

Quick Start Guide

Octet® BLI System

Octet® BLI R8 & Octet® BLI Discovery Control Software
A Practical Guide



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SARTORIUS

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1 About this Document

1.1 Validity

This document applies to the following versions of the device:

Device
Octet® R8
Octet® BLI Discovery
Octet® Analysis Studio

This document provides the basic steps in setting up and using the Octet® R8 BLI system for kinetics and affinity and Octet® quantitation assays.

The scope of this document is to provide easy and fast access to using the Octet® R8 BLI system and its software. Users should use this document to answer simple questions about the system and software design. For more in-depth inquiries, scientists should contact their local Field Applications Specialist (FAS).

The operating instructions provided must be observed. The operating instructions describe how to use the product correctly.

1.2 Related Documents

- In addition to these instructions, please observe the following documents:
 - Operating instructions for Octet® BLI Discovery and Octet® BLI Analysis User Guides, supplied with the Octet® BLI system
 - Octet® BLI System: A Beginner's Guide

2 Safety

Observe the safety information in the operating instructions provided with the device. The operating instructions describe how to use the product correctly.

WARNING

Risk of fire!

Restricting the airflow can damage the instrument or cause a fire.

- ▶ Do not block, push objects into, or allow dust to accumulate in the air vents.
- ▶ Do not store an Octet® system in a low airflow environment, such as a closed cabinet, while in operation.

WARNING

Risk of fire!

Using incompatible cables or improperly connecting cables to a power strip or electrical outlet may damage the equipment or cause a fire.

- ▶ Connect the power cord between the product and a grounded AC outlet. Power connectors and power strips vary among countries.
- ▶ Use only certified power cord sets having at least 16 AWG/3G (3 x 0.75mm²) cable with power plug and connector rated 250 V, 10 A.

WARNING

Risk of injuries to users!

If the Octet® system is not used as specified, injury to the user and/or damage to the instrument may result.

- ▶ Keep the area around the sample door clear and unobstructed.

NOTICE

Do not position the Octet® instrument in a way that makes it difficult to disconnect the power.

NOTICE

Octet® system, software installation or any changes to the Octet® controller should be performed by Sartorius personnel only.

3 Description

3.1 How Does BLI Work?

BLI is an optical, label-free, real-time technology that measures the changes in interference pattern between light waves.

The Octet® BLI platforms measure light interference originating from the tip of the biosensor surface, where light wavelengths are made to reflect from two layers: a biocompatible layer at the end of the biosensor surface, and an internal reference layer.

For more information see the [instruction video](#).

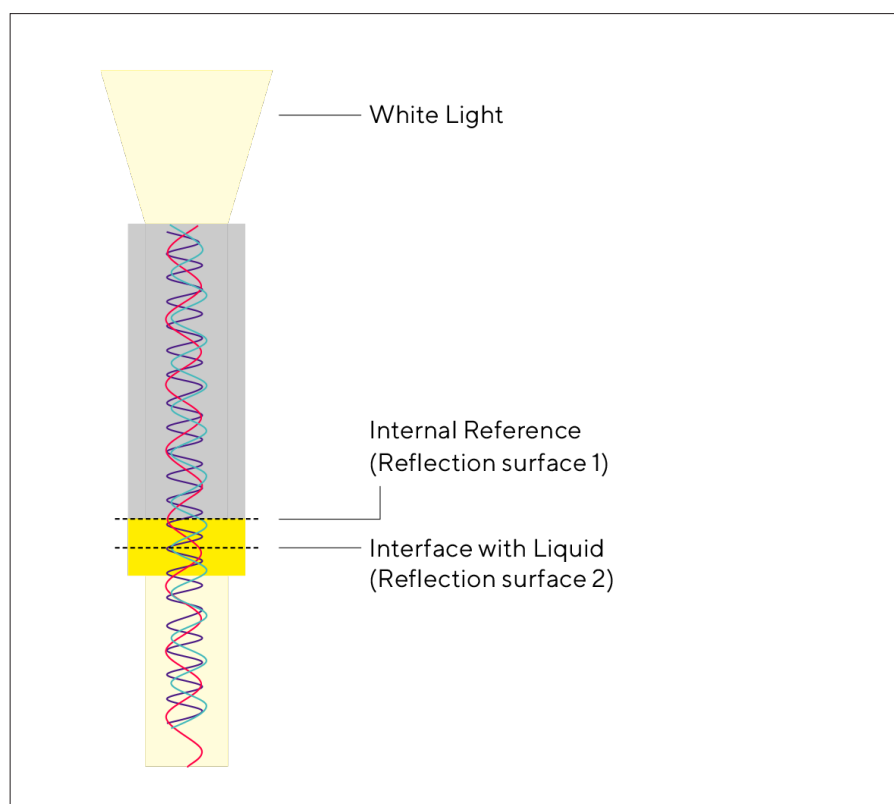


Fig. 1: BLI Is an Optical Analytical Technique That Analyzes the Interference Pattern of White Light Reflected from Two Surfaces

Description

Dip and Read biosensors contain two optical interfaces at the biosensor tip: the internal reference layer (optical layer) and the surface biocompatible matrix which interfaces with liquid and upon which ligand molecules are immobilized.

Incident white light that reflects from the two layers contains a mixture of wavelengths that show either constructive, partially constructive, or destructive interference. This relative intensity output depends on the thickness of the molecular bilayer at the biosensor tip and, therefore, BLI is sensitive to changes in the amount of analyte bound to an immobilized ligand. Initially, a baseline wave is observed when the biosensor is dipped into assay buffer.

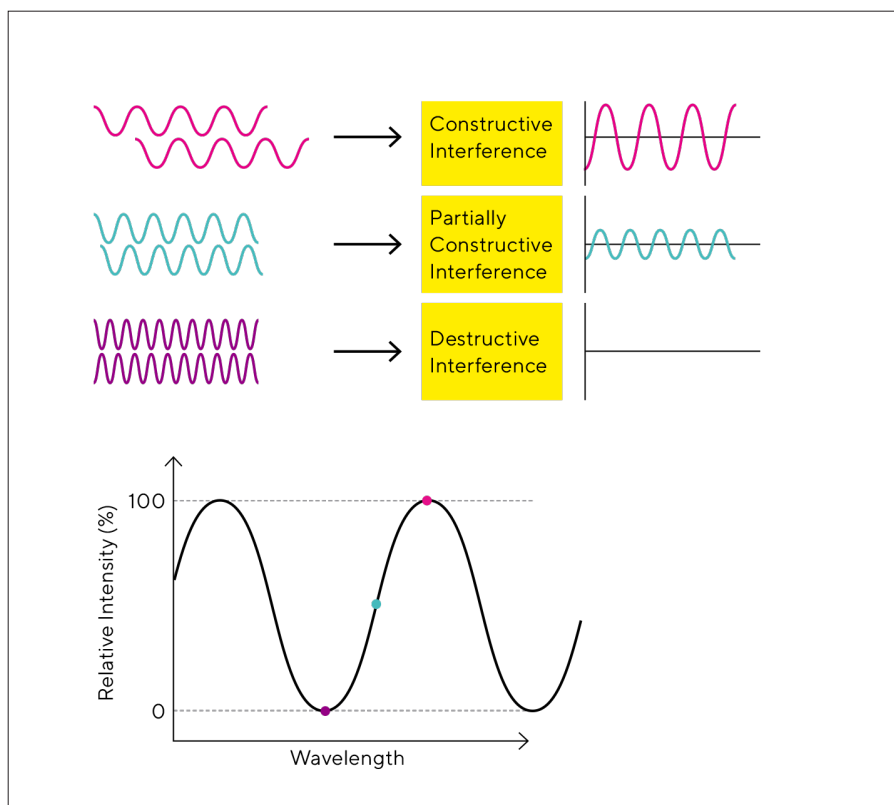


Fig. 2: Interferometry: Measurement of Interference of Light Between Two Waves

Description

Incident white light reflects from the two layers and contains a mixture of wavelengths that show either constructive, partially constructive, or destructive interference.

The spectral pattern of the reflected light changes as a function of the optical thickness of the molecular layer (i.e., the number of analyte molecules bound to the ligand at the biosensor surface). As the assay progresses and the ratio of free and bound ligand changes, the spectral shift is monitored at the detector and reported on a response curve as a change in wavelength (nm shift).

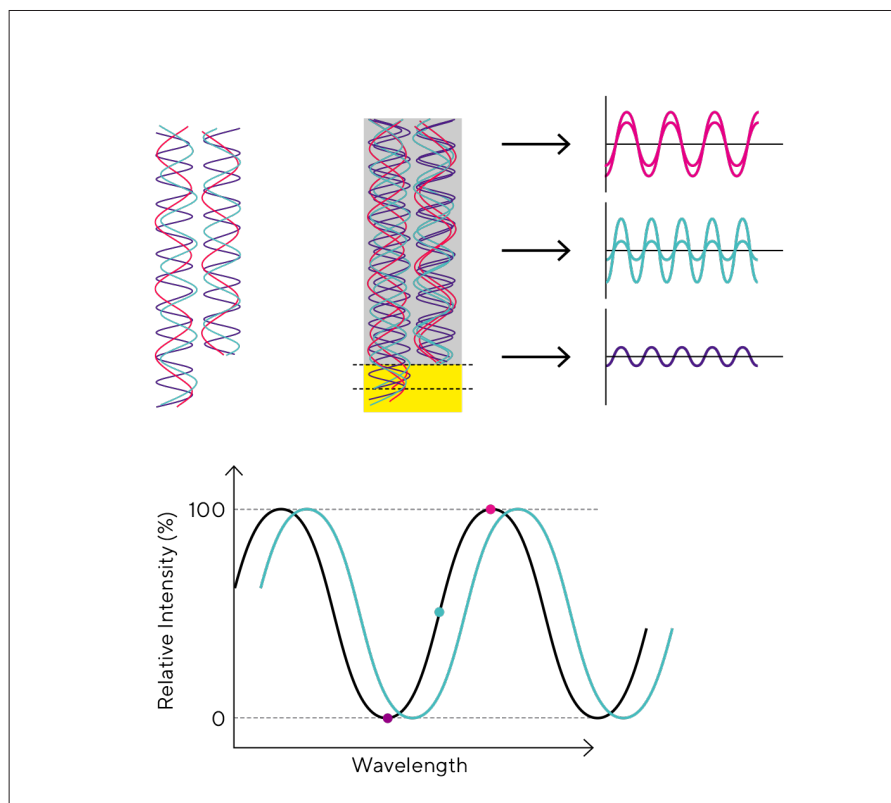


Fig. 3: Interference Pattern Changes with Increased Molecular Thickness

Description

The relative intensity output depends on the thickness of the molecular bilayer at the biosensor tip. Changes in the ratio of free and bound ligand produce a spectral shift that is reported on a response curve as a change in wavelength (nm shift).

Monitoring the interference pattern (i.e., spectral shift) in real time provides kinetics data on molecular interactions.

Dip and Read biosensors are fundamental to BLI technology. The biosensor tip is coated with a biocompatible matrix that minimizes non-specific binding, while providing a uniform and non-denaturing surface for biomolecules. BLI's ability to characterize interactions directly in complex matrices and non-purified samples is a key advantage. This is possible due to the robustness of the biosensor architecture and the lack of complex fluidic pathways for introducing the sample to the immobilized ligand. The biosensor moves to a 96- or 384-well plate and is "dipped" into the sample. This provides a robust, flexible, and simple way to introduce an analyte to the sensor surface to monitor binding.

3.2 Octet® R8 system

The Octet® R8 system is a benchtop instrument that should be installed on a standard, non-flammable laboratory bench with a sufficient weight capacity.

The door on the system is opened and closed by lifting and lowering the yellow handle.

The waste container utilizes a push-click locking system. To open the waste container, push on the drawer and completely remove it from the system. To replace the waste container, push the drawer in until a click is felt.

For more information see the [instruction video](#).

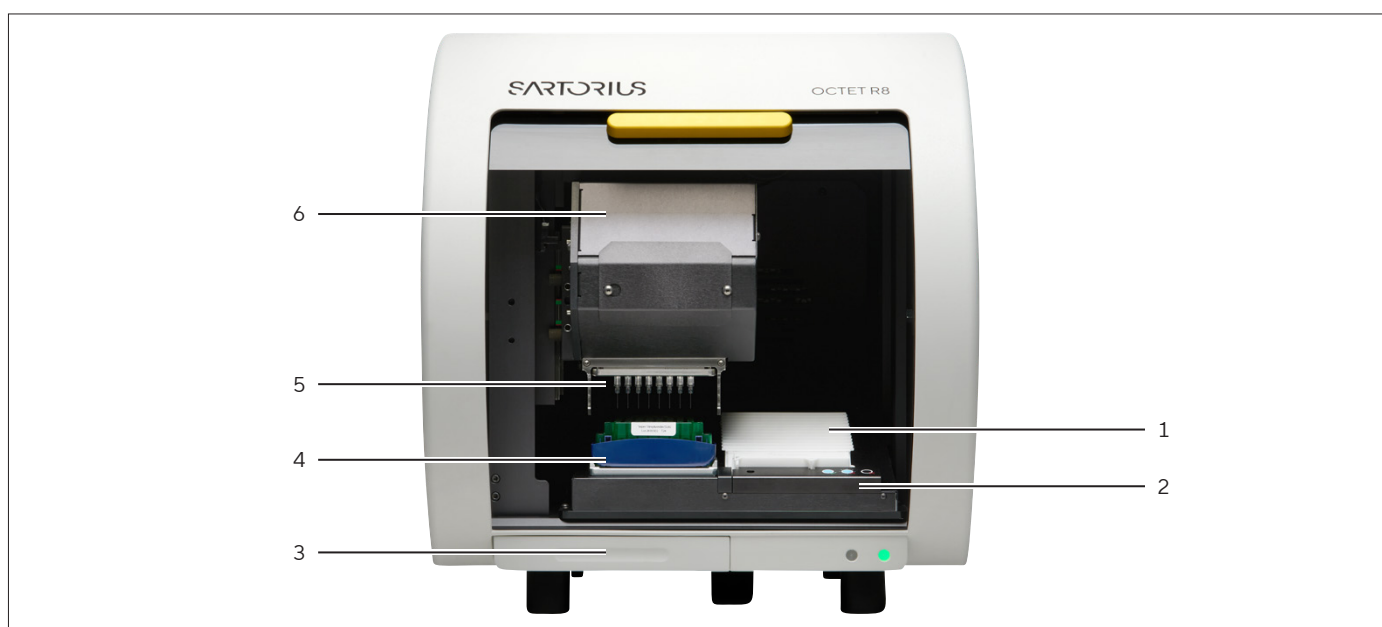


Fig.4: Octet®-R8 (door open)

Pos.	Name	Description
1	Sample plate with evaporation cover	Instruction video
2	Orbital shaker	
3	Waste container	Instruction video
4	Biosensor tray	Instruction video
5	8-channel biosensor manifold	
6	Optics	

3.2.1 Electrical Connectors

The power switch can be found on the left-hand side at the rear of the system above the power socket. The Octet® BLI instrument should remain powered on at all times and it is recommended to leave the instrument on for a minimum of eight hours prior to using it for the first time.

For more information see the [instruction video](#).

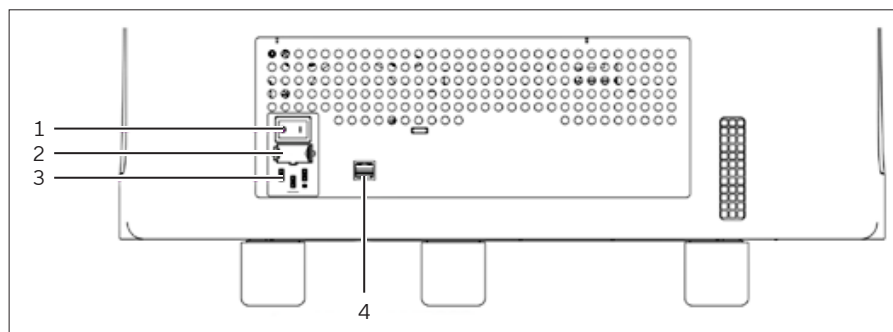


Fig. 5: Octet® R8 Rear View

Pos.	Name
1	Power switch
2	Fuse tray
3	Power socket
4	Communication port

3.2.2 Electrical Connection

- Only use the power cords provided by Sartorius or an AC cord rated 60 C, 300 V, 16 AWG or better.
- Do not connect the system and computer to an electrical circuit with high intermittent power draws such as refrigerators, freezers, compressors, or vacuum pumps.
- If your site has a history of power outages, spikes, and/or drops, use an on-line uninterpreted power supply (UPS) to power the instrument and computer. Your Sartorius service representative can provide specifications for the recommended UPS system.

3.2.3 Warm-up Period

If the instrument is powered down, turn the system on using the power switch and allow at least 60 minutes for the instrument to warm up prior to running the first experiment (a warmup period of 3 hours is recommended when performing kinetic assays).

4 Operating Design

4.1 Starting the Octet® BLI Discovery Software

To start the system and software

1. Turn on the computer
2. Make sure the door is closed and turn on the Octet® BLI system using the power switch
3. Wait 5 minutes for the instrument to connect to the PC.
4. Launch the Octet® BLI Discovery software by double clicking on the Octet® BLI Discovery desktop icon.



4.2 Main Menu and Toolbar

After the software is launched, the Octet® BLI Discovery software Main Screen components along with the default windows will appear.

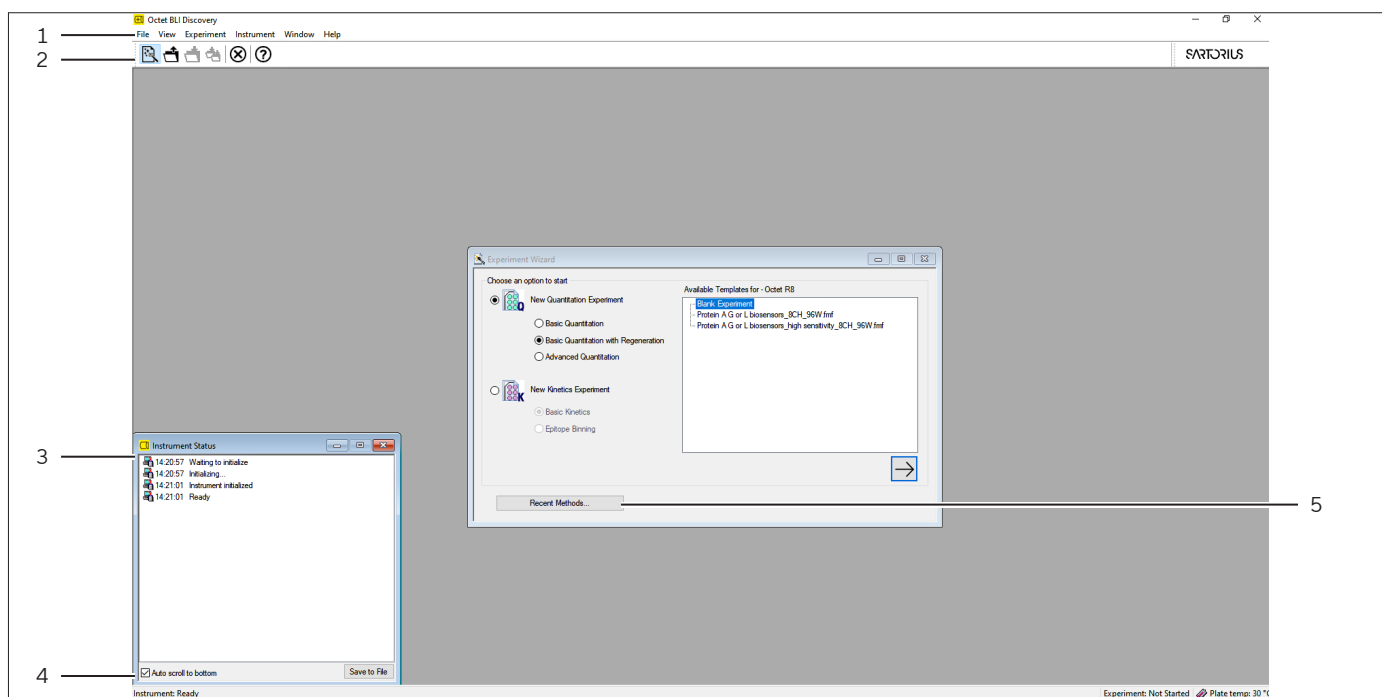


Fig. 6: Octet® BLI Discovery Software Main Screen

Pos.	Name
1	Main Menu
2	Toolbar
3	Instrument Status Window
4	Status Bar
5	Experiment Wizard

4.2.1 Toolbar

The Toolbar is located in the upper left of the Main Screen. The Main Menu functions of each section are discussed below.

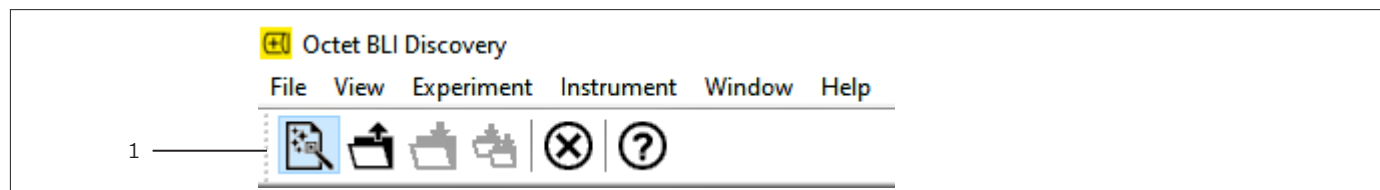


Fig. 7: Toolbar

Pos.	Name
1	Toolbar

4.2.2 File Menu

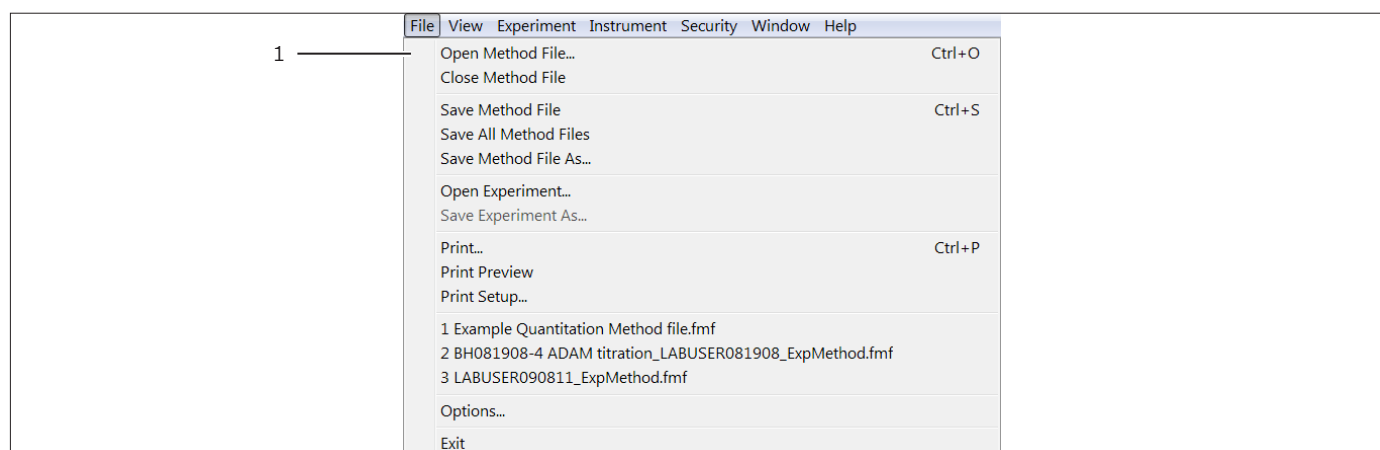


Fig. 8: File Menu

Pos.	Name
1	File menu

The File menu allows users to open and save method files, view experiments, print files and set system and software options.

A method file (.fmf) contains sample plate configuration, sample plate table information, sensor assignments, and assay step information that allow the Octet® BLI instrument and software to run an experiment.

A read-only copy of the method file will automatically be saved in the experiment folder when the run is started. When the run is complete, the data in the experiment folder can be reviewed.

Menu Commands

Symbol	Name	Description
	Open Method File	Opens an experiment method file (.fmf).
	Close Method File	Closes the active experiment method file but does not save changes
	Save Method File	Saves the active experiment method file (.fmf).
	Save All Method Files	Saves all open method files (.fmf).
	Save Method File As	Save the active experiment method file as a new file without overwriting the original method file.
	Open Experiment	Opens an experiment folder.
	Save Experiment	Saves the active experiment.
	Print	Opens the Print dialog box to print a file.
	Print Preview	Opens a print preview window of a method or assay definition file.
	Print Setup	Opens the Print Setup dialog box to print a file.
	File History	Displays a list of previously opened files.
	Options	Opens the Options dialog box.
	Exit	Closes the software.

4.2.3 View Menu

The View menu allows users to show or hide the Toolbar and status windows. A check mark next to the menu item indicates the option is currently shown.

Menu Commands

Name	Description
Toolbar	Shows or hides the Toolbar.
Status Bar	Shows or hides the Status bar.
Instrument Status	Displays the Instrument Status window.

4.2.4 Experiment Menu

The Experiment menu provides access to the Experiment Wizard, assay and experiment options as well as experiment templates.

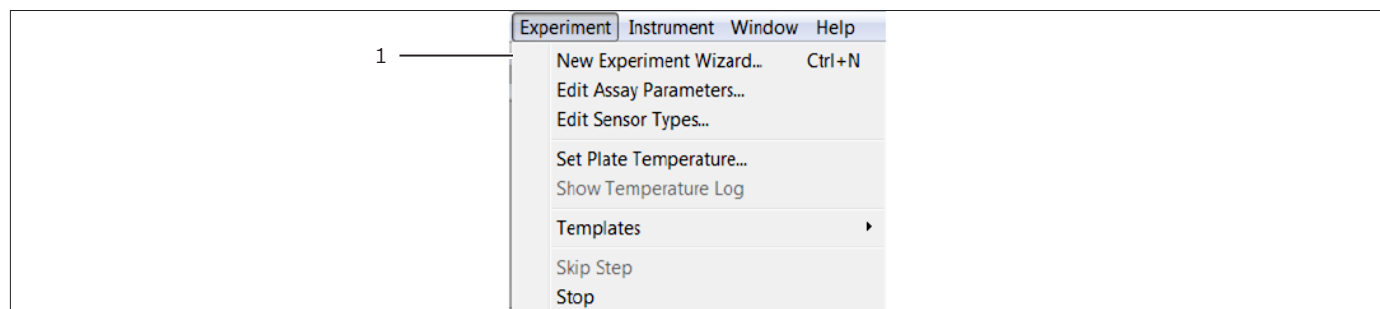


Fig. 9: Experiment Menu

Pos.	Name
------	------

1	Experiment menu
---	-----------------

Menu Commands

Symbol	Name	Description
	New Experiment Wizard	Opens the Experiment Wizard.
	Edit Assay Parameters	Opens the Edit Assay Parameters dialog box to define a new assay, edit an existing assay, or remove an assay from the quantitation application.
	Edit Sensor Types	
	Set Plate Temperature	Opens the Temperature Setting dialog box that displays the current sample plate temperature and allows users to change the current temperature setting of the instrument. For more information see chapter “6 Frequently Asked Questions”, page 17
	Templates	Allows users to select from a set of predefined quantitation or kinetics method templates.
	Skip Step	Skips the step in the method that is currently executing (kinetics experiments only).
	Stop	Stops the experiment. Data from the active biosensor is not saved, but all data prior to the active biosensor will be available.

4.2.5 Instrument Menu

The Instrument menu provides direct control of the Octet® instrument.

Menu Commands

Name	Description
Reset	Resets the instrument and the log in the Instrument Status window.
Stop Shaker	Stops the sample plate shaker.

4.2.6 Window Menu

The Window menu provides options for the open windows in the Main Screen. All open windows are listed at the bottom of the menu, and a check mark indicates the window that is currently active. To view another window, select it from the list. Open windows can be automatically arranged using the menu commands.

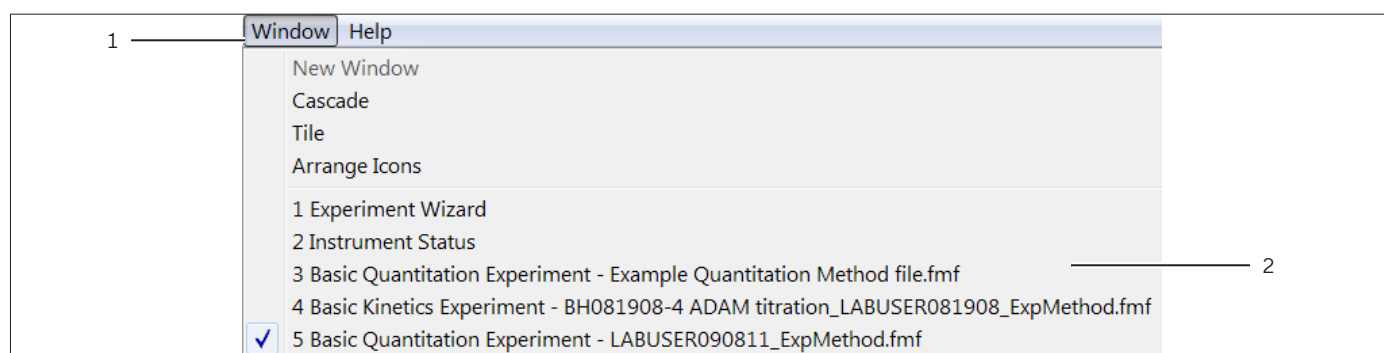


Fig. 10: Window Menu

Pos.	Name
1	Window menu
2	Open Windows

Menu Commands

Name	Description
New Window	Opens a new Runtime Binding Chart window.
Cascade	Organizes all windows in a cascade.
Tile	Tiles all windows vertically.
Arrange Icons	Arranges the minimized window icons in a row at the bottom of the screen.
Open Windows	Lists the windows currently open.

5 Cleaning the Octet® R8 system

In general, Octet® BLI systems are essentially maintenance free but for best performance of the system it is recommended that cleaning of the system should be performed every two weeks or after any period of extended heavy usage. The following protocol should be used for cleaning the pick-up tips.

For more information see the [instruction video](#).



Fig. 11: Octet® R8 pick-up tips

1. Turn the instrument power off.
2. Open the instrument door by pulling up on the yellow handle.
3. Spray a Kimwipe® tissue with 70% isopropyl alcohol.
4. Wipe the sides of the pick-up tips with the wet Kimwipe® tissue (Do not worry about touching the lenses on the bottom, they are set back, and the wipe will not contact the lens).



5. Allow the pick-up tips to dry for at least one minute (with the instrument door open).
6. Close the instrument door by pulling down on the yellow handle.
7. Turn the instrument power on and allow the lamps to warm up prior to performing any assays.

6 Frequently Asked Questions

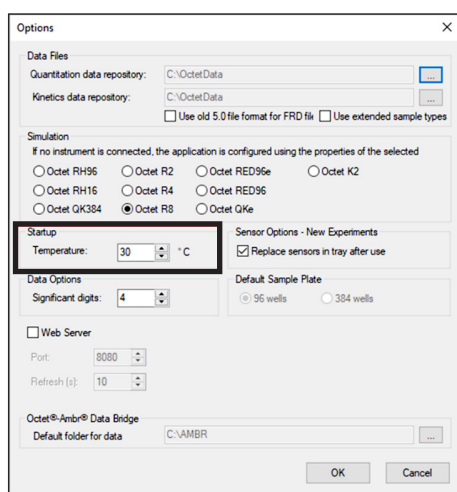
6.1 How do I Change the Plate Temperature?

A factory-set default plate temperature of 30 °C is used as a system startup plate temperature and the experiment default temperature. This default value can be customized by the user. In addition, the plate temperature setting can be changed for individual experiments when needed. The current plate temperature displays in the Status bar at the bottom of the Main Screen.

6.1.1 Defining a New Default Sample Plate Temperature

IMPORTANT: For the new default temperature value to take effect, you must restart the software. To define a new default temperature that will be used at startup and as the default plate temperature for all experiments:

1. From the Main Menu, click File > Options.
2. In the Options dialog box, select a new temperature in the Startup box and click OK. The plate temperature will then adjust to the new value, and this setting will be used as the new default startup temperature whenever the software is launched.
3. Allow the sample plate to equilibrate to the new temperature before beginning an experiment. For experiments set to 25 °C or 30 °C, allow approximately 10 minutes for a plate at room temperature. For experiments set to 15 °C, allow approximately 20 minutes for plate at room temperature. If the temperature is increased to 30 °C from a previous run at 15 °C, then allow 20 minutes for the plate to equilibrate.

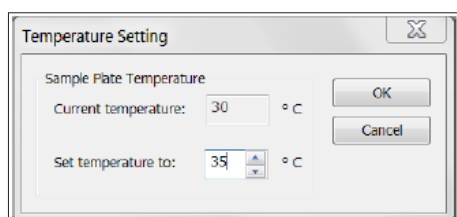


6.1.2 Changing the Plate Temperature for Individual Experiments

If the Octet® BLI Discovery software is closed, the plate temperature will reset to the default startup value specified in the Options dialog box when the software is relaunched.

To set the plate temperature to a value different than the default setting for a specific experiment:

1. From the Main Menu, click Experiment > Set Plate Temperature.
2. Select the desired temperature in the Set temperature to field and, then click OK.
3. Allow the sample plate to equilibrate to the new temperature before beginning an experiment. For experiments set to 25 °C or 30 °C, allow approximately 10 minutes for a plate at room temperature. For experiments set to 15 °C, allow approximately 20 minutes. If the temperature is increased to 30 °C from a previous run at 15 °C, then 20 minutes should be sufficient time for the plate to equilibrate.



6.2 How do I set the Default Location for my data?

Sartorius recommends that the data be saved to the local machine first, then transferred to a network drive if needed.

1. From the Main Menu, click File > Options.
2. The default location is shown in the Data Files section.
3. Click the three dots (browse) to select a different folder. This can be performed for both Quantitation and Kinetics data repositories.

6.3 How can I set the System to Eject Used Biosensors to the Waste Container?

The default setting for the Octet® BLI system is to replace the biosensors back into the biosensor tray after use but this can be changed to them being ejected to the waste container by:

1. From the Main Menu, click File > Options.
2. The replace sensors in tray after use default option is shown in the Sensor Options _ New Experiments section.
3. Untick the default option for used biosensors to be ejected to the waste container.

6.4 Can I Design Methods on a Computer not Attached to the Octet® BLI System?

If you are using the CFR version of the software, the remote computer must be able to connect to the GxP Server. CFR and non-CFR method files are not interchangeable.

You can install the BLI Discovery software on another computer, say a laptop computer in another room, and design the experiment on that laptop. To do this, perform the following steps:

1. Install the BLI Discovery on any Windows 10 PC following the steps described earlier in this chapter.
2. Start the BLI Discovery software.
3. On the main screen, click File > Options to open the Options dialog box.
4. In the Simulation group box, select the target instrument type for the experiment.
5. Click OK to accept the settings.
6. Use BLI Discovery to design an experiment using the instructions in this guide.
7. After designing the experiment, save the experiment method file to a USB device or a file server connected to the Octet® PC.
8. Start BLI Discovery software and load the experiment method file. Mount the appropriate sensor trays and sample plates and start the assay.

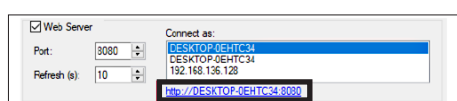
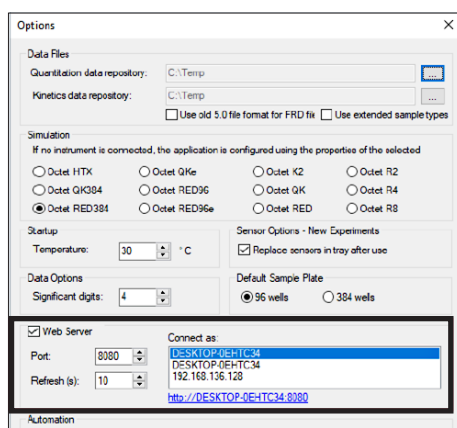
6.5 Can I Monitor my Assay Remotely?

Sartorius recommends using the Port and Connect as (IP address) settings shown as default in the Web Server box, as they are unique to your Octet® system.

The remote computer or device must be on the same network as the Octet® system, or connected to the network the instrument is on via VPN

If the Octet® system computer is connected to a local network, experiment progress can be monitored remotely from any networked computer, smartphone or mobile device using any web browser. In addition, instrument log files and previously run experiments can also be accessed remotely for review.

1. From the Main Menu, click File > Options.
2. In the Options dialog box, select the Web Server check box. Adjust the Port and Refresh settings and change the Connect as IP address if needed. The default Refresh rate of 10 will refresh the experiment view in the web browser every 10 seconds. Click OK.



3. Click File > Options to access the Options dialog box again. A Web Server URL will now be listed under the Connect as box. Record this URL as it will be needed to access the experiment remotely.
4. Start the experiment in the Octet® BLI Discovery software as you normally would.
5. Open a web browser on a remote computer or device that is on the same network as the Octet® system

7 Trademark Information

Kimwipe® is a registered trademark of Kimberly-Clark Worldwide, Inc.

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The information and figures contained in these instructions correspond to the version date specified below.

Sartorius reserves the right to make changes to the technology, features, specifications and design of the equipment without notice.

Masculine or feminine forms are used to facilitate legibility in these instructions and always simultaneously denote all genders.

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