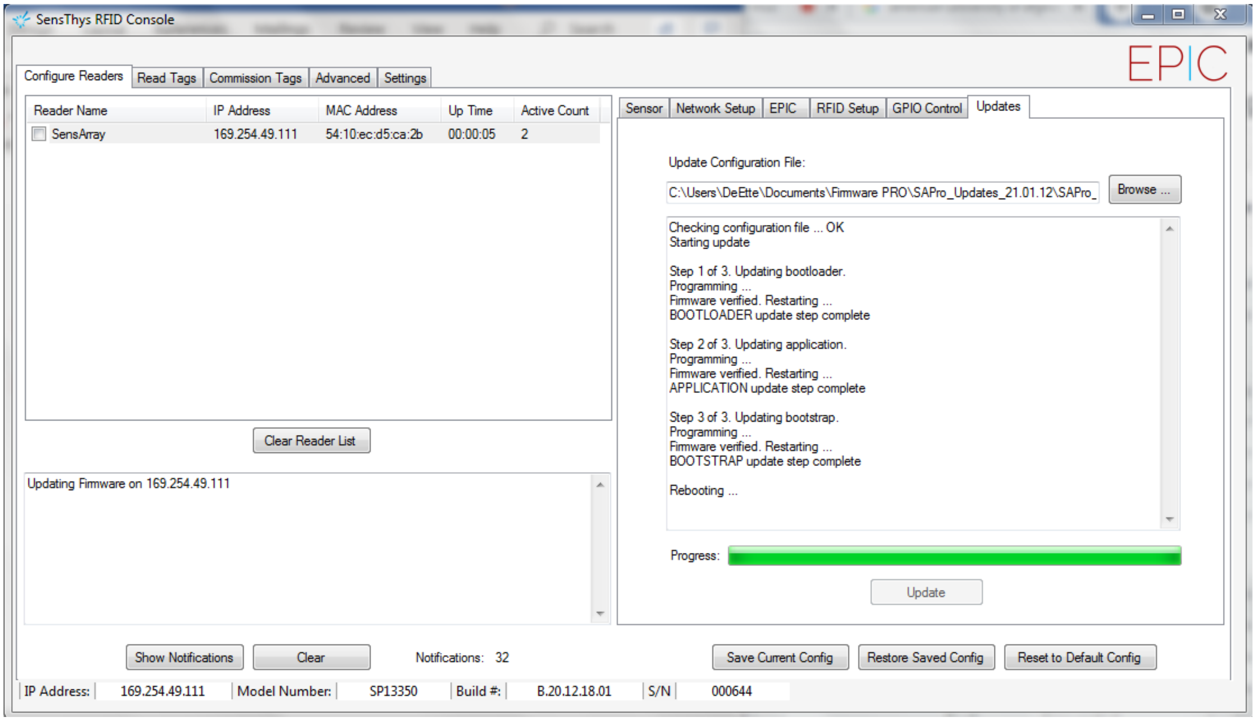
GP Outputs
■ GPO-1
■ GPO-2
■ GPO-3
■ GPO-4

IP Address: 169.254.49.111 | Model Number: SP13350 | Build #: B.20.11.13.01 | S/N

Figure 11: The GPIO Control tab in the Console

4.4 Updates

The Update tab lets you update the firmware of the console if an update is needed. Click the “Browse” button, find the update file, provided by SensThys, and click the “Update” button.



Reader Name	IP Address	MAC Address	Up Time	Active Count
□ SensArray	169.254.49.111	54:10:ec:d5:ca:2b	00:00:05	2

Update Configuration File: C:\Users\DeEtte\Documents\Firmware PRO\SAPro_Updates_21.01.12\SAPro_

```
Checking configuration file ... OK
Starting update

Step 1 of 3. Updating bootloader.
Programming ...
Firmware verified. Restarting ...
BOOTLOADER update step complete

Step 2 of 3. Updating application.
Programming ...
Firmware verified. Restarting ...
APPLICATION update step complete

Step 3 of 3. Updating bootstrap.
Programming ...
Firmware verified. Restarting ...
BOOTSTRAP update step complete

Rebooting ...
```

Progress: 🟩

```
Updating Firmware on 169.254.49.111
```

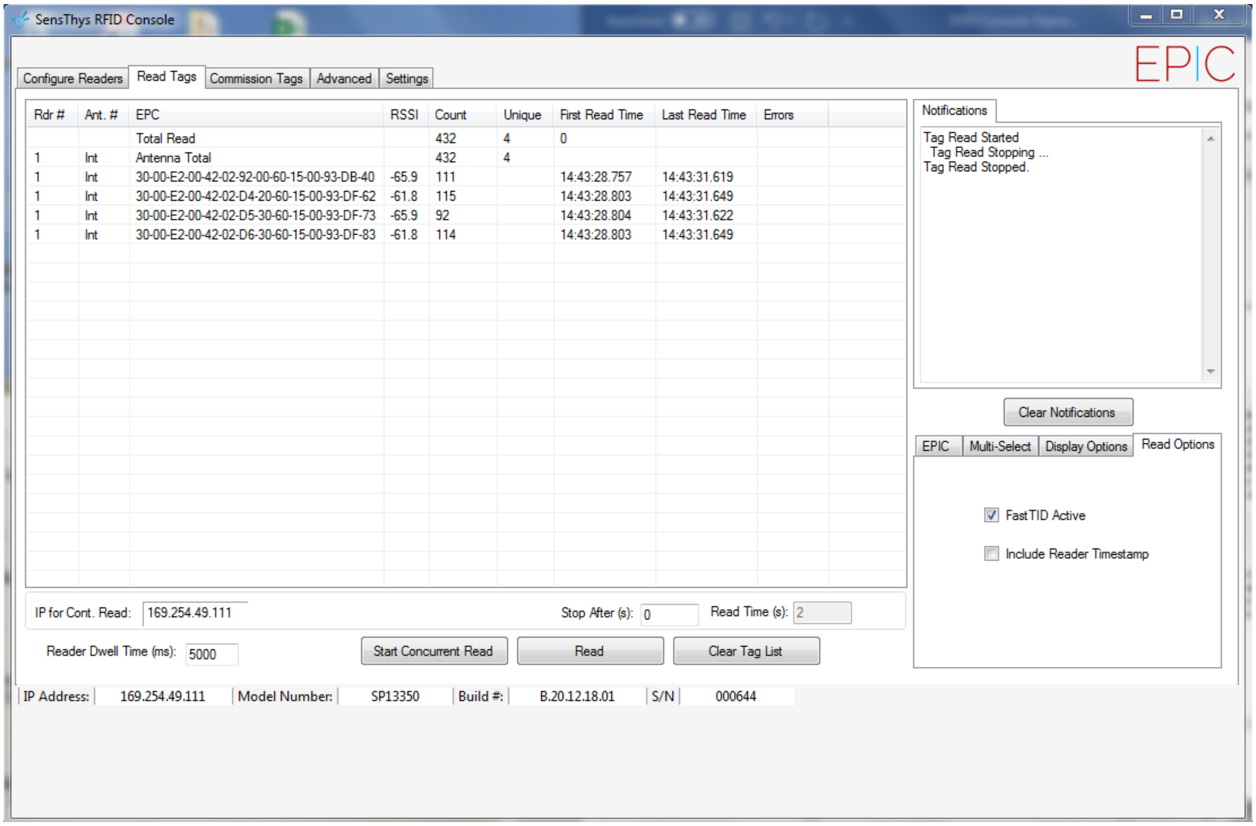
Notifications: 32

IP Address: 169.254.49.111 | Model Number: SP13350 | Build #: B.20.12.18.01 | S/N 000644

Figure 12: The Updates tab in the Console. Shown is sample run of a typical update.

5 READ TAGS

The Read Tags tab is where you can read tags by using the readers in your network. Place an RFID tag, or tags, in front of the unit, and click the "Read" button. Once the desired amount of tag reads have been performed, press the "Stop" button to stop tags from being read. A list will then appear showing the antenna and reader the tag was read on under "Rdr #" and "Ant #" respectively, the EPC of the tag under "EPC", the RSSI (Return Signal Strength Indicator) of the tag under "RSSI", and the number of times the tag has been read under "Count". Clicking the "Clear Tag List" button will erase the read tags from the list.



Rdr #	Ant. #	EPC	RSSI	Count	Unique	First Read Time	Last Read Time	Errors
		Total Read		432	4	0		
1	Int	Antenna Total		432	4			
1	Int	30-00-E2-00-42-02-92-00-60-15-00-93-DB-40	-65.9	111		14:43:28.757	14:43:31.619	
1	Int	30-00-E2-00-42-02-D4-20-60-15-00-93-DF-62	-61.8	115		14:43:28.803	14:43:31.649	
1	Int	30-00-E2-00-42-02-D5-30-60-15-00-93-DF-73	-65.9	92		14:43:28.804	14:43:31.622	
1	Int	30-00-E2-00-42-02-D6-30-60-15-00-93-DF-83	-61.8	114		14:43:28.803	14:43:31.649	

Notifications

Tag Read Started
Tag Read Stopping ...
Tag Read Stopped.

IP for Cont. Read: 169.254.49.111

Stop After (s): 0

Read Time (s): 2

Reader Dwell Time (ms): 5000

☑ Fast TID Active

☐ Include Reader Timestamp

IP Address: 169.254.49.111 | Model Number: SP13350 | Build #: B.20.12.18.01 | S/N 000644

Figure 13: Sample run of tag reads after pressing the "Read" button

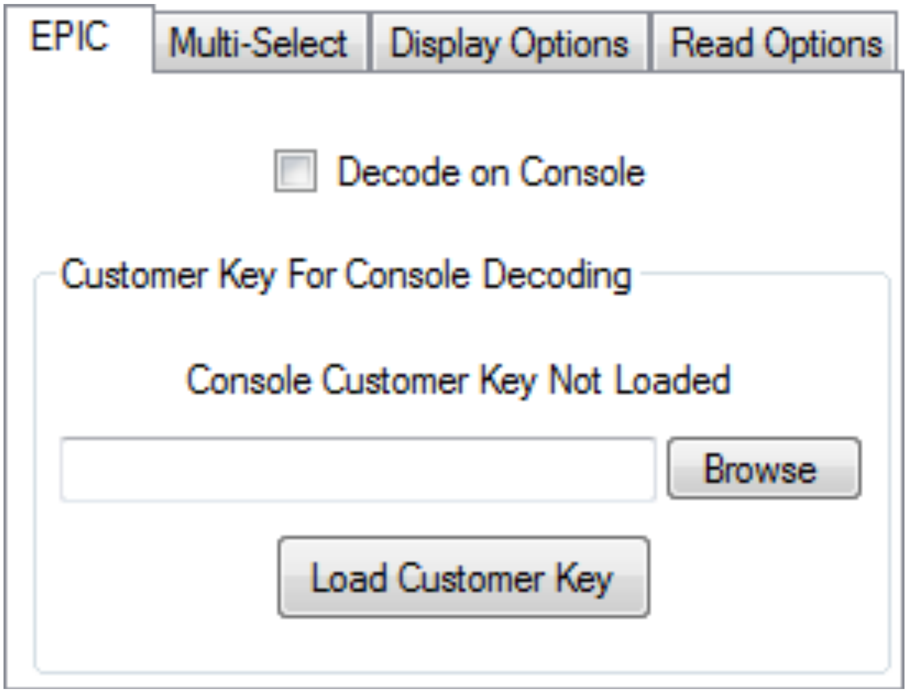
5.1 Concurrent Read

Next to the Read Tags button is the Concurrent Read button. There are two ways tags can be read in the console. The method described previously is a sequential read, where tags are read one reader at a time before moving to the next reader in the network after the length of time shown in Reader Dwell Time. Concurrent Read allows for reading tags on all of the readers in the network at once. If such a method is desired, click the Concurrent Read button.

In the bottom right corner of the Read Tags tab are 4 settings that allow for customizing how tags are read.

5.2 EPIC

EPIC is a form of error correction pioneered by SensThys in order to prevent data loss from tags that can occur due to interference from other devices or data being lost over transmission. The way this is done is by encoding the data for error correction and then encrypting the desired tags with a key that is given to the user, which is then input into the console in the space next to the Browse Button, loading the key by pressing the "Load Customer Key" button, then using the key by checking the "Decode on Console" box



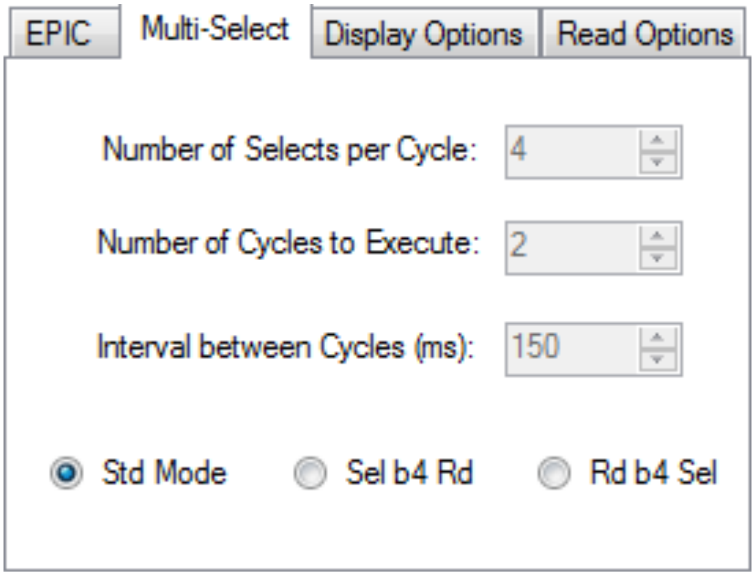
□ Decode on Console

Console Customer Key Not Loaded

Figure 14: The EPIC tab in the Console

5.3 Multi-Select

This tab has settings that allow for customization of the sequence at which tags are read. At the bottom, there 3 options to choose from. Std. Mode, which is the default, has tags selected (displayed on the list on the left of the screen) and read at the same time. Sel b4 Rd has tags selected before its contents are read. Rd b4 Sel has the contents of a tag read before it is selected. If "Rd b4 Sel" or "Sel b4 Rd" is selected, three additional options are available. "Number of Selects" is the number of times a tag is selected before a new cycle, or set of tag reads, is started. "Number of Cycles to Execute", is the number of cycles the reader will execute before moving on to the next antenna that is enabled. All of these options can be customized by entering a number into a drop-down menu next to each of these three options.



Number of Selects per Cycle: 4

Number of Cycles to Execute: 2

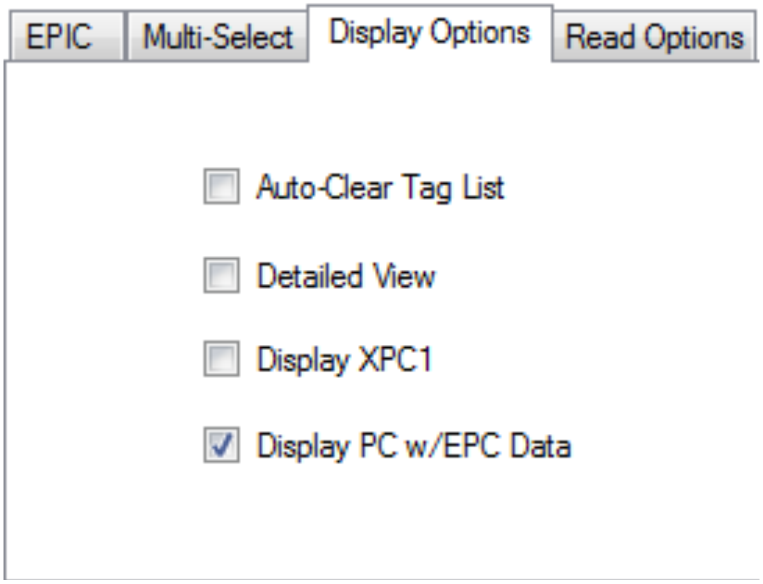
Interval between Cycles (ms): 150

● Std Mode ○ Sel b4 Rd ○ Rd b4 Sel

Figure 15: The Multi-Select tab in the Console

5.4 Display Options

This tab has settings that allow for toggling what information is shown on the list when tags are read. Checking the “Auto-Clear Tag List” box will automatically clear the tags in the list after all of the tag reads on a network are completed. Checking the “Detailed View” box updates the amount of reads for each tag as they are being read. Checking the “Display XPC1” box shows the XPC1 number, in the form of the two two-digit numbers separated by a dash, for each tag. Checking the “Display PC w/ EPC Data” box shows the PC number, in the form of two two-digit hexadecimal numbers separated by a dash, in front of the EPC number associated with the tag.



□ Auto-Clear Tag List

□ Detailed View

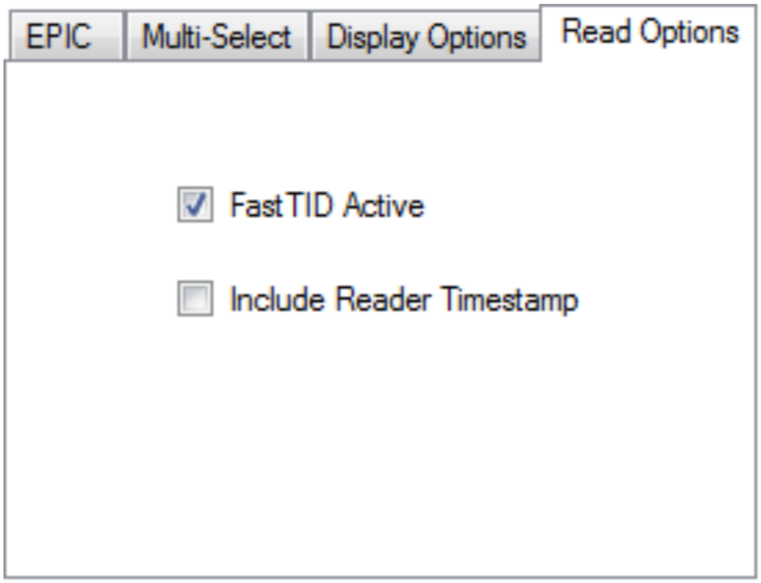
□ Display XPC1

☑ Display PC w/EPC Data

Figure 16: The Display Options tab in the Console

5.5 Read Options

This tab has additional settings regarding tag reads. Checking the “FastTID Active” box enables a functionality for certain Impinj die that allows the TID and EPC to be read at the same time. Checking the “Include Reader Timestamp” box provides a timestamp from the reader for each tag read.



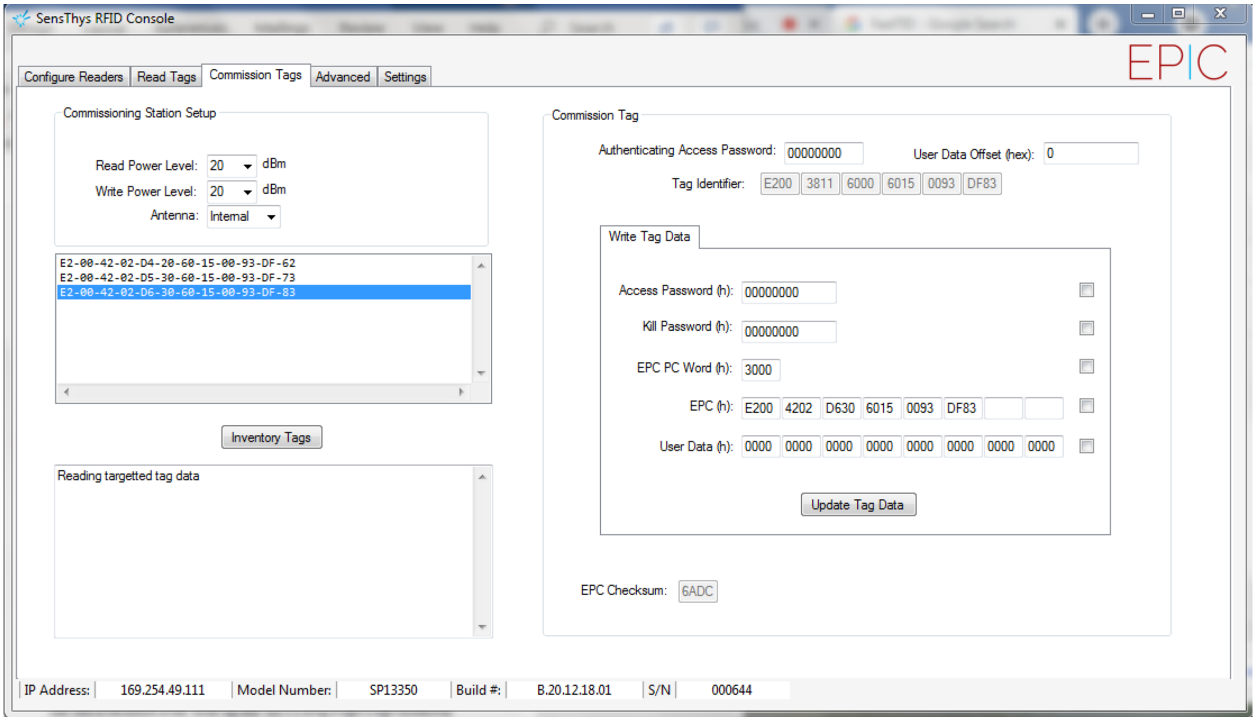
☑ FastTID Active

☐ Include Reader Timestamp

Figure 17: The Read Options tab in the Console

6 COMMISSION TAGS

Next to the Read Tags tab is the Commission Tags tab. The settings provided on this tab allow for keeping track of tags and creating new tags.



Commissioning Station Setup

Read Power Level: 20 dBm
Write Power Level: 20 dBm
Antenna: Internal

```
E2-00-42-02-D4-20-60-15-00-93-DF-62
E2-00-42-02-D5-30-60-15-00-93-DF-73
E2-00-42-02-D6-30-60-15-00-93-DF-83
```

Reading targetted tag data

Commission Tag

Authenticating Access Password: 00000000
User Data Offset (hex): 0
Tag Identifier: E200 3811 6000 6015 0093 DF83

Write Tag Data

Access Password (h): 00000000 □
Kill Password (h): 00000000 □
EPC PC Word (h): 3000 □
EPC (h): E200 4202 D630 6015 0093 DF83 □
User Data (h): 0000 0000 0000 0000 0000 0000 0000 0000 □

EPC Checksum: 6ADC

IP Address: 169.254.49.111 | Model Number: SP13350 | Build #: B.20.12.18.01 | S/N 000644

Figure 18:The Commission Tags tab in the Console

6.1 Commissioning Station Setup

In this section, you can set the power level, in dBm, for reading and writing tags. You can also choose from a drop-down menu whether you would like to use the reader's internal antenna or one of several external antennas to pick up tags.

6.2 Inventory

The inventory is a list of tags that were picked up by the antenna you have selected in Commissioning Station Setup. To get this list, select the desired antenna and press the "Inventory Tags" button

6.3 Commission Tag

This section shows you the identification number, in hexadecimal, that the tag uses to identify itself, and has several settings in the "Write Tag Data" box that allows you to add extra security measures to and modify the tag if the situation calls for it. You can set an access password that will then be required to be entered if that tag needs to be accessed, and a kill password that will make the tag be unreadable if entered in case of a situation where you would want the tag to no longer be readable and discarded. Both the kill and access passwords are all 0s by default. User Data at the bottom of the "Write Tag Data" box is a string of eight 4-digit hexadecimal words that the reader uses to pick up the tag the User Data is associated with. Changing this value will create a new tag that uses the new User Data you have created as its User Data. At the bottom is an EPC Checksum, a 4-digit hexadecimal number that the tag uses to check for errors on the receiving end.

7 ADVANCED

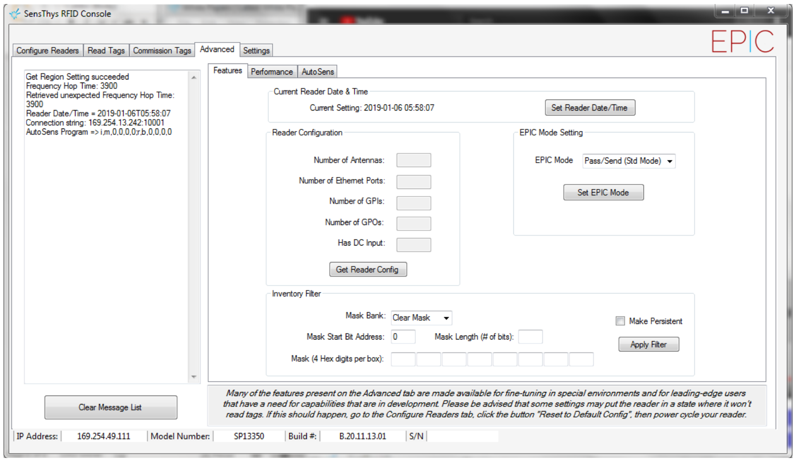
The Advanced tab includes more technical settings that allow for fine-tuning your reader for use in special environments such as environments with high temperatures or a high amount of noise.

7.1 Features

First is the Features tab.
The "Current Reader Date & Time" section lets you set the date and time on the reader to the current date and time by pressing the "Set Reader Date/Time" button. The date and time is random by default.

In "Reader Configuration", pressing the "Get Reader Config" button will give you the number of antennas, number of ethernet ports, and number of general purpose inputs and outputs of your reader. It will also point out if your unit allows for DC input or not.

In "Inventory Filter", you can set a mask, in sets of 4 hexadecimal digits, so that the reader only picks up tags that include the hexadecimal digits from the mask. The "Mask Start Bit Address" box lets you choose the starting point in your mask where the hexadecimal digits within the mask are used for comparison against tags received by your reader, and the "Mask Length (# of bits)" box lets you choose the length, in bits, of the mask that you want to use for filtering.
Lastly, the "EPIC Mode Setting" box lets you choose the style of error detection that you want to use by choosing the style you want from a drop-down menu and clicking the "Set EPIC Mode" button. The default value for this option is "Pass/Send (Std Mode)".



```
Get Region Setting succeeded
Frequency Hop Time: 3900
Retrieved unexpected Frequency Hop Time:
3900
Reader Date/Time = 2019-01-06T05:58:07
Connection string: 169.254.13.242:10001
AutoSens Program => i,m,0,0,0,0;r,b,0,0,0,0
```

Current Setting: 2019-01-06 05:58:07

EPIC Mode: Pass/Send (Std Mode)

Mask Bank: Clear Mask

Mask Start Bit Address: 0

Many of the features present on the Advanced tab are made available for fine-tuning in special environments and for leading-edge users that have a need for capabilities that are in development. Please be advised that some settings may put the reader in a state where it won't read tags. If this should happen, go to the Configure Readers tab, click the button "Reset to Default Config", then power cycle your reader.

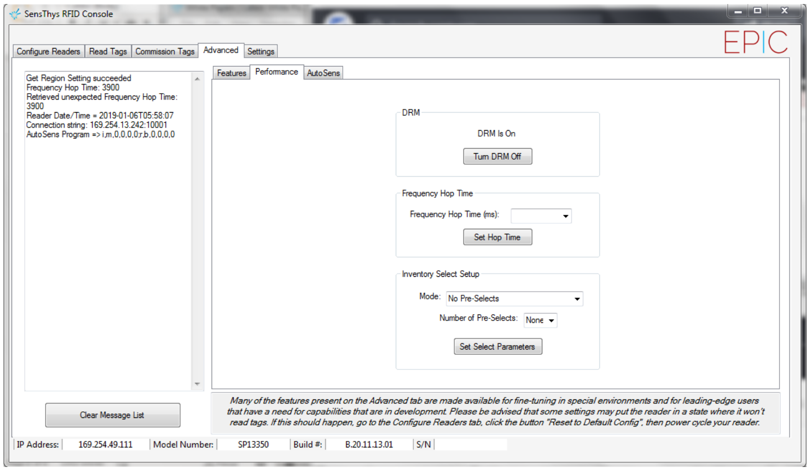
IP Address: 169.254.49.111 | Model Number: SP13350 | Build #: B.20.11.13.01 | S/N

Figure 19: The Features tab in the Console

7.2 Performance

Next is the Performance tab.
In "DRM", Dense Reader Mode can be toggled on or off by pressing the button below the text showing if DRM is on or not. Dense Reader Mode is a setting that minimizes interference from other readers in your network while tags are being read. If DRM is off, the reader is more sensitive to tags at the expense of being more susceptible to noise in the environment that can

affect tag reads. if DRM is on, the reader is less sensitive to noise in the environment at the expense of being less sensitive to tags. DRM is set to On by default.
Frequency Hop Time is the interval, in milliseconds, at which the console waits before switching frequencies. The desired hop time can be selected by a drop-down menu next to “Frequency Hop Time”, starting at 50 and going in increments of doubles up to a maximum of 400. The hop time is 400 by default.



```
Get Region Setting succeeded
Frequency Hop Time: 3900
Retrieved unexpected Frequency Hop Time:
3900
Reader Date/Time = 2019-01-06T05:58:07
Connection string: 169.254.13.242:10001
AutoSens Program => i,m,0,0,0,0;r,b,0,0,0,0
```

DRM Is On

Frequency Hop Time (ms):

Mode: No Pre-Selects

Number of Pre-Selects: None

Many of the features present on the Advanced tab are made available for fine-tuning in special environments and for leading-edge users that have a need for capabilities that are in development. Please be advised that some settings may put the reader in a state where it won't read tags. If this should happen, go to the Configure Readers tab, click the button "Reset to Default Config", then power cycle your reader.

IP Address: 169.254.49.111 | Model Number: SP13350 | Build #: B.20.11.13.01 | S/N

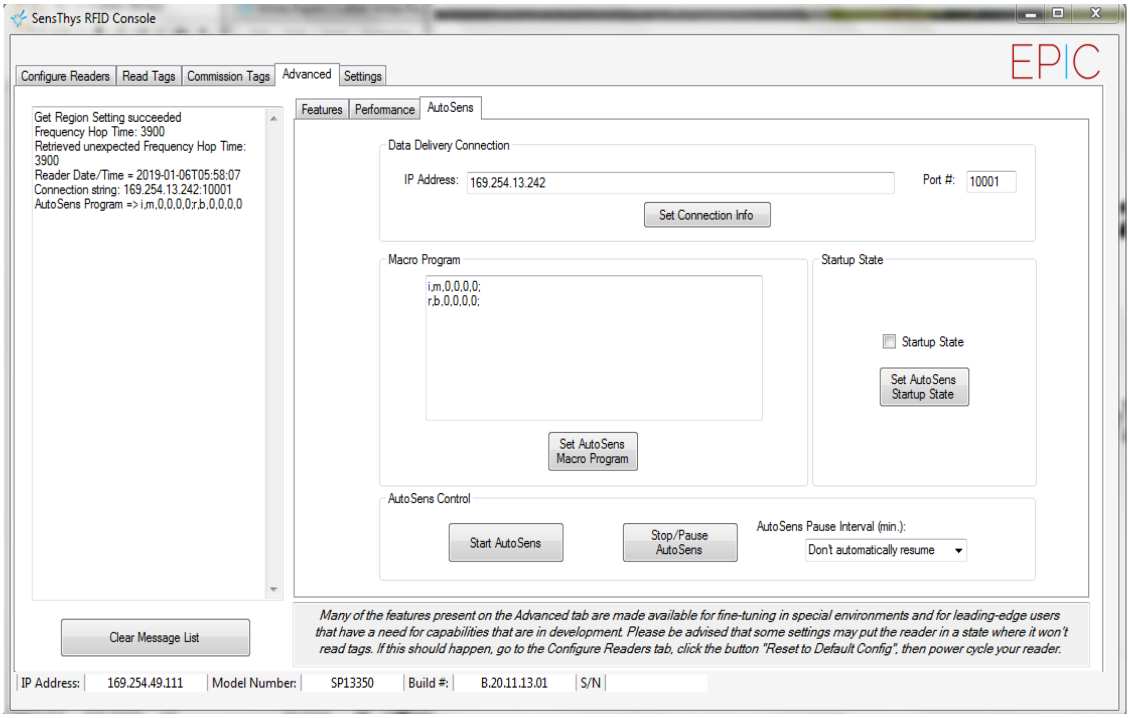
Figure 20: The Performance tab in the Console

7.3 AutoSens

Lastly is the AutoSens tab. AutoSens is a scripting language that is used to create programs that allow readers to run automatically without input from the user, and this tab lets you adjust settings related to AutoSens.

In “Data Delivery Connection”, you can set the IP address and port where you connect the reader to process data by entering the IP address you want into the “IP Address” box, entering the port you want into the “Port #” box, and pressing the “Set Connection Info” button. The default values are “169.254.13.242” for the IP address and “10001” for the port number.
In “Macro Program”, you can create a set of instructions that dictates how the reader acts when AutoSens is running. By default, the program contains the lines " i,m,0,0,0,0;” and “r,b,0,0,0,0;”. It should be noted that programs input into this box need to have commas between the letters and numbers for the reader to function properly. If a reader has been programmed with an AutoSens program different than what is shown in the Macro Program box, tags will not be seen by the console.

In “AutoSens Control”, pressing the “Start AutoSens” button will initiate AutoSens, while pressing the “Stop/Pause AutoSens” button will pause or stop AutoSens. There is a drop-down selection under “AutoSens Pause Interval (min.)”, which lets you select the interval, in minutes, between pauses of AutoSens.



```
Get Region Setting succeeded
Frequency Hop Time: 3900
Retrieved unexpected Frequency Hop Time:
3900
Reader Date/Time = 2019-01-06T05:58:07
Connection string: 169.254.13.242:10001
AutoSens Program => i,m,0,0,0,0;r,b,0,0,0,0
```

IP Address: 169.254.13.242

Port #: 10001

```
i,m,0,0,0,0;
r,b,0,0,0,0;
```

□ Startup State

AutoSens Pause Interval (min.): Don't automatically resume

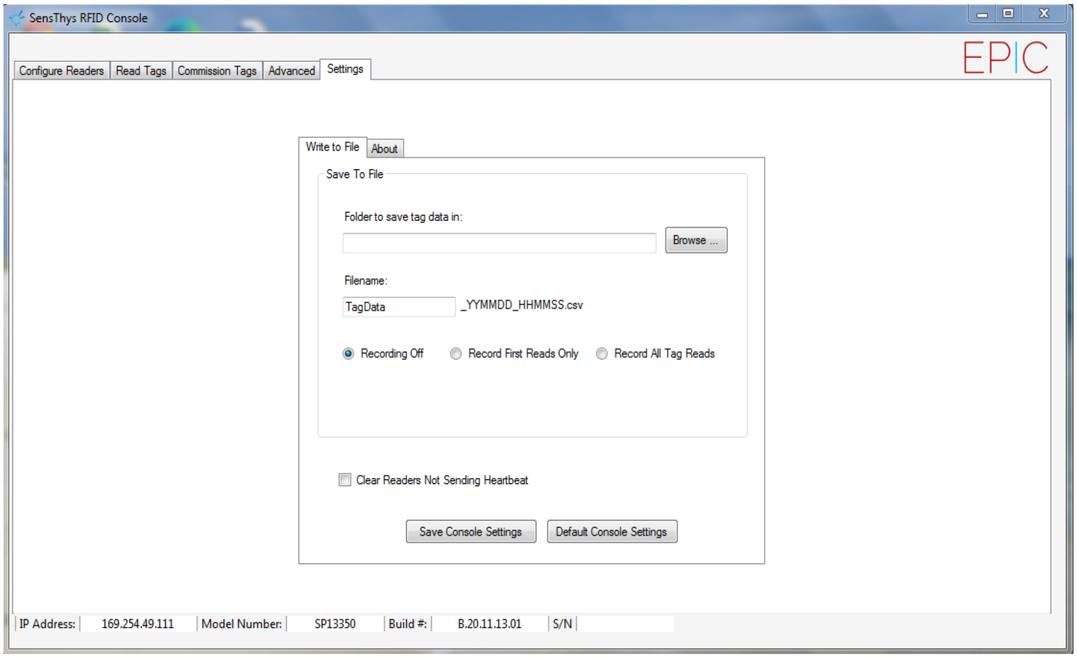
Many of the features present on the Advanced tab are made available for fine-tuning in special environments and for leading-edge users that have a need for capabilities that are in development. Please be advised that some settings may put the reader in a state where it won't read tags. If this should happen, go to the Configure Readers tab, click the button "Reset to Default Config", then power cycle your reader.

IP Address: 169.254.49.111 | Model Number: SP13350 | Build #: B.20.11.13.01 | S/N

Figure 21: The AutoSens tab in the Console

8 SETTINGS

The Settings tab lets you choose where data is saved after tags are read. You can choose to not record any reads by checking the “Recording Off” bullet, record only the first round of tag reads by selecting the “Record First Reads Only” bullet, or record all the tag reads obtained by selecting the “Record All Tag Reads” bullet. The file is saved in the “.csv” format.
Checking the “Clear Readers Not Sending Heartbeat” button clears readers from the recording file that are not sending a heartbeat to the console.
Clicking the “Save Console Settings” button saves the previously mentioned settings.



Folder to save tag data in:

Filename: TagData _YYMMDD_HHMMSS.csv

● Recording Off ○ Record First Reads Only ○ Record All Tag Reads

□ Clear Readers Not Sending Heartbeat

IP Address: 169.254.49.111 | Model Number: SP13350 | Build #: B.20.11.13.01 | S/N

Figure 22: The Settings tab in the Console

9 INSTALL TROUBLESHOOTING GUIDE

This document is designed for use by RFID system integrators, IT professionals, and software developers experienced with IoT devices and enterprise networking infrastructure. We've all had the experience of turning on something new, for the very first time, and having it fail. In large IoT installations, this can lead to enormous stress. Making this worse is the fact thatthere are lots of different players involved – the facilities manager, the IT group, the componentsuppliers, and the integration team that is responsible.
The intent of this document is to aid the process of getting an RFID system employing SensThysreaders up and running in the real world.

9.1 The Goals

- The reader operating as intended in the end-customer infrastructure.
- A structure for figuring out issues in getting the reader operational.

9.2 Homework

For the reader, or any IoT device, to be considered to be functional in the field, several conditionshave to be met.

1. Power. Does the device turn on?
2. Basic function. Does the device do what it is supposed to?
3. Data delivery. Does the device output its data like it is supposed to?
4. Data receipt. Does the data get to the right place?

The homework here is to have a portable system, comprised of a laptop, a power supply for thereader as illustrated in Figure 1. We'll call that the TEST KIT.

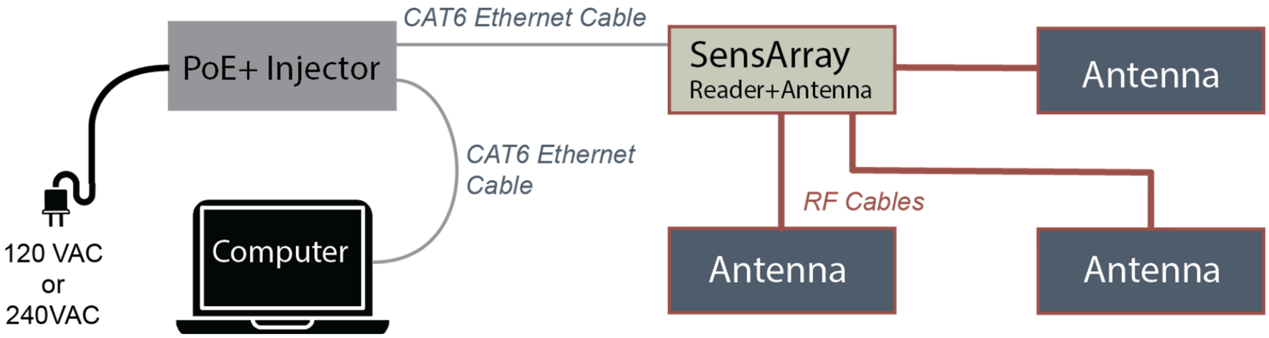
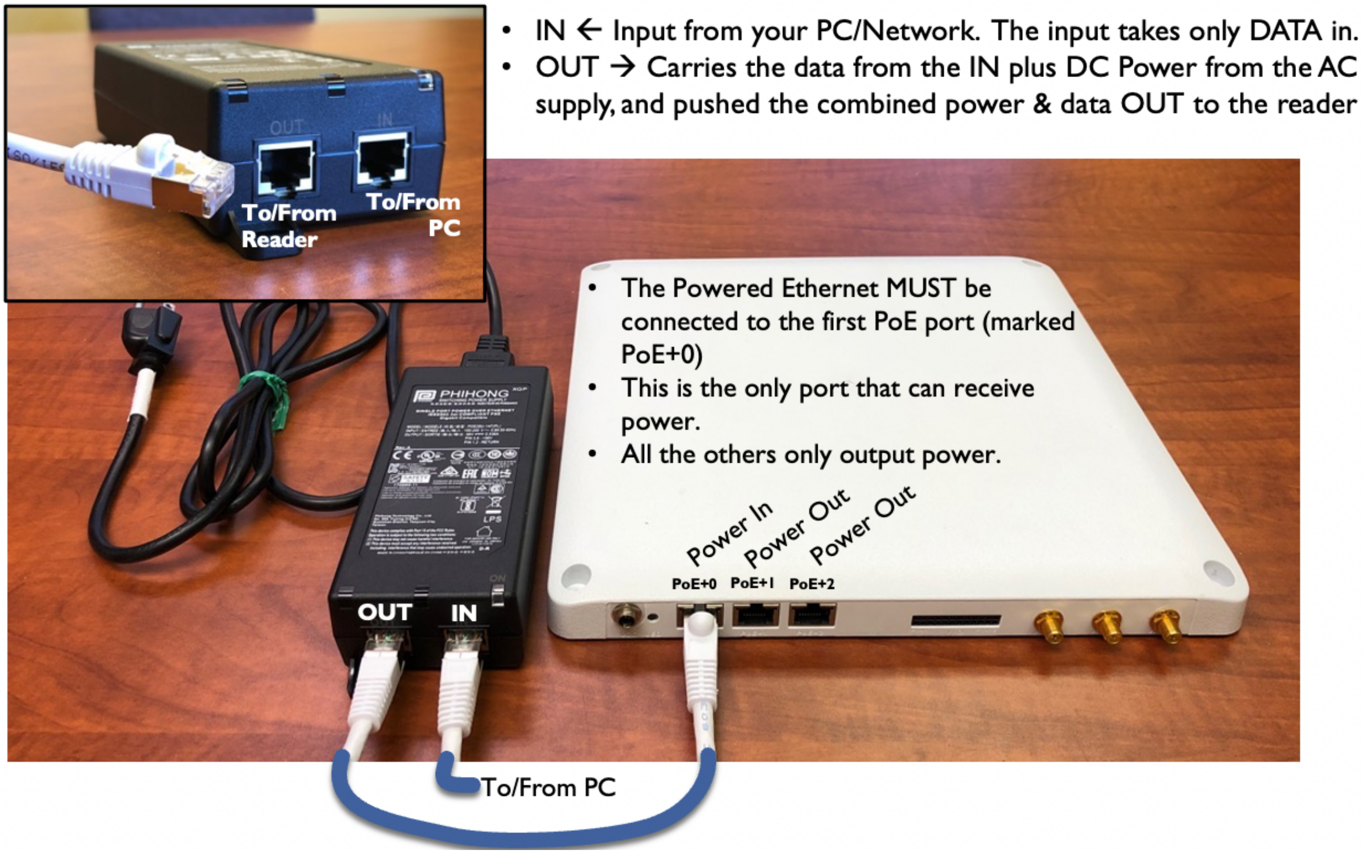


Figure 23 - The basic TEST KIT, comprised of a laptop, reader, PoE injector, cabling and antennas

Several User Guide videos are posted on the SensThys website to assist in using the SensThys Console and related hardware and can be found here: https://www.sensthys.com/videos/user-guide/.



- IN ← Input from your PC/Network. The input takes only DATA in.
- OUT → Carries the data from the IN plus DC Power from the AC supply, and pushed the combined power & data OUT to the reader

- The Powered Ethernet MUST be connected to the first PoE port (marked PoE+0)
- This is the only port that can receive power.
- All the others only output power.

Many of our customers use different systems to run the reader. These systems include building their own from scratch using our SDK/API, while others include MQTT, LLRP, RESTful API, AutoSens, etc. It is important to be able to test the operation of the reader, on premise, while running in the environment intended for deployment.

Thus, the laptop should be able to communicate/control the reader using software/firmware to be used in deployment. As an example, if the reader is to be controlled via LLRP, then the basic operation of the reader should be controllable by the laptop using an LLRP-based application, with the data sent to the laptop using LLRP formatted messages. Be capable of operating the TEST KIT in the software environment to be used in deployment.

9.3 Step by Step

What we propose next is very structured, to the point that most integrators will read this section and roll their eyes. While we recognize that this isn't how many, if any, readers will actually be installed, please trust us that you can use the thinking behind these steps to rapidly diagnose certain problems. Once you are on site….

1. Set up a full TEST KIT, regardless of your planned final hardware configuration. This includes using the SensThys provided Class 4 or Class 8 PoE injector. Demonstrate basicoperation of the reader by reading some tags.
2. Run the TEST KIT with your software environment (LLRP, RESTful API, etc).
3. Mount the antennas and readers. Verify operation.
4. For Pro or Enterprise, remove the injector. Run the PoE power (as will be used in the actual use case, regardless of whether this is an injector or a homerun from an IT closet) to Port 1, run the computer Ethernet line to Port 2. This will verify PoE handshaking andpower to the reader in its deployed configuration. If the reader turns on, operate the reader with the laptop.
5. Remove the connection to the laptop. Operate the device as intended in full deployment.
6. Verify data delivered to endpoint.

9.4 Test Implications

If the reader fails in step 1, please check power, connections, etc. If the reader appears to be working – the green LED is flashing and the link lights on the Ethernet port are lit – but you are not seeing the reader heartbeat in the SensThys console, you will probably need to change the firewall settings on the laptop. Otherwise, if nothing is found, test another reader. If the second reader works, this implies the first reader has failed → Contact SensThys.

If a failure occurs in step 2, it is time to get into the details of the configuration and settings needed to utilize the communication protocol that your application uses to communicate with the reader.

If a failure occurs in step 3, please check all connections. **Verify that the injector is grounded**. Verify that the injector has **shielded RJ45 connectors**. Verify the CAT6 to the reader is shielded with a drain, and has shielded connectors. NOTE: In this step the primary issue may be that the "ground" of the reader is now tied to some local ground.

If a failure occurs in step 4, there is an issue with the PoE infrastructure. Verify that the injector is grounded. Verify that the injector has shielded RJ45 connectors. Verify the CAT6 to the reader is shielded with a drain and has shielded connectors. NOTE: In this step the primary issue may be that the "ground" of the reader is now tied to some local ground that differs from the ground at the other end of the Ethernet cable. To verify if grounding issues are present, disconnect the antennas from the reader and remove the reader from its mount so that it is electrically floating. NOTE: We don't recommend floating devices for long term operation, this simply diagnoses a grounding problem needing to be fixed.

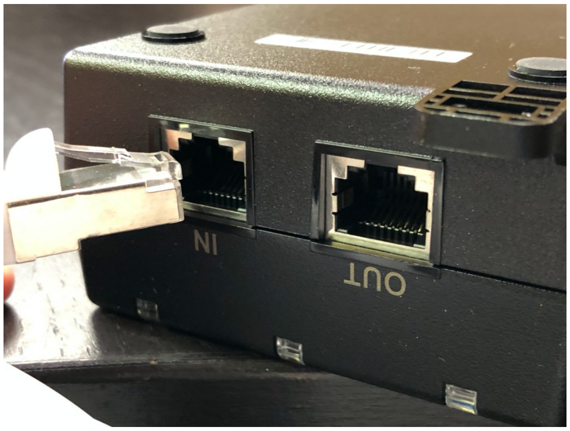


Figure 24 - PoE Injector with metal shield socket and Ethernet cable with metal shield surround (see Step 3)

If a failure occurs in either step 5 or step 6, there are issues with data transport through the network infrastructure. The resolution of these problems is often difficult, as security protocols and network hardware behaviors are often not understood or easy to figure out. However, recognize that steps 1 and 2 were designed to verify that the reader is fully functional and delivers the expected data stream in a simple network environment. Steps 3 and 4 verify that the power source from the installation works and that the equipment works as mounted at the location.

What remains is networking. The troubleshooting needs to focus on what is blocking the reader message traffic. This will include looking at how the network hardware firewall rules as well as looking at alternative communication port assignments that might be allowed for communication on the network…see next section.

10 COMMON NETWORKING ISSUES

It is not unusual, particularly in a corporate IT environment, that certain network configurations can be the cause of many common issues seen by SensThys support staff. The most common of these:

- The reader is not detected by the RFID console software (reader missing from the top left window), or
- The reader appears in the console but when you click on it to connect to it, the reader details don't display in the console and the notification window below the reader list shows a message that the console can't connect.
- The reader briefly reads but then "locks up" or the Stop button seems to fail to work or take an inordinate amount of time to cease reader operation.

There are several reasons that any of these might occur:

1. The reader's IP address has been set (either statically or dynamically) to an IP address in a different subnet to that of the computer the RFID Console is running on.
2. The computer's built-in firewall is blocking the ability of the RFID Console to listen for the reader's heartbeat messages.
3. Networking equipment sitting between the reader and the computer has a firewall that is blocking the reader's heartbeat messages.
4. The network architecture or host computer is not capable of transmitting the streaming data coming out of the reader

10.1 Reader Not Visible or No Connection

If you reader is not showing up in the RFID Console, or it is showing up but can't be operated, it can be due to one of two problems:

1. The computer's built-in firewall is blocking the ability of the RFID Console to listen for the reader's heartbeat messages. See section 10.1.1 below.
2. The reader's IP address has been set (either statically or dynamically) to an IP address in a subnet that is not on the same subnet as the computer where the RFID Console is being run. See section 10.1.2 below.

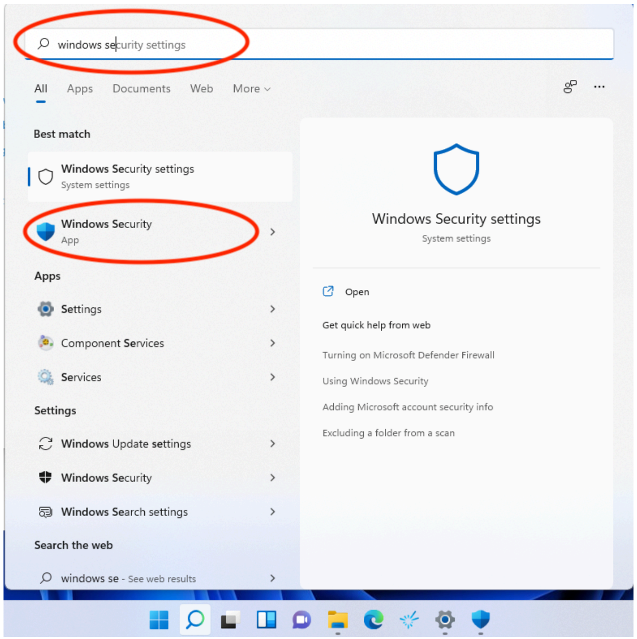
10.1.1 Firewall Settings

The first step in clearing this problem up is to check, and potentially change, the firewall settings for your computer.

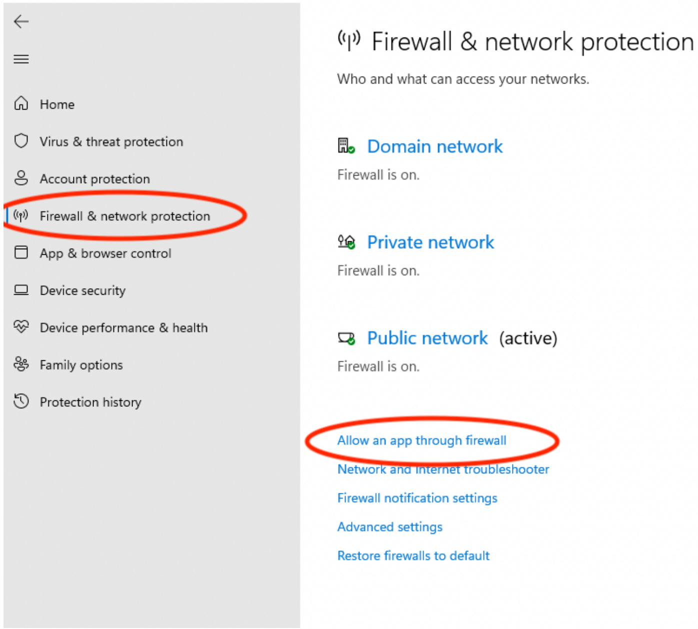
In Chapter 2 there is a step to disable the firewall acting on the RFID Console. You can check to see if this step was missed or the firewall configuration has been changed or miss-configured by following the steps in this section. You can also re-enable network access through the firewall to the RFID Console. To do this follow these steps.

The RFID Console app requires that the Firewall on the PC be configured for "Public Networks" for the console app to identify and communicate with all SensThys readers that are operating in the same subnet.

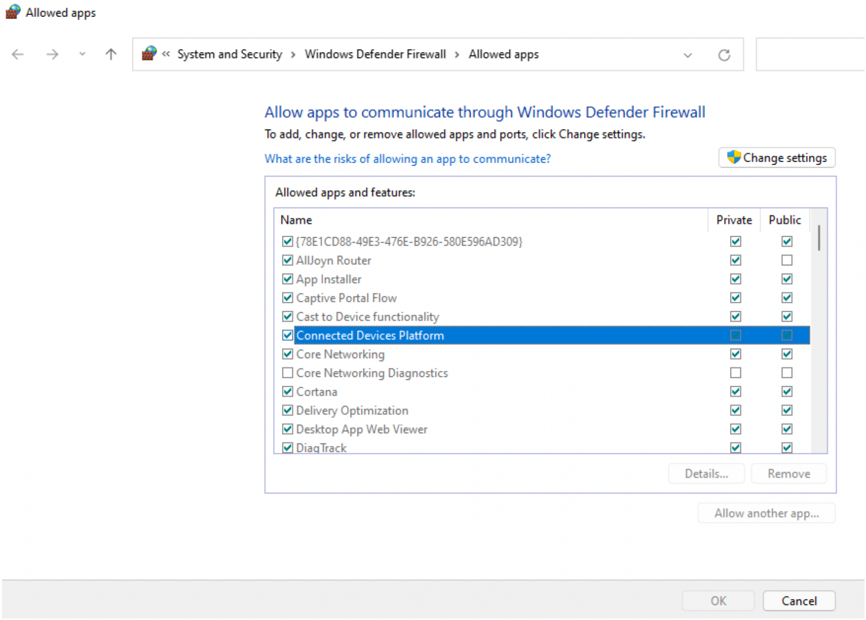
a) The firewall configuration is performed through the Windows Security settings. In Windows 10 11, type “Windows Security” into the search bar:



b) Open Windows Security, select “Firewall & network protection” (on the left) and then “Allow an app through firewall” on the lower right.


Home
Virus & threat protection
Account protection
Firewall & network protection
App & browser control
Device security
Device performance & health
Family options
Protection history
Firewall & network protection
Who and what can access your networks.
Domain network
Firewall is on.
Private network
Firewall is on.
Public network (active)
Firewall is on.
Allow an app through firewall
Network and Internet troubleshooter
Firewall notification settings
Advanced settings
Restore firewalls to default

c) You will see a dialog shown below.



Allowed apps

« System and Security › Windows Defender Firewall › Allowed apps

Allow apps to communicate through Windows Defender Firewall

To add, change, or remove allowed apps and ports, click Change settings.

What are the risks of allowing an app to communicate?

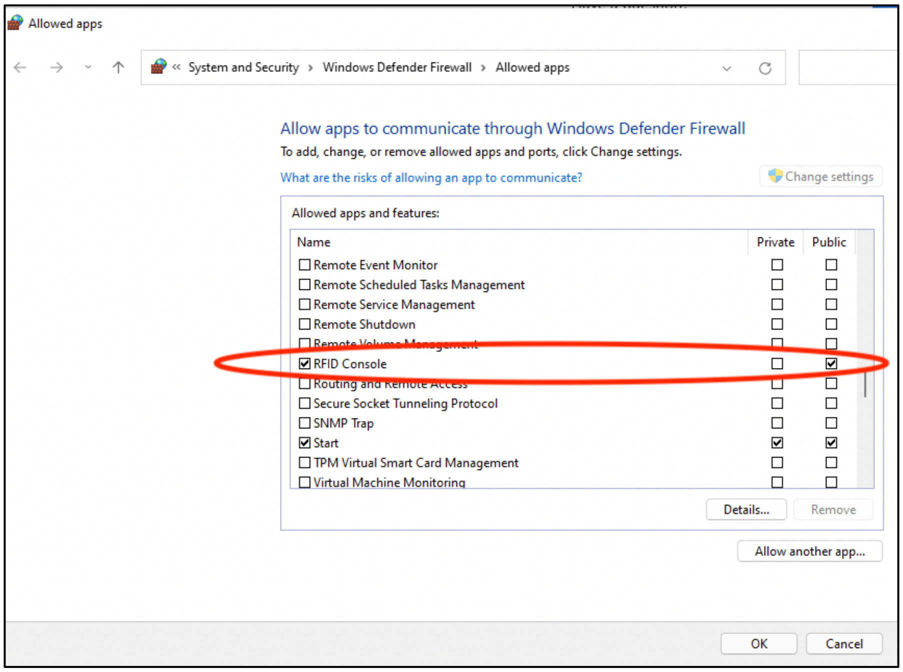
Allowed apps and features:

Name	Private	Public
☑ {78E1CD88-49E3-476E-B926-580E596AD309}	☑	☑
☑ AllJoyn Router	☑	☐
☑ App Installer	☑	☑
☑ Captive Portal Flow	☑	☑
☑ Cast to Device functionality	☑	☑
☑ Connected Devices Platform	☐	☐
☑ Core Networking	☑	☑
☐ Core Networking Diagnostics	☐	☐
☑ Cortana	☑	☑
☑ Delivery Optimization	☑	☑
☑ Desktop App Web Viewer	☑	☑
☑ DiagTrack	☑	☑

d) Scroll down to the **RFID Console** App.

Select “Change Settings”. Select “Public” box for RFID Console. Save changes with “Ok”.

The dialog should look similar to this:



Allowed apps

« System and Security › Windows Defender Firewall › Allowed apps

Allow apps to communicate through Windows Defender Firewall

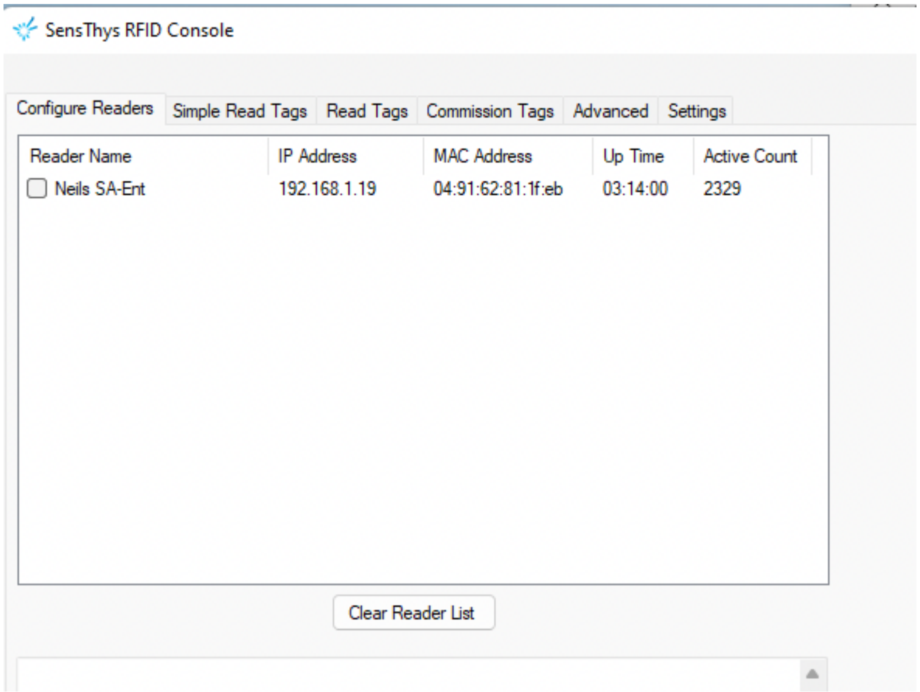
To add, change, or remove allowed apps and ports, click Change settings.

What are the risks of allowing an app to communicate?

Allowed apps and features:

Name	Private	Public
☐ Remote Event Monitor	☐	☐
☐ Remote Scheduled Tasks Management	☐	☐
☐ Remote Service Management	☐	☐
☐ Remote Shutdown	☐	☐
☐ Remote Volume Management	☐	☐
☑ RFID Console	☐	☑
☐ Routing and Remote Access	☐	☐
☐ Secure Socket Tunneling Protocol	☐	☐
☐ SNMP Trap	☐	☐
☑ Start	☑	☑
☐ TPM Virtual Smart Card Management	☐	☐
☐ Virtual Machine Monitoring	☐	☐

The RFID Console should now populate with all readers that are in the same subnet.



Reader Name	IP Address	MAC Address	Up Time	Active Count
□ Neils SA-Ent	192.168.1.19	04:91:62:81:1f:eb	03:14:00	2329

10.1.2 Subnet Mismatch

If, after changing your firewall settings per section 10.1.1, you still don't see the reader show up in the RFID Console, it is likely that your computer and the reader are on different subnets. The reader sends discovery messages that allow the RFID Console to show readers in its reader list. These messages are, by default, UDP broadcast messages sent every 30 seconds.

There are two common cases where this can happen.

The first is when the reader is unable to reach a DHCP server to be assigned a dynamic IP address. This could be due to there not being a DHCP server on the network or the reader is plugged directly into the computer with the computer's Ethernet port. In either case, it is quite likely that the Ethernet port on the computer has been configured to use a static IP address.

When the reader can't contact a DHCP server, it uses "Zero Config" mode to obtain a unique, local IP address. The following section describes the Zero Config process and the steps you should take to establish a connection under these conditions. This problem is addressed in section 10.1.2.1 below.

The second case occurs when the reader and the computer are on different network subnets as might occur in a large corporate network. Because the reader's heartbeat is a UDP **broadcast** by default, these heartbeat messages will be blocked by the networking equipment since this type of broadcast message is not allowed to cross subnet boundaries. For completeness, the UDP broadcast messages do cross subnet boundaries if not blocked, but much of current networking equipment will stop broadcast messages from crossing boundaries.

10.1.2.1 How does Zero Config work? How can I recover from this?

1. The reader first tries to find a DHCP server and get its IP address that way.
2. If the fails to contact a DHCP server then it goes into "Zero Config" mode (See https://en.wikipedia.org/wiki/Zero-configuration_networking) and https://en.wikipedia.org/wiki/Link-local_address
3. The reader will negotiate with other *devices* on the network to assign itself an address with the 169.254.*.* subnet.
    1. The zero-config process negotiates a unique IP address.
    2. The reader's heartbeat will then seen by the other devices on the same 169.254.*.* subnet (including the computer running the RFID Console).
    3. At this point the reader will appear in the RFID Console window and can be selected to view and change its configuration, including its network configuration.
4. If the reader isn't visible (e.g., on a computer directly connected to it), it will be because the reader has gone through zero-config and has obtained a 169.254.*.* IP address, but that the computer has a statically assigned IP address that is not on that same subnet. The following steps should be used to diagnose and fix this problem.
    1. You will need to set your **computer** to a static IP address in the 169.254.*.* range. The last 2 numbers of this IP address can be any values between 0 and 254 as long as they don't match those of the reader (and any other zero-config addresses that might have been assigned to other devices on that network.
    2. Once on the same subnet (169.254.*.*) then the reader's heartbeat will be seen by the console and the reader will appear in the console window.
    3. Once you see the reader you can click on it, change the reader network settings to a different static IP address on a subnet of your choice. This would probably be a static IP address on the same subnet as your computer started on.
    4. Note that when you change the reader's IP address to a new value, if it is on a different subnet, the reader heartbeat count will not update, and you will no longer be able to connect to it with the RFID Console until you change your computer back to its original settings. Once you reset your **computer** back to its original network setup you will be able to see the reader in the RFID Console.
    5. To verify these changes, either close the RFID Console and reopen it or hit the "Clear Reader List" button below the reader list. Then wait for the reader to appear in the reader list and click on it to confirm that you are able to connect to it.

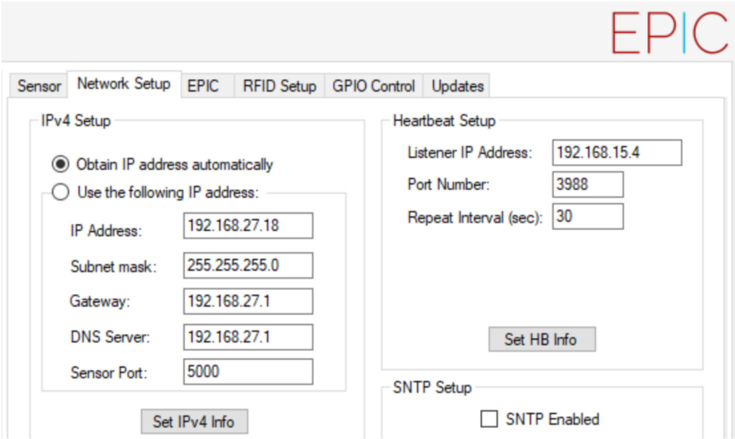
The details of each of these steps is beyond the scope of this document and will require some knowledge of basic computer network configuration.

10.1.2.2 What Happens When Computer and Reader Are on Different Subnets?

In a segmented network, it is possible to put the reader on a network segment (subnet) that is not the same as the one the computer is on. This is technically a more difficult problem to resolve, but you can take the following steps to resolve it.

1. Determine the IP address of the computer as it will be configured on the subnet (subnet-A) where it will reside at the end of the setup process.

2. Either move the computer to the subnet where the reader is installed (subnet-B) or move the reader to subnet-A. This is so that the reader can be seen in the RFID Console.
3. Select the reader in the RFID Console and change the Listener IP Address to the IP Address determined in step 1 above. (Be sure to hit "Set HB Info" and to save the configuration.) Note that when you make this change, the heartbeat's Up Time and Active Count will stop progressing.



IPv4 Setup

● Obtain IP address automatically
○ Use the following IP address:

IP Address: 192.168.27.18
Subnet mask: 255.255.255.0
Gateway: 192.168.27.1
DNS Server: 192.168.27.1
Sensor Port: 5000

Heartbeat Setup

Listener IP Address: 192.168.15.4
Port Number: 3988
Repeat Interval (sec): 30

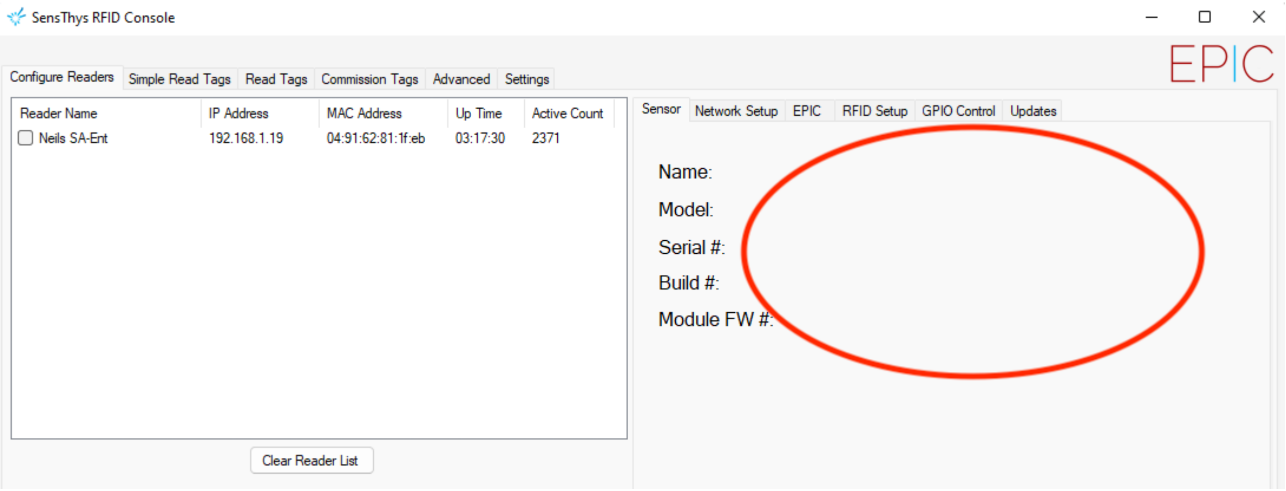
SNTP Setup

□ SNTP Enabled

4. Move the reader or the computer back to its original network connection.
5. Clear the reader list in the RFID Console and verify that you now see the reader listed. Because the default heartbeat is 30 seconds, you may need to allow about that much time before the heartbeat will show up.
6. Click on the reader to confirm that you can connect to it.

10.2 Reader Detected but Won't Connect

In this case the reader heartbeat is seen by the console and is populated on the left-hand side. However, when you select the reader, it fails to connect or some or all of the information on the right fails to populate.



Reader Name	IP Address	MAC Address	Up Time	Active Count
□ Neils SA-Ent	192.168.1.19	04:91:62:81:1f:eb	03:17:30	2371

Name:
Model:
Serial #:
Build #:
Module FW #:

There may be different settings that might result in this problem. The two most likely are:

1. The computer's firewall is blocking outgoing communications from the RFID Console to the reader. To diagnose and correct this issue, follow the steps is section 10.1.1 above.
2. The reader and the computer are on different subnets, but the networking equipment is allowing UDP broadcast messages to move between subnets. This can be determined by simply looking into the IP address of the computer and the reader. In this case, the IP address of the computer and the reader must be changed to put the units on the same subnet. We recommend you read section 10.1 and follow the procedures documented there
3. The IP address of the reader has been changed and there is a mismatch between the one the RFID Console has and the reader's currently configured IP address. If this is the case, close and reopen the RFID Console, wait for the reader to appear, and try again to connect. If this still fails, we recommend you read section 10.1 and follow the procedures documented there.

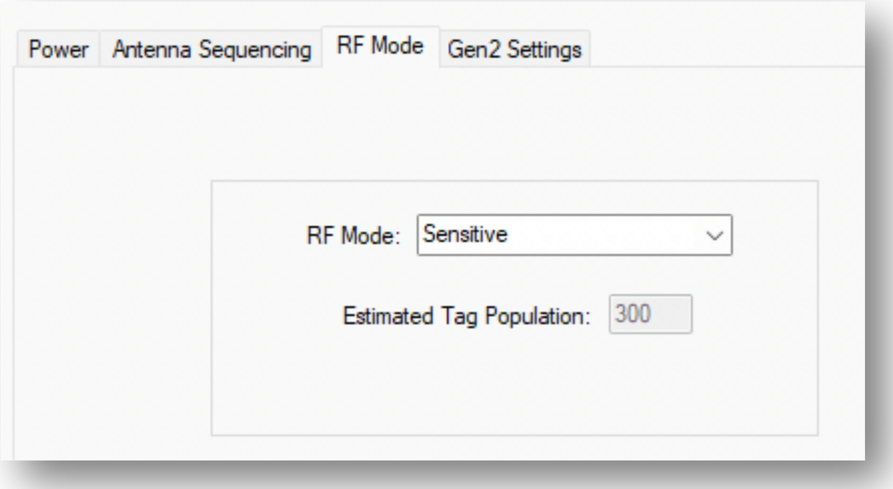
10.3 Reader or RFID Console "Locks" in Operation

If the reader briefly reads but then "locks up" or the Stop button seems to fail to work or take an inordinate amount of time to cease reader operation, this section will help you.

In this situation, the reader appears in the Console and is selectable and configurable in the console. However, in operation, the reader only operates for a short amount of time, and then locks up. The most common cause of this that we have observed is that the data flowing out of the reader faster than the receiving PC or network can absorb the data. This results in the data buffers in the reader or the Ethernet equipment of the computer clogging up and stalling the read process.

In this section we describe a series of steps that can minimize data flow from the reader into the Console – in many situations this allows stable operation.

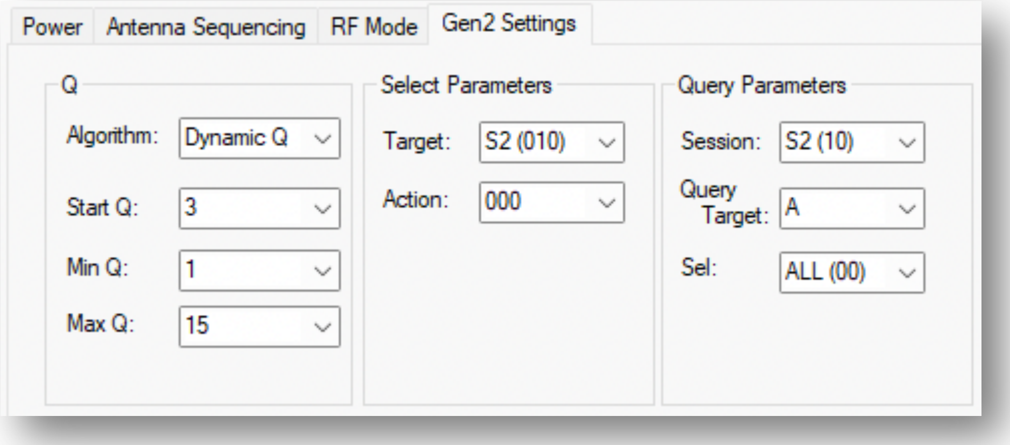
Step 1. Set the RF mode to Sensitive



RF Mode: Sensitive

Estimated Tag Population: 300

Step 2. Set the Select and Query Parameters to S2/S2/A



Q

Algorithm: Dynamic Q

Start Q: 3

Min Q: 1

Max Q: 15

Select Parameters

Target: S2 (010)

Action: 000

Query Parameters

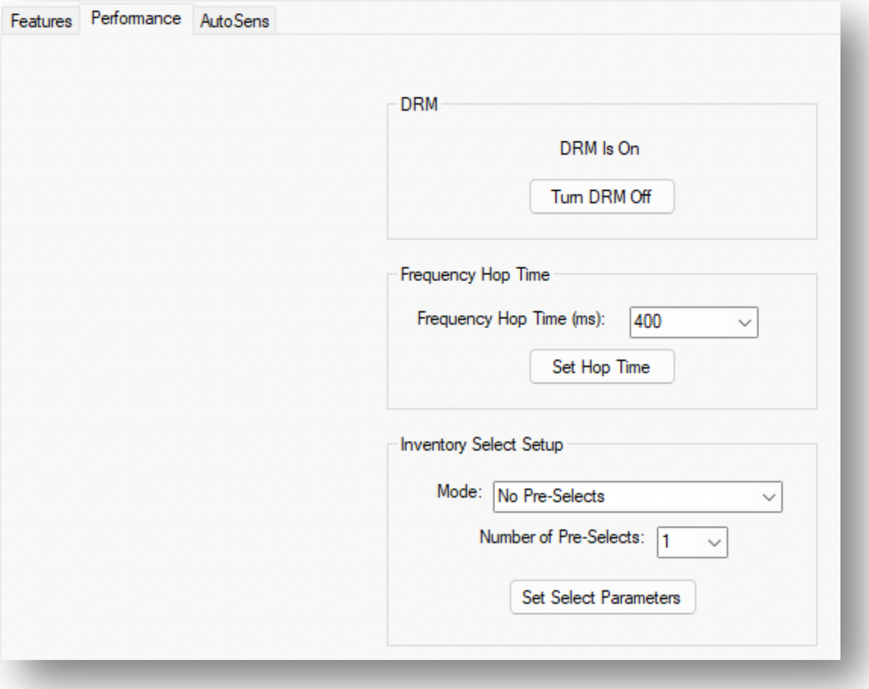
Session: S2 (10)

Query Target: A

Sel: ALL (00)

Step 3. Adjust the Inventory Select Setup

First, click on the Advanced tab, from there, select Performance. For Inventory Select Setup, choose Mode: No Pre-Selects.



DRM

DRM Is On

Frequency Hop Time

Frequency Hop Time (ms): 400

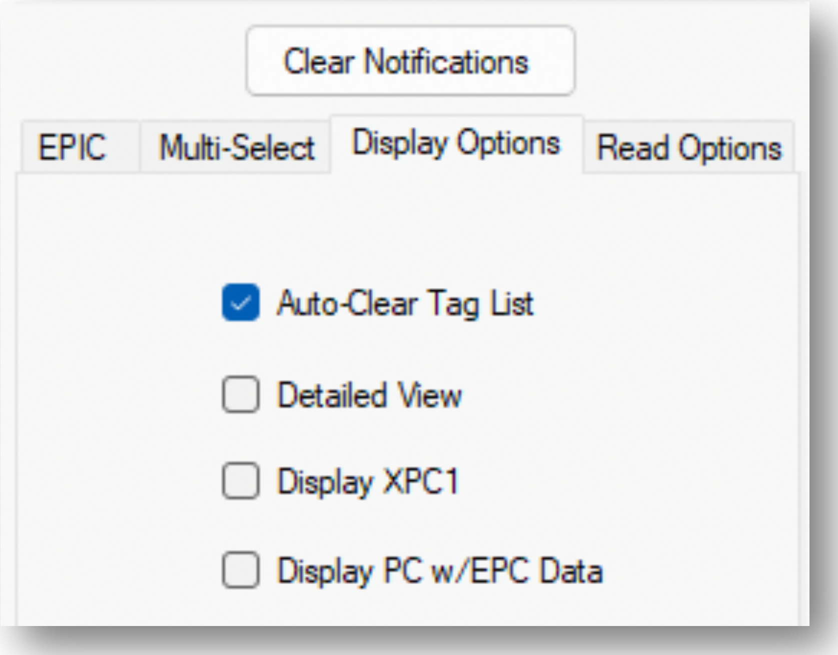
Inventory Select Setup

Mode: No Pre-Selects

Number of Pre-Selects: 1

Step 4. Simplify data stream

Proceed to the Read Tags tab and go to the bottom right-hand corner. Select Display Options – select Auto-Clear Tag List, and deselect Detailed View, Display XPC1 and Display PC w/EPC Data.



☑ Auto-Clear Tag List

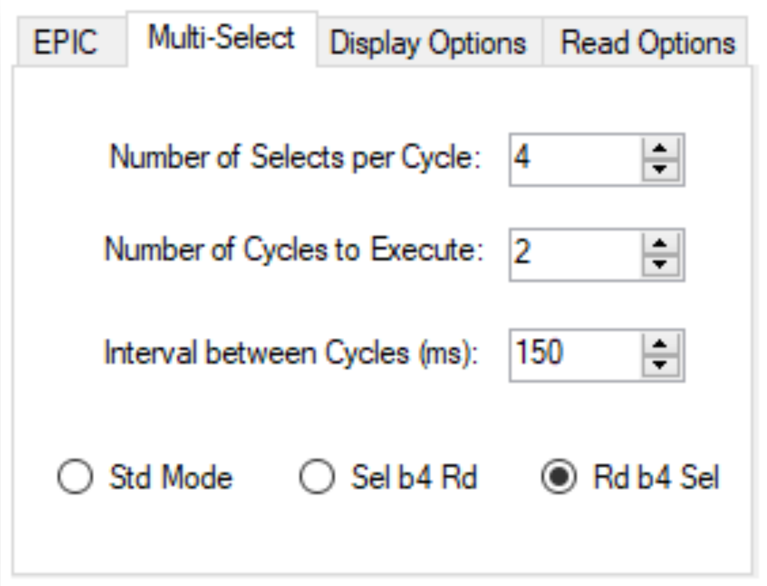
□ Detailed View

□ Display XPC1

□ Display PC w/EPC Data

Step 5. Set the select sequence.

On the Read Tags page, bottom right, select Multi-Select. Use the standard 4/2/150 settings for number of selects, number of cycles, and interval between cycles. Select Rd b4 Sel.



Number of Selects per Cycle: 4

Number of Cycles to Execute: 2

Interval between Cycles (ms): 150

○ Std Mode ○ Sel b4 Rd ● Rd b4 Sel

This combination of settings will allow you to see all the tags that are visible to the reader, in Sensitive mode, but will generally only read each tag once, thus minimizing the tag read traffic and providing quite stable Console operation.

As a concluding thought, the general use of the Console is to configure readers. Because of this mission, the reader, operating within the Console is providing a very complete and robust stream of data – much more than is ever expected in normal operation. In normal operation, these readers have a long track record of exceptional stability and reliability.

10.4 Uncommon Network Issues

As we see more unusual issues we will add more to this section. These are some additional things to watch out for:

- Readers or other network devices with the same IP address. This can manifest itself with strange tag read reporting or tag reporting at unexpected time. It can also result in transmissions from the reader never making it to the console.
    - To identify this, look for the reported MAC address changing in ProSens.
    - Wireshark can also be used to intercept messages and identify MAC vs IP addresses being reported in the messages.