

WSDA[®]-1000 User Guide



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WSDA[®]-1000 firmware

This manual is designed for use with MicroStrain's WSDA[®]-1000 firmware version 2.3.3.

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Chapter 1 - WSDA[®]-1000 Control Panel Overview

The WSDA[®]-1000 **Control Panel** is a web-based interface to the [WSDA[®]-1000 Wireless Sensor Data Aggregator](#). All web browsers are acceptable, though Firefox and Chrome provide the best results. The **Control Panel** is reached by logging in to the WSDA[®]-1000 through an Internet browser, as described in Login section below. The web-based interface is served from the WSDA[®]-1000 itself and allows the user to configure, reboot, troubleshoot, change passwords, and perform several other functions related to the WSDA[®]-1000, the wireless nodes it serves, and [SensorCloud[™]](#).

The screenshot shows the WSDA Control Panel interface. At the top left, it says "WSDA Control Panel" and at the top right, "Logged in as wsd1 | Logout". The interface is divided into three main sections: General, Data, and Tools. The "About" section is currently selected and displays the following information:

Device Name	
Serial Number	FFFF0015C9152080
MAC Address	00:15:C9:15:20:90
Model Number	WSDA-1000
OS Version	2.3.3
Flash Card Utilization	43 MB/1.8 GB
Connection Type	dhcp
<hr/>	
System Time	2013-02-27 14:13:18 UTC
Synchronization Status	Not Synchronized
Last Synchronized Time	2013-03-14 14:40:58 UTC
Last Synchronized Source	NTP(time-a.timefreq.bldrdoc.gov)
System Uptime	8 minutes
System Resets	3

Figure 1. WSDA[®]-1000 Control Panel window

As shown in *Figure 1*, the **Control Panel** offers a menu that allows navigation to the three main sections and a Logout feature. Logging out is described below. Each of the three sections is covered in detail in the next three chapters, but here is a quick overview:

Control Panel Sections

The **General** section provides information about the WSDA[®]-1000 identity, the wireless nodes it serves, and its current time settings. These are informational only and no user settings may be made in this section.

The **Data** section allows the user to actively set which nodes and channels are transmitted to the SensorCloud[™], and to clear the data from the WSDA[®]-1000 internal memory.

The **Tools** section allows the user to actively troubleshoot the WSDA[®]-1000, configure its mode, system time, beaconing state, radio frequency, etc., reboot the WSDA[®]-1000, update its operating system software and change the user's password.

Logging into the Control Panel

Typically the user will navigate to the WSDA[®]-1000 **Control Panel** Login screen by using Live Connect:

1. Install one end of the Ethernet cable into the Ethernet port on the back of the WSDA[®]-1000 and the other end into a Local Area Network (LAN).
2. Launch the Live Connect software which is found in: Start > All Programs > MicroStrain > Live Connect. The Live Connect window will automatically scan for all the WSDA[®]-1000s on the network and display their IP addresses and device names as shown in *Figure 2*.

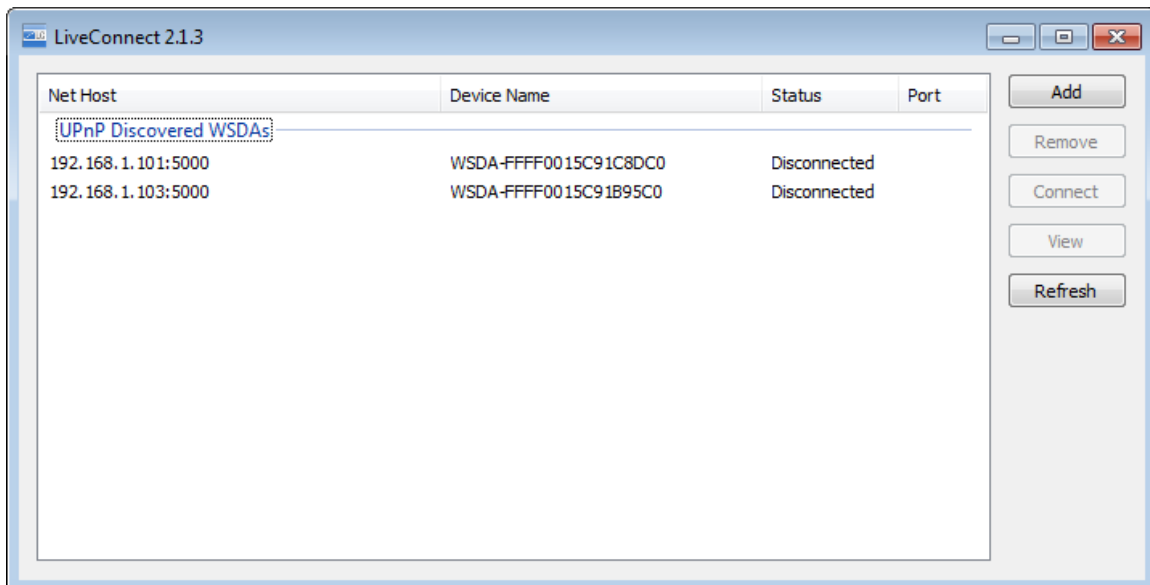


Figure 2. The Live Connect window

3. Click on your WSDA[®]-1000 to highlight it as shown in **Figure 2**.
4. Click the 'View' button. The Login window will pop up in your browser.
5. Enter your WSDA[®]-1000 Control Panel login credentials, as shown in **Figure 3**.

The factory default credentials are:

Login: wsd
Password: wsd

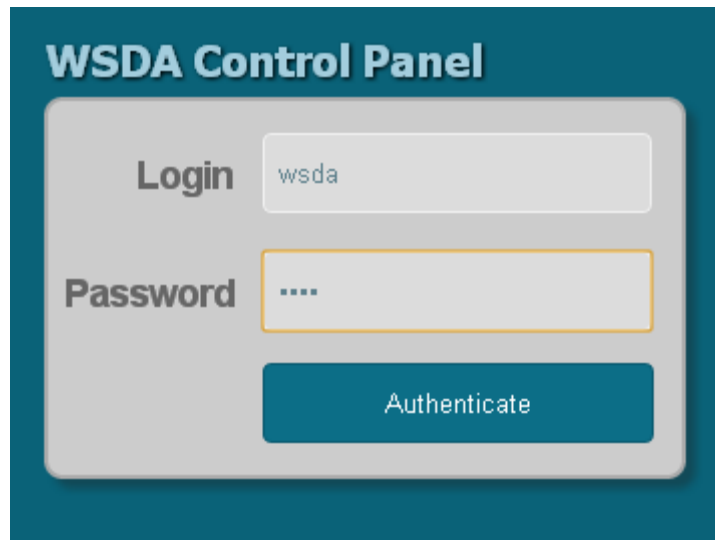


Figure 3. WSDA[®]-1000 Control Panel Login window

6. Click the 'Authenticate' button.
7. The WSDA[®]-1000 Control Panel Main screen will appear (shown in **Figure 4**).

Logging out of the Control Panel

1. Click **Logout** in upper right hand corner of the WSDA[®]-1000 Control Panel (shown in **Figure 4**).

The screenshot displays the WSDA Control Panel interface. At the top right, the text "Logged in as wsd" is followed by a "Logout" link, which is circled in red. The interface is divided into three main sections: a left-hand navigation menu, a top "About" section, and a bottom "System" section.

WSDA Control Panel

General

- About
- Node List

Data

- Upload Filter
- Calibration
- Clear Data

Tools

- Diagnostics
- Configuration
- Time Options
- Reboot
- OS Upgrade
- Change Password

About

Device Name	
Serial Number	FFFF0015C9152080
MAC Address	00:15:C9:15:20:90
Model Number	WSDA-1000
OS Version	2.3.3
Flash Card Utilization	43 MB/1.8 GB
Connection Type	dhcp

System

System Time	2013-02-27 14:13:18 UTC
Synchronization Status	Not Synchronized
Last Synchronized Time	2013-03-14 14:40:58 UTC
Last Synchronized Source	NTP(time-a.timefreq.bldrdoc.gov)
System Uptime	8 minutes
System Resets	3

Figure 4. WSDA[®]-1000 Control Panel Logout (circled in red)

Chapter 2 - General

The **General** section provides information about the WSDA[®]-1000 identity, the wireless nodes it serves, and its current time settings. These are informational only and no user settings may be made in this section. As shown in *Figure 5*, it has three subsections: **About**, **Node List**, and **Time Settings**. The rest of this chapter covers these three subsections in detail.

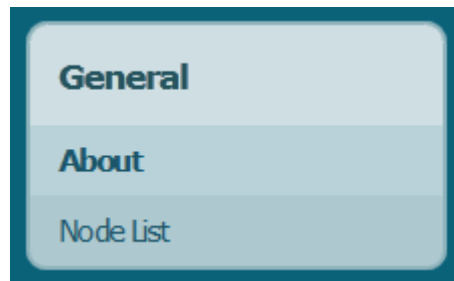


Figure 5. The General section

About

The **About** subsection provides the following general information about the WSDA[®]-1000.

Device Name

Example: My WSDA[®]-1000

A human readable ‘alias’ given to the WSDA[®]-1000 so that it is more easily recognized. By default, the **Device Name** is the same as the **Serial Number**. The **System Name** can be set by the user in the **Configuration** subsection under **Tools**.

Serial Number

Example: FFFF0015C91B95C0

An alpha-numeric identifier embedded in the WSDA[®]-1000 hardware. The **Serial Number** is set at the factory.

MAC Address

Example: 00:15:C9:1B:95:D0

An alpha-numeric identifier embedded in the network card in the WSDA[®]-1000 hardware. A **MAC** (Media Access Control) **Address** is a

unique identifier assigned to network interfaces for communications on the physical network segment. The **MAC Address** is set at the factory.

Model Number

Example: WSDA[®]-1000

An alpha-numeric identifier used to identify the WSDA[®] type. Several types exist including the WSDA[®]-1000 (WSDA[®]-1000 in standard enclosure with Ethernet interface), WSDA[®]-MIL (WSDA[®]-1000 designed for military applications), etc. The **Model Number** is set at the factory.

OS Version

Example: 2.3.3

A numeric identifier used to identify the WSDA[®]-1000 **OS** (Operating System) **Version**. The **OS** is the on-board software that operates the WSDA[®]-1000. WSDA[®]-1000 are shipped with the current OS version. As new features are added, MicroStrain makes available OS updates. These updates can be installed by the user through the **OS Upgrade** subsection found under **Tools**.

Flash Card Utilization

Example: 35 MB/1.8 GB

The amount of memory currently consumed by data on the WSDA[®]-1000 flash card. Data received from sensor nodes is stored here. The flash card has a capacity of 1.8 GB of data. When capacity is reached, the flash card will begin dumping data on a FIFO basis. i.e., the oldest data will be dumped.

Connection Type

Example: dhcp

The type of Ethernet connection the WSDA[®]-1000 uses. There are two possible options: DHCP or Static IP. The options can be set in the **Configuration** subsection found in **Tools**.

System Time

Example: 2012-09-16 18:01 UTC

The current UTC time on-board the WSDA[®]-1000 System Clock. UTC or [Coordinated Universal Time](#) is the time standard by which the world regulates clocks and time. The **System Clock** is normally updated from internet time servers every 12 hours.

Synchronization Status

Example: Synchronized

The WSDA[®]-1000 is considered to be *Synchronized* if it has successfully synchronized to one of its enabled time sources since it was booted, otherwise it is considered to be *Not Synchronized*. See **Time Sources** for more information about WSDA[®]-1000 time sources.

Last Synchronized Time

Example: 2013-03-14 20:08:32 UTC

This field states the last time the WSDA[®]-1000 was synchronized to a time source.

Last Synchronized Source

Example: NTP(time-a.timefreq.blrdoc.gov)

This field states the source that the WSDA[®]-1000 was last synchronized to.

System Uptime

Example: 22 hours

The elapsed time since the WSDA[®]-1000 was powered on and booted up. The **System Uptime** will be zeroed when the WSDA[®]-1000 power is cycled, or the WSDA[®]-1000 is rebooted using the Reboot menu in the Tools section.

System Resets

Example: 1

The number of times the WSDA[®]-1000 has been reset. The **System Resets** will be incremented when the WSDA[®]-1000 power is cycled or the WSDA[®]-1000 is rebooted using the **Reboot** option in the **Tools** section. The **System Resets** is written to non-volatile memory and survives any power events.

Node List

Clicking on this subsection displays all the wireless nodes that have data currently stored on the flash card. The node's address is shown along with the sensor channels that are transmitting data to the WSDA, the relative timestamp (time since the node sent its first data to the WSDA[®]-1000), and the last timestamp (the timestamp of the most recent node data received by the WSDA[®]-1000).

Node List			
Address	Channels	Last Timestamp	Relative Timestamp
1	ch1,ch2,ch3,ch4,ch5,ch6,ch7,ch8,rsi	07/16/12 13:03	4 hours
30	ch1,ch3,ch4,ch5,ch7,ch8,rsi	07/16/12 13:03	4 hours
5	ch1,ch2,ch3,ch4,ch5,ch6,ch7,ch8,rsi	07/13/12 12:53	3 days

Figure 6. Node List window

Chapter 3 - Data

The **Data** section allows the user to actively set which nodes and channels are transmitted to the SensorCloud™ and to clear the data from the WSDA®-1000 internal memory.

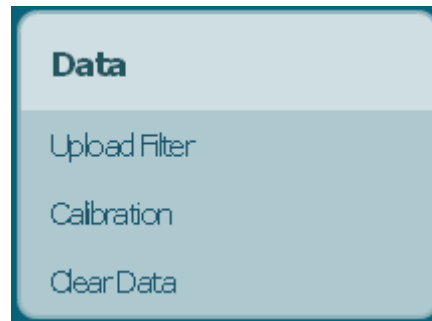


Figure 7. The Data section

Upload Filter

By default, the WSDA®-1000 transmits all node data stored on the flash card to the SensorCloud™. The **Upload Filter** function allows the user to filter which node data is to be transmitted to the SensorCloud™. Users may elect to transmit all data received from a wireless node, exclude some data from a wireless node, conversely include some data from a wireless node, or transmit no data for that particular node. The **Upload Filter** can be set in advance of receiving the wireless node data or after the fact. If data has already been received, consulting the **Node List** in the **General** section is recommended.

To be clear: if the user does not apply any filter to a particular node, all data will be transmitted to the SensorCloud™.

The 'Clear All' button allows the user to delete all node filters.

Important Note: The **Change Filter Type** function affects all nodes in the filter list; when applied, it sets all nodes in the filter list. It cannot be used to set each individual node.

Upload Filter

This page allows you to filter the sensors which are uploaded to SensorCloud.

To setup a filter:

1. Enter the address of the sensor you wish to filter in the "Address" field.
2. Enter a list of sensor channels you want to be filtered in the "Channel List" field. If you want all channels to be filtered, enter "all" as the channel list.
3. Select the filter type.

Filter Types:

Only Upload The Listed Channels - Only uploads the channels listed to SensorCloud.

Do Not Upload The Listed Channels - Uploads all channel data to SensorCloud except the listed channels.

Only Upload The Listed Channels
 Do Not Upload The Listed Channels
 Change Filter Type

Address Channel List

Figure 8. Upload Filter window

Example: If the user wanted to **exclude all** data received from node (with address) 206, these steps would be followed:

1. Enter 206 in the Address box.
2. Enter 'all' or 'ALL' or '*' in the Channel List box.
3. Click the 'Add' button and the filter will be added.
4. Select the 'Do Not Upload the Listed Channels' radio button.
5. Click 'Change Filter Type' button.

Example: If the user wanted to **exclude** channel 4 and channel 6 received from node 206, these steps would be followed:

1. Enter 206 in the Address box.
2. Enter 'ch4, ch6' or 'ch4 ch6' or 'CH4, CH6' in the Channel List box.
3. Click the 'Add' button and the filter will be added.
4. Select the 'Do Not Upload the Listed Channels' radio button.
5. Click 'Change Filter Type' button.

Example: If the user wanted to **include** just channel 1, channel 3 and rssi received from node 209, these steps would be followed:

1. Enter 209 in the Address box.

2. Enter 'ch1,ch3,rssi' or 'ch1 ch3 rssi' or 'CH1 CH3 RSSI' in the Channel List box.
3. Click the 'Add' button and the filter will be added.
4. Select the 'Only Upload the Listed Channels' radio button.
5. Click 'Change Filter Type' button.

Calibration

The **Calibration** option allows the user to specify coefficients for converting raw data to calibrated data.

Address	Channel	Slope	Offset	Low Limit	High Limit	Unit	Symbol
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Figure 9. Calibration window

Figure 9 shows two helpful options: **Overview** and **Field Definitions**. **Overview** gives general information about the calibration option. **Field Definitions** provide definitions for the fields next to the 'Add' button.

Coefficients entered using the **Calibration** option will only be applied to data downloaded from the WSDA[®]-1000 using the WSDA[®]-1000 Data Downloader Application. For more about the WSDA[®]-1000 Data Downloader, see Chapter 6.

To use the **Calibration** feature, click the 'Add' button after entering the proper values in each field. The following definitions describe each field shown in *Figure 9* (next to the 'Add' button).

Address: Wireless sensor address identifier.

Channel: Wireless sensor channel identifier.

Slope: Linear scaling slope coefficient (m).

Offset: Linear scaling offset coefficient (b).

Low Limit: Generate data-out-range indicator if measurement is below this value.

High Limit: Generate data-out-range indicator if measurement is above this value.

Unit: Long name of calibrated unit.

Symbol: Short name of calibrated unit.

Example: Given a sensor with address 170 measuring temperature in Celsius on channel 1. Calibrated data is desired to be in Fahrenheit with indicators if the measurement goes below 0 F or above 100 F.

Address	Channel	Slope	Offset	Low Limit	High Limit	Unit	Symbol
170	ch1	1.8	32	0	100	Fahrenheit	F

Clear Data

The **Clear Data** option allows the user to erase all wireless node data from the flash card. Before erasing, the user should confirm that all data has been transmitted to the SensorCloud™ by viewing the Node List. The **Current Data Size** display indicates the amount of data currently stored on the flash card.

To clear data simply click the ‘Clear All Data’ button and the data will be erased.

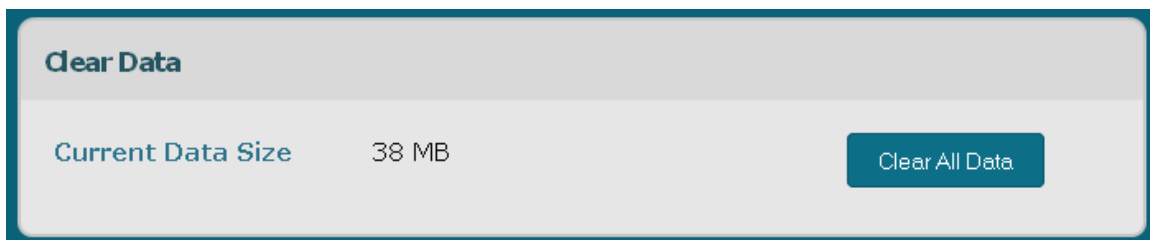


Figure 10. Clear Data window

Chapter 4 - Tools

The **Tools** section allows the user to actively troubleshoot the WSDA[®]-1000, configure its mode, system time, beaconing state, radio frequency, etc., reboot the WSDA[®]-1000, update its operating system software and change the user's password.

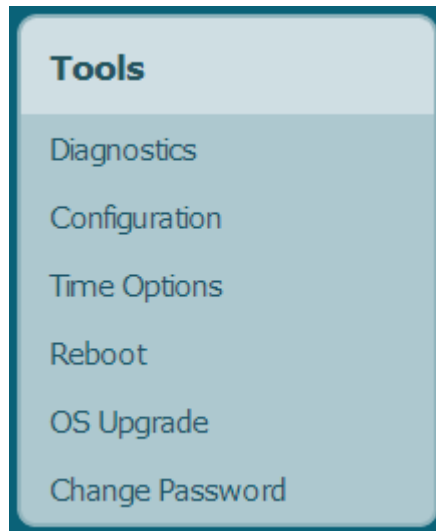


Figure 11. The Tools section

Diagnostics

The diagnostics option allows the user to identify causes when the WSDA[®]-1000 is not operating properly. By reading the WSDA[®]-1000's internal log files, the diagnostics option checks three possible sources of error: the Timing Engine, the SensorCloud Sync, and the Data Logger. It performs these diagnostic checks once at every power up and then periodically as the WSDA[®]-1000 runs.

Note: the SensorCloud Sync will not be checked if SensorCloud Sync has been disabled in the **Configuration** window. The Data Logger will not be checked if the WSDA[®]-1000 is in Live Connect mode (also found in the **Configuration** window).

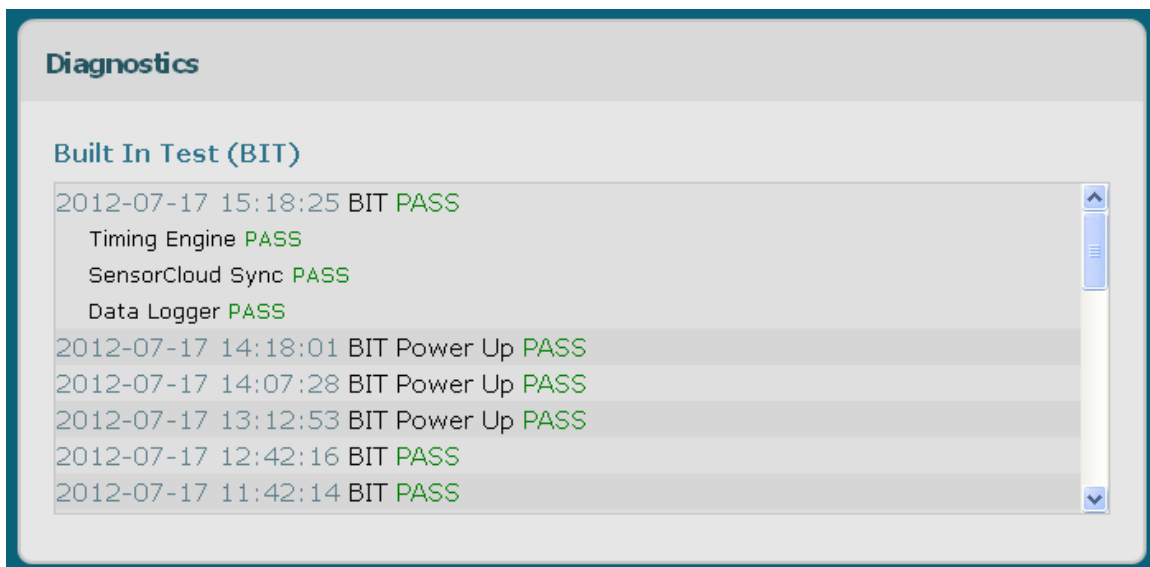


Figure 12. Diagnostics window

Configuration

The **Configuration** option allows the user to set a number of parameters associated with WSDA[®]-1000 operation.

Figure 13. Configuration window

Device Name

Default: (Empty)

The Device Name function allows the user to change the human-readable alias of the WSDA[®]-1000 so that it is more easily recognized. This field is displayed in LiveConnect rather than the serial number when the field is not empty.

1. Enter new name in the Device Name box.
2. Click the 'Save' button.

Local LiveConnect

Default: Enabled

The **Local LiveConnect** setting allows the user to disable **LiveConnect** for the user's local network.

Data Logging

Default: Enabled

The **Data Logger** on the WSDA[®]-1000 waits for time to be synchronized, sets the beacon state, sets the wireless channel, and starts logging. The **Data Logging** setting allows the user to disable the **Data Logger**.

WSN Beacon

Default: Off

The **WSN Beacon** setting allows the user to select whether the WSDA[®]-1000 should transmit the WSN (Wireless Sensors Network) beacon when logging data.

1. Select 'Off' or 'On' from the dropdown menu.
2. Click the 'Save' button.

WSN Channel

Default: 25

The **WSN Channel** setting allows the user to select which radio channel the WSDA[®]-1000 should use when logging data. The wireless nodes that the WSDA[®]-1000 is servicing must be set to the same radio channel.

1. Select a channel (from 11 to 26) in the dropdown menu.
2. Click the 'Save' button.

Network Mode

Default: DHCP

The network mode determines whether the WSDA[®]-1000 has a dynamic or a static IP address. Typically, 'DHCP' should be selected unless your network doesn't have a DHCP server, in which case you will need to manually set the WSDA[®]-1000's network settings using 'Static IP' mode.

To set the **Network Mode**, select the desired mode from the dropdown menu and then click 'Save'.

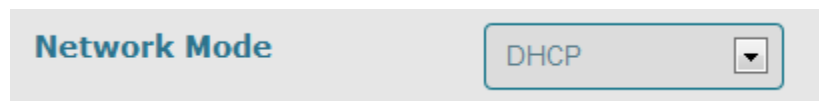


Figure 14. Network Mode options

When 'Static IP' is selected some extra options will be visible as shown in *Figure 15*.

Network Mode	Static IP <input type="button" value="▼"/>
Static IP Address	<input type="text" value="192.168.0.100"/>
Static Subnet Mask	<input type="text" value="255.255.255.0"/>
Static Gateway	<input type="text"/>

Figure 15. Static IP Options

Static IP Address

Default: 192.168.0.100

The **Static IP Address** is the IP Address the WSDA will be assigned. This cannot be the network address or the broadcast address of the subnet.

Static Subnet Mask

Default: 255.255.255.0

The **Static Subnet Mask** defines the address range the WSDA[®]-1000 can talk to, or the subnet. If the WSDA[®]-1000's IP Address is 192.168.0.100 and the subnet mask is 255.255.255.0 the WSDA[®]-1000 can talk to all addresses between 192.168.0.0 and 192.168.0.255.

Static Gateway

Default: (Empty)

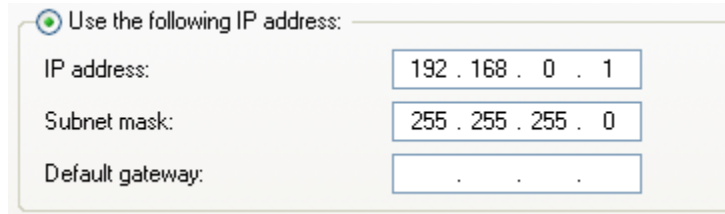
The **Static Gateway** option allows the user to define which address on the WSDA[®]-1000's subnet it should use to communicate outside of its subnet. This option is required for the WSDA[®]-1000 to be able to access the internet on a static network.

To set up a PC for direct communication with a WSDA[®]-1000, the PC's IP address must be changed so that it has the same subnet as the WSDA[®]-1000. The WSDA[®]-1000's subnet is the first three sets of numbers within the Static IP Address (192.168.0 using the default Static IP Address). To change the IP address on a PC running Windows, try the following steps:

1. Find your active Local Area Connection. Go to the Control Panel and click on the Network Connections folder.
2. Right click on the active Local Area Connection and select properties.
3. Scroll down and double click on 'Internet Protocol(TCP/IP)'.
4. In the pop-up window select 'Use the following IP address'
5. Enter the subnet into the field entitled 'IP address' and add a fourth number. It can be any number between 0 and 255 **except the number that the WSDA[®]-1000 utilizes.**

If the WSDA[®]-1000 **Static IP Address** is 192.168.0.100, the PC can have any address between 192.168.0.0 and 192.168.0.255, except 192.168.0.100. In the example shown in *Figure 16*, '1' was chosen.

6. In the 'Subnet mask' field, enter the same as the **Static Subnet Mask** from the configuration page.



The image shows a Windows network configuration dialog box with the following fields:

<input checked="" type="radio"/> Use the following IP address:	
IP address:	192 . 168 . 0 . 1
Subnet mask:	255 . 255 . 255 . 0
Default gateway:	. . .

Figure 16. Setting the IP address in Windows

7. Press OK and OK.

SensorCloud

Default: Data Upload Enabled, Remote Connectivity Enabled

The **SensorCloud** function allows the user to enable or disable transmission of sensor data to SensorCloud[™] and remotely access the WSDA control panel and Live Connect features through SensorCloud.

To disable these options:

1. Click on the 'Disable Data Upload' and/or the 'Disable Remote Connectivity' check box.
2. Click the 'Save' button.

Time Options

The **Timing Options** page allows the user to configure options related to how the WSDA[®]-1000 retrieves and uses time.

WSDA Control Panel Logged in as: wsdas | Logout

General

About

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Time Options

+ Overview

Name	Accuracy	Enabled	Expiration
Time Servers	milliseconds	<input checked="" type="checkbox"/>	1 Day
Manual	seconds	<input checked="" type="checkbox"/>	Never
Last Known	-	<input type="checkbox"/>	never

[Save](#)

System Time (UTC)

MM DD YYYY HH : MM : SS

3 / 14 / 2013 20 : 23 : 48

[Set System Time](#)

Time Servers (NTP)

Order	Hostname	Apply	Delete
0	time-a.timefreq.blrdoc.gov	Apply	Delete
1	time-b.timefreq.blrdoc.gov	Apply	Delete
2	time-c.timefreq.blrdoc.gov	Apply	Delete
3	utcnist.colorado.edu	Apply	Delete
4	utcnist2.colorado.edu	Apply	Delete
5	time-nw.nist.gov	Apply	Delete
6	nist1.symmetricom.com	Apply	Delete
7	nist1.columbiacountyga.gov	Apply	Delete
8	nist.expertsmi.com	Apply	Delete
9	nist.netservicesgroup.com	Apply	Delete
10		Insert	

Figure 17. Time Options Page

Time Sources

The WSDA[®]-1000 has different time sources that it can synchronize its time to. Possible time source options include GPS, NTP Time Servers, Manual, and Last Known.

- GPS allows the WSDA[®]-1000 to synchronize with an onboard GPS unit for an extremely accurate time.
- Time Servers allows the WSDA[®]-1000 to synchronize with external servers that provide the NTP service, a list of time servers is provided and can be modified by the user, see **Time Servers** for more information.
- Manual synchronizes to a time set by the user through the Control Panel, see **System Time**.
- Last Known synchronizes to the last time recorded on the WSDA[®]-1000, this could be from the WSDA[®]-1000's internal RTC or from a file on the WSDA[®]-1000's filing system.

Each time source has an expiration field; this field represents the amount of time a time sync is valid for. See **WSDA[®]-1000 Time Synchronization** for more information about how the WSDA[®]-1000 synchronizes time.

System Time

Default: Current WSDA Time

The **System Time** function allows the user to set the System Time. This function is normally used when no other time source (GPS, Time Servers, etc.) is available. Note that if time is set forward at least one hour the web session will be expired and the user will be logged out.

1. Enter MM-DD-YYYY HH:MM:SS in the System Time boxes.
2. Click the 'Set System Time' button.

Time Servers

The **Time Servers** function allows the user to set which time servers the WSDA[®]-1000 uses to synchronize and in what order it attempts to do so. The time servers are displayed in a list with the first server, order 0, being the first server checked by the WSDA[®]-1000 and the last being the last. A valid time server must support *NTP* for the WSDA[®]-1000 to use it.

To insert a new time server:

1. Enter the order at which you want the time server placed in the last line.
2. Enter the hostname of the time server in the 'Hostname' column of the last line.
3. Click the 'Insert' button.

To delete a time server:

1. Locate the time server you wish to delete in the list.
2. Click the 'Delete' button next to it.

To change the order of an existing time server:

1. Locate the time server you wish to change.
2. Enter the order you wish it to be at in the 'Order' column.
3. Click the 'Apply' button next to it.

Reboot

The **Reboot** option allows the user to restart and reinitialize the WSDA[®]-1000 without cycling the power.

1. Click the 'Reboot WSDA' button.
2. The WSDA[®]-1000 will commence its 3 stage boot-up process as described in **Table 1** below. This will take between 2 and 3 minutes.
3. A new Login will now be required.

Stage	Web LED	WSDA[®] LED	Power LED
1. Initial Power On	Red	Red	Green
2. Booting Up	Red	Blinking Blue	Green
3. Fully Booted	Green	Green	Green

Table 1. WSDA[®]-1000 LED Key

OS Upgrade

The **OS Upgrade** option allows the user to update the operating system software on the WSDA[®]-1000.

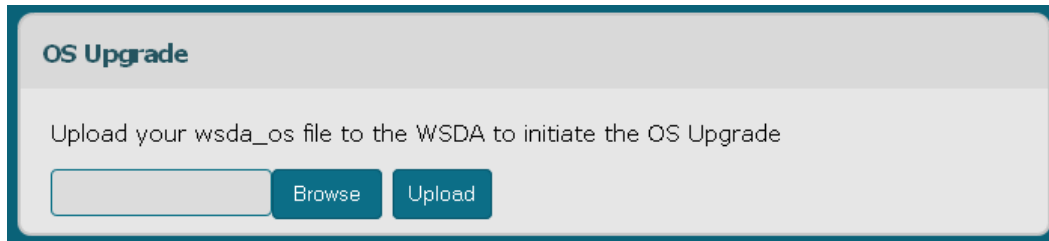


Figure 18. OS Upgrade window

Note: prior to using this tool, contact MicroStrain's customer service to get the latest version of the operating system

1. Click the 'Browse' button.
2. Navigate to the folder containing on your computer containing the update file provided by MicroStrain. As an example, the file will have a name and extension similar to: *firmware_v2.3.3.wsda_os*.
3. Click Open.
4. Click the 'Upload' button.

Please be patient. There are two parts to the upgrade – the upload and the actual flashing. Once the upload reaches 100%, the status bar should reset and represent the upgrade process. The entire upgrade can take fifteen to twenty minutes.

Change Password

The **Change Password** option allows the user to change the username and the password required at login. By default, the Username = wsda and the Password = wsda.



The screenshot shows a web form titled "Change Password". It features four input fields stacked vertically: "Username" (with the value "wsda"), "Current Password", "New Password", and "Confirm Password". A teal "Submit" button is positioned to the right of the "Current Password" field.

Figure 19. Change Password window

1. Enter new name in the 'Username' box.
2. Enter current password in the 'Current Password' box.
3. Enter new password in the 'New Password' box.
4. Enter new password in the 'Confirm Password' box.
5. Click the 'Submit' button.

Chapter 5 - Using the WSDA[®]-1000 to Configure Sensor Nodes

This chapter provides a step-by-step guide to setting up the WSDA[®]-1000 for use with Node Commander[®]. For information about configuring nodes once the WSDA[®]-1000 is connected to Node Commander[®], please consult the Node Commander[®] help found in the help tab of Node Commander[®] or the videos found in the [Node Commander[®] documentation tab](#) on MicroStrain's website.

Connecting to Node Commander

1. Make sure LiveConnect is enabled on the Configuration page of the WSDA[®]-1000 Control Panel.
2. Return to the LiveConnect program.
3. Highlight the WSDA[®]-1000 device and click the 'Connect' button. In a moment the device's Status will change from 'Disconnected' to 'Connected' and a COM port will be assigned. The example in *Figure 20* shows a WSDA[®]-1000 connected on COM 2.

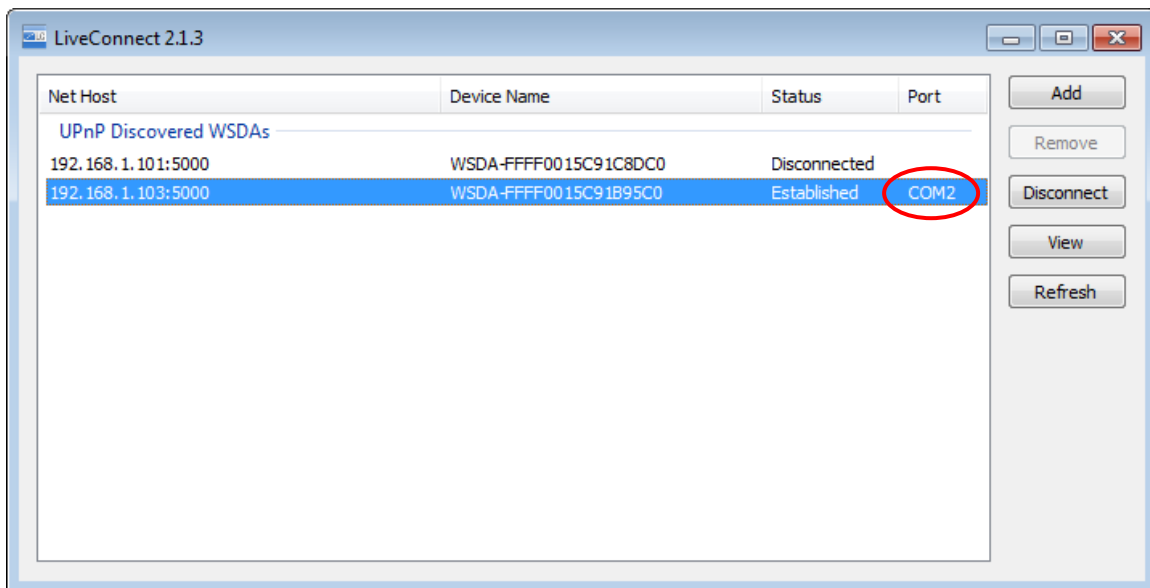


Figure 20. LiveConnect window

4. Launch the Node Commander[®] software and the Main screen will appear. The WSDA[®]-1000 will now be found and reported in the 'Controller' frame (on the left hand side of the Main screen) as WSDA Com X. The example in *Figure 21* shows the WSDA[®]-1000 open on Com 2.

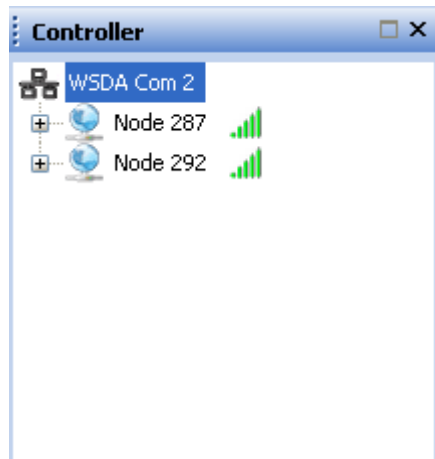


Figure 21. Node Commander Controller frame

5. If Node Commander[®] has trouble recognizing the WSDA[®]-1000 enable extended timeouts. Open the *Node Commander[®] Preferences* window by selecting *Edit* in the toolbar then *Preferences* in the dropdown menu that appears. From the *Node Commander[®] Preferences* window select the *Devices* tab and make sure *Use extended timeouts for WSDA[®]-1000s* is checked.

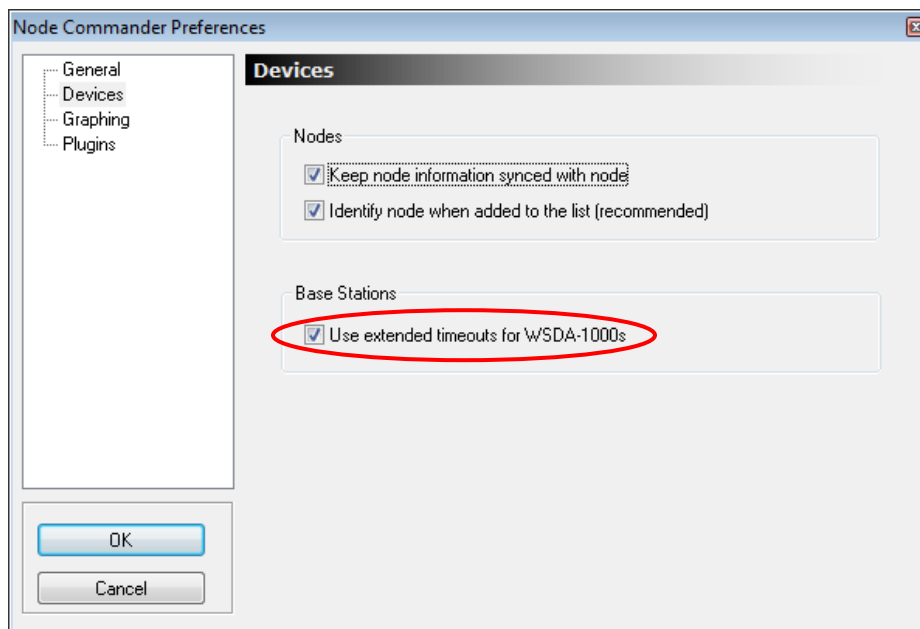


Figure 22. Node Commander[®] Devices Preferences

Node Commander[®] can now be used to configure the wireless nodes for operation, perform calibration using the wizards, set the sampling mode, update firmware, and so forth.

Chapter 6 - WSDA[®] Data Downloader

The **WSDA[®]-1000 Data Downloader** allows the user to download sensor data stored on the WSDA[®]-1000's micro SD card directly to their PC. The data will be placed in CSV file which can be easily opened in MS Excel or uploaded to SensorCloud[™]. Each sensor node selected for data download will generate a separate CSV file. Only the sensor channels selected will be downloaded into the CSV file.

The user can also use the **WSDA[®]-1000 Data Downloader** to clear the sensor data stored on the micro SD Card. This is an alternative to the 'Clear Data' feature in the Control Panel. **Warning:** Clearing the WSDA[®]-1000 data will erase **all** sensor data from the WSDA[®]-1000.

The **WSDA[®]-1000 Data Downloader** application can be downloaded by clicking on the 'Overview' field shown in *Figure 9* and then clicking on the 'WSDA[®]-1000 Data Downloader Application' hyperlink. Once downloaded, the user can run the **Data Downloader** from their desktop. When prompted for a WSDA[®]-1000 URL, use the WSDA[®]-1000's URL as found in the address bar on your web browser that is hosting the **WSDA[®]-1000 Control Panel**. This is shown in *Figure 23* and *Figure 24*.



Figure 23. The URL used to log into the WSDA[®]-1000

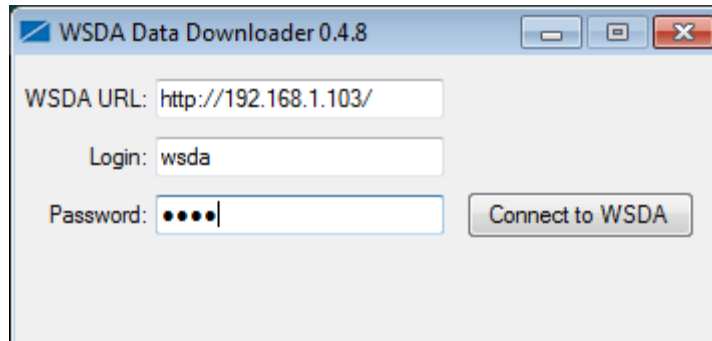


Figure 24. The URL as entered in WSDA[®]-1000 Data Downloader

After connecting to the WSDA[®]-1000, the GUI shown in *Figure 25* will appear.

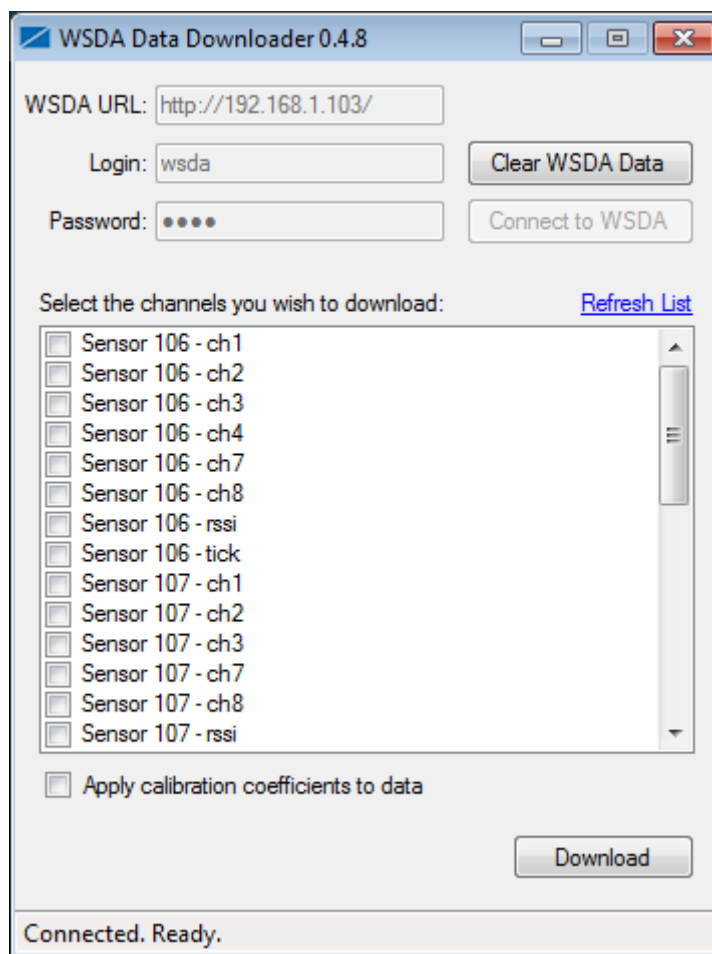


Figure 25. The WSDA[®]-1000 Data Downloader

The **WSDA[®]-1000 Data Downloader** has four main features: the ‘Clear WSDA[®]-1000 Data’ button, the channel selector check boxes, the ‘Apply calibration coefficients to data’ check box, and the ‘Download’ button.

As discussed earlier, the ‘Clear WSDA[®]-1000 Data’ button will clear all the sensor data stored on the WSDA[®]-1000’s micro SD Card. Before using this feature, be sure you have downloaded all the data you need.

To download data, first select the desired channels, all channels may be selected by right clicking anywhere in the sensors list and selecting *Select all channels* from the dropdown menu. If you have added calibration coefficients (see the section on **Calibration** in Chapter 3), check the ‘Apply calibration coefficients to data’ option.

These steps are shown in **Figure 26** where Channels 1, 2, and 3 from Sensor 20 were selected.

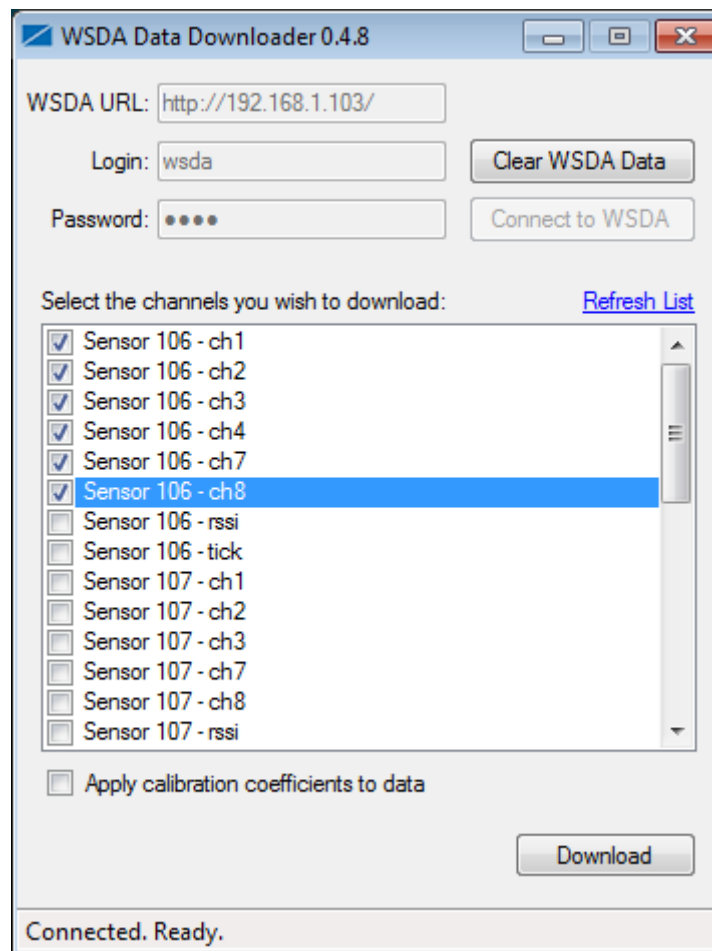


Figure 26. Selecting desired channels

Now press the ‘Download’ button and navigate to the folder where you would like the data to be downloaded. The **Data Downloader** will first request data from the WSDA[®]-1000, then download it, and finally build the CSV file. The length of this process depends on the amount of data selected. **Figure 27** shows a portion of the CSV file generated from the data selected in **Figure 26**.

FILE_INFO								
ListSeparator	comma							
DecimalSeparator	period							
SESSION_INFO								
TimeZone	UTC							
TimeZone	0							
DateTime	MM/DD/YY hh:mm:ss.nnnnnnnnn							
StartTime	00:00.0							
TimeForm	Absolute							
DEVICE_INFO								
Address	106							
CHANNEL_INFO								
Channel	Type	SampleRa	Equation	Coefficient	Unit	UnitSymb	WhereApplied	
ch1	Channel C	1Hz	result = data		bits		WSDA Data Downloader	
ch2	Channel C	1Hz	result = data		bits		WSDA Data Downloader	
ch3	Channel C	1Hz	result = data		bits		WSDA Data Downloader	
ch4	Channel C	1Hz	result = data		bits		WSDA Data Downloader	
ch7	Channel C	1Hz	result = data		bits		WSDA Data Downloader	
ch8	Channel C	1Hz	result = data		bits		WSDA Data Downloader	
DATA_START								
Time	ch1	ch2	ch3	ch4	ch7	ch8		
53:06.0	0.334793	-0.01838	0.568628	0.517368	0.2	95.59		
53:08.0	0.325657	-0.02675	0.531673	0.576973	0.18	95.66		
53:09.0	0.340319	-0.03104	0.636578	0.445843	0.19	95.68		
53:10.0	0.329489	-0.02304	0.444651	0.509024	0.18	95.68		
53:11.0	0.325731	-0.02093	0.528097	0.616312	0.2	95.68		
53:12.0	0.327647	-0.02893	0.565052	0.584126	0.2	95.68		
53:13.0	0.332657	-0.02231	0.488758	0.511408	0.21	95.71		
53:18.0	0.325878	0.013215	0.480413	0.540018	0.2	95.78		

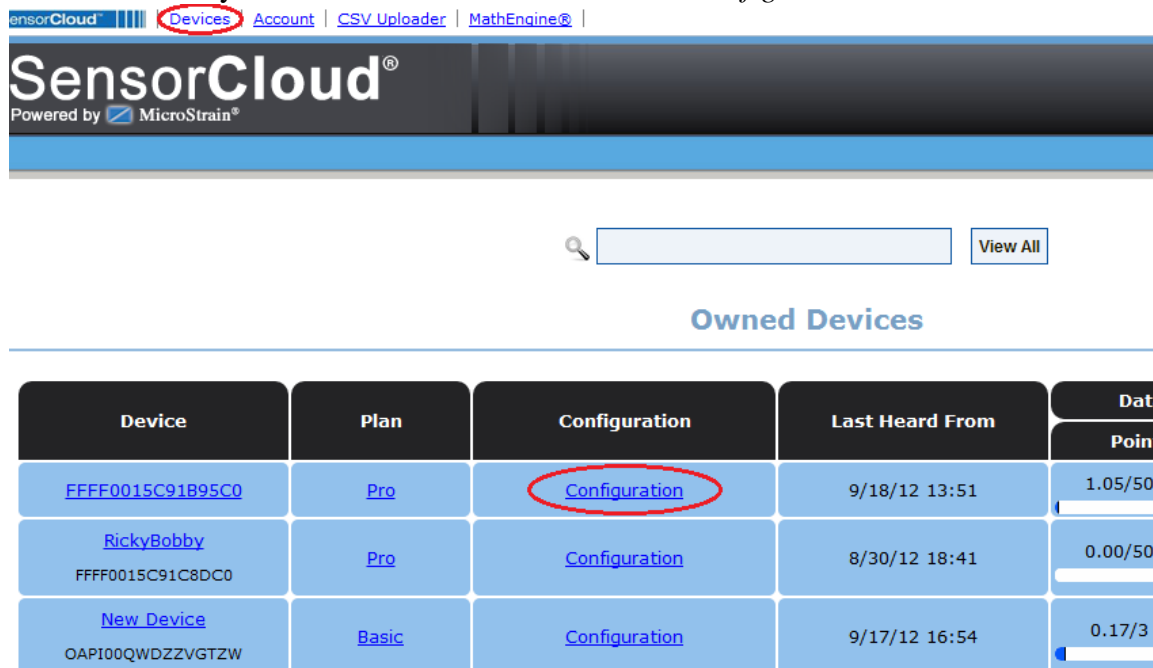
Figure 27. Generated CSV file

Chapter 7 – Remote Connectivity


The WSDA[®]-1000 maintains connections with SensorCloud[™] to provide secure remote access to both the Control Panel and LiveConnect services. For the WSDA[®]-1000 to provide these services it must have internet access on a network that allows outgoing TCP packets on port 443. The WSDA[®]-1000 must be setup with a Pro plan to be able access remote connectivity. If the WSDA[®]-1000 is not on a Pro plan the LiveConnect and Control Panel links will not be available on the device configuration page on SensorCloud[™].

Accessing the Control Panel Remotely

1. Navigate to <https://sensorcloud.microstrain.com> and log in using your SensorCloud[™] credentials.
2. Once logged in, navigate to your devices page by clicking on the *Devices* tab in the top left corner.
3. Find your WSDA[®]-1000 and click on the *Configuration* link.



sensorCloud **Devices** Account | CSV Uploader | MathEngine® |

SensorCloud[®]
Powered by  MicroStrain[®]

View All

Owned Devices

Device	Plan	Configuration	Last Heard From	Data Points
FFFF0015C91B95C0	Pro	Configuration	9/18/12 13:51	1.05/50
RickyBobby FFFF0015C91C8DC0	Pro	Configuration	8/30/12 18:41	0.00/50
New Device OAPI00QWDZZVGTZW	Basic	Configuration	9/17/12 16:54	0.17/3

Figure 28. SensorCloud[™] Devices Page

4. Click on the *WSDA Control Panel* button on the left hand side of the configuration page.



Figure 29. SensorCloud[™] Accessing WSDA[®]-1000 Control Panel

Accessing LiveConnect Remotely

1. Navigate to the *Configuration* page for the WSDA[®]-1000 you wish to LiveConnect with.
2. Click on the LiveConnect button on the left hand side of the configuration page. This will download a live_connect file.



Figure 30. SensorCloud™ Accessing LiveConnect

3. Open the live_connect file with the LiveConnect application. The WSDA will appear in LiveConnect and be automatically connected.

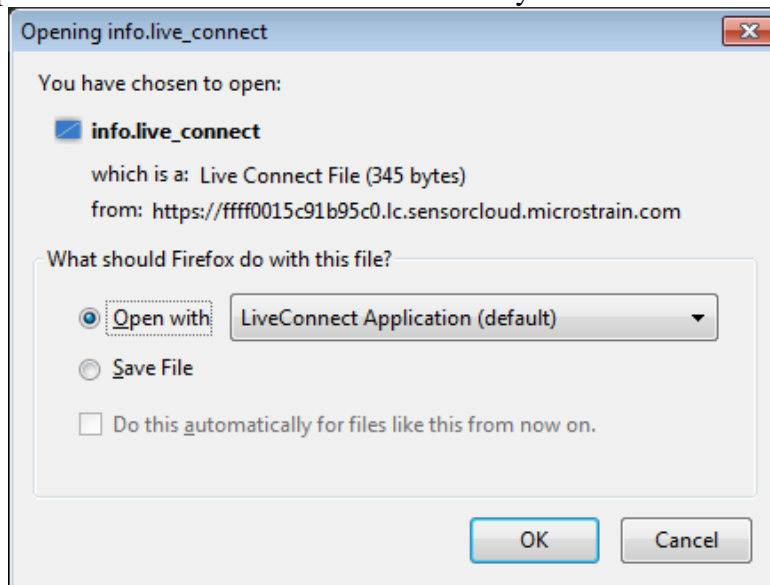


Figure 31. Open live_connect file with LiveConnect

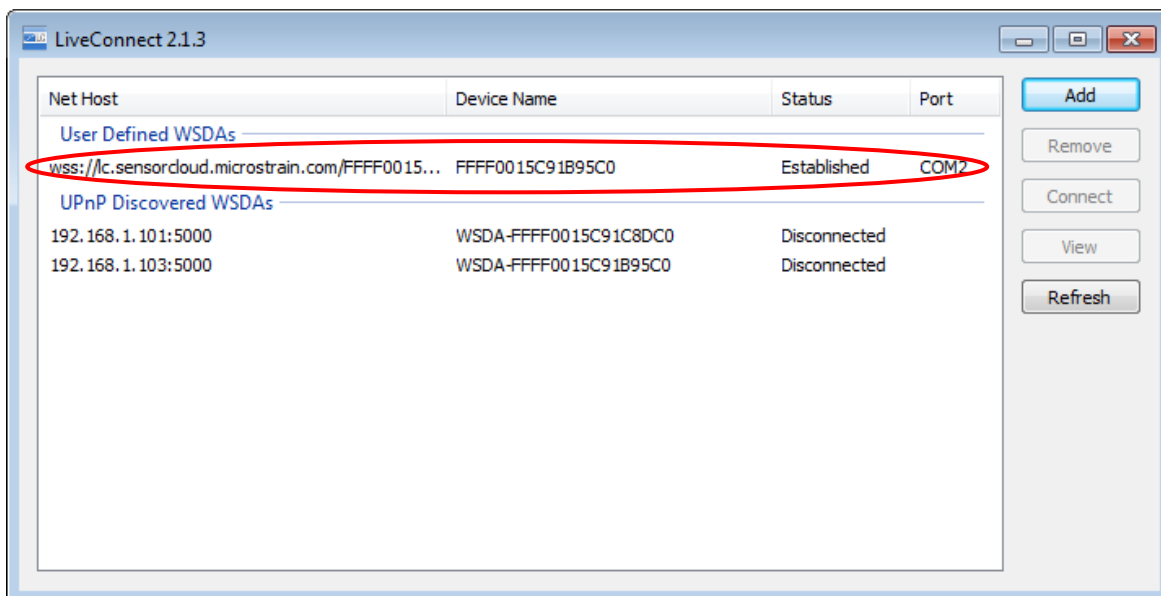


Figure 32. Remote WSDA[®]-1000 automatically connected in LiveConnect

Downloading Data Remotely

1. Navigate to your WSDA[®]-1000's Control Panel remotely.

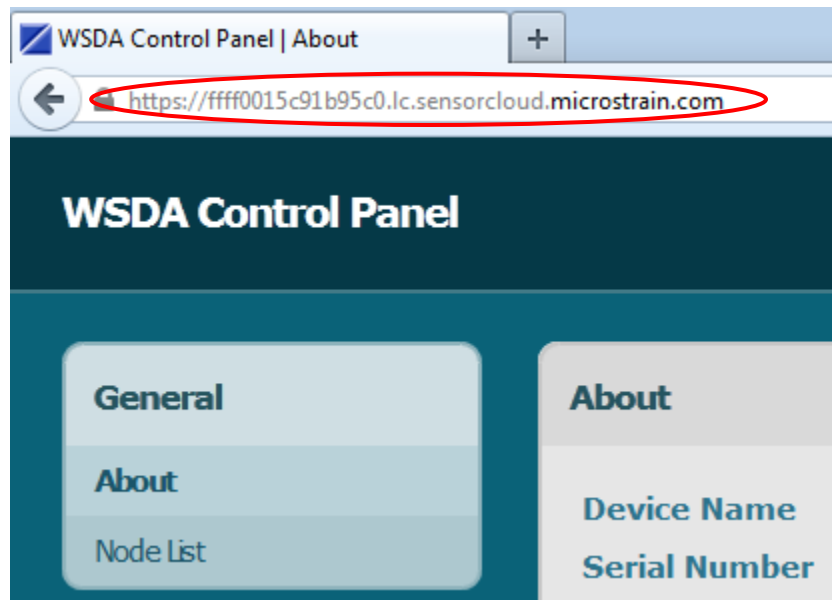


Figure 33. URL used to log into the WSDA[®]-1000 remotely.

2. Copy the URL in your address bar into the 'WSDA[®]-1000 URL' field of the data downloader interface and fill out the Login and Password fields with your WSDA[®]-1000 Control Panel credentials.

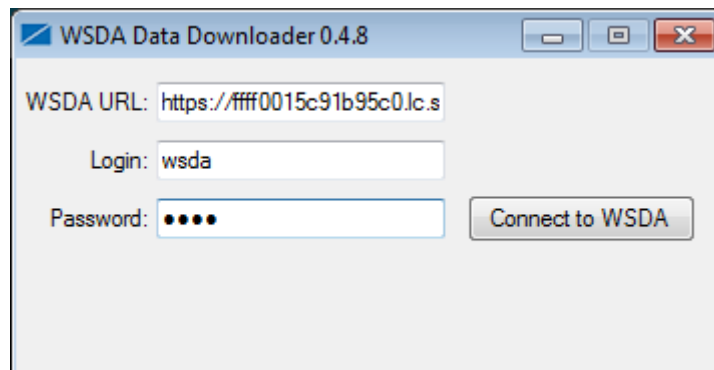


Figure 34. Remote URL as entered in WSDA[®]-1000 Data Downloader.

3. You will now be prompted to enter your SensorCloud™ credentials. The account you enter must be authorized to access the device you are downloading data from.

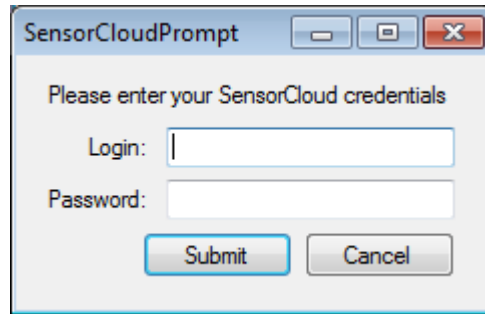


Figure 35. Prompt for SensorCloud™ credentials.

4. You will now be able to use the WSDA®-1000 Data Downloader Application as you normally would.

Chapter 8 - Further Topics

WSDA[®]-1000 Time Synchronization

The WSDA[®]-1000 has two on-board clocks, the System Clock and the Real Time Clock (RTC). The purpose of the System Clock is to provide the Operating System with a time source. The purpose of the Real Time Clock is 1) to provide time updates to the System Clock, and 2) to provide the beaconing function of the WSDA[®]-1000 with its timing source.

During normal operation, the WSDA[®]-1000 synchronizes time with its various time sources starting with the most accurate down to the least accurate. For each time source the WSDA[®]-1000 will first try to get a new time, if that fails it will check to see if it already has a non-expired time from that source, if it doesn't have a non-expired time it will move on to the next source. During boot the WSDA[®]-1000 must successfully synchronize time before it starts the data logger. After the WSDA[®]-1000 has successfully synchronized time on boot future time synchronization attempts will not interfere with data logging, even if they are unsuccessful. Manually setting time on the WSDA[®]-1000 will immediately override any synchronization attempts and allow data logging to start if it is configured to.

Refreshing Parameters

Several of the parameters in the WSDA[®]-1000 Control Panel are constantly changing such as System Time, Node List, Flash Card Utilization, etc. The WSDA[®]-1000 Control Panel does not automatically refresh the on-screen display of all parameters and keep the display of those parameters current. To refresh these parameters, the user can navigate between menu items, click the browser refresh, logout and login in, reboot, or cycle the power.

WSDA[®]-1000 Control Panel Timeout

The WSDA[®]-1000 Control Panel will timeout after 1 hour if it is not in use. The user will be required to Login again to regain control.

Transmissions to SensorCloud[™]

The WSDA[®]-1000 is set at the factory to transmit newly received data to SensorCloud[™] at 2 minute intervals. To explain a bit further: let's say that the WSDA[®]-1000, during its current cycle, spends 4 minutes transmitting data to SensorCloud[™]. At the end of that transmission, the WSDA[®]-1000 waits 2 minutes and again sends its next swath of data. After that transmission ends, it waits 2 minutes and sends again. The length of time that it takes to send data to

the SensorCloud™ is a function of how much data is coming into the WSDA®-1000 from the wireless nodes it is servicing and internet connection speeds. SensorCloud™ also facilitates remote access to the WSDA®-1000's control panel and LiveConnect. When enabled the WSDA®-1000 maintains connections to SensorCloud™ to provide this feature, but only transmits data when the service requested by the user through SensorCloud™.