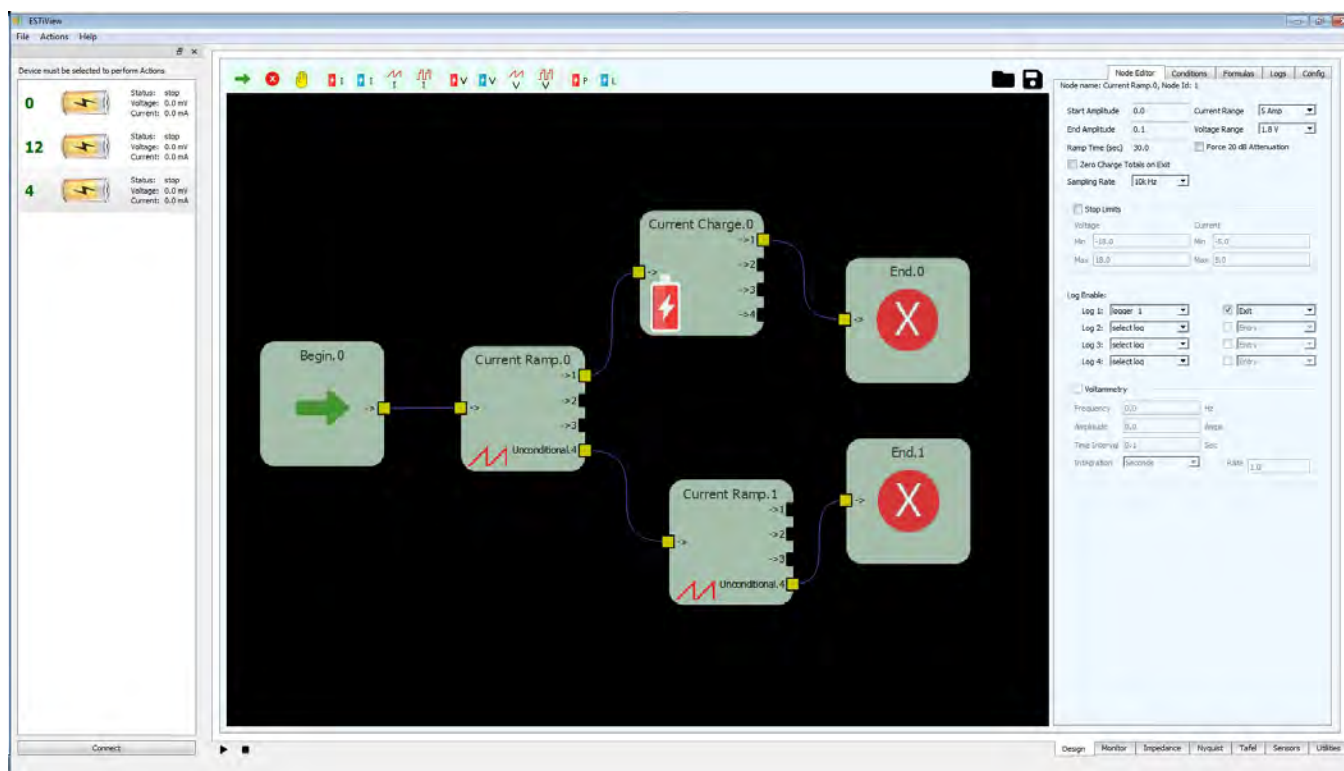


## ESTiView Software

ESTiView software is a highly intuitive, drag-and-drop, application used with ESTi hardware to test electrochemical devices such as batteries, capacitors to analyze their characteristics. ESTiView has a simple and easy-to-use graphical user interface (GUI) to control the hardware and to create and run complex tests. With ESTiView, the user can easily build a complex test by drag and drop control nodes to the layout.



## Electrochemical Techniques Supported

- Constant Charging and Discharging (current or voltage)
- Constant Power or Load
- Linear Sweep Voltammetry (LSV)
- Cyclic Voltammetry (CV)
- Step Voltammetry
- Pulse Voltammetry [e.g., square wave voltammetry (SWV)]
- Electrochemical Impedance Spectroscopy
- Potentiostatic Intermittent Titration (PITT)
- Galvanostatic Intermittent Titration (GITT)
- AC Voltammetry

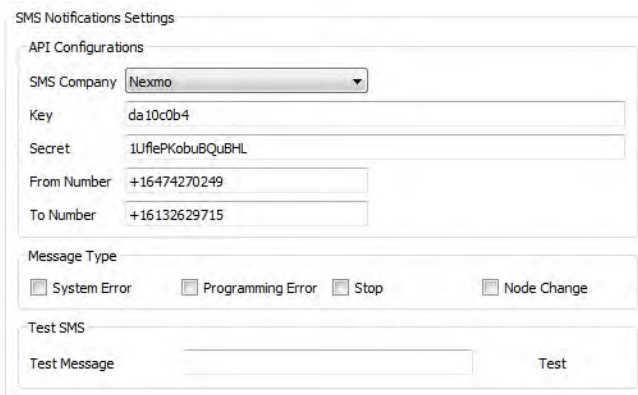
## Applications

- Corrosion Measurement
- Energy device testing [e.g., batteries]
- Electrolysis
- Fuel cells
- Coatings Evaluation
- Sensors

## SMS Notifications

The ESTiView software provides SMS texting support to inform users of events occurring with their operational tests, such as test completion or errors occurring, to be transmitted to their cell phone or other text messaging supported device.

Support only requires account activation on a supported SMS provider and a PC with access to the internet. ESTiView currently supports SMS providers Twilio and Nexmo.



The screenshot shows the 'SMS Notifications Settings' window. It contains the following fields and options:

- API Configurations:**
  - SMS Company: Nexmo (dropdown menu)
  - Key: da10c0b4
  - Secret: 1UfiePKobuBQuBHL
  - From Number: +16474270249
  - To Number: +16132629715
- Message Type:**
  - ☐ System Error
  - ☐ Programming Error
  - ☐ Stop
  - ☐ Node Change
- Test SMS:**
  - Test Message: (text input field)
  - Test (button)

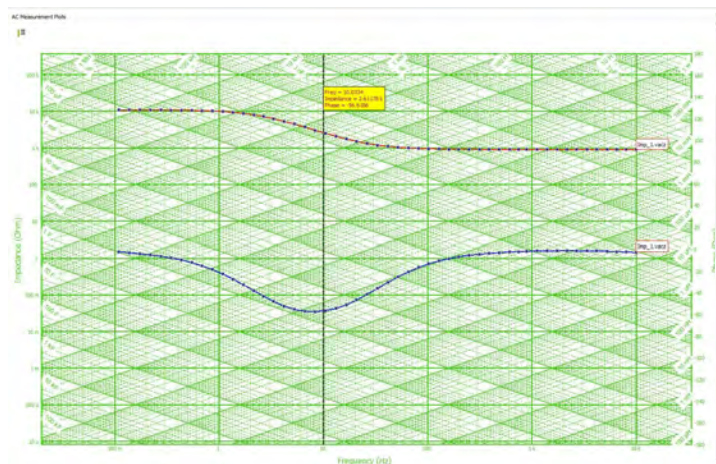
## Graphs

ESTiView software has four different graph types to plot and analyze the measured data.

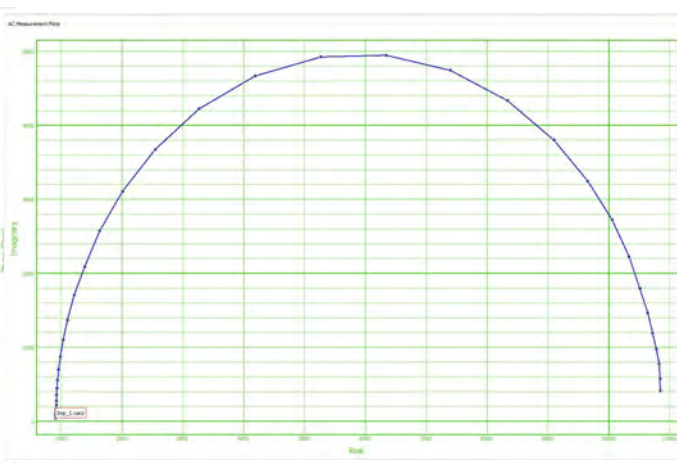
**Impedance and Nyquist Graphs** to display data from AC impedance sweeps performed during constant charge or discharge control nodes and AC voltammetry tests during ramp based control nodes.

**Tafel graph** associated with cyclic voltammetry testing, is used to plot current as a function of voltage.

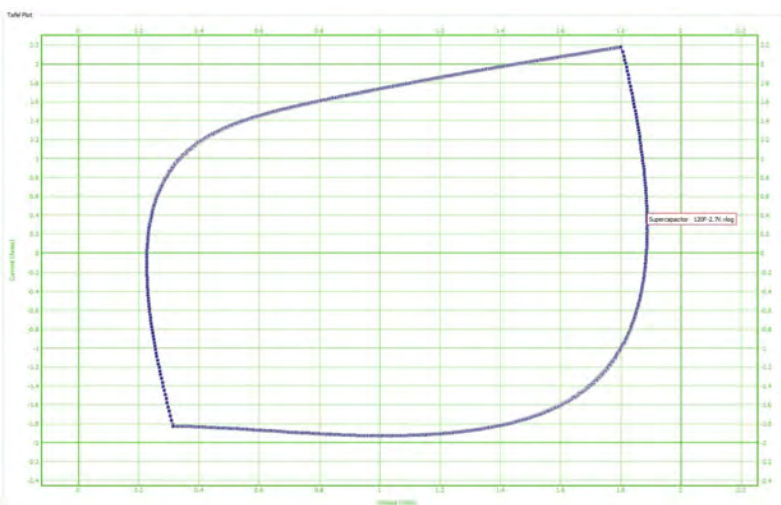
**Real-time graphs** plot the recent voltage and current history.



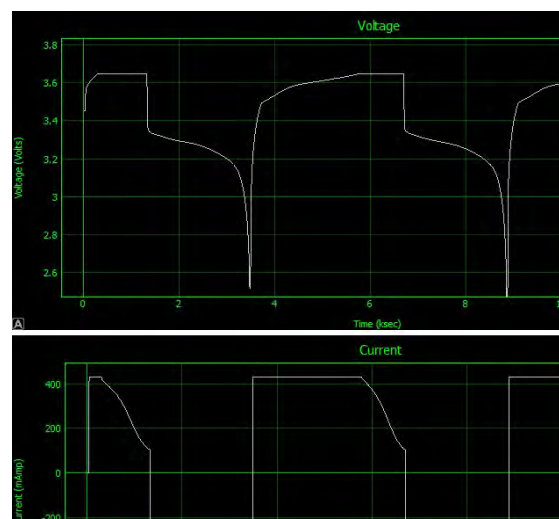
Impedance Graph



Nyquist Graph



Tafel Graph



Real Time Graph  
(monitor)

## Control Nodes

ESTiView has 13 control nodes for building out test scenarios and controls. Each node has parameters and different functions. The user can setup the parameters from node editor GUI.



The screenshot shows the 'Node Editor' window for 'Current Charge.0, Node Id: 1'. The window has tabs for 'Node Editor', 'Conditions', 'Formulas', 'Logs', and 'Config'. The 'Node Editor' tab is active, showing various parameters for the node. The parameters are organized into sections: 'Amplitude' (0.1), 'Current Range' (5 Amp), 'Sampling Rate' (25k Hz), 'Voltage Range' (1.8 V), 'Continue Previous Node' (checkbox), 'Force 20 dB Attenuation' (checkbox), 'Zero Charge Totals on Exit' (checkbox), and 'PID' (Disabled). Below these is a 'Stop Limits' section with 'Voltage' and 'Current' sub-sections, each containing 'Min' and 'Max' input fields. The 'Log Enable' section has four 'Log' entries (Log 1 to Log 4), each with a 'select log' dropdown and an 'Entry' checkbox. The 'ACZ Sweep' section includes 'Start Freq' (0.0 Hz), 'Stop Freq' (0.0 Hz), 'Amplitude' (0.0), 'Disable Autoranging' (checkbox), 'Time Interval' (0.1 Sec), 'Repeat' (checkbox), 'Integration' (Seconds), and 'Rate' (1.0). The 'Sweep Type' section has two options: 'Log' (selected) with '10 Steps/Decade' and 'Linear' with '1000000 Hz'. The 'PITT / GITT' section includes an 'Incremental Step Amount' (0.0) and an empty input field.

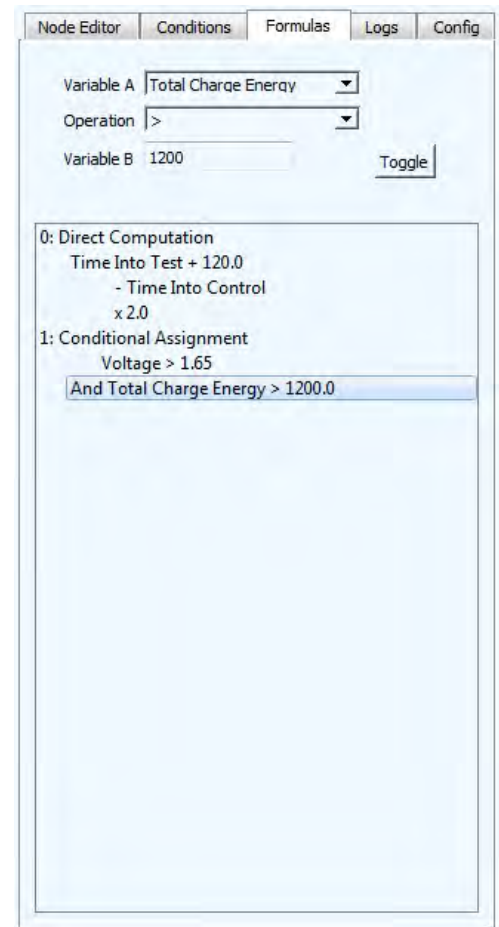
## Logs and Data Storage

ESTiView provides an “easy to use” method to store data, which is taken from instrument measurements, into file(s) for subsequent analysis. These are referred to as logs. Users can select one or more variables for each log.

The logs tab is split up into three sections. The list of user defined logs is created and displayed in the top left box. The list of variables to select for each log is displayed in the top right box. At the bottom of the window is the condition editor used to define conditions when a log of data should be recorded.

## Formulas

ESTiView gives you the ability to create complex equations for computational purposes with the result stored in user-defined variables. These computations can utilize built-in variables, other user-defined variables and constants. The formulas function allows you to perform 2 general types of operations. The first type is “Direct Computation” which consists of traditional arithmetic computations, but includes binary computations (AND/OR operations) as well. The second type is “Conditional Assignment” which performs a “compare and set” operation by comparing a chosen variable, against a combination of other variables or static values. Together, these formula capabilities allow the user to create very complex data computations that can be used in various other aspects of the software, including control node exit conditions and data logging activities



## Create and Run a Test Scenario

In the ESTiView software, a test scenario is made up of a sequence of operations, where each operation is done by a control node. Using the drag-and-drop feature of ESTiView, you can build and run a complex test scenario easily and quickly. Here are the steps to build a test scenario:

1. Connect to the instrument
2. Drag and drop the required nodes' control, for the test scenario, to the layout.
3. Connect the nodes in the desired order
4. Configure each nodes' control using the node editor window
5. Set up the exit condition for each control node to configure transitions to the next control node
6. Load the test into the instrument Action->Load Test
7. Run the test by clicking on Action->Start Test