

VW MiniLogger

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Introduction

The MiniLogger System

The VW MiniLogger is a compact datalogger designed to monitor a single VW sensor, such as a piezometer, crackmeter, strain gauge, or displacement sensor.

Logger Manager, available as a free download at

<https://durhamgeo.com/resources/download-pages/software/>,

is used to program the MiniLogger and also to retrieve the readings that the MiniLogger has recorded.

A wireless option can be added to the MiniLogger. The MiniLogger can then be set up and programmed remotely by a PC connected to a base-station radio.

Chapters in this Manual

Installing the Manager Program tells how to install the Logger Manager software on your PC.

Connecting to the MiniLogger tells how to connect your PC to the MiniLogger with a serial cable.

Setting Up tells how to set reading intervals and other functions of the MiniLogger.

Data Logging tells how to connect a sensor to the logger and start data logging.

Retrieving Data tells how to retrieve data from the logger and save it on your PC.

About Radio MiniLoggers provides a brief overview of the wireless system.

Installing Base Station Software tells how to install drivers for wireless communications.

Connecting to Radio MiniLoggers tells how to establish a radio link between your PC and the Radio MiniLogger.

Base Stations discusses the setting and options used in setting up Remote Stations.

Auto-Retrieval details how to obtain information from the logger without having to manually retrieve the data in the program.

Installing the Manager Program

Introduction The Manager program is used to program the MiniLogger and to retrieve stored data. You can download the most recent version of the program from www.durhamgeo.com.

Download the Manager Program

Logger Manager can be downloaded free of charge from the Durham Geo Slope Indicator website at:

<https://durhamgeo.com/resources/download-pages/software/>

Please check the site occasionally to verify that you have the most recent version.

1. Start your internet browser. Click in the address field, enter www.durhamgeo.com, and press Enter. When the website appears:
2. Click on Resources, then click on Software in the Downloads section.
3. Scroll down to Loggers & Readouts and choose the Logger Manager (32-bit or 64-bit) that is appropriate for your computer's operating system. Click on the link to start downloading the setup file.
4. Double-click on the downloaded file, which is called "setup-manager.exe."
5. Follow on-screen setup instructions. If you are prompted to install the FTDI Chip CDM Driver, Click OK to proceed with installation of the driver. Afterwards, you will find a shortcut named Logger Manager on your start menu. The actual path to your program is normally C:\Program Files\Logger Manager\LoggerManager.exe.

Updating the Manager Program

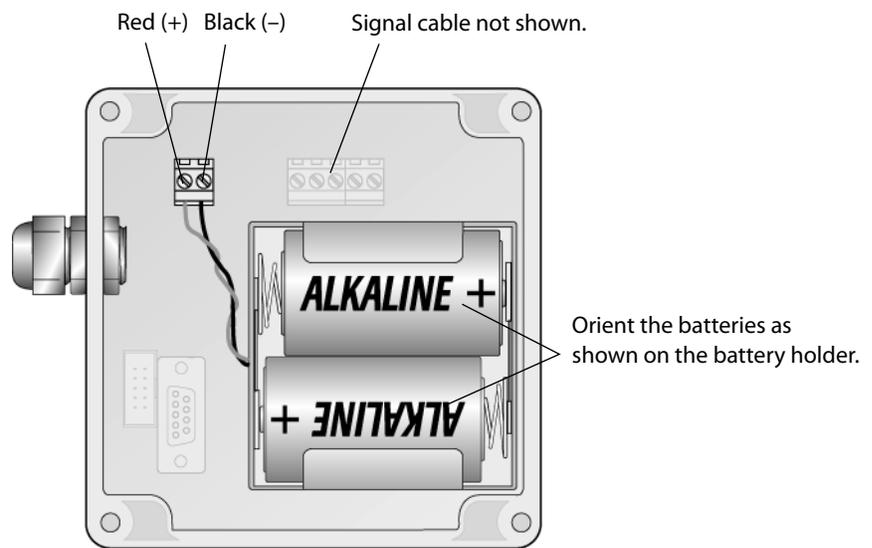
1. Follow the steps above to download the most recent version of the Manager program.
2. When you double-click on the downloaded file (setupmanager.exe), a dialog asks if you want to modify, repair, or remove the file. Choose remove. Windows then removes your old Manager program (but not any data). If Windows does not automatically prompt you to remove the old program, stop the installation process and manually remove the old program via the Windows Control Panel before continuing to install the updated version.
3. Once the old version has been deleted, install the new version.

Connecting to the MiniLogger

Overview This chapter tells how connect a PC to the MiniLogger using a serial cable.

Power Up the MiniLogger The MiniLogger requires two D-cell batteries. Alkaline batteries can last up to six months, but actual battery life depends on numerous variables such as the temperature, whether or not a radio is used, and how frequently data is retrieved.

1. Connect the wires of the battery holder to the terminal post, if necessary.
2. Orient and insert the batteries as shown on the battery holder.
3. The MiniLogger takes a reading immediately and then waits for its next scheduled reading.



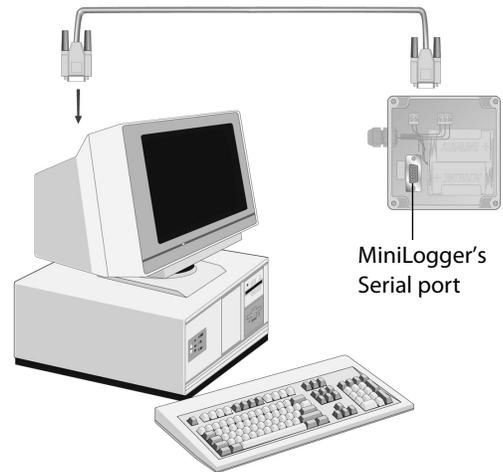
Connect by Serial Cable

A serial cable is supplied with the MiniLogger. It is a “modem cable” with straight-through wires. (Null-modem cables will not work).

1. Find your PC’s serial port. Look for a 9-pin connector.

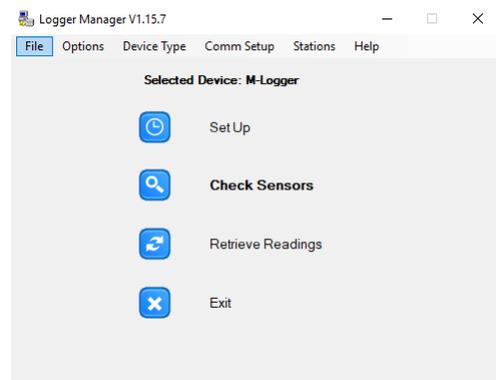
Most newer computers do not have a serial port. In that case, a USB to serial adaptor or a PC card is required. See troubleshooting later in this chapter.

2. Connect one end of the interface cable to the PC’s serial port and the other end of the cable to the MiniLogger’s serial port.

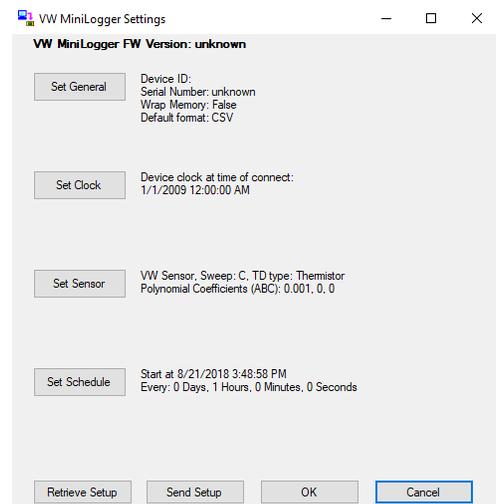


Start the Logger Manager Program.

1. Open the Logger Manager program.
2. Click Device Type and select the VW MiniLogger.
3. Click on Set Up.



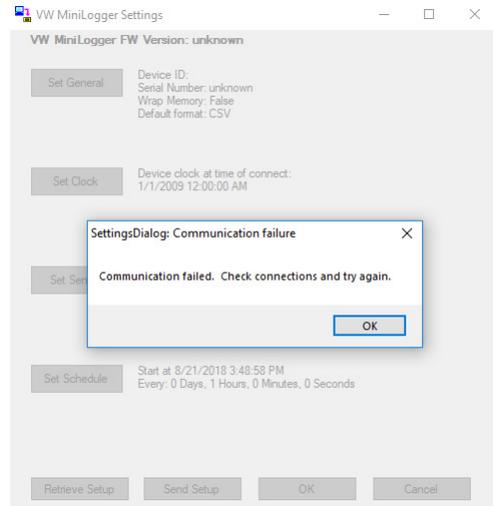
4. You should see a screen similar to this.
5. Click Retrieve Setup. This will download the current setup (factory or custom) that is on the logger, including the serial number.



Troubleshooting Serial Connections

If you see an error message, click OK to clear the message, and then:

- Check that the cables are firmly connected to MiniLogger and computer.
- Check the connection type, as explained below.
- Change the comm port, as explained below.
- Get a USB adapter, if necessary, as explained on the next page.



Check Connection Type

1. Click “Communications” on the menu bar.
2. Confirm that “Serial Cable” is selected. If it was not selected, select it, click OK, and try connecting again.

Communication Setup

The image shows a screenshot of the 'Communication Setup' dialog box. It has four radio button options: 'Serial port', 'Network', 'Spread Spectrum Radio', and 'Hermes Radio'. The 'Serial port' option is selected. Under 'Serial port', there is a dropdown menu for 'Serial port' (set to 'COM3'), a dropdown for 'Baud Rate' (set to '9600'), and a checkbox for 'Use RTS flow control'. Under 'Network', there are text boxes for 'IP or URL' (set to '192.168.2.5') and 'Port' (set to '12123'). Under 'Spread Spectrum Radio', there are text boxes for 'Radio ID' (set to '00000') and 'Channel' (set to '05'), and a 'Setup String' text box. There is a checkbox for 'Connect to remote base station via IP'. Under 'Hermes Radio', there is a dropdown for 'Address', a 'Get List' button, a dropdown for 'Network' (set to '262'), and a dropdown for 'Channel' (set to '1'). At the bottom, there is a 'Delay Timeout' field (set to '0') and a unit selector for 'milliseconds'. 'OK' and 'Cancel' buttons are at the bottom.

Change the Comm Port

1. Click Communications.
2. Choose a different Comm port from the dropdown list and click OK.
3. If there is only one choice on the Comm Port list, then some other device probably has control of the serial port.

Troubleshooting continued

Can't find a serial port? Some computers have only USB ports. In this case, you must use a USB-to-Serial adapter or a PC card (PCMCIA card) to connect to the MiniLogger.

USB to Serial Adapters

USB-to-serial adapters are less expensive and are available in computer stores and office-supply stores. In the package, you will find driver software and instructions. Follow the instructions exactly.

The driver will create a new Comm port. When you start the Manager program, and click communications, you should see the new port when your USB cable is plugged in. If you do not see the port, click the refresh button.

If the adapter does not work when you try it, download and install the latest driver from the manufacturer's website. There are usually instructions with the adapter that tell how to do this. We find that most adapters work fine when updated drivers are installed.

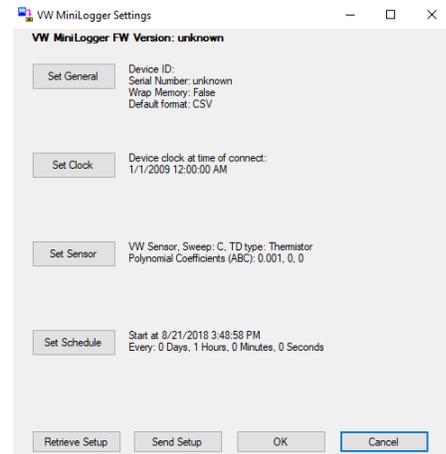
PC Card Serial Port

If your portable computer has a PC Card slot, you can use a PC card to provide a serial interface card. PC cards are typically more expensive than the adapters above, but the PCMCIA standard is fairly mature and the card is likely to work well.

Setting Up

- Preparations**
1. Check that the MiniLogger's batteries are in place.
 2. Connect the MiniLogger to the PC.
 3. Open Logger Manager
 4. Choose VW MiniLogger

- Edit Settings**
1. Click on "Set Up".
- You should see a screen similar to this.



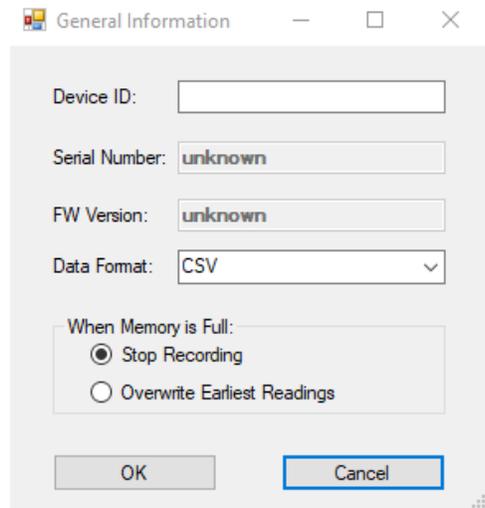
- Set MiniLogger**
- Click "Set General."
- Device ID:** Enter an identifier for the MiniLogger.

Change the Data Format (Campbell, Slope ID or CSV). If you are using a spreadsheet program to analyze the data, it is suggested that you select CSV format.

When Logger Memory is Full: Choose either stop recording or continue recording.

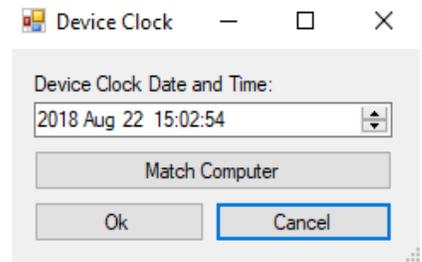
In the Stop mode, the MiniLogger stops recording when its memory is full. It will not record again until you retrieve the data and clear its memory.

In the Continue mode, the MiniLogger continues recording readings when its memory is full. It overwrites the earliest readings with the most recent readings.



Set Clock

Click on the “Set Clock” button to set the MiniLogger’s clock. To synchronize the MiniLogger clock to your computer’s clock, click the “Match Computer” button. If you want to set a different time, click in the date and time fields, type in values, and click OK.

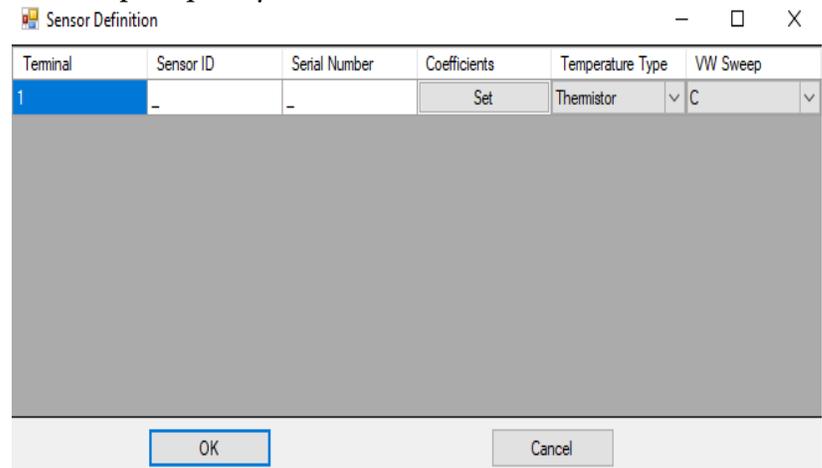


Note 1: The date display format is controlled by the short date setting in Windows (Control Panel>Regional Settings>Date).

Note 2: Both the MiniLogger and the Manager program use four-digit years internally.

Set Sensor

Click the Set Sensor button to enter the sensor serial number, the sweep frequency, and sensor calibration factors.



Sensor ID: Unique identifier established by the user. Cannot be the same as the serial number.

Sensor Serial Number: Sensor serial number from the factory. When you retrieve data and want to save it, the Sensor SN entry will be suggested as a file name.

Coefficients: Choose a Calibration Model for the sensors. For instance, standard borehole piezometers would use VW_ABC to specify a VW sensor using ABC Calibration factors. Choose Single Channel. Enter ABC factors as noted on the sensor calibration sheet.

Use ABC / TI factors: These factors are used to convert Hz readings to kPa or psi. TI factors integrate temperature readings to automatically correct for temperature effects. See the sensor calibration sheet to see how the factors are applied.

Calibration Factors: The actual calibration values are found on the sensor calibration sheet. Each sensor has unique factors, so check that the serial number on the calibration record matches the serial number of the sensor connected to the MiniLogger.

The Manager program applies these factors to readings that it retrieves from the MiniLogger. The resulting data file will contain both the original Hz values and also the calculated values.

RTD or Thermistor: Choose Thermistor or RTD. Most VW sensors use thermistors, but it will be noted on the sensor calibration record.

Sensor Coefficients

ID: _ S/N: _

Calibration Model: VW-TI

Single Channel Dual Channel

Channel 1	Channel 2
C0: 0	C0: 0
C1: 0	C1: 1
C2: 0	C2: 0
C3: 0	C3: 0
C4: 0	C4: 0
C5: 0	C5: 0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0

OK Cancel

Sensors and Sweeps Locate your sensor by name. Then find the appropriate sweep in the same row. In general, it is best to use the lowest sweep range that covers the sensor frequencies.

Sensor Name	Required Sweep
Crackmeter	Sweep C. If necessary, try sweep B.
Displacement Sensor, Extensometer	Sweep C. If necessary, try sweep B.
Jointmeter, Mass Concrete	Sweep C. If necessary, try sweep B.
Jointmeter, Submersible	Sweep C. If necessary, try sweep B.
Piezometer	Sweep C
Rebar Stressmeter	Sweep C. If necessary, try sweep B.
Settlement Cell, 20 psi	Sweep C. If necessary try sweep B.
Settlement Cell, 50 or 100 psi	Sweep C
Strain Gauge, Arc-Weldable	Sweep B. If necessary, try Sweep A
Strain Gauge, Embedment	Sweep B. If necessary try sweep A
Strain Gauge, Concrete Surfaces	Sweep B. If necessary, try Sweep A
Strain Gauge, Spot-Weldable	Sweep B for measuring compression Sweep C for measuring tension
Stress Station, VW Transducers	Sweep C
Total Pressure Cell	Sweep C
Total Pressure Cell, Radial	Sweep C
Total Pressure Cell, Tangential	Sweep C

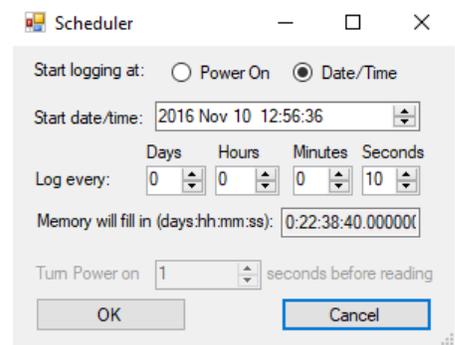
Sweep Frequencies If your sensor is not listed above, check your sensor calibration sheet to find the lowest and highest frequencies in the calibration. Then choose the sweep that is closest to those frequencies.

Sweep	Starting Freq	Ending Freq
Sweep A	450	1125
Sweep B	800	2000
Sweep C	1400	3500
Sweep D	2300	6000

Set Schedule

Click on the “Set Schedule” button to choose the start mode and reading interval. Then click OK.

Start Logging At: You can choose to have the MiniLogger start when batteries are inserted or you can choose a specific time to start.



If you choose “On power up,” the MiniLogger uses the moment that you insert the batteries as the base time for subsequent readings.

If you choose “At” and enter a time and date, the MiniLogger will use the time and date as the base time for subsequent readings.

The default start time is always 2 minutes in the future according to the MiniLogger’s clock. Edit this as needed, but be sure to specify a start time that is in the future.

Log Every: The reading interval controls how often readings are taken. For example, if you enter a 1 in the Hours field, the MiniLogger will take one reading every hour, with the first reading taken according to the Start Time setting. The shortest valid interval is 2 seconds. The longest is 7 days.

Turn Power On: You must select a delay for turning on the power; real time data recording begins immediately once power has been turned on (you can also delay the reading for a time after turning power on if you prefer).

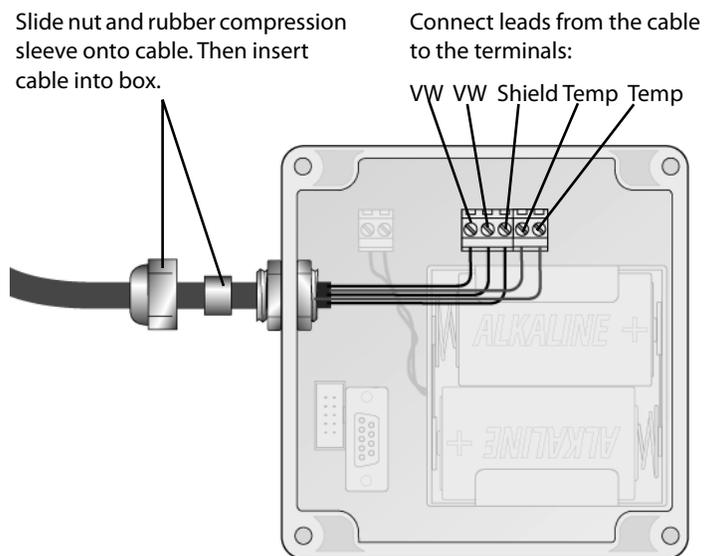
Data Logging

- Overview**
1. Connect the sensor to the MiniLogger.
 2. Insert new batteries, if necessary.
 3. Check the MiniLogger's settings.

- Connect the Sensor**
1. Remove the MiniLogger's lid.
 2. Prepare to insert cable through the cable gland: remove the nut, the nylon washer, and the rubber compression sleeve. Earlier models of the MiniLogger do not have the nylon washer. Slide the nut, nylon washer, and rubber compression sleeve onto the sensor's signal cable
 3. Insert the cable through the cable gland and connect the wires the MiniLogger's terminals as explained below.

Function	Wire Color	Alt Wire Color
VW	Orange	Red
VW	White & Orange	Black
Shield (Drain)	Bare wire	Bare wire
Temperature	Blue	White
Temperature	White & Blue	Green

4. Pull gently on the wires to check the connection.



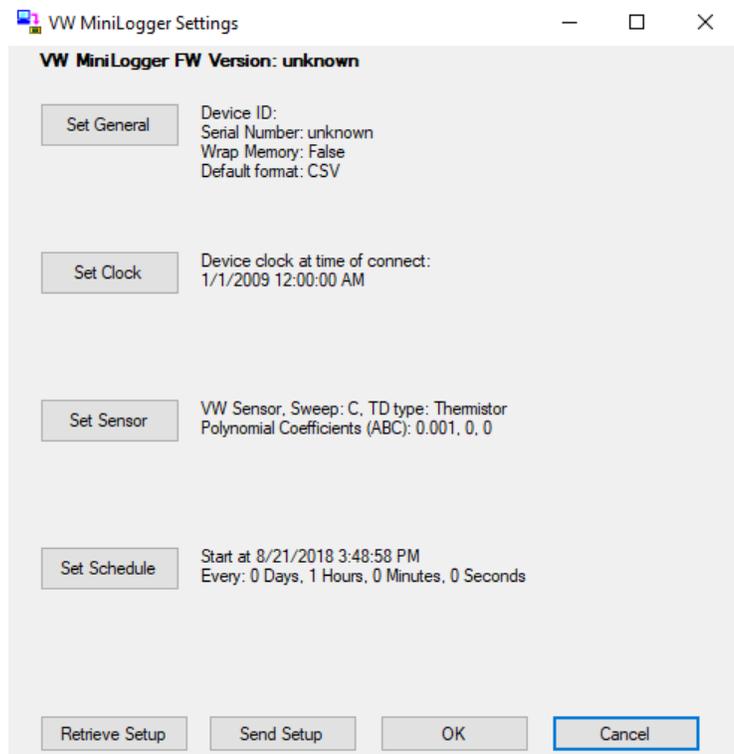
Insert Batteries

The MiniLogger requires two D-cell batteries. Battery life depends on how often readings are taken and also on the ambient temperature. Alkaline batteries normally provide about three months of service, but can last as long as six months. Cold temperatures and use of a radio will shorten battery life.

1. Check that wires from the battery holder are securely connected to the MiniLogger's terminal post.
2. Orient and insert the batteries as printed on the base of the battery holder.

Check Settings

1. Connect the MiniLogger to your PC.
2. Start the Manager program.
3. Click on the Set Up.
4. Click Retrieve Setup. This will populate the program with the settings in the current logger. Logger Manager will display the settings of the last logger that was connected if you do not perform this step.
5. Observe the settings displayed on the control panel. Make any necessary modifications.
6. Click the Send Setup button. This will send any changes back



to the logger.

7. Click the OK button.

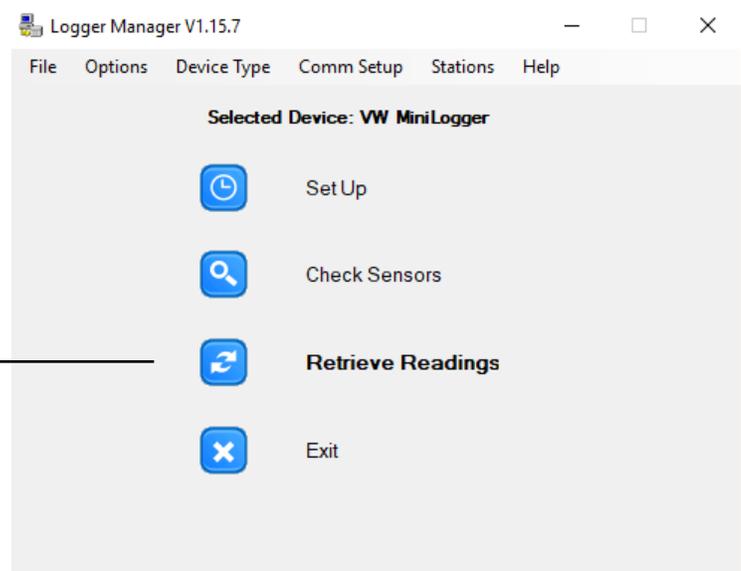
Retrieving Data

Retrieving Readings

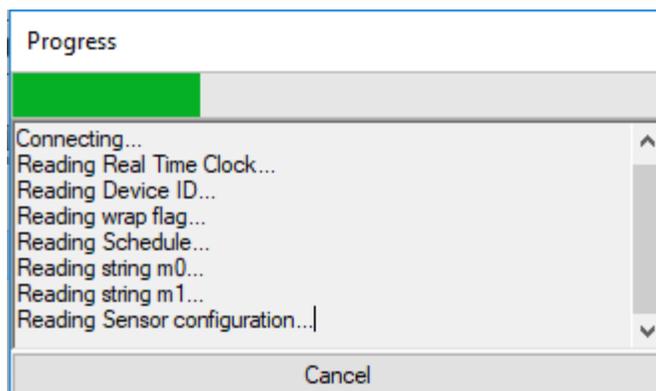
The MiniLogger is not very speedy in transmitting data to the PC. Retrieval time increases with the number of stored readings. You can minimize retrieval times by regularly clearing the MiniLogger's memory after you collect the readings.

1. Connect the MiniLogger to your PC and start the Logger Manager program.
2. Click "Retrieve Readings."

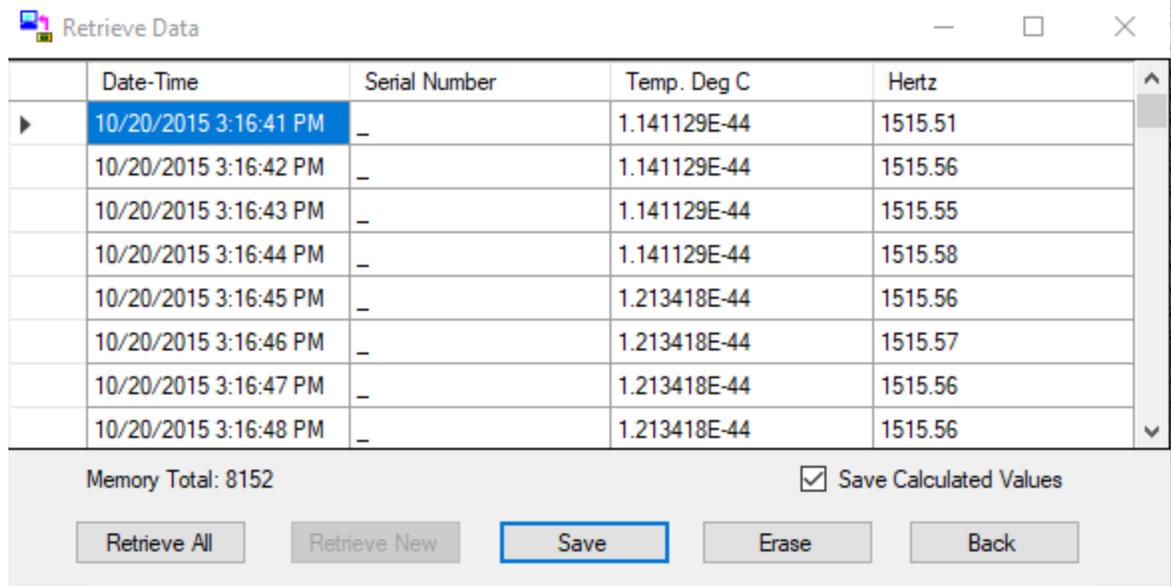
Click this button to retrieve readings.



3. The MiniLogger reports its progress.



- The Retrieved Data screen will appear but will be blank. Click Retrieve All. Logger Manager displays time-stamped readings both in Hz and engineering units.



The screenshot shows a window titled "Retrieve Data" with a table of data and a control panel at the bottom. The table has four columns: Date-Time, Serial Number, Temp. Deg C, and Hertz. The first row is highlighted in blue. The control panel includes a checkbox for "Save Calculated Values" (checked), a "Memory Total: 8152" indicator, and five buttons: "Retrieve All", "Retrieve New", "Save", "Erase", and "Back".

	Date-Time	Serial Number	Temp. Deg C	Hertz
▶	10/20/2015 3:16:41 PM	-	1.141129E-44	1515.51
	10/20/2015 3:16:42 PM	-	1.141129E-44	1515.56
	10/20/2015 3:16:43 PM	-	1.141129E-44	1515.55
	10/20/2015 3:16:44 PM	-	1.141129E-44	1515.58
	10/20/2015 3:16:45 PM	-	1.213418E-44	1515.56
	10/20/2015 3:16:46 PM	-	1.213418E-44	1515.57
	10/20/2015 3:16:47 PM	-	1.213418E-44	1515.56
	10/20/2015 3:16:48 PM	-	1.213418E-44	1515.56

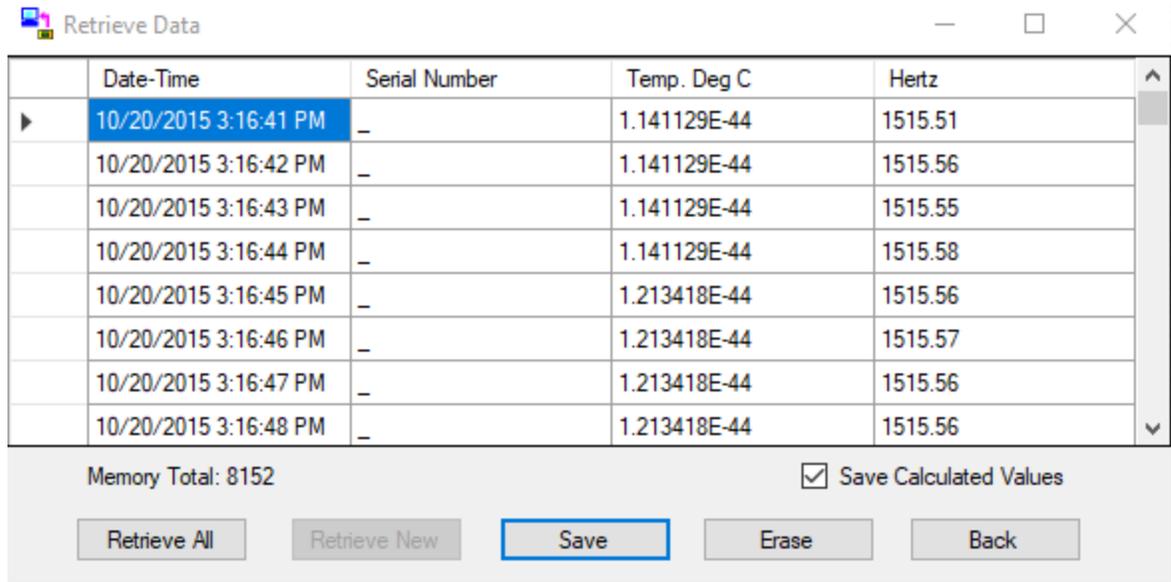
Memory Total: 8152 Save Calculated Values

Retrieve All Retrieve New Save Erase Back

- Click Save, then navigate to the location where you want to save the file. Choose a File Name and select the file type, then click Save.

Erase This is an important last step. After you retrieve readings from the MiniLogger, you should clear the memory to make room for new readings.

1. Check that the readings have been saved to your computer.
2. Return to the Logger Manager program and click the “Erase” button. Then click Yes to confirm.



About Radio MiniLoggers

Components The radio minilogger system includes these components:

MiniLogger with Wireless Option The wireless option is a 2.4 Ghz radio embedded in the lid of the MiniLogger. These 'radio lids' can be ordered with new MiniLoggers or retrofit to old MiniLoggers.

Each radio lid has a label with an ID and channel number. You will need the ID and channel number to make the wireless connection.

The radio lid replaces the standard lid of the MiniLogger. It is connected to the base of the MiniLogger by a cable. One end of the cable plugs into the MiniLogger's serial port. The other end of the cable plugs into the radio lid. An antenna screws into a terminal on the top of the lid.

Powering the radio naturally shortens battery life. Some testing has shown that when readings are taken at 1 hour intervals and retrieved four times a day, batteries can last three months or more in moderate weather. RF noise and longer distances from the logger will result in longer transmission times and shortened battery life.

Base Station Radio The base station radio is connected to the PC via a USB cable. One end of the cable plugs into the radio and the other end of the cable plugs into a USB port on your PC.

The base station radio is powered through the USB cable. If you are using a portable PC, consider that its battery will be powering the radio as well as the PC itself. If you are away from mains power, you may find it necessary to buy a car charger for the PC.

Base Station Software You must install driver software to make the base station work with your computer. You can find this software on a CD supplied with the base station.

Installing Base Station Software

Installing the Base Station Drivers

While there is a CD with the drivers shipped with your order, we recommend ensuring you get the latest drivers from this link: <http://www.digi.com/support/productdetail?5593&type=drivers> (all drivers will install with a single download and install process if using the online source).

Once you have downloaded the file, open it and follow the instructions in the dialogue boxes that appear (you can leave everything as its default unless you wish to alter the location of where you want the drivers installed; if you wish to leave everything as its default, simply keep clicking “Next” until the end and click “Finish”).

Connecting to Radio MiniLogger

Introduction The Logger Manager program needs a list of the radio IDs of the loggers that you want to connect to. This chapter tells how to create the list. You will need to perform these steps for each Radio MiniLogger in your system.

- Selecting the Comm Port**
1. Connect the base station to the PC, and start the Logger Manager program.
 2. Click “Comm Setup” to display the Communications Setup dialog.

Communication Setup

Serial port COM3

Baud Rate 9600

Use RTS flow control

Network
IP or URL 192.168.2.5
Port 12123

Spread Spectrum Radio
Radio ID 00000 Channel 05
Setup String

Connect to remote base station via IP

Hemes Radio
Address [dropdown] Get List
Network 262 Channel 1

Delay Timeout: 0 milliseconds

OK Cancel

- Enter Radio MiniLogger ID**
1. Choose Serial Port. Make sure the correct port is selected and you have the option to change the baud rate.

Base Stations

Introduction

Logger Manager has support for creating a list of remote stations. A station definition contains the type of device, how to communicate with it, and optional settings for automated data retrieval.

Creating a list of stations makes it easy to recall settings for manually connecting to a remote logger and is required for automation.

Remote Stations

Open Logger Manager and click on Stations on the top menu bar. The Station List form will appear.

Complete the fields and click “Run” to start running the scheduler. Click “OK” to save and return to the main menu.

	Station ID	Logger Type	Comm Setup	Auto-Retrieval
▶	New Station	VLogger	HemesRadio	Oct 12 09:27
*				

Station ID: Enter the name of the remote station in this field. The station name will be used as the file name when saving automated downloads. Double-clicking a station from the list will return you to the main page with those station settings activated, ready for manual connections to configure the logger or download data.

Logger Type: Select the type of logger for this station.

Comm Setup: Click here to open the Communication Setup screen. This will define how the software will connect to the logger. See page 19 for more information.

Auto-Retrieval: Used to schedule automated downloads. See the next chapter, *Auto-Retrieval* for more.

Button Descriptions

OK: Used to exit the page and activate the selected station settings. If the list has been modified the user will be prompted to save the changes.

Run: Starts automation for scheduled downloads. See chapter, *Auto-Retrieval* for more.

Delete: Use this to delete a station from the list. Select the station you want to delete by clicking on the Station ID or Logger Type. Click on the “Delete” button, then click on “Yes” to confirm delete.

Cancel: Exits the page without activating the selected station or prompting to save changes. If changes have been made that need to be saved, they can still be saved from the main menu in “File/Save Stations”.

Auto-Retrieval

Auto-Retrieval Use this dialog to automate data retrieval for a station.

Auto Retrieval

Enable Automated Retrieval

Retrieve Every: Days: 1 Hours: 0 Minutes: 0

Next Retrieval: 2018 Aug 24 09:27:57

Retries: 3

Retry in: 10 Minutes

After Successful Retrieval:

Save calculated values with data

Erase data from logger

Copy to FTP server FTP Settings

OK Cancel

Field Descriptions

Enable Automated Downloads: Click here to enable or disable scheduled data retrieval for this station.

Collect Every: Used to set the time interval for data to be retrieved.

Next Download: The date and time that the next data retrieval is due.

Retries: Used to set the number of times the Manager program will attempt to try retrieving data in the event of a failure. If all attempts fail, the schedule will be set for the next download interval before trying again.

Retry in: Used to set the time interval between attempts to retry retrieving data.

“After Successful Retrieval” Options

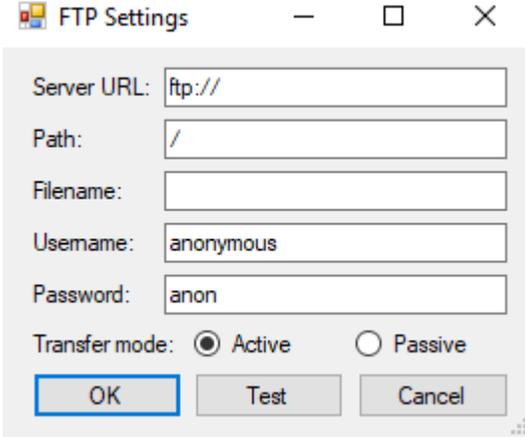
Save calculated values with data: Enabled by default. Saves to the local computer.

Erase data from logger: Check this box to erase the logger after data has been retrieved and saved. This is recommended to avoid duplicating records.

Copy to FTP Server: Check this box to copy retrieved data to a

server (such as ATLAS) via FTP.

FTP Settings Click to enter the FTP server and account information.



Server URL: Enter the FTP server name here.

Path: The path on the server to the folder where the file should be written.

Filename: The name that the file should be on the server. The FTP filename can be different from the download filename on the local PC.

Username: The username required to log onto the server.

Password: The user password required to log onto the server.

Transfer mode: Enter the FTP transfer mode used by your server. (ATLAS uses Active mode.)

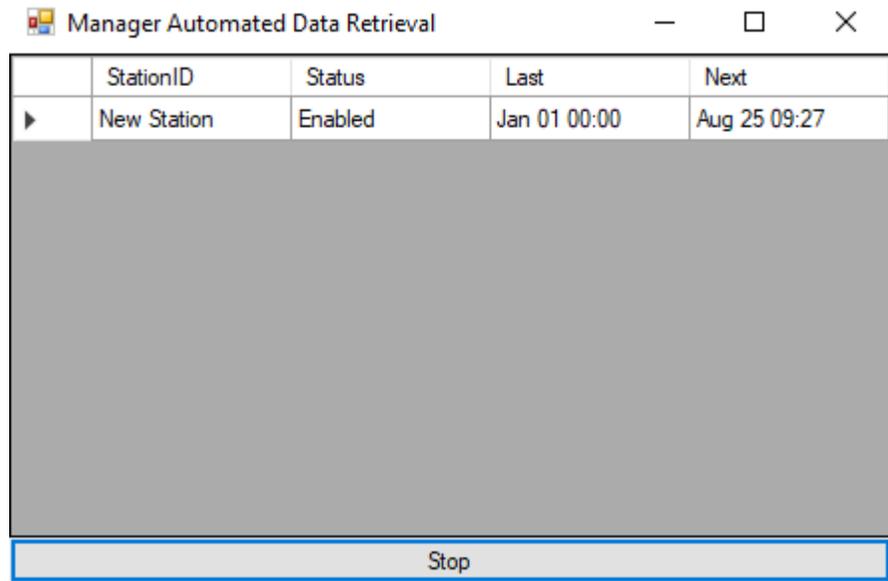
OK: Save settings and exit.

Test: Test the FTP settings.

Cancel: Exit without saving.

Running Automated Data Retrieval

Click “Run” from the station list dialog to start automated downloads.



Station ID: The name of the station as defined in the station list.

Status: When first started, this will show that a schedule has either been enabled or disabled. When an enabled station begins a scheduled download, the status will change to one of the following:

Running: This will show that a scheduled download is in progress. The line will be highlighted to show that it is active.

Completed: This will show that a scheduled download has completed successfully.

Retry: Indicates that a scheduled download attempt failed and will retry according to the intervals set in the Auto-Retrieval page.

Failed: Indicates that the scheduler has run out of retries and will try again at the next regularly scheduled download interval.

Last: Shows the date and time of the last successful download.

Next: Shows the date and time of the next scheduled download.

Stop bar: Cancels the process and returns to the Station List page.