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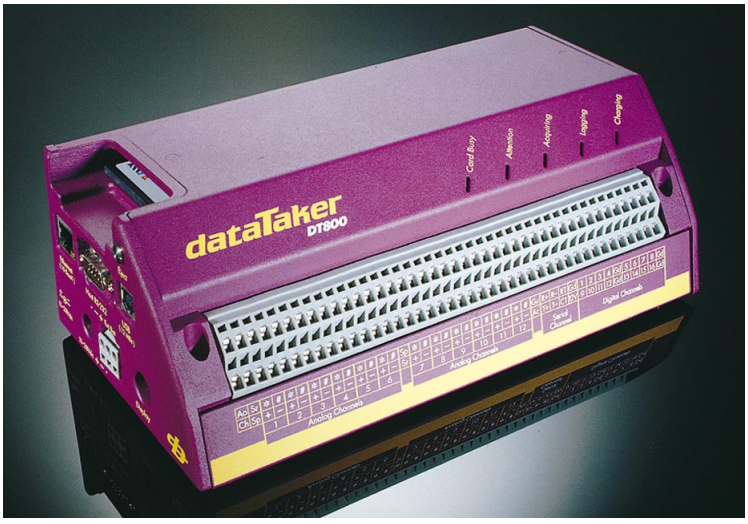
Getting Started

with *dataTaker® DT800 data loggers*

An introductory guide to:

- data acquisition
- data logging
- your *DT800*
- *dataTaker* software


dataTaker
DT800
Card Busy
Attention
Acquiring
Logging
Charging
Analog Channels
Serial Channel
Digital Channels

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Getting Started
with
DT800
dataTaker

UM-0071-A1

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About this User's Guide

Welcome to *Getting Started with DT800 dataTaker*.
This quick-start user's guide is a tutorial that uses step-by-step instructions, simple explanations and simple examples to get you up-and-running with your *dataTaker* DT800 data logging and acquisition system.

If You Never Read Manuals

If you're new to *dataTaker*, this user's guide is one manual you must read.
It won't take you long and, just like any good investment, the time you spend working through the information provided here will be repaid to you many times over as you use your *dataTaker*.

Which User Are You?

This guide is primarily designed for **new** *dataTaker* users. If you work through all the steps in the order in which they're presented, you can be confident that you'll learn enough about data acquisition and logging, your DT800 data logger, and the software you use to communicate with it to satisfy your needs for a very long time.
If you're an **experienced** *dataTaker* user, you can skim through this guide noting only the major instruction steps. These are designated by the arrow icon shown in the example immediately below. Instructions tagged in this way form a quick guide to prompt experienced users.

This is an example of a major instruction step. Instructions tagged like this summarize what follows, and experienced users may need to read only these.

If you're an experienced *dataTaker* and computer user in a hurry, you can go directly to the *DT800 dataTaker User's Manual* supplied with your DT800.

Extras

All readers will benefit from the "Extras" included with many of the topics. Extras are additional information intended to supplement each topic. You don't need to read the Extras to be able to work through this guide, although we do recommend you read them at some time because they contain valuable background information that will enhance your "big picture" of data acquisition, data logging and the DT800 *dataTaker* system.

More Information

Your DT800 is capable of extremely sophisticated data acquisition and logging. So if you want more information than this guide provides, refer to the *DT800 dataTaker User's Manual* supplied with each new DT800, or other DT800 documentation available separately (ask your *dataTaker* distributor, or visit www.datataker.com).
In any case, at your leisure, we recommend that you browse through the *DT800 dataTaker User's Manual* to get an overview of everything your DT800 is capable of.

This Guide Assumes...

- Microsoft® Windows® 95, Windows® 98, Windows® 2000 or Windows NT® is correctly installed on your computer and works reliably.
- You are familiar with basic Microsoft Windows operations and the concepts of COM ports and Windows communications.
  If you are inexperienced with Windows, refer to Microsoft publications such as *Microsoft Windows User's Guide* and *Getting Started with Microsoft Windows*, or any of the many third-party Windows reference books available.

What Now?

Go to "Contents" on page 5 for a bird's-eye-view of what's in store, then begin working through this tutorial starting with Chapter 1 "Acquisition? Logging?..." on page 6.

Contents

CHAPTER 1

Acquisition? Logging?...

You really can't avoid it — there's just no way you can afford to short-cut this chapter.
It's quick to read, and it will make you comfortable with some fundamental *dataTaker* data acquisition and logging concepts, terminology and conventions.
So read on…

1-1 Important Concepts

Your first job as you work through this tutorial-in-the-form-of-a-user's-guide is to familiarize yourself with the following concepts.

Data Acquisition versus Data Logging

Data acquisition and data logging are NOT the same.
Traditionally, data **acquisition** has been defined as the regular collection of data — scanning sensors, making instantaneous measurements, then feeding these to a recorder or computer.
Data **logging** has two possible definitions:

- It's considered by some to be simply making a permanent record of data that has been collected: printing or plotting it, writing it on a sheet of paper, or storing it on a computer's hard disk or in electronic memory.
- Others perceive data logging as the total operation of collecting data and making a permanent record of it. Therefore, they see data acquisition as part of data logging.

Now, with *dataTaker*, any distinction between these two terms has become even more blurred because the *dataTaker* DT800 combines acquisition and logging (and much more) in a single instrument about the size of a house brick.
So, when using your DT800, it's important that you treat acquisition and logging as two separate functions.

dataTaker's Acquisition Function

One of the DT800's two basic functions is to read sensors (that is, to measure, sample or scan sensors) and present the values to you on a computer screen or other display (Figure 1).
Although these readings can be used, say, to trigger an alarm, they are temporary: the DT800 has not recorded, stored or remembered them anywhere —

that is, the data has not yet been logged by the DT800.

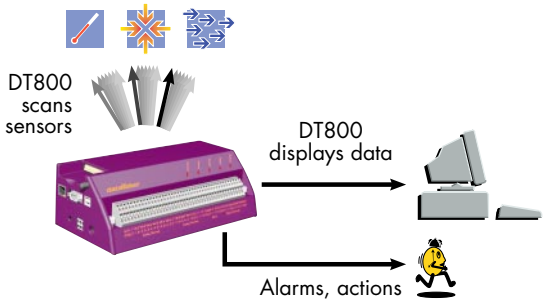


FIGURE 1 Data acquisition

dataTaker's Logging Function

The second of the DT800's two basic functions is to log data — that is, to record or store data (Figure 2). Once you've instructed the DT800 to acquire data, you must then issue the LOGON command (explained later) if you want it to store the data.

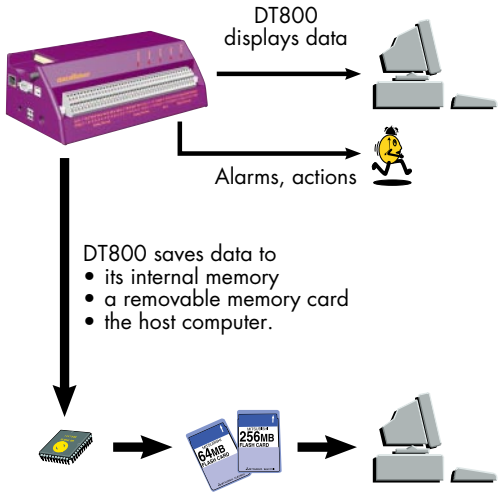


FIGURE 2 Data logging

The DT800

The *dataTaker* DT800 is an instrument for intelligently acquiring data from sensors connected to it, recording (logging) the data for later reference and analysis, and taking action (like raising alarms or altering its operation) based on the values it measures or calculates.

What It Can Do

More specifically, your DT800 can perform any or all of the following tasks:

- **acquire** data (scan sensors, make instantaneous measurements and forward them to a computer)
- **log** data (that is, store measurements in its own internal memory and/or its removable memory card)
- **convert** measurements according to your requirements (voltages to °C or °F, for example)
- carry out calculations on the measurements (average, standard deviation, maximum, minimum,…)
- log the converted measurements and the results of calculations to its internal memory and/or a removable memory card, or transfer them to a computer
- display all of this on a computer screen
- return data directly to a computer in **real time** (that is, as each measurement is made) as well as, or instead of, logging it
- raise **alarms** when data is outside specified ranges. Alarms can trigger outside events (turn on a warning light or siren, for example), or make the DT800 carry out additional tasks (scan more frequently, stop logging, or scan and log additional sensors, for example).

You're the Boss

Being microprocessor-based, you send instructions ("commands" — see the Extras panel "Sending Commands" on page 8) to the DT800 from a computer running DT800-compatible software such as **DeLogger** (used later in this guide). These instructions tell the DT800

- which sensors to read
- how often to read them
- what to do with the data.

Then you sit back and let the DT800 do the work.

Look, No Hands

Once you've set the DT800 running you can disconnect the computer if you wish — the DT800 continues to operate as programmed because the software that controls it is inside the DT800 itself. This is called **stand-alone** operation.

Input Types

The DT800 lets you monitor, record and raise alarms for readings from many types of sensors and transducers — temperature (thermocouples, thermistors, RTDs and solid-state sensors), pressure, flow, strain, digital state (high or low, off or on), count, frequency, period, voltage, current, resistance and so on.

The DT800 measures these fundamental parameters, from which all others are derived:

- voltage
- resistance
- frequency
- time
- counts (pulses)
- thermocouple reference temperature

This means that the DT800 supports many types of inputs. For example:

- voltage
- resistance
- current (including 4–20mA loops)
- thermocouples
- thermistors
- RTDs (Resistance Temperature Detectors)
- solid-state temperature sensors
- bridges (strain gauges)
- frequency
- time
- counts
- pressure sensors
- flow sensors
- load cells
- digital state (on/off, high/low)

You can connect many sensors — each one different — to a single DT800 and have them scanned whenever you choose.

Meaningful Quantities

Whatever the sensor, its raw output will be either voltage, current, resistance, frequency, time, counts or digital state. For example, the output from a thermocouple is a voltage that varies according to the temperature being measured: the thermocouple's raw output is volts (under 100 millivolts, actually), not degrees Centigrade or Fahrenheit.

Then the raw output must be converted to a meaningful quantity (to a temperature value in this example). Depending on the type of sensor, this conversion involves **linearization** and possibly **compensation**, terms which are beyond the scope of this guide. Just be aware that raw measurements usually have to be converted before they become the meaningful quantities that are useful to you (Figure 3).

One of the features of the DT800 is that it automatically performs these conversions for you. All you have to do is tell the DT800 what **type** the sensor is (a type T thermocouple, for example) and the microprocessor inside the logger performs the appropriate linearization and compensation, turning the raw sensor output into a quantity with meaningful units.

Sending Commands

There are three ways you can send commands to the DT800:

- from a computer connected to the DT800
- from a removable memory card — commands loaded into a memory card can be transferred to the DT800 and acted upon the moment the card is inserted into the DT800's memory card socket (this is a handy way of configuring and programming a remote DT800)
- using alarms (see the *DT800 dataTaker User's Manual*).

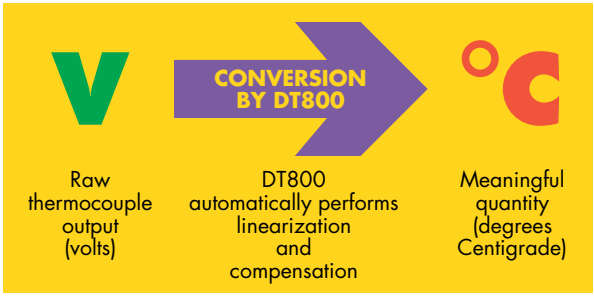


FIGURE 3 One of the DT800's many automatic conversion routines

In addition, the DT800 allows you to

- define your own linearization characteristics for any unusual sensor that is not directly supported by the DT800
- carry out statistical operations on the measurements, only returning the statistical results you want (average, standard deviation, maximum, minimum,…)
- apply other calculations or expressions you define to process the collected data.

Time and Date Stamps

Because you'll often want to know the time and date each measurement was made, the DT800 automatically keeps this information along with the measurements. This facility ensures that every reading from every sensor can be **time-stamped** and **date-stamped**.

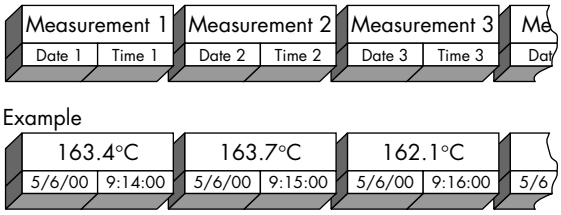


FIGURE 4 Your DT800 produces a series of information "chunks".

Data Format, Display and Storage

Your DT800 is extremely powerful and flexible in the ways it allows you to format, view and store data.

Data Format

You can format (layout, arrange) the data provided by your DT800 to best suit the way you want to use it, and the DT800 has two modes for doing this: free-format mode and fixed-format mode.

In **free-format mode**, you're free to format the data any way you want. For example, you can make it easy and meaningful to read, like

```
Boiler temperature 123.4 Deg C
```

or comma-separated ready for direct importing into a software spreadsheet, like

```
123.4,123.7,123.1,123.6
123.3,123.7,124.2,124.5
124.2,124.6,124.8,125.1
```

or with the time of each reading included, like

```
00:00:00,24.8
00:00:02,24.9
00:00:04,24.5
00:00:06,24.2
00:00:08,24.0
```

In **fixed-format mode**, the DT800 returns data in a predictable, repeatable, comprehensive format ready to be imported into spreadsheets and other data analysis software.

Real-time data can be returned in either free- or fixed-format mode, but logged data is always returned in fixed-format mode. These two modes are discussed in "Format of Returned Data" in Part A of the *DT800 dataTaker User's Manual*.

Data Display

You can connect the DT800 to any computer and, using appropriate software, data can be viewed on the computer screen as it is acquired.

Data Storage

Data can be stored in the DT800's own internal memory, in a removable memory card, or you can transfer it to a computer.

Once in the computer, you can save the data file for later reference, or bring it into one of many spreadsheet or plotting programs for analysis. For example, you can use Microsoft® Excel to create a printed report (including graphs), or *dataTaker*'s

DeLogger or DeLogger Pro to plot graphs of your data versus time directly on the computer screen.

Communication

The most common method of supervising your DT800 is to send commands to it directly from a computer. (There are other methods — see the Extras panel "Sending Commands" on page 8.)

To do this, and for the DT800 to return data to the computer,

- your computer must be running one of *dataTaker*'s DT800-friendly software packages such as DeLogger, DeLogger Pro, or DeTransfer
- the computer's communications port must be connected to one of the DT800's communications ports by any of the methods described in the Extras panel "Communications Links".

Communications Links

With appropriate software, the DT800 and the host computer can communicate with each other by means of

- a communications cable (called a "direct" connection) — for distances of up to 50 meters / 55 yards (a *dataTaker* communications cable, product code IBM-6, is supplied with your DT800)
- a communications cable fitted with line drivers — for distances of up to 5000 meters / 5500 yards
- telephone or radio modems, or satellite links — for much longer distances (you'll need to upgrade to DeLogger Pro if you want to use modems)
- an Ethernet network — the DT800 supports 10BaseT Ethernet.

Power

You can power the DT800 from three sources:

Internal	The DT800's internal main battery
External	A mains adaptor (11 to 28 volts DC)
External	External batteries, solar panels, vehicle power supplies and other DC sources (11 to 28 volts DC)

A mains adaptor and 12 volt internal battery are supplied with your DT800. This 12V battery is known as the **internal main battery** to distinguish it from the DT800's other internal battery, the **internal memory-backup battery** (next topic).

NOTE The DT800 is shipped with its internal main battery disconnected. Although you don't need it to work through this user's guide (because we instruct you to power the logger from its mains adaptor), it's a good idea to connect the internal main battery in the near future so that it can be fully charged — see "Main Battery is Disconnected for Shipping" in Part C of the *DT800 dataTaker User's Manual* supplied with your DT800.

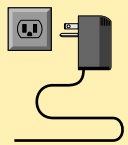
Good Power Practice

The recommended method of working with the DT800 is — while you are programming it "back at base" — to power it from the mains using a mains adaptor. The mains adaptor supplies the DT800 and charges the main internal battery.

When you've finished programming and are ready to use the DT800 "in the field", you disconnect it from both the computer and the mains adaptor and it continues to operate from the freshly-charged main battery. The amount of power consumed by the DT800 depends on the program running.

DT800 Mains Adaptor

Sometimes called a plug pack. Converts mains power (that is, power from a wall outlet) to a voltage suitable for the DT800 (11–28Vdc).



Internal Memory-Backup Battery

In addition to the main internal battery, the DT800 contains a small 3.6V lithium **internal memory-backup battery** that ensures your data, real-time clock and primary settings are not lost if power to the logger is interrupted. The backup battery can maintain this information for up to 12 months if necessary.

Sleep Mode

To conserve battery power, the DT800 "goes to sleep" if it has no measurements to do and there has been no communication for a period of 30 seconds.

This applies only if the DT800 is powered by its internal battery. If it's powered from an external source, the DT800 never goes to sleep (unless you override this default behaviour).

In sleep mode, most of the internal electronics shuts down. The current drain drops from a typical 400mA when awake to a tiny 250µA when asleep; just 0.07% of the awake value.

Auto-Sleep in the Event of Power Supply Failure

If the power supply to the DT800 drops below 9.5 volts, the logger automatically attempts to minimize its power requirements and maintain any logged data and settings by going to sleep. When the supply is restored, the logger senses this and automatically returns to its previous mode of operation.

1-2 Important Terminology

This section introduces you to some data acquisition and logging terms you'll need right away. Others are explained as they arise.

Sensors and Transducers

Origins of data in a data acquisition and logging system.

Sensors are the raw, basic devices that detect variable quantities (temperature, pressure, flow,…) and convert them into electrical signals. Sensors see, hear, taste, sniff or feel the environment and tell the DT800 (in electrical terms) what's going on.

If electronic components are added to a sensor, the result is sometimes called a **transducer**. The electronics may be added to excite, amplify, compensate, linearize, filter or interface to other equipment.

If the electronics include a software-controlled microprocessor, the result is a **smart sensor**.

Power-up

Applying power to a previously un-powered device.

Format

With *dataTaker*, you can **format** data in a variety of ways. That is, you can arrange the physical appearance and layout of data as it comes from the DT800 so that it best suits the way you want to use it.

Host Computer

The computer you use for supervising the DT800.

Host Software

The software you run on the host computer to supervise the DT800 (**DeLogger**, **DeLogger Pro** and **DeTransfer**, for example). See the Extras panel "DT800 Host Software" on page 16.

PC Card

A plug-in card meeting the PCMCIA standard (Personal Computer Memory Card International Association). It can be a storage card such as an ATA Flash card, or a communications device such as a PSTN modem card or GSM modem card.

Male and Female Connectors

Male connectors (plugs) have protruding pins, whereas female connectors (sockets) have holes to receive the pins. See the "Connectors, Adaptors" Extras panel.

Communications Ports

The DT800 has three communications ports:

- a **Host RS-232** port
- a 10BaseT **Ethernet** port
- a **USB** port

They are located on the DT800's left side panel.

The communications port(s) on the back of your computer are also known as "COM ports" (or "serial ports"). Most computers have one or more COM ports, named COM1, COM2 and so on, and may also have other connectors for Ethernet and USB.

Connectors, Adaptors

The connectors on the communications cable supplied with your DT800 are of the **DE** female type. This is a 9-pin D-shaped connector, as shown below.

Another common comms connector is the **DB** type, which is also D-shaped but has 25 pins. If your computer's COM port has one of these, you'll need to add a 9-pin to 25-pin adaptor to the end of your DT800 comms cable.

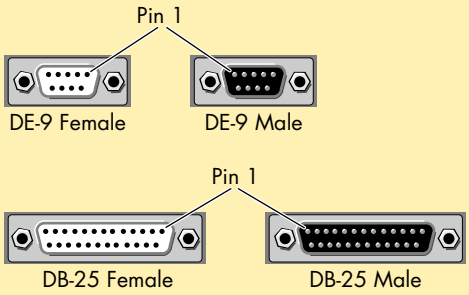


FIGURE 5 Typical comms connectors

Comms Cable

An abbreviation of "communications cable".

Many types of comms cables exist. But, because the DT800's Host RS-232 port is a standard DTE device, you only need a standard null-modem serial cable — also known as a "crossover cable" — to connect this port to the host computer.

In fact, the Host RS-232 port on the DT800 is exactly the same in form and function as the serial port on your PC. This means that you can connect a modem or other serial device to the DT800 using standard serial cables intended for connecting the modem to a computer.

NOTE The comms cable supplied with your DT800 is not the same as that supplied with *dataTaker* DT50 and DT500/600 Series data loggers.

Serial Channel

The DT800 has a serial port for smart sensors, located on the DT800's front panel and labelled **Serial Channel**. This port can be configured as RS-232, RS-422, RS-485 or SDI-12.

The DT800's Serial Channel is not a standard, serial COM port.

Characters

Things you type. The generic name for numbers (0, 1, 2, 3,…), letters (A, b, c, D,…) and symbols ($, %, &, +,…).

CHAPTER 2
SET UP THE HARDWARE

In this chapter, you get the DT800 hardware up-and-running.
You firstly check that you have everything, then you power the DT800 from the mains adaptor and connect the computer to the DT800.

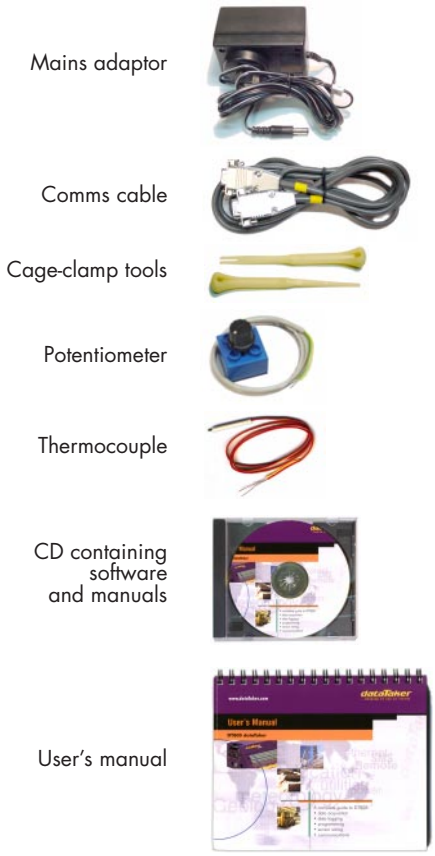


FIGURE 7 Accessories supplied with your DT800 (plus the user's guide you're reading now)

2-1 CHECKLIST

Make sure you have everything you'll need to successfully work through this user's guide.

Check that you have the following items:

a) From your DT800 shipping box:
- a DT800 data logger
- a mains adaptor
- a communications cable ("comms cable"; DE-9 female to DE-9 female) to connect between the DT800 and the host computer
- a pair of cage-clamp tools to open the terminal cage clamps for sensor wiring
- a potentiometer (variable resistance) mounted in a child's building block
- a thermocouple
- a DT800 CD (contains software and manuals)
- a *DT800 dataTaker User's Manual*
- the document you're reading now (*Getting Started with DT800 dataTaker*)

If anything is missing, contact your supplier immediately.

b) You also need a PC running Windows 95, 98, 2000 or NT with
- a CD-ROM drive
- a 200MHz Pentium® II processor or better
- at least
  - 64MB of RAM ("memory") for Windows 95 or 98
  - 128MB of RAM for Windows 2000 or NT (NT also requires Service Pack 4 or later)
- 40MB of free space on the hard disk for installing *dataTaker*'s DeLogger software (installed DeLogger occupies 25MB).

2-2 Power the DT800

There are several ways of providing power to your DT800, which are covered in "Powering the DT800" in Part C of the *DT800 dataTaker User's Manual*. In particular, be sure to read "Main Battery is Disconnected for Shipping".
For this tutorial, you'll simply use the mains adaptor.

Provide external power to the DT800 using the mains adaptor supplied.

To do this…

a) Plug the coaxial connector of the mains adaptor into the coaxial **11–28Vdc** socket on the left side of the DT800.

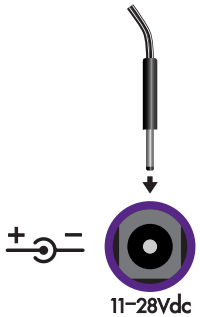


Figure 8 Powering the DT800 from a mains adaptor

b) Plug the mains adaptor into a wall outlet and, while watching the DT800's front panel, switch on at the wall.

If the DT800's internal main battery is not connected (we're assuming yours is not), the five red LED (light-emitting diode) indicators on the front panel flash rapidly four times. Then the Acquiring LED begins its "heartbeat" flash — every three seconds. (The functions of these LEDs are described in "Indicator LEDs" in Part B of the *DT800 dataTaker User's Manual* supplied with your DT800.)

2-3 Make the Hardware Connection

For the computer to talk to the DT800, and the DT800 to return data to the computer, you must establish a communications link between the two.
You can use any of the links described in the Extras panel "Communications Links" (page 10), but in this guide we'll use the simplest of all, the comms cable supplied with the DT800. You'll connect it between the DT800's Host RS-232 port and a COM port on your computer.

Locate and identify your computer's COM1 serial port then connect the comms cable to it.

To do this…

a) On the rear of your computer, locate the COM1 port and remove anything plugged into it (a modem, for example).

If you find several likely connectors and don't know which is COM1, just choose any one. Later, if communication with the DT800 is unsuccessful, simply change to a different connector (we'll remind you about this in the next chapter).

b) Plug either end of the comms cable supplied with the DT800 into the computer's COM1 port.

Connect the comms cable to the DT800.

To do this…

a) On the left side panel of the DT800, plug the other end of the comms cable into the connector labelled **Host RS-232**.

2-4 Attach a Sensor

Now use the potentiometer supplied with your DT800 (see Figure 7 on page 13) to simulate a resistive sensor.

Firstly, you attach this "sensor" to your DT800.

Attach the potentiometer supplied to analog channel 1 of your DT800 as shown in Figure 9.

To do this…

a) Locate the potentiometer (variable resistance) supplied with your DT800.

It's the child's building block with a knob on top and four wires.

b) Connect the potentiometer's yellow and white wires to the **+** and **–** terminals of analog channel 1 on the front panel of the DT800, as shown in Figure 9.

To open the terminals, we recommend that you use one of the cage-clamp tools supplied — refer to "Connecting Sensors to Channel Terminals" in Part B of the *DT800 dataTaker User's Manual*.

FIGURE 9 Connecting the potentiometer

CHAPTER 3

Set Up the DeLogger Software

Host Software

You communicate with, supervise, and transfer data from a DT800 by sending commands to it from the host computer using host software.

DeLogger host software is a powerful Windows application designed to make this communication, supervision and data return as simple yet fully-featured as possible.

As you work through this chapter, you'll become familiar with DeLogger and some basic DT800 operations.

3-1 Install DeLogger

Follow the steps in this section to install DeLogger from the CD supplied with your DT800 to your computer's hard disk. The process requires about 40MB of free space on the hard disk (installed DeLogger occupies 25MB) and takes less than five minutes.

If you already have DeLogger or DeLogger Pro installed on your computer, see the Extras panel "Re-Installing and Project Compatibility".

DeLogger Serial Number

DeLogger is free to use and requires no serial number. (But you do need one for DeLogger Pro — see the "Enabling DeLogger Pro" Extras panel on page 18.)

DT800 Host Software

Although you can use any terminal software to communicate with your logger, you'll find that DT800-friendly software packages incorporate productivity features specific to data acquisition, data logging and the DT800 that make it pointless to use anything else.

- **DeLogger** (included on the CD provided with your DT800 and used predominately throughout this guide) has a totally graphical interface, which means that knowledge of the *dataTaker* programming language is not required. Instead, you supervise the DT800 just by clicking on icons and making selections from menus and dialog boxes. And, in addition to standard text output, you can display and print real-time and logged data in dynamic table, chart and mimic (needle meter) views, load data into a fully-featured spreadsheet, and replay saved data to any of the dynamic views.
- **DeLogger Pro** is the big brother of DeLogger. It has the added features of modem support, a database data storage option, the ability to connect to more than one data site at a time, enhanced mimic screens, and additional spreadsheet/graphical analysis tools.
- **DeTransfer** (included on the CD provided with your DT800) is the easiest non-graphical host software to use with the DT800 programming language. It provides complete access to all of the DT800's capabilities, and has separate send and receive windows, which are the basis of its exceptional and unique functionality. If you prefer command-line interfaces, DeTransfer is for you.

Run the DeLogger installer **Setup.exe**, which is located in the DeLogger folder on the CD supplied (**Software** > **DeLogger** > **Setup.exe**). You do not need a serial number for this installation of DeLogger.

To do this…

a) Place the CD supplied with your DT800 into your computer's CD drive.

b) Follow the numbered steps in Figure 10.

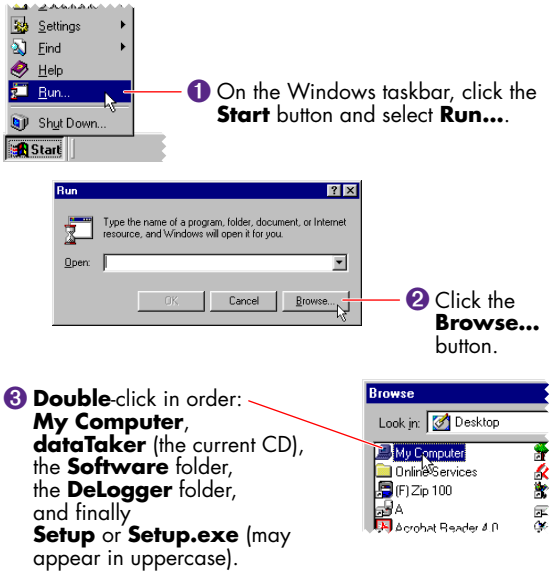


FIGURE 10 Starting the DeLogger installer

You are returned to the Run dialog box, which now contains the path to DeLogger's Setup.exe.

c) In the Run dialog box, click **OK**.
The DeLogger installer starts.

d) Follow the on-screen instructions.

e) After clicking **Finish** in the Setup Complete dialog box, restart the computer (**Start** menu > **Shut Down...** > select **Restart** > **OK**).

f) When the computer has restarted, notice that the **Start** > **Programs** menu now contains a **DeLogger** folder (Figure 11), from which you can launch

- **DeLogger** — the main application
- **On-Line Help**
- **Schedule** — for DeLogger Pro users; a utility that automatically runs DeLogger Pro events at pre-determined times (for example, dial a data site at 6:00pm every day, unload data on the second Tuesday of every month, or run Job3 every 15 minutes between 11am and 3pm every Friday)
- **SiteAdmin** — a utility that allows you to clear DeLogger's error and alarm logs
- **Uninstall DeLogger** — use to remove DeLogger from the hard disk.

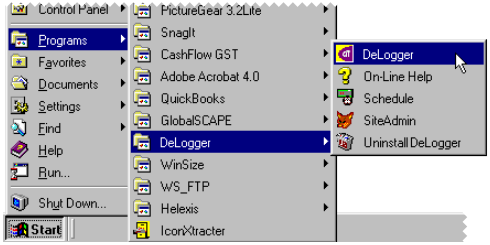


FIGURE 11 Typical Programs menu after installation

Re-Installing and Project Compatibility

Earlier Versions If an earlier version (that is, pre-version 4) of DeLogger already exists on the computer, you can do one of the following:

- **Clean Install** Remove the existing version (use Windows' Add/Remove Programs control panel) then install the new version.
- **Have Both** Install the new version to a different directory from the old one (both version 3 and version 4 can co-exist on your computer, but not in the same location).

Project Compatibility Project files from earlier versions (that is, pre-version 4) of DeLogger or DeLogger Pro can not be used with this version (version 4) of DeLogger (or DeLogger Pro). You'll need to re-create your version 3 projects using the new version of DeLogger.

DeLogger and DeLogger Pro Together Do not install DeLogger 4 and DeLogger Pro 4 together on a computer.

3-2 START DELOGGER

Start your new installation of DeLogger for the first time.

To do this…

a) On the **Start** menu> **Programs** > **DeLogger** menu, click **DeLogger** — see Figure 11.

DeLogger starts and presents you with its Serial Number Entry dialog box (Figure 12).

b) In the Serial Number Entry dialog box, leave the field empty and click **OK**.

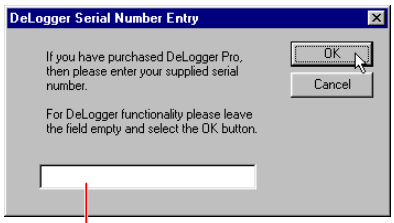


FIGURE 12 No serial number for DeLogger

The Welcome dialog box opens.

For more information about serial numbers and upgrading see the "Enabling DeLogger Pro" Extras panel.

c) In the Welcome dialog box, click **Start New Project** (Figure 13).

d) In the New Project dialog box that opens, type **Project99** (or whatever you like) and click **OK** (Figure 13).

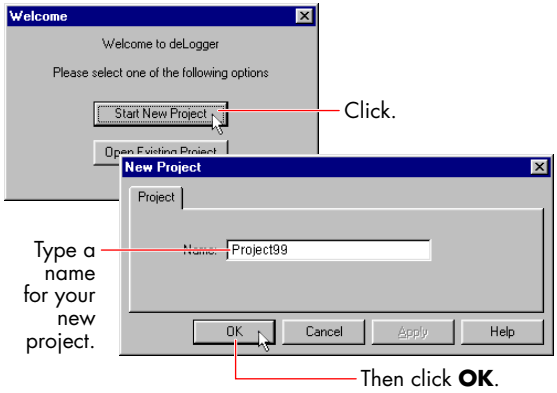


FIGURE 13 Creating a new DeLogger project

Project99's windows open within DeLogger's main window. Your screen should look like Figure 18 (page 25).

e) Notice that two windows are open in DeLogger's workspace (labelled **Prog1.dlp** and **Prog1.dl8** in their title bars) and five windows are minimized at the bottom of the workspace (**Mimic1.dlm**, **Form1.dlf**, **Text1.dlt**, **Chart1.dlc** and **Spread1.dls**).

Prog1.dlp is the program builder for DT500/600 series *dataTakers*, and **Prog1.dl8** is for your DT800.

f) Click **Prog1.dlp**'s minimize button (_ in its title bar).

You're not using the DT500/600 program builder in this tutorial.

EXTRAS

Enabling DeLogger Pro

If you purchase DeLogger Pro, or purchase an upgrade from DeLogger to DeLogger Pro, you'll receive a serial number that you use as follows:

- **If you've purchased DeLogger Pro** Install and start DeLogger exactly as described in topics 3-1 and 3-2 beginning on page 16 but, when the Serial Number Entry dialog box opens (Figure 12), enter your DeLogger Pro serial number.
- **If you've purchased an upgrade from DeLogger to DeLogger Pro** With DeLogger running, choose **Register Product...** from DeLogger's File menu. In the dialog box that opens (Figure 12), replace 0000-0000 in the field with your Pro serial number and click **OK**. (0000-0000 is the default serial number that enables basic DeLogger.) The next dialog box offers you the choice of quitting then restarting the program with the new functionality either now or later.

g) In DeLogger's File menu, choose **Save Project**.

This saves the change you just made to the window view (minimizing Prog1.dlp).

We'll introduce you to the things you can see in the DeLogger window in the next chapter. For now, continue with "Make the Software Connection".

3-3 Make the Software Connection

Your computer is physically connected to the DT800 (you did this in the previous chapter). Now you complete the communications link by making the software connection between DeLogger and the DT800.

From now on in this guide we use the term "Connection" — note the uppercase C — to mean "software connection" (see also page 28).

The "dt800 Com1" Connection

Although you can create your own Connections, in this tutorial you'll use one already provided with DeLogger. It's called **dt800 Com1** and contains instructions that tell DeLogger

- that the *dataTaker* at the other end of the communications link is a **DT800**
- to detect the DT800's communications baud rate and match the computer's baud rate to it
- to use software flow control when communicating with the DT800 (see the "Flow Control" Extras panel).

In addition, this Connection specifies that the DT800 is directly connected to the computer's COM1 serial port. So, if you chose to plug the comms cable into a serial port other than COM1 on the back of your computer, modify the dt800 Com1 Connection in DeLogger now (**Connections** menu > **Properties...**).

Connection Troubleshooting

If DeLogger responds with an "Error connecting to..." message, try the following:

- Check that the comms cable's connectors are firmly plugged into their sockets, then repeat "Make the Software Connection" above.
- If the computer has more than one COM port, swap the comms cable to the other port, then repeat "Make the Software Connection" above.
- Perform a hardware reset on the DT800 (described in "Resetting the DT800" in Part H of the *DT800 dataTaker User's Manual*), then repeat "Make the Software Connection" above.
- Make sure there is no software configured to access the computer's COM port you're using for the DT800 (COM1 if you're following this tutorial "to the letter"). If there is such software, you can
  - re-configure it to use a different COM port, or
  - quit it while you use DeLogger (you'll have to do this every time), or
  - remove it (use Windows' Add/Remove Programs control panel).

  Then repeat "Make the Software Connection" above.
- Change the serial port specification in the DeLogger software Connection (**Connections** menu > **Properties**) to, say, COM2. Then repeat "Make the Software Connection" above.

Connect to the DT800 using **dt800 Com1**.

To do this…

a) In DeLogger's Connections menu (fourth from the left), choose **Connect...**.

b) In the Connect dialog box that opens, highlight (one click) **dt800 Com1** and click **OK**.

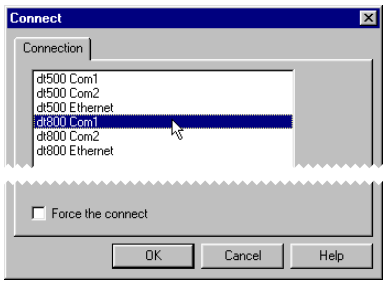


FIGURE 14 Connect dialog box

Two progress bar dialog boxes open, then close automatically to indicate that you've successfully connected to the DT800.

If a dialog box opens asking if you want to upgrade to a later version of the *dataTaker* firmware, click **No**. (You can do this at another time.)

If DeLogger is unable to connect (you'll see an "Error connecting to…" message), go to the Extras panel "Connection Troubleshooting".

3-4 VERIFY THE CONNECTION

Now carry out some simple communication with the DT800.

Get the *dataTaker*'s status.

To do this…

a) From DeLogger's *dataTaker* menu (sixth from the left), choose **Status...**.

DeLogger communicates with the DT800, retrieves information about what's currently happening in the DT800, and presents the information to you in the large dialog box that opens (Figure 15).

You can do this anytime you're connected to a DT800. In fact, as well as using this command to find out which schedules (see page 33) and alarms (see page 63) are currently running in the DT800, how much data storage (memory) is used and free in the DT800, and so on, you can send this command simply to confirm that you're connected to the DT800.

b) Look through the Status dialog box tabs to familiarize yourself with the information you can get from it, then click **OK**.

Flow Control

Flow control is a communications feature that allows communicating devices to control each other's transmission of information.

DeLogger and the DT800 support two types of flow control:

- **Hardware Flow Control (HWFC)** Flow control signals are sent between the communicating devices by means of dedicated RTS and CTS control wires in the cable.
- **Software Flow Control (SWFC)** Flow control command characters XOFF and XON are sent between the communicating devices by means of the data wires in the cable.

Setting Flow Control You must set the same type of flow control at each end of a communications link. For example, for this tutorial, both the DT800 and your DeLogger Connection must be set for software flow control.

This Tutorial We recommend that you use **software** flow control for this tutorial. This is the default/factory setting for a new DT800 and for DeLogger's **dt800 Com1** Connection. (If you're using a DT800 that has previously been set to hardware flow control, you must either change the DeLogger Connection to hardware flow control also, or change the DT800 to software flow control.)

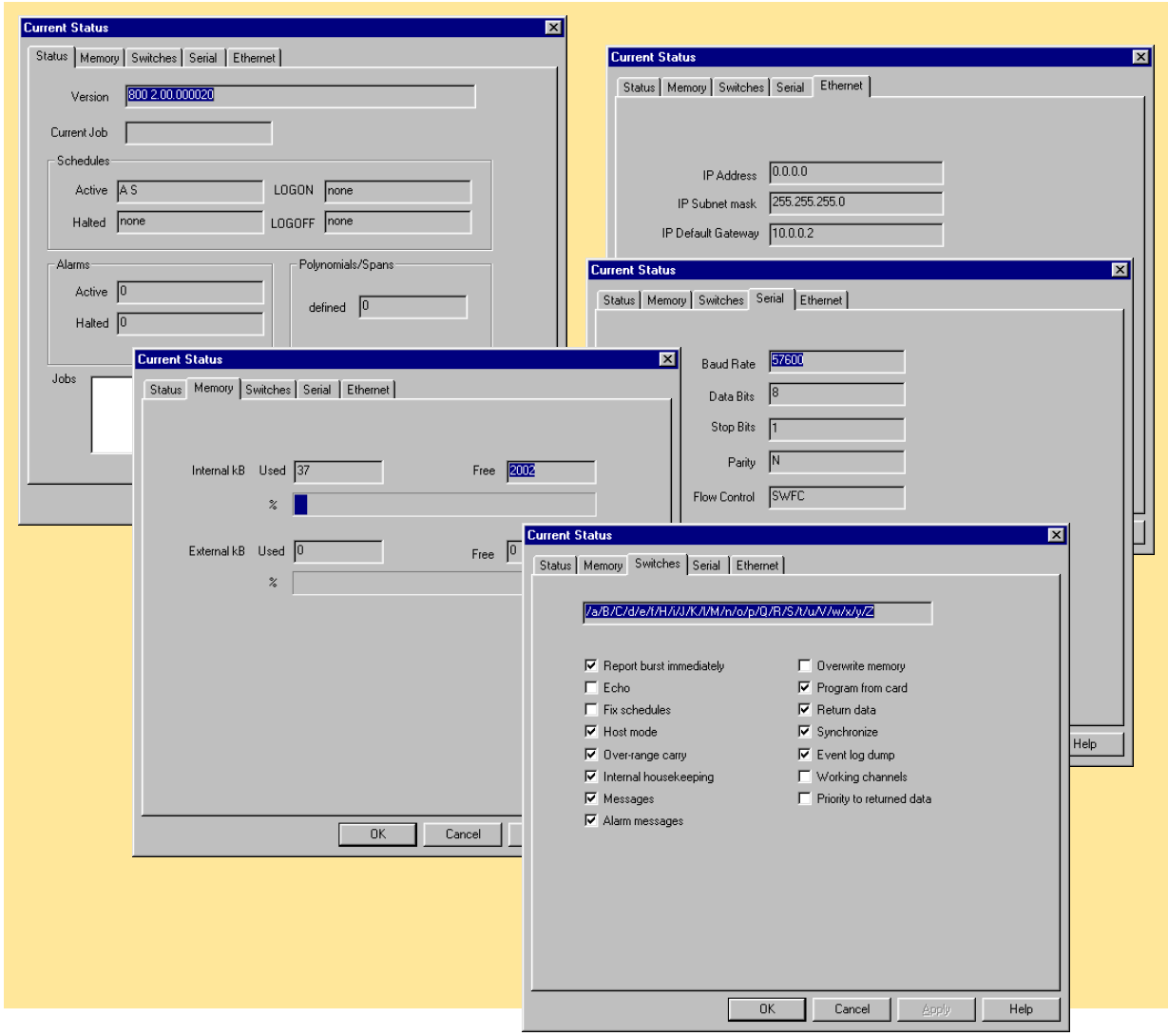


FIGURE 15 The five tabs of DeLogger's DT800 Status dialog box

CHAPTER 4

A Quick Overview of DeLogger

DeLogger host software provides you with a powerful set of tools for working with your DT800. (These are fully covered in the *User's Manual for DeLogger4 and DeLogger4 Pro*.)

To get you up-and-running now, this chapter presents a bird's-eye-view of DeLogger's windows, main toolbar and menus, which you'll use in later chapters.

Be sure not to miss "More Important Concepts and Terminology" on page 28.

4-1 The Big Pictures

Figure 16 is an overview of the window types available in a DeLogger project and some of the things you can do with them. Figure 17 shows the relationship between DeLogger projects, programs, schedules and channels. Figure 18 shows how DeLogger starts up the first time after installing it.

Then the remainder of this chapter gives you a quick visual tour of DeLogger:

- DeLogger's main toolbar — page 26
- DeLogger menus — page 27
- important DeLogger concepts — page 28

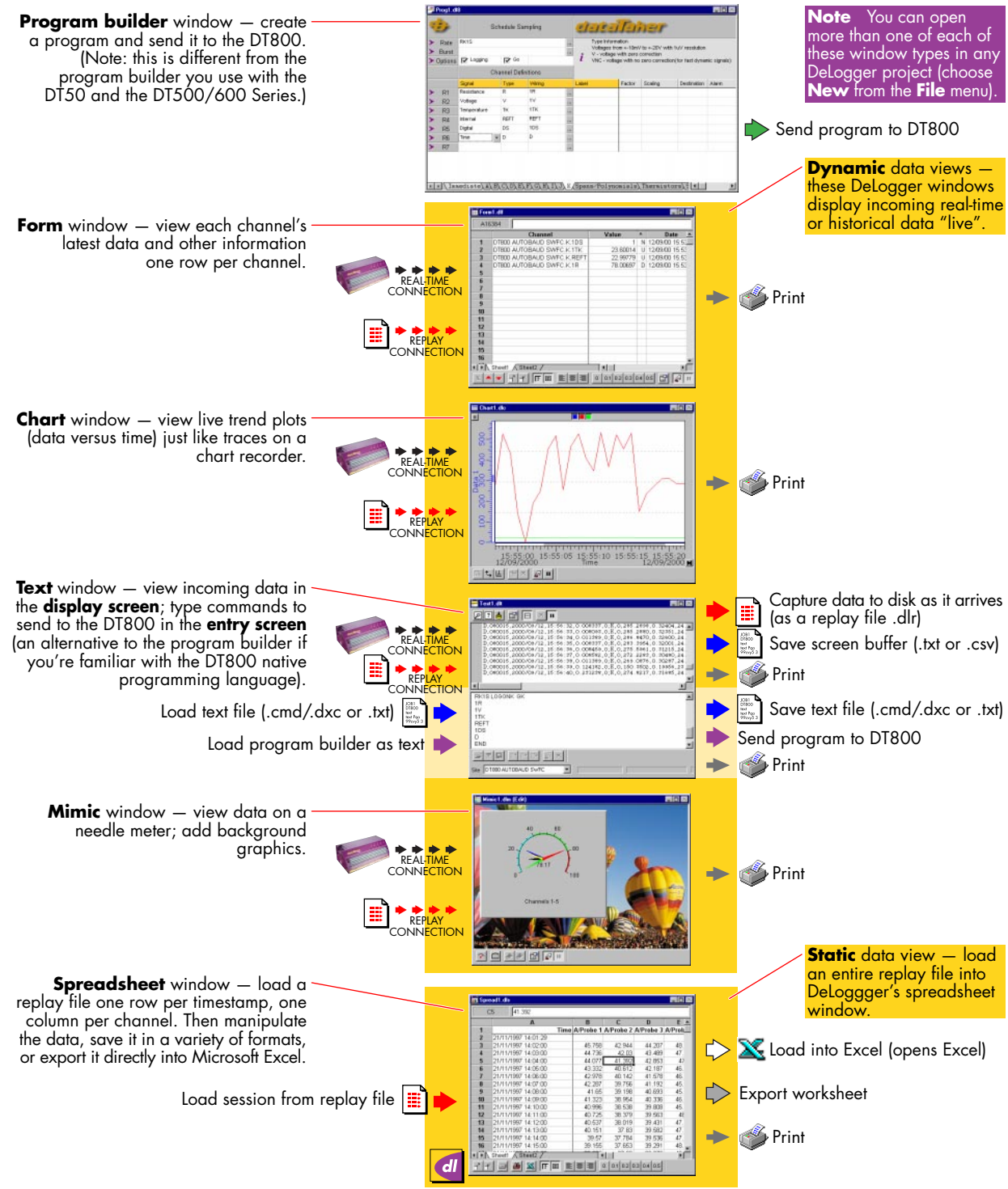


FIGURE 16 The big picture 1 — an overview of the window types available in a DeLogger project

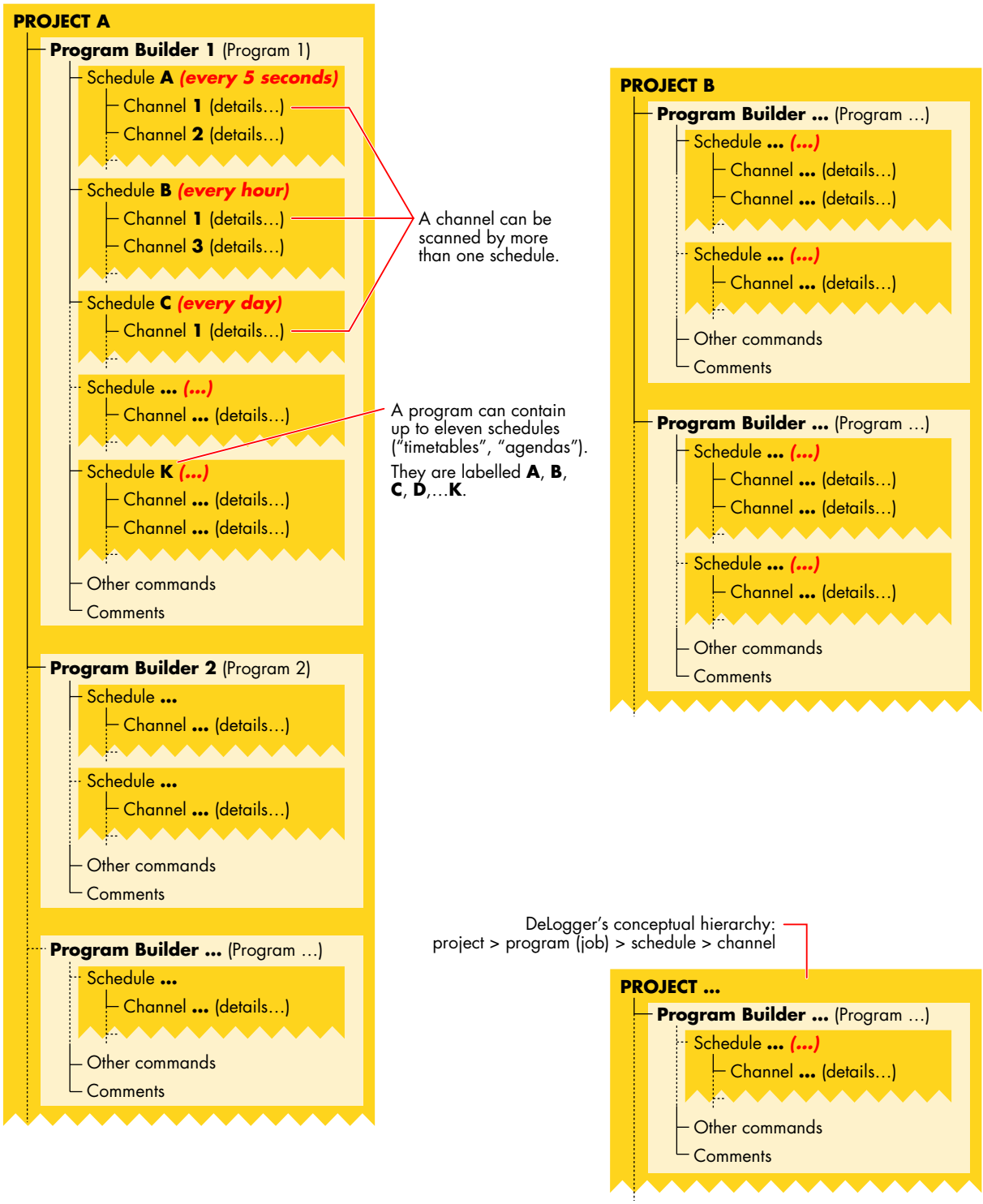


FIGURE 17 The big picture 2 — Projects, programs, schedules and channels

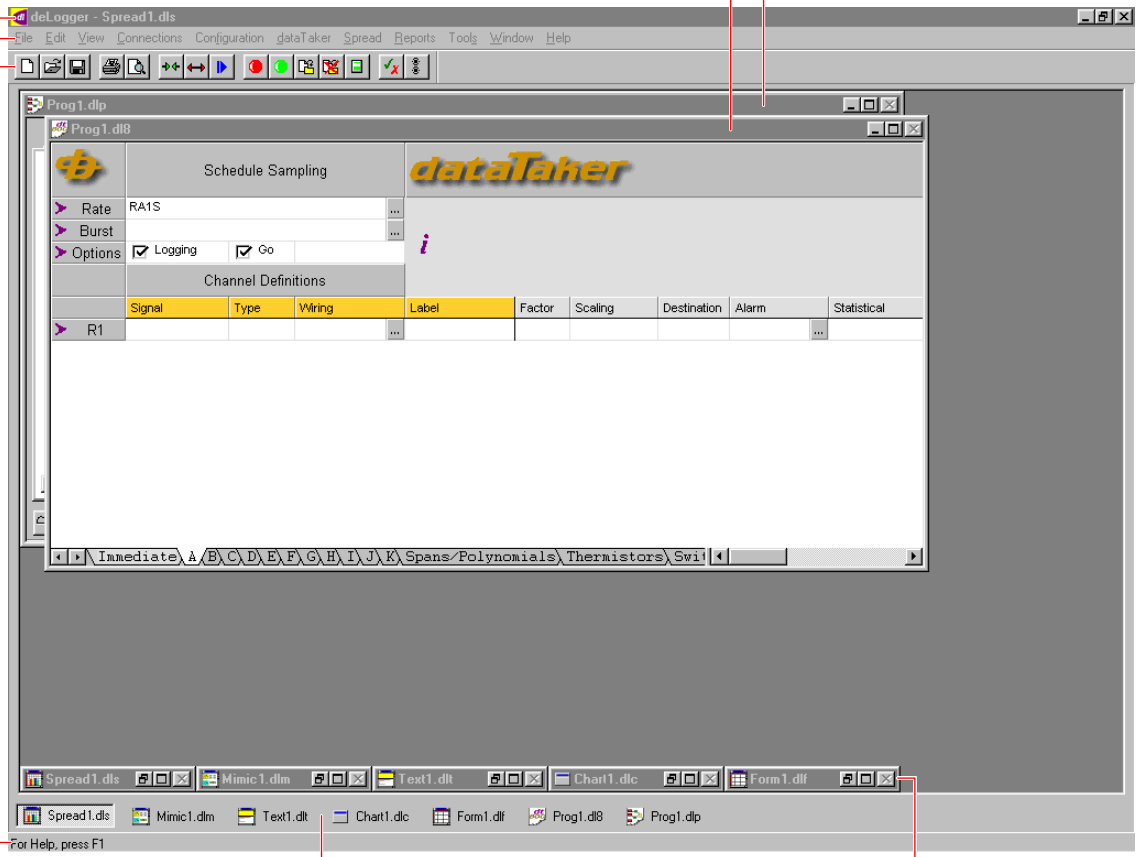
DeLogger's **main toolbar** allows you to quickly initiate frequently-used file, connection and *dataTaker* commands. See Figure 19.
The buttons duplicate commands found on the menu bar. If you drag the toolbar (by its gray background) from its docked position it becomes a floating toolbar. Use the View menu to show or hide the main toolbar.

Menu bar
See Figure 20.

The **title bar** contains standard Windows controls (minimize, maximize,...) and the name of the front-most DeLogger window.

DT800 **program builder** window. Here you create a program ready to send to the DT800. See page 31.

DT500 series **program builder** window — for DT50 and DT500/600 Series



Watch the **status bar** for prompts when you pause the mouse over a button or a menu item.
Use the View menu to show or hide the status bar.

The **document bar** gives you quick access to DeLogger's windows:

- Single-clicking a window's name in the document bar brings that window to the front in its current view state (minimized, maximized, or in-between). It's like choosing a window using the Window menu, only faster.
- Double-clicking a window's name in the document bar brings the window to the front and maximizes it.
- Once any window is maximized, a single click on a filename in the document bar maximizes that file (and minimizes the previous one).

Use the View menu to show or hide the document bar.

Minimized DeLogger windows (form, chart, text, mimic and spreadsheet)

FIGURE 18 The big picture 3 — DeLogger's startup layout after a new installation

4-2 DeLogger's Main Toolbar

The buttons on DeLogger's main toolbar duplicate frequently-used commands from the **File**, **Connections** and **dataTaker** menus.

If **Toolbar** is ticked on the View menu, the main toolbar is always visible no matter which DeLogger window you're working in.

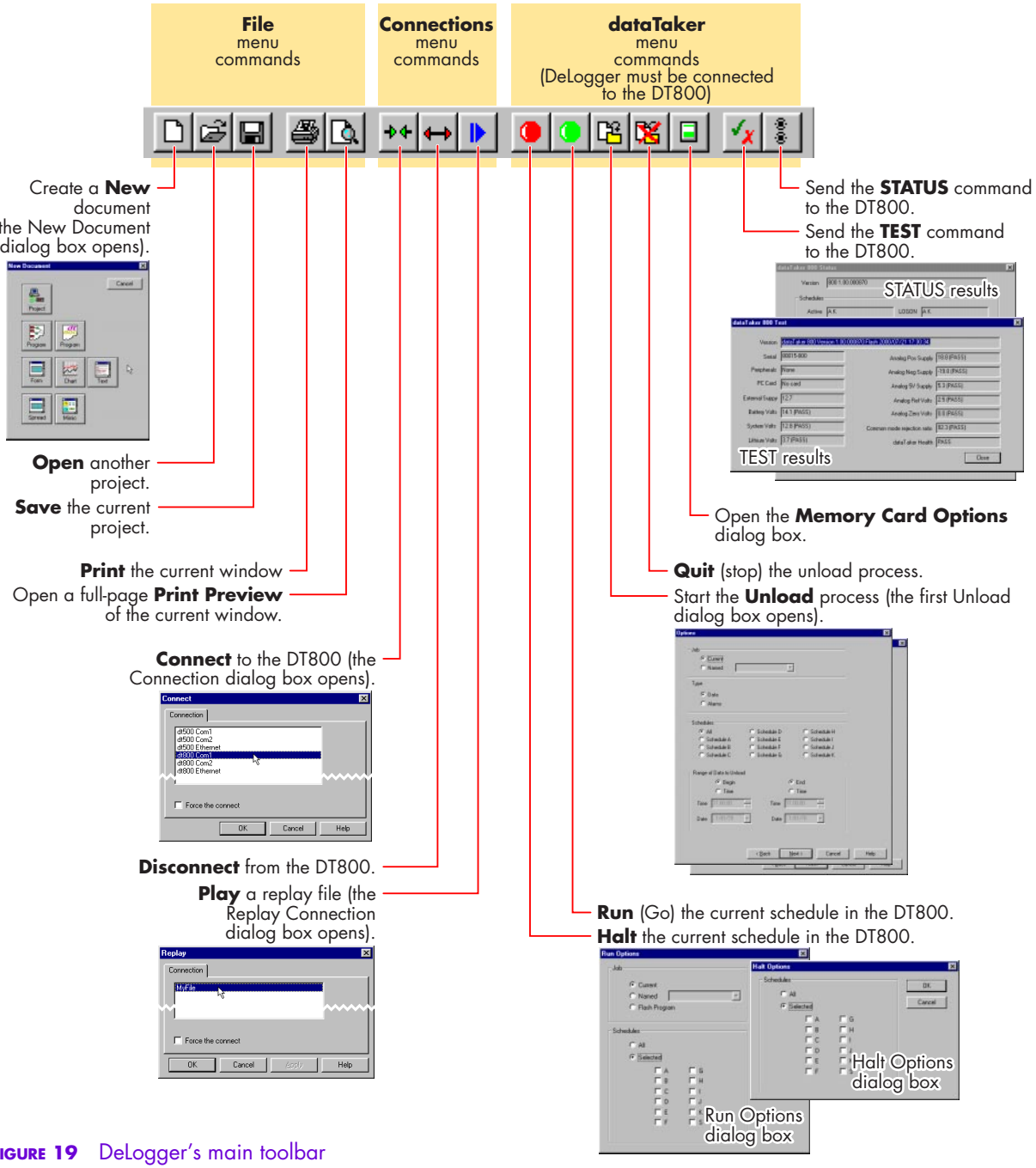


FIGURE 19 DeLogger's main toolbar

4-3 DeLogger's Menus

FIGURE 20 DeLogger's menus (sub-menus not shown)

4-4 More Important Concepts and Terminology

Connection

A DeLogger **Connection** is nothing more than a group of communications settings: a user-defined and user-named software tool that automates the process of linking DeLogger to a **data site** (explained below).

It specifies

- a particular computer port, a particular data site and particular communications parameters — for a **serial** Connection
- an IP address and port number — for a TCP or UDP Ethernet **network** Connection
- a particular DeLogger replay file (*.dlr; see page 30) — for a **file** Connection.

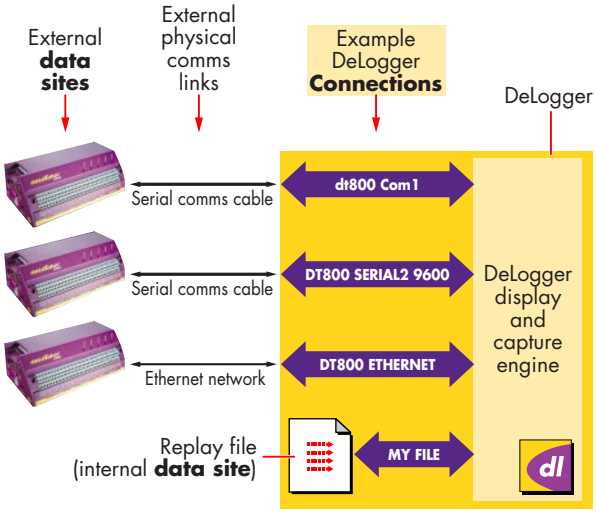


FIGURE 21 DeLogger's Connection concept

A Connection is the link between a data site and DeLogger.

You can create any number of Connections, each for a specific use, but DeLogger can have only one active Connection at a time — see the Extras panel "How Many Connections?".

DeLogger automatically saves each Connection, ready for the next time you want to use it.

To link DeLogger to a particular data site, you simply select the appropriate Connection name from DeLogger's live Connect dialog box or Replay dialog box and click **OK** (Figure 22).

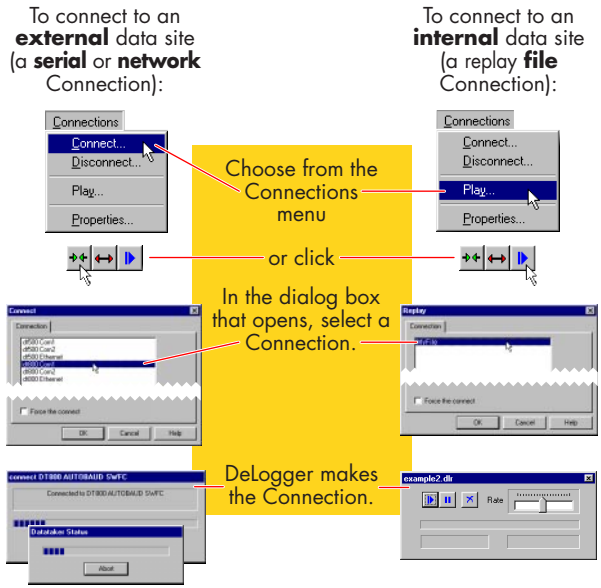


FIGURE 22 Making a Connection

Data Site

A source of data. DeLogger data sites can be

- external — a DT800 (or, to be more precise, the Connection to a DT800)
- internal — a replay file (or, to be more precise, the Connection to a replay file).

How Many Connections?

With DeLogger, you can make only one Connection at a time. (DeLogger automatically disconnects from the current data site in order to connect to another one.)

But with DeLogger Pro, you can make Connections to many data sites at the same time.

Channel

A "conduit" or "route" for data. See Figure 23.

DT800 Channels

The DT800 has

- **external physical channels** — the sets of terminals on the outside to which you connect sensors and transducers, and
- **internal physical channels** — internal sources of information, such as time and date from the DT800's clock/calendar, temperature, battery voltage, system variables and system timers.

DeLogger Channels

DeLogger works with

- **physical channels** — data returned from a DT800 (a "physical data site") either in real time, or unloaded at the end of a logging session
- **historical channels** — data supplied from a replay file (a "replay data site"; see page 30).

Figure 17 (page 24) shows where channels fit within projects, programs and schedules.

Details of all channels are kept in DeLogger's **data hub** (see page 30).

Programs and Jobs

When you're working with DeLogger and a DT800, the terms **program** and **job** mean the same thing.

Because the DT800 works with program entities called "jobs", every program you create in DeLogger is automatically tagged as a "job" when you send it to a DT800.

This tagging is almost invisible to the user (you can see it if you **Load DLP (Program) Text** into a text window entry screen). It's necessary for the DT800 to recognise a DeLogger program, but not for DT50 or DT500/600 Series *dataTaker*s.

Database

DeLogger stores housekeeping information (such as Connections, windows, and window sizes and positions) in a database.

And, by upgrading to DeLogger Pro, you can have extra database data management capabilities that add immense power to your data collection, analysis, presentation and reporting — all without leaving DeLogger Pro.

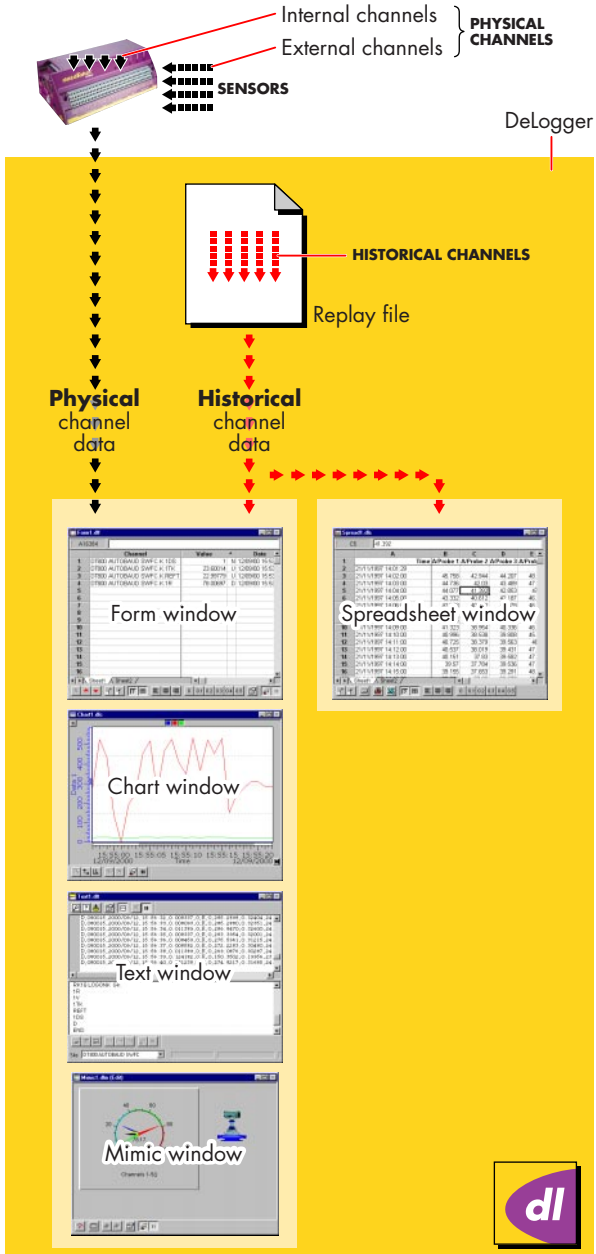


FIGURE 23 Channel concepts — external and internal, physical and historical

Data Hub

An indispensable table in DeLogger's database that stores details of every channel known to DeLogger during the current Connection (Figure 24).

Think of the data hub as a "resource controller" whose function is to

- monitor which channels are available (it does this — from all the data sites you're currently connected to; see the Extras panel "How Many Connections?" — every time you save a program builder window, send a program to the DT800, or otherwise communicate with a data site)
- keep an up-to-date list of available channels and their details
- compare available data site channels against those you've assigned in the current project's windows and warn you of any mismatch — that is, if any channels defined in DeLogger's windows aren't currently available from the connected data site(s)
- make valid channels available for you to use in the various DeLogger windows.

When you disconnect from a data site, that site's information is automatically cleared from the hub.

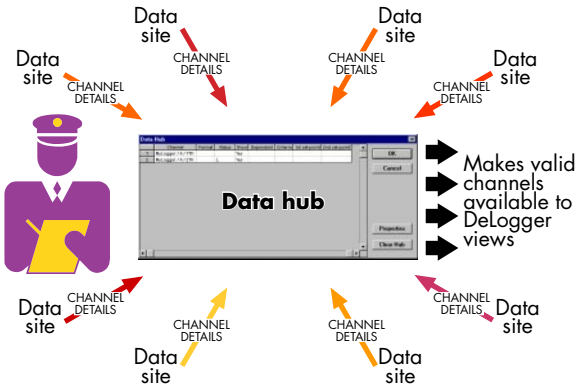


FIGURE 24 Data hub — DeLogger: one Connection at a time; DeLogger Pro: several Connections at a time

Real-Time Data

Data returned to the computer in real time — that is, the moment it is obtained by the DT800.

Logged Data

Data stored in the DT800's internal memory or in an inserted memory card.

You retrieve logged data using the **Unload...** command on DeLogger's **dataTaker** menu.

The DT800 can log data and return real-time data at the same time.

Replay Data, Replay File

Replay data is data saved in a computer file (a **replay file**, *.dlr) in a format that DeLogger can replay to its form, chart, text and mimic windows, just as if the data was arriving in real time (except that you can control the speed of the replay; see Figure 25).

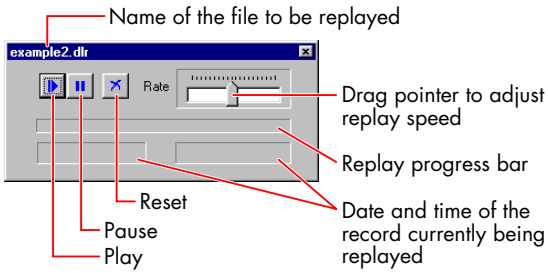


FIGURE 25 DeLogger's replay control panel

You can save both

- real-time data and
- logged data unloaded from a DT800

as a replay file.

DeLogger can also replay existing ***.dx8** and ***.dxu** files (*dataTaker* unload files).

A replay file is just another data site: to link to it, you use a DeLogger Connection called a **replay file Connection** (or a **file Connection** or a **replay Connection**).

You use the File tab in the **Connections** menu > **Properties** dialog box to create and edit replay file Connections. See Figure 22.

Front-Most Window

The DeLogger window that is in front of any others on your screen. Its title bar is more brightly colored than all the others, and it's always the last window you clicked on. Sometimes known as the "current", "top-level", "active" or "focus" window.

We don't use the term "active window" because DeLogger windows behind the front-most window can still be active. For example, values in a background form window can change as data arrives.

CHAPTER 5

YOUR FIRST PROGRAM

When you installed DeLogger in Chapter 3 you created and named a DeLogger project (done in "Start DeLogger" beginning on page 18). We called it **Project99**.

DeLogger is running on the computer and connected to your DT800. You verified this in "Verify the Connection" (page 20). You also connected the potentiometer to channel 1 of the DT800, to simulate a resistive sensor (page 15).

Now, in this chapter, you'll

- get to know DeLogger's program builder window — page 31
- create a program using a program builder window — page 33
- see the "raw" version of your program — page 36
- send the program to the DT800 — page 36.

Analog Channels, Digital Channels — What's the Difference?

Analog channel — accepts a continuous range of input values between a minimum and a maximum.

Digital channel — expects an input that has one of only two values:

- **on** or **off**
- **high** or **low**
- **1** or **0**

Often an analog channel is able to "read" a digital input, but the reverse is not true.

5-1 DeLogger's Program Builder Window

A DT800 **program builder** window is DeLogger's tool for creating a DT800 program. As Figures 26 and 27 show, you use it by choosing various schedule, channel and other items from drop-down lists and dialog boxes.

Important Program Builder Facts

- Each program builder window creates just ONE DT800 program.
  Although the program may contain several schedules and involve many DT800 channels, there is only one program per program builder.
- A project can contain more than one program builder — that is, more than one program. Figure 17 on page 24 illustrates this.
  (To add another project builder window, choose **New** on the File menu, then click the **DT800 Program** button.)
- A DT800 program is everything you specify in a program builder window — everything defined on every tab across the bottom of the program builder.
- Your DT800 runs one program at a time. When you send a new program, it replaces any existing program in the DT800 (DeLogger asks first to ensure that this is what you want to do).

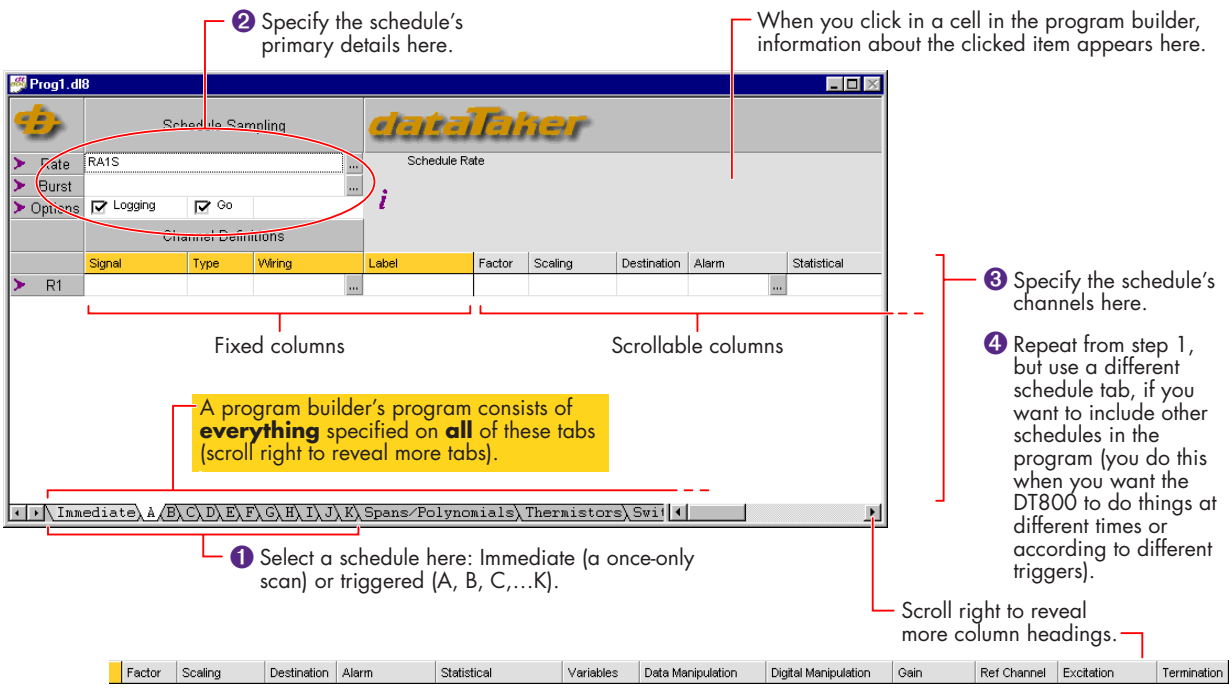


FIGURE 26 DeLogger's DT800 program builder — general sequence of use

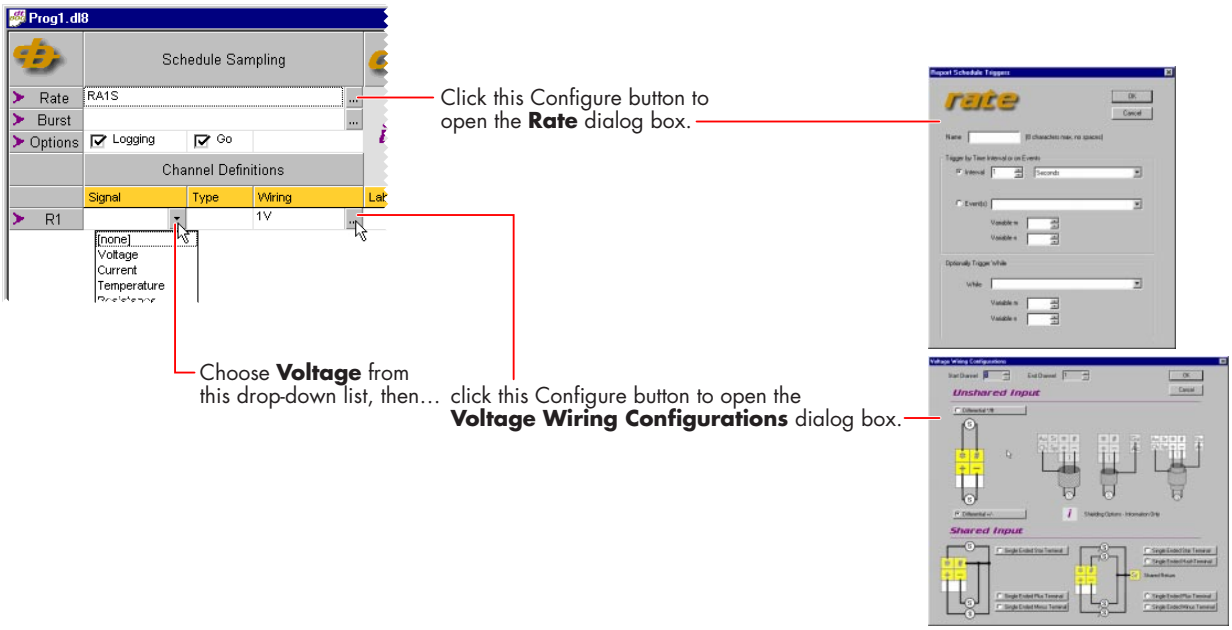


FIGURE 27 Using specific parts of the DT800 program builder — more details in the following topics

5-2 Create a Program

Now you'll use a DeLogger program builder window to create a simple program ready to send to the DT800. (You can also create a program in a DeLogger text window if you're familiar with the *dataTaker* programming language. But, in this tutorial, we'll do it the graphical way — by pointing and clicking in the program builder.)

The general steps for working in a program builder window are summarized by the numbered instructions in Figure 26.

Schedules

Scan **schedules** are the heart of any DT800 program. Here, you specify your program's first schedule. (If you want to know more about schedules, see the Extras panel "Scan Schedules — DT800 Timetables" below, and Part D of the *DT800 dataTaker User's Manual*.)

Define a schedule (use schedule **A**) that instructs the DT800 to scan channel 1 (the potentiometer) as a 2-wire resistance every half-second, and to log the measurements.

To do this…

a) Minimize all windows except the DT800 program builder (the window with **Prog1.dl8** in its title bar).

b) At the bottom of the program builder window, click the tab labelled **A**.

We'll only use one scan schedule, schedule A, in the program for now (you don't have to use schedule A first; you can use any of tabs A to K).

c) Set a **time interval** trigger for schedule A of half a second (a "0.5-second trigger rate") by following the numbered steps in Figure 29.

When the Triggers dialog box is open, notice the other options available:

- **Name** — Schedules can have optional names for identification — for example, **Boiler1** and **HOURLY** (spaces are not allowed). If no name is given, schedule identification defaults to **RA** for schedule A, **RB** for schedule B, and so on.
- Trigger on **Events** — Open the Event(s) drop-down list to see the event types you can use to trigger a schedule.
- Trigger **While** — Open the While drop-down list to see the "trigger while…" conditions you can assign to the schedule.

Scan Schedules — DT800 Timetables

A scan **schedule** tells the DT800 what to do and when to do it. It's a collection of instructions that specifies

- which channels to scan (a schedule can contain one, two or many channels)
- when to scan the specified channels — for example, whenever 5 seconds have elapsed (repeating every 5 seconds), whenever a door closes (scan on digital event), or whenever an alarm occurs
- how to read the channel (voltage, current, temperature, resistance,…)
- how to convert the reading, apply alarms, assign the channel's data to channel variables, apply gain, excitation and termination,… (may not be required).

Each program you send to the DT800 can contain up to eleven basic schedules (labelled **A**, **B**, **C**,…**K**). That is, in one program you send to the DT800, you can define various groups of channels to be scanned according to as many as 11 different "timetables" or "agendas".

See also Figure 17 on page 24. It shows how

- projects contain programs (program builders)
- programs contain schedules
- schedules contain DT800 channels.

There's also an **Immediate** scan schedule. Read about this in "Other Schedules and Scans" in Part D of the *DT800 dataTaker User's Manual*.

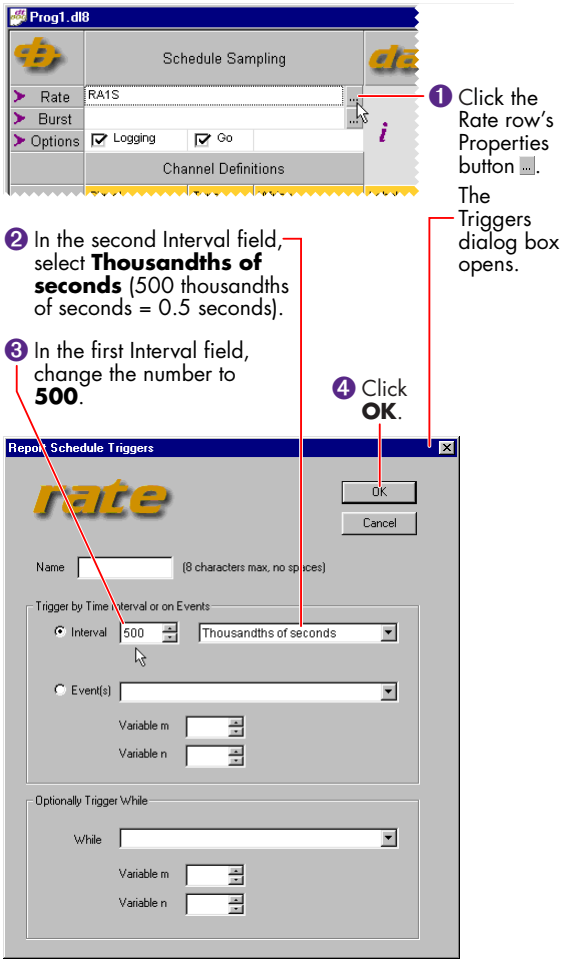


FIGURE 29 Setting schedule A's rate to 0.5 seconds

d) Single-click in the empty/white area of the Burst row and notice the information text that appears in the information area (on the right-hand side of the program builder window) — Figure 28.

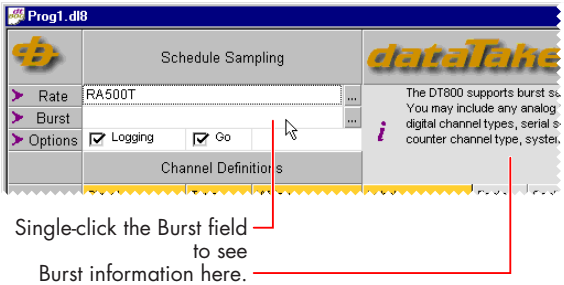


FIGURE 28 Information area example

You can use this technique to get information about most items in the program builder.

e) Click the Burst row's Configure button ... and, in the dialog box that opens, look over the burst schedule options available. When you've finished, click **Cancel** to close the dialog box.

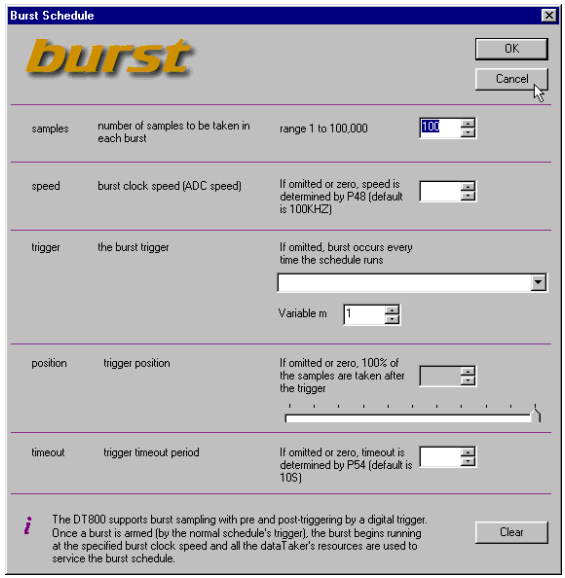


FIGURE 30 The burst schedule dialog box

We won't use a burst schedule in this tutorial, but you can read more about them in "Other Schedules and Scans" in Part D of the *DT800 dataTaker User's Manual*.

f) In the Options row of the program builder, leave **Logging** and **Go** ticked.

Then when you send the program you're currently building to the DT800, these options instruct the DT800 to run (**Go**) schedule A and to log its data.

g) Now specify the channel you want schedule A to read (the potentiometer channel) by following the numbered steps in Figure 31.

When you've finished working through Figure 31, you've specified your first schedule.

h) In DeLogger's File menu, choose **Save Project**.

This ensures you won't lose any of the work you've just done.

i) Note that there are a number of other columns in the program builder window.

They allow you to further affect how your input channels and sensors are managed during measurement, and how resulting data is processed and manipulated. Click the Configure buttons and the drop-down list buttons in these columns to see more of what's available.

You've just created and saved your first DeLogger program. It contains one schedule, schedule A. When you send it to the DT800, it will instruct the DT800 to scan channel 1 every half-second as a resistance and log the measurements.

Your program contains only one schedule because tab **A** (at the bottom of the program builder window) is the only one in which you've assigned a channel. In later chapters you'll add

- another channel to schedule A
- another schedule, schedule B, to the program.

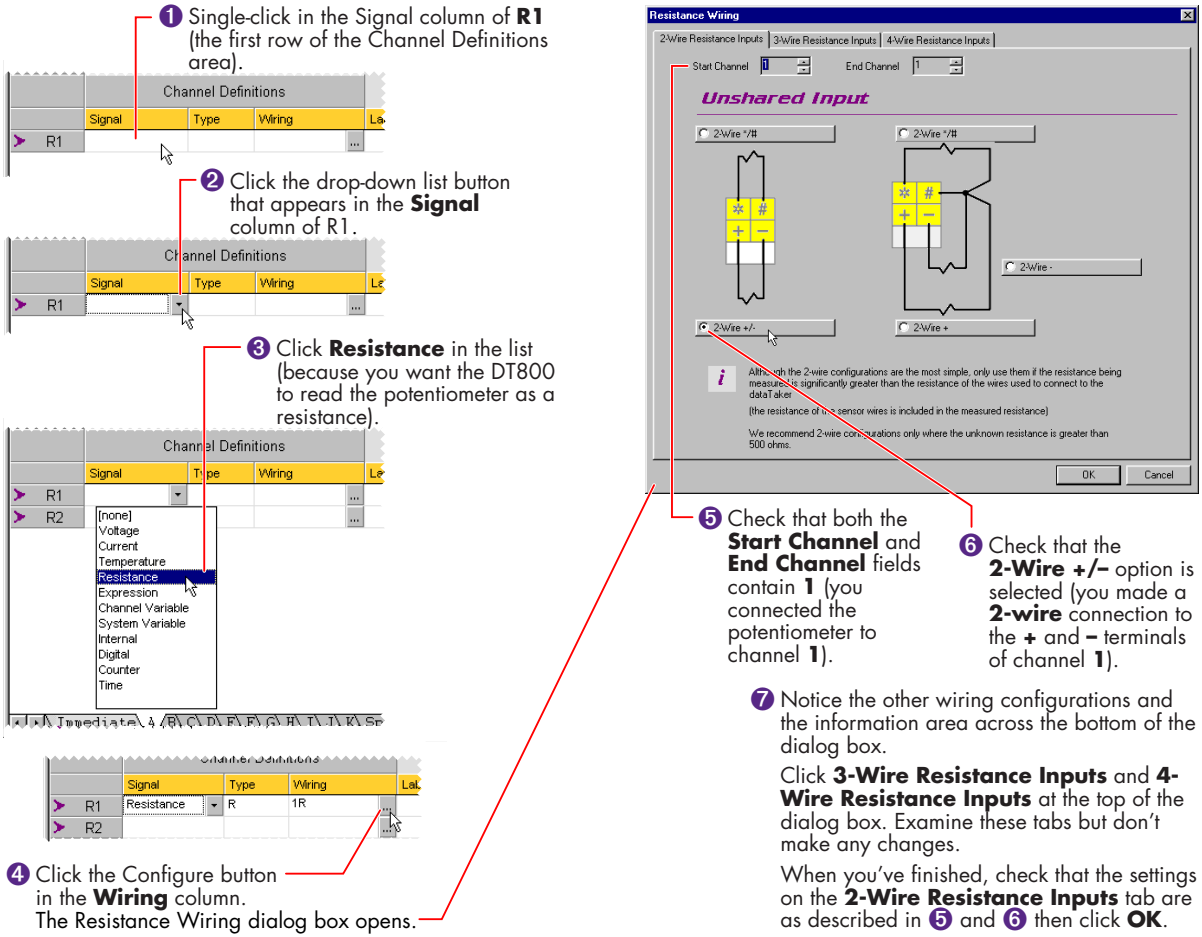


FIGURE 31 Specifying the potentiometer channel

5-3 See What You'll Send

At any time, you can see the program you're building in command-line (text) format. This is probably only useful if you're familiar with the *dataTaker* programming language, but have a look at it now so that you know this facility exists.

Use the program builder's right-click menu to see the command-line form of your program.

To do this…

a) **Right**-click anywhere in the program builder window (except the title bar).

A pop-up menu opens (Figure 32).

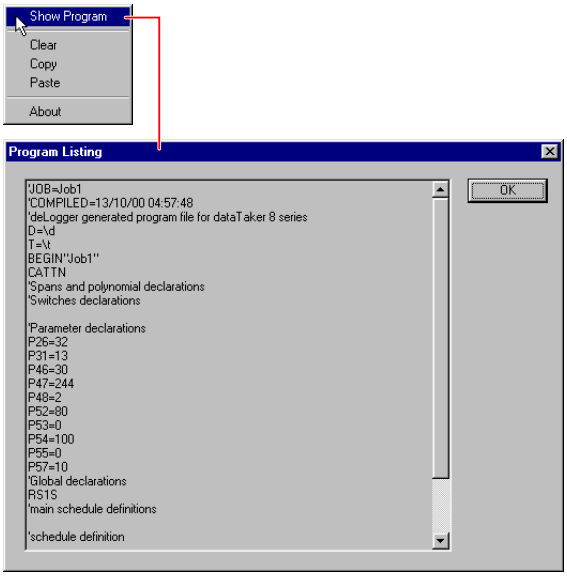


Figure 32 See your program's behind-the-scenes commands

b) In the pop-up menu, choose **Show Program**.

The Program Listing dialog box opens showing your program line-by-line. Scroll down to see all of the commands that constitute the program.

c) Click **OK** to close the dialog box.

5-4 Send the Program

Because you're currently connected to the DT800 (you did this in "Make the Software Connection" back on page 19), all is now ready for you to send your program.

Send your program to the DT800.

To do this…

a) Make sure that **Prog1.dl8** is the front-most window (single-click it if you're not sure).

Always take care if you have more than one DT800 project builder in any project. DeLogger sends only the program of the active program builder, so make sure the correct program builder is front-most.

When a program builder is the front-most window, the seventh menu from the left changes to **Program** — see Figure 20 (page 27).

b) In the Program menu, choose **Send to Connection**.

The Send Program File dialog box opens.

Figure 33 Send Program progress

The Event Logs window (Figure 34) may also open to report that there is no current job ("program") in the DT800. See the "Event Logs" Extras panel.

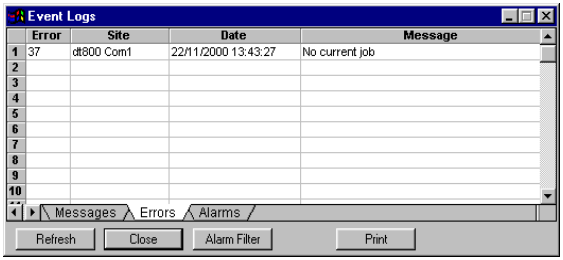


Figure 34 Event Logs window displays messages, errors and alarms

c) If the Event Logs window is open, click its **Close** button.

d) Notice that the Acquiring LED on the DT800's front panel now flashes every half-second — that is, every time the DT800 makes a measurement. (This is in addition to the DT800's three-second "heartbeat" flash discussed in step b) in "Power the DT800" on page 14.

Because your program instructed the DT800 to log the measurements, the Logging LED also flashes every half-second.

The DT800 is now running according to your program, scanning channel 1 every half-second and logging the value in its internal memory. We won't do it in this tutorial, but you could disconnect from the DT800 now, leaving it operating completely independent of the computer; this is how many *dataTaker*s are used.

Remember...

When you send a program, you send all settings on every tab in the current program builder window — see the bottom of Figure 26 (page 32). So, in addition to scan schedules, you're sending

- any span, polynomial and thermistor definitions you've created on these tabs
- the DT800 configuration settings on the Switches, Parameters and Global tabs.

Event Logs

The Event Logs window (Figure 34) displays

- messages on the Messages tab
- errors on the Errors tab
- alarms on the Alarms tab.

If you tick **Show Alarm Events** on the View menu, DeLogger opens this window every time an alarm occurs.

If you tick **Show Error Events** on the View menu, DeLogger opens this window every time an error occurs.

If you tick **Show Message Events** on the View menu, DeLogger opens this window every time a change message is received from the DT800.

(You can alter the degree of this reporting — see **Configuration** menu > **Defaults...** > **Confirmation Level** area.)

You can keep the Event Logs window permanently open on your screen by ticking **View Events** on the View menu.

Switches and Parameters

Switches are a group of internal settings you can use to configure the operation of a DT800.

Parameters are another group of internal settings.

Both are described in Part H of the *DT800 dataTaker User's Manual*.

Switches and parameters are primarily intended for use when programming the DT800 directly (that is, using the *dataTaker* programming language) and have little relevance when using DeLogger to supervise the DT800.

CHAPTER 6

See Your Data — Form Window

In this chapter
- you're introduced to DeLogger's form window — page 38
- you use the form window to see data being returned from the DT800 — page 41
- you automatically set the DT800's date and time — page 42.

6-1 DeLogger's Form Window

A DeLogger **form** window displays data from real-time or replay channels one row per channel (Figure 35). In Microsoft Excel terminology, the form window is a **workbook** that initially contains one **worksheet**. (You can add or delete worksheets at any time — explained in the lower right-hand corner of Figure 35.)

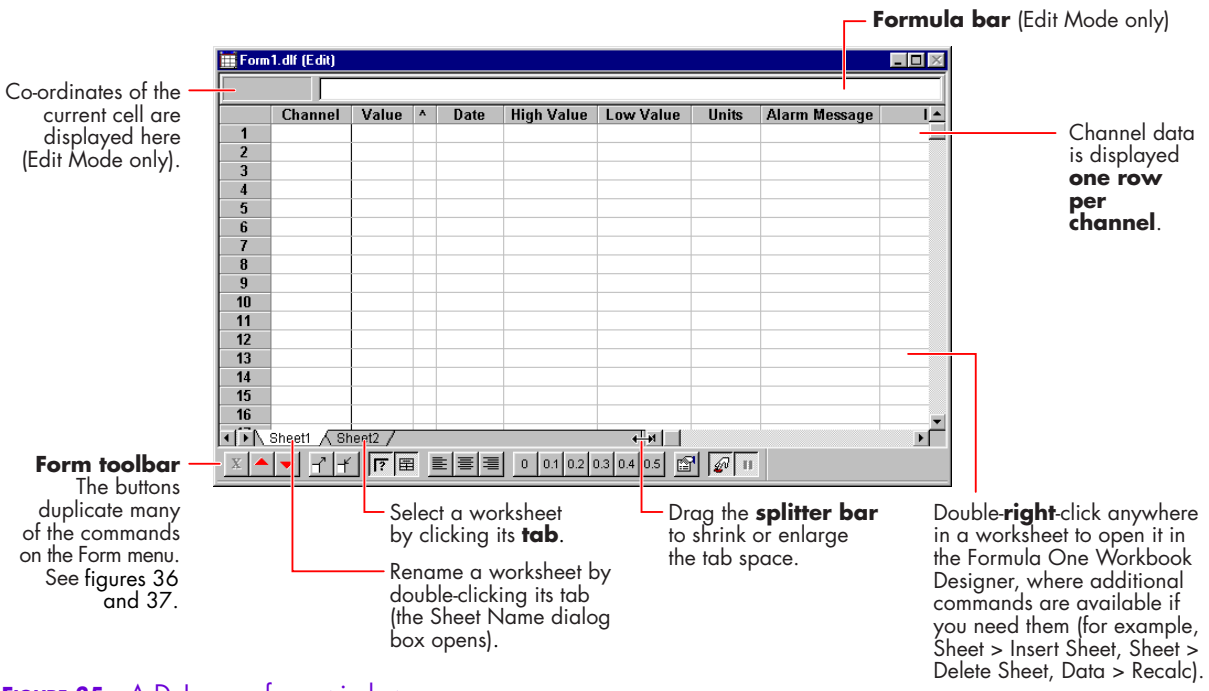


Figure 35 A DeLogger form window

Each channel's row in the worksheet contains

- the channel's latest value and its timestamp
- the channel's highest value and lowest value
- a trend indicator (**U**p or **D**own), which shows whether the latest value is above or below the previous value
- the channel's units
- any alarm message.

You can have as many form windows open as you need. (To add a form window, choose **New** on the File menu, then click the **Form** button.)

At any time, you can pause the incoming data and print selected areas of the form.

Edit Mode On/Off

The form window has two distinct modes:

- Edit Mode — for configuring the form (**Edit Mode** on the Form menu is ticked)
- Run Mode — for viewing incoming data (**Edit Mode** on the Form menu is un-ticked)

These modes are compared in Figures 36 and 37.

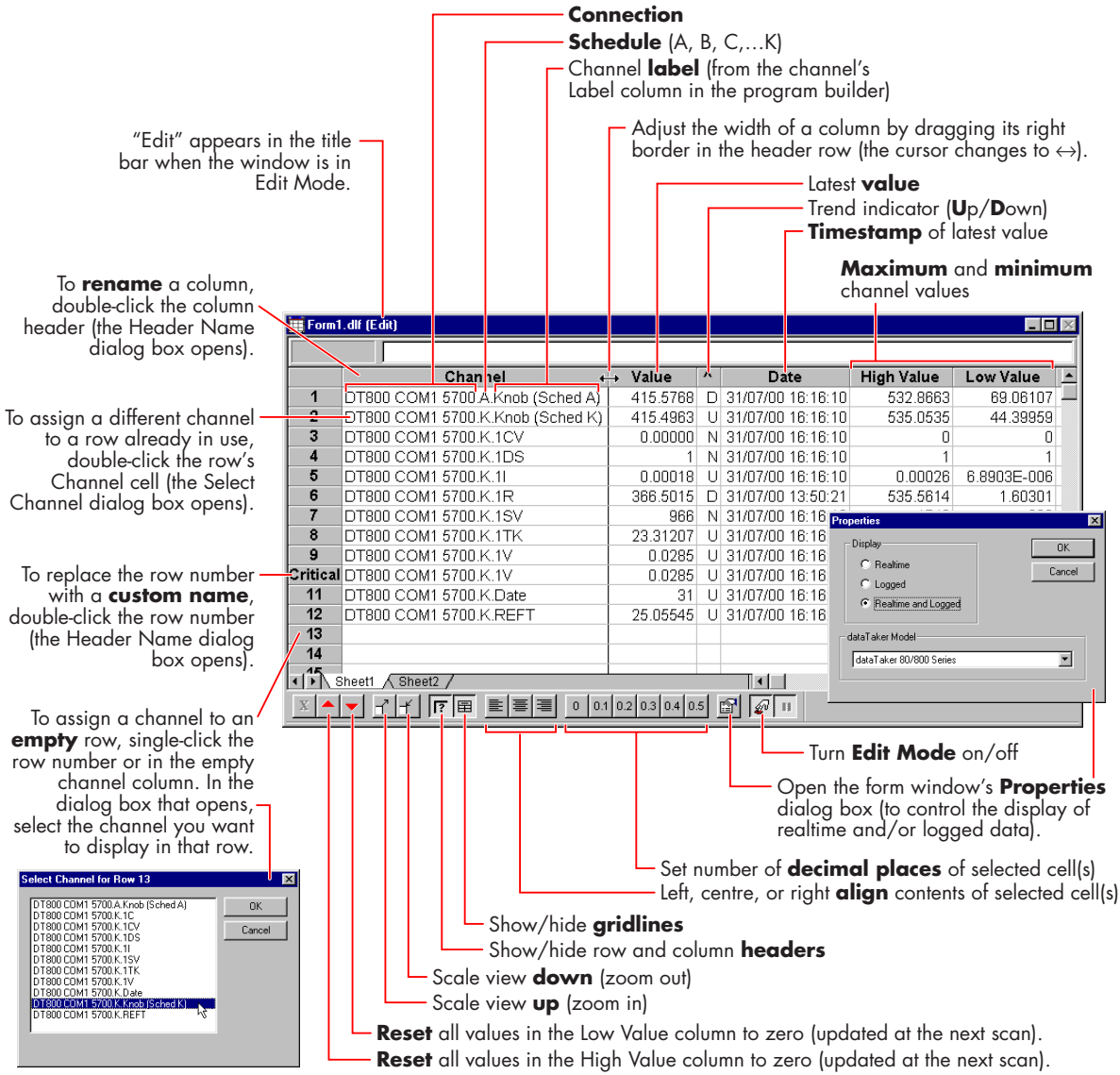


FIGURE 36 A DeLogger form window in Edit Mode (**Form** menu > **Edit Mode** is ticked)

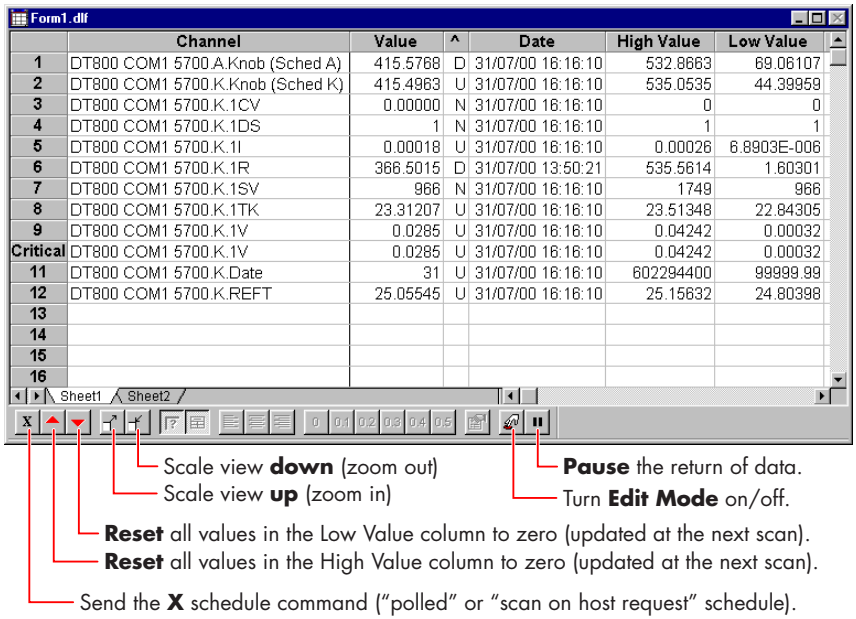


FIGURE 37 A DeLogger form window in Run Mode (**Form** menu > **Edit Mode** is un-ticked)

Can't See Live Data?

If the channel data in the Value column isn't updating as you think it should, check that

- **Edit Mode** on the Form menu is un-ticked (that is, the form window is in Run Mode)
- **Pause** on the Form menu is un-ticked
- for real-time channels: DeLogger is connected to the DT800, and the DT800 is running the program that contains the channels you've specified to be displayed in the form window
- for replay channels: the replay control panel is open and showing the correct replay file's name in its title bar.

The Form Menu

When a form window is DeLogger's front-most window, the seventh menu on DeLogger's menu bar is **Form** (see Figure 20 on page 27). Commands on this menu are specific to the form window, and some are duplicated by buttons on the form toolbar (Figure 38).

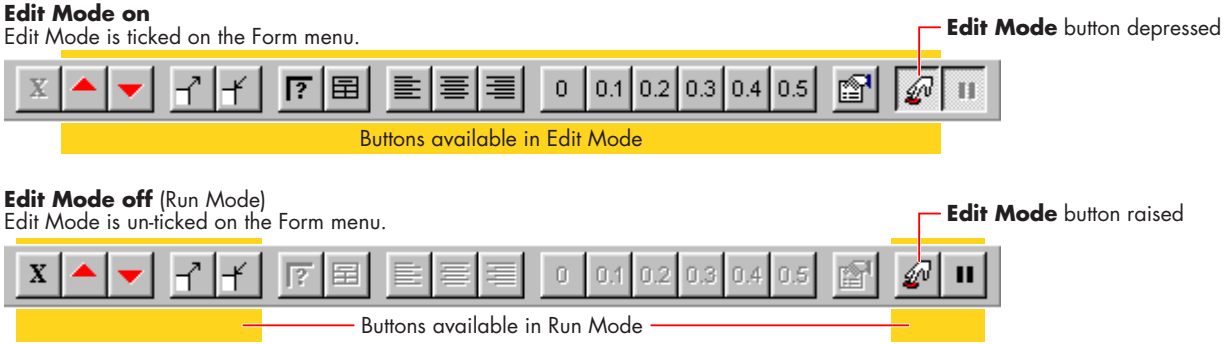


FIGURE 38 Buttons available on the form toolbar in Edit Mode and Run Mode

6-2 View the Returned Data

Use DeLogger's form window to view the real-time data that the DT800 is returning to your computer.

To do this…

a) Locate the minimized form window at the bottom of DeLogger's main window — it's named **Form1.dlf** — and click its Restore button.

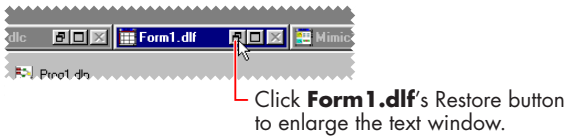


FIGURE 39 Restoring the form window

The form window is restored from its minimized state.

b) Make sure that the form window is in Edit Mode.

Do this by checking for any of the following:

- the word "Edit" is present in the form window's title bar
- the formula bar is present at the top of the form window (Figure 35)
- the Edit Mode button is in the pressed position (Figure 38)

If the window is not in Edit Mode, choose **Edit Mode** on the Form menu (or click the **Edit Mode** button).

c) Single-click in the **Channel** column of row 1.

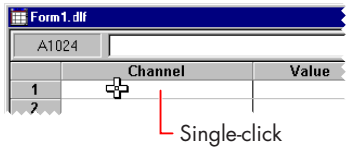


FIGURE 40 Assigning a channel to row 1

The Select Channel for Row 1 dialog box opens. It contains the name DeLogger has given to your potentiometer channel.

d) Notice that the name is composed of

- the Connection name
- **A** — the "schedule ID" (this is the default schedule ID; it is not replaced by any schedule ID you create in the program builder)
- **1R** — the "channel ID", which itself is composed of the "channel number" **1** and the **R**esistance channel type (this is the default channel ID; it is replaced by any channel label you create in the program builder — you'll do this in "Add a Channel Label" on page 55).

e) In the Select Channel for Row 1 dialog box, highlight (one click) your channel name and click **OK**.

See also the "Clearing the Form Window" Extras panel (page 42).

f) Turn Edit Mode **off** (un-tick **Edit Mode** on the form menu, or click/release the **Edit Mode** button) and — while watching the form window's Value column — turn the knob on the potentiometer.

Returned data (resistance) appears in the Value column and is updated every half-second.

g) Turn the knob in both directions and observe the effect in the trend indicator column (shows **U**p or **D**own) and the High Value and Low Value columns.

You may need to enlarge the form window or scroll it horizontally to see these columns.

If turning the potentiometer knob fully anticlockwise produces a maximum reading instead of a minimum, reconnect the potentiometer using the green and white wires instead of those used in Figure 9 (page 15).

h) Experiment with the **Reset High** and **Reset Low** buttons to see the effect they have on the readings in the High Value and Low Value columns.

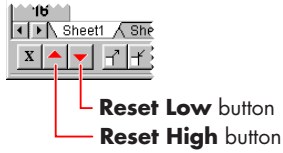


FIGURE 41 Reset High and Reset Low buttons

6-3 Set the DT800's Date and Time

Communicate again with the DT800 to set its date and time to that of your computer.

Use DeLogger's **Set Date/Time** command.

To do this…

a) Notice the current date and time reported by the DT800 in the form window's **Date** column.
They may not be correct.

b) In the **dataTaker** menu, choose **Set Date/Time**.
DeLogger communicates with the DT800 and sends it your computer's date and time (a progress dialog box appears momentarily).

c) Observe the **Date** column again.
The DT800 is now returning the correct date and time.

Clearing the Form Window

To clear one or more rows in the form window, highlight the row(s) — **Shift+click** and **Ctrl+click** work for multiple rows — then press **Delete** on your keyboard. A dialog box opens in which you select what you want to clear:

- all (formats and values)
- formats only (special cell alignment, fonts, borders, patterns and so on — see **Form** menu > **Format**)
- values only (leaves any special cell formatting untouched)

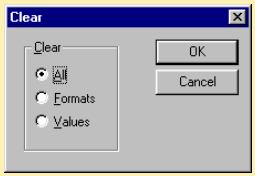


FIGURE 42 Form window's clear dialog box

CHAPTER 7

SEE YOUR DATA — CHART WINDOW

DeLogger's chart window turns your computer into a powerful chart recorder.

In this chapter

7-1 DELOGGER'S CHART WINDOW

A DeLogger **chart** window displays how the value of one or more DT800 channels changes with time. See Figures 43 and 44.

Incoming data from user-selected real-time or replay channels is automatically plotted against time. New data is plotted on the right-hand side of the trend area and the trend graphs move from right to left, exactly like the traces on a chart recorder.

You can display data from up to twelve channels in each chart window — that is, twelve separate trend graphs per chart window — and you can assign the

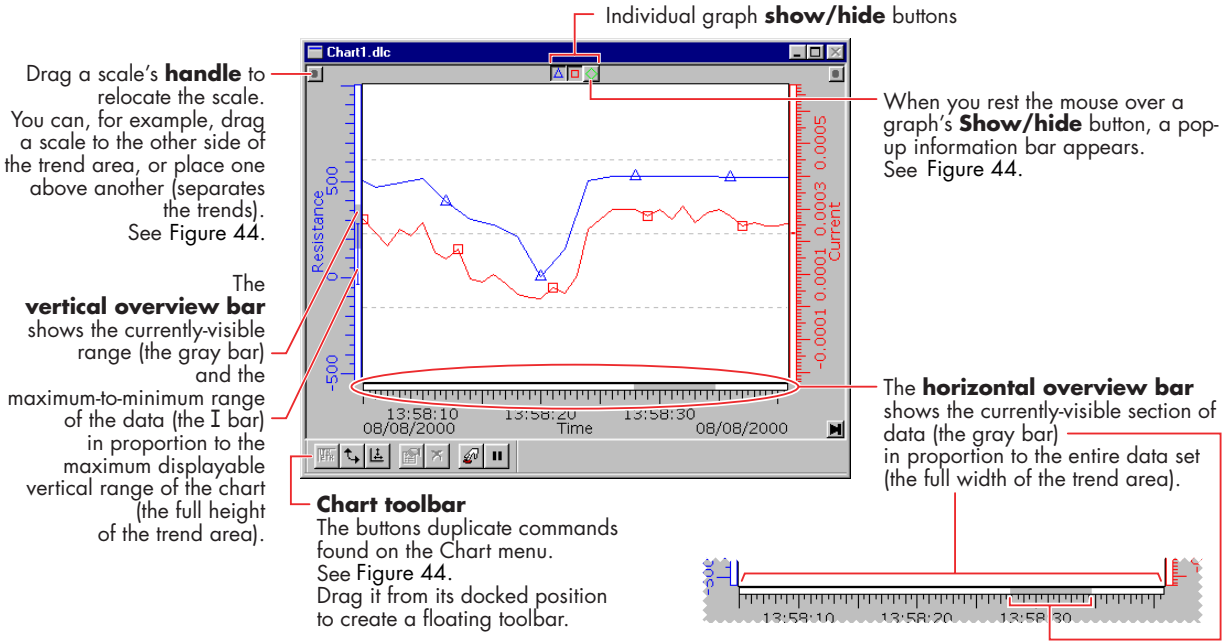


FIGURE 43 A DeLogger chart window displays trend graphs (like a chart recorder).

trends to as many as six Y axes (linear or logarithmic). You can also open additional chart windows if necessary. (To add a chart window, choose **New** on the File menu, then click the **Chart** button.)

You can watch the trends update as the real-time or replay data arrives, or you can home-in on a section of the data already charted (while incoming data continues to be recorded by the window).

Time (vertical) and data (horizontal) rulers allow you to read precise coordinates from the trends (Figure 47).

Mouse Power

In a DeLogger chart window, you use the mouse to select and scale sections of the trend graphs for optimal viewing of regions you're interested in. Figures 45 and 46 show how you do this.

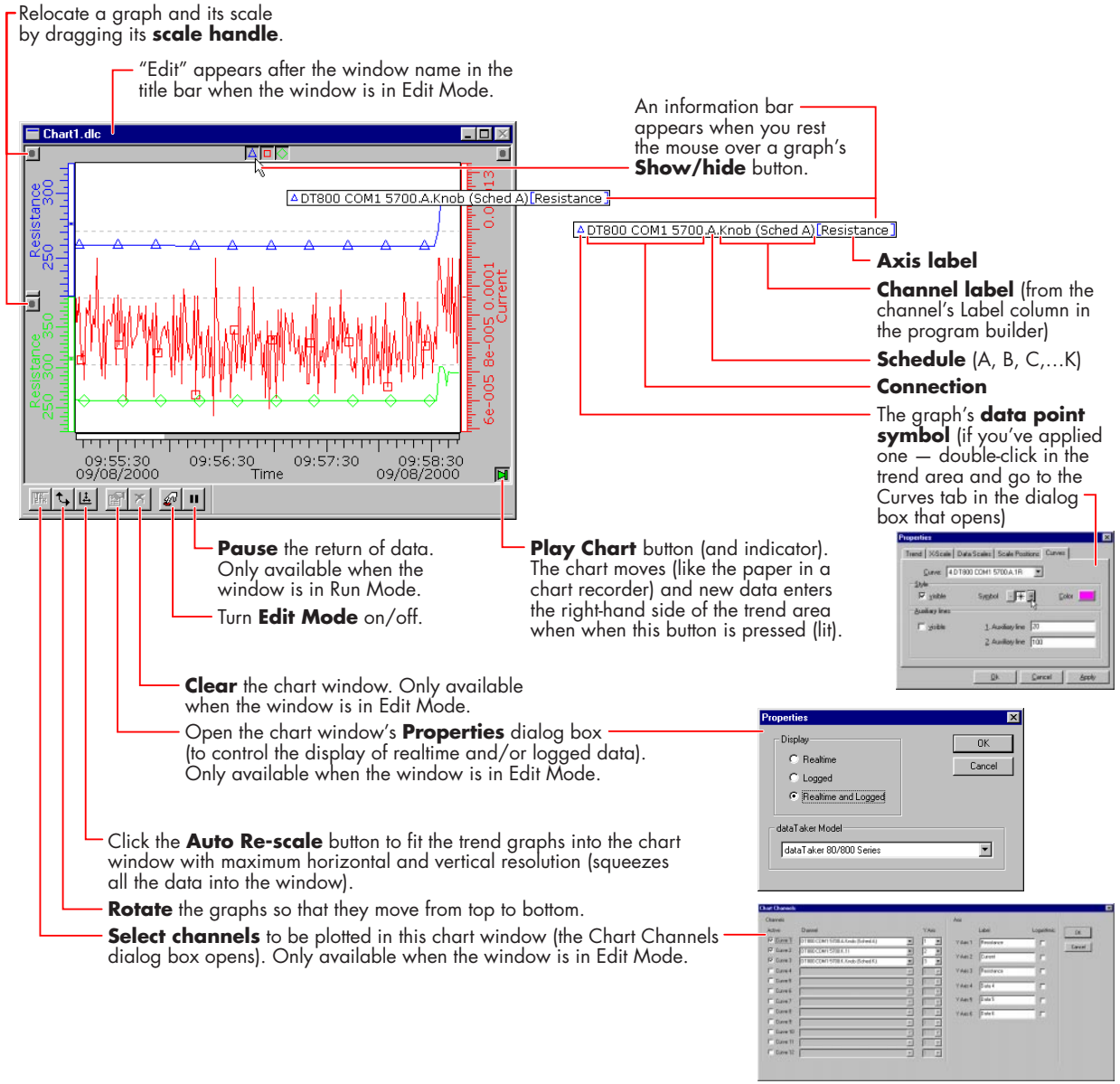
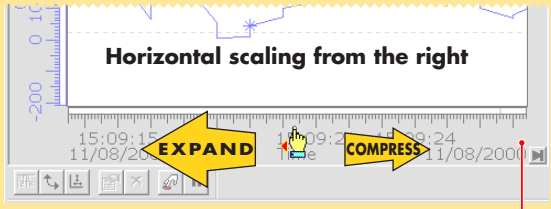


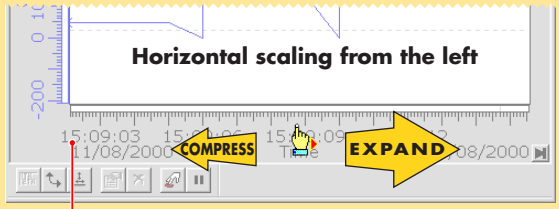
FIGURE 44 More features of the DeLogger chart window

HORIZONTAL SCALING
Rest the mouse over the horizontal scale (the cursor changes to) then click and drag as described here.



Move the **left** end of the scale by dragging horizontally with the **left** mouse button pressed.

The right-hand end of the scale stays fixed while you drag.



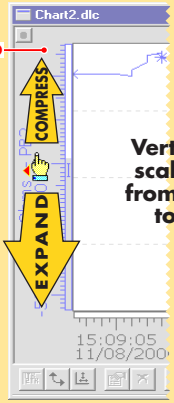
Move the **right** end of the scale by dragging horizontally with the **right** mouse button pressed.

The left-hand end of the scale stays fixed while you drag.

For finer control, start dragging further from the fixed end.

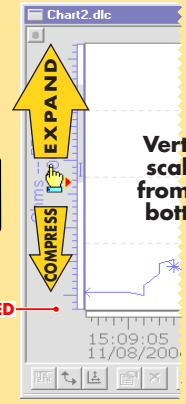
VERTICAL SCALING
Rest the mouse over the vertical scale (the cursor changes to) then click and drag as described here.

The upper end of the scale stays fixed while you drag.



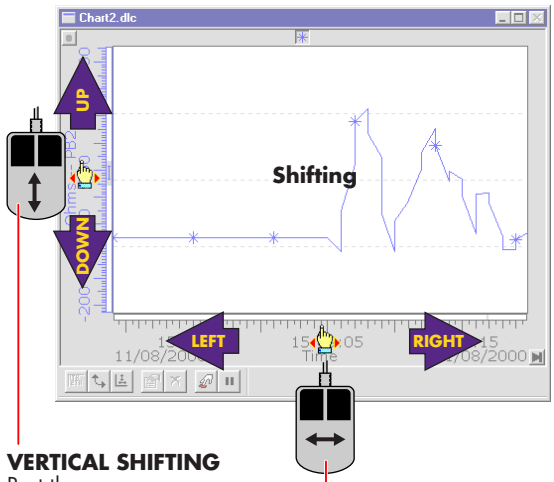
Move the **lower** end of the scale by dragging vertically with the **left** mouse button pressed.

For finer control, start dragging further from the fixed end.



Move the **upper** end of the scale by dragging vertically with the **right** mouse button pressed.

The lower end of the scale stays fixed while you drag.

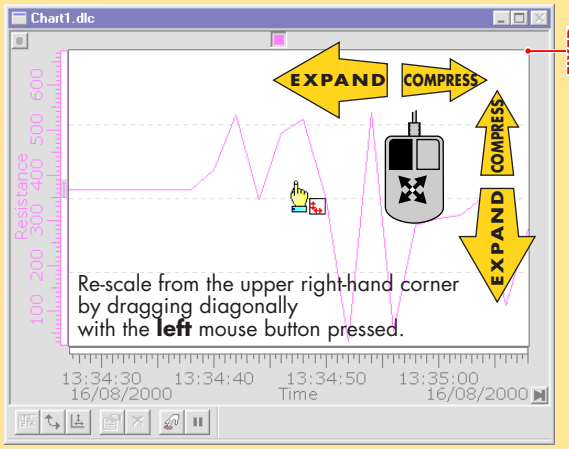


VERTICAL SHIFTING
Rest the mouse over the vertical scale (the cursor changes to), then hold down **both** mouse buttons and drag vertically.

HORIZONTAL SHIFTING
Rest the mouse over the horizontal scale (the cursor changes to), then hold down **both** mouse buttons and drag horizontally.

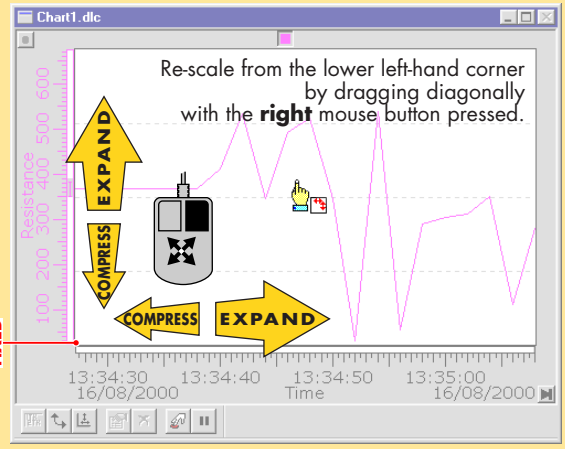
FIGURE 45 Chart window mouse power 1— horizontal/vertical scaling, and horizontal/vertical shifting

DIAGONAL SCALING
Drag inside the trend area (instead of along the scales) with the appropriate mouse button pressed.



The upper right-hand corner stays fixed while you drag.

For finer control, start dragging further from the fixed corner.



The lower left-hand corner stays fixed while you drag.

DIAGONAL SHIFTING
Drag inside the trend area (instead of along the scales) with **both** mouse buttons pressed.

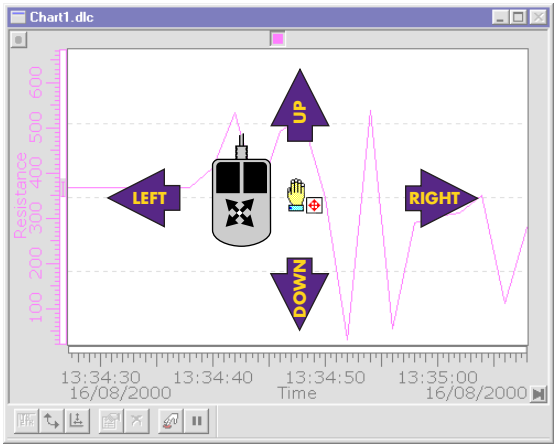


FIGURE 46 Chart window mouse power 2— diagonal scaling and diagonal shifting

Edit Mode On/Off

The chart window has two distinct modes:

- Edit Mode — for configuring the chart (**Edit Mode** on the Chart menu is ticked)
- Run Mode — for viewing incoming data or previous sections of the graphs (**Edit Mode** on the Chart menu is un-ticked)

Graphs Not Updating?

If your trend graphs are not updating in the chart window, check that

- **Edit Mode** on the Chart menu is un-ticked (that is, the chart window is in Run Mode)
- **Pause** on the Chart menu is un-ticked
- for real-time channels: DeLogger is connected to the DT800, and the DT800 is running the program that contains the channels you've specified to be displayed in the chart window
- for replay channels: the replay control panel is open and showing the correct replay file's name in its title bar.

The Chart Menu

When a chart window is DeLogger's front-most window, the seventh menu on DeLogger's menu bar is **Chart** (see Figure 20 on page 27). Commands on this menu are specific to the chart window, and some are duplicated by buttons on the chart window's toolbar (see Figures 43 and 44).

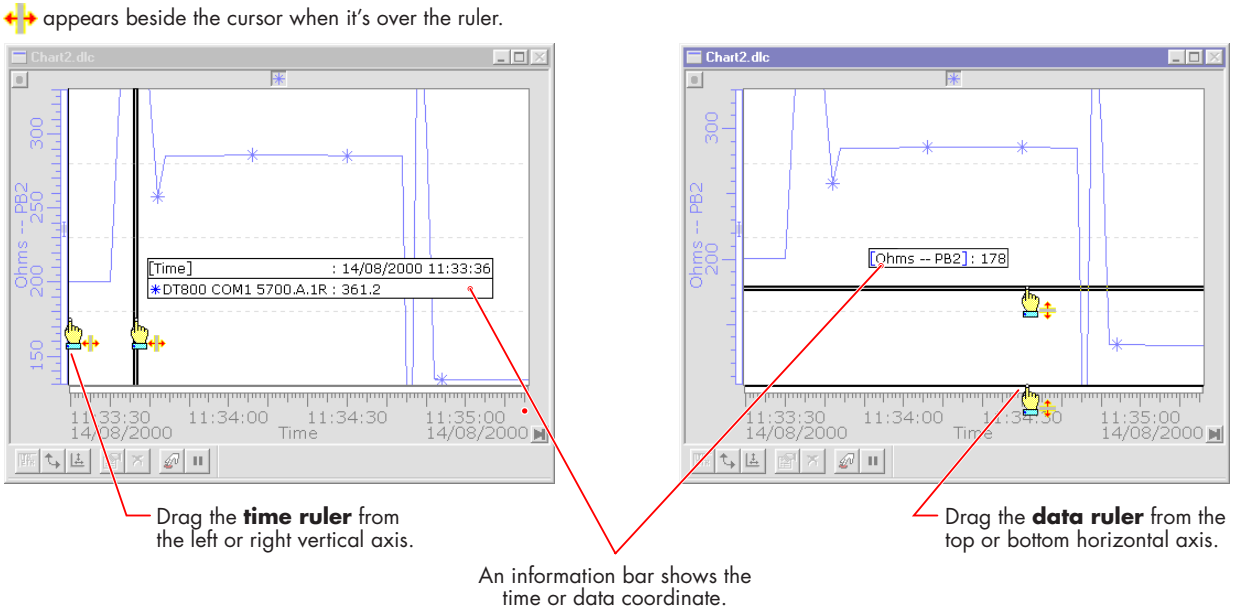


FIGURE 47 Chart window rulers for displaying precise time and data coordinates

7-2 Chart the Returned Data

Display data from the potentiometer channel in DeLogger's chart window.

To do this…

a) Locate the minimized chart window at the bottom of DeLogger's main window — it's named **Chart1.dlc** — and click its Restore button.

The chart window is restored from its minimized state.

b) Make sure that the chart window is in Edit Mode.

c) In the Chart menu (seventh menu from the left), choose **Select Channels...**.

The Chart Channels dialog box opens (Figure 48).

d) In the Chart Channels dialog box:

i. Under **Active**, tick **Curve 1**.

ii. Open the **Channel** drop-down list box that becomes available and choose the potentiometer channel.

iii. Leave the **Y Axis** set to **1**.

iv. Under **Label**, replace **Data 1** in the **Y Axis 1** field with **Ch1 Ohms** (or any text you want to appear on the vertical/data axis of the chart).

v. Do not tick under **Logarithmic**.

vi. Click **OK**.

The dialog box closes leaving the chart window almost ready to receive channel 1's data.

Note the axis text **Ch1 Ohms** on the left-hand side of the chart window.

e) Make sure that the **Play Chart** button (at the right-hand end of horizontal axis) is pressed/green.

f) Turn Edit Mode **off** (un-tick **Edit Mode** on the Chart menu, or click the **Edit Mode** button on the bottom of the chart window) and watch the chart window while you turn the potentiometer's knob.

The data points are plotted in the trend area and joined with straight-line segments as the chart moves from right to left.

g) In the Chart menu, choose **Auto Re-scale**.

All the data returned to the chart window so far is compressed into view in the trend area.

h) Click the **Play Chart** button to stop the chart (the button turns black).

Note that stopping the chart does not stop the flow of data into the window, whereas the **Pause** command does stop the flow — no data is stored in the window's buffer when the window is paused. This is also true for the other windows that can be paused (form, mimic and text).

i) Use your mouse as described in Figures 45 and 46 to scale and shift the trace.

j) Drag the time and data rulers into the trend area as shown in Figure 47.

Notice the information box that appears for each ruler. You can drag the box to your preferred position in the DeLogger window.

k) Turn Edit Mode **on** then choose **Clear** from the Chart menu (or click the **Clear** button).

All the data returned to the chart window is deleted.

l) Continue to experiment in the chart window if you want. Remember that Edit Mode must be **off** to plot incoming data.

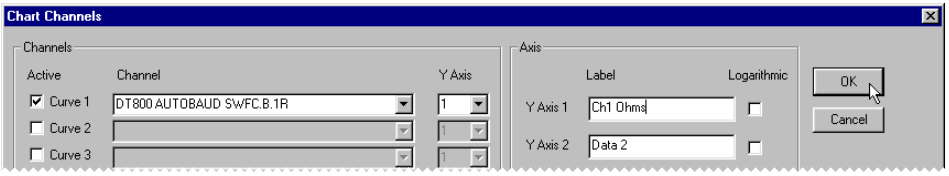


Figure 48 Assigning a channel to the chart window

CHAPTER 8

SEE YOUR DATA — MIMIC WINDOW

DeLogger also allows you to present data as a moving analog needle on a meter panel. (And if you upgrade to DeLogger Pro, you'll have access to other meter types, as well as buttons that perform actions.)

In this chapter

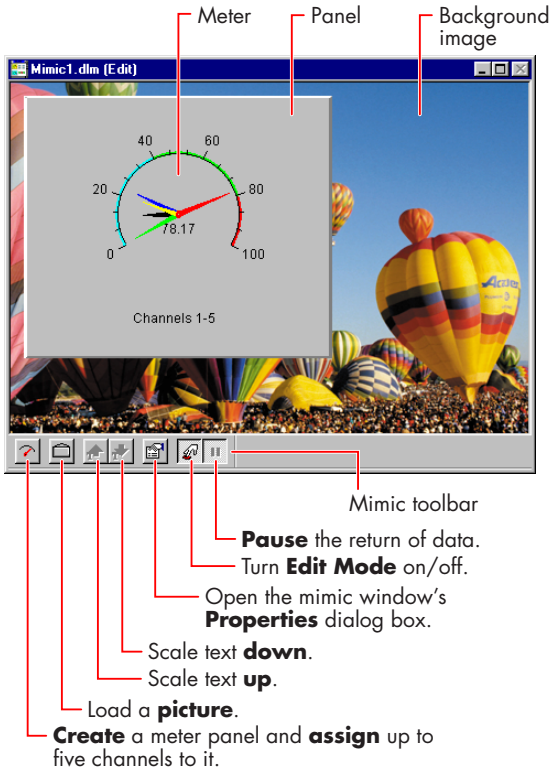


FIGURE 49 A typical DeLogger mimic window

8-1 DELOGGER'S MIMIC WINDOW

A DeLogger **mimic** window (Figure 49) lets you represent data as a panel containing one or more needle (arc) meters on your computer screen.

You can have as many mimic windows open as you need (limited only by computer memory and speed). To add a mimic window, choose **New** on the File menu, then click the **Mimic** button.

Edit Mode On/Off

The mimic window has two distinct modes:

- Edit Mode — for creating, moving and resizing mimics, and for assigning channels (**Edit Mode** on the Mimic menu is ticked)
- Run Mode — for displaying incoming data (**Edit Mode** on the Mimic menu is un-ticked)

Meters Not Updating?

If your meters are not updating in the mimic window, check that

- **Edit Mode** on the Mimic menu is un-ticked (that is, the mimic window is in Run Mode)
- **Pause** on the Mimic menu is un-ticked
- for real-time channels: DeLogger is connected to the DT800, and the DT800 is running the program that contains the channels you've assigned for display by the meters
- for replay channels: the replay control panel is open and showing the correct replay file's name in its title bar.

The Mimic Menu

When a mimic window is DeLogger's front-most window, the seventh menu on DeLogger's menu bar is **Mimic** (see Figure 20 on page 27). Commands on this menu are specific to the chart window, and some are duplicated by buttons on the mimic window's toolbar (see Figure 49).

8-2 Display Returned Data in a Meter

Create a meter panel and assign the potentiometer channel to it.

To do this…

a) Locate the minimized meter window **Mimic1.dlm** and click its Restore button.

b) Make sure that the mimic window is in Edit Mode.

c) In the Mimic menu (seventh from the left), choose **Needle Meters...**.

The Mimic Meter Panel Properties dialog box opens.

d) On tab 1:

i. Open the first drop-down list box and choose the potentiometer channel.

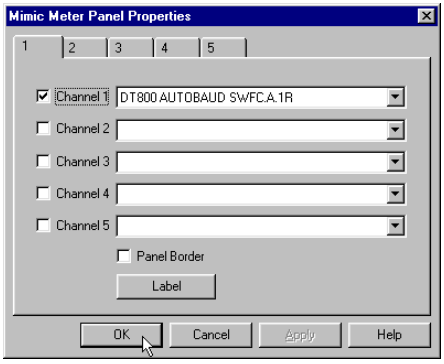


FIGURE 50 Assigning a channel to a meter's needle

ii. Tick **Panel Border** (Figure 50).

iii. Click the **Label** button (Figure 50).

iv. In the Mimic Label dialog box that opens (Figure 51), select **Manual Label** and type **My Pot.** (or any text you want to appear beneath the meter), then click **OK**.

v. Click **OK** again to close the Mimic Meter Panel Properties dialog box.

The new meter panel appears in the top left-hand corner of the mimic window.

e) **Single**-click anywhere within the meter panel.

A striped border appears around the panel to show that it's selected.

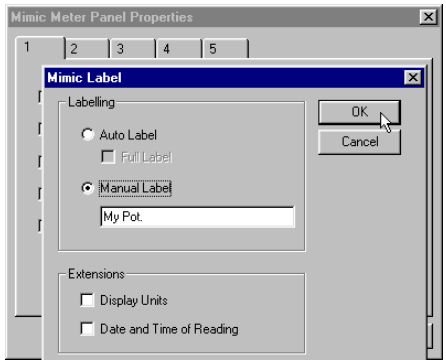


FIGURE 51 Creating a meter label

f) Drag the anchor point in lower right-hand corner down and to the right to enlarge the panel to approximately double its original size.

The mouse pointer changes to a double-ended diagonal arrow when you're over the anchor point.

g) Hold the mouse pointer anywhere within the panel. When the pointer changes to ✣, drag the panel into the centre of the mimic window.

h) Click outside the panel to de-select it.

Change the range of the meter to suit your potentiometer.

To do this…

a) **Double**-click the meter (in the centre of the meter, not the surrounding panel).

b) In the Meter Parameters dialog box that opens:

i. Type **600** in the **To** field of the **Range** area. This suits your potentiometer, which has a maximum resistance of approximately 550 ohms.

ii. Type **100** in the **Step** field of the **Ticks** area. The tick marks will appear 100 ohms apart around the meter.

iii. Click **OK**.

Your meter should now look like Figure 52.

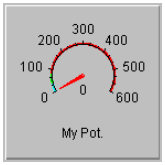


FIGURE 52 The meter before changing its alarm bands

Change the meter's alarm bands.

To do this…

a) **Double**-click the meter again.

b) In the Meter Parameters dialog box that opens, click the **Alarm Attributes...** button.

c) In the Alarm Attributes dialog box that opens:
   i. Type **500** in the **High** field (**Value** column).
   ii. Type **100** in the **Low** field (**Value** column).
   iii. Click **OK**.

d) Click **OK** again to close the Meter Parameters dialog box.
   Your meter should now look like Figure 53.

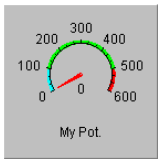


FIGURE 53 The finished meter

Use the meter to display data from the channel assigned to it (the potentiometer channel).

To do this…

a) Turn Edit Mode **off** for the mimic window and watch the meter while you turn the potentiometer's knob.
   The needle moves and the value shown under the needle changes according to the incoming data.

b) Look at the form window and the chart window also and continue turning the knob.
   Data in all three views updates every time schedule A makes a scan (every half-second).

8-3 REPLAY A FILE TO A METER

Data can also come from a file — a **replay file** — into DeLogger. You use a special DeLogger Connection — a **replay Connection** — to do this. See "Replay Data, Replay File" on page 30.

Open a replay Connection.

To do this…

a) In the Connections menu, choose **Play...**.

b) In the Replay Connection dialog box that opens, highlight **MyFile** and click **OK**.

c) In the Select Replay File dialog box that opens, highlight **Example.dlr** and click **Open**.
   The example replay files were placed here when you installed DeLogger.
   The file replay control panel opens ready for you to start a replay of **Example.dlr**.

d) Familiarize yourself with Figure 25 on page 30, which explains the various components of the replay control panel.

Create another meter panel and assign a replay channel to it.

To do this…

a) Make sure that the mimic window is in Edit Mode.

b) In the Mimic menu, choose **Needle Meters...**.

c) On tab 1:
   i. Open the first drop-down list box and notice that channels from the replay file Connection are now available (in addition to those from your Connection to the DT800).
   ii. From the list, choose **MyFileB.21CV**.
   iii. Click **OK**.
   The new meter panel appears in the top left-hand corner of the mimic window.

d) If you want, enlarge the meter's panel and drag it to a new location.

Activate the mimic window and play the replay file.

To do this…

a) Turn Edit Mode **off** for the mimic window.

b) Drag the replay control panel to a position that allows you to see it as well as the mimic window.

c) In the control panel, click the **Play** button and watch the second meter.

The needle of the second meter displays data as it is received from the replay file.

d) Increase the speed of the replay and watch the effect on the needle.

e) Use the **Pause**, **Reset** and **Play** buttons in the control panel.

f) During replay, turn the potentiometer's knob and observe that each meter displays its appropriate data.

8-4 Add a Picture

You can add pictures to a mimic window as a background or, for example, to create a flowchart that incorporates DeLogger meters.

Load a picture into the mimic window.

To do this…

a) Turn Edit Mode **on** for the mimic window.

b) In the Mimic menu, choose **Picture...**.

c) In the dialog box that opens, click the Browse button at the right-hand end of the **File** field.

d) In the Select Picture File dialog box that opens, select **BAKDROP5.bmp** and click **Open**.

BAKDROP5.bmp is a blue gradient.

e) Click **OK** to close the Mimic Picture Properties dialog box.

The picture appears in the mimic window.

f) **Single**-click the picture to select it, then drag its lower right-hand corner to fill the mimic window.

g) With the picture still selected, choose **Mimic** menu > **Arrange** > **Send to Back**.

h) With the picture still selected, choose **Mimic** menu > **Lock**.

The picture is locked behind your meters.

Tip When using a picture as a background behind your meters, load the picture first (and lock it) so that subsequent meter panels automatically overlay the picture.

8-5 DISCONNECT

Although you need to be connected to the DT800 in order to complete this tutorial, we'll get you to disconnect here and then reconnect in the next chapter — just for practice.

Carry out a software disconnection from your DT800.

To do this…

a) In DeLogger's Connections menu, choose **Disconnect...**.

b) In the Disconnect dialog box that opens, highlight (one click) **dt800 Com1** and click **OK**.

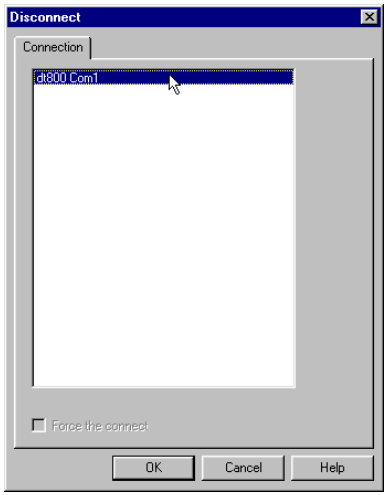


FIGURE 54 Disconnecting

There is no longer a link between DeLogger and your DT800, but the DT800 is still running according to your program — scanning channel 1 every half-second and logging the results into its internal memory.

c) Confirm that data is no longer being returned from the DT800 by looking at the form window, the chart window or the mimic window.

These windows are not updated when DeLogger is disconnected from the DT800.

CHAPTER 9

EXTEND YOUR PROGRAM

In this chapter you'll learn more about DeLogger and your DT800 by

- altering schedule A's rate — page 55
- adding your own label to the potentiometer channel — page 55
- adding channels to schedule A using more of the program builder's features — page 56
- reassigning the form, chart and mimic windows — page 59
- using a DeLogger text window — page 60
- adding an alarm to the potentiometer channel — page 63
- adding another schedule to your program — page 64.

9-1 RECONNECT

Connect to the DT800 now so that all is ready to send your program after each revision you make.

Reconnect to your DT800 (use the same Connection as last time).

To do this...

a) Repeat the step "Connect to the DT800 using dt800 Com1." on page 20.

b) Confirm the re-connection by checking that the information in the form window is again being regularly updated.

9-2 Change Schedule A's Rate

Change schedule A's rate to **5 seconds**.

To do this…

a) In tab A of the program builder, click the Rate row's Configure button ... . (Look back at Figure 29 on page 34 for a reminder.)
   The Triggers dialog box opens.

b) In the second Interval field, select **Seconds** from the drop-down list.

c) In the first Interval field, change the number to **5**.

d) Click **OK**.
   In the Rate row of tab A, you'll now see **RA5S** (**R**eport schedule **A**, **5 S**econds).

e) In DeLogger's File menu, choose **Save Project**.

9-3 Add a Channel Label

Next, add your own label to the potentiometer channel (channel 1 of the DT800). You'll see later where this becomes useful.

Give channel 1 the label **Potentiometer** (or any name you want).

To do this…

a) **Single**-click in the **Label** column of row 1 and notice the related message that appears in the information area of the program builder window.

b) **Double**-click in the **Label** column of row 1.
   Row 1 (**R1**) is where you defined channel 1 of the DT800 to be read as a resistance.

c) Type **Potentiometer**.
   Channel 1 now has a expressive name, and schedule A should now look like Figure 55.

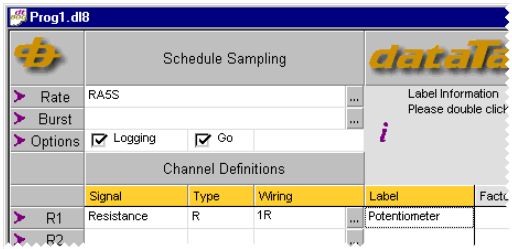


Figure 55 Schedule A after program changes

d) In DeLogger's File menu, choose **Save Project**.

9-4 Add More Channels to Schedule A

Now add more DT800 channels to schedule A. Because they're all on schedule A, they'll all be read every 5 seconds.

You'll add

- channel 6 — to be read as a voltage
- channel 7 — to be read as a voltage
- channels 9 to 12 — to be read as thermocouples.

If you have actual sensors you want to connect them to these channels, do it now. If you haven't, don't worry — you'll still be able to work through this tutorial and see data returned (although the data will be nonsense).

Use row 2 (**R2**) to instruct the DT800 to read its channel 6 as an unshared differential +/– voltage.

To do this…

a) Single-click in the **Signal** column of **R2**.

b) Click the drop-down list button that appears and choose **Voltage**.

c) In the **Wiring** column of **R2**, click the Configure button ...

The Voltage Wiring dialog box opens for row 2 (Figure 56).

d) In the **Start Channel** field at the top of the Voltage Wiring dialog box, click the up button until the field contains **6**.

Notice that the number in the End Channel field also changes to 6.

e) Leave the **Differential +/–** configuration selected (Figure 56) and click **OK**.

Channel 6's channel definition (R2) should look like Figure 60 on page 58.

Set the Start Channel to **6**.

Leave the **Differential +/–** option selected.

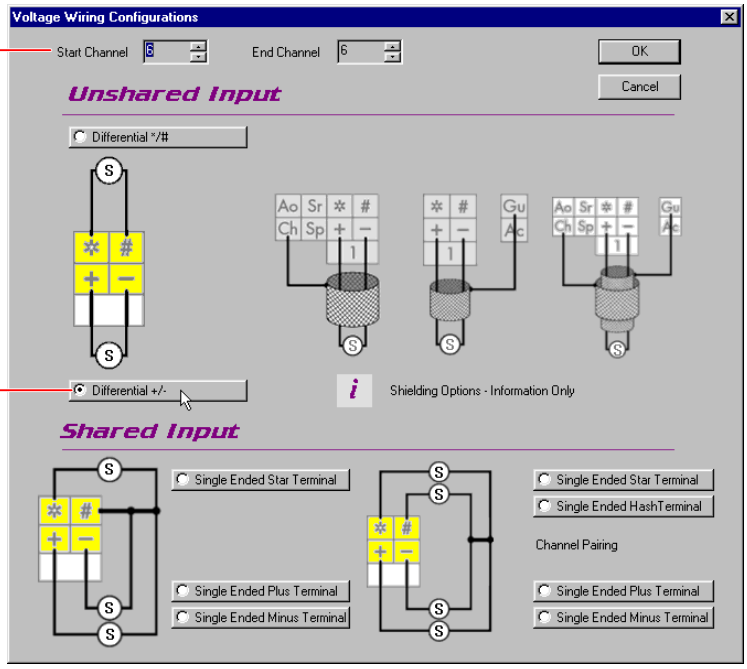


Figure 56 Defining channel 6 for voltage measurement

Use copy and paste to duplicate row 2's definition into row 3. Then modify row 3 to instruct the DT800 to read channel 7 as an unshared differential +/– voltage.

To do this…

a) Select all of row **2** by clicking its **row label** (the gray box containing **R2**) — see Figure 57.

b) Now **right**-click the row label of row **2**.
A menu appears (Figure 57).

c) In the right-click menu, choose **Copy**.

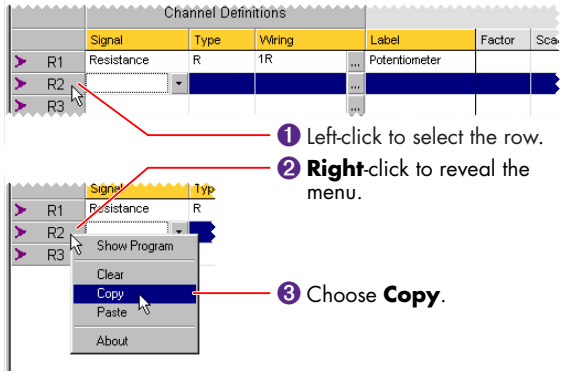


FIGURE 57 Select R2, copy, and paste into R3

All of row 2's cells are copied to the clipboard.

d) Click the **row label** of row **3** to select the entire row.

e) **Right**-click the row label of row **3**.

f) In the menu that appears, choose **Paste**.
Row 3 and row 2 are now identical.
Notice also the **Clear** command on the right-click menu. You use this to delete all information from a selected row.

g) In the **Wiring** column of **R3**, click the Configure button ... .
The Voltage Wiring dialog box opens for row 3 (Figure 58).

h) In the **Start Channel** field at the top of the Voltage Wiring dialog box, click the up button until the field contains **7**.

i) Leave the **Differential +/–** configuration selected and click **OK**.
Channel 7's channel definition (R3) should look like Figure 60.

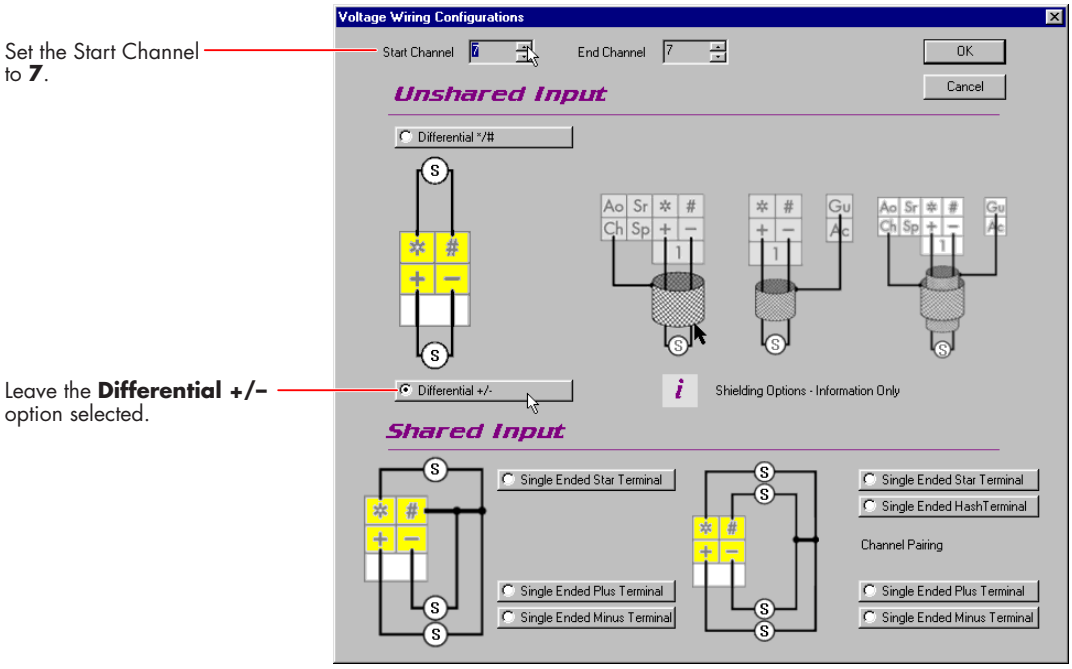


FIGURE 58 Defining channel 7 for voltage measurement

Use row 4 (**R4**) to instruct the DT800 to read channels 9 to 12 as thermocouples.

To do this…

a) Single-click in the **Signal** column of **R4**.

b) Click the drop-down list button that appears and choose **Temperature**.

c) In the **Wiring** column of **R4**, click the Configure button ... .

The Thermocouple Wiring dialog box opens for row 4 (Figure 59).

d) In the **Start Channel** field at the top of the Thermocouple Wiring dialog box, click the up button until the field contains **9**.

e) In the **End Channel** field at the top of the Thermocouple Wiring dialog box, click the up button until the field contains **12**.

f) Leave the **Differential +/–** configuration selected and click **OK**.

Row 4's channel definition should look like Figure 60.

g) In DeLogger's File menu, choose **Save Project**.

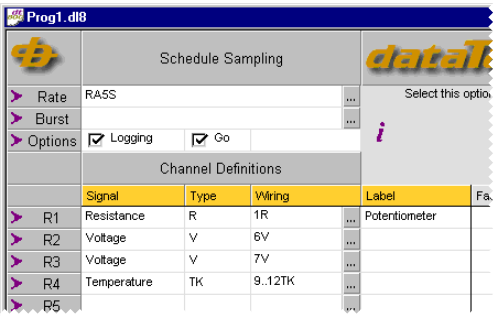


FIGURE 60 More channels

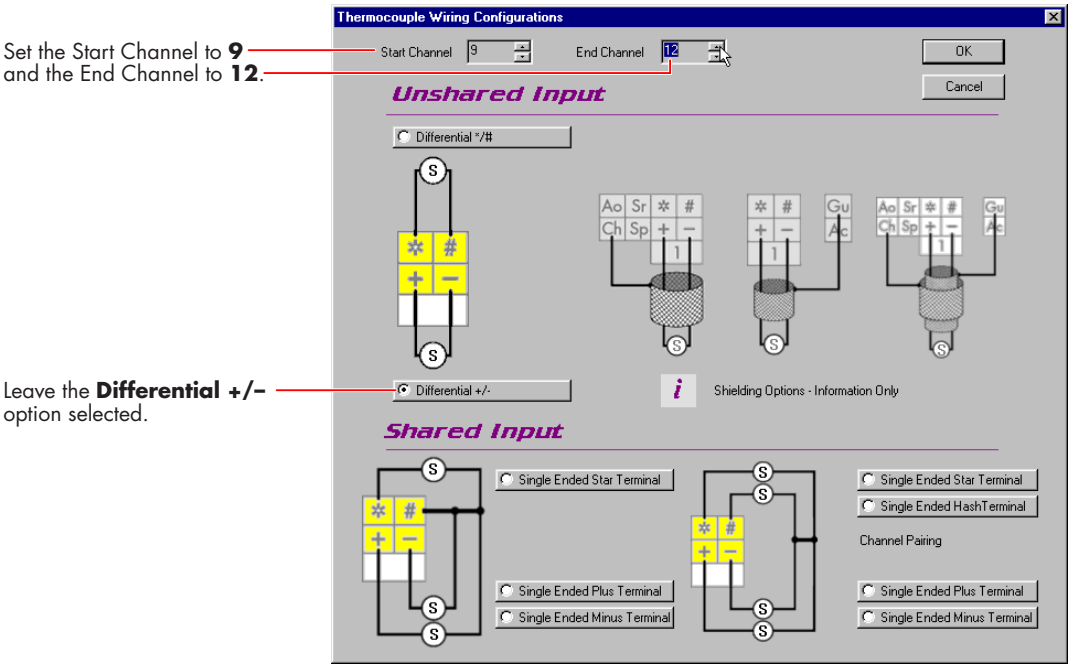


FIGURE 59 Defining channels 9 to 12 for thermocouple measurement (temperature)

9-5 Re-Send the Program

Update the DT800 with your modified program.

Send your program to the DT800.

To do this…

a) In the Program menu, choose **Send to Connection**.

b) In the "Warning — Job already defined…" dialog box that opens, click **Yes**.

The Send Program File dialog box opens to inform you of the progress. Also, if you've got Show Error Alerts ticked (on the View menu), the Event Logs dialog box may open to report (in the Errors tab) the event that has just occurred — see the Extras panel "Event Logs" on page 37.

c) Close the Event Logs dialog box if it's in your way.

You can open it at any time by choosing **View Events** in the View menu.

d) Notice that the Acquiring LED now flashes every 5 seconds (in addition to the three-second heartbeat flash). And, because Logging is still ticked in schedule A of the program, the Logging LED also flashes briefly every 5 seconds.

e) Use the **Status** command to confirm that the DT800 is running the new schedule.

You did this before in "Verify the Connection" on page 20.

9-6 Reassign the Form, Chart and Mimic Windows

Information from the potentiometer channel no longer updates in the form, chart and mimic windows because you changed this channel's channel ID when you added the **Potentiometer** label in "Add a Channel Label" on page 55.

Row 1 in the form window, the chart window, and your first meter in the mimic window are still assigned to the original channel ID, which no longer exists. (In DeLogger's channel drop-down lists, its name used to end with **1R**; now it ends with **Potentiometer**.)

Reassign row 1 in the form window to the modified (labelled) potentiometer channel.

To do this…

a) Make sure that the form window is in Edit Mode.

b) **Double**-click in the **Channel** column of row **1**.

c) In the Select Channel for Row 1 dialog box that opens, highlight the potentiometer channel — its channel ID is now **Potentiometer** (instead of **1R**) — and click **OK**.

d) Turn Edit Mode **off** for the form window.

You'll now see information in the form window being updated every 5 seconds (schedule A's new rate).

Carry out a similar procedure to reassign the chart window and your meter to the modified potentiometer channel.

To do this…

a) Put each window into Edit Mode.

b) For the chart window, use **Chart** menu > **Select Channels...** and choose the channel ending in **Potentiometer**.

c) In the mimic window, select your first meter, then use **Mimic** menu > **Edit Panel...** and choose the channel ending in **Potentiometer**.

d) With Edit Mode **off** for each of the three windows (form, chart and mimic), check that the three views of the potentiometer channel now update according to your revised program (that is, every 5 seconds).

9-7 DeLogger's Text Window

A DeLogger **text** (terminal) window contains two screens (Figure 61):

- **Display screen** (the upper screen) — displays incoming real-time data and replay data in various formats
- **Entry screen** (the lower screen) — if you're familiar with *dataTaker*'s native programming language, type commands here and send them to the DT800.

The Text Menu

When a text window is DeLogger's front-most window, the seventh menu on DeLogger's menu bar is **Text** (see Figure 20 on page 27). Commands on this menu are specific to the text window, and some are duplicated by buttons on the text window's two toolbars.

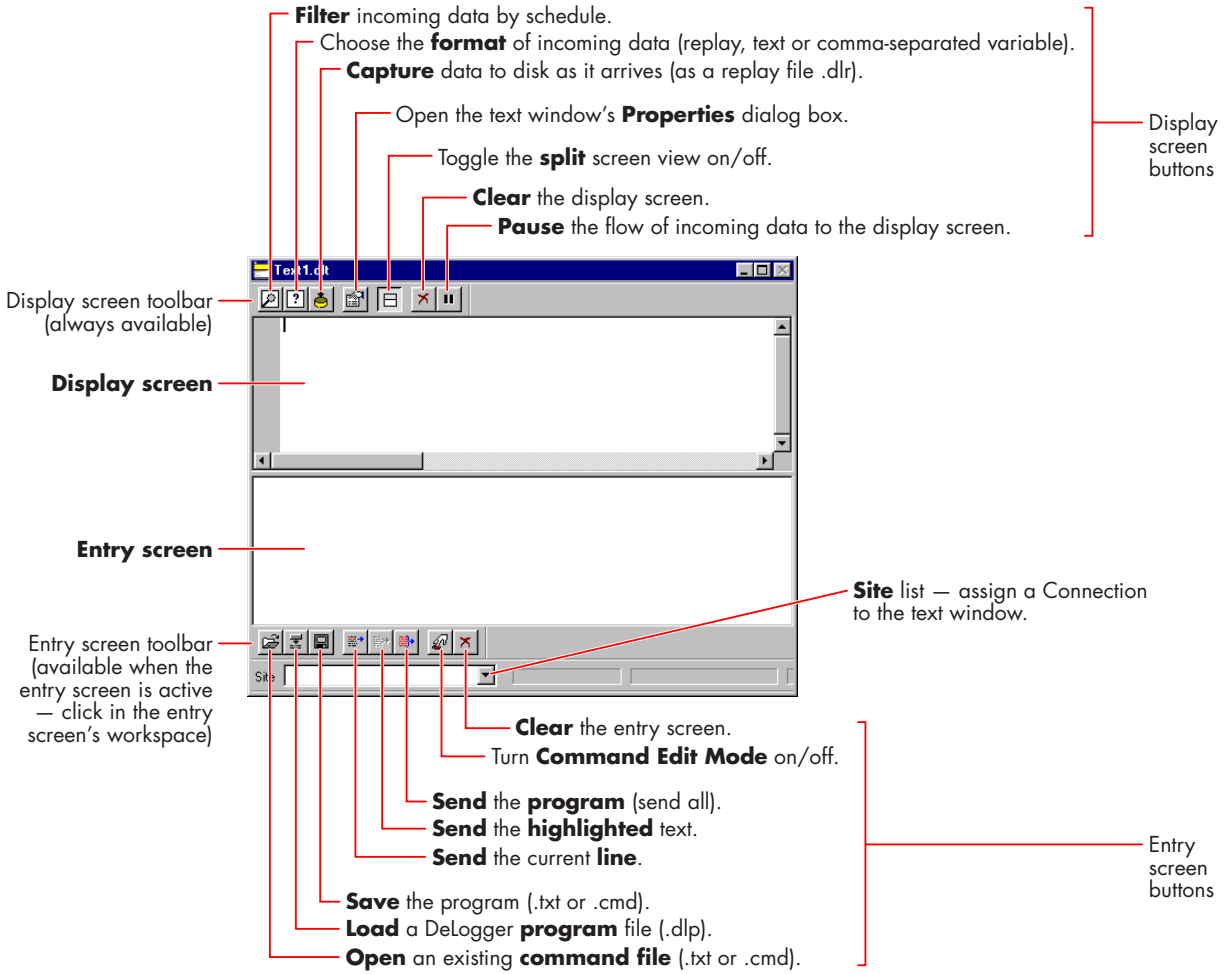


FIGURE 61 A new DeLogger text window

9-8 Return Data to the Text Window

Use DeLogger's text window to view the real-time data that the DT800 is returning to your computer.

To do this…

a) Locate the minimized text window **Text1.dlt** and click its Restore button.

b) In the **Site** drop-down list at the bottom of the text window, select your DT800's Connection (Figure 62).

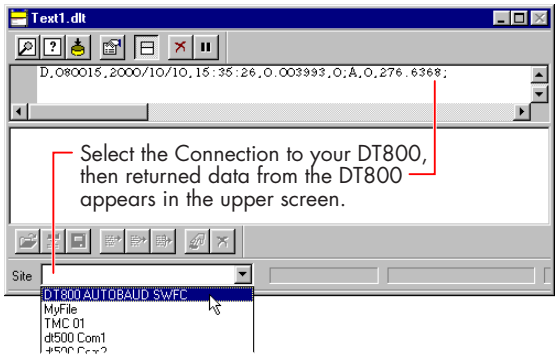


FIGURE 62 Assigning the DT800's Connection to the text window

A data record appears immediately in the upper (display) screen of the text window. The right-hand group of figures in the line is the data returned from the potentiometer and other channels in your program (see the "Data Structure — Replay Format" Extras panel).

c) Carry out the numbered steps in Figure 64 to learn more about the text window.

Data Structure — Replay Format

Figure 63 shows the main components of data displayed in replay format, which is the text window's default display format.

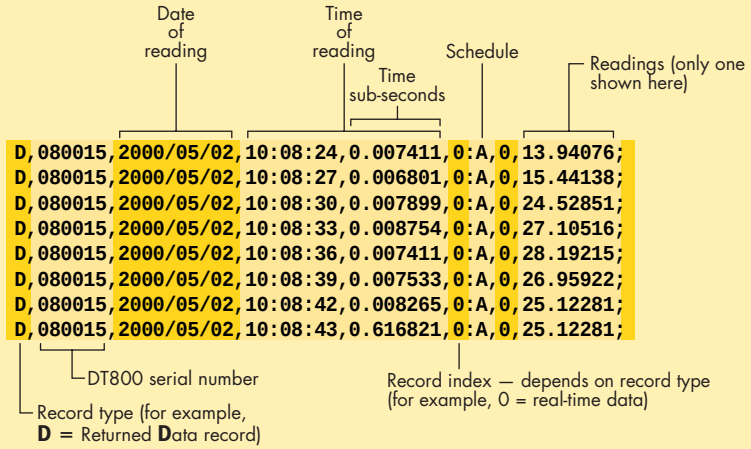


FIGURE 63 Typical default data records (replay format)

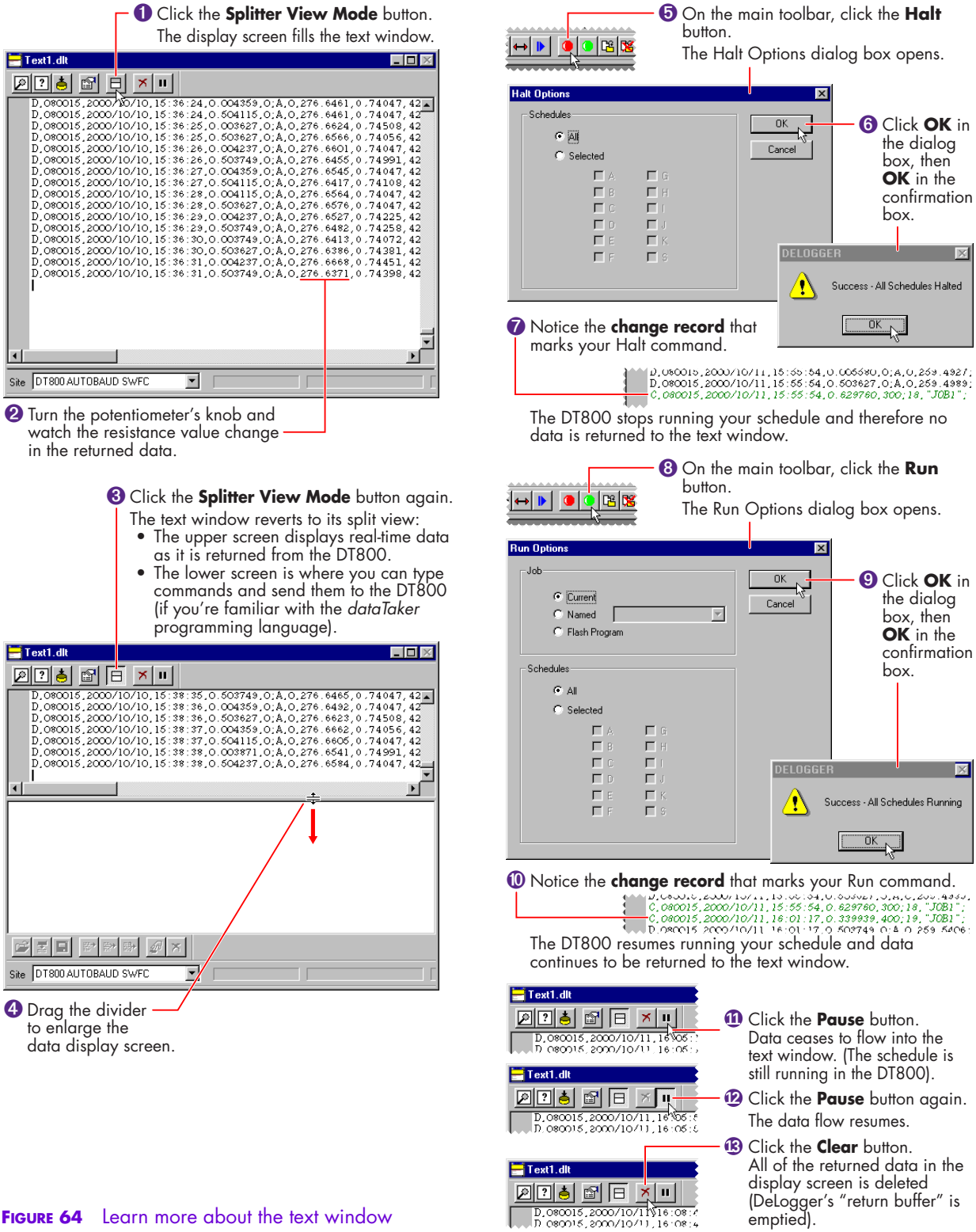


FIGURE 64 Learn more about the text window

9-9 Add an Alarm

Here you assign an alarm to the potentiometer channel.

Because alarm channels don't generate data, you'll make a copy of the potentiometer channel and assign the alarm to the copy. In this way, the original instance of the potentiometer channel generates data, and the copy generates alarms.

Add an alarm that triggers when the potentiometer's resistance is greater than 300 ohms.

To do this…

a) Turn the potentiometer knob fully **anti**-clockwise (minimum resistance).

b) In the View menu, make sure that **Show Alarm Events** is ticked.

This ensures that DeLogger will automatically open the Event Logs dialog box (Figure 34 on page 36) when an alarm occurs.

c) Click the text window to make it active. In the Text menu, choose **Display Screen** > **Display Data As...** then select **Replay format** and click **OK**.

In this format, alarms are obvious in the text window's display screen.

d) Click the program builder window to make it active.

e) On tab A of the program builder, use the right-button copy and paste method (see Figure 57 on page 57) to copy row 1 to row 5.

f) Follow the numbered steps in Figure 65 to specify the alarm for row 5.

g) In DeLogger's File menu, choose **Save Project**.

h) In the Program menu, choose **Send to Connection**. Click **Yes** or **OK** in any **Warning** or **Attention** dialog boxes that open.

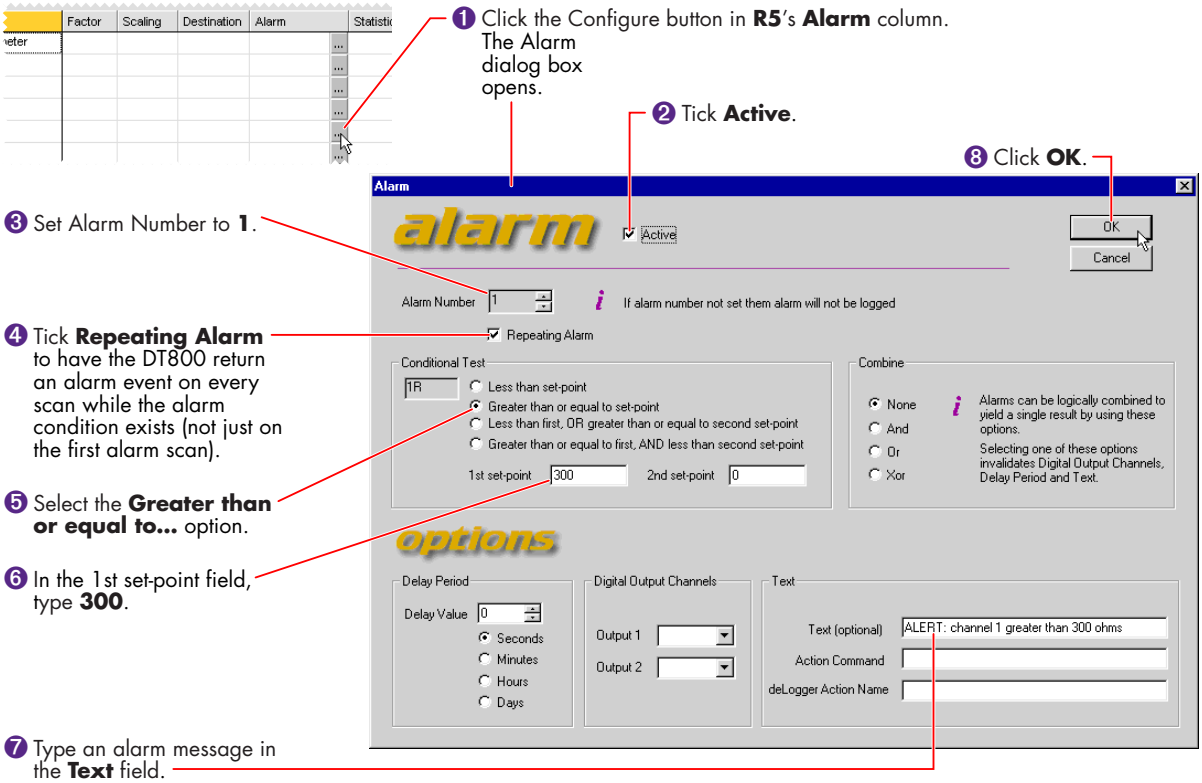


Figure 65 Specifying an alarm for channel 1

i) Watch the text window and turn the potentiometer knob to its fully clockwise position.

You'll see

- alarm records returned to the text window's display screen when the potentiometer's value exceeds 300 ohms (in addition to the regular data records); they contain your alarm message, are marked with a red pointer on the left-hand side of the display screen, and are prefixed with **A** for alarm (data records are prefixed with **D**) — Figure 66
- the Event Logs window open automatically; each new alarm event appears at the top of the Alarms tab.

j) Experiment with the potentiometer knob to see the alarm records returned to the text window and the Event Logs window.

Alarm messages are also returned to the form window's Alarm Message column.

k) When you're done, close the Event Logs window if it's in your way.

9-10 Add Schedule B to the Program

Next, you add a second schedule that instructs the DT800 to scan the potentiometer channel at a faster rate (in addition to the 5-second rate).

Set schedule B's rate to 2 seconds, and use the copy and paste method to add the potentiometer channel to schedule B.

To do this…

a) At the bottom of the program builder window, click the tab labelled **B**.

You could have used any of tabs B to K.

b) Set a **time interval** trigger for schedule B of 2 seconds by following a similar procedure to that shown in Figure 29 on page 34.

c) Use the right-button copy and paste method (see Figure 57 on page 57) to copy row 1 on tab **A** and paste it into row 1 on tab **B**.

The program now instructs the DT800 to scan its channel 1, the potentiometer channel, every 5 seconds (by schedule A) and every 2 seconds (by schedule B).

d) On tab B, type **Potentiometer2s** in the **Label** column of R1.

e) On tab B, click the Configure button ... in the **Alarm** column of R1. In the Alarm dialog box that opens:

i. Change the Alarm Number to **2**.

ii. Change the value in the set-point field to **425**.

iii. Change the alert message to read **ALERT: channel 1 greater than 425 ohms**.

iv. Click **OK** to close the dialog box.

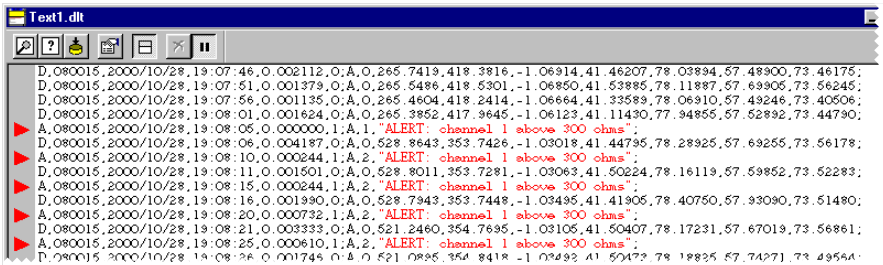


FIGURE 66 Alarm and data records returned to DeLogger's text window — schedule A

Tab B should now look like Figure 67.

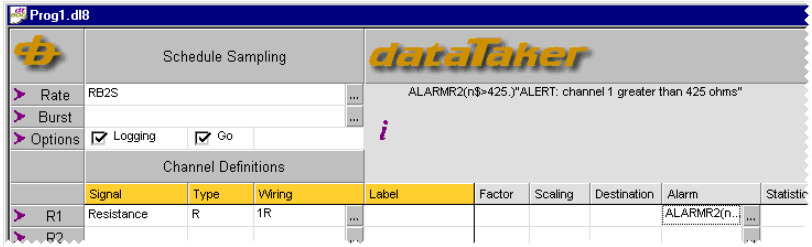


FIGURE 67 Schedule tab B

f) In DeLogger's File menu, choose **Save Project**.

g) In the Program menu, choose **Send to Connection**. Click **Yes** in any **Warning...** dialog boxes that open.

h) Experiment with the potentiometer knob to see the alarm records returned to the text window (Figure 68) and the Event Logs window.

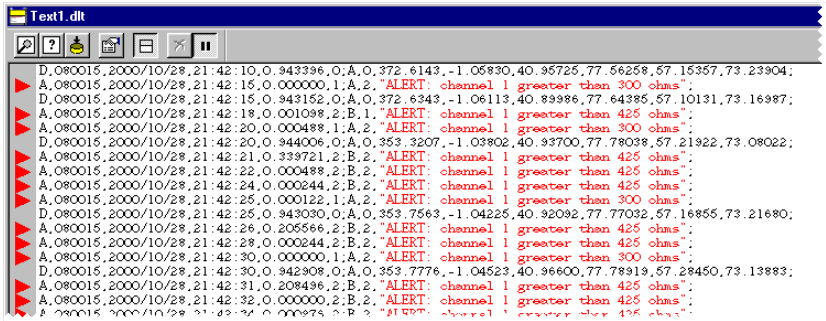


FIGURE 68 Alarm and data records returned to DeLogger's text window — schedules A and B

i) In the Text menu, choose **Display Screen** > **Filter Data...**.

j) In the dialog box that opens (Figure 69), notice that you can select which schedules' data is returned to the text window's display screen.

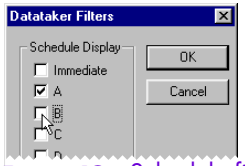


FIGURE 69 Schedule filter

k) Click **OK** to close the Filters dialog box.

CHAPTER 10

Other Things You Can Do with DeLogger

This chapter covers two more important functions of DeLogger:

- unloading logged data (that is, retrieving data stored in the DT800's internal memory) — page 66
- using DeLogger's spreadsheet window for manipulating and analysing data — page 68

10-1 Unload Logged Data

Your DT800 has been logging every measurement it has made since you first sent your program to it (because logging was enabled in both of your schedules). Now you'll retrieve this data from the DT800.

By the way: unloading data from the DT800 has nothing to do with DeLogger's form, chart, mimic or text windows — it's a function that's available to you no matter which DeLogger window you're using.

Unload all of the data currently logged in your DT800 to a replay file.

To do this…

a) In the **dataTaker** menu, choose **Unload...**.

The first screen (Options) of the unload dialog box sequence opens (Figure 70).

b) Familiarize yourself with the options available in this screen — do NOT make any changes — then click **Next >**.

The second screen (Unload To File) of the unload dialog box sequence opens (Figure 70).

c) In the second screen, tick **Unload to File** then select **Replay File**.

If you upgrade to DeLogger Pro, you'll have an additional option here — Unload to Database.

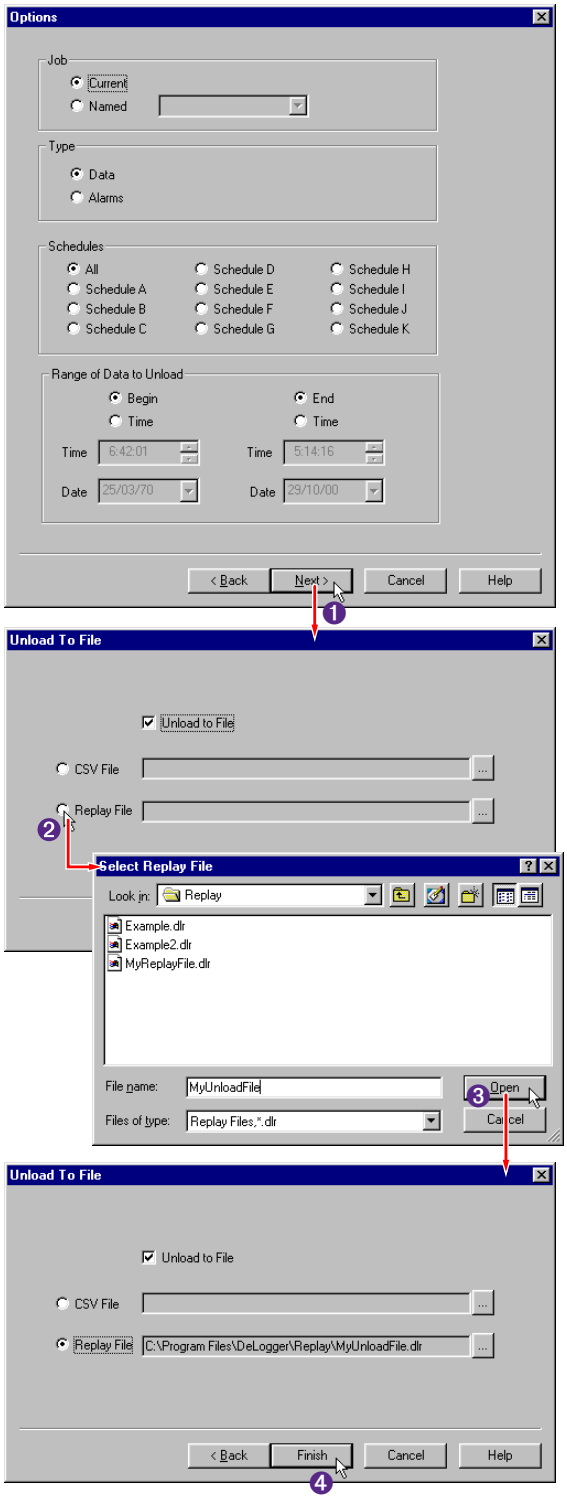


FIGURE 70 Unload dialog box sequence

d) In the Select Replay File dialog box that opens:

i. Type **MyUnloadFile** (or any name you want) in the **File name** field.

ii. Leave **Replay** as the destination folder for your file (**Save in**).

iii. Click **Open**.

You're returned to the second unload screen, which now contains the path to your unload destination.

e) Back in the second screen, click **Finish**.

The unload starts and a dialog box shows you its progress.

You can use other DeLogger windows during an unload.

f) While your logged data is unloading, open the **dataTaker** menu on DeLogger's menu bar and observe — don't choose — the **Quit Unload** command.

g) If you want to cut the unload short, choose **Quit Unload** now. Otherwise, wait until the unload finishes.

Because you unloaded your data to the **MyUnloadFile.dlr** replay file, you can load it into DeLogger's spreadsheet window, and replay it to DeLogger's form, chart, text and mimic windows (see Figure 16 on page 23).

And remember that you could also have unloaded the logged data to a comma-separated-variable file (.csv), which you can import into other programs such as Microsoft Excel.

10-2 DeLogger's Spreadsheet Window

A DeLogger **spreadsheet** window is a standard spreadsheet into which you can load ("dump") an entire DeLogger replay file one row per timestamp, one column per channel. Then you use standard spreadsheet tools to manipulate and analyse the data. You can also

- load the contents of the spreadsheet into Microsoft Excel (if it's installed on your computer) with a single command
- export the contents of the spreadsheet in a variety of formats.

The spreadsheet window is different from the form window in several ways:

- The form window is a dynamic display of incoming data; the spreadsheet window is a static display of historical data.
- Each row in the form window displays a variety of information from one channel; each row in the spreadsheet window displays just channel readings from one scan that may include many channels, each in a separate column.

The Spread Menu

When a spreadsheet window is DeLogger's front-most window, the seventh menu on DeLogger's menu bar is **Spread** (see Figure 20 on page 27). Commands on this menu are specific to the spreadsheet window, and some are duplicated by buttons on the spreadsheet toolbar.

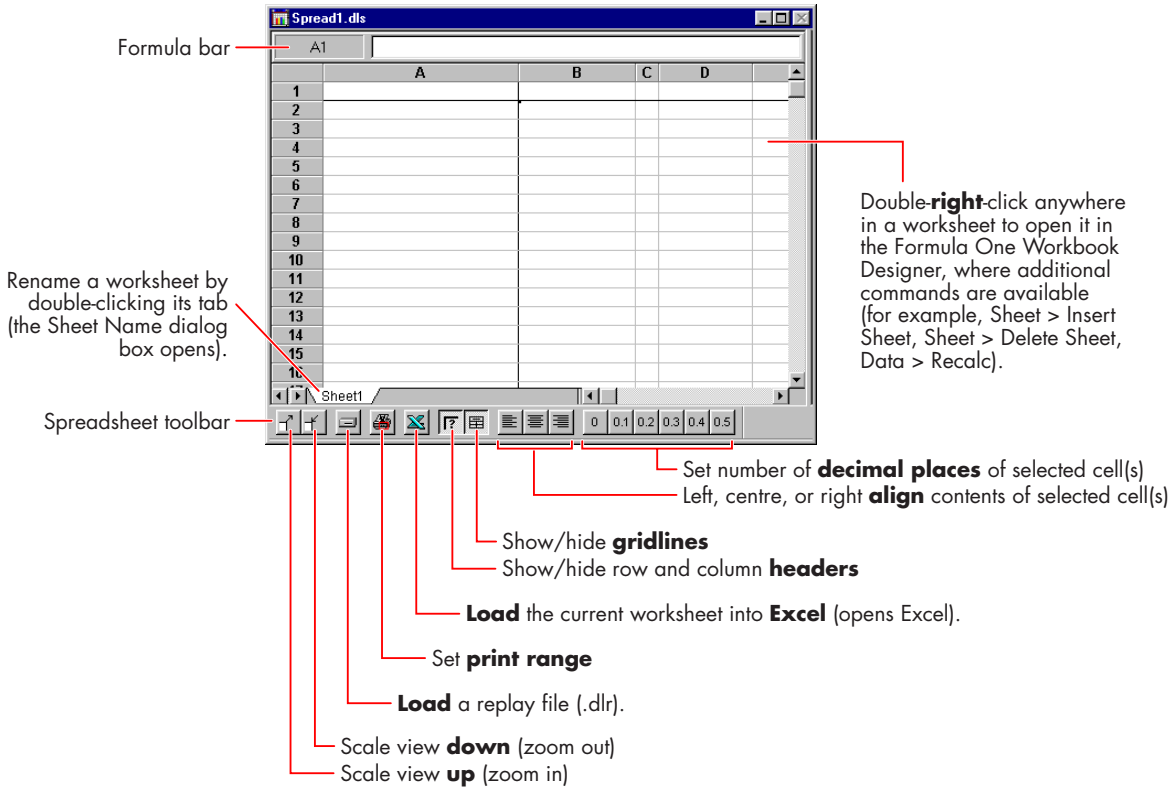


FIGURE 71 A new DeLogger spreadsheet window

10-3 Load Data into a Spreadsheet

Load a replay file into DeLogger's spreadsheet window.

To do this…

a) Locate the minimized spreadsheet window **Spread1.dls** and click its Restore button.

b) In the Spread menu, choose **Load Session From File...**.

c) In the Select Replay File dialog box that opens, highlight **Example2.dlr** and click **Open**.

All of the replay file's data is immediately loaded into the spreadsheet window.

Notice that each row is one data record (one scan) and each column contains data from one channel.

10-4 Finish Off

When you've finished working with DeLogger, save the project if you want (DeLogger remembers your window sizes, locations and so on) then carry out a software disconnection from the DT800 (**Connections** menu > **Disconnect...**).

Or simply quit DeLogger. (You'll be asked if you want to save the project, and DeLogger will disconnect automatically.)

The DT800 continues to operate according to its current program.

10-5 What's Next?

Now that you've finished working through this guide, you'll have seen how easy the DT800 *dataTaker* is to use and you have enough knowledge to set up your own basic data acquisition and logging sessions.

So, armed with your *DT800 dataTaker User's Manual*, this is just the beginning…

For help or more information, please visit **www. dataTaker.com** or contact your *dataTaker* representative. Our engineers are always happy to talk to you.

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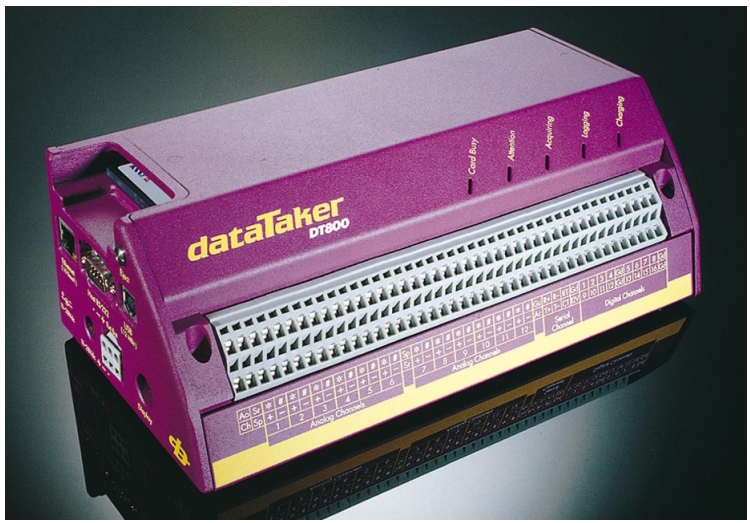
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