



## Version 3.0 Quick Reference Guide

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### TRILUTION® LH Software

TRILUTION LH Software is software for controlling automated liquid handling instruments.

Its innovative features include:

- simple drag-and-drop method creation
- extensive flexibility in methods and tasks through the use of variables and operators
- integrated customization to create racks and tasks
- graphical application simulation to ensure the functionality and reliability of the application prior to use with precious samples
- easy integration with third-party software applications and hardware (using GEARS)

### Tutorial

Gilson's self-contained Quick Start Tutorial on CD is an excellent reference and educational tool, demonstrating how to program TRILUTION LH Software for a simple liquid handling application to perform Solid Phase Extraction.

The Quick Start Tutorial CD will automatically load a main menu with several TRILUTION LH Software tutorials and an introductory tutorial on using the CD.



### On-line Help

An on-line help system is included with the software for displaying context-sensitive help or for choosing help topics from a Contents listing.


Access on-line help in the following ways:

- Click the Start button, and then select **All Programs>Gilson Applications>TRILUTION LH 3.0>TRILUTION LH Help**.
- Move the mouse cursor over a button in the software. A tooltip appears with text that describes what the button does.
- Click **Help** to display help for the dialog or task property page.
- Click **?** to display help about the window.
- Click **?** to display "How To" help topics (accessible from the menus).
- Click **Show** in an open help topic to display the Contents tab.



# Main Menu and Export/Import

## Main Menu Options

The main menu provides a way to navigate to key areas of the software. To return to the main menu from other areas in the software, click .

- 
- 1 Liquid Handling Menu.** Displays the Liquid Handling menu for accessing the Application Builder, Method Builder, Custom Task Builder, Utilities menu, Reports window, and the About screen.
  - 2 Administrative Tools Menu.** Displays the Administrative Tools menu, which enables all users to access the Change Password and User Setting dialogs and for members of the default Admin group to access the Users and Groups options.
  - 3 Log Out.** Ends the current user's session, which allows a different user to log in to TRILUTION LH.
  - 4 Application.** Opens the Application Task Builder for creating a sample list and running an application.
  - 5 Method.** Opens the Method Builder. A method includes a configuration, a bed layout, and a sequence of tasks to execute.
  - 6 Task.** Opens the Custom Task Builder for creating or modifying a custom task. Tasks are used to perform specific actions at run time, such as moving a liquid handler or controlling a pump, and are created using a combination of commands and operators. Tasks and operators provide the basic building blocks for creating methods.
  - 7 Utilities.** Displays the Utilities menu, which has options for setting units, viewing run results, purging or recovering deleted items, creating custom bed layout elements, registering TRILUTION LH, and enabling ERM.
  - 8 Reports.** Opens the Reports window, which enables generating the following report types: Task, Method, Application, Run, and Sample Tracking.
  - 9 About.** Opens the About screen, which displays the license information and provides access to system information.
  - 10 Lock.** Secures the software in its current state. All open, unsaved tasks, methods, and applications will remain open. Only the user who locked the software or a member of the default Admin group can log in when the software is locked.
  - 11 Help.** Opens the on-line help system.
  - 12 Minimize.** Reduces the menu window to an icon on the taskbar.
  - 13 Exit.** Closes TRILUTION LH.

## Export/Import

Export/Import functionality allows for transferring tasks, methods, or applications from one system to another quickly and easily.

### To export a task, method, or application:

- 1 Open the builder (Custom Task, Method, or Application).
- 2 Click **Export**.
- 3 Select one or multiple tasks, methods, or applications.
- 4 Browse for and then select the destination folder. Click **OK**.
- 5 Click **OK** in the export window.
- 6 When the export success/fail dialog appears, view **Details** or click **OK**.

### To import a task, method, or application:

- 1 Open the builder (Custom Task, Method, or Application).
- 2 Click **Import**.
- 3 Browse for and then select one or multiple Task (.LHTE), Method (.LHME), or Application (.LHAE) files.
- 4 Click **Open**. Rename, overwrite, or skip import of existing items.
- 5 When the import success/fail dialog appears, view **Details** or click **OK**.



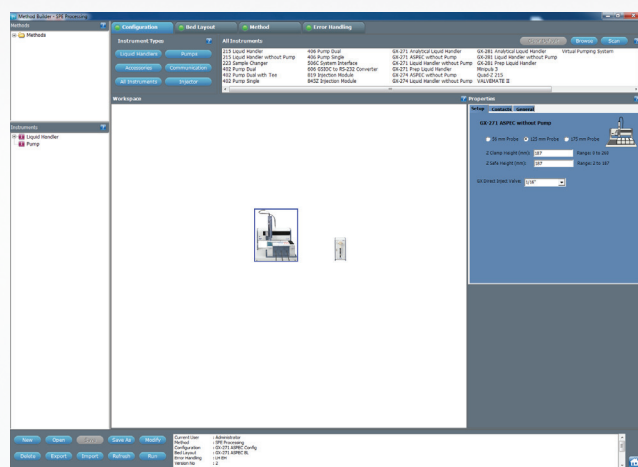
# Method Builder

## Method Builder Workflow

The following is a step-by-step listing of the basic workflow for creating a method in TRILUTION LH:

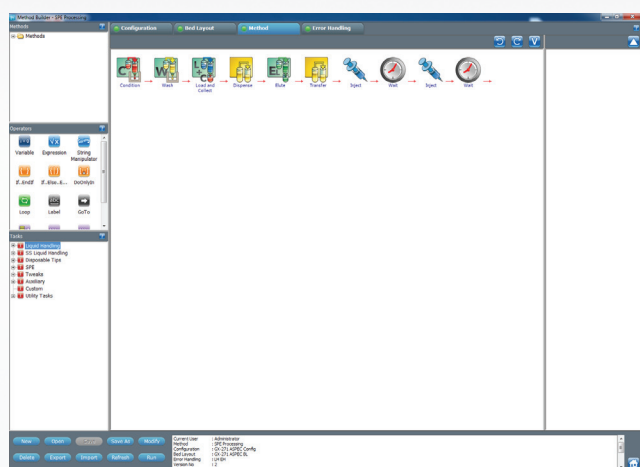
### 1 Configuration

Provide information to the software about the instruments that will be used. Scan for Gilson GSIOC or Ethernet instruments and GEARS devices. From the list of available instruments, drag the instrument and drop it in the workspace. Set the instrument properties.



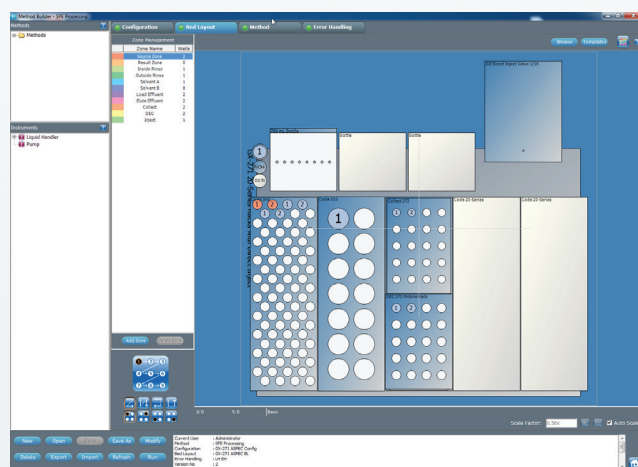
### 3 Method

Use the graphical interface to organize the tasks used in a method. Use a combination of tasks, expressions, and operators and, optionally, use variables for values in the tasks for more flexibility.



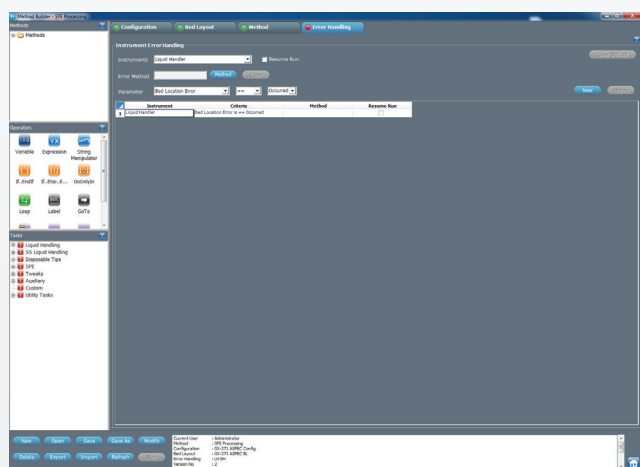
### 2 Bed Layout

Use the graphical interface to select racks, assign zones, and number wells. Select a template, select from a list of racks, select a numbering pattern, select a zone, and then finally number wells.



### 4 Error Handling (Optional)

Optionally, select error handling conditions to execute if a defined error is encountered.

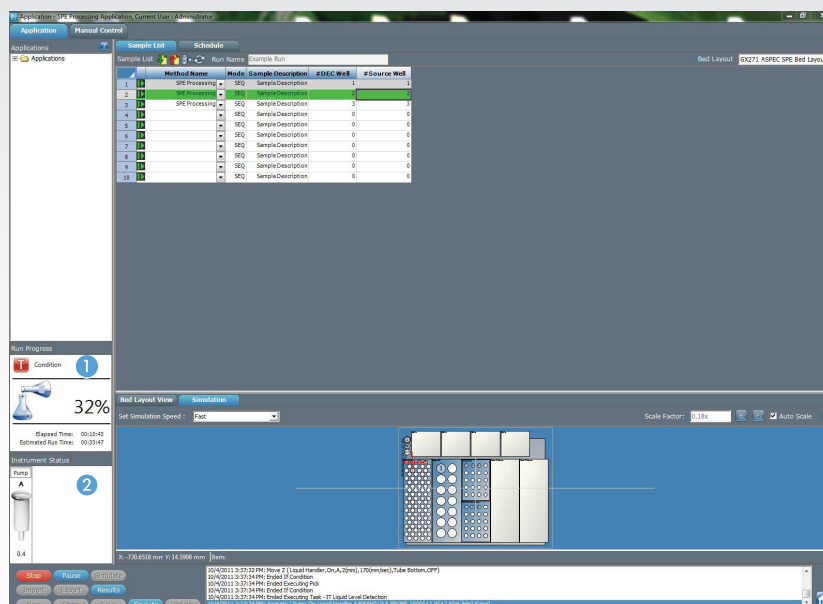


# Run and Simulation

## Run an Application

### To run an application:

- 1 Create the methods to use during the run.
- 2 Open the Application Builder.
  - From the **Liquid Handling** menu, select **Application**.
  - In the Method Builder, open or save a method, and then click **Run**.
- 3 Create a sample list to specify how many samples will be run, enter a sample description, and enter values for variables in the associated method.
- 4 Optionally, right-click on a column name and then click to select which columns to show.
- 5 Optionally, set initial volumes.
- 6 Optionally, schedule samples.
- 7 Click **Save**. Type a name for the application.
- 8 Optionally, type a name for the run (or accept the default name).
- 9 Optionally, click **Simulate** to simulate the run.
- 10 Click **Run**.



- 1 **Run Progress Indicator.** The Run Progress Indicator is a graphical representation of the progress of the run or simulation.

It displays the following:

- name of the current task or operator
- elapsed time
- estimated run time\*
- percentage completed\*

\*displayed only if the saved application is simulated first and no changes are made before or during a run

- 2 **Instrument Status.** The Instrument Status display is used to monitor the pressure of the 406 Pump Single or 406 Pump Dual during the run.

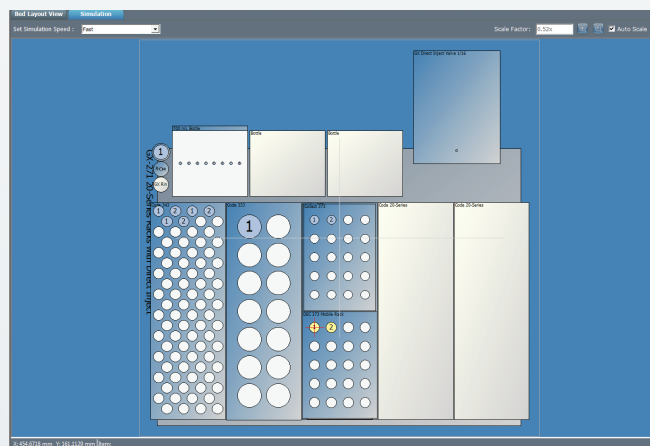
The estimated run time cannot be determined for tasks with unknown durations, such as Wait for Contact, Prompt, Prompt for Input, Run Executable, and Wait with Display. The estimated run time cannot be determined for applications that use GEARS devices.

## Simulate a Run

A graphical representation of a run is referred to as a simulation.

### To simulate a run:

- 1 Create or open an application.
- 2 Select the Simulation tab.
- 3 In the Set Simulation Speed field, select a speed from the drop-down list.
- 4 Click **Simulate**. Red crosshairs represent the probe movement.
- 5 Use the Scale Factor options to zoom, if desired.





# Manual Control and Results

## Bed Layout View Tab

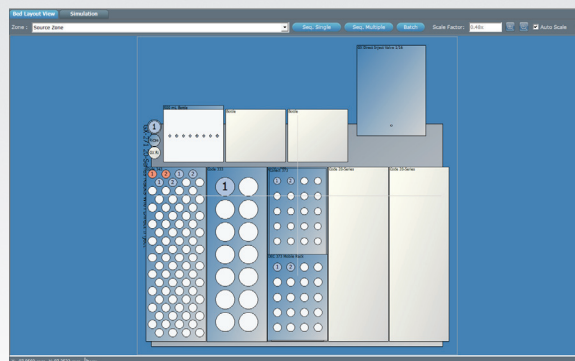
When creating a sample list, it is possible to view the bed layout, select multiple wells, and then have the software generate steps in the sample list.

- 1 Open the Application Builder.
- 2 Select a method containing a well variable.
- 3 Place the cursor in the first cell for which to select a well.
- 4 If not already selected, click to select the **Bed Layout View** tab.
- 5 Select a **Zone** from the drop-down list. Available wells appear highlighted in the active zone color.
- 6 Choose multiple well locations.
  - To select random wells within one zone, press the **CTRL** key, and then select each well.
  - To select a range of wells within one zone, click and drag over a block of wells.
- 7 Select the mode in which the samples should be processed by clicking **Seq. Single**, **Seq. Multiple**, or **Batch**.

If **Seq. Single** mode, all wells selected will be added as one row in the sample list and the mode will be set to Sequential. In Sequential (SEQ) mode, each sample is fully processed using all tasks in the method before continuing to the next sample.

If **Seq. Multiple** mode, each well selected will be added as its own row in the sample list and the mode will be set to Sequential. In Sequential (SEQ) mode, each sample is fully processed using all tasks in the method before continuing to the next sample.

If **Batch** mode, all wells selected will be added as one row in the sample list and the mode will be set to Batch. In Batch (BAT) mode, all samples are processed in order using the first task in the method. Then all samples are processed in order using the second task in the method, and so on.



## Manual Control

In addition to application runs, TRILUTION LH also provides manual control of Gilson instruments in the configuration through a graphical user interface. Manual control is useful for preparing a system for a run.

Before running your system in manual mode, be sure that the instruments in the system are turned on and the appropriate connections are made as described in each instrument's user's guide.

Manual control is accessed by clicking the Manual Control tab in the Application Builder.

### Manual Instrument Control

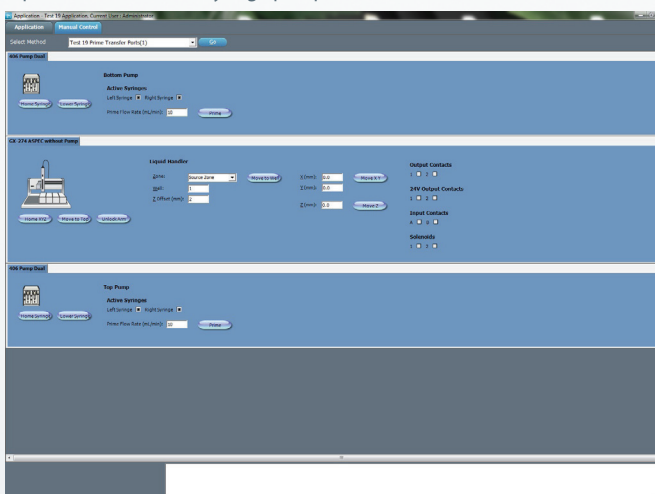
For manual control to occur, TRILUTION LH needs the configuration and bed layout information set in the method.

Use the following procedures to set which method information will be used for manual control.

- 1 Open the Application Builder.
- 2 Select a method.
- 3 Select the Manual Control tab.
- 4 Select a method from the drop-down list of methods.
- 5 Click **Go**. The instruments will initialize.

### Example

Refer to the example below, which shows manual control of a Gilson liquid handler and two syringe pumps.



## View Results

To view the run results (log) for a run or simulation:

- 1 On the **Liquid Handling** menu, select **Utilities | Run Results** or click **Results** in the Application Builder. The Run Results window is displayed.
- 2 Select the application that was run or simulated to create the results.
- 3 Right-click the run name and select **View Log**, double-click the run name, or select the run name, and then click **View Log**.

## GEARS

The Gilson Ethernet Asynchronous Remoting System (GEARS) is a mechanism for integrating third-party devices (RS-232) with any application that includes the proper implementation of Gilson's Ethernet communication protocol. In short, a GEARS device appears as if it were a Gilson Ethernet device. GEARS devices may be created using the GEARS Configuration Utility, which is used to define device instruction sets and add the device to the TRILUTION LH database (adds device specific commands for use within the Custom Task Builder, and provides a device which may be inserted into method configurations).

# Scheduling

## Schedule an Application

### How to Schedule an Application

Scheduling an application can make more efficient use of the liquid handling instruments by taking advantage of significant wait times to run multiple methods in parallel to shorten run times.

After creating the sample list, optionally schedule all or part of the application.

- 1 Open the Application Builder.
  - From the **Liquid Handling** menu, select **Application**.
  - In the Method Builder, open or save a method, and then click **Run**.
- 2 Create the sample list.
- 3 Create a schedule group, composed of one or more rows in the sample list that will be scheduled together. Samples in a schedule group can be processed in any order, which makes running methods with significant wait times more efficient.
  - To schedule one row per schedule group, select the row, right-click the cell in the **Mode** column, and then select schedule (**SCH**) mode.
  - To schedule one or more rows in a schedule group, select the row(s), right-click, and then select **Schedule**.

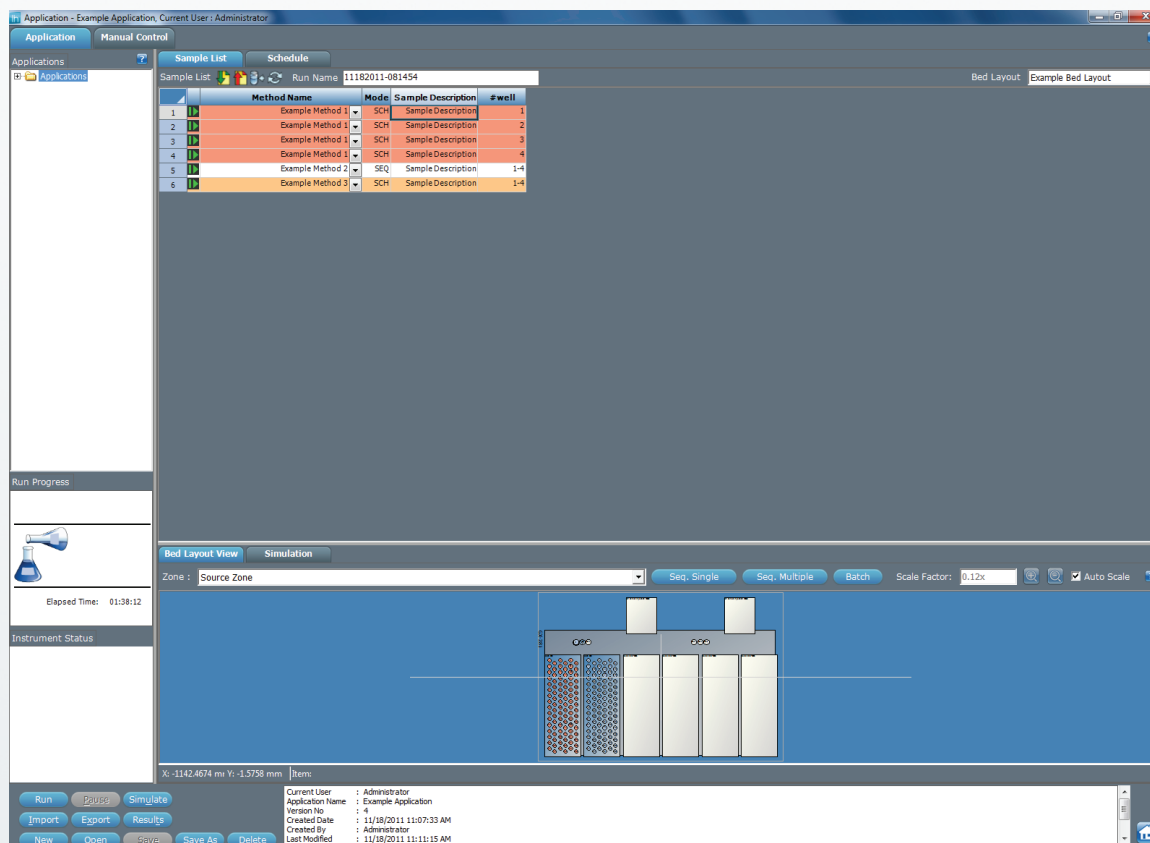
When scheduled, all rows in a schedule group will be highlighted with the same color.

Each schedule group must include a method with a Wait (Scheduled) task.

- 4 Optionally, right-click on a column name, and then click to select which columns to show.
  - The Schedule Group column indicates the rows that will be grouped together when running in schedule mode.
- 5 Repeat steps 3–4 for additional schedule groups.
- 6 Click **Save**.

During the run, the progress of each schedule group can be monitored on the Schedule tab.

Tasks with unknown durations, such as Wait for Contact, Prompt, Prompt for Input, Run Executable, and Wait with Display cannot be scheduled. Methods that use GEARS devices cannot be scheduled.



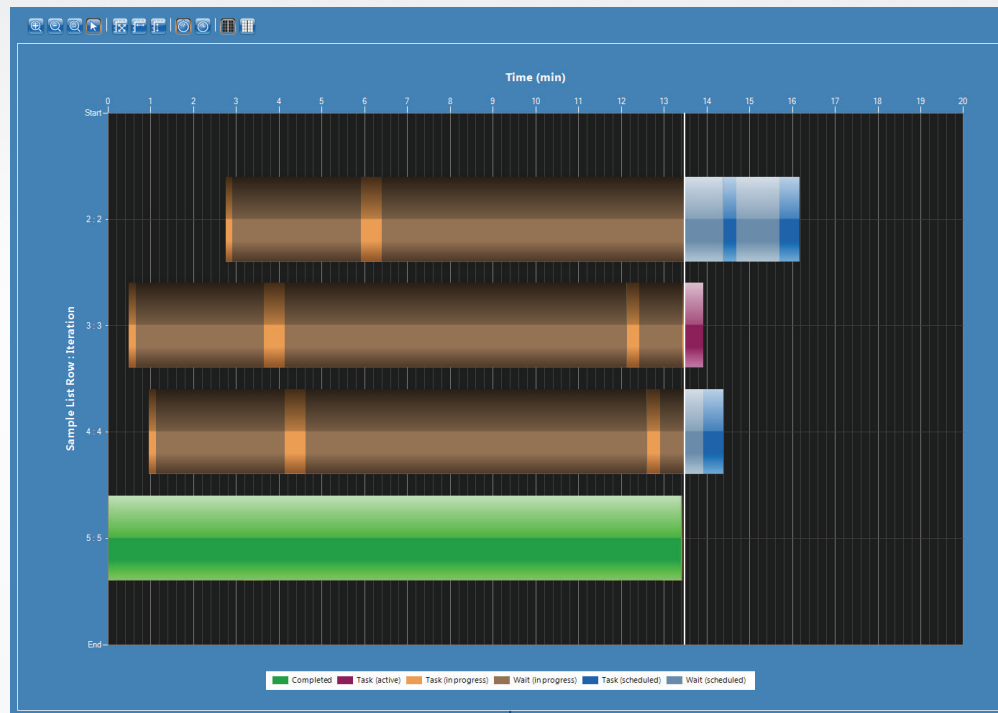


# Scheduling

## View the Schedule

Click the Schedule Tab to view the chart for a running schedule group.

- While the software determines the schedule, it displays “Scheduling Run”.
- The chart shows the progress of scheduled rows in a schedule group. Hover over a bar in the chart to view the tooltip, which provides information about the sample, including values for any variables in the sample list.
- While running scheduled rows, the run cannot be paused.



### Toolbar

Icon	Description
	Makes the viewable time scale shorter.
	Makes the viewable time scale longer.
	Enlarges lassoed portion of the chart.
	Selects the cursor (zoom disabled).
	Auto-scales both axes to minimum and maximum values.
	Auto-scales the X-axis (Time) to minimum and maximum values.
	Auto-scales Y-axis (Sample List: Iteration) to minimum and maximum values.
	Displays the chart using elapsed time. (Default)
	Displays the chart using actual time.
	Displays the chart with a dark background. (Default)
	Displays the chart with a light background.

### Legend

Color	Label	Description
	Completed	Indicates that the method (or iteration of the method) is complete.
	Task (active)	Indicates that tasks in the method (or iteration of the method) are running.
	Task (in progress)	Indicates that tasks in the method (or iteration of the method) have completed execution.
	Wait (in progress)	Indicates that the wait in the method (or iteration of the method) is in progress.
	Task (scheduled)	Indicates tasks in the method (or iteration of the method) that have not started running.
	Wait (scheduled)	Indicates a wait in the method (or iteration of the method) that has not yet started.

# Variables



## Create a Variable

To make tasks and methods more flexible, use a variable for a command or task property. When creating a method, assign values to any undefined variables used by any tasks. When setting a sample list for a run, assign values to any undefined variables used by the method. A message will be displayed when adding a task to a method or when beginning an application run if a value has not been assigned to a variable or if a variable has an invalid entry.

Two types of variables are available for creation and use in TRILUTION LH: Local (value type) variables and Global (reference type) variables. Local variables are only visible in the Variable List in the task or method in which they were created. The values for local variables are specific to each task or each method iteration and are reset before running the next task or method iteration. Global variables are available in all tasks and methods and do not reset for each task or each method iteration, thus enabling values to be passed from task to task or iteration to iteration.

### How to Create a New Variable

To create a variable:

- 1 On the Method Builder - Method tab or in the Custom Task Builder, do either of the following:
  - Click , which opens the advanced Variable Properties dialog.
  - Drag the Variable operator () and then drop it in the workspace, which opens the basic Variable Properties dialog.
- 2 When the Variable Properties dialog appears:
  - a) In the **Name** field, enter a unique name for the variable.
  - b) In the **Type** field, select a variable type from the drop-down menu.
  - c) Optionally, enter a default value for the variable (if applicable).
  - d) Optionally, enter the minimum value and maximum value (range) for the variable (if applicable).
  - e) Select the option for the variable type: Local (value type) or Global (reference type). (Local is selected by default.)
  - f) Select **Show in parent** to display the variable in the Method Builder (if creating a task variable) or in the sample list (if creating a method variable), even if the variable is not being used. It is selected by default for local variables. For global variables, it is not selected by default.
  - g) Optionally, add values to the Value List by typing the value (only available in the advanced Variable Properties dialog). Values entered in this list display as drop-down values in the task or method in which the variable is used. Values in this list are not displayed in the sample list.

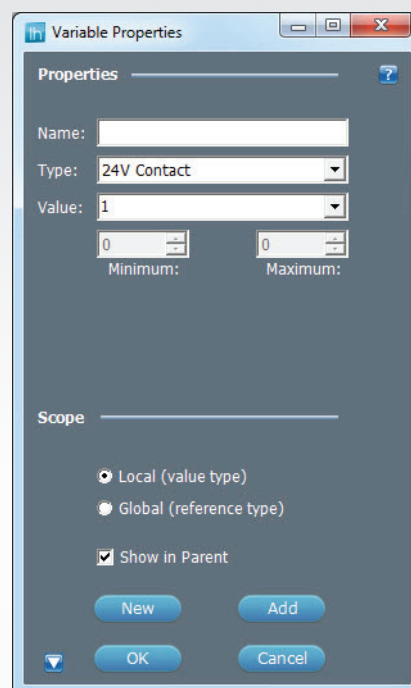
Another way to create a local variable is by entering a unique variable name, instead of a value, for a task property in the Method Builder or for a task or command property in the Custom Task Builder. A local variable name begins with #, and can be any combination of letters and numbers and can contain some special characters. Valid local variable names would be #FlowRate and #Sample\_Vol1.

- 3 Click **Add**. Repeat steps 2 and 3 to create additional variables.
- 4 When finished creating variables, click **OK**.

To make an existing global variable available for use in the task or in the method, click the arrow to open the advanced Variable Properties dialog, and then select **Visible in Method/Task** (depending on the builder).

To make all global variables available for use in the task or in the method, click **Select All**.

To clear the Visible in Method/Task (depending on the builder) selection for all global variables, click **Deselect All**.



The Variable Properties dialog box is shown. It has a 'Properties' section with fields for Name, Type (set to '24V Contact'), Value (set to '1'), and Minimum/Maximum values (both set to '0'). There is a 'Scope' section with radio buttons for 'Local (value type)' (selected) and 'Global (reference type)'. A checkbox for 'Show in Parent' is checked. At the bottom are buttons for 'New', 'Add', 'OK', and 'Cancel'.

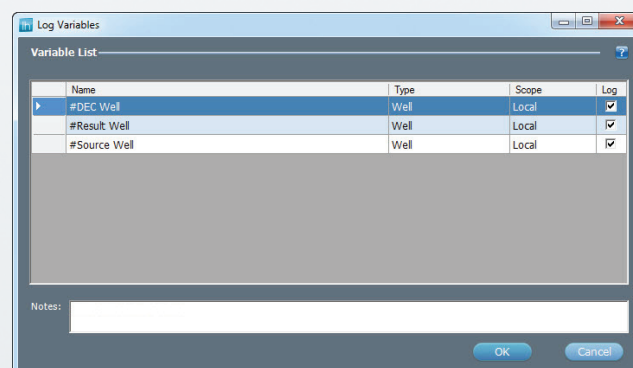
## Log Variables Task

When added to a method, this task records the current values for local and global variables in the method during a run or simulation and stores them in a spreadsheet. Time Stamp, Sample Line, Method Name, Method Iteration, and Notes are also reported in the spreadsheet each time the task is run. The file is automatically named VARIABLE LOG\_YYYY-MM-DD HH-MM-SS\_RUN NAME.XML, where \_RUN NAME is a user-supplied run name, and the file is stored in a Variable Logs folder at C:\Users\ OS User Name\My Documents\TRILUTION LH x.x\Export\Variable Logs.

To record the value for a variable, select the Log check box for the variable name in the Variable List.

Optionally, type notes in the Notes field to be recorded with the selected variables.

	A	B	C	D	E	F	G	H
1	Time Stamp	Sample Line	Method Name	Method Iteration	Notes	#DEC Well	#Result Well	#Source Well
2	8/25/2011 10:25	1	SPE Processing Method	1		1	1	1
3	8/25/2011 10:30	2	SPE Processing Method	2		2	2	2
4	8/25/2011 10:34	3	SPE Processing Method	3		3	3	3



The Log Variables dialog box is shown. It has a 'Variable List' section with a table showing variables and their log status. Below the table is a 'Notes' field and 'OK' and 'Cancel' buttons.

Name	Type	Scope	Log
#DEC Well	Well	Local	<input checked="" type="checkbox"/>
#Result Well	Well	Local	<input checked="" type="checkbox"/>
#Source Well	Well	Local	<input checked="" type="checkbox"/>