Biomek® 3000 Laboratory Automation Workstation

Quick-Start Guide

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1 Introducing the Biomek® 3000 Laboratory Automation Workstation

1.1 Introduction

Welcome to the Biomek® 3000 Laboratory Automation Workstation. This quick-start guide is designed to help you learn to use the Biomek Software with your Biomek 3000 instrument. This quick-start guide includes:

- *Getting to Know the Biomek® 3000 Laboratory Automation Workstation* (this chapter) — a general hardware overview on the Biomek 3000 Automated Laboratory Workstation and introduction to the Biomek Software.

- *Learning to Create Methods for the Biomek® 3000* (Chapter 2) — an introduction to creating methods for the Biomek 3000 instrument using the Biomek Software. This chapter gives instructions on creating, saving, running, checking in, and opening a small method.

- *Using the Editors While Creating Methods* (Chapter 3) — an introduction to using the editors in the Biomek Software. This chapter helps you to explore the depth of the software by giving instructions on accessing and learning more about the editors.

1.1.1   How to Use This Quick-Start Guide

Read through the quick-start guide while using the links to the specific sections in the *Biomek® 3000 Laboratory Automation Workstation User's Manual* and *Biomek Software User's Manual* to further investigate topics that are particularly relevant to you. Moving back and forth between this guide and the user's manuals you will be able to begin to learn about the Biomek 3000 instrument and software and also become familiar with the manuals and how chapters are arranged.

This quick-start guide can also be used as a tutorial since you'll be given instructions on creating a small method (refer to Chapter 2, *Learning to Create Methods for the Biomek® 3000*) and utilizing the editors (refer to Chapter 3, *Using the Editors While Creating Methods*). Some of the items you'll create in Chapter 3 may be viewed in the method you created in Chapter 2.

In addition to the explanations, graphics, and links to other sources, you will see other useful information in the following forms:

Definition
These boxes contain brief definitions of material that may be specific to the Biomek 3000, or generally unfamiliar.

Important Concept
These boxes emphasize important concepts relevant to the Biomek 3000 instrument and the Biomek Software. Refer to the links in this quick-start guide or the *Biomek® 3000 Laboratory Automation Workstation User's Manual* or the *Biomek Software User's Manual* for more information on these important concepts.

1.2   Biomek® 3000 Laboratory Automation Workstation

Your Biomek 3000 Laboratory Automation Workstation (Figure 1-1) is a multiaxis liquid-handling instrument sized to fit in a laminar flow or fume hood for sterile or hazardous operations. The open architecture design, along with the extensible operating software, provides a foundation for integrating current and future specific-use components.

The Biomek 3000 is a single head instrument with a series of interchangeable tools. Different tools provide options for performing a variety of functions, including liquid transfer and plate washing operations and moving labware around the deck. The modular design of the Biomek 3000 allows expansion of the instrument capabilities to include additional operations such as filtration, plate shaking, photometric measurement, and high-capacity operation. Regardless of the tool configuration or operating components, your Biomek 3000 workstation is controlled through the powerful Biomek Software.
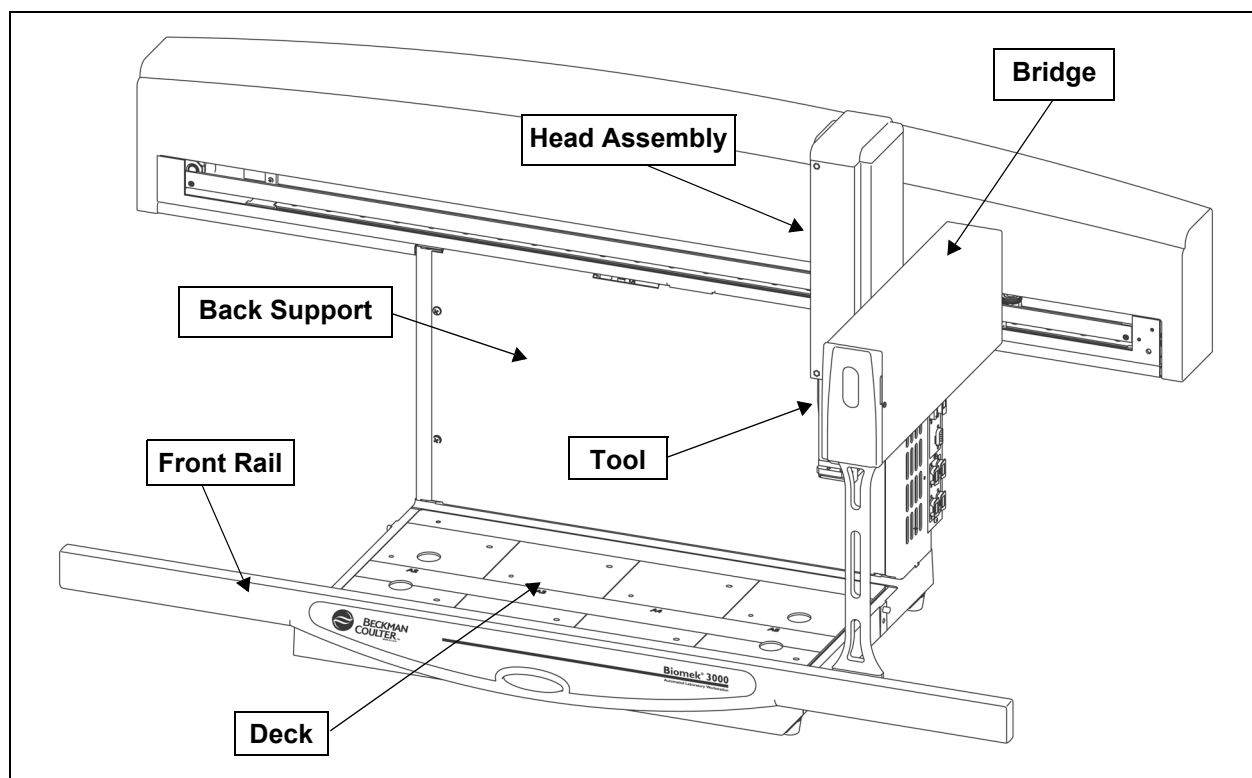
Figure 1-1. Biomek 3000 Laboratory Automation Workstation

1.2.1   Bridge

The bridge is the structure that moves in the X-axis along the tower and front rail. The bridge holds the head assembly and enables movement of the head assembly in the Y- (front to back) and Z-axes (up and down). Built into the bridge is an indicator light that displays the current operational status of Biomek 3000 workstation. The Biomek 3000 workstation supports only one bridge.

1.2.2　Head Assembly

The head assembly is supported and positioned by the bridge and moves in the Y- and Z-axes. The head assembly may hold various interchangeable tools, such as the P200L Single-Tip Tool or MP200 Multi-Tip Pipette Tool, that perform liquid-handling and other operations. The capabilities of the Biomek 3000 instrument change with the tool.

1.2.3　Tools

The Biomek 3000 uses interchangeable tools to perform various operations, such as aspirating and dispensing, washing, or moving labware around the deck.

Tools are stored on the deck in a tool rack when not in use and can be installed or removed from the head assembly automatically as part of an automated method. This allows multiple tool types to provide different functionality to the instrument within a method.

Tool types available for the Biomek 3000 head include:

- pipetting tools — single-channel and eight-channel tools used to aspirate and dispense liquid (refer to the *Biomek® 3000 Laboratory Automation Workstation User's Manual,* Chapter 2, *Pipetting Tools*).

- gripper tool — tool to grasp and move labware around the Biomek 3000 deck (refer to the *Biomek® 3000 Laboratory Automation Workstation User's Manual,* Chapter 3, *Gripper Tool*).

- wash system — the wash system includes single-channel and eight-channel tools used to perform washing and bulk dispense operations (refer to the *Biomek® 3000 Laboratory Automation Workstation User's Manual,* Chapter 4, *Wash System*).

- high density replication (HDR) tools — tools used to perform low-volume liquid transfer operations by liquid adhesion using stainless steel pins. Pin plates are available in 96-pin and 384-pin capacities (refer to the *Biomek® 3000 Laboratory Automation Workstation User's Manual,* Chapter 5, *High Density Replication System*).

  Note:　HDR tools require at least two tool racks, one for the HDR tool and one for the fan unit to dry pins after sterilization

1.2.4　Labware Positioners

Labware positioners are used to hold microplates, tube racks, reservoirs, or tip racks on the Biomek 3000 deck. The gripper tool can move labware to and from these labware positioners to other labware positioners or devices integrated on the left or right side of the Biomek 3000 workstation.

1.2.5　Tool Racks

The tool rack is a special labware positioner used to hold up to five interchangeable tools in a single deck position during a method.

Note:　The gripper tool requires a special tool rack that accommodates the gripper tool and up to two additional tools.

1.2.6   Optional Devices

The following optional devices can be added to the Biomek 3000 workstation to accommodate specific operations, such as tip and labware disposal, plate heating and cooling, microplate filtration, photometric measurement, and high-capacity operation:

- Disposal Accessory — provides a waste receptacle for disposing of tips and labware from the deck using the gripper tool. Tip boxes or other labware may be deposited directly into the disposal accessory, eliminating the need to manually dispose of waste (refer to the *Biomek® 3000 Laboratory Automation Workstation User's Manual,* Chapter 6.7, *Disposal Accessory*).

- Circulating Reservoir — continually cycles a reagent between off-deck reagent bottles and wells of a four-well reservoir positioned on the Biomek 3000 deck (refer to the *Biomek® 3000 Laboratory Automation Workstation User's Manual,* Chapter 8, *Biomek 3000 Circulating Reservoir*).

- Thermal Exchange Unit — heats or cools a reservoir or microplate on the Biomek 3000 deck. The temperature is controlled by a user-supplied circulating bath (refer to the *Biomek® 3000 Laboratory Automation Workstation User's Manual,* Chapter 9, *Thermal Exchange Unit*).

- Filtration System — includes a vacuum valve unit that is connected to the Biomek 3000 workstation via RS-485 communication, and a manifold system with interchangeable collars to allow collection of filtrates to microplates or waste. The filtration system is used to run screening assays which require filtration, such as receptor binding and cell-based assays, and plasmid DNA purification applications on the Biomek 3000 workstation (refer to the *Biomek® 3000 Laboratory Automation Workstation User's Manual,* Chapter 10, *Filtration System*).

- Stacker Carousel — provides additional labware capacity for microplates and tip boxes to the Biomek 3000 workstation. It includes up to four stacks and a shuttle for transporting labware between the Biomek 3000 deck and the Stacker Carousel. A Stacker Carousel may be installed on either the left side, right side, or both sides (refer to the *Biomek® 3000 Laboratory Automation Workstation User's Manual,* Appendix B:, *Using a Stacker Carousel*).

- Device Integrations — Several third-party devices, including microplate readers and shakers, may be integrated into the Biomek 3000 deck and used in an automated method in conjunction with the Biomek 3000 workstation (refer to the *Biomek® 3000 Laboratory Automation Workstation User's Manual,* Appendix C:, *DPC MicroMix Shaker*).

1.3   Biomek Software

The Biomek Software is designed to:

- Do a substantial amount of the method-building work for you.

- Allow you to take as much direct and precise control over the method-building process as you want.

Note: A method is a series of steps controlling the operations of your Biomek 3000.

The main editor that appears when the software is launched (Figure 1-2) is used to build and configure methods:

- Each step is dragged and dropped from a Step Palette into the Method View (refer to Chapter 2, *Learning to Create Methods for the Biomek® 3000*).

- When a step in the Method View is highlighted, the corresponding configuration options appear in the Step Configuration Area (refer to Chapter 2, *Learning to Create Methods for the Biomek® 3000*).

- The method is customized to the desired level of precise control via the editors accessed from the Project and Instrument menus (refer to Chapter 3, *Using the Editors While Creating Methods*).

Step Palettes
Step Palettes are panes in the Biomek main editor showing steps available for insertion in a method. They are located on the left of the main editor. Use the Step Palette Builder to add other step palettes. Refer to the *Biomek Software User's Manual,* Chapter 29.5, *Using the Step Palette Builder* for more information.

1.4   Starting the Biomek® 3000

To start the Biomek 3000, you will follow the instructions in this chapter to turn on the instrument, launch Biomek Software, and home all axes.

1.4.1   Turning On the Biomek 3000

To turn on the Biomek 3000 instrument:

1. Locate the power switch on the right side of the instrument (Figure 1-2).

2. Flip the switch to the On position. The indicator light comes on in solid green.

1.4.2   Launching the Software

To launch Biomek Software:

1. Choose **Start>All Programs>Beckman Coulter>Biomek Software**.

2. If Accounts & Permissions is enabled (see sidebar), a dialogue box appears requesting you to log in using the user name and password assigned to you by your system administrator. Enter the required information. Your account must have Develop Methods, Develop Projects, and Setup Instrument permissions to complete all parts of this quick-start guide. The Biomek Software main editor appears (Figure 1-2).

Note: If you are logging into Biomek Software for the first time, you must enter a new password. Remember your new password; you will need to enter it each time you access Biomek Software.
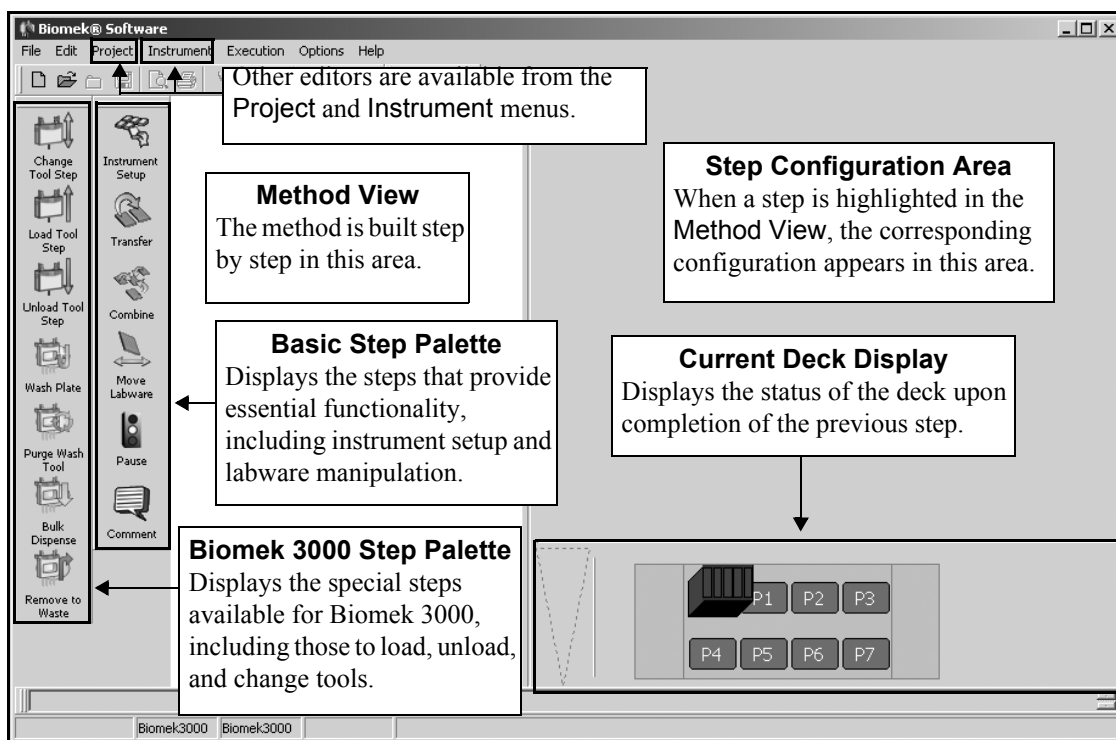

Figure 1-2. Biomek Software main editor

1.4.3   Homing All Axes of the Biomek® 3000 Pod

Home All Axes

Home All Axes gives the instrument a point of reference from which to make subsequent moves. The home position is to the left and back of the Biomek 3000 deck.

Every time the Biomek 3000 is turned on, you'll have to Home All Axes. This automatic process initiates the pod and defines the home position from which all subsequent moves are determined.

To home all axes:

1. From the Instrument menu, choose **Home All Axes**. A Warning appears.

2. Make sure that all warnings are addressed and choose **OK**. The pod is homed and the instrument is now ready for use.

Proceed through this quick-start guide while using the links to the user's manuals to learn more about the Biomek 3000 liquid-handling system.

2 ◢ Learning to Create Methods for the Biomek® 3000

2.1   Overview

In this chapter you will be given information and instructions for building a small method using Biomek Software. A method is a series of steps that control the operation of your Biomek 3000.

The method you complete in this chapter represents basic operations and is intended simply to familiarize you with the Biomek 3000, and to create a basic understanding of method-building opportunities.

Read the information in this chapter and complete the tutorial steps provided. After you have completed the instructions, or if you need additional information along the way, use the links provided to access the suite of user's manuals provided during installation. These manuals include *Biomek Software User's Manual* and *Biomek® 3000 Laboratory Automation Workstation User's Manual*. Each manual contains comprehensive information about the possibilities designed into the Biomek 3000.

In this chapter, you'll learn:

- *Creating a New Method* (Section 2.2)
- *Configuring the Instrument Setup Step* (Section 2.3)
- *Configuring a Transfer Step* (Section 2.4)
- *Configuring a Move Labware Step* (Section 2.5)
- *Using the Finish Step* (Section 2.6)
- *Saving a Method* (Section 2.7)
- *Running a Method* (Section 2.8)

2.2   Creating a New Method

If using Accounts & Permissions . . .
You must have Develop Methods permission to create methods. Refer to the *Biomek Software User's Manual,* Chapter 2, *Using Accounts & Permissions*, for more information.

In this chapter, you will build a simple method that transfers liquid between labware. In building this method, you will:

- Populate the deck with labware using the Instrument Setup step.

- Transfer liquid with an MP200 Multi-Tip Pipette Tool using a Transfer step.

- Move labware with the Gripper Tool using a Move Labware step.

    Note: A gripper tool rack must be installed on the Biomek 3000 deck to store a gripper tool when not in use.

When you create a new method by dragging a step into the Method View, the Start and Finish steps appear automatically. You will use an Instrument Setup Step to tell Biomek Software where you have physically placed labware on your deck.

Before proceeding with this quick-start method, make sure that:

- an MP200 Multi-Tip Pipette Tool and Gripper Tool are added in Hardware Setup (refer to Section 3.6, *Using Hardware Setup*).

- the deck layout in the Deck Editor contains at least one GripperToolRack, one ManualLatch, and four Biomek3000Positions (refer to Section 3.7, *Creating a New Deck*).

    Note: If your instrument configuration does not have a gripper tool, a standard ToolRack position can be used instead of the GripperToolRack.

- the deck is framed (refer to the *Biomek® 3000 Laboratory Automation Workstation User's Manual,* Chapter 13, *Framing the Biomek® 3000*).

You launched Biomek Software in Chapter 1, you are now going to create a small method:

1. Drag and drop an Instrument Setup into the Method View. A new method is created and assigned the default name Method1 [New] (Figure 2-1).
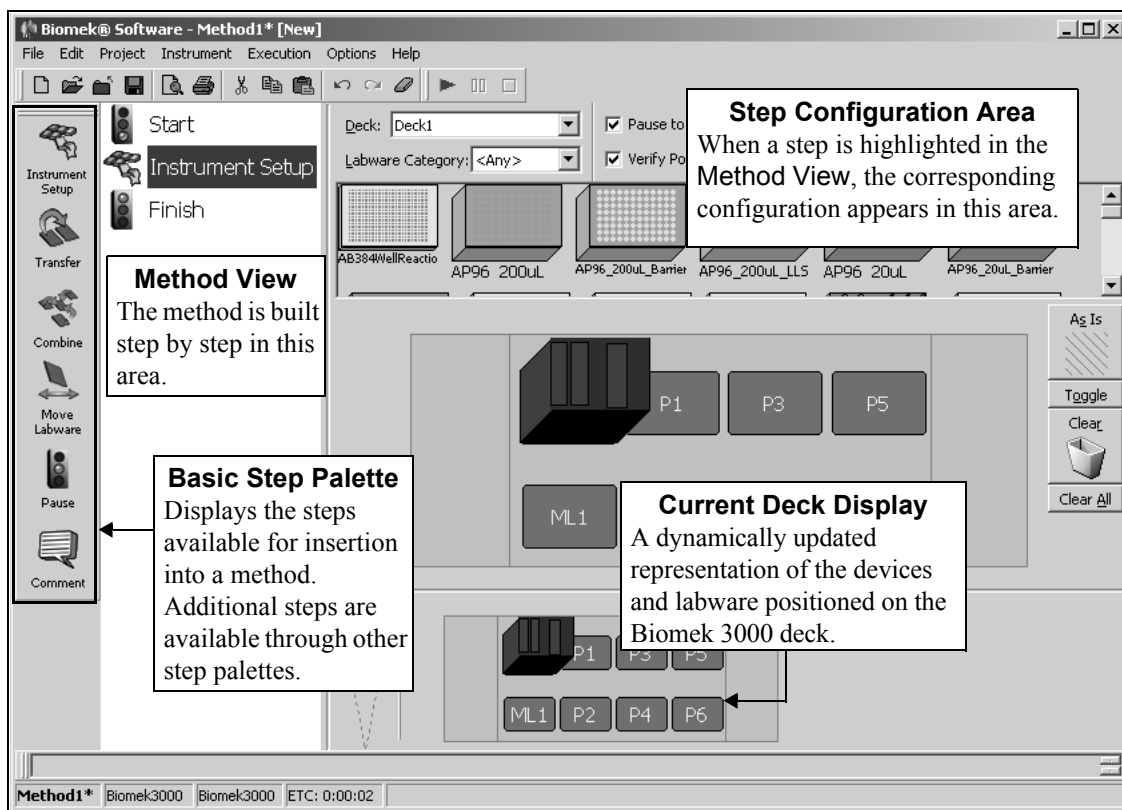

Figure 2-1. Biomek Software main editor for a Biomek 3000 instrument

Note: Your deck layout may differ slightly from the deck shown in Figure 2-1, depending on how your Biomek 3000 instrument is physically set up.

As you can see, two steps automatically appear in every method created and executed by the Biomek Software:

- Start — the first step in a method; allows creation of global *variables* that are applicable to the entire method. Refer to the *Biomek Software User's Manual,* Chapter 12.2.1, *Configuring the Start Step*, for information on creating variables in the Start step.

- Finish — the final step in a method; provides options to clear the Biomek 3000 deck, clear the devices on the deck, unload tips from the pod, and clear all global variables. Refer to the *Biomek Software User's Manual,* Chapter 12.2.2, *Configuring the Finish Step*, for information on configuring other options for the Finish step.

| **Variables** |
| A variable is a value that has been assigned a name that may be referenced repeatedly during a method. Refer to the *Biomek Software User's Manual,* Chapter 13, *Using Variables and Expressions in a Method* for more information. |

Proceed to Section 2.3, *Configuring the Instrument Setup Step* to learn how to configure the Instrument Setup step you just inserted into the method view.

2.3   Configuring the Instrument Setup Step

⚠️ **CAUTION: An inaccurate Instrument Setup may result in pod and labware collisions, or in inappropriate pipetting.**

Obstacle Avoidance

When building a method, you must ALWAYS use the Deck Editor and Instrument Setup step to tell the software what labware and ALPs are on the deck and the position each occupies. If this is not done, the pod could collide into these objects as it moves around the deck during a method run.

When creating Biomek methods, it is important to use the Instrument Setup step, along with the Deck Editor, to tell the software what labware and devices are on the deck for obstacle avoidance (*see sidebar*). You'll learn more about the Deck Editor in the next chapter (refer to Section 3.7, *Creating a New Deck*).
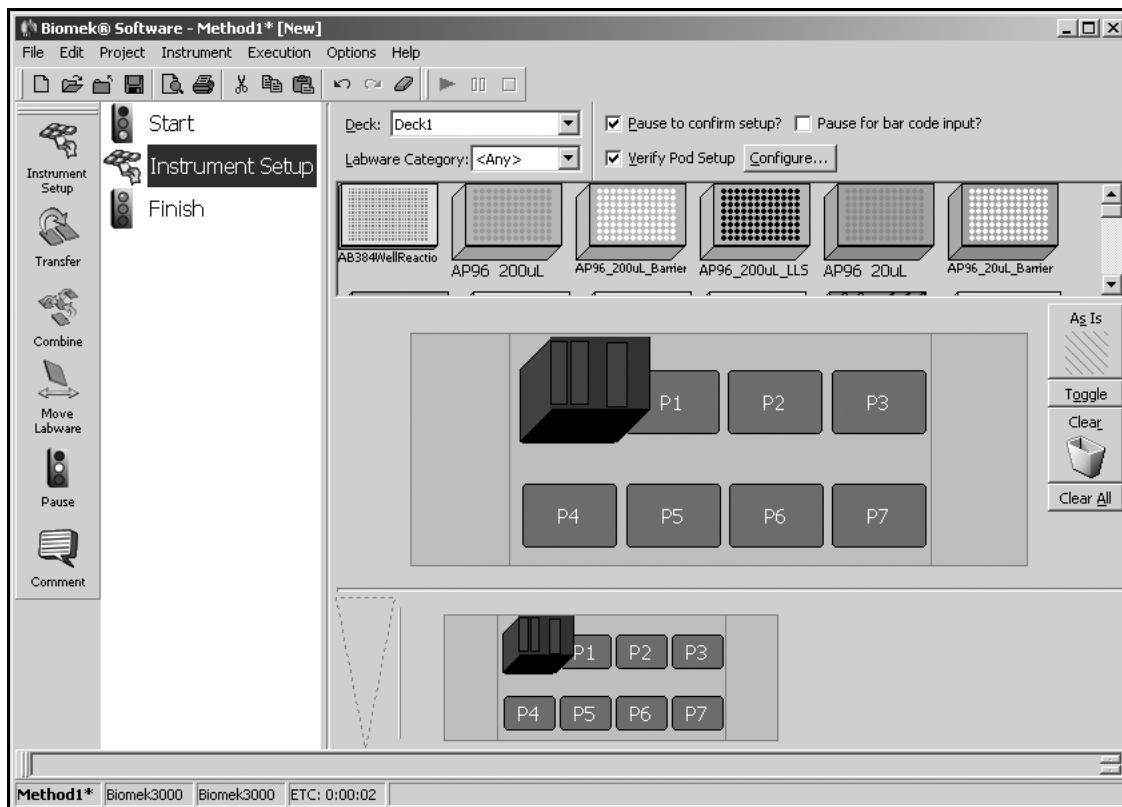

Figure 2-2. Instrument Setup step in the Method View

To configure the Instrument Setup step for your new method:

1. In Deck, make sure the default deck layout (Deck1) is selected. The Instrument Setup step uses a deck layout as a map for the placement of labware on the deck and external hardware devices, such as stacker carousels.

2. Drag and drop the following labware on the Deck Layout Display:

    • an **AP96_200uL** to ML1 or AL1.

    > **Note:**   Tip boxes must be placed in either a manual latch (ML1) or auto-latching (AL1) tip rack holder to precisely position tip racks so that pipetting tools can accurately load and unload tips. Make sure that the latch is securely holding the tip rack in position.

    • a **Reservoir** to P3.

    • a **BCFlat96** to P4. Your screen should look similar to Figure 2-3.

> **Note:** To remove unwanted labware from the Deck Layout Display during setup, drag and drop the labware to the **Clear** (trash) icon.

Creating Labware

If you want to use a labware type that does not appear in the available labware list, use the Labware Type Editor to create a new labware type. In Section 3.3, *Creating New Labware in the Labware Type Editor*, you will create a new labware type in the Labware Type Editor.
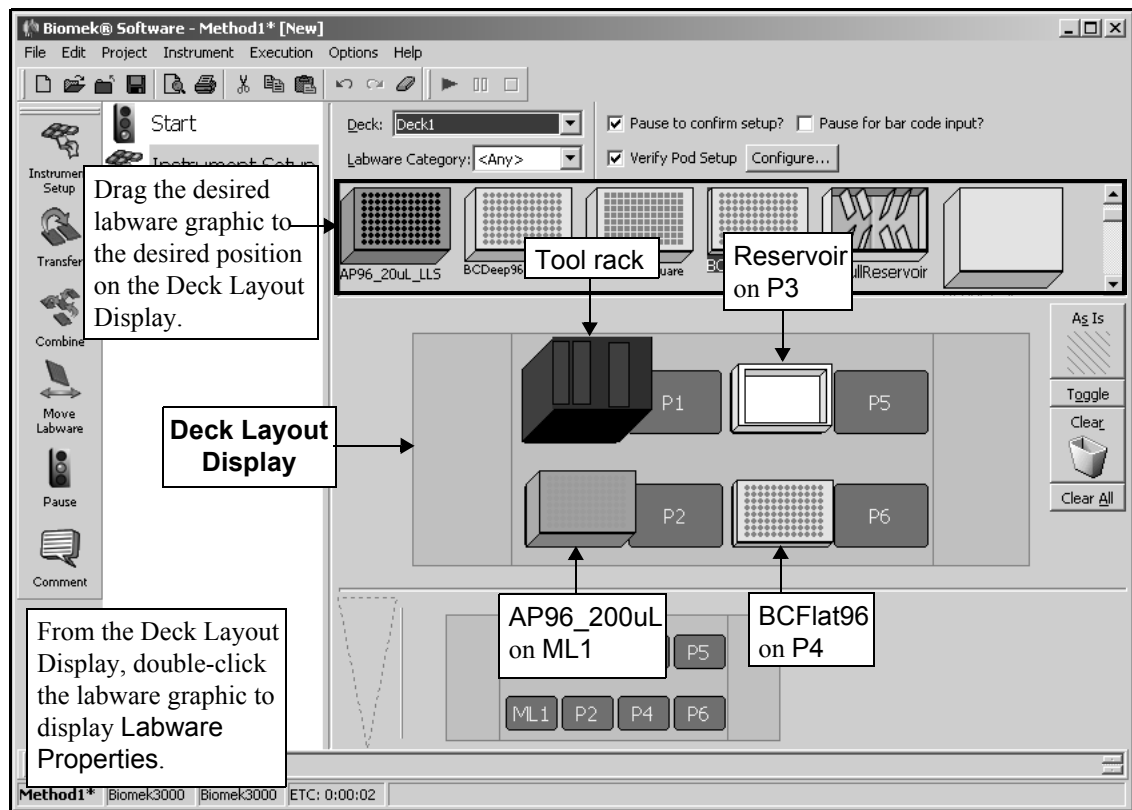

Figure 2-3. Instrument Setup step with labware added

3. From the Deck Layout Display, double-click the tool rack to display Labware Properties (Figure 2-4).
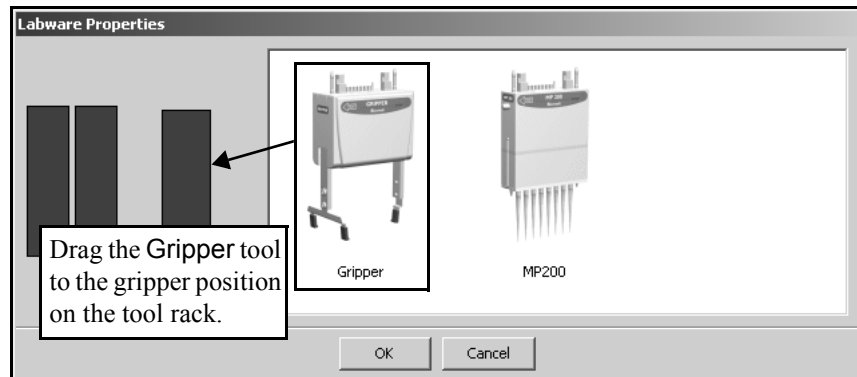

Figure 2-4. Labware Properties for tool rack

Note: Your Labware Properties for the tool rack may contain more tools on the right side, depending on your instrument configuration.

4. Drag the Gripper tool to the gripper tool position on the tool rack (the larger position on the right).

5. Drag the MP200 tool to either of the two remaining tool positions.

6. Choose **OK** to close Labware Properties.

7. From the Deck Layout Display, double-click the reservoir on P3 to display Labware Properties (Figure 2-5).
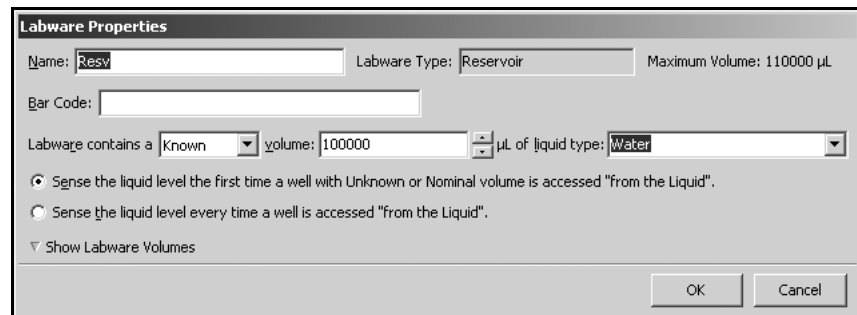

Figure 2-5. Labware Properties for Reservoir on P3

Naming Labware

It is helpful to name labware, particularly when you use lots of labware on the deck. You can assign a name that identifies the contents of the labware or a descriptive name that fits the work being done in the laboratory. Naming labware can reduce confusion.

8. In Name, enter **Resv** in Labware Properties.

9. In Labware contains, select **Known** from the pull-down menu.

10. In volume, enter **100000**. This means that you know you have 100000 microliters of liquid in the reservoir.

11. In liquid type, select **Water_MP200_P200** from the pull-down menu. Labware Properties for the Reservoir should look like Figure 2-5.

12. Choose **OK** to close Labware Properties.

13. Double-click the labware on P4 and name it **Dest1** in Labware Properties.

14. Choose **OK** to close Labware Properties.

Note: The default settings in Labware Properties will be used for the tip box; however, you can refer to the *Biomek Software User's Manual,* Chapter 15.2.5.1, *Configuring Labware Properties for Tips*, to learn more about configuring a tip box.

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15. Select **Pause to confirm setup?**. You will see a confirmation prompt when you run your method in Section 2.8, *Running a Method*.

16. Leave the **Verify Pod Setup** option as is. This setup is used to inform the software of the current state of the pod; for example, if the pod already has a tool loaded at the start of the method.

Your Instrument Setup step is now configured and the main editor should look like Figure 2-6.

Note: To learn more about the Instrument Setup step, refer to the *Biomek Software User's Manual,* Chapter 15.2, *Instrument Setup Step*.
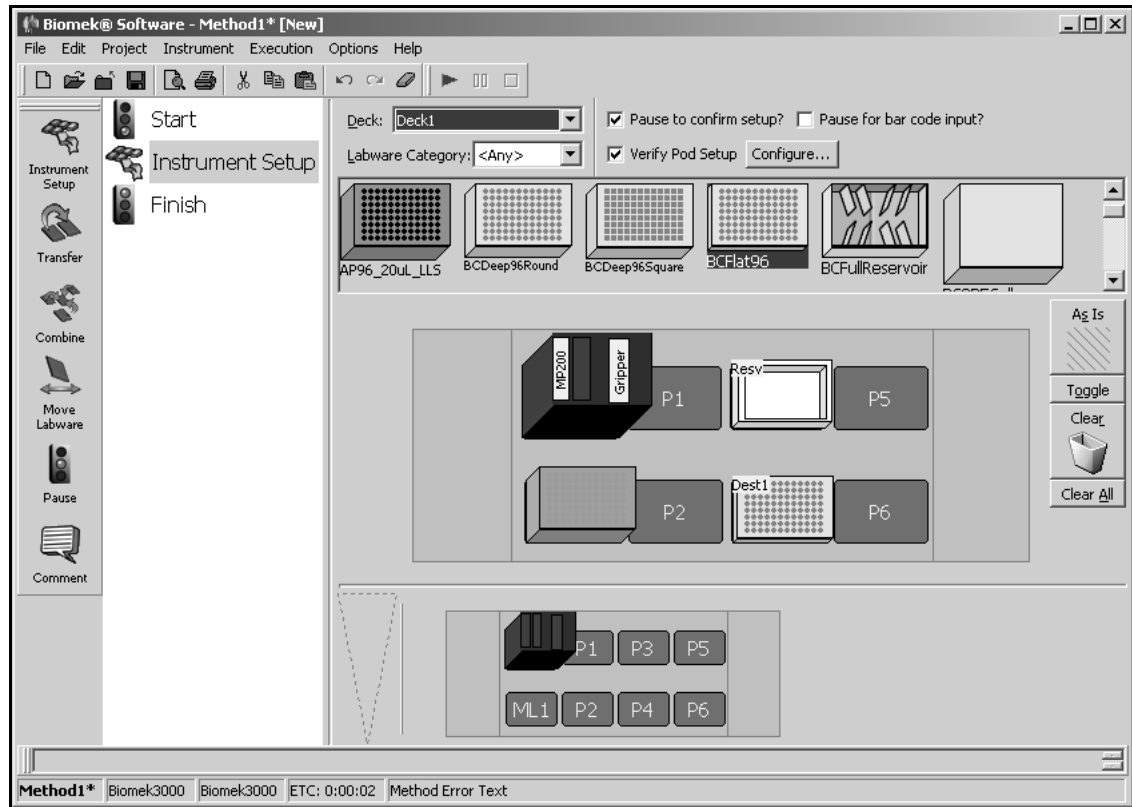

Figure 2-6. Instrument Setup step with labware named

Next you will configure a Transfer step using an MP200 tool. If your instrument configuration does not include an MP200 tool, any pipetting tool may be substituted.

2.4   Configuring a Transfer Step

Transfer Step

A Transfer step loads tips, aspirates and dispenses liquid, and unloads tips. This eliminates the need to insert four separate steps to complete a liquid transfer. However, there are steps in Biomek Software that allow these steps to be performed individually on the Intermediate Step Palette (refer to the *Biomek Software User's Manual,* Chapter 16, *Using the Intermediate Step Palette*).

The Transfer step transfers liquid from a single source to one or more destinations. You are going to insert a Transfer step into the method and configure it to move liquid from your source reservoir (Resv) to your destination microplate (Dest1) using an MP200 Multi-Tip Pipette Tool.

Note: Refer to the *Biomek Software User's Manual,* Chapter 15.3, *Configuring Transfer and Combine Steps,* for complete information on configuring the Transfer and Combine steps.

2.4.1   Inserting a Transfer Step

To insert a Transfer step into your method:

Drag and drop a **Transfer** step from the Step Palette into the Method View just below the Instrument Setup step. Notice that the Current Deck Display shows the current position of all labware on the deck (Figure 2-7).

You will complete three sections to configure the Transfer step for this method:

• Section 2.4.2, *Configuring Tip Handling*

• Section 2.4.3, *Configuring Source Labware*

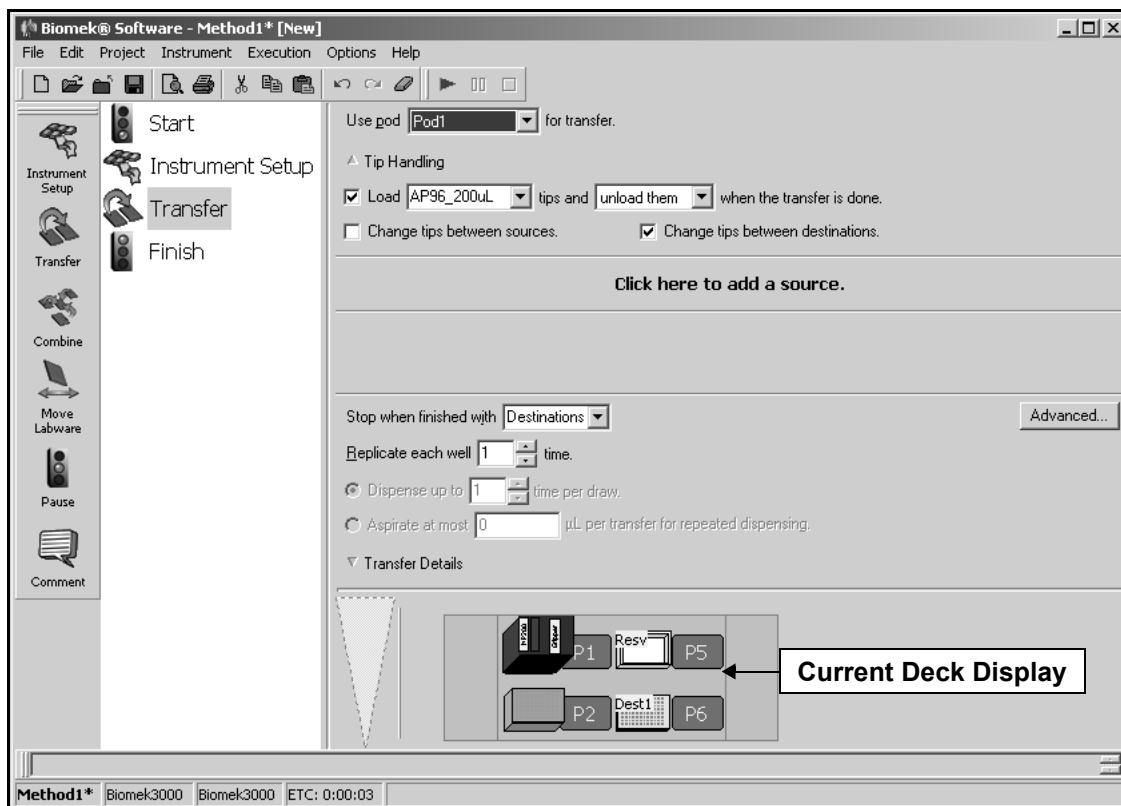• Section 2.4.4, *Configuring Destination Labware*

Figure 2-7. Transfer step inserted into the Method View

Tip Handling

Configuring Tip Handling is not always required because the Biomek 3000 locates and loads clean tips automatically during a Transfer step. Refer to the *Biomek Software User's Manual,* Chapter 15.3.1, *Configuring Tip Handling,* for information on other tip handling options, such as Change tips between destinations.

2.4.2 Configuring Tip Handling

The Transfer step automatically loads an appropriate tool if one is not already loaded. However, if you want to use a specific tool for the Transfer step, a tool can be loaded by inserting a Load Tool step prior to the Transfer step. For this quick-start method, it is not necessary to insert a Load Tool step since there is only one pipetting tool on the deck.

To configure tip handling:

1. In Tip Handling, make sure **Load** is checked

2. Click on the **AP96_200uL** tip box on ML1 in the Current Deck Display to load AP96_200µL tips as part of the Transfer step.

3. Make sure **unload them** is selected in the next field.

4. Check **Change tips between sources**.

5. Uncheck **Change tips between destinations**.

6. Your tips are configured for your liquid transfer, so click the **up arrow** next to Tip Handling to collapse the configuration. This allows more room for the step configuration (Figure 2-8). The text displayed reflects your tip handling configuration.

Load Tool Step

The Load Tool step is found on the Biomek 3000 Step Palette and is used to load a specific tool to the head assembly. If a tool is already loaded to the head assembly, that tool must first be removed using an Unload Tool step, or a Change Tool step may be used to execute both actions. Refer to the *Biomek Software User's Manual,* Chapter 20, *Using the Biomek 3000 Step Palette*.
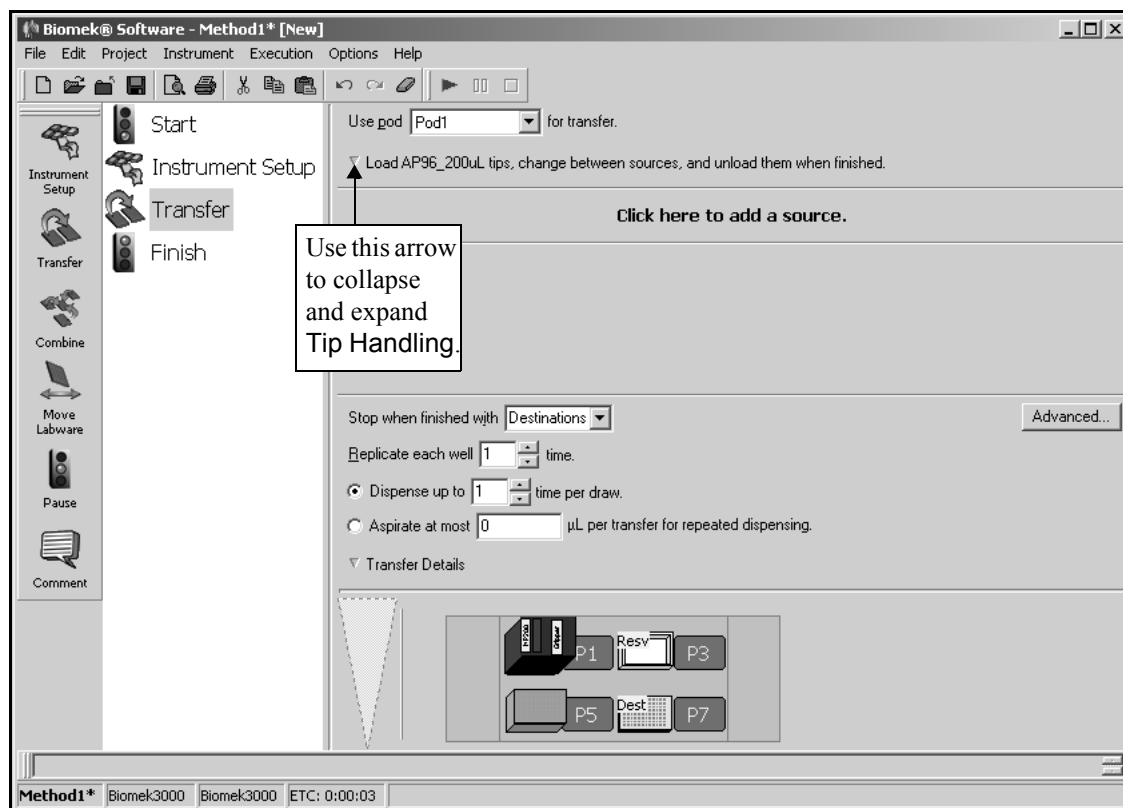

Figure 2-8. Transfer step with Tip Handling collapsed

2.4.3   Configuring Source Labware

To configure the labware named Resv as source labware in the Transfer step:

1. Click on **Click here to add a source**.

2. Click on **Resv** labware sitting on P2 in the Current Deck Display.

    Note: The information you supplied during Instrument Setup is displayed in the source labware configuration.

3. Leave the **Auto-Select** checkbox selected to use the technique selected by Biomek Software.

4. Right-click on the large tip illustration next to the microplate graphic in the configuration and choose **Measure from the Bottom**.

5. To adjust and set the aspirate height for the depth the tip descends into the reservoir, place the **mouse cursor over the tip illustration**. When the cursor turns into a hand, hold the left mouse button down to move the hand up and down until the depth is as close to **2.00 mm from bottom** as you can get. Then adjust the height precisely to 2.00 mm using the following note. This will be your aspirate height for this transfer.

    Note: After you click on the tip, you can adjust the height more precisely by using the up or down arrow keys on your keyboard while holding the Alt key. You can also right-click on the graphic, then select from the menu that appears to adjust the height.

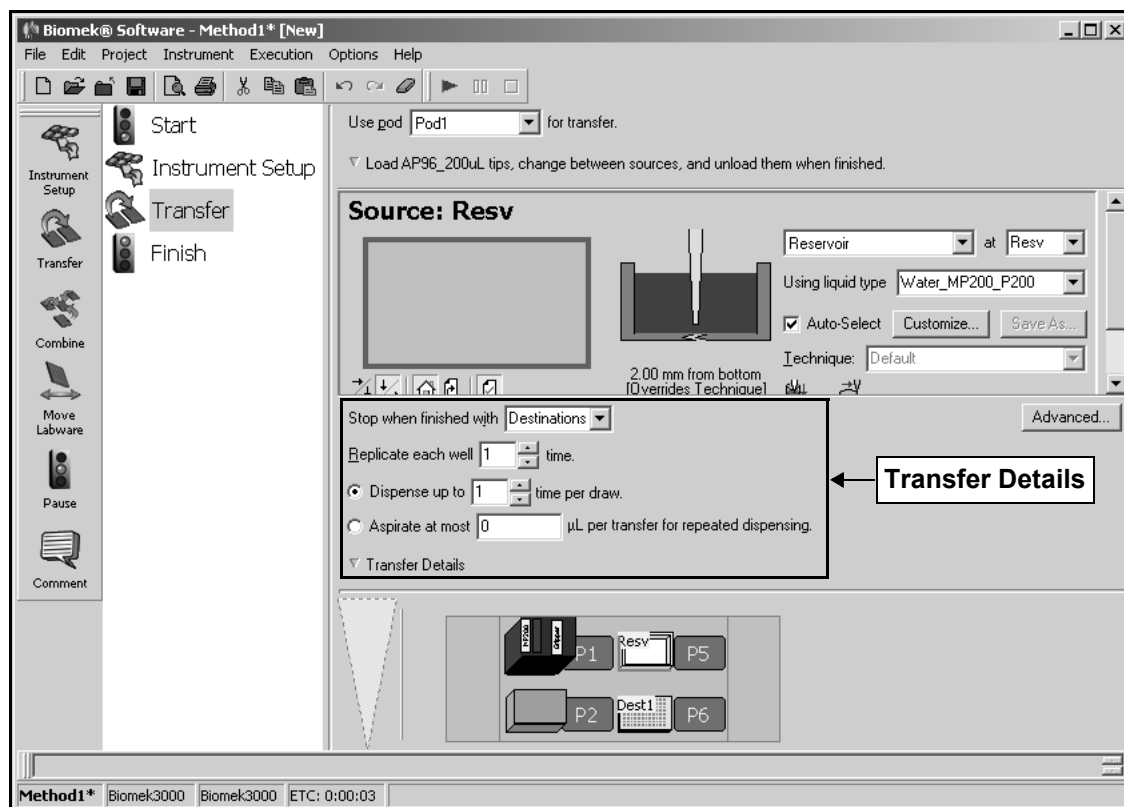The source labware configuration is complete and the main editor now looks like Figure 2-9.

Techniques

Techniques allow pipetting settings to be saved globally and used in any method. Biomek Software includes several predefined techniques. If Auto-Select is chosen in a pipetting step, such as Transfer, each time a method is created, Biomek Software automatically selects the technique most appropriate for the pipetting operation.

Figure 2-9. Transfer step with source labware configured

2.4.4   Configuring Destination Labware

To configure the labware named Dest1 as destination labware in the Transfer step:

> **Transfer Details**
>
> Transfer details include a stop condition for transfer operations; a repeat pipetting configuration; and a maximum tolerance in timing between transfer operations. Refer to the *Biomek Software User's Manual,* Chapter 15.3.4, *Configuring Transfer Details*.

1. Before you configure the destination labware, click the down arrow in Transfer Details located just above the Current Deck Display to collapse that section. You will not be making any changes to the options in this section.

2. Click on **Dest1** sitting on P6 in the Current Deck Display. This one operation accomplishes the same task as steps 1 and 2 of Section 1.5.2 *Configuring Source Labware*.)

   Note: Notice that the *source* labware configuration is now replaced with a brief sentence summary of the setup. If you want to reopen this source configuration for any reason, click anywhere in the collapsed configuration area.

3. The Volume field is highlighted, which allows you to designate the amount of liquid to be dispensed. For this tutorial, you're transferring 100 µL; so, type **100** into the Volume field.

   Note: The volume is measured in microliters (µL) automatically and indicates the amount of liquid that will be dispensed (100 µL) into each of the 96 wells; so, in this case, you're dispensing a total of 9600 µL into the 96-well microplate.

4. In of, select **Water_MP200_P200** as the liquid type, if necessary. Biomek Software comes with three liquid type definitions for water: Water, Water_MP20_P20, and Water_MP200_P200. You should always use the definition that includes the tool used for the transfer for best results.

5. Right-click on the large tip illustration and choose **Measure from Bottom**.

6. Set the dispense height in the large tip illustration to **4.00 mm from bottom**, using the same technique as you used for setting the aspirate height.

   Note: If you accidentally open too many destination configurations, all you have to do is right-click on the title above the graphic of the plate in the configuration. Click on **Delete** from the popup menu and the entire configuration goes away.

The destination labware is now configured, and the main editor looks like Figure 2-10. The Transfer step is now configured to transfer 100 μL from the source reservoir Resv to the destination microplate Dest1.
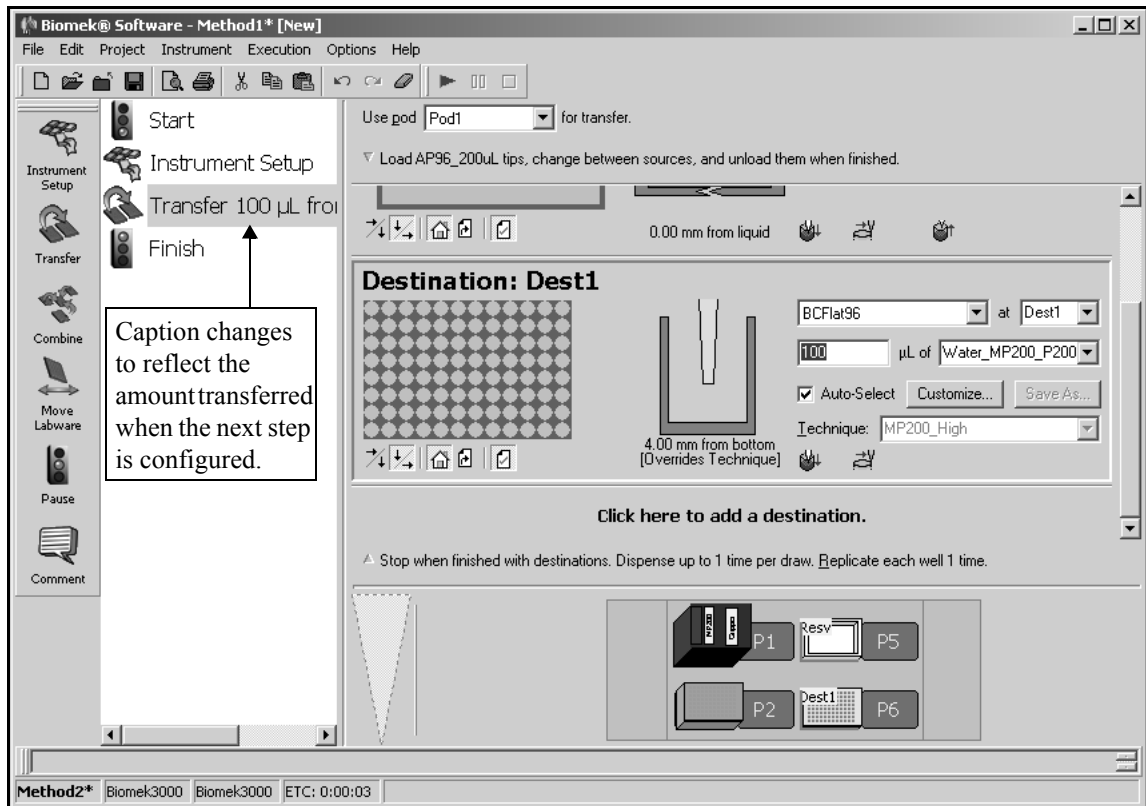

Figure 2-10. Transfer step with Destination configured

Note: The method view changes to reflect the amount transferred when the next step is configured.

The Transfer step configuration is now complete. In the next section, you will configure a Move Labware step to move the destination labware to a different deck position using the gripper tool. If your instrument configuration does not include a gripper tool, skip to Section 2.6, *Using the Finish Step*, to learn how long the method will take to run.

2.5 Configuring a Move Labware Step

If your instrument configuration does not include a gripper tool, you cannot move labware; continue to Section 2.6, *Using the Finish Step*.

The Move Labware step automatically changes tools to the gripper tool and moves labware from one position on the Biomek 3000 instrument deck to another position. Move Labware can also be used to remove labware from the deck by placing it in an appropriate disposal position, or to an external hardware device without halting the Biomek 3000 instrument or the method.

Note: Refer to the *Biomek Software User's Manual,* Chapter 15.4, *Move Labware Step*.

To configure the Move Labware step to move your Dest1 labware at position P6 to another deck position:

Gripper Tool

The gripper tool is a specialized tool that is loaded onto the head assembly and allows the Biomek 3000 workstation to grasp and move labware around the Biomek 3000 deck. Refer to the *Biomek® 3000 Laboratory Automation Workstation User's Manual,* Chapter 3, *Gripper Tool*.

---

1. Insert a **Move Labware** step into the Method View.

2. In Move labware from, select **P4** from the drop-down menu.

3. In Move labware to, select **P6** from the drop-down menu. The main editor should now look like Figure 2-11.
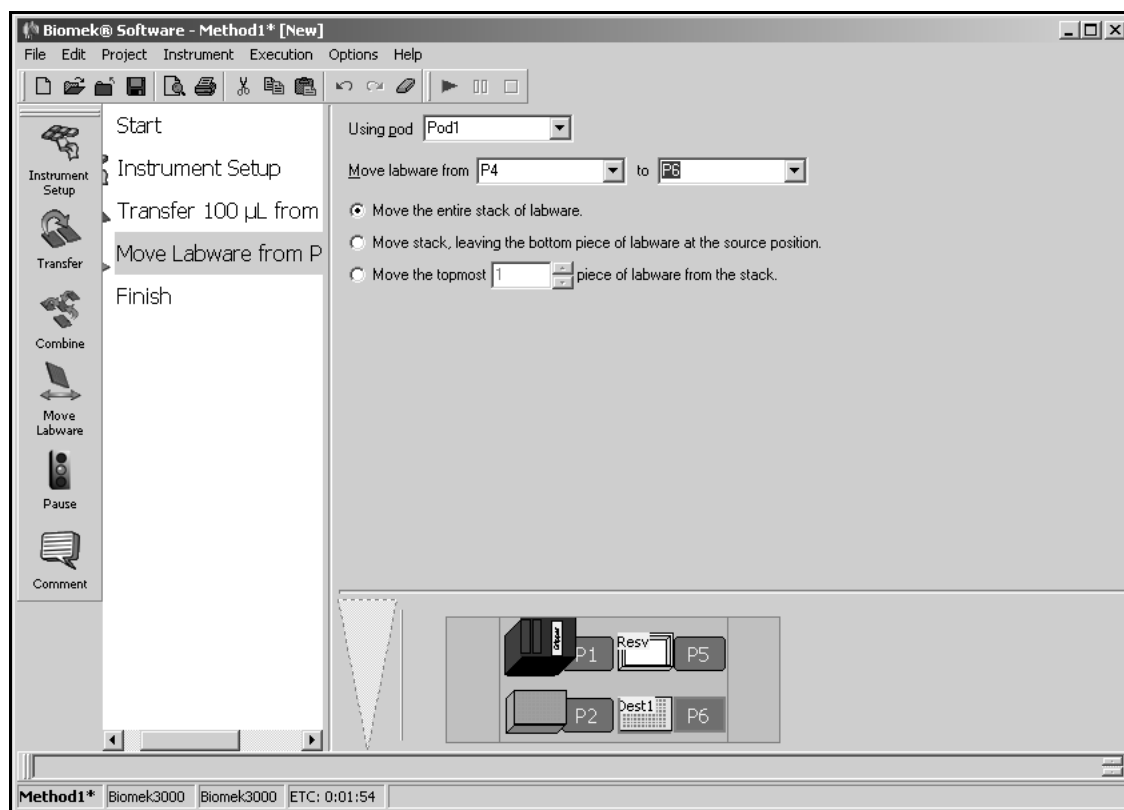
Figure 2-11. Configured Move Labware step

The Move Labware step configuration is complete. Now move on to Section 2.6, *Using the Finish Step*, to learn how long the method will take to run.

2.6   Using the Finish Step

Your liquid transfer is set up, so you can see how long it will take to run the entire method by using the Finish step.

1. Click on the **Finish** step in the Method View.

2. Check the status bar at the bottom of the editor for a display of the Estimated Time for Completion (ETC). For this method, the ETC is approximately 2:24.

Note: Your ETC may vary slightly. That's OK.

Note: Refer to the *Biomek Software User's Manual,* Chapter 12.2.2, *Configuring the Finish Step*, for information on configuring the Finish step.

2.6.1   Handling Configuration Errors

If there is a step configuration error in your method, when you click on the Finish or any step that occurs after the step with error, the step with the error is highlighted in red (Figure 2-12) and the ETC is displayed as Failed. The error message also is displayed in the status bar or when hovering the mouse over the highlighted step. Use the message to correct the error and reconfigure the step.

Note: Refer to the *Biomek Software User's Manual,* Chapter 25, *Handling and Preventing Errors*.
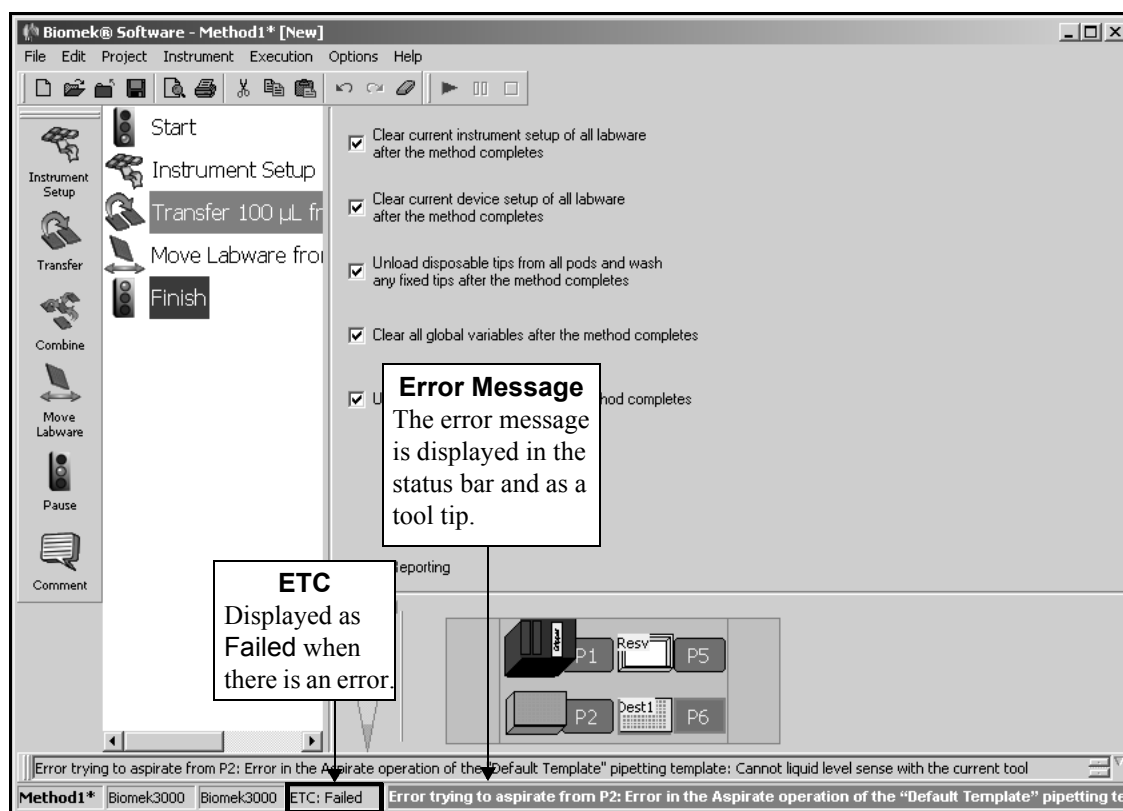
Figure 2-12. Quick-Start method with error

2.7 Saving a Method

Methods and Project Files

Methods are saved as elements of a project file, not as separate method files. Saving a method only saves the current status of the method. It does not create a revision or check in project items as revisions. Refer to the *Biomek Software User's Manual,* Chapter 6, *Understanding and Using Project Files*.

After you've clicked on Finish step, you can save or *check in* your method. We will just save it for now.

1. Choose **File>Save** from the toolbar. Save Method As appears.
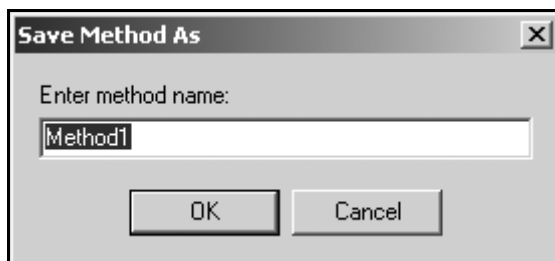
Figure 2-13. Save Method As

2. Enter Quick-Start Method and choose **OK**. The method editor now looks like Figure 2-14.

Check In

Checking in a method is similar to saving a method, but in addition creates a new revision of the method, checks in all project items of the project file, and creates new revisions for any items that have changed. You will check in the method later, in Section 3.5, *Checking In a Method and Project File*.
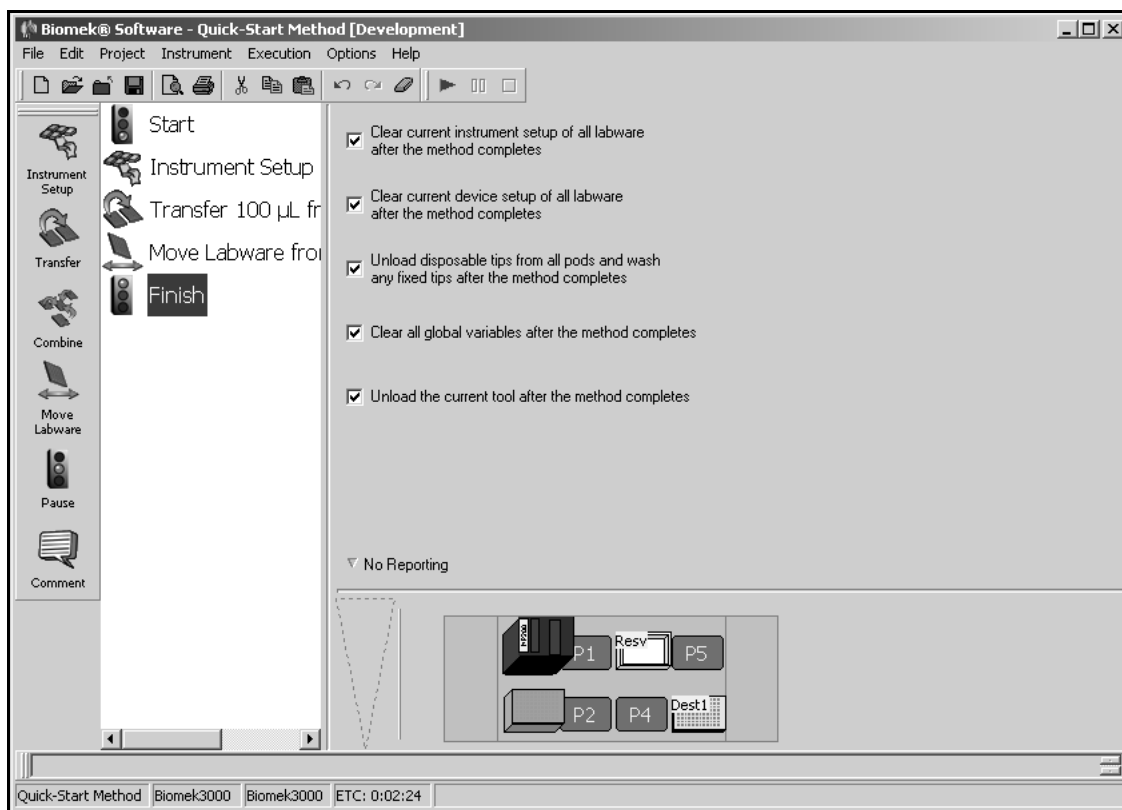
Figure 2-14. Quick-Start method saved and named

Move on to Section 2.8, *Running a Method*, to run your saved Quick-Start method.

2.8   Running a Method

Next you will run the method you just created using the simulator. The simulator allows you to watch the method on your screen without actually running the method on an instrument.

To run your saved method:

1. If you do not see the Simulation Display button on the toolbar (Figure 2-15), from the Instrument menu, choose **Hardware Setup**. Biomek Hardware Setup appears.
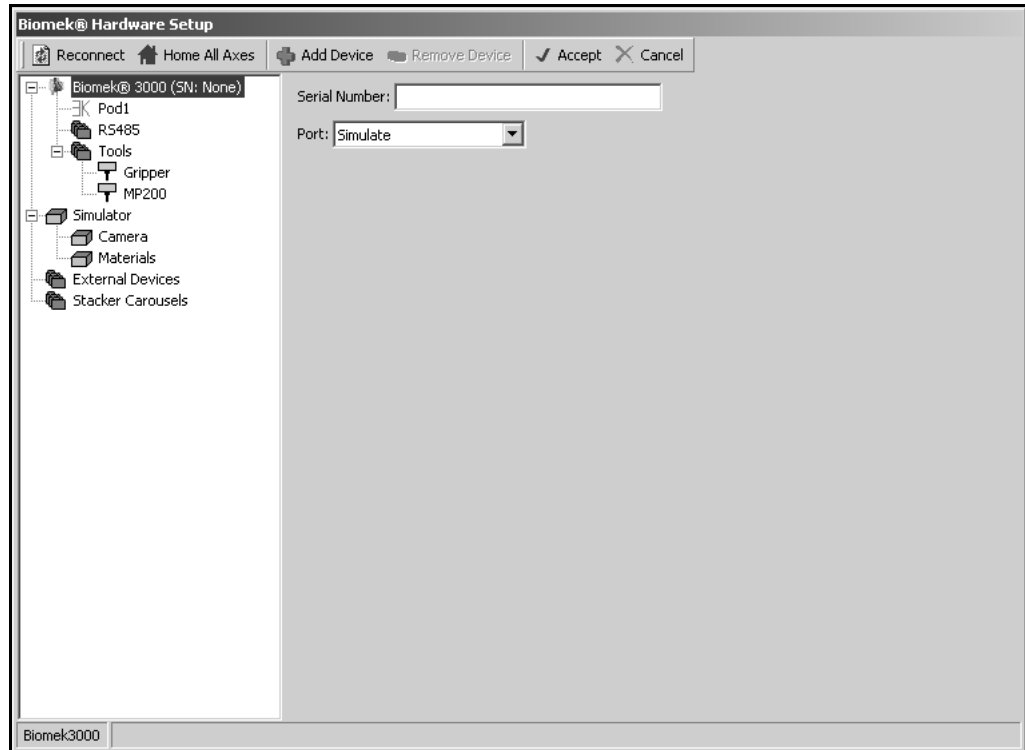

Figure 2-15. Hardware Setup

2. In Port, select **Simulate**.

3. Choose **Accept** to save changes and close Hardware Setup. Biomek Software is now running in simulation mode.

4. Click on the **green arrow** button on the toolbar. The simulation display is automatically launched and the step configuration area is replaced with a three-dimensional model of your Biomek 3000 (Figure 2-16). The deck confirmation prompt (Figure 2-17) appears on top of the main editor.
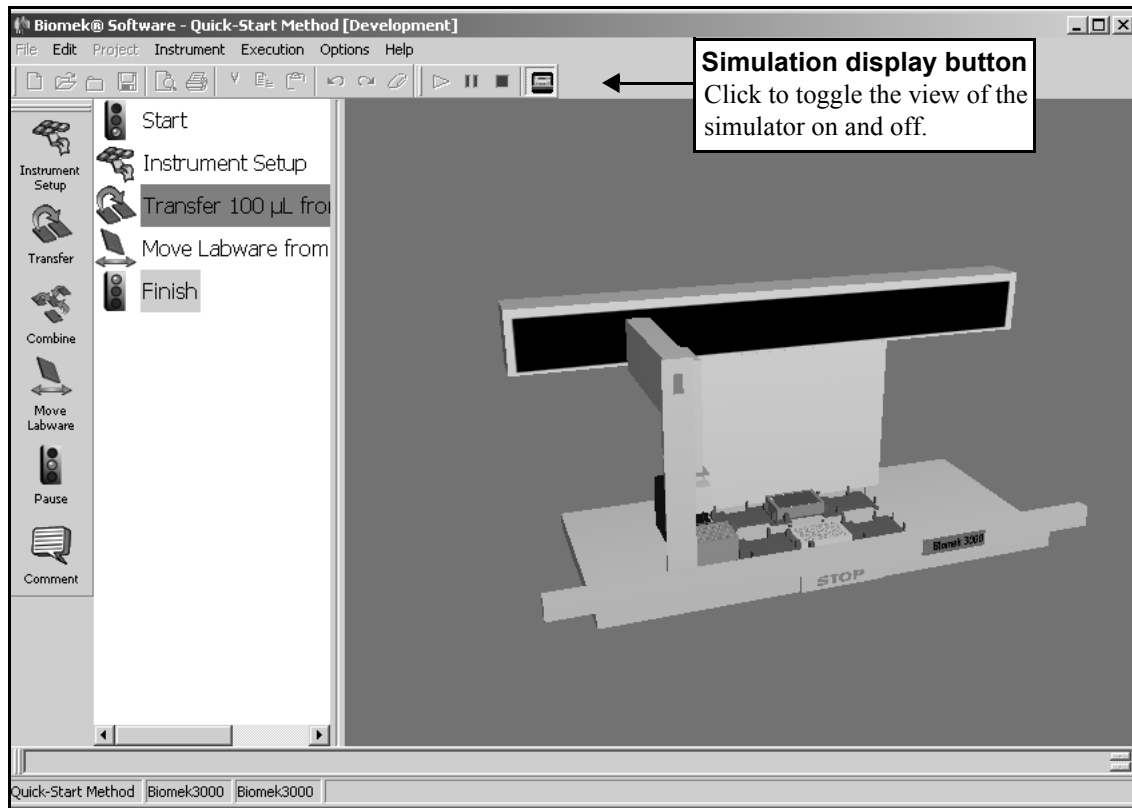
Figure 2-16. Biomek 3000 simulator displayed
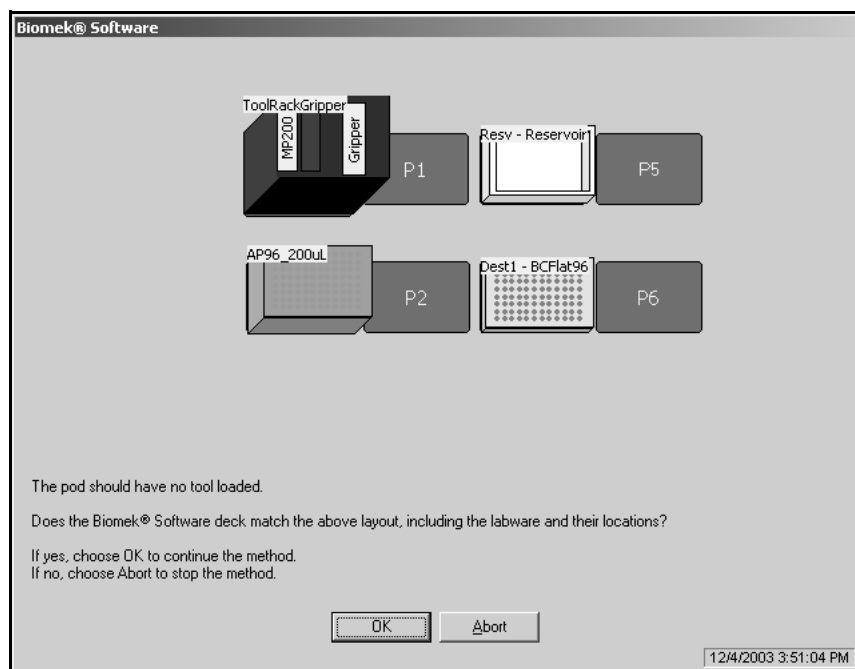
Figure 2-17. Deck confirmation prompt for Quick-Start method

5. Choose **OK**. The prompt closes and the method continues. View the method on screen as it proceeds in the simulator. The method can also be followed in the Method View as steps are highlighted in green as they are executed.

    Note: If you are running this method on your instrument instead of the simulator, make sure that the physical deck layout matches the expected deck layout shown in the deck confirmation prompt before you choose **OK**.

You can proceed directly to Chapter 3, *Using the Editors While Creating Methods*, to learn about the editors you'll use for customizing your methods.

3 Using the Editors While Creating Methods

3.1 Overview

This chapter presents step-by-step information to help you learn how to use the editors. You can follow the instructions to use the editors or read through this chapter without performing the numbered steps. Links to specific sections offer complete information on all the editors and allow you to use this chapter in conjunction with the *Biomek Software User's Manual*.

The editors allow your method to be customized to your special requirements. You can go beyond the predefined project items and instrument configurations; manually control the pod; restore instrument settings and project files; and configure external devices using specific editors.

The editors are accessed from the **Project** or **Instrument** menus located on the toolbar of the Biomek main editor (Figure 3-1).

This chapter includes the following information:

- *General Description of Editors* (Section 3.2)
- *Creating New Labware in the Labware Type Editor* (Section 3.3)
- *Creating a New Pattern* (Section 3.4)
- *Checking In a Method and Project File* (Section 3.5)
- *Using Hardware Setup* (Section 3.6)
- *Creating a New Deck* (Section 3.7)
- *Manually Controlling the Pod* (Section 3.8)

3.2   General Description of Editors

If using Accounts & Permissions . . .
You must have Develop Projects and Setup Instrument permissions to access the editors on the Project and Instrument menus. Refer to the *Biomek Software User's Manual,* Chapter 2, *Using Accounts & Permissions*, for more information.

Several editors are used to configure Biomek Software to control your Biomek 3000 instrument. Editors are accessed from one of two menus:
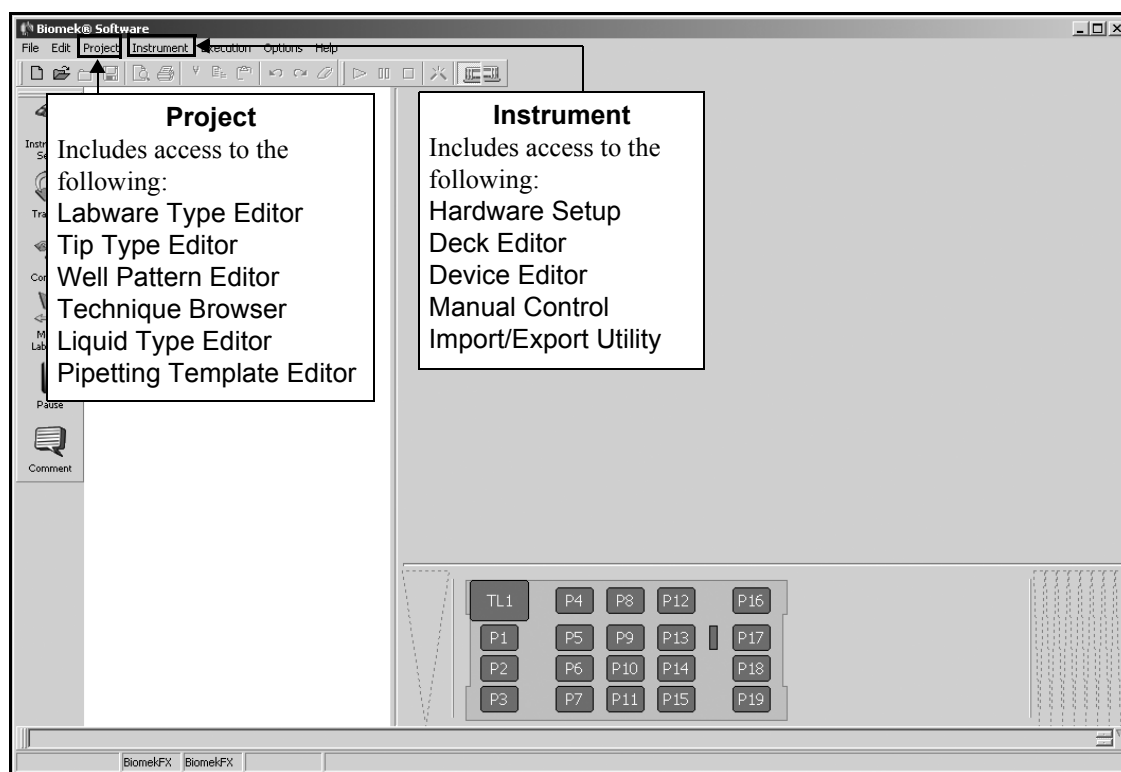
- Project menu (Figure 3-1)

  OR

- Instrument menu (Figure 3-1)

Figure 3-1. Biomek main editor

Following is a brief description of the editors available from the two menus displayed in Figure 3-1. If you would like to learn more about a specific editor, refer to the referenced chapter for more information.

You will work with four of the more commonly used editors and Manual Control in this quick-start guide.

3.2.1   Project Menu

The editors on the Project menu (Figure 3-1) allow project items to be created, copied, revised, and renamed. They include the following:

- Labware Type Editor — allows you to add new labware types, copy labware types, delete labware types, rename labware types, and edit labware type properties (refer to the *Biomek Software User's Manual,* Chapter 7, *Creating and Modifying Tip and Labware Types*).

   Note: Refer to Section 3.3, *Creating New Labware in the Labware Type Editor*, in this quick-start guide to follow step-by-step instructions to create new piece of labware.

- Tip Type Editor — allows you to add new tips types, remove tip types, and change tip properties (refer to the *Biomek Software User's Manual,* Chapter 7, *Creating and Modifying Tip and Labware Types*).

- Well Pattern Editor — allows patterns for hitting specific wells to be created and stored (refer to the *Biomek Software User's Manual,* Chapter 11, *Creating Well Patterns*).

   Note: Refer to Section 3.4, *Creating a New Pattern*, in this quick-start guide to learn how to create a well pattern.

- Technique Browser — allows you to customize techniques for your specific needs and save them for use in future methods (refer to the *Biomek Software User's Manual,* Chapter 9, *Understanding and Creating Techniques*).

- Liquid Type Editor — allows you to create new liquid types or to modify existing liquid types (refer to the *Biomek Software User's Manual,* Chapter 8, *Understanding and Creating Liquid Types*).

- Pipetting Template Editor — allows you to create or modify pipetting templates that configure the precise actions during pipetting operations (refer to the *Biomek Software User's Manual,* Chapter 10, *Using the Pipetting Template Editor*).

3.2.2   Instrument Menu

The editors on the Instrument menu (Figure 3-1) allow instrument configuration to be changed. They include the following:

- Hardware Setup — if you change the configuration of your instrument, it is used to install, configure, and remove other devices (refer to the *Biomek® 3000 Laboratory Automation Workstation User's Manual,* Chapter 12, *Configuring the Biomek® 3000 in Hardware Setup*).

- Deck Editor — used to define and change deck configurations and frame the deck (refer to the *Biomek Software User's Manual,* Chapter 5, *Preparing and Managing the Deck*).

- Device Editor — external devices may be integrated to your Biomek 3000 instrument. In order to use the device, it must be configured through the Device Editor (refer to the *Biomek Software User's Manual,* Chapter 22.4.1, *Configuring Devices Using the Device Editor*).

- Manual Control — allows you to control the movement of the bridge, head assembly, and grippers independently of a method. It is used to control the pod when framing the gripper tool and when recovering from errors (refer to the *Biomek® 3000 Laboratory Automation Workstation User's Manual,* Chapter 14, *Manually Controlling the Biomek® 3000 in Biomek Software*).

  Note: Refer to Section 3.8, *Manually Controlling the Pod*, in this quick-start guide to learn how to manually move a pod to another position after using Z-Max to raise it to the highest configured height.

- Import/Export Utility — allows you to import and export instrument settings (decks, framing tools, pod settings) as import files (.imp) (refer to the *Biomek Software User's Manual,* Chapter 3, *Using Instrument Files and Settings*).

3.3   Creating New Labware in the Labware Type Editor

Labware Definitions

When creating a new labware type, it is important that the labware dimensions are entered precisely per the manufacturer's specifications. An incorrect labware definition could result in a number of problems, including collisions, gripper errors, or poor pipetting performance.

The Labware Type Editor is used to create labware definitions so you can use labware that is not predefined in Biomek Software in your methods .

Assume that you have new labware that is very similar to a BCFlat96, but some specifications are slightly different so you must create a new labware type in the Labware Type Editor in order to use this new type in your methods.

Refer to the *Biomek Software User's Manual,* Chapter 7, *Creating and Modifying Tip and Labware Types,* for further information on using the Labware Type Editor.

Note: Do not run a method outside of the simulator using the labware you create here; the specifications may not be accurate for the physical piece of labware you use in this tutorial method *(see sidebar)*.

To create new labware in the Labware Type Editor:

1. From the Project menu, choose **Labware Type Editor**. Labware Types appear (Figure 3-2)
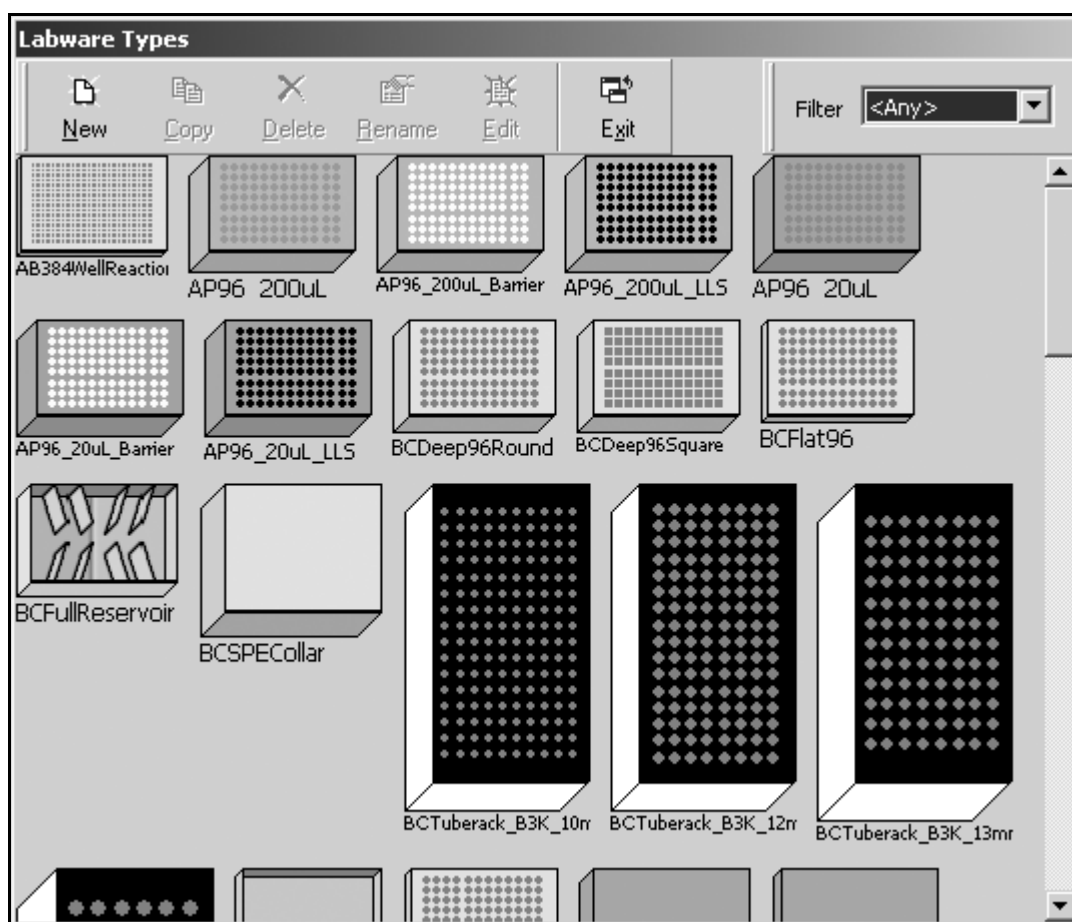
Figure 3-2. Labware Types

2. Click on BCFlat96 and choose **Copy**. Copy Labware Type appears (Figure 3-3).
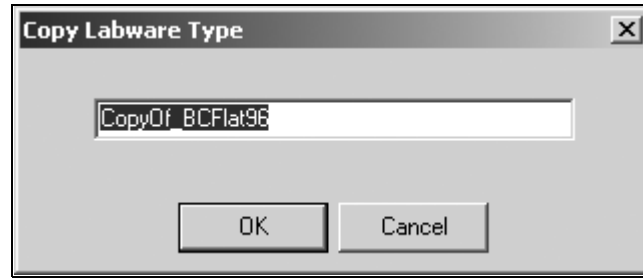
Figure 3-3. Copy Labware Type

Note: To retain the dimensions of predefined labware in Biomek Software, it is important to copy and then edit the copy of the labware type rather than just editing the predefined labware to meet the new labware specifications.

---

3. Enter NewLabwareQuickStart and choose **OK**. The copy of BCFlat96 is created with the specified name and appears in Labware Type Editor (Figure 3-4).
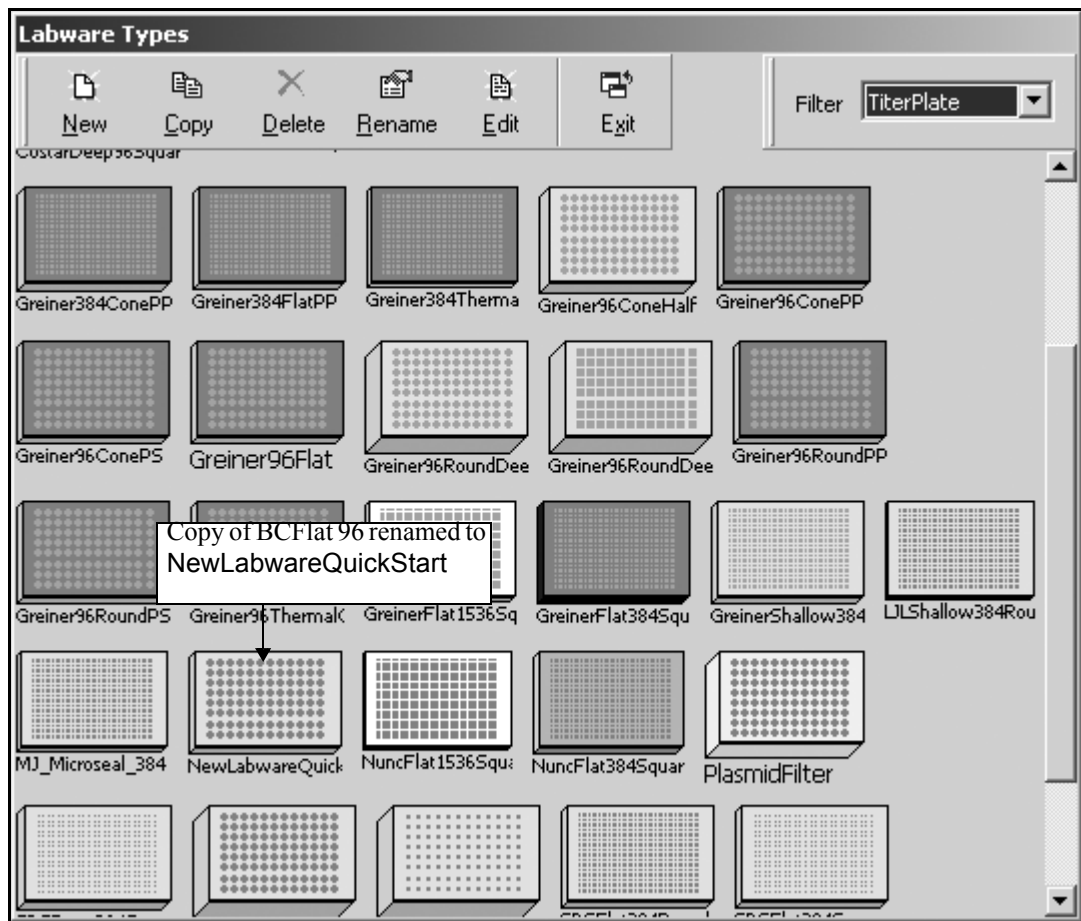
Figure 3-4. NewLabwareQuickStart in Labware Type Editor

4. Double-click the NewLabwareQuickStart graphic. NewLabwareQuickStart appears (Figure 3-5).
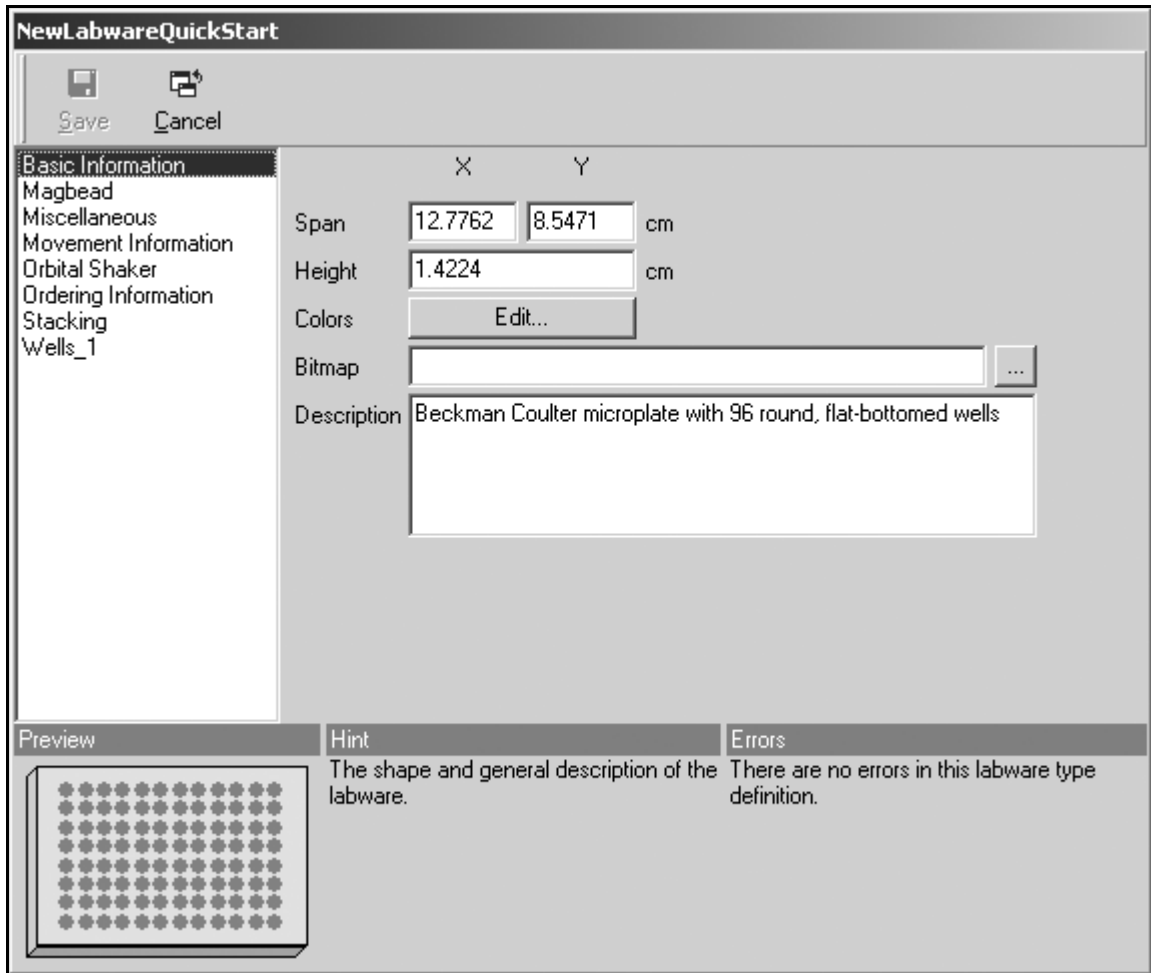
Figure 3-5. NewLabwareQuickStart

Note: Each piece of labware in Labware Types has its own mini-editor similar to Figure 3-5 to allow specifications to be revised and saved.

5. In Height, enter **1.46** and choose **Save**. You have created a new piece of labware in the Labware Type Editor.

6. Choose **Exit** to close the Labware Type Editor.

3.4 Creating a New Pattern

The Well Pattern Editor is used to create and store patterns for accessing specific wells in methods. There are also well patterns already created in Well Patterns that may be used or copied to create new patterns. The patterns created and stored in Well Patterns are accessible in the Transfer and Combine steps.

Assume that you want to create a new well pattern based on the NewLabwareQuickStart labware you created in the Labware Type Editor.

To create a new well pattern in the Well Pattern Editor:

1. From the Project menu, choose **Well Pattern Editor**. Well Patterns appears (Figure 3-6).
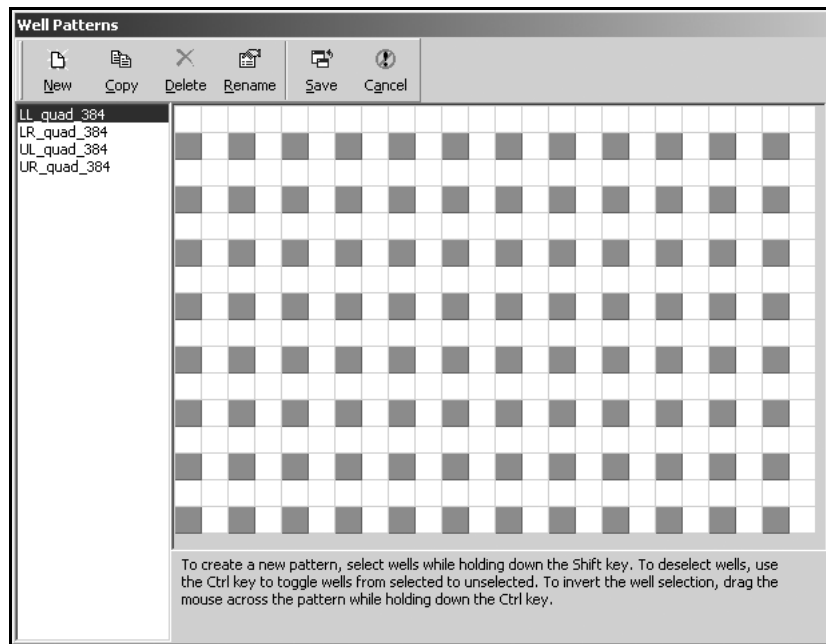
Figure 3-6. Well Patterns

2. Choose **New**. New Pattern appears (Figure 3-7).
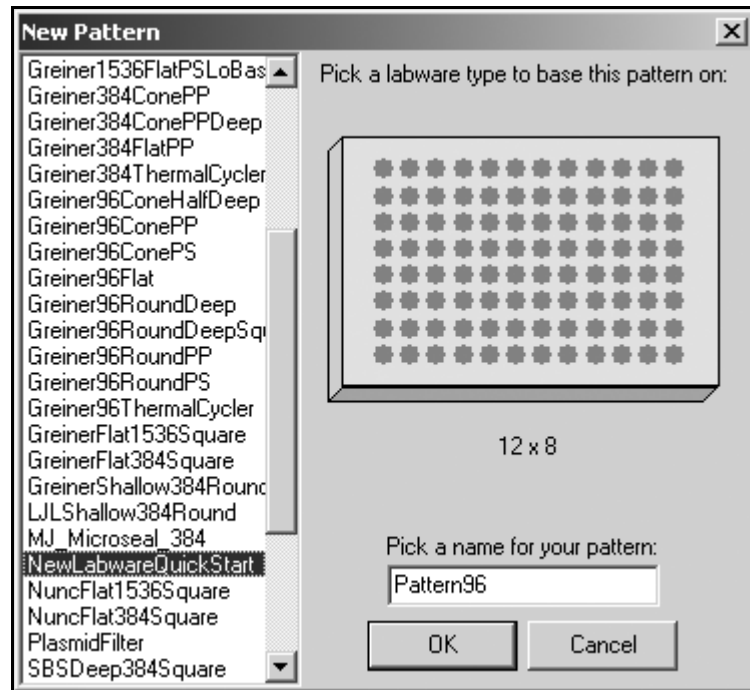
Figure 3-7. New Pattern

3. Highlight NewLabwareQuickStart and choose **OK** . Figure 3-8 appears.
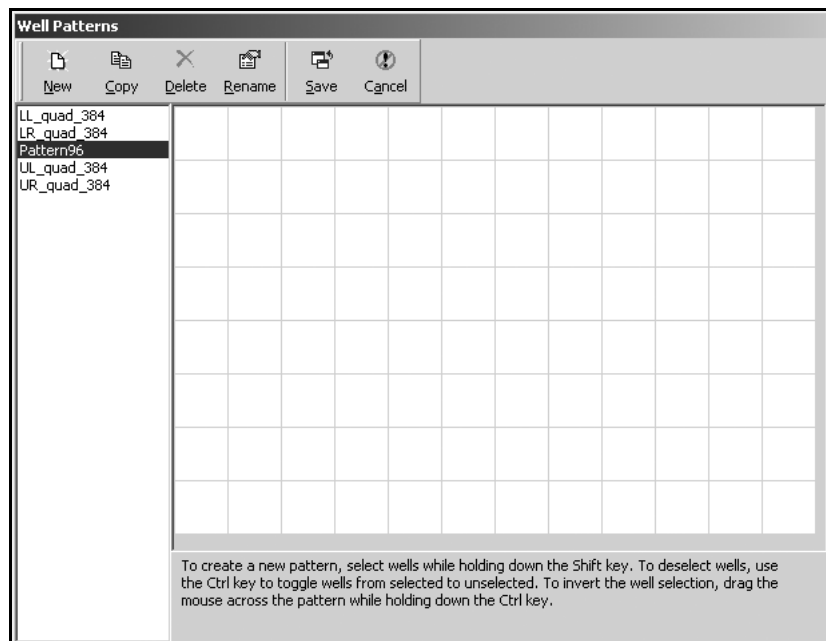
Figure 3-8. Well Patterns based on Pattern 96

4. While holding down the Shift key, select the wells for the new pattern so it looks like Figure 3-9.
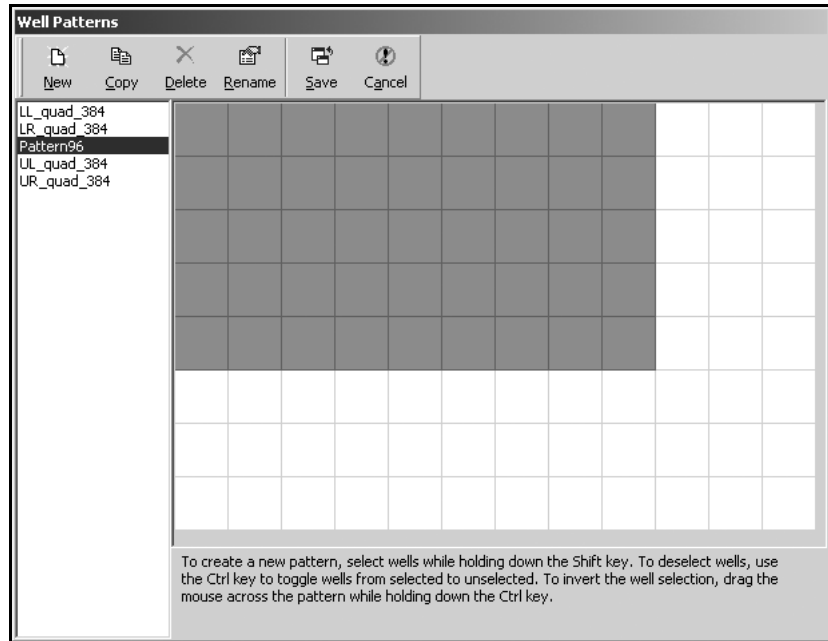
Figure 3-9. Wells chosen for the new pattern

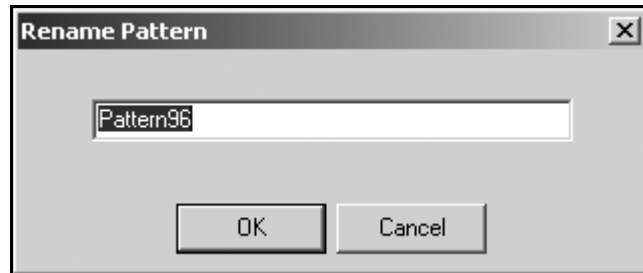5. Choose **Rename** to rename the new pattern. Rename Pattern appears (Figure 3-10).

Figure 3-10. Rename Pattern

6. Enter LabwareQuickStart and choose **OK**. Figure 3-11 appears.
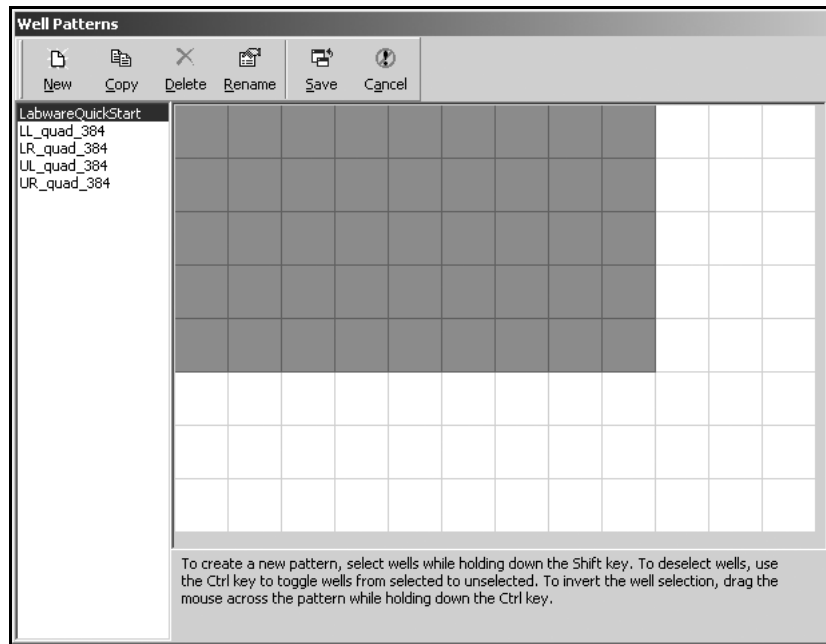
Figure 3-11. New pattern renamed

7. Choose **Save** to save LabwareQuickStart in Well Patterns.

Note: Refer to the *Biomek Software User's Manual,* Chapter 11, *Creating Well Patterns,* for more information on creating well patterns.

3.5   Checking In a Method and Project File

Checking in a method is similar to saving a method, but also creates a revision record of the method and checks in all project items of the project file and creates new revisions for any items that have changed.

You will check in your Quick-Start method, along with the new labware and well pattern you just created.

To check in your method with the new labware and well pattern:

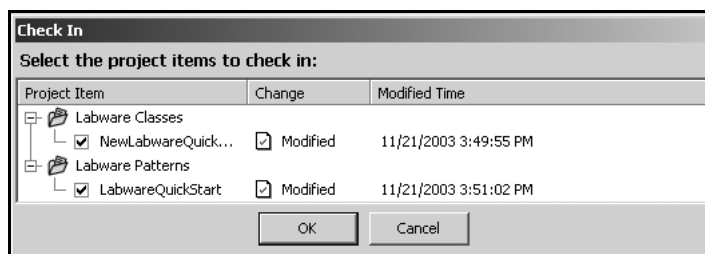1. From the File menu, choose **Check In**. Check In appears with the new labware type and well pattern.

Figure 3-12. Check In

2. Choose **OK** to check in the new revisions of project items.

Notice that the method name in the Biomek main editor title bar changes to Quick-Start Method [Revision 1: Development]. If Accounts & Permissions is enabled, other dialogues appear and more steps are required for checking in methods. Enter a reason and your password to check in the method and project. (refer to the *Biomek Software User's Manual,* Chapter 12.10, *Checking In a Method*).

Note: If using Accounts & Permissions, methods may also be validated by choosing **Validate** from the File menu (see sidebar).

3.6   Using Hardware Setup

While a Beckman Coulter Service Engineer normally installs and configures new devices in Hardware Setup, it may be necessary for you to install, configure, and remove other devices using Hardware Setup if you change the configuration of your instrument.

You will also need to configure Hardware Setup if you have a new tool that you want to use with your Biomek 3000 instrument.

You will add a P200L Single-Tip Pipette Tool to the list of tools available. Adding a tool in Hardware Setup makes it available to add to a tool rack in the Instrument Setup step and use it in a method.

To add a new tool in Hardware Setup:

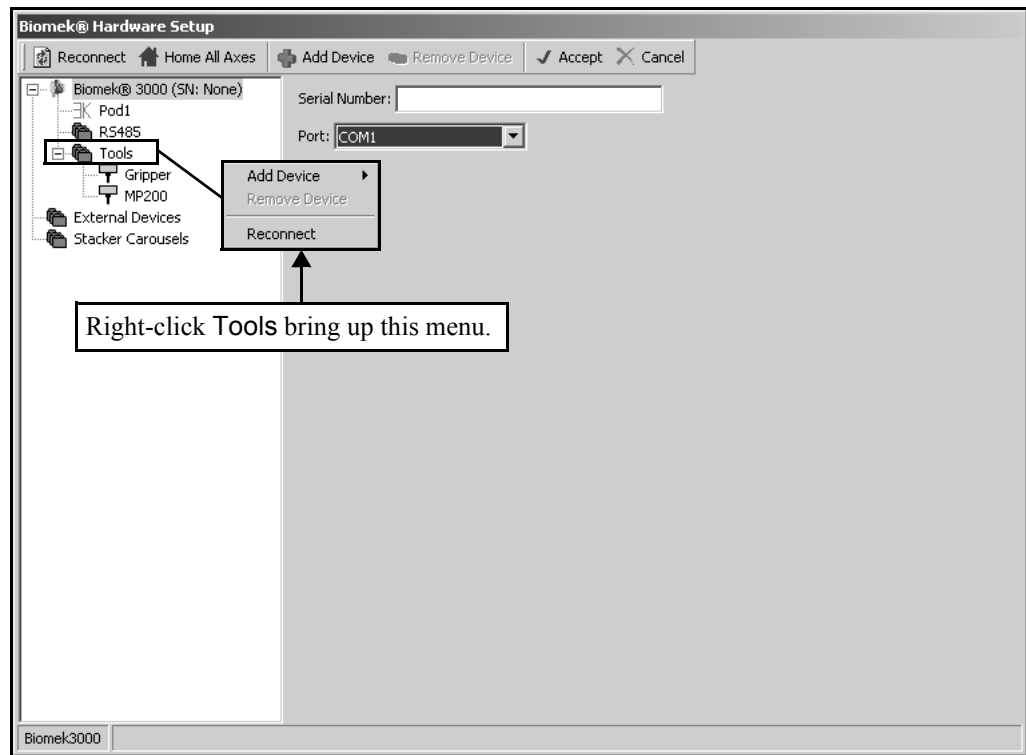1. Choose **Instrument>Hardware Setup**. Hardware Setup appears (Figure 3-13).

Figure 3-13. Hardware Setup

2. In the left pane, right-click **Tools** and choose **Add Device** from the menu that appears. A list of all the different tool types appears.

3. Select **P200L** from the list. A P200L tool is added to the list of tools in the left pane. Note the asterisk to the right of the tool name. This indicates the tool has been added or modified and changes have not been saved.
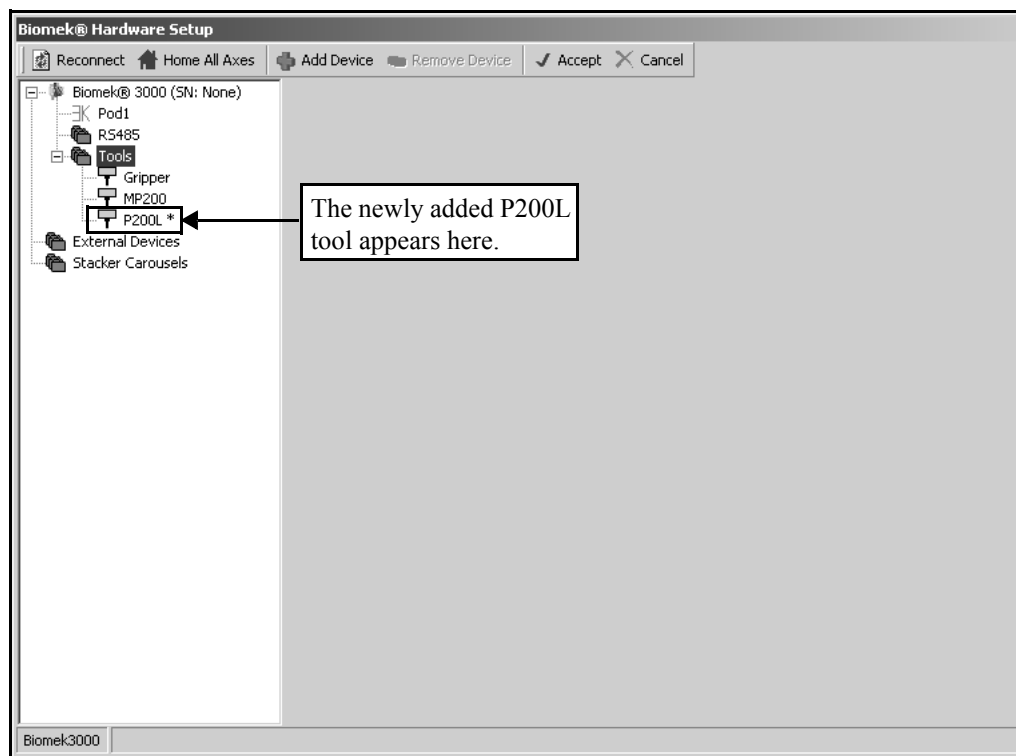

Figure 3-14. Hardware Setup with new tool added

4. Click on **P200L** in the left pane to display the tool configuration in the right pane.

5. If this new tool corresponded to a physical tool that would be used with the instrument, you would enter the serial number printed on the tool label in Tool Serial Number.

> **Note:** The other fields may be used to modify the performance of the tool. However, Tool Conversion Slope and Capacity should only be changed if you are instructed to do so by a Beckman Coulter support or service representative. Refer to the *Biomek® 3000 Laboratory Automation Workstation User's Manual,* Chapter 12, *Configuring the Biomek® 3000 in Hardware Setup,* for more information on adding and configuring tools in Hardware Setup.

6. Since this tool does not correspond to a physical tool, right-click **P200L** in the left pane and select **Remove Device** to remove the tool from Hardware Setup.

7. Choose **Accept** to close Hardware Setup.

3.7   Creating a New Deck

Framing

Framing teaches Biomek Software the location of the devices positioned on the deck. Biomek Software uses this framing information to move the pod to the appropriate position when performing liquid-handling operations and manipulating labware.

A Beckman Coulter Service Engineer frames the Biomek 3000 instrument during system installation. It may be necessary to repeat the framing if devices are added, moved, or removed from the deck. Refer to the *Biomek® 3000 Laboratory Automation Workstation User's Manual,* Chapter 13, *Framing the*

A deck in the Biomek Software refers to the software representation of the physical Biomek 3000 instrument deck. The Deck Editor is used to define and change deck configurations. A deck stores framing information and device associations for each position on the deck. Decks can be used for multiple methods and are stored in the Deck Editor.

Assume you have added a second tool rack to your deck and now must create another deck in the Deck Editor that reflects that addition to the physical deck.

Note: Refer to the *Biomek Software User's Manual,* Chapter 5, *Preparing and Managing the Deck*, for detailed information on using the Deck Editor.

To create a new deck in the Deck Editor:

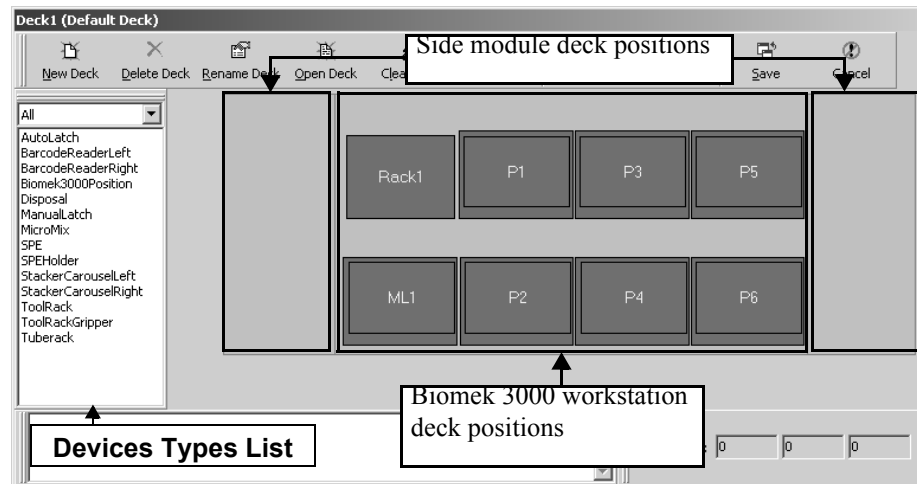1. Choose **Instrument>Deck Editor**. Deck Editor appears (Figure 3-15).

Figure 3-15. Deck Editor

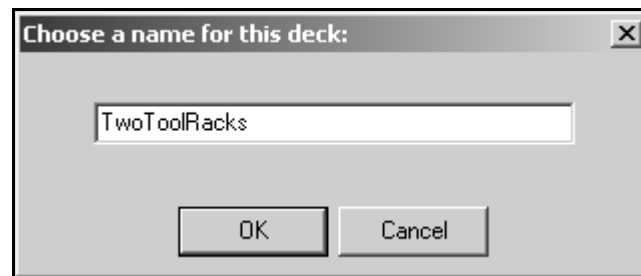2. Select New Deck. Choose a name for this deck appears (Figure 3-16).

Figure 3-16. Choose a name for this deck

3. Enter TwoToolRacks and choose **OK**. TwoToolRacks appears.

4. Click and hold the mouse button on ToolRack from the Devices Types List. Locations capable of supporting that ALP are indicted in the Deck View by dashed boxes.

5. Drag and drop **ToolRack** to any location capable of supporting it (Figure 3-17). A second ToolRack has been added to the deck. This deck is now the default deck and is available in the Instrument Setup step.

Figure 3-17. TwoToolRacks deck with second tool rack added

6. Select **Open Deck**. Select a Deck appears (Figure 3-18).

Figure 3-18. Select a Deck

7. Choose **Deck1** to make it the default deck since it is the deck you used when you created the Quick Start Method and choose **OK**.

8. Choose **Save** to exit the Deck Editor.

3.8   Manually Controlling the Pod

If you need to control the Biomek 3000 instrument outside of a method, including moving the bridge and head assembly outside of a method, you will use Manual Control. Manual Control is also used to control the pod when framing the gripper tool and when recovering from errors. Some devices can also be controlled outside a method using Manual Control. Refer to the *Biomek® 3000 Laboratory Automation Workstation User's Manual,* Chapter 14, *Manually Controlling the Biomek® 3000 in Biomek Software,* for additional information.

Using the following instructions, you will use Manual Control to move the pod to a different position on the deck. You'll move the pod to the Z-max height first to make sure you don't hit anything on the deck and then you'll move the pod to a selected position.

Note: If you launch the simulator, you can watch the pod move as you complete the following steps.

To move the pod using Manual Control:

To home all axes and move the head assembly using Manual Control:

1. Choose **Instrument>Manual Control**. Manual Control appears (Figure 3-19). Here is where you can choose to which position you want to move a pod.
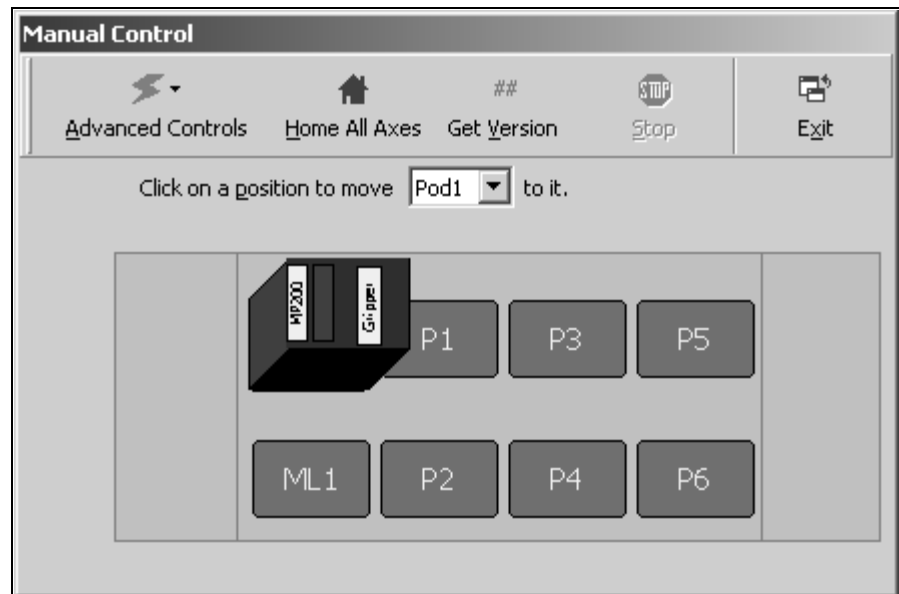

Figure 3-19. Manual Control

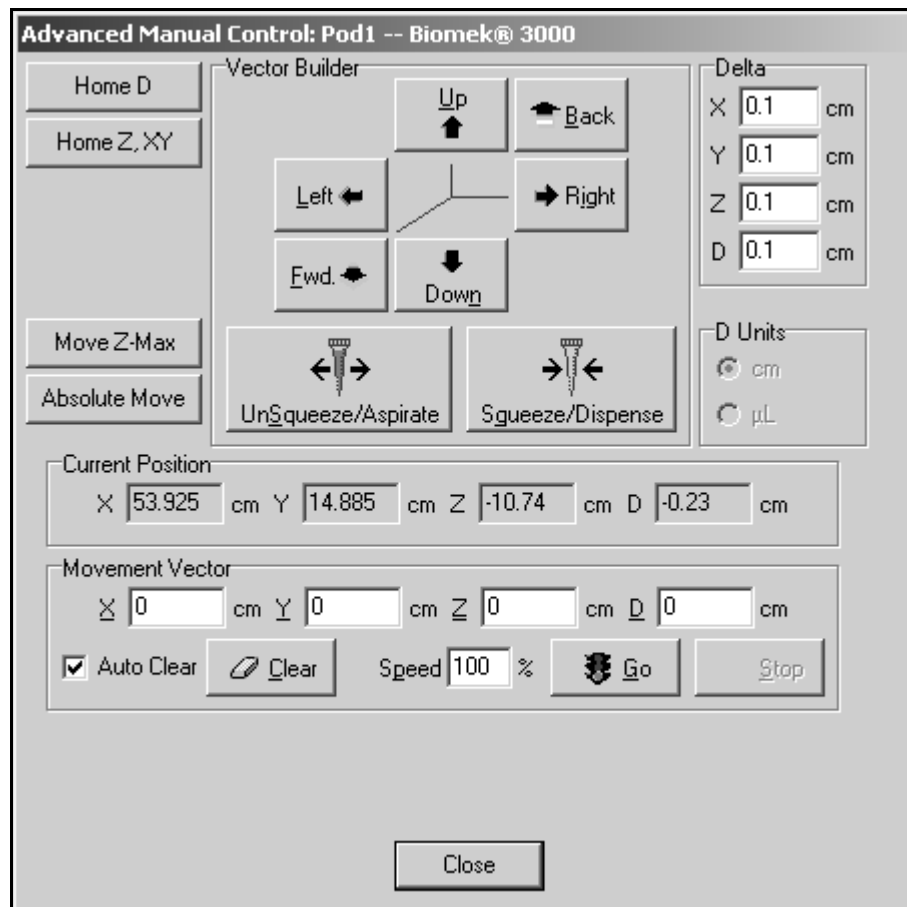2. Select **Advanced Controls** and highlight Pod1. Advanced Manual Control: Pod1 appears (Figure 3-20).

Figure 3-20. Advanced Manual Control for the Biomek 3000 head assembly

3. Select **Move Z-Max**. The head assembly moves to the highest configured height.

4. Select **Close**. Advanced Manual Control: Pod1 closes.

5. From Manual Control, click on **P5**. The head assembly moves to position P5 on the deck.

6. You can click on additional positions to move the pod to that position. When you are finished moving the pod with Manual Control, choose **Exit** to close Manual Control.

7. From the toolbar, choose **Close** to close the quick-start method.

   OR

   From the File menu, choose **Close**. The method closes and you are now ready to create a method of your own.

3.9   Quick-Start Guide Summary

Congratulations! You've just completed this quick-start guide.

You've completed:

- a small method.
- steps using the editors.
- steps creating some new project items.
- steps to manually control the Biomek 3000.

If you've used the links to other manuals, you've also learned where to find hardware information on the Biomek 3000 and more information on Biomek Software.

Enjoy your new Biomek 3000 Laboratory Automation Workstation.