Chapter 7: Peripheral (I/O) Devices

WinFrog can be configured to receive data from and output data to peripheral input/output (I/O) devices connected to the computer's serial ports. The maximum number of devices is limited only by the performance capabilities or limitations of the operating system to a maximum of 256 serial devices. For example, WinFrog can be used with 16 I/O devices if the computer is configured with a 16-port **DigiBoard**™ serial device. In addition, WinFrog is not limited in the number of instances of a specific device type that can be added, as long as each device has a unique name.

WinFrog allows for on-line editing of an added device's input/output communication parameters to suit the device's internally configured interface parameters. For example, changing a device's **Baud Rate**, **Data Bits**, **Parity**, **Stop Bits**, and **Comm Port** parameters can be accomplished by viewing a single screen in WinFrog, making changes very quick and easy. This makes initial device interfacing a simple process.

In addition to the communication parameters, some devices have numerous internal configuration options specific to the type of device added. WinFrog allows for the changing of the device configuration to accommodate these options. An example of a configuration parameter would be the type of NMEA format messages that a device can be configured to output.

A timeout may also be enabled for each serial device or network device that sends data to WinFrog. When data is not received from that device for longer than the interval, a dialog is displayed indicating the COM port or network device that stopped sending data. A different timeout interval may be set for each device.

When two WinFrogs are running on separate computers and connected to the same devices, only one computer can send data to the device. To allow this, you can set WinFrog to globally block all output on serial (COM) ports. See the section *Running Simultaneous WinFrogs* for details. Also see the section *Device I/O Parameters Dialog Box* for details on individual device override.

This chapter examines how to add, modify, configure, and delete peripheral devices in WinFrog. Adding a device to WinFrog inherently adds the display, computation and recording routines required to effectively utilize the data.

Throughout this chapter the terms "peripheral device" and "I/O device" are used synonymously.

Adding a Device

Adding a peripheral device to WinFrog is a multi-step process.

The first step is to physically connect the device to the computer through a serial port. This is not a trivial task. Care must be taken to ensure that the device's internal configuration is correct, that the device is in fact operating correctly, and that the wiring and connections between the device and the WinFrog computer will transfer the data correctly. This manual does not address

these matters. You may have to consult the device's manual to ensure that these concerns have been addressed correctly.

The second step is to instruct WinFrog where to find the device (i.e. which serial port the device is connected to), what type of device it is, and how to communicate with it.

The third step is to associate the device's data with a specific vehicle. This topic is briefly introduced here and covered in greater detail in the **Vehicle Data Source** chapter.

To Add a Device to WinFrog

There are two ways to add devices to WinFrog. Both methods use the same **Add Device** dialog box. The only difference is how you access the dialog box.
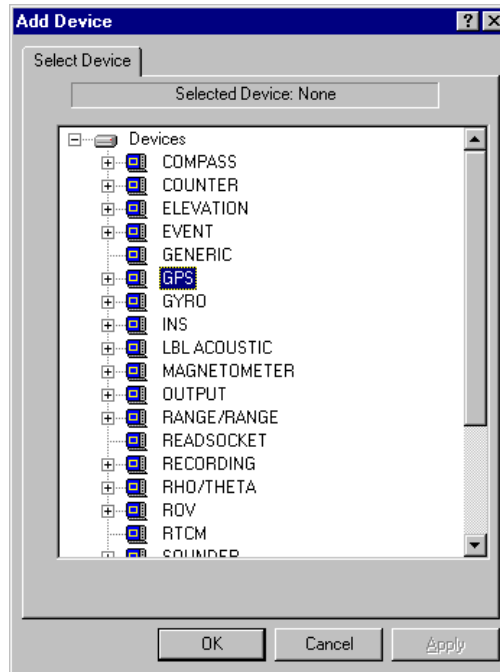
Recommended Method:

1A Select **View > I/O Devices** to display the **I/O Devices** window, as seen below**.**
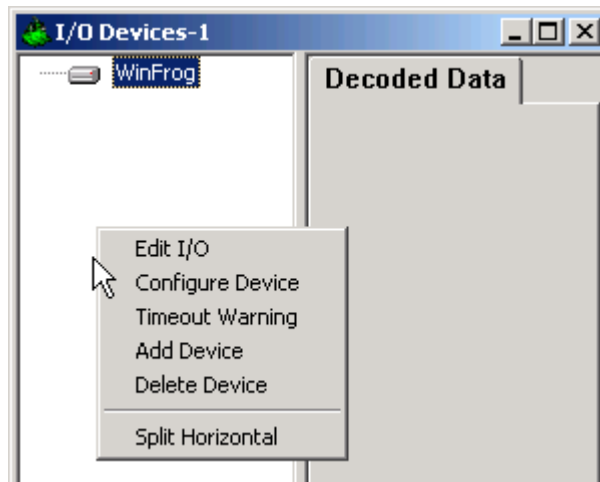

Next, place the mouse pointer within the white section (left side) of the **I/O Devices** window, click the right mouse button, and select **Add Device**.

1B Select **Configure** > **I/O Devices...Add**, at which point the same **Add Device** dialog box, shown below, displays.

The **Add Device** dialog box contains a list of **Device Groups**. Each device group contains one or more types of that particular device, including all common **NMEA** compliant data devices. For example, the **GPS** group contains device drivers for many commonly used GPS makes and models.

2   To view the various options of a particular device group, either click the "+" symbol beside the **Group** name, or double-click the **Device** group name. For example, double-clicking on the name **GPS** displays the various GPS options, as shown in the dialog box below.
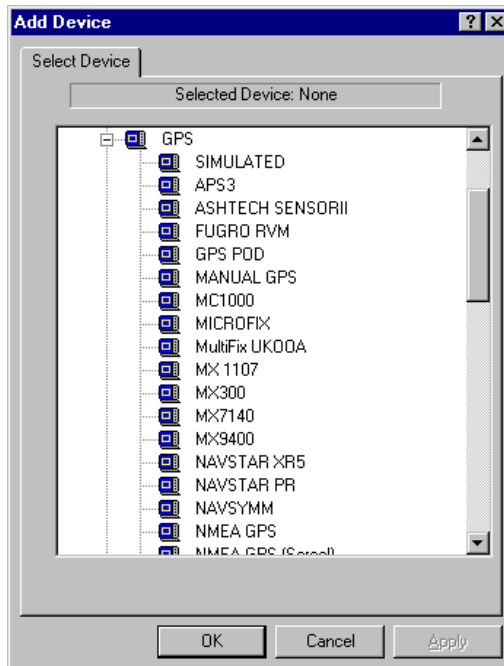
3   Select the desired device from the list of drivers and click **OK**.

A dialog box opens that allows you to configure the communication parameters for that device. Depending on the type of device selected, one of three different dialog boxes opens.

    A   If you select a **Simulated Real-time** device, a dialog box that allows for the configuration of the simulated device **name** only displays.

    B   If you select a **Real-Time** device (i.e. a device connected through a serial port), the **Device I/O Parameters** dialog box displays.

The **Device I/O Parameters** dialog box is the most common as it is displayed after (almost) any real-time device is selected.

    C   If you add a **NovAtel**[TM] **GPS** device to WinFrog, a **Novatel PC Card** dialog box displays, specifically for a **NovAtel CON** device connected through an ISA port.

Note: since Fugro Pelagos, Inc.'s systems are commonly configured with NovAtel GPS cards, this is described in specific detail in the **NovAtel PC Card** section later in this chapter.

4   When the desired communication parameters have been set, click **OK**.

Device I/O Parameters Dialog Box

Some devices support TCP communications as well as COM port (e.g. RS232) communications. Those devices that do support Ethernet will open with a dialog allowing you to select RS232 or TCP/IP as seen below.
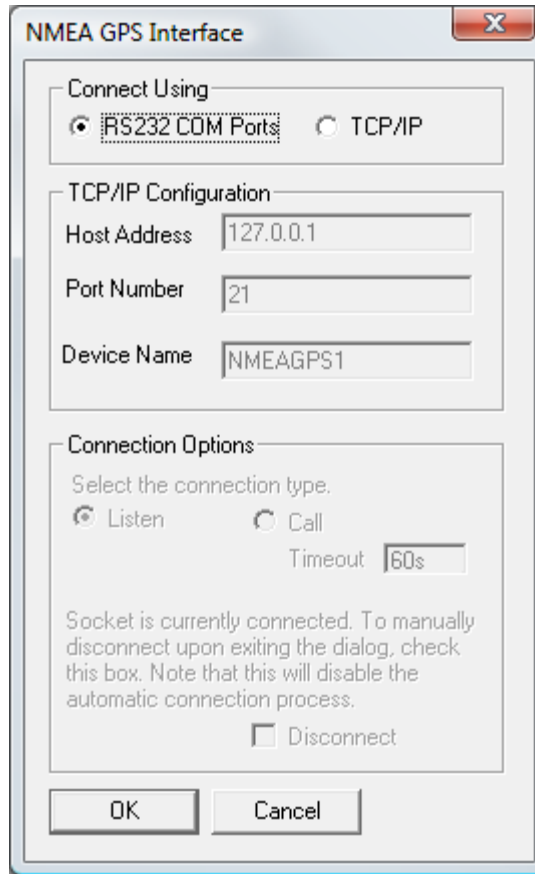
If you want TCP/IP, then click the radio button, enter the host address, port number, a unique device name, and select either to listen or call. See the specific device document for more details. If you want RS232, select this radio button and click OK to get the dialog below.
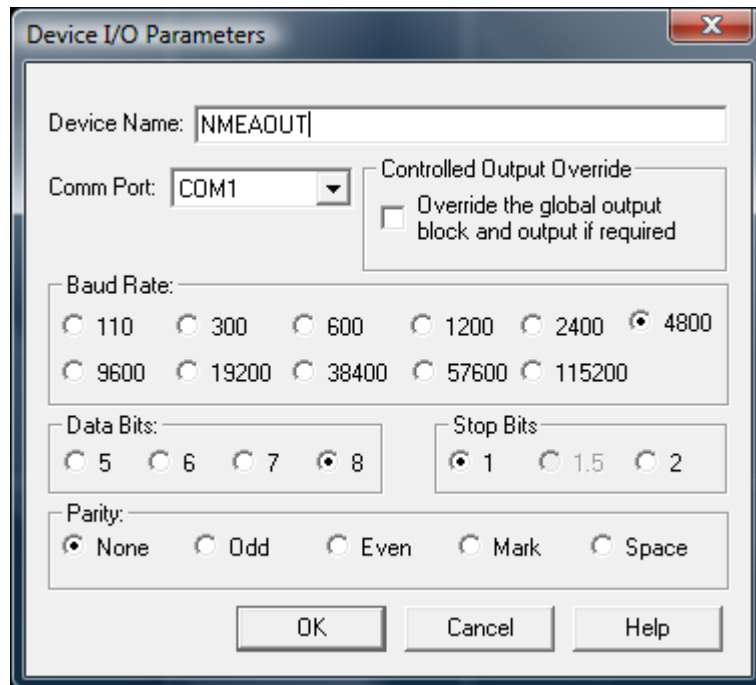
Device Name

You must enter a unique device name for each device selected for use in WinFrog.

Controlled Output Override

WinFrog supports two computers running WinFrog in a 'hot' mode where each device is connected to both PCs and each WinFrog is receiving data from the devices.

To use the same peripheral serial devices, an Ethernet Serial Port Concentrator that supports multiple connections needs to be employed. This will bring the data from each device into both computers at the same time. To prevent the garbling of data if both WinFrogs were allowed to transmit, WinFrog offers a feature that allows you to block serial (RS232) output (Ethernet devices not affected). See the section **Running Simultaneous WinFrogs** in this chapter for details on setup and selecting which WinFrog to output.

This particular checkbox overrides the global output block and allows this device to output. This is useful should a particular device only be connected to one 'hot' WinFrog. This checkbox will be disabled if WinFrog is in the Stand Alone mode where it is always outputting.

You must configure the following serial port communication parameters in the **Device I/O Parameters** dialog box:

Baud Rate	data transmission speed
Data Bits	number of data bits sent
Stop Bits	number of bits separating two consecutive words
Parity	error checking algorithm
Name	should be a unique name to distinguish the device from other devices
Comm Port	use the dropdown box to select the operating system's communication port to which the device is connected. **Note:** this is typically **not** the DigiBoard™ port number unless specifically configured.

The **Baud Rate, Data Bits, Stop Bits** and **Parity** must be configured to be the same as those configured within the peripheral device. If these communication parameters are not set correctly, WinFrog will not be able to receive information from or send information to the device.

Most modern peripheral devices use the following configuration settings:

Baud Rate: 9600   **Data Bits:** 8   **Parity:** None   **Stop Bits:** 1

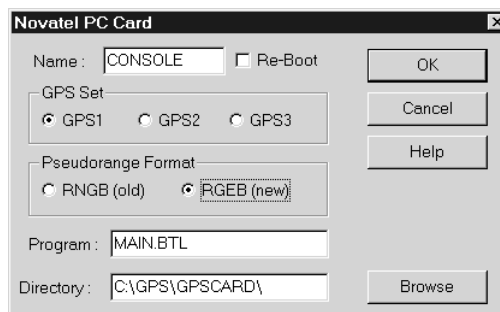Consult the device's manual for more information on communication settings for the device.

WinFrog attempts to initiate communications with the selected **Comm Port**. If the **Comm Port** is not found, an error message (such as the one shown below) displays and the device will not be added to WinFrog.

If WinFrog is successful at establishing communication with the comm port, the device will be added to WinFrog's **I/O Devices** display list. This does not necessarily mean that the data will be correctly received, as this is still subject to correctly setting the I/O parameters, as mentioned above. This only means that the **Comm Port** has been found. Observe the **Decoded Data** portion of the **I/O Devices** window to ensure that data are being received from the device and are updating at the appropriate interval.

NovAtel^{TM} PC Card

If a **NovAtel CON** device (connected through an **ISA** port) is selected from WinFrog's **I/O Devices** list, the **NovAtel PC Card** dialog box opens, as seen below.

You must configure the following parameters:

|	
Name	should be a unique name to distinguish the device from other devices
Re-Boot	This checkbox allows you to re-start the GPS card using the .**BTL** file
GPS Set	A computer can be configured to have as many as 3 NovAtel GPS cards. If there is more than 1 GPS card installed, each must have a unique identification: NovAtel cards can be configured to respond to GPS Sets 1, 2, and 3 (NGPS1, NGPS2, NGPS3). (Consult the NovAtel manual for more information on GPS sets.)
Pseudorange Format	Refers to the recording of raw measurements and tracking error information. The **RNGB** format is now obsolete. Unless a very old GPS Card (manufactured prior to March 1995) is used, select the default **RGEB (new)** option.
Program	The name of the specific .**BTL** file required by the installed NovAtel card. In all Fugro Pelagos, Inc. systems the .**BTL** file has been re-named to

match the serial number of the NovAtel card.

Directory Refers to the directory containing the **.BTL** file for that particular NovAtel card. Following a typical NovAtel installation, the **.BTL** file will be found in the **C:\ GPS\ GPSCARD** directory. If the **.BTL** file has been placed elsewhere, use the **Browse** button to navigate to that location.

Note: The **.BTL** file is required by the **NovAtel Console GPS Card** in order to initialize the GPS card. Consult the NovAtel manual for more information on **.BTL** files.

Once the desired communication parameters have been set, click **OK**.

WinFrog attempts to initiate communications with the NovAtel device. A status window opens, as seen below.
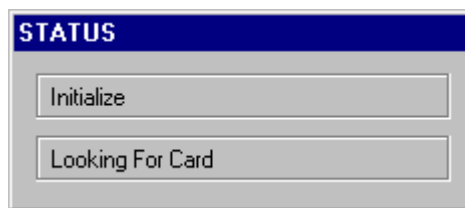
If this attempt fails, an error message is displayed, as seen below.
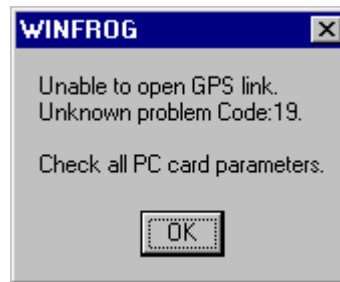
This message means that WinFrog is unable to communicate with the GPS card. This may be the fault of incorrect settings in the NovAtel configuration or an incorrectly installed GPS Card.

Select **OK** to continue. **Note:** a **CONSOLE** device is added to WinFrog's **I/O Device** listing, but no information is actually received from the NovAtel receiver. Rather than add another NovAtel device to WinFrog, you can highlight this **CONSOLE** device, then right click and select **Edit I/O** to bring up the same configuration dialog box mentioned above. Repeat the above mentioned configuration steps, ensuring that the all entries and selections are correct.

If the connection is successful, the NovAtel GPS information (i.e. the **SV**'s, **Channel**, **S/N** etc.) will be visible in the **Decoded Data** portion of the **I/O Devices** dialog box.
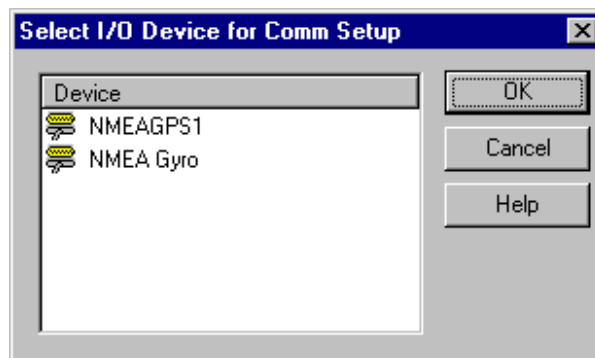
Editing Device Input/Output Parameters

If WinFrog is not communicating correctly with a specific device or if any error message appears after configuring the parameters described above, then the input/output parameters referring to that device must be edited. The following section details editing the I/O parameters as found in WinFrog. If these instructions do not solve the communication problems, you must examine the internal configuration of the device too.

To Edit WinFrog's Input/Output Parameters for a Device

There are two ways to edit the **I/O** parameters of devices interfaced to WinFrog. Both methods utilize the same **Edit I/O** dialog box. The only difference is how this box is accessed.

1A The preferred method is to select **View** > **I/O Devices** to view the **I/O Devices** window. Select the desired device, then right-click and select **Edit I/O.** The **Device I/O Parameters** dialog box opens, as seen above when the device was originally added.

1B Another method is to select **Configure** > **I/O Devices...Edit I/O**, at which point the **Select I/O Device for Comm Setup** dialog box appears, as seen below. Select the desired device and click **OK**. The **Device I/O Parameters** dialog box displays.

See the **Adding a Device** section earlier in this chapter for information concerning configuring the communication input/output parameters.

2 Make the changes to the input/output parameters.

3 When finished, click **OK** to close this dialog and activate the changes.

Configuring Generic Device Parameters

Some devices have configuration parameters that are specific to that type of device, regardless of the type of vehicle to which they are attached. These are "generic" device parameters that must be configured before the device is added to a vehicle. **Note:** most devices also require specific configuration once they have been added to a vehicle. See the **Vehicle Data Source** chapter for more information on vehicle-specific device configuration.
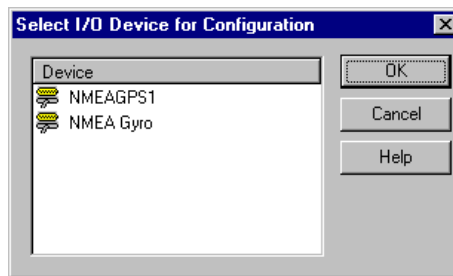
To Configure Generic Device Parameters

There are two ways to configure generic device parameters for all devices interfaced to WinFrog. Both methods will result in the same configuration dialog box for that device. The only difference is how this box is accessed.

Note: not all devices require this "generic" configuration. If there are no generic configuration options for a device, the following directions should not be used.

1A Select **View >I/O Devices** to view the **I/O Devices** window**.** Select the desired device, right-click and select **Configure Device.** The configuration dialog box for that specific device opens, if there is one for that device.

1B Select the main menu item **Configure** > **I/O Devices...>Configuration** to open the **Select I/O Device for Configuration** dialog box, as seen below.

2 Select the desired device and click **OK**. WinFrog opens a dialog box that allows for the configuration of parameters specific to that device.

Enabling the Timeout Warning

To Enable or Disable the Timeout Warning for a Device

There are two ways to configure the timeout warning for each device interfaced to WinFrog. Both methods will result in the same configuration dialog box for that device. The only difference is how this box is accessed.

Note: Not all devices support a timeout warning. Only those devices that send data to WinFrog are supported. If a device uses multiple COM ports that send data to WinFrog, each may be enabled separately. This feature does not test for eligible telegrams for the particular device to determine if the interval has elapsed or not; any character received counts as a positive indicator of communications.

1A Add all the devices as described above. Select **View >I/O Devices** to view the **I/O Devices** window then right-click and select **Timeout Warning.** The timeout configuration box will open as below.

1B Select the main menu item **Configure** > **I/O Devices...> Timeout Warning** to open the **timeout configuration** dialog box, as seen below.
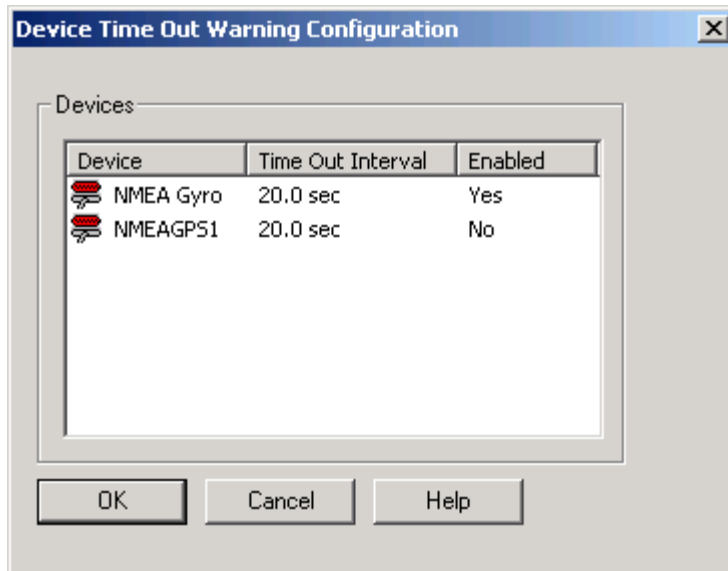
2 To toggle between enabled and disabled, click the appropriate No/Yes text beneath the Enabled column.

3 To change the timeout interval, click the appropriate current time to open a small edit box and enter a new time in seconds. It is not necessary to enter the word sec. The minimum timeout interval is 10 seconds.

4 Click OK to accept the changes or Cancel to close the dialog and ignore any editing.

Note: If a large number of devices have a short timeout interval and they all timeout at, or nearly at, the same instance, you may encounter difficulties trying to close all the message boxes. The message boxes need to be closed before other dialogs can be opened. Thus the time out intervals should be staggered and not unduly short.

Deleting a Device

To Delete a Device

There are two ways to delete devices interfaced to WinFrog.

1A Select **View > I/O Devices** to view the **I/O Devices** window. Select the desired device, right-click and select **Delete Device**. You must select **Yes** to confirm that you want to remove the device from WinFrog entirely.

1B The other method is to select the main menu item **Configure > I/O Devices... Delete**, at which point the **Select I/O Device for Deletion** dialog box appears displaying all devices currently added to WinFrog.

2 Select the desired device and click **OK**. Select **Yes** to confirm that you want this device to be removed from WinFrog.
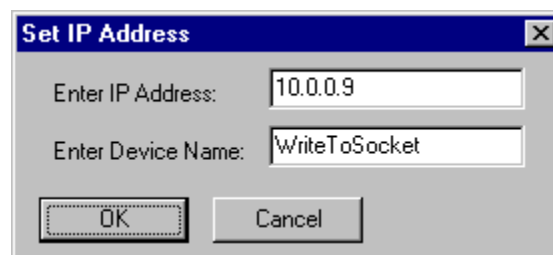
Adding I/O Socket Devices

Adding an I/O socket device to WinFrog is similar to adding a "peripheral device" connected to the computer's serial ports. In this instance, the device is connected to the network that the WinFrog computer is on and will communicate using TCP / IP protocols. Use the same setup as described previously to select the socket I/O devices "WriteToSocket" and "ReadSocket".
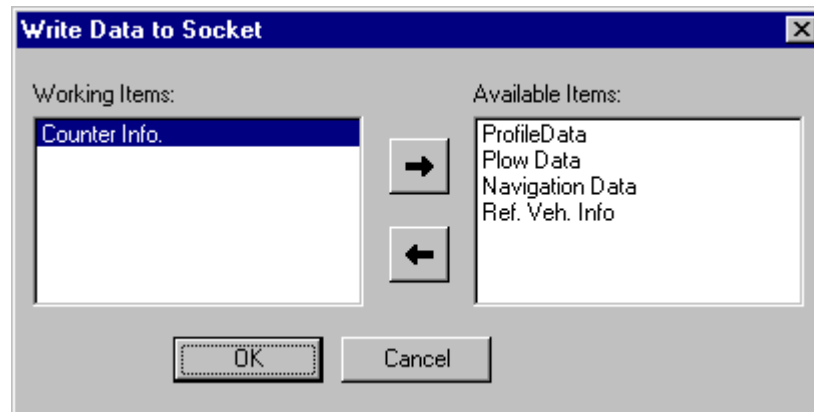
Configuring Socket Devices

To Configure the I/O device "WriteToSocket"

1   Set the IP number of the computer to write the data to using **Edit I/O**.
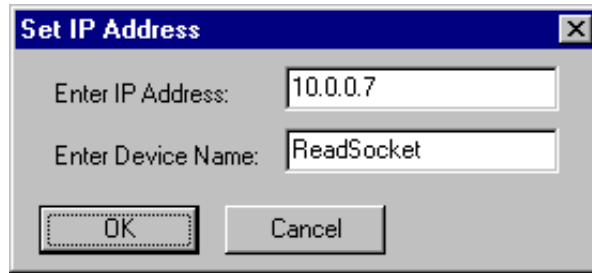

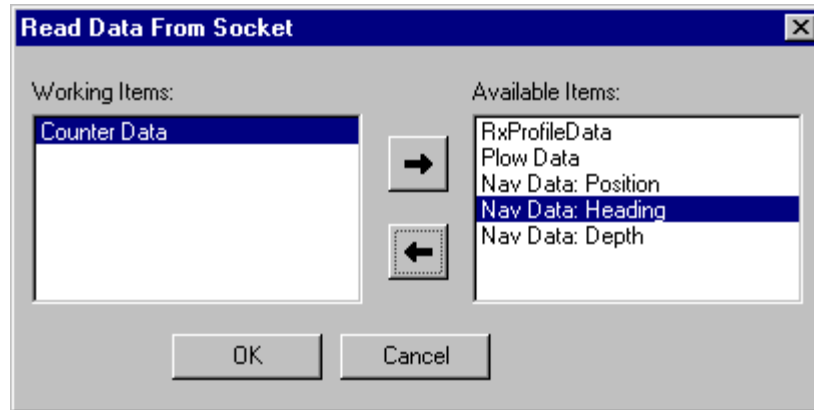2   Select the data to actually be sent to the other computer using **Configure Device**.

3   See the chapter **Vehicle Data Source** subsection **Adding a Peripheral Device to a WinFrog Vehicle** to attach this socket device to the vehicle.

4   See the chapter **Vehicle Data Source** subsection **To Configure the Primary System for Network Data Output Using Sockets** to setup this socket device to transmit data.

To Configure the I/O device "ReadSocket"

1   Set the IP number of the computer to write the data to using **Edit I/O**.

2 Select the data to actually be read from the other computer using **Configure Device**.

3 See the chapter **Vehicle Data Source** subsection **Adding a Peripheral Device to a WinFrog Vehicle** to attach this socket device to the vehicle.

Running Simultaneous WinFrogs

Two WinFrogs can be setup on separate computers such that both are completely operational (i.e. 'hot'). To use the same peripheral serial devices an Ethernet Serial Port Concentrator that supports multiple connections needs to be employed. This will bring the data from each device into both computers at the same time. To prevent the garbling of data if both WinFrogs were allowed to transmit, WinFrog offers a feature that allows you to block serial (RS232) output (Ethernet devices not affected). Furthermore, the two WinFrogs can communicate with each other, over the Ethernet, letting the other know if it is sending data or not, thus preventing you from setting both WinFrogs to transmit. See the document *MOXA Ethernet Serial Port Concentrator Installation* for specific hardware instructions.

Below are the three modes that WinFrog can be in with respect to transmitting data to peripherals, along with the corresponding toolbar button.

- **Standalone**   This is the default setting and all of WinFrog's device drivers that normally send data out will continue to send data out.

- **Shared devices actively transmitting**

- **Shared devices not actively transmitting**

To enable transmission click the **Off** button. Before WinFrog will begin transmitting, it monitors the network to see if another WinFrog is present and transmitting. If it doesn't receive any new messages for about 2.5 seconds indicating another WinFrog is present and transmitting, the button will depress and WinFrog will allow transmission to its serial devices.

Not all WinFrog device drivers actually require WinFrog to send data. All those in the Output group do, but the others may or may not. See individual device documents.

To set up the Inter-WinFrog Communications

1   Ethernet cards must be available in both computers on the same network and connected.

2   Hook up all the peripherals to the Ethernet Serial Port Concentrator.

3   When WinFrog is run the first time or when it reads an INI or CFG file whose version is <3.8.9 it will power up in 'standalone' mode. Boot up one of the WinFrogs.

4   From the main menu select **Configure > Ethernet Card and Device Output Control**. A dialog will open allowing you to select the network. (This same network is also used by the Smart Remotes.) Change the **Output to Device Control** to **Shared Devices (Controlled Output)**. The port may be changed should it conflict with others on the network, but both WinFrogs must use the same port. Close the dialog with OK.

5   WinFrog will then go to the 'shared device not actively transmitting' mode.

6   Boot up the second WinFrog and repeat step 4.

7   Both WinFrogs are now in the 'shared device' mode but neither is actually transmitting (except as described in Device Output Override below). Click the toolbar button on the WinFrog that you want to send data.

Device Output Override

Should you require a device to always output, follow the steps below:

1   Select the device in the **I/O Device window**. Right-click and select **Edit I/O**. (If the TCP or Serial dialog opens, select Serial then OK to get the **Device I/O Parameters dialog**.) Select the checkbox **Override the global output block and output if required**.

Note: If WinFrog normally sends data out to the device selected then it will again, regardless of the setting of the toolbar button.

Note: If you are going to use this override feature and always output data, you need to be sure that this device is not connected to both WinFrogs as both WinFrogs could transmit simultaneous causing the message to be garbled. It is suggested that such devices be connected directly to a native COM port (e.g. COM 1).