VERIS INDUSTRIES

Portland, Oregon USA ®

E/Server™ H8800-1 Installation and
User's Guide

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Contents

Quick Start

1. Install the E/Server

Follow steps starting with "Hardware: Installing" (page 1).

- Remove the E/Server cover
- Install the E/Server to a wall or other appropriate surface, and install peripherals

2. Connect External Components

Follow steps starting with "Connect Pulse Inputs to System Board" (page 2).

- Connect RS-485 devices and up to four pulse inputs to the system board
- Connect peripherals and cables
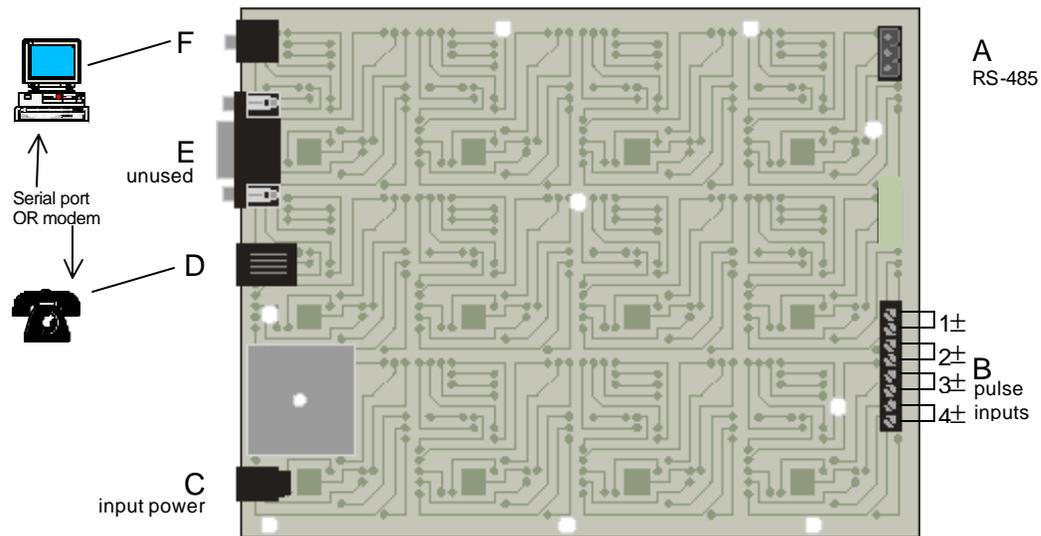
A. RS-485 connector
B. Pulse inputs (+); minus (-) terminals are connected to the system board ground and the chassis (commons)
C. Power connector
D. Telephone connector
E. RS-232 connector (**unused; do not connect devices here**)
F. Local connector to your PC's serial port

3. Install E/Server Software on your PC

Follow steps starting with "Software: Installing and Using" (page 4).

4. Add or Edit an E/Server Definition through the Setup Dialog

Follow steps starting with "Using E/Server Software on a PC" (page 5). The main options are:

- Connect your PC to an E/Server via modem* or your PC's serial port
- Enter an E/Server's name, phone number, and call scheduling information
- Define download information (to an ASCII text file or ODBC-compliant database)
- Configure data points
- Assign/Change Names for Modbus Devices and Pulse-Input Accumulators
- Zero Pulse-Input Accumulators and kWH Energy-Consumption Accumulators

 * The PC's modem must be connected to a serial port. The E/Server does not support a Winmodem.

Hardware: Installing

Configuring and Installing the E/Server

1. Remove and save the eight screws from the E/Server cover plate, and then remove the cover from the chassis.

2. Select a location to install the E/Server. The location must provide a standard telephone line (if you plan to connect via modem), 120V power source, and be reasonably free of environmental hazards like temperature extremes, moisture, vibration, and dust.

Install the E/Server

3. Install the E/Server by attaching it with four screws (not supplied) inserted through the four screw holes in the flanges extending from the sides of the E/Server chassis.

4. Install applicable peripherals (e.g., power meters, temperature sensors, pulse output devices, etc.) per their respective documentation.

Connect Pulse Inputs to System Board

5. Connect up to four pulse inputs to the terminals at J17 on the E/Server system board. These terminals are marked B in Figure 1. The terminal closest to the RS-485 connector (A in Figure 1) is input number 1, and all minus (-) terminals are connected to the circuit board ground and the chassis.

Connect RS-485 Devices to System Board

6. Connect the RS-485 devices to the connector at J11 (A in Figure 1).

7. Reinstall the cover plate using the eight screws you removed in step one. Tighten the screws to 18 inch-pounds.
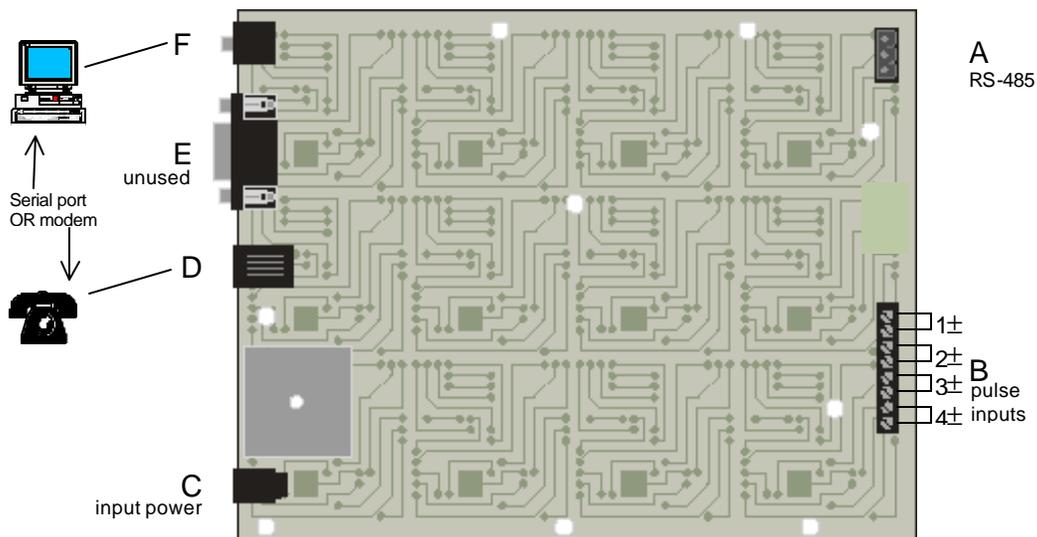
Figure 1: System Board Connector and Component Locations

A. RS-485 connector

B. Pulse inputs (+); minus (-) terminals are connected to the system board ground and the chassis (commons)

C. Power connector

D. Telephone connector

E. RS-232 connector (**unused; do not connect devices here**)

F. Local connector to your PC's serial port

Connect Peripherals and Cables

8. Connect peripheral cables to the external E/Server connectors.

NOTE: For cabling that connects peripherals to the E/Server, use conduit and shielded cables (e.g., Belden 1120A) in electrically sensitive locations or where physical damage is likely to occur.

9. For modem connections, connect the telephone line to the E/Server (connector marked D in Figure 1). For direct connections, connect the supplied serial port cable between your PC's serial port to the E/Server's local "laptop" connector (F in Figure 1).

10. Connect the power cord to the E/Server (power input jack connector marked C in Figure 1), and then plug the cord into a wall outlet.

NOTE: The connector marked E in Figure 1 is not used at this time and should not be connected to external devices.

Software: Installing and Using

Installing E/Server Software on a PC

To run E/Server software, you will need an IBM-compatible PC with at least a 486 processor and 8 Mb of RAM running Windows™ 95 or NT 4.0. You will also need at least one modem* if you plan to connect to E/Servers through a phone line.

1. Copy the ESERV.EXE file from the E/Server installation disk to a directory on your hard drive.

2. From the Windows Explorer, double click ESERV.EXE to execute the software. You can also create a shortcut to the Windows desktop.

* The PC's modem must be connected to a serial port. The E/Server does not support a Winmodem.

Using E/Server Software on a PC

When you execute ESERVE.EXE, the E/Server Main dialog appears:
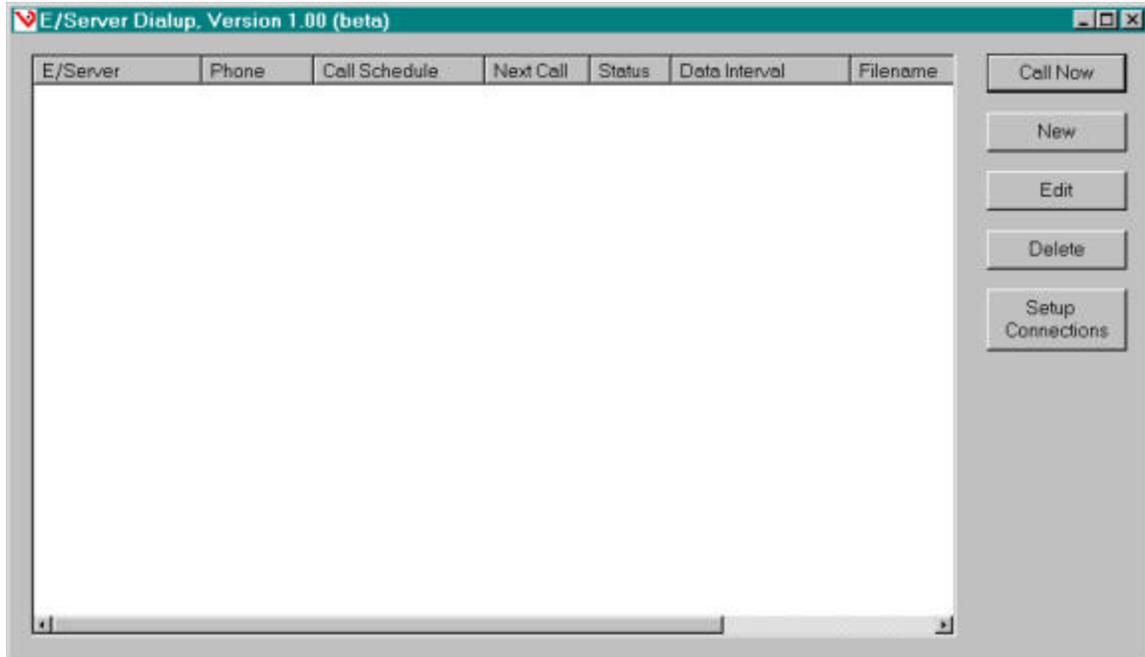
Figure 2: E/Server Main Dialog

1. Click <Setup Connections>. The Connections Setup Dialog appears:
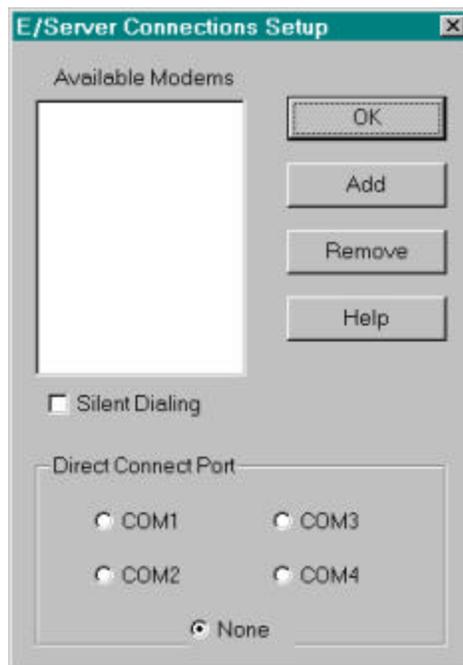
Figure 3: Connections Setup Dialog

2. To connect your PC to your E/Server:

- Follow the steps in "Connect Remotely Via Modem"(below)

OR

- Follow the steps in "Connect Directly Via Your PC's Serial Port" (page 7)

THEN

- Continue with "Define a New E/Server" (page 8)

Connect Remotely Via Modem

Add a Modem Connection

3. In the Connections Setup Dialog, click <Add>. The Add New Modem Port dialog appears:
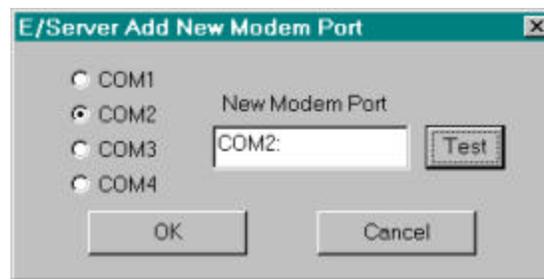
Figure 4: Add New Modem Port Dialog

4. Click the COM port you want to add.

5. Click <Test>. The software will check your modem***** connection. If the test is unsuccessful, repeat this and the previous step with a different COM port.

6. Click <OK> to accept changes and return to the Connections Setup dialog.

You can repeat this process to add any number of modems.

Remove a Modem Connection

7. To remove a modem, click on it to highlight it in the Connections Setup dialog, and then click <Remove>.

8. To turn off modem speakers, click the <Silent Dialing> check box.

9. When you are satisfied with your configuration, click <OK>. The Main dialog reappears.

* The PC's modem must be connected to a serial port. The E/Server does not support a Winmodem.

Connect Directly Via Your PC's Serial Port

10. In the Direct Connect Port section of the Connections Setup Dialog, click on the desired COM port.
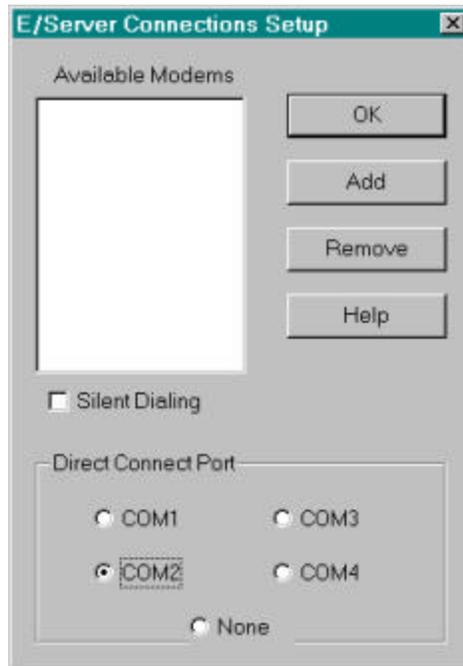
Figure 5: Connections Setup Dialog with Direct Connect Port Selected

11. When you are satisfied with your configuration, click <OK>. The Main dialog reappears.

Define a New E/Server

12. In the Main dialog, click <New> to set up a new E/Server. The Setup dialog appears:

Figure 6: Setup Dialog

13. Enter a name for the E/Server to which you're connecting in Name.

14. Enter the E/Server's phone number in Phone (for modem connection) OR check Direct Connect Via Serial Port (for direct connection).

Download Data to an ASCII Text File

15. Enter a name for the file in Filename. Click <Browse> to find an existing file.

16. Select a file format for your text file from the Type drop-down menu. If you entered nothing in Filename, this menu is unavailable (grayed out). The options are:

- **ASCII, compact, comma**: Each set of 20 Modbus data-points and four Pulse-Input Accumulators data, along with the E/Server name and time-stamp, is sent as one line, with the data separated by commas. Example:

Bldg2,01/19/1999 13:50:00,5.97,7.78,5.21,7.70,9.43,1.47,7.80,484.8,,,,,,,,,,,,,2,3,7,0

- **ASCII, compact, tab**: Same as previous, but with tabs as delimiters instead of commas.

- **ASCII, long, comma**: Each data point is sent on a separate line. Each line has its own E/Server name, data-point number, and time-stamp. Example:

Bldg2,1,01/19/1999 13:50:00,5.97
Bldg2,2,01/19/1999 13:50:00,7.78
. . .
Bldg2,24,01/19/1999 13:50:00,0

- **ASCII, long, tab**: Same as previous, but with tabs as delimiters instead of commas.

Download Data to an ODBC-compliant Database

17. Click <Database> in the Setup dialog. The software will prompt you to call the E/Server to retrieve its present configuration, if you have not already done so. The Save-to-Database Setup dialog appears:
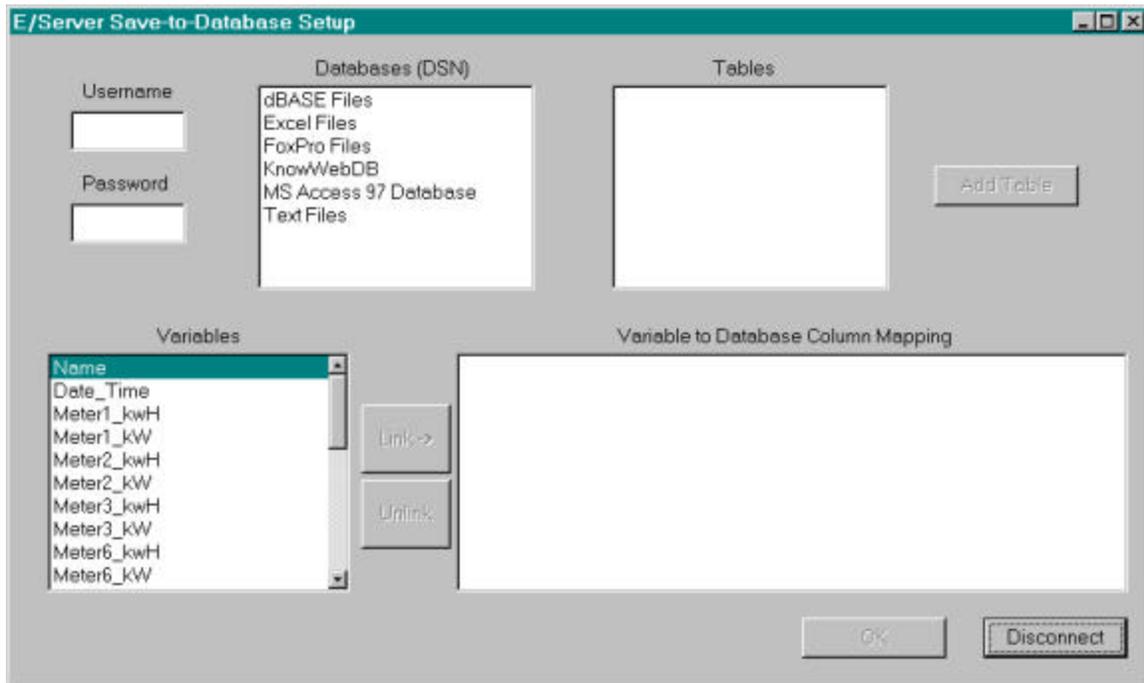
Figure 7: Save-to-Database Setup Dialog

18. Enter the user name and password for the database, if required.

Set Up a Data Source Name (DSN)

19. Select the DSN to which you want to download data. If the "Databases (DSN)" list box is empty, exit this program and create a DSN through the Windows 32-bit ODBC program in the Control Panel.

20. Select an existing table in the database to which you want to connect. If this list box is empty, click <Add Table> to create a new table.

21. Click the desired table. A list of all the columns within that table appears in the large text area. If any of these column names matches the names of the variables available from this software, and the data types are compatible, the associated variable will be linked automatically to that column.

    In cases where the variables are not linked automatically to your database's columns, you must manually create the links between each variable and the database's column where it will be stored.

    In cases where the database's data type for that column is incompatible with the data type for a variable, the <Link> button is disabled. For example, the "Data_Time" variable cannot be linked to columns that store ordinary numerical data.

Link/Unlink a Variable and a Column

22. To link a variable and column, click a variable, a column, and <Link>. If the <Link> button is disabled, you cannot map the chosen variable to the chosen column because the data types are different (e.g., floating-point vs. text).

23. To unlink a variable and column, click the column and <Unlink>.

24. Click <OK> to save changes or <Disconnect> to discard changes and disconnect from the database. The Setup dialog reappears.

E/Server Data Import Setup Procedure

This section details the procedure for importing E/Server data points into an MS Excel workbook. This section assumes that the E/Server is installed and working and has data to be retrieved.

A. Creating a blank excel workbook

Open MS Excel.

Click on " File " then " Save as "

Choose a name and a location for the file and click the save button.

Close Excel. If you keep the workbook file open, Excel will not allow it to be written to by the E/Server software.

B. Configuring ODBC

Click on " Start " , " Settings " AND " Control Panel "

Double click on " ODBC Data Sources(32-bit) "

Highlight " Excel files " and click the configure button.

Click the " Select Workbook " button.

Navigate to the blank workbook created in section A and click the " OK " button.

Click on " OK " button until you reach the control panel; close the control panel.

C. Configuring E/Server software to export data

Open the E/Server software, and click on the " New " button.

Enter a name for the E/Server.

Enter the phone number for the E/Server or check the " Direct connect via serial port" box.

Enter a filename for the file where the software should store the data retrieved from this E/Server.
Note: Data must be stored as a plain text file. The filename must be in the format of .txt

Set the logging interval, any desired passwords, and the normal calling schedule for this E/Server.

Click on the " OK " button to return to the main screen of the E/server software. The newly added E/Server should appear in the main window.

Highlight the E/Server name and click the " Call Now " button.

The software should dial out and retrieve the data from the E/Server. If it does not, refer to the manual that came with your E/server or contact Veris Customer support at 1-800-354-8556.

Once the call is completed click on the " Edit " button.

Click on the " Database " button.

In the " Databases(DSN) " box, highlight " Excel files "

Click on the " Add Table " button and give a name for the spreadsheet that you would like created with the data from this E/Server, and click OK.

Click OK until you return to the main screen of the E/Server software.

> There will now be a new tab in the workbook created in section A that has the name that you specified in step 12. This tab will have all of the data that the E/Server is configured to obtain. Each data point will appear in a separate column. You may now add or edit columns or column properties to manipulate the data in any way that best fits your needs.

Continue in Setup Dialog after Database Configuration

Figure 8: Setup Dialog

25. Enter any applicable notes in the Notes text box.

26. Select your desired logging interval (between five minutes and one hour) from the Logging Interval drop-down menu. The logging interval is the time between data acquisitions at the E/Server.

27. Enter a read/write password. RECORD YOUR PASSWORD AND STORE IT IN A SAFE PLACE. For additional considerations, see "Read/Write Password" in Table 2 on page 21.

28. Enter a read-only password. RECORD YOUR PASSWORD AND STORE IT IN A SAFE PLACE. For additional considerations, see "Read-Only Password" in Table 2 on page 21.

29. Select a calling schedule from the four choices. If you click Daily, you must specify the time in the Time To Call drop-down menu. If you click Weekly, you must specify the day from the Day to Call radio buttons.

Assign or Change the Names for any of the Possible Modbus Devices and the Four Pulse-Input Accumulators

30. Click <Device Names> in the Setup dialog. The software will prompt you to call the E/Server to retrieve its present configuration, if you have not already done so. The Device Names dialog appears:
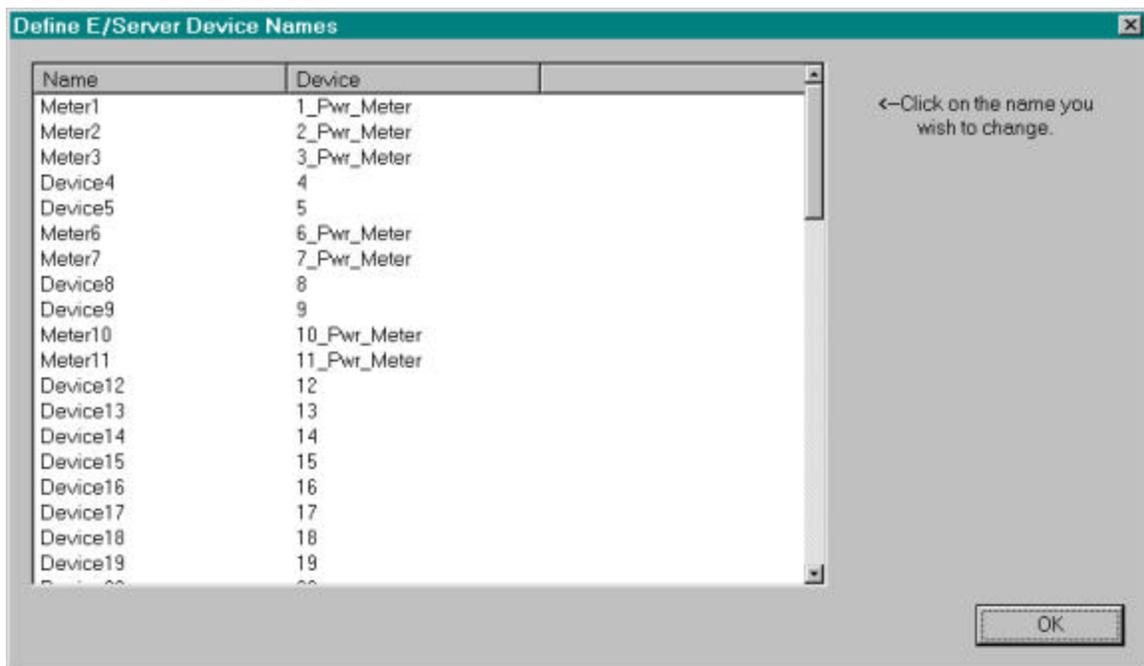
Figure 9: Device Names Dialog

31. Click on the name of a device to change it.

32. Click <OK> to accept changes and return to the Setup dialog.

Note: If device type does not appear after the device number, then the E/Server does not detect a device at that Modbus address.

Configure any of the E/Server's 20 Data Points

33. Click <Data Points> in the Setup dialog. The software will prompt you to call the E/Server to retrieve its present configuration, if you have not already done so. The Data Points dialog appears:

Figure 10: Data Points Dialog

34. For any applicable device, select the desired option from the Modbus Device and/or Parameter drop-down menus. Or, enter the Modbus address of an unrecognized (non-Veris) device in the Modbus Device drop-down menu; and, enter the Modbus register number of an unrecognized device in the Parameter drop-down menu.

35. Click <OK> to accept changes and return to the Setup dialog.

Zero the Four Pulse-Input Accumulators and kWH Energy-Consumption Accumulators

36. Click <Zero Accumulators> in the Setup dialog. The software will prompt you to call the E/Server to retrieve its present configuration if you have not already done so. The Zero Data Accumulators Setup dialog appears:
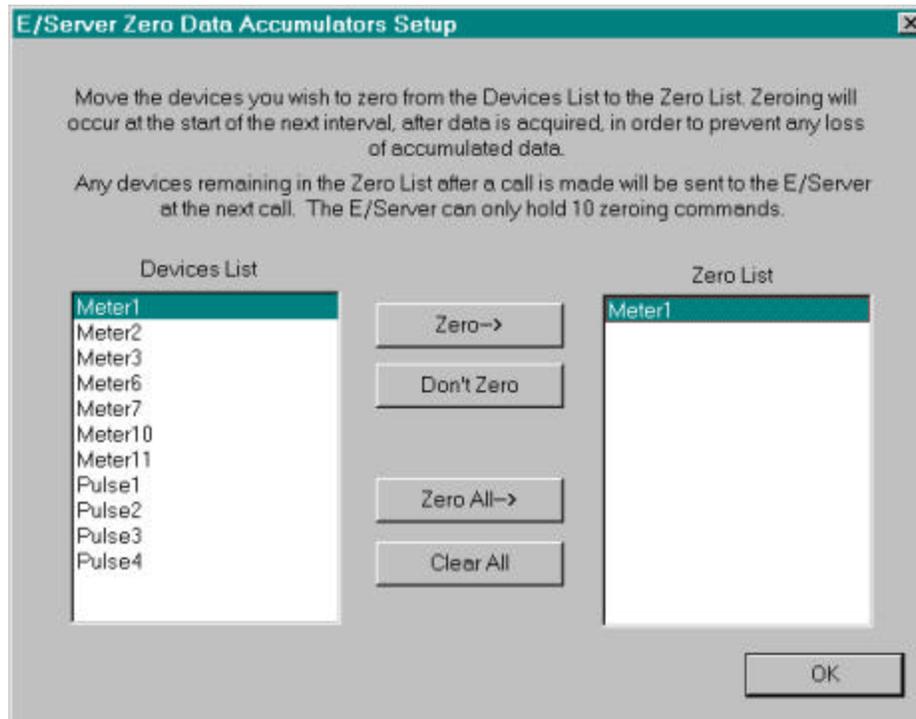
Figure 11: Zero Accumulators Dialog

37. Highlight the device you wish to zero by clicking on it in the Devices List.

38. Click <Zero> to transfer the device to the Zero List; repeat to transfer all applicable devices. The Zero List can hold more than ten devices, but the software will zero only ten at a time.

39. Click <Don't Zero> to remove a highlighted device from the Zero List.

40. Click <Zero All> to transfer all devices to the Zero List; or, click <Clear All> to remove all devices from the Zero List.

41. Click <OK> to accept changes and return to the Setup dialog.

Continue in Setup Dialog after Zeroing Accumulators

42. Click <OK> in the Setup dialog when you are satisfied with the configuration of your E/Server(s); or, click <Cancel> to cancel any changes made in the Setup dialog and return to the Main dialog.

43. The Main dialog appears and displays the information you entered in the Setup dialog:
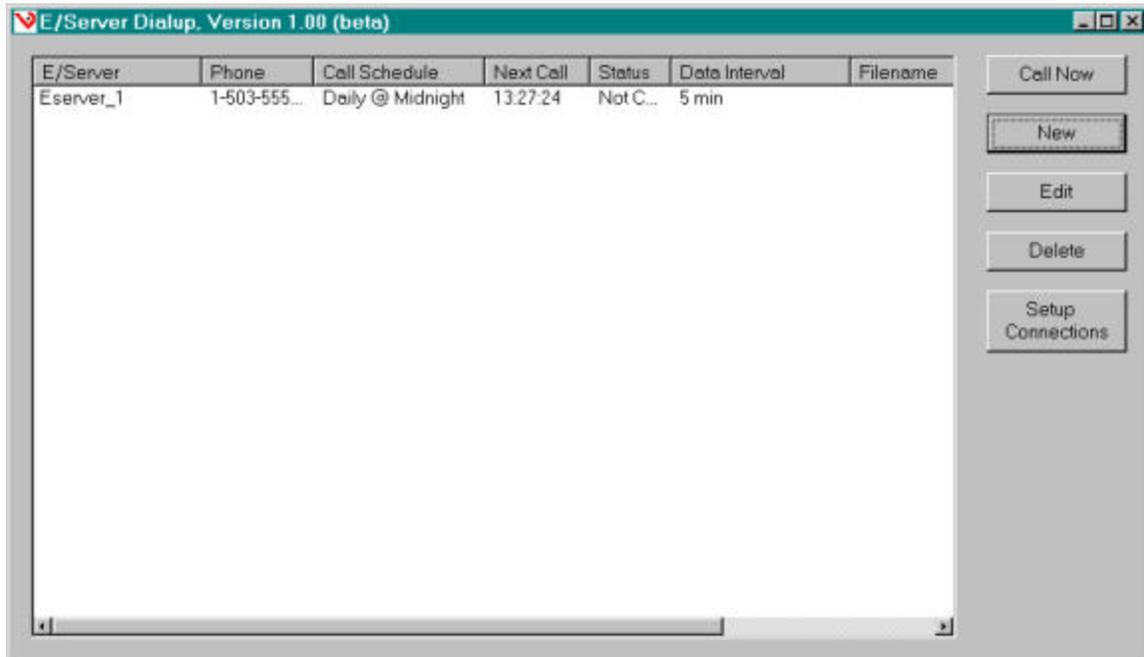
Figure 12: Main Dialog with One E/Server Configured

44. Click <Edit> to change information about an E/Server in the Setup dialog.

45. Click <Call Now> to dial an E/Server immediately, rather than waiting for the interval you specified in the Setup dialog.

Note: Step 45 must be performed in order to upload changes in the E/Server configuration.

Warning: If the E/Server grants read/write access to a PC whose clock is more than 15 minutes different from the E/Server's clock, data loss will result.

Appendix A: E/Server Overview and Description

Overview

The E/Server Energy Information Server is the perfect solution for:

- Energy aggregation of remote sites
- Submetering/metering of large facilities
- Energy cost allocation on campuses/bases

It is ideal for remote energy monitoring applications because it provides a flexible, cost-effective way to gather energy usage information from multiple sources, time/date stamp (and store) the information, then communicate it to remote machines via modem or local RS232.

The E/Server accepts up to 20 data points from any combination of Veris Modbus-compatible sensors and/or Alta Labs temperature sensors, and consumption pulses from up to four other sources. The E/Server's ability to accept standard pulsed inputs allows for easy integration of energy usage from water, gas, utility, and sewage meters.

All Veris sensors reporting information to an E/Server are daisy-chained together on a single RS-485 network to simplify the installation by eliminating the need for individual hard wire connections to the sensor inputs.

Easy to use configuration/call-scheduling software provides a simple means for configuring and setting callout schedule for one or more E/Servers.

Information uploaded from E/Servers is easily exported into popular spreadsheet programs like Excel®, or automatically inserted in any ODBC-compliant database for analysis and report generation.

Hardware Description

The Veris E/Server H8800-1 is a networked data logger with an integrated, 2400 baud, answer-only modem. Data are aggregated via an RS-485 connection to other Veris products, like the H8035/H8036 Enercept Power Meter, and from four local pulse inputs.

The E/Server's microcontroller:

- Accumulates data from external sources, like low-speed, pulse-generating devices (e.g., water or power meters)
- Queries Veris networked power meters and other devices on a regular programmed basis via an RS-485 connection

These data are stored in battery-backed memory and time-stamped by a real-time clock (RTC). A remote computer can call the E/Server and download these data or reset the data memory.

Password protection is available on two levels to enhance security.

The E/Server consists of a chassis and single system board, with external connectors for a modem or local PC connection. The system board mounts to the back wall of the chassis with nine screws; the removable chassis cover mounts to the chassis/system board assembly with eight screws. The E/Server is designed to be installed on a wall or other surface.

Software Description

Main Dialog

When you execute ESERVER.EXE, the E/Server Main dialog appears. Options in the Main dialog open other dialogs, which have more options to open further dialogs. The structure is as follows:

Main Dialog

- • Connections Setup Dialog

– Add New Modem Port Dialog

- • Setup Dialog

– Database Setup Dialog

– Data Points Dialog

– Device Names Dialog

– Zero Accumulators Dialog

Figure 13 on page 18 shows the Main dialog as it would appear upon first use: empty. The categories at the top (E/Server, Phone, Call Schedule, etc.) are configurable in the Setup Dialog (described on page 20). Table 1 lists descriptions for the buttons on the right side of the Main dialog.

Subsequent tables in this section list the features of their corresponding dialogs. Not every component of every dialog warrants explanation (like <OK> buttons), so self-explanatory items are omitted.
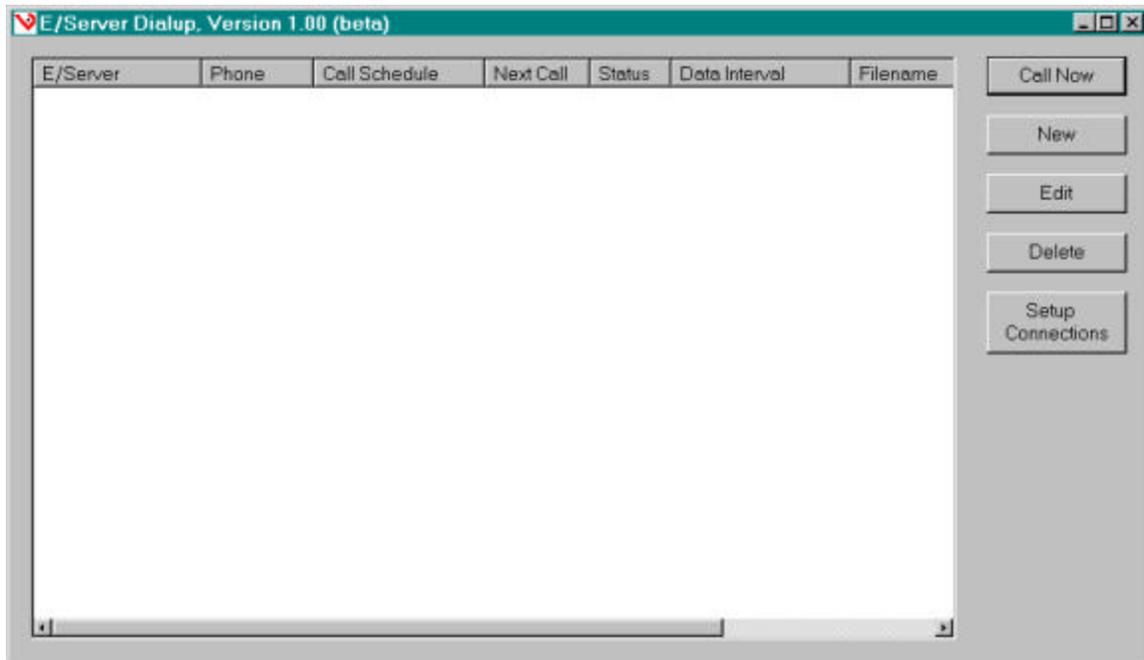
Figure 13: E/Server Main Dialog

Table 1: Main Dialog Components

Component/ Button	Description
Call Now	Initiates an immediate call from your PC to an E/Server (in the Setup Dialog, you establish a calling schedule for each E/Server; the Call Now button overrides that preestablished schedule).
New	Accesses the Setup Dialog (see page 20); allows you to add and configure a new E/Server.
Edit	Accesses the Setup Dialog (see page 20); allows you to edit the properties of an existing E/Server.
Delete	Deletes an existing E/Server.
Setup Connections	Accesses the Connections Setup Dialog (see page 19); allows you to set up local and remote connections from a PC to an E/Server.

Connections Setup Dialog

When you click <Setup Connections> in the Main dialog, the Connections Setup dialog appears. Connections Setup allows you to add or remove local and remote connections from a PC to an E/Server.

You can add modems to the top window, "Available Modems," by clicking <Add> to access the Add New Modem dialog (Figure 15).

You can connect directly to the E/Server via your PC's serial port by selecting a COM port in the
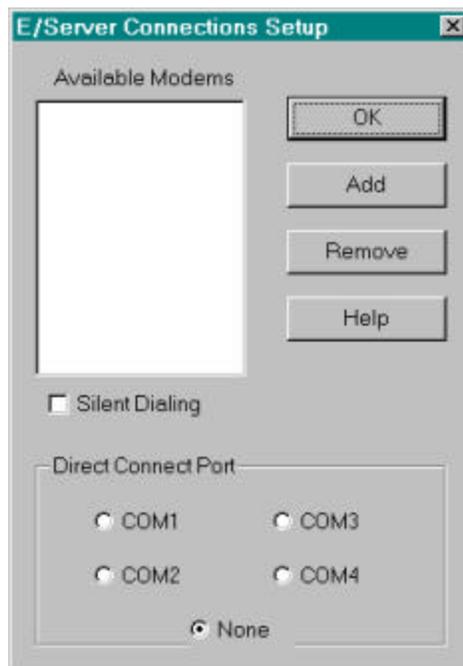
Figure 14: Connections Setup Dialog

Add New Modem Port Dialog

When you click <Add> in the Connections Setup dialog, the Add New Modem Port dialog appears. Add New Modem Port allows you to add remote connections from a PC to the E/Server. You can test the status of a modem at each COM port by selecting the port and clicking <Test>.
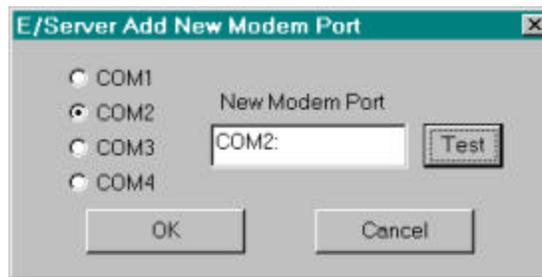
Figure 15: Add New Modem Port Dialog

Setup Dialog

When you click <New> or <Edit> in the Main dialog, the Setup dialog appears. Setup allows you to add and configure a new E/Server, or edit the properties of an existing E/Server.
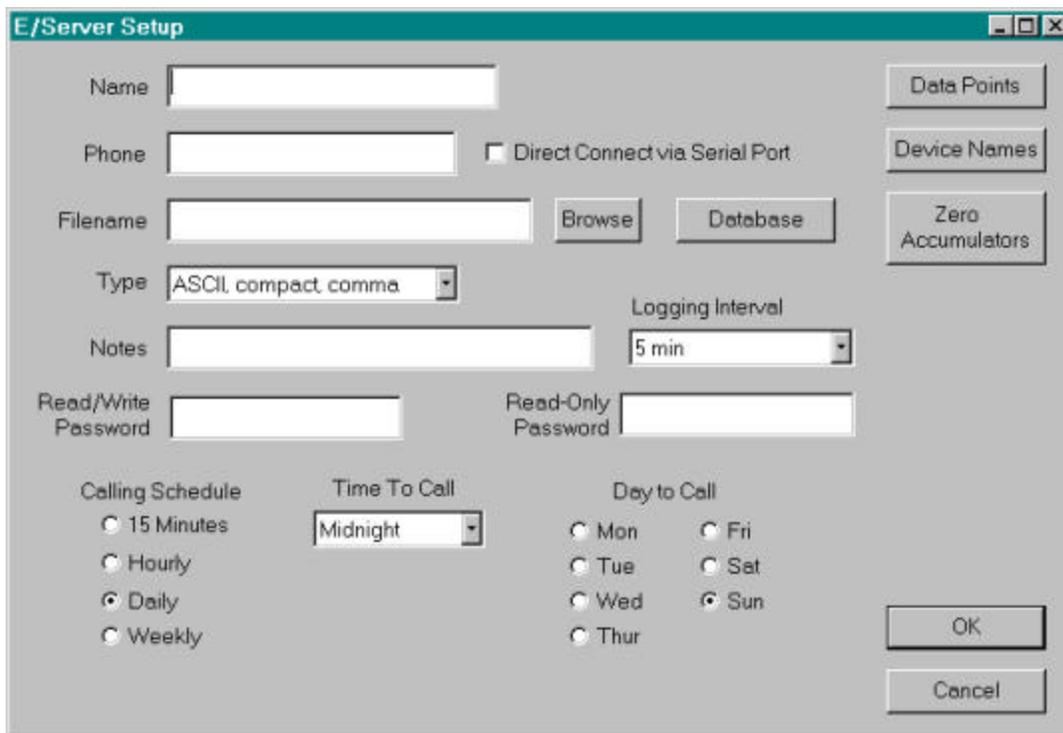
Figure 16: Setup Dialog

Table 2: Setup Dialog Components

Component/ Button	Description
Name	Assigns a name to the E/Server. The name will be used to identify the source data in the data-files/databases.
Phone	Assigns a phone number for the E/Server (used only if you plan to connect via a modem; if you plan to connect directly from your PC's serial port, see "Direct Connect Valid characters are 0-9, comma (,), pound (#), star (*) and space ( ). You can use up to 40 characters to access phone company features (cancel-call-waiting, credit cards, etc). Use commas for delays associated with accessing outside lines, etc.
Direct Connect via Serial Port	Allows you to access the E/Server directly from your PC's serial port.
Filename	Allows you to enter the name of an ASCII text file to which the E/Server will write data. You can click <Browse> to find an existing file or directory on your hard drive. Figure 17 on page 23 shows what an example text file looks like.
Type	Refers to the format of the ASCII text file you entered in "Filename," above. This drop-down menu is unavailable (grayed out) if you enter nothing in "Filename." Selections are: ASCII, compact, comma: Each set of 20 Modbus data-points and four Pulse-Input Accumulators data, along with the E/Server name and time-stamp, is sent as one line, with the data separated by commas. Example: Bldg2,01/19/1999 13:50:00,5.97,7.78,5.21,7.70,9.43,1.47,7.80,484.8,,,,,,,,,,,,2,3,7,0 ASCII, compact, tab: Same as previous, but with tabs as delimiters instead of commas. ASCII, long, comma: Each data point is sent on a separate line. Each line has its own E/Server name, data-point number, and time-stamp. Example: Bldg2,1,01/19/1999 13:50:00,5.97 Bldg2,2,01/19/1999 13:50:00,7.78 . . . Bldg2,24,01/19/1999 13:50:00,0 ASCII, long, tab: Same as previous, but with tabs as delimiters instead of commas.
Notes	Allows you to enter notes applicable to the E/Server.
Logging Interval	Allows you to configure the time between data acquisitions of the E/Server. A drop-down menu offers options from five to sixty minutes.

<div align="right">Continued</div>

Setup Dialog Components, continued

Component/ Button	Description
Read/Write Password	Enables a read/write password, which allows you to make configuration changes to the E/Server. **CAUTIONS** Others can change the E/Server's configuration unless you add a password here. You will not be able to recover the password after you type it, so record the password in a safe place. You can make configuration changes to the E/Server only from the PC on which you entered the read/write password. Do not install the same read/write password for the same E/Server on more than one PC. Configuration changes made from more than one PC will cause unpredictable behavior and data loss.
Read-Only Password	Enables a read-only password, which allows you to download data from the E/Server. You can install the same read-only password on multiple PCs, and then every PC with the E/Server's read-only password can download its data. **CAUTIONS** Others can download the E/Server's data unless you add a password here. You will not be able to recover the password after you type it, so record the password in a safe place.
Calling Schedule	Allows you to determine the frequency at which the PC will call the E/Server and download its data. Depending on which option you choose, the Time To Call and Day to Call areas will be either active (and requiring your input) or inactive (grayed out).
Database	Allows you to write the E/Server's data to an ODBC-compliant database. When you click <Database>, the Database Setup dialog appears (see Figure 18 on page 24).
Data Points	Allows you to configure the 20 data points for future data logging. When you click <Data Points>, the Data Points dialog appears (see Figure 20 on page 26).
Device Names	Allows you to assign and change the names of all 63 possible Modbus devices and the four Pulse-Input Accumulators. When you click <Device Names>, the Device Names dialog appears (see Figure 19 on page 25).
Zero Accumulators	This button allows you to zero the four Pulse-Input Accumulators and the kWH Energy Consumption accumulators in Veris Enercept H8035/8036 Power Meters. When you click <Zero Accumulators>, the Zero Accumulators dialog appears (see Figure 21 on page 27).

Data Results Text File

You can configure E/Server software to download data to a text file in the Setup dialog. For this manual, we created a text file ("Eserver_Results.txt," shown in Figure 17), and downloaded data to this file.
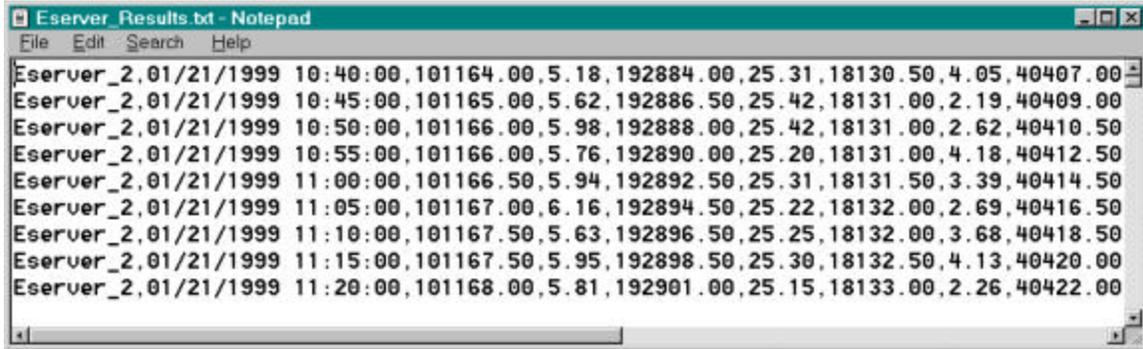
Figure 17: Data Results in a Text File

Save-to-Database Setup Dialog

When you click <Database> in the Setup dialog, the Save-to-Database Setup dialog appears. Save-to-Database Setup allows you to send data from an E/Server to an ODBC-compliant database; the "Databases (DSN)" section of this dialog lists your choices.
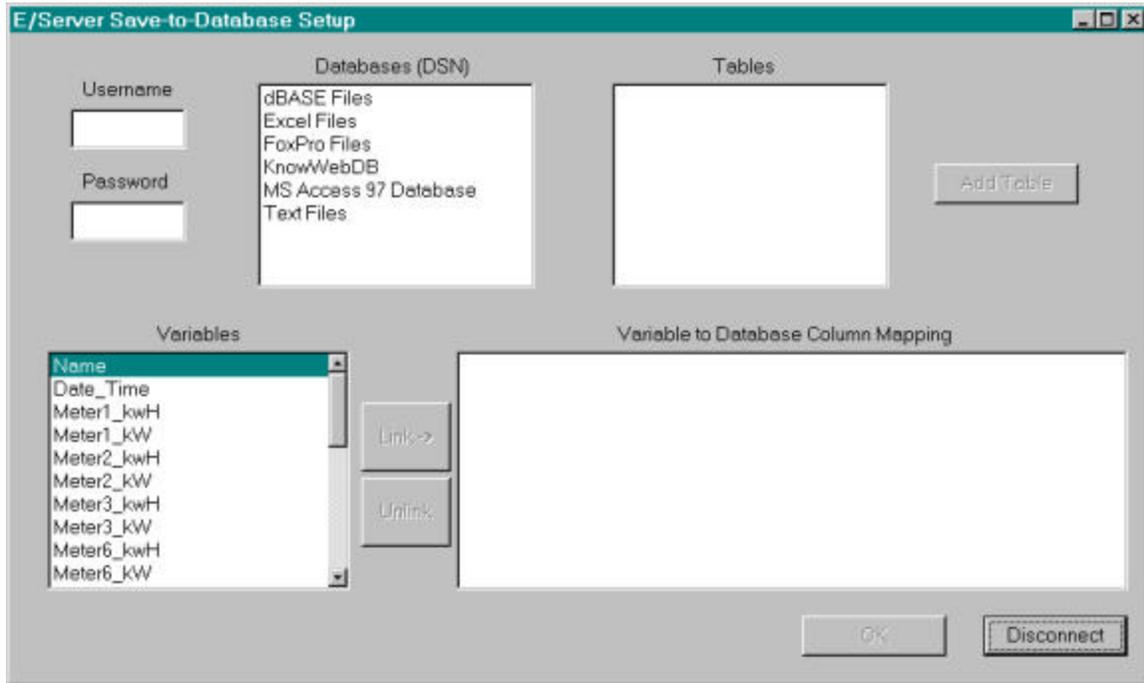
Figure 18: Save-to-Database Setup Dialog

Table 3: Database Setup Dialog Components

Component/ Button	Description
Username	Enables a user name for an E/Server (optional).
Password	Enables a password for the database (optional).
Databases (DSN)	Lists database options to which you can connect.
Tables/ Add Table button	Lists tables in each data to which you can connect. You can create a new table with the <Add Table> button.
Variables	Lists variables acquired by the E/Server.
Variables to Database Column Mapping/ Link/ Unlink	Lists the present mapping of the E/Server variables to the columns in the database table. If this is the first attempt at connecting this E/Server to this database table, the system will attempt to match-up the variables with the column names in this list box. You can change the mapping of a variable and a column with the <Link> and <Unlink> buttons.
OK/ Disconnect	<OK> accepts changes made in this dialog. <Disconnect> discards changes and disconnects from the database.

Device Names Dialog

When you click <Device Names> in the Setup dialog, the Device Names dialog appears. Device Names allows you to assign and change the names of all 63 Modbus devices and the four pulse-input accumulators.

The names are used to write header files that identify the data for the ASCII text files and databases. They are also useful in identifying the location/function of each device for your own use.
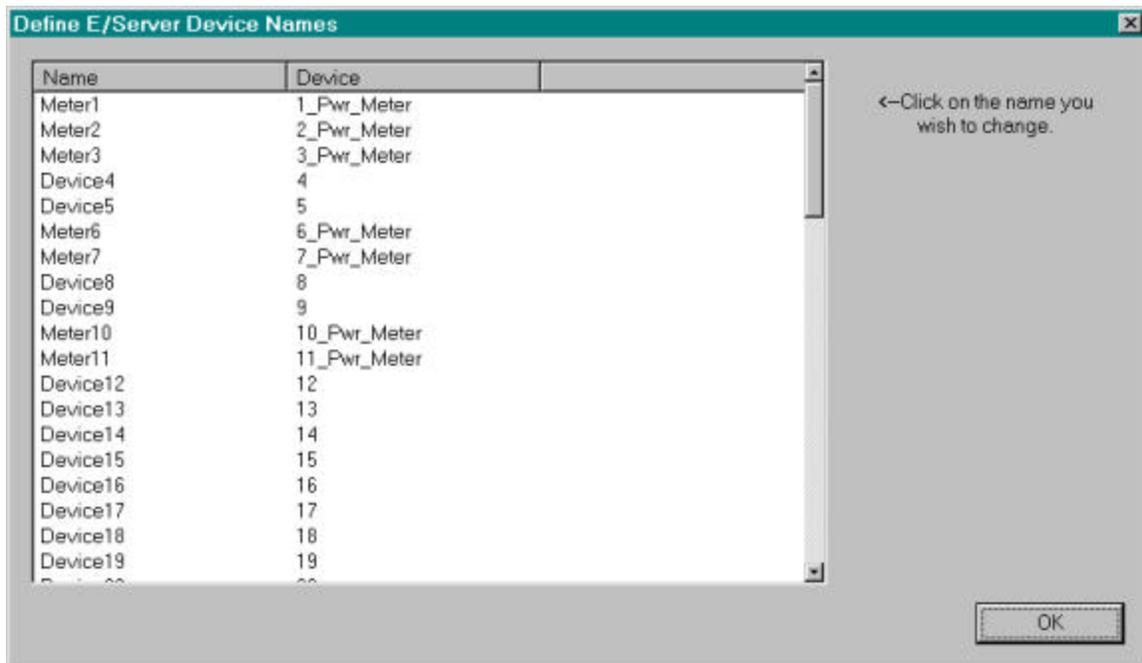
Figure 19: Device Names Dialog

Note: If device type does not appear after the device number, then the E/Server does not detect a device at that Modbus address.

Data Points Dialog

When you click <Data Points> in the Setup dialog, the Data Points dialog appears. Data Points allows you to configure the 20 data points for future data logging. You must first call an E/Server to retrieve its present configuration before you can change its data points.
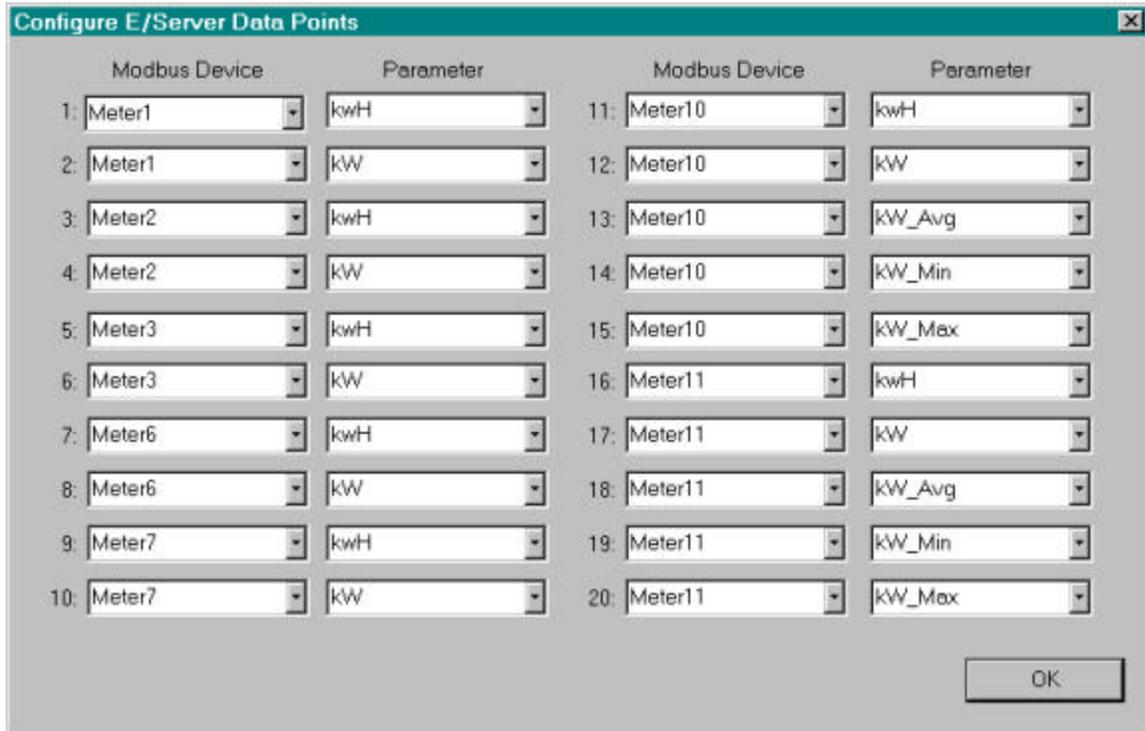
Figure 20: Data Points Dialog

Table 4: Data Points Dialog Components

Component/ Button	Description
Modbus Device	Lists all the recognized devices connected to the E/Server. You can select one of these or enter the Modbus address of an unrecognized (non-Veris) device. You can also enter the device number of a yet-to-be-installed Modbus device.
Parameter	Lists all parameters available for the recognized device. No information exists for an unrecognized or missing device. You can select one of these or enter the Modbus register number. You can also select devices and parameters for non-existent devices; this will do no harm, but data can not be acquired.

Zero Data Accumulators Dialog

When you click <Zero Accumulators> in the Setup dialog, the Zero Accumulators dialog appears. Zero Accumulators allows you to reset at zero the four pulse-input accumulators and the kWH energy-consumption accumulators in Veris Enercept H8035/8036 power meters. You must first call an E/Server to retrieve its present configuration before you can set up zeroing commands.

The E/Server takes the list of devices you configure in this dialog and zeroes them IMMEDIATELY AFTER the data are acquired at the next call. This prevents data loss between data-acquisition intervals.
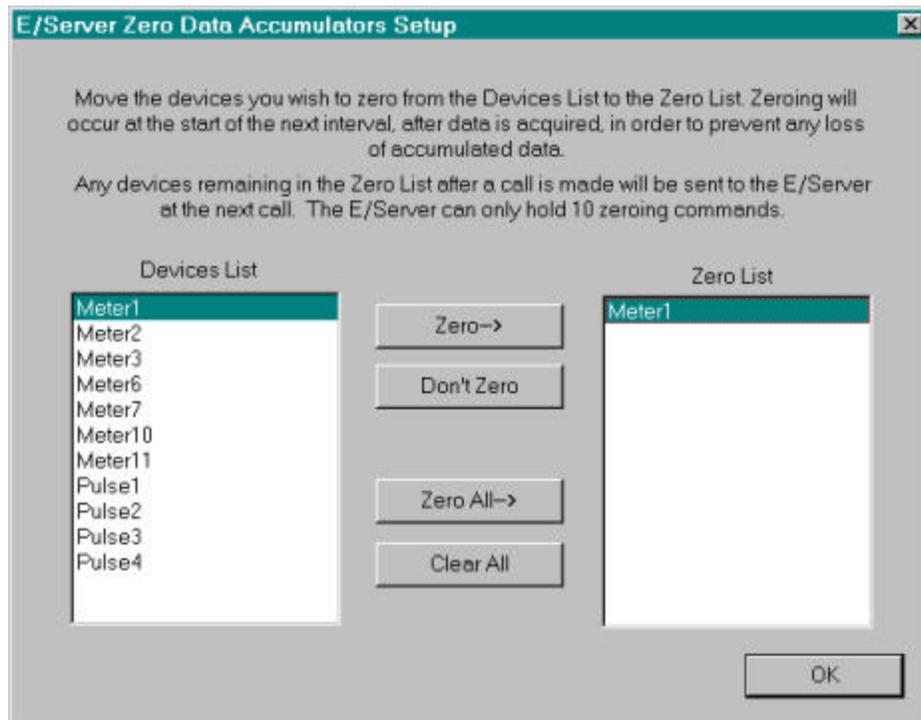
Figure 21: Zero Accumulators Dialog

Appendix B: Product Specifications

Table 5: E/Server Specifications

Item	Specification
Input power	9VDC @ 500mA max from included wall-mount supply
RS-485 connections	1 to 20 H8035 energy-only meters, temperature sensors, or other compatible RS-485 devices, dependent on options
Pulse inputs	Up to 4 TTL level, when applicable
Telephone connections	RJ11C jack
Real-time clock	
Accuracy	10 ppm
Function	Output data are date and time-stamped
Battery	
Type	CR-2032
Expected life at room temp.	5 years
Data retention	Battery life – up to five years without power
Data capacity	
With standard memory	Recording Interval Span 5 min 6.25 days 15 min 14.75 days 30 min 37.5 days 60 min 75 days
EMI	FCC Class A

Appendix C: E/Server Programming Manual

We have provided the following programming manual for those who want to write their own application to work with the E/Server. This manual defines the communication protocol between the E/Server and a remote PC. The protocol runs on either the modem or laptop port, but not on both simultaneously.

Contact Veris for information on licensing for source code, partnerships, etc.

OVERVIEW

The E/Server acquires 20 channels of Modbus data plus 4 internal pulse-accumulators every interval. A channel is defined as a parameter from any of 63 possible Modbus devices. The interval may be configured for 5, 10, 15, 30 or 60 minutes.

The data for the 20 Modbus channels are reported in 32-bit floating-point format. The data for the pulse registers are reported in 32-bit integer format.

The memory will hold 1807 data points for each of the 20 channels and 4 pulse-registers, and is a circular FIFO in the case of overflow. In the case of errors, such as no device found, comm errors with the device, or a power outage, a null will be recorded for that channel. Samples will not be lost when downloading. e.g. the sample time occurs shortly after a modem connection.

The default configuration for the E/server is to scan parameter 256 of Modbus addresses 1-20 at 30-minute intervals.

COMMUNICATIONS PARAMETERS

Modbus

Baud Rate: 9600, 8N1 format
Protocol: Modbus RTU
Physical characteristics: RS485, 2 wire plus shield
Detailed protocol specifications are available at **http://www.veris.com/modbus/**

Modem

Baud Rate: 2400, 8N1 format
Telephone connector: RJ11C jack

Config Port

Baud Rate: 9600, 8N1 format
Handshaking: None
Connector: Mini-stereo jack. Tip=E/Server Rcv, Ring=E/Server Xmt, Shield=Ground

COMMAND SUMMARY

Function	Access	Firmware	Command
Get Firmware Version	R	1.00	#100>
Reset All	R/W	1.00	#109>
Silence Config Port	R/W	1.00	#111>
Awaken Config Port	R/W	1.00	#112>
Reset Data Memory	R/W	1.00	#177>
Get current Values	R	1.00	#233>
Set Time	R/W	1.00	#555,SC,MN,HR,WD,MD,MN,YR,TZ>
Get Time	R	1.00	#656>
Set Interval	R/W	1.00	#805,INTERVAL>
Get Interval	R	1.00	#807>
Get #records >UNIXTIME	R	1.00	#914,UNIXTIME>
Get Data - Binary	R	1.00	#918,UNIXTIME>
Change Read/Write Pwd	R/W	1.00	#920,PASSWORD>
Change Read-Only Pwd	R/W	1.00	#921,PASSWORD>
Reset Pulse Accums	R/W	1.07	#925>
Write Point Next Ival	R/W	1.08	#926,TYPE,DEVICE,REGISTER,SETTING>
Set Channel	R/W	1.00	#928,CH,MB_ADD,MB_PARAM>
Get Channels & Devices	R	1.00	#929>
Set Device Name	R/W	1.08	#930,DEVICE-ID,NAME>
Get Device Names	R	1.08	#931>
Modbus Read Gateway	R	1.08	#932,ASCII_COMMAND_STRING>
Modbus R/W Gateway	R/W	1.08	#933,ASCII_COMMAND_STRING>

NOTES

All commands must end with 0xCKSM\r\n

Where:

\r	carriage return character
\n	newline character
CKSM	16-bit checksum expressed as 4-hex digits for the entire line preceding CKSM.
....	May be substituted for CKSM for any command sent to E/Server

R	Read Access
R/W	Read/Write Access

DETAILED COMMAND DESCRIPTIONS

100: Get Firmware Version

Returns the version number of the E/Server.

Access:	Read
Command Format:	#100>0xCKSM\r\n
Example Command:	#100>0x....\r\n
Response Format:	<n.nn>0xCKSM\r\n
Example Response:	<1.08>0x461D\r\n

109: Reset All

Resets all memory and configuration to factory defaults.

Defaults are:	Data memory clear.
	Pulse accumulators zeroed.
	Interval = 30 minutes.
	Channels = parameter 256 of modbus_address 1-20.

Access:	Read/Write
Command Format:	#109>0xCKSM\r\n
Example Command:	#109>0x....\r\n
Response:	Reset All\r\n

111: Silence Config Port

Turns-off all output to the config port.

Access:	Read/Write
Command Format:	#111>0xCKSM\r\n
Example Command:	#111>0x....\r\n
Response:	<ACK>

112: Awaken Config Port

Turns-on output to the config port.

Access:	Read/Write
Command Format:	#112>0xCKSM\r\n
Example Command:	#112>0x....\r\n
Response:	<ACK>

177: Reset Data Memory

All acquired data (Modbus-channels and pulse accumulators) are cleared. The interval is preserved.

Access:	Read/Write
Command Format:	#177>0xCKSM\r\n
Example Command:	#177>0x....\r\n
Response:	<ACK>

233: Get Current Values

Returns the values of all 20 channels and the 4 pulse accumulators.

Access:	Read
Command Format:	#233>0xCKSM\r\n
Response Format:	<A4,n,UNIXTIME,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,i,i,i,i,>0x CKSM
	where: n = total number of data including UNIXTIME in hex
	f = 32-bit floating point values for the Modbus data
	i = 32-bit integer value for the pulse accumulators
Example Command:	#233>0x....\r\n
Example Response:	<A4,19,3677B8DA,,,,,,480.98,3.73,42.47,,,,,,,,,,,,,338,821,2299,12>0xCKSM\r\n

555: Set Time

Set the real-time-clock target in the E/Server. All data in the E/Server will be erased if this time differs from the RTC by more than 10 minutes. If less than 10 minutes of difference, the E/Server's RTC will slowly eliminate this difference by adding or subtracting 1 second every 5 minutes until the difference is zero.

Access:	Read/Write
Command Format:	#555,SC,MN,HR,WDAY,MDAY,MN,YR,TZ>0xCKSM\r\n
	SC = seconds 00 - 59
	MN = minutes 00 - 59
	HR = hours 00(midnight) - 23
	WDAY = day of week 01(Monday) - 07(Sunday)
	MDAY = day of month 01-31
	MN = month 01 - 12
	YR = 4-digit year (1998)
	TZ = #min timezone difference (local time - GMT)
Example Command:	#555,29,18,15,03,09,12,1998,-0480>0x....\r\n
	(Wed Dec 9, 1998 15:18:29 GMT)
Response Format:	<tttttttt,rrrrrrrr>0xCKSM\r\n
	Where: tttttttt = target(commanded) time in UNIXTIME
	rrrrrrrr = RTC time in UNIXTIME
Example Response:	<366F0545,366F054A>0xCKSM\r\n

656: Get Time

Get the targeted E/Server time and the time in its real-time-clock(RTC). See command #555 for further details.

Access:	Read
Command Format:	#656>0xCKSM\r\n
Example Command:	#656>0x....\r\n
Response Format:	<tttttttt,rrrrrrrr>0xCKSM\r\n
	Where: tttttttt = target(commanded) time in UNIXTIME
	rrrrrrrr = RTC time in UNIXTIME
Example Response:	<366F0545,366F054A>0xCKSM\r\n

805: Set Interval

Set the data acquisition interval. ALL DATA MEMORY WILL BE ERASED!

Access:	Read/Write
Command Format:	#805,INTERVAL>0xCKSM\r\n
	INTERVAL = 01, 05, 10, 15, 30 or 60 minutes.
Example Command:	#805,15>0x....\r\n
Response Format:	<ii>0xCKSM\r\n where: ii = interval in decimal
Example Response:	<15>0xCKSM\r\n

807: Get Interval

Read the interval in minutes.

Access:	Read
Command Format:	#807>0xCKSM\r\n
Example Command:	#807>0x....\r\n
Response Format:	<ii>0xCKSM\r\n where: ii = interval in decimal
Example Response:	<15>0xCKSM\r\n

914: Get Number of Records > UNIXTIME

Read the number of data records available which were taken after a specified time.

Access:	Read
Command Format:	#914,UNIXTIME>0xCKSM\r\n
Example Command:	#914,366F0545>0x....\r\n
Response Format:	<nnnn>0xCKSM\r\n where: nnnn = #records in decimal
Example Response:	<1965>0xCKSM\r\n

918: Get Data - High Speed Binary

Download data from E/Server in compressed binary mode. There is no facility to re-send a line of data.

Access:	Read
Command Format:	#918,UNIXTIME>0xCKSM\r\n
Example Command:	#918,3677EE18>0x....\r\n

<u>Response Format</u>

The data is communicated to the host in a compressed binary format. To speed download times, only data which has changed from the previous reading is reported. A FIELD MASK is used to indicate which data are to be reported in the current and subsequent lines until the next FIELD MASK. The first line transmitted will always contain a FIELD MASK. The FIELD MASK is defined as follows:

```
000000u xxxxpppp cccccccc cccccccc ffffcccc ffffffff
0000 00000000 11111110    2111      <== pulse(1-4)/chan(1-20)
      4321 87654321 65432109    0987
```

where: u = UNIXTIME
       p = pulse accumulator
       c = Modbus channel
       f = reserved for future use
       x = don't care

Data is transmitted in the following order:
       FIELD_MASK,UNIXTIME,channels,pulse_accumulators,checksum

The last byte of each line transmitted also contains a FLAG BYTE which defines the format of the next line. The FLAG BYTES are as follows:

> 0x11 - the next line will contain a field mask.
> 0x14 - the next line will not contain a field mask.
> 0x18 - End of transmission.

Example Responses (shown in hex ASCII for readability)

response: 0100E00000007C4C793660143D472C610A478CFA2847CFDA14

decoded: This is either the first line of a transmission or the previous line included the 0x11 FLAG BYTE. This FIELD MASK indicates that UNIXTIME and channels 6,7,8 are included. UNIXTIME reported LSB first is 7C4C7936. The 32-bit floating-point data for channels 6,7,8 (LSB first) are 60143D47, 2C610A47, 8CFA2847. The 16-bit checksum is CFDA. Finally, the FLAG BYTE is 0x14, indicating that the next line will not contain a FIELD MASK.

response: 9A153D470C620A47A0FB2847E29618

decoded: The previous line indicated that this line does not contain a FIELD MASK (FLAG BYTE = 0x14). Therefore, this line contains data for the same channels as the previous line. Data for channels 6,7,8 are 9A153D47, 0C620A47 and A0FB2847 respectively. The checksum is E296 and the FLAG BYTE is 0x18, indicating this is the last line of transmission.

920: Change Read/Write Password

Changes the Read/Write password for future access to this E/Server. The password may contain any character except the right bracket (>). The password will be truncated to 31 characters length.

Access:	Read/Write
Command Format:	#920,PASSWORD>0xCKSM\r\n
Example Command:	#920,open sesame>0x....\r\n
Response:	Root Password Changed\r\n

921: Change Read-Only Password

Changes the Read-Only password for future access to this E/Server. The password may contain any character except the right bracket (>). The password will be truncated to 31 characters length.

Access:	Read/Write
Command Format:	#921,PASSWORD>0xCKSM\r\n
Example Command:	#921,let it read>0x....\r\n
Response:	User Password Changed\r\n

925: Reset Pulse Accumulators

Immediately clears all four pulse accumulators to zero.

Access:	Read/Write
Command Format:	#925>0xCKSM\r\n
Example Command:	#925>0x....\r\n
Response:	<ACK> if successful, <NAK> if not successful.

926: Write to a Point at Start of Next Interval

Store an event in the E/Server for execution at the start of the next interval, AFTER the point data is acquired.

Access:	Read/Write
Command Format:	#926,TYPE,DEVICE,REGISTER,SETTING>0xCKSM\r\n
	Where TYPE = 00-99, 00=pulse counters, 01=Modbus
	DEVICE = 00-03 for pulse regs, 00-63 for Modbus
	REGISTER = 000-999, ignored for pulses
	SETTING = 00000000-FFFFFFFF
Example Command:	#926,01,08,001,0000035A>0x....\r\n
Response Format:	<dd>0xCKSM\r\n where dd=number of remaining events
	<NAK> if not successful.
	<FULL> if no room available in memory to store event

928: Set Channel

Configure a channel to a specific parameter from a specific Modbus device.

Access:	Read/Write
Command Format:	#928,CHANNEL,MODBUS-ADDRESS,MODBUS_PARAMETER>0xCKSM\r\n
	CHANNEL = channel number 01-20
	MODBUS_ADDRESS = 01-63
	MODBUS_PARAMETER = 000-999
Example Command:	#928,04,03,256>0x....\r\n
Response:	<ACK> if successful, <NAK> if not successful.

929: Get Channels & Devices

Read the channel and device table from the E/Server. This command returns two lines of data.

Access:	Read
Command Format:	#929>0xCKSM\r\n
Example Command:	#929>0x....\r\n

<u>Response Format</u>

<id|pm,(...18 more id|pm,. . .)id|pm,>0xCKSM\r\n
<type, (...61 more type,. . .) type,>0xCKSM\r\n

where: id = modbus device address 01-63
      pm = parameter within Modbus device at address id
      type = Veris -assigned device type, null if no detected device at this address.

    At present, the following devices have assigned types:

    100 = Alta Labs Outside Air Temperature/Humidity Sensor
    133 = Enercept Model H8035-0100-2 Energy Meter
    134 = Enercept Model H8035-0300-2 Energy Meter
    135 = Enercept Model H8035-0400-3 Energy Meter
    136 = Enercept Model H8035-0800-3 Energy Meter
    137 = Enercept Model H8035-0800-4 Energy Meter
    138 = Enercept Model H8035-1600-4 Energy Meter
    139 = Enercept Model H8035-2400-4 Energy Meter
    145 = Enercept Model H8036-0100-2 Enhanced Data Stream Meter
    146 = Enercept Model H8036-0300-2 Enhanced Data Stream Meter
    147 = Enercept Model H8036-0400-3 Enhanced Data Stream Meter
    148 = Enercept Model H8036-0800-3 Enhanced Data Stream Meter
    149 = Enercept Model H8036-0800-4 Enhanced Data Stream Meter
    150 = Enercept Model H8036-1600-4 Enhanced Data Stream Meter

151 = Enercept Model H8036-2400-4 Enhanced Data Stream Meter

Example Response:
<1|256,2|256,3|256,4|256,5|256,6|256,7|256,8|256,9|256,10|256,11|256,
12|256,13|256,14|256,15|256,16|256,17|256,18|256,19|256,20|256,>0x550A\r\n
<,,,,,133,,100,,,,,147,,,133,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,>0xFF47\r\n

930: Set Device Name

Assign a text name to a Modbus device. Names may not exceed 21 characters.

Access:	Read/Write
Command Format:	#930,MODBUS_ADDRESS,NAME>0xCKSM\r\n
	MODBUS_ADDRESS = 01-63
	NAME = Truncated at 21 characters maximum. Must only include A-Z, a-z,0-9
	or underscore(_). First char must be A-Z, a-z or underscore (_).
Example Command:	#930,43,Chiller4>0x....\r\n
Response:	<ACK> if successful, <NAK> if not successful.

931: Get Device Names

Read all of the text names assigned to all Modbus devices. Each name is returned in a separate line. Only assigned (non-NULL) names will be reported. If no names are assigned, only the termination line is returned.

Access:	Read
Command Format:	#931>0xCKSM\r\n
Example Command:	#931>0x....\r\n
Response Format:	<id,name>0xCKSM\r\n where:id=device number 01-63
	<id,name>0xCKSM\r\n
	. . .
	<id,name>0xCKSM\r\n
	<99,XXX>0xCKSM\r\n (termination line)
Example Response:	<03,Heater5>0xCKSM\r\n
	<15,Lights_Mfg>0xCKSM\r\n
	<43,Chiller3>0xCKSM\r\n
	<99,XXX>0xCKSM\r\n

932: Modbus Read Gateway

This provides a means of communicating Modbus Read commands directly to Modbus using ASCII representations of the binary RTU protocol. The Modbus checksum must be provided in the ASCII string to send. This command will only process Modbus Read commands. Use #933 for Modbus Write commands.

Access:	Read
Command Format:	#932,ASCII_COMMAND_STRING>0xCKSM\r\n
Example Command:	#932,060301000001cksm>0x....\r\n
Response Format:	<ASCII_RESPONSE_STRING>0xCKSM\r\n
	<NAK>\r\n if Modbus Write command, bad send CKSM or cksm, bad return cksm or Modbus timeout.
Example Response:	<060302473Dcksm>0xCKSM\r\n

933: Modbus Read/Write Gateway

This provides a means of communicating Modbus Read/Write commands directly to Modbus using ASCII representations of the binary RTU protocol. The Modbus checksum must be provided in the ASCII string to send.

Access:	Read/Write
Command Format:	#933,ASCII_COMMAND_STRING>0xCKSM\r\n
Example Command:	#933,090601001234cksm>0x....\r\n
Response Format:	<ASCII_RESPONSE_STRING>0xCKSM\r\n
	<NAK>\r\n if bad send CKSM or cksm, bad return cksm or Modbus timeout.
Example Response:	<090601001234Dcksm>0xCKSM\r\n