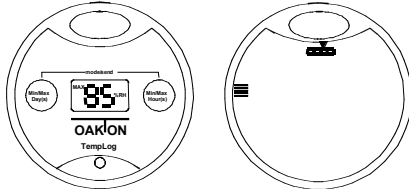**Operating Instructions**

OAKTON® 35710-series

OaktonLog Temperature and Temperature/Humidity Data Loggers

Contents

Introduction

Principles of Data Logging

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 OaktonLog'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 OaktonLog's memory is where the recorded data are stored. The OaktonLog 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 OaktonLog Device

Keys and Connections
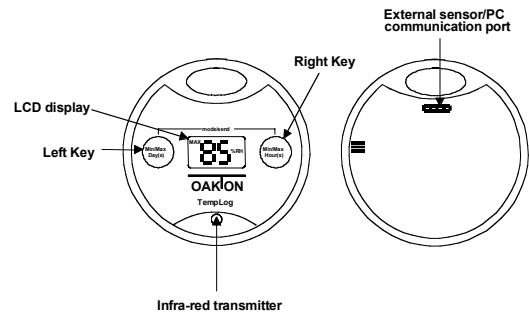
The LCD display is used for viewing data without downloading them to a PC. The left and right keys are used to view the Min and Max values of the OaktonLog's measurements and to download recorded data to a computer via a cable or the IRDA port.

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 OaktonLog PC kit.

Battery Replacement

A 1/2AA 3.6V lithium battery powers the OaktonLog 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 OaktonLog, replace the battery, and reassemble the OaktonLog. Make sure that you place the positive (+) pole towards the + sign on the OaktonLog circuit board.

NOTE: BEFORE REPLACING BATTERIES,
MAKE SURE YOUR HANDS ARE CLEAN AND DRY.

OaktonLog Factory Settings

The OaktonLog is initially configured to work in a *Cyclic Run* mode, taking a sample every 6 minutes from each sensor. The *Cyclic Run* mode means that the OaktonLog continuously records data until its memory is full, and to overwriting then the oldest samples. To change the initial configuration you have to use the MicroLab software (see page 3).

The OaktonLog's Buttons

The OaktonLog 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/Max Values in the Last 1 to 24 Hours
You can view the minimum and maximum values measured during a specific time period up to 24 hours by using the OaktonLog's right key. To view those values, you need to perform the following 3 steps:

Press right key and hold to select between 1-24 hours → **When released, point towards IR printer to print report** → **The LCD will also display the min. and max.values of the selected period**
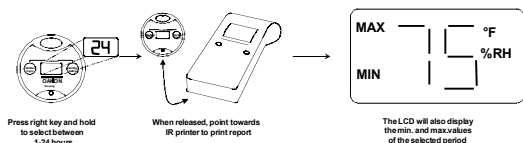
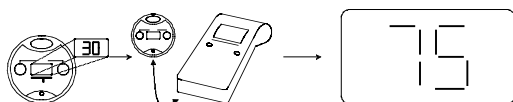1. Select a time period – when you press OaktonLog's right button, the LCD will start displaying the number of hours. When you reach the desired time period (ranging from 1 to 24 hours), release the right key.

2. After releasing the right key, the OaktonLog will display the Min and Max values of the selected sensors, for the selected time period.

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

NOTE: You cannot enter a time period greater than the time elapsed since entering Run mode.

Viewing Min/Max Values in the last 1 to 30 Days

You can view the minimum and maximum values measured during a specific time period up to 30 days by using the OaktonLog's right key. To view those values, you need to perform the following 3 steps:

1. Select a time period – When you press the OaktonLog'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 OaktonLog will display the Min and Max values of the selected sensors, for the selected time period.

3. (Optional) After releasing the left key, the OaktonLog will send an IR signal of the Min and Max values for the time period you selected in step 1. To receive a printout for these data, point the OaktonLog 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.

NOTE: You cannot enter a time period greater than the time elapsed since entering Run mode.

Viewing the OaktonLog's Status

The OaktonLog is always in one of the 4 possible mo   s:

Stop – The OaktonLog is idle and not recording.

Press both keys and release → **The LCD displays the current status of the OaktonLog**
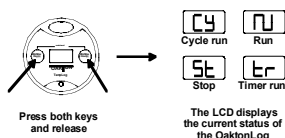
Run – The OaktonLog is recording data. It will stop recording when the memory is full.

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

Timer Run – You can configure the OaktonLog to start recording at a predetermined time. When the OaktonLog is set for such a delayed run, the OaktonLog's status will is set to **Timer Run**.

Once the OaktonLog starts recording, the status changes to either **R u n** or **Cyclic Run**, depending on your configuration. The following diagram indicates how to view the status of the OaktonLog:

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

Downloading Data to a computer via IRDA Port
The OaktonLog is equipped with an infrared transmitter. Using the OaktonLog's keys you can transmit the data stored in the OaktonLog'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 on your computer.

2. Point the OaktonLog towards the computer's IRDA port.

3. Hold both keys down for 2 seconds. The OaktonLog's LCD will change to PC.

4. The OaktonLog downloads all the data to the computer and displays a graph of them.

The following scheme shows how to download the data:
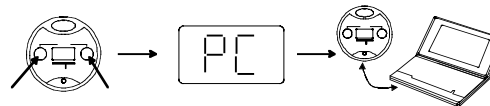
The MicroLab Software

Introduction

To set the OaktonLog 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 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 a brief description of MicroLab's screen:
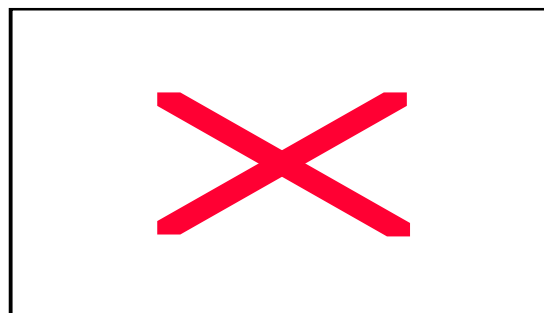
Communication Setup

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

1. **Hardware connection** – Connect the OaktonLog to the computer.
2. **"Wake up" the OaktonLog** – Open the OaktonLog's COM port for computer communication.
3. **Software Connection** – Establish a connection using MicroLab.

Hardware Connection
In your OaktonLog 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 OaktonLog device.

"Wake up" the OaktonLog
Since communication depletes battery life, the OaktonLog device is not generally open for communication. If you wish to transfer data to and from the OaktonLog, you have to first open the computer connection port manually by pressing both of the OaktonLog's keys simultaneously. The OaktonLog's LCD displays the status of the device, and from that moment the PC connection port is open for transmission. The port remains open for 4 minutes. Please find the scheme of this procedure at page 12.

Note: Communication between the PC and the OaktonLog device requires a free serial port.

Software Connection
In most cases, the OaktonLog will automatically connect to the software. You should be able to proceed to setting up the OaktonLog parameters (page 3) or downloading data (page 4).

If there has been a communication problem or you have changed ports 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, 2 and 4 are 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, MicroLab establishes a connection with the OaktonLog. The **Connected** window opens. Click OK - the OaktonLog is now ready to communicate with the computer. Once a connection is established with the OaktonLog, you can perform all operations from the MicroLab software. The following section provides additional information regarding various MicroLab features.

Setting up the OaktonLog

Data-Recording Setup
All data recording parameters are configured from the right panel of the MicroLab software.

Stopping the OaktonLog
Before setting up the OaktonLog, you must stop the current recording run.

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

Sensor selection – The upper part of the right tool bar is used to select the sensors to be used in the next recording. These are temperature, humidity, and external temperature sensor. Click the button at left of temperature icon to select °F or °C.

Clicking one of the sensor icons with the left mouse button selects the corresponding sensor 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. To the right you see only the internal temperature sensor selected, while the two other ones are not.

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

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

Make sure that the OaktonLog has been stopped (i.e. it measures, but doesn't save the result in its memory).

Measure the humidity in two known values (e.g. 23% and 75%).

Fill in those values together with the values the OaktonLog is showing.

Click **Calibrate**. The OaktonLog takes about five seconds to calculate the new linear conversion for the relative humidity. After the OaktonLog finished 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 OaktonLog. 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 to the right shows a sample interval of 10 seconds.

Start Time – You may set the OaktonLog 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 7:49 PM on February 14th, 2001. The number 01 refers to the year 2001.

Cyclic Run – A cyclic run means that when the OaktonLog'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 – After setting recording parameters you must send these settings to the OaktonLog using the Send Icon. The arrow of the Send icon is empty (wire) by default to indicate that no changes

have been entered. If you have changed the recording parameters, the arrow will flash 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 OaktonLog 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 have not been saved in the OaktonLog. Make sure the OaktonLog is communicating with your PC (refer to page 3) and that it is stopped (refer to page 3).

3 modes of the Send button

No update needed	Click to update OaktonLog	No communication

Starting the Logging Run
After you finish setting up the OaktonLog, it is time to start the data recording.

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

Downloading and Viewing Data

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

File management
The three top icons on the left toolbar of MicroLab are used for file management. Clicking the **Open** icon opens saved files. Clicking the **Save** icon saves the file you are currently 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.
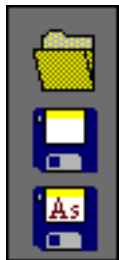
Viewing the Data: The Markers
The MicroLab software supplies you with a helpful marker tool. The marker is used to view the data at a specific moment, or to measure the difference between two points in the graph.

To place a marker on the graph, double-click on the desired place on the graph. A black arrow appears on the graph, and at the bottom of the graph window the Y and t values represented by the marker appear. 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, press and hold the left

mouse button, and drag the mouse pointer over the section you wish to zoom in. 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 can see 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 of that graph, where you can see or change the graph's name, or enter a title for the graph's Y-axis, and view the applied sensor and start time for that graph.

Placing the notepad mouse pointer clicking on the window title with the left mouse button 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 of 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 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:

1. ***Output to printer*** – prints the active graph.
2. ***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.
3. ***Output to Excel*** – Saves the data as a CSV file and automatically opens the file in Excel (if it is installed on your computer).
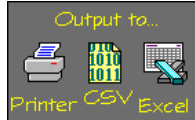
Extended Functions of the OaktonLog

The OaktonLog 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 OaktonLog, 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 OaktonLog is open and that the OaktonLog is in Standby mode). The comment will be saved in the OaktonLog'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 sensor and the humidity sensor. When this level is crossed upwards, the display of the OaktonLog 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 OaktonLog's display and to view the Min and Max values, which triggered the alarm, press one of the OaktonLog's keys. Upon displaying these values, the OaktonLog continues the data recording and the flashing stops.
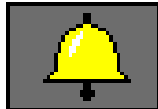
To select the alarm levels, click the alarm icon in MicroLab. The Alarm Levels dialog box opens. Note that the set default values displayed for the alarm levels are the max. values possible for each sensor. Change the levels of internal and external temperature and humidity sensor. Click the Send button to send the alarm data to the OaktonLog (make sure that the OaktonLog 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: -22.7°F - 121.7°F (-30°C - 50°C), Resolution 0.9°F (0.5°C), accuracy ±1.08°F (±0.6°C).

Humidity: 0-90% (resolution 0.5%, accuracy ±3% @ 77°F).

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

Model:

35710-00: Temperature + External Input

35710-10: Temperature + Humidity + External Input

Output

Two digits 7-segment LCD

IRDA Interface to Portable HP-Printer or PC Host

RS-232 Cable connection to the PC (additional to IRDA port)

Memory Capacity

16000 recording samples

Power Supply

Internal Lithium Battery – 3.6 V TL5101

Battery Life – About two years, replaceable (Might change when connecting external sensors)

Sampling Rate

User defined: from every 10 sec to every 2 hours

Dimensions

Thickness – 22.9 mm Width - 72 mm diameter

Weight – 55 gr.

CP650 – Dust proof IP60 standard compliance.

CP600 – Water and Dust proof IP65 standard.

Year 2000 compatible –4 digit year. CE, FCC compliance

Software

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

Warranty

OAKTON warranties this product to be free from significant deviations in material and workmanship for a period of one year from date of purchase. If repair or adjustment is necessary and has not been the result of abuse or misuse within the warrantied time period, please return – freight pre-paid – and correction will be made without charge. OAKTON alone will determine if the product problem is due to deviations or customer misuse.

Out-of-warranty products will be repaired on a charge basis.

Return of items

Authorization must be obtained from our customer Service Department before returning items for any reason. When applying for authorization, please include data regarding the reason the items are to be returned. For your protection, items must be carefully packed to prevent damage in shipment and insured against possible damage or loss. We will not be responsible for damage resulting from careless or insufficient packing. A restocking charge will be made on all unauthorized returns.

Note: We reserve the right to make improvements in design, construction, and appearance of products without notice.