

**Symphonie™**

# **iPackACCESS**

User's Manual



SEE THE POTENTIAL

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## Customer Support

Renewable NRG Systems offers a variety of support options to help you get the most from your RNRG product. If you have questions about your RNRG product, first look in the product documentation or the Knowledge Base or Technical Forum in the Tech Support section of the Renewable NRG Systems web site ([www.renewablenrgsystems.com/technical-support](http://www.renewablenrgsystems.com/technical-support)). If you cannot find the answer, contact your salesperson or Renewable NRG Systems Technical Support for assistance using the information below. Customer support is available 8:30 AM to 5:00 PM EST, Monday through Friday.

Renewable NRG Systems  
110 Riggs Road  
Hinesburg, Vermont  
05461 U.S.A.

Telephone: 802-482-2255 ext. 3

Fax: 802-482-2272

Email: [support@renewablenrgsystems.com](mailto:support@renewablenrgsystems.com)

When you call or email, please have the appropriate product documentation at hand and be prepared to give the following information:

- Customer name
- Who purchased equipment
- Item number or description
- Serial numbers of loggers and iPack equipment
- When equipment was purchased
- Where equipment is installed - terrain conditions
- Description of the problem with some detail
- What events took place leading up to the problem
- What you have tried while attempting to solve the problem
- 

You may be asked to provide data files or other information to help us investigate an issue. All information and data provided are kept strictly confidential.

Renewable NRG Systems maintains an extensive website which includes an in-depth customer support area. If you need assistance at times other than our regular business hours, we suggest visiting our website, [www.renewablenrgsystems.com](http://www.renewablenrgsystems.com).

All instruments, sensors, software and towers manufactured by Renewable NRG Systems are designed to be reliable and easy to use. We welcome your comments and appreciate your help in making our products the best available.



## Introduction

Congratulations on your purchase of the Symphonie iPackACCESS. Symphonie*PLUS3* stores ten-minute statistical data for wind resource assessment on a standard SD card and makes available real time data through the iPackACCESS. The iPackACCESS is designed to be used in an industrial communications network. The iPackACCESS will act as a server using the MODBUS protocol to send data to a client. MODBUS is a master-slave protocol. The MODBUS client will send a request, and the iPackACCESS will act on the request and send a response.

The SymphoniePLUS3's standard 10-minute averaged data stream can also be transmitted by the iPackACCESS over the dedicated network connection (instead of cellular connection like the iPackGPS).

### Using This Manual

The iPackACCESS manual assumes the user is familiar with programming, grounding, connection, and installation of the Symphonie*PLUS3* logger, iPackGPS, and the Symphonie Data Retriever software. More detailed information can be found in the SymphoniePLUS3 manual, available here:

<http://www.nrgsystems.com/TechSupport/Documentation.aspx>

iPackACCESS configuration for transmission of SymphoniePLUS3 daily wind resource assessment files is described in a separate chapter from the MODBUS configuration.

This document and the instruments described herein may use the following symbols:



Earth (Ground)



Read the Manual



DC Voltage

### Definitions

This type style is used for the general body of this manual and is used for general descriptions and instructions to the user.

Instructions in **Bold Type** refer to Symphonie Data Retriever Software and require you to press a button on the computer screen, open a file, or select from a program menu. For example: **File>Open**.

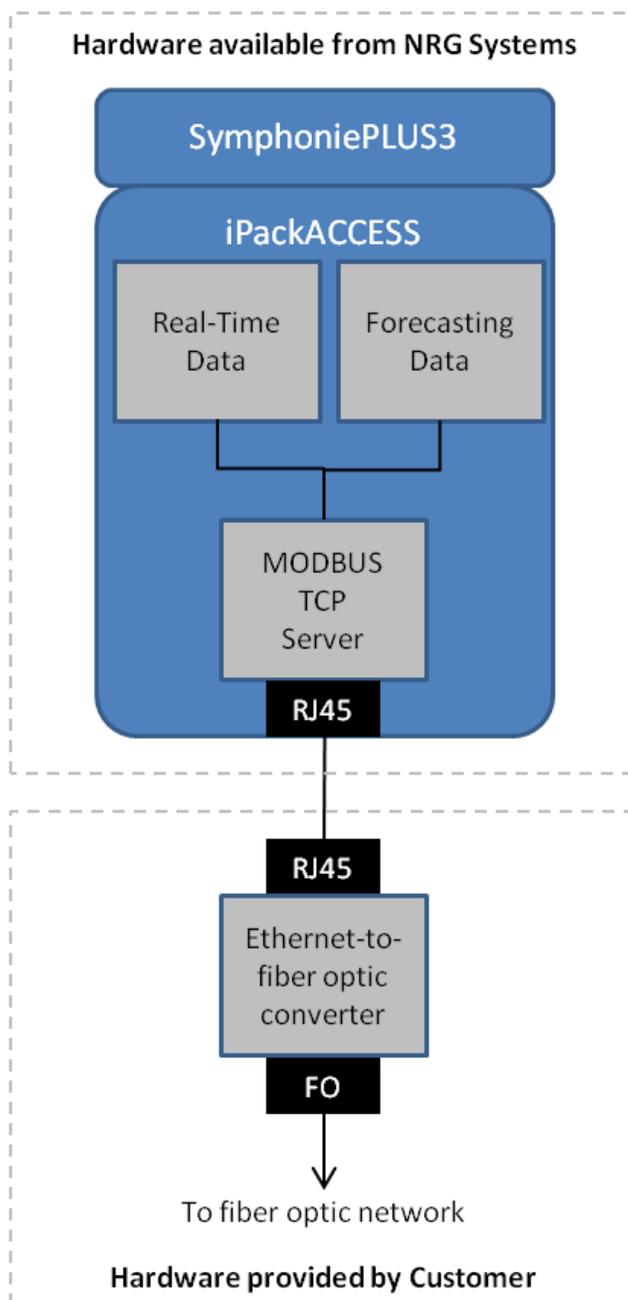
Instructions in **[Brackets]** refer to Symphonie*PLUS3* logger keypad navigation and require you to press a series of keys to perform a specific function. For example, pressing the **[Home/Esc]** key will always return the display to the Main Menu.

This type style is used to show actual prompts and messages that appear on the logger display.

*This type style is used to warn users of a potential danger, either to themselves or to the equipment or data.*

## Theory of Operation

Real-time (one-second) data are collected from each of SymphoniePLUS3's 15 channels. Raw and scaled data are made available to the SCADA system through the MODBUS TCP protocol to help wind farm operators analyze the performance of turbines within a wind farm. Statistical forecasting data (average, standard deviation, minimum, maximum) at a user-specified interval are also available through the MODBUS TCP protocol for analysis by wind farm operators and for delivery to a forecasting service provider. Ten-minute data are available for validation of the wind resource via email delivery over the SCADA network's internet connection or by manually pulling the SD card from the data logger.



The iPackACCESS was developed to make available three data streams from the SymphoniePLUS3 data logger:

- **Real-time data** provides one-second samples that are made available to the SCADA system through the MODBUS TCP protocol. These raw and scaled data are pulled from the iPackACCESS to help wind farm operators analyze the performance of turbines within a wind farm.
- **Statistical data** provides average, standard deviation, minimum, and maximum values at user-specified intervals (1, 2, 5, 10, 15, 30, and 60 minutes) through the MODBUS TCP protocol. This data is pulled from the iPackACCESS for analysis by wind farm operators and forecasting service providers to predict the future energy production of a wind farm through the use of a wind forecast model.
- **Wind resource assessment data** is the ten-minute average data collected during a wind measurement campaign prior to the development of the wind farm. This data is available via email delivery over the SCADA network's internet connection or by manually pulling the SD card from the data logger to validate the wind resource after a wind farm becomes operational.

## iPackACCESS

The iPackACCESS makes the SymphoniePLUS3's real time raw and scaled data available from a series of registers which can be queried by a MODBUS client. Statistical data are also computed and made available by the iPackACCESS through an additional set of MODBUS registers.

The iPackACCESS has configurable averaging intervals and also allows streaming of 1-second data. The iPackACCESS is programmed using the SDR software.

## SymphoniePLUS3

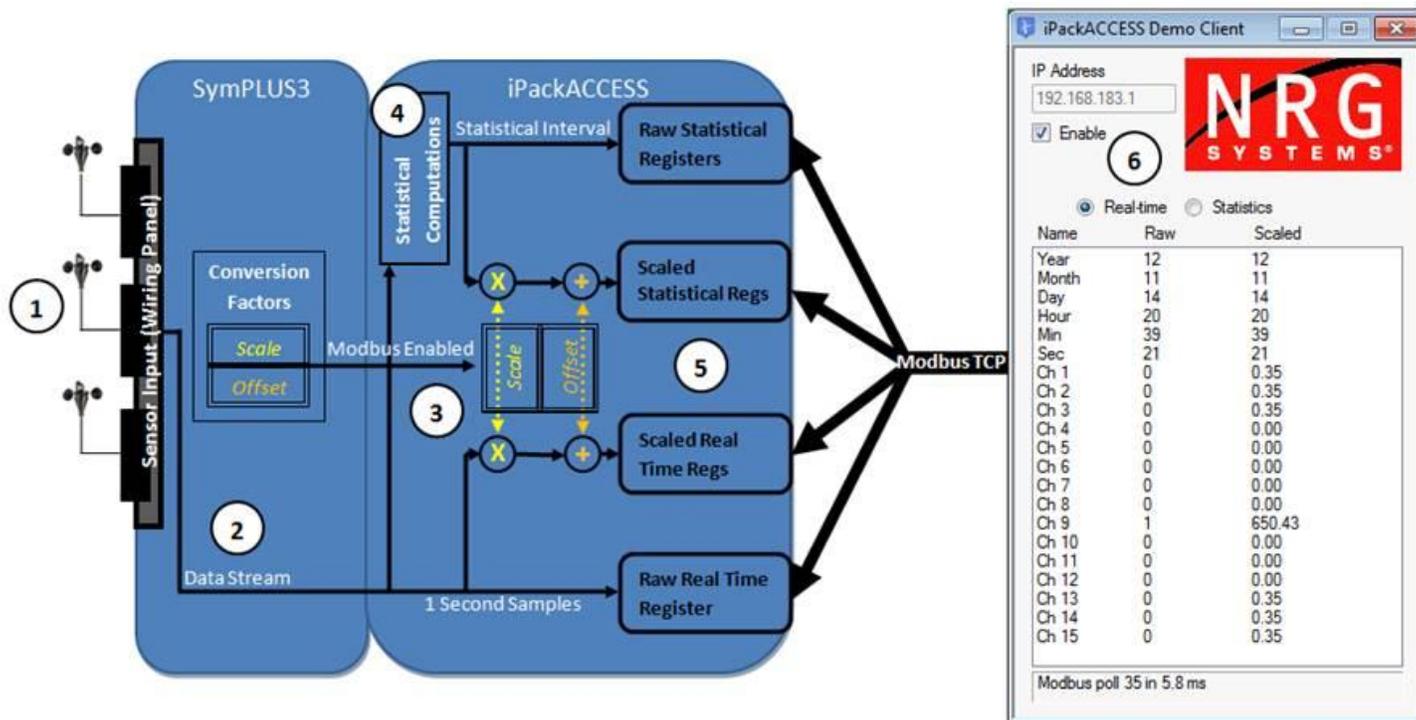
Each of the 15 channels' averages, standard deviations, and other statistical values are calculated from continuous 1 second data samples. Scaled values are calculated based on the scale factors and offsets programmed into the logger. Data intervals are calculated every 10 minutes, time stamped with the beginning time of each interval and written to the SD Card (SD) at the top of each hour.

Symphonie Data Retriever (SDR) software is then used to process raw data files stored on your computer either from an SD Reader or email. Configuration of iPacks is also performed by the SDR software with the use of a programming cable.

Sensor scale factors and offsets programmed into the SymphoniePLUS3 logger can be edited later with SDR if there is a mistake or if a sensor is added or changed. Corrections can also be made remotely using a sensor patch file. Once a sensor's scale factor or offset has been corrected, 10 minute data can be reprocessed. The parameters in SDR's Site Information Editor are used to create the tab-delimited text file (ASCII), so there is always an opportunity to make changes to how the raw files will be processed before generating ASCII data files for export.

Changes to the logger's programming can be made immediately available to the MODBUS client by disabling and then re-enabling on the MODBUS status page. For example, if a sensor's scale factor is incorrect and is changed, disabling and re-enabling will show the effect of the change on the scaled real-time data.

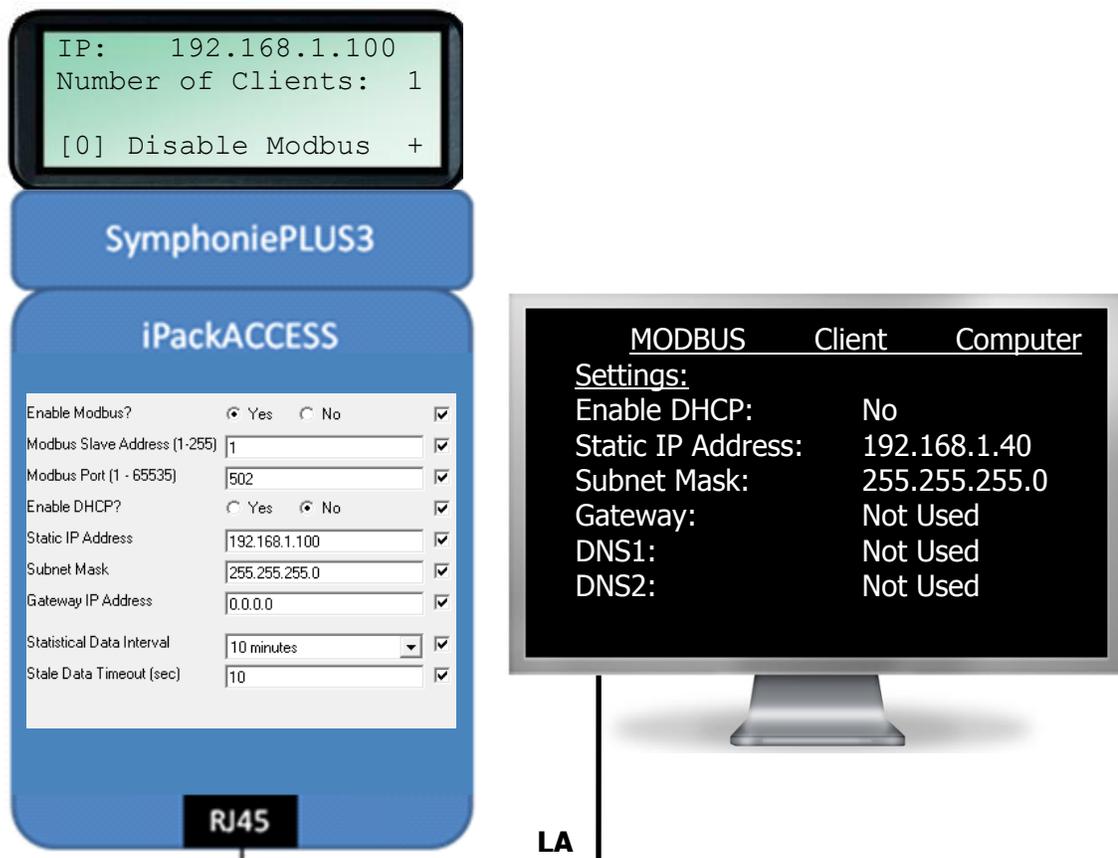
## MODBUS Data Flow Diagram



1. Sensor signals are received by the logger through its wiring panel.
2. At the same time, the raw data is passed on to the iPackACCESS, where it is used for statistical calculations and formatted into Modbus registers (shown in the chapter MODBUS Communication).
3. When the Modbus server is enabled, the iPackACCESS takes the conversion factors from the logger and stores them in the iPackACCESS. As raw data is collected, the iPackACCESS scales the data using the conversion factor and makes the scaled statistical and real time data available on their designated registers.
4. The iPackACCESS collects the raw 1 second data and performs statistical calculations on a configurable interval
5. All of the data (raw real time, scaled real time, scaled statistical and raw statistical) is processed in the iPackACCESS and made available on each corresponding register, where it can be polled through an Ethernet network by a Modbus client.
6. A Modbus client can poll the iPackACCESS registers for data once a second.

## Examples of Network Configurations

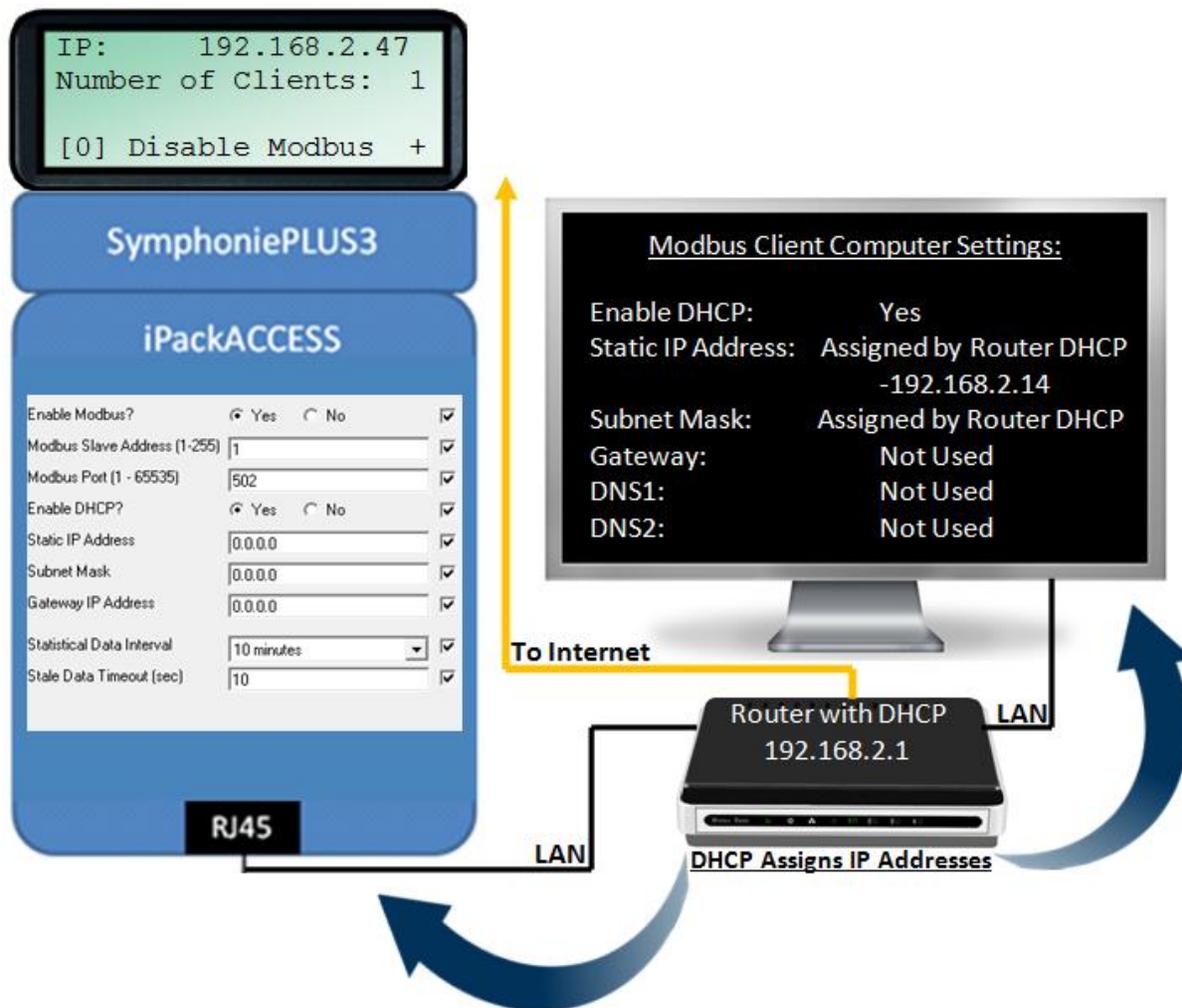
### Direct connection with static IP addresses



This example shows the most basic network setup with an iPack directly connected to a computer running a MODBUS client. DHCP is disabled, and a fixed IP address (programmed in the iPack) is used to connect to the MODBUS client. No email is enabled, and no DNS is enabled.

Network Configuration		
Parameter	iPackACCESS	Computer
Enable DHCP:	No	No
Static IP Address	192.168.1.100	192.168.1.40
Subnet Mask	255.255.255.0	255.255.255.0
Gateway	Not used	Not used
DNS1	Not used	Not used
DNS2	Not used	Not used

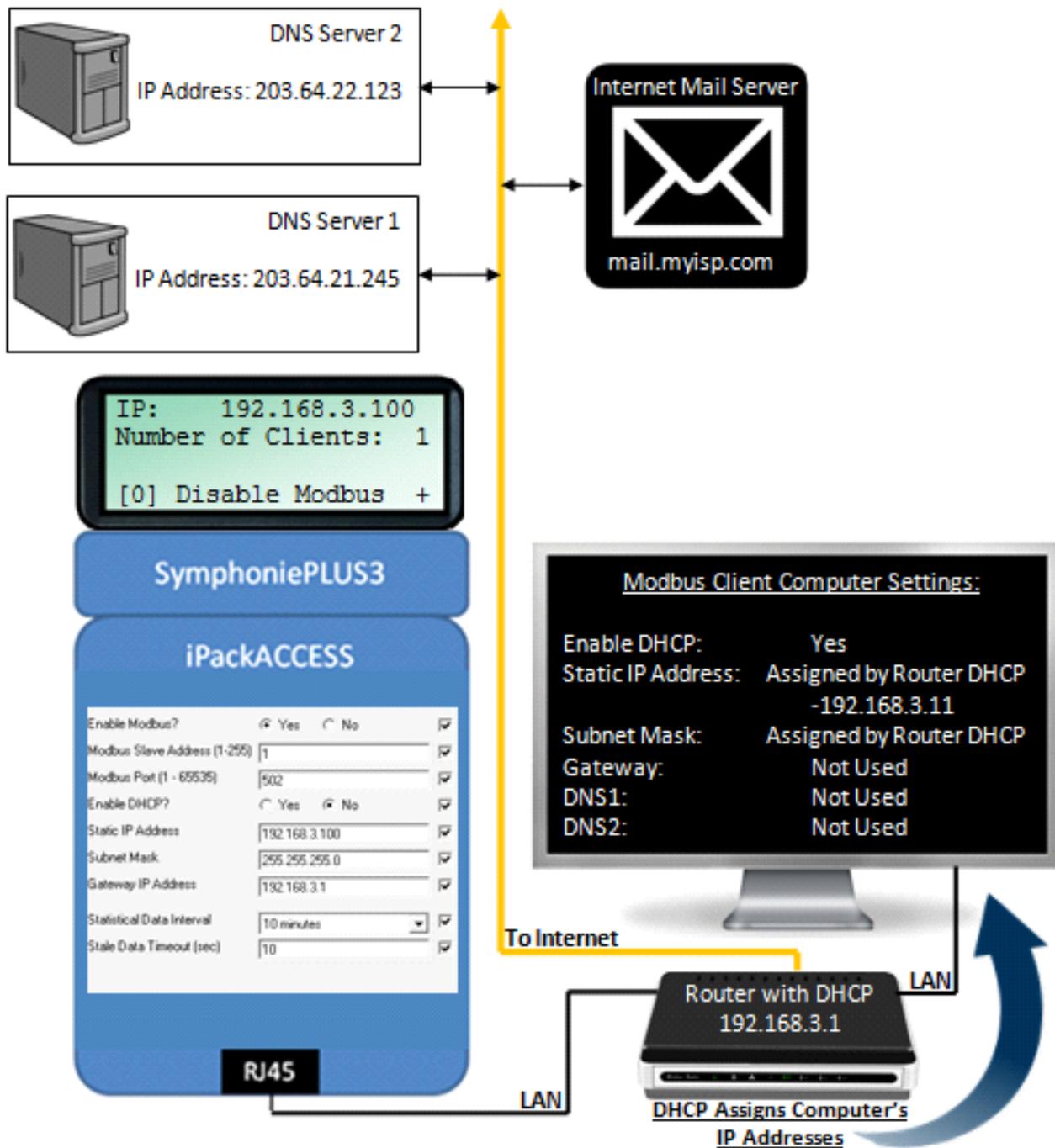
## Router with DHCP



This example shows a common network setup with a DHCP server assigning IP addresses to all devices. DHCP is enabled and responsible for giving the iPackACCESS and computer their IP addresses. In the iPackACCESS settings, DHCP is turned "ON" and Static IP address is not used. No email is enabled, and no DNS is enabled; data are available over the local network.

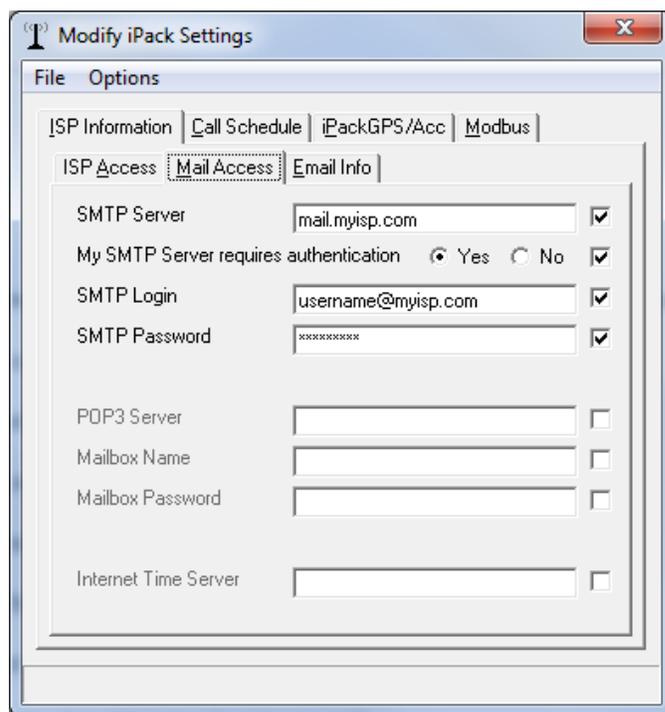
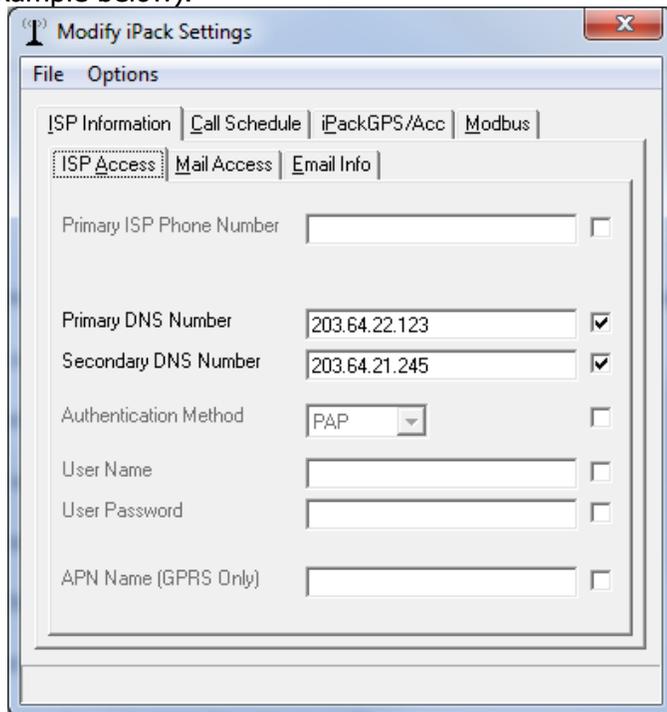
Network Configuration		
Parameter	iPackACCESS	Computer
Enable DHCP:	Yes	Yes
Static IP Address	Assigned by DHCP	Assigned by DHCP
Subnet Mask	Assigned by DHCP	Assigned by DHCP
Gateway	Not used	Not used
DNS1	Not used	Not used
DNS2	Not used	Not used

## Router with DHCP and Internet email



This example shows a network with email enabled and the DHCP server assigning an IP address only to the computer, not the iPackACCESS. The iPackACCESS has DHCP off, which means it has a fixed IP address. The iPackACCESS must have the same Subnet as the computer and router. The computer has DHCP enabled, so the router provides the computer with an IP address. This example has both the DNS servers enabled (see "ISP Access" tab in SDR software showing the iPackACCESS's \*.ipk file; see example below) and the SMTP

server information (see the "Mail Access " tab in SDR software showing the iPackACCESS's \*.ipk file; see example below).



<b>Network Configuration</b>		
<b>Parameter</b>	<b>iPackACCESS</b>	<b>Computer</b>
Enable DHCP:	No	Yes
Static IP Address	192.168.3.100	Assigned by DHCP
Subnet Mask	255.255.255.0	Assigned by DHCP
Gateway	192.168.3.1	Not used
DNS1	203.64.21.245	Not used
DNS2	203.64.22.123	Not used

## Networking Considerations

- MODBUS default port is 502 but the iPackACCESS can be configured to use any port number.
- The iPackACCESS supports DHCP for automatic configuration of network address.
- If DHCP is disabled, you will need to manually edit the Static IP Address, Subnet Mask, and Gateway IP Address. Your IT administrator may be able to assist you with this.
- As a security feature, the iPackACCESS can be configured to limit the allowed connections.
- The iPackACCESS implements a standard 10baseT Ethernet interface that can auto-negotiate full or half duplex and adjust for crossover.
- The iPackACCESS allows up to 4 simultaneous client connections.
- The iPackACCESS allows configuration of SMTP and POP ports to accommodate different firewall settings.



## iPackACCESS Components (Quick Tour)

### Unpacking the iPackACCESS

Follow standard precautions for handling electronic components when unpacking the iPackACCESS. Discharge static electricity from your body by touching a piece of grounded metal or wearing a ground strap.

Confirm that you have received all components by comparing your order to the packing list shown below. Immediately contact Renewable NRG Systems if any of the components are missing. You should find the following standard equipment:

- Qty. (1) iPackACCESS (Picture 2)
- Qty. (1) GPS Antenna Cable
- Qty. (4) #10-32x4", Machine, HexHead, 18-8SS screws
- Qty. (1) Ethernet cable boot assembly (also shown in Picture 3)



**Picture 1**



Picture 2

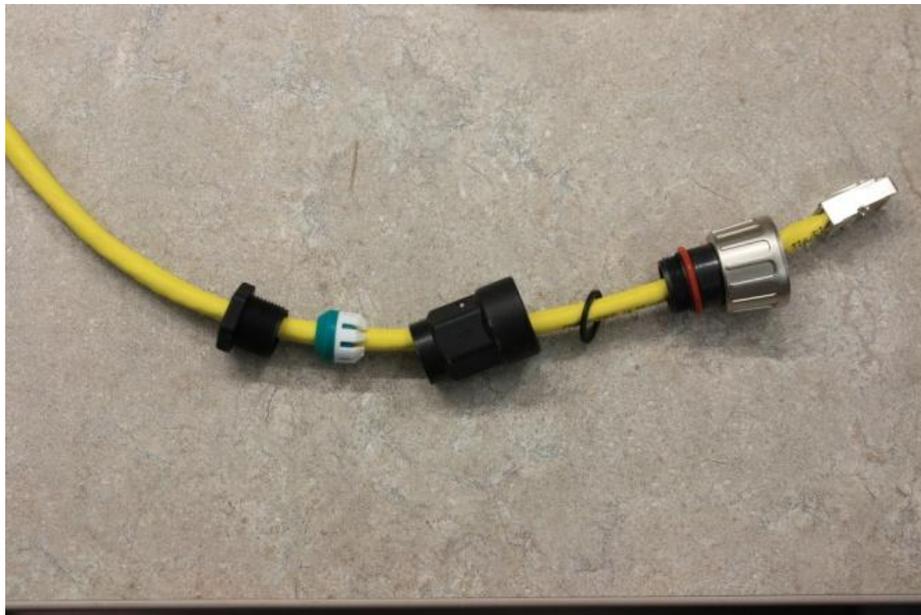
## iPackACCESS Connections & Components

### Ethernet boot assembly

Remove Ethernet boot assembly components from bag and feed the cable through components in the sequence shown in Picture 4. Crimp the RJ-45 Ethernet Connector to the end of the cable.

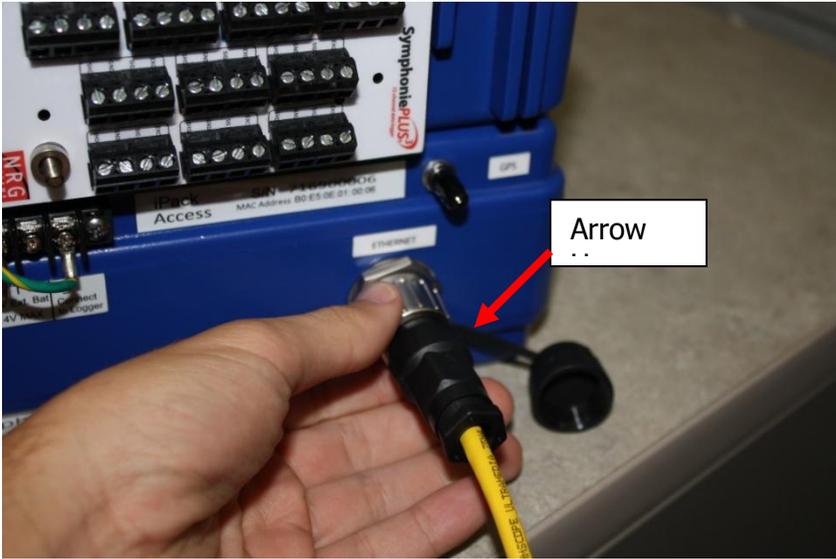


**Picture 3**



**Picture 4**

Insert RJ-45 into the slot labeled "Ethernet" on the iPackAccess and tighten all Ethernet cable boot assembly components making sure that the arrow on the plastic piece is facing up and pointing toward the connection as shown in Picture 5. Make sure all components are tight and the connection is secure enough to provide a water proof seal by gently pulling on the Ethernet cable. Pulling on the cable should not cause it to move in the socket.



Picture 5

## iPackACCESS Configuration

The iPackACCESS is pre-configured to utilize DHCP. If your network supports DHCP, no configuration of network address is required. Default parameters are provided in the iPackACCESS; however, other settings can be programmed using the SDR software as described below.

iPackACCESS programming is done using the Symphonie Data Retriever software (version 7.03.15 or higher). Symphonie Data Retriever (SDR) can be downloaded from here:

<http://www.renewablenergysystems.com/TechSupport/SoftwareDownloads.aspx>

Uploading from SDR requires connection directly to the iPackACCESS or through the logger's iPack programming port (recommended). The Logger Direct Editor screen can be used to program the logger and is accessed through SDR's Modify iPack Settings screen. Scale factors and offsets programmed into the logger will be used to calculate real-time scaled data, so be sure to take extra care in programming these values.

Details of SymphoniePLUS3 programming can be found in the SymphoniePLUS3 User's Manual, which can be found on our website here:

<http://www.renewablenergysystems.com/TechSupport/Documentation.aspx>

The iPackACCESS can be configured for MODBUS communication only, or it can be configured for both MODBUS communication and transmission of wind resource assessment data. Instructions for configuring the iPackACCESS for transmission of wind resource assessment data can be found in the chapter called *Wind Resource Assessment (WRA) Data Stream*.

### Grounding

*Whenever coming in contact with the iPackACCESS or SymphoniePLUS3 logger, either in the field or indoors, it is good practice to first grasp a piece of grounded (earthed) metal before touching the logger to avoid a potentially damaging electrostatic discharge (ESD) to the equipment.*

### Establishing Serial Connection with the Computer

Connect the iPackACCESS to the SymphoniePLUS3, and then use the programming adapter and cable to connect to the PC. Connect the computer end first, and then connect to the programming adapter. If your computer doesn't have a 9-pin serial port, you will need to use a USB to serial converter with the iPack programming cable.

### Starting Symphonie Data Retriever iPack Configuration Software

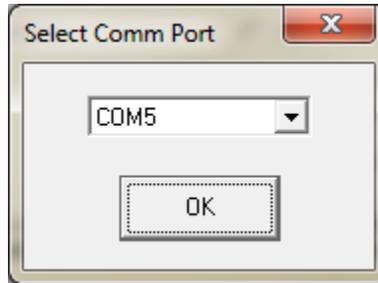
Start the Symphonie Data Retriever Software from the Windows **Start** menu. The program is usually found here: **C:\NRG\SymDR\SDR.exe**.

### Establishing serial communication with SDR software

From the main SDR Window, select **Site>Modify iPack Settings**. Check the lower left hand corner of the Modify iPack Settings window for a message.

If you receive no message or "iPack Communication Failed," it is likely that the COMM port on your computer is not configured properly. You must disable any programs that might be trying to access the COMM port.

Select **Options>Comm Port** from the menu, and select the communication port you will be using to connect to the iPack.

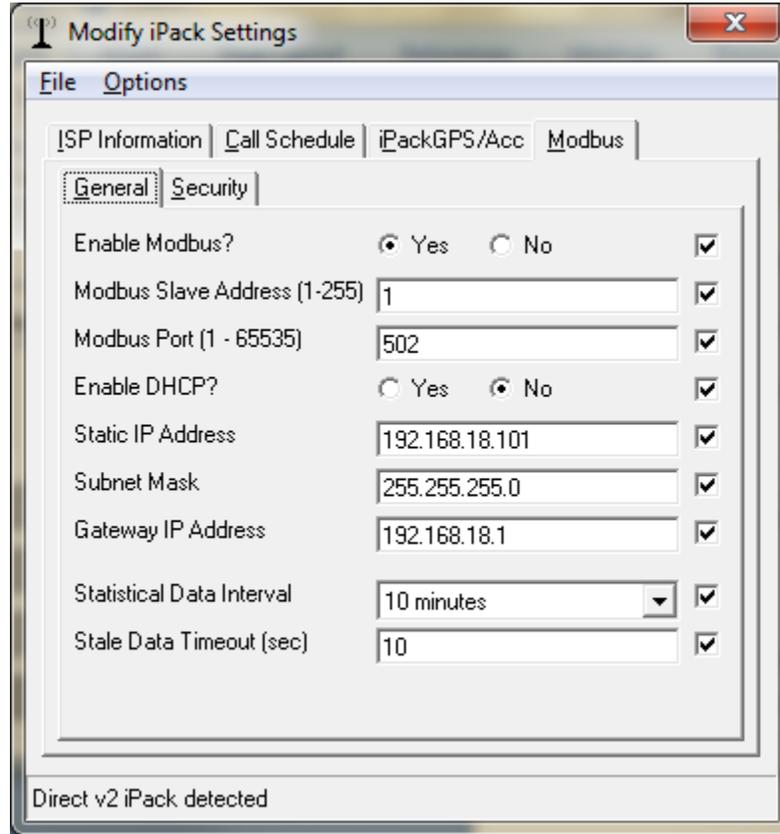


The COMM port setting will be restored the next time you use the program and only needs to be entered the first time you use the program or following a reinstallation of SDR software.

*Note: If none of the COMM ports in the Select Comm Port window can be selected, you will need to use Windows Control Panel's Device Manager to change the available COMM port number to 1 through 16.*

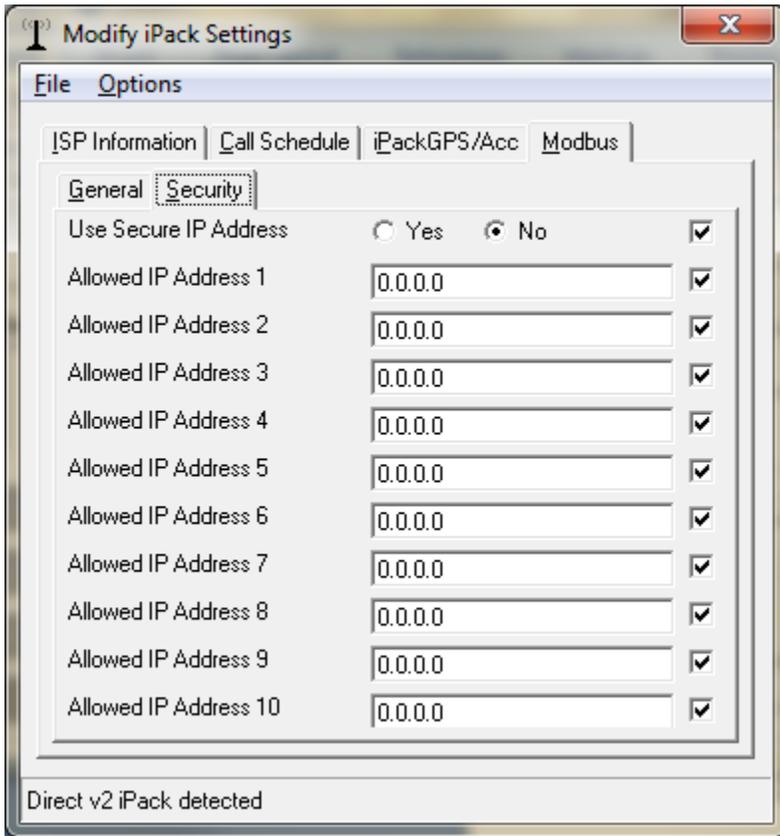
If the port is properly configured, you should see the message "Verifying iPack Connection" and then "iPack detected" at the bottom of the window.

Choose the **MODBUS** tab and select **General** to begin configuring the iPackACCESS.



MODBUS Configuration Parameters	
Parameter Name	Parameter Description
Enable MODBUS?	This is a Boolean switch to enable or disable the persistent configuration of the iPack for use as a MODBUS server.
MODBUS Slave Address	The address used to identifier the iPack on the MODBUS Network. This number can be 1-255.
MODBUS Port ( 1 – 65535)	Port Number used for MODBUS TCP/IP communication. Default is the reserved port 502.
Enable DHCP?	A Boolean switch to turn on or off the use of DCHP to acquire network parameters. The Static IP Address, Subnet Mask, and Gateway IP Address fields are not used with DHCP enabled.
Static IP Address	Static IP address that can be assigned to the iPackACCESS
Subnet Mask	Subnet Mask for the network to which the iPack is connected.
Gateway IP Address	IP address of Gateway the iPack may connect through.
Statistical Data Interval	Length of time data are acquired for statistical calculations (1, 2, 5, 10, 15, 30, and 60 minutes).
Stale Data Timeout (sec)	The amount of time in seconds elapsed since a real time data set was acquired that designates the data set as stale.

Next, select the **Security** tab and enter IP Addresses.



MODBUS Configuration Parameters	
Parameter Name	Parameter Description
Use Secure IP Addresses	This is a switch that when not set the iPackACCESS will respond to requests from any IP address. If it is set, it will only respond to the IP addresses specifically stated.
Allowed IP Addresses	Ten allowed IP address fields . The iPackACCESS will only respond to these addresses if the "Secure IP Addresses" configuration is set.

## Connect to Network

Connect and secure the cable assembly to the iPackACCESS’s Ethernet port, and connect the other end to your network or to a computer running the MODBUS Client Demonstration Application.

## Verifying Network Connection

The connection status page **[Home][3][4][2]** should display the type of connection (Half, Half-x, Full, or Full-x) in the lower right corner. This verifies that the iPackACCESS has detected the network connection. A “No Link” message indicates that no network connection is detected.

The MODBUS status page **[Home][3][4][6]** should show the expected IP Address of the iPackACCESS based on the chosen network configuration.

To verify network communication, open a DOS window on a computer connected to the same network as the iPackACCESS. At the command prompt, type "ping" followed by the iPackACCESS's IP Address, and hit Enter. The display should show successful communication with no packet loss.

Once successful connection and communication have been verified, start your MODBUS client and make sure that it communicates successfully.

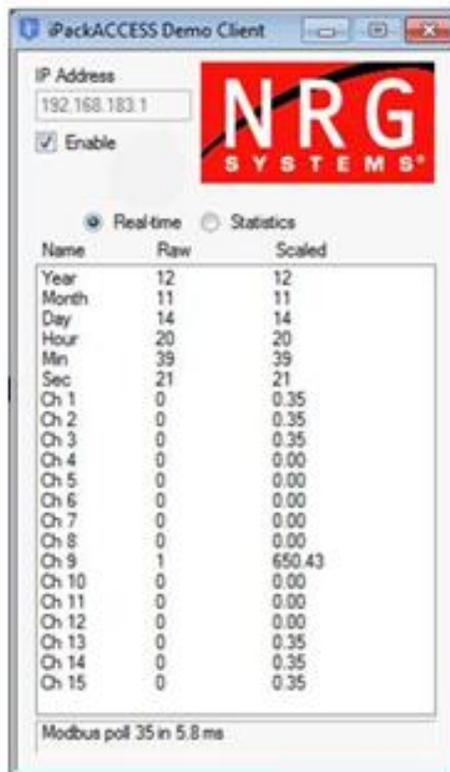
### MODBUS Client Demonstration Application

The MODBUS Client Demonstration Application communicates with the iPackACCESS via ModbusTCP and can be used to view the Modbus Register Set of the iPackACCESS. The purpose of this demo application is to provide a simple way to verify network connectivity and test data streams from each attached sensor.

The MODBUS Client Demonstration Application can be downloaded from here:

<http://www.renewablenergysystems.com/TechSupport/SoftwareDownloads.aspx>

Extract ZIP file and instructions to any local folder (for example, C:\temp). This application has been tested on Windows XP and Windows 7 and can be run directly from the executable file (no installation required). It can be run directly from a USB drive, or from a network file server. This makes it easy to test from any location on the network without the need for Administrator rights and program installations.



## Using the MODBUS Client Demonstration Application

- Start the application by double-clicking the ModbusDemo.exe file
- Enter the active IP Address of the iPackACCESS (the iPackACCESS's IP address can be found by pressing HOME, [3], [4], [6] on the logger's keypad)
- Click the Enable checkbox
- Select either Real-time or Statistics data streams using the radio buttons
- The list will show both raw and scaled data streams
- Timing and error information is reported at the bottom of the window

### Tips

- The MODBUS Client Demonstration Application attempts to open a TCP socket connection to the iPackACCESS on port 502. Warning messages may appear from your firewall the first time this application attempts to connect. If this occurs, select the option to allow the use of port 502 by the demo application.
- Since the iPackACCESS can support multiple MODBUS Clients, this application can be used simultaneously with other MODBUS Clients. This can be helpful in debugging the setup of MODBUS tag information in the end user application.

## Checking iPack status

### [Home][3][4] = iPack

1. eMail Now
2. Connection Status
3. GPS Status
4. iPack Event Log
5. Manual Dial (not used with iPackACCESS)
6. Modbus Status \*

If an iPackACCESS is attached to the Symphonie*PLUS3*, the status screen will display the above menu.

The + symbol will alternate with the \* symbol to indicate the iPackACCESS is on. **[Home][3][4][2]** will show the iPackACCESS's live Connection Status page, which displays the model of iPackACCESS in use, the revision level, the battery voltage, and the connection type.

iPackACCESS v02 Eth  
Network Connected

Batt: 12.8 Full +

Connection type can be:

- Half – half duplex connection
- Half-x – half duplex connection with crossover
- No Link – iPackACCESS has not detected a network
- Full –full duplex
- Full-x – full duplex connection with crossover

**[Home][3][4][3]** will show the iPackACCESS's GPS Status page. The GPS Status page displays the model of

iPackACCESS in use, the revision level, latitude and longitude, altitude, and number of acquired GPS satellites.

iPackACCESS v02 Eth  
Lat:  
Lon:  
Alt:            Sat: 4 \*

**[Home][3][4][4]** will show the iPackACCESS's Event Log. The iPack Event Log allows the user to scroll through numbered events by pressing the up and down arrow keys. The most recent events are displayed first. Using the numeric keypad, the user can enter a number jump to a particular event.

**[Home][3][4][5]**, "Manual Dial" is currently not used by the iPackACCESS.

**[Home][3][4][6]** will show the iPackACCESS's MODBUS Status page. The IP Address of the iPackACCESS is displayed at the top of the screen along with number of connected clients. Additional network information can be displayed by pressing the following keys:

1	Active IP Address (iPackACCESS)
2	DNS1
3	DNS2
4	MAC Address

Press 0 to enable or disable MODBUS communication.

## MODBUS Communication

MODBUS Application Protocol Specification V1.1b is followed when implementing the communications portion of the protocol. Only the standard exception codes in the table below are supported.

MODBUS Exception Codes		
Code	Name	Meaning
01	ILLEGAL FUNCTION	The function code is not supported by the iPackACCESS or is not in the correct state to be able to perform the function.
02	ILLEGAL DATA ADDRESS	An address in the requested data range is not an allowable address.
03	ILLEGAL DATA VALUE	The value in the data field is not allowable by the iPackACCESS.
04	SLAVE DEVICE FAILURE	An unrecoverable error occurred when the iPackACCESS was performing the request.

### Input Register Data and Addressing

The iPackACCESS only supports the "Input Register" primary table. Therefore only MODBUS function 4 will be supported. This function is read only. The client will request that the input register table be read by sending function 4, the start address, and the number of registers that it would like to read.

The information for this section is described in the text below and summarized in the tables and figures.

- A time stamp is provided for each block of data. The real time data time stamp is the latest time stamp sent from the logger. The statistical data time stamp is the time at the beginning of the last calculated interval. Each time stamp has the Year, Month, Day, Hour, Minute, and Seconds stored in a different register in this sequence.
- For the real time data block, the values for each channel are represented by an unsigned 16 bit number. The 15 registers after the time stamp contain all the real time data for each of the channels.
- For the statistical data, the values for each channel are represented by four bytes of data in single precision floating point format following IEEE 754 except for the count. Each statistical value is contained in two MODBUS registers as each register is two bytes, except the count which is represented by a single unsigned 16 bit integer in one register. The first register containing the statistical data is the most significant half of the word, and the second contains the least significant. The order for each piece of statistical data for each channel is: Average, Standard Deviation, Maximum, Minimum, and Count. Channel one's start register starts after the last time stamp register.
- A header is located at the address space before the time stamp for each block of data. This header is considered an optional block of information. If additional information is added to the header, it will expand to lower addresses. Each header has an error register below the time stamp address.

- The error register indicates problems with the iPackACCESS and communication. The communication errors may be redundant to the built-in error information in the MODBUS communication protocol.
- The real time data contain an additional register that will indicate whether the real time data are stale. The data are considered stale if there has not been an update within a certain configurable time period. This register reports a 0 if the data are not stale and a 1 for stale data.

**MODBUS Registers**

<b>MODBUS Register Address</b>	<b>Register Content</b>
1995	Real Time Count
1996	Board Temp
1997	Battery Voltage
1998	Stale Data
1999	Error Code
2000	Year
2001	Month
2002	Day
2003	Hour
2004	Minute
2005	Second
2006	Channel 1 Data
2007	Channel 2 Data
2008	Channel 3 Data
2009	Channel4 Data
2010	Channel 5 Data
2011	Channel 6 Data
2012	Channel 7 Data
2013	Channel 8 Data
2014	Channel 9 Data
2015	Channel 10 Data
2016	Channel 11 Data
2017	Channel 12 Data.
2018	Channel 13 Data
2019	Channel 14 Data
2020	Channel 15 Data

**Raw Real Time Data MODBUS Addresses**

<b>Modbus Register Address</b>	<b>Register Content</b>
2995	Real Time Count
2996	Board Temp
2997	Battery Voltage
2998	Stale Data

2999	Error Code
3000	Year
3001	Month
3002	Day
3003	Hour
3004	Minute
3005	Second
3006	Scaled Channel 1 Data Most Significant Word
3007	Scaled Channel 1 Data Least Significant Word
....	....
3034	Scaled Channel 15 Data Most Significant Word
3035	Scaled Channel 15 Data Least Significant Word

**Scaled Real Time Modbus Register Addresses**

<b>MODBUS Register Address</b>	<b>Register Content</b>
3998	Error Code
3999	Count
4000	Year
4001	Month
4002	Day
4003	Hour
4004	Minute
4005	Second
4006	Channel 1 Average Most Significant Word
4007	Channel 1 Average Least Significant Word
4008	Channel 1 SD Most Significant Word
4009	Channel 1 SD Least Significant Word
4010	Channel 1 Max Most Significant Word
4011	Channel 1 Max Least Significant Word
4012	Channel 1 Min Most Significant Word
4013	Channel 1 Min Least Significant Word
....	....
4118	Channel 15 Average Most Significant Word
4119	Channel 15 Average Least Significant Word
4120	Channel 15 SD Most Significant Word
4121	Channel 15 SD Least Significant Word
4122	Channel 15 Max Most Significant Word
4123	Channel 15 Max Least Significant Word
4124	Channel 15 Min Most Significant Word
4125	Channel 15 Min Least Significant Word

**Raw Statistical Data MODBUS Addressing**

<b>Modbus Register Address</b>	<b>Register Content</b>
4998	Error Code
4999	Count
5000	Year
5001	Month
5002	Day
5003	Hour
5004	Minute
5005	Second
5006	Scaled Channel 1 Average Most Significant Word
5007	Scaled Channel 1 Average Least Significant Word
5008	Scaled Channel 1 SD Most Significant Word
5009	Scaled Channel 1 SD Least Significant Word
5010	Scaled Channel 1 Max Most Significant Word
5011	Scaled Channel 1 Max Least Significant Word
5012	Scaled Channel 1 Min Most Significant Word
5013	Scaled Channel 1 Min Least Significant Word
....	....
5118	Scaled Channel 15 Average Most Significant Word
5119	Scaled Channel 15 Average Least Significant Word
5120	Scaled Channel 15 SD Most Significant Word
5121	Scaled Channel 15 SD Least Significant Word
5122	Scaled Channel 15 Max Most Significant Word
5123	Scaled Channel 15 Max Least Significant Word
5124	Scaled Channel 15 Min Most Significant Word
5125	Scaled Channel 15 Min Least Significant Word

**Scaled Statistical Modbus Register Addresses**

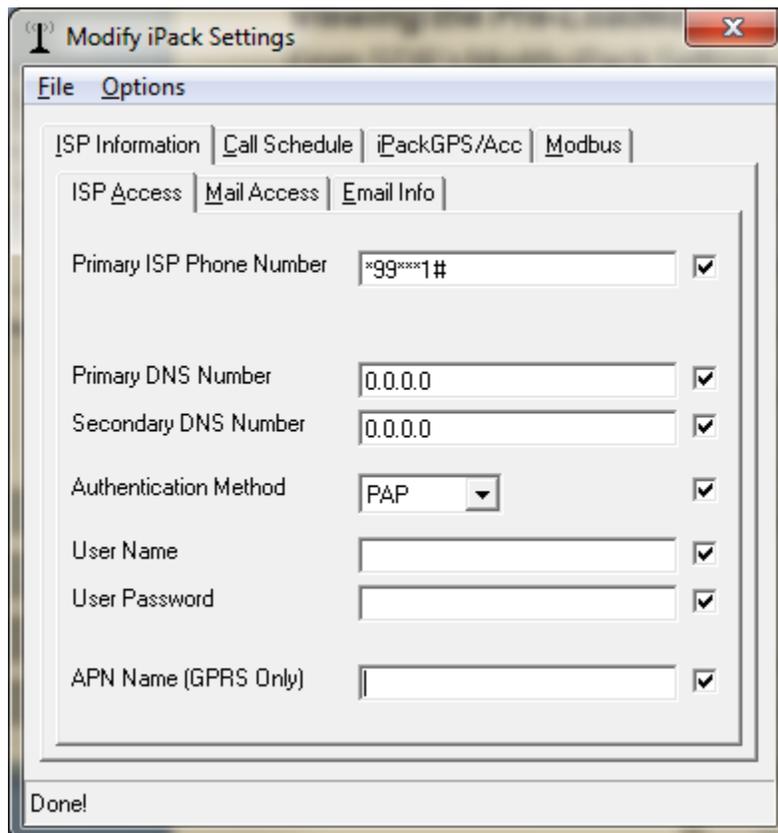
## Wind Resource Assessment (WRA) Data Stream

If you want the iPackACCESS to email \*.RWD files of time-stamped 10 minute averaged data, you will need to program Mail Access and Email Info parameters into the iPackACCESS. The programming has been organized into a familiar folder-tab system. The programming will be discussed tab by tab.

*You will want to take extra care during this section. Even a minor typographical error will prevent the iPackACCESS from connecting to the Internet. It is strongly recommended that you get the iPackACCESS working before bringing it to the field for installation!*

### Viewing the Pre-Loaded iPack Settings

From SDR's Modify iPack Settings window, select **File>Load from iPack** from the menu. The status line on the bottom of the screen should show the message "Transferring >>>>>" followed by the message "Done!" You will now see the fields populated with information that is currently programmed into your iPack.



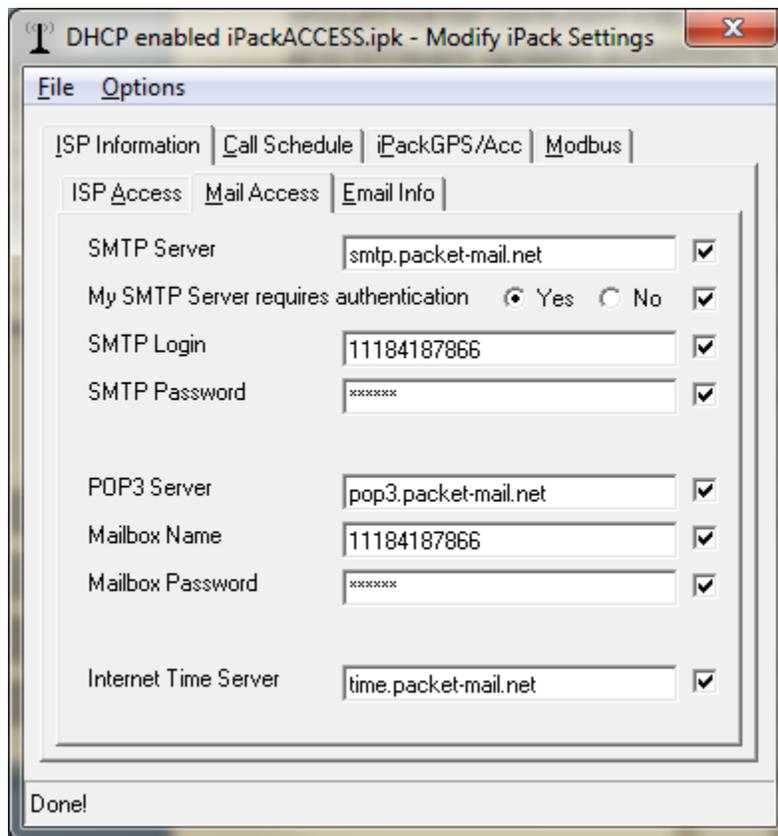
All the checkboxes will be checked, and you may now edit each setting (if not, go to **Options>Check All**). General information regarding each setting is provided below.

### ISP Access Tab

The only parameters on the ISP Access tab utilized by the iPackACCESS for MODBUS communication are the Primary and Secondary DNS fields.

### Mail Access Tab

All the checkboxes should still be checked, and you may edit each Mail Access setting. General information regarding each setting is provided below. Note that the SMTP server setting is used to send the email from the iPackACCESS and should not be confused with the POP3 server, which is used to access patch files addressed to the logger and patch files and firmware updates addressed to the iPackACCESS.



### SMTP Server Name

This is the SMTP server name that your ISP will provide and/or you can find on your ISP's web site. It is used to send mail from the iPackACCESS.

- Enter it exactly as your ISP provided; do not enter any extra spaces or quotation marks; check that there are no leading or trailing spaces in your entry.

### **My SMTP Server requires authentication**

Some SMTP servers require a login and password before allowing you to send mail. If the SMTP server does not require authentication, select "No." If your ISP requires SMTP server authentication, select "Yes" and enter the SMTP login and password.

### **POP3 Server Name**

This is the name of the POP3 server that your ISP will provide and/or you can find on your ISP's web site.

- Enter it exactly as your ISP provided, and do not enter any extra spaces or quotation marks; check that there are no leading or trailing spaces in your entry.

### **Mailbox Name**

This is the mailbox account name your ISP provided or you selected when you set up your email account for the iPackACCESS.

- This is the mailbox account name on the POP3 server that the logger points to in order to retrieve mail (patch files, for example).
- Enter it exactly as your ISP provided; do not enter any extra spaces or quotation marks; check that there are no leading or trailing spaces in your entry.
- It should be something like:  
    Logger  
    7345552555

### **Mailbox Password**

This is the mailbox password your ISP provided or you selected that allows access to your mailbox.

- Enter it exactly as it is provided to you.
- When you enter your password, it will be displayed as asterisks (\*) so it will be secure if someone else reads the information from the iPackACCESS.
- When you read the parameters from the iPackACCESS and then save them to the iPackACCESS, all parameters, including the mailbox password, are returned unchanged unless the user changes them and then chooses **File>Save to iPack**.

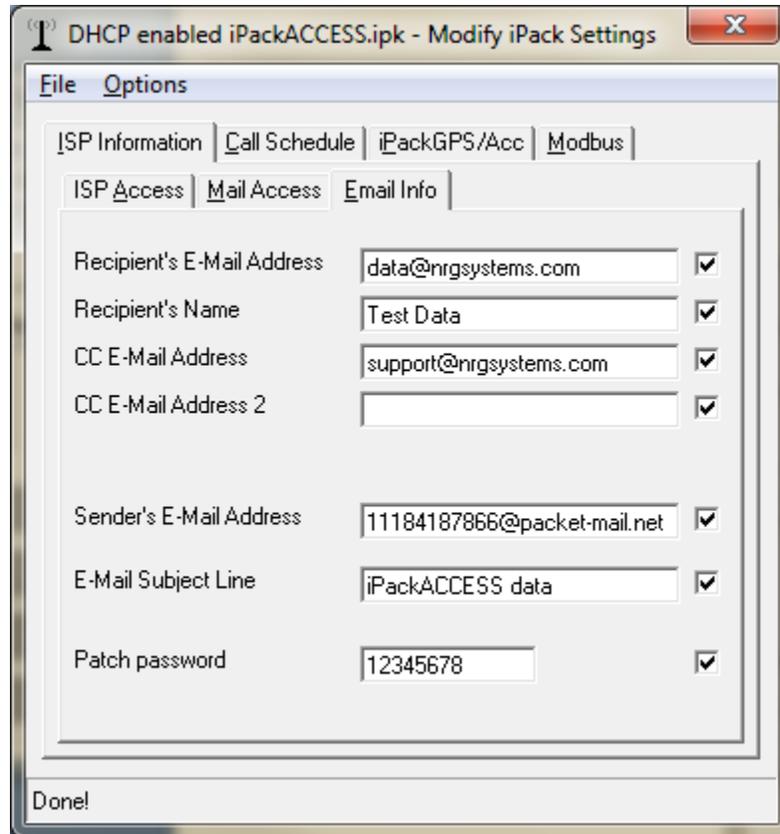
### **Internet Time Server Name**

- As part of the iPackACCESS's connection routine, it gets the current time (in UTC) from the Internet and updates the Symphonie*PLUS3*'s clock.
- The user must enter a local time server for the iPackACCESS to use.
- Enter the time server name exactly as provided, and do not enter any extra spaces or quotation marks; check that there are no leading or trailing spaces in your entry; be sure to include the decimal points in the name.

Once the information on this tab has been edited and double checked, move to the E-Mail Info tab.

### **Email Info Tab**

All the checkboxes should still be checked, and you may edit each Email Info setting. General information regarding each setting is provided below.



### Recipient's E-Mail Address

This is the primary e-mail address where the Symphonie*PLUS3*'s iPack is going to send the data.

- This can be your e-mail at work.
- Enter it exactly as your ISP provided; do not enter any extra spaces or quotation marks; check that there are no leading or trailing spaces in your entry.
- It should look something like:  
jsmith@mycompany.com

### Recipient's Name

This field is the text portion of the e-mail address.

- If you look at an e-mail in your in-box, it will have the "To" item as something like, "John Smith" <jsmith@mycompany.com>.
- This entry is the "John Smith" portion of the recipient's e-mail address.
- This field is optional but is useful if someone has to sort through incoming emails.
- It could look something like:  
John Smith

### CC E-Mail Address

This is an additional e-mail address where the iPackACCESS is going to send the data.

## CC E-Mail Address 2

This is also an additional e-mail address where the iPackACCESS is going to send the data.

## Sender's E-Mail Address

This is the e-mail address that will appear in the "from" of the emails being sent to the recipient's email address from the iPackACCESS. It is often identical to the Mailbox Name plus the "@myisp.com" part of the email address. *However, the Sender's E-Mail Address is NOT necessarily the address to which patch files should be sent.*

- Do not enter any extra spaces or quotation marks; check that there are no leading or trailing spaces in your entry.
- It should look something like:  
[logger@mycompany.com](mailto:logger@mycompany.com)

## E-Mail Subject Line

This entry will become the subject line of the e-mail that you receive from the iPackACCESS and may contain letters, numbers and other symbols.

- It is typically a description of the site from which the iPackACCESS that will be calling.
- It should look something like:  
Site 1234 – Derry Mountain

## Patch Password

The patch password is a security measure that protects your data logger from unwanted or accidental patching.

- Enter a patch password – do not leave blank.

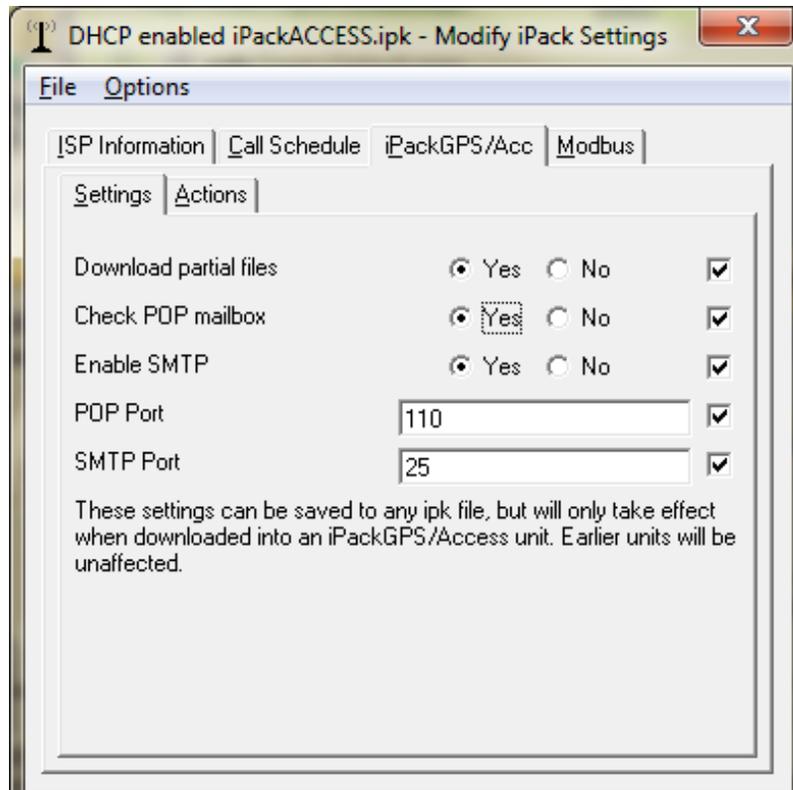
Once the information on this tab has been edited and double checked, move to the Call Schedule tab.

## Setting iPackACCESS Preferences – iPackGPS/Acc Tab

This screen provides access to new features of the iPackACCESS unavailable in previous iPack versions.

## Settings

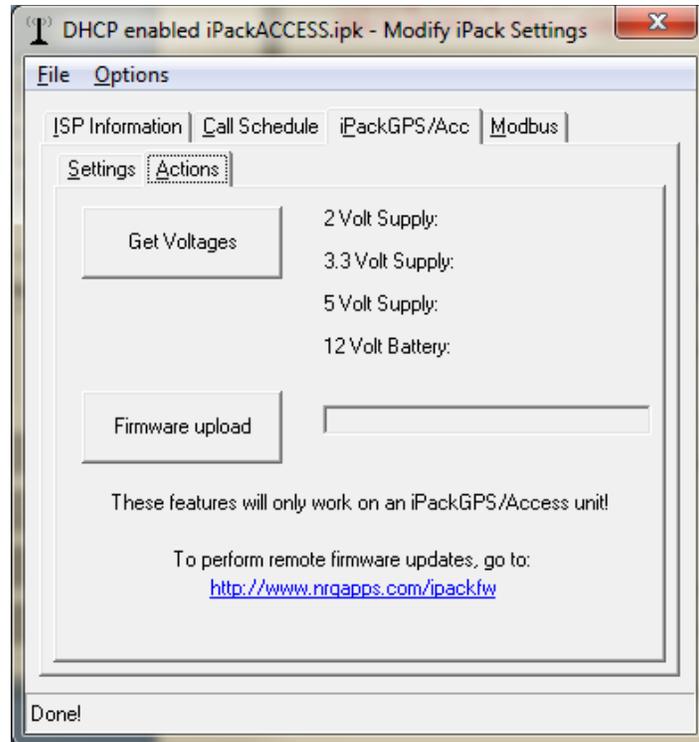
Like all other screens in the Modify iPack Settings window, once you have made a change, you must go to **File** and choose **Save to iPack**.



- The “Download partial files” setting allows the user to toggle on and off downloading of partial files.
- A “partial file” refers to a file that includes less than 24 hours of data, typically from midnight up until the iPack’s scheduled call time.
- Disabling the downloading of partial files and checking of POP3 can reduce air time. However, this is generally not recommended for remote sites.
- If POP3 checking is disabled, the iPack will not be able to receive patches or firmware updates until the setting is changed via a direct connection to SDR.

### Actions

The Actions screen provides voltage readings that can be useful for diagnosing a problem and a button for updating the iPackACCESS’s firmware.



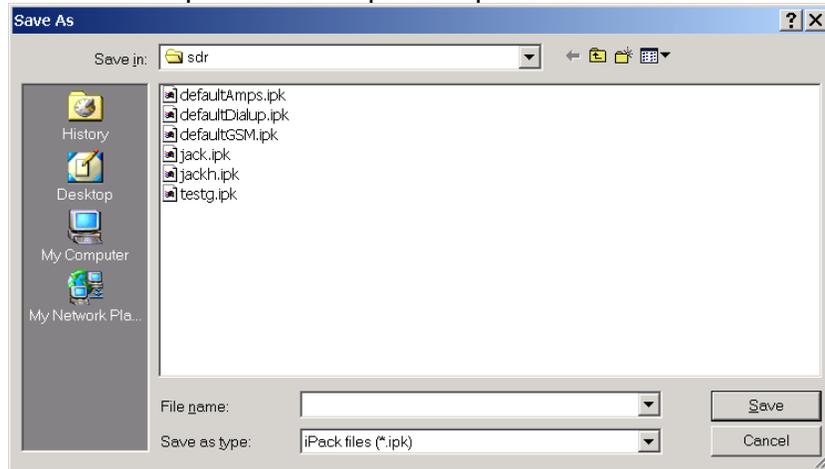
- iPack battery voltage and voltages from various locations on the iPackACCESS's circuit board are displayed here when the **Get Voltages** button is clicked.
- iPackACCESS firmware version can be updated via SDR and the iPack programming cable using the **Firmware Upload** button.
- A link to the site used for remote firmware updates is also displayed on this screen.
- The iPackACCESS event log will show "UPDATE\_DOWNLOAD\_EVT" and "UPDATE\_APPLY\_EVT" to help track the installation of the new firmware. Note that these events will only appear for remote updates, not for updates performed using SDR's "Firmware upload" button.
- Firmware updates via SDR and the iPack programming cable are completed in a few minutes.

### **Saving the iPack Displayed Setup to the connected iPack**

After editing the parameters on the screen, save the changed parameters to the iPack by selecting **File>Save to iPack**. This will download all of the checked settings to the attached iPack. On the lower left of the Modify iPack Settings window you should see the message "Transferring>>>>>" and then "Done!" You've now completed programming the iPackACCESS for emailing \*.RWD files.

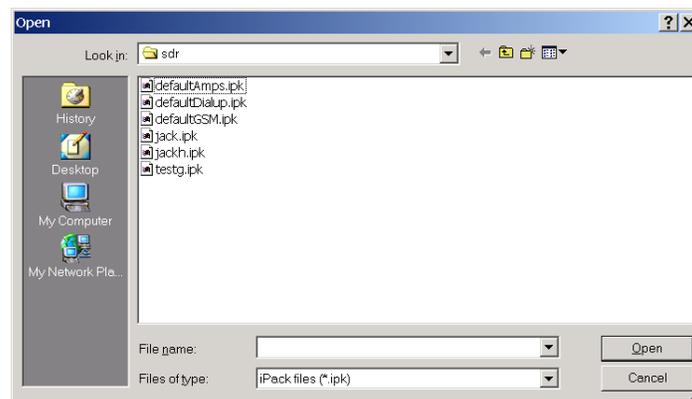
## Saving a copy of the iPack File (.ipk) to your computer

Save a copy of the iPack settings by selecting **File>Load from iPack**. This will load the current iPackACCESS configuration to your computer screen. Then choose **File>Save iPack File**. This will save a copy of the iPackACCESS's configuration file (\*.ipk file) to your computer. Remember to send a copy of the \*.ipk file to your site management team – it is important to keep the \*.ipk file safe!



## Opening a Saved iPack File (.ipk)

From the Modify iPack Settings Window, select **File>Open iPack File**. In the future, you may want to open a saved iPack file, edit the settings and then send it back to the iPackACCESS. You can also do this to check the saved iPack file.



## Technical Specifications

<b>Accessory Type</b>	Real-time, statistical, and wind resource assessment <b>data transfer communications device</b> for SymphoniePLUS3 data loggers
<b>Applications</b>	<ul style="list-style-type: none"> <li>• Real-time and statistical data accessible to wind farm SCADA system via MODBUS TCP</li> <li>• Wind resource assessment data is available by email if internet is accessible via wind farm network</li> </ul>
<b>Instrument compatibility</b>	SymphoniePLUS3 data logger
<b>Function</b>	MODBUS TCP server available over RJ45 Ethernet connection
<b>Mounting</b>	iPackACCESS stacks with SymphoniePLUS3 data logger on long logger mounting screws
<b>Software</b>	Configured with Symphonie Data Retriever (SDR)
<b>Data Delivery</b>	<ul style="list-style-type: none"> <li>• Real-time, 1-second values of all 15 channels available from MODBUS TCP server</li> <li>• Mean, standard deviation, minimum, and maximum values at user-selected time interval (1, 2, 5, 10, 15, 30, and 60 minutes) available from MODBUS TCP server</li> <li>• SymphoniePLUS3 10-minute data is available by email if internet is accessible via wire-connected SCADA network</li> </ul>
<b>User Interface</b>	<ul style="list-style-type: none"> <li>• Status reporting on data logger front panel</li> <li>• Configuration via SDR on Windows PC</li> </ul>
<b>Configurable Parameters</b>	<ul style="list-style-type: none"> <li>• MODBUS secure client list to prevent unauthorized access by limiting the acceptable IP addresses for incoming connections (up to 10 allowable addresses)</li> </ul>
<b>Batteries</b>	Lead acid gel cell recharged via external power input
<b>External power input</b>	14-28 VDC
<b>Connections (Physical)</b>	<ul style="list-style-type: none"> <li>• RJ45 connector for connection to SCADA system</li> <li>• SymphoniePLUS3 to iPackACCESS via DB25 interface</li> <li>• Two (2) screw terminals for solar PV panel or external power supply input</li> <li>• Two (2) screw terminals for external battery</li> <li>• One (1) screw terminal for earth ground, pre-wired for connection to data logger earth ground stud</li> <li>• GPS antenna connector QMA female</li> </ul>
<b>Weight</b>	<i>To Be Determined</i>
<b>Dimensions</b>	165 x 222 x 102 mm (6.5 x 8.75 x 4.0 inches)
<b>Enclosure</b>	Polycarbonate plastic
<b>Operating Temperature Range</b>	-40 °C to 65 °C (-40 °F to 149 °F)
<b>Computer</b>	Windows PC with Symphonie Data Retriever (SDR) required for programming of iPackSCADA settings
<b>Operating System</b>	Symphonie Data Retriever (SDR) requires Windows 95 or higher
<b>Related Hardware</b>	<ul style="list-style-type: none"> <li>• SymphoniePLUS3 Data Logger (Item 5504)</li> <li>• iPack Programming Kit (Item 3368)</li> <li>• Universal iPack Charger (Item 3615)</li> </ul>

## Warranty Statement

Renewable NRG Systems (RNRG) warrants its products for a period of two years from date of original purchase solely for the benefit of the original consumer purchaser. If this product is determined to be defective in materials or workmanship, RNRG will, at RNRG's option, repair or replace this product without charge. This warranty does not cover damage due to improper installation or use, accident or misuse, damages due to any unauthorized service or lightning. This warranty also will not apply if any seal on any instrument or sensor is broken, if any cable has been severed, or the equipment was not adequately grounded.

To return a defective product, request an RMA (return merchandise authorization) number by calling us at the number below or by emailing [support@renewablenrgsystems.com](mailto:support@renewablenrgsystems.com), or by submitting a request through our website's Technical Support area.

Please provide the serial number of the item as well as date of purchase. No products will be accepted for warranty work without an RMA number. The product must be returned, postage prepaid, to RNRG with a brief description of the problem, RMA number and a return address with phone number.

The foregoing limited warranty is given in lieu of all other warranties, express or implied. RNRG specifically disclaims all implied warranties including, but not limited to, any implied warranties of merchantability and fitness for a particular purpose.

The above limited warranty expressly excludes, and RNRG shall not be liable for, any incidental or consequential damages caused by or related to the selection, use of, inability to use or malfunction of this product.

RNRG will make a good faith effort to repair or replace promptly any product which proves to be defective within the warranty period. First, contact RNRG or the representative from whom the product was purchased and ask for an RMA number. Inspect your shipments for damage to packages or missing packages immediately upon receipt. Record any such exceptions on the freight receipt of the delivery agent. If any contents are damaged or missing, report this in writing to the freight carrier and send RNRG a copy of the damage report. If you insured the shipment yourself, report any damages to your insurance carrier.

Tel: 802-482-2255

Fax: 802-482-2272

email: [support@renewablenrgsystems.com](mailto:support@renewablenrgsystems.com)

website: <https://www.renewablenrgsystems.com/technical-support>

# Sending Items for Repair

## INTERNATIONAL CUSTOMERS

1. **Contact Renewable NRG Systems by phone, email, or through our website to obtain an RMA number (Return Material Authorization).** Write the RMA number clearly on all shipping cartons.

Tel: 802-482-2255

Fax: 802-482-2272

email: [support@renewablenrgsystems.com](mailto:support@renewablenrgsystems.com)

website: <https://www.renewablenrgsystems.com/technical-support>

2. **Send your item to Renewable NRG Systems "Delivery Duty Paid"** (see address below) using a door-to-door courier service such as UPS, FedEx, or DHL. If the repair is not urgent, please send your package by Airmail. (Courier services deliver the package directly to us, customs cleared.)

***Renewable NRG Systems will not accept packages shipped Freight Collect or with Collect charges.***

If Renewable NRG Systems refuses the shipment, the courier service will charge your account return freight charges.

***DO NOT send return items by direct or consolidated air freight service with an airline.***

The cost for air freight may seem lower than the courier service, but air freight costs do not include customs clearance, airport handling, break bulk fees, and inland delivery to Renewable NRG Systems.

3. **Attach a Commercial Invoice** to the carton. The Commercial Invoice should include the following information:

- Name and address of the shipper.
- Renewable NRG Systems' complete address and telephone number as the consignee.
- Description of the items being returned.
- Quantity of each item being returned.
- Value for customs / insurance (purchase price or replacement cost).
- Number of cartons with respective weights and dimensions.
- Please include the following statement to avoid paying US import duties:

"These items are being returned to their U.S. manufacturer. Country of manufacture and origin is USA, HTS CODE 9801.00.1012."

4. **Pack your repair item in a sturdy packing carton.** Tag each item with a brief description of the problem.

5. **Insure your shipment** against damage or loss in transit. Be sure to check the appropriate box and enter a "Value for Carriage" (insurance) on your air waybill. The value is the purchase price of the equipment or what it would cost to replace the equipment if the shipment were lost. Keep a record of the tracking number.

Once your item arrives, we will assess the item and notify you of the repair cost. Any repair charges and freight costs, if applicable, are payable before Renewable NRG Systems will return the repaired item to you via door-to-door courier service. Renewable NRG Systems will send you a shipment advisement when the repaired item is shipped.

**International Customers:**

Before sending the repair item to Renewable NRG Systems, check with your local customs authorities about provisions in your country for exporting and re-importing repair items. Some countries treat repair shipments like new shipments and charge import duties and taxes again upon re-importation. Other countries have specific steps to follow or specific forms to complete which help reduce the import duties upon re-import of the item.

**US CUSTOMERS**

Please see items 1, 4, and 5 above. Send your item(s) to Renewable NRG Systems "Freight Prepaid and Insured." **Shipments sent freight collect will not be accepted by Renewable NRG Systems.**

Renewable NRG Systems Attn: RMA- _____ 110 Riggs Road Hinesburg VT 05461 USA
---

Global leader in wind measurement



# Declaration of Conformity

(in accordance with ISO/IEC 17050-1:2004)

**Supplier:** NRG Systems  
**Supplier Address:** 110 Riggs Road, Hinesburg, VT 05461, USA  
 Telephone: 802 482 2255, Fax: 802 482 2272  
 Email: sales@nrgsystems.com

**Declares that the Product:** SymphoniePLUS3 Logger System, including:

<b>Logger-SymphoniePLUS3, with</b>	<b>Item 4941</b>
<b>SCM Cards</b>	<b>Items 3075, 3070, 3988, 3673, 3077, 3253, 3252, 3073, 3583, 3076, 3071, 3072, 3078, 3742, 3743, 3074, 6925, 6946, 6646</b>
<b>Symphonie iPacks</b>	<b>Items 3860, 3533, 4222, 3531, 3146, 3861, 4620, 4621, 4622, 7169</b>

**is in conformity with the requirements of the following documents:**

**EN61326-1 Class A** "Electrical Equipment for Measurement, Control, and Laboratory Use—EMC Requirements", in accordance with: **CISPR 11; EN 61000-4-2; EN 61000-4-3; EN 61000-4-8; EN 61000-4-4; EN 61000-4-20; 61000-4-6**

**IEC 61010-1** "Safety requirements for electrical equipment for measurement, control, and laboratory use"

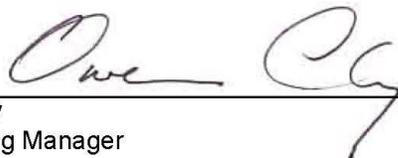
**Additional Information:**

This product complies with the requirements of the applicable directives **2006/95/EC, 2004/108/EC**; and standard **EN 61010-1** and therefore, the product is CE marked in accordance with **93/68/EEC**.

FCC compliance is demonstrated with compliant CISPR data.

The design documentation, test reports, and assessment laboratory accreditation are under document control in NRG Engineering.

Issued at Hinesburg, VT, USA  
 31 Oct 2012

  
 Owen Clay  
 Engineering Manager

Tel 802.482.2255 | Fax 802.482.2272 | info@nrgsystems.com | 110 Riggs Road, Hinesburg, Vermont 05461 USA | [www.nrgsystems.com](http://www.nrgsystems.com)

## References

Some of our products incorporate software that is available in the open source community, including [www.freertos.org](http://www.freertos.org) (version 6.00) and [www.savannah.nongnu.org](http://www.savannah.nongnu.org). The information that follows is provided to comply with the terms of use.

[www.freertos.org](http://www.freertos.org)

FreeRTOS is a real time operating system available in the open source community and utilized in the iPackACCESS. Source code is available from NRG upon request.

[www.savannah.nongnu.org](http://www.savannah.nongnu.org)

We are using the lwIP lightweight TCP/IP stack in the iPackACCESS.

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