Change process model

- Click on **Process** from the menu bar, then click on **Select Model** from the drop down menu.
- Highlight one of the available process models from the sub-menu and press **Open**

Additional process models may be defined using the **Builder** model configuration program.

Change parameters of a process model:

- Click on **Process** from the menu bar, then click on **Change Parameters**.
- When the process model was defined using **Builder**, certain parameters were made accessible through **PC-ControLAB**. Highlight any one of the listed parameters, key in a new value, then press **OK**.

Change characteristics of the AutoLoad function:

- Click on **Load** from the menu bar.
- The table lists types of automatic load change that can be applied (random walk, random step, sinusoidal, etc.) when the **AutoLoad** is pressed. You can enable or disable any of these types as well as change parameter values (for instance, the amplitude of the sinusoidal disturbance) which govern their behavior. See **PC-ControLAB HELP** for more details.

PRODUCT SUPPORT

Wade Associates, Inc. 1-281-304-9502
17522 Brushy River Court FAX: 1-281-256-3442
Houston, TX 77095 e-mail: controlab@wadeco.com
www.wadeco.com

APPENDIX
Abbreviations and Terminology

Auto	Refers to the automatic mode of operation of a controller
Man	Refers to the manual mode of operation of a controller
SP	Set point; the target value which the controller tries to achieve
PV	Process variable; the measured value of a physical variable (such as temperature)
Out	Controller output; signal to a final control element, such as a valve
Load	Used interchangeably with the term disturbance. A random, external influence on a process variable. Its influence must be compensated for by the controller
Tune	Adjustable parameters which "tune" the behavior of the controller to match the dynamic characteristics of the process.

PC-ControLAB™ 3
QUICK START GUIDE

Congratulations on acquiring **PC-ControLAB**, the finest, most flexible, most realistic and easiest to use process control training program on the market. This continuously running process control loop simulation program provides the look and feel of an actual process operator's workstation. It allows you to perform the usual operator functions such as changing controller modes from manual to automatic, changing controller set point or output value, tuning the controller, observing the response and more.

PC-ControLAB is very rich in features. It also allows you to select, operate and observe the behavior of advanced control strategies such as cascade and feedforward. You can modify controller characteristics, similar to choosing configuration options in commercial control systems. You can also select from a number of different types of process models; by the use of the companion **Builder** program, you can construct your own process model which will resemble an actual process unit.

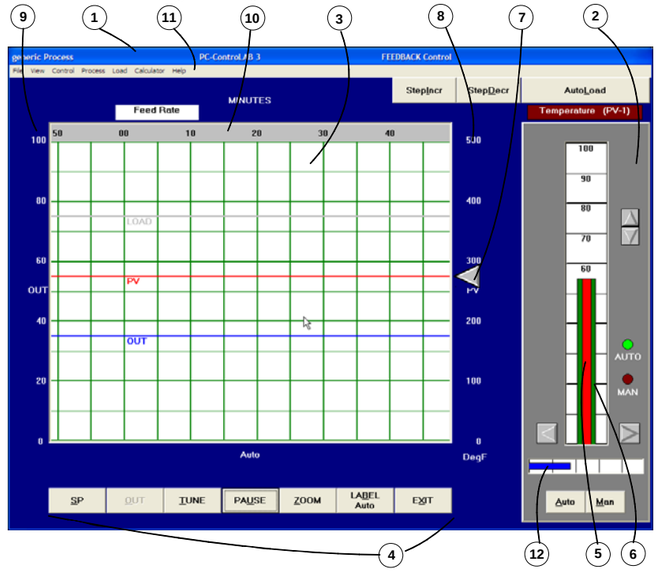
This Quick Start guide should provide enough information for most users to begin beneficial use of the program. For more in depth instructions, both **PC-ControLAB** and **Builder** provide tutorial programs, accessible under **HELP**.

INSTALLATION

- Insert the CD into your CD-ROM drive. If AutoRun does not start automatically, then from the Windows START menu, RUN D:\setup.exe. (If your CD-ROM drive is not D, use the appropriate designation.)
- Follow the on-screen instructions:
  - Enter the serial number from the back of the CD case.
  - During the installation procedure, you will be asked for a destination folder. By default, the destination folder is C:\Program Files\PC-ControLAB 3. You may change the destination folder if you wish.
  - At one point you will be asked if you want a Complete or Custom installation. The difference between these two is that the Complete installation loads the Laboratory Exercises onto your hard drive and the Model Predictive control program and documentation, whereas the Custom installation does not. A complete installation will require approximately 16.2 mB on your hard drive; this will be reduced by about about 3.4 mB if you choose not to install the complete package. Laboratory Exercises can be accessed from the CD.
  - Access to the Laboratory Exercises requires Adobe Acrobat Reader. If the installation program does not detect a copy on your computer, it will install a copy. Alternatively, a free version may be downloaded from www.adobe.com.

THE MAIN DISPLAY

After starting **PC-ControLAB**, the title display appears for a few moments, then the main operational display appears. This display resembles a typical process operator's workstation with a single feedback controller and a continuously scrolling trend display. Behind the scenes a simulated process model is running; this model has dynamic characteristics similar to many types of process units, hence it is called a "generic" process.



1	Title Bar
2	Feedback Controller
3	Scrolling Trend Display
4	Operational Buttons
5	PV Indicator (red bar)
6	SP Indicator (green bar)
7	SP Pointer
8	PV Scale (0 - 100% or engr units)
9	Output Scale (0 – 100%)
10	Horizontal time scale (60 minutes)
11	Menu Bar
12	Controller Output (blue bar)

Changing the display size:

The initial size of the display may fill only a portion of your monitor screen. Depending upon the size and resolution setting of your monitor, it may be possible to increase or decrease the display size.

- On the menu bar, select **View**
- From the drop down menu, select **Display Size**.
- In the sub-menu, click on either **Bigger** or **Smaller**. (One or the other of these may be grayed out, indicating that the display is already at the maximum or minimum size for the existing resolution setting.)

BASIC OPERATION

Given below is a brief introduction to the basic operational features of this display. A more detailed explanation is given in the Tutorial, accessed under **HELP**.

Switch controller modes between Manual and Automatic:

- Move the cursor to and click on the **Man** or **Auto** button on the controller. (Further instructions will refer to this type of operation as "Press the Man or Auto button".) Note the change in the LEDs on the controller, and also the indication beneath the trend display.

Enter a new value for controller output. (The controller must be in the Manual mode.):

- Press **Out** beneath the trend display and key in a new value. Then confirm your entry by clicking on **OK** or by pressing the **Enter** button on the keyboard.

> You can also change the controller output by pressing and holding down one of the output jog buttons on the controller.
>
> 

Enter a new value for controller set point:

- Press **SP** and key in a new value. Confirm your entry by pressing **OK** or by pressing **Enter** on your keyboard.

> You can also change the set point by pressing and holding one of the set point jog buttons on the controller
>
> 
>
> or by clicking and dragging the set point pointer at the right of the trend display.
>
> 
>

Enter new controller tuning parameters:

- Press **Tune**. A dialog box appears which permits you to enter new values for:

  GAIN
  RESET (minutes per repeat)
  DERIVATIVE

- After you key in each value, confirm its entry by clicking **OK** or by pressing **ENTER**. (If you click **OK** or press **ENTER** without keying in a value, the present value of that tuning parameter is retained.)
- Press **Clear** to remove the dialog box.

> Some commercial controllers are tuned with Proportional Band, rather than Gain. Others are tuned with Reset Rate (repeats per minute), rather than Reset Time (minutes per repeat).
>
> To change tuning parameter type, select the **Options** tab from the Tuning Dialog Box. Select the desired designation for each tuning parameter. Then return to the **Tuning** tab.

Simulate a load change to a control loop. (This is something you might want to do after entering new tuning parameters, to see how the loop responds to a disturbance.):

- Press **StepIncr** or **StepDecr** (buttons above the controller). Each step represents a 5% load increase or decrease.

> You can also turn on or off automatic load changes by pressing **AutoLoad**. (The default form of the automatic load change is a random walk.) Other forms of automatic load change can be set up by selecting **Load** on the menu bar.

Pause the simulation. (This is one thing that this program does that cannot be done on a real process. Even though sometimes you might want to "stop the world"!)

- Press **Pause**. A scroll bar and "scooter" line appears, along with a data box that gives the numerical value of process variables, also the time (minutes since last hour change), at the position of the scooter bar.

Resume the simulation

- Press **Run** (the same button as Pause, only relabeled).

"Zoom in" on a selected portion of the vertical (PV) scale:

- Press **Zoom**. Then select the desired low and high values for the expanded PV scale. Press OK. (Note that this only changes the display range for the trend display. The graduations on the controller indicator are unchanged.)

MORE ADVANCED OPERATION

The following gives an overview of some of the more advanced functions which can be performed. For a more detailed discussion, see the **PC-ControLAB** Help section, or the tutorial accessible under **HELP**.

Select another control strategy:

- Click on **Control** from the menu bar, then click on Select Strategy from the drop down menu.
- Select from one of the 13 available control strategies.
- See **PC-ControLAB** Help or the tutorial for detailed operational instructions for these strategies.

> A newly selected control strategy will contain default tuning parameters (Gain = 1.0, Reset = 100 minutes per repeat and Derivative = 0); the process model will be unchanged. A control loop package, consisting of a particular control strategy, pre-assigned tuning parameters and a designated process model, can be obtained by selecting **Retrieve Strategy, Model and Tuning** from the drop down menu.

Change controller options:

- Click on **Control** then **Control Options**.
- Change the settings for any of the available control options (example: direct acting or reverse acting for a controller). The available options are similar to configuration options available on commercial control systems.

> The present settings for the control options can be viewed in either the Manual or Automatic controller mode. The settings can only be changed, however, when the controller is in the Automatic mode.