



# micrOptix

## Quick Start Users Guide

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***\*Please read this guide before operating your i-LAB® Unit.***

# The i-LAB<sup>®</sup>



# i-LAB<sup>®</sup> Adaptors

## **Adaptor**

(Holder piece uses for both Cuvette & Round Vial)

**Holder Piece “legs”**



Fig. 1



Fig. 2

**Black Cover** (Needed for Measuring)

*To cover Vial or Cuvette when in Adaptor*



Fig. 3

**Cuvette Holder**



Fig. 4

**Surface Reader**



Fig. 5

**Calibrator (Blank/White)**



Fig. 6

# The i-LAB<sup>®</sup>

## Terms

**Adaptor**– An accessory added to the unit to make color measurements for surface reflectance and liquid transmittance. The Adaptor snaps into place on the top of the i-LAB<sup>®</sup> and over the neck. The “i-LAB<sup>®</sup>” logo needs to face the front.

**Cuvette Adaptor** (Refer to pg 4) – Consists of three pieces necessary to determine color measurements of liquids using a 10 mm cuvette. The pieces are: Black Cover (Fig. 3), Cuvette Holder (Fig. 4) and Holder Piece (Fig. 1) (which also serves as a round vial Adaptor) that snap onto the i-LAB<sup>®</sup> neck. The Holder Piece has “legs” that may be extended.

**Round Vial Adaptor** (Refer to pg 4) – Consists of two pieces that are necessary to determine color measurements of liquids using a standard 25 mm round vial. The pieces are: Black Cover (Fig. 3) and Holder Piece (Fig. 2) that snaps onto the i-LAB<sup>®</sup> neck. The holder piece also has “legs” that may be extended.

**Surface Reader Adaptor** (Fig. five, pg 4) – Consists of a cylinder with a five mm lens open one side and an opening holding the prism on the other side. The open side snaps onto the i-LAB<sup>®</sup> neck. The “i-LAB<sup>®</sup>” logo needs to face the front.

**Spectral Window** (Fig. 1, pg 3) – Is located at the top of the i-LAB<sup>®</sup>. The spectral window should be covered with a protective black i-LAB<sup>®</sup> logo cap (Fig. 3, pg 4) when Adaptors are not attached.

**Neck** (Fig. 1, pg 3) – Is the part of i-LAB<sup>®</sup> to which all Adaptors are attached.

**Eject Clip** (Fig. 1, pg 3) – Is the silver oblong piece with the flat side facing forward. “U” cutouts should be positioned over the handles of the eject clip before snapping the Adaptor into place. **To remove the Adaptor press down on the eject clip.**

**Screen** (Fig. 1, pg 3) – The screen is the illuminated area where the user can see the instructions for the i-LAB<sup>®</sup>, view result and see if the unit is connected to a computer.

**Center Key** (Fig. 1, pg 3) – ON/OFF - The center key turns on the unit by pressing for a few seconds and turns off the unit by pressing for a few seconds.

**Center Key- OPERATIONS** – When screen says “CENTER/GO” press the Center Key.

**Menu Key** (Fig. 1, pg 3) – The top left key says “MENU”. The Menu key shows the first level of commands including Method, Log (data and memory), and Setup.

**Delete Key** (Fig. 1, pg 3) – The bottom left key says “DEL” is the delete key. The delete key only can delete measurement files in the View Log.

**Scroll Up Key** (Fig. 1, pg 3) – The top right key with the triangle pointing down is the scroll up key to access files and methods.

**Scroll Down Key** (Fig. 1, pg 3) – The bottom right key with the triangle pointing up is the scroll down key to access files and methods.

**Battery Door** On the back of the i-LAB<sup>®</sup> is the battery door. Three “AA” batteries. The two outside ones face (+) up, with the center battery facing (+) down. Use the enclosed Phillips head screw driver to remove the battery door.

**USB Port-** A USB port is at the bottom of the unit. The USB cable can attach the i-LAB<sup>®</sup> to a computer to transfer data and methods.



*i-LAB<sup>®</sup> is a registered trademark of Microptix Technologies, LLC*

# Using the i-LAB<sup>®</sup> Spectrophotometer

**Turn On-** To turn on the i-LAB, simply **press the CENTER key** for one second. The unit's screen will light up. The time should be displayed in the upper right corner. A battery power level is indicated in the upper left corner.

**Access-** Press the **MENU key**. Click the "CENTER" key to see the methods. Use the up and down scroll keys to select the Method. If the light goes off, simply press the "CENTER" key again.

**Methods-** are the programs that direct the i-LAB<sup>®</sup> to measure. Depending on the unit and its capabilities- it may have background, surface reader (SR) methods using CIEXYZ programs, or cuvette (CV) methods, round vial (RV) methods using LABXYZ programs, samplette (SM) methods for liquids using Lab programs, and customized methods. Clicking the "CENTER" key two (if not sleeping) or three times (if sleeping) will start a method.

**Menu-** Press the **MENU key** to access the menu.

## Log

**Scroll down-** to Log. Press the "CENTER" key to open the LOG mode. You'll see **View Log, View Memory, and Clear Log**. Click on "CENTER" key to determine if there are any logs of measurements. Scroll down to see what measurements exist. Logs are generally saved as two digit month, two digit day and sample number (sequential). Click **MENU** key to return to main log.

## View Memory

**Scroll down-** to "View Memory". Click "CENTER" key to determine the capacity of memory to store logs. Click "CENTER" key to return to menu.

## Clear Log

**Scroll down-** to "Clear Log". Click "CENTER" key which will present two options, "Erase ALL stored results" or "Cancel". "Erase All" will delete all stored results, "Cancel" will return to log menu without erasing results.

## Setup

**Scroll down-** to "Setup" and press the CENTER key to find **Backlight Timer (XXs), Auto-off Timer (On), Method Prompt (On), Autosave (On), Sound (on), Time/Date** and **About**.

## Light Timer

**Scroll up-** to the "Backlight Timer" press CENTER key to set amount of time for screen light( off, 1five, 30 or 4five seconds), **Auto-off** (1, 2, or 3 minutes), **Methods Prompt** (On or Off), **Auto-save** (On or Off), **Sound** (On or Off), and **Time/Date** (to be set)

## **Properties**

**Scroll down- to "About"** press CENTER key to locate the Serial number (a letter followed by numbers) of your i-LAB<sup>®</sup> unit, model number, Spectral range, firmware revision and date, and hardware revision.

**Turn Off-** Press the CENTER key and hold for three seconds.

## **Transferring log data to the computer for storage and further analysis**

1. Insert the enclosed Datalog CD software into your computer and follow instructions to download it.
2. Open Datalog software.
3. Attach USB cable to i-LAB<sup>®</sup> port and computer.
4. Allow the computer to locate the i-LAB<sup>®</sup> and then install the Datalogger if this is the first usage.
5. Click on "Datalog" and click on "Result Data".
6. Import your data from the i-LAB<sup>®</sup> to the computer. The data comes in a \*.csv (comma space variable) file that is compatible with many programs. This data is initially stored in the file "iLabResultsData.csv" in the My Documents folder.
7. The data may be saved in an MS Excel or other format for further analysis.
8. It is recommended that data be transferred at least once a day.

# Surface Reader for Solid Surfaces

## TYPICAL METHODS

*In all methods spectra are generated from 400 nm to 700 nm which can be seen and transferred with DATALOG software.*

### Measurement Methods:

- Backg\_SR** Measures and saves background color for the Blank/White reference sample and the Black reference sample.
- BackgLAB\_SR** Measures and saves the Blank/White reference sample. This method uses the spectra obtained using **Backg\_SR**. This method performs and stores the CIE-LAB calculations on the Blank/White reference sample.
- CIEBackg\_SR** Measures and saves the Blank/White reference sample. This method uses the spectra obtained using **Backg\_SR**. This method performs and stores the CIE-LAB calculations on the Blank/White reference sample.
- CIEXYZ4\_SR** Measures sample and compares with background sample (Blank/White sample). The background method **CIEBackg\_SR** generates the background spectrum and CIE calculations for this Blank/White reference sample. For this method to operate properly the method **Backg\_SR** and **CIEBackg\_SR** must have been previously run.
- (CIE uses a D6five light source and 10° observer angle for the CIE-LAB calculations)*
- LabXYZ\_SR** Measures sample and compares with background sample (Blank/White sample). The background method **BackgLAB\_SR** generate the background spectrum and CIE calculations for Blank/White reference sample. For this method to operate properly the method **Backg\_SR** and **BackgLAB\_SR** must have been previously run.
- (Lab uses a C light source and 2° observer angle for the CIE-LAB calculations)*
- QASmp\_SR** Measures a sample, compares with library spectra generated by **QAStd\_SR** and gives best fit with  $R^2$  correlation. For this method to operate properly the method **Backg\_SR** and **QAStd\_SR** must have been previously run.
- QAStd\_SR** Measures and saves up to five library spectra that can be uses by **QASmp\_SR**. This method uses the reference Blank/White and Black samples generate from the method **Backg\_SR**.
- sRGB\_SR –** Measures sample and outputs it in terms of Red, Green, and Blue values. This method uses **BackgLAB\_SR** calculated values and Blank/White reference spectrum. For this method to operate properly the method **Backg\_SR** and **BackgLAB\_SR** must have been previously run.

# Calibrating the i-LAB<sup>®</sup>

## Calibrating and Background

**Important**– An i-LAB<sup>®</sup> with an Adaptor requires a background measurement. This background may be obtained from a previously run program or by calibration. Changing Adaptors requires a new measurement be done.

**Calibrate the instrument and obtain a proper background for the measurement as follows:**

1. Remove the i-LAB<sup>®</sup> protector cap. Place surface reader Adaptor onto i-LAB neck with “i-LAB<sup>®</sup>” logo facing forward. Firmly, snap into place.
2. Turn i-LAB<sup>®</sup> by pressing the CENTER key
3. If the display is not highlighting a method – With the top of the screen displaying “METHOD”, then press MENU key and scroll (to “Method” and Press CENTER key to access the Methods Menu.
4. In the Methods Menu, scroll to **Backg\_SR**
5. Press CENTER key- i-LAB<sup>®</sup> Ready should display with highlighted **Backg\_SR**.
6. Press CENTER key- “Scan Blank/White Sample” will appear with **CENTER** highlighted.
7. Place Adaptor on the sample to be measured. This sample should be a “White” sample. Take care to keep sample flat with Adaptor, not allowing any stray light to enter around the contact area.
8. Press CENTER
9. The i-LAB<sup>®</sup> will start Calibrating and the LEDs will turn on and off- the screen will be dark with occasional flashes of light.
10. The program will stop and request the sample be changed and will ask for “Scan Black Sample. Place the Surface reader Adaptor head into the “Black Hole” end of the Adaptor accessory that is supplied with the Surface Reader Adaptor.
11. Press CENTER key.
12. The i-LAB<sup>®</sup> will start to acquire data (Acquiring) and the LEDs will turn on and off- the screen will be dark with occasional flashes of light.
13. Measurement is complete when the screen reports i-LAB<sup>®</sup> Ready and **Backg\_SR** highlighted.
14. Scroll to **CIEBackg\_SR**

15. Press CENTER key- “Scan Blank/White” will appear with **CENTER** highlighted
16. Place Adaptor on the sample to be measured. This sample should be a “Blank/White” sample. Take care to keep sample flat with Adaptor, not allowing any stray light to enter.
17. Press CENTER key.
18. The i-LAB<sup>®</sup> will start Calibrating and the LEDs will turn on and off- the screen will be dark with occasional flashes of light.
19. Measurement is completed when the screen stays on and shows i-LAB<sup>®</sup> Ready and the **CIEBackg\_SR** is highlighted.
20. The instrument is now calibrated to analyze samples with this Surface Reader Adaptor.

# Surface Reader Instructions

## Analyzing Samples

*If using your i-LAB for the first time be sure to Calibrate prior to following the below instructions.*

1. In the Methods Menu - Scroll up or down to get to **CIEXYZ\_SR** and press the CENTER key.
2. Response will be “Scan Sample” with CENTER highlighted.
3. Place the Adaptor directly onto the sample. Take care to keep sample flat with Adaptor, not allowing any stray light to enter. Press CENTER key.
4. The i-LAB<sup>®</sup> will start to acquire data and the LEDs will turn on and off. The screen will be dark with occasional flashes of light. Measurement is completed when the screen stays on and presents the CIE measurements results to the screen.
5. Respond to each output result seen on the screen with a Press of the CENTER key.
6. The results data will not be saved to the log until all the results have been responded with a Press of the CENTER key and the screen reports i-LAB<sup>®</sup> Ready and **CIEXYZ\_SR** is highlighted.
7. The log is saved under a number in the upper right hand screen and will have the time and date, also recorded. The measurements and spectra numbers from 400 nm to 700 nm are saved.

## Measuring a Solid Surface with CIE XYZ Method

*The output to the i-LAB<sup>®</sup> screen will be the following:*

CIE X

CIE Y

L\*

A\*

CIE Z

B\*

Delta E

Chroma

Saturation (internal)

Delta H\*ab

Yellowness vs. reference

Whiteness vs. reference

Tint Index

*These parameters may not be on every i-LAB<sup>®</sup>*

# Measuring a Solid Surface with QA (Color Matching) Method

## Calibrating and Background

***Important**– An i-LAB<sup>®</sup> with an Adaptor requires a background measurement. This background may be obtained from a previously run program or by calibration. Changing Adaptors requires a new measurement be done.*

Calibrate the instrument and obtain a proper background for the measurement by following the calibration directions on pages 10 & 11.

## Measurement Instructions

1. If the display is not highlighting a method then press MENU key, scroll to “Method” and press CENTER key to access the Methods Menu.
2. In the Methods Menu, scroll (with scroll up and down keys) until on **QAStd\_SR**
3. Place Adaptor over the reference sample #1 to be measured. Take care to keep sample flat with Adaptor, not allowing any stray light to enter.
4. Press CENTER key – “Scan Sample#1” will appear with **CENTER** highlighted.
5. The i-LAB<sup>®</sup> will start to acquire data and the LEDs will turn on and off- the screen will be dark with occasional flashes of light. Measurement is completed when the screen stays on it “Menu or Scan Sample#2”.
6. If this is the last sample to be added to the Reference Library, Press the Menu key.
7. If an additional Library reference sample is desired, place the Adaptor on the sample and Press CENTER key. Take care to keep sample flat with Adaptor, not allowing any stray light to enter.
8. The i-LAB<sup>®</sup> will start to acquire data and the LEDs will turn on and off. The screen will be dark with occasional flashes of light. Measurement is completed when the screen indicates “Menu or Scan Sample#3”.
9. Repeat steps 7-9 until all the five-samples (the desired number – up to five) have added to the Reference Library.
10. Measurement is completed when the screen indicates i-LAB<sup>®</sup> Ready and **QAStd\_SR** is highlighted.

## Analyzing Samples using Surface Reader

11. If the display is not highlighting a method – With the top of the screen displaying “METHOD”, then press MENU key and scroll to “Method” and Press CENTER key to access the Methods Menu.
12. In the Methods Menu, scroll until on **QASmp\_SR**
13. Press CENTER key- “Scan Sample” will appear with CENTER highlighted.
14. Place the Adaptor directly onto the sample. Take care to keep sample flat with Adaptor, not allowing any stray light to enter. Press CENTER key.
15. The i-LAB<sup>®</sup> will start to acquire data and the LEDs will turn on and off. The screen will be dark with occasional flashes of light. Measurement is completed when the screen stays on and it gives the reading “HQI nQA\_Lib#\_SR Corr value:0.XXXXXX”. This is describing the Pearson correlation between the best fit QA standard (library) and the R<sup>2</sup> number.
16. The log is saved under a number in the upper right hand screen and will show the time and date, too. The measurements HQI results are saved to the log.
17. Transfer data to Datalog software as described under the CIE\_LAB method.

# Measuring a Solid Surface with LAB XYZ Method

*The output to the i-LAB<sup>®</sup> screen will be the following:*

L\* Sample

a\* Sample

b\* Blank/White

Delta E

*These parameters may not be on every i-LAB<sup>®</sup> as additional methods can be added*

## Round Vial Adaptor Measuring Liquids

### Measurement Methods

**Backg\_RV** – Measures and saves background color for the Blank/White reference sample and the Black reference sample.

**BackgLAB\_RV** – Measures and saves the Blank/White reference sample. This method uses the spectra obtained using **Backg\_RV**. This method also performs and stores the CIE-LAB calculations on the Blank/White reference sample.

**CIEBackg\_RV** – Measures and saves the Blank/White reference sample. This method uses the spectra obtained using **Backg\_RV**. This method also performs and stores the CIE-LAB calculations on the Blank/White reference sample.

**CIEXYZ\_RV** – Measures sample and compares with background sample (Blank/White sample). The background method **CIEBackg\_RV** generates the background spectrum and CIE calculations for this Blank/White reference sample. For this method to operate properly the method **Backg\_RV** and **CIEBackg\_RV** must have been previously run.

*(CIE uses a D6five light source and 10° observer angle for the CIE-LAB calculations)*

**LabXYZ4\_RV** – Measures sample and compares with background sample (Blank/White sample). The Background method **BackLAB\_RV** generates the background properly the method **Backg\_RV** and **BackgLAB\_RV** must have been previously run.

*(Lab uses a C light source and 2° observer angle for the CIE-LAB calculations)*

- QASmp\_RV** – Measures a sample, compares with library spectra generated by **QAStd\_RV** and gives best fit with  $R^2$  correlation. For this method to operate properly the method **Backg\_RV** and **QAStd\_RV** must have been previously run.
- QAStd\_RV** – Measures and saves up to five library spectra that can be used by **QASmp\_RV**. This method uses the reference Blank/White and Black samples generated from the method **Backg\_RV**.
- sRGB\_RV** – Measures sample and outputs it in terms of Red, Green, and Blue values. This method uses **BackgLAB\_RV** calculated values and Blank/White reference spectrum. For this method to operate properly the method **Backg\_RV** and **BackgLAB\_RV** must have been previously run.

## Measuring a Liquid with LAB XYZ Method

### Measurement Methods

- Backg\_RV (and Backg\_CV)** – The round vial (and cuvette) LABXYZ method for calibration of the instrument. This method is the equivalent to the CIE\_LAB method **Backg\_SR**, except it is using the C-illumination and 2° observer.
- BackgLAB\_RV (and BackgLAB\_CV)** – The round vial (and cuvette) LABXYZ method for background of the instrument. This method is the equivalent to the CIE\_LAB method **CIEBackg\_SR**, except it is using the C-illumination and 2° observer.
- LABXYZ\_RV (and LABXYZ\_CV)** – The round vial (and cuvette) LABXYZ method for analyzing the sample. This method is the equivalent to the CIE\_LAB method **CIEXYZ\_SR**, except it is using the C-illumination and 2° observer.
- QASmp\_RV (and QASmp\_CV)** – The round vial (and cuvette) LABXYZ method for analyzing the sample. This method is the equivalent to the CIE\_LAB method **QASmp\_SR**, except it is using the C-illumination and 2° observer.
- QAStd\_RV (and QAStd\_CV)** – The round vial (and cuvette) LABXYZ method for background of the instrument. This method is the equivalent to the CIE\_LAB method **QAStd\_SR**, except it is using the C-illumination and 2° observer.
- sRGB\_RV (and sRGB\_CV)** – The round vial (and cuvette) LABXYZ method for analyzing the sample. The method generates RGB values based on using the C-illumination and 2° observer.

# Measuring a Liquid with RGB Method using the Round Vial Adaptor

*The output to the i-LAB<sup>®</sup> screen will be the following:*

Red =

Green =

Blue =

## Calibrating and Background

**Important**– An i-LAB<sup>®</sup> with an Adaptor requires a background measurement. This background may be obtained from a previously run program or by calibration. Changing Adaptors requires a new measurement be done.

Calibrate the instrument and obtain a proper background for the measurement by following the calibration directions on pages 10 & 11.

## Measurement Instructions

1. If the display is not highlighting a method – With the top of the screen displaying “METHOD”, then press MENU key and scroll to “Method” and Press CENTER key to access the Methods Menu.
2. In the Methods Menu, use Scroll up or Scroll down key until **sRGB\_RV** is located.
3. Press CENTER key- “Scan Sample” will appear with **CENTER** highlighted.
4. Place the sample in the Adaptor to be measured.
5. Press CENTER key.
6. The i-LAB<sup>®</sup> will start to acquire data and the LEDs will turn on and off. The screen will be dark with occasional flashes of light. Measurement is completed when the screen stays on and it has **RED= XXX.XXX** Color with **CENTER** highlighted.
7. Press the CENTER key and **Green= XXX.XXX** Color will appear with **CENTER** highlighted.
8. Press the CENTER key and **Blue= XXX.XXX** Color will appear with **CENTER** highlighted.
9. Press the CENTER key.

10. To save results, scroll through all results by pressing CENTER key when you are prompted “OK”. Results are saved once the screen stays on saying i-LAB<sup>®</sup> Ready and **sRGB\_RV** is highlighted.
11. The log is saved under a number in the upper right hand screen and will show the time and date. The measurements and spectra numbers from 400 nm to 700 nm are saved.
12. Transfer data to Datalog software as described under the CIE\_LAB method.

*The output to the i-LAB<sup>®</sup> screen will be the following:*

X Spectrum

Y Spectrum

CIE X Sample

CIE Y Sample

CIE X Sample

Red

Green

Blue

## Cuvette Adaptor Measuring Liquids

### Measurement Methods

**Backg\_CV** – Measures and saves background color for the Blank/White reference sample and the Black reference sample.

**CIEBackg\_CV** – Measures and saves the Blank/White reference sample. This method uses the spectra obtained using **Backg\_CV**. This method also performs and stores the CIE-LAB calculations on the Blank/White reference sample.

**CIEXYZ\_CV** – Measures sample and compares with background sample (Blank/White sample). The background method **CIEBackg\_CV** is first used to generate the background spectrum and CIE calculations for this Blank/White reference sample. For this method to operate properly the method **Backg\_CV** and **CIEBackg\_CV** must have been previously run.

*(CIE uses a D65 light source and 10° observer angle for the CIE-LAB calculations)*

**BackgLAB\_CV** – Measures and saves the Blank/White reference sample. This method uses the spectra obtained using **Backg\_CV**. This method also performs and stores the CIE-LAB calculations on the Blank/White reference sample.

**LabXYZ\_CV** – Measures sample and compares with background sample (Blank/White sample). The background method **BackgLAB\_CV** is first used to generate the background spectrum and CIE calculations for this Blank/White reference sample. For this method to operate properly the method **Backg\_CV** and **BackgLAB\_CV** must have been previously run.

*(Lab uses a C light source and 2° observer angle for the CIE-LAB calculations)*

**sRGB\_CV** – Measures sample and outputs it in terms of Red, Green, and Blue values. This method uses **BackgLAB\_CV** calculated values and Blank/White reference spectrum. For this method to operate properly the method **Backg\_CV** and **BackgLAB\_CV** must have been previously run.

**QAStd\_CV** – Measures and saves up to five library spectra that can be used by **QASmp\_CV**. This method uses the reference Blank/White and Black samples generated from the method **Backg\_CV**.

**QASmp\_CV** – Measures a sample, compares with library spectra generated by **QAStd\_CV** and gives best fit with  $R^2$  correlation. For this method to operate properly the method **Backg\_CV** and **QAStd\_CV** must have been previously run.



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