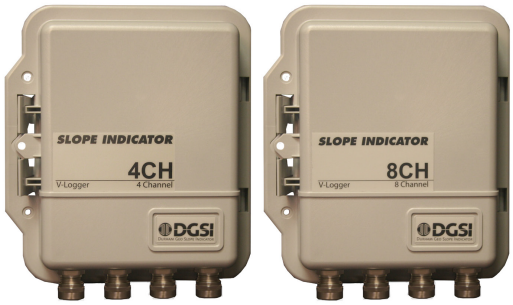
V-Logger Manual



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Covers part numbers:
52615140, 52615142, 52615144, 52615146, 52615248
52615180, 52615182, 52615184, 52615186, 52615288

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Table of Contents

Chapter 1
Introduction....4

Chapter 2
Connecting Power to the V-Logger....5

Chapter 3
Connecting Your PC and Sensors to the V-Logger....6

Chapter 4
Setting & editing Settings Using Logger Manager....8

Chapter 5
Real-Time Readings....16

Chapter 6
Retrieving Readings....18

Chapter 7
Remote Radio Setup....20

Chapter 8
Remote Stations....21

Chapter 9
Automation....22

Apendices
Software Installation....24
LED and Battery Indications....24
Updating Logger Firmware....25
Part 15 FCC Compliance Warning....26
Industry Canada (IC) Certification....26

CHAPTER 1

Introduction

The V-Logger

The V-Logger series is a line of compact data loggers designed to monitor readings from vibrating wire sensors (such as piezometers, crackmeters, strain gauges, or displacement transducers) on up to four or eight channels, depending on the model purchased.

The V-Logger is designed to work with all Slope Indicator VW sensors in the range of 450-6000Hz, and works in conjunction with Slope Indicator's "Logger Manager" software, available for free download at www.slopeindicator.com.

This manual is applicable to the following model numbers:

- **52615140 - 4 Channel V-Logger**
- **52615180 - 8 Channel V-Logger**

- **52615248 - 4 Channel V-Logger - RS-232**
- **52615288 - 8 Channel V-Logger - RS-232**

- **52615142 - 4 Channel V-Logger with Hermes Radio, North America**
- **52615144 - 4 Channel V-Logger with Hermes Radio, Europe**
- **52615146 - 4 Channel V-Logger with Hermes Radio, Australia/New Zealand**

- **52615182 - 8 Channel V-Logger with Hermes Radio, North America**
- **52615184 - 8 Channel V-Logger with Hermes Radio, Europe**
- **52615146 - 8 Channel V-Logger with Hermes Radio, Australia/New Zealand**

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CHAPTER 2

Connecting Power To the V-Logger

Install the Software

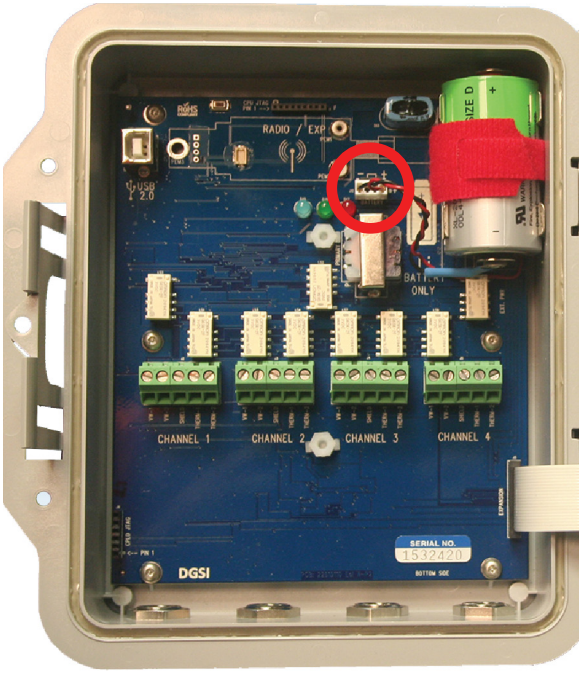
Install the Logger Manager software prior to connecting the V-Logger to your PC. See Instructions in Appendix A.

Connect the Power Source

For Lithium Battery models, connect the pins housed in the white plastic cap as shown in figure 2-1.

(Remove plastic tab covering pins for shipping).

Figure 2-1: Battery Pin Connector



CHAPTER 3

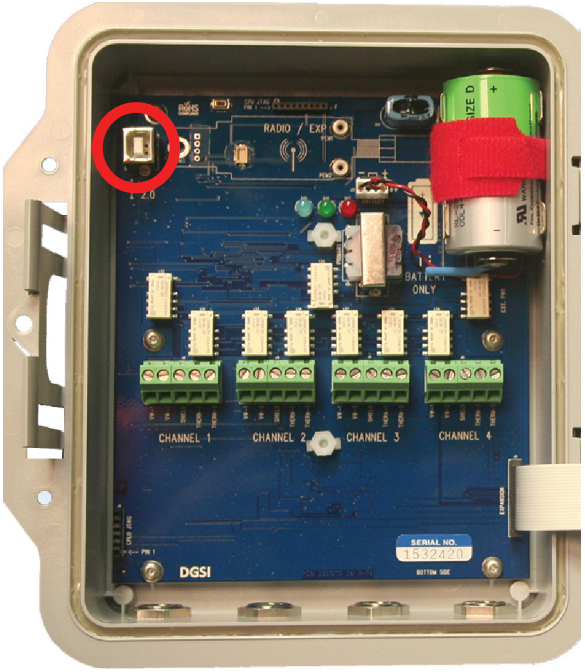
Connecting your PC and Sensors to the V-Logger

Connecting your PC

1. Connect the V-Logger to the PC via the USB port on your PC and the port circled in Figure 3-1.
   NOTE - Once connected, a USB driver for the V-Logger will start installing. Let it finish before proceeding.

2. Make sure any sensors needed are connected to the logger via steps listed below.

Figure 3-1: USB Connector



Connecting Sensors

1. Unscrew a cable gland at the bottom of the V-Logger and slide it over the signal cable (See Figure: 3-2).

2. Slide the cable through the part of the connector fixed to the V-Logger (See Figure: 3-2).

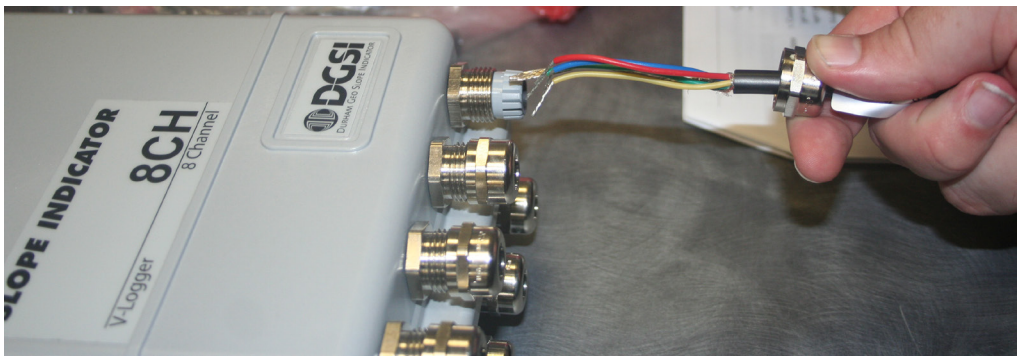


Figure 3-2: Sensor Valve Connection

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3. Using the provided multi-tool, attach the sensor wires to the green screw terminal (See Figures 3-4 and 3-5).

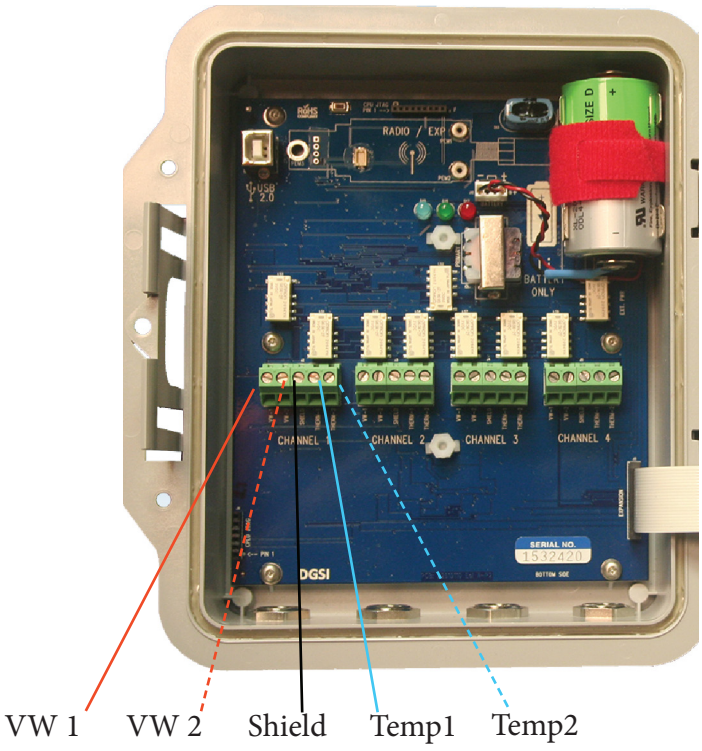
4. Using the multi-tool provided, tighten the cable gland.
NOTE: The wrench must be used to maintain the IP criteria.

Figure 3-3: Sensor Valve Connector in Use

Figure 3-4: Sensor Wire Colors Table

Function	Wire Color	Alternate Wire Color
Vibrating Wire 1	Orange	Red
Vibrating Wire 2	White & Orange	Black
Shield (Drain)	Bare Wire	Bare Wire
Temperature 1	Blue	White
Temperature 2	White & Blue	Green

Figure 3-5: Wire Arrangement for Channel Connector



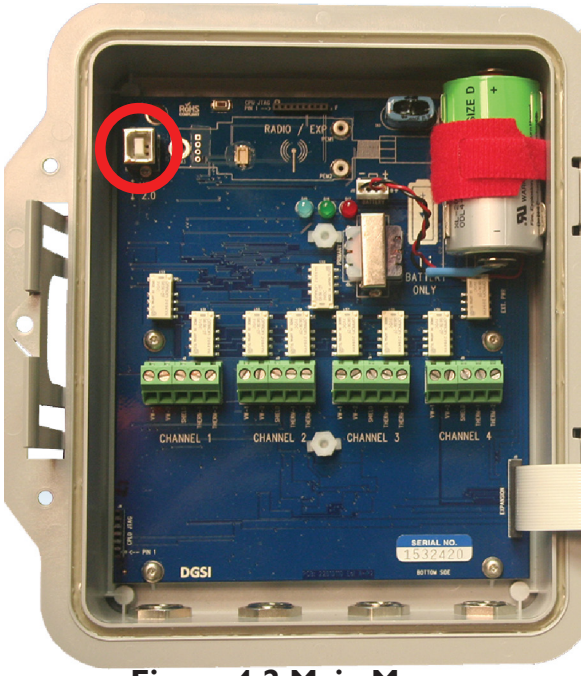
CHAPTER 4

Setting & Editing Settings Using Logger Manager

Preparation

1. Check that the V-Logger power source is connected and power is available.
2. Connect the V-Logger to the PC via the USB port on your PC and the port circled in Figure 4-1.

Figure 4-1



Launch Logger Manager

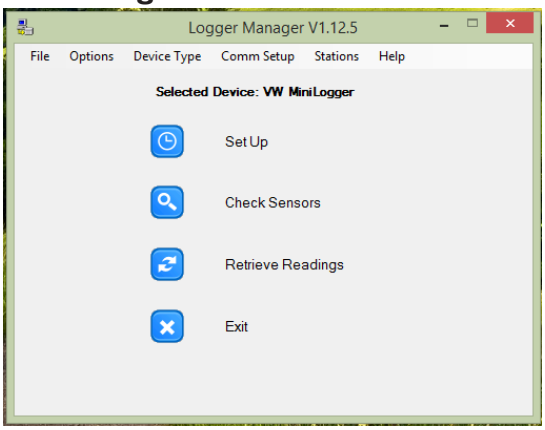
If you are using windows 7 or earlier, go to: Start>"Program Files">Logger Manager. If using Windows 8 or later, use the Search feature and type "LoggerManager" (Win 8 should also have live tile; Win 10 should also be accessible via "All Apps" via Start button). Launch Logger Manager.

Logger Manager Menu

The image to the right shows the main menu for the Logger Manager. The four options are as follows:

1. Set Up - Set/Edit settings for a new/existing logger.
2. Check Sensors - View current installed sensors.
3. Retrieve Readings - Import data from the logger.
4. Exit - Close the Logger Manager Software

Figure 4-2 Main Menu



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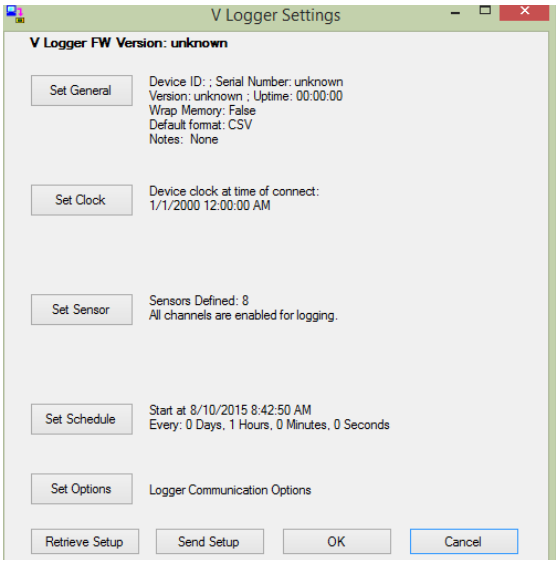
Set Up New Sensor / Edit Current Logger Settings

Note - There are many options regarding the format of data saved by the Logger Manager as well as the location it saves the data. These are discussed in detail in the Logger Manager Manual available for download at www.slopeindicator.com. For the purpose of this manual, we will only be showing how to set up the frequency of the basic readings and basic set up of a logger.

To set up a new logger or to add/edit sensors on the logger...

Figure 4-3: "Set Up" Menu



1. After connecting the sensor and logger and launching the Logger Manager software, click on "Device Type" in the top horizontal menu and select "V-Logger".

2. Click the "Set Up" option from the Logger Manager main menu.

3. Click on "Set General" and name the logger (Device ID), Wrap Memory (overwrite oldest readings if memory full), and default data format (See Figure: 4-4).

4. Click on "Set Sensor" to choose the sensor's terminal, and make any changes to the coefficients based on your calibration sheet (supplied with your order) and VW sweep (See Figure: 4-5).

6. Click on "Set Schedule" to schedule your when your logger takes its first reading and how often readings are taken (See Figure: 4-6).

   NOTE - Readings are taken on all four (or eight) channels on the same schedule, therefore, if different sensors have varying requirements, you should set the schedule based on the sensor that needs to be read most frequently.

   In depth instructions are provided for setting up sensors and for scheduling readings on the following pages.

Figure 4-4
Set General Menu

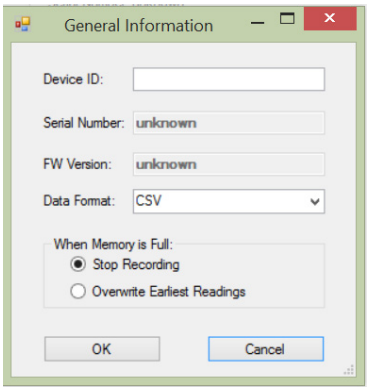


Figure 4-5
Set Sensor Menu

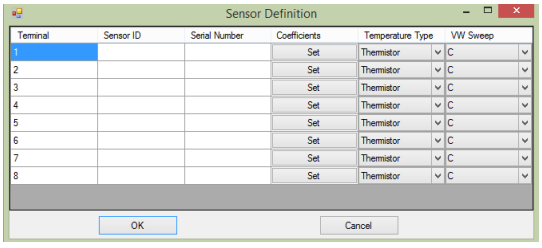
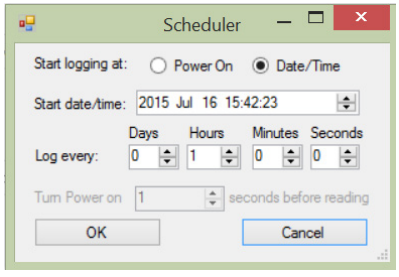


Figure 4-6
Set Schedule Menu



Set General

Device ID: Enter a name for the V-Logger. This will be the default name for data files manually downloaded from the logger.

Serial Number: This field is for the factory-assigned serial number of the V-Logger (not the sensors connected to it). This is a read-only field.

FW Version: This is the version of the firmware in the logger. This is a read-only field.

Data Format: Sets default format for saving retrieved data to a file.

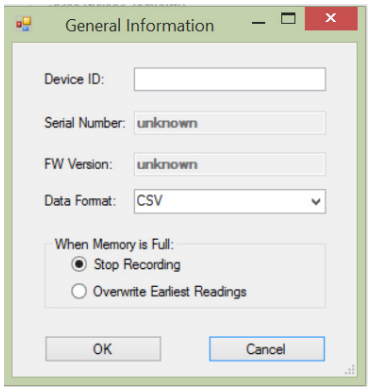


Figure 4-7
Set General Menu

Slope ID: This format is useful for automation. Each record has a time & date stamp, the sensor serial number, and the readings for that sensor. Files have a .txt file extension.

NOTE: Slope ID uses a period(.) for a decimal separator and a comma(,) as a list separator regardless of regional settings.

Campbell Files: This format emulates the output of the Campbell Scientific data logger. It is useful for automation and is compatible with Atlas. The output file includes a 4-line header followed by the data records. Each record has a time & date stamp followed by an array of values. Values are associated with sensors only by their position in the array. Files have a .dat extension.

NOTE: Campbell files uses a period(.) for a decimal separator and a comma(,) as a list separator regardless of regional settings.

Spreadsheet Text File: This format is useful for importing into a spreadsheet. It uses regional settings for time & date, decimal separator, and list separator. Files have a .csv file extension.

When Memory Is Full: Select whether you want the logger to stop recording once memory has reached max capacity or overwrite the earliest readings.

Set Clock

Click on the Set Clock button to bring up its dialog box. To synchronize the clock to your PC, click the "Match Computer" button in the dialog box. You can also set a different date and time by manually entering it. Click "OK" when finished to set the logger clock and return to the settings menu.

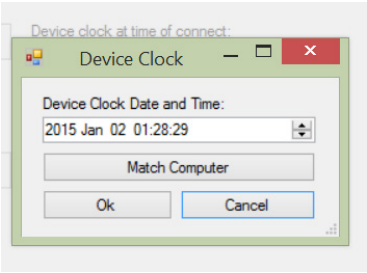


Figure 4-8
Set Clock

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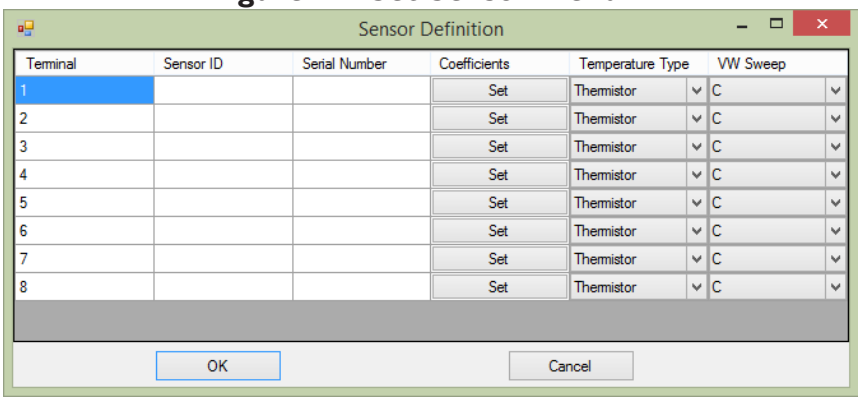
Setting Sensors

Figure 4-9 Set Sensor Menu



Terminal: The terminal the sensor is connected to. The terminals read left to right ***when the logger is opened***. This means when closed (with you looking at the front of the logger), the front four terminals are actually 4, 3, 2, 1 left to right. 5-8 are still left to right in the back row.

Set Sensor ID: This is where you type the name of your choosing for the sensor (i.e. "piezo-depth-5").

Serial Number: This is where you will type the serial number that came with your sensor from the factory.

Coefficients: Click the "Set" button to enter the coefficients and click on the drop-down menu to select one of the following coefficients for your V-Logger:

VW_ABC	Vibrating wire sensors using ABC factors (no temperature correction).
VW_TI	Vibrating wire sensors using TI factors (temperature corrected).

The actual calibration values are found on the sensor calibration sheet shipped with each sensor. As every sensor's factors will be unique, be sure that the coefficients you are entering in the logger manager software are being paired with their corresponding serial numbers, or else your readings will be inaccurate.

Once you have selected your calibration model, the labels will change to match the factors on the sensor calibration sheets. Enter the factors in the channel information and click "OK" when finished.

Temperature Type: Select RTD or Thermistor (Thermistor is standard unless you specifically requested RTD when you placed your order).

VW Sweep: Choose a sweep frequency that matches the frequency range of your sensor. The table below shows the frequency range for each sweep type while the table on the following page shows the most common sweep for each sensor type. NOTE - you can set different sweeps for each sensor.

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

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.

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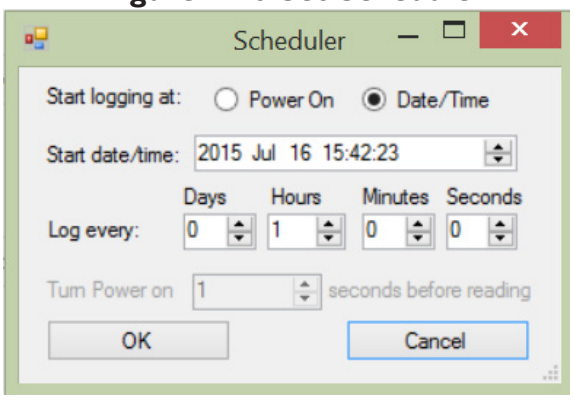
Set Schedule

Figure 4-10 Set Schedule



Log Every: Set the logging interval. The minimum interval is 20 seconds for a 4 channel logger and 30 seconds for an 8 channel logger. The maximum interval is 1 year for either logger.

NOTE: While you can have different sensor types and different sweeps, you cannot vary the intervals for the sensors - the V-Logger will read all sensors on the same schedule, so if you have varying needs for how often certain sensors should be checked, set the interval to the sensor that needs to be checked most often.

Communication Method

On the main menu screen, select "Comm Set-up" from the small horizontal menu at the top of the box. A dialog box like the one on the right will appear.

Serial Communication Setup: Check to make sure that the Serial Port radio button is filled in, with the port reading "COM[n*]" and the Baud Rate reading 115200 (This should be default, but if it is not, change it).

* "n" denotes a number. Which COM number appears will vary by computer. As you are just installing the device, it should be the highest number of your COM options.

Figure 4-11 Serial Comm Setup

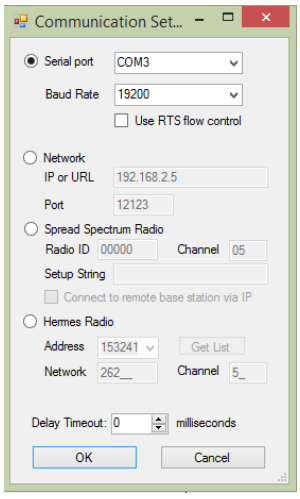
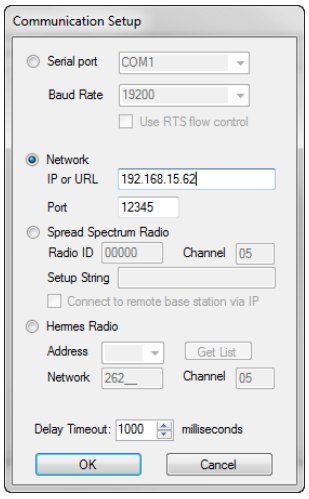


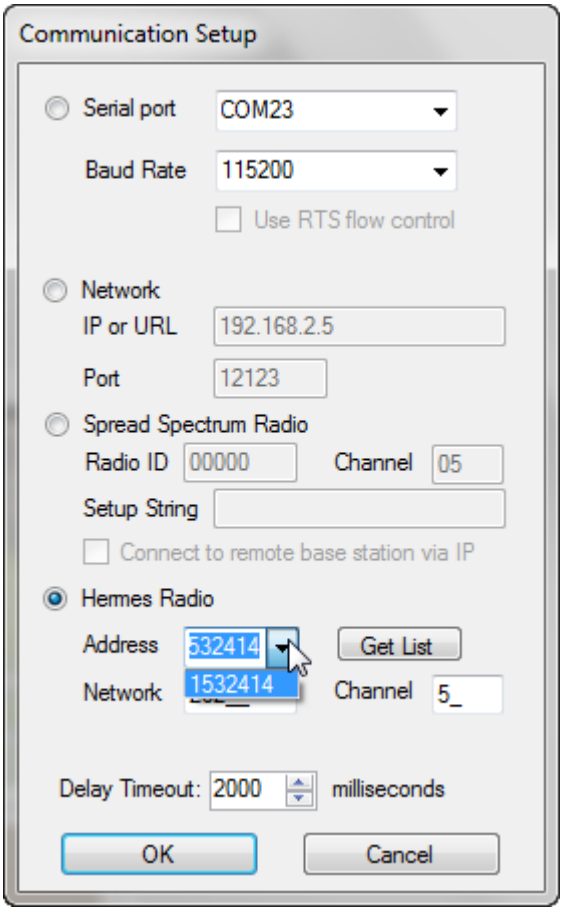
Figure 4-12 RS-232 Comm Setup



RS-232 Cellular Communication: The V-Logger can be paired with a RS-232 cellular modem option to facilitate long-distance communication using the internet. To use this method, you will need to obtain the IP address from your Internet Service Provider (ISP) and know the port number to enter in the designated area.

Hermes Radio (if purchased - if you did not purchase the Hermes Radio Option, skip to chapter 5.):

Figure 4-13 Hermes Radio Option



Address: The default address, as set in the factory, is the same as the VLogger serial number, but it can be changed if needed. 153241 is the default value that appears in LoggerManager, but it must be changed to reflect the actual logger's address before use.

Get List: Recommended. Automatically calls out through the dongle to find any available VLogger radio addresses that are within range. The Address dropdown list will then contain all addresses that were found. May take 10-15 seconds. It will also update the channel to match the regional settings previously set in the dongle.

Channel: The radio frequency Hermes is using to communicate with LoggerManager (see below).

Network: The network ID for all devices Hermes is communicating with (see below).

*Even though the Hermes Radio radial button is selected, the COM Port will also need to be set to the Port containing the radio dongle.

*When the dongle is first connected to the computers USB, it will automatically connect to the internet to download and install the required drivers. May take 10-15 minutes, depending on computer platform and internet connection. Windows should pop up a window notifying you when the driver install is complete.

NOTE: *Since communication will stop the instant there is a difference on either the Channel or Network settings between LoggerManager and the V-Logger, you must always update the V-Logger settings first followed by LoggerManager. See instructions below.*

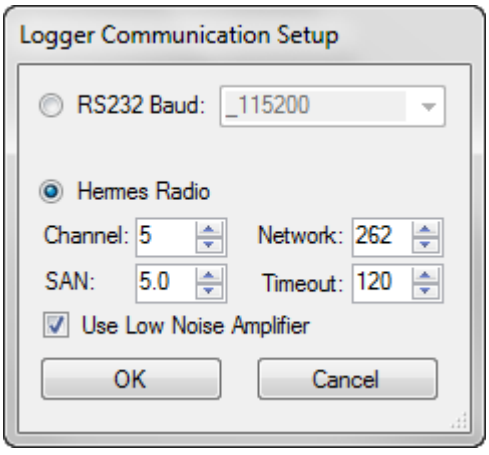
Set Hermes Radio Options on the V-Logger

Channel: This sets the radio frequency that will be used for communication. Available channels depend on the region the radio is set up for. The chart on the following page shows channels by region.

Network: Defaults to 262. A radio will normally only receive messages from the network it is set to. Normally, all radios on a site will use the same network. Valid networks are 1-65279.

Address: The default address, as set in the factory is the same as the VLogger serial number, but can be changed. Each radio must have its own unique 32 bit address. The address specifies the destination (logger) radio that will be linked to. Valid addresses are 1 – 4294967294.

Figure 4-14 Set Hermes Radio



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SAN: Sleep and ANnounce. This is the number of seconds that the radio on the V-Logger will sleep between announcements. LoggerManager can only be connected to a V-Logger when it announces. Longer gaps between announcements will conserve more power, but will also increase the maximum possible wait time for LoggerManager to connect to the V-Logger. It also affects the auto detection when using the 'get list' option in LoggerManager's communication setup. Reducing the gap between announcement times will make connecting faster, but will cause the radio to consume more power, and in sites with many radios it can cause downloads to take longer.

Timeout: The amount of time before the radio gives up waiting for a response.

Figure 4-15 Radio Channel Chart

Channel	Frequency	Region			
		N. America	Australia	Europe	China
1	906MHz	✓			
2	908MHz	✓			
3	910MHz	✓			
4	912 MHz	✓			
5	914MHz	✓*			
6	916MHz	✓			
7	918MHz	✓	✓		
8	920MHz	✓	✓*		
9	922MHz	✓	✓		
10	924MHz	✓	✓		
11	864.5MHz			✓	
12	866.5MHz			✓*	
13	868.5MHZ			✓	
14	781MHz				✓
15	783MHz				✓*
16	785MHz				✓

✓ Usable channel for that region

* Default channel for that region

Default Region Channel
North America – 5
Australia – 8
Europe – 12
China – 15

CHAPTER 5

Real-Time Readings

Connect and Check Sensors

1. Connect your PC to the logger using the USB connection point discussed in Chapter 3 and shown to the right.

2. Open Logger Manager.

3. Click on the Check Sensors button from the Logger Manager main menu, shown below.

4. You will see a dialog box like the one below and to the right appear. NOTE - these readings will not be saved, nor will this reading affect when the next automatic reading takes place.

Figure 5-1: USB Connector

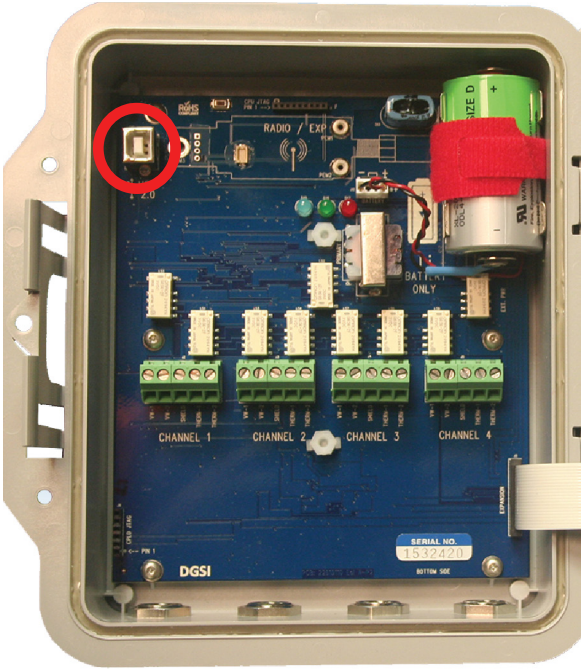


Figure 5-2: Main Menu

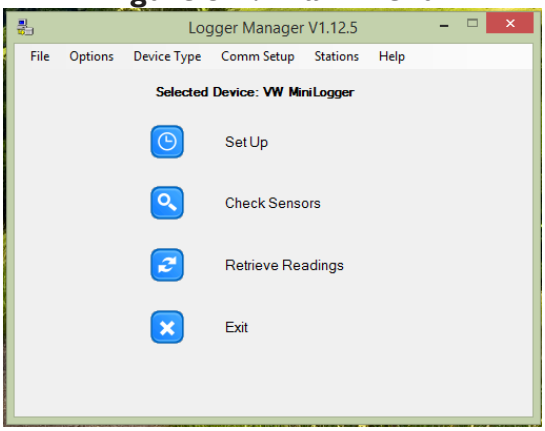
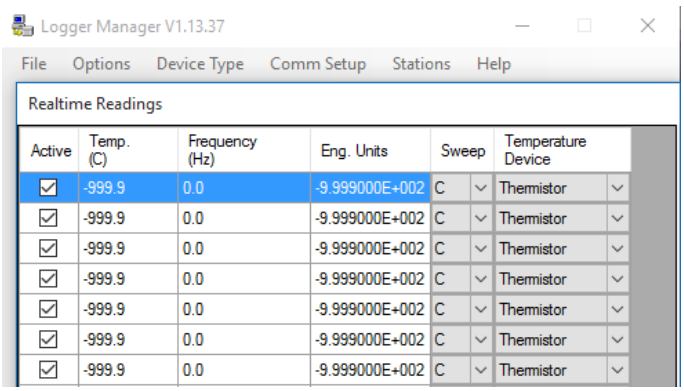


Figure 5-3: Sensor Check



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The columns in the dialog box show the following information:

Sweep: The sweep being used for that particular sensor.

Hertz: The current reading in Hertz.

Temp C: The temperature of the sensor in degrees Celsius.

Eng. Units: The current reading calculated using the coefficients and model entered in the Set Up menu from when you set up the sensor and logger.

Active: Check mark shows if the sensor is active.

Flags: Any alert associated with the sensor that may require attention.

Close: Click the "Close" button to close the window and return to the main menu.

CHAPTER 6

Retrieving Readings

Connect and Retrieve

1. Connect your PC to the logger using the USB connection point discussed in Chapter 3 and shown to the right.

2. Open the Logger Manager.

3. Click on the Retrieve Readings button from the Logger Manager main menu, shown below.

4. You will see a dialog box like the one below and to the right appear. See next page for detailed explanation of options.

Figure 6-1: USB Connector

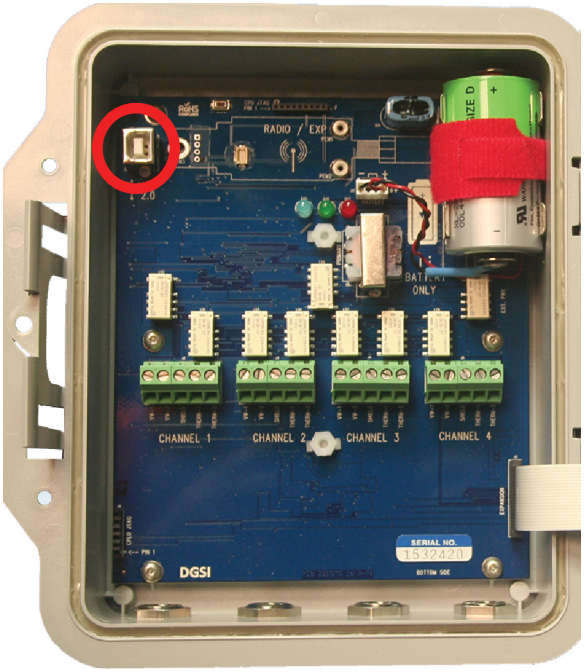


Figure 6-2: Main Menu

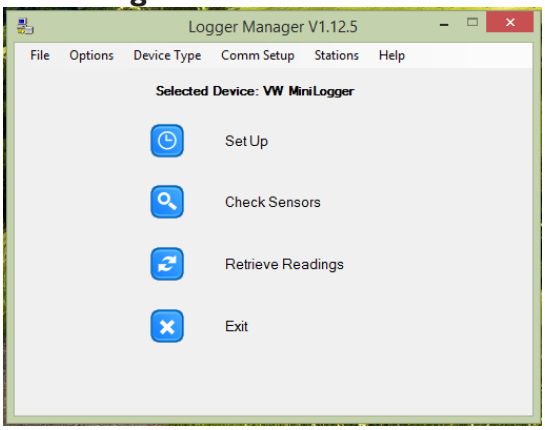
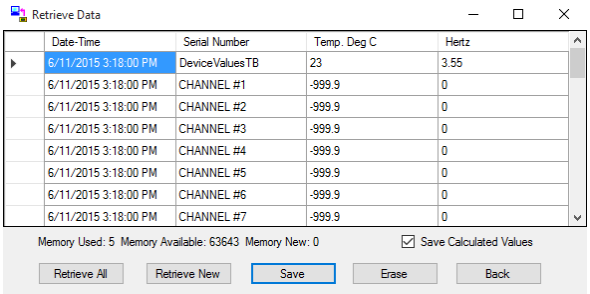


Figure 6-3: Retrieve Data Dialog



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Options within the dialog include:

Retrieve All: Retrieve all data in the V-Logger's system memory.

Retrieve New: Retrieve all new readings since your last retrieval (the V-Logger flags the most recent retrieval date and time)

Save: Once the table is populated after selecting Retrieve All or Retrieve New, save the data currently shown.

Erase: Erase data retrieved from the V-Logger's memory. This is necessary if you desire new readings but do not wish the V-Logger to automatically overwrite oldest readings, but make sure you save the data on your PC first as this cannot be undone.

Back: Close the dialog box without further action.

Save Calculated Values Check Box: Choose whether to to import the calculated values. If this box is checked, engineering units will be included in the data file downloaded for the logger. If this box is not checked, only the raw data in Hz and Degrees Celsius will be downloaded.

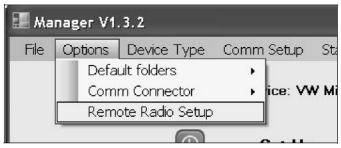
NOTE: By default, the data will be saved in the format you selected when you set up the logger as explained in Chapter 4, but you can select a different option in the dialog box.

CHAPTER 7

Remote Radio Set Up

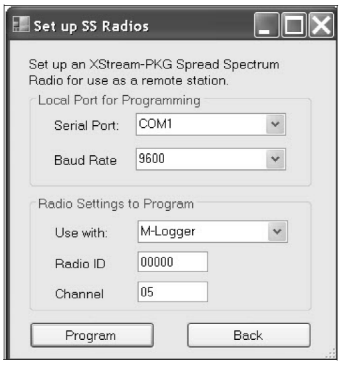
Introduction

The Remote Radio Setup option is used to configure an XStream-PKG radio as a remote radio node for a logger.



1. In the main menu, click on "Options" then click on "Remote Radio Setup".

2. A new screen will appear. Enter the settings and click "Program" to send the settings to the radio. Click "Back" to return to the main menu.



Local Port for Programming:

Serial Port: The local PC's port that will be used to program the logger.

Baud Rate: The current baud rate the modem is set to. The default rate is 9600 however if the modem has been previously programmed the rate may need to be changed prior to connecting and reprogramming the radio modem.

Radio Settings to Program: Use With: Selects the type of logger the radio will be connected to. Radio ID: A unique ID that is used to identify the radio. Values range from 0 to 65535 The channel can be an arbitrary choice, but using the serial number of the logger the radio is matched to may help to better identify it.

Channel: This is the hopping channel to use. Any channel will work, but some channels will work better in areas where other radios are in use.

- XStream radios support channels 0-6.
- XBee radios support channels 11-26.
- XBee Pro radios support channels 12-23.

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CHAPTER 8

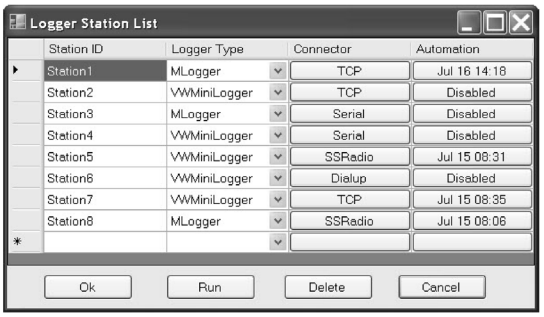
Remote Stations

Introduction

The 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 the Logger Manager program 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 or click "OK" to save and return to the main menu.



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.

Connector: Click here to open the Communication Setup screen. This will define how the software will connect to the logger. See chapter 3 for more information about this.

Automation: Used to schedule automated downloads. More Automation information in the following chapter.

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 the next chapter for more information.

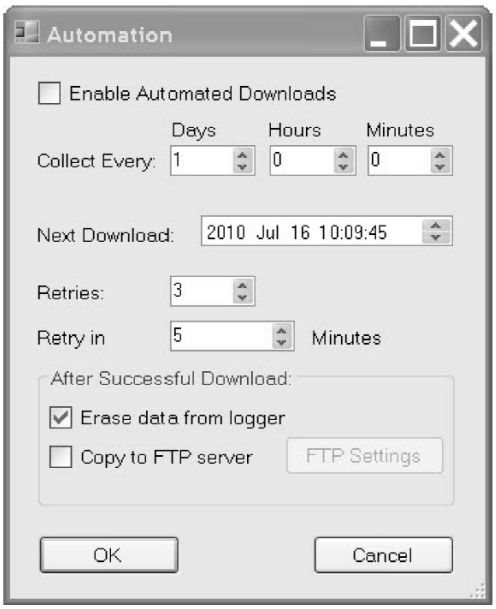
Delete: Use this to delete a station from the list. Select the station you want to delete by clicking on the Station ID or Logger Type. Click on the "Delete" button, then click on "Yes" to confirm delete.

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".

CHAPTER 9

AUTOMATION

Automation Setup Dialog



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 Logger Manager program wil 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.

Automation Setup Dialog

Erase Data From Logger: Check this box to erase the logger after data has been retrieved and written to disk. 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.

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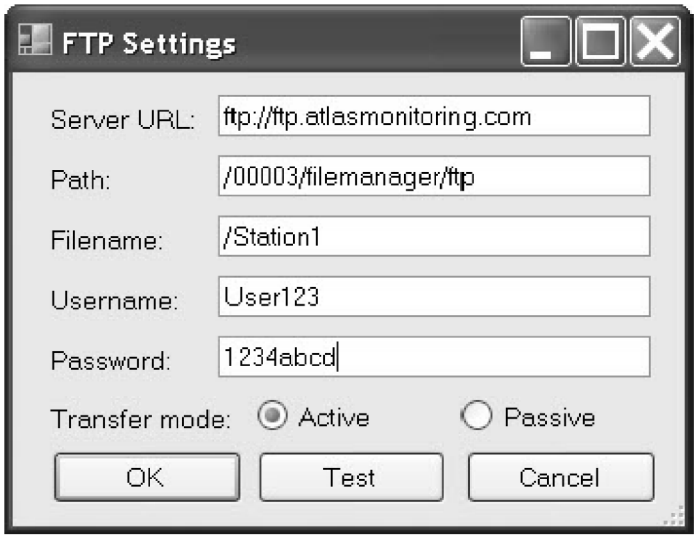
FTP Settings



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.

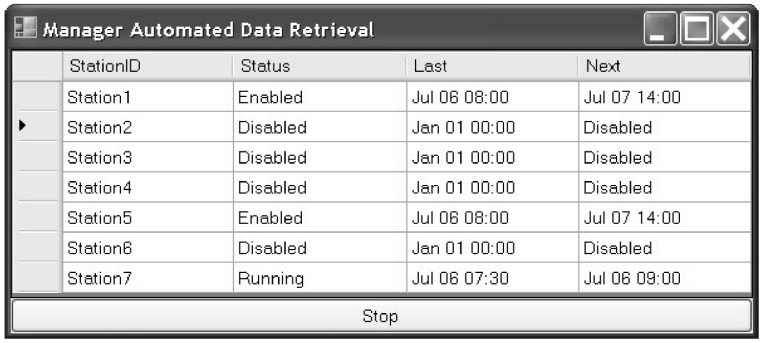
Password: The user password required to log onto the server.

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 Automation

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 Automation 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.

Appendix A:
Software installation

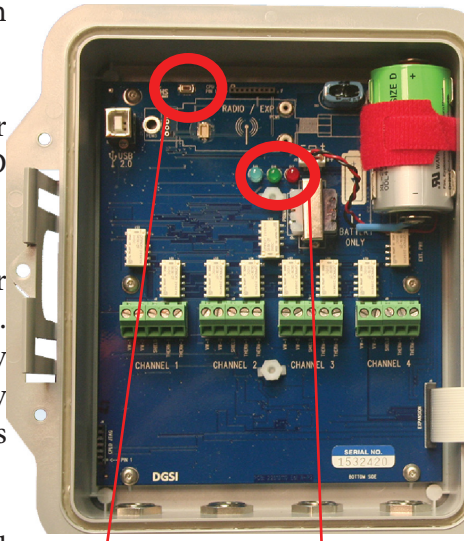
The software needed to set up the logger is available as a free download at www.slopeindicator.com in the downloads section. You will have the option to select a 32 bit or 64 bit version, based on the build of your Windows Operating System. To find out if you have a 32 or 64 bit operating system, follow the instructions for your specific operating system (Windows 7, 8, 8.1, or 10) on the Windows support website.

Once you have downloaded the software, double click to begin the installation progress. You will need to consent to the license agreement by accepting the terms that appear in the dialog box near the beginning of the process. Once the software is installed, click "Finish".

Appendix B:
LED and Battery Indications

There are three LED indicators inside the V-Logger: BLUE, GREEN and RED. They are used to signal operational status of the logger.

- Normal operation is indicated by a brief (5mS), bright BLUE flash every 10 seconds. This is the "I'm OK, up and running" indicator.
- If the time has not been set, the logger will not proceed after initialization, until such time that it is set, and will flash BLUE & RED every 1 second.
- A warning condition (Warning1) is indicated if the battery is low or there is an error in reading of any of the specified/selected channels. This warning is signified by briefly flashing BLUE and GREEN every 10 seconds. Whenever you remove a battery, after putting a battery back in place you must hit the reset (RST) button to stop the lights from flashing the low battery warning.
- A more serious warning (Warning2) is indicated in case the log is full (only if memwrap is off), or the logger is missing its calibration stamp (i.e. it has not been calibrated in manufacturing). This warning is signified by briefly flashing BLUE and RED every 5 seconds.
- A fatal error or a failed power up self-test will be followed by repeating series of 3 rapid RED flashes. This is an unmistakable sign that something is seriously wrong, and all operation will cease. Pressing the RST switch on the board is the only way to recover from this. However in most cases, V8 hardware failure will be the cause, so this will not remedy the situation.



RST Button (Reset)

LEDs

If the battery is not replaced relatively soon after the battery warning, it will return a voltage that will be deemed unsafe for continued operation. To prevent data loss, and to preserve the stated logger accuracy, all operation will cease, and V8 will wait in its lowest power state for new batteries. After replacing the power source, RST must be pressed to continue operation.

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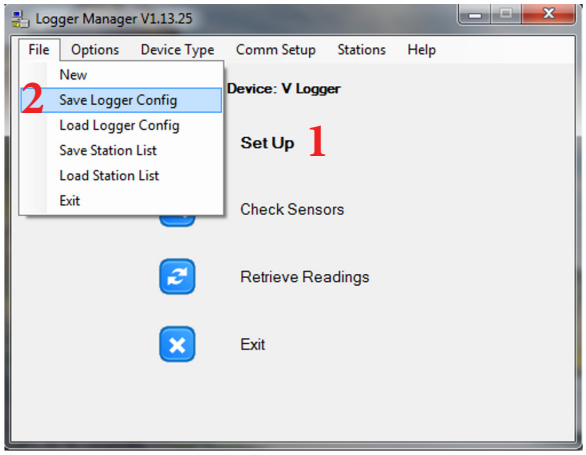
Appendix C:
Updating Logger Firmware

Connect and Retrieve

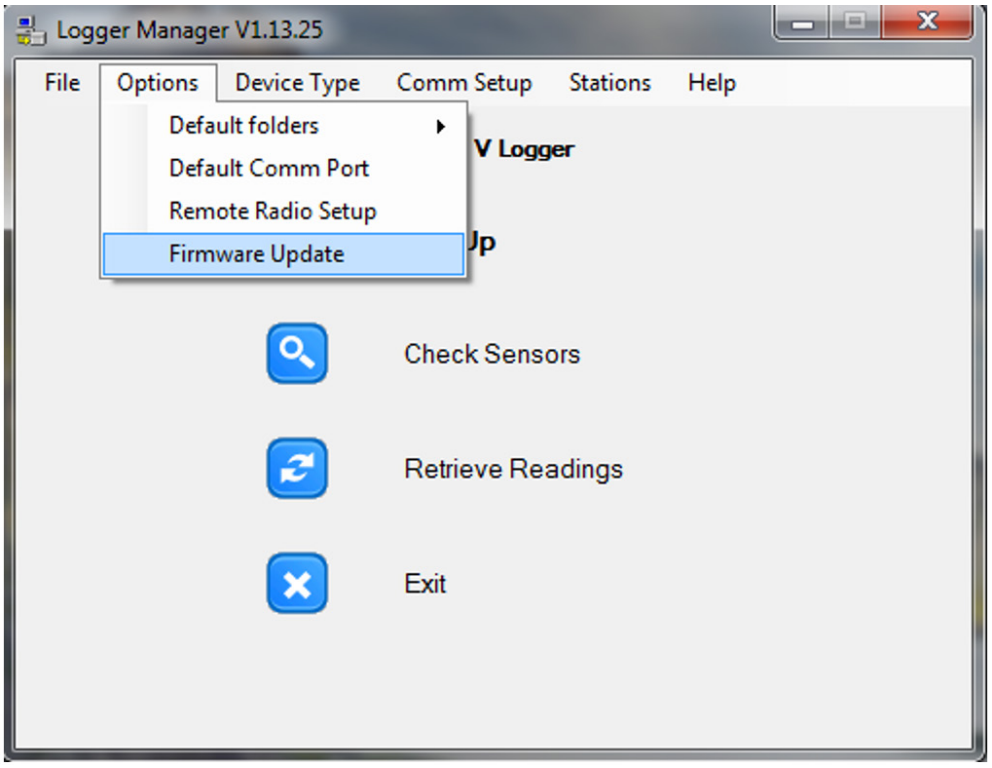
1. Connect your pc to the logger and retrieve setup by clicking "Set Up" from the main menu (shown right, "1") and then "Retrieve Setup" in the bottom left corner of the Setup submenu (see figure 4-3 in Chapter 4). After retrieving setup, click "ok" to close the submenu and return to the main menu.

2. Before updating your V-Logger's firmware, always save all of your data and the Logger Config files as shown (right, "2"). This will ensure the you can restore your settings if they are deleted by the firmware update.



Updating Firmware

1. To start the firmware update, go to Options, then "Firmware Update".



Appendix D:
Part 15 FCC Compliance Warning

Changes or modifications to the Hermes radio module in the V-Logger not expressly approved by Durham Geo-Enterprises, Inc. (dba Durham Geo Slope Indicator) could void the user's authority to operate this product.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operations.

Appendix E:
Industry Canada (IC) Certifications

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Cet appareil numérique ne dépasse pas les limites de classe B pour les émissions de bruit radio provenant des appareils numériques énoncées dans le Règlement sur les interférences radioélectriques du ministère des Communications du Canada.

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