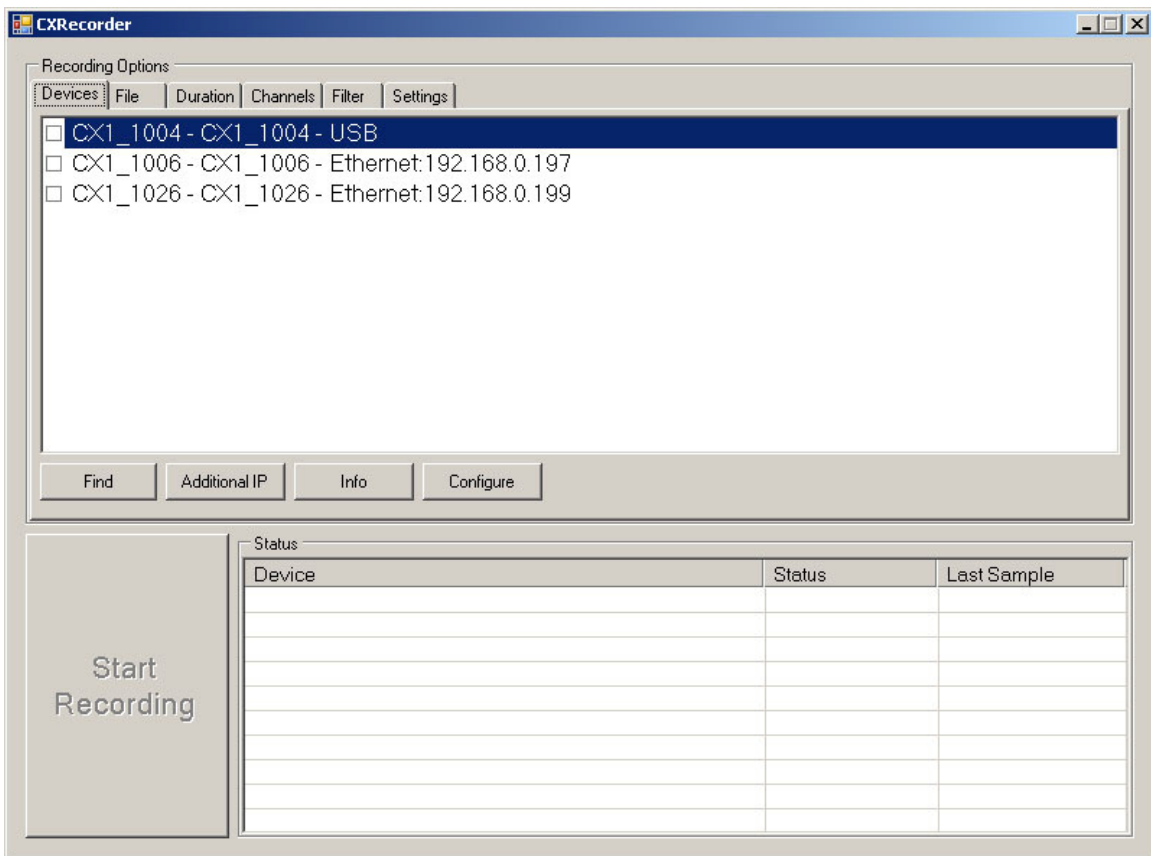




# CXRecorder User Guide



**Version 1.0**  
February 8, 2010

# CXRecorder User Guide

---

## Table of Contents

<b>1</b>	<b>PREAMBLE .....</b>	<b>3</b>
1.1	Software License Agreement.....	3
<b>2</b>	<b>INSTALLING CXRECORDER.....</b>	<b>4</b>
2.1	Installing the Software .....	4
<b>3</b>	<b>CXRECORDER.....</b>	<b>5</b>
3.1	CXRecorder Description .....	5
3.2	CXRecorder Device Tab.....	5
3.2.1	Selecting a device .....	5
3.2.2	Find a Device.....	6
3.2.3	Specify specific IP addresses.....	6
3.2.4	Review device information.....	6
3.2.5	Configure device communications .....	6
3.2.6	Start Recording .....	6
3.3	CXRecorder File Tab.....	6
3.4	CXRecorder Duration tab .....	7
3.5	CXRecorder Channels tab.....	8
3.6	CXRecorder Filter tab.....	9
3.7	CXRecorder Settings tab .....	10
<b>4</b>	<b>TECHNICAL SUPPORT .....</b>	<b>10</b>
4.1	Technical Support.....	10

# CXRecorder User Guide

---

## 1 Preamble

### 1.1 Software License Agreement

PLEASE READ THIS SOFTWARE LICENSE AGREEMENT CAREFULLY BEFORE USING THE SOFTWARE.

**License Grant:** SENSR LLC. ("SENSR") and its suppliers grant to Customer ("Customer") a nonexclusive and nontransferable license to use the CXRecorder software ("Software") in object code form only on as many central processing units as is required to support the functionality of the products used in conjunction with this software.

EXCEPT AS EXPRESSLY AUTHORIZED ABOVE, CUSTOMER SHALL NOT: COPY, IN WHOLE OR IN PART, SOFTWARE OR DOCUMENTATION; MODIFY THE SOFTWARE; REVERSE COMPILE OR REVERSE ASSEMBLE ALL OR ANY PORTION OF THE SOFTWARE; OR RENT, LEASE, DISTRIBUTE, SELL, OR CREATE DERIVATIVE WORKS OF THE SOFTWARE.

Customer agrees that aspects of the licensed materials, including the specific design and structure of individual programs, constitute trade secrets and/or copyrighted material of SENSR. Customer agrees not to disclose, provide, or otherwise make available such trade secrets or copyrighted material in any form to any third party without the prior written consent of SENSR. Customer agrees to implement reasonable security measures to protect such trade secrets and copyrighted material. Title to Software and documentation shall remain solely with SENSR.

SOFTWARE WARRANTY. SENSR warrants that for a period of ninety (90) days from the date of shipment from SENSR: (i) the media on which the Software is furnished will be free of defects in materials and workmanship under normal use; and (ii) the Software substantially conforms to its published specifications. Except for the foregoing, the Software is provided AS IS. This limited warranty extends only to Customer as the original licensee. Customer's exclusive remedy and the entire liability of SENSR under this limited warranty will be, at SENSR's option, repair, replacement, or refund of the Software. In no event does SENSR warrant that the Software is error free or that Customer will be able to operate the Software without problems or interruptions. This warranty does not apply if the software (a) has been altered, except by SENSR, (b) has not been installed, operated, repaired, or maintained in accordance with instructions supplied by SENSR.

DISCLAIMER. EXCEPT AS SPECIFIED IN THIS WARRANTY, ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS, AND WARRANTIES INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE, ARE HEREBY EXCLUDED TO THE EXTENT ALLOWED BY APPLICABLE LAW. IN NO EVENT WILL SENSR BE LIABLE FOR ANY LOST REVENUE, PROFIT, OR DATA, OR FOR SPECIAL, INDIRECT, CONSEQUENTIAL, INCIDENTAL, OR PUNITIVE DAMAGES HOWEVER CAUSED AND REGARDLESS OF THE THEORY OF LIABILITY ARISING OUT OF THE USE OF OR INABILITY TO USE THE SOFTWARE EVEN IF SENSR HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. In no event shall SENSR's liability to Customer, whether in contract, tort (including negligence), or otherwise, exceed the price paid by Customer. The foregoing limitations shall

# CXRecorder User Guide

---

apply even if the above-stated warranty fails of its essential purpose. SOME STATES DO NOT ALLOW LIMITATION OR EXCLUSION OF LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES.

The above warranty DOES NOT apply to any beta software, any software made available for testing or demonstration purposes, any temporary software modules or any software for which SENSR does not receive a license fee. All such software products are provided AS IS without any warranty whatsoever.

This License is effective until terminated. Customer may terminate this License at any time by destroying all copies of Software including any documentation. This License will terminate immediately without notice from SENSR if Customer fails to comply with any provision of this License. Upon termination, Customer must destroy all copies of Software.

Software, including technical data, is subject to U.S. export control laws, including the U.S. Export Administration Act and its associated regulations, and may be subject to export or import regulations in other countries. Customer agrees to comply strictly with all such regulations and acknowledges that it has the responsibility to obtain licenses to export, re-export, or import Software.

This License shall be governed by and construed in accordance with the laws of the State of Iowa, United States of America, as if performed wholly within the state and without giving effect to the principles of conflict of law. If any portion hereof is found to be void or unenforceable, the remaining provisions of this License shall remain in full force and effect. This License constitutes the entire License between the parties with respect to the use of the Software.

## 2 Installing CXRecorder

### 2.1 Installing the Software

Please verify that your PC meets the following minimum system requirements:

Operating System: Windows XP SP2, Vista, Windows 7

CPU:	Pentium 4, 1.4 GHz
System Memory (RAM):	1GB
Hard Disk:	2 GB free space (for data files)
Display:	1024 x 768, 32-bit "True Color"

Microsoft .NET Frameworks: 2.0 Service Pack 2 or newer and 3.5 SP1 or newer

This software is based upon Microsoft's .NET Framework. The user can download this environment from Microsoft using the Windows update utility. Depending on the update settings the "Custom" update option may need to be selected. The .NET Framework 3.5 SP1 is considered an optional component and is listed in the Software category.

***You must install the .NET Framework 2.0 SP2 and 3.5 SP1 before you install this application.***

CX Recorder is contained in a compressed folder located in the Applications folder on the SENSR CD. Double-click the icon for the compressed folder, a window should open to show the contents of the compressed folder. Drag the folder inside the window to a location on your desktop. CX Recorder is now located inside this folder on your desktop and is ready to be launched.

# CXRecorder User Guide

To execute the program, double-click the CXRecorder.exe file.

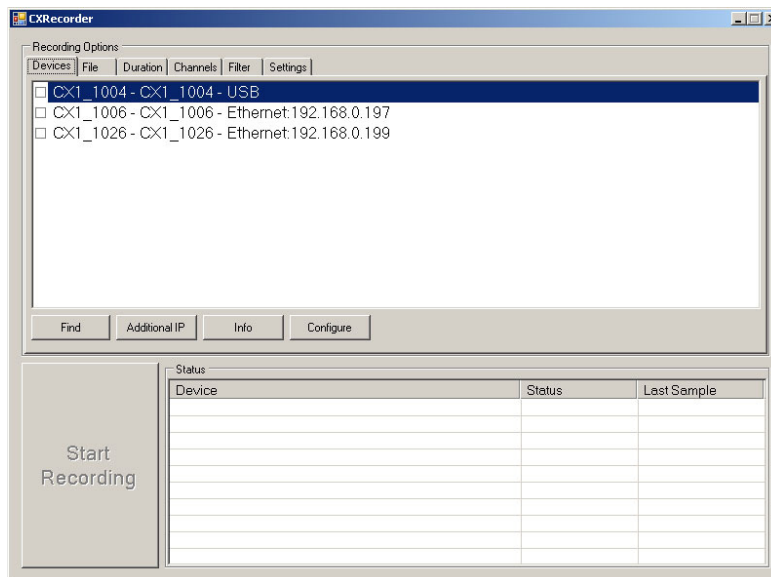
## 3 CXRecorder

### 3.1 CXRecorder Description

CXRecorder is general-purpose program designed to provide the user a tool for collecting data from 1 or more CX1s. CXRecorder is the preferred program for recording data over extended periods. CXRecorder enables the user to: configure instruments, define recording sessions and save data.

### 3.2 CXRecorder Device Tab

Before launching CXRecorder connect your SENSR devices to your computer or network. To launch CXRecorder double-click the CXRecorder icon, after a brief device search the CXRecorder Device tab screen will appear.



CXRecorder Device Tab

From the CXRecorder Devices tab screen the user can:

- Select a device
- Find a device
- Scan additional IP addresses
- Review device information
- Configure device communications.
- Start Recording

#### 3.2.1 Selecting a device

To select a device move your mouse cursor to the name of the device and highlight the device in blue. The user must select a device before attempting to configure a device or change settings.

# CXRecorder User Guide

---

If no devices are listed - press the find button (see section 3.2.2).

## **3.2.2 Find a Device**

To search for connected SENSr devices left-click the find button and wait for the program to scan your computer and network. Once a device has been found it will appear on the list. Scanning for devices should only take a few seconds. The find device functions works for SENSr devices that are connected to the host computer via USB and SENSr devices that are connected to the host's Ethernet network. In the event that a networked connected device is not found – connect the instrument to the local computer via USB and verify the devices IP settings are set correctly using this program (See section 3.2.5 Configure device communications).

## **3.2.3 Specify specific IP addresses**

The Find a Device function scans the local computer and network environment for connected SENSr devices, in the event that the device you want to connect to resides on another subnet you can specify specific addresses for the Find device command.

## **3.2.4 Review device information**

Once a device and been found, the user can select the device then click the Info button to review device specific information.

## **3.2.5 Configure device communications**

When configuring new devices for network operation it is best to connect the device via USB to the local computer. Once the device has been found the user can configure the network communication options. For Network communications the user can choose to use DHCP or specify specific: IP, Net mask and Gateway addresses.

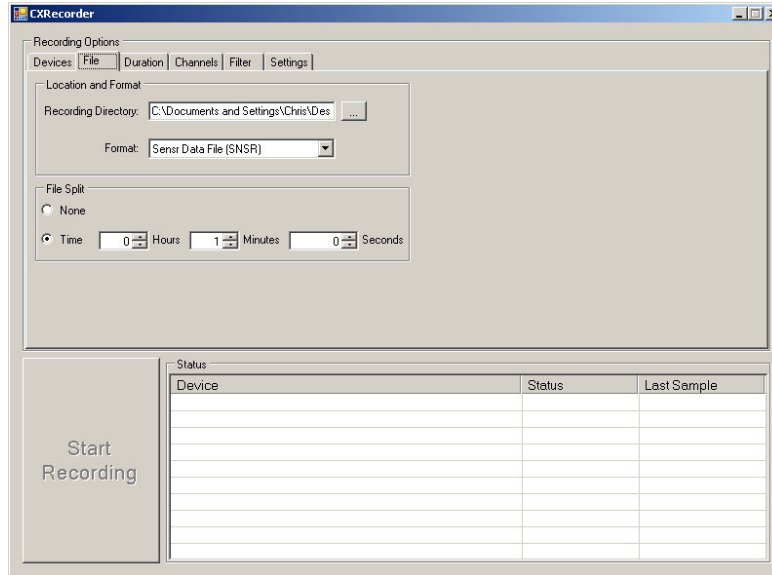
## **3.2.6 Start Recording**

Once the devices have been configured and the recording session details specified the user can initialize the recording session by left clicking the check box next to the device(s) to record, and then press the Start Recording button. Once a recording session begins this button changes to a stop recording button. When using the delayed start function press this button to commit your start schedule.

## **3.3 CXRecorder File Tab**

The CXRecorder file tab configures the parameters associated with saving the data. On this tab the user can specify the directory to save into, file formats, and file duration sizes.

# CXRecorder User Guide



CXRecorder File Tab

CXRecorder uses a structured file naming system for the file name convention.

## File names

Example: CX1\_1004 - CX1\_1004 - ATC - 20100204\_173808.snsr

Assigned device name – device type\_device serial number – data channels - YYYYMMDD\_TTTTTT. file extension. The default time format is UTC, the file name references the start recording time.

## File formats

CXRecorder saves data in two formats:

CSV – this is a generic uncompressed data format that most spreadsheet and analysis programs can import.

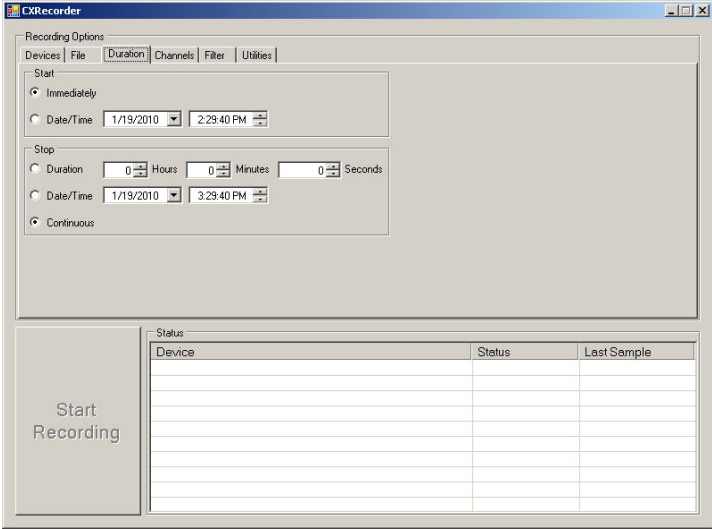
SNSR – this is a proprietary compressed format used by programs authored by SENSR.

SENSR devices can be configured to generate large amounts of data and huge data files; to ensure responsive performance by analysis programs we strongly recommend splitting recording sessions into small files. For CSV files destined to be analyzed in Excel we recommend specifying the CSV file split time to 30 minutes or less. For SNSR files destined to be analyzed with SENSR programs we require file splits to be set at 5 minutes or less.

### **3.4 CXRecorder Duration tab**

The CXRecorder Duration tab specifies the recording session timing and duration. All times are referenced to local times based upon the host PC's clock.

# CXRecorder User Guide

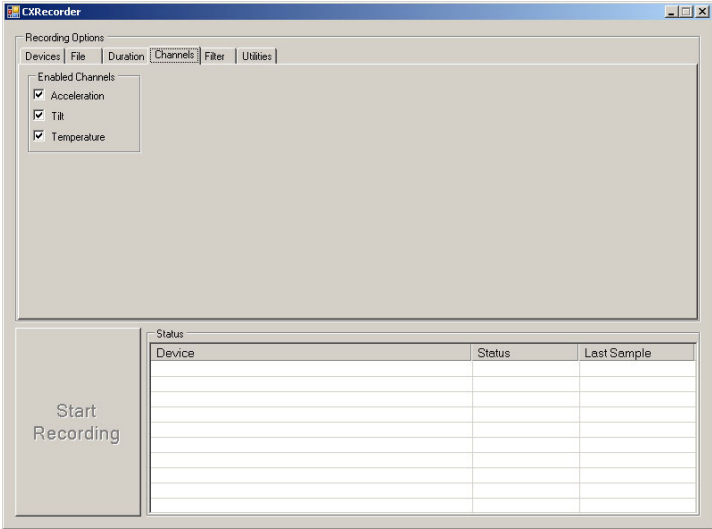


CXRecorder Duration tab.

### 3.5 CXRecorder Channels tab

The CXRecorder Channels tab specifies the signal channel types that will be recorded.

- Acceleration: X Y Z acceleration, units are reported in X.XXXXX g
- Tilt: X Y tilt, units are reported in XX.XXXX degrees
- Temperature: Degrees C



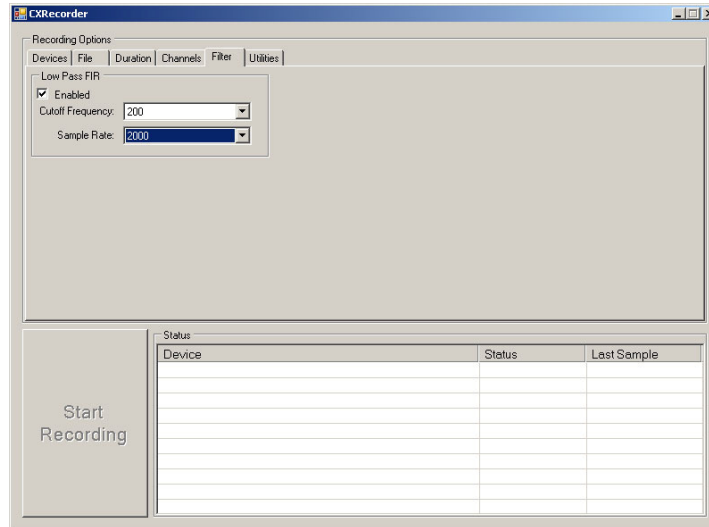
CXRecorder Channels tab.



# CXRecorder User Guide

## 3.6 CXRecorder Filter tab

The Filter tab allows the user to specify a low-pass filter cut off frequency and the sample rate for all of the accelerometers.



CXRecorder Filter tab.

The filters are implemented using a digital FIR filter; they were tailored to provide maximum flatness in the pass band while allowing for steep roll off to the stop band. The maximum allowable pass band ripple is 0.01dB. The minimum stop band attenuation is 120dB. The allowable samples rates for each cutoff frequency were chosen to provide a minimum of a 4x over sample of that cutoff frequency.

The following table defines the available filters.

Cutoff Frequency	Stop band Frequency
200	300
100	200
90	180
80	160
70	140
60	120
50	100
40	80
30	60
20	40
10	20
5	15
2	10
1	5

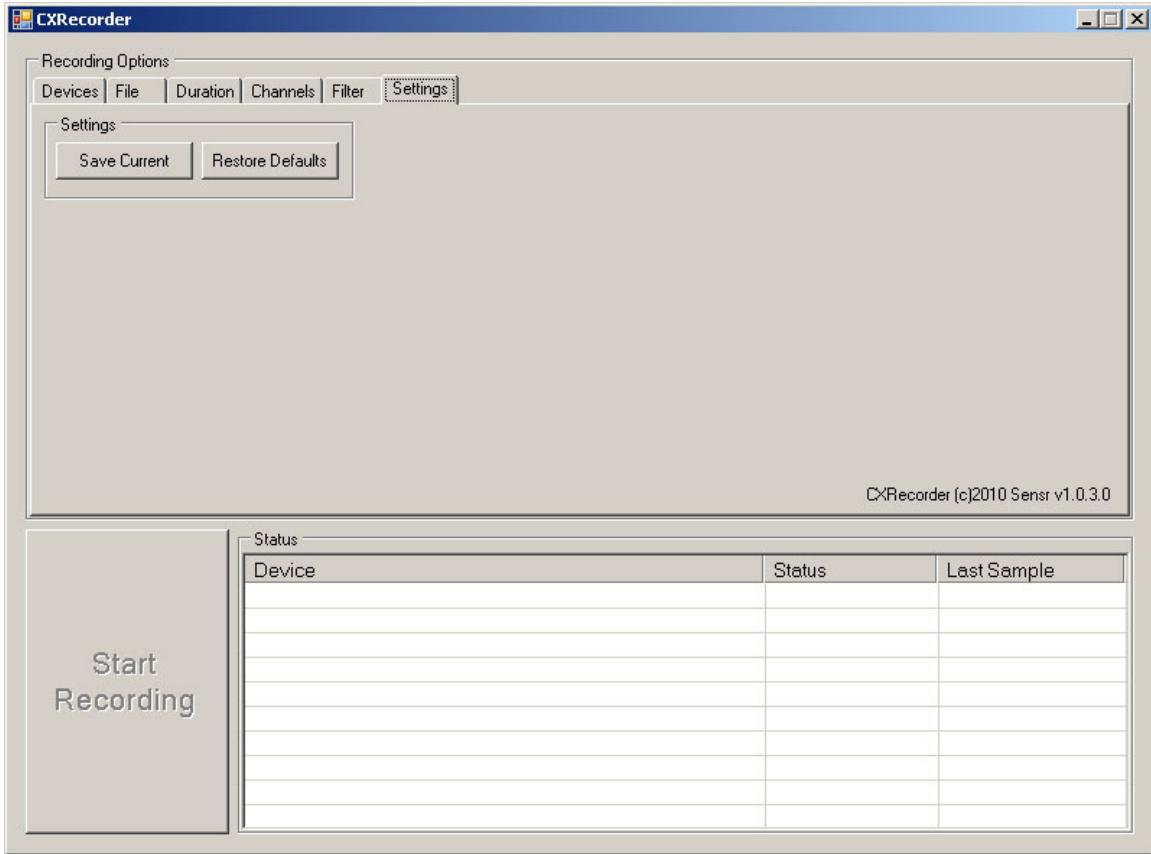
**Cutoff Frequency:** The frequency at which the filters response is -0.01dB with respect to its maximum response.

**Stop band Frequency:** The frequency at which the filters response is at least -120dB with respect to its maximum response.

# CXRecorder User Guide

## 3.7 CXRecorder Settings tab

The Settings tab lets the user save setting profiles for future recording sessions. This option will only save the current recording session settings and does not save device specific information.



CXRecorder Settings tab

## 4 Technical Support

### 4.1 Technical Support

For questions about this program, e-mail support at [support@sensr.com](mailto:support@sensr.com) or call 563.245.3750. Standard hours of operation are 8 am - 5 pm CST, M–F.