



Appendix B: EasyData Reference

In this book, you use the TI-83 Plus or TI-84 Plus graphing calculators connected to a data collection device to collect, examine, analyze, and graph data in the activities. Once Vernier EasyData™ is installed on your calculator, it can be accessed by pressing the **APPS** key.

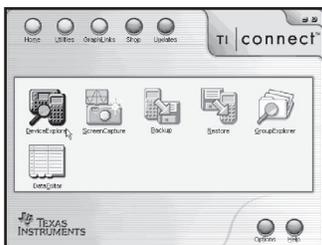
How Do I Get EasyData on My Calculator

EasyData is part of the bundle of Apps that come preloaded on all new TI-84 Plus and TI-84 Plus Silver Edition graphing calculators manufactured after January 2005. To check to see if EasyData is on your calculator, press **APPS** and scroll through the list of loaded applications. If your graphing calculator does not contain the EasyData App, you can download EasyData from the Vernier Web site: www.vernier.com/easy.html. Then use TI Connect to transfer it to your graphing calculator.

Using TI Connect™ to Load EasyData

TI Connect software is a universal application that is compatible with many calculators..

Windows Computers Running Windows 98, NT 4.x, 2000 or ME, and XP

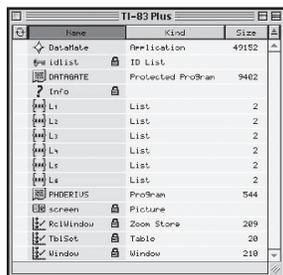


1. Connect the TI-GRAPH LINK cable, or the TI Connectivity cable, to the serial or USB port of your computer and to the port at the bottom edge of the TI-83 Plus graphing calculator.

Note: If you are using the TI-84 Plus or TI-84 Plus Silver Edition, connect the TI USB cable to the USB port of your computer and to the USB port at the top edge of your graphing calculator.

2. Start the TI Connect software on your computer. Click on Device Explorer.
3. The program will identify the attached device and call up a window representing the contents.
4. Loading programs and applications onto a TI graphing calculator is very easy. All you have to do is drag the program or application from wherever you have it on your computer to the Device Explorer window, and it will copy onto your graphing calculator.
5. The program should now be loaded into your calculator. To confirm this, press **APPS** on the calculator to display the loaded applications.

Macintosh Computers Running Mac® OS X 10.2 (Jaguar), 10.3 (Panther), and 10.4 (Tiger)



1. Connect the TI-GRAPH LINK cable, or the TI Connectivity cable, to the USB port of your computer and to the port at the bottom edge of the TI-83 Plus or TI-83 Plus Silver Edition graphing calculator.

Note: If you are using the TI-84 Plus or TI-84 Plus Silver Edition graphing calculator, connect the TI USB cable to the USB port of your computer and to the USB port at the top edge of your graphing calculator.

2. Turn the calculator on. On the computer, start TI Device Explorer.
3. The program will identify the attached device and call up a window representing the contents.
4. Loading programs onto a TI graphing calculator is very easy. All you have to do is drag the program to the device's window, and it will copy onto your graphing calculator.

5. The program should now be loaded into your calculator. To confirm this, press **APPS** on the calculator to display the loaded applications.

Main Screen

The Main screen of EasyData is shown in Figure 1. The top portion of the screen displays the sensor currently in use—in this case a temperature probe. A sensor reading is also displayed. The lower portion of the screen displays the default data collection mode for the sensor. Five options are listed across the bottom of the screen, which correspond to the five calculator keys directly below them. The Main screen of EasyData can be used as a meter; the sensor readings are updated approximately every second.

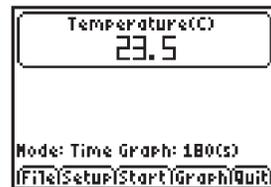


Figure 1

File Menu

The File menu contains four options. When you select File by pressing the **Y=** key, a pop-up menu appears, as shown in Figure 2. When you select the first option, **New**, the EasyData program is reset, and it will return to the Main screen. You should select **New** at the beginning of an experiment as a matter of routine or when you want to confirm that the program has all of the default values in place for the sensor and the data collection. Select **Help** to view the four screens of the help tips for EasyData. Select **About** to see the splash screen, which tells you which version of EasyData you are running and the firmware version of any connected interface. After a moment, the program will return to the Main screen. Select **Quit** to exit EasyData.

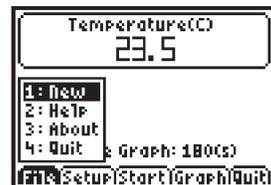


Figure 2

Setup Menu

The Setup menu lists options for the sensors in use and the data collection mode and for zeroing a sensor. Shown in Figure 3 is the Setup menu when a temperature probe is used. Please see the section below for more information about the Setup menu.



Figure 3

Start, Graph, and Quit Options

Select **(Start)** to begin data collection. Select **(Graph)** to view a graph of data that you have already collected. Select **(Quit)** to exit the EasyData application.

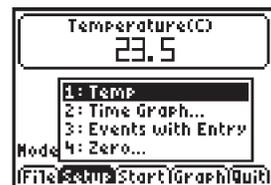


Figure 4

Using the Setup Menu

The Setup menu offers a list of options that depends on the sensor (s) being used. Figure 4 shows the Main screen of EasyData when **(Setup)** is selected. The sensor in use is displayed at the top of the list, followed by the data collection options. The last item listed is **Zero...**, the option to zero a sensor. The following example shows you how to use the Setup menu with a temperature probe.

1: TEMP

When you select **1:TEMP**, the sensor setup screen is displayed (Figure 5). This screen identifies the sensor and the units of measure. There are three options displayed at the bottom of the screen: **(Units)**, **(Cancel)**, and **(OK)**.

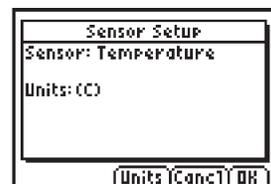


Figure 5

When you select **(Cancel)** or **(OK)**, you are sent back to the Main screen.

When you select **(Units)**, you can view the units of measure that are available for use with the sensor. For example, when using a temperature probe, you may choose to display and record the temperature readings in degrees Celsius, degrees Fahrenheit, or the kelvin absolute temperature scale (Figure 6). (Kelvin temperature values are not referred to as “degrees,” nor is the degree symbol used.)

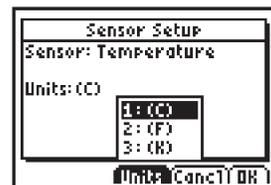


Figure 6

2: Time Graph...

When you select the time graph option, the time graph default settings for your sensor are displayed (Figure 7). Please note that these are the default values for the auto-ID sensor being used with EasyData. There are three options displayed at the bottom of the screen: **(Edit)**, **(Cancel)**, and **(OK)**.

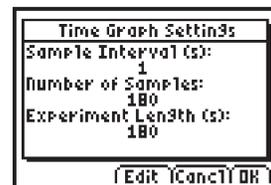


Figure 7

When you select **(Cancel)** or **(OK)**, you are sent back to the Main screen.

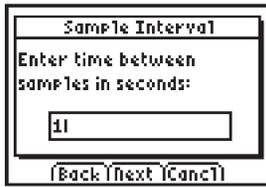


Figure 8

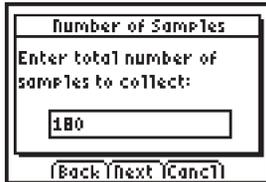


Figure 9

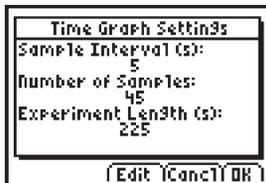


Figure 10



Figure 11

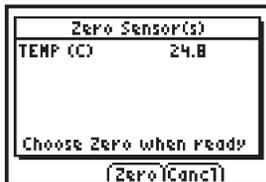


Figure 12

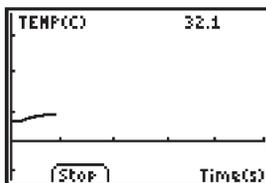


Figure 13

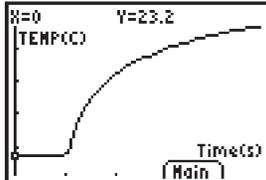


Figure 14

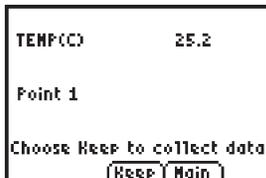


Figure 15

Select **(Edit)** to change the time graph settings. The first screen to appear is the sample interval screen (Figure 8). It displays the current data collection interval, in seconds, with the cursor next to the value. You can delete the current value by pressing **(CLEAR)** or by pressing **(←)** and **(DEL)**. You can also type over the current value by pressing **(←)** and entering a new sample interval. Note that EasyData allows only certain sample intervals. If you enter a sample interval that EasyData does not support, an error message will appear and a sample interval will be chosen for you.

If, at any time, you wish to stop what you are doing and return to the Main screen, select **(Cancel)**. The original values will be restored.

When you have entered a new sample interval or decided to use the default interval, you can continue by selecting **(Next)**. A new screen entitled “Number of Samples” will appear (Figure 9). It displays the default value. You may delete and enter numbers in this screen as you did with the sample interval screen. Again, note that EasyData allows a maximum number of samples based on the sensor in use.

When you have made the desired changes, select **(Next)**. The new time graph settings will be displayed (Figure 10). EasyData always expresses time in seconds; it cannot be changed to minutes or hours. If you select **(Cancel)** from this screen, the original settings will be restored and you will go to the Main screen. If you select **(Edit)**, you will go back to the sample interval screen. Select **(OK)** to accept the new time graph settings and return to the Main screen.

3: Events with Entry...

When you select the Events with Entry option, you are changing the data collection mode to one that is independent of time. There are no other choices to be made, thus after you select **Events with Entry...**, the screen goes blank for a second or two and then returns to the Main screen. The new mode is displayed at the bottom of the screen (Figure 11).

4: Zero...

Select this option when you wish to set the current sensor reading to zero. Allow the sensor readings to stabilize, and then select **(Zero)** (Figure 12).

Data Collection

Time Graph

In most instances, data are plotted as they are collected (Figure 13). This is known as live data collection. If the data collection rate is too fast or too slow, the data collection will be non-live and “Sampling” will appear on the screen until data collection has finished.

To collect data, select **(Start)** from the Main screen. During live data collection the screen will change to a graph and the data will be plotted. The data collection will cease automatically, according to the sampling parameters. However, you can halt the data collection early by selecting **(Stop)**. After the data collection ends, the graph autoscales to best fit the data. The calculator vernacular for this process is “ZoomStat.” Figure 14 shows the autoscaled version of the previous graph. Press **(→)** or **(←)** to trace the data and examine individual data pairs which are displayed at the top of the graph. Select **[Main]** to return to the Main screen.

Events with Entry

Select **(Start)** from the Main screen to begin data collection. The screen will change to display a sensor reading and list the data point that you will be collecting (Figure 15). When the reading has stabilized, select **(Keep)** to collect the data point.

The “Enter Value” dialog box will appear (Figure 16). The cursor will rest in a box beneath the title. Type the value for the independent variable (x -value), and then select **OK**. Repeat this process to collect subsequent data points.

After you have collected two data points, the screen will display a graph of your data. The current sensor reading will appear at the top of the screen, and you will have two options from this point on. Select **Keep** to collect a data point, or select **Stop** to halt the data collection and see an autoscaled graph of your data.

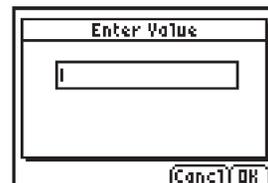


Figure 16

Using the Sample Data Files

The CD inside the back cover of this book includes sample data files for each calculator for each activity. The sample data let you evaluate the activity without setting up and performing the activity procedures. To use the sample data, use TI Connect to drag the sample data files onto your graphing calculator. Once the sample data files have been loaded, proceed to the Analysis section of the activity and follow the instructions for working with the data.