A single
and powerful
software platform
to control all **Bio-Logic**
potentiostats/galvanostats...

Bio Logic
Science **Instruments**

- EC-Lab®
- EC-Lab® Express
- EC-Lab® development package

EC-Lab®

A comprehensive **modular** and **powerful** software

EC-Lab® is a common platform for controlling all Bio-Logic potentiostats/galvanostats, be it single channel or multichannel systems and across all our hardware technologies. It is Windows-based, compatible with either 64-bit or 32-bit operating systems.

EC-Lab® software is a multi-device software able to control several potentiostats from a single interface view. The firmware of the instrument is loaded at interface launch, and hardware control is completely autonomous while the experiment is running.

Versatile interface

EC-Lab® enables the user to define a personalized profile to retain favourite settings for screen representations and tool bars. The software allows for remote access to an instrument on a network. When used as a multichannel system, several channels of the unit can be synchronized, grouped or stacked.

Dedicated techniques

With more than 70 techniques available in 9 different categories, **EC-Lab®** can address all the electrochemical application areas.
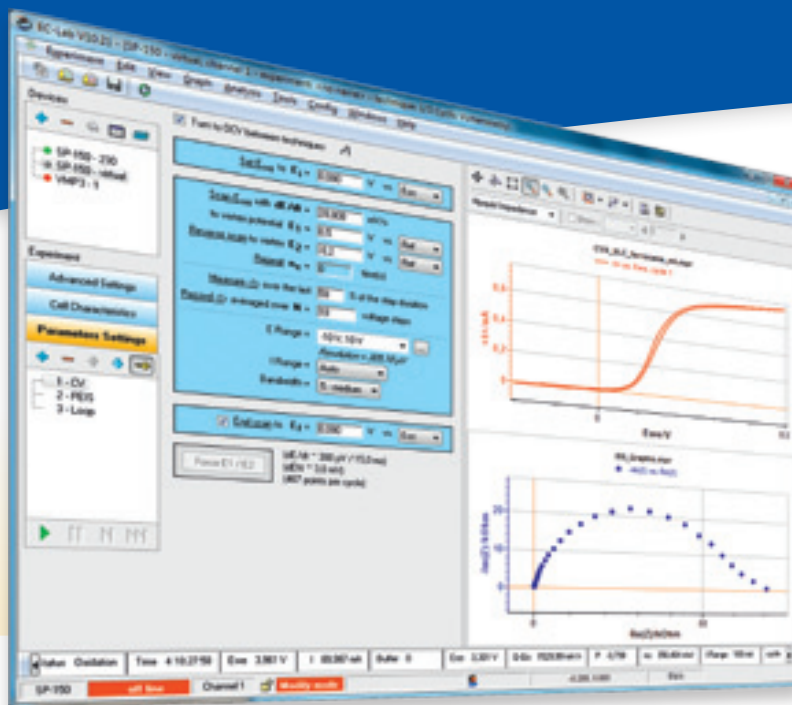
Powerful experiment builder

EC-Lab® can execute a series of different modular techniques with wait and loop options added to create complex experimental chain. Within many techniques, the user can create up to 100 unique sequences. Adding or removing sequences and linking techniques can be done easily with "+" and "-" buttons. The resulting experiment can be saved as a "Custom application" for ease of reusing.

Setting management

Upon selecting a technique, the corresponding parameter settings are shown as a series of boxes representing the building blocks of the experiment. Most of the parameters in the blocks can be modified during a run and these modifications are then saved in the log and data file. Two additional tabs allow the user to define cell characteristics and more advanced parameters.

Experiment and safety limits

Several experiment limit parameters are available to control the experiment process and/or protect the electrochemical cell. These limits can either be set for all the experiments in a series or for individual techniques. The experiment can also be setup to terminate or skip to the next sequence on a limit value coming from an external device such as a temperature probe.

External device coupling

EC-Lab® has an advanced external device configuration menu that can be configured to control and record data from a separate instrument, such as a QCM, a RRDE or a thermostatic chamber.

Techniques

Voltammetric techniques	OCV, CV, CVA, CA, CP, SV, LASV, ACV
Impedance spectroscopy	GEIS, PEIS, SGEIS, SPEIS (Mott-Schottky), PEISW
Pulsed techniques	DPV, SWV, DPA, DNPV, NPV
Technique builder	Modular Potentio/Galvano, Loop, Trigger in/out, Wait
Ohmic drop determination	MIR, ZIR, Current Interrupt
Bipotentiostat	CV-CA, CP-CA, CA-CA
Batteries	GCPL (1 to 7), PCGA, CLD, CPW, APGC, Urban cycle simulation, ModuloBat
Photovoltaic/fuel cell	I-V characterization, CLD, CPW
Corrosion	Linear and Cyclic Polarization, Generalized Corrosion, Pitting, ZRA, ZVC, Corrosimetry, VASP, CASP

	Line Fit...		RP Fit...		Mott-Schottky...		Peak Analysis...
	Circle Fit...		Tafel Fit...		Z Fit...		Wave Analysis...
	Integral...		Electrochemical Noise...		Z Sim...		CV Fit...
	Min Max...		Corr Sim...		Kramers-Kronig...		Linear Interpolation...
	Filtering...		VASP Fit...		Capacity & Energy Per Cycle or Sequence...		Process Data (Cycles, R, QCM mass...)
	Fourier Transform...		CASP Fit...		Photovoltaic Analysis...		
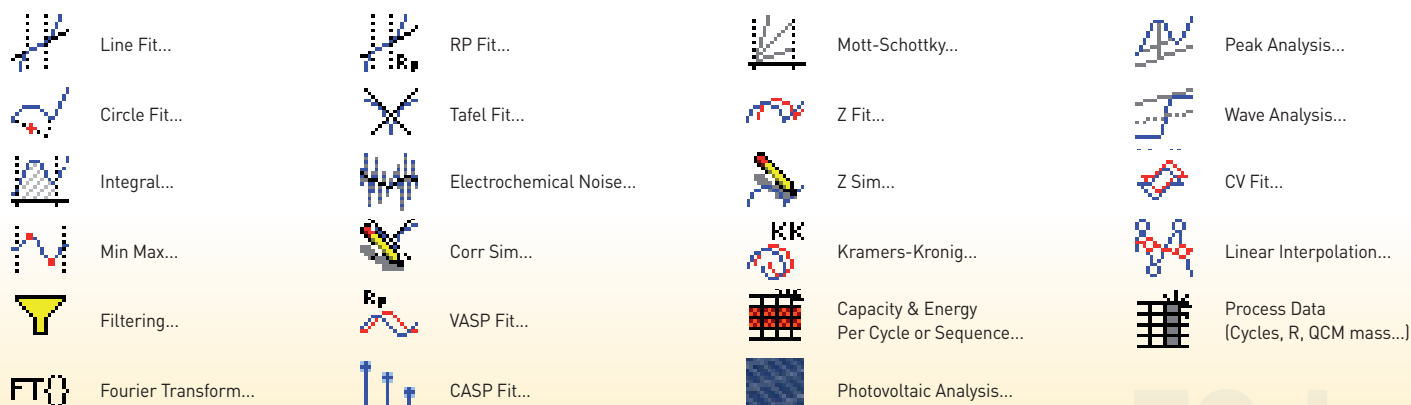
EC-Lab® graphics

A comprehensive **graphic package**

EC-Lab's graphic package is embedded with the software and includes a powerful tool to create unique graph templates.

This package offers a unique trace filtering option by channel or technique. This results in a multigraph windows capable of up to 64 graphs displayed on a single window.

With the advanced graph properties, the user can add new variables for each axis. This enables mathematical operations to be performed on data plotted on any axis.

Powerful analysis tools (such as peak find/height, convection wave, integral, Tafel fit, Rp determination) are available in **EC-Lab**®.

These analyses incorporate classical fit routines (linear, circular) and algorithms. All the analysis results are stored in a separate file preserving the integrity of the raw data file.

EIS data modeling

EC-Lab's EIS modeling package utilizes the equivalent circuit approach. There are over 150 standard circuits and two minimization algorithms available for use in understanding impedance plot information. The user can define and build his own circuit model using a range of thirteen simple elements (R, C, L, La, Q, W, G, Ga, Gb, Wd, M, Ma, Mg). A batch processing feature allows fitting of multiple cycles in an impedance experiment.
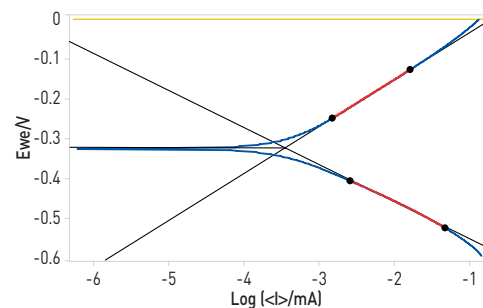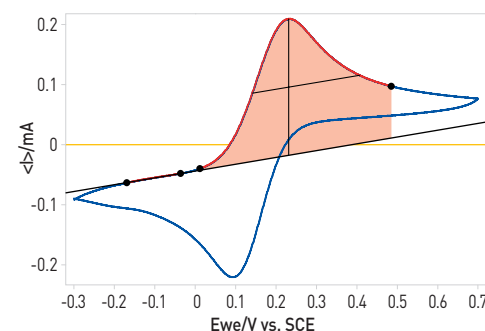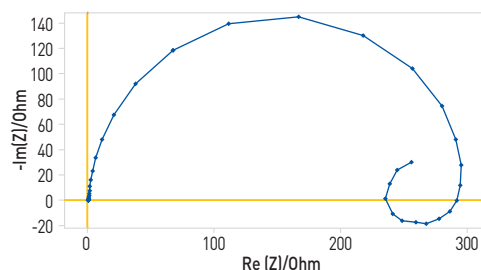
CV data analysis

An advanced simulator and fitting tool for voltammetric curves is included for consideration of both electrochemical and chemical reactions.

Continuous software improvements

Our experienced team of engineers continuously addresses improvements and new features in **EC-Lab**®. These improvements are released in two major software versions per year and are available free of charge for **Bio-Logic** customers. Upgrades are available for download from our website at www.bio-logic.info.

A demo version including all our analysis tools is also available for the electrochemists interested in analyzing their data with these powerful graphic tools.
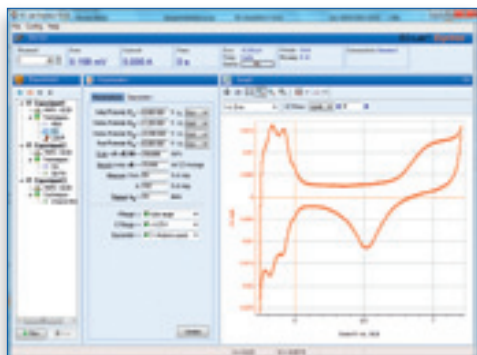
EC-Lab® Express: even easier-to-use software

More than 45 techniques with up to 100 sequences can be linked in EC-Lab® Express software.

This software has evolved into a stand-alone, user-friendly basic package with unique features and advanced functionality. The settings and active graph are shown on a single screen view. An experiment selector enables the user to quickly create a setup and switch between techniques easily.

The software allows the user to set data sampling and recording conditions without any limit on the number of data points taken. With **EC-Lab® Express**, the instrument operates independently from the PC during an experiment, the same as **EC-Lab®**.

One of the advanced functions of this software is the capability to perform EIS measurements simultaneously on the working and on the counter electrodes.

EC-Lab® Express also offers a specific interface for Bipotentiostat experiments with a simultaneous control and synchronisation of the settings on the ring and the disk electrodes. The data files are also displayed on two graphs in the same window.

Additionally, the acquisition time has been reduced to 1 µs in the CV fast technique for fast scanning experiments using the linear scan generator.
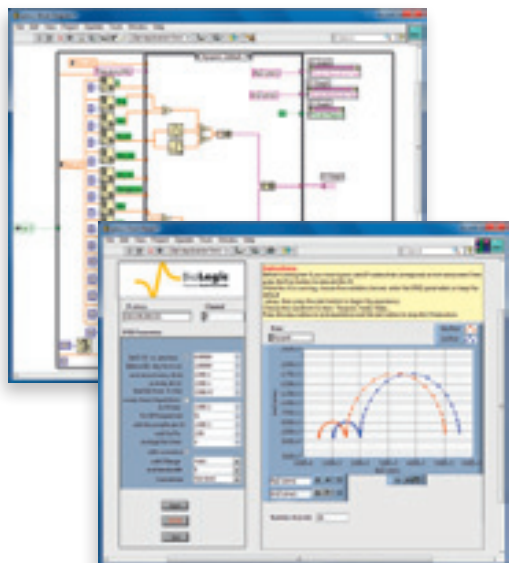

EC-Lab® development package:
for software developers

This package is made for software developers who need to integrate the control of the Bio-Logic potentiostats/galvanostats/FRAs in an OEM software. This package supports the following instruments: SP50/150/200/240/300, VSP/VSP-300, VMP3/VMP-300, MPG-2 series, HCP-803.

The **EC-Lab®** development package includes a DLL with specific functions for:
- connection/disconnection to a selected instrument,
- initialization of the channels by loading the firmware,
- loading techniques on the channels,
- start/stop the selected channels,
- retrieving data.

It includes also the USB drivers and a library with almost 30 DC and AC techniques (*.ecc files). Different examples with test programs are available in three languages: Labview (including Vis), VEEPRO and DELPHI.