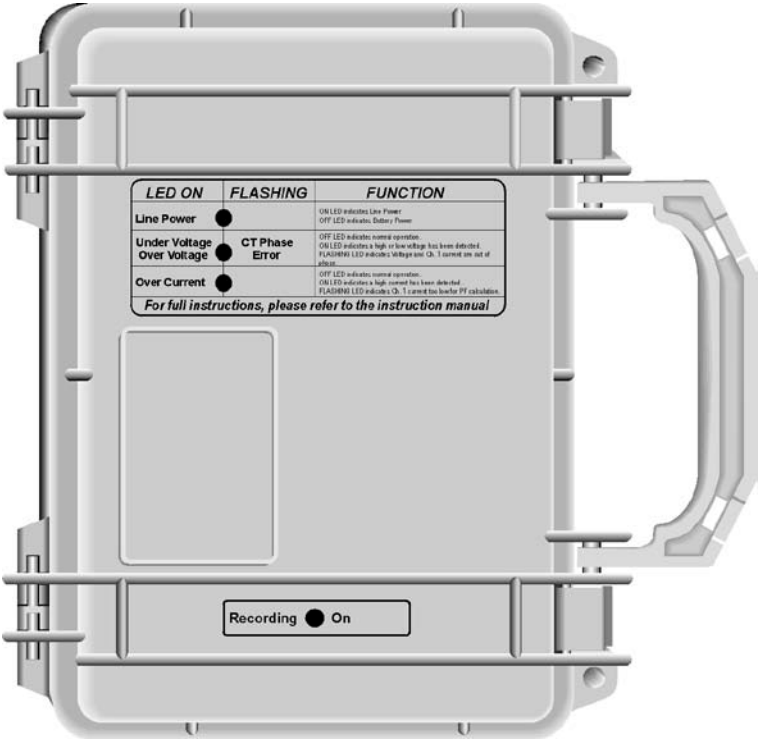
Northwood Power Instruments Inc.

Silent Partner Max



Six Channel True RMS Data Logger

Version 1.0

Silent Partner Max™ User's Guide

The information in this document is subject to change without notice.

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Introduction to *Silent Partner Max*

The ***Silent Partner Max*** logger was developed in co-operation with the NORTHWOOD DATA LOGGERS distributor in the United Kingdom. ***Silent Partner Max*** offers the following features:

- true RMS measurement
- 12 bit resolution
- ± 0.25% accuracy
- 3 current and 1 voltage input channels
- 1 dry contact input channel for use with pulse output meters
- power factor measurement
- ***Silent Partner PowerPack*** software.

Designed for flexibility, ease of use, accuracy and durability, ***Silent Partner Max*** is the perfect tool for:

- energy studies
- industrial monitoring
- machinery and motor analysis
- HVAC studies
- electrical utilities
- peak shaving and load management.

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Hardware Specifications

Maximum Channels	
6	Selectable storage for each channel
Range	
Ch 1 0 - 275 VAC Ch 2 0 - 1 VAC - Current CT Input Ch 3 0 - 1 VAC - Current CT Input Ch 4 0 - 1 VAC - Current CT Input Ch 5 0 - 360° Ch 1 to Ch 2 Ch 6 Pulse input	RMS for 50/60 Hz. operation Power factor calculated via software. Pulse input for dry or voltage free contacts only
External Connections	
1 voltage/auxiliary power, 1 download, 3 current, 1 pulse	
Sensor Type	
External CT's, internal impedance network for voltage	
Sampling Rate	
0.25 second	
Data Storage Rate	
1 second to 15 minutes	Set via software
Parameters Stored	
Avg, Min/Max, or Min/Max/Avg	Set via software
Samples per Average	
4 - 3600, depending on storage rate.	Set automatically
Memory	
512K, non-volatile RAM	
Memory Treatment	
Stop when full, or wrap.	Set via software
Storage Capacity	
15 days for 6 channels, Min/Max/Avg, 1 min. storage interval	Capacity depends on number of channels used and storage mode
Status Indicators	
Line Power, Over/Under Voltage, Phase Error/Over Current/No Current, Recording, Battery Charged (inside cover)	

continued…

Hardware Specifications continued

Power	
Line Power, Internal battery	Battery recharged via line power
Battery Life	
14 days	
Communications	
Opto-isolated RS232, support for remote setup	
Software	
Silent Partner PowerPack	Requires PC running Windows 3.1 or later and 1 free serial port
Packaging	
Rugged, durable ABS.	
Accuracy	
± 0.25 % Range + CT error	
Safety	
Optically isolated download	
Operating Temperature	
- 20ºC to 50ºC	

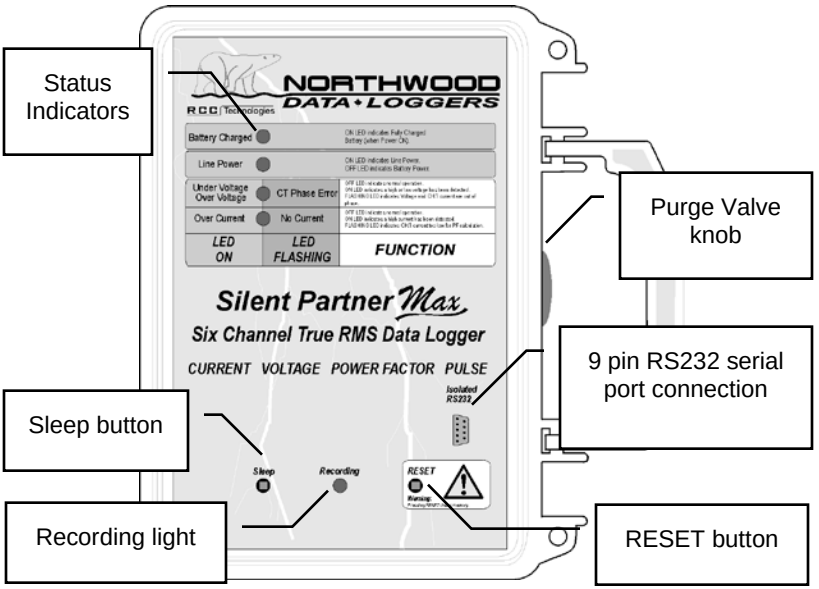
Specifications subject to change without notice.

Important Safety Information

Silent Partner Max **has been designed for safety. However, individuals using the logger must be suitably qualified and trained, and are responsible for the safe operation of the logger. Please observe the following safety precautions:**

- **Do not allow water seepage into the logger. The logger case is not hermetically sealed and moisture can cause a shock hazard to the operator and damage to the unit.**
- **Never work alone with high voltage circuits.**
- **When installing the logger near high voltage circuits, connect the unit only after the power has been turned off.**
- **To avoid personal injury and damage to the logger, never exceed the maximum rated input voltage for a channel.**

The Logger - Inside Front Cover



Status Indicators

There are 5 status indicators on the front of the unit. These lights may be on, off or flashing to indicate different conditions.

Battery Charged Indicator

When the Battery Charged light is ON it indicates that the battery is fully charged. When the Battery Charge light is OFF it indicates that the battery is not fully charged.

continued…

The Logger - Inside Front Cover continued

Line Power Indicator

When the Line Power light is ON it indicates that the logger is operating on line power. The light is OFF when the logger is operating on battery power.

Under Voltage/Over Voltage/Phase Error Indicator

Using ***Silent Partner PowerPack***, you can set an anticipated voltage range in the logger. If ***Silent Partner Max*** detects a voltage outside this range at any time during a survey, the Under Voltage/ Over Voltage light is turned ON. The light FLASHES to indicate that the voltage and Channel 1 current are out of phase. If the light is OFF, no over or under voltage event has been detected. Resetting the logger clears the memory and turns off the Under Voltage/ Over Voltage light.

Over Current Indicator

Using ***Silent Partner PowerPack***, you can set an anticipated current range in the logger. If ***Silent Partner Max*** detects a current above this range at any time during a survey, the Over Current light is turned ON. The light FLASHES to indicate that the current has fallen below the specified range and that the power factor calculation has been discontinued. If the light is OFF, no over or under current event has been detected. Resetting the logger clears the memory and turns off the Over Current light.

Recording Indicator

The Recording light blinks while ***Silent Partner Max*** is logging.

continued…

The Logger - Inside Front Cover continued

Sleep Button

The Sleep button is a recessed control. Press the Sleep button before disconnecting or transporting ***Silent Partner Max*** to stop the logging function and power down the logger to standby mode. This minimizes the risk of data loss and prevents the logger from recording 0 data levels after it has been disconnected.

Reset Button

The RESET button is a recessed control. Press RESET after transporting the logger to the survey site and connecting it. Resetting clears the logger's memory, clears the Under Voltage/Over Voltage and Over Current event detection lights, and begins a new survey.

Because resetting clears the logger's memory, make sure to download any logged data before pressing RESET.

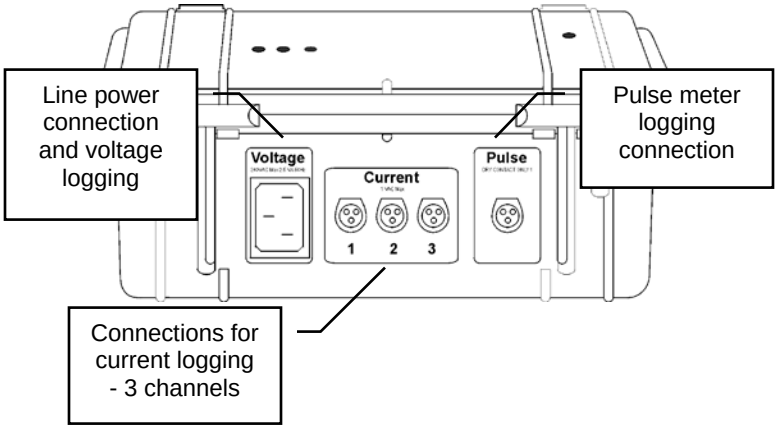
Purge Valve Knob

The ***Silent Partner Max*** case includes a purge valve. To avoid a shock hazard to the operator and damage to the unit do not allow water seepage into the logger.

Serial Port Connection

The communication cable supplied with ***Silent Partner Max*** connects at this 9 pin RS232 connector. Attach the other end of the cable to a free serial communication port on the back of a PC to download data, configure the logger or check the logger's status.

The Logger - Connectors



The connections to the logger are located on the side of the unit.

Voltage

This is the line power input as well as the Voltage logging channel.

Current

There are 3 labelled connections for Current logging. These labels correspond to the I1, I2 and I3 labels that appear in dialog boxes.

Pulse

There is 1 connection for a pulse meter sensor.

Introduction to *Silent Partner PowerPack* Software

Silent Partner PowerPack software is an essential tool to help you get the most from your ***Silent Partner Max*** logger and manage the data it collects. ***Silent Partner PowerPack*** lets you:

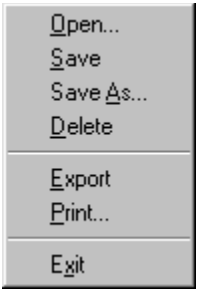
- configure the logger
- set data logging parameters
- query the logger's status
- view reports and graphs of logged data
- export data to a spreadsheet program in Lotus.WK1 format
- calculate power using measured current and voltage plus an assigned or measured power factor.

Silent Partner PowerPack and Windows®

Silent Partner PowerPack is a Windows-based application so you will find the interface familiar. It employs the same menu structure and screen navigation as other Windows programs. Simply make selections using a mouse, or from the keyboard by pressing the underlined letter of the command you wish to select. Dimmed menu items are unavailable.

Silent Partner also uses Windows file management functions.

To do this….	**click File then click here.**
select a previously stored survey	⇨
save a survey with its current name	⇨
save a survey with a new name	⇨
delete an existing survey	⇨
export a survey in Lotus.WK1 format	⇨
print the current report or change print setup	⇨
exit ***Silent Partner PowerPack*** software	⇨



For additional information on using Windows refer to your Windows documentation or on-line Help.

Quick Start

This section provides an overview to help you get started quickly. Please read through the remainder of this manual for important information on the correct setup and use of the ***Silent Partner Max*** logger and ***Silent Partner PowerPack*** software.

Preparing to Log

1. Install ***Silent Partner PowerPack*** software.
2. Start ***Silent Partner PowerPack*** software.
3. Connect the ***Silent Partner Max*** logger at the PC serial port.
4. Select the logger type and serial port, set the time and date, and specify the data logging parameters.
   (**Setup**, **Logger Serial Port**), (**Logger, Set Time and Date**)
   (**Logger**, **Change Parameters**)
5. Disconnect the logger from the PC.
6. Connect the logger to the load you wish to monitor.
7. **RESET** the logger to begin your survey.

After Your Survey

1. Disconnect the logger from the load and connect it to the PC.
2. Start ***Silent Partner PowerPack*** and download the data.
   (**Logger**, **Download SP Data**)
3. Setup the Power, Costing or Pulse calculations.
   (**Setup, Range/Power**), (**Setup, Range/Power**),
   (**Setup, Pulse Rate Period**)
4. Select a display group.
   (**Setup, Measurement Scale**)
5. Select a report type.
   (**View**, *report type*)
6. Tailor the report's appearance to suit your needs.
   (**Setup, Display/Print Options**)
7. Print the report and save the file.

Installing Silent Partner PowerPack Software

System Requirements:

- IBM compatible PC
- Windows 3.1 or later
- VGA display (colour strongly recommended)
- COM1, 2, 3, or 4 (serial communications port)
- Hard disk with 1 megabyte free
- Floppy drive (for program installation)
- although not necessary, a mouse facilitates using the software

Software Installation

1. Make sure that your computer is running Windows 3.1, 95 or 98.
2. Insert the ***Silent Partner*** disk in the floppy drive (A: or B:).
3. Windows 3.1 users, select **Run** from the **File** menu in the Program Manager to open the Run dialog box.

   Windows 95 or 98 users click 

and select **Run** to open the Run dialog box.
4. In the Run dialog box, type **A:\SETUP** (or **B:\SETUP**).
5. Follow the on-screen instructions.

A program group named ***Silent Partner*** and a ***Silent Partner PowerPack*** icon are created during installation. To run the program, double click the icon.

After installing the software you will need to specify the type of logger you are using and the number of the serial port that you will use to communicate with the logger. In addition, you may wish to change the default directories in which ***Silent Partner*** stores data and export files. Turn to **Setting Up Silent Partner PowerPack Software** for instructions.

Connecting the Logger to a PC

1. Attach the power cord at the socket on the side of the logger.
2. Plug the power cord into an electrical outlet. The Line Power light will come on.
3. Open the logger's front cover and plug the download cable into the 9 pin connector.
4. Plug the other end of the download cable into a serial communication port on the back of the PC.

The first time you communicate with a logger from a PC you will need to identify for the software which logger type and COM port you are using. Refer to **Setting Up Silent Partner PowerPack Software** for instructions on selecting a logger type and specifying the COM port number.

Starting Silent Partner PowerPack Software

1. Double click the ***Silent Partner*** icon to start the program and display the opening screen.

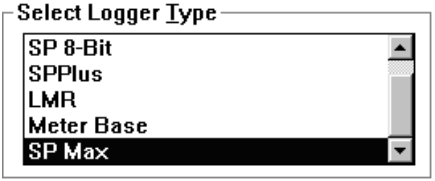
After a few seconds the opening screen closes to display a blank screen with the ***Silent Partner PowerPack*** title bar and main menu at the top.

Setting Up Silent Partner PowerPack Software

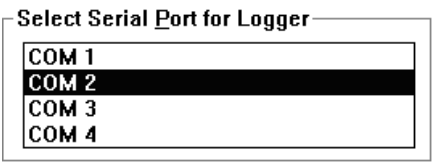
After installing ***Silent Partner PowerPack***, you must complete the setup of the software. Northwood Power Instruments Inc. offers a broad range of logging and metering equipment, all supported by ***Silent Partner PowerPack***. The first time you communicate with your logger from a PC you will need to identify for the software which model of logger you are using. You will also need to specify which PC serial port will be used to communicate with the logger, and synchronise the logger's time and date with that of the PC. You may also wish to change the default directories that ***Silent Partner PowerPack*** uses to store data files and export files.

Identifying the Logger and Serial Port

1. Click **Logger Serial Port** in the **Setup** menu to open the Logger Port Setup dialog box.
2. Scroll down the **Select Logger Type** list and click **SP Max**.



3. In the **Select Serial Port for Logger** list, click the **COM port** to which the logger is attached.



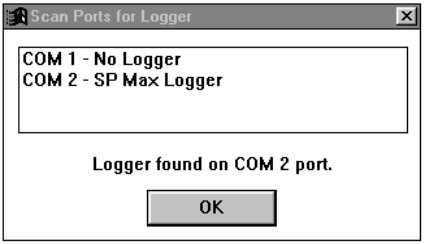
If you do not know the COM port's number you can instruct ***Silent Partner*** to scan all the ports and locate the logger. To scan ports for the logger, proceed to **Step 4**. If you have already selected the COM port, go to **Step 7**.

continued…

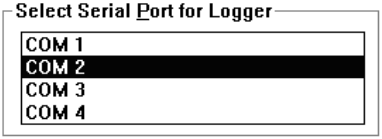
Identifying the Logger and Serial Port continued

4. Click **Start Port Scan for Logger**. ***Silent Partner PowerPack*** reminds you to connect the logger.

5. Click **OK**. ***Silent Partner*** confirms the location of the logger.



6. Click **OK**. ***Silent Partner*** selects the port at which the logger was found as the download port.



7. Click **OK** again to confirm the selection and close the Logger Port Setup dialog box.

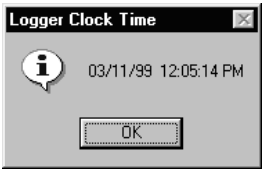
Synchronising Logger Time and Date with the PC

To ensure the accuracy of your surveys you will need to synchronize ***Silent Partner Max***'s internal clock with that of your PC before logging any data. You may also need to re-synchronize the clock if you use ***Silent Partner Max*** with a different PC, or after you have recharged the logger's battery.

Changing the time and date erases the logger's memory and resets the logger. Download any data before synchronizing.

1. Make sure the logger is connected to the correct PC serial port.
2. Click **Set Time and Date** in the **Logger** menu. ***Silent Partner PowerPack*** communicates with the logger and displays a warning. If you have logged data that you wish to save, click **Cancel** and turn to **Downloading Data**. Otherwise, proceed.

3. Click **OK**. ***Silent Partner PowerPack*** synchronizes the time and date in the logger with the time and date in the PC and displays a confirmation message.



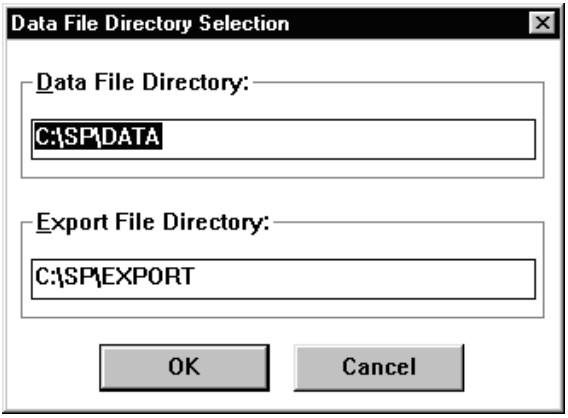
4. Click **OK** to close the Logger Clock Time confirmation message.

Silent Partner PowerPack lets you synchronize the time and date. However the format in which time and date appear is determined by the selection you make in the International Settings section of your Windows Control Panel. For information on Windows time and date formats refer to your Windows documentation or on-line Help.

Changing the Default Directories

At installation, ***Silent Partner*** creates two subdirectories or folders in which it stores data files. Files downloaded from the logger are stored in C:\SP\DATA. Data files you export in Lotus.WK1 format are stored in C:\SP\EXPORT. ***Silent Partner*** allows you to change one or both of these default directories.

1. Click **Directories** in the **Setup** menu. Silent Partner displays the Data File Directory Selection dialog box.



2. To change the directory in which data files are stored, type the new path in the **Data File Directory** text box. To change the directory in which export files are stored, type the new path in the **Export File Directory** text box.

3. Click **OK** to confirm the change and close the Data File Directory Selection dialog box.

Setting the Logging Parameters

Changing parameters erases the logger's memory and starts a new survey. Download any data before changing parameters.

Data Storage Interval and Survey Length

Silent Partner Max has the flexibility to store sampled data at intervals from 1 second to 15 minutes. Because a shorter data storage interval results in the logger's memory becoming full more quickly, you can choose to store values frequently over a relatively short period or less frequently over a longer survey. Alternatively, you may wish to log data over a specified period of time. ***Silent Partner PowerPack*** lets you select a survey duration of between 5.4 hours and 202.1 days and the logger automatically adjusts its data storage interval to accommodate the survey length you choose.

Wraparound Mode

Silent Partner Max has 512 kb of non-volatile RAM. You can instruct the logger to respond in one of the following two ways when its memory is full:

- stop recording and enter Sleep mode to conserve energy, or
- continue recording and 'wrap around' to replace the oldest data with new data.

Channel Configuration

Silent Partner Max has 6 data input channels; 1 voltage channel, 3 current channels 1 pulse channel and 1 computed power factor channel. You can log data on all 6 channels simultaneously or disable some channels. When a channel is disabled, the memory allocated to it is reassigned to the active channel or channels, allowing you to record longer surveys. Voltage is logged via the unit's line power input. For current logging you must identify for the software the type of clamp you are using. For pulse meter logging you need to identify the type of sensor. You will also need to set current and voltage limits for out-of-range event detection. In addition, you can select whether the logger stores the minimum and maximum values recorded during a storage interval, the average of all values recorded, or both.

Setting the Logging Parameters continued

Storing Minimum, Maximum and Average Values

Silent Partner Max samples data multiple times during each storage interval. You can specify whether the logger stores the lowest and the highest readings collected during the storage interval (Min/Max), an average of all readings collected during the interval, or both.

If you intend to take advantage of the Silent Partner *Max* power calculation feature, you will need to enable Average recording.

Specifying the Type of Current Clamp in Use

Before logging current you will need to specify for the software which type of clamp you are using. You do this by selecting the range for which the clamp is rated.

Specifying the Sensor Type for Pulse Meter Logging

Before beginning a pulse meter survey you will need to specify for the software the type of sensor you are using. You do this by selecting an option from a list. For instructions on adding different types of pulse meters to the list, refer to **Customizing Silent Partner Powerpack**.

Setting Current and Voltage Limits for Event Detection

Lights on the front of the logger indicate if current or voltage outside a specified range has been detected during a survey. This event detection flags the need for further analysis of the logged data. ***Silent Partner Max*** allows you to specify the anticipated range for both current and voltage. If ***Silent Partner Max*** detects any readings outside this specified range, the appropriate light is activated.

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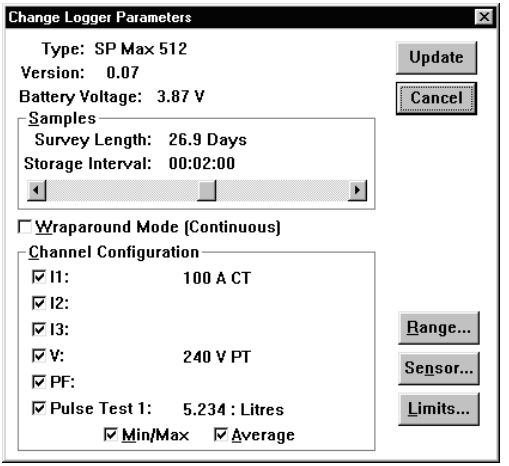
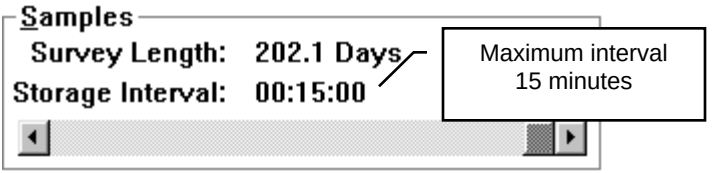
Setting the Logging Parameters continued

1. Click **Change Parameters** in the **Logger** menu. ***Silent Partner Powerpack*** communicates with the logger and displays the Change Logger Parameters dialog box.



2. To adjust the Survey Length and Storage Interval move the **slider**.



3. To instruct the logger to replace the oldest data with new data, select **Wraparound Mode (Continuous)**.

To instruct the logger to stop recording and enter Sleep mode when its memory is full, deselect **Wraparound Mode**.

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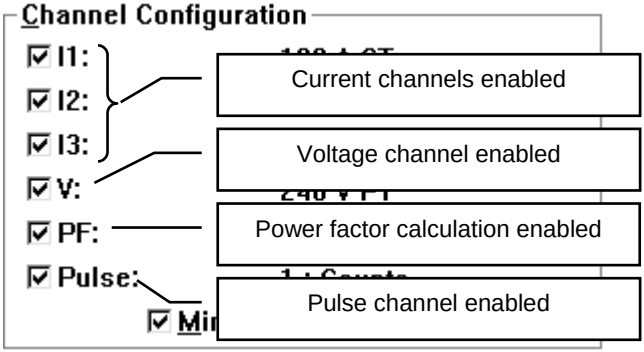
Setting the Logging Parameters continued

4. To enable data logging on any channel, select it.

   To disable a channel, deselect it.

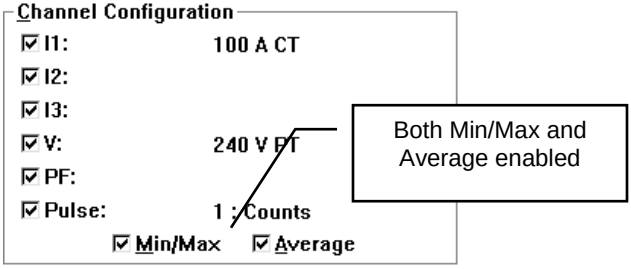


Note that Pulse logging requires line power.

5. To enable storage of the lowest and highest recorded values select **Min/Max**.

   To enable storage of the average value select **Average**.

   To disable the storage of either measurement, deselect that measurement.



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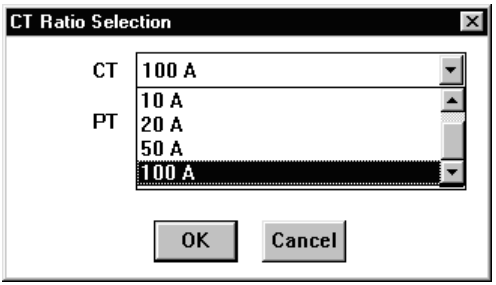
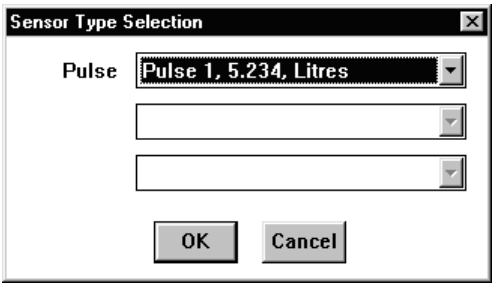
6. To specify the type of current clamp in use, click the **Range** button to open the CT Ratio Selection dialog box.



7. Open the **CT** drop-down list and select the appropriate CT value. Then click **OK**.Note that for other NORTHWOOD DATA LOGGER products you may also specify a voltage range for PT's, however ***Silent Partner Max*** logs voltage through the unit's power cable and the voltage range may not be adjusted.

8. To specify the type of pulse sensor in use, click the **Sensor** button to open the Sensor Type Selection dialog box..



9. Open the **Pulse** drop-down list and select the appropriate sensor type. Then click **OK**.

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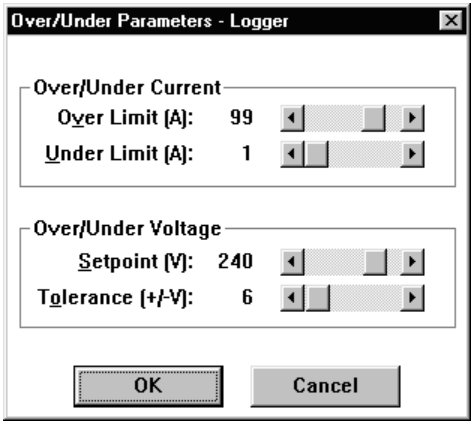
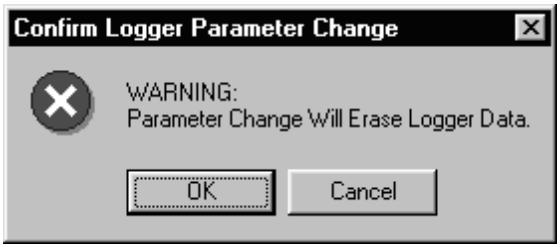
Setting the Logging Parameters continued

10. To set the anticipated current and/or voltage range, click the **Limits** button to open the Over/Under Parameters - Logger dialog box.



11. Move the **sliders** to adjust the upper and lower limits for current or the setpoint and tolerance for voltage. Then click **OK**.
12. Click **Update**. ***Silent Partner*** displays a warning that changing logging parameters erases the logger's memory. If you have logged data that you wish to save, click **Cancel** and turn to **Downloading Data**. Otherwise, proceed.



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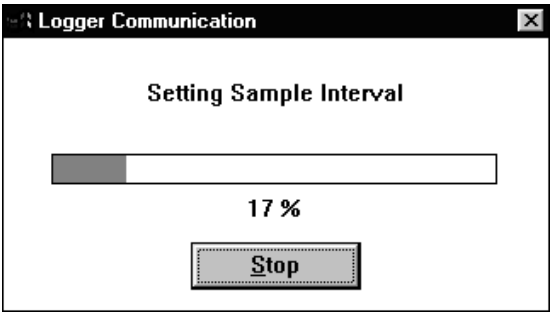
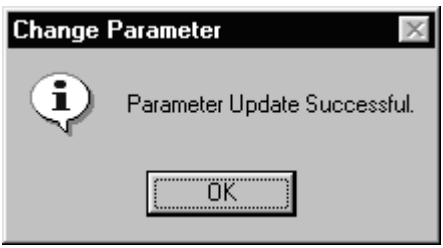
Setting the Logging Parameters continued

13. Click **OK**. ***Silent Partner PowerPack*** communicates with the logger, updates the parameters and displays a confirmation message.



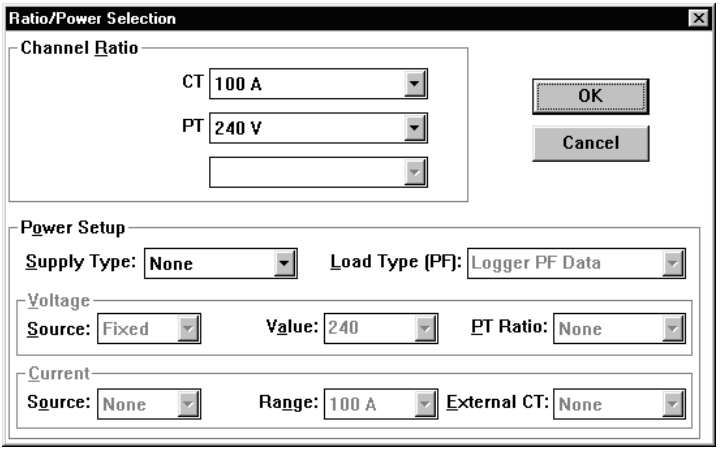


14. Click **OK**.

Downloading Data

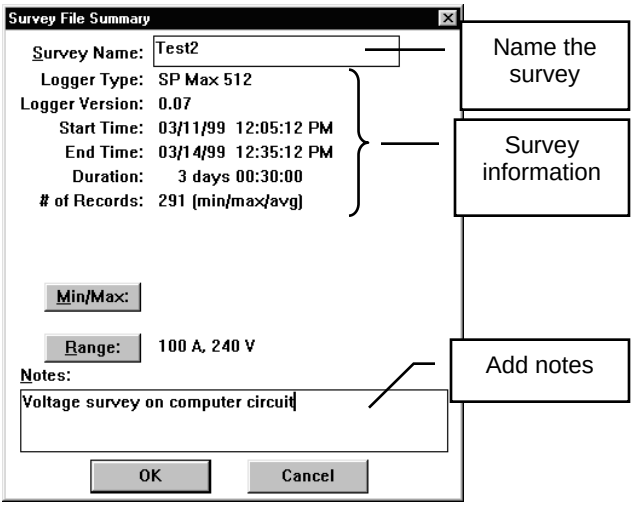
Once your survey is finished, you will need to download the data from the logger to your PC. Note that downloading does not clear the data from the logger. You can download the same data again, provided that you have not cleared the logger's memory by resetting, changing the logging parameters or using the Set Time and Date function.

1. Open the logger's front cover. Plug the download cable into the 9 pin connector on the logger. Plug the other end of the cable into the correct COM port on the back of the PC.
2. Click **Download SP Data** in the **Logger** menu. ***Silent Partner Powerpack*** displays a progress bar while it downloads the data and a confirmation message when the download is complete.
3. Click **OK**. ***Silent Partner*** displays the Ratio/Power Selection dialog box to allow you to change the current range scaling for each channel or to setup the power calculation. You can make your selections now, or return to the Ratio/Power Selection dialog box after the file has been saved. For information on the Ratio/Selection dialog box, turn to **Calculating Power**.



continued…

4. Click **OK**. ***Silent Partner PowerPack*** displays the Survey File Summary dialog box. This dialog box allows you to name the survey, add descriptive notes, view the minimum and maximum reading for the survey period, or open the Range/Power Selection dialog box.

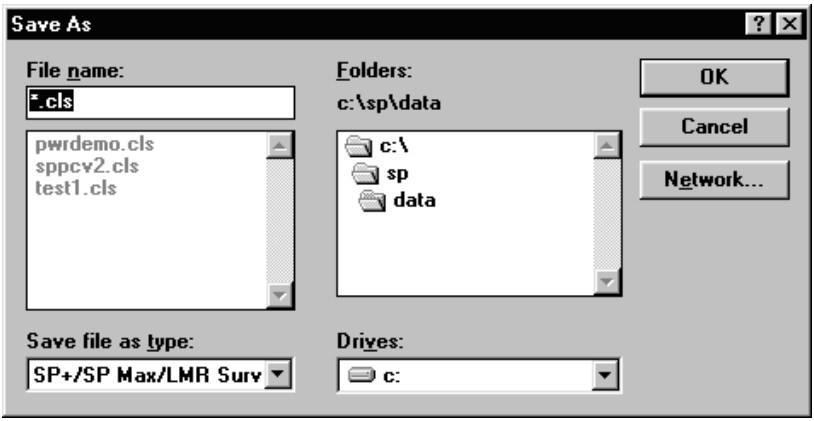


5. To name the survey, click in the **Survey Name** text box and type in a file name.
6. To add comments or a description, click in the **Notes** text box and type your comments. This information will appear on the Report Summary printout.
7. To view minimum and maximum readings during the survey period, click the **Min/Max** button. ***Silent Partner PowerPack*** opens the Data Min/Max Values dialog box to display the minimum and maximum values for the selected display group. For more information, refer to **Selecting a Display Group**.

continued…

8. Click **OK** to close the Data Min/Max Values dialog box.

9. Click **OK** on the Survey File Summary dialog box. ***Silent Partner PowerPack*** opens the Windows **Save As** dialog box.



10. Click in the **File name** text box and name the file.

File names may be no more than 8 characters long and cannot include spaces. You may use any letter or number or any of the following characters in file names: underscore (-), caret (^), dollar sign ($), tilde (~), exclamation point (!), number sign (#), percent sign (%), ampersand (&), hyphen (-), braces ({}), parentheses(),at sign (@), apostrophe (') or the grave accent (`).

11. Click **OK** to close the dialog box and save the file.

Viewing the Data

Silent Partner PowerPack allows you to view logged data in a variety of different ways. You can select which channel or channels you would like to display. You can view the data as a graph or in tabular form. You can display summary information about the survey, and you can zoom in for a more detailed view of the data relative to the graph's Y axis. For information on adjusting a graph's X axis, refer to **Displaying and Printing Graphed Data**.

Selecting a Display Group

Silent Partner Max can log minimum, maximum and average readings on 6 separate input channels. To display this volume of data most clearly, ***Silent Partner PowerPack*** organizes it into subsets. The software allows you to select a display group that is defined as a single channel or a group of related channels. The display group you select automatically sets the following display parameters:

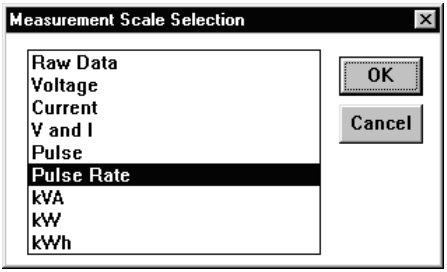
- which data appears in graphs
- which units of measurement appear on graphs
- which data appears in tabular data lists
- which units of measurement appear in the Logger Status dialog box
- which minimum and maximum data values appear in the Data Min/Max Values dialog box
- which trace selections appear in the Display/Print Options dialog box.

Where possible, the last selected display group becomes the default when you open or download a new file. If ***Silent Partner PowerPack*** does not display you data or does not display the channel you wish to see, you may need to select a different display group.

continued…

Selecting a Display Group continued

1. Click **Measurement Scale** in the **Setup** menu to open the Measurement Scale Selection dialog box. Note that kVA, kW and kWh appear in the list only after you specify a Supply Type in the Ratio/Power Selection dialog box. To specify a Supply Type, click **Cancel** to close the Measurement Scale Selection dialog box and turn to **Calculating Power** for instructions. Otherwise proceed.



2. Select a display group to specify the information you would like to display. If you are logging data other than voltage, current, pulse or power, select **Raw Data**.
3. Click **OK** to close the Measurement Scale Selection dialog box.

Viewing the Data as a Listing

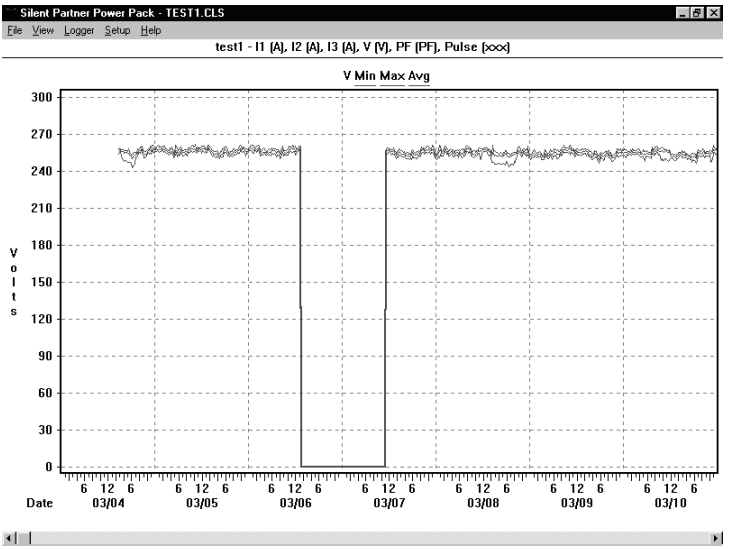
1. Click **Measurement List** in the **View** menu. ***Silent Partner*** displays the data in tabular form. Depending upon the display group you have selected, the table will include different information, however the item number, date and time of each sample is always shown.

I1: Current (A), V: Voltage (V), PF: PF (PF), Pulse 1: Pulse 1 (Lit)

Item	Date	Time	V Volts		
			Min	Max	Avg
1	03/17/99	11:13:05 AM	256.3	256.3	256.3
2	03/17/99	11:13:06 AM	256.0	256.4	256.3
3	03/17/99	11:13:07 AM	255.6	256.4	255.9
4	03/17/99	11:13:08 AM	256.3	256.4	256.3
5	03/17/99	11:13:09 AM	256.3	256.4	256.3
6	03/17/99	11:13:10 AM	256.3	256.5	256.4

Viewing the Data as a Graph

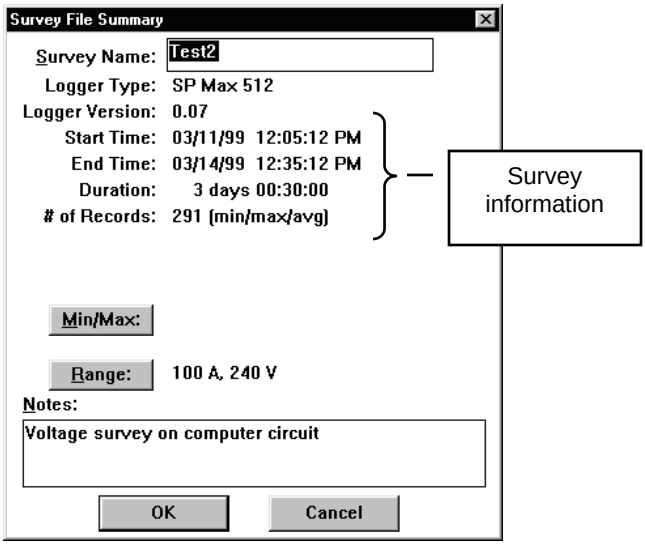
1. Click **Measurement Graph** in the **View** menu. ***Silent Partner*** displays the data as a graph. Depending upon the display group you group you have selected, the graph will include different information and display different units of measurement.



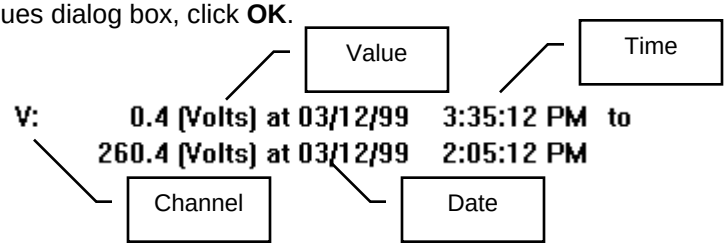
Displaying the Survey Summary Information

You can check the summary information for any survey quickly and easily.

1. Click **Survey Summary** on the **View** menu OR click **Survey Description** in the **Setup** menu. ***Silent Partner PowerPack*** displays the Survey File Summary dialog box.



2. To display the minimum and maximum readings during the survey period for the display group you have selected, click the **Min/Max:** button. The minimum and maximum values are displayed in the format shown below. To close the Data Min/Max Values dialog box, click **OK**.



continued…

Displaying the Survey Summary Information continued

3. To examine the current range scaling for each channel or setup the power calculation, click the **Range:** button. To close the Ratio/Power Selection dialog box, click **OK**. For more detailed information on the Ratio/Power Selection dialog box, refer to **Calculating Power**.
4. Click **OK** to close the Survey File Summary dialog box.

Zooming In and Out

Silent Partner PowerPack allows you to zoom in on a graph for a more detailed view of the data relative to the Y axis. The software automatically selects the closest zoom that still allows the minimum and maximum graphed values to be displayed. Then you can zoom out to return to the overview. For information on changing the X axis of a graph, refer to **Displaying and Printing Graphed Data**.

1. Click **Zoom** on the **View** menu. ***Silent Partner PowerPack*** displays a magnified view of the graphed data.
2. Click **Unzoom** on the **View** menu. ***Silent Partner PowerPack*** displays the overview of the graphed data.

Displaying and Printing Graphed Data

Silent Partner PowerPack gives you control over how your data is displayed, graphed and printed. You can choose which traces, channel or channels to include in a graph, select the length of time displayed or printed on a graph, and add a title, other text or your company logo to the summary page of all your printed reports.

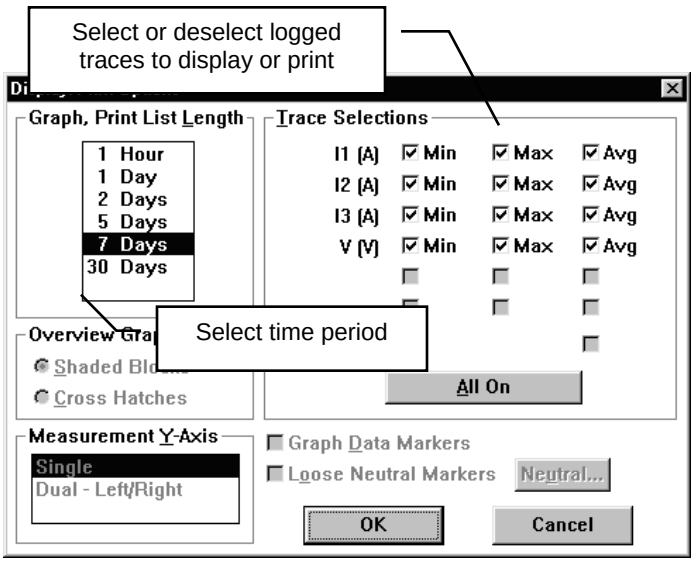
Selecting Which Data to Graph

Although ***Silent Partner Max*** can log minimum, maximum and average data on all 6 channels simultaneously, you may prefer not to display or print all logged traces. ***Silent Partner PowerPack*** lets you choose to display or print a single trace or a combination of traces.

Changing the X Axis Time Period

Silent Partner PowerPack allows you to select the period of time included on a single displayed or printed graph. You change the time period by adjusting the graph's X axis.

1. Click **Display/Print Options** in the **Setup** menu to open the Display/Print Options dialog box. The channels displayed in the Trace Selections pane change depending upon which display group you have selected. For more information on display groups, refer to **Selecting a Display Group**.



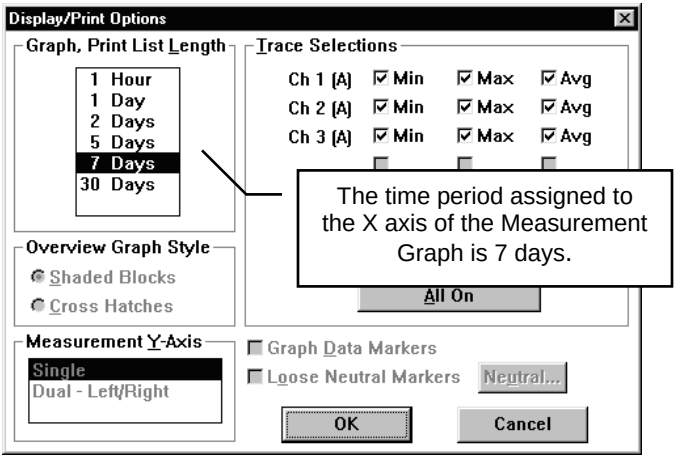
2. To display or print a logged minimum, maximum or average trace, select it.

   To prevent a logged minimum, maximum or average trace from displaying or printing, deselect it.

   To display or print all logged traces, click the **All On** button.

continued…

3. Click to select an alternate time period in the Graph, Print List Length pane. The selection you make here also determines the minimum time period that can be printed in a graph or list.

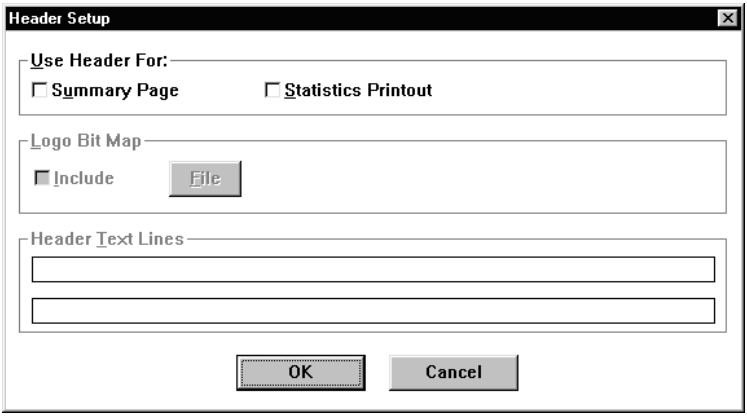


4. Click **OK** to close the Display/Print Options dialog box.

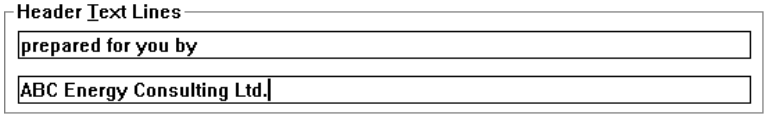
Adding a Text Header and Logo to the Summary Page

Silent Partner PowerPack allows you to add a title, slogan or other text as a header on the Summary Page of all your graphs and reports. You can include a bitmap of your company logo so that it prints as well on the Summary Page.

1. Click **Header** in the **Setup** menu to open the Header Setup dialog box.



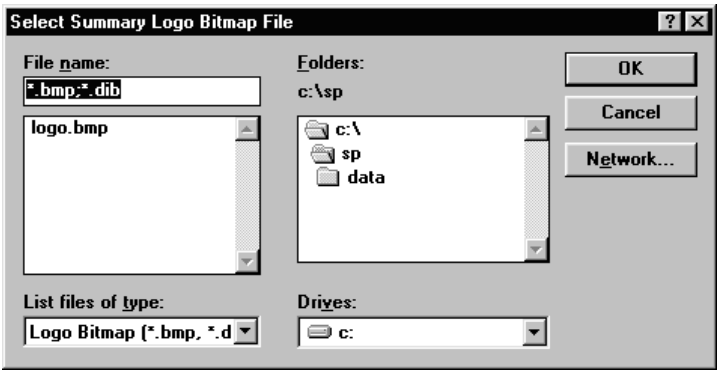
2. Select **Summary Page** in the Use Header For pane. Note that the Statistics Printout feature is unavailable for ***Silent Partner Max***.
3. Click to place the insertion point in the upper text box labelled **Header Text Lines**. Note that there are 2 text boxes, allowing for 2 lines of text in the header.
4. Type in the text. If you wish to add a second line of header text, press **Tab** OR click to place the insertion point in the lower text box and then type in the text.



continued…

Adding a Text Header and Logo to the Summary Page continued

5. Select **Include** in the Logo Bit Map pane.
6. Click **File** in the Logo Bit Map pane to open the Select Summary Logo Bitmap File dialog box and specify the location of the bitmap. You will find a sample file named **logo.bmp** in the **sp** directory or folder.



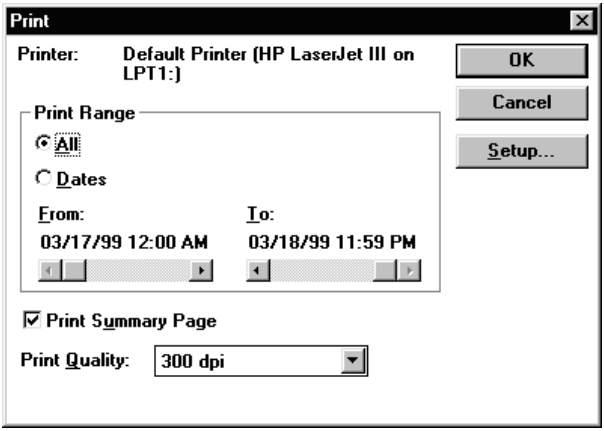
7. Select the bitmap you would like to include. If you do not have a bitmap of your logo, but would like to test this feature, you can use the sample **logo.bmp**.
8. Click **OK**. ***Silent Partner PowerPack*** displays the location of the logo bitmap beside the File button in the Header Setup dialog box.

9. Click **OK** to close the Header Setup dialog box.

Printing a Graph and Summary Page

With ***Silent Partner PowerPack*** you can choose to print all the data for a survey or only those readings that occurred during a specific time period. You can enable or disable printing of the Summary Page or specify the print quality of the graph or listing. You can also open a Print Setup dialog box to select the page orientation or access other print setup functions.

1. Make sure that the graph or list you wish to print is open and that the data is displayed as you would like to see it printed.
2. Click **Print** in the **File** menu to open ***Silent Partner PowerPack***'s Print dialog box.



3. To print all the data for a survey, select **All** in the Print Range pane.

   To print only those readings that occurred during a specific time period, select **Dates** in the Print Range pane and then move the **sliders** to specify the time period.

The minimum Print Range you can select depends on the Graph Print List Length you selected in the Display/Print Options dialog box. For example, if you selected a Graph Print List Length of 2 days, the minimum Print Range will also be 2 days.

continued…

Printing a Graph and Summary Page continued

4. To enable printing of the Summary Page, select **Print Summary Page**.
   To disable printing of the Summary Page, deselect **Print Summary Page**.
5. To change the print quality, open the **Print Quality** drop-down list and select an alternative dpi rate.
6. To change the page orientation click the **Setup** button to open the Print Setup dialog box and select **Portrait** or **Landscape**.
7. Make any other changes to the Print Setup you would like, and then click **OK** to close the Print Setup dialog box.
8. Click **OK** on the Print dialog box to close the dialog box and print the selected information.

Calculating Power

When the Power Factor, Voltage and first Current channels are enabled, ***Silent Partner Max*** logs the phase angle between the Voltage and the Channel 1 current. ***Silent Partner PowerPack*** can use this data to develop the Power Factor and calculate kW and kWh values.

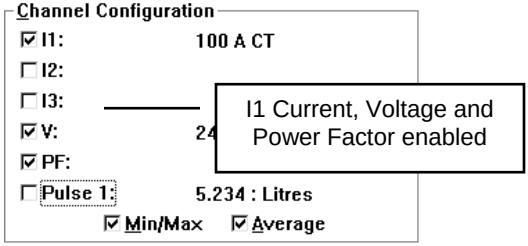
Alternatively, you can choose to log only Current or Current and Voltage and then specify a Power Factor in the software. In this case, ***Silent Partner PowerPack*** uses the logged data and the specified Power Factor to calculate kW and kWh values.

It is important to set up the logger correctly to generate reliable power data. After completing the survey and downloading the data, you will need to specify the Power Setup using the Ratio/Power Selection dialog box.

Setting the Logging Parameters for Power

1. Click **Change Parameters** in the **Logger** menu to display the Change Logger Parameters dialog box.
2. To log Current, Voltage and the Power Factor, select the **I1 Current** channel, the **Voltage** channel and the **Power Factor** channel.

   To log Current and Voltage only, select at least 1 **Current** channel and the **Voltage** channel.

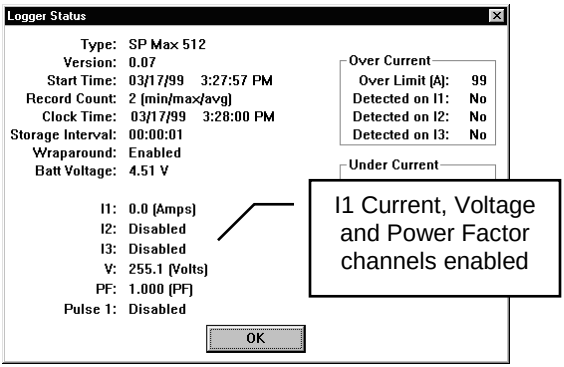


The number of Current channels you enable determines the Supply Types from which you can choose in the Ratio/Power Selection dialog box. Refer to **Displaying Power Data**.

continued…

Setting the Logging Parameters for Power continued

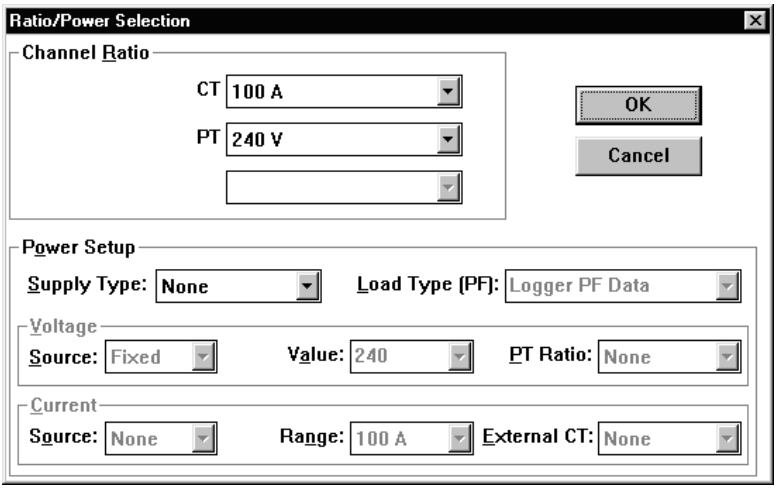
3. If you are logging the Power Factor, ensure that the **Average** data recording mode is enabled. If you wish, you may also enable Min/Max.
4. Click the **Range** button to open the CT Ratio Selection dialog box.
5. Open the **CT** drop-down list and select the rated range for the current clamp(s) you intend to use.
6. Click **OK** to close the CT Ratio Selection dialog box.
7. To select a Survey Length or Storage Interval, specify a Pulse sensor type, or to set Voltage and Current event detection limits, refer to **Setting Logging Parameters**.
8. Click **Update**. ***Silent Partner*** displays a warning that changing logging parameters erases the logger's memory. If you have logged data that you wish to save, click **Cancel** and turn to **Downloading Data**. Otherwise, proceed.
9. Click **OK**. ***Silent Partner PowerPack*** communicates with the logger, updates the parameters and displays a confirmation message.
10. Click **OK**. ***Silent Partner PowerPack*** displays the Logger Status dialog box, confirming the new logging parameters.



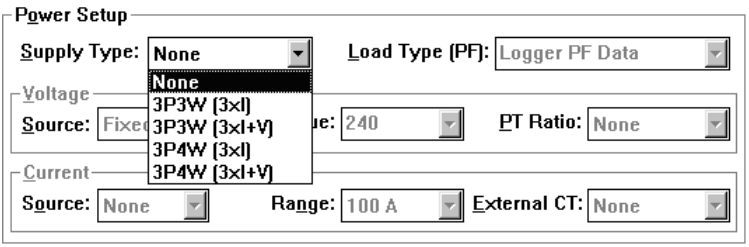
11. Click **OK** to close the Logger Status dialog box.

Displaying Power Data

1. Download the data and save the file. For instructions, refer to **Downloading Data**.
2. Click **Range/Power** in the **Setup** menu to open the Ratio/Power Selection dialog box.



3. If you need to change the current clamp specified, open the **CT** drop-down list in the Channel Ratio pane and select the range.
4. Open the **Supply Type** drop-down list in the Power Setup pane.



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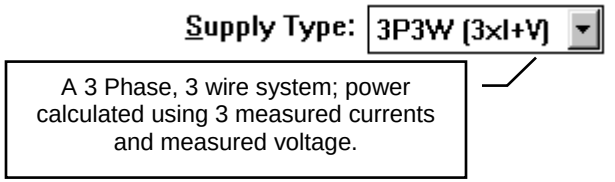
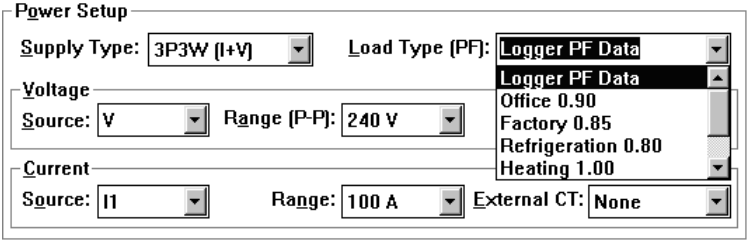
Displaying Power Data continued

5. Select the type of power distribution system logged during the survey from the **Supply Type** drop-down list. Note that when you select a system type the Voltage pane displays either Value (P-P) or Range (P-N). For additional information on Phase to Phase or (PN) Phase to Neutral (P-N), refer to the **Appendix**.



6. If you logged the Power Factor, select **Logger PF Data** in the Load Type drop-down list.

   If you did not log the Power Factor, or if you would like to use an alternative, fixed factor open the **Load Type (PF)** drop-down list and select a Power Factor.



7. If you did not log Voltage, open the **Value (P-N)** drop-down list in the Voltage pane and select a Voltage value.

8. If you logged Current and need to change the current clamp specified, open the **Range** drop-down list in the Current pane and select an alternative.

continued…

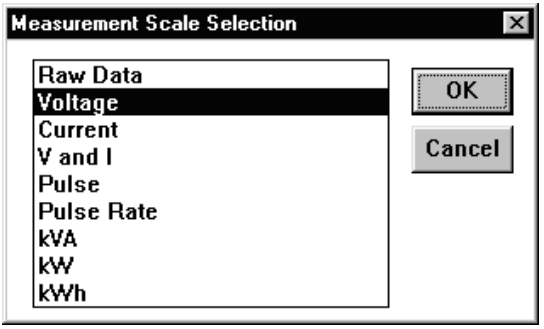
Displaying Power Data continued

9. If you did not log Voltage, but selected a fixed Voltage Value and wish to apply a multiplier to the data, open the **PT Ratio** drop-down list in the Voltage pane and select a factor.

10. If you wish to apply a multiplier to the Current data, open the **External CT** drop-down list in the Current pane and select a factor.

11. Click **OK** to close the Ratio/Power Selection dialog box.

12. Click **Measurement Scale** in the **Setup** menu to open the Measurement Scale Selection dialog box.



13. Select **kVA**, **kW** or **kWh** to display the power data. Note that total kWh data is displayed as bar graphs rather than line graphs.

For details on Silent Partner PowerPack's power calculations, refer to **Appendix C**. Note that after the power data has been calculated, you can enable ***Silent Partner PowerPack***'s Costing feature.

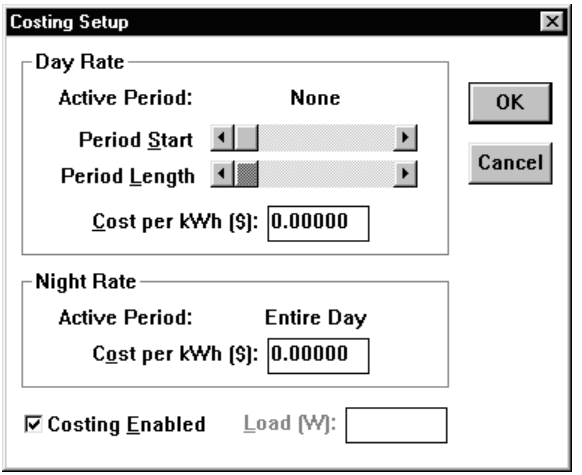
Costing

Silent Partner PowerPack allows you to calculate the cost of the power you use and the software supports both peak (Day Rate) and off-peak (Night Rate) rate structures. To setup the Costing feature, simply specify the time of the peak billing period. ***Silent Partner PowerPack*** automatically applies the off-peak rate to the remainder of the day. Then input the cost per kWh for the peak billing period and for the off-peak period if that applies. The software stores this setup information.

To calculate and display the cost of your power consumption, enable the feature while displaying your kWh data as a graph or list.

Setup Costing Information

1. Click **Costing** in the **Setup** menu to open the Costing Setup dialog box. When costing is disabled, both panes in the dialog box are dimmed.
2. Select **Costing Enabled** to turn the feature on and to activate the Day Rate and Night Rate panes in the dialog box. If **None** has been selected as the Active Period in either pane, the Active Period in the other pane will be **Entire Day**.



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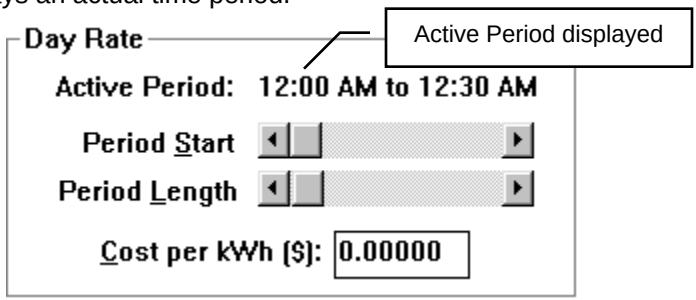
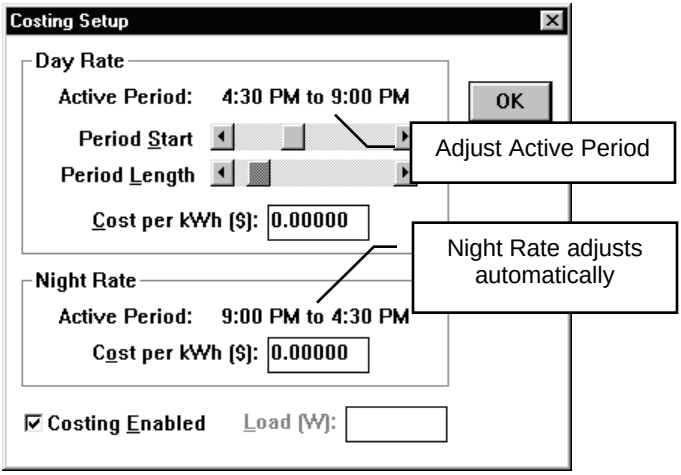
Setup Costing Information continued

3. If the Active Period in the Day Rate pane is **None**, move the **Period Length** slider slightly so that ***Silent Partner PowerPack*** displays an actual time period.



4. To setup a day rate and a night rate, move the **Period Start** slider to specify the start of the peak billing period. The Active Period in the Night Rate pane adjusts automatically.

5. Move the **Period Length** slider to specify the end of the peak billing period. The Active Period in the Night Rate pane adjusts automatically.



continued…

Setup Costing Information continued

6. To setup a single billing rate, move the **Period Length** slider to the far right so that the Active Period displays **Entire Day**. The Active Period for the Night rate will display **None**.
7. Double click in the **Cost per kWh** box in the Day Rate pane to highlight the number displayed and then enter the appropriate rate.

The units of currency displayed are determined by Windows. To change the units of currency, refer to the International Settings information in your Windows documentation or on-line Help.

8. To add an off-peak rate, adjust the **sliders** to specify two separate billing periods. Then double click in the **Cost per kWh** box in the Night Rate pane and enter the appropriate cost.
9. Click **OK** to make the changes and close the Costing Setup dialog box.

Displaying Costing Information

Costing information displays only on kWh graphs or lists. To view your consumption costs you need to select the kWh display group in the Measurement Scale Selection dialog box. For instructions, refer to **Selecting a Display Group**.

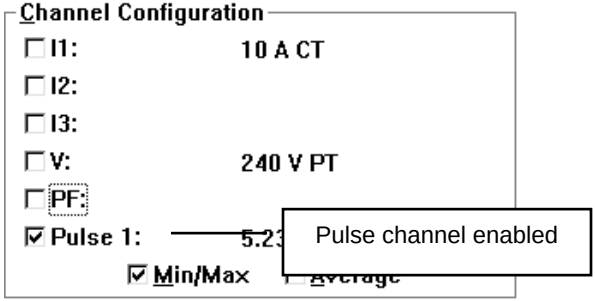
Pulse Meter Logging

Silent Partner Max allows you to log data from almost any kind of pulse meter. You can modify one of ***Silent Partner PowerPack***'s initialization files to add details about the sensors you intend to use, the units of measurement per pulse, and the calculations associated with a variety of pulse metering applications. Once you have set up the specific pulse information in the **SPMax.INI** file, ***Silent Partner PowerPack*** will calculate consumption values based on your input. For instructions on editing **SPMax.INI**, refer to **Appendix D**.

Pulse logging differs from other kinds of logging in that ***Silent Partner Max*** counts and stores all pulses it receives. The Min/Max and Average modes of data storage do not apply. As well, to complete a pulse meter survey, the logger must be connected to line power.

Setting the Logging Parameters for Pulse Meters

1. Click **Change Parameters** in the **Logger** menu to display the Change Logger Parameters dialog box.
2. To log a pulse meter survey, select the **Pulse** channel.



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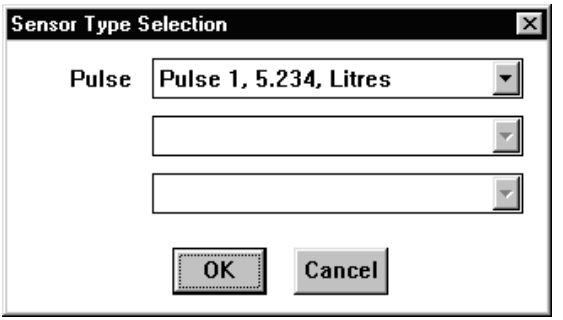
Setting the Logging Parameters for Pulse Meters continued

3. Click the **Sensor** button to open the Sensor Type Selection dialog box.



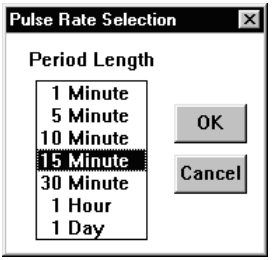
4. Open the **Pulse** drop-down list and select the sensor type that you intend to use.
5. Click **OK** to close the Sensor Type Selection dialog box.
6. To select a Survey Length, specify a CT range, or to set Voltage and Current event detection limits, refer to **Setting Logging Parameters**.
7. Click **Update**. ***Silent Partner*** displays a warning that changing logging parameters erases the logger's memory. If you have logged data that you wish to save, click **Cancel** and turn to **Downloading Data**. Otherwise, proceed.
8. Click **OK**. ***Silent Partner PowerPack*** communicates with the logger, updates the parameters and displays a confirmation message.
9. Click **OK**. ***Silent Partner PowerPack*** displays the Logger Status dialog box, confirming the new logging parameters.
10. Click **OK** to close the Logger Status dialog box.

For pulse meter logging, the unit must be connected to line power.

Displaying Pulse Meter Data

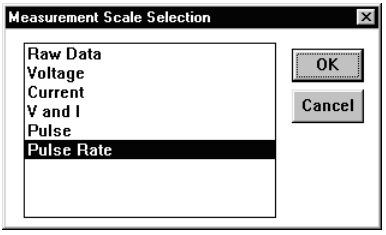
You can display Pulse Meter data as either a simple flow or as a consumption rate. To calculate and display a consumption rate, you need to specify the time period to be used in the calculation and select Pulse Rate as the display group.

1. Download the data and save the file. For instructions, refer to **Downloading Data**.
2. Click **Pulse Rate Period** in the **Setup** menu to open the Pulse Rate Selection dialog box.



3. Select the period for which you would like the consumption rate calculated and displayed

4. Click **Measurement Scale** in the **Setup** menu to open the Measurement Scale Selection dialog box.



5. To display the measured pulses as a line graph, select **Pulse**.

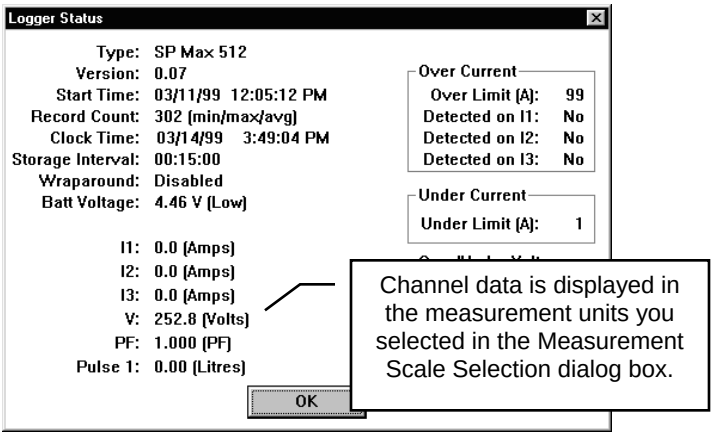
   To display a consumption rate as a bar graph, select **Pulse Rate**.

Logger Status

Checking Logger Status

Silent Partner PowerPack allows you to check the status of the logger. The Logger Status dialog box displays the type of logger in use, the logging parameters selected, and the present readings for each enabled channel.

1. Make sure that the logger is connected to the PC.
2. Click **Read Status** in the **Logger** menu. ***Silent Partner PowerPack*** communicates with the logger and displays the Logger Status dialog box.



3. Click **OK** to close the Logger Status dialog box.

Resetting the Logger

Resetting the Logger erases the unit's memory and begins a new survey, so be sure to download any data before resetting the unit. You should reset after transporting the logger to the survey site and connecting it to the circuit or equipment you are monitoring.

1. To reset the logger in the field, press the recessed **RESET** button on the unit's front panel.

Should the RESET button fail or if you wish to clear the logger's memory and restart a survey while the unit is connected to your PC, you may reset ***Silent Partner Max*** using ***Silent Partner PowerPack*** software.

1. Click **Reset** in the **Logger** menu. Silent Partner PowerPack communicates with the logger and then displays a warning message.
2. Click **OK** to clear the logger's memory and begin a new survey.

Adjusting the Logger - PC Communication Speed

Silent Partner PowerPack allows you to adjust the speed at which your computer communicates with the logger. If you have a Pentium class computer, you can select a communication speed of 19200 baud. However, if you are using a slower computer, you may find you receive incomplete downloads at 19200 baud due to data transmission errors. In this case you can select a slower rate of 9600 baud.

In addition, the software includes a handshaking control feature. When this feature is enabled, your computer can signal the logger to briefly suspend the download. When the computer has caught up, it can then signal the logger to resume data transmission. Handshaking control should normally be enabled.

continued…

Adjusting the Logger - PC Communication Speed continued

1. Click **Logger Serial Port** in the **Setup** menu to open the Logger Port Setup dialog box.
2. Select a communication speed click in the MBL Options pane.

3. To enable handshaking control, select **XON/XOFF** in the MBL Options pane.
4. Click **OK** to adjust the communication speed and close the Logger Port Setup dialog box.

When Things Go Wrong

If you have difficulty with your ***Silent Partner Max*** logger or ***Silent Partner PowerPack*** software, consult the following list of solutions. If you still have trouble, please call your nearest NORTHWOOD DATA LOGGERS representative, or email us at: rcct@rccgroup.com.

Menus and Dialog Boxes

There are menu and dialog box items in Silent Partner PowerPack that are always dim and unavailable.

Northwood Power Instruments Inc. offers a broad range of logging and metering equipment, all supported by ***Silent Partner PowerPack***. Some selections in the software relate to features not supported by the ***Silent Partner Max*** logger.

For a list of NORTHWOOD's other logging and metering products, contact your nearest NORTHWOOD DATA LOGGERS representative.

Download Problems

The MBL will not download.

- Check the download cable and make sure it is plugged into the correct communications port on your computer.
- Make sure you have selected the correct COM port in the Setup section of the software. Refer to **Setting Up Silent Partner PowerPack Software** for instructions.
- If you are downloading at 19200 baud, try setting the communication speed down to 9600 baud. Refer to **Adjusting the Logger - PC Communication Speed** for instructions.
- Toggle the XON/XOFF handshaking control. Refer to **Adjusting the Logger - PC Communication Speed** for instructions.

The software reports an "Invalid Wakeup Response."

This message is most often displayed when the software tries to communicate with something other than a Silent Partner logger. Sometimes this is due to an internal modem or some other device responding when the software is tries to initiate a conversation.

- Select a different serial port for communication with the logger. Refer to **Setting Up Silent Partner PowerPack Software** for instructions.

Scan Ports for Logger says that no logger was found.

- Make sure the download cable is plugged in before pressing the scan button.
- If you have unplugged a serial mouse and then plugged the logger into that port, it probably will not work. The reason for this is that the Windows mouse driver will report that the port is still in use by the mouse, regardless of whether or not it is physically connected. If this happens, Windows will not allow Silent Partner to use that port for communications. This can be overcome by using a different port for communication with the logger. Refer to **Setting Up Silent Partner PowerPack Software** for instructions.
- Ensure that the port you are using actually works. You can do this by attempting to communicate with some other device such as an external modem.

Time and Date

The time and date on all of the graphs and printouts is wrong.

- Make sure you have set the logger's clock using the Set Time and Date function in the software. Refer to **Synchronizing Logger Time and Date with the PC** for instructions.
- Ensure that your computer's time and date are set correctly.
- Make sure that you press the RESET button on the logger to begin each survey.

All of the times on the graphs and reports are in 24-hour format, but I want 12-hour format (or the reverse).

The dates appear in the wrong format.

The way in which times and dates are displayed in the Silent Partner software is determined by the International Settings portion of Control Panel In Windows. For information on changing the International Settings, refer to your Windows documentation on on-line Help.

Printing

I click on the Cancel button when printing, but the printer keeps on going.

Printing can continue after you click the Cancel button for several reasons. Windows has a feature called Print Manager which acts as a background print spooler. The function of a print spooler is to allow printing in the background, freeing up your computer for more important things. If Print Manager is enabled, ***Silent Partner PowerPack*** prints to Print Manager instead of to the printer. Print Manager, in turn, sends the data to the printer leaving the computer free for other tasks. Pressing Cancel stops data from going to Print Manager, but it will not stop Print Manager from sending the data it already received to the printer.

continued…

To remedy this situation, cancel the print job from Print Manager.

- Select the proper print job from the list and delete it.
- You may wish to disable Print Manager and print directly to the printer. For information on disabling Print Manager, refer to your Windows documentation or on-line Help.

Your printer may also continue to print if it has a large amount of on-board memory. This memory serves the same purpose as Printer Manger by providing a temporary storage space for the data to be printed so that the computer can move on to more important tasks.

- If Print Manager is disabled and your printer continues to print after you click Cancel, reset your printer. This should clear any data stored in the printer's memory. If your printer does not have a reset switch, turn the printer off and then on again.

Display

The colours on the Graph are difficult to see on the screen.

Refer to **Appendix A** for information on changing ***Silent Partner PowerPack***'s graph colours.

Appendix A - SILPRTNR.INI File Settings

Silent Partner PowerPack stores some of its configuration information in a special file called SILPRTNR.INI. You can edit this file using Notepad or any other text editor.

This file should only be modified by advanced users.

Customizing Graph Colours

If the colours used in the measurement graph are not to your liking, you can change them by editing items in the "[GraphPref]" section of the SILPRTNR.INI file shown below.

```
[GraphPref]

Meas1RGB=255,0,0    ;Channel 1 (I1) Avg
Meas2RGB=0,255,0    ;Channel 2 (I2) Avg
Meas3RGB=0,0,255    ;Channel 3 (I3) Avg
Meas20RGB=128,0,0   ;Channel 4 (V)  Avg
Meas21RGB=0,128,0   ;Channel 5 (PF) Avg
Meas22RGB=0,0,128   ;Channel 6 (Pulse)
Meas4RGB=255,0,0    ;Channel 1 Min
Meas5RGB=255,0,0    ;Channel 1 Max
Meas6RGB=0,255,0    ;Channel 2 Min
Meas7RGB=0,255,0    ;Channel 2 Max
Meas8RGB=0,0,255    ;Channel 3 Min
Meas9RGB=0,0,255    ;Channel 3 Max
Meas10RGB=128,0,0   ;Channel 4 Min
Meas11RGB=128,0,0   ;Channel 4 Max
Meas12RGB=0,128,0   ;Channel 5 Min
Meas13RGB=0,128,0   ;Channel 5 Max
TotalRGB=128,0,128  ;Calculated Total
GridRGB=127,127,127 ;Graph Grid
```

continued…

Customizing Graph Colours continued

The items that control the colours are named from Meas1RGB= to Meas22RGB=, TotalRGB= and GridRGB= as shown below. The three numbers separated by commas after each of these names determine the colour for that item by specifying the amount of Red, Green and Blue 'pigments' used, with the value of each pigment ranging between 0 and 255. Some sample colours are listed below. You can also experiment with the colour palette in the Windows Paint program to determine the RGB values for other colours:

Colour	Red	Green	Blue
Black	0	0	0
Blue	0	0	128
Green	0	128	0
Cyan	0	128	128
Red	128	0	0
Magenta	128	0	128
Brown	128	128	0
Light Grey	128	128	128
Dark Grey	192	192	192
Light Blue	0	0	255
Light Green	0	255	0
Light Cyan	0	255	255
Light Red	255	0	0
Light Magenta	255	0	255
Yellow	255	255	0

If you will be printing graphs on a black and white printer, be aware when choosing alternative colours that shades for which the sum of the Red, Green and Blue values is less than 382 will be printed as black, whereas colours for which the sum is greater than 381 will be printed as white.

Other SILPRTNR.INI Items

The remaining items in the **SILPRTNR.INI** file reflect various options that are selected while using the software and are changed while running Silent Partner Power Pack.

Appendix B - SPPOWER.INI File Settings

The following section is intended for advanced users.

Customizing Silent Partner Power Calculations

Editing the **SPPOWER.INI** file allows you to set some of the computational parameters for the Power feature of the software. ***Silent Partner PowerPack*** refers to **SPPOWER.INI** for the options it displays in the Ratio/Power dialog box's drop-down lists. You can edit these entries to add custom line voltages, fixed power factors, etc.

If you open **SPPOWER.INI** in Windows Notepad or a similar text editor, the file will resemble the sample shown on the following page.

Changes to the SPPOWER.INI file should be undertaken with caution, since incorrect entries could cause erroneous calculations.

continued…

Customizing Silent Partner Power Calculations continued

```
;Silent Partner Power Value File

[Defaults]
V1Phase=110, 120, 220, 240, 347
V3Phase= 208, 380, 415, 600
HVRatio=11kV:110, 11kV:240, 1000:110
LoadType=Office 0.9, Factory 0.85, Refrigeration 0.8,
Heating 1.00, Lighting 1.00, Motor 0.80
ExtCT=100:5, 200:5, 300:5
kWhPeriod=15

V1Phase=      Lists the voltages that appear in the
Voltage Range box for single phase supply types.
V3Phase=      Lists the voltages that appear in the
Voltage Range box for three phase supply types.
HVRatio=      Lists the PT ratios that appear in the PT
Ratio box. Each entry is in the format <primary
voltage>:<secondary voltage>. A comma separates
individual entries.
LoadType=     Lists the pre-defined Power Factor values
that appear in the Load Type (PF) box. Each entry is in
the format of <description> <space> <Power Factor value>
ExtCT= Lists the CT ratios that appear in the External
CT box.  Each entry is in the format <primary
voltage>:<secondary voltage>>. A comma separates
individual entries.

kWhPeriod=    Defines the calculation period in minutes
used when computing kWh. This value is set to 15 in
North America, 30 for Europe.
```

Appendix C – Power Configurations and Calculations

You must enable Average recording in the Logger Setup section in order to calculate power. If you record only Min/Max information, you will not be able to access the Ratio/Power Selection dialog box.

Over/Under Current Detection in the Logger

An undercurrent condition is detected in the logger when:

I1 channel current < configured Undercurrent Limit.

An overcurrent condition is detected in the logger when:

I1, or I2, or I3 current > configured Overcurrent Limit.

Over/Under Voltage Detection in the Logger

An under voltage condition is detected in the logger when:

Line Voltage < configured Setpoint Voltage - Tolerance.

An over voltage condition is detected in the logger when:

Line Voltage > configured Setpoint Voltage + Tolerance

continued…

Average Calculations

When you enable the Average data storage mode, the value ***Silent Partner PowerPack*** stores is calculated based on the following numbers of samples per storage interval.

Storage Interval	Samples/ Average	Storage Interval	Samples/ Average
1 second	4	2 minutes	480
2 seconds	8	3 minutes	720
3 seconds	12	4 minutes	960
4 seconds	16	5 minutes	1200
5 seconds	20	6 minutes	1440
6 seconds	24	7 minutes	1680
7 seconds	28	8 minutes	1920
8 seconds	32	9 minutes	2160
9 seconds	36	10 minutes	2400
10 seconds	40	11 minutes	2640
20 seconds	80	12 minutes	2880
30 seconds	120	13 minutes	3120
40 seconds	160	14 minutes	3360
50 seconds	200	15 minutes	3600
1 minute	240		

continued…

Current and Voltage Combinations for Calculating Power

Silent Partner PowerPack is very intelligent and can generally determine the appropriate metering systems depending on the way in which the logger has been configured. The chart below explains how to configure your logger depending on the voltage distribution system you wish to monitor.

Supply Type	Required Logger Configuration
1P2W	1 Current or Voltage, Current I1and Power Factor
1P3W	2 Currents or Voltage, Current I1, Power Factor plus Current I2 or I3
3P3W	1 Current or 3 Currents or Voltage, Power Factor and either Current I1 or 3 Currents
3P4W	1 Current or 3 Currents or Voltage, Power Factor and either Current I1 or 3 Currents

Note that the logger measures Power Factor by determining the phase angle between the Voltage and the Current 1 (I1) channel input signals. If the Voltage and I1 Current channels are not both logged a fixed Power Factor can be selected for use in the power calculations instead of that measured by the logger.

continued…

Silent Partner PowerPack **Power Calculations**

Silent Partner PowerPack calculates power values for each channel as shown below:

Supply Type	Channel Power
1P2W 1P3W 3P4W	$V_{PHASE\text{-}NEUTRAL} \times I \times PF$
3P3W	$\frac{V_{PHASE\text{-}PHASE} \times I \times PF}{\sqrt{3}}$

In all cases, Total Power is the sum of the power for all phases. The total for a multiple supply type for which only 1 Current is measured is calculated assuming a balanced load and is the power in the measured circuit multiplied by the number of phases of the supply.

Appendix D - SPMax.INI File Settings (CT Ratios and Pulse Channel Configurations)

The following section is intended for advanced users.

Silent Partner PowerPack allows you to specify the CT and PT ratios and the pulse meter types that are available within the software for logger configuration. You do this by editing the **SPMax.INI** file. If you open **SPMax.INI** in Windows Notepad or a similar text editor, the file will resemble the sample shown below.

```
;SPMax.ini file

[Current] ;CT Ratios for I1-I3 Channels
Ratio= 5, 10, 20, 50, 100

[Voltage] ;PT Ratios for Line Input Voltage
Channel
Ratio= 240

[Pulse] ;Meter types and units
;Type Number, Name, Pulses per unit, Unit of
measure, Unit abbreviation, Rate Type
Type01=Water, 1000, Litres,l
Type02=PCount, 1, Counts, c
Type03=W Demand, 0.001, W, W, HourRate
```

[Current] Group

In the “Ratio=” item, list the current clamp types that you would like to appear in the Configuration/Range CT list. Multiple items in the list are separated by a comma.

continued…

[Voltage] Group

In the “Ratio=” item, list the line voltages that you would like to appear in the Configuration/Range PT list. Multiple items in the list are separated by a comma.

[Pulse] Group

Each item in this group is used to define the characteristics of a pulse meter type that is available for selection from the Configuration/Sensor list. The meter descriptions are identified by a type number followed by a list of up to 4 parameters.

Type Number

The meter type number at the start of the line is in the form “Typexx=”, where xx can range from 01 to 99 to allow up to 99 pulse meter types. The type number for the selected pulse meter is stored within the logger during configuration updating and is saved along with the survey data after a download. When survey data or the logger status is displayed, the configured type number is used to select the characteristics of the pulse meter from this file.

Name

This parameter contains the name of the meter that appears in the Configuration/Sensor list. The name can be up to 10 letters long.

continued…

Pulses Per Unit

This parameter specifies the number of pulses from the meter which represent 1 of the measured units and can be up to 6 digits long (including the decimal point). Data displayed for the Pulse display group selection are scaled by this number as:

$$\text{Pulse Value} = \frac{\text{Pulse Count From Logger}}{\text{Pulses Per Unit for configured meter type}}$$

For example, the Type01 meter shown in the sample file outputs a pulse for every millilitre of liquid measured, so a unit quantity of 1 litre would be indicated by 1000 pulses. Conversely, the Type03 W Demand meter outputs kW pulses, so each Watt unit is only 1/1000 of a pulse, or 0.001.

Unit of measure

This parameter specifies the name of the measured units to be used for identification with the survey data. The name can be up to 6 letters long.

Unit abbreviation

This parameter identifies the abbreviation to be used to identify the pulse meter data type when displaying the data and can be up to 3 letters long.

continued…

Rate Type

This parameter allows selection of the calculation to be used to display the data on the Pulse Rate display.

Default - The default is to leave this item blank. In this case, Pulse Rate data are calculated as:

$$\frac{\textbf{Scaled Pulse Count From Logger}}{\textbf{Sample Interval}} \textbf{ x Pulse Rate Period}$$

Therefore, if 600 scaled units were measured during a sample interval of 10 minutes and the Pulse Rate data are displayed with a Pulse Rate Period of 5 minutes, the value displayed for each of these two intervals is (600/10) x 5 = 300.

HourRate - An alternate calculation is provided to allow conversion of an average quantity such as Watt Demand into a consumption value such as Watt-Hours which is pro-rated based on a 1 hour period. To select this calculation, the Rate Type is set to “HourRate”, as shown for meter Type03 in the sample file. With this selection, the scaled pulse data are assumed to be constant over the sample interval and the consumption for the Pulse Rate Period is calculated as :

$$\textbf{Scaled Pulse Count From Logger x } \frac{\textbf{Pulse Rate Period}}{\textbf{60}}$$

If the values in the above Default example are used with HourRate selected, the consumption value displayed for each of the two 5-minute intervals is 600 x 5/60 = 50. The total consumption after an hour at this rate (12 5-minute periods) is 50 x 12 = 600 unit-hours.