PULSAworks™ Serial Communications Interface
Version 2.12

Users Manual

72-385-00
Rev. I04

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PULSAworks™ Serial Communications Interface Version 2.12

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Before you Begin

We Assume...
This manual is written with the assumption that you have a basic understanding of the WINDOWS™ program, IBM PC (and/or compatible) hardware, and use of a mouse.

The Program Diskettes or CD ROM
You should have received either diskettes or CD ROM containing the installation program. If you did not or they are defective, please contact your sales representative for assistance. Or visit www.pulsa.com for the latest software.

The Program License Agreement
Please read the Program License Agreement appearing at the end of this manual.

Read the Manual!
We strongly suggest you read the manual in its entirety before using the program.

Software Updates
Software updates, bug fixes and enhancements are available free to current owners of PULSAworks. Please visit our web site at www.pulsa.com for more information.

Overview

Welcome!

This program is a communications link and data analysis tool for multiple controller models. The program enables you to perform many controller tasks using your computer, with the added benefit of the ease of use characteristic of most WINDOWS™-based programs.

What does the program do?

The program is primarily used to perform functions dealing with communications. These include connecting to controllers either directly via RS232 port, or via modem. You may initialize the history downloading process, perform an XMODEM file transfer and save downloaded files to disk. You may also display and update real time system variables and parameters.

Following is a list of functions that can be performed using this program.

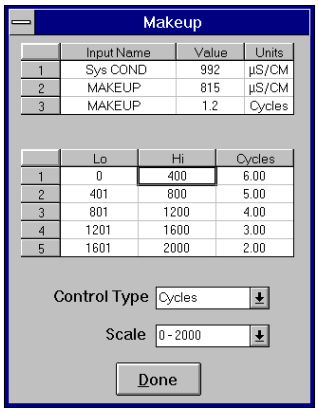
- Store information, phone numbers, passwords, etc. for up to 35 controllers
- Connect to a controller
- View real time data
- Update controller parameters
- Autopoll (if enabled)
- Receive alarm callbacks (if enabled)
- Download history information and optionally store it to a Dbase (.DBF) format database
- Display and print any downloaded data history, in tabular or graphics format.
- Keep a log of all downloads and autopolls.
- Archive data.

About this Manual

This manual is written with the assumption that you have a basic understanding of IBM PC compatible hardware, and WINDOWS™, including concepts such as using a mouse, scroll bars, pulldown menus, etc.

If you have questions about your hardware, please refer to the manual(s) for same. If you have questions regarding WINDOWS™, please refer to your WINDOWS™ documentation, or ask your computer system manager for assistance.

Text in this manual appears in different formats, depending on the information being presented. Please note:



Sample windows appear throughout the documentation. Sometimes your window will not exactly match the one you see in the manual. This will occur if information specific to your company and your hardware has already been entered into the program by someone else.

ENTER

When you are instructed to press a key on the keyboard, the name or label for the key will appear as **BOLD TEXT**. Look for a key on your keyboard which matches the key label shown.

`TYPE THIS`

Any information you are to type will appear in **`COURIER BOLD`**. Remember to include blank spaces, if/when they appear in an example.

When the documentation is focused on menus and/or windows, you may notice that a character in the name of a menu (or sometimes in the name of a subwindow of a menu) is underlined. This generally means that if you press **ALT** and the underlined letter simultaneously, that menu or window will display. Please refer to your WINDOWS™ documentation for complete information about this capability.

System Requirements

Hardware and Software Requirements

Following is a list of the minimum system requirements to run the program:

Hardware

- A 486 or greater 100% IBM PC compatible computer
- 8 Mb RAM
- Minimum 10 Mb free space on your hard disk
- One 3.5” disk drive
- Monitor (minimum VGA)
- For modem connection, 2400 baud (or higher) 100% Hayes compatible modem on a serial port with dedicated IRQ; COM1 through COM4
- For Direct connect, use of any serial port with dedicated IRQ; COM1 through COM4

Please see further discussion of serial ports on Pages 5 and 6.

Software

- WINDOWS™ 9X/2000/NT/XP

Important Notes Regarding Serial Ports

This is a Must!

Before attempting to run the program, you must make sure your COM ports are properly configured. If this is not done, you will not be able to use the program. Please read this section carefully and make any necessary adjustments before attempting to run the program. If you encounter problems, please consult an authorized computer technician for assistance.

First, a few Definitions...

Your communications ports must be set up and configured properly for communications to work at all. To help you understand these concepts, we have included some definitions pertaining to communications:

COM port

A connection through which the computer communicates serially (1 bit at a time) with outside devices. Modern PCs have four of these ports, COM1 - COM4.

IRQ

Interrupt Request Line. The way any external device gets the CPU's (central processing unit, "brain") attention is to send a hardware interrupt signal on one of the sixteen available IRQs. By convention, many of your IRQs are dedicated (already assigned a function) in a standard way. For example, IRQ1 is the keyboard. Other standards include IRQ3 = COM2, IRQ4 = COM1, IRQ5 = printer port 2, IRQ6 = your floppy and hard drives, etc.

PORT ADDRESS

Once a device has the CPU's attention with a hardware interrupt, the CPU communicates with that device by reading and writing to a certain location in memory. These "locations" are called the BASE PORT ADDRESS or the I/O ADDRESS. By convention, these are:

COM1	0x03F8
COM2	0x02F8
COM3	0x03E8
COM4	0x02E8

Some Restrictions...

For historical reasons, there is a severe restriction that affects communications. COM1 and COM3 often cannot be used simultaneously, nor can COM2 and COM4, because they share IRQ's by default (COM1 & COM3 use IRQ4... and COM2 & COM4 use IRQ3) and many, though not all devices will not work properly using shared IRQs.

As many systems run a serial mouse on COM1, this would preclude you from running a modem on COM3 at the same time using the default IRQ settings, because (as explained above) two devices sharing the same IRQ will often conflict.

Some Solutions...

If you want to run both modem and direct connections with controllers under WINDOWS™, the default settings will usually need to be changed.

Important Notes Regarding Serial Ports

Generally, a standalone system does not use both printer ports, so IRQ5 (printer port #2) is often available. Given this scenario, your system could be configured as in the following example.

Sample configuration:

COM1 IRQ4 mouse
COM2 IRQ3 RS232 connection
COM3 IRQ5 modem

These changes are made in WINDOWS™ by modifying the 386 enhanced section of the SYSTEM.INI file:

[386Enh]
COM3Irq=5
COM3Base=03E8

On top of all this, it may be necessary to move jumpers on an internal modem to set it to COM3! Please refer to your modem manual for more information.

Give it a Try...

Once everything is set up it should be verified before attempting to run this program. WINDOWS™ 9X/2000/NT/XP includes "HYPER TERMINAL" that you can use to verify your setup. You will need to run the TERMINAL utility by selecting the program icon, or through use of the "RUN" command. Refer to your WINDOWS™ manual if you do not know how to perform these functions.

Once you have run the TERMINAL utility, select the Settings menu, then select the Communications option. Select the COM port your modem is on from the list of COM ports shown at the lower right-hand area of the window. Exit this dialog by clicking on the OK button with your mouse, and you are returned to the main window with the cursor blinking in a blank field.

Type:

AT&F

then press **ENTER**.

This sends a command to the modem to reset itself. It should respond right away by displaying "OK" on your window. If you do not see the "OK" string, something is wrong somewhere in the setup.

If you do see the "OK" string display, your next step will be to select a convenient phone number where someone can let you know if the phone is ringing or not. Then type:

ATDT 5551234 ***(replacing 5551234 with the actual telephone number)***

and press **ENTER** .

You should hear a dial tone and the number being dialed on your modem speaker. If the phone rings, you can be confident that this communications package will run on your modem. Press **ESC** to hang up and exit the program.

Documentation

How to use this manual

This manual contains detailed information about all aspects of the program. It is intended to help you find the answers to any questions that you may have about using the program.

Finding Information About A Task

To find information about completing a task using the program, locate the task in the Quick Reference Guide section of this manual. The Quick Reference Guide can point you to the documentation for some of the programs most commonly used features. Step by step instructions for completing some tasks can also be found in Tutorials in the Appendix section of this manual.

Finding Information About A Window

Lookup the window title in the Table of Contents and refer to the appropriate section of this manual. There is a manual section for each window used by the program. All buttons and fields are defined in their window's section.

Finding Information About An Error Message

Should you encounter an error message, refer to the Error Message Index in the Appendix section of this manual to obtain further details.

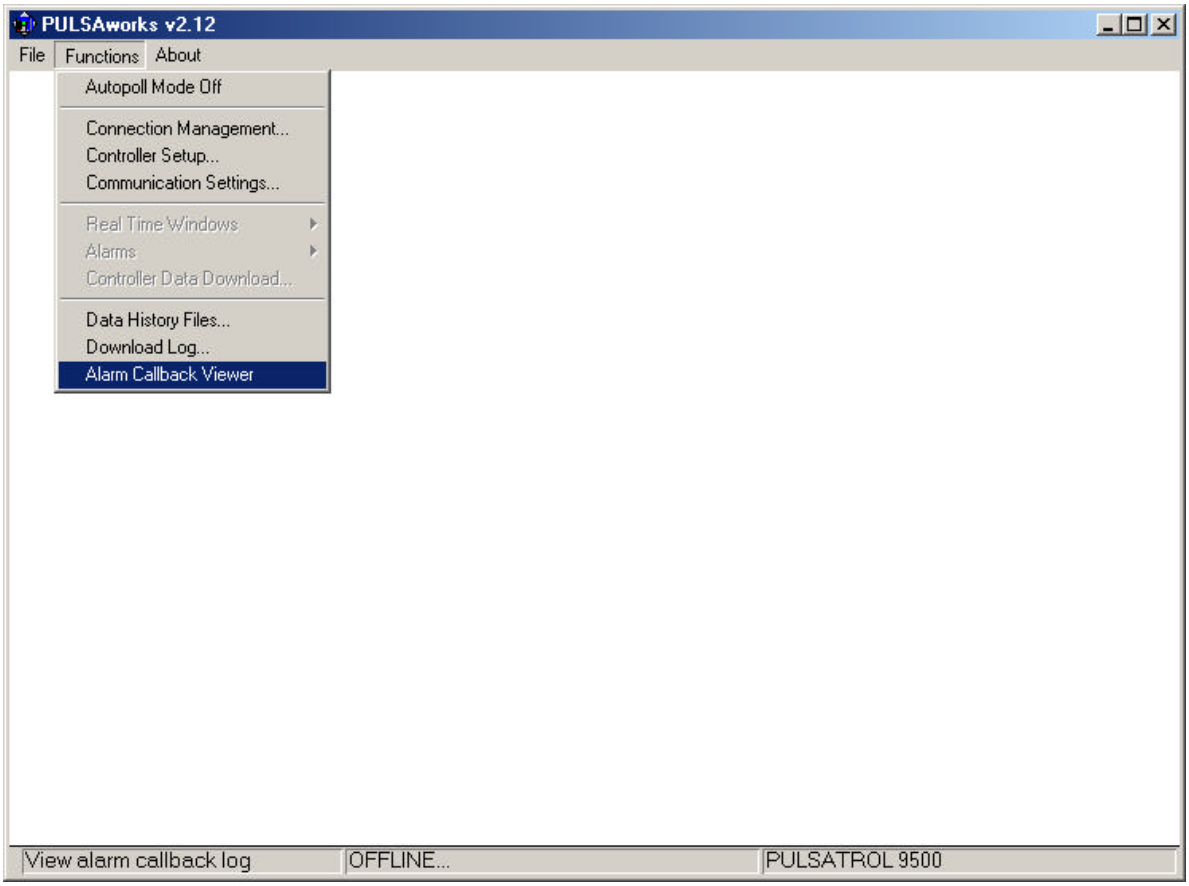
Status Bars

What is a Status Bar?

While using this program a status bar will appear at the bottom of the program window. Status bars are there to help you understand what functions you are currently performing, the current state of the program, or what choices are available to you.

What does the Status Bar look like?

The dark gray area at the bottom of this sample window is the status bar. It is divided into three sections.



The leftmost section of the status bar displays information about the currently selected menu item, or the status of the current operation. In this example, the leftmost section indicates what the currently highlighted selection from the menu, “Functions – Alarm Callback Viewer," will do.

The center portion of the status bar indicates connection status (online or off-line) and baud rate. In the example, “OFFLINE” indicates the program is not currently connected.

The third section of the status bar, to the far right, where “PULSATROL 9500” appears in the example, will display the DEVICE ID if one has been selected, regardless of whether you are actively connected to that device or not.

Remember, the status bar is an aid designed to help you as you use the program and access your controllers.

Passwords

Different Types of Passwords

There are three levels of password capability built into the program. They are MAIN PASSWORD, LEVEL ONE and LEVEL TWO.

Main Password

When logging on, the program requires you to establish a main password to prevent unauthorized access to the program, and thus to your data. All of your controller phone numbers, device ID's and passwords are stored in this program, so you may want to control who has access to this information. The default password when the package is shipped is "pulsaworks" (in all lowercase letters). This will always be the password unless it is changed via the COMMUNICATIONS SETTINGS window.

Level One Password

Accessing a controller at this level allows read and write access (i. e., you may perform all program options). These tasks include viewing data, changing data and downloading history files. The default Level One Password is "NONE" (not nothing at all, the word "NONE" in uppercase). The Level One Password can be changed via the MISCELLANEOUS CONTROLLER PARAMETERS window by a level one user only.

Level Two Password

Accessing a controller via the Level Two Password allows read-only access (i. e., you may only view data from the computer). You may not change controller settings. The default Level Two Password is "NONE" (not nothing at all, the word "NONE" in uppercase). The Level Two Password can be changed via the MISCELLANEOUS CONTROLLER PARAMETERS window by a level one user.

Choosing a Password

There are a few guidelines to follow when creating a password. These guidelines apply to all levels of passwords:

- Your password may consist of up to ten (10) alphanumeric characters
- The main password is case-specific, i.e., if you type any letter in uppercase or lowercase when creating the password, that letter must always be typed in uppercase or lowercase in the future
- Controller Level One and Level two passwords are all upper case letters. Any characters you type will be converted to their upper case equivalent

The Password is invisible!

For added security, your passwords do not appear on most program windows as you type. The controller Level One and Level Two passwords can only be viewed in the Controller Setup window. In all other windows your password characters are replaced by asterisks. This way, no unauthorized party will see your password unintentionally.

Record your Password

It's a good idea to write your password somewhere in case it's forgotten. However, we do not recommend that you write it in this manual.

Use the set of instructions appropriate for your computer to get the installation utility started. Then proceed to *Using the Installation Utility* to complete the installation.

Installing the program under WINDOWS™ 9X/2000/NT/XP

1. Insert installation diskette #1 or CD ROM into your disk drive, making sure you know the drive letter (is it A ,B or D?).

2. Click on the WINDOWS™ Start button.

3. From the Start Menu choose Run...

4. In the Open field, type:

   A:\SETUP.EXE ***(replacing A: with appropriate CD ROM drive letter)***

5. Click on OK with your mouse, or press **ENTER**.

6. Soon, the installation process begins.

Using the Installation Utility

The installation utility will copy all program files and sample data to your hard drive.

A dialog appears informing you that the program will be installed in the directory “c:\pulsawks”. You may accept this default path or you may select a new path via the pulldown menu, or by typing a new path. If you do not have the directory shown, the installation utility will create it for you. This is where all of the program files will be stored. A sub-directory named “histdata” will be added to the selected path and created if necessary. The “histdata” sub-directory will be used to store all of your downloaded data, program settings and controller information.

Next, choose either full or custom installation by clicking on either the FULL INSTALLATION button or the CUSTOM INSTALLATION button with the mouse. Clicking on FULL INSTALLATION begins the standard installation process, and you are prompted for further information as needed. If this is an initial installation, you must select FULL INSTALLATION. The program WILL NOT run unless all components have been installed.

Clicking on CUSTOM INSTALLATION with the mouse presents another dialog which enables you to specify which component(s) to upgrade or re-install. You are then guided through the remainder of the installation process.

Clicking on the EXIT INSTALL button with the mouse exits the installation utility.

Why three icons?

The program makes use of command line options to change the start-up mode. For your convenience the installation utility will create icons for starting the program in the three most commonly used modes. The ‘Autopoll On’ icon is used to start the program in Autopoll mode. The ‘Callback Off’ icon is used to start the program with alarm callbacks disabled. Use the Callback Off icon if you do not want the program to answer the phone. The other icon starts the program in the default mode, Autopoll Off and Callback enabled. For more information about the command line options see Appendix II - Command Line Switches.

Running the program from WINDOWS™ 9X/2000/NT/XP

1. Click on the WINDOWS™ Start button.
2. Expand the Programs Menu.
3. Expand the PULSAworks™ menu.
4. Click on one of the PULSAworks™ Icon.

The "Logon" Dialog

As installed, the program is not password protected. If a password has been set, the "Logon" dialog will appear each time the program is started and prompt you for a password:



The default password is "PULSAworks" in all lowercase letters unless someone has changed it. Please obtain the current password from the person who installed this program on your computer. Be sure to note if the password is upper and/or lowercase, as the password is case-specific. If you make a mistake when typing, press the **BACKSPACE** key to erase what you have typed and retype the password.

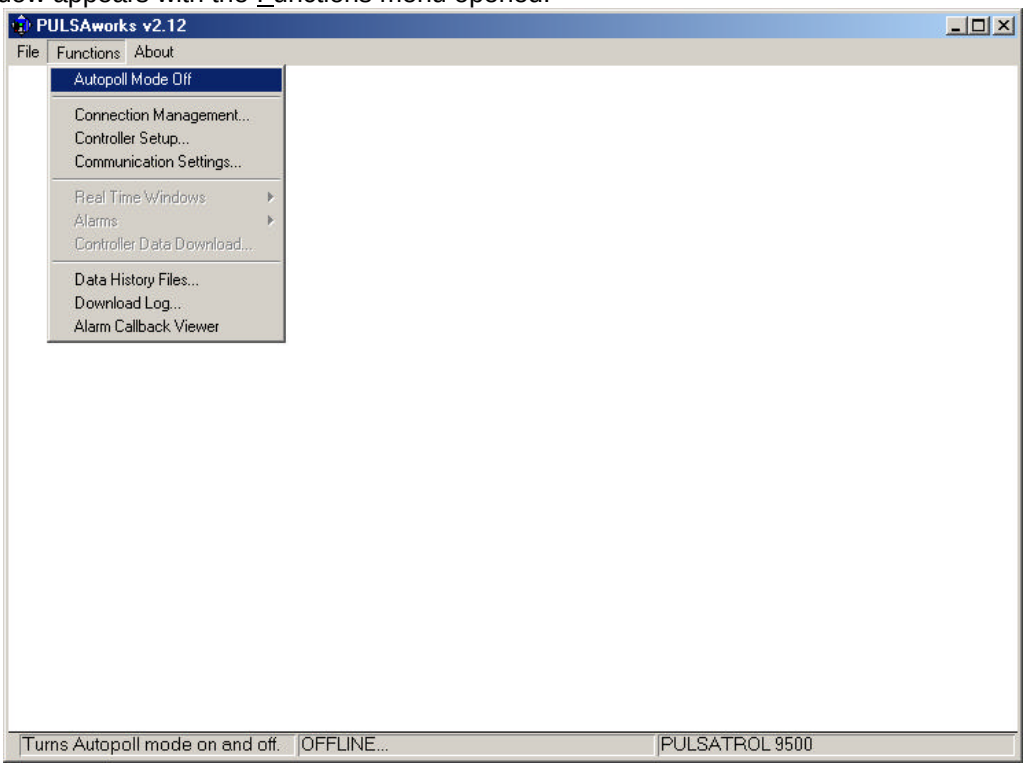
After typing the password, click on OK with the mouse.

If you have entered an incorrect password, you will see a message indicating so. Click on OK with the mouse, or **ENTER**, then try again. If your password still does not work, consult the person who installed this program on your computer.

The program will terminate after three incorrect tries.

If you have the Alarm dialup function enabled, immediately after the logon process, the computer will initialize that option and this may cause a slight delay. If this is the case, you will see an indication on the status bar that the alarm dialup is being initialized.

Next, a window appears with the Functions menu opened.



The Autopoll Mode option is highlighted.

Please review the next section in this manual, "Quick Reference Guide", then proceed to the section on "Menus" and the documentation following, which describes in detail each of the program windows and the functions each performs.

This Quick Reference Guide may help direct you to the appropriate window to complete different tasks. The left column describes the task, the right column directs you to the window where you may perform that operation. Please read the section in this manual concerning the referenced window for complete information about the operation you wish to perform.

This reference guide does not list all functions. It is intended as only an aid to locate information about the most commonly used functions of the program.

PLEASE READ THE ENTIRE MANUAL FOR BEST RESULTS.

Task	Window
Exiting the program	File Menu, select Exit
ALARMS	
Dialup, enabling	ALARM CALLBACK SETUP
Dialup, disabling	ALARM CALLBACK SETUP
Dialup, specifying phone numbers	ALARM CALLBACK SETUP
Display, current alarms	VIEW CURRENT ALARMS
High, specifying set point	ANALOG
Low, specifying set point	ANALOG
AUTODIAL	

Quick Reference Guide

Task	Window
Adding controller to list	CONTROLLER SETUP
Deleting controller from list	CONTROLLER SETUP
Activating Autopoll mode	FUNCTIONS
Viewing next start time	COMMUNICATIONS SETTINGS
ARCHIVES	
Archiving controller data	EXPORT DATA
Restoring archived data	IMPORT DATA
CONTROLLERS	
Adding	CONTROLLER SETUP
Autodialing	CONTROLLER SETUP
Connecting to	CONNECTION MANAGEMENT
Data File, specifying	CONTROLLER SETUP
Disconnecting from	CONNECTION MANAGEMENT
Password, changing	CONTROLLER SETUP
Phone number, specifying	CONTROLLER SETUP
Testing connection	CONTROLLER SETUP
DATA FILES	
Display / Graph	DATA HISTORY FILES
Downloading	CONTROLLER DATA DOWNLOAD
File name, specifying	CONTROLLER SETUP
DIRECT CONNECTION	
Baud rate, specifying	COMMUNICATIONS SETTINGS
Determining type of connection package installed	COMMUNICATIONS SETTINGS
Port, specifying	COMMUNICATIONS SETTINGS
MODEM CONNECTION	
Area code, specifying local	COMMUNICATIONS SETTINGS
Baud rate, specifying	COMMUNICATIONS SETTINGS
Dialing prefix, specifying	COMMUNICATIONS SETTINGS
Initialization string	COMMUNICATIONS SETTINGS
Port, specifying	COMMUNICATIONS SETTINGS
PASSWORDS	
Controller-specific, modifying	CONTROLLER SETUP
Controller Level One Password, changing	MISCELLANEOUS CONTROLLER PARAMETERS
Controller Level Two Password, changing	MISCELLANEOUS CONTROLLER PARAMETERS
Program Level One Password, changing	CONTROLLER SETUP
Program Level Two Password, changing	CONTROLLER SETUP
Logon password, changing	COMMUNICATIONS SETTINGS

Menus

The Three Menus

There are three “pulldown” menus you will use in this program. These menus are called:

- File
- Functions
- Help

Choosing from the Menus

To access the choices on the menus, either use your mouse to bring the “pulldown” options into view, and choose a function, or use your keyboard as follows:

1. Press **ALT** and the underlined letter of the title of the menu simultaneously. For example, to access the File menu, press **ALT** and **F** at the same time.

2. The File menu “drops” down to display choices. If a selection is followed by “right arrow”, this means there will be more than one choice to select from on the next level. If a selection is followed by “...”, then selecting this item will result in a window being displayed.

3. Use - and ¯ to move up and down the menu until your choice is highlighted.

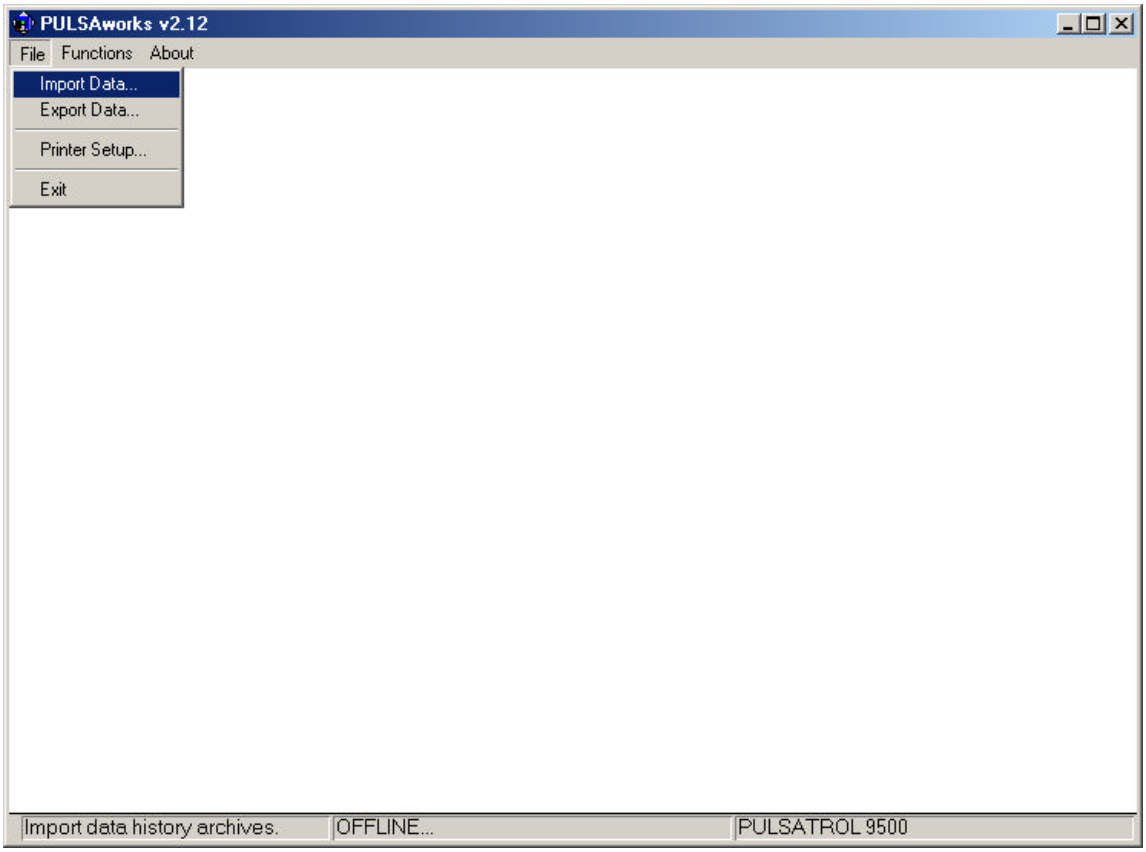
4. Press **ENTER**. The window you selected displays.

The File Menu

Overview of Choices on the File Menu

This is a brief overview of the File Menu. Detailed information about the Import and Export options can be found in the following sections.

The File menu displays as follows:



IMPORT DATA

Accesses a window that allows you to import data from an archive file.

EXPORT DATA

Accesses a window enabling you to export controller data to an archive file. Allows you to specify the name and location for the archive file, the range of data to archive and if the data should be removed from the controllers data history.

PRINTER SETUP

Accesses the standard WINDOWS™ Print Setup window. Allows you to specify the default printer, page orientation and paper type. This window will also allow you to access the options window for your specific printer. Please refer to your WINDOWS™ documentation for details about the use of this window.

EXIT

Choose Exit to end the program and close the program window.

Notes about Archiving Data

Why archive data?

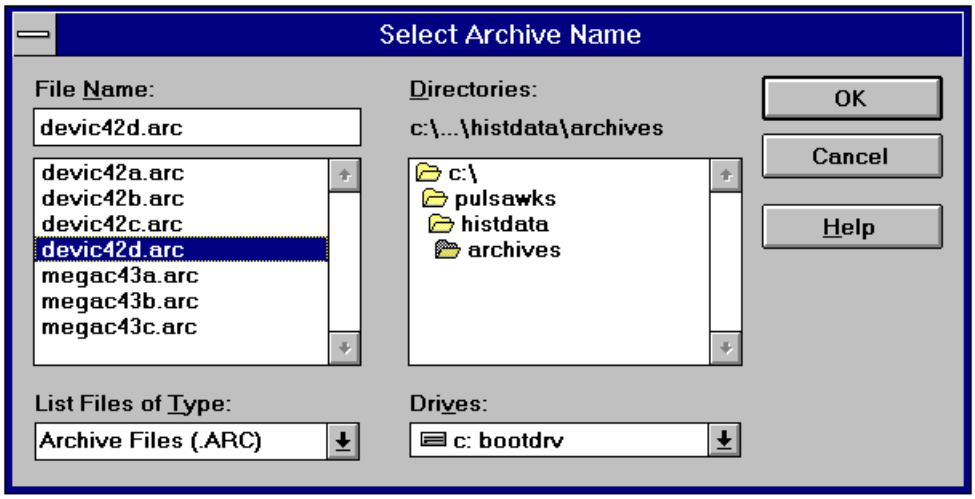
The archive routines can be used to create backup copies of data, or to remove records from the data history files. By creating a backup copy of your data and storing it on different media than your hard drive, you can protect against data loss due to computer or hard drive failure. Removing records from your data history files keeps files small and improves program speed and performance. Archive files can also be used to transfer data from one computer to another.

Setup a regular Archive schedule

It is recommended that you setup a regular archive schedule. First you need to determine how much data must remain in data history for your data reporting and diagnostics needs. Once per month you should archive and remove any data that is older than this limit. These archives can then be copied to removable media for long term storage. You should also perform regular weekly archives of all data to prevent possible data loss from program or system failure.

File Menu Windows - Import Data

Selecting Import Data from the File menu will display the Select Archive Name window as follows:



PURPOSE:
Allows you to select the archive file to import. Only archive files with a .ARC file name extension can be imported. The controls on this window are identical to the standard WINDOWS™ Open File window. Please refer to your WINDOWS™ documentation for details about the use of this window. Archives exported with PULSAworks v2.10 cannot be imported into earlier versions. However, PULSAworks v2.10 does support archives exported with earlier versions of the software.

OPERATION:
Once an Archive file has been selected, the program proceeds to read the file to determine the Device ID from which the data was exported. If this Device ID is currently in the controllers list, all data from the Archive file is added to the data history for this Device ID. Any data that is already in data history is skipped and not duplicated. If the Device ID is not currently in your controllers list, the Controller Not Found window is displayed to enable you to select the destination for the data from the archive file.

Controller Not Found

The Controller Not Found window displays as follows:



PURPOSE:
Allows you to select between importing the archive to a Device ID that is already present on your system and creating a new Device ID identical to the Device ID from which the data was exported.

RADIO BUTTON CHOICES:

Add Device ID...

Select this button if you wish to create a new controller for storing the data from the Archive file. A new controller will be created with the Device ID, dialing and data information read from the Archive.

Import data to Device...

Select this button if you wish to import the data to a controller that is already present on your system. When this button is selected the Device ID box will become active allowing you to select from all of the Device ID's in your controller's list.

BUTTON CHOICES:

OK

Accepts the selection for destination controller and starts the data import.

CANCEL

Cancels the archive with no changes to your controllers list or data history.

File Menu Windows - Export Data

Selecting Export Data from the File menu will display the Export Data window as follows:



Purpose:

This window enables you to select the controller from which to export data, the destination file name for the exported data and the type and range of data to be exported. You can also choose to delete the exported records from the controllers data history.

Fields:

Device ID

List of names of all controllers. Using pulldown menu, select the device whose data you wish to export.

You may type the first character in the name of the DEVICE ID and the program will automatically search for device names beginning with that character and will display the first in alphabetic order, beginning with the character you provided.

You may also use - and ¯ to scroll up and down through the list of DEVICE ID's.

Export Device Information Only

Highlight this check box if you only wish to export the controller information with no data. This will create an archive of the controller ID and all associated parameters. This is useful for duplicating a controller setup on multiple computers. If this field is highlighted, the date and time selecting fields will be disabled because no data can be selected.

Export Name

The current drive letter, path and file name where the archive will be created. This field is read-only. To change the archive destination use the Change Export File button.

From

The date and time of the first record to export. This field will initially display the date and time of the oldest record in data history for the selected controller. This field will only need to be changed if you do not wish to archive the oldest data for this controller.

To

The date and time of the last record to export. This field will initially display the date and time of the last record downloaded for the selected controller. To archive all data for a controller neither the From or To fields should be changed. If you wish to archive and remove all data except data collected within the past month, this field should be set to the date for one month prior to the current date.

Delete Exported Records

Check this field if you wish to remove the exported records from the controllers data history. This is the only means of removing portions of a controllers data history. Removing old data that you no longer access will improve the performance and decrease the disk space requirements for running this program.

Button Choices:

OK

Starts archiving the selected data. Click On this button after all fields display the correct information for the data you would like to archive. The Export Data window is removed and a status window is displayed to show the progress of the current archive.

Change Export Name

Use this button to change the destination name for the exported data. Clicking on this button will display the Set Export Name window. The controls in this window are identical to the standard WINDOWS™ Save As window. A unique file name must be selected as data can not be added to an existing archive. Please refer to your WINDOWS™ documentation for more information about the use of this window.

Cancel

Exits the Export Data window without exporting any data.

Functions Menu Overview

Overview of Choices on the Functions Menu and its Submenus

This is a brief overview of the Functions Menu and its submenus. Detailed information about each option can be found in the section of this manual pertaining to each specific window.

The following choices are offered on the Functions Menu and its submenus:

AUTOPOLL MODE ON/OFF

Toggles autopoll mode on and off. When the program is in autopoll mode, the Autopoll Status window will be displayed and downloads will be performed automatically on controllers configured with autopoll enabled. The Autopoll Status window shows the results of downloads attempted, alarm callbacks received, the date and time of the next scheduled download and the amount of time remaining before the next action by the autopoll system. This window also enables you to re-schedule or suspend downloading.

CONNECTION MANAGEMENT

Accesses a window that allows you to choose a DEVICE ID and connect to, or disconnect from, that device. Displays status of connection.

CONTROLLER SETUP

Accesses a window enabling you to add and remove devices from the DEVICE ID list and change passwords associated with those devices. Allows you to specify if the devices are to be added to the Autodial List, and if so, allows you to provide dialing information for each device. Also enables you to specify a data file for data logging and select to store data history in .DBF database format.

COMMUNICATIONS SETTINGS

Accesses a window that displays the type of communications package installed. Enables you to select port(s) and baud rate(s) for modem and/or direct connection. Enables you to enter and change Main Password, local modem initialization string, dialing prefix, local area code and Autopoll start time.

REAL TIME WINDOWS

Choosing Real Time Windows from the Functions menu yields a submenu enabling you to access several other windows used for setting and/or viewing real time data. From the submenu you may access ten different windows. Each selection from the submenu accesses one window, except for 28-Day Timers, which provides access to two windows. The choices on the submenu are: Analog, Timers, 28-Day Timers (which has two windows, Set and Run), Relays, Makeup, Digital, Data Collection, Accumulators and Miscellaneous.

REAL TIME WINDOWS -- ANALOG

Displays current settings, including INPUT TYPE, CURRENT READING, SET POINT, TRIGGER, TRACKING, HIGH ALARM, LOW ALARM, DIFFERENTIAL and LIMIT TIMER for up to eight (8) inputs. For specific models, allows you to change SET POINT and/or TRIGGER in either of two modes, TRACK or INDEPENDENT.

Functions Menu Overview

REAL TIME WINDOWS -- TIMERS

Displays information regarding timer feeds, for up to a maximum of four (4) Timers. Allows you to change Timer feed types and parameters pertaining to the type of feed.

REAL TIME WINDOWS -- 28 DAY TIMERS - SET

Accesses a window allowing you to set parameters for up to four 28-Day Timer feeds, and enables you to establish a schedule for each.

REAL TIME WINDOWS -- 28 DAY TIMERS - RUN

Accesses a window that displays current status of the 28-Day Timer Run functions.

REAL TIME WINDOWS -- RELAYS

Accesses a window that monitors and displays status and on-time of six numbered relays and the Alarm Relay. Gives the option to change the state or reset the on-time for any of the numbered relays.

REAL TIME WINDOWS -- MAKEUP

Displays the current value for the system and makeup conductivities. Allows you to select the input scale, and toggle the makeup between setpoint and cycle mode. Up to five (5) makeup ranges can be specified.

REAL TIME WINDOWS -- DIGITAL

Displays the input name and current status for a maximum of eight (8) digital inputs. On some controllers, the alarm parameters for each input can also be selected.

REAL TIME WINDOWS -- DATA COLLECTION

Allows you to create up to ten (10) data collection channels by entering the name and unit type for each. Data can then be entered at the controller or in the window, for each channel. This data will be time stamped by the controller and stored with its data history.

REAL TIME WINDOWS -- ACCUMULATORS

Displays the input name, pulse count, total gallons and date of last reset for a maximum of eight (8) accumulators. From this window you can change the number of gallons per pulse or reset the pulse count for each accumulator.

REAL TIME WINDOWS -- MISCELLANEOUS

Displays name, DEVICE ID and model number of currently connected device. Enables you to change the week of the month, day of week, date and time of the “internal clock” for the device. Allows you to change HISTORY INTERVAL and DAMPENER settings for the currently connected device. Allows you to edit the Level One and Level Two passwords associated with this DEVICE ID. On some controllers, allows you to set history mode to event driven.

Functions Menu Overview

ALARMS

Selecting Alarms from the Functions menu yields a submenu from which you may choose either View Current Alarms or Alarm Callback Setup.

ALARMS -- VIEW CURRENT ALARMS

The View Current Alarms window displays a list of current alarm conditions.

ALARMS -- ALARM CALLBACK SETUP

Accesses a window that allows you to enable alarm dialup for the currently connected controller. Enables you to provide prefix string and telephone number(s) for alarm dialup, Allows you to enable different alarm dialup conditions depending on type of Input you select.

CONTROLLER DATA DOWNLOAD

Accesses a window allowing you to start a download of the currently connected controller. This window will also monitor and display data transfer statistics for a download in progress.

DATA HISTORY FILES

Accesses a window that allows you to choose a device and select the input for that device (such as pH, Conductivity, etc.), then reads history data from the database and displays it on the window. If the graphics option is included, allows you to display data in graph format and print graphs.

DOWNLOAD LOG

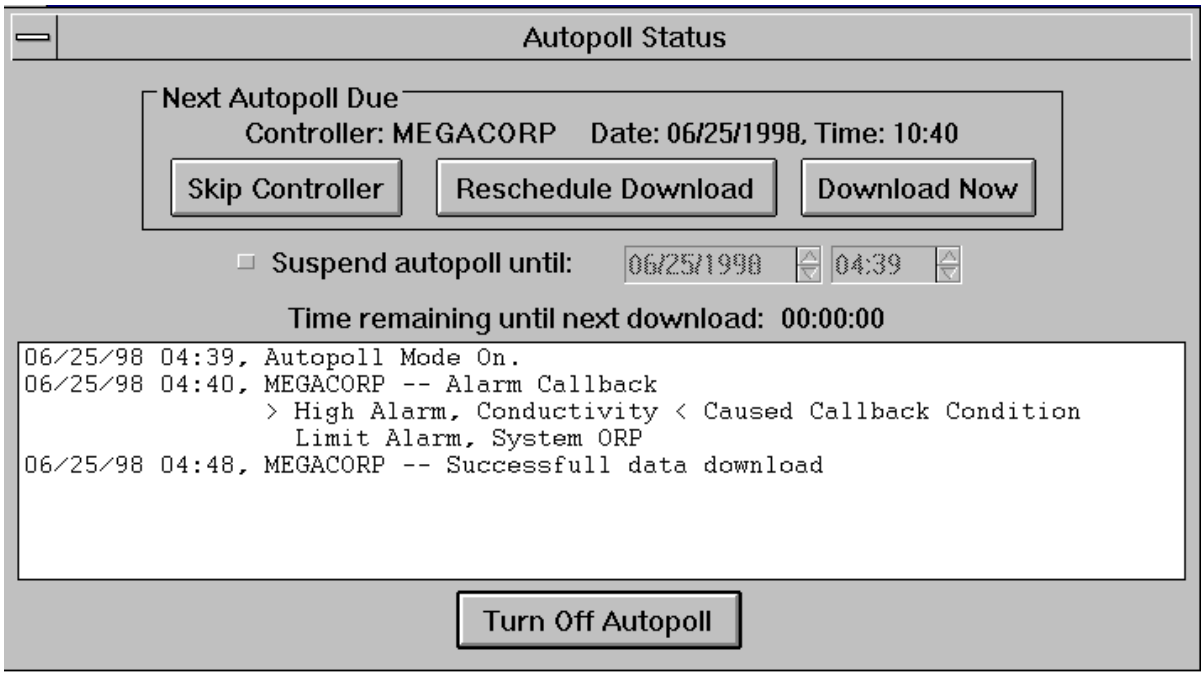
Allows you to select a DEVICE ID and view a list of the date, time and completion status for all downloads performed on that device.

ALARM CALLBACK VIEWER

Allows you to view alarm callback messages transmitted by the controller.

Functions Menu Windows - Autopoll Status

Selecting Autopoll Mode from the Functions menu will display the Autopoll Status window as follows:



PURPOSE:
Monitors the current status of the autopoll system, displays alarm callbacks, and allows you to re-schedule or suspend downloads.

NOTE: When the Autopoll Status window is displayed, the main program window will be resized to surround this window. This will leave the remainder of your desktop window visible. If you want autopolls to run in the background, minimize your program window after the Autopoll Status window has been displayed.

FIELDS:

NEXT AUTOPOLL DUE

Inside this box is all information for the next controller to be downloaded. The controller Device ID and the date and time for the scheduled download are displayed. See below for details on the three button choices within this box. The controller shown will be downloaded at the date and time listed within this box. Note a time and date earlier than the present may be shown if you have suspended downloading.

SUSPEND AUTOPOLL UNTIL:

Clicking on this field so that a red check mark appears in the check box to the left will activate the date and time fields to the right and suspend all downloads until the date and time shown within these fields. When the system clock reaches the date and time shown in these fields, The red check mark is removed and autopoll mode resumes. At this time any downloads that are due will be performed. NOTE: All controllers are NOT automatically downloaded when the suspend time expires. Only controllers whose downloads are due will be autopolled. To Remove the red check mark and resume autopolling, click on this field again.

Functions Menu Windows -Autopoll Status FIELDS, continued...

TIME REMAINING UNTIL NEXT DOWNLOAD:

This field is a countdown timer showing the amount of time until the next download is performed. If autopoll is suspended, this field will show the amount of time until the system clock reaches the suspend time or the time until the next scheduled download, whichever is greater.

STATUS BOX

The STATUS BOX is a scrollable text box below the countdown timer. All actions taken by the autopoll system and any alarm callbacks received are recorded in this text box. If more messages are displayed than will fit within the text box area, a vertical scroll bar appears on the right edge of the text box to allow scrolling through messages. The contents of this text box are cleared every time autopoll mode is turned on. Previous messages can still be viewed in the DOWNLOAD LOG (for autopoll download messages) or CALLBACK VIEWER (for alarm callbacks).

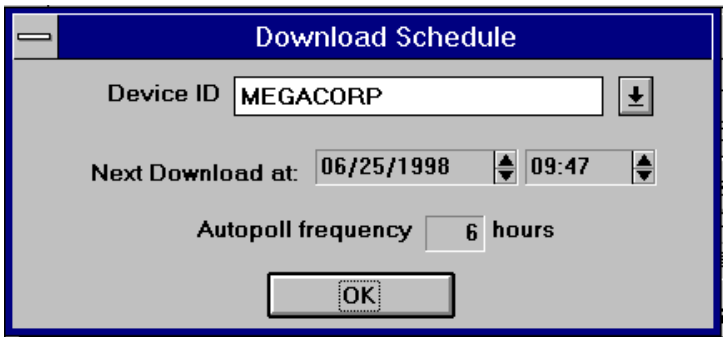
BUTTON CHOICES:

SKIP CONTROLLER

Cancels the download for the controller listed in the NEXT AUTOPOLL DUE box. The autopoll system then determines the next scheduled download and displays the controller, date and time for this download. NOTE: If there is only one controller with autopolling enabled, or if the controller skipped is autopolled more frequently than any other controller, the next download may be for the same controller but at a later time.

RESCHEDULE DOWNLOAD

Displays the RESCHEDULE DOWNLOAD screen as follows:



From this screen you can set the next download time and date or change the download frequency for any controller with autopoll enabled. Unlike the NEXT AUTOPOLL DUE box, this screen will not display a time and date earlier than the present. If the selected controller was due for downloading before the current time, the date and time will be updated to the present.

Functions Menu Windows -Autopoll Status BUTTONS, continued...

DOWNLOAD NOW

Causes the controller listed in the NEXT AUTOPOLL DUE box to be downloaded immediately. After the download has completed, the STATUS BOX will show the result of the download and the NEXT AUTOPOLL DUE box will display the next scheduled download.

TURN OFF AUTOPOLL

Closes the AUTOPOLL STATUS window and takes the program out of autopoll mode. This is the same as selecting AUTOPOLL MODE again from the Functions menu or closing the AUTOPOLL STATUS window from it's title bar. The main program window will be restored to it's original size and position.

Functions Menu Windows - Connection Management

Selecting Connection Management from the Functions menu will display the Connection Management window as follows:



PURPOSE:

Allows you to choose a DEVICE ID, edit dialing and password information, and connect to, or disconnect from that device. Displays status of connection. Select a device via the pulldown menu in the DEVICE ID list. Use **TAB** to move between fields.

FIELDS:

You can only change the field values before connecting to a controller. When online to a controller, all of the fields will be disabled.

DEVICE

List of names of all controllers. Using pulldown menu, select device to which you wish to make connection.

You may type the first character in the name of the DEVICE ID and the program will automatically search for device names beginning with that character and will display the first in alphabetic order, beginning with the character you provided.

You may also use - and ¯ to scroll up and down through the list of DEVICE ID's.

Functions Menu Windows - Connection Management FIELDS, continued...

PASSWORD 1

This is the Level One Password associated with the selected DEVICE ID. Use **TAB** to enter this field. Type the Level One Password for the displayed DEVICE ID.

Important Note: See "Passwords" section of this manual for an explanation of password levels.

PASSWORD 2

This is the Level Two Password associated with the selected DEVICE ID. Use **TAB** to enter this field. Type the Level Two Password for the displayed DEVICE ID.

Important Note: See "Passwords" section of this manual for an explanation of password levels.

MODEM and DIRECT Radio Buttons

Selects the type of connection to attempt. If you have not entered dialing information for the selected controller, the direct button will be selected. Attempts to select the modem button will result in a message prompting you to add the dialing information.

DIALING PREFIX

This field is for a dialing prefix (if necessary) to access an "outside" telephone line. For example, dialing a "9" is often necessary to access an outside line. Use a comma "," if you need a one second pause in your dialing process. For example, if you need to wait for a second dial tone after dialing the prefix.

COUNTRY AND AREA CODE

For this connection, type the country code (if applicable -- for foreign calls), then 1 and the area code to dial.

DEVICE PHONE NUMBER

For this connection, type the seven digit telephone number in this field. If there is no telephone number in this field and your installation includes both the DIRECT and MODEM options, the program assumes you wish to perform a direct connection and will attempt same.

STATUS

Displays a message indicating status of connection; advises if a connection error has occurred.

NOTE: Changes made to the fields on the Connection Management window are temporary and will only affect the current connection. To permanently change the default dialing prefix, edit the DIALING PREFIX field on the Communications Settings window. See the Communications Settings section of this manual for more information. To permanently change the passwords or dialing information edit the corresponding fields on the Controller Setup window. See the Controller Setup section of this manual for more information.

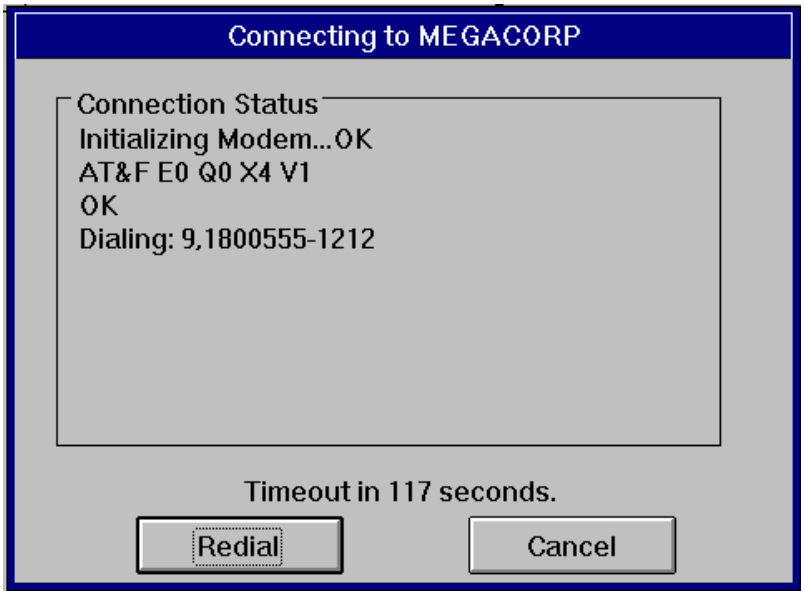
BUTTON CHOICES:

SETUP >>>

Clicking on this button will display the Controller Setup window. From the Controller Setup window you can edit any of the values permanently associated with this controller. See the Controller Setup section of this manual for more information.

MAKE CONNECTION

Attempts connection to the device specified in the DEVICE field. If a modem connection has been selected, the Connecting To ... window will be displayed. The title bar displays the Device ID for the controller. The window displays the modem status and dialing messages during connection. Buttons are present to allow you to restart or cancel a connection in progress. During a normal modem connect attempt, this window will appear as follows:



After a connection has been established the Connecting To … window will disappear. When connected to select controller models, the main program window will be re-sized and the Controller Front Panel window will be displayed. Refer to the Controller Front Panel section of this manual for more information.

DISCONNECT

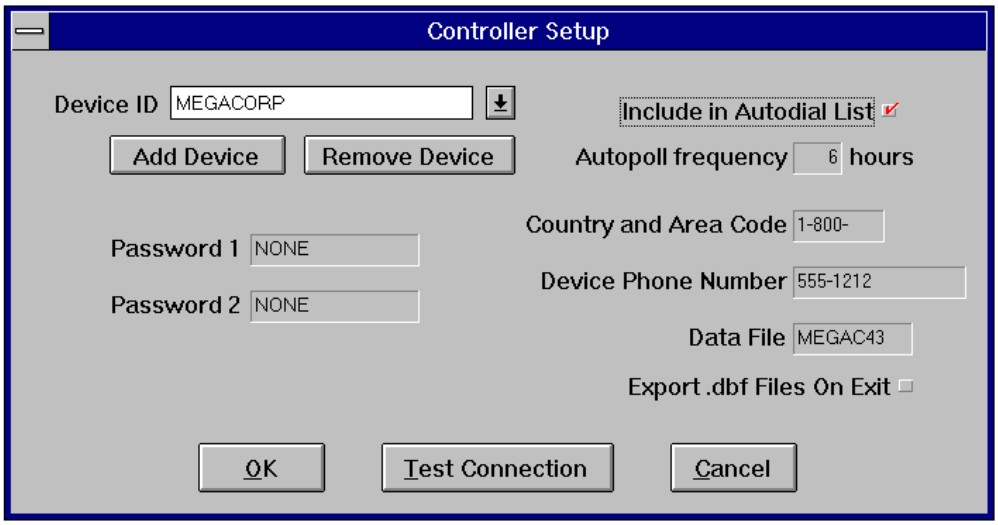
Disconnects device specified in the DEVICE field.

OK

Used to exit this window.

Functions Menu Windows - Controller Setup

Selecting Controller Setup from the Functions menu will display the Controller Setup window as follows:



PURPOSE

This display enables you to add and remove devices from the DEVICE ID list, set passwords, dialing information and activate autodialing for the device. Allows you to specify a data file for data logging. Allows you to select data export in .DBF database format. Use **TAB** to move between fields.

This window will automatically display if you are starting up the program and there are no devices in the controllers database. This will only occur if all Device ID's have been deleted.

FIELDS:

DEVICE ID

This is a list of names of all your controllers. Using pulldown menu, select device for which you wish to change password(s), autodial information, or a data file name.

If you have not yet added any device names, the field appears with "TYPE NEW ID HERE". You may type in your DEVICE ID(s). Each of your controllers should be given a DEVICE ID (a name you select). Each name may contain 20 alphanumeric characters maximum, including blank spaces.

Type the name of the device in the DEVICE ID field. If unique, it is considered new and is added. Tab through (and complete as needed) other fields on the window and click on the OK button with your mouse to add the DEVICE ID and all other data you have entered on this window.

You may also click on the ADD DEVICE button. This will prompt you to save the changes to the current Device ID (if any) then clear all fields and prompt you with "TYPE NEW ID HERE". This is useful if you are adding multiple Device ID's.

If later you wish to return to this window and add other devices, use **TAB** to access this field, then type in the name of a new device, and complete other fields on the form as necessary before clicking on OK or ADD DEVICE.

Functions Menu Windows - Controller Setup FIELDS, continued...

DEVICE ID, continued...

To remove a device from the DEVICE ID list, use the pulldown menu for this field to select a device to be removed. When the name of the device to be removed appears in the DEVICE ID field, click on the REMOVE DEVICE button with your mouse. A dialog box appears asking you to verify your choice. Click on YES to remove the device, or NO if you do not wish to remove the device.

PASSWORD 1

This is the Level One Password (Read/Write) associated with the selected DEVICE ID. The default password = NONE (the actual uppercase word NONE, as opposed to nothing at all).

Use **TAB** to enter this field. The cursor is placed immediately to the right of the word "NONE". Use the **BACKSPACE** key to erase the currently displayed password, then type your new password. Be sure to use the mouse to click on the OK button when exiting the window to keep your changes.

Important Note: See "Passwords" section of this manual for an explanation of password levels and for rules governing passwords.

PASSWORD 2

This is the Level Two Password (Read Only) associated with the selected DEVICE ID. The default password = NONE (the actual uppercase word NONE, as opposed to nothing at all).

Use **TAB** to enter this field. The cursor is placed immediately to the right of the word "NONE". Use the **BACKSPACE** key to erase the currently displayed password, then type your new password. Be sure to use the mouse to click on the OK button when exiting the window to keep your changes.

Important Note: See "Passwords" section of this manual for an explanation of password levels and for rules governing passwords.

INCLUDE IN AUTODIAL LIST

Click on this field, (or press the spacebar) if you wish the device specified in the DEVICE ID field to be added to the Autodial List. A red checkmark appears in this field. Click again (or press the spacebar again) if you wish to remove the selection. Notice that when a red checkmark appears, the (previously blank) field below is altered. Please see below for more information.

AUTOPOLL FREQUENCY

For this field to be active, "INCLUDE IN AUTODIAL LIST" must be checked.

Your parameter in this field will determine the frequency (in hours) of Autopolling for the selected DEVICE ID. Type a number. Maximum = 1116. Default = 1. To determine the optimum rate for autopolling multiply the controller data storage rate in minutes (set with the Real Time Windows -- Miscellaneous window) by 372 (limit of controller data storage) and divide the

Functions Menu Windows - Controller Setup FIELDS, continued...

Autopoll Frequency continued...

result by 60 (to convert minutes to hours). IMPORTANT NOTE: AUTOPOLLING AT A RATE GREATER THAN THIS WILL CAUSE DATA LOSS.

COUNTRY AND AREA CODE

For selected DEVICE ID, type the country code (if applicable -- for foreign calls), then 1 and the area code of the telephone line for the specified DEVICE ID.

DEVICE PHONE NUMBER

For selected DEVICE ID, type the seven digit telephone number in this field. If there is no telephone number in this field and your installation includes both the DIRECT and MODEM options, the program assumes you wish to perform a direct connection and will attempt same.

DATA FILE

A data file name will be automatically assigned from the first five characters of the Device ID you specify. If you are not satisfied with the assigned name, type the new name of the computer file into which the downloaded data from the selected DEVICE ID will be placed. The maximum number of digits is seven, no blank spaces allowed. There is actually an eighth digit in this field, but it is reserved by the program, for use as a suffix.

EXPORT .DBF FILES ON EXIT

Click on this field (or press the spacebar) if you wish to have data for the device specified in the DEVICE ID field saved in dBase IV format. A red checkmark appears in this field. Click again (or press the spacebar again) if you wish to remove the selection.

Data history is stored in sequential .DAT files. This is for efficient access when downloading or viewing data. If you wish to access a controller's data history from other applications it is convenient to have the data in a standard database format. Every time the program exits, the data history for all controllers with this option selected are saved in .DBF files. This is a duplicate copy of each controllers data history that you can view and edit from most standard WINDOWS™ database and spreadsheet programs. See the Appendix for more information about the file formats, contents and naming convention.

BUTTON CHOICES:

ADD DEVICE

Clicking on the ADD DEVICE button with your mouse adds the device (name of controller) specified in the DEVICE ID field. It then clears all fields for entry of the next device setup information.

REMOVE DEVICE

Clicking on the REMOVE DEVICE button removes the device specified in the DEVICE ID field.

OK

Clicking on the OK button with the mouse accepts data you have entered into the various fields on the window. The data applies to the device currently displayed in the DEVICE ID field. If changes have been made, a dialog box appears prompting you to save your changes.

TEST CONNECTION

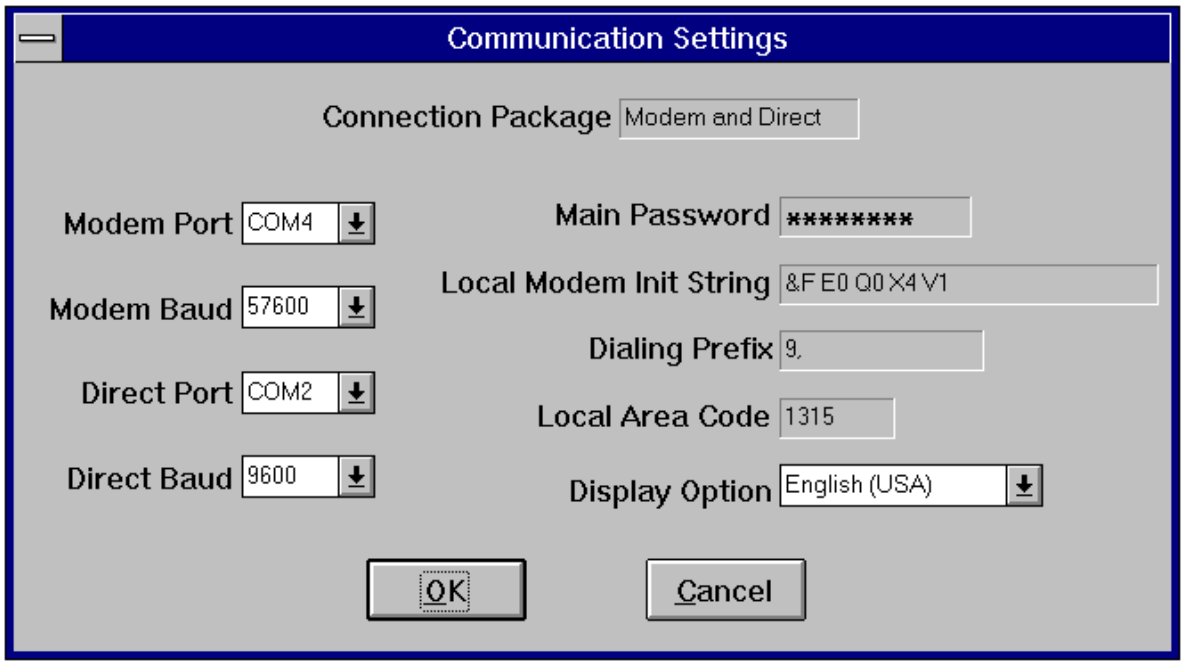
Clicking on the Test Connection button attempts to connect to the selected controller using the dialing information provided. If a connection is established, a window appears listing the controller model number and all inputs and relays available in this controller. If connection fails, a status window appears explaining the error.

CANCEL

Clicking on the Cancel button with your mouse exits the window and discards any current (unapproved) changes you may have made.

Functions Menu Windows - Communications Settings

Selecting Communications Settings from the Functions menu will display the Communications Settings window as follows:



PURPOSE:

Displays type of communications package installed. Enables you to select port(s) and baud rate(s) for modem and/or direct connection to your controllers. Enables you to enter and change Main Password, local modem initialization string, dialing prefix and local area code. Use **TAB** to move between fields.

FIELDS:

CONNECTION PACKAGE

Automatically indicates type of connection package you have, i.e., Modem and Direct, Modem, or Direct.

MODEM PORT

Until a modem port is selected, this field appears with the entry "???". Before you choose a modem port, please read carefully the section in this manual titled "IMPORTANT NOTES REGARDING SERIAL PORTS".

Select a modem port by highlighting your choice with the mouse on the pulldown menu.

MODEM BAUD

Baud rate for modem. By default this field is set at 19200, although there are other choices available on the pulldown menu. If you are having trouble connecting to an older controller (pre-1998), try setting the MODEM BAUD to 2400.

Functions Menu Windows - Communications Settings FIELDS, continued...

DIRECT PORT

Until a direct port is selected, this field appears with the entry "???". Before you choose a direct port, please read carefully the section in this manual titled "IMPORTANT NOTES REGARDING SERIAL PORTS".

Select a direct port by highlighting your choice with the mouse on the pulldown menu.

DIRECT BAUD

Baud rate for direct connection. This value must match the setting on the controller. By default this field is set at 2400.

MAIN PASSWORD

If a password has been established, you will see an asterisk for each character. If you wish to edit the password, use **TAB** to access this field. You are placed to the right of the existing password. Using backspace, erase the old password and type a new one. Be sure to use the mouse to click on the OK button when exiting this window to save your changes.

If you have not yet established a password, please read the section titled "PASSWORDS" in this manual before doing so. It contains important information about maximum number of characters allowed, restrictions, etc.

If you leave this field blank, you will not be prompted to enter a password when you start the program.

LOCAL MODEM INIT STRING

This program assumes the need for a 100% Hayes compatible modem, The initialization string appearing in this field is a good default string provided for use with this program. If you need to edit this string, use **TAB** to access this field. You are placed to the right of the existing string. Using backspace, erase the old string and type a new one. Be sure to use the mouse to click on the OK button when exiting the window to save your changes. Do not include the initial "AT" if you change this string. The program automatically adds "AT" to the beginning of whatever string you enter.

The string you enter must contain the following elements: E0 (echo off), Q0 (enable result codes), X4 (enable extended codes) and V1 (verbal result codes).

DIALING PREFIX

This field is for a dialing prefix (if necessary) to access an "outside" telephone line. For example, dialing a "9" is often necessary to access an outside line. Use a comma "," if you need a one second pause in your dialing process. For example, if you need to wait for a second dial tone after dialing the prefix.

Functions Menu Windows - Communications Settings FIELDS, continued...

LOCAL AREA CODE

This field should contain the numeral 1 followed by your local area code (applicable to where your computer is located now). For example, if your area code is 714, the proper entry for this field would be "1714". Note that there is not a space between the one and the area code. The program examines this field to see if dialing the number one and an area code is necessary when remote communications are taking place. When calling a location within the same area code, the program will know not to dial this entry.

DISPLAY OPTION

Selects date formatting and liquid unit defaults for PULSAworks. The two available options are English (USA) and English (UK). If English (USA) is selected, the displayed date format is MM/DD/CCYY and the default liquid unit is the gallon. If English (UK) is selected, the displayed date format is DD/MM/CCYY and the default liquid unit is the litre.

BUTTON CHOICES:

OK

Clicking on the OK button with the mouse accepts data you have entered into the various fields on the window. If you made changes, a dialog box will appear asking you to verify those changes. Click on YES to accept your changes.

CANCEL

Clicking on the CANCEL button exits the window and discards any changes you may have made while it was displayed.

Notes about Real Time Mode

What is Real Time Mode?

Real time mode is your state of operation when you are actually connected to a controller. When in real time mode, you may perform real time functions, such as changing parameters for feed times, setting alarm options, etc.

When not in real time mode, you are only able to change controller communications settings and view history and logged data.

NOTE: If you are in Real Time Mode (on-line to the controller) and you make changes to settings while someone is also standing in front of the controller changing settings, your changes may be over ridden by the other user.

Real Time Mode Communications

When operating in real time mode, you will be receiving information from, and sending information to a controller. Every three seconds or so, by default, the program sends a message to the controller requesting current information about the controller's functions. Upon receipt of the data, the program processes the information and updates fields in real time mode windows. This is how you see up-to-date information about your controller's functions.

When you disconnect from a controller, this starts another timer that polls the modem every ten seconds to see if the phone is ringing. This would be the case if a controller is setup with alarm callback and it is attempting to report an alarm. If so, the program will answer the phone, attempt to communicate with the controller, download the alarm log and hang up.

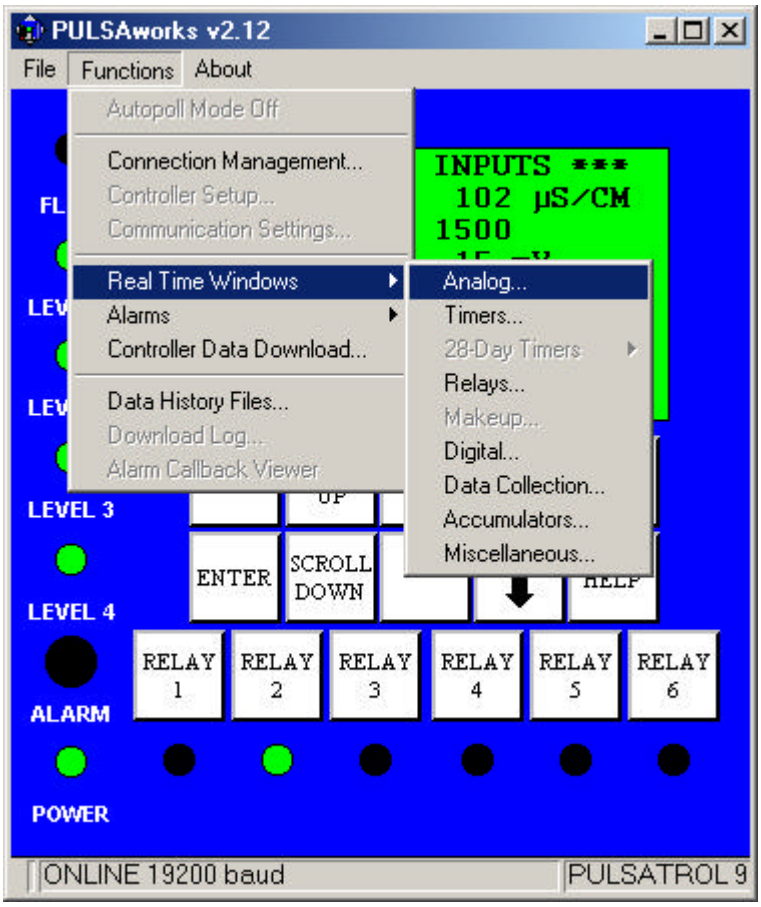
Real Time Mode Menu Options

The three Real Time Mode menu options are Real Time Windows, Alarms and Controller Data Download. These selections will appear in gray on the menu when they are not available to you. If you are not actively connected to a controller (and are thus not in real time mode) these options will not be available to you. When you initiate a connection and activate real time mode, the menu will display with these options in black print, indicating they are available to you at the present time. Depending on the controller model you are communicating with, you may continue to see some options grayed - even though you are on line. This is because those options are not available for the connected controller. For example the controller must have a makeup conductivity input to activate the Makeup window.

Functions Menu Window - Real Time Windows

Choosing Real Time Windows from the Functions menu yields a submenu enabling access to several other windows used for setting and/or viewing real time analog data from the controller.

The Real Time Windows submenu appears as follows:



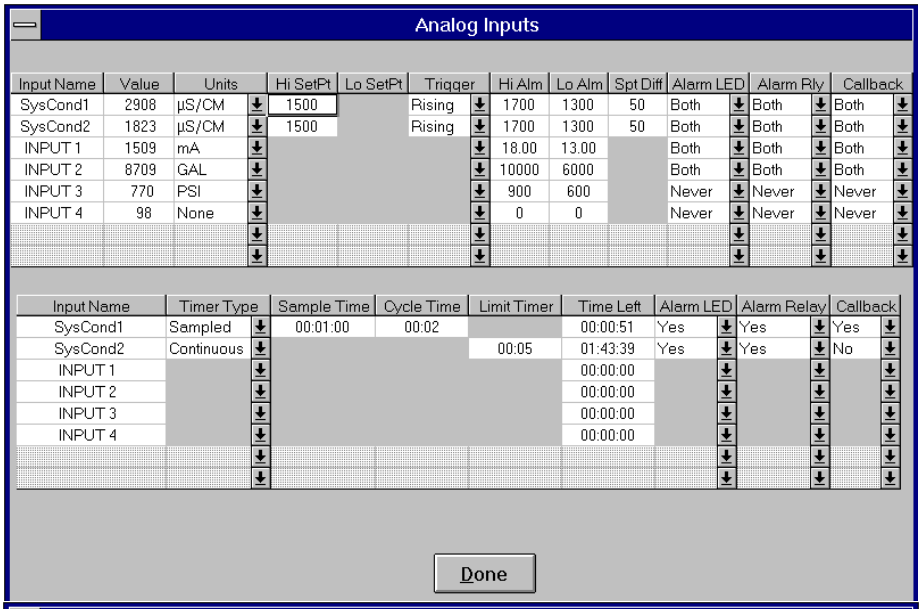
From this submenu you may access ten different windows. Each selection from the submenu accesses one window, with the exception of 28 Day Timers (which accesses two windows, Set and Run). The other Real Time Windows are Analog, Timers, Relays, Makeup, Digital, Data Collection, Accumulators and Miscellaneous.

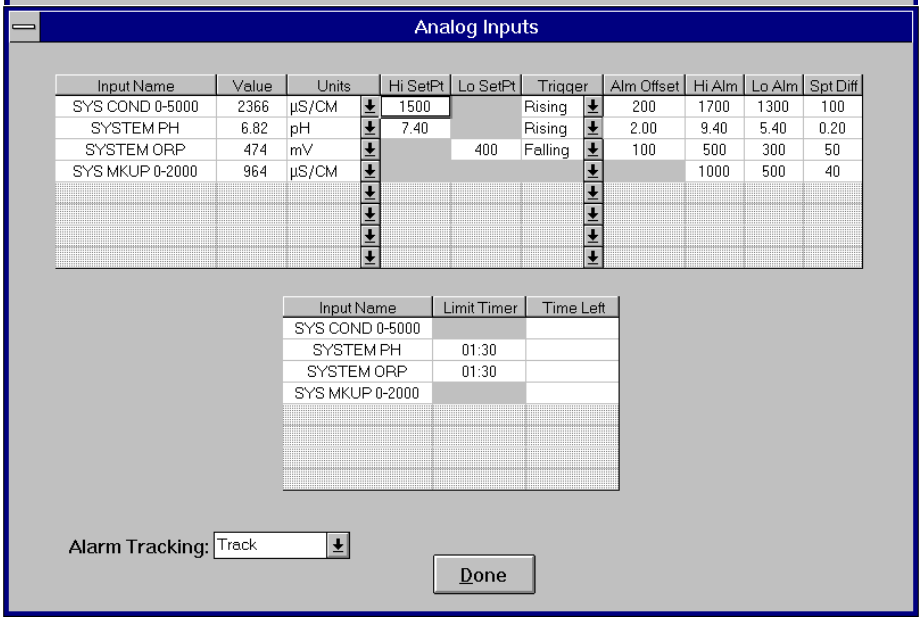
If a particular option is not present on the controller you are connected to, that particular option will be disabled and grayed.

Complete information on each window follows.

Functions Menu Windows: Real Time Windows - *Analog*

The Analog window is accessed via the Functions menu, by selecting Real Time Windows, and then selecting Analog. If there is no analog input on the selected DEVICE ID, the selection will appear gray (and not accessible) in the menu. The Analog Inputs window will display like one of the following examples. Window differences are dependent upon the type of controller currently connected.





PURPOSE:

Automatically displays information dealing with analog inputs. This window is divided into two sections, data and timers. The data section shows information for the INPUT NAME, CURRENT VALUE, UNITS, SET POINT, TRIGGER, TRACKING, HIGH ALARM, LOW ALARM, DIFFERENTIAL and Alarm options. The timer section is for viewing and setting parameters for the associated limit timers. Use **TAB** to move between fields. Unused fields appear gray.

When changes are made to the values on this window, upon exiting the field, the field containing the edited value turns yellow while the new value is being processed. Once the changes are accepted by the controller, the changed field appears in green until you exit the window.

If an invalid value is typed in a field, that field will display in red when you try to exit the field, for example, if you tried to set a HI ALM below the set point.

TRACKING MODE

This window also operates in two distinctly different modes. These modes are referred to as TRACK and INDEPENDENT. When in TRACK mode, you may change the values in the SETPOINT and ALM OFFSET fields on this window, and the HI ALM and LO ALM values will automatically change according to the value of the SETPOINT plus and minus the ALM OFFSET value. In Track mode you cannot change the HI ALM and LO ALM values manually. When in INDEPENDENT mode, the ALM OFFSET field is inactive, and the HI ALM and LO ALM fields can be adjusted manually. For some controllers TRACK mode is not available. These controllers operate in INDEPENDENT mode.

NOTE:

Not all fields will be present for all controllers. Some fields are not displayed if the connected controller does not support them. For example, the ALM OFFSET field will only be displayed if you are connected to a controller that supports alarm TRACKING mode.

DATA FIELDS:

INPUT NAME

Lists inputs such as Makeup Conductivity, System Conductivity, System pH, System ORP and System Input (4-20 mA).

VALUE

Displays current reading for the named input. Readings update periodically while the window is displayed.

UNITS

Units of measure for each input. Displays the units (pH, mV, etc.) associated with each input. System Conductivity, Makeup Conductivity, System pH and System ORP have fixed units that can't be changed. 4-20 mA Inputs can be configured with any of the following units: µS/CM, pH, mV, GAL, Litre, °C, °F, PPM, PSI, %, mA, Mil/Y, µM/Yr, NTU ↓, NTU ↑, PPM ↓ and None.

Tip: To disable a 4-20 mA Input, set its units to "NONE".

By using the pulldown menu you can select the type of units for each System Input. Note: This feature is not available on all controllers.

Functions Menu Windows - Real Time Windows - Analog FIELDS, continued...

HI SETPT, LO SETPT

Control Set Point. Displays current Set Point. Normally only one of these fields will be active. When TRIGGER is set to rising, the HI SETPT field is active. When TRIGGER is set to falling, the LO SETPT field is active. When trigger is set to DUAL (available on select models with pH control), both fields will be active.

When in Track mode, the Set Point, combined with the value entered into the Tracking field (at right) determines High Alarm and Low Alarm values. Set Point plus Tracking = High Alarm. Set Point minus Tracking = Low Alarm.

You may optionally use the "spin button" to edit this field. To change the value, place the cursor in the field then double-click the left mouse button. The "spin button" appears at the right side of the field. Use the up and down arrows on the spin button to increase or decrease the value in the field.

TRIGGER

Displays current trigger setting. Using pulldown menu, choose from the available options, either Rising or Falling as the value for this field. A "Rising" Trigger will cause the relay to activate when the signal rises above the setpoint. A "Falling" Trigger will cause the relay to activate when the signal falls below the setpoint. A "Dual" Trigger uses both Rising and Falling setpoints. For an input such as Conductivity, Rising would be the normal choice. For ORP, Falling would be the normal choice.

ALM OFFSET

Displays current offset value. Note: This field is not available on all controllers. The offset value is automatically added to, or subtracted from, the Set Point, producing the High Alarm and Low Alarm values, when in Track mode. Change the value in the ALM OFFSET field to alter the HI ALM and LO ALM values.

Track mode is selected via the ALARM TRACKING combo box at the bottom left of this window.

You may optionally use the "spin button" to edit this field. To change the value, place the cursor in the field then double-click the left mouse button. The "spin button" appears at the right side of the field. Use the up and down arrows on the spin button to increase or decrease the value in the field.

HI ALM

High Alarm. The threshold at which a high alarm condition will result. Automatically displays current high alarm value. This field will change based on the values entered in the ALM OFFSET and SETPT fields when in Track mode.

Track mode is accessed via the ALARM TRACKING combo box appearing at the bottom left of this window.

You may optionally use the "spin button" to edit this field. To change the value, place the cursor in the field then double-click the left mouse button. The "spin button" appears at the right side of the field. Use the up and down arrows on the spin button to increase or decrease the value in the field.

Functions Menu Windows - Real Time Windows - Analog FIELDS, continued...

LO ALM

Low Alarm. The threshold at which a low alarm condition will result. Automatically displays current low alarm value. This field will change based on the values entered in the ALM OFFSET and SETPT fields when in Track mode.

Track mode is accessed via the ALARM TRACKING combo box appearing at the bottom left of this window.

You may optionally use the "spin button" to edit this field. To change the value, place the cursor in the field then double-click the left mouse button. The "spin button" appears at the right side of the field. Use the up and down arrows on the spin button to increase or decrease the value in the field.

SPT DIFF

Differential. Automatically displays current differential value. The value in this field determines the span of control. For example, if the Conductivity set point is 1500 µS/CM, the DIFFERENTIAL is set at 100 µS/CM, and a relay is triggered on a rising set point, the relay will be de-energized when the monitored input is at a set point minus the DIFFERENTIAL (1500 - 100 = 1400). In this example, the span of control would be 1400-1500 µS/CM.

You may optionally use the "spin button" to edit this field. To change the value, place the cursor in the field then double-click the left mouse button. The "spin button" appears at the right side of the field. Use the up and down arrows on the spin button to increase or decrease the value in the field.

ALARM LED

Alarm LED mode selection. Determines the conditions under which alarm events on this input will affect the controller front panel Alarm LED. There are four modes accessible via the pulldown menu in this field, NEVER, LOW, HIGH and BOTH. NEVER - the Alarm LED is never activated by alarm events on this input. LOW - the Alarm LED is activated if the current value drops below the value set in the LO ALM field. HIGH - the Alarm LED is activated if the current value exceeds the value set in the HI ALM field. BOTH - the Alarm LED is activated if the current value is above the HI ALM value or below the LO ALM value. NOTE: This field is only available on select controllers.

ALARM RLY

Alarm Relay mode selection. Determines the conditions under which alarm events on this input will energize the controller Alarm relay. There are four modes accessible via the pulldown menu in this field, NEVER, LOW, HIGH and BOTH. NEVER - the Alarm relay is never energized because of alarm events on this input. LOW - the Alarm relay is energized if the current value drops below the value set in the LO ALM field. HIGH - the Alarm relay is energized if the current value exceeds the value set in the HI ALM field. BOTH - the Alarm relay is energized if the current value is above the HI ALM value or below the LO ALM value. NOTE: This field is only available on select controllers.

Functions Menu Windows - Real Time Windows - Analog FIELDS, continued...

CALLBACK

Alarm callback mode selection. Determines the conditions under which alarm events on this input will cause the controller to initiate an alarm callback. There are four modes accessible via the pulldown menu in this field, NEVER, LOW, HIGH and BOTH. NEVER - an alarm callback is never initiated because of alarm events on this input. LOW - an alarm callback is initiated if the current value drops below the value set in the LO ALM field. HIGH - an alarm callback is initiated if the current value exceeds the value set in the HI ALM field. BOTH - an alarm callback is initiated if the current value is above the HI ALM value or below the LO ALM value. NOTE: This field is only available on select controllers.

TIMER FIELDS:

INPUT NAME

Lists inputs such as Makeup Conductivity, System Conductivity, System pH, System ORP and System Input (4-20 mA). This is a duplicate of the INPUT NAME field in the analog data section above.

TIMER TYPE

Analog Input Timer type selection. Determines the type of timer to use with this input. NOTE : This field is only accessible when connected to select boiler controller models. There are two timer types accessible via the pulldown menu in this field, SAMPLED and CONTINUOUS. Selecting SAMPLED enables the SAMPLE TIME and CYCLE TIME fields and disables the LIMIT TIMER field. Selecting CONTINUOUS enables the LIMIT TIMER field and disables the SAMPLE TIME and CYCLE TIME fields.

SAMPLE TIME

Sample Time value. Displays the sample time in hours, minutes and seconds. Maximum allowable time is 1 hour.

CYCLE TIME

Cycle Time value. Displays the cycle time value (in 24 hour format), in hours and minutes. Maximum allowable time is 23 hours 59 minutes.

LIMIT TIMER

Limit Timer. Displays current limit timer value (in 24 hour format), which specifies the amount of time, in hours and minutes, that the relay will be allowed continuously active.

You may optionally use the “spin button” to edit this field. To change the value, place the cursor in the field then double-click the left mouse button. The “spin button” appears at the right side of the field. Use the up and down arrows on the spin button to increase or decrease the value in the field.

TIME LEFT

Automatically counts down the time left in the current timer cycle. This field is updated every three seconds. The time left is displayed in hours minutes and seconds in 24-hour format.

Functions Menu Windows - Real Time Windows - Analog FIELDS, continued...

ALARM LED

Alarm LED mode selection. Determines if the timer event for this input will affect the controller front panel Alarm LED. There are two options accessible via the pulldown menu in this field, NO and YES. NO - the Alarm LED is not activated by timer events for this input. YES - the Alarm LED is activated if a timer event occurs for this input. NOTE: This field is only available on select controllers. Applies only to Limit Timer Type.

ALARM RELAY

Alarm relay mode selection. Determines if the timer event for this input will cause the controller to energize the Alarm relay. There are two options accessible via the pulldown menu in this field, NO and YES. NO - the Alarm relay is not energized when a timer event occurs for this input. YES - the Alarm relay is energized when a timer event occurs for this input. NOTE: This field is only available on select controllers. Applies only to Limit Timer Type.

CALLBACK

Alarm callback mode selection. Determines if the timer event for this input will cause the controller to initiate an alarm callback. There are two options accessible via the pulldown menu in this field, NO and YES. NO - an alarm callback is not initiated when a timer event occurs for this input. YES - an alarm callback is initiated when a timer event occurs for this input. NOTE: This field is only available on select controllers. Applies only to Limit Timer Type.

ALARM TRACKING

Mode selection for alarm entry. There are two modes accessible via the pulldown menu in this field, TRACK and INDEPENDENT.

When in TRACK mode, you may change the values in the SETPT and ALM OFFSET fields on this window, and the HI ALM and LO ALM values will automatically change according to the values you have entered. In this mode you cannot change the HI ALM and LO ALM values manually.

When in INDEPENDENT mode, the ALM OFFSET field is inactive, and the SETPT, HI ALM and LO ALM fields can be adjusted manually.

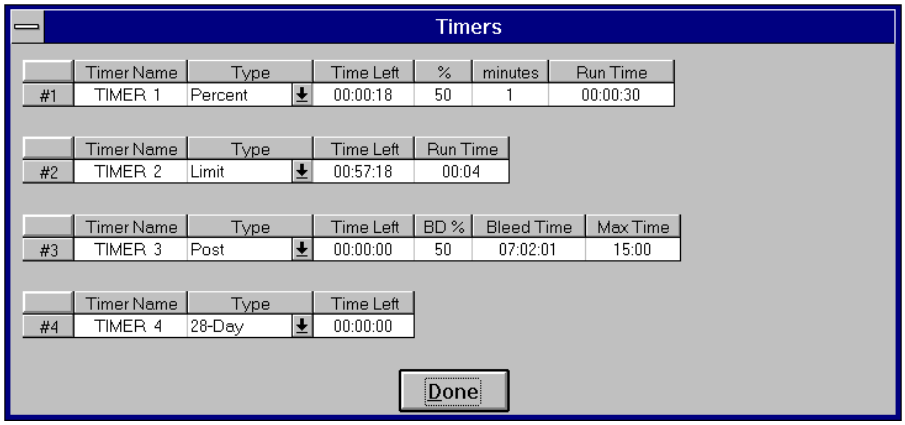
NOTE: This field is not available on select controller models. If ALARM TRACKING is not available, it defaults to INDEPENDENT.

BUTTON CHOICES:

Click on the DONE button with the mouse to exit this window.

Functions Menu Windows: Real Time Windows - *Timers*

The Timers window is accessed via the Functions menu, selecting Real Time Windows, selecting Timers. If you have no programmable timers on the selected DEVICE ID, the selection will appear gray (and not accessible) on the menu. The Timers window displays as follows:



PURPOSE

Displays information regarding timer feeds for up to a maximum of four (4) timers. Allows you to change timer feed types and parameters pertaining to the type of feed. Use **TAB** to move between fields. Unused fields appear in gray.

When changes are made to the values in this window, upon exiting the field, the field containing the edited value turns yellow while the new value being processed. Once the controller accepts the new value, the changed field appears in green until the window is exited.

If an invalid value is typed in a field, that field will display in red when you try to exit it.

FIELDS:

TIMER NAME

Displays the controller name for this timer. Note: This field appears gray when connected to some controllers.

TYPE

Use the pulldown menu to select feed type of DISABLED, LIMIT (Limit Timer), PERCENT (Percent Timer), POST (Post Blowdown %), PULSE (Pulse Timer) or 28-DAY (28-Day timer). Depending on type of feed selected, other fields must be completed. Fields not applicable to the selected TYPE appear in gray. NOTE: You can not disable or select a 28-Day timer type when connected to some controllers.

TIME LEFT

Counts down the on-time remaining in the active timer cycle. Displays the time in 24-hour format in hours minutes and seconds. This field is view only. It is displayed for all timer types. Note: This field appears gray when connected to some controllers.

Functions Menu Windows - Real Time Windows -Timers FIELDS, continued...

RUN TIME

RUN TIME is displayed for the LIMIT and PERCENT timer types, and has different functions for each. If TYPE = LIMIT, this is an editable field representing the hours and minutes of chemical feed. You must specify a RUN TIME when TYPE = LIMIT. If TYPE = PERCENT this field displays the total on-time for the feed portion of the cycle. Note: The RUN TIME is not reported for PERCENT timers on some controllers.

%

Percent of time (relative to minutes field) that chemical is being fed. Use **TAB** to access this field. You must specify % when TYPE = PERCENT. Range 0-100.

MINUTES

Number of minutes in a chemical feed cycle. Use **TAB** to access this field. You must specify MINUTES when TYPE = PERCENT. Range 0-120.

SET

Pulse Set. Used to set the trip point for pulses (i. e., the number of pulses for the chemical feed relative to COUNT). Use **TAB** to access this field. You must specify SET when TYPE = PULSE. Range 0-255.

You may optionally use the “spin button” to edit this field. To change the value, place the cursor in the field then double-click the left mouse button. The “spin button” appears at the right side of the field. Use the up and down arrows on the spin button to increase or decrease the value in the field.

COUNT

Pulse Count. A view only field that displays the current count of pulses to the Pulse SET point. Use **TAB** to access this field. Specify when TYPE = PULSE.

HH:MM:SS

Pulse run time. The amount of time that the feed relay will be turned on when the SET value is satisfied. Use **TAB** to access this field. You must specify HH:MM:SS when the TYPE = PULSE. In 24 hour format, enter inhibitor feed time in hours, minutes, seconds. Current maximum = 00:59:59.

You may optionally use the “spin button” to edit this field. To change the value, place the cursor in the field then double-click the left mouse button. The “spin button” appears at the right side of the field. Use the up and down arrows on the spin button to increase or decrease the value in the field.

BD%

Post Blowdown %. The percentage of time the relay will be turned on when the bleed shuts off. Use **TAB** to access this field. You must specify BD% when the TYPE = POST. Range 0-100%.

Functions Menu Windows - Real Time Windows - Timers FIELDS, continued...

BD%, continued...

You may optionally use the “spin button” to edit this field. To change the value, place the cursor in the field then double-click the left mouse button.

The “spin button” appears at the right side of the field. Use the up and down arrows on the spin button to increase or decrease the value in the field.

BLEED TIME

Bleed Time in hours, minutes and seconds. Note: This field is view only and will appear gray, if the connected controller does not support BLEED TIME setting.

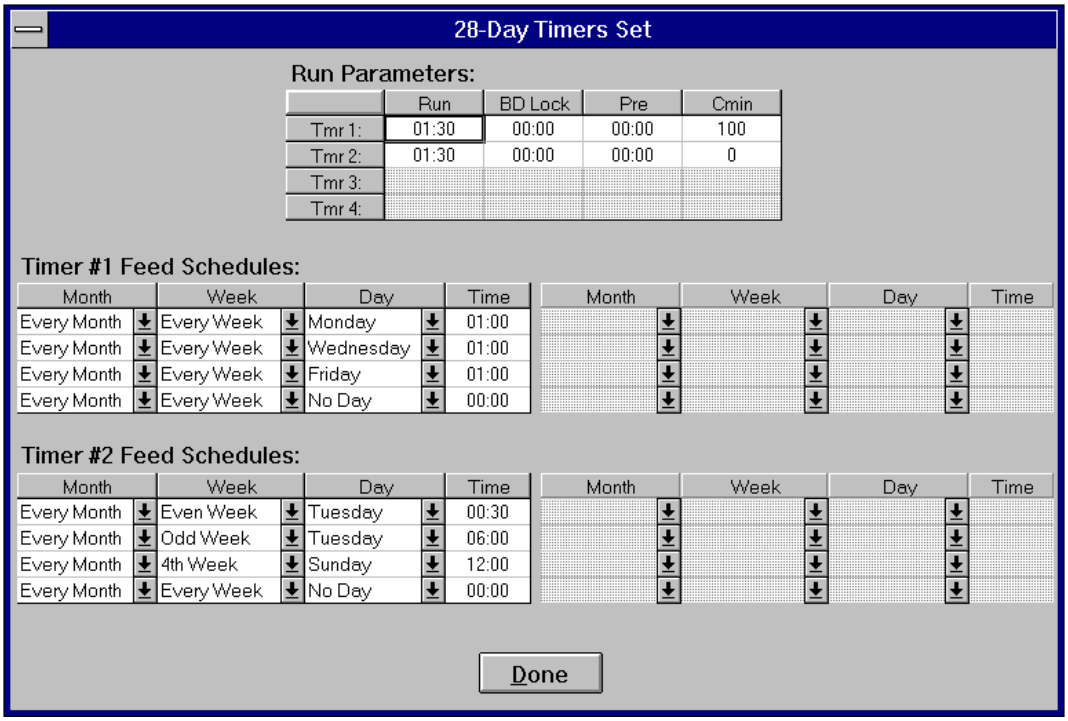
MAX TIME

Maximum time (limit time) for the Post Blowdown % timer cycle. This field is entered in hours and minutes.

BUTTON CHOICES:

Click on the DONE button with the mouse to save your changes and exit this window.

The 28-Day Timers Set window is accessed via the Functions menu, selecting Real Time Windows, selecting 28-Day Timers, selecting Set. If you have no 28-Day timers configured on the selected DEVICE ID, the selection will appear gray (and not accessible) on the menu. The 28-Day Timers Set window displays as follows:



PURPOSE

Sets RUN parameters for up to four 28-Day timer feeds, and allows you to establish schedules for each feed. Each 28-Day timer feed has four timers associated with it, as well as appropriate limit timer's cycle time. Use **TAB** to move between fields. Unused fields appear in gray.

FIELDS:

RUN

Timer Feed Cycle Period. In format of hours and minutes, specifies length of feed. Use **TAB** to enter this field. Cursor is placed immediately to the right of time. Use **BACKSPACE** key to erase current time, then type new time of feed.

You may optionally use the "spin button" to edit this field. To change the value, place the cursor in the field then double-click the left mouse button. The "spin button" appears at the right side of the field. Use the up and down arrows on the spin button to increase or decrease the value in the field.

PRE

28-Day Timer Pre-bleed Cycle Period, in hours and minutes format. The length of time before the 28-Day Timer feed that bleed relay is activated. If you do not desire a pre-bleed prior to timer feed, set this value to 00:00. Use **TAB** to enter this field. Cursor is placed immediately to right of time. Use

Functions Menu Windows - Real Time Windows - 28-Day Timers - Set FIELDS, continued...

PRE
continued...

BACKSPACE key to erase current time, then type new time of pre-bleed time.

You may optionally use the "spin button" to edit this field. To change the value, place the cursor in the field then double-click the left mouse button. The "spin button" appears at the right side of the field. Use the up and down arrows on the spin button to increase or decrease the value in the field.

BD LOCK

Blowdown Lockout. In hours and minutes format. The length of time controller will prevent the bleed from activating while the 28-Day Timer runs. Use **TAB** to enter this field. Cursor is placed immediately to right of time. Use **BACKSPACE** key to erase current time, then type new blowdown lock time.

You may optionally use the "spin button" to edit this field. To change the value, place the cursor in the field then double-click the left mouse button. The "spin button" appears at the right side of the field. Use the up and down arrows on the spin button to increase or decrease the value in the field.

CMIN

Conductivity minimum. In number of µS/CM (micro Siemens per centimeter). The lower limit at which the pre-bleed will be discontinued regardless of elapsed time. Set value to 0 to cause the controller to pre-bleed for the entire time specified. Use **TAB** to enter this field. Cursor is placed immediately to right of time. Use **BACKSPACE** key to erase current time, then type new conductivity minimum time.

You may optionally use the "spin button" to edit this field. To change the value, place the cursor in the field then double-click the left mouse button. The "spin button" appears at the right side of the field. Use the up and down arrows on the spin button to increase or decrease the value in the field.

MONTH

Selects the months during which the 28-day timer feed schedule will be used. Using the pulldown menu, select from EVERY MONTH, ODD MONTHS or EVEN MONTHS. Note: The MONTH field is not active for all controller models.

WEEK

Frequency of 28-Day Timer feed. Using pulldown menu, select from options presented: NO WEEK, 1ST WEEK, 2ND WEEK, 3RD WEEK, 4TH WEEK, EVEN WEEK, ODD WEEK, EVERY WEEK.

Functions Menu Windows - Real Time Windows - 28-Day Timers - Set FIELDS, continued...

DAY

Day of the week of 28-Day Timer feed, relative to the period specified in the WEEK field. Using pulldown menu, select from the options presented: NO DAY, SUNDAY, MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, SATURDAY, EVERY DAY. Note: Set value to NO DAY to prevent the 28-Day timer from activating.

TIME

In 24 hour format, time of day 28-Day Timer feed is to begin, relative to the DAY and PERIOD specified to left. Use **TAB** to enter this field. Cursor is placed immediately to right of time. Use **BACKSPACE** key to erase current time, then type new feed time using 24 hour format.

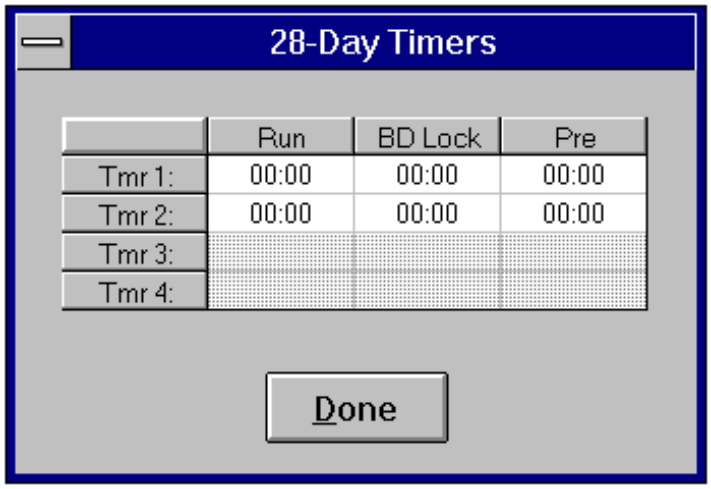
You may optionally use the "spin button" to edit this field. To change the value, place the cursor in the field then double-click the left mouse button. The "spin button" appears at the right side of the field. Use the up and down arrows on the spin button to increase or decrease the value in the field.

BUTTON CHOICES:

Click on the DONE button with mouse to save your changes and exit this window.

Functions Menu Windows: Real Time Windows - *28-Day Timers Run*

The 28-Day Timer Run window is accessed via the Functions menu, selecting Real Time Windows, selecting 28-Day Timers, selecting Run. If you have no 28-Day Timers configured on the selected DEVICE ID, the selection will appear gray (and not accessible) on the menu. The 28-Day Timer Run window displays as follows:



PURPOSE:
Automatically displays current status of 28-Day Timer Run functions such as Timer Run time, Pre-Bleed time and Blowdown-lock run time, Unused fields appear in gray. Note: Values in this window cannot be edited.

FIELDS:

RUN

For each of four possible 28-Day Timer feeds, displays (in format of hours and minutes) elapsed length of Timer feed specified for each feed on 28-Day Timers Set window.

PRE

Pre-bleed. For each of four possible 28-Day Timer feeds, displays (in format of hours and minutes) elapsed length of pre-bleed time specified for each feed on 28-Day Timers Set window.

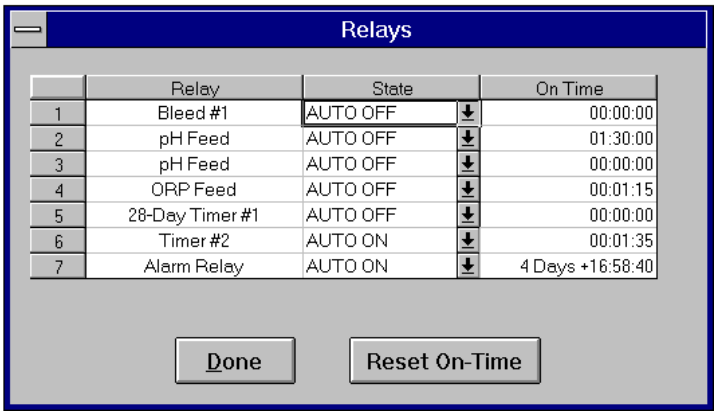
BD LOCK

Bleed Lockout. For each of four possible 28-Day Timer feeds, displays (in format of hours and minutes) elapsed length of blowdown lock specified for each feed on 28-Day Timer Set window.

BUTTON CHOICES:
Click on DONE with mouse to exit this window.

Functions Menu Windows: Real Time Windows - *Relays*

The Relays window is accessed via the Functions menu, selecting Real Time Windows, selecting Relays. The Relays window displays as follows:



PURPOSE:

Monitors the status of a maximum of six numbered relays and the Alarm relay currently on the controller. This window automatically displays the name, state and amount of time relay has been on since last reset. The RELAY field indicates if a relay is unused by displaying "UNUSED RELAY" to right of number. Note: On-Time information and options are not available when connected to a some controllers.

FIELDS:

RELAY

Automatically displays a description of the function this relay (relative to number at left) performs.

STATE

Automatically displays status of the relay shown at left. You may change this status by selecting from the choices on the pulldown menu: FORCED ON, FORCED OFF, AUTO OFF, AUTO ON.

When changes are made to the values in this window, upon exiting the field, the field containing the edited value turns yellow while the new value being processed. Once the new state is accepted by the controller, the changed field appears in green until the window is exited.

ON-TIME

Displays the total time (in days, hours, minutes and seconds) that the relay has been turned on since last reset.

BUTTON CHOICES:

RESET ON-TIME

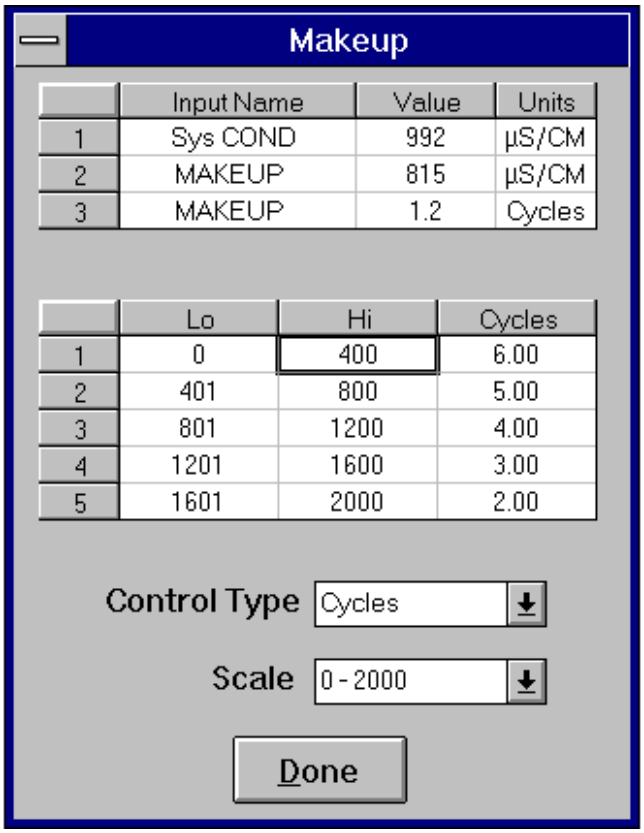
Resets the ON-TIME counters to 0's for all relays.

DONE

Click on the DONE button with mouse to exit this window.

Functions Menu Windows: Real Time Windows - *Makeup*

The Makeup window is accessed via the Functions menu, selecting Real Time Windows and selecting Makeup. If you have no makeup on the selected DEVICE ID, the selection will appear gray (and not accessible) on the menu. The Makeup window displays as follows:



PURPOSE:

Enables you to specify five ranges of conductivity, and corresponding cycles of concentration or setpoint level, for makeup water. Automatically displays the current values of the System Conductivity (in µS/CM) and Makeup Conductivity (in µS/CM and Cycles),Use **TAB** to move between fields.

FIELDS:

LO

Low start point for range. Range 1 low value is always zero. The next low value will automatically be the previous high value plus 1.

HI

High start point for range. Specify high set point for this range of conductivity. Use **TAB** to access this field, then type number of high set point. You may optionally use the "spin button" to edit this field. To change the value, place the cursor in the field then double-click the left mouse button. The "spin button" appears at the right side of the field. Use the up and down arrows on the spin button to increase or decrease the value in the field.

Functions Menu Windows - Real Time Windows - Makeup FIELDS, continued...

CYCLES

Cycles of Concentration. In two decimal place numeric format, specify cycles of concentration, relative to the LO and HI range specified to the left. Use **TAB** to access this field. This column is displayed whenever the Control Type selection box is set to Cycles. Note: This field displays one decimal place when connected to select controller models.

SETPOINT

Setpoint value relative to the LO and HI range specified to the left. Maximum value is 20,000. Use **TAB** to access this field. This column is displayed whenever the Control Type selection box is set to Setpoint.

SELECTION BOXES:

CONTROL TYPE

Use the pulldown menu to select the Makeup Control Type. The available choices are CYCLES and SETPOINT. Note: This selection is not available for all controllers. If this selection is not available, the control type is always Cycles.

SCALE

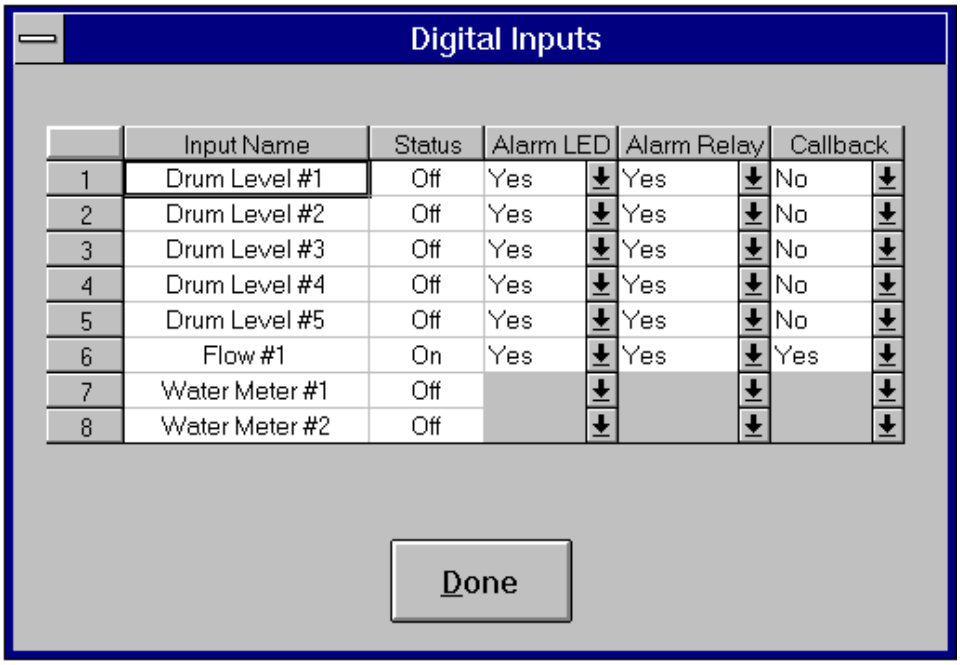
Use pulldown menu to select the scale for the Makeup Conductivity input from one of the following choices: 0-500, 0-2000, 0-5000, 0-10000, and 0-20000. Note: This selection is not available on some controllers.

BUTTON CHOICES:

Click on DONE button with mouse to save your changes and exit this window.

Functions Menu Windows: Real Time Windows - *Digital*

The Digital window is accessed via the Functions menu, selecting Real Time Windows and selecting Digital. If there are no digital inputs on the selected DEVICE ID, the selection will appear gray (and not accessible) on the menu. The Digital Inputs window displays as follows:



PURPOSE:

Automatically displays the name and current state for a maximum of eight (8) digital inputs. All alarm options for the digital input lines are selected in this window.

FIELDS:

INPUT NAME

Displays the controller name for the numbered input line. Note: the digital inputs listed here will change depending on the controller you are currently connected to.

STATUS

Displays the current state of the digital input. This field will display either ON or OFF.

ALARM LED

Alarm LED mode selection. Determines if events on this input line will affect the controller front panel Alarm LED. The two options available via the pulldown menu are NO and YES. NO - The Alarm LED is not activated with the 'ON' status of this digital input line. YES - The Alarm LED is activated with the 'ON' status of this digital input line.

Functions Menu Windows - Real Time Windows - Digital Inputs FIELDS, continued...

ALARM RELAY

Alarm relay mode selection. Determines if events on this input line will cause the controller to energize the alarm relay. The two options available via the pulldown menu are NO and YES. NO - The Alarm relay is not energized with the 'ON' status of this digital input line. YES - The Alarm relay is energized with the 'ON' status of this digital input line.

CALLBACK

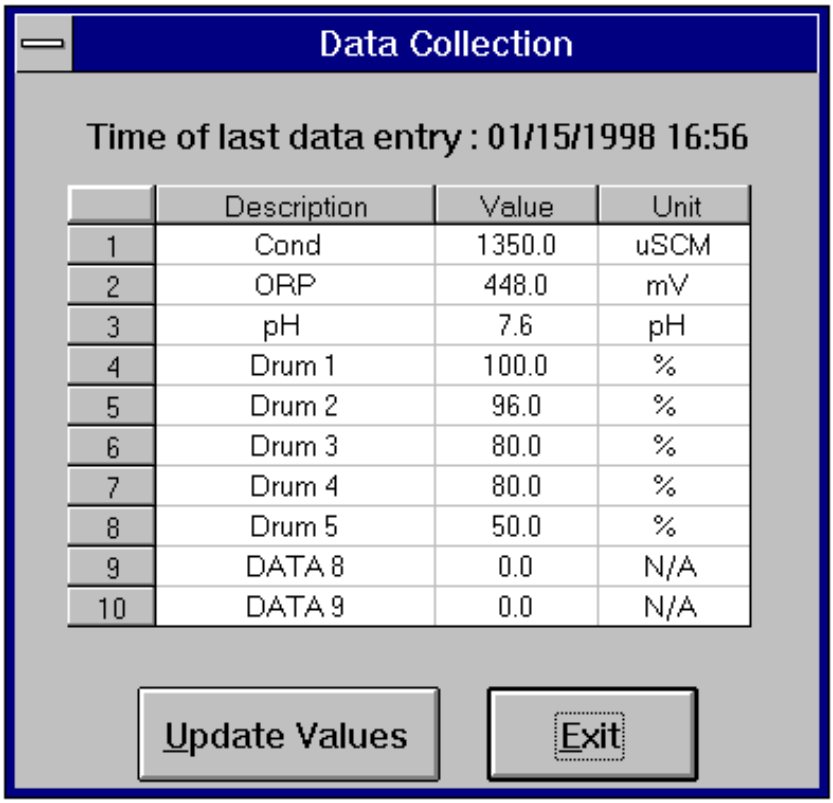
Alarm callback mode selection. Determines if events on this input line will cause the controller to initiate an alarm callback. The two options available via the pulldown menu are NO and YES. NO - An alarm callback is not initiated with the 'ON' status of this digital input line. YES - An alarm callback is initiated with the 'ON' status of this digital input line.

BUTTON CHOICES:

Click on the DONE button with the mouse to exit this window.

Functions Menu Windows: Real Time Windows - *Data Collection*

The Data Collection window is accessed via the Functions menu, selecting Real Time Windows and selecting Data Collection. If data collection channels are not available on the selected DEVICE ID, the selection will appear gray (and not accessible) on the menu. The Data Collection window displays as follows:



	Description	Value	Unit
1	Cond	1350.0	uSCM
2	ORP	448.0	mV
3	pH	7.6	pH
4	Drum 1	100.0	%
5	Drum 2	96.0	%
6	Drum 3	80.0	%
7	Drum 4	80.0	%
8	Drum 5	50.0	%
9	DATA 8	0.0	N/A
10	DATA 9	0.0	N/A

PURPOSE:

The Data Collection window gives you the ability to assign an entry description and unit type for up to ten (10) data collection channels. Data can then be entered in each channel for storage and display along side controller generated data history. The window displays the last values entered for each of the ten channels and the date and time at which they were entered.

When changes are made in the DESCRIPTION and UNIT fields, upon exiting the field, the field containing the edited value turns yellow while the new value being processed. Once the changes are accepted by the controller, the changed field appears in green until the window is exited. Changes made to the VALUE field are not processed by the controller until the UPDATE VALUES button is pressed.

FIELDS:

DESCRIPTION

Up to six (6) characters describing the name or type of data that will be entered into this channel. Characters can be any combination of upper or lower case alpha-numeric or the space, %, +, -, _ or /. All other characters should be avoided.

Functions Menu Windows - Real Time Windows - Data Collection FIELDS, continued...

VALUE

Enter the value to be saved for this data collection channel. The value can be any number in the range 0.0 - 999,999.9. Note: The entered value is not saved in controller data history when this field is exited. All ten data collection channels are time stamped and saved simultaneously when the UPDATE VALUES button is pressed. See the UPDATE VALUES heading for more information.

UNIT

Up to four (4) characters describing the units of measure for data that will be entered into this channel. Characters can be any combination of upper or lower case alpha-numeric or the space, %, +, -, _ or /. All other characters should be avoided. Note: If the data you will be manually entering has units that match one of the standard unit types available on the controller, it is recommended that you use an abbreviation from the following list: uSCM, pH, C, F, mA, mV, GAL, L, %, PPM, PSI, MilY or uM/Y. This will facilitate scaling of this data along side the controller generated data in the Data Graphs window.

BUTTON CHOICES:

UPDATE VALUES

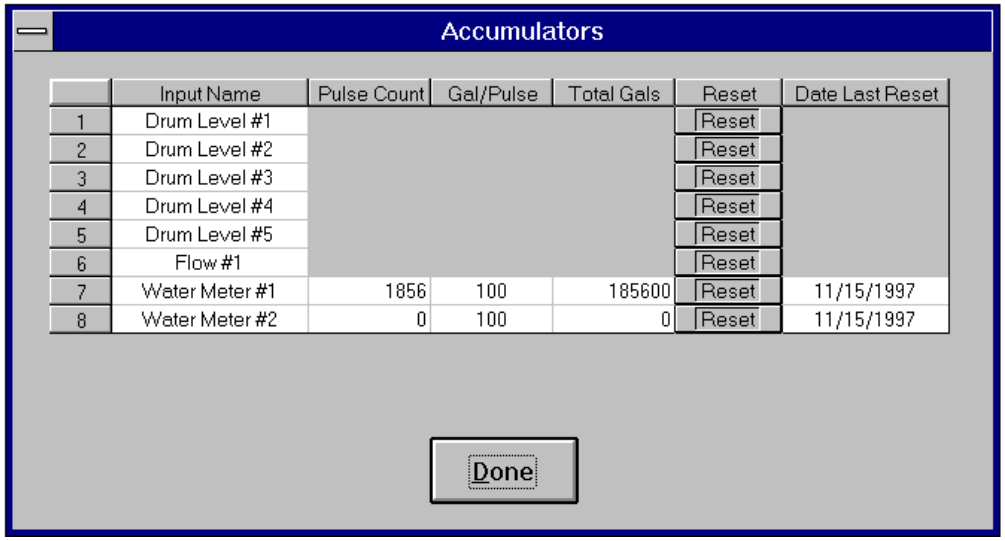
Clicking on the UPDATE VALUES button causes all ten data values to be time stamped and logged by the controller. When the button is pressed, all of the value fields will turn yellow. After the controller has accepted and stored the values, these fields will turn green and the top line of the window will indicate the current date and time. Following the next download of this controller these values will be available as part of the data history for this Device ID. Enter all of the values that you will be updating before clicking on the UPDATE VALUES button. Do not click on the Update values button once for each value.

EXIT

Clicking on the Exit button closes this window. This will cancel any changes that have been made to the VALUE fields since the last time the UPDATE VALUES button was pressed.

Functions Menu Windows: Real Time Windows - *Accumulators*

The Accumulators window is accessed via the Functions menu, selecting Real Time Windows and selecting Accumulators. If there are no accumulators on the selected DEVICE ID, the selection will appear gray (and not accessible) on the menu. The Accumulators window displays as follows:



PURPOSE:

Automatically displays the name , current pulse count, total gallons and date of last reset for a maximum of eight (8) accumulators. Pulse counts can be reset and the values for gallons per pulse entered.

FIELDS:

INPUT NAME

Automatically displays the controllers Accumulator name for the numbered input line.

PULSE COUNT

Automatically displays the count of all pulses accumulated since the last reset. To reset the count to zero (0), use the RESET button on the same line.

Note: The units for the next two fields will change depending on the current setting of the Display Option. If English(USA) is selected, the units will be gallons. If English (UK) is selected, the units will be litres. See the Communications Settings section of this manual for more information about the Display Option Setting.

GAL/PULSE
LITRES/PULSE

Enter the value, in gallons or litres, to be counted per pulse. Range = 0 - 1000. If this field is changed, upon exiting the field, the field turns yellow while the new value is being processed. Once the changes are accepted by the controller, the changed field appears in green until the window is closed and the value in the next column is recalculated to reflect the current values.

Functions Menu Windows - Real Time Windows - Accumulators FIELDS, continued...

TOTAL GALS
TOTAL LITRES

Total gallons or litres. Calculated product of the PULSE COUNT multiplied by GAL/PULSE (or LITRES/PULSE). Reflects the total number of gallons (or litres) counted since last reset.

RESET

This is a button field. Clicking on one of the reset buttons will reset the named accumulator on the same line. Once the controller accepts the reset. The PULSE COUNT and TOTAL GALS fields will be changed to zero (0). The DATE LAST RESET will be changed to the current date.

DATE LAST RESET

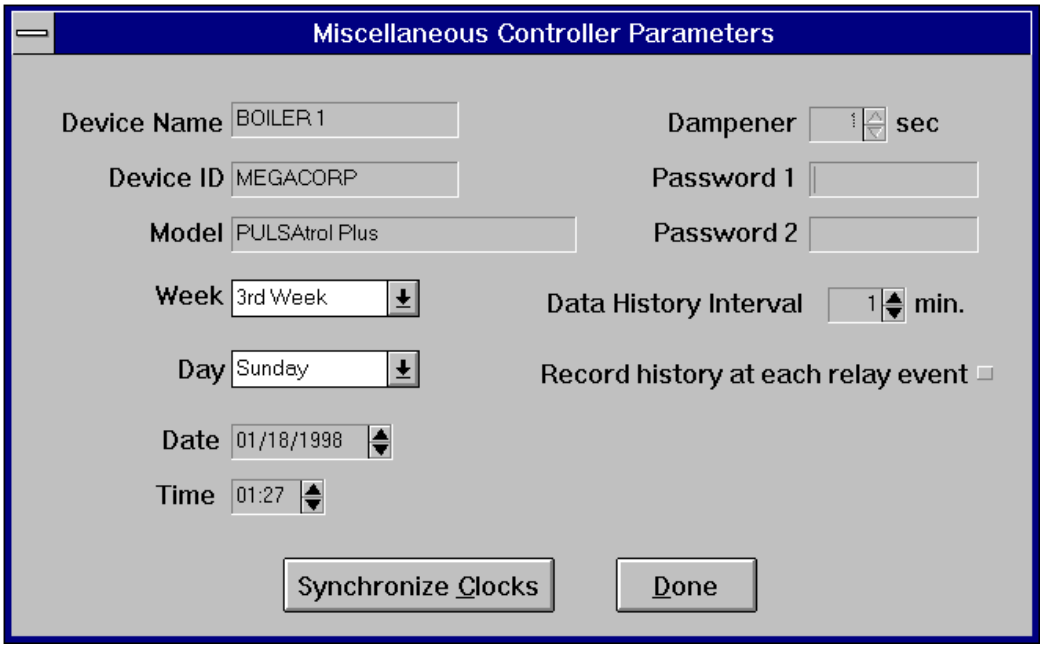
Shows the date, as stored in the controller memory, the last time this accumulator was reset. All values for this controller are based on the number of pulses accumulated since this date.

BUTTON CHOICES:

Click on the DONE button with mouse to exit this window.

Functions Menu Windows: Real Time Windows - *Miscellaneous*

The Miscellaneous Controller Parameters window is accessed via the Functions menu, selecting Real Time Windows, selecting Miscellaneous. The Miscellaneous Controller Parameters window displays as follows:



PURPOSE:

Automatically displays name, DEVICE ID and model number of currently connected device. Enables you to change the week, day, date and time for the "internal clock" on the currently connected DEVICE ID. Allows you to change HISTORY INTERVAL and DAMPENER settings for the currently connected device. Displays and allows you to edit the Level One and Level Two passwords associated with this DEVICE ID.

When changes are made to the values in this window, upon exiting the field, the field containing the edited value turns yellow while the new value is being processed. Once the changes are accepted by the controller, the changed field appears in green until the window is exited.

If an invalid value is typed in a field, that field will display in red when you try to exit it.

FIELDS:

DEVICE NAME

Displays the name of the currently connected device.

DEVICE ID

Displays the DEVICE ID of the currently connected device.

MODEL

Displays the model number of the currently connected device.

Functions Menu Windows - Miscellaneous Controller Parameters FIELDS, continued...

WEEK

The current week on the internal clock of the currently connected controller. Use the pulldown menu to select 1st WEEK, 2nd WEEK, 3rd WEEK or 4th WEEK.

DAY

The current day of the week on the internal clock of the currently connected controller. Use the pulldown menu to select MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, SATURDAY or SUNDAY.

DATE

The current date on the internal clock of the currently connected controller. Use **TAB** to access this field. Use **BACKSPACE** key to erase present entry, and type new date in MM/DD/CCYY format. You may optionally use the "spin button" to edit this field. Use the up and down arrows on the spin button to increase or decrease the value in the field.

TIME

The current time on the internal clock of the currently connected controller. Use **TAB** to access this field. Use **BACKSPACE** key to erase present entry, and type new time in 24 hour format. You may optionally use the "spin button" to edit this field. Use the up and down arrows on the spin button to increase or decrease the value in the field.

DAMPENER

Frequency of analog dampener. The stamps taken by the controller every history interval are averaged over the value of the dampener, as specified in this field in seconds format. Use **TAB** to access this field. Use **BACKSPACE** key to erase entry and type a new one in seconds format. You may optionally use the "spin button" to edit this field. Use the up and down arrows on the spin button to increase or decrease the value in the field. Note: This field is not available for all controllers.

PASSWORD 1

The Level One Password (Read/Write) for this device. If you change the password from this window, you must then access the CONNECTION MANAGEMENT and CONTROLLER SETUP windows and update the passwords shown on those displays, as they will not automatically reflect your changes entered here.

Use **TAB** to access this field. Use **BACKSPACE** key to erase the current entry and type a new one.

Important Note: See "Passwords" section of this manual for an explanation of password levels and for rules governing passwords.

Functions Menu Windows - Miscellaneous Controller Parameters FIELDS, continued...

PASSWORD 2

The Level Two Password (Read only) for this device. If you change the password from this window, you must then access the CONNECTION MANAGEMENT and CONTROLLER SETUP windows and update the passwords shown on those displays, as they will not automatically reflect your changes entered here.

Use **TAB** to access this field. Use **BACKSPACE** key to erase the current entry and type a new one.

Important Note: See "Passwords" section of this manual for an explanation of password levels and for rules governing passwords.

DATA HISTORY INTERVAL

The time interval between sequential data points for this controller. Specified in minutes. The controller will record a complete set of data points for all inputs, digitals and relays once every X minutes. Where X is the DATA HISTORY INTERVAL. Use **TAB** to access this field. Use the **BACKSPACE** key to erase entry and type a new one in minutes format. You may optionally use the "spin button" to edit this field. Use the up and down arrows on the spin button to increase or decrease the value in the field. Range is 1-180. Note: If the DATA HISTORY INTERVAL is changed, you may need to adjust the AUTOPOLL FREQUENCY for this Device ID. See the "Controller Setup" section of this manual for more information.

RECORD HISTORY AT EACH RELAY EVENT

Click on this field (or press the spacebar) if you want this controller to record a data history record every time a relay changes state. A red checkmark appears in this field. Click again (or press the spacebar again) if you wish to remove the selection. Note: This field is not available when connected to a some controllers. If this field is checked, the optimum autopoll frequency can not be determined for this controller. See AUTOPOLL FREQUENCY in the "Controller Setup" section of this manual for more information.

BUTTON CHOICES:

SYNCHRONIZE CLOCKS

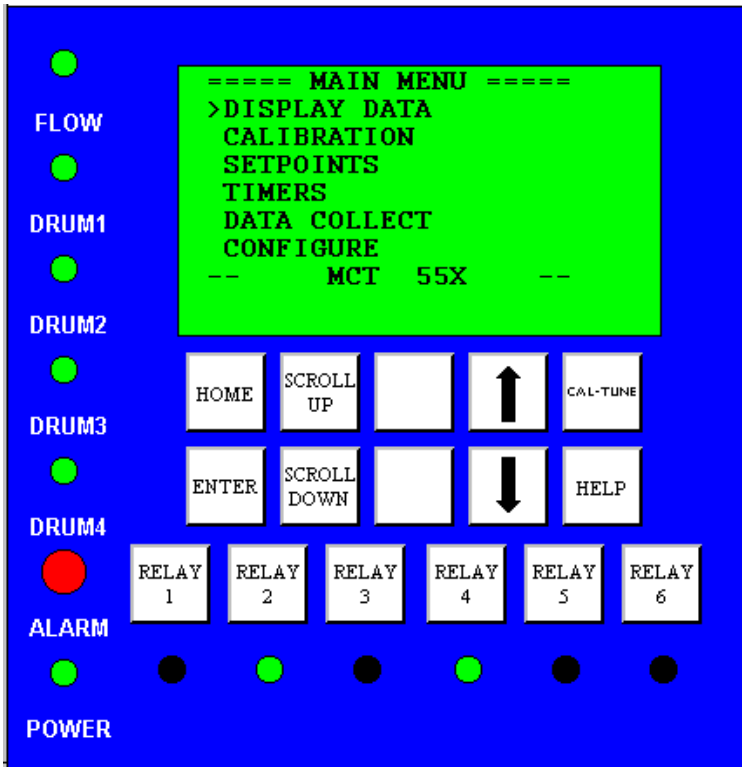
Clicking on this button will cause the date and time to be read from your computers internal clock. These values will then be used to update the WEEK, DAY, DATE and TIME fields in this window. Any fields that are altered will turn green once the controller accepts the changes.

DONE

Click on this button to exit this window and return to the Functions Menu.

Functions Menu Windows: Real Time Windows - *Controller Front Panel*

When on-line with select controller models, the Controller Front Panel window will automatically appear as follows.



PURPOSE:

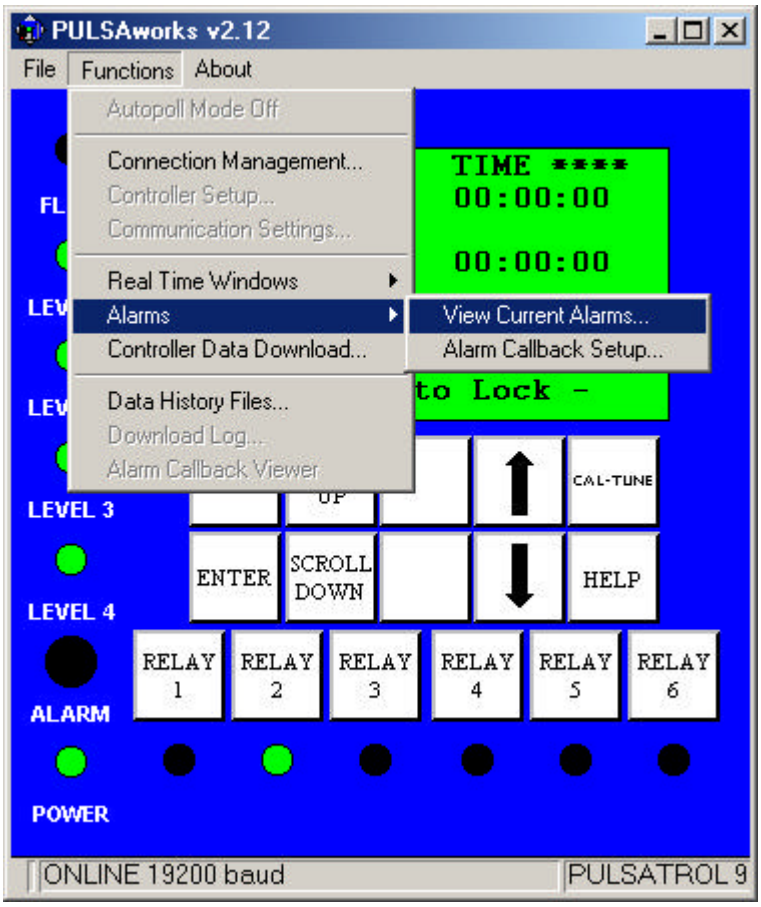
This window provides access to all operations you can perform by pressing buttons on the physical controller. Clicking on any of the buttons on the screen produces the exact same result as pressing the corresponding button, with the exception of contrast, on the physical controller. The contrast buttons have no effect. The screen updates continuously so the text displayed in the window matches the text that is currently displayed on the controller. This window can not be closed. It will close automatically when you disconnect or begin a download. All other Real-Time Functions are still available while the Controller Front Panel window is displayed.

Note: This window is only available if you are running the program under Windows 95. The screen display may differ depending on the type of controller that is currently connected. Refer to your controller hardware manual for information on all of the options that are available to you.

Functions Menu Windows: *Alarms*

Choosing Alarms from the Functions menu yields a submenu enabling you to access two other windows used for setting and viewing alarms.

The submenu appears as follows:



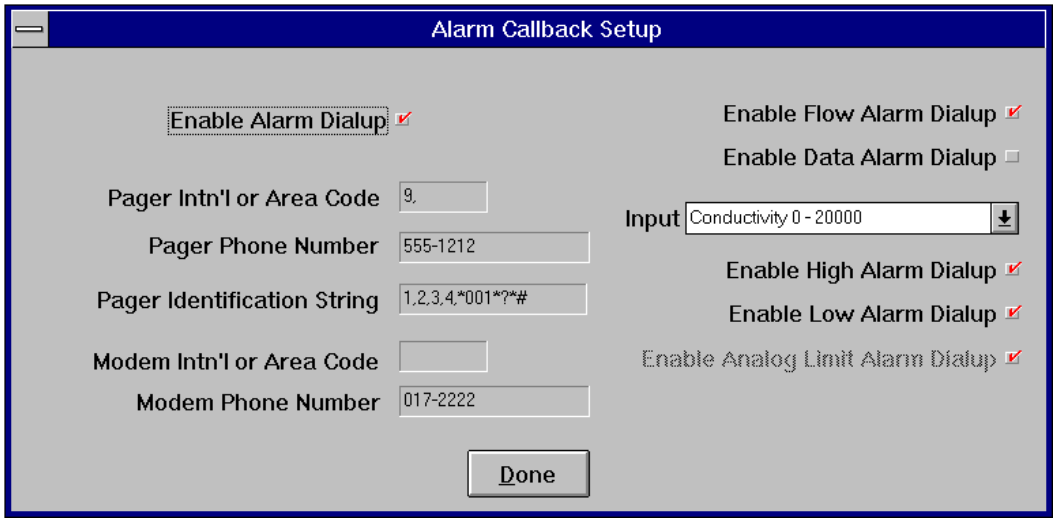
From this submenu you may access two different windows.

The choices on the submenu are: View Current Alarms and Alarm Callback Setup.

If a particular option is not present on the controller you are currently connected to, that selection on the menu will be disabled.

Complete information on the two alarm windows follows.

The Alarm Callback Setup window is accessed via the Functions menu, selecting Alarms and selecting Alarm Callback Setup. The Alarm Callback Setup window displays as follows:



PURPOSE:

Select controller models are capable of dialing into a pager and/or modem that is controlled by this program. The setup of this function is accomplished through the Alarm Callback Setup window. Pager and/or modem phone numbers are entered and specific alarm conditions are enabled for dialup. Use [TAB] to move between fields. Some fields appear "grayed" if not applicable to the current input.

When the controller detects an alarm condition that is selected for Alarm Callback, it dials first the pager and then the modem. When the program detects a call from the controller it answers the phone, connects and downloads the alarm condition file. Once the file is successfully transmitted, the controller will not re-call the alarm until it you connect to it either manually, or with an Autopoll download. You can view the transmitted alarm information by selecting Alarm Callback Viewer from the Functions menu.

A word about pagers...

Most paging systems currently in use were designed for human interaction. That is, the human can listen until the paging system answers the phone, listen for the voice message, type in the message and listen for the confirmation tone. Unfortunately, automating this process is difficult to accomplish reliably. Unlike a standard modem-to-modem connection where the modems exchange and confirm carriers, a modem must 'blind dial' into a paging system, wait a certain amount of time, enter the message and hang-up. Without any modem detectable confirmation tones, it is impossible for the controller to know that the message was transferred successfully. The pager number will be tried 1 time. You should not expect 100% pager message throughput. Follow the steps outlined below to obtain the highest possible success rates.

FIELDS:

ENABLE ALARM DIALUP

Click on check box to activate the Alarm Dialup for the currently connected DEVICE ID. This action makes other fields active and is required for Alarm Dialup activation.

Functions Menu Windows - Alarms - Alarm Callback Setup FIELDS, continued...

PAGER INTN'L OR AREA CODE

This field is for an international prefix and/or area code related to the pager telephone number dialed in the event of an alarm condition. This field is not required. Use it only if you must dial an international or area code to access your pager. A comma ',' may be used to insert a 2 second pause at any point. Consider the following examples:

1) You are in the United States and are using a national paging service with the toll free number: 1(800)123-1234. You would enter '1800' here.
2) You are setting up a controller in the US to dial a pager in Mexico. The pager number is: 011-52-65-123-1234. You would enter '0115265' here.
3) You are setting up a controller on a private PBX telephone system. Your pager number is local (e.g., 555-1234). You must dial a '91' and wait 4 seconds to gain access to an outside line. You would enter '91,,' here.

PAGER PHONE NUMBER

The telephone number of the pager to be dialed in the event of an alarm condition. May be a maximum of 15 digits. You may use a comma ',' to insert a 2 second pause anywhere in the string. For example, to dial the pager number 555-1234 you would enter '5551234' here. If you leave this field blank, the PULSAtrol™ will disable pager dialout on alarm. If only a pager phone number is entered (i.e., the modem phone number field is blank), the pager number will be dialed one time for every alarm. If both the modem and pager phone number fields are filled, the pager number will be dialed once for every 5 modem connection attempts.

PAGER IDENTIFICATION STRING

This string will appear on your pager when the controller is paging you. Use this string to signify the Controller and Alarm Number to the paging system. Any occurrence of the question mark character (i.e., '?') will cause the alarm number that triggered the callout event to appear in the paging message. Most paging systems use the asterisk (i.e.,*) to indicate a dash (i.e., '-') and the pound sign (i.e., '#') to indicate the end of message. The default value for this field is '*001*?*#'. If High System Conductivity (alarm 00) has caused the alarm callback condition the page would appear like this: '001-00-'. Timing of entry of the Pager Identification String is critical to the successful transference of the page. Remember, your paging system will not always answer the phone in the same number of rings! You will have to experiment by adding commas (i.e., ',') at the beginning of the paging string to wait for the phone to be picked up and the system to become ready to accept your Identification String. Follow this procedure:

Functions Menu Windows - Alarms - Alarm Callback Setup FIELDS, continued...

PAGER IDENTIFICATION STRING
continued...

1) Measure how long it takes for your pager to answer the phone and become ready for your Identification String. Dial your pager number with a standard voice telephone. When you press the last digit of the phone number start timing. Stop your watch when the system is ready to accept the first character of your Identification String. Record the number. Repeat this step multiple times to obtain an average time.

2) Divide the number obtained in step 1 in half. This is the number of commas to place in front of your ID String. For example, if it took 12 seconds for your paging system to answer the phone and become ready to accept your ID, then you would insert 6 commas in front of the ID String (e.g., ',,,,,,*001*?*#').

3) You can increase the reliability of your page by interspersing numbers between the commas. For example: ',,1,2,3,4,*001*#'. This causes characters (i.e., 1, 2, 3, etc.) to be transmitted even while the phone is ringing. But it guarantees that a character will be transmitted at some point when the system is ready to accept the ID string. The page message will look slightly different depending on how many rings it takes the paging system to pick up the phone. For example, in some cases it may appear as '1234-001-00-' and in others it may appear as '34-001-00-'. If you can accept the fact that you must only pay attention to the last 8 characters, the improvement in pager throughput is worth the effort.

4) You may also be able to improve reliability by interspersing all of the characters with commas (i.e., ','). For example try using: ',,,1,2,*,0,0,1,*,?,*'. Paging system were designed with slower human dialing characteristics in mind.

MODEM INTN'L OR AREA CODE

This field is for an international prefix and/or area code related to the modem telephone number to be dialed in the event of an alarm condition. Please see the guidelines (above) for PAGER INTN'L OR AREA CODE.

MODEM PHONE NUMBER

This is the number of a modem attached to a computer running this program. Please see guidelines for PAGER PHONE NUMBER. If an activated alarm condition occurs, this phone number will be re-dialed every minute until a connection is made. If a pager number is also present, the pager number will also be re-dialed after every 5 modem attempts.

ENABLE FLOW ALARM DIALUP

Clicking the mouse (or spacebar) causes a red checkmark to appear and selects this option which activates the option of having the alarm dialup function take place in the event of a FLOW ALARM. Click the mouse (or press spacebar) again if you wish to disable the selection.

Functions Menu Windows - Alarms - Alarm Callback Setup FIELDS, continued...

ENABLE DATA ALARM DIALUP

Clicking the mouse (or spacebar) causes a red checkmark to appear and selects this option which activates the option of having the alarm dialup function take place in the event of a DATA ALARM. Click the mouse (or press spacebar) again if you wish to disable the selection.

Most controller models only store 372 data points. The controller will collect a data point as specified by the history interval you have defined. If the history interval is one minute, this means that only 372 minutes can be stored before the data is overwritten. When you approach the point where data will be overwritten because it has not been downloaded for a while, this alarm results.

Obviously, it is wise to set a reasonable history interval, to avoid an alarm every 372 minutes. A greater history interval will avoid this problem. Also, downloading data on a regular basis will help if you must use a short interval.

INPUT

Type of input, i.e., analog inputs and inhibitor timers. Using the pulldown menu, select the input (Conductivity, inhibitors, etc.) to be associated with this alarm callback setup.

ENABLE HIGH ALARM DIALUP

Applies to all analog inputs, and will be disabled if the input is not analog. Clicking the mouse (or spacebar) causes a red checkmark to appear and selects this option which activates the alarm dialup function in the event of a HIGH ALARM. Click the mouse (or press spacebar) again if you wish to disable the selection.

ENABLE LOW ALARM DIALUP

Applies to all analog inputs, and will be disabled if the input is not analog. Clicking the mouse (or spacebar) causes a red checkmark to appear and selects this option which activates the alarm dialup function in the event of a LOW ALARM. Click the mouse (or press spacebar) again if you wish to disable the selection.

ENABLE ANALOG LIMIT ALARM DIALUP

Applies to select analog inputs, and will be disabled if the input is not analog. Clicking the mouse (or spacebar) causes a red checkmark to appear and selects this option which activates the alarm dialup function in the event an ANALOG LIMIT TIME level is reached. Click the mouse (or press spacebar) again if you wish to disable the selection.

ENABLE INHIBITOR LIMIT ALARM DIALUP

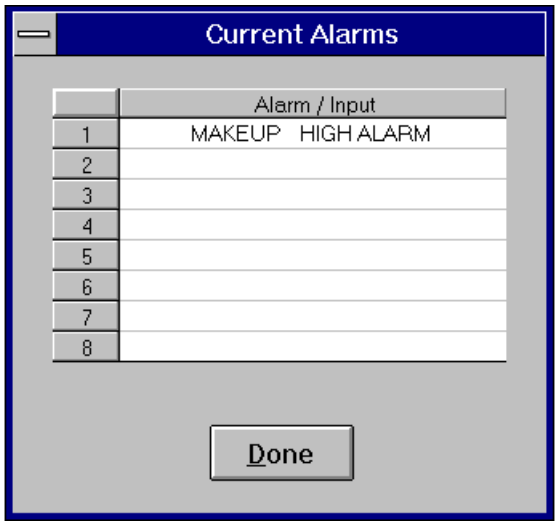
Applies to timers on select controller models, and will be disabled if the input is not a timer. Clicking the mouse (or spacebar) causes a red checkmark to appear and selects this option which activates the alarm dialup function in the event a TIMER LIMIT level is reached. Click the mouse (or press spacebar) again if you wish to disable the selection. This field will only appear when connected to a controller which supports this type of alarm callback.

BUTTON CHOICES:

Press “DONE” button with mouse to save your changes and exit this screen.

Functions Menu Windows: Alarms - *View Current Alarms*

The View Current Alarms window is accessed via the Functions menu, selecting Alarms, selecting View Current Alarms. The Current Alarms window displays as follows:



PURPOSE:
Displays a list of current alarm conditions. Includes alarms that do not call back automatically.

FIELD:

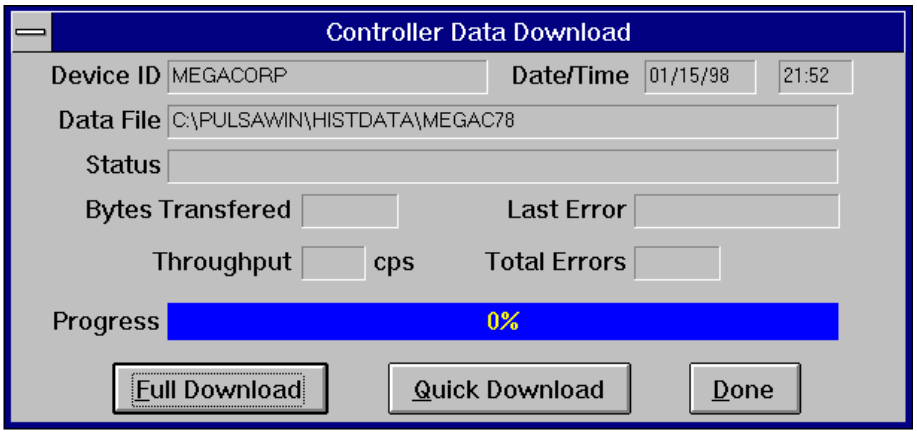
ALARM/INPUT

Display shows alarm and associated input for selected DEVICE ID. For example, “MAKEUP HIGH ALARM” would indicate a makeup level that is in the high alarm state.

BUTTON CHOICES:
Click on DONE with the mouse to exit this window.

Functions Menu Windows: Controller Data Download

The Controller Data Download window is accessed via the Functions menu, by selecting Controller Data Download. The Controller Data Download window displays as follows:



PURPOSE:

Enables you to download all or some of the stored data history from the connected controller. Provides information regarding status, download progress and throughput statistics once a download has begun.

If you attempt to download data without having first specified a data file name in the CONTROLLER SETUP window, a dialog appears giving an error, the download process terminates, you are exited from this window and returned to the menu.

FIELDS:

DEVICE ID

Displays the name of the currently connected device.

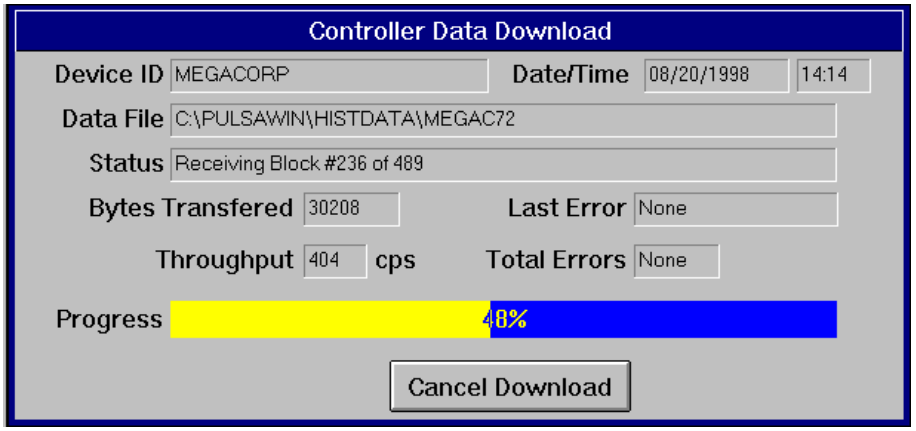
DATE/TIME

Displays the current date and time.

DATA FILE

Displays the name of the file into which the downloaded data will be stored. This file is defined in the CONTROLLER SETUP window.

Once a download has begun, the remaining fields display information and the window will appear similar to the following:



Functions Menu Windows - Controller Data Download FIELDS, continued...

STATUS

Displays a verbal description of the status of the download progress. While the controller is downloading, this field shows the total number of data blocks and the number of blocks that have been transferred.

BYTES TRANSFERRED

The total number of bytes transferred. This is how many bytes of raw data have been transferred to the RAWDATA.DAT file in your data history directory.

THROUGHPUT

Automatically displays the calculated transfer throughput in characters per second (cps). The throughput value will vary depending on the connection type and speed, as well as the type of controller being downloaded.

LAST ERROR

Displays a verbal description of the last transfer error during the current download. If no errors have been encountered, this field will display "None". Controller downloads use a standard XMODEM error checking protocol to ensure reliable data transfer between the controller and the computer. This field shows the type and block number for the last encountered error. These blocks are then automatically transferred again so the data history remains error free.

TOTAL ERRORS

Displays the total number of errors that have been encountered during the current download. If no errors have been encountered this field will display "None". Errors typically indicate problems with the connection (i.e. poor quality phone line, serial cable interference, etc.). If you are averaging more than two (2) errors per download, check all cabling and phone line connections. If the problem persists, contact technical support for assistance.

PROGRESS

Once the downloading of raw data has begun, a yellow "progress bar graph" slides from left to right providing visual indication of percentage of completion of download routine. This can take a few minutes, perhaps up to eight or so. The time required to download a controller will vary depending on the connection type, baud rate, type of download being performed and type of controller being downloaded.

BUTTON CHOICES:

FULL DOWNLOAD

Click on this button when you have reviewed the information displayed in this window, and you are ready to begin the download process. This will download all of the data history that is currently stored in the controller's memory. This button becomes disabled once the download process is begun.

Functions Menu Windows - Controller Data Download BUTTON CHOICES, continued...

QUICK DOWNLOAD

Click on this button when you have reviewed the information displayed in this window, and you are ready to begin the download process. This will download the last fifty (50) data history records stored for each input or relay on this controller. This button becomes disabled once the download process is begun. Note: QUICK DOWNLOADs are not available when connected to some controllers. The QUICK DOWNLOAD button will appear gray and be disabled for these controllers.

CANCEL DOWNLOAD

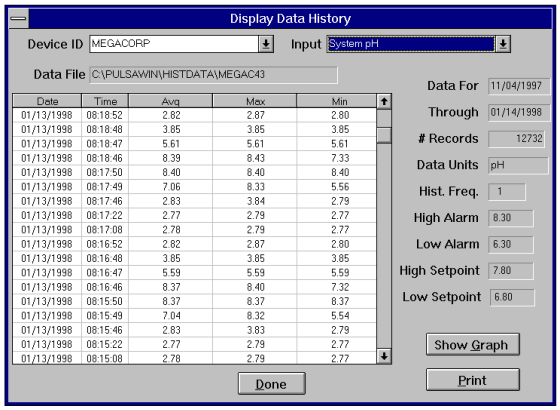
This button appears once a download has begun. Clicking on this button stops the current download and resets the Controller Data Download window.

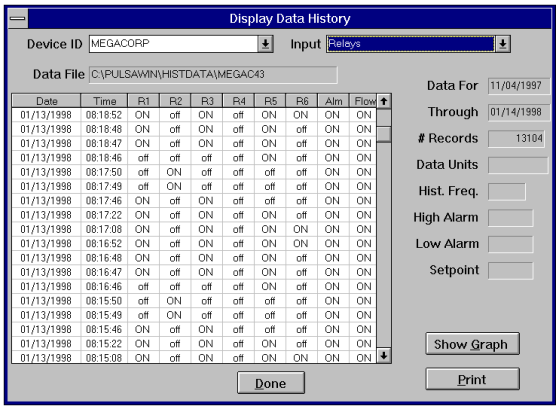
DONE

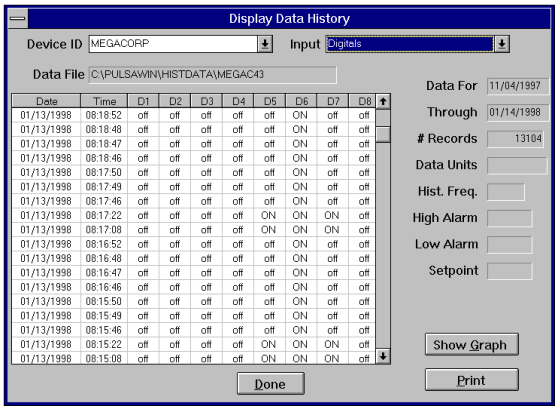
This button is disabled during the download process. Click on the DONE button with the mouse to close this window after the “progress bar graph” indicates the download is 100% complete and the STATUS displays “Done”.

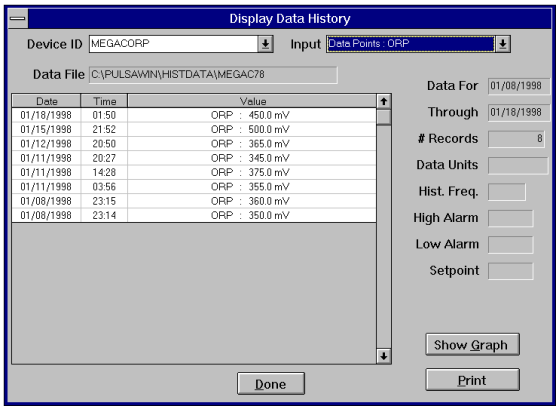
Functions Menu Windows: Display Data History

The Display Data History window is accessed via the Functions menu, by selecting Display Data History. The Display Data History window displays as follows.









PURPOSE:

Allows you to choose a device and select an input for that device (such as pH, Conductivity, etc.), then reads history data from database and displays it in the window. Allows you to print all or a portion of the displayed data. Choose a device via the pulldown menu in the DEVICE ID field, and select an input for that device (such as pH, Conductivity, etc.) via the pulldown menu in the INPUT field. Use **TAB** to move between fields.

The window displays different fields, depending on type of input selected.

If a download has never been done for the selected device, a dialog will appear informing you of this, and you will be returned to the window to select another DEVICE ID and/or INPUT.

FIELDS:

DEVICE ID

List of configured devices. Using pulldown menu, select device for which you wish to display data history.

INPUT

List of inputs being monitored, such as pH, Conductivity, etc. Select input via pulldown menu.

Functions Menu Windows - Display Data History FIELDS, continued...

DATA FILE

Shows the name of the file in which the displayed information resides.

DATA FOR

Shows last date displayed data was collected.

THROUGH

Shows first date displayed data was collected.

 # RECORDS

Shows number of records of collected data for the displayed input. There is one record per line on the display.

DATA UNITS

When applicable, automatically shows unit of input. For example, when input is Conductivity, DATA UNIT is µS/CM. When INPUT is Relay, DATA UNIT field appears blank.

HIST. FREQ.

When applicable, automatically shows (as a number of minutes) the value entered in the HISTORY INTERVAL field in the MISCELLANEOUS CONTROLLER PARAMETERS window for specified DEVICE ID.

SET POINT

When applicable, shows value entered in SET POINT field in the ANALOG INPUTS window for specified INPUT. When viewing data for a dual setpoint pH input, this field is replaced by the fields HI SETPOINT and LO SETPOINT.

HIGH ALARM

When applicable, shows value entered in HI ALM field in the ANALOG INPUTS window for specified INPUT.

LOW ALARM

When applicable, shows value entered in LO ALM field in the ANALOG INPUTS window for specified INPUT.

DATE

Displays date(s) (in descending order when applicable) that data for this DEVICE ID and INPUT were recorded.

TIME

Displays times when data for this DEVICE ID and INPUT were recorded.

MAX AVG MIN

When applicable, displays unit values (recorded between previous time stamp and the time and date to the left) for specified DEVICE ID and INPUT.

Functions Menu Windows - Display Data History FIELDS, continued...

VALUE

When viewing the data for a manually entered data collection channel, the description, number and units are all listed under the column VALUE.

R1 - R6

When INPUT is RELAY, displays the status (ON or OFF) for the numbered relay at the time and date on the same line. Note: If the relay is activated at any time over the interval (current time stamp to previous time stamp), the relay is considered on for the entire interval.

ALM

Column heading for the status (ON or OFF) data for the Alarm relay.

FLOW

Column heading for the status (ON or OFF) data for the Flow input.

D1 - D8

When INPUT is DIGITAL, displays the status (ON or OFF) for the numbered digital input at the time and date on the same line.

TO SCROLL THROUGH DATA HISTORY DISPLAY:

Use mouse to click on up and down arrows on scroll bar.

BUTTON CHOICES:

SHOW GRAPH

Clicking on the SHOW GRAPH button with the mouse displays the history data in graph format. If you have not purchased the graphics option, the SHOW GRAPH button will appear gray and this function will not be available to you.

Even if you have purchased the graphics option, the SHOW GRAPH button appears gray until an INPUT is selected.

For complete information regarding graphics, please read the following section in this manual.

PRINT

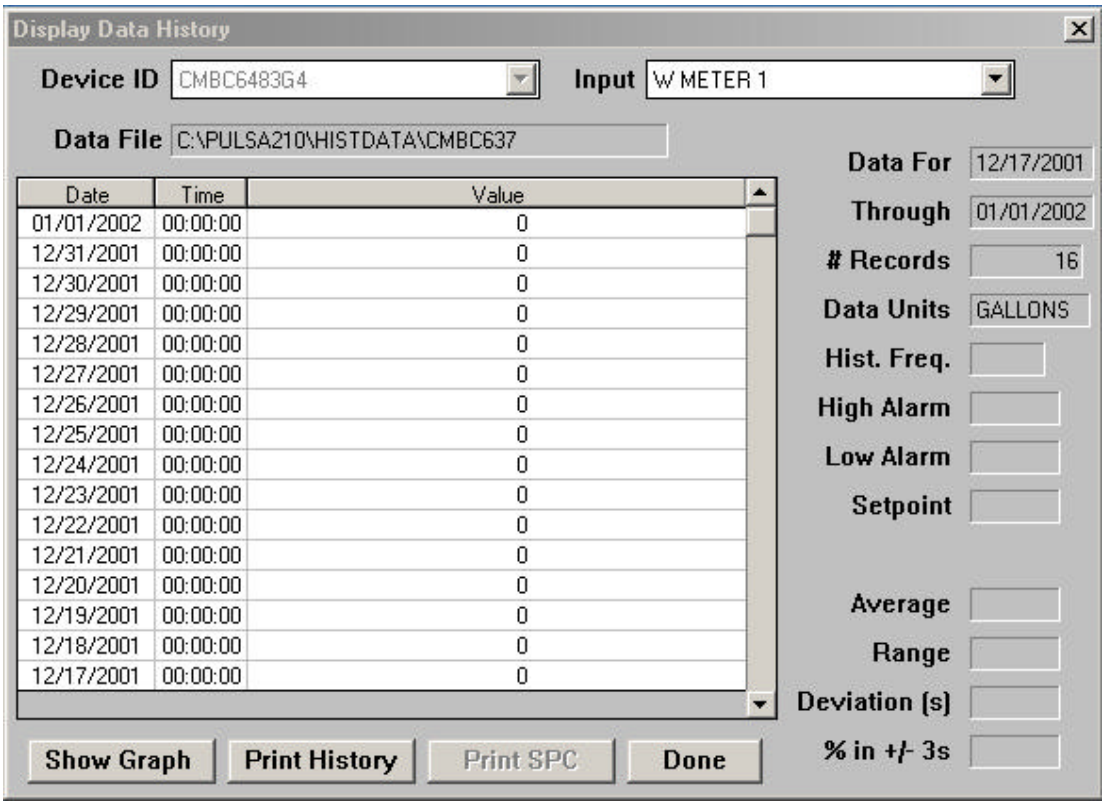
Prints the selected data on the default printer. A dialog appears to show the status of the print job. Before clicking on the PRINT button, a range of data must be selected. To select all data, place the mouse pointer on one of the column headings (e.g. Date) and click the mouse button. To select a range of data, place the mouse pointer on the first line you wish to print and click the mouse button. Then place the mouse pointer on the last line you wish to print, hold the **SHIFT** key and click the mouse button. This will highlight all data between the two selected lines. Once the correct data is highlighted, click on the PRINT button. To change the default printer use the PRINTER SETUP option on the FILE menu.

DONE

Click on DONE button with mouse when you are finished and wish to exit this window.

Functions Menu Windows: Display Data History

Using controller software version 2.20 or later, Water Meter data can be accessed by selecting the appropriate selection (i.e. W METER 1) via the Input drop-down box in the Display Data History window. The Water Meter Data window displays as follows:



PURPOSE:

To allow a user to view the total water used per 24-hour period for a Water Meter (PULSAworks supports up to a maximum of 4 Water Meters). To allow a user to print all or a portion of the data displayed on the screen.

The window is only available when using controller software version 2.20 or later.

FIELDS:

DATE

The month, day and year the data was recorded. The topmost date is representative of the water used over the last 24-hour period, starting at midnight.

TIME

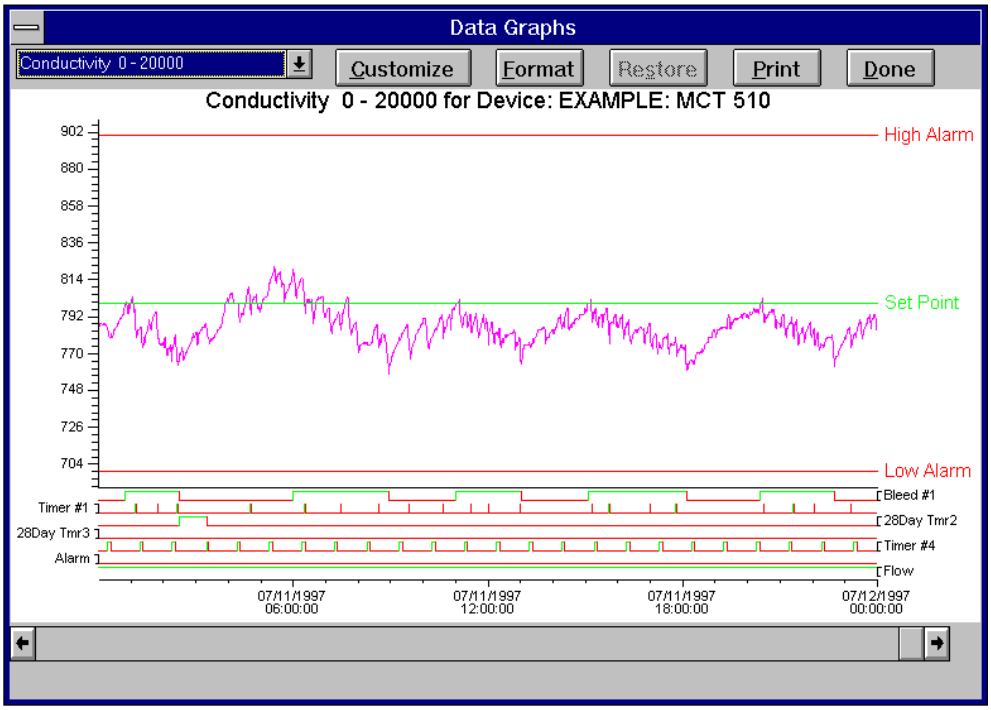
The time the data was recorded. For Water Meter data this time will always be 00:00:00 because new data is recorded in the PULSAtrol box every 24 hours at midnight.

VALUE

The number of Gallons or Liters of water used for a given 24-hour period.

Functions Menu Windows: Display Data History - *Data Graphs*

The Data Graphs window is accessed by clicking on the SHOW GRAPH button on the Display Data History window. A typical display of the Data Graphs window appears as follows:



PURPOSE:

The Data Graphs window is used to view your data history in graphical format. The Customize button allows you to select any combination of inputs and relays for display. The Format button allows you to change the colors and manner in which the data will be drawn. The Restore button redraws the graph at the default time format and scale effectively canceling any zoom operations. The status bar provides a constant update of the mouse pointer coordinates, in data units, any time it is located within the data area. Up to 25 custom graph formats can be saved and recalled by name for use with the current data. The entire contents of the data area can be output to any connected printer using the print function. A pulldown menu allows you to quickly select any single input or named custom graph. Use **TAB** to move between buttons and to access the pulldown menu.

Accessing The Data Graphs Window

The Data Graphs window is accessed via the SHOW GRAPH button located in the lower right corner of the Display Data History window. The SHOW GRAPH button will be gray and inactive if there is no data for the selected DEVICE ID.

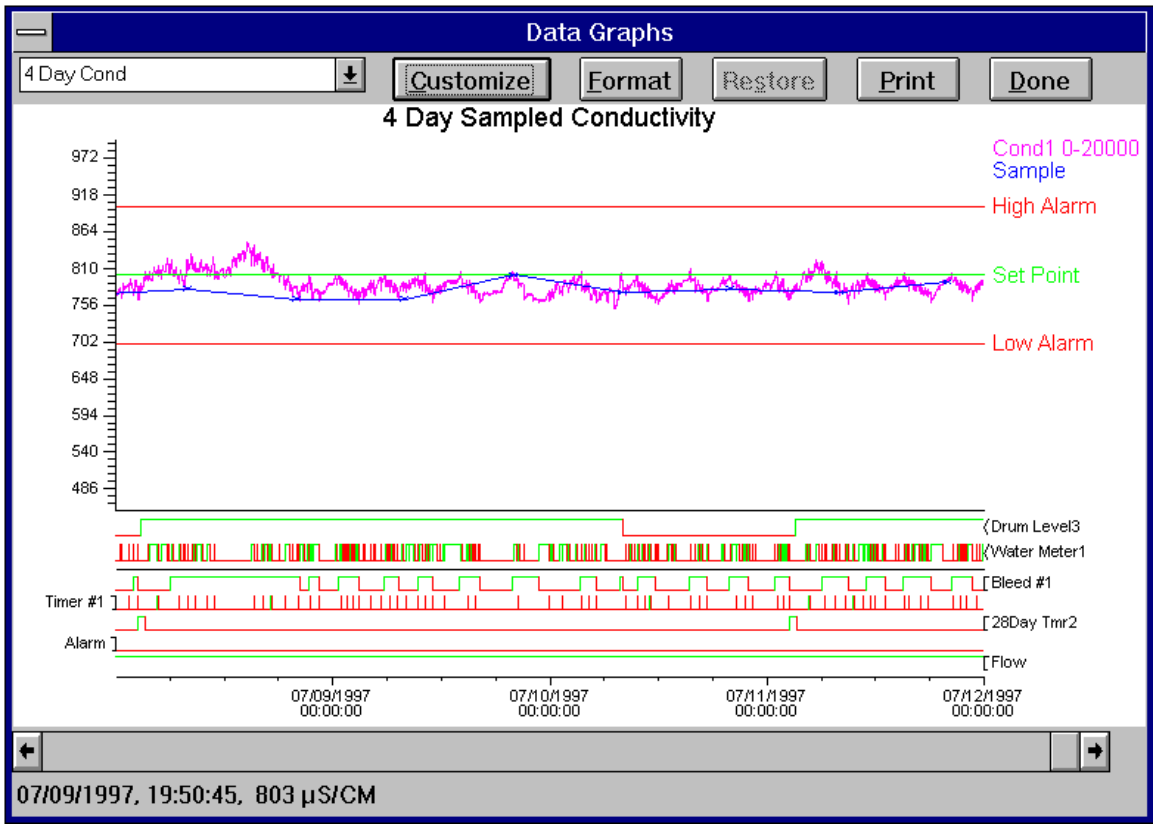
If one of the analog inputs (e.g., Conductivity) is selected in the INPUT box of the Display Data History window, the same input will appear in the initial display of the Data Graphs window. If any other input or relays is selected, the first input in the list will appear in the initial display of the Data Graphs window. The Data graphs window initially appears with one analog input and all relays drawn. Use the pulldown menu at the upper left corner of the window to change the displayed input or to select a named custom graph. Use the CUSTOMIZE button to select a combination of inputs, change the graph title or create a new custom graph. Use the FORMAT button to change any of the colors used in graph drawing or change the analog data format. Use the RESTORE button to undo any ZOOM operations. Use the

PRINT button to output the displayed graph to any connected printer. Use the DONE button to return to the Display Data History window.

Data Graphs Window Layout

It is important to understand the layout of the Data Graphs window in order to take full advantage of the options available for customizing the display. The top of the window consists of the buttons and pulldown menu on a gray background. This is the CONTROL AREA. All graphing operations except ZOOMING and RESIZING, are performed by selecting from the pulldown menu or clicking on one of the buttons in the CONTROL AREA. The bottom of the window is an area of black text on a gray background. This is the STATUS BAR. Any time the mouse pointer is positioned over the graph, the STATUS BAR displays the current coordinates. If you point the mouse at a specific point of interest, the STATUS BAR will display the current locations date, time and analog value(s).

The area between the CONTROL AREA and the STATUS BAR is the GRAPH AREA. The GRAPH AREA displays the current graph on a white background. Refer to the following illustration to identify each element of the GRAPH AREA.



GRAPH TITLE

You can specify any title you wish by clicking on the CUSTOMIZE button and entering your text in the field GRAPH TITLE. The default title for a single input graph shows the input name and Device ID. The default title for a multiple input graph shows selected inputs and the Device ID.

ANALOG GRAPH

This area plots the data for all of the selected analog inputs and data collection points. Each analog input is drawn as a solid line in the color specified in the GRAPH FORMAT window. The first input is a light purple by default. Controller analog data consists of high, low and average values at each time point. The solid line represents the average values. The high and low values can also be drawn, as broken lines surrounding the average, by selecting the SHOW ANALOG LIMITS field on the Graph Format window. Data collection points are drawn as small "X's", and the points for each channel are connected by straight lines.

If this is a single input graph, the input name will appear in the GRAPH TITLE. If this is a multiple input graph, the names for each input will be listed to the right of the data. The color of the input name matches the data, so the data traces can be identified.

The setpoint(s) and alarms are drawn as solid lines and labeled to the right hand side of the data. Setpoint(s) and alarms are drawn using the colors specified on the GRAPH FORMAT window (green and red by default). If the setpoint and alarm values are very close to each other, the labels on the graph may overwrite one another. This overwriting of text is due to limitations of the computer display and has no bearing on any of the functions listed on the graph. The setpoint(s) and alarms are only drawn on single input graphs, and on graphs that contain a single analog input and data collection points with like units. If more than one analog input is drawn or the data collection units do not match the analog input units, the setpoint(s) and alarms will not be drawn.

To the left of the data is the y-axis. The y-axis is incremented in the units of the displayed inputs. If all Inputs do not have like units, the y-axis is left blank.

DIGITAL GRAPH

Displays the ON/OFF state of all selected digital inputs. The DIGITAL GRAPH does not appear in the initial display of the Data Graphs window. The DIGITAL GRAPH can be turned on by clicking on the CUSTOMIZE button and selecting any combination of digital inputs in the Customize Graph window. The data is drawn as a continuous bi-level line for each digital input. The name of the input is drawn directly to the right or left of the line so that each input can be identified. When the input is in the ON state, the line is drawn in the DIGITAL ON color (green by default) ABOVE the input name label. When the input is in the OFF state, the line is drawn in the DIGITAL OFF color (red by default) BELOW the input name label. The DIGITAL ON and DIGITAL OFF colors can be set on the Graph Format window.

RELAY GRAPH

Displays the ON/OFF state of all selected HOA's. You can select the HOA's displayed by clicking on the CUSTOMIZE button and selecting any combination of relays on the Customize Graph window. The data is drawn as a continuous bi-level line for each HOA. The name of the HOA is drawn directly to the right or left of the line so that each can be identified. When the HOA is in the ON state, the line is drawn in the RELAY ON color (green by default) ABOVE the HOA name label. When the HOA is in the OFF state, the line is drawn in the RELAY OFF color (red by default) BELOW the HOA

name label. The RELAY ON and RELAY OFF colors can be set on the Graph Format window.

X-AXIS

Below the RELAY GRAPH, the dates and times are identified on the X-AXIS. The most recent time will always appear on the right end of the X-AXIS. The most distant time will always appear on the left end of the X-AXIS. Unlike the Y-AXIS, the X-AXIS applies to all three graphs. You can identify a point on any of the three graphs by finding the point on the X-AXIS directly below the point of interest. Alternately; You can identify a point by placing the mouse pointer on the point of interest and reading the date and time from the STATUS BAR.

HORIZONTAL SCROLL BAR

The HORIZONTAL SCROLL BAR appears any time the displayed X-AXIS does not represent the full range of data available for this Device ID. The HORIZONTAL SCROLL BAR allows you to scroll forward (to the right) or backward (to the left) through the range of time points. The PAGE WIDTH for the HORIZONTAL SCROLL BAR is defined as the extent of time currently visible on the X-AXIS. Clicking the mouse button on the right arrow causes the graph to be scrolled forward by one-tenth of the current PAGE WIDTH or to the most recent data point, whichever is shorter. Clicking the mouse button on the left arrow causes the graph to be scrolled backward by one-tenth of the current page width or to the most distant data point, whichever is shorter. Clicking the mouse button in the scroll bar to the right of the SLIDER causes the graph to be scrolled forward by an amount equal to one PAGE WIDTH or to the most recent data point, whichever is shorter. Clicking the mouse button in the scroll bar to the left of the SLIDER causes the graph to be scrolled backward by an amount equal to one PAGE WIDTH or to the beginning of data whichever is shorter. The SLIDER can also be moved by clicking and holding the mouse button while the mouse pointer is on the SLIDER. The mouse can then be moved to reposition the SLIDER anywhere within the scroll bar area. The graph will not be redrawn until the mouse button is released.

NOTE: For some Device ID's it may appear that the HORIZONTAL SCROLL BAR and X-AXIS extend beyond the range of controller data. This is usually due to another input (possibly a data collection point) having a larger range of data than the currently selected inputs. If there has been a gap in downloads, there may be a large enough gap in the data such that no data will fall within the currently visible time range. Expanding the visible range of data will help identify these gaps.

VERTICAL SCROLL BAR

The VERTICAL SCROLL BAR affects only the ANALOG GRAPH and Y-AXIS. The VERTICAL SCROLL BAR will appear and become active any time the ZOOM function is used to enlarge an area of data. When an ANALOG GRAPH is loaded, it is scaled so that all data points will fall within the Y-AXIS range and the VERTICAL SCROLL BAR is turned off. If the ZOOM function is used to expand the visible data, the VERTICAL SCROLL BAR is used to view areas of the graph that are no longer visible. The PAGE HEIGHT is defined as the current extent of the Y-AXIS. Clicking the mouse button in the up arrow will cause the ANALOG GRAPH to be scrolled up by one-tenth of the PAGE HEIGHT or to the top of the initial scale, whichever is shorter. Clicking the mouse button in the down arrow will cause the

ANALOG GRAPH to be scrolled down by one-tenth of the PAGE HEIGHT or to the bottom of the initial scale, whichever is shorter. Clicking the mouse button in the scroll bar above the SLIDER will cause the ANALOG GRAPH to be scrolled up by an amount equal to one PAGE HEIGHT or to the top of the initial scale, whichever is shorter. Clicking the mouse button in the scroll bar below the SLIDER will cause the ANALOG GRAPH to be scrolled down by an amount equal to the current PAGE HEIGHT or to the bottom of the initial scale, whichever is shorter. The SLIDER can also be moved by clicking and holding the mouse button while the mouse pointer is on the SLIDER. The mouse can then be moved to reposition the SLIDER anywhere within the scroll bar area. The graph will not be redrawn until the mouse button is released.

Viewing A Single Input Graph

Position the mouse pointer in the pulldown menu in the upper left corner of the window (the control area). Clicking the mouse button causes the list to expand showing all of the inputs available on the current Device ID. Position the mouse pointer on the input you wish to view and click the mouse button. The selected input is automatically drawn in the ANALOG GRAPH area. The graph includes the setpoint and alarm values for the selected input. This change does not affect the contents of either the DIGITAL GRAPH or the RELAY GRAPH. Note: Data collection channels can not be selected in this manner. To display data collection points click on the CUSTOMIZE button and select the data collection channel from the ANALOG INPUTS list on the Customize Graph window. See the Customize Graph section of this manual for more information.

Viewing A Custom Graph

Position the mouse pointer in the pulldown menu in the upper left corner of the window. Clicking the mouse button causes the list to expand. The top of the list will display all of the inputs available on the current Device ID. Below the inputs, all of the saved custom graphs are listed. Position the mouse pointer on the name of the custom graph you wish to view and press the mouse button. The custom graph is loaded and displayed using the most recent data available for this Device ID. Custom graphs are created and saved by using the Customize Graph window. For more information see the CUSTOMIZE GRAPH section of this manual.

Zooming In

The ZOOM feature can be used to expand any area of the visible graph to fill the whole graph area. Follow this procedure to use the ZOOM feature:

1). Identify a segment of the display you would like to zoom in on in the current graph. Next, you will draw a rubber band box around this area to define the zoom.

2). Place the mouse pointer on the upper left corner of the graph area you want to box in (i.e., zoom in on). Click and hold the left mouse button.

3). While still holding the left mouse button down, drag the mouse down and to the right. As you do so, you will notice a box with elastic sides is drawn over the data -- this defines your zoom window.

4). When you are satisfied with the placement of the box, release the left mouse button. The graph will be re-drawn showing only the data that you

have selected. Scroll bars appear at the bottom and right side of your window. You can use them to move your zoom window around the graph.

5). Repeat steps 1 to 4, zooming in as often as you like.

To return to the initial graph view, click on the RESTORE button in the CONTROL AREA of the window. The ZOOM feature can be used on any of the three graphs. If the ZOOM feature is used in the DIGITAL or RELAY graph, only the X-AXIS is affected. The Y-AXIS for the ANALOG GRAPH is only affected if the first ZOOM corner is located within the ANALOG GRAPH area.

The STATUS BAR is active while ZOOMING to enable the selection of a specific region of the graph.

Resizing The Graph Areas

Any time more than one graph is visible in the Data Graphs window, there is a solid horizontal black line that separates the graphs. This line can be moved to change the relative size of the graphs above and below it. Any change resizes two graphs, the graphs above and below the line that is moved. To resize a graph, follow this procedure:

1). Place the mouse pointer on the line that is to be moved. The mouse pointer will change to an Up/Down arrow.

2). Click and hold the left mouse button.

3). While still holding down the left mouse button, drag the line to the desired position. As you move the mouse, the line will move with the mouse pointer.

4). Release the left mouse button. The graphs will be redrawn with the dividing line in the new location.

5). Repeat steps 1-4 until you are satisfied with the relative sizes of the displayed graphs.

Changes to the graph sizes are not saved when you exit the Data Graphs window. To save your size changes for future use, use the CUSTOMIZE button to create a named custom graph. Graph sizes will be saved with the custom graph and restored every time this graph is loaded. By adjusting the graph sizes before saving your custom graphs, you can optimize the display for each of the data views you use most often. See the Customize Graph section of this manual for more information.

CONTROL AREA CHOICES

PULLDOWN MENU

The PULLDOWN MENU is used to select any single input graph or saved custom graph for the current Device ID. Position the mouse pointer in the PULLDOWN MENU in the upper left corner of the window. Clicking the mouse button causes the list to expand. The top of the list will display all of the inputs available on the current Device ID. Below the inputs, all of the saved custom graphs are listed. Position the mouse pointer on the name of the input or custom graph you wish to view and press the mouse button. The selected graph will then be displayed.

CUSTOMIZE

Clicking on the CUSTOMIZE button displays the Customize Graph window. This window is used to select the relays, digital inputs and/or analog inputs for display. The Customize Graph window can also be used to change the GRAPH TITLE and create or edit named custom graphs. See the Customize Graph section of this manual for more information.

FORMAT

Clicking on the FORMAT button displays the Format Graph window. This window is used to select the colors for all data, alarms and setpoints. The Format Graph window is also used to specify the analog data format and the maximum extent for the X-AXIS. See the Format Graph Section of this manual for more information.

RESTORE

Clicking on the RESTORE button will undo any changes made by ZOOMING. If the ZOOM feature has not been used, the RESTORE button will be disabled.

PRINT

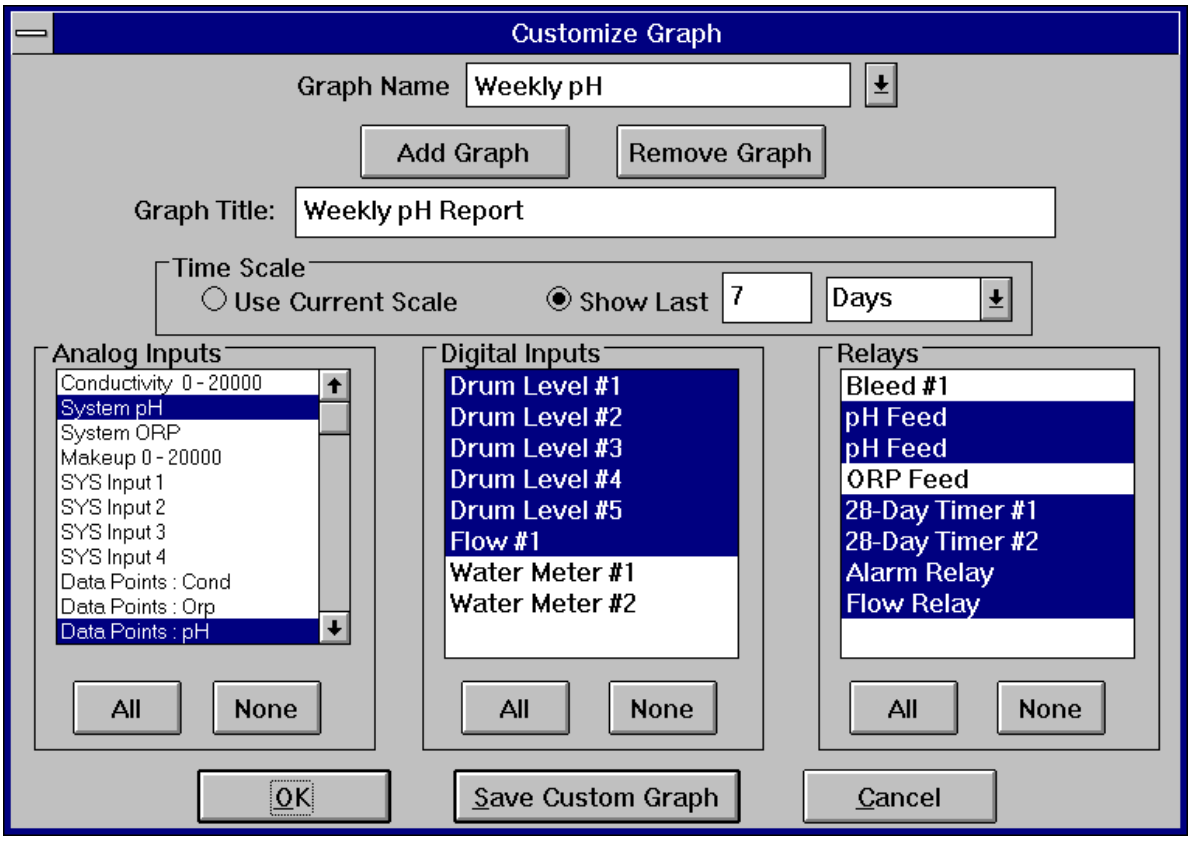
Prints the graph currently displayed. The Print Dialog appears to enable you to select a printer and all needed setup options. Click OK to begin printing when the printer and setup are correct.

You can also use the **CTRL-PRINT SCREEN** key combination on your keyboard to copy the current display to the WINDOWS clipboard. You can then “Paste” the contents into a graphics program for manipulation or into a word processor for reporting purposes.

DONE

Click on the DONE button to exit the Data Graphs window and return to the Display Data History window.

The Customize Graph window is accessed by clicking on the CUSTOMIZE button on the Data Graphs window. The Customize Graph window displays as follows:



PURPOSE:

This window allows you to customize the Data Graphs for your own reporting or display needs. Any combination of analog, data collection, digital or relay data can be selected for simultaneous graphing. You can specify a title for the graph and the amount of data to display. Once you have made all of your selections in this window, you can save them as a named custom graph. This allows you to apply the same selections to future data without needing to enter this window or do any typing.

CUSTOMIZE GRAPH FIELDS:

GRAPH NAME

This field allows you to select the name of a saved custom graph to edit or enter the name of a new custom graph to save. If no custom graphs have been saved for this Device ID, the pulldown menu will only contain the label "New Custom Graph". As custom graphs are saved, the names of each will be added to the list. To select a graph name, place the mouse pointer over the pulldown menu and press the mouse button. The list will expand to show the names of all saved graphs for this Device ID. Place the mouse pointer over the name of the graph you wish to load and press the mouse button. All fields in this window will be updated to show the selections loaded. To add a name to the list see the ADD GRAPH button description. To remove a graph from the list see the REMOVE GRAPH button description.

GRAPH TITLE

Enter up to 60 characters to appear at the top of the displayed graph. Any combination of upper case alphabetic, lower case alphabetic, number or punctuation keys can be used.

TIME SCALE

The fields in this box enable you to specify the amount of data that is initially displayed every time this graph is loaded. This is useful for creating daily, weekly or monthly views of your data. The TIME SCALE fields allow you to set a range from one hour to 52 weeks, or to use the current default time scale.

To use the current default time scale, click on the USE CURRENT SCALE radio button so it becomes highlighted. If USE CURRENT SCALE is highlighted, no time scale value is saved for this graph. When this graph is loaded, the horizontal time scale will not be altered. The graph will be displayed on the time scale that is currently in the window.

To enter the time scale for this graph, click on the SHOW LAST radio button so it becomes highlighted. If the SHOW LAST button is highlighted, the two fields to the right of it become active. The first field to the right of the SHOW LAST button is for a numeric entry. The second field is a list box for selecting the units (HOURS, DAYS or WEEKS) to apply to the number just entered. These two fields are used together to select the amount of data to initially display every time this graph is loaded. Specify “24 HOURS” for a daily graph, “7 DAYS” for a weekly graph etc.

INPUT BOXES

There are three input boxes for selecting the data to display. The ANALOG INPUTS box is for selecting the analog and/or the data collection inputs. The DIGITAL INPUTS box is for selecting the digital inputs. The RELAYS box is for selecting the HOA’s to display. The DIGITAL INPUTS box will not be available if the current Device ID does not have digital inputs. All three boxes operate in the same manner, although independently. Any input or relay names that are highlighted will be drawn when this graph is loaded. Each input box has an ALL button for selecting all of the inputs listed in that box. Each input box has a NONE button for deselecting all of the inputs listed in that box.

To select a single choice from any of the list boxes, place the mouse pointer over the desired input name and click the mouse button. The selected name will become highlighted and all other names in the same list box will be deselected.

To select a range of names from any of the list boxes. Place the mouse pointer over the first name of your desired selection and click the mouse button. Then place the mouse pointer over the last name in your desired selection, press and hold the **SHIFT** key on your keyboard, then press the mouse button. The first name selected, the last name selected, and all names in between will be highlighted. All of the highlighted names will be displayed when this graph is drawn.

To select a combination of names click on the NONE button so that all items are deselected. Place the mouse pointer over the name you wish to add. Press and hold the **CTRL** key on your keyboard and press the mouse button. This will toggle the state of the selected name without affecting any other selections in the same list box. This procedure can be used repeatedly to

select any combination of names. This procedure can also be used to deselect a name without affecting any of the other selections in the same list box.

BUTTON CHOICES:

ADD GRAPH

This button is used to add a graph name to the GRAPH NAME pulldown menu. When this button is pressed "TYPE NEW GRAPH NAME" appears in the GRAPH NAME box. Type the name for the new graph. The graph name can be up to twenty (20) alphabetic or numeric characters. Select a name that describes the graph to be displayed. Press the **TAB** key on your keyboard to exit this field after the name has been entered.

REMOVE GRAPH

This button is used to remove the currently selected graph name from the pulldown menu. All of the selections and text for this graph are deleted. Only remove graphs you will no longer be needing.

SAVE CUSTOM GRAPH

This button saves all information for the currently selected graph. This is useful if you will be making changes to several custom graphs. After all of your changes have been made click on the SAVE CUSTOM GRAPH button before selecting the next graph to edit from the GRAPH NAME pulldown menu. If there is no custom graph selected (the GRAPH NAME box displays "NEW CUSTOM GRAPH"), clicking on this button is the same as clicking on the ADD GRAPH button.

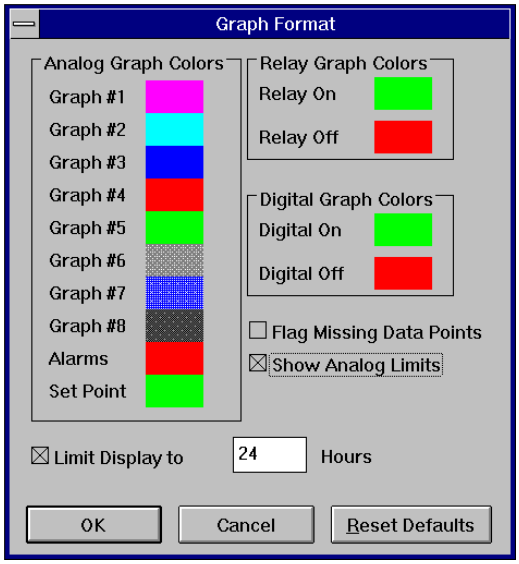
OK

This button exits this window and returns to the Data Graphs window. The Data Graphs window will be redrawn to display all of the inputs, time range and title selected. If you have been editing a saved graph, you will be prompted to save your changes before exiting this window.

CANCEL

The CANCEL button is used to exit the Customize Graph window without saving changes to the current custom graph, and without causing the Data Graphs window to be redrawn. Clicking on CANCEL cancels any changes you have made in the Customize Graph window and returns to the Data Graphs window without changing the displayed graph.

The Format Graph window is accessed by clicking on the FORMAT button on the Data Graphs window. The Format Graph window displays as follows:



PURPOSE:

This window allows you to specify the colors used for all data drawing, select how the analog data will be drawn, select how missing data will be handled and limit the amount of data initially displayed for all graphs.

FIELDS:

COLOR BOXES

The COLOR BOXES are used to select the colors used for all data, alarms and setpoints. Eight (8) colors can be selected for the analog data. If more than eight inputs are displayed in the ANALOG GRAPH, the colors will be reused in sequence.

To change a color: Click on the color that you would like to change. A standard color selection window will appear. Chose a standard color or mix your own. When you are satisfied with the selected color click on the OK button to return to the Format Graph window. The color you have selected will be displayed in the appropriate color box.

FLAG MISSING DATA POINTS

If this field is checked, the graph will visually alert you to any missing data. The graph will highlight any areas where data points are missing by displaying that area of the graph on a black background instead of a white background. Data is considered missing if the time lapse between adjacent data points is larger than the DATA HISTORY INTERVAL. The entire time interval between the two points would be drawn on a black background to indicate that there is at least one data point missing in this range. Note: on some controllers with very short HISTORY INTERVALS (e.g., 1 minute) you will notice missing data points at every history download. This is because some controllers do not log data history while they are being downloaded. The FLAG MISSING DATA POINTS option is turned off by default.

SHOW ANALOG LIMITS

Controllers log three pieces of data at each time point - an average, min and max values. Normally only the average values are graphed. While the average value graph can look nice, it does not always explain why a relay turned on or an alarm was triggered at a particular point in time. By selecting SHOW ANALOG LIMITS all three values will be graphed. The average value is plotted as a solid line and the min and max values are plotted as dashed lines of the same color. This enables you to see the full range of values for the displayed input. The SHOW ANALOG LIMITS option is turned off by default.

LIMIT DISPLAY TO XXXX HOURS

Allows you to limit the amount of data that is loaded any time a graph is displayed. The default value for this field is 24 Hours. For example, if you have been collecting data for this Device ID for the last month, when you select a graph, only the last 24 hours of collected data will be displayed. The HORIZONTAL SCROLL BAR will also be displayed so you can scroll to view the older data. The smaller the number that you enter here, the faster graphs can be loaded and displayed. If your graphs take too long to load and display, try lowering the limit value here.

If this option is turned off by clicking the mouse over the check box so the checkmark disappears, no time limit will be applied. All of the collected data for the Device ID will be displayed for each graph.

Note: This value affects all graphs except custom graphs with an explicit TIME SCALE value.

BUTTON CHOICES:

RESET DEFAULTS

Click on the RESET DEFAULTS button to reset all colors and fields to their default values.

OK

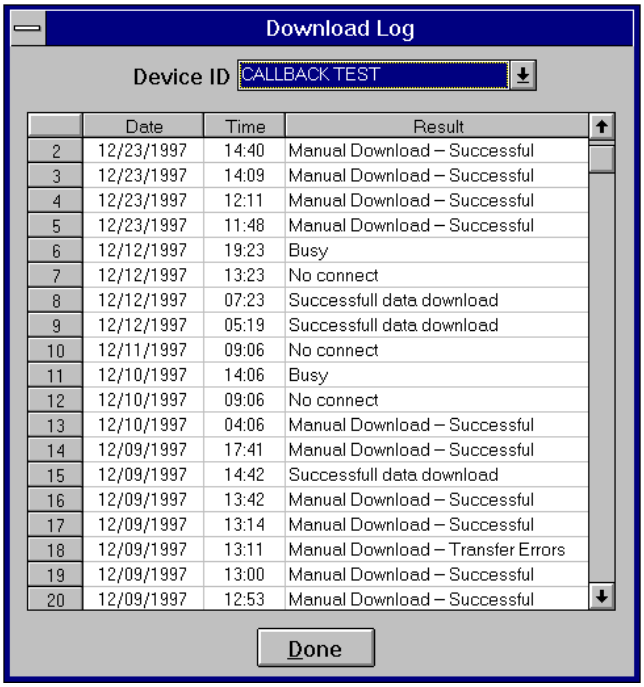
Click on the OK button to exit the Graph Format window and save the changes you have made for all future sessions in the Data Graphs window. These changes affect graphs for all Device ID's.

CANCEL

Click on the CANCEL button to return to the Data Graphs window without keeping any of the changes you have made to the Format Graph window fields.

Functions Menu Windows: Download Log

The Download Log window is accessed via the Functions menu by selecting Download Log. The Download Log window displays as follows:



	Date	Time	Result
2	12/23/1997	14:40	Manual Download – Successful
3	12/23/1997	14:09	Manual Download – Successful
4	12/23/1997	12:11	Manual Download – Successful
5	12/23/1997	11:48	Manual Download – Successful
6	12/12/1997	19:23	Busy
7	12/12/1997	13:23	No connect
8	12/12/1997	07:23	Successfull data download
9	12/12/1997	05:19	Successfull data download
10	12/11/1997	09:06	No connect
11	12/10/1997	14:06	Busy
12	12/10/1997	09:06	No connect
13	12/10/1997	04:06	Manual Download – Successful
14	12/09/1997	17:41	Manual Download – Successful
15	12/09/1997	14:42	Successfull data download
16	12/09/1997	13:42	Manual Download – Successful
17	12/09/1997	13:14	Manual Download – Successful
18	12/09/1997	13:11	Manual Download – Transfer Errors
19	12/09/1997	13:00	Manual Download – Successful
20	12/09/1997	12:53	Manual Download – Successful

PURPOSE:
Allows you to select a device and view a list of all downloads that have been attempted on that device.

FIELDS:

DEVICE ID

List of connected devices. Using pulldown menu, select device for which you wish to display download information.

DATE

The date the download was attempted.

TIME

Time of day the download was attempted. Note: the DATE and TIME listed are at read from your computers clock at the time of the download. This may be different from the time stored in the controllers internal clock.

RESULT

This field displays the result of the attempted download. Manual downloads are indicated as such, all other downloads are the result of autopolling. There are nine possible messages to be displayed in this field:

SUCCESSFUL DOWNLOAD

Meaning: Data was downloaded successfully.

Functions Menu Screens -Download Log FIELDS, continued...
RESULT,
continued...

DOWNLOAD ERROR

Meaning: Download was not completed, or data was corrupted.

NO CONNECT

Meaning: Attempt to connect was unsuccessful.

BUSY

Meaning: Attempted connection failed as telephone line was busy.

CONNECTION ERRORS

Meaning: Modems timed out and disconnected before the download was complete.

COM PORT ALREADY IN USE

Meaning: Com port is not available. Typically caused because another application or user on a network is using the com port.

INVALID PASSWORDS

Meaning: Autopoll could not connect because the passwords are not correct for this Device ID.

DOWNLOAD ABORTED - FILESIZE

Meaning: Controller download error, contact technical support for more information.

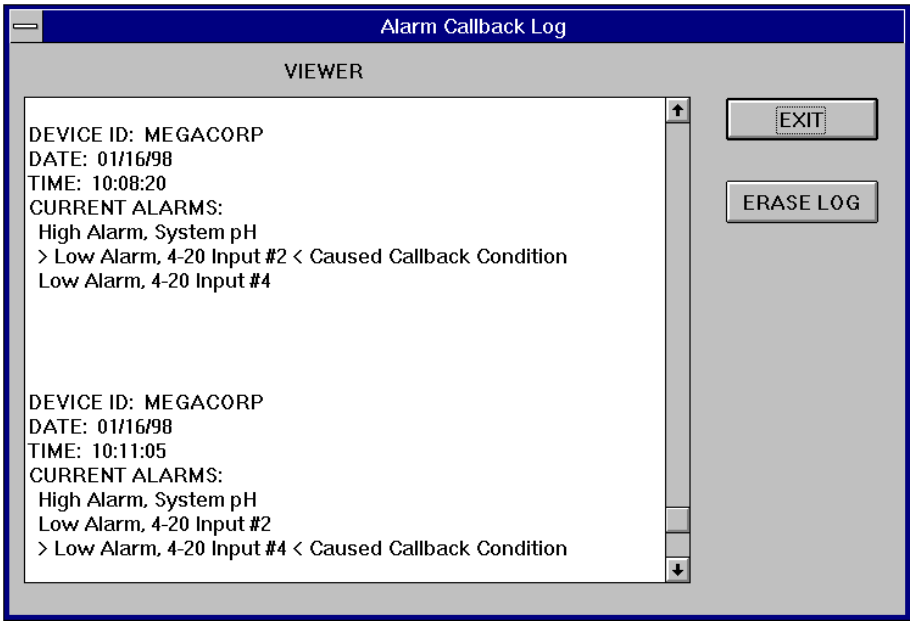
INSUFFICIENT DISK SPACE

Meaning: There is not enough free disk space to store downloaded data. Archive and remove files from the system in order to continue storing controller data.

BUTTON CHOICES:
Click on DONE with mouse to exit this window.

Functions Menu Windows: Alarm Callback Viewer

Selecting Alarm Callback Viewer from the Functions menu will display the Alarm Callback Log window as follows:



PURPOSE:
This window can be used to view or erase the log of alarm callbacks. All alarm callbacks that have been received by this program are saved for display in this window until the ERASE LOG button is pressed. Note: Opening this window stops the program from playing the ALARM.WAV file ("beep") when an alarm is received.

This window consists of the VIEWER field and two buttons:

VIEWER

The VIEWER displays all alarm callbacks, in the order received, from top to bottom. When this window is initially displayed, the viewer is scrolled all the way to the bottom to ensure that the most recent callback is visible. You can use the scroll bar on the right side of the viewer to scroll up and view previous callbacks. The Device ID, Date/Time and Alarm conditions are listed for each callback. The Device ID shows the ID of the controller that generated the callback. The Date/Time indicates the time, as stored in your computer's internal clock, when the callback was received. All of the controller's alarm conditions at the time of the callback are also listed, with the alarm that caused the callback flagged. Note: If a callback is received while this screen is displayed, the scroll bar is repositioned to the bottom so the new alarm is visible in the VIEWER.

ERASE LOG BUTTON

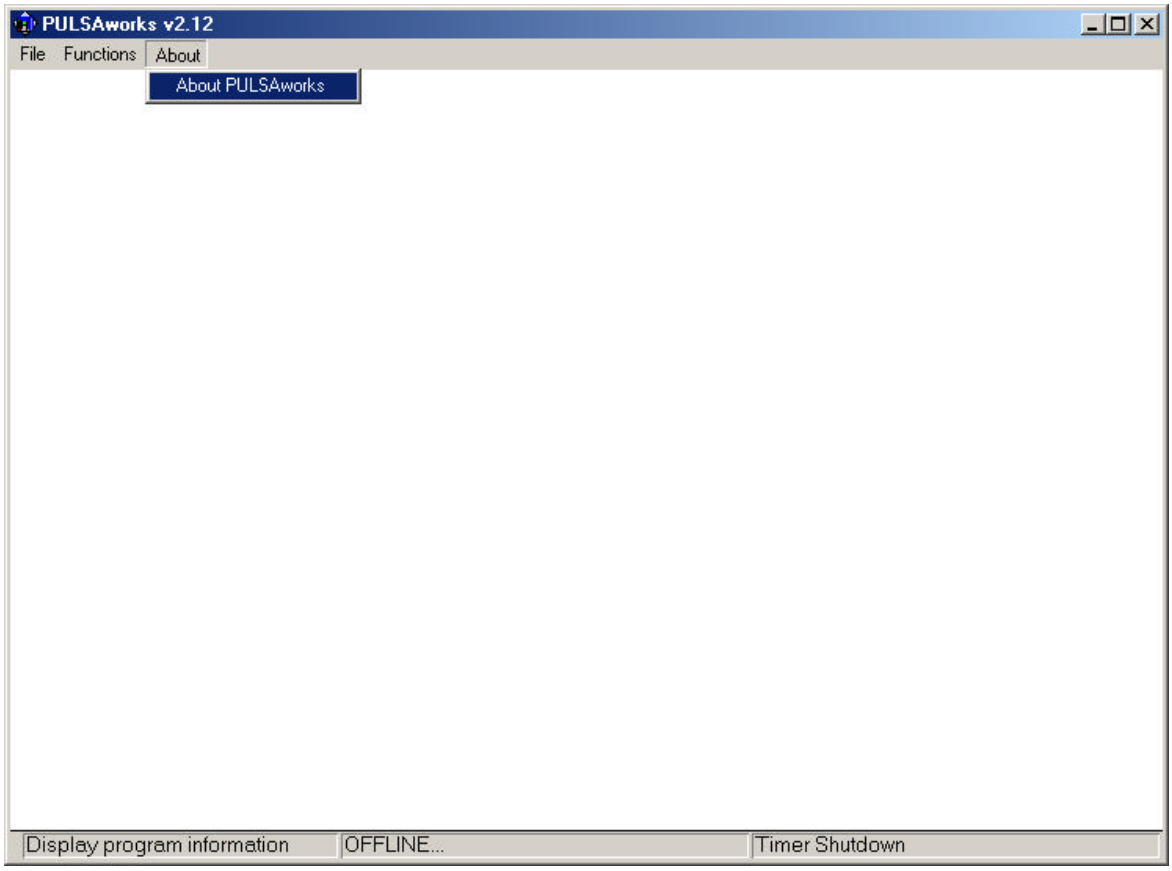
This button permanently erases all of the entries in the displayed callback log. Once the ERASE LOG button is pressed, the program no longer has any record of the callbacks listed in this window.

EXIT BUTTON

Click on the EXIT button to close this window and return to the Functions menu.

The Help Menu

The About menu displays as follows:



ABOUT PULSAworks™

Displays an information window with the current version number of PULSAworks™ and copyright date.

Examples

This section guides you through step-by-step examples of adding a controller, selecting a modem port and baud rate, connecting to a controller, downloading and viewing the controllers data history.

Please refer to the sections in this manual pertaining to the windows you encounter for complete information about the fields and options available in each window.

Selecting a modem port and baud rate

In this example the computer has an external 14.4kBaud modem connected to COM1. The local area code is 315 and a "9" must be dialed to access an outside line.

1. Access the Communications Settings window. This is done by running PULSAworks, accessing the Functions menu and selecting the Communications Settings window.

2. Make sure the cursor is located in the MODEM PORT field (press the **TAB** key to position the cursor there if necessary). Select a modem port using the pulldown menu. **See the section in this manual called "IMPORTANT NOTES REGARDING SERIAL PORTS" before making this selection.** For this example select COM1.

3. Press the **TAB** key to position the cursor in the MODEM BAUD field. Typically the program will perform best if you pick the highest available baud rate, 57600. Some modems will not connect properly with this setting. If you are have trouble establishing a connection once the remote modem answers the phone, try lowering the baud rate in this field. Select your chosen baud rate using the pulldown menu. For this example leave the default value of 19200.

4. Press the **TAB** key until the cursor is positioned in the LOCAL MODEM INIT STRING field. Enter a modem initialization string using the guidelines set forth for this field in the Communications Settings section of this manual. For this example accept the default setting.

5. Press the **TAB** key to position the cursor in the DIALING PREFIX field. Enter a dialing prefix using the guidelines set forth for this field in the Communications Settings section of this manual. For this example we need to dial a "9" to get an outside line. Enter "9," (the comma will cause a two second pause).

6. Press the **TAB** key to position the cursor in the LOCAL AREA CODE field. Enter your local area code using the guidelines set forth for this field in the Communications Settings section of this manual. For this example enter "1315".

7. Click on the OK button with the mouse. A dialog box appears. Click on OK to save your changes. You are returned to the window displaying the main menu bar.

The program is now configured for modem communications!

Adding a controller

In this example we will add a controller with the Device ID "TOWER #1", a Level One Password of "MASTER", a Level Two Password of "USER", a phone number of 1(716) 292-8173 to be Autopolled every 24 hours.

1. Access the Controller Setup window. This is done by running the program, accessing the Functions menu and selecting Controller Setup.

2. Click on the ADD DEVICE button with the mouse. The DEVICE ID field will now be highlighted and the text "TYPE NEW ID HERE" will appear in the input box.

3. Type a descriptive name for the controller you wish to add and press the **TAB** key. A default data file name will be entered in the DATA FILE field and the input focus will shift to the PASSWORD 1 field. For this example enter “TOWER #1” here.

4. You may enter a Level One Password at this time, or if you prefer you may retain the default password of “NONE” by pressing the **TAB** key again to exit the field without changes. For this example enter “MASTER” here.

5. Press the **TAB** key to position the cursor in the PASSWORD 2 field. You may enter a Level Two Password at this time, or if you prefer you may retain the default password of “NONE” by pressing the **TAB** key again to exit the field without changes. For this example enter “USER” here.

6. Press the **TAB** key to position the cursor in the INCLUDE IN AUTODIAL LIST field. If you do not wish to automatically downloaded this controller at regular intervals, press the TAB key to exit this field and proceed to step 8. If you do wish to have this controller automatically downloaded, press the **SPACE BAR** to include this device in the autodial list. A red checkmark appears in the field, and the field directly below it appears as “AUTOPOLL FREQUENCY”. For this example, check this field to turn on Autopoll.

7. Press the **TAB** key to position the cursor in the AUTOPOLL FREQUENCY field. Enter a number indicating how often you would like this controller to be downloaded. If you enter the number 24, the controller will be downloaded every 24 hours. For this example enter “24” here.

8. Press the **TAB** key to position the cursor in the COUNTRY AND AREA CODE field. Type the country and/or area code as described for this field in the Controller Setup window documentation. If this controller is within your local dialing area, you may leave this field blank. For this example enter “1716” here.

9. Press the **TAB** key to position the cursor in the DEVICE PHONE NUMBER field. Type the device phone number as described for this field in the Controller Setup window documentation. For this example enter “292-8173” here.

10. Press the **TAB** key to position the cursor in the DATA FILE field. Type the name of the data file into which the downloaded data for this DEVICE ID will be placed. We strongly recommend that you either, accept the default as shown or enter the local telephone number (7 digits) for this DEVICE ID. For this example accept the default.

11. Click on the TEST CONNECTION button with the mouse. A dialog box appears. Click on OK to save your changes. The Connecting To *Device ID* window will appear showing the status of the dialing attempt. Any errors that occur during dialing should be noted and corrected. If the connection is successful, a window will appear showing the model number and capabilities of the connected controller.

12. Click on the OK button with the mouse to close the Successful Connection window.

13. Click on the OK button with the mouse. A dialog box appears. Click on OK to save your changes. The Controller Setup window closes and you are returned to the main program window.

Your controller has been added to the database and communications have been verified!

Examples

Connecting to a controller

1. Access the Connection Management window. This is done by running the program, accessing the Functions menu and selecting Connection Management.

2. Make sure the cursor is located in the DEVICE ID field. Using the pulldown menu, select the DEVICE ID for the controller you wish to make a connection with.

3. Press the **TAB** key to position the cursor in the PASSWORD 1 field. Use the backspace key to erase the current entry, then type the correct password for the selected controller. For more information about password usage, see the Passwords section of this manual.

4. Press the **TAB** key to position the cursor in the PASSWORD 2 field. Use the backspace key to erase the current entry, then type the correct password for the selected controller.

5. Use the mouse to select the desired connection type by clicking on the MODEM or DIRECT radio buttons. If the selected controller is directly connected to your computer by a serial communications cable, you must choose DIRECT. If you will be connecting to this controller via modem and phone lines, choose MODEM.

6. Use the mouse to click on the MAKE CONNECTION button. If you are making a modem connection, the Connecting To ... window will display showing the progress of the dialing attempt. After the connection is established the Connecting To ... window is automatically closed.

7. The STATUS field indicates when your connection is established. The STATUS BAR at the bottom of the main program window will also be updated to indicate that you are now on-line.

8. Use the mouse to click on the OK button and close the Connection Management window.

9. When you wish to terminate the connection, you will return to the Connection Management window and use the mouse to click on the DISCONNECT button.

You are now on-line with the selected controller!

Changing a setpoint

This example assumes that you are already on-line with a controller. If you are not already on-line, follow the above example, Connecting to a controller, and proceed with step one of this example when you are on-line.

1. Access the Analog Inputs window. This is done by accessing the Functions menu, selecting Real Time Windows and selecting Analog.

2. Wait a moment for all needed values to be read from the controller and the window to be initialized. Once all active fields are displayed, use the mouse to click on the SET POINT value you wish to change. The field you have selected will display a dark border around it to indicate that it has the input focus.

3. Type the new value for this field and press the **TAB** key.

4. The field will turn yellow to indicate the change has been sent to the controller.

5. Once the new value is accepted and acknowledged by the controller, the field will turn green.

6. Use the mouse to click on the DONE button and the Analog Inputs window will close.

You have now used the program to change the controllers settings.

You can change any of the controllers values by following the same procedure used here. By selecting a different window in step 1 and/or selecting a different field in step 2, any of the controllers fields can be set. You do not need to close the window after each field is edited. You can edit as many fields as needed and close the window after all fields show the proper values.

Downloading data history

This example assumes that you are already on-line with a controller. If you are not already on-line, follow the example, Connecting to a controller, and proceed with step 1 of this example when you are on-line.

1. Access the Controller Data Download window. This is done by accessing the Functions menu and selecting Controller Data Download. The Controller Data Download window will display showing the Device ID, date, time and destination file name.

2. Use the mouse to click on the FULL DOWNLOAD button. The screen fields will update as the download progresses.

3. When the download has completed the PROGRESS bar will indicate 100% and the STATUS field will show the word “Done”.

4. Use the mouse to click on the DONE button and close the Controller Data Download window.

You have now downloaded all of the controllers data history to your computer.

Disconnecting from a controller

You must currently be on-line in order to disconnect.

1. Access the Connection Management window. This is done by accessing the Functions menu and selecting Connection Management.

2. Use the mouse to click on the DISCONNECT button. The program will terminate communication, and if using a modem connection, hang-up the phone.

3. If you are running the program with alarm callback enabled (the default), the program will initialize the modem to accept callbacks.

4. If you downloaded data history during your on-line session, the Parsing data window will be displayed while the new data is being added to your databases. This window will be automatically closed when the database update completes.

5. Use the mouse to click on the OK button and close the Connection Management window.

Viewing Data History

1. Access the Display Data History window. This is done by accessing the Functions menu and selecting Data History Files.

2. Use the mouse to click on the desired controller from the DEVICE ID pulldown menu.

3. Use the mouse to click on the input to view from the INPUT pulldown menu.

4. The most recent data is shown for the selected input.

5. To view older data, use the scroll bar to scroll through the data file.

6. Press the SHOW GRAPH button to display the data as a graph. The Data Graphs window displays with the selected input graphed using the current graph format.

7. To change the displayed input, use the mouse to click on a different input from the pulldown menu in the top left corner of the Data Graphs window.

8. Click on the DONE button with the mouse to close the Data Graphs Window.

9. Press the DONE button with the mouse to close the Display Data History window.

You have now viewed your data in tabular and graphical formats.

Appendix I - Database Reference

Each of the databases used by the program to manage controllers and store data is described in this appendix.

ACCOUNTS.DBF: Account Database

This Database is used to maintain information specific to this installation of the program..

Field	Type	Description
ACCOUNT_ID	numeric	Account identification number.
ACCOUNT	text	Account name. Will be “DEFAULT” if you do not specify a name.
MODPORT	numeric	The port used for modem communications. (0 = COM1, 1 = COM2, 3 = COM3, 4 = COM4, 5 = unused)
MODBAUD	numeric	The baud rate for modem communications. (0 = 1200, 1 = 2400, 2 = 9600, 3 = 14400, 4 = 19200, 5 = 28800, 6 = 57600)
DIRPORT	numeric	The port used for direct serial communications. (0 = COM1, 1 = COM2, 3 = COM3, 4 = COM4, 5 = unused)
DIRBAUD	numeric	The baud rate for direct serial communications. (0 = 1200, 1 = 2400, 2 = 9600, 3 = 14400, 4 = 19200, 5 = 28800, 6 = 57600)
MODINTSTR	text	The modem initialization string.
DIALPREFIX	numeric	Dialing prefix to be used for modem connections.
AREACODE	numeric	The area code of the local modem number.
POLLTIME	numeric	Next Autopoll start time.

CNTRLS.DBF: Controllers Database

Each record of this database stores all needed information for one controller. The information in this database is set using the Controller Setup window. Note: The name in the DATAFILE field is needed to locate the data for each controller.

Field	Type	Description
CNTRLR_ID	numeric	Identifies the control number link to other data base files. Records in all databases for this controller will match this CNTRLR_ID.
ACCOUNT	text	Not used.
DEVID	text	The device name.
AREACODE	numeric	The area code used to access the controller.
PHONE	numeric	The telephone number used to access this controller.
ISAUTODIAL	char	“T” if this controller is to be Autopolled, “F” if not.
POLLINTVL	numeric	Autopoll frequency in hours.
LASTDLOAD	numeric	The date of the last download from the specific device.
DATAFILE	text	The data base file root name used to generate the names of all files needed to store data for this controller. Other names are generated by adding a single character suffix to this root name.
WATERBAL	char	“T” if this controller has a water balance table, “F” if it does not.
DBFONEXIT	char	“T” if the *B.DBF, *C.DBF, *D.DBF and *E.DBF files

Field	Type	Description
		are to be created for this controller, “F” otherwise.

Appendix I - Database Reference

Data History Databases

There are five (5) databases which contain the data history for each controller. Each database is named using the DATAFILE field for this device from the controllers database and appending one of the letters A - E. For example, if you download information from your controller and name it 'DATA', the files will be named DATAA.DBF - DATAE.DBF. The contents of each of the databases is defined in the next five tables.

***datafile*A.DBF: Download Headers Database**

All information needed to interpret the downloaded data is contained in this database. This database stores one record for each input in every download performed on this device.

Field	Type	Description
DUMPHDR_ID	numeric	Identifies the header record corresponding to this data.
CNTRLR_ID	numeric	Identifies the control number link to other data base files.
DEVNAME	text	The device name used to download the information.
MODEL	alpha-num	The model number of the device being used to download the information.
VERSION	numeric	The version number of the device being used.
DATE	numeric	The date of the download.
TIME	numeric	The time of the download.
HOATYPES	alpha-num	The types of HOAs being used. For a complete list of possible values, refer to the HOA Types Table at the end of this section.
HISTINTVL	numeric	History interval.
NUMANALOGS	numeric	The number of analog channels the device has.
NUMSTAMPS	numeric	Number of relay time points contained in this download.
INPUT	numeric	The input being recorded by the controller. To interpret the input number, please refer to the Input Number Table at the end of this section.
UNITS	text	The units the input is being measured in.
CNTRLTYPE	text	Type of control. This will always be linear.
NUMASTAMPS	numeric	Number of analog time points contained in this download.
NUMDECIMAL	numeric	The number of decimal places the input has.
RANGEMAX	numeric	The highest input value in the download.
RANGEMIN	numeric	The lowest input value in the download.
SETPOINT	numeric	The input's high set point value.
SETPOINT2	numeric	The input's low set point value.
HIALM	numeric	The input's high alarm setting.
LOALM	numeric	The input's low alarm setting.
RISEFALL	numeric	The trigger value for the input. This value is dependent upon the controller being downloaded.

***datafile*B.DBF: Analog Database**

This database stores all data points for the analog inputs. Each record contains the input identifier, time stamp and data to make up one data point.

Field	Type	Description

Field	Type	Description
CNTRLR_ID	numeric	The controller identification number.
DUMPHDR_ID	numeric	Identifies the header record corresponding to this data.
INPUT	numeric	The input number that is being recorded.
DATE	numeric	The date the data was recorded.
TIME	numeric	The time the data was recorded.
AVG	numeric	The average of the input in the specific time interval.
MAX	numeric	The maximum value that the input has taken on in the specific time interval.
MIN	numeric	The minimum value that the input has taken on in the specific time interval.

***datafile*C.DBF: Relay Database**

This database stores the information for the relay data. Each record contains all relay data for one time point. For all of the relays "T" indicates that the relay was On at the specified time point and "F" indicates that it was Off. To identify the types of relays on this controller interpret the HOATYPES field from a *datafile*A.DBF record with a matching DUMPHDR_ID field.

Field	Type	Description
CNTRLR_ID	numeric	The controller identification number.
DUMPHDR_ID	numeric	Identifies the header record corresponding to this data.
DATE	numeric	The date the data was recorded.
TIME	numeric	The time the data was recorded.
R1 - R6	text	Relay state for relays 1 through 6.
RA	text	The alarm relay state.
RF	text	The flow relay state.

***datafile*D.DBF: Data Points Database**

This database stores the information for the data collection values. Each record contains all information for a single data collection point.

Field	Type	Description
CNTRLR_ID	numeric	The controller identification number.
DUMPHDR_ID	numeric	Identifies the header record corresponding to this data.
DATE	numeric	The date the data was recorded.
TIME	numeric	The time the data was recorded.
DPVALUE	text	Contains the name, value and units for this point.

***datafile*E.DBF: Digitals Database**

This database stores the information for the digital input data. Each record contains all digital data for one time point. For all of the digitals "T" indicates that the input was "On" at the specified time point and "F" indicates that it was "Off".

Field	Type	Description
CNTRLR_ID	numeric	The controller identification number.
DUMPHDR_ID	numeric	Identifies the header record corresponding to this data.
DATE	numeric	The date the data was recorded.
TIME	numeric	The time the data was recorded.

Field	Type	Description
D1 - D8	text	Input state for digitals 1 through 8.

POLL_LOG.DBF: Download Log Database
This database stores one record for each download (either manual or Autopoll) performed by the program. The Date, Time and Result of the download is recorded.

Field	Type	Description
POLL_ID	numeric	Control number for this record.
CNTRLR_ID	numeric	Identifies the control number link to other data base files.
DATE	numeric	Date of the download or the attempted download.
TIME	numeric	Time of the download or the attempted download.
RESULT	text	The result of the download. See the Download Log section of this manual for a complete description of possible values.

HOA Types Table
The HOATYPES field is a six (6) digit field that identifies each of the six relays. The first digit corresponds to relay #1 etc. The following table shows the meaning for each possible value of the digits. If this data is from a controller that does not have six relays, the extra digits will contain 9's to indicate that they are not used.

Digit	Relay Type
0	Bleed
1	pH Feed
2	ORP Feed
3	Configurable Timer
4	28-Day Timer
5	ORP Feed
6	Disabled
7 - 9	Unused

Input Number Table
The INPUT field is a two digit number that represents the input type being reported. Use the INPUT number and the following table to lookup the input type.

INPUT #	Input Description.	
0 - 29	Conductivities.	# = scale + 5x(Input Line - 1)
30 - 39	System pH.	# = 29 + Input Line
40 - 49	System ORP.	# = 39 + Input Line
50 - 79	Makeup Conductivities.	# = 50 + scale + 5x(Input Line - 2)
	Note : Makeup CAN NOT appear on Input Line #1	
80 - 88	Aux Input.	# = 79 + Input Line
89 - 92	SYS Input 1 - SYS Input 4 (4-20 mA Inputs)	
0	Conductivity 0 - 500	
1	Conductivity 0 - 2000	
2	Conductivity 0 - 5000	
3	Conductivity 0 - 10000	
4	Conductivity 0 - 20000	
5	Conductivity2 0 - 500	
6	Conductivity2 0 - 2000	
7	Conductivity2 0 - 5000	
8	Conductivity2 0 - 10000	
9	Conductivity2 0 - 20000	
10	Conductivity3 0 - 500	

INPUT #	Input Description.
11	Conductivity3 0 - 2000
12	Conductivity3 0 - 5000
13	Conductivity3 0 - 10000
14	Conductivity3 0 - 20000
15	Conductivity4 0 - 500
16	Conductivity4 0 - 2000
17	Conductivity4 0 - 5000
18	Conductivity4 0 - 10000
19	Conductivity4 0 - 20000
20	Conductivity5 0 - 500
21	Conductivity5 0 - 2000
22	Conductivity5 0 - 5000
23	Conductivity5 0 - 10000
24	Conductivity5 0 - 20000
25	Conductivity6 0 - 500
26	Conductivity6 0 - 2000
27	Conductivity6 0 - 5000
28	Conductivity6 0 - 10000
29	Conductivity6 0 - 20000
30	System pH
31	System pH
32	System pH
33	System pH
34	System pH
35	System pH
36	System pH
37	System pH
38	System pH
39	System pH
40	System ORP
41	System ORP
42	System ORP
43	System ORP
44	System ORP
45	System ORP
46	System ORP
47	System ORP
48	System ORP
49	System ORP
50	Makeup 0 - 500
51	Makeup 0 - 2000
52	Makeup 0 - 5000
53	Makeup 0 - 10000
54	Makeup 0 - 20000
55	Makeup 0 - 500
56	Makeup 0 - 2000
57	Makeup 0 - 5000
58	Makeup 0 - 10000
59	Makeup 0 - 20000
60	Makeup 0 - 500
61	Makeup 0 - 2000
62	Makeup 0 - 5000
63	Makeup 0 - 10000
64	Makeup 0 - 20000
65	Makeup 0 - 500
66	Makeup 0 - 2000

INPUT #	Input Description.
67	Makeup 0 - 5000
68	Makeup 0 - 10000
69	Makeup 0 - 20000
70	Makeup 0 - 500
71	Makeup 0 - 2000
72	Makeup 0 - 5000
73	Makeup 0 - 10000
74	Makeup 0 - 20000
75	Makeup 0 - 500
76	Makeup 0 - 2000
77	Makeup 0 - 5000
78	Makeup 0 - 10000
79	Makeup 0 - 20000
80	Aux Input
81	Aux Input
82	Aux Input
83	Aux Input
84	Aux Input
85	Aux Input
86	Aux Input
87	Aux Input
88	Aux Input
89	4-20 mA Input #1
90	4-20 mA Input #2
91	4-20 mA Input #3
92	4-20 mA Input #4

Appendix II - Command Line Switches

This program makes use of command line switches to alter the mode in which it starts. The three switches available are /D, /A and /M. To use the command line switches add a space after the program name and then add the switch you desire. For example:

C:\PULSAWKS>**PULSAWKS.EXE /D**
C:\PULSAWKS>**PULSAWKS.EXE /A**
or
C:\PULSAWKS>**PULSAWKS.EXE /M**

/D

The /D command line switch causes the program to start with alarm callback mode disabled. This option is useful if you need to prevent the program from polling the modem and attempting to answer the phone. For example if you are connected to a modem pool and don't have a dedicated modem for this software, you would run the program with this option. This option is also useful if you are running fax or some other communications software that you would like to handle the incoming calls.

/A

The /A command line switch causes the program to start in Autopoll mode. This option is useful if you will be using another application to launch this program (perhaps Windows Startup). As soon as the program starts it determines the autopoll schedule and immediately downloads any controllers that need updating. TIP: If you wish to Autopoll all of you controllers overnight while the telephone rates are low, you can use any program that launches another at a specific time to start your Autopolls.

/M

This option is identical to the /A switch except the main program window is minimized, instead of being displayed on your Windows™ Desktop.

Icons were created by the installation utility for running the program with the /A and /D command line switches. To edit these, go to the Windows™ properties page for the icon you wish to edit. See your Windows™ documentation for more information.

Appendix III - .WAV File Support

The install utility copied four .WAV sound files to your selected program directory. The .WAV files are ALARM.WAV, ERROR.WAV, GOODBYE.WAV and WELCOME.WAV. Each of the installed .WAV files make no sound. These are place holders that you can replace with your own sound files. Each of these is played at specific times during the running of this program.

ALARM.WAV

This .WAV file is played to alert you that the program has received an alarm callback from a controller. The .WAV file is played every ten seconds from the time the callback is received, until you have opened the Alarm Callback Log to view the alarm conditions. This is useful if you leave the program running in callback mode and do not desire to check on it often. By supplying your own sound file, the program can audibly inform you that a callback has been received.

ERROR.WAV

This .WAV file is played anytime an error occurs with controller communications or program operations. This is useful if you leave your computer with Autopoll active. If there is a problem with the Autopoll, this sound file will be played to alert you to check the download log for the source of the error.

GOODBYE.WAV

This sound file is played after all databases have been updated and the program is exiting.

WELCOME.WAV

This sound file is played after the program has initialized and is ready for input.

Appendix IV - Installed Files

This section lists all of the files that were copied to your hard disk by the installation utility. In the following table *install* refers to the directory in which this program was installed (e.g. c:\pulsawks).

Directory	File	Purpose
install	pulsawks.exe	Executable
install	pwks210.pdf	This manual in .pdf format
install	anadata.rpt	Analog Inputs Report Format
install	rlydata.rpt	Relay Report Format
install	digdata.rpt	Digital Inputs Report Format
install	dpdata.rpt	Data Collection Report Format
install	ptrol.trm	Windows Terminal Configuration File
install	logfile.txt	Communications Log File
install	readme.txt	Release Notes
install	alarm.wav	Alarm Wave File (Blank)
install	error.wav	Program Error Wave File (Blank)
install	goodbye.wav	Program Exit Wave File (Blank)
install	welcome.wav	Program Start Wave File (Blank)
instal\histdata	accounts.cdx	Database File
instal\histdata	cntrlrs.cdx	Database File
instal\histdata	keys.cdx	Database File
instal\histdata	accounts.dbf	Database File
instal\histdata	cntrlrs.dbf	Database File
instal\histdata	keys.dbf	Database File
instal\histdata	dblock.key	Data Lock File
install	cb5.dll	Dynamic Link Library
install	tbpro1w.dll	Dynamic Link Library
install	tbpro2w.dll	Dynamic Link Library
install	tbpro3w.dll	Dynamic Link Library
install	tbpro5w.dll	Dynamic Link Library
install	crpe.dll	Dynamic Link Library
install	pdbxbse.dll	Dynamic Link Library
install	pulsawks.xls	Macro set for Microsoft Excel 7.0

Recovering Disk Space

Do not delete files from the *install* or *install*\histdata directories. If you need to recover disk space, either delete controllers that are no longer needed (this is done in the Controller Setup window), or delete old data history that you no longer need to keep on-line (this is done in the Export Data window).

Un-Installing

To un-install the program, delete the files from the *install* and *install*\histdata directories. Remove the directories themselves and any associated icons and program groups.

Appendix V - Error Messages Index

This index provides supplemental information to assist you in understanding error messages presented by the program. The error messages are categorized according to the type of function they pertain to.

THE FOLLOWING ARE COMMUNICATIONS SETUP AND INITIALIZATION ERRORS:

"ERROR: Unable to create WINDOWS™ comm object...Terminating realtime mode"
Error attempting to allocate or initialize code handling high level windows communications.

"ERROR: Unable to create serial port object...Terminating realtime mode"
Error attempting to allocate or initialize code handling serial port interface.

"ERROR: Unable to create modem access object...Terminating realtime mode"
Error attempting to allocate or initialize code handling modem specific functions.

"Communications error: XX...Terminating realtime mode"
General communications error not covered above. Call tech support with the number of the error.

"PROBLEM STARTING ALARM TIMER - REMOTE DIALUP IS NOT POSSIBLE"
Some problem occurred attempting to initialize a modem port for remote dial in. This message will occur from the first time the program is run until a valid modem port is set in the Communications settings window (because port is initially set to ???).

"ERROR - UNABLE TO ESTABLISH COMMUNICATIONS CHANNEL"
The program could not establish a proper communications channel and will not be able to communicate with a CONTROLLER.

The following apply to data download errors:

"ERROR: Unable to create data download object...Terminating realtime mode"
Error attempting to allocate or initialize code handling the execution of XMODEM data transfers.

"ERROR: Unable to create download monitor object...Terminating realtime mode"
Error attempting to allocate or initialize code handling the monitoring of XMODEM data transfers.

"ERROR: Unable to create data file parser object...Terminating realtime mode"
Error attempting to allocate or initialize code handling the formatting and conversion of data downloaded from the CONTROLLER.

"THE DOWNLOAD WAS INCOMPLETE - DATA WAS NOT ADDED TO DATABASE"
The program downloaded data from a controller but did not get all of the data; the download was halted by the controller before all data was sent.

"ERROR - UNABLE TO OPEN DOWNLOAD FILE"
Unable to open the file that the downloaded data should go into.

Appendix V - Error Messages Index

"ERROR: Unable to write to download file..."
Unable to write to the file that the downloaded data should go into.

"ERROR: Transfer protocol error..."
Error in protocol characters being sent by the controller.

"ERROR: Timeout..."
PC waited too long without receiving characters from controller.

The following are realtime mode errors:

"ERROR - DO COMMAND - TERMINATING REAL TIME MODE"
A serious error occurred while attempting to send a message to the controller. The PC will assume communications are corrupted and will discontinue real time mode

"ERROR: Change Variable...Terminating realtime mode"
The controller sent back a message indicating that a command sent to change some controller value was not accepted.

"ERROR: Send Instruction...Terminating realtime mode"
Not currently used.

"ERROR: Invalid switch...Terminating realtime mode"
The controller sent an erroneous command character.

"ERROR: Parse version...Terminating realtime mode"
Not currently used.

"ERROR: Line status...Terminating realtime mode"
The program has detected an abnormal condition on the communications channel and cannot proceed. For example: The modem has disconnected.

"ERROR: Too many unsuccessful connection tries... Terminating realtime mode"
The program has had too many unsuccessful attempts to connect with a controller, even though the communications channel is OK.

"ERROR: Checksum...Terminating realtime mode"
The program has detected repeated checksum errors on the information being sent from the controller indicating that the information is being garbled during transmission.

"ERROR: Send buffer...Terminating realtime mode"
The program fills a special buffer with characters that will be sent by the modem to the controller. An error occurred attempting to write characters to that buffer, or an abnormal line condition occurred just prior to filling the buffer.

"ERROR: Invalid string...Terminating realtime mode"
Error indicating that the controller sent a string to the program that is either too short or

improperly terminated. This check occurs before the checksum validation.

"ERROR: Invalid command was sent...Terminating realtime mode"
The program doesn't recognize the command character sent by the controller.

The following errors are WINDOWS internal errors that indicate a windows problem of some sort and all indicate an inability to perform a routine function such as adding information to a Pulldown combo box:

ERROR - READING COMBO BOX
ERROR - UPDATE DATA RETURNS 0 (ZERO)
ERROR - ADDING CONTROLLERS TO COMBO BOX
ERROR - ADDING INPUTS TO COMBO BOX
ERROR ADDING DAYS TO COMBO BOX
ERROR ADDING WEEKS TO COMBO BOX
ERROR - UNABLE TO RENAME FILE

The following are database related errors. They all occur for 1 of 4 reasons:

1. ***Can't open a database file due to insufficient system resources, corruption, or erasure.***

2. ***Can't read a database file due to corruption.***

3. ***Can't write a database file due to corruption or read-only attribute.***

4. ***Can't locate records within a database file due to corruption.***

The messages indicate which particular database is affected:

ERROR - ATTEMPTING TO READ CONNECT MANAGER DATABASE
ERROR - ATTEMPTING TO WRITE CONNECT MANAGER DATABASE
ERROR - UNABLE TO OPEN DATA HISTORY FILES
ERROR - UNABLE TO OPEN AUTOPOLL HISTORY FILES
ERROR - FAILURE READING FROM DATA BASE, DATA BASE MAY BE CORRUPTED
ERROR - UNABLE TO OPEN DATA HISTORY FILE
ERROR WRITING PROGRAM PARAMETERS - DATABASE CHANGES WERE NOT SAVED
ERROR ATTEMPTING TO READ CONTROLLER DATABASE
ERROR ATTEMPTING TO WRITE CONTROLLER DATABASE
ERROR ATTEMPTING TO WRITE DOWNLOAD DATA TO DATABASE
ERROR - UNABLE TO LOCATE DOWNLOAD RECORDS
ERROR COUNTING NUMBER OF CONTROLLERS
ERROR LOCATING CONTROLLER - DELETE NOT PERFORMED
ERROR SAVING CONTROLLER SETUP DATA
ERROR ADDING NEW CONTROLLER

The following Alarm codes are inserted for the '?' character in the pager identification string. The examples given here are for fully loaded controllers. Match your controller's inputs to the definition to determine which chart applies.

Series 200/300 Controllers with Conductivity, Makeup, pH and ORP:

Appendix VI - Alarm Callback: Pager Alarm Codes

Alarm Type	Input #	Typical Use	Code
High Alarm	1	Sys Cond	00
High Alarm	2	Mkup	01
High Alarm	3	pH	02
High Alarm	4	ORP	03
Low Alarm	1	Sys Cond	08
Low Alarm	2	Mkup	09
Low Alarm	3	pH	10
Low Alarm	4	ORP	11
Limit Time	1	Sys Cond	16
Limit Time	2	Mkup	17
Limit Time	3	pH	18
Limit Time	4	ORP	19
INH Time	1	Inhibitor #1	24
INH Time	2	Inhibitor #2	25
INH Time	3	Inhibitor #3	26
INH Time	4	Inhibitor #4	27
No Flow	N/A	No Flow	28
History	N/A	History 80% Full	29

Series 200/300 Controllers with Conductivity, pH and ORP:

Alarm Type	Input #	Typical Use	Code
High Alarm	1	Sys Cond	00
High Alarm	2	pH	01
High Alarm	3	ORP	02
Low Alarm	1	Sys Cond	08
Low Alarm	2	pH	09
Low Alarm	3	ORP	10
Limit Time	1	Sys Cond	16
Limit Time	2	pH	17
Limit Time	3	ORP	18
INH Time	1	Inhibitor #1	24
INH Time	2	Inhibitor #2	25
INH Time	3	Inhibitor #3	26
INH Time	4	Inhibitor #4	27
No Flow	N/A	No Flow	28
History	N/A	History 80% Full	29

Appendix VI - Alarm Callback: Pager Alarm Codes

Series 200/300 Controllers with Conductivity only:

Alarm Type	Input #	Typical Use	Code
High Alarm	1	Sys Cond	00
Low Alarm	1	Sys Cond	08
Limit Time	1	Sys Cond	16
INH Time	1	Inhibitor #1	24
INH Time	2	Inhibitor #2	25
INH Time	3	Inhibitor #3	26
INH Time	4	Inhibitor #4	27
No Flow	N/A	No Flow	28
History	N/A	History 80% Full	29

Series 500 Controllers with Conductivity only:

Alarm Type	Input #	Typical Use	Code
High Alarm	1	Sys Cond	00
Low Alarm	1	Sys Cond	08
Limit Time	1	Sys Cond	16
Drum Level	1	Drum Level #1	20
Drum Level	2	Drum Level #2	21
Drum Level	3	Drum Level #3	22
Drum Level	4	Drum Level #4	23
Drum Level	5	Drum Level #5	24
EEPROM	N/A	EEPROM Error	25
RTC Error	N/A	Real Time Clock Error	26
History	N/A	History 80% Full	29
Init	N/A	Factory Re-Init Alarm	30
Flow	N/A	No Flow	31

Series 500 Controllers with Conductivity and ORP:

Alarm Type	Input #	Typical Use	Code
High Alarm	1	Sys Cond	00
High Alarm	2	ORP	01
Low Alarm	1	Sys Cond	08
Low Alarm	2	ORP	09
Limit Time	1	Sys Cond	16
Limit Time	2	ORP	17
Drum Level	1	Drum Level #1	20
Drum Level	2	Drum Level #2	21
Drum Level	3	Drum Level #3	22
Drum Level	4	Drum Level #4	23
Drum Level	5	Drum Level #5	24
EEPROM	N/A	EEPROM Error	25
RTC Error	N/A	Real Time Clock Error	26
History	N/A	History 80% Full	29
Init	N/A	Factory Re-Init Alarm	30
Flow	N/A	No Flow	31

Appendix VI - Alarm Callback: Pager Alarm Codes

Series 500 Controllers with Conductivity and pH:

Alarm Type	Input #	Typical Use	Code
High Alarm	1	Sys Cond	00
High Alarm	2	pH	01
Low Alarm	1	Sys Cond	08
Low Alarm	2	pH	09
Limit Time	1	Sys Cond	16
Limit Time	2	pH	17
Drum Level	1	Drum Level #1	20
Drum Level	2	Drum Level #2	21
Drum Level	3	Drum Level #3	22
Drum Level	4	Drum Level #4	23
Drum Level	5	Drum Level #5	24
EEPROM	N/A	EEPROM Error	25
RTC Error	N/A	Real Time Clock Error	26
History	N/A	History 80% Full	29
Init	N/A	Factory Re-Init Alarm	30
Flow	N/A	No Flow	31

Series 500 Controllers with Conductivity, Make-up, and pH:

Alarm Type	Input #	Typical Use	Code
High Alarm	1	Sys Cond	00
High Alarm	2	Mkup	01
High Alarm	3	pH	02
Low Alarm	1	Sys Cond	08
Low Alarm	2	Mkup	09
Low Alarm	3	pH	10
Limit Time	1	Sys Cond	16
Limit Time	2	Mkup	17
Limit Time	3	pH	18
Drum Level	1	Drum Level #1	20
Drum Level	2	Drum Level #2	21
Drum Level	3	Drum Level #3	22
Drum Level	4	Drum Level #4	23
Drum Level	5	Drum Level #5	24
EEPROM	N/A	EEPROM Error	25
RTC Error	N/A	Real Time Clock Error	26
History	N/A	History 80% Full	29
Init	N/A	Factory Re-Init Alarm	30
Flow	N/A	No Flow	31

Series 500 Controllers with Conductivity, Make-up, pH, ORP, 4-20mA Inputs:

Alarm Type	Input #	Typical Use	Code
High Alarm	1	Sys Cond	00
High Alarm	2	Mkup	01
High Alarm	3	pH	02
High Alarm	4	ORP	03
High Alarm	5	4-20mA Input #1	04
High Alarm	6	4-20mA Input #2	05
High Alarm	7	4-20mA Input #3	06

High Alarm	8	4-20mA Input #4	07
Low Alarm	1	Sys Cond	08
Low Alarm	2	Mkup	09
Low Alarm	3	pH	10
Low Alarm	4	ORP	11
Low Alarm	5	4-20mA Input #1	12
Low Alarm	6	4-20mA Input #2	13
Low Alarm	7	4-20mA Input #3	14
Low Alarm	8	4-20mA Input #4	15
Limit Time	1	Sys Cond	16
Limit Time	2	Mkup	17
Limit Time	3	pH	18
Limit Time	4	ORP	19
Drum Level	1	Drum Level #1	20
Drum Level	2	Drum Level #2	21
Drum Level	3	Drum Level #3	22
Drum Level	4	Drum Level #4	23
Drum Level	5	Drum Level #5	24
EEPROM	N/A	EEPROM Error	25
RTC Error	N/A	Real Time Clock Error	26
History	N/A	History 80% Full	29
Init	N/A	Factory Re-Init Alarm	30
Flow	N/A	No Flow	31

Series 500 Controllers with Dual Conductivity:

Alarm Type	Input #	Typical Use	Code
High Alarm	1	Sys Cond #1	00
High Alarm	2	Sys Cond #2	01
Low Alarm	1	Sys Cond #1	08
Low Alarm	2	Sys Cond #2	09
Limit Time	1	Sys Cond #1	16
Limit Time	2	Sys Cond #2	17
Drum Level	1	Drum Level #1	20
Drum Level	2	Drum Level #2	21
Drum Level	3	Drum Level #3	22
Drum Level	4	Drum Level #4	23
Drum Level	5	Drum Level #5	24
EEPROM	N/A	EEPROM Error	25
RTC Error	N/A	Real Time Clock Error	26
History	N/A	History 80% Full	29
Init	N/A	Factory Re-Init Alarm	30
Flow	N/A	No Flow	31

Series 600 Controllers with 3-Boiler and 4-20mA Inputs:

Alarm Type	Input #	Typical Use	Code
High Alarm	1	Sys Cond #1	00
High Alarm	2	Sys Cond #2	01
High Alarm	3	Sys Cond #3	02
High Alarm	5	4-20mA Input #1	04
High Alarm	6	4-20mA Input #2	05
High Alarm	7	4-20mA Input #3	06

High Alarm	8	4-20mA Input #4	07
Low Alarm	1	Sys Cond #1	08
Low Alarm	2	Sys Cond #2	09
Low Alarm	3	Sys Cond #3	10
Low Alarm	5	4-20mA Input #1	12
Low Alarm	6	4-20mA Input #2	13
Low Alarm	7	4-20mA Input #3	14
Low Alarm	8	4-20mA Input #4	15
Limit Time	1	Sys Cond #1	16
Limit Time	2	Sys Cond #2	17
Limit Time	3	Sys Cond #3	18
Drum Level	1	Drum Level #1	20
Drum Level	2	Drum Level #2	21
Drum Level	3	Drum Level #3	22
Drum Level	4	Drum Level #4	23
Drum Level	5	Drum Level #5	24
EEPROM	N/A	EEPROM Error	25
RTC Error	N/A	Real Time Clock Error	26
History	N/A	History 80% Full	29
Init	N/A	Factory Re-Init Alarm	30
Flow	N/A	No Flow	31

Series 600 Controllers Single Boiler w/ Condensate pH:

Alarm Type	Input #	Typical Use	Code
High Alarm	1	Sys Cond	00
High Alarm	2	pH	01
Low Alarm	1	Sys Cond	08
Low Alarm	2	pH	09
Limit Time	1	Sys Cond	16
Limit Time	2	pH	17
Drum Level	1	Drum Level #1	20
Drum Level	2	Drum Level #2	21
Drum Level	3	Drum Level #3	22
Drum Level	4	Drum Level #4	23
Drum Level	5	Drum Level #5	24
EEPROM	N/A	EEPROM Error	25
RTC Error	N/A	Real Time Clock Error	26
History	N/A	History 80% Full	29
Init	N/A	Factory Re-Init Alarm	30
Flow	N/A	No Flow	31

Appendix VII - Pulsawks.XLS MS Excel™ Macros

There are macros available for importing PULSAworks data into a Microsoft Excel™ 7.0 or Microsoft Excel™ 97 spreadsheet. These macros can be downloaded from www.pulsa.com. Before attempting to use these macros, please follow the following instructions to ensure your system database drivers are properly configured so MS Excel™ can read the PULSAworks databases.

1 Verify dBase ODBC data source.
- 1.1 From the **Control Panel** window double-click on the **32bit ODBC** icon.
- 1.2 Click on the **System DSN** tab.
- 1.3 If there is a line under **System Data Sources (Driver):** that begins '**dBase [...**' proceed to step 2.
- 1.4 Click on the **Add** button to create the needed data source.
- 1.5 Highlight **Microsoft dBase Driver (*.dbf)** under the installed ODBC drivers list. If this driver is not present in the list, refer to your MS Excel documentation for instructions on adding this driver and proceed with these instructions.
- 1.6 Click on the **Finish** button.
- 1.7 In the **Data Source Name** field enter *dBase*.
- 1.8 In the **Version** selection box, select *dBase IV*.
- 1.9 Click on the **Use Current Directory** checkbox so that it is marked with a check.
- 1.10 Click on the **OK** button. The dBase ODBC data source is now configured and you can exit from **System Data Sources**, **Data Sources** and the **Control Panel**.

2 Check Microsoft Excel™ for needed Add-Ins. If you are running Microsoft Excel 97™ skip steps 2.2, 2.3 and 2.4.
- 2.1 Open a new 'Blank Workbook' in MS Excel.
- 2.2 Expand the **Tools** menu.
- 2.3 Select the **Add-Ins...** option.
- 2.4 Ensure that the **MS Query Add-In** line has a check mark. If this line is not present, use the MS Excel™ 7.0 or MS Office™ 95 Setup program to install it.
- 2.5 Expand the **Data** menu.
- 2.6 If the **Get External Data...** line appears somewhere on this menu, the MS Query add in is installed properly. If this line does not appear, refer to the installation documentation that you received with your copy of Microsoft Excel™ for installing the MS Query components.

3 Close the blank workbook and open the Pulsawks.XLS macro set.

The first time the file is loaded it will prompt you for the location of the Pulsawks program files. A window will appear asking you to enter the full path of the installation directory. This is the location of your histdata directory (e.g. c:\pulsawks). Your controller's database will then be read, and a list of all controllers will be presented on the screen. Select a controller and click the Open Workbook button. Depending on the amount of data stored for this controller, it may take several minutes for the update to complete. Do not attempt to access the new workbook until the Controller Menu is removed from the screen. The workbook will be created using the datafile name for the selected controller and the extension .XLS. The Pulsawks controller menu can be brought up at any time by selecting Pulsawks and Controller Menu from the MS Excel™ main menu bar.

Pulsawks.XLS will read data from your Pulsawks or Pulsawin databases and create a workbook for complete analysis of the stored data. A worksheet is created for each input at the selected controller. All data points and time-stamps are added to the worksheet. Additional columns are available for entering formulas or additional data. The controller workbooks can be opened directly or through the controllers menu.

Pulsawks.XLS is not compiled so that you can customize it to meet your specific needs. To add code to be run each time the worksheets are updated, Unhide the workbook and edit the 'Update Subs' Visual Basic module.

Program License Agreement

Please review the following terms and conditions carefully, By using this program, you indicate acceptance of such terms and conditions. In the event you do not agree with any of them, you should promptly return the package unopened. Your money will be refunded.

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You may not use, copy, modify, or transfer the program, or any copy, modification, or merged portion, in whole or in part, except as expressly provided for in this Agreement. If you transfer possession of any copy, modification, or merged portion of the program to another party, your license is automatically terminated.

TERMS

The license is effective until terminated. You may terminate it at any other time by destroying the program together with all copies, modifications, and merged portions in any form. It will also terminate upon conditions set forth elsewhere in this Agreement or if you fail to comply with any terms or condition of this Agreement. You agree upon such termination to destroy the program together with all copies, modifications, and merged portions in any form.

LIMITED WARRANTY AND REMEDIES

Pulsafeeder, Inc. warrants the diskette(s) on which the program is furnished to be free from defects in materials and workmanship under normal use for a period of ninety (90) days from the date of delivery to you as evidenced by your receipt. This warranty is limited to you and is not transferable.

The foregoing warranty does not extend to any diskette which has been damaged as a result of accident, misuse, abuse or a result of service or modification by anyone other than Pulsafeeder, Inc.

Except as expressly set forth above, no other warranties, either express or implied, are made with respect to this program, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose, and Pulsafeeder, Inc. expressly disclaims all warranties not stated herein. You assume the entire risk as to the quality and performance of the program. Should the program prove defective, you and not Pulsafeeder, Inc. assume the entire cost of necessary servicing, repair, or correction. Some states do not allow the exclusion of implied warranties, so the above exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Pulsafeeder does not warrant that the functions contained in the program will meet your requirements or that the operation of the program will be uninterrupted or error-free. You also assume responsibility for the selection of the program to achieve your intended results, and for the installation, use and results obtained from the program.

Your sole remedies and Pulsafeeder's entire liability are set forth above. In no event will Pulsafeeder, Inc. be liable to you or any other person for damages, including incidental or consequential damages, expenses, lost profits, lost savings, or other damages arising out of the use of or inability to use such program.

Some states do not allow the limitation or exclusion of incidental or consequential damages for consumer products, so the above limitations or exclusions may not apply to you.

GENERAL

You may not sublicense, assign, or transfer the license or the program except as expressly provided in this Agreement. Any attempt to otherwise sublicense, assign, or transfer any of the rights, duties, obligations hereunder is null and void.

If you have any questions concerning this Agreement, including warranty service, contact Pulsafeeder, Inc., 27101 Airport Rd. Punta Gorda, Florida 33982.

This Agreement will be governed by the Laws of the State of New York.

You acknowledge that you have read this Agreement, understand it, and agree, to be bound by its terms and conditions; you further agree that it is the complete and exclusive statement of this Agreement between us which superseded any proposal or prior Agreement, oral or written, and any other communications between us relating to the subject matter of the Agreement.

PULSAFEEDER Inc.
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