

SWD-Collect™

Version 4.0

User's Guide



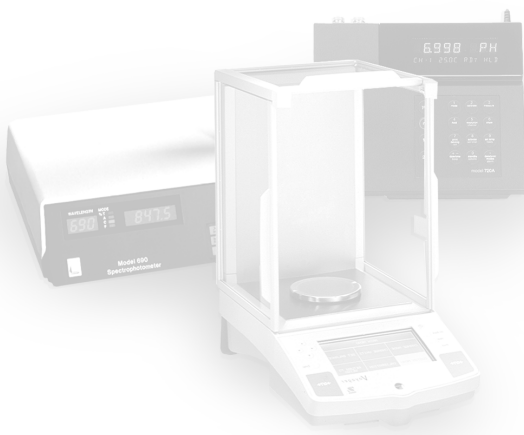


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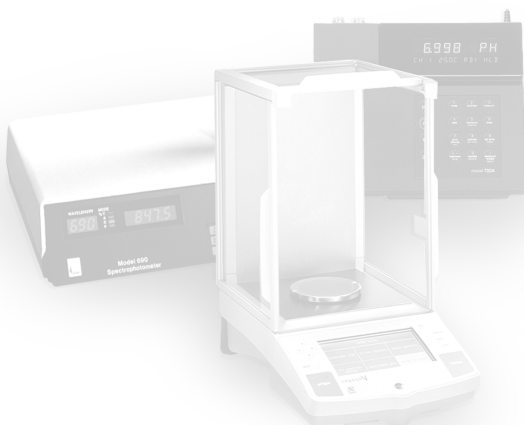
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Introductory Notes

The Software

SWD-Collect is designed for those who simply want to turn on their computer and begin collecting data. It is ideal in laboratory and production environments where an easy-to-use system is required. In particular, **SWD-Collect** can carry out the following basic steps:

1. **SWD-Collect** will receive data directly from an instrument by collecting data arriving at an RS232 port. It can also import an existing ASCII (also known as ‘text only’) data file.
2. The collected data is then processed. This consists of modifying the data by selectively breaking it into required components (referred to as ‘parsing’ the data). Using macros, required key strokes and other characters are then added to the data. User-specified prompts such as operator’s name and sample description may also be added to the data.
3. The modified data can then be sent to any of four destinations. It can be sent to a disk file, to the screen, to a built-in spreadsheet, or directly to the keyboard for entry in another **Windows**®-based application.

By sending the data to the keyboard, **SWD-Collect** ‘fools’ any other application running in the foreground into thinking that you are manually entering the data. For example, you can use your favorite spreadsheet while **SWD-Collect** is collecting data in the background. Whenever data becomes available, it will be sent to the keyboard, resulting in the data being added to the spreadsheet in real-time.

When selecting destinations other than the keyboard, **SWD-Collect** works in the ‘background’ of the computer. This is done in such a way that it will not interfere with other programs running on the computer at the same time.

SWD-Collect will permit data collection from up to 9 instruments at one time. Most computers can support up to 4 standard RS232 COM ports, and these can be located on the mother board or an add-on board. The software will work with multi-port boards configured to work under your operating system.

Conventions in this Manual

The following conventions are used in this manual:

- The word ‘**press**’ is used for keys you press.
- The word ‘**type**’ is used when asking you to type a response through the keyboard.
- The word ‘**click**’ is used when asking you to respond with the mouse.
- Dialog boxes have special command buttons, and these are shown in ***Bold Italic*** print when referenced.
- Special keyboard keys such as Shift, Alt, Ctrl, ESCape, Tab, INSert, DELete, etc. will be enclosed in triangular brackets. For example: <INSert> <DELete> <TAB> <SHIFT> <ALT> etc.
- Two keys in a row without a space such as <CTRL><INSert> means press and hold down the <CTRL> key while pressing <INSert>.
- Computer input such as file names are specified within double quotes in the manual. Do not include the quotation marks when entering the input. For example, if “*a:setup*” is included in the manual to explain how to enter a file name, you would not enter the quotation marks.
- Menu selections are referenced in bold print, with the hot key character for the selection underlined. For example, when a menu option must be chosen, the manual will say something such as “Pull down the **Configure** Menu and select **Instrument**”. To do this you would click on the **Configure** menu option, and then select the **Instrument** option from the sub-menu which appears when you select **Configure**.

- Proper names used in the program are denoted by a leading capital letter, for example ‘Instrument Data Destination’ or ‘Parser Setup’.
- An **instrument** refers to any external device other than the computer. This manual assumes you know the theory and principles of the laboratory instruments being used and their resultant data.
- Dialog boxes are shown for your reference. However, any examples of Instrument Setups, Parsers, Macros or data are included for demonstration purposes only. When the program has a default value, it will be referenced.

Special Keys and Procedures

Certain keys, combinations and procedures give consistent behaviors when using **Windows®-based** applications. The following are just a few to note.

<Alt><Tab>

When running any **Windows®-based** program, you can press <Alt><Tab> to switch to another program, which is already running. The program you were using will continue to operate in the background.

The OK and Cancel Buttons

Many of the Dialog Boxes used in the program contain both an ‘**OK**’ button and a ‘**Cancel**’ button. Selecting the ‘**OK**’ button will accept any input you provided in the Dialog Box and then close the Box. Selecting the ‘**Cancel**’ button will ignore any input you provided and close the Dialog Box.

Words With An Underlined Letter

Many menu options and button labels will contain a letter, which is underlined. This indicates that the letter is a ‘hot key’. Generally speaking, pressing <Alt> in combination with a hot key is equivalent to clicking on the selection.

For a Menu from the Menu bar, you can type <Alt> plus the hot key. For example, the **I**nstruments Menu has an underlined '**I**'. Instead of using the mouse, you could press <Alt><I>, or <Alt> then <I>.

For an option from a Menu, you only need to press the hot key. For example, **O**pen is an option in the **I**nstruments Menu that has an underlined '**O**'. Once you have selected the Instruments Menu, you could press <O> to activate the option.

For a button, pressing <Alt> in combination with a hot key is equivalent to clicking on the selection. For example, the '**C**reate' button on the [Setup Instruments] dialog box has an underlined '**C**'. Instead of clicking on the '**C**reate' button, you could press <Alt><C>. Note that these two keys must be pressed simultaneously.

Mouse Procedures and Terms

Many actions in **Windows**®-based programs require the use of a mouse. This manual uses certain terms to indicate that a mouse action is required.

When a menu option must be chosen or a button needs to be '*pushed*', the manual will say something such as "Pull down the **C**onfigure Menu and select **I**nstrument," or "Click on the '**O**K' button." This means you should use the mouse to position the arrow cursor on the specified menu, option or button, and then push the left mouse button once.

Some selections require you to '*click and drag*' the mouse. This means to hold the left mouse button down while you move the mouse, known as '*dragging*'. This operation is often used within a spreadsheet - see Chapter 6 of this manual for more details on selecting spreadsheet cells.

Some selections in **Windows**®-based applications are accomplished by '*double-clicking*' the mouse. This means to position the arrow cursor on the item to be selected and then push the left mouse button twice in rapid succession.

On-Line Help

The On-Line Help is a **Windows**® Help file, allowing you to choose subjects relevant to the program. When you choose **H**elp from the menu bar, the Help window will open on the screen. If you are unfamiliar with using a windows help file you can obtain instructions from the Help program's menu item **H**elp | **H**ow to Use **H**elp .

Status Line and Tool Tips Help

At the bottom of the **SWD-Collect** screen is a status line that shows messages to help you use the program. It lets you know what a certain menu option will do by displaying a message as you position the mouse pointer on it. For example, if you pull down the **C**onfigure Menu and position the pointer over **I**nstrument, 'Setup an Instrument' is the message that appears on the status line. The status line also lets you know which open instrument is the active window, as well as what port the instrument is connected to.

To get help with a toolbar button, point to it (rest the mouse pointer on the button). A tool tip will appear with a brief description of the button's function.

Exiting from SWD-Collect

To exit from the **SWD-Collect** program, pull down the **I**nstruments Menu and choose **E**xit.

Last Minute Changes

From time to time, improvements are made to both the software and the manual. The latest changes will be explained in a README file that will be installed with the program. To list this information:

1. Double-click on the 'README' question-mark icon that was installed in the same Program Group as **SWD-Collect**.
2. The **readme.hlp** file will be displayed in a standard **Windows**®-based on-line help format, allowing you to jump to various topics.
3. To exit the README, simply pull down the **F**ile menu and select **E**xit.

If such a file exists, you may look at the README file at any time, although it is a good idea to look at it before installing the program.

Installation

Contents of the SWD-Collect Package

Two 3.5" SWD-Collect Program Disks
One SWD-Collect User's Manual

Preparing your System (Computer Requirements)

Hardware Requirements

SWD-Collect requires that your computer has the following minimum specifications:

- An IBM compatible 80486DX or higher
- 8 MB RAM minimum, 16 MB recommended
- Hard Disk with at least 5 MB of free disk space
- At least one 3.5" floppy disk drive
- VGA or higher resolution
- COM1 / COM2 etc. ports to support RS232 communications (the minimum is one available COM port)
- For RS232 communications, please ensure that you have a cable that is certified by the instrument manufacturer.

Software Requirements

SWD-Collect can run under the Microsoft® **Windows® 95**, **Windows® 98**, **Windows® NT** and **Windows® 2000** operating systems. Check your disks to verify you have the correct version for your operating system.

Installing the Software

SWD-Collect comes with an automated setup program. The setup program must be run from within **Windows® 95**, **Windows® 98**, **Windows® NT** or **Windows® 2000**.

1. First have your **Windows®** operating system running.
2. Insert the **SWD-Collect** disk #1 into your computer's floppy drive.
3. Click on the '**Start**' button at the bottom left corner of your screen, and choose the **Run...** item from the pop-up menu.
4. You will advance to a [Run] dialog box, where you may enter the name of a program, folder or document to be run. This is called '**Open:**'. Type "*a:\setup*" (or "*b:\setup*"), then click on the '**OK**' button.
5. The setup program will specify a drive and directory to install to. If you wish to change the default simply enter the appropriate information here. The setup program will create the necessary directories and copy the files over.
6. Double-click on the **SWD-Collect** icon to start the program. You will see the main window for **SWD-Collect**. Chapter 2 of this manual gives a **Quick Start** introduction to the program, while Chapters 3-6 provide complete details.

Registering the Software

Each new installation of the software requires its own registration. You may install **SWD-Collect** from the original master disks or from copies of these master disks. Once installed, the program is fully functional for 30 days; registration of the installation with OMEGA Engineering Inc. is required for further use. **This must be done within 30 days of installing the program.**

When you first start **SWD-Collect** you will advance to the [Register] dialog box. Enter the 10 digit Registration Code found on the Product Installation Disk. If a registration code was not supplied with the product, contact OMEGA directly to obtain one. Before registering the product, please ensure that you are complying by your current license agreement with OMEGA before activating this copy of the product.

If you do not register the program now, you will be permitted to use a fully functional unregistered copy of the program for a period of 30 days, after which you are required to register the product.

Should you require technical support, you will be required to provide the serial number. This can be retrieved from the product's About Box. Select the **A**bout sub-menu item from the **H**elp menu.

While using the program, you may also see the [Register] dialog box by choosing the **About item from the **H**elp menu. You will first see an information window about SWD-Collect, and you may click on the 'Register' button there.**

Copyright

SWD-Collect is copyright protected by *Labtronics Inc.* with all rights reserved. This manual is copyright protected by OMEGA ENGINEERING INC. with all rights reserved. No part of this software or manual may be copied, in whole or in part without written consent except to make a backup copy for normal use.

License

Labtronics Inc. grants you a non-exclusive license to use **SWD-Collect** on a single machine and to copy it for a backup in support of your use of the program on a single machine.

Chapter 2 Quick Start - Just the Basics

The purpose of this Chapter is to introduce you to the **SWD-Collect** environment. Following this chapter will show you how to quickly configure one of your instruments, and then see the program collect raw data from that instrument. Comprehensive details of the **SWD-Collect** software are provided in Chapters 3, 4, 5 and 6 for your reference.

You should first be familiar with your Windows® operating system, and you should know how to use the mouse to *click and drag* the pull-down menus as well as select options. More importantly, you should first have your instrument connected to a COM port on the back of your computer, and you should be able to provide the comport details that must be entered in SWD-Collect.

If you have not yet installed **SWD-Collect** onto your computer, go back to the Installation section now (Pages 6 to 8) and follow the required steps. Once installed, you are ready to start the program.

Start **SWD-Collect** from **Windows®** by selecting the program icon from **Start | Programs | SWD-Collect V4.0**.

Upon entering the program you will see the **SWD-Collect** ‘main screen’, as shown in Figure 2.1.

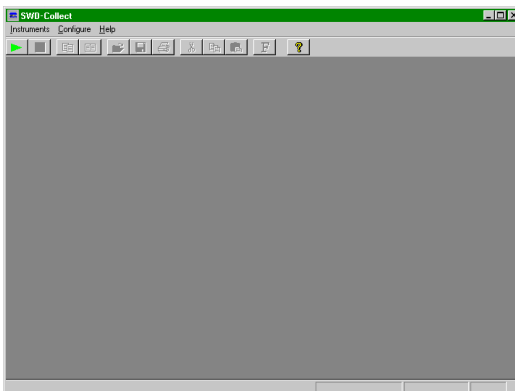


Figure 2.1: SWD-Collect ‘main screen’ - Access to the program’s features

Configuring your Instrument

The first step is to configure your instrument to work with SWD-Collect.

1. From the 'main screen', pull down the **C**onfigure menu item.
2. Select the **I**nstrument sub-menu item. The [Setup Instruments] dialog box similar to the one shown in Figure 2.2 will appear. (Please note the listed instruments are examples only.)

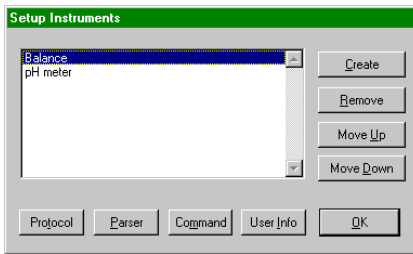


Figure 2.2: Setup Instruments dialog box

Setting up a New Instrument

Click on the '*Create*' button. You will advance to the [Instrument Protocol Setup] dialog box as shown in Figure 2.3.

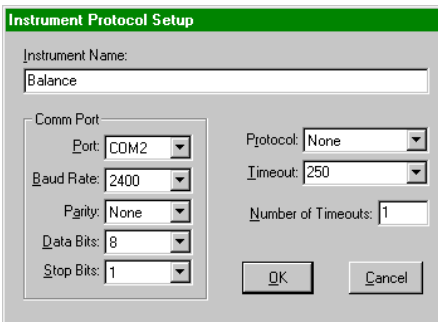


Figure 2.3: Define the instrument protocol

Defining your Instrument Protocol

There are some key communication parameters associated with serial (RS232) communication that must be matched exactly between your instrument and the configuration in **SWD-Collect**. *In particular, if the Baud Rate, Data Bits, Stop Bits, and Parity are not matched exactly between the instrument and SWD-Collect, serial data transfer **will not work**.* The computer does not automatically determine what these parameters are for your instrument - **YOU MUST ENTER THEM HERE**.

Specifying the Instrument Name

The cursor will be flashing in the Instrument Name text box. Type in the name of the instrument so that you will be able to identify the instrument throughout the **SWD-Collect** program. Do not press <Enter> after typing in the name, as this will cause you to close the dialog box.

Specifying the Comport Information

You must enter the correct Comport information based on the details supplied in the user manual for your instrument. It is important that these details match exactly those of your instrument. Note that by clicking on the arrow to the right of each box, you can see a list of items from which you can make your selections. Simply click on the up and down arrows to scroll through the list, and click on the desired entry.

Port	Select the port that is connected to your instrument. COM2 is the default selection.
Baud Rate	Select the Baud Rate that corresponds to the data transmission speed of your instrument. 2400 is the default Baud Rate selection.
Parity	Indicate what parity bit should be added to your data for successful communication. "None" is the default value and this is often selected.
Data Bits (Word Length)	Eight (8) appears as the default value. This indicates how many bits of data are in a data unit for communication purposes.
Stop Bits	Indicate how many stop bits are added to the data unit. The default selection is 1.

Defining a Protocol for Data Transmission

The Protocol is also known as ‘handshaking’, which establishes the method for controlling the flow of data between devices so that one device transmits only when the other device is ready. **SWD-Collect** is designed to be ready for your device’s transmission at all times, so you need only select the default protocol, **NONE**. Any additional protocols that may be listed are custom-designed methods reserved for highly specialized applications.

Specifying a Timeout for Data SWD-Collection

The program will collect data until an interval of time occurs when no more data is received. This time interval is known as the ‘*Timeout*’. After the Timeout occurs, the program will organize (parse) the data and send it to either the keyboard, a spreadsheet, the monitor or to a specified disk file. **SWD-Collect** then gets ready to receive the next segment of data.

For now, leave the Timeout default value of 250 milliseconds.

Defining the Number of Timeouts for Data SWD-Collection

Here you may specify the number of timeouts the program is to detect before parsing begins. For now, leave the default for this option at ‘1’ (one), which will be the most common selection.

Please refer to Chapter 3, (see Pages 20 to 23) for additional information on defining protocols and timeouts.

Saving the Instrument Protocol Setup

Once you have completed your entries to the [Instrument Protocol Setup] dialog box (see Figure 2.3, Page 10), click on the ‘**OK**’ button to save the configuration. Selecting ‘**OK**’ will return the [Setup Instruments] dialog box (see Figure 2.2, Page 10), with the name of the created instrument listed and highlighted.

Defining Instrument Commands

Does your instrument require a command from the computer to prompt it to start or stop transmitting data? Check your instrument's manual for a section on 'External Control'.

1. If your instrument does require such commands, work your way through the following section.
2. If your instrument does not require a command from the computer, click the **'OK'** button and skip ahead to the section, **'Opening the Instrument'**, Page 15.

If your instrument requires a command from the computer, click on the **'Command'** button located along the bottom of the [Setup Instruments] dialog box (see Figure 2.2, Page 10) to open the [Instrument Command Setup] dialog box, shown in Figure 2.4.

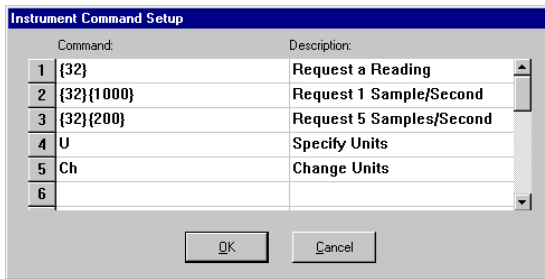


Figure 2.4: Define the instrument commands

You can enter up to twenty commands here, which you can then send to the instrument to control its operation. For example, your instrument may require **SWD-Collect** to send a command of 'S' to prompt the instrument to send data.

Please refer to Chapter 4, (see Pages 36 to 38) for additional information on sending commands.

How to Set up Commands for your Instrument

1. Using the mouse, move the pointer to a Command box (on the left side) and click on it.
2. Type the required command through the keyboard. It is fairly common that the command will include ‘non-printable’ characters, such as a carriage return or line feed. These should be entered as ASCII numbers enclosed in { } brackets . For example, the carriage return is {13} and the line feed is {10}. A listing of ASCII numbers appears in Appendix A.
3. Click the pointer on the box beside it, under the heading ‘Description’.
4. Enter a description for the command. For example, you could enter ‘Start sending data’ as the description.

Please Note: It is mandatory that you enter a description here for each command.

5. Complete steps 1-4 for each command that is specified in your instrument’s user manual. Note that when you’re actually running the instrument and choose to send commands, these commands will be listed in the order they appear here, from top to bottom. If you would like the commands to appear in a certain order, for ease of selection, then ensure you enter them in order here.
6. When you have finished entering the command for the instrument, click on the ‘**OK**’ button to save the details.

Please refer to Chapter 3, Pages 24 to 28 for additional information on defining instrument commands.

Opening the Instrument

Before **SWD-Collect** can start collecting data, you must first “open” the instrument.

To open an instrument, do one of the following:

1. From the **SWD-Collect** ‘main screen’ (see Figure 2.1, Page 9), pull down the **I**nstruments menu.
2. Select the **O**pen sub-menu item.

or



1. From the **SWD-Collect** ‘main screen’ (see Figure 2.1, Page 9), click the ‘**O**pen’ button from the Toolbar, as shown here in the margin.

In either case, you will advance to the [Open Instrument] dialog box will appear, similar to the example shown in Figure 2.5.

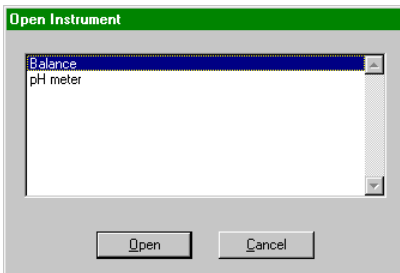


Figure 2.5: Open Instrument dialog box

You will see a listing with the instrument(s) that you have just configured for the **SWD-Collect** program. Clicking once on an instrument name will highlight it. Click on the ‘**O**pen’ button to proceed to the [Instrument Data Destination] dialog box (see Figure 2.6, Page 16), or ‘**C**ancel’ to return to the main **SWD-Collect** window.

Double-clicking on the instrument name will automatically select it and open the [Instrument Data Destination] dialog box (see Figure 2.6, Page 16).

Where to Send the Instrument Data

When opening an instrument you must complete the [Instrument Data Destination] dialog box and click on the '**OK**' button. Clicking on the '**Cancel**' button will return you to the previous dialog box.

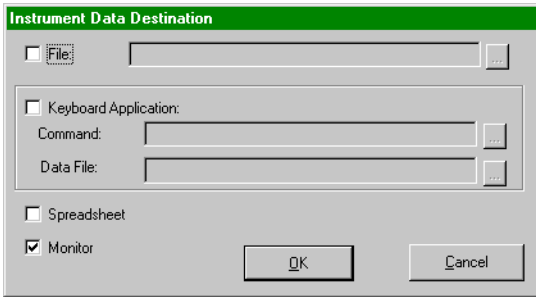


Figure 2.6: Instrument Data Destination dialog box

Simply click the check box beside the destination name to toggle it on or off. An indicator will mark the square when it has been selected. You are able to specify one or all of the following destinations: File; Keyboard Application; Spreadsheet; or Monitor.

For now, specify the monitor destination by clicking the check box beside the word '**Monitor**'. An indicator will mark the small square when it has been selected.

Click on the '**OK**' button to open the instrument. A window will open with that instrument's name appearing at the top, similar to the example shown in Figure 2.7 (see Page 17).

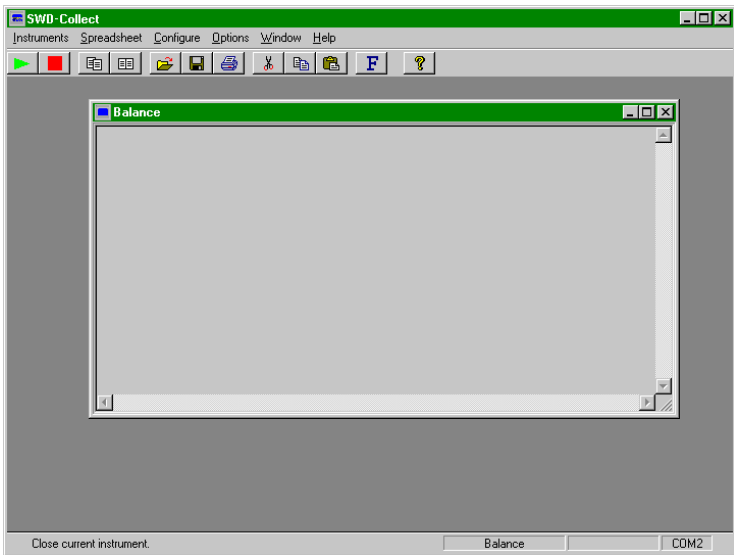


Figure 2.7: An open instrument

You may already see data being displayed on the monitor, or you may have to press the ‘*Print*’ or ‘*Send*’ key on your instrument to have it start transmitting data.

Please refer to Chapter 4, Pages 31 to 35 for additional information on Instrument Data Destination.

Sending Commands

If you do not see data immediately, you may need to prompt your instrument to transmit the data to the PC with one of the commands you entered during the setup. (Note: if your instrument does not require commands, ensure you have correctly entered the instrument configuration.)


1. Pull down the **Instruments** menu from the top of the screen, and select the **Command** option.

2. The commands that you entered for this instrument will appear in the [Commands] dialog box.
3. Click on the command that will prompt the instrument to transmit data, then click on the '*Send*' button.

Follow these steps for all other commands to your instrument.

Closing the Instrument

Data will be received and collected until you 'close' the instrument.

1. Click on the window associated with the instrument.
2. If applicable, follow the '**Sending Commands**' procedure to prompt the instrument to stop transmitting data.
3. Click on the '*Close*' button on the toolbar, shown here in the margin.
 You will be prompted to confirm that you are closing the instrument.
4. Click the '*OK*' button to close the instrument.

Chapter 3 **Configuring Instruments**

If you have not yet installed **SWD-Collect** onto your computer, go back to the Installation section now (Page 6 to Page 8) and follow the required steps. Once you have installed **SWD-Collect** onto your computer, you are ready to start the program.

Start **SWD-Collect** from **Windows®** by selecting the program icon from **Start | Programs | SWD-Collect V4.0**.

Upon entering the program you will see the main **SWD-Collect** screen, shown in Figure 3.1.

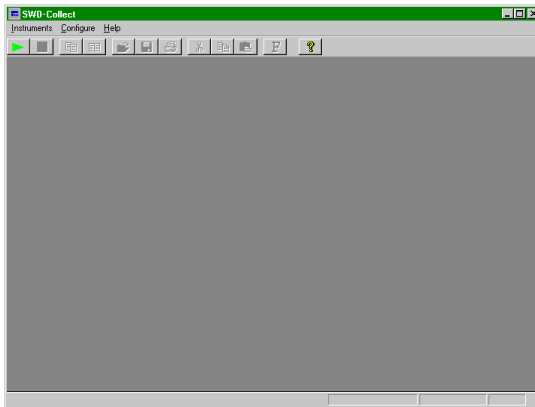


Figure 3.1: SWD-Collect ‘main screen’ - Access to the program’s features

Setting up a New Instrument

Your first task is to configure your instruments to work with **SWD-Collect**.

1. From the 'main screen', pull down the **Configure** menu.
2. Select the **Instrument** sub-menu item. The [Setup Instruments] dialog box will appear, similar to the sample shown in Figure 3.2.

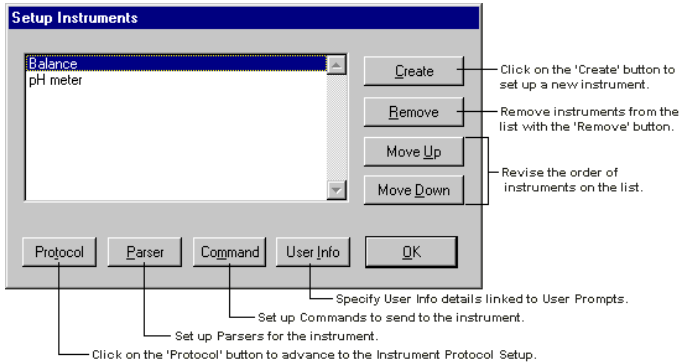


Figure 3.2: Setup Instruments dialog box

Here you are able to create and update the configuration for each instrument connected to **SWD-Collect**. If you have already 'opened' an instrument, you must first close it before reconfiguring. Then you can re-open it to see the new configuration in effect.

3. Click on the '**Create**' button to set up a new instrument. You will advance to the [Instrument Protocol Setup] dialog box, as seen in Figure 3.3.

Defining your Instrument Protocol

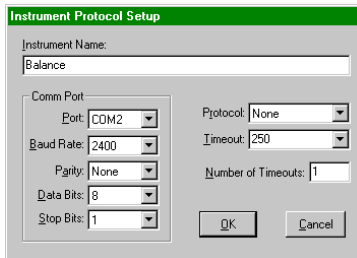


Figure 3.3: Instrument Protocol Setup dialog box

There are some key communication parameters associated with serial (RS232) communication that must be matched exactly between your instrument and the configuration in **SWD-Collect**. *In particular, if the Baud Rate, Data Bits, Stop Bits, and Parity are not matched exactly between the instrument and SWD-Collect, serial data transfer **will not work**.* The computer does not automatically determine what these parameters are for your instrument - **YOU MUST ENTER THEM HERE**.

Specifying the Instrument Name

The cursor will be flashing in the Instrument Name box. Type in the name of the instrument so that you will be able to identify the instrument you are using throughout the **SWD-Collect** program. Do not press <Enter> after typing in the name, as this will cause you to close the dialog box.

Specifying the Comport Information

Enter the correct Comport information based on the details supplied in the user manual for your instrument. It is important that these details match exactly those of your instrument. Note that by clicking on the arrow to the right of each box, you can see a list of items from which you can make your selections. Simply click on the up and down arrows to scroll through the list, and click on the desired entry.

Port	Select the port that is connected to your instrument. COM2 is the default selection.
Baud Rate	Select the Baud Rate that corresponds to the data transmission speed of your instrument. 2400 is the default Baud Rate selection.
Parity	Indicate what parity bit should be added to your data for successful communication. "None" is the default value and this is often selected.
Data Bits (Word Length)	Eight (8) appears as the default value. This indicates how many bits of data are in a data unit for communication purposes.
Stop Bits	Indicate how many stop bits are added to the data unit. The default selection is 1.

Defining a Protocol for Data Transmission

The Protocol is also known as ‘handshaking’, which establishes the method for controlling the flow of data between devices so that one device transmits only when the other device is ready. **SWD-Collect** is designed to be ready for your device’s transmission at all times, so you need only select the default protocol, **NONE**. Any additional protocols that may be listed are custom-designed methods reserved for highly specialized applications.

Specifying a Timeout for Data SWD-Collection

When the program detects data arriving at the comport, it starts an internal clock and will collect data until an interval of time occurs when no more data is received. This time interval is known as the Timeout. After the Timeout occurs, the program will organize (parse) the data and send it where you specify: the keyboard, a spreadsheet, the monitor or to a specified file. **SWD-Collect** then gets ready to receive the next segment of data.

A Timeout that is too short will result in data being chopped up into small segments. A Timeout that is too large will result in long delays between receiving the data and seeing the data at the specified destination. An overly large Timeout also can result in missing data.

Click on the arrow to the right of the Timeout box. The Timeout (in milliseconds) can be specified by scrolling through the list of available times and selecting one, or you may specify a timeout value that is not listed, by clicking in the text box and typing in the desired time in milliseconds. The default Timeout value of **250** milliseconds will work for most data collection. Leave this default setting unless you are certain that your instrument’s timing will require a different value.

Defining the Number of Timeouts for Data SWD-Collection

Here you may specify the number of Timeouts the program is to detect before parsing begins. The default for this option is ‘**1**’ (one), which will be the most common entry. This means that after every Timeout the program will parse the data and send it to the specified destination.

If your instrument transmits data over more than one stage, you may want to delay Parsing until all the data is received. For example, if you know that your instrument describes a sample in 3 stages, then you can set the Number of Timeouts to 3. In this case the program will keep the incoming data in memory until it counts 3 Timeouts, then it will begin parsing all the data.

Saving the Instrument Protocol Setup

Once the [Instrument Protocol Setup] dialog box has been completed, click on the '**OK**' button to save the configuration, or click on **Cancel** to proceed without saving the setup. Selecting **OK** will return the [Setup Instruments] dialog box (see Figure 3.2, Page 20), with the name of the created instrument listed and highlighted.

If you clicked on **Cancel**, a Caution message will appear (see Figure 3.4).

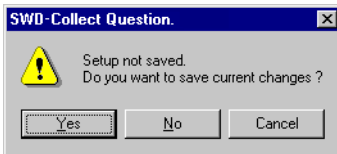


Figure 3.4: Do you want to save current changes?

Click on the '**Yes**' button if you wish to save the changes, the **No** button to proceed without saving the configuration, or the '**Cancel**' button to return to the [Instrument Protocol Setup] dialog box (see Figure 3.3, Page 20).

Defining Instrument Commands

Does your instrument require a command from the computer to prompt it to start or stop transmitting data? Check your instrument's manual for a section on 'External Control'.

1. If your instrument does require such commands, proceed through the following instructions.
2. If your instrument does not require a command from the computer, skip ahead to Chapter 4 - '*Opening Instruments*'.

If your instrument does require one or more commands from the computer, click on the '*Command*' button (along the bottom of the [Setup Instruments] dialog box) to open the [Instrument Command Setup] dialog box, as seen in Figure 3.5.

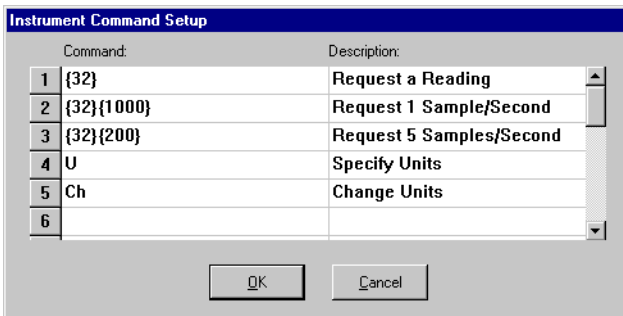


Figure 3.5: Instrument Command Setup dialog box

You can enter up to twenty commands here, which you then can send to the instrument to control its operation. Please refer to section '*Sending Commands*' in Chapter 4 (see Page 36) for more complete details.

How to Set Up Commands

1. With the mouse, move the pointer to a Command box (on the left side) and click on it.
2. Type the required command through the keyboard. Non-printable characters such as a carriage return should be entered as ASCII numbers enclosed in {} brackets. (A listing of ASCII numbers appears in Appendix A). Please see the section *'Repeating, Delaying and Pacing Commands'* (see Page 26) for further details on sending commands.
3. Click the pointer on the box beside it, under the heading *'Description'*.
4. Enter a description for the command. For example, you could enter 'Start sending data' as the description.

Please Note: It is mandatory that you enter a description here for each command.

5. Complete steps 1-4 for each command that is specified in your instrument's user manual.
 - Double-clicking on a cell will highlight any text that is present, or will show the text insertion bar in an empty cell. Use the scroll bar to reveal other cells.
 - When you're actually running the instrument and choose to send commands, these commands will be listed in the order they appear here, from top to bottom. If you would like the commands to appear in a certain order, for ease of selection, then ensure you enter them in order here.
6. When you have finished entering the command(s) for the instrument, click on the **'OK'** button to save the details, or click on **Cancel** to leave the dialog box without saving any changes. You will return to the [Setup Instruments] dialog box (see Figure 3.2, Page 20).

Repeating, Delaying and Pacing Commands

You are able to repeat, delay, pace or send commands at variable intervals by including specific times within the command line.

Repeating Commands

To have the command re-sent repeatedly, enter a cycle time (in milliseconds) in square brackets [] at the end of the command. For example, suppose your instrument requires a command “X” to transmit each data value. You could enter a cycle time of 1000 milliseconds beside the command like this: “X[1000]”. Sending this command means that **SWD-Collect** will prompt the instrument to send a data value every second until you interrupt it, by clicking on the ‘**Interrupt**’ button found on the window listing your Commands at run time, or until you close the instrument.

Delaying Commands

A time delay can be entered between commands also using square brackets []. Suppose your instrument will transmit the units of measurement following the command “U”, and then requires a command “X” to transmit each data value. You could enter the command as “U[1000]X”, and then **SWD-Collect** will insert a 1000 milliseconds delay between each command.

Pacing Commands

The ‘-’ character can also be used to pace the command. Again, suppose your instrument will change the units of measurement with the command “C”, transmit the units of measurement following the command “U”, and then requires a command “X” to transmit each data value. You could enter the command as “C-U-X[1000]”, and **SWD-Collect** will insert a 100 milliseconds delay between each command, and then repeat it every second. The ‘-’ character can be used cumulatively, if desired.

Sending Commands at Specified Intervals

In addition to the “cycle times”, you may also send a command at specified time intervals. The time intervals are variable, based on the following formula:

TIME INTERVAL = START TIME x (MULTIPLICATION FACTOR)ⁿ

Where:

START TIME Is the number of milliseconds past “time=0sec”, the time when the command is “sent”.

MULTIPLICATION FACTOR Is a whole number used to multiply the **START TIME**, and is raised to the power of “0,1,2,... etc.”, depending on the “n” specified. If n=4, then this factor would be calculated to the power of 0,1,2 and 3.

n Is an integer number representing a total of “n” time intervals to prompt the instrument for data.

Example 1:

Suppose that your instrument requires the command “X” to transmit each data value, and suppose you require 50 data values from your instrument at a fixed time interval of 10 seconds apart. You could enter a ‘time interval’ command where the **START TIME** is 10 seconds (10000 msec) after the command is first “sent”, and with a **MULTIPLICATION FACTOR** of 1, to be raised to the power of “n” 50 times.

These components are specified in square brackets following the command, and separated by commas. The command that you type into the Command box would be as follows: “X[10000,1,50]”

SWD-Collect will then prompt the instrument “n” times. The program will do this at the following time intervals past “time=0sec”, when the command is first “sent”, and then **SWD-Collect** will stop.

n	TIME CALCULATION	TIME INTERVAL	PAST “TIME=0sec”
1	10000	10 sec	10 sec
2	10000 x (1)	10 sec	20 sec
3	10000 x (1x1)	10 sec	30 sec
..			
50	10000 x (1x1x1) etc.	10 sec	500 sec

Please note that the n=50 means *the number of time intervals* and not the value of the power integer itself.

Example 2:

Suppose you require data from your instrument more frequently at first, but then less often as time progresses. You could specify a ‘time interval’ command where the **START TIME** is 10 seconds (10000 msec) after the command is first “sent”, and with a **MULTIPLICATION FACTOR** of 2, to be raised to the power of “n” 4 times. The command would be: “X[10000,2,4]”. The program will prompt the instrument 4 times, at the following time intervals past “time=0sec”:

n	TIME CALCULATION	TIME INTERVAL	PAST “TIME=0sec”
1	10000	10 sec	10 sec
2	10000 x (2)	20 sec	20 sec
3	10000 x (2x2)	40 sec	40 sec
4	10000 x (2x2x2)	80 sec	80 sec

Example 3:

To send the same sequence as above but in reverse order, specify the n as “-4.” You may want to use this if the instrument’s data is required more frequently as time goes on. The command would be: “X[10000,2,-4]”. In this case, the program uses a slightly different calculation but would still prompt the instrument 4 times, at the following times past “time=0sec”.

n	TIME INTERVAL	TIME PAST “TIME=0sec”
1	0 sec	0 sec
2	40 sec	40 sec
3	20 sec	60 sec
4	10 sec	70 sec

Exiting the Instrument Setup

At the bottom right of the [Setup Instruments] dialog box (see Figure 3.2, Page 20) , click on the ‘OK’ button to return to the main **SWD-Collect** window (see Figure 3.1, Page 19).

Your instruments are now configured to work with **SWD-Collect**. Proceed to Chapter 4 - ‘*Opening Instruments*’ for complete details.

Chapter 4 Opening Instruments

Before **SWD-Collect** can start collecting data, you must first *‘open’* the instrument.

Opening an Instrument

To open an instrument, do one of the following:

1. From the ‘main screen’, pull down the **I**nstruments menu and select **O**pen.
2. Press <Shift><PgDn> on the keyboard.
3. Click the special *‘Open’* button from the Toolbar, pictured in the margin.



In all cases, you will advance to the [Open Instrument] dialog box, as seen in Figure 4.1.

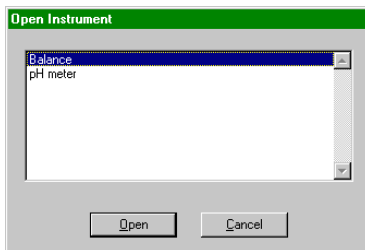


Figure 4.1: Open Instrument dialog box

You will see a list of the instruments that you have configured for the **SWD-Collect** program.

Moving around the [Open Instrument] dialog box

1. You may scroll through the instrument names with the up and down arrow keys, or you may click on the scroll bar.
2. If you have an extensive list of instruments, you may also type the first letter of the instrument name to move the highlighted line to the next listed device beginning with that letter. Upon reaching the bottom of the list, the highlighted line returns to the top.
3. Clicking once on an instrument name will highlight it.
4. Click on the '*Open*' button to proceed to the next dialog box, or *Cancel* to return to the main **SWD-Collect** window.
5. Double-clicking on the instrument name will automatically select it and open the next dialog box.

Specifying the User Info

If you have specified a Macro (see Chapter 5, Page 63) that includes User Prompts asking the operator to enter information, you will see the [User Prompts] dialog box as shown in Figure 4.2. If not, skip ahead to the next section '*Where to Send the Instrument Data*' (see Page 31).

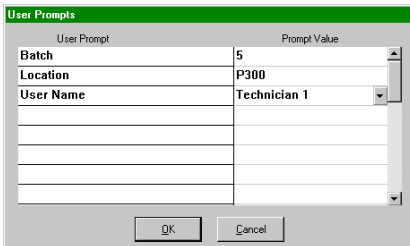


Figure 4.2: Specify the prompt values

On the left side are the User Prompts defined within the Macro. You should enter the appropriate Prompt Value on the right side of the dialog box.

1. Click on the cell that is opposite to the User Prompt.
2. Click on the ‘down arrow’ to reveal a list of previously entered Prompt Values.
3. Click on the appropriate value to select it.
4. If the appropriate response is not listed, double-click on the cell and type in your response to the prompt.
5. Click on the ‘**OK**’ button to proceed to the [Instrument Data Destination] dialog box (see Figure 4.3). Clicking on the ‘**Cancel**’ button will return you to the previous dialog box.

For further information, please refer to the section “*Displaying the User Prompts*” in Chapter 5 (see Pages 66-67).

Where to send the Instrument Data

SWD-Collected data is parsed and then combined with Macros (see chapter 5 - ‘*Instrument Parser Setup*’). Data can then be sent to a specified destination. When opening an instrument you must complete the [Instrument Data Destination] dialog box (see Figure 4.3) and click on the ‘**OK**’ button. Clicking on the ‘**Cancel**’ button will return you to the previous dialog box.

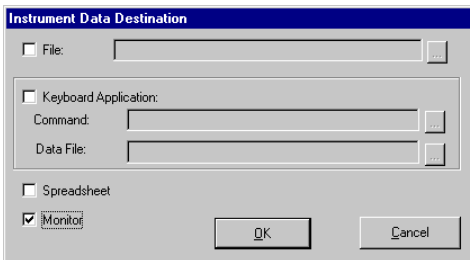


Figure 4.3: Instrument Data Destination dialog box

Simply click the check box beside the destination name to toggle it on or off. An indicator will mark the square when it has been selected. You can specify one or all of the following destinations: File, Keyboard Application, Spreadsheet or Monitor.

Sending the Data to a File

Data is sent directly to a specified disk file. When you specify the file destination, you must enter a path to the file. Clicking on the '**Browse**' button (pictured as an ellipsis '...') beside the File text box opens the [Destination File] dialog box, as illustrated in Figure 4.4.

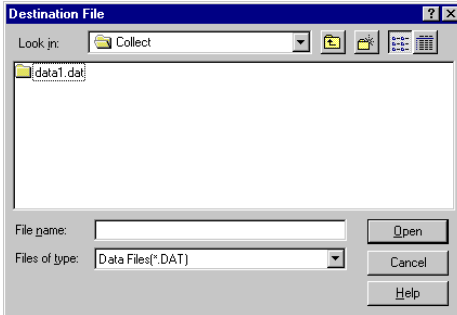


Figure 4.4: Destination File dialog box

Specify the required information for the file destination, then click on the '**OK**' button. You will return to the [Instrument Data Destination] dialog box (see Figure 4.3, Page 31).

Sending the Data to an Application

When '**Keyboard Application**' is selected, the data is entered directly into the **Windows**[®]-based application that you specify here, such as your own spreadsheet program. The *Command Line* and *Data File* fields will default whatever entries were made there previously for that instrument.

This section allows you to take advantage of the '**Automatic Focus Locking**' feature of **SWD-Collect**, where the Instrument and another application are 'locked' together. If no entries are made for these fields, then the program will send the instrument data through the keyboard into whatever application that is the window of 'focus' (identified as the one with the highlighted title bar). This occurs with the first measurement, after which **SWD-Collect** is locked to the application.

Specifying a Command Line to run the Destination Application

Enter the command line to run the desired destination application. The Instrument and the application will then be ‘locked’ together, so that data from the Instrument will always be directed to the specified application. This field may be left blank, if desired. If no Command Line is specified, then the Application specified in the above field will not be started if it isn’t found already running.

You may click on the ‘**Browse**’ button (pictured as an ellipsis ‘...’) to see the [Destination Application] dialog box, where you may specify the required information for the destination. Click on the ‘**OK**’ button in the Destination Application window to return to the [Instrument Data Destination] dialog box (see Figure 4.3, Page 31).

Opening a Data File with the Application

You may enter the name of a specific data file to be opened by the destination application. For example, you may have the application open a template file for your data, which you can then later save as another file name.

Again, you may click on the ‘**Browse**’ button (pictured as an ellipsis ‘...’), to advance to the [Keyboard Application Data File] dialog box. Specify the required information.

Sending the Data to a Spreadsheet

Select this destination to have the data entered directly into the built-in spreadsheet program, known as the QuickSheet.

Sending the Data to the Monitor

When monitor is selected, the data transmitted from the instrument will be shown directly on the monitor. Unprintable ASCII characters are displayed within curly braces ({ }) as their decimal equivalents. For example, {13} would represent a carriage return.

Opening the Instrument

Once you have specified where to send the instrument data through the [Instrument Data Destination] dialog box (see Figure 4.3, Page 31), click on the ‘**OK**’ button located along the bottom of the dialog box. Doing so will confirm the ‘Destination’ details and open the instrument. A new window will open in **SWD-Collect** with that instrument’s name appearing at the top. Depending upon which destinations were specified, you will see either a blank window (Monitor selected) or a window that includes the spreadsheet (Spreadsheet selected), similar to the example shown in Figure 4.5.

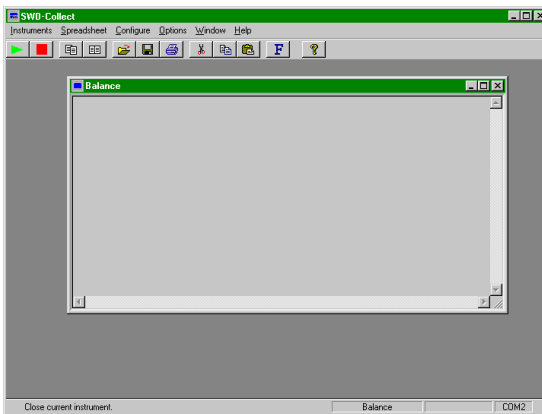


Figure 4.5: Spreadsheet

Note the additional menu options available across the top of the dialog box. Please refer to the section ‘*Using the Additional Options Available*’ on Page 38.

If you selected the Keyboard destination, then **SWD-Collect** will search your system for any running version of the specified Application, or of the program identified through the Command Line. If the application is already running, you will see a warning message. Clicking on the ‘**OK**’ button will open a new version of the application.

If there are no versions of the application running, then the Command Line is executed and the application is run. The specified data file will be opened automatically if one was specified.

In all cases you may see the data being collected immediately from the instrument and displayed in the chosen destination(s), or you may first have to press the *'Print'* or *'Send'* button on your instrument to actually transmit the data.

Opening Another Instrument

If you wish to open more than one instrument, simply follow the same procedure. Note that any devices which are already open will not appear on the list of instruments.

While the procedure for configuring instruments can be followed for an indefinite number of devices, **SWD-Collect** will permit data collection from up to 9 instruments at one time, provided you have up to 9 serial communications ports available. Since most computers have only 2 or 4 standard COM ports, additional ports must be added to your computer through an add-on board. The software will work with multi-port boards configured to work under your operating system.

SWD-Collecting to Other Applications

The procedure for opening one or more instruments is the same. The data from each instrument can be sent to any or all of the four destinations. One of these destinations is named Keyboard, which allows you to have data transferred to another **Windows**[®]-based application through the keyboard.

One Instrument to One Application

When specifying the Keyboard destination, it is necessary to follow a certain order to ensure the data is successfully transferred to another **Windows**[®]-based application. A simple case of sending data from one instrument into an application can be achieved through the following steps:

1. In **SWD-Collect**, open the instrument with Keyboard as one of the data destinations. The specified **Windows**[®]-based application

will be located or started, according to your entries in the [Instrument Data Destination] dialog box (see Figure 4.3, Page 31). The **SWD-Collect** Instrument and the Destination Application will be 'locked' together.

2. In the Destination Application, position the cursor or click on the location where the first data value is to go.
3. Start sending data into **SWD-Collect**. The instrument data will be sent to the Destination Application.

Multiple Instruments to Multiple Applications

A more complicated situation may arise when you would like data from more than one instrument to be sent to more than one application. For example, suppose you want data from two instruments to be saved in two separate **Windows**®-based spreadsheet applications. To do this, you simply repeat the above steps for One Instrument to One Application.

Sending Commands

If you do not see data immediately upon opening the instrument or after transmitting the data with the instrument's 'Print' or 'Send' button, you may need to prompt your instrument to transmit the data to the PC with one of the commands entered during the setup.

Please Note: If your instrument does not require commands, ensure you have correctly configured the instrument, and that you are using a cable certified by the instrument manufacturer).

1. Pull down the **I**nstruments menu from the top of the screen (see Figure 4.5, Page 34), and select the **C**ommand sub-menu item.
2. The commands that you entered for this instrument (see Figure 3.5, Page 24) will appear in the [Commands] dialog box, similar to the example shown in Figure 4.6 (see Page 37).

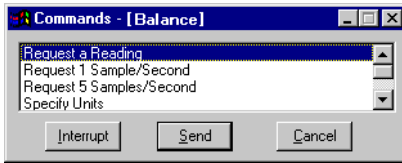


Figure 4.6: Commands dialog box

This dialog box remains open and ‘floats’ on top of all applications. You may close the [Commands] dialog box at any time by selecting the ‘*Cancel*’ button.

3. You may ‘*minimize*’ the Commands dialog to a button in the Taskbar by clicking on the button with a dash in the top right corner of the Commands box.
4. Please note that if you wish, you may have the [Commands] dialog box open automatically, each time you open this instrument, by selecting the **Options | AutoOpen Commands** menu item.
5. If you have opened an Instrument with the Keyboard destination, you will be able to switch to the Destination Application (using the **Windows® <Alt><Tab>** functionality makes this easier) and the [Commands] dialog box will ‘float’ on top of that application’s screen as well.
6. Click on the command that will prompt the instrument to transmit data, or carry out any other desired actions. If necessary, use the scroll bar to reveal your complete list of commands.
7. Click on the ‘*Send*’ button located along the bottom of the dialog box.

Interrupting a Command

Note there is also an ‘*Interrupt*’ button located along the bottom of [Commands] dialog box (see Figure 4.6) that you can click to stop **SWD-Collect** from sending commands to the instrument. For example, if you have set up a command to prompt the instrument to send data every 5000 milliseconds, you could use the ‘*Interrupt*’ button to stop this command. If data collection is occurring at a fast rate (multiple

readings per second), activating the *'Interrupt'* button may require more than one attempt.

Please Note: If the rate of data collection is occurring at a very fast rate, you may be unable to activate the *'Interrupt'* button. If this is the case, quickly press on the <Pause Break> key as many times as is necessary to terminate data collection. Use of the <Pause Break> key to halt data collection is only applicable when 'Keyboard Application' has been specified through the [Instrument Data Destination] dialog box (see Figure 4.3 Page 31).

Using the Additional Options Available

Once you have opened an instrument, you will notice additional menu options across the top of the **SWD-Collect** window. There are additional options under the **I**nstruments menu, and there are three new pull-down menus: **S**preadsheet, **O**ptions, and **W**indow. You may use these menus and options for each open instrument. Click on the open instrument to make it the active window, then pull down the desired menu and select the option.

Viewing the User Prompts

This option is the same as clicking on the *'User Info'* button in the [Setup Instruments] dialog box (see Figure 3.2, Page 20). The **U**ser **I**nfo option will reveal a list of User Prompts **only if you have specified a Parser** that includes User Prompts asking the operator to enter information. Prompt Values for an open instrument may be changed at any time.

Please refer to the section *'Displaying the User Prompts'* in Chapter 5 (see Pages 66-67).

Importing a File

This feature allows you to import an ASCII data file for **SWD-Collect** (Binary files can't be imported with this program).

1. Click on the open instrument to make it the active window
2. Pull down the **I**nstruments menu.
3. Select the **I**mport **F**ile sub-menu item. You will advance to the [Import File] dialog box, similar to the example shown in Figure 4.7.

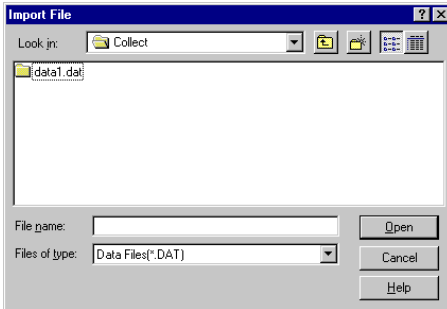


Figure 4.7: Importing a File

4. Specify the required information of the file to be imported.
5. Click on the '**OK**' button.

Viewing the Data Destination

1. Click on the open instrument to make it the active window
2. Pull down the **O**ptions menu.
3. Depending upon your selections for the Data Destination, the **V**iew**S**preadsheet and **V**iew**M**onitor options will have a check mark beside them if they were specified. Clicking on these options toggles the destination on or off. If you disable the destination, data will not be collected there.

If you turn off both of these destinations, the open instrument will be 'minimized' to an icon in the SWD-Collect window.

You must double-click on the icon to 'maximize' it. Remember, however, that the destinations were turned off and data was not collected in them. If you wish to 'minimize' an open instrument but continue to

collect data in the monitor and/or spreadsheet destinations, click on the button in the top left corner of the instrument window and select 'minimize' from the sub-menu. This is a standard **Windows**[®] feature.

AutoScrolling the Spreadsheet

This feature is used only when the Spreadsheet is specified as a destination.

1. Click on the open instrument to make it the active window
2. Pull down the **Options** menu.
3. Click on the **AutoScroll** sub-menu item to have a check mark appear beside the word **AutoScroll**.

This feature enables the spreadsheet to automatically scroll down as data is transmitted into it from your instrument, so that you can observe the entry of data. AutoScroll also causes data to be placed in the currently selected cell, so you may direct where the data values appear. The AutoScroll feature will be active every time this instrument is opened with the Spreadsheet as a destination, unless you switch it off again.

Click **AutoScroll** again to turn this feature off.

AutoStarting your Instrument

1. Click on the open instrument to make it the active window
2. Pull down the **Options** menu.
3. Click on the **AutoStart** sub-menu item to have a check mark appear beside the word **AutoStart**.

SWD-Collect will automatically open this instrument when you restart the program, with the current configuration and destinations. The AutoStart must be switched on for each instrument that you want to have opened automatically. Note that User Prompts will not be automatically requested when an instrument is AutoStarted.

Click **AutoStart** again to turn this feature off.

AutoLoading a Spreadsheet

This feature is used only when the Spreadsheet is selected as a destination.

1. Click on the open instrument to make it the active window.
2. Pull down the **Options** menu.
3. Click on the **AutoLoad** sub-menu item to have a check mark appear beside the word **AutoLoad**.

A *'Set Spreadsheet for Autoload'* dialog box will open, asking you to specify the drive, directory and file name for an existing spreadsheet. **SWD-Collect** will automatically load this spreadsheet every time you open the instrument. The AutoLoad must be switched on for each instrument that you want to have opened automatically.

Autoloading only supports the loading of spreadsheets in the native spreadsheet format (*.WSP).

When using 'AutoLoad', you must first click on the appropriate cell in the spreadsheet where the new data is to be entered, before you start data transmission from your instrument.

Click **AutoLoad** again to turn this feature off.

AutoOpening the Commands

1. Click on the open instrument to make it the active window
2. Pull down the **Options** menu.
3. Click on the AutoOpen Commands sub-menu item to have a check mark appear beside the **AutoOpen Commands** item.

SWD-Collect will automatically open the [Commands] dialog box (see Figure 4.6, Page 37) for this instrument every time you open the instrument.

Using the Spreadsheet Menu Options

Pulling down the **S**preadsheet menu provides options for use with the built-in spreadsheet. See Chapter 6 for complete details on using the spreadsheet.

Using Standard Windows® Options

1. Click on the open instrument to make it the active window
2. Pull down the **W**indow menu to see the available options.

These are standard options within the **Windows**® operating system. Please take note of the two special toolbar buttons that produce the same results as selecting the **C**ascade and **T**ile options.

Closing all Open Instruments

1. Click on the open instrument to make it the active window
2. Pull down the **W**indow menu.
3. From here, select the **C**lose **A**ll sub-menu item.

All the open instruments will be closed if you select this option. You will see a dialog box asking you to confirm closing each instrument.

Closing the Instrument

Data will be received and collected until you close an instrument.

To do this, click on the open instrument to make it the active window, then pull down the **I**nstruments menu bar and select **C**lose, or click on the '**C**lose' button from the toolbar. You may also press <SHIFT><PgUp>. The system will open a dialog box asking you to confirm closing the instrument.

Click the '**O**K' button to close the instrument, or click the '**C**ancel' button to continue collecting data with the open instrument.



Chapter **5** Setting up the Instrument Parser

In programming language the term ‘**to parse**’ means to break up a long string of data into individual data segments.

SWD-Collect will receive data until the specified *Number of Timeouts* occur. You indicate the *Timeout* duration and the *Number of Timeouts* in the Instrument Configuration, described in Chapter 3 (see Figure 3.3, Page 20). At this point the program will have a block of data from the instrument in memory. This block could be as simple as one number, or it could be many numbers and characters spread over several lines. Before the program can make use of this data it must break it up into smaller usable parts. That is to say, the program must ‘*parse*’ the data. Through the Instrument Parser Setup you can tell the program just how to break up the block of data into smaller parts. If no Parser is specified, the program will not modify the data.

NOTE: You will find it much easier to create the Parser in stages, checking your work as you progress by displaying the resulting data to the screen. You should first be familiar with opening your instrument and sending commands through **SWD-Collect**, so that you may check the Parsers in stages.

Basic Steps to Creating a Parser

There are two aspects to setting up a Parser.

1. You must tell the program how to recognize the data.
2. You must tell the program which components of the data to save and which components to discard.

Once the data is parsed correctly, you can add Macros — sequences of keystrokes and characters that are entered before or after the data. Macros are often used to add extra details to the data such as the date and time, or to make sure the data appears in a desired format.

Accessing the Parser Setup

1. Open your instrument (see Quick Start, Page 15 or Opening Instruments, Page 29) to see what the data that is transmitted from the instrument looks like. Write down some of the data you see for reference later, when you must decide what type of Parser to use. Also, you should consult the *User Manual* for your instrument to determine if the data is transmitted in a set format. Then Close the instrument.
2. Pull down the **C**onfigure Menu and select **I**nstrument to open the [Setup Instruments] dialog box, as seen in Figure 5.1.

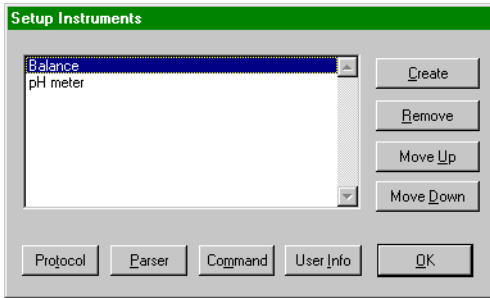


Figure 5.1: Setup Instruments dialog box

3. Highlight your instrument's name by clicking on it.
4. Click on the '*Parser*' button to set up a parser for the selected instrument. The [Instrument Parser Setup] dialog box will open, similar to the example shown in Figure 5.2 (see Page 45).

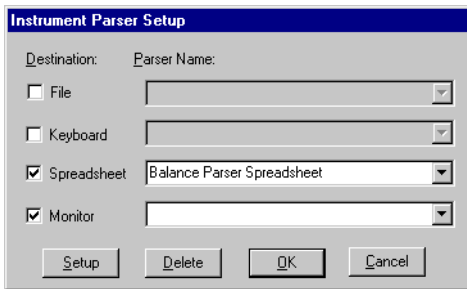


Figure 5.2: Instrument Parser Setup dialog box

Defining a Destination for Incoming Data

There are four possible destinations for incoming data; File; Spreadsheet; Keyboard; Monitor. Each is marked along the left side of the [Instrument Parser Setup] dialog box, seen in Figure 5.2.

Supplementary Notes on Defining a Destination

- An indicator appears in the check-box beside each destination name when you select it.
- You can select the destination either here or in the [Instrument Data Destination] dialog box when you actually open the instrument (see Figure 4.3, Page 31). Simply click on the destination name to insert or remove the indicator.
- All destinations have access to all previously defined Parsers.
- You are able to specify a different Parser for each destination, if necessary.
- At least one destination must be selected to create or modify a Parser.

Defining a Parser Name

Referring back to Figure 5.2 (see Page 45), a text box is located adjacent to each destination. Here is where the name of the Parser is entered.

1. When creating a new Parser, click in the text box to show the cursor, and enter a name for it.
2. When editing a Parser for an instrument that is currently open, simply click on the Parser Name to highlight it.
3. When editing an existing Parser for a closed instrument, click on the arrow to the right of this box to reveal your list of Parsers, then select the one to be changed.

Setting up the Parser

With a Parser Name highlighted in the [Instrument Parser Setup] dialog box (see Figure 5.2, Page 45), click on the '*Setup*' button located along the bottom of the box. You will advance to the [Parser Setup] dialog box, similar to the example shown in Figure 5.3.

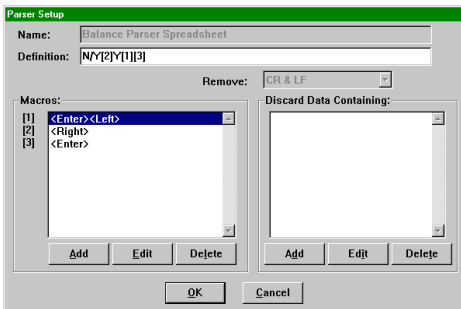


Figure 5.3: Parser Setup dialog box

Note the name of the Parser will appear dimmed in the top box. The name cannot be changed on this screen. The cursor will be flashing in the Definition text box.

Specifying the Parser

The Definition line is where you enter the actual Parser itself. The Parser always follows a particular format — it always begins with the **Parser Type**, then depending on the Type it includes details such as **Parser Selectors** and **Parser Positions**. The Parser Type, Selectors and Positions are separated by slashes '/'. Please refer to the section '*Designing a Parser*', later in this chapter (see Page 49).

You can also specify Macros on this line, which are identified within square brackets []. Please refer to the section '*Using Macros*', later in this chapter (see Page 58).

Removing the Carriage Return or Line Feed from the Data

The Remove field is active only when you specify a Delimiter type (D) parser in the Definition line. It allows you to specify whether the parser should automatically remove the carriage return (CR) and/or line feed (LF) characters from the data. The 'Remove' field has a drop-down list of four options: CR & LF; CR; LF or Nothing. When you have entered a "D" in the Definition Line, you are then able to select one of these four choices. The carriage return and/or line feed will be removed before the parser itself is carried out.

Defining Macros

When defining a Parser, you are able to create and specify Macros. A Macro is simply a sequence of keystrokes and characters. You can insert a Macro before or after each segment of data. Please refer to the section '*Using Macros*' later in this chapter (see Page 58).

It is also a good idea to complete the Parser first, and then add the Macros one at a time.

Discarding Data using Identifiers

This feature gives the ability to ignore certain data that contain strings sent from the instrument. For example, some instruments such as a balance will send special characters like 'T' or 'TA', along with a data

value, when being tarred. While a Parser Definition can be set up to isolate only numeric values, it won't make judgments based on accompanying characters and therefore the tare value would be treated as any other. But by telling **SWD-Collect** to discard data containing the string 'T' or 'TA', the decision is made by the Parser before the data can be isolated.

The key here is to know what strings are sent with the data from your instrument. The User's Manual for your instrument should help you determine these. If you know that certain strings consistently accompany the data you don't want to keep, you can specify these as identifiers for discarding data.

1. Click on the '**Add**' button located at the bottom of the area called 'Discard Data Containing:'. You'll see the [Discard] dialog box (see Figure 5.4), prompting you to "Enter the discardable data identifier text."

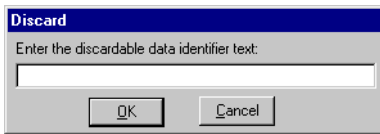


Figure 5.4: Enter the discardable data identifier text

2. Type in the text (up to 64 characters) that accompanies the data you want discarded. This entry is case sensitive.
3. Click on the '**OK**' button to save this string and it will be added to the list of identifiers.

You may **Add** as many identifiers as necessary, but the more you add, the slower the parser will be. Each identifier must be entered separately. You may also **Edit** or **Delete** entries.

Designing a Parser

When determining a parser solution for your data, it is best to first collect the instrument's raw data. This means collecting data without the use of any parser, following the procedures described in chapters 2 and 3 of this manual. Once you carefully examine the data in its raw format, a parser can easily be designed to handle the data.

Tips to follow when trying to designing a suitable Parser

1. Make your Parser in stages. After each change you make to the Parser, save the new configuration by clicking on the '**OK**' button in the [Instrument Parser Setup] dialog box (see Figure 5.2, Page 45).
2. Click the '**OK**' button in the [Setup Instruments] dialog box (see Figure 5.1, Page 44) to make your open instrument the active window again.
3. If necessary, send the appropriate command to prompt the instrument to begin transmitting data again.
4. Carefully look at the incoming data to verify that the change was correct.
5. Return to the [Parser Setup] dialog box (see Figure 5.3, Page 46) to make more changes, if necessary.
6. It is also a good idea to complete the Parser first, and then add the Macros one at a time.

Parser Types

The first step in designing a Parser is to select the Type. There are five different types of Parsers that specify how to break up the data that is transmitted to the computer. The types along with a description are presented in Table 5.1.

N	Numbers	Data is parsed on a numbers-only basis. All numbers are extracted from the data and only numbers are used. This type should be used for decimal numbers (i.e. "35.6"). Please note a 'number' is considered any continuous string of numeric digits, including decimals, and negative signs. When the program encounters any other character, the number is considered complete. (See Page 52 for examples).
C	Numbers	Data is parsed similarly to the N type, except the format of the numbers uses a comma (i.e. "35,6"), which is a common format in Europe. This type cannot be used for 'comma delimited' data. Please note a 'number' in this case is considered any continuous string of numeric characters, including commas, and negative signs. (See Page 52 for examples).
P	Position	Data is parsed based on position. This can be used where the data is always in the same position. (See Page 53 for examples).
S	Scales	For parsing data from scales operating in continuous send mode. The Scales Parser Type is specific to a particular Balance brand and model number. (See Pages 54-56 for examples).
D	Delimiter	Data is parsed based on a leading and trailing pair of delimiters. The delimiter may be a comma, a space (ASCII 32), or any other literal character or group of characters. (See Pages 56-57 for examples)

Table 5.1: Parser Types

Each Parser can have only one type selected. Therefore, the first character in a Parser must be a **N**, **C**, **P**, **S**, or a **D**, followed by a slash “/”. Most balances and similar instruments can use a simple Numbers parser and should be fairly straightforward to work with.

Each Parse Type along with relevant examples is described in a corresponding section within this chapter.

Parser Syntax

Each type of parser also has its own syntax, as shown in the following:

- **N/SELECTOR/COMMENT**
- **C/SELECTOR/COMMENT**
- **P/POSITIONS/COMMENT**
- **S/DATA FORMAT/MACRO/TOLERANCE/COMMENT**
- **D/DELIMITER/SELECTOR/COMMENT**

The COMMENT is the only part of the Parser Syntax that is optional. All other components must be specified. The Parser Definition can hold up to 200 characters representing up to 500 Parser components, including Y or N values and macros.

Parser Selector

The Numbers and Delimiter types of Parsers are not very selective in defining what data is to be kept. The Delimiter type defines all of the data, while the Numbers types will extract all the numbers. Please recall that a ‘number’ is considered any continuous string of numeric characters, including the decimal (N Type) or comma (C Type). The Selector in the Parser allows you to specify the data that is saved.

The Selector is a list of Ys and Ns, such as /YYNNY. A Y(es) instructs the program to keep the data, and an N(o) means do NOT keep the data. In this example, the first, second and fifth ‘data values’ will be saved. The third and fourth will be ignored.

Several short forms can be used for repeating sequences in the Selector.

Examples:

N/NNNYYYYYYYNN can be written as:
N/3N7Y2N

D/{32}/YYYYNYNYN can be written as:
D/{32}/4Y3(NY)

N/Y[1]Y[1]Y[1]Y[1]Y[2] can be written as:
N/4(Y[1])Y[2]

Parser Comment

The Parser Comment can be a brief statement describing what the Parser does. The length allowed for the comment will depend on the amount of space available on the Parser Definition line after the other Parser components have been specified. The Parser Comment can consist of any alphanumeric characters except the forward slash (i.e., ‘/’).

Choosing a Suitable Parser Type

Using the Numbers Parser Type

Select the N or C types if only numbers are required from the data. This is the easiest Type to use, and the following is the syntax for such a parser setup:

N/SELECTOR/COMMENT
C/SELECTOR/COMMENT

The Parser will be an ‘N’ or ‘C’ followed by a slash ‘/’. This is followed by a series of Ys and Ns to indicate which numbers are to be saved. Again, please recall that a ‘number’ is considered any continuous string of numeric characters, including the decimal (N Type) or comma (C Type). So a number can be a single digit or several numeric characters.

Example 1: N/Y/keep weight

As a simple example, suppose that you collect the following data from your balance:

193.67 mg

The Numbers Parser ‘**N/Y/keep weight**’ will parse the data so that the number is saved (23.5) and the units (mg) are ignored.

Example 2: N/YNYY/no units
C/YNYY/comment (The ‘C’ Type is for numbers in comma format, common in Europe, such as “35,6”.)

As a more complicated example, suppose that your instrument transmits a line with the following 4 data values:

23.5 units,0.7 units,27.6 units,25.6 units

The Numbers Parser ‘**N/YNYY/no units**’ would parse the data so that

the first number is saved (23.5), the second is ignored (0.7), and then the third (27.6) and fourth (25.6) are kept. The ‘units’ appearing after each number are always ignored.

Later in this chapter, you will see how to use **Macros** to organize the data in the specified destination (see Page 58). For example, between each selector in the above Numbers Parser you might place a Macro to ‘press’ the <Enter> key so that each number appears on a new line.

Using the Position Parser Type

Many instruments generate data that is always in the same position. For example, a balance may always have the weight in positions 1 to 7 and the unit always in positions 9-10.

If the data is always in the same position, a Parser Type of Position (P) can be used. The following is the syntax for such a parser setup:

P/POSITIONS/COMMENT

This Parser consists of a ‘P’ followed by a ‘/’. This is followed by the positions that are to be saved. The Position is a sequence of number ranges separated by commas.

Example 1: P/1-7/comment

Suppose that you collect the following data from your balance:

0193.67 mg

The example Parser ‘**P/1-7/comment**’ will extract data in positions 1 to 7.

Example 2: P/12-15,6-6,5-9/Comment

Now suppose that you collect the following data from your instrument:

READ4T-mg//23.5

The positions indicated in the above Parser are 12 to 15, 6 to 6, and 5 to 9.

The numbers here represent the positions in the data string that contain

the required values. Each sequence must state a start and end position. In the example, the first data value consists of characters in positions 12 to 15 inclusive (23.5). The second data value consists of one character in position 6 (T). And the third consists of characters in position 5,6,7,8 and 9 (4T-mg).

You can arrange the position numbers in any order (see how the 6-6 is listed after the 12-15 in the example). As the data is transferred it will be processed in the order listed.

If necessary, you can use a position more than once. The above example uses position 6 in both ranges 6-6 and 5-9. Only list those positions which contain data that is to be saved. In the above example data in positions 1-4 and 10-11 are not required and therefore are not listed.

Using the Scales Parser Type

If your instrument is a scale that transmits data in ‘continuous send mode’, the Scales Type (S) Parser can be used. Please note this type is rarely used, as it is specifically tailored to one brand of balances. The following is the syntax for such a parser setup:

S/DATA FORMAT/MACRO/TOLERANCE/COMMENT

Example: S/1/[1][2]/0.35

A scale that transmits data in ‘continuous send mode’ will generate continuous data values that will arrive at **SWD-Collect** as one long string. The program needs some way to determine which data values are to be kept. Scales follow certain standard formats when transmitting the data, and you can specify a Scales type parser to match the data format from your scale. Currently, three formats are handled by **SWD-Collect**:

```
S/1:    HH,—data—UUU<CR><LF>
S/2:    HH,U,—data—<CR><LF>
S/3:    HH_—data—_U...U<CR><LF>
```

where **HH** is the header sent by the instrument (e.g. ST, WT, QT, S_) when it has a stable value;

UUU, U, or U...U is the units of measurement (e.g. g, lb.);
 and —data— is the weight reading.

The S/1, S/2 or S/3 appear as the first two components in a Scales Parser (S/DATA FORMAT). The data sent from your scale must match one of these formats. If your scale is capable of sending additional information such as an ID number, turn these features off, if you can, when using **SWD-Collect**.

SWD-Collect follows three steps when parsing the data with a Scales Parser:

1. First, **SWD-Collect** looks for the header (HH) to determine if the reading is stable.
2. Second, the program compares the stable reading with the ‘tolerance level’ that you specify. You probably don’t want **SWD-Collect** to keep every stable value that is transmitted from the scale, so you need to tell the program what the ‘tolerance level’ is. The tolerance level is the minimum value that you expect for a stable reading. **SWD-Collect** will ignore all the transmitted data values between 0 and this number (positive and negative), and save the first stable value outside this range. The tolerance level is specified at the end of the Parser.

For example, if you set the tolerance level at (+/-) 0.35, **SWD-Collect** will not keep the “stable” zero reading that is continuously sent from the scale when nothing is being weighed. When you do put something on the scale, **SWD-Collect** will wait for the first stable reading above 0.35, and then keep it.

3. Thirdly, **SWD-Collect** looks for the next stable value within the range set by the tolerance level that you specify. While it won’t keep this value, the program will recognize that the scale has returned to ‘zero’ and will begin again at step 1. So if you set the tolerance level at (+/-) 0.35, the next stable value within the range -0.35 to +0.35 will be recognized but not kept.

The following is an example of a Scales Parser setup:

Example: **S/1/[1][2]/0.35**

Macro	[1]	<Header><Right><Data><Right><Units>
	[2]	<Enter>

Please note the ‘tolerance level’ of 0.35 as the last component of the Parser.

You will also notice that the Macros [1] and [2] are included in the Parser. Please refer to the section on Using Macros for further details on creating Macros and adding them to a Parser. The <Header>, <Data> and <Units> components of Macro [1] are selected from the list of **Special Functions** (at the bottom) in the [Define Macro] dialog box. These will extract the header (HH), weight reading (—data—), and units (UUU) respectively. Once **SWD-Collect** has determined a stable value is to be kept, this Macro will extract the necessary details from the data string.

You must at least include one Macro that includes the <Data> Special Function in order to extract a weight reading.

Using the Delimiter Parser Type

If none of the above Parser Types are suitable for the data from your instrument, you may need to use the Delimiter Type (D). A DELIMITER is a computer term for any character that separates units of data. The comma and the space are common delimiters.

Look at the data and see if some unique characters can be found between the data that is required. These could be any characters except the forward slash ‘/’. The comma and the space are common separators, but even words can be used provided that none of the letters in the word are also part of the required data.

The following is the syntax for such a parser setup:

D/DELIMITER/SELECTOR/COMMENT

The ‘D’ Parser consists of a list of the valid ‘delimiters’, followed by a list of Y’s and N’s (selectors) to indicate the data that is to be saved. In

this case the data will be whatever string of characters appears

Example: **D/{32},/YNNNYNYN/COMMENT**

In this example, the delimiters are a space (ASCII 32) and a comma. If either of these characters are encountered in the data string, the program knows that one segment of data ends and another one starts. Suppose your instrument transmits a string of data as follows:

23.5 units,0.7 units,27.6 units,25.6 units

The Delimiter Parser '**D/{32},/YNNNYNYN/COMMENT**' would identify 8 segments of data but only save the first, fifth and seventh - the numbers "23.5", "27.6" and "25.6". The second number ("0.7") and all units are ignored.

If several of these delimiters occur in sequence one after the other, the program will treat each as a separate delimiter. For example, in the string "45,,67" the second element is a blank because there is nothing between the two commas. A blank will be transferred as the data for the second element, along with any associated Macros.

You can list as many delimiters as you wish. If they are standard printable (**keyboard**) characters, simply list them in the Parser (i.e. D/.g+#/YYNN/comment). If they are not printable characters, you must list them in the form of an ASCII character enclosed in {} brackets, such as {32} for a file that is 'space delimited'.

Please note that the carriage return (ASCII 13) and line feed (ASCII 10) are not recognized as delimiters by the program. If your data string is long and consists of more than one line (i.e., it has a <LF> <CR> in the middle of the data), then you are able to remove these characters with the **Remove** field described earlier.

If the data cannot be parsed with any of these Types, contact the OMEGA Customer Service Department. Other programs are available with much more powerful Parsers.

Using Macros

When defining a Parser, you are able to create and specify Macros. A Macro is simply a sequence of keystrokes and characters. You can insert a Macro before or after each segment of data.

Please note that the use of Macros is optional. Use them only when and where they are required. As an example, consider getting several weight measurements from a balance and adding these to a spreadsheet. The weights can go into column A, starting at A1.

The Parser will isolate the weight from the rest of the data sent by the balance. The weight will then be sent to the cursor position in the spreadsheet so that it will be displayed in cell A1.

A problem occurs when the second weight arrives, however. It will also go into cell A1 since no one has pressed <ENTER> to move the cursor to cell A2. The Macros are used to automatically press <ENTER> for you between each weight. All you have to do is define one of the Macros as the <ENTER> key and then insert it into the Parser after the weight.

Such a modified Parser will then add an <ENTER> key to the end of each weight as it is being sent to the active **Windows**[®]-based application.

Any key or combination of keys can be specified as part of a Macro. The Macro can be inserted in front of or after each segment of data.

Defining a Macro

A Macro has to be defined in order for it to do anything in the Parser. In the [Parser Setup] dialog box there is an area for listing Macros that are defined exclusively for that Parser. These are listed by numbers contained within square brackets, such as [1], [2] etc.

1. If this is the first Macro for the Parser, the list should be blank and the top line opposite [1] should be highlighted. Simply click on the '*Edit*' button located below the 'Macros' box on the [Parser Setup] dialog box (see Figure 5.3, Page 46). This will open the [Define Macro] dialog box, as seen in Figure 5.5 (see Page 59).

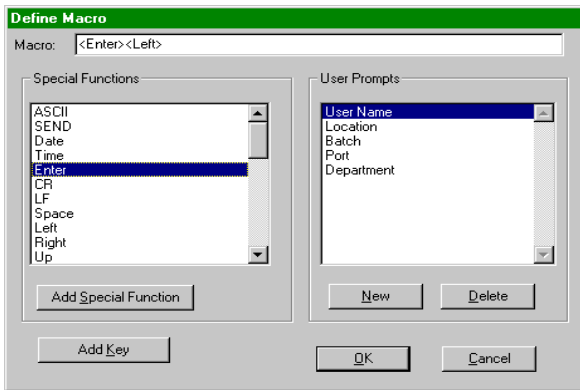


Figure 5.5: Define Macro dialog box

2. If you are adding new Macros after defining the first one [1], click on the '**Add**' button located below the 'Macros' box on the [Parser Setup] dialog box (see Figure 5.3, Page 46) to add as many new numbers in the margin as are required.
3. Click inside the box opposite a Macro number to highlight that line (see Figure 5.3, Page 46), then click on the '**Edit**' button to open the [Define Macro] dialog box, shown in Figure 5.5.
4. If you are editing Macros that have already been created, highlight the line with that Macro and click on the '**Edit**' button located below the 'Macros' box on the [Parser Setup] dialog box (see Figure 5.3, Page 46). This will open the [Define Macro] dialog box. Please refer to Figure 5.5.

The cursor will be flashing in the Macro text box at the top. You can define the macro with up to 125 characters. Although unlikely, if the macro is to be larger than this, you can simply define another macro and place them side by side in the Parser. (See '**Adding a Macro to a Parser**', Page 64). There are three types of entries that can be used in the Macro: Keyboard Characters, Special Functions and ASCII Characters.

Including Keyboard Characters in the Macro

A keyboard character is any character that you can enter directly from the keyboard. It includes all of the numbers, letters, and punctuation keys. If you want to enter function keys or other special keys such as <CTRL> and <ALT>, place the cursor in the correct position in the Macro, then click on the ‘*Add Key*’ button. You will see the [Macro Keys] dialog box, as shown in Figure 5.6.

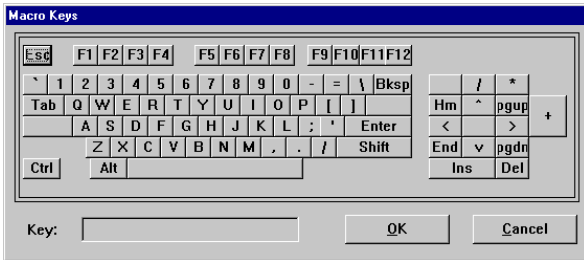


Figure 5.6: Macro Keys dialog box

1. Click on any key that you want to include in the Macro. Certain special keys will only appear if they are combined with a second letter. For example, if you wanted to add <ALT><F7> to the Macro, first click on the <ALT> key, then on the <F7> key. Your selection will appear dimmed in the text box beside Key: at the bottom of the dialog box.
2. Click the ‘*OK*’ button. You will see the [Define Macro] dialog box again (see Figure 5.5, Page 59), and your key selection will be added to the Macro. For example, you will see <Alt F7>.

As described, certain keys such as the <Alt> key will appear in the [Macro Keys] dialog box only if they are combined with a second one. However, the second component will occasionally get ‘lost’ during parsing. For example, clicking on the <Alt> key and the <F> key will insert the combination <Alt F> in the Key: box. But in this case, the “F” will occasionally be lost when the data is parsed and the macro is applied.

To be certain that this second component does not get lost, please follow these steps:

- a) Go to the new macro keys that have been added to the macro. For example, go to the <Alt F>.
- b) Delete the second component by placing the cursor before it and pressing the <Delete> key. For the <Alt F> example, you would place the vertical cursor immediately left of the “F” and press the <Delete> key once.
- c) Ensure that you leave a space between the first component and the right “>” bracket. For example, <Alt > and NOT <Alt>.
- d) Re-type the deleted second component immediately to the right of the “>” bracket. For example, <Alt >F.

This correction will ensure that the macro works properly.

Including ‘Special Functions’ in the Macro

Certain Keyboard Characters cannot actually be typed into the Macro because they control the cursor and other functions. These include the cursor arrow keys, <ESC>, <ENTER>, <F1>, <HOME> and <END>.

These characters instead can be selected from the list of 37 Special Functions, on the left side of the [Define Macro] dialog box (see Figure 5.5, Page 59).

To add one of these characters to the Macro, do one of the following:

1. Double-click on the Special Function or highlight it and press <ENTER>. You will see the selected character(s) appear in the Macro definition box, within <> brackets.
2. Highlight the Special Function. Click on the ‘**Add Special Function**’ button. You will see the selected character(s) appear in the Macro definition box, within <> brackets.

Use the scroll bar to see the complete list of Special Functions. Most are simply non-printable key strokes. But some Special Functions carry out some tasks, including date and time stamping, which will automatically insert particulars for the date and/or time with the data.

Other functions that may be inserted include:

1. The *Cumulative Time*, which records the time that has elapsed since the instrument was opened (in minutes, seconds or milliseconds).
2. A *Serial Number* that assigns a unique number to each data value. This numbering is continuous; starting at zero when **SWD-Collect** is first installed and increasing by one for each data value that is parsed with this Special Function.
3. A *Counter*, which simply assigns a number to each data value starting at zero each time the instrument is opened.
4. *Send*, which opens a [Send] dialog box when you add it to the Macro like the one shown here. You may enter any text, up to 64 characters, to be sent to the instrument. ASCII characters may be entered within curly brackets {}.
5. *Data, Header, and Units*, all for use in conjunction with the Scales Type Parser.
6. *Beep*, which causes the computer to beep. This could be used to audibly indicate when data is parsed.

All entries can be used in any order and you can place any characters between the entries.

For example, if you wanted the Date to be ‘stamped’ with the data going into a spreadsheet application, you first position the cursor in the Define Macro text box. You could type “DATE:” to have this heading appear with the date stamp. Then you would scroll down through the Special Functions list and double-click on <Right> to have **SWD-Collect** press the right arrow key, to move to the next cell. Next you would double-click on <Date> to include it in the Macro, and double-click on <Right> again to press the right arrow key following the date.

The <Date> Special Function will stamp the date in the format set up in your **Windows®** Control Panel.

Including ASCII Characters in the Macro

One of the entries on the Special Functions list can be used to enter ASCII characters. To enter an ASCII character in your Macro, follow these steps:

1. Position the cursor in the correct position in your Macro definition.
2. Double-click on *ASCII* from the Special Functions list, and you will see an [ASCII Value] dialog box, similar to the example shown in Figure 5.7.

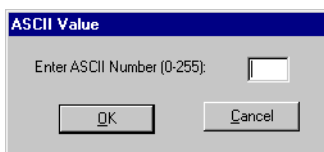


Figure 5.7: ASCII Value dialog box

3. Enter the desired ASCII Number, between 0-255. For a list of ASCII Numbers, see Appendix A at the end of this manual.
4. Click the '**OK**' button. The ASCII code will appear in the Macro within triangular brackets, such as <ASCII 32>.

Including User Prompts in the Macro

User prompts will prompt the operator to enter information at the time the instrument is opened. These are inserted into the Macro definition. For example, you could add the operator's name, the type of sample being measured, or the batch number.

To use this feature, you must first define a User Prompt.

1. Click the '**New**' button located below the User Prompts: box in the [Define Macro] dialog box (see Figure 5.5, Page 59). The [New User Prompt] dialog box will appear as shown in Figure 5.8 (see Page 64).

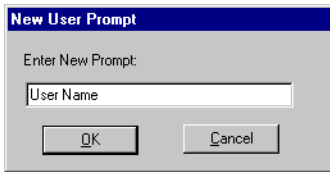


Figure 5.8: New User Prompt dialog box

2. Enter the new prompt, which will ask the operator for specific information. For example, you could have ‘Operator’s Name’ as the prompt.
3. Click on the ‘**OK**’ button. The prompt will appear on the list of User Prompts.
4. Position the cursor in the Macro definition where you want the prompt to appear.
5. Double-click on the User Prompt to include it in the Macro.

This now allows you to click on the ‘**User Info**’ button on the [Setup Instruments] dialog box (see Figure 5.1, Page 44) to specify a pre-set value for the User Prompts (see Figure 5.9, Page 66). You must <OK> out of the [User Prompts] dialog box, and repeat this procedure (i.e., click on the ‘**User Info**’ button) to add an additional pre-set value . Repeat this action for any supplementary entries.

When you have completed defining the Macro, click on the ‘**OK**’ button to return to the [Parser Setup] dialog box (see Figure 5.3, Page 46). The Macro will appear on the list of Macros.

Adding a Macro to a Parser

Macros are used by adding them to the Parser. A Macro is identified by placing the Macro number inside square [] brackets. They can then be inserted as illustrated in the following examples.

Examples:

```

P/[1],1-7,[3]
D/,/Y[2]Y[2]
P/12-15,6-6,[4],5-9
D/,{32}/[5][4][1]YNY Y
N/[1]Y[2]N[3]Y[4]

```

The first Parser has two Macros, the [1] and the [3]. The Macro [1] will be added before the data (1-7) and the Macro [3] will be added at the end of the data. In this example, the Macro [1] could add a format character so that the data is formatted correctly. The Macro [3] could be an <ENTER> to position the cursor on the next line, ready for the next data point.

Macros can be used as frequently as required, and the same Macro can be used several times as illustrated in the second Parser example. This example could also be rewritten as D/,/2(Y[2])

Several Macros can also be linked together forming one large Macro as shown in the fourth example. The [5][4][1] acts as one large Macro since the program will perform one after the other.

Removing Macros from a Parser

From the [Parser Setup] dialog box (see Figure 5.3, Page 46), position the cursor before the Macro in the Definition text box and press the <Delete> key to delete the square brackets as well as the Macro number.

To delete the contents of an established Macro, highlight it and click on the '*Delete*' button. Note that the number reference of the Macro remains displayed.

Displaying the User Prompts

In the [Setup Instruments] dialog box you will see the ‘*User Info*’ button. The ‘*User Info*’ button will reveal a list of User Prompts only if you have specified a Parser that includes User Prompts asking the operator to enter information. Selecting this button allows you to enter Prompt Values for responding to the user prompts when the instrument is opened.

Once you have created a Parser for the instrument that includes User Prompts, you can click on the ‘*User Info*’ button in the [Setup Instruments] dialog box (see Figure 5.1, Page 44) to see the [User Prompts] dialog box, similar to the sample shown in Figure 5.9.



Figure 5.9: User Prompts dialog box

On the left side are the User Prompts defined within the Macro. You should enter the appropriate Prompt Value on the right side of the dialog box.

1. Click on the cell that is opposite to the User Prompt.
2. Click on the ‘down arrow’ to reveal a list of any previously entered Prompt Values.
3. Click on the appropriate value to select it.
4. If the appropriate response is not listed, double-click on the cell and type in your response to the prompt. For example, if the prompt asks for the Operator’s Name, you would enter your name.

- Click on the **'OK'** button to save the User Info details, and you will see the [Setup Instruments] dialog box (Figure 5.1, Page 44) again.

Using What We have Learned so far

This Parser Setup example illustrates the use of Parsers, Macros and User Prompts. The example shown in Figure 5.10 could be used to add data from an instrument such as a balance into the built-in QuickSheet.

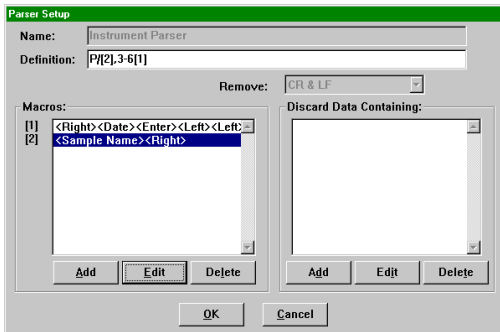


Figure 5.10: Example of a Parser Setup

The **P** in the Parser indicates that the data is parsed by Position. The characters in positions 3 to 6 will be saved. Macro number **[2]** is inserted before the data and Macro **[1]** is inserted after the data.

Macro **[2]** consists of the User Prompt **<SAMPLE NAME>**, followed by a right arrow key. Macro **[1]** consists of a right arrow key, a Date stamp, and the Enter Key followed by two left cursor keys.

The resulting spreadsheet would appear similar that shown in Figure 5.11 (see Page 68).

The screenshot shows a window titled "SWD-Collect" with a menu bar (Instruments, Spreadsheet, Configure, Options, Window, Help) and a toolbar. Below the toolbar is a spreadsheet window titled "Balance" with columns A through G. The spreadsheet contains three rows of data:

	A	B	C	D	E	F	G
1	Nerve Tissue	32.5	1999/04/01				
2	Nerve Tissue	34.6	1999/04/01				
3	Nerve Tissue	31.5	1999/04/01				
4							
5							
6							
7							
8							
9							
10							
11							
12							

At the bottom of the window, there is a status bar with the text "Insert data from the Clipboard at the cursor position." and two buttons labeled "Balance" and "COM2".

Figure 5.11: Example of the resulting spreadsheet

When the instrument is opened, Macro [2] prompts the operator to enter the <Sample Name>, such as 'Nerve Tissue'. The Macro enters this into the spreadsheet in column A, and presses the right arrow key to allow data to be entered into column B. Macro[1] presses the right cursor key after the data has been entered, then enters the Date stamp in column C. The Macro then presses enter to move to row 2, and two left arrow keys to return to column A for the next value to be transmitted.



Chapter **6** The SWD-Collect Spreadsheet

One of the possible destinations for data that is collected is the built-in spreadsheet, known as the '*QuickSheet*'. This chapter can be read as a separate reference for using the Spreadsheet.

Spreadsheet Basics

When opening an instrument, select 'Spreadsheet' as one of the destinations. **SWD-Collect** will open a new spreadsheet, and the data from your instrument can be entered directly into it. You may save the data within the spreadsheet as a separate spreadsheet file, which you may also open at another time to add more data to it. Please read this Chapter for complete details.

The spreadsheet is a grid of 400 rows and 26 columns. Each *cell* is the intersection of a row and a column and it has a unique address, or *reference*. For example, the cell where column B and row 5 intersect is cell B5. You use cell references when you write formulas or refer to cells.

Generally, you first *select* the cell or cells you want to work with, and then you enter data or choose a command. Selected cells appear highlighted on your screen. The *active cell* is the cell in which data is entered when you start typing. Only one cell is active at a time. The active cell is shown by a heavy border.

Using the Menu Commands

Menu commands pertaining to the Spreadsheet are grouped into the **Spreadsheet** Menu on the menu bar across the top. Pull down this menu to see the available menu options and to make your selections.

Using the Toolbar Buttons

To choose a toolbar button, click it. Using these buttons requires a mouse. Placing the mouse cursor on a toolbar button will cause the program to display a help line, at the bottom of the window, which explains the function of the toolbar.

Choosing Commands

There is usually more than one method to achieve the same result. For example, there are several equivalent ways to copy data. Choose the method that suits you best.

Remember you must select the cells or objects you want to work with before choosing most commands.

Selecting Cells

Selections are always rectangular blocks of cells.

To select:	Do the following:
A single cell	Click on it. The cell will be highlighted with a heavy border.
A range of cells	Position the mouse pointer over the first cell, then hold down the left mouse button and drag diagonally from the first cell to the last cell. Release the mouse button, and the range will be highlighted.
An entire row	Click the row heading.
An entire column	Click the column heading.
The entire spreadsheet	Click on the square button that is above row 1 and to the left of column A.

Moving Around in a Spreadsheet

Use:	To Move:
Arrow keys	up, down, left, right one cell
<PAGE UP> or <PAGE DOWN>	up or down one window
<HOME>	to the beginning of the current row
<END>	in the current row, to the last column containing data
<CTRL> + <HOME>	to the top left corner of the spreadsheet
<CTRL> + <END>	to the bottom row of the last column containing data in the spreadsheet
<TAB>	to the next cell in the same row
<Shift> + <TAB>	to the previous cell in the same row

Scrolling Through the Spreadsheet

Action	Move the pointer to the down arrow in the vertical scroll bar on the right edge of the window, and then click the right mouse button.
Result	The spreadsheet scrolls down one row.
Action	Click the scroll bar area below the scroll box.
Result	The spreadsheet scrolls down one screen.
Action	Move the pointer into the scroll box. Hold the mouse button down, move the pointer back to the top of the vertical scroll bar, and then release the mouse button. This is called dragging .
Result	The spreadsheet scrolls back up to the first row.

Loading a Spreadsheet

To load a spreadsheet that you have previously saved, do one of the following.

1. Pull down the **S**preadsheet Menu.
2. Select **L**oad.

or



1. Click on the '**L**oad' button, shown in the margin.

In either case, you will advance to the [Load Spreadsheet] dialog box, similar to the example shown in Figure 6.1.

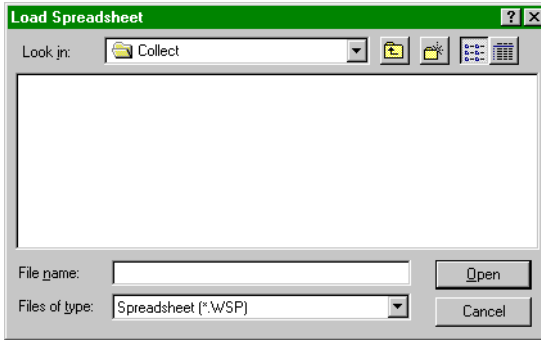


Figure 6.1: Specify the file to load

Specify the required information to load a spreadsheet.

Click the '**OK**' button to load the desired spreadsheet.

Saving a Spreadsheet

To save a spreadsheet, do one of the following:

1. Pull down the **S**preadsheet menu.
2. Select **S**ave.

or

3. Click on the '**S**ave' button, shown in the margin.

In either case, if you haven't saved the spreadsheet previously, or if you opened it as read-only, the [Save as] dialog box appears, similar to the example shown in Figure 6.2 (see Page 73).

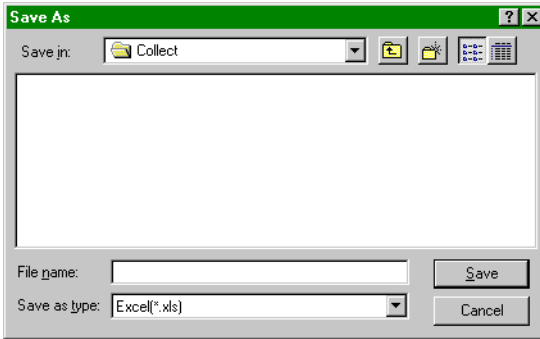


Figure 6.2: Saving a spreadsheet

Here you can specify the required information for saving the spreadsheet. Please note the *'Save as Type'* box at the bottom. Here you can specify whether to save the spreadsheet as a Spreadsheet File (*.WSP), an Excel File (*.XLS) or a Text File (*.TXT).

Click the *'OK'* button to complete this process.

Formatting the Spreadsheet

1. Pull down the **S**preadsheet menu.
2. Select **F**ormat. A list of sub-menu items is available allowing you to format the cell contents.

Menu Option	Description
A lign	Allows you to specify the format of the cell contents to be aligned Left, Center, or Right.
I ncrease Decimals	Increases the number of decimals displayed by one.
D ecrease Decimals	Decreases the number of decimals displayed by one.
S et Decimals	Allows you to choose the number of decimals from a list.
T ext	Allows you to specify that the entry in a cell is Text.
F loat	Allows you to specify that the entry in a cell is Float.

Making Entries in the Spreadsheet

There are two basic kinds of entries in a spreadsheet: **constant values** and **formulas**. When a cell is highlighted, you can make any type of entry in it.

A **constant value** is data that you type directly into a cell. It can be a numeric value, called 'Float' (Real Numbers or Integers), or it can be Text such as a date, time, currency, or percentage. Constant values do not change unless you select the cell and edit the value yourself.

As you make your entry, the program will automatically determine if it is either a Text type or Float type entry:

- If you enter numbers with or without decimal places, it will be considered a **Float** type entry.
- If you type any characters other than numbers in a cell, it will automatically be a **Text** type entry.

A **formula** is a sequence of values, cell references, names, functions, or operators that produces a new value from existing values. Formulas always begin with an equal sign (=), and the program recognizes automatically when a formula is entered. A value that is produced as the result of a formula can change when other values in the spreadsheet change.

To change the type of entry, follow these steps:

1. Select the cell or range of cells to be changed.
2. Pull down the **S**preadsheet menu.
3. Select the **F**ormat sub-menu.
4. Make your selection from either **T**ext or **F**loat.

Displayed Value vs. Stored Value

The number you see in a cell is based on the cell number format and may differ from the number stored. For example, if a cell is formatted to display only two decimal places and you type 26.006 in that cell, the spreadsheet displays 26.01. The stored number is used for calculations, no matter how it is displayed on the screen.

To see the stored number in a cell, double-click on that cell. The stored number will be shown highlighted.

Copying and Moving Cells in the Spreadsheet

1. Pull down the **S**preadsheet menu.
2. Select **E**dit. A list of sub-menu items becomes available.

Please Note: Before using any of the sub-menu options, select the cells that will be affected by the menu option.

Copying and moving cells can be performed by a combination of the **C**ut, **C**opy and **P**aste sub-menu options.

Menu Option	Description
C ut	Removes the selected characters from the cell and places them on the Clipboard. Pressing <Shift><Delete> will also perform this function.
C opy	Makes a copy of the selected characters and places them on the Clipboard. Pressing <Ctrl><Insert> will also perform this function.
P aste	Places the contents of the Clipboard in a cell at the insertion point. Pressing <Shift><Insert> will also perform this function.

Filling a Series of Cells

1. Pull down the **S**preadsheet menu.
2. Select **E**dit.
3. From here, select the **F**ill sub-menu item. This will advance you to the [Fill Cell] dialog box, similar to the example shown in Figure 6.3 (see Page 76).

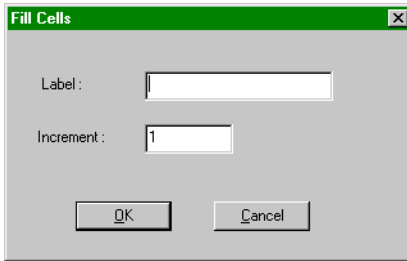


Figure 6.3: Fill Cell dialog box

The Fill options allows you to fill a series of cells with a single entry. The entered value can be specified as well as an increment value. The latter will increment numeric entries. This option is very useful for entering sequential sample IDs. If cells already contain information, the filling process will skip over these cells and not increment the counter for these cells.

Clearing the Spreadsheet

1. Pull down the **S**preadsheet menu.
2. Select **E**dit.
3. From here, click on **C**lear to remove the contents of the entire cell, or delete selected characters (highlighted) from the cell. Select the **C**lear **A**ll sub-menu item to clear the entire spreadsheet.

Setting Fonts in a Spreadsheet

To set the fonts on a spreadsheet, do one of the following.

1. Pull down the **S**preadsheet menu.
2. Select **F**ont.

or



1. Click on the '**Font**' button, shown in the margin.

In either case, you will advance to the [Font] dialog box.

From here you can set the font, font style, size, effects and color of each cell.

Printing a Spreadsheet

To print a spreadsheet, do one of the following.

1. Pull down the **S**preadsheet menu.
2. Select **P**rint.

or



1. Click on the '**P**rint' button, shown in the margin.

In either case, you will advance to the [Print Options] dialog box, similar to the example shown in Figure 6.4.

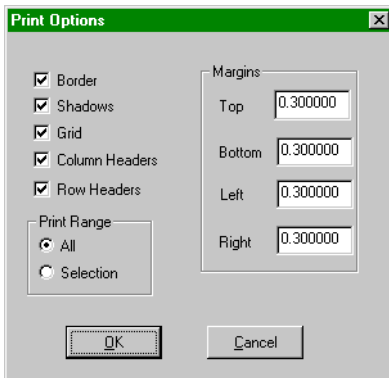


Figure 6.4: Printing a spreadsheet

Defining the Print Options

Figure 6.4 presents a variety of options related to the spreadsheet printout.

Printing Option	Description
Border	Click on this check box to print the spreadsheet border.
Shadows	Click on this check box to print any colored areas with shading.
Grid	Click on this check box to print the vertical and horizontal lines of the spreadsheet.
Column Headers	Click on this check box to print the column labels.
Row Headers	Click on this check box to print the row labels.
Print Range	Click on the radio button (All or Selection) to specify the range to be printed.
Margins	You can specify the margins by entering a number, in inches, in the Margin box (e.g., Top, Bottom, Left, Right).

Previewing the Print

1. Pull down the **S**preadsheet menu.
2. Select **P**rint **P**review. This will advance you to the [Print Preview] dialog box, similar to the example shown in Figure 6.5.

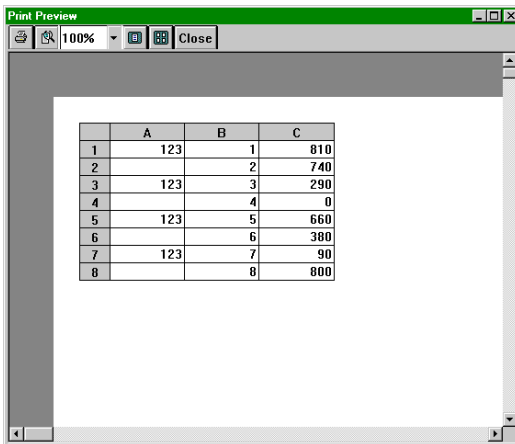


Figure 6.5: Print Preview dialog box

Enhanced Spreadsheet Features

Using Formulas to Analyze Your Data

Using a formula can help you analyze data on a spreadsheet. With a formula you can perform operations, such as addition, multiplication and comparison on spreadsheet values. Use a formula when you want to enter calculated values on a spreadsheet.

- A formula always begins with an equal sign (=).
- A *constant* is a numeric or text value that you type directly into a cell.

A simple formula combines constant values with operators, such as a plus or minus sign, in a cell to produce a new value from existing values. Think of a formula as one side of an equation whose result is shown in the cell.

The following is an example of a formula:

=(B4/25)+100

Formula Operators

Valid operators in a formula are:

+	Addition
-	Subtraction
^	Power operator
*	Multiplication
/	Division
&	Logical And
|	Logical Or
!	Negation
>	Greater Than
<	Less Than
=	Equality
:	Sum a range of cells

Formula Functions

Valid functions in a formula are:

ABS (Coord or Value)	Returns the absolute value of the specified cell or value.
ADD (a,b)	Adds the two elements, which can be cell coordinates or values.
EXP (Coord or Value)	Returns e to the power of the specified cell or value.
IF (a,b,c)	If a is true, cell is assigned b ; if false, cell is assigned c . The elements a , b and c can be cell coordinates or values.
IEMPTY (Coord)	Returns TRUE if cell is empty, FALSE otherwise.
LN (Coord or Value)	Returns the Natural Log for the specified cell or value.
LOG (Coord or Value)	Returns Log Base 10 for the specified cell or value.
NEG (Coord or Value)	Returns the negative of the specified cell or value.
NOT (Coord or Value)	Returns the logical NOT of the specified cell or value.
ROUND UP (Coord or Value, # of Decimals)	Returns the specified cell or value, rounded up to the next integer. The # of Decimals specifies the number of decimal places to which the original value should be rounded. It must be a whole number, and negative numbers are permitted to indicate places to the left of the decimal point.
ROUND (Coord or Value, # of Decimals)	Returns the specified cell or value, rounded up (when $\geq .5$) or down.
SUM (Start Cell:End Cell)	Returns the sum of the defined range of cells.
TRUNCATE (Coord or Value, # of Decimals)	Returns the specified cell or value, truncated at the given number of decimals.

Examples of valid formulas:

SUM(A1:A10)	Sums the first column, rows 1 through 10.
3.1415*C6	PI times the value in C6.
A# * G#	The value of cell column A, this row, multiplied by the value of the cell at Column G, same row.
(A1 + B1) * C1	Adds the first two cells and multiplies the result by the third.
IF(A1>5,A1*2,A1*3)	If the contents of A1 are greater than 5, then multiply A1 by 2, else multiply A1 by 3.
LOG(A1 + B1)	Adds the first two cells and then returns the Log Base 10 for the result.

Combining Expressions With Parentheses

If a formula contains operators with the same priority, the spreadsheet evaluates the operators from left to right. If you want to alter the order of evaluation, use parentheses to group expressions in your formula.

Example:

This formula	Produces this value
$=4*2+4*6/2$	20
$=4*(2+4)*6/2$	72

Displaying Formulas on the Spreadsheet

A cell containing a formula normally displays the formula's resulting value on the spreadsheet. When you move the cursor over a cell containing a formula, the formula is displayed in the tool tip for your reference.

Editing Within a Cell

You can edit a cell on your spreadsheet by typing a new entry over an existing one or by editing part of the information within the cell. To edit within a cell, double-click the cell. Selecting the cell and pressing <ESC> will also switch to 'editing mode'. When you edit a cell containing a formula, the formula is displayed and the value is hidden.

Changing Column Widths and Row Heights

You can adjust both the column width and the row height as needed. Rows automatically adjust to accommodate wrapped text or the largest font entered into the row.

In a new spreadsheet all the columns are set to the standard width. You can change the standard width setting to adjust all columns on the sheet, or you can adjust only the columns you want to change.

These changes are performed by placing the cursor between two rows or two column headings, until it changes to a double arrow, and then hold down the left mouse button and drag the line to its new location.

Appendix **A** ASCII Numbers

If your data is delimited by a particular keyboard printable character, you can type it directly into the parser. However, if the delimiter is non-printable, you must enter the appropriate ASCII number within { } brackets. The hexadecimal equivalents (HEX #) are also shown.

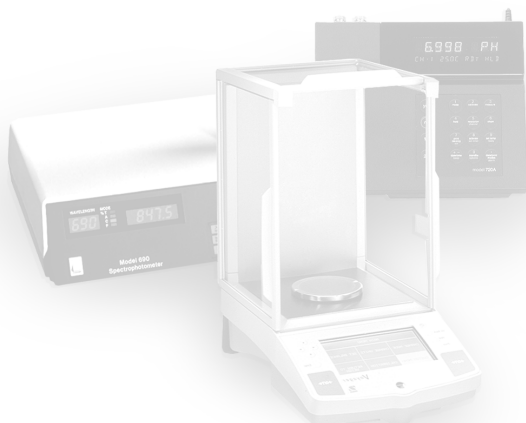
ASCII #	HEX #	Common Delimiters	Control Character
0	00h	(null)	NUL
1	01h		SOH
2	02h		STX
3	03h		ETX
4	04h		EOT
5	05h		ENQ
6	06h		ACK
7	07h	(beep)	BEL
8	08h	(backspace)	BS
9	09h	(tab)	HT
10	0Ah	(line feed)	LF
11	0Bh	(home / hard return)	VT
12	0Ch	(form feed / page break)	FF
13	0Dh	(carriage return)	CR
14	0Eh	(page / column break)	SO
15	0Fh		SI
16	10h		DLE
17	11h		DC1
18	12h		DC2
19	13h		DC3
20	14h	(paragraph marker ¶)	DC4
21	15h		NAK
22	16h		SYN
23	17h		ETB
24	18h		CAN
25	19h		EM
26	1Ah		SUB
27	1Bh		ESC
28	1Ch	(cursor right)	FS
29	1Dh	(cursor left)	GS
30	1Eh	(cursor up)	RS
31	1Fh	(cursor down)	US
32	20h	(space)	

APPENDIX A ASCII Numbers

For your reference, additional ASCII and hexadecimal numbers are shown here.

ASCII	HEX#	Char.	ASCII	HEX#	Char.	ASCII	HEX#	Char.
33	21h	!	76	4Ch	L	119	77h	w
34	22h	“	77	4Dh	M	120	78h	x
35	23h	#	78	4Eh	N	121	79h	y
36	24h	\$	79	4Fh	O	122	7Ah	z
37	25h	%	80	50h	P	123	7Bh	{
38	26h	&	81	51h	Q	124	7Ch	|
39	27h	‘	82	52h	R	125	7Dh	}
40	28h	(	83	53h	S	126	7Eh	~
41	29h	)	84	54h	T	127	7Fh	
42	2Ah	*	85	55h	U	128	80h	Ç
43	2Bh	+	86	56h	V	129	81h	ü
44	2Ch	,	87	57h	W	130	82h	é
45	2Dh	-	88	58h	X	131	83h	â
46	2Eh	.	89	59h	Y	132	84h	ä
47	2Fh	/	90	5Ah	Z	133	85h	à
48	30h	0	91	5Bh	[	134	86h	â
49	31h	1	92	5Ch	\	135	87h	ç
50	32h	2	93	5Dh	]	136	88h	ê
51	33h	3	94	5Eh	^	137	89h	ë
52	34h	4	95	5Fh	˘	138	8Ah	è
53	35h	5	96	60h	˘	139	8Bh	ï
54	36h	6	97	61h	a	140	8Ch	î
55	37h	7	98	62h	b	141	8Dh	ï
56	38h	8	99	63h	c	142	8Eh	Ä
57	39h	9	100	64h	d	143	8Fh	Å
58	3Ah	:	101	65h	e	144	90h	É
59	3Bh	;	102	66h	f	145	91h	æ
60	3Ch	<	103	67h	g	146	92h	Æ
61	3Dh	=	104	68h	h	147	93h	ö
62	3Eh	>	105	69h	i	148	94h	ø
63	3Fh	?	106	6Ah	j	149	95h	ò
64	40h	@	107	6Bh	k	150	96h	ù
65	41h	A	108	6Ch	l	151	97h	ù
66	42h	B	109	6Dh	m	152	98h	ÿ
67	43h	C	110	6Eh	n	153	99h	Ö
68	44h	D	111	6Fh	o	154	9Ah	Û
69	45h	E	112	70h	p	155	9Bh	€
70	46h	F	113	71h	q	156	9Ch	£
71	47h	G	114	72h	r	157	9Dh	¥
72	48h	H	115	73h	s	158	9Eh	
73	49h	I	116	74h	t	159	9Fh	f
74	4Ah	J	117	75h	u	160	A0h	á
75	4Bh	K	118	76h	v	161	A1h	í

ASCII	HEX#	Char.	ASCII	HEX#	Char.
162	A2h	ó	209	D1h	
163	A3h	ú	210	D2h	
164	A4h	ñ	211	D3h	
165	A5h	Ñ	212	D4h	
166	A6h	ª	213	D5h	
167	A7h	º	214	D6h	
168	A8h	¿	215	D7h	
169	A9h	—	216	D8h	
170	AAh	¬	217	D9h	
171	ABh	½	218	DAh	
172	ACH	¼	219	DBh	
173	ADh	¡	220	DCh	
174	Aeh	«	221	DDh	
175	Afh	»	222	DEh	
176	B0h		223	DFh	
177	B1h		224	E0h	
178	B2h		225	E1h	
179	B3h		226	E2h	
180	B4h		227	E3h	
181	B5h		228	E4h	
182	B6h		229	E5h	
183	B7h		230	E6h	
184	B8h		231	E7h	
185	B9h		232	E8h	
186	BAh		233	E9h	
187	BBh		234	EAh	
188	BCh		235	EBh	
189	BDh		236	ECh	
190	BEh		237	EDh	
191	Bfh		238	EEh	
192	C0h		239	EFh	
193	C1h		240	F0h	
194	C2h		241	F1h	
195	C3h		242	F2h	
196	C4h		243	F3h	
197	C5h		244	F4h	
198	C6h		245	F5h	
199	C7h		246	F6h	
200	C8h		247	F7h	
201	C9h		248	F8h	
202	CAh		249	F9h	
203	CBh		250	FAh	
204	CCh		251	FBh	
205	CDh		252	FCh	
206	Ceh		253	FDh	
207	Cfh		254	FEh	
208	D0h		255	FFh	(blank)





Appendix B Troubleshooting

Problem:

No data is received by the software or the data that is received consists of garbage (characters that don't make sense).

Possible Solutions:

1. The program may not be active. Exit SWD-Collect, then try starting the program again.
2. The Instrument Protocol Setup (see Figure 2.3, Page 10 or Figure 3.3, Page 20) may not be correct. This usually results in data being captured but the data does not make sense. There are some key communication parameters associated with serial (RS232) communication that must be matched exactly between your instrument and the configuration in SWD-Collect. In particular, if the Baud Rate, Data Bits, Stop Bits, and Parity are not matched exactly between the instrument and SWD-Collect, serial data transfer will not work. The computer does not automatically determine what these parameters are for your instrument - YOU MUST ENTER THEM IN THE SOFTWARE.
3. The cable between the instrument and the computer may be incorrect. This will usually result in no data being received. Try a different cable and confirm that the wiring is correct by contacting the instrument manufacturer.
4. The computer hardware, especially the RS232 port, may not be working. Check the Comport configuration in your operating system, or try a different COM port, preferably on a different computer.

5. The instrument may not be sending the data. The instrument may need to be set up differently or its RS232 port is not functional. Try a different instrument, the simpler the better, to confirm that the computer end is working properly.

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