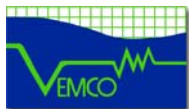


VUE

SOFTWARE

MANUAL

VUE Software Version 2.0.0



VEMCO, a Division of AMIRIX Systems Inc.

DOC-4399-16 2012-02-20

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MANUAL Summary

This manual is intended to provide our users with the information they require to use VUE software. VEMCO highly recommends that the user fully read the manual before using VUE.

Section 1

Instructions for installing VUE software and installation of the Bluetooth adapter

Section 2

Overview of the software

Section 3

Frequently Asked Questions (FAQ)

Section 4

Specific instructions for use with the VR4-UWM, VR2W, and VR2 receivers and can be considered a **Quick Start** for those who prefer to read the manual later.

Section 5

Troubleshooting Tips & Index

Questions, comments or suggestions are welcomed and can be submitted via the web at http://www.vemco.com/contact_form.php.

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SOFTWARE REVISION HISTORY

| | | |
|-------------------------|--|------------|
| VUE SW Version 1.0 | Initial Release | 2007-01-25 |
| VUE SW Version 1.2 | <ol style="list-style-type: none"> 1) Compatible with Microsoft Windows Vista operating system. 2) Support for importing legacy VR2 and VR3-UWM text data files generated by VR2PC or VR3HS software allowing users to combine data from previous studies. 3) Supports entry of transmitters with duplicate IDs to support databases with data from multiple years, multiple studies and multiple users. 4) Supports entry of transmitters with duplicate serial numbers required for dual sensor transmitters. 5) Supports altering VRL files to correct for time drift, incorrect time zones and changes/additions of station names. 6) Supports graphing of detection data. | 2007-08-16 |
| VUE SW Version 1.2.1 | Minor corrections within software – no change to usage. | 2007-10-04 |
| VUE SW Version 1.4 | <ol style="list-style-type: none"> 1) Added new search filters for viewing subsets of detection data. 2) Improved the Event Table to include all receiver header information 3) Added ability to import and export tag meta data between databases | 2008-05-21 |
| VUE SW Version 1.6 | <ol style="list-style-type: none"> 1) Added support for VR2W firmware versions up to 2.0 2) Added support for the new VEMCO Global code map, MAP-112 which includes support for new VEMCO tags to be released in 2009. 3) Improved the reliability of the Bluetooth communication link to VR2Ws 4) Added support for importing a new file format from VR3HS 5) Improved the reliability of the serial port communication link to VR2s | 2009-05-05 |
| VUE SW Version 1.6.4 | Version number only changed to match new software release. Minor corrections within software – no change to usage. | 2009-09-22 |
| VUE SW Version 1.6.5 | Version number only changed to match new software release. Minor correction within software – no change to usage. | 2010-04-29 |
| VUE SW Version 1.8 | <ol style="list-style-type: none"> 1) Added support for importing VR3HS-style files with detections of transmitters using new code spaces 2) Added the option to export to CSV files on offload – see section 2.3.1.3 3) Changed the default CSV format and added several new CSV export formatting options – see section 2.3.1.6 4) Added the new chart display option to sort by station and day/night shading – see section 2.9 5) Added acceleration units for sensor tags 6) Improved support for Bluetooth dongles | 2010-08-20 |
| VUE SW Version 1.8.1 | <ol style="list-style-type: none"> 1) Added support for new code map (MAP-413) 2) Corrected CSV output of sensor values (occasionally included too many decimal places) 3) Corrected station assignment names when exporting CSV files | 2010-12-6 |
| VUE SW Version 2.0.0 | <ol style="list-style-type: none"> 1) Added new Windows 7 look 2) Added support for VR4-UWM 3) Added residency search | |

1 INSTALLATION

1.1 INSTALLING AND STARTING VUE SOFTWARE

VUE software requires Windows XP SP2, Windows VISTA, or Windows 7.

To install VUE, first attach the VEMCO supplied *Bluetooth*® USB adapter (see photo) to any USB port on your PC. If the “Found New Hardware Wizard” window opens, select Cancel.

Run the VUE setup file on your VUE CD or download it from the VEMCO website: http://www.vemco.com/support/vue_support.php. Follow the instructions in the installation wizard.



Bluetooth® USB Adapter

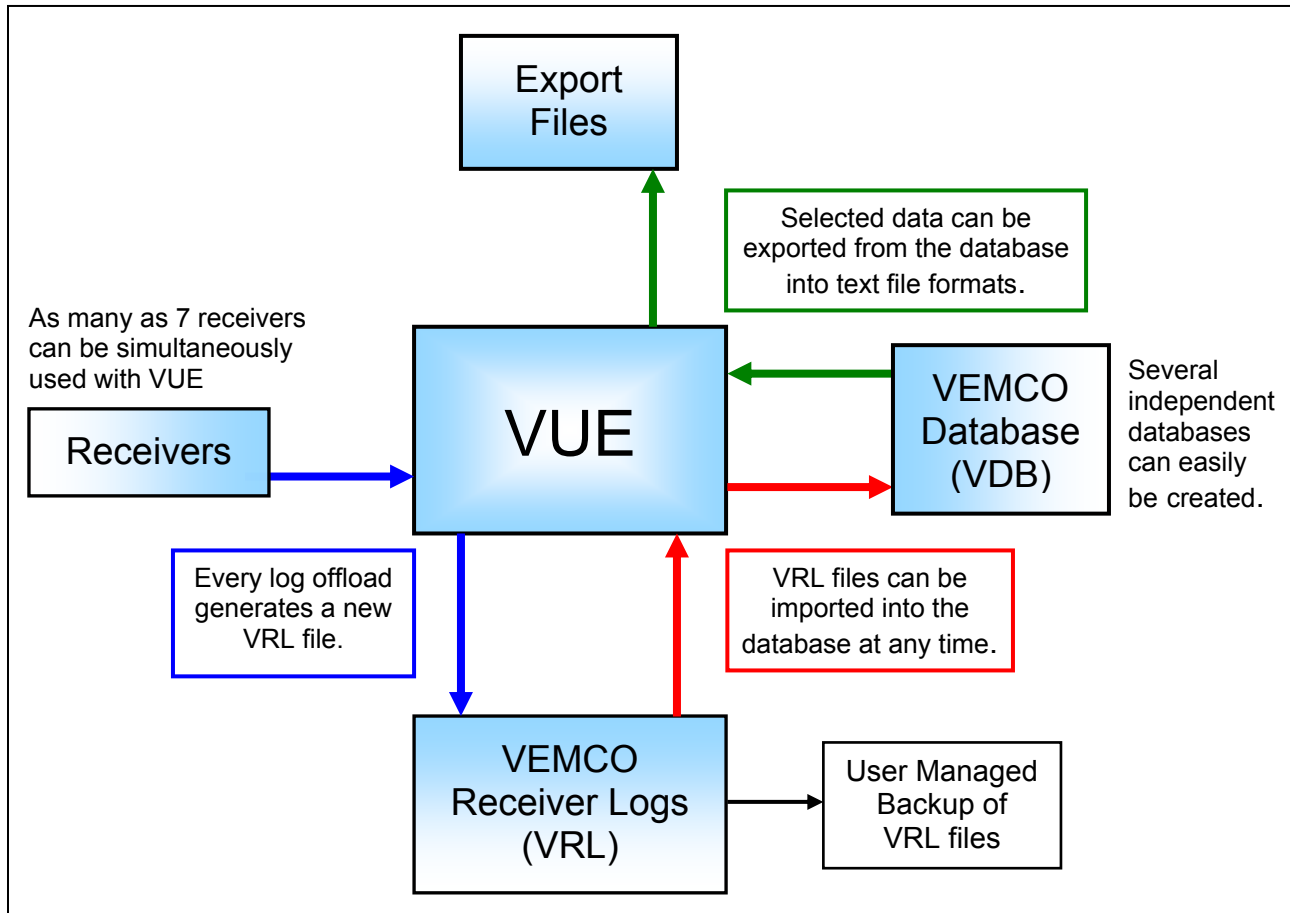
The *Bluetooth* USB adapter is required for operation with the VR2W and the VR4-UWM but not with the VR2 receiver or the VR3-UWM files. If you are not using VR2W or VR4-UWM receivers and you do not have a VEMCO supplied *Bluetooth*® USB adapter, select cancel when prompted to install the *Bluetooth* (BT) drivers.

Launch the software.

If you are opening a database created by an earlier version of VUE (version 1.4.4 or older), you will receive a warning that the database will be converted to the new version of VUE and will no longer be compatible with older versions of the software.

2 OVERVIEW OF VUE SOFTWARE

The VUE (VEMCO User Environment) software has been developed to aid researchers in gathering, viewing and analysing acoustic detection data. VUE is not receiver centric but instead employs a central database to allow collection and viewing of data from multiple receivers of various types.



Using receiver plug-ins, VUE provides a receiver-specific link which allows communication with the receiver for performing such functions as retrieving receiver data files, setting the receiver clock, clearing the receiver memory, and changing the receiver code map.

VUE databases combine detection data from multiple receivers!

VUE can create one or more central databases combining data files from multiple receivers and multiple types of receivers (for example, VR4-UWM, VR2W and VR2). Old VR2 and VR3-UWM data files can also be imported into VUE databases. Having a central database allows easy comparison between detections from multiple studies, across multiple years, and from various locations.

You may choose to create smaller, temporary databases on laptops used for collecting data in the field. A larger, more central, database containing all receiver data files can then be created on a lab computer or network server.

2.1 CHANGES FROM VUE VERSION 1.8.1 TO 2.0

For those already familiar with the VUE environment, the following are the new features of Version 2.0:

- 1) Improved user interface; Window 7 ribbon look and feel
- 2) Support for the VR4-UWM receiver
- 3) New Residency search
- 4) Detections and events are in separate tabs

Previous changes from version 1.8 to 1.8.1:

- 1) Added support for new code map (MAP-413)
- 2) Corrected CSV output of sensor values (occasionally included too many decimal places)
- 3) Corrected station assignment names when exporting CSV files

Previous changes from version 1.6 to 1.8:

- 1) Added support for importing VR3HS-style files with detections of transmitters using new code spaces
- 2) Added the option to export to CSV files on offload – see section 2.3.1.3
- 3) Changed the default CSV format and added several new CSV export formatting options – see section 2.3.1.6
- 4) Added the new chart display option to sort by station and day/night shading – see section 2.9
- 5) Added acceleration units for sensor tags
- 6) Improved support for Bluetooth dongles

Previous changes from version 1.4 to 1.6:

- 1) Added support for VR2W firmware versions up to 2.0
- 2) Added support for the new VEMCO Global code map, MAP-112 which includes support for new VEMCO tags to be released in 2009.
- 3) Improved the reliability of the Bluetooth communication link to VR2Ws
- 4) Added support for importing a new file format from VR3HS
- 5) Improved the reliability of the serial port communication link to VR2s

Previous changes from version 1.2 to 1.4:

- 1) Detection filtering. You can now view subsets of your data by filtering your detections based on date, time, transmitter, receiver, station, number of detections, and transmitter/receiver combination. Details on how to implement detection filters are found in Section 2.5.
- 2) Improved plotting capabilities. Plotting is discussed in Section 2.10.
- 3) New database metadata import and export capability. You can now export database information such as transmitter calibrations and filter definitions to another database, saving time when creating new databases. Refer to Section 2.3.2 for more details on Metadata.
- 4) VRL file removal. Imported VRL files can now be removed from a particular database if desired. Section 2.3.1.5 explains VRL file removal.

2.2 VIEWING DATA

The VUE database has been designed with optimal performance in mind. To speed up the viewing of large detection databases, VUE software contains a selection tree which allows the user to display all information or to search by receiver, transmitter, station, receiver log (VRL) file, or detection filter. Separate tabs, each with its own selection tree, contain detection and events information.

TIP

Use the selection tree to search database for detections based on receiver, transmitter, station, VRL file, or filter.

Detections ribbon:

This ribbon contains the functions that can be performed with the data. The functions change base on the tab selected.

Selection Tree:

Select "All Detections", a receiver, a transmitter, a station, a log file, or a filter to display the associated data in the right side of the VUE window.

Each item in the list can be expanded as shown below so an individual receiver, transmitter, etc. can be viewed.

- Receivers (10)
 - VR2-5344
 - VR2W-100
 - VR2W-101
 - VR2W-100282
 - VR2W-106582
 - VR4UWM-250010
 - VR4UWM-250011

The screenshot shows the VUE software interface with the 'Detections' ribbon selected. The ribbon includes icons for Detections, Files, Filters, Stations, and Transmitters. On the left, a selection tree shows 'All Detections' selected. The main area displays a table of 33276 detections with the following columns: Date, Time, Code Space, ID, Transmitter, Receiver, and Station.

| Date | Time | Code Space | ID | Transmitter | Receiver | Station |
|------------|----------|------------|------|---------------|----------|---------|
| 2006-10-18 | 06:23:32 | A69-1206 | 1102 | A69-1206-1102 | VR2-5344 | |
| 2006-10-18 | 06:30:20 | A69-1206 | 1102 | A69-1206-1102 | VR2-5344 | |
| 2006-10-18 | 06:32:44 | A69-1206 | 1102 | A69-1206-1102 | VR2-5344 | |
| 2006-10-19 | 02:26:23 | A69-1206 | 1102 | A69-1206-1102 | VR2-5344 | |
| 2006-10-19 | 02:27:17 | A69-1206 | 1102 | A69-1206-1102 | VR2-5344 | |
| 2006-10-19 | 02:27:49 | A69-1206 | 1102 | A69-1206-1102 | VR2-5344 | |
| 2006-10-19 | 02:28:44 | A69-1206 | 1102 | A69-1206-1102 | VR2-5344 | |
| 2006-10-19 | 02:29:24 | A69-1206 | 1102 | A69-1206-1102 | VR2-5344 | |
| 2006-10-19 | 02:29:57 | A69-1206 | 1102 | A69-1206-1102 | VR2-5344 | |
| 2006-10-19 | 02:30:30 | A69-1206 | 1102 | A69-1206-1102 | VR2-5344 | |
| 2006-10-19 | 02:31:06 | A69-1206 | 1102 | A69-1206-1102 | VR2-5344 | |
| 2006-10-19 | 02:31:53 | A69-1206 | 1102 | A69-1206-1102 | VR2-5344 | |
| 2006-10-19 | 02:32:50 | A69-1206 | 1102 | A69-1206-1102 | VR2-5344 | |
| 2006-10-19 | 02:33:17 | A69-1206 | 1102 | A69-1206-1102 | VR2-5344 | |
| 2006-10-19 | 02:33:49 | A69-1206 | 1102 | A69-1206-1102 | VR2-5344 | |
| 2006-10-19 | 02:34:40 | A69-1206 | 1102 | A69-1206-1102 | VR2-5344 | |
| 2006-10-19 | 02:35:04 | A69-1206 | 1102 | A69-1206-1102 | VR2-5344 | |
| 2006-10-19 | 02:35:46 | A69-1206 | 1102 | A69-1206-1102 | VR2-5344 | |
| 2006-10-19 | 02:36:38 | A69-1206 | 1102 | A69-1206-1102 | VR2-5344 | |
| 2006-10-19 | 02:37:30 | A69-1206 | 1102 | A69-1206-1102 | VR2-5344 | |

The right side of the VUE window changes according to what's selected in the tree on the left side of the window. If a receiver is selected, then this half of the window reports which tags were detected by that receiver. If a tag is selected, all of the detections in the database for that tag are shown. If a station is selected, all detections in the database recorded at that station are shown.

2.2.1 Viewing All Detections

To view all detections in a database, first select the *Detections* tab at the top of the window. This tab is only visible when a database is open. Select “All Detections” at the top of the selection tree on the left hand side of the VUE window (see picture on previous page). All detections, sorted by date, will be listed on the right-hand side of the screen.

2.2.2 Viewing by Receiver

Receivers are uniquely named according to their model and serial number (for example, VR2W-100282). To view detections collected with a specific receiver, select the receiver in the selection tree on the Detections tab. For specific instructions on communicating with VEMCO receivers using VUE for configuration or offloading of data, refer to Section 4.

2.2.3 Viewing by Transmitter

Each transmitter is provided an ID number at the factory. The transmitter data sheet which was shipped with the transmitter will provide the ID number, the transmitter serial number, and the transmitter *code space*. Within VUE, the default transmitter name will be displayed as a combination of the *code space* and the ID number. By selecting the transmitter name in the list on the left side of the VUE detections window, VUE will show all detections found in the current database for that transmitter. The *code space* name is based on new nomenclature introduced with VUE to avoid ambiguity between tag coding types. More information follows in section 2.2.3.1.

Default Transmitter Name: **code_space – ID#**

example: **A69-1303-6185**

A transmitter can also be assigned a user-defined name. To do this, highlight the tag in the selection tree and click the *Edit selected transmitter* in the *Transmitter* section of the Detections ribbon (shown at right), or right-click on the tag in the selection tree and select *Edit transmitter*. Either method will open the Edit Transmitter window shown below. The serial number and a user-defined name can be entered to be assigned to that tag.



The user-defined transmitter name will appear in the “Transmitter” column on the right hand side of the VUE window when “All Detections”, “All Events” or a receiver, station, log file, or filter is selected on the left hand side. The database columns “Code Space” and “ID” will still contain the code space and transmitter ID.

| Date | Time | Code Space | ID | Transmitter | Station |
|------------|----------|------------|----|-------------|---------|
| 2008-02-14 | 17:12:09 | A69-1303 | 1 | A69-1303-1 | |
| 2008-02-14 | 17:12:17 | A69-1303 | 3 | A69-1303-3 | |
| 2008-02-14 | 17:12:31 | A69-1303 | 3 | A69-1303-3 | |
| 2008-02-14 | 17:12:44 | A69-1303 | 3 | A69-1303-3 | |
| 2008-02-14 | 17:12:59 | A69-1303 | 1 | A69-1303-1 | |
| 2008-02-14 | 17:13:27 | A69-1303 | 9 | Salmon 58 | |
| 2008-02-14 | 17:13:39 | A69-1303 | 9 | Salmon 58 | |
| 2008-02-14 | 17:13:56 | A69-1303 | 9 | Salmon 58 | |

Default transmitter name

User-defined name

2.2.3.1 New Nomenclature for Code Maps and Code Spaces (Submaps)

With the release of VUE, VEMCO has taken the opportunity to introduce new nomenclature for VEMCO Code Maps and Code Spaces (Submaps).

Code Space describes everything the receiver needs to know about that transmitter

A Code Space is a term used to describe the type of coding scheme used for a particular tag type. VEMCO has various coding schemes available to support a large number of unique IDs. In the past these have been described with a series of parameters such as R4K, sync 340 ms, bin 20 ms, etc. This required our customers to know the intricate details of the coding scheme, which could lead to confusion and error. VUE uses new, unambiguous nomenclature that provides each coding scheme with a unique identifier that encompasses all of the information required for the receiver to detect that tag. Tag datasheets include this identifier.

A69-1303 is an example of a valid Code Space label. The “A69” indicates an Acoustic Tag operating at a frequency of 69 kHz. The 1303 is a unique number that is understood by the receiver firmware to determine how to detect and decode the tags. VUE will report tag detections as **Code space-ID#** by default. Datasheets sent to the customer with each tag order will contain this label. It is important to note that a tag that transmits a Code space-ID#, e.g., A69-1303-2056, is a different transmitter than one with a label of A69-1206-2056. The ID codes are the same but the coding scheme is different!

A Code Map describes a collection of Code Spaces. When a receiver is configured with a particular Code Map, it can detect and decode all types of transmitters in that map.

For details on currently supported Code Maps and how to select the proper code map for your study, please visit <http://www.vemco.com/maps.php>.

2.2.4 Viewing by Station

As receivers are mobile units easily moved from one location to another, VUE has provided the option to associate a receiver with a station (location) for a particular deployment. This is set up when the user configures the receiver. The station specifies a location, including latitude and longitude (if desired), which is assigned and recorded in the receiver’s memory during initialization. Avoid giving different locations the same station name. Multiple receivers can be associated with the same station name and a receiver can be associated with multiple stations. Selecting a station name in the selection tree on the left side of the VUE window will show all detections in the database from that station, including those from multiple receivers.

A station is used to identify the location of the receiver during deployment.



DO NOT give multiple locations the same Station Name



Set up your station name **before** you deploy your receiver

VR2 receivers do not support Station Names within the receiver; however, “Study Strings” can be entered into a VR2 during initialization and will be shown in the receiver Events.

2.2.4.1 Adding a Station Name

To associate a receiver with a particular station before it is deployed, you must first use VUE to add a station name to your database. Follow the steps listed below to add a station.

1. Select the Detections tab and click the *Add Station* icon (shown at right) in the ribbon, or right click on “Station” in the selection tree and select *Add Station*. The *New Station* window (shown below) will open.



2. Enter the location’s unique name in the box labelled “Name”. The station name will be used to identify the station in the selection tree and in the Station field of the database. This name should be unique from all other station names.
3. Optionally, enter the location’s latitude and longitude in the boxes marked “latitude” and “longitude”. There are various formats that will be recognized and you may use any of the formats listed in the table below when inputting your data. Hemisphere must be indicated by either using +/- or by N/S/E/W.

| Format | Latitude | Longitude |
|-------------------|----------------|-----------------|
| Degrees | +44.64085 | -063.67083 |
| | 44.64085° N | 063.67083° W |
| | N44.64085 | W063.67083 |
| Degrees/Mins | 44°38.451' N | 063°40.250' W |
| | N4438.451 | W06340.250 |
| | +4438.451 | -06340.250 |
| Degrees/Mins/Secs | 44°38'27.07" N | 063°40'14.98" W |
| | N443827.07 | W0634014.98 |
| | +443827.07 | -0634014.98 |

Regardless of which format of “latitude” and “longitude” you choose to input, the default display setting is in +/- Degrees and will automatically convert to that format. This default display can be changed in the *Options* window (see section 2.11.2).

4. Enter a description of the location in the “Description” box for your reference.
5. Click OK.

To change the station association of a detection or group of detections, select the detections and “drag and drop” them onto the correct station name within the station selection tree.

Once you have imported your data, you can edit a station name using the same window described above. When station information is changed, it will change for all data associated with the original station name. It’s better to edit a station name rather than deleting a station and adding a new one at the same location because the data association is lost when a station is deleted.

TIP: A new station can also be created when a study is setup (see sections 4.1.3 and 4.2.2).

2.2.5 Viewing by Log File

To view all detection data associated with a particular log (VRL) file, select the desired file in the selection tree. Using the selection tree in the Detections tab will show all detections in that file while selecting a file in the Events tab selection tree will display all events in that file. Each VRL file contains the data from a particular receiver offload.

2.2.6 Viewing by Detection Filter

Subsets of your data can be viewed by creating Detection Filters. To view filtered data, click on the filter name in the selection tree on the left hand side of the VUE window. For instructions on how to create detection filters, refer to Section 2.5 of this manual.

2.2.7 Date/Time Format

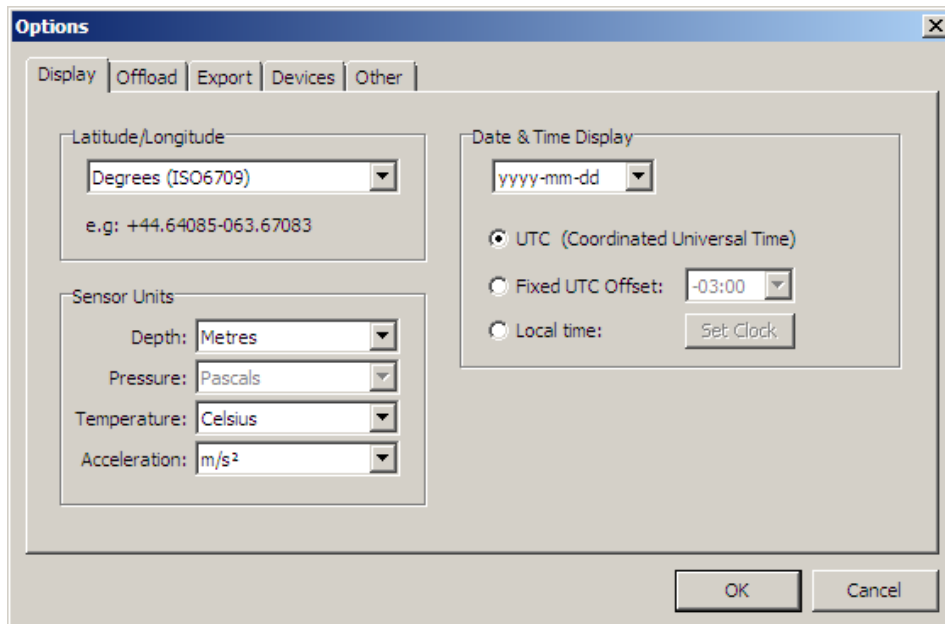
VUE configures all receivers in Coordinated Universal Time (UTC), also known as Greenwich Mean Time, regardless of whether your computer is set to UTC or not. This allows data from multiple receivers to be compared without the challenge of adjusting receiver data for time zone differences when receivers are initialized. To ensure your receiver is configured to the correct UTC time, you must ensure your computer is set to the proper **local time** and **time zone**. Alternately, you may set your PC to UTC time. In either case, it is imperative that your PC clock be set accurately.

VUE configures all receivers to record detections in UTC time.

VUE provides the option to change the display settings so that your data are displayed in local time; however the data remains stored within the database and within the receiver in UTC time. To change the display settings, open the *Options* window and select the *Display* tab to view the setting options (see section 2.11.2). Choose the desired setting.

Set your computer to the correct **Local Time and Time Zone** or **UTC**

Data times in files imported into VUE will automatically be converted to UTC regardless of the time zone used to configure the associated receiver. This is applicable for receivers configured with older VEMCO software such as VR2PC used for VR2s.



2.2.8 Telemetry Sensor Data

The **Data** column under the Detection tab displays sensor data if the transmitter in question includes a sensor (for example temperature or depth). To display the sensor data in the correct units, the slope and intercept values used for sensor calibration must be entered into the database. Slope and intercept values can be found on the transmitter datasheet received with your transmitters. Until the slope and intercept values are entered, the data units are shown as “ADC”, or Analog to Digital Converter units. ADC values range between 0 and 255.

Enter the slope and intercept by following the steps listed below:

1. Select the desired tag in the selection tree list on the Detections tab.
2. Edit the tag information by either selecting the *Edit tag* icon (shown here) or by right-clicking on the tag name and selecting “Edit transmitter”. The *Edit Transmitter* window (shown below) will open.
3. Enter the tag’s serial number and a unique Tag Name (name is optional). The Tag Name will be used to identify the tag in the selection tree and in the Transmitter field of the database.
4. Enter the slope and intercept as it was received from VEMCO in the boxes marked “slope” and “intercept”.
5. Select the sensor type from the drop-down list in the Type box.
6. Click OK. The data in the database associated with this tag is now correctly shown in the selected units.



Edit Transmitter A69-1105-148

Tag S/N:

Tag Name: (optional)

Sensor 1

Slope:

Intercept:

Type:

OK Cancel



CAUTION

DO NOT give multiple tags the same Tag Name



Calibration and name information can be added for sensor tags that have not yet been detected and offloaded to the database. Open the *Add transmitter* window by selecting *Add Transmitter* from either the Detection ribbon (icon shown at right) or by right-clicking “Transmitters” in the selection tree. Fill in the appropriate information as described above and select OK.

To ease adding sensor tag information, VEMCO recommends that you import detection data from receivers first and then edit the tag information to include the serial number and calibration information.

Note: Tag calibration information is not stored in the receiver, but instead is kept within the VUE database. Therefore, it is not necessary to enter tag calibration information into VUE before initializing and deploying a receiver. Tag calibration information can be exchanged between databases using the *Export Metadata* and *Import Metadata* features described in Section 2.3.2.2.

Add Transmitter

Coding Type:

Frequency: kHz

Tag ID:

Tag S/N:

Tag Name: (optional)

OK Cancel

2.3 MANAGING DATA

VUE keeps track of two types of data. The first type, detection data, includes all detection information that is captured by your receivers: date and time of detection, transmitter ID, which receiver made the detection, and any sensor data (temperature, depth) associated with the detection.

The second type of data managed by VUE is metadata. Metadata consist of any calibrations and configurations that you have manually entered into VUE. Examples of metadata are transmitter sensor calibrations, transmitter names, stations names and filter definitions.

2.3.1 Managing Detection Data

2.3.1.1 What is a VRL file?

When data from a receiver are offloaded using VUE software, they are stored as a **VRL (VEMCO Receiver Log)** file. VRL files are digitally encrypted/signed binary files that cannot be altered. They provide a permanent record of the data stored by the receiver and can be imported into any number of VUE databases. The VRL file contains all the information pertinent to the dataset, including the receiver configuration (code map, clock initialization, receiver serial number, deployment location, etc.) and, of course, the detection data. You are strongly advised to keep a back-up copy of all VRL files. If you need to restore your database you can import the original data from your VRL files.

Receiver Data Files are stored as a binary file called a VRL file.

Keep a back-up copy of all VRL files.

VRL files are labelled (named) to allow you to identify the receiver to which they belong and the date that the data were offloaded. For example, the file VR2W_187_20061130_1.vrl came from a VR2W receiver with the serial number 187 and was offloaded on Nov. 30, 2006. The “_1” at the end indicates that it was the first offload of the day for VR2W 187.

Sample VRL File Label: VR2W_187_20061130_1.vrl

2.3.1.2 Offloading VRL files

When you connect to a VEMCO receiver using VUE software either through a Bluetooth signal, a RS232 cable, or an acoustic modem, you can proceed to offload data from the receiver. The method of offload is specific to the receiver type. For instructions on offloading data from a VR4-UWM receiver, see section 4.1.1 (*Bluetooth*) or section 4.1.2 (acoustic modem). VR2W receivers, refer to Section 4.2.4. Instructions for offloading data from VR2 receivers are found in Section 4.3.2.

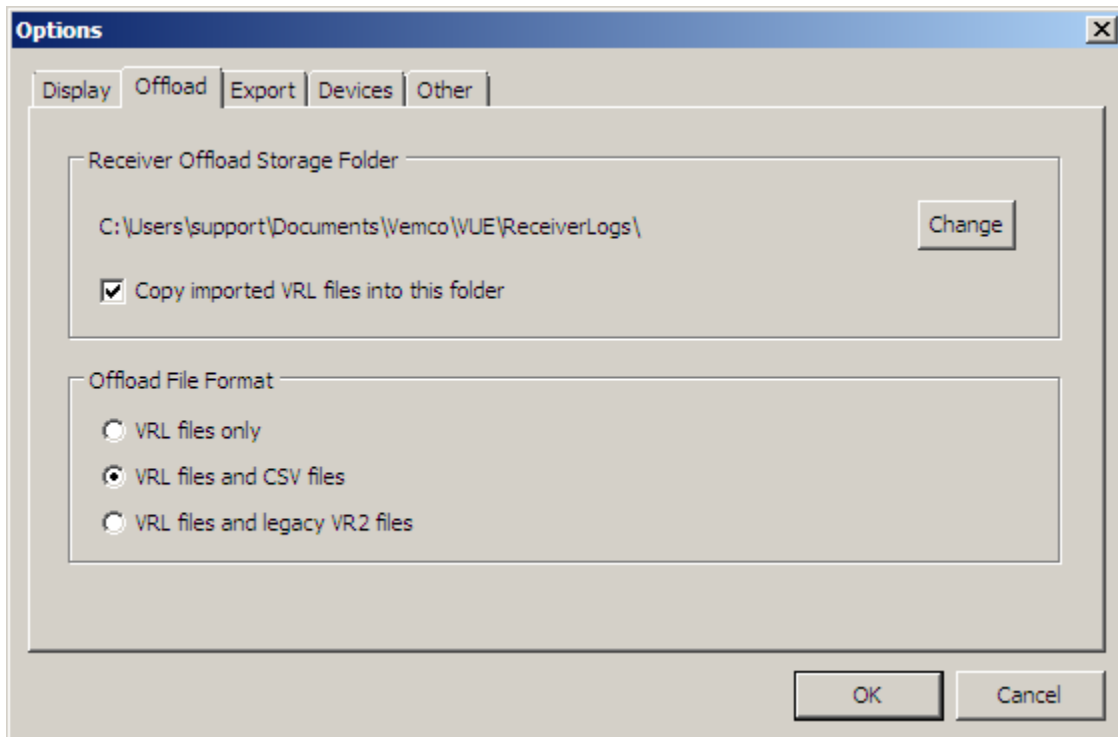
VUE provides the option to offload the entire dataset contained within a receiver *or* to offload only the data that have been stored since the receiver was last offloaded. The last offload point is marked and maintained within the receiver itself and thus is independent of the computer being used for communication.

Note: VR2 receivers do not support incremental offloads.

2.3.1.3 Storing VRL files

The default VRL file offload location on your PC depends on which version of Windows you're running. Windows XP uses "C:\Documents and Settings\USERNAME\My Documents\Vemco\VUE\ReceiverLogs". Windows Vista and Windows 7 use "C:\Users\USERNAME\Documents\Vemco\VUE\ReceiverLogs". This default location can be changed by opening the *Options* window and then the *Offload* tab (see section 2.11).

You may offload your files as VRL files only, as both VRL files and CSV files, or as both VRL files and legacy VR2 files. See section 2.3.1.6 for various CSV export options.



2.3.1.4 Importing VRL files into VUE

To offload data from a receiver into VUE, you can choose to only create VRL data files or create VRL files and import the data into your VUE database. To save time in the field, you can choose to only create VRL files. The VRL data can be imported into your database at a later time. The VRL file can be imported into any number of databases depending upon your needs.

Reduce retrieval time in the field by offloading data files first and importing into the database later.

Note that importing a VRL file from anywhere other than the default directory will cause that file to be copied into the default directory. This ensures that you always have a local copy of every imported file. This feature of the VUE software is enabled by default, but can be disabled by un-checking "Copy imported VRL files into this folder" on the *Offload* tab of the *Options* window (see section 3.1.12 to open *Options*).

To import a VRL file, select the *Detections* tab and select the *Import file* icon (shown at right). The "Import Files" window will appear. Select one or more VRL files to import. Multiple files can be selected by pressing and holding the CTRL key while left clicking on each desired file.



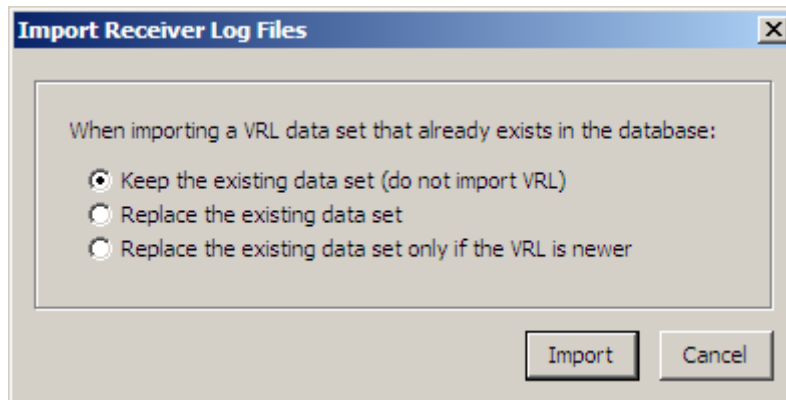
If you import a VRL file multiple times, or import two or more VRLs which have overlapping data, for example, by offloading data from a receiver and redeploying the receiver without erasing the previous data, VUE will identify duplicate detections and remove them from the database. Duplicate detections are defined as multiple records of a detection made for the same transmitter, by the same receiver at the exact same time.

“Duplicate” detections are automatically removed from the VUE database.

VUE is able to detect when two files contain the same data set, even if the dates and times are different. After you have selected the VRL files that you would like to import, the following three import options describe what VUE will do if it detects that a file contains a data set that was previously imported from some other file.

1. *Keep the existing data set (do not import VRL).* This option will not import a VRL if that same VRL has already been imported into VUE and therefore does nothing with the selected file. This is usually what you want.
2. *Replace the existing data set.* Remove the previously imported VRL file before importing the selected file. Use this option if you want to replace a VRL file in the database with an edited version of the same file.
3. *Replace the existing data set only if the VRL is newer.* Remove the previously imported VRL file before importing the selected file but only if the selected file is newer than the previously-imported one. Use this option if you have several edited versions of a file and you want to have the newest one in the database.

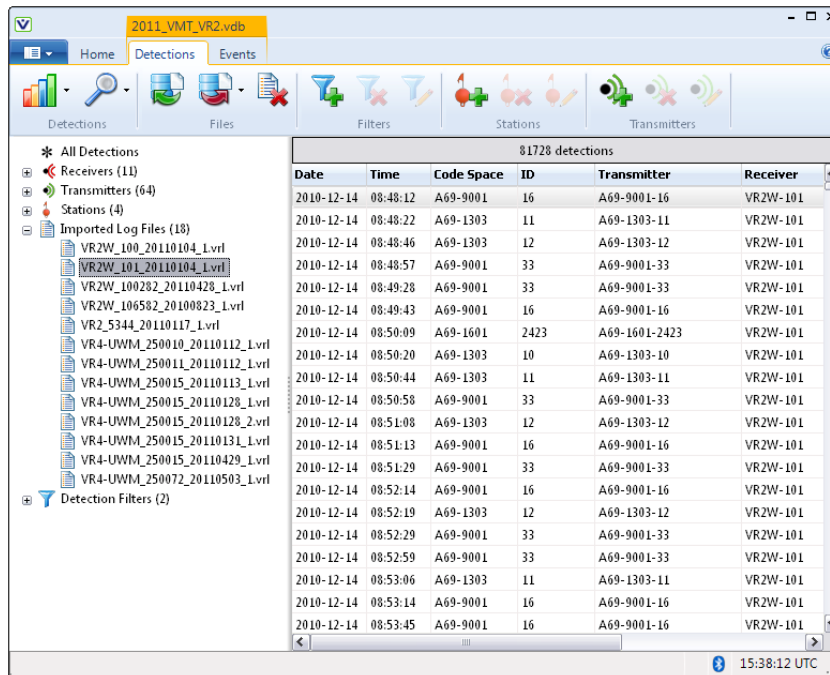
It is important to note that *none* of these options will detect overlapping data sets. If a detection has already been imported from a different data set (either a subset or a superset), it will *not* be overwritten.



2.3.1.5 Removing files from VUE

Data that was imported from a VRL file but is no longer wanted in a database can be removed. Removing a VRL file from a VUE database does not remove it from its storage location on your computer's hard drive. The VRL file is unchanged and remains available for import at a later time.

To remove a file, it must be selected in the selection tree on the left side of the window when the Detections tab is selected (see below). This enables the *Remove file* icon in the Detections ribbon (shown at right). A file can also be removed by right-clicking on the desired file name in the selection tree and selecting *Remove file* in the list. NOTE: All detections associated with the VRL file will be removed from the VUE database.



Removing a VRL file from a VUE database does not remove it from its storage location (VRL file) on your computer's hard drive.

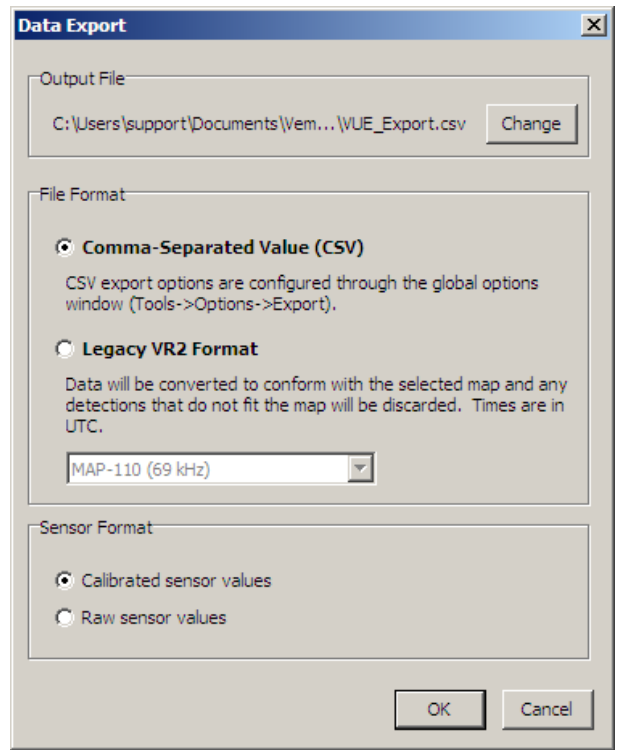
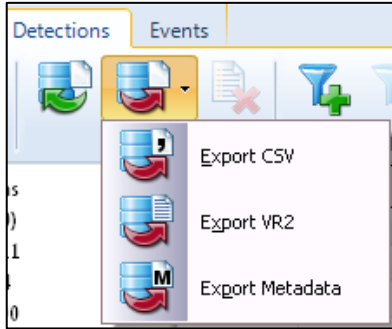
All detections associated with the removed VRL file will be removed from the VUE database.

2.3.1.6 Exporting Detection Data

Data can be exported from the database for use in other applications. VUE provides two format options for exporting detection data: comma-separated value (.csv) format and legacy VR2 format.

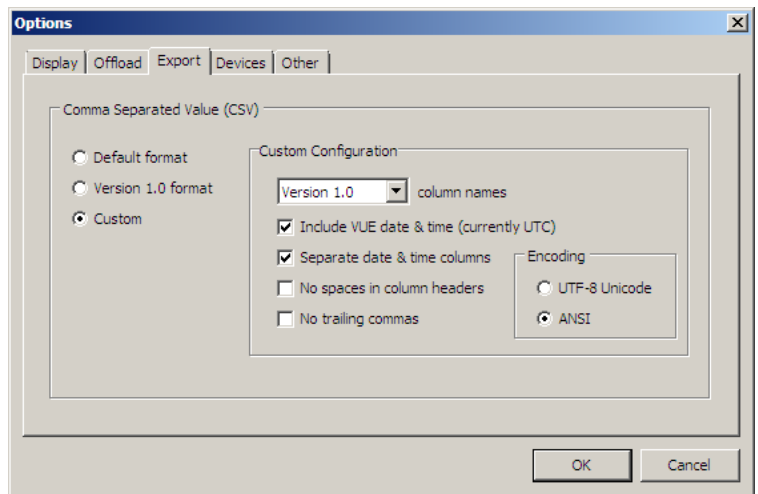
CSV files can be read by most spreadsheet, database and statistics applications; therefore this export format should be used if you intend to analyze the detection data in another application. Alternately, you may wish to export your data from VUE in Legacy VR2 format similar to what was provided by VR2PC software.

To export detection data, select the detections you wish to export using the selection tree on the left hand side of the window (Detections tab or Events tab). Choose the *Export file* icon in the ribbon (shown below) and select your desired export format. Selecting CSV or VR2 formats will open the *Data Export* window, shown at right (VR2 format is not available in the Events tab). Note that regardless of the time zone display option you have selected in VUE, all detection data will be exported in UTC time, unless your *Export* options are configured to also export in display time (see Custom format below).



To set your CSV file format export options, open the *Options* window (see section 3.1.12) and select the *Export* tab. The following describes the various formats available when exporting CSV files:

- **Default Format:** Output detection data are in the default CSV export format (*recommended setting*).
- **Version 1.0 Format:** Output detection data are in the original CSV format. Use this setting for compatibility with older versions of VUE (prior to Version 1.8).
- **Custom Format:** Output detection data uses custom settings:
 - Column names may be based on the default or Version 1.0 CSV format
 - A column can be added for the time zone currently displayed in VUE. This column is in addition to the UTC time column, which is always output.
 - Date and time may be split into separate columns.
 - Spaces may be eliminated from column names. If in doubt, disable this option.
 - Trailing commas may be eliminated for rows. If in doubt, enable this option.
 - The output file may use ANSI or UTF-8 Unicode character encoding. Changing this option may eliminate garbage characters when viewing the file in an external application. If in doubt, select UTF-8 Unicode.



If you are exporting your data in Legacy VR2 format, you will need to select a Code Map to complete the process. In the old VR2PC format, the code map setup information is defined in the header of each file. To be compatible with the VR2PC format, the legacy format can only be supported for code maps with 4 types of coded tags. If the set of data you have chosen contains more than four types of tags then you will not be able to export all of them into a single VR2 text file. You will get a warning describing the data that were not exported. Choose the remaining detections and an alternate map that is suitable for these detections to export the remainder of your data.

2.3.1.7 Importing “Old” VR2 and VR3-UWM Text Data Files

VUE will allow you to import legacy VR2 and VR3-UWM text data files. The text files must not have been altered and must be a direct output of VR2PC or VR3HS software. To import these files, select the *Import file* icon (shown at right) on the Detections ribbon (tab) and select one or more text data files. Multiple files can be selected by pressing and holding the CTRL key and clicking the left mouse button. Your old VR2 data files will likely be found in the default location that was used by the VR2PC software (C:\Program Files\VR2PC\Data). These data files can be recognized by their numbered extensions (e.g. “.000”, “.001”). Data files generated by the VR3HS software will be located in the folder that was chosen at the time of their offload. There is no default location.



Upon import into VUE, the text files will be converted to VRL binary data files. You will be asked to specify the time zone used to configure the receivers and also given the option to add a Station name. The text file will be converted to a VRL file with data times converted to UTC. If you are importing files from other users it is very important that you know the correct PC clock settings when the VR2 was initialized and offloaded. Regions that follow DST changeovers must consider two UTC time zone offsets (winter & summer).



Time Zones

When importing VR2 text files, VUE will convert all data to UTC. You must enter the UTC time zone offset used when the receiver was initialized and offloaded.

Before you begin:

- (1) You will need to know the offset from UTC used for the Timestamps in the VR2 text files. The VR2PC software sets the clock of the VR2 receiver based on the clock of the PC used to communicate with the VR2 when it was initialized. At initialization, you may have set your PC to local time or to UTC time. The legacy VR2 files do not contain information on the time zone used for the detection timestamps.
- (2) VR3-UWM receivers are set using either the local time or UTC time based on the PC clock setting. As in (1), you will need to know the UTC offset for any VR3 file.
- (3) For corrections to time zone or to account for time drift, you may edit a copy of the VRL files after they are created. See Section 2.7 for details.
- (4) If you wish to add “station” (location) information to your detection files, you will need to “Add Stations” prior to importing the VR2 or VR3 files. See Section 2.2.4 for details.

To import files:

- (1) Select the *Import file* icon on the Detections ribbon and select one or more VR2 and VR3 detection files.
- (2) Under TimeZone, fill in the offset from UTC for the TimeStamps in the VR2 or VR3 text files. For example if the detection TimeStamps in your VR2 text file are in Eastern Standard Time then the offset from UTC is -5 or -4 (DST) hours. You may apply one time zone to all files by entering it in the “All Files” row.
- (3) A VRL file will be created for each VR2 or VR3 file you wish to import and all data times will be converted to UTC.
- (4) Select a station name for each file from the drop down list (optional).
- (5) If you deselect “Import”, a VRL file will be created but will not be imported into your VUE database.

| File Name | Time Zone | Station | Import |
|------------------------------------|-----------|------------|-------------------------------------|
| All Files <input type="checkbox"/> | | | <input checked="" type="checkbox"/> |
| VR2 1658 20020718.000 | UTC-03:00 | Bear River | <input checked="" type="checkbox"/> |
| VR2 1967 20020821.000 | UTC-02:00 | | <input checked="" type="checkbox"/> |
| VR2 1986 20050512.000 | UTC-04:00 | Big Cove | <input checked="" type="checkbox"/> |
| VR2 2266 20030811.000 | UTC | Mahone Bay | <input checked="" type="checkbox"/> |

When importing a VRL data set that already exists in the database:

- Keep the existing data set (do not import VRL)
- Replace the existing data set
- Replace the existing data set only if the VRL is newer

Import Cancel

If you’ve previously imported some or all of these VR2 files, you will have created multiple VRL files from the same dataset. The VRL files may differ if you have chosen different Time Zones or Station information. However, VUE understands that they are duplicates of the same dataset if it recognizes multiple records of a detection made for the same transmitter, by the same receiver, and at the exact same time. Three options are provided for handling duplicate detections on import:

“*Keep the existing data set*” – will not import the new edited VRL file if the original has already been imported into your VUE database.


“*Replace the existing data set*” will overwrite existing VRL files within your VUE database with newly edited VRL files.

“*Replace the existing data set only if the VRL is newer*” will overwrite an existing VRL file with the edited VRL file if the edited version was created later. This is helpful if you have a folder of VRL files with many edited versions and you wish to import all the latest ones.

How does VUE display sensor data from VR2PC files?

VR2PC software converts raw sensor data from “ADC” (Analog to Digital Converter) units to calibrated measurements (depth, temperature) based on calibration information entered into the VR2PC software. The calibration information is not stored within the VR2PC text files and so it’s not available in the VUE database. If the VR2 or VR3 file contains a text descriptor for units other than “ADC” (e.g., meters) then VUE assumes it has been pre-calibrated and stores the telemetry data as calibrated sensor data with the units as a text string, i.e. in quotes (see sample at right). You will not be able to alter the calibration information for these detections.

The items circled in red with text strings in quotes are pre-calibrated data. These were calibrated before being imported into VUE. These data records cannot be altered in VUE. The sensor data circled in green was calibrated within VUE by entering calibration information. These can be altered.

| Data |
|--|
| 14.726 °C |
|  Precalibrated Data This datum was calibrated prior to import. |
| 7.9 "PSI" |
| 20.7 "DegC" |
| 13.973 °C |
| 0 ADC |
| 13.879 °C |
| 0 ADC |
| 197.0m |

2.3.2 Managing Metadata

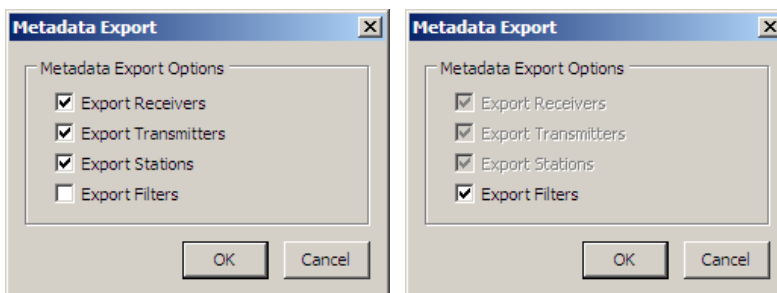
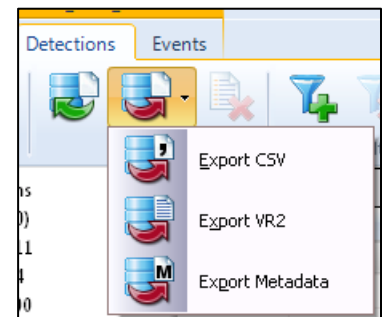
2.3.2.1 What is Metadata?

Metadata consist of any calibrations and configurations that you have manually entered into VUE, such as transmitter sensor calibrations, transmitter names, stations names and locations, and filter definitions. Transferring metadata between databases that contain many of the same receivers, transmitters, and stations can save you appreciable time since you do not have to manually re-enter your definitions into the new database. In addition, because the information is transferred by VUE, you eliminate the possibility of introducing new typographical errors into the database that is receiving the information.

2.3.2.2 Transferring Metadata Between Databases

To transfer metadata to a new database, you will first need to export it from your existing database. Follow the steps below to **export metadata**.

1. Select the Detections tab and then the *Export file* icon (shown at right).
2. Choose *Export Metadata* from the drop-down list.
3. Enter the desired file name for your metadata in the “Export File Name” window and click Save.
4. Check the boxes next to the items that you wish to export when the *Metadata Export* window appears. If you select the “Export Filters” option, then all receiver, transmitter and station metadata are also exported by default.



5. Click OK. A message box will appear indicating that your metadata were successfully exported.

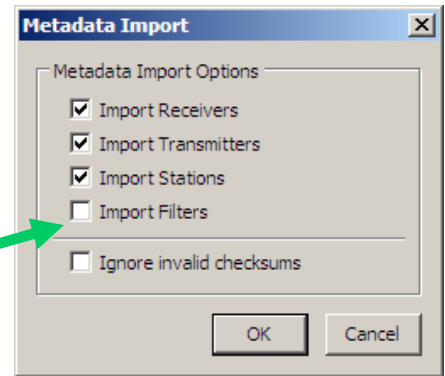
VUE exports metadata in VEMCO XML file format (*.vxm). The default folder for VUE metadata files is "My Documents\Vemco\VUE\" when VUE is first opened. Every subsequent time, it will be the folder you last exported to.

Next, you will need to import the metadata into your target database. Follow the steps below to **import metadata**.

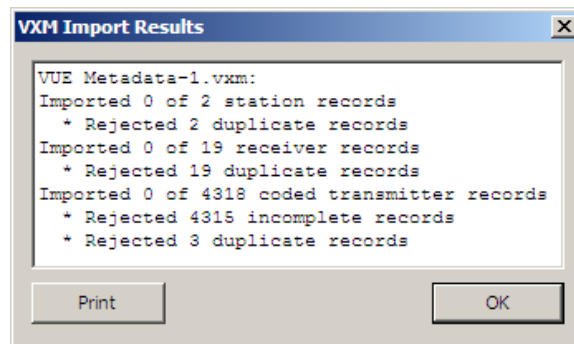
1. Open the target database for import (see section 3.1.1 for how to open a database).
2. Choose the *Import file* icon from on the Detections tab (shown at right).
3. In the "Import Files" window, locate the desired metadata file. Select the file and click "Open".
4. Select the item definitions that you wish to import when the *Metadata Import* window appears. By selecting "Import Filters" you will automatically include all receiver, transmitter and station information.
5. If you have altered the metadata file manually, VUE will report that the checksum is invalid and not import the file. You can override this by selecting "Ignore Invalid Checksums"
6. Click OK.



Select "Import Filters" to automatically include all receiver, transmitter and station information.



The *VXM Import Results* window will appear, showing the number of successfully imported station, receiver, transmitter, and filter records as well as the number of rejected duplicate and incomplete records. Duplicate records are records for things that already exist in the database. Incomplete records are for things that were not completely defined in the exporting database. For example transmitters without defined serial numbers are incomplete.



2.4 EVENTS TAB

The VUE event log describes a receiver's operational history over the span of a study. Each event records receiver status information for a time period.

If a database is open, an Events tab will be visible at the top of the window. If a particular receiver is selected in the selection tree (left side of window), then the events related to that receiver or VRL file are listed on the right side of the window. To see the events for all the receivers combined, select "All Events" at the top of the selection tree.

| Date | Time | Receiver | Description | Data |
|------------|----------|---------------|----------------------------|---------------------|
| 2011-01-26 | 04:00:00 | VR4UWM-250015 | Pings on 180 kHz | 12 |
| 2011-01-26 | 04:00:00 | VR4UWM-250015 | Syncs on 180 kHz | 0 |
| 2011-01-26 | 04:00:00 | VR4UWM-250015 | Rejects on 180 kHz | 0 |
| 2011-01-26 | 04:00:00 | VR4UWM-250015 | Internal temperature | 22.5°C |
| 2011-01-26 | 04:00:00 | VR4UWM-250015 | Internal relative humidity | 23 % |
| 2011-01-26 | 04:00:00 | VR4UWM-250015 | 69 kHz receiver current | 858 mA |
| 2011-01-26 | 04:00:00 | VR4UWM-250015 | 180 kHz receiver current | 2.064 A |
| 2011-01-26 | 04:00:00 | VR4UWM-250015 | Tilt angle | 90° |
| 2011-01-26 | 04:00:00 | VR4UWM-250015 | Rotation angle | 320° |
| 2011-01-27 | 04:00:00 | VR4UWM-250015 | Memory Capacity | 0.8 % |
| 2011-01-27 | 04:00:00 | VR4UWM-250015 | Battery | 10.8 V |
| 2011-01-27 | 04:00:00 | VR4UWM-250015 | Realtime Clock | 2011-01-26 23:59:59 |
| 2011-01-27 | 04:00:00 | VR4UWM-250015 | Pings on 69 kHz | 55125 |
| 2011-01-27 | 04:00:00 | VR4UWM-250015 | Syncs on 69 kHz | 7281 |
| 2011-01-27 | 04:00:00 | VR4UWM-250015 | Rejects on 69 kHz | 597 |
| 2011-01-27 | 04:00:00 | VR4UWM-250015 | Pings on 180 kHz | 3 |
| 2011-01-27 | 04:00:00 | VR4UWM-250015 | Syncs on 180 kHz | 0 |
| 2011-01-27 | 04:00:00 | VR4UWM-250015 | Rejects on 180 kHz | 0 |
| 2011-01-27 | 04:00:00 | VR4UWM-250015 | Internal temperature | 24.1°C |
| 2011-01-27 | 04:00:00 | VR4UWM-250015 | Internal relative humidity | 27 % |
| 2011-01-27 | 04:00:00 | VR4UWM-250015 | 69 kHz receiver current | 917 mA |

2.4.1 Events Common to all Receiver Types

2.4.1.1 Reset Event

Reset events occur when the receiver internal software initializes and are described as "Normal Restart". This will occur if the battery is replaced or possibly if the battery connection is loose. Other Reset Events include "WATCHDOG RESET", "FLASH ACCESS VIOLATION" or "UNIDENTIFIED RESET". If you see any of these events, please contact VEMCO as they may indicate a receiver malfunction.

2.4.1.2 Initialization Event

Initialization events are created each time your receiver is initialized. When you import your VRL files into VUE, you will see the following information displayed in the Events tab for each receiver initialization.

| Description | Data |
|-------------------|---|
| PC Time Zone | Time zone of PC used to initialize the receiver, referenced to UTC time (e.g. UTC-04:00) |
| Map | Displays Code Map and associated Code Spaces used for receiver initialization |
| Blanking | Receiver blanking time. This is the time for which the receiver stops listening after receiving a detection (to avoid detecting echoes) |
| Station | Station name entered during initialization – VR2W and VR4-UWM receivers only |
| Study Description | Study Description text entered during initialization – VR2 receivers only |

2.4.1.3 Memory Capacity Event

Displays receiver memory remaining (%). For VR2W receivers, this is recorded each day along with all other status elements. For VR2 receivers, this is recorded when the data are offloaded from the receiver. For VR4-UWM receivers, this is recorded with all other status elements at the interval selected at the time the study was initialized (see section 4.1.3).

2.4.2 Receiver-Specific Events

VEMCO receivers generate detection data summary statistics at specific intervals depending on the receiver type. These events are stored along with the detection data in the receiver and are added to the VUE database when the VRL file is imported.

For VR2W receivers, data summary statistics are recorded every 24 hours at midnight UTC. An entry containing a “partial day” of statistics is also recorded when data are offloaded from a VR2W. These “partial day” data summary entries can be identified by noting the time the summary was created. Data summary statistics for VR2 receivers are recorded once for the entire dataset when the data are offloaded from the receiver.

Data Summary statistics are recorded every 24 hours at midnight UTC and when data are offloaded from the VR2W.

VR4-UWM receivers record data summary statistics at an interval selected at the time the study was initialized (see section 4.1.3). VR4-UWM statics can be stored at an interval of between 1 to 14 days; the default is 1 day (24 hours).

| Table 1: | | | | | |
|---|----------------------------------|----------------------------|---------------------------------|-----------------------|-----------------|
| Data Summary Statistic | VR2W | | | VR2 | |
| | Descriptor | Data Summary Logging | | Descriptor | Logging |
| | | Every 24 hours (00:00 UTC) | On data offload ("partial day") | | On data offload |
| Receiver time since reset (days) | Not available | – | – | Uptime | ✓ |
| Battery Level | Battery | ✓ | ✓ | Not Available | |
| Number of pings received during time interval | Daily Pings | ✓ | ✓ | Cumulative Pings | ✓ |
| Number of sync intervals ¹ received during time interval | Daily Syncs | ✓ | ✓ | Cumulative Syncs | ✓ |
| Number of rejects (check sum errors) received during time interval | Daily Rejects | ✓ | ✓ | Cumulative Rejects | ✓ |
| Number of detections for a given Code Space during time interval | Daily Detections on <Code Space> | ✓ | ✓ | Cumulative Detections | ✓ |
| Date and time of last detection for given Code Space during time interval | Last Detection on <Code Space> | ✓ | ✓ | Not available | – |

2.4.3 “Old” Events

If you open a VUE database that was created by an older version of VUE, the Events tab will look different. VUE versions up to 1.2 grouped receiver statistics within a single entry. An example follows:

```

2007-07-30  00:00:00  VR2W-100041 Data Summary Pings=41134 Syncs=6407 Rejects=310
2007-07-30  00:00:00  VR2W-100041 Data Summary A69-1008: Detects=2485 Last=2007-07-29
                23:59:58 (UTC)
2007-07-30  00:00:00  VR2W-100041 Data Summary A69-1105: Detects=1793 Last=2007-07-29
                23:59:47 (UTC)
2007-07-31  00:00:00  VR2W-100041 Status Bat=3.57 v Log=115985

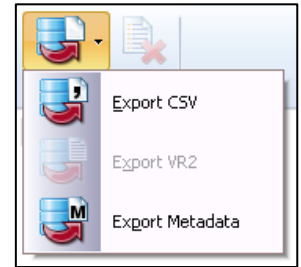
```

In response to customer feedback, newer versions of VUE separate the events into individual entries. This was done to improve the process of exporting event data (see 2.4.4). If you wish to create the newer version of events, you will need to create a new database in VUE and re-import the VRL files.

¹ A sync interval is the first of 7 intervals in a series of 8 pings required for the successful detection of a transmitter (A69-1303 or A69-1105). In a favourable receiving environment, the number of pings will equal roughly 8 times the number of syncs. Excessive syncs or pings suggests that there are a large number of transmission collisions, echoes or noise in the vicinity of the receiver.

2.4.4 Exporting Events

To export Event logs for use in other applications, first select the Events tab and then select a receiver or “All Events” in the selection tree on the left hand side of the VUE window. Next, select the “Export file” button (shown at right) in the Events ribbon near the top of the window and choose to export the information as either a CSV file or as a Metadata file. Event times are exported in UTC, regardless of the time zone display option selected in VUE.



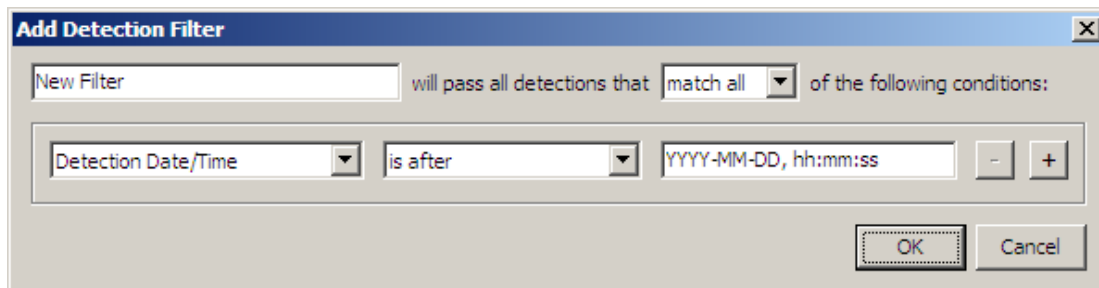
2.5 FILTERING DATA

As well as allowing you to view detection data by receiver, transmitter, station, or log file, VUE provides the capability to view your data by detection filter. You can create detection filters to look at subsets of your data that meet particular criteria such as date, time, transmitter ID, transmitter frequency, receiver, station, number of detections, and transmitter/receiver combination. For example, if you are interested in looking at all of the detections in your database for transmitter Tag ID #3 that occurred *after* March 5, 2006 at 2:00 pm and excluding detections at “Big Red Rock” station, then VUE makes it easy to create a filter with those definitions. Detection filters provide an easy way to view, plot, and export subsets of your database.

2.5.1 Creating Detection Filters

To create a detection filter, follow the steps listed below.

1. Select the Detections tab.
2. Select the *Add Detection Filter* icon (shown at right) in the Detections ribbon or right-click on “Detection Filters” in the selection tree and choose “Add Filter”. The “Add Detection Filter” window will appear (shown below).



3. Enter the filter name in the box labelled “New Filter”.
4. Choose either “Match all” or “Match any” from the drop-down list to the right of the New Filter box. If you filter your data using more than one criterion you can control whether the data must match all of your chosen criteria or at least one of the chosen criteria.
5. Using the drop-down menu in the box labelled “Detection Date/Time”, choose your first criterion. VUE provides thirteen different options for filter criteria. These criteria are listed and described in section 2.5.3.
6. In the next drop-down menu box, choose your desired “qualifier” for the filter criterion that you have selected. The qualifiers available will depend on the filter criterion that you have selected. For example, if you choose to filter by Detection Date/Time, the available qualifiers are “is after” or “is before”. Refer to section 2.5.3 for a complete list of qualifiers for each filter option.
7. In the box on the bottom right of the Add Detection Filter window, type the desired data value to use in the filter.
8. To add another filter criterion to the same filter, click on the + sign on the right-hand side of the window. A new row will appear for you to enter the next filter criterion.
9. When you are finished adding filter criteria, click OK.

Filters that have been created are shown in the selection tree under “Detection Filters”. Your filtered data can be viewed by expanding the detection filters branch and clicking on the filter of interest in the selection tree. The data are displayed in the detection window on the right hand side of the screen. When your data are displayed, they can be plotted by selecting the *Chart data* icon (shown at right) in the Detections tab.



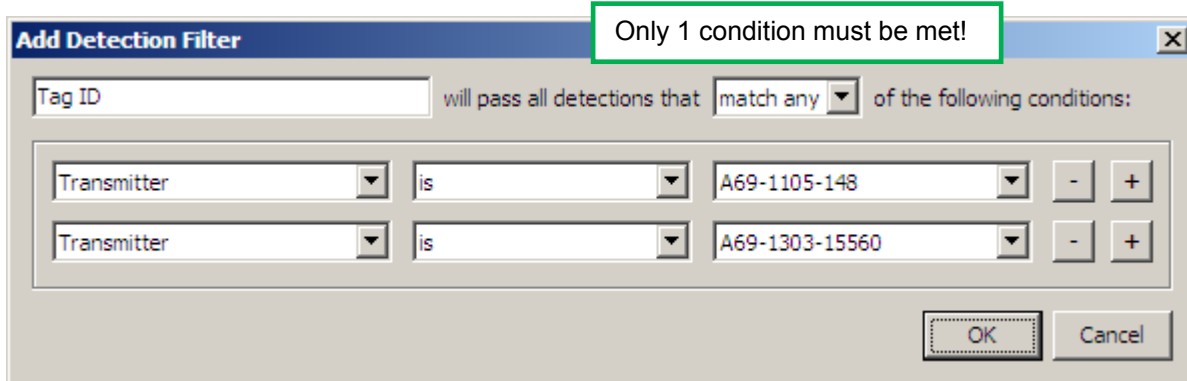
To export your filtered data, select the *Export File* icon under the Detections tab (shown at right). Metadata associated with your filtered detections can also be exported, by selecting *Export Metadata*. Details on exporting and importing metadata are found in Section 2.3.2.2, “Transferring Metadata Between Databases”.



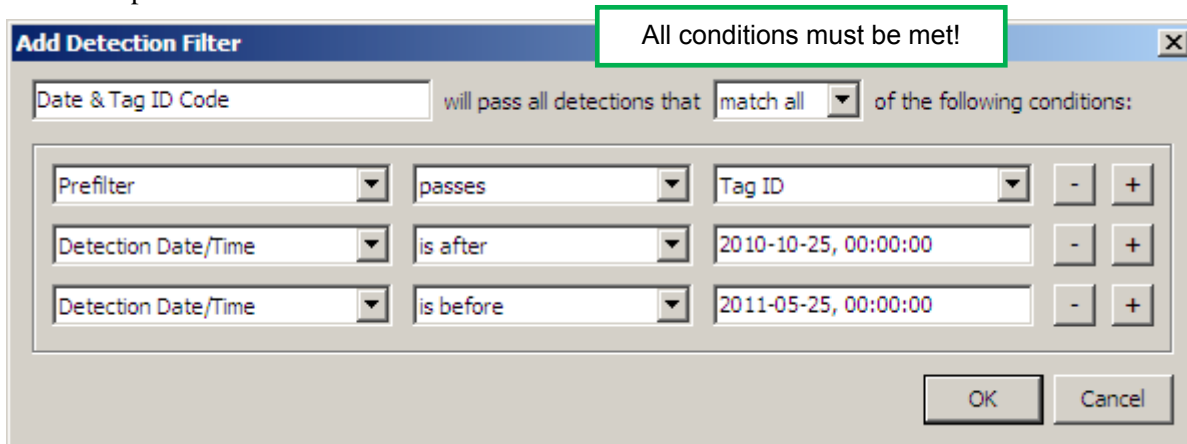
2.5.2 An Example of a Common Filter

How do I create a filter that queries all detections of an S64K transmitter between two dates?

Step 1: Create a filter that displays all detections for two ID codes.



Step 2: Create a filter that displays all detections for 2 codes between 2 dates using the filter created in Step 1 as a prefilter.



FILTER DEFINITION: Display (ID numbers 148 **OR** 15560) (1 tag) **AND** after October 25, 2010 0:00 hrs **AND** before May 25, 2011 0:00 hrs.

2.5.3 Filtration Options

VUE provides thirteen different options for filtration criteria that you can use to build your detection filters. Table 2 lists and describes the options.

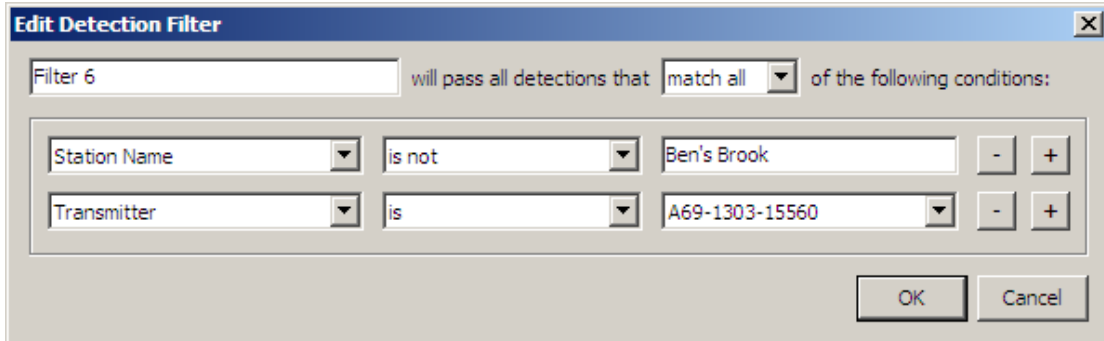
Table 2: Filtration Criteria Options

| Filtration Criterion | Qualifiers | Description |
|-----------------------------|--|---|
| Detection Date/Time | <ul style="list-style-type: none"> • is after • is before | Displays all detections in the database occurring after (or before) a given date and time. If no time is specified, the default is 00:00:00 on the date given. |
| Transmitter | <ul style="list-style-type: none"> • is • is not | Displays all detections from (or not from) a given transmitter selected from a list of all transmitters in the current database. For example, "A69-1303-9" (transmitter with a default label) or "Salmon 58" (a user-named transmitter). |
| Transmitter Name | <ul style="list-style-type: none"> • is • is not • contains • does not contain • begins with • does not begin with • ends with • does not end with | Displays all detections of transmitters matching or not matching the specified Transmitter Name, or portions of the Transmitter Name. This criterion only searches <i>named</i> transmitters, i.e. transmitters that have been manually named in VUE. Transmitters that have not been assigned a name other than the default will be ignored by this filter. To filter by the default transmitter label assigned by VUE (e.g. "A69-1303-9"), use the "Transmitter" filtration criterion above. |
| Transmitter Code Space | <ul style="list-style-type: none"> • is • is not | Displays all detections from (or not from) the specified Coding ID. Transmitter Code Space refers to the last 4 digits found in the "Code Space" column of the VUE window for each transmitter. For example, to find all detections for transmitters of <i>any</i> frequency in the 1303 code space, set the Transmitter Code Space filter to "is" and its value to "1303". To find all detection records for 69 kHz transmitters in the 1303 Code Space (i.e. A69-1303), use the criterion described above in combination with one for Frequency "is" "69", and use the "Matches all of" option. |
| Transmitter Tag ID | <ul style="list-style-type: none"> • is • is not • is greater than • is less than | Displays all detections for transmitters matching, not matching, greater than, or less than the specified Transmitter Tag ID. The transmitter tag ID is shown in the "ID" column of the VUE window. |
| Transmitter Frequency | <ul style="list-style-type: none"> • is • is not • is greater than • is less than | Displays all detections for transmitters of the specified frequency. The transmitter frequency is contained in the first 3 characters of the "Code Space" column in the VUE window. For example, if the Code Space is A69-1303, the transmitter frequency is 69 kHz. |
| Transmitter Detection Count | <ul style="list-style-type: none"> • is • is not • is greater than • is less than | Displays all detections from any transmitter for which the database contains (or does not contain) a given number of detections. You can also search for transmitters with detection counts above or below a given value. |
| Receiver | <ul style="list-style-type: none"> • is • is not | Displays all detections recorded by (or not recorded by) a given Receiver selected from a list of all Receivers in the current database. |
| Station | <ul style="list-style-type: none"> • is • is not | Displays all detections that occurred at (or not at) a given Station, selected from a list of all Stations in the current database. |

| Filtration Criterion | Qualifiers | Description |
|------------------------------|--|--|
| Station Name | <ul style="list-style-type: none"> • is • is not • contains • does not contain • begins with • does not begin with • ends with • does not end with | Displays all detections at Stations matching or not matching the specified Station Name, or portions of the Station Name |
| Rxx/Txx Detection Count | <ul style="list-style-type: none"> • is greater than • is less than • is • is not | Displays all detections from any receiver/transmitter pair for which the database contains (or does not contain) a given number of detections. You can also search for receiver/transmitter pairs with detection counts above or below a given value. |
| Rxx/Txx Detection Separation | <ul style="list-style-type: none"> • is less than • is greater than | Displays all detections that are within less than or greater than a given number of minutes of another detection from the same receiver/transmitter pair. |
| Prefilter | <ul style="list-style-type: none"> • passes • does not pass | <p>Displays all detections that pass or do not pass an existing filter in the database. The Prefilter provides a way to string together a series of filters that you have already created for your database. It is the only way to combine filters that use the “Matches all of” and “Matches any of” options.</p> <p>For example, you have defined a filter called “Recent Salmon Detections” that returns all detections from Transmitter Names containing “salmon” AND occurring after March 6, 2007 (using the “Matches all of” option), and another filter called “Shallow Stations” that returns all detections that occurred either at Station 1 OR at Station 2 (using the “Matches any of” option). Now you can use the Prefilter option to create a third filter called “Recent Salmon Detections, Shallow” that returns all the detections that pass both your “Recent Salmon Detections” and “Shallow Stations” filters.</p> |

2.5.4 Editing and Deleting Detection Filters

To edit an existing filter, select the *Edit Filter* icon in the Detections ribbon (select Detections tab to see Detections ribbon), or right-click on the filter name in the selection tree and select “Edit Filter”. The *Edit Detection* Window, shown below, will appear to allow any of the filter options to be edited.



To delete a filter, select the *Delete Filter* icon in the Detections ribbon, or right-click on the filter name in the selection tree and select “Delete Filter.” You may also delete all filters in your database by selecting “Delete All Filters” after right-clicking on a filter name in the selection tree.



2.5.5 Exporting Detection Filters to Another Database

Filter definitions can be exchanged between databases using the Metadata Import and Export options. To transfer existing filters from one database to another, follow the steps listed in Section 2.3.2.2, “Transferring Metadata between Databases.”

2.6 RESIDENCY SEARCH

The residency search option provides methods of reducing the data by accumulating the number of detections during a fixed period of time. The user can specify the start and stop times and the number of detections to be considered residency. The “Absence Threshold” allows the user to specify the maximum time between detections to be considered part of a single residency period. Specific receivers or transmitters can be selected as parameters of the residency search.



Export search results as a CSV file

Execute the search

| Transmitter | Receiver | Arrival | Departure | Detections | Absence (days) |
|-----------------|---------------|---------------------|---------------------|------------|----------------|
| A180-1701-10003 | VR4UWM-250079 | 2011-05-24 12:08:31 | 2011-05-27 03:39:47 | 714 | |
| A180-1701-10003 | VR4UWM-250079 | 2011-05-27 12:57:34 | 2011-05-27 16:53:39 | 45 | 0.4 |
| A180-1701-10003 | VR4UWM-250079 | 2011-05-28 07:06:39 | 2011-05-30 09:07:38 | 557 | 0.6 |
| A180-1701-10003 | VR4UWM-250079 | 2011-05-30 13:12:13 | 2011-05-31 17:37:32 | 285 | 0.2 |

4 residencies spanning 1601 detections. 0 detections rejected.

Separate date & time columns

Absence Threshold:

The maximum length of time permitted between detections within a single residency period.

Detection Threshold:

The minimum number of detections required for a residency to be reported.

Allow residencies to span time limits:

When enabled, this option allows residencies to span the start and end time limits. When disabled, residencies are cut off before the limit.

2.7 EDITING VRL FILES

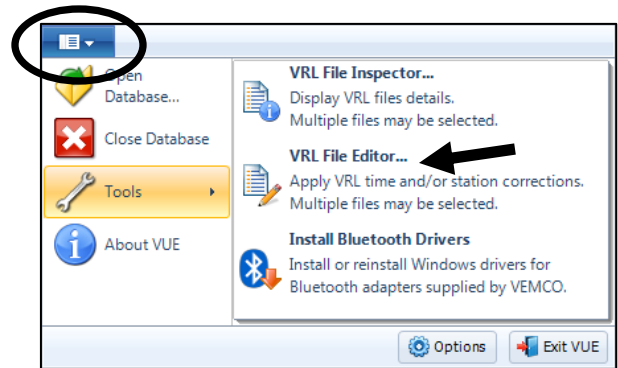
Reasons to edit a VRL file are:

- i) to correct detection data for time drift,
- ii) to correct for an incorrect PC time during initialization, and/or
- iii) to add or correct a station name.

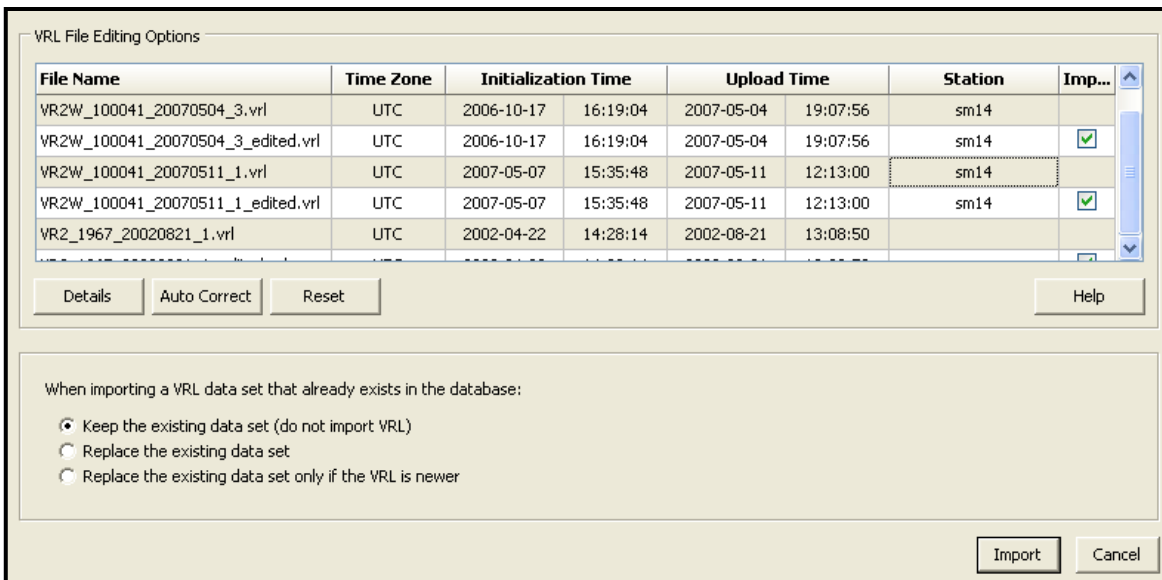
VRL files are a record of the information that was offloaded from a receiver or possibly from the conversion of a VR2 or VR3-UWM text file. It's important that these original records be kept unaltered so that the validity of the original data remains intact. For this reason, when altering VRL files a new VRL file is created and the original file is left unaltered. **Altered or edited VRL files are labelled with “_edited” appended to the file name.**

To edit one or more VRL files, open the VUE menu (circled at right) and select *Tools* → *VRL File Editor* (see arrow at right).

Select the VRL files you wish to edit. You may edit multiple files at one time by holding the CTRL key while selecting multiple files with the mouse. A VRL editing window will appear that lists your chosen files (shown below).

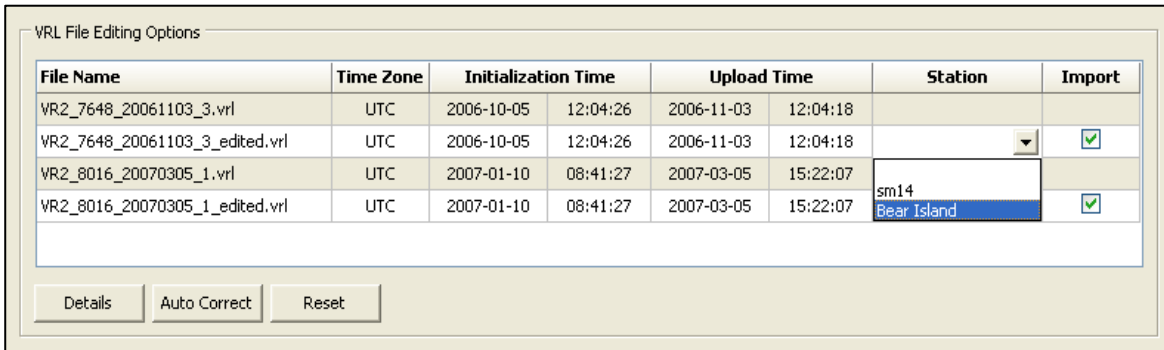


You will notice that beneath each chosen file, is a new file with “_edited” appended to the filename. Your existing VRL files will not be altered but a new edited file will be created and stored with your existing VRL files.



2.7.1 Correcting or Adding a Station Name to a VRL file

To change or add a station name to a VRL file, select the correct station name from the pull down menu under Station in the row(s) for the edited VRL(s). You will only be able to select from a list of existing station names within your VUE database. If you need to add additional station names, you will need to exit this window and add a new station (see section 2.2.4.1).



2.7.2 Correcting the Time Zone in a VRL

The receiver’s clock time is set by VUE during initialization in UTC based on the clock on your PC. The accuracy of the receiver clock is based on the accuracy of your PC clock. Your PC clock may have been inaccurate and/or it may have had the time zone set incorrectly. If either of these cases exist, you may edit the VRL to correct it.

To edit the Time Zone, you can change the value under Time Zone to a value relative to UTC. When you do this, you are telling VUE that the data times within the VRL file are not UTC but rather some offset from UTC. VUE will use this offset to adjust the data stamps to UTC for the edited VRL file

Example:

A researcher, located in the Atlantic Standard Time Zone, sets the laptop computer to the correct local time of 2:00 pm before the receiver is initialized. However, the PC is incorrectly set to Eastern Standard Time (UTC-5) when it should have been set to Atlantic Standard Time (UTC-4). VUE initializes the receiver and sets the clock to 7:00 pm UTC (2:00+5) but the correct time should have been 6:00 pm UTC.

When the researcher offloads the data file from the VR2W, he notes that the PC Time Zone is listed as UTC-5. Knowing that he was in Halifax at the time of the deployment he realizes his mistake – it should have been UTC-4. This means that his VRL file timestamps are not at UTC as expected but at UTC+1 hour. The researcher can edit the VRL file by setting the TimeZone to UTC+1. VUE will create a new edited VRL with the timestamps shifted back by one hour.

| | Time Zone | Initiali |
|--------------|-----------|-----------|
| 1.vrl | UTC | 2007-05-1 |
| 1_edited.vrl | UTC+01:00 | 2007-05-1 |

2.7.3 Correcting the Initialization Time in a VRL

If your initialization time was incorrect, you can adjust it by editing the time for each VRL file under the Initialization Time column. When VUE imports the edited VRL file, it will shift all detection times based on the new initialization time.

2.7.4 Correcting for Receiver Time Drift

VEMCO submerged receivers rely on crystal oscillators to keep track of time. Due to manufacturing variations, the frequency of the crystal oscillators varies slightly between receivers. Over time, the clock

drifts and loses or gains time. A receiver may drift up to 4 seconds per day. Some of the time drift is due to changes in temperature, however, the majority of the drift is due to the variations in the oscillator. Therefore the drift is highly linear and can be corrected.

To correct for clock drift, you first must establish that the PC clock was correct when the receiver was initialized and when data was offloaded. If these conditions are met then the time difference between the PC offload time and the receiver offload time was due entirely to clock drift. VUE will apply a linear time drift correction to a VRL detection file if you alter the receiver offload time in the VRL editor. You can use the “Auto Correct” button in the *VRL File Editing Options* window, accessed in the VUE menu by selecting *Tools/VRL File Editor*, to allow VUE to determine the clock drift and create a time drift corrected VRL file.

The Auto Correct button will automatically assign corrected values to the receiver time zone and upload time based on the assumption that the clock on the uploading PC was correct. The time zone will only be correct if the clock variance is less than 30 minutes.

2.8 MULTIPLE RECEIVER COMMUNICATIONS

VUE allows you to communicate with up to seven receivers simultaneously. See section 4 for specifics on communication with the receivers. At this point, VUE can communicate with VR2 (using the VRPC interface), VR2W (using *Bluetooth*®), and VR4-UWM receivers (using *Bluetooth*® or an acoustic modem).

Since your PC can talk to any *Bluetooth*® active receiver within range (typically 10 meters) of the *Bluetooth* wireless technology interface, it is important that you ensure you are communicating with the correct unit, particularly before initializing and erasing receiver memory files.

CAUTION

Multiple receivers can be in communication with VUE so check the serial number of the receiver you're communicating with to be sure it's the intended receiver before initializing or configuring the receiver.

2.9 MANAGING DUPLICATE TAGS IN VUE

Note: The following section provides guidance on managing a database with duplicate tag ID numbers. This can occur if you combine data from multiple years or multiple users. If you don't expect your database to have duplicate tag ID numbers, you can skip this section of the manual.

What is a duplicate tag?

If you are comparing data from multiple years, multiple studies, or from multiple users, then it's possible that your data sets will contain duplicate ID numbers for different tags. This is less of an issue today for pingers, as VEMCO has moved to new coding and worldwide unique ID numbers. However, in previous years, duplicate ID numbers were issued, separated either by geography or between multiple seasons (once a tag expired its ID may have been reused). For sensor transmitters, duplicate S256 ID numbers were regularly issued as part of the S64K² sensor coding scheme.

Pingers with duplicate ID numbers will often be separated in the database by date or location and therefore it is usually straightforward to distinguish one transmitter from another. For sensor tags however, specific sensor calibration (e.g., slope & intercept) information must be associated with a particular transmitter. It is important to ensure that tag detections are associated with the correct sensor tag record within the VUE database.

² S64K coding alternates between R64k and S256 codes. This allows unique identification of all VEMCO sensor tags. See <http://www.vemco.com/resources/faqs.php - q1> for more information.

When a VRL data file is imported into the VUE database, VUE inspects each detection for a previous record of the ID number in the database. If a matching tag record exists in the database, the new detection is associated with that existing tag data record. If more than one transmitter data record exists which matches the detection tag ID number, the detection is associated with the *first* matching record in the database. If it is the first entry then a new one is created using the tag type and ID number contained in the detection.

If you edited a sensor transmitter record to include a serial number and sensor calibration information, the raw sensor data (AToD) will be converted into meaningful units (e.g. degrees Celsius). If a transmitter database record has a serial number, then any new detections imported will be highlighted and marked as an *Unverified Transmitter*. This is a warning that the detection has been associated with an existing transmitter serial number and the association may be wrong if there are duplicate tag ID numbers within the dataset.

Two examples for managing duplicate tag ID numbers follow. The first is an example where duplicate tags are not present in the data, and the second is an example with duplicate tag ID numbers in the same dataset.

Example #1 – No Duplicates

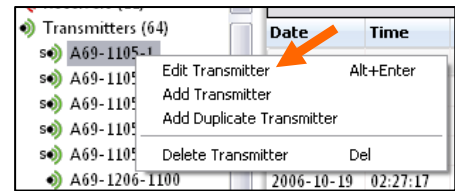
In the following case, we’ve created a new database and offloaded data from two receivers: a VR2 with serial number 7731 and a VR2W with serial number 100037. The detections from the receivers belong to the transmitters listed below at left.

| | Date | Time | Code Space | ID | Transmitter | Receiver | Station | Data |
|------------|------------|----------|------------|----|-------------|-------------|-------------|---------|
| A69-1105-1 | 2008-02-12 | 13:32:51 | A69-1105 | 1 | A69-1105-1 | VR2W-100037 | Ben's Brook | 199 ADC |
| A69-1105-2 | 2008-02-12 | 13:33:05 | A69-1105 | 2 | A69-1105-2 | VR2W-100037 | Ben's Brook | 0 ADC |
| A69-1303-3 | 2008-02-12 | 13:34:26 | A69-1105 | 1 | A69-1105-1 | VR2W-100037 | Ben's Brook | 198 ADC |
| A69-1303-1 | 2008-02-12 | 13:34:40 | A69-1105 | 2 | A69-1105-2 | VR2W-100037 | Ben's Brook | 0 ADC |
| A69-1303-3 | 2008-02-12 | 13:36:54 | A69-1105 | 1 | A69-1105-1 | VR2W-100037 | Ben's Brook | 194 ADC |
| A69-1303-9 | 2008-02-12 | 13:37:08 | A69-1105 | 2 | A69-1105-2 | VR2W-100037 | Ben's Brook | 0 ADC |
| | 2008-02-12 | 13:38:49 | A69-1105 | 1 | A69-1105-1 | VR2W-100037 | Ben's Brook | 192 ADC |

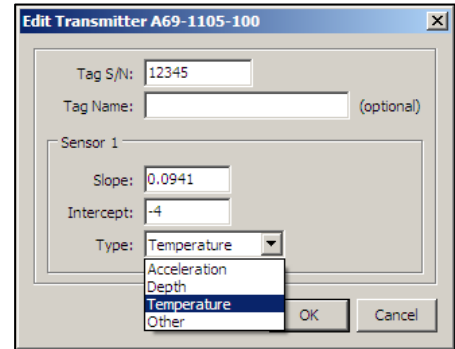
The detections for transmitters A69-1105-1 and A69-1105-2 are for sensor tags, because A69-1105 denotes an S256 transmitter.

Next, we add sensor tag calibration information. This converts the values in the data column from “ADC” (Analog-to-Digital Converter) units to measurement units (e.g. meters or degrees Celsius). The calibration information (slope and intercept) is found on the tag datasheets sent by VEMCO with the sensor tags.

To calibrate, we first select the transmitter A69-1105-1 from the selection tree (under Transmitters) in the Detections tab. Right-click on the selected transmitter in the selection tree list and select “Edit Transmitter” from the list that appears.



In the *Edit Transmitter* window that opens (shown at right), fill in the serial number, slope, and intercept from the datasheet provided by VEMCO. The sensor type (temperature, in this case) is selected from the drop-down menu at the bottom of the window.



The data are converted to °C and all the detections will be highlighted and flagged as “Unverified Transmitter” as shown below. The highlighting is a warning that the detection(s) may or may not be associated with the correct transmitter record.

| Date | Time | Code Space | ID | Receiver | Station | Data |
|------------|----------|------------|----|-------------|-------------|-----------|
| 2008-02-12 | 13:32:51 | A69-1105 | 1 | VR2W-100037 | Ben's Brook | 14.726 °C |
| 2008-02-12 | 13:34:26 | A69-1105 | 1 | VR2W-100037 | Ben's Brook | 14.632 °C |
| 2008-02-12 | 13:36:54 | A69-1105 | 1 | VR2W-100037 | Ben's Brook | 14.255 °C |
| 2008-02-12 | 13:38:49 | A69-1105 | 1 | VR2W-100037 | Ben's Brook | 14.067 °C |
| 2008-02-12 | 13:40:33 | A69-1105 | 1 | VR2W-100037 | Ben's Brook | 13.973 °C |
| 2008-02-12 | 13:43:33 | A69-1105 | 1 | VR2W-100037 | Ben's Brook | 13.879 °C |
| 2008-02-12 | 13:46:15 | A69-1105 | 1 | VR2W-100037 | Ben's Brook | 14.161 °C |

Unverified Transmitter

This detection has been automatically associated with a transmitter serial number. The association may need to be corrected if duplicate tag ID numbers are present.

Verifying a transmitter and its data

In this case, we know that all of these detections are from one animal. Therefore, we can verify these detections are associated with the correct (and only) transmitter data record with this ID number. To verify an ID number and its data:

1. Select the desired transmitter in the selection tree.
2. Select all the detections for that transmitter in the right hand VUE window by pressing and holding the SHIFT key and clicking on the last detection in the list.
3. Drag and drop the detections onto the correct transmitter name under the transmitter selection tree. The detections will now be intentionally associated with this transmitter record and the highlighting and the warning will disappear.

Note: If these detections are deleted from the database and re-imported from the VRL, the detections will need to be verified again.

| Date | Time | Code Space | ID | Receiver | Station | Data |
|------------|----------|------------|----|-------------|-------------|-----------|
| 2008-02-12 | 13:32:51 | A69-1105 | 1 | VR2W-100037 | Ben's Brook | 14.726 °C |
| 2008-02-12 | 13:34:26 | A69-1105 | 1 | VR2W-100037 | Ben's Brook | 14.632 °C |
| 2008-02-12 | 13:36:54 | A69-1105 | 1 | VR2W-100037 | Ben's Brook | 14.255 °C |
| 2008-02-12 | 13:38:49 | A69-1105 | 1 | VR2W-100037 | Ben's Brook | 14.067 °C |
| 2008-02-12 | 13:40:33 | A69-1105 | 1 | VR2W-100037 | Ben's Brook | 13.973 °C |
| 2008-02-12 | 13:43:33 | A69-1105 | 1 | VR2W-100037 | Ben's Brook | 13.879 °C |
| 2008-02-12 | 13:46:15 | A69-1105 | 1 | VR2W-100037 | Ben's Brook | 14.161 °C |

Example 2 – Duplicate IDs

How to separate duplicate ID numbers (different fish)

In this example, we have duplicate detections for sensor tag A69-1105-2. Most of these detections were offloaded from the receiver when it was at station “Ben’s Brook” and the rest were offloaded from the same receiver when it was at “Big Red Rock”. The ID 2 at “Ben’s Brook” was determined to be a depth transmitter and the same ID 2 “Big Red Rock” was determined to be a temperature sensor. If we apply the temperature sensor calibration information to the depth sensor, all the detections will be converted to degrees Celsius.

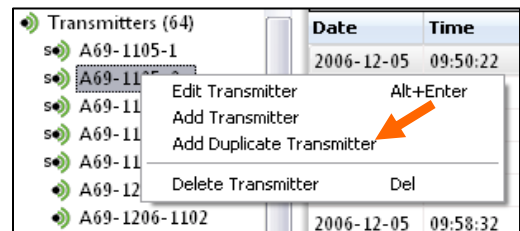
This would be an error, as some of these detections belong to another fish with a different sensor.

In order to apply calibration information separately, create a second transmitter record and associate the “Big Red Rock” detections with the new record.

| Date | Time | Code Space | ID | Receiver | Station | Data |
|------------|----------|------------|----|-------------|--------------|-------|
| 2008-02-12 | 13:33:05 | A69-1105 | 2 | VR2W-100037 | Ben's Brook | 0 ADC |
| 2008-02-12 | 13:34:40 | A69-1105 | 2 | VR2W-100037 | Ben's Brook | 0 ADC |
| 2008-02-12 | 13:37:08 | A69-1105 | 2 | VR2W-100037 | Ben's Brook | 0 ADC |
| 2008-02-12 | 13:39:03 | A69-1105 | 2 | VR2W-100037 | Ben's Brook | 0 ADC |
| 2008-02-12 | 13:40:45 | A69-1105 | 2 | VR2W-100037 | Ben's Brook | 0 ADC |
| 2008-02-12 | 13:46:08 | A69-1105 | 2 | VR2W-100037 | Big Red Rock | 0 ADC |
| 2008-02-12 | 13:46:29 | A69-1105 | 2 | VR2W-100037 | Big Red Rock | 0 ADC |

To do this, add a duplicate transmitter record. Transmitter records are considered duplicates if their Code Space and ID are identical, in this case, A69-1105-2. The serial number and calibration information will be different.

Select the transmitter from the selection tree and right click the mouse and select “Add Duplicate Transmitter”.



The newly created transmitter has no detections associated with it. All of the tag ID A69-1105-2 detections within the database are currently associated with the first A69-1105-2 record.

Next, select the “Big Red Rock” temperature sensor detections and drag and drop them onto the new transmitter record in the selection tree. This will remove them from the first transmitter record and associate them with the second transmitter record.

We can now edit each of the two transmitter records to add serial number, calibration information, sensor type etc. We suggest that you change the display name of the transmitters to help differentiate it in the selection tree.

Change the display name of the duplicate transmitters to help differentiate them in the selection tree.

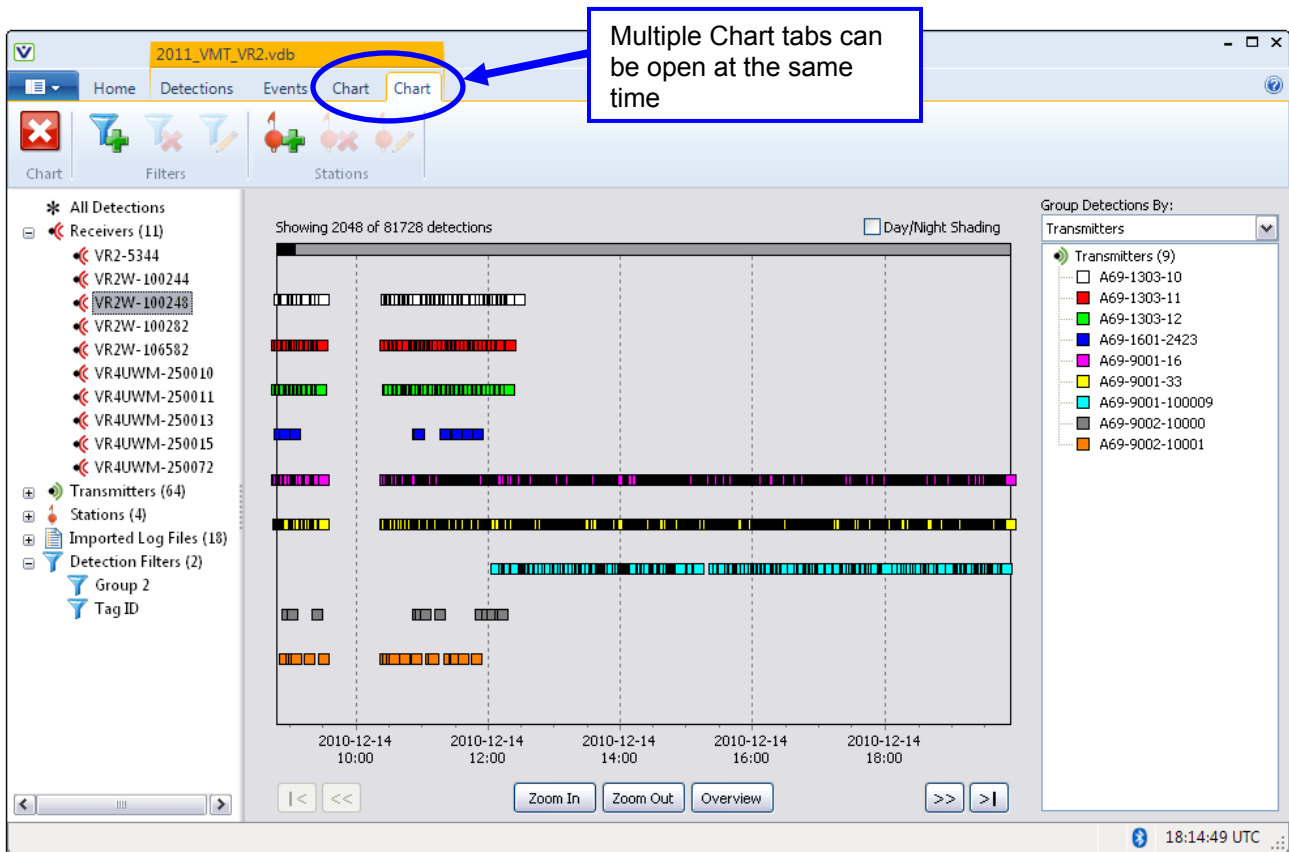
2.10 PLOTTING IN VUE

Any data displayed in the VUE detection table can be plotted by time. The plot can be viewed by selecting the “Chart Detections” icon in the Detections tab. The detections that are plotted are selected using the selection tree on the left. Selecting a transmitter will plot all the detections from that transmitter, grouped by receiver. Selecting a receiver will plot all the detections from that receiver, grouped by transmitter. Selecting “All Detections” will plot all database detections, grouped by transmitter.



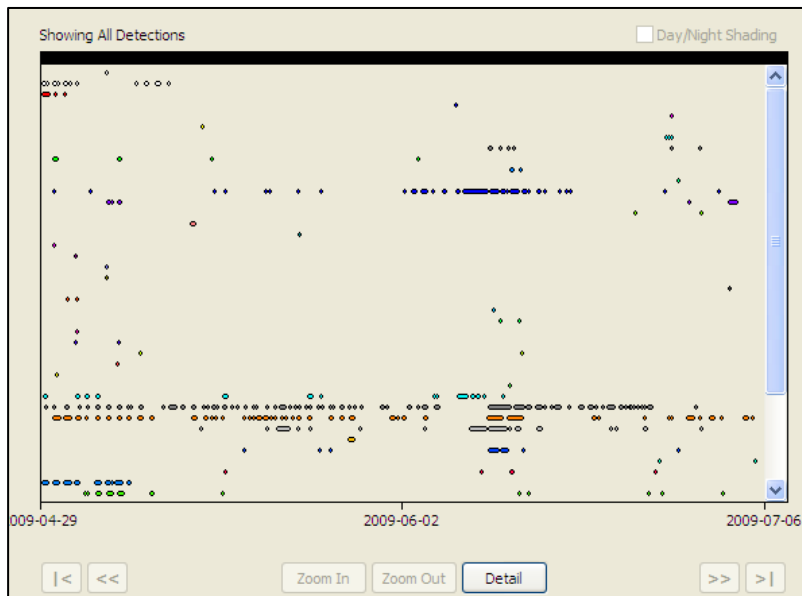
The detection plot displays the current view of the database. Adding or removing data from the database automatically updates the plot. Making a new selection in the main VUE window will update the selection of data displayed in the plot window.

There are two plot display modes in VUE: a detail mode that includes details with each datum and an overview mode. When you first generate a plot, the data are shown in detail mode. In this mode, the plot window is capable of simultaneously displaying up to 8192 detections. The number of detections currently displayed, as well as the total number of detections in the selected data are shown on the top left of the plot window. The black section of the grey bar at the top of the plot indicates which portion of your selected data you are currently viewing. In the example below, the plot shows the first 2048 of all 81,728 detections for the receiver VR2W-100248.



Detections can be grouped by transmitters, receivers, or stations. The legend on the right hand side of the window provides a list of the transmitters, receivers, or stations for which detections are *currently* visible on the plot.

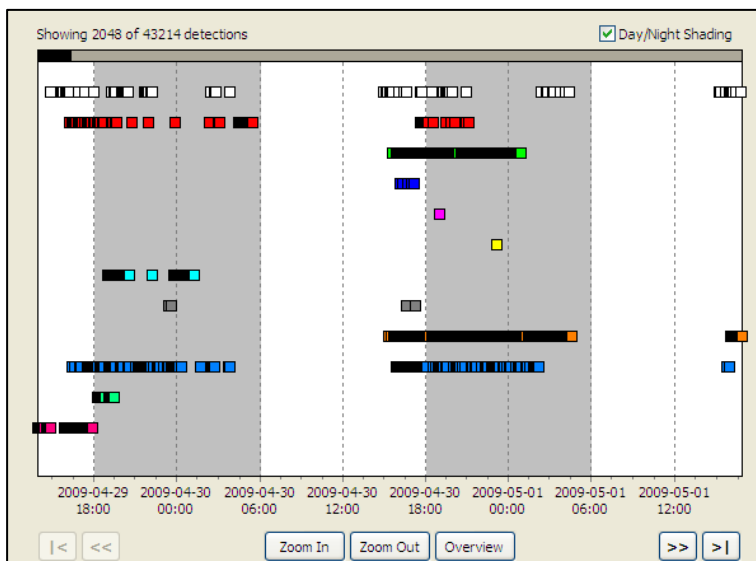
To view all detections in your database simultaneously, click on the “Overview” button below the chart. Overview mode will display all detections but will not display the details of each detection.



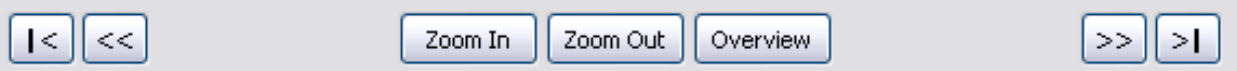
To return to detail mode, click on the “Detail” button at the bottom of the plot window (this replaced the “Overview” button).

For large datasets, overview mode may take considerable time to display. For this reason, VUE provides the option to abort loading the overview plot. To do so, click on the “Abort” button at the bottom left of the plot window.

To more easily distinguish the time of day each transmission was detected, you can opt to select the *Day/Night Shading* box above the chart. When selected, a dialog box initially appears where you can set the sunrise and sunset times or use latitude and longitude values. The plot will then show any night detections with a shaded area, as shown in the sample below.

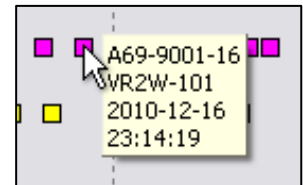


The Chart tab contains several navigation tools to help browse your data. These are listed and described in the table below.



| Button | Description |
|-------------------------------------|--|
| < | Go to the beginning of the data selection |
| > | Go to the end of the data selection |
| << (or keyboard left arrow) | Skip back one display page (keyboard left arrow) |
| >> (or keyboard right arrow) | Skip forward one display page (keyboard right arrow) |
| Zoom In (or keyboard down arrow) | Display a shorter time range. You can also zoom in on a particular area by clicking anywhere on the graph and dragging to define a time range. |
| Zoom Out (or keyboard up arrow) | Display a longer time range (keyboard up arrow) |
| Overview | Display entire dataset at once |

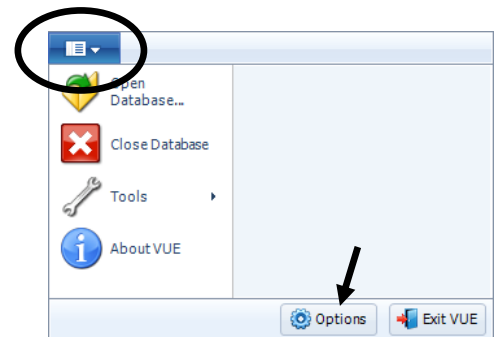
In both detail and overview modes, moving the mouse pointer over any point on the plot will display the transmitter ID number, the receiver it was stored on, and the date and time details of that detection (see example at right).



2.11 SETTING OPTIONS

2.11.1 Open the Options window

The *Options* window is accessed by selecting the VUE menu (circled in picture at right) and clicking the “Options” button at the bottom of the menu box (see arrow in picture at right). The *Options* window contains the following tabs: Display, Offload, Export, Devices, and Other. Each tab is described in the following sections.



2.11.2 Display of location, units, and time

The Display tab in the *Options* window allows the format to be changed for how the latitude/longitude, the sensor units, and the date and time are displayed in the VUE software.

2.11.3 Offload data settings

The Offload tab in the *Options* window allows the Receiver Offload Storage Folder location to be altered by clicking the “Change” button and selecting a different storage location for the offloaded data files. The default directory location is created in “...\My Documents\Vemco\VUE\ReceiverLogs\”

Also, the offloaded file format can be chosen from the choices listed: VRL files only, VRL files and CSV files, or VRL files and legacy VR2 files. The option to additionally offload the raw data files from VR2W receivers is also found in this tab.

2.11.4 CSV file settings

The format of the CSV files created in VUE can be changed from the default format to either the Version 1.0 format or to a custom format in the Export tab of the *Options* window.

2.11.5 Close inactive receiver

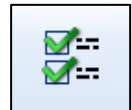
The Devices tab in the *Options* window offers the option of automatically closing Bluetooth communications with a receiver if communication with that receiver has been inactive for 30 minutes. This is a power-saving feature since more receiver battery power is needed to keep the communication open that is used for detecting and recording tags.

2.11.6 Other settings

The Other tab in the Options window allows the last database that was launched in VUE to be automatically open the next time VUE is opened. Also, the default options settings and the hidden dialogs can be restored to their default settings.

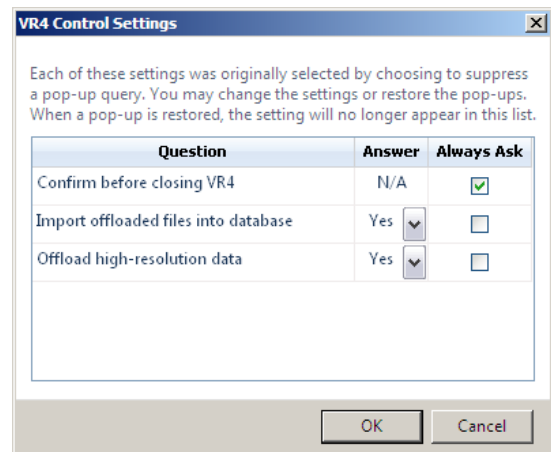
2.11.7 Set Local options

The local options feature (icon shown at right) allows you to change which suppressed pop-up queries are visible. This feature is only enabled on the ribbon if there are queries that have been suppressed. To enable a query, select “Always Ask” and that query will be enabled the next time that feature is used. For example, if “Confirm before closing VR4” is selected, then a query will open the next time a VR4 is closed.



Changing an action is also possible in the Control Setting window, without enabling the query. For example, if “No” was selected when the “Import offloaded files into database” was disabled and you now want to import the data without being queried each time, then click the drop-down menu next to the answer and select “Yes” from the list.

Be sure to select “OK” to apply the changes.



3 FREQUENTLY ASKED QUESTIONS

A list of frequently asked questions (FAQ) has been compiled and sub-divided to group related questions together.

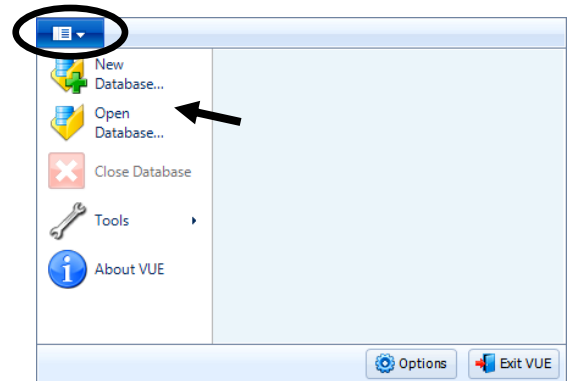
3.1 SOFTWARE/DATABASE RELATED QUESTIONS

3.1.1 How do I open a database?

For VUE 2.0 and higher, an open database is no longer mandatory to offload data from receivers. A database must be open to view data.

To open an existing database, open the VUE menu by clicking the blue button circled in the picture shown on the right. Select “Open Database” and, when the Open window appears, select the desired database.

To create a new database, select “New Database” and provide the name of the new database in the “File Name” box. Click the “Open” button to create and open the new database.



3.1.2 Where do I find my VRL files?

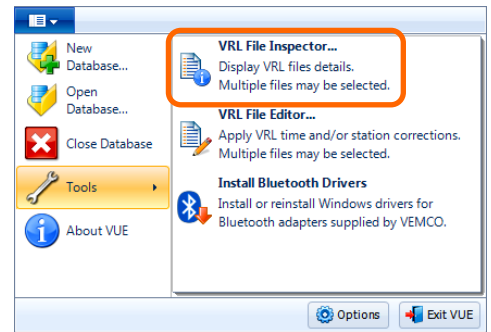
The default VRL file location depends on which version of Windows you're using. Windows XP uses "C:\Documents and Settings\username\My Documents\Vemco\VUE\ReceiverLogs\". Windows Vista uses "C:\Users\username\Documents\Vemco\VUE\ReceiverLogs\". Version 1.0 of VUE stored VRL files by default to C:\ProgramFiles\VEMCO\VUE\datafiles\receiverlogs. If you upgrade to version 1.4, your new VRL files will be stored in the new location based on the operating system and your old VRL files will stay in the previous location. You can change the default storage location under the *Offload* tab in the *Options* window (see section 2.11.3).

Note that importing VRL files into VUE from anywhere other than the default directory will cause that file to be copied into the default directory. This ensures that you always have a local copy of every imported file. This feature can be disabled by un-checking “Copy imported VRL files into this folder” under the *Offload* tab of the *Options* window (see section 2.11.3).

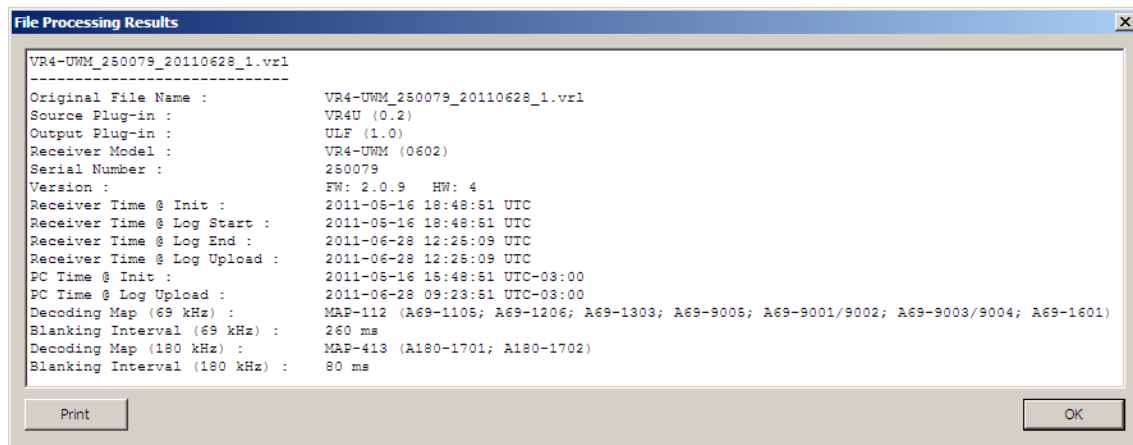
3.1.3 How do I view summary information about my VRL files?

There are two methods available to view the summary of a VRL file. One method is to select the VUE menu (to the left of the Home tab) and select *Tools / VRL File Inspector*. This method allows you to open multiple VRL files.

If the VRL file is located in the default log directory, then another method is available. In the Selection Tree of the Detections tab, expand the *Imported Log Files* section, right-click on the desired VRL file, and select “Inspect File” from the list. Only one VRL file can be opened at a time using this method.



Summary information, including the receiver name, model, station, and computer clock time used to configure the receiver. A sample is shown below.



3.1.4 What happens to duplicate detections?

Each time you offload data from your receiver, the VUE software creates a VRL file. If you offload the same data from the same receiver multiple times, you will create VRL files with duplicate or overlapping detections. VUE will not display the duplicate detections when the VRL files are imported into the database. Also, the overlapping detections will only be displayed as part of the first VRL that was imported.

3.1.5 How do I access statistics from my VRL files?

VR2W and VR4-UWM receivers record statistics on the number of detections, pings, syncs and rejections (check sum errors). The VR2W does this on a daily basis and the VR4-UWM does it at a user-selected interval between 1 – 14 days (see section 0). VR2 receivers provide summary data over the entire deployment period. These data are stored along with detections and will be included in a VRL file when the data are offloaded from the receiver.

To view these data, select the receiver or the VRL file of interest from the selection tree shown on the Events tab (see section 2.4). The displayed information on the Events tab can be exported into a comma delimited (.csv) file for further analysis (see section 2.4.4).

3.1.6 How do I start over with my VRL Files?

When a receiver is deleted from a database, all data from that receiver's VRL files are removed from the database. VRL files can also be removed individually. To do so, first select the VRL file from the list of Imported Log Files shown in either the Detections tab or the Events tab. Click the Remove button (shown here) in the Files section of the ribbon or right-click on the file name and select "Remove file". The VRL files can then be re-imported into the database (see section 2.3.1.4).



3.1.7 Can I import old VR2 data files?

Yes. VR2 or VR3-UWM text data files created by either VR2PC or VR3HS software can be imported into VUE. Section 2.3.1.7 provides detailed information about importing old VR2 files.

3.1.8 Can I adjust for clock drift on my receiver?

Yes, VUE provides the ability to edit a VRL file to apply a linear correction for time drift. See section 2.7.4 for detailed instructions.

3.1.9 How do I export my data for use in another application?

Using the selection tree in the Detections tab, choose the detections required for export. You can do this for "All Detections", or by receiver, transmitter or station. Next, select the type of file to be created by choosing either *Export CSV* or *Export Metadata* (if metadata are desired) – details are available in section 2.3.1.6. Note that all exported times will be in UTC format, regardless of the time zone display option selected in VUE.



3.1.10 How do I separate date and time in my exported data?

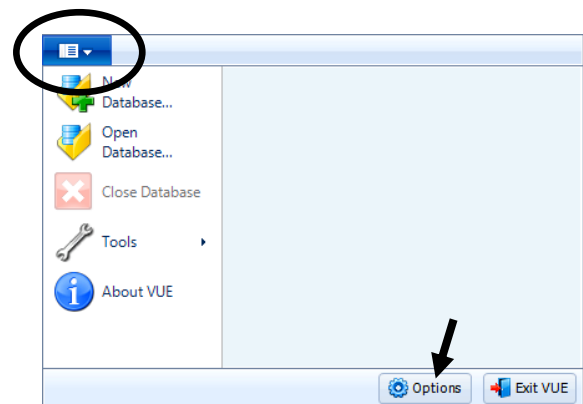
The date and time will be exported as a single column. Excel, and other programs capable of reading CSV files, will read the combined date/time field and convert it to a number (days since 1900) and format it for display as date, time or date/time. If you want to see separate columns, you can insert a new column and set it equal to the date/time column; format one to display date and the other to display time.

3.1.11 I deleted a receiver from VUE. What now?

Once you have deleted a receiver from the VUE database, all the detections associated with that receiver are no longer in your database. To get them back, you will need to import the VRL file(s) once again as described in section 2.3.1.4. The VRL files are named with the receiver type, serial number, and date of offload. NOTE: Deleting a receiver will remove all the VRL files for that receiver from the database. You will need to import all of them again.

3.1.12 How do I open the *Options* window?

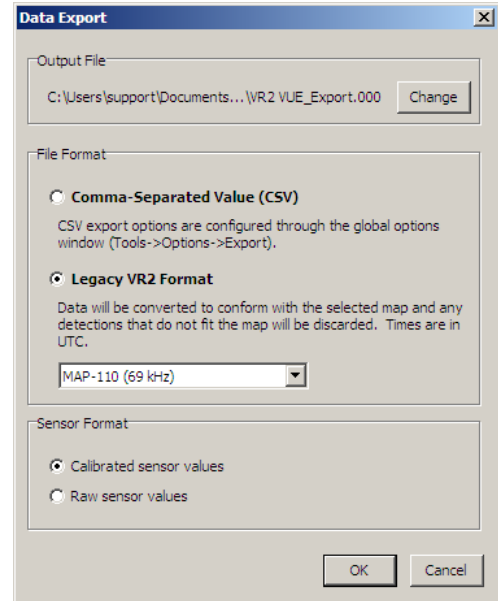
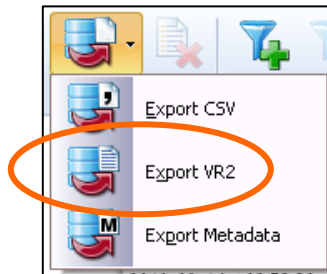
The *Options* window (see section 2.11) is accessed by selecting the *VUE* menu (circled in picture at right) and clicking the "Options" button at the bottom of the menu box (see arrow in picture at right). The *Options* window contains the following tabs: Display, Offload, Export, Devices, and Other.



3.1.13 How do I export data into old VR2 format?

You may wish to export data from VUE into the older VR2 file format if you are accustomed to the VR2PC software, or if you have other software developed that inputs the older style format.

To do this, first select the detections you wish to export using the selection tree in the Detections tab. Then select the export icon on the Detections ribbon and select “VR2 Legacy Format” (circled below). Refer to Section 2.3.1.6 for further information.



3.2 RECEIVER RELATED QUESTIONS

3.2.1 How/when do I change my receiver code map?

Receivers must be configured with a Code Map that defines which type of tags the receiver can detect. Check <http://www.vemco.com/maps.php> for details on currently supported Code Maps and choosing the proper map for your study.

Changing a receiver map is not done often and should be done with careful attention. Setting up a receiver with an incorrect map may result in no detection data, which would not be discovered until you retrieve the receiver and offload your data.

WARNING
Setting up a receiver with an incorrect map may result in no detection data.

When a receiver is configured with a new map, the data logs are automatically erased as they are no longer valid in the presence of a different code map. Please offload stored data prior to installing a new code map.

Detailed instructions on configuring your receiver with a new code map are located in section 4 based on the receiver type.

3.2.2 What is initialization?

Initialization is an important step required to configure your receiver correctly. During initialization, you can input the station name (location) where the receiver will be deployed (VR2W and VR4-UWM only) and set the receiver clock based on your computer clock. The receiver clock is always updated based on your PC clock during the initialization process. This information will be resident with the receiver and will be available during offload, regardless of whether you use the same computer or not. Initialization also erases the receiver log files so be sure to offload data from your receiver *before* initializing it. When data are offloaded from a receiver, the VRL file contains information about how the receiver was initialized.

If a VR2W receiver is deployed without being initialized, the receiver will detect tags but the receiver will not necessarily have the correct clock setting or map configuration required for proper data detection.

WARNING
Offload your data first!
Initializing a receiver will ERASE all data!

VR2 receivers must be initialized before deployment or they will not detect tags.

3.2.3 My VR4-UWM wants me to enter a password. Why?

A password can be setup for a receiver when a study is initialized (see section 0). It is not necessary to lock a receiver with a password, and although it increases communication time requirements, the option is available. If the receiver is locked, the Unlock button (a gold lock) is shown in the ribbon on the receiver tab. Click on the Unlock button and enter the password to unlock the receiver.

If a receiver is password enabled (a password is setup) but not locked, the Lock button is shown (a silver lock). Click the Lock button to lock the receiver. Be sure you know the password before locking the receiver as you will need it to communicate with the receiver again.



If a faded out Lock button is visible, it indicates that the receiver is not password protected.

4 VUE AND RECEIVERS

4.1 VR4-UWM WITH VUE SOFTWARE

4.1.1 Bluetooth® Communication

When not deployed underwater, the VR4-UWM can use *Bluetooth*® wireless technology to communicate with the VUE software. This feature dramatically increases data offload speed compared to the acoustic modem. *Bluetooth*® may be used for placing the VR4-UWM into or out of Suspend mode, for the initial configuration before deployment (start a study), or for offloading data after the receiver has been retrieved.



Bluetooth® is still a relatively new standard and we have observed that not all *Bluetooth*® devices are created equal or work reliably. To ensure successful operation with VEMCO receivers, we provide our users with a *Bluetooth*® USB adapter that we are confident will provide reliable functionality.



IMPORTANT:

Due to Bluetooth characteristics in water, the VR4-UWM must communicate to the *Bluetooth*® USB adapter **through air** (typical range is 10 meters).

STEP 1

Open the VUE software. Attach the VEMCO supplied *Bluetooth* USB adapter to the USB port on the PC. Follow the instructions in Section 1.1 if this is the first time the *Bluetooth* USB adapter is being connected to this PC.

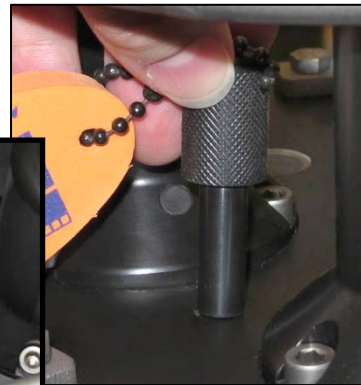
STEP 2

Place the magnetic Communication Key against the circular indent in the VR4-UWM's lid as shown.



WARNING

The Communication Key contains a **strong magnet**. Do not put it near magnet-sensitive materials, such as computer monitors or magnetic stripes, or they could be seriously damaged.



STEP 3

Watch for a flashing red light on the VR4-UWM's top, flashing at a one second interval, and then remove the key.



STEP 4

Click "Device Scan" in the software and wait. When the software finds the receiver, a VR4-UWM icon will be displayed in the "Bluetooth Devices" section of the window with the receiver's serial number for identification. It will display all *Bluetooth*® ready VR4-UWM receivers within range.



STEP 5

Double-click on the receiver icon and information pertaining to this receiver will be displayed.

TIP: Click the blue circular icon in the top right corner to refresh the information.



STEP 6

When finished communicating, click the large “Close View” button (on left end of ribbon) to disconnect.



4.1.2 Modem Communication

Offloading data from the VR4-UWM receiver is like reading a book – each word is read one by one until the entire page is complete. For the VR4-UWM, each piece of data must be offloaded to the VUE software one at a time until the entire block of data (or page) has been offloaded. This page is then checked for errors using a checksum that was transmitted with the data. If the error check passes, then the next block of data is sent, one piece at a time. If the error check fails, which is usually caused by acoustic noise, then the page is re-transmitted from the beginning of the page. The error check can be compared to a comprehension check; you can’t move on to the next page of the book unless you understood the page you just read.


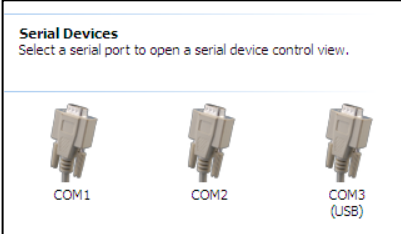
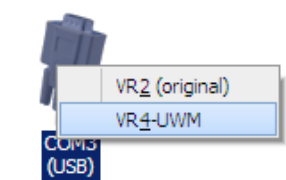
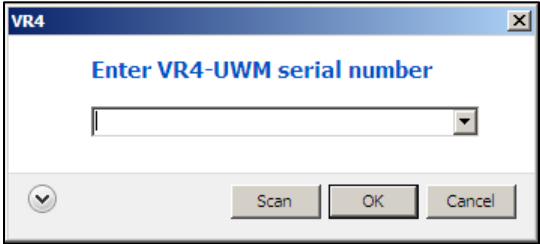
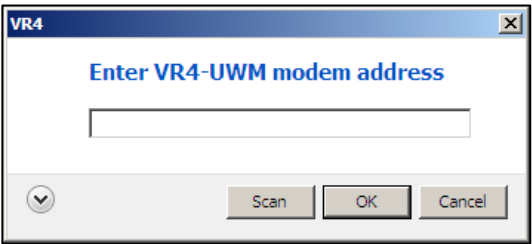
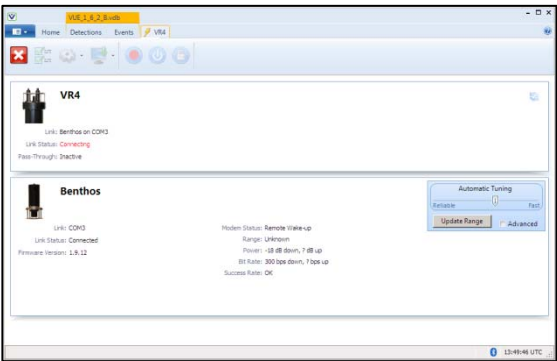
Two key features in communicating with a deployed VR4-UWM are the power of the signal and the bit rate of the communication. The power is the strength of the signal being transmitted and it can vary between 0 dB (the strongest power level) and -21 dB (the weakest power level). The stronger signals are generally used when the surface modem is farther from the VR4-UWM. The power level of the signal sent from the Benthos surface transducer is listed as Power Down and the power of the signal being sent up from the VR4-UWM is listed as Power Up.

The other key feature is the bit rate, or the speed at which the signal is sent. This can be different for the signal being sent down from the Benthos surface transducer (Bit Rate Down) and the signal being sent up (Bit Rate Up). The bit rate can vary from 300 bps to 1200 bps.

It is sometimes faster to offload data at a slower bit rate speed. If you’ve ever played a game that involves catching items that are moving towards you and the rate at which the items are coming increases, you know that it’s much easier to catch every item when the speed is slower. With acoustic data, there are circumstances when it can be easier to get all the data through error free if the data is being sent at a slower rate. The speed of transmission (bit rate) is slower but the number of pages that must be re-transmitted is much lower and this reduces the over-all time required.

4.1.2.1 Modem communication connection

After the acoustic modem is setup and in position to communicate with a VR4-UWM (see VR4-UWM user manual for details), follow the steps listed below to communicate with the receiver using VUE software.

| | | |
|--|---|--|
| <p>STEP 1</p> <p>Launch the VUE 2.0 software.</p>  | <p>STEP 2</p> <p>Click on the COM symbol in the “Serial Devices” section of the Home tab that matches the COM number that is connected to the Benthos Deck Box. The last COM port that was used will be identified with “(last used)” under the name.</p>  | <p>STEP 3</p> <p>Select “VR4-UWM” from the list that appears.</p>  |
| <p>STEP 4</p> <p>Enter the serial number, located on the top of the VR4-UWM, in the box and click OK.</p>  <p>If you're uncertain of the serial number, then click the “Scan” button and select the desired receiver from the list of receivers that respond.</p> | <p>STEP 5</p> <p>Enter the Modem address, which can be found in the receiver specification sheet.</p>  <p>If you're uncertain of the modem address, click the “Scan” button. VUE will search for the receiver and connect to it automatically when it is found.</p> | |
| <p>STEP 6</p> <p>Wait for communication to begin. You should hear a “buzzing” noise on the Deck Box speakers (if volume is on) indicating that the modem transducer is trying to wake up the receiver and begin communication. The information/status for the VR4-UWM receiver and the Benthos acoustic modem is listed in the window when communication has been established.</p> <div data-bbox="227 1690 795 1837" style="border: 2px solid green; padding: 5px;"><p>It may be beneficial during communication to reduce other sources of noise in the water (depth sounder, propeller noise, etc.).</p></div> |  | |

4.1.2.2 Modem communication tips

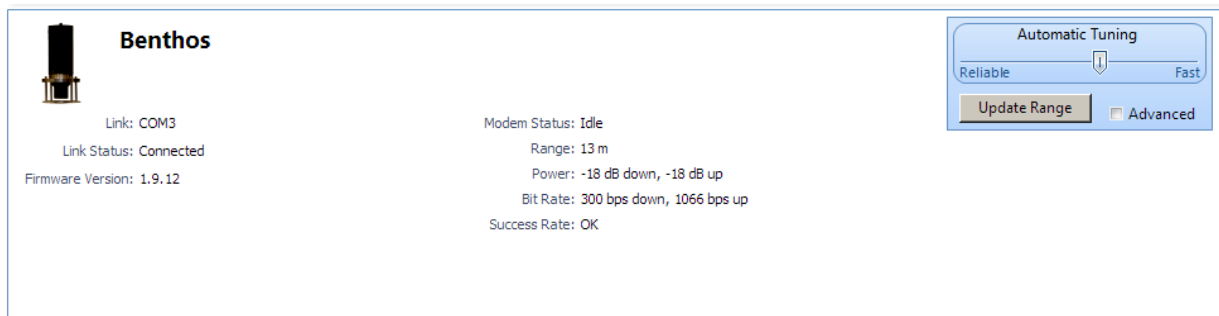
Acoustic communication through the modem can be challenging due to the different environmental conditions that can affect the acoustic properties of an area. Some tips have been gathered to help keep in mind while setting up acoustic communication. These tips are applicable for both Automatic Tuning (section 4.1.2.3) and Advanced Tuning (section 4.1.2.4).

1. Use a VR100 receiver with one channel set to 27 kHz and an omni-directional hydrophone in the water below the hull of the boat to listen to the signals being transmitted between VR4-UWM and the Benthos transducer. Select a low manual gain setting on the VR100 receiver (less than 12 dB).
2. Remember that when you change a communication setting, it takes time for the VR4-UWM to receive the command and make the change.
3. If a command is sent to the VR4-UWM receiver when you are out of acoustic communication range, the command will not be received by the receiver. Move closer and try sending the command again.
4. A VR4-UWM stationed in an area where you expect there will be many tagged animals should have the data offloaded at a frequent schedule. This reduces the amount of data being offloaded at each visit and therefore the time required at the site.
5. The status and range communications are short messages and are more likely to succeed during challenging acoustic conditions. Use these smaller communications to help identify the settings needed to establish a “good” or “very good” communication level before starting the offloading communication. The status command is sent by clicking the Refresh icon in the top right corner of the receiver status. The range command can be sent manually or automatically as explained in section 4.1.2.5.



4.1.2.3 Automatic tuning

When modem communication is established between the surface modem and the VR4-UWM, the lower half of the screen shows the status of the communication. The VUE software will adjust the bit rate and ranging period as needed to give optimum communication given existing conditions. The slider allows you to tell VUE if you prefer the focus to be on reliable communication (move the slider to the left) or on retrieving the data as quickly as possible (move the slider to the right).



The Success Rate will show one of the following results based on the rate of successful communication: Very Poor, Poor, OK, Good, or Very Good. Poor ratings are caused by repeated errors encountered when transmitting the data from the VR4-UWM to the surface. These errors also require the data to be re-transmitted. To improve the rating, move the slider closer to the “Reliable” side of the scale. If the success rate does not improve, then use Advanced Tuning (see section 4.1.2.5).

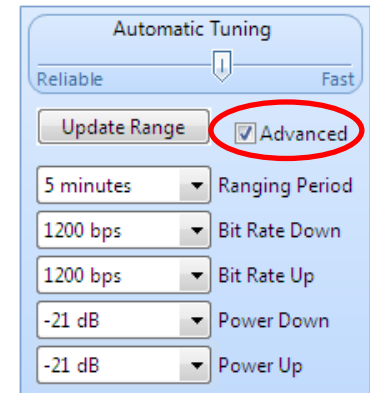
Automatic Tuning only varies the bit rate. The acoustic power level must be changed manually.

Only the bit rate is adjusted automatically. Use the Advanced tuning option (section 4.1.2.4) if the power settings need to be adjusted, such as increasing the power to compensate for an increased distance from the receiver or to decrease the power to lessen the echoes produced in an acoustically reflective area.

4.1.2.4 Advanced tuning

By default the VUE software has the modem tuning set to Automatic Tuning, but there are times when it's more desirable to select these settings yourself. To take the modem communication settings off automatic, click the Advanced box in the Automatic Tuning section of the window and make the desired adjustments. This should be done with caution as the modem settings will not automatically adjust for peak communication and could negatively affect communication.

If you are unfamiliar with the settings necessary at a particular location, begin with the settings shown in the sample shown at right and make further adjustments as needed. These settings are a good starting point.



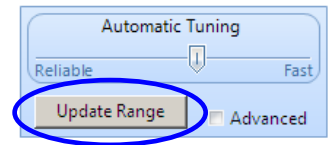
When to make adjustments, and what adjustments to make, depends on the unique conditions at the location and time of communication. Some important points are listed below.

1. The Power Up and Power Down settings may both need to be increased **as the boat drifts** away from the VR4-UWM. Don't increase the power levels too quickly or echoes may be created that will create interference and increase the communication time required.
2. If the receiver is located in an **acoustically reflective environment** (hard bottom), then avoid using high power settings as this can cause intense reflected signals (echoes) that could interfere with the direct communication signals.
3. If the surface transponder is **close to the VR4-UWM and communication quality is poor**, then reduce the power levels for both the up and the down communication. Too much power may cause additional noise in the water and lower the quality of communication. You may also need to reduce the bit rate to 300 bps or 600 bps. This should reduce the errors caused in transit and therefore require less transmission repetition.
4. **Record the power and bit rate settings** for each VR4-UWM location. This will reduce the communication setup time for your next visit to this location. The acoustic conditions will probably change due to environmental factors but the physical characteristics of the area should remain constant. For example, if the area has a hard bottom that is very reflective to acoustic signals and requires a lower power setting, then start with the same power setting at your next visit since the bottom is probably still very reflective.
5. **Power scale:** 0 dB is the highest power (signal strength) and -21 dB is the lowest power level. Using a high power level when it is not necessary can saturate the area with acoustic signals and reduce conditions for communication.

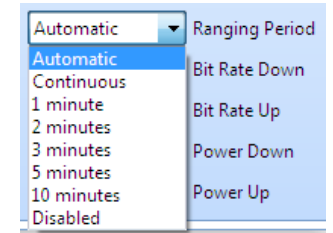
Use caution if removing any Tuning settings from Automatic.

4.1.2.5 Range Updates

Click the “Update Range” button in Automatic Tuning area to manually request a range distance between the surface modem unit and the receiver. The button will remain greyed out until the information has been collected and updated.



Automatic range updates occur at the frequency selected in the Advanced tuning settings. Click the “Advanced” box next to the Update Range button to view the advanced settings that can be changed. Open the drop-down list next to the Ranging Period line and select from the times listed.



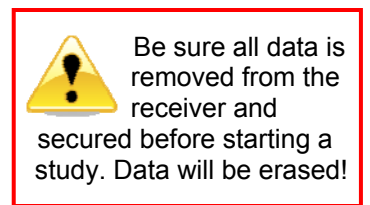
Setting the ranging period to “Automatic” will automatically set the ranging update based on where the Automatic Tuning slider is positioned. On the “Reliable” end, the range will be updated frequently. On the “Fast” end, it will be updated less frequently. The “Continuous” setting will send a range command immediately after the last range distance was received. It can be useful when locating a deployed VR4-UWM receiver, but interferes with data offloading. All automatic range updates can be disabled by selecting “Disabled” from the list.

4.1.3 Start a Study (erase all data)

Start a study by clicking on the red and blue “Start Recording” button while the receiver is in communication with the PC (button is not available if communication is not present). This will open a warning that the data stored on the receiver will be erased when the new study begins. If the stored data needs to be offloaded, then click the cancel button and follow the instructions in section 4.1.5 to offload the data. If “OK” is selected, the window shown below opens.



Enter the study description and the station name (if desired). The station can be selected from a list of existing stations or simply type a new station name in the “Station Name” line to create a new station. If this station is a fixed position, then click a check mark in the “Fixed Station Position” box and enter the latitude and Longitude. Note, if the fixed location is already entered for an existing station, then this information will appear as soon as the station name is selected from the drop-down list.



Select the channels (frequencies) to be turned on (enabled). If one of the channels is not enabled, then no detections will occur on that frequency. The VR4-UWM will not be “listening” to that frequency. This can be useful in conserving power if there are no tags deployed on that frequency. CAUTION: It is possible to turn both channels off, which means that the receiver is not listening for any tag detections.

Enter a description/title for this study.

Make sure the frequency you are working with is checked or the VR4-UWM will not be “listening” for your tags.

Study Configuration

Description: Pre-deployment test

Station Name: None

Fixed Station Position

Latitude: 00.00000° N S

Longitude: 000.00000° E W

Enable 69 kHz channel

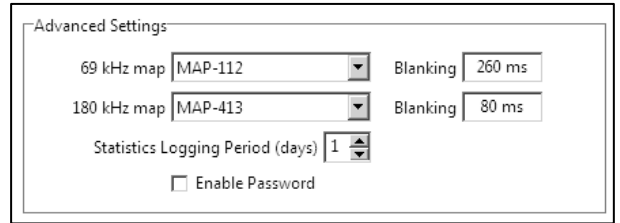
Enable 180 kHz channel

Show Advanced Settings

OK Cancel

Select or enter a station name and location.

Selecting “Show Advanced Settings” opens the Advanced Settings section of the window. Here, the map and blanking interval for each channel can be changed. Changing these values can seriously affect your data collecting so only make changes under direction of VEMCO.



The Statistics Logging Period, how often the statistics are stored in memory, can be changed from the default of one day to up to 14 days (integer values only).

The option to password-protect the receiver is another advanced setting feature. Using the password protect feature requires additional communication time between the receiver and the VUE software so most users do not use this feature. If it is selected, the password must be entered before the study is initialized and again each time the settings on the receiver are changed or the data is offloaded.

Click the “OK” button to begin the study.


When a study is running (receiver is in Record mode), the status light on the VR4-UWM receiver will flash a heartbeat of two quick flashes every five seconds. Red flashes indicate that the receiver is listening at 69 kHz (channel 1) and yellow flashes indicate 180 kHz (channel 2). If the receiver is listening at both 69 kHz and 180 kHz (both channel 1 and channel 2 are enabled), then the light will alternate between two red flashes and two yellow flashes.



Status light

4.1.4 View receiver status information

The receiver’s status can be monitored in the receiver tab, including the number of detections received on each active channel (circled in picture below). This information is a “snap-shot” taken during the last communication with the receiver. To update the information, click the refresh symbol in the top right corner of the section (see arrow below).




VR4 Underwater Modem
Modem Test

Serial Number: 250079
Firmware Version: 2.0.9
Link: Benthos on COM3
Link Status: Connected
Memory Size: 8.45 MB
Modem Address: 79
Pass-Through: Inactive

Clock: 2011-06-28 13:51:37
Battery: 97% remaining
Temperature: 22.9°C
Humidity: 6%
Tilt: 80°
Rotation: 217°

180 kHz: 6508 detections, 55402 pings
69 kHz: 68207 detections, 747522 pings

Receiver Status: Recording
Password: Disabled
Study Start: 2011-05-16 18:48:51
Data Log Size: 764.9 KB (9.1%)
New Data: 66.9 KB
Old Data: 698.0 KB
Station: None
180 kHz map: MAP-413
69 kHz map: MAP-112



Refresh Receiver Info

4.1.5 Offload data

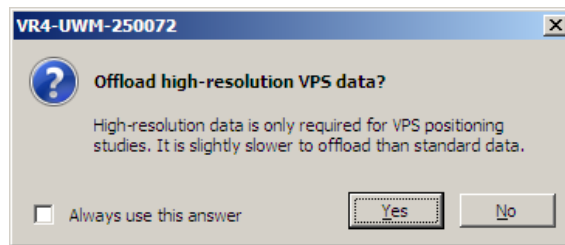
Data can only be offloaded from a VR4-UWM receiver while it is in communication with the VUE software, either through the acoustic modem or through *Bluetooth*®. Follow the steps below to offload data.

1. Select the Offload data icon (shown at right)
2. Select one of the listed options:
 - a. Offload All Data (offloads all data; will duplicate data already offloaded)
 - b. Offload New Data (offloads only data that was stored since the last offload)
 - c. Offload Raw Data (only use this when directed to do so by VEMCO)



Raw data are only used by VEMCO for diagnostic purposes. It is not required for VPS studies. Offloading raw data through the acoustic modem will add *significantly* to the total offload time. Only offload raw data if you suspect a problem exists with the receiver or its location (i.e., very low detection data, excessively high ping count, etc.). Please contact VEMCO if you require clarification.

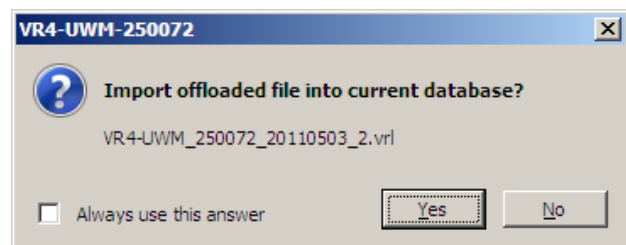
3. Select either “Yes” or “No” to the “Offload high-resolution VPS data?” question that appears. Selecting “Yes” will give you the high resolution data necessary for VPS studies but will also take longer to offload. If the data are not being used for a VPS study, then click the “No” button.



If a database is open, then an additional dialog box will appear asking if the offloaded data should be imported directly into the open database. If “NO” is selected, then the file(s) will be saved to the directory and in the format selected in the Offload tab of the *Options* window (see section 2.11.1) and will not be imported to the database. If desired, the files can be imported later (see section 2.3.1.4). The file types are also selected at that location. The choices are:

- VRL files only
- VRL files and CSV file
- VRL files and legacy VR2 files

The offloaded data will be stored in the selected file(s) types and location regardless of if the data is directly imported in to the VUE database or not.



If a database is not open when data are offloaded, then the data will automatically be saved in the file format(s) and in the directory selected in the *Options* window (see section 2.11.1).

4.1.6 Disconnect communication with receiver

Click the “Close View” button (red box with white X; shown at right) to disconnect the communication between the VR4-UWM and the VUE software. A window will appear to confirm that you want to close the VR4 View window.



4.1.7 Update VR4-UWM firmware

While communication is established between the VR4-UWM and the VUE software, click the “Set advanced device options” button (shown at right) and an *Open* window will appear. Select the firmware file received from VEMCO to begin the firmware update.



4.1.8 Unlock a VR4-UWM

Receivers can be locked when a study is setup (see section 0). It is not necessary to lock a receiver with a password but the option is available.

If the receiver is locked, the Unlock button is shown (a gold lock) and a flashing red “Locked” appears in the receiver view area of the receiver tab. Click on the Unlock button and enter the password to unlock the receiver.

If a receiver is password enabled but not locked, the Lock button is shown (a silver lock) and the Password is listed as “Enabled”. Click the Lock button to lock the receiver.

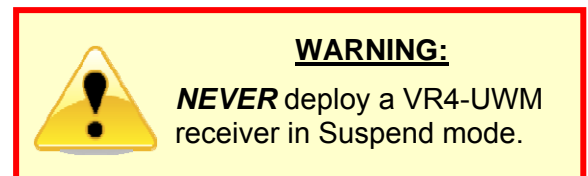


If a faded out Lock button is visible, it indicates that the receiver is not password protected. Also, the receiver view will read “Disabled” for the password status.

4.1.9 Suspend the VR4-UWM activity for storage

The VR4-UWM can be powered down using the VUE software and the *Bluetooth*® interface. This conserves battery power while avoiding the risk of damaging the case seals that might occur if the VR4-UWM were disassembled to disconnect/reconnect the battery. The VR4-UWM can be stored in Suspend mode for an extended time with negligible impact on the battery life.

It is not possible to place the VR4-UWM into or take it out of Suspend mode using the acoustic modem. For this reason, it is important that a receiver never be in Suspend mode when it is deployed.



4.1.9.1 Put a VR4-UWM into Suspend Mode:

During *Bluetooth*® communication (see section 4.1.1), click the “Enter low-power sleep” button (shown at right). VUE will ask you to verify that you do want to suspend the receiver’s operation (shut it down). After “Yes. Suspend and close the VR4” has been selected, a confirmation window will appear and remind you how to bring the receiver out of Suspend mode (see section 4.1.9.2).



4.1.9.2 Remove a VR4-UWM from Suspend Mode

Wake a VR4-UWM receiver from Suspend mode by connecting to the VR4-UWM via *Bluetooth*® (see section 4.1.1) and starting a new study in the VUE software (see section 0). This can not be done through acoustic communication so be sure the receiver is not in Suspend mode when it is deployed.

4.1.10 Additional information

Status Light Flashes

The VR4-UWM has a status light visible through the clear plastic window on the top of the receiver. This light will flash either red or yellow, depending on the status of the receiver. The meaning of the different flash patterns and colours are listed in the table below.

| Flash Pattern | Red Flash | Yellow Flash |
|----------------------------------|---|---|
| 2 rapid flashes every 5 seconds* | Channel 1 Heartbeat – VR4-UWM is in operating mode at 69 kHz (channel 1 is on) | Channel 2 Heartbeat – VR4-UWM is in operating mode at 180 kHz (channel 2 is on) |
| 1 short flash | Ping detected on channel 1 (69kHz) | Ping detected on channel 2 (180kHz) |
| 1 long flash | Tag detection stored on channel 1 (69kHz) | Tag detection stored on channel 2 (180kHz) |
| Long flash once per second | <i>Bluetooth</i> ® ready to accept connection from PC | N/A |
| On continuously | <i>Bluetooth</i> ® is connected to the PC | N/A |
| None | Either: <ul style="list-style-type: none">• VR4-UWM is in Suspend mode; or• More than 1 hour has elapsed since <i>Bluetooth</i>® communication (firmware version 2.0.9 or earlier) | |

* If the flash pattern is alternating red and yellow, then both channels 1 and 2 are on. That is, two quick red flashes, wait five seconds, two quick yellow flashes, wait five seconds, and repeat.

4.2 VR2W RECEIVER WITH VUE SOFTWARE

4.2.1 Connect to VR2W

To begin, open the VUE software and, if desired, open a database (see section 3.1.1). The software can be setup to automatically open the last database used with the VUE software on this computer (see section 2.11.6).

Attach the VEMCO supplied *Bluetooth* USB adapter to the USB port on the PC. Follow the instructions in Section 1.1 if this is the first time the *Bluetooth* USB adapter is being connected to this PC.



Use Communication key to activate Bluetooth®

Remove the VR2W from the water and place it within 10 meters of the PC. Insert the Communication Key (shown below with orange float) in the large hole in the VR2W (see photo at left) and wait until the LED is flashing bright, long, steady flashes before removing the key (takes approximately 3 seconds).



WARNING

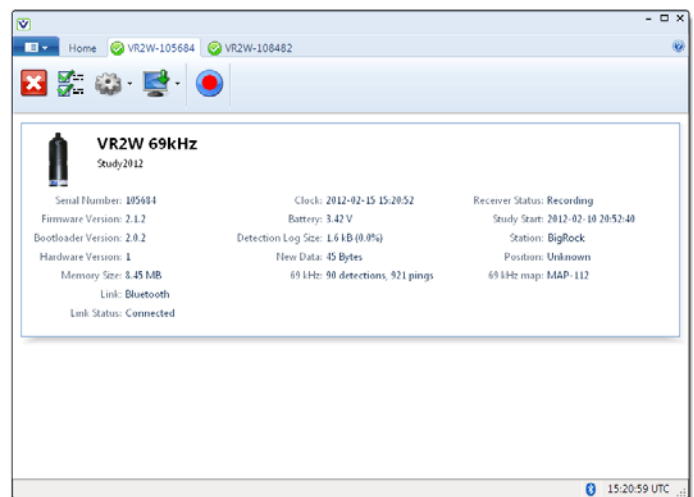
The Communication Key contains a **strong magnet**. Do not put it near magnet-sensitive materials, such as computer monitors or magnetic stripes, or they could be seriously damaged.



Click “Device Scan” on the VUE software’s Home tab and wait while the software searches for the receiver. When the software finds the receiver, a VR2W icon will be displayed in the “Bluetooth Devices” section of the Home tab with the receiver’s serial number for identification. It will display all *Bluetooth*® ready receivers (LED is flashing bright, long, steady flashes) within range (approx. 10 meters).



Double-click on the receiver icon and communication will be established. Information pertaining to this receiver will be displayed in the receiver tab (see pictures at right). The ribbon in this tab allows a study to be setup (initialized), data to be offloaded, firmware to be upgraded, and the receiver to be disconnected from the VUE software. These features are described in the sections to follow.



VUE software allows you to communicate with up to seven receivers simultaneously. Simply use the Communication key to activate each receiver and follow the instructions above. Since your PC can talk to any activated VR2W unit within range (typically 10 meters) of the *Bluetooth*® USB interface, it is important to ensure that you are communicating with the correct unit, particularly before initializing and erasing receiver memory files. The tabs clearly show the receiver’s unique identification (for example, VR2W-100013).

CAUTION:




Verify the receiver you are communicating with is the intended unit, particularly before initializing and erasing receiver memory files, or data could be lost. Communication can occur with any VR2W with *Bluetooth*® wireless technology activated within a 10 meter range (typical range in air).

4.2.2 Initialize VR2W Receiver/Start Study

Start a study, also known as initializing receiver, by first clicking on the red and blue “Start Recording” button found in the receiver tab’s ribbon (button is not available if communication between receiver and VUE software is not present). This begins the process of setting up the study.

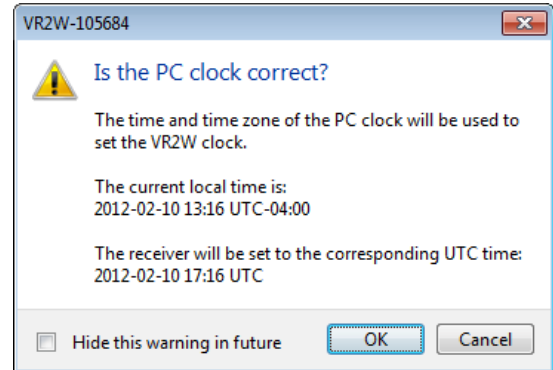


The first step in setting up a study is to verify that the PC clock is correct. A dialogue box opens showing the current local time according to the PC clock and asking for confirmation that this time is correct. The receiver will be set to UTC time based on the current time of the PC so the PC time *and the UTC offset* must be correct. If the time or UTC offset are not correct, then click “Cancel” and make the necessary corrections before returning to start the study. If the time and UTC offset are correct, then click the “OK” button to continue.



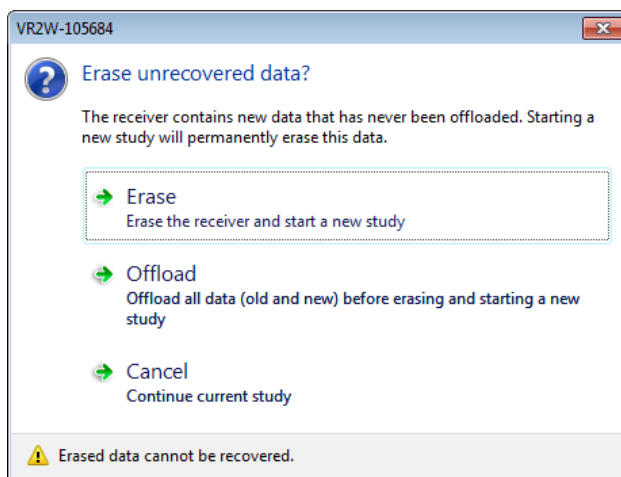
WARNING


It is vital that the PC clock be correctly set to your local time, including time zone, ***before the VR2W is initialized.***



With the time correct, a second dialogue box opens reminding that starting a new study will erase the memory in the VR2W and presenting three options.


1. If the data stored in the VR2W has already been offloaded, then click “Erase” to continue and set up the study.
2. If the data has not been offloaded, or there is uncertainty that it has, then click “Offload” and the data will be offloaded immediately before continuing to the Study Configuration window where the study is set up.
3. To continue with the study that is currently running in the VR2W receiver, click “cancel” to close the window without affecting the receiver.





WARNING

Initializing the VR2W will erase the receiver’s memory. ***Retrieve all detection logs before the VR2W is initialized.***



CAUTION: Verify the receiver you are communicating with is the intended unit, particularly before initializing and erasing receiver memory files, or data could be lost. Communication can occur with any VR2W with Bluetooth® wireless technology activated within a 10 meter range (typical range in air).

The Study Configuration window allows the study to be set up. Enter the study description in the Description line. The station is optional and can be selected from a list of existing stations or simply typed in the “Station Name” line to create a new station. If this station is a fixed position, then click a check mark in the “Fixed Station Position” box and enter the latitude and Longitude. Note, if the fixed location is already entered for an existing station, then this information will appear as soon as the station name is selected from the drop-down list.

Create a new station by entering the name in the Station Name line.

Enter a description/title for this study.

Select or enter a station name.

Select Fix Station to enter lat/long location of VR2W.

Choose unique station names for each deployment location.

Selecting “Show Advanced Settings” opens the Advanced Settings section of the window. Here, the map and blanking interval can be changed. Changing these values can seriously affect your data collecting so only make changes under direction of VEMCO.

Click the “OK” button to begin the study.

When a study is running (receiver is in Record mode), the status light on the VR2W receiver will flash a heartbeat of two quick flashes every five seconds.



LED/status light

Once you have initialized a receiver and are ready for deployment, it is wise to test it with a transmitter and then to offload (retrieve) the data – details of how to perform this in-air test are available in the receiver manual. This test will create a VRL file which contains all the configuration information for this receiver. This file can be kept as a record of the receiver configuration.

4.2.3 View receiver status information

The receiver’s status can be monitored in the receiver tab, including the number of detections received (circled in picture below), the battery voltage, the study start date, the station name, and more.

4.2.4 Offload Data from VR2W Receiver

Data can only be offloaded from a VR2W receiver while it is in communication with the VUE software through *Bluetooth*®. Follow the steps below to offload data.

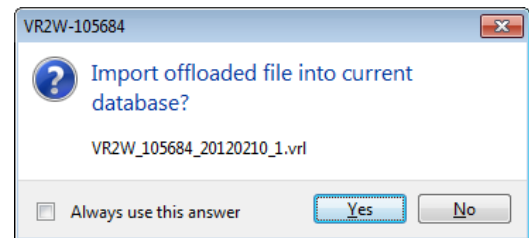
1. Select the Offload data icon (shown at right)
2. Select one of the listed options:
 - a. Offload All Data (offloads all data; will duplicate data already offloaded)
 - b. Offload New Data (offloads only data that was stored since the last offload)



If a database is open, then an additional dialog box will appear asking if the offloaded data should be imported directly into the open database. If “NO” is selected, then the file(s) will be saved to the directory and in the format selected in the Offload tab of the *Options* window (see section 2.11.1) and will not be imported to the database. If desired, the files can be imported later (see section 2.3.1.4). The file types are also selected at that location. The choices are:

- VRL files only
- VRL files and CSV file
- VRL files and legacy VR2 files

The offloaded data will be stored in the selected file(s) types and location regardless of if the data is directly imported in to the VUE database or not.



If a database is not open when data are offloaded, then the data will automatically be saved in the file format(s) and in the directory selected in the *Options* window (see section 2.11.1).

IMPORTANT

Due to *Bluetooth*® wireless technology characteristics in water, the VR2W must communicate to the *Bluetooth*® USB adapter **through air** (typical range is 10 meters).



The VR2W receiver stops recording when data is being offloaded.

4.2.5 Disconnect communication with receiver

Click the “Close View” button (red box with white X; shown at right) to disconnect the communication between the VR4-UWM and the VUE software. A window will appear to confirm that you want to close the VR4 View window.



The VR2W starts recording detections as soon as *Bluetooth*® wireless technology communication is disconnected.

4.2.6 Upgrade Firmware

It is possible to upgrade the VR2W receiver's firmware if a design change occurs in the future. If there is an occasion to upgrade the receiver's firmware, instructions will be sent from VEMCO.

4.2.7 Additional Information

LED Flashes

The red LED on the side of the VR2W case flashes based on the task being performed or the status of the receiver. The flashes can be interpreted using the table below.

| VR2W LED Flashes | Interpretation of Flashes |
|--|--|
| No flash | Battery is disconnected or has depleted |
| Two quick flashes every 5 seconds | VR2W is in record mode (records any received pings) |
| Two quick flashes every 10 seconds | The VR2W memory full |
| One short flash | An acoustic ping was received |
| One long flash | A complete detection was written to memory |
| Continuous long flashes (1 per second) | The VR2W is ready for <i>Bluetooth</i> wireless technology communication |
| LED on constantly | Communicating with VUE software using <i>Bluetooth</i> wireless technology |

Battery Removal

Detailed instructions for removing the battery in the VR2W receiver is given in the VR2W Users manual. Before the battery is removed, communicate with the VR2W and select "Stop Recording" in the Receiver Control Window to exit Record Mode. Close the Receiver Controller Window after the battery is disconnected.

4.3 VR2 RECEIVER WITH VUE SOFTWARE

4.3.1 Connect to VR2

To begin, open the VUE software and open a database (see section 3.1.1). The software can be setup to automatically open the last database used with the software on this computer (see section 2.11.6).

A database must be open for the VR2 to communicate with VUE.



Connect the VRPC Interface box (see photo on left below) to the serial port on the computer and make note of the serial port number. Insert the VR PC Interface probe into the large hole in the VR2 as shown in the photo on the right below.

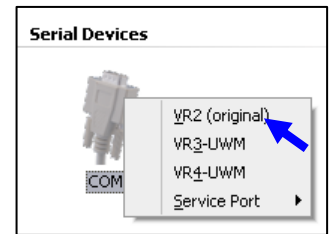


VR PC Interface with probe

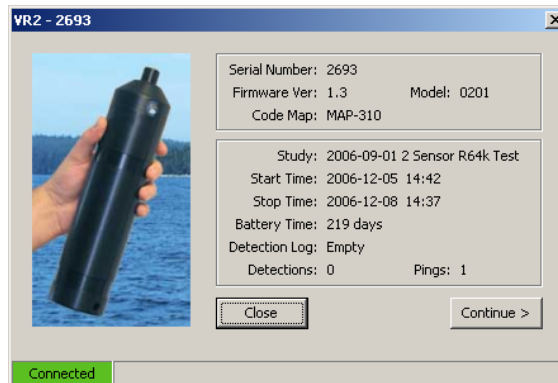


Inserting probe in VR2

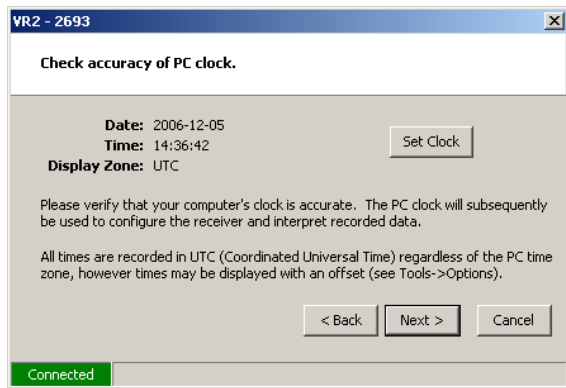
Open the Home tab in the VUE software and select the correct COM (serial) port number in the Serial Devices section of the window (see picture at right). A list of receiver types will appear; select *VR2 (original)* from the list and wait for communication to be established. You can watch the red status lights on the VRPC interface box to verify that communication is being established.



The Receiver Controller Window (RCW) will open and, after communicating with the VR2, list the status of the receiver.



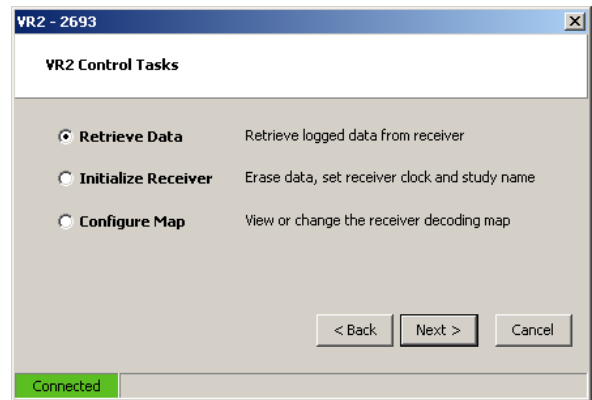
Continue to the next window (shown below) to verify that the PC time is correct. This is very important as it will be used to configure the VR2 receiver and interpret the recorded data. If the time shown in the window is not correct, use the “Set Clock” button and change the time, date, and time zone so they are correctly set to your local time, or set correctly to UTC time.



NOTE: The PC clock must be set to the correct *local* date, time, and *time zone!*

NOTE: “Set Clock” updates the **PC clock**, not the receiver clock. The receiver clock will be updated based on the PC clock when you chose to initialize your receiver.

After ensuring the PC clock has been set correctly (including time zone), continue to the next window for a selection of VR2W Control tasks (shown at right). See sections 4.2.4 to 4.2.6 for details on each task.



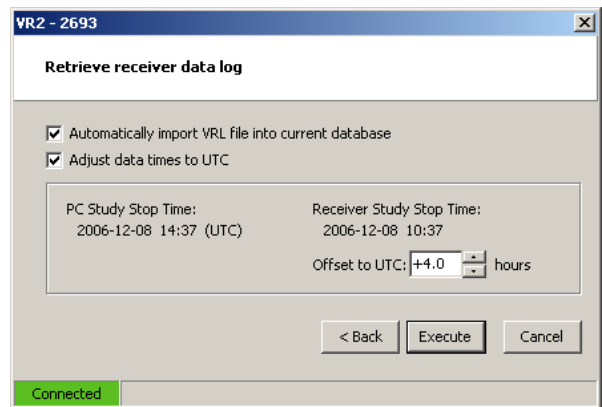
4.3.2 Offload Data from VR2 Receiver

Select the radio button next to “**Retrieve Data**” in the VR2 Control Tasks list and then select “Next” to open the “Retrieve receiver data” window (shown at right).

“Automatically importing the VRL file into current database” allows the data to be viewed immediately after the data are recovered. For large data files, you may choose to unselect this and import the data later. This will speed up the offload process.

The option is given adjust the times to UTC. This is only necessary if the receiver was initialized using the VR2PC software. If the VR2 was initialized using the VUE software, the times are already UTC and an adjustment isn’t necessary.

To adjust the times to UTC, first click the “Adjust data times to UTC” box and then select the correct offset based on the difference between UTC and the receiver’s time. A suggested offset is shown based on the PC clock and the receiver’s clock. The PC UTC time is shown on the left and the receiver’s time is shown on the right. Set the value in the “Offset to UTC” box to the hours that must be added or subtracted from the *receiver’s* time to obtain correct UTC time.



NOTE: The UTC offset should **only** be used if data are being retrieved from a VR2 that was initialized with the VR2PC software.

After the desired retrieval settings are made, the “Execute” button will begin the process.

The data are stored in a VRL file which can be imported later into this or another VUE database by using the Import File feature explained in section 2.3.1.4.

VUE software allows you to communicate with up to seven receivers simultaneously, both VR2 and VR2W receivers. Since your PC can talk to as many VR2 units as are connected to the PC, it is important that you ensure you are communicating with the correct unit, particularly before initializing and erasing receiver memory files.

CAUTION: *Verify the receiver you are communicating with is the intended unit*, particularly before initializing and erasing receiver memory files, or data could be lost. The receiver name is displayed in the RCW.

4.3.3 Initialize VR2 Receiver

Initializing a receiver clears the receiver logs, sets the receiver clock, and stores configuration information into the receiver memory. Initialization is required to put the VR2 receiver into detect mode.

Select the radio button next to “**Initialize Receiver**” in the VR2 Control Tasks list and then select “Next” to open the “VR2 Initialization” window (shown below).

The VR2 does not support the use of a separate Station (Location) Name stored into memory, however the “Study Description Field “ can be used to include both a receiver name and location details.

A brief description or name of the study can be saved in the receiver’s memory and associated with the data. This could be the location where the VR2 was deployed or the name of the study being conducted, for example.

The receiver clock is set based on the PC clock and is used to time stamp the detections as they are stored in memory. This is why it is vital that the PC clock be correct, including time zone, before the VR2 is initialized.

WARNING
It is vital that the PC clock be correctly set to your local time, including time zone, **before the VR2 is initialized.**

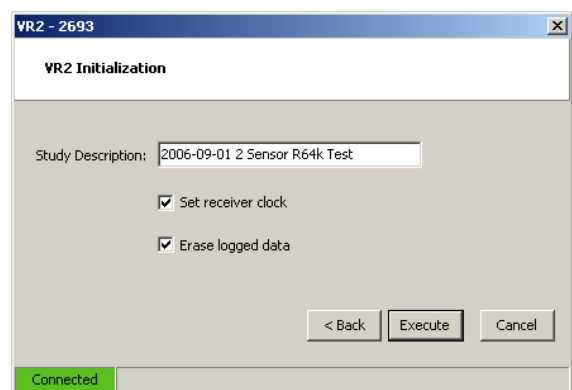
WARNING
Initializing the VR2 will erase the receiver’s memory.
Retrieve all detection logs before the VR2 is initialized.

The initialization process clears the memory from the receiver, erasing all detections that are stored in memory. If there are data in the VR2 that have not been retrieved, they must be retrieved before the receiver is initialized.

NOTE: You will not be able to proceed unless *Set Receiver Clock* and *Erase logged Data* are both selected.

After the desired study description has been entered and *Set Receiver Clock* and *Erase logged Data* are both selected, click the “Execute” button to begin the initialization process.

Once you have initialized a receiver and are ready for deployment, it is wise to test with a transmitter and then to offload (retrieve) the data. This will create a VRL file which contains all the configuration information for this receiver. This file can be read later if required to verify that the VR2 initialized properly before deployment.



4.3.4 Change Code Map

The VR2 Map Configuration window is used to change the Code Map used by the VR2 to detect and decode VEMCO transmitters.

WARNING

Configuring a receiver with an incorrect map may result in lost detection data.

WARNING

Offload all data before configuring with a code map. Configuring a receiver with a new map erases data.

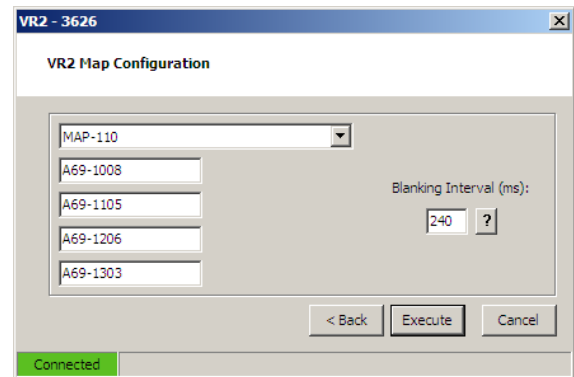
The Code Map should be changed with great caution, as configuring a receiver with an incorrect map may result in lost detection data. To determine which VEMCO code map to use, please see <http://www.vemco.com/maps.php> or consult your VEMCO sales agent.

Configuring a receiver with a new map automatically erases the data logs from the VR2. Please offload all data before configuring with a code map.

Select the radio button next to “Configure Map” in the VR2 Control Tasks list (see section 4.3.1) and then select “Next” to open the “VR2 Map Configuration” window (shown at right).

The “VR2 Map Configuration” window will automatically display the current map used within the VR2.

VEMCO maps are listed in the top drop-down box. Selecting one of these maps will automatically set the corresponding tag types in the boxes below.



The “Execute” button will start the configuration process to store the new map settings in the VR2.

4.3.5 Additional Information

LED Flashes

The red LED on the side of the VR2 case flashes based on the task being performed or the status of the receiver. The flashes can be interpreted using the table below.

| VR2 LED Flashes | Interpretation of Flashes |
|------------------------------------|--|
| No flash | VR2 is not initialized |
| Two quick flashes every 5 seconds | VR2 is in record mode (records any received pings) |
| Two quick flashes every 10 seconds | The VR2 memory full |
| One short flash | An acoustic ping was received |
| One long flash | A complete detection was written to memory |

5 APPENDIX

5.1 TROUBLE SHOOTING

5.1.1 VUE does not detect the *Bluetooth* adapter

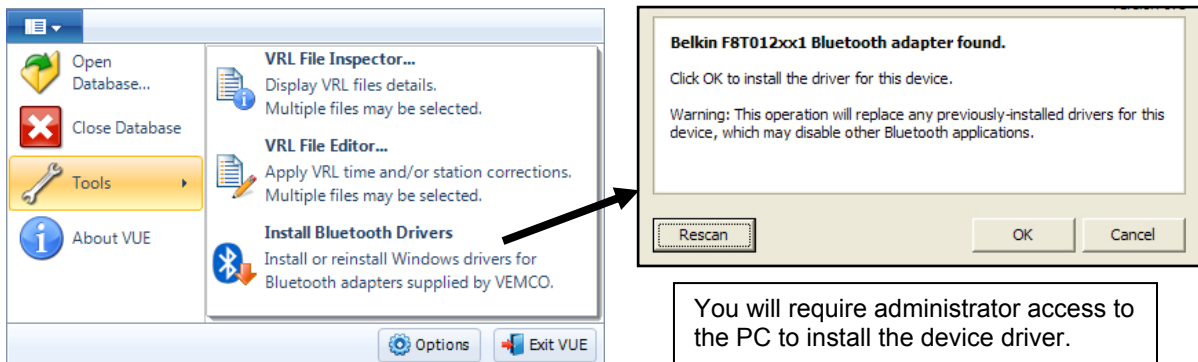
VUE will display a *Bluetooth*® logo in the bottom right hand corner of the main VUE window when the *Bluetooth*® adapter is detected and functional. If it is not detected, a red X will appear over the logo, as shown in the sample on the right below.



Here are some things to check if VUE does not detect a *Bluetooth*® adapter:

1. Is the VEMCO-supplied *Bluetooth*® adapter installed in a functional USB 2.0 High-Speed port on your PC? If nothing happens when the adapter is plugged in, try a different USB port. VUE may work with other adapters; however it is designed primarily for the adapters supplied by VEMCO.
2. Are you running the latest version of VUE? The model of VEMCO-supplied *Bluetooth*® adapter may change from time to time. Updating to the latest version of VUE is the best way to ensure compatibility. See **VUE Software Support** (http://www.vemco.com/support/vue_support.php) for the latest download.
3. Are incompatible drivers installed? The *Bluetooth*® adapter must be configured to use drivers supplied by Microsoft. These drivers are installed automatically in Windows 7 or manually through VUE in Windows XP and Windows Vista. Do not install drivers from any other source. The drivers distributed by the original manufacturer of the *Bluetooth*® adapter may not be compatible with VUE. If you previously installed the Belkin *Bluetooth*® software, it must be removed before installing the Microsoft drivers.

To install the Microsoft drivers in Windows XP or Windows Vista, use the Install *Bluetooth*® Drivers tool located under "Tools" in the VUE menu (shown below on left). You will require administrator access to the PC to install the device driver.



If no compatible adapter is found, your *Bluetooth*® adapter or USB port is not functional.

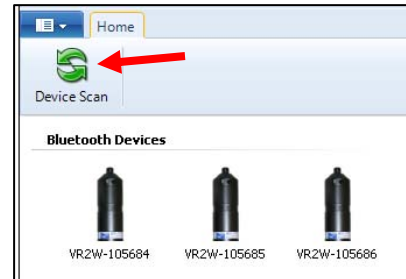
4. Is the BTH.INF file missing? This driver information file is a standard part of the Windows system, however some computer manufacturers rename or delete it to force customers to use a particular set of *Bluetooth*® drivers. This file should be located at C:\windows\inf\BTH.INF. If it is not present, then it may have been renamed to C:\windows\inf\BTH.BAK. Simply rename this file by replacing .BAK with .INF and rerun the VUE driver installation.

5.1.2 My receiver does not appear in the VUE receiver list

VUE will display a receiver icon in the “Bluetooth Devices” section of the Home tab when an active *Bluetooth*® signal is detected. VUE 2.0 and higher will only scan for *Bluetooth*® enabled receivers when the “**Device Scan**” button in the Home tab ribbon is selected.

NOTE: Only VR2W and VR4-UWM receivers are *Bluetooth* compatible.

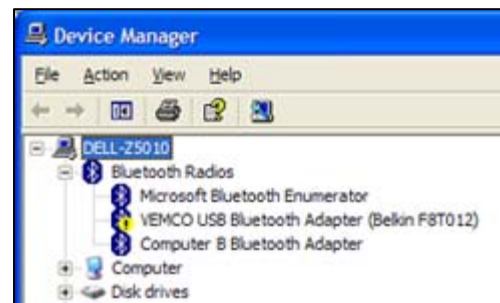
There are a number of things that may prevent a receiver from being detected.



1. Does VUE indicate that your *Bluetooth* adapter is functional? (see section 0)
2. Is the receiver in *Bluetooth* mode? The receiver’s status light will flash once a second as long as the *Bluetooth* signal is enabled. Details on putting the receiver in *Bluetooth* mode are found in section 4.
3. Have you waited long enough for the receiver to be detected by VUE? VUE will start scanning when the “Device Scan” button is clicked. You may have to wait up to 30 seconds for the receiver to appear in VUE. While you are actively communicating with one or more receivers, additional receivers will take up to 2 minutes to appear in the receiver list.
4. Is the receiver placed within range of the *Bluetooth* adapter? Try moving the receiver closer to the *Bluetooth* adapter and eliminating any possible sources of radio interference.
5. Is there a second *Bluetooth* adapter installed on your PC? A second *Bluetooth* adapter, such as a built-in adapter on a notebook PC, can interfere with the VEMCO-supplied *Bluetooth* adapter in some circumstances.

Try removing or disabling the other adapter. If you are unfamiliar with the Windows Device Manager, please consult the Windows documentation for details. You will require administrator access to the PC in order to disable devices.

- Open the Windows Device Manager.
- Open the list of *Bluetooth* Radios.
- Disable any radio devices other than VEMCO devices using the "Disable" action. Do not disable the "Microsoft *Bluetooth* Enumerator".
- Remove the VEMCO *Bluetooth* adapter from the USB port and reinsert it. It should reappear without the yellow exclamation mark.



5.2 GLOSSARY

Bluetooth wireless technology: A technology based on the *Bluetooth* standard which provides for fast wireless communication in air, typically over a 10 meter range.

Bluetooth USB Adapter: This is a physical device that attaches to the PC USB port and enables your PC to communicate wirelessly to the VR2W receiver.

Clock drift: The clocks within a receiver are controlled by a crystal oscillator. The timing of the oscillator will vary over time and thus the receiver time will drift 2-3 seconds per day.

Code Map: Collection of code spaces that define the types of transmitters the receiver can detect.

Code Space: New nomenclature for VEMCO tags which provides unambiguous description of the coding parameters for that tag type.

Exporting: Taking detection data, event data, or metadata from a VUE database and converting into a text file that can be used in other applications.

Importing: Reading VRL files into a database for viewing and post processing, or importing Metadata.

Receiver Plug-in: Modules needed to work with VUE to allow communication with specific receiver types.

Slope and Intercept: Values associated with sensor transmitters that are used to convert raw analog measurements into useful units such as degrees Celsius for temperature sensors or meters for depth sensors.

Station Name: Name for a specific deployment location including lat and long parameters.

Offloading: Retrieving data from a VEMCO receiver and storing it in a VRL file.

UTC: Co-ordinated Universal Time is a world wide standard for time, sometimes referred to as Greenwich Mean Time. VUE configures VEMCO receivers in UTC time.

VRPC Reader: This is a physical device that attaches at one end to the serial port of your PC and has a magnetic probe at the other end which is inserted into your VR2 receiver. It is used to communicate with your VR2 receiver before and after deployment.

VRL files: Binary file format for VEMCO Receiver data logs read from VEMCO receivers.

VUE : VEMCO User Environment PC Receiver software from VEMCO.

VUE Database: A collection of imported VRL files. VRL files are all that is needed to recreate a database or to create other databases.

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