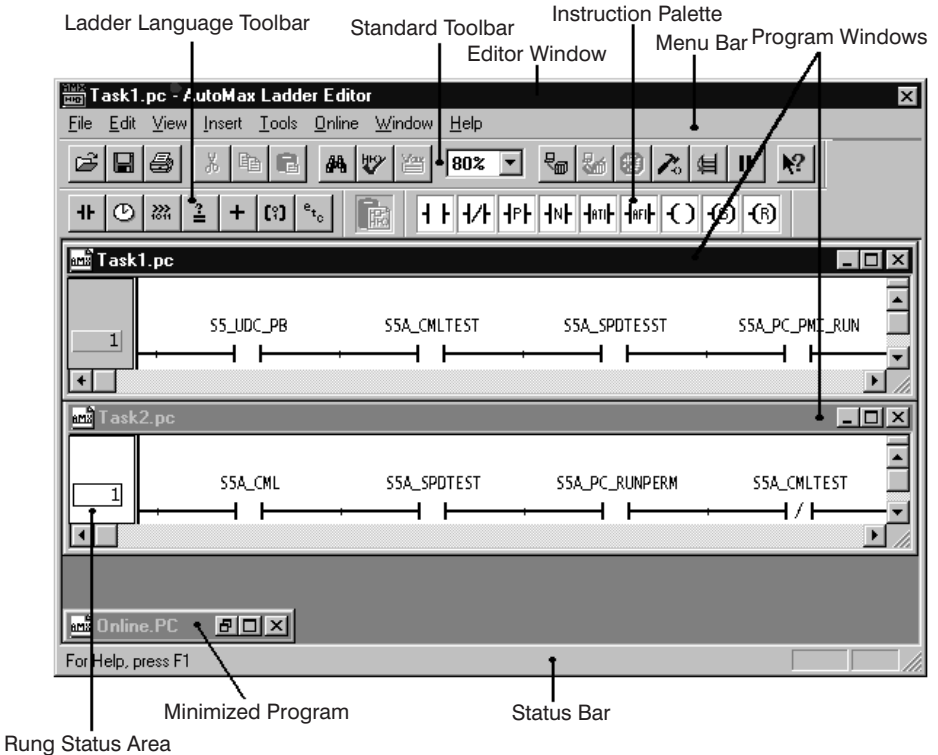


# 1.0 Getting Familiar with the Editor

This section describes some basic information to help you become familiar with the Editor.

## 1.1 Overview of the AutoMax Ladder Editor Window



- **Ladder Language Toolbar:** Provides access to the individual ladder instruction palette
- **Standard Toolbar:** Provides shortcuts to common commands by clicking on a button
- **Editor Window:** Identifies the name of the currently active program and provides access to the application window controls
- **Instruction Palette:** Lets you drag and drop instructions into your program
- **Menu Bar:** Provides access to the available Editor commands, many of which can be accessed via a standard toolbar button or keyboard characters

- **Program Windows:** Presents the open program(s). The name of the program is listed in each window
- **Rung Status Area:** Displays rung numbers, revision marks, set triggers, and indicates active versus non-active powerflow
- **Minimized Program:** Can help organize many open programs
- **Status Bar:** Displays information about the program objects you have selected, the state of the program in the active window, and helpful messages

Refer to Appendix A for more information about the toolbars, instruction palettes, and the status bar.

## 1.2 Opening Programs

Opening a program is the first step in editing it. Before you can open a program, you must have added it to the rack using the Task Manager application.


You can open a program from the Task Manager application or from the AutoMax Ladder Editor.

### To open a program from within the Task Manager application

- From the Task Manager application, select a task and choose Edit from the Task menu.

### To open a program from within the Editor

Step 1. Do one of the following:

- Click on 

or

- From the Ladder Editor's File menu, choose Open

The Open dialog box is displayed.

Step 2. Choose the location of the file that you want to open. The default drive and directory is the drive and directory from which a program was last opened.

To change this:	Do this:
The drive and directory in which to search	Click in the Look in list box. From here choose the drive and directory that contains the program you want to open.
The directory in which to search	Click on a folder or on a file in the list of files and folders contained within a directory.

Step 3. From the list of file names, select the program you want to open. The default file type is ladder programs (\*.pc). You can open only .pc programs using the Ladder Editor.

Step 4. Open the file by clicking OK.

If the ladder program was created using an older version ladder editor, the Editor first prompts you to convert the

program. To convert the program, choose Yes. For more information, see Appendix F.

You can have at most 15 unique offline programs opened at one time.

## 1.3 Closing Programs

Close the active program with the Close command. The Editor stays active and any other open programs stay open.

The Editor prompts you to save any changes to open programs before closing.

### To close a ladder program


- Step 1. From the File menu or Program Control Menu, choose Close.
- Step 2. If you have made changes to the program since you last saved it, choose one of the following buttons in the message box that asks if you want to save the changes:

To:	Click:
keep the changes	Yes
not save the changes	No
keep the program open and cancel the changes	Cancel

## 1.4 Saving Programs

Save changes to the active, offline program by using the Save command. The Editor stays active with the same program open after saving the changes.

### To save a ladder program

- Click on 

or

- From the File menu, choose Save

The Editor saves global and local variables and their descriptions to the program symbol table.

### Tip

Any offline revision marks present in the program disappear once you save a program.

### Tip

To save changes made to an online program, use the Accept or Commit Test Mode Changes commands. For more information, see Chapter 5.0.

## 1.5 Saving Programs Automatically As You Work

To make sure that you do not lose work, you can use the Automatic Save Every feature to save your offline ladder programs at a specified interval—for example, every ten minutes. Specify whether you want your programs to be saved automatically and the time interval to use within the General Options tab.

Files that are saved automatically are stored in the same directory as the original ladder program and under the same name. However, the file extension for an automatically saved file is .ASV.

### To automatically save programs as you work

- Step 1. From the Tools menu, choose Options.
- Step 2. On the General tab, choose Automatic Save Every.
- Step 3. Using the Minutes spinner box, choose or type the time interval (in minutes) that you want the Editor to wait before it automatically saves the ladder program. Choose an interval from 1 to 120 minutes. The default setting is 10 minutes.

The program is saved at your specified time interval whenever a change to the program has been made since the last automatic save.

If a program you are trying to open has a more current autosaved copy, the Editor prompts you to choose either the autosaved file or the program file you last saved.

The auto-saved copy of a ladder program is deleted whenever you save the program by using the Save command or close the program.

## 1.6 Displaying a Program in Multiple Windows

To help you simultaneously view different parts of a program, you can choose to display it in more than one window. Any changes you make to the program are reflected in the other window(s) in which the program is displayed. When you open a new window, it becomes the active window and is displayed on top of all other open windows.

### To display a program in multiple windows

- Step 1. Make sure that the program you want to display in a new window is the active program.
- Step 2. Do one of the following:
  - From the Window menu, choose New Window.or
  - With no program items selected and the mouse pointer positioned in the grid area, click the right mouse button, and choose New Window from the pop-up menu.

The program window name is appended by a “:#”. For example, if you chose to display the program LINE\_1.pc in a new window, the new program window would be LINE\_1.pc:2.

## 1.7 Editing Different Parts of the Same Program Using Split Windows

A program window may be split into two horizontal panes. Any editing done in one pane is reflected in the other.

Each pane can be scrolled independently using its own vertical scroll bar.

### To view different parts of the same program using the Split command

- Step 1. From the Window menu, choose Split. The cursor turns into a split pointer, a combination up arrow and down arrow.
- Step 2. Using the mouse or the up and down arrow keys, position the cursor at the point in the program where you would like to split the screen.
- Step 3. Press ENTER or click the mouse button once to position the split between the panes.

### To view different parts of the same program by clicking on the splitter bar

- While pointing to the splitter bar, press the left mouse button, drag the splitter bar to the desired location, and release the button.

### To remove the splitter bar

- Click on the splitter bar and drag it to the top or bottom of the window.
- or
- Double-click anywhere on the splitter bar.

## 1.8 Editing Multiple Programs

You can edit multiple programs (up to 15) within the Editor at the same time. Each program has its own window. Only one window at a time can be the active window, which you can identify by the highlighted title bar and rung status area.

### To edit multiple ladder programs from the Task Manager

- Step 1. From the Task Manager, select each ladder program that you want to edit.
- Step 2. From the Task Menu, choose Edit. The files you selected are opened along with the Editor.
- Step 3. From the Editor's Window menu, select Tile or Cascade. All non-minimized programs are arranged within the Ladder Editor window. Or, use the mouse to arrange the windows on the desktop.
- Step 4. Click on the program window to make it active before editing the program.

### To edit multiple ladder programs from the Editor

- Step 1. From the File menu, open all the programs you want to edit.
- Step 2. From the Window menu, select Tile or Cascade. All non-minimized programs are arranged within the Ladder Editor window. Or, use the mouse to arrange the windows on the desktop.
- Step 3. Click on the program window to make it active before editing the program.

#### Tip

To switch among the programs you are editing, press CTRL+F6.

## 1.9 Displaying/Hiding Revision Marks While Editing Programs Offline

Revisions are always displayed while you are editing a program online. But you can choose to display offline editing revision marks.

Revisions are marked by a letter in the rung status area and by the modified rung color.

Letter	Meaning
M	Logic was modified, or wires have been added or deleted.
I	The rung has been inserted.
D	The rung has been deleted.

#### Tip

If you delete a newly inserted rung before committing or saving the change, the rung is deleted. However, it is not marked with a "D" revision mark.

### To display/hide revision marks while editing programs offline

- Step 1. From the Tools menu, choose Options. A tabbed dialog box is displayed.
- Step 2. From the General tab, locate the Miscellaneous group box.
- Step 3. Choose the Show Revisions While Offline Editing option. This setting applies to the current and subsequent Editor sessions until you change the setting again.
- Step 4. Click OK to accept the new setting.

## 1.10 About Program Properties

The Program Properties dialog box contains three tabs:

Use this tab:	For:
Program Info	viewing information about the program
Scan Info	defining how the program should be scanned and the program's scan time.
Error Log	viewing the online error log

### To access Program Properties from the File menu

- Step 1. Make sure no rung or instruction is selected.
- Step 2. From the File menu, choose Properties. The Program Properties dialog box is displayed.

### To access Program Properties from the pop-up menu

- Step 1. Make sure no rung or instruction is selected, and position the mouse in the program's grid area away from any instruction or wire.
- Step 2. Press the right mouse button. A pop-up menu is displayed.
- Step 3. From the pop-up menu, choose Properties. The Program Properties dialog box is displayed.

See the AutoMax Enhanced Ladder Language Reference manual, J2-3094, for how to interpret the entries in the error log. See section 1.11 below for defining program scan time.

## 1.11 About Program Execution

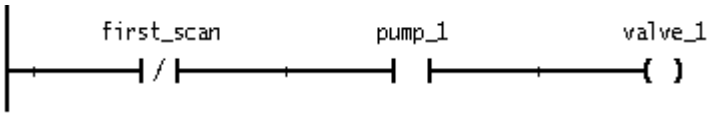
Programs can execute by being scanned or event-driven. An event is a flag or indicator that one program can set or raise and another program can wait for.

Scanned programs execute based on the scan time in ticks you define. For a ladder program, you can define how often you want the program to execute by defining scan time in ticks. The actual scan time of a program is determined by this formula:

$$\text{scan time (ms)} = \text{tick rate of the Processor module} * \text{number of ticks.}$$

You define the tick rate for the Processor module when you add it to your rack configuration. By changing the tick rate, you can change the time base for program execution. This allows you to run a program based on a unit of your choice. You can set the tick rate in increments of 0.5 ms between 0.5 ms and 10.0 ms. The default value is 5.5 ms. The tick rate is defined separately for each Processor in a rack. For more information, see section 1.11.1.

Event-driven programs can be controlled by either hardware events or software events. When an event-driven is first started (run), the program executes once to completion. After this initial execution, the program then waits for the designated event to occur. If you have program logic that you do not want to run during the initial execution of the program, use the pre-defined *first\_scan* variable. An example is shown here:



Hardware events are generated by an external condition. These AutoMax modules can set a hardware event:

- UDC module (57652)
- Pulse Tach Input module (57C421)
- Resolver Input module (57C411)
- 2-Channel Analog Input module (57C409)
- 32-Bit Digital Input module (57C419)

However, hardware events cannot be used on the AutoMax PC3000. See a module's instruction manual for information about interrupts. For more information, see section 1.11.2.

Software events are flags generated by other programs. Software events can be set by BASIC, control block, or ladder programs. For information about programming software events, see your programming language's instruction manual and section 1.11.3.

### 1.11.1 Specifying a Scan Time To Control Program Execution

For a ladder program, you can define how often you want the program to execute by defining scan time in ticks. The actual scan time of a program is determined by this formula:

$$\text{scan time (ms)} = \text{tick rate of the Processor module} * \text{number of ticks}$$

Define the scan time by using the Scan Info tab under Program Properties.

#### To define how often you want your program to execute

- Step 1. Access Program Properties. Make sure no rung or instruction is selected, and choose Properties from the File menu.
- Step 2. Choose the Scan Info tab.
- Step 3. Select Scanned for the Scan Mode.
- Step 4. In the Scan Time (ticks) field, enter the number of ticks you want to use. Enter a value from 1 to 32767. The default value is 20.

For example, if you want a program to execute every 30 ms, and the Processor has a tick rate of 3 ms, enter 10 in the Scan Time field.

- Step 5. Click OK to accept the changes.

### 1.11.2 Specifying a Hardware Event To Control Program Execution

Hardware events are generated by an external condition, such as a digital input or a programmed hardware event from a Resolver module. Specify the hardware event that triggers a program's execution by using the Scan Info tab under Program Properties.

You can specify a timeout for the hardware event. This lets you specify the maximum amount of time in ticks that can pass before the hardware event occurs. You can use a timeout as a safeguard in case something happens to the module you are using to generate the hardware event. If the event does not occur before the timeout time, a rack STOP ALL error occurs.

**To specify a hardware event**

- Step 1. Access Program Properties. Make sure no rung or instruction is selected, and choose Properties from the File menu.
- Step 2. Choose the Scan Info tab.
- Step 3. Select Event Driven for the Scan Mode.
- Step 4. Select Hardware as the Event Type.
- Step 5. In the Name field, type the name of the hardware event that will trigger the program's execution.
- Step 6. In the ISCR Variable Name field, type the name of the variable associated with the ISCR (Interrupt status and control) register on the hardware module being used to generate the interrupt.
- Step 7. Do one of the following:

To:	Do this:
specify a timeout for the hardware event	<ul style="list-style-type: none"> <li>a. Select the Timeout Enabled</li> <li>b. Enter an integer value between 1 and 32767</li> </ul> <p>You should set the timeout to a time longer than what you expect the actual time will be. A good general rule is 1.5 times longer than the expected time between events.</p>
not use a timeout	Make sure the Timeout Enabled checkbox is not selected.

- 8. Click OK to accept the changes.

**1.11.3 Specifying a Software Event To Control Program Execution**

A software event is a flag set by another program. Specify the software event that triggers a program's execution by using the Scan Info tab under Program Properties.

**To specify a software event**

- Step 1. Access Program Properties. Make sure no rung or instruction is selected, and choose Properties from the File menu.
- Step 2. Choose the Scan Info tab.
- Step 3. Select Event Driven for the Scan Mode.

- Step 4. Select Software as the Event Type.
- Step 5. In the Name field, type the name of the software event that will trigger the program's execution.
- Step 6. Click OK to accept the changes.

## 1.12 Running and Stopping Ladder Programs

Use the Online Task Manager to place a program into run or to stop a program. If you are editing online, you must pause the Editor before you can access the Online Task Manager, since they both share the same communication channel. See "Pausing the Editor," section 5.3, for more information.

## 1.13 Exiting the Ladder Editor

Exit the Editor with the Exit command. The Exit command closes all program windows and closes the Editor.

The Editor prompts you to save any changes to open programs before exiting. If you choose to close an online program that has changes that have not been accepted, the Editor prompts you to return to the editing session or close. Selecting close discards all the changes.

### To exit the Editor

- Step 1. From the File menu, choose Exit.
- Step 2. If you have made changes to any open ladder program since you last saved it, choose one of the following buttons in the message box that asks if you want to save the changes:

To:	Click:
keep the changes	Yes
not save the changes	No
not close the program	Cancel

### Tip

You can also exit the Editor by choosing Close from the Editor Control menu.