RightHand
Engineering, LLC *Com Port Troubleshooting*

The information in this document may be of use in the event that you are not able to get *WinVerter* to communicate with your renewable energy (RE) hardware. *WinVerter* communicates with RE hardware via a host PC's serial communications port (a.k.a. RS-232 Port or Com Port) and the RE equipment computer interface (e.g. Xantrex SWCA/ICA or OutBack Mate). The following are possible causes of failed communications:

1. The PC doesn't have a Com Port.

What does an external serial Com Port look like? Except for very old PCs, serial Com Ports have a 9-pin male (pins exposed) connector. If your PC is very old it may have a 25-pin male connector. Do not confuse this with the parallel printer port - a serial port always has male pins instead of female sockets. If your PC has a 25-pin serial Com Port you will probably need to obtain a 25 pin female-to-9 pin male adapter, usually also available at local computer stores.

Some new laptop (or notebook) computers do not have an external serial Com Port. Also, it is possible that customized or modified desktop computers may not have an external Com Port. Of course, if one does not exist, then there is no way for *WinVerter* to use it. However serial ports can be added to PCs in one of two ways. If your PC is newer it may have a USB port. If so a USB-to-Serial converter can be purchased at a computer store for about $40. If your laptop has a PCMCIA card slot, a single, dual or quad serial port card may be obtained that plugs into one of these slots. PCMCIA cards and USB converters may be purchased from B & B Electronics (http://www.bb-elec.com). USB converters (a.k.a. USB PDA Adapters) made by Belkin (such as pn F5U109) can be purchased at most local computer stores. In both cases you will probably also have to install driver software for the added device on your PC.

2. *WinVerter* is configured to use the wrong or non-existent PC Com Port.

WinVerter can select from up to 16 different Com Ports, only one of which is correct for *WinVerter*. Generally a PC has at least one external serial communications port and may also have one or more "internal" ports. An "internal" serial port may be a modem port or an infrared (IR) interface. *WinVerter* requires an external port. Generally if you try to set *WinVerter* to use a non-existent port, you will receive an error "Invalid Port Number". If you set *WinVerter* to use an internal port, and that port is not in use, it may think it is a valid port to use, but it won't actually work. If in doubt, first try setting the *WinVerter* Com Port to Com #1 and then try working your way through the next higher port number. You may use the **Serial Com Port Test Procedure** below to identify whether a Com Port is used by a modem.

3. The PC's Com Port is already in use by another PC program.

If you try setting *WinVerter*'s Com Port to a port that is already in use, you will see the error "Port already in use". This may happen if the port is already allocated to a different program running on your PC. The most common type of background program that uses an external Com Port, is Palm™ or Pocket PC™ synchronization software, or other type of software designed to communicate with cradled or dockable devices that need synchronization (including a serial mouse). To locate the potential culprit, find the various background software on your system tray (the Windows™ area generally on the bottom, right-hand corner of you screen) and disable or exit the programs one at a time until the error stops happening (you should restart *WinVerter* each time you disable/exit a program).
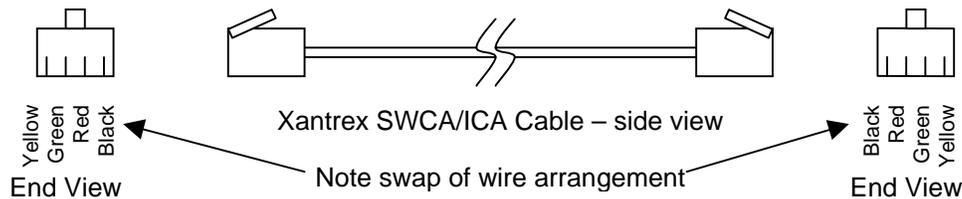
4. The PC's Com Port is not functional.

Com Ports are controlled by the Windows™ operating system. If the operating system is not able to communicate with it, neither can any program running under the operating system (such as *WinVerter*). You can check to see what the Windows operating system had detected by doing the following: Right-click "My Computer", left-click the "Properties" item in the drop-down menu, left-click the "Hardware" tab in the pop-up window, left-click the "Device Manager" button on the pop-up window. Locate an entry in the list labeled "Ports (COM & LPT)" and click the "+" box to the left of the label. The ports that Windows recognizes will be listed here. If Windows detects a problem with a port, the graphic symbol for the port will

have a warning symbol within it. If you right-click the graphic symbol and left-click "Properties" in the drop-down menu, you can see more details about the Windows status for the port.

Note that a port can be broken to the point that Windows does not recognize it. Also, Windows can show a port as being good, but it may not actually be working well enough to communicate with your RE hardware. To know for sure if a Com Port works try the **Serial Com Port Test Procedure** and the **Serial Com Port Handshake Line Test Procedure**.

5. The cable connecting the PC's Com Port to the RE equipment's computer interface is the wrong type or is non functional.

Xantrex: The cable used to connect the host PC's Com Port to the Xantrex SWCA (SW Communications Adapter) or ICA (Inverter Communications Adapter) is a 4-conductor telephone-style cable. The factory cable is 25 feet long and uses modular 6-position, 4-conductor telephone connectors at both ends. The end that plugs into the PC must use the factory supplied telco-to-9-pin adapter. It is possible for the factory cable to be mis-wired. If the SWCA or ICA cable has been modified or extended, it is very possible that the cable has been improperly made. A correctly wired cable will have the order of the wires reversed from end-to-end. See the following diagram. If you have access to an ohm-meter and know how to use one, you can verify that the cable is correctly wired using the diagram as a guide.

Xantrex SWCA/ICA Cable – side view

Note swap of wire arrangement

Yellow Green Red Black
End View

Black Red Green Yellow
End View

OutBack: The cable used to connect the host PC's Com Port to the OutBack Mate is a 9-pin male-to-female cable (a.k.a. CGA/EGA Monitor or Serial Mouse Extension Cable). This cable is not supplied by OutBack, but is readily available in most computer stores (Belkin pn F2N209 is one example). Cables up to 25 feet long may be used with the Mate. To verify that the Mate cable works, follow the **Serial Com Port Test Procedure** and the **Serial Com Port Handshake Line Test Procedure** below.

6. The RE computer interface is not configured properly.

The Xantrex SWCA (SW Communications Adapter) and ICA (Inverter Communications Adapter), and the OutBack Mate must be configured to communicate with your PC.

Xantrex: The SWCA/ICA contains a Unit address, which must match the Unit address configured in *WinVerter*. Both the SWCA and ICA Unit address, as delivered from the Xantrex factory, are normally set to Unit #1. To change the SWCA Unit address, use the Xantrex SWFPS DOS program. To change the ICA Unit address, use the Xantrex ICAP Windows program.

OutBack: The OutBack Mate contains a PC enable parameter that must be set to "on". To configure this parameter use the Mate to navigate to the SETUP, MATE, COMM (PG2), PC menu and press the "on" menu button. If the menu navigation of your mate is different than this, review the documentation supplied with your Mate.

7. The RE computer interface is not present or not functional.

Of course, it goes without saying that if your RE hardware is not properly equipped, there is no way for *WinVerter* to communicate with it. The Xantrex SW and PS series inverters require the SWCA. The Xantrex SW-Plus series inverters require the ICA. The OutBack FX and MX series equipment require the Mate.

If you have the correct RE computer interface and all other possibilities above have been checked and eliminated as the problem, then the problem is probably with the RE computer interface itself (the Xantrex SWCA/ICA, or OutBack Mate). In that case it should be returned to the company from whom you purchased it to see if they can verify that it has a problem and/or for replacement.

Serial Com Port Test Procedure

To verify that your PC's serial Com Port works properly, follow these steps:

1. Construct a "Loop Back" connector.
   a. Obtain a 9 position female solder D-sub connector (such as Radio Shack pn 276-1538) and 12" or more of 22 gauge insulated hookup wire (such as Radio Shack pn 278-1215).
   b. With a soldering iron and solder, wire the connector as follows:
   c. Wire from Pin 2 to Pin 3
   d. Wire from Pin 4 to Pin 6
   e. Wire from Pin 7 to Pin 8
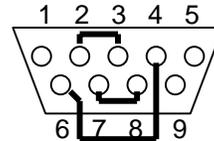
View of female connector
from Solder side

2. Plug the Loop Back connector into your PC's serial Com Port connector (or if equipped to communicate with an OutBack Mate, you may plug the Mate's cable into your PC's serial Com Port and plug the Loop Back connector into the Mate-end of the 9-pin cable – this will test both your Com Port and the cable together).
3. Start the "Hyper Terminal" terminal emulation program on your computer.
   a. Click "Start"
   b. Click "Programs"
   c. Click "Accessories"
   d. Click "HyperTerminal" (in newer versions of Windows you may need to click "Communications" first).
   e. If the "ComPortTest" icon exists, double click it and go to step 5.
   f. If the "ComPortTest" icon doesn't exist double click the "Hypertrm.exe" Icon and continue with step 4.
4. Configure the HyperTerminal options.
   a. In the "Connection Description" window enter the name "ComPortTest" in the "Name" box and select your preferred Icon from the "Icon" box.
   b. In the "Connect To" or "Phone Number" window choose the appropriate PC RS-232 com port in the "Connect Using" box. This should be the same com port number that you have attempted to use with *WinVerter*. If your PC has only 9-pin or 25-pin male connector (pins exposed), it is usually "COM1".
   c. In the "COM Properties" window choose the following options: "Bits per second" = 19200, "Data bits" = 8, "Parity" = None, "Stop bits" = 1, "Flow control" = None.
   d. Click "OK" on the pop-up window to close the window.
   e. Click the "File" menu item in the Hyperterminal window. Click the "Properties" item in the drop-down menu.
   f. Click the "Settings" tab in the pop-up window. Click the "ASCII Setup" button on the window.
   g. Make sure the "Echo typed characters locally" check box in the ASCII Sending section is not checked.
   h. Click "OK" on the pop-up windows until the Hyperterminal window is in full view.
5. Observe the lower left status bar area of Hyper Terminal. It should say "Connected" if it does not, click the button showing the telephone with the handset in the cradle.
   If you receive a communications error when attempting to connect to the desired Com Port it is likely that some other software or driver is using the port or you are attempting to use a port that does not exist. You must resolve this problem otherwise *WinVerter* will not be able to communicate with your RE hardware.
   a. A com error could happen because the PC operating system has mistakenly determined that a serial mouse has been plugged into the port. To resolve this problem restart the PC but first disconnect the Loop Back connector and leave it disconnected until the PC has finished rebooting. Then reconnect the cable and try these steps again.
   b. Another possibility is that the port is being used by PDA synchronization software such as used by Palm(tm) and Pocket PC(tm) type devices. If this is the case you must access the synchronization software on your PC and disable its use of the serial Com Port.
   c. If the Com Port does not exist, select another Com Port number repeating step 4.
6. If no errors occur when you attempt to connect to the desired Com Port, type the letters "AT" and the Enter key (do not type the quotation marks). Do this twice.

a.   If you see the word "OK" or the numeral "0" appear on the Hyperterminal window, you are communicating with a modem, not an external serial Com Port. If this is the case, choose another Com Port number repeating step 4.

b.   If you do not see the word "OK" or the numeral "0" appear, try typing your name.
If you see your name appear on the Hyperterminal window the serial port you are testing is at least mostly working. Hyperterminal is not able to test the function of the serial Com Port handshake lines which are needed for communications with the OutBack Mate (they are not needed for communications with the Xantrex SWCA/ICA). If after discovering the correct Com Port it still does not work with the OutBack Mate, perform the **Serial Com Port Handshake Line Test Procedure**. If after typing your name you do not see your name appear in the window, choose another Com Port number repeating step 4. Generally the highest possible number for a Com Port number is 8, so if you reach 8 with still no indication of the problem, your PC most likely has a bad serial Com Port.

Serial Com Port Handshake Line Test Procedure

The OutBack Mate's com port is optically isolated and requires that the PC's com port handshake signals be in the correct polarity and have sufficient voltage. Some PCs, particularly some laptops, use low-power com ports that may not have sufficient voltage to supply the Mate's com port with power. To verify that your PC's serial Com Port handshake lines have sufficient voltage, follow these steps:

1.   Construct a "Loop Back" connector as shown in Step 1 of the **Serial Com Port Test Procedure**.
2.   Plug the Loop Back connector into your PC's serial Com Port connector (or if equipped to communicate with an OutBack Mate, you may plug the Mate's cable into your PC's serial Com Port and plug the Loop Back connector into the Mate-end of the 9-pin cable – this will test both your Com Port and the cable together).
3.   Start *WinVerter-Monitor FX-MX* and be sure it is configured to use the serial Com Port being tested (this is set in the Options:Communications menu in the program).
4.   Obtain a volt meter, turn it on and set it to the 20 volt range.
5.   Attach the negative volt meter lead to pin 5 of the Loop Back connector (ground) and attach the positive lead to pin 4. The voltage reading must be between +8 and +15 volts DC.

View of female connector
from Solder side
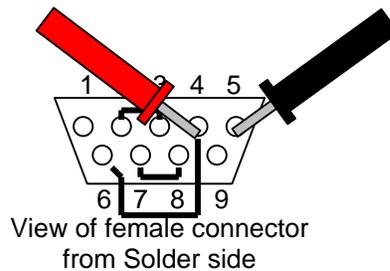
6.   Attach the negative volt meter lead to pin 5 of the Loop Back connector (ground) and attach the positive lead to pin 7. The voltage reading must be between –8 and –15 volts DC.

View of female connector
from Solder side
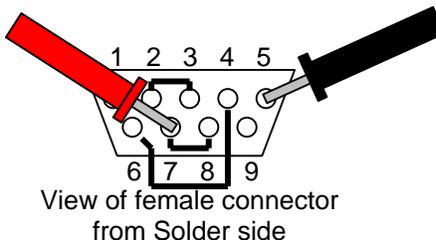
7.   If the voltages in steps 5 and 6 are the correct polarity, but is closer to zero than +/-8 volts, the serial Com Port may either be a low-power type, or the Com Port may be damaged. In this case, your problem may be solved by adding a new serial Com Port to your PC. Solutions that provide greater port voltage may be obtained from B and B Electronics (http://www.bb-elec.com). If your PC is equipped with USB ports, you may want to instead use a USB-to-Serial converter which will likely provide increased power. Converters may be obtained from B and B Electronics as well as Belkin (http://www.belkin.com) commonly available in computer stores.