The MicroLog
User Manual

Contents

Introduction

Principles of Data Logging

A data logger is a device that collects data and stores it in its memory for further analysis or display. The MicroLog is a small data logger with 2 internal sensors and 1 external sensor port.

Before working with a data logger, you need to be familiarized with a few basic terms:

Sensor –A component that transforms physical data to electronic data recorded by the MicroLog's processor.

Selected Sensors – As a user, you can decide which of the sensors will participate in the data recording. You select the sensors by using the MicroLab software.

Sample – A single measurement taken by the data-logging device, and stored in its memory. In

this manual, we refer to a sample as a single measurement from each of the selected sensors. **Memory** – The MicroLog's memory is where the recorded data are stored. The MicroLog has 16,000 bytes of memory capacity and can therefore store up to 16,000 different measurements. A sample can take 1-3 cells of memory (depending on how many sensors were sampled).

The MicroLog Device

Keys and Connections

The LCD display is used for viewing data without downloading it to a PC. The left and right keys are used to view the Min and Max values of the MicroLog's measurements and to download

recorded data to a computer via a cable connection or the IRDA port.
The infrared LED transmits data to a portable printer or a computer via an IRDA port.
The external sensor/communication port is designed to connect an external temperature sensor or a computer. The computer connection cable and external sensor cable are sold separately in the MicroLog PC kit.

Battery Replacement

A 1/2AA 3.6V lithium battery powers the MicroLog and should last for 1.5 years. If you use an external sensor, or transmit often via the IRDA port, this period is shortened. To replace the battery, simply open the 4 screws in the back of the MicroLog, replace the battery, and reassemble the MicroLog. Make sure that you

place the positive (+) pole towards the + sign on the MicroLog circuit board.

BEFORE REPLACING BATTERIES, MAKE SURE YOUR HANDS ARE CLEAN AND DRY!!!

The MicroLog's Default State

By default, the MicroLog is configured to work in a ***Cyclic Run*** mode, taking a sample every 6 minutes from each sensor. The ***Cyclic Run*** mode means that the MicroLog continuously records data until its memory is full, and then overwrites the oldest samples with the new ones. For changing the default configuration you have to use the MicroLab software (see page 25).

The MicroLog's Buttons

The MicroLog device has 2 keys used to display and transmit its data and status. The following pages deal with the functions of these 2 keys.

Viewing Min. and Max Values in the Last 1-24 Hours

You can view the minimum and maximum values measured during a specific time period by using

the MicroLog's left and right key. To view those values, you need to perform the following 3 steps:

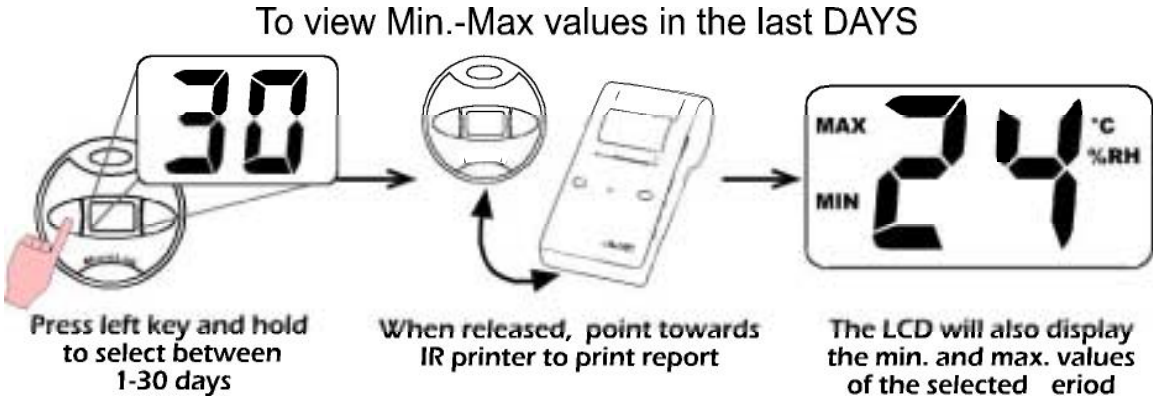
1. Select a time period – when you press MicroLog’s right button, the LCD will start displaying the number of hours. When you reach the desired time period (ranging from 1 to 24 hours), release the right key.
2. After releasing the right key, the MicroLog will display the Min and Max values of the selected sensors, for the selected time period.
3. (Optional) After releasing the right key, the MicroLog will send an IR signal of the Min and Max values for the time period selected in step 1. To receive a printout of this data, point the MicroLog to the IR printer (HP portable printer – model No. 82240B).

Viewing Min. and Max Values in the last 1-30 Days

Using the MicroLog's keys you can view the Min and Max values measured during a specific time period. To perform this function you need to perform the following 3 steps:

1. Select a time period – When you press the MicroLog's left key, the LCD will start displaying the number of days. When you reach the desired time period (ranging from 1 to 30 days) release the left key.
2. After releasing the left key, the MicroLog will display the Min and Max values of the selected sensors, for the selected time period.

3. (Optional) After releasing the left key, the MicroLog will send an IR signal of the Min and Max values for the time period you selected in step 1. To receive a printout of this data, point the MicroLog to the IR printer (HP portable printer – model No. 82240B).



You can also find a scheme of this procedure on your mini-manual reference card.

Viewing the MicroLog's Status

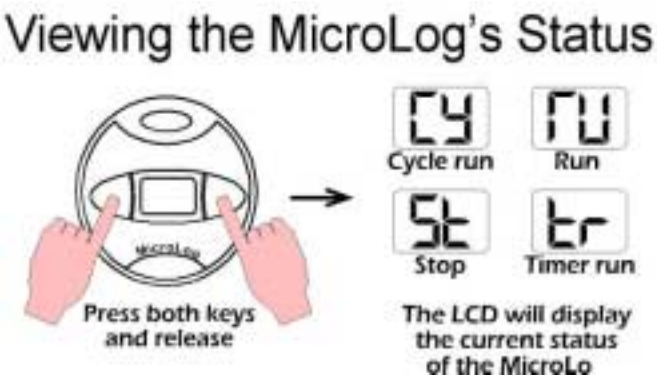
The MicroLog is always in one of the 4 possible modes:

Stop – The MicroLog is idle and not recording.

Run – The MicroLog is recording data. It will stop recording when the memory is full.

Cyclic Run – Same as **Run**, but the MicroLog overwrites the old measurements (starting with the oldest one) when the memory is full.

Timer Run – You can configure the MicroLog to start recording at a predetermined time. When the MicroLog is set for such a delayed run, the MicroLog's status is set to **Timer Run**. Once the MicroLog starts recording, the status changes to either **Run** or **Cyclic Run**, depending on your configuration. The following diagram indicates how to view the status of the MicroLog:



When you press both keys simultaneously, the MicroLog's LCD will display the status of the MicroLog. It will also "wake up" the MicroLog device for communication with a computer.

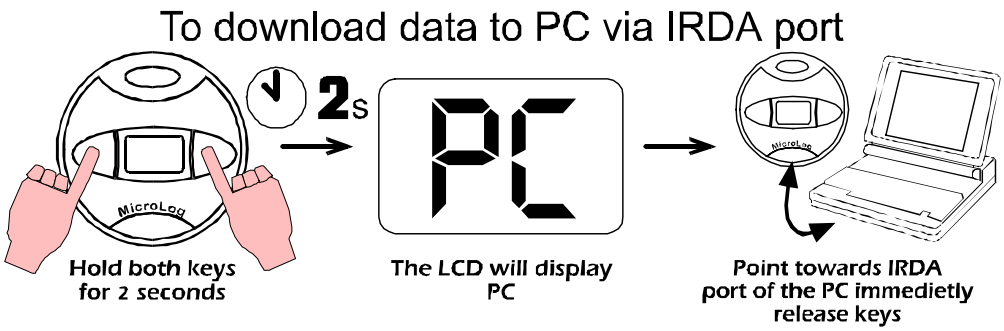
Downloading Data to a computer via IRDA Port

The MicroLog is equipped with an infrared transmitter. Using the MicroLog's keys you can transmit the data stored in the MicroLog's memory to your computer's IRDA port. To

perform this function you need to perform the following 4 steps:

1. Open the MicroLab software in your computer.
2. Point the MicroLog towards the computer's IRDA port.
3. Hold both keys down for 2 seconds. The MicroLog's LCD will change to PC.
4. The MicroLog downloads all the data to the computer and displays a graph of it.

The following scheme shows how to download the data:



The MicroLab Software

Introduction

To set the MicroLog up for recording data, you have to use the MicroLab software. The MicroLab software is also required for downloading, viewing and saving recorded data. This section provides you with a detailed guideline for the MicroLab.

Installation

Windows 3.X Installation

1. Insert the MicroLab diskette into your 3.5” drive.
2. From the **File** menu in the **Program Manager**, choose **Run**.
3. Type in the full path to the installation program in the command line- setup.exe (e.g., **a:\setup**), and press Enter.
4. Follow the simple instructions outlined in the setup program.

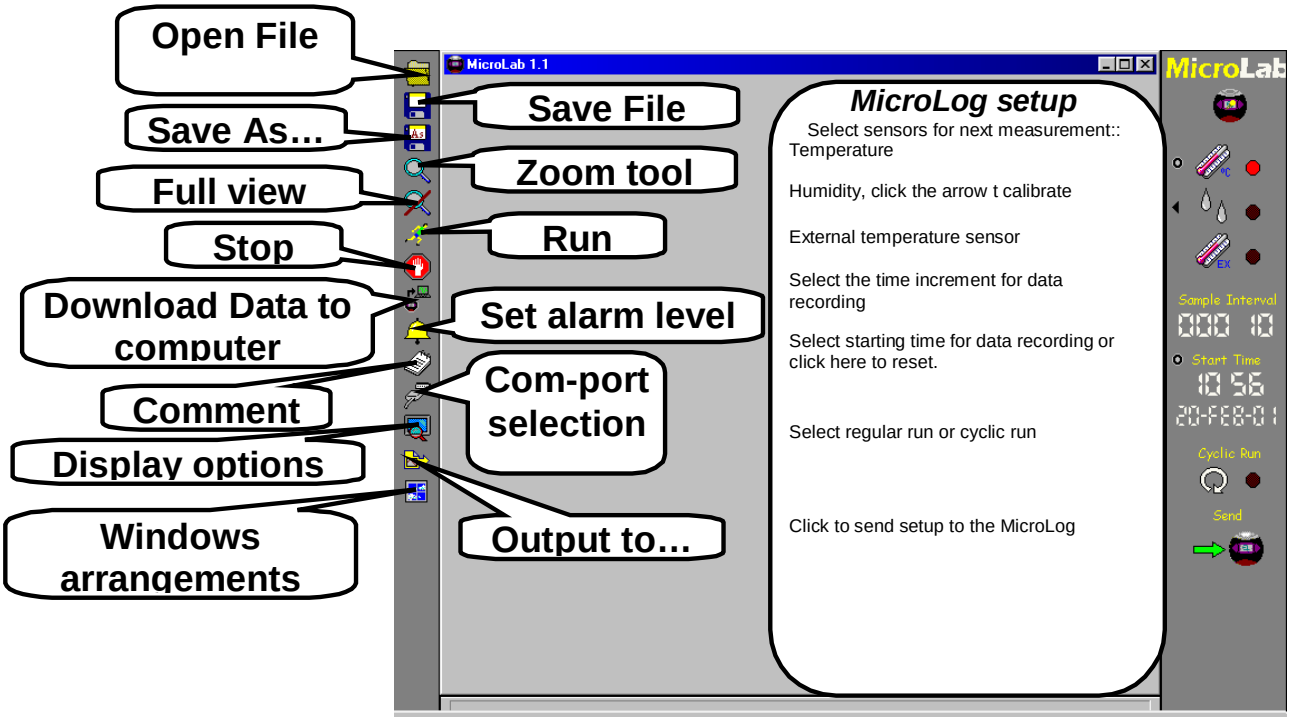
Windows 95/98/NT Installation

1. Insert the MicroLab diskette into your 3.5” drive.
2. Choose **Run** from the **START** menu.

3. Type the full path to the installation program in the command line- setup.exe (e.g., **a:\setup**), and press ENTER.
4. Follow the simple instructions outlined in the setup program.

The MicroLab Software: Overview

The following diagram provides you with a brief description of MicroLab's screen:



Communication Setup:

You set the MicroLog up for recording, saving, downloading, and viewing the data from your computer. Connecting the MicroLog to the computer is a 3-step operation:

1. ***Hardware connection*** – Connect the MicroLog to the computer.
2. ***"Wake up" the MicroLog*** – Open the MicroLog's COM port for computer communi-cation.
3. ***Software Connection*** – Establish a connection using MicroLab (Done once only after installation)

Hardware Connection

In your MicroLog PC connection kit you will find a serial cable. One end of this cable connects to an empty serial port on the back of your

computer. Note that you may need to use a 9/25-pin adapter (this applies mostly to non-Pentium computers).
Connect the other end of this serial cable to the computer connection socket on the back of your MicroLog device.

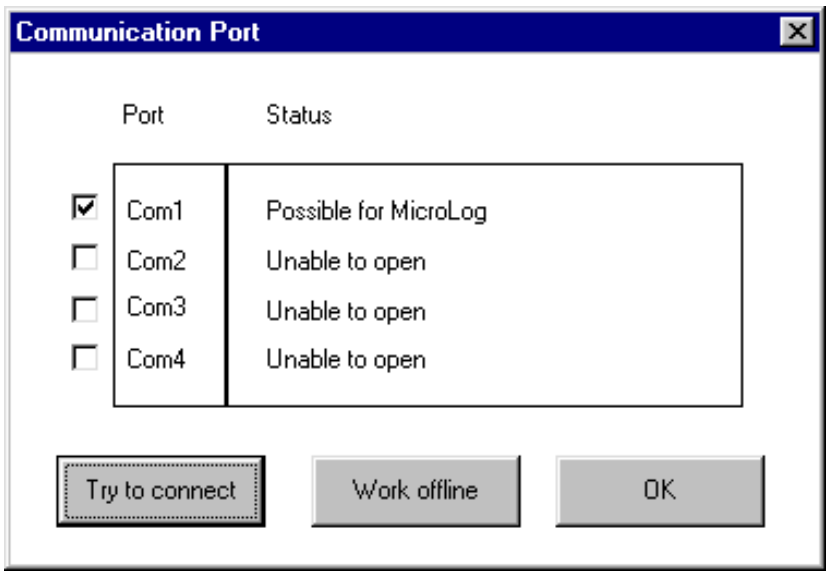
“Wake up” the MicroLog

Since communication utilizes a lot of power, the MicroLog device is not generally open for communication. When transferring data to and from the MicroLog we must first open the MicroLog communication port. This is done either manually by pressing the 2 MicroLog buttons until the MicroLog shows its status, or from the MicroLab software.

Whenever sending a command from the MicroLab the software “checks” whether the previous command was acknowledged by the MicroLog. If it was not acknowledged the MicroLab next command will “wake up” the MicroLog.

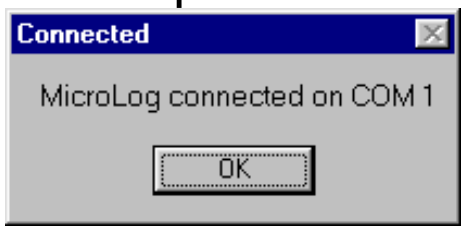
Software Connection

When opening the MicroLab for the first time after installation or when you click the ***Connect*** icon on the left toolbar, the ***Comm Setup*** dialog box opens. This dialog box indicates which of the four possible serial ports on your computer are available for communication. Note that in the dialog box above COM 1 is available for communication. If none of the four boxes in the ***Comm Setup*** dialog box is checked, you must open a serial port in your BIOS



configuration. If you do not know how to open a serial port on your computer, refer to your computer vendor.

By clicking the ***Try to connect*** button, the MicroLab establishes a connection with the MicroLog. The ***Connected*** window opens. Click OK - the MicroLog is now ready to communicate with the computer. Once a connection is established with the MicroLog, you can perform all operations from the MicroLab software. The following section provides additional information regarding various MicroLab features.



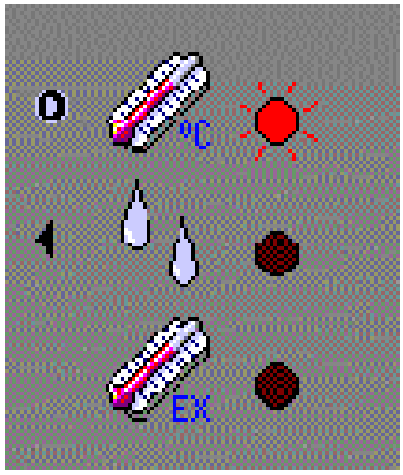
Note: Click the Connect icon only when you want to change the communication COM port

MicroLab Features:

Operating the MicroLog - Data-Recording Setup

All programming of data recording parameters are configured from the right panel of the MicroLab software. The items in the right panel are:

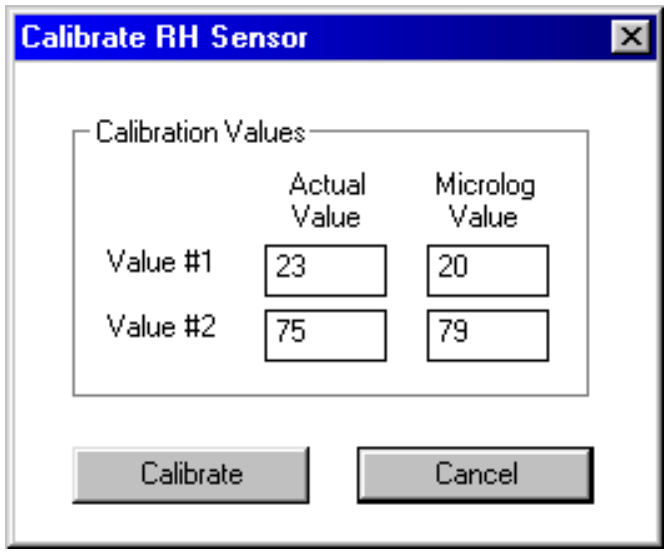
Sensor selection – The upper part of the right tool bar is used to select the sensors to be used in the next data recording. These are the temperature, humidity, and the external temperature sensor.



Clicking on one of the sensor icons with the left mouse button selects it for the next data logging. A selected sensor shows a red light next to it. Otherwise the circle next to the icon will appear black. Note that in the diagram found on the previous page only the internal temperature sensor was selected, while the two other ones are not.

Some models do not include the humidity sensor. In those models the humidity sensor icon is disabled. When you select the humidity sensor, you may calibrate it through the Microlab software as follows:

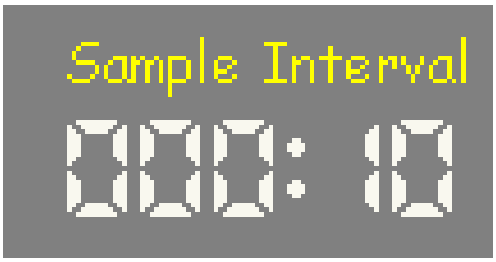
1. Click the arrow to the left of the Humidity sensor icon. The Calibrate dialog box opens.



2. Make sure that the MicroLog is on standby mode (i.e. it measures, but doesn't save the result in its memory).
3. Measure the humidity in two known values (e.g. 23% and 75%).
4. Fill in those values together with the values the MicroLog is showing.

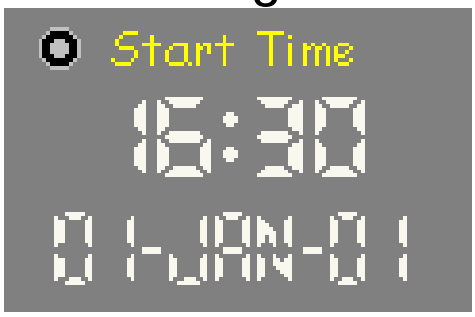
5. Click **Calibrate**. The MicroLog takes about five seconds to calculate the new linear conversion for the relative humidity. After the MicroLog finishes the calculation, the calibration dialog box closes.

Sample interval – This digital display is used to determine the amount of time between every two samples taken by the MicroLog. To change the sample interval, simply click on the digit that you wish to change. A click on the left mouse button makes the digit rise by one unit. A click on the right mouse button lowers it accordingly. The largest sample interval is 120 minutes and the smallest one 10 seconds. The

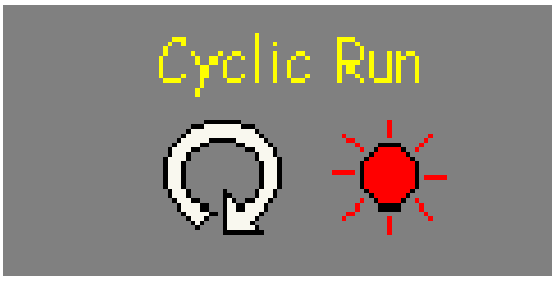


picture found on the previous page shows a sample interval of 10 seconds.

Start Time – You may set the MicroLog to start the data recording at a predetermined date and time. This is done by changing the Start Time display. By default, the start time is set to your current time and date. A click on the left or right mouse button on time and date changes it to the start time of your choice. If you want to return to the default time and date, click on the small reset button. In the picture above, the starting time was set to 4:30pm on January 1st, 2001. The number 01 refers to the year 2001.



Cyclic Run – A cyclic run means that when the MicroLog's memory is full, it overwrites older samples starting with the oldest one. Click the Cyclic run indicator with the left mouse button to select a cyclic run for the next data recording. This picture shows that the ***Cyclic run*** has been selected for the next data recording.



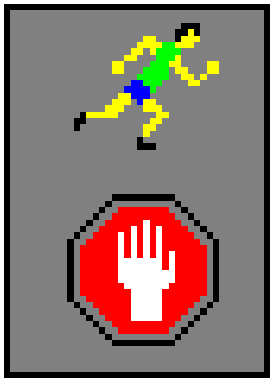
Send – The Send command is the last command in the programming sequence. The arrow of the Send icon is empty (wire) by default. If you change the recording parameters, the arrow will start flashing in yellow-green. After you finish setting all the parameters in the panel, press the flashing Send icon. If the settings are

downloaded properly to the MicroLog device, the Send arrow stops flashing and returns to the default wire-frame mode.

If the icon changes to a broken red arrow, the settings were not saved in the MicroLog due to a communication problem.

Note: Make sure that the MicroLog is in Standby mode before using the Send command

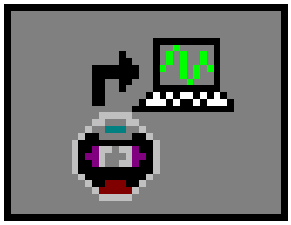
Operating the MicroLog–: Running, stopping, and downloading



After you finish setting up the MicroLog, it is time to start the data recording.

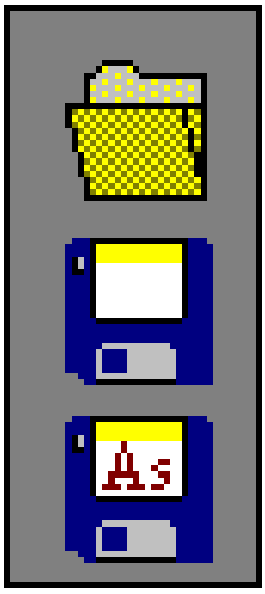
Click the ***Run*** icon on the left toolbar. Once you click it, The MicroLog starts recording data, based on the pre-programmed parameters.

To ***stop*** recording data, make sure the MicroLog is connected to the cable, and that its communication channel is open. Click the ***Stop*** icon on the left toolbar. The MicroLog stops recording data.



Downloading is done by clicking the ***Data Download*** icon on the left toolbar. Make sure that the MicroLog's communication port is open.

File management



The three top icons found on the MicroLab's left toolbar are used for file management. Clicking the ***Open*** icon opens saved files. Clicking the ***Save*** icon saves the file you are curently working on. If you save your results the first time, you have to enter a file name into a dialog box opening up. The file name cannot consist of more than 8 characters. The extension of the data files used by MicroLab is *.SMP.

The ***Save As…*** icon is used to save an already saved data file under a different name.

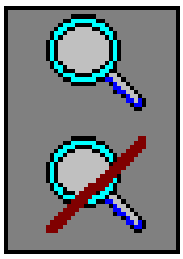
Viewing the Data: The Markers

The MicroLab software supplies you with a helpful marker tool. The marker is used to view the data at a specific moment, or to measure the difference between two points in a graph.

To place a marker on a graph, simply double-click on the desired place on the graph. A black arrow will appear on the graph and at the bottom of the graph a window displaying the corresponding Y and t values will open. You can move the marker by placing the mouse pointer on it, holding the left mouse button, and dragging the marker to the left or right. You can also place the mouse pointer on the marker, left-click once,

and then move the marker by using the left and right arrow keys on your keyboard.
Placing a second marker is done the same way. When you place the second marker, the data at the bottom of the window include the values for ΔX; Δt. Δ refers to the difference values between the markers.
To remove a marker, click on it with the right mouse button.

Viewing the Data: Zooming



Zooming in is done by clicking the ***Zoom*** icon on the left tool bar. Once clicked, the mouse pointer changes to a magnifying glass. Place it on the beginning of the section you wish to zoom in on, press and hold the left mouse button, and drag the mouse pointer over the

section you wish to zoom in on. Once released, the window displays only the zoomed data. Pressing the right mouse button will zoom the plot out to the previous position. If you wish to view the original data, click the ***Full view*** icon. Clicking anywhere outside the graph window will turn the mouse pointer back to its normal mode.

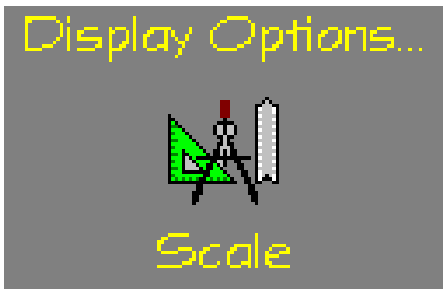
Viewing the Data: Display Options

On the left tool bar you will find a screen icon. When the mouse pointer is placed on it, the Display options sub-menu opens. You can select one of three options

Window Appearance – Your mouse pointer changes to a brush. Placing the brush on one of

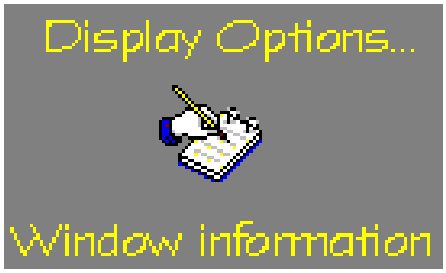
the graphs or on the background of your data window and clicking there with the left mouse button opens a color dialog box, in which you can select a different color for graphs or background.
Clicking on one of the data graphs with the right mouse button opens the Line preferences dialog box, where you can select line type, line width, and a symbol to be placed where the data points were recorded.
Placing the brush on the X or Y-axis of your graphs, or on the graph title, opens the Font dialog box, in which you can select the font type, size and color for the axis and the main title.

Viewing the Data: Scaling



Scaling means changing the minimum and maximum values of your graph's Y-axis. Clicking the Scale icon with the left mouse button opens the Scaling dialog box. Select the graph you wish to scale, and enter then the new Min and Max values. Click OK to apply the scaling on the graph.

Viewing the Data: Window information

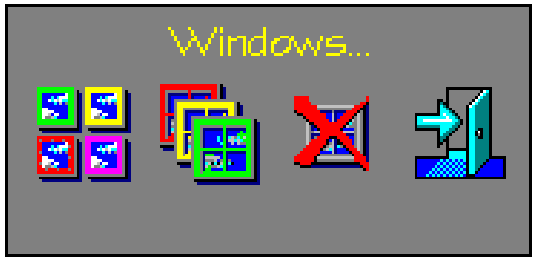


Clicking the ***Window information*** icon with the left mouse button will turn the mouse pointer into a

notepad. Placing it on a graph and clicking it opens the Information window, where you can see or change the graph's name, enter a title for the graph’s Y-axis, view the applied sensor and start time for that graph.

Placing the notepad icon on the graph’s title window and clicking on the left button of the mouse, opens the Information window where you can change the title of the window, enter a title for the X-axis, and view the sensor and the total number of samples taken. In both the dialog boxes, the mouse pointer returns to its normal mode upon clicking OK. If you wish to continue using the notepad mouse pointer, click “See More Info”.

Viewing the Data: Windows Arrangement



On the bottom of the left toolbar, you will find the Windows submenu. Place the mouse pointer on the icon to see the options for arranging the windows:

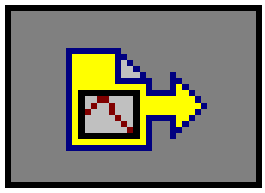
Tile – Displays all open windows next to each other so that they fill the MicroLab's work area.

Cascade – Alters all open windows so that they all have the same size, and arranges them in a cascading fashion on the top at the left side of the screen.

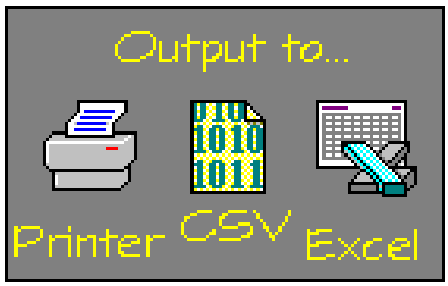
Close all – Closes all open windows.

Exit – Exits MicroLab.

Viewing the Data: Output Options



Placing the mouse pointer on the output icon in the left toolbar displays the output options of the MicroLab software. There are 3 output options:



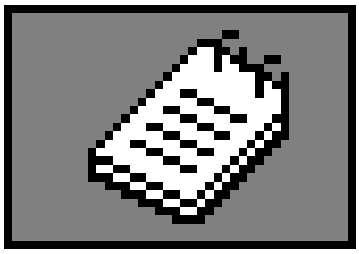
Output to printer –prints the active graph.

Output to CSV file – A CSV (Comma Separated Values) file is a standard spreadsheet data file, compatible with Excel, Lotus, and many other spreadsheet programs.

Output to Excel – Saves the data as a CSV file and automatically opens the file in Excel (if EXCEL 5 is installed on your computer).

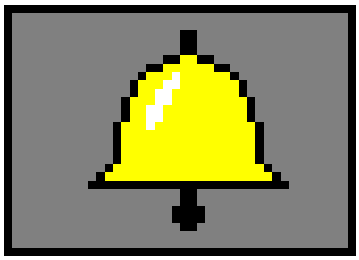
Extended Functions of the MicroLog

The MicroLog has a few unique features extending its functionality and making it much easier to use.



Enter Comment – On the left toolbar of MicroLab you find the ***Send Comment*** icon. Clicking it opens the following dialog box, in which you can enter a text message of up to 32 characters. This text message can be used to identify the MicroLog, the cargo it monitors, or any other text you want to enter. After typing the text, click the ***Send*** button (make sure that the Comm port of the MicroLog is open and that the MicroLog is in Standby mode). The comment will be saved in the MicroLog's memory and displayed as the

main title of the data graph after the data are downloaded.



Alarm Level – In the left toolbar you find the Alarm icon. The alarm function enables the user to select a specific alarm level for internal and external temperature sensors and the humidity sensor. When this level is crossed, the MicroLog's display starts flashing on and off. The display continues flashing even if the measurement that set the alarm off returns to its normal state. To cancel the flashing of the MicroLog's display and to view the Min and Max values, which triggered the alarm, press one of the MicroLog's keys. Upon displaying these values, the MicroLog

continues the data recording and the flashing stops.
To select the alarm levels, click the alarm icon in the MicroLab software. The Alarm Levels dialog box opens. Note that the set default values displayed for the alarm levels are the max. Values possible for each sensor. Change the levels of internal and external temperature and humidity sensors. Click the Send button to send the alarm data to the MicroLog (make sure that the MicroLog is open for communication and in Standby mode). The RESET button changes the levels back to their default values.

Technical Specifications

Input

Two Built-in sensors:

Temperature: -30°C - 50°C (-22.3°F - 121.7°F), Resolution 0.5°C (0.9°F), accuracy ±0.6°C (±1.08°F).

Humidity: 0-90% (resolution 0.5%, accuracy ±3% @ 25°C).

One ext. temperature sensor: -50°C - 100°C (-57.6°F - 211.7°F), accuracy ±1.5°C (±2.7°F)

Model:

EC600: Temperature + External Input
EC650: Temperature + Humidity + External Input

Output

Two digits 7-segment LCD
IRDA Interface to Portable HP-Printer
IRDA Interface to PC Host (RS-232)
RS-232 Cable connection to the PC (additional to IRDA port)

Memory Capacity
16000 recording samples

Power Supply
Internal Lithium Battery - 3.6V TL5101
Battery Life - About two years, replaceable
(Might vary when external sensors are connected)

Sampling Rate
User defined: from every 10 sec to every 2 hours

Dimensions
Thickness - 22.9 mm
Width - 72 mm diameter
Weight - 55 gr.

EC650 – Dust proof IP60 standard compliance.
EC600 – Water and Dust proof IP65 standard.
Year 2000 bug compatible - 4 digit year value.
CE, FCC compliance.

Software

Windows 3.x, Windows 95/98 compatible
Export to common spreadsheets

Contact Us

Fourier Systems Ltd.
P.O.Box 10244, Petah Tiqva, ISRAEL 49222
Phone: +972 3 9244705
Fax: +972 3 9242159

Internet: http://www.fourier-sys.com