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WHEN MEASUREMENTS MATTER

Campbell Scientific Hydro-Link Hands on Training

NOAA Joint Satellite Conference Oct 2019, Boston Mass

Overview

- 1 - Introduction to Hydro-Link
- 2 - Introducing the CR300 Datalogger / DCP
- 3 - Downloading Hydro-Link
- 4 - Connecting to Hydro-Link
- 5 - Configuring the DCP Using Hydro-Link
- 6 - Using the Hydro-Link Dashboard
- 7 - Using the Hydro-Link Data Monitor
- 8 - Using Hydro-Link Diagnostics
- 9 - Conclusion

Introduction to the DCP

Shown is the CR300 datalogger mounted on top of the TX321 GOES transmitter

GOES transmitters provided by Campbell Scientific are CS2 Certified and support both timed and random transmissions

The CR300 datalogger provides analog and digital inputs for sensor connections and provides for different communication options including GOES, Cell and Iridium

Introduction to Hydro-Link

- Complete DCP Configuration Tool
  - Point and Click User Interface
  - Simple Library of Sensors
  - Multiple Communication Options
- Hands on Field Tool
  - Real-Time Measurements
  - Calibration Options
  - Data Retrieval Options
  - Diagnostic Services
  - Data Presentation Options

Hydro-Link Advantages

- Simple Download
  - ZIP File or Install File, Which is best for you
- Free
  - Allows all technicians to have the same tool
- Independent of PC
  - Configure on a PC, Continue on another PC
- Independent of Device
  - Use Smart Phones or Tablets

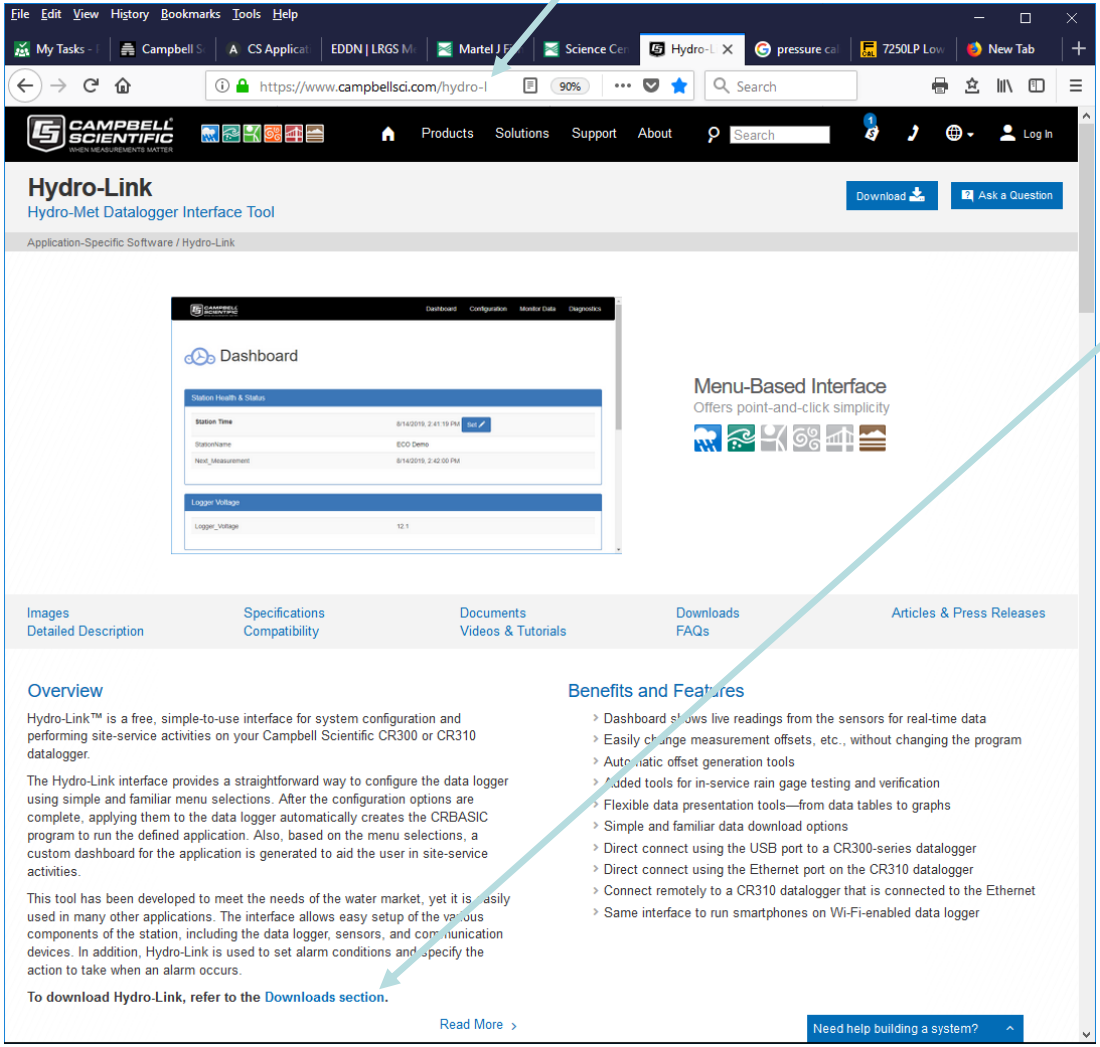
Limitations of Hydro-Link

- Currently works on CR300 series loggers, future plans may include other loggers.

- The current set of sensors in the library is limited. With the “generic” options in the library, all standard sensors are supported. The library will grow with the needs of the customer.

Downloading Hydro-Link

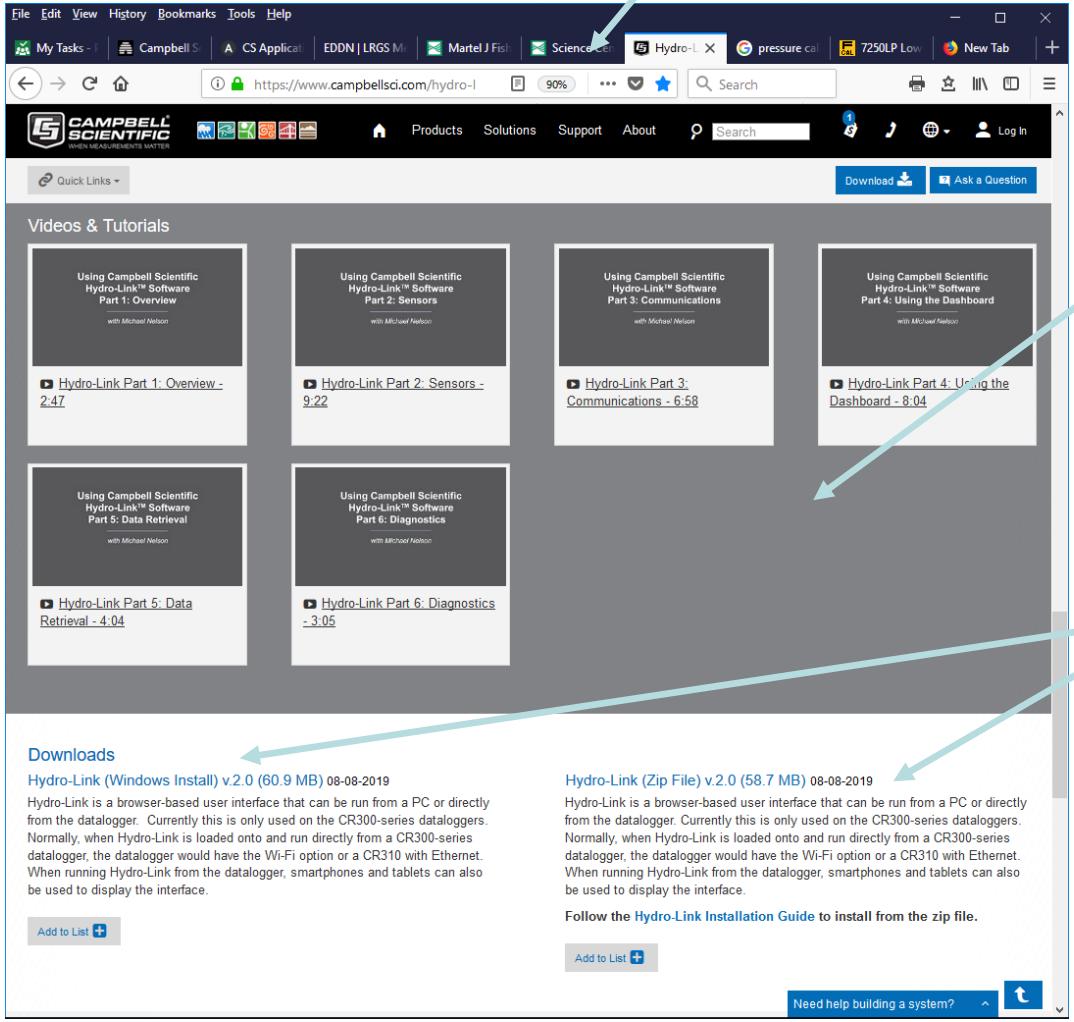
The link: https://www.campbellsci.com/hydro-link



Jump to the Download Options or scroll down and find them

Downloading Hydro-Link

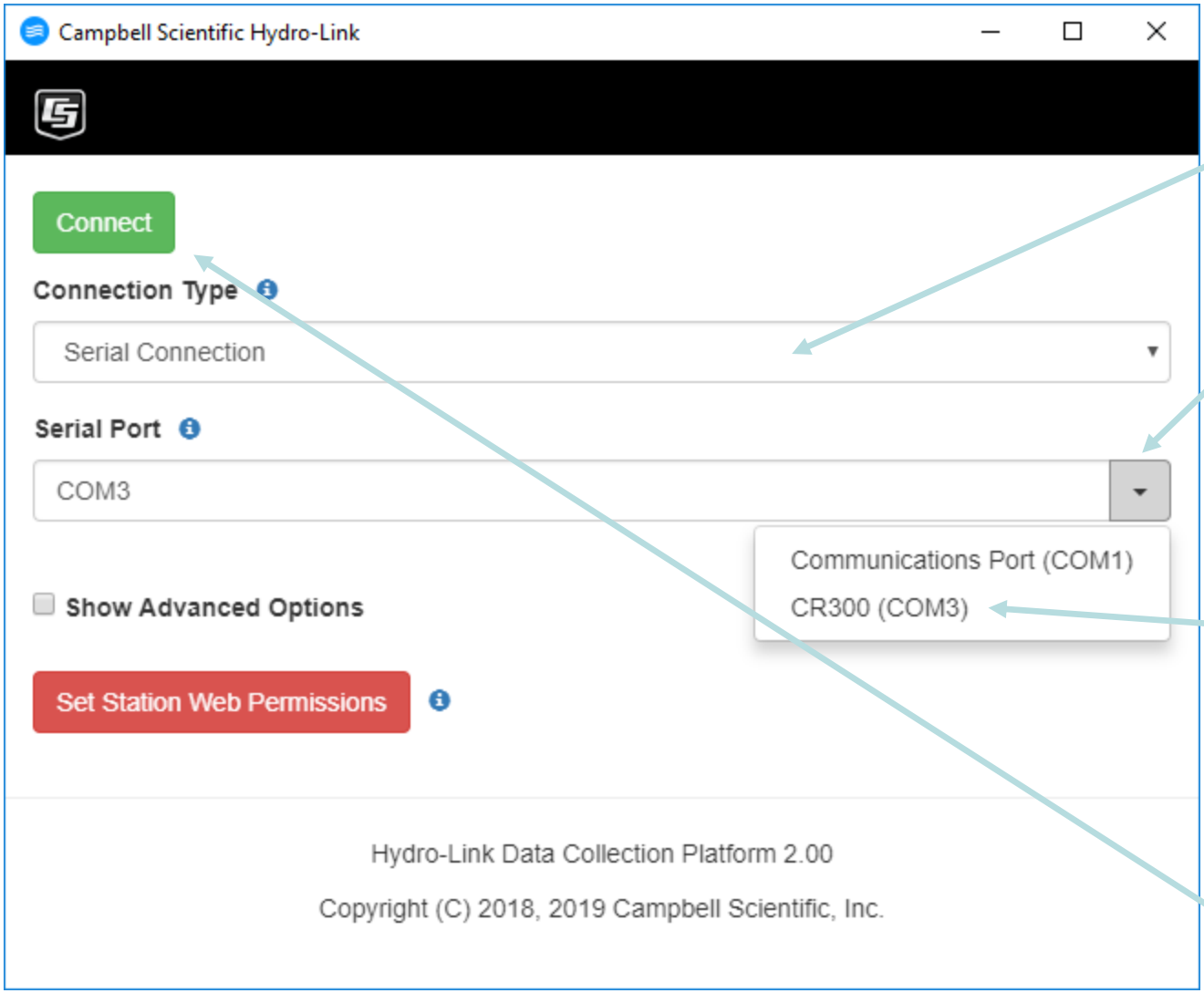
The link: https://www.campbellsci.com/hydro-link



Scrolling down shows other information on the interface, Here are some training videos on using Hydro-Link

Download Options: A ZIP File or a Windows Install File

Hydro-Link, Connect Screen - Serial



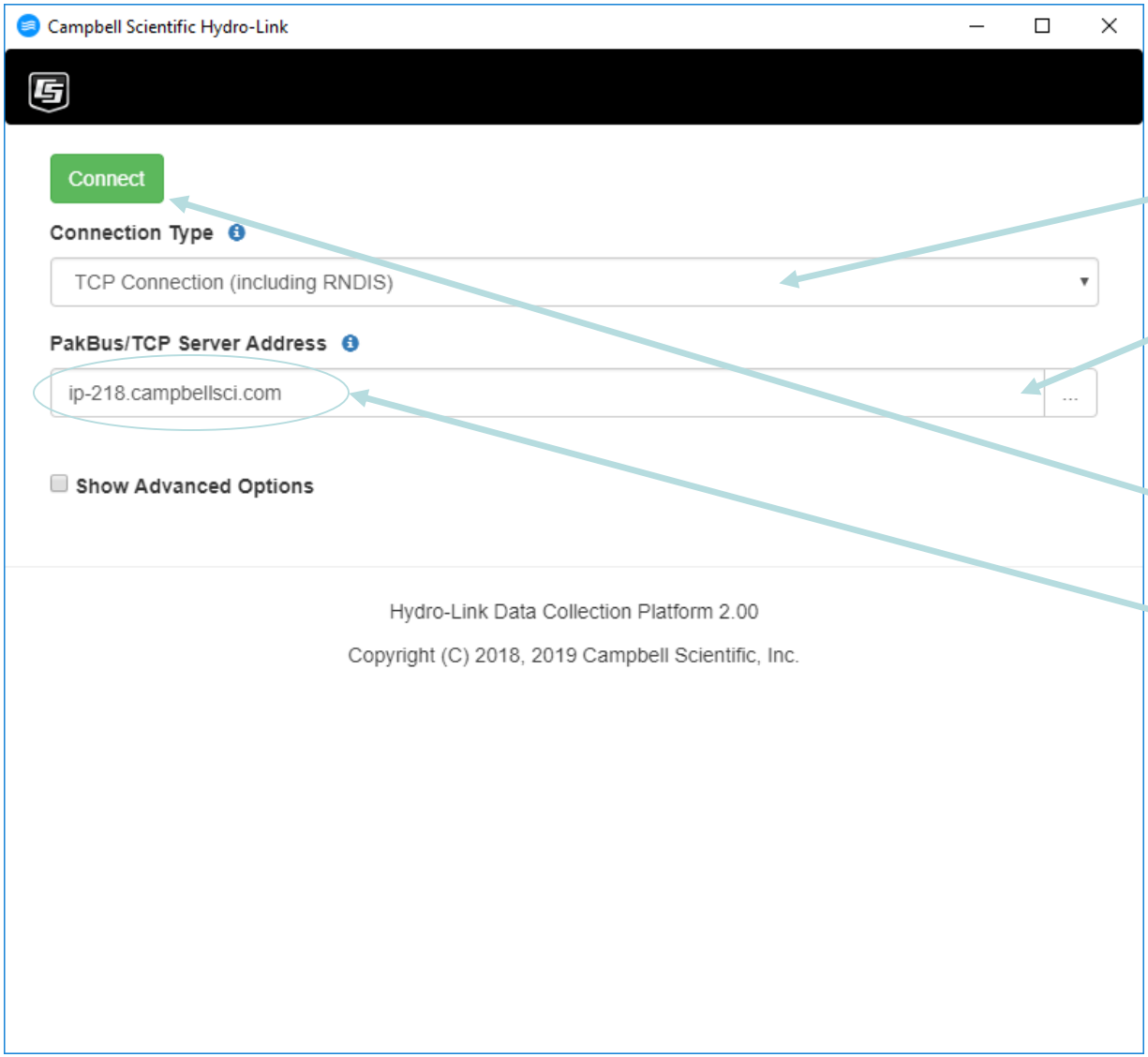
Use the USB serial connection

Use the dropdown option to see the available com ports

Select the CR300

With the CR300 connected, press the “Connect” button

Hydro-Link, Connect Screen - TCP



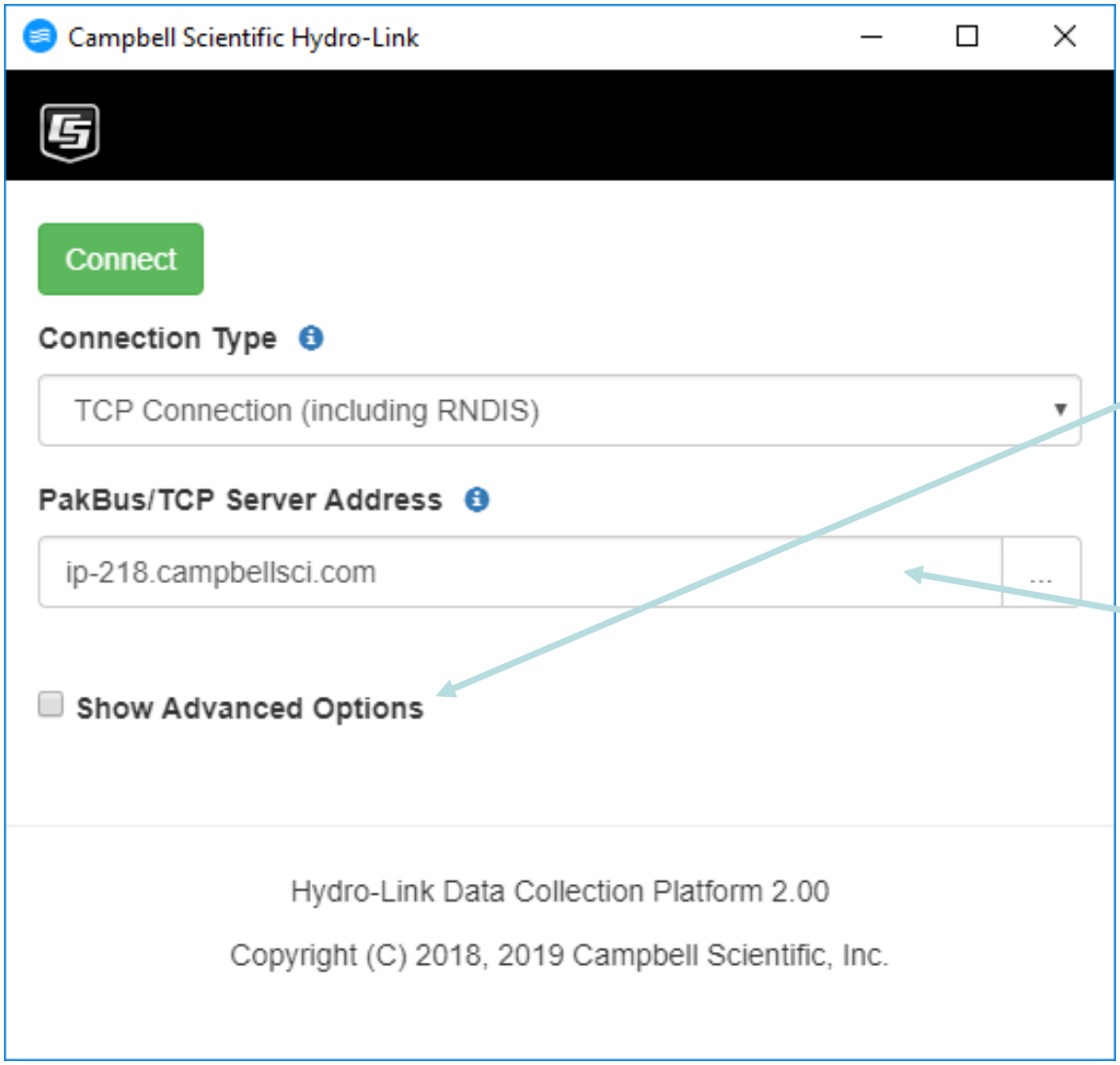
Use a wireless or internet connection

Enter the address of the datalogger

Press the “Connect” button

NOTE: This address is a test site in Logan Utah that may be accessed for live demos.

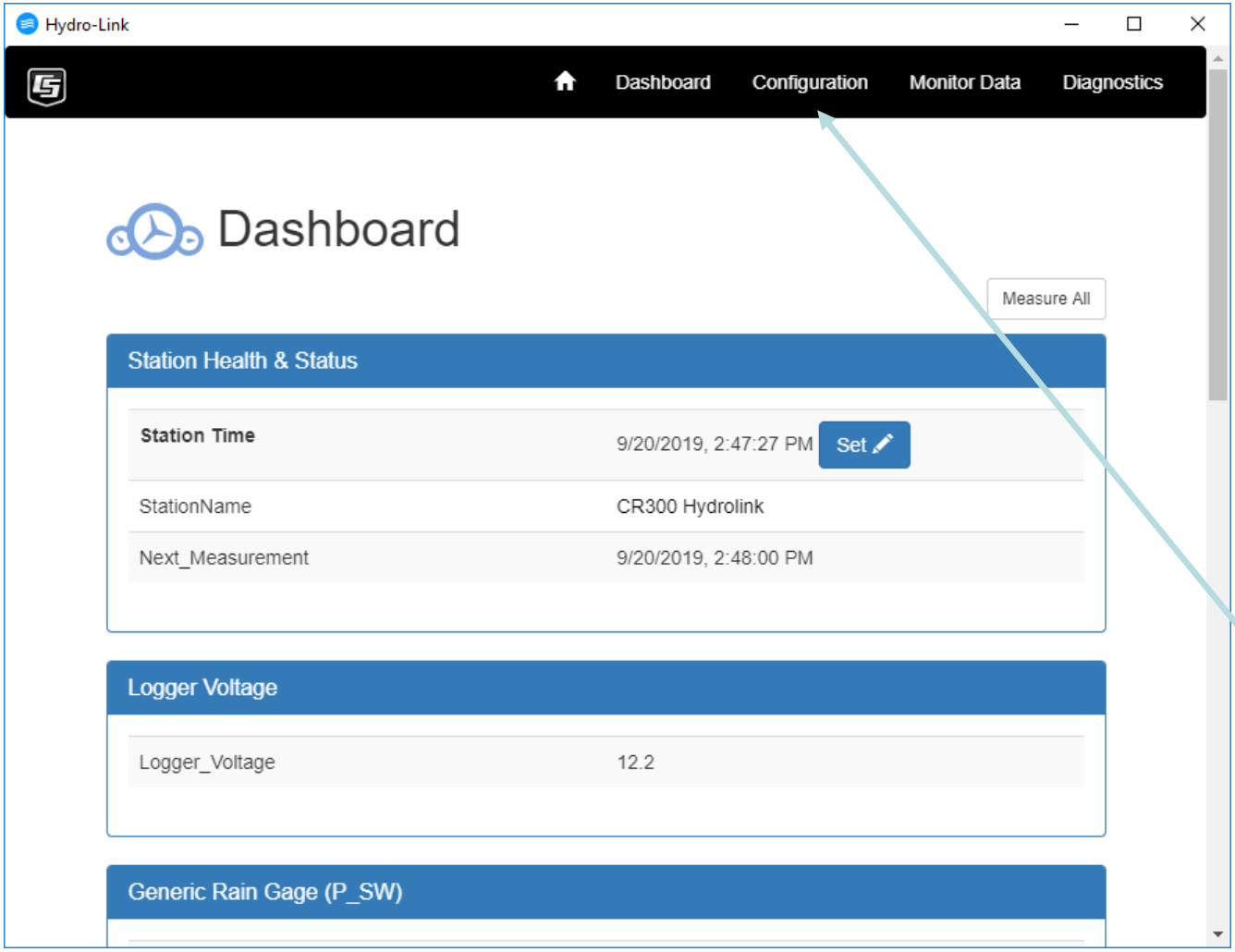
Datalogger Security



Some advanced options are used to set the password for the station when using an HTTP connection

On this demo site:
The User name is admin
The password is admin

Dashboard

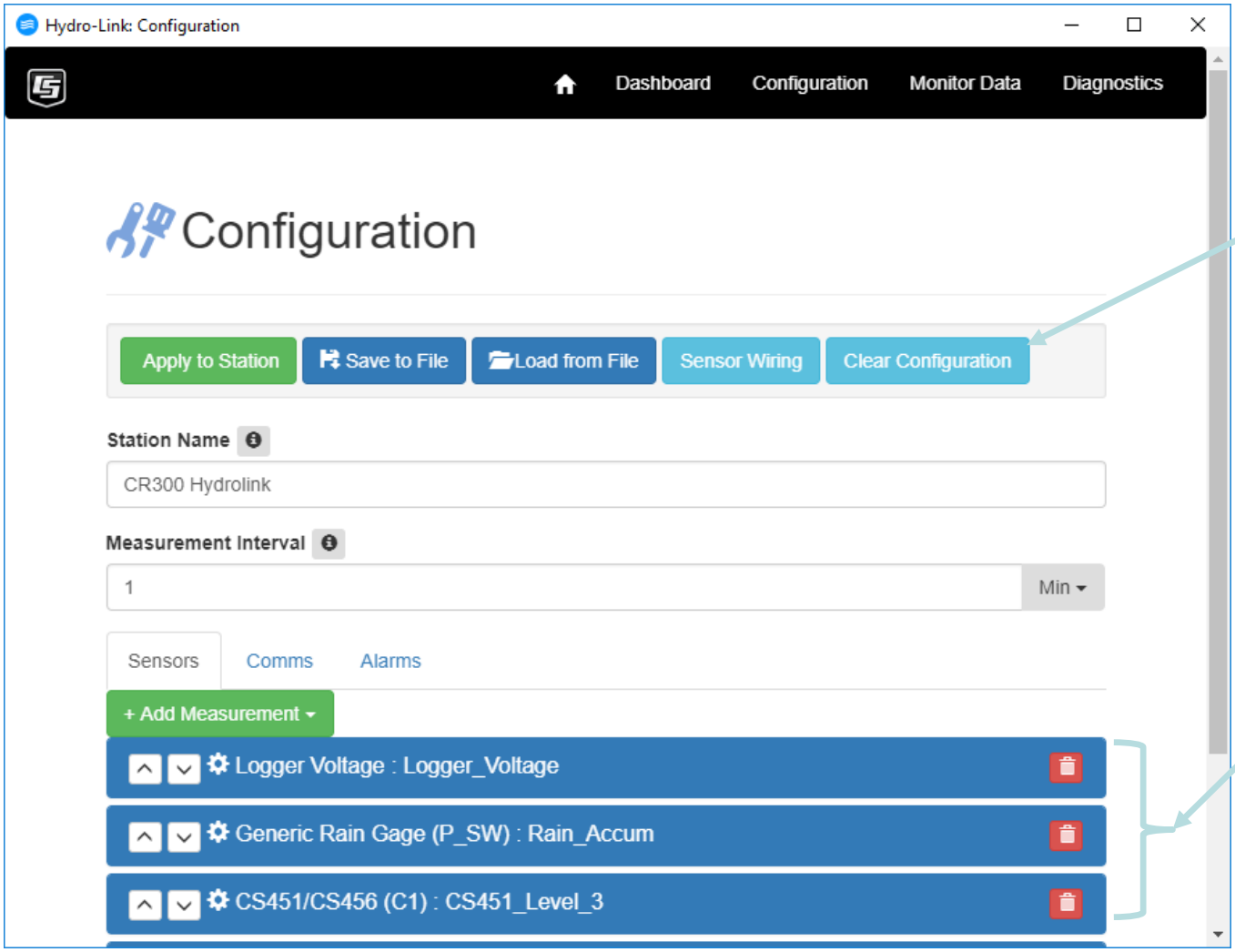


Normally after pressing the **Connect** button, the Dashboard is displayed.

The **Dashboard** layout is based on the current configuration.

To start a new **Configuration** select this option

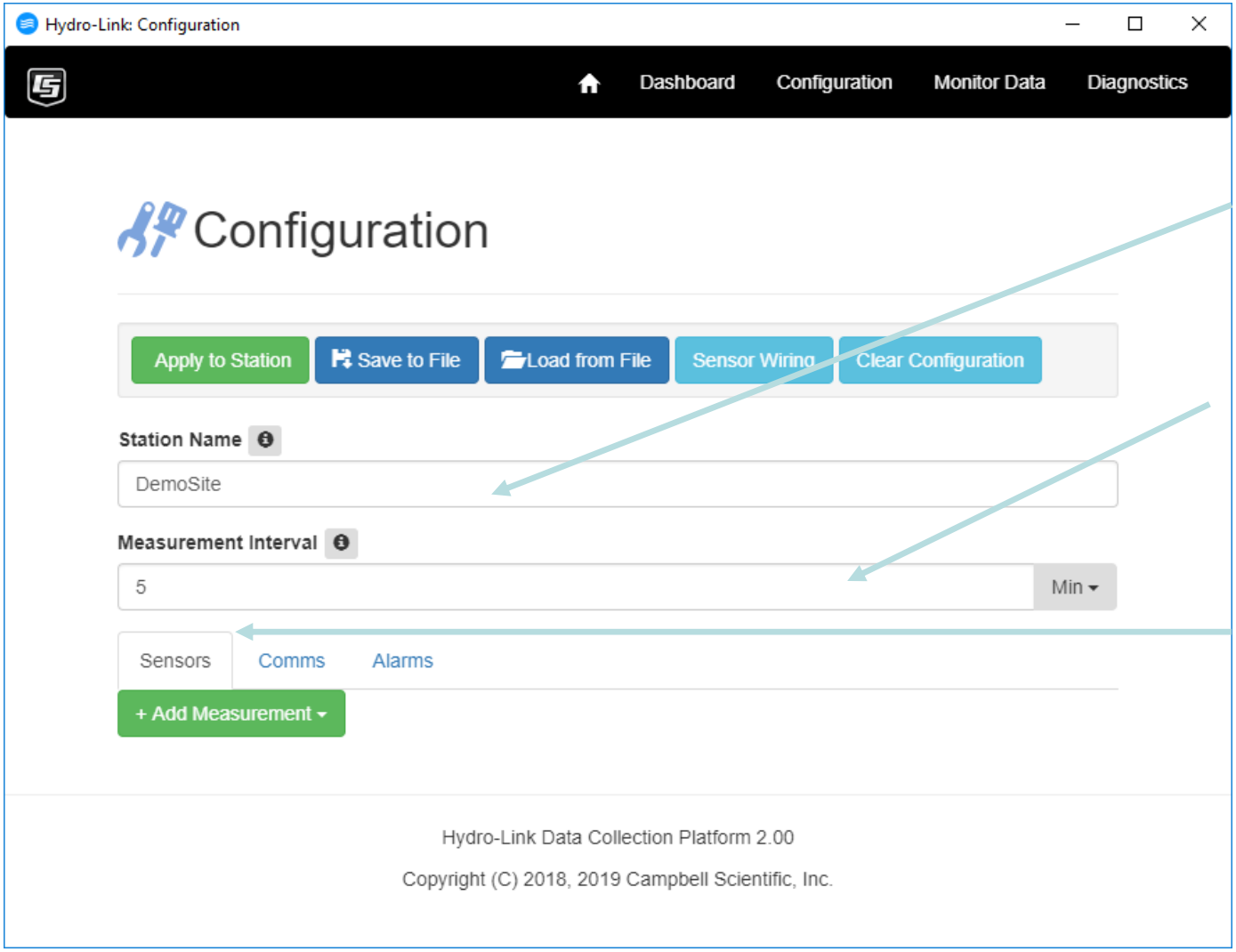
Configuration - 1



For a new configuration, we will want to clear out the current settings, use this option to clear the current options.

Once the **Clear Configuration** option has been used the current settings will be cleared out.

Configuration - 2



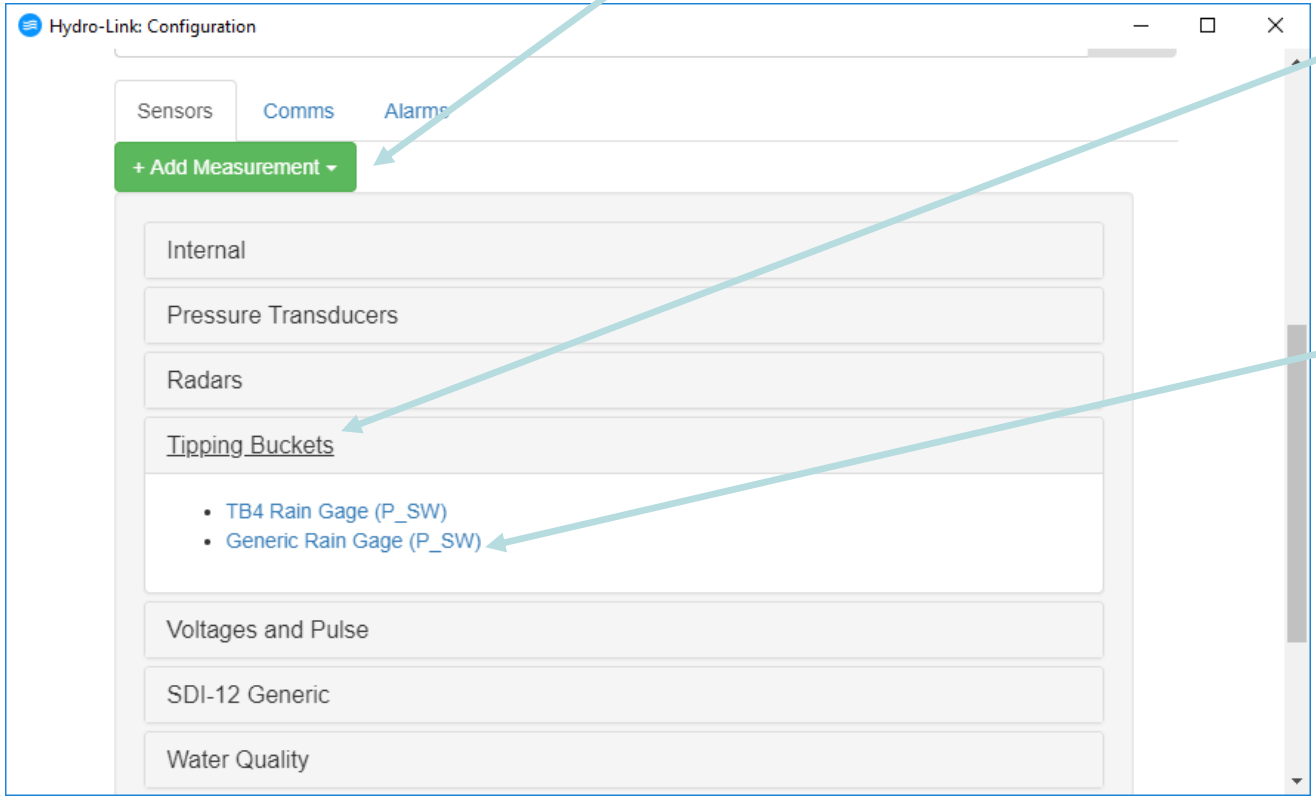
Enter in a **Station Name** for the new application.

Enter in a **Measurement rate**.

Now we are ready to add sensors.

Configuration - 3

To add a Rain Gauge, first press the **Add Measurement** option

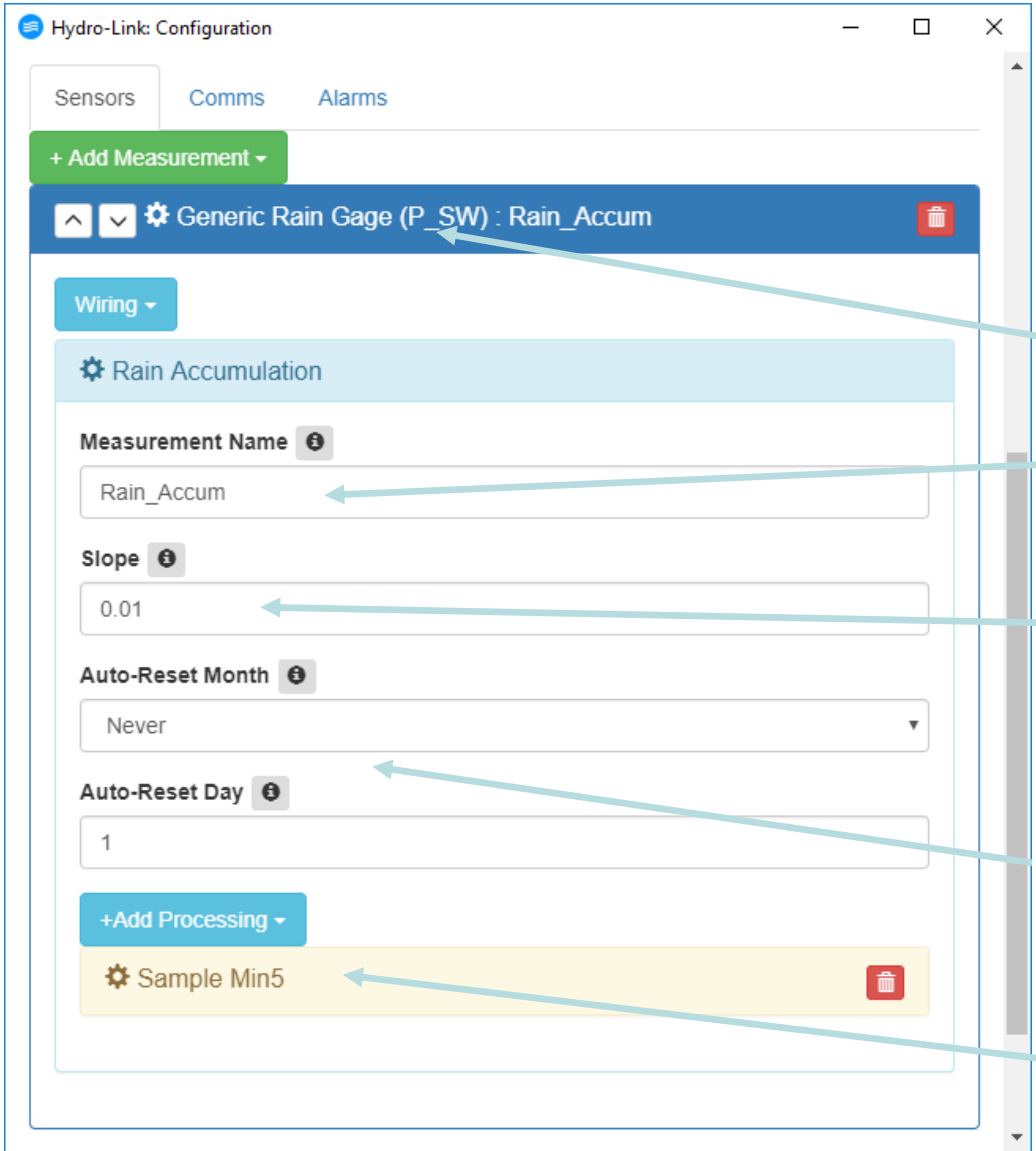


Next select the **Tipping Buckets** option

Then select the **Generic Rain Gauge** option,

Notice the (P_SW) label indicating what connection this is on the datalogger

Configuration - 4



A dialog box will be displayed allowing the user to make specific changes to the rain gauge. Once the options are complete, click on the **title bar** to minimize the options

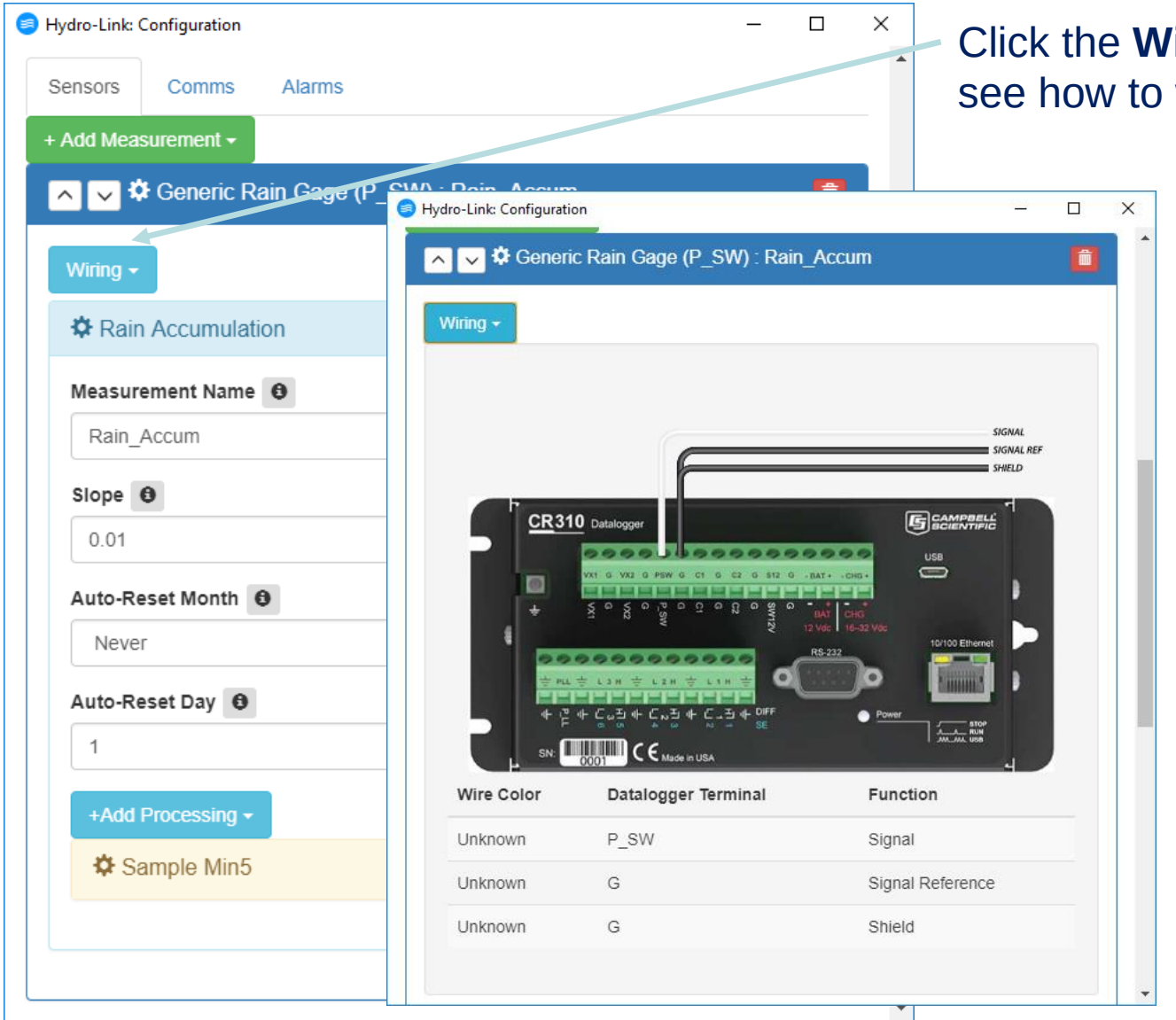
Enter in the name to use for the data identifier

Enter in the count per tip

If the rain accumulator is to be automatically reset, select a month and day for the reset to occur

Normally the processing can be left at the default settings

Configuration - 5



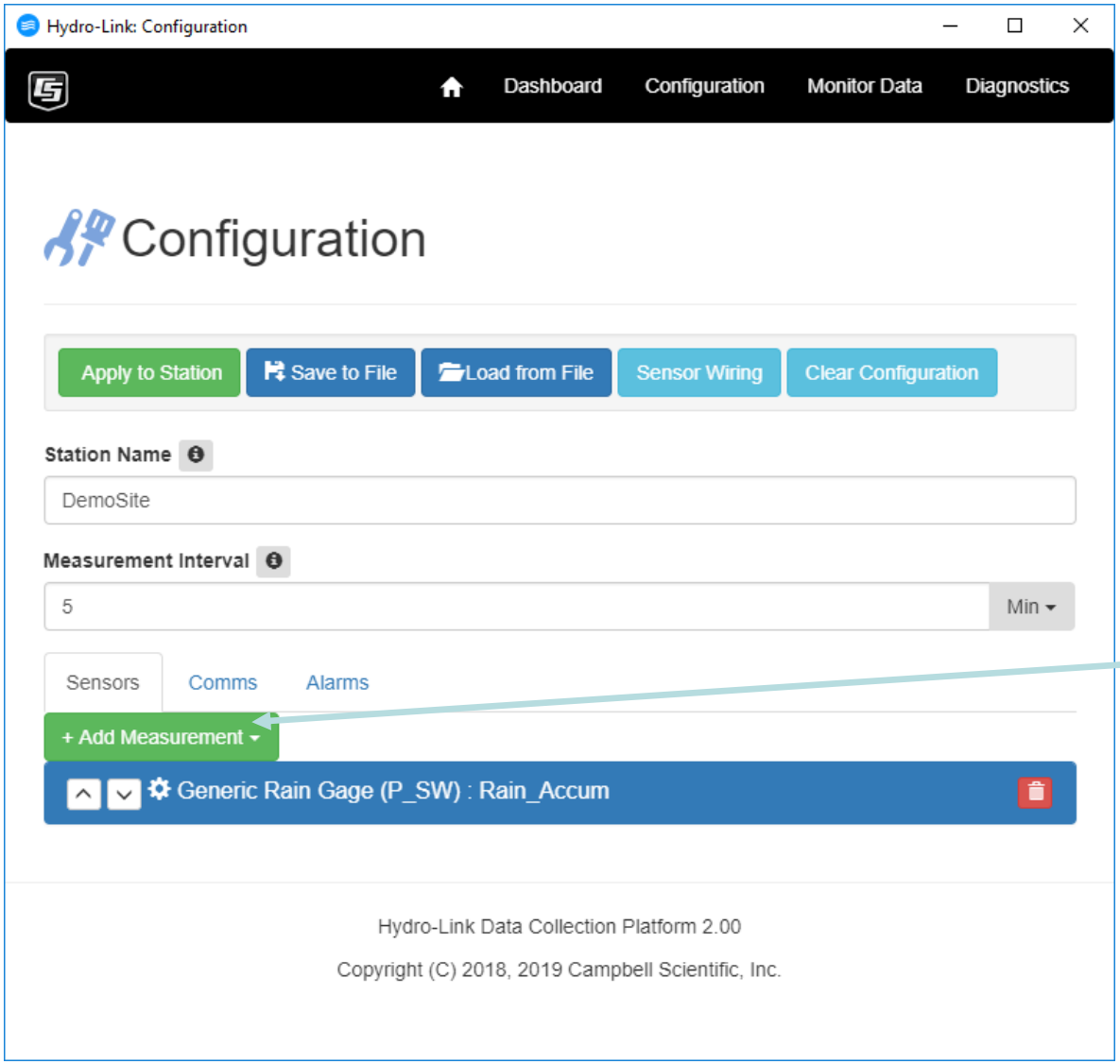
Click the **Wiring** button to see how to wire in the sensor

An image of the datalogger will be displayed with the wiring outlined

Click the **Wiring** button again to close this window

Click on the rain gauge title bar to minimize these options

Configuration - 6

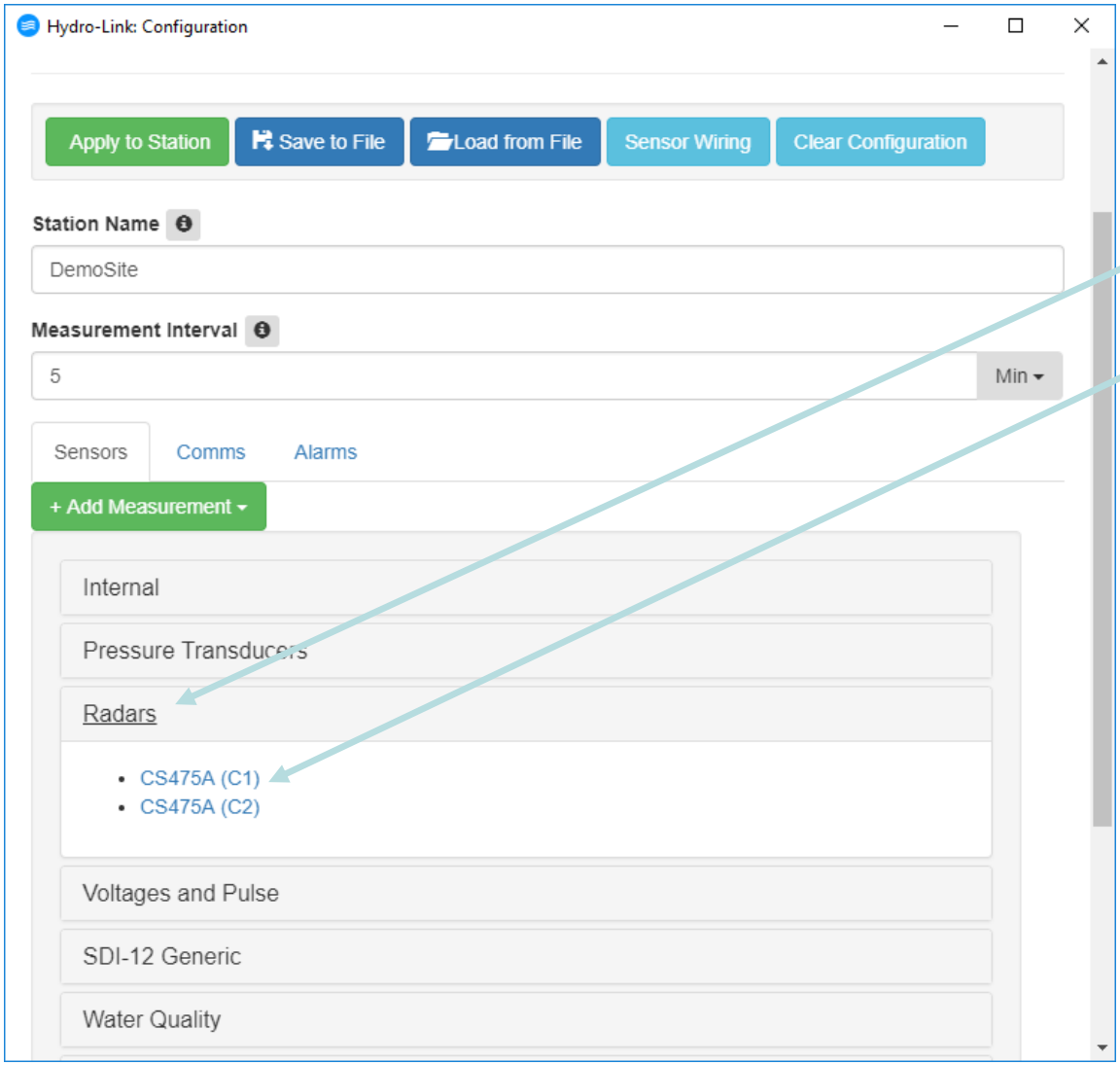


The rain gauge is now configured and the options for the rain gauge are minimized

Now add in a water level sensor. For this we will use the CS475A radar sensor

Click **Add Measurement** to start

Configuration - 7

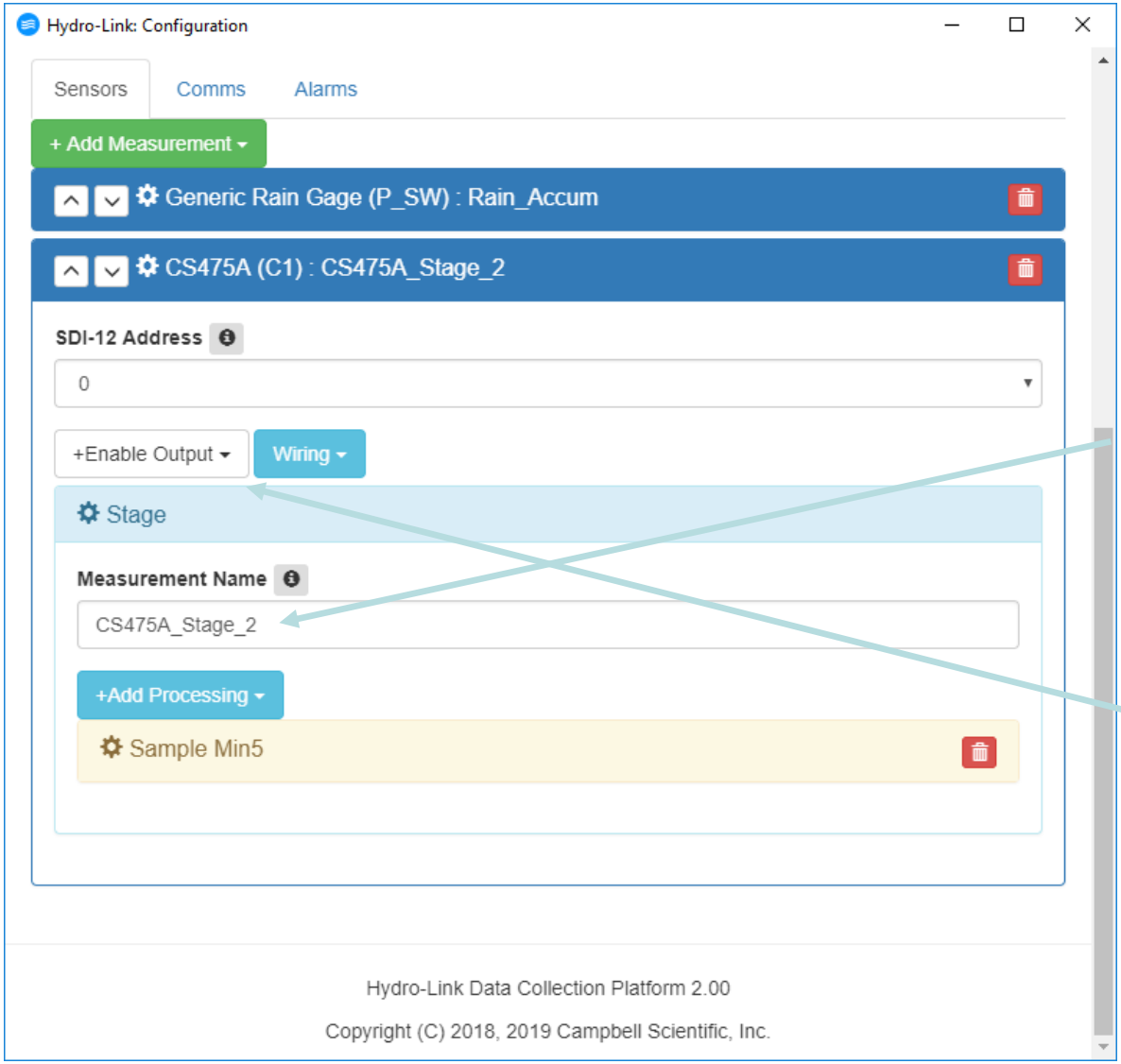


With the sensor library options displayed, Select the **Radars** option

Then select **CS475A (C1)**

This is an SDI-12 sensor that will be connected to the C1 terminal

Configuration - 8

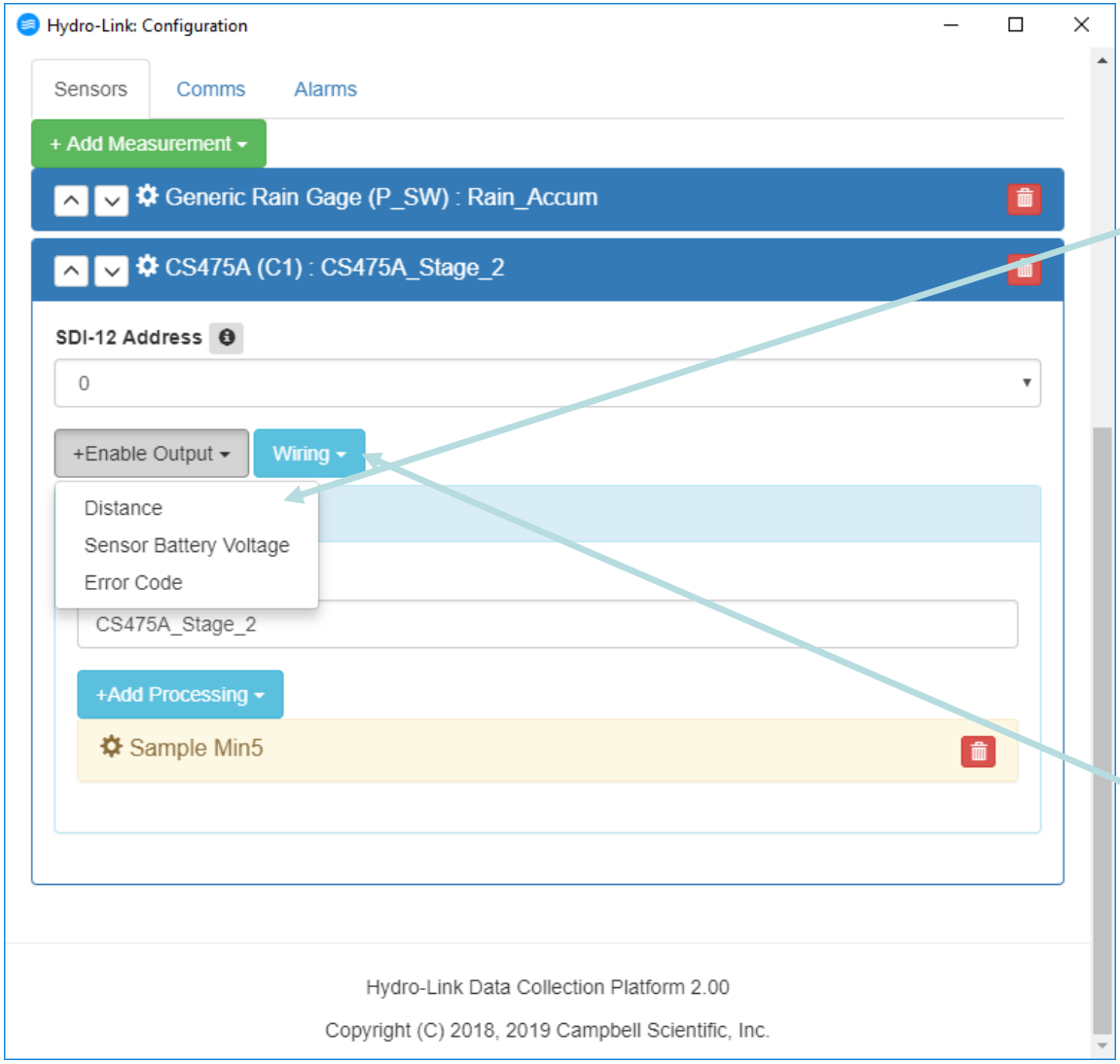


A new dialog box will be displayed showing the options to setup the radar sensor

Enter the name to use to identify the data value, the default value may also be used

The radar gauge has other output values, to enable one of them, select the **Enable Output** button

Configuration - 9



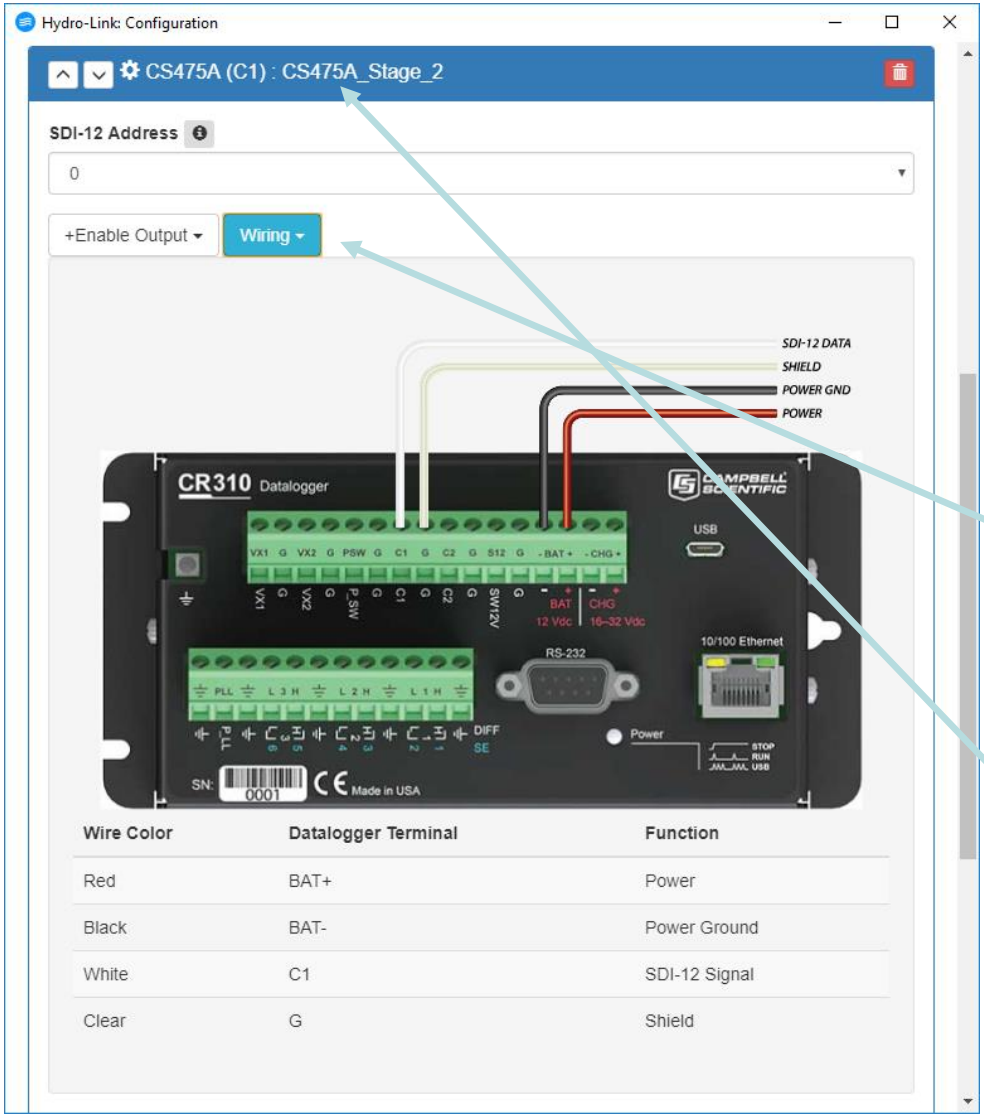
Additional output options are displayed here

Select an output and configure it using the options in the new dialog box that pops up

For this example, no other outputs will be used

Press the **Wiring** button to see how this sensor is wired to the datalogger

Configuration - 10



Wire Color	Datalogger Terminal	Function
Red	BAT+	Power
Black	BAT-	Power Ground
White	C1	SDI-12 Signal
Clear	G	Shield

An image of the datalogger is displayed showing the connections for the wires.

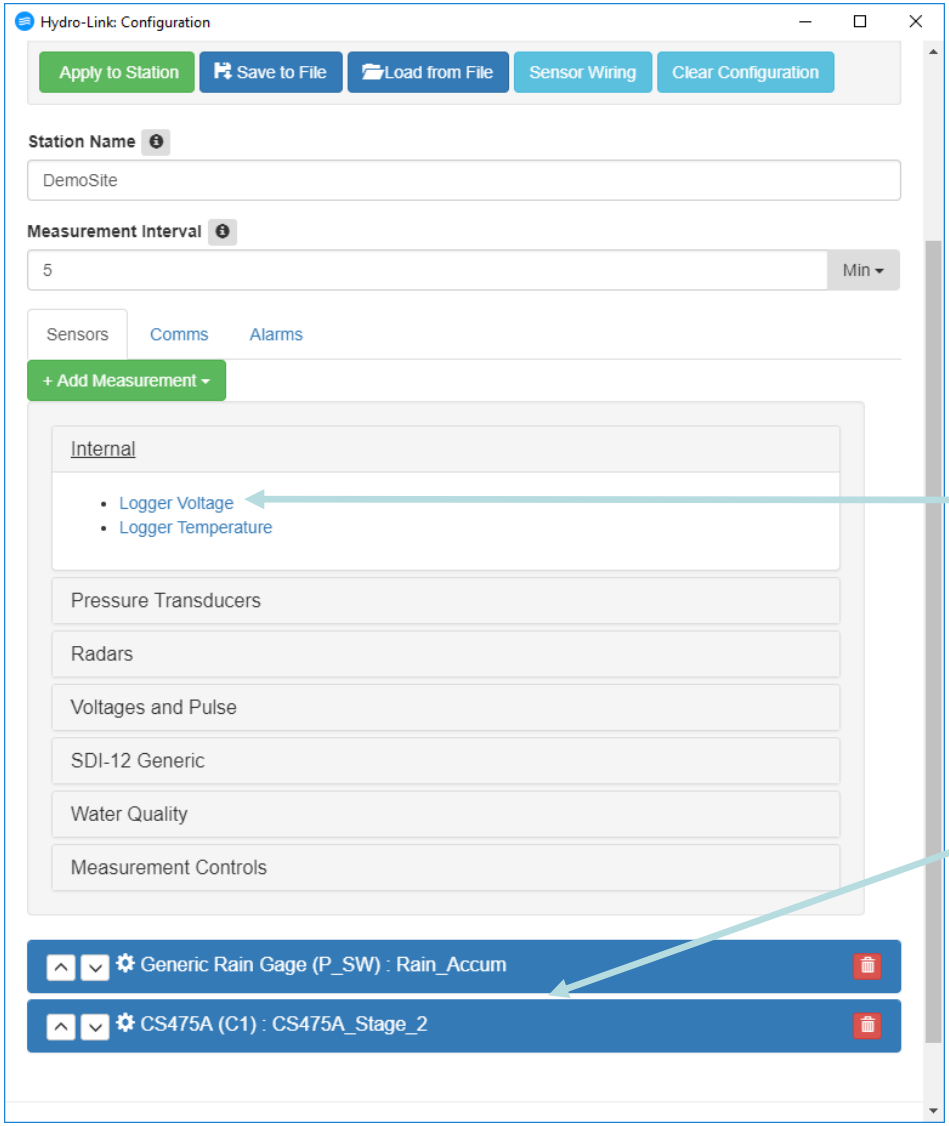
Also shown is a wiring table for this sensor

Clicking on the **Wiring** button again will cause the window to be removed.

The radar gauge is setup

Clicking on the **CS475A title bar** will cause the complete dialog box to be collapsed

Configuration - 11

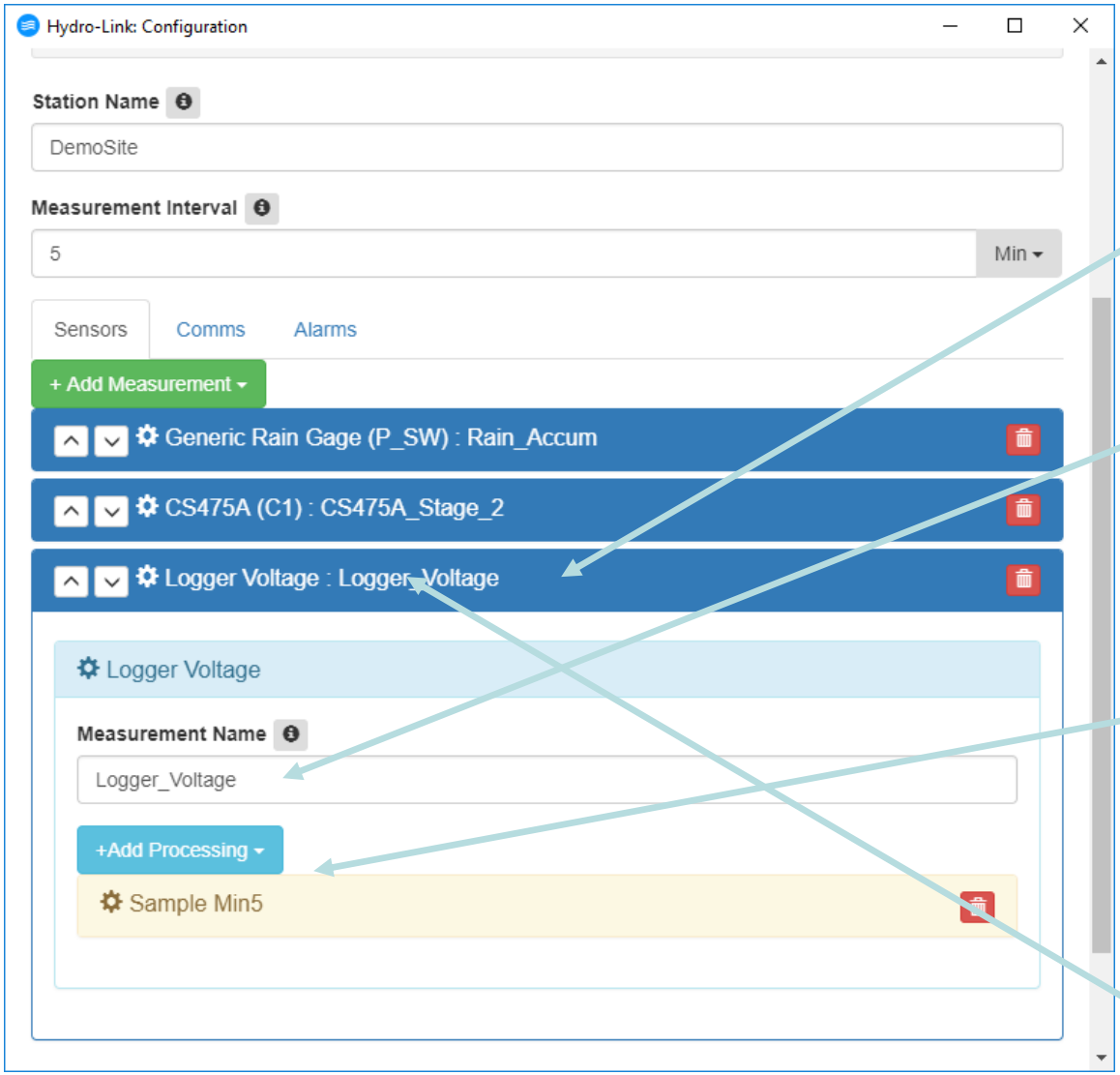


Now with the rain and water level sensor dialog boxes minimized, add in the system battery voltage. This is often recorded for diagnostic reasons

Select **Add Measurement**, **Internal**, and then **Logger Voltage**

Rain and water level shown here but minimized

Configuration - 12



The Logger Voltage measurement is added after the rain and water level measurements

If desired, change the default name for the data value

The default processing will be used

The Add Processing options are used to get averages, max and min values etc. if needed

Click the **title bar** to minimize this window

Configuration - 13

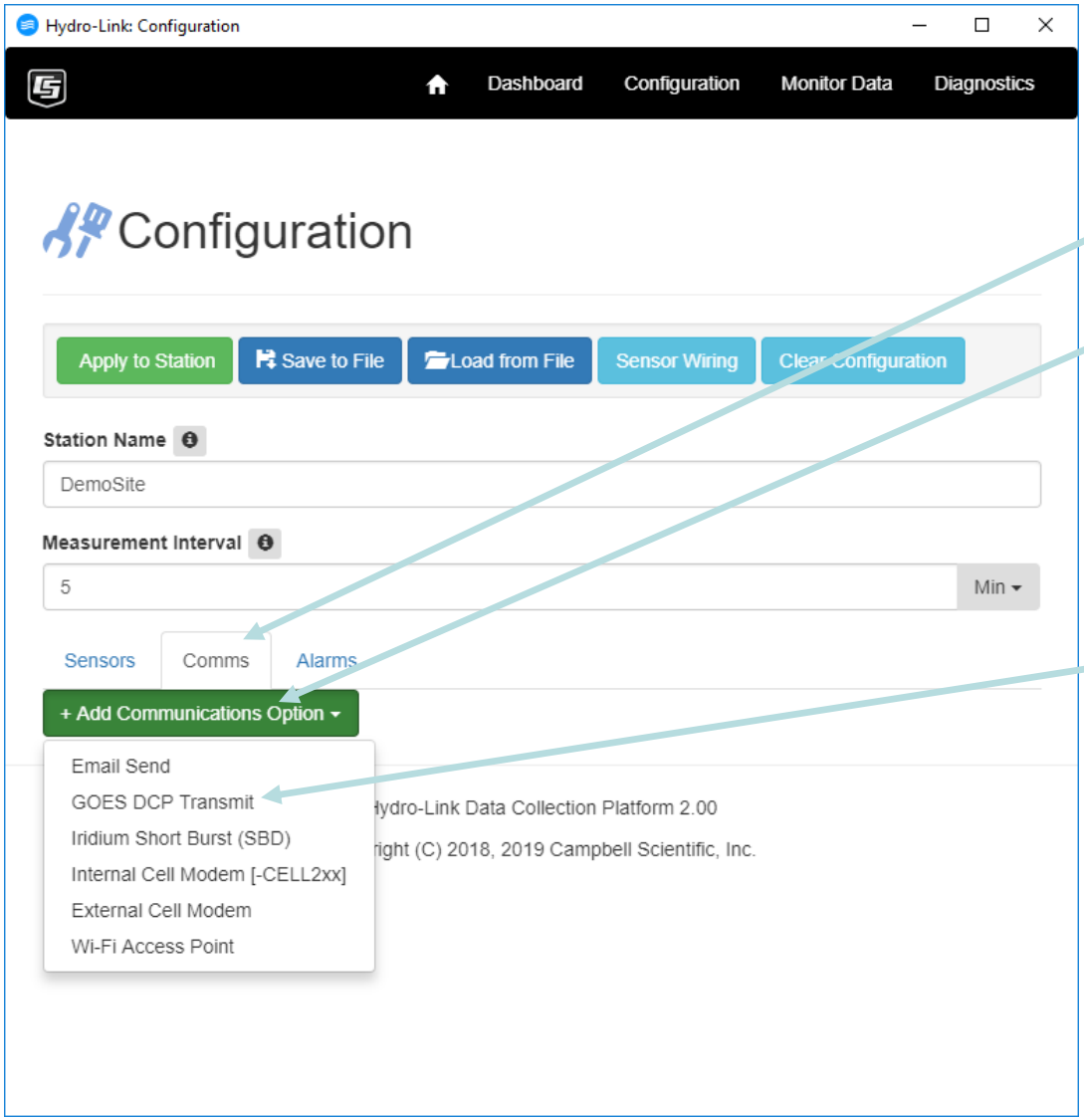
Here is the configuration window with the three sensors shown

Notice that the water level sensor is now listed before the rain gauge. The **arrow keys** were used to rearrange the order of the measurements as desired. Normally primary data is listed first

More measurements can be added if needed

Measurements can be deleted by clicking on the **garbage can**

Configuration - 14

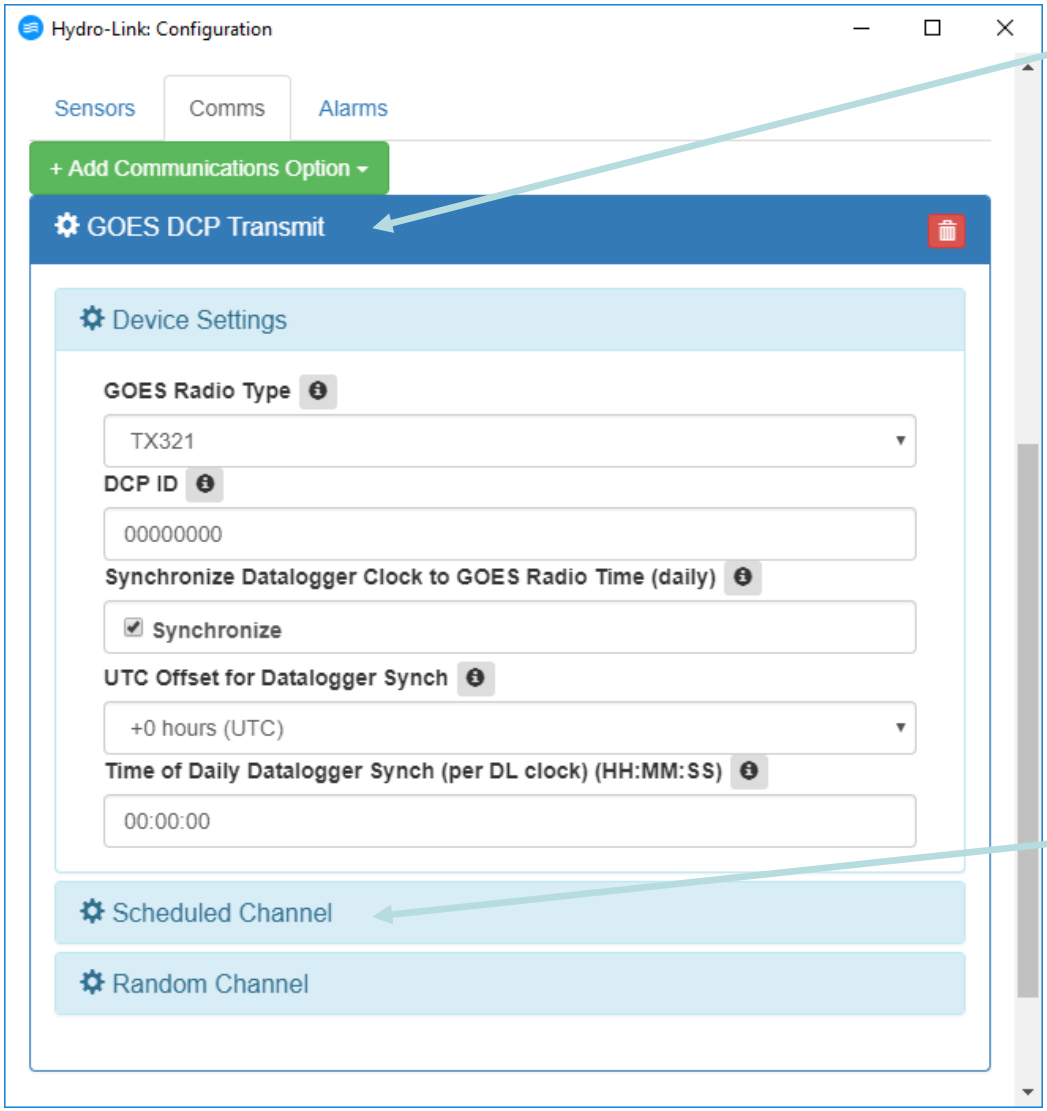


Now communication options can be configured

Select the **Comms** tab and then **Add Communications Option** button to see the options

Several different communication options are available, for this demo the **GOES DCP** option will be used. Click on this option

Configuration - 15

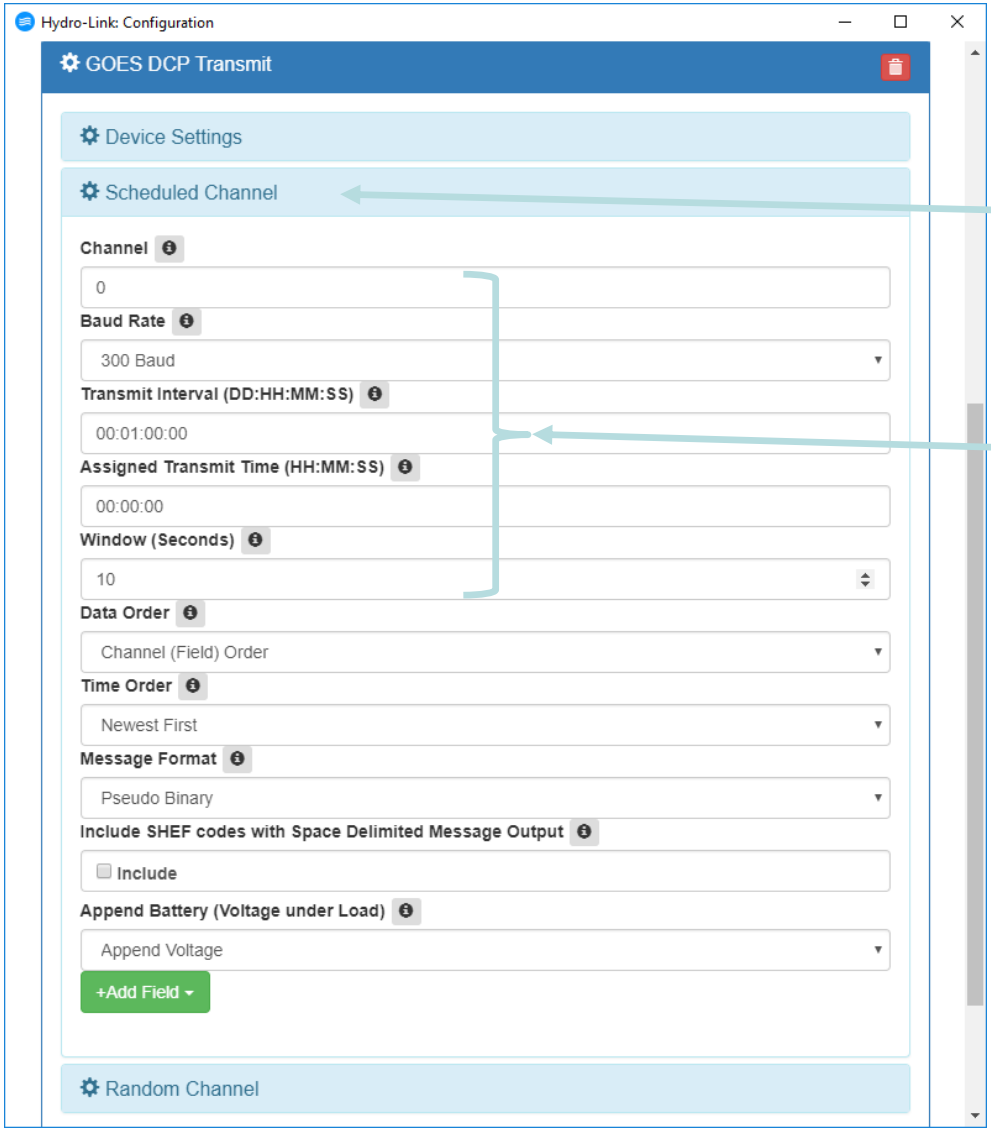


Clicking on the title bar will open the **GOES DCP**, Device Settings dialog box and show the title bars for the scheduled or self timed options and random options

The options here are general radio options, make the selections as needed. Some options for the DCP setup are assigned by NESDIS

Once options for the general setup have been made click on the title bar for the **Scheduled Channel** to open this dialog box

Configuration - 16



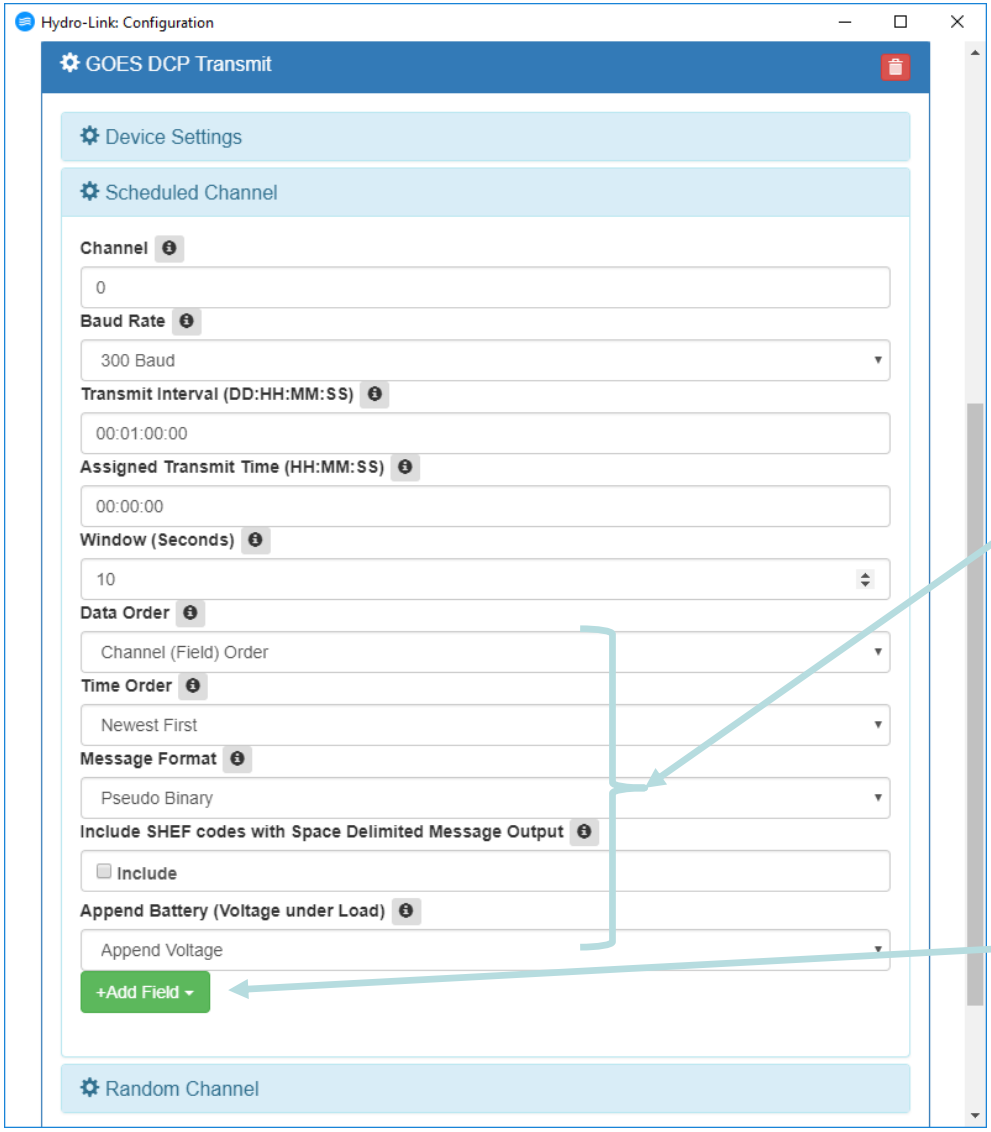
Clicking on the Device Settings title bar to minimize it.

Then click on the **Scheduled Channel** title bar to open that dialog box

Many options here are assigned by **NESDIS**, enter in the assigned values.

NOTE: Leaving these options at the default setting will cause the datalogger to leave the GOES radio disabled.

Configuration - 17

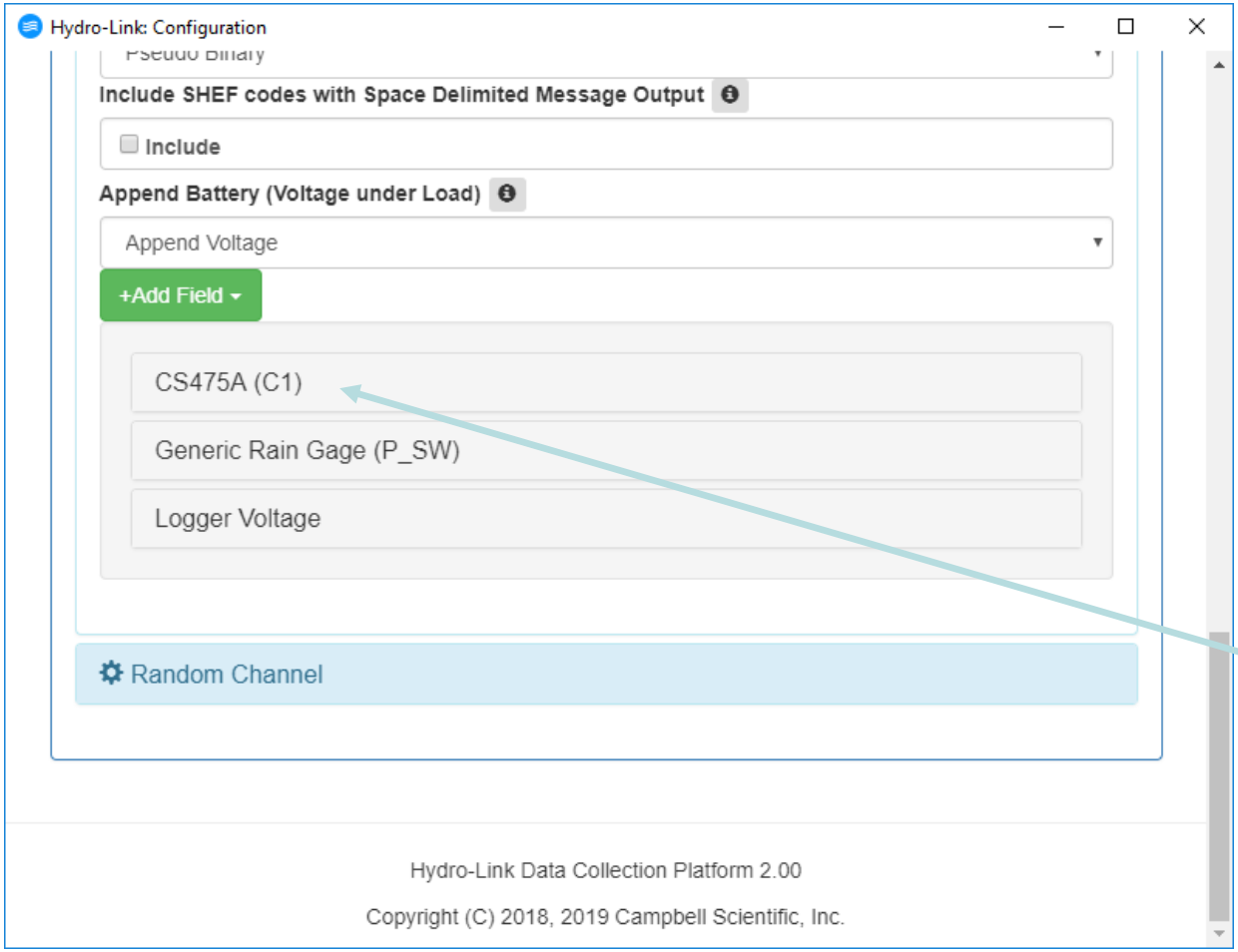


Other options on the **Scheduled Channel** page indicate how the data will be transmitted

These options indicate if the data should be transmitted in an ASCII or Pseudo Binary format, if the SHEF codes should be included in the transmission, what order the data will be transmitted, if a loaded battery reading is to be sent, etc.

Once these options have been selected, use the **Add Field** option to indicate what data to transmit

Configuration - 18

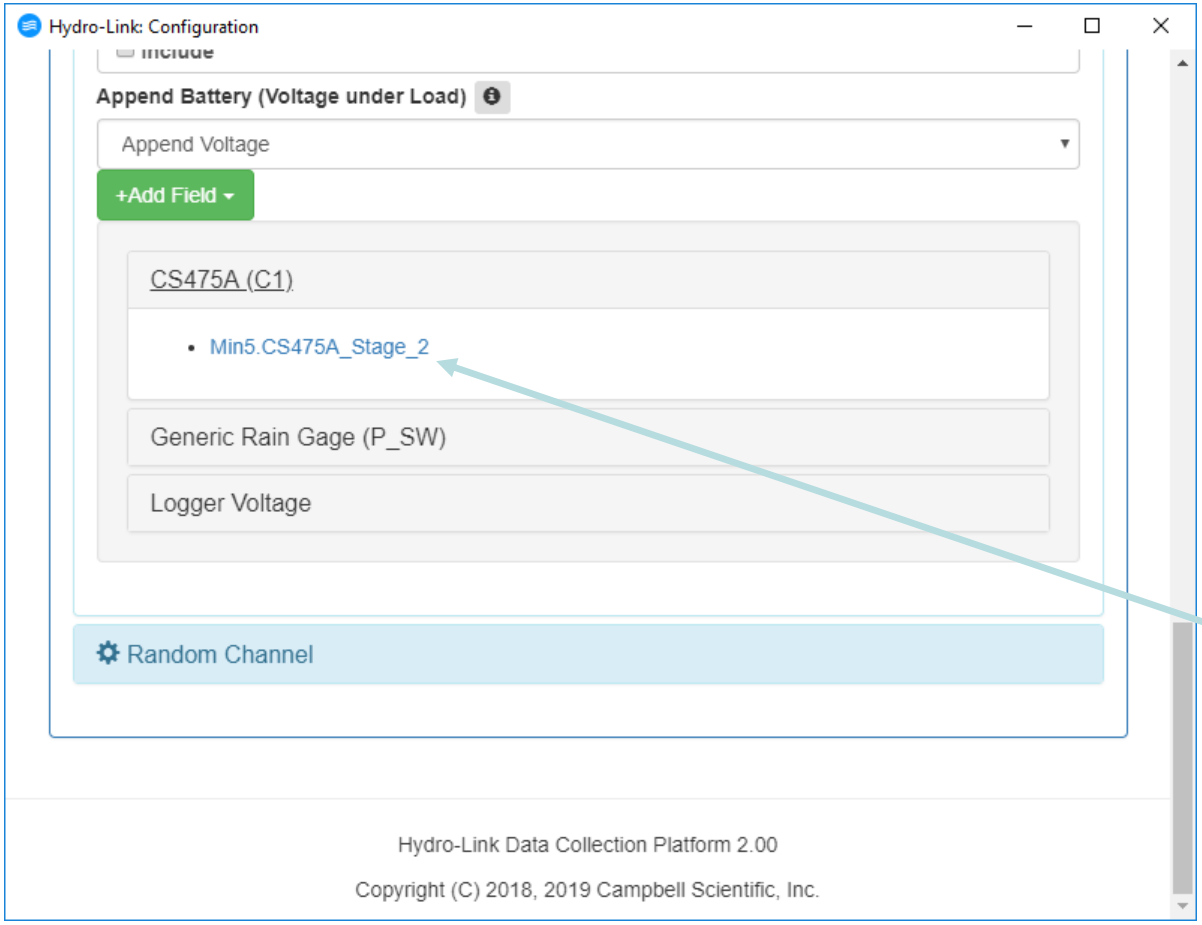


Notice once the **Add Field** button is clicked, the three measurements included earlier are listed.

Note the data logged does not have to be transmitted.

Click on the **CS475A Radar** to set it up to be transmitted

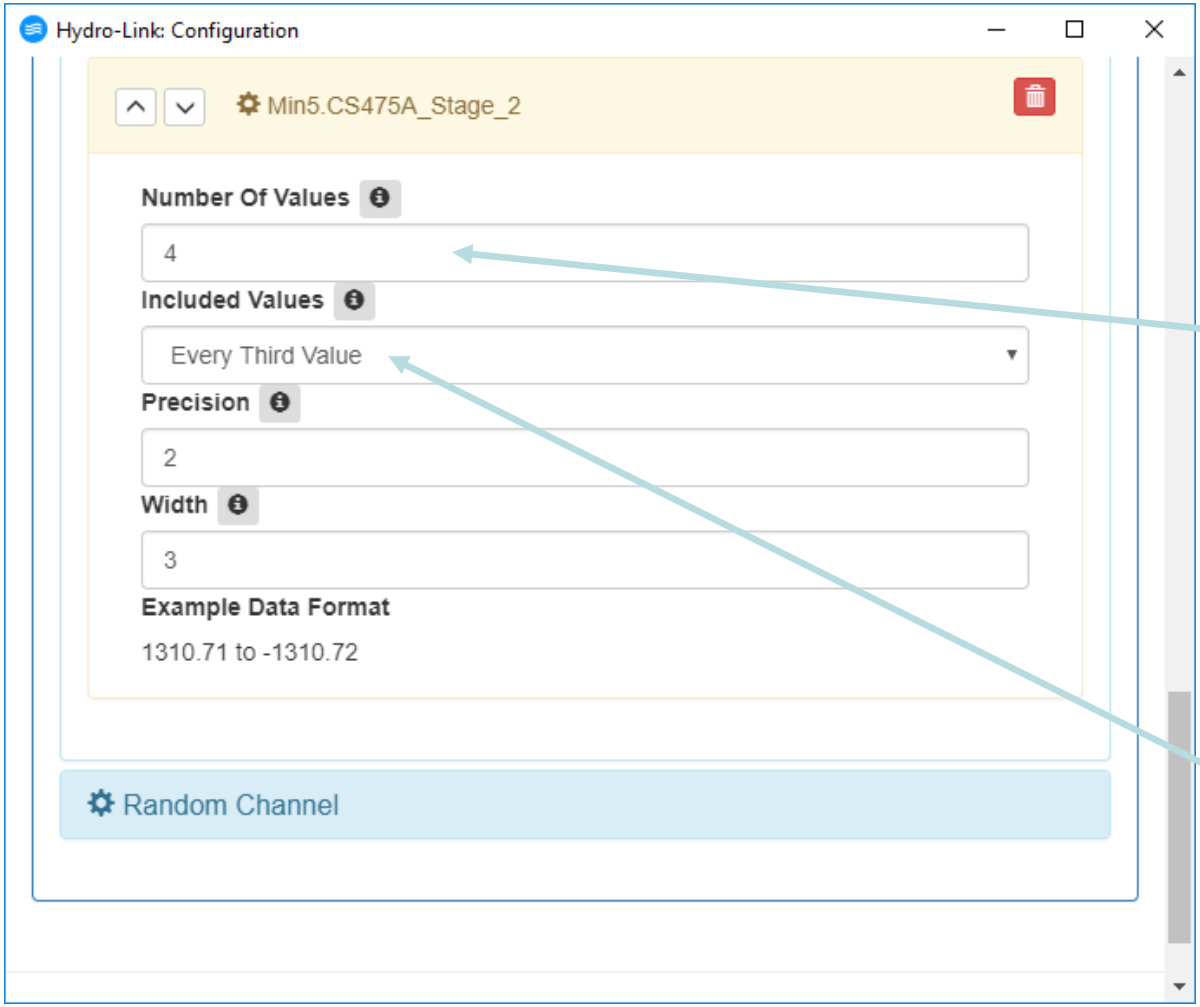
Configuration – 19



After clicking on the **CS474A**, the options from the measurement setup for that sensor are listed. Here only the **sample** water level (Stage) value is listed as we did not include any averaging or max, min processes

Click the **Min5.CS475A_Stage** link to open the dialog box for that measurement

Configuration – 20

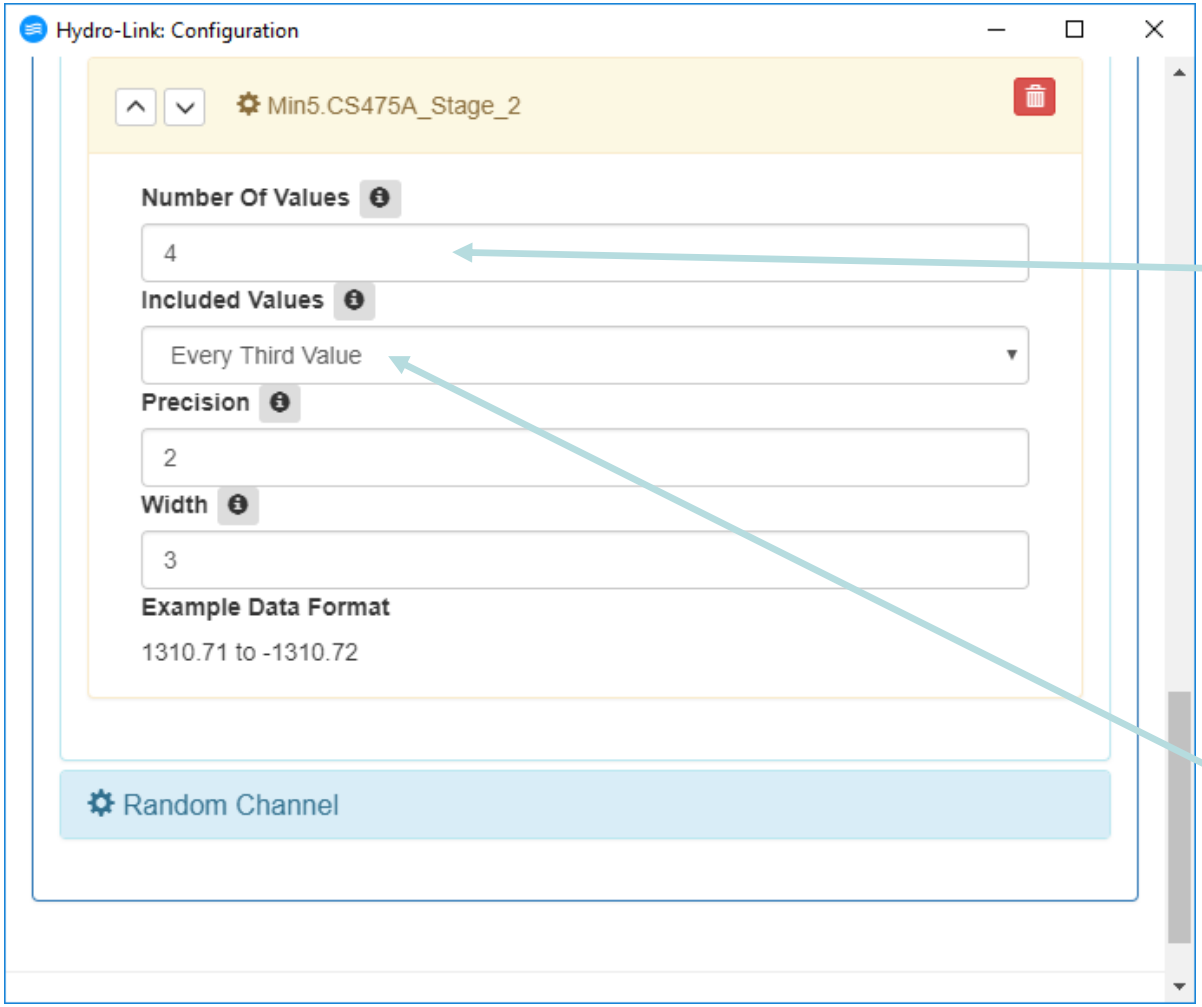


Options here are used to set the transmit parameter for this single measurement

For this example, the **Number of Values**, option indicates how many values of the water level measurement will be sent each transmission

The Number of Values option is used in conjunction with the **Include Values** option

Configuration – 21

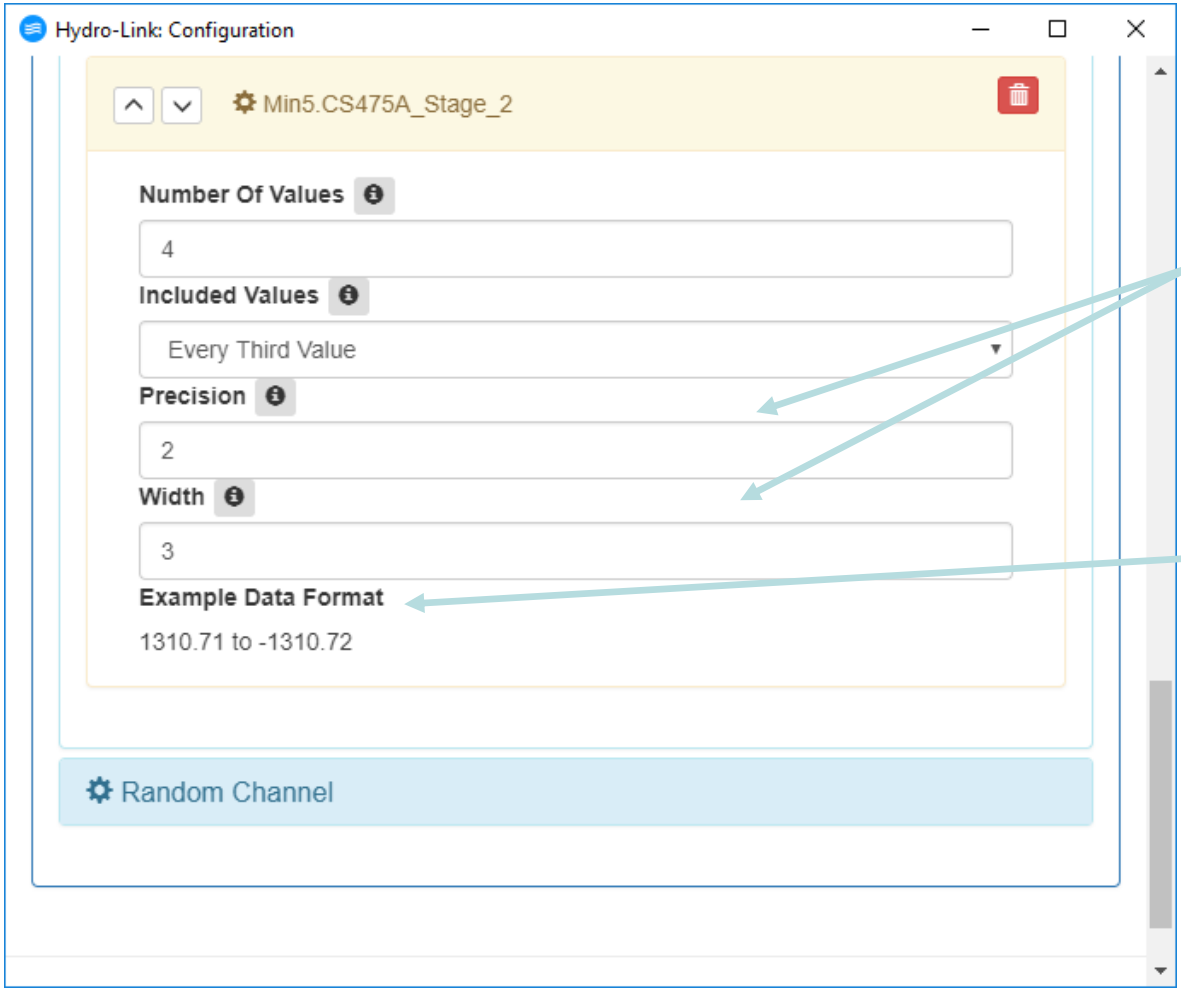


Since the unit is set to log data every 5 minutes, setting the **Include Values** option to “Every Third Value” tells the system to transmit 15 minute data.

With the **Number of values** option set to 4, then one hour of data will be transmitted for this measurement

Setting the **Number Of Values** option to 8 would send one set of redundant data, which is a common practice

Configuration – 22

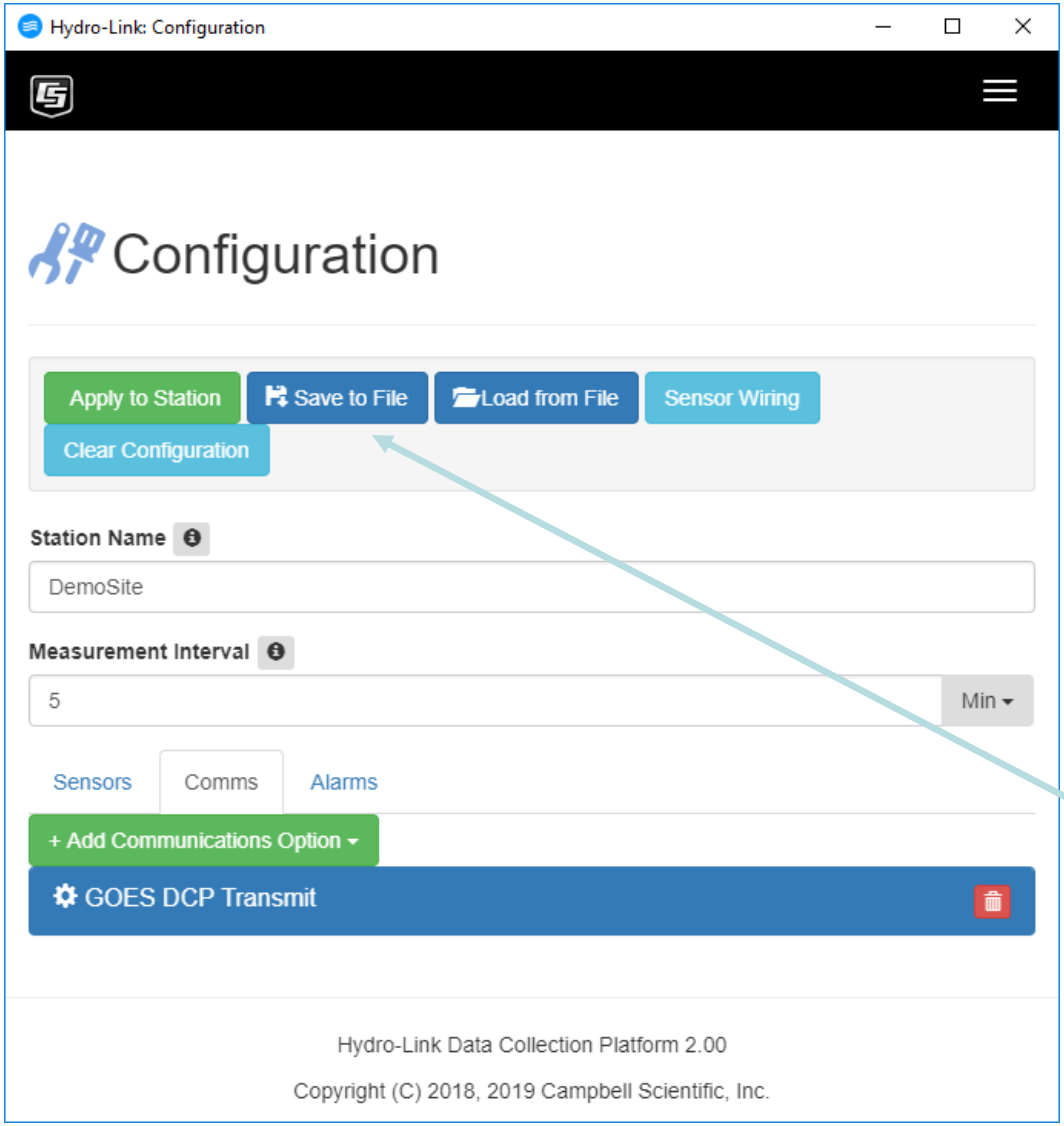


The **Precision** and **Width** options are used for both the Pseudo Binary for the ASCII format. They define how many characters are used for each value

It is sometimes hard to remember how different settings affect the data range, the example format is a helpful reminder

The rain gauge is added the same way. The batt value is normally added as an appended value

Configuration - 23

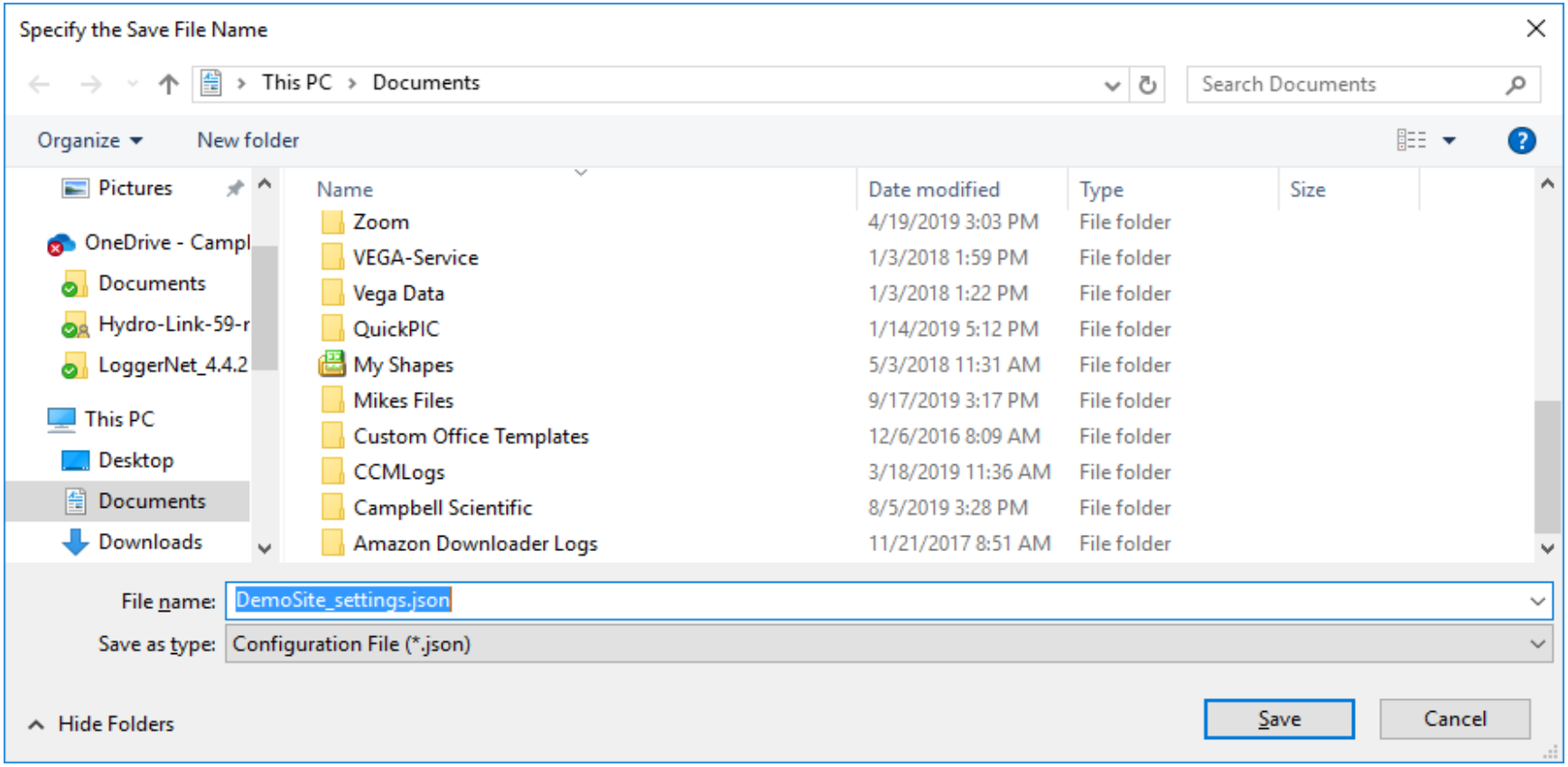


Here is the configuration window with all the options minimized and the Comms tab selected. Notice it shows the header for the GOES DCP indicating it is being used

No alarms will be setup for this demonstration, Alarms are used to control digital outputs or make special communication transmissions

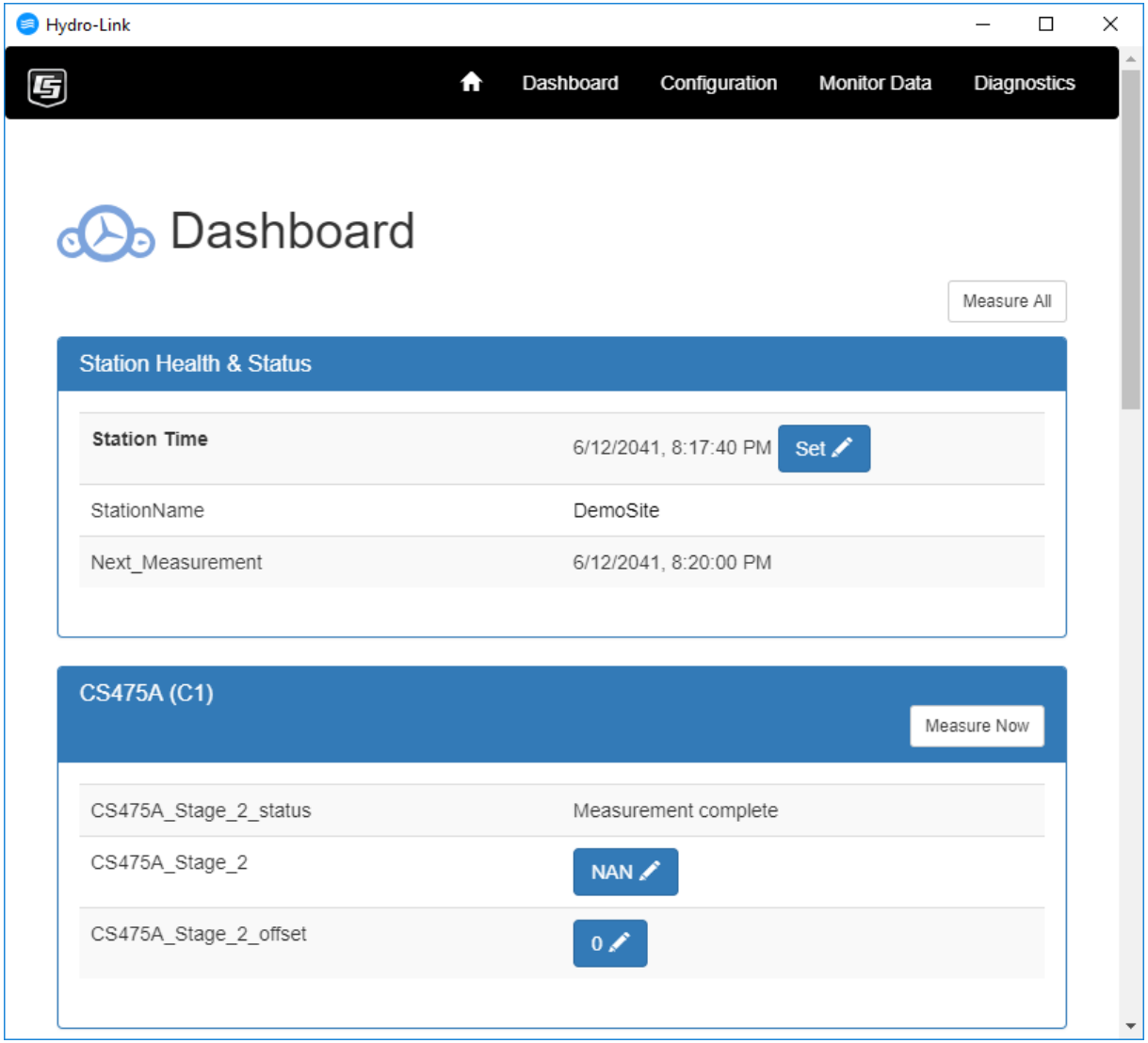
This is a good time to **save** the configuration to the computers hard drive or to send it to the datalogger

Configuration - 24



When saving the configuration file, standard windows dialog boxes or file download tools are used. It is always suggested to save the configuration files for later use

Dashboard - 1

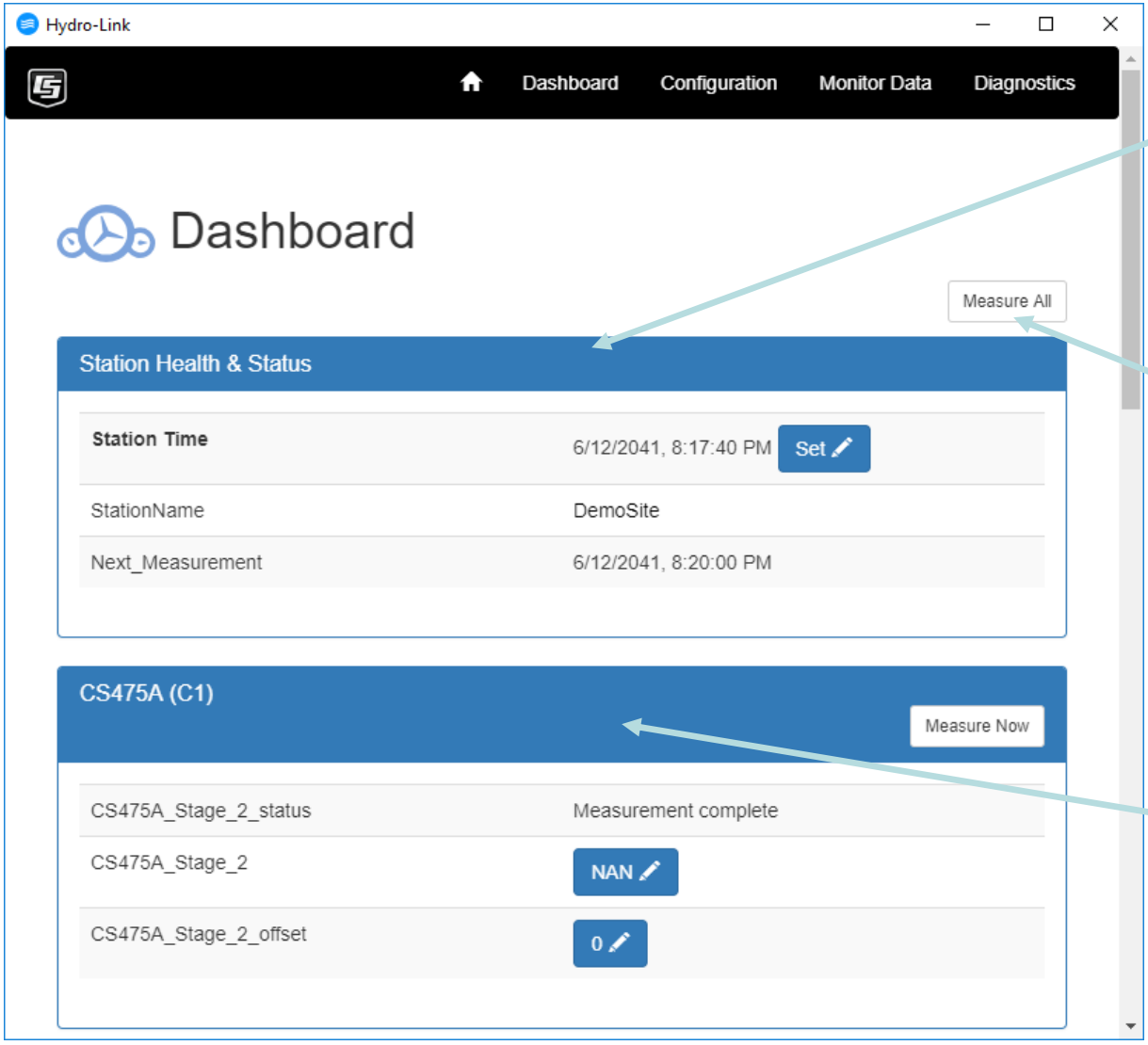


The **dashboard** will be one of the most used functions of Hydro-Link

Normally the datalogger is configured one time and then once in service the dashboard is used every site visit to verify operation. That is why the dashboard is the main landing page once connected

The dashboard is built based on the options selected in the configuration process

Dashboard - 2



The **Station Health & Status** panel will always be on the top of the dashboard. It lists general information of the site

The **Measure All** button allows an easy way to measure all the sensors immediately, independent of the scan rate.

The first sensor configured for this demo was the CS475A radar for water level or stage, it will be the next panel on the dashboard

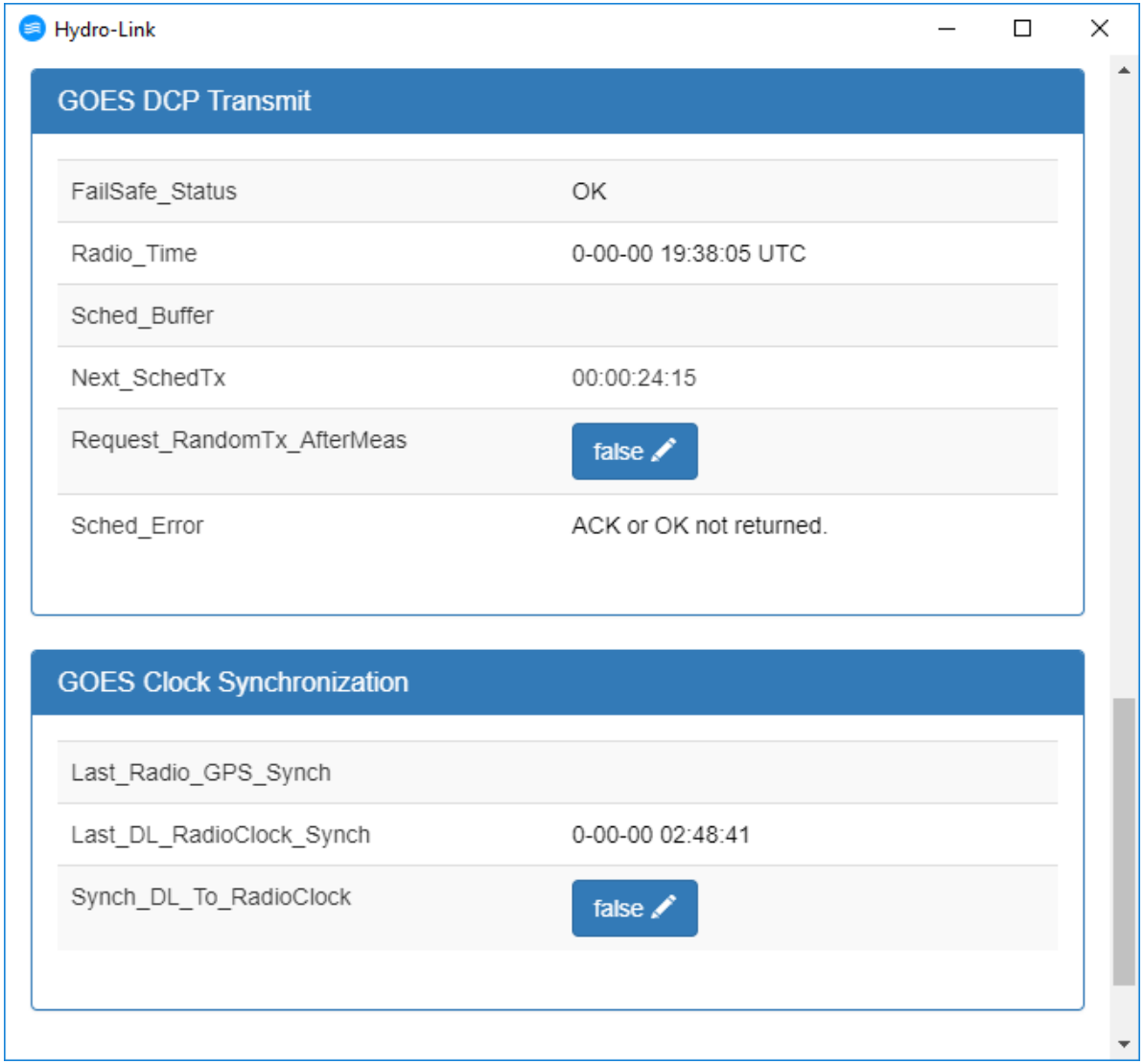
Dashboard - 3

Normally for each sensor panel, the last measured value for that sensor will be displayed near the top of the panel.

There are options on the dashboard that are better set during runtime rather than during initial configuration, an offset value for example

The rain gauge panel has several options on the dashboard used to test the calibration of the rain gauge. These are run time actions, not needed when configuring the DCP

Dashboard - 4

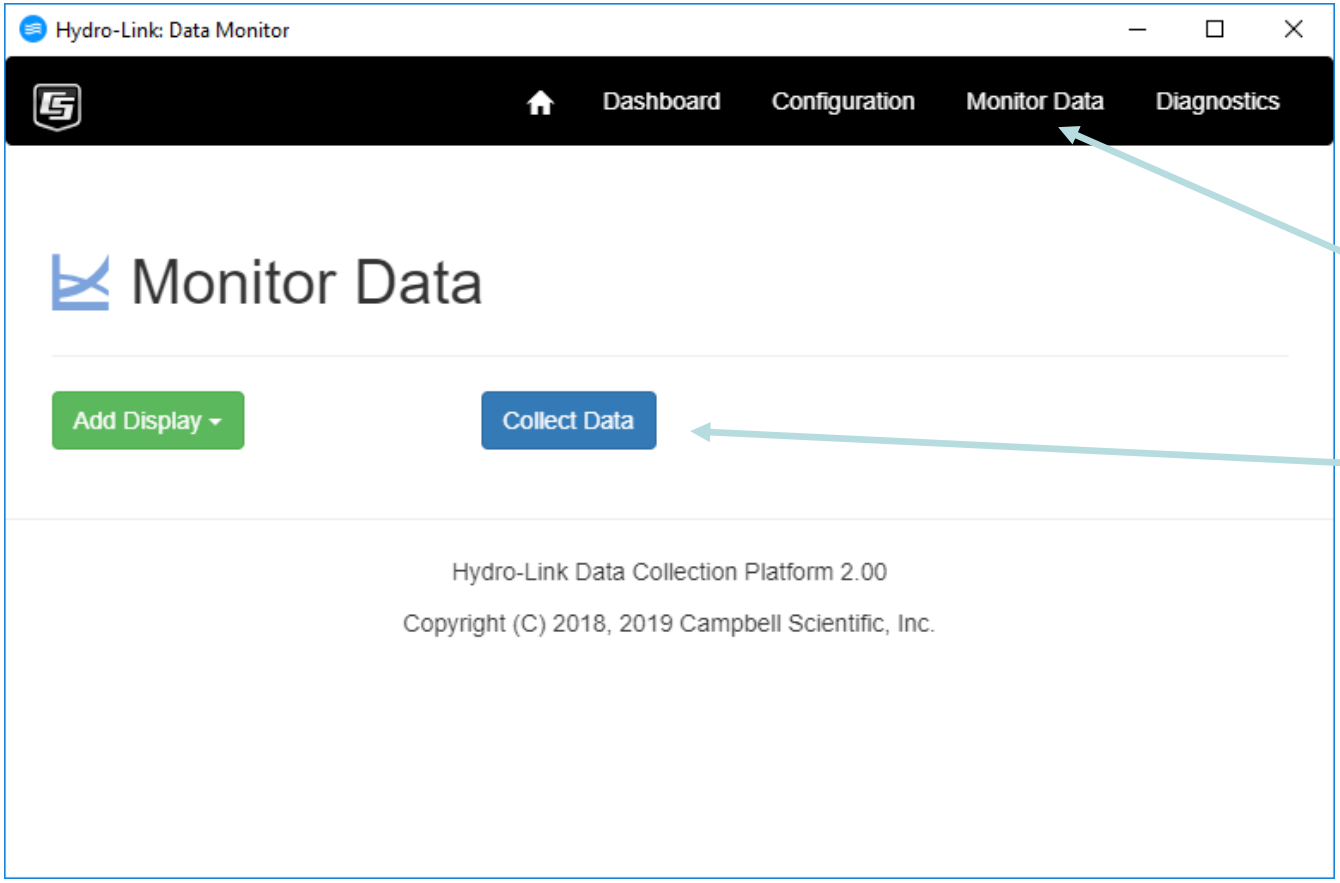


The GOES radio was configured under the Comms options, Since it was included in the configuration, it will have a panel on the dashboard also.

General radio status will be displayed on the dashboard

When setting the GOES radio options, the option to sync the datalogger clock to the accurate GOES clock was also set. This panel lists information on the sync process

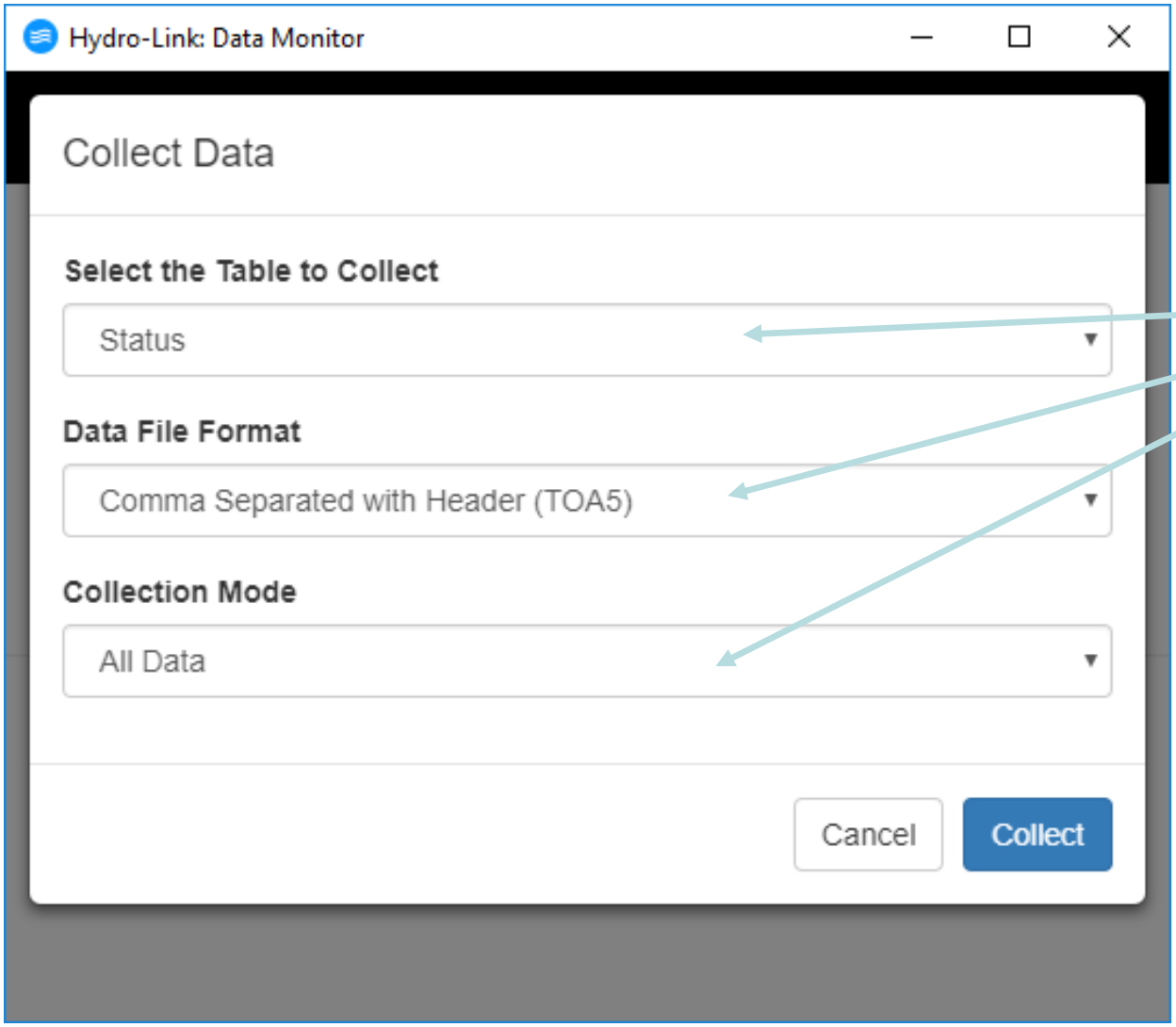
Data Monitor - 1



The **Data Monitor** tab is used to create graphs or tables to display the data,

The one option that will be used most often will be the **Collect Data** Option

Data Monitor - 2

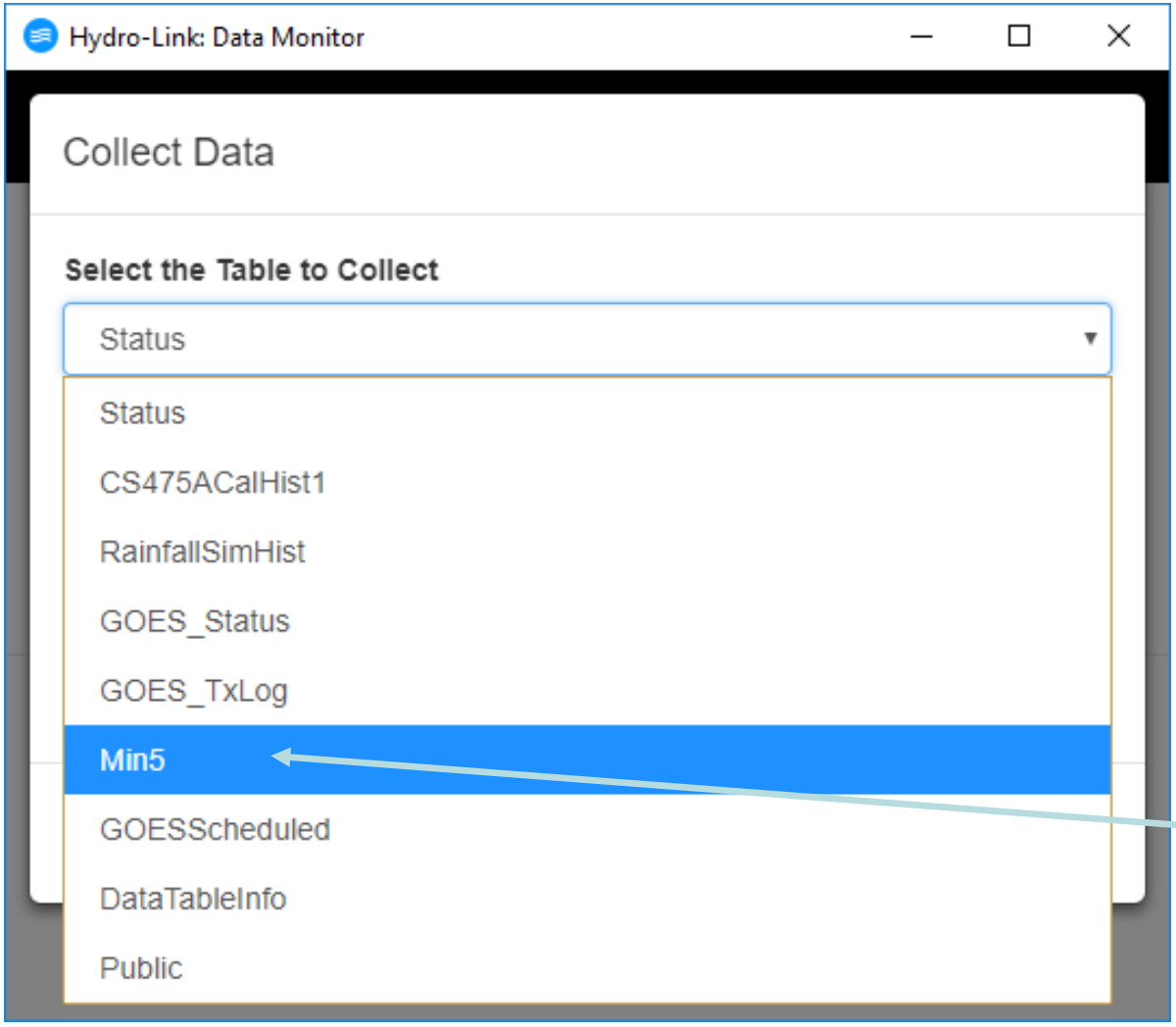


After clicking the **Collect Data** button, options are displayed to:

- Select a data table
- Select a file format
- Select a collect mode

Normally the default settings for the file format and the collection mode are the best

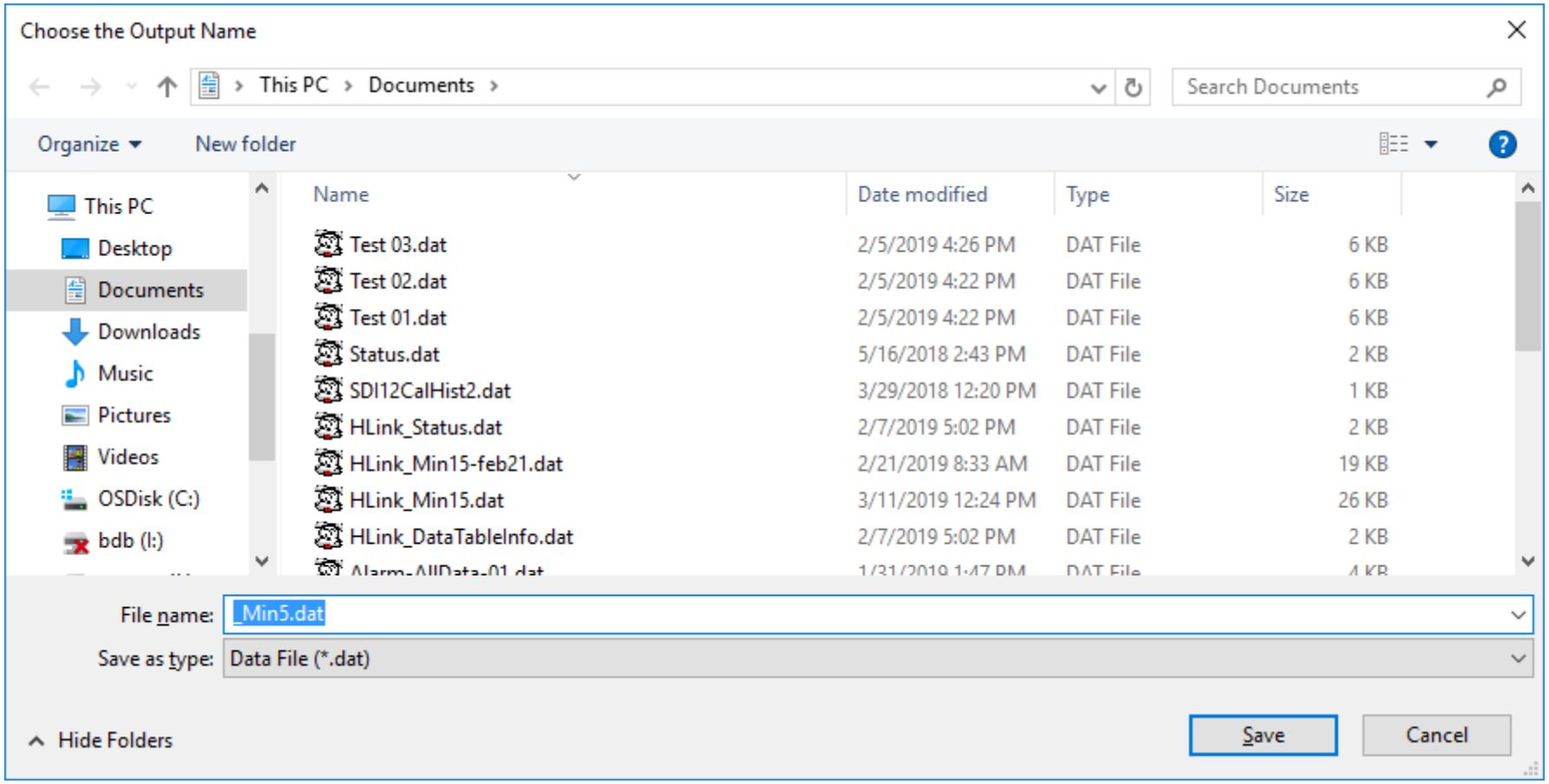
Data Monitor - 3



There are several data tables to choose from. Several of the data tables are for diagnostics and normally do not need to be collected

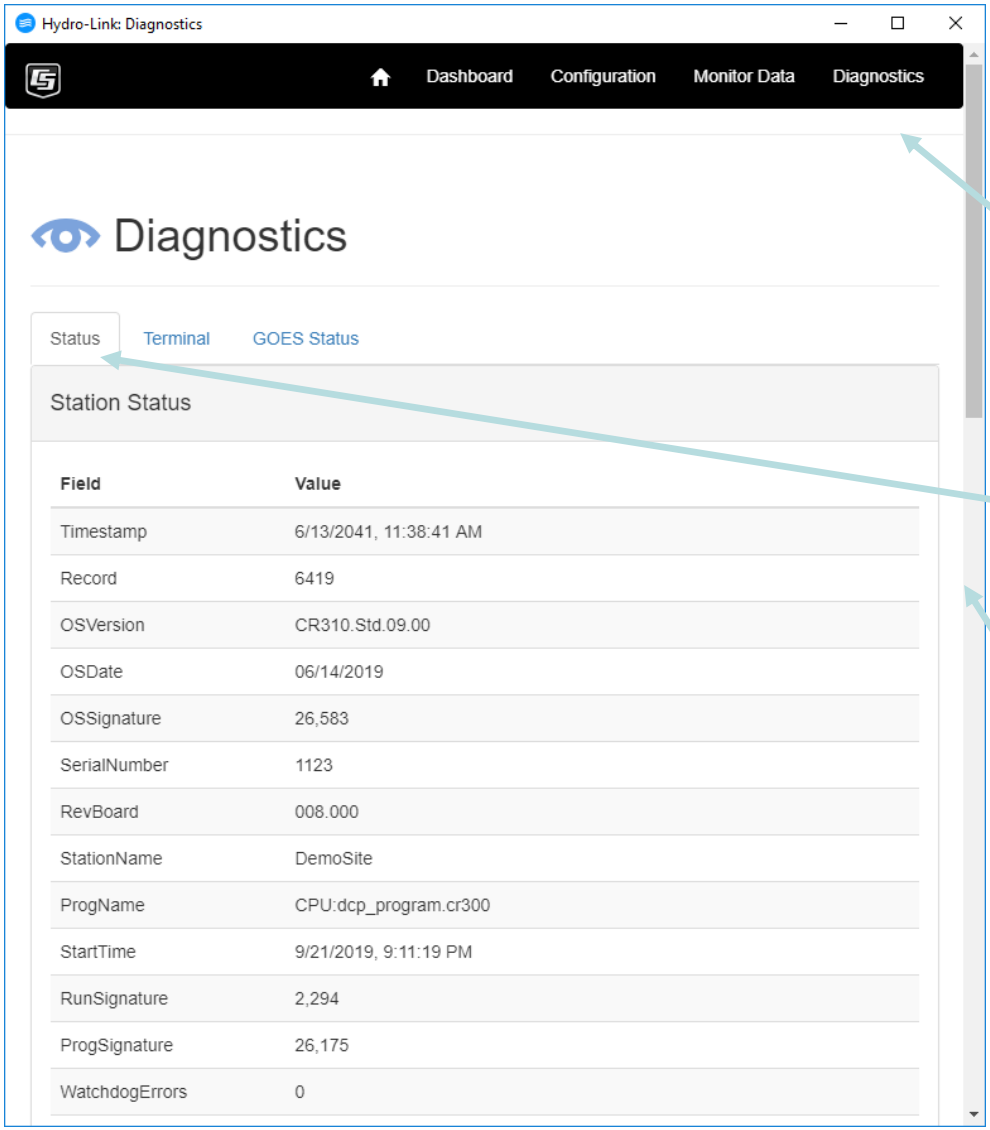
The table holding the data from the sensors is normally called Min5 or Min15 for 5 minute data or 15 minute data. In this example it is Min5, select this table and click on the **Collect** button

Data Monitor - 4



After clicking on the **Collect** button, the normal windows File Save dialog box is displayed allowing the data file to be saved. The data file may also be renamed or saved to some other location other than the default location

Diagnostics - 1

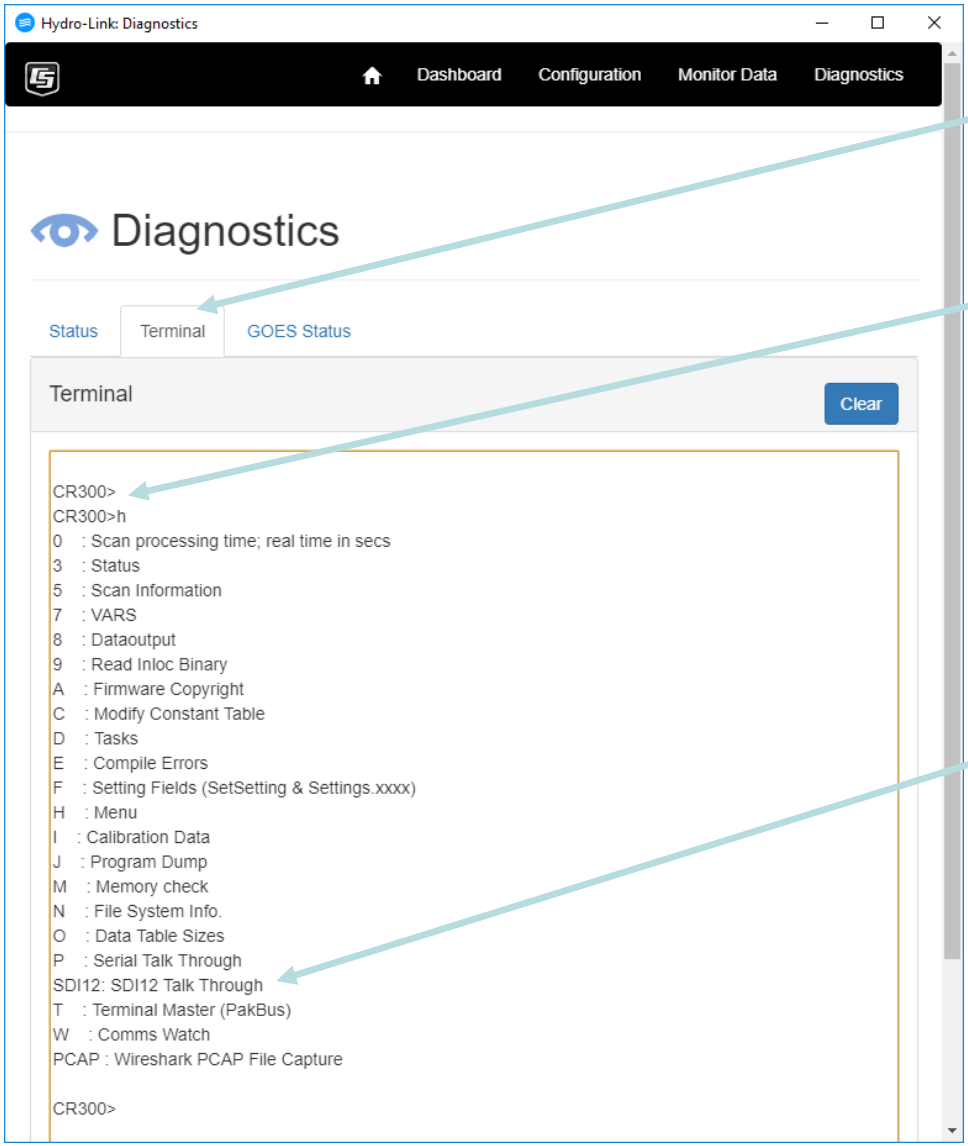


Use the **Diagnostic** tab to check system performance and perform other diagnostic processes

The first diagnostic screen shows the detailed status of the datalogger

Notice the scroll bar indicating there is much more status information below

Diagnostics - 2

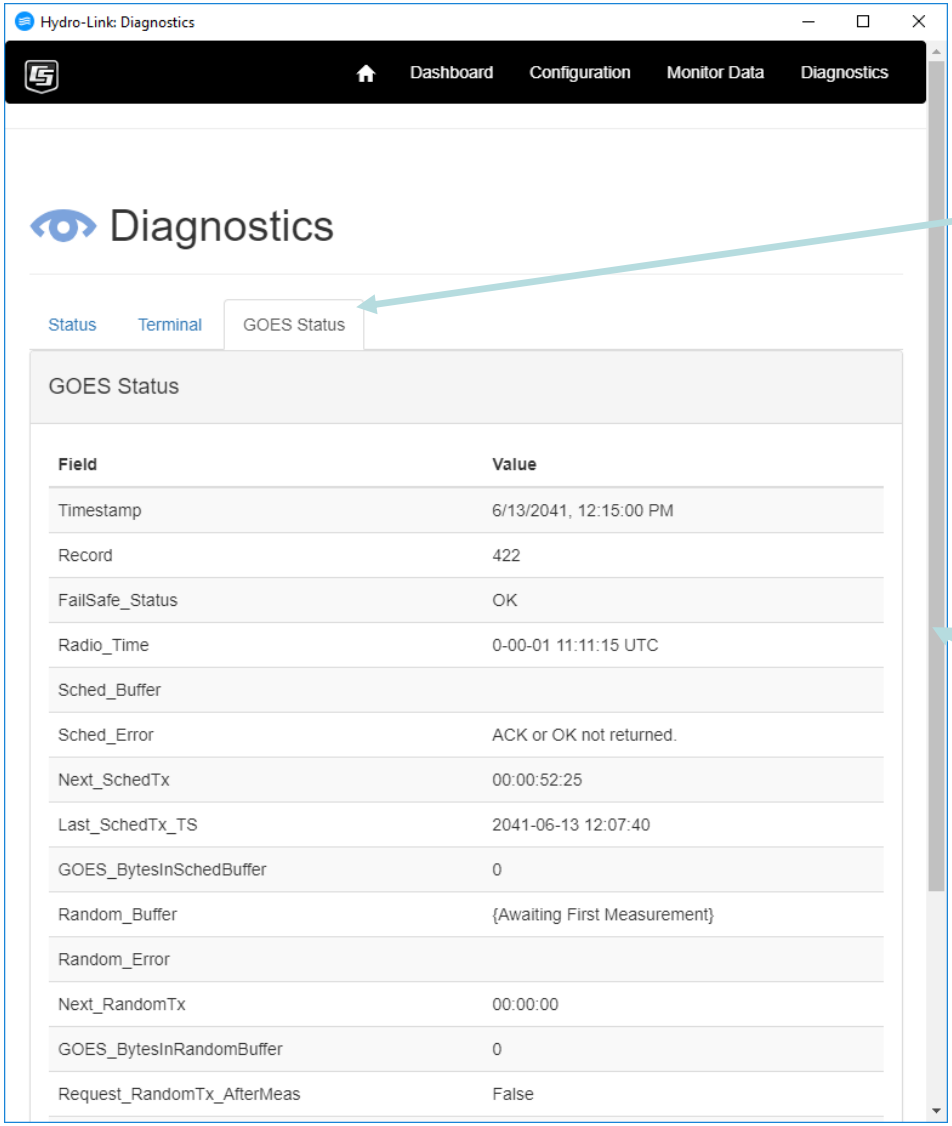


Under the Terminal tab are several options. Once the Terminal tab is clicked, press the ENTER key a few time to get the prompt, **CR300>**

Once the prompt is displayed, press the **H** key for Help and then the ENTER key to display the menu for the terminal tab. See the menu to the left

One of the most used options here is the **SDI12 Talk Through** option. It is used to send commands to SDI-12 sensors. It is often used to make sure a sensor is configured correctly

Diagnostics - 3



Under the GOES tab are several status messages related to the GOES radio and its operation

This information is much more detailed than that displayed on the dashboard.

Notice the scroll bar indicating there is more information listed below

Conclusion

- Use the demo site to try Hydro-Link most any time
- Realize others may be on there at the same time so some actions may act differently than expected
- There are no sensors connected to the site so data values may show up as NAN (Not a Number)
- A GOES radio is not connected to the site but all GOES options are still available

- Demo site link: ip-218.campbellsci.com
- User Name / Password: admin / admin

? Questions

Thank You