

**VEMCO VR60 RECEIVER**

**VR60PC SOFTWARE MANUAL**

**Version 1.01      12-12-2011**

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*A Division of AMIRIX Systems Inc.*

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# INTRODUCTION

## ***ABOUT VEMCO***

VEMCO, a division of AMIRIX Systems Incorporated, is a leader in the design and manufacture of oceanographic research tools and systems since 1979. Located on the shores of Shad Bay, Nova Scotia, VEMCO's product line ranges from miniature acoustic transmitters and data loggers to large tracking, positioning, and monitoring systems. Data communication methods include acoustic telemetry, radio modem and cellular telephone modem.

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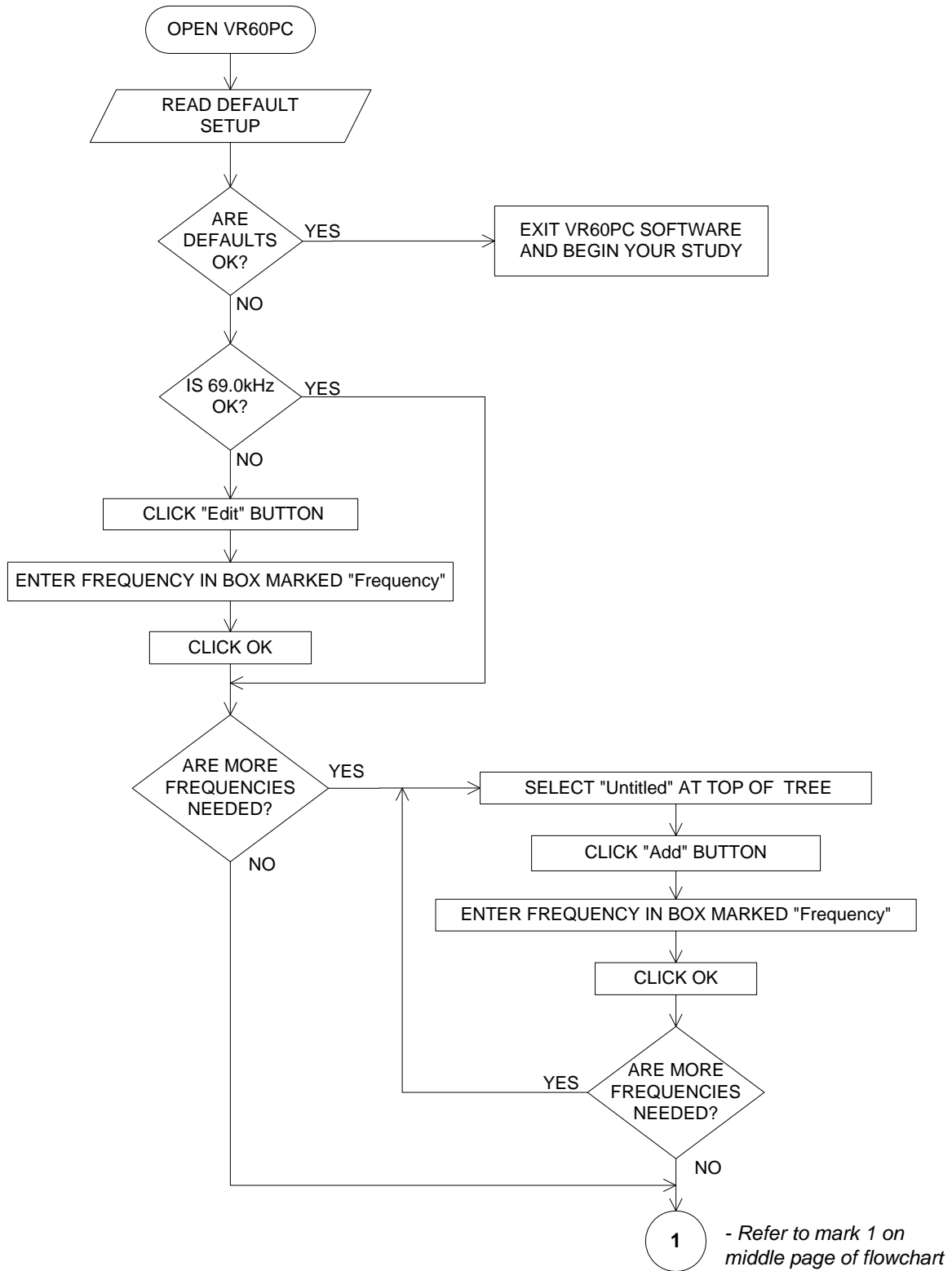
## ***SYSTEM OVERVIEW***

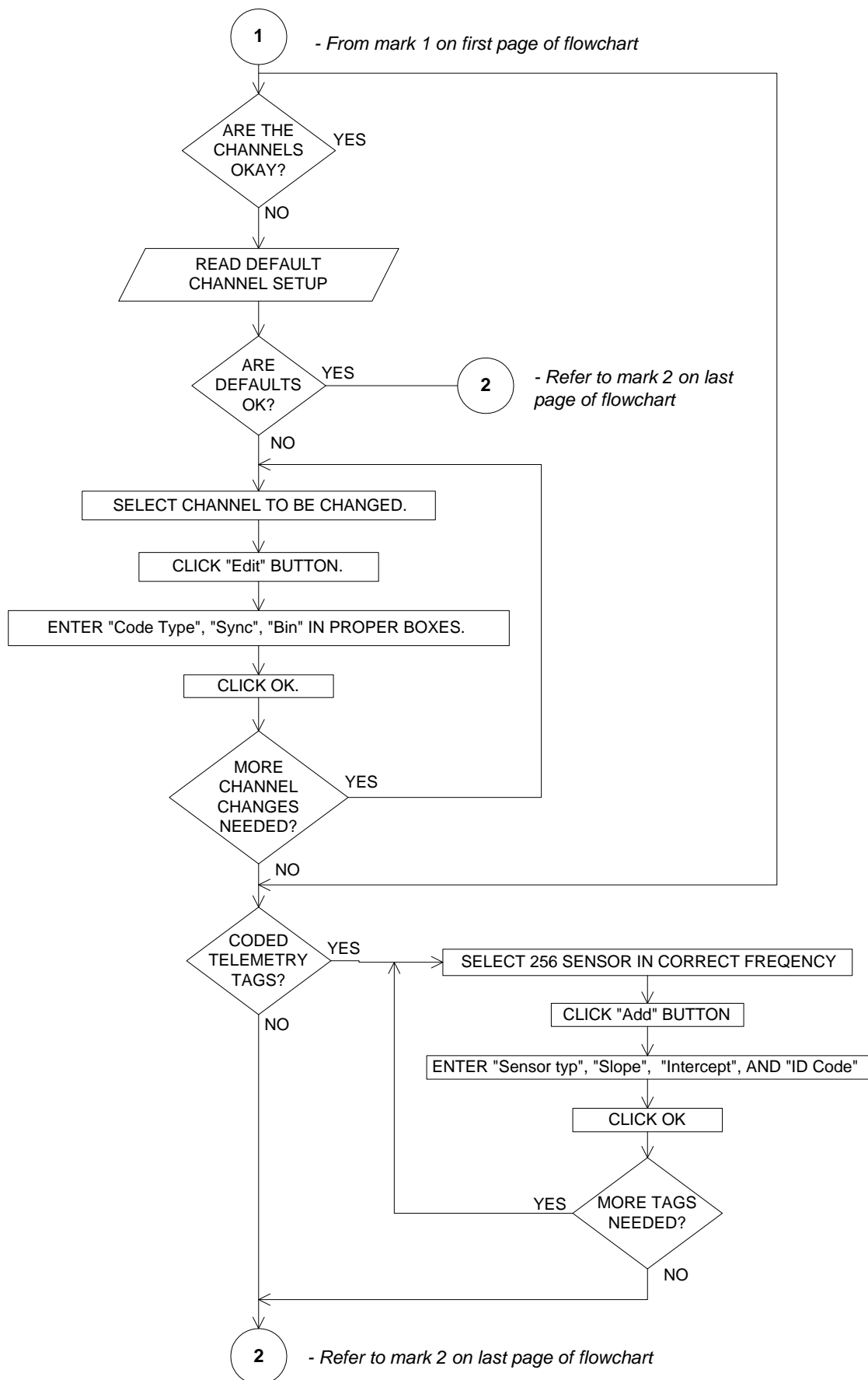
The VR60 Ultrasonic receiver is intended to receive underwater signals transmitted from pingers, location markers, data telemetry transmitters, and other similar devices over a frequency range of 10 kHz to 100 kHz.(a version is available for 200kHz). The VR60 receiver is designed to operate with a hydrophone containing a high gain, low noise pre-amplifier powered by the receiver. An omnidirectional test hydrophone is provided as a standard accessory (VH65). An optional V10 or other directional hydrophone, when used with the signal strength indicator on the receiver front panel, enables the VR60 receiver to locate and track a transmitter.

A VR60 receiver with the coded option can identify up to four transmitter types on one frequency. The frequency and means of identifying the transmitter types is set at the factory but may be altered using the VR60PC software. Information pertaining to coded telemetry transmitters, such as slope and intercept, may be entered in the VR60PC software and uploaded to the VR60 receiver. The VR60PC software also allows the current setup in the VR60 receiver to be downloaded to the computer for verification or editing. Multiple setups may be created and saved separately, allowing the same software program to maintain multiple VR60 receivers that use different setups.

## QUICK SETUP

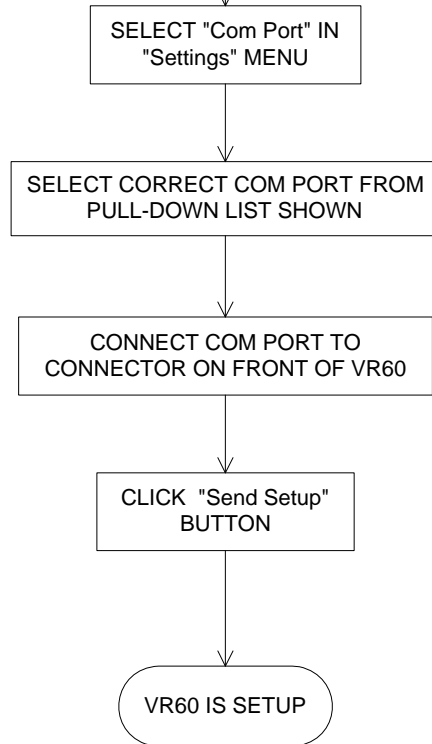
After the software has been installed (see *Software Installation* in the Appendix), follow the steps listed in the following flowchart to create a new setup for the VR60 receiver and upload that setup to the receiver.





2

- From mark 2 on middle page of flowchart



## CODED HARDWARE

A VR60 receiver with coded transmitter capability (Option 07) should be setup using the VR60PC software. Without the VR60PC software, the receiver is limited to the factory setup. The CHANNEL knob on the front of the VR60 *must* be in the external (EXT) position for coded transmitters to be detected.

To enter *Coded* mode on a VR60 receiver, press the '+' key followed by the '8' key on the keypad at the ENTER COMMAND prompt. If the desired frequency is not shown in the list of frequencies, it must be added to the VR60 receiver setup using the VR60PC software program.

NOTE: If there is only one frequency setup in the VR60 receiver, the receiver will not request a frequency selection. The frequency will be displayed.

When the frequency has been selected, the LCD display will briefly display the frequency, as shown below.

```
CODED FREQUENCY
IS 69.0 kHz
```

When a transmitter is received by the VR60, the top line in the display will indicate the arrival of the sync pulse (designated by a capital S) and each successive pulse (designated by a black rectangle § ). If a tag has been previously detected, the bottom line will display the ID code last detected (see below).

```
S § § § § § § § §
ID: 128
```

When the last pulse has been received, the information for that transmitter will be displayed. This information includes the channel, the transmitter type, the ID number, and if applicable the telemetry data and unit. The sample below shows the display for a coded 256 telemetry tag.

```
CH:C 256 SENSOR
ID: 128 56.8m
```

If no signal is received after eight seconds of monitoring, the top line of the display will read "NO SIGNAL". If a detection is made but part of the pulse train is missed, the display will read "INVALID CODE" or "WAITING FOR SYNC".

NOTE: If the top line of the display does not contain the channel ID and the transmitter type, as shown above, the information displayed on the bottom line (coded ID number and telemetry data if applicable) is not current. The code ID and telemetry data remain on the bottom line until the next complete pulse train is received.

A coded telemetry transmitter's information **must** be entered in the VR60PC software (see the *Adding Telemetry Data* section of this manual) when the coded frequency setup is sent to the VR60 receiver. If a coded telemetry transmitter is not setup and it is detected by the VR60 receiver, the bottom line of the display will show the ID number of the transmitter with the AtoD data in place of the telemetry data, as shown in the example below.

CH: C 256 SENSOR  
ID: 142 AtoD: 183

The AtoD data is the raw received data. The slope and intercept pertaining to that transmitter can be used to convert the raw data to meters or temperature.

To exit the coded transmitter option, press the ENTER key while the VR60 receiver is in signal detection mode.

### ***TRANSMITTER TYPE***

There are four types of coded transmitters available in different sizes. The table below identifies the names and key features of each code type.

<b>Code Type Name</b>	<b>Abbreviation</b>	<b>Number of Available ID Codes</b>	<b>Number of pulses</b>	<b>Telemetry?</b>
256 Pinger	R256	256	6	NO
4K Pinger	R04K	4096	7	NO
256 Sensor	S256	256	8	YES
64K Pinger	R64K	65536	8	NO

# VR60PC SOFTWARE

## ***FILE MENU***

### ***New***

The *New* feature in the *File* menu will create a new Vemco Setup File (extension .vsf) with the default coded map (see the Appendix for details on the default coded map). This feature is also accessible by clicking the *New* button in the row below the main menu (on the far left). The button is identified in the picture below (enlarged).

### ***Open***

The *Open* feature will open a previously saved Vemco Setup File. The *Open* window will allow the desired file to be selected from the list of Vemco Setup Files. This feature is also accessible by clicking the *Open* button in the row below the main menu (second from the left). The button is identified in the picture below (enlarged).

### ***Save***

The *Save* command will save the current setup as a Vemco Setup File that can be accessed at a future time. If the setup was not previously saved, the *Save* window will open to allow the name of the file to be entered. The location of the file may be altered before saving the file, if desired. This feature is also accessible by clicking the *Save* button in the row below the main menu (third from the left). The button is identified in the picture below (enlarged).



### ***Save As...***

The *Save As...* feature allows the currently open Vemco Setup File to be saved to a different name and/or location.

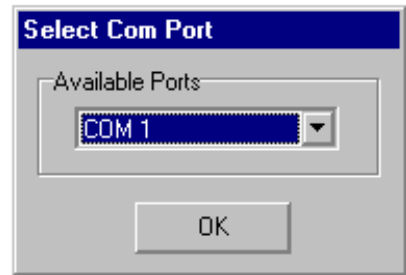
### ***Exit***

Use *Exit* to close the program, or click on the small “x” in the top right corner.

## SETTINGS MENU

### Com Port

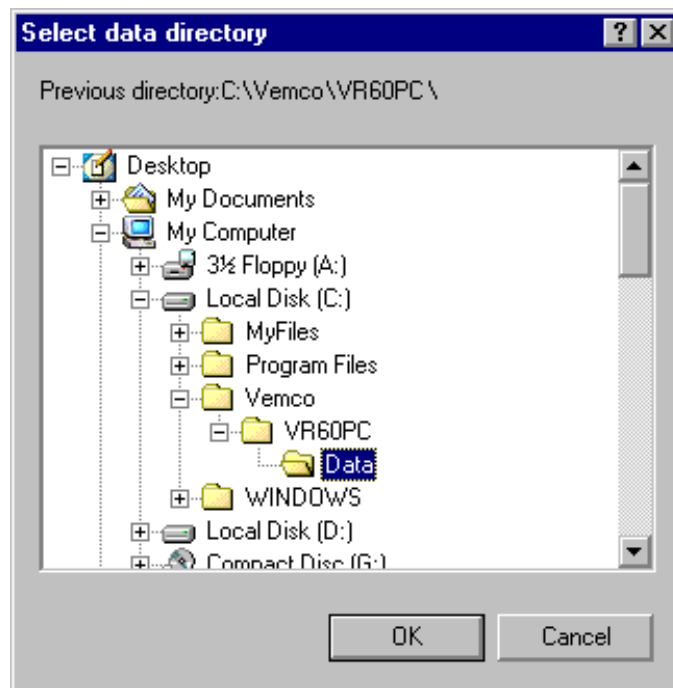
The VR60 receiver is connected to the computer through a com port, also referred to as a serial port. The VR60PC software will scan for available serial ports and will list them in the *Select Com Port* window, shown to the right. The com port to which the VR60 receiver is connected must be selected from this list for the computer to communicate with the receiver.



### Data directory

The VR60PC software will automatically save data loaded from a VR60 receiver to a data file located in an assigned data directory. The location of the data directory on the computer or network is specified in the *Select data directory* window (shown below). The install procedure will create a data directory, named Data, which is a sub-directory of the install directory. This directory will be assigned as the data directory by default. The Data directory is open in the example below and will be used to contain the Vemco Setup File data files.

If a different data directory location is desired for the data directory then click the plus symbol next to the directory until the desired directory is shown as open. Click OK. The directory listed at the top of the window will be used as the data directory.



## RECEIVER MENU

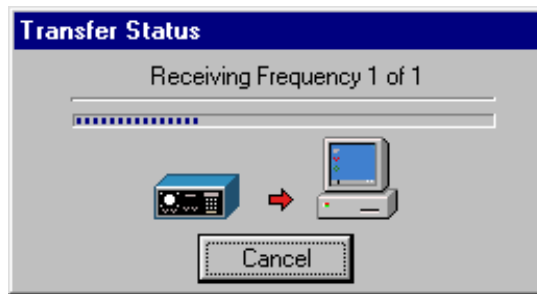
### Receive Setup

A VR60 receiver's setup may be downloaded from the receiver to the VR60PC software for viewing or editing. This is accomplished using the *Receive Setup* command, which is accessible from both the *Receiver* menu and by selecting the *Receive Setup* icon shown to the right (enlarged).



While the setup is being downloaded from the receiver, the *Transfer Status* window (shown below) will appear to indicate that communication is either being attempted or is underway.

Communication between the VR60PC software and the VR60 receiver can only occur when the designated com port on the computer is connected to the DB-25 connector on the front of the receiver with a serial cable. If communication is not possible, a window will appear with the message "VR60 not responding. Check connection." When a successful upload is complete, the message "VR60 Setup successfully received" will appear.

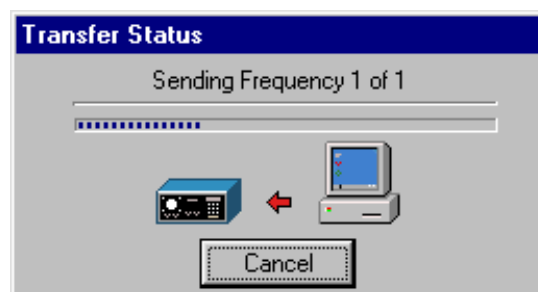


### Send Setup

Any changes made to a setup file must be uploaded to the VR60 receiver to allow for correct detection of the transmitters and reception of any telemetry data. This is accomplished using the *Send Setup* command, which is accessible from both the *Receiver* menu and by selecting the *Send Setup* icon shown to the right (enlarged).



While the setup is being uploaded to the receiver, the *Transfer Status* window (shown below) will appear to indicate that communication is either being attempted or is underway. Communication between the VR60PC software and the VR60 receiver can only occur when the designated com port on the computer is connected to the DB-25 connector on the front of the receiver with a serial cable. If communication is not possible, a window will appear with the message "VR60 not responding. Check connection." When a successful download is complete, the message "VR60 setup successfully transferred" will appear.



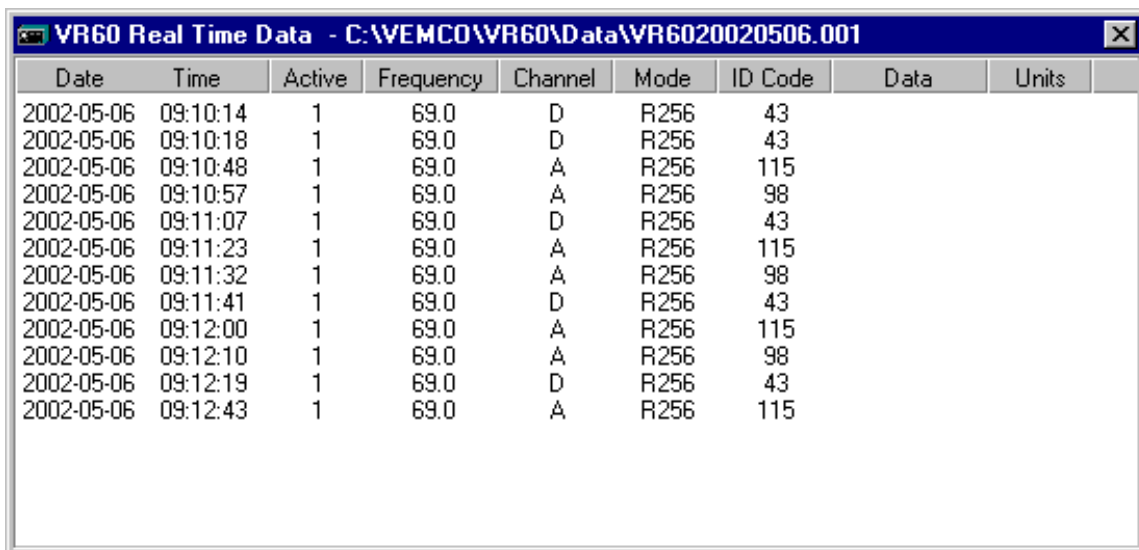
## TOOLS MENU

### Terminal

The terminal window displays the date, time, and information pertaining to each detection received by the VR60 on the computer screen. This is helpful to see the data as it arrives, during testing, or to log detections over a period of time. The computer must be connected to the receiver for the terminal window to operate.

Before the terminal window will open, VR60PC software will communicate with the VR60 and download its setup. When this is completed, the *Select Frequency* window will appear to allow the selection of the desired frequency to be monitored. The available frequencies are those in the VR60's setup, and are presented in a pull-down list. After the desired frequency is selected, click the OK button and the *VR60 Real Time Data* window (also referred to as the terminal window) will open.

The *VR60 Real Time Data* window, shown below, will display the date and time that each transmitter was detected. With this information is included the active frequency number, the frequency of the tag, the channel it was received on (A, B, C, or D), the mode (256 pinger, 4K pinger, 256 sensor, or 64K pinger), and the ID code. If the tag has telemetry capabilities, the data and unit will be included after the ID code.



The screenshot shows a window titled "VR60 Real Time Data - C:\WEMCO\VR60\Data\VR6020020506.001". The window contains a table with the following columns: Date, Time, Active, Frequency, Channel, Mode, ID Code, Data, and Units. The table lists 13 rows of data, all from the date 2002-05-06, with various times and active status (all 1). The frequency is consistently 69.0, and the channel alternates between D and A. The mode is consistently R256, and the ID code alternates between 43 and 115. The Data and Units columns are empty.

Date	Time	Active	Frequency	Channel	Mode	ID Code	Data	Units
2002-05-06	09:10:14	1	69.0	D	R256	43		
2002-05-06	09:10:18	1	69.0	D	R256	43		
2002-05-06	09:10:48	1	69.0	A	R256	115		
2002-05-06	09:10:57	1	69.0	A	R256	98		
2002-05-06	09:11:07	1	69.0	D	R256	43		
2002-05-06	09:11:23	1	69.0	A	R256	115		
2002-05-06	09:11:32	1	69.0	A	R256	98		
2002-05-06	09:11:41	1	69.0	D	R256	43		
2002-05-06	09:12:00	1	69.0	A	R256	115		
2002-05-06	09:12:10	1	69.0	A	R256	98		
2002-05-06	09:12:19	1	69.0	D	R256	43		
2002-05-06	09:12:43	1	69.0	A	R256	115		

The active frequency number is the number assigned to the frequency being monitored, and can be found in the tree list in the VR60PC window. The number is assigned according to the order in which the frequencies were entered in the VR60PC software. The frequency in the example above was the first entered in the current setup. Another setup may have had 69kHz entered third in order and the Active number seen in the *VR60 Real Time Data* window would be a three (3).

The mode identification in the *VR60 Real Time Data* window refers to the transmitter code type and has been abbreviated. The abbreviations and the coded types are listed in the table below.

<b>Code Type Abbreviations</b>	
<b>ABBREVIATION</b>	<b>CODE TYPE</b>
R256	256 Pinger
R04K	4K Pinger
S256	256 Sensor
R64K	64K Pinger

The data is automatically saved to a data file as the information is detected. The name and location of the data file is shown in the header of the *VR60 Real Time Data* window. More detail about data files can be found in the Appendix.

## ***HELP MENU***

### ***Help***

Selecting *Help* will open the help window, which contains the following options:

#### **Contents**

To select a general topic for overall help, use the *Contents* feature. Open a topic by double clicking on the book symbol next to the name, or on the name itself. A list of sub-topics will appear to choose from. Double clicking on one of these sub-topics will open the help topics related to that general topic.

#### **Index**

To select a specific topic, use the *Index* feature, which will display the complete list of topics in the help file. To select a topic, either move through the list (using the arrow keys or the scroll bar) until the desired topic is highlighted, or type the name in the box at the top of the window. As the name is entered, the list will reflect the letter being entered. For example, if the letter “t” is entered, the list will alter so the “t” section is shown. Once the topic is highlighted, either select *Display* at the bottom of the window, or double click on the topic name.

## **Find**

To search for a specific word within a topic use the *Find* feature. A word list must be created if *Find* has not be previously used. Simply follow the on-screen instructions to setup *Find*. If *Find* is not desired, select *Cancel*. A list of topics containing the desired word is listed in the third box from the top. Select a topic and click the *Display* button at the bottom of the window.

## ***How to Use Help***

The *How to use help* feature provides access to the Windows Help file, which provides step-by-step directions on using a help file.

## ***About***

*About* provides information about the VR60PC software, such as the version number, and contains a picture of a VR60 receiver.

## VR60PC WINDOW

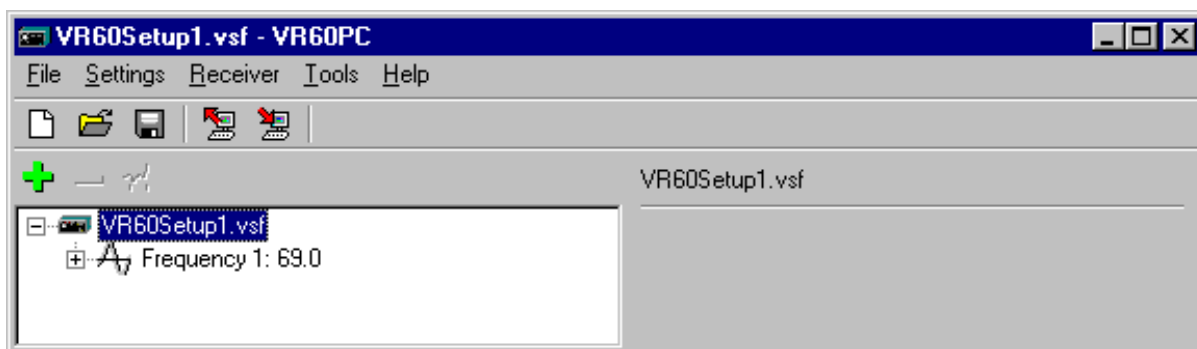
Most of the functionality of the VR60PC software occurs in the main window, called the VR60PC window. This window is divided into two sections. The left side contains a tree list of the frequencies, channels, and tags (if applicable) that have been entered in a setup. The right side of the window will allow viewing or editing of the information in the setup.

A setup is the collection of unique frequencies (maximum of 15), channels, and tag information (if applicable) that is to be uploaded to a VR60 receiver for use with coded transmitters. A setup can be saved and re-opened at a later time, which is very useful if a VR60 receiver is being used by more than one group of people. A setup may also be uploaded from a VR60 to view what has been previously downloaded to the receiver.

**NOTE:** When a change has been made to a setup, that setup must be uploaded to the VR60 receiver before the receiver will be able to act upon the changes. For example, if Channel D (69kHz) is customized to detect 256 pingers with the default sync and bin for Channel D but the change is not uploaded to the receiver, then the VR60 will not be able to identify the 256 pingers.

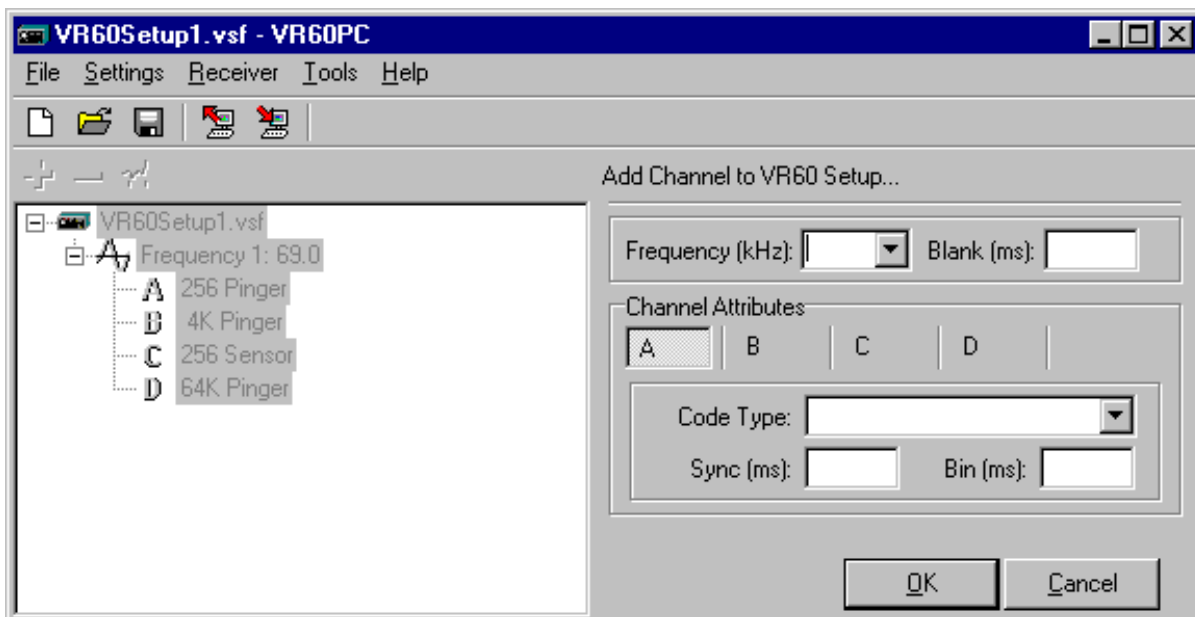
### *Adding a Frequency*

To add a frequency to a setup, select the name of the file shown in the left half of the window. In the window below, the setup file name, VR60setup1.vsf, is highlighted to indicate that it has been selected using the left button on the mouse. After the setup file name has been selected, there are three methods available to add a frequency. One method is to click the *Add Item to Setup* button (containing a green plus symbol) above the tree list. The second method is to press the Insert (Ins) key while the setup file name is selected. The third method is to right click the setup file name and select the *Add* option from the list shown. Each of these methods will enable the *Add Channel to VR60 Setup...* information, shown on the right half of the window (see the window on the following page), which includes the frequency, the blanking interval, and the channel attributes. A setup may contain a maximum of 15 unique frequencies.



The frequency is given in kilo Hertz (kHz) and may be either selected from the pull-down list or entered on the computer keyboard. The frequencies given in the pull-down list are: 32.8, 50.5, 69.0, and 200.0 kHz. The operation of the VR60 is not limited to these frequencies since any

frequency may be entered manually. When a frequency that is not included in the pull-down list is added, the VR60PC software will select the Blank value and Channel Attributes based on the default values for the frequency range in which the new frequency falls. For example, if a frequency of 66kHz was entered manually then the software would select the default values for the 51 - 78kHz frequency range. These values may be changed for a custom setup (see *Editing a Channel*). The frequency ranges are listed in the *Coded Channel* section of the Appendix.



The blanking interval (also referred to as Blank) is the length of time, in milliseconds, after an acoustic signal has been received in which the VR60 receiver will ignore any subsequent signals. This is to eliminate the reception of echoes by the receiver. The factory blanking interval default depends on the frequency selected. For example, at 69kHz the default blanking interval is 300 milliseconds.

The channel attributes include the channel number (A, B, C, or D), the transmitter code type (either 256 pinger, 4K pinger, 256 sensor, or 64K pinger), and the sync and bin values (both in milliseconds). The information required for the channel attributes is explained in detail in the *Coded Channels* section of the Appendix.

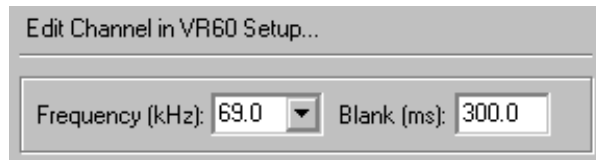
When the correct information has been selected for the new frequency, select the OK button at the bottom of the window. To exit the new frequency without saving it, select the Cancel button.

### ***Viewing a Frequency***

Information pertaining to a frequency in the setup may be viewed by clicking that frequency in the tree list on the left side of the VR60PC window. At the top of the right side of the window, the frequency number and the frequency will be displayed. Below this information, the frequency is shown with the blanking interval pertaining to that frequency. If the desired frequency for viewing is not visible in the tree list, click the plus symbol to the left of the setup file name to display the frequencies entered in the setup.

### ***Editing a Frequency***

The information pertaining to a frequency and/or its blanking interval can be edited by selecting the desired frequency and either clicking the *Edit Item in Setup* button or by clicking the frequency with the right mouse button and selecting *Edit* from the list that appears. The setup for that frequency will be shown in the right side of the window and the information will be enabled (the text will be black). The tree list on the left will become disabled when in edit mode. The frequency and/or blanking interval may now be altered as desired. The changes will not be accepted until the OK button at the bottom of the window is selected.



After a change has been made to a frequency, the setup must be downloaded to the VR60 receiver for the changes to take effect in the receiver.

### ***Deleting a Frequency***

A frequency may be deleted from the setup by first selecting the desired frequency. After the frequency has been selected, there are three methods available to deleting that frequency. One method is to click the *Delete Item from Setup* button above the tree list (containing a red negative symbol). The second method is to press the Delete (Del) key on the computer keyboard while the frequency selected. The third method is to right click the frequency and select the *Delete* option from the list shown.

### ***Viewing a Channel***

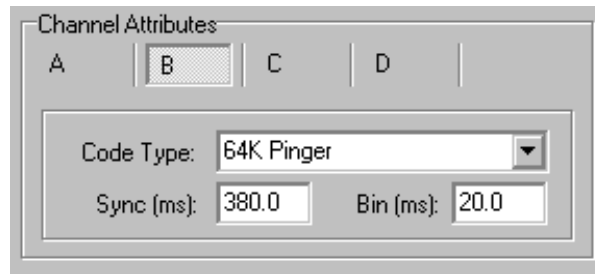
Information pertaining to a channel in the setup (channel name, transmitter code type, and sync and bin values) may be viewed by clicking the desired channel in the tree list (on the left side of the VR60PC window) with the left mouse button. The right side of the window will display all the information pertaining to that channel, including the frequency and blanking interval. If the desired channel is not visible in the tree list, click the plus symbol to the left of the correct frequency to display the channels pertaining to that frequency.

### ***Editing a Channel***

The information pertaining to a channel may be edited by selecting the desired channel and either clicking the *Edit Item in Setup* button or by clicking the channel with the right mouse button and selecting *Edit* from the list that appears. The information shown on the right will be enabled, and the tree list on the left will become disabled. The channel attributes may now be edited.

The channel attributes consist of the transmitter code type, the sync value (in milliseconds), and the bin value (in milliseconds). The code type options are Reserved, 256 Pinger, 4K Pinger, 256 Sensor, and 64K Pinger. The different code types inform the receiver of the number of pings that must be received for correct tag identification.

A different channel within the same frequency may be edited by clicking on the channel number (A, B, C, or D) with the left mouse button. The information pertaining to that channel will be displayed and is ready for editing. In the example below, the information for Channel B is shown and available for editing (enabled).



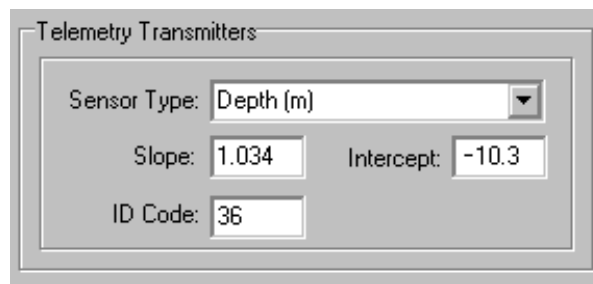
Changes made to a channel will not be accepted until the OK button at the bottom of the window is selected. After a change has been made to a channel, the setup must be downloaded to the VR60 receiver for the changes to take effect in the receiver.

### ***Telemetry Data***

All coded telemetry transmitters (256 Sensor type) used with the VR60 receiver must be setup in the VR60PC software and uploaded to the receiver for proper interpretation of the received data. The calibrated slope and intercept for each telemetry transmitter is shipped with the transmitter in the *Transmitter Specifications* manual. These values (slope and intercept) must be entered in the Telemetry Transmitters section of the Channel information.

### **Adding Telemetry Data**

A telemetry transmitter may be added to the 256 Sensor channel (if applicable) by selecting the 256 Sensor channel. After the 256 Sensor channel has been selected, there are three methods available to add a telemetry transmitter. One method is to click the *Add Item to Setup* button (containing a green plus symbol) above the tree list. The second method is to press the Insert (Ins) key while the 256 Sensor channel is selected. The third method is to right click the 256 Sensor channel and select the *Add* option from the list shown. Each of these methods will enable the open the Telemetry Transmitters section, shown on the right half of the window below the Channel Attributes section (see window below). The Telemetry Transmitters section includes the type of telemetry sensor (depth or temperature), the slope, the intercept, and the ID code of the transmitter. This information is shipped with the transmitter.



**NOTE:** Although it is possible to select the sensor types in different units (for example, depth may be in meters or feet), the slope and intercept values are given in metric units of either meters (m) or degrees Celsius (°C). If another unit is used, the slope and intercept must first be converted from Metric (see *Converting Units* section in Appendix).

After the telemetry information has been entered in the correct boxes, select the OK button to add this transmitter to the tree list. The change to the setup must be downloaded to the VR60 receiver for the telemetry data to be correctly displayed.

A total of 300 telemetry transmitters (maximum) may be entered into one setup. This total (300) includes transmitters on all frequencies in the setup.

If a telemetry transmitter that has not been setup is detected by the VR60, the data will appear as AtoD units and must be converted manually into meters or degrees Celsius, depending on the type of sensor.

### **Viewing Telemetry Data**

The telemetry data of a previously added transmitter may be viewed by clicking the desired transmitter code number in the tree list (on the left side of the VR60PC window) with the left mouse button. The right side of the window will display all the information pertaining to that transmitter, including the frequency, blanking interval, channel attributes, sensor type, slope, intercept, and ID code. If the desired transmitter is not visible in the tree list, click the plus symbol to the left of the 256 Sensor channel to display the transmitter ID codes setup in that channel.

### **Editing Telemetry Data**

The information pertaining to a transmitter can be edited by selecting the desired transmitter from the tree list and either clicking the *Edit Item in Setup* button or by clicking the transmitter with the right mouse button and selecting *Edit* from the list that appears. The information shown on the right will be enabled, and the tree list on the left will become disabled. The transmitter information may now be edited.

Changes made to a transmitter will not be accepted until the OK button at the bottom of the window is selected. After a change has been made to the information pertaining to a transmitter, the setup must be uploaded to the VR60 receiver for the changes to take effect in the receiver.

### **Deleting Telemetry Transmitter**

A transmitter may be deleted from the setup by first selecting the desired transmitter. After the transmitter has been selected, there are three methods available to deleting that transmitter. One method is to click the *Delete Item from Setup* button (containing a red negative symbol) above the tree list. The second method is to press the Delete (Del) key on the computer keyboard while the transmitter selected. The third method is to right click the transmitter and select the *Delete* option from the list shown.

## APPENDIX

### *CODED CHANNELS*

The VR60 receiver can identify up to four transmitter types on one frequency. This is done by using different sync and bin values for each of the four channels. The assigning of these sync and bin values is referred to as a coded map. The default coded map (referred to as Default Coded Map “D”) is shown in the table below. The channel values differ depending on the frequency range so as to best fit the transmitter capabilities based on transmitter size and power.

<b>VEMCO Default Coded Map “D”</b>						
<b>Transmitter Model</b>	<b>Frequency Band (kHz)</b>	<b>Channel</b>			<b>Code Type</b>	
		<b>#</b>	<b>Sync (ms)</b>	<b>Bin (ms)</b>	<b>Description</b>	<b>Transmitter Abbr.</b>
V16HF, V16THF, V16PHF	<b>200 kHz</b> (Blank = 250)	A	340	20	256 Pinger	R256
		B	320	20	4K Pinger	R04K
		C	300	20	256 Sensor	S256
		D	280	20	64K Pinger	R64K
V8, V8B, V8SC, V16, V16T, V16P	<b>51 - 78 kHz</b> (Blank = 300)	A	401.2	22.3	256 Pinger	R256
		B	380	20	4K Pinger	R04K
		C	360	20	256 Sensor	S256
		D	340	20	64K Pinger	R64K
V22, V22T, V22P	<b>34.1 - 50.5 kHz</b> (Blank = 650)	A	800	30	256 Pinger	R256
		B	770	30	4K Pinger	R04K
		C	740	30	256 Sensor	S256
		D	710	30	64K Pinger	R64K
V32, V32T, V32P, Chat	<b>27 - 34 kHz</b> (Blank = 750)	A	1000	40	256 Pinger	R256
		B	960	40	4K Pinger	R04K
		C	920	40	256 Sensor	S256
		D	880	40	64K Pinger	R64K

If a VR60 with the default coded map receives a pulse of 401.2 milliseconds then it knows that the bin should be 22.3 milliseconds (ms) and that the ping originated from a 256 pinger type transmitter. A 256 pinger type transmitter with a sync of 380 ms and a bin of 20 ms will not be identified unless the coded map is customized in the *Channel Attributes* section.

## ***CODED TRANSMITTER TYPES***

The VR60 receiver is capable of receiving transmissions from the coded tags types explained below. Once a transmitter is powered, it will continue to broadcast according to factory setup until powered down.

### ***256 Pinger***

The coded 256 Pinger emits a pulse train consisting of six pulses, usually followed with either a fixed or random delay period. Each pinger will have one of 256 unique codes. The unique code, coupled with a random delay, allows a study to have up to 256 pingers operating on the same frequency at one time. The VR60 receiver must have the 256 Pinger channel enabled for use with these pingers.

### ***4K Pinger***

For applications where more than 256 pingers are deployed at a single time, coded pingers with 4096 unique codes are available. The 4K Pinger emits a pulse train consisting of seven pulses and either a fixed or random delay period. A study can have up to 4096 pingers on the same frequency at the same time. The VR60 receiver must have the 4K Pinger channel enabled for use with these pingers.

### ***64K Pinger***

For applications where more than 4096 pingers are deployed at a single time, coded pingers with 65536 unique codes are available. The 64K Pinger emits a pulse train consisting of eight pulses and either a fixed or random delay period. A study can have up to 65536 pingers on the same frequency at the same time. The VR60 receiver must have the 64K Pinger channel enabled for use with these pingers.

### ***256 Sensor***

Coded telemetry transmitters are capable of transmitting either temperature or depth data within the pulse train. The 256 Sensor transmitters emits a pulse train consisting of eight pulses. A study may contain up to 256 coded telemetry transmitters on the same frequency and at the same time.

The ID number, slope, intercept, and data units of each transmitter being used must be entered using the *Telemetry transmitters* feature in the *Setup* menu for correct interpretation of the telemetry data.

## DATA FILES

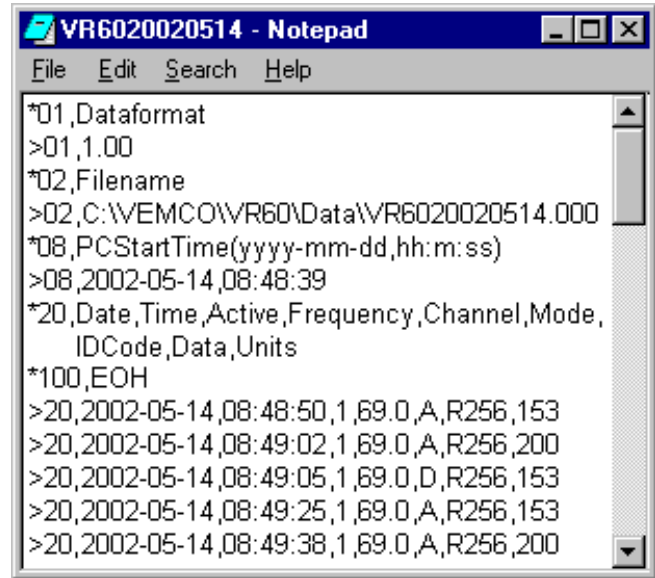
Data files are created each time the Terminal feature is used. The data files are stored in the assigned data directory, and are named according to the data file naming convention. The file is stored in ASCII text format with a comma as a delimiter. The data file can be viewed with a text editor, or be imported into a spreadsheet program.

A line in the data file beginning with an asterisk (\*) is a text header line and is usually used to identify the information contained in the next line. The header contains the following information:

- data format (firmware version number)
- file name (location)
- computer time when the file was started

The end of the header section is marked with the line `"*100,EOH"` which stands for "End Of Header".

The last header line before the EOH identifies the content of the data lines that follow. Data lines begin with the "greater than" symbol (>). The top data line in the sample data file shown here contains, in order, the data line identification (>), the date of detection, the time of detection, the active frequency number, the frequency (in kHz), the receiver channel (A, B, C, or D), the mode (R256, R04K, S256, or R64K), and the ID code of the pinger. For a telemetry transmitter, the data received would be shown at the end of the data line with the units pertaining to that data.



```
*01,Dataformat
>01,1.00
*02,Filename
>02,C:\VEMCO\VR60\Data\VR6020020514.000
*08,PCStartTime(yyyy-mm-dd, hh:m:ss)
>08,2002-05-14,08:48:39
*20,Date,Time,Active,Frequency,Channel,Mode,
  IDCode,Data,Units
*100,EOH
>20,2002-05-14,08:48:50,1,69.0,A,R256,153
>20,2002-05-14,08:49:02,1,69.0,A,R256,200
>20,2002-05-14,08:49:05,1,69.0,D,R256,153
>20,2002-05-14,08:49:25,1,69.0,A,R256,153
>20,2002-05-14,08:49:38,1,69.0,A,R256,200
```

The mode refers to the transmitter code type and has been abbreviated to reduce file sizes. The abbreviations and the coded types are listed in the table below.

Code Type Abbreviations	
ABBREVIATION	CODE TYPE
R256	256 Pinger
R04K	4K Pinger
S256	256 Sensor
R64K	64K Pinger

### ***Data file naming convention***

Data files are named using the convention VR60YYYYMMDD.ZZZ, where:

YYYYMMDD = date the file was created (year month day)  
ZZZ = number of data files created on this date (beginning with 000)

An example of a data file name is VR6020020514.001, which is the second time the *Terminal* feature was used on May 14, 2002. The third data file created on the same day would be VR6020020514.002. The file extension on the data file increments by one each time the Terminal feature is used as long as all files are stored in the same directory location.

### **CONVERTING UNITS**

The calibration data supplied with each transmitter contains the slope and intercept for a particular set of units (for example, depth in meters). If the units of display are to be changed, the slope and intercept data must be converted to match the desired units. The following examples show the procedure for depth and temperature. The conversion factors are listed in the table below.

#### **DEPTH:**

Slope :  $250 \text{ m/s} \times 3.281 = 820 \text{ ft/s} \div 6 = 137 \text{ fath/s}$   
Intercept :  $-240 \text{ m} \times 3.281 = -787 \text{ ft} \div 6 = -131 \text{ fath}$

#### **TEMPERATURE:**

Slope :  $(15.5 \text{ }^\circ\text{C/s} \times 1.8) + 32 = 60 \text{ }^\circ\text{F/s}$   
Intercept :  $(-15.0 \text{ }^\circ\text{C} \times 1.8) + 32 = 5 \text{ }^\circ\text{F}$

---

<b>UNIT CONVERSION FACTORS</b>	
<b>PRESSURE:</b>	1 bar = 14.50377 psi 1 psi = 703.1 kg/m <sup>2</sup>
<b>DEPTH:</b>	1 psi = 2.307 feet of fresh water at 4 °C 1 psi = 2.244 feet of sea water at 0 °C 1 foot = 0.3048 meters 1 meter = 3.281 feet 1 fathom = 6 feet
<b>TEMPERATURE:</b>	n °C = [(1.8 × n) + 32] °F

---

## **GLOSSARY**

### ***Bin Size***

The *Bin Size* for each coded tag is stored in the firmware of that particular tag. It is necessary for proper reception of the pulse string by the VR60 receiver.

### ***Blanking Interval***

The Blanking Interval is the time after each detected pulse in which echoes and reverberations are ignored. The Blanking Interval is normally set according to the frequency being used. The default Blanking Intervals, based on the frequency ranges, are shown in the table below. In extremely reverberant areas, the Blanking Interval may be increased to improve tag identification.

<b>Default Blanking Interval Values</b>			
<b>Frequency Range (kHz)</b>	<b>Blanking Interval (ms)</b>	<b>Frequency Range (kHz)</b>	<b>Blanking Interval (ms)</b>
27.0 - 34.0	750	50.6 - 99.9	300
34.1 - 50.5	650	200	250

### ***Setup***

A setup is the collection of unique frequencies (maximum of 15), channels, and tag information (if applicable) that is to be uploaded to a VR60 receiver for use with coded transmitters. A setup can be saved and re-opened at a later time, which is very useful if a VR60 receiver is being used by more than one group of people. A setup may also be uploaded from a VR60 to view what has been previously downloaded to the receiver.

**NOTE:** When a change has been made to a setup, that setup must be uploaded to the VR60 receiver before the receiver will be able to act upon the changes. For example, if Channel D (69kHz) is customized to detect 256 pingers with the default sync and bin for Channel D but the change is not uploaded to the receiver, then the VR60 will not be able to identify the 256 pingers.

### ***Sync Period***

The *Sync* is a value in milliseconds which allows the VR2 receiver to receive the acoustic transmissions of the tags (pingers and telemetry transmitters). The *Sync* for each coded tag is stored in the firmware of that particular tag.

## ***INSTALLING SOFTWARE***

### ***System Requirements***

VR2PC is a Windows©95/Windows NT© based software application that can be executed on any IBM compatible personal or mobile computer with the following configuration:

Minimum Pentium Processor, 100MHz  
Minimum 512 kilobytes Video RAM  
Minimum VGA Monitor 16 Colour  
3.5 inch diskette drive for program installation  
One serial port for VR60 (required)

The default setup is saved in a configuration file every time the program is exited.

### ***Software Installation***

VR2PC is a Windows©95/Windows NT© application. VEMCO assumes customer familiarity with Windows©95 terminology.

#### **To install VR60PC:**

- Step 1: Insert Install diskette into diskette drive.
- Step 2: From Start menu in Windows©95/Windows NT©, select Run.
- Step 3: Type A:\setup.exe (Type B:\setup.exe if using drive B)
- Step 4: Follow on-screen instructions.