

# Using the MS-2000 Diagnostics Program

Rev.0 (for version 2.00)

DLH 9/7/1999

## General

The MS-2000 Diagnostics program provides a means to acquire, store and display diagnostic information from an MS-2000 system. Stored diagnostic data files can be sent to the factory for evaluation and troubleshooting of an MS-2000 installation.

*Note: This version of the MS-2000 Diagnostics program is designed to work with MS-2000 firmware versions 1.23 and above (version 1.13 and above for the Model 2010).*

## Requirements

- 486/66 or higher running Windows 3.1, Windows 95/98 or Windows NT
- 3.5" floppy drive
- Available serial port (not needed for playback only)
- MS-2000 serial connection cable (not needed for playback only)

## Installation

Insert the MS-2000 Diagnostics Installation disk 1 into the floppy drive. From the Windows "Run" menu, type **a: setup** (or **b: setup**, depending on the drive letter assigned to the 3.5" floppy drive). Follow the on-screen instructions to complete the installation.

## Quick Start

### ***Capturing diagnostic data to a file***

1. Connect the PC to the MS-2000 system using the serial connection cable. Make sure the MS-2000 system is operating.
2. Start the program by double-clicking the MS-2000 Diagnostics icon, or selecting the program in the Start menu.
3. Make sure the program is in polling mode. You can tell which mode the program is in by looking at the title bar of the program; it will say **MS-2000 Diagnostics [Polling]** or **MS-2000 Diagnostics [Playback]**. If the program is in playback mode, change to polling mode by clicking the **Polling Mode** button (pointing hand) on the tool bar.
4. Select the desired sensor number by clicking on the **Sensor Selector** control, then choosing from the list.
5. You should now start seeing diagnostic data appear on the program screen. If a **No response from MS unit** message appears in the status message area at the bottom of the program screen, it means the program is unable to communicate with the MS-2000 system. In this case, consult the troubleshooting section in this document.
6. By default, the program does not record the diagnostic data in a log file. To start a log file, click the **Open Log File** button on the tool bar.
7. In a given MS-2000 Diagnostics session, the first time a log file is started, a dialog comes up asking the user to verify that the date and time on the PC are correct, and that the site code setting in polling options is appropriate. Click the **Yes** button to check and/or modify the site code, or the **No** button to proceed without checking.
8. Diagnostic data is now being saved to the disk file shown at the bottom of the program screen. You can add notes to the data file by clicking the **Add Note** button on the tool bar. Once all of the diagnostic data items have been updated on the screen, you can get data for another sensor by changing the sensor number using the **Sensor Selector** control. You can tell when all of the data for a sensor has been updated by looking at the

bracketed value next to **Raw Echo Table**. If the bracketed value is [\*\*\*\*], then the data has not yet been updated.

9. If you just want to capture the current situation to a disk file for factory analysis, you're done. Just close the log file by clicking the Close Log File button on the tool bar. Exit the program by clicking the Exit button.

## Setup

In order to acquire diagnostic information from an MS-2000 system, a connection must be made from the PC serial port to the RS-232 port on the MS-2000 system. Plug the RJ-11 connector on the MS-2000 serial connection cable into the RJ-11 jack on the MS-2000 CPU or CPU/IO combo board. Figure 1 shows the location of the jack on a CPU/IO combo board; the jack is similarly located on the older CPU board. Plug the DB-9 end of the connection cable into the serial port connector on the PC. If the PC serial port has a DB-25 connector, then a DB-25 to DB-9 adapter must be used.



**Figure 1 - Location of RJ-11 jack**

If the program is just going to be used to view existing diagnostic data files, the connection from the PC to an MS-2000 system is not necessary.

## Operation

*Note: Throughout this document, it is assumed that the user will interact with the program by using a mouse or other pointing device to activate tool bar buttons and other clickable objects to control the program. Keep in mind that most actions can also be performed via menu options, and that most actions have keyboard shortcuts as well. In*

most cases the shortcuts are displayed with the associated menu item; where this isn't the case, the keyboard shortcut will be mentioned in the appropriate section of this document.

## Starting the program

Normally the program is invoked simply by double-clicking the MS-2000 Diagnostics icon in Windows. The operating mode will be whichever mode the program was in when last exited. It is possible to modify the startup of the program by specifying command line options. Refer to Appendix A for information on these options.

## Polling mode

This is the default mode of the program after it is first installed. In polling mode, the program communicates with a connected MS-2000 system to acquire diagnostic information, which is then displayed on the screen. The data can also be recorded to disk files on the PC. The program is in polling mode if the title bar at the top of the program screen says **MS-2000 Diagnostics [Polling]**. If not in polling mode, click the **Polling Mode** button (pointing hand) on the tool bar. The various program controls for polling mode are shown in Figure 2.

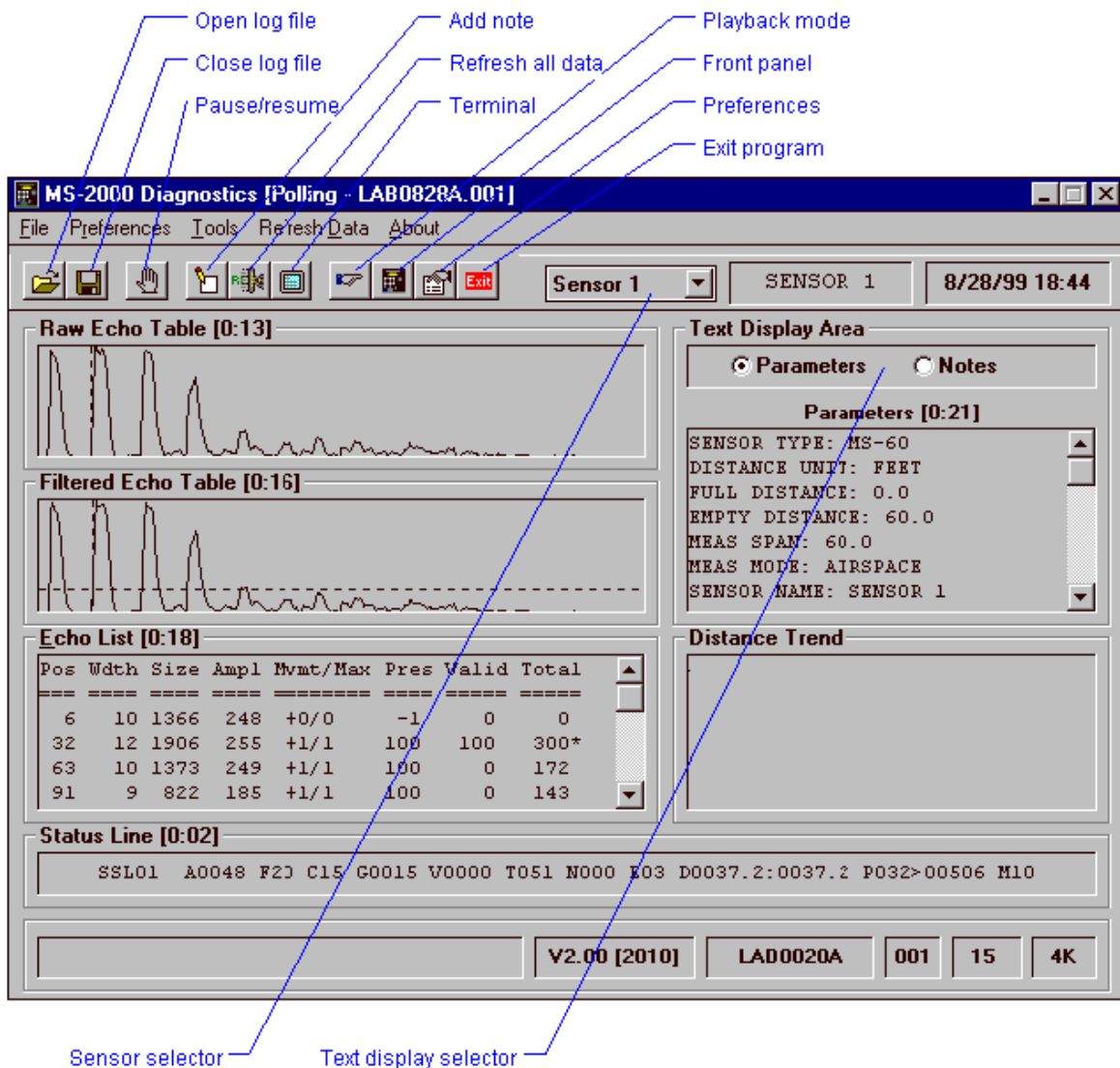


Figure 2 - Polling mode controls

## Communication port

In order for the program to communicate with the MS-2000 system, it must be configured to use the correct communication port on the PC. Click the **Preferences** button, then click the radio button associated with the communication port to be used, then click the **OK** button. The communication port setting will be saved for future program sessions.

## Choosing a sensor

The program attempts to acquire data for the sensor number shown in the **Sensor Selector** control. To choose a sensor number, click the **Sensor Selector**, then pick the desired sensor number from the list. Sensor numbers 1 to 10 can also be specified by holding down the control key (**<CTRL>**) and pressing a number key (top row, not numeric keypad). For example, **<CTRL> + 3** would select sensor number 3. The '0' key is used to select sensor 10 (i.e. **<CTRL> + 0**).

For data to be acquired, the selected sensor number must match a sensor number on a connected MS-2000 system. Normally the sensor number of a sensor is the same as its sensor position on the MS-2000 system. For example, sensor 2 on a Model 2001 would have a sensor number of 2, and sensor 6 on a Model 2010 would have a sensor number of 6. If the selected sensor number is not present on a connected MS-2000 system, then the program will not receive a response.

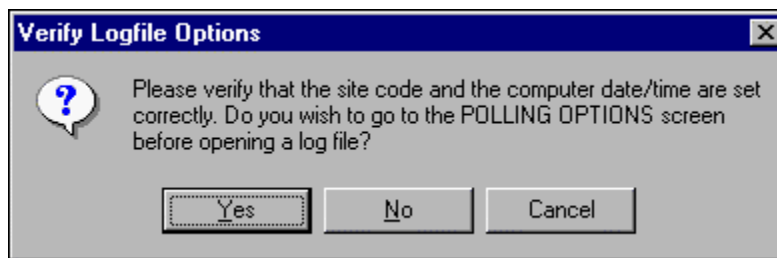
MS-2000 firmware versions 2.00 and higher support extended sensor addressing using DIP switches 1 through 6 on the IO PCB. This scheme supports sensor numbers 1 through 98. When the switches are all off, the unit behaves just like earlier versions; that is, the sensor number is the same as the sensor position. A full explanation of extended sensor addressing is beyond the scope of this document.

## Recording diagnostic information

### Opening a log file

The program can record all received diagnostic data into log files on the PC. By default, data logging is turned off; it must be explicitly turned on in order to save data for later analysis. When data logging is off, the message **NOT LOGGING** flashes at the bottom of the program screen. It's a good idea to wait until communications are established with the desired sensor before turning on data logging.

Data logging is enabled by clicking the **Open Log File** button. The first time a log file is opened in a given MS-2000 Diagnostics session, a dialog comes up asking the user to verify that the date and time on the PC are correct, and that the site code setting in polling options is appropriate.



**Figure 3 - Verify log file options**

Make sure the date and time on the PC are correct. In Windows 3.1, the date and time are accessed via the Control Panel. In Windows 95/98, just double-click the time display in the system tray (the right-hand side of the task bar, usually located at the bottom of the screen). The site code is really not important unless there are already data files from other sites in the program folder, or you plan to log data from other sites. Click the **Yes** button if you want to check the site code setting, and you will be taken to the **Polling Preferences** screen before data logging is started. Click the **No** button to bypass **Polling Preferences** and start data logging.

Once data logging is started, it will continue until either the log file is closed using the Close Log File button, or the program operating mode is changed to playback, or the program is closed using the Exit button.

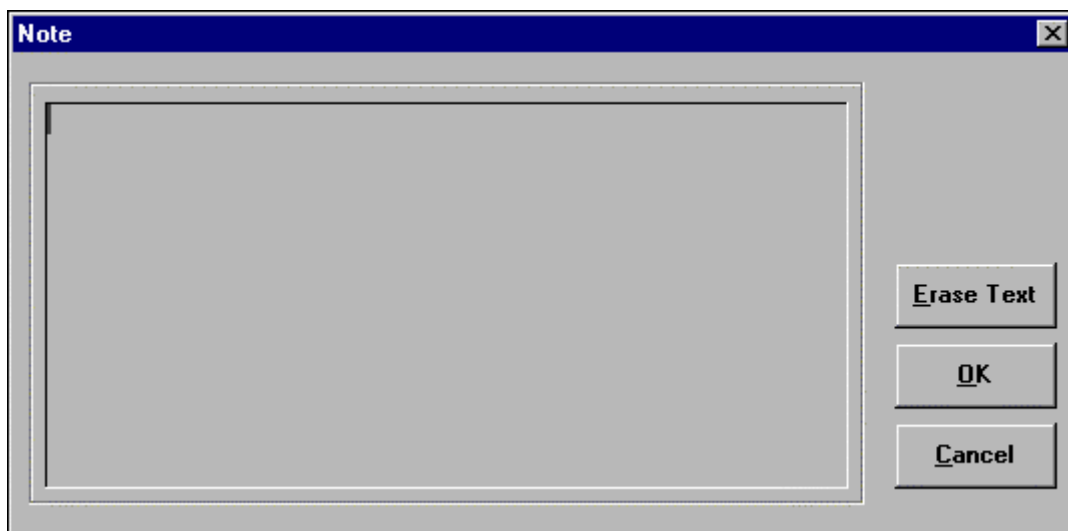
### Pausing and resuming data logging

It is possible to temporarily disable data logging; this is done by clicking the **Pause/Resume** button or pressing the space bar. When logging is paused, the file name at the bottom of the screen flashes and has a line drawn through it. Data will still be received and updated on the screen, but it will not be saved to the log file. Clicking the same button or pressing the spacebar causes data logging to resume.

Pausing/resuming of data logging can be useful to avoid recording during times when the data would not be meaningful, for instance while relocating the sensor. However, in most cases it makes better sense to just close the log file, then start a new one after the changes have been made.

### Adding a note to the file

Notes can be added to the log file by clicking the **Add Note** button, causing the **Add Note** dialog to appear:



**Figure 4 - Add note dialog**

Type the desired note in the text entry area, then click the **OK** button or press **<ENTER>** to save it to the log file. Clicking the **Cancel** button or pressing **<ESC>** exits the **Add Note** dialog without saving the note. Clicking the **Erase Text** button clears any existing text in the note entry area (but it does not affect any previously-entered notes). When a note is saved, the date and time the note was entered are saved along with it.

### Log file details

Log files are saved in the same folder as the MS-2000 Diagnostics program files (unless otherwise specified using a command line option - see Appendix A). The files are names using the following format:

XXXMMDDA.###

where 'XXX' is the site code, and 'MMDD' is the month and day the log file was started (for example 0803 for August 3). The 'A' represents an alphabetic character used to distinguish files that were started on the same date from one another. The '###' is a sequential number identifying the file in a series. Log files are limited to a size of 100K; when a log file reaches that size, it is closed, and a new one created with the same name but with the extension incremented.

As an example, assume the site code is ABC, and the date the log file is started is February 23. The first log file will be ABC0223A.001, the next file in that series would be ABC0223A.002, and so on. If that log file is closed and a new one started, the new log file series would be ABC0223B.001, ABC0223B.002, etc.

## Refreshing data

Normally diagnostic data items are updated at the interval specified in **Polling Preferences**. The value in brackets next to the data label for the item shows how much time has elapsed since that data item was received from the MS-2000 system. For example, **Echo List [0:12]** means the echo list was last updated 12 seconds ago. If there is a row of asterisks instead of a time in the brackets [\*\*\*\*], it means that data item has never been received, or that a request has been made to manually update the data item.

It is possible to request that a data item be refreshed by clicking on the data label for that item. All data items can be refreshed by clicking the **Refresh All Data** button. If the sensor number is changed, all data items are erased and then refreshed; this happens even if the same sensor number is selected.

## Front panel

The front panel interface of the MS-2000 system can be accessed by clicking the **Front Panel** button. This will bring up the following screen:



**Figure 5 - Front panel screen**

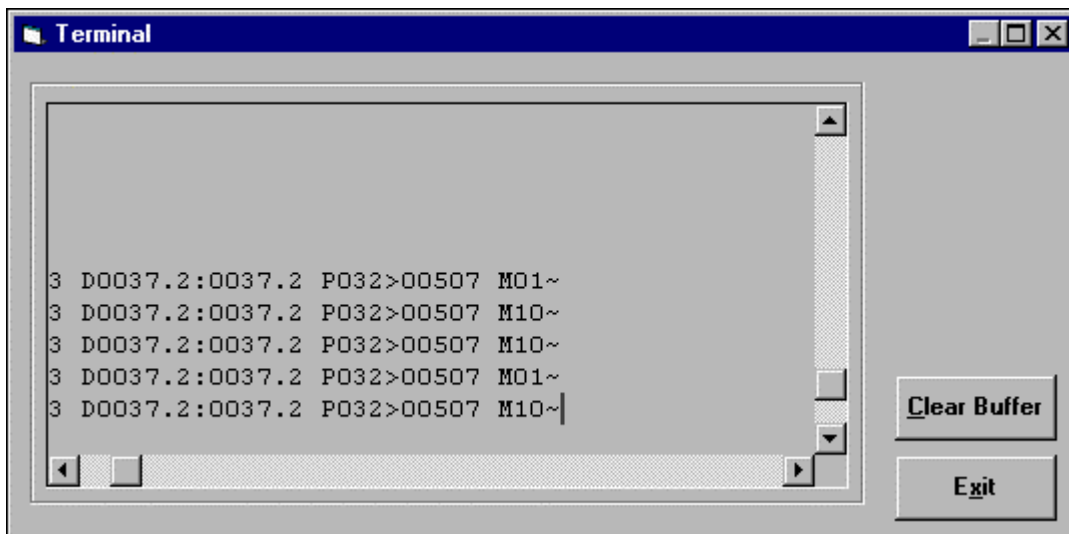
While the front panel screen is displayed, all data logging activity is suspended. The screen shows exactly what appears on the display of the MS-2000 system. Clicking and releasing the keypad keys in the front panel screen produces the same result as pressing the same keys on the actual front panel. To close the front panel screen, click the **Done** button or press the **<ESC>** key.

This feature provides a convenient way to remotely access the user interface on an MS-2000 system, particularly when used in conjunction with a modem.

*Note: The response of the MS-2000 system to remote key presses may be slow at times, particularly when accessed via modem, depending on connection quality and other factors. Line noise can corrupt the key presses sent to the system, causing unexpected results. Generally this poses no problem, as any inadvertent key press can be immediately corrected.*

## Terminal screen

Clicking the **Terminal** button brings up the terminal screen. This feature provides a very basic terminal interface for accessing the MS-2000 system directly. Data acquisition is suspended while the terminal screen is open.



**Figure 6 - Terminal screen**

The text area displays a partial history of the data that has been received by the program, with the cursor positioned at the end of the data. Clicking the **Clear Buffer** button erases the data history, but does not affect the data log file. Any key press on the PC keyboard is immediately sent to the MS-2000 system. Click the **Exit** button or press the **<ESC>** key to close the terminal screen.

The terminal screen is particularly useful for communicating with a modem in order to initiate or terminate a connection to a remote MS-2000 system. Refer to Appendix B for more information on using a modem with the MS-2000 Diagnostics program.

## Polling preferences

Settings associated with polling mode can be accessed by clicking the **Preferences** button, then clicking the **Polling** tab, or by double-clicking the **File Name** at the bottom of the program screen when in polling mode. The Polling Preferences screen looks like this:

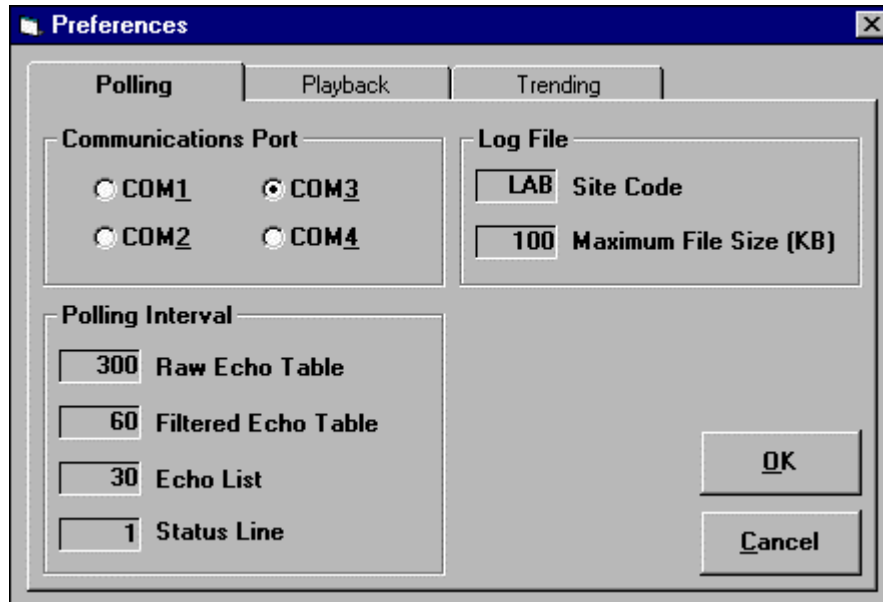


Figure 7 - Polling preferences

### Communications Port

Click the radio button associated with the port to be used for communicating with the MS-2000 system. Communication ports 1 through 4 are supported.

### Polling Interval

Determines how often the program requests each particular data item from the MS-2000 system, in seconds. Short polling intervals are useful when changes are being made, and it is desired to observe diagnostic information in as close to real-time as possible. However, small polling intervals produce large log files, and are more intrusive on the operation of the MS-2000 system (because it has to spend more time sending out data).

### Log File

The site code is used to help uniquely identify log files from different sites. The maximum file size parameter is currently fixed at 100K, and is not changeable.

## Playback mode

Playback mode is used to observe previously recorded diagnostic data files. The program is in polling mode if the title bar at the top of the program screen says **MS-2000 Diagnostics [Playback]**. If not in playback mode, click the **Playback Mode** button (pointing hand) on the tool bar. The various program controls for playback mode are shown in Figure 8.

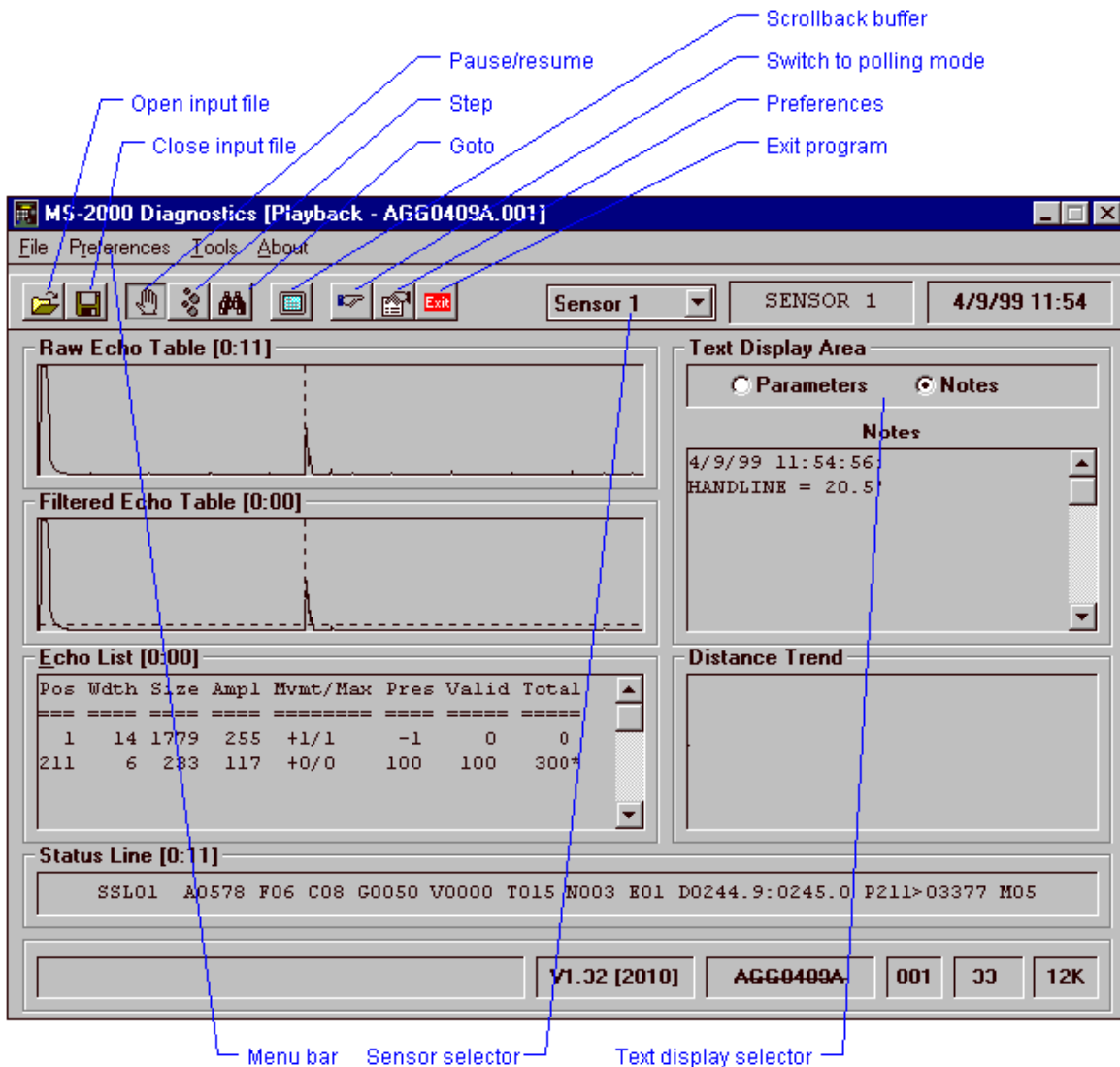


Figure 8 - Playback mode controls

## Choosing an input file

Click the Open Input File button to select a diagnostic log file for playback. This produces a standard Windows Open File dialog, allowing the user to navigate to different drives and folders. By default, the program only lists *starting* log files, that is, files that end with the **.001** extension. By clicking on the control labeled **List files of type** and selecting **Most Log Files**, log files other than starting log files can be listed. Selecting **All Files** causes all files, including non-log files, to be listed. To open a particular log file, click the file name in the file list, then click the OK button.

*Note: Attempting to open a file that is not a diagnostic log file can produce unpredictable results.*

## Playing back the data

### Choosing a sensor

In playback mode, the sensor number acts a little differently than in polling mode. The sensor number can change depending on what is in the input file, and the status of a setting in the playback preferences.

If the setting **Automatically switch to incoming sensor number** is checked, then the sensor number can change as the input file is played back, if there is data for more than one sensor number in the file. As data items for a different sensor number are encountered, the sensor number shown in the **Sensor Selector** control changes accordingly. Furthermore, if the **Pause when sensor number changes** setting is also checked, playback of the file will automatically pause each time a new sensor number is encountered.

When **Automatically switch to incoming sensor number** is not checked, then the sensor number shown in the **Sensor Selector** will not change (even if there is data for other sensors in the input file), and only data for that sensor number will be displayed.

### Changing playback speed

By default, the program plays back the data at full speed, which is limited only by the performance of the PC running the MS-2000 Diagnostics program. Playback speed can be adjusted using the adjustment slider in the Playback Preferences screen. A more convenient way to adjust playback speed is by pressing the **+** and **-** keys on the numeric keypad.

### Manually pausing/resuming playback

Click the **Pause/Resume** button or press the space bar to cause file playback to stop or start up again. File playback is paused when the file name at the bottom of the program screen has a line through it, and is flashing.

### Stepping through the file

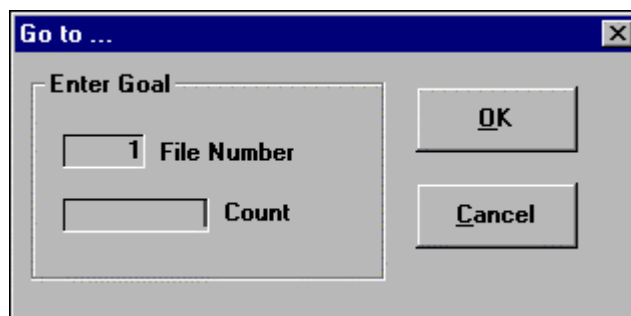
When file playback is paused, click the **Step** button to advance one data item.

### Jumping to the previous or next file in a series

The **F2** and **F3** function keys cause playback to jump to the beginning of the previous or next file in the file series respectively.

### Skipping to a specific place in log file

It is possible to "fast forward" to a specific position in a data file. To do this, bring up the goto dialog by clicking the **Goto** button.



**Figure 9 - Goto dialog**

Enter the desired position in the **Count** field, and, if necessary, the file number in which it is located. After the **OK** button is clicked, playback will proceed until the specified position is reached.

## Reviewing notes in the file

Notes that were recorded in the input file can be seen by switching the text display area from Parameters to Notes. This is done by clicking the Notes radio button.

## Scrollback buffer

The scrollback buffer, opened by clicking the Scrollback Buffer button, displays a partial history of diagnostic data that has been read from the input file. Click the Exit button or press the <ESC> key to close the scrollback buffer.

## Playback preferences

The Playback Preferences screen can be invoked by clicking the Preferences button then clicking the Playback tab, or by double-clicking the **File Name** at the bottom of the program screen when in playback mode.

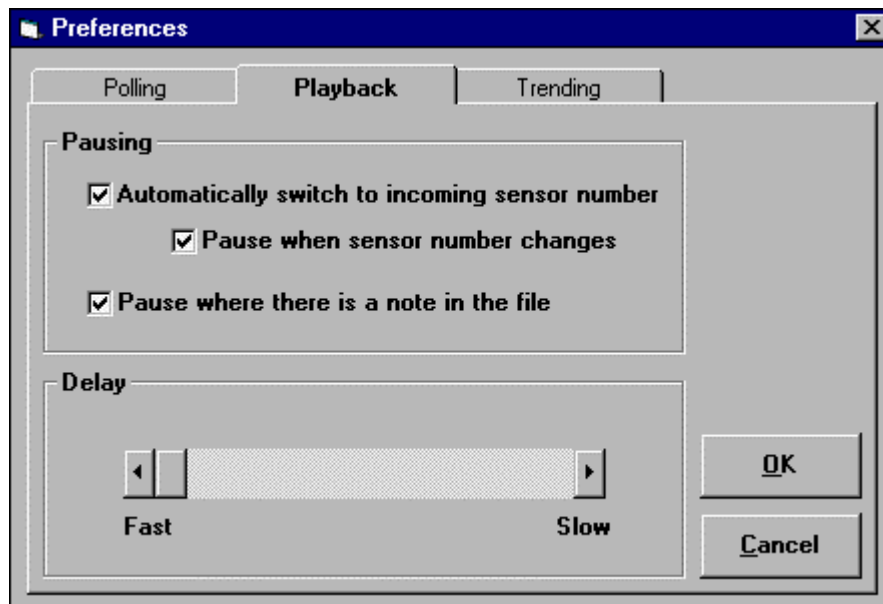


Figure 10 - Playback preferences

### Automatically switch to incoming sensor number

When checked, this setting causes the displayed sensor number to change whenever a new sensor number is encountered in the input file. Otherwise, the sensor number would not change, and only data for that particular sensor number would be displayed.

### Pause when sensor number changes

When checked, this setting causes playback to pause when a new sensor number is encountered in the input file. The pause occurs just before the display changes over to the new sensor number. This allows an opportunity to examine one sensor's data before it is over-written with the new sensor's data. This setting is ignored if the Automatically switch to incoming sensor number setting is not checked.

### Pause when there is a note in the file

When checked, causes playback to pause each time a note is encountered in the input file. The note is displayed in the text display area.

### Delay

The slider adjusts playback speed by adding some delay between each item in the input file. A value of 0 is no delay, and a value of 10 is maximum delay. Actual playback speed depends on the performance of the PC.

## Program information

During both polling and playback modes, various information is provided regarding the operation of the program and the connected MS-2000 system, as shown in Figure 11.

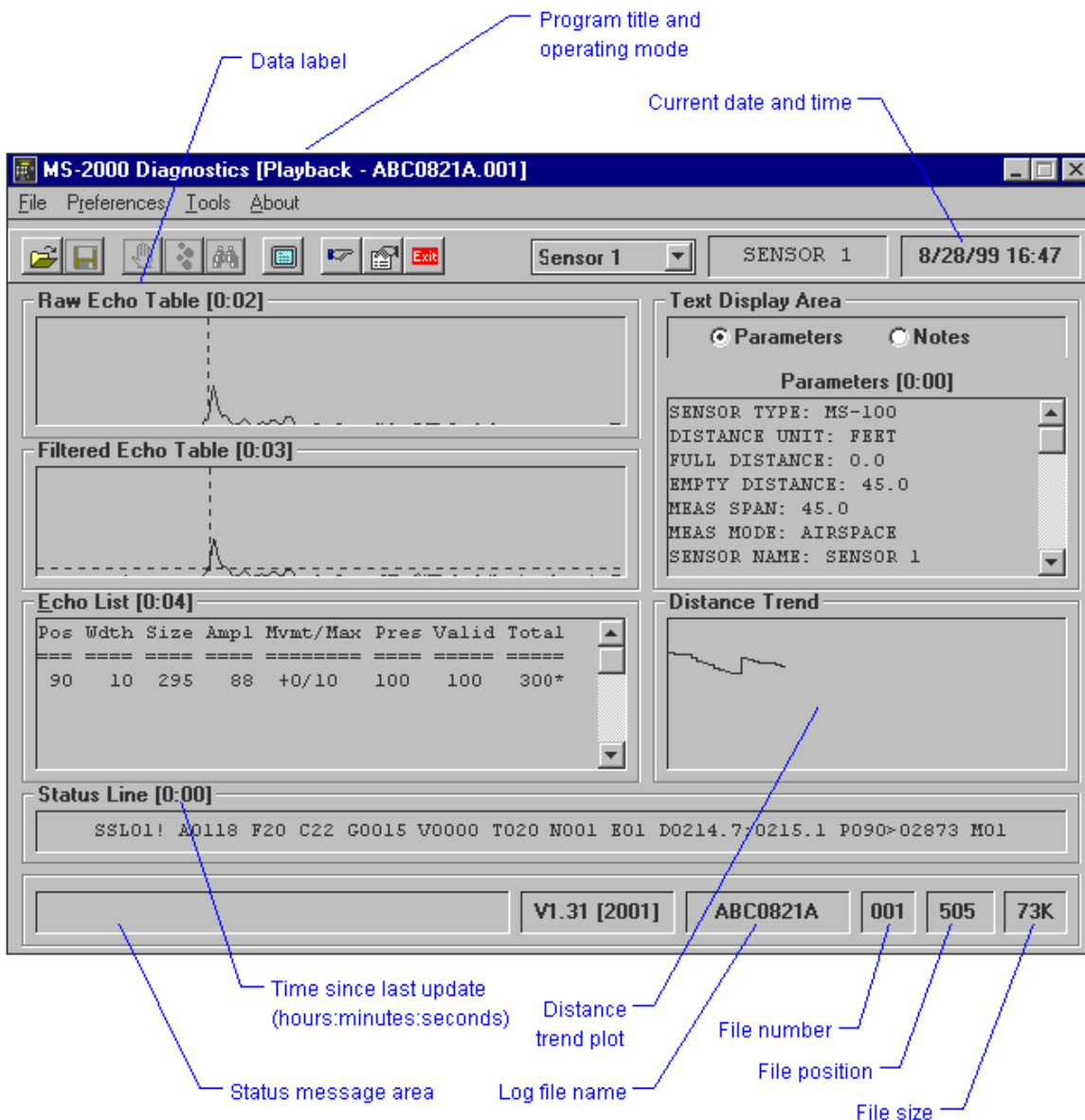


Figure 11 - Program information

## File name, status and position

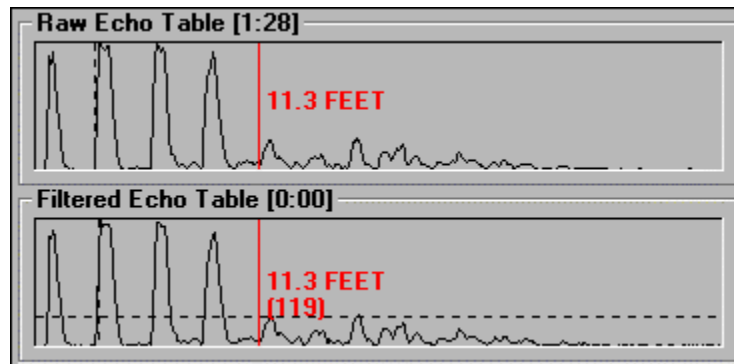
File name is the name of the log file or input file, without the 3-digit extension. File number is the number of the current file in the file series, and matches the 3-digit extension. File status is indicated by the way the file name is displayed - if the file name has a line through it and is flashing, then the file is paused. If in polling mode, and a log file has not been started, **NOT LOGGING** will be displayed in the file name area.

File position indicates the exact position in the current log file. This value is incremented each time a data item is saved to (or read from) the log file. The file size indicates the size of the current log file (if in polling mode), or how

much has been played back so far (if in playback mode). By noting the file name, number and position, a particular situation can be easily found at a later time.

### Distance cursor

Clicking in the raw echo table area brings up the distance cursor, which can be used to measure the distance to a particular position in the raw and filtered echo tables. Moving the mouse cursor within the raw echo table area causes the distance cursor to move in both echo table areas.



**Figure 12 - Distance cursor**

The distance from the sensor to the position represented by the distance cursor is displayed in the units selected by the DISTANCE UNIT parameter of the MS-2000 system. The value in parenthesis is the offset into the filtered echo table corresponding to the cursor position.

### Current date and time

In polling mode, the current date and time are the same as the date and time setting on the PC. In playback mode, the current date and time represents the date and time associated with the current position in the input file.

### Data item status

Next to each label identifying a diagnostic data area on the screen, there is a value in brackets. This value indicates how much time has elapsed from the time that data item was last updated to the current date and time (see previous item). If the brackets contain asterisks, it means either that that data item has never been updated, or that an update has been manually requested.

### Distance trending

The distance trend plot provides a graphical representation of the measured distance from the sensor to the target. A data point is plotted each time a status line is received. The top of the plot represents a distance closer to the sensor than the bottom of the plot. The distances associated with the top and bottom of the plot can be specified in the Trending Preferences screen.

Data points in the distance trend display in red if the sensor was in failsafe at the time.

## Distance trending preferences

Click the Preferences button then click the Trending tab, or double-click in the Distance Trend area, to bring up the Trending Preferences screen.

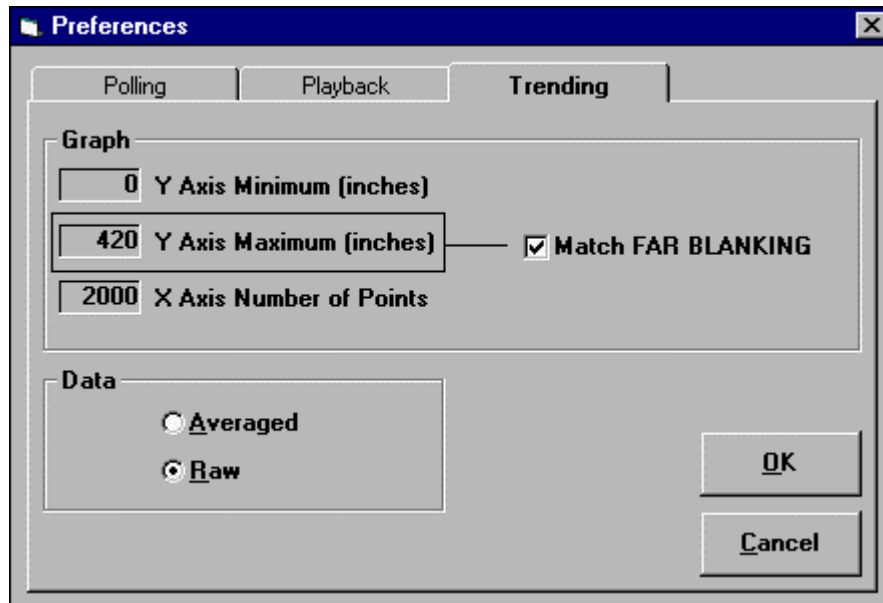


Figure 13 - Trending preferences

### Y Axis Minimum

The distance from the sensor, in inches, represented by the top of the trend plot.

### Y Axis Maximum

The distance from the sensor, in inches, represented by the bottom of the trend plot.

### Match FAR BLANKING

If checked, the Y Axis Maximum is set to the same distance as the FAR BLANKING parameter of the MS-2000 system. The value will be updated each time parameters are acquired.

### Data

Determines whether the distance used in the trend plot is before (Raw) or after (Averaged) the SIGNAL AVERAGING parameter is applied.

## Diagnostic data

Figure 14 shows the main program screen with the various diagnostic data elements identified. All data items other than MS firmware version pertain to the sensor number shown in the sensor selector control. (MS firmware version pertains to the MS-2000 system that the specified sensor number belongs to.) When the sensor number changes, all data items are erased from the screen. This applies equally whether the program is running in playback or polling mode.

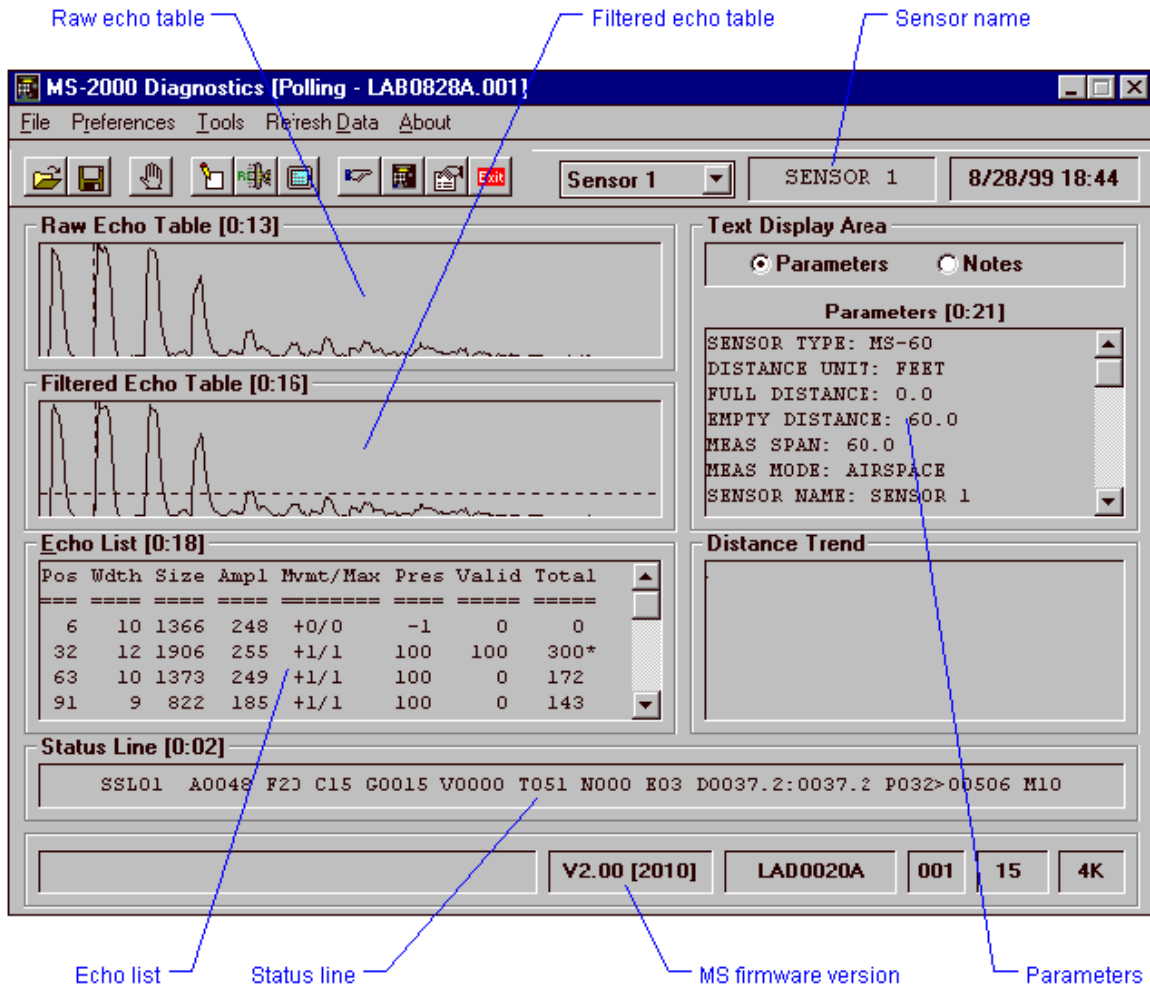


Figure 14 - Diagnostic data

A brief description of the various data items follows.

### Raw echo table

The raw echo table represents the return echo signal from the last sensor firing. The amplitude range is 0 to 2.5V as seen at TP1 on the IO PCB (TP8 on the combo CPU/IO PCB). The X axis of the plot represents the distance specified in the FAR BLANKING parameter on the MS-2000 system.

### Filtered echo table

The filtered echo table is derived from the raw echo table, and represents the average return echo signal from numerous sensor firings. As with the raw echo table, the X axis of the plot represents the distance specified in the FAR BLANKING parameter on the MS-2000 system.

## Status line

The status line contains a variety of operating information and parameters, and also contains the distance from the sensor to the target in inches. It is displayed in red if the sensor is in failsafe or manual mode, or the transmit voltage is not properly controlled.

## Echo list

The echo list tracks information on active echoes received by the sensor.

## Parameters

This is a list of all sensor-related parameters, plus the UNIVERSAL parameter group. Relay and 4-20mA output parameters are not included.

## Sensor name

The name of the sensor as specified by the SENSOR NAME parameter in the BASIC SETUP group.

## MS firmware version

The firmware version of the MS-2000 system containing the specified sensor number.

## Troubleshooting

### ***No response from MS unit***

Things to check:

- MS-2000 system is powered and operating.
- PC and MS-2000 system are connected correctly.
- Correct communications port is specified in program preferences.
- Sensor number in program matches a sensor number on connected MS-2000 unit.

## Appendix A - Command Line Options

Two command line options are available to modify program startup. Note that these command line options are mutually exclusive; specifying both available options may cause unexpected program operation.

### File name for playback

A previously recorded diagnostic file name can be passed to the program at startup. This causes the program to start in playback mode, with the specified file name as the input file. To accomplish this, the command line would appear like this:

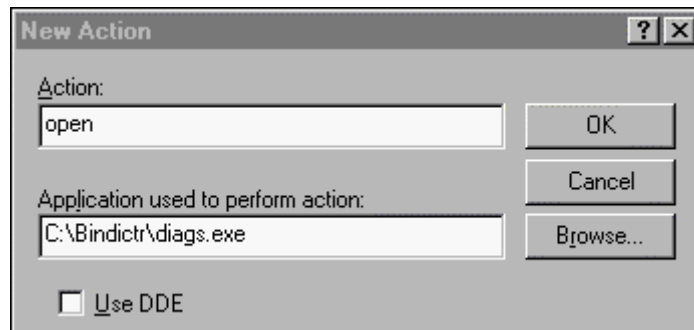
```
diags.exe file name
```

Where *file name* is the full name and path of the file to be viewed. Since MS-2000 Diagnostics is a 16-bit program compatible with DOS and Windows 3.1, the name and path must be in DOS 8.3 format; the program does not support long names for folders or files. Here is an example:

```
diags.exe c:\bindictr\remote~1\yzchem~1\yzc0829a.001
```

It is possible to associate the .001 file extension with the MS-2000 Diagnostics program, so that double-clicking a diagnostic file ending in .001 in Windows Explorer or File Manager causes the program to start with that file as the input file (i.e. Windows itself passes along the file name and path to the program). In Windows 95/98, this can be accomplished as follows:

1. In any Windows Explorer screen, choose Folder Options (or Options in Windows 95) in the View menu.
2. Click the File Types tab, then click the New Type button to bring up the Add New File Type dialog.
3. Using the TAB key to move between fields, enter information as follows:
  - Description of type:** MS-2000 Diagnostics
  - Associated extension:** .001
  - Content type (MIME):** text/plain (select this from the drop-down list)
4. Click the New... button to bring up the New Action dialog.
5. In the Action: field, type **open**.
6. Click the Browse... button to bring up the Open With dialog, then navigate to the folder containing the MS-2000 Diagnostics application files. Usually this folder is **c:\bindictr\**. In the Open With dialog, either double-click the **diags.exe** file, or click it once and then click the Open button. The dialog should now look like Figure 15. Click OK to close the New Action dialog.



**Figure 15 - New Action dialog**

7. The Add New File Type screen should now appear as shown in Figure 16. Click the Close button, then click the OK button in the Folder Options screen (or Options screen under Windows 95)

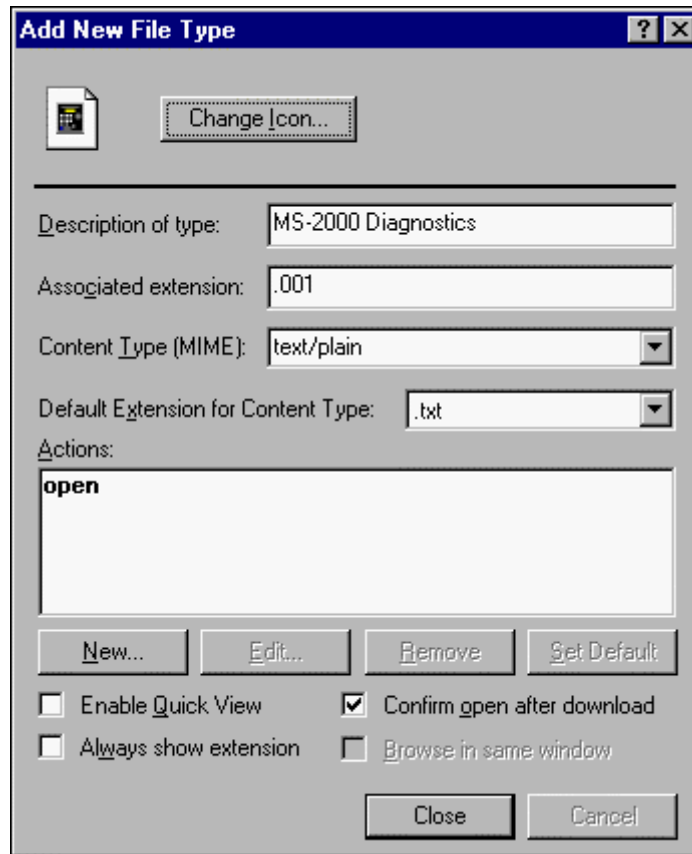


Figure 16 - Add New File Type dialog

### Folder location for settings file

Normally the program stores and retrieves its settings from the file **diags.ini** located in the same folder as the program file, **diags.exe**. This same folder is also used to store log files recorded in polling mode. It is possible to specify a different folder using the following command line option:

```
diags.exe /p=path name
```

Where **path name** is the full path to the folder to be used for storing recorded data and program settings. Since MS-2000 Diagnostics is a 16-bit program compatible with DOS and Windows 3.1, the name and path must be in DOS 8.3 format; the program does not support long names for folders or files. Here is an example:

```
diags.exe /p=c:\bindictr\remote~1\yzchem~1
```

In this example, the program will use the settings contained in the **diags.ini** file in the **c:\bindictr\remote~1\yzchem~1** folder. If the **diags.ini** file doesn't exist, it will be created when the program is closed (this is when settings are normally written to the file). Also, any data files recorded in polling mode will be placed in this folder.

## **Appendix B - Connecting Using a Modem**

The MS-2000 Diagnostics program can remotely communicate with an MS-2000 system located anywhere in the world with an available telephone line. In order to do this, the PC must be equipped with 9600 baud V.32 or higher modem, and the MS-2000 system must be connected to a specially-configured 9600 baud V.32 or higher modem. Consult the factory for details.

Assuming the PC and the MS-2000 systems are properly equipped with modems, the following are the steps to take to get up and running.

### **Set communication port**

Using the Polling Preferences screen, select the communication port associated with the modem.

### **Enter terminal mode**

From the main MS-2000 Diagnostics screen, in polling mode, bring up the terminal screen. Proper modem operation can be verified by typing "AT" followed by <ENTER>, after which an "OK" response should be seen in the terminal window.

### **Dial the remote system**

Dial the remote system by typing "ATDTXX...XX" followed by <ENTER>, where "XX...XX" is the telephone number of the remote system, including area code and any necessary access codes. For example, the command "ATDT1206555-5555" would dial the number 1-206-555-5555.

If the modem speaker is enabled, you should hear the progress of the call (i.e. dialing tones, ringing, and modem synchronization tones). When a successful connection is made, you should see the message "CONNECT 9600" in the terminal screen text area. Be sure you don't press any keys or exit the terminal screen before this message is received; doing so will terminate the connection attempt.

*Note: Sometimes you may get a successful connection at a lower baud rate (such as 7200). This should work OK, but if you have problems, hang up and try again.*

### **Test the connection**

At this point, the connection between the host computer and the MS-2000 system should be complete. To test this, press the "D" key. A status line response from the MS-2000 system should appear in the terminal mode window. Once this is verified, press <ESC> to exit terminal mode. Operation of the MS-2000 Diagnostics program should now proceed normally.

*Note: If the MS-2000 system has version 2.00 or later firmware, then it will not respond to the "D" command by itself. The command must be preceded by a valid sensor address on the MS-2000 system. In most cases, valid sensor addresses are 1 through 2 for a Model 2001, and 1 through 10 for a Model 2010. Thus the entire test command, using sensor address 1, would be "1D".*

### **Terminating the connection**

To terminate the connection (i.e. hang up the phone), bring up the terminal screen again. Wait one second, then type "+++" (three plus signs). After the "OK" response is received indicating the modem is in command mode, type "ATH" followed by <ENTER>. The modem will hang up.

## Appendix C - Settings File (diags.ini)

This section provides a description of the information contained in the settings file, **diags.ini**, which is normally located in the MS-2000 Diagnostics installation folder. This file contained several sections, each identified with a name in brackets, such as [Polling]. Under each section heading, key names identify each piece of information, where the key name is to the left of the equals sign (=), and the data or setting associated with that key name is on the right of the equals sign. Key names with their associated data can be in any order within the appropriate section. Here is an example of a section heading followed by a key name and its associated data:

```
[Polling]
CommPort= 1
```

Most of the information contained in the **diags.ini** file is accessible through the Preferences screens within the program. However, some of the settings are only accessible through editing of the **diags.ini** file. This can be done in any text editor, such as Notepad. Changes should not be made to the **diags.ini** file while the MS-2000 Diagnostics program is running. The program writes its current settings back to the **diags.ini** file when exited, and this would overwrite any changes that were made to the file while the program was running.

It is advisable wherever possible to change settings through the Preferences screens within the program. This way, the values that are entered are verified to be within the allowable range. When changes are made directly to the **diags.ini** file, unexpected results can occur due to values that are not in the accepted range for a particular data item.

Section Name / Key Name	Description	Default
[MS2000 Diagnostics]	Section name for general settings	
OperatingMode	Determines polling or playback mode. Acceptable values are 1 and 2, where polling = 1, and playback = 2.	1 (polling mode)
SensorNumber	Sensor number for data acquisition or display. Acceptable values are 1 through 98.	1
AutoLogging	Determines whether log file is automatically started when program is opened in polling mode. Acceptable values are 0 and -1, where 0 = false, -1 = true. Only changeable by editing the diags.ini file.	Not present, which is the same as a setting of 0 (false)
[Polling]	Section name for polling settings	
CommPort	Communication port to use for accessing the MS-2000 system. Acceptable values are 1 through 4.	1
RawEchoTableInterval	Controls how often a raw echo table is requested from the MS-2000 system. Acceptable values are 0 to 9999 seconds. A value of 0 means a raw echo table will never be requested.	300
FilteredEchoTableInterval	Controls how often a filtered echo table is requested from the MS-2000 system. Acceptable values are 0 to 9999 seconds. A value of 0 means a filtered echo table will never be requested.	60
EchoListInterval	Controls how often an echo list is requested from the MS-2000 system. Acceptable values are 0 to 9999 seconds. A value of 0 means an echo list will never be requested.	30
StatusLineInterval	Controls how often a status line is requested from the MS-2000 system. Acceptable values are 0 to 9999 seconds. A value of 0 means a status line will never be requested.	1

<b>Section Name / Key Name</b>	<b>Description</b>	<b>Default</b>
SiteCode	A three-letter code that is embedded in the file name of recorded log files to help relate them to a particular site. Consists of any combination of three letter or number characters.	XXX
AllowKeys	Determines whether keypresses on the PC keyboard are sent to the MS-2000 system. Acceptable values are 0 and -1, where 0 = false, -1 = true. Only changeable by editing the diags.ini file.	Not present, which is the same as a setting of 0 (false)
LockKeyboard	If set to yes, this parameter limits access to program controls during polling operation. This is to help prevent accidental keypresses from causing changes to program operation in automatic logging situations. Acceptable values are 0 and -1, where 0 = false, -1 = true. Only changeable by editing the diags.ini file.	Not present, which is the same as a setting of 0 (false)
[Playback]	Section name for playback settings	
InputPath	Path to folder containing diagnostic data file for playback. Example: c:\bindictr\data\	MS-2000 Diagnostics installation folder
AutoSensorNumber	When set to true, causes sensor number to follow data in file during playback (when data file contains data for different sensor numbers). Otherwise, only data for the specified sensor number is displayed.	-1 (true)
PauseOnNewSensorNumber	When set to true, and AutoSensorNumber is set to true, playback is paused when a different sensor number is encountered in data file.	-1 (true)
PauseOnNoteInFile	When set to true, playback is paused when a note is encountered in the data file.	-1 (true)
PlaybackDelay	Delay value for playback. Higher value slows down playback. Acceptable values are 0 to 10.	0 (full playback speed)
[Distance Trending]	Section name for distance trending	
YMin	Distance in inches from sensor represented by top of trend plot.	0 inches
YMax	Distance in inches from sensor represented by bottom of trend plot.	1000 inches (approx. 83')
Match Far Blanking	When set to true, the YMax value is updated to match the MS-2000 system FAR BLANKING value whenever parameters are received.	-1 (true)
XPoints	Number of data points in trend plot.	500
Mode	Distance data used in trend plot, where 0 = averaged (according to MS-2000 system SIGNAL AVERAGING parameter), and 1 = raw (no averaging).	0 (averaged)