

ECH₂O

DataTrac

Data Analysis Software

Operator's Manual
Version 4



Decagon Devices, Inc.
2365 NE Hopkins Court
Pullman WA 99163 USA
Tel: (509) 332-2756
ECH2OHelp@decagon.com

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1. Introduction

Thank you for purchasing ECH₂O DataTrac. DataTrac allows you to collect, manipulate and analyze data from the Em50, Em50R, Em5, Em5R, and Em5b loggers. DataTrac will also work with the DataStation, which acts as a data collection point for multiple loggers.

This program has been designed for ease of use and incorporates many features to make your job easier. This manual is designed to help you understand and fully utilize DataTrac to accomplish your research goals efficiently.

System Requirements

To use ECH₂O DataTrac, you must have the following minimum computer resources:

- CD-ROM drive
- 64 MB of RAM for Windows 98
- 128 MB of RAM for Windows NT (SP5)/2000/XP/Vista
- 100 MB free hard drive space
- Monitor set to 1024x768 or higher resolution
- A Windows-compatible printer for report printing
- Serial port or serial-to-USB adapter

Customer Support

If you ever need assistance with your ECH₂O DataTrac, or if you just have questions, there are several ways to contact us:

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E-mail

support@decagon.com

Please include your name, contact information, instrument serial number(s), and a description of your problem or question.

sales@decagon.com

Please include your name, address, phone number, the items you wish to order and a purchase order number. Credit card numbers should always be called in.

Phone

1-800-755-2751 (USA and Canada Only)

1-509-332-2756 (International)

You can also send feedback to Decagon using the “Send Feedback to Decagon” feature. See Appendix A for more information.

Warranty Information

ECH₂O DataTrac has a 30-day satisfaction guarantee.

2. Installing DataTrac

Installing DataTrac from CD

DataTrac is a Windows application that installs from the CD found in the front cover of the DataTrac user's manual. Place the CD in your computer's CD drive, wait for the "ECH₂O Software Installer" to appear, and select "Install ECH₂O DataTrac" from the menu. If the installer does not launch by itself, go to My Computer, select your CD drive, and double-click on the "autorun.exe" file. Then follow the subsequent installation prompts.

Installing DataTrac from the Web

Updates for the DataTrac software can be found online at www.decagon.com/support/downloads. If your computer is connected to the Internet, you can use the Decagon Version Check web engine to check for updates to DataTrac. Select "Check for Updates..." from the Help Menu.

You can find out which version is currently installed on your computer by clicking on the Help Menu and selecting "About DataTrac".

Licensing DataTrac

The copy of DataTrac you install from the CD is a 30-day evaluation copy! After installation, you will have 30 days to license your copy of DataTrac. Licensing DataTrac allows you to use all of the program's indefinitely. **After**

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2. Installing DataTrac

30 days, you will be unable to use the program if it has not been licensed!

To license your copy of DataTrac, you will need your Software License certificate, which you receive after purchasing the full version of DataTrac. Do the following:

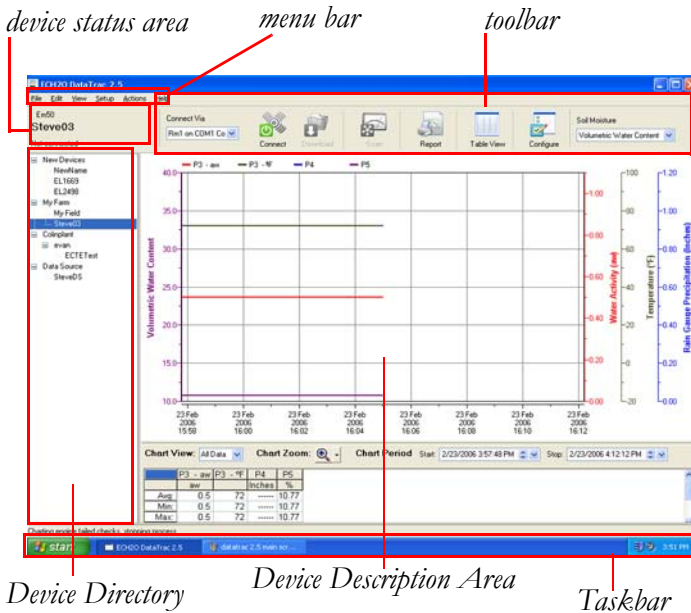
1. Go to Help > License. This opens the License Wizard. The first page will display the license status of your copy of DataTrac as NOT licensed, and the number of days remaining until your evaluation period expires.
2. Click "License". This displays the license agreement, and asks you to accept or decline. If you choose "Decline" you cannot continue, and will only be able to click "Cancel" and start over.
3. Select "Accept License Agreement" if you agree. This activates the "Next" button. Click it to move to the Licensing Information screen.

Enter your full name, company name, and your license code exactly as written on the license certificate. Please contact Decagon if the information on your license certificate is incorrect.

NOTE: Once you have licensed DataTrac, returning to the License screen will display the "Remove License" button. This button will remove DataTrac's license and you will need to re-license the program to continue using it. This was intended to let the user move their license to a new computer.

3. DataTrac Introduction

DataTrac will create a directory in the Start Menu when it has finished installing. Go to Start > Programs > ECH₂O DataTrac, and click the DataTrac icon to launch the program. When it opens, you will see an empty screen similar to the one shown below. The screen is divided into six main sections. Each of these sections is explained in detail below.



NOTE: The term “logger” can refer to any of the ECH₂O system loggers (Em50, Em5b, etc.). The term “devices” refers to the DataStation and loggers.

The Menu Bar

DataTrac is a Windows-based program, and features a central menu bar. The menu bar allows you to perform operations and access program features. DataTrac's menu bar contains six menus, each one containing several sub-menu items. A brief overview of each menu and sub-menu follows.

File

The File Menu allows you to save and open data files, and print saved data.

- **Import Data File...** Imports measurement data from a DataTrac data file (see Chapter 6 for information on reading in saved data files).
- **Re-Import Data File...** DataTrac normally ignores duplicate data when downloading or importing data into DataTrac. Using this feature allows you to replace data already in your DataTrac database. DataTrac compares the date and time for each data point. If the data point is already in the database, the new data point replaces the old. If the new data point doesn't exist in the database, then it is added.
Warning, re-importing data will overwrite any data points you may have manually edited. Any data points marked "IGNORED" will be visible on the chart.
- **Export.** Exports data and logger settings as a bundled data file for future use.
 - *Table...* When in Table View, you can export the table into several different formats, which can be viewed with most standard spreadsheet or word processing programs.
 - *Chart...* When in Chart View, you can export the

chart as a picture file to use with most word processing and web editing programs.

- *Transfer Set...* Exports a data file called a transfer set, which contains all of the data, configuration settings, and tree information for a selected logger.

- **Print Setup...** Configure printer settings and options for printing reports. *NOTE: When you configure your printer, the paper orientation is ignored; DataTrac will only print portrait-style reports.*
- **Print Report.** A report contains information about the logger, the chart data (as seen on the screen), the report summary data, and any recommendation text (see Chapter 4 for more information).
- **Exit.** Closes the program.

Edit

The Edit Menu allows you to copy, and select on-screen data.

- **Undo.** Disabled.
- **Cut.** Disabled.
- **Copy** (Table View only). Allows you to copy data cells or rows and copy them into word processing or spreadsheet programs such as Word or Excel.
- **Copy Chart** (Chart View only). Copies the visible chart and converts it into a picture file for pasting into other applications. You can select what picture format to use in the DataTrac Preferences menu. (See Chapter 5 for more details.)
- **Paste** (Table View only).
- **Select Visible Data Rows** (Table View only). Selects all the data rows currently visible on the screen.

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- **Select All.** Selects all the cells in Table View, or the cells in Chart View.

View

The View Menu allows you to control how data is viewed in DataTrac.

- **Chart View.** Check mark to the left indicates that the Chart View is currently active.
- **Table View.** Check mark to the left indicates that the Table View is currently active.
- **Enable Editing** (Table View only). Allows you to edit the values in the table.
- **Show Unprocessed Data** (Table View only). Shows the data as it comes in from the logger, raw and unprocessed.
- **Reload Data For (device name).** The Reload Data option is useful if you are not seeing the data displayed as you expected in the Chart. This option will reload the data from the selected logger.
- **Zoom In.** (Chart View only) Increases the chart size.
- **Zoom Out.** (Chart View only) Decreases the chart size.

Setup

The Setup menu allows you to create Farms and Fields, configure devices, and modify program settings in the DataTrac Preferences.

- **Create New.** Create a new Farm, Field, Em50, Em5b, or DataStation.
 - *Em50...* Create a new Em50 in the device directory.
 - *Em5b...* Create a new Em5b in the device directory.
 - *DataStation...* Create a new DataStation.
 - *Farm.* Create a new Farm in the device directory.

- *Field*. Create a new Field level of a Farm.
- **Configure (device/Farm/Field name)**. Takes you to the Configuration dialog, used for configuring devices, Farms, or Fields within DataTrac.
- **Rename (device/Farm/Field name)**. Change a selected device's, Farm's, or Field's current name.
- **Redeploy (logger name)**. Allows you to restart a logger as if it were a new logger with no data (see Chapter 3 for more information).
- **Delete (device/Farm/Field name)**. Deletes the selected device, Farm, or Field from the system.
- **DataTrac Preferences**. Opens the Preferences dialog which modifies program operational settings. See Chapter 5 for information on the Preferences Menu.

Actions

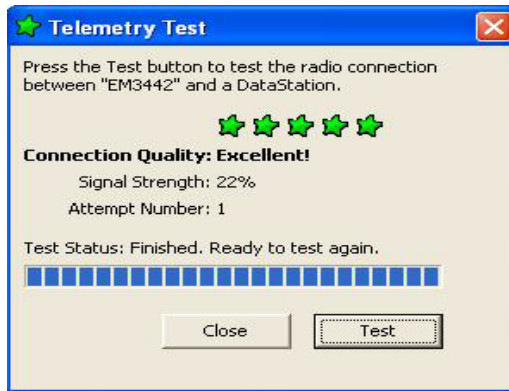
The Action menu is used for connecting to your logger, and downloading data from it.

- **Connect**. Connects to a selected logger through the COM port selected in the Connect Via combo box.
- **Connection Query** (applies to radio loggers only). Use to connect to any radio logger on a specified channel/sub-channel.
- **Download**. Downloads data from a device. Not enabled unless you are connected.
- **New Data**. Downloads data that has been collected by the device since the last download from that device.
- **All Data**. Downloads all the data currently stored in the device's data memory.
- **Scan Ports**. Takes real-time readings of all a logger's ports. You must be connected to a logger to enable this option.

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- **Device Tools.** Contains several tools for interfacing with your device.
 - **Set Time.** Sets the logger's time to the computer's system time.
 - **Firmware Test.** Tests the integrity of the device's firmware. DataTrac reports as either Good or Bad.
 - **Telemetry Test.** Allows you to verify the radio connection between the radio logger and the DataStation. Choose "Telemetry Test" from the Actions Menu.



Click the Test button and the test will begin. When the test has finished you will be presented with the results of the test. You may have to relocate the radio logger while doing the Telemetry Test in order to find the best connection quality. Once you have found the radio logger location that provides the best connection quality, install the radio logger at that location. Disconnect from the radio logger.

NOTE: Telemetry Test only works with Em50 loggers running firmware 1.12 or newer.

- **Erase Data in (name of device).** Erases all of the data currently stored in the device.

WARNING! the data cannot be recovered once erased!

- **Initialize Radio.** Resets a device's radio.

- **Initialize (device name).** Resets the selected device.

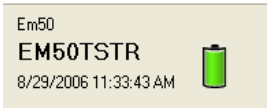
WARNING! This will erase all data currently stored in that device's data memory, and cannot be undone!

Help

The Help menu contains the DataTrac help file, licensing wizard, and program version.

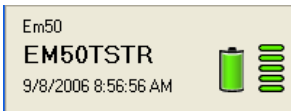
- **DataTrac Help.** Opens the DataTrac help file, which contains help topics for each aspect of DataTrac and some problem solutions.
- **Send Feedback to Decagon.** This menu item helps you send product feedback, bug reports, or feature requests to Decagon. Your computer must be connected to the internet for this feature to work. See Appendix B for more information.
- **Check for Updates.** Connects to the Internet to find any available program updates (must be connected to the Internet for this option to work).
- **License.** Opens the License wizard to license DataTrac. DataTrac comes with a 30-day evaluation period, but you cannot use the program indefinitely until you purchase and enter a program license key.
- **About DataTrac.** Displays program version.

The Device Status Area



The device status area displays information about the device currently selected in the device directory, and connected to

DataTrac. For loggers, when connected it will display the logger's type, given name, logger date and time, and battery status.

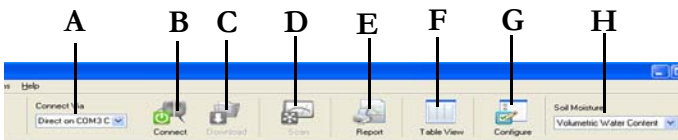


When DataTrac is connected to a radio logger via the Rm1, the device status area also shows the radio signal strength information

(RSSI) for the connection.

Using the Toolbar

Across the top of the screen are several tools used to interface with your logger, as shown in the picture below. These controls make up the toolbar.



A: Connect Via. Select a COM port to connect to a logger via a RS-232 serial cable (direct connect) or a Rm1 radio modem.

B: Connect/Disconnect button. Connects to or disconnects from a device.

C: Download. Downloads data that has been collected by the device since the last download from that device.

D. Scan. Allows you to make instantaneous readings of all a logger's ports when you are connected to that logger.

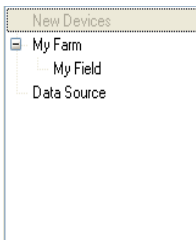
E: Report. Allows you to print or create a PDF document of the currently selected logger in the Device Directory that includes logger location, name, notes, current chart view and summary data below the chart.

F: Chart/Table View. Switches between Chart and Table views of downloaded data.

G: Configure. Takes you to the Configure menu.

H: Soil Moisture. Here you can choose how soil moisture data will be displayed: 1) in terms of Water Content, 2) Plant Available Water, or 3) Inches per Foot.

The Device Directory



The device directory is where all devices will appear. DataTrac uses Farms and Fields to organize devices. DataTrac refers to each main location as a Farm. Within each Farm can be placed sub-locations, known as Fields.

Device Description Area

The device description area displays information about any highlighted node on the tree that is not a logger. For loggers, this will display measurement data as a graphical chart or in a table.



Taskbar

The taskbar displays DataTrac system messages.

A screenshot of a taskbar message box. The message is displayed in a black font on a light beige background. The text reads: "Program successfully updated item named: EM50TSTR." The message box has a thin border and a small shadow effect.

4. Common Tasks

This chapter details the most common tasks users would like to accomplish. Other features of the program and tasks not discussed here are described later in this manual.

Setting Up the Device Directory

Once DataTrac has been installed and licensed, you are ready to begin setting up the device directory.

Creating a Farm

To create a new Farm:

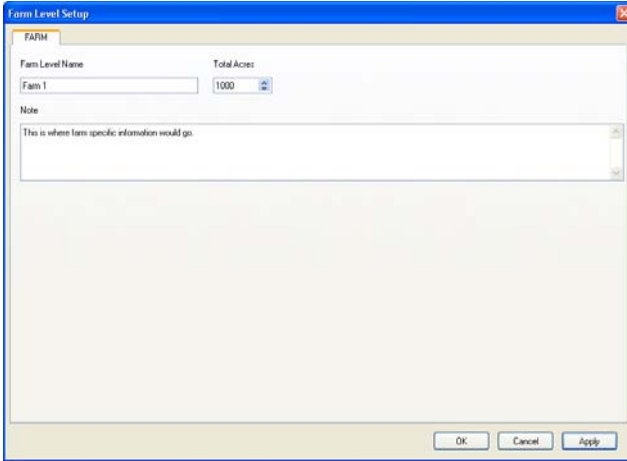
1. Select Setup > Create New > Farm. The dialog box below will appear.



2. Enter a name for the farm (up to 24 characters) and click "OK". The "Farm Level Setup" dialog, shown below, will appear next:

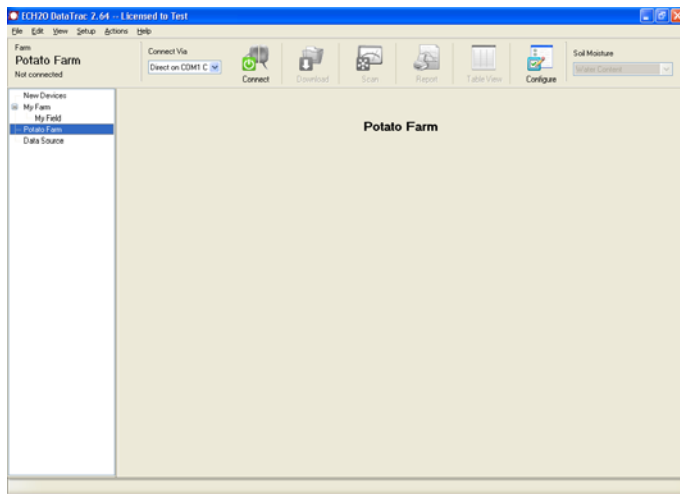
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The screenshot shows a 'Farm Level Setup' dialog box. It has a title bar with the text 'Farm Level Setup' and a close button. Below the title bar is a tab labeled 'FARM'. The main area contains two input fields: 'Farm Level Name' with the text 'Farm 1' and 'Total Acres' with the value '1000'. Below these is a 'Note' field with the placeholder text 'This is where farm specific information would go.'. At the bottom are 'OK', 'Cancel', and 'Apply' buttons.

- In the **Farm Level Name** field, you can enter a new name for the Farm or modify the current name.
 - Enter the Farm's acreage in the **Total Acres** field.
 - Use the **Notes** fields to enter any comments about that farm (i.e. crop type).
3. Fill in the appropriate fields, then click "OK". The Farm will appear in the device directory, and its name, acreage, and any notes will appear in the device description area. The screen will look similar to the one shown below.



You may add additional Farms by repeating these steps.

Creating a Field

To add a Field to an exiting Farm:

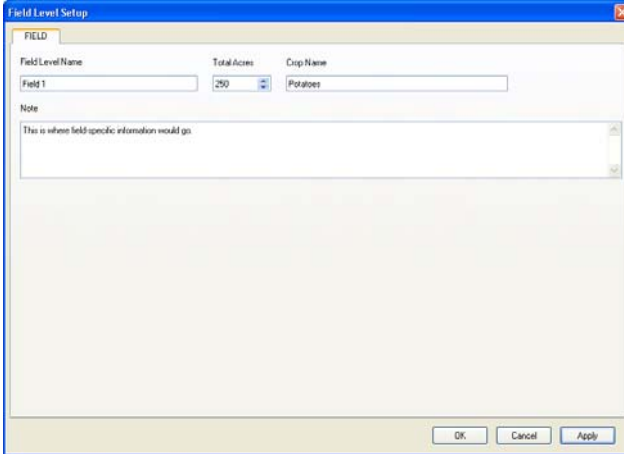
1. Select Setup > Create New > Field. The dialog box below will appear:



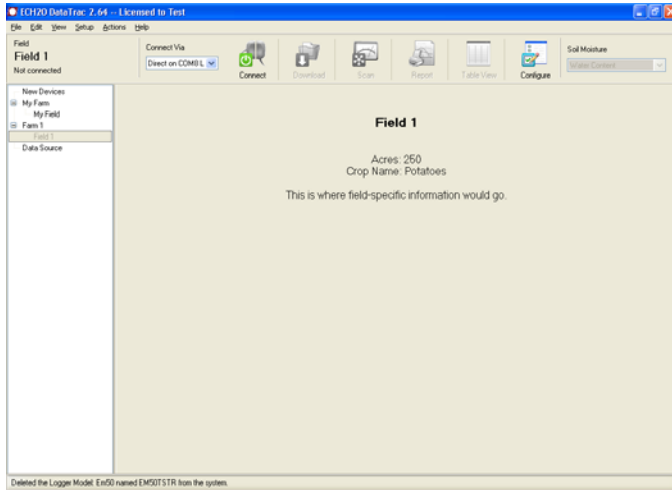
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4. Common Tasks

2. From the “Farm” drop-down list, select which existing Farm the Field will be associated with.
3. Enter a name for the Field (up to 24 characters) and click “OK”. The “Field Level Setup” dialog, shown below, will appear next:



- In the **Field Level Name** field, you can enter a new name for the Field, or modify the current name.
 - Enter the Field’s acreage in the **Total Acres** field.
 - Enter the crop name in the **Crop Name** field.
 - Use the **Notes** fields to enter any comments about that field (i.e. location, special conditions, etc.).
4. Fill in the appropriate fields, then click “OK”. The Field will appear in the device directory, and its name, acreage, crop name, and any notes will appear in the device description area. The field’s name will also appear in the device status area. The screen will look similar to the one shown below.
-



You may add additional Fields by repeating these steps.

You can delete Farms and Fields by selecting them in the device directory, then selecting Setup > Delete (name of Farm/Field).

WARNING! When deleting a Farm or Field, all loggers in that Farm or Field will be deleted!

Connecting to and Configuring a DataStation

DataStations are different from loggers in that the DataStation receives data from multiple radio-enabled Em50R loggers. The logger data from the DataStation still requires configuration and entry into the device directory, but this is handled differently than connecting to an indi-

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4. Common Tasks

vidual logger. The DataStation needs to have the parameters Name, Radio Channel, and Radio Sub Channel set before it can collect data from loggers. The following section details how to connect to and configure DataStations in DataTrac.

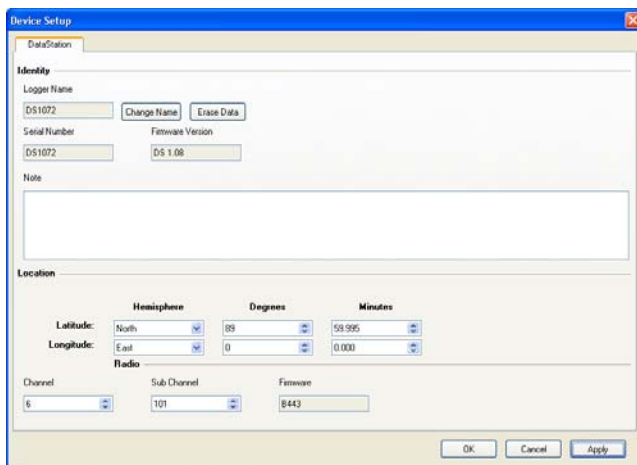
Connecting to a DataStation

1. Connect the DataStation to the computer's communications port via an RS232 cable.
2. In DataTrac, select the appropriate COM port from the "Connect Via" drop-down list, and click the "Connect" button on the toolbar.
3. After establishing connection with the DataStation, the DataStation will be added under the Data Source node in the device directory area.
4. The following information will be displayed in the device description area: Serial Number, Firmware Version Number, Radio Channel, Radio Sub Channel, Last Time Connected, and Last Downloaded Data.

Device Setup

The DataStation can now be configured. There are three ways to get to the Device Setup screen: 1) click on the menu Setup > Configure DataStation Name, 2) click on the Configure toolbar button, or 3) double click the left mouse button on the DataStation node in the device directory. The Device Setup screen contains one sub-screen or tab labeled "DataStation".

DataStation Tab



DataStation Tab in Device Setup

This screen features three main sections:

1. **Identity.** This section displays the basic information about the DataStation.

- *Change Name:* Click the “Change Name” button if you wish to rename your current logger.
- *Erase Data:* It is recommended that you erase the logger’s memory before making measurements to ensure a clean data set. Click “Erase Data” to erase all data stored on the logger.
- *Note:* In the “Note” field, you can write more detailed information about the logger; for example, the type of plant growing at that site, the name of the location, etc. Anything you type here appears on printed data reports.

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2. **Location.** In this section you can set the physical location of the DataStation (latitude and longitude).
3. **Radio.** Use this section to change the following:
 - *Channel:* Can be set from 0 to 6
 - *Sub Channel:* Can be set from 0 to 65534
 - *Firmware:* (Read-only, cannot be modified) Displays the radio module's firmware version.

Connecting/Configuring a Logger

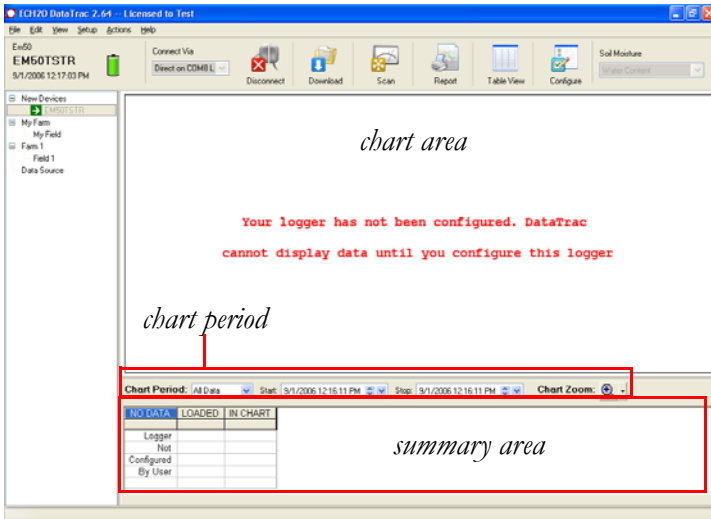
Before a logger can be used with DataTrac, it will need to be configured and entered into the device directory. Loggers need to have parameters such as name, date, time, measurement interval, and communication mode set. The radio-enabled logger will not respond to radio contact until properly configured. The following section details how to connect to loggers.

Connecting

Before you can configure a logger, you must first physically connect it to your computer. Two methods can be used to accomplish this. A USB to stereo cable adapter (UCA) was included with with your logger. Also, if you prefer a serial to stereo adapter (SCA) these are also available upon request.

Note: you must install the USB driver before connecting the USB cable to your computer. You can download the Microsoft Windows Drivers at www.decagon.com/downloads.

1. Connect you cable adapter UCA or SCA to a Commu-
nications port on your computer and the stereo plug
end to the logger's Communications Port (COMM
PORT for the Em50/Em50R, Port 1 for the Em5/
Em5R, and Em5b).
2. Select the appropriate COM port in the “Connect
Via” drop-down list, then Click the “Connect” button.
3. Once connected you will see the logger's name appear
in the device directory under the New Devices farm.
The logger's type, name, logger time, and battery sta-
tus will appear in the device status area. DataTrac will
also indicate that your logger has not yet been config-
ured. The screen will look similar to the one shown
below.



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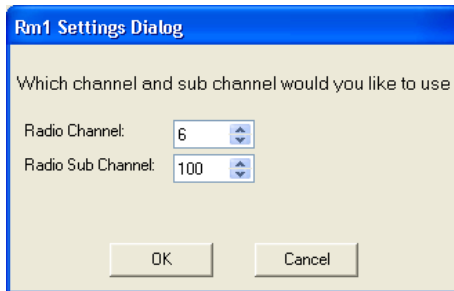
- The **chart area** is where charted data will appear.
- The **chart period** allows you to set a date range for charted data. You can select what time interval of data is displayed (Day, Week, Two Weeks, 30 Days, Season, All Data, or Custom).
- The **summary area** displays a summary of each chart data line, showing each line's Average, Minimum, Maximum, Total, and Events values.

Connect via an Rm1 radio modem:

1. Connect the Rm1 to your computer with an RS232 serial cable.
2. In DataTrac, select which COM port the Rm1 is connected to from the "Connect Via" combo box, and select "Connect Via Rm1 on...".

NOTE: You cannot connect to the Rm1 itself, only connect through it to radio loggers.

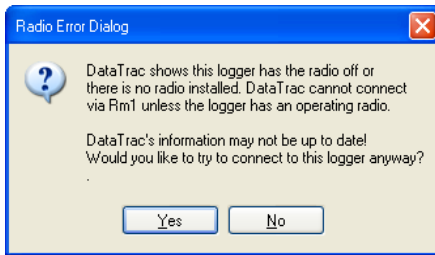
3. Click the "Connect" button on the Toolbar.
 - If you have not already highlighted a logger in the device directory, DataTrac will ask you which channel and sub channel you would like to use:



Enter a value for each, then click “OK”.

- If you know which logger you want to connect to, select it and then click “Connect”. DataTrac will not display the “Rm1 Settings Dialog”, because these values are already set.

NOTE: If you try to connect to a non-radio enabled logger, DataTrac will display the following error message:



This means that:

- The device is not a radio logger (Em50R or Em5R);
- The device's radio is either not connected or not correctly configured (i.e. its radio mode is set to “Radio Off/No Radio”).

Make sure you are using a radio logger and that it is correctly configured, then connect again.

4. If the connection is successful, the radio logger's information and RSSI data are displayed in the device status area. DataTrac will also indicate that your logger has not been configured yet.

ECH₂O DataTrac User's Manual

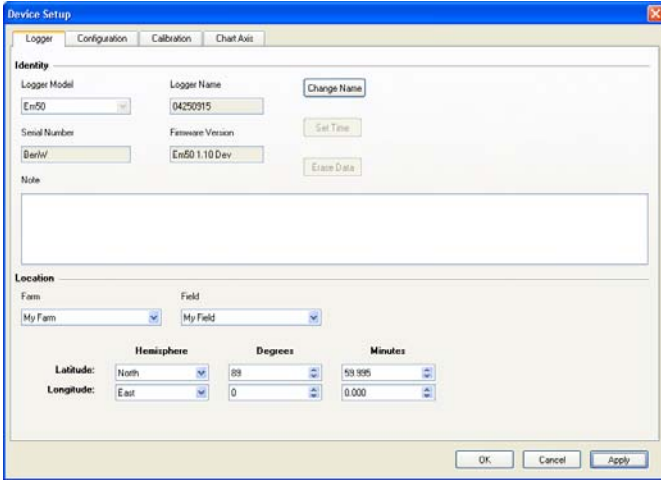
4. Common Tasks

Once you have connected to your logger, click the “Configure” icon on the Toolbar to continue. This will open the Device Setup screen.

Device Setup

The Device Setup screen contains four sub-screens or tabs, which can be navigated by clicking the tabs at the top of the screen. The first is the Logger tab.

Logger Tab



This screen features two main sections:

1. **Identity.** This section gives you the basic information about your logger.

Change Name - Click the “Change Name” button if you wish to rename your current logger

Set Time - Click “Set Time” to set the logger time to the system time on your computer

Erase Data - It is recommended that you erase the logger’s memory before making measurements to ensure a clean data set. Click “Erase Data” to erase all data stored on the logger.

In the “Note” field, you can write more detailed information about the logger, for example, the type of plant growing at that site, the name of the location, etc. Anything you type here appears on printed data reports.

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4. Common Tasks

2. **Location.** In this section, select the Farm and Field where you want this particular logger to be grouped within the device directory. At the bottom of the screen you can set the physical location of the logger (latitude and longitude).

Configuration Tab

Selecting the Configuration Tab displays the screen below:



This page is where you set up the sensor type, measurement interval, and charting preferences for your logger. This screen is divided into four sections:

1. Template and Measurement Interval

- *Apply Configuration Template.* If the user wants the data to always be displayed in the same way for more than one logger, then the user can create a configuration template. This is done by selecting the desired values

for Depth (Inches), Legend Name, Trace Color, Trace Size, and Data marker. Click on the Apply Configuration Template drop down list, select Save Current Configuration as..., type in a name that is descriptive of the configuration and click OK. The Configuration Template is now saved in the Apply Configuration Template list and can be applied to any logger in the Device Tree. More Configuration Templates can be created as needed and when Configuration Templates are no longer needed, they can be deleted. An existing Configuration Template can be modified by applying the template to a logger, deleting the original Configuration Template, making needed changes to the current logger, and saving the configuration back to the original Configuration Template name.

- *Measurement Interval.* Loggers allow you to select a measurement interval between 0 and 1440 minutes. A measurement interval of zero (0) stops the logger from making measurements.

2. Sensors.

- *Sensor Types.* In the Sensor Type combo boxes you can use the drop-down menus for each port to “tell” the logger what type of sensor is plugged into each of the 5 ports. However, if you try to configure the ports without first setting up the logger in the “Logger” tab, the sensor selection will be limited. Therefore, you must make sure that you have configured the logger in the “Logger” tab before you can configure the sensors. Once this is done, click “Apply” and all of the sensors will become available.

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4. Common Tasks

- *Depth (Inches)*: Use the Depth edit boxes to note the depth in inches that the sensors are placed in the soil.
 - 3. **Chart.** This section will be discussed in the “Viewing Data” section.
 - 4. **Radio.** In the “Radio” section, you set the radio mode, channel and sub channel for Em50R radio loggers. There are two Distinct types of modes to choose from, Transmit and Two-way. Transmit modes are for use with a DataStation. There is no limit to the number of loggers transmitting to a DataStation. Two-way modes are for use with an RM1 connected to a PC.
 - Radio Off/No Radio: The radio logger will take and store measurements as configured, but will only download via a direct connection using a serial cable adapter (SCA) or USB cable(UCA) and a computer.
 - Confirmed Delivery Transmit: This is the most robust transmit radio mode. The radio logger adds a checksum to the data packet before broadcasting the data to a datastation. The logger then waits for the DataStation to confirm it correctly received the data packet. If the logger doesn't hear the confirmation, it retries sending the packet again. The logger stops trying to transmit to a *DataStation* after 25 attempts.
 - Transmit Only: In this mode, every time the radio logger stores a measurement (according to the programmed measurement interval), it will also transmit the measurement to a “listening” receiver. Choose this mode when using a *DataStation* to receive your data. This radio mode uses the least battery power. The actual transmit time is randomly delayed to help prevent two or more radio loggers from transmitting at the same time.
-

- Two-way 6:00-18:00: This option is for use with an *Rm1* radio modem connected to a PC. In this mode, from 6:00 to 18:00 (6 am - 6 pm), the radio logger will “listen” for any available connection with an *Rm1* every 45 seconds. If an *Rm1* is actively transmitting, the radio logger will wait for a login command for a short time. This mode is useful for reducing battery consumption by not trying to make radio connections during the night.
- Two-way 24-hour: The radio logger will function as described above on a 24-hour basis with an *RM1*.
- Transmit + Two-way: Communicates as described above, but will also transmit data as measurements are taken. This mode uses the most battery power, and is primarily for troubleshooting radio connection problems.
- CD Transmit + Two-way: This mode combines the Two-way Radio mode and the Confirmed Delivery Transmit Radio mode. You could use this mode while configuring and testing your radio network. You should not leave your radio logger in this mode because it uses the most battery power of all the radio modes. Using CD Transmit + Two-way radio mode with the wake interval set to 1 or 2 will cause the batteries of your logger to drain very rapidly.

NOTE: Em50R loggers must have firmware version 1.12 or later to enable the Confirmed Delivery Transmit mode and Telemetry Test feature. Your DataStation must have firmware version 1.09 or later to receive Confirmed Delivery Transmit mode data packets. Contact Decagon for an application note that covers the steps needed to upgrade your hardware.

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4. Common Tasks

- **Unknown Radio Mode:** When DataTrac connects to a radio logger and cannot identify the radio mode, it will be automatically set to unknown.
 - *Channel:* Can be set from 0 to 6.
 - *Sub Channel:* Can be set from 0 to 65534
 - *Firmware:* (Read-only, cannot be modified) Displays the radio module's firmware version.

Calibration Tab

This tab is discussed in Chapter 5.

Chart Axis Tab

This tab is discussed in Chapter 5.

5. Viewing The Data

Downloading Data

Once your loggers are properly configured and collecting data, you will eventually want to download the data that has accumulated into DataTrac.

To download data:

1. Connect to your device as described in the previous chapter.
2. Once connected, click the “Download” icon, or go to Actions > Download, and select an option.
3. A screen indicating a download is in progress will appear, similar to the one shown below. To cancel the process at any point, click the “Cancel” button.

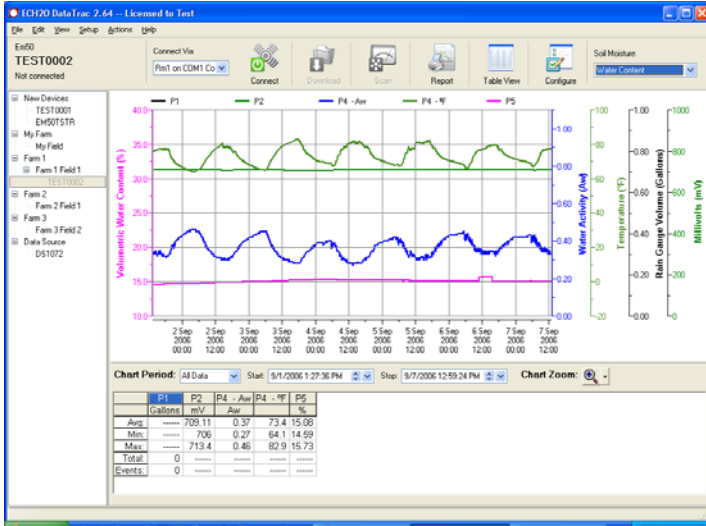


4. If the device you are downloading from is a DataStation, then you will need to configure the loggers (as described in the “Connecting to and Configuring a Logger” section) listed in the New Devices section of

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5. Viewing The Data

- the device directory before you can see the data in the chart.
5. Once the new data is read in, the data will appear in the chart when you select that particular logger in the device directory.

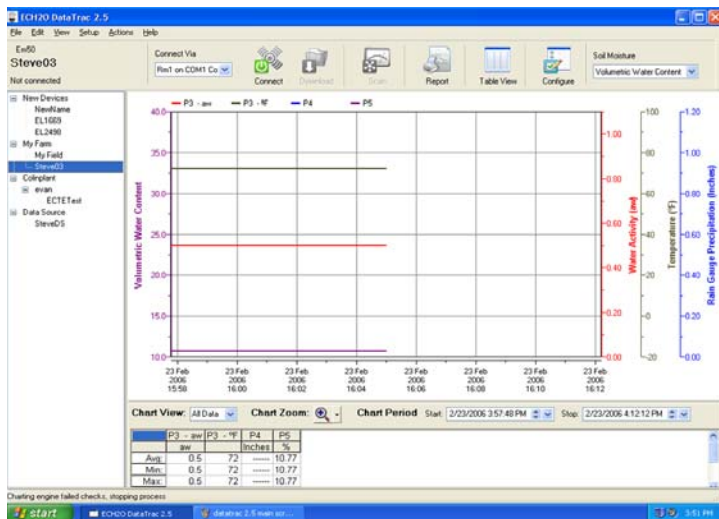


Different Views

After you download data into DataTrac, you can see your data in two different views.

Chart View

When you click on the Chart View icon, you will see your data in terms of a graph chart



An axis will appear for each type of measurement being displayed. Using your mouse pointer, you can click on any of the x- or y-axes and move them for ease of viewing. To zoom in, click on the zoom tool in the lower right corner, or input a specific range of dates in the “Chart Period” box at the bottom of the graph. You can also select from Day, Week, Two Weeks, Month, Season, or All Data view in the “Chart View” drop-down menu for custom views of the data.

Understanding the Chart Period

The Season View controls regulate the number of data records that are loaded from the database into the chart. This improves the performance of the application.

To cause the data in the range defined in the Season View settings to be loaded into the chart requires the user to

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select one of the Chart Period Choices: Day, Week, Two Weeks, 30 Days, All Data, or Custom. When you select a Chart Period option, the records in the database that match the date range you have selected in Preferences menu are loaded into the chart. The right hand side of the chart displays the last data record from the database that fit the Season View criteria, and the left end displays the time span listed in the Chart Period control.

- **Day.** Zooms the chart to the last day of data loaded from the database.
- **Week.** Zooms the chart to the last week (7 days) of data loaded from the database.
- **Two Weeks.** Zooms the chart to the last two weeks (14 days) of data loaded from the database.
- **30 Days.** Zooms the chart to the last 30 days of data loaded from the database.
- **All Data.** Zooms the chart to show all of the data in the database.
- **Custom.** Enables the user to select the Start and Stop dates located to the right of the Chart Period drop down list.

NOTE: The time axis range depends on how much data is in the database. For example, if you set a minimum number of two months to display, but there is only three days of data loaded into the database, the chart will only display those three days. Data is also arranged such that the current data point is at the right of the screen. For example, if you want to view data from June 2005 to June 2006, the chart would display data from just before the first and slightly after the last data points in that range. However, if you select Week View, the chart will place the current date's data point at the right of the screen and display data from a week before it to the left.

By double clicking with the left mouse button on a chart data point, the table will be loaded and the data point clicked on will be selected. This makes it very easy to look at a specific data point in the table view.

A right mouse click on the chart will bring up a menu with the following choices:

- **Adjust Axis Scale.** Opens the Chart Axis tab in the Device Setup screen.
- **Table View.** Switches to Table view.
- **Copy Chart.** Copies the chart to the clipboard so that it can be pasted into other programs for use in reports or web pages.

Below the graph is a small summary table showing the Average, Minimum, Maximum, Total, and Events values for each port.

A right mouse click on the summary table will bring up a menu with the following choices:

- **Copy.** Copies the selected cells onto the clipboard.
- **Select All.** Selects all of the cells in the summary table.

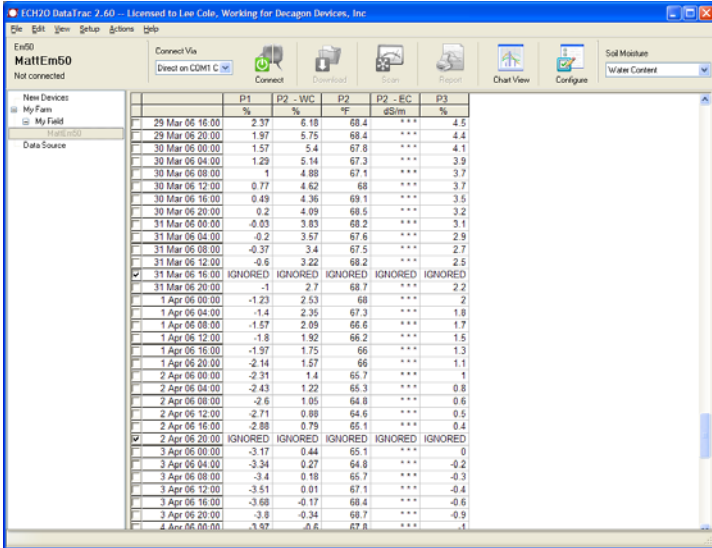
Table View

The Table View displays your data in a spreadsheet format, with the date and time of each measurement on the y-axis and the 5 ports on the x-axis. The Table View displays your data in a tabular “spreadsheet” format, with the date and time of each measurement on the y-axis and the 5 ports on the x-axis. Clicking the check box next to a reading will display IGNORED. That reading will then no

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longer appear in the Chart View. You can restore it by clicking the check box again.



The screenshot shows the ECH2O DataTrac software interface. The title bar reads "ECH2O DataTrac: 2.60 - Licensed to Lee Cole, Working for Decagon Devices, Inc". The interface includes a menu bar (File, Edit, View, Setup, Actions, Help), a toolbar with icons for Connect, Download, Report, Chart View, and Configure, and a "Solid Motion" dropdown menu. The main window displays a table of data for a device named "MattEm50". The table has columns for date, P1, P2_WC, P2, P2_EC, and P3. The data rows show various measurements over time, with some rows marked as "IGNORED".

	P1	P2_WC	P2	P2_EC	P3
	%	%	°F	µS/cm	%
<input type="checkbox"/> 29 Mar 06 16:00	2.37	6.18	68.4	***	4.5
<input type="checkbox"/> 29 Mar 06 20:00	1.97	5.75	68.4	***	4.4
<input type="checkbox"/> 30 Mar 06 00:00	1.57	5.4	67.8	***	4.1
<input type="checkbox"/> 30 Mar 06 04:00	1.29	5.14	67.3	***	3.9
<input type="checkbox"/> 30 Mar 06 08:00	1	4.88	67.1	***	3.7
<input type="checkbox"/> 30 Mar 06 12:00	0.77	4.62	68	***	3.7
<input type="checkbox"/> 30 Mar 06 16:00	0.49	4.36	69.1	***	3.5
<input type="checkbox"/> 30 Mar 06 20:00	0.2	4.09	68.5	***	3.2
<input type="checkbox"/> 31 Mar 06 00:00	-0.03	3.83	68.2	***	3.1
<input type="checkbox"/> 31 Mar 06 04:00	-0.2	3.57	67.6	***	2.9
<input type="checkbox"/> 31 Mar 06 08:00	-0.37	3.4	67.5	***	2.7
<input type="checkbox"/> 31 Mar 06 12:00	-0.6	3.22	68.2	***	2.5
<input checked="" type="checkbox"/> 31 Mar 06 16:00	IGNORED	IGNORED	IGNORED	IGNORED	IGNORED
<input type="checkbox"/> 31 Mar 06 20:00	-1	2.7	68.7	***	2.2
<input type="checkbox"/> 1 Apr 06 00:00	-1.23	2.53	68	***	2
<input type="checkbox"/> 1 Apr 06 04:00	-1.4	2.35	67.3	***	1.8
<input type="checkbox"/> 1 Apr 06 08:00	-1.57	2.09	66.6	***	1.7
<input type="checkbox"/> 1 Apr 06 12:00	-1.8	1.92	66.2	***	1.5
<input type="checkbox"/> 1 Apr 06 16:00	-1.97	1.75	66	***	1.3
<input type="checkbox"/> 1 Apr 06 20:00	-2.14	1.57	66	***	1.1
<input type="checkbox"/> 2 Apr 06 00:00	-2.31	1.4	65.7	***	1
<input type="checkbox"/> 2 Apr 06 04:00	-2.43	1.22	65.3	***	0.8
<input type="checkbox"/> 2 Apr 06 08:00	-2.6	1.05	64.8	***	0.6
<input type="checkbox"/> 2 Apr 06 12:00	-2.71	0.88	64.6	***	0.5
<input type="checkbox"/> 2 Apr 06 16:00	-2.88	0.79	65.1	***	0.4
<input checked="" type="checkbox"/> 2 Apr 06 20:00	IGNORED	IGNORED	IGNORED	IGNORED	IGNORED
<input type="checkbox"/> 3 Apr 06 00:00	-3.17	0.44	65.1	***	0
<input type="checkbox"/> 3 Apr 06 04:00	-3.34	0.27	64.8	***	-0.2
<input type="checkbox"/> 3 Apr 06 08:00	-3.4	0.18	65.7	***	-0.3
<input type="checkbox"/> 3 Apr 06 12:00	-3.51	0.01	67.1	***	-0.4
<input type="checkbox"/> 3 Apr 06 16:00	-3.69	-0.17	68.4	***	-0.6
<input type="checkbox"/> 3 Apr 06 20:00	-3.8	-0.34	68.7	***	-0.9
<input type="checkbox"/> 4 Apr 06 00:00	-3.97	-0.6	67.8	***	-1

A right mouse click on the table will bring up a menu with the following choices:

- **Show Unprocessed Data.** Displays the data in raw or unprocessed values.
- **Chart View.** Switches to Chart view.
- **Copy.** Copies the selected cells to the clipboard so that it can be pasted into other programs for use in reports or web pages.
- **Paste.** Pastes the value in the clipboard to the selected cell.
- **Select Visible Data Rows.** Selects the data rows that are visible to the user.
- **Select All.** Selects all data.

When the table is displaying the data as unprocessed values the first choice in the right mouse click menu will be Show Processed Data.

Editing Data Points

The Em50 compatible sensors can be edited in the table view in accordance with the following table:

Em50 Sensor	Processed Data	Unprocessed Data
EC-20	Yes	Yes
EC-10	Yes	Yes
EC-5	No	Yes
ECH ₂ O-TE	No	No
LWS	No	No
ECT	Yes	Yes
ECRN	Yes	No
G1	Yes	No
PS1	No	No
mV	Yes	Yes
EHT	Yes	No
EC-TM	No	No
MPS-1	No	No
PYR	No	No

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Em50 Sensor	Processed Data	Unprocessed Data
QS0-S	No	No
5TE	No	No
10HS	Yes	Yes

If you use a Drain Gauge, a Rain Gauge, or pressure switch, which employ an accumulator (the total number of dump events in the system), and you edit a data entry in the Table View, **if the next entry is a non-zero value you must edit each successive entry until a zero value is obtained!** Unedited events generate an internal error message, which prohibits DataTrac from making further calculations until two events with equal accumulators are supplied.

Charting Data

To chart data, click on the logger of interest in the device directory.

- Change display period by choosing a default interval from the Chart Period combo box.
- View a specific display period by setting the desired interval in the Chart Period boxes beneath the chart.
- Remove and restore traces from the graph by clicking on the Legend Name of the trace.
- Move the axis by placing the pointer over the axis numbers and holding down the left mouse button while you move it.
- View soil moisture in terms of Water Content, Plant Available Water or Inches Per Foot by choosing

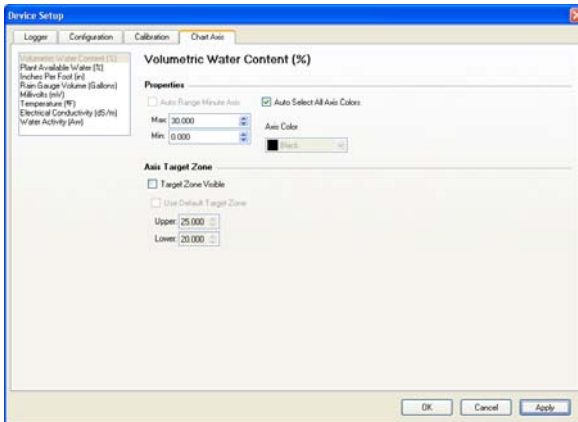
between alternatives in the Soil Moisture combo box in the upper right corner.

- Zoom in and out of the graph screen by choosing the (+) or (-) magnifying tool from the lower right corner of the window and by clicking on the magnifying glass icon.

Adjusting the Chart Axis

DataTrac allows you to adjust the range of the chart axis. Do the following:

1. This feature can be accessed in three ways:
 - Select Setup > Configure (logger name), and click the Chart Axis tab;
 - Double-click on a logger in the device directory to open the Configuration menu, and select the Chart Axis tab.
 - Click the Configuration button on the toolbar, and select the Chart Axis tab, shown below.



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- Select the data view you would like to adjust from among the alternatives shown in the box in the upper left corner of the device setup screen.
- Set the desired range by adjusting the Maximum and Minimum values in the Properties section of the screen.
- The axis color may also be changed if desired.
- Click the Apply button in the bottom right corner of the window to apply the settings and remain in the setup window. Click OK to apply the settings and exit the setup window.

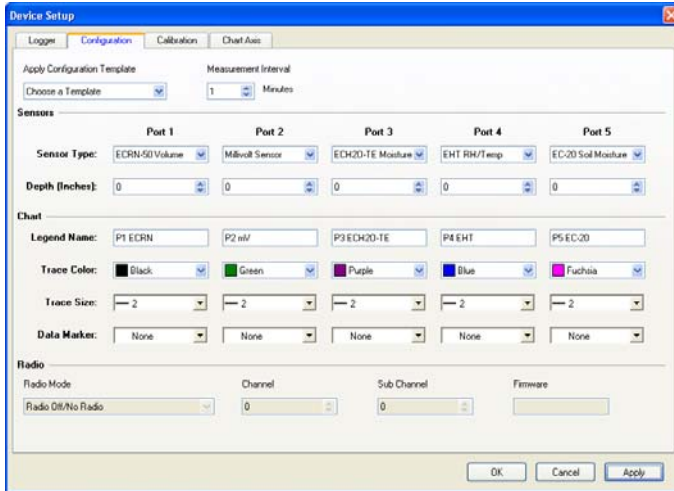
NOTE: The chart axes were designed to be larger than necessary to allow the user to drag traces on and off of the screen. For example, if you have a busy chart and want to move a particular trace to make more space, click on that trace's chart axis and drag the mouse upward to take the trace off the screen. The trace will be returned to its starting position if you leave the chart view and return to it.

Configuration

You can also use the Device Setup menu to control how data are displayed in DataTrac. See Chapter 4 for more information on this menu.

Configuration Tab

Selecting the Configuration Tab displays the screen below:



This page is where you set up the sensor type, measurement interval, and charting preferences for your logger.

Apply Configuration Template. If the user wants the data to always be displayed in the same way for more than one logger, then the user can create a configuration template.

This is done by selecting the desired values for Depth (Inches), Legend Name, Trace Color, Trace Size, and Data marker. Click on the Apply Configuration Template drop down list, select Save Current Configuration as..., type in a name that is descriptive of the configuration and click OK. The Configuration Template is now saved in the Apply Configuration Template list and can be applied to any logger in the Device Tree.

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More Configuration Templates can be created as needed and when Configuration Templates are no longer needed, they can be deleted. An existing Configuration Template can be modified by applying the template to a logger, deleting the original Configuration Template, making needed changes to the current logger, and saving the configuration back to the original Configuration Template name.

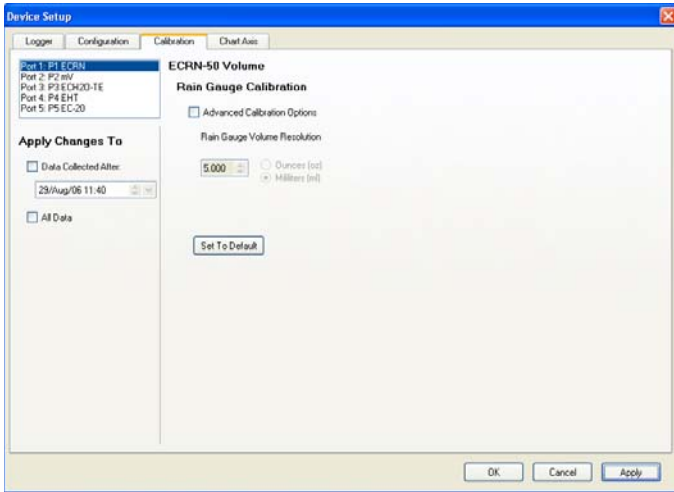
Measurement Interval. Loggers allow you to select a measurement interval between 0 and 1440 minutes. A measurement interval of zero (0) stops the logger from making measurements.

The remainder of the screen is divided into three sections:

1. **Sensors.** Here, set which type of sensor is connected to each port, and each sensor's measurement depth.
2. **Chart.** Here, you can modify settings changing how the chart data is displayed.
 - *Legend Name:* Chart legend and table column names.
 - *Trace Color:* A color to represent each sensor on the graph.
 - *Trace Size:* Trace line and width sizes.
 - *Data Marker:* Set markers for data points on trace lines.
3. **Radio.** See the radio section in Chapter 4 under Configuration Tab.

Calibration Tab

The Calibration tab of the Device Setup allows you to apply soil-specific calibrations to your ECH₂O soil moisture probes, as well as apply calibration to other sensors that require sensor-specific calibration.



This screen has three sections:

- 1. Port List.** In the upper left corner of the screen is the Port List. From this list select sensor ports that have a sensor connected. The list is organized by port number and legend name.
- 2. Sensor specific calibration information.** When the default calibration equations are not suitable for your soil type, you can enter your own calibration equations here.

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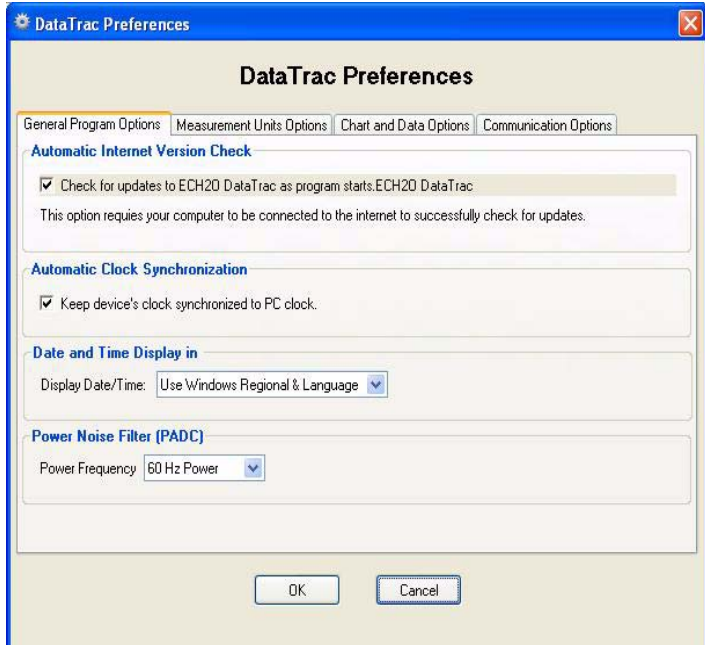
5. Viewing The Data

- 3. Apply Changes To.** After you have made calibration changes, specify which parts of your data to apply the new calibration to.

DataTrac Preferences

The Preferences menu allows you to adjust program settings, the way data is displayed on the screen, and select units you wish DataTrac to use when displaying data. This menu features four sections, accessed by clicking the tabs at the top of the screen. Each section and its options are described here.

General Program Options

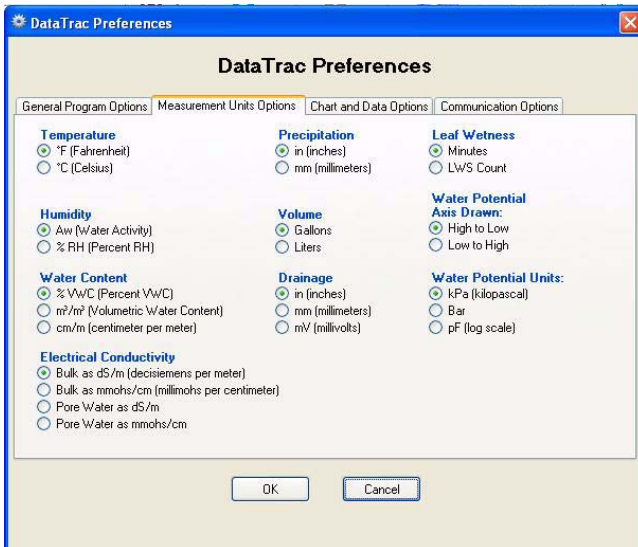


- **Automatic Internet Version Check.** Enabling this option will have the program check automatically for updates when the program starts, whenever you are connected to the Internet. When an update is found, you will be directed to the website where you can download it.
- **Automatic Clock Synchronization.** By default, DataTrac automatically synchronizes the logger's date and time to the time set on the computer. Click the check box to disable this feature. You can update the date and time manually anytime you are connected by selecting Actions > Device Tools > Set Time.
- **Date and Time Display in ECH₂O DataTrac.** You have control how your logger's date and time are displayed on the toolbar. By default, the date and time are formatted using the settings in the Windows Regional & Language Options control panel. You can modify this to display the date and time in day/month/year format, with either 12- or 24-hour format.
- **Power Noise Filter (PADC).** The AC or "mains" electrical power we use every day can add a subtle amount of noise to the logger sensor measurements. The logger's Power Noise Filter (PNF) is a setting designed to eliminate this electrical noise that comes from the AC power distribution system. You should set the value of the PNF to match the frequency of the power cycle where you live. (North America and most of Asia use 60 Hz, while in most of Europe it is 50 Hz.) This value only needs to be set once. DataTrac will automatically set the PNF of each logger it connects to.

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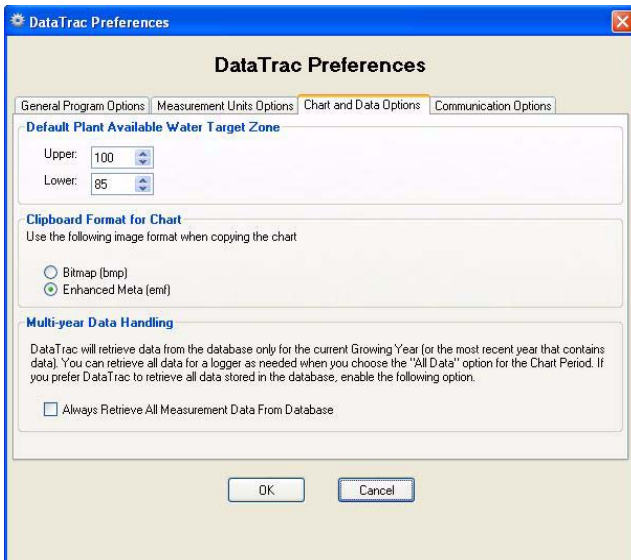
Measurement Units Options



- **Temperature.** Specifies whether temperature read-out is displayed in Celsius or Fahrenheit.
- **Precipitation.** Specifies whether precipitation output from the ECH₂O Rain Gauge is displayed in inches or in millimeters.
- **Leaf Wetness.** Minutes or LWS count.
- **Humidity** Specifies whether humidity is displayed in Water Activity or % RH.
- **Volume.** Specifies whether readings from the ECH₂O Rain Gauge are displayed in gallons or liters.
- **Water Potential Axis Drawn.** Specifies whether the chart axis for readings from the ECH₂O Matric Potential sensor will be drawn highest potential to lowest, or vice versa.

- **Water Content.** Specifies the unit of measurement for water content readings, as percent volumetric water content (% VWC), straight VWC (m^3/m^3), or as centimeter per meter (cm/m).
- **Drainage.** Specifies whether measurements from the ECH₂O Drain Gauge will be displayed in inches, millimeters or millivolts.
- **Water Potential Units.** Specifies the unit of measurement for water potential readings, as kPa (kilopascal), Bar, or pF (log scale).
- **Electrical Conductivity.** You can choose to display the EC reading in pore water or bulk, as dS/m (decisiemens per meter), or mmohs/cm (milimoles per centimeter).

Chart and Data Options

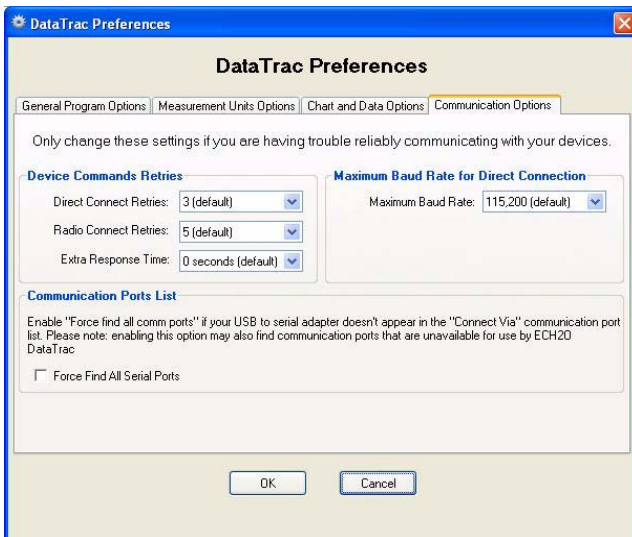


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5. Viewing The Data

- **Default Plant Available Water Target Zone.** Sets a global target zone of how much water is available in the measured media.
- **Clipboard Format for Chart.** Sets the image format when copying the chart.
- **Multi-year Data Handling.** Allows the user to retrieve all data from the database or only the current year data.

Communication Options



- **Direct Connect Retries.** If you are experiencing unreliable communication with a logger, set the number of times the computer will automatically attempt to reconnect to a logger from 3 to 10 times (usually, no more than 3 tries should be necessary).
 - **Radio Connect Retries.** If you are experiencing unreliable communication with a radio logger while
-

using a DataStation or Rm1, set the number of times the computer will automatically attempt to reconnect to a radio logger from 5 to 12 times.

- **Extra Response Time.** If you are experiencing unreliable communication with a device on an Ethernet connection, increase the Extra Response Time to match or exceed the delay present in the network. This causes DataTrac to wait for the data to be available before trying to read it into the database.
- **Maximum Baud Rate for Direct Connection.** Set a baud rate lower than the default 115,200 baud if you consistently experience a noisy serial connection.
- **Force Find All Serial Ports.** If you are using a model of USB-to-serial adapter that is not recognized in the “Connect Via” menu, enabling this option will find all available serial ports on your computer. Your adapter should then be available. (It may also list some ports that DataTrac cannot use to connect.)

Click OK to apply any changes made to the Preferences.

6. Tools

In addition to the many features already discussed, DataTrac features other tools to interact with your devices and modify settings controlling downloaded data.

Printing Reports

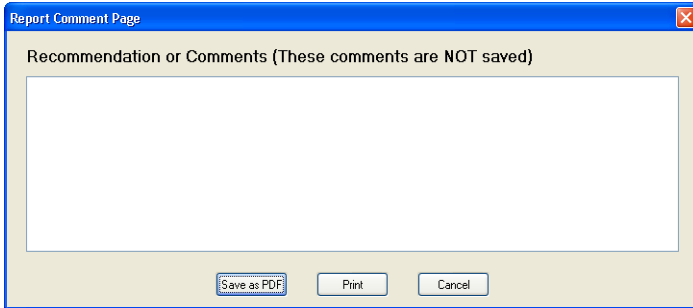
DataTrac combines several sources of data to print a report. The report contains information about the logger, the chart data (as seen on the screen), the report summary data, and an optional recommendation text. DataTrac should support any printer installed in Windows. You may physically print out a report, or save it as a PDF.

Print a Physical Report

1. Ensure that your printer is installed and correctly configured by selecting File > Print Setup. Make any changes to your printing configuration here.

NOTE: Paper orientation is ignored; DataTrac will always print in portrait format.

2. Select File > Print Report.
3. The “Report Comment Page” dialog box appears (shown below). Enter any notes or comments here. These will appear on the report, **but are not saved by DataTrac.**
4. Click “Print”.



Print a Report as a PDF

1. Follow steps 1 - 3 as outlined above.
2. Click “Save as PDF”.
3. DataTrac will indicate that a PDF is being generated in the task bar. After a few seconds, the “Save PDF as” dialog appears, where you can enter a filename and a location to save the PDF. Do this, then click “Save”.
4. The PDF will be generated within a few seconds.

Consider choosing data markers on the traces if you plan to print the report in black and white (like a laser printer). This can better help identify the traces on the chart.

Exporting Chart Data

DataTrac supports exporting the chart data for use in other applications. You can use the chart data to create your own custom reports or web pages with third-party applications (word processors or web authoring software)

To export a chart:

1. Display the chart to be exported. The exported chart image will look exactly as it does on the screen.

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6. Tools

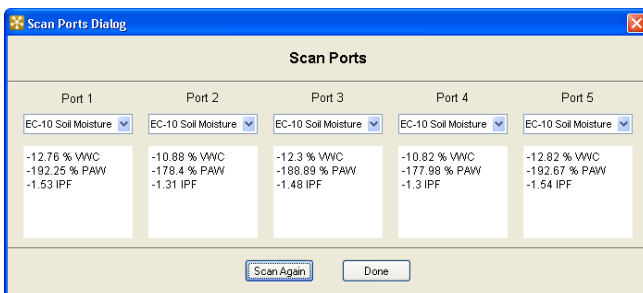
2. Click File > Export > Chart.
3. Name the file and choose file type and location.
4. Save the file.

Notes on Exported Chart File Formats

DataTrac can export the chart data as either bitmap data or vector data, which can be saved in the following formats: *.bmp, *.emf, *.jpg, and *.png. Choose Enhanced Metafile (EMF) vector data if you plan to use the chart in a word processor or publishing program. The Enhanced Metafile supports resizing the chart and will give the best looking text on any printer. The bitmap data formats are useful for web publishing or for programs that don't support the EMF format. The Portable Network Graphics (PNG) format is a better choice for web publishing than JPEG.

Scan Ports

When you are connected to a logger either directly or via an Rm1 radio modem, you can take a direct measurement on all 5 ports by selecting "Scan Ports" from the Actions menu, or by clicking the "Scan" button on the toolbar. This allows you to see a real-time measurement for the ports. These measurements are not saved.



Redeploy a Logger

At times, you may want to use your logger for a new purpose in a new location. If you simply change the name of the logger, all of the data stored in DataTrac moves with the new name as if it were collected with a logger under a new name. The Redeploy feature allows you to restart a logger as if it were a new logger with no data. The previously acquired data will be archived under the old logger name (or a new name, depending on how the redeploy is done).

To redeploy a logger:

1. Connect to the logger.
2. Go to Setup > Redeploy (name of logger).
3. The Redeploy dialog box will appear.
4. You can choose to rename the existing logger, or create a new logger while archiving the old data under the previous name. You can also choose to keep the same name for the new logger and change the name of the old logger. Previously acquired data will now be stored under the new name assigned to the old logger. The new logger will appear in the device directory under a specified Farm and Field. You can also choose to erase all data on the selected logger; **be careful - once this option is selected, all data is deleted and cannot be recovered!** The old logger will still contain all data previously downloaded.
5. Once you have assigned these values, click OK. The new logger will appear where specified, and can be configured and used to collect data.

Exporting a Transfer Set

DataTrac allows you to export the information for a logger and its data from one copy of DataTrac and import it into another. DataTrac does this by creating a data file called a transfer set, which contains all of the data, configuration settings, and device directory information for the selected logger. This file can be especially helpful for troubleshooting ECH₂O DataTrac problems.

To export a transfer set:

1. Select the logger in the device directory that you wish to export.
2. Go to File > Export > Transfer Set.
3. Specify a file name, and location where the file will be saved, and then click OK. A transfer set will then be created and saved to the specified location.

Reading in Saved Data Files

In addition to connecting to a logger and downloading data from it, you can also bring saved data (in the form of transfer sets) into DataTrac in two ways:

1. Go to C:\Program Files\Decagon\ECH₂O DataTrac and place the file in the Import directory.
2. Go to File > Import Data. Find where your transfer set is saved (file extension is *.dzd*) and click OK.

When DataTrac imports the transfer set, it will place the logger in the same location in the device directory as the copy of DataTrac that exported it. You do not have to reconfigure the logger, as all of its settings are automatically applied. When placing a file in the Import directory,

the data will be automatically loaded into the chart or table the next time DataTrac is launched.

NOTE: If a logger already exists in your system with the same name as the one you are attempting to import, DataTrac will display an error message indicating that you have a naming conflict. When this error message appears, you have three options:

- **Replace.** Replace the current logger with the incoming logger's calibration, configuration, and data.
- **Rename Incoming.** Assign the incoming logger a new name.
- **Rename Existing.** Assign the current logger a new name. This will preserve the logger's calibration, configuration, and data.

When you have made a selection, click "OK" to apply the changes.

Hiding Unused Sensors

To remove a sensor from the chart view, do the following:

Temporarily:

In the Chart View, click on that sensor's legend name in the chart legend. The legend name will display "Off". It will reappear, however, if you click on another logger in the data tree and come back to the original logger.

Permanently:

1. Go to Setup > Configure > Configuration tab.
2. Under "Chart", go to Trace Color, select the appropriate line, and select White from the color menu.

3. Click Apply to make the change permanent. The line will remain that color until changed again.

Device Tools

The Device Tools menu, located in the Actions main menu, allows you to perform many tasks, such as erasing data and changing logger system settings. Each tool is described below.

NOTE: This menu is only enabled when you are connected to a device.

Set Time

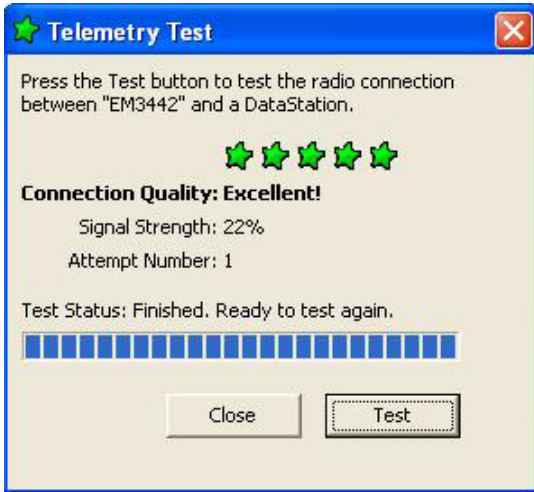
(Loggers only) This will set the logger's date and time to the current settings on your computer.

Firmware Test

This will test the logger's firmware. A dialog box will appear indicating whether the firmware has tested as Good or Bad. For more information on firmware and on obtaining updates, please see the Troubleshooting section.

Telemetry Test

This allows you to verify the radio connection between the radio logger and the DataStation. Choose "Telemetry Test" from the Actions Menu.



Click the Test button and the test will begin. When the test has finished you will be presented with the results of the test. You may have to relocate the radio logger while doing the Telemetry Test in order to find the best connection quality. Once you have found the radio logger location that provides the best connection quality, install the radio logger at that location. Disconnect from the radio logger.

NOTE: Telemetry Test only works with Em50 loggers running firmware 1.12 or newer.

Erase Data in (device name)

To erase data from a connected device, go to “Erase Data in (device name)”. This will quickly erase all data currently stored on the device, but will *not* erase the data already stored in DataTrac. **WARNING! Once this feature is activated, ALL device data will be erased and cannot be recovered!**

Initialize Radio

This feature will reset the radio and all associated settings (Em50R, Em5R, and DataStation only).

Initialize (device name)

Occasionally, it may be necessary to reset a logger if you are continually getting unreliable communications from it. Click on Initialize Device. This will completely reset the system, and erase data stored on it. **WARNING! Once this feature is activated, ALL device data will be erased and cannot be recovered!**

7. Troubleshooting

Although DataTrac has been designed to run as efficiently as possible, problems may sometimes occur. The following chapter details the most common problems you may encounter and their solutions. Additional information on DataTrac's features can be found in the DataTrac help file.

PROBLEM: DataTrac informs me the COM port I am trying to use doesn't exist.

SOLUTION: This is an operating system issue. Check to see if the COM port is installed correctly.

PROBLEM: My USB to Serial adapter is not showing in the communication port picker.

SOLUTION: Although DataTrac supports most models of serial-to-USB adapters, some models might not be recognized. Do the following:

1. Go to Setup > DataTrac Preferences > "General Program Options" tab.
 2. Enable the "Force Find All Serial Ports" check box. This will search the system and find all COM ports; not all of these, however, can be connected to (i.e. modem ports).
 3. Return to the "Connect Via" menu. Your adapter should now be available.
 4. If enabling the Force Find check box does not find your adapter, try one of the following:
-

- Reinstall/update the drivers for your logger;
- Use another available COM port;
- Use another model of serial-to-USB adapter.

PROBLEM: DataTrac tells me the communication port I want to use is busy or in use by another application, but I don't think any other programs are running.

SOLUTION: Some PDA synchronization software monitors serial communication ports. Disable Microsoft's ActiveSync or Palm's HotSync system software while trying to use the serial port with DataTrac.

PROBLEM: No data are being displayed, or the letters "NP" appear in the data columns.

SOLUTION: If the error message, "DataTrac did not load data into the chart" ever appears, one or a combination of the following may have occurred:

1. ***The logger or connected sensors are not correctly configured.*** When you first configured your logger, you may not have configured the logger to a Farm or Field, or not configured what type of sensor is connected to each port. Your logger stores what type of sensor is connected. You may have selected the wrong sensor type (i.e. you have connected an EC-20 probe, but selected an EC-5). Refer to the "Device Setup" section of Chapter 2.
2. ***You have deleted all of the data.*** Once data has been erased, it cannot be recovered.

3. *The logger does not have any sensors connected.*
Check to make sure that the sensors are correctly connected.
4. If there is data present, go to the Preferences menu, Calibration tab, and enable the “All Data” option, then click Apply.

PROBLEM: My data shows “*” in the Scan Ports window or in the data file.**

SOLUTION: The three stars mean the raw data was out of the expected range for the sensor. This could indicate a broken sensor. Make sure your sensor type is set correctly for the type of sensor you have in each port.

PROBLEM: My firmware has become corrupt.

SOLUTION: Firmware - the internal code that makes the hardware function properly - can occasionally become corrupt. This may cause your logger to run slower than usual, or to produce unreliable readings. If your logger is beginning to show these symptoms, it might be necessary to test the status of its firmware. Do the following:

1. Go to Setup > Device Tools > Firmware Test.
2. DataTrac will test your logger's firmware, and depending on its condition, will display a message saying the firmware check reported the firmware as either good or bad. If the firmware reports as bad, connect to the Internet, then go to www.decagon.com/ech2o/software to obtain a firmware update.
3. If you do not have an Internet connection, cannot download the update, or problems do not cease after

installing it, please contact Decagon for instructions on mailing your logger to us for repair.

PROBLEM: I am receiving unreliable communication from my logger.

SOLUTION: It may be necessary to reset your logger if you are continually getting unreliable communication from it. Do the following:

1. Open the logger case.
2. At the top of the circuit board there is a small silver button with the word RESET above it. Press this once. When you do this, the green status light will come on for a few seconds, then continue to blink periodically.
3. This will reset the processor. You will not lose any of your stored data or settings when you initiate a reset.

PROBLEM: DataTrac informs me there is no radio in the logger when I try to communicate via an Rm1 to that logger.

SOLUTION: In this case DataTrac needs to acquire the logger's radio settings. This can be done in two ways; by:

1. Directly connecting to the radio logger and retrieving all of its settings; or
2. Initiating a "Query Any" and attempting to connect to that logger. If the logger answers a "Query Any," then DataTrac will update the settings for that logger.

PROBLEM: My Rm1 is not connecting to radio loggers.

SOLUTION: There are a myriad of error messages which could cause such a problem.

If “No Rm1 detected” or “Cannot setup Rm1” type error message appears:

- Make sure the Rm1's power supply is connected and that the Rm1 is turned on.
- Reset the Rm1 by pressing the “Reset” switch on the case.
- Check that the Rm1 is connected to the correct COM port or serial-to-USB adapter.

If there is no reply from a logger:

- Make sure the radio antenna is connected.
- Check that it has been 10 minutes since you last attempted to communicate via the Rm1.
- Verify that the logger in DataTrac's configuration (channel, sub channel, and radio mode) are the same as the radio logger you are trying to reach.
- Any radio interference can disrupt the Rm1's signal and cause it to take longer to reach a radio logger, or not reach it at all. Make sure the Rm1 and radio logger have not been setup by metal buildings, or by anything that could interfere with the transmission.
- If there is a reply from a logger, and a message appears indicating a problem with the logger, this does not apply to DataTrac. See that logger's operator's manual for a solution.

PROBLEM: My radio logger or Rm1 is taking too long to connect to a remote logger.

SOLUTION: If your radio logger does not connect to your Rm1 transmitter after 50 seconds:

1. Make sure that the logger is still transmitting. As soon as you disconnect from a logger, the radio becomes inactive for 10 minutes. You can fix this by waiting 10 minutes, or by doing a complete system reset.
2. Make sure the radio logger is set to a radio mode **other than “Radio Off/No Radio” or “Unknown Radio Mode”**. This can be changed by going to Setup > Configure > Configuration tab > Radio. Mode #0 is Radio off/No Radio; mode #4 is Transmit & Communicate 24 hrs. See Chapter 2 for a description of the radio modes.

PROBLEM: How do I know if my connected sensors are working properly?

SOLUTION: Once you have connected and configured your logger, you may want to check to see if your sensors are working properly. This can be done by doing the following:

1. Go to Actions > Scan Ports.
2. DataTrac will do an immediate scan of all the ports and display the data for each sensor.
3. Each port also has the option of displaying unprocessed data. Selecting this will display that port's unprocessed value.
4. To take another reading, click “Scan Again”. If this proves successful after several attempts, the sensors are configured and working correctly.

PROBLEM: The error message “DataTrac cannot set any global settings” appears.

SOLUTION: The best solution to this message is to completely reinstall DataTrac. Doing this will erase all data and settings currently stored in your current version of DataTrac. Please contact your ECH₂O System sales representative for help with this problem.

PROBLEM: The error message “Cannot get device settings” appears when I connect to my logger.

SOLUTION: Try connecting to the logger again. If this does not work, reset your logger, disconnect, and try to connect again, or close DataTrac and reboot your computer. If the problem still persists, contact your ECH₂O System sales representative.

PROBLEM: I receive an error message when trying to rename my logger.

SOLUTION: When you name or rename a logger, it must conform to the following standards:

- No more than 8 characters;
- No punctuation (“ ”, ? : etc.);
- No whitespace characters;
- You must rename the logger you are connected to;
- You cannot rename a logger unless you are connected to it;
- The new logger name must be unique from other loggers in the system;

PROBLEM: The message “Cannot build Device Tree” appears when I start DataTrac.

SOLUTION: When this occurs, something may have gone wrong with DataTrac's database engine files. DataTrac's database files are contained inside the EchoWorkingFiles directory. This is found at C:\Program Files\Decagon\ECH₂O DataTrac. (This is a hidden directory, so you will need to enable viewing hidden files to access it.) Do the following:

1. Check how many files the folder contains. The folder must contain a minimum of 32 files for DataTrac to function correctly.
2. Verify that DataTrac has write permissions to write files to this directory.
3. Verify that the Borland Database Engine (BDE) is installed and functioning correctly. To test this, go to Start > Programs > BDE Information Utility. This will open a diagnostic window. Click the "Test BDE" button. This will perform a diagnostic test of the BDE. If all is well, the program will display "The BDE is installed and working properly".
4. If the problem still persists, you may have to completely reinstall DataTrac.

NOTE: It is best to restart DataTrac entirely after performing a repair.

PROBLEM: When I try to license DataTrac, the program will not accept my license key.

SOLUTION: Only DataTrac version 2.60 or newer supports licensing. Make sure to do the following:

- When you enter your license key, you must enter your name, company name, and license key exactly as they appear on the license sheet.

NOTE: To avoid confusion between the number zero and the letter "O", the license key will only contain "O"s.

- When you enter the license key, it must be entered in groups of four as shown on the license sheet.
- Make sure that the key you received is for the proper version of DataTrac (it will say on the license key sheet).

PROBLEM: My 30-day evaluation period has expired and I need more time.

SOLUTION: You may obtain a 30-day extension of your evaluation period by contacting your sales representative.

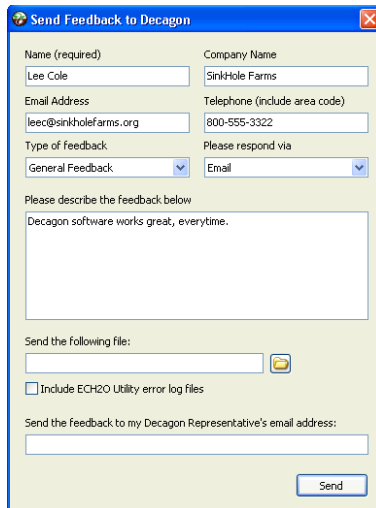
PROBLEM: I select a data point in the Table View, but when I return to the Chart View I cannot find my data.

SOLUTION: This problem has multiple solutions. First, under the Chart View menu, select a different view than what is selected. This will readjust the chart and may adjust the axes such that your data are displayed. If this does not work, you can also click on the axes and drag them in the appropriate direction to manually resize them

Appendix A

Send Feedback to Decagon

Decagon Software makes it easy to send feedback, bug reports, and feature requests to Decagon or your Decagon Distributor. Choose “Send Feedback to Decagon...” from the help menu. This opens the window shown below.



The screenshot shows a dialog box titled "Send Feedback to Decagon". It contains the following fields and options:

- Name (required):** Lee Cole
- Company Name:** SinkHole Farms
- Email Address:** leec@sinkholefarms.org
- Telephone (include area code):** 800-555-3322
- Type of feedback:** General Feedback (dropdown menu)
- Please respond via:** Email (dropdown menu)
- Please describe the feedback below:** A text area containing the text "Decagon software works great, everytime."
- Send the following file:** A file selection button.
- Include ECH₂O Utility error log files
- Send the feedback to my Decagon Representative's email address:** An empty text field.
- Send** button.

Enter your name, company name, and other contact information. Tell us what type of feedback you are sending (General Feedback, Feature Suggestions, Bug Report, or

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Other). Indicate how you want us to respond to your feedback (Email or Telephone).

Use the description area to give details for your feedback. If you are reporting a bug, it is very helpful for you to tell us what steps you took for the bug to happen and any error message you saw. By default, bug reports also include the software error files.

You can send Decagon a file using this form too. This is useful for sending data files that you have questions about.

If you work directly with a Decagon representative, put their E-mail address in the field at the bottom of the form. This sends the contents of the form to them. Your Decagon representative can follow-up with you directly.

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