

WAVEWIN

SYSTEM MONITORS

QUICK START

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Preface

This document contains information about the Wavewin Dispatch table and the Fault Data Manager applications.

This document is intended for use by individuals working in protection, engineering, and system operations.

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C H A P T E R 1

System Requirements & Installation

This chapter lists the system requirements needed for installing and running the Wavewin software. It also describes the installation procedures and provides technical support information.

System Requirements

The system requirements are listed below.

- An IBM or compatible PC with an 80486 microprocessor or higher.
- 500 Megabytes of memory.
- 2 gigabytes of available hard disk space.
- A VGA, 8514/A, or compatible graphics adapter.
- Microsoft Windows version XP or higher.

Installation

The system files are distributed in a compressed format. To install the software follow the instruction for the type of storage media distributed with this manual.

Web: To install the software from the Web access the www.wavewin.net web site. Under the “Wavewin Upgrades” link click on the Wavewin application to download. Enter your username and password. The username and password are case sensitive. Click on the software link to download the latest system’s executable files. Open the zip file and run the install.

CD: To install the software using a CD place the CD into the CD drive. The installation program will run automatically. If the installation program is not displayed, navigate to the CD’s root drive and double click on the install.exe application.

Follow the instructions to fully install the software.



Figure 1.1 Destination Folder

Define the destination folder for the system files then click Next to start the installation.

The destination folder is the location where all files are to be copied. Use the browse button to select an existing folder.



Figure 1.2 Finish Install

The install is now complete click Finish to end the installation.

Starting the Software

After you have installed the software on your computer, you are ready to begin. How you begin depends on your own style. If you like to dive right in and learn by doing the system provides on-line help to assist you. If you prefer a structured learning approach, read the quick start chapters to get familiar with the software.

To run the software, click on the installed desktop icon or open the Start menu, navigate to the installed Program folder and click on the Wavewin32 shortcut.



Technical Support

Although this system is easy to use and understand, at some point you may encounter a technical question, feel that the system has improperly operated, or have suggestions for future improvements. In either case, contact Softstuf using one of the following methods:

Phone: 215-922-6880, hours are from 9:00 a.m. to 6:00 p.m. Mon- Fri, (EST).
 Fax: 215-625-2497, response time is 24 hours.
 E-mail: support@softstuf.com, response time 24 hours.

C H A P T E R 2

Dispatch Table Quick Start

The Dispatch Table is used to request event files and meter information upon demand from one or more devices.

The dispatch table communicates to the Wavewin device manager through message files saved in the message folder. The message folder is defined in both the dispatch table (Dispatch Properties dialog) and the device manager (Save & Archive dialog). These fields must point to the same folder. The device manager polls the device(s) specified by the message files and responds with either an “Unable to Connect” or “Poll Complete” status.

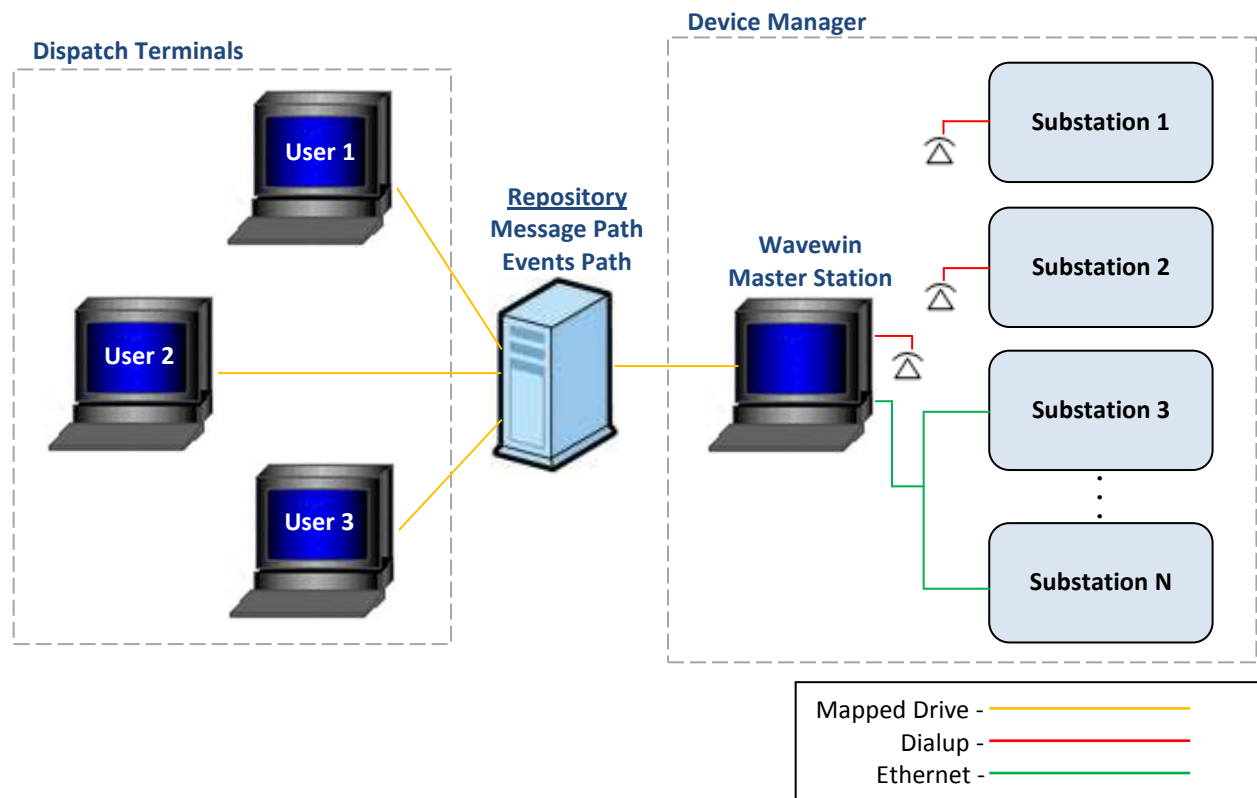


Figure 2.1 Dispatch Table and Device Manager

Dispatch Example

The Dispatch Table columns are created from the fields exported from the device manager, the fields in the event filenames and from the message files stored in the message folder.

The dispatch table will not open if the “Master Station, Station ID, Station Name.txt” does not exist in the message folder. Refer to “Exporting devices to the Dispatch Table” in the Device Manager Quick Start for more information on how to export the device manager fields.

D...	District	Station	Dev-Name	Line Len	Location	Type	Date of Fault	Time of Fault	DB ...	Status	Poll Requested At
10	RIVER	SOUTH ARKEY	LINE A (351)	28.41	-86.00	CG T	08/15/2009	23:19:00.838	2	Poll Complete	09/01/2009 22:2...
11	RIVER	SOUTH ARKEY	LINE B (MDAR)				09/02/2009	18:40:10.370	8		
12	RIVER	SOUTH ARKEY	LINE C (311)	198	+36.00	2AG T	08/15/2009	23:19:00.858	2		
13	RIVER	SOUTH ARKEY	LINE D (ALPS)				07/25/2009	13:19:00.328	3	Poll Complete	09/01/2009 22:2...
20	QUINCY	BREAK STREET	DFR-A (TRANSCAN)			BLMT	06/30/2009	14:16:02.278	3		
21	QUINCY	BREAK STREET	LINE F (DLP)		012.9	BCG	08/27/2009	14:33:55.890	3		
22	QUINCY	BREAK STREET	LINE G (387)			ER	03/11/2009	15:54:25.348	1		
23	QUINCY	BREAK STREET	LINE H (587)			MER	05/24/2009	11:30:15.656	6		
26	QUINCY	BREAK STREET	LINE I (501)			FAULT X	02/03/2009	12:35:01.292	1	Poll in Progress	09/01/2009 22:4...
27	QUINCY	BREAK STREET	LINE J (287)			TRIP	01/09/2009	12:44:04.495	1	Poll in Progress	09/01/2009 22:4...
28	QUINCY	BREAK STREET	T-3 (D60)						1	Poll in Progress	09/01/2009 22:4...
35	QUINCY	BREAK STREET	LINE M (551)			ER1	03/12/2009	05:56:05.548	1	Poll in Progress	09/01/2009 22:4...
36	QUINCY	BREAK STREET	LINE S1 (LFZP)				04/21/2009	06:23:38.000	2	Poll in Progress	09/01/2009 22:4...
37	QUINCY	BREAK STREET	LINE P (352)			TRIP3.1	03/18/2009	14:59:21.865	1	Poll in Progress	09/01/2009 22:4...
50	OCEAN	LINPOINT	DFR B (TESLA)			Converted_S1	02/13/2009	13:14:19.664	6		
52	OCEAN	SOMERS HARBOR	LINE Q (421)	48.77	32.29	CG T	09/01/2009	13:24:26.980	5		
54	BERGER	NORTHVILLE	LINE R (321)	123.81	78.04	ER	08/08/2009	15:05:01.641	3	Poll Complete	09/01/2009 22:2...
55	BERGER	NORTHVILLE	M3 BANK (187)			TRIP	07/02/2009	21:32:18.183	1		
56	BERGER	NORTHVILLE	DRF-C (HATHAWAY)				08/18/2009	14:15:00.675	5		
57	BERGER	NORTHVILLE	LINE T (DPU2000R)							Unable to Connect	09/01/2009 22:4...
67	PLEASANTON	HAMILTON	LINE S2 (BPRO)				06/09/2009	11:20:39.323	2		
68	PLEASANTON	HAMILTON	LINE R1 (TPRO)				06/09/2009	11:20:39.323	2		
69	PLEASANTON	HAMILTON	LINE X1 (LPRO)				10/15/2009	13:11:34.710	2		

Figure 2.2 Dispatch Table

The columns in the table are described in the following table. Not all columns are applicable for all devices.

Columns	Description	Source
Dev-ID	The device number assigned to the device in the device manager table.	Device Manager
Station	The station name listed in the device manager's group name field. The station is separated from the group name with a dash (-). Example: RIVER-SOUTH ARKEY	Device Manager
Group	The group name listed in the device manager's group name field. The station is separated from the group name with a dash (-). Example: RIVER-SOUTH ARKEY	Device Manager
Dev-Name	The device name assigned in the device manager title field.	Device Manager
DB Recs	The total number of event files for the device located in the event folder.	Event Folder
Line Len.	The length of the line associated with the device. The line length is added to the filename's eighth field (if available in the file) when the file is saved in the device manager. Refer to the Long File Naming Format section for more information on the structure of the file names.	Filename Fields
Location	The fault location of the event contained in the file. The fault location is added to the filename's ninth field (if available in the file) when the file is saved in the device manager. Refer to the Long File Naming Format section for more information on the structure of the filenames.	Filename Fields
Type	The type of fault for the event contained in the file. The fault type is added to the filename's tenth field (if available in the file) when the file is saved in the device manager. Refer to the Long File Naming Format section for more information on the structure of the filenames.	Filename Fields
Date of Fault	The date of the fault listed in the file. The date of	Filename Fields

Columns	Description	Source
	the fault is added to the filename's first field when the file is saved in the device manager. Refer to the Long File Naming Format section for more information on the structure of the filenames.	
Time of Fault	The time of the fault listed in the file. The time of the fault is added to the filename's second field when the file is saved in the device manager. Refer to the Long File Naming Format section for more information on the structure of the filenames.	Filename Fields
Status	The status of polling for the device. Refer to the Dispatch Polling section for more information on how devices are polled.	Message Folder
Poll Requested At	The date and time the last poll was requested for the device.	Message Folder
Poll Completed At	The date and time the last poll was completed for the device.	Message Folder
Poll Devices	The device number sequence to poll to download the latest events and meter information from the device.	Device Manager
Event Files	The path and filename of the latest event downloaded.	Event Folder

Open the Dispatch Table

The dispatch table can be opened 3 ways, from the file manager, from the device manager and through a command line parameter. To open the Dispatch Table from the file manager, select the "Dispatcher Table..." menu option under the "Options" menu. To open the Dispatch Table from the device manager, select the "Dispatcher Table..." menu option under the "Options" menu. The command line option is described in the next section.

The first time the dispatch table is opened the "Dispatch Properties" dialog is displayed. The "Message & Logs Path" and the "Event Path" must be specified prior to opening the dispatch table. These folders must be the same folders defined in the "Save & Archive" dialog in the device manager. Enter the folder where the polling messages are saved and enter the folder where the event files are saved.

The dispatch table also has an automatic refresh option that will automatically refresh the event and status information. To turn the automatic refresh option on, click on the "Turn ON Automatic Refresh" checkbox. Checked = ON. Also, enter the automatic refresh period. The period is specified in seconds. The default is 30 seconds.

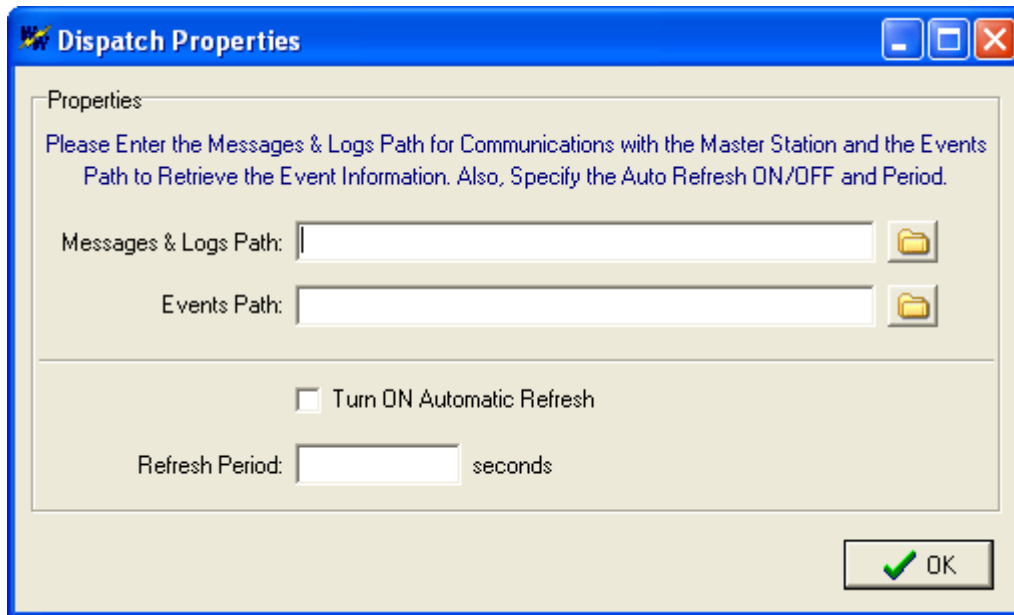


Figure 2.3 Dispatch Properties Dialog

COMMAND LINE PARAMETER

The Dispatch Table can be automatically opened when Wavewin runs using the command line parameters. To add the “dispatcher” command line parameter opposite click on the Wavewin icon or shortcut. Add “dispatcher” after the Wavewin folder and filename in the target field. .

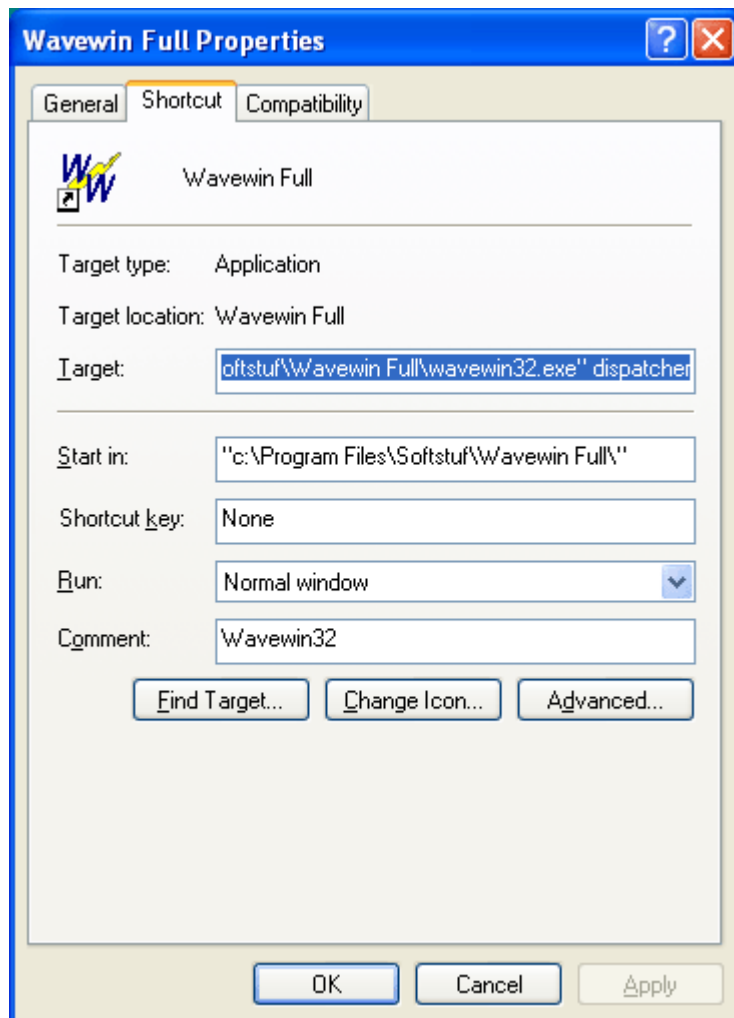


Figure 2.4 Dispatch Table – Command Line Parameter

Dispatch Polling

Polling of the devices is initiated from the Dispatch table. To request a poll first mark all the devices to poll. Marked devices are displayed in red. Next, click on the Poll Request button  in the button menu or select the “Request Poll” menu option under the “Options” menu. A message dialog is displayed listing the current status of each device requested.

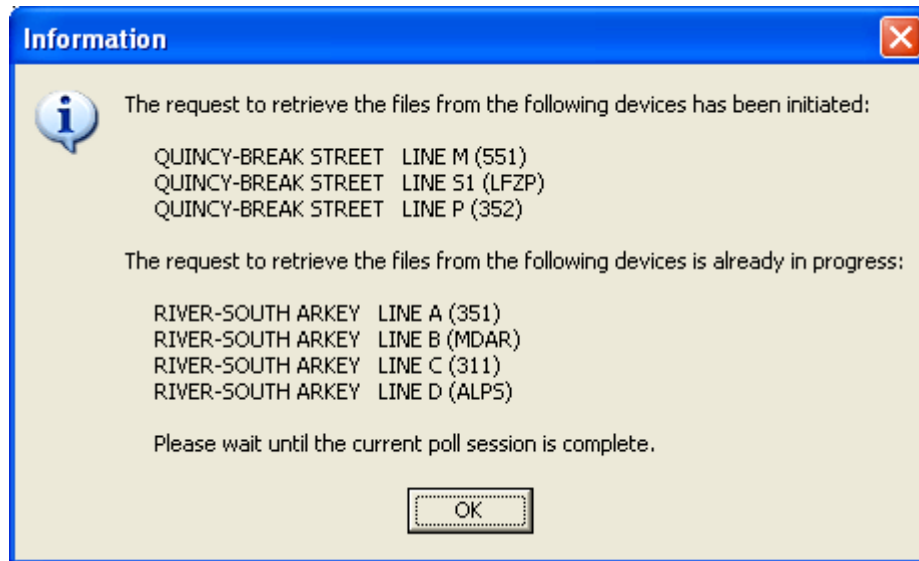


Figure 2.5 Poll Status Message

The devices that can be polled are listed under the “initiated” list and the devices that are already scheduled to be polled are listed under the “already in progress” list. The “Status”, “Poll Initiated At” and “Poll Complete At” columns display the status of the poll. The “Status” column has the following updates:

- **Poll Requested:** When a poll is requested the dispatch table saves a POL message in the message folder for each device marked. The Status column is updated with “Poll Requested” and the Poll Requested At column is updated with the date and time the poll was requested.
- **Poll in Progress:** The device manager monitors the message folder for POL files. Once it sees a POL file it starts the polling process and renames the POL file to a CAL file indicating the poll is in progress. The dispatch table also monitors the message folder. When it sees a CAL file it updates the Status column to “Poll in Progress”.
- **New Files:** During the polling process the dispatch table checks if new event files were downloaded. At each automatic refresh period the dispatch table will count the number of event files in the events folder. If the number of event files counted is greater than the device’s DB Recs column then the Status column is updated with “New Files”.
- **Poll Complete:** When a poll is successfully completed the device manager will rename the CAL file to a DON file. The dispatch table will update the Status column with “Poll Complete” and update the Poll Completed At column with the date and time the poll completed.
- **Unable to Connect:** When the device manager encounters a problem connecting to the device the CAL file is renamed to an NCR file. The dispatch table will update the Status column with “Unable to Connect” and update the Poll Completed At column with the date and time the poll completed.

Table Features

The following sections describe the main features in the dispatch table.

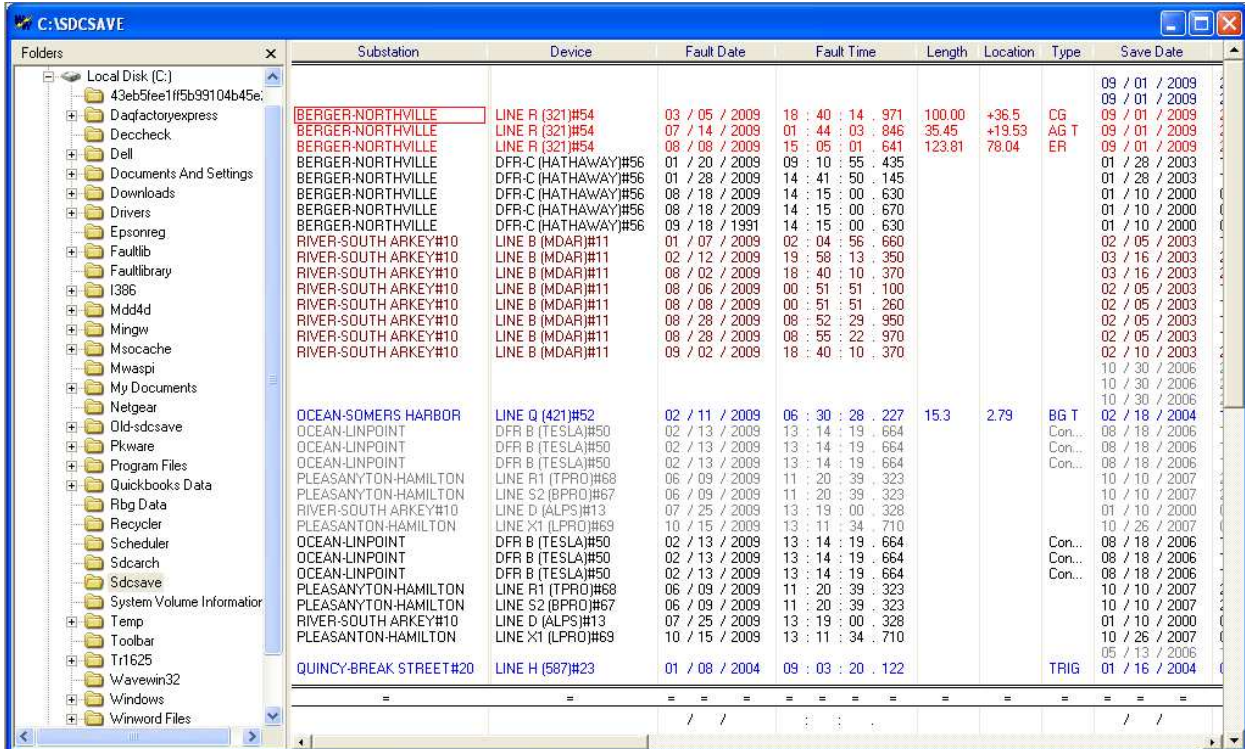
REQUESTING A POLL

To request a poll first mark the devices to poll. Next, either click the poll request button in the button menu  or select the “Request Poll” menu option under the “Option” menu.

The status of the poll is displayed in the “Status”, “Poll Requested At” and “Poll Completed At” columns. The “Status” column updates when the poll is started and when it is completed. It also indicates if new event files have been downloaded. The “Poll Requested At” displays the date and time the last poll was requested. The “Poll Completed At” is updated once the poll has been completed. The time difference between the Poll Requested At and the Poll Completed At shows how long it took to complete the poll.

DISPLAYING EVENT FILES

All the events downloaded from the devices are saved to the events folder. To list the events for a specific device double click on the device in the dispatch table. All event, history and summary files for the selected device are marked and group at the top of the file manager table.



Substation	Device	Fault Date	Fault Time	Length	Location	Type	Save Date
BERGER-NORTHVILLE	LINE R (321)#54	03 / 05 / 2009	18 : 40 : 14	971	100.00	CG	09 / 01 / 2009
BERGER-NORTHVILLE	LINE R (321)#54	07 / 14 / 2009	01 : 44 : 03	846	35.45	AG T	09 / 01 / 2009
BERGER-NORTHVILLE	LINE R (321)#54	08 / 08 / 2009	15 : 05 : 01	641	123.81	ER	09 / 01 / 2009
BERGER-NORTHVILLE	DFR-C (HATHAWAY)#56	01 / 20 / 2009	09 : 10 : 55	435			01 / 28 / 2003
BERGER-NORTHVILLE	DFR-C (HATHAWAY)#56	01 / 28 / 2009	14 : 41 : 50	145			01 / 28 / 2003
BERGER-NORTHVILLE	DFR-C (HATHAWAY)#56	08 / 18 / 2009	14 : 15 : 00	630			01 / 10 / 2000
BERGER-NORTHVILLE	DFR-C (HATHAWAY)#56	08 / 18 / 2009	14 : 15 : 00	670			01 / 10 / 2000
BERGER-NORTHVILLE	DFR-C (HATHAWAY)#56	09 / 18 / 1991	14 : 15 : 00	630			01 / 10 / 2000
RIVER-SOUTH ARKEY#10	LINE B (MDAR)#11	01 / 07 / 2009	02 : 04 : 56	660			02 / 05 / 2003
RIVER-SOUTH ARKEY#10	LINE B (MDAR)#11	02 / 12 / 2009	19 : 58 : 13	350			03 / 16 / 2003
RIVER-SOUTH ARKEY#10	LINE B (MDAR)#11	08 / 02 / 2009	18 : 40 : 10	370			02 / 05 / 2003
RIVER-SOUTH ARKEY#10	LINE B (MDAR)#11	08 / 06 / 2009	00 : 51 : 51	100			02 / 05 / 2003
RIVER-SOUTH ARKEY#10	LINE B (MDAR)#11	08 / 08 / 2009	00 : 51 : 51	260			02 / 05 / 2003
RIVER-SOUTH ARKEY#10	LINE B (MDAR)#11	08 / 28 / 2009	08 : 52 : 29	950			02 / 05 / 2003
RIVER-SOUTH ARKEY#10	LINE B (MDAR)#11	08 / 28 / 2009	08 : 55 : 22	970			02 / 10 / 2003
RIVER-SOUTH ARKEY#10	LINE B (MDAR)#11	09 / 02 / 2009	18 : 40 : 10	370			10 / 30 / 2006
OCEAN-SOMERS HARBOR	LINE Q (421)#52	02 / 11 / 2009	06 : 30 : 28	227	15.3	BG T	02 / 18 / 2004
OCEAN-LINPOINT	DFR B (TESLA)#50	02 / 13 / 2009	13 : 14 : 19	664		Con...	08 / 18 / 2006
OCEAN-LINPOINT	DFR B (TESLA)#50	02 / 13 / 2009	13 : 14 : 19	664		Con...	08 / 18 / 2006
OCEAN-LINPOINT	DFR B (TESLA)#50	02 / 13 / 2009	13 : 14 : 19	664		Con...	08 / 18 / 2006
PLEASANTON-HAMILTON	LINE R1 (TPRO)#68	06 / 09 / 2009	11 : 20 : 39	323			10 / 10 / 2007
PLEASANTON-HAMILTON	LINE S2 (BPRO)#67	06 / 09 / 2009	11 : 20 : 39	323			10 / 10 / 2007
RIVER-SOUTH ARKEY#10	LINE D (ALPS)#13	07 / 25 / 2009	13 : 19 : 00	328			01 / 10 / 2000
PLEASANTON-HAMILTON	LINE X1 (LPRO)#69	10 / 15 / 2009	13 : 11 : 34	710			10 / 26 / 2007
OCEAN-LINPOINT	DFR B (TESLA)#50	02 / 13 / 2009	13 : 14 : 19	664		Con...	08 / 18 / 2006
OCEAN-LINPOINT	DFR B (TESLA)#50	02 / 13 / 2009	13 : 14 : 19	664		Con...	08 / 18 / 2006
OCEAN-LINPOINT	DFR B (TESLA)#50	02 / 13 / 2009	13 : 14 : 19	664		Con...	08 / 18 / 2006
PLEASANTON-HAMILTON	LINE R1 (TPRO)#68	06 / 09 / 2009	11 : 20 : 39	323			10 / 10 / 2007
PLEASANTON-HAMILTON	LINE S2 (BPRO)#67	06 / 09 / 2009	11 : 20 : 39	323			10 / 10 / 2007
RIVER-SOUTH ARKEY#10	LINE D (ALPS)#13	07 / 25 / 2009	13 : 19 : 00	328			01 / 10 / 2000
PLEASANTON-HAMILTON	LINE X1 (LPRO)#69	10 / 15 / 2009	13 : 11 : 34	710			10 / 26 / 2007
QUINCY-BREAK STREET#20	LINE H (587)#23	01 / 08 / 2004	09 : 03 : 20	122		TRIG	05 / 13 / 2006
							01 / 16 / 2004

Figure 2.6 Event List

To view only the event files first select the device then click on the “View Events” button  in the button menu or select the “View Events...” menu option under the “Options” menu. To view only the history files click on the “View History” button  or select the “View History...” menu option under the “Options” menu.

To return to the dispatch table press the ESC key in the file manager or click the “Back” button  Back in the system toolbar.

VIEWING METER INFORMATION

Each time a device is polled the meter information is also downloaded (VA, VB, VC, & IA, IB IC). To view the meter values select the desired device then click on the “Meter Information” button  in the button menu or select the “View Meter Values...” menu option under the “Options” menu. The meter information

is displayed is an ASCII text editor. To return to the dispatch table press the ESC key in the ASCII editor or click the “Back” button  Back in the system toolbar.

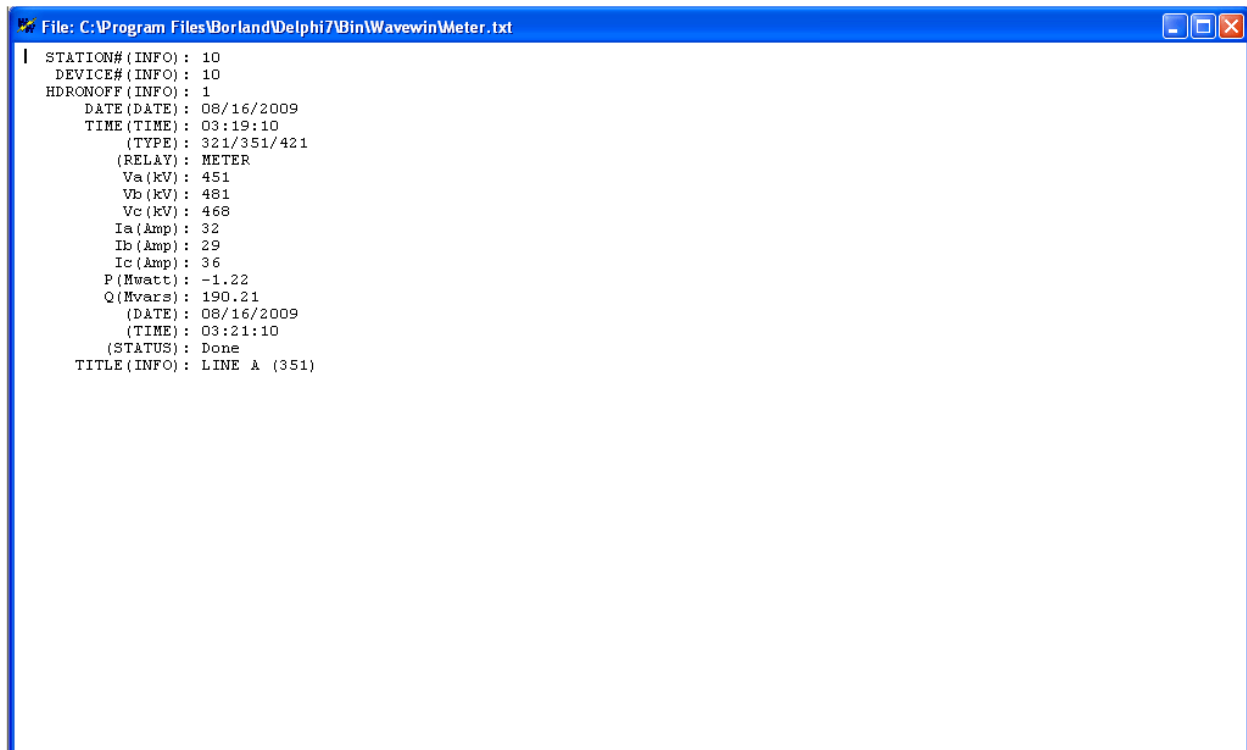


Figure 2.7 Meter Information

REFRESH THE TABLE

The Dispatch Table columns can be manually or automatically refreshed. To have the table automatically refreshed open the “Dispatch Properties” dialog from the “Options” menu.

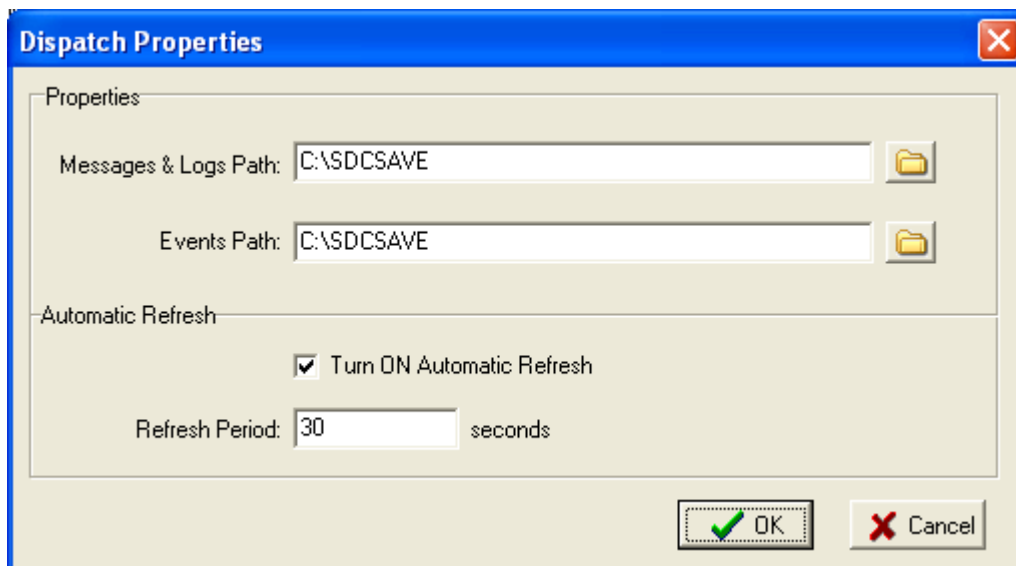


Figure 2.8 Automatic Refresh

Click on the “Turn ON Automatic Refresh” checkbox. If the box is checked the automatic refresh is ON. Also, enter the refresh period. The period is measured in seconds. The default is 30 seconds. The automatic refresh will update the event and status columns only.

To manually refresh the table click on the Refresh button  in the button menu. All of the columns in the table are updated.

CUSTOMIZING THE DISPATCH TABLE

The columns displayed in the table can be repositioned through the “Table Properties” menu option under the “Options” menu. Use the Move Up and Move Down buttons to change the position of a column. The table columns can also be resized. Position the mouse over the column separator in the table and drag the mouse to the desired location or double click on a column separator to resize the column to the largest display.

The size of the font displayed in the table can also be changed. Use the “Table Font Size” drop down list to select the desired font.

The way a device is selected (marked) in the table is defined in the “File Marking” field. To follow the Window’s convention, select the “Windows- Ctrl-Click” selection. To have a file selected, using a single mouse click, select the “Single Mark Click” selection. The Single Mark Click toggles a device from selected (marked) or unselected.

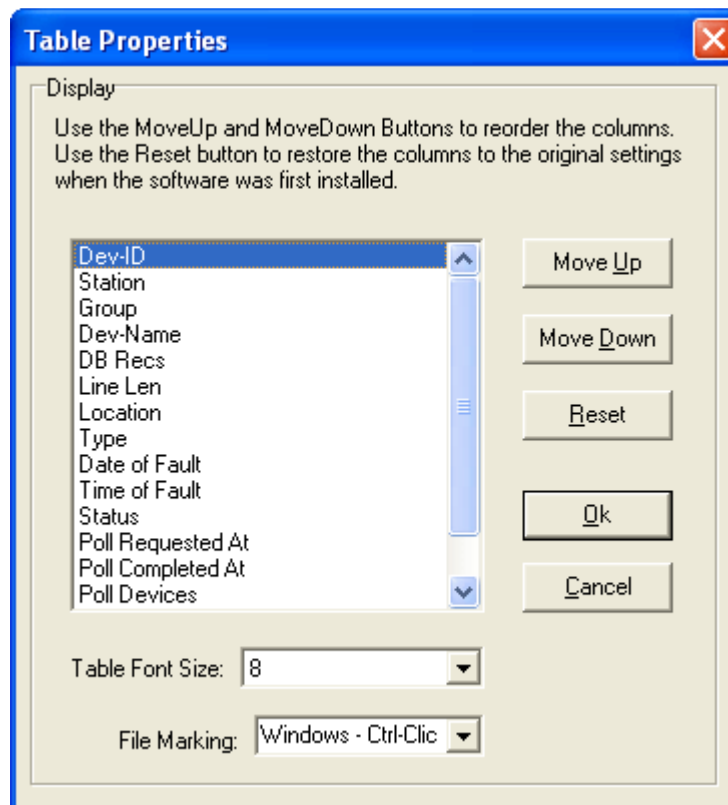


Figure 2.9 Device Display Dialog

QUERYING DEVICES

The query fields are used to search for specific information in the dispatch table. Query fields are located below the table. Use the tab key to move the cursor from the device table to the query fields and the up

arrow to return to the table. Use the Ctrl-Left/Right arrow keys to move between the query fields. Each field contains a criteria and an operator.

The criterion is directly entered from the keyboard, and may include the “*” and “?” wild cards. Operators are located above the criteria fields and can be changed by clicking the mouse button on the operator symbol or by pressing the F9 key. The selectable options include equal to (=), less than (<), and greater than (>).

[illegible]

Figure 2.10 Query Fields

When a query is launched, the engine numerically compares the specified criteria with the information in the table. If numerical comparison is not possible then it symbolically compares. When multiple fields are defined, the engine searches for a match on the first field “AND” on the second field “AND” on the third field and so on.

Three query options are available: Query All, Query Marked, or Query Unmarked. Devices that meet the specified query requirements are marked, grouped, and displayed at the top of the table. Use the tab and Ctrl-Left/Right arrow keys to navigate through the query fields and the <enter> key to execute the query.

SORTING DEVICES

The column headers displayed at the top of the table are used to sort the devices in ascending or descending order. Use the Sort menu options to sort all or marked devices with respect to the selected sort field. To set the sort field, place the cursor in the desired column and select “Set Sort Field” from the “Sort” menu. Clicking on the column header also sets the active sort field. The active sort field is displayed in the status bar at the bottom of the window. The active sort column header displays the sort order

Dev-Name

MARKING/UNMARKING DEVICES

Devices are marked and unmarked through the “Mark” menu option, the spacebar, or the mouse button. Use the shift+mouse click button to mark a group of devices or the ctrl+mouse click button to randomly mark devices. Marked devices are displayed in red and can be grouped (Alt+M,G), sorted (Alt+S), printed (Alt+P,P) or polled (Alt+O,R).

DELETING DEVICES

Devices must be marked in order to delete them from the table. To delete a device, mark the device and press the delete key or select "Delete" from the "File" menu. The software prompts for confirmation, click **Yes** to continue or **No** to Cancel.

Devices that are deleted from the Dispatch table will be restored the next time the Dispatch Table is opened or a manual refresh is selected.

SAVING THE DISPATCH TABLE

The device information listed in the Dispatch table can be saved to a .csv file. When the dispatch table is opened all the device information displayed in the columns is saved to the Dispatchers Table.csv file located in the Wavewin folder. To save the current state of the dispatch table to this file select the “Save” menu option under the “File” menu.

To save the current state of the Dispatch table to a new file select the “Save As...” menu option under the “File” menu. The window’s “Save As” dialog is displayed. Select the destination folder and enter the filename using the .csv file extension. The dispatch files can be used for generating report files.

C H A P T E R 3

Fault Data Manager Quick Start

The Fault Data Manager is used to manage fault files named using the IEEE Long File Naming Format (C37.232). The Wavewin Master Station polls the connected devices for event, summary and history files. All files extracted from the devices (DFRs, Relays, Meters and more) are saved using the IEEE Long File Naming Format (C37.232). The fault data manager also allows for requesting an immediate poll of all marked devices. The device table located in the top right section of the window sends messages to the Wavewin master station requesting to poll all the marked devices for the latest event, summary and history files. The Status, Poll Requested At and Poll Completed At columns list the current state of a poll request.

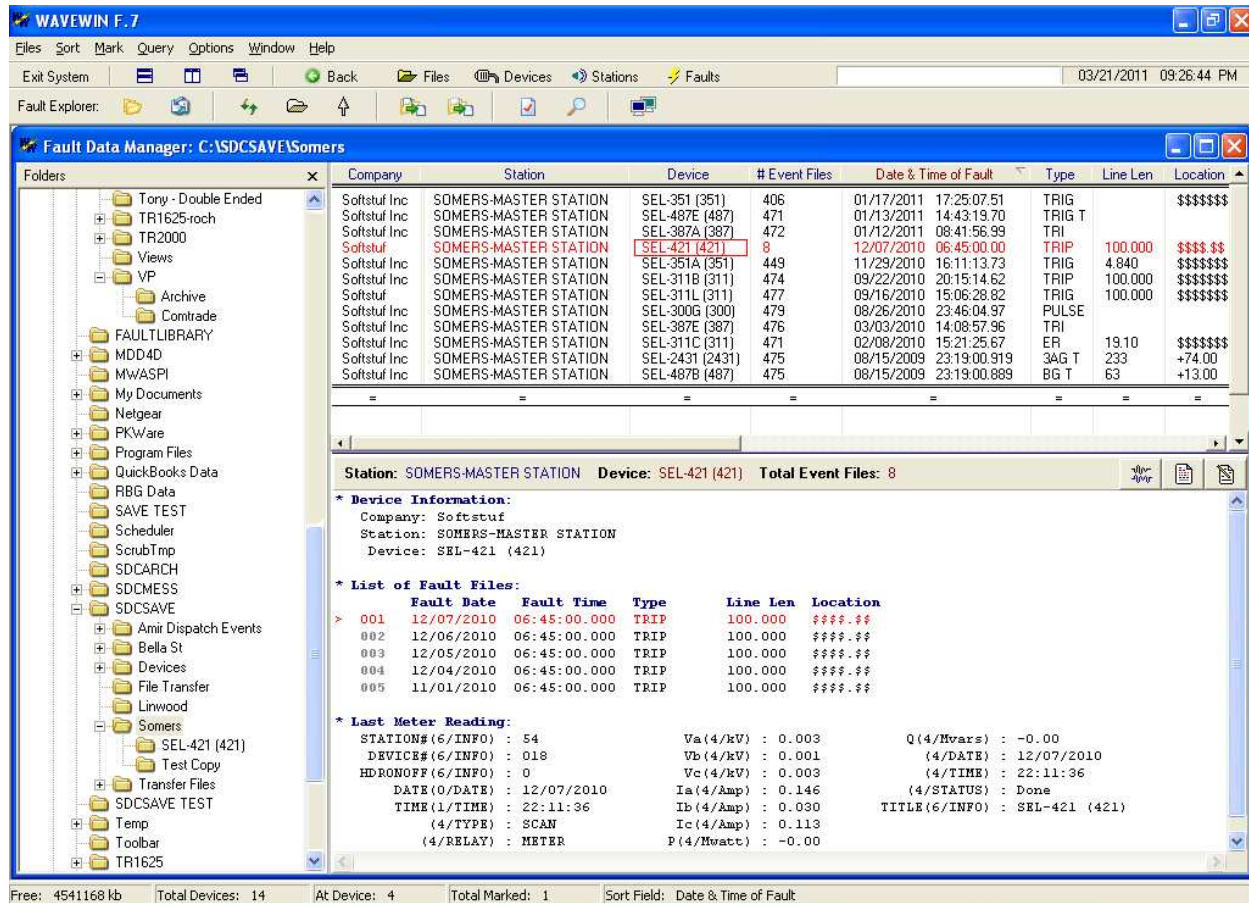


Figure 3.1 Fault Data Manager

The folder tree located on the left side of the window allows for navigating the local drives and all networked drives. When the window is first displayed the folder tree points to the active folder in the File Manager. To change the active folder click on the desired folder/drive listed in the folder tree. The table displayed in the top right section of the window lists all the devices that have long file naming event files located in the active folder. When the folder is scanned the device table compiles a list of unique devices according to the information listed in the long filenames. For more information on the IEEE C37.232 format refer to the Long File Naming Format section below. If there are no files, named using the long file naming format, in the active folder then "No Items To View" is displayed in the device table.

Fault Data Manager Sections

The Fault Data Manager window has 4 sections: the Folder Tree, the Device Table, the Query Bar and the Device Summary Information section. The Tab key toggles between the 4 sections.

The 4 window sections are described in the following sections:

FOLDER TREE

Summary:

The Folder Tree is used to navigate through all folders on the local drives and networked drives. The active folder is displayed in the window's header. To change the active folder click on the desired folder node in the tree. If the subfolders are not displayed, click on the "+" icon to open the folder.

Functions	
Change Folder	To change the active folder click on the folder in the tree, or click on the UP menu button to change to the parent folder, or open the "File" menu and select the "Change Folder" option to specify the desired folder.
Create a New Folder	To create a new folder under the active folder open the "File" menu then select the "New Folder" menu option or opposite click in the tree and select the "New Folder" option from the popup menu. A new folder will be created under the active folder with the named defaulted to "New Folder". Type the new folders name and press enter.
Rename a Folder	To rename the selected folder open the "File" menu then select the "Rename Folder" menu option or opposite click in the tree and select the "Rename" option from the popup menu. The edit box for the active folder is activated, type the new name and press enter.
Delete a Folder	To delete the active folder opposite click in the tree and select the "Delete" option from the popup menu. The folder and all files and sub-folders will be moved to the recycle bin.
Refresh Tree	To refresh the tree open the "File" menu then select the "Refresh" menu option or opposite click in the tree and select the "Refresh" option from the popup menu. The tree and device table will be refreshed with the latest information in the folders.
Close Tree	Close the Folder tree. To reopen the tree open the "File" menu then select the "Show/Hide Folder Tree" menu option or click on the first menu button.

DEVICE TABLE

Summary:

The Device Table lists all devices that have event files located in the active folder. If a Wavewin master station is installed then poll upon demand commands can be sent directly to the master station from the device table. To set up the poll upon demand from the device table open the "Options" menu and select the "Fault Manager Properties" option. Enter the shared "Messages & Logs" folder into the "Messages & Logs Path" field.

The Device Table columns are populated from the fields in the IEEE Long event filenames (Company, Station, Device, Type, Line Length, Location, Dev-ID and Latest Event), and from the message files stored in the "Messages & Logs" folder (Status, Poll Requested At and Poll Completed AT). The table fields are described below:

Table Columns:

Company	The company that owns the device. The company name is stored in the 6th field in the event files.
Station	The station name. The station is stored in the 4th field in the event files.
Device	The device name. The device name is in the 5th field in the filename.
# Event Files	The number of event files located in the active folder for the device.
Date & Time of Fault	The date and time of the latest event in the active Folder. The date and time of the fault is the first and second fields in the filename.
Type	The type of fault from the latest event file. The fault type is stored in the filename's tenth field (if available in the file).
Line Len	The length of the line read from the device's latest event file. The line length information is stored in the filename's eighth field (if available during polling).
Location	The fault location from the device's latest event file. The fault location is stored in the filename's ninth field (if available in the file).
Dev-ID	The device number assigned to the device at the master station.
Status	The current status of the poll.
Poll Requested At	The date and time the last request for polling.
Poll Completed At	The date and time the last poll was completed.
Latest Event	The filename of the latest event.

When the Enter key (Cr) or the Left Mouse Double Click is detected, the table inspects the device at the cursor position, and executes the driver type associated with that device and plots the latest event for that device.

Functions	
Mark	To mark/unmark a device in the device table use the space bar or Ctrl+left mouse button. To mark/unmark multiple devices use the shift+left mouse button, shift+up arrow, shift+down arrow or the mark menu options.
Sort	The column headers displayed at the top of the table are used to sort all the devices in the table. Click the header buttons to toggle between ascending and descending order or use the Sort menu options to sort all or marked files with respect to the selected sort field. To change the sort field, place the cursor in the desired column and select "Set Sort Field" from the Sort menu. The active sort field is displayed in the status bar at the bottom of the window.
Plot	To open the latest event file from a device double click on the device.
Copy	To copy all the event files from the marked device(s) to a new folder click on the copy menu button or select the "Copy To..." menu option under the "Files" menu. Enter or select the destination folder and click "OK".
Move	To move all the event files from the marked device(s) to a new folder click on the move menu button or select the "Move To..." menu option under the "Files" menu or drag the marked devices to a folder displayed in the tree.

QUERY BAR

Summary:

The Query Section allows for searching for devices in the active device table. A query field is provided at the bottom of each table column.

A query field is composed of two items: a query value or criteria, and a query operator. The query criteria is directly entered from the keyboard and may include wild cards: "*", and "?". The query editor is

activated by clicking the left mouse button over the desired query criteria box. The query operators can be changed from the Query/Change Operator menu option, or by using the (F9) key or the left mouse button positioned over the desired query operator box. The action of each available operator is explained below:

- (=) Search for files that match the set query.
- (<) Search for files that are less than the set query.
- (>) Search for files that are greater than the set query.

The query mechanism numerically compares the specified query with the available data columns. If numerical comparison is not possible then it will symbolically compare. When multiple query fields are specified, it will search for a match on the first field "AND" on the second field "AND" on the third ... After a query is executed the rows that match the specified query are marked and grouped at the top of the table. Use the Ctrl-left/right arrows to move between query fields or left click on the desired query criteria field.

Functions	
All Files	Query All Devices in the Device table.
Marked Files	Query only the marked devices in the Device table.
Unmarked Files	Query only the unmarked devices in the Device table.
Clear Query Area	Clear the entire query area.
Change Operator	Change the operator at the active column.

DEVICE INFORMATION

Summary:

The Device Information section lists a history of the event files for the device selected in the device table. The number of event files listed can be changed by opening the "Fault Manager Properties" dialog under the "Options" menu. Change the "# of Event Files" field to the desired number to display.

The station name, device title and the total number of events files stored in the active folder for the selected device is displayed in the header section of the summary window. If the devices are being polled by Wavewin then the last meter reading is displayed under the history list.

Each file listed in the history can be plotted, viewed/edited and summarized. To plot one of the files use the tab key to activate the device information section or click in the section. The up arrow, down arrow, page up and page down keys are used to move the cursor. The enter key will plot the highlighted file, F2 will display the contents of the file and the F3 will show a summary. Double clicking on the file will also plot the file.

There are 3 buttons displayed in header section that will plot, summarize or view/edit the selected file.

Functions	
Navigate	Move the cursor, up arrow, down arrow, page up, page down or default mouse click.
Plot	Plot the file at the cursor, enter key or double click on the file or click on the plot button.
View/Edit	View the contents of the file, F2 key or click on the view/edit button.
Summarize	View a summary of the file, F3 key or click on the summary button.

LONG FILE NAMING FORMAT (C37.232)

All the data downloaded from the connected devices are saved to a file using the IEEE long file naming format. The IEEE long file naming format is a PSRC format used to name time sequenced data files. The file name contains the following ten fields stored in a comma-delimited fashion:

Example: 000112,123433234,-5S, South Arkey,DLP1,Sun Power,T,123.22,+34.60,AG T.OCS

Field Definitions:

Field	Example	Displayed	Definition
Date	040112	01/12/2004	The Date field defines the start date of the file. The date fields are stored as: year (2 characters), month and day.
Time	123433234	12:34:33.234	The time field defines the start time of the file. The Time fields are defined as: hour, minutes, seconds and milliseconds.
Tcode	-5S	-5S	The Time Code defines the time offset from GMT time. -5s would be specified for US Eastern Standard Time. If the start time is expressed in UT, this field is coded 0z. Note: GMT is the international abbreviation for Greenwich Mean Time.
Substation	South Arkey	South Arkey	The substation name or code where the originating device is located.
Device	DLP1	DLP1	The device name or code that generated the file.
Company	Sun Power	Sun Power	The company of the specified substation.
File Tag	T	T	The fault type or contents type of the file.
Line Length	123.22	123.22	The line length extracted from the event file. This field applies to certain relays.
Fault Location	+34.60	+34.60	The fault location extracted from the event file. This field applies to certain relays.
Fault Type	AG T	AG T	The fault type extracted from the event file. This field applies to certain relays.

Open the Fault Data Manager

The Fault Data Manager can be opened 3 ways, from the file manager, from the device manager and through a command line parameter. To open the fault data manager from the file manager, select the “Fault Data Manager...” menu option under the “Options” menu. To open the fault data manager from the device manager, select the “Fault Data Manager...” menu option under the “Options” menu. The command line option is described in the next section.

To setup polling of the devices from the fault data manager open the “Fault Manager Properties” dialog from the “Options” menu. Enter the shared path between the device manager polling station and the fault data manager in the “Messages & Log Path” This folder must be the same folder defined in the “Save & Archive” dialog in the device manager.

The fault data manager also has an automatic refresh option that will automatically refresh the event and status information. To turn the automatic refresh option on, click on the “Turn ON Automatic Refresh” checkbox. Checked = ON. Also, enter the automatic refresh period. The period is specified in seconds. The default is 60 seconds.

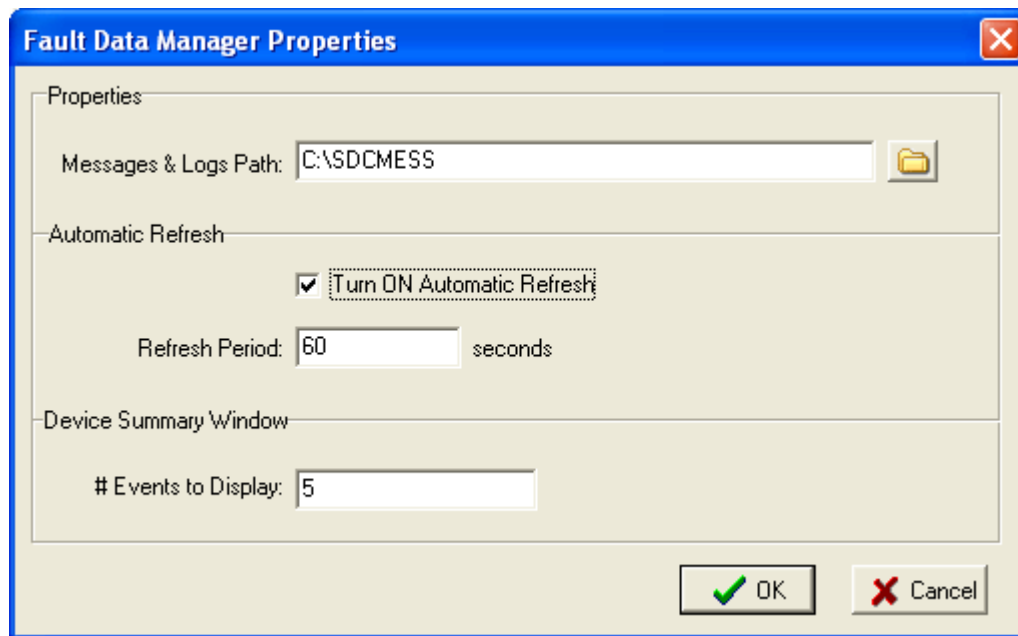


Figure 3.2 Fault Data Manager Properties Dialog

COMMAND LINE PARAMETER

The Fault Data Manager can be automatically opened when Wavewin runs using the command line parameters. To add the "fault" command line parameter opposite click on the Wavewin icon or shortcut. Add "fault" after the Wavewin folder and filename in the target field.

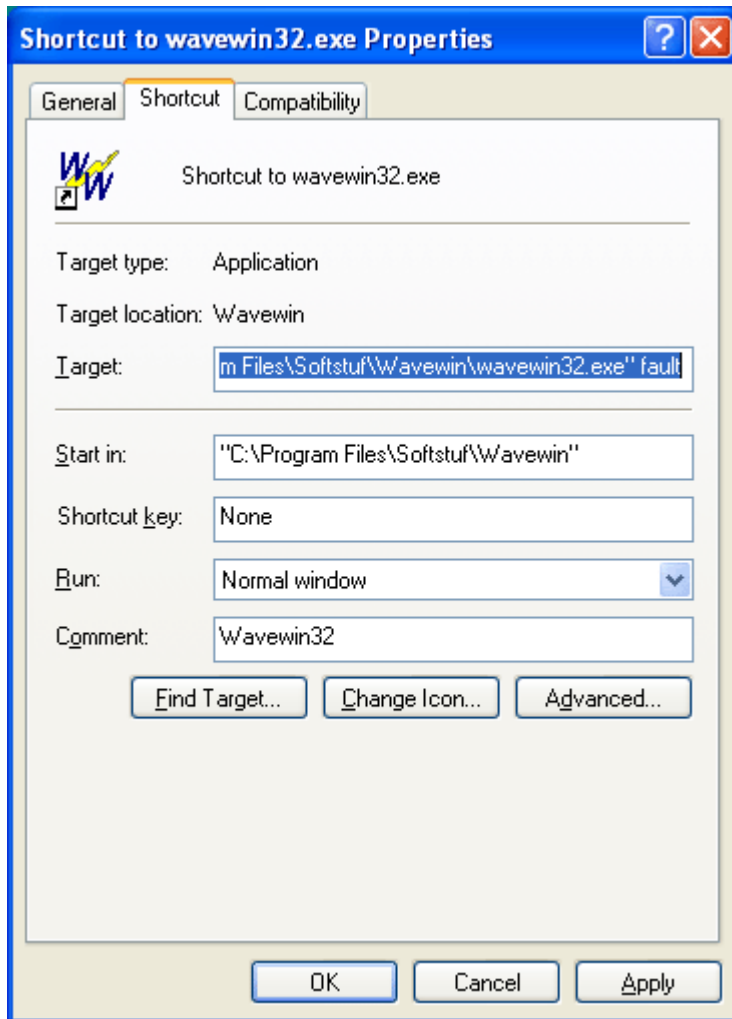


Figure 3.3 Fault Data Manager – Command Line Parameter

Fault Data Manager Polling

Polling of the devices is initiated from the Device table. To request a poll first mark all the devices to poll.

Marked devices are displayed in red. Next, click on the Poll Request button  in the button menu or select the “Request Poll” menu option under the “Options” menu. A message dialog is displayed listing the current status of each device requested.

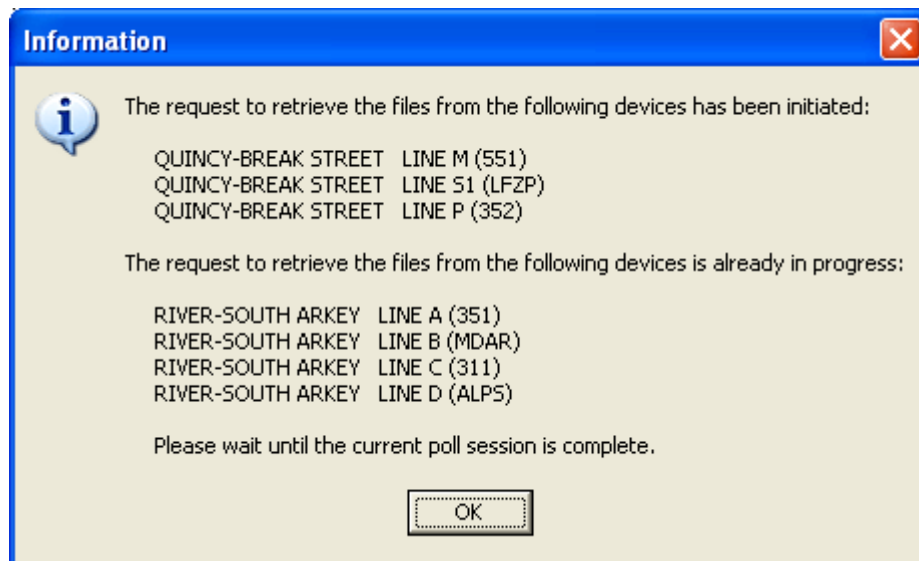


Figure 3.4 Poll Status Message

The devices that can be polled are listed under the “initiated” list and the devices that are already scheduled to be polled are listed under the “already in progress” list. The “Status”, “Poll Requested At” and “Poll Completed At” columns display the status of the poll. The “Status” column has the following updates:

- **Poll Requested:** When a poll is requested the device table saves a POL message in the messages & logs folder for each device marked. The Status column is updated with “Poll Requested” and the Poll Requested At column is updated with the date and time the poll was requested.
- **Poll in Progress:** The device manager monitors the message folder for POL files. Once it sees a POL file it starts the polling process and renames the POL file to a CAL file indicating the poll is in progress. The fault data manager also monitors the message folder. When it sees a CAL file it updates the Status column to “Poll in Progress”.
- **New Files:** During the polling process the fault data manager checks if new event files were downloaded. At each automatic refresh period the fault data manager will count the number of event files in the active folder. If the number of event files counted is greater than the number of events listed in the “# Event Files” column then the Status column is updated with “New Files” and the date time in the system toolbar blinks red.
- **Poll Complete:** When a poll is successfully completed the device manager will rename the CAL file to a DON file. The fault data manager will update the Status column with “Poll Complete” and update the Poll Completed At column with the date and time the poll completed.
- **Unable to Connect:** When the device manager encounters a problem connecting to the device the CAL file is renamed to an NCR file. The fault data manager will update the Status column with “Unable to Connect” and update the Poll Completed At column with the date and time the poll completed.

LIST DEVICES

If event files are not currently listed in the Fault Data Manager’s device table for a specific device then the device can be polled using the “List Devices” dialog. This will occur if it is a new device added to the device manager polling station and it has not been polled yet or all the device’s events files where

archived to an archive path. To open the “List Devices” dialog select the “List Devices...” menu option under the “Options” menu

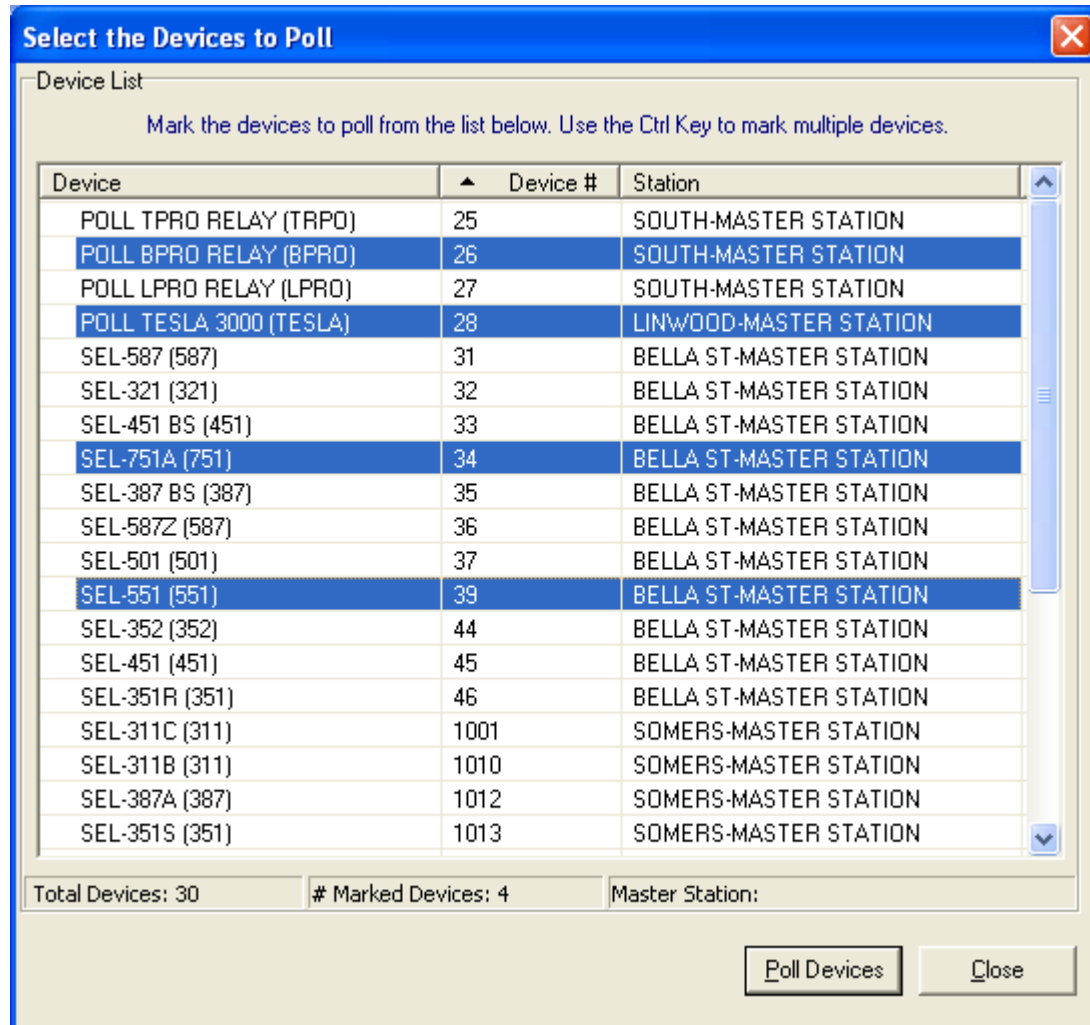


Figure 3.5 List Devices

To poll devices from the “List Devices” dialog first marked the devices using the Ctrl mouse click on all devices to poll then click on the “Poll Devices” button. The Status and Poll Requested At columns in the device table are updated.

Table Features

The following sections describe the main features in the Fault Data Manager’s device table.

REQUESTING A POLL

To request a poll first mark the devices to poll. Next, either click the poll request button in the button menu  or select the “Request Poll” menu option under the “Option” menu.

The status of the poll is displayed in the “Status”, “Poll Requested At” and “Poll Completed At” columns. The “Status” column updates when the poll is started and when it is completed. It also indicates if new

event files have been downloaded. The “Poll Requested At” displays the date and time the last poll was requested. The “Poll Completed At” is updated once the poll has been completed. The time difference between the Poll Requested At and the Poll Completed At shows how long it took to complete the poll.

DISPLAYING EVENT HISTORY

All the events downloaded from the devices are saved to the events folder using the IEEE long file naming format. A history list of the event files are displayed in the Device Information section. To plot, view/edit or view a summary of the events tab to the device information section and move the event cursor to the desired event file. To plot the file press the enter key or double click on the event file or click on the “Plot” button  displayed in the upper right corner. To view a summary of the event, click on the “Summary” button . To view/edit the event’s raw file click on the “Edit” button .

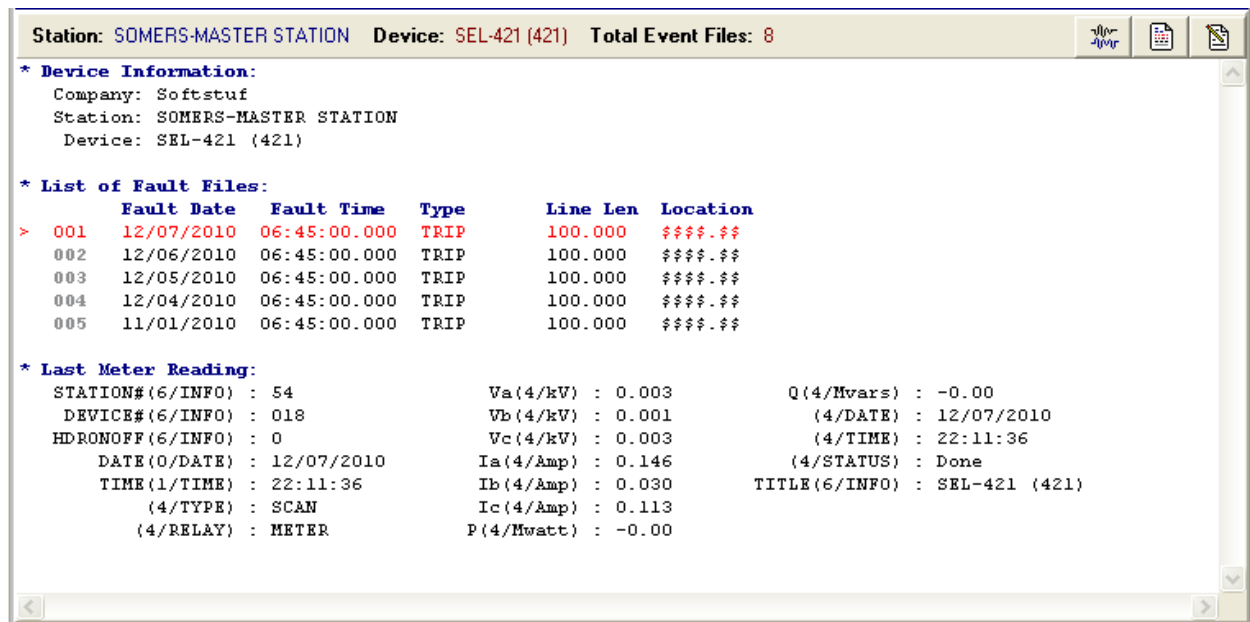


Figure 3.6 Event History List

VIEWING METER INFORMATION

Each time a device is polled the meter information is also downloaded (VA, VB, VC, & IA, IB IC). To view the latest meter values move the cursor to the desired device in the device table. The “Device Information” section list the latest history of events along with the latest meter information. Tab to the “Device Information” section and use the scroll bar to show the latest meter information.

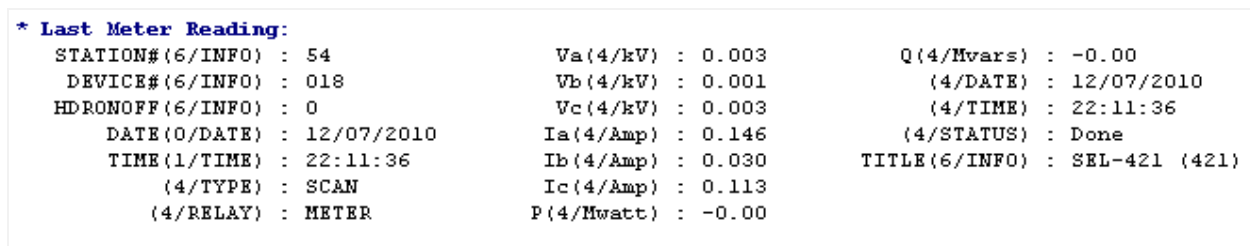


Figure 3.7 Meter Information

REFRESH THE TABLE

The device table columns can be manually or automatically refreshed. To have the table automatically refreshed open the “Fault Manager Properties” dialog from the “Options” menu.

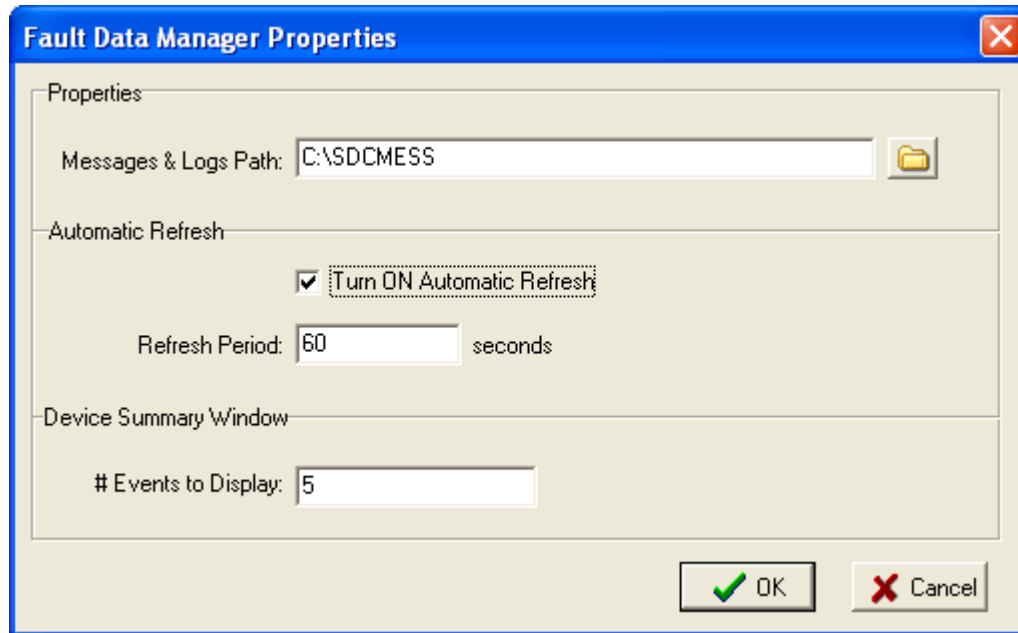


Figure 3.8 Automatic Refresh

Click on the “Turn ON Automatic Refresh” checkbox. If the box is checked the automatic refresh is ON. Also, enter the refresh period. The period is measured in seconds. The default is 60 seconds. The automatic refresh will update the event and status columns.

To manually refresh the table click on the Refresh button  in the button menu. All of the columns in the table are updated.

CUSTOMIZING THE DISPATCH TABLE

The columns displayed in the device table can be repositioned through the “Table Properties” menu option under the “Options” menu. Use the Move Up and Move Down buttons to change the position of a column. The table columns can also be resized. Position the mouse over the column separator in the table and drag the mouse to the desired location or double click on a column separator to resize the column to the largest display.

The size of the font displayed in the table can also be changed. Use the “Table Font Size” drop down list to select the desired font.

The way a device is selected (marked) in the table is defined in the “File Marking” field. To follow the Window’s convention, select the “Windows- Ctrl-Click” selection. To have a file selected, using a single mouse click, select the “Single Mark Click” selection. The Single Mark Click toggles a device from selected (marked) or unselected.

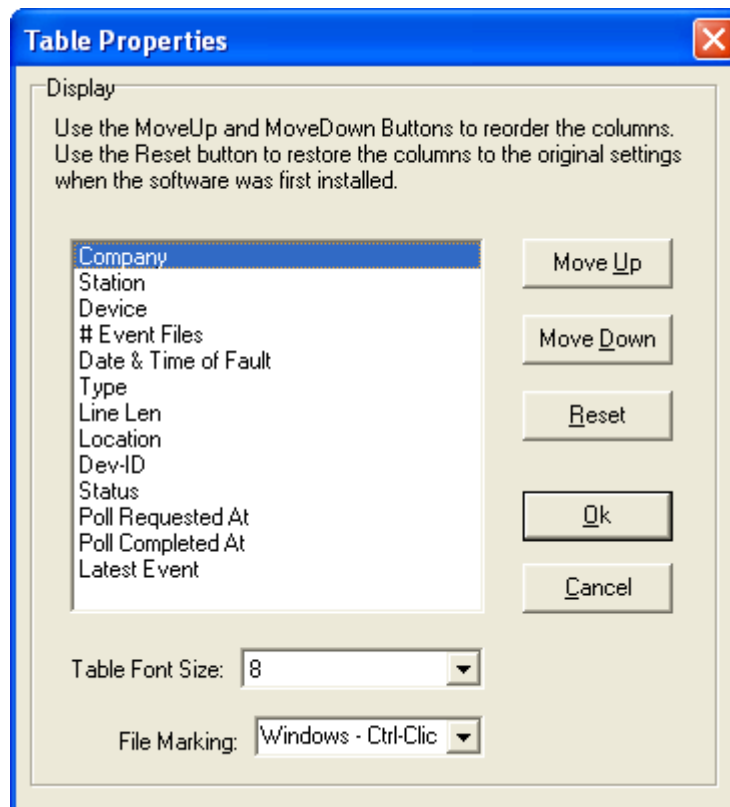


Figure 3.9 Table Properties Dialog

QUERYING DEVICES

The query fields are used to search for specific information in the device table. Query fields are located below the table. Use the tab key to move the cursor from the device table to the query fields and the up arrow to return to the table. Use the Ctrl-Left/Right arrow keys to move between the query fields. Each field contains a criteria and an operator.

The criterion is directly entered from the keyboard, and may include the “*” and “?” wild cards. Operators are located above the criteria fields and can be changed by clicking the mouse button on the operator symbol or by pressing the F9 key. The selectable options include equal to (=), less than (<), and greater than (>).

[illegible]

Figure 3.10 Query Fields

When a query is launched, the engine numerically compares the specified criteria with the information in the table. If numerical comparison is not possible then it symbolically compares. When multiple fields are defined, the engine searches for a match on the first field "AND" on the second field "AND" on the third field and so on.

Three query options are available: Query All, Query Marked, or Query Unmarked. Devices that meet the specified query requirements are marked, grouped, and displayed at the top of the table. Use the tab and Ctrl-Left/Right arrow keys to navigate through the query fields and the <enter> key to execute the query.

SORTING DEVICES

The column headers displayed at the top of the table are used to sort the devices in ascending or descending order. Use the Sort menu options to sort all or marked devices with respect to the selected sort field. To set the sort field, place the cursor in the desired column and select “Set Sort Field” from the “Sort” menu. Clicking on the column header also sets the active sort field. The active sort field is displayed in the status bar at the bottom of the window. The active sort column header displays the sort order

Dev-Name ↕

MARKING/UNMARKING DEVICES

Devices are marked and unmarked through the “Mark” menu option, the spacebar, or the mouse button. Use the shift+mouse click button to mark a group of devices or the ctrl+mouse click button to randomly mark devices. Marked devices are displayed in red and can be grouped (Alt+M,G), sorted (Alt+S), printed (Alt+P,P) or polled (Alt+O,R).

A P P E N D I X A

System Keys

This section lists the function keys, cursor keys, and menu buttons available in the system monitors.

Device Manager

Function Keys	Description
F1	Display the device manger's help file.
F2	Edit the device record at the cursor position.
F3	Test the device's port at the cursor positon using the loop back plug detection test.
F4	Create a new device.
F5	Create or edit the terminal function keys for the device at the cursor position.
F6	View the data stored in the device buffer.
F7	Run the MID interrogation interface for all or marked devices assigned a device driver.
F8	Run the DXF interrogation interface for all devices assigned a device driver.

Cursor Keys	Description
Left Arrow	Move the cursor bar to the left one position.
Right Arrow	Move the cursor bar to the right one position.
Up Arrow	Move the cursor bar up one position.
Down Arrow	Move the cursor bar down one position.
Page Up	Display the devices on the previous page.
Page Down	Display the devices on the next page.
Home	Move the cursor to the first column in the port table.
End	Move the cursor to the last column in the port table.
Ctrl+Home	Move the cursor to the first device in the table.
Ctrl+End	Move the cursor to the last device in the table.
Tab	Move the cursor from the device table to the query fields.
Delete	Delete all the marked devices in the table.
Enter	Run the terminal display for the selected device.

Menu Buttons	Description
 Configure	Edit the device at the cursor position
 New	Create a new device.
 TermKeys	Create or edit the terminal function keys for the device at the cursor position.
 Terminal	Run the terminal display for the selected device.
 EventFile	View the data stored in the device buffer.
 MID	Run the MID interrogation display for all or marked devices assigned device drivers.
 DXF	Run the DXF interrogation display for all devices assigned device drivers.

Query Fields

Function Keys	Description
F1	Display the query help file.
F5	Query all the marked devices in the active configuration.
F6	Query all the devices in the active configuration.
F7	Query all the unmarked devices in the active configuration.
F8	Clear the query criteria and set all the query operators to “=”.
F9	Toggle through the available query operators for the active query field.

Cursor Keys	Description
Up Arrow	Return the cursor to the device table.
Right Arrow	Move the cursor one position to the right, wraps to next field at the end.
Left Arrow	Move the cursor one position to the left, wraps to next field at the beginning.
Tab	Move the editor to the next query field.
Shift+Tab	Move the editor to the previous query field.
Enter	Process the query criteria for all devices in the active configuration.

Menu Button	Description
 Query	Query all devices in the active configuration.

DXF Display

Function Keys	Description
F1	Display DXF mode's help window.
F2	Display the “Drawing Properties” dialog.

Cursor Keys	Description
Up Arrow	Move the viewing area of the drawing up 40 pixels.
Down Arrow	Move the viewing area of the drawing down 40 pixels.
Right Arrow	Move the viewing area of the drawing to the right 40 pixels.
Left Arrow	Move the viewing area of the drawing to the left 40 pixels.
Ctrl+Right	Move the viewing area of the drawing to the right by one screen.
Ctrl+Left	Move the viewing area of the drawing to the left by one screen.
Page Up	Move the viewing area of the drawing up by one screen.
Page Down	Move the viewing area of the drawing down by one screen.
Home	Display the far left portion of the drawing.
End	Display the far right portion of the drawing.
Ctrl+Home	Display the top left portion of the drawing.
Ctrl+End	Display the bottom right portion of the drawing.
Tab	Move to the next DXF drawing tab
Shift+Tab	Move to the previous DXF drawing tab
+ key	Increase the drawing's resolution.
- key	Decrease the drawing's resolution.

Menu Buttons	Description
 Original	Display the drawing in the original coordinates.
 Fit in Win	Fit the full drawing to fit in the screen area.
 Zoom-In	Increase the drawing's resolution.
 Zoom-Out	Decrease the drawing's resolution.
 Print	Print the DXF drawing in the selected DXF tab.
 Const	Set the drawing properties for the active DXF drawing.
 Refresh	Refresh the polled values in the selected DXF drawing.
 Control	Display the control dialog to send control commands to the connected devices.

Dispatch Table

Cursor Keys	Description
Left Arrow	Move the cursor bar to the left one position.
Right Arrow	Move the cursor bar to the right one position.
Up Arrow	Move the cursor bar up one position.
Down Arrow	Move the cursor bar down one position.
Page Up	Display the devices on the previous page.
Page Down	Display the devices on the next page.
Home	Move the cursor to the first column in the port table.
End	Move the cursor to the last column in the port table.
Ctrl+Home	Move the cursor to the first device in the table.
Ctrl+End	Move the cursor to the last device in the table.
Tab	Move the cursor from the device table to the query fields.
Delete	Delete all the marked devices in the table.
Enter	Display the event, summary and history files for the selected device.

Menu Buttons	Description
 Print	Print all of the devices in the table.
 Request Poll	Request a poll for all of the marked devices.
 Event Files	Display the events files for the selected device.
 History Files	Display the history files for the selected device.
 Meter Values	Display the last polled meter values for the selected device.
 Refresh	Refresh the Dispatch table.
 Mark	Mark or Unmark the marked devices.
 Query	Query the devices.

Query Fields

Function Keys	Description
F1	Display the query help file.
F5	Query all the marked devices in the active configuration.

F6	Query all the devices in the active configuration.
F7	Query all the unmarked devices in the active configuration.
F8	Clear the query criteria and set all the query operators to “=”.
F9	Toggle through the available query operators for the active query field.

Cursor Keys	Description
Up Arrow	Return the cursor to the device table.
Right Arrow	Move the cursor one position to the right, wraps to next field at the end.
Left Arrow	Move the cursor one position to the left, wraps to next field at the beginning.
Tab	Move the editor to the next query field.
Shift+Tab	Move the editor to the previous query field.
Enter	Process the query criteria for all devices in the active configuration.

Menu Button	Description
 Query	Query all devices in the active configuration.

Fault Data Manager Table

Cursor Keys	Description
Left Arrow	Move the cursor bar to the left one position.
Right Arrow	Move the cursor bar to the right one position.
Up Arrow	Move the cursor bar up one position.
Down Arrow	Move the cursor bar down one position.
Page Up	Display the devices on the previous page.
Page Down	Display the devices on the next page.
Home	Move the cursor to the first column in the port table.
End	Move the cursor to the last column in the port table.
Ctrl+Home	Move the cursor to the first device in the table.
Ctrl+End	Move the cursor to the last device in the table.
Tab	Move the cursor from the device table to the query fields.
Enter	Display the event, summary and history files for the selected device.

Menu Buttons	Description
 Folder Tree	Show/Hide the Folder Tree.
 Email	Email the Device Information Section.
 Refresh	Refresh the Folder Tree and Device table.
 ChDir	Change the active folder to the specified destination path.
 Previous Dir	Change to the previous directory.
 Copy	Copy the marked device files to the destination path.
 Move	Move the marked device files to the destination path.
 Mark	Mark/Unmark all devices.
 Query	Query the devices.
 Request Poll	Request a poll for all of the marked devices.

Query Fields

Function Keys	Description
F1	Display the query help file.
F5	Query all the marked devices in the active configuration.
F6	Query all the devices in the active configuration.
F7	Query all the unmarked devices in the active configuration.
F8	Clear the query criteria and set all the query operators to “=”.
F9	Toggle through the available query operators for the active query field.

Cursor Keys	Description
Up Arrow	Return the cursor to the device table.
Right Arrow	Move the cursor one position to the right, wraps to next field at the end.
Left Arrow	Move the cursor one position to the left, wraps to next field at the beginning.
Tab	Move the editor to the next query field.
Shift+Tab	Move the editor to the previous query field.
Enter	Process the query criteria for all devices in the active configuration.

Menu Button	Description
 Query	Query all devices in the active configuration.

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