



# DataLog<sup>®</sup> Mapping System

## Operator's Manual

Version 3.0



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## Introduction

The DataLog<sup>®</sup> Mapping System is an easy-to-use add-on to the DigiTrak<sup>®</sup> Locating System that allows you to collect and store drill data electronically. The data can be stored in the DataLog module for later analysis, or the system can be connected to a computer during the drilling process to view the data in real time. All types of data measured by the DigiTrak system can be recorded for later analysis, including the following:

- Date/Time
- Depth
- Topology (Ground Level)
- Left/Right Tracking
- Pitch
- Roll Orientation
- Transmitter Battery Status
- Transmitter Temperature
- Ultrasonic Depth

This manual provides very important information for operating your DataLog system. It first describes the system components and then explains how to install the DataLog software on a PC or laptop, how to use the software (including the menu functions) for data collection and analysis, and how to collect data in the field (including using the real-time feature).

## System Components

The standard DigiTrak system components that are used with the DataLog system include the following: receiver and transmitter.

- **DataLog-Ready DigiTrak Receiver** – Mark II, III, or IV model with version 3.77 firmware or higher.

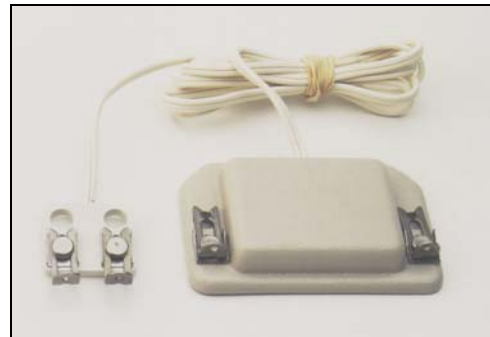


- **DigiTrak Transmitter** – Mark II, III, or IV model.

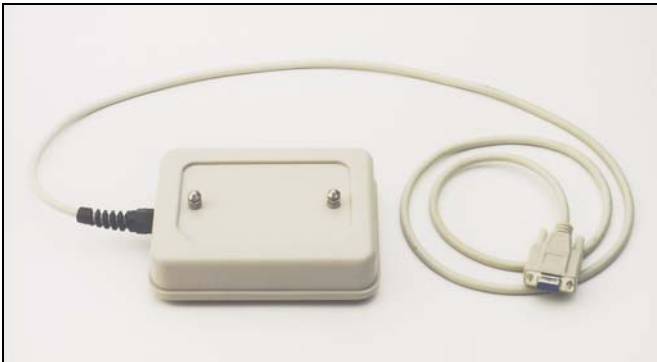
In addition, the DataLog system has the following components: remote display, real-time cable, PC adapter, DataLog module, and DataLog software.



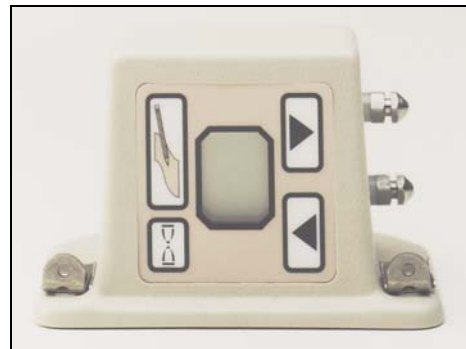
- **DataLog-Ready Remote Display** – Mark II, III, or IV model, shown here with DataLog module attached.



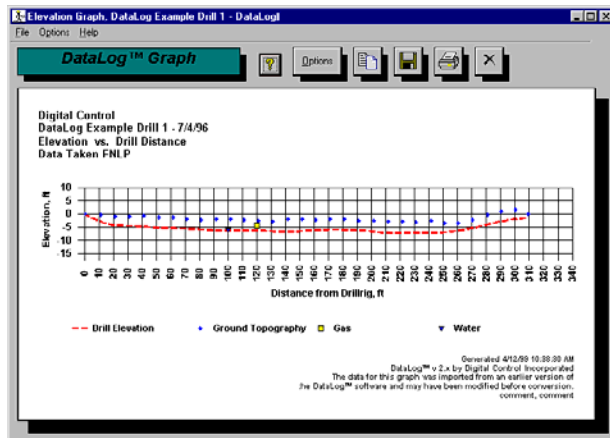
- **Real-Time Cable** – Used with PC Adapter to connect DataLog module to computer for use in the field.



- **PC Adapter** – Used to connect DataLog module to computer. This is required to download data collected in the module or when operating the real-time feature.



- **DataLog Module** – Connects to the remote display and stores up to 99 readings.



- **DataLog Software** – To be installed in customer-supplied PC.

## Attaching the DataLog Module

The DataLog module **MUST** be mounted on the remote display with its display window in the same direction as the display windows on the remote display. To attach the DataLog module, place the module onto the remote display's stainless steel prongs, and then fasten the two slide locks on the module.

**NOTE:** The DataLog module cannot record data without a DataLog-compatible remote display.

## DataLog Module Operation



The DataLog module has a center display window and four touch-sensitive buttons, two above the window and two below the window.

The upper right button on the DataLog module is the “Store Reading” button. Once the drill head or front locate point has been located accurately, you press this button to record the next valid data coming from the receiver. The receiver must be held completely still until the reading is stored (see the “Collecting Data in the Field” section). The upper left logo button is not functional.

The display window on the module shows a two-digit number from 01 to 99 that identifies the data set (rod number/reading number) currently being recorded. Up to 99 numbered data records can be stored in the module's memory. The module has extra memory for readings that are retaken (i.e., when you pull back and have to retake readings). The old reading still takes up space in memory, so you can't retake more than about 40 readings per module. If the memory becomes full, the letters “AO” (all out) will appear in the display window.

**NOTE:** The module automatically increments one reading number after storing a data set. If you have to rerecord measurements, be sure to reset the record number on the display so that the record number sequence is maintained.

The lower part of the module display has two arrow buttons (up and down) that allow you to scroll the data record number up or down if needed (for example, if you want to repeat a measurement or a series of measurements). Each recording is marked with a time/date stamp, and all data available to the remote display are stored in the module.

## Recommended Computer Requirements

- Windows® compatible Pentium 75 MHz or greater processor (customer supplied)
- Microsoft Windows 95, 98, 2000, or NT 4.0
- 24 MB RAM or greater
- 20 MB hard drive space available
- SVGA display running at least 256 colors
- Serial (COM) port available
- Pointing device (mouse)
- Color printer for color graphs

While the DataLog software can run on any computer that is operating Windows 95, the above-recommended specifications should deliver acceptable response time. More RAM and a faster processor are recommended to increase software speed.

## Installing the Software

The DataLog software runs on Microsoft's Windows 95, 98, 2000, or NT (4.0 or above) platforms. It is provided on a single CD-ROM.

### Installation Procedure

**NOTE:** Read **ALL** the following instructions **BEFORE** installing the DataLog software.

1. Before inserting the DataLog CD-ROM, close any open applications, including any desktop toolbars. The DataLog setup program cannot install system files or update shared files if the files are in use. If you are installing onto a Windows NT platform, it is suggested that you log on to your computer with administrative permissions.
2. Put the CD-ROM in its drive.
3. From the Windows Taskbar select **Start | Run | X:\setup** (where *X* is the CD-ROM drive letter, typically "d").



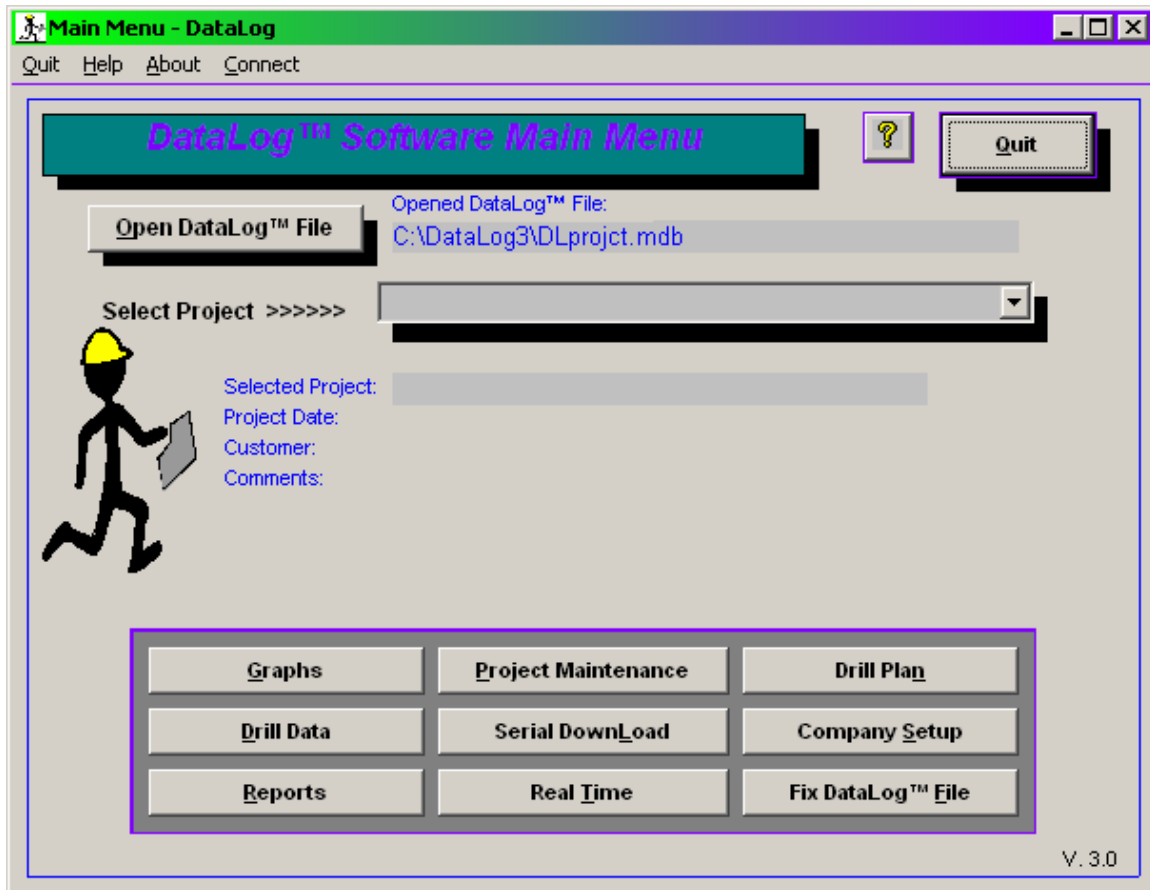
4. Then a window will appear asking you to make sure that you have no open applications. Verify that you have closed all programs and click "Next."



5. You will then see a screen prompting you to click the setup button to continue installation. Click the button to accept the default installation folder.  
If you want to change where the program will be loaded click "Change Directory" and indicate the location you wish the program to be loaded to in the dialog box.
6. If you have an earlier version of DataLog installed on your computer, the program will ask you if you want to convert those files into a format that the new version of the program can read. Converting your old files does not affect your existing files and they are still useable with your older version of the DataLog software.
7. After the program has loaded, a DataLog program group will be installed under the Programs menu. This group will include the program icon, the ReadMe file, a boresheet, and a copy of the manual in Microsoft Word format. An icon is also placed on your desktop for easy access to the program.
8. Be sure to send in the Product Registration Card to receive future information on software patches, fixes, and updates.

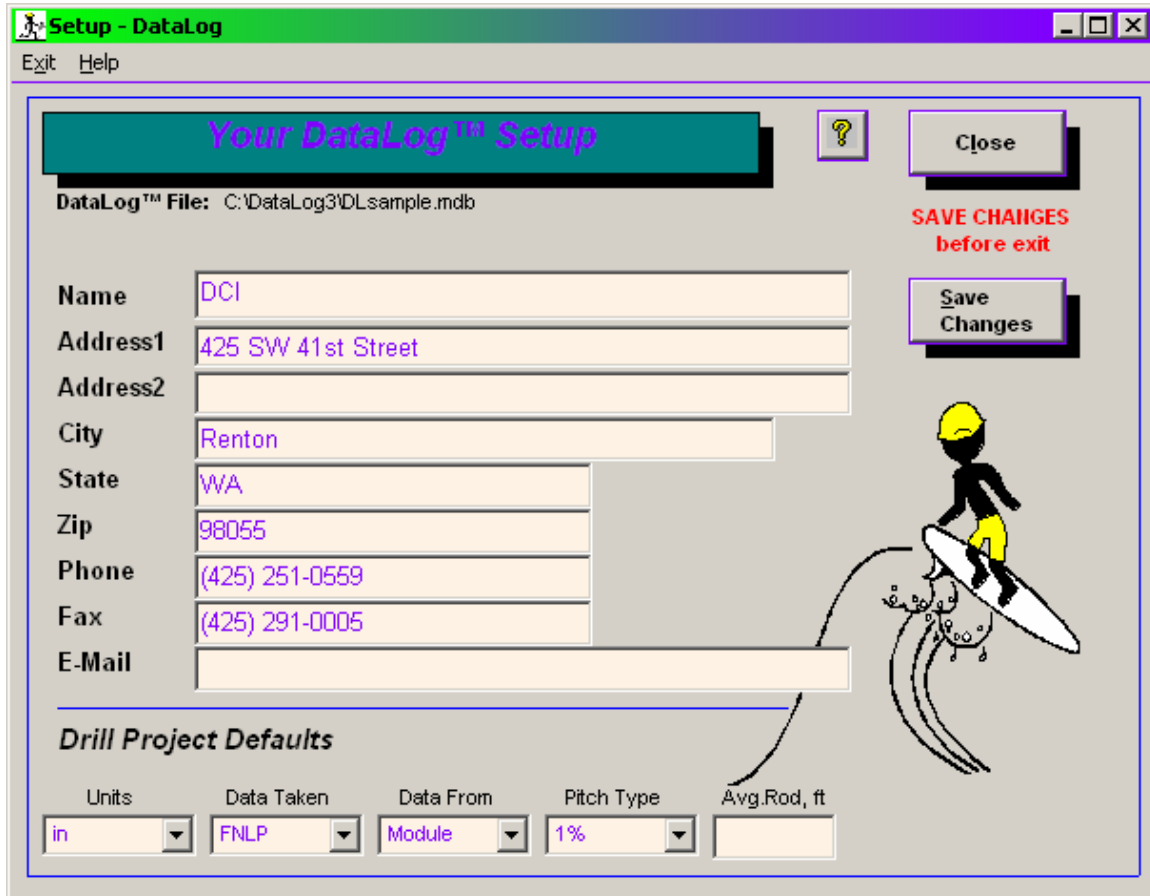
## First-Time Operation

1. When you start up the DataLog program (select **Start | Programs | DataLog3** or click on the icon on your desktop) for the first time, you will see the DataLog Welcome screen followed by the DLM Connection screen (if you are using the DataLog module with the PC Adapter at this time, see “Connecting the DataLog Module with PC Adapter” in the next section; otherwise click “No” to advance from the Connection screen).
2. After either clicking “No” or connecting the DataLog module and PC adapter, you will see the Main Menu screen. From the Main Menu, you must first open a database, and then you will enter your company information.



3. First click on the “Open DataLog File” button and select DLsample.mdb.
4. Next click on the “Select Project” drop-down list and select DataLog Example Drill.
5. Then click on the “Company Setup” button to open the Setup - DataLog form.

- In the Setup form, complete the information requested regarding the registered owner/company of the DataLog software. In the “Drill Project Defaults” section, enter default selections for your projects. Each new project you start in the Project Maintenance screen (see “Main Menu” in next section) will begin with these default settings, but they can be changed at any time. These defaults are database specific. You may use different defaults for each database.




The screenshot shows a window titled "Setup - DataLog" with a menu bar containing "Exit" and "Help". The main area is titled "Your DataLog™ Setup" and contains the following fields and sections:

- DataLog™ File:** C:\DataLog3\DLsample.mdb
- Name:** DCI
- Address1:** 425 SW 41st Street
- Address2:** (empty)
- City:** Renton
- State:** WA
- Zip:** 98055
- Phone:** (425) 251-0559
- Fax:** (425) 291-0005
- E-Mail:** (empty)
- Drill Project Defaults:**
  - Units: in
  - Data Taken: FNLP
  - Data From: Module
  - Pitch Type: 1%
  - Avg.Rod, ft: (empty)

Additional UI elements include a question mark icon for help, a "Close" button, a "Save Changes" button, and a red warning text: "SAVE CHANGES before exit". A cartoon character of a person surfing is also present on the right side of the form.

## Online Help

A copy of this manual is available from directly within the DataLog Program as online help. To access the help file, press the “F1” button on the top row of your keyboard or click the  button wherever it appears. Context sensitive help will appear on the screen. Click the <Esc> button on your keyboard to get out of help and return to the program.

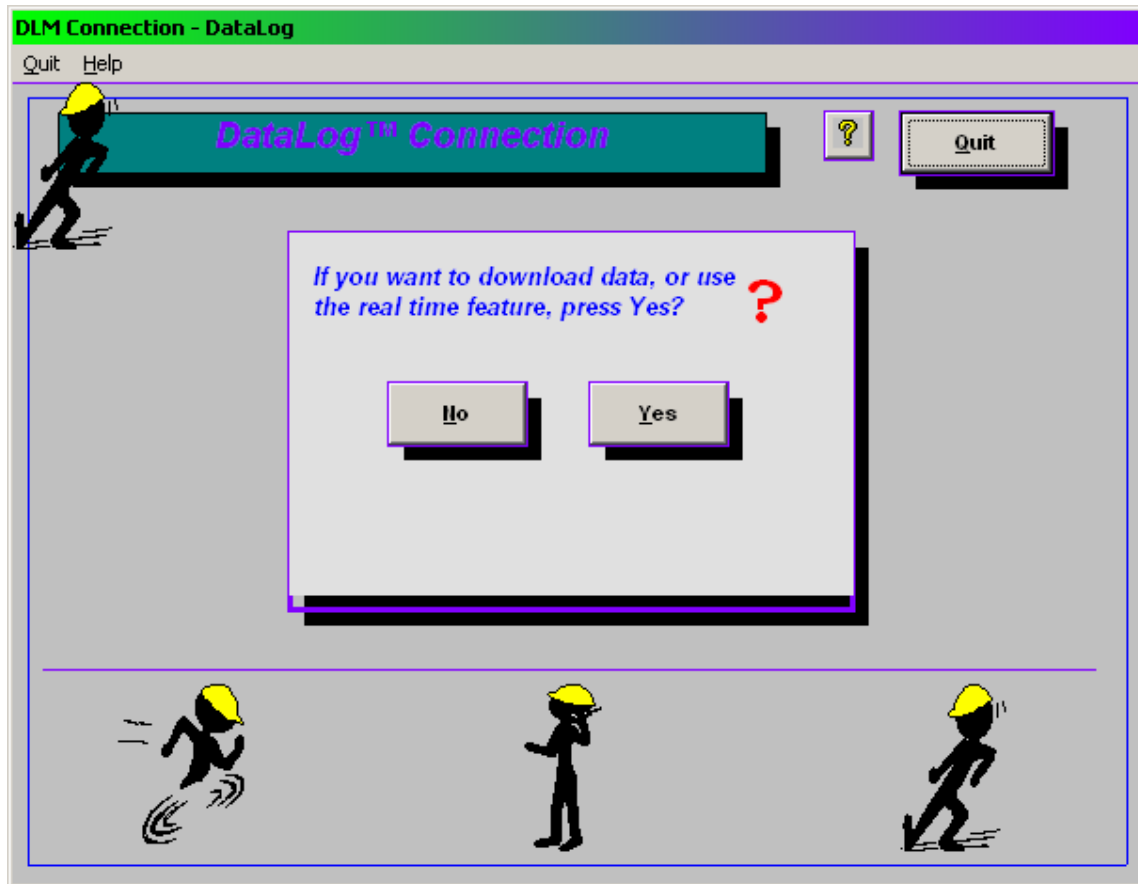
## Using DataLog Software

The DataLog software allows you to track projects, communicate with the DataLog module, and use the real-time feature in the field.

1. To start the software, Select **Start | Programs | DataLog3** or click on the desktop icon. You will see the Welcome screen with information about the DataLog software, such as the version number, and contact information for Digital Control Incorporated (DCI). Click "Continue" to proceed with the program.



2. The next screen is the DLM Connection screen. If you will not be using the DataLog module with the PC adapter at this point click “No” and skip the next section—proceed to the “Main Menu” section. If you will be using the DataLog module with the PC adapter, then you must first set up the communications port correctly. In this case, click “Yes” here and proceed to the next section for instructions on setting up the DataLog connection.



## Communications Port for Using DataLog Module with PC Adapter

1. You must set up the communications port correctly so that the DataLog module can communicate with the software. After clicking “Yes” at the DLM Connection screen in the previous step, the following screen will appear.



**NOTE:** The DataLog module MUST be connected to the PC before proceeding with the program.

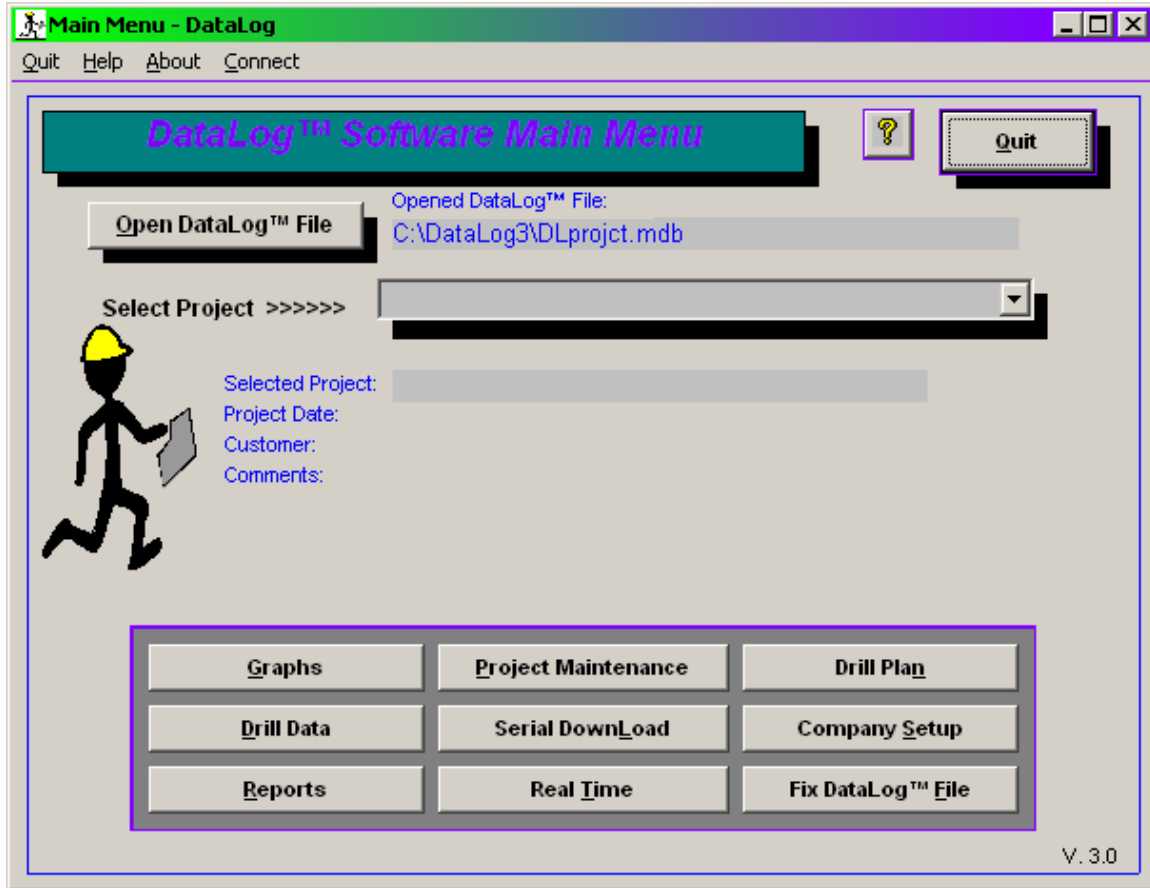
2. You will see a “Select Serial Port” drop-down menu along with a “Test for Possible Ports” button. If you know which serial port the module is connected to, select it from the drop-down list. If you do not know the number of your serial port, you can test for suggestions.

To test for possible ports, either choose a port (and use the process of elimination until you find a number that works) or use the test function. To use the test function, first check your connection to make sure that the module is securely connected to a port on your PC. Next click the “Test for Possible Ports” button. If there are any working devices on your computer, the test function will detect them and suggest those port numbers. The test function may suggest more than one port. This is because other devices, such as serial modems, can look like a functioning device to the program. Simply try one of the suggested ports by selecting it from the drop-down menu and continuing with the program. If the test function cannot detect any devices or the suggested ports are not valid, check your module setup and your connections and try the test again.

3. After selecting the serial port number from the drop-down list, click on “Continue” to proceed to the Main Menu (see next section).

## Main Menu

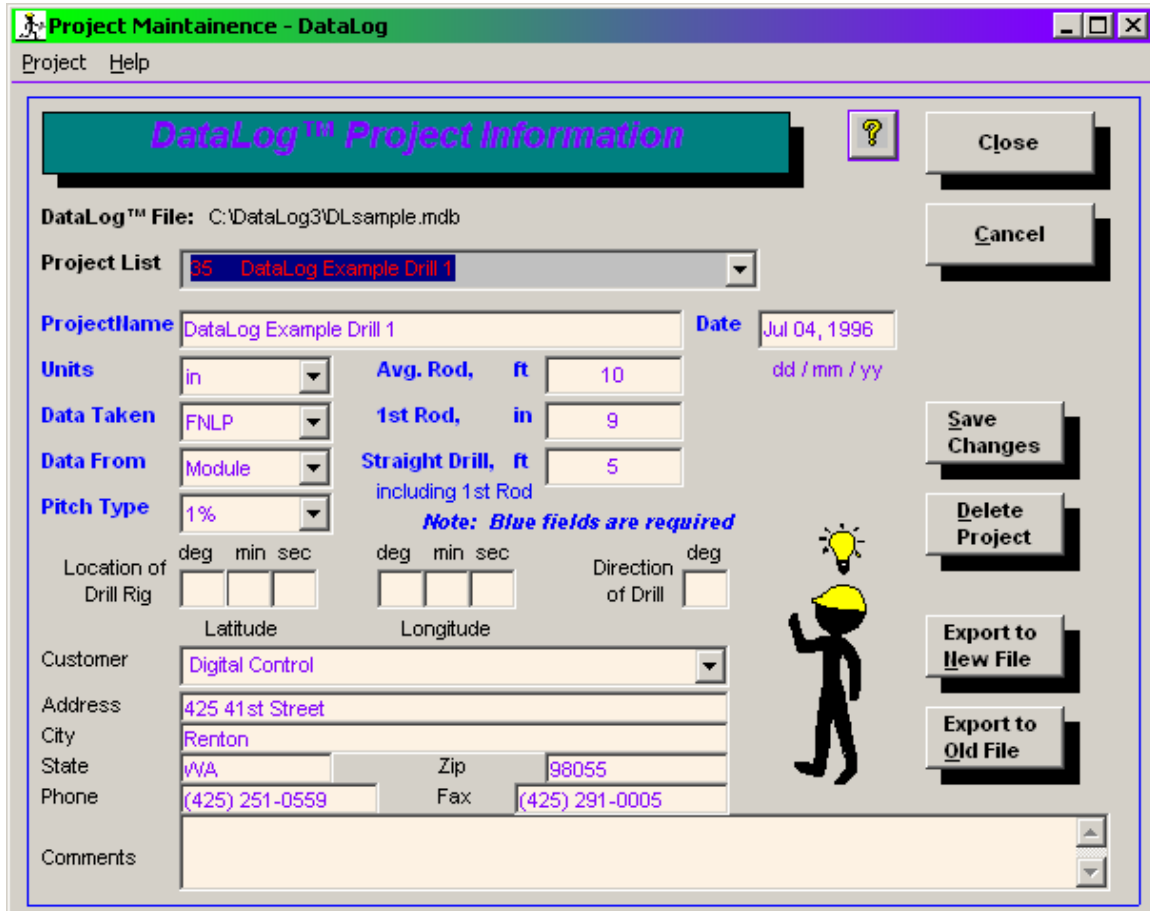
The main menu allows you to open projects for viewing, printing, or analysis. It has functions buttons at the bottom of the screen to access the various DataLog functions. The purpose of each button is explained in subsections on the following pages. These subsections are provided in the following order: Project Maintenance, Graphs, Drill Data, Reports, Serial Download, Real Time, Drill Plan, and Fix DataLog File. The “Company Setup” button brings you to the Setup screen, which is discussed under the “First-Time Operations” section.



1. At the Main Menu screen, first choose a database by clicking on the “Open DataLog File” button. This will open a standard “Open File” dialog box. Select a database and click OK.
2. Next, you must select a project. Use the “Select Project” drop-down list to view all projects in the selected database. Click on the desired project. To begin a new project click on the “Project Maintenance” button at this point (see “Project Maintenance” later in this section).
3. Select a function from the rows of buttons at the bottom of the screen. If this is a new project (or to make project modifications) choose “Project Maintenance.”

## Project Maintenance

The Project Maintenance form allows you to set up a new project, edit information for existing projects, and export projects to other databases. To access the form, click the “Project Maintenance” button on the Main Menu.



The project information requested on this form needs to be completed to set up a new project. All information labeled in blue is mandatory—these fields are described in the list below. All other fields are optional and refer to the project customer.

- Project Name – Name of this particular project. This name will show up in the drop-down project list on the Main Menu screen. Do not use apostrophes (') in the project name.
- Units – Measurement units for data; the units specified on this form must match the receiver's settings. Select “in.” (inches) to use the English system and “cm” for the metric system.
- Data Taken – Specifies where data points were taken. Choose “FNLP” if the project data were taken at the front locate point, “Over Head” if the data were taken over the drill head. Please note that left/right deviation cannot be recorded or calculated if the data are taken over the drill head.
- Pitch Type – Choose “1%” or “0.1%” to match the sensitivity of the transmitter used on this project.
- Average Rod – This is the average length of each rod used on this project. DataLog readings must be taken at the same point on each rod consistently (typically when each new rod is added).

- 1<sup>st</sup> Rod – The initial DataLog reading is taken as the drill head penetrates the plane of the ground (with half the drill head under the ground level). The length of the drill stem left on the rack (from drive chuck to make-up/break-out clamps) is the “1<sup>st</sup> Rod Length.”
- Straight Drill – This is the distance drilled straight before steering and should include any portion of the first rod that is part of that first straight drill.

### **How to Set Up a New Project**

1. Select “New Project” in the drop-down box labeled “Project List”.
2. Type in all the necessary information in the appropriate boxes.
3. Click “Save Changes” to save the information to the database.
4. Click “Close” to return to the Main Menu.

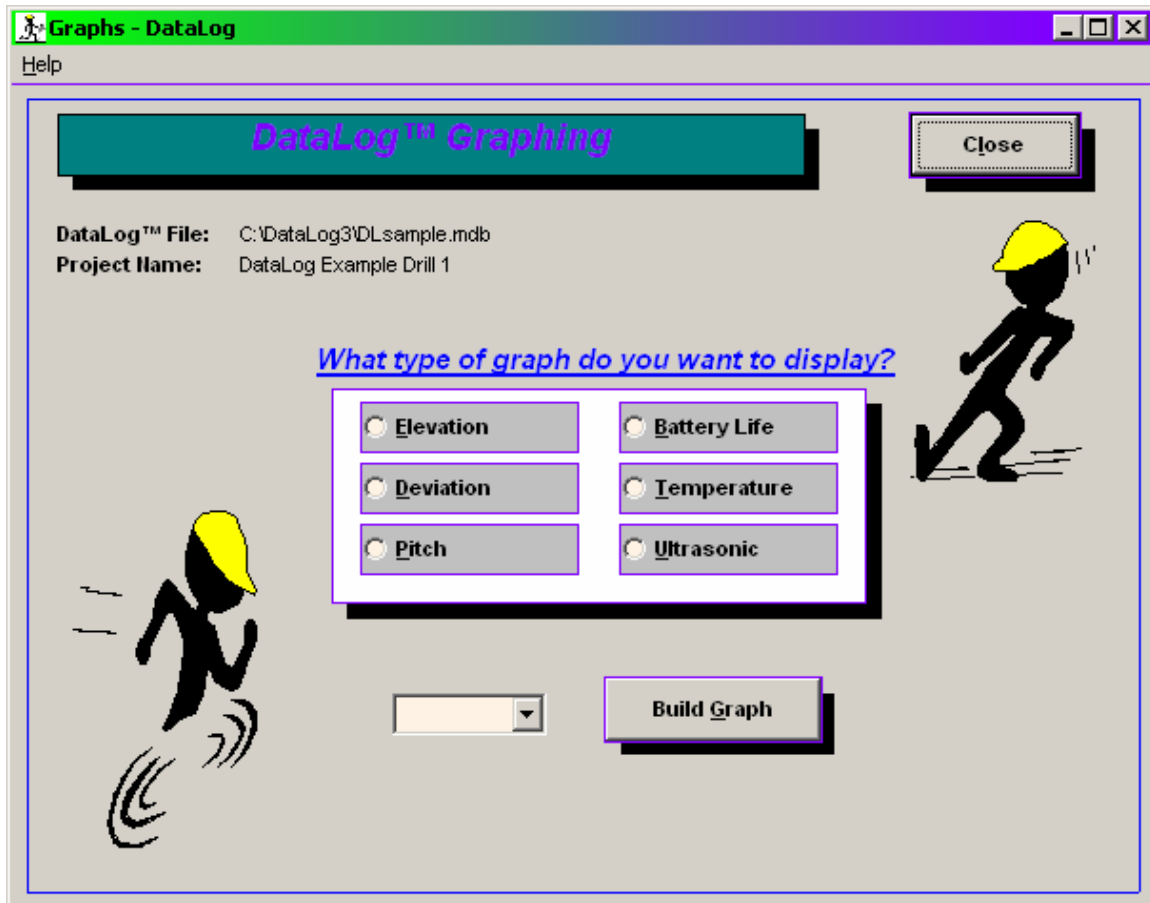
**NOTE:** You can press the “Cancel” button at any time to cancel changes made to project information and return to the Main Menu.

### **How to Export a Project to a Different Database**

1. Select the project in the “Project List” drop-down box.
2. If you want to export to an existing database, click on the “Export to Old File” button.
3. If you want to export to a new database, click on the “Export to New File” button.
4. A dialog box will appear. Select the database you want to export the project to (or for a new database type in the name of the new file). Click “OK.”
5. You will then see a “Project Copied” message box.
6. Click “Exit” to return to the Main Menu.

## Graphs

After you have downloaded data into your selected project, you can display the project data in a variety of graphic formats. To display a graph, select the “Graphs” button from the Main Menu. The following screen will appear asking what type of graph you want to display.

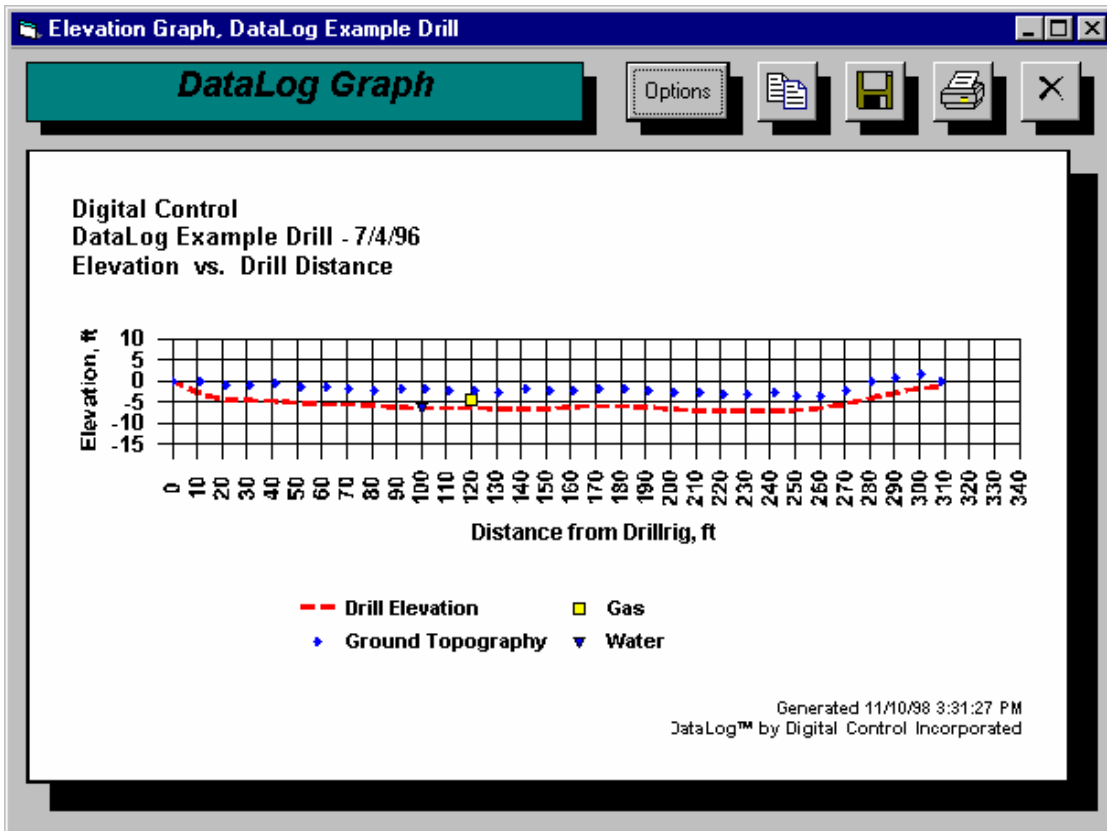


The “Deviation” graph type will not be visible if the data were taken over the drill head, since left/right deviation can only be calculated for measurements taken at the front locate point (FLP) using the reference line.


If you select “Elevation”, a units box will appear. Choose the units for displaying the depth (feet or inches for the English system; meters or centimeters for the metric system). NOTE: You must have entered a topography point for your last recorded rod to display an elevation graph.

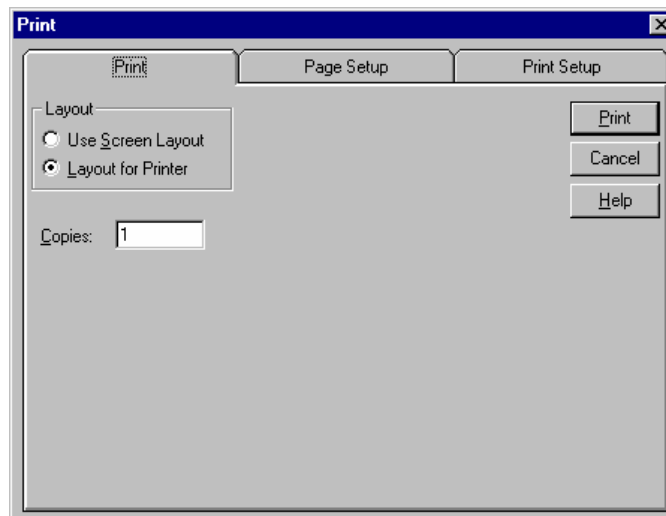
Graphs cannot be displayed if invalid data exist in the database, such as negative rod numbers or duplicate rod numbers. Invalid data must be edited or removed using the “Drill Data” function before graphs can be displayed.

After selecting a type of graph click on the “Build Graph” button. If all the data in the database are valid, the graph screen will open with the type of graph generated appearing on the screen, as shown in the next screen shot. Graphs can be printed, copied, saved or modified.



### Printing a Graph

1. Click the "Print" button . You will first be asked if you wish to print the graph as it appears on the screen or if you would like it specially formatted for the printer.
2. Next a Print dialog box will appear with three tabs: Print, Page Setup, and Print Setup.

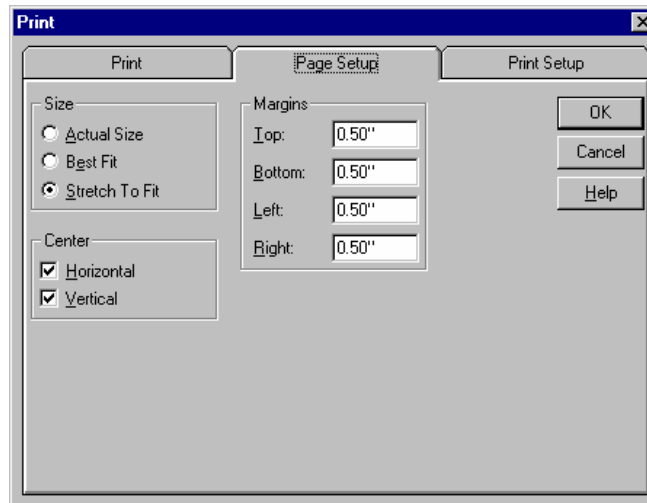


**Print Tab:**

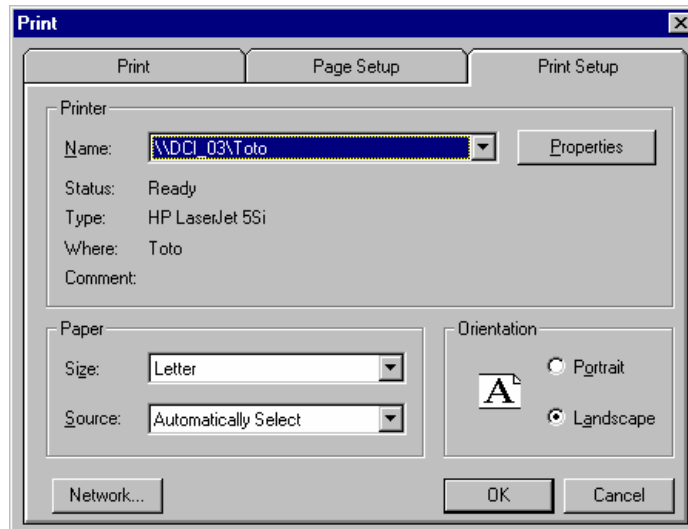
- Layout – It is recommended that you select “Layout for Printer”.
- Copies – Box to input the number of copies of the graph you want.
- Print – Prints the graph.
- Cancel – Cancels printing and close dialog box
- Help – Displays help for this box

**Page Setup Tab:**

- Size – Choose how you want the graph sized to the page. Stretch to fit shows the most detailed graph
- Center – Choose if you want the graph centered horizontally and/or vertically on the page.
- Margins – Margins are typically set to 0.5 in. for the biggest graph on the page. Consult your printer manual for limits on these settings.




Print Setup Tab: The typical print setup settings are shown below.




3. After making your selections under the three print tabs in the Print dialog box, return to the Print tab and click “Print” to print the graph with the selected settings. NOTE: Clicking “OK” on the Page Setup tab sets up the page but closes the dialog box without printing the graph.

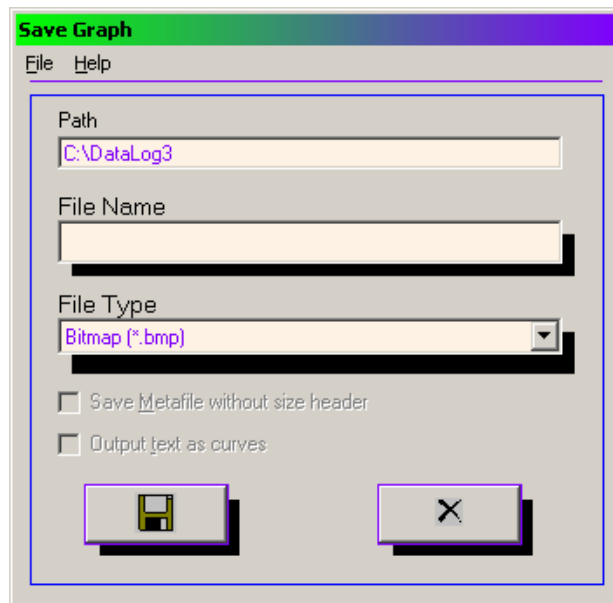
### Copying a Graph

1. Click the “Copy” button . This copies the graph to the clipboard.
2. Go to the application where you want to copy the graph image. Any application that accepts bitmap (BMP) images should accept the image from the clipboard.
3. Select **Edit | Paste** from the application’s menu or toolbar or press Ctrl + v to place the image into the document.

**NOTE:** The quality of copied BMP images is generally poor. A higher-quality image can be used if the graph is “saved” rather than “copied.”

### Saving a Graph

1. Click the “Save” button . A “Save Graph” dialog box will open.



2. Enter a File Name.
3. Select a File Type from the drop-down box.
4. If you choose a Windows Metafile (WMF) file type, choose whether or not to save without a size header and output text as curves (see note below regarding file types).
5. Click the “Save” button in the dialog box.

**A Note About File Types** – The file type that you choose for saving your graph has a tremendous impact on the quality of the image and where you can use the image. The available file types (VTC, BMP, and WMF) are explained below.

- The Chart File (VTC) type can only be used in this program or with First Impressions' Chart Program.
- The Bitmap (BMP) type is the most flexible. Most programs will recognize this type of file. Unfortunately, the image quality is very poor.
- The Windows Metafile (WMF) type gives the best image quality. This type can be used within most Microsoft programs, such as Word and Excel. If you select Windows Metafile, then the two options below become available.
  - “Save Metafile Without Size Header” refers to the Adobe placeable header available with this file type. You must not check this option if you are going to place the image into a Microsoft program.
  - “Save Text as Curves” should be used if the file will be placed in a program that does not recognize the font used or if you intend to stretch the image.

### **How to Place a Graph into Microsoft Word or Excel**

First, save the graph in the DataLog program:

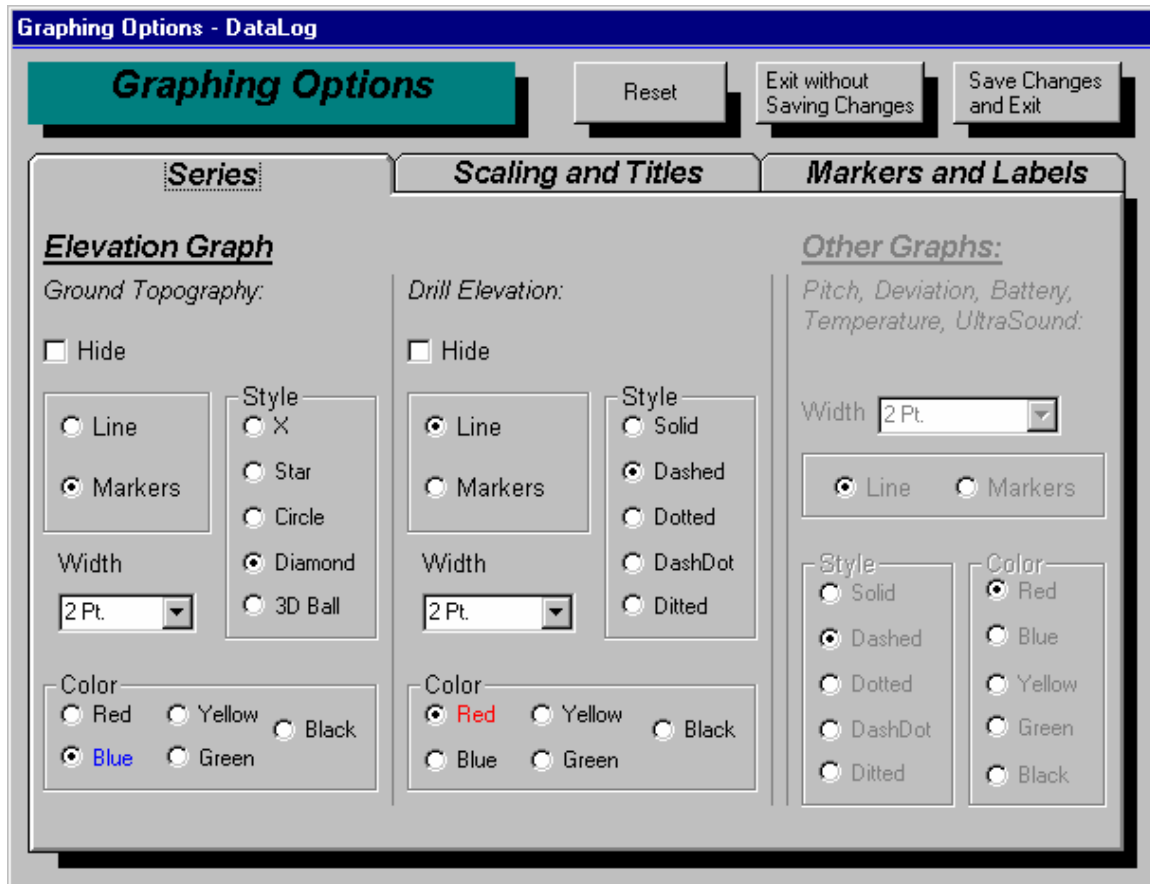
1. In the “Save Graph” form, enter an appropriate file name.
2. Select “Windows Metafile (.wmf)” as the file type.
3. Do not select either of the two saving options (Header info or text as curves).
4. Click on the “Save” button.

Then open the Microsoft Word or Excel application and place the graph as follows:

1. Place the cursor where you want the graph image to appear.
2. Under the “Insert” menu, go down to “Picture” and select “From File.”
3. Locate the file you saved your graph as (probably in the C:\DataLog3 folder).
4. Click the “Insert” button. The image will appear in your document sized appropriately. This will provide the highest-quality version of the graph (much better than a file of another type or copying and pasting the image).

## Graphing Options

Clicking on the “Options” button on the graph page will open the “Graphing Options” window, which allows you to make changes to the appearance of your graph. The first time the screen appears for each project, it will contain the options that the program uses to display the current graph. Most options are only available for elevation-style graphs.



The “Graphing Options” form has three buttons as follows:

- The “Reset” button undoes all changes you have made and sets the defaults in the database back to the original way the program displayed the graph.
- “Exit without Saving Changes” exits the Default Changes Screen but does not change anything. The defaults and graph display will remain the same as they were before you opened the changes window this time.
- “Save Changes and Exit” will save your defaults to the database and redraw the graph using your new defaults. Each time you open this particular graph for this project it will be displayed with these display defaults until you change the defaults again or click on “Reset” in this screen.

The “Graphing Options” form also has three tabs with various options. The first tab is the “Series” tab, as shown in the screen above. If the currently generated graph is an elevation graph, the first two columns (Ground Topography and Drill Elevation) will be enabled. If the current graph is anything other than an

elevation graph, the third column (Other Graphs) will be displayed. Defaults set in “Other Graphs” will apply to all graphs other than elevation. Each column has basically the same options, after the “Hide” button, as described below.

- The first box is for selecting the way the series will be displayed, either as markers for each point or as a line. Selecting one or the other changes what is available in the Style box.
- Style – If “Line” is chosen in the first box the choices for line Style are solid, dashed, dotted, dashdot and ditted (square “dots” which print better for low resolution than round dots). If “Markers” is chosen in the first box the choices are X, Star (\*), Circle, Diamond, and 3D Ball.
- Width – This drop-down box allows you to determine the width of the line or the size of the marker used to display the series. NOTE: Some markers do not display well with certain widths (e.g., if Stars and 3D Balls are so small that you can barely see them or they look like circles, try increasing the “Width” size).
- Color – You can select the color that the series markers or line will be displayed in.
- Hide – Check this box if you do not want the series to be displayed (i.e., check “Hide” in topography to display only the drill points). *Available only for elevation graphs.*

The second tab in the “Graphing Options” form is the “Scaling and Titles” tab, as shown below. These options are available for elevation graphs only.

**Graphing Options - DataLog**

**Graphing Options** [Reset] [Exit without Saving Changes] [Save Changes and Exit]

**Series** | **Scaling and Titles** | **Markers and Labels**

**X - Axis**

Automatic Scale

Minimum, ft.

Maximum, ft.

Major Divisions

Minor Divisions

Show X - Axis Title

X - Axis Title

**Y - Axis**

Automatic Scale

Minimum, ft.

Maximum, ft.

Major Divisions

Minor Divisions

Show Y - Axis Title

Y - Axis Title

Show Legend

Show Chart Title

Title Text

Show Comments

Comments

Note: Changing comments here does NOT change the comments stored on the project setup page. Extensive comments may change the layout of other graph components.

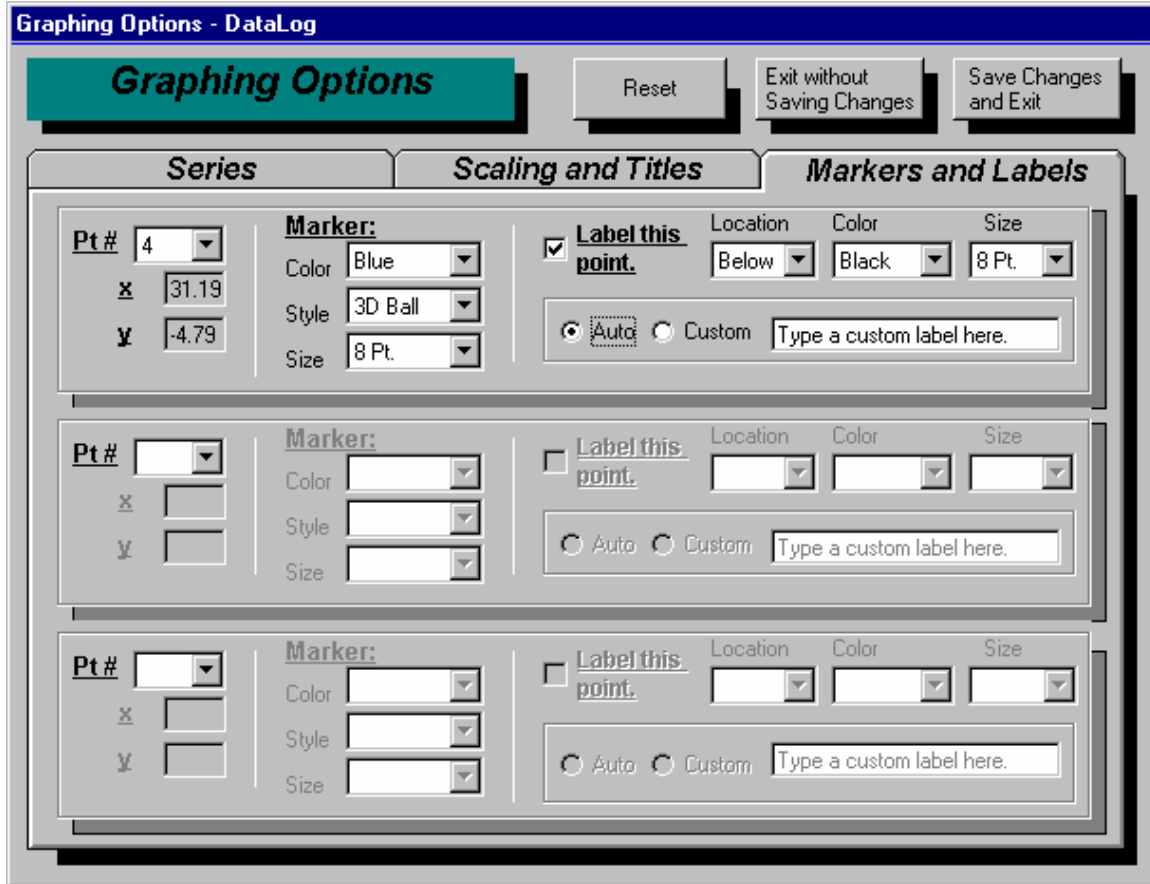
The “Scaling and Titles” tab provides several options. The first column deals with the dimensions of the x-axis (horizontal distance); the second is for the y-axis (vertical distance), as discussed below:

- Automatic Scale – Check this box if you want the program to automatically scale the graph.
- Minimum – This is the starting value for the axis. *Available only if Automatic Scale is not checked for this axis.*
- Maximum – This is the ending value for the axis. *Available only if Automatic Scale is not checked for this axis.*
- Major Divisions – How many division marks you want displayed and labeled on the axis. It is recommended that the total distance be evenly divisible by the number of major divisions so that the axis labels will be whole numbers. *Available only if Automatic Scale is not checked for this axis.*
- Minor Divisions – How many minor division marks you want between the major division marks. These markers are not labeled. A value of 1 results in no visible minor markings. *Available only if Automatic Scale is not checked for this axis.*
- Show X(Y) Axis Title – Check to display the axis title.
- X(Y) Axis Title – The text of the axis title. *Available only if Show Axis Title is checked.*

The third column in the “Scaling and Titles” tab provides more general display options:

- Show Legend – Check here if you want the Legend to be displayed.
- Show Chart Title – Check here if you want the Chart Title to be displayed.
- Chart Title – The text of the Chart Title. *Available only if Show Chart Title is checked.*
- Show Comments – Check here if you want to display comments under the footnote.
- Comments – The comments to display under the footnote. The default is to display any comments in the comments box in Project Maintenance. However any changes made to comments here will be displayed on the graph but will not change the comments as they appear in the Project Information itself and therefore will not be changed for reports. The maximum number of characters that can be saved in the database is 255. *Available only if Show Comments is checked.*

The third tab in the “Graphing Options” form is the “Markers and Labels” tab, as shown below. These options are available for elevation graphs only.



To put a marker or label on a particular point on your graph, choose the point from the drop-down list. Up to three points are available. When you choose a point the x,y coordinates will be displayed. You can then choose options for marking and labeling the point.

**Marker:**

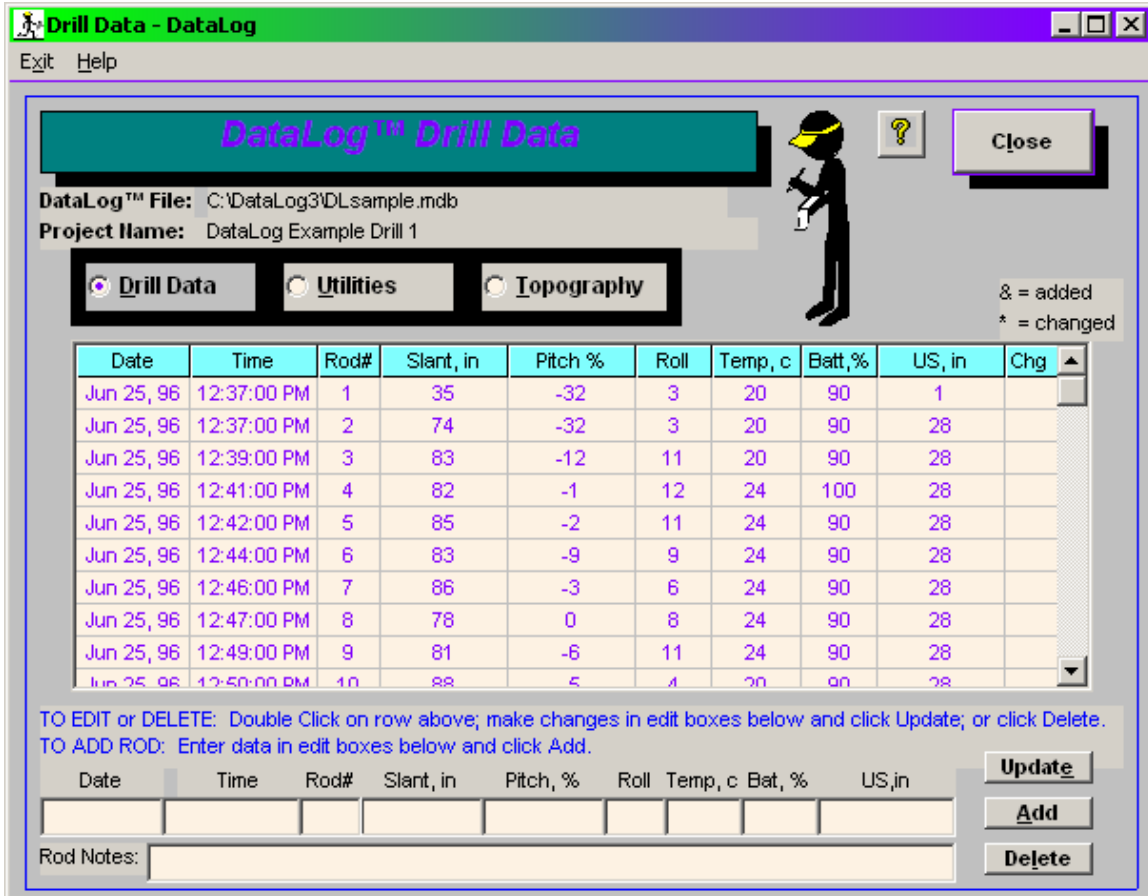
- Color – The color of the marker.
- Style – The style of the marker (X, Star, Circle, Diamond, or 3D Ball)
- Size – A point size for the marker
- Cancel – Cancels printing and close dialog box
- Help – Displays help for this box

**Labeling:**

- Label this point – Check this if you want a label to go with the marker.
- Location – Location of the label (Above the point, Below the Point, Centered on the Point or to the Left or Right of the Point). *Available only if Label this Point is checked.*
- Color – The color of the label font. *Available only if Label this Point is checked.*
- Size – The size of the label font. *Available only if Label this Point is checked.*
- Auto – Select if you want the point to be labeled with the x/y coordinates and not the custom label. *Available only if Label this Point is checked.*
- Custom – Select if you want to type in your own label in the box to the right. *Available only if Label this Point is checked.*

## Drill Data

The Drill Data screen is where you can view and update data once it has been downloaded. To view rod-by-rod data, select "Drill Data" from the option buttons at the top of the screen. The date, time, rod number, slant, pitch, roll, temperature, battery, and ultrasonic measurements from the database will be displayed.



**DataLog™ Drill Data**

DataLog™ File: C:\DataLog3\DLsample.mdb  
Project Name: DataLog Example Drill 1

Drill Data    Utilities    Topography

& = added  
\* = changed

Date	Time	Rod#	Slant, in	Pitch %	Roll	Temp, c	Batt, %	US, in	Chg
Jun 25, 96	12:37:00 PM	1	35	-32	3	20	90	1	
Jun 25, 96	12:37:00 PM	2	74	-32	3	20	90	28	
Jun 25, 96	12:39:00 PM	3	83	-12	11	20	90	28	
Jun 25, 96	12:41:00 PM	4	82	-1	12	24	100	28	
Jun 25, 96	12:42:00 PM	5	85	-2	11	24	90	28	
Jun 25, 96	12:44:00 PM	6	83	-9	9	24	90	28	
Jun 25, 96	12:46:00 PM	7	86	-3	6	24	90	28	
Jun 25, 96	12:47:00 PM	8	78	0	8	24	90	28	
Jun 25, 96	12:49:00 PM	9	81	-6	11	24	90	28	
Jun 25, 96	12:50:00 PM	10	88	5	4	20	90	28	

TO EDIT or DELETE: Double Click on row above; make changes in edit boxes below and click Update; or click Delete.  
TO ADD ROD: Enter data in edit boxes below and click Add.

Date   Time   Rod#   Slant, in   Pitch, %   Roll   Temp, c   Bat, %   US, in

Rod Notes:

Update  
Add  
Delete

### To Edit Drill Data

1. Double click on the row of data you wish to edit. That row's data will appear in the boxes at the bottom of the screen.
2. Make changes to the data in the edit boxes.
3. Click the "Update" button to the right of the edit boxes to update the information.

**NOTE:** All modified data will be marked with an asterisk (\*) in the last column in the Drill Data screen. Modified data will be identified on reports and graphs.

### To Add Drill Data

1. Make sure that no existing rod data are in the edit boxes (they should be empty).
2. Input data in the edit boxes following the format of existing data.
3. Click “Add” to add the data to the database.

**NOTE:** All added data will be marked with an ampersand (&) in the last column in the Drill Data screen. Added data will be identified on reports and graphs.

### To Delete Drill Data

1. Double click on the row of data you wish to delete. That row’s data will appear in the boxes at the bottom of the screen.
2. Click “Delete” to the right of the edit boxes.

### To View or Restore Data

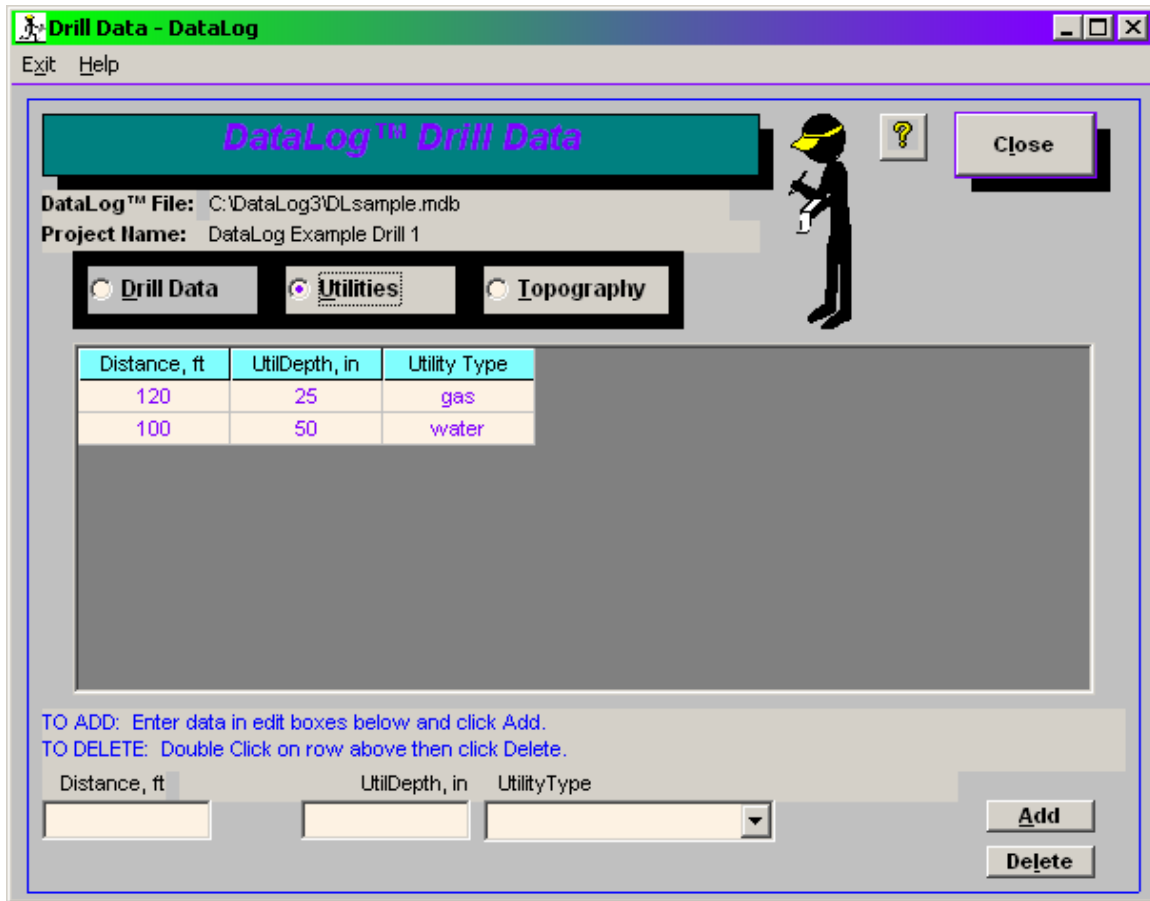
At any time you may view the data as it was originally downloaded by clicking the “View Original Data” button. If you are viewing the original data and you wish to return to the data you have updated, click on the “Drill Data Option” button (next to the “Utilities” and “Topography” buttons).

If you wish to return your database to the originally downloaded data, click the “Restore to Original Data” button. Once you have clicked this button you cannot retrieve the changes you made.

### Utilities Drill Data

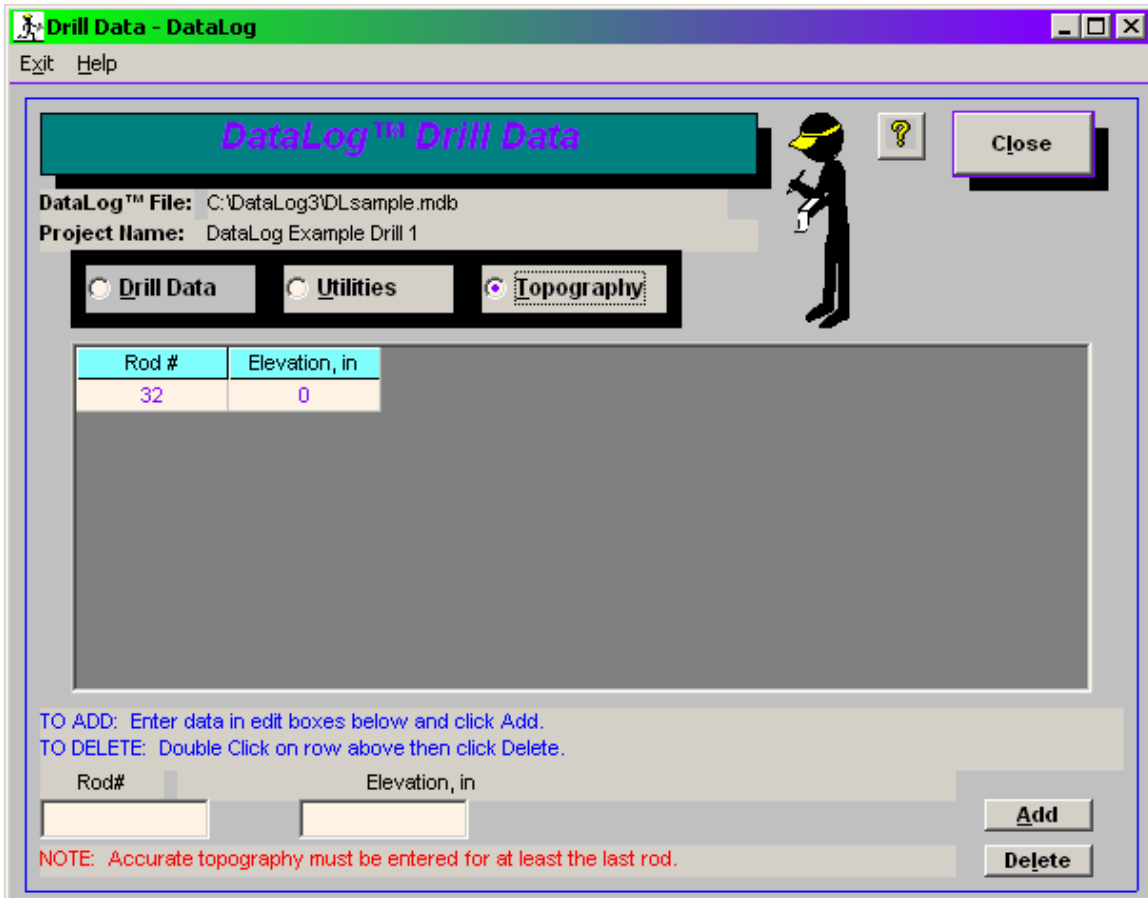
To view, update, or delete utility data click on the “Utilities” option button at the top of the screen. You will see the following screen (next page).

On this screen, enter utility data as you would drill data. “Distance” is the distance from the beginning of the drill to the utility measured horizontally. Choose a utility from the drop-down list: cable, gas, power, road, sewer, telephone, water, or misc. You may also type in as many as four new types of utilities. Added and modified utility data are not marked. Utilities will appear on the elevation graph if they are within the graphed range.



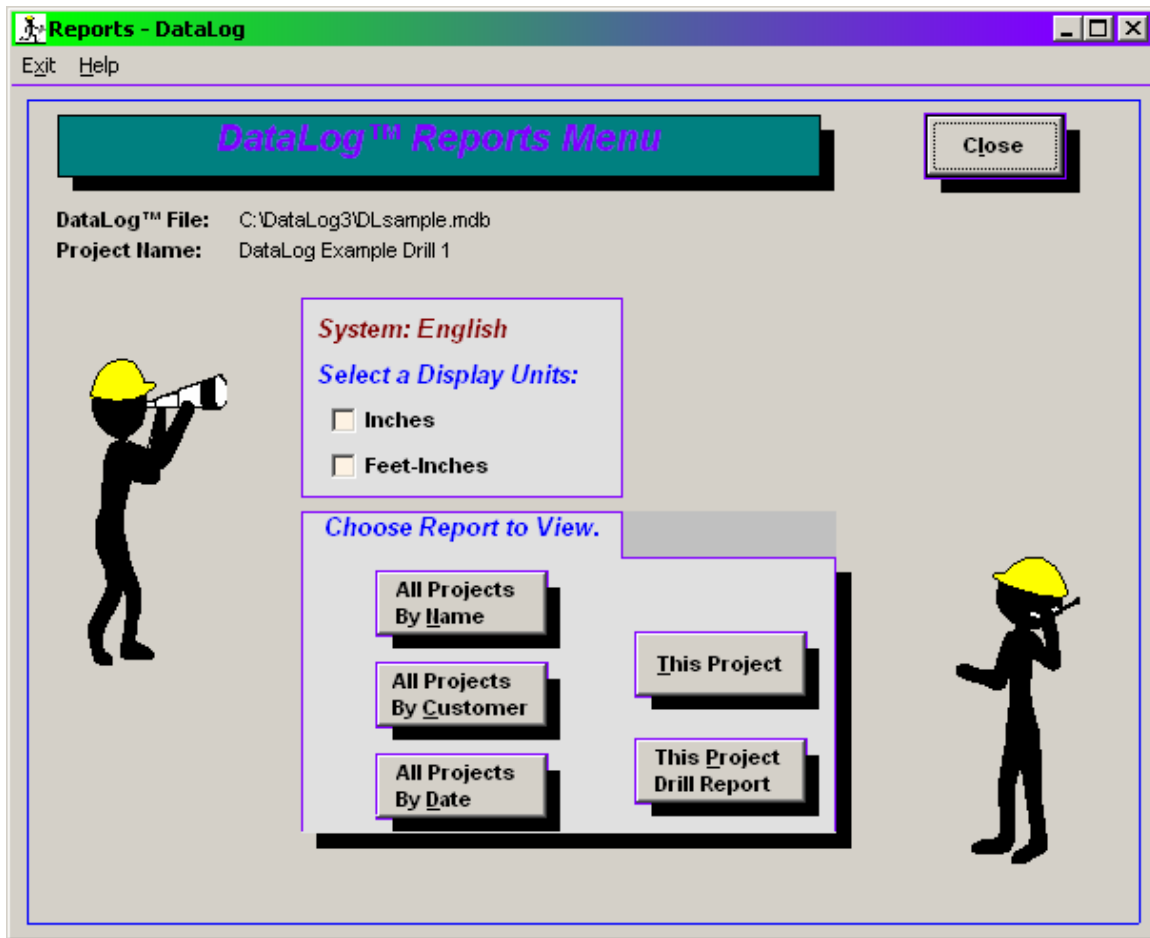
## Topography Drill Data

To view, update, or delete topography points, click on the “Topography” option button at the top of the screen. Enter topography data as you would drill data. “Rod #” is the rod number corresponding to where the topography measurement was taken. Elevation is the height of the point relative to the topography at the start of the drill. For the most accurate calculations and graphs, you must enter the topography point at the last drill rod.



**NOTE:** To build a graph, you must enter the elevation of the last rod recorded for that bore.

## Reports



Clicking on the “Reports” button from the Main Menu provides five report options that allow you to view or print project data:

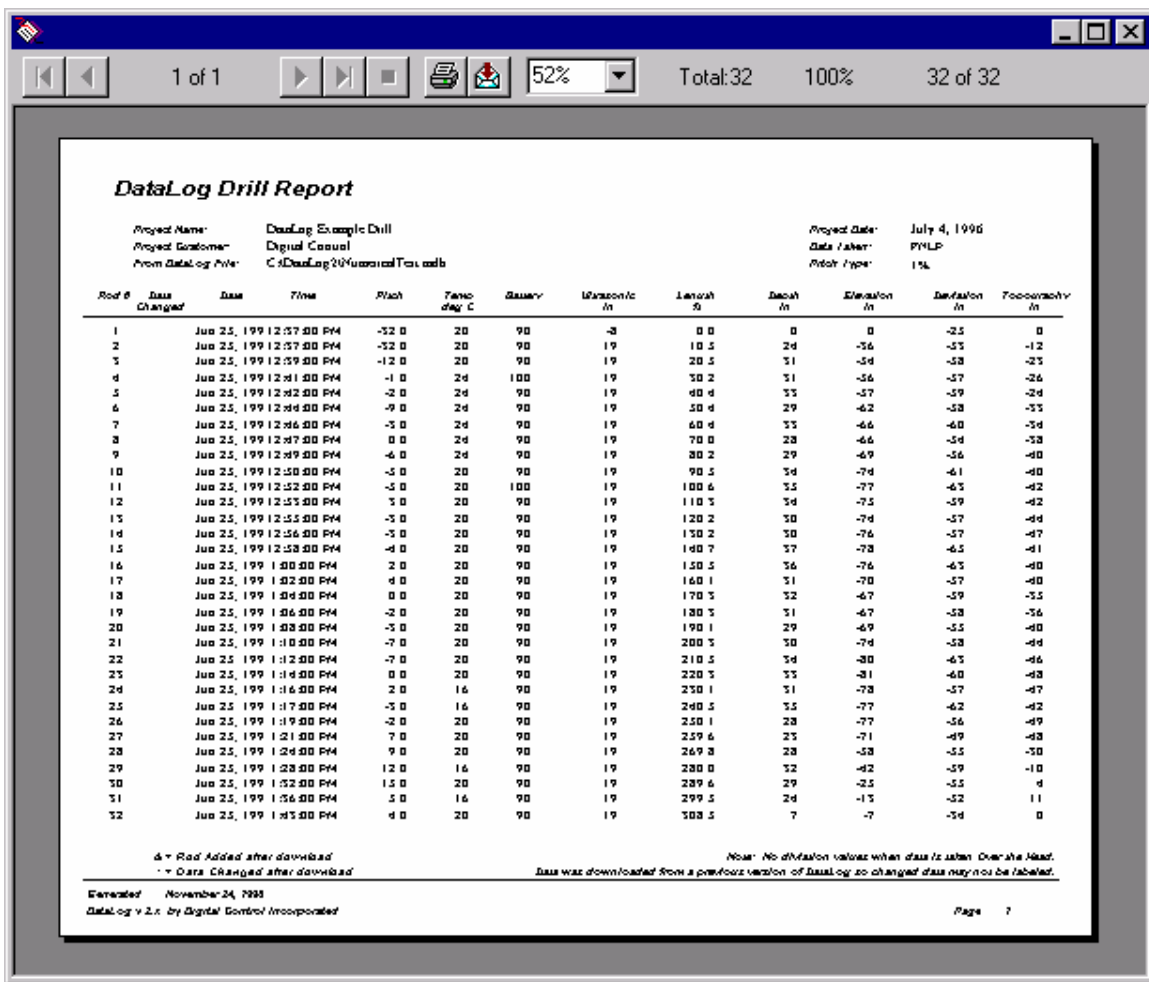
- All Projects By Name – This report lists all the projects in the selected database with the corresponding date, customer, city/state and comments from the Project Maintenance screen sorted by Project Name.
- All Projects By Customer – This report lists all the projects in the selected database with the corresponding date, customer, city/state and comments from the Project Maintenance screen sorted by Customer Name.
- All Projects By Date – This report lists all the projects in the selected database with the corresponding date, customer, city/state and comments from the Project Maintenance screen sorted by Project Date.
- This Project – This report displays all the information from the Project Maintenance screen for the selected project.
- This Project Drill Report – This report displays the rod number, data, time, pitch, temperature, battery, ultrasonic distance, length, depth, elevation, deviation (if data taken at the FLP), and topography for the selected project.

If the system units are English, you will have a choice of selecting inches or feet-inches format to display units in a report.

**NOTE:** All reports are formatted for printing. Reports cannot be edited.

### Report Print Preview Screen

The report print preview screen displays the report including all of its data. This screen can be enlarged to make viewing easier. The buttons on the top tool bar include arrow buttons to navigate between pages and a printer icon to print the report. The drop-down box shows the zooming percentage. The total is the number of records (rods) in the report.

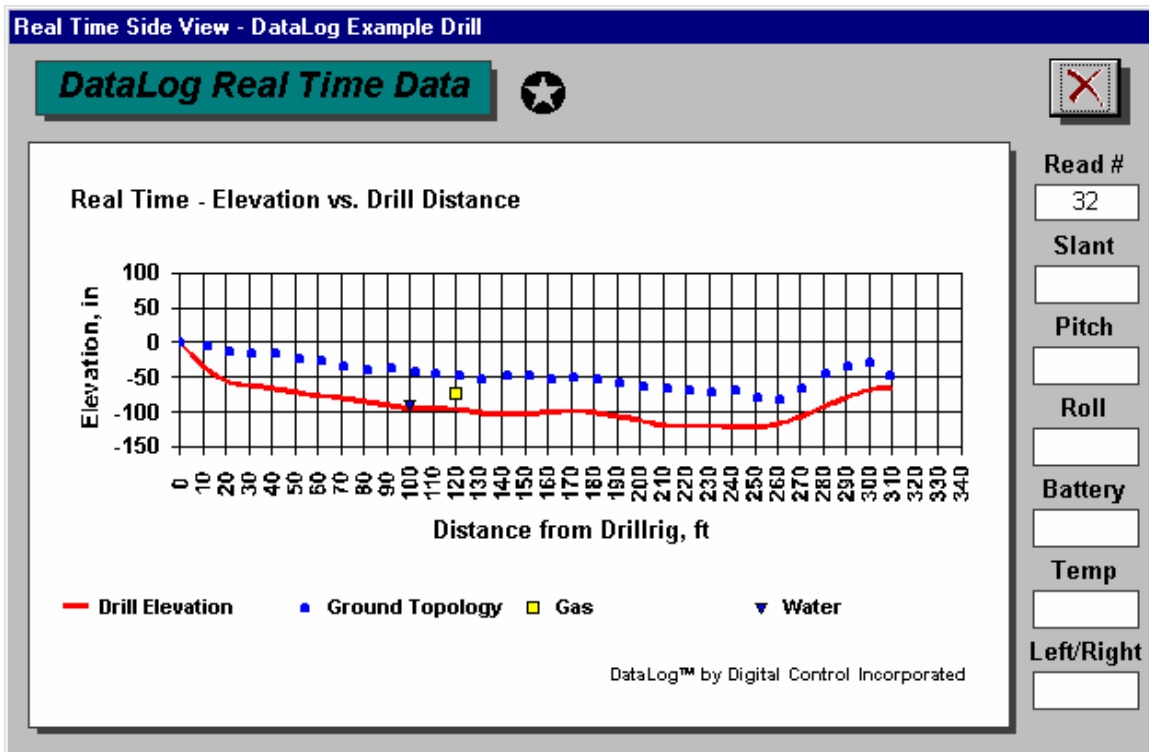


### Serial Download

Clicking on the "Serial Download" button from the Main Menu brings up the Serial DataLog Communications screen, which is used to communicate with the DataLog module. See "Serial Download" under the "Collecting Data in the Field" section later in this manual.

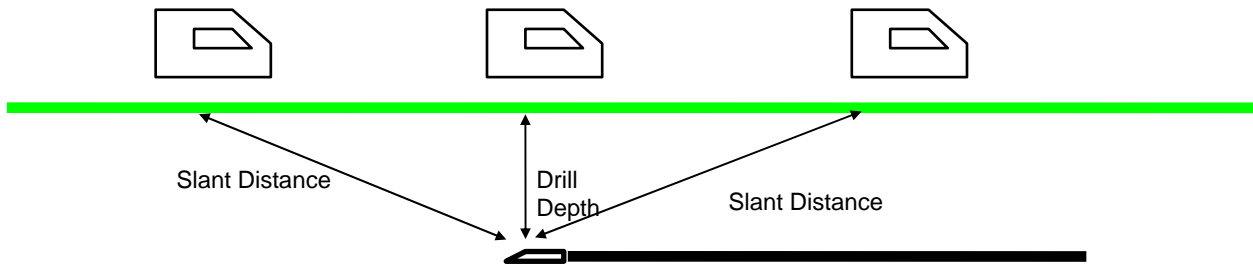
### Real Time

Clicking on the “Real Time” button on the Main Menu brings you to the Real-Time Data screen, shown below. This screen allows you to access the real-time function so that you can view data as it is being collected in the field. You can see all of the measurements displayed at the DigiTrak receiver and remote display as well as a graph of the drilling depth vs. distance drilled. This graph will also chart the topology of the ground surface above the drill head, as computed from the pitch and slant reading measurements from the transmitter, and any information you have input regarding utilities in the area. (See “Real-Time Data Collection and Viewing” section later in this manual.)



The column of boxes on the right side of the real-time form shows data as follows:

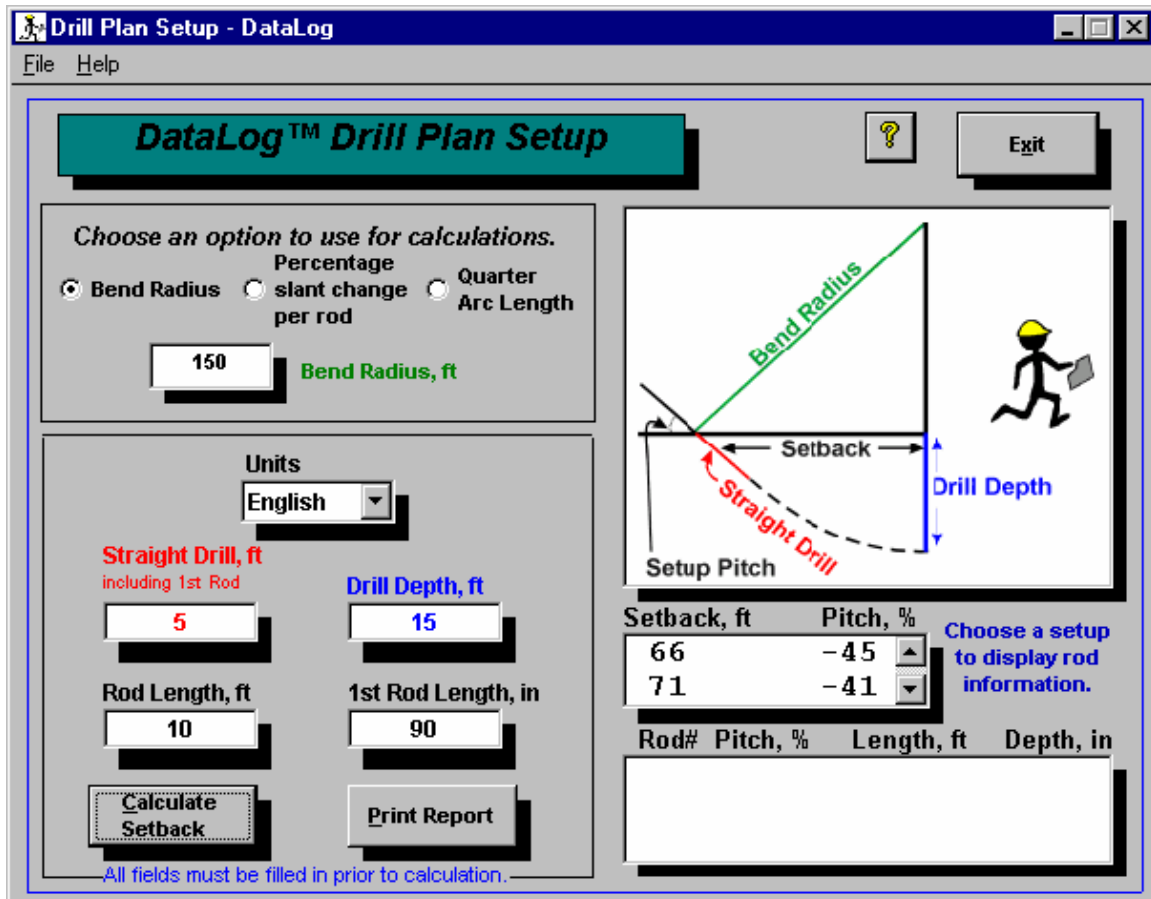
- Read # (Reading) – This displays the last reading recorded or the last data point showing on the graph.
- Slant – This is the actual distance to the drill head. If the receiver is directly above the drill head it is the depth. Otherwise it is the slant distance.



- Pitch – Current pitch reading from the receiver.
- Roll – Current roll reading from the receiver.
- Battery – Current % battery life left on the transmitter batteries.
- Temp – Current transmitter temperature. 60°C starts overheat warning (beeping). 70°C increased overheat warnings (increased beeping). At 80°C, transmitter overheat damage occurs.
- Left/Right – How far left or right the drill head is from the desired drill path. Left/right is only available if the data points are taken at the FLP. If locate readings are taken over the drill head, then the left/right field is hidden.

## Drill Plan

The Drill Plan Setup window allows you to plan a setback and pitch angle by inputting key information, such as bend radius and desired depth.



The information in the Drill Plan Setup is described below.

- Exit Button – Click the Exit button to leave the Drill Plan Window and return to the Main Menu.
- Rod Flexibility Box – From this box (upper left outlined box) you must choose an option to determine the flexibility of your drill rod. First choose to enter the Bend Radius (as shown in the diagram), the percentage slant change per rod or the quarter arc length of the rod. The label of the text box will change according to your selection. Then enter the value for your selection in the text box.
  - Bend Radius – Bend radius is the radius of the circle formed by the rods at their maximum bend.
  - Percentage slant change per rod – The maximum percentage you know you can change the slant for one rod.
  - Quarter Arc Length – Quarter arc length is the length of a quarter of this circle.

➤ Other information:

- Units – Select either “English” for inches and feet or “Metric” for meters and centimeters from the drop-down box.
- Straight Drill – Enter the distance of the straight drill in either feet or meters. This is the distance drilled straight before steering and should include any portion of the first rod that is part of that first straight drill.
- Drill Depth – Enter the desired depth you wish to attain for this project in either feet or meters depending on your units choice.
- Rod Length – Enter the average rod length in feet or meters that you will be using for this project.
- 1<sup>st</sup> Rod Length – Enter the length of the first rod in either inches or centimeters. The initial DataLog reading is taken as the drill head penetrates the plane of the ground (half the drill head under ground level). The length of the drill stem left on the rack (drive chuck to the make-up/break-out clamps) is the first rod length.
- Calculate Setback – After inputting the data in all of the boxes above, click on the “Calculate Setback” button to calculate the possible setback distances and their pitches, which will be displayed in the Setback scroll box to the right. All information above must be entered before any calculations can be done. Click here also after changing any of the data.
- Setback Box – The Setback box displays possible setback distances in feet or meters and the corresponding percent pitch to reach the desired depth. In order to display values in this box, you must input values in all the boxes above and then click the “Calculate Setback” button. Click on a row in the Setback box to display the rod-by-rod information in the box below.
- Rod-by-Rod Information – The rod-by-rod information box displays each rod’s percentage pitch, length out from the entry point, and depth. To display information in the rod-by-rod information box, first fill in the appropriate values in the input boxes above. Next click “Calculate” to display possible setback distances and pitch in the Setback box. Then click on a row in the Setback box to display the corresponding rod-by-rod data in this box. Rod-by-Rod data can be printed by clicking the print button above.
- Print Report – Click on the “Print Report” button to print a report containing the chosen setback and the rod-by-rod data.

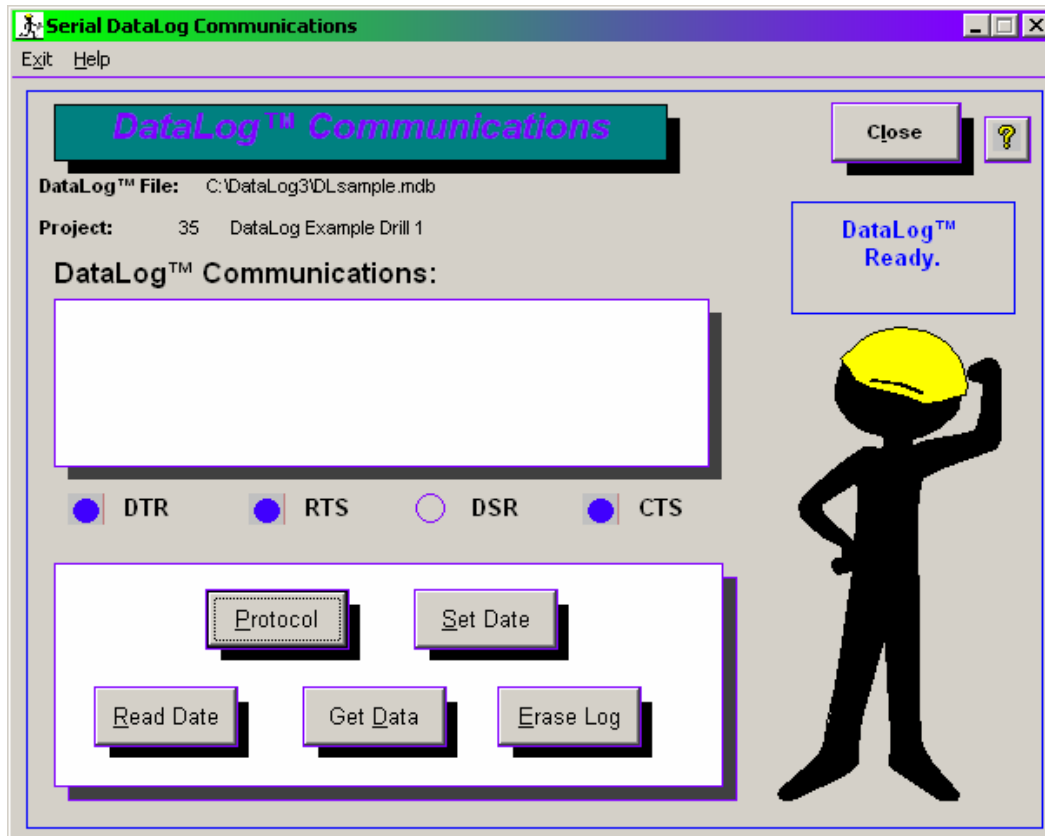
### ***Fix DataLog File***

If a database behaves unpredictably, select the database and then click on the “Fix DataLog File” button from the Main Menu. Over time as information is added to the drill/project tables (DataLog Data Tables) they become bloated with blank fields and inefficient grouping of data. This slows the program down, especially if you are working with a lot of data. The DataLog software is capable of storing up to 10,000 projects and can get very slow. The “Fix DataLog File” procedure helps solve this problem, too.

## Collecting Data in the Field

### Serial Download

When you click on the “Serial Download” button from the Main Menu, the Serial Communications screen will be displayed. This form is used to communicate with the DataLog module. Through the computer’s serial (COM) interface, the data stored in the module can be downloaded to the computer. This is also where you erase any previous data, set/read the module date/time, and get the version number of the module.



**NOTE:** The DataLog module MUST be connected to the PC adapter before opening the Serial Communications form.

The information on the Serial Communications form includes the following:

- DTR, RTS, DSR and CTS – Buttons to display serial port control line status (RS-232). (filled = on, empty = off) used by DCI engineers for troubleshooting.
- Protocol – Displays the protocol version number of the DataLog module.
- Set Date – Sets the date/time of the DataLog module to the same date/time of the computer.
- Erase Log – Erases the DataLog module memory, clearing any previous data.
- Read Date – Displays the date/time of the DataLog module.
- Get Data – Transfers the data stored in the DataLog module to the program database. Informs you of the upload status. View the data in the Drill Data form.

## Charging Module and Memory Capacity

The DataLog module depends on external power to provide communication functions and to store values in its memory. The computer or the remote display charges the DataLog module, providing the module with power to respond to the computer requests. It takes a few minutes for the computer to charge the module fully after the program is started. When the Serial Communications form is first opened it takes an additional 1 to 1.5 minutes to establish communications and verify protocol before you can continue. Also, after each function use (button pressed), the module can become discharged enough to prevent communications, so the buttons may be momentarily disabled after each use.

## Setting Up Module for Data Collection

The DataLog module must be correctly set up prior to each time it is used in the field. This involves:

- Checking and, if needed, setting the correct time/date in the module. The DataLog module's clock is run by a small watch-type battery that sometimes discharges itself. When you read the date and it returns all 154's for time and date, the battery is dead. To charge the battery, attach it to a DigiTrak remote display that has a fully charged battery. Start the remote display and leave it on overnight.
- Erasing the memory of old drill records so that new data can be collected.

To set up the module prior to data collection:

1. Plug the PC adapter into the proper serial port on your computer and then turn the power switch on the PC adapter to ON.
2. Connect the DataLog module to the PC adapter by fitting the module into the recessed area and aligning the two holes on the module over the two posts in the recessed area. Then clip the slide locks to attach the module in place.
3. If you are not already running the software, start the DataLog software.
4. Select "Yes" to tell the program that the PC adapter is connected.
5. From the Main Menu, select the "Serial Download" button. You will first see the message "DataLog Module Not Ready" while the computer establishes communication with the module. When this message clears, the buttons will be enabled and you may proceed.
6. Select the "Read Date" button on the screen to see what the current time and date settings are in the DataLog module. The clock in the DataLog module is preset in the factory and may not need resetting. The clock in the DataLog module may never need resetting, but it is always good to verify the time and date during setup and to compare the values with the settings in the computer.
7. Make sure the correct time and date are set in your computer. Select the "Set Date" button on the screen to automatically set the clock in the DataLog module to the time and date on the clock in the computer.
8. Select the "Erase Log" button to clear the DataLog memory. This will clear all drilling data previously collected in the DataLog module. You will be prompted to make sure you do want to erase the data. Be sure any data records that are stored in the DataLog memory have been saved in the computer before clearing the memory.
9. Turn the power switch on the PC adapter to OFF.

## Collecting Data

**CAUTION:** The DataLog Mapping System is a very precise electronic instrument—the following instructions for collecting data in the field **MUST** be strictly followed to obtain accurate data.

Collecting data in the field involves the following steps:

1. Attaching the module to the remote display.
2. Setting the rod length.
3. Identifying a reference line for left/right deviation (this is not necessary if no left/right deviation is to be recorded).
4. Positioning the drill head for the first data point.
5. Recording data, which can be done over the drill head, at the front locate point (FLP), or at a location on the reference line.

Each of these steps is described fully below.

### ***Attaching Module to Remote Display***

With the remote display turned off, place the DataLog module onto the remote display's stainless steel prongs so that the display windows on both devices face in the same direction. Then fasten the two slide locks on the module.

Next, power up the remote display by pressing the "on" button. This will also power up the DataLog module. If the module does not contain any data records, the display will read "01". Otherwise, the display will show the next rod/recording number to be taken. It may take 2 to 3 minutes for the module's battery to charge before the rod number will display.

### ***Setting Rod Length***

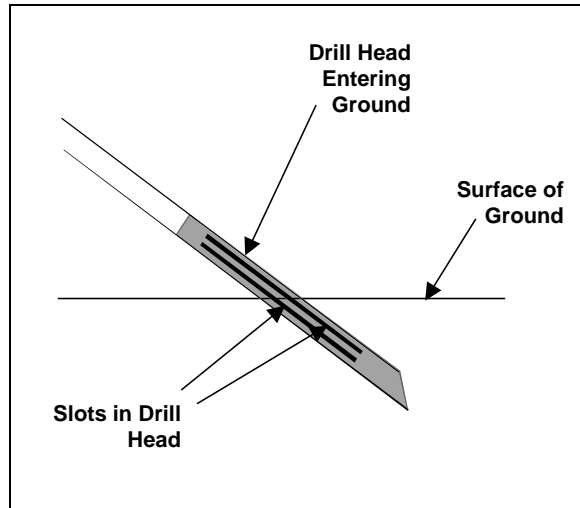
The "rod length" used in the DataLog software is a constant length at which you plan to record data. This length can be any convenient length or it can be the length of one drill rod. For example, if you want to record data every 5 ft but the length of your drill rod is 15 ft, you would specify your rod length in the DataLog software as 5 ft since this is your recording interval distance.

### ***Identifying Reference Line for Left/Right Deviation***

To record the drill path's left/right deviation, it is necessary to identify a reference line. The reference line can be the intended drill path or a line conveniently located near the drill path. A good reference line is a feature or object that is prominent in its relationship to the drill path, such as a curb, road, or utility line. The reference line must be closer to the drill path than the depth of the drill head. For example, if the depth is 10 ft, the reference line **MUST** be less than 10 ft from the intended drill path.

### **Positioning Drill Head for First Data Point**

Push the drill head into the ground so that the slots are half above and half below the ground (or a plane parallel to the ground if drilling into a pit)—see sketch shown below. This is the position that the drill head needs to be in before you can record the first data point.



With the drill head correctly positioned, you must then measure the amount of drill rod left on the rack. This is referred to as “1<sup>st</sup> Rod Length” on the DataLog software’s Project form, where you need to record it in either inches or centimeters. The 1<sup>st</sup> Rod Length is measured from the make-up/break-out clamps to the top of the rod, and will be the actual distance that the drill head gets pushed into the ground with the first rod.

### **Recording Data**

Once the drill head is correctly positioned and you have made a note of the 1<sup>st</sup> Rod Length, you are ready to position the receiver to record the first data set. The receiver can be positioned over the drill head, at the front locate point, or along the reference line. Follow the correct instructions below, depending upon where you are placing the receiver for data collection.

**NOTE:** Confirm that the receiver and remote display are set to the same channel and that they are both receiving consistent and consecutive pitch and roll updates before you attempt to record data.

### **Recording Data Over the Drill Head**

If you are recording data with the receiver over the drill head, the receiver must be positioned so that it is held level with respect to the ground and aligned in the same direction as the drill head. (For complete instructions on locating the drill head see the *DigiTrak Locating System Operator’s Manual*.) Because the drill head is basically at ground level (half above and half below the ground) for the first recording, the receiver must also be positioned far enough away so that it is not saturated by the transmitter’s signal. This requires you to use the ultrasonic height setting (see *DigiTrak Locating System Operator’s Manual* for instructions on setting the ultrasonics).

For the first recording, position the receiver about 30–40 in. (75–100 cm) above the ground, as described in the above paragraph, and set the ultrasonics. Then move the receiver off to the side of the drill head until the depth reading shows “0”. You are now ready to record your first data point.

Follow the appropriate instructions below for how to record a data point depending upon whether you are using a Mark III system or a Mark IV system.

### **Using a Mark III system**

If you are using a Mark III system, press the “Store Reading” button on the DataLog module. A single beep will be heard to acknowledge the button has been pressed. The display will then flash, indicating that information is being stored. When the display stops flashing, three short confirmation beeps will sound to indicate that a successful data point was recorded, and the rod number will advance to the next number.

If two long tones are heard, the data point was not successfully recorded. Verify that the transmitter is “awake” by rotating the drill string, and attempt to take the data again.

After recording the first data point, reset the ultrasonics. Then you may continue to take more readings.

### **Using a Mark IV system**

If you are using a MIV system, press the “Store Reading” button on the DataLog module. With the receiver positioned correctly, click the trigger to advance to the DataLog menu item. Hold the trigger for the countdown, and let go when you get to “0”—you will hear three confirmation beeps. The DataLog module will also sound three confirmation beeps if the data were successfully recorded, and the rod number will advance.

If two long tones are heard, the data point was not successfully recorded. Verify that the transmitter is “awake” by rotating the drill string, and attempt to take the data again.

After recording the first data point, reset the ultrasonics. Then you may continue to take more readings.

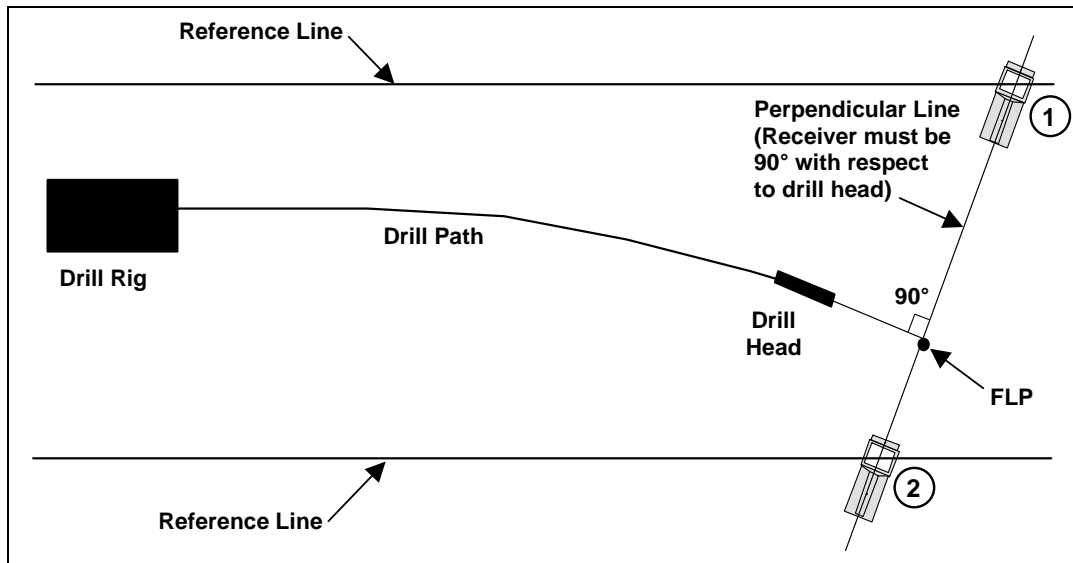
### **Recording Data at the Front Locate Point**

To record the first data point and subsequent data points at the FLP, position the receiver so that it is level with respect to the ground and aligned in the same direction as the drill head at the FLP. (For complete instructions on finding the FLP, see the *DigiTrak Locating System Operator’s Manual*). Follow the steps given above to record data using a Mark III or a Mark IV system, depending upon which type of system you are using.

### **Recording Data at the Reference Line**

To record the first data point and subsequent data points at the reference line, follow the instructions given here and refer to the drawing shown below.

The drawing shows two different reference lines. The circled number 1 indicates the data recording location for the receiver when using a reference line to the left side of the intended drill path (if looking from the drill rig in the direction of drilling). The circled number 2 indicates the data recording location for the receiver if using the reference line to the right side of the intended drill path.



***Bird's-Eye View of Drill Site Showing Proper Use of Reference Line***

To position the receiver at location 1, you must first find the FLP. Once at the FLP (you will be facing toward the drill rig), turn your body 90 degrees in the clockwise direction so that you are standing and holding the receiver at a 90-degree angle to the direction of the drill head. Your left shoulder should be pointing toward the drill rig—the orange arrow on the back of the receiver will also be pointing toward the drill rig. Walk forward until the receiver's display window just crosses the plane of the reference line.

**NOTE:** When recording data at the reference line, the orange arrow on the receiver **MUST** be pointing toward the drill rig.

You may place the receiver on the ground or hold it above ground—you must reset the ultrasonic height if you change the position. In either position (on or above the ground), be sure that the receiver is level and steady while the data point is taken. For instructions on how to record the data point, use the instructions given above for “Using a Mark III system” or “Using a Mark IV system”, depending upon which type of system you are using.

To position the receiver at location 2 (for a reference line on the right side of the drill path), maintain the same 90-degree configuration of the receiver with the arrow pointing towards the drill rig. Move the receiver “backwards” until the display window just crosses the plane of the reference line. For instructions on how to record the data point, use the instructions given above for “Using a Mark III system” or “Using a Mark IV system”, depending upon which type of system you are using.

## Transferring Data from Module to Computer

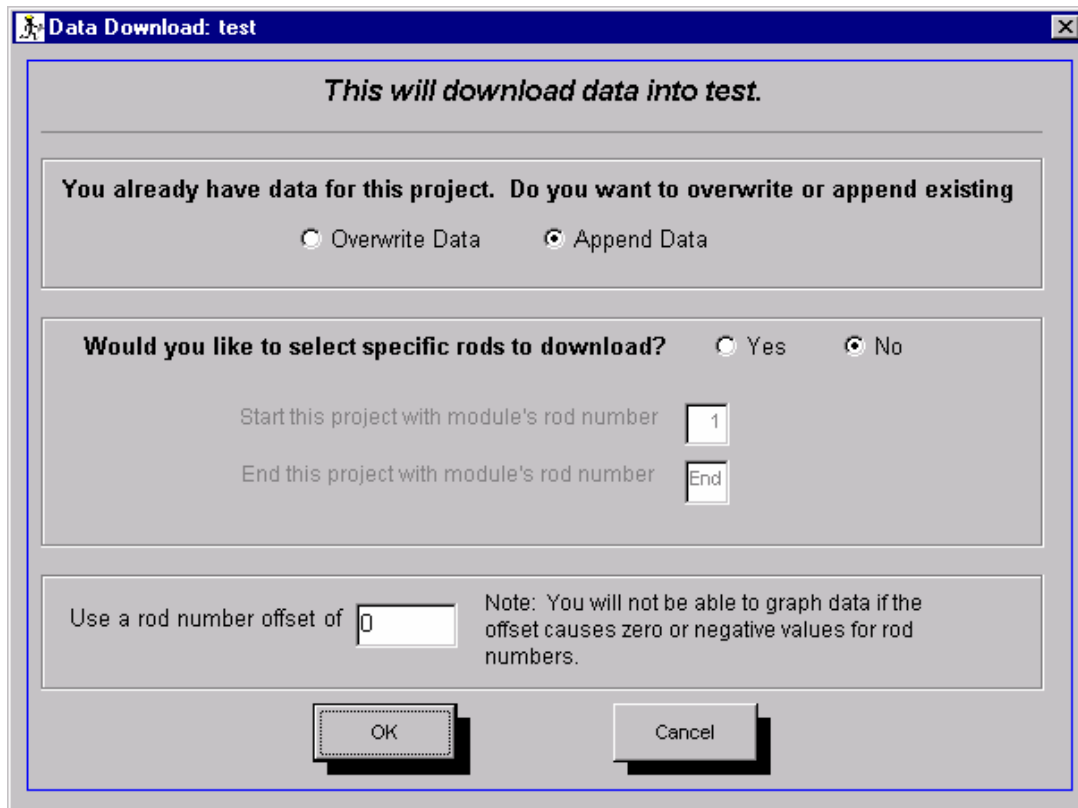
Use the following procedure to download the data from the DataLog module to your computer.

1. Plug the PC adapter into the proper serial port on your computer and then turn the power switch on the PC adapter to ON.
2. Connect the DataLog module to the PC adapter by fitting the module into the recessed area and aligning the two holes on the module over the two posts in the recessed area. Then clip the slide locks to attach the module in place.
3. Start the DataLog software.

4. Select "Yes" to tell the program the PC adapter is connected. Select a port or test for your connected port.
5. If this is a new project, select "New Project" in the Project Maintenance form and fill in at least all the items labeled in blue. Close the Project Maintenance form and click the "Serial Download" button.
6. If you have already entered the new project then select it in the Main Menu drop-down list and click the "Serial Download" button.
7. Initially when the Serial Communications form is opened it will not be ready to accept data. When the DataLog is ready and the buttons are enabled, you can click the "Get Data" button.
8. At this point a number of download options (see "Download Options" section below) will be available. To simply download everything in the module as-is, click "OK" without changing any options.
9. During the downloading process, the data will be checked for validity. If after three attempts, the computer cannot get valid data, the program will inform you of the problem. The data will still be downloaded; however, one or more records may have bad data. Check the data through the Drill Data form and delete any bad records or try "Get Data" again.
10. When the operation is completed, the software will inform you if data were downloaded successfully or not. Data can be viewed in a display window. To edit data you must open the Drill Data window from the Main Menu.

### **Download Options**

When you click on "Get Data" in the Serial Communications screen, the following Download Options form will open.



**Data Download: test**

*This will download data into test.*

**You already have data for this project. Do you want to overwrite or append existing**

Overwrite Data     Append Data

**Would you like to select specific rods to download?**     Yes     No

Start this project with module's rod number   

End this project with module's rod number   

Use a rod number offset of     Note: You will not be able to graph data if the offset causes zero or negative values for rod numbers.

There are three sections on this form that deal with different options for handling data and storing it into the database. Above the three question sections is the statement “This will download data into test.” In place of the word test will be the name of the project that you have selected to download the data into.

The first question is whether you want to overwrite or append existing data. This question only appears if there is already data in the database for this project. If you want to erase the existing data and write this new data in its place select “Overwrite Data.” If you would like to keep the data that is already in the database and just add the new data after the existing data select “Append Data.” If appending data results in more than one record for the same rod number you will have to edit the data before you can graph or report calculated values. To edit the data, open the Drill Data form and make the corrections there.

The second question is whether you would like to select specific rods to download. For instance if the first 12 rods in the module were from a different project, select “Yes.” Then you can choose which rods to start downloading with and where to end.

The third question is for a rod offset, which has to do with downloading multiple bores or bores from a different project (see next section below).

### **Multiple Project/Bore Download**

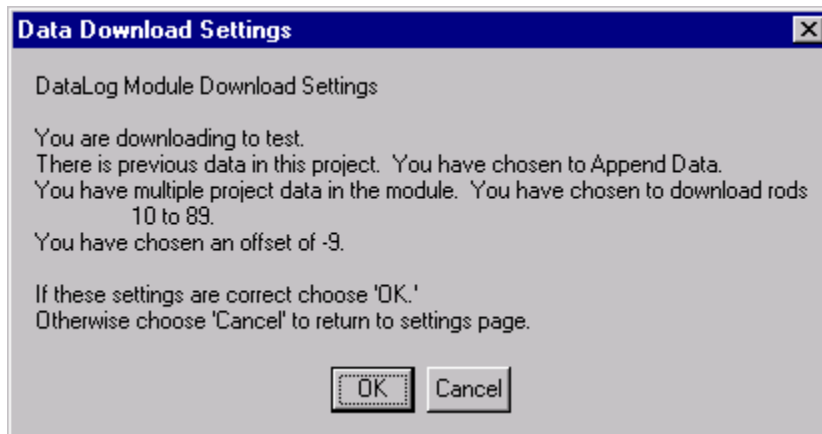
If the module contains more than one project/bore, it may be useful to download each separately using the Download Setting options. For example, if you have one project that occupies rods 1–35 in the module and another project that occupies rods 36–98 in the module you may use this procedure.

1. First download the first project. On the Main Menu select the first project name and open the serial download screen.
2. Click “Get Data.”
3. In the Download Settings form click “Yes” to download only certain rods. Type in “1” for the starting rod and “35” for the ending rod.
4. Leave the offset at 0.
5. Click “OK” and continue the download.
6. When that download is complete close the serial form and return to the Main Menu.
7. Click on project and select the name of the second project.
8. Click “Serial” to return to the Serial Communications screen.
9. Click “Get Data” to get back to the download options.
10. In the Download Settings form click “Yes” to download only certain rods. Type in “36” for the starting rod. Either leave “End” or type “98” for the ending rod.
11. In the offset box type –35 so that rod number 36 will actually be numbered starting as rod 1.
12. Proceed with the download.

This procedure will result with the first project database file containing rods 1-35 and the second project containing the modules rods 36–98 renumbered as rods 1-62.

The Download Options window always comes up with default values for appending any existing data and downloading all the rods with no offset.

At this point click “OK” to continue with the download. (The cancel button can be clicked at any time before clicking OK to abort the download.) A message box will appear to confirm your choices.



When you click “OK” here, the module will be downloaded into the database. Your data will be displayed on the screen. This screen is for viewing data only. To edit the data you must return to the Main Menu, move the project into an editable database, and edit in the Drill Data window.

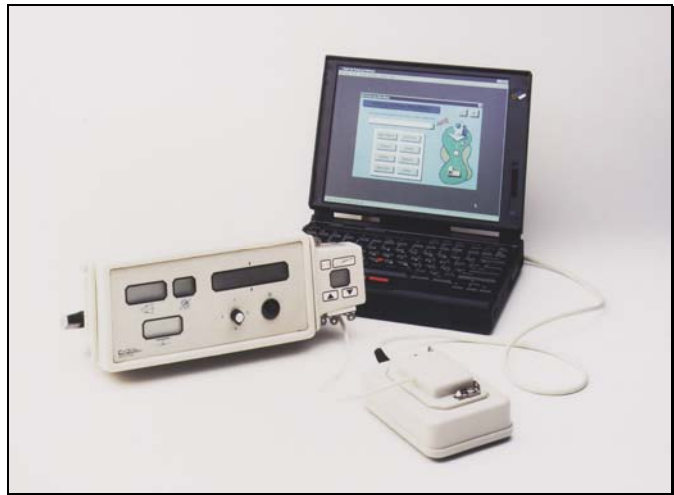
## Real-Time Data Collection and Viewing

The real-time feature allows you to collect bore data by using a computer in the field. You can then view the data as it is being collected; the collected data are automatically saved in the computer and the DataLog module.

### Connecting System Components

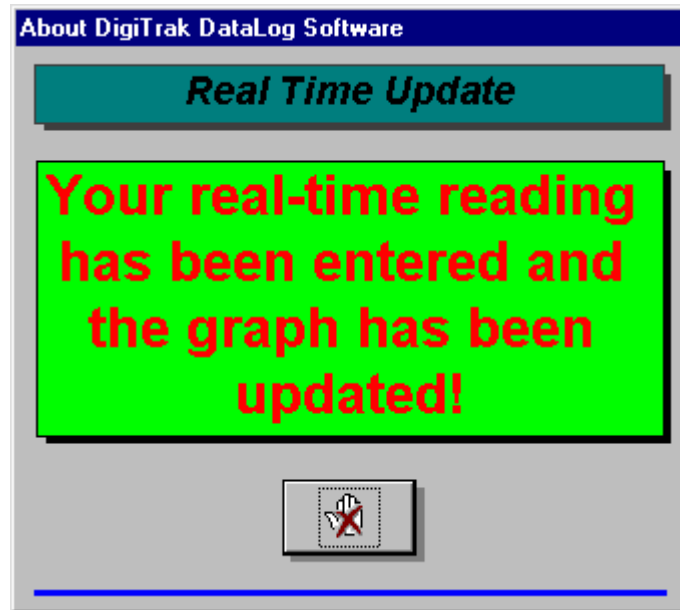
To use the real-time feature, the DataLog module must be hooked up to the remote display as well as the computer, using the PC adapter and the real-time cable as follows.

1. Be sure the power to both the remote display and the PC is off before connecting real-time components.
2. Plug the PC adapter into the proper serial port on your computer and then turn the power on the PC adapter to ON.
3. Connect the DataLog module to the right side of the remote display with the module's display facing directly out (the same as the remote display), then fasten the two slide locks.
4. Connect the smaller end plate of the real-time cable to the bottom of the DataLog module using the two slide locks on the module.
5. Connect the larger end plate of the real-time cable to the PC adapter using the two slide locks on the cable end plate.
6. Start up the computer and the DataLog software.
7. Select the project from the Main Menu drop-down list to store data in or start New Project.
8. On the DataLog Main Menu, select the "Real Time" button.
9. The individual data points from the remote display are shown on the right and a graph of Drill Depth vs. Drill Distance is shown to the left (see figure under "Real Time" in "Main Menu" section earlier in this manual).
  - The Left/Right reading is only valid when the receiver is at the FLP and you are holding the receiver level and perpendicular to the drill path. The right side of the receiver must be facing the drill head; negative values indicate left deviation.
  - The graph is updated each time a new data point is recorded in the field.
  - The DigiMan at the top of the screen will be blinking with red, blue, or yellow hard hats to show that the different data packets are being received. DigiMan flashes with each valid update. If DigiMan is not flashing the data will be invalid.
  - The data path is from the transmitter to the receiver. The receiver then forwards the data to the remote display via telemetry where the module receives it.
  - The form will not be able to get data from the receiver in the real-time feature if the DataLog module is not properly connected to your computer or if the correct serial port is not identified correctly under Setup in the DataLog software.



## Automatic Collection of DataLog Data

After the DataLog module record button has been clicked, the current DataLog values are recorded into the database and the graph is updated. When the value is entered and the graph is updated, the program will prompt you that the data have been successfully collected.



**NOTE:** If you do not receive this message but the DataLog module still beeps three times, the data were stored in the module but not the computer. The graph will not be updated.

Hit <Enter> or click "OK" to acknowledge updated data so that the next stored DataLog data record is stored by the computer. If not acknowledged before another data set is entered, the form will automatically update.

The DataLog module continues to record data even if you forget about acknowledging updated data.

NOTE: Due to common electrical interference associated with above-ground locating systems and electronic data collection after clicking the DataLog module record button, the "store" acknowledgments may get garbled in the process of sending them from the receiver to the remote display to the computer. If you do not receive this message within a minute after you click the DataLog module record button, the data have not been successfully recorded. Simply back the rod number up and push the record button again.