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MTCDS Installation & Operation Manual

MultiTrode Control and Diagnostic Software

This Manual is the support documentation for the installation, commissioning and operation of MultiTrode MTCDS.

Document Version 8.0

MTCDS V8.0.5

To support equipment version up to 8.0.x

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Contents

1 Warnings & Cautions 6

1.1 Terms used in this Manual 6

2 Introduction 9

2.1 Features & Benefits of the Control and Diagnostics Software 9

3 Firmware Compatibility Chart 10

3.1 How different firmware versions relate to the new MTCDS 10

3.2 DIP Switch Settings 12

4 Installation 12

4.1 Check the contents: 12

4.2 System Requirements 12

4.3 Software Installation 12

4.4 Hardware installation 12

4.5 PC Software Configuration 12

5 Overview 12

5.1 MultiTrode Settings Change Program 12

5.2 MultiTrode Status/Datalog Program 12

5.3 MTCDS Utility Packages 12

6 Operation 12

6.1 MultiTrode Settings Change Program 12

6.2 MonitorPro 12

6.3 MultiTode Status/Datalog program 12

6.4 TinyMon Automatic Programmer 12

7 Dialup Points Configuration 12

8 Appendix A – Radio Configuration 12

8.1 Radio Link Communication 12

8.2 Equipment Required 12

8.3 Remote Radio Installation 12

8.4 PC Radio Installation 12

8.5 PC Software configuration 12

9 Appendix B – Modem Configuration 12

9.1 Configuration of Modems when using the Dial-up Feature 12

9.2 Equipment Required 12

9.3 Remote Modem Setup 12

9.4 PC Modem SETUP 12

10 Appendix C – Upgrading Firmware 12

10.1 Firmware upgrade steps for Pre V7.00 firmware units 12

11 Appendix D – USB Converters 12

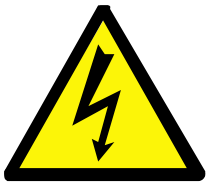
11.1 Using USB to Serial Converters 12
11.2 Solution 12
12 Glossary of Terms 12
13 Abbreviations 12
14 Accessories 12
14.1 MultiTrode Outpost 12
14.2 MT2PC & MT3PC 12
14.3 MonitorPro Station Supervisor 12
14.4 MultiTode Probe 12
14.5 MultiTode Relays 12

1 Warnings & Cautions

Information to User

Read through the manual obtain working knowledge and maximum performance from the product. After reading, put the manual away in a safe place for future reference.

1.1 Terms used in this Manual

	**DANGER:** THIS SYMBOL IS USED WHERE NON-COMPLIANCE COULD RESULT IN INJURY OR DEATH.
	**WARNING:** THIS SYMBOL IS USED WHERE NON-COMPLIANCE COULD RESULT IN INCORRECT OPERATION, DAMAGE TO OR FAILURE OF THE EQUIPMENT.
	**NOTE:** THIS SYMBOL IS USED TO HIGHLIGHT AN ISSUE OR SPECIAL CASE WITHIN THE BODY OF THE MANUAL.

Company Profile

Figure 1 - MultiTrode's Brisbane Head Office

Our vision is for MultiTrode to be the world leader in level sensing, pump monitoring and pump station management systems.

We recognise that total customer satisfaction is integral to the achievement of this vision, and to this end the company has adopted the following initiatives.

Appropriate solutions

MultiTrode has developed and will continue to produce a complete range of products so that customers may purchase an appropriate solution for their needs.

The products range from level sensing probes and simple relay based controllers to sophisticated microprocessor based systems and PC based supervisory control software providing full pump-station management.

Simplicity of use

All MultiTrode products are designed for easy installation and operation by the end user and are supplied with complete installation and operating instructions.

Research and development

MultiTrode maintains an extensive research and development program. While taking account of user needs, we ensure that our products and systems include the best possible technology and provide the benchmark by which pump-station management systems are measured.

Free technical support

MultiTrode provides free pre and post sale technical support by telephone, fax or email. Any inquiry regarding the use of our products will be responded to promptly by our engineering support staff.

Global service

Our products are distributed worldwide.

Your investment is protected by our service and support network.

Satisfaction guaranteed

All MultiTrode products are covered by a minimum 2 year warranty and repairs are carried out by our own highly trained technicians. In a critical situation, customers are supplied with exchange units.

2 Introduction

Congratulations on your purchase of the MultiTrode Control & Diagnostic Software.

Figure 2 – MTCDS Screens

MultiTrode's Control and Diagnostic Software has been designed to allow operators to view, save or change current system settings, upgrade product software and to customise the data received, all from the comfort of their personal computer or laptop. Its main aim is to make the control and monitoring of MultiTrode systems as easy as possible.

The basic system is designed to integrate with MultiTrode's range of digital pump controllers and remote station monitors. Communication, using standard modem, radio and cable systems, allows users to change or save site details and to access and update reports.

2.1 Features & Benefits of the Control and Diagnostics Software

- Set pump and alarm levels
- Set pump and alarm delays
- Set probe sensitivity
- Set Electronic DIP Switches (EDS)
- Access to controls at anytime
- Tailored trending and reports
- View trend data in formatted charts
- Intuitive click and drag settings controls
- Tailored reports that can be printed out or filed in a database
- Upgrade products with the latest software

Combining all these features with its ability to generate precise and informative reports makes the MultiTrode Control and Diagnostic Software stand out from all other packages which offer the user, control and reporting capabilities for their station management.

Once again, MultiTrode is the answer to all your pump station needs

3 Firmware Compatibility Chart

3.1 How different firmware versions relate to the new MTCDS

MultiTrode has an aggressive policy of continually seeking to improve our products to conform to customer requirements. These changes inevitably lead to improvements in the product and methods of interfacing to the products which can cause different versions to not be directly compatible.

Below is a comprehensive description of the new MTCDS and how it relates to existing and new versions of product firmware.

See “Firmware Compatibility Chart” over page. Firmware is defined as software that is programmed into the MonitorPRO and Pump Controller, it is identified in the chart by versions numbers, for example; V7.00; V8.0.5.

Software is defined as an application that runs on a computer. The following software is used in the chart:

1. MTSettingsChange is used to extract and change settings on either the MonitorPRO or Pump Controller.
2. MTStatLog is used to extract the datalog file information from the MonitorPRO and also show the remote site status of the Pump Controllers.
3. MTConfig is used to configure the information for dial-up remote sites.
4. TinyMon is a software utility that is used to upgrade the firmware (i.e. the program inside the product) in the MonitorPRO, Remote Reservoir Monitor and Pump Controller.

The MultiTrode Control and Diagnostic Software has the same version number as the firmware that it uses to upgrade a device so MTCDSVersion8.0.5 has V8.0.5 firmware packaged within it.

3.1.1 Using MTCDS Version 8.0.5 via the RS232 Communications Port

Version of current firmware	MONITORPRO			PUMP CONTROLLER		
	MTStatLog [2] MTConfig [3]	MTSettingsChange [1]	Tinymon [4]	MTStatLog [2] MTConfig [3]	MTSettingsChange [1]	Tinymon [4]
Pre V7.00	The above software applications in no way work with Pre V7.00 firmware products.	The above software application in no way works with Pre V7.00 firmware products.	N.B. To use Tinymon on older versions of firmware, the existing settings should be hand extracted from the product, so they can be re-entered after firmware upgrade. Only hardware versions 5.00 and above can be upgraded to V8.0.5. If the hardware version is too old and features from V8.0.5 are required, either purchase a new unit or send the unit back to the factory for an upgrade. Should the hardware version be correct then follow the steps in Appendix C.	The above software applications in no way work with Pre V7.00 firmware products.	The above software application in no way works with Pre V7.00 firmware products.	N.B. To use Tinymon on older versions of firmware, the existing settings should be hand extracted from the product, so they can be re-entered after firmware upgrade. Only hardware versions 5.00 and above can be upgraded to V8.0.5. If the hardware version is too old and features from V8.0.5 are required, either purchase a new unit or send the unit back to the factory for an upgrade. Should the hardware version be correct then follow the steps in Appendix C.
From V7.00 to V7.7.3	MTCDS Version 8.0.5 supports all firmware versions from V7.00 to V8.0.5.	MTSettingsChange can only read settings from units with these firmware versions. These read settings can then be sent to a unit with V8.0.x firmware.	All firmware versions V7.00 and above will be able to be upgraded as the hardware version will be correct. Follow the instructions as described in the manual. The unit can be reset from the front keypad for this upgrade and power does not need to be cycled.	V7.00 – Pre7.03a: The above software does not work with these firmware versions when connected directly to the RS232 communications port of the Pump Controller BUT will work via the RS232 port of the MonPro. V7.03a – V7.7.3: These firmware versions are supported via a direct connection.	MTSettingsChange can only read settings from units with these firmware versions. These read settings can then be sent to a unit with V8.0.x firmware.	Firmware versions V7.00 and above will be able to be upgraded as the hardware version will be correct. Follow the instructions as described in the manual. The unit can be reset from the front keypad for this upgrade and power does not need to be cycled.
From V8.0.0 to V8.0.x	MTCDS Version 8.0.5 supports all firmware versions from V7.00 to V8.0.5	Settings can be read from and sent to these firmware versions	Follow the instructions as described in the manual.	V8.0.5 supports all firmware versions from V7.00 to V8.0.5	Settings can be read from and sent to these firmware versions	Follow the instructions as described in the manual.

3.2 DIP Switch Settings

3.2.1 Hardware Versions 7.01 and above

As of MonitorPRO Hardware Version 7.01, the eight DIP switches on the rear (DIN rail clip side) of the unit have been removed. As a result, no DIP switches need to be altered to select between MODEM (as used with SCADA) and RS232 link (as used for software upgrade and with settings change program).

This means that when the unit has been set up for SCADA with the radio MODEM, then to perform MonitorPro software upgrade the unit does not need to have DIP switches changed. Similarly, when using the RS232 mode for MultiTrode's Control and Diagnostic Software, no DIP switches need to be changed.

Note:
When using the RS232 port for a MonitorPRO software upgrade, or for the MultiTrode's Control and Diagnostic Software in RS232 mode, any radio which is attached should be turned off, or preferably unplugged from the MonitorPRO. If this is not done, then transmissions from the radio will occur which can interfere with SCADA communications to other sites. SCADA transmissions can also interfere with the software upgrade process.

Reminder:
Once you have finished the MonitorPRO software upgrade or use of the MultiTrode's Control and Diagnostic Software, remember to switch the radio back on or plug it back in.

3.2.2 Hardware Version 7.00 and Below

DIP Switches for the configuration of the RS232 and MODEM ports can be found on the rear (DIN rail clip side) of the MonitorPro's chassis. The keypad will need to be detached to gain access if the unit is panel mounted. The eight DIP's have the following functions:

DIP Number	Function	Default Setting
1	Reserved - Do not change	OFF
2	Reserved - Do not change	OFF
3	MODEM CCITT V23 Mode	OFF
4	MODEM Bell 202 Mode	OFF
5	Modem/ RS232 Selection	OFF
6	Modem/ RS232 Selection	ON
7	Modem/ RS232 Selection	OFF
8	Modem/ RS232 Selection	ON

To enable the modem for use with internal radio modem, set dip switches as follows:

1	2	3	4	5	6	7	8
OFF	OFF	OFF	ON	ON	OFF	ON	OFF

To enable the Rs232 Port for use software upgrades, set dip switches as follows:

1	2	3	4	5	6	7	8
OFF	OFF	OFF	OFF	OFF	ON	OFF	ON

Figure 3 – Dip Switch Settings

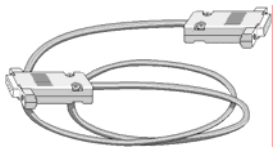
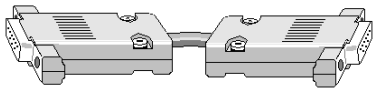
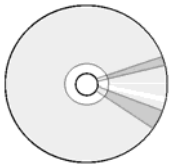
4 Installation

4.1 Check the contents:

Please check that all the accessories below have been included with this package.

4.1.1 MultiTrode RS232 Modem Cable

This cable must be used to connect a modem to the MonitorPro in the field. Note that the "MultiTrode RS232 Software Cable" is not used in the field.

	**MultiTrode RS232 Modem Cable** This cable must be used to connect a modem to the MonitorPro in the field. Note that the "MultiTrode RS232 Software Cable" is not used in the field.
	**MultiTrode RS232 Software Cable** This cable is used, together with the "MultiTrode RS232 Modem Cable", when a MonitorPro or Pump Controller is directly connected to a personal computer.
	**MultiTrode Control and Diagnostic Software CD-ROM**
	**User's Manual (this manual)**

If any of these items are missing or damaged, contact your place of purchase immediately.

4.2 System Requirements

- Microsoft Windows 95/98, NT Workstation 4.0 or Windows 2000
- Pentium 120 (or higher)
- 250MB available hard disk space
- 16MB RAM
- CD-ROM drive

4.2.1 Installation of the MultiTrode CDS software involves the following:

- Software Installation
- Hardware Installation
- PC Communication Configuration

Once these tasks have been completed, you will have a fully functional system

4.3 Software Installation

4.3.1 Follow these steps to install MTCDS

1. Insert the MTCDS CD into the CD-ROM drive of the PC.
2. Run Windows Explorer, open the MTCDS directory and run ‘setup.exe’
3. Read the instructions presented and press ‘NEXT >’ to continue.
4. Accept the default destination folder C:\Program Files\ MultiTrode Pump Management, or designate a directory by entering the appropriate path. Press ‘NEXT >’ to continue.

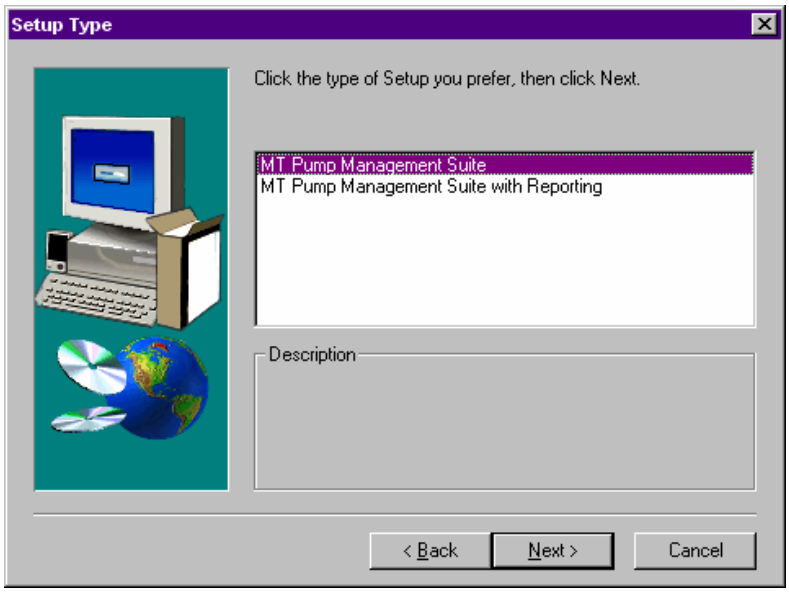


Figure 4 - Default destination folder

5. Choose the appropriate software package from the list presented and follow the instructions that display on the screen.
6. After the installation is complete, select ‘Finish’ when asked. The computer will restart and the necessary files will be installed.

4.4 Hardware installation

The following describes the hardware connections needed to enable system communications using the MultiTrode RS 232 cables supplied.

Note:
For information on radio installation, see Appendix A
For information on modem installation, see Appendix B

Alternatively this software package comes with an extensive online Help, accessed by pressing the F1 key. Help contents are shown below:

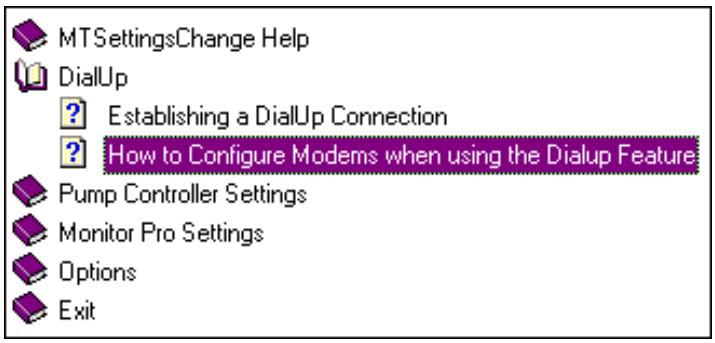


Figure 5 - Help Contents

4.4.1 Connecting the Modem

1. Connect the male modem end of the MultiTrode Modem cable to either end of the Software Adapter cable, as per the diagram below.

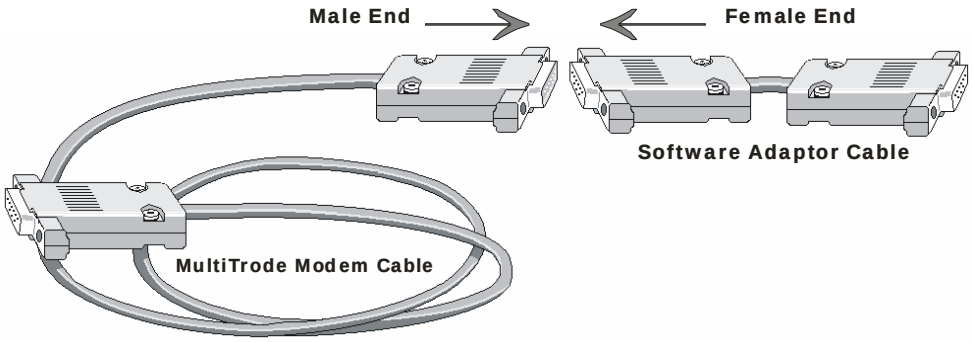


Figure 6 – Connecting the Modem

WARNING:
Only use the supplied MultiTode connection cables. Using other cables may result in incorrect operation or even damage to the MultiTode device.

2. With the MultiTrode Modem and Software Adapter cables in place, position the PC or laptop and/or the MultiTrode device as to allow ease of connection with.

3. Connect one end of this cable, to an available port on the PC or laptop and the other end to the 'Comms Interface' port on the MultiTrode device:

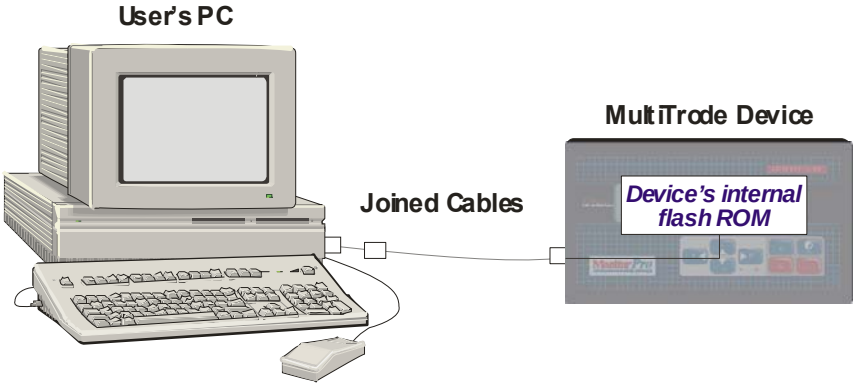
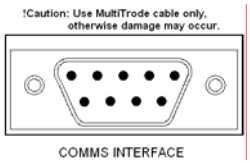


Figure 7 – Connect the cable to the PC/Laptop and the MultiTrode device.

Note:
The communication interface connection on the Monitor Pro and Pump Controller is the port to where the RS232 serial cable, MTCIU cable, radio modem, or telephone modem is connected.

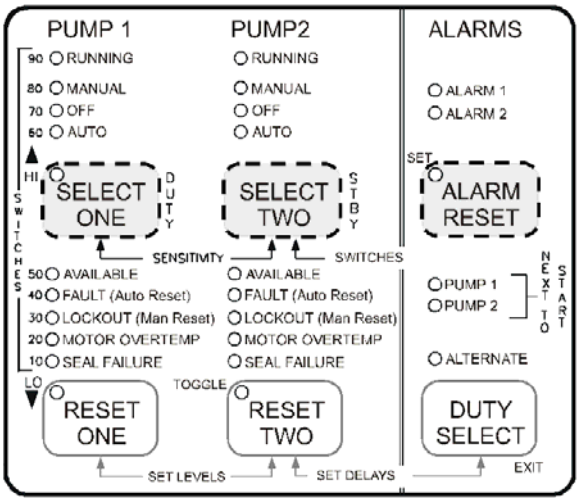


Note:
When connecting directly to a pump controller, EDS 44 (Communications with Network) must be set to OF. For convenience a shortcut method for changing EDS 44 is shown below.

4.4.2 Set EDS 44 to Off

Simultaneously press 'Select One', 'Select Two' and 'Alarm Reset".

When pressed, an LED test will commence.



4.5 PC Software Configuration

For successful communications with the MonitorPro or Pump Controller in the field, the Control and Diagnostics software communications mode settings need to be configured for one of the following communication devises.

- RS 232 (MultiTrode Cables - supplied)
- RS 485 (MultiTrode Computer Interface Unit, MTCIU – not supplied)
- Radio (MultiTrode approved Radios – not supplied, see Appendix A)
- Modem (MultiTrode approved Modems – not supplied, see Appendix A)

4.5.1 Software Configuration Procedure

Follow these instructions to configure the communication settings.

1. After the installation of MTCDS, double-click on the 'MT Settings Change' shortcut icon.

The following menu will display.

Figure 8 – MTSettingsChange Menu

2. Click 'Communications Options'.
3. The 'Options dialog box now appears. Refer to the table on the following page for an explanation of this screen.

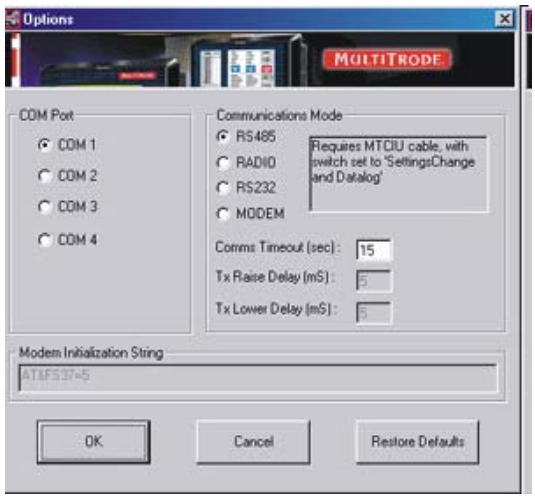


Figure 9 – Communications Options Window

4. Press the 'OK' button. To ignore changes, press 'Cancel' or to return to the default settings, press 'Restore Defaults'.

Note:
If a USB to serial adapter is being used the COM port may need to be checked or changed, refer to Appendix D for details.

4.5.2 Options Dialogue Definitions

Field	Description
COM Port	Specifies the PC serial communications port that will be use for communicating with the unit. This is the port to which the RS232 serial cable, MTCIU cable, radio or telephone modem is to be connected. If a USB to serial adapter is being used the COM port may need to be checked or changed, refer to appendix D for details.
Communications Mode	**RS485** The Settings Change program will communicate with the unit via an RS485 cable. This requires the use of an MTCIU (MultiTrode Computer Interface Unit) cable, (MTCIU switch must be set to "Settings Change and Datalog"). This cable needs to be ordered separately.  **Note:** If you are experiencing communications problems in RS485 mode, try disabling the FIFOs for the Serial Port of the PC: For ***Windows 98***, go to Start Menu, 'Settings', 'Control Panel'. Select 'System', and click on the Device Manager tab. Expand 'Communication Ports' in the list and select the serial port that being used for this program. Click on 'Properties', then select the 'Port Settings' tab and press 'Advanced'. Uncheck the 'Use FIFO Buffers' check box. For ***Windows NT 4***, go to Start Menu, 'Settings', 'Control Panel'. Select 'Ports', then the serial port that being used for this program. Click on 'Settings', then 'Advanced', and then uncheck the 'FIFO Enabled' check box.
	RADIO The Settings Change program will communicate with the unit via a radio channel. Requires use of a MTRM (MultiTrode Radio Modem) and pair of UHF radios. See Appendix A. The MTRM & radios need to be ordered separately.
	RS232 The Settings Change program will communicate with the unit via the MultiTrode RS232 cables (supplied), or alternatively an MTCIU cable (MTCIU switch must be set to "Software Upgrade").
	MODEM The Settings Change program will communicate with the unit via a telephone modem connection. Requires use of a pair of Hayes-compatible telephone modems and telephone line. See Appendix B.
Comms Timeout	The maximum period of time in seconds that the program will wait for a reply from the unit. This should be set to 15 seconds for optimum performance.
Tx Raise Delay	Reserved
Tx Lower Delay	Reserved
Modem Initialization String	Command sequence that is sent to the modem when using dialup. See Appendix B.

5 Overview

The Control and Diagnostic Software consists of two main software packages. Each is designed to allow various control, monitoring and reporting functions via easy to use graphical interfaces.

To access a particular software program, double-click on the corresponding shortcut icon.

5.1 MultiTrode Settings Change Program

Figure 10 – Settings Change Menu

The MultiTrode Settings Change program enables the user to access the following settings;

- Monitor Pro
- Pump Controller
- SCADA Pump Controller
- Communication options for PC
- Dialup connection for modem sites

5.2 MultiTrode Status/Datalog Program

Figure 11 – Status Dialog Icon

Figure 12 – Status Dialog Window

The MultiTrode Status and Datalog program enables the user to access the following;

- Datalog information from a Monitor Pro.
- Up-to-date status information of both Monitor Pro and Pump Controller
- Dialup configuration for -modem sites
- Communication options for user's PC.

5.3 MTCDS Utility Packages

The Control and Diagnostic Software also consists of two utility packages. These packages allow for remote site communications configuration and firmware upgrade via graphical interfaces that are based on a classic windows "look and feel". To access a utility package, double-click on the corresponding shortcut icon.

5.3.1 MultiTrode Dialup Points Configuration

This software enables the user to add or edit remote modem site configuration. See Appendix B for details.

Figure 13 – Configuration Icon

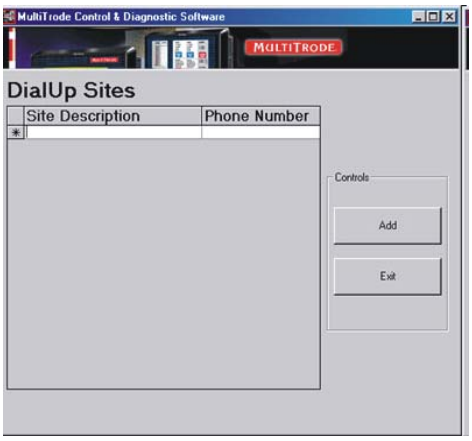


Figure 14 – Configuration Window

5.3.2 MultiTrode TinyMon Automatic Programmer

The MultiTrode TinyMon program enables the user to upgrade the firmware running on the following devices:

- Monitor Pro
- MT2PC
- MT3PC
- Reservoir Monitor

Figure 15 – TinyMon Icon

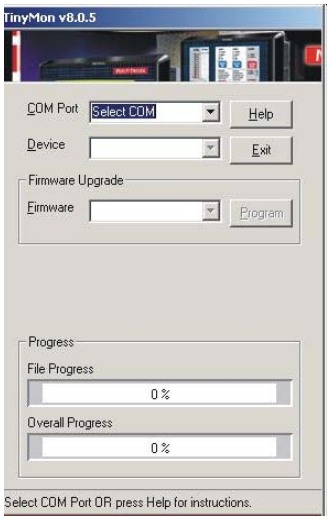


Figure 16 – TinyMon Window

6 Operation

This section covers the basics of the Control and Diagnostics Software.

6.1 MultiTrode Settings Change Program

Figure 17 – Settings Change Menu

The MultiTrode Settings Change program allows operators to view, save or change current system settings using established communication between the PC and the relevant pump controller and/or station monitor.

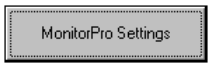
Communication to the station site is via the RS232 serial cable, MTCIU cable, radio modem, or telephone modem. To configure the communication network, see Section 6.2.3.

The setting change program has the following main functions:

- MonitorPro Settings
- Pump Controller and SCADA Pump Controller Settings
- DialUp
- Communication Options

6.2 MonitorPro

Note:
The Operations, File Operations and Communications categories are explained in Section 6.2.2.

From the “Settings Change Menu”, please select “MonitorPro Settings”. 

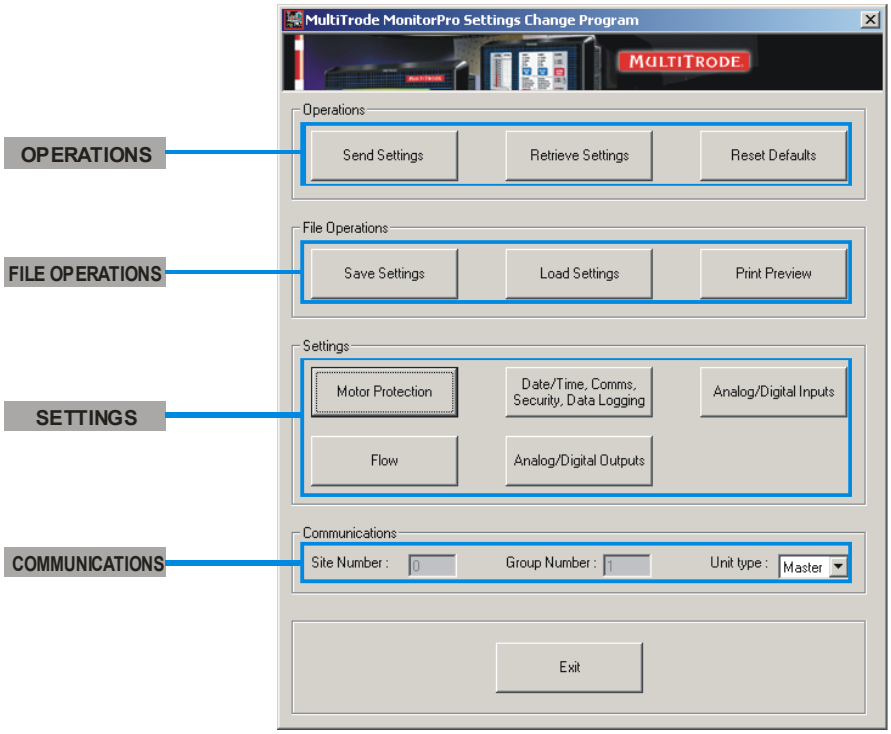


Figure 18 - Select "MonitorPro Settings" button.

Note:
The purpose of the MonitorPro Settings section is to enable the user to both configure and obtain settings from a specified station monitor.

6.2.1 Settings

"Settings" is divided up into the following options:

- Motor Protection
- Date/Time, Comms, Security, Data logging
- Analog/Digital Inputs
- Flow
- Analog/Digital Outputs

Figure 19 – Motor Protection Button

This function allows the user to configure the pump protection settings for a MonitorPro. For a complete description of pump protection settings refer to the MultiTrode MonitorPro user manual.

Figure 20 – Date/time and settings Button

This button allows configuration of date/time, communications, security and data logging settings for a MonitorPro. For a complete description of these settings refer to the MultiTrode MonitorPro user manual.

A user can also receive the date/time settings from the MonitorPro by clicking on the 'Get Date/Time' button located on the Date/Time/Unit Details screen. If there is a considerable difference between the unit's date/time and that of the user's PC's system clock, a notification message is shown. To send the date and time to the unit, click on the 'Set System Time' button and then click 'Send Date/Time'. This will result in the designated unit being synchronised with the PC system clock of the user's PC.

Figure 21 – Inputs Button

This button allows configuration analog and digital input settings for a MonitorPro. For a complete description of these input settings refer to the MultiTrode MonitorPro user manual.

Figure 22 – Flow Button

This button allows configuration of the flow settings for a MonitorPro. For a complete description of the flow settings refer to the MultiTrode MonitorPro user manual.

Figure 23 – Outputs Button

This button allows configuration both the analog and digital output settings for a MonitorPro. For a complete description of these output settings refer to the MultiTrode MonitorPro user manual.

6.2.2 Pump Controller and SCADA Pump Controller Settings

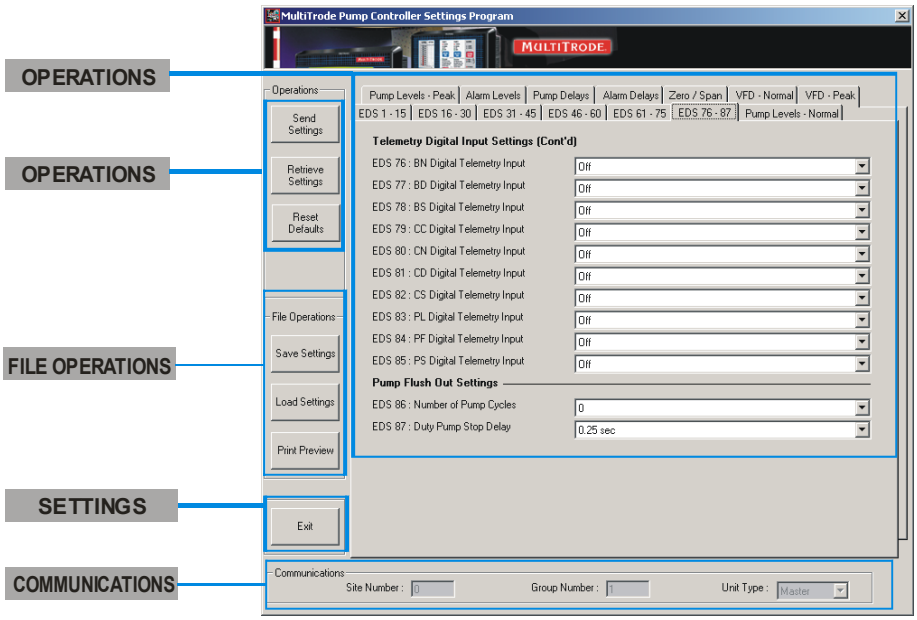


Figure 24 –SCADA/Pump Controller Settings Menu

The Pump Controller interface enables the user to configure and obtain settings from a specified pump controller unit.

Note:
For further operational functions on the Monitor Pro, see Section 6.2

6.2.2.1 Operations

Note:
If the Pump Controller is connected to a Monitor Pro via a LAN network, ensure EDS 44 is set to Off.

Using this function, a complete list of all the current settings from a Pump Controller or Monitor Pro can be obtained. The user will be asked to wait several seconds while the communications process completes. After the completion of the communications process, the Setting Change Program will contain all settings of the connected unit.

Note:
MultiTrode does not recommend transmitting 'settings' data via radio link systems as data corruption may occur. Radio communication systems have inherent signal loss problems.

The purpose of 'Send Settings' is to reprogram the Pump Controller or Monitor Pro with newly configured setting changes or to load settings stored on disk. See Section 6.2.2.2 The user will be informed if any of the settings will result in the loss of communications between the MultiTrode device and the users PC.

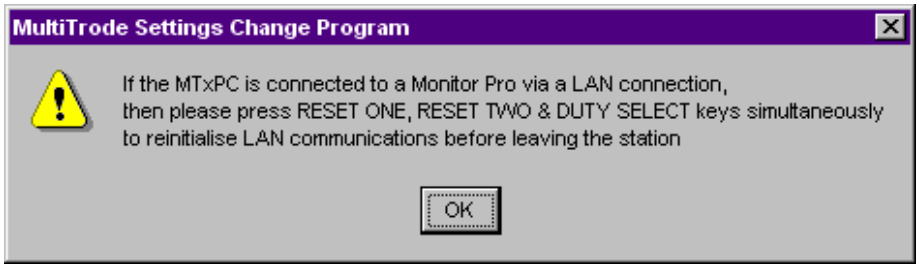
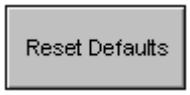


Figure 25 – System Reset prompt

Upon completion of the data send, the pump controller will perform a system reset and the following dialog box will appear. If necessary, reinitialise LAN communications and press 'OK'.



This function can be used to configure a Pump Controller/Monitor Pro with its original factory default settings. To do this click 'Reset Defaults' followed by the 'Send Settings' function button.

6.2.2.2 File Operations

File operations consist of;

- Save Settings
- Load Settings
- Print Preview

This function provides a mechanism for saving Pump Controller/Monitor Pro settings for future reference (current unit settings can be obtained using the 'Retrieve Settings' function).

Saving system settings safeguards against data loss from system failure, accidental overwrite or data deletion. It can also be used as a basis for making any new changes to the system. When saving system data, ensure the chosen file name accurately describes the site.

This function will load Pump Controller/ Monitor Pro settings from a file on disk into the system view. This is useful for reinstating the units settings where the data has been corrupted or after a TinyMon firmware upgrade.

Print Preview

This function provides a method for printing a hardcopy of the settings. When the print preview button is clicked, a preview of the settings is displayed. The user can edit the text and then print, copy, or save to disk in rich text format file (.rtf).

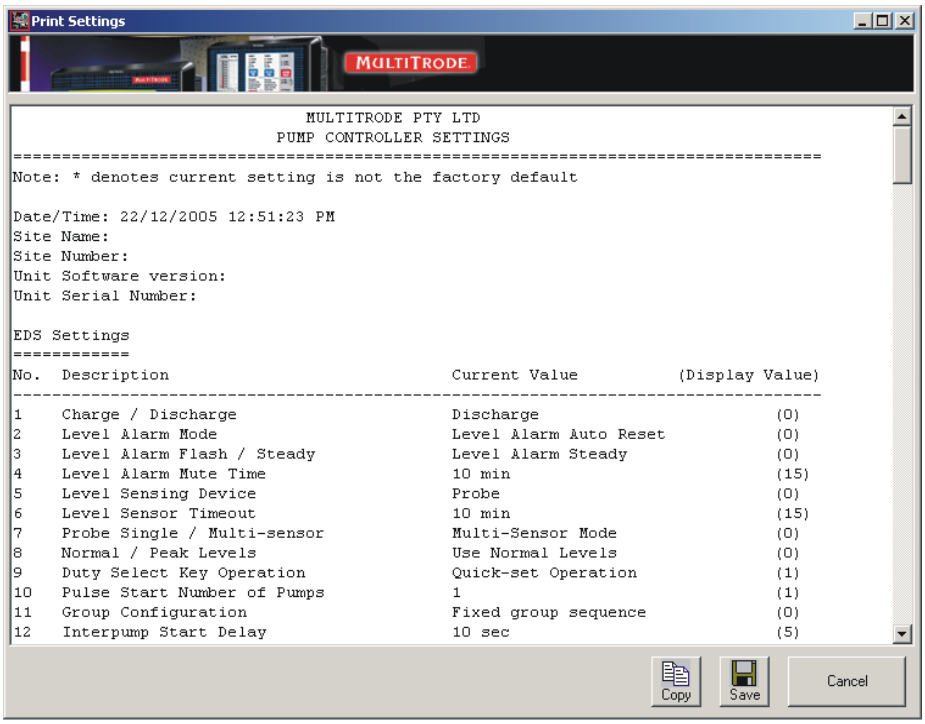


Figure 26 – Print Preview Window

6.2.3 Communications

This section of the graphical interface is comprised of:

- Site Number
- Group Number
- Unit Type

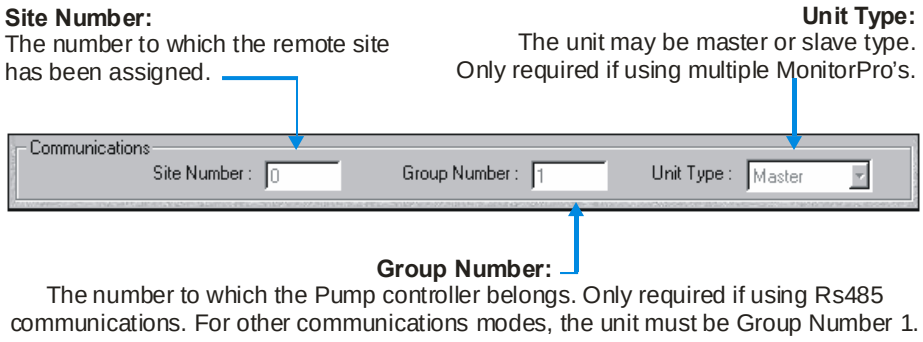


Figure 27 – Communications Options

6.2.4 Exit

Clicking 'Exit' terminates this part of the program. If any changes to system data have been made, saving the data before exiting is recommended.

If connected to a system via a RS232 cable, the following dialog box will be displayed upon exit:

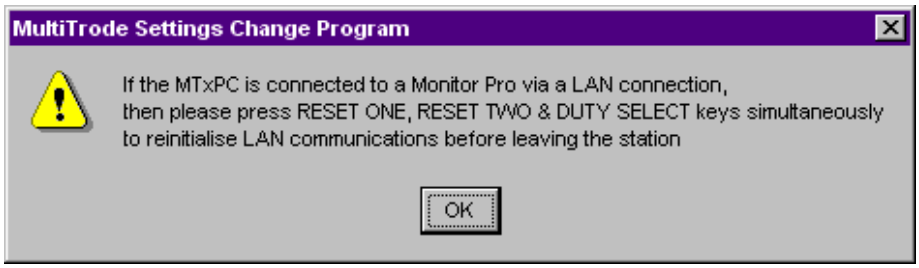


Figure 28 – Reinitialise LAN comms dialog box

6.2.5 Level, Delay and EDS Settings

The process for the configuration of pump and alarm activation/deactivation levels, pump delay settings as well as Electronic DIP Switches (EDS), used to configure the majority of functions within the pump controller, is explained here.

For further information on the Monitor Pro Interface operation, see section 5.1.3.1.

Note:
Consult the MultiTrode Pump Controller manual for setting descriptions, defaults and allowable ranges.

6.2.5.1 Controls and Indicators

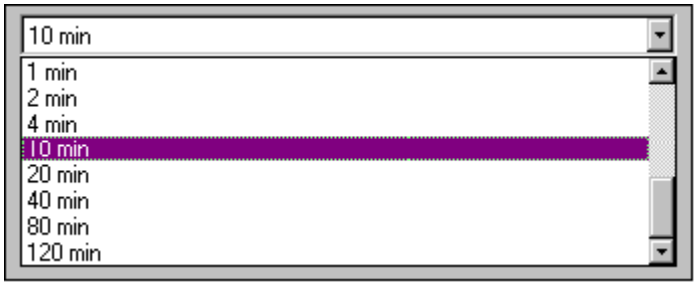
Controls and indicators allow configuration of the pump controller settings to suit the specific application and consist of drop-down menus and sliders with value indicators.

Drop-Down Menus

Drop-down menus are assigned to EDS settings and provides the user with a complete range of selectable values.

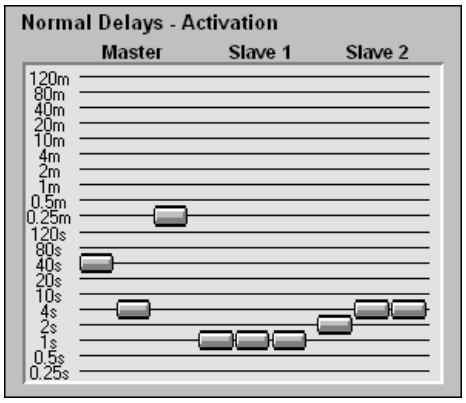
To access the drop-down menu, click the button on the right-hand side of the appropriate dialog.

Click on the desired value to nominate the selection.

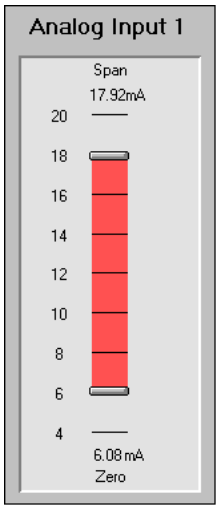


6.2.5.2 Sliders

The pump controller settings program offers two different types of sliders, incremental and analog. Incremented sliders align to the desired value reference line when moved.



Click on and hold the left mouse button to move the slide controller to the desired position. Releasing the mouse button sets the slider to the new position.



Analog sliders allow change of variable indicators by changing slider position. The value indicator will increase as the slider is moved up and decrease when moved down.

6.2.6 Configurable Pump Controller Settings

Note:
Consult the MultiTrode Pump Controller manual for setting descriptions, defaults and allowable ranges.

- EDS Settings 1-87
  All 87 EDS's are available within the Pump Controller settings interface.

- Pump Levels Normal / Pump Levels Peak
  Contains the level settings for a maximum of three pump controllers and caters for peak/normal level and charge/discharge mode settings.

- Alarm Levels
  Contains normal and peak alarm level settings for alarms 1 and 2. This setting is for a maximum of three pump controllers, one Master and two Slave units.

- Pump Delays
  Contains the normal and peak activation/deactivation pump delays for pumps 1, 2, and 3. Maximum of three pump controllers.

- Alarm Delays
  Contains activation and deactivation alarm delays for alarms 1 and 2. Maximum of three pump controllers.

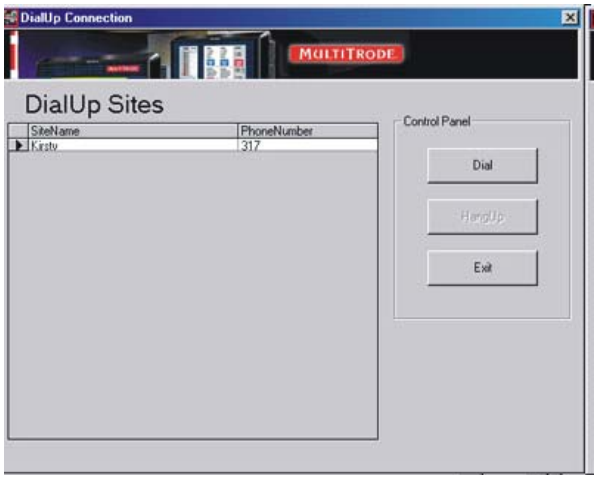
- Sensitivity and Zero Span
  Contains zero-span and probe sensitivity level settings for the Master Pump Controller.

- VFD Settings Normal and Peak
  Contains the Variable Frequency Drive settings. Maximum of three pump controllers.

6.2.7 DialUp

The dialup connection allows connection to a remote modem site. See Section 7, MultiTrode DialUp Points Configuration for details on adding or editing modem site details.

Figure 29 – Dialup Connection



To establish a connection, highlight a phone number from the list provided and click on the Dial button. A successful connection will result provided the phone number is valid. After establishing this connection, click on the 'HangUp' button to disconnect.

6.3 MultiTode Status/Datalog program

Figure 30 - MultiTode Status/Datalog program

The MultiTrode Status/Datalog program allows the operator to view up-to-date system status information, store records of events that have occurred and log system events or time-based periodical values. This program relies on establishing communications between the PC and the relevant pump controller and/or station monitor.

The Status/Datalog program has four system options

- Datalog
- Status
- DialUp
- Communications Options

6.3.1 DialUp

The Dialup Connection allows the user to establish a connection with a remote modem site. See section 5 (Dial Up) for more information.

6.3.2 Communications Options

Communication to the station site is via the RS232 serial cable, MTCIU cable, radio modem, or telephone modem. To configure the communication network, see Section 4.5.

6.3.3 DataLog

This screen provides an interface for downloading datalog entries from a MonitorPro.

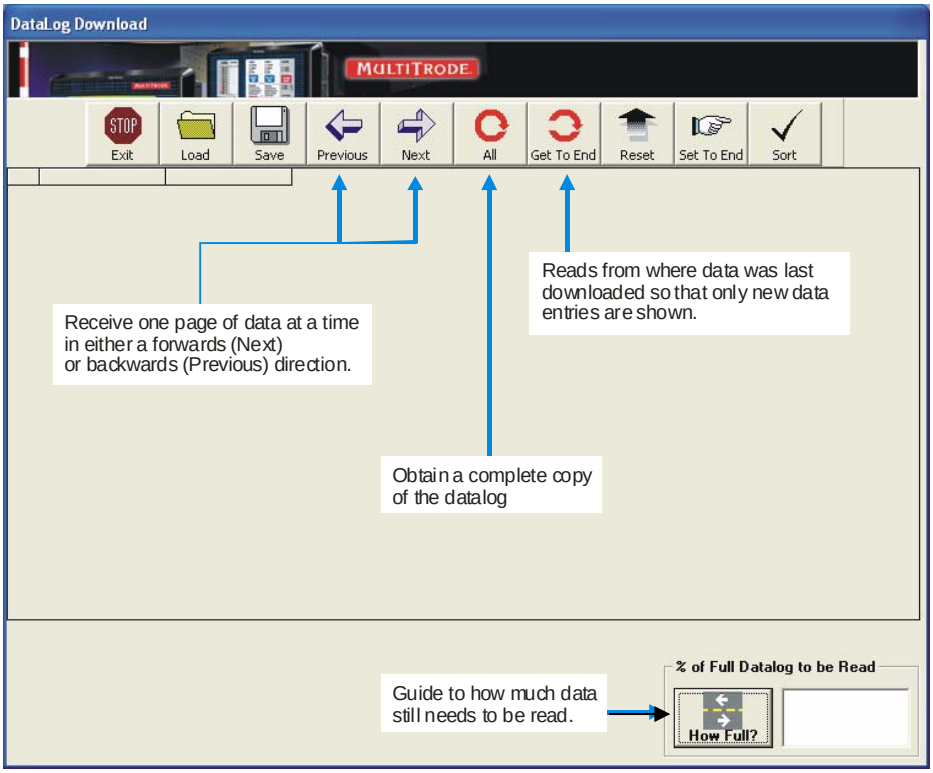
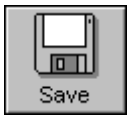


Figure 31 – Datalog Screen

Stops a datalog download process or used to close the datalog application. Remember to save any changes made before exiting the application.

Used to open previously saved datalog files. A datalog file has a Microsoft Access (.mdb) filename extension.

Note:
This function will only load a file with an .mdb extension. Ensure that the datalog is saved as a Microsoft Access© database (.mdb extension).



This allows the data currently displayed in the datalog to be saved to either a Microsoft Access© database (.mdb extension) file or as a Comma Space Delimited (.csv extension) file, for use with Microsoft Excel© , Lotus 1-2-3 © or other spreadsheet programs. Normal spreadsheet capabilities can be used to format the datalog information that has been saved.

To change the type of file that the datalog is saved to, select the desired type from the 'Save as type' box in the 'Save' screen.

Note:
To Load the datalog into MTStatlog again it is necessary to save the file as a Microsoft Access© database (.mdb extension) file.

The datalog can be saved twice, using a different file format extension each time. To do this, save using one file format (e.g. Microsoft Access© file) extension and then press the save button again this time using the other file format (e.g. Comma Space Delimited file).

This function is very similar to the 'Next' function except that it gets the page before the read pointer. This also sets the read pointer to the beginning of the data just read. This means that if the 'Previous' function is used repeatedly, the pages will be read moving backward from the read pointer, until the read pointer reaches the beginning of the datalog.

If this function is used in conjunction with Set To End, the entire datalog can be read backwards.

This function retrieves a single page (2K Bytes) of data from the datalog. This data is read from the current read pointer. The read pointer is also moved forward to allow retrieval of the next data in the log. This allows the user to get the entire datalog, a page at a time, by using this function continuously until reaching the end of the datalog.

This function downloads the entire datalog from the beginning of data (the oldest data) to the end (the newest data). This means that any data previously read will be retrieved again.

It is recommend that an operator use this function if it has been longer than three weeks since the last datalog download from the unit. Users of this function should note that if the datalog of the MonitorPro were full, then this function will take approx 20 minutes (RS232 mode), 40 minutes (RS485 mode), or 100 minutes (Radio or Modem mode) to complete. Performing regular datalog downloads from the unit avoids building up these lengthy delays.

This function provides a means of sorting the entire list of downloaded entries according to Date, Time and ID. The resulting sorted data is displayed at the top of the previously unsorted datalog entries.

This function allows the user to retrieve any new datalog entries that have been logged on the MonitorPro since the last time this program was used to download data. By using this function the entire datalog does not have to be downloaded. This function should only be used if downloads from the MonitorPro are performed on a regular basis.

This is the preferred operation for normal use of the datalog since it only retrieves data which has not previously been read. The normal way to use this is to Load the data previously retrieved from a file on disk, then do a 'Get to End' to retrieve the new data. The new data will be appended to the old.

Example of Typical Download

The logging of flow, level, fault, and start/stop information for an average of 5 pump cycles/hour would result in 75 datalog entries per hour. One page of the MonitorPro's datalog can contain a maximum of 256 entries; a full datalog (192 pages) would contain 49152 entries. In this example, it would take approximately 27 days for the MonitorPro's datalog to become completely full. To prevent data loss (this can happen if the datalog becomes full), the operator should perform regular downloads with a maximum desired period of 3 weeks.

This function sets the 'Read Pointer' to the beginning of the datalog. This can be used to re-read old data.

This function sets the 'Read Pointer' to the end of the datalog (where the latest data is being written). This can be useful for two purposes:

1. To ignore all old data and set the unit so that the next data read will contain new entries only.
2. To look at the most recent data in the log perform a 'Set to End' to set the read pointer to the end of the datalog (the most recent data). Then use 'Get Previous' to read the most recent data backwards from the end.

6.3.4 Status

The Status section provides an up-to-date view of the status of both a MonitorPro and accompanying Master Pump Controller (if present). This is not an exhaustive account of all the information available, but contains the most important parts.

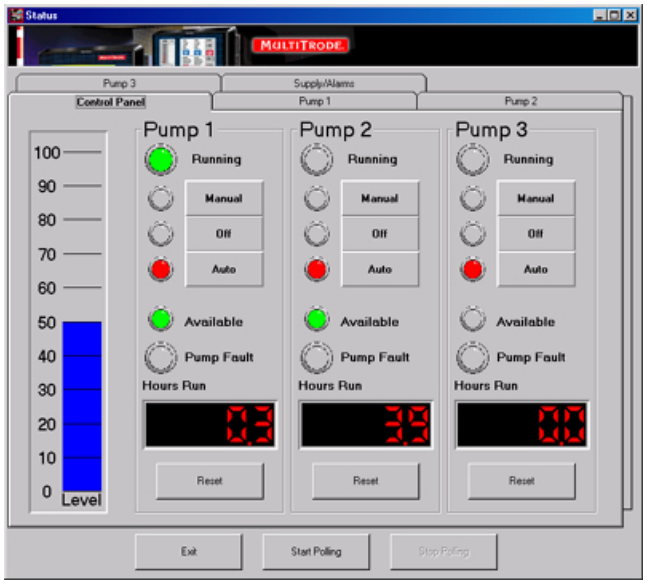
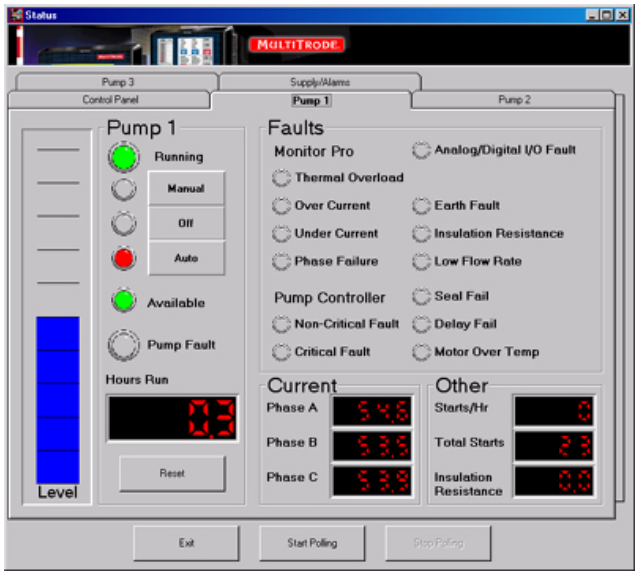


Figure 32 – Status Screen

The program will call for the current status of the unit(s) once only. The user may click the 'Start Polling' button to begin the status cycle that will repeat at the interval set in the 'Communications Options' section of the program. To stop this cycle, the click on the 'Stop Polling' button.



When a connection with the remote site is established, the Pump screens present information pertaining directly to individual pump sites.

As with the Control Panel screen, the user is presented with the Manual, Off and Auto buttons, but only for the selected pump. Also present is the same fault Reset button that appears in the Control Panel screen.

The Pump screen also provides a list of possible Pump Controller and MonitorPro faults, a red light indicates a fault at site.

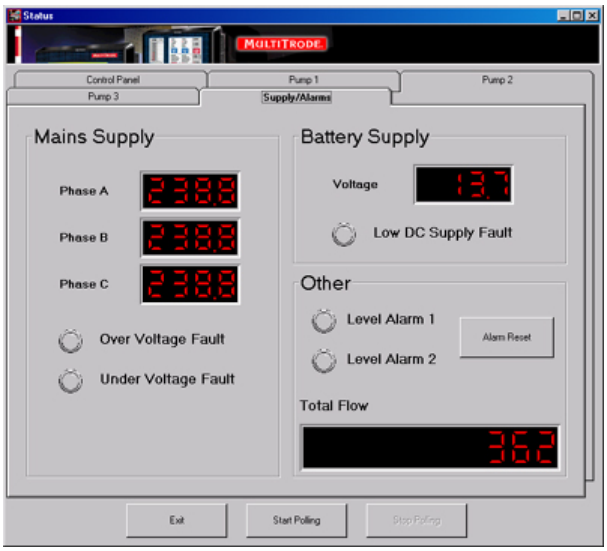


Figure 33 –Alarm Screen

The Alarm/Supply screen shows the status of:

- Site's level alarms
- Mains or DC supply values (along with warning lights should these values drop below or exceed their set limits)
- Communications failure warning light
- Total flow meter

The 'Alarm Reset' button will reset any unacknowledged level alarm condition

6.4 TinyMon Automatic Programmer

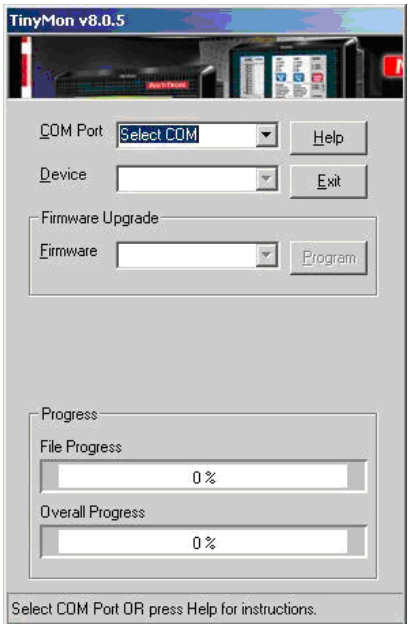


Figure 34 – TinyMon Automatic Programmer

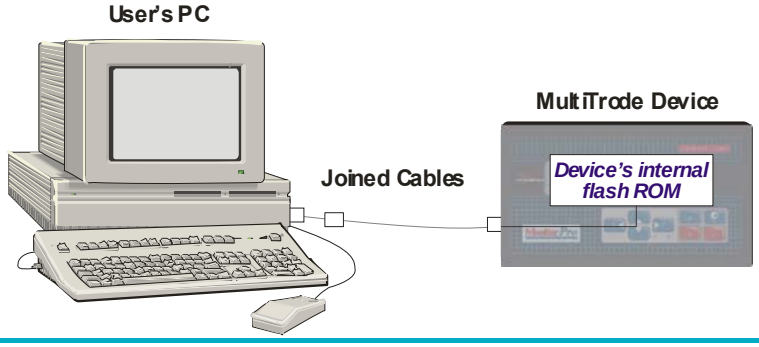
The MultiTrode TinyMon program allows the operator to update system hardware with the latest firmware.

- Firmware upgrade is based upon the product model and hardware version
- Simple graphical user interface, provides a classic windows look and feel
- This program has the ability to utilise any serial port on the PC

The TinyMon software facilitates the upgrade of firmware in the following MultiTrode products:

- MonitorPro (firmware versions 2.25, 7.04 to 8.05)
- Pump Controller (MTxPC – firmware versions 4.25, 5.25, 6.25, 7.04 to 8.0.5)
- Reservoir Monitor (firmware versions 2.25, 7.04 to 8.0.5)
- Communication between the user's PC and the MultiTrode device is only available via the RS232 serial communication cables supplied.

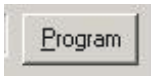
Note:
It is recommended, before upgrading any hardware, that a current list of settings for the particular unit is recorded.



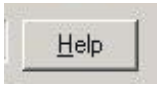
Once communications are established, TinyMon will reprogram the device's internal Flash ROM with the latest firmware version.

The TinyMon dialog box contains the following controls:

COM Port Selection Box: Displays only the available COM ports on the system.



Program Button: Activates the programming of the RAM and FLASH ROM. The button remains inactive until the user has selected a device and firmware version. If the user reselects the device they wish to program, this button again becomes inactive until firmware is once again selected.



Help Button: This button presents the user with a help file explaining the general operation of the TinyMon application.

Exit button: This button has two operational modes. During the reprogramming process, the 'Exit' button is delegated as the 'Abort' button and pressing at this time will cancel the programming of the device. Pressing at any other time will close TinyMon.

Firmware selection box: Shows the available firmware upgrades based upon the result of the Device selection combo box. The box remains inactive until communications have been established.

Device selection box: Shows the devices available for upgrade. This combo box remains inactive until communications have been established.

Check Software button: This button only appears once an MTxPC has been selected as the device. Pressing this button opens another window showing what extra functionality the unit has (e.g. VFD enabled or SCADA enabled).

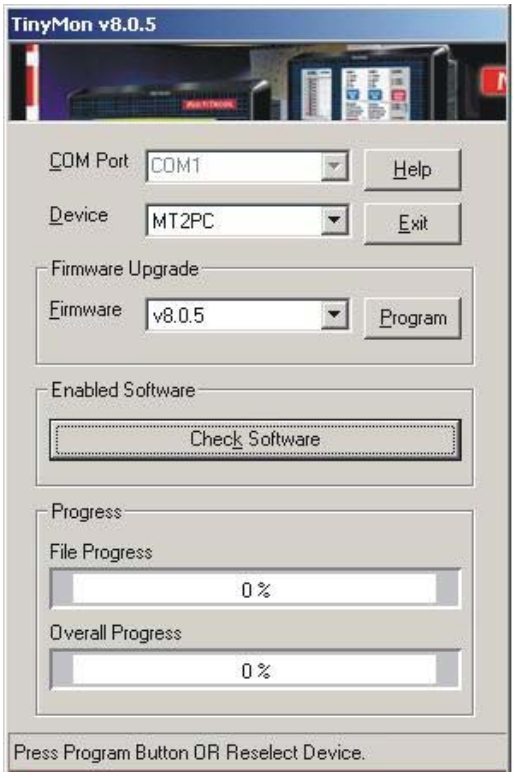


Figure 35 - TinyMon Dialog Box

6.4.1 Firmware Upgrade Procedure

The follow is detailed procedure for firmware upgrade of MultiTrode devices.

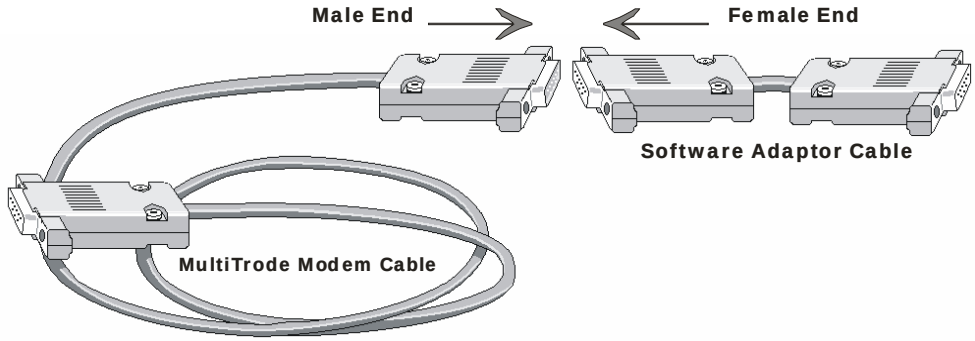
To install TinyMon, the following items are needed. They are included in the Control and Diagnostic package.

- MultiTrode Modem cable
- Software Adapter cable

As previously mentioned, communication between the user's PC and the MultiTrode device is *only* available via the RS232 serial communication cables supplied with this software package.

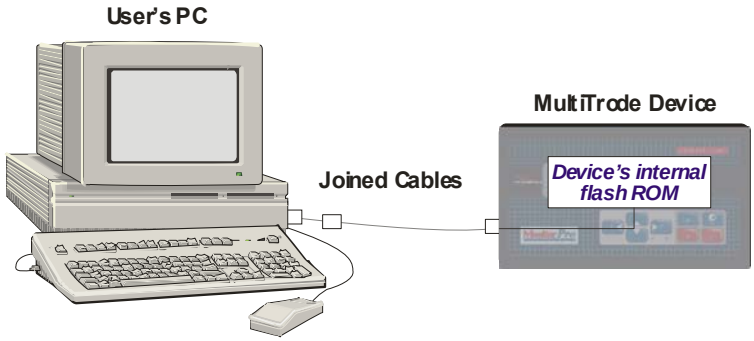
Note:
It is recommended, before upgrading any hardware that a current list of settings for the particular unit is recorded, as the unit's settings may change during the upgrade procedure.

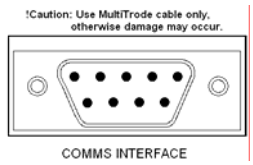
1. Connect the male modem end of the MultiTrode Modem cable to either end of the Software Adapter cable.



Note:
Only use the supplied MultiTrode connection cables. Using other cables may result in incorrect operation or damage to the MultiTrode device.

2. With the MultiTrode Modem and Software Adapter cables now connected, position the PC or laptop and/or the MultiTrode device as to allow ease of connection with the connected cables.
3. Connect one end of this cable, to an available port on the PC or laptop and the other end to the 'Comms Interface' port on the MultiTrode device. As per the diagram below.





The comms interface connection on the Monitor Pro, Reservoir Monitor, and Pump Controller is the port to which the RS232 serial cable, MTCIU cable, radio modem, or telephone modem is to be connected.

4. Double-click the 'TinyMon' icon, on the desktop, to launch the program.

Figure 36 - TinyMon Desktop Icon

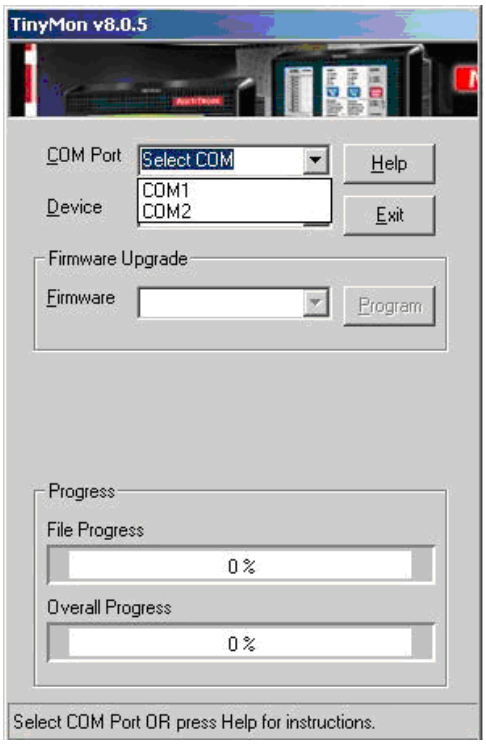


Figure 37 - TinyMon Window

5. Select the 'COM' port to which the MultiTrode device is connected.

Note:
Between steps 5 and 6, there is a 10-second time limit period in which to perform a full reset. It is recommended that the user carefully read through these steps before proceeding.

6. Once the 'COM' port has been selected, perform a full reset of the device using one of the following appropriate methods:

For Monitor Pro and Reservoir Monitor units:

- Simultaneously press **'Left'**, **'Right'**, and **'Help'** buttons.

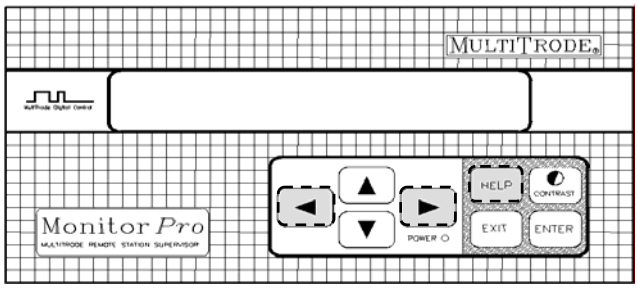


Figure 38 – Reset the MonitorPro device

For MTxPC units:

- Simultaneously press **'Select One'**, **'Select Two'**, and **'Duty Select'** buttons.
- A lamp test commences.

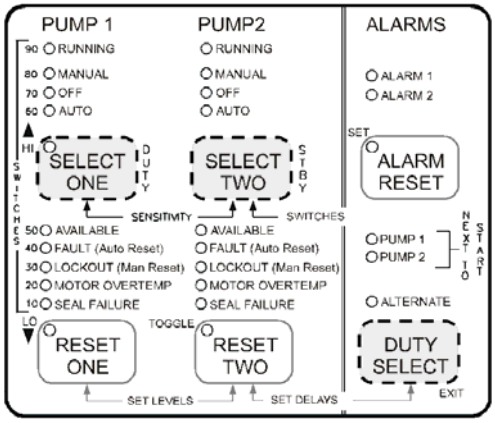


Figure 39 – Reset the MTxPC device.

7. Wait for communications to be established. If the following dialog box appears, please check the MultiTrode unit and cable connections. Press 'OK' and repeat steps 5 through 6.

Figure 40 – Communications error message.

If communications have been successfully established between the MultiTrode unit and the PC, the following dialog box appears. Press 'OK'.

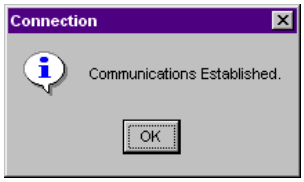
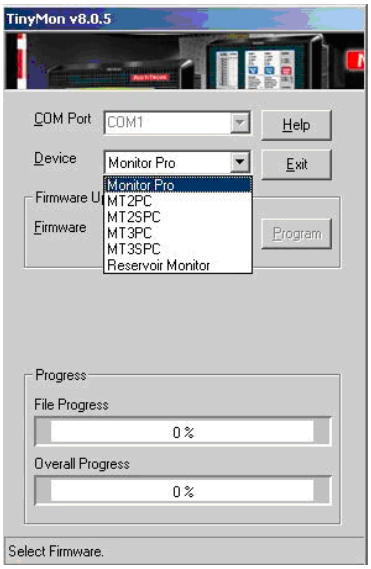
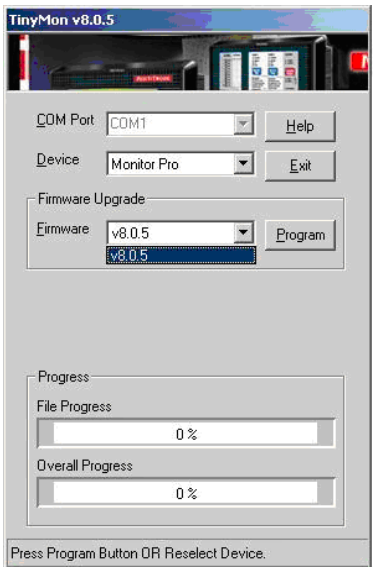


Figure 41 – Communications established message.

8. Select the MultiTode device from the drop-down list.



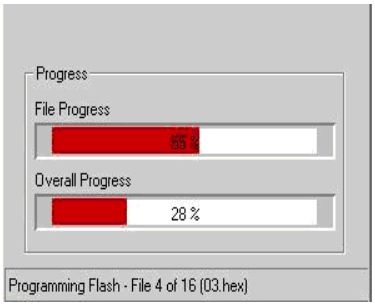
9. Select the firmware version to be installed onto the unit.



10. The 'Program' button is now enabled. Press this button to program the device with the selected firmware version. The device and firmware may be re-selected before clicking 'Program'. The Exit button (before programming starts) will terminate the TinyMon application, leaving the original firmware still in the MultiTrode unit.

11. Programming may take approximately 5 minutes.

These indicators show the file and the progress of the firmware being downloaded.



Pressing the Abort button will cancel the programming of the unit and return the user to the COM port selection screen. The device will now be in an indeterminate state. Reselect, and then reprogram the device with the appropriate firmware application.

Note:
Never operate a MultiTrode product without the correct firmware installed.

12. Once programming is complete, press 'OK'. The firmware selected is now embedded into the MultiTrode device. To ensure that the device operates correctly, it is advisable to reload the devices settings saved prior to the firmware upgrade.

7 Dialup Points Configuration

The MultiTrode Dialup Points Configuration program allows the user to add or edit remote modem site details. Only used for Modem connections.

Figure 42 - Dialup Points Configuration Interface

1. On the Dialup Points Configuration interface, click on the 'Add' button. The 'Enter New Site Details' dialog box will appear.

Figure 43 - New Site Details window

2. In the 'Site Description' field, type the new site's area location, short and descriptive as possible.
3. In the 'Phone Number' field, type the new modems contact phone number, include all area codes.
4. When completed, press 'OK'.

Figure 44 - Edit/Delete Sites Screen

To edit a site, simply highlight the field and type the new information.
To delete a site, press the corresponding left-hand-side marker, this highlights the entire dialup site, pressing the Delete button will then permanently remove this site.

8 Appendix A – Radio Configuration

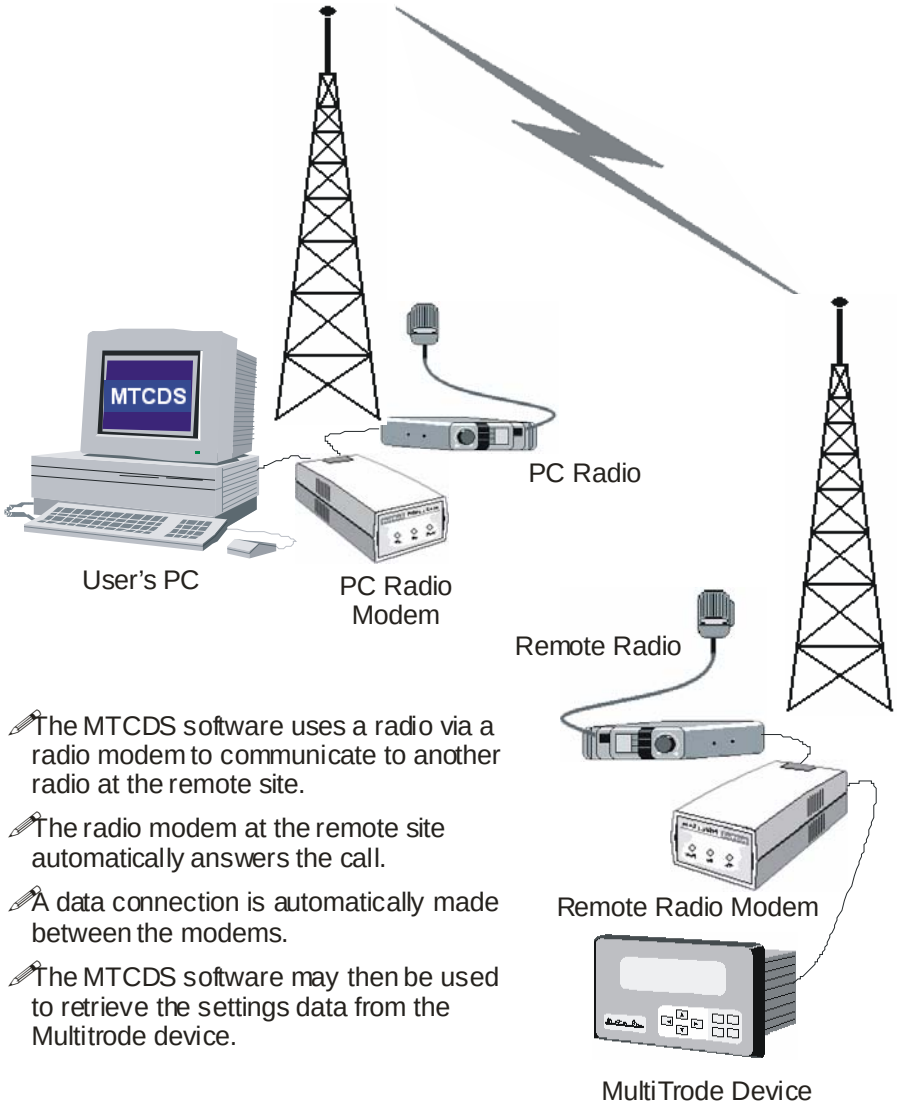
8.1 Radio Link Communication

This document details the steps required to install radios when using the dialup feature in the MultiTrode Control and Diagnostic Software (MTSettingsChange and MTStatlog programs) and a MultiTrode Monitor Pro (not to used with Pump Controllers).

Two radio modems and radios are required when using this feature. One radio modem and radio is located at the PC end and the others are located at the MultiTrode Monitor Pro (remote) end.

Note:
Radio communication systems have inherent signal loss problems.

The dial-up feature operates in the following manner:



- The MTCDS software uses a radio via a radio modem to communicate to another radio at the remote site.
- The radio modem at the remote site automatically answers the call.
- A data connection is automatically made between the modems.
- The MTCDS software may then be used to retrieve the settings data from the Multitrode device.

Note:
MultiTrode does not recommend transmitting 'settings' data to a MultiTrode device via radio link systems, as data corruption may occur.

8.2 Equipment Required

- Monitor Pro
- 2 x MTRM-1 radio modems (contact the nearest MultiTrode supplier)
- 2 x radio (see table below for list of approved radios)
- Coax cables (not-supplied)
- Antennas
- PC with a spare COM port, and running the MultiTrode Control and Diagnostic Software.

Radio brand	Model
Motorola	M120 and M130
Maxon	SD- 125U2 Data Radio
Maxon	SM 2450 Base Station
Tait	2015 Data Radio

8.3 Remote Radio Installation

Perform the following steps to install the remote radio:

1. Connect an MTRM-1 radio modem to a 'MODEM' port on the Monitor Pro.
2. Connect the MTRM-1 radio modem to the Radio using the radio cable.
3. Connect the antenna.
4. Connect power to the radio.
5. Connect power to the MTRM-1 using the supplied cable or plug pack.

8.4 PC Radio Installation

Perform the following steps to install the PC radio:

1. Connect an MTRM-1 radio modem to a communications port on to the PC using the MultiTrode Control and Diagnostic software. MultiTrode recommends COM Port 3 for the radio channel.

Note:
The radio modem must connect to one of the ports on the 'communication port card' (which is plugged into the bus). It must not be installed on one of the communication ports that our connected to the motherboard, as these ports do not support radio comms data.

2. Connect the MTRM-1 radio modem to the Radio using the radio cable. Check the rear label of the MTRM-1 to ensure the modem is configured correctly for the type of radio used. An approved MultiTrode Radio must be used.
3. Connect the antenna.
4. Connect power to the radio.
5. Connect power to the MTRM-1 using the supplied cable or plug pack.

8.5 PC Software configuration

Performing the following steps configures the PC software:

1. Run the MTSettingsChange or MTStatlog program.
2. From the main form, click the 'Communication Options' button.

The following dialog box appears:

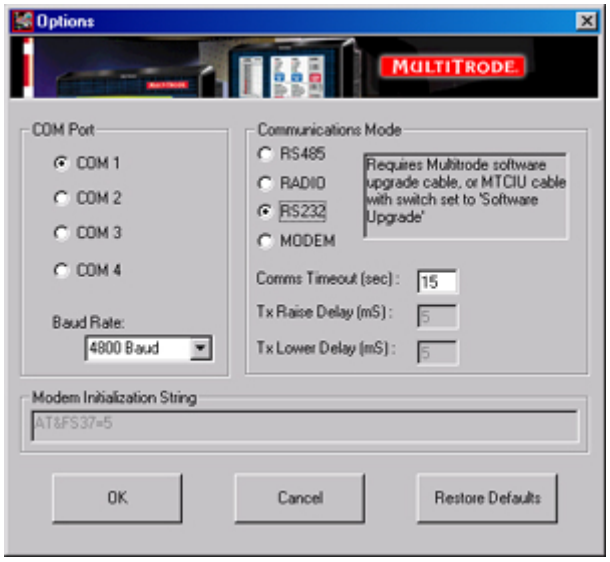


Figure 45 - PC Software Configuration Screen

Enter the following settings in the 'Options' dialog box:

Communications Mode:	Select 'RADIO'.
Comm Port:	Select the PC COM port number that radio is connected to (MultiTrode recommends Com 3).
Comms Timeout (sec):	15
Tx Raise Delay (mS):	5
Tx Lower Delay (mS):	5

3. Press the 'OK' button. This completes the PC software configuration.

9 Appendix B – Modem Configuration

9.1 Configuration of Modems when using the Dial-up Feature

This document details the steps required to configure the modems when using the dialup feature in the MultiTrode Control and Diagnostic Software (MTSettingsChange and MTStatlog programs).

Two modems are required when using this feature. One modem is located at the PC end and the other is located at the MultiTrode device (remote) end.

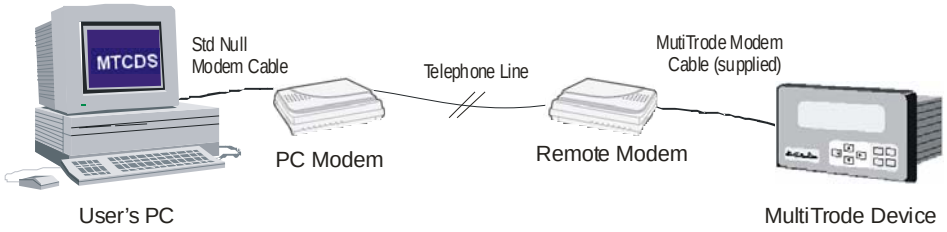


Figure 46 – Modem Configuration

The dial-up feature works in the following manner:

- The PC software uses a modem to dial-up another modem at the remote site.
- The modem at the remote site automatically answers the call.
- A data connection is automatically made between the modems.
- The PC software may then be used to modify the settings or to retrieve the stored datalog from the MultiTrode device at the remote site.

Note:
Please ensure that there is no other equipment (e.g. fax machines or other modems) connected to the telephone line.

9.2 Equipment Required

- 2 x telephone modems (see modem approval list below)
- 1 x standard RS232 modem cable
- 1 x MultiTrode Modem cable (supplied)
- Telephone line
- PC with a spare COM port, and running the MultiTrode Control and Diagnostic Software.

Modem brand	**Model**
Hayes	Accura 336 Message Modem
3Com / US Robotics	56K Voice Faxmodem
Netcomm	Roadster 56 Ultra
Dynalink	V1433VQE

9.3 Remote Modem Setup

9.3.1 Remote Modem Configuration

1. Connect the modem to the spare PC COM port using a standard RS232 modem cable.
2. Turn on the modem.
3. Run the Windows HyperTerminal program, by selecting:

   Start button ∗ Programs ∗ Accessories ∗ HyperTerminal ∗ HyperTerminal

4. Under ‘Name’, enter a description such as “Modem config”. Press the ‘OK’ button.

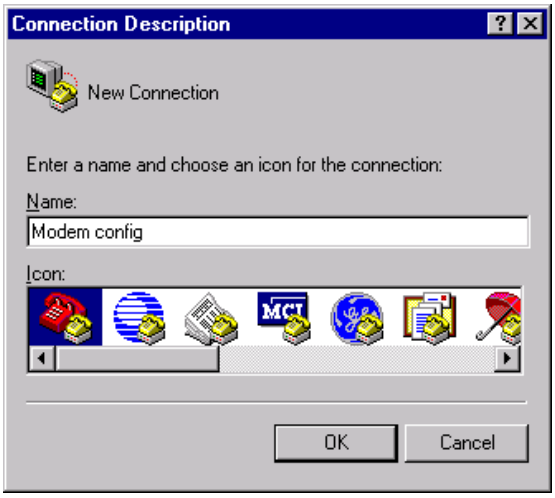


Figure 47 - Modem Configuration - Software

5. The ‘Connect To’ dialog box appears. In the ‘Connect using’ box, select ‘COMx’ where x is the PC COM port to which the modem is connected. Press the ‘OK’ button.

Figure 48 - Connection Dialog

6. The ‘COM Properties’ dialog box now appears. Make the selections as per the following figure. Press the ‘OK’ button.

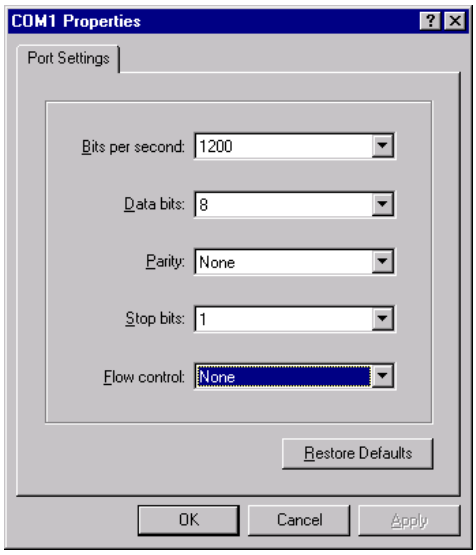


Figure 49 - Com Properties Dialog

7. The main ‘HyperTerminal’ window now appears. Type “at” and press [Enter]. The modem should respond with the response ‘OK’, displayed in the main window.

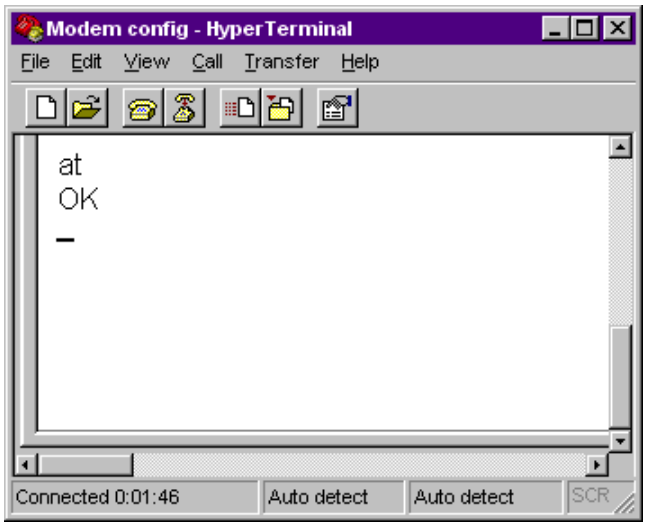


Figure 50 - HyperTerminal Window

8. In the 'HyperTerminal' window, enter the strings as listed in the table below, followed by [Enter]. Check that the response "OK" is displayed after entering each string.

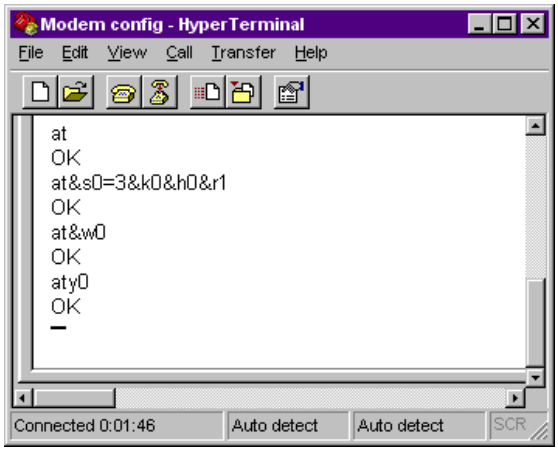


Figure 51 –HyperTerminal "string" entry window

Modem brand	Model	String
Hayes	Accura 336 Message Modem	AT&FS0=3&K0 [Enter] AT&W0 [Enter] AT&Y0 [Enter]
3Com / US Robotics	56K Voice Faxmodem	AT&FS0=3&K0&H0&R1 [Enter] AT&W0 [Enter] ATY0 [Enter]
Netcomm	Roadster 56 Ultra	AT&FS0=3&K0&D0%C0\N1+MS=1,1,1200,1200 [Enter] AT&W0 [Enter] AT&Y0 [Enter]
Dynalink	V1433VQE	AT&FS0=3&K0 [Enter] AT&W0 [Enter] AT&Y0 [Enter]
Other		Contact the place of purchase.

9. Turn off the modem and disconnect from PC. This completes the remote modem configuration.

9.3.2 Remote Modem Installation

1. Using the MultiTrode Modem cable (supplied), connect the modem to the MultiTrode device via the port marked 'Comms Interface'

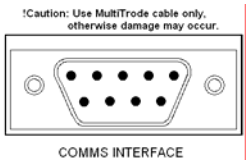


Figure 52 - Comms Interface Port

WARNING:
Only use the supplied MultiTrode connection cables. Using other cables may result in incorrect operation or even damage to the MultiTrode device.

2. Connect the modem to a telephone wall socket. Refer to manufacturer's instructions.
3. Turn on the modem. This completes the remote modem installation.

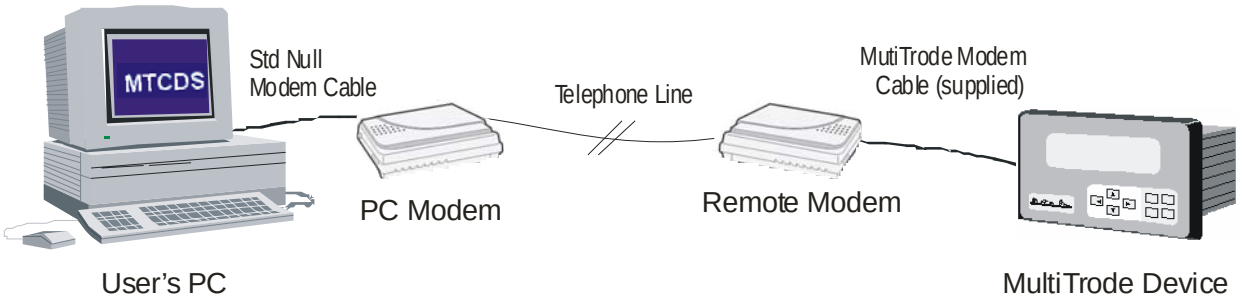


Figure 53 - Remote Modem Installation

9.4 PC Modem SETUP

9.4.1 PC Modem Installation

1. Connect the modem to a spare PC COM port using a standard RS232 modem cable.
2. Turn on the modem. This completes the PC modem installation.

9.4.2 PC Software configuration

1. Run the MTSettingsChange or MTStatlog program.
2. From the main form, click the 'Communication Options' button. The following dialog box appears:

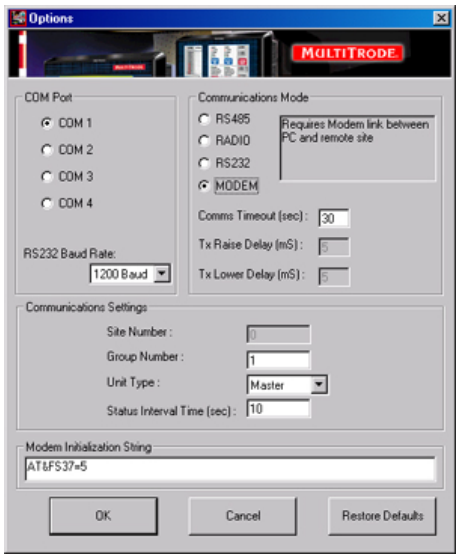


Figure 54 - Communications Options

3. Enter the following settings in the 'Options' dialog box:

Com Port	Select the PC COM port number that the modem is connected to.
Communications Mode:	Select 'MODEM'
Comms Timeout (sec):	15
Modem Initialization String:	Enter the modem initialisation string according to the table below.

Modem brand	**Model**	**String**
Hayes	Accura 336 Message Modem	AT&FS37=5
3Com / US Robotics	56K Voice Faxmodem	AT&F&N2
Netcomm	Roadster 56 Ultra	AT&F&K0&D0%C0\N1+MS=1,1,1200, 1200
Other		Contact the place of purchase.

4. Press the 'OK' button. This completes the PC software configuration.

10 Appendix C – Upgrading Firmware

10.1 Firmware upgrade steps for Pre V7.00 firmware units

10.1.1 Monitor Pro

1. Hand-extract the settings and configurations from the unit.
2. Switch power OFF to the unit.
3. Check section 3 to see if DIP switches require changing. Ensure the DIP switches are returned to their original state after firmware upgrade.
4. Connect both the Modem and Software cables together and connect these cables between the unit and the computer.
5. Run TinyMon and follow the instructions in Section 6.4.

10.1.2 MTxPC

1. Hand-extract the settings and configurations from the unit.
2. Switch power OFF to the unit.
3. Connect both the Modem and Software cables together and connect these cables between the unit and the computer.
4. Run TinyMon and follow the instructions in Section 6.4.

11 Appendix D – USB Converters

11.1 Using USB to Serial Converters

A serial port connected through the USB is assigned a COM port number by the operating system. Sometimes the number is outside the range COM1 - COM4. MTCDS cannot communicate on serial ports outside this range.

11.2 Solution

The assigned port number can be changed from the computer control panel using the following procedure:

1. Open the Control Panel and switch to "classic view" if using win XP
2. Double Click "System", click "Hardware" and "Device Manager"
3. Expand the "Ports" item by clicking on the plus sign (+)

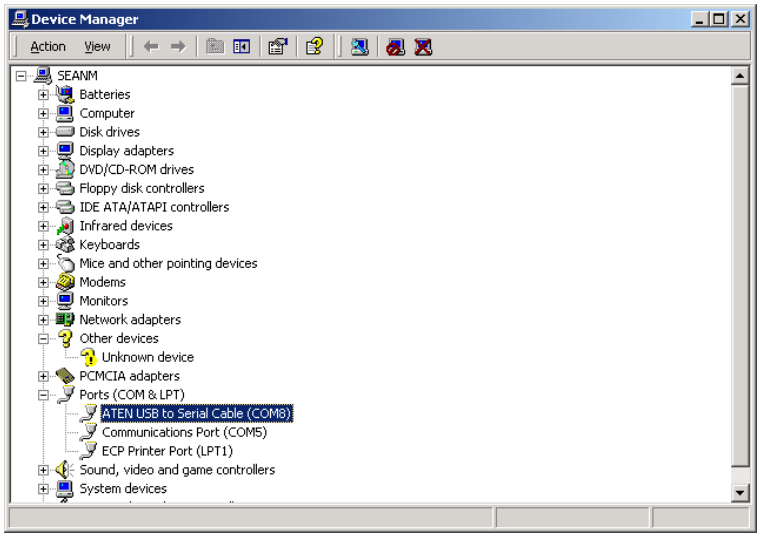


Figure 55 - This is the serial port for the USB to serial connection. Note that the COM port is outside of the 1-4 range

1. Find the item in the list for the USB to Serial converter
2. Right click the list item and select "Properties"
3. Click on "Port Settings" and "Advanced"
4. Change the Port Number to be within the range COM 1-4

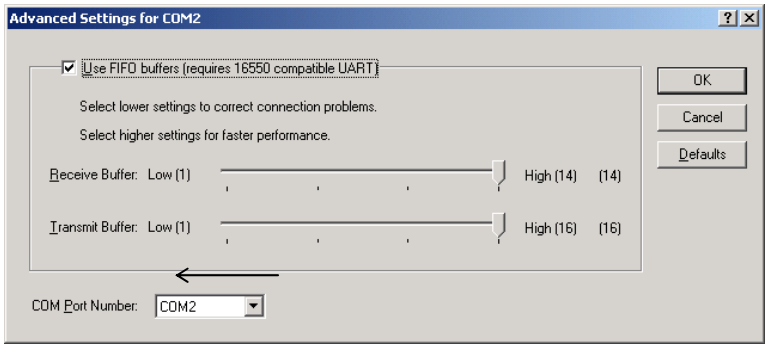


Figure 56 - Change the port number if required (the value shown is OK)

12 Glossary of Terms

Activation Level	The point at which a pump or alarm is switched On.
Alternate Mode	The pump controller is automatically alternating (switching or changing) between the two pumps.
Charge Mode	When the pump controller is set to fill a tank or pit.
Cleared Fault	A fault which has occurred is no longer present and has been reset by the operator.
Deactivation Level	The point at which a pump or alarm is switched Off.
Decommissioned Pump	A pump that has been removed from duty or an installation, e.g. for maintenance purposes.
Discharge Mode	When the pump controller is set to empty a tank or pit.
Duty Pump	The main pump or the first pump to start within a pumping cycle.
Fixed Sequence	Pump 1 or pump 2 is fixed as the duty pump.
InterPump Start Delay	The delay between any two pumps starting.
InterPump Stop Delay	The delay between any two pumps stopping.
Present Fault	A current fault condition exists.
Standby Pump	The secondary pump or the next pump to start within a pumping cycle.
Probe	MultiTrode manufactures a range of conductive level sensors. They have many advantages over traditional devices such as ball floats. Advantages include: resistance to fatty deposit build-up, tangle-free and an adjustable sensitivity to liquid to prevent false readings.

13 Abbreviations

Ω	Resistance Value (Ohm)
EMC	Electromagnetic Compatibility
Hz	Frequency (Hertz)
LED	Light Emitting Diode
MTPC	MultiTrode Pump Controller
N/O	Normally Open
VAC	Alternating Current Voltage
VDC	Direct Current Voltage

14 Accessories

14.1 MultiTrode Outpost

The MultiTrode Outpost management system is a centralised system, enabling the user to monitor and assume full control of over 300 points at each pump station, 24 hours a day.

It's a powerful and cost effective management solution:

- Reducing running costs.
- Increased reliability.
- Easy maintenance and upgrades.
- Provides management with vital information for productive organisations.

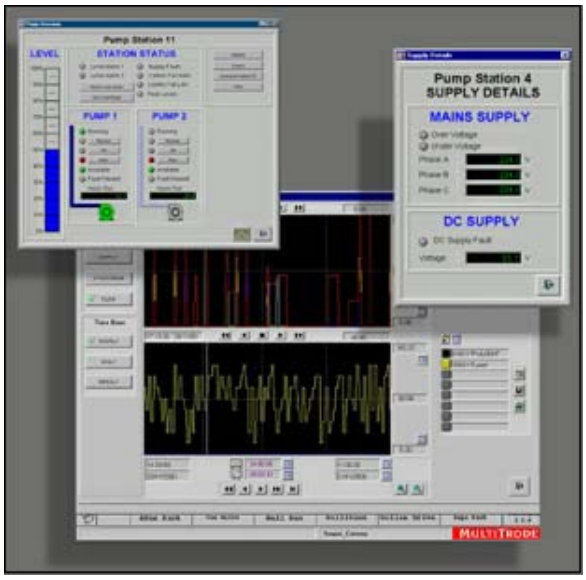


Figure 57 –Outpost Screens

14.2 MT2PC & MT3PC

These products make many of the control components found in pump switchboards redundant. Their simplified design, ease of installation and reduced construction, together with reduced operating and maintenance costs make them market leaders in pump control systems.

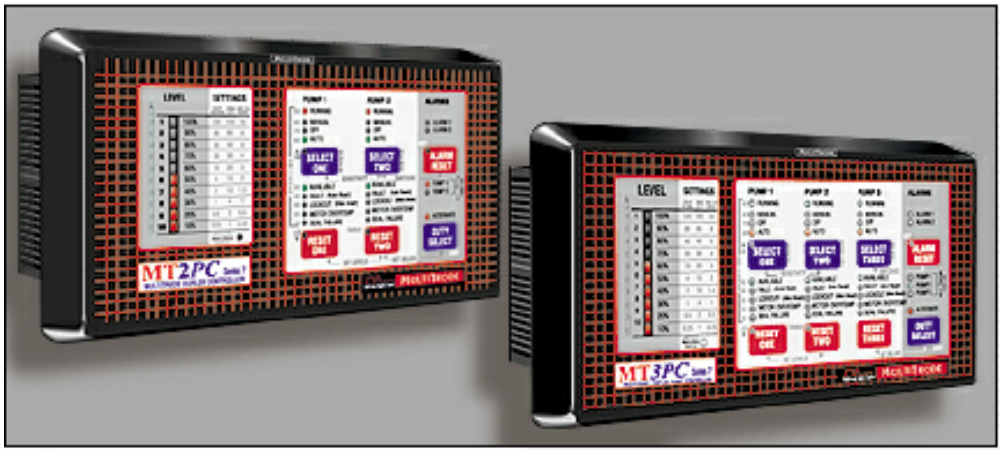


Figure 58 –The MultiTode Duplex and Triplex Pump Controllers

14.3 MonitorPro Station Supervisor

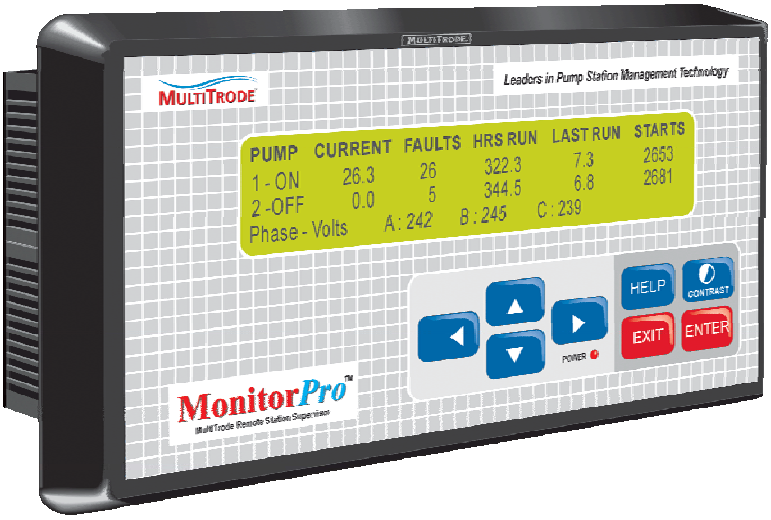
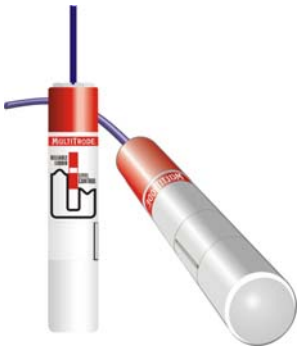


Figure 59 - MonitorPro Station Supervisor

The MultiTrode MonitorPro will monitor, control, display and log all functions in a multi-pump station. In conjunction with a MT2PC or MT3PC, the MonitorPro, will eliminate the majority of individual conventional logic control and protection devices required in a typical pump station. Many expensive functions such as flow monitoring, advanced motor protection, pump protection and data communication, are included in this cost effective control unit

14.4 MultiTode Probe



The patented MultiTrode probe has proved to be the most reliable and cost-effective liquid level control system available. It was designed for the arduous and turbulent conditions encountered in municipal wastewater.

This probe was still fully operational despite the build-up. The operator is pulling the probe through the standard cleaning bracket to clean off the build-up.

14.5 MultiTode Relays

The MTR level relay has proven itself to be simple and extremely reliable in pump stations everywhere. The MTR controls one pump or one alarm. The MTRA controls one pump and one alarm

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