Redefining Electrochemical Measurement

Series G 300™ and Series G 750™ Potentiostat/Galvanostat/ZRA Quick-Start Guide

Installation Sequence is Important for Success

The Gamry potentiostats are plug-and-play devices. **Therefore, setup is easiest if you use the sequence below, installing the software before the hardware**. Setup of the Series G Potentiostat takes about 15 minutes.

1) **Install the Gamry Framework™ software on the PC**. In the process, you will also install the Gamry software packages you have purchased, such as DC105 DC Corrosion Techniques and EIS300 Electrochemical Impedance Spectroscopy Software. See page 5.
2) **Install the Series G 300™ or Series G 750™ Potentiostat in the PC.** The operating system and Gamry software will recognize the Potentiostat automatically when you restart the PC. See page 6.
3) **Complete software setup**. You will be prompted through this task when you restart the PC after installing the software and hardware. See page 8.
4) **Calibrate the potentiostat** using the Universal Dummy Cell 3 included in your Gamry shipment. See page 9.
5) **Do optional tests** using the Universal Dummy Cell 3. See page 12.

When the first four tasks have been completed, the Series G potentiostat is ready to use.

You can run experiments and gather data with your Gamry software packages. **Instructions for running experiments** are on page 16.

This guide also includes **instructions for installing Gamry Echem Analyst**™. (See page 14.) Gamry Echem Analyst makes it easy for you to view and manipulate experiment data.

Table of Contents

Cautions

To avoid damaging electronic components on the Gamry Potentiostat and controller boards, and in your PC, observe standard precautions against static damage.

Ground yourself before touching the potentiostat boards or components inside your PC.

Handle printed circuit boards only by their edges. (Fingerprints on the boards can be harmful.)

Installed Potentiostat with Cell Cable Attached

Computer Requirements

You must install the Gamry Potentiostat board (with controller board) and the Gamry Framework Version 5 software in the same computer. This PC must meet the requirements below.

Hardware

- A Windows-compatible personal computer
- Two unobstructed, full height (11 cm, 4.3 in) PCI expansion slots for the Series G potentiostat board and controller board; each slot must be capable of accepting a board that is 26 cm (10 in) long
- Up to 50 watts of power supply capacity for each pair of Series G potentiostat and controller boards (in addition to the power normally drawn by your computer and its usual peripherals)
- One unused disk drive power connector for each potentiostat and controller board pair

Software

- Microsoft® Windows® 2000 or Windows® XP
- At least 256 MB of memory (512 MB recommended) and 200 MB of available hard disk space
- Web browser, such as Microsoft® Internet Explorer

Compatibility Between Software Versions and Potentiostats

Gamry Version 5 software is compatible with all Gamry Potentiostats in the current generation.

- The Reference 600™ and Series G Potentiostats work with Gamry Version 5 software only.
- The PCI4/300™ and PCI4/750™ Potentiostats, and the FAS2™ Femtostat work with either Version 5 or Version 4 of the Gamry software.

Earlier potentiostat generations (PC4, FAS1, and PC3 Potentiostats) are not compatible with Version 5 Gamry software.

Authorization Codes and Serial Numbers

A sticker on the software license envelope contains the ten-digit Authorization Codes needed to install (or upgrade) the Gamry software.

Before you can use a Gamry software package, you must enter the Authorization Code to access the software. Authorization Codes are tied to the five-digit serial number of the controller board associated with a specific potentiostat. The serial number of each potentiostat board and controller board is on a sticker on the end plate of the board.

If you bought more than one potentiostat (to be installed in more than one PC), each potentiostat will be packed in a separate carton with its own controller board and software Authorization Codes. Keep the contents of each carton together. Authorization Codes are valid only for the potentiostat board and controller board shipped with the codes.

Preparations

The pictures below and on the following page identify the items in a typical shipment from Gamry.

Standard cables are pictured on page 4. If you ordered special cables, those may also be included in the potentiostat shipment.

To prepare to install your new Potentiostat:

1) Unpack the shipment carefully.

   Do not discard the software license shipped with the CD. Authorization Codes that you will need to install the software are on the license sheet. (See *Authorization Codes and Serial Numbers* on page 2.)

   The potentiostat and controller printed circuit boards are shipped in anti-static bags. Leave the circuit boards in these bags until you install the boards.

   Save the anti-static bags. If you return the boards to Gamry, put the boards in the bags before packing the boards for shipment.

2) *If custom scripts (or standard scripts with modifications) are already on this PC,* back up the scripts.

3) *If Version 4 of Gamry Framework and associated software packages are on the PC*, you will uninstall Version 4 during the installation process.

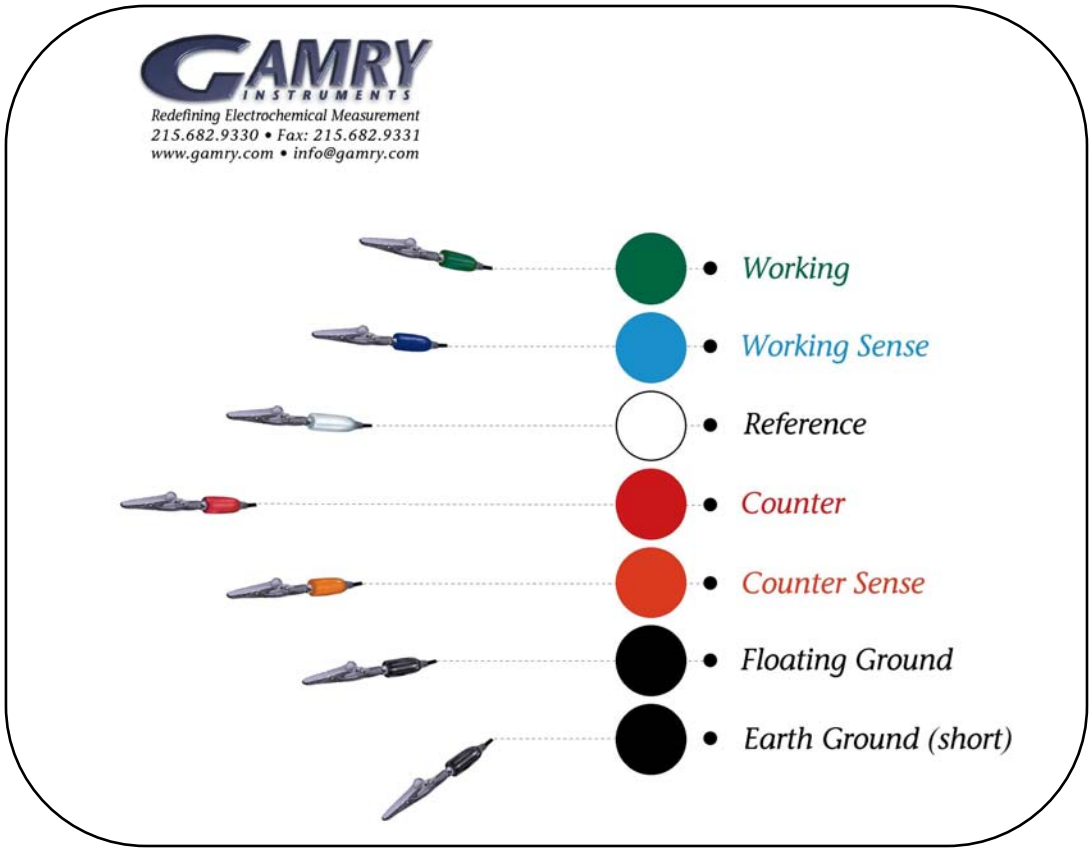
   The contents of your "My Gamry Data" folder will not be removed when you upgrade. The data in the folder will not be overwritten when you install the new version of the Gamry software. Scripts in the "Scripts" folder will be overwritten if they have the same name as Version 5 scripts.

4) No tools are needed to install the potentiostat. However, a Phillips screwdriver may be needed to open the computer case and to anchor the boards in the PC.

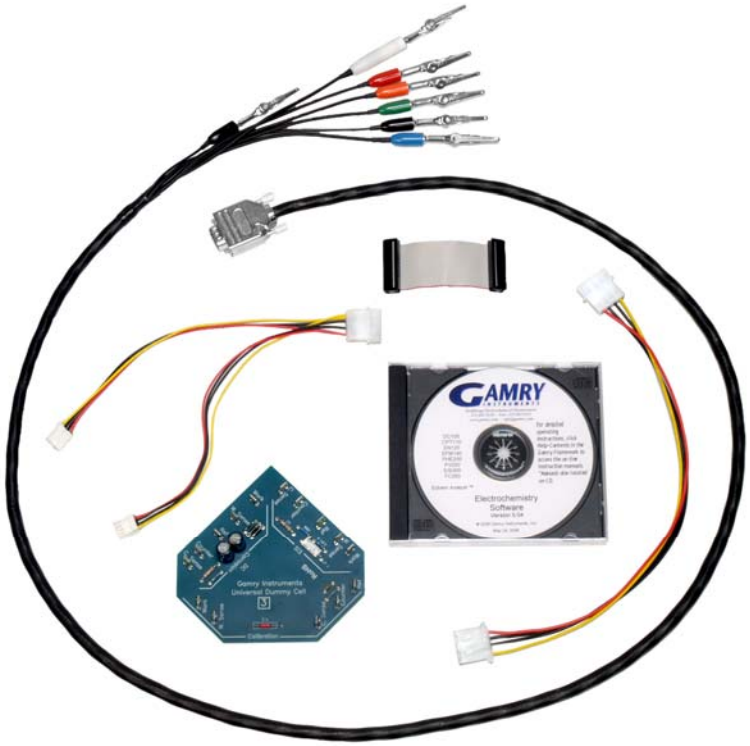
   If you need a screwdriver for these tasks, find one now.

Potentiostat Board

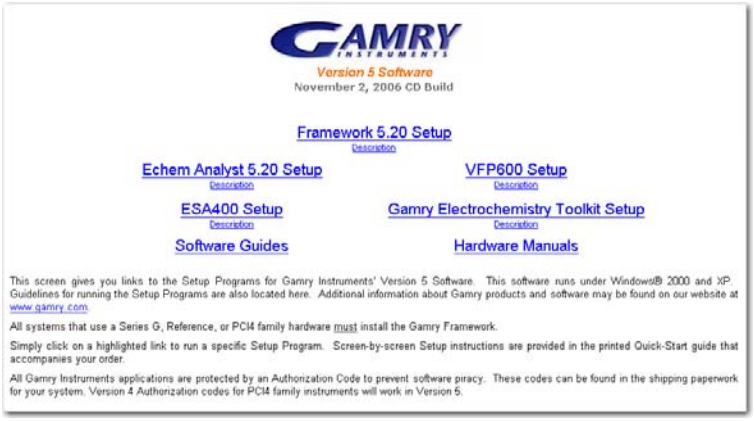
Control Board



Mouse Pad with Color Coding for Leads



Cell Cable (black with color-coded clips on leads), Ribbon Cable, CD, Universal Dummy Cell 3, Power Extension Cable and Power Y Cable (multi-colored wires with white connectors)



Installation of Gamry Framework and Software Packages

Purpose of Gamry Framework Software

Gamry Framework software serves as the user interface for the Gamry software packages used to acquire experiment data. Examples of Gamry software packages are DC105 DC Corrosion Techniques and EIS300 Electrochemical Impedance Spectroscopy Software.

The Framework software is also used to calibrate the potentiostat. Therefore, install the Framework software, even if you do not plan to use any of the Gamry software packages. If you bought only Gamry ESA400 or VFP600 software (which have their own graphical user interfaces), install the Framework software for calibration.

All the Gamry software is provided on a single CD.

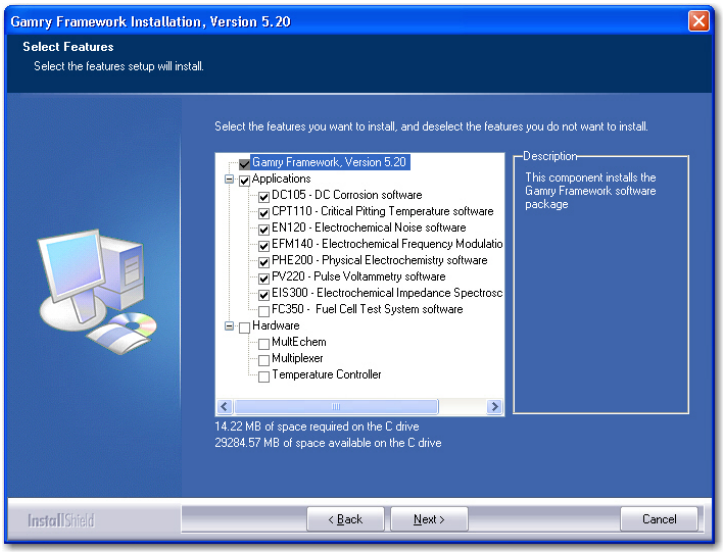
Starting the Installation Process

To start the installation process:

1) Put the Gamry software CD into the drive. The Gamry setup page on the CD will be displayed automatically in your Web browser, if auto-run is enabled.

2) If the Gamry software setup page is not displayed automatically, select **Start** > **Run**. In the Run window, type **`D:\switchboard`** in the Open field, and then click on **OK**. (Substitute the letter of your CD drive for **D**.)

3) Click on the **Framework Setup** link to start the Installation Wizard. The Wizard will step you through the installation process. Most of the steps will be familiar; they are common to many other software installation procedures. The next subsections provide instructions for two Gamry-specific screens.



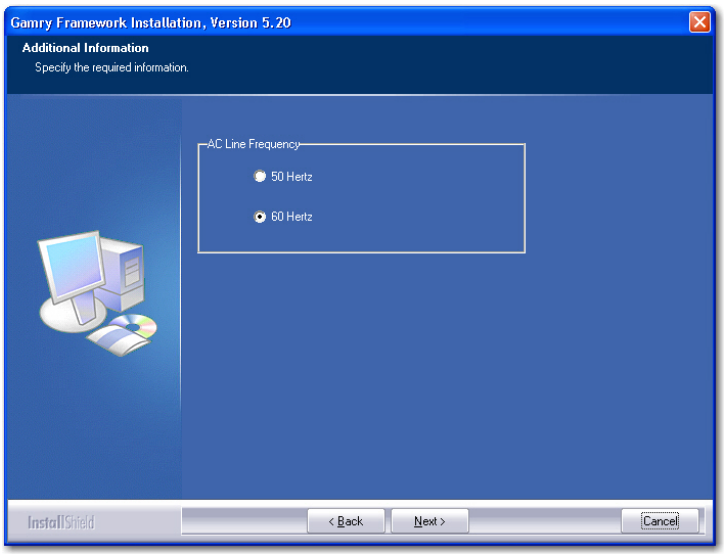
Selecting Software Packages to Install

When you get to the Select Features screen, check all the software packages (applications) that you want to install.

You can install software you have not yet purchased, as well as the software packages you did buy. After installation, you will be able to see the standard experiments available in all installed applications. However, you will not be able to use unlicensed applications. Your Gamry shipment included Authorization Codes for the software packages you bought. You will enter those codes later in the installation process. [1]

The installation routine assumes that at least one Gamry Potentiostat will be installed in this PC. Therefore, no potentiostats are listed on the Select Features screen. If you have ordered additional Gamry hardware that is on the list, check the name of the hardware now.

[1] If you like what you see and decide to buy more Gamry software packages, contact your Gamry sales representative. When you buy an additional software package you will get a new Authorization Code. If you have already installed the software package, you will be able to enter the Authorization Code without repeating the installation process. The tip on page 9 explains how to enter an additional Authorization Code.



Specifying Line Frequency

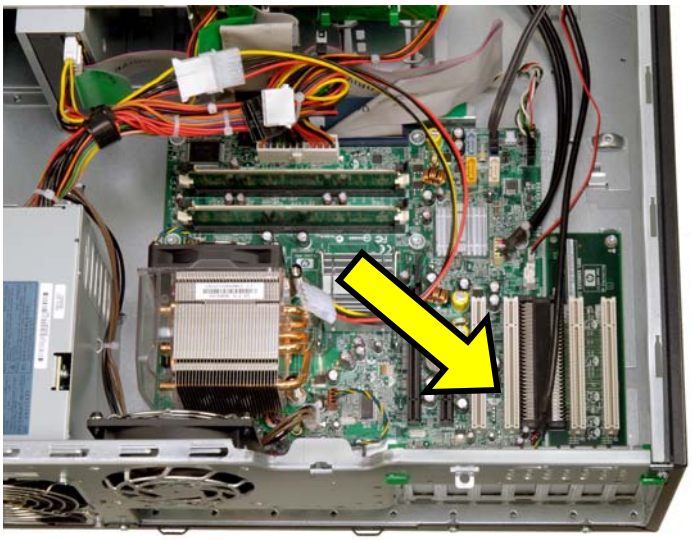
On the Additional Information screen, be sure to select the appropriate AC line frequency for your location. For example, in the United States, select 60 Hertz. In Europe, select 50 Hertz.

Completing Installation

To complete software installation and get ready for hardware installation:

1) Read the Readme file at the end of the installation process. In addition to release history information and notes on software fixes, this file contains any late-breaking news about the software that is not included in the other documentation.
2) Leave the Gamry CD in the drive.
3) Shut down Microsoft Windows. Do not restart the computer yet.

Next you will install the potentiostat in this PC.



Installing Potentiostat and Controller Boards

Before opening the PC case, remove AC power by unplugging the computer.

Preparations

To prepare to install the potentiostat board and controller board:

1) Turn off the PC.
2) Unplug the PC.
3) Open the PC's case.
4) The potentiostat board and controller board must be installed in two adjacent PCI slots. If necessary, move an existing board out of the way.
5) Cable connectors on the end plates of the potentiostat and controller boards must extend through the back of the PC case. If necessary, remove knock-out panels behind the PCI slots.
6) Move the anchoring brackets or clips out of the way. (Save bracket screws. You will need them to anchor the potentiostat and controller boards.)

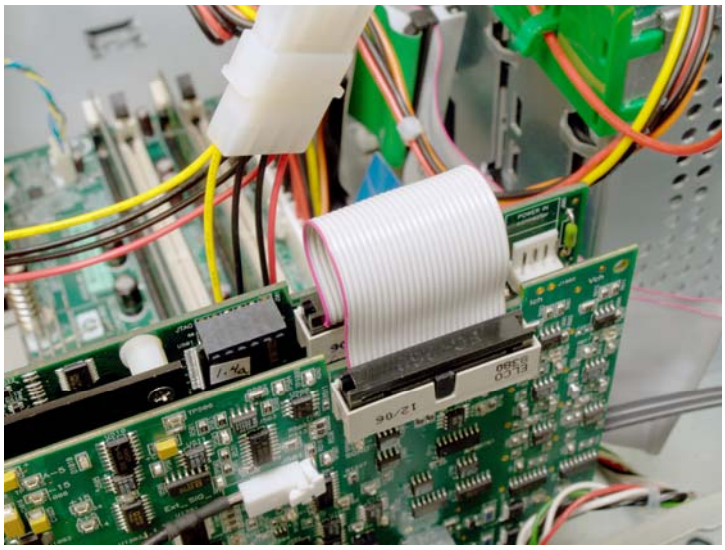
Install and Anchor Potentiostat and Controller Boards

Save the anti-static bags in which the boards are shipped. If you return the boards to Gamry, put the boards in the bags before packing the boards for shipment.

To install the potentiostat and controller boards:

1) Orient and align the controller board's edge connectors with a PCI slot as shown. (It does not matter whether you install the controller board in the first or second available slot.)
2) Gently, but firmly, press the controller board into the PCI slot. Do not use excessive force. (If the board does not snap into the connector easily, the board is not aligned correctly.)
3) Anchor the board using the bracket or clip provided by the PC manufacturer.

Repeat these steps to install the potentiostat board.



Install Ribbon Cable

Signals travel between the controller board and the potentiostat board via a ribbon cable supplied with the potentiostat. The two ends of the cable are the same.

Connect the ribbon cable to the potentiostat board and controller board as shown.

Connect Drive Power Cable to the Controller and Potentiostat Board

The drive power cable supplies power to both the controller and potentiostat boards.

To power the boards, connect the male end of the provided Y Power Cable to the drive power cable in the PC as shown. The provided Power Extension Cable may be necessary to make this connection. Connect the smaller female ends of the Y Power Cable to each of the boards as shown. Both female connectors are equivalent.

Close Case and Plug in PC

When both the potentiostat board and controller board have been installed and anchored, and a power connection has been made to the controller board, close the PC case.

Plug in the computer, but do not turn it on yet.

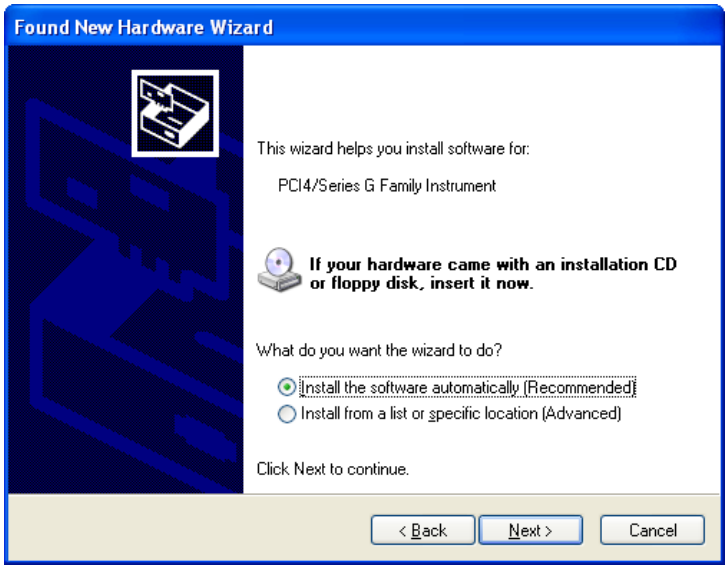
Attach Cell Cable to Potentiostat

A cell cable is shipped with the potentiostat. One end of the cable has multiple color-coded cell leads ending in alligator clips. The other end of the cable has a nine-pin male D connector.

To install the cell cable:

1) Connect the cell cable to the nine-pin female D connector on the end of the potentiostat board (the board with the yellow LED).

2) Use the screws on the cable connector to secure the connection. (Although screwdriver slots are provided, connecting the cable screws finger-tight is sufficient.)



Make Sure Potentiostat Has Been Detected by Windows

Because you installed the Gamry software before you installed the potentiostat, the potentiostat should be recognized automatically, and the correct software drivers installed.

To check hardware detection:

1) With the Gamry CD still in the drive, turn on the PC.

2) After the operating system starts, you will see a message that an instrument from the Series G family has been detected.

   If running Windows XP, the "Found New Hardware Wizard" asks questions about the software installation. When asked about connecting to the Internet, select "No". When asked about searching the computer to load drivers automatically, select "Yes". After working through the wizard, go to the next step.

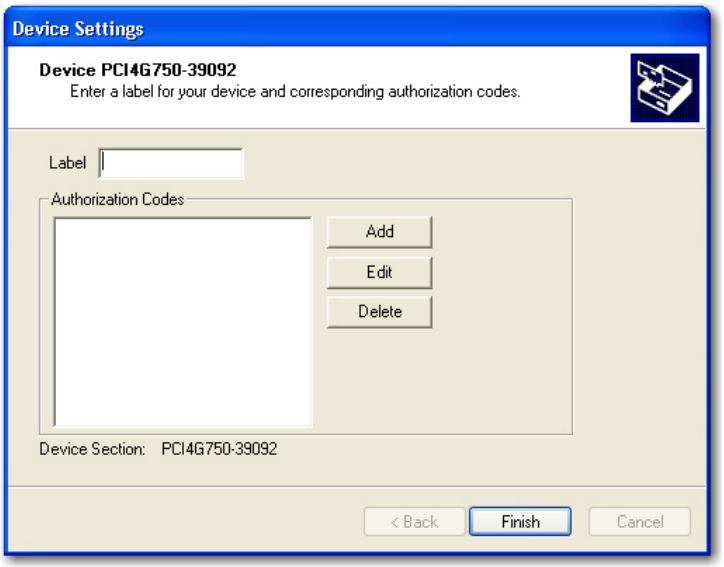
   If running Windows 2000, acknowledge the message and go to the next step.

3) *If the PCI4 family of instruments was detected*, remove the Gamry CD from the drive.

   or

   If you see a message that refers only to "other PCI bridge device", the operating system could not find the Series G Gamry drivers.

   Try this: Shut down Windows and turn off the PC. Remove both the potentiostat board and controller board. Power up the PC and wait until Windows has completed normal startup. Shut down Windows and turn off the PC. Reinstall the potentiostat board and controller board. Power up the PC.



Completing Software Setup

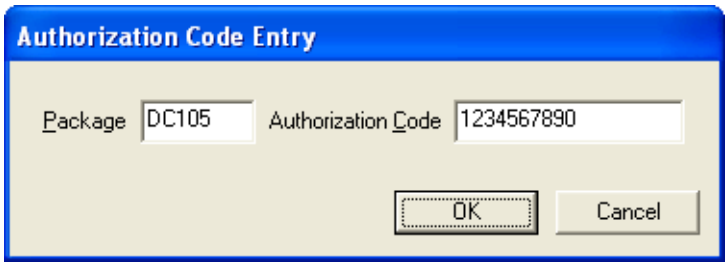
Assign Label (Name) to Potentiostat

The potentiostat's Device Settings window opens automatically the first time the PC is started after the Framework software has been installed successfully. This window shows the model number of the potentiostat, followed by its serial number.

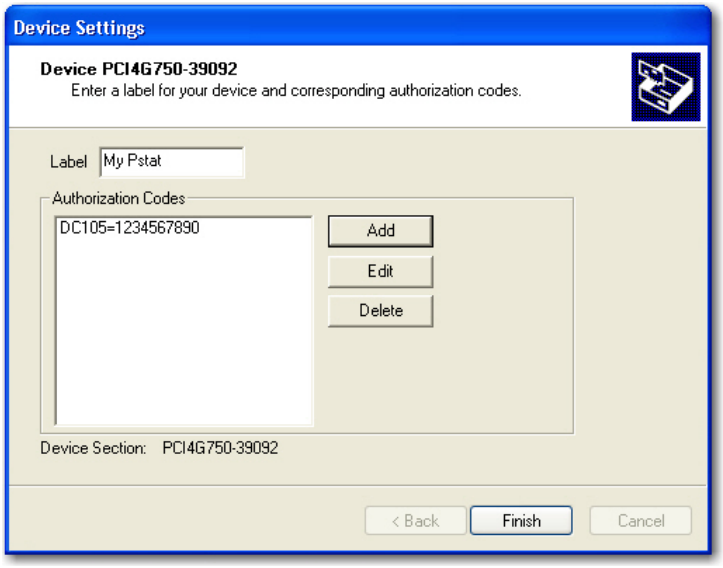
Use this window to specify the text label that will be used to identify the potentiostat on Gamry software screens. The maximum size of a label is ten characters (including spaces).

To assign a name to a potentiostat, type the name in the Label field in the Device Settings window.

Do not click on **Finish**. You must enter Authorization Codes as described below.



Tip: Current packages are: DC105, EIS300, PHE200, PV220, EN120, EFM140, CPT110, VFP600, ESA400, eChemBasic, eChemDC, and eChemAC.



Tip: If you want to change the name of a potentiostat or enter Authorization Codes after setup, use the Properties window for the potentiostat.

To edit the potentiostat's properties:

1) Open the System Properties window by selecting **Start** > **Control Panel** > **System**.
2) Open the Device Manager window by clicking on the **Device Manager** button on the Hardware tab in the System Properties window.
3) In the Device Manager window, expand the "Gamry Instruments Devices" list.
4) Display a context menu by right-clicking on the current name of the potentiostat.
5) Select **Properties** from the context menu.
6) Edit the properties as needed.
7) Click on **OK** to save the changes.

Enter Authorization Codes During Setup

The Device Settings window for each potentiostat contains an Authorization Code field for every Gamry software package that runs under the Gamry Framework software.

You must enter an Authorization Code for a software package before you can use it to run experiments. If you try to run an experiment with an unlicensed package, a message naming the Authorization Code you need will be displayed.

To enter the Authorization Codes:

1) Find the ten-digit Authorization Codes on the license shipped with the potentiostat.
2) In the Device Settings window for the potentiostat, use the **Add** button to access the Authorization Code Entry window. Enter the name of the Package and corresponding Authorization Code. Press **Ok.** Repeat for each package included on your license.

   Authorization Codes are linked to a specific potentiostat's serial number. Be sure to enter the Authorization Codes that were shipped with the potentiostat named in the Device Settings window.
3) When you have labeled the potentiostat and entered all Authorization Codes, click on **Finish**.

Calibration

Launch Gamry Framework

The process of installing the Gamry Framework software adds two new icons to the desktop: **Gamry Framework** and **My Gamry Data**.

Use the **Gamry Framework** icon to launch the Gamry Framework software and open the Framework main window.

Use the **My Gamry Data** icon to access the default location for experiment data. The "My Gamry Data" folder is located in the root of the C drive (C:\My Gamry Data). You can use the Framework **Options** menu to specify a different destination for experiment data files.

Icons are not added for the software packages you installed. You will use the Gamry Framework user interface to run experiments with these software packages.

You can also use the **Start** > **Programs** > **Gamry Instruments** path to open the Gamry Framework main window.

Make Sure Potentiostat Is Recognized by Framework

When you restarted the PC after installing the Gamry hardware and software, you confirmed that the operating system recognized the potentiostat and found the appropriate software drivers.

Now confirm that the Gamry Framework software recognizes the potentiostat.

virtual LED

To confirm hardware recognition:

1) Look at the top left corner of Framework screen (below the menu bar). When the Framework window first opens "Initializing Devices" is displayed.

2) After the potentiostat has been initialized, the "Devices Present" line should display the name (label) assigned to the potentiostat. A green "virtual LED" should also be displayed to symbolize that the potentiostat is ready for use.

   When a potentiostat is in use, the virtual LED turns yellow. The virtual LED and potentiostat label should always be displayed.

3) *If the name of the potentiostat is displayed and the virtual LED is green*, you are ready to calibrate the potentiostat as described in the next subsection.

4) *However, if a potentiostat's name is not displayed*, the potentiostat board and controller board may not be installed correctly. In this case, shut down the operating system, unplug the PC, open the case, and make sure the potentiostat and controller boards are seated properly. Close the case, power up the PC, and launch the Framework software again.

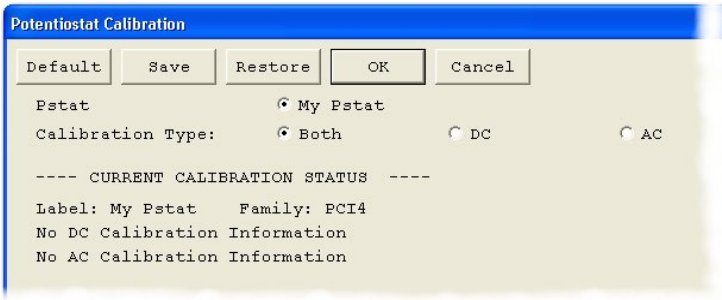
Calibration Preparation

Before you can use a new potentiostat, you must calibrate it using the Universal Dummy Cell 3 shipped with the potentiostat (or a Gamry Universal Dummy Cell 2).

Recalibrate a potentiostat every six months or after moving the potentiostat to a different computer.

To prepare for calibration:

1) Let the PC warm up for at least 30 minutes.
2) If you are in a noisy environment, construct or buy a Faraday Cage.
3) Make sure the cell cable supplied with the potentiostat is firmly connected to the potentiostat to be calibrated.



Tip: If the selected potentiostat has never been calibrated in this PC, no Current Calibration Status information is displayed in the bottom half of the Potentiostat Calibration window.

However, if the potentiostat has already been calibrated in this PC, this window displays information about the most recent calibration.

Start Calibration Utility and Select the Potentiostat

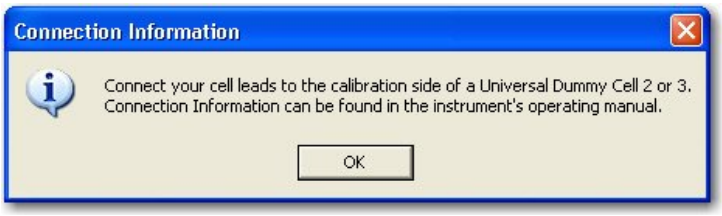
If you see a green virtual LED and the name of the potentiostat installed in the PC, you are ready to calibrate.

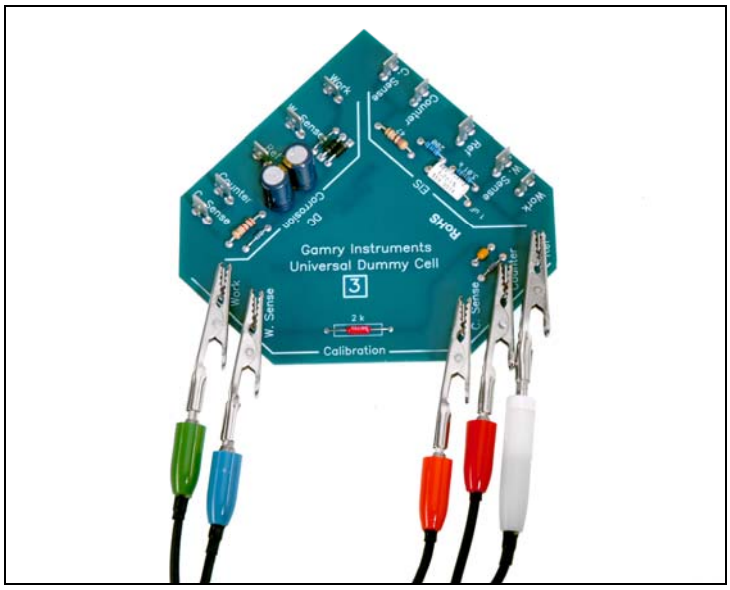
A **Utilities** submenu in the **Experiment** menu is always available in Framework. The Utilities submenu always includes the **Calibrate Instrument** choice.

The other submenus available from the **Experiment** menu depend on the selections you made when installing the Gamry software. An Experiment submenu is available for every Gamry software package you installed, although you can run experiments only for authorized software packages.

To start the calibration utility:

1) Open the Potentiostat Calibration window by selecting **Experiment** > **Utilities** > **Calibrate Instrument** from the Framework menu bar.
2) In the Potentiostat Calibration window select the option button labeled with the name of the potentiostat to be calibrated.
3) Select the calibration type "Both".
4) Click on **OK**. The Potentiostat Calibration window remains open. The Connection Information window will open. It contains general instructions for using the Universal Dummy Cell (UDC). Specific instructions for using the Universal Dummy Cell are in this document (see below).





Attach Cell Leads to Calibration Side of UDC 3

When calibrating a Series G Potentiostat, use the Universal Dummy Cell 3 that is included with the potentiostat (or a Gamry Universal Dummy Cell 2).

It is easy to connect the cell leads correctly, because they are color coded. You can always refer to your Gamry mouse pad for the meanings of the cell cable lead colors.

To attach cell leads to the Universal Dummy Cell:

1) Use the alligator clips on the cell cable to make the following connections to the posts on the Calibration edge of the Universal Dummy Cell 3.

Clip Color	Calibration Connector Label on Universal Dummy Cell 3
white	Ref
red	Counter
orange	C. Sense
blue	W. Sense
green	Work

2) *If you use a Faraday Cage (recommended)*, see page 16 for grounding instructions.

Start Calibration

When the potentiostat has been connected to the Universal Dummy Cell you are ready to start the calibration:

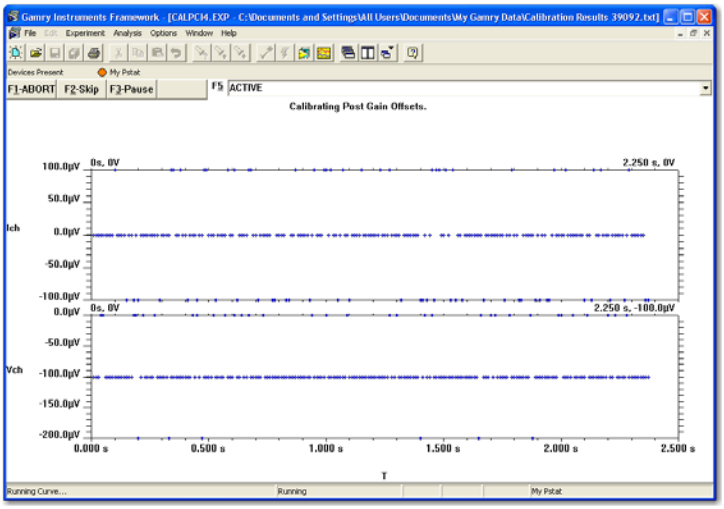
To start calibration:

1) Click on **OK** in the Calibration Information window**.** The Performance Tips window is displayed.

2) Click on **OK** in the Performance Tips window.

3) Confirm that the virtual LED for the potentiostat selected in the Potentiostat Calibration window has turned yellow (to show that the potentiostat is in use).

4) Sit back and wait.

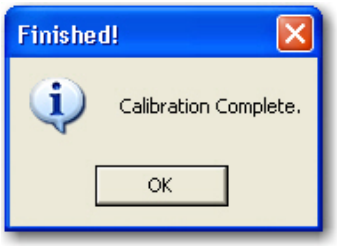


Wait for Completion

You can go get a cup of coffee at this point. No operator action is required during calibration, which takes about five minutes.

During calibration, a series of messages are displayed in the status bar at the bottom of the Framework window. Data is displayed in the Framework window. It is impossible to make sense of this data; don't bother trying!

At the conclusion of the calibration, one of two messages will be displayed.



Message Displayed Following Successful Calibration

If the calibration was successful, you will see the "Calibration Complete" message. Clear the message by clicking on **OK**.

If the calibration was not successful, you will see an error message that tells which test failed, and the measured value that was outside the valid range, which is also displayed. Clear the message by clicking on **Ignore**.

Calibration Results

Calibration results are stored in a file in the "My Gamry Data" folder. The name of the file is "calibration results <SN>.txt", where <SN> is the serial number of the selected potentiostat's controller board (the board with the green LED).

The next time you select this potentiostat in the Potentiostat Calibration window, the information in the calibration results file will be displayed. When you calibrate the potentiostat again, the results file will be overwritten.

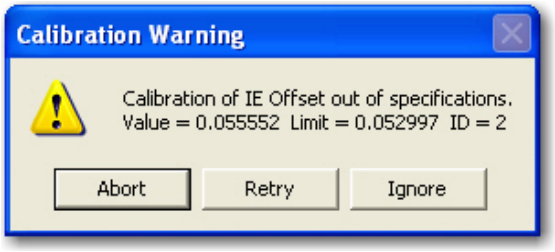
If the Calibration Was Not Successful

If the calibration was not successful, check the following after clicking on **Retry** and trying again.

- Make sure the cell cable is firmly connected to the potentiostat.
- Check that the cell leads are clipped to the correct connectors on the Universal Dummy Cell. (If in doubt, check the color codes on the Gamry mouse pad.)
- Be sure the welds on the underside of the Universal Dummy Cell are not touching a conductive surface.

Also, wait until the PC warms up (to drive off any moisture on the potentiostat), and then try again.

If you have checked all of the above and waited until the PC is completely warmed up, but the calibration fails again, then try again using a Faraday Cage. If calibration fails a third time, even though you used a Faraday Cage, contact Gamry.



Example of Message Displayed Following Unsuccessful Calibration

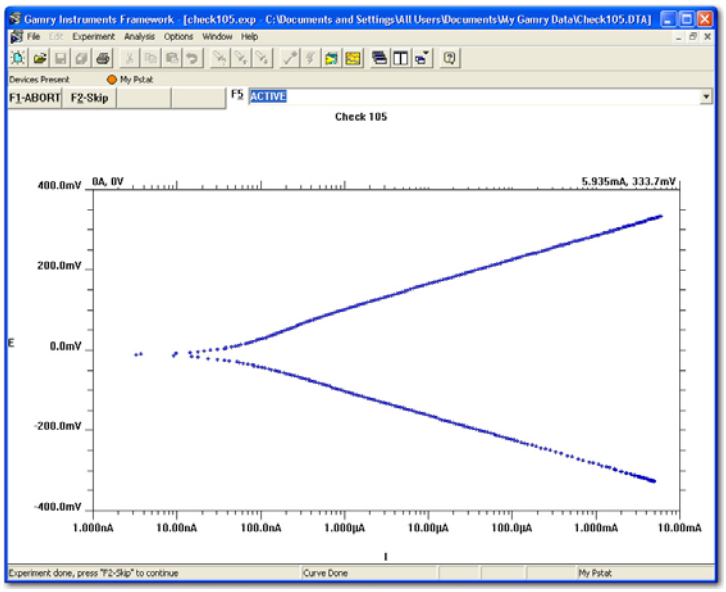
Optional Tests

Introduction

After the Gamry Framework and Gamry software packages have been installed, and the potentiostat has been calibrated, you are ready to use the Framework interface to run experiments with the Gamry software packages. General instructions for running experiments are on page 16.

If you bought the DC105 DC Corrosion Techniques Software and EIS300 Electrochemical Impedance Spectroscopy Software, you can run DC and EIS test experiments using Universal Dummy Cell 3.

These tests are not required. However, it is a good idea to run them to check potentiostat functionality and to become familiar with the process of running experiments through the Framework interface.



DC105 "Check105" Test Results

DC105 "Check105" Test

The DC Corrosion edge of the Universal Dummy Cell closely mimics the behavior of a corroding electrode. The checkout procedure records an open circuit curve and a Tafel curve using a script supplied with the DC105 software. The script is named "Check105.exp". Find it in the "Scripts" folder. To access this folder, select **Experiment** > **Named Scripts**.

To do the DC105 test:

1) Connect the clips on the cell cable to the appropriate posts on the DC Corrosion edge of the Universal Dummy Cell 3. (For color codes, see page 16.)

2) Run the "Check105.exp" script that is stored in the "Scripts" folder. No parameters values apply to this test, but you must specify a name for the results file.

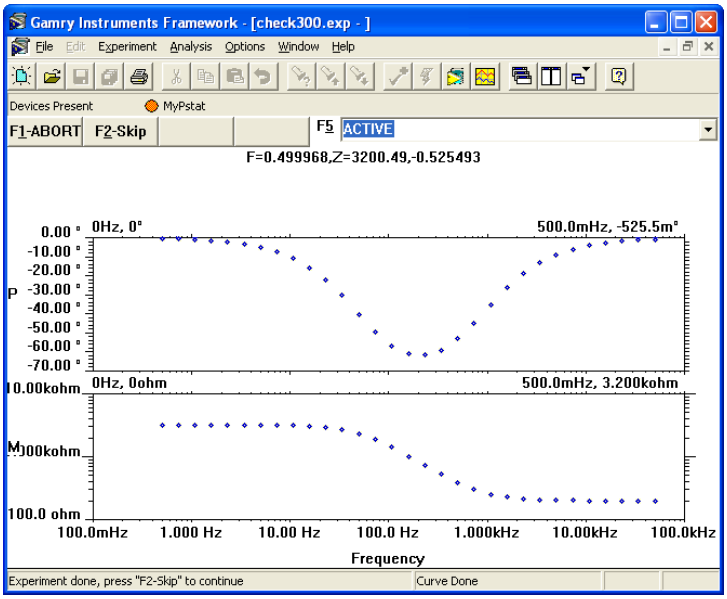
3) Partway through the test, a message will be displayed about switching curves. Acknowledge the message.

4) When the test has concluded, compare your results with the screenshot (see left).

   If the plot in your Framework window is similar to ours and all initial data is within 500 micro-volts of zero, the potentiostat passed the test.

   If the plot in your Framework window is not similar to ours, try the experiment again with the Universal Dummy Cell in a Faraday Cage.

   If your plot is not similar to ours after running the test with the Universal Dummy Cell in a Faraday Cage, contact us.



EIS300 "Check300" Test Results

EIS300 "Check300" Test

Using the EIS edge of the Universal Dummy Cell and the"Check300.exp" script (found in the "Scripts" folder), you can run a Potentiostatic EIS scan on the Universal Dummy Cell.

To do the EIS300 test:

1) Connect the clips on the cell cable to the appropriate posts on the EIS edge of the Universal Dummy Cell 3. (For color codes, see page 16 or wait until the script displays connection information.)

2) Run the "Check300.exp" script that is stored in the "Scripts" folder. No parameter values apply to this test. The results are automatically written to a file named "Check300.dta".

3) When the test has concluded, compare your results with the screenshot (see left).

   If the plot in your Framework window is similar to ours, the potentiostat passed the test.

   If the plot in your Framework window is not similar to ours, try the experiment again with the Universal Dummy Cell in a Faraday Cage.

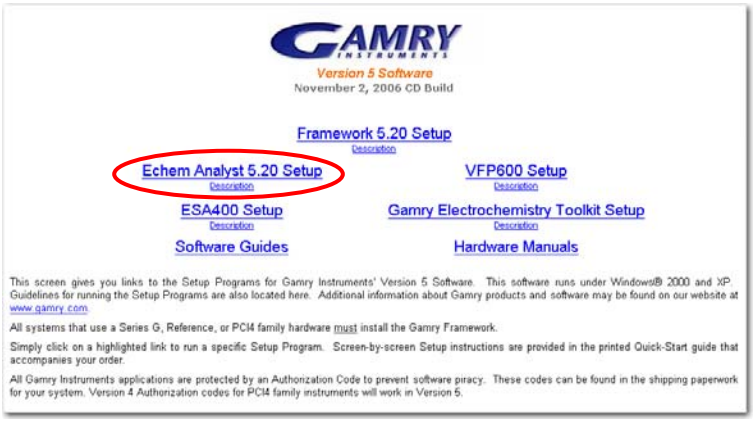
   If your plot is not similar to ours after running the test with the Universal Dummy Cell in a Faraday Cage, contact us.

Gamry Echem Analyst Installation

Purpose of Gamry Echem Analyst

Use Gamry Echem Analyst software to manipulate and interpret data gathered with experiments run with Gamry software packages (through the Gamry Framework user interface).

Echem Analyst can be installed on the same PC as the one containing the potentiostat or on a different PC. You are licensed to install Echem Analyst on multiple computers.



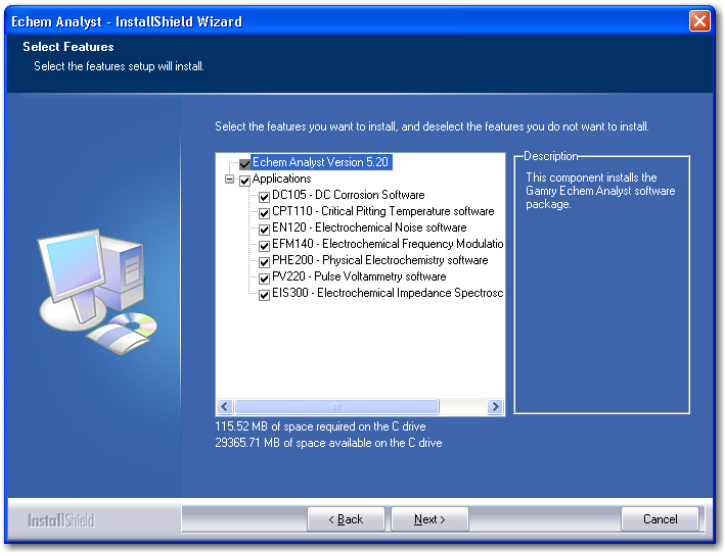
Starting the Installation Process

To start the installation process:

1) Put the Gamry software CD into the drive. The Gamry setup page on the CD will be displayed automatically in your Web browser, if auto-run is enabled.

2) If the Gamry software setup page is not displayed automatically, select **Start** > **Run**. In the Run window, type **`D:\switchboard`** in the Open field, and then click on **OK**. (Substitute the letter of your CD drive for **D**.)

3) Click on the **Echem Analyst Setup** link to start the installation wizard. The wizard will step you through the installation process. Most of the steps will be familiar; they are common to many other software installation procedures. The next subsection provides instructions for a Gamry-specific screen.



Selecting Features

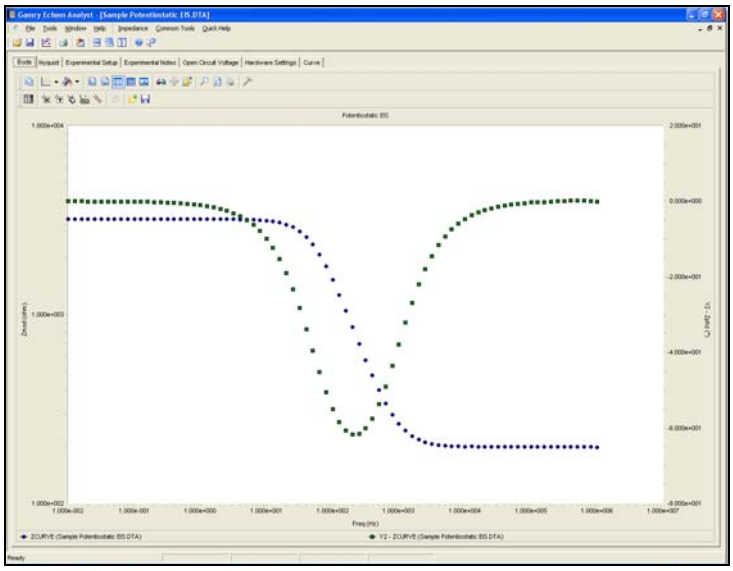
When you get to the Select Features screen, check all the software packages (applications) you installed with the Gamry Framework software.

Completing Installation

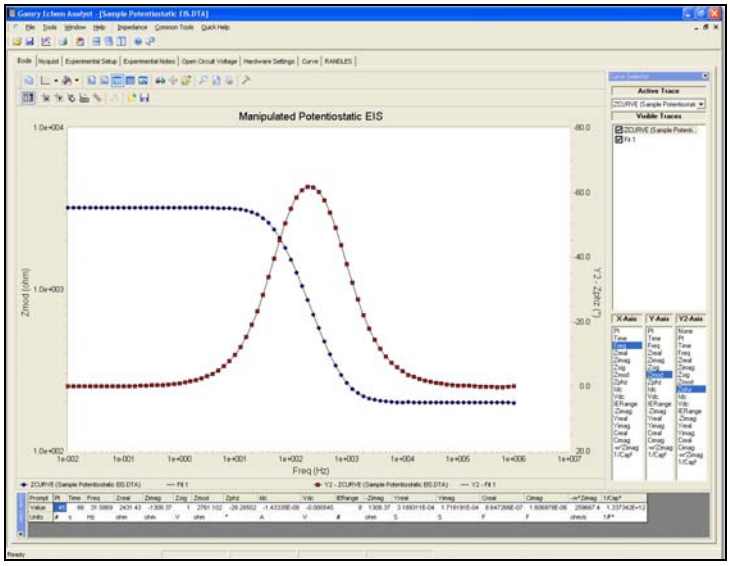
To complete software installation:

1) Read the Readme file at the end of the installation process. In addition to release history information and notes on software fixes, this file contains any late-breaking news about the software that is not included in the other documentation.

2) Remove the Gamry CD from the drive.



(A) Sample Potentiostatic EIS data file as it opens in the Gamry Echem Analyst.



(B) Manipulated form of the same data file — the secondary Y-axis (Phase Angle) is reversed, data are fitted, axes are formatted, and both the Curve Selector and Point Information Viewer are open.

Accessing Gamry Echem Analyst

Installing the Gamry Echem Analyst software adds a new icon to the desktop: **Echem Analyst**.

You can also use the **Start** > **Programs** > **Gamry Instruments** path to open the Gamry Echem Analyst main window. A shortcut to the Echem Analyst main window is also available in Framework. Click on **Analysis** in the Framework menu bar to launch the Echem Analyst software.

Manipulating Sample Data

Files containing sample data are written to the "My Gamry Data" folder when the Gamry Framework software is installed. You can begin to gain an appreciation for the rich set of features available in Echem Analyst by manipulating this sample data.

To open a data file, select **File** > **Open** from the Echem Analyst menu bar. The sample data filenames start with "Sample" and include the name of the type of experiment, such as "Sample Cyclic Voltammetry.dta". Figure A is an example of a data file as it opens.

Some functions available in the Echem Analyst window are applicable to many types of experiments. For example, commands in the **Tools** menu are available to display point information, change the current convention, and make other choices that affect how data is displayed. The **Common Tools** menu choices, such as **Linear Fit, Add Constant E**, and **Add Constant I**, let you manipulate data.

Other functions, specific to the experiment type, are available from the menu named for the type of experiment. For example, when analyzing data gathered with Potentiostatic EIS, the Impedance menu contains commands for functions specific to EIS300 experiments.

Similarly, some tabs in the display, such as Experimental Setup and Hardware Settings, are common to all types of experiments. Other tabs, such as Bode, Nyquist, and Randles (the selected Fit model) in Figure B, are specific to particular types of experiments.

After you have used Echem Analyst menu functions to manipulate the data and its presentation, you can use **File** > **Save As** to save your changes, along with the experiment data, as .GData files. You can open the .GData file later (by selecting **File** > **Open**) and see the data presented exactly as you saved it.

Sources of More Information

Technical specifications for the potentiostat are in the hardware manual on the CD shipped with the instrument.

More information about the Gamry software is available in Help, accessible from the Framework and Echem Analyst menu bars.

Gamry manuals (as .pdf files) are on the software CD. Access the files from the links on the page you used to install the Framework and Echem Analyst software. This page is in the file "Welcome.htm". It is at the root of the CD. For example, if your CD drive is D, the path to the file is `D:\Welcome.htm`.

The Readme file is installed in the same folder as the Gamry software.

More information about Gamry potentiostats, software, and electrochemical applications is available at the Gamry Web site: http://www.gamry.com

Contacting Gamry

Do not hesitate to contact us if you have questions or problems during the installation or operation of the potentiostat.

E-mail: techsupport@gamry.com

Telephone: Within the USA and Canada phone 1-877-367-4267. From other countries phone +1-215-682-9330. The support team is available from 8:15 AM to 6:00 PM US Eastern Standard Time.

Fax: 215-682-9331

Mail: Gamry Instruments, Inc.
734 Louis Drive
Warminster, PA 18974
USA

Reference Information

Procedure for Experiments

The procedure for running any experiment is:

1) **Connect the cell cable leads** to the appropriate electrodes on the electrochemical cell. Refer to the table on this page or the Gamry mouse pad for the color coding of the leads.

2) **Select the script** you want to run.

   To use a standard Gamry script, select it from the application submenus, such as **DC Corrosion** or **Electrochemical Impedance,** accessible from the **Experiment** menu.

   To use a custom script, select it from the "Scripts" folder (**Experiment** > **Named Scripts**). This folder contains all scripts (standard and custom), as well as global scripts used by other scripts.

3) **Name the .dta output file** that will contain the experiment data generated by the test. This ASCII text file will be created in "My Gamry Data" (or the new destination you specify using the **Options** menu).

4) **Specify parameter values.** When the window used to run a script opens, the parameter values most recently used for this script will be displayed. At this point you have several choices.
   - You can edit the parameter values. You can save the new values to a ".set" file for future use by clicking on **Save**. When assigning a name to the saved parameter values, it is a good idea to include the name of the script or experiment in the file name.
   - You can use values stored in an existing .set file by clicking on **Restore**. A window will open that contains all the .set files for all experiment types. Pick a file of values for this type of experiment.
   - You can use the Gamry default values for this script by clicking on **Default**.

5) **Start the experiment and activate the potentiostat** by clicking on **OK** in the experiment window. Depending on the script you selected, one or more messages may be displayed containing advice for running the experiment.

6) *If any messages are displayed*, follow the advice, and then acknowledge the messages by clicking on **OK**.

7) While the experiment is running, plotted data will be displayed. Messages in the status bar allow you to monitor progress of the test.

   You can cancel the experiment by clicking on **F1-Abort** (no test data stored), skip the current stage of the experiment by clicking on **F2-Skip**, or temporarily halt the experiment by clicking on **F3-Pause**.

8) At the conclusion of the experiment, an "Experiment Done" message is displayed. The message contains instructions for closing the window used to start the test.

9) Press the F2 (Skip) button.

Grounding

The grounding leads both have black clips. The longer of the two leads is the floating ground. The shorter lead with a black clip is the earth ground.

The short lead can be clipped to an independent earth ground. (The short lead is connected internally to the computer chassis.)

When using a Faraday Cage, connecting both ground leads to the cage usually results in the lowest noise. However, **leave the short black lead open if the experiment setup is earth grounded.** For example, if the Faraday Cage, electrolyte circulation pump, or a metal vessel for the cell is grounded, do not connect the short lead to anything.

Gamry File Types

The types of files generated or used by Gamry software are described below.

File Type	What It Stores
.exp	experiment script written in Gamry Explain™ experiment control language; in "Scripts" folder accessed via Framework **Experiment** menu
.dta	experiment results; in "My Gamry Data" folder
.Gdata	experiment results that have been manipulated in Echem Analyst; in "My Gamry Data" folder
.txt	calibration results; in "My Gamry Data" folder; file name is "calibration results <SN>.txt", where <SN> is the serial number of the controller board (the board with the green LED)
.set	experiment parameter values; in "Sets" folder under software installation location

General Instructions for Connecting Leads

The leads on Gamry cell cables are color-coded for easy installation. The meanings of the colors are below. Color codes are also on the Gamry mouse pad shipped with the potentiostat.

Clip Color	Electrode
green	working
blue	working sense
white	reference
red	counter
orange	counter sense
black (long)	floating ground
black (short)	earth ground

Notes:
blue and green leads – If you have used other manufacturers' potentiostats and cell cables, you may be puzzled by Gamry's use of two leads for working electrodes. The two working electrode leads make it possible to devise a greater variety of experiments. However, to do a standard three-electrode potentiostatic experiment, connect both the green and blue clips to the working electrode (or clip the green to the blue, and then clip the blue to the electrode).

orange lead – The orange lead is used only in ZRA (zero resistance ammeter) experiments.