DIAdem™

Getting Started with DIAdem

July 2011
373422K-01

NATIONAL INSTRUMENTS™

Worldwide Technical Support and Product Information

ni.com

Worldwide Offices

Visit ni.com/niglobal to access the branch office Web sites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.

National Instruments Corporate Headquarters

11500 North Mopac Expressway Austin, Texas 78759-3504 USA Tel: 512 683 0100

For further support information, refer to the *Technical Support and Professional Services* appendix. To comment on National Instruments documentation, refer to the National Instruments Web site at ni.com/info and enter the Info Code feedback.

Important Information

Warranty

The media on which you receive National Instruments software are warranted not to fail to execute programming instructions, due to defects in materials and workmanship, for a period of 90 days from date of shipment, as evidenced by receipts or other documentation. National Instruments will, at its option, repair or replace software media that do not execute programming instructions if National Instruments receives notice of such defects during the warranty period. National Instruments does not warrant that the operation of the software shall be uninterrupted or error free.

A Return Material Authorization (RMA) number must be obtained from the factory and clearly marked on the outside of the package before any equipment will be accepted for warranty work. National Instruments will pay the shipping costs of returning to the owner parts which are covered by warranty.

National Instruments believes that the information in this document is accurate. The document has been carefully reviewed for technical accuracy. In the event that technical or typographical errors exist, National Instruments reserves the right to make changes to subsequent editions of this document without prior notice to holders of this edition. The reader should consult National Instruments if errors are suspected. In no event shall National Instruments be liable for any damages arising out of or related to this document or the information contained in it.

EXCEPT AS SPECIFIED HEREIN, NATIONAL INSTRUMENTS MAKES NO WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. CUSTOMER'S RIGHT TO RECOVER DAMAGES CAUSED BY FAULT OR NEGLIGENCE ON THE PART OF NATIONAL INSTRUMENTS SHALL BE LIMITED TO THE AMOUNT THERETOFORE PAID BY THE CUSTOMER. NATIONAL INSTRUMENTS WILL NOT BE LIABLE FOR DAMAGES RESULTING FROM LOSS OF DATA, PROFITS, USE OF PRODUCTS, OR INCIDENTAL OR CONSEQUENTIAL DAMAGES, EVEN IF ADVISED OF THE POSSIBILITY THEREOF. This limitation of the liability of National Instruments will apply regardless of the form of action, whether in contract or tort, including negligence. Any action against National Instruments must be brought within one year after the cause of action accrues. National Instruments shall not be liable for any delay in performance due to causes beyond its reasonable control. The warranty provided herein does not cover damages, defects, malfunctions, or service failures caused by owner's failure to follow the National Instruments installation, operation, or maintenance instructions; owner's modification of the product; owner's abuse, misuse, or negligent acts; and power failure or surges, fire, flood, accident, actions of third parties, or other events outside reasonable control.

Copyright

For copyright notices, conditions, and disclaimers, including information regarding certain third-party components used in DataFinder Server Edition refer to the *Copyright* appendix.

Trademarks

LabVIEW, National Instruments, NI, ni.com, the National Instruments corporate logo, the Eagle logo, and DIAdem are trademarks of National Instruments Corporation. Refer to the *Trademark Information* at `ni.com/trademarks` for other National Instruments trademarks.

Other product and company names mentioned herein are trademarks or trade names of their respective companies.

Members of the National Instruments Alliance Partner Program are business entities independent from National Instruments and have no agency, partnership, or joint-venture relationship with National Instruments.

Patents

For patents covering National Instruments products/technology, refer to the appropriate location: **Help»Patents** in your software, the `patents.txt` file on your media, or the *National Instruments Patent Notice* at `ni.com/patents`.

Export Compliance Information

Refer to the *Export Compliance Information* at `ni.com/legal/export-compliance` for the National Instruments global trade compliance policy and how to obtain relevant HTS codes, ECCNs, and other import/export data.

WARNING REGARDING USE OF NATIONAL INSTRUMENTS PRODUCTS

(1) NATIONAL INSTRUMENTS PRODUCTS ARE NOT DESIGNED WITH COMPONENTS AND TESTING FOR A LEVEL OF RELIABILITY SUITABLE FOR USE IN OR IN CONNECTION WITH SURGICAL IMPLANTS OR AS CRITICAL COMPONENTS IN ANY LIFE SUPPORT SYSTEMS WHOSE FAILURE TO PERFORM CAN REASONABLY BE EXPECTED TO CAUSE SIGNIFICANT INJURY TO A HUMAN.

(2) IN ANY APPLICATION, INCLUDING THE ABOVE, RELIABILITY OF OPERATION OF THE SOFTWARE PRODUCTS CAN BE IMPAIRED BY ADVERSE FACTORS, INCLUDING BUT NOT LIMITED TO FLUCTUATIONS IN ELECTRICAL POWER SUPPLY, COMPUTER HARDWARE MALFUNCTIONS, COMPUTER OPERATING SYSTEM SOFTWARE FITNESS, FITNESS OF COMPILERS AND DEVELOPMENT SOFTWARE USED TO DEVELOP AN APPLICATION, INSTALLATION ERRORS, SOFTWARE AND HARDWARE COMPATIBILITY PROBLEMS, MALFUNCTIONS OR FAILURES OF ELECTRONIC MONITORING OR CONTROL DEVICES, TRANSIENT FAILURES OF ELECTRONIC SYSTEMS (HARDWARE AND/OR SOFTWARE), UNANTICIPATED USES OR MISUSES, OR ERRORS ON THE PART OF THE USER OR APPLICATIONS DESIGNER (ADVERSE FACTORS SUCH AS THESE ARE HEREAFTER COLLECTIVELY TERMED "SYSTEM FAILURES"). ANY APPLICATION WHERE A SYSTEM FAILURE WOULD CREATE A RISK OF HARM TO PROPERTY OR PERSONS (INCLUDING THE RISK OF BODILY INJURY AND DEATH) SHOULD NOT BE RELIANT SOLELY UPON ONE FORM OF ELECTRONIC SYSTEM DUE TO THE RISK OF SYSTEM FAILURE. TO AVOID DAMAGE, INJURY, OR DEATH, THE USER OR APPLICATION DESIGNER MUST TAKE REASONABLY PRUDENT STEPS TO PROTECT AGAINST SYSTEM FAILURES, INCLUDING BUT NOT LIMITED TO BACK-UP OR SHUT DOWN MECHANISMS. BECAUSE EACH END-USER SYSTEM IS CUSTOMIZED AND DIFFERS FROM NATIONAL INSTRUMENTS' TESTING PLATFORMS AND BECAUSE A USER OR APPLICATION DESIGNER MAY USE NATIONAL INSTRUMENTS PRODUCTS IN COMBINATION WITH OTHER PRODUCTS IN A MANNER NOT EVALUATED OR CONTEMPLATED BY NATIONAL INSTRUMENTS, THE USER OR APPLICATION DESIGNER IS ULTIMATELY RESPONSIBLE FOR VERIFYING AND VALIDATING THE SUITABILITY OF NATIONAL INSTRUMENTS PRODUCTS WHENEVER NATIONAL INSTRUMENTS PRODUCTS ARE INCORPORATED IN A SYSTEM OR APPLICATION, INCLUDING, WITHOUT LIMITATION, THE APPROPRIATE DESIGN, PROCESS AND SAFETY LEVEL OF SUCH SYSTEM OR APPLICATION.

Contents

About This Manual

You can use this manual to familiarize yourself with DIAdem features and how to use them. Each chapter describes a DIAdem panel.

This manual contains exercises for finding, analyzing, and presenting data, and for automating functions to process your data. The exercises do not take long, and they make it easier for you to get started with DIAdem. Each chapter concludes with a summary of the main points.

Conventions

The following conventions are used in this manual:

<>	Angle brackets indicate a key you press to perform a function, for example, <Ctrl> for the control key.
»	The » symbol leads you through nested menu items and dialog box options to a goal. The settings **Help»Examples** instruct you to open the **Help** menu and select the menu item **Examples**.
	This icon denotes a tip, which alerts you to advisory information.
	This icon denotes a note, which alerts you to important information.
bold	Bold text denotes items that you must select or click in DIAdem, such as menu items and dialog box options. Parameters are also in bold type.
italic	Italic text denotes variables, emphasis, cross-references, or an introduction to important concepts.
`monospace`	Text in this font denotes text or characters that you should enter from the keyboard, such as sections of code, programming examples, and syntax examples. This font is also used for the proper names of disk drives, paths, folders, programs, subprograms, subroutines, device names, functions, operations, commands, variables, controls, events, methods, filenames and extensions, and code excerpts.
`monospace bold`	Bold text in this font denotes the messages and responses that the computer automatically outputs to the screen.

Related Documentation

For more information on DIAdem, refer to the following documentation:

- *DIAdem: Data Mining, Analysis, and Report Generation*

  This DIAdem manual describes the structure of DIAdem and how you use DIAdem to find data, to execute analyses, to create reports, and to combine all the functions in scripts.

- *DIAdem: Data Acquisition and Visualization*

  This DIAdem manual describes how to use DIAdem to acquire data, to control sequences, to operate plants, and to visualize processes.

- *DIAdem Help*, which you open via **Help»Contents**, or <F1>.

  The DIAdem help offers you procedures and dialog box help for each panel, as well as references to object oriented interfaces, to functions, to commands, and variables for programmers.

- *DataFinder Server Edition: Search Engine for Technical Data*

  This manual describes how you use the DataFinder server to index data files in networks. Users connect DIAdem with a DataFinder server to search for the indexed data.

1

Introduction to DIAdem

DIAdem is the interactive National Instruments software for finding and managing technical data, for mathematically and graphically-interactively analyzing data, and for presenting data in reports. In a uniform environment, DIAdem offers a unique combination of tools that are tailored to the requirements of technicians, engineers, and scientists. You can adjust all the tools to your tasks and automate them in scripts which drastically reduce the evaluation time.

The DIAdem DataFinder enables you to find test data quickly and intuitively, and to identify correlations within the data. To use the DataFinder you do not require a database or support from the IT-department because the DataFinder is ready for use directly after installation.

Working with DIAdem

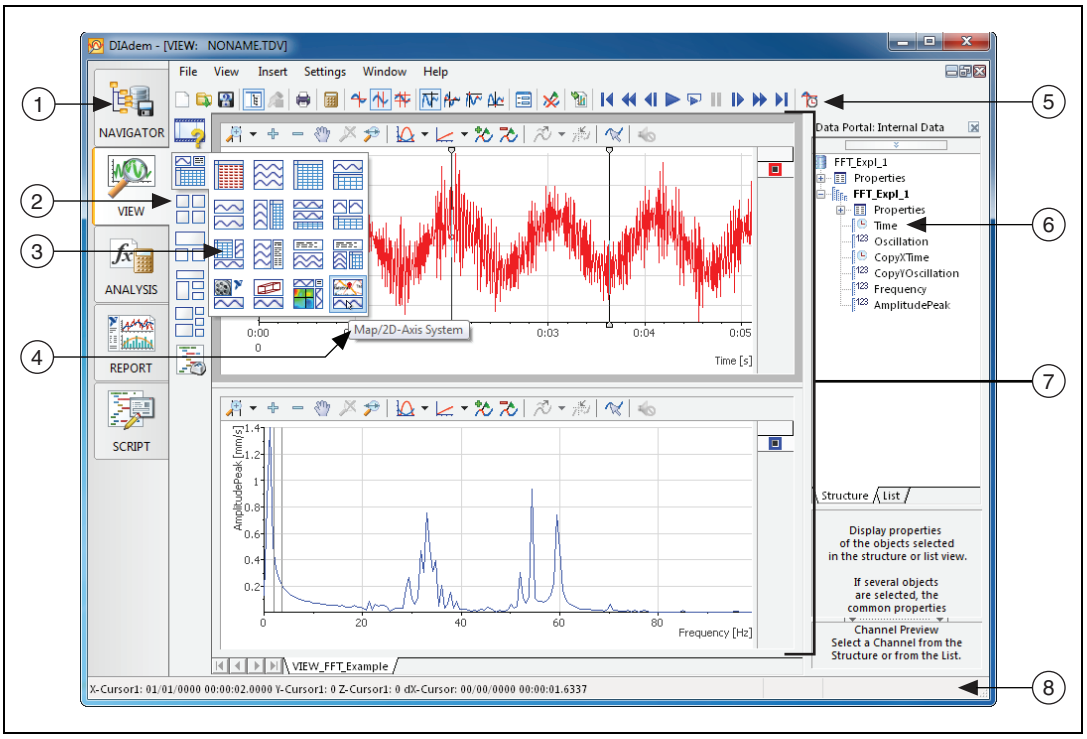
DIAdem groups related functions in panels. Use the panel bar that is on the left of the DIAdem screen to switch panels. Each panel provides all the tools for one of the following tasks:

- Use DIAdem NAVIGATOR to find, to load, and to manage data. Use the DataFinder to search for data on your computer and in the network, and to navigate through the found data files and databases. You load the data into the Data Portal so that all DIAdem panels can work with the data, which is organized in channels.
- Use DIAdem VIEW to view, to analyze, and to edit data as curves in axis systems. In channel tables you can edit and delete the data as values and enter new data. You synchronize videos or the map display of a test drive with data. You project data onto 3D models or map 3D data in two-dimensional contour areas.
- Use DIAdem ANALYSIS to analyze data mathematically. You can apply predefined standard mathematical functions, including basic mathematics, curve fitting, signal analysis, and statistics. The dialog boxes for these standard functions guide you through the calculation so

you do not have to enter a formula. You select the input data and the settings. Use the DIAdem Calculator to define and calculate your own formulas.

- Use DIAdem REPORT to document data and present results. In 2D and 3D axis systems you display your data as curves, as bar diagrams, and as surfaces. In 2D and 3D tables you list channel contents. You can label your report with comments and text and illustrate the report with graphics and formulas.
- Use DIAdem SCRIPT to automate tasks in a script, which combines several work steps for recurring sequences such as standard calculations and serial evaluations. Scripts, which you can record interactively, use the functions of all DIAdem panels. You can add program structures and dialog boxes to scripts in the integrated script editor.

When you select a panel, DIAdem changes the user interface so that you can quickly find the functions you want. Each DIAdem panel has its own group bar to the right of the panel bar as shown in Figure 1-1. Open a group bar, click a function group, and select a function. The workspace also changes with the DIAdem panel and displays a folder hierarchy or a worksheet. The toolbars and the context menus contain frequently used functions, which DIAdem also adapts to the selected panel.



1	Panel bar	5	DIAdem VIEW toolbar
2	Group bar	6	Data Portal
3	Function group	7	DIAdem VIEW workspace
4	Tooltip of the selected function	8	Status bar

Figure 1-1. The Elements of the DIAdem User Interface

The Introduction Screen

When you launch DIAdem, the DIAdem introduction screen appears. The introduction screen includes video tutorials and examples that show you how to work with DIAdem. The information on DIAdem contains tips for newcomers and for advanced users and leads you to related information on the internet.

Note If DIAdem does not display the introduction screen when DIAdem launches, select **Help»Introduction** to open the introduction screen.

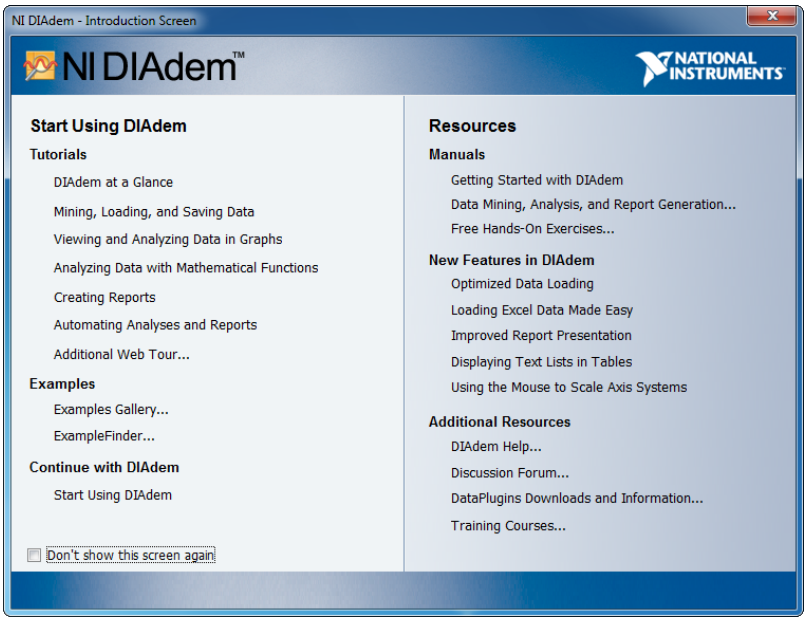


Figure 1-2. The DIAdem Introduction Screen

Use the tutorials in the introduction screen to learn how to use DIAdem. The DIAdem panels contain tutorials in the tutorials function group that explain the respective panel. Refer to the DIAdem Web site `ni.com/diadem` for further videos.

Use the Example Gallery or the ExampleFinder to load and execute examples and to use these examples as templates for your own applications. The table of contents of the ExampleFinder contains procedures which are step-by-step instructions for the solution of certain tasks. Reproduce the steps of a procedure to learn how to solve the described task.

2

Finding Data

Use DIAdem NAVIGATOR to find, to load, and to manage data. Use the DataFinder to search for data on your computer and in the network, and to navigate through the found data files and databases. You load the data into the Data Portal so that all DIAdem panels can work with the data, which is organized in channels.

Mining Data

Use the **Quick Search** to search for a term if you do not know whether the property belongs to a file, a group, or a channel. Use the **Advanced Search** to combine several search conditions and to specify which properties you are searching for.

Executing a Quick Search

To find data with a **Quick Search**, complete the following steps.

1. Select **DIAdem NAVIGATOR**.

   The file browser in the NAVIGATOR panel offers external data in a tree structure.

2. Enter `Weather` in the input area, to find all the data sets that contain the term `Weather`.

3. Click **Search**.

   In the quick search DIAdem does not distinguish whether the data set contains the term as the name or the property of a file, of a channel group, or of a channel. DIAdem displays all files that contain the term `Weather` or compound terms such as `Weather data`, as **Search Results** as shown in Figure 2-1.

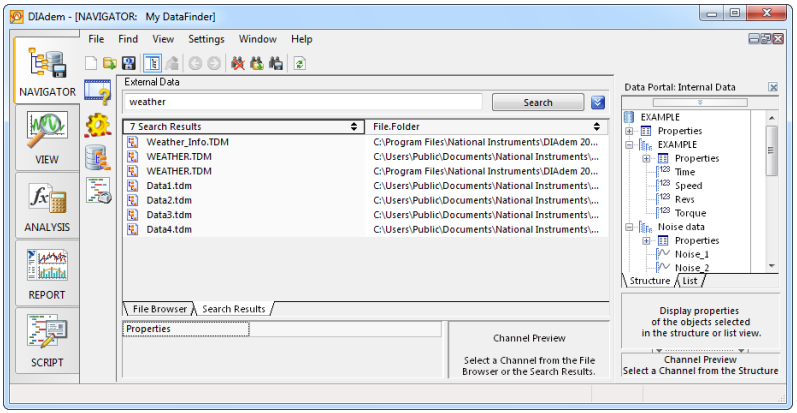


Figure 2-1. Search Results of the Quick Search

Executing an Advanced Search

To find data with an **Advanced Search**, complete the following steps.

1. Click the **Advanced Search** button to specify the search results more accurately, as shown in Figure 2-2.

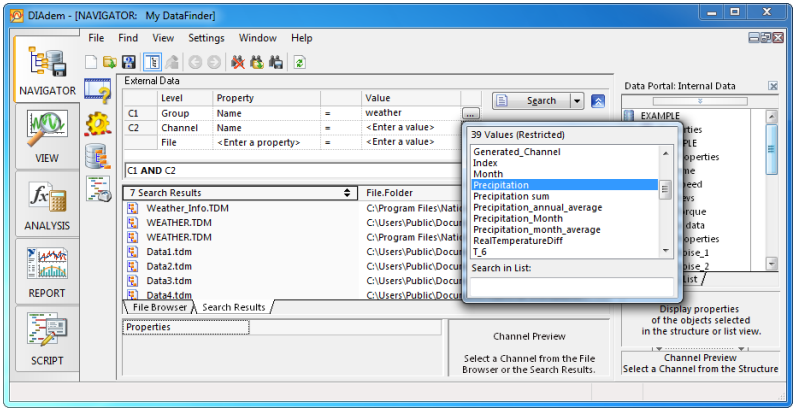


Figure 2-2. Selection List with the Channel Names of the Indexed Data

2. Click **File** in the first row of the **Level** column and select `Group`.
   a. Click **<Enter a property>** in the **Property** column of the first row and select `Name`.

   b. Click the button with the three dots at the end of the first line. DIAdem lists the names of all the groups found.
   c. Double-click the group name `Weather`.

Note If the list does not contain the term `Weather`, DIAdem has not been able to index all example files yet. Select **Settings»My DataFinder»Configure»Indexer»Start Now** to start indexing.

Define another search condition in the second row to specify the search more accurately.

3. Click **File** in the second row of the **Level** column and select `Channel`.
   a. Click **<Enter a property>** in the **Property** column of the second row and select `Name`.
   b. Click the button with the three dots at the end of the second row. DIAdem lists the names of all the channels found, as shown in Figure 2-2.
   c. Double-click the channel name `Precipitation`.

   As you can see in the logical operations line under the search conditions, DIAdem connects several search conditions with the AND operator by default.
4. Replace `AND` with `OR` in the logical operations line to create the following operation:

   ```
   C1 OR C2
   ```
5. Click **Search**.

   DIAdem displays the **Search Results**, as shown in Figure 2-3. Each of the listed files contains a group with the name `Weather` or a channel with the name `Precipitation`.

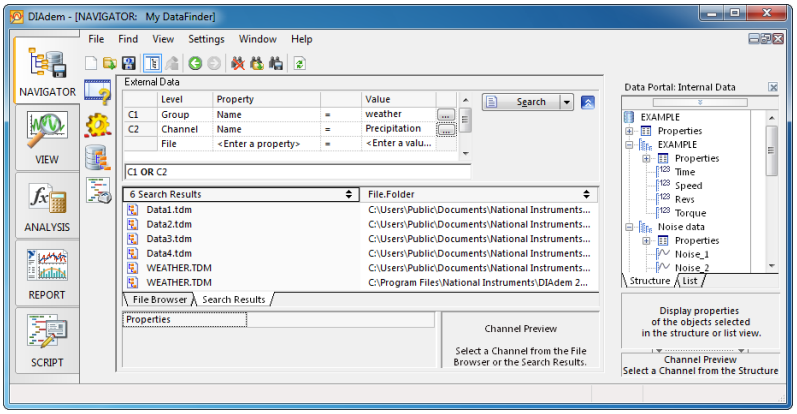


Figure 2-3. Search Results of the Advanced Search

Browsing in Data Sets

Complete the following steps to open data files in the file browser in order to inspect search results.

1. Right-click the `Data1.tdm` file in the search results to open the context menu.
2. Select **Display in File Browser** from the context menu.

   DIAdem switches from the search results to the file browser and displays the `Data1.tdm` file with the TDM file symbol in the tree structure.

   If the file browser knows the file format, it displays the respective file symbol before the file. If the file browser does not know the file format, it displays the file symbol with a question mark.

3. Click the plus sign in front of the file symbol to view the channel groups.

4. Click the plus sign in front of the `Weather` channel group to view the channels.
5. Click the `Precipitation` channel.

   DIAdem lists all the channel groups and channels that are contained in a file, in a tree structure. You can browse down to the channel level in the files if the file format supports browsing. You can find further information on the selected file, channel group, or channel in the **Properties** window below the **File Browser** as shown in Figure 2-4. If you select a channel, the channel preview to the right of the properties display shows the channel data as a curve.

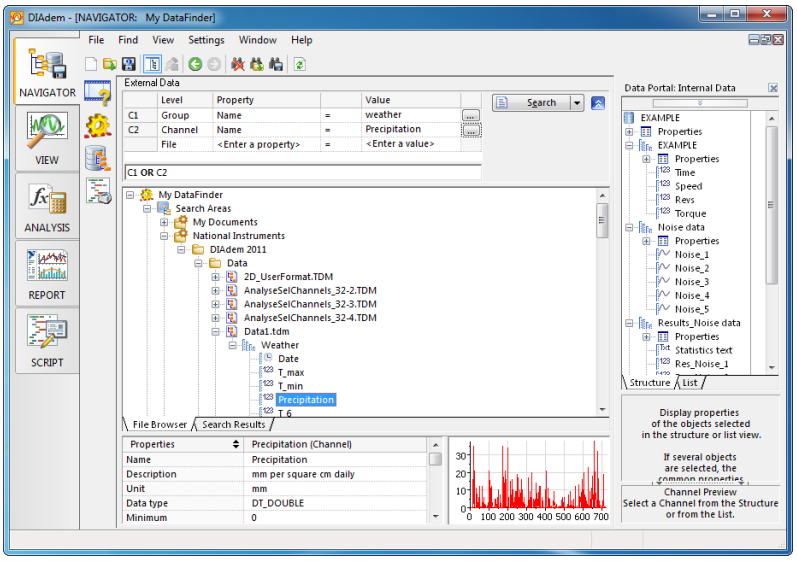


Figure 2-4. Browsing the Found Files in the File Browser

Loading and Managing Data

If you want to work with the data you have found, you must load the data into the Data Portal. To load data and to remove unnecessary data, complete the following steps.

1. Click **Delete Internal Data** on the toolbar.

2. Click the `Weather` channel group in the file browser to select this channel group.
3. Drag and drop the selected channel group into the Data Portal.

   The Data Portal displays the `Weather` channel group with all the channels, as shown in Figure 2-5. If you select a channel, the channel preview of the Data Portal displays the channel data as a curve.

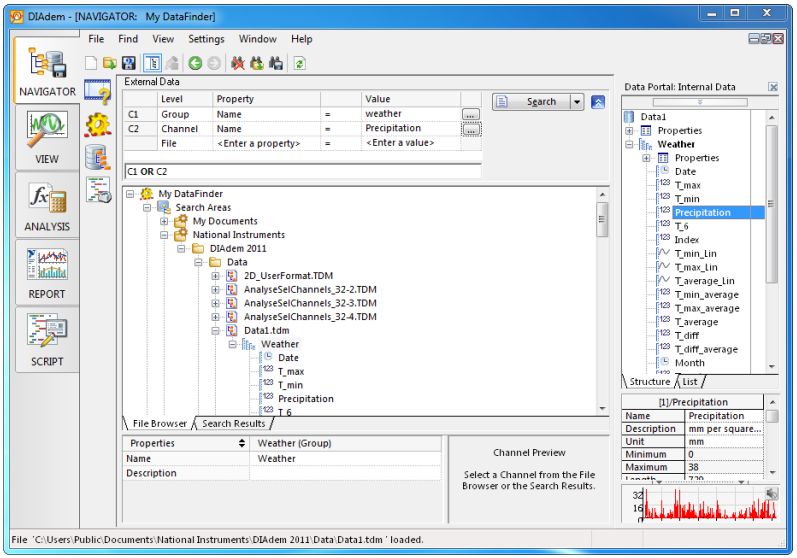


Figure 2-5. Loading Data from the File Browser to the Data Portal

Note If you modify data in the Data Portal, DIAdem does not save the changes automatically. The changes are executed only in the memory and not in the data file from which you loaded the data. This enables you to experiment with data without modifying the original data.

Saving Data

To save the data in the Data Portal, complete the following steps.

1. Navigate to the DIAdem folder `Data` in the `National Instruments` folder.
2. Select the `Weather` channel group in the Data Portal.
3. Drag and drop `Weather` to the `Data` folder.
4. Enter the file name `Weather data` in the **Save As** dialog box.
5. Select the file type `National Instruments TDM Files (*.tdm)`.
6. Click **Save**.

Summary

The summary provides an overview of the topics discussed in this chapter. It also includes additional information.

DataFinder

In the search input area of the DataFinder you enter search conditions to find your data. You also can drag and drop properties from the properties display of the Data Portal or of the file browser into the search input area. In the logical operations line you connect the search conditions with AND and OR and use parentheses to specify a queries more precisely. DIAdem lists the files found in the search areas on the **Search Results** tab.

DataFinder Server Edition

The DataFinder Server Edition indexes data files in the network and enables up to 25 DIAdem users to access common search areas simultaneously. You can enable security settings and use archiving systems.

Search Areas

Search areas are folders of the file system, which the DataFinder indexes. Select **Settings»My DataFinder»Configure** to modify the search areas of the DataFinder.

File Browser

The **File Browser** displays the files of the search areas in a tree structure. Right-click the empty space of the file browser to open the context menu and hide or show the folders of the local file system in a separate tree.

Internal Data in the Data Portal

DIAdem manages internal data in the Data Portal, which is visible in all panels. In all DIAdem panels you work with the channels of the internal data and their descriptive information. DIAdem saves result data in the Data Portal. You can display and edit the channel contents in DIAdem VIEW.

Tip You do not need the <Shift> or <Ctrl> keys to select several channels in the Data Portal; just click the symbols next to the channel names. DIAdem displays a cursor with a plus sign.

Channel Groups

Channel groups contain channels and descriptive properties of the channel groups. Use different channel groups to organize your data. You can define a channel group as a default group, for example, to automatically group together all the calculation results from DIAdem ANALYSIS. DIAdem displays the group name of the default group in bold type.

Channels

Channels contain data series that you measured during a test, loaded from an external data set, or calculated with DIAdem. DIAdem distinguishes numeric channels, waveform channels, time channels, and text channels. Numeric channels contain data series, waveform channels contain data series and the associated x-channel as a generation instruction, time channels contain time data series, and text channels contain text.

Properties

Properties are information about the data, which DIAdem saves with the data series in a TDM file. The data set properties contain the name of the author and the storage date, the channel group properties contain the name of the measurement and comments, and the channel properties contain the data type and the channel unit. In addition to the standard properties, you can create your own custom properties for the data set, the channel group, and the channel. DIAdem displays the properties in the properties displays of the file browser and of the Data Portal.

Units Catalog

The channel unit is a special channel property because you can organize the channel units in the units catalog. Use the units catalog to assign a physical quantity and a unit to measurement values, for example, the quantity speed and the unit kilometers per hour. If you assign the unit mile per hour from the units catalog to the speed channel, DIAdem can convert the channel values.

3

Viewing and Evaluating Data

Use DIAdem VIEW to view, to analyze, and to edit data as curves in axis systems. In channel tables you can edit and delete the data as values and enter new data. You synchronize videos or the map display of a test drive with data. You project data onto 3D models or map 3D data in two-dimensional contour areas.

Viewing Curves

To view the loaded data set in an axis system, complete the following steps.

Note If you have not completed the exercise from the previous chapter, load the data set `Data1.tdm` located in the DIAdem `Data` folder. You find this folder in the DIAdem NAVIGATOR file browser in the search area **National Instruments**.

1. Select **DIAdem VIEW**.

2. Click **New Layout**.

3. Click **Regular Worksheet Partitions** on the group bar.

4. Click **Two Areas** in this function group.

Note Each panel has its own group bar on the left side. When you click a button on the group bar, DIAdem opens the function group where you can select a function.

5. Select the `Date` time channel in the Data Portal.

6. Click the symbol shown on the left before the channel name to also select the numeric channels `T_max` and `T_min`. The cursor changes its color and displays a plus sign.
7. Drag and drop the three channels selected in the Data Portal into the upper worksheet area.

8. Select **2D Axis System** in the selection dialog box.

   DIAdem displays the axis system as shown in Figure 3-1.

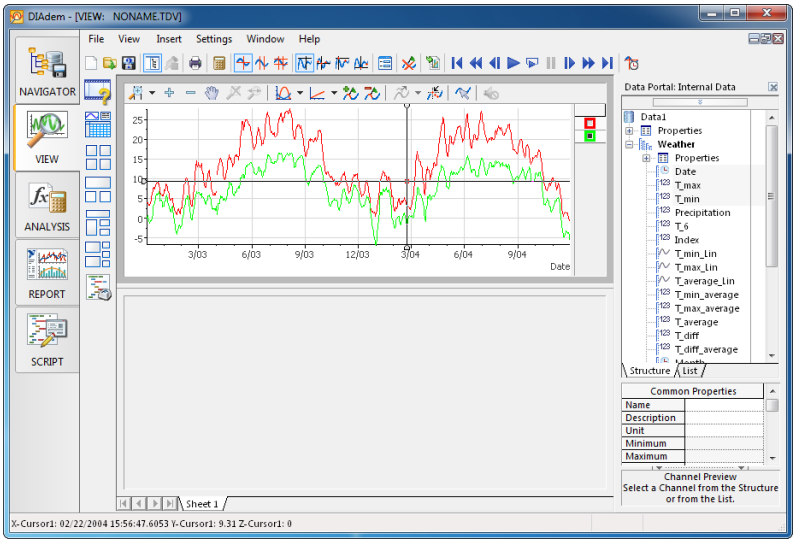


Figure 3-1. Viewing Temperature Data as Curves

Note If you select several numeric channels in the Data Portal and drop the channels onto an axis system, DIAdem assigns the first channel you select to the x-axis. If you select only one channel, DIAdem uses the index to display a numeric channel and uses the x-part to display a waveform channel.

Zooming Curve Sections

In DIAdem VIEW you can zoom curves with the band zoom or the frame zoom from the axis system toolbar. For a close-up view of curves, complete the following steps.

1. Click **Band Zoom** on the axis system toolbar.
2. Click the axis system and drag open the band to specify the width of the curve section.

3. Click **Move** on the axis system toolbar and move the curves to the section that you want to magnify.

4. Click **Zoom In** on the axis system toolbar to increase the zoom in the selected section.

5. Click **Zoom Off** to return from the zoomed area to the complete curve.

6. Click **Move** again to disable the move mode and to reactivate the cursor.

Editing Curves

In DIAdem VIEW you can measure curves, and copy, delete, and interpolate curve sections. Use the curve cursor, the maximum values cursor, or the minimum values cursor on the DIAdem VIEW toolbar to measure a curve. To edit curve sections use the flag functions on the axis system toolbar. The functions on the toolbar of the axis system influence the curves in the associated axis system whereas the functions on the DIAdem VIEW toolbar influence all areas.

Measuring Curves

To follow the curve points with the curve cursor in an axis system, complete the following steps.

1. Click **Curve Cursor** on the toolbar.
2. Click the axis system and move the curve cursor along the curve.

   DIAdem displays the x-values and the y-values of the curve points in a tooltip next to the crosshair cursor that follows the cursor.

3. Click a checkbox on the right side of the axis system to select a different curve as the leading curve.

   DIAdem displays the coordinates of the new leading curve in the tooltip.

Copying Curve Sections

To select a curve section and to copy the data of the curve section into the Data Portal, complete the following steps.

1. Click **Band Cursor** on the toolbar.
2. Click the axis system at `3.04` and drag open the band cursor up to `12.03`.

   Click between the two lines to move the band cursor along the curves. Move the cursor lines to specify the width of the band cursor.

3. Click **Set Flags** on the axis system toolbar to mark the points of the leading curve in the selected time segment.

Note If you press <Shift> at the same time, DIAdem marks the points of all curves in this section.

4. Click **Flags: Copy Data Points** on the axis system toolbar to copy the data of the marked curve points to new channels.

   In the Data Portal, DIAdem creates a time channel and a numeric channel with the values of the copied curve section.

5. Drag and drop the new channels into the bottom workspace.
6. Select **2D Axis System**. DIAdem displays the copied curve section as shown in Figure 3-2.

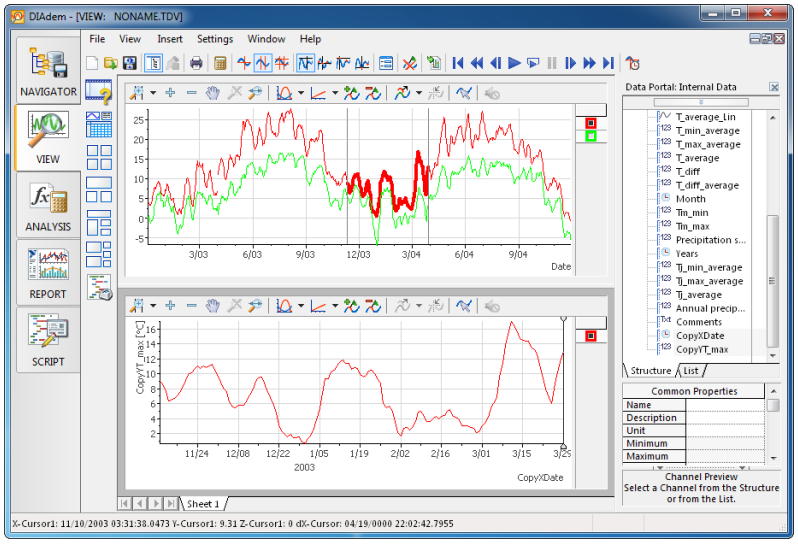


Figure 3-2. Selecting Curve Sections and Copying them in the Data Portal

7. Click **Remove Flags from All Data** on the DIAdem VIEW toolbar to undo the selections.

Editing Data in Channel Tables

In channel tables you can edit and delete data and add new data. You can enter or generate new data manually. To edit values in a channel table and to generate new values complete the following steps.

1. Click **Assigned Worksheet Partitions** on the group bar.

2. Click **Channel Table** in this function group.

   DIAdem creates a new worksheet with a channel table.

3. Select the channels `Comments`, `CopyXDate`, and `CopyYT_max` in the Data Portal.
4. Drag and drop the channels selected in the Data Portal into the channel table.

   DIAdem displays the columns in the order in which you select the channels in the Data Portal.
5. Click the cell in the **CopyYT_max** column, row **10**.
6. Enter the value `1` and press <Enter>.

   DIAdem also displays the new value in the curve in the bottom axis system on the previous worksheet.
7. Right-click next to the channel table or into an empty column and select **Create New Channel** from the context menu.
   a. Enter the channel name `Generated_Channel`.
   b. Click **OK** to create the new channel in the channel table and in the Data Portal.
8. Right-click the first cell of the empty column **Generated_Channel** and select **Generate** from the context menu.
   a. Enter `0.5` as the step width and `100` as the number of values.
   b. Click **OK** to create the channel values.

   DIAdem displays the channel table as shown in Figure 3-3.

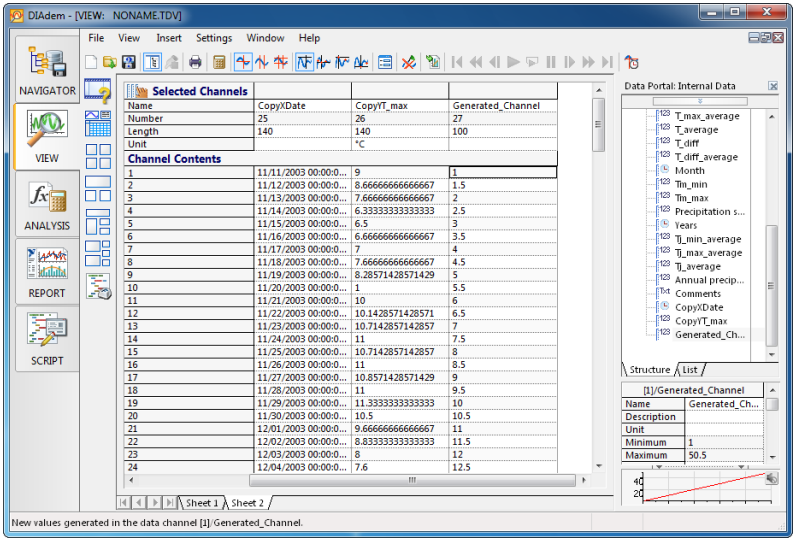


Figure 3-3. Editing and Generating Data in Channel Tables

To use the layout with all worksheets as a template for similar data sets, click **Save Layout As**. Enter the file name `MyView`.

Summary

The summary provides an overview of the topics discussed in this chapter. It also includes additional information.

Layouts

A layout can contain several worksheets. DIAdem saves layouts separately from the channels. You can reuse the layout as a template for data sets with a similar structure.

Areas

Partition worksheets into areas to insert axis systems, channel tables, videos, 3D models, contours, maps, dialog boxes, text, and images. You can move the separating bars to resize any area in a worksheet. Use the **Assigned Worksheet Partitions** function group to add new worksheets with predefined areas to a layout.

Axis Systems

In axis systems you display data as curves, as spikes, or as stair curves. To insert data into an axis system, drag and drop channels from the Data Portal into an axis system. Use the band cursor and the frame cursor to zoom curve sections. You open the legend on the right side of an axis system.

Graphics Cursors

DIAdem VIEW offers various graphics cursors for evaluating curves in axis systems. The free cursor moves freely in the axis system and the curve cursor follows the curve from curve point to curve point. Other graphics cursors determine the maximum values and the minimum values of a curve. If an axis system contains several curves, the graphics cursor follows the leading curve that you specify with the checkboxes in the legend. DIAdem synchronizes all the cursors of a worksheet with each other and with videos and 3D models.

Flags

Use the band cursor and the frame cursor to mark curve sections with flags, to delete, to copy, or to recalculate the marked curve points.

Channel Tables

In channel tables you view the individual values of the channels, edit the values of all channel types, and add new values or channels. In the display properties of a channel table you can specify whether a channel table only displays the channels that were dragged and dropped into the table or whether the channel table automatically displays all channels of a group or of the Data Portal.

Videos

In video areas you show videos. If you display the associated measured values as curves in an axis system, you can move a graphics cursor along the curves to display the video frame associated with each measurement value. Double-click an empty video area to insert a video.

3D Models

In model areas you project the measured or simulated data as a color shading or as a deformation onto a model of the test object. For example, you display temperatures as color shading on a climate dummy, and you display strain on bridge elements as deformation. To do so, you insert the 3D model of the test object and connect each data channel with the respective model point. For model points with no sensor, DIAdem interpolates the values from the data of neighboring model points.

Contours

In contour areas you display 3D data two-dimensionally by displaying the third dimension of the data as a color value and with isolines. You can use a contour display, for example, to display and to analyze characteristic diagrams. If you move the graphics cursor over a contour, DIAdem displays the associated isolines dynamically. You can save the data of every associated isoline and also the x-parallel and y-parallel intersection in the Data Portal.

Maps

In map areas you display geographic data in map sections. For example you can follow the route of a test drive when you move the graphics cursor in an axis system along the data such as consumption, RPM, and torque collected during the test drive. To do so enter the recorded longitude and latitude and, for example, the time channel for the synchronization.

Dialog Boxes

In dialog boxes you enter values, check settings, or start functions to change the displays in other areas of the layout during the analysis. You can include every user dialog box to which you added the control `VIEWConnector` in the dialog editor of DIAdem SCRIPT.

4

Analyzing Data with Mathematical Functions

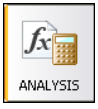
Use DIAdem ANALYSIS to analyze data mathematically. You can apply predefined standard mathematical functions, including basic mathematics, curve fitting, signal analysis, and statistics. The dialog boxes for these standard functions guide you through the calculation so you do not have to enter a formula. You select the input data and the settings. Use the DIAdem Calculator to define and calculate your own formulas.

Using Standard Mathematical Functions

DIAdem has extensive libraries of standard mathematical functions in several function groups in DIAdem ANALYSIS. The results of the calculations are displayed in new channels in the Data Portal.

Note If you have not completed the exercise from the previous chapter, load the data set `Data2.tdm` located in the DIAdem `Data` folder. You find this folder in the DIAdem NAVIGATOR file browser in the search area **National Instruments**.

To create a new group for the calculation results, complete the following steps.



1. Select **DIAdem ANALYSIS**.
2. Right-click in the Data Portal and select **New»Group** from the context menu.
3. Enter `Results` as the **Name**. Enable the checkbox **Set default group**.
4. Click **OK**.

   DIAdem displays the name of the default group in bold type in the Data Portal.

Calculating the Sum of Channel Values

To total the precipitation for the year 2003, complete the following steps.

1. Click **Statistics** on the group bar.

2. Click **Descriptive Statistics** in this function group.

3. Click the button with the three dots at the end of the **Channels** entry field in the **Object to be evaluated** area.
4. Select `[1]/Precipitation sum`.

   This notation means the `Precipitation sum` channel is in the first channel group.
5. Click **OK**.
6. Enter `2-13` as the **Rows**.

Tip To check which rows the precipitation for 2003 is in, switch to DIAdem VIEW and load the channels `Month` and `Precipitation sum` into a channel table. The `Month` channel contains the time values for the monthly precipitation totals.

7. Click **All Off** on the **Characteristic Values** tab to clear all the checkboxes of the characteristic values.
8. Select **Sums»Measured values**.

   DIAdem shows the **Descriptive Statistics** dialog box as shown in Figure 4-1. The dialog box displays the channel preview of the precipitation sum in the top right-hand corner and displays the result data below the channel preview.

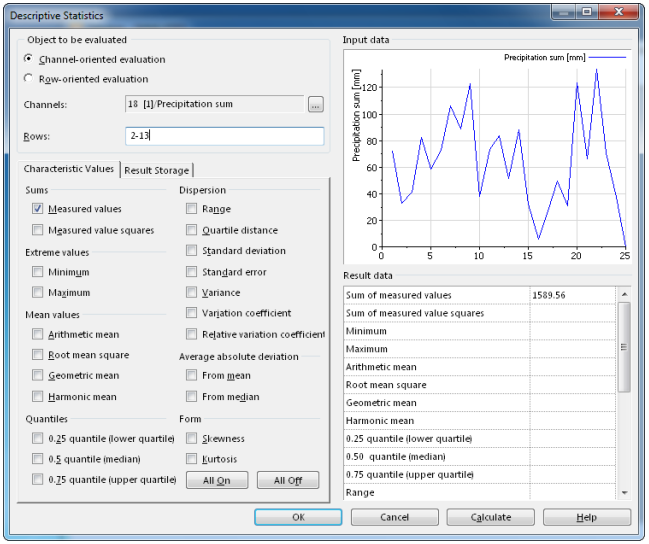


Figure 4-1. Precipitation Summation in Sections

9. Click **OK** to calculate the sum and to close the dialog box.

Note If you want to execute further calculations with this standard function, click **Calculate**. The dialog box remains open for further entries.

10. Right-click `Results/Sum` in the Data Portal and select **Rename**.
11. Enter `Precipitation_2003` as the channel name and press <Enter>.

Averaging Channels

To calculate the average monthly temperatures, complete the following steps.

1. Click **Channel Functions** on the group bar.
2. Click **Average Channels** in this function group.
3. Click the button with the three dots at the end of the **Channels** entry field in the **Channels to be averaged** area.
4. Select `[1]/Tm_min`.
5. Press <Ctrl> and also select `[1]/Tm_max`.
6. Click **OK**.

DIAdem displays the dialog box as shown in Figure 4-2.

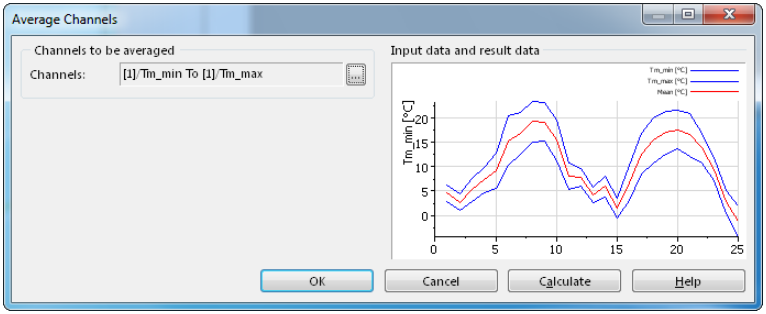


Figure 4-2. Averaging Minimum and Maximum Temperatures

7. Click **OK**.
8. Right-click `Results/Mean` in the Data Portal and select **Rename**.
9. Enter `Temperatures` as the channel name and press <Enter>.

Calculating with the Units Catalog

The DIAdem units catalog organizes physical quantities and the associated units. Use the units catalog to convert channels into other units.

To convert the calculated average monthly temperatures from degrees Celsius to degrees Fahrenheit, complete the following steps.

1. Click **Channel Functions** on the group bar.

2. Click **Convert Channel Unit** in this function group.
3. In the **Channel** entry field in the dialog box area **Channel to be calculated** you find the channel `[2]/Temperatures`.

   If you see a different channel there, select `Results/Temperatures` in the data portal, and drag the selected channel into the entry field.

4. Select `[°F] degree Fahrenheit` for **Unit»To** as shown in Figure 4-3.

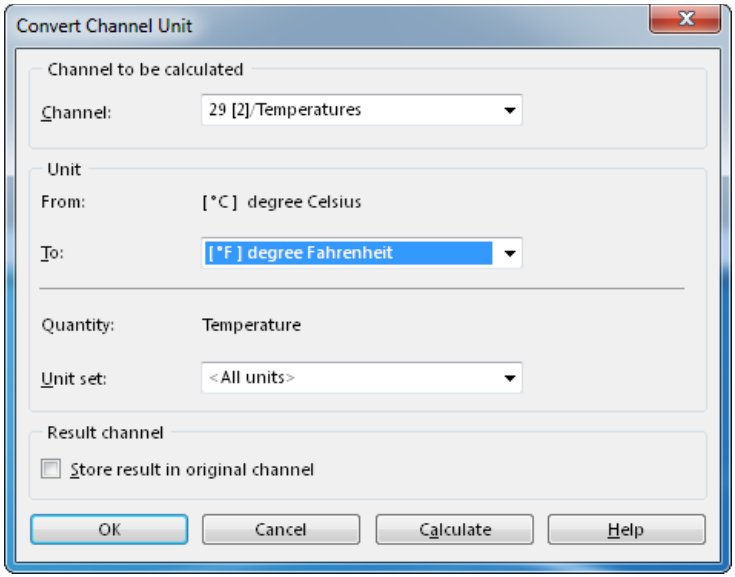


Figure 4-3. Converting Channel Units with the Units Catalog

5. Click **OK**.
6. Right-click `Results/UnitConverted` in the Data Portal and select **Rename**.
7. Enter `Temperatures_F` as the channel name and press <Enter>.

Note You also can convert channel data to a different unit in the Data Portal. To do so, click the unit entry field in the properties display and click the button with the three dots to open the **Symbol Input Help** dialog box.

DIAdem ANALYSIS displays a record of the calculations as shown in Figure 4-4, and the Data Portal contains new channels with the calculation results.

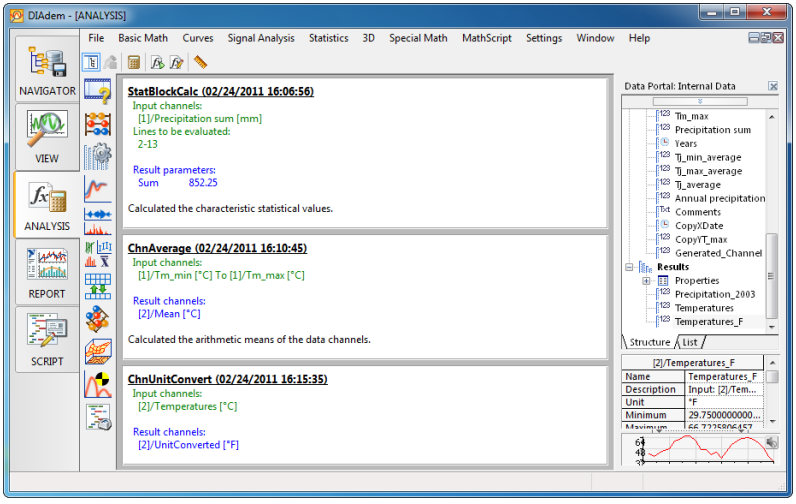


Figure 4-4. Record of the Calculations with Standard Functions

Refer to Figure 5-3 in the next chapter to view the curves of the average temperatures and the annual precipitation.

Calculating Formulas with the Calculator

Use the DIAdem Calculator to calculate your own mathematical formulas. In the Calculator you calculate with channels, variables, and values you enter. DIAdem stores the results in channels or variables.

To calculate the difference between the monthly maximum temperatures and the average temperatures, complete the following steps.

1. Click the **Calculator** on the toolbar.
2. Enter the following formula in the Calculator entry field.

```
Ch("Results/TmMax_Diff")=Ch("[1]/Tm_max")-Ch("[2]/Temperatures")
```

Tip Instead of typing in the entire formula double-click a channel on the **Channels** tab. DIAdem inserts the channel name with the group index and the variable `Ch` at the cursor.

DIAdem displays the Calculator as shown in Figure 4-5.

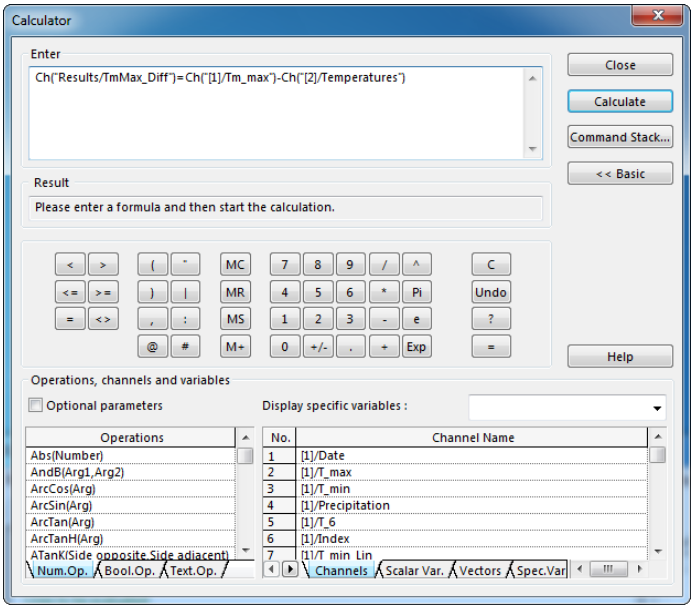


Figure 4-5. Calculating Formulas with the Calculator

3. Click **Calculate**.
4. Click **Close**.

   DIAdem adds the new channel `TmMax_Diff` to the `Results` channel group in the Data Portal.

Summary

The summary provides an overview of the topics discussed in this chapter. It also includes additional information.

Mathematical Functions

DIAdem ANALYSIS offers a variety of standard functions for analyzing your data. You assign input channels to standard functions, set parameters, and execute the calculation. Click **OK** to execute a calculation once and to close the dialog box. Click **Calculate** to execute several calculations with the same standard function.

Result Channels

DIAdem ANALYSIS saves calculation results in new channels. This enables you to calculate new data without overwriting the existing channels. In most dialog boxes of the standard functions you can select **Store result in original channel** to overwrite the existing channels.

Default Group

DIAdem stores the result channels of a calculation in the default group in the Data Portal. Define in the context menu a different group as the default group to specify where DIAdem saves calculation results. DIAdem displays the group name of the default group in bold type.

Calculator

Use the Calculator to specify your own formulas for analyzing data. The Calculator has functions that range from simple arithmetic functions to advanced scientific and engineering functions. Use the Calculator to calculate channels, variables, and single values. DIAdem stores the results in channels or variables.

Units

If you assign units from the units catalog to the original channels, DIAdem automatically determines the unit of the result channels. Based on the physical quantities and units of the original channels, the division of distance by time results in a speed with the unit kilometers per hour, for example. Select **Settings»Options»Units** to add your own units and to define unit sets with preferred units.

Calculation Manager

To execute recurring analysis sequences with a mouse-click you can define simple as well as complex calculations in the calculation manager. An analysis sequence can contain user-specific formulas and default functions and can combine calculations when one calculation step accesses the result of a different calculation step.

5

Creating Reports

Use DIAdem REPORT to document data and present results. In 2D and 3D axis systems you display your data as curves, as bar diagrams, and as surfaces. In 2D and 3D tables you list channel contents. You can label your report with comments and text and illustrate the report with graphics and formulas. You use the Chart Wizard to create and to modify 2D axis systems and polar axis systems.

Creating Axis Systems

To create a new layout with the Chart Wizard, complete the following steps.

Note If you have not completed the exercise from the previous chapter, load the data set `Data3.tdm` located in the DIAdem `Data` folder. You find this folder in the DIAdem NAVIGATOR file browser in the search area **National Instruments**.

1. Select **DIAdem REPORT**.
2. Click **New Layout**.
3. First select the `Weather/Month` channel in the Data Portal and then `Weather/Precipitation sum` and `Results/Temperatures`.
4. Right-click the selected channels and select **Chart Wizard** from the context menu.

   DIAdem opens the Chart Wizard and creates a new worksheet with an axis system. In the axis system, DIAdem displays the channels that are selected in the Data Portal as curves as shown in Figure 5-1. DIAdem assigns the first selected channel to the x-axis.

   In Step 1 you select the diagram type. In Step 2 you add or delete curves. In Step 3 you specify the diagram display on several tabs. The preview as shown in Figure 5-1 directly displays how the diagram changes.

5. Click the diagram type **Lines with Several Y-Axes**.

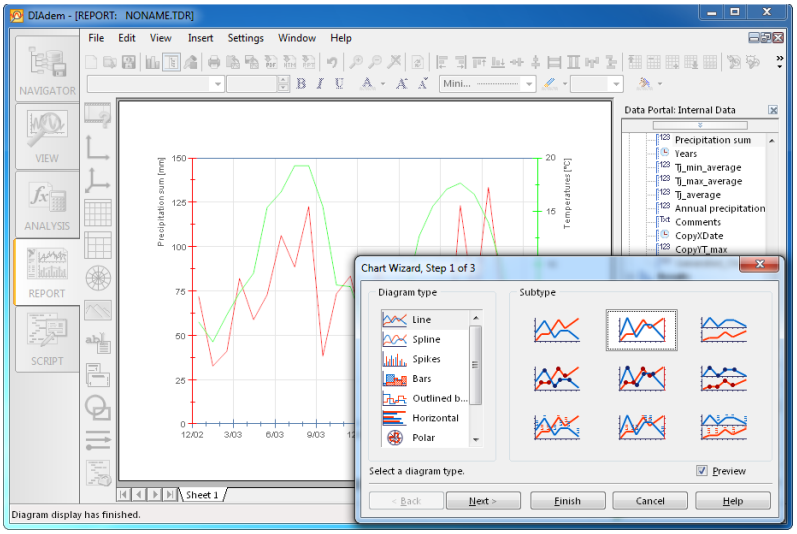


Figure 5-1. The Chart Wizard Displays the Preview in the Worksheet

6. Click **Next** twice to open Step 3 of 3.
7. Select the **X-Axis** tab.
8. Enable **Manual from** for the value range and enter `01.01.2003` as the start and `12.31.2003` as the end.
9. Click **Finish** to create the axis system.

   In the axis system, DIAdem displays the monthly precipitation and the monthly average temperatures over the date.

Tip You can open the Chart Wizard at several points in DIAdem. If you want to display curves with various x-channels, open the Chart Wizard on the toolbar. If you want to integrate axis systems into the current worksheet, open the Chart Wizard from the **2D Axis Systems** function group or the **Polar Axis Systems** function group. If you want to edit an axis system, open the Chart Wizard from the context menu of the axis system.

Editing Axis Systems

You can move and resize axis systems or parts of an axis system. To make it easier for you to see which objects you can select, DIAdem displays an object in a blue frame as soon as the mouse cursor idles on the object. Double-click the object to open its settings.

Complete the following steps to display the precipitations as bars.

1. Double-click the red curve of the precipitation sum to open the associated curve parameter.

2. Select the **Display mode** `Bars`.
3. Click **OK** to close the dialog box.

   DIAdem displays the worksheet as shown in Figure 5-2.

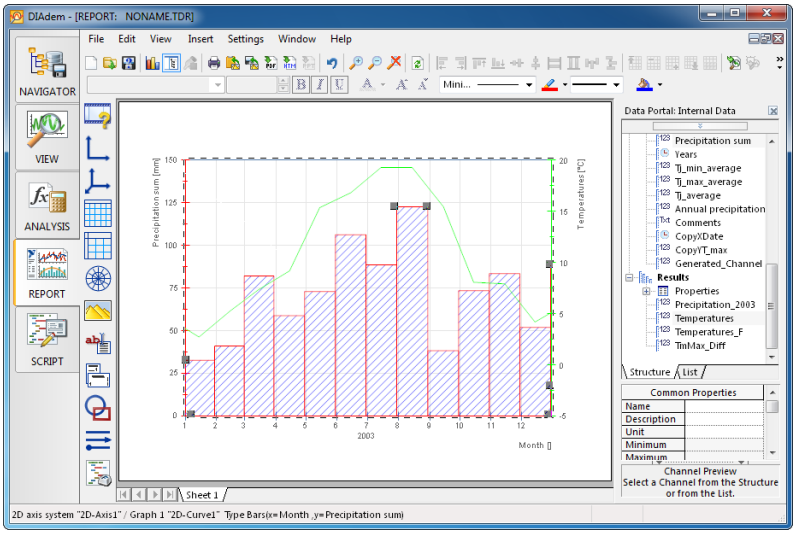


Figure 5-2. DIAdem Displays the Precipitation as Bars

4. Single-click into the axis system to select it.
5. To reduce the width of the axis system move the small square in the middle of the right edge of the selected axis system to the left.

Graphics and Lines

Illustrate reports with graphics and company logos. Use lines and rectangles to divide the worksheet or to highlight a description field.

To add a graphic to your worksheet, complete the following steps.

1. Click **Graphics** on the group bar.

2. Click **Load Graphic** in this function group.

3. Select `Weather.jpg` in the DIAdem `Documents` folder and click **Open**.
4. Click and drag the graphic to the right edge of the workspace. Resize the graphic by dragging the small squares at the corners of the graphic.

To prepare a description field on the right of the worksheet, complete the following steps.

1. Click **Line and Arrows** on the group bar.

2. Click **Continuous Vertical Line** in this function group.

   DIAdem inserts a vertical line on the right edge. Move this line slightly to the left to widen the description field.

Using Text and Variables as Labels

Add text and variables to a report to explain the contents and highlight specific items. All texts can include formula expressions and DIAdem variables, which DIAdem updates along with the rest of the report. Double @ characters indicate to DIAdem which parts of the text to evaluate dynamically.

To add a text to your report, complete the following steps.

1. Click **Text** on the group bar.

2. Click **Text** in this function group. The cursor changes to a text cursor.
3. Click at the top of the description field in the worksheet, where you want to enter a heading.
4. Enter the text `Weather report` and press <Enter>.
5. Enter `@@CurrDate@@` in the second line.
6. Click outside the text to conclude the entry.
7. Click the text. To resize the text, drag the small squares at the corners of the text with the mouse.

Adding and Formatting Channel Properties

Click the button with the three dots at the end of the entry field in the text editor dialog box to edit text and use variables and expressions. You can easily drag and drop channel properties from the Data Portal into the worksheet.

To add a channel property to your report and to edit the channel property, complete the following steps.

1. Select `Results/Precipitation_2003` in the Data Portal.
2. Click **Minimum** in the properties display of the Data Portal and drag the channel property into the description field.
3. Double-click the inserted text. The text editor displays the following text:

```
Minimum: @@Str(Data.GetChannel("[2]/Precipitation_2003").
  Properties("minimum").Value, "AutoAdj")@@
```

   a. Replace the first word `Minimum:` with the description `Annual precipitation`.

   b. Press <Enter> to position the value below the text.

   c. Enter `mm` at the end of the text.

4. Click the **Position** tab and select `Centered` as the **Relative position**.
5. Click **OK**.

6. Select all texts and the graphic and click **Center Vertically** on the toolbar.

   DIAdem displays the worksheet as shown in Figure 5-3.

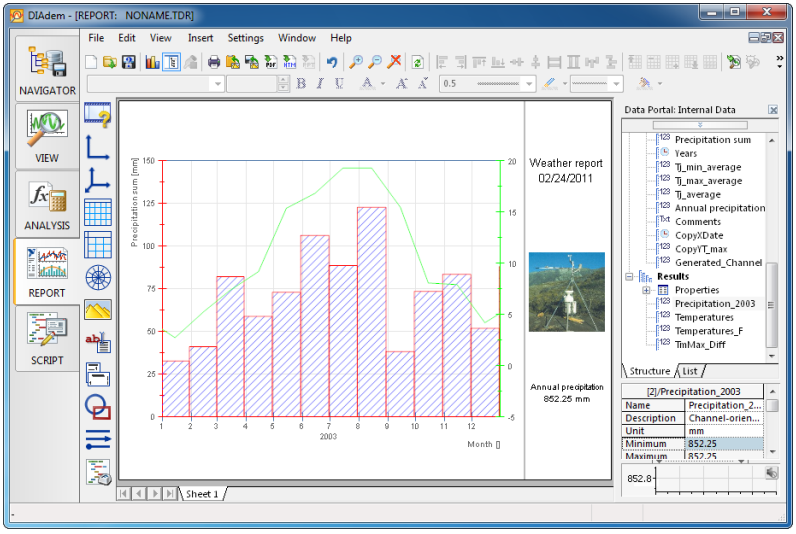


Figure 5-3. Using Text and Variables as Labels

To use the layout with all worksheets as a template for similar data sets, click **Save Layout As**.

Summary

The summary provides an overview of the topics discussed in this chapter. It also includes additional information.

Layouts

A layout can contain several worksheets. DIAdem saves layouts separately from the channels. You can reuse layouts as templates for data sets with a similar structure.

Worksheets

Worksheets contain axis systems, tables, text, formulas, and graphics. To add data to the worksheet, drag and drop channels from the Data Portal into axis systems and tables. In addition to selecting data channels from the Data Portal, you also can add data channels by double-clicking an axis system or a table.

Select **Settings»Layout Setup»Worksheet Parameters** to change the page format of a worksheet so that, for example, the table of contents is in portrait format whereas the diagrams remain in the landscape format.

Master Layout

Use a master layout to create a uniform appearance for reports. The master layout remains unchanged in the background of all worksheets and consists of a landscape master and a portrait master. To create a master layout, select **File»Master Layout»New**.

Chart Wizard

You can use the Chart Wizard to create and to modify 2D axis systems and polar axis systems. The preview function displays each changed setting in the worksheet.

Axis Systems

Use axis systems to display channels as curves, as bars, and as surfaces. You double-click an axis system to edit the displayed curves, to add new curves, and to delete existing curves. To zoom curve sections, change the scaling of the x-axis and the y-axis with the mouse wheel as soon as you position the cursor over the respective axis.

Tables

Use tables to list the contents of numeric channels and also text channels. You double-click a table to edit the displayed columns, to add new columns, and to delete existing columns.

Text

Use text to label worksheets. Use the **Coordinate** display mode in the context menu of a curve to comment values. Text also can include variable information such as filenames or the current date. For DIAdem, the `@@` characters indicate a variable expression. Click **Refresh** on the DIAdem REPORT toolbar to display the current variable contents.

Formulas

Use formulas to display calculation instructions in graphics. DIAdem uses the formula syntax of the Mathematical Markup Language (MathML) used in word processing.

Decorations

Use comments, lines, arrows, rectangles, and circles in a worksheet to highlight certain areas or curve points.

Graphics

Use graphics and logos to illustrate worksheets. DIAdem supports numerous different graphic formats including PNG, BMP, JPG, TIF, and WMF.

6

Automating Sequences

Use DIAdem SCRIPT to automate tasks in a script, which combines several work steps for recurring sequences such as standard calculations and serial evaluations. Scripts, which you can record interactively, use the functions of all DIAdem panels. You can add program structures and dialog boxes to scripts in the integrated script editor.

Creating Scripts

The recording mode is the easiest way to create scripts. When you enable the recording mode, DIAdem creates a new script in the script editor and records the steps you make in this script. To create a new script in the recording mode, complete the following steps.

1. Select **DIAdem SCRIPT**.

2. Click **Enable Recording Mode** on the toolbar to start recording the script.
3. Enter `DIAdem user` as the **Author** and `Manual example` as the **Comment** as shown in Figure 6-1.

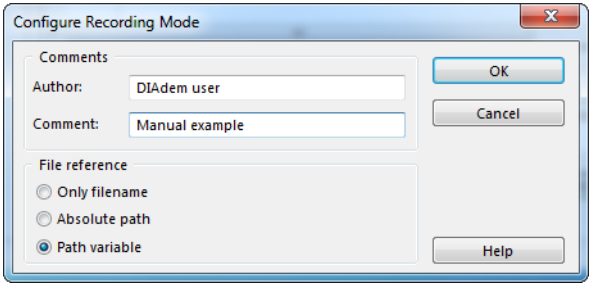


Figure 6-1. Configuring the Recording Mode

DIAdem writes this information directly into the script code to help you identify the script in the future.

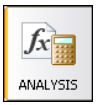
4. Click **OK**.

   The status bar displays the recording mode symbol.

5. Select **DIAdem NAVIGATOR**.

6. Click **Delete Internal Data** to delete the data in the Data Portal.
7. Enter `Weather` in the search input area of the quick search.

8. Click **Search**.
9. Drag and drop the `Data1.tdm` file into the Data Portal.



10. Select **DIAdem ANALYSIS**.

11. Click **Channel Functions** on the group bar.

12. Click **Average Channels** in this function group.

13. Click the button with the three dots at the end of the **Channels** entry field in the **Channels to be averaged** area.
14. In the selection dialog box that opens, select the channels `[1]/Tm_min` and `[1]/Tm_max` and click **OK**.
15. Click **OK** to calculate the average.

16. Select **DIAdem REPORT**.

17. Click **Load Layout**.
18. Select the layout `Report2.tdr` and click **Open**.

    DIAdem automatically refreshes the display to show the data set you have just loaded.

19. Select **DIAdem SCRIPT**.

20. Click **Disable Recording Mode**.

    DIAdem displays the recorded script in the script editor as shown in Figure 6-2.

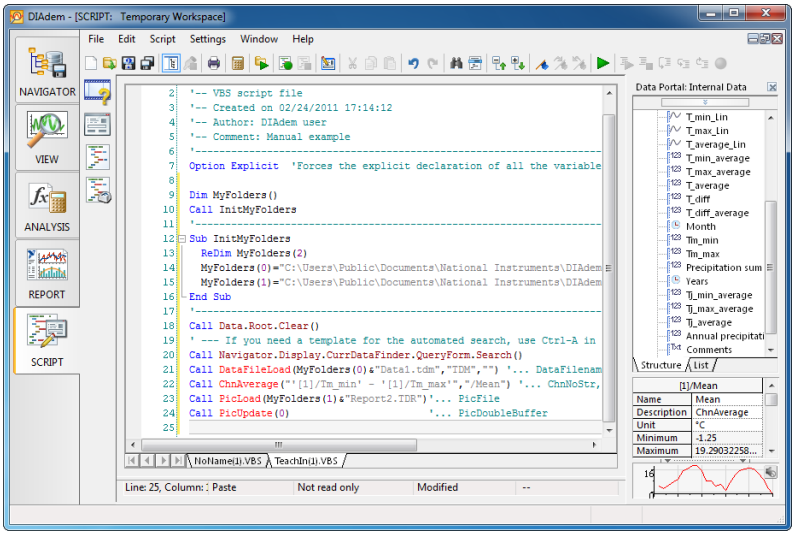


Figure 6-2. Recording Actions in the Script Editor

After the commenting header, DIAdem declares the `MyFolders` path variable and assigns to this variable the paths to the data folder and to the document folder. If you want the script to load the data file or the report file from another folder, just change the paths at this exact point in the script.

Editing Scripts

In the recording mode you have recorded the search for weather data, loaded a data set, and created a report. Expand the recorded script to evaluate further weather data.

To select data interactively complete the following steps.

1. Replace the script line for loading the data file `Data1.tdm`

   ```
   Call DataFileLoad(MyFolders(0)&"Data1.tdm","TDM","")
   ```

   with the following script lines:

   ```
   Call WndShow("NAVIGATOR","OPEN")
   Call InteractionOn("Load Data4.tdm")
   ```

The first script line opens the NAVIGATOR panel and the second line stops the script so that you can load data interactively.

2. After the last script line, enter the statement for hiding the DataPortal and use the CodeCompletion function to do so:

   a. Enter `Portal.`

      As soon as you enter the dot behind the `Portal` object, DIAdem offers the methods and properties available for this object, as shown in Figure 6-3.

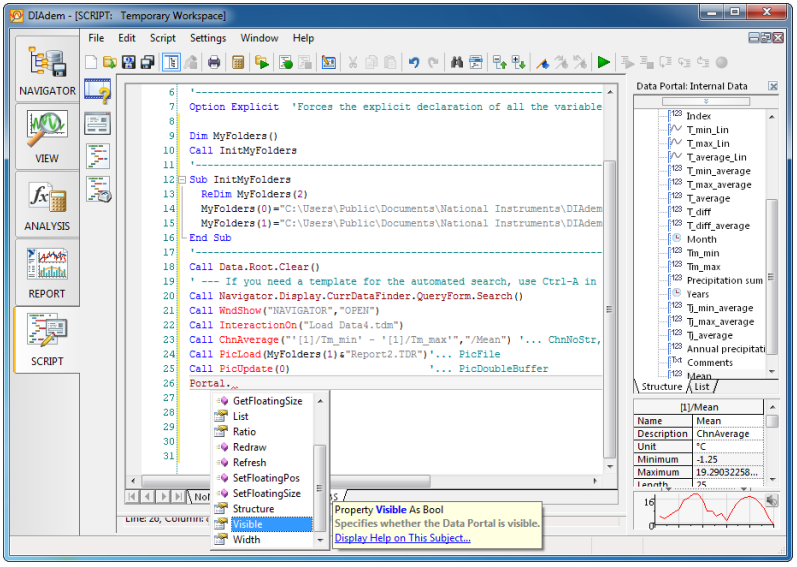


Figure 6-3. CodeCompletion and the SmartInfo Make Editing Objects Easier

   b. Double-click `Visible` to insert this property into the script.

   c. Complete the script line as follows:

      ```
      Portal.Visible = False
      ```

DIAdem displays the respective SmartInfo for every element in the selection list. Click **Display Help on this Subject** to open the help page on this object.

Testing Scripts

To test the modified script, complete the following steps.

1. Click **Run Script**.

   The script opens the NAVIGATOR panel and displays in the **Search Results** all the data files that contain the term `Weather`.

2. Click the file symbol in front of the `Data4.tdm` file to select the file.
3. Drag and drop the selected file into the Data Portal.

4. Click the message box **`Load Data4.tdm`** to end the interaction.

   The script opens the REPORT panel. DIAdem refreshes the date displayed in the header and hides the Data Portal as shown in Figure 6-4.

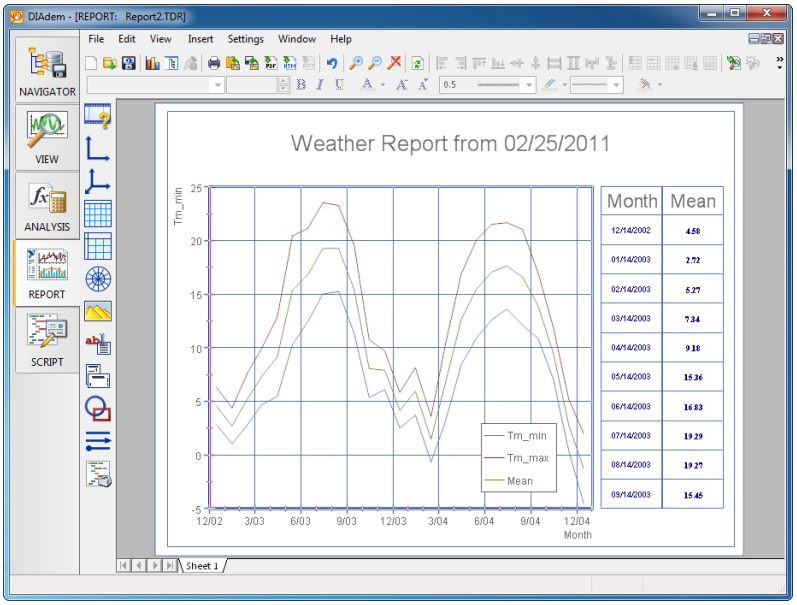


Figure 6-4. Report Created with the Script

5. Click **Data Portal** to enable the Data Portal for further tasks.

Select **DIAdem SCRIPT** and click **Save File As** to save the script.

Summary

The summary provides an overview of the topics discussed in this chapter. It also includes additional information.

Scripts

Scripts allow you to execute a series of commands for finding data, loading data, analyzing data, and creating reports. You can use VBS functionality and DIAdem commands in scripts. You can integrate the standard dialog boxes in scripts or you can create your own dialog boxes.

Recording Scripts

In the recording mode DIAdem records the command for every action that you execute interactively, in a script.

<Ctrl-A>

In the recording mode, DIAdem does not usually record the value assignment for program variables. For example, press <Ctrl-A> in a DIAdem REPORT dialog box to record the values of the program variables. If DIAdem is not in the recording mode, press <Ctrl-A> to copy the program variable value assignment to the Windows clipboard. Then add these assignments to a script and modify the required program variables.

Script Editor

The script editor displays the program code of scripts. While you record actions in the recording mode, DIAdem records the commands directly in the script editor. Use functions such as go to line, bookmarks, restoring, and find and replace, to make script editing easier. Use the Microsoft Windows Script Debugger in the script editor to work through scripts step by step and to find errors.

If you click a command, a property, a method, or a variable, the SmartInfo displays the parameters of the command, the property, the method, or the value range of the variable. For further information click **Display Help on this Topic**.

CodeCompletion

If you enter the name of an object and complete the entry with a dot, the script editor offers the subobjects, events, properties, and methods that are available for this object. Add your selection to the object in the script with a double-click.

When you enter the first characters of a command, for example, and press <Ctrl-Spacebar>, the script editor automatically completes the command. If several commands start with these characters, the script editor offers a selection list of all the possible objects, commands, and procedures.

Interaction Mode

When you use the interaction mode, you can stop your script and work interactively with DIAdem. You enable the interaction mode in scripts with the `InterActionOn` command. To end the interaction mode, click the **End Interaction** button, which is on the toolbar in all panels or in the message box.

User Commands

To add commands to DIAdem, you can define user commands in a script. For example, you use user commands to run calculations in the calculator, to format axis systems in DIAdem REPORT, or to extend the range of functions in scripts.

User Dialog Boxes

Create user dialog boxes in the dialog editor in DIAdem SCRIPT to enter values, to request settings, or to start functions. Use events to connect elements from user dialog boxes and specify how the script proceeds depending on the previously specified settings.

A

Copyright

I. Under the copyright laws, this publication may not be reproduced or transmitted in any form, electronic or mechanical, including photocopying, recording, storing in an information retrieval system, or translating, in whole or in part, without the prior written consent of National Instruments Corporation.

National Instruments respects the intellectual property of others, and we ask our users to do the same. NI software is protected by copyright and other intellectual property laws. Where NI software may be used to reproduce software or other materials belonging to others, you may use NI software only to reproduce materials that you may reproduce in accordance with the terms of any applicable license or other legal restriction.

II. Third Party Copyright Notices

A. In regards to components used in USI (Xerces C++, Stingray, ICU, HDF5, b64, and STLport), the following copyright notices apply.

Xerces C++
This product includes software developed by the Apache Software Foundation (`http://www.apache.org/`) that is subject to the Apache License, Version 2.0, a copy of which may be found at: `http://www.apache.org/licenses/LICENSE-2.0`.
Copyright 1999 The Apache Software Foundation. All rights reserved.

Stingray
This software includes Stingray software developed by Rogue Wave Software division of Quovadx, Inc. Copyright 1995–2006. Quovadx, Inc. All Rights Reserved.

ICU
Copyright (c) 1995–2009 International Business Machines Corporation and others. All rights reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the “Software”), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, provided that the above copyright notice(s) and this permission notice appear in all copies of the Software and that both the above copyright notice(s) and this permission notice appear in supporting documentation.

THE SOFTWARE IS PROVIDED “AS IS”, WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF THIRD PARTY RIGHTS. IN NO EVENT SHALL THE COPYRIGHT HOLDER OR HOLDERS INCLUDED IN THIS NOTICE BE LIABLE FOR ANY CLAIM, OR ANY SPECIAL INDIRECT OR CONSEQUENTIAL DAMAGES, OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Except as contained in this notice, the name of a copyright holder shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization of the copyright holder.

HDF5
Copyright Notice and Statement for NCSA Hierarchical Data Format (HDF) Software Library and Utilities

NCSA HDF5 (Hierarchical Data Format 5) Software Library and Utilities Copyright 1998, 1999, 2000, 2001, 2002, 2003 by the Board of Trustees of the University of Illinois. All rights reserved.

Contributors: National Center for Supercomputing Applications (NCSA) at the University of Illinois at Urbana-Champaign (UIUC), Lawrence Livermore National Laboratory (LLNL), Sandia National Laboratories (SNL), Los Alamos National Laboratory (LANL), Jean-loup Gailly and Mark Adler (gzip library).

Redistribution and use in source and binary forms, with or without modification, are permitted for any purpose (including commercial purposes) provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions, and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions, and the following disclaimer in the documentation and/or materials provided with the distribution.
3. In addition, redistributions of modified forms of the source or binary code must carry prominent notices stating that the original code was changed and the date of the change.
4. All publications or advertising materials mentioning features or use of this software are asked, but not required, to acknowledge that it was developed by the National Center for Supercomputing Applications at the University of Illinois at Urbana-Champaign and to credit the contributors.
5. Neither the name of the University nor the names of the Contributors may be used to endorse or promote products derived from this software without specific prior written permission from the University or the Contributors, as appropriate for the name(s) to be used.
6. THIS SOFTWARE IS PROVIDED BY THE UNIVERSITY AND THE CONTRIBUTORS “AS IS” WITH NO WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED. In no event shall the University or the Contributors be liable for any damages suffered by the users arising out of the use of this software, even if advised of the possibility of such damage.

Portions of HDF5 were developed with support from the University of California, Lawrence Livermore National Laboratory (UC LLNL). The following statement applies to those portions of the product and must be retained in any redistribution of source code, binaries, documentation, and/or accompanying materials:

This work was partially produced at the University of California, Lawrence Livermore National Laboratory (UC LLNL) under contract no. W-7405-ENG-48 (Contract 48) between the U.S. Department of Energy (DOE) and The Regents of the University of California (University) for the operation of UC LLNL.

DISCLAIMER:
This work was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor the University of California nor any of their employees, makes any warranty, express or implied, or assumes any liability or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately-owned rights. Reference herein to any specific commercial products, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or the University of California, and shall not be used for advertising or product endorsement purposes.

b64
File: b64.c
Purpose: Implementation file for the b64 library
Created: 18th October 2004
Updated: 2nd August 2006
Home: `http://synesis.com.au/software/`

Copyright (c) 2004–2006, Matthew Wilson and Synesis Software
All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
- Neither the name(s) of Matthew Wilson and Synesis Software nor the names of any contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS “AS IS” AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

STLport
Copyright 1999–2003 Boris Fomitchev

This material is provided “as is”, with absolutely no warranty expressed or implied. Any use is at your own risk.

Permission to use or copy this software for any purpose is hereby granted without fee, provided the above notices are retained on all copies. Permission to modify the code and to distribute modified code is granted, provided the above notices are retained, and a notice that the code was modified is included with the above copyright notice.

The Licensee may distribute binaries compiled with STLport (whether original or modified) without any royalties or restrictions.

The Licensee may distribute original or modified STLport sources, provided that:

- The conditions indicated in the above permission notice are met;
- The following copyright notices are retained when present, and conditions provided in accompanying permission notices are met:

  Copyright 1994 Hewlett-Packard Company
  Permission to use, copy, modify, distribute and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation. Hewlett-Packard Company makes no representations about the suitability of this software for any purpose. It is provided “as is” without express or implied warranty.

  Copyright 1996–1999 Silicon Graphics Computer Systems, Inc.
  Permission to use, copy, modify, distribute and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation. Silicon Graphics makes no representations about the suitability of this software for any purpose. It is provided “as is” without express or implied warranty.

  Copyright 1997 Moscow Center for SPARC Technology.
  Permission to use, copy, modify, distribute and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation. Moscow Center for SPARC Technology makes no representations about the suitability of this software for any purpose. It is provided “as is” without express or implied warranty.

B. In regards to the DataFinder component the following copyright notice applies.

CLucene
The use of CLucene software is governed by the CLucene License Conditions which can be found in the DIAdem help.
Copyright (c)2004, Apache License, Version 2.0.

C. In regards to components used in DIAdem the following copyright notices apply.

CyberX3D
The use of CyberX3D software is governed by the CyberX3D License Conditions which can be found in the DIAdem help.
Copyright (c)2002-2003 Satoshi Konno.

GpHugeF/GpTextStream
The use of GpHugeF/GpTextStream software is governed by a license which can be found in the DIAdem help.
Copyright (c)2003, Primoz Gabrijelcic.

OpenStreetMap
The use of OpenStreetMap tiles is governed by the “Creative Commons Attribution-ShareAlike 2.0 license” which can be found in the DIAdem help.
Copyright (c)OpenStreetMap (and) contributors, CC-BY-SA.

Stingray
This software includes Stingray software developed by Rogue Wave Software division of Quovadx, Inc. Copyright 1995–2006. Quovadx, Inc. All Rights Reserved.

Xerces C++
This product includes software developed by the Apache Software Foundation (`http://www.apache.org/`) that is subject to the Apache License, Version 2.0, a copy of which may be found at: `http://www.apache.org/licenses/LICENSE-2.0`.
Copyright 1999 The Apache Software Foundation. All rights reserved.

B

Technical Support and Professional Services

Visit the following sections of the award-winning National Instruments Web site at ni.com for technical support and professional services:

- **Support**—Technical support at ni.com/support includes the following resources:
  - **Self-Help Technical Resources**—For answers and solutions, visit ni.com/support for software drivers and updates, a searchable KnowledgeBase, product manuals, step-by-step troubleshooting wizards, thousands of example programs, tutorials, application notes, instrument drivers, and so on. Registered users also receive access to the NI Discussion Forums at ni.com/forums. NI Applications Engineers make sure every question submitted online receives an answer.
  - **Standard Service Program Membership**—This program entitles members to direct access to NI Applications Engineers via phone and email for one-to-one technical support as well as exclusive access to on demand training modules via the Services Resource Center. NI offers complementary membership for a full year after purchase, after which you may renew to continue your benefits.

    For information about other technical support options in your area, visit ni.com/services, or contact your local office at ni.com/contact.
- **Training and Certification**—Visit ni.com/training for self-paced training, eLearning virtual classrooms, interactive CDs, and Certification program information. You also can register for instructor-led, hands-on courses at locations around the world.
- **System Integration**—If you have time constraints, limited in-house technical resources, or other project challenges, National Instruments Alliance Partner members can help. To learn more, call your local NI office or visit ni.com/alliance.

You also can visit the Worldwide Offices section of `ni.com/niglobal` to access the branch office Web sites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.