WAVEWIN

DEVICE MANAGER

QUICK START

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Acknowledgments

Preface

This document contains information about data collection with Wavewin. A number of examples are provided including communicating with devices from Hathaway, Mehta, Schweitzer, ABB, GE, etc.

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

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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

Device Manager Quick Start

This chapter shows an example of a typical utility's digital devices and how they are configured in the Wavewin Device Manager. The example uses the different network and device topologies available in the device manager.

Configuration Example

The digital devices are outlined below:

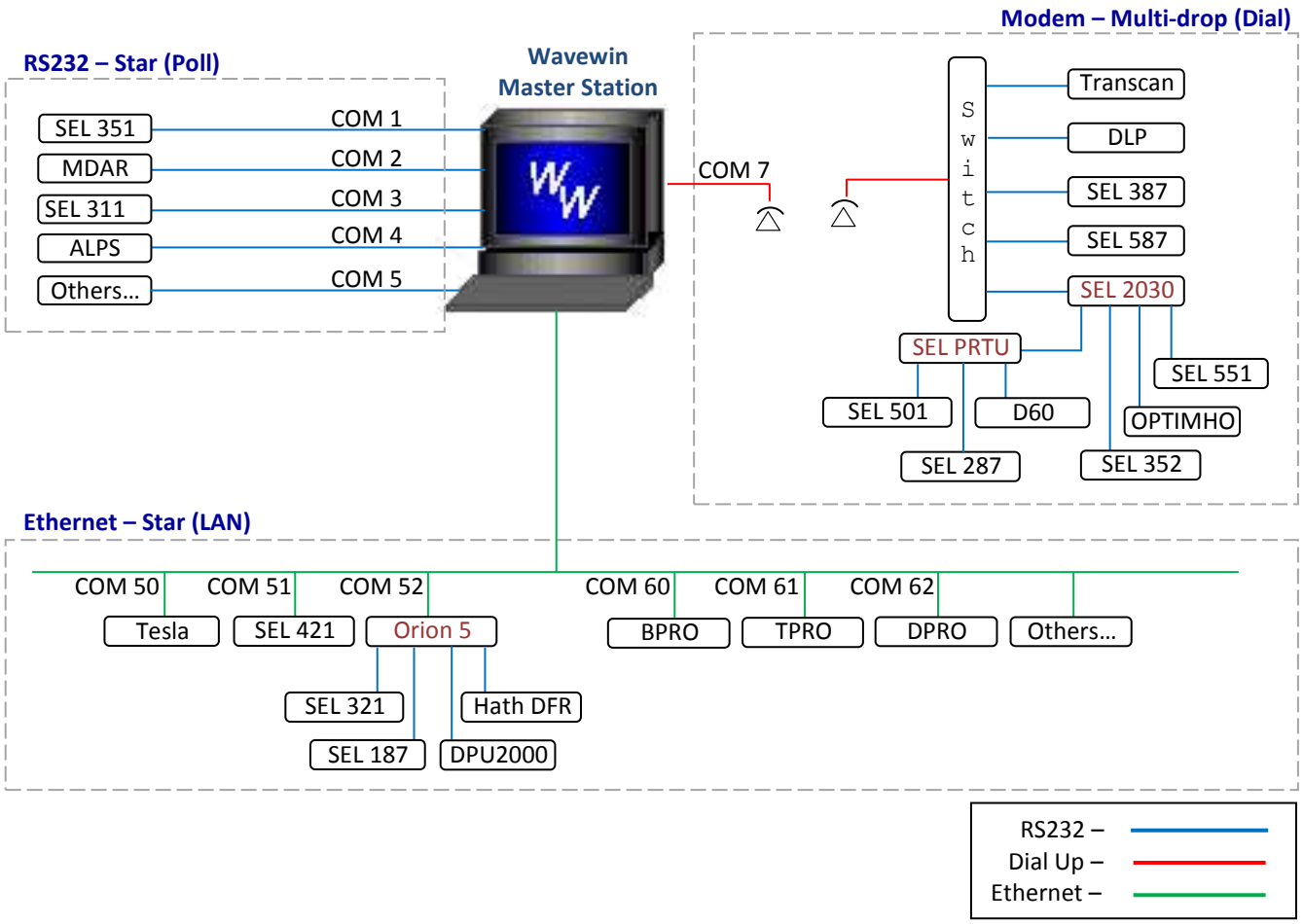
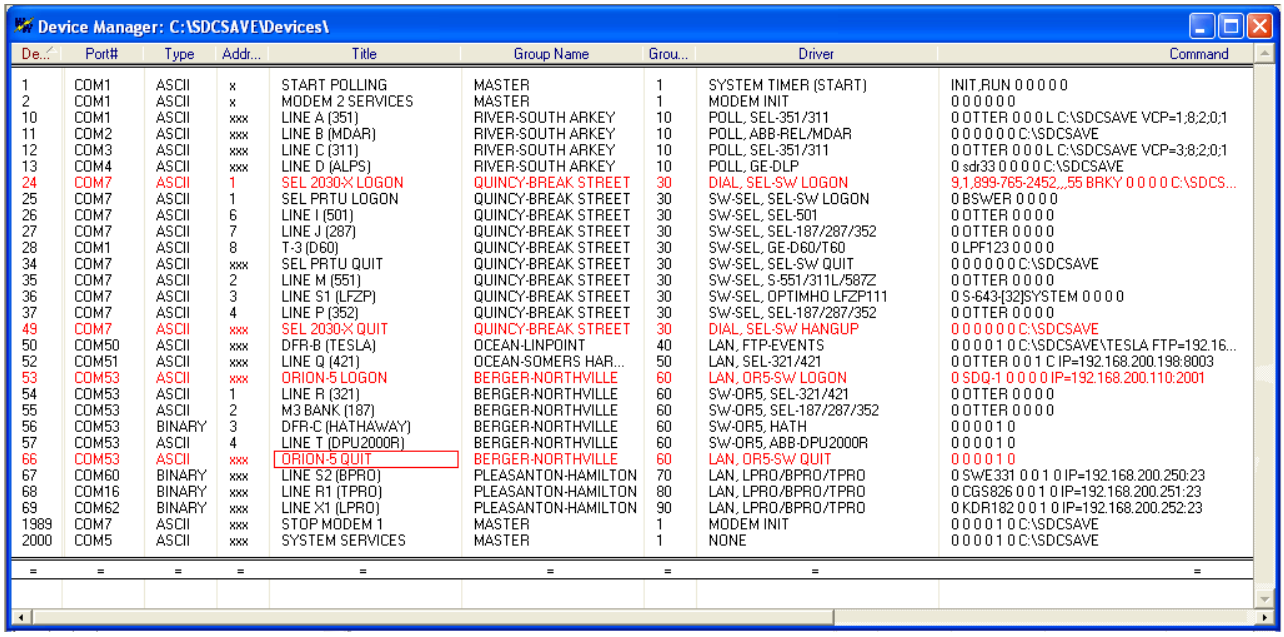


Figure 2.1 Example Digital Devices

Device Manager Table

The device manager table lists all the devices configured in the software. The following sections describe how each device defined in the example is configured. The device manager can poll up to 2000 devices.



De..	Port#	Type	Addr...	Title	Group Name	Grou...	Driver	Command
1	COM1	ASCII	x	START POLLING	MASTER	1	SYSTEM TIMER (START)	INIT,RUN 0 0 0 0 0
2	COM1	ASCII	x	MODEM 2 SERVICES	MASTER	1	MODEM INIT	0 0 0 0 0 0
10	COM1	ASCII	xxx	LINE A (351)	RIVER-SOUTH ARKEY	10	POLL, SEL-351/311	0 OTTER 0 0 0 L C:\SDCSAVE VCP=1;8;2;0;1
11	COM2	ASCII	xxx	LINE B (MDAR)	RIVER-SOUTH ARKEY	10	POLL, ABB-REL/MDAR	0 0 0 0 0 0 C:\SDCSAVE
12	COM3	ASCII	xxx	LINE C (311)	RIVER-SOUTH ARKEY	10	POLL, SEL-351/311	0 OTTER 0 0 0 L C:\SDCSAVE VCP=3;8;2;0;1
13	COM4	ASCII	xxx	LINE D (ALPS)	RIVER-SOUTH ARKEY	10	POLL, GE-DLP	0 sdr33 0 0 0 0 C:\SDCSAVE
24	COM7	ASCII	1	SEL 2030-X LOGON	QUINCY-BREAK STREET	30	DIAL, SEL-SW LOGON	9,1,899-765-2452,,,55 BRKY 0 0 0 0 C:\SDCS...
25	COM7	ASCII	1	SEL PRTU LOGON	QUINCY-BREAK STREET	30	SW-SEL, SEL-SW LOGON	0 BSWER 0 0 0 0
26	COM7	ASCII	6	LINE I (501)	QUINCY-BREAK STREET	30	SW-SEL, SEL-501	0 OTTER 0 0 0 0
27	COM7	ASCII	7	LINE J (287)	QUINCY-BREAK STREET	30	SW-SEL, SEL-187/287/352	0 OTTER 0 0 0 0
28	COM1	ASCII	8	T-3 (D60)	QUINCY-BREAK STREET	30	SW-SEL, GE-D60/T60	0 LPF123 0 0 0 0
34	COM7	ASCII	xxx	SEL PRTU QUIT	QUINCY-BREAK STREET	30	SW-SEL, SEL-SW QUIT	0 0 0 0 0 0 C:\SDCSAVE
35	COM7	ASCII	2	LINE M (551)	QUINCY-BREAK STREET	30	SW-SEL, S-551/311L/587Z	0 OTTER 0 0 0 0
36	COM7	ASCII	3	LINE S1 (LFZP)	QUINCY-BREAK STREET	30	SW-SEL, OPTIMHO LFZP111	0 S-643-[32]SYSTEM 0 0 0 0
37	COM7	ASCII	4	LINE P (352)	QUINCY-BREAK STREET	30	SW-SEL, SEL-187/287/352	0 OTTER 0 0 0 0
49	COM7	ASCII	xxx	SEL 2030-X QUIT	QUINCY-BREAK STREET	30	DIAL, SEL-SW HANGUP	0 0 0 0 0 0 C:\SDCSAVE
50	COM50	ASCII	xxx	DFR-B (TESLA)	OCEAN-LINPOINT	40	LAN, FTP-EVENTS	0 0 0 0 1 0 C:\SDCSAVE\TESLA FTP=192.16...
52	COM51	ASCII	xxx	LINE Q (421)	OCEAN-SOMERS HAR...	50	LAN, SEL-321/421	0 OTTER 0 0 1 C IP=192.168.200.198:8003
53	COM53	ASCII	xxx	ORION-5 LOGON	BERGER-NORTHVILLE	60	LAN, OR5-SW LOGON	0 SDQ-1 0 0 0 0 IP=192.168.200.110:2001
54	COM53	ASCII	1	LINE R (321)	BERGER-NORTHVILLE	60	SW-OR5, SEL-321/421	0 OTTER 0 0 0 0
55	COM53	ASCII	2	M3 BANK (187)	BERGER-NORTHVILLE	60	SW-OR5, SEL-187/287/352	0 OTTER 0 0 0 0
56	COM53	BINARY	3	DFR-C (HATHAWAY)	BERGER-NORTHVILLE	60	SW-OR5, HATH	0 0 0 0 1 0
57	COM53	ASCII	4	LINE T (DPU2000R)	BERGER-NORTHVILLE	60	SW-OR5, ABB-DPU2000R	0 0 0 0 1 0
66	COM53	ASCII	xxx	ORION-5 QUIT	BERGER-NORTHVILLE	60	LAN, OR5-SW QUIT	0 0 0 0 1 0
67	COM60	BINARY	xxx	LINE S2 (BPRO)	PLEASANTON-HAMILTON	70	LAN, LPRO/BPRO/TPRO	0 SWE331 0 0 1 0 IP=192.168.200.250:23
68	COM16	BINARY	xxx	LINE R1 (TPRO)	PLEASANTON-HAMILTON	80	LAN, LPRO/BPRO/TPRO	0 CGS826 0 0 1 0 IP=192.168.200.251:23
69	COM62	BINARY	xxx	LINE X1 (LPRO)	PLEASANTON-HAMILTON	90	LAN, LPRO/BPRO/TPRO	0 KDR182 0 0 1 0 IP=192.168.200.252:23
1989	COM7	ASCII	xxx	STOP MODEM 1	MASTER	1	MODEM INIT	0 0 0 0 1 0 C:\SDCSAVE
2000	COM5	ASCII	xxx	SYSTEM SERVICES	MASTER	1	NONE	0 0 0 0 1 0 C:\SDCSAVE

Figure 2.2 Example Device Manager Table

SECURITY

To insure the company's security information is protected according to the CIP standards all users of the device manager must log in before using the available features. Communications with devices sometimes require a phone number and or password. To insure this information does not get into the wrong hands a user must log in before viewing the secured information. The "Log In" button is located on the device manager's tool bar. Once logged in the button name will change to "Log Out". If there is no activity for 15 minutes or longer the system will automatically log out.

The password is set in the "Save and Archive" dialog. If the password field is blank then the system will not require a log on/log off. The log on button will only be displayed if a password exists in the "Save and Archive" dialog.

Figure 2.3 Security – Log In

Figure 2.4 Security – Log Out

POLLING TIMERS

The first device defined in the table starts the polling sequence. The polling sequence is always performed in a sequential manner according to the device numbers. The start polling entry can either poll the devices periodically, upon demand or at a given time during the day. The polling type is defined in the "Save and Archive" dialog. To open the "Save and Archive" dialog click on the "Save and Archive" menu button  or select the "Save Archive Dialog" menu option under the "Option" menu.

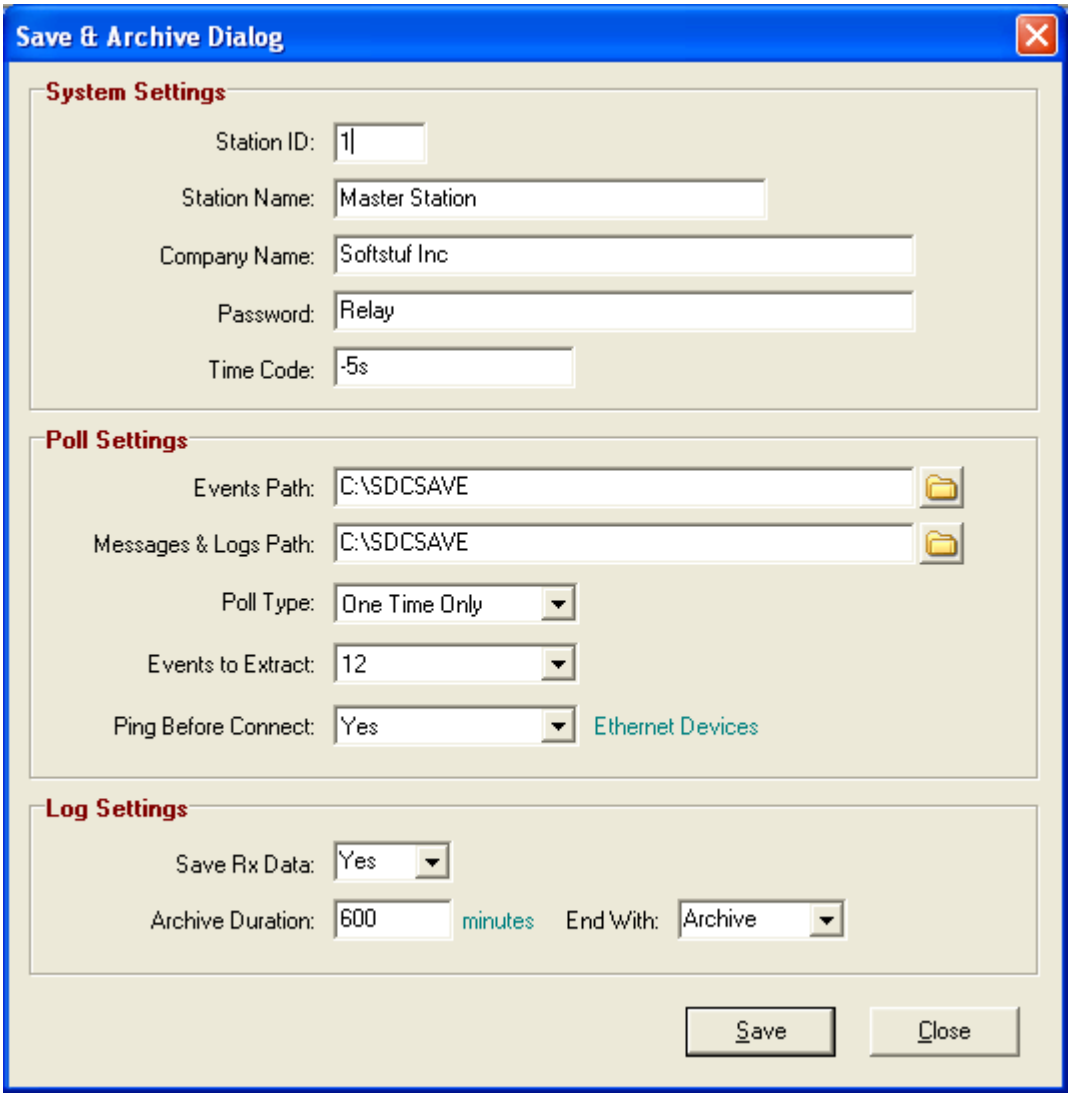


Figure 2.5 Polling Timers – One Time Only

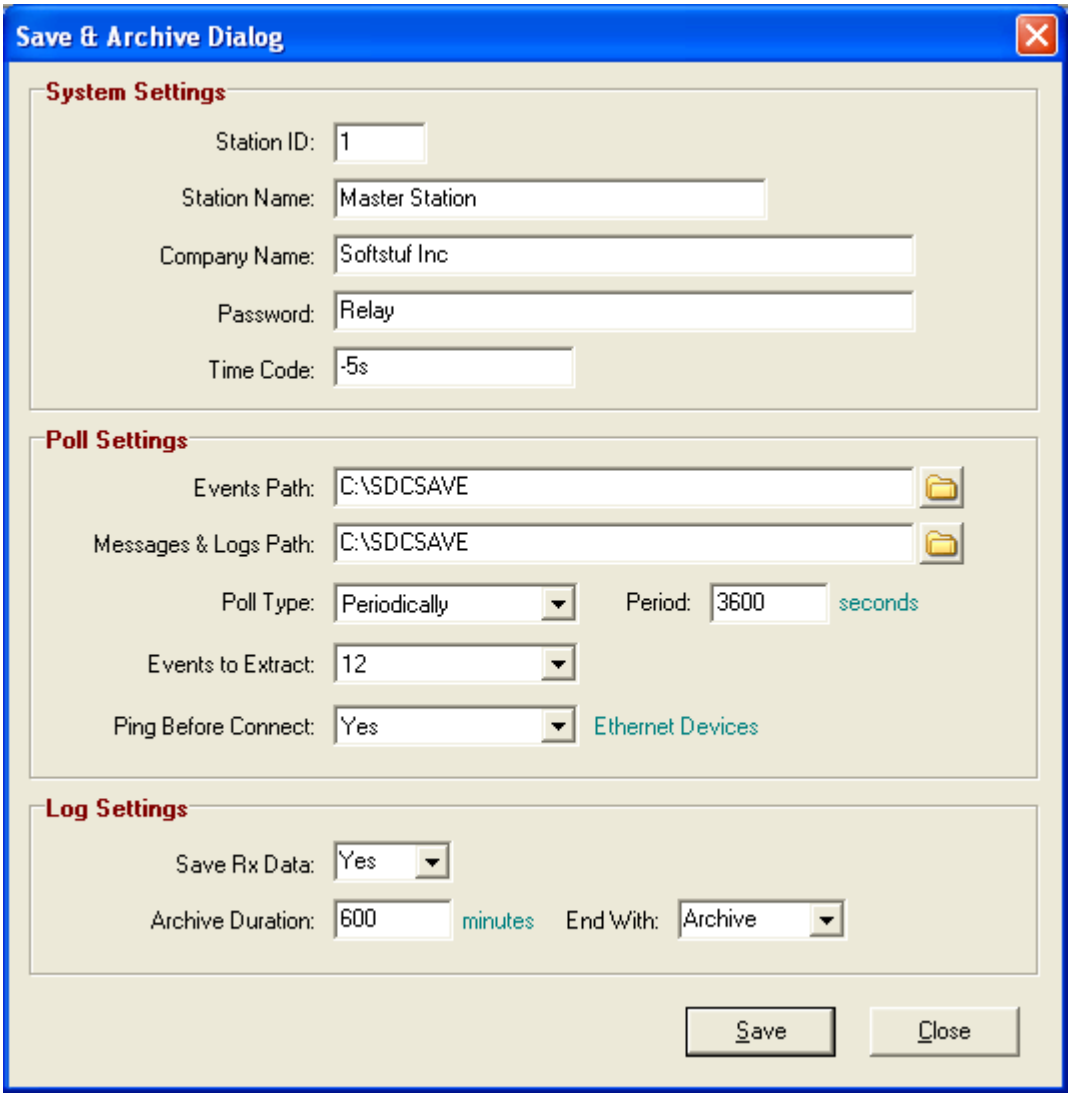


Figure 2.6 Polling Timers – Log Out - Periodically

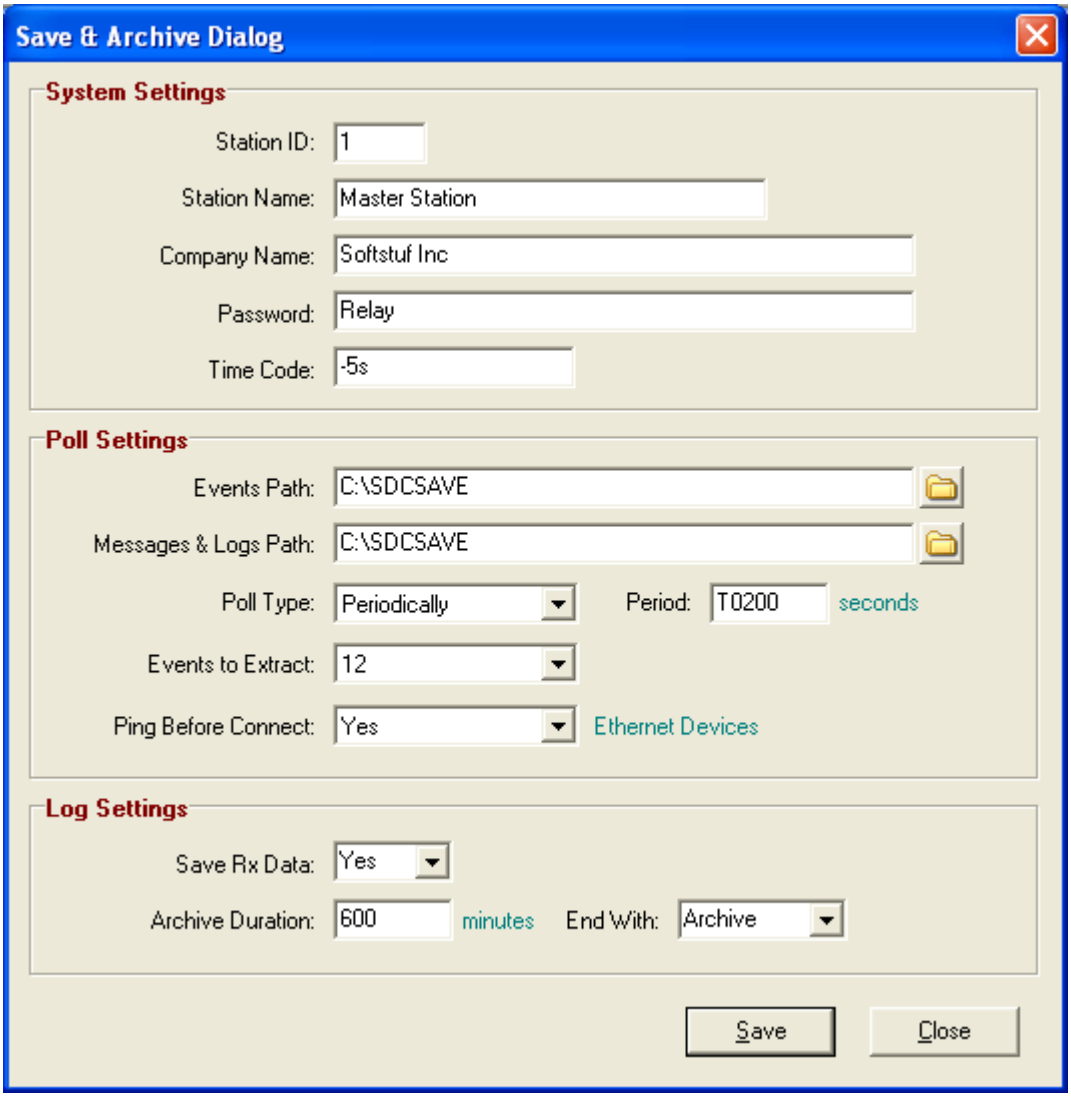


Figure 2.7 Polling Timers – Military Time

CONFIGURATIONS

The following sections explain how to configure the devices defined in the example device configuration. DFRs and Relays can be polled directly or through a communication processor, phone switch, Statmux or port switch.

A Communication Processor requires 2 main device entries in the table, one to dial and logon and one to logoff and hang up after polling is complete. Also, there must be an entry for each device connected. The dial and logon entry is the first entry defined, then a device entry for each device connected to the communication processor and the last device entry is the hang up. The device numbers for each entry must be defined in a sequential manner. The hang up driver's device number can be X times greater than the last device defined so future expansion is allowed.

INITIALIZE MODEMS

The second device defined in the table resets the modem used to call the devices configured for modem communications. The MODEM INIT driver sends a number of initialization commands to the modem. In

this example only one modem is used. If multiple modems are configured then there must be an initialize modem entry for each modem.

SERIAL DEVICES

In Wavewin serial devices can be polled in two ways. The first is to have the serial port opened when the device manager is opened and closed when the device manager is closed. To have the serial device open and locked during the duration of the device manager select the “Serial” connection in the Connection Type box under the Communication Information section in the Device Configuration dialog. The second is to have the serial port closed at all times except when a polling the device. The serial port will be opened before connecting to the device and immediately closed when polling is complete for the specific device. This allows for other applications to connect to the device when the device is not being polled by Wavewin. To have the serial device open only during the polling session select the “Virtual Port” connection in the Connection Type box under the Communication Information section in the Device Configuration dialog.

RS232 DEVICES (POLL DRIVERS)

The RS232 example is a star topology with each device directly connected to the Wavewin computer. In a star topology all devices are polled simultaneously. Device numbers 10, 11, 12 and 13 are the configurations for the RS232 devices. Each device’s configuration is defined in the following sections.

DEVICE 10 (SEL 351)

The SEL 351 relay is directly connected to the computers COM1 serial port. Below is the configuration dialog along with a description for each field.

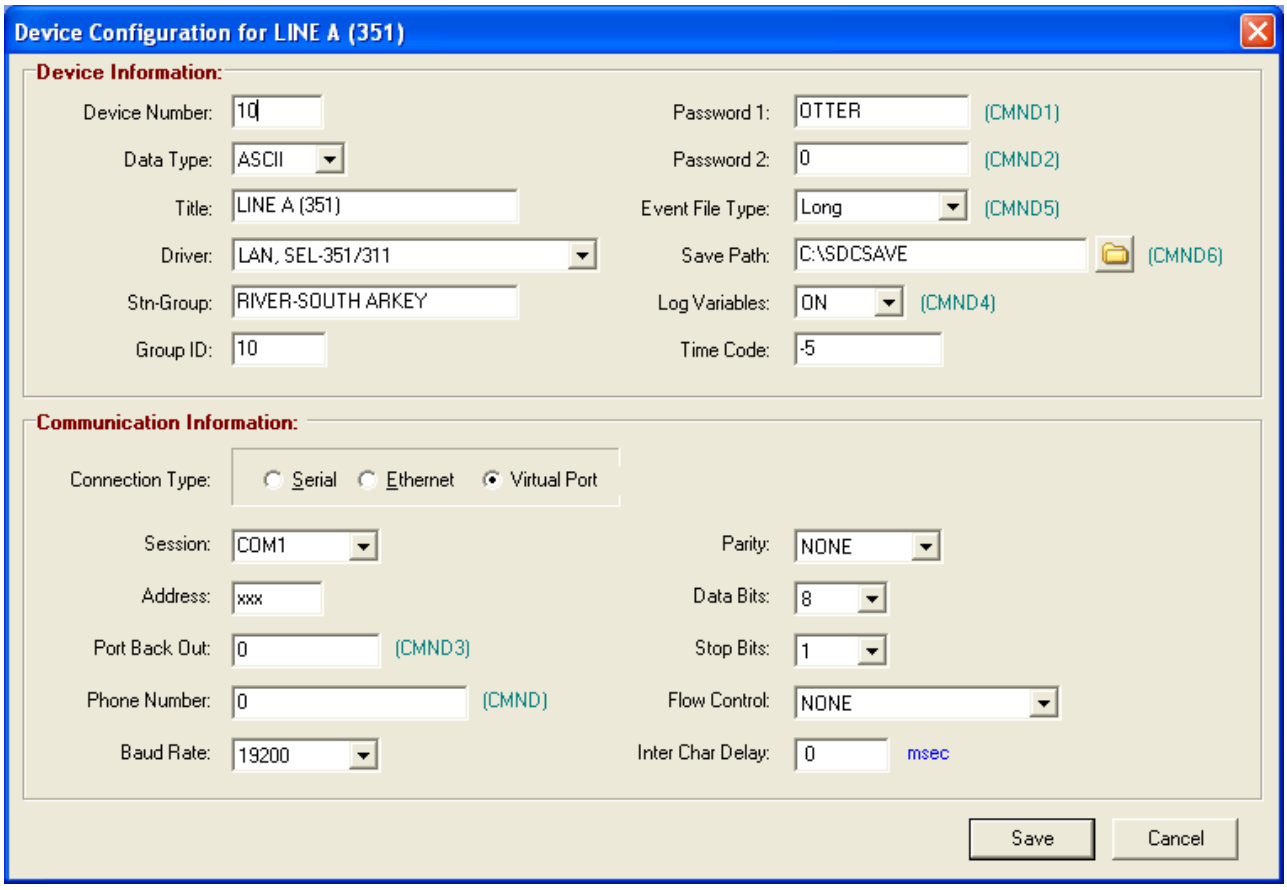


Figure 2.8 SEL 351 Relay

Field	Description
Device Information	
Device Number	The SEL 351 relay is device number 10.
Data Type	The 351 relay communicates using an ASCII protocol.
Title	The title of the relay is Line A (351). All devices that are polled for event files and/or meter values must have the device type included in the title surrounded by ().
Device Driver	The **LAN, SEL-351/311** driver is selected. The LAN drivers are used for direct communications with a device. This driver issues the following commands: ▪ Send a logon command to the relay using Password 1. ▪ Poll for new events. ▪ Send a meter command to the relay.
Group Name	The relay is in the South Arkey group.
Group ID	The relay is in group 10.
Password 1	The password is OTTER to gain access to the history report, event files and meter readings.
Password 2	There is no second level password needed for SEL relays.
Event File Type	The 16 samples per cycle event files are retrieved. There are 5 types of events that can be retrieved, Default (DFR's, Proprietary Relays…), Short (4 samples/cycle), Long (SEL 16 samples/cycle), Raw (SEL Raw w/ 16 samples/cycle), Compressed (SEL Compressed format).
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The SEL 351 relay connection type is virtual port. Open the serial port only when polling the device starts and close the serial port when polling is complete.
Session	The polling session is through the COM1 serial port.
Address	Since the relay is directly connected to the computer the address field does not apply, it is defaulted to xxx.
Port Back Out	Since the relay is directly connected to the computer the port back out field does not apply, it is defaulted to 0.
Phone Number	The phone number is not required.
Baud Rate	The baud rate is 19200.
Parity	No parity.
Data Bits	The Data Bits = 8.
Stop Bits	The Stop Bits = 1.
Flow Control	The Flow Control = None.
Inter Char Delay	No Inter Char Delay is needed.

DEVICE 11 (MDAR)

The MDAR relay is directly connected to the computers COM2 serial port. Wavewin uses the ABB Incom protocol to communicate with the MDAR relays. Below is the configuration dialog along with a description for each field.

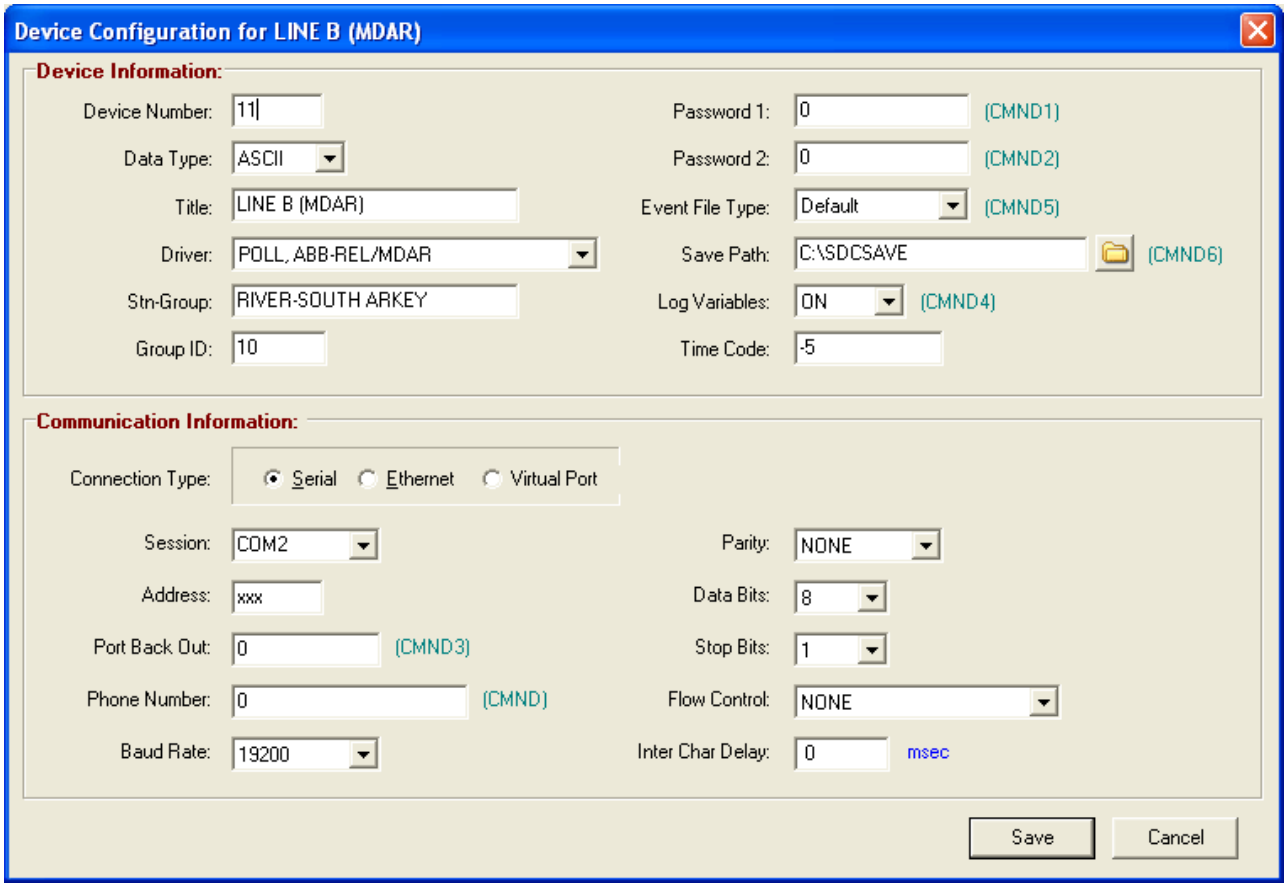


Figure 2.9 MDAR Relay

Field	Description
Device Information	
Device Number	The MDAR relay is device number 11.
Data Type	The MDAR relay communicates using a Binary protocol.
Title	The title of the relay is Line B (MDAR). All devices that are polled for event files and/or meter values must have the device type included in the title surrounded by ().
Device Driver	The **POLL, REL-30X** driver is selected. The POLL drivers are used for direct communications with a device. This driver issues the following commands: ▪ Request fault status. ▪ Request and save the latest targets 0 - 7. ▪ Request and save the latest targets 8 - 15. ▪ Save the latest target summary files. ▪ Save the target history file. ▪ Request and save the latest oscillography events 0 – 7. ▪ Request and save the latest oscillography events 8 – 15.
Group Name	The relay is in the South Arkey group.
Group ID	The relay is in group 10.
Password 1	A password is not required to communicate with the MDAR relays.
Password 2	There is no second level password needed for MDAR relays.
Event File Type	The default event files are retrieved.
Save Path	Path location where to save the retrieved files.

Field	Description
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The MDAR relay connection type is serial. Open the serial port when the device manager is open and closed the port when the device manager is closed.
Session	The polling session is through the COM2 serial port.
Address	Since the relay is directly connected to the computer the address field does not apply, it is defaulted to xxx.
Port Back Out	Since the relay is directly connected to the computer the port back out field does not apply, it is defaulted to 0.
Phone Number	The phone number is not required.
Baud Rate	The baud rate is 19200.
Parity	No parity.
Data Bits	The Data Bits = 8.
Stop Bits	The Stop Bits = 1.
Flow Control	The Flow Control = None.
Inter Char Delay	No Inter Char Delay is needed.

DEVICE 12 (SEL 311)

The SEL 311 relay is directly connected to the computers COM3 serial port. Below is the configuration dialog along with a description for each field.

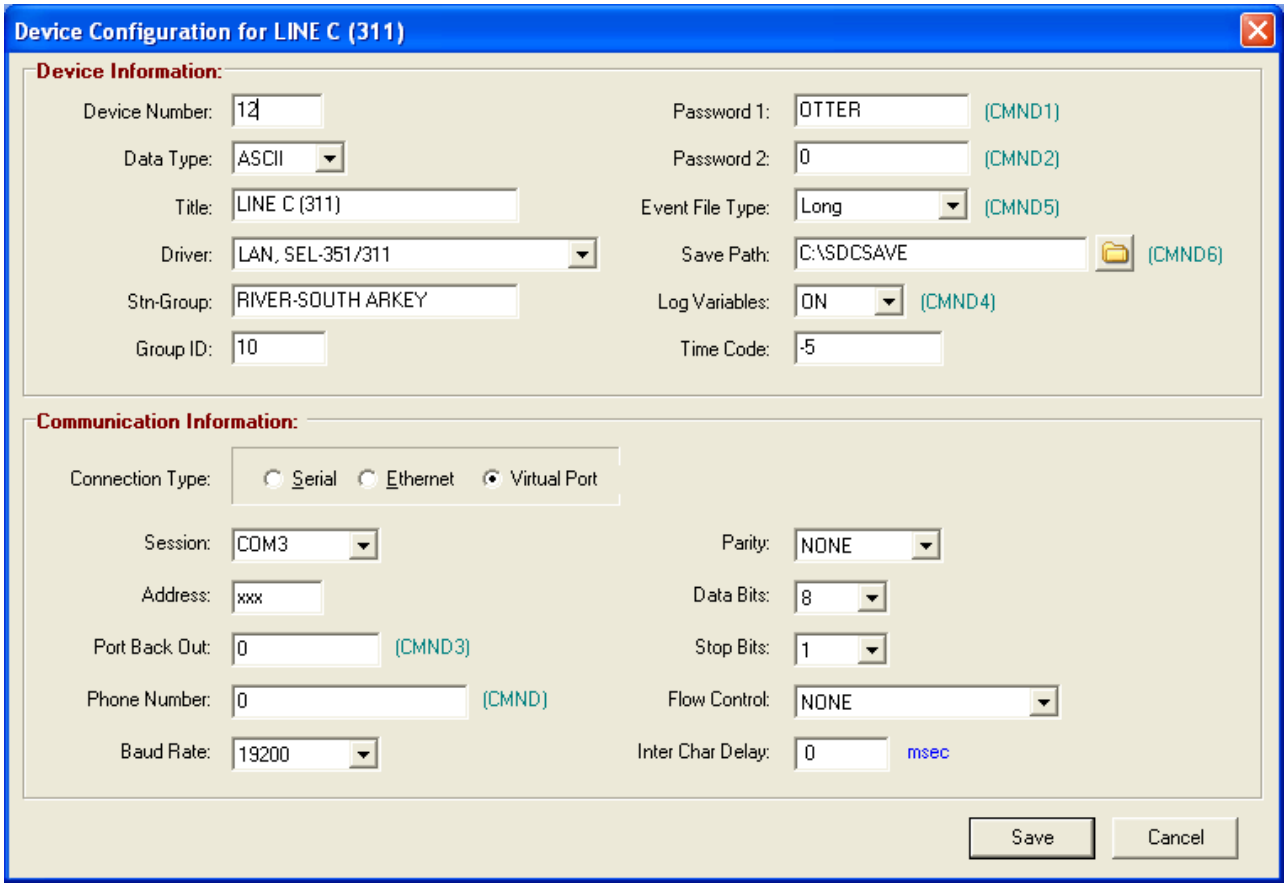


Figure 2.10 SEL 311Relay

Field	Description
Device Information	
Device Number	The SEL 311 relay is device number 12.
Data Type	The SEL 311 relay communicates using an ASCII protocol.
Title	The title of the relay is Line C (311). All devices that are polled for event files and/or meter values must have the device type included in the title surrounded by ().
Device Driver	The **LAN, SEL-351/311** driver is selected. The LAN drivers are used for direct communications with a device. This driver issues the following commands: ▪ Send a logon command to the relay using Password 1. ▪ Poll for new events. ▪ Send a meter command to the relay.
Group Name	The relay is in the South Arkey group.
Group ID	The relay is in group 10.
Password 1	The password is OTTER to gain access to the history report, event files and meter readings.
Password 2	There is no second level password needed for MDAR relays.
Event File Type	The 16 samples per cycle event files are retrieved. There are 5 types of events that can be retrieved, Default (DFR's, Proprietary Relays…), Short (4 samples/cycle), Long (SEL 16 samples/cycle), Raw (SEL Raw w/ 16 samples/cycle), Compressed (SEL Compressed format).
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The SEL 311 relay connection type is virtual port. Open the serial port only when polling the device starts and close the serial port when polling is complete.
Session	The polling session is through the COM3 serial port.
Address	Since the relay is directly connected to the computer the address field does not apply, it is defaulted to xxx.
Port Back Out	Since the relay is directly connected to the computer the port back out field does not apply, it is defaulted to 0.
Phone Number	The phone number is not required.
Baud Rate	The baud rate is 19200.
Parity	No parity.
Data Bits	The Data Bits = 8.
Stop Bits	The Stop Bits = 1.
Flow Control	The Flow Control = None.
Inter Char Delay	No Inter Char Delay is needed.

DEVICE 13 (ALPS)

The ALPS relay is directly connected to the computers COM4 serial port. Below is the configuration dialog along with a description for each field.

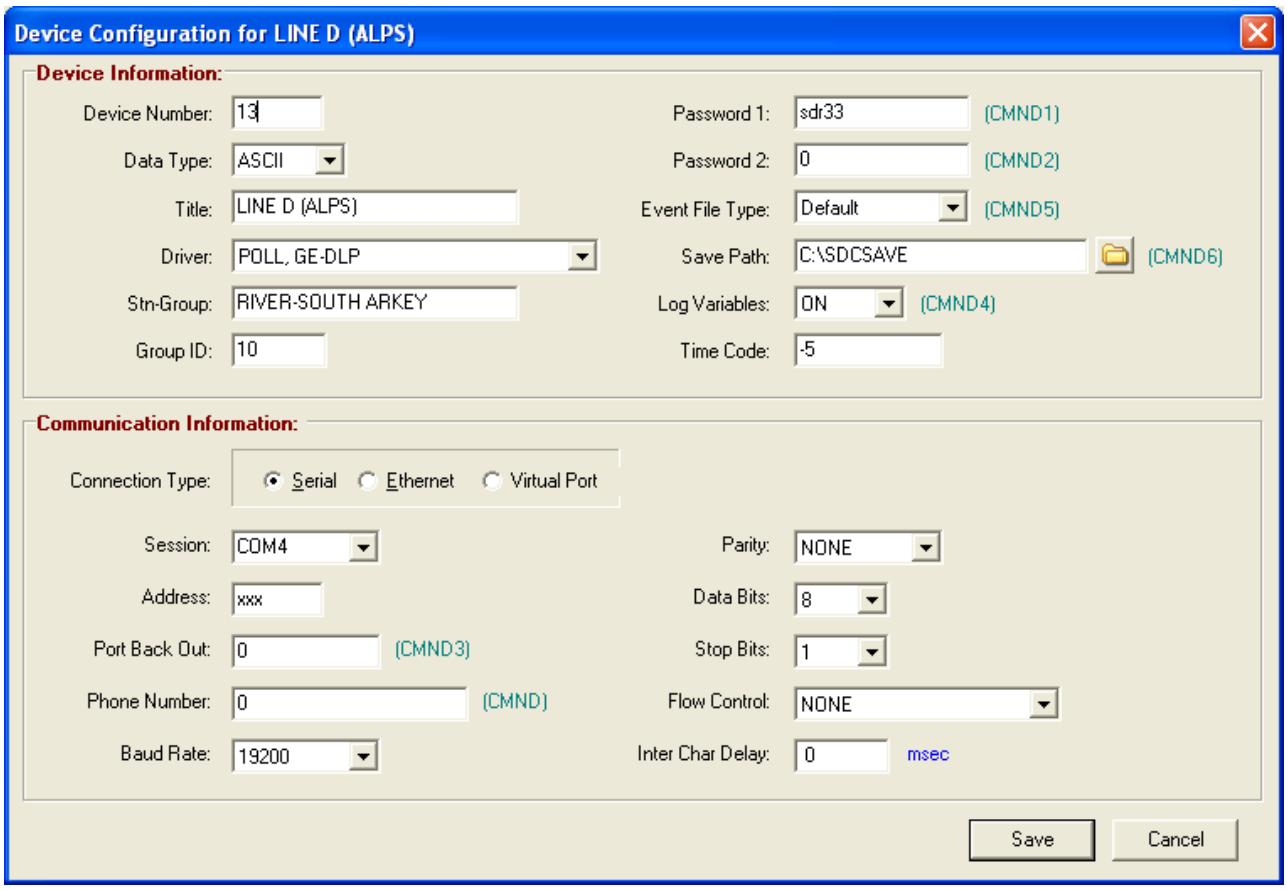


Figure 2.11 ALPSRelay

Field	Description
Device Information	
Device Number	The ALPS relay is device number 13.
Data Type	The ALPS relay communicates using an ASCII protocol.
Title	The title of the relay is Line D (ALPS). All devices that are polled for event files and/or meter values must have the device type included in the title surrounded by ().
Device Driver	The **POLL ALPS** driver is selected. The POLL drivers are used for direct communications with a device. This driver issues the following commands: ▪ Send a logon command to the relay using Password 1. ▪ Poll for new events. ▪ Send a meter command to the relay.
Group Name	The relay is in the South Arkey group.
Group ID	The relay is in group 10.
Password 1	The password is sdr33 to gain access to the history report, event files and meter readings.
Password 2	There is no second level password needed for the ALPS relays.
Event File Type	The default event files are retrieved.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.

Field	Description
Communication Information	
Connection Type	The ALPS relay connection type is serial. Open the serial port when the device manager is open and closed the port when the device manager is closed.
Session	The polling session is through the COM4 serial port.
Address	Since the relay is directly connected to the computer the address field does not apply, it is defaulted to xxx.
Port Back Out	Since the relay is directly connected to the computer the port back out field does not apply, it is defaulted to 0.
Phone Number	The phone number is not required.
Baud Rate	The baud rate is 19200.
Parity	No parity.
Data Bits	The Data Bits = 8.
Stop Bits	The Stop Bits = 1.
Flow Control	The Flow Control = None.
Inter Char Delay	No Inter Char Delay is needed.

DIALUP DEVICES (DIAL DRIVERS)

The Modem example is a multi-drop topology with each device connected a phone switch and some also connected to a communication processor. In a multi-drop topology all devices are polled one at a time. The devices are polled in sequence according to the device numbers. The modem devices are device numbers 20 thru 49. Each devices configuration is defined in the following sections.

DEVICE 20 (TRANSCAN)

The Transcan DFR is connected to a phone switch. The Wavewin computer first calls the phone switch then switches to the port where the DFR is connected. Below is the configuration dialog along with a description for each field.

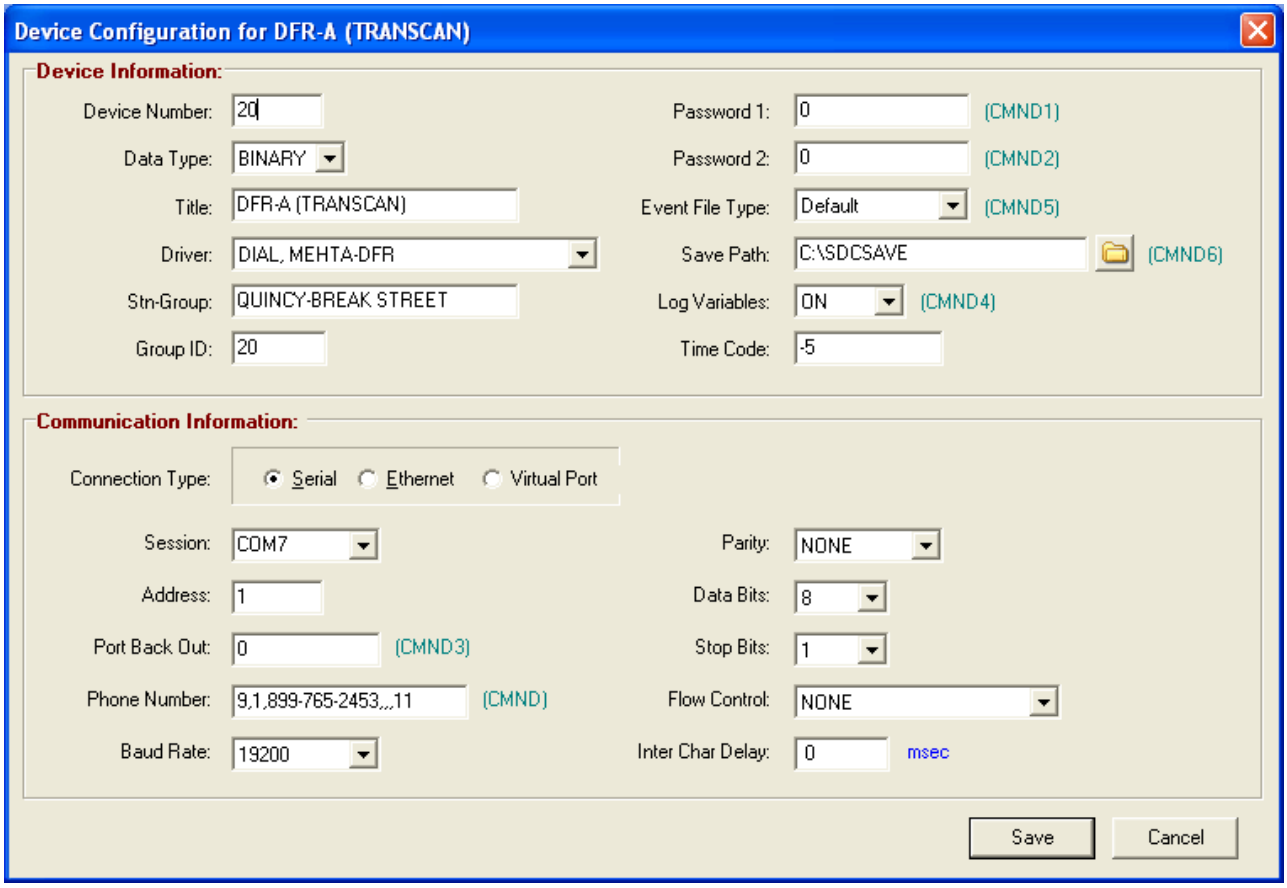


Figure 2.12 Transcan DFR

Field	Description
Device Information	
Device Number	The Mehta Transcan DFR is device number 20.
Data Type	The Transcan DFR communicates using a Binary protocol.
Title	The title of the DFR is DFR-A (Transcan). All devices that are polled for event files must have the device type included in the title surrounded by ().
Device Driver	The **DIAL, MEHTA-DFR** driver is selected. The DIAL drivers are used to communicate with a device that is connected to a modem. This driver issues the following commands: ▪ Dial the DFR and wait for a Connect signal from the modem. ▪ Logon as defined Master. The Master number is defined in the Address field. ▪ Request the Mehta DIR. ▪ Retrieve the latest event files.
Group Name	The DFR is in the Break Street group.
Group ID	The DFR is in group 20.
Password 1	A password is not required for communications with the Mehta DFR.
Password 2	There is no second level password needed for the ALPS relays.
Event File Type	The default event files are retrieved.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.

Field	Description
Communication Information	
Connection Type	The Mehta Transcan DFR connection type is serial through a modem. Open the serial port when the device manager is open and closed the port when the device manager is closed.
Session	The polling session is through the COM7 serial port.
Address	Since the relay is directly connected to the computer the address field does not apply, it is defaulted to xxx.
Port Back Out	Since the relay is directly connected to the computer the port back out field does not apply, it is defaulted to 0.
Phone Number	The phone number is required to call and poll the DFR.
Baud Rate	The baud rate is 19200.
Parity	No parity.
Data Bits	The Data Bits = 8.
Stop Bits	The Stop Bits = 1.
Flow Control	The Flow Control = None.
Inter Char Delay	No Inter Char Delay is needed.

DEVICE 21 (DLP)

The DLP relay is connected to a phone switch. The Wavewin computer first calls the phone switch then switches to the port where the DLP relay is connected. Below is the configuration dialog along with a description for each field.

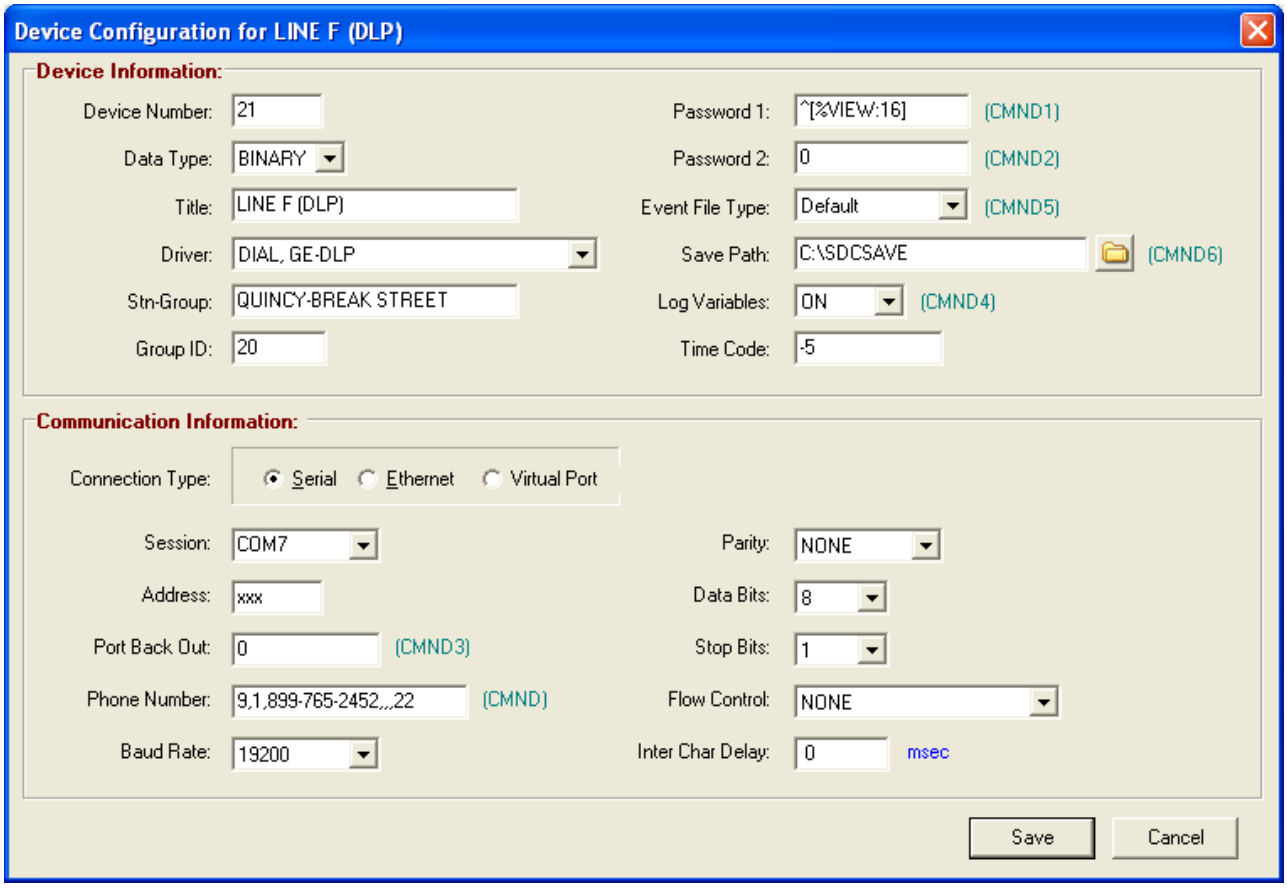


Figure 2.13 DLP Relay

Field	Description
Device Information	
Device Number	The DLP relay is device number 21.
Data Type	The DLP relay communicates using a Binary protocol.
Title	The title of the relay is Line-F (DLP). All devices that are polled for event files and/or meter values must have the device type included in the title surrounded by ().
Device Driver	The **DIAL, GE-DLP** driver is selected. The DIAL drivers are used to communicate with a device that is connected to a modem. This driver issues the following commands: ▪ Dial the relay and wait for a Connect signal from the modem. ▪ Send a login command to the relay. ▪ Request the fault list. ▪ Request latest fault files, save fault files and produce summary files. ▪ Request meter values.
Group Name	The relay is in the Break Street group.
Group ID	The relay is in group 20.
Password 1	The DLP password is set to VIEW, the DLP relays requires 16 characters for the password the ":16" pads blanks at the end of the password.
Password 2	There is no second level password needed for the DLP relays.
Event File Type	The default event files are retrieved.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Log Headers	Display the header information in Station Mode.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The DLP Relay connection type is serial through a modem. Open the serial port when the device manager is open and closed the port when the device manager is closed.
Session	The polling session is through the COM7 serial port.
Address	Since the relay is directly connected to the computer the address field does not apply, it is defaulted to xxx.
Port Back Out	Since the relay is directly connected to the computer the port back out field does not apply, it is defaulted to 0.
Phone Number	The phone number followed by 3 commas and the port switch number.
Baud Rate	The baud rate is 19200.
Parity	No parity.
Data Bits	The Data Bits = 8.
Stop Bits	The Stop Bits = 1.
Flow Control	The Flow Control = None.
Inter Char Delay	No Inter Char Delay is needed.

DEVICE 22 (SEL 387)

The SEL 387 relay is connected to a phone switch. The Wavewin computer first calls the phone switch then switches to the port where the relay is connected. Below is the configuration dialog along with a description for each field.

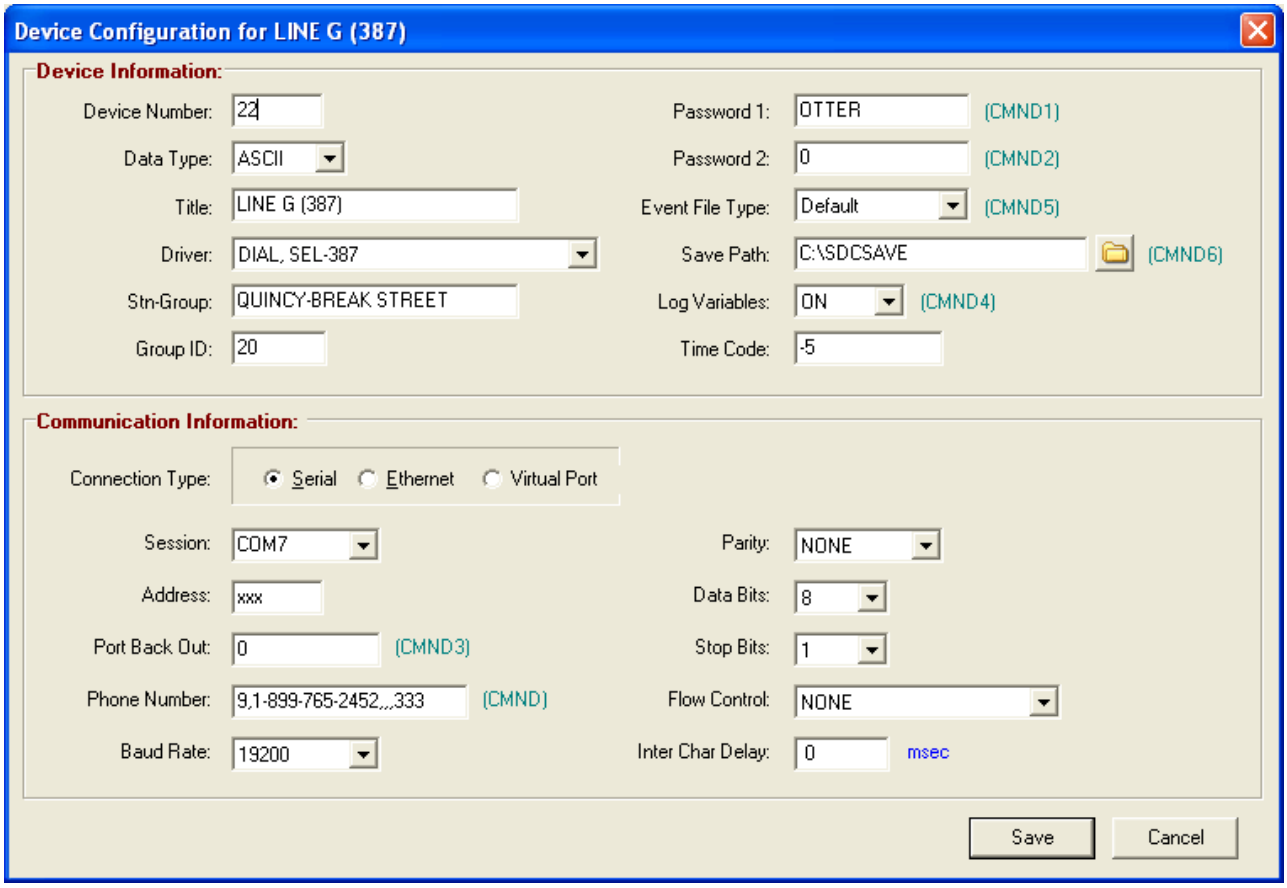


Figure 2.14 SEL 387 Relay

Field	Description
Device Information	
Device Number	The SEL 387 relay is device number 22.
Data Type	The SEL 387 relay communicates using an ASCII protocol.
Title	The title of the relay is Line-G (387). All devices that are polled for event files and/or meter values must have the device type included in the title surrounded by ().
Device Driver	The **DIAL, SEL-387** driver is selected. The DIAL drivers are used to communicate with a device that is connected to a modem. This driver issues the following commands: ▪ Dial the relay and wait for a Connect signal from the modem. ▪ Send a logon command to the relay. The password is defined in the second parameter in the EscSeq field. ▪ Poll for new events. ▪ Send a meter command to the relay.
Group Name	The relay is in the Break Street group.
Group ID	The relay is in group 20.
Password 1	The password is set to OTTER.
Password 2	There is no second level password needed for the SEL 387 relays.
Event File Type	The default event files are retrieved, short 4 samples/cycle.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.

Field	Description
Communication Information	
Connection Type	The SEL 387 Relay connection type is serial through a modem. Open the serial port when the device manager is open and closed the port when the device manager is closed.
Session	The polling session is through the COM7 serial port.
Address	Since the relay is directly connected to the computer the address field does not apply, it is defaulted to xxx.
Port Back Out	Since the relay is directly connected to the computer the port back out field does not apply, it is defaulted to 0.
Phone Number	The phone number followed by 3 commas and the port switch number.
Baud Rate	The baud rate is 19200.
Parity	No parity.
Data Bits	The Data Bits = 8.
Stop Bits	The Stop Bits = 1.
Flow Control	The Flow Control = None.
Inter Char Delay	No Inter Char Delay is needed.

DEVICE 23 (SEL 587)

The SEL 587 relay is connected to a phone switch. The Wavewin computer first calls the phone switch then switches to the port where the relay is connected. Below is the configuration dialog along with a description for each field.

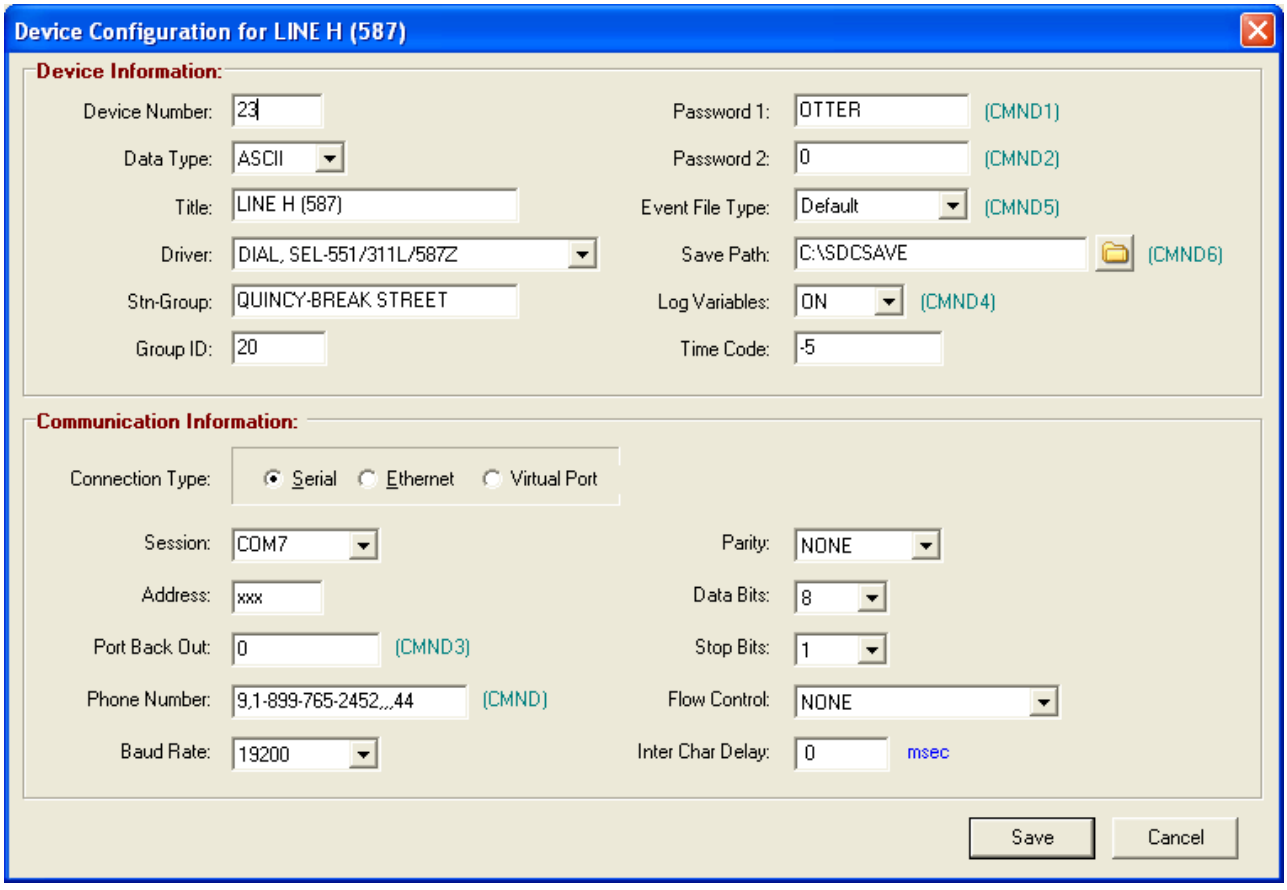


Figure 2.15 SEL 587 Relay

Field	Description
Device Information	
Device Number	The SEL 587 relay is device number 23.
Data Type	The SEL 587 relay communicates using an ASCII protocol.
Title	The title of the relay is Line-H (587). All devices that are polled for event files and/or meter values must have the device type included in the title surrounded by ().
Device Driver	The **DIAL, SEL-587** driver is selected. The DIAL drivers are used to communicate with a device that is connected to a modem. This driver issues the following commands: ▪ Dial the relay and wait for a Connect signal from the modem. ▪ Send a logon command to the relay. The password is defined in the second parameter in the EscSeq field. ▪ Poll for new events. ▪ Send a meter command to the relay.
Group Name	The relay is in the Break Street group.
Group ID	The relay is in group 20.
Password 1	The password is set to OTTER.
Password 2	There is no second level password needed for the SEL 587 relays.
Event File Type	The default event files are retrieved, short 4 samples/cycle.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The SEL 587 Relay connection type is serial through a modem. Open the serial port when the device manager is open and closed the port when the device manager is closed.
Session	The polling session is through the COM7 serial port.
Address	Since the relay is directly connected to the computer the address field does not apply, it is defaulted to xxx.
Port Back Out	Since the relay is directly connected to the computer the port back out field does not apply, it is defaulted to 0.
Phone Number	The phone number followed by 3 commas and the port switch number.
Baud Rate	The baud rate is 19200.
Parity	No parity.
Data Bits	The Data Bits = 8.
Stop Bits	The Stop Bits = 1.
Flow Control	The Flow Control = None.
Inter Char Delay	No Inter Char Delay is needed.

DEVICE 24 (SEL 2030)

The SEL 2030 communication processor is connected to a phone switch. The Wavewin computer first calls the phone switch then switches to the port where the 2030 is connected. Below is the configuration dialog along with a description for each field.

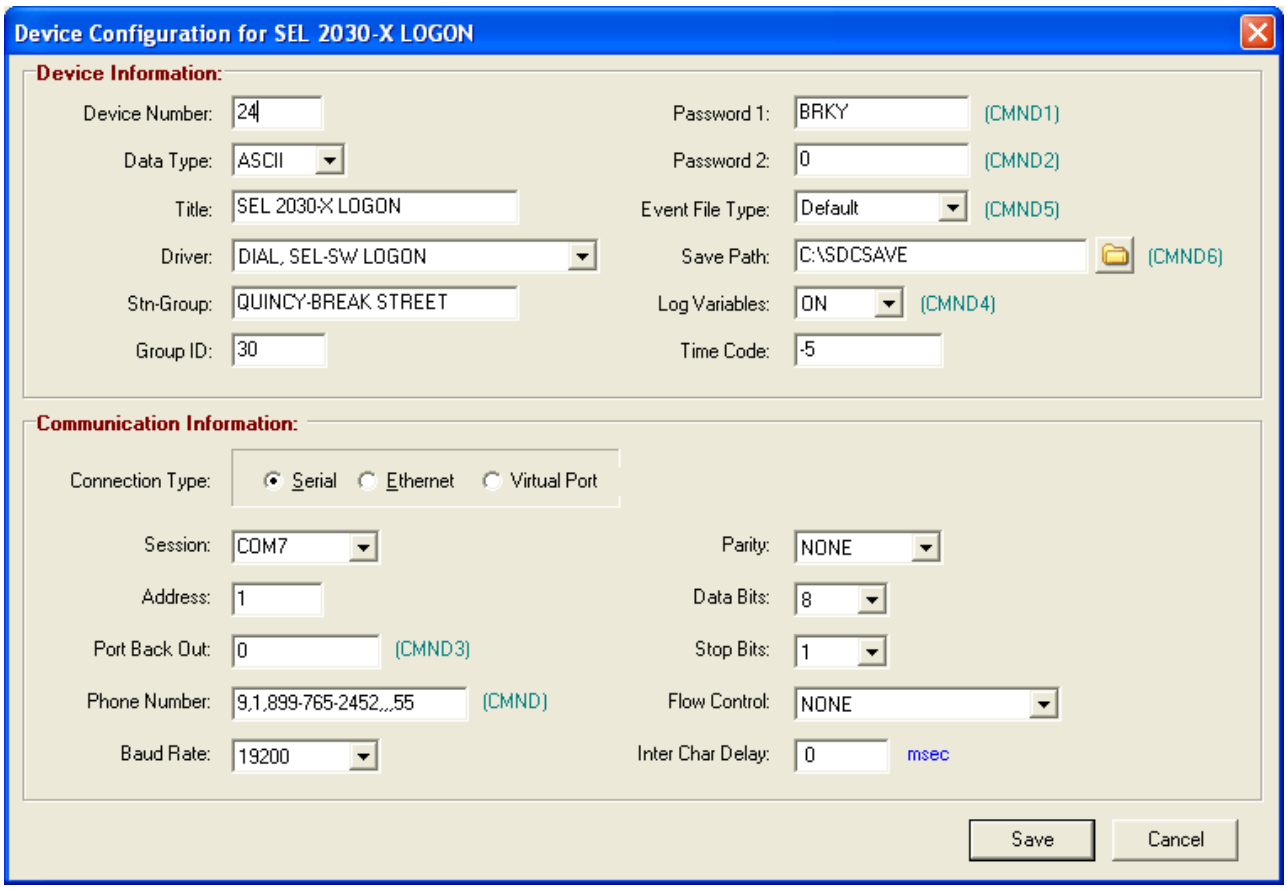


Figure 2.16 SEL 2030 Communication Processor

Field	Description
Device Information	
Device Number	The SEL 2030 communication processor is device number 24.
Data Type	The SEL 2030 communicates using an ASCII protocol.
Title	The title of the relay is SEL 2030-X Logon.
Device Driver	The **DIAL, SEL-SW LOGON** driver is selected. The DIAL drivers are used to communicate with a device that is connected to a modem. This driver issues the following commands: ▪ Dial the 2030 and wait for a Connect signal from the modem. ▪ Send the SEL **ACC** command to the 2030 along with the password defined in the EscSeq Command field.
Group Name	The 2030 is in the Break Street group.
Group ID	The 2030 is in group 30.
Password 1	The password is set to BRKY.
Password 2	There is no second level password needed for the SEL 2030.
Event File Type	No events are retrieved from the 2030, set to default.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The SEL 2030 connection type is serial through a modem. Open the serial port when the device manager is open and closed the port when

Field	Description
	the device manager is closed.
Session	The polling session is through the COM7 serial port.
Address	Since the device is directly connected to the computer the address field does not apply, it is defaulted to xxx.
Port Back Out	Since the device is directly connected to the computer the port back out field does not apply, it is defaulted to 0.
Phone Number	The phone number followed by 3 commas and the port switch number.
Baud Rate	The baud rate is 19200.
Parity	No parity.
Data Bits	The Data Bits = 8.
Stop Bits	The Stop Bits = 1.
Flow Control	The Flow Control = None.
Inter Char Delay	No Inter Char Delay is needed.

DEVICE 25 (PRTU)

The SEL PRTU is connected to the 2030 communication processor through a direct serial link. The Wavewin computer first calls the phone switch then switches to the port where the 2030 is connected then switches to the PRTU. Below is the configuration dialog along with a description for each field.

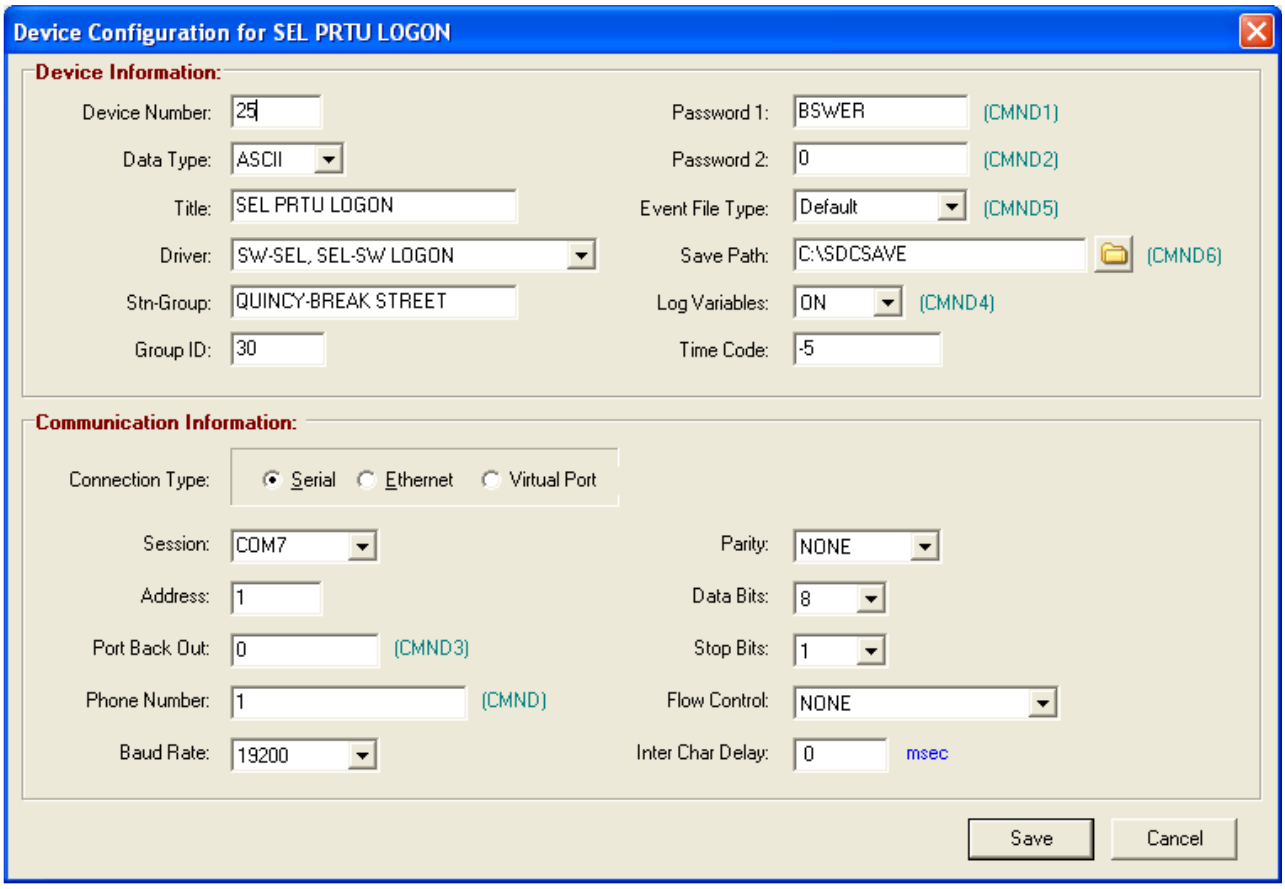


Figure 2.17 SEL Protective Relay Terminal Unit (PRTU)

Field	Description
Device Information	
Device Number	The SEL PRTU is device number 25.

Field	Description
Data Type	The SEL PRTU communicates using an ASCII protocol.
Title	The title of the PRTU is SEL PRTU Logon.
Device Driver	The **SW-SEL, SEL-SW LOGON** driver is selected. The SW drivers are used to communicate with a device that is connected to a communication processor. This driver issues the following commands: ▪ Send a Clear command to the PRTU. ▪ Switch to the port number listed in the address field. ▪ Send the **ACC** command and the password defined in the EscSeq Command field.
Group Name	The PRTU is in the Break Street group.
Group ID	The PRTU is in group 30.
Password 1	The password is set to BSWER.
Password 2	There is no second level password needed for the SEL PRTU.
Event File Type	No events are retrieved from the PRTU, set to default.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The SEL PRTU connection type is serial.
Session	The polling session is through the COM7 serial port.
Address	The address field is 1. The PRTU is connected to the 2030's port 1.
Port Back Out	The port back out field does not apply, it is defaulted to 0.
Phone Number	The phone number is not required, it is defaulted to 1.
Baud Rate	The baud rate is 19200.
Parity	No parity.
Data Bits	The Data Bits = 8.
Stop Bits	The Stop Bits = 1.
Flow Control	The Flow Control = None.
Inter Char Delay	No Inter Char Delay is needed.

DEVICE 26 (SEL 501)

The SEL 501 Relay is connected to a PRTU which is connected to a 2030 communication processor through a direct serial link. The Wavewin computer first calls the phone switch then switches to the port where the 2030 is connected then switches to the PRTU then switches to the 501 Relay. Below is the configuration dialog along with a description for each field.

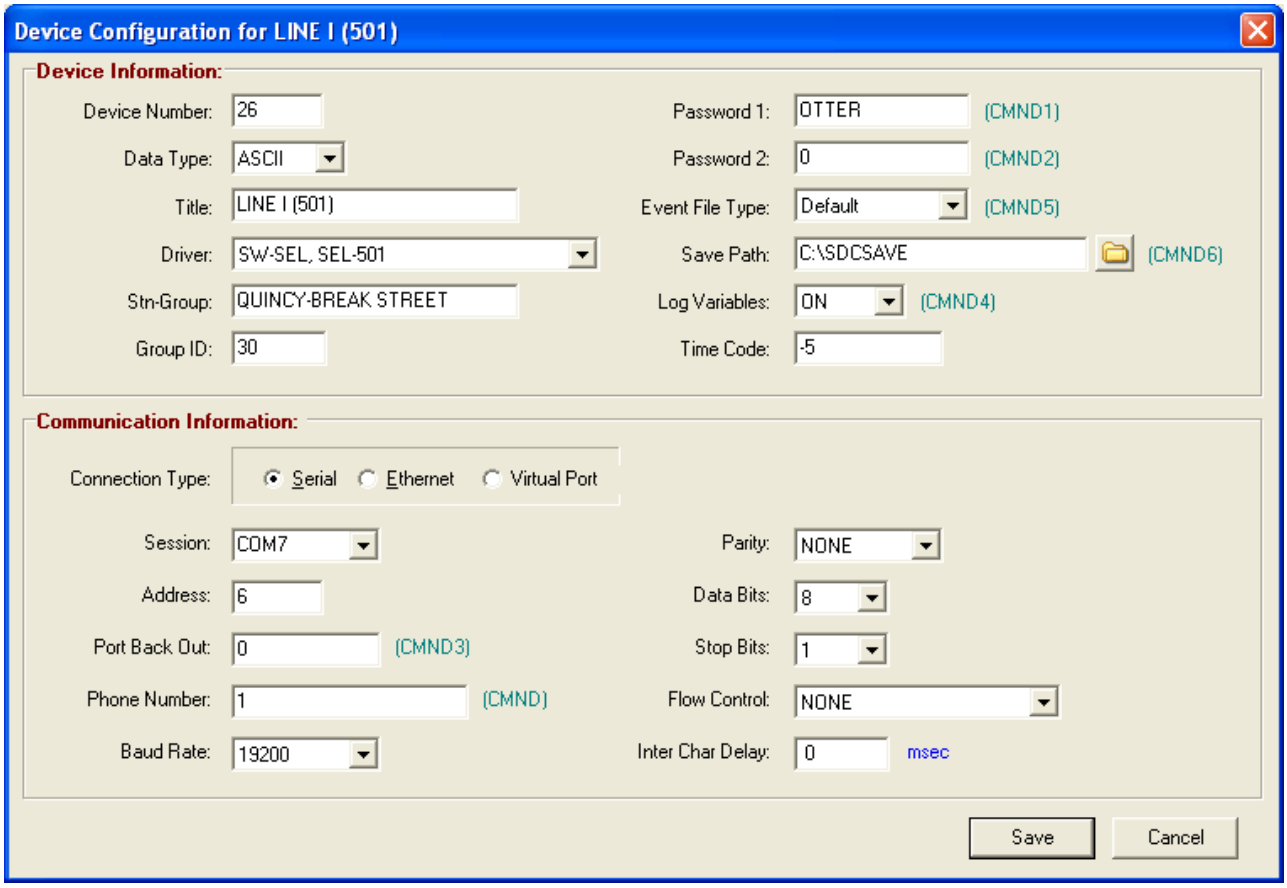


Figure 2.18 SEL 501 Relay

Field	Description
Device Information	
Device Number	The SEL 501 is device number 26.
Data Type	The SEL 501 relay communicates using an ASCII protocol.
Title	The title of the relay is Line I (501). All devices that are polled for event files and/or meter values must have the device type included in the title surrounded by ().
Device Driver	The **SW-SEL, SEL-501** driver is selected. The SW drivers are used to communicate with a device that is connected to a communication processor. This driver issues the following commands: ▪ Switch to the port number listed in the address field. ▪ Send the SEL **ACC** command to along with the password defined in the EscSeq Command field. ▪ Download all new events. ▪ Send a Meter command.
Group Name	The 501 relay is in the Break Street group.
Group ID	The relay is in group 30.
Password 1	The password is set to OTTER.
Password 2	There is no second level password needed for the SEL 501 relays.
Event File Type	The default event files are retrieved, short 4 samples/cycle.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.

Field	Description
Communication Information	
Connection Type	The SEL 501 connection type is serial.
Session	The polling session is through the COM7 serial port.
Address	The address field is 6. The SEL 501 relay is connected to the PRTU port 6.
Port Back Out	The port back out field does not apply, it is defaulted to 0.
Phone Number	The phone number is not required, it is defaulted to 1.
Baud Rate	The baud rate is 19200.
Parity	No parity.
Data Bits	The Data Bits = 8.
Stop Bits	The Stop Bits = 1.
Flow Control	The Flow Control = None.
Inter Char Delay	No Inter Char Delay is needed.

DEVICE 27 (SEL 287)

The SEL 287 Relay is connected to a PRTU which is connected to a 2030 communication processor through a modem. The Wavewin computer first calls the phone switch then switches to the port where the 2030 is connected then switches to the PRTU then switches to the 287 Relay. Below is the configuration dialog along with a description for each field.

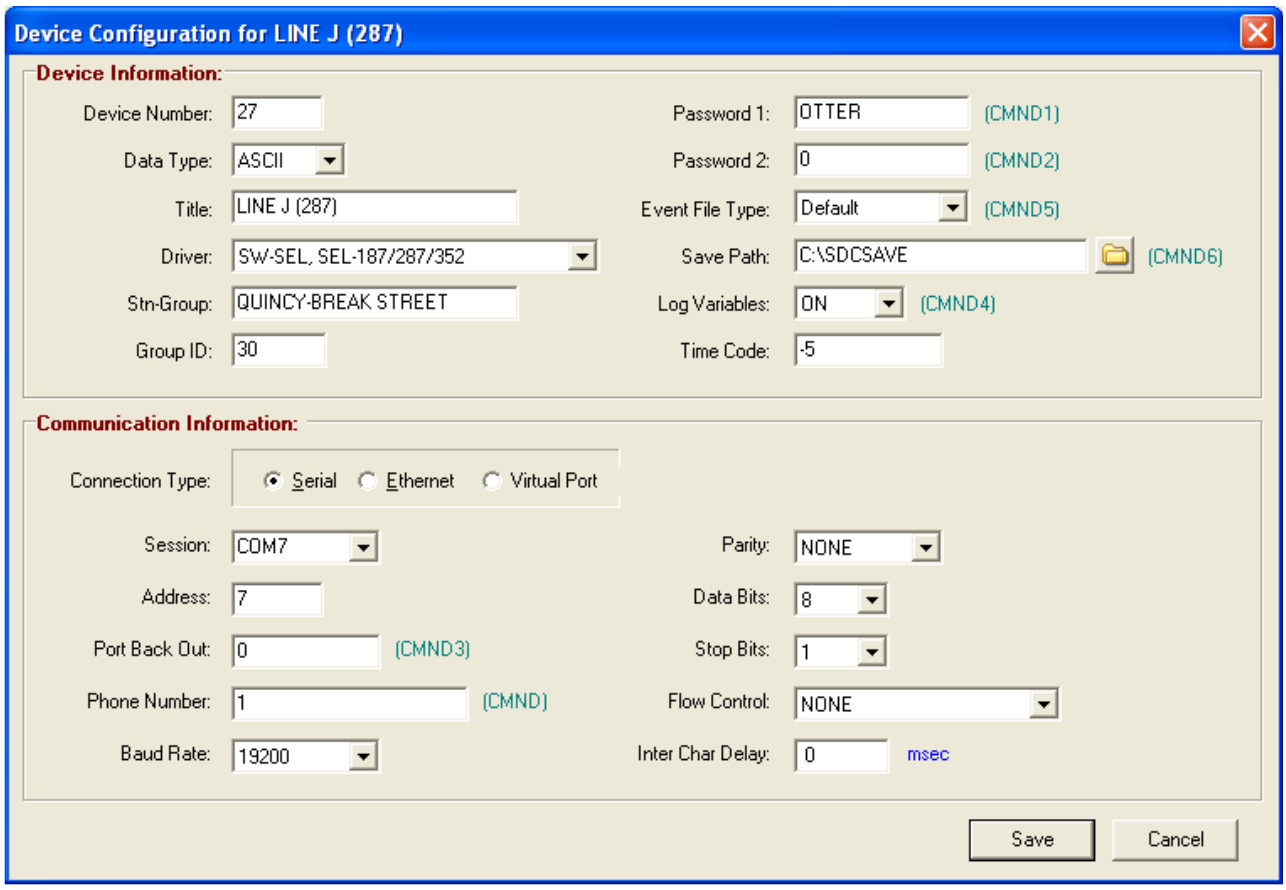


Figure 2.19 SEL 287 Relay

Field	Description
Device Information	
Device Number	The SEL 287 Relay is device number 27.
Data Type	The SEL 287 relay communicates using an ASCII protocol.
Title	The title of the 287 relay is Line J (287). All devices that are polled for event files and/or meter values must have the device type included in the title surrounded by ().
Device Driver	The **SW-SEL, SEL-187/287/352** driver is selected. The SW drivers are used to communicate with a device that is connected to a communication processor. This driver issues the following commands: ▪ Switch to the port number listed in the address field. ▪ Send the SEL **ACC** command to along with the password defined in the EscSeq Command field. ▪ Download all new events. ▪ Send a Meter command.
Group Name	The relay is in the Break Street group.
Group ID	The relay is in group 30.
Password 1	The password is set to OTTER.
Password 2	There is no second level password needed for the SEL 287 relays.
Event File Type	The default event files are retrieved, short 4 samples/cycle.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The SEL 287 connection type is serial.
Session	The polling session is through the COM7 serial port.
Address	The address field is 7. The 287 relay is connected to the PRTU's port number 7.
Port Back Out	The port back out field does not apply, it is defaulted to 0.
Phone Number	The phone number is not required, it is defaulted to 1.
Baud Rate	The baud rate is 19200.
Parity	No parity.
Data Bits	The Data Bits = 8.
Stop Bits	The Stop Bits = 1.
Flow Control	The Flow Control = None.
Inter Char Delay	No Inter Char Delay is needed.

DEVICE 28 (D60)

The GE D60 Relay is connected to a PRTU which is connected to a 2030 communication processor through a direct serial link. The Wavewin computer first calls the phone switch then switches to the port where the 2030 is connected then switches to the PRTU then switches to the D60 Relay. Below is the configuration dialog along with a description for each field.

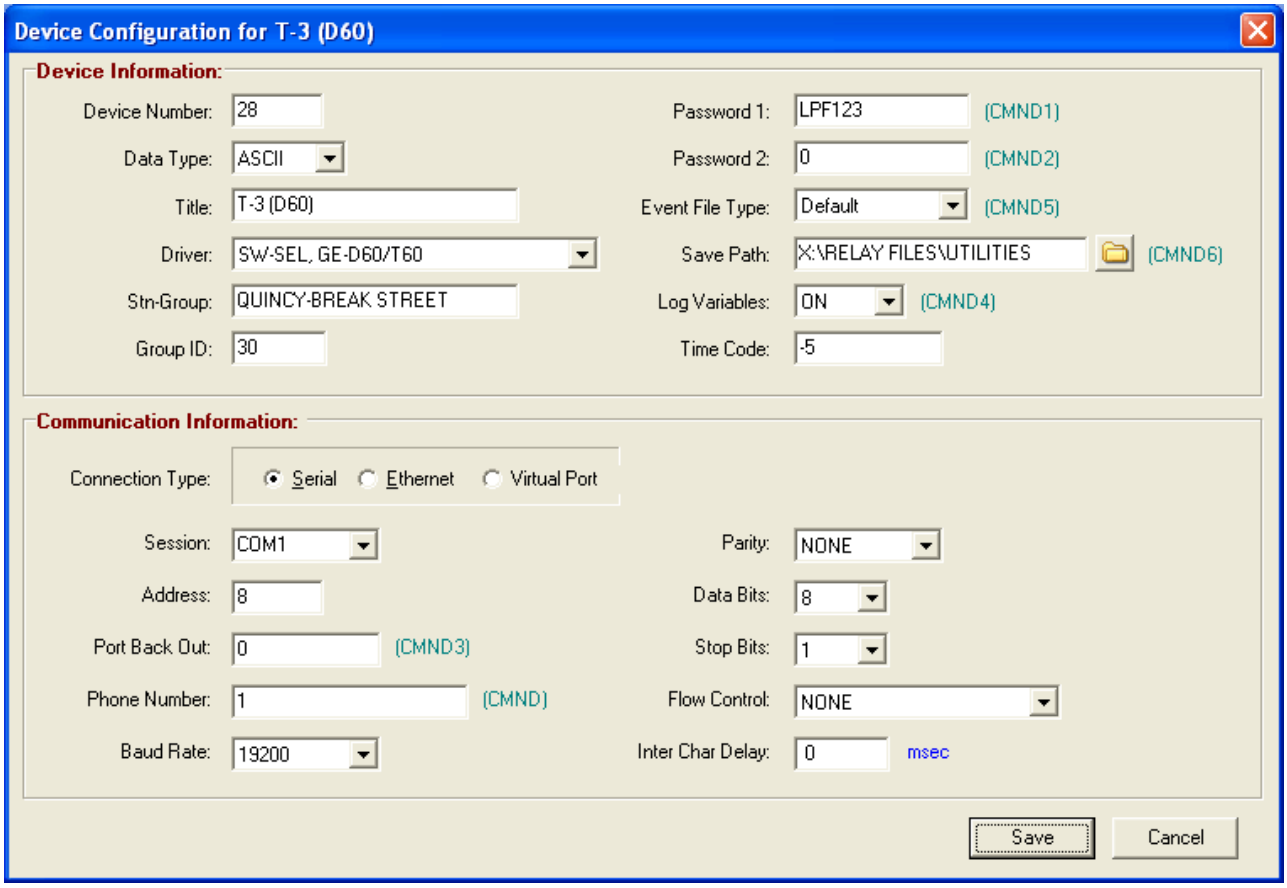


Figure 2.20 GE D60 Relay

Field	Description
Device Information	
Device Number	The GE D60 Relay is device number 28.
Data Type	The GE D60 relay communicates using an ASCII protocol.
Title	The title of the relay is T-3 (D60). All devices that are polled for event files and/or meter values must have the device type included in the title surrounded by ().
Device Driver	The **SW-SEL, GE-D60/T60** driver is selected. The SW drivers are used to communicate with a device that is connected to a communication processor. This driver issues the following commands: ▪ Switch to the port number listed in the address field. ▪ Logon using the password defined in the EscSeq field if there is a password set on the machine. ▪ Request and save all new html fault report files. ▪ Request and save all new event files. ▪ Request and save all new oscillography Comtrade files. ▪ Request and save all new data logger Comtrade files. ▪ Log off.
Group Name	The relay is in the Break Street group.
Group ID	The relay is in group 30.
Password 1	The password is set to LPF123.
Password 2	There is no second level password needed for the GE D60 relays.
Event File Type	The default event files are retrieved.

Field	Description
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The GE D60 Relay connection type is serial.
Session	The polling session is through the COM7 serial port.
Address	The address field is 8. The D60 relay is connected to the PRTU's port number 8.
Port Back Out	The port back out field does not apply, it is defaulted to 0.
Phone Number	The phone number is not required, it is defaulted to 1.
Baud Rate	The baud rate is 19200.
Parity	No parity.
Data Bits	The Data Bits = 8.
Stop Bits	The Stop Bits = 1.
Flow Control	The Flow Control = None.
Inter Char Delay	No Inter Char Delay is needed.

DEVICE 34 (PRTU QUIT)

The SEL PRTU QUIT will back out of the last connected port on the PRTU then issue a QUIT command to the PRTU. Below is the configuration dialog along with a description for each field.

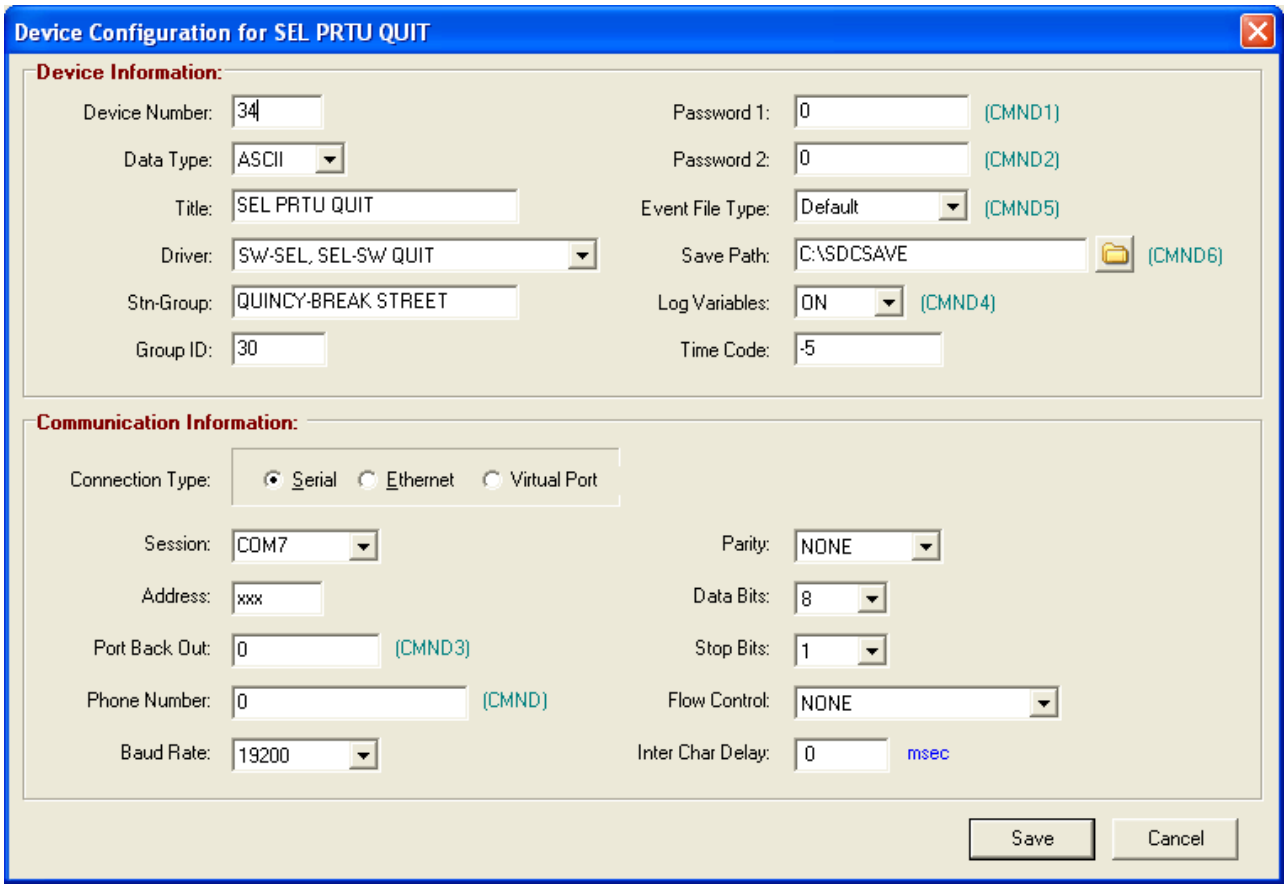


Figure 2.21 SEL PRTU Quit

Field	Description
Device Information	
Device Number	The PRTU Quit is at device number 34. Five device numbers where skipped between the D60 relay and the PRTU Quit. This is done to handle new devices that may be added to the SEL PRTU in the future. Always leave a difference of at least 5 device numbers between the last device on a communication processor and the PRTU quit.
Data Type	The PRTU communicates using an ASCII protocol.
Title	The title of the PRTU Quit is SEL PRTU QUIT.
Device Driver	The **SW-SEL, SEL-SW QUIT** driver is selected. The SW drivers are used to communicate with a communication processor. This driver issues the following commands: ▪ Switch back out to the PRTU. ▪ Send a QUIT command to the PRTU.
Group Name	The relay is in the Break Street group.
Group ID	The relay is in group 30.
Password 1	The password is not required, defaulted to 0.
Password 2	A second level password is not required, defaulted to 0.
Event File Type	No events are retrieved.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The SEL PRTU connection type is serial.
Session	The polling session is through the COM7 serial port.
Address	The address field is not needed, it is defaulted to xxx.
Port Back Out	The port back out field does not apply, it is defaulted to 0.
Phone Number	The phone number is not required, it is defaulted to 1.
Baud Rate	The baud rate is 19200.
Parity	No parity.
Data Bits	The Data Bits = 8.
Stop Bits	The Stop Bits = 1.
Flow Control	The Flow Control = None.
Inter Char Delay	No Inter Char Delay is needed.

DEVICE 35 (SEL 551)

The SEL 551 Relay is connected to the 2030 communication processor through a direct serial link. The Wavewin computer first calls the phone switch then switches to the port where the 2030 is connected then switches to the SEL 551 Relay. Below is the configuration dialog along with a description for each field.

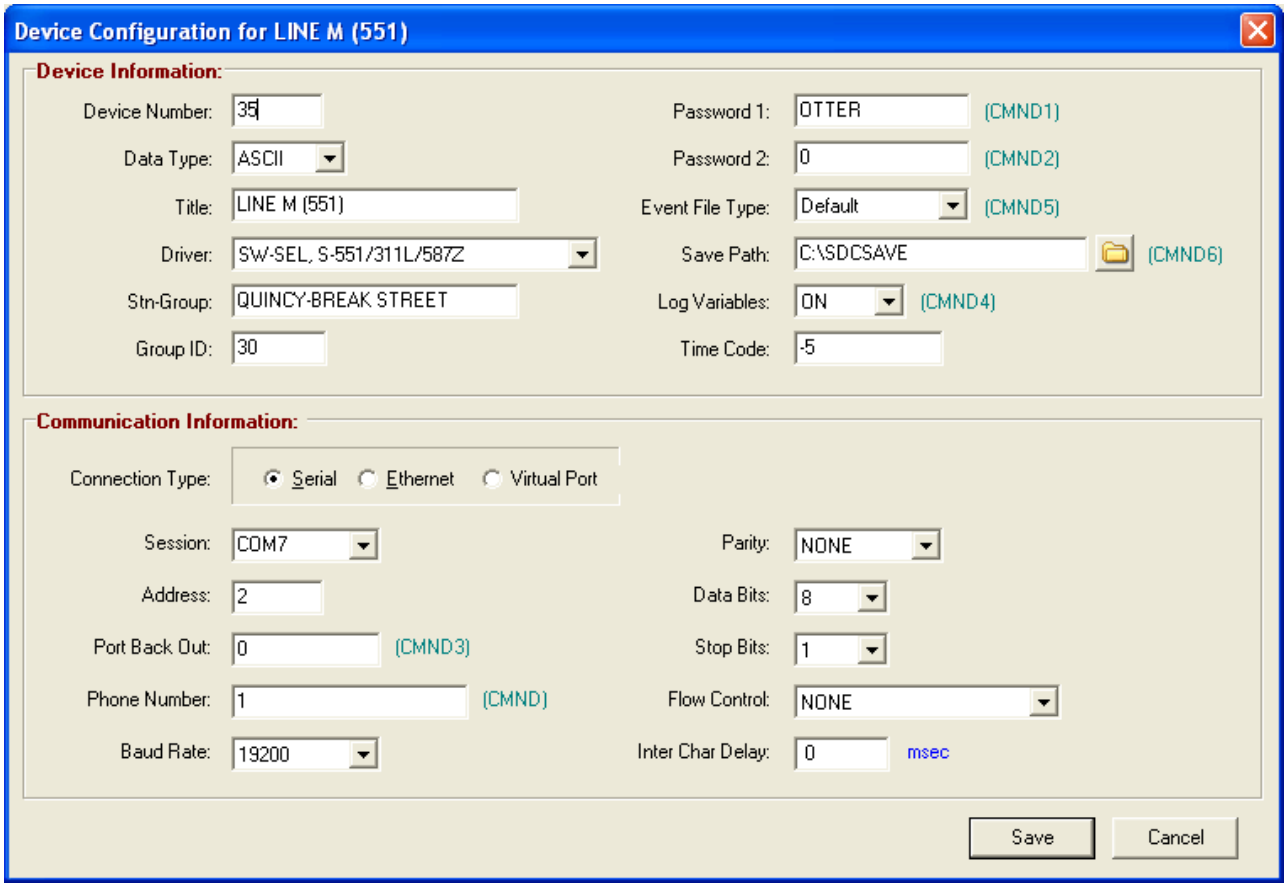


Figure 2.22 SEL 551 Relay

Field	Description
Device Information	
Device Number	The SEL 551 Relay is device number 35.
Data Type	The 551 relay communicates using an ASCII protocol.
Title	The title of the relay is Line M (551). All devices that are polled for event files and/or meter values must have the device type included in the title surrounded by ().
Device Driver	The **SW-SEL, S-551/311/587Z** driver is selected. The SW drivers are used to communicate with a device connected to a communication processor. This driver issues the following commands: ▪ Switch to the port number listed in the address field. ▪ Send the SEL **ACC** command along with the password defined in the EscSeq Command field. ▪ Download all new events. ▪ Send a Meter command.
Group Name	The relay is in the Break Street group.
Group ID	The relay is in group 30.
Password 1	The password is set to OTTER.
Password 2	A second level password is not required, defaulted to 0.
Event File Type	The default event type is retrieved, short 4 samples/cycle.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.

Field	Description
Communication Information	
Connection Type	The SEL 551 Relay connection type is serial.
Session	The polling session is through the COM7 serial port.
Address	The address field is 2. The 551 relay is connected to the 2030's port number 2.
Port Back Out	The port back out field does not apply, it is defaulted to 0.
Phone Number	The phone number is not required, it is defaulted to 1.
Baud Rate	The baud rate is 19200.
Parity	No parity.
Data Bits	The Data Bits = 8.
Stop Bits	The Stop Bits = 1.
Flow Control	The Flow Control = None.
Inter Char Delay	No Inter Char Delay is needed.

DEVICE 36 (OPTIMHO)

The Optimho Relay is connected to the 2030 communication processor through a direct serial link. The Wavewin computer first calls the phone switch then switches to the port where the 2030 is connected then switches to the Optimho Relay. Below is the configuration dialog along with a description for each field.

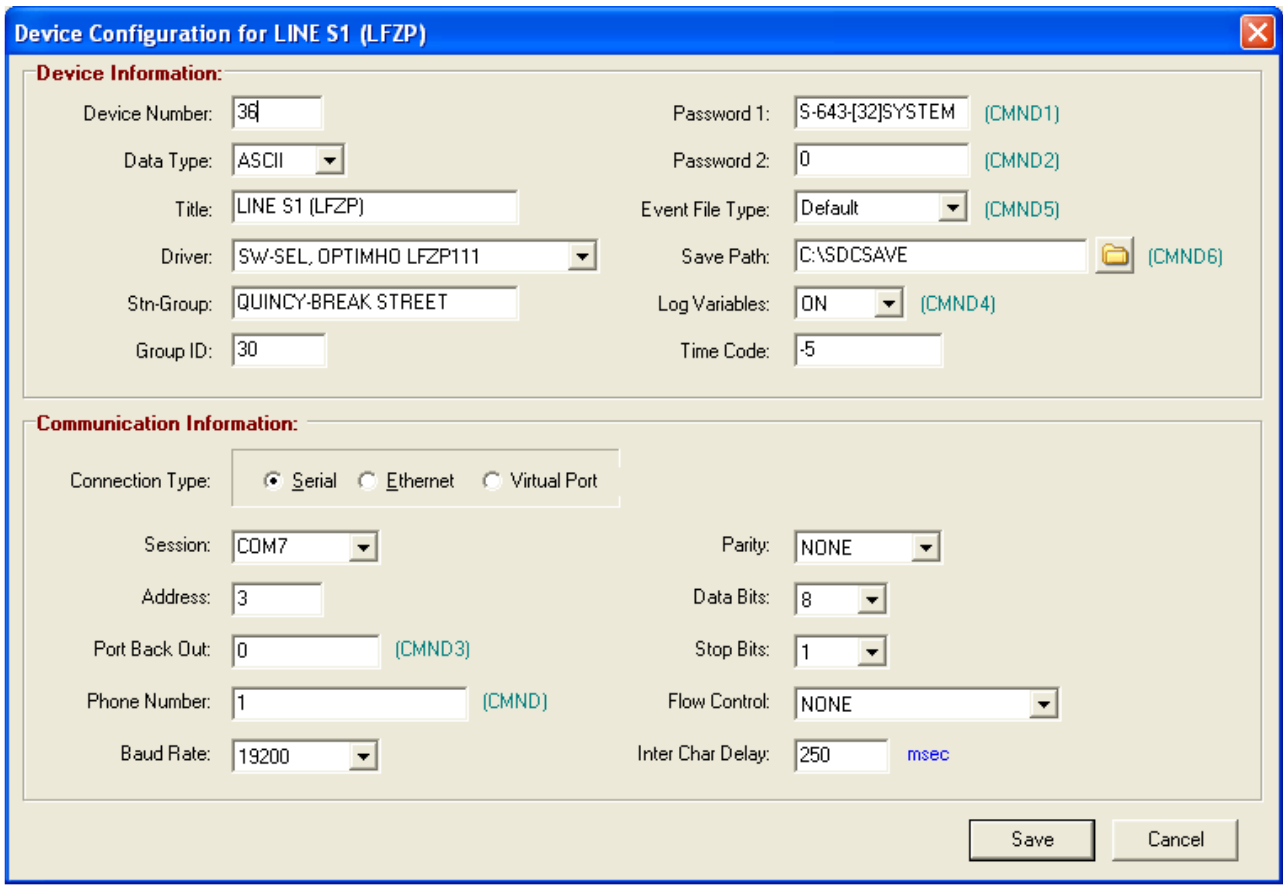


Figure 2.23 Optimho Relay

Field	Description
Device Information	
Device Number	The Optimho relay is device number 36.
Data Type	The Optimho communicates using an ASCII protocol.
Title	The title of the relay is Line S1 (LFZP). All devices that are polled for event files and/or meter values must have the device type included in the title surrounded by ().
Device Driver	The **SW-SEL, OPTIMHO LFZP111** driver is selected. The SW drivers are used to communicate with a communication processor. This driver issues the following commands: ▪ Switch to the port number listed in the address field. ▪ Logon to the relay using the password defined in the EscSeq Command field. ▪ Download all new events. ▪ Logoff the relay.
Group Name	The relay is in the Break Street group.
Group ID	The relay is in group 30.
Password 1	The password is set to S-643^[32]SYSTEM^[32]1.
Password 2	A second level password is not required, defaulted to 0.
Event File Type	The default event type is retrieved.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The Optimho Relay connection type is serial.
Session	The polling session is through the COM7 serial port.
Address	The address field is 3. The Optimho relay is connected to the 2030's port number 3.
Port Back Out	The port back out field does not apply, it is defaulted to 0.
Phone Number	The phone number is not required, it is defaulted to 1.
Baud Rate	The baud rate is 19200.
Parity	No parity.
Data Bits	The Data Bits = 8.
Stop Bits	The Stop Bits = 1.
Flow Control	The Flow Control = None.
Inter Char Delay	No Inter Char Delay is needed.

DEVICE 37 (SEL 352)

The SEL 352 Relay is connected to the 2030 communication processor through a direct serial link. The Wavewin computer first calls the phone switch then switches to the port where the 2030 is connected then switches to the SEL 352 Relay. Below is the configuration dialog along with a description for each field.

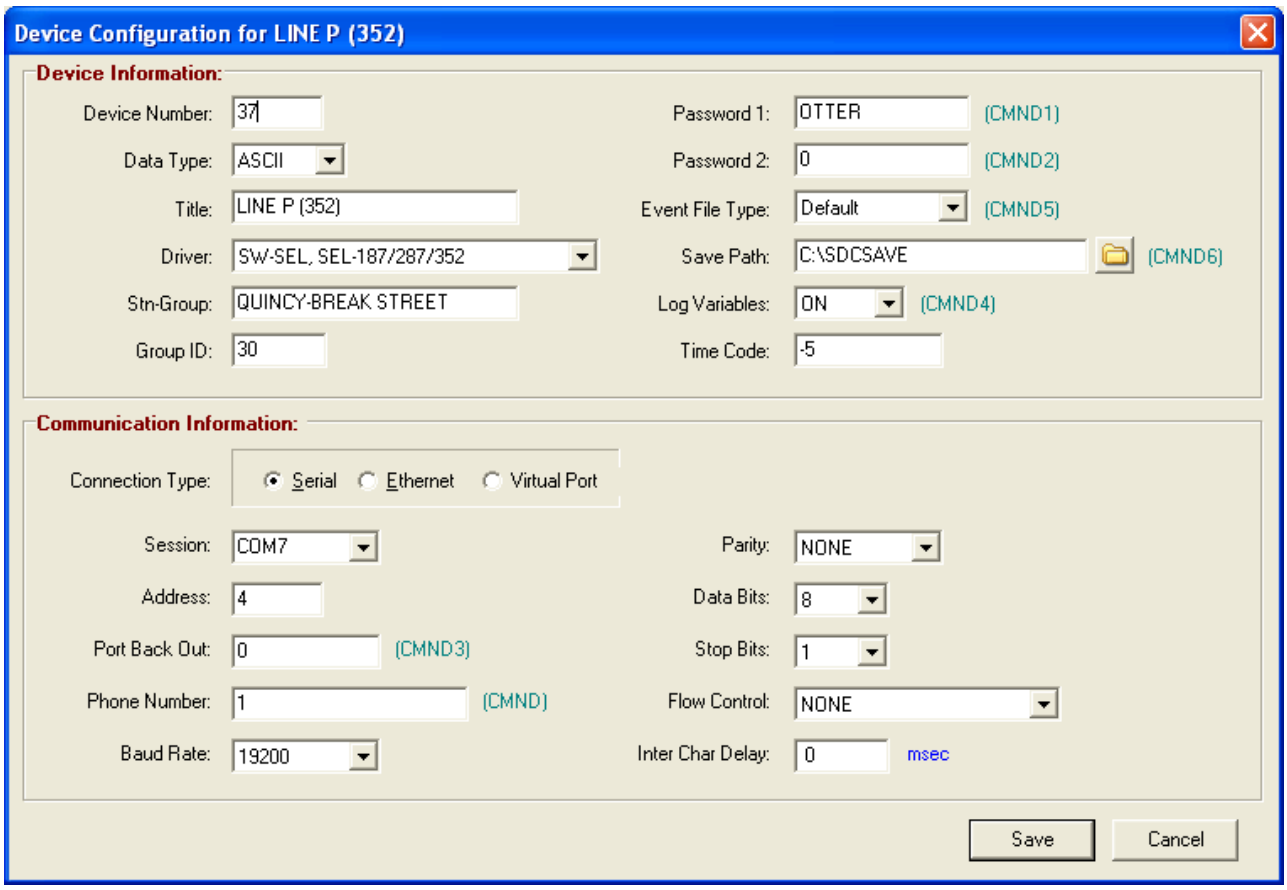


Figure 2.24 SEL 352 Relay

Field	Description
Device Information	
Device Number	The SEL 352 Relay is device number 37.
Data Type	The 352 relay communicates using an ASCII protocol.
Title	The title of the relay is Line P (352). All devices that are polled for event files and/or meter values must have the device type included in the title surrounded by ().
Device Driver	The **SW-SEL, SEL-187/287/352** driver is selected. The SW drivers are used to communicate with a device connected to a communication processor. This driver issues the following commands: ▪ Switch to the port number listed in the address field. ▪ Send the SEL **ACC** command along with the password defined in the EscSeq Command field. ▪ Download all new events. ▪ Send a Meter command.
Group Name	The relay is in the Break Street group.
Group ID	The relay is in group 30.
Password 1	The password is set to OTTER.
Password 2	A second level password is not required, defaulted to 0.
Event File Type	The default event type is retrieved, short 4 samples/cycle.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.

Field	Description
Communication Information	
Connection Type	The SEL 352 Relay connection type is serial.
Session	The polling session is through the COM7 serial port.
Address	The address field is 4. The 352 relay is connected to the 2030's port number 4.
Port Back Out	The port back out field does not apply, it is defaulted to 0.
Phone Number	The phone number is not required, it is defaulted to 1.
Baud Rate	The baud rate is 19200.
Parity	No parity.
Data Bits	The Data Bits = 8.
Stop Bits	The Stop Bits = 1.
Flow Control	The Flow Control = None.
Inter Char Delay	No Inter Char Delay is needed.

DEVICE 49 (SEL 2030)

The SEL 2030-X QUIT will back out of the last connected port on the 2030 then issue a QUIT command to the 2030 then hang up the modem. Below is the configuration dialog along with a description for each field.

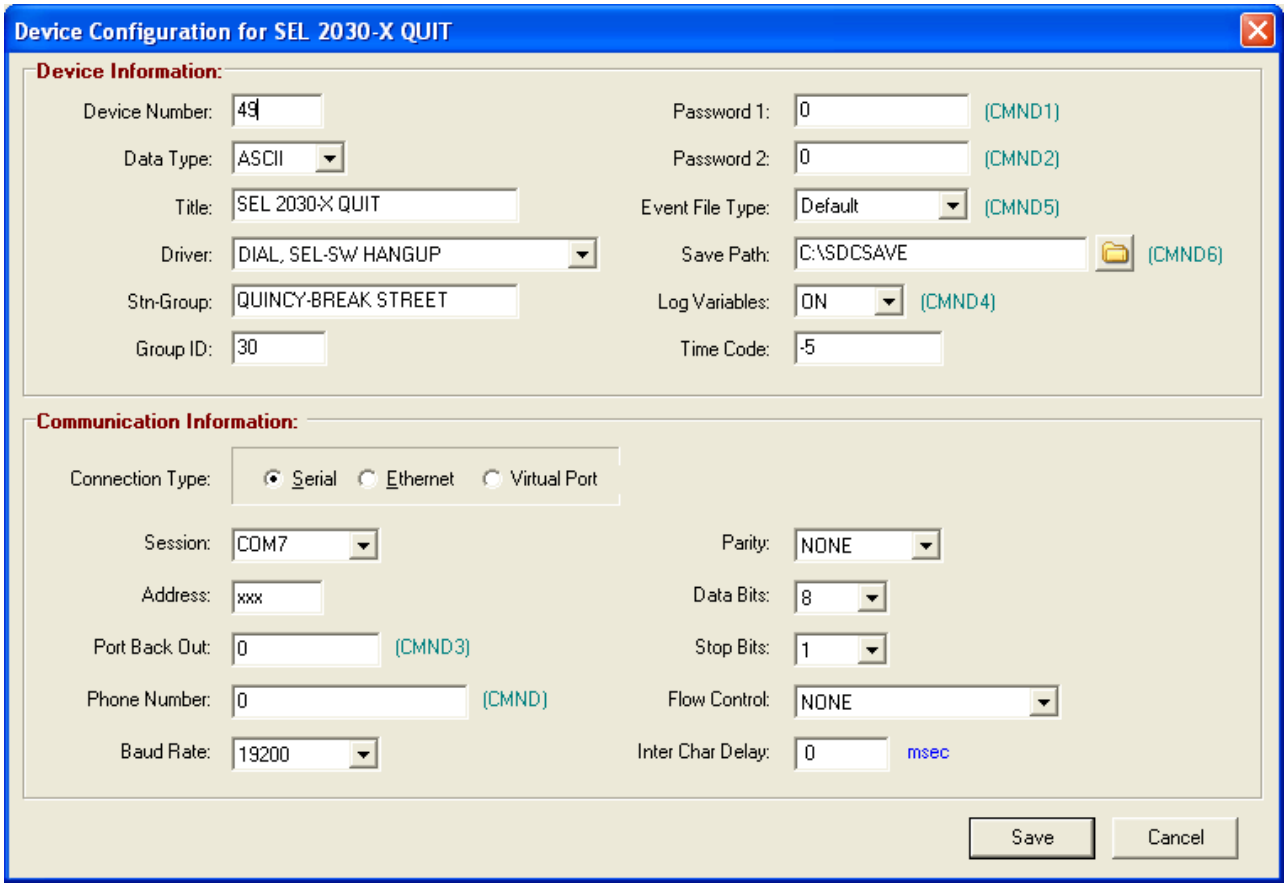


Figure 2.25 SEL 2030-X Quit

Field	Description
Device Information	
Device Number	The 2030-X Quit is at device number 49. Twelve device numbers where skipped between the SEL 352 relay and the 2030-X Quit. This is done to handle new devices that may be added to the SEL 2030 in the future. Always leave a difference of at least 5 device numbers between the last device on a communication processor and the PRTU quit.
Data Type	The 2030 communicates using an ASCII protocol.
Title	The title of the 2030-X Quit is SEL 2030-X QUIT.
Device Driver	The **DIAL, SEL-SW HANGUP** driver is selected. The DIAL drivers are used to communicate with a device connected to a modem. This driver issues the following commands: ▪ Switch back out to the 2030. ▪ Send a QUIT command to the 2030. ▪ Hang up the modem.
Group Name	The 2030 quit is in the Break Street group.
Group ID	The 2030-X Quit is in group 30.
Password 1	A password is not required, defaulted to 0.
Password 2	A second level password is not required, defaulted to 0.
Event File Type	No events are retrieved.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The SEL 2030 connection type is serial.
Session	The polling session is through the COM7 serial port.
Address	The address field is not needed, it is defaulted to xxx.
Port Back Out	The port back out field does not apply, it is defaulted to 0.
Phone Number	The phone number is not required, it is defaulted to 1.
Baud Rate	The baud rate is 19200.
Parity	No parity.
Data Bits	The Data Bits = 8.
Stop Bits	The Stop Bits = 1.
Flow Control	The Flow Control = None.
Inter Char Delay	No Inter Char Delay is needed.

ETHERNET STAR (NETWORK DRIVERS)

The Ethernet example is a star topology with each device having an IP address and port number. In a star topology all devices are polled simultaneously. The Ethernet devices are device numbers 50 thru 69. Each device's configuration is defined in the following sections.

DEVICE 50 (TESLA)

The Tesla DFR is connected to the computer using an Ethernet connection. Below is the configuration dialog along with a description for each field.

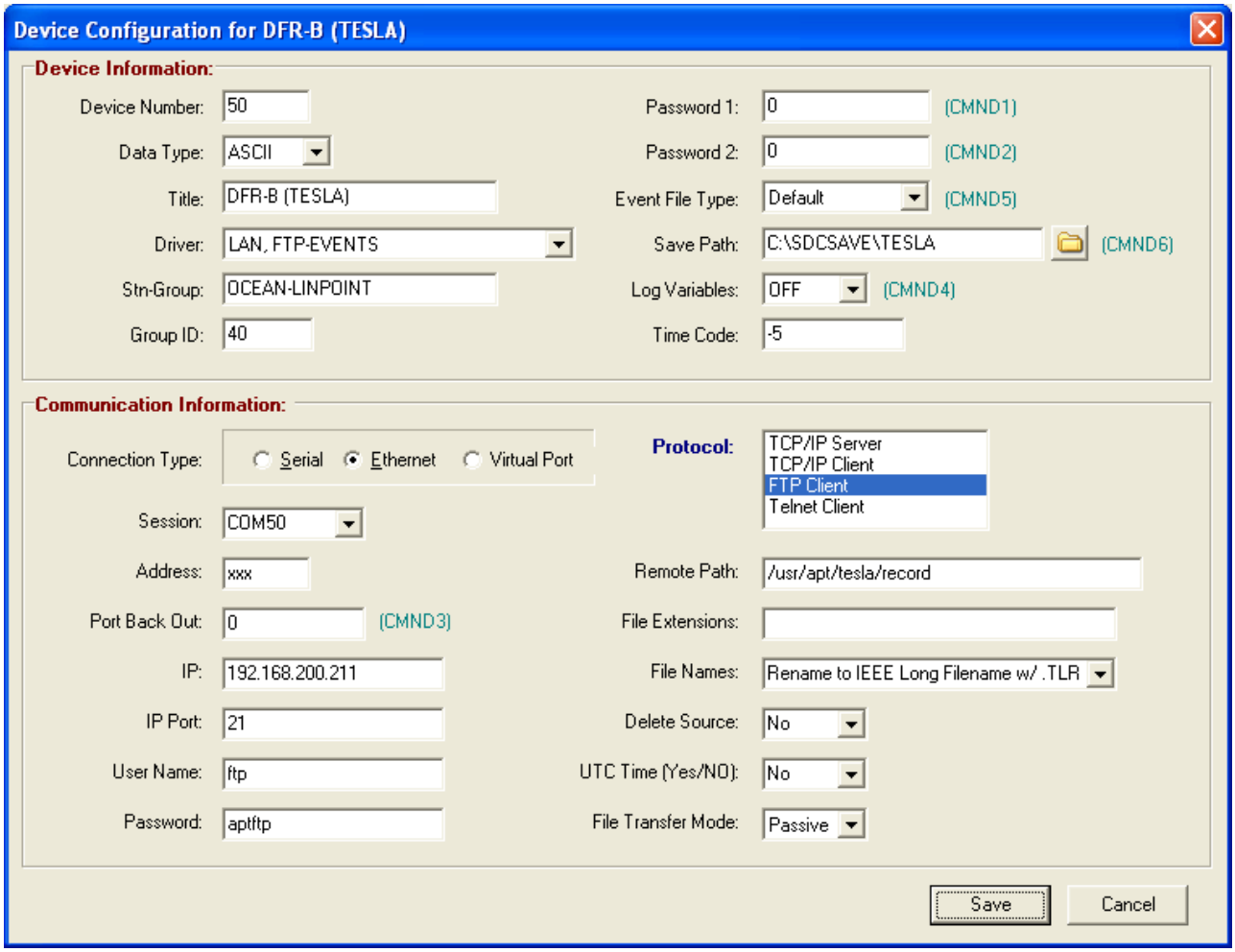


Figure 2.26 Tesla DFR

Field	Description
Device Information	
Device Number	The Tesla DFR is at device number 50.
Data Type	The Tesla communicates using an ASCII protocol.
Title	The title of the DFR is DFR B (Tesla). All devices that are polled for event files and/or meter values must have the device type included in the title surrounded by ().
Device Driver	The **LAN, FTP-EVENTS** driver is selected. The LAN drivers are used to communicate with a device connected using Ethernet. This driver issues the following commands: ▪ Connect to the FTP server. ▪ Request a directory listing on the FTP server's remote path. ▪ Download all new event files. ▪ Disconnect the from the FTP server.
Group Name	The Tesla is in the Linpoint group.
Group ID	The DFR is in group 40.
Password 1	A password is not required, defaulted to 0.
Password 2	A second level password is not required, defaulted to 0.
Event File Type	The default event files are retrieved.
Save Path	Path location where to save the retrieved files.

Field	Description
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The Tesla DFR connection type is Ethernet.
Session	The polling session is through the virtual COM50 port.
Address	The address field is not needed, it is defaulted to xxx.
Port Back Out	The port back out field does not apply, it is defaulted to 0.
IP	The IP Address to the FTP Server on the Tesla DFR.
IP Port	The FTP IP Port number is 21.
Username	Username to get access to the FTP Server.
Password	Password to get access to the FTP Server.
Remote Path	The remote path on the FTP server where the event files are located.
File Extensions	The file extensions to retrieve, blank = all files. File extensions are separated by a pipe | sign. Example: *.CFG|*.DAT|*.HDR
File Names	How to name the files once they are retrieved. The Tesla files are renamed using the IEEE long file naming format with the TLR extension. There are 3 types of naming conventions, Maintain the Original name, Rename to the IEEE long file naming convention and Rename to the IEEE long file naming convention with the TLR extension.
Delete Source	Delete the source files once they are retrieved, Yes or No.
UTC Time (Yes/No)	Change the file's time from UTC to local time, Yes or No.
File Transfer Mode	Select the type of FTP file transfer mode, Passive or Active

DEVICE 52 (SEL 421)

The SEL 421 Relay is connected to the computer using an Ethernet connection. Below is the configuration dialog along with a description for each field.

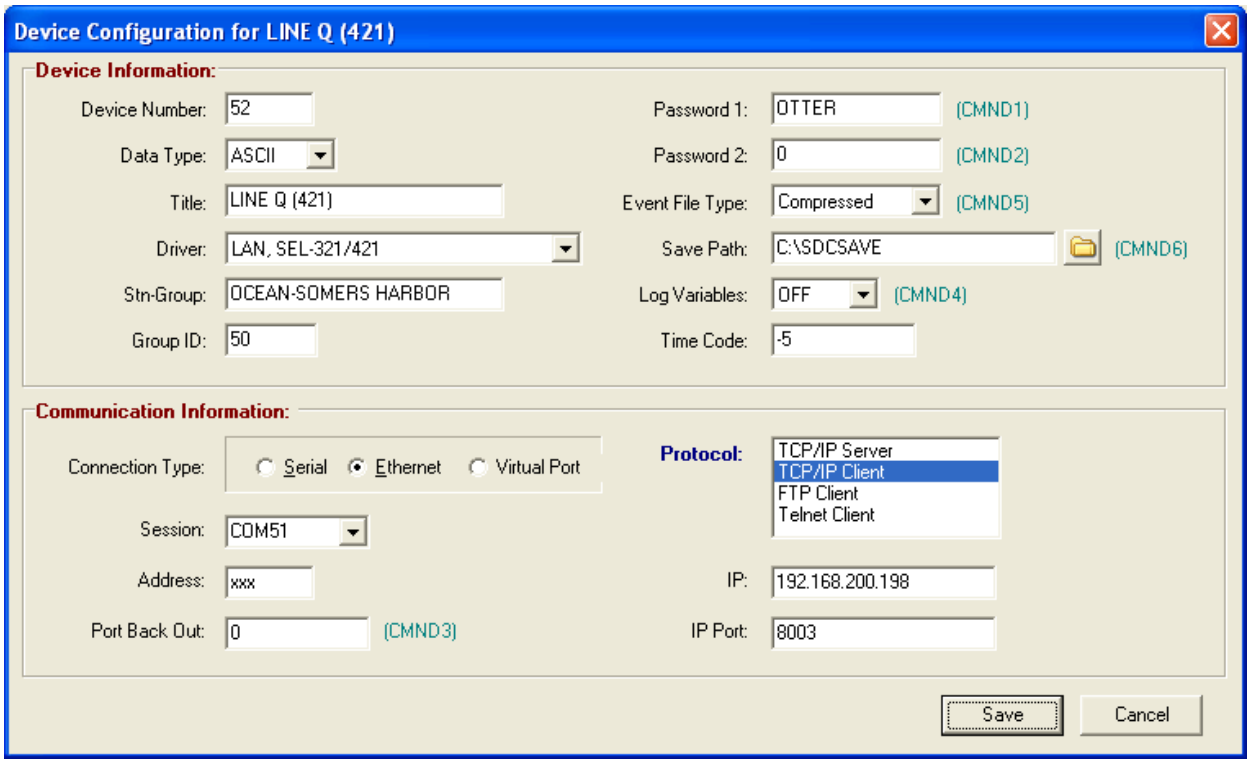


Figure 2.27 SEL 421

Field	Description
Device Information	
Device Number	The SEL 421 is at device number 52.
Data Type	The SEL 421 communicates using an ASCII protocol.
Title	The title of the relay is Line Q (421). All devices that are polled for event files and/or meter values must have the device type included in the title surrounded by ().
Device Driver	The **LAN, SEL-321/421** driver is selected. The LAN drivers are used to communicate with a device connected using Ethernet. This driver issues the following commands: ▪ Connect to the IP server. ▪ Switch to the port number listed in the address field. ▪ Send the SEL **ACC** command along with the password defined in the EscSeq Command field. ▪ Download all new events. ▪ Send a Meter command. ▪ Disconnect the from the IP server.
Group Name	The relay is in the Somers Harbor group.
Group ID	The relay is in group 50.
Password 1	The password is set to OTTER.
Password 2	A second level password is not required, defaulted to 0.
Event File Type	Retrieve the 421 Compressed Events.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The SEL 421 Relay connection type is Ethernet.
Session	The polling session is through the virtual COM51 port.
Address	The address field is not needed, it is defaulted to xxx.
Port Back Out	The port back out field does not apply, it is defaulted to 0.
IP	The IP Address to the FTP Server on the Tesla DFR.
IP Port	The SEL 421 IP Port number is 8003.

DEVICE 53 (ORION 5)

The Orion5 communication processor is connected to the computer using an Ethernet connection. Below is the configuration dialog along with a description for each field.

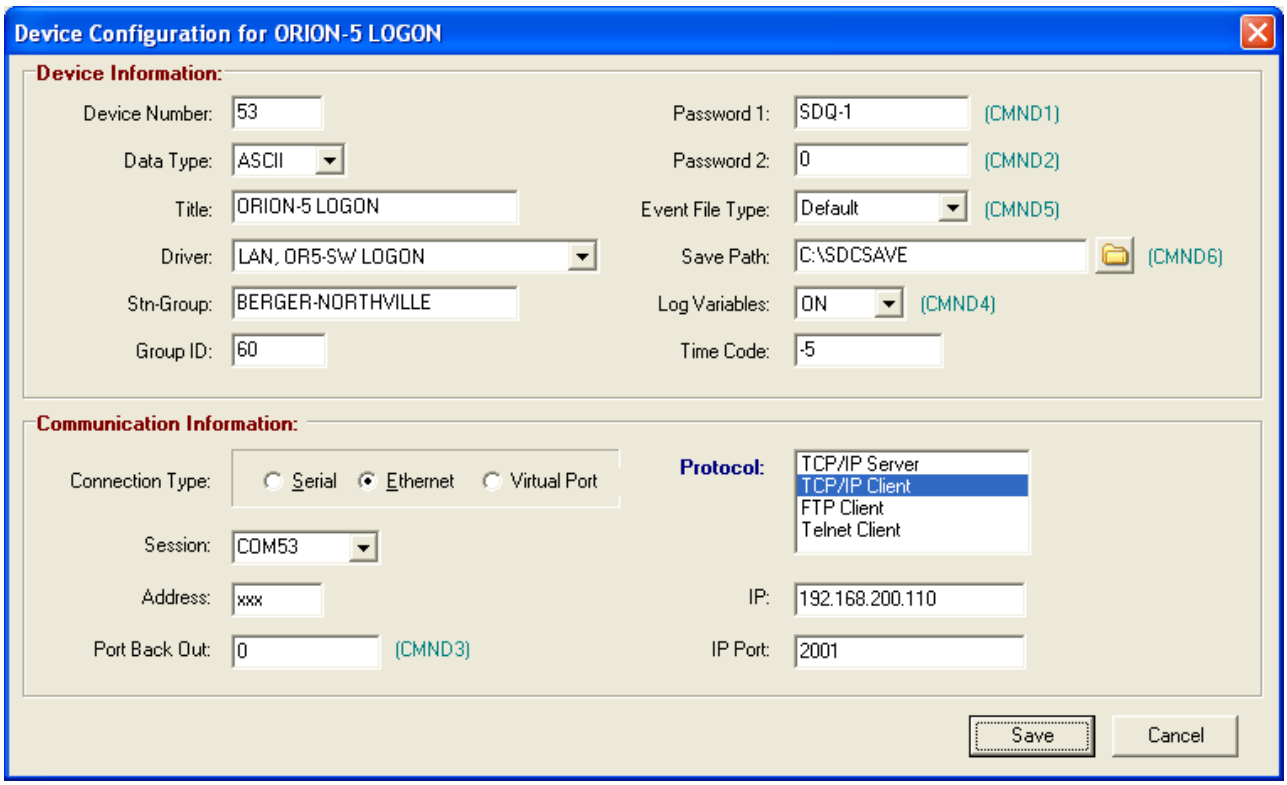


Figure 2.28 Orion5

Field	Description
Device Information	
Device Number	The Orion5 is at device number 53.
Data Type	The Orion5 communicates using an ASCII protocol.
Title	The title of the Orion is Orion-5 LOGON.
Device Driver	The **LAN, OR5-SW LOGON** driver is selected. The LAN drivers are used to communicate with a device connected using Ethernet. This driver issues the following commands: ▪ Connect to the IP server. ▪ Logon with the password defined in the EscSeq Command field.
Group Name	The Orion is in the Northville group.
Group ID	The Orion5 is in group 60.
Password 1	The password is set to SDQ-1.
Password 2	A second level password is not required, defaulted to 0.
Event File Type	No events are retrieved from the Orion device.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The Orion5 connection type is Ethernet.
Session	The polling session is through the virtual COM53 port.
Address	The address field is not needed, it is defaulted to xxx.
Port Back Out	The port back out field does not apply, it is defaulted to 0.
IP	The IP Address to the IP Server on the Orion.
IP Port	The Orion IP Port number is 2001.

DEVICE 54 (SEL 321)

The SEL 321 Relay is connected to the Orion5 communication processor. The Wavewin computer first connects to the Orion5 using an Ethernet connection then switches to the SEL 321 Relay. Below is the configuration dialog along with a description for each field.

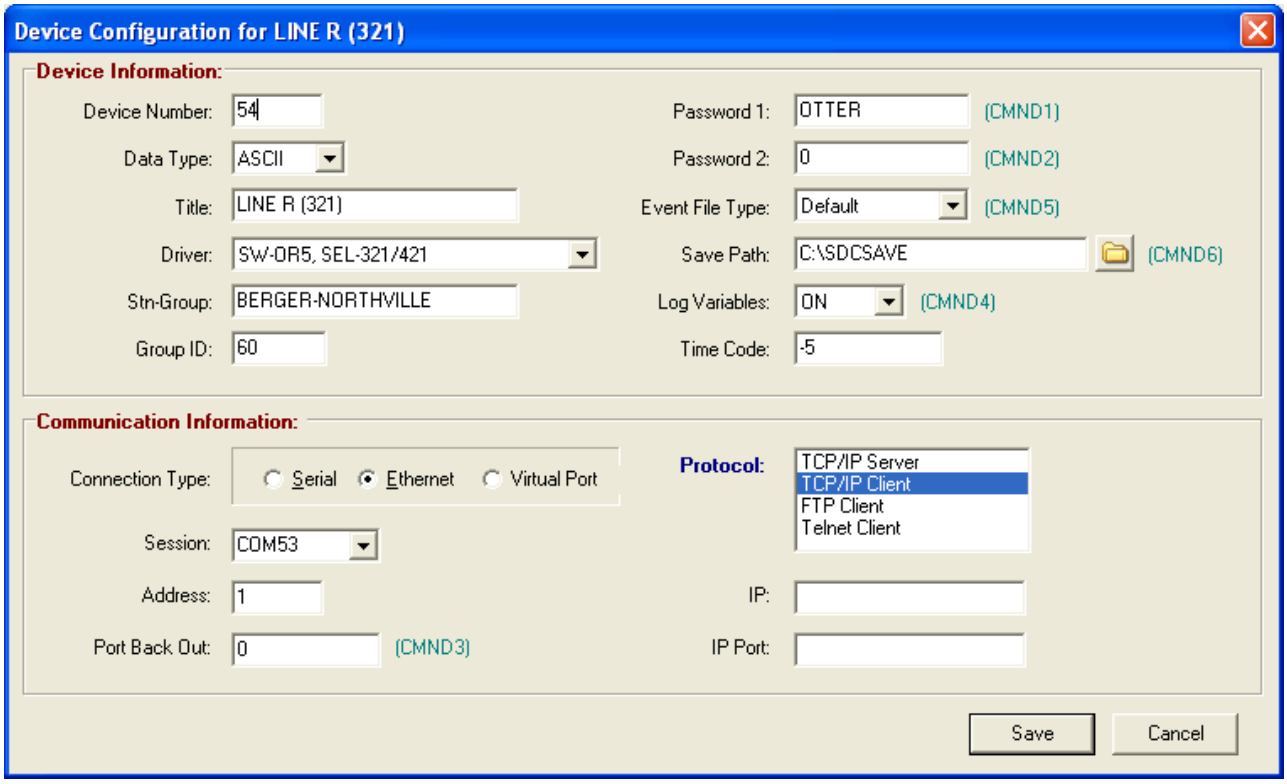


Figure 2.29 SEL 321 Relay

Field	Description
Device Information	
Device Number	The SEL 321 Relay is device number 54.
Data Type	The 321 relay communicates using an ASCII protocol.
Title	The title of the relay is Line R (321). All devices that are polled for event files and/or meter values must have the device type included in the title surrounded by ().
Device Driver	The **SW-OR5, SEL-321/421** driver is selected. The SW drivers are used to communicate with a device connected to a communication processor. This driver issues the following commands: ▪ Switch to the port number listed in the address field using the Orion pass thru command. ▪ Send the SEL **ACC** command along with the password defined in the EscSeq Command field. ▪ Download all new events. ▪ Send a Meter command.
Group Name	The SEL 321 relay is in the Northville group.
Group ID	The SEL 321 relay is in group 60.
Password 1	The password is set to OTTER.
Password 2	A second level password is not required, defaulted to 0.
Event File Type	The default events files are retrieved, short 4 samples/cycle.

Field	Description
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The SEL 321 Relay connection type is Ethernet.
Session	The polling session is through the virtual COM53 port.
Address	The address field is 1. The SEL 321 relay is connected to the Orion's port number 2.
Port Back Out	The port back out field does not apply, it is defaulted to 0.
IP	The IP Address is not required.
IP Port	The IP Port number is not required.

DEVICE 55 (SEL 187)

The SEL 187 Relay is connected to the Orion5 communication processor. The Wavewin computer first connects to the Orion5 using an Ethernet connection then switches to the SEL 187 Relay. Below is the configuration dialog along with a description for each field.

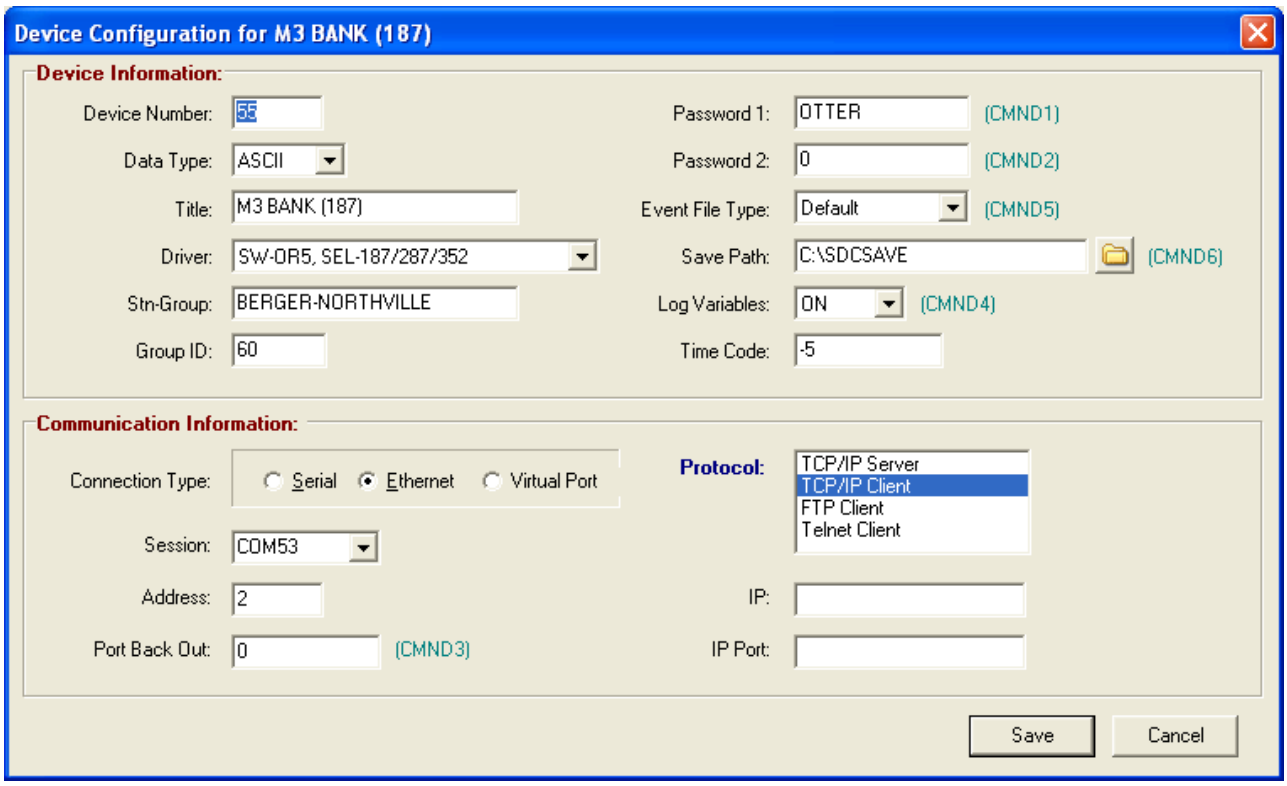


Figure 2.30 SEL 187 Relay

Field	Description
Device Information	
Device Number	The SEL 187 Relay is device number 55.
Data Type	The 187 relay communicates using an ASCII protocol.
Title	The title of the relay is M3 Bank (187). All devices that are polled for event files and/or meter values must have the device type included in

Field	Description
	the title surrounded by ().
Device Driver	The **SW-OR5, SEL-187/287/352** driver is selected. The SW drivers are used to communicate with a device connected to a communication processor. This driver issues the following commands: ▪ Switch to the port number listed in the address field using the Orion pass thru command. ▪ Send the SEL **ACC** command along with the password defined in the EscSeq Command field. ▪ Download all new events. ▪ Send a Meter command.
Group Name	The SEL 187 relay is in the Northville group.
Group ID	The SEL 187 relay is in group 60.
Password 1	The password is set to OTTER.
Password 2	A second level password is not required, defaulted to 0.
Event File Type	The default events files are retrieved, short 4 samples/cycle.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The SEL 187 Relay connection type is Ethernet.
Session	The polling session is through the virtual COM53 port.
Address	The address field is 2. The 187 relay is connected to the Orion's port number 2.
Port Back Out	The port back out field does not apply, it is defaulted to 0.
IP	The IP Address is not required.
IP Port	The IP Port number is not required.

DEVICE 56 (HATHAWAY)

The Hathaway DFR is connected to the Orion5 communication processor. The Wavewin computer first connects to the Orion5 using an Ethernet connection then switches to the Hathaway DFR. Below is the configuration dialog along with a description for each field.

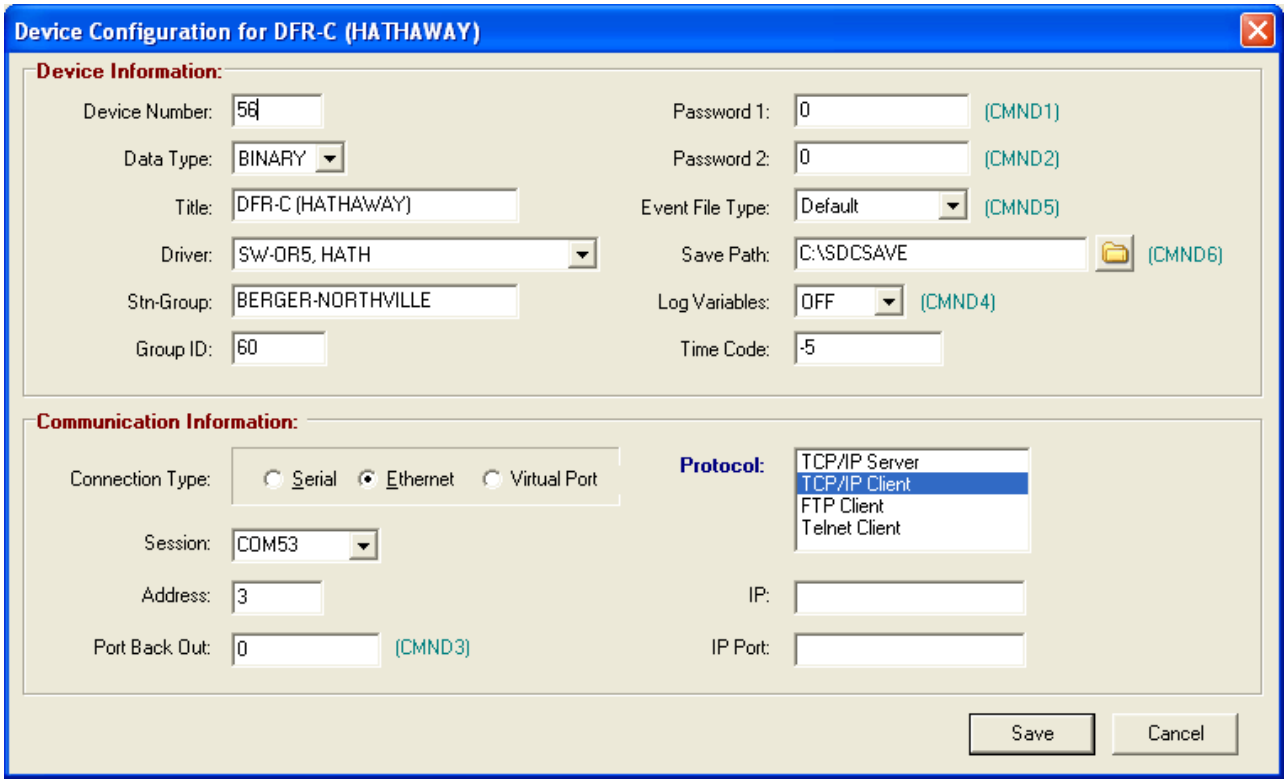


Figure 2.31 Hathaway DFR

Field	Description
Device Information	
Device Number	The Hathaway DFR is device number 56.
Data Type	The Hathaway DFR communicates using a Binary protocol.
Title	The title of the DFR is DFR-C (Hathaway). All devices that are polled for event files and/or meter values must have the device type included in the title surrounded by ().
Device Driver	The **SW-OR5, HATH** driver is selected. The SW drivers are used to communicate with a device connected to a communication processor. This driver issues the following commands: ▪ Switch to the port number listed in the address field using the Orion pass thru command. ▪ Request the latest event file. ▪ If event is a new file download the event.
Group Name	The Hathaway DFR is in the Northville group.
Group ID	The Hathaway DFR is in group 60.
Password 1	The password is not required, defaulted to 0.
Password 2	A second level password is not required, defaulted to 0.
Event File Type	The default events files are retrieved.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The Hathaway DFR connection type is Ethernet.
Session	The polling session is through the virtual COM53 port.

Field	Description
Address	The address field is 3. The DFR is connected to the Orion's port number 3.
Port Back Out	The port back out field does not apply, it is defaulted to 0.
IP	The IP Address is not required.
IP Port	The IP Port number is not required.

DEVICE 57 (DPU2000R)

The DPU2000R Relay is connected to the Orion5 communication processor. The Wavewin computer first connects to the Orion5 using an Ethernet connection then switches to the DPU2000R relay. Below is the configuration dialog along with a description for each field.

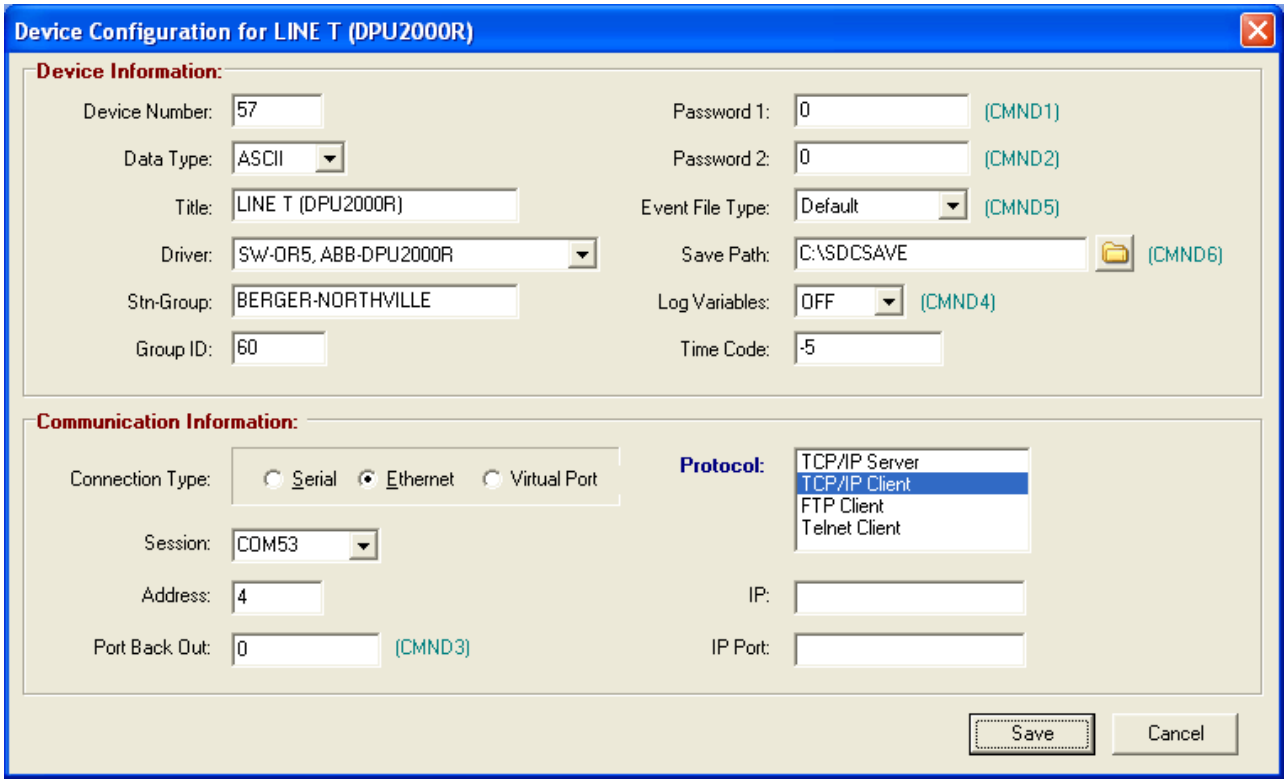


Figure 2.32 DPU2000R Relay

Field	Description
Device Information	
Device Number	The DPU2000R relay is device number 57.
Data Type	The DPU2000R relay communicates using an ASCII protocol.
Title	The title of the relay is LINE T (DPU2000R). All devices that are polled for event files and/or meter values must have the device type included in the title surrounded by ().
Device Driver	The **SW-OR5, ABB-DPU2000R** driver is selected. The SW drivers are used to communicate with a device connected to a communication processor. This driver issues the following commands: ▪ Switch to the port number listed in the address field using the Orion pass thru command. ▪ Request total number of records. ▪ Request 1st new records configuration. ▪ Request Quarter Cycle data until done.

Field	Description
	▪ Save Configuration & Data to a long filename with a ".DPU" extension.
Group Name	The DPU2000R relay is in the Northville group.
Group ID	The DPU2000R relay is in group 60.
Password 1	The password is not required, defaulted to 0.
Password 2	A second level password is not required, defaulted to 0.
Event File Type	The default events files are retrieved.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The DPU2000R relay connection type is Ethernet.
Session	The polling session is through the virtual COM53 port.
Address	The address field is 4. The relay is connected to the Orion's port number 4.
Port Back Out	The port back out field does not apply, it is defaulted to 0.
IP	The IP Address is not required.
IP Port	The IP Port number is not required.

DEVICE 66 (ORION5)

The Orion-5 QUIT will back out of the last connected port on the Orion then issue a QUIT command to the Orion then hang up the modem. Below is the configuration dialog along with a description for each field.

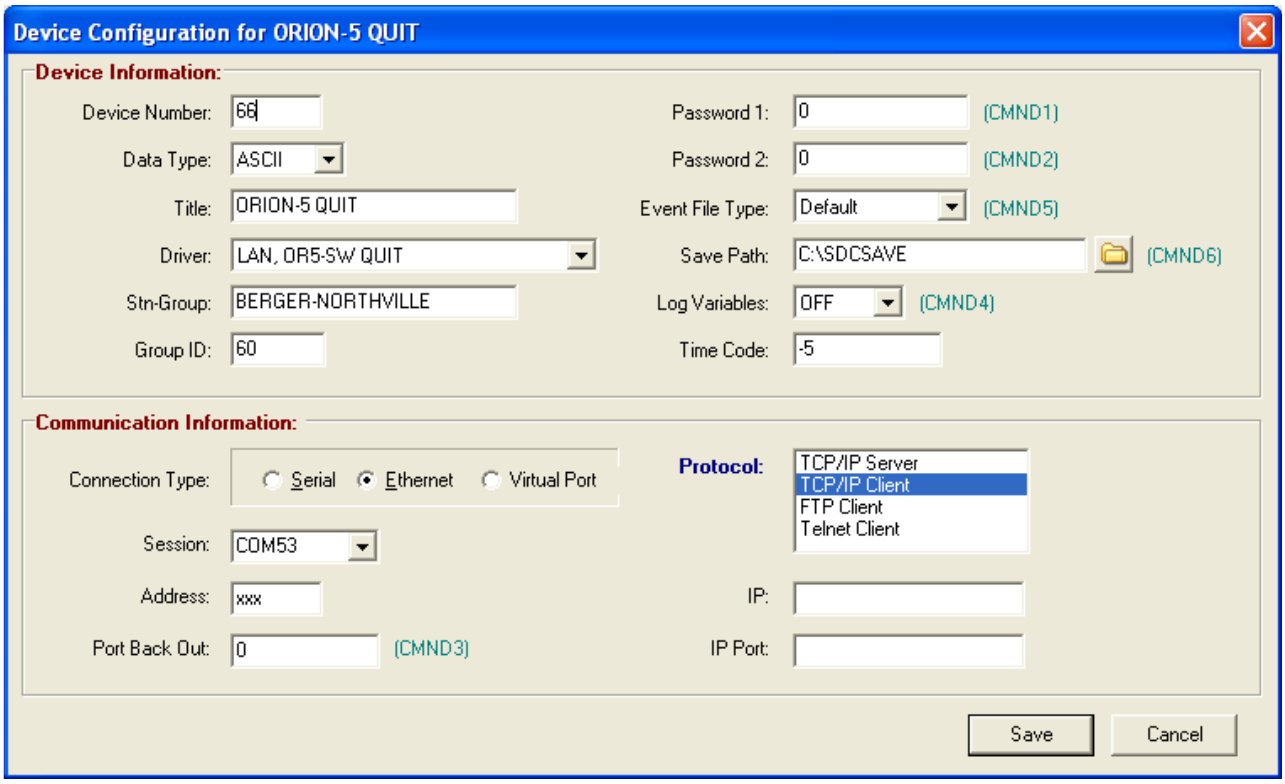


Figure 2.33 Orion-5 Quit

Field	Description
Device Information	
Device Number	The Orion-5 Quit is at device number 66. Nine device numbers where skipped between the DPU2000R relay and the Orion-5 Quit. This is done to handle new devices that may be added to the Orion in the future. Always leave a difference of at least 5 device numbers between the last device on a communication processor and the quit.
Data Type	The Orion-5 communicates using an ASCII protocol.
Title	The title of the Orion Quit is Orion-5 QUIT.
Device Driver	The **LAN, OR5-SW QUIT** driver is selected. The LAN drivers are used to communicate with a device connected via Ethernet. This driver issues the following commands: ▪ Switch back out to the Orion. ▪ Send a QUIT command to the Orion. ▪ Disconnect the from the IP server.
Group Name	The Orion-5 Quit is in the Northville group.
Group ID	The Orion-5 Quit is in group 60.
Password 1	The password is not required, defaulted to 0.
Password 2	A second level password is not required, defaulted to 0.
Event File Type	No events files are retrieved.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The Orion-5 relay connection type is Ethernet.
Session	The polling session is through the virtual COM53 port.
Address	The address field is not needed, it is defaulted to xxx.
Port Back Out	The port back out field does not apply, it is defaulted to 0.
IP	The IP Address is not required.
IP Port	The IP Port number is not required.

DEVICE 67 (BPRO)

The BPRO relay is connected to the computer using an Ethernet connection. Below is the configuration dialog along with a description for each field.

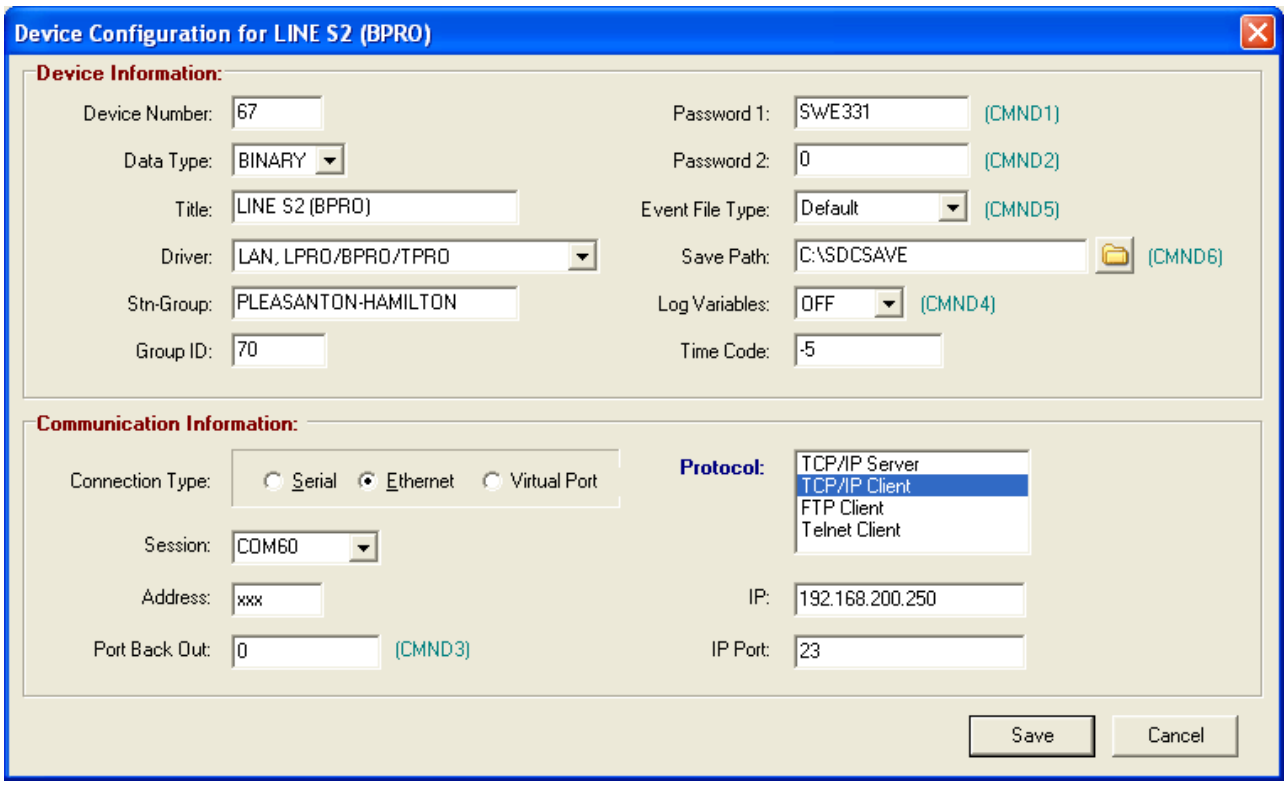


Figure 2.34 BPRO Relay

Field	Description
Device Information	
Device Number	The BPRO relay is device number 67.
Data Type	The BPRO relay communicates using a Binary protocol.
Title	The title of the BPRO Relay is Line S2 (BPRO). All devices that are polled for event files and/or meter values must have the device type included in the title surrounded by ().
Device Driver	The **LAN, LPRO/BPRO/TPRO** driver is selected. The LAN drivers are used to communicate with a device connected using Ethernet. This driver issues the following commands: ▪ Connect to the ErlPhase Relay through Telnet. ▪ Enter the password in the VT100 Terminal Mode. ▪ Navigate the VT100 Terminal menu to the Records list. ▪ Download all new event files in the list using Zmodem protocol.
Group Name	The BPRO relay is in the Hamilton group.
Group ID	The BPRO relay is in group 70.
Password 1	The password is set to SWE331 for this BPRO relay.
Password 2	A second level password is not required, defaulted to 0.
Event File Type	The default event files are retrieved.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The BPRO relay connection type is Ethernet.
Session	The polling session is through the virtual COM60 port.

Field	Description
Address	Since the relay is directly connected to the computer through an Ethernet connection the address field does not apply, it is defaulted to xxx.
Port Back Out	The port back out field does not apply, it is defaulted to 0.
IP	The IP Address for the BPRO relay.
IP Port	The IP Port number for Telnet is 23.

DEVICE 68 (TPRO)

The TPRO relay is connected to the computer using an Ethernet connection. Below is the configuration dialog along with a description for each field.

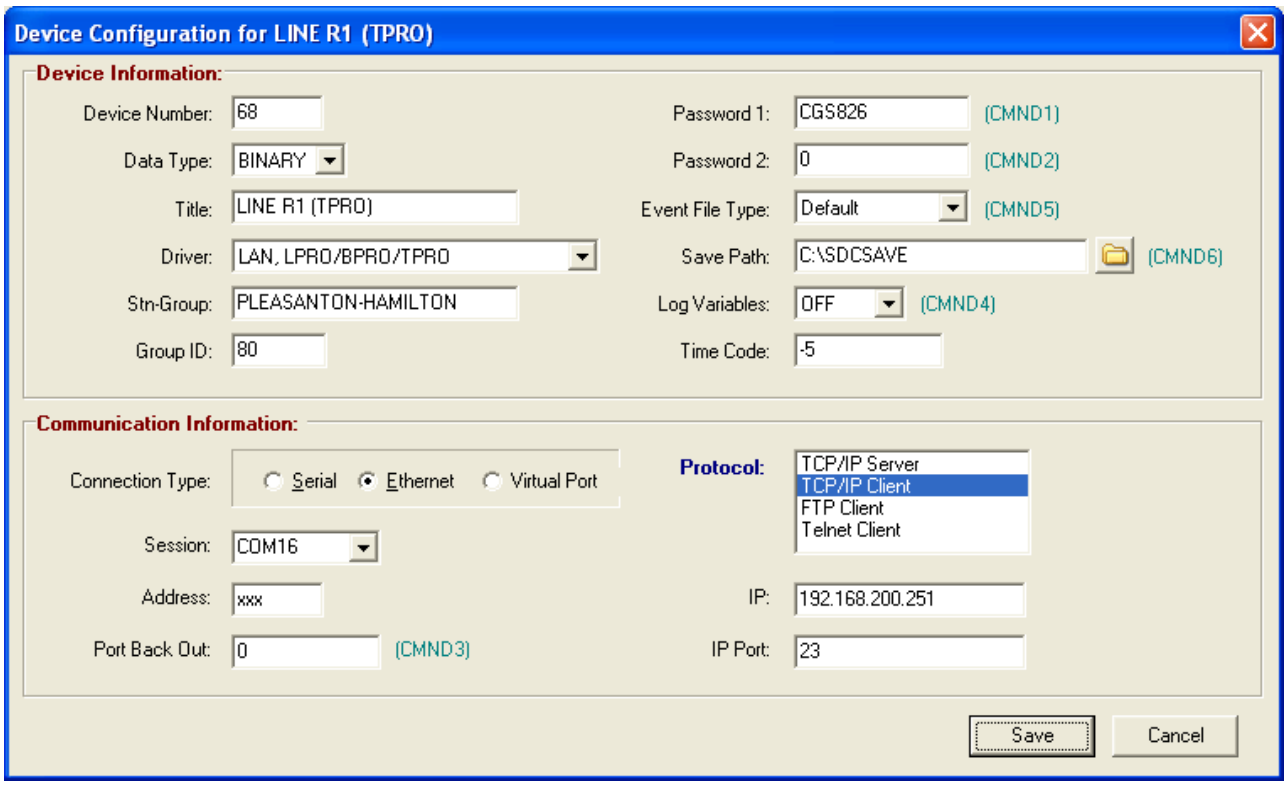


Figure 2.35 TPRO Relay

Field	Description
Device Information	
Device Number	The TPRO relay is device number 68.
Data Type	The TPRO relay communicates using a Binary protocol.
Title	The title of the relay is LINE R1 (TPRO). All devices that are polled for event files and/or meter values must have the device type included in the title surrounded by ().
Device Driver	The **LAN, LPRO/BPRO/TPRO** driver is selected. The LAN drivers are used to communicate with a device connected using Ethernet. This driver issues the following commands: ▪ Connect to the ErlPhase Relay through Telnet. ▪ Enter the password in the VT100 Terminal Mode. ▪ Navigate the VT100 Terminal menu to the Records list. ▪ Download all new event files in the list using Zmodem protocol.
Group Name	The TPRO relay is in the Hamilton group.

Field	Description
Group ID	The TPRO relay is in group 80.
Password 1	The password is set to CGS826 for this TPRO relay.
Password 2	A second level password is not required, defaulted to 0.
Event File Type	The default event files are retrieved.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The TPRO relay connection type is Ethernet.
Session	The polling session is through the virtual COM61 port.
Address	Since the relay is directly connected to the computer through an Ethernet connection the address field does not apply, it is defaulted to xxx.
Port Back Out	The port back out field does not apply, it is defaulted to 0.
IP	The IP Address for the TPRO relay.
IP Port	The IP Port number for Telnet is 23.

DEVICE 69 (LPRO)

The LPRO relay is connected to the computer using an Ethernet connection. Below is the configuration dialog along with a description for each field.

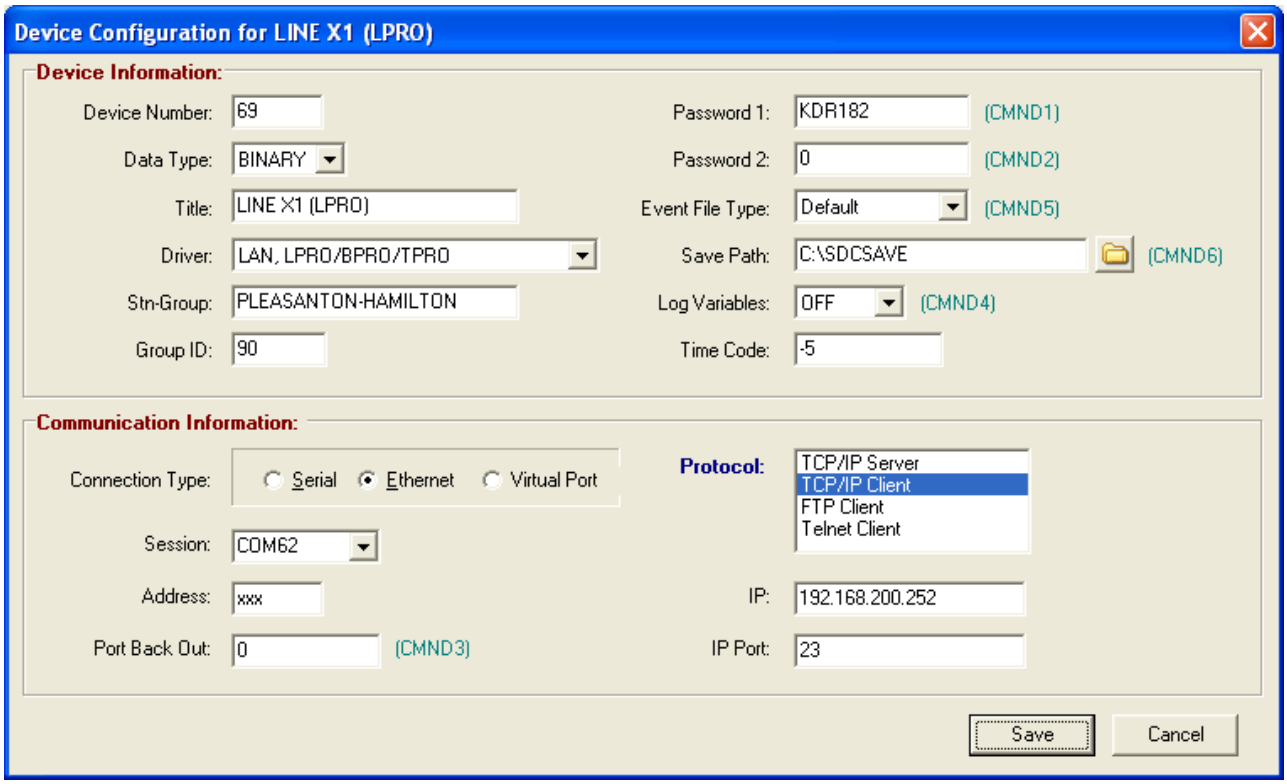


Figure 2.36 LPRO Relay

Field	Description
Device Information	
Device Number	The LPRO relay is device number 69.

Field	Description
Data Type	The LPRO relay communicates using a Binary protocol.
Title	The title of the relay is LINE X1 (LPRO). All devices that are polled for event files and/or meter values must have the device type included in the title surrounded by ().
Device Driver	The **LAN, LPRO/BPRO/LPRO** driver is selected. The LAN drivers are used to communicate with a device connected using Ethernet. This driver issues the following commands: ▪ Connect to the ErlPhase Relay through Telnet. ▪ Enter the password in the VT100 Terminal Mode. ▪ Navigate the VT100 Terminal menu to the Records list. ▪ Download all new event files in the list using Zmodem protocol.
Group Name	The LPRO relay is in the Hamilton group.
Group ID	The LPRO relay is in group 90.
Password 1	The password is set to KDR182 for this LPRO relay.
Password 2	A second level password is not required, defaulted to 0.
Event File Type	The default event files are retrieved.
Save Path	Path location where to save the retrieved files.
Log Variables	Turn On/Off logging of the polling status. Default = On.
Time Code	The Time Code is -5 for eastern US.
Communication Information	
Connection Type	The LPRO relay connection type is Ethernet.
Session	The polling session is through the virtual COM62 port.
Address	Since the relay is directly connected to the computer through an Ethernet connection the address field does not apply, it is defaulted to xxx.
Port Back Out	The port back out field does not apply, it is defaulted to 0.
IP	The IP Address for the LPRO relay.
IP Port	The IP Port number for Telnet is 23.

STOP MODEMS

The second to last device defined in the table resets the modem used to call the devices configured for modem communications. The MODEM INIT driver sends a number of initialization commands to the modem. In this example only one modem is used. If multiple modems are configured then there must be a reset modem entry in the table for each modem.

SYSTEM SERVICES

The last device defined in the table performs any system services needed. The system services can include monitoring the message folder for poll requests, archiving files and so on.

Device Manager Features

DEVICE CONFIGURATION FIELDS

The device manager table lists the configuration fields for each device. To configure a new device select the “New” menu option under the “Device” menu or click the “**New”**  menu button in the Device Manager’s menu toolbar. To edit an existing device select the ‘Edit” menu option under the “Device” menu or click the “**Edit”**  menu button in the Device Manager’s menu toolbar or right click on the device.

The configuration fields are described in the following table. Not all fields may be applicable for all devices. Use the fields that are associated with the device being configured.

Serial Communications:

Field	Description	Range
Device Information		
Device Number	Each device must have a unique device number.	1..2000
Data Type	The data type field defines the type of communication protocol.	ASCII / Binary
Title	The Title field is the device name followed by the type of device surrounded by (). This field is used when composing the IEEE long file name for event, history and summary files. Microsoft does not allow a number of characters in a file name. Do not use the comma and the list of illegal characters displayed in the IEEE long file name section.	24 Characters
Driver	The driver is selected from a drop down list. There are 3 types of drivers: • POLL: The Poll drivers are used for direct communications with a device. • SW: The SW drivers are used for devices connected to a communication processor. • LAN: The LAN drivers are used for devices connected on a LAN network.	Selectable
Stn-Group Name	The Stn-Group Name field is the name of the station and or group the device is associated with. This field is used when composing the IEEE long file name for the event, history and summary files. Microsoft does not allow a number of characters in a file name. Do not use the comma and the list of illegal characters displayed in the IEEE long file name section. To specify a station along with the group name separate them with a dash "-". For example West-River Street specifies that West is the station and River Street is the group name. In dispatch mode the station and group names are separated into 2 columns.	24 Characters
Group ID	The group ID defines what group the device is associated with.	4 Byte Number 1..214748364
Password 1	The password to gain access to the event files in the device.	24 Characters
Password 2	The second level password to gain access to the event files in the device.	24 Characters
Event File Type	The type of files to retrieve. All devices will use the default event type except for the SEL relays. The SEL relays can specify Short (4 samples/cycle), Long (16 samples/cycle), Raw (raw and 16 samples/cycle) or Compressed.	Default, Short, Long, Raw or Compressed
Save Path	The path where all retrieved files are saved.	255 Characters
Log Variables	Turn On/Off logging of the polling status. Default = On.	On / Off
Time Code	The Time Code defines the time offset from GMT time.	4 Characters

Field	Description	Range
Communication Information		
Connection Type	Specifies a Serial connection to the device.	Serial / Ethernet/ Virtual Port
Session	The Session field defines the physical or virtual COM port used for connecting to the device. Serial communications use a physical connection. The drop down list has all the physical COM ports available on the computer.	Selectable
Address	The address field can define the port number the device is connected to off a communication processor or the relay's communication number for DLP relays or the master station number for Mehta Transcan DFRs.	4 Characters
Port Back Out	The command used to back out of a relay and return to a communication processor. Ctrl-D is the back out command used for SEL devices.	5 Characters
Phone Number	The phone number for the device if connection via modem.	20 Characters
Baud Rate	Select the Baud Rate. The baud rate must be an exact match of the baud rate set on the device.	Selectable
Parity	Select the Parity. The parity must be an exact match of the parity set on the device. Default = None.	None, Odd, Even
Data Bits	Select the Data Bits. The data bits must be an exact match of the data bits set on the device. Default = 8.	7, 8
Stop Bits	Select the Stop Bits. The stop bits must be an exact match of the stop bits set on the device. Default = 1.	1, 2
Flow Control	Select the Flow Control. The flow control must be an exact match of the flow control set on the device. Default = None.	None, Software, Hardware

Ethernet Communications (TCP/IP and Telnet):

Field	Description	Range
Device Information		
Device Number	Each device must have a unique device number.	1..2000
Data Type	The data type field defines the type of communication protocol.	ASCII / Binary
Title	The Title field is the device name followed by the type of device surrounded by (). This field is used when composing the IEEE long file name for event, history and summary files. Microsoft does not allow a number of characters in a file name. Do not use the comma and the list of illegal characters displayed in the IEEE long file name section.	24 Characters
Driver	The driver is selected from a drop down list. There are 3 types of drivers: • POLL: The Poll drivers are used for direct	Selectable

Field	Description	Range
	communications with a device. • SW: The SW drivers are used for devices connected to a communication processor. • LAN: The LAN drivers are used for devices connected on a LAN network.	
Stn-Group Name	The Stn-Group Name field is the name of the station and or group the device is associated with. This field is used when composing the IEEE long file name for the event, history and summary files. Microsoft does not allow a number of characters in a file name. Do not use the comma and the list of illegal characters displayed in the IEEE long file name section. To specify a station along with the group name separate them with a dash "-". For example West-River Street specifies that West is the station and River Street is the group name. In dispatch mode the station and group names are separated into 2 columns.	24 Characters
Group ID	The group ID defines what group the device is associated with.	4 Byte Number 1..214748364
Password 1	The password to gain access to the event files in the device.	24 Characters
Password 2	The second level password to gain access to the event files in the device.	24 Characters
Event File Type	The type of files to retrieve. All devices will use the default event type except for the SEL relays. The SEL relays can specify Short (4 samples/cycle), Long (16 samples/cycle), Raw (raw and 16 samples/cycle) or Compressed.	Default, Short, Long, Raw or Compressed
Save Path	The path where all retrieved files are saved.	255 Characters
Log Variables	Turn On/Off logging of the polling status. Default = On.	On / Off
Time Code	The Time Code defines the time offset from GMT time.	4 Characters
Communication Information		
Connection Type	Specifies an Ethernet connection to the device.	Serial / Ethernet / Virtual Port
Session	The Session field defines the physical or virtual COM port used for connecting to the device. Ethernet communications use a virtual connection. The drop down list has all the virtual ports available. All Ethernet connections must have a unique Session number.	Selectable
Address	The address field can define the port number the device is connected to off a communication processor or the relay's communication number for DLP relays or the master station number for Mehta Transcan DFRs.	4 Characters
Port Back Out	The command used to back out of a relay and return to a communication processor. Ctrl-D is the back out command used for SEL devices.	5 Characters
IP	The IP address to the device.	15 Characters
IP Port	The IP Port number. Standard IP port number for	20 Characters

Field	Description	Range
	different type of servers is: Telnet = 23, FTP = 21 and TCP/IP = 23.	

Ethernet Communications (FTP):

Field	Description	Range
Device Information		
Device Number	Each device must have a unique device number.	1..2000
Data Type	The data type field defines the type of communication protocol.	ASCII / Binary
Title	The Title field is the device name followed by the type of device surrounded by (). This field is used when composing the IEEE long file name for event, history and summary files. Microsoft does not allow a number of characters in a file name. Do not use the comma and the list of illegal characters displayed in the IEEE long file name section.	24 Characters
Driver	The driver is selected from a drop down list. There are 3 types of drivers: • POLL: The Poll drivers are used for direct communications with a device. • SW: The SW drivers are used for devices connected to a communication processor. • LAN: The LAN drivers are used for devices connected on a LAN network.	Selectable
Stn-Group Name	The Stn-Group Name field is the name of the station and or group the device is associated with. This field is used when composing the IEEE long file name for the event, history and summary files. Microsoft does not allow a number of characters in a file name. Do not use the comma and the list of illegal characters displayed in the IEEE long file name section. To specify a station along with the group name separate them with a dash "-". For example West-River Street specifies that West is the station and River Street is the group name. In dispatch mode the station and group names are separated into 2 columns.	24 Characters
Group ID	The group ID defines what group the device is associated with.	4 Byte Number 1..214748364
Password 1	The password to gain access to the event files in the device.	24 Characters
Password 2	The second level password to gain access to the event files in the device.	24 Characters
Event File Type	The type of files to retrieve. All devices will use the default event type except for the SEL relays. The SEL relays can specify Short (4 samples/cycle), Long (16 samples/cycle), Raw (raw and 16 samples/cycle) or Compressed.	Default, Short, Long, Raw or Compressed
Save Path	The path where all retrieved files are saved.	255 Characters
Log Variables	Turn On/Off logging of the polling status. Default =	On / Off

Field	Description	Range
	On.	
Time Code	The Time Code defines the time offset from GMT time.	4 Characters
Communication Information		
Connection Type	Specifies an Ethernet connection to the device.	Serial / Ethernet / Virtual Port
Session	The Session field defines the physical or virtual COM port used for connecting to the device. Ethernet communications use a virtual connection. The drop down list has all the virtual ports available. All Ethernet connections must have a unique Session number.	Selectable
Address	The address field can define the port number the device is connected to off a communication processor or the relay's communication number for DLP relays or the master station number for Mehta Transcan DFRs.	4 Characters
Port Back Out	The command used to back out of a relay and return to a communication processor. Ctrl-D is the back out command used for SEL devices.	5 Characters
IP	The IP address to the device.	15 Characters
IP Port	The IP Port number. Standard IP port number for different type of servers is: Telnet = 23, FTP = 21 and TCP/IP = 23.	20 Characters
Username	The FTP username to gain access to the directory lists.	20 Characters
Password	The FTP Password to gain access to the directory lists	20 Characters
Remote Path	The remote path on the device where the event files are located.	255 Characters
File Extensions	Specifies the type of files to retrieve according to the file extension. Example: *.DAT|*.CFG|*.HDR. Multiple extensions must be separated by a pipe sign.	25 Characters
File Names	Specifies how to name the event files that are retrieved from the device and saved in the Save Path. There are 3 options: Maintain the Original Name, this option will not change the name. Rename to IEEE Long Filename, this option will name the file using the IEEE long file naming format. The Group name and title fields are used when composing the long filename. Rename to IEEE Long Filename w/ .TLR Ext, this option will name the file using the IEEE long file naming format using the .TLR extension. This option is used for Tesla DFRs. The Tesla files have no extension when stored in the device. For automatic association in the file manager the .TLR extension is needed.	Selectable
Delete Source	Delete the event files in the device after retrieving.	Yes / No
UTC Time (Yes/No)	Convert the event file's date and time to local time from UTC time.	Yes / No
File Transfer Mode	The type of FTP File Transfer Protocol to use.	Passive / Active

LONG FILE NAMING FORMAT

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 specifed 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.

OPENING DEVICE TABLE

To open the Device Manager table, select “Device Manager” from the File Table’s Options menu or click on the **Devices** menu button Devices. When the Device Manager is activated all the devices defined in the table are automatically configured. If the Connection type is defined as “Serial” then the port is opened when the device table is opened and closed when the device table is closed. A message dialog reports on the state of each connection. If an error occurs while initializing a serial port then all other serial devices are disabled. The device manager consists of a table and a query bar. The device table can poll a maximum of 2000 devices.

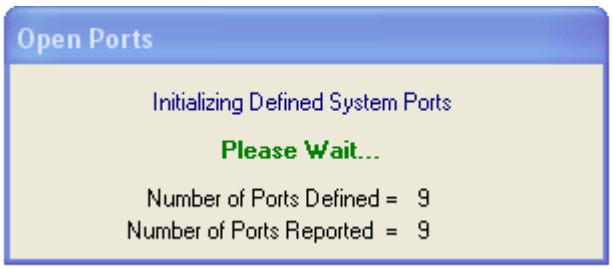


Figure 2.37 Initialize Device Ports

CREATING/EDITING DEVICE RECORDS

To create a new device, press F4 or click the **New** menu button. The new dialog defaults the connection type to Serial. To switch from Serial, Ethernet or Virtual Port click on the Connection Type radio buttons.

To Duplicate a device refer to the "Duplicating Device Records" section following.

To edit an existing device, select the device and press F2 or click the **Edit** menu button or right click on the device. Use the tab key to navigate between fields. Fields that are followed by a down arrow button are selectable fields. Use the up and down arrow keys to view the selectable options or click the down arrow button.

For a description of each field in the dialog refer to the "Device Configuration Fields" section above.

Click **Save** to save the record or **Cancel** to close the dialog without saving. If an error occurs when opening a physical COM port a message is displayed and all device I/O is aborted. If an error occurs connecting to an Ethernet port then the last device that reported an error is displayed in the device table's status bar. All communication is left open when an Ethernet connection reports an error. The polling drivers will try to reopen the Ethernet connection on each poll. To edit an existing record select the device in the table and press F2 or click the **Edit** menu button.

The title and group fields are used to compose the IEEE long file name. Refer to "IEEE Long File Naming Format" section above for more information. Below are the characters not permitted in the filename.

: ? " / \ < > * | @ #

An error message will be displayed if these characters are entered into the title or station fields.

DUPLICATING DEVICES RECORDS

To duplicate an existing device record, place the cursor on the desired device and select "Duplicate" from the "Device" menu or press Alt+D,U. When duplicating an existing device the device number must be changed. If the device number is duplicated or out of range all device I/O is aborted until the error is corrected. Up to 2000 devices can be defined.

SAVE & ARCHIVE DIALOG

To setup the system and file properties open the "Save & Archive" dialog under the "Options" menu or click on the Save & Archive menu button. This dialog is used to set up the basic system parameters such as: station ID, station name, company name, polling properties, system password and system files settings.

The file settings maintain the device DTB files. The device DTB files can be periodically renamed to the IEEE PSRC long naming format (Refer to the "IEEE Long File Naming Format" section) and/or deleted when the device file size exceeds the defined buffer size.

Refer to the table below for information on each field.

Field	Description
System Settings	
Station ID	The Station number where the system is running.
Station Name	The Station name where the system is running.
Company Name	The company name.

Field	Description
Password	The password to gain access to this platform from another station. The password is case senstive.
Time Code	The time code where the system is located.
Poll Settings	
Events Path	Path where the event files are saved to disk. Enter up to 80 characters/digits.
Message & Logs Path	Path where the received data DTB files are saved to disk. Enter up to 80 characters/digits.
Poll Type	The type of poll (one time or periodic). When periodic is selected the period field will be displayed.
Period	Poll all the devices every xxx seconds.
Events to Extract	The total number of events to extract for each device.
Ping Before Connect	Ping the Ethernet devices before attemping to connect to them.
Log Settings	
Save Rx Data	Save all data received from the polled devices to a separate DTB file. Select “Yes” to keep a record of all data received from the devices or “No” to discard all received data. This feature is used to troubleshooting commincations with devices.
Archive Duration (min)	The duration when to rename or delete the received data stored in the database files (DTB). Enter up to 99999 minutes or 0 to turn this feature off. A military time can also be specified using the T indicator (T2359 = One minute before midnight).
End With	Action to take when the duration field is exceeded. Select rename to rename the DTB file using the IEEE long file naming format or delete to delete the files from disk.

Use the tab key to navigate between fields, the **Save** button to save the data, and the **Cancel** button to terminate the command.

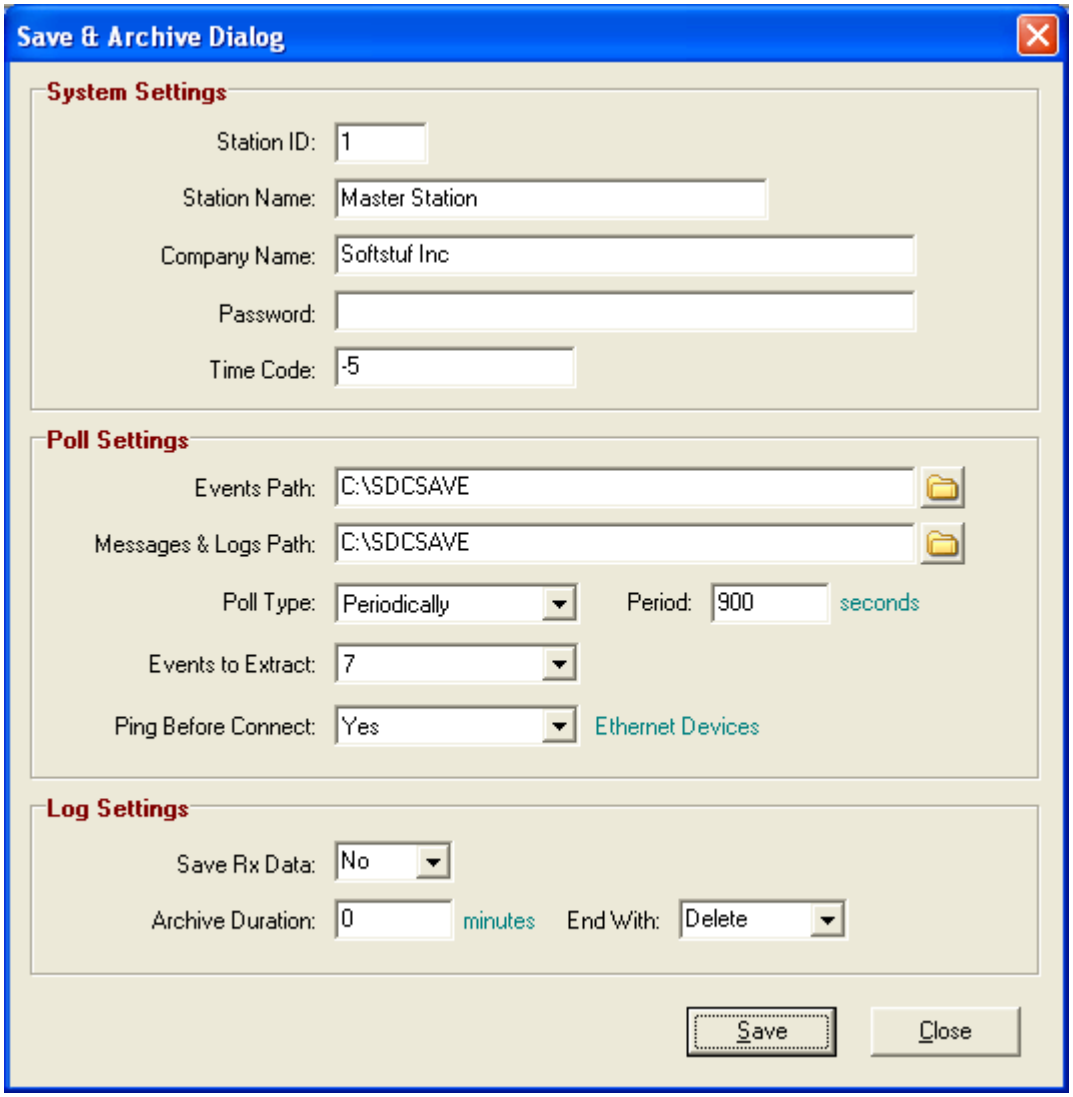


Figure 2.38 Save & Archive Dialog

EXPORT

The export feature exports device records from the active configuration table to a comma delimited ASCII file. The “Export” menu option is under the “Device” menu. All devices or only the marked devices can be exported,

This feature is useful for changing common information for all devices quickly. For example if a COM port number has changed for a number of devices then those devices can be exported. The export file can be opened in “Excel” and all of the Com port fields can be changed easily. To import the changes back into the device configuration table use the “Import” menu option under the “Device” menu.

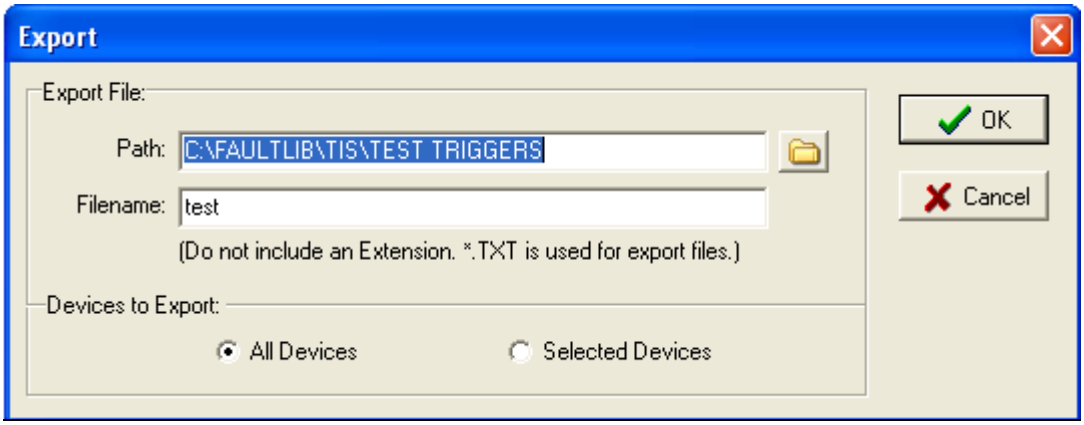


Figure 2.39 Export Dialog

IMPORT

The import feature imports all device information from a comma delimited ASCII file. It is advisable to always keep a backup of the existing Device Configuration files before using the import feature. This allows for a quick recovery if any of the changes made to the device ASCII comma delimited file were incorrect. The 3 files to backup are the CFG_DEVS.DTB, CFG_SHOT.DTB & DRIVERS.INI files. The location of the device configuration files are listed in the header of the device table.

To import an ASCII comma delimited file select the “Import” menu option under the “Device” menu. Enter the exported file’s path and filename or use the “Browse” button to select the file. Also, select the type of import: overwrite the existing devices or append all the devices in the ASCII comma delimited text file to the end of the table. All device information contained in the imported file will be updated in the active device configuration table.

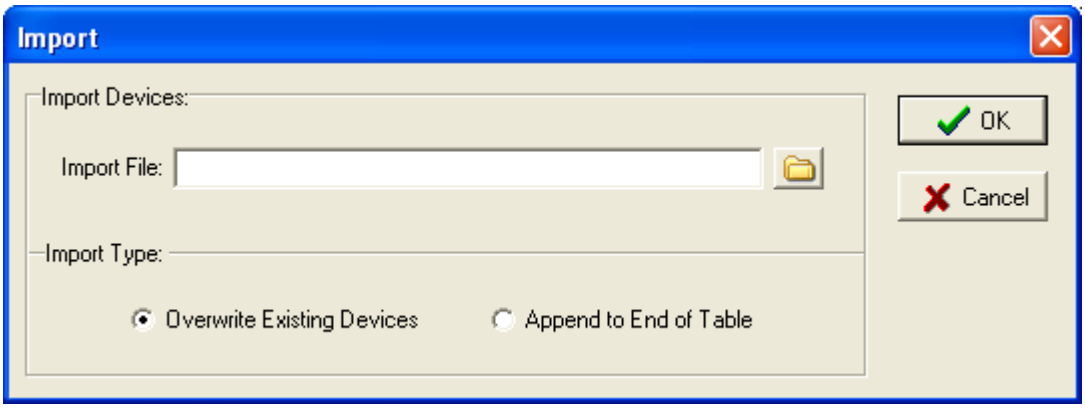


Figure 2.40 Import Dialog

NAVIGATING

To navigate the device records in the table use the up, down, page up, page down, ctrl+home, and ctrl+end keys, or the vertical scroll bar. To navigate the columns use the right, left, home, and end keys or the horizontal scroll bar. 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.

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 deleted (Del), copied (Alt-D,Y), grouped (Alt+M,G), sorted (Alt+S), printed (Alt+P,P) or polled in the multiport interrogation display (MID) window (F7) or the DXF display window (F8).

DELETNG 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 Device menu. The software prompts for confirmation, click **Yes** to continue or **No** to Cancel.

SORTING DEVICES

The column headers displayed at the top of the table are used to sort the device records 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 

.

CUSTOMIZING THE DEVICE TABLE

The columns displayed in the table can be repositioned through the “Display” 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.

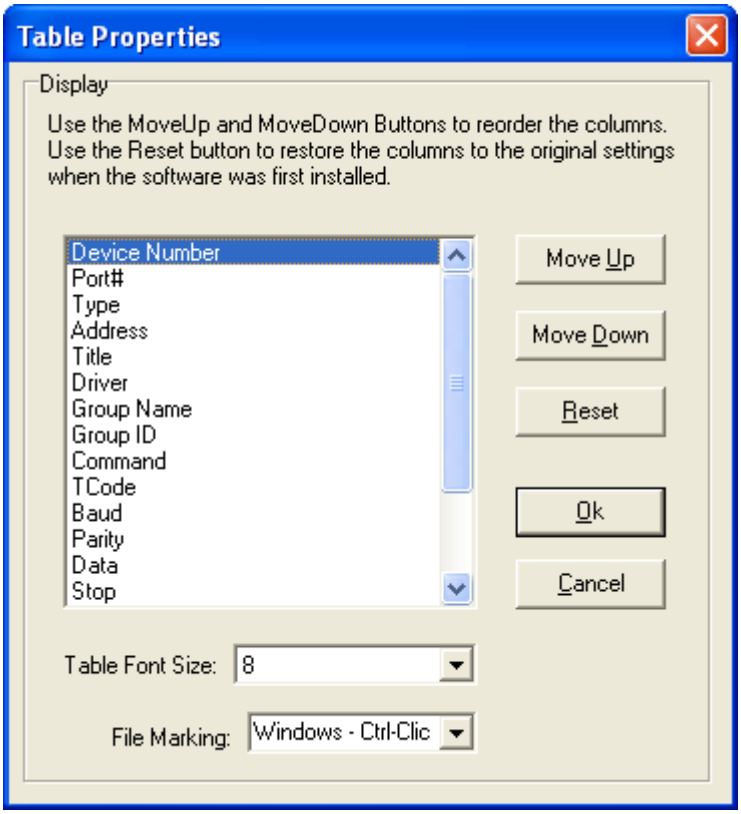


Figure 2.41 Device Display Dialog

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 up arro 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 (<).

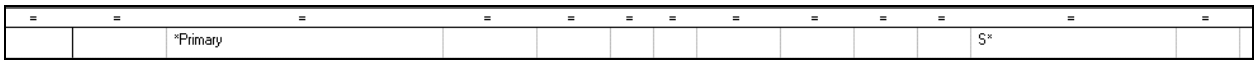


Figure 2.42 Query Fields

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 Devices, Query Marked Devices, or Query Unmarked Devices. 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.

CREATING FUNCTION KEYS

Programmable function keys allow for a string of ASCII characters or hexadecimal values to be transmitted to the output device through a single keystroke. The function keys are active in ASCII and Binary terminal emulators. Each device contains up to nine function keys. To create a function key, select the device and press F5 or click the **TermKeys** menu button  .

Each function key is composed of two fields: name and transmit (Tx). The name fields are used as key descriptors and the transmit fields are used to assign a string of ASCII characters, hexadecimal values, escape sequences, or other transmit strings. When the associated key is pressed in the terminal emulator the assigned transmit string is sent to the output device one character at a time. For example:

ASCII	F1:name	Request Meter Information
Tx:	meter ^[13;10]	
Binary	F1:name	Request RTU SOE Points
Tx:	7E 01 01 03 A0 8A 20 C4 A6	

The term “meter” specifies an ASCII command and the instruction “^[” initiates an escape sequence that represents a series of decimal codes separated by semicolons and terminated by a closed bracket, “]” or a space. In the Binary case only hex characters (0..9,A..F) are allowed. A transmit string may also include other transmit strings. For example:

F1:TX	acc^[13;10]password^[13;10]
F2:TX	%F1%meter^[13;10]

When F2 is pressed the transmit command defined in F1 is sent to the output device followed by the ASCII command “meter” and the escape sequence, defined in F2. Up to eight transmit strings can be included in a single string. To save the function keys click the **Save** button or click **Cancel** to terminate the command. The function keys names are displayed at the bottom of the terminal mode window.

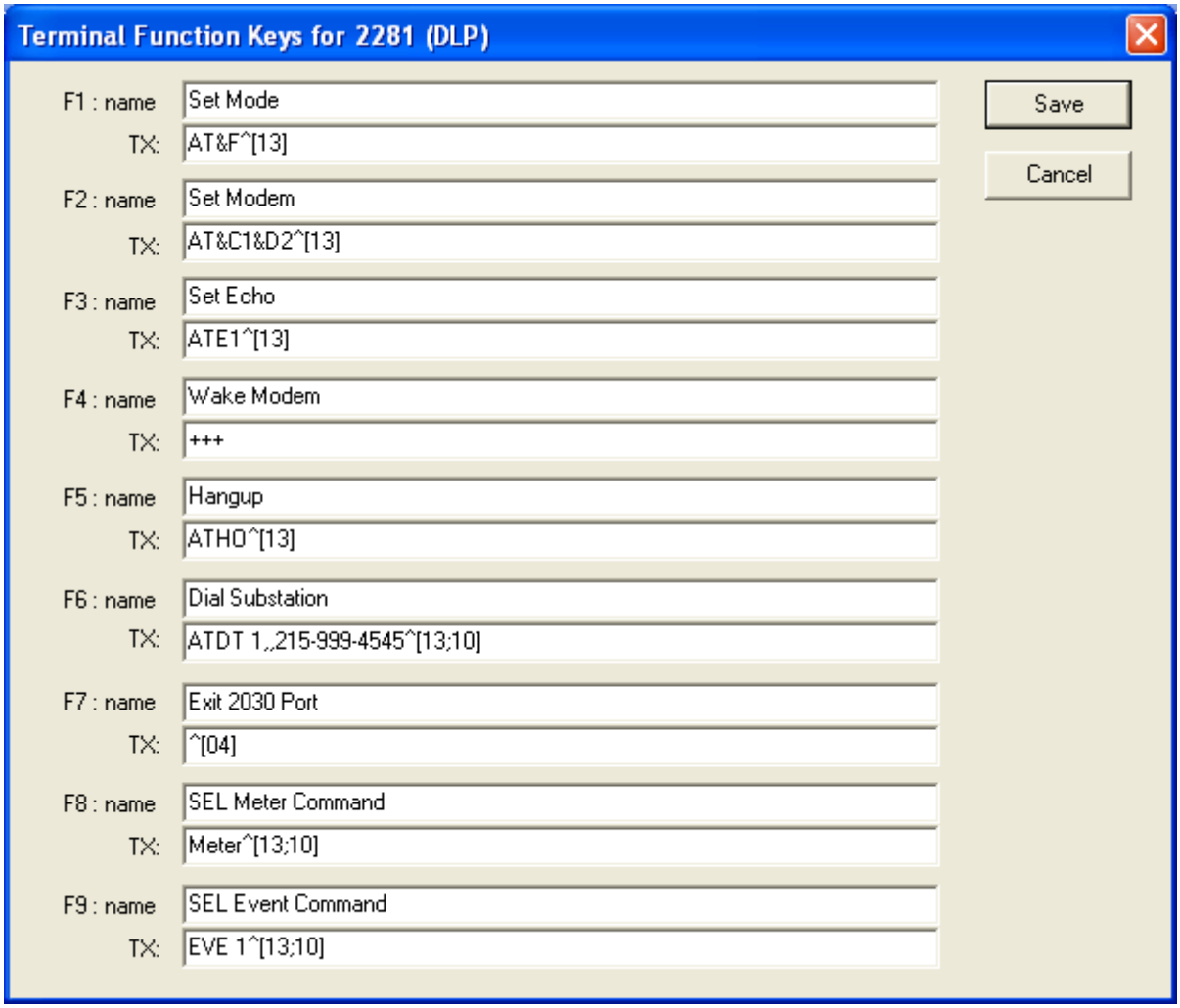


Figure 2.43 Terminal Function Keys

COMMUNICATING WITH AN ASCII DEVICE

The ASCII emulator is used to transmit ASCII characters and/or escape sequences to the output device. To communicate with an ASCII device place the cursor on the desired device and press <enter> or click the **Terminal** menu button  . Data is transmitted to the output device by pressing the predefined function keys or by manually pressing the numeric and/or letter keys. If the device does not respond, check the device's communication parameters (F2) and/or the device connection. Use the up arrow, down arrow, right arrow, left arrow, page up, and page down keys to browse the data and the <esc> key to exit.

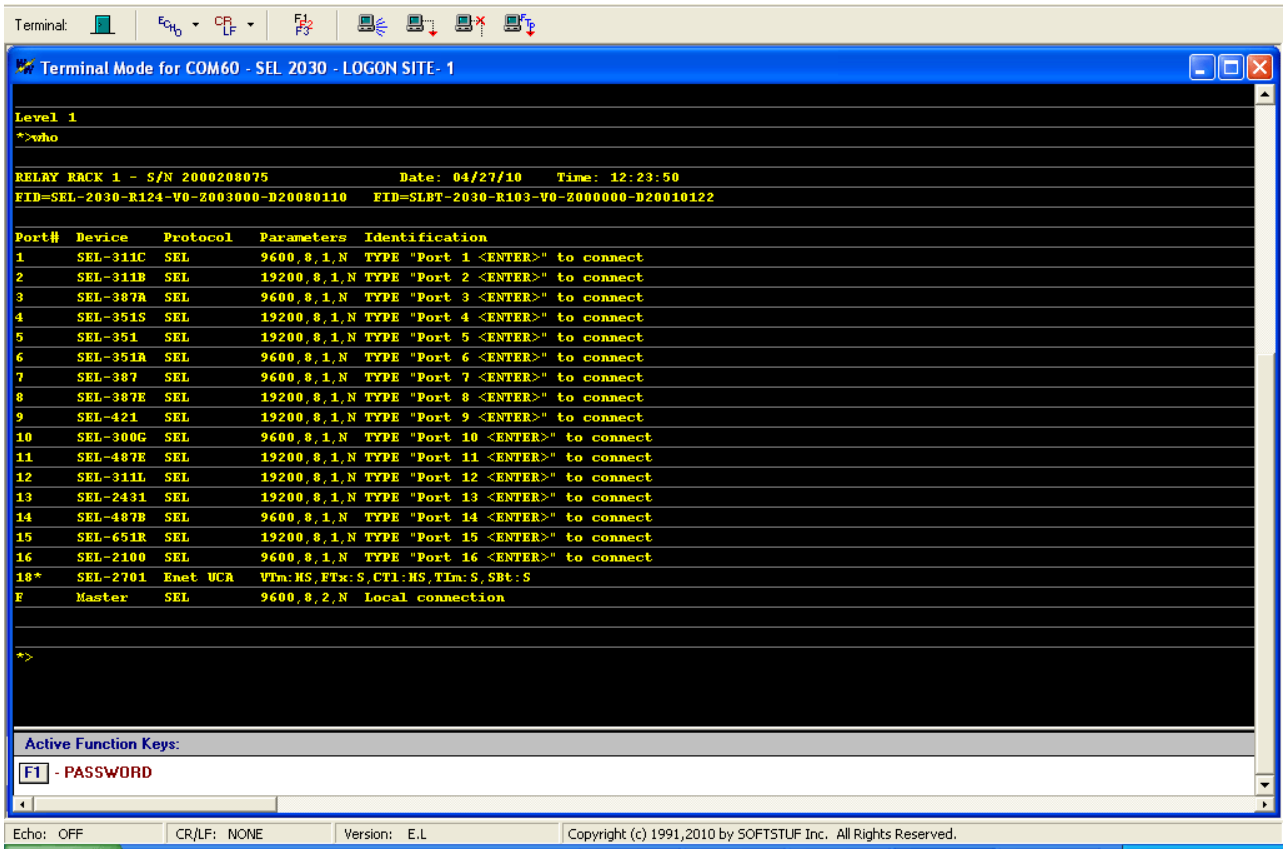


Figure 2.44 ASCII Terminal Mode

COMMUNICATING WITH A BINARY DEVICE

The Binary emulator is used to transmit hex characters to the output device. To communicate with a Binary device place the cursor on the desired device and press <enter> or click the **Terminal** menu button  . The Binary display consists of a hex editor and an ASCII display. When a hex value is entered, the ASCII equivalent appears in the window to the right of the editor. Hex values range from 00 to FF. Transmit data to the output port by pressing the predefined function keys or by manually pressing the numeric keys. If the device does not respond, check the device's communication parameters (F2), and/or the device connection.

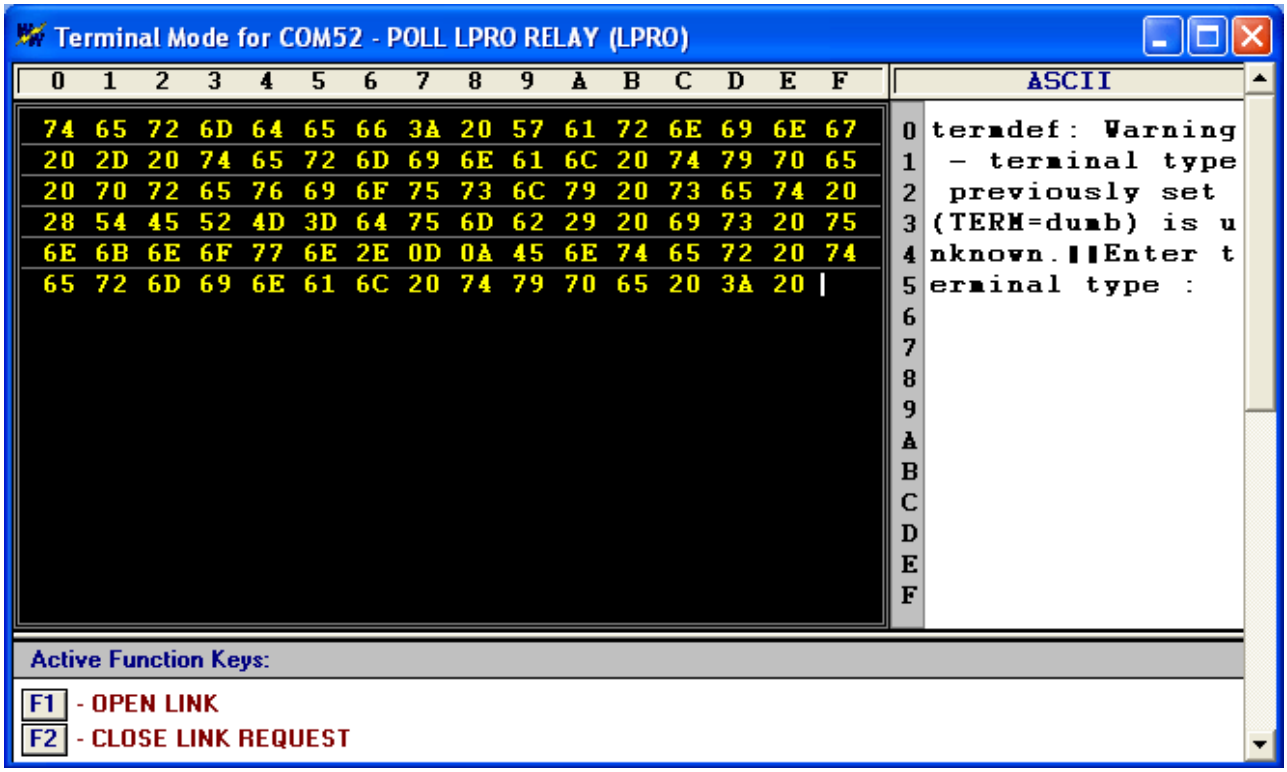


Figure 2.45 Binary Terminal Mode

VIEWING EVENT DATA

All data received from a device is archived in a Dev_###.DTB file (### is the device number in the device table) in the “Messages & Logs” folder defined in the “Save & Archive” dialog. To view or modify the data saved in the device DTB file, select the device and press F6 or select the “View Event File” menu option under the “Options” menu or click on the “Event File” menu button . If a message folder is not defined in the “Save and Archive” dialog, then the DTB files are saved in the Wavewin directory. Use the up arrow, down arrow, page up, page down, ctrl+page up, ctrl+page down, left arrow, right arrow, home, and end keys to browse the data. The **Cut** (shift+del), **Copy** (ctrl+ins), and **Paste** (shift+ins) menu options are used to edit the file and the **Save As** command to save the file under a new name. Press <esc> or click the **Close** menu button to exit the window.

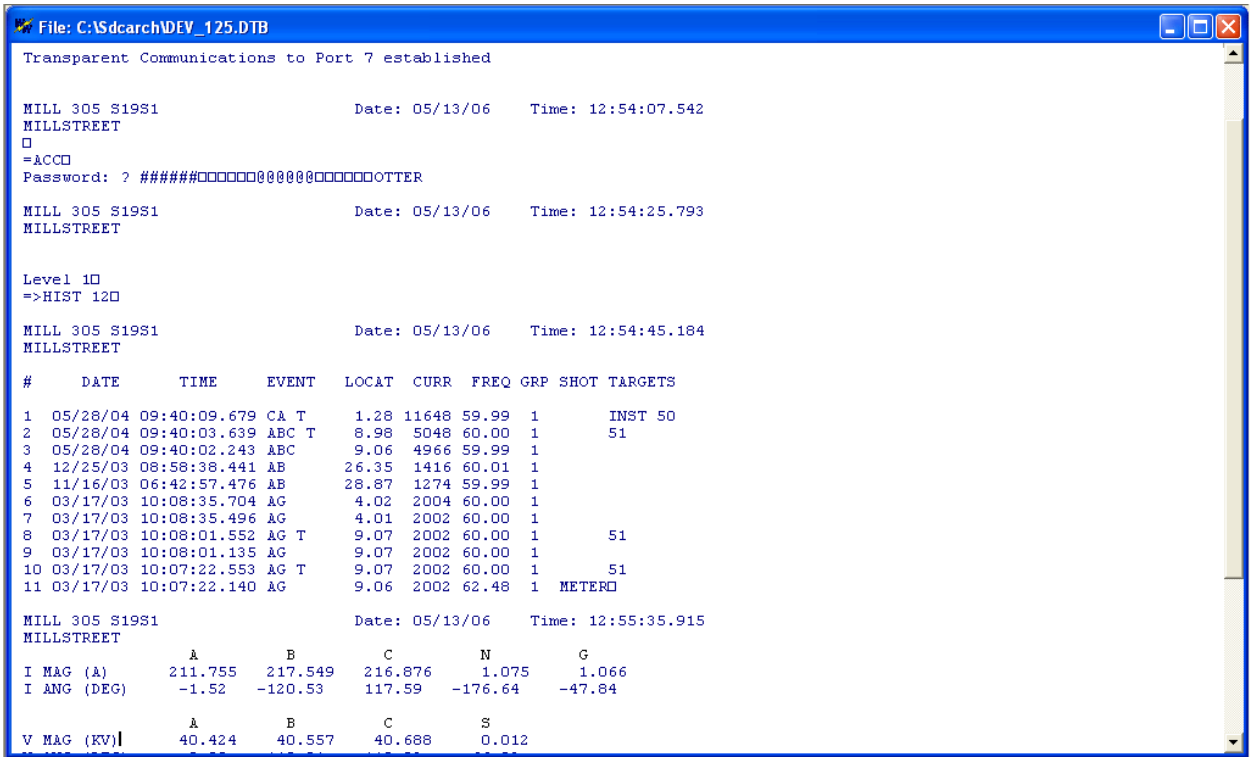


Figure 2.46 View Device Event Data

CAPTURING DATA

The Device Manager offers both unsolicited and solicited data captures. When the device table is open, the system captures any unsolicited data received from the devices. The captured data is buffered, processed, and saved to the device's database file in the Message folder specified in the "Save & Archive" dialog. The database filename indicates the device number in which the data was received. For example, DEV_129.DTB represents device 129. All data is saved in the original form it was received and can be viewed or modified in the ASCII or Binary editors.

Devices that do not speak on their own can be periodically polled for analog, digital, summary and history information. A number of pre-canned drivers are supplied for report by exception commands, building load profile files, and for populating one-line diagrams. For devices not supported, the scripting language can be used to create script routines (device drivers) that periodically interrogate a device, parse values from the response, and display the values in the Multiport Interrogation Display (MID) device panels or in a one-line diagram (DXF).

MULTIPORT INTERROGATION DISPLAY

The Multiport Interrogation Display (MID) contains four device panels per page. A maximum of 2000 device panels can be opened at one time. MID executes the device's assigned drivers and updates the parsed information into the device panel. To activate the MID window press F7. If no devices are marked all devices assigned a driver are displayed and polled. If there are marked devices then only the marked devices assigned a driver are displayed and polled. Use the up, down, page up, and page down keys to view the device panels. When F7 is pressed the device's TXCOMMAND assigned in the DRIVERS.INI file is periodically sent to the output device. The response data is parsed by the RXSTRIP commands and updated on screen. Each panel displays the device title (Hdr), the assigned active device drive (Drv), the device number (Dev#), the number of times the driver executed (Cycle) and the group name (Group).

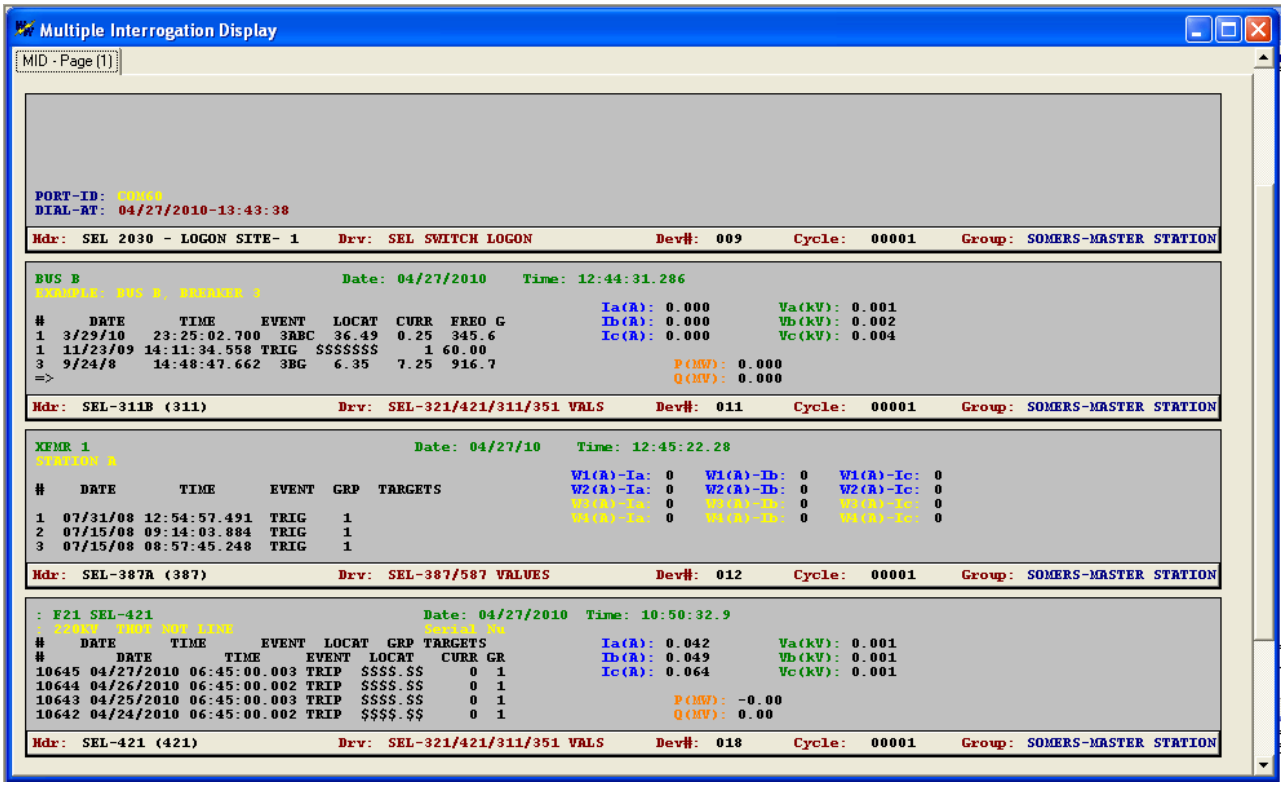


Figure 2.47 Multiport Interrogation Display (MID)

ANIMATED CAD-DXF

Information parsed by the device drivers can also be used to populate a CAD-DXF drawing. In order to populate the drawing, control points must be added to offset the parsed data. The word “Device”, the associated device number, and the device title (optional) define a control point. For example, if the CAD-DXF reader encounters the text “Device 12 SEL-321” in the DXF file, the information parsed by the assigned driver is offset at the upper left corner of the letter “D” in the word “Device”.

DXF drawings can be created using an off the shelf program such as AutoCAD, Turbo CAD, Technical Visio, Drafix, or MEDUSA. The animated CAD-DXF reader also supports layered objects and multiple paging views. To activate the animated CAD-DXF display, click the **DXF** menu button  or press F8.

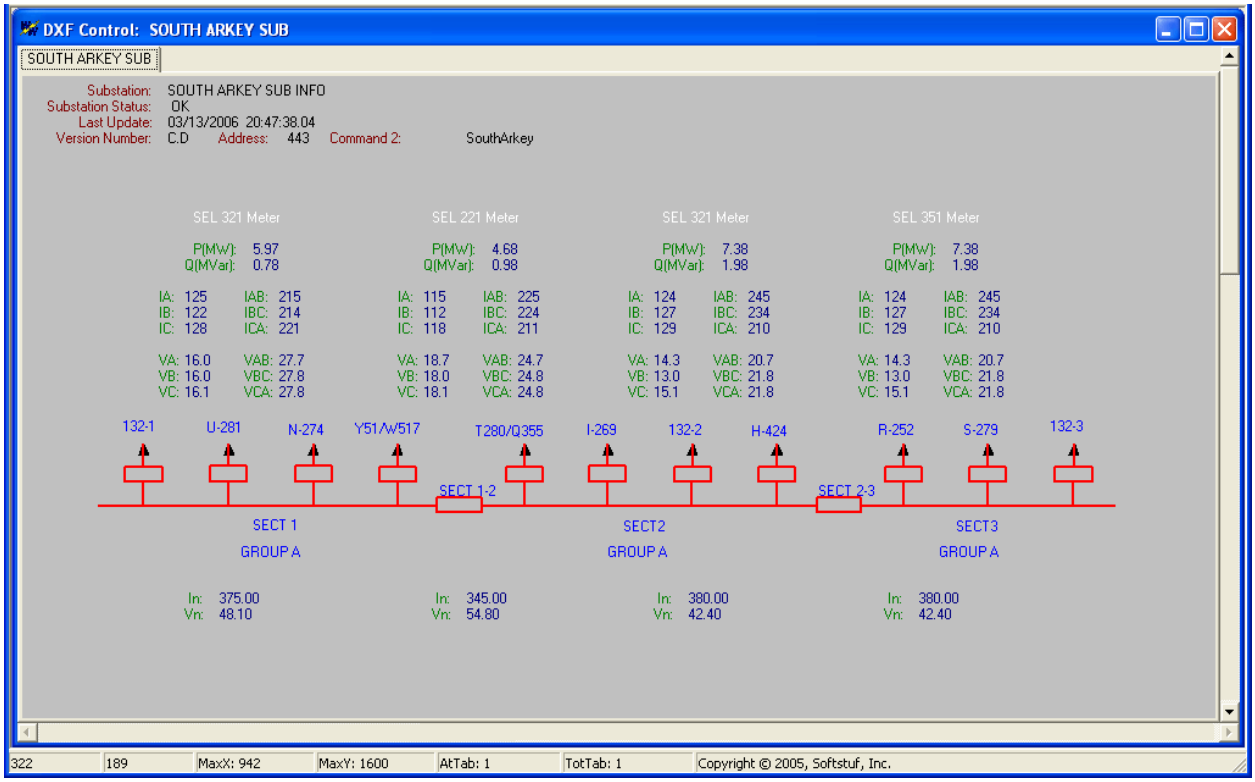


Figure 2.48 Animated CAD-DXF Display

The status bar at the bottom of the DXF screen displays: the X and Y coordinates of the mouse position, the maximum X and Y coordinates, the active tab number and the total number of tabs in the window.

To zoom in on the drawing press the "+" key, to zoom out press the "-" key or use the **ZoomIn** and **ZoomOut** menu buttons. Click the right mouse to resize the drawing to window size or to the windows original coordinates when the drawing was first opened.

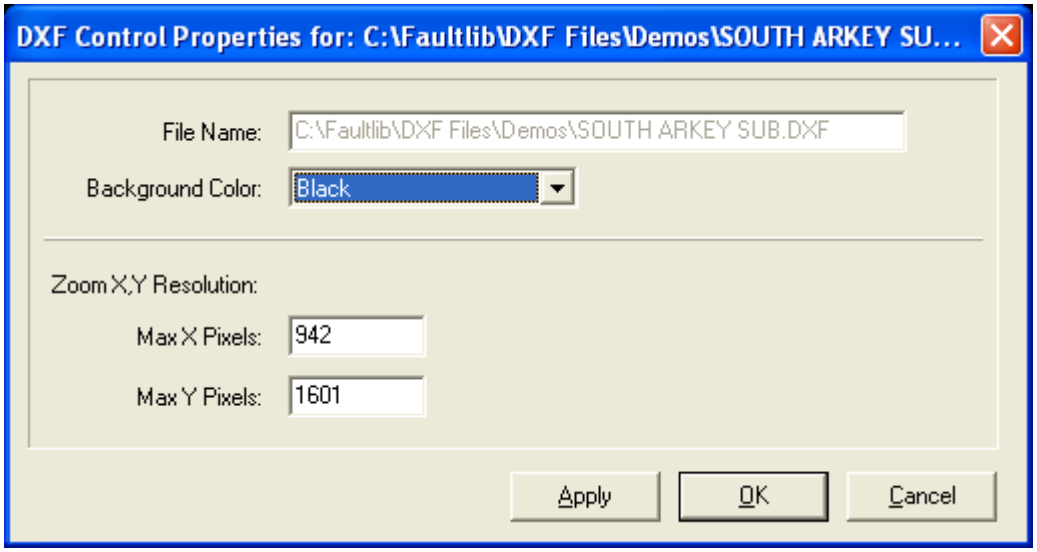


Figure 2.49 DXF Dawing Properties

EXPORTING DEVICES TO THE DISPATCH TABLE

The Dispatch Table is created from the devices configured in the device manager, also from the event files stored in the save folder and from the message files saved to the message folder. The Dispatch table and the Device Manager communicate using message files saved in the message folder.

The message folder is defined in the device manager's "Save & Archive" dialog. The "Message & Logs Path" field in the Save & Archive dialog must point to the same folder as the Dispatch Table's "Message & Logs Path" in the Dispatch Table Properties dialog. This is also true for the "Save Path" in the Save & Archive dialog and the "Event Path" in the Dispatch Table Properties dialog.

To make the device manager information available to the dispatch table export all devices to a text file named "Master Station,Station ID,Station Name.txt" and save it in the message folder. Before exporting make sure the device manager table is sorted by device numbers in ascending order Device Number. To export, use the "Export" menu option under the "Device" menu.

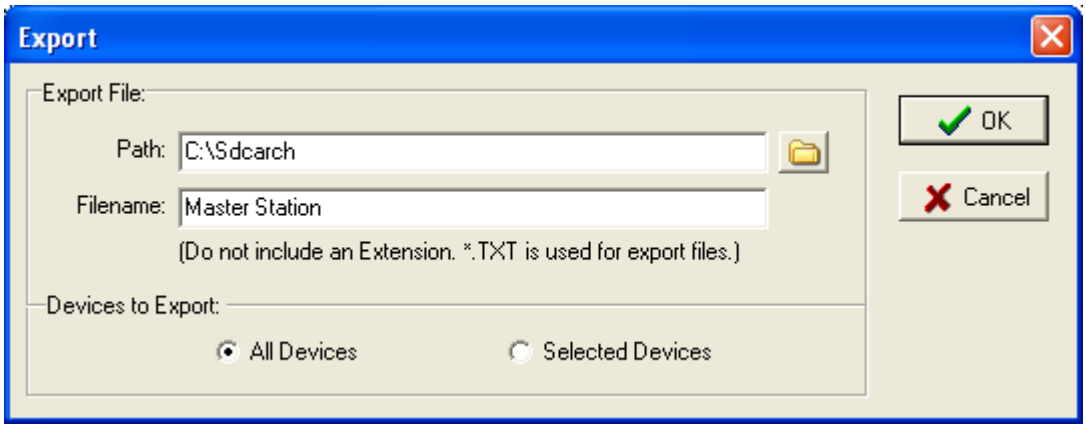


Figure 2.50 Export for Dispatch Table

Set the "Path" field to the message folder defined in the "Save & Archive" dialog. Enter Master Station in the "Filename" field. The extension is automatically assigned to ".txt". Click the "All Devices" radio button then click OK.

The dispatch table displays columns for the Station and Group Name. To have both columns populated in the dispatch table, enter the Station-Group Name in each device's group name field.

Devices that have a driver assigned and have the device type between open brackets () defined in the title are imported into the dispatch table.

PREPARING THE DEVICE MANAGER FOR DISPATCH REQUESTS

The device manager must be in poll mood to respond to the poll requests issued from the dispatch table. To put the device manager in poll mode first make sure there are no marked devices in the device manager table. Next, click on the MID interface button in the button menu or select the "Run MID Interface…" menu option under the "Options" menu. The MID window will be displayed and the start polling device along with the initialize modem devices will be executed. Leave the device manager in this state. The MID window will respond to the poll requests sent from the dispatch table.

A P P E N D I X A

Device Drivers

The DRIVERS.INI file, located in the system directory is used to create device drivers. The driver consists of script commands that periodically interrogate a device, parse information from the response, display the parsed response in a text window or graphical display, activate automatic triggers, generate reports, and/or archive the data. The drivers are created in the DRIVERS.INI file and assigned in the device record dialog.

CHANGE POLLING DRIVERS

There are a number of drivers in the drivers.ini file that have specific information pertaining to current master station being developed, such as polling start times & location on a server where files are saved. The sections below explain how to edit the drivers.ini to make the needed changes.

FILE LOCATIONS

To change where the files are saved on the connected server open the Drivers.ini file located in the Wavewin32 directory. Navigate to drivers 96 & 97. Below are the driver fields.

```
[XMIT RELAY-FILES BRIDGE]
DRIVER#=96
TYPE=ASCII
TXFILE=*.SLH W:\FAULTLIBRARY\HISTORY /M
TXFILE=*.3EH W:\FAULTLIBRARY\HISTORY /M
TXFILE=*.3TH W:\FAULTLIBRARY\HISTORY /M
TXFILE=*.SLS W:\FAULTLIBRARY\SUMMARY /M
TXFILE=*.DLS W:\FAULTLIBRARY\SUMMARY /M
TXFILE=*.30S W:\FAULTLIBRARY\SUMMARY /M
TXFILE=*.SOP W:\FAULTLIBRARY\SUMMARY /M
TXFILE=*.SLP W:\FAULTLIBRARY\SUMMARY /M
TXFILE=*.SEL W:\FAULTLIBRARY\EVENT /M
TXFILE=*.OSC W:\FAULTLIBRARY\EVENT /M
TXFILE=*.30X W:\FAULTLIBRARY\EVENT /M
TXFILE=*.DFR W:\FAULTLIBRARY\EVENT /M
TXFILE=*.EOP W:\FAULTLIBRARY\EVENT /M
TXFILE=*.FLP W:\FAULTLIBRARY\EVENT /M
TXFILE=*.DAT W:\FAULTLIBRARY\EVENT /M
TXFILE=*.CFG W:\FAULTLIBRARY\EVENT /M
TXFILE=*.HDR W:\FAULTLIBRARY\EVENT /M
TXFILE=*.DXF W:\FAULTLIBRARY\STATIONS /M
TXFILE=*.DN* W:\FAULTLIBRARY\STATIONS /M
TXFILE=*.OK* W:\FAULTLIBRARY\STATIONS /M
TXFILE=*.BSV W:\FAULTLIBRARY\LOADPROFILE /M
TXPERIOD=120
TXDELAY=-114

[XMIT DFR-FILES BRIDGE]
DRIVER#=97
TYPE=ASCII
TXFILE=*.X01 W:\FAULTLIBRARY\EVENT /M
TXFILE=*.MEH W:\FAULTLIBRARY\EVENT /M
TXFILE=*.TLR W:\FAULTLIBRARY\EVENT /M
TXPERIOD=120
TXDELAY=-118
```

The destination drive for the files on the server can be changed. Change the drive letter (W:\) to the mapped driver letter for the connected server. All files with the listed extensions are moved from the polling computers C:\SDCSAVE directory to the specified directories on the server.

NOTE: Make sure the above directories exist on the server before starting the polling process.

SCRIPT COMMAND DEFINITIONS

All available script commands are defined below. In the definitions below there are references to Escape Sequence Commands. The escape sequence commands are used to access system and user variables. The "^", "[" and "]" characters specify the use of an escape sequence command. To insert a carriage return and a line feed after an ASCII TXCOMMAND insert ^[13;10] after the ASCII characters to transmit to the device. For example to transmit an SEL meter command, insert the following command in the drivers TXCOMMAND field: meter^[13;10].

ESCAPE CODE COMMANDS

Available Escape Code Commands. The following commands are reserved system variables. Their names cannot be used for user variables.

- 13: Carriage Return
- 10: Line Feed
- Y: 2 Digit Year (Current Date & Time from the System Clock)
- YR: 4 Digit Year
- MON: Month
- DAY: Day
- HR: Hour
- MIN: Minute
- SEC: Second
- HSEC: Hundredth of a Second
- ID: Device Number
- PID: Port Number
- HDR: Device Name
- ADDR: Device Address
- SID: Station Number
- STN: Station Name
- TC: Is the "time code" field assigned to each device.
- CMP: Is the "company name" assigned in the "save and archive" dialog.
- VER: Program's Version Number
- CRCSATEC: Proprietary SATEC Meter 8-Bit Checksum
- CRCMDAR: Proprietary ABB MDAR Relay 16-Bit CRC Checksum
- CRCBI: Proprietary BiTRONICS Meter 8-Bit Checksum
- CRCDLP: Proprietary DLP Relay 16-Bit CRC Checksum
- CRCHYDRAN: Proprietary Hydran CRC Checksum
- CRCHATH: Proprietary Hathaway DFR I, II and IIB CRC Checksum
- CRCDPU: Proprietary DPU Modbus CRC Checksum
- CRCPASS: Creates a 6 character random password.
- CRCROCH Proprietary Rochester DFR checksum
- P#: Pause # of Seconds (Maximum Delay is 99 Seconds)
- #: Any 1 Byte integer Number in Decimal (0 to 255)
- ^X^Y: The Variable Name "X" From Device# "Y"
- %#:N: The text # will be left justified with blanks to the length specified in N.

- $FILE:N: Read Nth line in the file specified in “FILE” and insert in the command. The file specified in the “FILE” field must be in the Wavewin directory.
- CMND: The phone number field in the device configuration dialog.
- CMND1: The password 1 field in the device configuration dialog.
- CMND2: The password 2 field in the device configuration dialog.
- CMND3: The back out field in the device configuration dialog.
- CMND4: The log header field in the device configuration dialog.
- CMND5: The event type field in the device configuration dialog.
- CMND6: The save path field in the device configuration dialog.
- CMND7: Reserved for future use.
- CMND8: Reserved for future use.
- CMND9: Reserved for future use.
- CMND10: Reserved for future use.
- CMND11: Reserved for future use.
- F1…F9: The function keys assigned to each device in the device manager table.
- EXIT: Close the wavewin application and run laplink for remote control
- WAIT: Wait until all scheduled polling is complete.
- CONNECT: Connect to the device using the specified Ethernet protocol (ETHERNET).
- DISCONNECT: Disconnect from the device's Ethernet connection (ETHERNET).

DRIVER DEFINITION COMMANDS

[...]:

The “Driver Name” is assigned between brackets. Each driver must be assigned a unique name. The driver name is displayed in the device record’s “Driver” drop down list. A maximum of 24 characters is permitted. Up to 255 drivers is supported.

DRIVER#:

Each driver must have a unique ID number assigned (range 1 to 255). A driver is used to automatically transmit a predefined sequence of characters or bytes ("TXSTART"+"TXCOMMAND"+"TXEND") to an external device, then capture the response, parse and display the response (RXSTRIP) and/ or save the parsed data (LOGCOMMAND).

If a unique driver number is assigned then the driver is loaded into memory and the driver’s name is added to the driver drop down list in the device record dialog.

Other drivers can also be included by using the "&" character followed by the driver number. For example: "DRIVER#=2 &7 &1" will cause drivers 2, then 7 then 1 to execute. The maximum number of included drivers is 64. Included drivers can also include other drivers. Below is an example where included drivers can be used, there are 5 driver defined:

SEL **Logon** driver defined at Driver # 1.
SEL **History** driver defined at Driver # 2.
SEL **Events** driver defined at Driver 3.
SEL **Meter** driver defined at Driver # 4.
SEL **Logout** driver defined at Driver # 5.

To execute each driver for an SEL device create and new driver at Driver # 5 and include the top five drivers: **DRIVER#=6, &1, &2, &3, &4, &5**. Below is an example of Driver #6.

[SEL, POLL SEL-351/311]
DRIVER#=6 &1 &2 &3 &4 &5

Drivers are executed in the order that they are included. In general there are six different ways to execute a driver:

- PERIODICALLY: "TXPERIOD=4" will execute once every 4 seconds.
- 2) DAILY: "TXPERIOD=T1830" will execute once @ 6:30 p.m.
- 3) WEEKLY: "ONDOW=7" will execute on Sunday @ the defined "TXPERIOD".
- 4) MONTHLY: "ONDAY=14" will execute on the 14th @ the defined "TXPERIOD".
- 5) CONDITIONALLY: Using "SETMESSAGE", "ATMESSAGE" and "M" commands.
- 6) MANUALLY: By selecting from the “Control” options menu.

Periodically executed drivers are called interrogation drivers and are executed when the “TXPERIOD elapses. Manually executed drivers ("TXPERIOD=0" AND "TXDELAY=0") are called “Control Menus” and are executed from the “Control Menu” list in the DXF display window. Refer to the examples below on how to create control drivers.

TYPE:

Defines the type of data specified in the "TX" & "LOG" commands. The two available types are “ASCII” or “Hexadecimal”.

SYSTEM COMMANDS

REPORTIF:

A sequence of characters to search for (ASCII or Hex) in the captured data. If the sequence is found then the captured data is saved to a file using the IEEE long file naming convention and transmitted to a remote computer. A file transmit driver must exists for the reportif file to be sent. The maximum Reportif length is 255 characters. The reportif can also include escape sequence commands.

SETPORT:

A command used to reinitialize the port configuration dynamically. Use this command to reinitialize a port’s baud rate, byte size, parity and stop bits before the driver is executed. This feature is useful when switching between different devices connected via the same port. For example if 2 SEL 2030 with different port configurations are being polled from the same modem or direct connection then setport will insure the proper port configuration for both SEL 2030s.

SETSYSVAR:

An internal command use to change the value of any one of the 7 EscSeq internal variables. The EscSeq variables are defined in the device record. The command sequence is SETSYSVAR=ExistingVarName NewVarName. This feature was created for the “Change Password” feature but can be used for any one of the EscSeq variables defined. The example below changes the password defined in the 3rd EscSeq variable defined in the device record with a randomly generate 6 character password. The “CRCPASS” Escape Code Command creates a 6 character randomly generated string. The device record in the database (CFG_SHOT.DTB) and on screen is updated with the variable string. The maximum length is 80 characters and escape code sequence commands are allowed.

Example: SETSYSVAR ^[^CMND2] ^[CRCPASS]

LOG COMMANDS

LOGPERIOD:

The save cycle in seconds (an integer number up to 2 million). For example, if "LOGPERIOD=90" was specified in a driver then the variables and text that are specified in the "LOGCOMMAND" will be saved to disk once every 90 seconds. The saved data is stored in text format in the filename

specified in the “LOGFILE=" command to the save directory defined in the “Save and Archive” dialog. If "LOGPERIOD=0" was specified then these actions will not occur unless "LOGDELAY>0" was specified in which case the driver will execute one time only. If "LOGPERIOD=T0800" was specified then the driver will execute at 08:00 am every day. T commands are specified in military time.

LOGDELAY:

The duration in seconds to wait before the Log cycle begins. For example, if "LOGDELAY=3" was specified then only the first occurrence of "LOGPERIOD" is delayed by 3 seconds (LOGPERIOD+LOGDELAY). In the previous example the first period will occur after 93 seconds, all others will occur 90 seconds apart. To have the log cycle begin immediately set “LOGPERIOD=-89 (90+-89). If "LOGPERIOD=0" was specified than specifying "LOGDELAY" will cause the driver to execute one time only (this is useful for writing headers to the log file).

LOGFILE:

The path and file name of the text file that will contain the outputs of the "LOGCOMMAND=". If the path is not specified than the default save path (save path specified in the “Save & Archive” dialog) is used. If the command "LOGFILE" is not included than the system will automatically assign an IEEE long file name with a “.CSV” extension. The maximum length is 255 character and escape code commands are allowed.

LOGRENAME:

Automatically renames the specified “LOGFILE=” file to an IEEE long file name with a “.CSV” extension. The specified file must exist in the specified path (path defined in the “LOGFILE” command or the save path define din the “Save & Archive” dialog). If the path is not specified in the “LOGFILE=” command than the default save path is used. This command is required in order to transfer files that are being periodically appended. LOGRENAME occurs upon TXPERIOD and not upon LOGPERIOD. The maximum length is 255 characters and escape code commands are allowed.

LOGCOMMAND:

Specifies a sequence of characters to save (ASCII OR BINARY) to the “LOGFILE=” when the "LOGPERIOD" command expires. The maximum length is 1024 characters and escape code commands are allowed. For example the following LOGCOMMAND:

^[10;13;YR;MON;DAY;HR;MIN;SEC;HSEC;ID;HDR;ADDR;SID;STN;VER;^TOTMW^2]

Will cause a carriage return, line feed, 4 digit year, month, day, hour, minute, second, hundredth of second, device number, device name, device address, station number, station name, version and the values of the user variable "TOTMW" from device # 2, to be saved to the log file.

WARNING: Using a Pause command in this escape sequence will generate errors. Pause commands are mainly used in TXCOMMANDS

LOGHEADER:

Specifies a sequence of characters to save as the first line upon, creation of the log file specified in the "LOGFILE" COMMAND. The maximum length is 1024 characters and escape code commands are allowed.

Example driver with LOG commands defined:

```
[GE-DLP VALUES]
DRIVER#=125
TYPE=ASCII
ATMESSAGE=^[^STN],^[^SID],RUN
RXSTAY=2
```

```
;SCAN
RXSTRIP=N00, C00, X52, Y1, H6, "     Scan GE-DLP Relay"
RXSTRIP=N00, C06, X52, Y3, H1, "             Time:", %^DTM
RXSTRIP=N00, C14, X52, Y4, H1, "           Status:", %^STS
RXSTRIP=N00, C02, X52, Y6, H0, "Total to Download:", %^TOT
RXSTRIP=N00, C01, X52, Y7, H0, "         At Event:", %^ATF
;METER
RXSTRIP=N00, C14, X01, Y1, H1, "    DLP METER: ", %^DDT
RXSTRIP=N00, C14, X01, Y2, H1, "  -------------------------"
RXSTRIP=N00, C14, X05, Y3, H1, "IA: ",       %^IA
RXSTRIP=N00, C14, X15, Y3, H1, "Angle: ",    %^AIA
RXSTRIP=N00, C14, X05, Y4, H1, "IB: ",       %^IB
RXSTRIP=N00, C14, X15, Y4, H1, "Angle: ",    %^AIB
RXSTRIP=N00, C14, X05, Y5, H1, "IC: ",       %^IC
RXSTRIP=N00, C14, X15, Y5, H1, "Angle: ",    %^AIC
RXSTRIP=N00, C14, X05, Y6, H1, "IN: ",       %^IN
RXSTRIP=N00, C14, X15, Y6, H1, "Angle: ",    %^AIN
RXSTRIP=N00, C14, X28, Y3, H1, "VA: ",       %^VA
RXSTRIP=N00, C14, X40, Y3, H1, "Angle: ",    %^AVA
RXSTRIP=N00, C14, X28, Y4, H1, "VB: ",       %^VB
RXSTRIP=N00, C14, X40, Y4, H1, "Angle: ",    %^AVB
RXSTRIP=N00, C14, X28, Y5, H1, "VC: ",       %^VC
RXSTRIP=N00, C14, X40, Y5, H1, "Angle: ",    %^AVC
RXSTRIP=N00, C14, X05, Y7, H1, "P(MWatt): ", %^PW
RXSTRIP=N00, C14, X05, Y8, H1, "Q(MVar): ",  %^QV
;DUN FILE
LOGFILE=C:\SDCSAVE\^[^STN].ZNN
LOGHEADER=STATION#(6/INFO), DEVICE#(6/INFO), HDRONOFF(6/INFO),
LOGHEADER= DATE(0/DATE), TIME(1/TIME), (4/DATE), (4/PORT),
LOGHEADER= Va(4/kV), Vb(4/kV), Vc(4/kV),
LOGHEADER= Ia(4/Amp), Ib(4/Amp), Ic(4/Amp),
LOGHEADER= P(4/Mwatt), Q(4/Mvars), (4/EVENTS), (4/STATUS),
TITLE(6/INFO)^[13;10]
LOGCOMMAND=^[^SID], ^[ID], ^[^CMND1],
LOGCOMMAND= ^[MON]/^[DAY]/^[YR], ^[HR]:^[MIN]:^[SEC], ^[^DTM], ^[^PID],
LOGCOMMAND= ^[^VA], ^[^VB], ^[^VC],
LOGCOMMAND= ^[^IA], ^[^IB], ^[^IC],
LOGCOMMAND= ^[^PW], ^[^QV], ^[^TOT], ^[^STS], ^[HDR]^[13;10]
```

**Multiple LOGHEADER and LOGCOMMAND fields are concatenated together to form one LOGHEADER and one LOGCOMMAND.

FILE COMMANDS

RENFILE:

Automatically renames an existing file to a new name. The command sequence is RENFILE=path+existing file name | new file name. The specified file must exist in the specified path. The pipe sign is used as a separator between the old path & filename and the new path & file name. RENFILE executes upon a "TXPERIOD" command or upon an “ATMESSAGE” command. The maximum length is 255 characters and escape code commands are allowed.

Example: RENFILE=C:\TEMP\^[^CMND].CSV | C:\TEMP\^[^CMND1].CSV

DELFILE:

Automatically deletes the specified file. The command sequence is DELFILE=path+filename. DELFILE executes upon a "TXPERIOD" command or upon an “ATMESSAGE” command. The maximum length is 255 characters and escape code commands are allowed.

Example: DELFILE=C:\TEMP\^[^CMND].CSV

RUNFILE:

Runs the specified file and passes the defined command line parameters to the specified application. The command sequence is RUNFILE=path+existing file name | command line parameters. If the path is not in the system environment then the path is required. If command line parameters are used then they must have a pipe sign preceding the command line parameters. RUNFILE executes upon a "TXPERIOD" command or upon an "ATMESSAGE" command. The maximum length is 255 characters and escape code commands are allowed.

Example: RUNFILE=C:\TEMP\FTP_SCRIPT.EXE | "C:\TEMP\ACTIVE_SCRIPT"

DUNRENAME:

Automatically renames all files with a “.ZUN” extension to the same file name with a “.DUN” extension. Also, all files with a “*.ZN*” extension are renamed with a “*.DN*” extension. The command sequence is DUNRENAME=path. The path is the file path where all *.ZUN” and “*.ZN*” are located on disk. DUNRENAME executes upon a "TXPERIOD" command or upon an “ATMESSAGE” command. The maximum length is 255 characters and escape code commands are allowed.

Example: DUNRENAME=C:\SDCSAVE\^[^STN]

MESSAGE COMMANDS

SETMESSAGE:

Sequence of characters sent as a message to all loaded drivers. All drivers that have an "ATMESSAGE=" command matching the sent message will be executed in the order defined in the device manager table. The maximum length is 255 characters. The system can handle up to 32 messages per second. For example the command "SETMESSAGE=DIAL,LOGON,HANGUP^2" will send the messages 'DIAL' & 'LOGON' to all loaded drivers and will send the message 'HANGUP' to the drivers on device #2 only. The maximum length for each message in the sequence is 24 characters.

ATMESSAGE:

Sequence of characters that will cause the driver to execute if it is equal to the received "SETMESSAGE=" command string. The "SETMESSAGE=" and "ATMESSAGE=" commands can appear together in the same driver as long as they are not equal. This is useful for organizing drivers in a link list and executing them in order. If the "SETMESSAGE=" and "ATMESSAGE=" are equal in the same driver than the system will fall into and endless loop. The maximum length for each “ATMESSAGE” is 24 characters.

Example drivers with "SETMESSAGE=" and "ATMESSAGE=" commands defined:

```
[INITIATE SDC POLLING]
DRIVER#=143
TYPE=ASCII
SETMESSAGE=RUN
TXPERIOD=300
TXDELAY=-250

[SEL SWITCH LOGON]
```

```
DRIVER#=10 &127
TYPE=ASCII
ATMESSAGE=^[^STN],^[^SID],RUN
TXCOMMAND=^[P2]ACC^[13;P3;^CMND1;13]
RXSTAY=30
RXEND=*>
RXWAIT=4
RXQUIT=SDCEND^[^SID]
;CHK
RXSTRIP=N00, %NoRsp, @STS
RXSTRIP=N01, B01, X01, Y03, D00, C07, H07, "", V=ACC, P0, JC0, J01
RXSTRIP=N00, %Done, @STS
;MID
RXSTRIP=N01, S01, T40, X01, Y04, D00, C14, H11, "", @D3
RXSTRIP=N02, S01, T40, X01, Y05, D00, C08, H11, "", @D4
RXSTRIP=N00, C14, H01, X01, Y07, "PORT-ID:", %^PID, @PORT
RXSTRIP=N00, C06, H01, X01, Y08, "DIAL-AT:", %^[MON]/^[DAY]/^[YR]-,
%^[HR]:^[MIN]:^[SEC], @CALL
;LOG
LOGFILE=PORT-^[^PID].SOE
LOGCOMMAND=^[Mon]/^[Day]/^[Yr]-^[Hr]:^[Min]:^[Sec]> ^[^STN](^[^SID]),
SEL-SWITCH LOGON, STS=^[^STS;13;10]
```

DIRMESSAGE:

The name of a directory path for the system to monitor. If any "*.MSG" files are detected then the name portion of the filenames will be used as messages to the system as in "SETMESSAGE".

TRANSMIT (TX) COMMANDS

TXFILE:

Copies or moves one or more files from a specified source folder to a destination folder. The format is "TXFILE=SOURCE_PATH\WHICH_FILES DESTINATION_PATH /MOVE (optional)".

All specified file names must include fully qualified path strings. When the "TXFILE" command is used the "TXCOMMAND" is ignored. The ";" character is reserved and should not be used in this command, the software uses the ";" to separate between multiple "TXFILE" commands. All of the listed "TXFILE" commands are concatenated to a single data buffer of 1024 characters maximum length.

FILE TRANSFER PROTOCOL:

The protocol is very simple, designed to be quick and highly dependent on the quality of the communication link. First, the transmit end sends: (START BLOCK)+(FILE CONTENTS)+(END BLOCK) and then upon "END BLOCK" the received-end sends: (ACK BLOCK).

In the event that the "END BLOCK" terminator was not received then the receive-end will terminate and reset in 30 seconds from the time that the last byte was received. The block formats are as follows (all values, messages and parameters are enclosed by parenthesis and all messages are case sensitive):

Start Block:

BYTE	1-2:	The values (TEN)+(ELEVEN)
BYTE	3-23:	The message (File Transfer Enable:)
BYTE	24:	The value (TEN)

BYTE 25--:	The parameters (DESTINATION PATH)+(;)+ (FILE NAME)+(;)+ (SIZE)+(;)+ (PACKED FILE-DATE&TIME BORLAND FORMAT)+(;)+ (ASCII TRANSMIT-DATE&TIME)+(;)+ (OPTIONAL FIELD=LONG TSD FILE NAME)
BYTE LAST:	The values (TEN)+(ELEVEN)

File Contents:

The actual file contents starting from the first to the last byte.

End Block:

BYTE 1:	The value (SEVEN)
BYTE 2-7:	The message (Crc:=)
BYTE 8-11:	The parameter (16-bit CRC calculated for the file contents block only. The mask is 8408 hex and the CRC is shipped in ASCII hex format where 4 characters make a word - HI Byte first - The CRC is initialized to FFFF and is not flipped at the end and must be in uppercase HEX notation).
BYTE 12-13:	The values (SEVEN)+(TEN)

Ack Block:

BYTE 1-2:	The values (TEN)+(ELEVEN)
BYTE 3-21:	The message (File Transfer Done:)
BYTE 22:	The value (TEN)
BYTE 23-27:	The message (Crc:)
BYTE 28-31:	The parameter (16-bit CRC calculated for the received file block only. The mask is 8408 hex and the CRC is shipped in ASCII hex format where 4 characters make a word - HI byte first – the CRC is initialized to FFFF and is not flipped at the end and must be in uppercase hex notation.
BYTE 32:	The value (TEN)
BYTE 33--:	A duplicate of the "Byte 25--" section of the received "START BLOCK".
BYTE LAST:	The values (TEN)+(ELEVEN)

Example:

For example the exact protocol to transfer a 2 byte file named HELLO.TXT containing the word "HI" is as follows (the skipped lines are transmitted line feeds (VALUE=10)):

```
TX ->|
     | File Transfer Enable:
     | C:\TEMP;HELLO.TXT;000000002;645175976;4/10/2001 19:54:50;
     | HICrc:= A7DB
     |
RX <-|
     | File Transfer Done:
     | Crc: A7DB
     | C:\TEMP;HELLO.TXT;000000002;645175976;4/10/2001 19:54:50;
     |
```

TXDIAL:

This command is only valid when "TXFILE" is specified. If "TXFILE" finds files to transfer then the sequence of characters specified in "TXDIAL" will be transmitted first. The maximum sequence length is 255 characters. Example: TXDIAL=^[13;P1]ATDT 1,123-456-7899^[13;P60].
Note: The "P60" (pause 60 seconds) above will be aborted when "CONNECT" is detected.

TXHANGUP:

This command is only valid when "TXFILE" is specified. When "TXFILE" file transfer is complete the sequence of characters in the "TXHANGUP" command will be transmitted. The maximum sequence length is 255 characters.

Example driver with "TXDIAL", “TXFILE” and "TXHANGUP" commands defined:

```
[TRANSMIT FILES EXAMPLE]
DRIVER#=11
TYPE=ASCII
TXDIAL=AT^[13;10;P2]ATDT 1,700-555-1234^[13;10;P45]
TXFILE=C:\FAULTLIB\MEHTA\SHIP\*.SCF S:\SYSPROT\RECORDS\DFR
TXFILE=C:\FAULTLIB\MEHTA\SHIP\*.X01 S:\SYSPROT\RECORDS\DFR
TXHANGUP=^[P2]+++^[P2]ATH0^[13;10;P3]AT&F^[13;10;P2]ATS0=1^[13;10;P2]
TXPERIOD=900
TXDELAY=5
```

If no files are present in the source directory then the driver is not executed.

TXSTART:

Sequence of characters to transmit (ASCII OR BINARY) before "TXCOMMAND" and "TXLOGON" ("TXSTART" is inserted at the beginning of these commands). The “TXSTART” + “TXLOGON” + ‘TXCOMMAND” definitions are concatenated together to form the final transmit command sent to the device upon a "TXPERIOD" or upon “ATMESSAGE”. The maximum length for TXSTART is 1024 characters and escape code commands are allowed.

TXLOGON:

A sequence of characters to transmit (ASCII or Binary) when the driver is loaded for the first time. The maximum sequence length is 255 characters. TXLOGON will only work from the parent driver. Escape code sequences are allowed.

TXCOMMAND:

A sequence of characters to transmit (ASCII or Binary) upon "TXPERIOD" or upon “ATMESSAGE” or by request by the control options menu. The maximum length is 1024 characters and escape code commands are allowed. For example, to request a meter command from a DLP relay use the following driver to transmit the TXCOMMAND:

02^[ADDR]35CA00^[CRCDLP;P1]05FA^[P1]06F9^[P1]06F9

```
[DLP METER]
DRIVER#=69
TYPE=HEX
ATMESSAGE=^[^STN],^[^SID],RUN
TXCOMMAND=02^[ADDR]35CA00^[CRCDLP;P1]05FA^[P1]06F9^[P1]06F9
RXSTAY=5
RXEND=04FB
RXWAIT=3
RXSTRIP=N01, S11,  T20, D0, C8, X01, Y1, H8,"    DLP METER: ", @DDT
RXSTRIP=N00,            D0, C8, X01, Y2, H8,"  -------------------------"
RXSTRIP=N01, S31,  T6,  D0, C8, X05, Y3, H8, "IA: ",      @IAV
RXSTRIP=N01, S37,  T4,  D0, C8, X15, Y3, H8, "Angle: ",   @AIA
RXSTRIP=N01, S41,  T6,  D0, C8, X05, Y4, H8, "IB: ",      @IBV
RXSTRIP=N01, S47,  T4,  D0, C8, X15, Y4, H8, "Angle: ",   @AIB
RXSTRIP=N01, S51,  T6,  D0, C8, X05, Y5, H8, "IC: ",      @ICV
RXSTRIP=N01, S57,  T4,  D0, C8, X15, Y5, H8, "Angle: ",,  @AIC
RXSTRIP=N01, S61,  T6,  D0, C8, X05, Y6, H8, "IN: ",      @INV
```

```
RXSTRIP=N01, S67,  T4,  D0, C8, X15, Y6, H8, "Angle: ",   @AIN
RXSTRIP=N01, S71,  T5,  D0, C8, X28, Y3, H8, "VA: ",      @VAV
RXSTRIP=N01, S76,  T4,  D0, C8, X40, Y3, H8, "Angle: ",   @AVA
RXSTRIP=N01, S80,  T5,  D0, C8, X28, Y4, H8, "VB: ",      @VBV
RXSTRIP=N01, S85,  T4,  D0, C8, X40, Y4, H8, "Angle: ",   @AVB
RXSTRIP=N01, S89,  T5,  D0, C8, X28, Y5, H8, "VC: ",      @VCV
RXSTRIP=N01, S94,  T4,  D0, C8, X40, Y5, H8, "Angle: ",   @AVC
RXSTRIP=N01, S98,  T6,  D0, C8, X05, Y7, H8, "P:(MWatt): ",@PMW
RXSTRIP=N01, S104, T6,  D0, C8, X05, Y8, H8, "Q:(MVar): ", @QMV
```

The DLP meter TXCOMMAND will transmit a hex 02 byte, the address stored in the device's record, the hex values 35 CA 00, and the DLPCRC values. It will then pause for 1 second then transmit the hex values 05 FA pause again for 1 second then transmit the 06 F9, pause for 1 second and transmit the 06 F9 again.

Another example is the terminate modem connection command:

```
^[10;13;P1]+++^[P3]ATH0^[13;10]
```

There are a number of pre-canned drivers used for downloading events, summaries, histories, RTU-SOE points, DNP status points, and for time synchronizing the devices. The pre-canned drivers are called via the "TXCOMMAND". Refer to the following on how to call the pre-canned drivers.

"TXCOMMAND=RTU-SOE"

The RTU-SOE command executes the precoded SES-92 binary protocol for reading SOE points from the RTU. The command executes upon a "TXPERIOD" or "ATMESSAGE".
***REQUIREMENTS**:*
TYPE=BINARY
RXSTAY=2
Use the "D0" data type with the "RXSTRIP" commands.

"TXCOMMAND=RTU-ANALOG"

The RTU-ANALOG command executes the precoded SES-92 binary protocol for reading analog dumps from the RTU. The command executes upon a "TXPERIOD" or "ATMESSAGE".
REQUIREMENTS:
TYPE=BINARY
RXSTAY=2
Use the "D0" data type with the "RXSTRIP" commands.

"TXCOMMAND=RTU-STATUS"

The RTU-STATUS command executes the precoded SES-92 binary protocol for reading status dumps from the RTU. The command executes upon a "TXPERIOD" or "ATMESSAGE".
REQUIREMENTS:
TYPE=BINARY
RXSTAY=2
Use the "D0" data type with the "RXSTRIP" commands.

"TXCOMMAND=SEL-351FM"

The SEL-351FM (fast meter) command executes the precoded SEL-351 binary protocol for fast meter operations. The command executes upon a "TXPERIOD" or "ATMESSAGE".
REQUIREMENTS:
TYPE=BINARY
RXSTAY=2
Use the "D0" data type with the "RXSTRIP" commands.

"TXCOMMAND=SEL-EVENTS"

The SEL-EVENTS command executes the precoded SEL EVE ASCII protocol for automatic event capture. The latest raw events files are downloaded and saved in separate files using the IEEE long file naming convention with the extension ".SEL". Summary files for each event is also saved in separate files using the IEEE long file naming convention with the extension ".SLS" and a history file is created if there are new events to download. The history file is also saved using IEEE long file naming convention with the extension ".SLH". The command executes upon a "TXPERIOD" or "ATMESSAGE".

REQUIREMENTS:

TYPE=ASCII
RXSTAY=30
RXEND==>
RXWAIT=4

Example Summary File:

```
       SEL FAULT REPORT
   --------------------------

       Date =  06/25/02
       Time =  17:25:59.18
    Station =  SEAVILLE SW
     Device =  A-521
      Event =  AG
   Location =  +1.76
    LineLen =  4.70
    Targets =  COMM ZONE2 EN G 50
```

Example History File:

```
  =>HIST 12

  SEAVILLE SW  A-521              Date: 12/05/02    Time: 12:29:47.012

  #    DATE      TIME      EVENT  LOCAT  GRP TARGETS

  1  12/04/02 14:50:42.202 CG    +22.90   1   EN
  2  11/25/02 17:10:03.189 CG 64   1   EN
  3  07/20/02 09:12:28.082 AG    +21.84   1   EN
  4  07/20/02 09:12:27.874 AG    +40.53   1   EN
  5  07/02/02 17:01:51.200 BG    +22.09   1   EN
  6  07/02/02 16:57:56.713 BG    +34.93   1   EN
  7  06/25/02 17:25:59.180 AG     +1.76   1  INST ZONE1 EN A G
  8  04/01/02 04:43:19.558 ER    $$$$$$   1   EN
  9  03/14/01 00:28:36.139 BG     +4.85   1   EN
  10 00/00/01 00:03:11.753 BG     -0.02   1  INST ZONE1 EN B G
  11 00/00/01 00:03:07.501 BG    +16.05   1   EN
  12 00/00/01 00:03:03.062 BG    +16.00   1   EN
```

"TXCOMMAND=SYNC-ARB"

The STNC-ARB command executes the precoded ARBITRAR ASCII protocol for reading the GPS clock's time and sets the PC'S system clock. The command executes upon a "TXPERIOD" or "ATMESSAGE".

REQUIREMENTS:

TYPE=ASCII
RXSTAY=4
RXEND
RXPLUS in this case are reserved for internal use.

"TXCOMMAND=SYNC-TRUE"

The SYNC-TRUE command executes the precoded TRUE TIME ASCII protocol for reading the GPS clock's time and sets the PC'S system clock. The command executes upon a "TXPERIOD" or "ATMESSAGE".

REQUIREMENTS:

TYPE=ASCII
RXSTAY=4
RXEND
RXPLUS in this case are reserved for internal use.

"TXCOMMAND=DNP-ANALOG"

The DNP-ANALOG command executes the precoded DNP 3.0 protocol for reading analog values from the connected devices. The analog values can be referenced by line number in the RXSTRIP commands. For example, analog value 1 is located in line 1, analog value 2 is in line 2 and so on. The line values are stored as ASCII characters. The command executes upon a "TXPERIOD" or "ATMESSAGE".

REQUIREMENTS:

TYPE=BINARY
RXSTAY=4
Use the "D0" data type with the "RXSTRIP" commands.

"TXCOMMAND=HATH-DFR"

The HATH-DFR command executes the precoded HATHAWAY DFR-II protocol for downloading the latest records and saving them to separate files using the IEEE long file naming convention with the extension ".DFR". The command executes upon a "TXPERIOD" or "ATMESSAGE".

REQUIREMENTS:

TYPE=BINARY
RXSTAY=15
RXEND=1B 03 FF
RXPLUS=1

"TXCOMMAND=REL-30X"

The REL-30X command executes the precoded ABB REL30X protocol for downloading the latest event records, target files and history files for the events and targets. All downloaded data is saved to separate files using the IEEE long file naming convention. The event files have the extension ".30X", the summary files have the extension ".30S" and the event history files have the extension ".3EH" and targets history files have ".3TH". The command executes upon a "TXPERIOD" or "ATMESSAGE".

REQUIREMENTS:

TYPE=HEX
RXSTAY=4
RXPLUS in this case is reserved for internal use.

Example Target File:

```
REL 301/302 FAULT REPORT
 --------------------------
      MODEL =  REL 301/302
 STATION ID =  SEAVILLE SW
    LINE ID =  B43 (REL-302)
       DATE =  09/04/03 03:14:11.830
 FAULT TYPE =  BG Fault
     TARGET =  Z3 Pickup

  BK1 =  NO     SEND =  NO
  BK2 =  NO      RX1 =  NO
```

```
 Z1G =  NO      RX2 =  NO
 Z1P =  NO      WFT =  NO
 Z2P =  NO      ITP =  NO
 Z2G =  NO      ITG =  NO
 Z3P =  NO      CIF =  NO
 Z3G =  NO      LLT =  NO
PLTG =  NO       GB =  NO
PLTP =  NO

   Z =  7.04 Ohms
FANG =  68°
 DMI =  30.00 Miles
 DKM =  48.20 kilometers

PFLC =  1.50 Amps
PFLV =  68.00 Volts
  LP =  3°
 VPA =  63.20 Volts     ANG = 0°
 VPB =  55.20 Volts     ANG = -117°
 VPC =  62.80 Volts     ANG = 128°
  V1 =  60.30 Volts     ANG = 3.69°
  V2 =  5.11 Volts      ANG = -51.15°
 3V0 =  0.10 Volts      ANG = 0°
 IPA =  5.90 Amps       ANG = -21°
 IPB =  8.00 Amps       ANG = 176°
 IPC =  3.10 Amps       ANG = 33°
  I1 =  5.14 Amps       ANG = -53.50°
  I2 =  3.11 Amps       ANG = 39.38°
 3I0 =  0.18 Amps       ANG = 46.01°
 IPN =  0.00 Amps       ANG = 0°
```

Example Target History File:

```
--  REL TARGET HISTORY  --
---------------------------

 STATION ID =  SEAVILLE SW
    LINE ID =  115 (REL-302)
       DATE =  05/13/2004 01:06:18 PM

#   TRIG DATE    TRIG TIME    F-TYPE      TRIGGER     DIST  EVENT#
-------------------------------------------------------------------
10  10/31/2003  19:48:06.100  BG Fault    Z3 Pickup   279   210
09  06/24/2003  10:05:42.900  CA Fault    Z3 Pickup   340   1
08  05/25/2003  09:04:34.990  AG Fault    Trip        128   15
07  05/25/2003  09:04:34.970  AG Fault    Z2 Pickup   128   223
06  05/25/2003  09:03:46.100  AG Fault    Trip        1     14
05  05/25/2003  09:03:42.720  AG Fault    Trip        1     253
04  05/25/2003  09:03:16.560  AG Fault    Trip        128   76
03  05/25/2003  09:03:16.550  AG Fault    Z2 Pickup   128   172
02  05/25/2003  09:02:51.670  AG Fault    Trip        174   219
01  05/25/2003  09:00:02.730  AG Fault    Trip        174   10
16  05/25/2003  08:59:46.990  AG Fault    Trip        175   169
15  05/25/2003  08:53:55.620  AG Fault    Trip        175   216
14  05/25/2003  08:53:43.840  AG Fault    Trip        174   7
13  05/25/2003  08:51:44.750  AG Fault    Trip        174   246
12  05/25/2003  08:51:34.800  AG Fault    Trip        172   5
11  05/25/2003  08:51:21.200  AG Fault    Trip        174   20
```

Example Event History File:

```
--  REL EVENT HISTORY  --
---------------------------

 STATION ID =  SEAVILLE SW
    LINE ID =  B43 (REL-302)
       DATE =  05/13/2004 01:18:05 PM

#   EVE-DATE    EVE-TIME      COUNTER      TRIGGER
-------------------------------------------------------
09  05/07/2004    10:23:19.100  0000       N / A
08  04/23/2004    18:28:19.450  0008       Trip
07  04/23/2004    18:28:18.970  0007       Z3 Pickup
06  04/01/2004    19:17:02.240  0006       Z3 Pickup
05  02/28/2004    15:25:57.580  0005       Z3 Pickup
04  10/15/2003    16:53:15.370  0004       Z3 Pickup
03  09/04/2003    03:14:12.100  0003       Z3 Pickup
02  09/04/2003    03:14:11.840  0002       Z3 Pickup
01  09/04/2003    03:14:11.710  0001       Z3 Pickup
16  00/00/2000    00:00:00.000  0000       N / A
15  00/00/2000    00:00:00.000  0000       N / A
14  00/00/2000    00:00:00.000  0000       N / A
13  00/00/2000    00:00:00.000  0000       N / A
12  00/00/2000    00:00:00.000  0000       N / A
11  00/00/2000    00:00:00.000  0000       N / A
10  00/00/2000    00:00:00.000  0000       N / A
```

"TXCOMMAND=REL-30X-M"

The REL-30X-M command executes the precoded ABB REL30X-M protocol for downloading the latest meter values. The command executes upon a "TXPERIOD" or "ATMESSAGE".

REQUIREMENTS:

TYPE=HEX
RXSTAY=4
RXPLUS in this case is reserved for internal use.

Meter Values Extracted:

```
Date and Time
LOP – Loss of Potential
LOI – Loss of Current
IA and Angle
IB and Angle
IC and Angle
VA and Angle
VB and Angle
VC and Angle
```

"TXCOMMAND=DLP-EVENTS"

The DLP-EVENTS command executes the precoded GE DLP-EVENTS protocol for downloading the latest event records and summaries. All downloaded data is saved to separate files using the IEEE long file naming convention. The event files have the extension ".OSC" and the summary files have the extension ".DLS". The command executes upon a "TXPERIOD" or "ATMESSAGE".

REQUIREMENTS:

TYPE=HEX
RXSTAY=10

RXPLUS in this case is reserved for internal use.

Example Summary File:

```
DLP FAULT REPORT
 ----------------
      MODEL: DLP1512GC
 STATION ID: SEAVILLE SW
    LINE ID: X2250 (DLP)

 TRIP DATE: 6/27/04    TRIP TIME: 14:33:55.890

 FAULT TYPE:  AG         DISTANCE: 003.2
  TRIP TYPE:  Z1         OPERATING TIME: 00023

 PREFAULT             FAULT
 Ia: 548.00 A         Ia: 4380.0 A
 Ib: 012.00 A         Ib: 008.00 A
 Ic: 012.00 A         Ic: 012.00 A
 In: 372.00 A         In: 4368.0 A

                      Va: 000.4 KV
                      Vb: 134.0 KV
                      Vc: 134.0 KV
```

"TXCOMMAND=DPU-MODBUS "

The DPU-MODBUS command executes the precoded ABB DPU-MODBUS protocol for downloading the latest event records. All downloaded data is saved to separate files using the IEEE long file naming convention. The event files have the extension ".DPU". The command executes upon a "TXPERIOD" or "ATMESSAGE".

REQUIREMENTS:

TYPE=HEX
RXSTAY=10
RXEND=^[13;10]
RXPLUS in this case is reserved for internal use.

"TXCOMMAND=ROCH-DFR"

The ROCH-DFR command executes the precoded Rochester DFR protocol for downloading the latest event records. All downloaded data is saved to separate files using the Rochester naming convention. The event files have the extension ".0##". The command executes upon a "TXPERIOD" or "ATMESSAGE".

REQUIREMENTS:

TYPE=HEX
RXSTAY=8
RXPLUS in this case is reserved for internal use.

"TXCOMMAND=GE-D60"

The GE-D60 command executes the precoded GE-D60 protocol for downloading the latest event records. All downloaded data is saved to separate files using the IEEE long file naming convention. The event files are in the Comtrade format and have the extension ".CFG", ".DAT". The command executes upon a "TXPERIOD" or "ATMESSAGE".

REQUIREMENTS:

TYPE=HEX
RXSTAY=8
RXPLUS in this case is reserved for internal use.

"TXCOMMAND=FTP-EVENTS"

The FTP-EVENTS command executes the standard FTP protocol for downloading the latest event records from the connected FTP server. All downloaded data is saved to separate files using either the IEEE long file naming convention or maintaining the original file name. The event files are in the manufacturer allocated format. The command executes upon a "TXPERIOD" or "ATMESSAGE".
REQUIREMENTS:
TYPE=ASCII
RXSTAY=4
RXPLUS in this case is reserved for internal use.

"TXCOMMAND=FTP-SEND"
The FTP-SEND command executes the standard FTP protocol for sending event files to the connected FTP server. The command executes upon a "TXPERIOD" or "ATMESSAGE".
REQUIREMENTS:
TYPE=ASCII
RXSTAY=4
RXPLUS in this case is reserved for internal use.

"TXCOMMAND=TIS-RECORDER"
The TIS-RECORDER internal driver executes the pre-coded standard TIS protocol upon “TXPERIOD” or “ATMESSAGE”.
REQUIREMENTS:
TYPE=ASCII
RXSTAY=4
RXEND
RXPLUS in this case are reserved for internal use.

"TXCOMMAND=TIS-CONFIG"
The TIS-CONFIG internal driver executes the pre-coded TIS-CONFIG protocol upon "TXPERIOD" or "ATMESSAGE".
REQUIREMENTS:
TYPE=ASCII
RXSTAY=4
RXEND and RXPLUS in this case are reserved for internal use.
;
"TXCOMMAND=TIS-BINARY"
The TIS-BINARY internal driver executes the pre-coded TIS-BINARY protocol upon "TXPERIOD" or "ATMESSAGE".
REQUIREMENTS:
TYPE=BINARY
RXSTAY=4
RXEND and RXPLUS in this case are reserved for internal use.
;
"TXCOMMAND=ERL-RELAYS"
The ERL-RELAYS internal driver executes the pre-coded ERLPHASE relay protocol for extracting the latest event records from the TPRO, BPRO, LPRO and FPRO relays using the VT100 terminal mode and zmodem protocol. The command executes upon "TXPERIOD" or; "ATMESSAGE".
REQUIREMENTS:
TYPE=BINARY
RXSTAY=4
RXEND and RXPLUS in this case are reserved for internal use.

TXEND:

A sequence of characters to transmit (ASCII OR BINARY) after the "TXCOMMAND" and "TXLOGON" commands ("TXEND" is inserted at the end of these commands). The maximum length is 1024 characters and escape code commands are allowed.

TXPERIOD:

The transmit cycle in seconds (an integer number integer number up to 2 to 2 million). For example, if "TXPERIOD=4" was specified then the "TXSTART", "TXCOMMAND", and "TXEND" strings are concatenated and transmitted once every 4 seconds. If "TXPERIOD=0" was specified then these actions will not occur unless "TXDELAY>0" was specified in which case the driver will execute one time only. If "TXPERIOD=T0800" was specified then the driver will execute at 08:00 am. All “T” periods are defined in military time.

TXDELAY:

The duration in seconds to wait before the transmit cycle begins. For example, if "TXDELAY=3" was specified then only the first occurrence of "TXPERIOD" is delayed by 3 seconds. In the previous example the first period occurs after 7 seconds (TXPERIOD+TXDELAY) and all others will occur 4 seconds apart. If "TXPERIOD=0" was specified then specifying "TXDELAY" will cause the driver to execute only one time (useful for logon procedures).

TXBREAK:

This command sends a number of break signals to the connected device. The sequence runs by first calling the WinAPI SetCommBreak function to suspend character transmission for the specified communications device and places the transmission line in a break state until the ClearCommBreak function is called. It then waits the specified break time then calls the WinAPI ClearCommBreak function to restore character transmission for the specified communications device and places the transmission line in a non-break state. It then pauses the specified pause time before repeating the sequence. This sequence is repeated the number of times specified in the command break parameters. The calling scheme is TXBREAK=# of times to repeat sequence, time interval in milliseconds between SetCommBreak and ClearCommBreak, time interval between sequence calls.

Example: TXBREAK=2,500,250

SENDCR:

This command will send a carriage return to the connected device every x seconds to ensure the device does not time out during a polling session. Some devices have settings that will time out after a specified number of minutes if no characters are received.

Example: SENDCR=20

ONDAY:

The driver commands will be processed on the specified day of each month for the duration of that day or once during that day. The range of values is 1 to 31. Use this command in combination with the military time "TXPERIOD" command to perform monthly functions.

ONDOW:

The driver commands will be processed on the specified day of each week for the duration of that day or once during that day. The range of values is 1 to 7 (1=Monday to 7=Sunday). Use this command in combination with the military time "TXPERIOD" command to perform weekly functions.

RECEIVE (RX) COMMANDS

RXSTART:

A sequence of characters received from the device that indicates the "Start of Response" (STX). The maximum length for "RXSTART" is 255 characters. This string is used to synchronize with the start of a response. For example, the numeric value 2 (02 Hex) is used by some devices to indicate the start byte of the response. In this case use "RXSTART=^[02]" for "TYPE=ASCII", or "RXSTART=02" for "TYPE=HEX".

RXEND:

A sequence of characters received from the device indicating "End the Response" (ETX). The maximum length for "RXEND" is 255 characters. This string is used to indicate that the driver has received the full response. Upon "RXEND" the system will process the "RXSTRIP" commands to parse and display the data and when complete the driver is unloaded so other drivers (that are defined at the same port) can execute. Also upon "RXEND" the "RXSTAY" delay is aborted.

For example: the numeric value 3 (03 Hex) is used by some devices to indicate the end of a response. In this case use "RXEND=^[03]". for "TYPE=ASCII", or "RXEND=03" for "TYPE=HEX".

Another example is connecting to a modem. The connection is established when the modem sends a connect signal (CONNECT 14400/ARQ). For modem connection drivers set "RXEND=Connect".

RXPLUS:

Some devices transmit a check sum or CRC code after "RXEND". In this case, the "RXEND" no longer indicates the physical end of the response. Use "RXPLUS" to define the total number of bytes received beyond "RXEND". For example, if "RXEND=1B 03 FF" is set and the actual response end in "1B 03 FF 83" then use "RXPLUS=1".

RXSTAY:

There is a delay between the time that a command is transmitted and the time the response arrives. Also, there are breaks during transmission where the responding device may pause and then continue to transmit. Such delays and pauses should be timed using terminal mode to study the response time of a device. Use the "RXSTAY" command to record the largest delay encountered. If "RXSTAY=4" is defined the system will initiate an internal counter to count up to 4 seconds from the time that last byte was received. If new bytes arrive during the "RXSTAY" counter then the internal counter is initialized. The default value is "RXSTAY=3". Once the internal counter reaches "RXSTAY" then the system will unload the driver so other driver (on the same port) can execute. When "RXEND" is encountered, "RXSTAY" aborts.

RXWAIT:

If "RXEND" is known and the number of bytes received after the defined "RXEND" is unknown use "RXWAIT" to wait a number of seconds before ending the driver. For example, when a modem connects it sends a "Connect" signal. The number of bytes it sends after the "Connect" signal varies. Set "RXWAIT=" to delay the driver from being unloaded. This ensures that all the data remaining to be received goes to the proper device file "DEV_###.DTB". Refer to the example modem driver below.

RXQUIT:

If "RXEND" is not detected set "RXQUIT" to send message commands. For example, in the modem driver below if the "Connect" signal is not detected then the RXQUIT can be used to set a message "REDO" to execute the driver again.

RXCLEAR:

The receive buffer will not be cleared upon TXPERIOD and will be allowed to build up to the total number of fields (RXSTRIP Lines). Use "RXCLEAR" to hold only the last polled values. The range of values for RXCLEAR is 0 or 1 (default=0). This is useful for creating scrollable information.

RXSAVE:

The receive data is buffered into link list with 256 characters per link. To save the buffered data to a text or binary file (depends on the type setting) use RXSAVE=filename. For example, the Optimho driver buffers the data then when complete it saves the buffered data to a file. The maximum length is 255 characters and escape code commands are allowed. The following example saves the received data to a text file called RX-Device#.BUF (RX-2.BUF) in the c:\SDCSave directory.

```
RXSAVE=C:\SDCSAVE\RX-^[ID].BUF
```

Examples: The following drivers use the **RXSTAY, RXEND, RXWAIT, RXQUIT** and **RXPLUS** commands.

```
[HATHAWAY DFR PROTOCOL]
DRIVER#=71
TYPE=BINARY
TXCOMMAND=HATH-DFR
TXPERIOD=0
TXDELAY=1
RXSTAY=15
RXEND=1B 03 FF
RXPLUS=1
RXSTRIP=N00,                        X1,Y1,H6,"     Scan Hathaway DFR"
RXSTRIP=N00,%^ADDR,                 X1,Y2,H1,"    DAU ID:"
RXSTRIP=N00,%^[MON]/^[DAY]/^[YR], X1,Y3,H1,"      Date:"
RXSTRIP=N00,%^[HR]:^[MIN]:^[SEC], X1,Y4,H1,"      Time:"
RXSTRIP=N03,S1,T40,D0,C14,          X1,Y5,H1,"    LstRsp:"
RXSTRIP=N04,S1,T40,D0,C02,          X1,Y6,H1,"   NxtCmnd:"
RXSTRIP=N01,S1,T40,D0,C01,          X1,Y7,H0,"  LstFault:"
RXSTRIP=N02,S1,T40,D0,C01,          X1,Y8,H0,"      Time:"

[DIAL MODEM]
DRIVER#=2
TYPE=ASCII
ATMESSAGE=^[^STN],^[^SID],RUN
TXCOMMAND=^[P2]ATDT ^[^CMND;13;10;P4]
RXSTAY=90
RXEND=CONNECT
RXWAIT=4
RXQUIT=SDCEND^[^SID],REDO^[^STN]
RXSTRIP=N01, S01, T40, X01, Y01, D00, C08, H11, "", @D1
RXSTRIP=N03, S01, T40, X01, Y02, D00, C14, H11, "", @D2
```

RXSTRIP:

Sequence of characters or bytes to strip from the received data and displayed on screen [up to 512 RXSTRIP commands per driver]. The RXSTRIP commands are executed following the sequence in which they appear. Also, the RXSTRIP commands are the last commands executed when the driver is complete.

N# = Line number to strip or block number for binary [positive #]
If "N0" is specified then the field is a header field only.
Header fields can be used to display variables defined or calculated using the @, +, -, *, /, &, |, >, or < commands.

S# = Starting character or byte number to strip [from 1 to 512].

T# = Total number of characters or bytes to strip [ASCII=1 to 75, Binary=1 to 4].

B# = The Nth non-blank sequence of characters to strip.
For example, to strip “Viny” from “My name is Viny” use the “B4” command.

BC# = The Nth comma sequence of characters to strip.
For example to strip "Viny" from "My,,name,is,,,Viny" use the "BC7" command.
D# = Type of data to display. The available types are:
0: ASCII (read each byte as an ASCII code),
1: INTEGER (convert 1, 2 or 4 bytes to an integer string),
2: HEX (convert 1 byte to a hexadecimal string),
3: REAL (4 byte IEEE single float to a real string),
4: ASCII-HEX (convert 1, 2 or 4 hex characters to decimal),
5: ASCII-DECIMAL (read ASCII string as decimal).
6: ASCII-CODED-DECIMAL (convert hex string to ASCII code).
"" = Contains the header to display ahead of the stripped data [max 24 characters].
H# = Color to display the header [from 0 to 15].
X# = X column offset to display the header and the stripped data [from 1 to 75].
Y# = Y row offset to display the header and the stripped data [from 1 to 8].
C# = Color to display the stripped data [from 0 to 15].
V# = Compare the parsed data with a string/value and show the defined header if equal.
V=# = Compare the parsed data with a string/value and show the defined header if equal.
V># = Compare the parsed data with a string/value and show the defined header if greater.
V<# = Compare the parsed data with a string/value and show the defined header if less).
V~# = Compare the parsed data with a string/value and show the defined header if not equal.
U# = Upper offset for the V trigger (V+U Hysteresis (default=0)).
L# = Lower offset for the V trigger (V-L Hysteresis (default =0))
P# = Persistence (# of true readings before trigger (default=1, disable=0)).
M"" = If the V command triggered then set a message in for all drivers "".
MF"" = If the V command triggered then set the message to the forward drivers only.
JC# = If V triggered bypass the next # of RXSTRIPS (jump conditional).
J# = Bypass the next # of RXSTRIP COMMANDS (JC# over rides J#).
*# = Multiply the parsed data by a constant value (ASCII-DECIMAL).
/# = Divide the parsed data by a constant value (ASCII-DECIMAL).
+# = Add a constant value to the parsed data (ASCII-DECIMAL).
-# = Subtract a constant value from the parsed data (ASCII-DECIMAL).
&# = And the parsed data (1 byte) with a hex value (Hex = 00 to FF).
|# = Or the parsed data (1 byte) with a hex value (Hex = 00 to FF).
<# = Shift left (1 byte) a number of bits (ASCII-DECIMAL 1 to 8).
># = Shift right (1 byte) a number of bits (ASCII-DECIMAL 1 to 8).
= = Set a variable to a defined value.
FE = Exponential of the parsed data.
FL = Logarithm of the parsed data.
FS = Sin in radians of the parsed data.
FC = Cos in Radians of the parsed data.
FA = Arc Tangent in radians of the parsed data.
FQ = Square of the parsed data.
FR = Square root of the parsed data.
FT = Truncate the parsed data to an integer values.
%# = Set data to a constant text string.
@NAME = Put the parsed data in a variable named "NAME" (maximum length is 12 characters).
The reserved system variable defined in the beginning of this Appendix names cannot be used. System and user variables can be accessed using the "^NAME^DEVICE" commands.
^NAME = Get the parsed data (maximum 80 characters) stored in the variable name.
(@/^)NAME^# = Applies only to the variable "NAME" attached to the device# "#".
If "@" was in place instead of the # then the number of the parent device will be used.
E"" = Same as "", but for the DXF display only [maximum 24 characters].
ES# = Same as S#, but for the DXF display only [from 1 to 512].
ET# = Same as T#, but for the DXF display only [same range as T#].

EH# = Same as H#, but for the DXF display only [from 0 to 15].
EX# = Same as X#, but for the DXF display only [from -255 to 255].
EY# = Same as Y#, but for the DXF display only [from -255 to 255].
EC# = Same as C#, but for the DXF display only [from 0 to 15].

NOTES:

The "," comma is reserved as the separator between the RXSTRIP commands.
The maximum number of variables allowed per file is 10,000.

* Available Colors:
  - 00: Black
  - 01: Blue
  - 02: Green
  - 03: Cyan
  - 04: Red
  - 05: Magenta
  - 06: Brown
  - 07: Lightgray
  - 08: Darkgray
  - 09: Lightblue
  - 10: Lightgreen
  - 11: Orange
  - 12: Lightred
  - 13: Lightmagenta
  - 14: Yellow
  - 15: White

EXAMPLES:

```
[SEL-LOGON EXAMPLE]
DRIVER#=1
TYPE=ASCII
TXSTART=^[13;10]
TXCOMMAND=acc^[13;10]OTTER
TXEND=^[13;10]
TXPERIOD=0
TXDELAY=1

[ASCII RESPONSE EXAMPLE]
DRIVER#=2 &1
TYPE=ASCII
TXSTART=^[13]
TXCOMMAND=^[02;10;10;10;10;10]
TXCOMMAND=METER
TXEND=^[13;03]
TXPERIOD=8
TXDELAY=1
RXSTART=2
RXEND=3
RXSTRIP=X1, Y1, "Any Label For The Window", H1
RXSTRIP=N06,S1,T49,D0,C08,X1,Y3,H1,"N06: "
```

```
RXSTRIP=N08,S1,T49,D0,C07,X1,Y4,H6,"N08: "
RXSTRIP=N09,S1,T49,D0,C12,X1,Y5,H6,"N09: "
RXSTRIP=N10,S1,T49,D0,C07,X1,Y6,H6,"N10: "
RXSTRIP=N12,S1,T24,D0,C10,X1,Y7,H1,"N12: "
RXSTRIP=N13,S1,T24,D0,C10,X1,Y8,H1,"N13: "
RXSTRIP=ES12,ET3,EC12,EX-15,EY2,EH12,E" I(A):"
RXSTRIP=ES12,ET3,EC10,EX-15,EY3,EH10,E"P(kV):"
RXSTRIP=ES12,ET3,EC10,EX-15,EY4,EH10,E"Q(kV):"

[TRANSMIT FILES EXAMPLE]
DRIVER#=3
TYPE=BINARY
TXFILE=C:\EVENTS\TEMP\*.* J:\EVENT\MASTER1 /MOVE
TXFILE=C:\SDCSAVE\*.OK C:\SDCHOLD /MOVE
TXFILE=C:\PECO\DATABASE\*.* C:\TEMP
TXFILE=C:\BP\BIN\DATAPORT\CREATE.HLP C:\TEMP
TXFILE=C:\SDCSAVE\PORT_001.DTB C:\TEMP
TXDIAL=^[13]ATDT 1,123-456-7899^[13]
TXHANGUP=+++ATH0^[13]
TXPERIOD=0
TXDELAY=5

[RTU-SOE POINTS DUMP]
DRIVER#=4
TYPE=HEX
TXCOMMAND=RTU-SOE
TXPERIOD=5
TXDELAY=0
RXSTRIP="FIN ",       H1, X41, Y1, T1, D0, C8
RXSTRIP="ALE ",       H1, X41, Y2, T1, D0, C8
RXSTRIP="ATT ",       H1, X41, Y3, T1, D0, C8
RXSTRIP="ERR ",       H1, X41, Y4, T1, D0, C8
RXSTRIP="SOE ",       H4, X41, Y5, T1, D0, C8
RXSTRIP="ACC ",       H1, X41, Y6, T1, D0, C8
RXSTRIP="ALG ",       H1, X41, Y7, T1, D0, C8
RXSTRIP="STS ",       H1, X41, Y8, T1, D0, C8
RXSTRIP="SYNC-BYTE ", H1, X48, Y1, T2, D0, C8
RXSTRIP="   RTU-ID ", H1, X48, Y2, T2, D0, C8
RXSTRIP=" GROUP-ID ", H1, X48, Y3, T2, D0, C8
RXSTRIP="FRAME-LEN ", H1, X48, Y4, T2, D0, C8
RXSTRIP="  MESSAGE ", H1, X48, Y5, T2, D0, C8
RXSTRIP=" FUNCTION ", H4, X48, Y6, T2, D0, C8
RXSTRIP=" DATA-LEN ", H4, X48, Y7, T2, D0, C8
RXSTRIP=" END-FLAG ", H1, X48, Y8, T2, D0, C8
RXSTRIP="CRC-HI ",    H1, X63, Y7, T2, D0, C8
RXSTRIP="CRC-LO ",    H1, X63, Y8, T2, D0, C8
RXSTRIP=X1, Y1, T38, D0, C1, N1, S2
RXSTRIP=X1, Y2, T38, D0, C7, N2, S2
RXSTRIP=X1, Y3, T38, D0, C7, N3, S2
RXSTRIP=X1, Y4, T38, D0, C7, N4, S2
RXSTRIP=X1, Y5, T38, D0, C7, N5, S2
RXSTRIP=X1, Y6, T38, D0, C7, N6, S2
RXSTRIP=X1, Y7, T38, D0, C7, N7, S2
RXSTRIP=X1, Y8, T38, D0, C7, N8, S2
```

A P P E N D I X B

System Keys

This section lists the function keys, cursor keys, and menu buttons available in the device manager, query fields and DXF display.

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 interrogration interface for all or marked devices assigned a device driver.
F8	Run the DXF interrogration 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.

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