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M-Trend User's Manual

Introduction

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Chapter 1

Using This Manual

Introduction

This manual explains how to use M-Trend, a program that allows the graphic or textual display of archived data in M-Trend formatted, Open Database Connectivity (ODBC) compliant databases. It describes the procedures used to establish a database connection, define query parameters, view the trend data, and save the parameters into M-Trend (.htv) files for later recall.

This manual does not include information about the mechanisms used to collect and write the trend samples into the database. These mechanisms are specific to different products, which include the M-Trend display component.

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Key Concepts

Chapter Organization

Each chapter in the *M-Trend User's Manual* is divided into five main sections:

Table 1-1: Chapter Organization

Section	Description
Introduction	Briefly outlines the contents of the chapter.
Key Concepts	Describes background information necessary to perform or understand specific tasks.
Procedure Overview	Describes general steps for performing the tasks that are described in detail in the *Detailed Procedures* section. This section is geared toward users already experienced in using M-Trend who only need a reference.
Detailed Procedures	Describes in detail the steps needed to complete specific tasks described within the chapter. This section is geared toward users who are new to M-Trend.
Troubleshooting	Provides information on potential problems as well as methods for solving them.

If a section is not necessary for a particular chapter, it is omitted. For example, this chapter, *Using This Manual*, does not contain a troubleshooting section.

Online Help

M-Trend software includes online Help. The Help screens may be accessed by selecting Help from the menu bar, by pressing the F1 key, or by pressing Alt+H. Help describes the basic procedures for performing functions within the M-Trend software. The online help system follows the basic conventions of Windows® 95 and Windows NT® help systems.

Manual Conventions

As in most Windows-based programs, sometimes there are multiple ways to perform the same tasks. This manual does not describe how to use both the mouse and the keyboard to perform the same step. In general, Microsoft® conventions are used to describe software features.

Chapter 2

Introduction to M-Trend

Introduction

M-Trend is a program designed to query a database of archived trend samples, and display the query results in both graphical and textual formats. M-Trend allows the user to create and save trend documents containing these query and display characteristics for future reference.

This chapter provides:

- M-Trend hardware and software requirements
- M-Trend data connection overview
- M-Trend operation overview

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Key Concepts

M-Trend Hardware and Software Requirements

M-Trend may be run standalone or within an ActiveX® document container such as the M-Series Workstation or Microsoft® Internet Explorer 4.0. The minimum recommended Personal Computer (PC) components are:

Product	M-Graphics (MW-MGRAPH-0)
Processor	
Recommended	Windows® 2000 Professional Operating System (OS) with Service Pack 4 or Windows XP Professional OS with Service Pack 1 2.6 GHz Pentium® 4 processor
Tested and Approved	Windows 2000 Professional OS 350 MHz Pentium III processor
Random Access Memory (RAM)	
Recommended	Windows 2000 Professional OS and Windows XP Professional OS: 256 MB
Minimum	Windows 2000 Professional OS and Windows XP Professional OS: 128 MB
Bus	Peripheral Component Interconnect (PCI)
Hard Disk Capacity	40 GB minimum. (If running System Tools and an M-Series Workstation on the same computer, we recommend maintaining 600 MB of free space on your hard disk for virtual memory.)
Monitor	Super VGA (800 x 600), (1024 x 768), or (1280 x 1024)
CD-ROM	4x or higher We recommend a CD-RW drive for making backups.
Graphics Support	VGA or SVGA
Video Memory	Minimum 2 MB VRAM that supports 16-bit (65,535) colors
Required Software	M3 Workstation Software (MW-M3WHCI-0) or M5 Workstation Software (MW-M5WHCI-0)
Software Components	ODBC Administrator and supporting files* Driver files for each database to be used with M-Trend* M-Historian databases containing the archived Trend samples to be queried*

* Normally supplied during installation of the product, which creates and populates the database.

M-Trend Data Connection Overview

Each M-Trend document consists of 1-32 Data Sources chosen by the user from a pool of all available archived data stored within the M-Historian database. A date/time range may be chosen for the display of data, and the user can manipulate the appearance of data, both in the graphical and textual formats. See Figure 2-1 for an overview of how M-Trend connects with data.

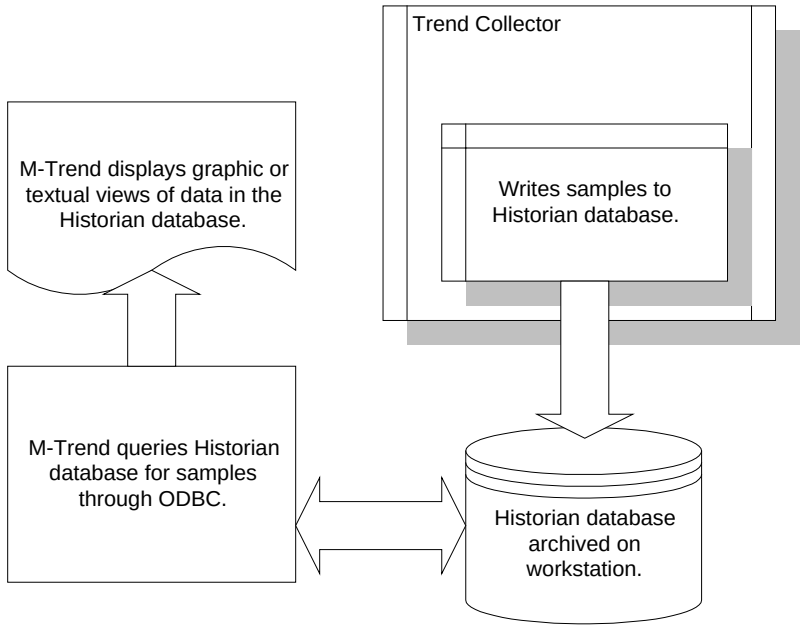

Figure 2-1: M-Trend Data Connection Overview

M-Trend Operation Overview

The M-Trend program is a display tool providing the functionality necessary to view any combination of archived data within an M-Historian database. The configuration, definition, and maintenance of the trend collection mechanism or the archive database is assumed to already be in place.

See Figure 2-2 for an overview of the steps necessary to create and view an M-Trend document.

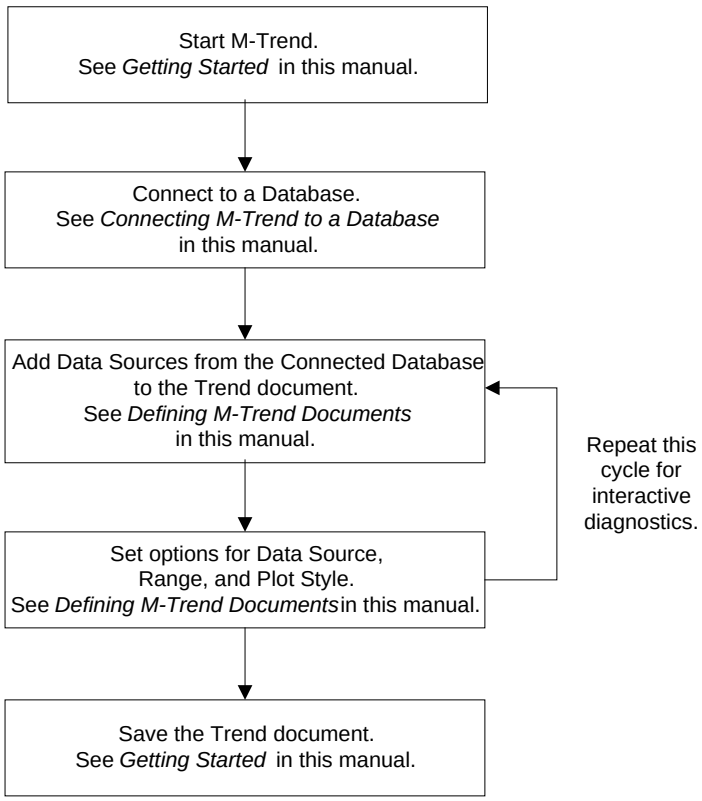

Figure 2-2: Using M-Trend Overview

M-Trend provides the user with the ability to collectively display the historical data of globally distributed points throughout a site. Any designated trended Data Source collected within an M-Historian database can be visually tracked via one or more M-Trend documents. The data can be in the form of an analog or binary value (e.g., room temperature or online/offline). For example, an M-Trend document may be used to monitor the status of a fan device (on or off), or to compare the inside and outside air temperature over a period of time.

The user has the flexibility to create, edit, and save individual M-Trend documents in (*.htv) files for later display. Each (*.htv) file stores all the information necessary to display the requested data samples both in graphical and textual format.

M-Password

M-Trend supports the restriction of certain user activity as established by the M-Password component.

Refer to the *M-Password Technical Bulletin (LIT-1153150)* in the *M3 Workstation Manual (FAN 1153)* for more information.

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Chapter 3

Getting Started

Introduction

M-Trend can be run as a standalone program or in an ActiveX document container. This chapter describes how to get started using M-Trend as a standalone program.

This chapter describes how to:

- start M-Trend
- create a new M-Trend file
- open an M-Trend file
- zoom in on part of an M-Trend Graphic View
- view detailed Trend sample information
- save an M-Trend file
- save an M-Trend file with a new name
- print an M-Trend file

This chapter assumes M-Trend is installed and you have defined and connected to an M-Historian database.

For details in installing M-Trend, refer to your workstation installation documentation.

For details on connecting to an M-Historian database or defining a connection to an M-Historian database, see the *Connecting M-Trend to a Database* chapter in this manual.

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Key Concepts

M-Trend Main Window

Figure 3-1 shows the Main window of the M-Trend program.

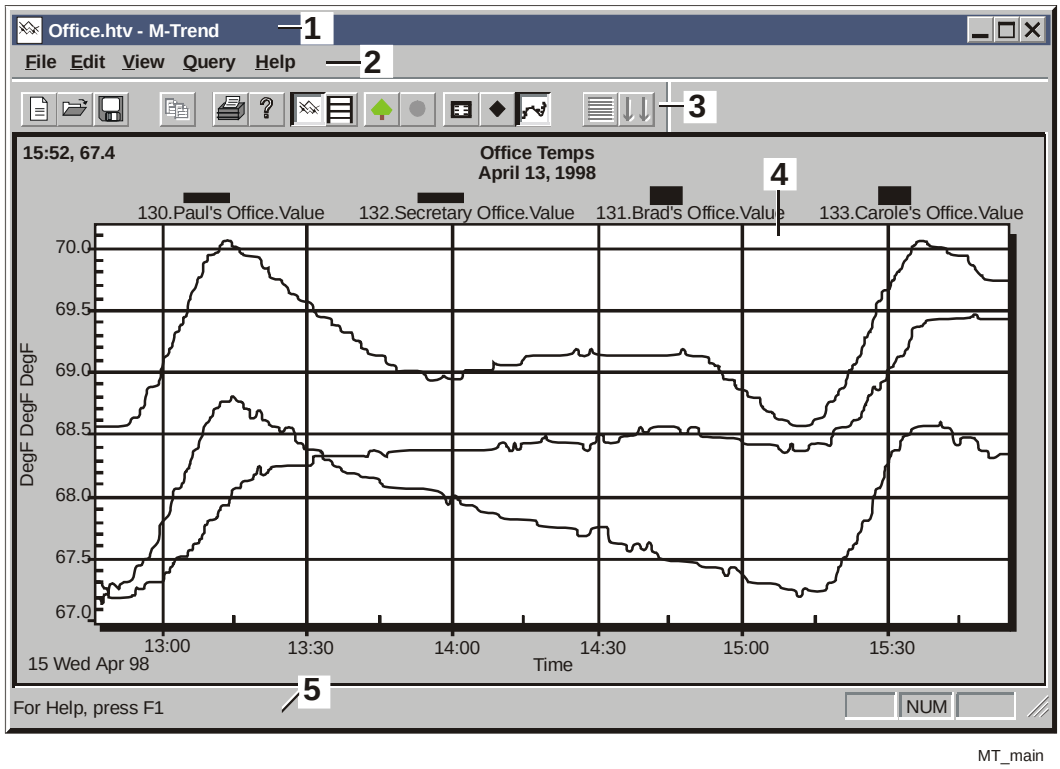

Figure 3-1: M-Trend Main Window

Table 3-1: Main Window Callouts

Callout	Name	Description
1	Title Bar	Shows name of file and program.
2	Main Menu Bar	Shows top level of available menu selections.
3	Toolbar	Provides button access to commonly used tools.
4	Data Display Area	Area where graphs and tables are viewed.
5	Status Bar	Provides messages about actions being performed.

M-Trend Main Window Menus

Table 3-2 describes M-Trend menus.

Table 3-2: M-Trend Main Window Menu Options

Menu	Command	Description
File	New	Creates a new, blank M-Trend document.
	Open	Opens an M-Trend document.
	Save	Saves the current M-Trend document with a .htv extension.
	Save As	Saves the current M-Trend document with a new name.
	Print	Prints the current M-Trend view.
	Recent File List	Lists recently opened M-Trend documents.
	Exit	Exits M-Trend.
Edit	Edit Trend	Opens the M-Trend Definition dialog box.
	Set Default Connection	Determines or changes M-Historian database connection.
	Undo Zoom	If the current display has any zoom factor, this command returns to normal view.
View	Toolbar	Toggles the display of the M-Trend toolbar.
	Status Bar	If checked, displays a status bar at the bottom of the screen.
	Progress Indicator	If checked, displays percentage completed when querying data.
	View Graph	If checked, data appears in a graphic format.
	View Text	If checked, data appears in a text format.
	Point Symbols	When View Graph is checked, this command adds unique symbols to each point on the graph. Not available in Text View.
	Mark Data Points	When View Graph is checked, this command marks each data point on the graph with a small point. Not available in Text View.
	Grid Lines	When View Text is checked, this command adds grid lines to the displayed table. Not available in Graphic View.
Query	Refresh Data	Starts or restarts the current query.
	Cancel Query	Cancels any query in progress.
Help	Help Topics	Displays the Table of Contents for the online help system.
	About M-Trend	Displays M-Trend version and copyright information.

M-Trend Main Window Toolbar

Table 3-3 describes the M-Trend toolbar buttons.

Table 3-3: M-Trend Toolbar Buttons

Button	Name	Description
	**New**	Creates a new blank Trend document.
	**Open**	Opens the Open File document to allow the selection and opening of a saved Trend document.
	**Save**	Saves the current document. If the document has been saved previously, it overwrites it; otherwise, the Save As dialog box appears.
	**Copy**	Copies selected text to the clipboard in View Text mode.
	**Print**	Prints the current graph or table.
	**About**	Opens the M-Trend information box to display version and copyright.
	**Graphic View**	Displays data in a graphic format.
	**Text View**	Displays data as text in a table.
	**Refresh Data**	Starts or restarts the current query.
	**Cancel Query**	Cancels any query in progress.
	**Edit View**	Opens the M-Trend Definition dialog box.
	**Point Symbols**	Adds unique symbols to each point on the graph.
	**Data Points**	Marks each data point on the graph with a small dot.
	**Grid Lines**	Toggles the horizontal grid lines on or off in Text View.
	**Auto Scroll**	If automatically updating data and in Text View, selecting this button keeps the table scrolled to the latest entry.

M-Trend Right-click Menu in Graphic View

Table 3-4 lists menu options available in Graphic View by right-clicking the mouse.

Table 3-4: Right-click Menu Options

Menu Selection	Description
Edit Trend	Opens the M-Trend Definition dialog box.
Undo Zoom	If the current view has any zoom factor, this command returns it to normal view.
Point Symbols	When View Graph is checked, this command adds unique symbols to each trended data point on the graph. Not available in Text View.
Mark Data Points	When View Graph is checked, this command marks each data point on the graph with a small point. Not available in Text View.
Maximize	Provides a full-screen view of the current Trend View.
Print	Prints the current Trend View.

Procedure Overview

Table 3-5: Getting Started

To Do This	Follow These Steps:
Start M-Trend	On the Windows Start menu select Programs > Johnson Controls > M-Trend. Select the type of database connection. Click OK.
Create a New M-Trend File	On the File menu, click New.
Open an M-Trend File	On the File menu, click Open. Select a file. Click Open.
Zoom in on Part of an M-Trend Graphic View	Left-click the mouse on the graphic and drag over desired portion of graphic data.
View Detailed Trend Sample Information	With Trend data displayed in either Graphic View or Text View, move the cursor over a data point. Left-click to view Trend sample information about the data point you have selected. In Text View, you must select sample data other than the date and time.
Save an M-Trend File	On the File menu, click Save. Enter a name for the file. Click Save.
Save an M-Trend File with a New Name	On the File menu, click Save As. Type in a new name. Click Save.
Print an M-Trend File	On the File menu, click Print. The Print dialog box appears. Click OK.

Detailed Procedures

These procedures assume you have already installed M-Trend, defined a connection to, and connected to an M-Historian database. For more information on connecting to a database, see the *Connecting M-Trend to a Database* chapter in this manual.

Starting M-Trend

To start M-Trend:

1. On the Windows Start menu, select Programs > Johnson Controls > M-Trend. The M-Trend Database Connection Dialog screen appears (Figure 3-2).

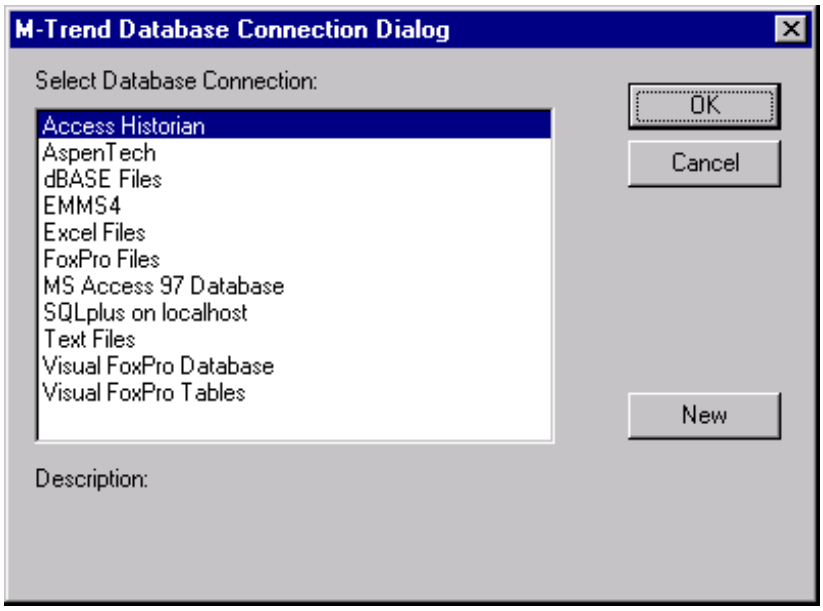

Figure 3-2: M-Trend Database Connection Dialog Screen

2. Select the type of database connection.

Note: Choose the DSN ODBC name that connects to the M-Historian Database file. For Johnson Controls installed servers, select either Access Historian or AspenTech®.

3. Click OK. The M-Trend Main window appears.

Creating a New M-Trend File

To create a new M-Trend file:

On the File menu, click New.

Note: If you have made any changes to the current file you are prompted to save it. Otherwise a new, blank document appears.

Opening an M-Trend File

To open an M-Trend file:

1. On the File menu, click Open. The Open dialog box appears (Figure 3-3).

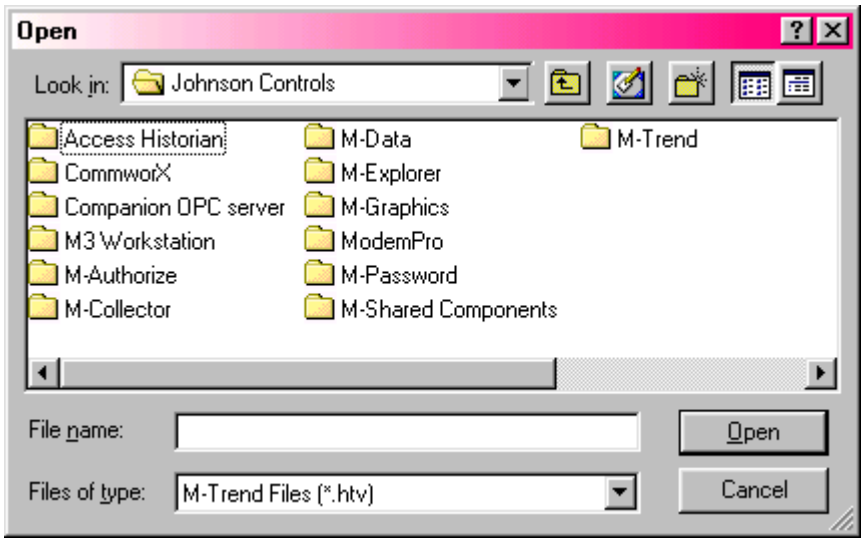

Figure 3-3: File - Open Dialog Box

2. Navigate to the directory where your file is saved and select a file or type the file name in the File name box.
3. Click Open.

Zooming In on Part of an M-Trend Graphic View

To zoom in on part of an M-Trend Graphic View:

1. Left-click and hold the mouse on Graphic View in Main window of M-Trend.
2. Drag the mouse to draw a rectangle over the portion of graphic you wish to zoom in on. A magnifying glass cursor appears as you drag out the rectangle. See Figure 3-4.
3. Release the mouse button.

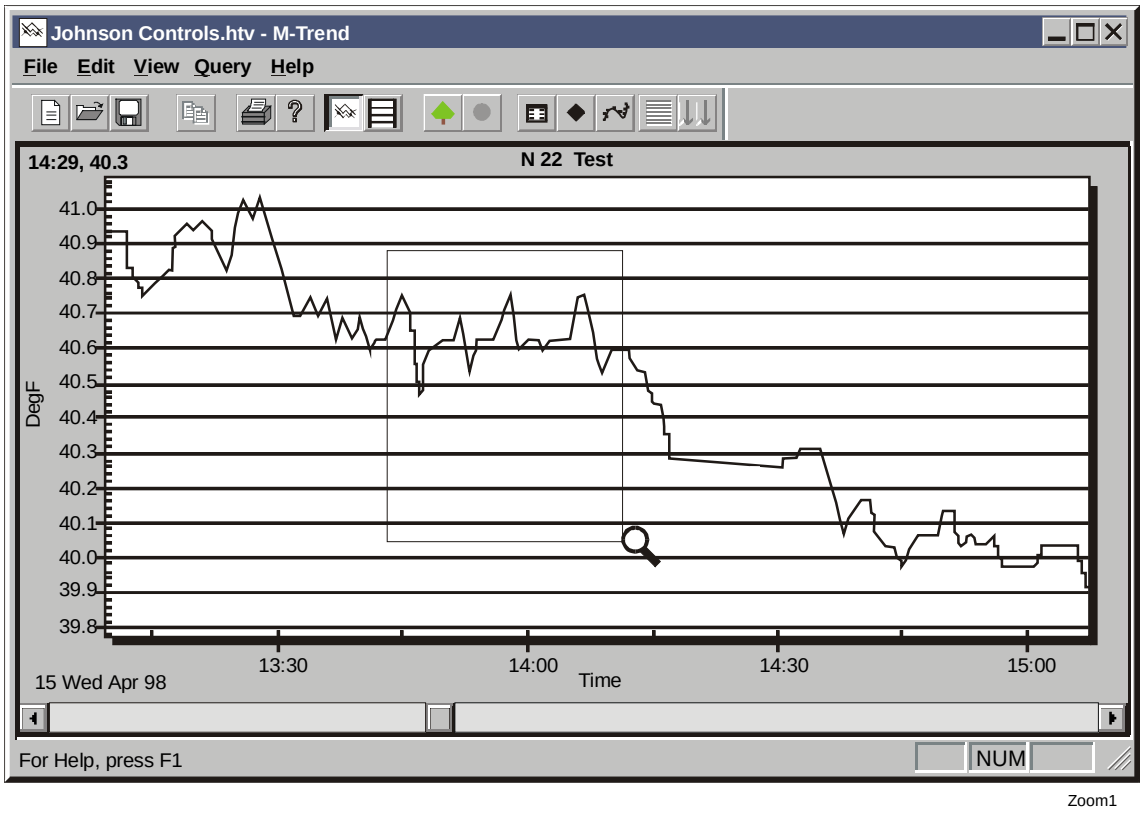

Figure 3-4: Zooming In on a View

Viewing Detailed Trend Sample Information

Note: Metasys® System Trend samples taken at fixed predetermined intervals, starting at once per minute, may differ from the M-Trend view that displays Point History data every half-hour. While these two values should be close, they may not be the same because they are sampled by the different tasks in the Network Control Module (NCM).

In addition, the delay between sampling can be greater if there are many objects in the NCM that have Point History enabled. This occurs because of the flurry of NCM activity at the top and bottom of the hour and each object's position in the Point History list.

To view detailed Trend sample information:

1. Move the cursor over a data point in the sample. In Graphic View, the cursor turns into a hand. In Text View, the cursor does not change.

Note: You can mark the data points by selecting the data point icon or from the menu with right mouse click.

2. Left-click the mouse to display detailed sample information about the point you have selected. See Figure 3-5 for an example of the sample data point information label.

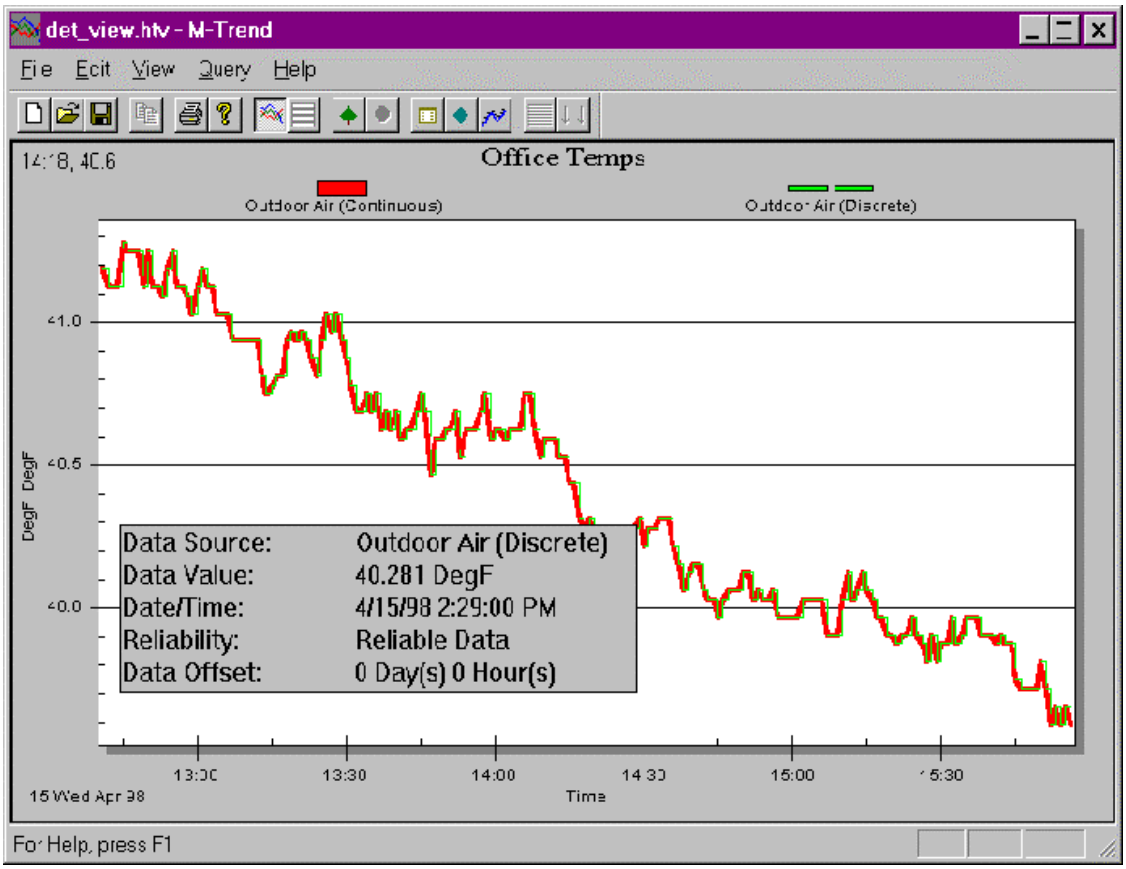

Figure 3-5: Viewing Detailed Sample Information

Table 3-6 contains a description of the fields in the detailed sample information.

Table 3-6: Detailed Sample Information

Name	Description
Data Source	Name of the sample point being viewed
Data Value	Numerical measurement of the sample point being viewed
Date/Time	Date and time the sample was collected
Reliability	An indication of the likelihood of the sample being correct. Not available for aggregate data.
Data Offset	If offsetting the values on a piece of trended data, the value of the offset is indicated on the offset version of the data.

Saving an M-Trend File

To save an M-Trend file:

1. On the File menu, click Save. If the file is already named, it is saved with the current data. Otherwise, the Save As dialog box appears.
2. Enter a file name in the file name box.
3. Click Save.

Saving an M-Trend File with a New Name

To save an M-Trend file with a new name:

1. On the File menu, click Save As…The Save As dialog box appears.
2. Enter a name in the File Name box.
3. Click Save.

Note: If you select an existing name from the File name list box and click Save, all existing data in the selected file is overwritten with the data in the current file.

Printing an M-Trend File

To print an M-Trend file:

1. On the File menu, click Print. The Print dialog box appears.
2. Click OK.

Troubleshooting

Table 3-7: M-Trend Troubleshooting

Error/Condition	Problem	Solution
There is no Johnson Controls directory under Program Files on the Windows Start button.	M-Trend has been installed to a different program group or not installed.	Determine if it is in another directory or install it.
A saved file is opened and there is no graph displayed.	Data is out of range of current settings.	Ensure that the study range start and end times are valid.

Chapter 4

Connecting M-Trend to a Database

Introduction

M-Trend displays graphical and textual views of data contained in an M-Trend formatted, ODBC compliant M-Historian database. The data contained in these databases is collected from other sources, such as supervisory controllers, and stored in an M-Historian database. In order to use the database with M-Trend, you must define an ODBC Data Source connection for the database that provides a link, or map, between M-Trend and the data to be viewed.

This chapter describes how to:

- connect M-Trend to a defined database
- view the name of the current database

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Key Concepts

ODBC

Open Database Connectivity (ODBC) provides an interface to allow M-Trend to make a standard set of requests for data regardless of the actual database package used. For example, historical data could be stored in the format used by Microsoft Access or by AspenTech. Using ODBC, M-Trend can view data stored in these databases, even though it has no knowledge of Access or AspenTech database formats.

Each database used by M-Trend must be registered as an ODBC data source provider through the ODBC Administrator. Each ODBC compliant database package used by M-Trend must include software to register itself as an ODBC driver on the client PC.

To view, add, or remove Data Source Names (DSN) select the New button from the M-Trend Database Connection dialog box.

M-Historian Database

Database where Trend data samples are archived. It can be saved in a site subdirectory.

Data Source Name (DSN)

A DSN file is used to define a connection to an archived database for M-Trend to access. When defining an ODBC data source for M-Trend, you are naming a link, or map, to the M-Historian database.

There are three types of DSN in the ODBC administrator: User, System, and File. When using Windows NT databases such as AspenTech, you generally use a System DSN.

User data sources can only be used on the current machine. System data sources are visible to all users, including NT Services.

DSN File Definition

Defining a DSN is the process of defining an open connection to allow third-party programs that are ODBC compliant (such as Microsoft Excel) to view data from a database of archived Trend samples.

Data Source Connection

Connecting to a Data Source refers to selecting the DSN, which points M-Trend to the database for the site you are viewing. A saved .htv file automatically reconnects to the defined DSN when opened.

M-Trend Database: New Button

New connections may be created for Access Historian databases located on a remote computer or Access Historian databases stored on the local computer with location/names that are different from the default. Refer to *Appendix A: Adding Database Connections* for more details.

Procedure Overview

Table 4-1: Connecting M-Trend to a Database

To Do This	Follow These Steps:
Connect M-Trend to a Defined Database	On the Windows Start menu, select Programs > Johnson Controls > M-Trend. From the M-Trend Edit menu, click on Set Default Connection. Select a defined data source connection from the M-Trend database Connection dialog box and click OK. Select Yes or No to make this your default database connection.
View the Name of the Current Database	From the M-Trend Edit menu, click on Edit Trend. The M-Trend Sample Database screen appears. The name of the current database is in the title bar of the dialog box to the right of the words M-Trend Sample Database.

Detailed Procedures

Connecting M-Trend to a Defined Database

To connect M-Trend to a defined database:

Note: This procedure is for a local Access database using install defaults or an AspenTech with client installed.

1. On the Windows Start menu, select Programs > Johnson Controls > M-Trend.
2. From the M-Trend Edit menu, click on Set Default Connection. The M-Trend Database Connection Dialog screen appears (Figure 4-1).

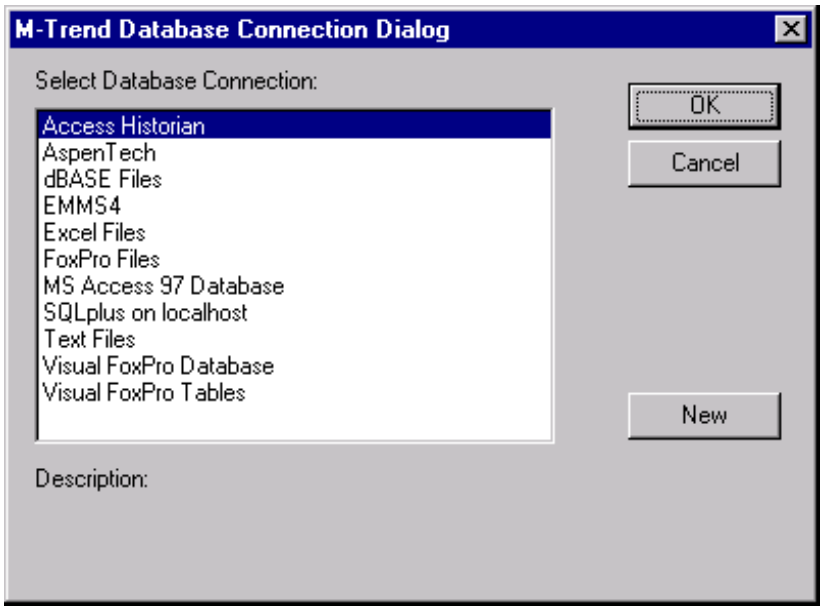

Figure 4-1: M-Trend Database Connection Dialog Screen

3. Select the database you want to view with M-Trend. You may select any previously defined database connection.

Note: For Johnson Controls installed servers, select either Access Historian or AspenTech.

If you select a type of file rather than a defined database, for example Excel files in Figure 4-1, the ODBC Administrator program opens to request further information.

4. Click OK. A dialog box appears asking whether to set this database connection as your default connection.
5. Select Yes or No.

Note: Connecting M-Trend to a database does not cause Trend data to appear on your screen. To view Trend data, you must define the portion of the database you wish to view. This is done by selecting data sources from within your database and defining time ranges to view. For further information, see the *Defining M-Trend Documents* chapter in this manual.

Viewing the Name of the Current Database

1. From the M-Trend Edit menu, click on Edit Trend.
2. The M-Trend Sample Database Dialog box appears. The name of the currently connected database appears in the title bar to the right of the words M-Trend Sample Database.

Chapter 5

Defining M-Trend Documents

Introduction

M-Trend documents are defined subsections or views of the default database. A saved M-Trend document saves the settings used in a particular view so that they may be recalled at a later time. See the *Getting Started* chapter in this manual for further details. This chapter describes M-Trend definition, which determines the data sources to be displayed and how they appear.

This chapter describes how to:

- set the General options for an M-Trend document
- select Data Sources for an M-Trend document
- remove Data Sources from an M-Trend document
- set Data Range for an M-Trend document
- set Data Source Options for an M-Trend document
- set Plot Style for an M-Trend document
- set fonts and colors for an M-Trend document

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Key Concepts

M-Trend Definition

The parameters in the M-Trend Edit Properties dialog box determine what data is displayed in an M-Trend document, and the way it is displayed.

Data Source Tab: M-Trend Definition

Select and remove individual data items available within the database in the Data Source tab.

Add Button

Allows you to select desired data sources for display from a list of available archived data. Data references can be selected more than once in the same query. This allows comparison of the same data source over different times using the offset function.

Remove Button

Removes unwanted data sources from the current trend view. It does not remove data sources or samples from the database.

Data Source Name List Box

The list box includes all items currently involved in the M-Trend query.

Data Range Tab: M-Trend Definition

Set the desired range of chronological data in the Data Range tab. Use the default date/time format provided, or use the wild card terms described in the *Wild Card Terms* section in this chapter.

Study Range

The Study Range specifies the range of data that is queried for display within the M-Trend document. The Study Range defaults to NOW-8H until NOW, which reflects the last 8 hours of samples.

Refresh Rate

The Refresh Rate specifies the length of time between database updates to the screen. This parameter is only enabled if a relative study range has been entered, for example, TODAY or NOW.

Note: The display changes on screen refreshes only if new samples have been added to the Historian database since the last query.

Wild Card Terms

M-Trend supports wild card terms when specifying a Study Range for data retrieval within the Historian database. Wild card terms allow you to easily specify relative time-based date ranges for the retrieval of data. The following wild card terms are used:

- NOW - This keyword specifies the current date/time. The value is set at the exact time the database request is made.
- TODAY - This keyword specifies the current date. If no time of day is specified, midnight is assumed.
- D - This keyword indicates a specific number of days. Example: TODAY-8D indicates a date eight days prior to the current date.
- H - This keyword indicates a specific number of hours. Example: NOW-3H indicates a time three hours before the current time.
- M - This keyword indicates a specific number of minutes. Example: NOW-5H30M indicates a time 5 hours and 30 minutes prior to the current time.

Time may also be specified either in the standard 12 hour, a.m./p.m. format or in 24-hour time. For example, 12/12/97 12:00:00 p.m. and 12/12/97 23:00:00 are valid parameters.

Note: Time and date formats allowed follow the regional time/date format setting in the Windows operating system.

Data Source Options Tab: M-Trend Definition

Data Source Name

This drop-down box allows you to select one of the data sources you have added to your Trend document in the Data Source.

Data Source Description

Allows you to give a descriptive name to the data source that is selected in the Data Source Name list box. This description is then used as a label for the data source on graphs or tables.

Units

Allows you to label the value of units on the Y-axis in graphical view. The units specified are also included in the column label of text views.

Time Offset

The time offset feature allows you to shift the time line of a data source in order to compare different time ranges of the same data source, for example, to compare yesterday’s temperature to today’s.

Pen

The Pen commands, Pen Style and Pen Color, allow you to customize the look of the plotted line for each individual data source.

Aggregate Functions

Aggregate functions, in databases that support them such as the AspenTech Historian, allow you to perform statistical functions on the data in an M-Trend query in order to allow various types of analysis of the data. You must set a data interval in order to use aggregate functions. The data interval allows you to set the amount of time between samples you are performing the aggregate functions on. M-Trend supports the following aggregate functions:

All Data - Shows all available data. This is the default and is also the only available option for queries on databases that do not support aggregate functions.

Average - Returns the average (arithmetic mean) of the values of the selected data source.

Maximum - Returns the largest values in a set of values.

Minimum - Returns the smallest values in a set of values.

Range - Returns the difference between the Minimum and Maximum values in a set of values.

Standard Deviation - Estimates standard deviation based on a sample. The standard deviation is a measure of how widely values are dispersed from the average value (the mean).

Sum - Adds all the numbers in a range of data sources.

Variance - Estimates variance based on a sample.

Y Axis Range

For stacked graphs, allows the override of calculated ranges.

Plotting Methods

Continuous plotting assumes a linear change in value between samples and draws a straight line between them. Discrete plotting follows the assumption that each sample is an event, that is, the value changes abruptly for each new sample, with the value staying constant until the next sample is plotted. In Figure 5-1 the same data source is plotted with continuous plotting (dark line) and discrete plotting (gray line). Note that the larger the sample you are looking at, the less apparent the differences are.

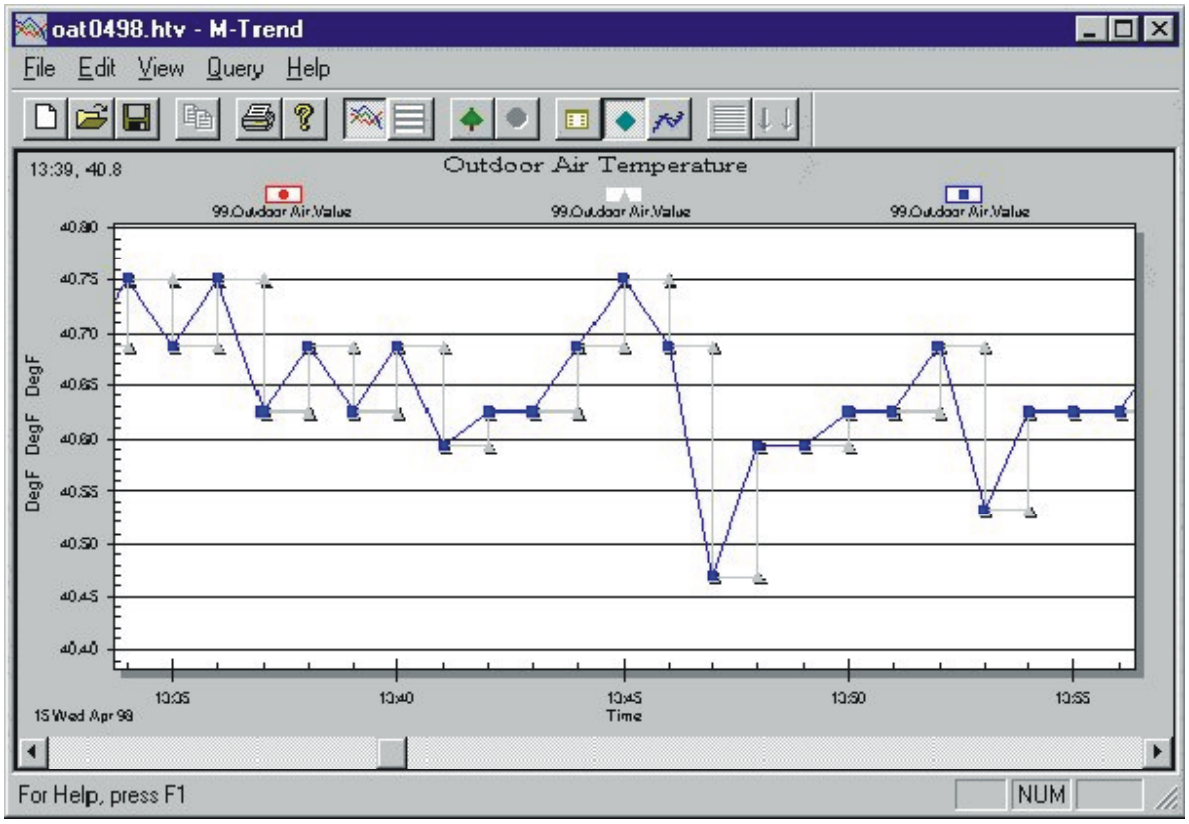

Figure 5-1: Continuous vs. Discrete Plotting

Plot Style Tab: M-Trend Definition

The Plot Style tab lists different plotting styles for each Y-axis used. The following plotting styles are available:

- Area Graph
- Bar Graph
- Line Graph
- Points Graph
- Points + Line Graph
- Points + Spline Graph
- Spline Graph

Mark Data Points

This option marks each data point on the graph with a small dot.

Fonts/Colors Tab: M-Trend Definition

Change the visual display of the graph in the Fonts/Colors tab.

Font

The Fonts/Colors tab allows you to change the fonts associated with all text displayed on the graph. You may also bold, italicize, or underline text for emphasis.

Color

The Fonts/Colors tab allows you to change various foreground and background colors.

Query

A request by M-Trend for information from the current database. The M-Trend document shows the results of the most recent query.

Procedure Overview

Table 5-1: Defining M-Trend Documents

To Do This	Follow These Steps:
Set General Options for an M-Trend Document	On the Edit menu, select Edit Trend. Select the General tab. Fill in the fields. Click OK.
Select the Data Sources for an M-Trend Document	On the Edit menu, select Edit Trend. Select the Data Source tab. Click Browse. Select data sources from the list. Click Add. Click OK.
Remove Data Sources from an M-Trend Document	On the Edit menu, select Edit Trend. Select the Data Source tab. Select a data source from the list. Click Remove. Click OK.
Set Data Range for an M-Trend Document	On the Edit menu, select Edit Trend. Select the Data Range tab. Fill in the fields. Click OK.
Set Data Source Options for an M-Trend Document	On the Edit menu, select Edit Trend. Select the Data Source Options tab. Select a Data Source Name. Fill in the fields. Click OK.
Set Plot Style for an M-Trend Document	On the Edit menu, select Edit Trend. Select the Plot Style tab. Fill in the fields. Click OK.
Set Fonts and Colors for an M-Trend Document	On the Edit menu, select Edit Trend. Select the Fonts/Colors tab. Choose the fonts, font styles, and colors desired. Click OK.

Detailed Procedures

The following procedures assume M-Trend is already connected to a Historian database. For instructions on connecting to a data source or information about data types in general, please refer to *Connecting M-Trend to a Database* in this manual.

Setting General Options for an M-Trend Document

To set the General options for an M-Trend document:

1. On the Edit menu, select Edit Trend or click the Edit View icon. The M-Trend Definition dialog box appears (Figure 5-2).

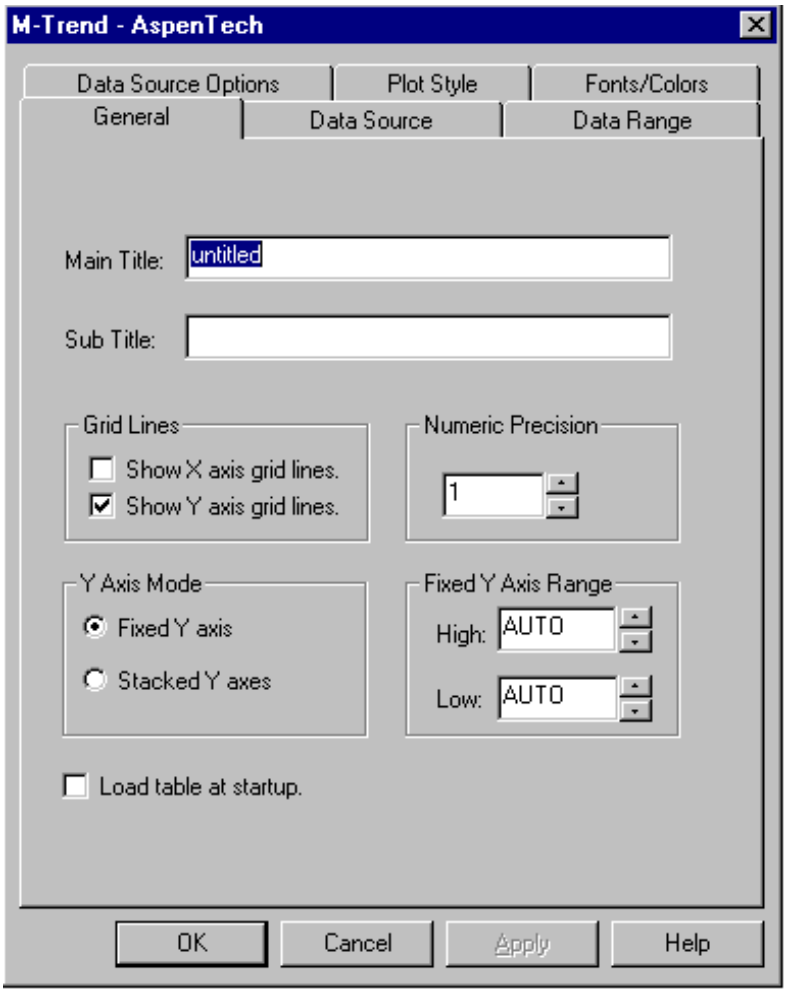

Figure 5-2: M-Trend Definition Dialog Box: General Tab

2. Select the General tab.
3. Fill in the fields using Table 5-2.

Table 5-2: General Tab

Field	Description
Main Title	Title displayed with M-Trend document when displayed. Default file name when saving document.
Sub Title	Additional heading to be associated with the given M-Trend document.
Grid Lines: Show X axis grid lines.	Toggles the horizontal grid lines in Graphic View.
Grid Lines: Show Y axis grid lines.	Toggles the vertical grid lines in Graphic View.
Numeric Precision	Determines precision of data by specifying the number of digits to be displayed after the decimal point.
Y Axis Mode: Fixed Y axis	Used to view individual data sources on the same graph.
Y Axis Mode: Stacked Y axis	Allows the viewing of separate data sources to compare sources of different scales. The first six data source names are graphed.
Fixed Y Axis Range: High	Allows the setting of an upper boundary for the Y axis. Data that is higher is truncated in the Graphic View. When set to Auto, the upper limit of the Y axis is based on available data.
Fixed Y Axis Range: Low	Allows the setting of a lower boundary for the Y axis. Data that is lower is truncated in the Graphic View. When set to Auto, the lower limit of the Y axis is based on available data.
Load table at startup.	Allows you to load both the graph and the table simultaneously. Default is unchecked, which loads graph only on startup.

4. Click OK.

Selecting Data Sources for an M-Trend Document

To select Data Sources for an M-Trend query:

1. On the Edit menu, select Edit Trend or click the Edit View icon. The M-Trend Definition dialog box appears (Figure 5-2).

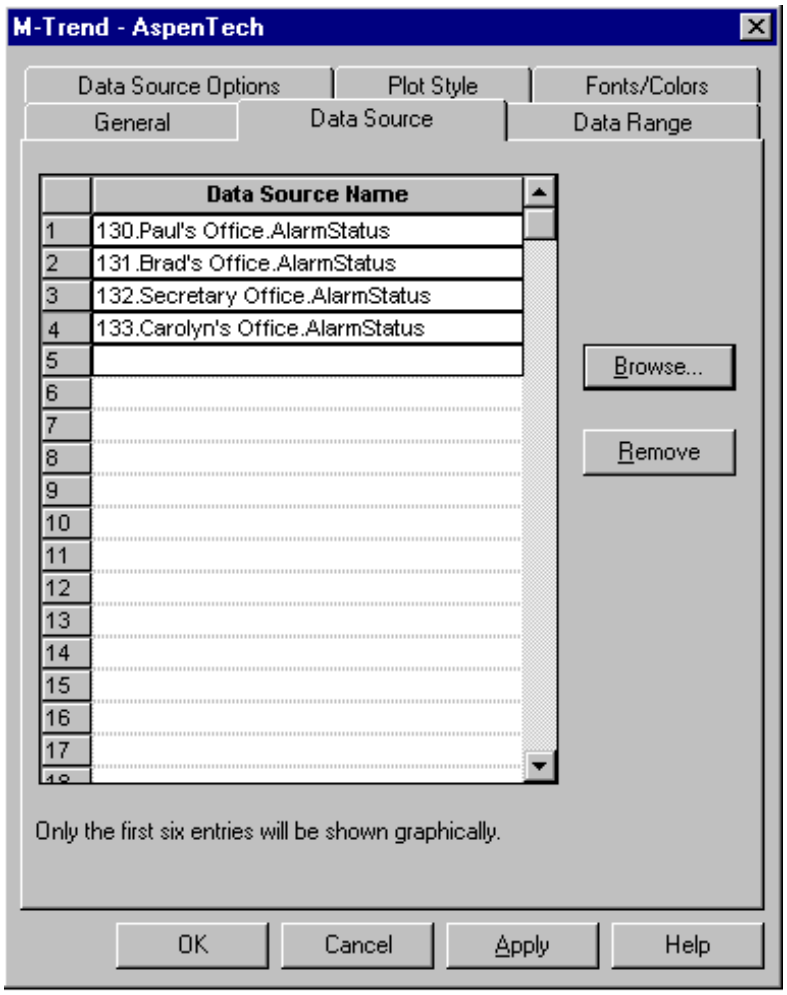

Figure 5-3: M-Trend Definition Dialog Box: Data Source Tab

2. Select the Data Source tab. Figure 5-3 shows a Data Source tab with several Data Source Names.
3. Type the Data Source Name or click the Browse button for a list of available data sources (Figure 5-4).

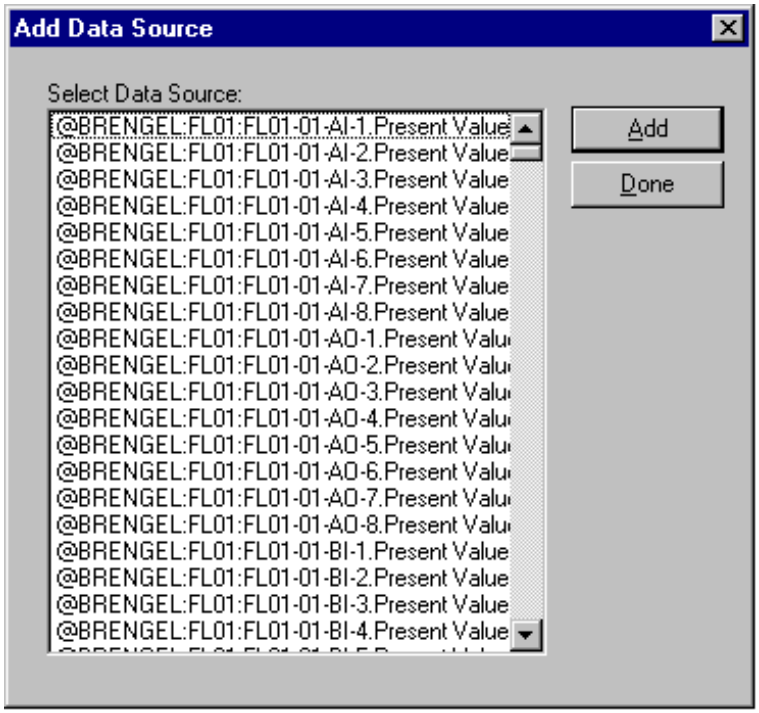

Figure 5-4: Add Data Source Dialog Box

4. Select up to 32 data sources and click Add.
5. Click Done to return to the M-Trend Definition screen (Figure 5-3).

Notes: Only the first six Data Source Names listed in the Data Source tab are shown in the graph. Samples from all 32 Data Sources are displayed in the text view.

Data Source Names that do not appear in a graphical view because they are not in the first six listed on the Data Source tab can be repositioned so they do appear on the graph. Reposition them by selecting and dragging into the top six.

You may select the same data source multiple times by clicking add more than once.

6. Click OK in the M-Trend Definition dialog box.

Removing Data Sources for an M-Trend Document

To remove Data Sources from an M-Trend query:

1. On the Edit menu, select Edit Trend or click the Edit View icon. The M-Trend Definition dialog box appears (Figure 5-2).
2. Select the Data Source tab. Figure 5-3 shows a Data Source tab with several Data Source Names.
3. Select the data source you want removed and click Remove.
4. When finished removing data sources, click OK.

Setting Data Range for an M-Trend Document

To set the Data Range options for an M-Trend document:

1. On the Edit menu, select Edit Trend or click the Edit View icon. The M-Trend Definition dialog box appears.

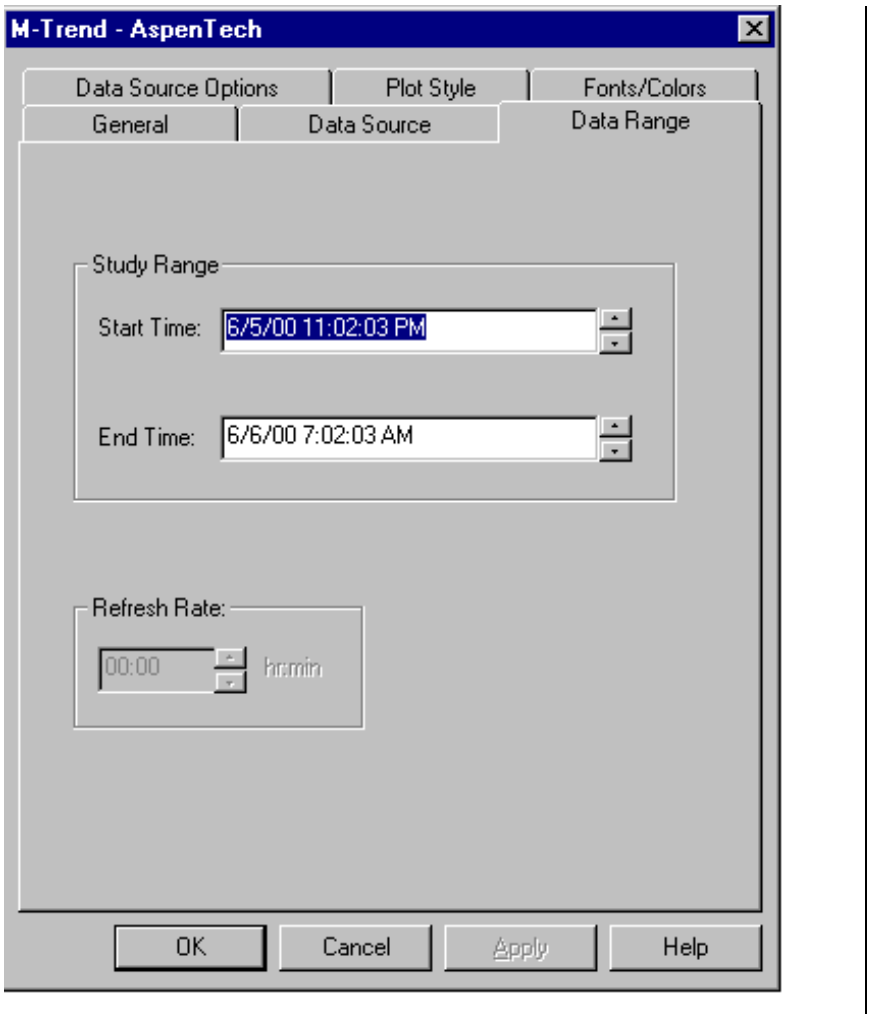

Figure 5-5: M-Trend Definition Dialog Box: Data Range Tab

2. Select the Data Range tab (Figure 5-5).
3. Fill in the fields using actual dates and times or wild cards. See the *Key Concepts* section of this chapter for a discussion of available wild card terms.
4. Set Refresh Rate to set the length of time between database updates to the screen.

Note: This parameter is only enabled when a relative study range is selected using wild cards such as Today or Now. The view changes only if new samples have been added to the database since the last time the query was requested.

5. Click OK.

Setting Data Source Options for an M-Trend Document

To set the Data Source options for an M-Trend document:

1. On the Edit menu, select Edit Trend or click the Edit View icon. The M-Trend Definition dialog box appears.

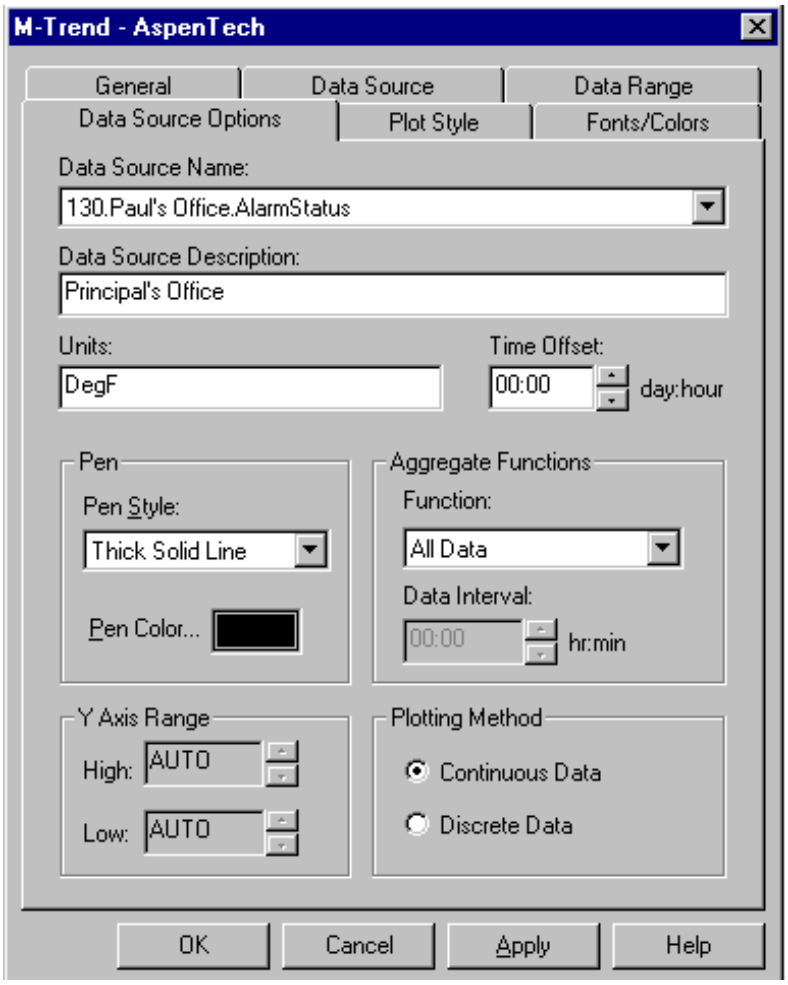

Figure 5-6: M-Trend Definition Dialog Box: Data Source Options Tab

2. Select the Data Source Options tab (Figure 5-6).
3. Fill in the fields using Table 5-3.
4. Click OK.

Table 5-3: Data Source Options Tab

Field	Description
Data Source Name	Drop down box that allows you to select which data source is currently available for editing.
Data Source Description	You may add text to represent the present data source. If text is entered, it replaces the data source name in the graph legend.
Units	Allows you to override the default engineering units. Units specified here are seen in both the graph and grid.
Time Offset	The time value entered for the time offset is subtracted from the current data range and plotted on it. For example, if the offset set to one day, the data from the day before is plotted on today's time range. Note that to compare data from the same data source at different times, the offset version should be given the same name with different capitalization. That is "99.Outside Air" can be compared to an offset "99.outside air" to use the offset capability.
Pen Style	Allows you to set line options such as thickness and solid or dotted.
Pen Color	Specifies color of individual data sources in graph.
Aggregate Functions: Function	All Data - Shows all available data. Average - Returns the average (arithmetic mean) of the values of the selected data sources. Maximum - Returns the largest value in a set of values. Minimum - Returns the smallest number in a set of values. Range - Returns the difference between the Minimum and Maximum values in a set of values. Standard Deviation - Estimates standard deviation based on a sample. Sum – Adds all the numbers in a range of data sources. Variance - Estimates variance based on a sample.
Aggregate Functions: Data Interval	Determines the interval between samples on which the aggregate data is calculated.
Y Axis Range: High	For stacked graphs, allows override of the calculated ranges.
Y Axis Range: Low	For stacked graphs, allows override of the calculated ranges.
Plotting Method: Continuous Data	Assumes a linear change in value between samples and draws a straight line between them.
Plotting Method: Discrete Data	Shows each sample as an event, that is, the value changes abruptly for each new sample, with the value staying constant until the next sample is plotted.

Setting Plot Style for an M-Trend Document

To set the Plot Style for an M-Trend document:

1. On the Edit menu, select Edit Trend or click the Edit View icon. The M-Trend Definition dialog box appears.

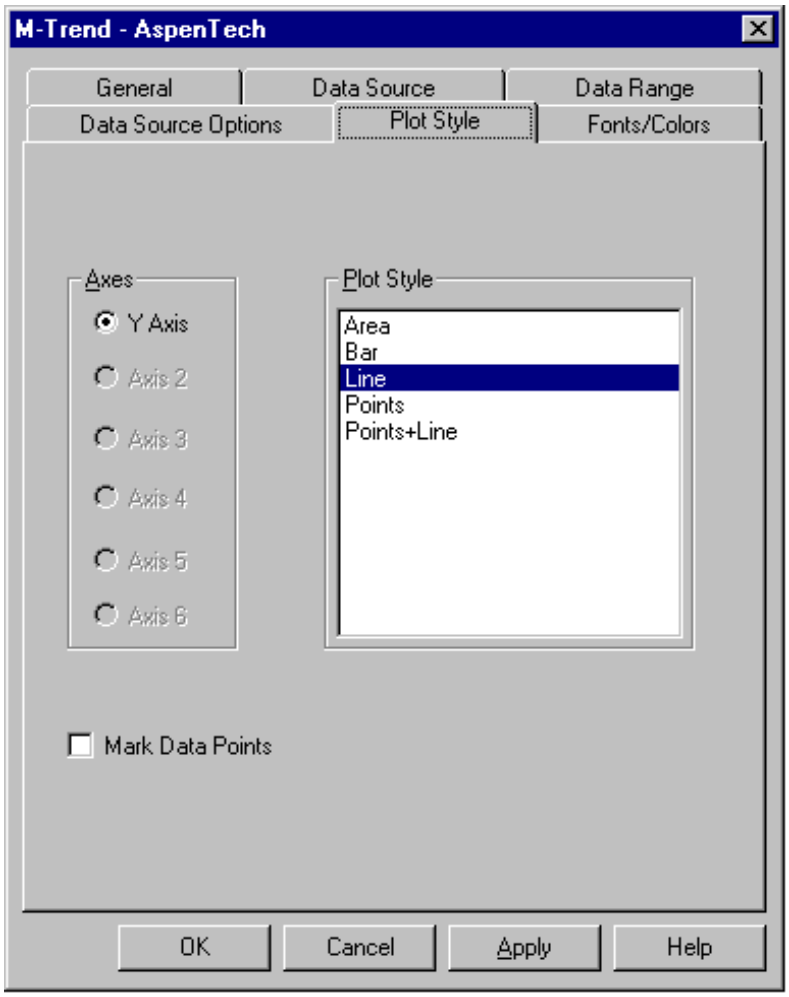

Figure 5-7: M-Trend Definition Dialog Box: Plot Style Tab

2. Select the Plot Style tab (Figure 5-7).
3. Select the Axis and Plot Style you want for the current document.
4. Select Mark Data Points if you would like each data point to be marked with a small dot in Graphic View.
5. Click OK.

Setting Fonts and Colors for an M-Trend Document

To set the fonts and colors for an M-Trend document:

1. On the Edit menu, select Edit Trend or click the Edit View icon. The M-Trend Definition dialog box appears.

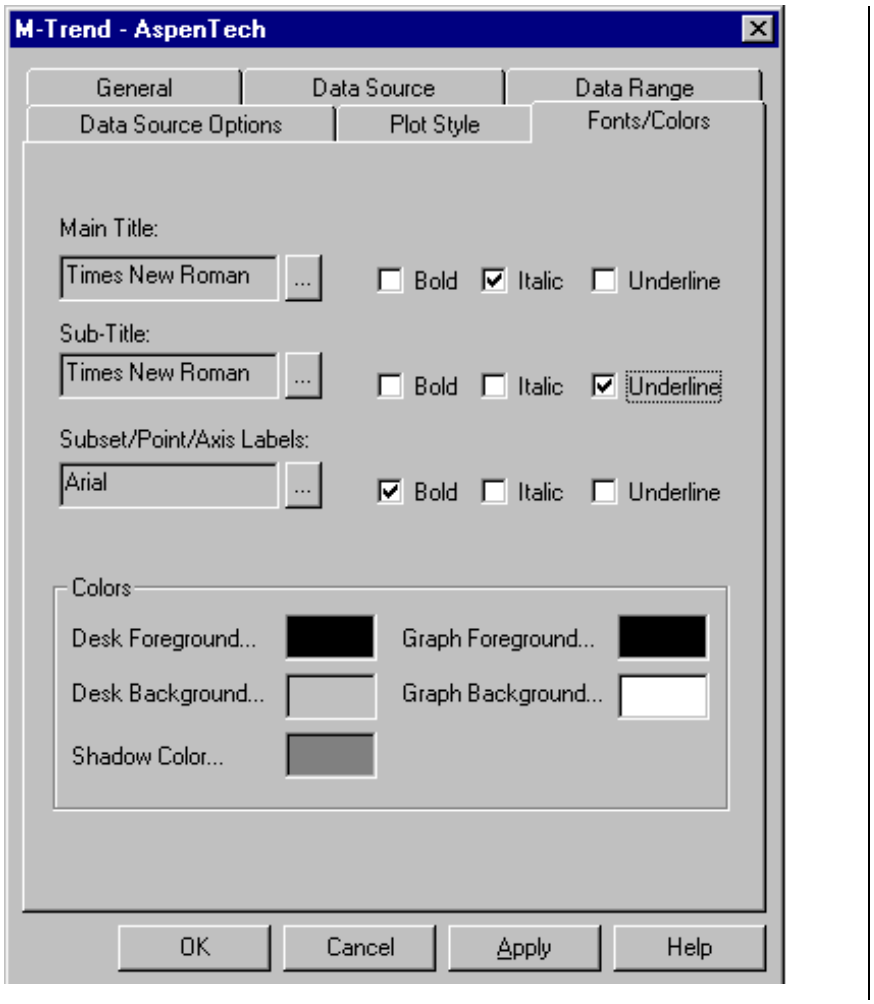

Figure 5-8: M-Trend Definition Dialog Box: Fonts/Colors Tab

2. Select the Fonts/Colors tab (Figure 5-8).
3. Select the fonts you want for the current document. Clicking on the browse button displays a list of available fonts and styles.
4. Select bold, italic, or underline if desired.
5. Click on a colored box in the colors section of the dialog box to open the color palette. Select a new color.
6. Click OK.

Chapter 6

M-Trend ActiveX Control

Introduction

The M-Trend ActiveX control allows you to create M-Trend graphs in ActiveX -compliant programs. Although there is a separate procedure for inserting the ActiveX control, the control object is connected to a database, defined, and edited in the same manner described in the rest of this manual. This chapter describes how to:

- insert the M-Trend ActiveX control in an M-Graphics display
- navigate to the M-Trend menus in an M-Trend ActiveX control in an M-Graphics display
- save M-Trend parameters in an M-Graphics document

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Key Concepts

ActiveX

A loosely defined set of technologies developed by Microsoft. ActiveX is an outgrowth of two other Microsoft technologies called OLE (Object Linking and Embedding) and COM (Component Object Model). ActiveX applies to a whole set of COM-based technologies. ActiveX is not a programming language, but rather a set of rules for how applications should share information.

ActiveX Controls

ActiveX controls represent a specific way of implementing ActiveX technologies. They can be used to provide limited functionality of an application, such as M-Trend, without having to have the entire program downloaded to a machine.

M-Trend ActiveX Control

An ActiveX control that allows the display of M-Trend graphs in M-Graphics displays, or in other ActiveX-compliant applications such as Internet Explorer 4. Using the M-Trend ActiveX control, a user can put multiple M-Trend graphs into an M-Graphics display.

Note: The M-Trend ActiveX Control does **not** allow you to view M-Trend documents (.htv files) in other applications.

When an M-Trend ActiveX control is created in an M-Graphics display, the information for the M-Trend graph is saved in the M-Graphics document. Therefore, instead of having a separate .htv file for the M-Trend information, the M-Trend information is accessed when the M-graphics document (.gdf file) is opened.

M-Graphics

An OPC (OLE for Process Controls) graphics package from Johnson Controls. Allows the user to create dynamic, animated graphics to represent the controls processes in a facility.

Expanded Right-click Menu in an M-Trend ActiveX Control

When an M-Trend ActiveX control is inserted in an ActiveX compliant application, some of the menu options that are present in the M-Trend program menu bar are accessed through an expanded right-click menu (Figure 6-1). See Table 6-1 for a description of the options.

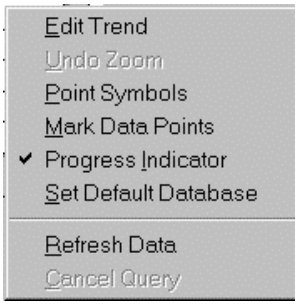

Figure 6-1: M-Trend ActiveX Control: Expanded Right-click Options

Table 6-1 describes the expanded right-click menu options used in the M-Trend ActiveX Control.

Table 6-1: M-Trend ActiveX Control: Expanded Right-click Options

Menu Selection	Description
Edit Trend	Opens the M-Trend Definition dialog box.
Undo Zoom	If the current view has any zoom factor, this command returns it to normal view.
Point Symbols	When View Graph is checked, this command adds unique symbols to each trended data point on the graph. Not available in Text View.
Mark Data Points	When View Graph is checked, this command marks each data point on the graph with a small point. Not available in Text View.
Progress Indicator	When checked, provides a visual indication of percentage completed when querying data.
Set Default Database	Determines or changes the Historian database connection.
Refresh Data	Starts or restarts the current query.
Cancel Query	Cancels any query in progress.

Procedure Overview

Table 6-2: M-Trend ActiveX Control

To Do This	Follow These Steps:
Insert an M-Trend ActiveX Control in an M-Graphics Display	On the M-Graphics Edit menu, select Insert New Object. The Insert Object dialog box appears. Choose Create Control. Scroll to and select Johnson Controls M-Trend Control. Select OK.
Navigate to the M-Trend Menus in an M-Trend ActiveX Control in an M-Graphics Display	**Accessing the M-Trend Definition Dialog box:** With M-Graphics in Configure mode, right-click the M-Trend ActiveX control. From the Johnson Controls M-Trend Control Object menu, select Properties. **Accessing the expanded right-click menu for M-Trend ActiveX controls:** With M-Graphics in Configure mode, right-click the M-Trend ActiveX control. From the Johnson Controls M-Trend Control Object menu, select Edit. A black line appears around the M-Trend ActiveX control. Right-click the M-Trend ActiveX control again to see the expanded right-click menu. With M-Graphics in Runtime mode, right-click the M-Trend ActiveX control.
Save M-Trend Parameters in an M-Graphics Document	After inserting the M-Trend ActiveX control, setting a database connection, and defining the M-Trend graph in an M-Graphics document, choose Save or Save As from the File menu. M-Graphics must be in Configure mode to access these menu selections.

Detailed Procedures

Inserting an M-Trend ActiveX Control in an M-Graphics Display

To insert an M-Trend ActiveX control into M-Graphics display:

1. On the Edit menu, select Insert New Object. The Insert Object dialog box appears (Figure 6-2).
2. Choose Create Control on the Insert Object dialog box.
3. Scroll to and select Johnson Controls M-Trend Control.

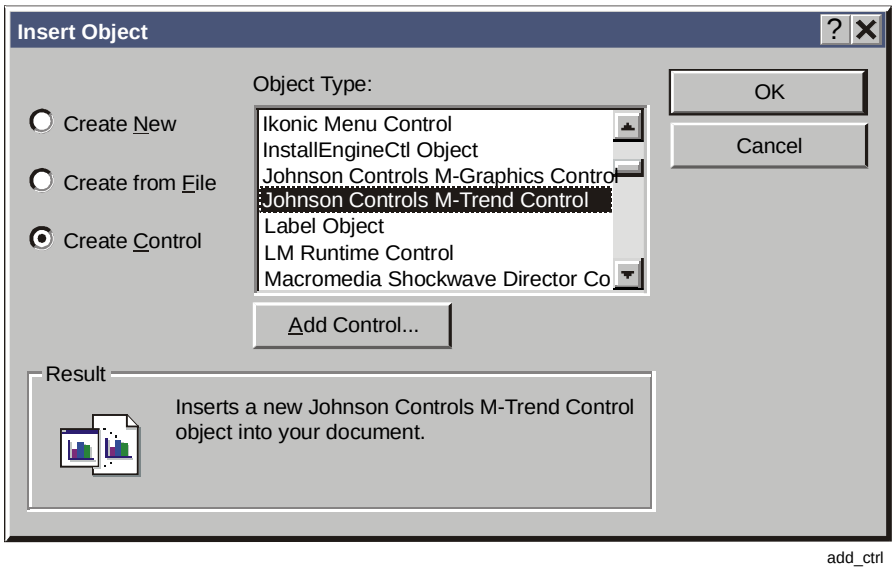

Figure 6-2: Insert Object Dialog Box

4. Click OK.

Navigating to M-Trend Menus in an M-Trend ActiveX Control in an M-Graphics Display

An M-Trend ActiveX Control in an M-Graphics display is connected to a database, defined, and edited in the same manner as described in the rest of this document. However, there are some differences in how you get to the menus and screens. Since there is no edit menu for M-Trend within M-Graphics, the default database connection is set through an expanded right-click menu.

Accessing the M-Trend Definition Dialog Box

1. With M-Graphics in Configure mode, right-click the M-Trend ActiveX control. A list of options appears (Figure 6-3).

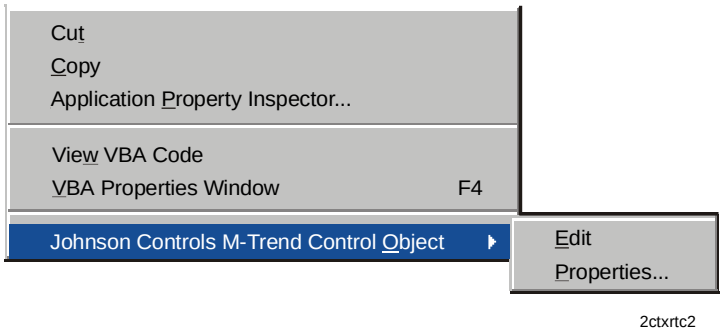

Figure 6-3: Right-click Menu for an Unselected M-Trend ActiveX Control in an M-Graphics Display

2. Select Properties (Figure 6-3) from the Johnson Controls M-Trend Control Object menu. The M-Trend Definition screen appears allowing you to define the M-Trend graph as described in *Defining M-Trend Documents* in this manual.

Accessing the Expanded Right-click Menu for M-Trend ActiveX Controls

1. With M-Graphics in Configure mode, right-click the M-Trend ActiveX control. A list of options appears (Figure 6-3).
2. Select Edit (Figure 6-3) from the Johnson Controls M-Trend Control Object menu. A black line appears around the M-Trend ActiveX Control object.
3. Right-click with the cursor over the M-Trend ActiveX control. The M-Trend ActiveX control's right-click menu appears (Figure 6-4).

Note: The right-click menu in the M-Trend ActiveX control is an expanded set of the right-click menu when running the full M-Trend application. This is to allow the setting of necessary parameters that would be accessed through the main menu bar in the full M-Trend application.

4. See Chapters 3 through 5 in this manual for details on setting M-Trend options.

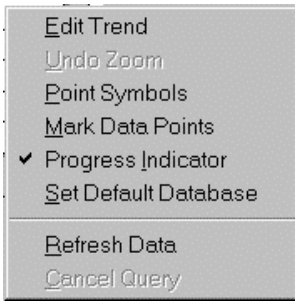

Figure 6-4: M-Trend ActiveX Control: Expanded Right-click Options

Saving M-Trend Parameters in an M-Graphics Document

To save M-Trend parameters in an M-Graphics document:

1. Insert, set the database connection, and define the M-Trend graph as described in this manual.
2. With M-Graphics in Configure mode, select save or save as from the file menu.
3. Name your M-Graphics document and select OK. The parameters of your M-Trend graph are saved within the M-Graphics document.

Appendix A

Adding Database Connections

Introduction

This appendix contains information about adding connections to databases created after the initial installation. You add connections to a database when you do not want to use the default. This chapter describes how to:

- add new connections to a Microsoft Access Historian database
- add new connections to a AspenTech Historian database

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Key Concepts

ODBC

Open Database Connectivity (ODBC) provides an interface to allow M-Trend to make a standard set of requests for data regardless of the actual database package used. For example, historical data could be stored in the format used by Microsoft Access or by AspenTech. Using ODBC, M-Trend can view data stored in these databases, even though it has no knowledge of Access or AspenTech database formats.

Each database used by M-Trend must be registered as an ODBC data source provider through the ODBC Administrator. Each ODBC compliant database package used by M-Trend must include software to register itself as an ODBC driver on the client PC.

To view, add, or remove Data Source Names (DSN) select the New button from the M-Trend Database Connection dialog box.

M-Historian Database

Database where Trend data samples are archived. It can be saved in a site subdirectory.

Data Source Name (DSN)

A DSN file is used to define a connection to an archived database for M-Trend to access. When defining an ODBC data source for M-Trend, you are naming a link, or map, to the M-Historian database.

There are three types of DSN in the ODBC administrator: User, System, and File. When using Windows NT databases such as AspenTech, you generally use a System DSN.

User data sources can only be used on the current machine. System data sources are visible to all users, including NT Services.

DSN File Definition

Defining a DSN is the process of defining an open connection to allow third-party programs that are ODBC compliant (such as Microsoft Excel) to view data from a database of archived Trend samples.

Data Source Connection

Connecting to a Data Source refers to selecting the DSN, which points M-Trend to the database for the site you are viewing. A saved .htv file automatically reconnects to the defined DSN when opened.

Procedure Overview

Table A-1: Connecting M-Trend to a Database

To Do This	Follow These Steps:
Add New Connections to a Microsoft Access Historian Database	From the M-Trend Edit menu, click on Set Default Connection. Click New. On the ODBC Data Source Administrator, choose the User tab. Click Add. Select a database driver for your data source. Click Finish. Enter a name and description for the data source connection you are defining. Click Select. Browse to, and select, the desired database. Click OK. Click OK again.
Add New Connections to an AspenTech M-Historian Database	From the M-Trend Edit menu, click on Set Default Connection. Click New. On the ODBC Data Source Administrator, choose the System tab. Click Add. Select a database driver for your data source. Click Finish. Enter a name and description for the data source connection you are defining. Click Select. Browse to, and select, the desired database. Click OK. Click OK again.

Detailed Procedures

Adding New Connections to a Microsoft Access Historian Database

To define a connection to a Microsoft Access Historian database:

Note: For a remote Access database on another platform or a local Access base that did not use installed defaults.

1. From the M-Trend Edit menu, click on Set Default Connection. The M-Trend Database Connection Dialog box appears (Figure 4-1).
2. Click New… The ODBC Data Source Administrator dialog box appears (Figure A-1).

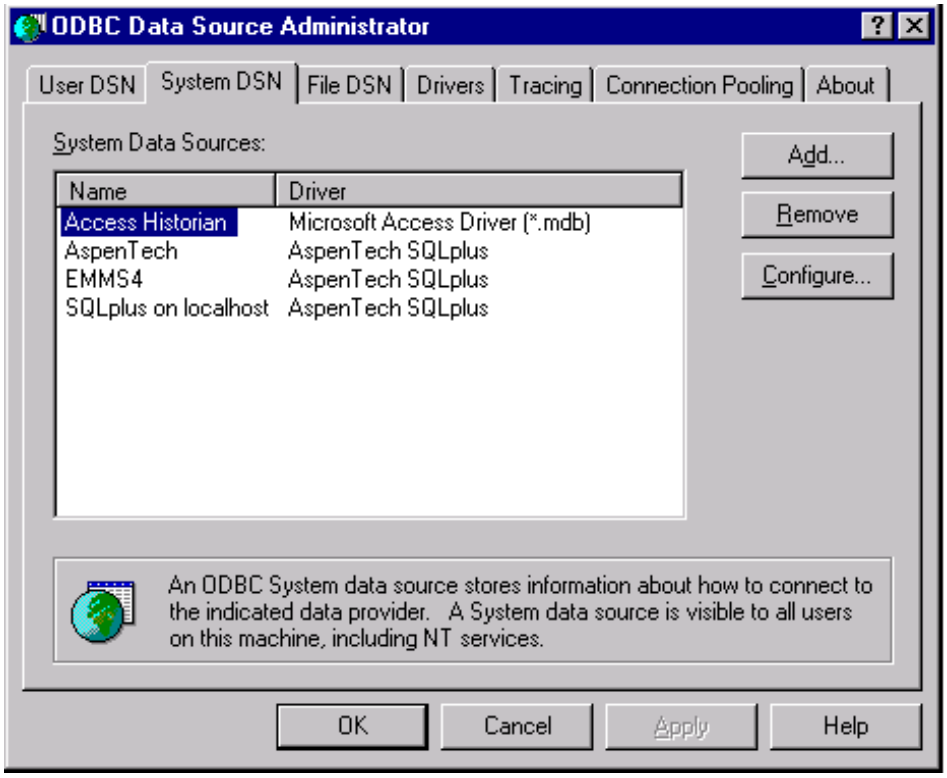

Figure A-1: ODBC Data Source Administrator Dialog Box - System DSN Tab Selected

3. Click Add. The Create New Data Source dialog box appears (Figure A-2).

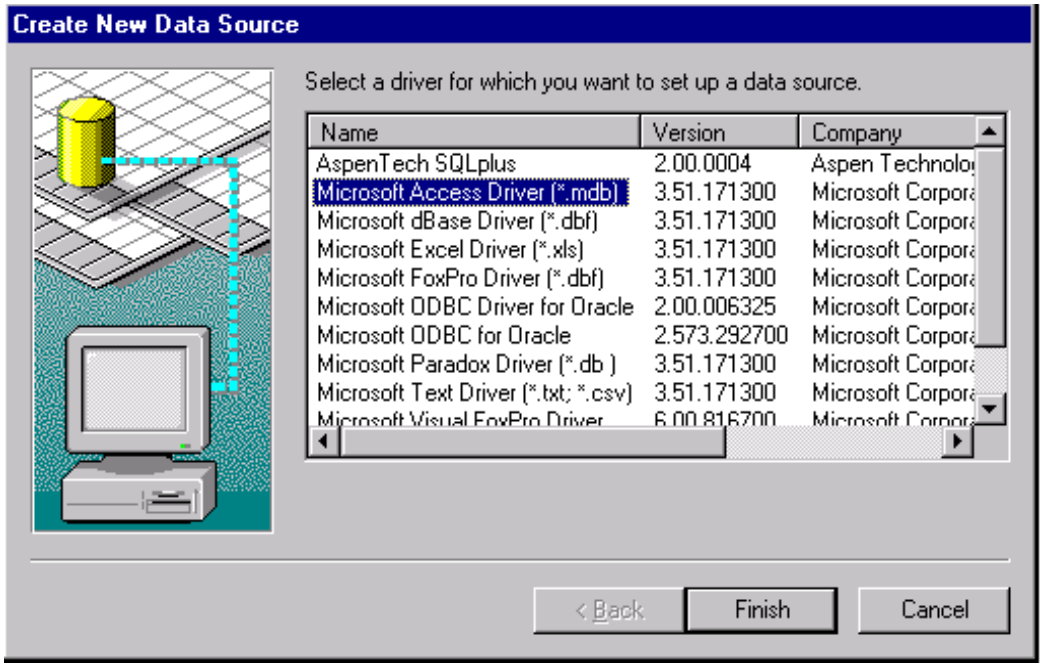

Figure A-2: Create New Data Source Dialog Box

4. Select the driver for the data source you are defining a connection for and click Finish. The ODBC Setup screen for the driver you select appears.

Note: Choose Microsoft Access Driver if using Access Historian.

Figure A-3 shows the ODBC Microsoft Access 97 Setup screen when choosing a Microsoft Access Driver.

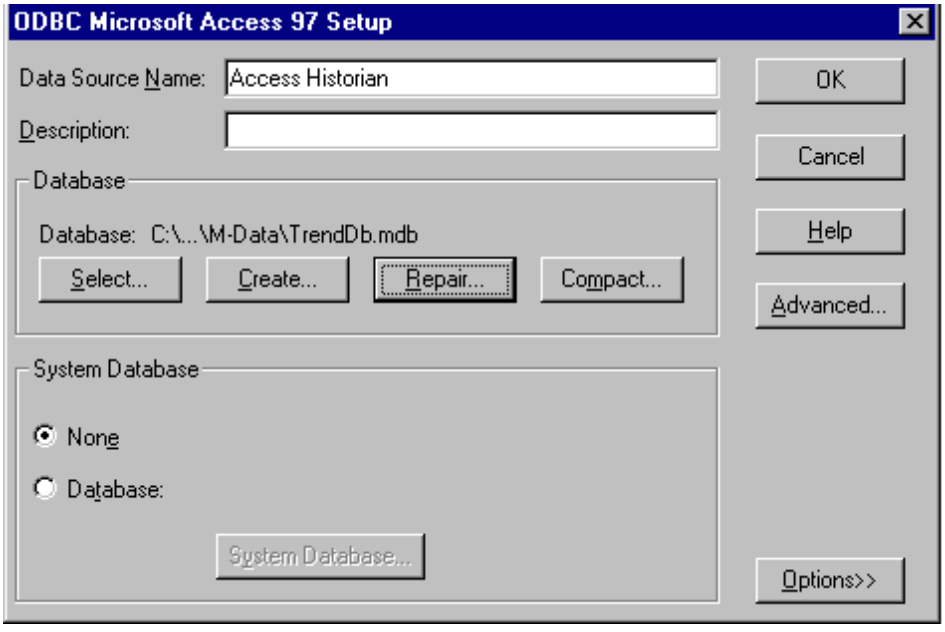

Figure A-3: Microsoft Access 97 ODBC Driver Setup Screen

5. In the appropriate boxes, enter a Name and Description for the data source you are defining. The name you give your data source is the name that appears in the M-Trend Database Connection Dialog screen (Figure 4-1). This occurs when you click on Set Default Connection in the Edit menu after a connection is defined.
6. Under the Database section of the ODBC Setup screen (Figure A-3), click on Select… The Select Database screen appears (Figure A-4).

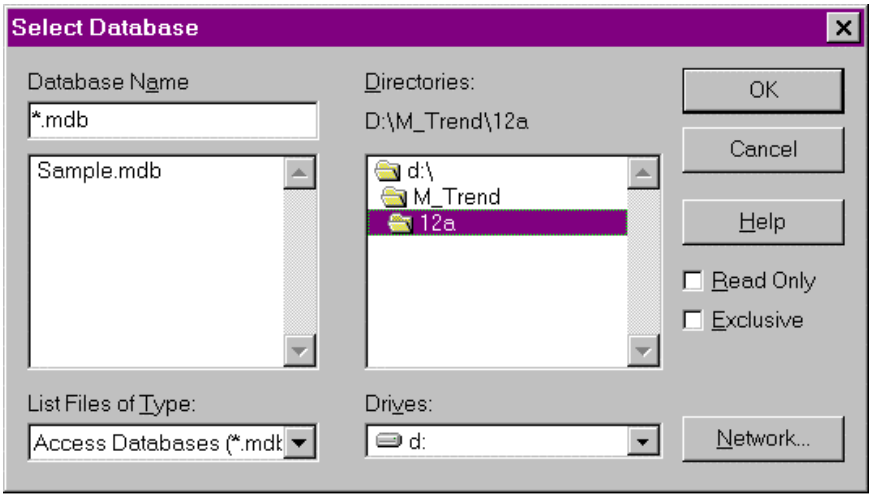

Figure A-4: Select Database Screen

7. Browse to and select a data source, then click OK. The ODBC Setup screen reappears (Figure A-3).
8. Click OK. The ODBC Data Source Administrator dialog box reappears (Figure A-1). The Database connection you just defined should be one of the user data sources listed.
9. Click OK. The M-Trend database Connection Dialog screen reappears (Figure 4-1) with the database connection you just defined added to it.
10. Select the defined database connection you wish to connect M-Trend to, and click OK.
11. Answer Yes or No if you want this to be your default data connection.

Note: Connecting to a Machine Data Source does not cause Trend data to appear on your screen. To view Trend data, you must define the portion of the database you wish to view. This is done by selecting data sources from within your database and defining time ranges to view. For further information, see the *Defining M-Trend Documents* chapter in this manual.

Adding New Connections to an AspenTech M-Historian Database

To define a connection to an AspenTech M-Historian database:

Note: For an AspenTech database that did not use the install defaults. Client already installed.

1. From the M-Trend Edit menu, click on Set Default Connection. The M-Trend database Connection Dialog box appears (Figure 4-1).
2. Click New… The ODBC Data Source Administrator dialog box appears.
3. Select the System DSN tab. Figure A-5 shows the ODBC Data Source Administrator (with the System DSN tab selected).

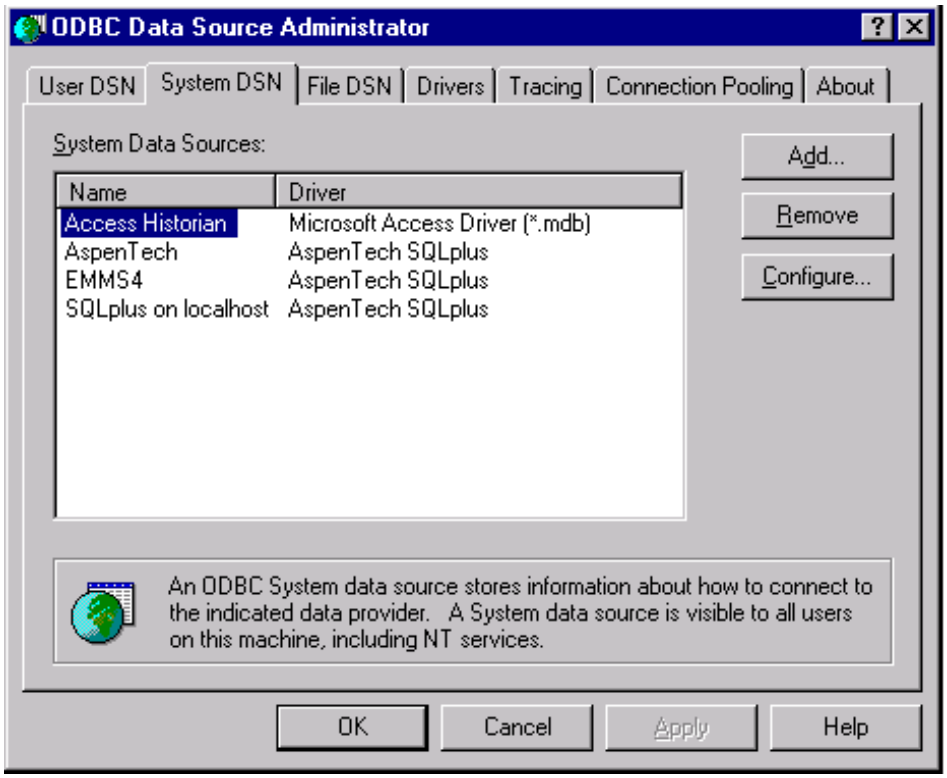

Figure A-5: ODBC Data Source Administrator Dialog Box - System DSN Tab Selected

4. Click Add. The Create New Data Source dialog box appears (Figure A-6).

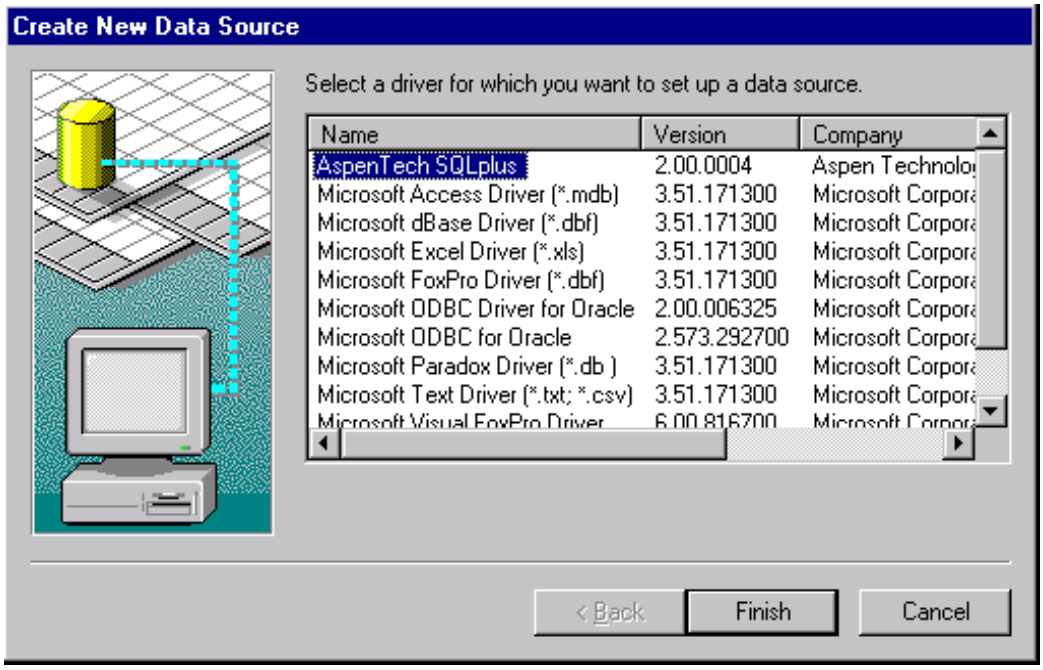

Figure A-6: Create New Data Source Dialog Box

5. Select the driver for the data source you are defining a connection for and click Finish. The ODBC Setup screen for the driver you select appears. Figure A-7 shows the SQLplus Setup screen that appears when an AspenTech driver is selected.

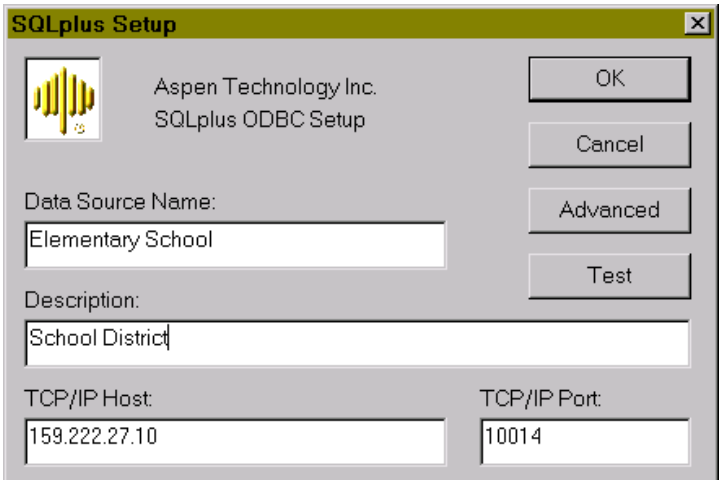

Figure A-7: SQLplus ODBC Setup Screen for AspenTech M-Historian Database

6. In the appropriate boxes, enter a Name and Description for the data source you are defining. This is the name that appears in the M-Trend database Connection Dialog screen (Figure 4-1).

Note: You must define the TCP/IP Host and Port.

7. (This step is for Advanced users only; all others go to Step 9.) Click Advanced. The SQLplus Advanced Setup screen appears (Figure A-8).

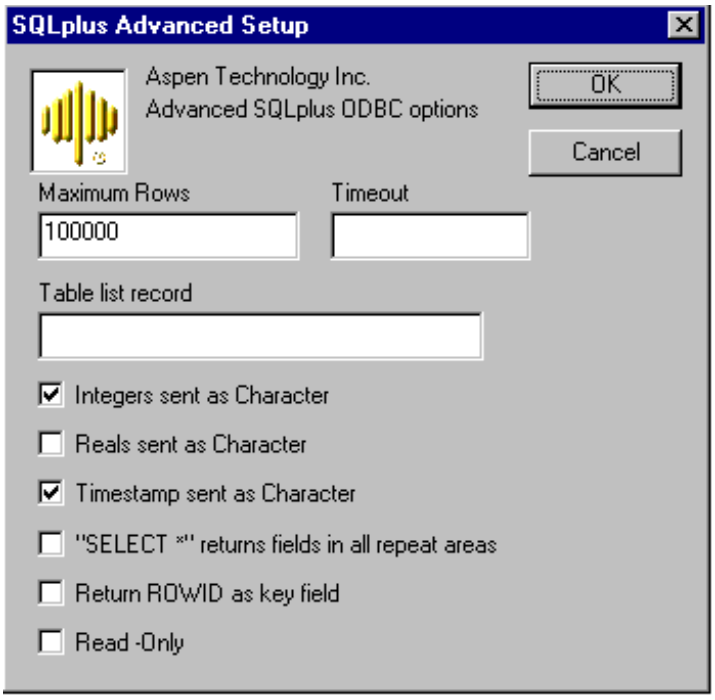

Figure A-8: SQLplus Advanced Setup

8. Fill in the fields according to Table A-2 and click OK. The SQLplus ODBC Setup screen reappears (Figure A-7).

Table A-2: SQLplus Advanced Setup Fields

Field	Description
Maximum Rows	Maximum number of rows that is returned when a query is run.
Timeout	Maximum amount of time that the driver allows a query to continue before it aborts.
Table list record	If blank, allows access to all tables. When a list is entered, allows access to only the tables that appear in the list.
Integers sent as Character	Allows integer data to be returned either by integer value or by character strings.
Reals sent as Character	Allows Reals to be returned as either floating point values or character strings.
Timestamp sent as Character	Allows timestamps to be returned as either double precision values or character strings. **Do not check** this box if using a different time format than U.S. standard.
"SELECT" returns fields in all repeat areas	Controls the way the SELECT statement returns fields.
Return ROWID as key field	Returns AspenTech ROWID field with the query.
Read-Only	Sets the current connection to the database as read only. No writing permitted. Not applicable to M-Trend.

9. Click OK. The ODBC Data Source Administrator dialog box reappears (Figure A-5).

Note: The database connection you just defined should be one of the system data sources listed.

10. Click OK. The M-Trend Database Connection Dialog screen reappears (Figure 4-1) with the database connection you just defined added to it.

11. Select the defined database connection you wish to connect M-Trend to, and click OK.

12. Answer Yes or No if you want this to be your default data connection.

Note: Connecting to an ODBC Data Source does not cause Trend data to appear on your screen. To view Trend data, you must define the portion of the database you wish to view. This is done by selecting data sources from within your database and defining time ranges to view. For further information, see the *Defining M-Trend Documents* chapter in this manual.