



**SOLA/
HEVI-DUTY**

POWER PROTECTION

MultiLink™

Version 3.0 Release

**User
Manual**



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**Version 3.0 Release
User Manual****Sola/Hevi-Duty**

United States	Canada
EGS Electrical Group Sola/Hevi-Duty 7770 N. Frontage Road Skokie, IL 60077 Sales Phone: 1 847 763 6651 FAX: 1 847 763 6652 Technical Support Phone: 1 800 377 4384 FAX: 1 800538 6554 E-mail: tech@solaheviduty.com	Phone: 1 519 653 2581 FAX: 1 519 653 5181
Sola/Hevi-Duty Web Site: http://www.solaheviduty.com MultiLink Web Site: http://www.solaheviduty.com/products/ups	

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1.0 WHAT IS MULTILINK?

MultiLink was developed to protect computers from costly damage such as loss of data resulting from power failures—from single computers to large networks. MultiLink constantly monitors one or more Uninterruptible Power Supply (UPS), warns computer users of impending power loss and initiates graceful operating system shutdowns when needed. This product permits configurable responses to UPS status changes, including support for e-mail, pagers and on-screen notification.

1.1 How Does MultiLink Work?

MultiLink on a host computer communicates with a UPS using network or direct cable connections to detect loss of utility power and the status of the UPS battery. For network communications, MultiLink employs the SNMP protocol and IP addresses. For direct cable connections, MultiLink uses either serial communications or contact closure, depending on the UPS model.

With the release of MultiLink 3.0, the user has the option of expanding MultiLink's network capabilities. License upgrades allow the System Administrator to monitor and control multiple devices—computers powered by the same UPS, other UPSs and even other MultiLink installations—throughout a network from a single location.

The MultiLink Network Shutdown License permits the designation of an authorized number of computers as targeted client computers. MultiLink installed on those targeted clients responds to On Battery and Low Battery notifications from MultiLink on the host computer.

MultiLink uses the SNMP protocol and IP addresses to communicate with targeted client computers (running MultiLink) using the network—instead of requiring separate, expensive hardware and cables that might run alongside network lines.

Typical sequence

MultiLink's responses to a power loss depends on its configuration by the user, installation of any upgrade licenses and the type of connection between the host computer and the UPS. Following is a simplified version of how MultiLink might respond to a utility power failure.

- Utility power fails, and the UPS begins powering the computer network. The UPS senses the power loss, triggering MultiLink to activate timers and issue notifications that utility power has been interrupted. If the timers expire before utility power is returned, MultiLink can prompt an operating system shutdown, preventing the loss of valuable data as well as damage to computers from a precipitous loss of power.
Depending on configuration by the user, MultiLink will respond automatically to this UPS event by sending pop-up notifications, e-mails and pager messages, running command-line options, performing an orderly shutdown and keeping a log of all events.
- When utility power is restored, the UPS prompts MultiLink to cancel the timers and notify targeted computers of the return to normal status.

2.0 How Do You CONTACT SOLA/HEVI-DUTY FOR TECHNICAL SUPPORT?

For help on deciding how to set up MultiLink or any other Sola/Hevi-Duty product, contact the Support Center at:

UNITED STATES	Phone: +1 800-377-4384
WORLDWIDE	Phone: +1 847-763-8235
	All Products: http://www.solaheviduty.com MultiLink: http://www.solaheviduty.com/products/ups
	E-mail: tech@solaheviduty.com

3.0 WHO CAN BENEFIT FROM MULTILINK?

Any computer user—from the person with a single computer to the business with a multiple network system—can protect valuable data using a Sola/Hevi-Duty UPS and MultiLink to perform an orderly shutdown of the operating system in the event of utility power failure.

3.1 Configurations

The application can monitor virtually any configuration (see examples in **Figure 4**):

- Any individual computer with a single UPS
- Any single network with multiple computers and one or more UPS units
- Interconnected networks with computers powered by one or more UPS units

3.2 Connections

MultiLink works with any of these connections to a UPS:

1. SNMP card on a network or interconnected networks
2. Serial port on your computer (using serial communications or contact closure)

A single computer connected by any of those methods can be networked to other computers and, with license upgrades, configured to monitor UPSs connected to those computers. MultiLink can monitor a network that includes any combination of LANs, WANs and any other type of network.

MultiLink can notify targeted client computers of “On Battery” and “Low Battery” events for coordinated shutdown of the operating system.

3.3 Platforms

MultiLink functions on multiple platforms. Visit the Web site for a list of currently supported platforms.

4.0 WHAT IS REQUIRED TO USE MULTILINK?

Visit the Web site at [Sola/Hevi-Duty](#) for links to currently supported systems. The Web site always has the most detailed and up-to-date information on system requirements.

4.1 Connecting host computer, UPS and targeted clients

A host computer can be connected to a UPS and to targeted client computers in almost limitless ways. The connections and MultiLink configurations are constrained only by the UPS model, installed options and upgrade licenses.

1. Ethernet/Intranet/Internet—SNMP protocol and IP addresses
2. Any combination of the connections above, comprising a Local Area Network (LAN) or Wide Area Network (WAN)
3. Serial Communications—direct cable connection between a UPS and a computer
4. Contact Closure—direct cable connection between a UPS and a computer

4.1.1 MultiLink Basic Notification Source

Computers on a network, such as a LAN or WAN, may be set up to receive notifications from another computer configured to monitor the UPS that is powering the network. For these computers, choose the connection type **MultiLink Basic Notification Source** during setup. This feature requires a MultiLink Network Shutdown License (see **Table 14**).

These computers must be running MultiLink. On these computers, MultiLink is not communicating directly with a UPS but with a MultiLink installation on another computer. This host computer must be configured to communicate with the UPS as **Serial UPS**, **SNMP** or **Contact Closure**, as described in the following section.

4.1.2 Serial or SNMP Connection

Serial and SNMP communications allow you to take full advantage of MultiLink's features. Contact Closure communications provide basic functions only. The following table shows the communications methods available with selected UPS models:

Table 1 Communications Method by UPS Model

UPS Model	Local		Network	
	Contact Closure	Serial UPS	MultiLink Basic Notification Source	SNMP
Serial/SNMP or Contact Closure:				
S5kModular	✓	✓	✓	✓ *
S4k Series	✓	✓	✓	✓ *
4000 Series	✓	✓	✓	✓ *
3000 Series	✓	✓	✓	✓ *
Contact Closure Only:				
2000 Series	✓	No	✓	No
All other UPS models	✓	No	✓	No

* Available when UPS is equipped with SNMP card, such as Intellislot SNMP/Web card

4.1.3 Contact Closure

In MultiLink, Contact Closure supports only three UPS-related events:

- UPS Operating On Battery
- Low Battery
- UPS Returned From Battery (Normal)

For these three events, this connection supports most MultiLink actions, such as sending pop-up notifications, e-mails and pager messages, running command-line options, performing orderly shutdowns and keeping a log of all events.

4.2 Requirements for Installing MultiLink

Before beginning installation, review these requirements and follow steps 1 through 3 below.

The prospective user must have:

- The MultiLink software—downloadable from the [MultiLink Web](#) site. Visit the Web site or contact your local Sola/Hevi-Duty representative, value-added reseller, or distributor for information.
- This manual (downloadable from the Sola/Hevi-Duty Web site).
- A UPS linked to a computer.
- For requirements specific to various operating systems, see the [MultiLink Web](#) site or **Appendix A - Operating System Details**.
- A communications link between the UPS and the computer.
 - Ethernet, Internet or Intranet, utilizing SNMP protocol and IP addresses
OR
 - A special serial cable—available from Sola/Hevi-Duty or built with instructions in **Appendix B - Making Your Own MultiLink UPS Cable** of this manual—and an available serial port on the computer protected by the UPS (see **Appendix C - Technical Information & Frequently Asked Questions**).
- With an SNMP card in the UPS, with available IP ports 161 and 162 (see **Appendix C - Technical Information & Frequently Asked Questions**).
- TCP/IP connectivity throughout the network, if the UPS is equipped with an SNMP card or if MultiLink will monitor or communicate with more than one UPS or computer.

Before beginning installation:

1. Check with your System Administrator about the need to disable certain network software (see **Appendix C - Technical Information & Frequently Asked Questions**).
2. For a serial port connection to the UPS, you will need to buy or make a custom cable. MultiLink will NOT function properly with an ordinary serial cable connected to the UPS.
 - You may purchase a cable by contacting your local Sola/Hevi-Duty representative, value-added reseller, or distributor (see **Appendix E - Ordering Parts From Sola/Hevi-Duty** for part numbers).
 - To make a cable, see **Appendix B - Making Your Own MultiLink UPS Cable**.
3. For configurations in which the source of events is to be a UPS with an SNMP agent, be sure to include the IP address of the computer(s) on which MultiLink is to be installed in the SNMP agent's list of trap recipients. This speeds notifications about the UPS's condition to the computer.

5.0 MULTILINK CONFIGURATIONS

MultiLink is configured according to the method a computer uses to monitor the status of a UPS, either through an SNMP card or by a direct cable connection to the serial port.

MultiLink is designed to monitor any part of a network. Its functionality permits it to monitor any Sola/Hevi-Duty UPS that can be contacted via serial cable, contact closure, an Ethernet or the Internet, but the software's functionality does not require networked computers and UPSs.

Configure MultiLink according to the type of connection between the computer and UPS. The various methods are shown in **Figures 1, 2** and **3**.

5.1 Cable Connection

Figure 1, below, shows the simplest possible MultiLink installation. MultiLink can be configured to monitor the UPS, and, if utility power fails or another problem arises, MultiLink can notify Computer #1 and personnel about the problem. In the event of a serious power problem, MultiLink can be configured to prompt the shutdown of Computer #1's operating system.

Figure 1 Direct cable connection

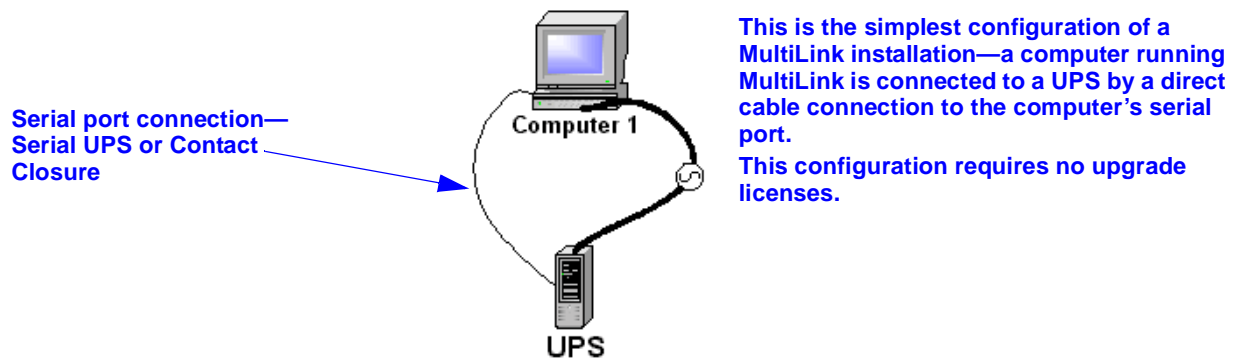
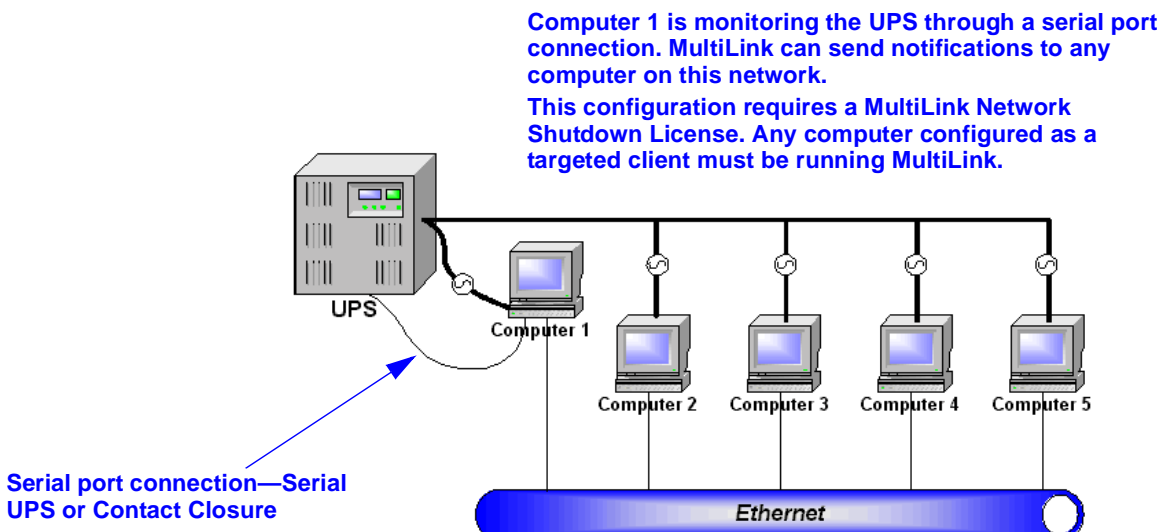


Figure 2 shows the same type of serial connection to a computer on a network (Computer 1). With either serial communications or a contact closure connection, MultiLink can send notifications to all computers (Computers #2-5) on a network. (These computers must be running MultiLink.) With a MultiLink Network Shutdown License on Computer #1, MultiLink can send notifications to those computers when needed.

Figure 2 UPS connected by cable to one computer on network

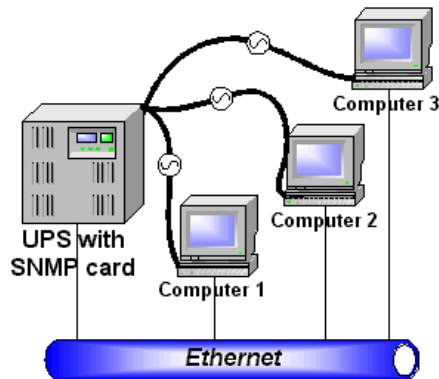


5.2 SNMP Connection

Figure 3 shows one example of a UPS with an SNMP connection. Any computer running Multi-Link can monitor the status of the UPS and send notifications to the other computers. Some SNMP cards impose a limit on the number of computers that can receive notifications.

Figure 3 UPS with SNMP card on network

This UPS is connected to computers over an Ethernet via an SNMP card.
Any computer configured as a targeted client must be running MultiLink.



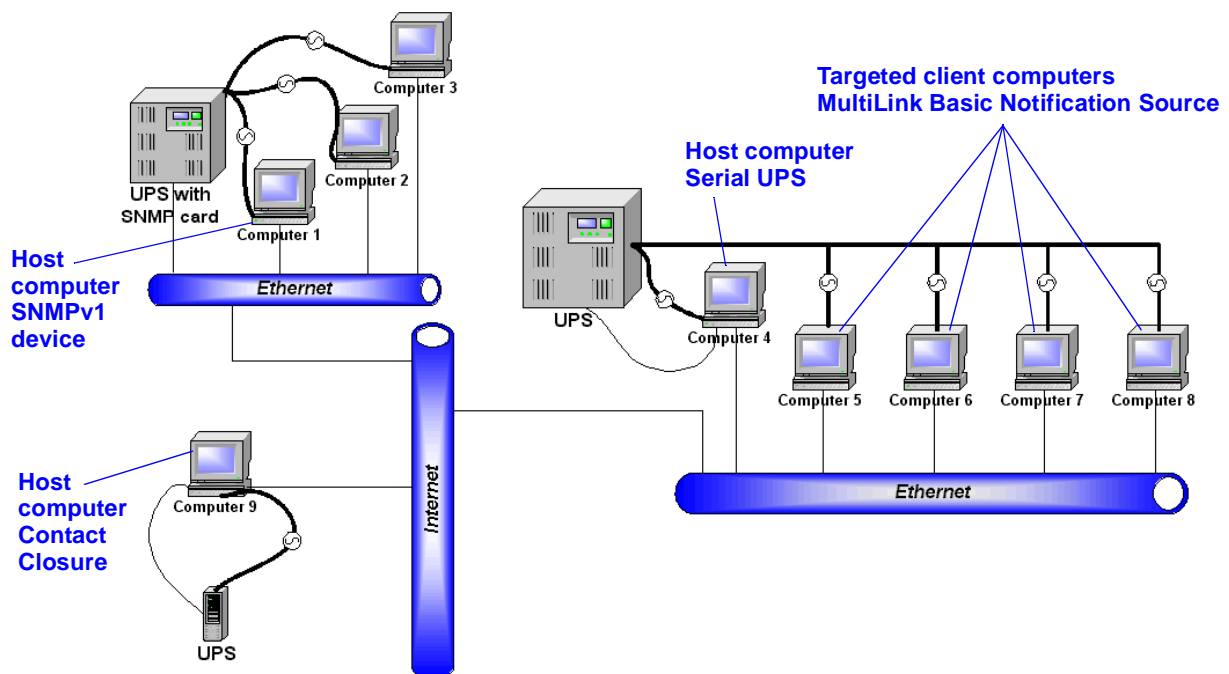
5.3 Monitoring with Multiple Types of Connections

A computer can be set up to monitor and control more than one UPS, including UPS models requiring different types of connections. For example, with network connections and the appropriate upgrade licenses, any computer in **Figures 1, 2** and **3** could monitor the status of any UPS on the network and send notifications to other computers, allowing them to shut down if needed.

A computer can receive alerts from only one UPS, but can monitor the status of any UPS on a network.

Figure 4 shows possible interconnections of host computers, targeted clients and UPS models with varying connections. In this figure, any computer can be configured to monitor any UPS or MultiLink installation.

Figure 4 Multiple Users - SNMP and Serial Port Connections



6.0 INSTALLING THE SOFTWARE

Follow these instructions to install MultiLink. Be sure to read any notes on upgrading or reinstalling and multiple installations, as applicable. Some steps vary according to the operating system. For information, see **Appendix A - Operating System Details** before beginning.

6.1 Before Installing MultiLink

6.1.1 Upgrading or Reinstalling MultiLink

If you wish to preserve your MultiLink configuration when upgrading or reinstalling MultiLink, simply install without removing your present MultiLink installation. Your configuration files will be incorporated into the new directory. This step varies for some operating systems; refer to **Appendix A - Operating System Details**.

6.1.2 Multiple Installations

For identical installation on multiple computers, the System Administrator may install MultiLink on one computer, configure that computer and use those settings for subsequent installation on other computers.

Identical installations require that the computers use the same operating system as the original installation and the same version of MultiLink.

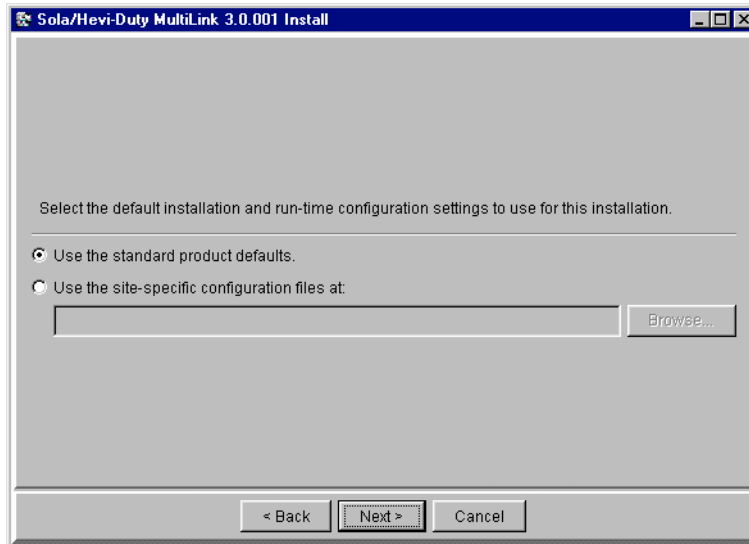
1. Install MultiLink on one computer as described in **6.2 - Beginning the Installation**, then follow these steps before subsequent installations:
 - a. Make a copy of the MultiLink distribution in a common location that is accessible to System Administrators who intend to install MultiLink on similar computers.
 - b. In that common location, create a subdirectory where you will place the configuration files from the initial installation. This new subdirectory can have any name, but using the name **site_cfg** simplifies subsequent installations by allowing automatic detection of the configuration files.
 - c. Copy the configuration files (in the **cfg** subdirectory) from the initial installation into the subdirectory created in **Step b**.
2. Proceed with the second and subsequent installations as described in **6.2 - Beginning the Installation**, starting each installation from the common location described in **Step a** above.

6.2 Beginning the Installation

- Execute the installation file. For detailed instructions, see **Appendix A - Operating System Details**.
- After viewing the Welcome screen, read the MultiLink Software License and the Java license agreements. If you do not accept the terms and conditions, cancel the installation.

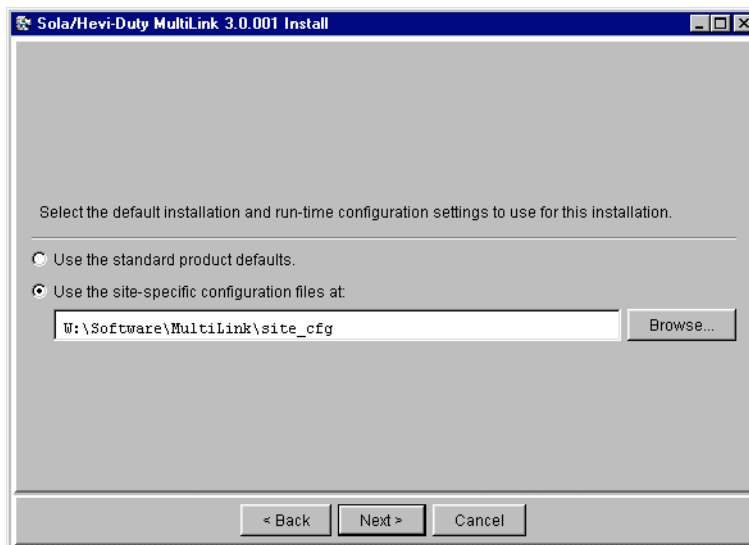
Installation on a Single Computer (or Initial Installation)

- For the initial MultiLink installation or for installation on a single computer, choose **Use the standard product defaults**, shown below. (These default settings can be altered later.)



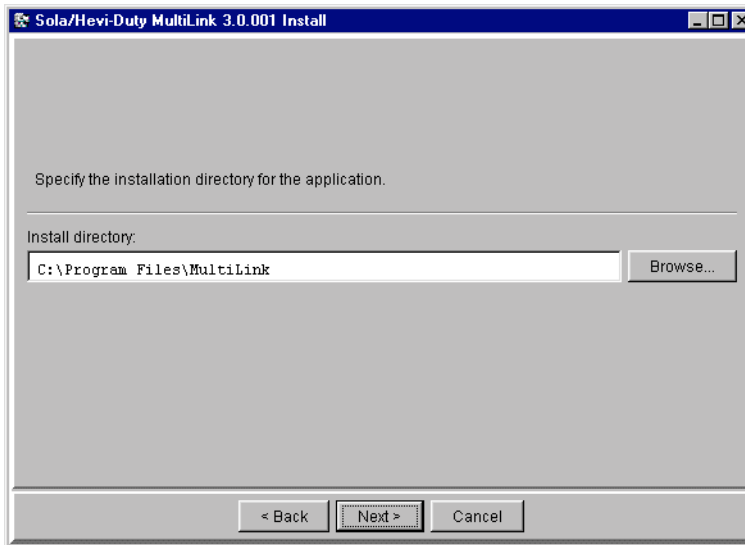
Subsequent Installations

- For subsequent installations, choose **Use the site-specific configuration files at** (subdirectory created in **Step b** in **6.1.2 - Multiple Installations**), as shown below. The text box must display the full path where the configuration files were placed—**site_cfg** or another directory as specified by the System Administrator. The subdirectory can be entered manually or it can be found by using the **Browse** button.



6.2.1 Specify Installation Directory

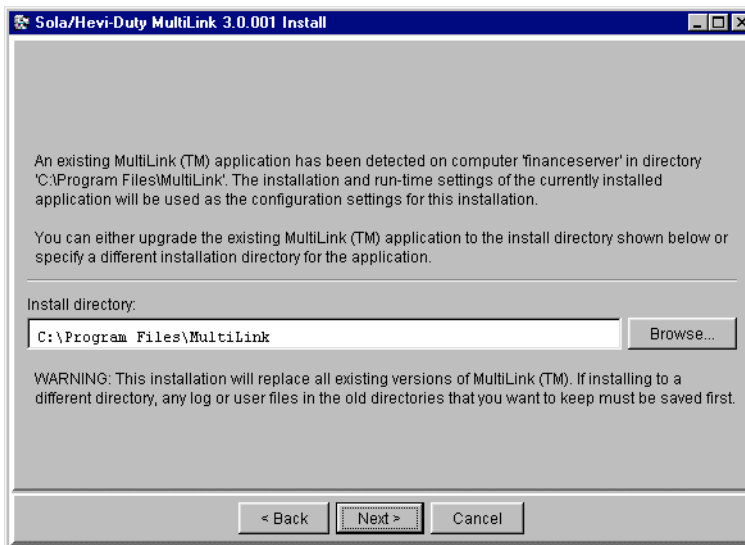
The program asks whether to install the application files in the default location—**MultiLink**—or in an alternate location. This step varies for some operating systems; refer to **Appendix A - Operating System Details**.



Upgrade or Reinstallation

- If you are upgrading or reinstalling MultiLink, the existing version is detected and MultiLink will incorporate your existing configuration files into the new installation, bypassing some steps required for an initial installation.

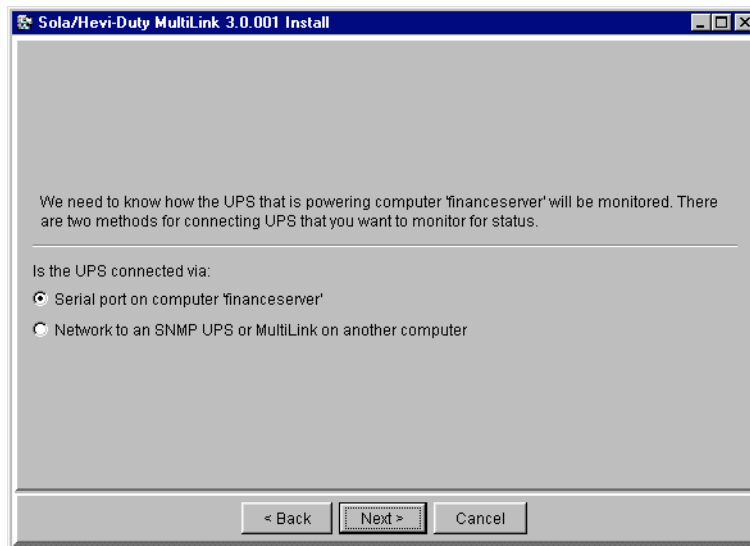
Click on the **Next** button and go to **6.2.4 - Restrict or Allow Access to Configuration Settings**.



6.2.2 Specify the Method of Monitoring the UPS

Click on the appropriate choice to designate how the UPS powering this computer will be monitored:

- **Serial port on computer [computer name]** for either a Serial UPS or Contact Closure cable connection
- **Network to an SNMP UPS or MultiLink on another computer** for a UPS equipped with an SNMP card or for a computer that will be notified by MultiLink on another computer

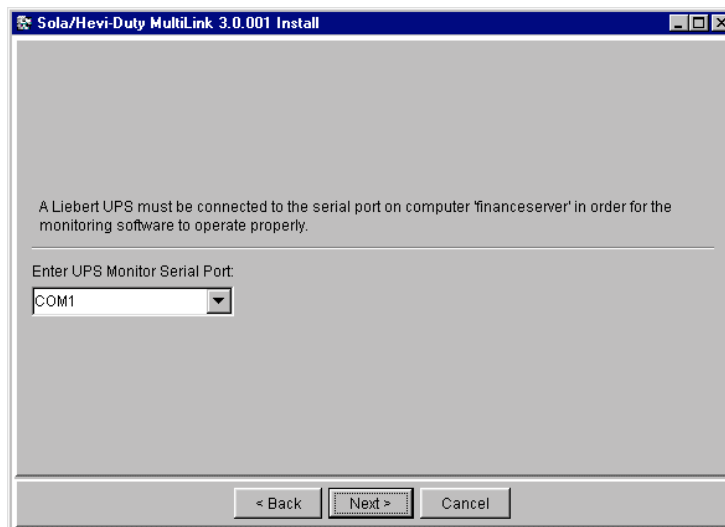


6.2.3 Select the Connection—Serial Port or Network

The next option depends on your connection method choice in **6.2.2 - Specify the Method of Monitoring the UPS**.

Serial Port Connection

If you chose **Serial port on computer [computer name]** in **6.2.2 - Specify the Method of Monitoring the UPS**, specify the serial port of the computer to which the UPS is connected by choosing from the drop-down list of ports. If the port you wish to use is not in the drop-down list, type the designation into the box.



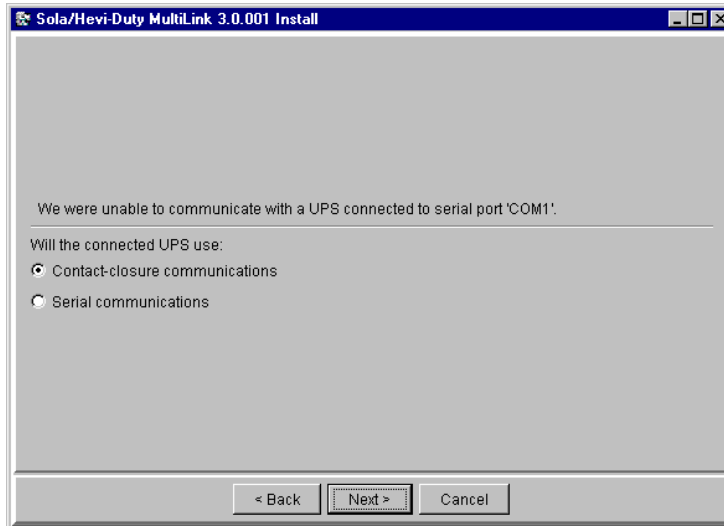
For further information, see serial port information for your operating system in **Appendix A - Operating System Details**.



NOTE

*Make sure that the specified port is a serial port on the computer, not on a terminal expander. For a Contact Closure UPS, this port must support the modem control lines shown in **Table 9** in **Appendix B - Making Your Own MultiLink UPS Cable**. For a serial connection UPS, see **Table 8**.*

If the UPS and computer are not yet linked by a cable or if the UPS uses Contact Closure connection, MultiLink will prompt you for the type of connection to be used.



Refer to **4.1 - Connecting host computer, UPS and targeted clients** before making a selection. The two types of connections are:

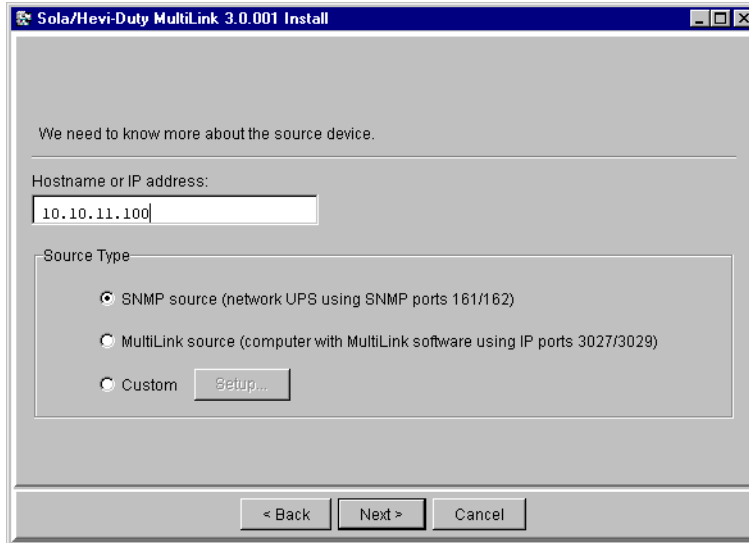
- **Contact-closure communications**—for UPS models, see **Table 1**
- **Serial communications**—for UPS models, see **Table 1**

Each type requires a custom cable. These cables can be made or purchased. To make a cable, see **Appendix B - Making Your Own MultiLink UPS Cable**. To buy a cable, see **Appendix E - Ordering Parts From Sola/Hevi-Duty**.

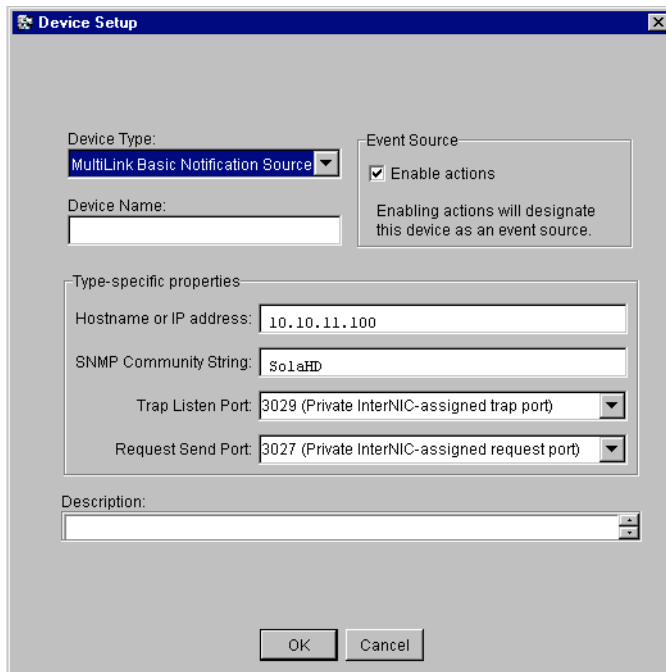
Network Connection

If you chose **Network to an SNMP UPS or MultiLink on another computer** in **6.2.2 - Specify the Method of Monitoring the UPS**, click on the appropriate **Source Type**:

- **SNMP source**—this computer uses a network to monitor a UPS equipped with an SNMP card
- **MultiLink source**—this computer uses a network to receive notifications from MultiLink on another computer
- **Custom**—this computer will be an SNMP or MultiLink source but with customized options



To choose options that are not standard, click on the **Setup** button. This opens the Device Setup window, as shown below. For details on these setup options, see **9.3.3 - Properties - Setup Tab**.

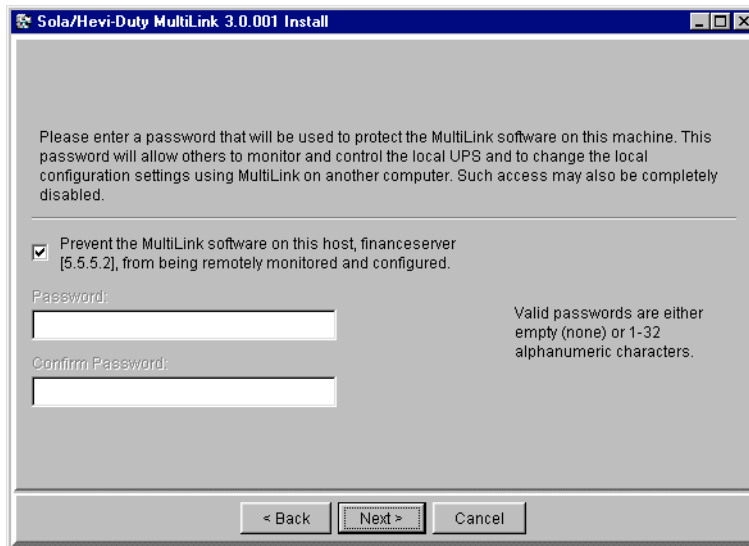


6.2.4 Restrict or Allow Access to Configuration Settings

A password can be used to protect MultiLink's configuration settings from unauthorized users. By default on most operating systems, MultiLink prevents remote monitoring and configuration.

For variations on this step, refer to **Appendix A - Operating System Details**.

- To permit remote access, remove the check mark from the **Prevent** box shown below.
- Enter up to 32 alphanumeric characters in the **Password** box.
- Type the same password in the **Confirm Password** box.



6.3 Reviewing Settings and Installing the Software

Review the **Install Summary**.

- If the setup configuration is acceptable, click **Install**.
- To alter any settings, click the **Back** button and make the desired changes. Then click **Install**.

A dialog box displays the progress of the installation process, which may take a few minutes.

6.4 Checking Permissions for Multiple Users, if Needed

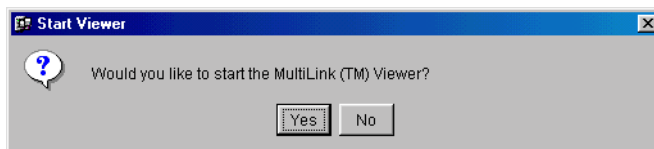
If there are multiple users of the system on which MultiLink is being installed, the System Administrator should check the permissions on the installed files and modify the permissions as desired. The default permissions may not be appropriate.

The MultiLink Viewer requires full read/write access to the MultiLink directories and certain files within. It requires administrator (root) privileges to perform functions that start or restart the MultiLink service.

6.5 Starting the MultiLink Viewer

After installation, MultiLink asks whether you want to open the MultiLink Viewer. The Viewer shows the status of the UPS and allows you to modify configuration settings. (For details on configuring MultiLink, see **9.0 - Configuring MultiLink for Your System**.)

- To open the Viewer now, click **Yes** in the dialog box.



7.0 OVERVIEW - MULTILINK VIEWER

This section summarizes the features available with various connections, the functions accessible through the MultiLink Viewer tabs and menus, along with MultiLink notifications and informational icons displayed in the Viewer and in pop-up notifications.

The MultiLink Viewer has these main functions:

- Navigation to a device of interest
- Display of summary status for all devices
- Display of parametric data from a selected device
- Configuration of UPS-related events to send notifications and shutdown messages and to launch scripts
- Testing of event configuration through simulation of an event
- Display of event logs from a selected device

Step-by-step instructions on using these functions are in **8.0 - Viewing UPS Status** and **9.0 - Configuring MultiLink for Your System**.

7.1 MultiLink Features

The type of connection—Serial UPS, SNMP, Contact Closure or MultiLink Basic Notification Source—determines the features available in MultiLink as shown in **Table 2**.

Whether a function is available depends on the type of UPS and the connection between the UPS and the local host (see **4.1 - Connecting host computer, UPS and targeted clients**).

Table 2 Features Available by Connection Type

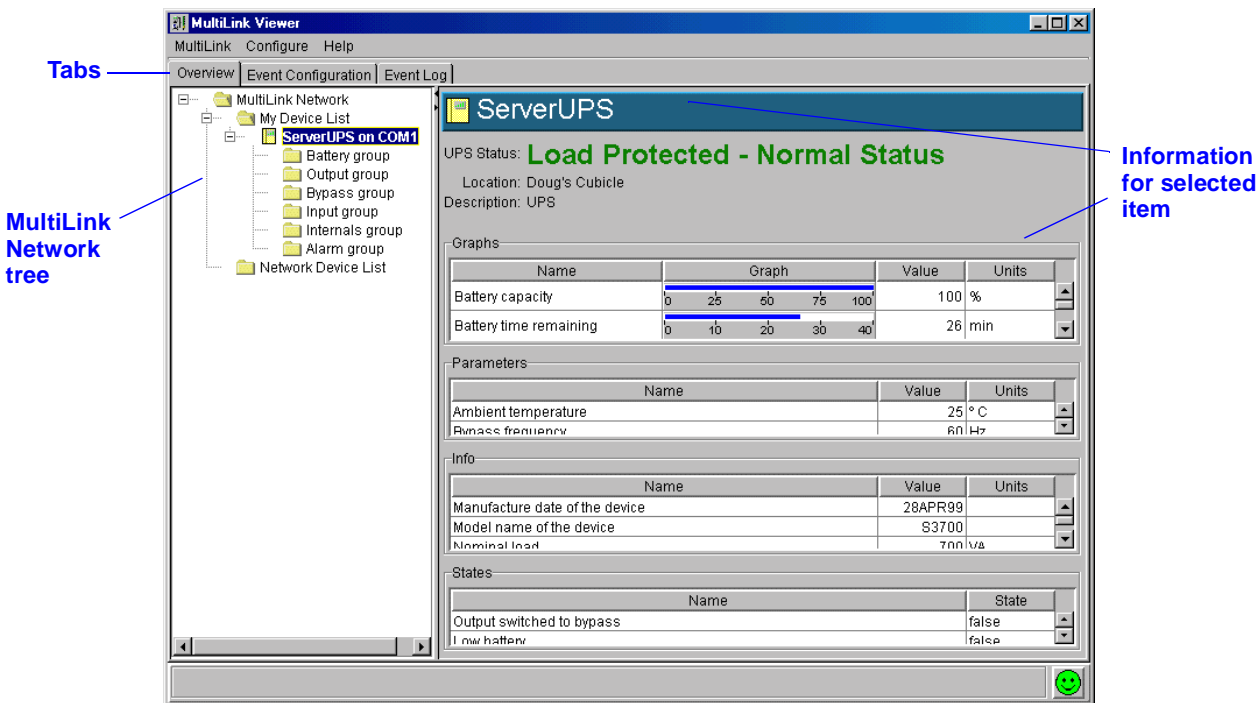
Category	Feature	Local		Network	
		Contact Closure	Serial UPS	MultiLink Basic Notification Source	SNMP
Overview Data (Overview tab with UPS selected)	Graphs	No	✓	No	✓
	Parameters	No	✓	No	✓
	Info	No	✓	No	✓
	States	✓	✓	✓	✓
Data Categories (Overview tab with UPS selected and expanded)	Battery Group	No	✓	No	✓
	Output Group	No	✓	No	✓
	Bypass Group	No	✓	No	✓
	Input Group	No	✓	No	✓
	Internals Group	No	✓	No	✓
	Alarm Group	No	✓	No	✓
UPS Control (Overview tab right-click on UPS for pop-up menu)	Diagnostics—Test Battery	No	✓	No	✓
	Output Control—Turn UPS Output Off/On	*	✓	No	✓
	UPS Audible Alarm—Silence	No	✓	No	✓
UPS Events (Event Configuration tab with UPS selected)	UPS Operating On Battery	✓	✓	✓	✓
	Low Battery	✓	✓	✓	✓
	UPS Output Returned From Battery	✓	✓	✓	✓
	Other Events	None	All (see Table 11)	None	All (see Table 11)
Event Actions (Event Configuration tab with UPS selected)	Notify	✓	✓	✓	✓
	E-mail	✓	✓	✓	✓
	Page	✓	✓	✓	✓
	Shutdown	✓	✓	✓	✓
	Command	✓	✓	✓	✓
	Log	✓	✓	✓	✓
	Silence Alarm	No	✓	No	✓
Monitoring Device Events (Event Configuration tab with My Event Actions [or monitoring device] selected)	System Shutdown Commencing	✓	✓	✓	✓
	UPS Monitor Software Started	✓	✓	✓	✓
	UPS Monitor Software Stopped	✓	✓	✓	✓

* Some but not all Sola/Hevi-Duty UPS units support Turn UPS Output Off with Contact Closure connection.

7.2 Viewer Tabs

The Viewer window has two parts. The left side displays the MultiLink network as a navigation tree, and the right side shows information about any selected item in the tree.

The Viewer's three tabs—**Overview**, **Event Configuration** and **Event Log**—provide different views of the tree at left. The information at right varies according to the item in the tree that is selected.



The **Overview** tab has two functions: to view the UPS status and to configure the UPS.

The **Event Configuration** tab allows you to set up responses to individual events and test configuration by simulating an event.

The **Event Log** tab displays a list of the most recent UPS events. **Table 3** shows where to find detailed information about each of the Viewer's tabs.

Table 3 Viewer Tabs - Summary

Tab	Function	For a detailed description, see:
Overview	View the status of the UPS	8.1 - Checking UPS Status—Overview Tab
	Configure the MultiLink network	9.3 - Configuring the UPS Properties—Overview Tab
Event Configuration	Configure responses to UPS-related events	9.5 - Configuring—Event Configuration tab
	Test responses to UPS-related events	9.6 - Testing Responses to Events
Event Log	View the log of UPS-related events	8.2 - Checking UPS Status—Event Log Tab

7.3 Viewer Menus

The Viewer also has functions available from three menus: **MultiLink**, **Configure** and **Help**. Each menu has a drop-down list of options that apply to all device components and events.

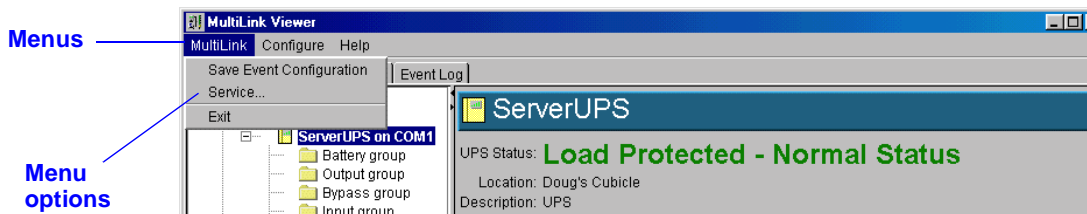


Table 4 summarizes the options available in the Viewer menus and shows where to learn more about each.

Table 4 Viewer Menu Options - Summary

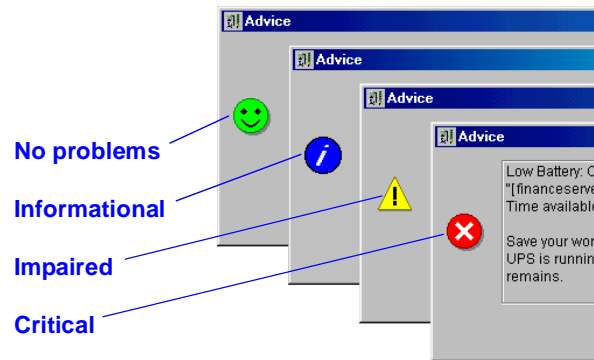
Menu	Option	Function	For more information, see:
MultiLink	Save Event Configuration	Save changes to Event Actions	9.1.1 - MultiLink Menu - Save Event Configuration
	Service	Start & stop MultiLink service	9.1.2 - MultiLink Menu - Service and 10.1 - Starting or Stopping MultiLink Service
	Exit	Quit the MultiLink Viewer	9.1.3 - MultiLink Menu - Exit
Configure	Edit My Device List	Add, delete or alter the configuration of a UPS	9.4.3 - Configure Menu - Edit My Device List
	Edit Network Device List	Add, delete or alter another MultiLink installation	9.4.4 - Configure Menu - Edit Network Device List
	Modem	Set up the modem	9.4.5 - Configure Menu - Modem
	Local Password	Set password for access from another MultiLink installation	9.4.6 - Configure Menu - Local Password
	Upgrade License	Install an upgrade license	9.4.7 - Configure Menu - Upgrade License
Help	About	Check MultiLink version	—

7.4 Notifications

When MultiLink is running, various types of notifications may appear as pop-up or console messages or may be sent as e-mail or pager messages to selected users. The timing, content and recipients of these notifications are specified for each UPS-related event during configuration, as described in **9.5 - Configuring—Event Configuration tab**.

7.5 Status Icons

MultiLink employs graphics to illustrate the status of configured devices, including whether they are operating normally or experiencing any alarms. The icons shown below appear in pop-up notifications and in the MultiLink Viewer:



8.0 VIEWING UPS STATUS

This section describes how to use the MultiLink Viewer to check the status of any UPS configured for monitoring and check the log of UPS-related events. Available functions differ according to the type of UPS and the type of connection between the UPS and the monitoring device (see **4.1 - Connecting host computer, UPS and targeted clients**).

The Viewer offers a quick summary of the status of the UPS:

- Informational symbols and text indicate the presence of any alarms.
- Graphs and parametric data illustrate the state of a variety of UPS components (not available with Contact Closure connection).
- An event log lists recent events, actions and similar data about the UPS, including its condition.

Two of the Viewer's three tabs provide viewing functions: The **Overview** tab shows the status of the UPS and the **Event Log** displays recent UPS-related events.

Table 5 Viewer Tabs - Checking the UPS Status and Event Log

Tab	Function	For information see:
Overview	View the status of devices monitored by MultiLink	8.1 - Checking UPS Status—Overview Tab
Event Log	View log files of UPS-related events	8.2 - Checking UPS Status—Event Log Tab

8.1 Checking UPS Status—Overview Tab

The **Overview** tab provides a variety of detailed, graphic views of the status of the UPS.

For instructions on opening the MultiLink Viewer, see the information for your platform in **Appendix A - Operating System Details**.

- To view the status of the UPS, click on the **Overview** tab.

The screenshot shows the MultiLink Viewer interface. On the left is a tree view with folders like 'MultiLink Network', 'My Device List', and 'ServerUPS on COM1'. The main area shows 'ServerUPS' status: 'Load On Battery - 27 Minutes Remaining'. Below this are graphs for 'Battery capacity' (96%) and 'Battery time remaining' (27 min). A 'Parameters' table shows ambient temperature (25 °C) and bypass frequency (0 Hz). An 'Info' table shows manufacture date (28APR99), model name (S3700), and nominal load (700 VA). A 'States' table shows 'Output switched to bypass' and 'Low battery' as false. A yellow warning icon is in the bottom right corner.

Name	Graph	Value	Units
Battery capacity		96	%
Battery time remaining		27	min
Output load		21	%

Name	Value	Units
Ambient temperature	25	° C
Bypass frequency	0	Hz

Name	Value	Units
Manufacture date of the device	28APR99	
Model name of the device	S3700	
Nominal load	700	VA

Name	State
Output switched to bypass	false
Low battery	false

In the example above, the left side of the window shows the **MultiLink Network** tree with either an SNMP or serial connection. Limited group information is available with a Contact Closure connection.

To expand or collapse a folder, click on the symbol to the left of the folder icon.

The lower right corner of the Viewer displays the icon representing the most serious condition existing in the tree. Except when conditions are normal for all monitored devices, the top of the tree also displays the icon denoting the most serious condition. When the navigation tree is expanded, MultiLink displays the icon at each level (see **7.5 - Status Icons** for a legend to interpret the icons).

- To view graphs and parametric data, click on an item in the left side of the window; the associated data appears on the right. It may take a few moments for MultiLink to collect the data. These views do not apply to Contact Closure connections.

The screenshot shows the MultiLink Viewer application window. The left pane displays a tree view of the MultiLink Network, with the 'Battery group' selected under 'ServerUPS on COM1'. The right pane displays the configuration and data for the selected 'Battery group'. The data is organized into several sections: Graphs, Parameters, Info, and States.

Graphs

Name	Graph	Value	Units
Battery capacity		91	%
Battery time remaining		25	min
Battery voltage		28	V

Parameters

Name	Value	Units
Automatic battery test	Enabled	
Low battery warning setting	2	min
Status of the current/last device battery test	Passed	
Nominal battery voltage	28	V

Info

Name	Value	Units
Automatic battery test	Enabled	
Low battery warning setting	2	min
Status of the current/last device battery test	Passed	
Nominal battery voltage	28	V

States

Name	State
Battery test in progress	false
Battery is fully charged	true
Low battery	false

Annotations in the image include:

- Select item in tree**: Points to the 'Battery group' in the left tree view.
- MultiLink menu (to exit)**: Points to the 'MultiLink' menu item in the top menu bar.
- View data for selected item**: Points to the main data display area on the right.
- Graphs**: Points to the 'Graphs' section of the data display.
- Parametric data**: Points to the 'Parameters' section of the data display.
- Other info**: Points to the 'Info' section of the data display.
- States**: Points to the 'States' section of the data display.

This example shows information for the Battery group, the item selected in the tree at left. Each portion of the **MultiLink Network** tree displays similar data.

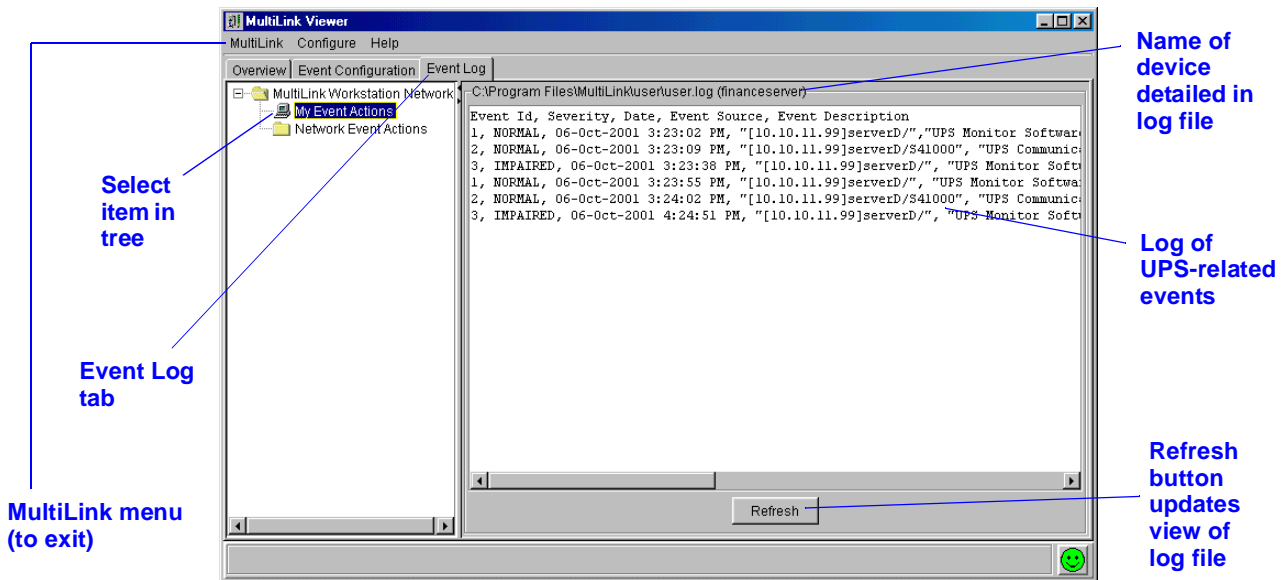
- To close the MultiLink Viewer, click on **MultiLink**, then on **Exit**.

8.2 Checking UPS Status—Event Log Tab

The Event Log tab allows you to view the log file, which contains a list of UPS-related events. The log file is a comma-delimited file (values are separated by commas). Events are listed in order of time of occurrence; new events are added at the end of the log file.

For instructions on opening the MultiLink Viewer, see the information for your platform in **Appendix A - Operating System Details**.

- Click on the **Event Log** tab to view a list of UPS-related events. If needed, click on the icon to the left of the MultiLink network to expand the view.
- Click on an item in the tree at left, as shown below. At right, the log displays UPS-related events—with time of occurrence and devices involved.



- Clicking on **My Event Actions** displays a log of events from the device designated as your event source. Logs of events pertaining to other MultiLink installations are available under the **Network Event Actions** portion of the tree.
- To close the MultiLink Viewer, click on **MultiLink**, then on **Exit**.

9.0 CONFIGURING MULTILINK FOR YOUR SYSTEM

The MultiLink Viewer offers powerful options for configuring how MultiLink responds to UPS-related events and notifies computer users of events and pending actions, such as an operating system shutdown.

This section details the following functions available through the Viewer to customize MultiLink's features for your system.

Table 6 Viewer Menu and Tab Options - Configuring the Software

Function	Access Method	For information, see:
Save changes to event actions	MultiLink menu	9.1.1 - MultiLink Menu - Save Event Configuration
Start or stop MultiLink service		9.1.2 - MultiLink Menu - Service
Exit the Viewer		9.1.3 - MultiLink Menu - Exit
Rename a UPS	Right-click on UPS for Properties (Overview tab)	9.2 - Renaming a UPS
Test battery; turn UPS output on or off; temporarily silence an alarm	Right-click on UPS for UPS Control (Overview tab)	9.3.2 - Review the UPS Control Options
Enable alerts; change UPS connection type or communication ports; change status polling rate	Right-click on UPS for Properties (Overview tab)	9.3.3 - Properties - Setup Tab
Change UPS settings: enable audible alarm, battery testing and auto restart		9.3.4 - Properties - UPS Settings Tab
Add MultiLink Network Shutdown Clients		9.3.5 - Properties - Clients Tab
Configure data logging features		9.3.6 - Properties - Data Logging Tab
Add a local UPS	Configure menu	9.4.3 - Configure Menu - Edit My Device List
Add a network MultiLink installation		9.4.4 - Configure Menu - Edit Network Device List
Enable and configure modem		9.4.5 - Configure Menu - Modem
Change password or permission for remote configuration		9.4.6 - Configure Menu - Local Password
Install an upgrade license		9.4.7 - Configure Menu - Upgrade License
Set up responses to UPS-related events	Event Configuration tab	9.5 - Configuring—Event Configuration tab
Simulate a UPS-related event to test configuration	Right-click on event for Test Event (Event Configuration tab)	9.6 - Testing Responses to Events
Temporarily disable a UPS-related event	Right-click on event for Disable (Event Configuration tab)	9.7 - Disabling an Event
Temporarily disable an event Action	Right-click on Action for Disable (Event Configuration tab)	9.8 - Disabling an Action

(Each section of this chapter begins with opening the MultiLink Viewer. For instructions on opening the Viewer, see the information for your platform in **Appendix A - Operating System Details**.)

9.1 Using MultiLink Menu Items

9.1.1 MultiLink Menu - Save Event Configuration

Changes to Event Actions must be saved before they will take effect. To do this:

- Click on **MultiLink**, then on **Save Event Configuration**. If you try to exit the Viewer before saving Event Actions changes, MultiLink will prompt you to do so.

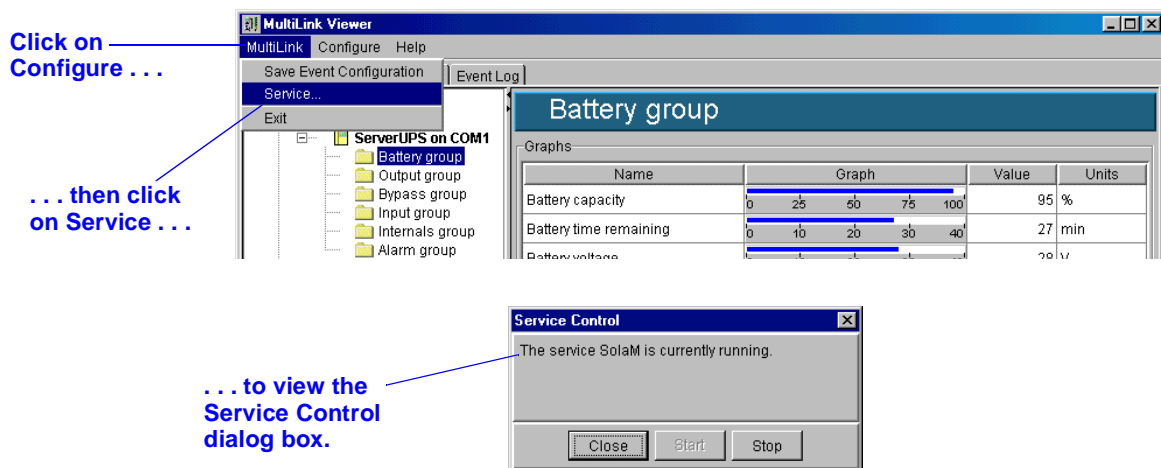
9.1.2 MultiLink Menu - Service

The **Service** menu item allows the System Administrator to verify that the MultiLink service (daemon) is running or to start or stop the MultiLink service.

Under normal circumstances, you will not need to start or stop the MultiLink service manually. Stopping the service means that the software is unable to protect your computer network and data during a power failure. See **10.1 - Starting or Stopping MultiLink Service** for details.

If you wish to verify that MultiLink is running:

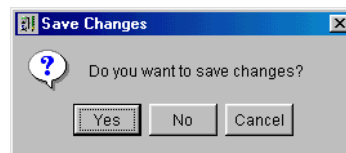
- Click on **MultiLink**, then on **Service**. The **Service Control** window states whether MultiLink is running.
- Click on **Close** to close the window.



9.1.3 MultiLink Menu - Exit

- To close the Viewer, click on **MultiLink**, then on **Exit**. This closes the Viewer, but does not stop MultiLink's monitoring process; this continues running in the background.

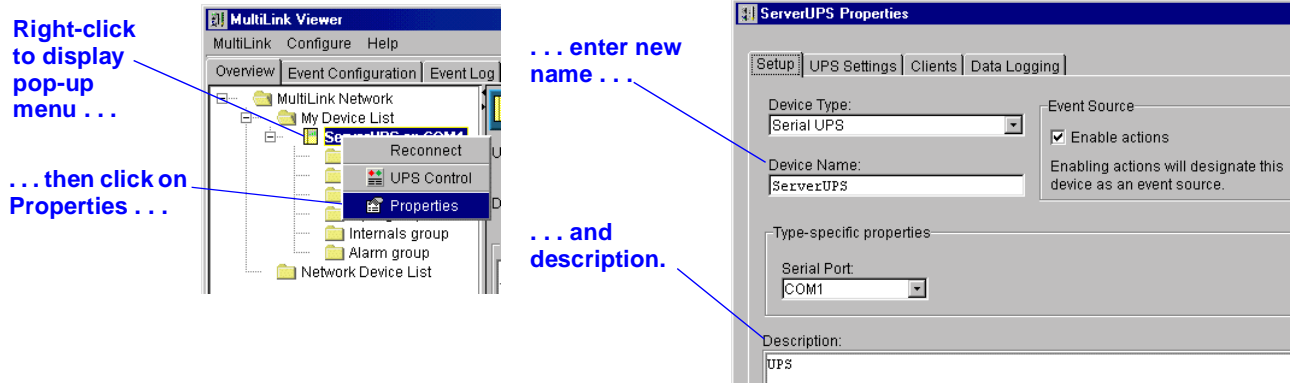
If you have made any changes to MultiLink's Event Actions that have not been saved, MultiLink will prompt you to save the changes.



9.2 Renaming a UPS

A UPS can be renamed, assisting in troubleshooting when there is more than one UPS on the network.

- Click on the **Overview** tab.
- On the left side of the window, right-click on the UPS to be renamed and choose **Properties** from the pop-up menu.
- Click on the **Setup** tab and enter a descriptive name in the **Device Name** box.
- In the **Description** field, enter any notes about the UPS, such as its location, model and similar information.



For more information on the **Setup** tab in the Properties window, see **9.3.3 - Properties - Setup Tab**.

9.3 Configuring the UPS Properties—Overview Tab

The **Overview** tab allows the System Administrator to set up the configuration of the UPS. In the **Overview** tab, using a right-click on the UPS gives access to a pop-up menu with two items:

- Reconnect
- UPS Control
- Properties: Setup, UPS Properties, Clients and Data Logging

9.3.1 Using the Reconnect Function

If the MultiLink password for a **Network Device** has changed, the **Reconnect** function opens a dialog box permitting the user to attempt to log in with the new password.

To use this function:

- Click on the **Overview** tab.
- Right-click on one of the computers listed in the **Network Device List** to open a pop-up menu, then click on **Reconnect**.

MultiLink immediately checks the status of the selected device.

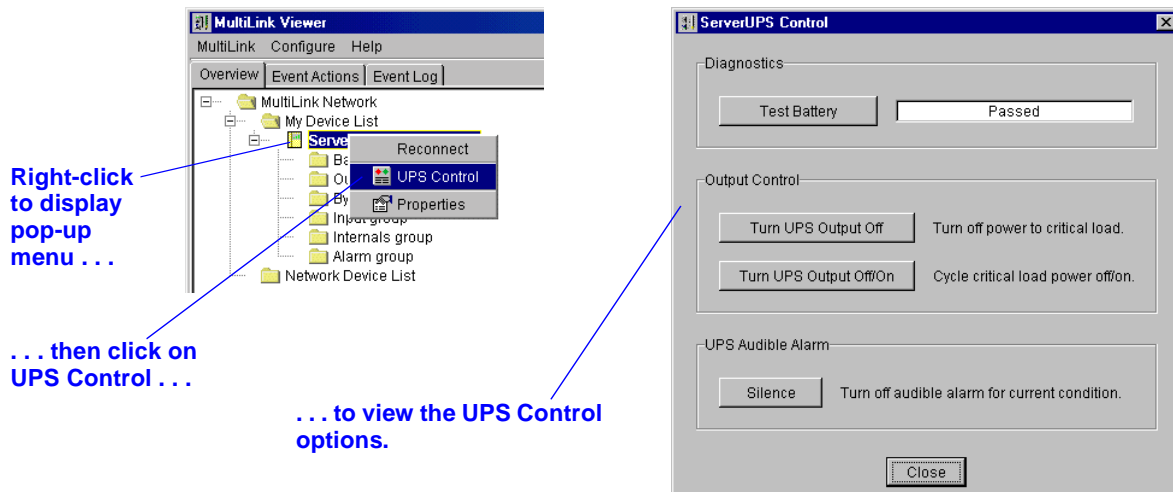
9.3.2 Review the UPS Control Options

For Serial UPS and SNMP communications, MultiLink permits the System Administrator to perform the following UPS control functions:

- Test the UPS battery
- Turn the UPS output off
- Briefly turn the UPS output off and then restore power to the output
- Temporarily silence a UPS alarm

To view the UPS Control options:

- Click on the **Overview** tab.
- Right-click on the UPS device name to open a pop-up menu, then click on **UPS Control**.
- This opens the **UPS Control** dialog box, as shown below.



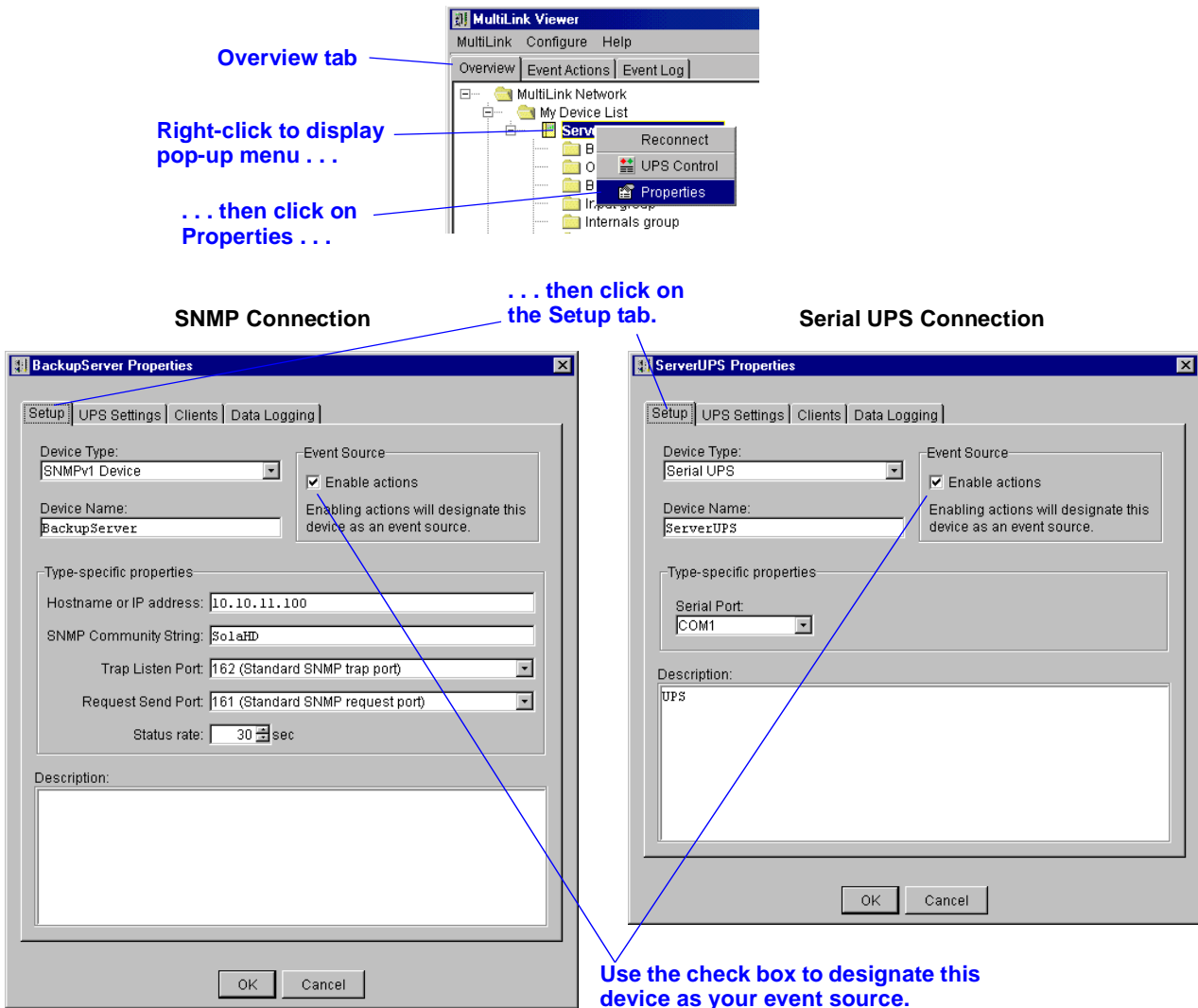
For details on using the UPS Control options, see **10.2 - Using the UPS Control Options—SNMP and Serial Connection**.

UPS models requiring Contact Closure connections offer only one option: **Turn UPS Output Off**. For further information, see **10.3 - Using the UPS Control—Contact Closure**.

9.3.3 Properties - Setup Tab

The **Setup** tab allows you to configure MultiLink to change the device type, rename the UPS, change the serial or SNMP port selection, designate the event source and enter a description of the UPS.

- Click on the **Overview** tab.
- In the left side of the window, right-click on the UPS and choose **Properties** from the pop-up menu. For Serial UPS and SNMP communications, the **Properties** box has four tabs: **Setup**, **UPS Settings**, **Clients** and **Data Logging**. A Contact Closure connection has only the **Setup** and **Clients** tabs.
- Click on the **Setup** tab.



- The **Device Type** box should correctly display the type of device with which the computer is to communicate:
 - Contact Closure**—for example, Computer #9 in **Figure 4**
 - Serial UPS**—for example, Computer #4 in **Figure 4**
 - SNMPv1 Device**—for example, Computer #3 in **Figure 4**
 - MultiLink Basic Notification Source**—for example, Computers #5-8 in **Figure 4**Refer to **4.1 - Connecting host computer, UPS and targeted clients**. MultiLink determines the type of connection during installation by sensing the type of UPS and cable connected to the computer.
- The **Device Name** box displays a name for the UPS. This name can be changed by entering a new name in the box.

-
- The **Enable Actions** check box allows you to designate which UPS in the **My Device List** subfolder is to act as the source of events for the host computer. There can be only one event source for each MultiLink installation. For details, see **9.4.2 - MultiLink Event Source**.

The **Type-specific properties** options relate to communications between the UPS and the host computer. These properties vary by connection type; values are automatically detected by MultiLink. The defaults are correct for most installations, but some may be altered if necessary.

SNMP connections

For SNMP connections, you will see these **Type-specific properties**:

- **Hostname or IP address**—identifies the UPS
- **SNMP Community String**—the default is **SolaHD** (case-sensitive)
- **Trap Listen Port**—usually port **162 (Standard SNMP trap port)** for communicating events (traps) because of SNMP card requirements
- **Request Send Port**—usually port **161 (Standard SNMP request port)** for communicating status (gets) because of SNMP card requirements
- **Status Rate**—Determines how often MultiLink checks the condition of the UPS.

MultiLink Basic Notification Source

For MultiLink Basic Notification Source connections, you will see these **Type-specific properties**:

- **Hostname or IP address**—identifies another computer (that is running MultiLink version 3) acting as a “virtual UPS.” The computer that is acting as the virtual UPS (i.e., the MultiLink Basic Notification Source) must be running MultiLink version 3. If you intend to use the MultiLink Basic Notification Source as your event source, MultiLink (on the virtual UPS computer) must include your IP address in its list of client targets and have the MultiLink Network Shutdown License installed.
- **SNMP Community String**—the default is **SolaHD** (case-sensitive)
- **Trap Listen Port**—usually port **3029 (Private InterNIC-assigned trap port)** for communicating events (traps)
- **Request Send Port**—usually port **3027 (Private InterNIC-assigned request port)** for communicating status (gets)

Serial UPS and Contact Closure

For Serial UPS and Contact Closure, the **Type-specific properties** box has only one option:

- The **Serial Port** box displays the port selected during installation. If it is no longer valid, select a different port by clicking on your choice. You may also enter the name of the port manually. For further information on serial ports, see **Appendix A - Operating System Details**.

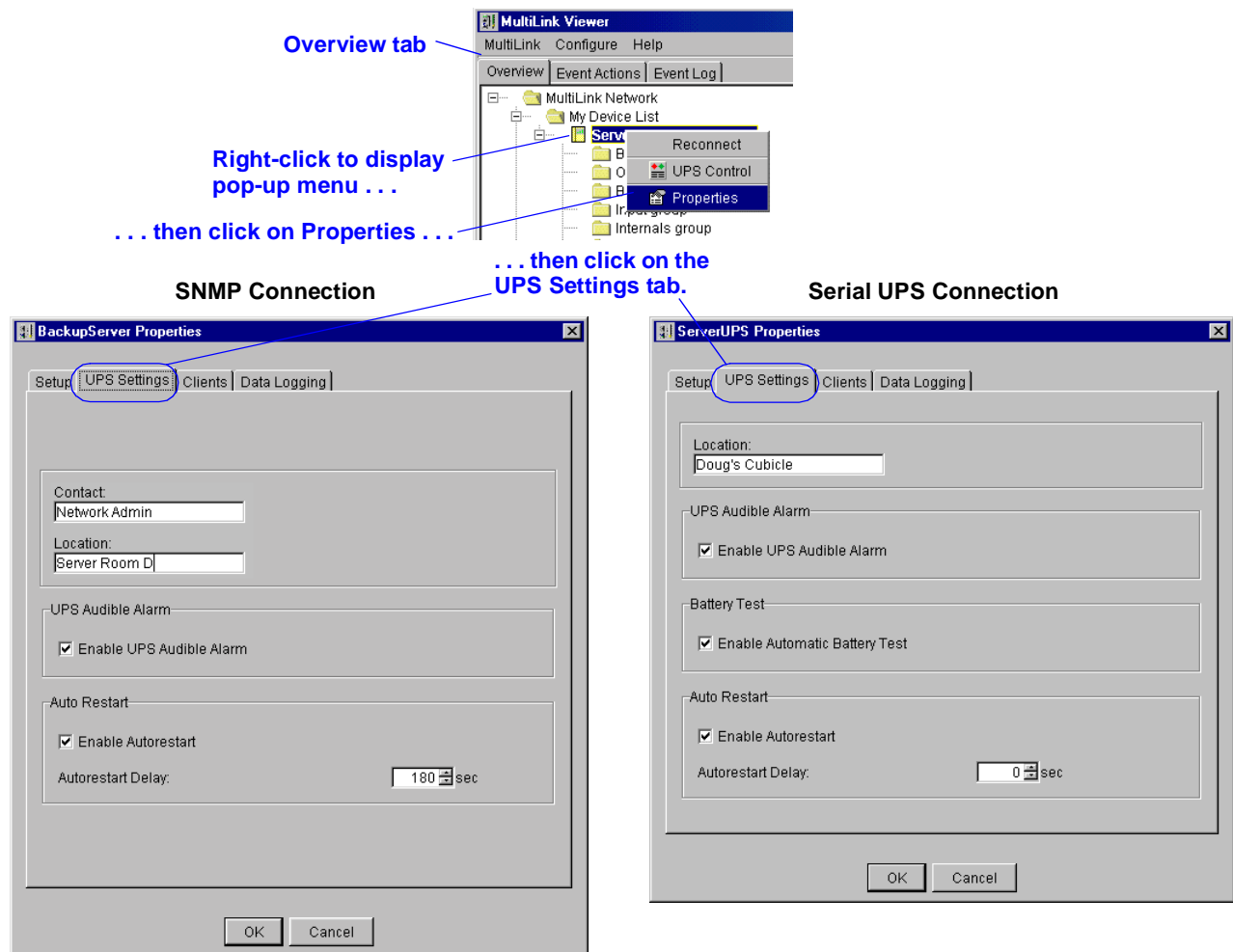
All connection types

- In the **Description** box, enter a short identifier for the UPS being monitored by MultiLink. This optional field is helpful if the user has more than one UPS. For example, “Finance Server” might be used for the UPS powering the finance department’s server.
- When finished, click on the **OK** button to accept the changes. To close the window without saving changes, click on **Cancel**.

9.3.4 Properties - UPS Settings Tab

The **UPS Settings** tab allows the user to configure certain features of the UPS. For all connection methods, you can record the location of the UPS and enable or disable the UPS audible alarm and automatic restart of the UPS when utility power returns after a power failure. An SNMP connection allows specification of a contact person for UPS-related events. A Serial UPS connection permits an automatic battery test.

- Click on the **Overview** tab.
- In the left side of the window, right-click on the UPS and choose **Properties** from the pop-up menu.
- Click on the **UPS Settings** tab (not available with Contact Closure or MultiLink Basic Notification Source).



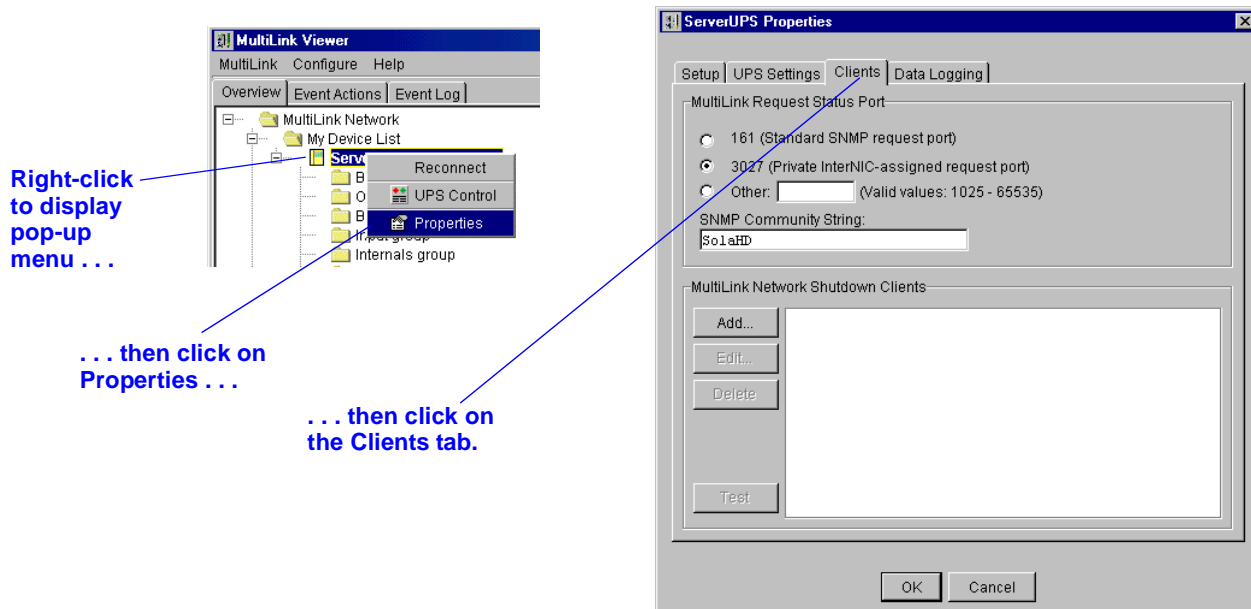
- In the **Contact** box (SNMP connection), enter the name of the person who should be contacted about issues involving this UPS.
- In the **Location** box, enter the physical location of the UPS, for example, “George’s cubicle.” This optional field is helpful if the user has more than one UPS.
- (Certain UPS models only) To allow activation of an alarm when a UPS-related event occurs, click in the **Enable UPS Audible Alarm** box. To deactivate the alarm, clear the check box. This operation prevents the UPS from sounding an audible alarm for any condition. To silence the alarm while an event is occurring, see **10.2.3 - UPS Audible Alarm—Silencing Alarm**.
- (Certain UPS models only) To perform periodic battery tests (Serial UPS), click in the **Enable Automatic Battery Test** box. To disable automatic testing, clear the check box.
- (Certain UPS models only) To automatically restart the UPS after utility power is restored following a loss of input power, place a check mark in the **Enable Autorestart** check box, then specify the desired time delay in the **Autorestart Delay** box. To disable automatic restarting, clear the check box.

9.3.5 Properties - Clients Tab

The **Clients** tab allows you to designate computers that will receive notification of UPS-related events, such as Low Battery. Before doing so, you must first obtain a MultiLink Network Shutdown License for the appropriate number of clients and install the license on the host computer (see **9.4.7 - Configure Menu - Upgrade License**).

Each targeted client must be running MultiLink 3.x or 1.x. For MultiLink 3.x clients, choose the connection type **MultiLink Basic Notification Source** during setup (see **4.1 - Connecting host computer, UPS and targeted clients** and **9.3.3 - Properties - Setup Tab**).

- Click on the **Overview** tab.
- Right-click on the UPS device name to open a pop-up menu, then click on **Properties**.
- In the Properties window, click on the **Clients** tab.

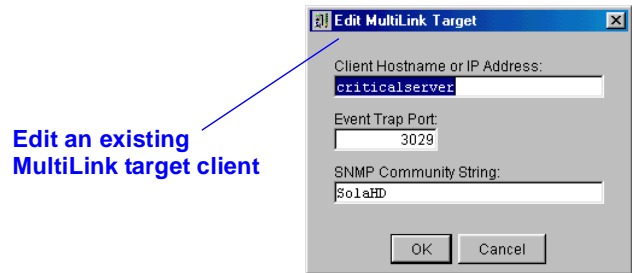
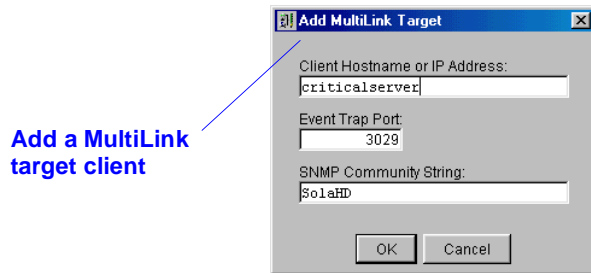


The values in the **MultiLink Request Status Port** box relate to communications between the host computer and targeted client computers.

- The default port, 3027, is correct for most applications. Contact Technical Support for assistance.
Ensure that all **MultiLink Network Shutdown Clients** are configured to request status from the host computer on the port specified in the **MultiLink Request Status Port** box. The host computer must be running MultiLink 3.x and all clients must be running MultiLink 3.x or 1.x.
- Check to make sure the entry in the **SNMP Community String** box matches that in your other systems. The default is **SolaHD** (case-sensitive).

The lower portion of the window, **MultiLink Network Shutdown Clients**, allows you to set up targeted clients to receive notification of UPS-related events.

- Click on **Add** to enter a new MultiLink client.
- To make changes to an existing MultiLink client, click on the client, then on **Edit**.

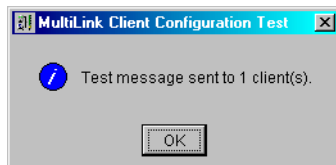


- The targeted client's Hostname or IP address must be correctly entered in the **Client Hostname or IP Address** box.
- Each client must have MultiLink 3.x or 1.x installed and must be configured to listen for traps on the port that is configured in the **Event Trap Port** box.
- Check to make sure the entry in the **SNMP Community String** box matches that in your other systems. The default is **SolaHD** (case-sensitive).
- To remove a client from the list, click on the client, then on **Delete**. MultiLink will not ask for confirmation before deleting the selected client. Click on **Cancel** to close the window without saving the changes.

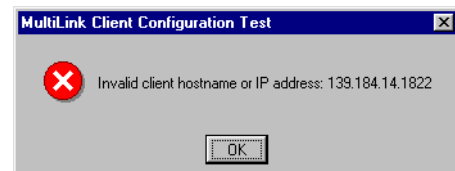
Send a test message to clients

Sending test messages can help determine whether targeted clients are properly set up to receive notifications of UPS-related events. To do so:

- Click on the **Overview** tab, right-click on the UPS device name, click on **Properties**, then on the **Clients** tab.
- Select one or more clients from the **MultiLink Network Shutdown Clients** list and click on the **Test** button. This causes MultiLink to send a test message to each targeted client computer selected.
- To verify that test messages were sent and received, check both the host computer and client computers as follows:
 - a. The host computer will display one of the two messages shown below. If any test messages are sent, a verification similar to the one at left below appears on the computer running MultiLink, showing the total number of test messages that were sent. This is not an indication that the clients received the messages. (For Novell, the verification message is displayed only if the Viewer is running on the server.)



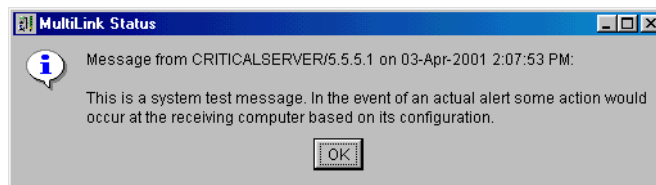
Test message successfully sent



Error message

If any messages are not sent, an error message will appear on the host computer. The error message, above right, indicates a conflict between the entry in **Client Hostname or IP Address** box and the client's actual identity. The selected computer probably is not configured in the Domain Name Service. If it is configured with its associated reverse lookup entry, there might be a problem accessing the name service. Try to ping the name server and correct any problems there. If no problems are found at the server, check the configuration at the client end.

- b. Check all targeted client computers to verify that each received a test message similar to the one shown below.



This message should appear within five seconds of being sent. If it does not, compare the time it is displayed with the time on the message. If the lapse is more than 10 seconds, there is a local name service problem. If the message is received within five seconds, the local name service configuration is correct.

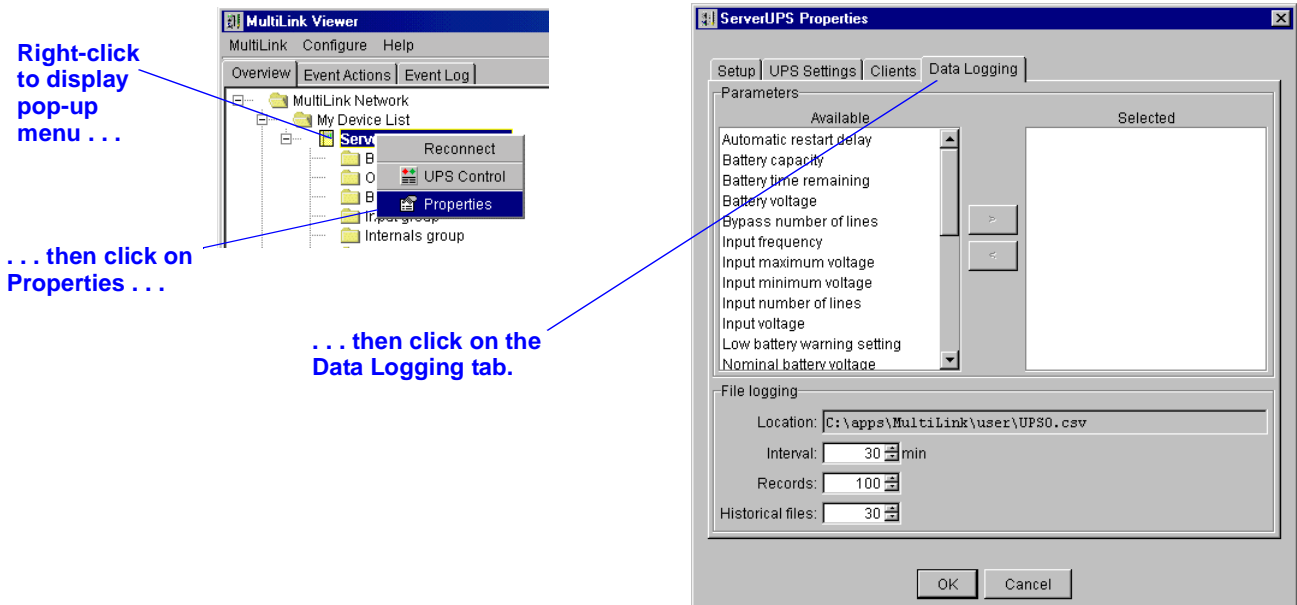
If test messages are received in a timely fashion and the entry was a hostname, DNS or other name services are correctly configured.

For NetWare servers, the message above will appear on the MultiLink screen.

9.3.6 Properties - Data Logging Tab

The System Administrator can use the **Data Logging** tab to record the condition of the UPS at fixed intervals. MultiLink will check the UPS at specified intervals and take a “snapshot” of selected parameters. Each time MultiLink checks the UPS, the software updates a file containing the parametric data. With this tab, the System Administrator also can regulate the size and number of historical files that will be retained.

- Click on the **Overview** tab.
- Right-click on the UPS device name to open a pop-up menu, then click on **Properties**.
- In the Properties window, click on the **Data Logging** tab (not available with Contact Closure).



- To select UPS parameters that will be checked and recorded in the data log file, click on an item in the **Available** window, then click on the arrow to move that item to the **Selected** window. More than one item can be moved at one time by using standard methods common to your operating system.

MultiLink will record data about any parameter selected for logging.

- The **Interval** box displays the number of minutes between MultiLink’s checks of the UPS.
- The **Records** box displays the number of records that will be stored in the data log file.
- The **Historical files** box displays the number of data log files that will be retained.

9.4 Configuring—Configure Menu

The **Configure** menu is integral to setting up MultiLink's response to various UPS-related events. The **Configure** menu allows you to add and delete UPSs for monitoring, set up the modem, edit your password and install an upgrade license.

9.4.1 Device List Subfolders

The MultiLink Network consists of two subfolders: **My Device List** and **Network Device List**. These subfolders are especially useful in organizing the UPSs and MultiLink installations to be monitored.

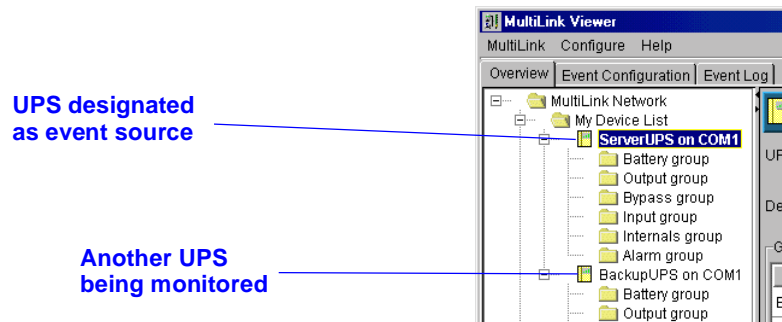
- The **My Device List** subfolder contains the UPS that is powering the host computer and other UPSs being hosted by this computer.
- The **Network Device List** subfolder allows you to add other MultiLink installations anywhere on your network, enabling the System Administrator to keep tabs on multiple MultiLink installations and their hosted UPSs from a single location.

9.4.2 MultiLink Event Source

The UPS designated as a computer's event source is central to MultiLink's monitoring function. Events affecting the UPS chosen as the event source prompt MultiLink to issue alerts, shutdown notifications and launch scripts. For details on designating a UPS as your event source, use the **Enable Actions** check box as described in **9.3.3 - Properties - Setup Tab**.

The UPS added to the **My Device List** subfolder during MultiLink's installation serves as that computer's event source. The System Administrator can add other UPSs to this subfolder for organizational purposes, but only one UPS may be designated as the computer's event source. The event source designation can be switched to another UPS in the **My Device List** subfolder.

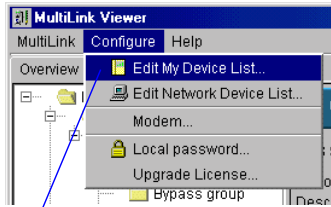
MultiLink displays the host computer's event source in **bold letters**.



9.4.3 Configure Menu - Edit My Device List

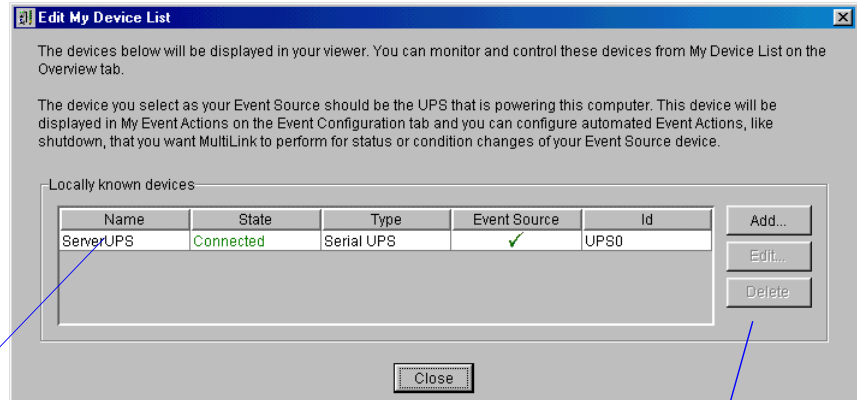
MultiLink allows you to add a UPS, change its configuration or remove it from the **My Device List** subfolder. To do so:

- Click on **Configure**, then on **Edit My Device List**.



Click on **Configure**, then on **Edit My Device List** . . .

. . . to view any UPS in your local device list . . .



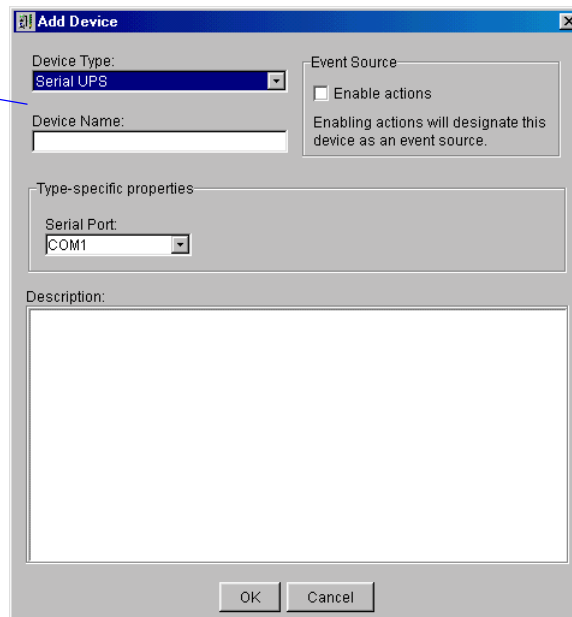
. . . and the controls to add, alter or remove a UPS.

- Add, change or remove a UPS as described in the following sections.

Add a UPS

- In the **Edit My Device List** window, choose **Add** if you wish to include another UPS as a locally known device.
- This window contains the same options as the **Setup** tab in the **Properties** window. Enter the UPS information according to the instructions in **9.3.3 - Properties - Setup Tab**.

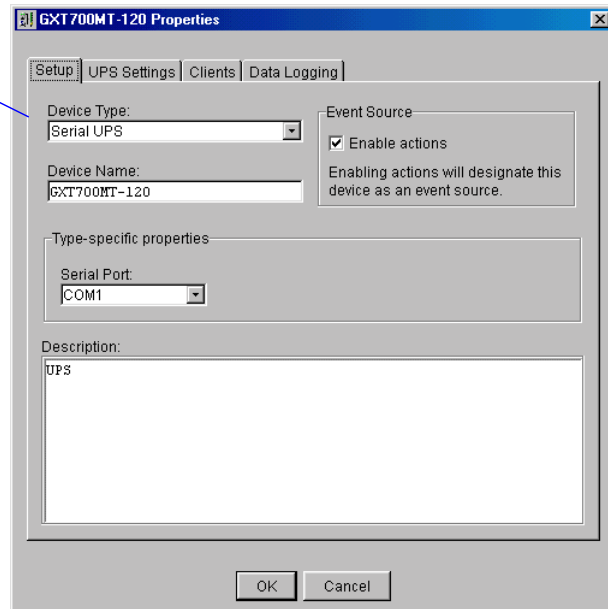
See 9.3.3 - Properties - Setup Tab for details on entering data.



Alter UPS data

- In the **Edit My Device List** window, select the UPS from the list, then click on **Edit** if you wish to alter information about that UPS.
- This window contains the same options as the **Setup** tab in the **Properties** window. Enter the UPS information according to the instructions in **9.3.3 - Properties - Setup Tab**.

See 9.3.3 - Properties - Setup Tab for details on entering data.



Delete a UPS

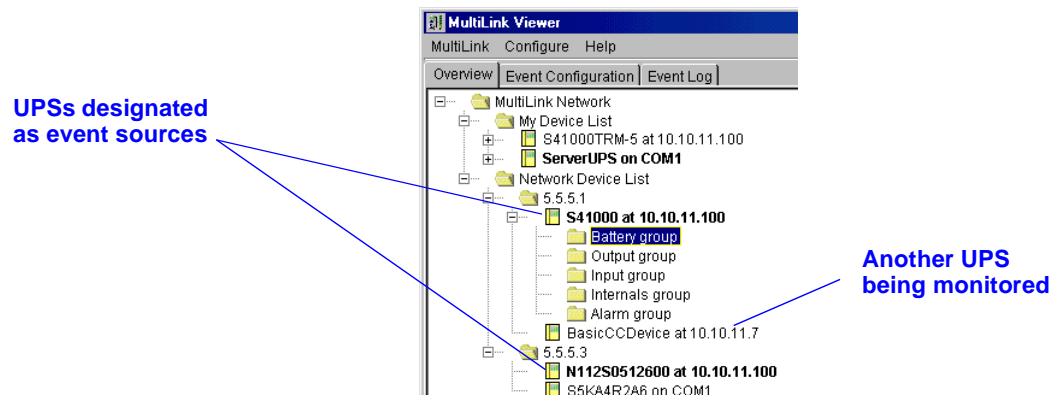
- In the **Edit My Device List** window, select the UPS from the list, then click on **Delete** if you wish to remove a UPS from the **My Device List** subfolder.
- MultiLink will ask you to confirm that you wish to delete the UPS. Click on **Yes** to confirm the deletion.

9.4.4 Configure Menu - Edit Network Device List

The **Network Device List** allows you to monitor and configure any UPS hosted by a MultiLink installation on your network from a single location.

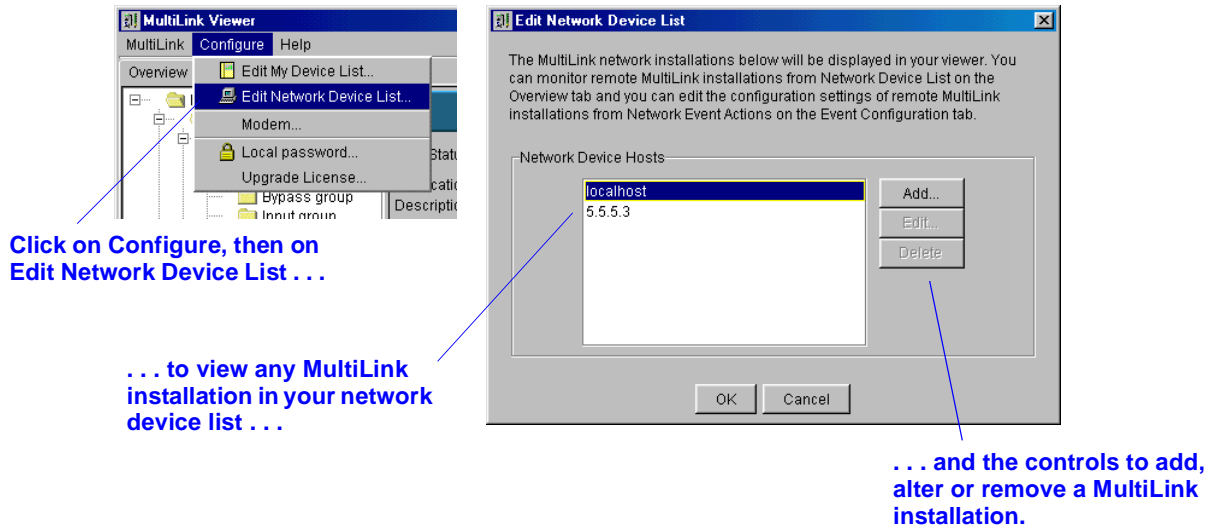
Only MultiLink installations—a host computer running MultiLink, including the devices in its **My Device List** subfolder—can be added to the **Network Device List**. MultiLink dynamically updates all information about any MultiLink installation in the **Network Device List**, whether changes are made to a UPS from its host computer or from a remote location.

Each MultiLink installation in the **Network Device List** displays the remote computer's event source in **bold letters**.



The **Edit Network Device List** menu option allows you to add, change or remove a MultiLink installation. To do this:

- Click on **Configure**, then on **Edit Network Device List**.



Click on **Configure**, then on **Edit Network Device List** . . .

. . . to view any MultiLink installation in your network device list . . .

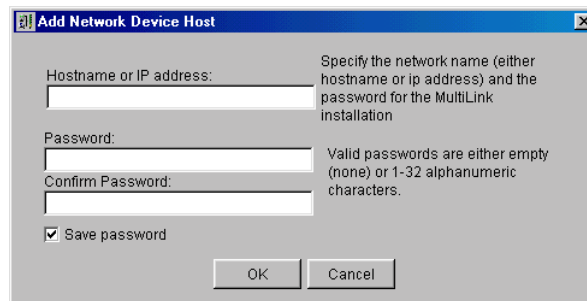
. . . and the controls to add, alter or remove a MultiLink installation.

- Add, edit or delete a MultiLink installation as described in the following sections.

Add a MultiLink installation

A MultiLink Network Administration License is required for this procedure. In addition, a MultiLink installation must permit remote access before it can be monitored or configured by a remote computer (see **9.4.6 - Configure Menu - Local Password**).

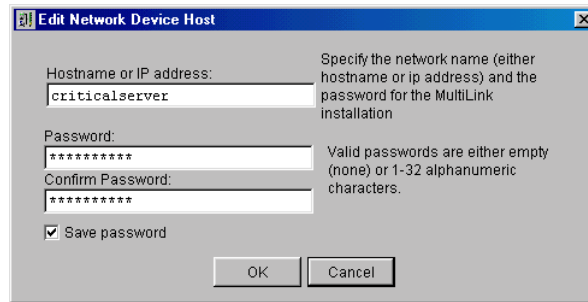
- In the **Edit Network Device List** window, choose **Add** if you wish to include a MultiLink installation.



- In the **Hostname or IP address** box, enter the host computer's name or IP address.
- In the **Password** box, enter the MultiLink password for the computer that is being added to the Network Device List. This permits the System Administrator to access the network MultiLink installation. Checking the **Save password** box prevents a user from having to enter the password on each use.

Alter MultiLink installation identity or password

- In the **Edit Network Device List** window, select the **Network Device Host** from the list, then click on **Edit** if you wish to alter information about that MultiLink installation.



Specify the network name (either hostname or ip address) and the password for the MultiLink installation

Valid passwords are either empty (none) or 1-32 alphanumeric characters.

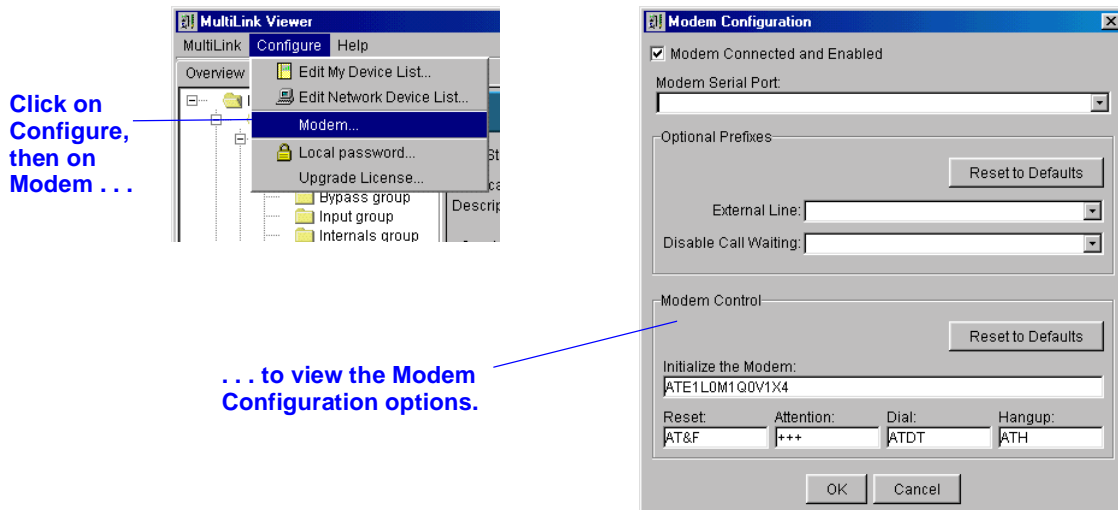
- If the computer hostname or IP address has changed, enter the new name or address in the **Hostname or IP address** box.
- If the MultiLink password has changed, enter the new password in the **Password** boxes. Checking the **Save password** box prevents a user from having to enter the password on each use.

Delete a MultiLink installation

- In the **Edit Network Device List** window, select the MultiLink installation from the list, then click on **Delete** if you wish to remove a MultiLink installation from the **Network Device List** subfolder.
- MultiLink will NOT ask you to confirm that you wish to delete the MultiLink installation. You can avert the deletion by clicking on **Cancel** at the bottom of the **Edit Network Device List** window.

9.4.5 Configure Menu - Modem

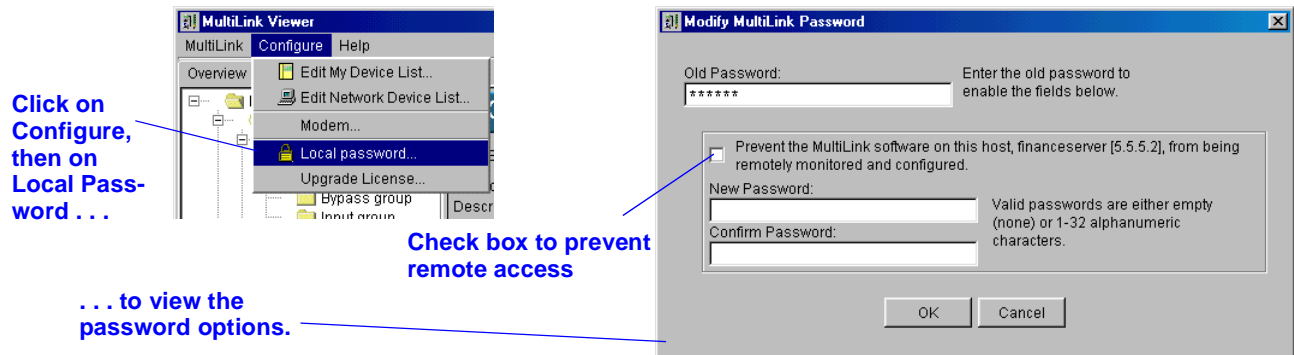
Using the **Modem** menu item, the System Administrator can set up MultiLink with the modem commands needed to send pager messages.



- To enable MultiLink to use the modem, click on **Configure**, then on **Modem**.
- In the **Modem Configuration** window that opens, place a check mark (✓) in the **Modem Connected and Enabled** box—this is required to use the modem.
- Select the proper **Modem Serial Port** from the drop-down list.
- Enter the required information.
 - a. If your telephone system requires dialing a particular digit, such as 9, to get an outside line, choose from the drop-down list in the **External Line** box or enter the number followed by a comma.
 - b. If the line used by the modem has call-waiting feature, choose from the drop-down list in the **Disable Call Waiting** box or enter the required code followed by a comma.
 - c. Before MultiLink can find and utilize the modem, data must be entered in the **Modem Control** boxes. You may change the default values as needed.
 - d. At any time, click on the **Reset to Defaults** button to revert to the factory defaults for this feature.
 - e. Click **OK** to save the changes or click **Cancel** to close the window without saving.

9.4.6 Configure Menu - Local Password

Using the **Local Password** menu item, the System Administrator can set up security access for MultiLink.



- Click on **Configure**, then on **Local Password**.
- In the **Modify MultiLink Password** window, enter the current password in the **Old Password** box. This enables the remaining options in the window.
- To prevent remote configuration changes, place a check mark (✓) in the check box. Leaving the check box blank will permit configuration and monitoring from a remote location.
- To change the password, enter up to 32 alphanumeric characters in the **New Password** box.
- Enter the same password in the **Confirm Password** box.

9.4.7 Configure Menu - Upgrade License

Two types of licenses allow you to expand MultiLink's capabilities, letting you monitor and control an entire network from a single location.

- The **MultiLink Network Shutdown License** (license.key) permits the System Administrator to configure MultiLink to notify targeted client computers of UPS-related events. All targeted client computers must be running MultiLink. This license is available for various numbers of computers (see **Table 14** for part numbers).
- The **MultiLink Network Administration License** (license.net) allows the System Administrator to monitor other MultiLink installations from a single location and add more than one device to the local device list (see **Table 15** for this license part number).

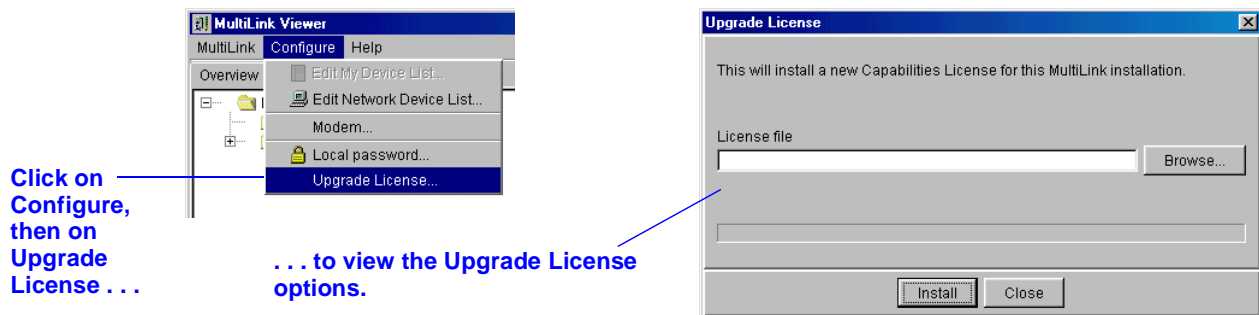
To obtain either license, visit the web site at <http://www.solaheviduty.com/products/ups> or contact your local representative, value-added reseller or distributor.

To install the appropriate license, use the **Upgrade License** menu item described below. The licenses may be installed in any order. Note that each computer identified as a targeted client must have MultiLink installed.

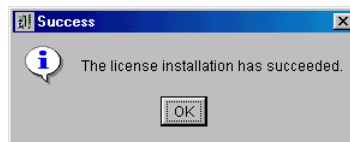
MultiLink Network Shutdown License

To set up a MultiLink upgrade license that allows you to send notifications to targeted client computers (which must be running MultiLink):

- Click on **Configure**, then on **Upgrade License**.
- In the **License File** box, enter the name of the appropriate file—**license.key**—with its full path, or click on the **Browse** button to locate the file, which is available from Sola/Hevi-Duty.



- Click on the **Install** button to begin the installation. A message box appears after successful installation.



- After installing the license, configure the targeted MultiLink clients as described in **9.3.5 - Properties - Clients Tab**. (Targeted MultiLink clients must have MultiLink version 1.x or MultiLink version 3 installed. If the targeted MultiLink client is running version 3 of the software, the **Device Type** for the event source must be **MultiLink Basic Notification Source**. Also, in the **Hostname or IP address** box of the targeted MultiLink client computer, the hostname of the computer on which the MultiLink Network Shutdown License is installed must be specified. See **4.1 - Connecting host computer, UPS and targeted clients** and **9.3.3 - Properties - Setup Tab**).

MultiLink Network Administration License

To set up a MultiLink upgrade license:

- Click on **Configure**, then on **Upgrade License**.
- In the **License File** box, enter the name of the appropriate file—**license.net**—with its full path, or click on the **Browse** button to locate the file, which is available from Sola/Hevi-Duty.
- Click on the **Install** button. A message box appears after successful installation.
- After installing the license, you may add any MultiLink installation on the network to the Viewer device lists for monitoring and configuration (see **9.4.3 - Configure Menu - Edit My Device List** and **9.4.4 - Configure Menu - Edit Network Device List**).

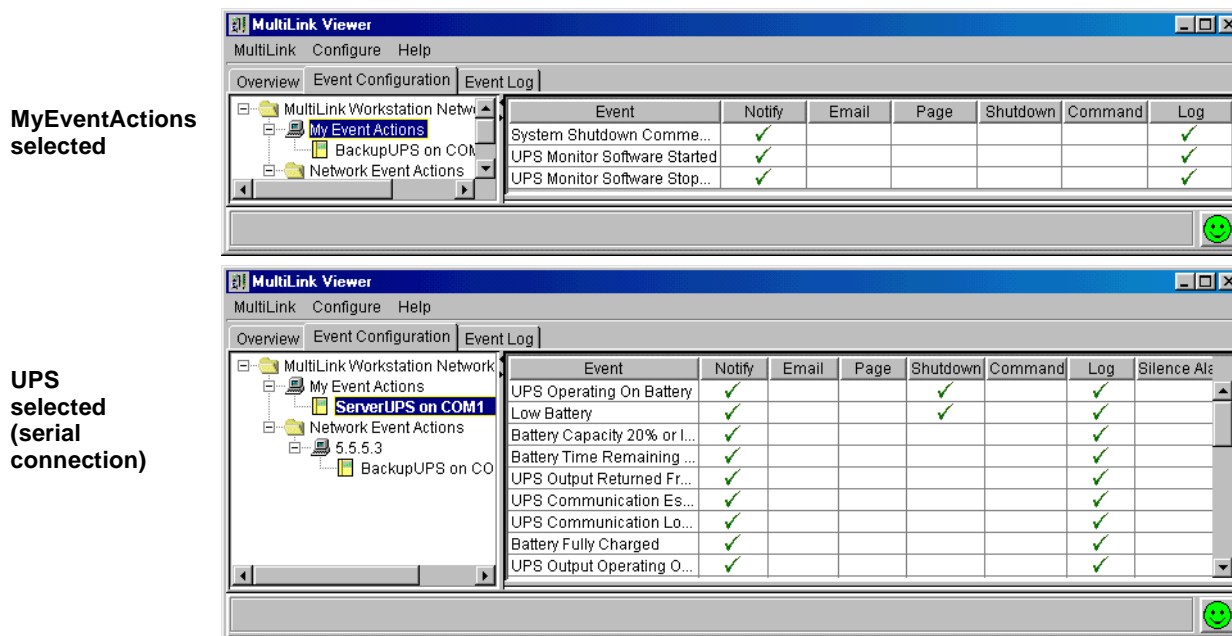
9.5 Configuring—Event Configuration tab

The **Event Configuration** tab allows you to set up MultiLink’s response to UPS-related events such as Utility Failed and Low Battery.

9.5.1 Overview of Configuring Event Actions

Types of Events

Events may be configured for the Local Host and for the UPS. Each device displays a different list of Events in the right side of the window, as shown below.



A Contact Closure connection between the UPS and the computer supports only three events: UPS Operating On Battery, Low Battery, UPS Output Returned From Battery (Normal).

See **Appendix D - List of Events** for a complete list of events for the Local Host (**Table 10**) and for the UPS (**Table 11**).

Types of Actions

The following Actions may be configured for any Event:

Table 7 Actions Available for Configuration

Action	Description	For details, see:
Notify	Broadcast messages (pop-up or console) about UPS-related events	9.5.2 - Event Actions - Notify
E-mail	Send e-mail messages	9.5.3 - Event Actions - E-Mail
Page	Send messages to targeted clients' telephone pagers	9.5.4 - Event Actions - Page
Shutdown	Shut down this computer	9.5.7 - Event Actions - Shutdown
Command	Run commands	9.5.8 - Event Actions - Command
Log	Make records of UPS-related events and actions	9.5.9 - Event Actions - Log
Silence Alarm*	Turn off a UPS' warning alarm (such as for maintenance or repair)	9.5.10 - Event Actions - Silence Alarm

*Silence Alarm Action available with serial connection only

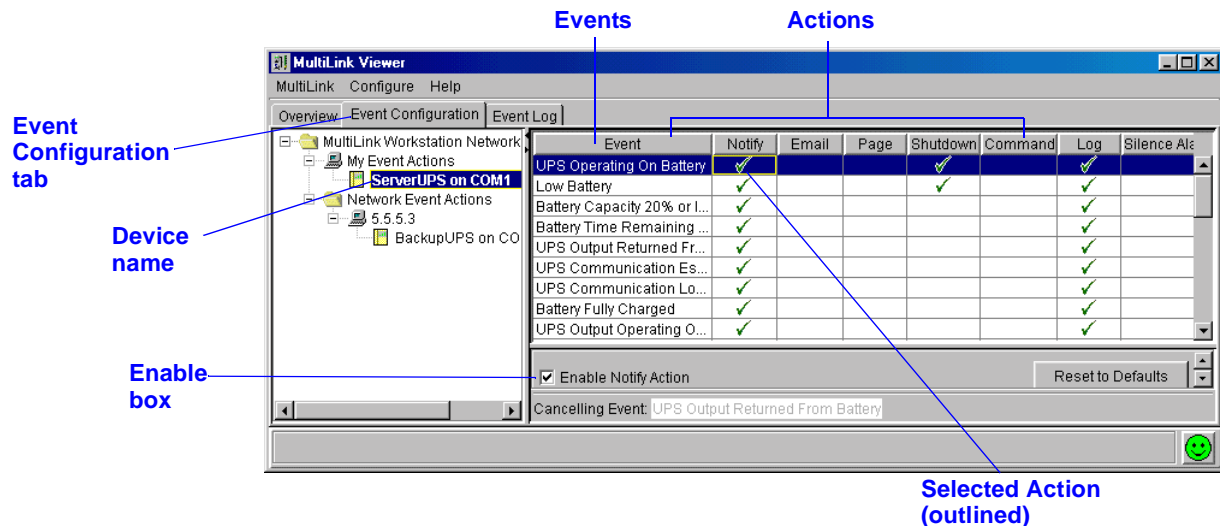
Configuring the Timing of Actions

Configuring the timing of Actions may be the most important aspect of setting up MultiLink. This feature allows you to specify how quickly MultiLink performs such actions as sending notifications, launching scripts and shutting down the operating system.

Appropriate times will vary according to the type of UPS in service, the Event and Action being configured and the number of computers being powered by the UPS.

Setting Up Event Actions

- Click on the **Event Configuration** tab.
- Click on the device name in the left side of the window.
- To enable an action for any event, click in the box to the right of the Event and under the Action. This highlights the Event row and outlines the selected Action. It also reveals the configuration settings for the Action.
- Next, click in the **Enable** box (beneath the list of events). This places a check mark (✓) in the box beneath the selected Action.



The example above shows how to enable a Notify Action for UPS Operating On Battery.

Testing Configuration Settings

After configuring the responses to a UPS-related event, you may test your settings by simulating the event, as described in **9.6 - Testing Responses to Events**.

Temporarily Disabling an Event

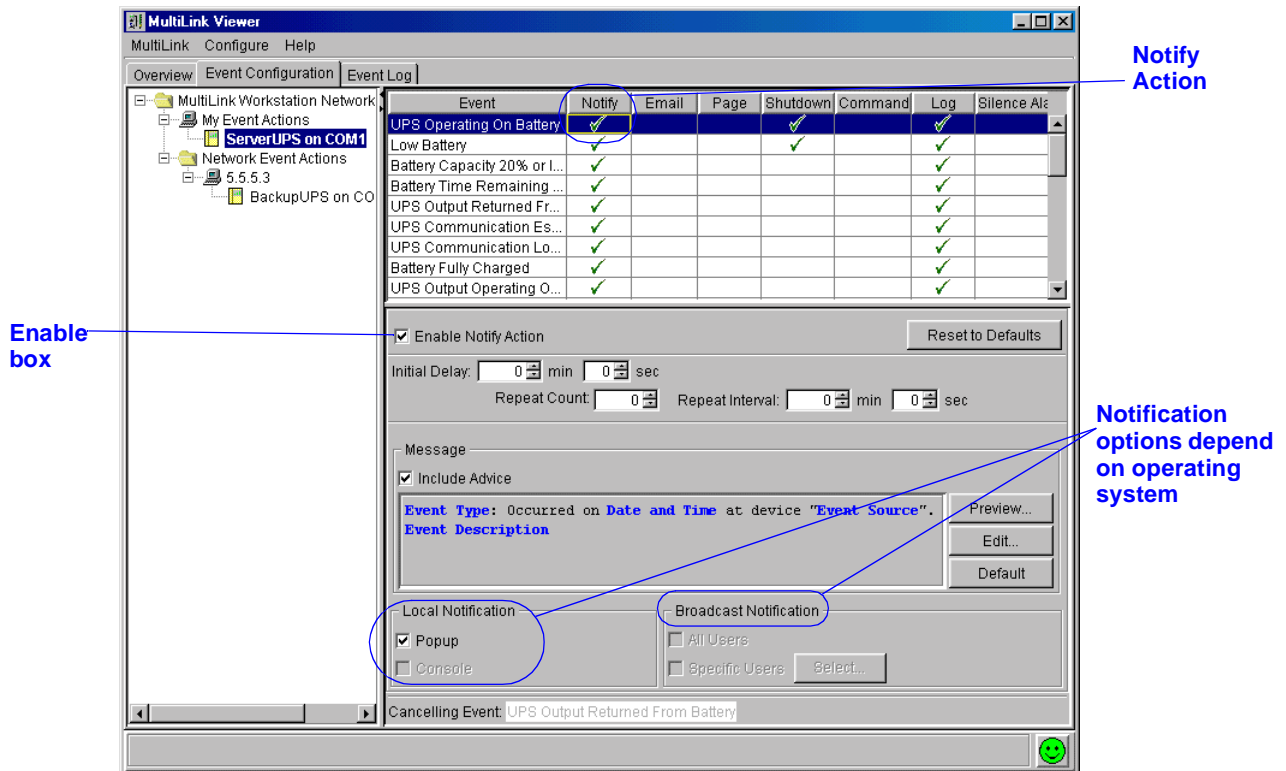
At any time, you may deactivate an event. When the event is re-enabled, all configuration settings remain as last saved. For details, see **9.7 - Disabling an Event**.

Configuration Steps

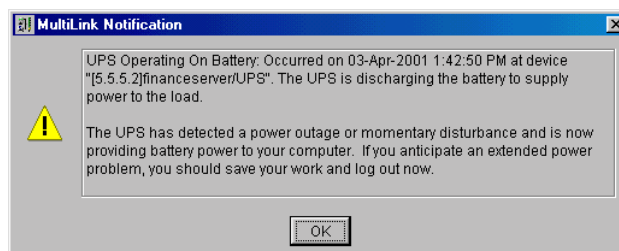
The following sections detail the options available for each Action. The Actions and Events available depend on the connection method and device type, but the steps are the same for all types.

9.5.2 Event Actions - Notify

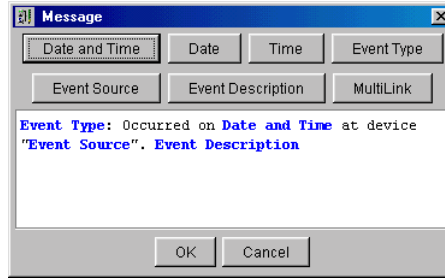
The **Notify** feature automatically generates messages (pop-up or console) about UPS-related events that appear on specified computer users' screens.



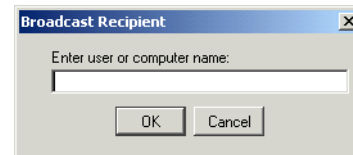
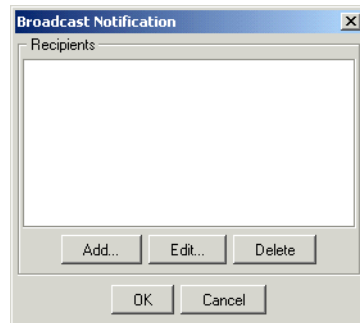
- Check (✓) the **Enable Notify Action** box. This is required for the action to operate.
- The **Initial Delay** displays the time lapse between an event's occurrence and when the notification message is sent. The **Repeat Count** box shows how many times MultiLink will send a message at intervals specified in the **Repeat Interval** box.
For example, to start sending a notification 15 seconds after the Event occurs and then every 30 seconds for a total of 5 times:
 - **Initial Delay** = 15 sec
 - **Repeat Count** = 5
 - **Repeat Interval** = 30 sec
- Default messages have been set up for all events. These messages state the type of event, the time it occurred, the device involved and a description of the event. To view a message as it will appear on users' screens, click on the **Preview** button.



- To alter a message, click on the **Edit** button and enter the desired text in the **Message** window, as shown below.



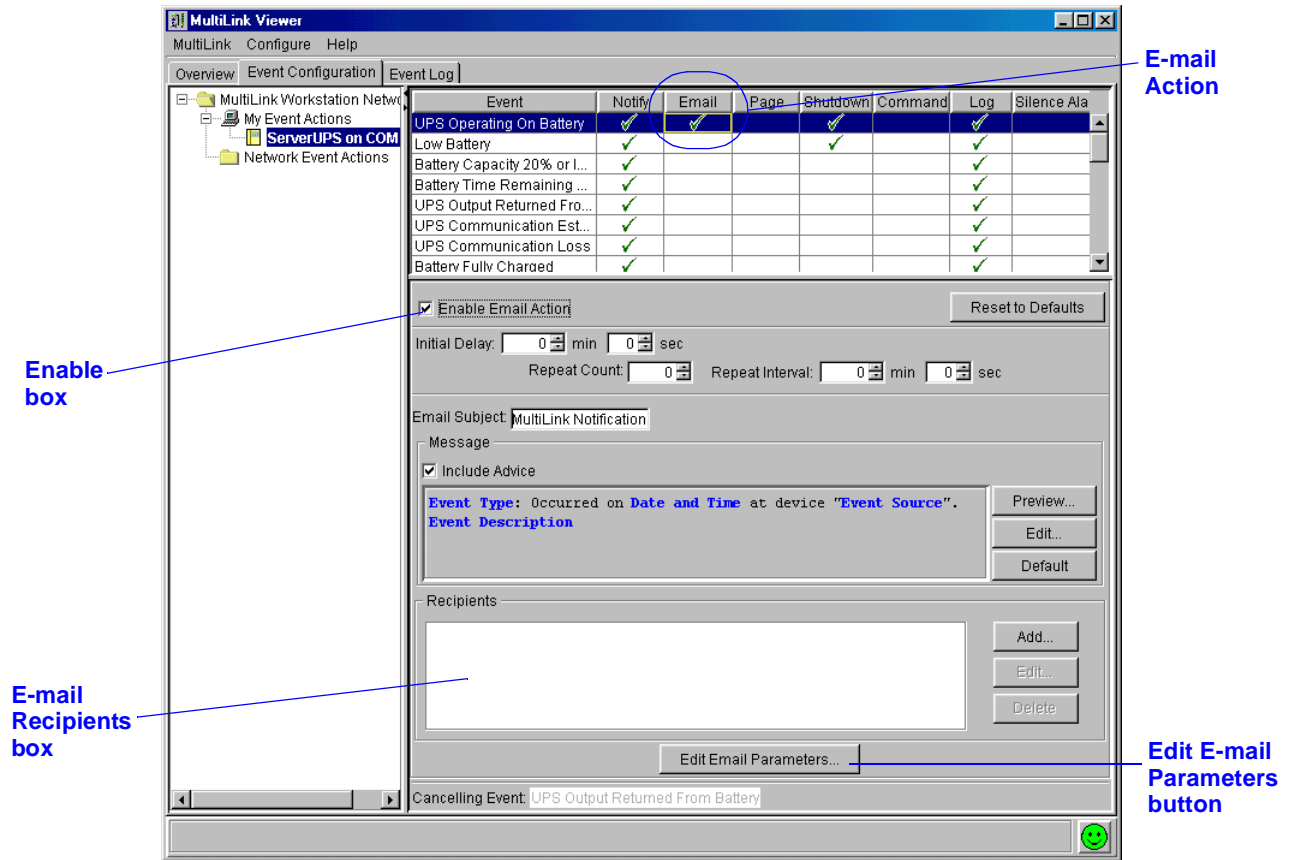
- Buttons at the top of the **Message** window insert linked text that prompts MultiLink to describe the event. Text also may be typed into the **Message** window. To restore the default message at any time, click on **Default**.
- Checking the **Include Advice** box inserts text into the message that will advise computer users to begin taking certain actions. For example: “Save your work and log out now as system shutdown will begin shortly. The UPS is running out of battery capacity and minimal battery backup runtime remains.”
- The **Local Notification** option may send messages by pop-up or to the operating system console. These options vary by operating system. For information, see **Appendix A - Operating System Details**.
- The **Broadcast Notification** box allows you to specify message recipients as **All Users** or **Specific Users**. (This feature is not available on all operating systems; see **Appendix A - Operating System Details**.) To choose specific users to receive the message, click on **Specific Users**, then on **Select** to open the Broadcast Notification window.



- In the Broadcast Notification window, click on the **Add** button to enter the Hostname or IP address of recipients.
- Once entered, a recipient’s Hostname or IP address can be changed by using the **Edit** button or removed by using the **Delete** button on the Broadcast Notification window.
- The **Canceling Event** will abort all actions initiated by MultiLink in response to the event being configured. See **Table 11** for a list of Events with default canceling events.
- At any time, click on the **Reset to Defaults** button to revert to the factory defaults for this feature.
- To save settings, click on the **MultiLink** menu at the top of the window, then click on **Save Event Configuration**.

9.5.3 Event Actions - E-Mail

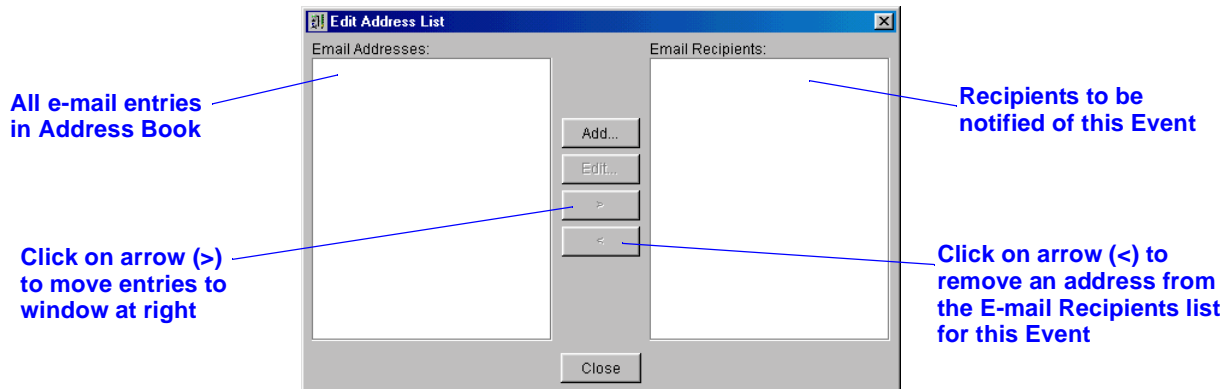
The **E-mail** feature automatically sends e-mail messages about UPS-related events.



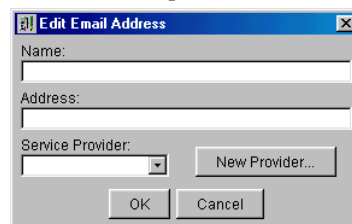
To configure the **E-mail** action:

- Check (✓) the **Enable E-mail Action** box. This is required for the action to operate.
- The **Initial Delay** displays the time lapse between an event's occurrence and when the e-mail is sent.
- The **Repeat Count** box shows how many times MultiLink will send a particular e-mail at intervals specified in the **Repeat Interval** box.
- Check to make sure a subject is specified in the **E-mail Subject** box. By default, the subject is "MultiLink Notification." This can be changed by entering a new subject.
- Default messages have been set up for all events. These e-mails state the type of event, the time it occurred, the device where it occurred and a description of the event. To view the text as it will appear in a recipient's e-mail message, click on the **Preview** button.
- To alter a message, click on the **Edit** button and enter the desired text. Buttons at the top of the **Message** window insert linked text that prompts MultiLink to describe the event. Text also may be typed into the **Message** window. To restore the default message at any time, click on **Default**.
- Checking the **Include Advice** box inserts text into the message that will advise computer users to begin taking certain actions. For example: "Save your work and log out now as system shutdown will begin shortly. The UPS is running out of battery capacity and minimal battery backup runtime remains."

- The message will be sent to all e-mail addresses in the **Recipients** box. Addresses may be added, altered or deleted by using the **Add**, **Edit** and **Delete** buttons as appropriate.
 - a. To **Add** an e-mail address to the recipients list:
 1. Click on the **Add** button—this opens the **Edit Address List** window.



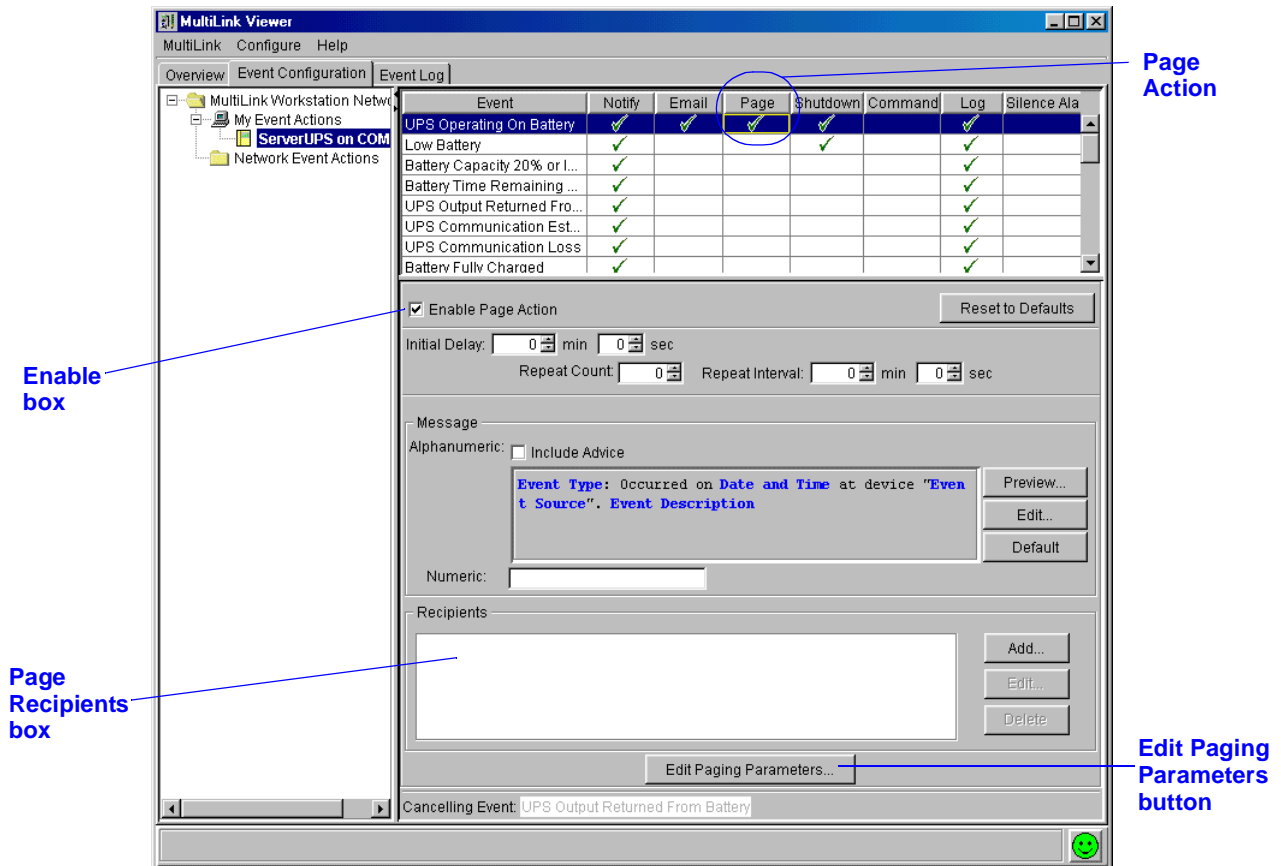
2. Select an address on the left side of the window by clicking on it—this highlights the address.
 3. Use the arrow (>) between the windows to move the name to the **E-mail Recipients** window at right.
 4. Click on **Close**—the new address appears in the **Recipients** box. (New e-mail addresses can be added to the Address Book from this window by clicking on **Add** and entering the information as described above.)
- b. To **Edit** a recipient's e-mail address:
 1. Highlight the address in the **Recipients** box in the main window (**Event Configuration** tab with the **E-mail** action highlighted).
 2. Click on the **Edit** button—this opens the **Edit E-mail Address** window, shown below.



3. Update the person's name and e-mail address as needed.
 4. To update the person's service provider, choose from the **Service Provider** drop-down menu or click on the **New Provider** button to enter a new provider.
 5. Click on **OK**.
- c. To **Delete** a recipient from the list:
 1. Highlight the address in the **Recipients** box in the main window (**Event Configuration** tab with the **E-mail** action highlighted).
 2. Click on the **Delete** button. The address is deleted from the e-mail recipients list. An alternate method of removing a recipient is to open the **Edit Address List** window, highlight the address to be removed from the recipients listing and click on the < arrow.
- The **Edit E-mail Parameters** button gives you access to an address book with e-mail addresses and service providers. For details, see:
 - 9.5.5 - Edit E-Mail/Pager Parameters - Address Book** and
 - 9.5.6 - Edit E-Mail/Pager Parameters - Services.**
 - The **Canceling Event** will abort all actions initiated by MultiLink in response to the event being configured. See **Table 11** for a list of Events with default canceling events.
 - At any time, click on the **Reset to Defaults** button to revert to the factory defaults for this feature.
 - To save settings, click on the **MultiLink** menu at the top of the window, then click on **Save Event Configuration**.

9.5.4 Event Actions - Page

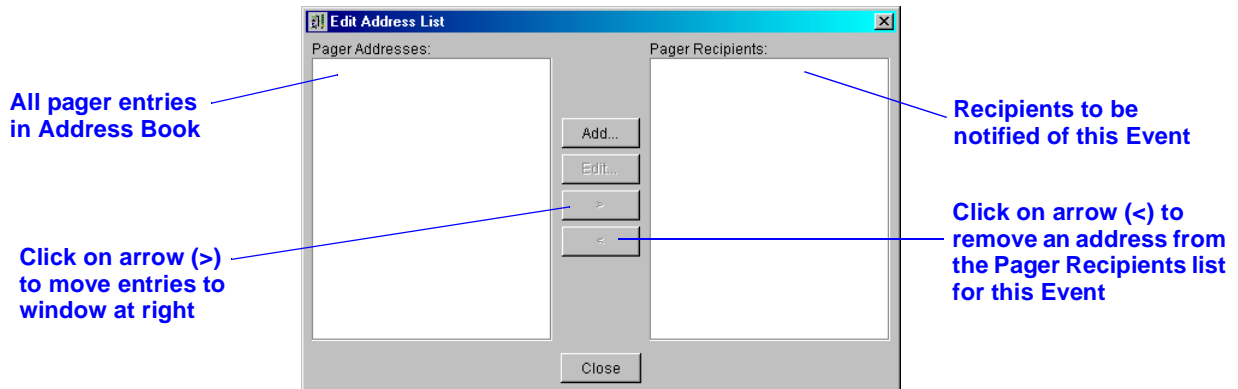
The **Page** feature allows the System Administrator to automatically send numeric and alphanumeric telephone pager messages to personnel in response to UPS-related events.



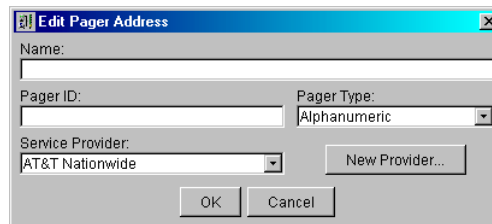
To configure the **Page** action:

- Ensure the modem is configured. (See **9.4.5 - Configure Menu - Modem**.)
- Check (✓) the **Enable Page Action** box. This is required for the action to operate.
- The **Initial Delay** displays the time lapse in minutes and seconds between an event's occurrence and when the paging function is activated.
- The **Repeat Count** box shows how many times MultiLink will send the page at intervals specified in minutes and seconds in the **Repeat Interval** box.
- The **Message** box allows you to specify the content of both types of messages: alphanumeric and numeric. (The type of pager is set up for each pager address as alphanumeric or numeric paging—see **Add a paging service provider**.) To specify the content of messages in the **Message** box:
 - a. Alphanumeric default messages have been set up for all events. The message displayed in the **Alphanumeric** box will be sent to all recipients set up for alphanumeric pagers. Note that some paging services limit the length of messages that can be sent. These messages state the type of event, the time it occurred, the device where it occurred and a description of the event. To view an alphanumeric message as it will appear on users' pagers, click on the **Preview** button. To alter an alphanumeric message, click on the **Edit** button and enter the desired text. Buttons at the top of the **Message** window insert linked text that prompts MultiLink to describe the event. Text also may be typed into the **Message** window. To restore the default message at any time, click on **Default**. Checking the **Include Advice** box inserts text into the message that will advise computer users to begin taking certain actions. For example: "Save your work and log out now as system shutdown will begin shortly. The UPS is running out of battery capacity and minimal battery backup runtime remains."
 - b. To enter a numeric message, enter the appropriate digits in the **Numeric** box. This message will be sent to all recipients set up for numeric pagers.

- The message will be sent to all pager addresses in the **Recipients** box. Addresses may be added, altered or deleted by using the **Add**, **Edit** and **Delete** buttons as appropriate.
 - a. To **Add** a pager address to the recipients list for this Event:
 1. Click on the **Add** button—this opens the **Edit Address List** window.



2. Select an address from the **Pager Addresses** box on the left side of the window by clicking on it—this highlights the address.
 3. Use the arrow (>) between the windows to move the name to the **Pager Recipients** box.
 4. Click on **Close**—the new address appears in the **Recipients** box.
- b. To **Edit** a recipient's pager address:
 1. Highlight the address in the **Recipients** box in the main window (**Event Configuration** tab with the **Page** action highlighted).
 2. Click on the **Edit** button—this opens the **Edit Pager Address** window, as shown.



3. Update the person's name and **Pager ID** as needed. The **Pager ID** is the unique method paging service providers use to connect to a pager. Some paging service providers use a unique phone number as the **Pager ID**; others use a common phone number and an identifying number.

For services using a unique phone number, enter the pager-specific phone number in the **Pager ID** box and leave the **Service Provider** phone number blank.

For services using a common phone number, enter the specific ID in the **Pager ID** box and the common phone number in the **Service Provider** configuration.
 4. Choose the paging method—numeric or alphanumeric—from the **Pager Type** drop-down menu.
 5. To update the person's service provider, choose from the **Service Provider** drop-down menu or click on the **New Provider** button to enter a new provider.
 6. Click on **OK**.
- c. To **Delete** a recipient from the list:
 1. Highlight the address in the **Recipients** box in the main window (**Event Configuration** tab with the **Page** action highlighted).
 2. Click on the **Delete** button. The address is deleted from the page **Recipients** box. An alternate method of removing a recipient is to open the **Edit Address List** window, highlight the address to be deleted from the recipients listing and click on the < arrow.
- The **Edit Paging Parameters** button gives you access to an address book with pager addresses and service providers. For details, see:
 - 9.5.5 - Edit E-Mail/Pager Parameters - Address Book** and
 - 9.5.6 - Edit E-Mail/Pager Parameters - Services.**

- The **Canceling Event** will abort all actions initiated by MultiLink in response to the event being configured. See **Table 11** for a list of Events with default canceling events.
- At any time, click on the **Reset to Defaults** button to revert to the factory defaults for this feature.
- To save settings, click on the **MultiLink** menu at the top of the window, then click on **Save Event Configuration**.

9.5.5 Edit E-Mail/Pager Parameters - Address Book

MultiLink's **Address Book** stores e-mail and pager addresses for easy access when setting up notification of UPS-related events. Once entered, addresses become part of a list. Entries can be selected and copied, saving the work of re-entering the data for multiple MultiLink functions.

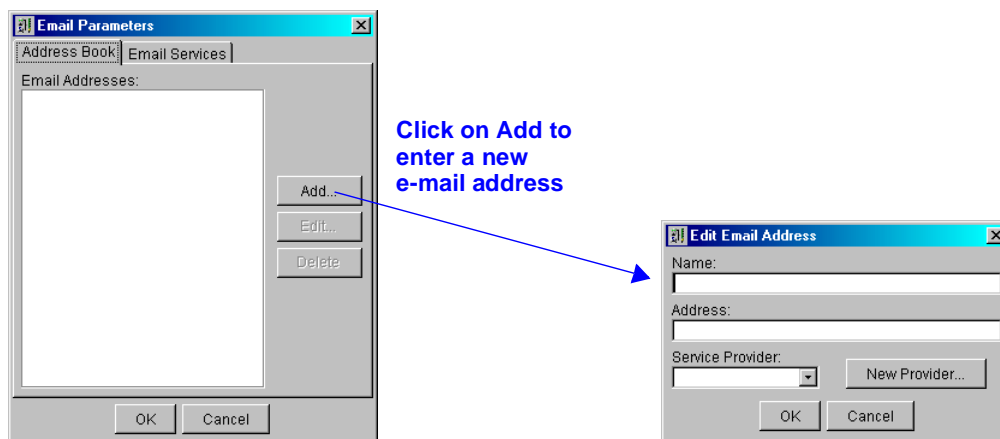
The **Address Book** requires a separate entry for each e-mail and pager address. When making multiple entries for the same person, you must add text to the name to differentiate the entries. For example, you might use the following designations in the name:

- Smith, Adam (e-mail)
- Smith, Adam (numeric pager)
- Smith, Adam (alphanumeric pager)

Further, to simplify finding a name, use a consistent entry method because names are sorted alphabetically by the first name entered. For example, entering "Adam Smith" will place the name near the top of the **Address Book**, whereas entering "Smith, Adam" places the name near the bottom of the **Address Book**.

Add an E-mail address

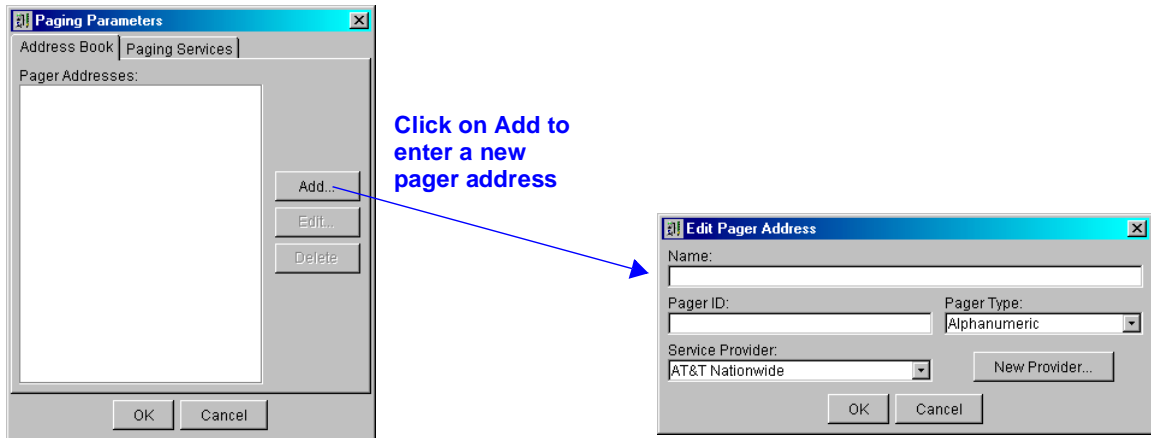
- Click on the **Event Configuration** tab and select the **E-mail** Action for the Event being configured. Place a check in the **Enable E-mail Action** box.
- Click on **Edit E-mail Parameters**, then on the **Address Book** tab, then on **Add**. This opens the **Edit E-mail Address** window.



- Enter the person's name in the **Name** box. If the Address Book already contains an entry for this person, you will be prompted to alter the entry. For ease in setting up e-mails, you could use the following designation or a variant—Smith, Adam (e-mail)
- Enter the e-mail address in the **Address** box.
- Choose from the **Service Provider** drop-down list, or click on the **New Provider** button to enter a new service provider.
- Click **OK**.

Add a pager address

- Click on the **Event Configuration** tab and select the **Page** Action for the Event being configured. Place a check in the **Enable Page Action** box.
- Click on **Edit Paging Parameters**, then on the **Address Book** tab, then on **Add**. This opens the **Edit Pager Address** window.



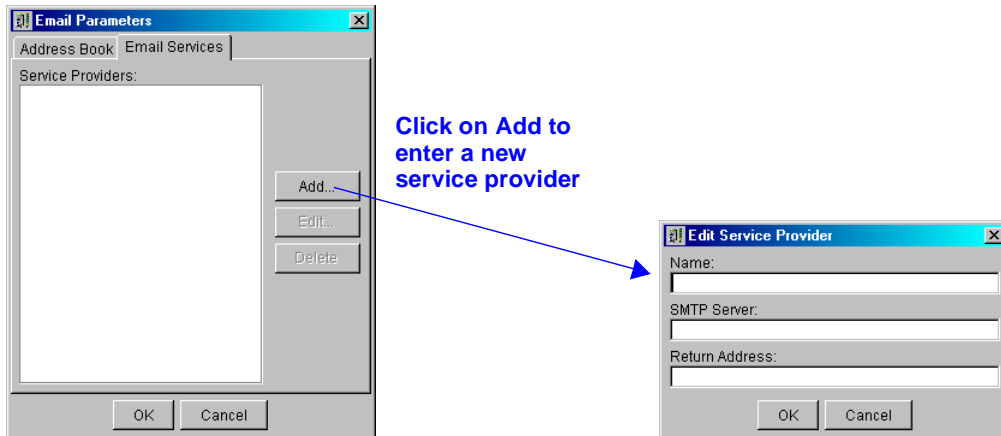
- Enter the person's name and pager ID in the appropriate boxes.
- Select the type of pager (alphanumeric or numeric) from the **Pager Type** drop-down list.
- Choose from the **Service Provider** drop-down list, or click on the **New Provider** button to enter a new service provider.
- Click **OK** to save the changes or click **Cancel** to close the window without saving.

9.5.6 Edit E-Mail/Pager Parameters - Services

MultiLink's **E-mail Services** and **Paging Services** store e-mail and pager service provider information for easy access when setting up notification of UPS-related events. Once a service provider is entered you may select it from a list, saving the work of re-entering the data for multiple MultiLink functions.

Add an e-mail service provider

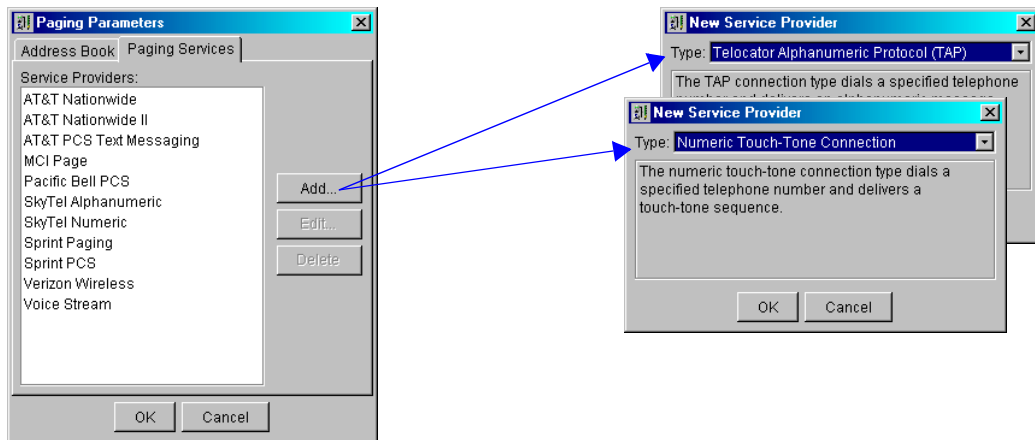
- Click on the **Event Configuration** tab and select the **E-mail** Action for the **Event** being configured. Place a check in the **Enable E-mail Action** box.
- Click on **Edit E-mail Parameters**, then on the **E-mail Services** tab, then on **Add**. This opens the **Edit Service Provider** window.



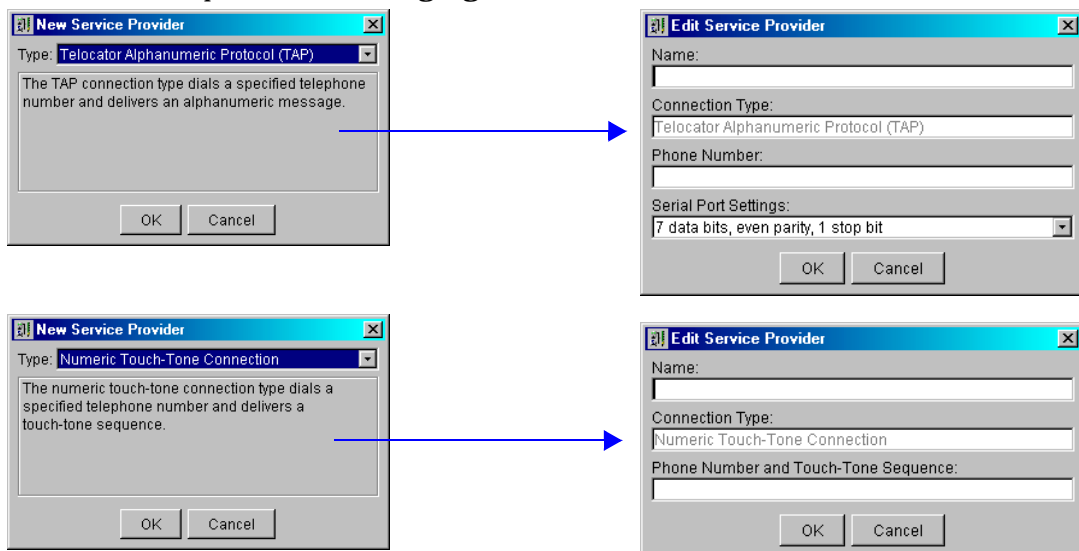
- Enter the name of the service provider in the **Name** box.
- In the **SMTP Server** box, enter the name of the service provider's mail server, for example:
mail.domain.com
- The **Return Address** box must have an e-mail address for messages to be sent, for example, the e-mail address where the message originated. If identifying information is included in the Return Address, the e-mail address must be enclosed in angle brackets, for example:
smith@domain.com
OR
Joe Smith<smith@domain.com>
- Click **OK** to save the changes or click **Cancel** to close the window without saving.

Add a paging service provider

- Click on the **Event Configuration** tab and select the **Page** Action for the **Event** being configured. Place a check in the **Enable Page Action** box.
- Click on **Edit Paging Parameters**, then on the **Paging Services** tab, then on **Add**. This opens the **New Paging Service Provider** window.



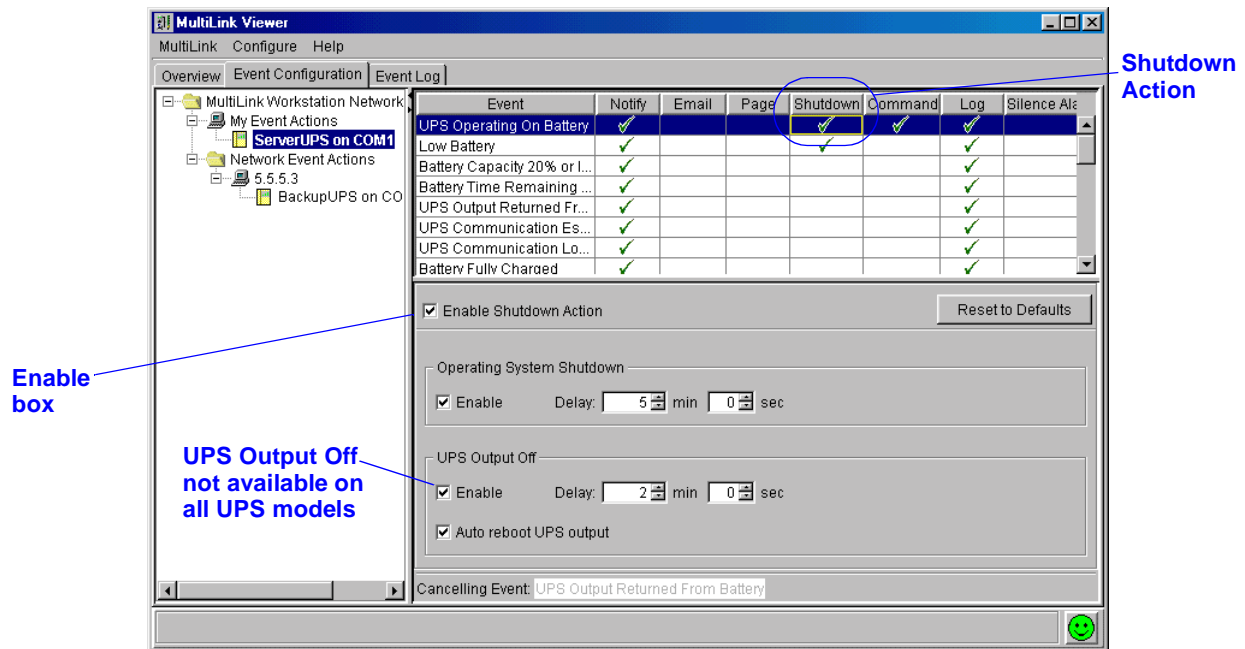
- Choose the type of paging service from the **Type** drop-down menu, either **Telocator Alphanumeric Protocol (TAP)** for alphanumeric pagers or **Numeric Touch-Tone Connection** for numeric pagers. An alphanumeric pager displays messages containing text and numerals; a numeric pager displays only numerals.
- Click **OK**. This opens the **Edit Paging Service Provider** window, as shown.



- Enter the service provider's name in the **Name** box.
- The **Connection Type** box displays the choice of Type made in the preceding step.
- Enter the service provider's phone number:
 - For an alphanumeric pager, enter the phone number in the **Phone Number** box in this format: 1 800-555-1212. Do not use parentheses around the area code.
 - For a numeric pager, enter the phone number immediately followed by any touch-tone sequence—such as a comma for a pause—to be delivered in the **Phone Number and Touch-Tone Sequence** box. Use this format for the phone number: 1 800-555-1212,,, (note commas for pauses). Do not use parentheses around the area code.
- For an alphanumeric pager, choose the appropriate parity/data bits setting from the **Serial Port Settings** drop-down menu.
- Click **OK** to save the changes or click **Cancel** to close the window without saving.

9.5.7 Event Actions - Shutdown

The **Shutdown** feature allows the orderly shutdown of the operating system and the UPS in response to certain events, such as Low Battery.



To configure the **Shutdown** action:

- Check (✓) the **Enable Shutdown Action** box. This is required for the action to operate.
- In the **Operating System Shutdown** area, check the **Enable** box to permit MultiLink to perform an orderly shutdown of the operating system. Use the arrows in the **Delay** boxes to specify the time lapse between an event's occurrence and when the shutdown begins.
- The System Administrator can use the **UPS Output Off** feature to set up MultiLink to shut down the UPS after shutting down the host computer's operating system. This feature is available only on Serial UPS and Contact Closure connections and is not available on certain UPS models. (A special cable is required to support this feature on Contact Closure connections.)
 - To set up the **UPS Output Off** feature, click on the **Enable** box,
 - With Serial UPS, use the related **Delay** boxes to specify an additional delay (above and beyond the "Operating System Shutdown" delay) prior to turning off the UPS output.



NOTE

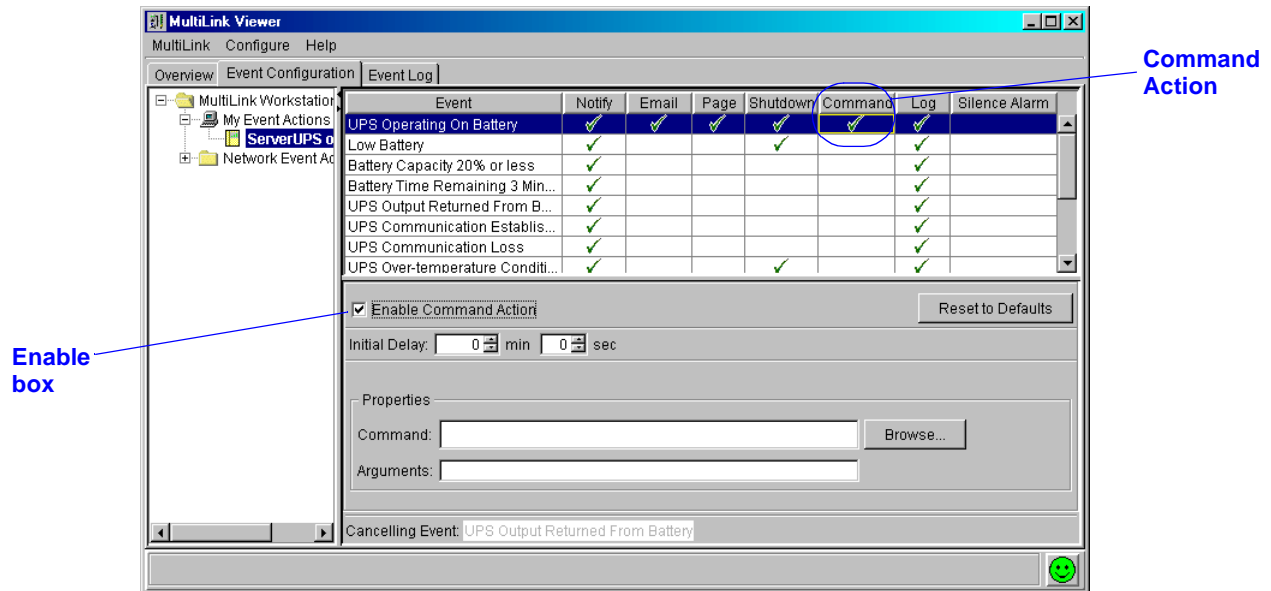
Because the **Canceling Event** does not halt the **UPS Output Off** portion of the **Shutdown** action, Sola/Hevi-Duty strongly advises against enabling the **UPS Output Off** action if the **Operating System Shutdown** action is not enabled.

- With Serial UPS, enabling **Auto reboot UPS output** causes the UPS to restore power to the load (after a brief delay) after the output power has been turned off as a result of selecting the **Enable** check box. These features induce a controlled cycling of power to the critical load, eliminating the need to reset the UPS manually. This option is not available with Contact Closure.

Note: Input power to the UPS must be present before UPS output power can be restored. If the output has been turned off during a utility outage, the UPS output power will not be turned on until the input utility is restored.
- The **Canceling Event** will abort all actions initiated by MultiLink in response to the event being configured, except **UPS Output Off** (see NOTE above). See **Table 11** for a list of Events with default canceling events.
- At any time, click on the **Reset to Defaults** button to revert to the factory defaults for this feature.
- To save settings, click on the **MultiLink** menu at the top of the window, then click on **Save Event Configuration**.

9.5.8 Event Actions - Command

The **Command** feature allows the System Administrator to control applications that have command-line options, for example, to save files or close an application.



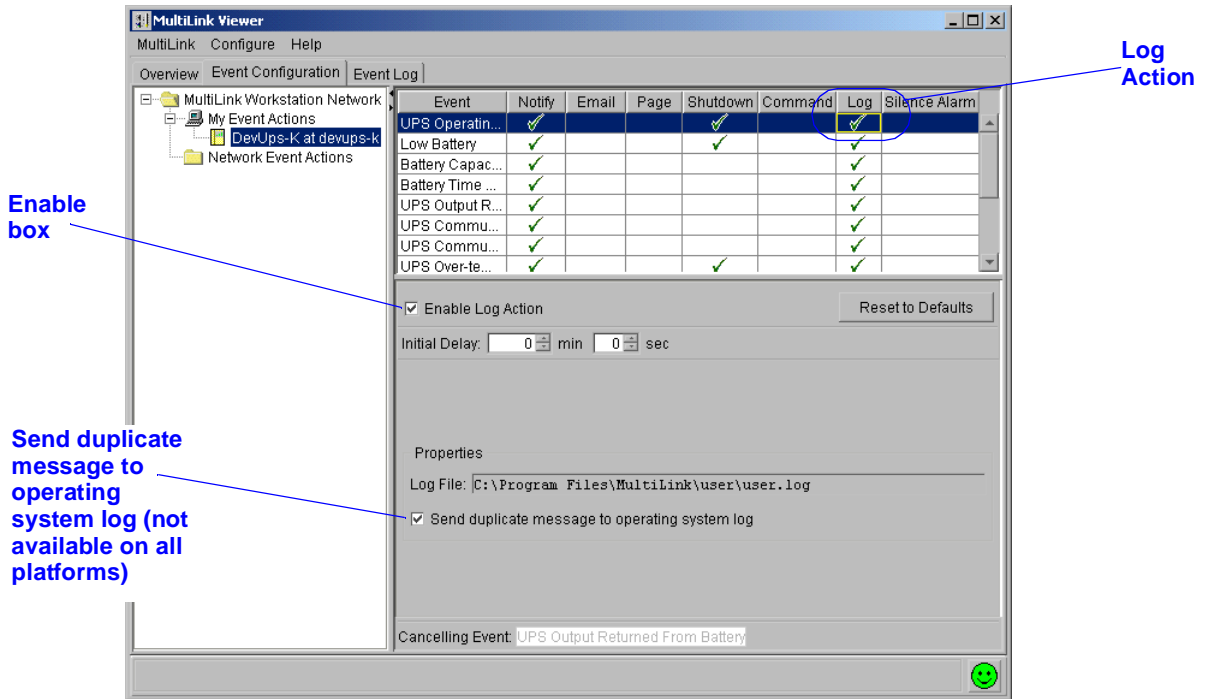
To configure the **Command** action:

- Check (✓) the **Enable Command Action** box. This is required for the action to operate.
- Use the arrows in the **Initial Delay** boxes to specify the time lapse between an event's occurrence and when the command is executed.
- In the **Properties** line, specify a command by either typing it in the **Command** box or by clicking on the **Browse** button and locating the appropriate file.
- In the **Arguments** box, enter any arguments required for the command to function properly. Once entered, arguments will remain in the **Arguments** box until deleted. If inappropriate arguments are displayed, be sure to delete them.
- The **Canceling Event** will abort all actions initiated by MultiLink in response to the event being configured. See **Table 11** for a list of Events with default canceling events.
- At any time, click on the **Reset to Defaults** button to revert to the factory defaults for this feature.
- To save settings, click on the **MultiLink** menu at the top of the window, then click on **Save Event Configuration**.

9.5.9 Event Actions - Log

MultiLink will create a file—**user.log**—documenting the occurrence of UPS-related events and MultiLink's actions in response to those events.

To view the log file, click on the **Event Log** tab in the MultiLink Viewer.



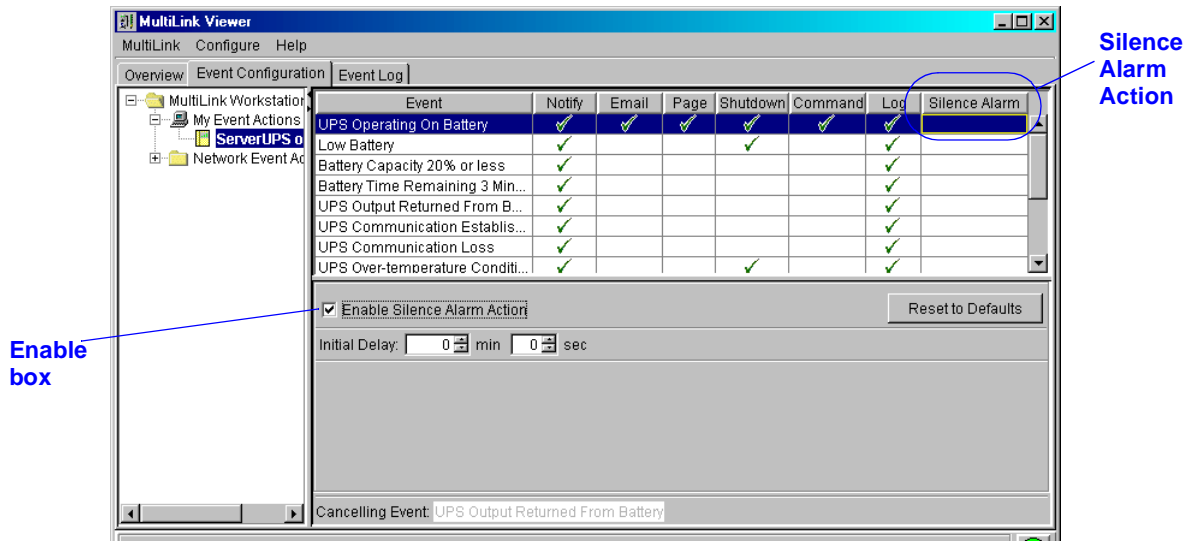
To configure the **Log** action:

- Check (✓) the **Enable Log Action** box. This is required for the action to operate.
- Use the arrows in the **Initial Delay** boxes to specify the time lapse between an event's occurrence and when the event log is created.
- The event log's file name with its full path appears in the **Log File** portion of the **Properties** section. The log's default file size is 1 MB and will hold thousands of records.
- On some platforms, MultiLink offers the option of sending duplicate log entries to the operating system log. (This feature is not available on all operating systems; see **Appendix A - Operating System Details**.)
- There is no canceling event for the **Log** action.
- At any time, click on the **Reset to Defaults** button to revert to the factory defaults for this feature.
- To save settings, click on the **MultiLink** menu at the top of the window, then click on **Save Event Configuration**.

The log file, **user.log**, is a comma-delimited file (values are separated by commas). The file's contents can be imported into an external application, such as a spreadsheet, database, text editor, or word processing program.

9.5.10 Event Actions - Silence Alarm

The **Silence Alarm** action turns off the audible alarm at the UPS for the selected Event. This might be useful for such events as maintenance, testing and similar activities.



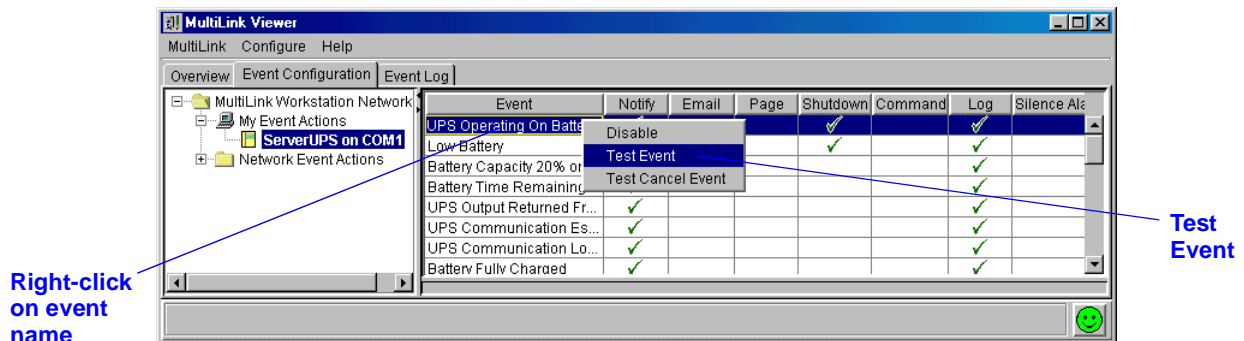
- Check (✓) the **Enable Silence Alarm Action** box. This is required for the action to operate.
- Use the arrows in the **Initial Delay** boxes to specify the time lapse between an event's occurrence and when the **Silence Alarm** action occurs.
- There is no canceling event for the **Silence Alarm** action.
- At any time, click on the **Reset to Defaults** button to revert to the factory defaults for this feature.
- To save settings, click on the **MultiLink** menu at the top of the window, then click on **Save Event Configuration**.

9.6 Testing Responses to Events

MultiLink's testing feature allows you to simulate a UPS-related event and verify the responses configured for that event. Care should be taken in preparing for any testing because, unless it is canceled, the simulation will complete all configured actions on the host computer, including shutting down the operating system. In this simulation, however, targeted client computers will not receive notifications.

To perform a test:

- Ensure that you have saved all changes to the event configuration. If you have not saved changes to the event configuration, the test will fail. To save changes, click on the **MultiLink** menu and then on **Save Event Configuration**.
- Click on the **Event Configuration** tab.
- Right-click on the name of the event you want to test.
- In the pop-up menu that appears, click on **Test Event**.



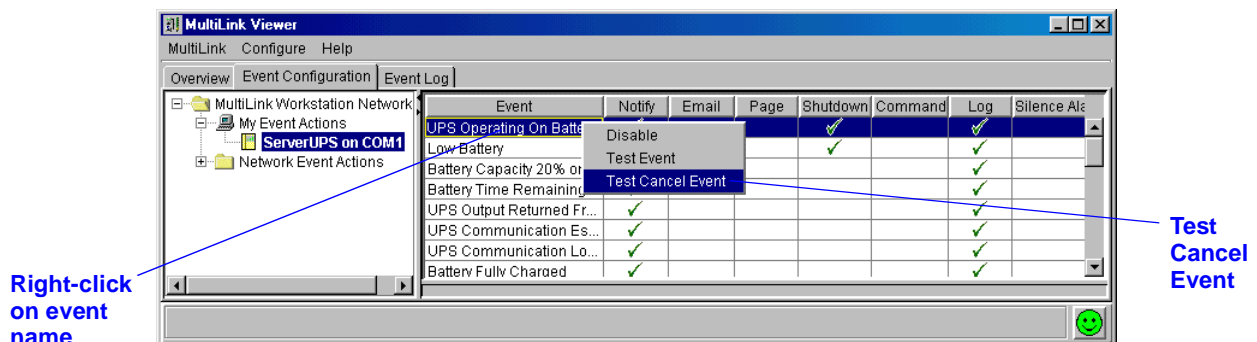
For example, if you are testing the **UPS Operating On Battery** event, the following occurs:

- If the **Notify** action is enabled, the configured notification occurs on the host computer.
- If the **Shutdown** action is enabled, a shutdown timer begins.
- If this timer expires before you cancel the test, the operating system is shut down.

Canceling an event simulation

To cancel event testing:

- Click on the **Event Configuration** tab.
- Right-click on the name of the event.
- In the pop-up menu that appears, click on **Test Cancel Event**.

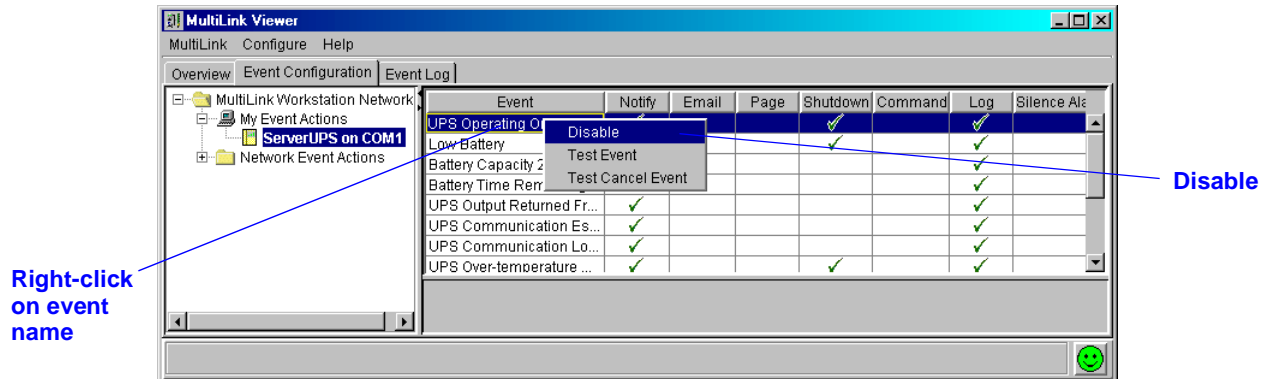


9.7 Disabling an Event

MultiLink allows you to temporarily deactivate a UPS-related event but retain all configuration settings for that event. This may be helpful to prevent unwanted interruptions at certain times. Record any disabled events so they can be re-enabled, allowing MultiLink to monitor the UPS properly.

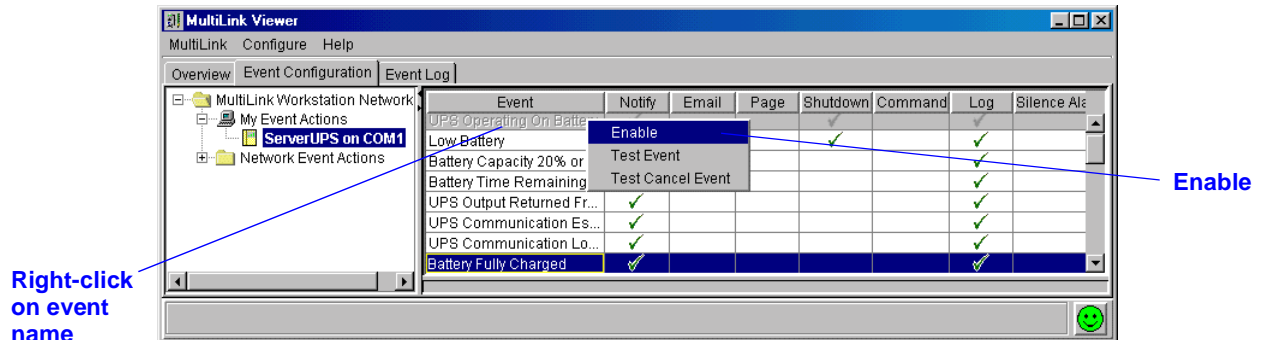
To disable an event:

- Click on the **Event Configuration** tab.
- Right-click on the name of the event you want to disable.
- In the pop-up menu that appears, click on **Disable**. The event and all its actions are grayed-out.



To re-enable an event:

- Click on the **Event Configuration** tab.
- Right-click on the name of the event.
- In the pop-up menu that appears, click on **Enable**.

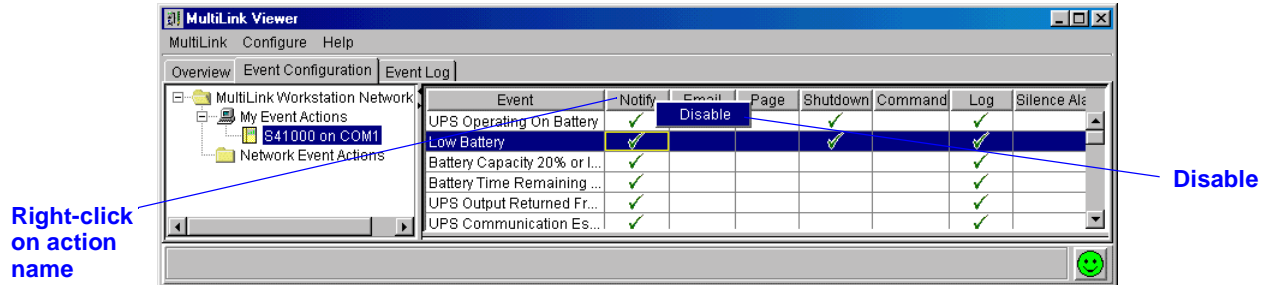


9.8 Disabling an Action

MultiLink allows temporary disabling of an action without deleting configuration settings for that action. This may be helpful to prevent unwanted interruptions at certain times. Record any disabled actions so they can be re-enabled, allowing MultiLink to monitor the UPS properly.

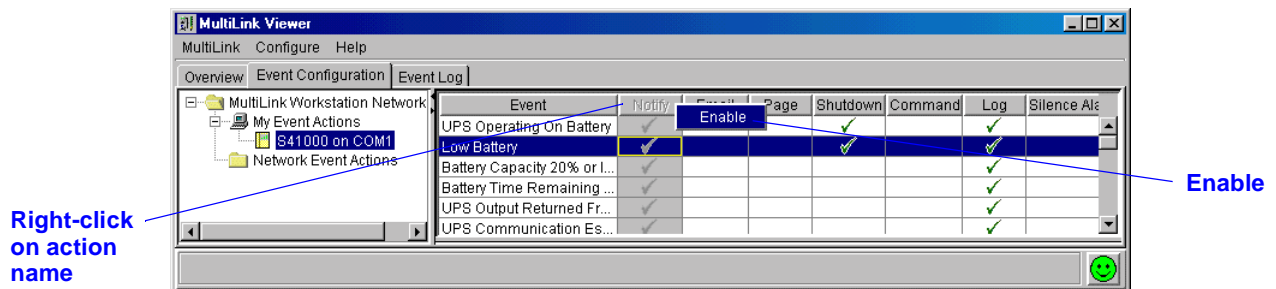
To disable an action:

- Click on the **Event Configuration** tab.
- Right-click on the name of the action you want to disable. You must right-click at the top of the column.
- In the pop-up menu that appears, click on **Disable**. The action is grayed-out.



To re-enable an action:

- Click on the **Event Configuration** tab.
- Right-click on the name of the action.
- In the pop-up menu that appears, click on **Enable**.



10.0 RUNNING MULTILINK

After installation, the MultiLink service (daemon) begins running in the background, protecting your system from data loss. It continues running constantly unless stopped through the **Service** option on the Viewer's **MultiLink** menu. The same option allows you to resume running MultiLink service without having to restart the computer.

The installation modifies the computer so that MultiLink automatically begins running each time the computer is started up and remains running in the background unless stopped through the Viewer's **MultiLink** menu.

To ensure that both MultiLink and the UPS are performing optimally, MultiLink permits the System Administrator to test the UPS battery, turn the UPS output on or off and temporarily silence a UPS alarm.

10.1 Starting or Stopping MultiLink Service

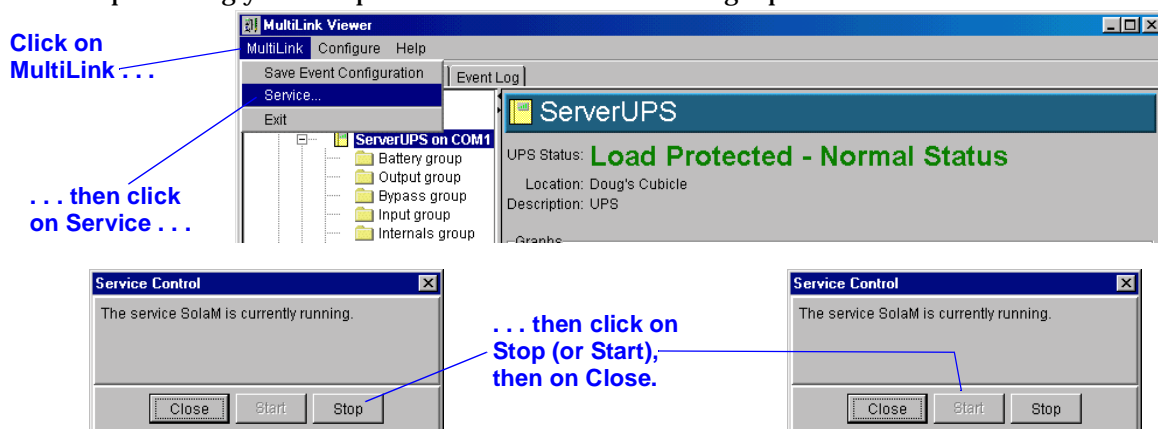
Under normal circumstances, you will not need to start or stop MultiLink service. Stopping MultiLink means that the software is unable to protect your computer network and data during a power failure.

If you wish to verify that MultiLink is running:

- Click on **MultiLink**, then on **Service**. The **Service Control** window states whether MultiLink is running.

To stop MultiLink service or to restart MultiLink later, perform the step above, then:

- Click on **Stop** to shut down the MultiLink service, or click on **Start** to restart MultiLink. Only one of these buttons is active at any time (the other button is grayed-out).
- Click on **Close** to close the window. Again, stopping MultiLink prevents the software from protecting your computer network and data during a power failure.



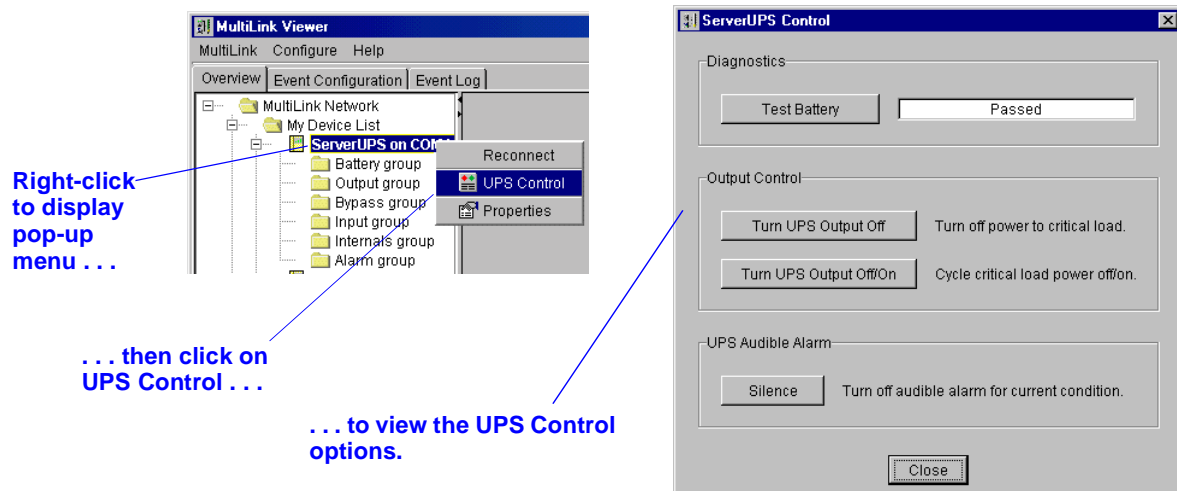
10.2 Using the UPS Control Options—SNMP and Serial Connection

MultiLink permits the System Administrator to perform the following UPS control functions:

- Test the UPS battery
- Turn the UPS output off
- Briefly turn the UPS output off and then restore power to the output
- Temporarily silence a UPS alarm

To use these options in the UPS Control dialog box:

- Click on the **Overview** tab.
- Right-click on the UPS device name to open a pop-up menu, then click on **UPS Control**.



10.2.1 Diagnostics—Testing the Battery

- Click on the **Test Battery** button to determine the condition of the UPS battery. When the test is complete, the box displays the status: **Passed** or **Failed**. (To enable automatic testing of the UPS battery, use the **Enable Automatic Battery Test** box—see **Properties - UPS Settings Tab**).

10.2.2 Output Control—Controlling UPS Output

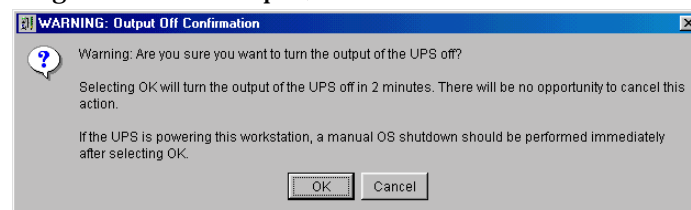
- To turn off power from the UPS to the critical load, click on the **Turn UPS Output Off** button.



WARNING

TURNING THE UPS OUTPUT OFF IS NOT RECOMMENDED. ALL LOADS PLUGGED INTO THE UPS WILL LOSE POWER WITHIN TWO (2) MINUTES. THIS MAY REQUIRE A MANUAL SHUTDOWN OF YOUR COMPUTER NETWORK.

Before turning off the UPS output, MultiLink will ask for confirmation that you wish to do so.



- To cycle the UPS output (i.e., turn UPS output power off, then return output power following a brief delay), click on the **Turn UPS Output Off/On** button in the **UPS Control** window. (To automatically restart the UPS after utility power is restored, use the **Auto Restart** box—see **Properties - UPS Settings Tab**).

10.2.3 UPS Audible Alarm—Silencing Alarm

- When the UPS sounds an alarm as a result of an event or a condition, the alarm can be temporarily silenced by clicking on the **Silence** button. This button permits the UPS to sound an alarm the next time an event or a condition occurs. (To disable the alarm for all conditions and events, use the **Enable UPS Audible Alarm** box—see **Properties - UPS Settings Tab**).

10.3 Using the UPS Control—Contact Closure

The UPS Control in the Contact Closure setup permits you to turn off the UPS output. This feature requires a special cable and is available only on certain UPS models. Contact Technical Support for information.

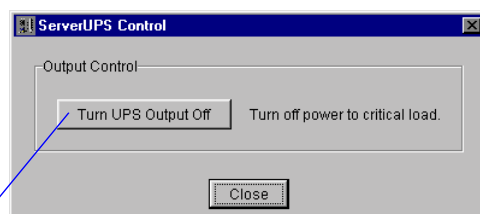
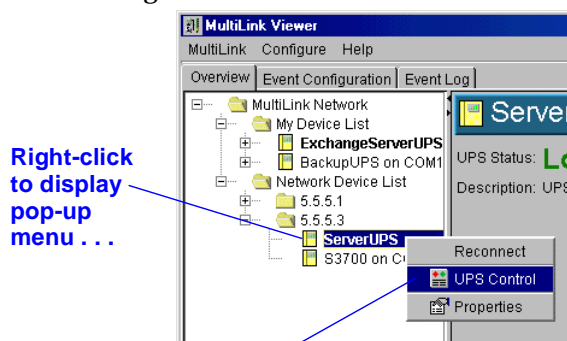


WARNING

TURNING THE UPS OUTPUT OFF IS NOT RECOMMENDED. ALL LOADS PLUGGED INTO THE UPS WILL LOSE POWER WITHIN TWO (2) MINUTES. THIS MAY REQUIRE A MANUAL SHUTDOWN OF YOUR COMPUTER NETWORK.

To open the UPS Control dialog box and turn off the UPS output:

- Click on the **Overview** tab.
- Right-click on the UPS device name to open a pop-up menu, then click on **UPS Control**.



... then click on UPS Control ...

- To turn off power to the critical load, click on the **Turn UPS Output Off** button.

11.0 MULTILINK RESPONSE TO UPS EVENTS—TYPICAL SEQUENCE

MultiLink constantly monitors the UPS and performs actions as specified in the configuration settings for each event (see **9.5 - Configuring—Event Configuration tab**).

Notification may appear on the screen in the form of a graphic (dialog box, or pop-up) or as text (console message).

Most events will be documented in the log file; some will trigger execution of a script or other program through the **Command** action, for example, to save files and close certain applications; and some will begin an orderly shutdown of the operating system.

This section describes typical sequences for the following events:

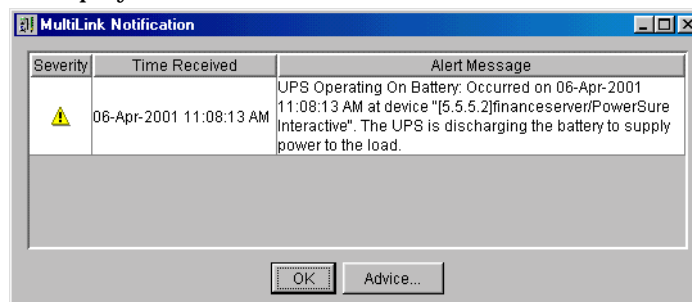
- **On Battery** - utility power has failed and the UPS is supplying power to the computer
- **Low Battery** - power drain has reduced the reserves of the UPS to a low level

For a complete list of events, see **Appendix D - List of Events**.

UPS Operating On Battery

When MultiLink detects a **UPS Operating On Battery** event, the following occurs:

1. A UPS Alert is displayed.

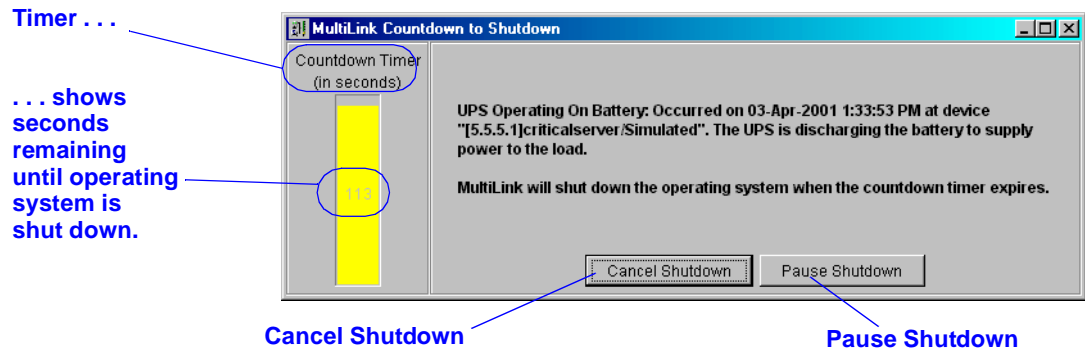


2. If the **Command** action is enabled:

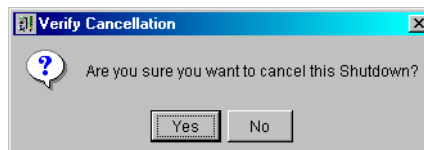
- A timer starts that may lead to executing a command that the user or System Administrator has written to perform site-specific operations for applications that have command-line options.
- If this timer expires—the duration specified during configuration—the script is executed.
- To cancel the **Command** action manually, open the MultiLink Viewer, select the **Event Configuration** tab and remove the check mark (✓) from the **Enable Command Action** box. Click on **MultiLink**, then on **Save**.

3. If the **Shutdown** action is enabled:

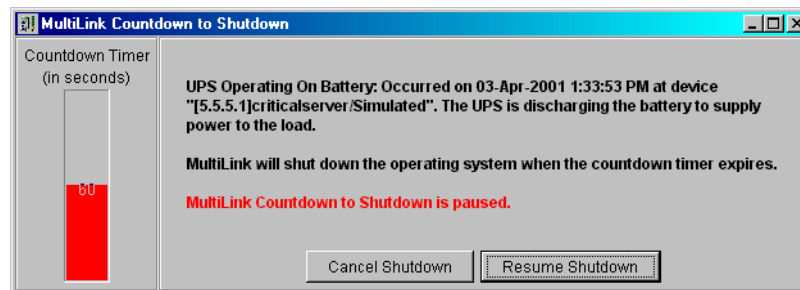
- A shutdown timer begins when **UPS Operating On Battery** occurs. The timer's duration is specified during configuration.
- If this timer expires before the canceling event **UPS Output Returned From Battery** occurs, the operating system is shut down.
- MultiLink notifies the user that a shutdown is impending.
- When two minutes remain on the shutdown timer, the **MultiLink Countdown to Shutdown** box opens.



- Clicking on **Cancel Shutdown** overrides the configuration settings and prevents the operating system from being shut down. A dialog box asks for confirmation before the shutdown is canceled.



- Clicking on the **Pause Shutdown** button suspends the shutdown process, including the timer. A dialog box confirms that the shutdown is paused and offers the options of canceling the shutdown or resuming the countdown toward an orderly shutdown of the operating system.

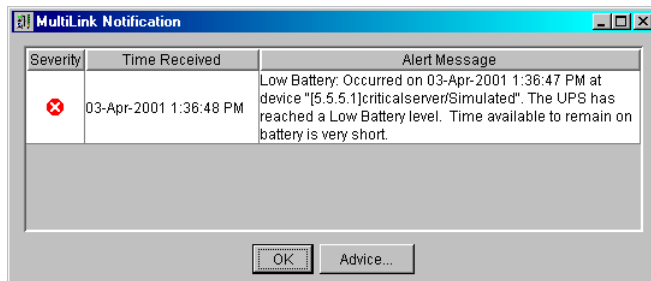


Low Battery

The **Low Battery** event functions as a safety net, prompting an orderly shutdown of the operating system before power is lost. The **Low Battery** event will override a longer on-battery timer. Timers for this event typically are set for much shorter times than for other UPS-related events.

When MultiLink detects a **Low Battery** event:

1. It displays a **UPS Alert**.



2. If the **Command** action is enabled:
 - A timer starts that may lead to executing a command that the user or System Administrator has written to perform site-specific operations for applications that have command-line options.
 - If this timer expires—the duration specified during configuration—the script is executed.
 - To cancel the **Command** action manually, open the MultiLink Viewer, select the **Event Configuration** tab and remove the check mark (✓) from the **Enable Command Action** box. Click on **MultiLink**, then on **Save**.
3. If the **Shutdown** action is enabled:
 - A shutdown timer begins when **Low Battery** occurs. The timer's duration is specified during configuration.
 - If this timer expires before the canceling event **UPS Output Returned From Battery** occurs, the operating system is shut down.
 - MultiLink notifies the user that a shutdown is impending.
 - When two minutes remain on the shutdown timer, the **MultiLink Countdown to Shutdown** box opens.
 - Clicking on **Cancel Shutdown** overrides the configuration settings and prevents the operating system from being shut down. A dialog box asks for confirmation before the shutdown is canceled.
 - Clicking on the **Pause Shutdown** button suspends the shutdown process, including the timer. A dialog box confirms that the shutdown is paused and offers the options of canceling the shutdown or resuming the countdown toward an orderly shutdown of the operating system.

12.0 UNINSTALLING MULTILINK FROM YOUR SYSTEM

To remove MultiLink from your network, run the uninstall program that came with MultiLink. For details, see **Appendix A - Operating System Details**.

13.0 SOLA/HEVI-DUTY SOFTWARE PROGRAM LICENSE AGREEMENT

SOLA/HEVI-DUTY MULTILINK SOFTWARE LICENSE

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(1) The replacement of any distribution media not meeting Sola/Hevi-Duty's warranty, or

(2) If Sola/Hevi-Duty is unable to provide you a replacement which conforms to Sola/Hevi-Duty's warranty, to refund the purchase price.

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ASSIGNMENT: You may not sublicense, assign, or otherwise transfer this license of the Software without the prior written consent of Sola/Hevi-Duty. Any such transfer of rights, duties, or obligations is void.

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MultiLink License revision September, 2001

APPENDIX A - OPERATING SYSTEM DETAILS

For details on your operating system, see:

Operating System	Refer to:
Windows 2000/NT/Me/98/95	A.1 - Windows 2000/NT/Me/98/95
Sun Solaris	A.2 - Sun Solaris
Linux	A.3 - Linux
Hewlett Packard HP-UX	A.4 - Hewlett Packard HP-UX
IBM AIX	A.5 - IBM AIX
Novell NetWare	A.6 - Novell NetWare



NOTE

*These requirements should be adequate for the simplest MultiLink installation—a single workstation connected to a UPS by serial port connection (see **Figure 1**). More complex configurations may require additional processor speed, disk space or RAM—especially if you plan to use MultiLink on a network with multiple copies of MultiLink communicating with one another.*

A.1 WINDOWS 2000/NT/ME/98/95

A.1.1 Platform-Specific Requirements

In addition to the general requirements listed in **4.0 - What is Required to Use MultiLink?**, prospective MultiLink users must also have these minimal requirements:

- Windows 2000, NT™ 4.0 with SP5 or later, Me (Millennium Edition), 98 or 95
- 200 MHz Intel Pentium-class processor
- 40 MB of free disk space
- Memory requirements
 - 256 MB of RAM—Windows 2000/NT Server
 - 128 MB of RAM—Windows 2000 Professional/NT Workstation
 - 64 MB of RAM—Windows Me/98/95
- A mouse or other pointing device
- TCP/IP network protocol

Windows 95 users must also install the following patches:

- Windows 95 Service Pack 1 (4.0.950a) or later
- Windows Socket 2 Update
- Windows Socket Update - Kernel 32 (where applicable)
- Windows 95 Year 2000 Update

For further information about these patches, go to:

<http://www.microsoft.com/windows95/downloads/contents>

A.1.2 Installation Notes

Pre-Installation Checklist—Windows 2000/NT

1. If you are not using an SNMP hardware card with your UPS, then MultiLink can use its default port settings of 3029/3027, and there is no need to disable the SNMP service with Windows 2000/NT.

If you are using an SNMP hardware card with your UPS, there can be a conflict with the SNMP ports used on Windows 2000/NT. MultiLink must take ownership of ports 162/161 to communicate with the SNMP-enabled UPS. In this case, the Windows SNMP services (if running) will cause a conflict. If you are using an SNMP hardware card, you must disable the SNMP services. To check these services, see below.

- Windows 2000—run the Computer Management application by pressing the **Start** button, then clicking on **Programs, Administrative Tools**, and finally **Computer Management**. Expand the **Services and Applications** item in the tree and then click on **Services**.
- Windows NT—open the Services window by pressing the **Start** button, then clicking on **Settings, Control Panel**, and finally **Services**.

If the services SNMP and SNMP Trap Service are not present or are shown as not running (blank status) and Disabled, you may proceed. Otherwise, these services must be stopped and/or disabled before you can install MultiLink.

2. Installation on Windows 2000/NT requires Administrative privileges.

Pre-Installation Checklist—Windows Me/98/95

On Windows Me/98/95, no additional pre-installation checks are required.

Serial Port Selection

The preconfigured serial ports are COM1 through COM4. You may select one of these or enter another as appropriate.

A.1.3 Notes on Running MultiLink

Starting MultiLink Applications

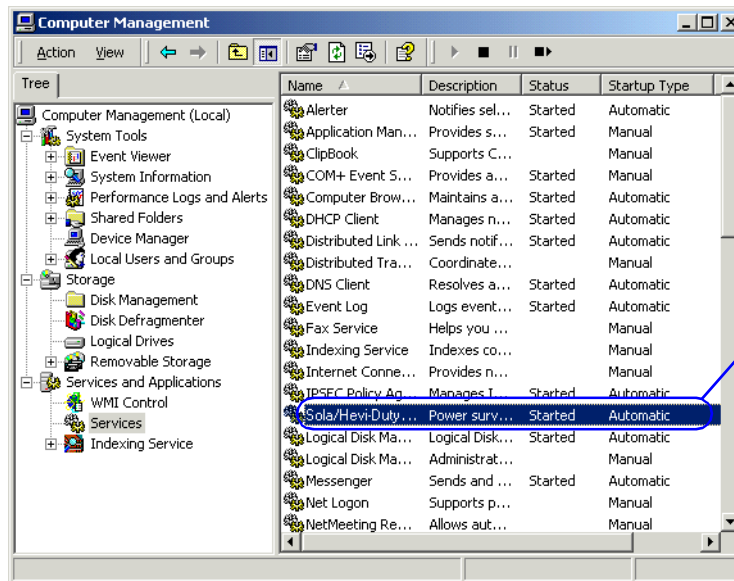
During installation, shortcuts for the MultiLink Viewer and the Uninstall function are created in the MultiLink folder in the Start menu of the user performing the installation.

To execute either of these programs, click on the **Start** button, then click on **Programs, Multi-Link**, and finally on the desired shortcut.

Verify MultiLink is Running—Windows 2000

When operating properly, MultiLink is running constantly in the background. To verify that it is doing so:

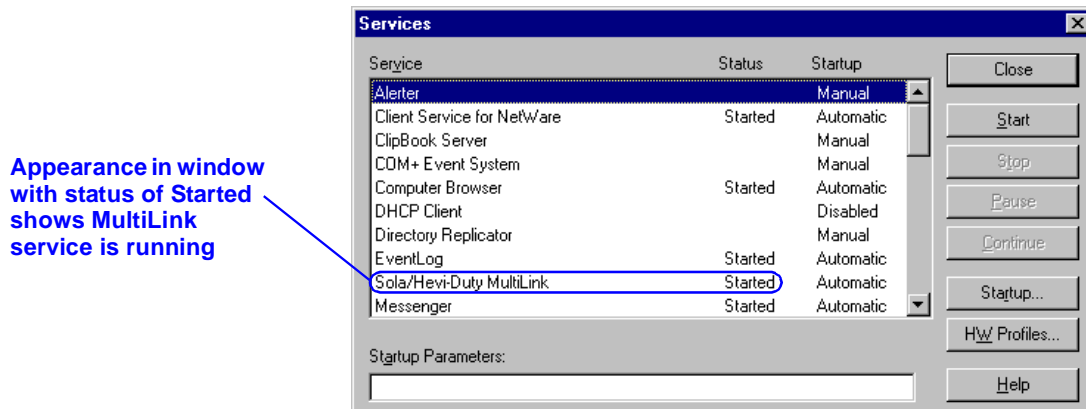
- Right-click on **My Computer** to open a pop-up menu, then click on **Manage** to open the Computer Management window as shown below. In that window, click on **Services and Applications**, then on **Services**. If the MultiLink service is running, **Sola/Hevi-Duty MultiLink** appears in the list with a status of **Started**.



Verify MultiLink is Running—Windows NT

When operating properly, MultiLink is running constantly in the background. To verify that it is doing so:

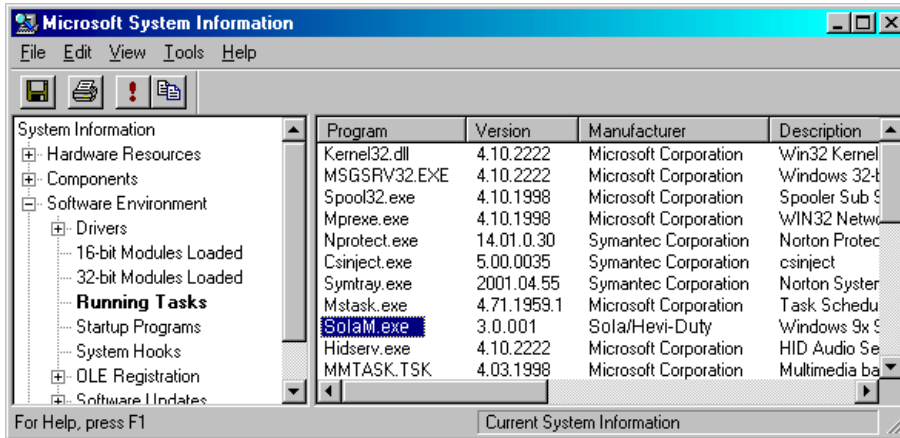
- Open the **Services** window as shown below by pressing the **Start** button, then clicking on **Settings, Control Panel**, and finally **Services**. If the MultiLink service is running, **Sola/Hevi-Duty MultiLink** appears in the list with a status of **Started**.



Verify MultiLink is Running—Windows Me/98

When operating properly, MultiLink is running constantly in the background. To verify that it is doing so:

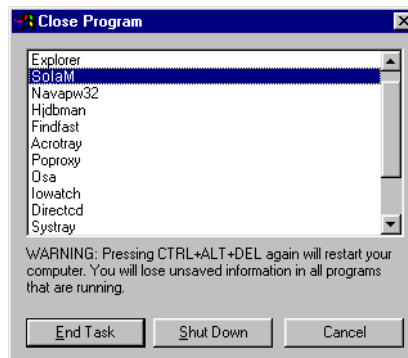
- Run the System Information utility as shown below by pressing the **Start** button, then clicking on **Programs, Accessories, System Tools**, and finally **System Information**. In the System Information tree, click on **Software Environment**, then **Running Tasks**. The **SolaM.exe** program should appear in the list.



Verify MultiLink is Running—Windows 95

When operating properly, MultiLink is running constantly in the background. To verify that it is doing so:

- Press the **Ctrl, Alt, and Delete** keys simultaneously to display the **Close Program** dialog box. The **SolaM** program should appear in the list.



Identifying a Computer's IP address

There are several ways to determine a computer's IP address. Use the one you are familiar with or the applicable method below.

For Windows 2000/NT/Me/98:

1. For Windows 2000 and NT, launch a Command Prompt window; for Windows Me and 98, launch an MS-DOS Prompt window.
2. At the prompt enter:

```
ipconfig /all | more
```
3. Execute the command by pressing the Enter key.
4. The screen will display the IP address. If the computer has more than one network adapter, the IP address will be the numbers associated with the active Network Interface Card.

For Windows 95 (also available for Windows Me/98):

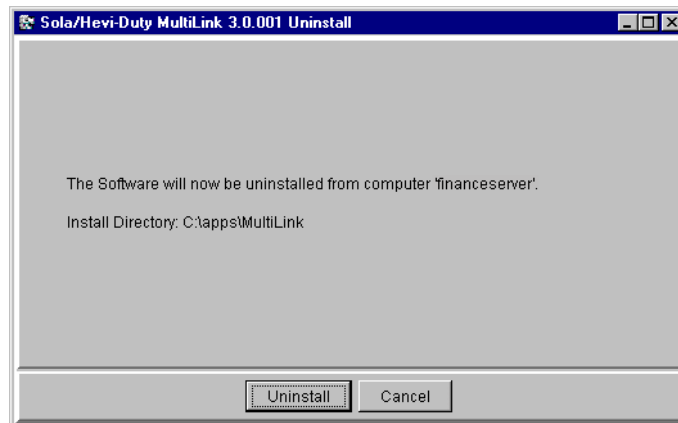
1. Launch an MS-DOS prompt window.
2. At the prompt enter:

```
winipcfg /all
```
3. Execute the command by pressing the Enter key.
4. This opens the IP Configuration window; select the active network adapter from the drop-down list.
5. The computer's IP address will show automatically beside **IP Address**.

A.1.4 Uninstalling MultiLink

To remove the MultiLink software from your computer, use the Uninstall shortcut created during installation:

- Close the MultiLink Viewer—the uninstall process will fail if the Viewer is open.
- Press the Start button, then click on **Programs, MultiLink**, and finally the **Uninstall** icon. This opens the following window.



- Click on the **Uninstall** button. A confirmation box asks if you are sure you want to uninstall the software.
- Pressing the **Yes** button will begin removing the software.
- A message box appears when the process is completed.

The uninstall process stops the MultiLink service and removes all MultiLink files from the hard drive.

A.2 SUN SOLARIS

A.2.1 Platform-Specific Requirements

In addition to the general requirements listed in **4.0 - What is Required to Use MultiLink?**, prospective MultiLink users must also have these minimal requirements:

- SunSoft Solaris on an UltraSPARC processor
- Appropriate patches applied to the operating system as noted below (for Solaris 2.6 and Solaris 7) in order to run Java 1.1.8_10. (Minimum revision levels are shown; later revisions are acceptable.)

Solaris Version	Patch ID	Required or Recommended	Description
2.6 (5.6)	106040-11	Required	X Input & Output Method patch
2.6 (5.6)	105181-15	Recommended	Kernel Update (socket close/hang)
2.6 (5.6)	105284-25	Recommended	Motif Runtime Library patch
2.6 (5.6)	105490-07	Recommended	Dynamic linker patch
2.6 (5.6)	106409-01	Recommended	* Chinese TrueType fonts patch
2.6 (5.6)	105633-30	Recommended	* OpenWindows 3.6: Xsun Patch
2.6 (5.6)	105568-13	Recommended	Libthread Patch
2.6 (5.6)	105210-19	Recommended	LibC Patch
2.6 (5.6)	105669-07	Recommended	CDE 1.2: libDTSvc Patch (dtmail)
7 (5.7)	107636-01	Required	X Input & Output Method patch
7 (5.7)	106980-05	Recommended	Libthread Patch
7 (5.7)	107607-01	Recommended	motif fontlist fontset libxm
7 (5.7)	107078-10	Recommended	* OpenWindows 3.6.1 Xsun Patch

* recommended for locales that use traditional Chinese characters

- 35 MB of free disk space (during installation, the /tmp partition must have 45 MB free)
- 128 MB of RAM
- Common Desktop Environment or Sun OpenWindows (X Window System)
- A mouse or other pointing device
- TCP/IP network protocol

A.2.2 Installation Notes

Pre-Installation Checklist

Comply with the following requirements, then return to **6.1 - Before Installing MultiLink**.

1. During installation you must be logged in as "root."
2. If using a serial port connection to the UPS, use the pmadm utility to disable ttymon from monitoring the port. To disable ttymon, you must perform the following command:

```
pmadm -l
```

This command lists the **PMTAG** and **SVCTAG** for each port. You will substitute the values of these tags in the following command:

```
pmadm -d -p {PMTAG} -s {SVCTAG}
```

3. If you are using an SNMP card, check for SNMP daemons. Execute the command `ps -ef | grep -i snmp`. If the processes snmpdx or snmpdm are running, they must be disabled before you can install MultiLink.

If you are not using an SNMP hardware card with your UPS, then MultiLink can use its default port settings of 3029/3027, and there is no need to disable the SNMP daemons.

4. Make sure the MultiLink distribution file has execute permission (`chmod +x <file>`), then execute it.

Serial Port Selection

The preconfigured serial ports are `/dev/term/a` and `/dev/term/b`. You may select one of these or enter another as appropriate.

Post-Installation Notes

The MultiLink installation program places the script `SolaM` in the `/etc/init.d` directory. It also creates `K30SolaM` and `S90SolaM` links in the `/etc/rc1.d` and `/etc/rc2.d` directories.

A.2.3 Notes on Running MultiLink

If running the Common Desktop Environment (CDE), all users meant to receive pop-up messages must allow access to their desktop. This can be accomplished by adding the following command to a common logon script (e.g., `/etc/profile`)—see the CDE documentation or `xhost` man page for more information about the desktop security mechanism:

```
/usr/openwin/bin/xhost +`hostname`
```

Note: The characters surrounding `hostname` are the grave accent (```) that is usually found on the same keyboard key as the tilde (`~`).

Starting MultiLink Applications

During installation, shell scripts are created in the product installation directory tree (e.g., `/opt/MultiLink`). These scripts may be used to execute these MultiLink applications:

- `bin/Viewer`—Viewer
- `Uninstall`—Uninstall MultiLink

For convenience, you may want to add the `bin` subdirectory to your `PATH`.

Verify MultiLink is Running

When operating properly, MultiLink is running constantly in the background. To verify that it is doing so, use `/etc/init.d/SolaM show` to get a list of the active MultiLink processes.

Identifying a Computer's IP Address

Run the following command:

```
hostname
```

You will next see output similar to this:

```
frodo
```

The result of this command will show your machine name. In this example, the machine name is `frodo`. Then run the following command:

```
more /etc/hosts
```

You will next see output similar to this:

```
127.0.0.1 localhost
10.0.0.10 frodo
10.0.0.11 bilbo
```

The result of this command will list one or more entries of IP address and name pairs. In this example:

The IP address for machine name `frodo` is `10.0.0.10`

The IP address for machine name `bilbo` is `10.0.0.11`

A.2.4 Uninstalling MultiLink

- You must log in as “root.”
- Close the MultiLink Viewer—the uninstall process will fail if the Viewer is open.
- Go to the directory where the MultiLink files are located (e.g., `/opt/MultiLink`) and run `Uninstall`.
- A confirmation box asks if you are sure you want to uninstall the software.
- Pressing the **Yes** button will begin removing the software.
- A message box appears when the process is completed. The uninstall process stops MultiLink services that are running and removes all MultiLink files from the hard drive.

A.3 LINUX

A.3.1 Platform-Specific Requirements

In addition to the general requirements listed in **4.0 - What is Required to Use MultiLink?**, prospective MultiLink users must also have these minimal requirements:

- A Linux distribution with a version 2.2 or later kernel running on a 200 MHz Intel Pentium-class processor. Use `uname -r` to determine the version of your kernel and note that, in most cases, this will be different from the version of your Linux distribution.
- GNU C Runtime Library (glibc) version 2.1 or greater. To check the version of glibc that you have, use `ls -l /lib/libc.so.6`. If this is not found, you do not have glibc on your system. If the file to which this is linked begins with `libc-2.1`, then you have an acceptable version of glibc. Consult the documentation for your Linux distribution for more information on upgrading to the required version of glibc.
- A Linux distribution that manages services (daemons) using the System V method. This uses an `init.d` directory and several `rc?.d` directories located either in `/etc/rc.d` or just `/etc` (e.g., `/etc/rc.d/init.d`).
- 35 MB of free disk space (during installation, the `/tmp` partition must have 45 MB free)
- 128 MB of RAM
- Xfree86 (X Window System) with either the KDE or Gnome desktop environment
- A mouse or other pointing device
- TCP/IP network protocol

Most recent popular Linux distributions meet these requirements. MultiLink has been tested on:

Red Hat[®] Linux 6.0 and 7.0
Caldera Systems, Inc.[®] OpenLinux[™] 2.4
SuSE Linux 6.4

MultiLink has been tested with both KDE and Gnome desktop environments.

A.3.2 Installation Notes

Pre-Installation Checklist

Comply with the following requirements, then return to **6.1 - Before Installing MultiLink**.

1. During installation you must be logged in as “root.”
2. If using a serial port connection to the UPS, you must disable `getty` or `ttyd` from monitoring that port. These services may be started during initialization via entries in `/etc/inittab` or startup scripts located in `/etc/rc.d` depending on your particular Linux distribution. MultiLink will not function properly if it is using the same serial port as one of these processes. Consult the documentation for your Linux distribution for more information on how to disable `getty/ttyd` on the UPS serial port.
3. If you are using an SNMP card, check for SNMP daemons. Execute the command `ps -ef | grep -i snmp`. If the process `snmpd` is running, it must be disabled before you can install MultiLink. Consult the documentation for your Linux distribution for more information on how to uninstall SNMP.
If you are not using an SNMP hardware card with your UPS, MultiLink can use its default port settings of 3029/3027, and there is no need to disable the SNMP daemons.
4. Make sure the MultiLink distribution file has execute permission (`chmod +x <file>`), then execute it.

Serial Port Selection

The preconfigured serial ports are `/dev/ttyS0` and `/dev/ttyS1`. You may select one of these or enter another as appropriate.

Note: Be careful to not pick the port used by the serial mouse, if your system has one.

Post-Installation Notes

The MultiLink installation program places the script `SolaM` in the `/etc/rc.d/init.d` (or `/etc/init.d`) directory. It also creates `K30SolaM` and `S90SolaM` links in several of the `/etc/rc.d/rc?.d` (or `/etc/rc?.d`) directories.

A.3.3 Notes on Running MultiLink

If running an X Window system window manager, all users meant to receive pop-up messages must allow access to their desktop. This can be accomplished by adding the following command to a common logon script (e.g., `/etc/profile`)—see the `xhost` documentation for more information about the desktop security mechanism:

```
/usr/bin/X11/xhost +`hostname`
```

Note: the characters surrounding `hostname` are the grave accent (```) that is usually found on the same keyboard key as the tilde (`~`).

Starting MultiLink Applications

During installation, shell scripts are created in the product installation directory tree (e.g., `/opt/MultiLink`). These scripts may be used to execute these MultiLink applications:

- `bin/Viewer`—Viewer
- `Uninstall`—Uninstall MultiLink

For convenience, you may want to add the `bin` subdirectory to your `PATH`.

Verify MultiLink is Running

When operating properly, MultiLink is running constantly in the background. To verify that it is doing so, use `/etc/rc.d/init.d/SolaM show` to get a list of the active MultiLink processes. You may see what appears to be a large number of processes for MultiLink. Most of these are not actual processes but are due to the implementation of Java native threads on Linux.

Identifying a Computer's IP Address

Run the following command:

```
hostname
```

You will next see output similar to this:

```
frodo
```

The result of this command will show your machine name. In this example, the machine name is `frodo`. Then run the following command:

```
more /etc/hosts
```

You will next see output similar to this:

```
127.0.0.1 localhost
10.0.0.10 frodo
10.0.0.11 bilbo
```

The result of this command will list one or more entries of IP address and name pairs. In this example:

The IP address for machine name `frodo` is `10.0.0.10`

The IP address for machine name `bilbo` is `10.0.0.11`

A.3.4 Uninstalling MultiLink

- You must log in as “root.”
- Close the MultiLink Viewer—the uninstall process will fail if the Viewer is open.
- Go to the directory where the MultiLink files are located (e.g., `/opt/MultiLink`) and run `Uninstall`.
- A confirmation box asks if you are sure you want to uninstall the software.
- Pressing the **Yes** button will begin removing the software.
- A message box appears when the process is completed. The uninstall process stops MultiLink services that are running and removes all MultiLink files from the hard drive.

A.4 HEWLETT PACKARD HP-UX

A.4.1 Platform-Specific Requirements

In addition to the general requirements listed in **4.0 - What is Required to Use MultiLink?**, prospective MultiLink users must also have these minimal requirements:

- HP-UX 11
- Appropriate patches applied to operating system. For patches required to run Java 1.1.8, see: <http://www.hp.com/products1/unix/java/infolibrary/patches.html>
- Common Desktop Environment (X Window System)
- TCP/IP network protocol
- 30 MB of free disk space on the partition where MultiLink will be installed (during installation, the /tmp directory must have 45 MB free)
- A mouse or other pointing device
- 128 MB of RAM
- A minimum of 90 threads per process. This is the kernel parameter `max_thread_proc`, which can be viewed or modified using SAM.
- HP recommends mid-range N class and low-end L-class systems and PA-8500-based workstations to obtain optimal performance when running Java applications. The recommended minimum system for running Java applications is a PA-RISC 2.0 system or a PA-RISC 1.1 system with a floating-point coprocessor. For information on setting important system parameters required for correct execution of Java programs, go to <http://www.hp.com/go/JAVA>

A.4.2 Installation Notes

Pre-Installation Checklist

Comply with the following requirements, then return to **6.1 - Before Installing MultiLink**.

1. During installation you must be logged in as “root.”
2. If using a serial port connection to the UPS, use the SAM utility to disable `getty` or `uugetty` at system startup from monitoring the port where you are connecting the UPS. Optionally, you can delete or comment the following line (or similar) from the `/etc/inittab` file:

```
ttpl:234:respawn:/usr/sbin/getty -h tty0p1 9600
```

3. If you are using an SNMP card, check for SNMP daemons. Execute the command `ps -ef | grep -i snmp`. If the processes `snmpd` or `snmpdm` are running, they must be disabled before you can install MultiLink.

If you are not using an SNMP hardware card with your UPS, MultiLink can use its default port settings of 3029/3027, and there is no need to disable the SNMP daemons.

4. Make sure the MultiLink distribution file has execute permission (`chmod +x <file>`), then execute it.

Serial Port Selection

The preconfigured serial ports are `/dev/tty0p0` and `/dev/tty1p0`. You may select one of these or enter another as appropriate.

Post-Installation Notes

The MultiLink installation program places the script `SolaM` in the `/sbin/init.d` directory. It also creates `K300SolaM` and `S900SolaM` links in the `/sbin/rc1.d` and `/sbin/rc2.d` directories.

A.4.3 Notes on Running MultiLink

If running the Common Desktop Environment (CDE), all users meant to receive pop-up messages must allow access to their desktop. This can be accomplished by adding the following command to a common logon script (e.g., `/etc/profile`)—see the CDE documentation or `xhost` man page for more information about the desktop security mechanism:

```
/usr/bin/X11/xhost +`hostname`
```

Note: The characters surrounding `hostname` are the grave accent (``) that is usually found on the same keyboard key as the tilde (~).

Starting MultiLink Applications

During installation, shell scripts are created in the product installation directory tree (e.g., `/opt/MultiLink`). These scripts may be used to execute these MultiLink applications:

- `bin/Viewer`—Viewer
- `Uninstall`—Uninstall MultiLink

For convenience, you may want to add the `bin` subdirectory to your `PATH`.

Verify MultiLink is Running

When operating properly, MultiLink is running constantly in the background. To verify that it is doing so, use `/sbin/init.d/SolaM show` to get a list of the active MultiLink processes.

Identifying a Computer's IP Address

Run the following command:

```
hostname
```

You will next see output similar to this:

```
frodo
```

The result of this command will show your machine name. In this example, the machine name is `frodo`. Then run the following command:

```
more /etc/hosts
```

You will next see output similar to this:

```
127.0.0.1 localhost
10.0.0.10 frodo
10.0.0.11 bilbo
```

The result of this command will list one or more entries of IP address and name pairs. In this example:

The IP address for machine name `frodo` is `10.0.0.10`

The IP address for machine name `bilbo` is `10.0.0.11`

A.4.4 Uninstalling MultiLink

- You must log in as “root.”
- Close the MultiLink Viewer—the uninstall process will fail if the Viewer is open.
- Go to the directory where the MultiLink files are located (e.g., `/opt/MultiLink`) and run `Uninstall`.
- A confirmation box asks if you are sure you want to uninstall the software.
- Pressing the **Yes** button will begin removing the software.
- A message box appears when the process is completed. The uninstall process stops MultiLink services that are running and removes all MultiLink files from the hard drive.

A.5 IBM AIX

A.5.1 Platform-Specific Requirements

In addition to the general requirements listed in **4.0 - What is Required to Use MultiLink?**, prospective MultiLink users must also have these minimal requirements:

- AIX 4.3 for RISC System/6000
- Appropriate “fixes” applied to operating system For specific fixes that need to be installed to run Java 1.1.8 applications on AIX, see Java 1.1.8 for AIX download area at:
<http://www-106.ibm.com/developerworks/java/jdk/index.html>
- Common Desktop Environment (X Window System)
- TCP/IP network protocol
- 30 MB of free disk space on the partition where MultiLink will be installed (during installation, the /tmp directory must have 45 MB free)
- A mouse or other pointing device
- 128 MB of RAM

A.5.2 Installation Notes

Pre-Installation Checklist

Comply with the following requirements, then return to **6.1 - Before Installing MultiLink**.

1. During installation you must be logged in as “root.”
2. If using a serial port connection to the UPS, use the SMIT utility to disable getty at system startup from monitoring the port where you are connecting the UPS.
3. If you are using an SNMP card, check for SNMP daemons. Execute the command `ps -ef | grep -i snmp`. If the process `snmpd` (or similar) is running, it must be disabled before you can install MultiLink.
If you are not using an SNMP hardware card with your UPS, MultiLink can use its default port settings of 3029/3027, and there is no need to disable the SNMP daemons.
4. Make sure the MultiLink distribution file has execute permission (`chmod +x <file>`), then execute it.

Serial Port Selection

The preconfigured serial ports are `/dev/tty0` and `/dev/tty1`. You may select one of these or enter another as appropriate.

Post-Installation Notes

The MultiLink installation program places the script `SolaM` in the `/usr/sbin` directory and modifies the `/etc/rc.tcpip` file to execute this script.

A.5.3 Notes on Running MultiLink

If running the Common Desktop Environment (CDE), all users meant to receive pop-up messages must allow access to their desktop. This can be accomplished by adding the following command to a common logon script (e.g., `/etc/profile`)—see the CDE documentation or `xhost` man page for more information about the desktop security mechanism:

```
/usr/bin/X11/xhost +`hostname`
```

Note: The characters surrounding `hostname` are the grave accent (```) that is usually found on the same keyboard key as the tilde (`~`).

Starting MultiLink Applications

During installation, shell scripts are created in the product installation directory tree (e.g., `/opt/MultiLink`). These scripts may be used to execute these MultiLink applications:

- `bin/Viewer`—Viewer
- `Uninstall`—Uninstall MultiLink

For convenience, you may want to add the `bin` subdirectory to your `PATH`.

Verify MultiLink is Running

When operating properly, MultiLink is running constantly in the background. To verify that it is doing so, use `/usr/sbin/SolaMM show` to get a list of the active MultiLink processes.

Identifying a Computer's IP Address

Run the following command:

```
hostname
```

You will next see output similar to this:

```
frodo
```

The result of this command will show your machine name. In this example, the machine name is `frodo`. Then run the following command:

```
more /etc/hosts
```

You will next see output similar to this:

```
127.0.0.1 localhost
10.0.0.10 frodo
10.0.0.11 bilbo
```

The result of this command will list one or more entries of IP address and name pairs. In this example:

The IP address for machine name `frodo` is `10.0.0.10`

The IP address for machine name `bilbo` is `10.0.0.11`

A.5.4 Uninstalling MultiLink

- You must log in as “root.”
- Close the MultiLink Viewer—the uninstall process will fail if the Viewer is open.
- Go to the directory where the MultiLink files are located (e.g., `/opt/MultiLink`) and run `Uninstall`.
- A confirmation box asks if you are sure you want to uninstall the software.
- Pressing the **Yes** button will begin removing the software.
- A message box appears when the process is completed. The uninstall process stops MultiLink services that are running and removes all MultiLink files from the hard drive.

A.6 NOVELL NETWARE

A.6.1 Platform-Specific Requirements



NOTE

MultiLink cannot be installed with Novell 4.11 on a multiprocessor machine running SMP.nlm, which prevents running Java.

In addition to the general requirements listed in **4.0 - What is Required to Use MultiLink?**, prospective MultiLink users must also have these minimal requirements:

- NetWare 4.11, 4.2, 5.0, or 5.1 server with JAVA and NETDB modules loaded
- 35 MB of free disk space on SYS: volume
- Novell's NetWare Client on Windows 2000, NT™, 98 or 95 on an Intel Pentium-class processor
- Read/write access to SYS:\System\
(SYS must be mapped to a drive on the client for installation and for operating the MultiLink Viewer)
- 45 MB of free disk space in the client's %TEMP% directory for installation
- A mouse or other pointing device on the client workstation
- TCP/IP network protocol
- Novell Java Virtual Machine (JVM) v1.1.7B (build 112811 or a higher build)
- *Optional:* support for Java's GUI (NWGFX)—to enable pop-ups on the server (Novell 5.x only)

A.6.2 Installation Notes

Pre-Installation Checklist

Before installing MultiLink on your system:

- Download the self-extracting MultiLink file and execute it on a NetWare client workstation. This workstation must have the Novell NetWare client installed on Windows 2000, NT, 98, or 95. The target for the installation will be the Novell server.
- The program will be installed into SYS:\System\ML (this cannot be changed) on the server you select.

If you are upgrading your software from MultiLink 1.1 to MultiLink 3.0:

- Stop the MultiLink 1.1 service, which is running on the server, by executing the `UNLOAD JAVA` command from the server. **(This method will kill ALL Java processes running on the server.)**



NOTE

*Do NOT use the commands `JAVA -SHOW` and `JAVA -KILL#####` to stop the MultiLink 1.1 service. Attempting to do so will result in two LX*NLMs that cannot be unloaded. It is impossible to continue the upgrade installation with `LXNWSERV.NLM` still loaded. The `JAVA NLM` must be unloaded and then reloaded for the upgrade to proceed.*

- After unloading the `JAVA NLM`, you must reload the `NLM` by issuing the command:
`LOAD JAVA`
- To verify that the `NLMs` have been unloaded, execute these two commands on the server:
`MODULES LX232`
`MODULES LXNWSERV`
- If nothing is returned from these commands, the modules have been unloaded. If they produce output, the associated `NLM` still needs to be unloaded.
- To unload an `NLM` use the command `UNLOAD ****`, where "****" is the name of the `NLM`. For example, the command to unload `LXNWSERV.NLM` would be `UNLOAD LXNWSERV`.
- Before beginning the install, issue the command `UNLOAD AIOCOMX` for each instance of `AIOCOMX` related to the use of MultiLink.

Upgrading to MultiLink 3.0 from MultiLink 1.1 leaves two lines in the AUTOEXEC.NCF file:

```
LOAD NWSNUT
LOAD AIOCOMX
```

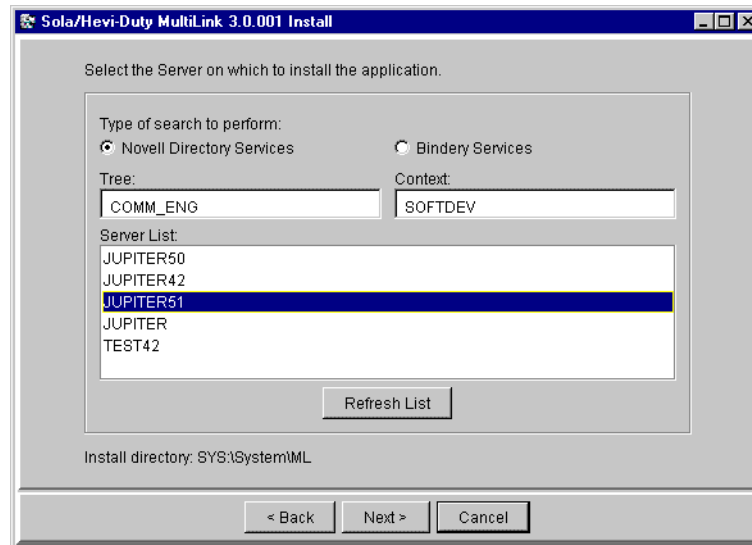
These are loads of NetWare system NLMs. Because of the way the AUTOEXEC.NCF file is “cleaned,” removing these would be dangerous because every instance of them would be removed. These other instances of the NetWare system NLMs might be required by other programs.

The old AUTOEXEC.NCF (the file’s name prior to “cleaning”) is renamed to AUTOEXEC_*.M30.

Upgrades do NOT delete the old SYS:\System\SNML search path. Uninstalling does NOT delete the SYS:\System\ML search path. However, both of these search paths will disappear when the system is rebooted.

Specify Installation Directory

During installation, MultiLink will prompt you to select the server where the software will be installed.



By default, **Novell Directory Services** is selected as the type of search to perform, showing the **Tree** and **Context** of the client.

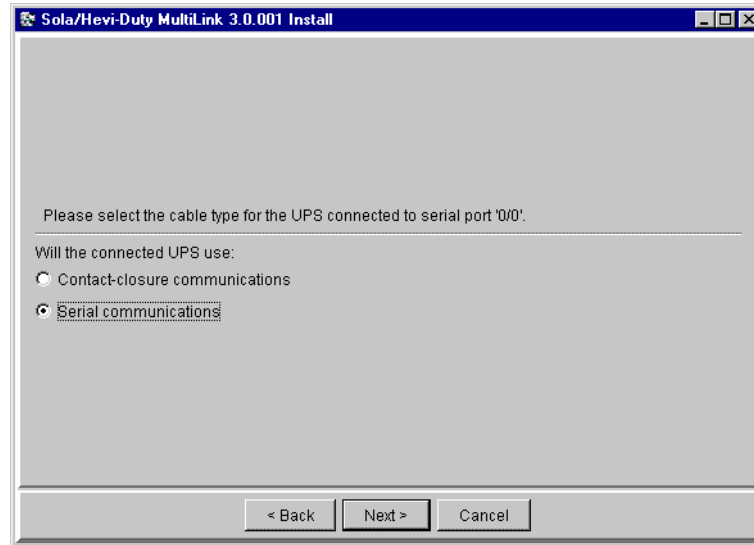
- If this is correct for the server where MultiLink is to be installed:
 - Select the server from the **Server List** box.
 - Click the **Next** button to continue.
- If this is incorrect for the server where MultiLink is to be installed:
 - Enter the correct **Tree** and **Context** information.
 - Click on the **Refresh List** button.
 - Select the server from the **Server List** box.
 - Click the **Next** button to continue.

Selecting **Bindery Services** as the type of search to perform disables the **Tree** and **Context** boxes. To continue:

- Select the server from the **Server List** box.
- Click the **Next** button to continue.

Serial Port Selection

The preconfigured serial ports are 0/0, 0/1, and 1/1 (where “0/1” represents port “1” on AIO board “0”). You may select one of these or enter another as appropriate. Be careful to not pick the port used by the serial mouse, if your Novell system has one.



NOTE

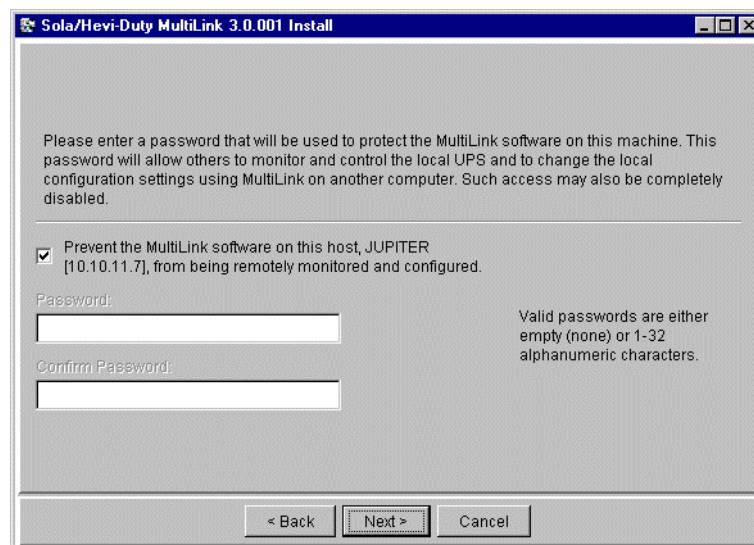
If the UPS is connected to a local serial port, MultiLink will detect at startup whether AIOCOMX is running. If it is not running, MultiLink will load one instance of AIOCOMX. This is all that is required if you are using 0/0. If MultiLink detects any instance of AIOCOMX at startup, it will not load any additional instances. If you are using 0/1 or 1/1 for MultiLink, you will need to make sure the AUTOEXEC.NCF file has an appropriate number of LOAD AIOCOMX statements.

Restrict of Allow Access to Configuration Settings

A password can be used to protect MultiLink’s configuration settings from unauthorized users. By default, during installation on a Novell server, MultiLink allows remote monitoring and configuration.

This default can be changed, but doing so limits the functionality of the Viewer when run from a client workstation.

To allow remote access, do NOT check the **Prevent** box, as shown below.



In the event you wish to prohibit remote access:

- Place a check mark in the **Prevent** box.

Post-Installation Notes

MultiLink installation adds a line containing `SYS:\System\ML\SolaM.ncf` to the server's AUTOEXEC.NCF and adds `SYS:\System\ML\bin` to the server's search path.

A.6.3 Notes on Running MultiLink

Starting MultiLink Applications

MultiLink services are configured and started during installation. Installation also creates .NCF and .LNK command files in the bin subdirectory of the product installation directory (e.g., `SYS:\System\ML\bin`). These scripts may be used to execute the following MultiLink GUI application:

- Viewer (Viewer.lnk)

The Viewer may be run at the client workstation by using Viewer.lnk.

To enable the scrollable GUI notification pop-up on a NetWare 5.x server, the server must be configured to support Java's GUI (NWGFX).

The .LNK files are provided for the convenience of starting the GUI on your NetWare client workstation. To run the applications on the NetWare client, you must have access to `SYS:\System\ML`.

Verify MultiLink is Running

When operating properly, MultiLink is running constantly in the background. To verify that it is doing so, get a list of all active Java programs running through the `java -show` command (there should be an entry with 'Classname' of 'com.liebert.dpg.executor.LxExecutor' if the MultiLink service is running).

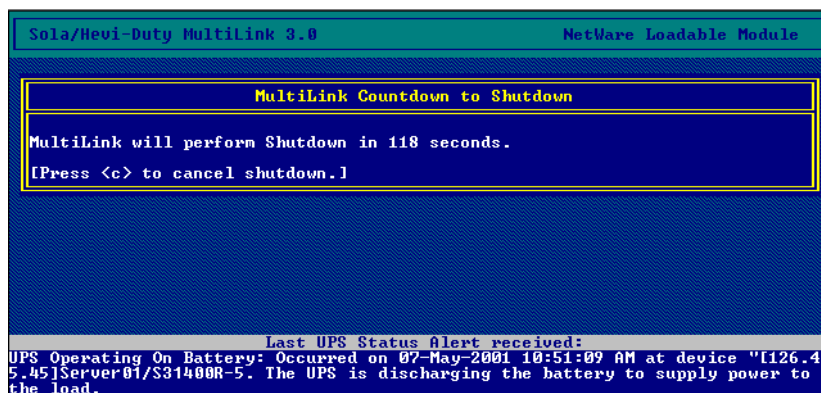
Identifying a Computer's IP Address

Refer to Novell's INETCFG instructions.

Message Format

The message format can be specified through the Event Configuration tab (see **9.5.2 - Event Actions - Notify**). The default message format for Novell is console. If pop-up notification is selected, MultiLink will use the GUI on the server (NetWare 5.x servers only).

MultiLink console notification appears in the format below. The MultiLink console application may display one or two countdown timers simultaneously.



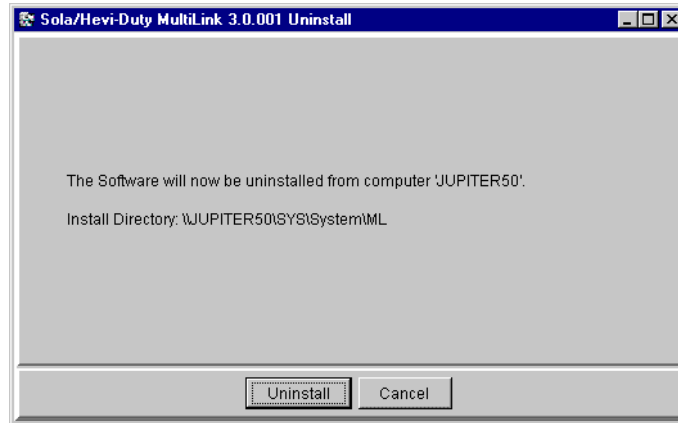
Stopping the MultiLink Service

- Stop the MultiLink service by entering "SolaM stop" at the server console.
- Restart the MultiLink service by entering "SolaM start" at the server console.

A.6.4 Uninstalling MultiLink

To remove the MultiLink software from your computer, launch the Uninstall shortcut created during installation at `SYS:\System\ML\Uninstall.lnk`. This must be done at a Windows workstation running the Novell NetWare Client:

- Close the MultiLink Viewer—the uninstall process will fail if the Viewer is open.
- Map a drive on the client workstation to access `SYS:\System\ML` from the server. Launch the Uninstall shortcut located there to access the following uninstall window.



- Click on the **Uninstall** button. A confirmation box asks if you are sure you want to uninstall the software.
- Pressing the **Yes** button will begin removing the software.
- A message box appears when the process is completed.

The uninstall process stops the MultiLink service and removes all MultiLink files from the Novell server.

APPENDIX B - MAKING YOUR OWN MULTILINK UPS CABLE

The UPS and monitoring computer can be connected in either of two ways: serial connection or contact closure. A serial connection cable permits access to MultiLink's complete functionality, but may be used only for those UPS models listed in **Table 1**. Any other UPS model must use contact closure.

MultiLink requires a custom cable. The software will NOT function properly with ordinary serial cables. Proper cables can be purchased from Sola/Hevi-Duty or made with readily available materials.

To make your own cable, follow the instructions in this section. With the exception of **Step 5**, the instructions are identical for both the serial connection cable and the contact closure cable. (You may purchase a MultiLink UPS cable by contacting your local Sola/Hevi-Duty representative, value-added reseller, or distributor. See **Table 12** for part numbers.)

You should prepare and attach the cable **before** installing MultiLink so that the system will be ready to use the software.

B.1 MATERIALS YOU WILL NEED

- Two connectors, one with pins, the other with sockets, either DB25 or DB9
- RJ11 or RJ12 cable
- Two connectors, RJ11 or RJ12, depending on the cable being used

B.2 INSTRUCTIONS

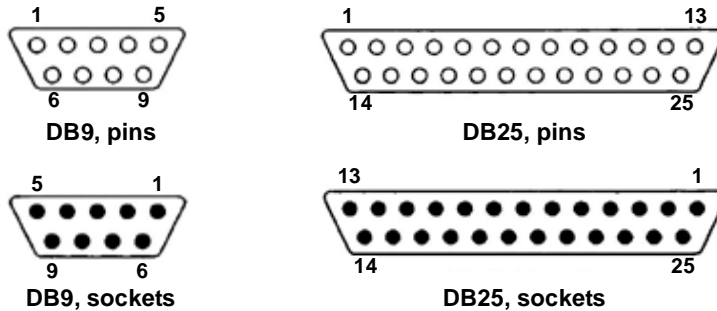
Follow these directions to build the cable:

1. Determine the connector your UPS needs

Examine the back of your UPS.

- Does it have a 9-socket or 25-socket connector?
- The diagrams in **Figure 5 - Serial Port Connectors** will help determine the type of connector you have. The circles denote pins and the dots denote sockets.

Figure 5 Serial Port Connectors



2. Determine the connector your computer needs

Examine the back of your computer.

- Does it have a 9-pin or 25-pin connector?
- Is the connector a pin or socket type? (A pin connector has protruding pins; a socket connector has holes.)
- If the back of the UPS has a socket connector, the cable connector must have pins and vice versa.
- The diagrams in **Figure 5 - Serial Port Connectors** will help determine the type of connector you have. The circles denote pins and the dots denote sockets.

3. Determine the length of the cable you need

Measure the distance between the UPS and the computer. The cable must be long enough to reach each machine's connector and to go around obstructions. Keep the cable as short as possible, preferably less than 25 feet. Do not lay the cable near electromagnetic interference sources such as AC power lines, fluorescent lights and induction motors.

4. Buy the parts

The parts are available at most electronics stores or large computer stores as well as through mail-order companies. The following illustration shows some of the parts you may need.



5. Assemble the UPS and computer connectors

Assemble the UPS and computer connectors according to the appropriate table below—a serial communication cable is connected according to **Table 8**; a contact closure communication cable is connected according to **Table 9**. The face of the connector has a number assigned to each hole or pin.

Table 8 Serial Communication

UPS Interface Port	Comments	Computer Interface Port
DB9 PINS		DB9 SOCKET
2		2
3		3
5		5
Hood Shield	USE CABLE SHIELD - Shield connected on one side only	Not Connected

Table 9 Contact Closure Communication

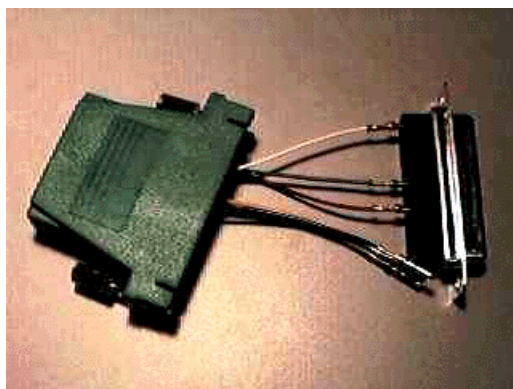
UPS Interface Port			Wire Color	Computer Interface Port		
DB25	DB9	Function		Signal	DB9	DB25
16	9	ON Battery	Red	<<<TX	3	2
17	8	ON Battery	Green	RX>>>	2	3
11	1	LOW Battery	Black	<<<RTS	7	4
9	7	LOW Battery	Yellow	DCD>>>	1	8
7	5	UPS Ground	If cable has shield, connect shield at UPS		Not connected	Not connected
19	4	UPS Off	Must NOT be connected		Not connected	Not connected



NOTE

Unlisted pins and sockets are not connected.

The following picture shows a possible pin-wire insertion for a connector.



6. Assemble the connector housing and connect the cable to it

7. Connect the cable to the computer and UPS

APPENDIX C - TECHNICAL INFORMATION & FREQUENTLY ASKED QUESTIONS

1. What is a DHCP server?

DHCP is the acronym for Dynamic Host Configuration Protocol. This protocol allows hostnames to be allocated dynamically when computers are connected to a network. This protocol is often used to remotely grant a hostname to a computer for a limited time, as when a student uses a computer for a quarter or longer. See RFC-1541 for more detailed information. (RFCs are *Request For Comment* documents that set forth regulations on how communication occurs on the Internet. These documents are controlled by the Internet Engineering Task Force (IETF) and are available for viewing at the IETF Web site.)

2. How do I identify possible TCP/IP port conflicts when using a UPS equipped with an SNMP card? How do I resolve the conflict?

TCP/IP port conflicts with ports 161 and 162 can be resolved by stopping SNMP services or daemons from running. This product does not support running the “monitor” or the “shut-down-client” on the same machine as a Network Management System (NMS).

For the proper procedure to stop the SNMP services or daemons, see **2.0 - How Do You Contact Sola/Hevi-Duty for Technical Support?** to get assistance.

3. What is a service or a daemon?

Both are processes initiated at boot time that require no user intervention to start and run. Some platforms, such as Windows NT, call them *services*; Unix terms them *daemons*. They also continue to run after the user logs off the computer.

4. Why do I see the screen flash when the UPS goes to on-battery or returns to normal?

The flash is caused by display of an empty script window (windows that are devoid of text).

5. Should I use IP addresses or hostnames to configure MultiLink?

MultiLink uses IP addresses to route alerts and notifications. It utilizes name service lookup to translate between IP addresses and hostnames. The hostnames are more easily understood by computer users who see them in notification messages and in the user log.

In general, notification messages should appear within five seconds of the triggering event. Slower display of notification messages might be caused by DNS configuration problems. If this is suspected, follow the steps in **Send a test message to clients in 9.3.5 - Properties - Clients Tab** to send a test message.

If slow display of messages is a persistent problem, Sola/Hevi-Duty suggests using IP addresses instead of hostnames. However, if TCP/IP addresses are dynamically assigned on your network, you may have to use hostnames.

APPENDIX D - LIST OF EVENTS

D.1 EVENTS FOR LOCAL HOST

The table below shows all **Events** that appear in the Viewer's **Event Configuration** tab when **My Event Actions** is selected (see **9.5 - Configuring—Event Configuration tab**).

Table 10 Events from Event Configuration tab with My Event Actions selected

Event	Description	Advice	Severity
System Shutdown Commencing	The operating system has been instructed to begin an orderly shutdown.	The operating system has been instructed to shutdown by the MultiLink event manager. Typically this occurs when the UPS is on battery, and an unattended orderly shutdown of the operating system needs to take place in order to avoid data corruption during a complete loss of power.	Critical
UPS Monitor Software Started	The MultiLink background service/daemon has started.	The software that constantly monitors the UPS and protects your computer has started. This is the background portion of the software, and is not normally visible.	Informational
UPS Monitor Software Stopped	The communication service/daemon was stopped by a user, the operating system, or by the MultiLink software.	The software that constantly monitors the UPS and protects your computer has been stopped. This is the background portion of the software, and is not normally visible.	Impaired

D.2 EVENTS FOR UPS

The table below shows all UPS-related events that appear in the Viewer's **Event Configuration** tab when the UPS is selected (see **9.5 - Configuring—Event Configuration tab**).

- Contact Closure supports only the first three events in the table below.
- The Advice portion is displayed when you click on the **Advice** button on a MultiLink pop-up notification.
- MultiLink has three **Severity** levels: Informational, Impaired and Critical.

Table 11 Events from Event Configuration tab with UPS selected

Event	Description	Advice	Severity
Events supported by all device types			
UPS Operating On Battery	The UPS is discharging the battery to supply power to the load.	The UPS has detected a power outage or momentary disturbance and is now providing battery power to your computer. If you anticipate an extended power problem, you should save your work and log out now.	Impaired
Low Battery	The UPS has reached a Low Battery level. Time available to remain on battery is very short.	Save your work and log out now as system shutdown will begin shortly. The UPS is running out of battery capacity and minimal battery backup runtime remains.	Critical
UPS Output Returned From Battery	The UPS has returned from an abnormal utility input condition.	The UPS is receiving good utility power and is in the normal mode of operation. You may continue working.	Informational
Weak Battery Condition (certain UPS models only)	The UPS has reported that the battery is in a weak condition (with utility present). This is a contact closure event only.	The UPS is reporting a weak battery condition which indicates there currently is little capacity left in the battery, or there is possibly a bad battery. If this condition persists, the UPS battery may need to be replaced. If you need further assistance, please call Sola/Hevi-Duty Technical Support.	Impaired
Events not supported by contact closure			
UPS Communication Established	The MultiLink software has established communications via the serial port. This could be from the starting of the service, or a reestablishment of communication after an interruption.	The MultiLink software has established communication with the UPS and is now monitoring status. This could be from the starting of the service, or a reestablishment of communication after an interruption.	Informational
UPS Communication Loss	An unexpected loss of communications with the UPS via the serial port.	Please verify that MultiLink is correctly configured and that the physical connection between the computer (or server) and UPS is properly installed. If you need further assistance, please call Sola/Hevi-Duty Technical Support.	Critical
UPS Output Operating On Bypass	The load has transferred to bypass and is unprotected.	The UPS is on bypass and will be unable to power your load in the event of a power failure. When a UPS experiences an internal failure, the load is switched to bypass as a protective measure. The UPS may have been manually switched to bypass by a user. If a non-user initiated bypass condition occurred, you should investigate the condition of the UPS.	Impaired
Battery Fully Charged	The UPS has reported that the battery is fully charged.	The UPS battery is fully charged. You now have the maximum amount of battery runtime available for any future power outages.	Informational

Table 11 Events from Event Configuration tab with UPS selected

Event	Description	Advice	Severity
Battery Capacity XX% or less	User defined event. The battery capacity is equal to or fallen below the defined level. This event is enabled only when operating on battery.	The battery capacity has fallen below a user-defined level. Depending on where this level is, you will want to take appropriate action such as saving your work and logging off. The Battery Capacity level notification is user configurable and can be modified in the "Event Configuration" tab in MultiLink.	Impaired
Battery Time Remaining XXX Minutes or less (While On Battery)	User defined event. The battery time remaining has fallen at or below the defined level. This event is enabled only when operating on battery.	The battery runtime remaining has fallen below a user-defined level. Depending on where this level is set, you will want to take appropriate action such as saving your work and logging off. The Battery Time Remaining notification is user configurable and can be modified in the "Event Configuration" tab in MultiLink.	Impaired
UPS Over-temperature Condition	The temperature of the UPS internal components is operating above the normal temperature range.	If this condition persists, the UPS will shut off without further warning. Save your work and log out now. Check to be sure that ventilation openings to the UPS are not blocked and that the temperature outside the UPS does not exceed the maximum value listed in the manual for your unit. Some UPS models have air filters, which may be clogged. Also, be sure that the UPS is not overloaded.	Critical
UPS Output In Boost Mode	The UPS has reported it is in boost mode. Boost mode is the correction of output voltage during low input utility conditions.	To conserve battery power your UPS corrects an under voltage condition by using a boost circuit. If this under voltage condition is persistent and the UPS continually operates in boost mode and you do not experience intermittent power failures, you may be experiencing an extended brownout. It is acceptable for the UPS to operate constantly in this state.	Informational
Input Voltage High	The input voltage is higher than the nominal range of the UPS.	Your UPS will correct this problem, however if this condition is persistent, it may be indicative of a utility problem.	Informational
Output Voltage High	The output voltage is higher than the nominal range of the UPS.	The output voltage is higher than the nominal range of the UPS. This condition is serious and needs to be investigated further.	Impaired
Output Voltage Low	The output voltage is lower than the nominal range of the UPS.	The output voltage is lower than the nominal range of the UPS. This condition needs to be investigated further.	Impaired
Battery Charger Failed	The battery charger in the UPS has failed.	The UPS has been designed to detect potential problems. The battery charging circuit of the UPS is not working and the UPS should be replaced or serviced immediately.	Critical
Output Overload	The output load has exceeded the capacity of the UPS.	The size of the load on the UPS is greater than the rating on the UPS. If the UPS experiences a power failure, it will be unable to continue powering the load. Review equipment which may have been recently plugged into the UPS and remove any non-critical items. You may also need a larger capacity UPS to handle your current requirements.	Critical
Bypass Power Out Of Tolerance	The bypass input power is out of the usable range in terms of frequency or voltage.	The utility voltage or frequency is not adequate to support your load on the bypass circuit. Do not switch to bypass until utility power returns to normal.	Impaired

Table 11 Events from Event Configuration tab with UPS selected

Event	Description	Advice	Severity
Output Overload Removed	The load has returned to within the output limits of the UPS.	The size of the load being powered by the UPS is now within the acceptable range of the UPS. If you have taken steps to correct an overload condition, you have been successful. If you are frequently receiving this notification along with an Output Overload warning, you should confirm the UPS is only powering intended equipment and that an unauthorized device has not been connected to the UPS.	Informational
Bypass Power Returned To Normal	The bypass input voltage has returned to a usable range in terms of frequency or voltage.	The utility voltage and frequency are now adequate to support your load on the bypass circuit. It is safe to switch to bypass power if required.	Informational
Battery Test Initiated	The UPS has initiated a test of the battery system.	The UPS is beginning a test of the battery. Some UPS models automatically start a test of the battery on a period basis. The battery test can also be manually initiated by the MultiLink software.	Informational
Battery Test Failed	The UPS has failed a test of the connected battery.	The UPS finished a test of the battery and found a problem with the battery. It is possible that the UPS battery is failing, in which it should be replaced as soon as possible. If the battery was recently discharged, you may wish to allow it to recharge for 12 hours and try the test again to verify the results.	Critical
UPS Diagnostic Test Failed	The UPS has failed an internal diagnostic test.	The UPS diagnostic test has found a problem. Further inspection of the UPS by a qualified individual should be conducted as soon as possible.	Critical
Battery Test Passed	The UPS has performed a test of the connected battery and reported the result as "passed".	The UPS finished a test of the battery and has not found any problems. No additional steps are required at this time. The battery test should be run on a periodic basis to ensure the battery is in good condition.	Informational
UPS Diagnostic Test Passed	The UPS has performed an internal test and reported the result as "passed".	The UPS finished a test of its electronics and has not found any problems. No additional steps are required at this time.	Informational
Replace Battery	The UPS has determined that the battery needs to be replaced.	The UPS has been designed to detect potential problems. The UPS has detected a bad battery and the battery should be replaced as soon as possible.	Critical
Input Frequency Is Out Of Range	The input frequency is out of the nominal range of the UPS.	Your UPS will correct this problem, however if this condition is persistent, it may be indicative of a utility problem.	Informational
UPS Output Returned From Bypass	The output load has returned to the UPS from bypass and is now protected.	The UPS is no longer on bypass and has returned to normal mode of operation.	Informational
UPS Output Returned From Boost Mode	The UPS output has returned from boost mode. Boost mode is the correction of output voltage during low input utility conditions.	The utility voltage is within a normal range and the UPS is no longer operating on the boost circuit.	Informational
UPS Output In Buck Mode	The UPS has reported it is in buck mode. Buck mode is the correction of output voltage during high input utility conditions.	To conserve battery power your UPS corrects an over voltage condition by using a buck circuit. If this over voltage condition is persistent and the UPS continually operates in buck mode, it may be indicative of a utility problem.	Informational

Table 11 Events from Event Configuration tab with UPS selected

Event	Description	Advice	Severity
UPS Output Returned From Buck Mode	The UPS output has returned from buck mode. Buck mode is the correction of output voltage during high input utility conditions.	The utility voltage is within a normal range and the UPS is no longer operating on the buck circuit.	Informational
UPS Temperature Has Returned To A Normal Range	The temperature of the UPS internal components has returned to a normal operating range.	Internal components of the UPS have returned to a normal operating temperature.	Informational
Input Voltage Returned From High To Normal Range	The input voltage has returned from high to the nominal operating range.	The utility voltage is now within a normal range and is supplying the UPS with adequate power.	Informational
Output Voltage Returned From High To Normal Range	The output voltage has returned from high to the nominal operating range of the UPS.	The output voltage has returned to the nominal operating range of the UPS and is supplying voltage that will properly support the load.	Informational
Input Frequency Returned To Normal Range	The input frequency has returned to the nominal range of the UPS.	The utility frequency is now within a normal range and can be utilized by the UPS.	Informational
UPS Diagnostic Test Initiated	UPS diagnostic test initiated.	The UPS is performing a self-test of its electronics. The result will be issued shortly.	Informational
Ambient Over-temperature	The ambient temperature inside the UPS has reached a higher level than is recommended.	If the air temperature inside the UPS goes above the maximum level, this alarm will occur. Ensure that the UPS has adequate ventilation and that environmental conditions where the UPS is located have not changed adversely. Check to see that the ventilation openings in the UPS are not blocked and that there is adequate clearance around the unit.	Critical
UPS Returned From Ambient Over-temperature	The ambient temperature inside the UPS has returned within the normal operating level.	The internal air temperature of the UPS has returned to the normal range.	Informational
Power Module Failed	A power module in the UPS is in a failed state and needs to be replaced.	The UPS has been designed to detect potential problems. A power module connected to the UPS has failed and the UPS has taken the module offline. This may prevent the UPS from working properly, as capacity/redundancy may have been lost. The power module should be replaced.	Critical
Battery Module Failed	A battery module in the UPS is in a failed state and needs to be replaced.	The UPS has been designed to detect potential problems. A battery connected to the UPS has failed and the UPS has taken the module offline. This may prevent the UPS from working properly. The battery module should be replaced.	Critical
Internal UPS Communication Loss	Communication between UPS internal components has failed.	The internal components within the UPS are not communicating properly. There is something wrong inside the UPS that needs to be investigated.	Critical
Internal UPS Communication Restored	Communication between UPS internal components has been restored and is operating properly.	The internal components within the UPS are communicating normally now. No further action is required at this time. If you need further assistance, please call Sola/Hevi-Duty Technical Support.	Informational

Table 11 Events from Event Configuration tab with UPS selected

Event	Description	Advice	Severity
Main Control Failed	The UPS main control has failed and the unit is operating on redundant control.	The UPS has been designed to detect potential problems. The main control module of the UPS has failed. The UPS is fully functional, however system redundancy has been compromised. We recommend replacing the module to restore redundancy of the controls.	Impaired
Maximum Load Exceeded	The UPS maximum load setting has been exceeded.	This alarm is to annunciate when the UPS load has exceeded a user-defined level. This level can be set for many reasons, one of which is to ensure that additional unauthorized load is not added to the UPS which can decrease available battery runtime. This alarm may not necessarily indicate an overload condition.	Impaired
Maximum Load Returned To Normal	The UPS load has receded below the maximum load setting.	The UPS load level has returned below the user-defined level.	Informational
Redundant Control Failed	The UPS redundant control has failed and the unit is operating on main control.	The UPS has been designed to detect potential problems. The redundant control module of the UPS has failed. The UPS is fully functional, however system redundancy has been compromised. We recommend replacing the module to restore redundancy of the controls.	Impaired
UPS Power Not Redundant	The UPS is not operating in a redundant power module configuration based on the user-selectable redundancy setting.	Redundant mode is when your UPS has one or more power modules installed than is necessary to operate the current load. The UPS is currently no longer in redundant mode. While the UPS is fully rated to protect the current load, you no longer have redundant-level protection. This condition could have occurred because load has been added beyond intended levels or because a power module was removed from the system. To operate in a redundant mode, review load requirements and either replace power modules or add additional power modules.	Impaired
UPS Returned To Power Redundant	The UPS is now operating in a redundant power module configuration based on the user-selectable redundancy setting.	Redundant power modules permit the UPS to continue operating when one or more modules have failed.	Informational
Transformer Over-temperature Condition	The temperature of the UPS internal transformer is operating above the normal temperature range.	If this condition persists, the UPS will shut off without further warning. Save your work and log out now. Check to be sure that ventilation openings to the UPS are not blocked and that the temperature outside the UPS does not exceed the maximum value listed in the manual for your unit. Some UPS models have air filters, which may be clogged. Also, be sure that the UPS is not overloaded.	Critical
Transformer Temperature Has Returned To A Normal Range	The temperature of the UPS internal transformer has returned to operating in the normal temperature range.	The transformer component in the UPS has returned to a normal operating temperature.	Informational
UPS User Interface Failed	The UPS user interface (display) has failed.	The UPS has been designed to detect potential problems. The front panel of the UPS is not working properly, however the UPS continues to protect your equipment. You may continue to monitor the system status with the MultiLink software. We recommend replacing the display.	Impaired

Table 11 Events from Event Configuration tab with UPS selected

Event	Description	Advice	Severity
Battery Test Cannot Be Performed	The battery diagnostic test cannot be performed either because it is inhibited or there is a system problem.	The battery diagnostic test cannot be performed if the UPS is currently on battery power, or if there is some other unknown system problem. Verify the state of the UPS and try the test again.	Informational
UPS Diagnostic Test Cannot Be Performed	The UPS diagnostic test cannot be performed either because it is inhibited or there is a system problem.	The diagnostic self test cannot be performed This may be due to some unknown system problem. Verify the state of the UPS and try the test again.	Informational
Output Voltage Returned From Low To Normal Range	The output voltage has returned from low to the nominal operating range of the UPS.	The output voltage has returned to the nominal operating range of the UPS and is supplying voltage that will properly support the load.	Informational
UPS Output is off	The UPS output is off, the load is not supplied with power.	The UPS output has been turned off. There is no power to the load. To receive this message, this computer must be receiving power from a source other than the UPS, otherwise this event will never occur.	Critical
UPS Output is on	The UPS output has been turned on, the load is now supplied with power.	The UPS output has been turned on. There is power to the load. To receive this message, this computer must have been signalled to turn its output on, otherwise this event will never occur.	Informational

APPENDIX E - ORDERING PARTS FROM SOLA/HEVI-DUTY

The tables below list part numbers for items available from Sola/Hevi-Duty. To obtain any item, visit the Web site at <http://www.solaheviduty.com> or contact your local Sola/Hevi-Duty representative, value-added reseller, or distributor.

Table 12 Cables to Connect UPS and Computer

Part Number	Description
SML39P9S	MultiLink Serial Interface Cable
SML9P9S	MultiLink Standard Contact Closure cable for UPSs equipped with DB9 ports

Table 13 MultiLink Software on CD-ROM

Part Number	Description
SML3ACD	MultiLink Version 3.0, Single User

Table 14 MultiLink Network Shutdown Licenses

Part Number	Description
MLLKB	MultiLink License Kit—5 Computers
MLLKC	MultiLink License Kit—10 Computers
MLLKD	MultiLink License Kit—20 Computers
MLLKG	MultiLink License Kit—100 Computers
Contact your local Sola/Hevi-Duty representative, value-added reseller, or distributor.	MultiLink License Kit—Unrestricted

Table 15 MultiLink Network Administration License

Part Number	Description
MLLNA	MultiLink Network Administration License



MultiLink™

Version 3.0 Release

Technical Support

U.S.A. 1 800-377-4384
Outside the U.S.A. 1 847-763-8235
E-mail tech@solaheviduty.com
Web site <http://www.solaheviduty.com>
MultiLink Web site <http://www.solaheviduty.com/products/ups>
Worldwide FAX 1 800 538 6545
tech support

The Company Behind The Products

Sola/Hevi-Duty specializes in identifying and providing industrial power quality solutions. Sola/Hevi-Duty has a history of product innovations and excellence in customer support dating back to the early 1900's. We manufacture a variety of product solutions and offer expert advice. Sola/Hevi-Duty offers the broadest power quality line, including UPS, power conditioners, voltage regulators, shielded transformers, TVSS and power supplies..

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