Instructions for Use

Biomek 4000 ACPrep System

Biomek 4000 Laboratory Automation Workstation

PN B36612AA August 2013



Beckman Coulter, Inc. 250 S. Kraemer Blvd. Brea, CA 92821 U.S.A.



Biomek 4000 ACPrep Software

PN B36612AA (August 2013)

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Revision History

Initial Issue, 08/2013 Software Version 2.5

This document applies to the latest software listed and higher versions. When a subsequent software version affects the information in this document, a new issue will be released to the Beckman Coulter website. For labeling updates, go to www.beckmancoulter.com and download the latest version of the manual or system help for your instrument.

Revision History

Safety Notice

Read all product manuals and consult with Beckman Coulter-trained personnel before attempting to operate instrument. Do not attempt to perform any procedure before carefully reading all instructions. Always follow product labeling and manufacturer's recommendations. If in doubt as to how to proceed in any situation, contact your Beckman Coulter Representative.

Alerts for Danger, Warning, Caution, Important, and Note

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. May be used to indicate the possibility of erroneous data.

<u>A</u> CAUTION

CAUTION indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices. May be used to indicate the possibility of erroneous data.

- **IMPORTANT** IMPORTANT is used for comments that add value to the step or procedure being performed. Following the advice in IMPORTANT adds benefit to the performance of a piece of equipment or to a process.
- **NOTE** NOTE is used to call attention to notable information that should be followed during installation, use, or servicing of this equipment.

Safety Notice Alerts for Danger, Warning, Caution, Important, and Note

Contents

Revision History, iii

Safety Notice, v

Alerts for Danger, Warning, Caution, Important, and Note, v

Introduction, xv

Scope of Manual, xvi

Conventions, xvi Typographic Conventions, xvi

Hardware Overview, xvii Indicator Lights, xvii Liquid Level Sensing (LLS), xviii Tip and Tool Usage, xviii

Software Overview, xix Side Panel, xx Tips for Using the Software, xxi

CHAPTER 1: Accounts and Permissions, 1-1

Overview, 1-1

Administering User Accounts and Permissions, 1-1 Opening Account Management, 1-2 Accounts, 1-4 Roles, 1-5

Restoring the Administrator Password, 1-8

CHAPTER 2: Configuring System Settings, 2-1

Introduction, 2-1

Configuring the System, 2-2 Configuring Fluorochromes, 2-3 Defining a Flow Cytometer, 2-6 Defining Antibody Templates, 2-9 Searching for Existing Antibody Templates, 2-10 Creating New Antibody Templates, 2-11 Editing Antibody Templates, 2-13 Deleting Antibody Templates, 2-14 Defining Panels and Cocktails, 2-15 Searching for Existing Panels and Cocktails, 2-16 Creating New Panels and Cocktails, 2-17 Editing Panels and Cocktails, 2-19 Deleting Panels, 2-20 Deleting Cocktails from Panels, 2-21

CHAPTER 3: System Operation, 3-1

Introduction, 3-1

Common Operations Across all Workflows, 3-2 Setting the Expiration Date, 3-2 Selecting an Output Fill Option for Output Racks, 3-3 How the System Handles Input Vials, 3-5 How the System Determines the Order of Pipetting Operations, 3-6

Setting up the Instrument for a Run, 3-7 'Prepare' Screens Overview, 3-8 Performing a Run, 3-8

Preparing Tubes from Antibodies, 3-9 Preparing a Worklist, 3-9 Configuring the Deck, 3-11 Input Racks, 3-12 Output Racks, 3-15

Preparing Bulk Cocktails, 3-16 Preparing a Worklist, 3-16 Configuring the Deck, 3-18 Input Racks, 3-19 Output Racks, 3-21

Preparing Tubes from Bulk Cocktails, 3-22 Preparing a Worklist, 3-22 Configuring the Deck, 3-24 Input Racks, 3-25 Output Racks, 3-27

Starting a Run, 3-29

CHAPTER 4: Biomek Actions, 4-1

Introduction, 4-1

Biomek Actions Screen, 4-1 Homing the Instrument, 4-3 Raising the Pod and Unloading the Tool, 4-5 Manually Controlling the Pod, 4-6 Viewing the Current Position of the Biomek 4000 Pod, 4-7 Moving the Biomek 4000 Pod to a Safe Roving Height, 4-8 Performing Relative Moves Using the Vector Builder, 4-8

CHAPTER 5:	Reporting, 5-1
	Introduction, 5-1
	Viewing Reports, 5-1 Viewing Rack Inventory Reports, 5-2 Viewing Worklist History Reports, 5-4
CHAPTER 6:	Preventive Maintenance and Troubleshooting, 6-1
	Introduction, 6-1
	Preventive Maintenance, 6-1
	Troubleshooting, 6-3 Troubleshooting the Biomek 4000 Instrument, 6-3 Troubleshooting Pipette Tools , 6-3 Troubleshooting the Biomek 4000 ACPrep Software, 6-4
APPENDIX A:	Specifications, A-1
	System Specifications, A-1
APPENDIX B:	Symbologies for the Optional Barcode Reader, B-1 Barcode Reader Menu Selection, B-1
APPENDIX C:	Parts List, C-1
	Parts List, C-1
	Abbreviations
	Glossary

Performing Absolute Moves for the Biomek 4000 Pod, 4-10

Illustrations

1.1	Account Services Window Screen, 1-2
1.2	Account Services Menu Screen, 1-3
1.3	Administrator Login, 1-3
1.4	Account Management - Accounts Tab, 1-4
1.5	Account Management - Roles Tab - Advanced Operator, 1-5
1.6	Account Management - Roles Tab - Operator, 1-6
1.7	Account Management - Roles Tab - Service, 1-6
1.8	Administrator Password Restore, 1-8
1.9	Administrator Password Restore, 1-8
1.10	Administrator Password Changed, 1-9
2.1	Biomek 4000 ACPrep Software Log In Screen, 2-2
2.2	Biomek 4000 ACPrep Software Main Screen, 2-2
2.3	Configuration Menu Screen, 2-3
2.4	Fluorochrome Definitions Screen, 2-4
2.5	Fluorochrome Details, 2-4
2.6	Newly-Defined Fluorochrome Configuration, 2-5
2.7	Delete Confirmation for Fluorochrome, 2-6
2.8	Flow Cytometers Definitions Screen, 2-6
2.9	Flow Cytometer Details, 2-7
2.10	Fluorochromes Selection List Example, 2-7
2.11	Newly-Defined Flow Cytometer, 2-8
2.12	Confirmation to Delete the Flow Cytometer, 2-8
2.13	Antibody Template Definitions Screen, 2-9
2.14	Search Criteria, 2-10
2.15	Search Results, with Information Displayed for Selected Item, 2-10
2.16	Antibody Template Details, 2-11
2.17	Newly-Defined Antibody Template, 2-12
2.18	Opening an Antibody Template for Editing, 2-13
2.19	Editing an Antibody Template, 2-13
2.20	Confirmation to Delete the Antibody Template, 2-14
2.21	Panels and Cocktails Configurations Screen, 2-15
2.22	Search Criteria, 2-16
2.23	Search Results, with Information Displayed for Selected

	Item, 2-16
2.24	Panels and Cocktails Details, 2-17
2.25	Defining a Panel, 2-18
2.26	Adding Cocktails to a Panel, 2-18
2.27	Newly-Defined Panel, 2-19
2.28	Opening a Panel for Editing, 2-19
2.29	Editing Panels and Cocktails, 2-20
2.30	Confirmation to Delete a Panel, 2-20
2.31	Deleting a Cocktail, 2-21
2.32	Cancel Deleting a Cocktail from a Panel, 2-21
3.1	Setting the Expiration Date, 3-2
3.2	Calendar Option for Setting the Expiration Date, 3-2
3.3	Optional Way to Setting the Expiration Date, 3-3
3.4	Output Fill Option, 3-3
3.5	Row with Wrapping, 3-4
3.6	Column with Wrapping, 3-4
3.7	Fill Horizontally, 3-4
3.8	Fill Vertically, 3-5
3.9	Run Instrument Menu Screen, 3-7
3.10	Sample Preparation Options Main Screen, 3-8
3.11	Populated Worklist Area - Preparing Tubes from Antibodies, 3-9
3.12	Usage Drop-Down Screen, 3-10
3.13	Deck Layout Area, 3-11
3.14	Selecting a Rack, 3-12
3.15	Creating a New Rack, 3-12
3.16	Rack Details, 3-13
3.17	Auto Populating Position Details, 3-14
3.18	Changing the Remaining Volume, 3-14
3.19	Output Destination, 3-15
3.20	Populated Worklist Area, 3-16
3.21	Usage Drop-Down Screen, 3-17
3.22	Deck Layout Area, 3-18
3.23	Selecting a Rack, 3-19
3.24	Creating a New Rack, 3-19
3.25	Rack Details, 3-20
3.26	Auto Populating Position Details, 3-21
3.27	Populated Worklist Area - Preparing Sample Tubes from Bulk Cocktails, 3-22

3.28	Usage Drop-Down Screen, 3-23
3.29	Deck Layout Area, 3-24
3.30	Selecting a Rack, 3-25
3.31	Creating a New Rack, 3-25
3.32	Rack Details - Preparing Tubes from Bulk Cocktails, 3-26
3.33	Auto Populating Position Details, 3-27
3.34	Output Destination, 3-27
3.35	Run Reminder, 3-29
3.36	Homing Instrument Message, 3-29
3.37	Homing Message, 3-30
3.38	Progress Bar - Running, 3-30
3.39	Available Tips Dialog Box, 3-30
3.40	Progress Bar - Paused, 3-31
3.41	Abort Run Confirmation Screen, 3-31
3.42	Aborted Run Screen, 3-31
3.43	Run Successful Message/Table Access Arrow, 3-32
3.44	Actions Table/Close Table Arrow, 3-32
4.1	Run Instrument Menu Screen, 4-2
4.2	Biomek Actions Screen, 4-2
4.3	Homing Instrument Message, 4-3
4.4	Homing Instrument Message, 4-4
4.5	Manual Control, 4-6
4.6	Vector Builder, 4-9
4.7	Enter Absolute Move Coordinates, 4-10
5.1	Reporting Menu Screen, 5-1
5.2	Rack Inventory Screen, 5-2
5.3	Rack Report, 5-2
5.4	Exporting a Report, 5-3
5.5	Successful Export Message, 5-3
5.6	Worklist History Screen, 5-4
5.7	Worklist History Report Screen, 5-4
5.8	Worklist History Report - Outputs Tab, 5-5
5.9	Worklist History Report - Inputs Tab, 5-5
5.10	Worklist History Report - Run Events Tab, 5-5
5.11	Exporting a Report, 5-6
5.12	Successful Export Message, 5-6
5.13	Confirmation to Delete Worklist History, 5-7

Tables

1.1	Role Requirements by Operation, 1-7
1.2	Permissions, 1-7
3.1	Troubleshooting Homing Instrument Cautions, 3-29
4.1	Troubleshooting Homing Instrument Cautions, 4-3
4.2	Manual Control Selection Areas for the Biomek 4000 Pod, 4-7
6.1	Troubleshooting the Biomek 4000, 6-3
6.2	Troubleshooting Pipette Tools, 6-3
6.3	Troubleshooting the Biomek 4000 ACPrep Software, 6-4
A.1	System Specifications, A-1
C.1	Parts List, C-1

Tables

Introduction

Biomek 4000 ACPrep is a workflow solution designed for use on the Biomek 4000 Laboratory Automation Workstation. The solution can dramatically reduce manual effort and errors in antibody cocktail preparations for multicolor flow cytometry analyses, while providing flexibility and control expected in flow cytometry laboratories.

Antibody vials that are directly supported on the Biomek 4000 ACPrep system include IOTest, IOTest3, and CYTO-STAT monoclonal antibodies from Beckman Coulter. Antibodies from other manufacturers are indirectly supported on the system if they are in equivalent or supported vial types or by transferring the reagent to any empty amber vial compatible with racks from Beckman Coulter.

The system supports preparing antibody mixtures in bulk with subsequent transfer to assay labware, or antibody mixtures can be created directly in assay labware. Supported assay labware includes 12 mm \times 75 mm tubes, 96-well microplates or 96-well deep-well plates that meet the ANSI/SBS 1-2004 through ANSI/SBS 4-2004 standards. Tubes can be positioned in a carousel or 24-position tube rack.

Scope of Manual

This manual describes how to configure, set up, and run the Biomek 4000 ACPrep Software. Data tracking and reporting functions are included. We recommend that you read this entire manual, especially the *Safety Notice* section and all safety-related information, before utilizing the software.

- The following introductory pages contain an overview of the system, including hardware and software overviews.
- CHAPTER 1, *Accounts and Permissions* contains information on implementing accounts and permissions in order to utilize the software.
- CHAPTER 2, *Configuring System Settings* contains information on how to define the fluorochrome, flow cytometer, antibody template, and panel and cocktail configurations used in the software.
- CHAPTER 3, *System Operation* contains information on how to operate the software in order to automate the transfer of antibodies or cocktails into appropriate labware.
- CHAPTER 4, *Biomek Actions* contains information on using the Biomek actions, such as homing the instrument, raising the pod, and using manual control.
- CHAPTER 5, *Reporting* contains information on how to create various reports available through the software.
- CHAPTER 6, *Preventive Maintenance and Troubleshooting* contains procedures for routine operator maintenance and troubleshooting.
- APPENDIX A, Specifications contains specifications for the Biomek 4000.
- APPENDIX B, *Symbologies for the Optional Barcode Reader* contains information on the symbologies for the barcode reader.
- APPENDIX C, Parts List lists the part number for Biomek 4000 parts such a tips, vials, and inserts .
- Abbreviations defines most of the abbreviations that are used in this manual.
- *Glossary* contains terms used in this manual.
- *Index* can be use to facilitate the referencing of words or subject matter in this manual.

Conventions

Typographic Conventions

Certain typographic conventions are used throughout this manual to distinguish names of user interface components, such as keys and displays.

- Computer key names appear as (START) or (ENTER).
- Display names (for example, **TEMP°C** or **SPEED**) appear in bold type.

Hardware Overview

This section provides a brief description of the system and describes features of the Biomek 4000 ACPrep Software.

Functionality of the system is provided by the Biomek 4000 liquid handling instrument. Figure 1 is a photo of the system.





10. Carousel

Indicator Lights

The power indicator board on the Biomek 4000 bridge contains a series of LED lights that indicate the operational status of the system. Table 1 defines the indicator lights and the operational status each represents.

Indicator Light	State	Operational Status			
Solid Green	ldle	System is functional and in a ready state. It is safe to access the instrument and deck.			
Blinking Green	Pause	Planned pause as part of software routine.			
Solid Amber	Active	An operation is in progress.			
Blinking Amber	Error	Caused by pressing the Stop button or system error. The Stop button halts the Biomek 4000 bridge and pod operations immediately. Software communicates the cause.			

 Table 1
 Indicator Light Key

Liquid Level Sensing (LLS)

The P200L and P1000SL Single-Tip Pipette Tools include patented technology that sonically detects the liquid level. Liquid Level Sensing (LLS) is performed using an acoustic process that involves a transmitter and receiver within the single-channel tools. The transmitter emits a sound wave through the tip that bounces back when it contacts liquid. The receiver detects the wave as it bounces back past the end of the tip.

Liquid Level Sensing will generally allow the instrument to detect when there is no liquid in a container. However, it may sometimes detect the actual bottom of a container as liquid. Make sure that the amount of liquid present in a container matches the value that the software shows in the "Remaining Volume" field for the container.

NOTE Barrier tips are not compatible with LLS.

Tip and Tool Usage

The P200L and P1000SL Single-Tip Pipette Tools are created to handle different volumes of liquid. The P200L tool is used with P20 tips for all volumes less than or equal to 100 μ L. The P1000SL tool is used with P1000 tips for all volumes greater than 100 μ L.

NOTE The system has the capacity for two P20 tip boxes and one P1000 tip box. This results in 192 tips available at volumes less than or equal to 100 μ L and 96 tips available for volumes greater than 100 μ L.

Software Overview

The Biomek 4000 ACPrep Software is organized to perform three primary functions: **Run Instrument**, **Reporting**, and **System Configuration** (Figure 2). The function of the menu buttons is explained in Table 2.

Figure 2 Biomek 4000 ACPrep Software Main Screen



Table 2 Menu Buttons and Functions

	Button	Button Function
1		 The Run Instrument function allows the operator to select one of the following options: Prepare assay tubes from antibodies Prepare bulk cocktails Prepare assay tubes from bulk cocktails Perform manual control operations for the Biomek 4000 Liquid Handling System
2		 The Reporting function allows the operator to select one of the following options: View antibody inventory reports View worklist history
3		 The Configuration function allows the advanced operator to configure and define: Panels and cocktails Antibody templates Flow cytometers Fluorochromes

Side Panel

A side panel is located on the right side of the main screen (Figure 3). The side panel provides information about the software and offers alternative methods to log in, log out, and exit the software. The functions of the side panel buttons are explained in Table 3.

Figure 3 Biomek 4000 ACPrep Main Software Screen with Side Panel



Table 3 Side Panel Buttons and Functions

	Button	Button Function
1	**	The Expand button opens the side panel.
2	>>>	The Collapse button closes the side panel.
3	ABOUT	The About button provides information about the Biomek 4000 ACPrep Software.

	Button	Button Function
4	EXIT	The Exit button closes the Biomek 4000 ACPrep Software application.
5		 The Log In button logs you into the Biomek 4000 ACPrep Software application. Must fill in User Name and Password before clicking on Log In.
6		The Log Out button logs you out of your current session, and takes you to the Log In screen.

Tips for Using the Software

Throughout the software, there are elements that are repeated. Below is a list and some examples of these elements.

1. Fields surrounded by a red box require information. You must complete these fields before you can save your work or continue (Figure 4).

Save	
Panel Name:	•
Description:	
Flow Cytometer:	Cocktail
Cocktails	
No cocktails de	fined Select a cocktail to view and edit its details

Figure 4 Red Box - Required Information

2. Hover the mouse over certain elements within the software to display a tool tip that provides additional information (Figure 5).

Figure 5 Example of Information in Tool Tip

Wor	klist						
					Usag	je	*
	Sample Name	Panel	Cocktails				
×	Sample 1	Sample Panel	Cocktail	1	+		
×	Sample 2	Naive_Resting T cells	CD37-FITC 4 1 20 µL C CD44-APC 4 1 10 µL 1 CD8-PC7 : 20 µL	2 3	+		
		Naive_Resting T cells	Assay Volume : 50 µL				

3. To make an antibody or panel a favorite, click 🖄 to the right of the name. Favorites are moved to the top of the list (Figure 6).

Figure 6 Example of Favorite Items



Accounts and Permissions

Overview

Accounts and Permissions is an integrated set of features built into the Biomek 4000 ACPrep Software that provides control of user access within the software application. User access is controlled by setting up accounts for different types of users. Each user is required to log into the software and will only have access to certain software features and reporting functions based upon the role defined.

When several Beckman Coulter systems that use **Accounts and Permissions** are present at one location, **Accounts and Permissions** must be installed and enabled separately for each system. **Accounts and Permissions** only provides support for closed systems. Networked systems are not supported.

Users require a separate account for each system they need to access. For each Beckman Coulter system that uses **Accounts and Permissions**, a single administrator sets up the level of support provided through **Accounts and Permissions**, creates, sets and manages permissions for user accounts, and configures system parameters relating to **Accounts and Permissions**.

The implementation of **Accounts and Permissions** for the Biomek 4000 ACPrep Software is not designed for compliance with electronic signature requirements (such as 21 CFR Part 11). Use of this product will not sign records electronically as part of using the software application. Therefore, this application does not claim to be compliant with electronic signature requirements.

Administering User Accounts and Permissions

System administration tasks for **Accounts and Permissions** are performed in **Account Management**, a separate application from the Biomek 4000 ACPrep Software. The system administrator sets up and configures user accounts, passwords, and permissions, and configures system settings such as automatic password expiration and system logout time.

A single, system-wide **Administrator** account is used on a system. Administration tasks may be performed only on the computer where **Account Management** is installed. Access to **Account Management** over a network is not supported.

NOTE The administrator is not automatically given a user account on the system. The **Administrator** account can only be used for Accounts and Permissions, not other operations of the software. If the administrator requires an account, one must be created in **Account Management**.

This section covers opening **Account Management** and provides an overview of permissions available for this application. For detailed information about using this application to administer user accounts and permissions, refer to the **Account Management** online help available from the **Account Management** application.

Opening Account Management

To open Account Management:

- **1** Open the Biomek 4000 ACPrep Software.
- **2** Log in as Administrator using the Accounts and Permissions Administrator password. The Account Services window appears (Figure 1.1).

Figure 1.1 Account Services Window Screen

Select an item from the menu at the top to begin a task	
	TIBODY tail preparation
Uperator: System Administrator	4/2/2012 6:36:11 AM

1

3 Click to open the **Account Services** menu (Figure 1.2).

n	
l	ſ

Select a task to configure BCAP.	Account Services Menu	
	Account Management	

- **4** Click Account Management to open the Account Management task screen.
- **5** Click to start **Account Management**. The **Administrator Login** dialog box appears (Figure 1.3)



Administrator Login	
Please enter the administrator password:	
OK Cancel	

NOTE The Biomek 4000 ACPrep Software automatically logs out while **Account Management** is running. Do not use the software while using **Account Management**.

6 Supply the administrator password in the **Administrator Login** dialog box. The **Account Management** screen appears and defaults to the **Accounts** tab (Figure 1.4).

		Poles
Name	Full Name	
🛃 service	BCI Service	Operator
		Description
		Account is disabled

Figure 1.4 Account Management - Accounts Tab

Accounts

It is the responsibility of the administrator of the system to create accounts, assign roles, disable and enable accounts, and set and reset passwords. Accounts are managed on the **Accounts** tab of **Account Management**. All of the accounts on the system are listed along the left side in the **Accounts** list. The roles assigned to an account are displayed in the **Roles** list on the right side. Controls for creating new accounts, setting descriptions for accounts, setting passwords, and disabling accounts are along the bottom.

NOTE Account Management has online help that is available via the ? button in the bottom right corner of the Account Management screen or the (F1) key on your keyboard. Refer to the online help for detailed information about Account Management.

1

Roles

Each account in the system can have roles assigned for use by any application that uses **Accounts** and **Permissions**. For the Biomek 4000 ACPrep Software, there are three roles: **Operator**, **Advanced Operator**, and **Service**.

• The **Advanced Operator** role is assigned to accounts that are used for configuring the system as well as for running the system. Accounts with this role assigned can create, view, and edit all software items, including items in the **Configuration Menu** (Figure 1.5).

💀 Account Management	×
👪 Accounts 🔐 Roles 🔞 Settings	🗐 Repositories 🕏 Audit
Roles	Di
Name	Permissions
🛃 Advanced Operator	Antibody Cocktail Preparation
🎝 Operator	
🏰 Service	Run System
	Visue Departs
	Disavely@ Control Cofficiency
	Change the Biomek® Software preferences
	Control the Biomek® instrument via manual control
	Create, modify, and run Biomek® methods
	Create, modify, or delete projects
	Run validated Biomek® methods
	Validate Biomek® methods
	Description
	Users with the ability to run the system, generate reports,
	and configure the system
Create Role Delete Role	Rename Role Set Description

Figure 1.5 Account Management - Roles Tab - Advanced Operator

• The **Operator** role is assigned to accounts that are used for running the system, but not for configuring the system. Accounts with this role assigned can view all software items, but cannot edit any items in the **Configuration Menu** (Figure 1.6).

👫 Account Management	×
👪 Accounts 🏰 Roles 👸 Settings	🗊 Repositories 😒 Audit
Roles	Permissions Antibody Cocktail Preparation Run Service Run System System Configuration View Reports Biomek® Control Software Change the Biomek® instrument setup Change the Biomek® instrument via manual control Create, modify, and run Biomek® methods Create, modify, or delete projects Run validated Biomek® methods Validate Biomek® methods Validate Biomek® methods
	Description
	Users with the ability to run the system and generate reports
Create Role Delete Role	Rename Role Set Description ?

Figure 1.6 Account Management - Roles Tab - Operator

• The Service role is reserved for use by Beckman Coulter Service personnel (Figure 1.7).



Figure 1.7 Account Management - Roles Tab - Service

Table 1.1 describes the software operations available for each role.

Table 1.1 Role Requirements by Operation

Operation	Administrator	Operator	Advanced Operator
Managing Accounts	Х		
Runnning the Instrument		Х	Х
Running Reports		Х	Х
Changing Configuration Settings			Х

NOTE The Administrator role is available to the Administrator account only.

- **NOTE** If an account has more than one role assigned, it gets the combination of all of the assigned roles. For example, an account assigned both **Operator** and **Advanced Operator** roles can do everything an **Advanced Operator** can do.
- **NOTE** Roles other than those for this application may appear in the **Roles** list. Ignore all roles other than **Operator** and **Advanced Operator**.

A role is a set of permissions. Permissions are used by the software to grant or deny access to certain features. For this application, permissions relate to accessibility of various screens and the ability to edit various items. The permissions for this application are described in Table 1.2.

Permission	Description
Run Service	Reserved for use by Beckman Coulter Service personnel only.
Run System	Permits access to the Run Instrument operation in order to set up and execute runs on the system. Also gives access to the manual control operations in the Biomek Actions task. It is used for all roles.
System Configuration	Permits access to the Configuration operation to configure system settings. It is used for the Advanced Operator and Service roles, but not for the Operator role. Accounts with only the Operator role have "view only" capabilities for configuration items and cannot edit fluorochrome configurations, flow cytometer configurations, antibody templates, panels, or cocktails.
View Reports	Permits access to to reports. It is used for all roles.

Table 1.2 Permissions

NOTE Account Management has online help that is available via the ? button in the bottom right corner of the Account Management screen or the (F1) key on your keyboard. Refer to the online help for detailed information about Account Management.

NOTE Permissions other than those listed in Table 1.2 may appear. Ignore all permissions other than those listed in the table.

Restoring the Administrator Password

Only one **Administrator** account exists on a system with **Accounts and Permissions** installed. If the **Administrator** password is lost or forgotten, Beckman Coulter Technical Support must be contacted at 1-800-526-7694 to restore access to the **Account Management** application.

NOTE The Biomek 4000 ACPrep Installation CD is required for this process. Processes should be in place to ensure that access to the Biomek 4000 ACPrep Installation CD is controlled. In some cases, Beckman Coulter Service personnel retains the CD and must be contacted before proceeding with the password recovery process.

To restore the **Administrator** password:

- **1** Open the Biomek 4000 ACPrep Installation CD on the computer where the password is to be restored.
- **2** Locate and open the **Beckman Coulter Accounts and Permissions Admin Password Restore.exe** program. **Administrator Password Restore** appears (Figure 1.8).

Figure 1.8 Administrator Password Restore

Administrator Pass	word Restore		×
Give this to customer	technical support (do i	not close this app until you ge	t the code back)
357F-46EC-C822-44	AE-B07D-0605-9492-34	4E7	
Type the code custo	ner technical support g	ives you here:	
ſ			1
	OK	Cancel	

- **IMPORTANT** Leave **Administrator Password Restore** open until Beckman Coulter Customer Technical Support supplies a new code for the lower field. The new code is based on the code displayed in the upper field, which can change each time **Administrator Password Restore** is opened.
- **3** In the USA or Canada, contact Beckman Coulter Technical Support at 1-800-526-7694 and provide the code displayed in the upper field of **Administrator Password Restore**. (Figure 1.8). Outside the USA or Canada, contact your Beckman Coulter Representative.
- **4** Enter the code provided by Beckman Coulter Technical Support or your Beckman Coulter Representative in the bottom field of **Administrator Password Restore** (Figure 1.9).

Figure 1.9	Administrator	Password Restore	
5			

	10 M 10	20 W W	
Give this to custome	r technical support (do i	not close this app until you get	the code back)
51C2-D223-8A98-40	CCE-8A28-8CE3-0D7E-F	CE2	
Type the code custo	mer technical support g	ives you here:	
3BA8-4613-E035-68	14-6EE6-9066-6FEA-27	'30	

1

5 Click **OK** to close **Administrator Password Restore** and accept the new code.

Figure 1.10 Administrator Password Changed

	×
The Admin password has been set to "password" (no quotes).

NOTE After the **Administrator** password has been reset, log into **Accounts and Permissions** to change the **Administrator** password to a more secure password.

6 Follow any additional instructions provided by Beckman Coulter Technical Support or your Beckman Coulter Representative.

Configuring System Settings

Introduction

This chapter describes how to configure the fluorochromes, flow cytometers, antibody templates, and panels of cocktails used in the Biomek 4000 ACPrep Software. To facilitate use of the software, it is necessary to initially configure these items in the following order:

- **1.** Configure fluorochromes a fluorochrome is a fluorescent label that is associated with a particular antibody (for example, Fluorescein isothiocyanate).
- **2.** Configure flow cytometers The configuration of flow cytometers provides the ability to configure the fluorochromes, which can be analyzed by a specific flow cytometer.
- **3.** Configure antibody templates an antibody template is a description of antibody characteristics (for example, name, species, or default pipetting volume). When setting up an antibody template, it is associated with a fluorochrome to facilitate reagent selection when building panels and cocktails.
- **4.** Configure panels and cocktails an antibody cocktail is a selection of antibodies that will be transferred to a single assay tube and measured using a flow cytometer. An antibody can be selected for each fluorochrome in the chosen flow cytometer configuration. An antibody panel is a collection of antibody cocktails used to assay a given sample.
- **NOTE** To perform the operations in this chapter, you must be logged into an account assigned the **Advanced Operator** role. Accounts with the **Operator** roles can view the settings, but are unable to edit them.

Configuring the System

Follow the steps below to configure the system.

1 Double-click to open the Biomek 4000 ACPrep Software. The log in screen appears (Figure 2.1).

Figure 2.1 Biomek 4000 ACPrep Software Log In Screen

	User Name Password	2
Enter your User Name and Password then click the Log In button to log in. Please Log In		
Uperator:		8/1/2011 8:51:47 PM

2 Enter your User Name and Password, then click or press (Enter) on the keyboard. The software main screen appears (Figure 2.2)

Figure 2.2 Biomek 4000 ACPrep Software Main Screen



3 Click On the top right side of the software main screen. The **Configuration Menu** screen appears (Figure 2.3).

The following options are available and are arranged in order from the most frequently used to the least frequently used:

- Panels and Cocktails (see Defining Panels and Cocktails)
- Antibody Templates (see Defining Antibody Templates)
- Flow Cytometers (see Defining a Flow Cytometer)
- Fluorochromes (see Configuring Fluorochromes)

NOTE To configure the software for the first time, these items must be completed in reverse order, starting with **Fluorochromes** and finishing with **Panels and Cocktails**.

Figure 2.3 Configuration Menu Screen

Select a task to configure the system.	Configuration Menu	Tasks
	Antibody Templates	
	Flow CytometersFluorochromes	
Operator:		1/19/2012 9:38:49 AN

Configuring Fluorochromes

This is the first step to configure the Biomek 4000 ACPrep Software. Configure fluorochromes to provide the association between antibodies and the flow cytometer. To build an antibody cocktail, the software selects antibody conjugates that match a supported fluorochrome label on a flow cytometer. Likewise, it excludes antibodies with fluorochrome labels that do not match the target flow cytometer.

A single fluorochrome configuration can be used with multiple flow cytometers and is not exclusive to a flow cytometer.

Configuring fluorochromes and flow cytometers ensures that panel configurations may only include antibodies with labels that match the hardware setup of the assigned flow cytometer. Antibodies with labels that do not match are excluded from panel and cocktail configurations.

To configure fluorochromes:

1 From the **Configuration Menu** screen, click Fluorochromes. The **Fluorochrome Definitions** screen appears (Figure 2.4). The list is populated with some example fluorochromes. Edit the fluorochromes already listed or add new ones.

Figure 2.4 Fluorochrome Definitions Screen

🎨 Antibody Cocktail Preparation		_ # ×
Use this task to	configure fluorochrome definitions.	Tasks
P New		x
APC APC-Alexa Fluor 750 APC-Alexa Fluor 750 ECO FITC Kr0 P8 PCS PCS PCS PCS PC PE RD1	Select a fluorochrane to view or edit its details	3
Operator:		1/18/2012 8:19:43 AM

2 To add new fluorochromes, click Rew located on the top left side of the screen. The **Fluorochrome Details** interface appears (Figure 2.5).

Figure 2.5 Fluorochrome Details

Label:	•	
Name:		
Description:		
Display Color:	Transparent	
3 In the fields provided, enter the fluorochrome Label, Name, and Description.

NOTE The **Label** field is used throughout the software to identify the fluorochrome, and it is the only required field.

4 In the **Display Color** field, click the drop-down list to open a display of color options and select a color.

NOTE This color will be displayed next to the fluorochrome label throughout the software.

5 Click **Save** to save the configuration. The newly-defined fluorochrome configuration appears alphabetically in the list on the left side of the screen (Figure 2.6).

Figure 2.6 Newly-Defined Fluorochrome Configuration

Use this task to	configure fluorochrome definitions.		Tasks
New R01 AC AC-Aleas Huor 700 AC-Aleas Huor 700 AC-Aleas Huor 700 TITC Ko P8 CS FC5 PC5 PC PC PC	Pe-Cy5	Deleto	×
Operator: BCI Service		3/14/2012	10:07:27 AM

- **6** Repeat this procedure to add more fluorochromes.
- **7** To edit a fluorochrome:
 - **a.** Select the fluorochrome from the list on the left.
 - **b.** Click <u>located</u> located above the name of the fluorochrome.
 - **c.** Make edits as necessary.
 - **d.** Click **Save** to save the configuration.
- **8** To delete a fluorochrome:
 - **a.** Select it from the list on the left and click **Delete**. A confirmation to delete the fluorochrome will appear (Figure 2.7).

b. Click Delete to delete the fluorochrome.

Figure 2.7 Delete Confirmation for Fluorochrome

Antibod	y Cocktail Preparation
	Confirm Delete
-	Are you sure you want to delete the fluorescence?
	Delete Cancel

Defining a Flow Cytometer

This is the second step to configure the Biomek 4000 ACPrep Software. A flow cytometer configuration is needed to specify a set of fluorochromes that is compatible with the hardware setup of the flow cytometer. If more than one flow cytometer or flow cytometer configuration exists with different sets of compatible fluorochromes, then each configuration has to be defined.

Follow the steps below to define a flow cytometer:

1 From the **Configuration Menu** screen, click Flow Cytometers. The **Flow Cytometers Definitions** screen appears (Figure 2.8). One example flow cytometer configuration is already defined in the software at the time of installation. This example configuration can be edited or replaced with another configuration, as desired.



Figure 2.8 Flow Cytometers Definitions Screen

2 To add a new flow cytometer, click located on the top left side of the screen. The **Flow Cytometer Details** interface appears (Figure 2.9).

Figure 2.9 Flow Cytometer Details

lame:	•
Description:	
JRL:	
luorochromes:	÷
	No assigned fluorochromes

- **3** In the fields provided, enter the Name, Description, and URL. The URL is an optional item that is used to provide a link to any useful reference file or location. For example, it could be a path to instructions for using the flow cytometer.
- **4** In the **Fluorochromes** field, click **I** to display a list of available fluorochromes (Figure 2.10).

Figure 2.10 Fluorochromes Selection List Example

APC	
APC-Alexa Fluor 750	
KrO	
PC5	
PC5.5	
PC7	
PE	
Pe-Cy5	
Tip: Hold down the CTRL key to select multiple items.	
+ Add	

5 Select the fluorochromes, and then click + Add. To select multiple items, hold down the (Ctrl) key on the keyboard and select each fluorochrome.

6 Click **Save** to save the configuration. The newly-defined flow cytometer appears on the left (Figure 2.11).

Figure 2.11 Newly-Defined Flow Cytometer

Contract: BC Service 100 Carton carto	🥪 Anti	body Cocktail Preparation			
We this task to configure flow cytometers definitions. Image: State of the state to configure flow cytometer Image: State of the state of th	₽				9
Image: Section Very Flow Cytometer Image: Section Very Flow Cytometer Image: Section Operator: BCl Service 422012 8:31:43 AM	0) Use this task to	configure flow cytometers definitions.		Tasks
New Flow Cytometer	6	New Nios 10/3 instrument	Edt	Delete	x
Operator: BCI Service 42/2012 8:31:43 AM	2	on Flow Cytometer	New Flow Cytometer		8
	Opera	ator: BCI Service		4/2/2012 8:3	31:43 AM

- **7** Repeat this procedure to add more flow cytometers.
- **8** To edit a flow cytometer:
 - **a.** Select the flow cytometer from the list on the left.
 - **b.** Click <u>located</u> located above the name of the flow cytometer.
 - c. Make edits as necessary.
 - **d.** Click **Save** to save the configuration.
- **9** To delete a flow cytometer:
 - **a.** Select it from the list on the left and click **Delete**. A confirmation to delete the flow cytometer will appear (Figure 2.12).
 - **b.** Click Delete to delete the flow cytometer.

Figure 2.12 Confirmation to Delete the Flow Cytometer

Antiboo	y Cocktail Preparation
	Confirm Delete
	Are you sure you want to delete the flow cytometer?
	Delete Cancel

Defining Antibody Templates

This is the third step to configure the Biomek 4000 ACPrep Software. Vials of antibodies, or bulk antibody cocktails, are the pipetting source for all operations in the software. An antibody template is like the catalog configuration of an antibody, in that it defines the general attributes of an antibody. Specific information for a given vial of antibody reagent, such as lot number and expiration date, is entered in the rack inventory to prepare the run.

From the **Configuration** screen, click Antibody Templates. The **Antibody Template Definitions** screen appears (Figure 2.13).





Follow the steps below to search, define, edit, or delete antibody templates.

Searching for Existing Antibody Templates

- **1** To search for existing information:
 - **a.** Click Search on the top left side of the screen. A search area opens.
 - **b.** Define your search by clicking on the boxes to the left of the list in **Contains any**.
 - **c.** Type the search criteria in the **Search** field.

The list of antibody template definitions to the right automatically updates to show only those items that match the search criteria (Figure 2.14).

Figure 2.14 Search Criteria

FITC ×	CD29-FITC CD29-FITC, Clone 484LDC9LDH8 (484), 50 te
Contains any: Name Description	CD35-FITC CD35-FITC, Clone J3D3, 100 tests, RUO
Clone Host	CD37-FITC CD37-FITC, Clone BL14, 100 tests, RUO
Fluorochrome Rack Type	CD45RA-FITC CD45RA-FITC, Clone 2H4LDH11LDB9 (2H4)
Manufacturer Catalog Reference URI	CD49b-FITC CD49b-FITC, Clone Gi9, 100 tests, RUO
Options:	CD51-FITC CD51-FITC, Clone AMF7, 100 tests, RUO
	CD55-FITC CD55-FITC, Clone JS11KSC2.3, 100 tests, RUO
	CD69-FITC CD69-FITC, Clone H1.2F3, 0.5mg, LUO
Found: 8 of 52	

2 Click on the item you need and information about that selection displays to the right (Figure 2.15).



Figure 2.15 Search Results, with Information Displayed for Selected Item

Creating New Antibody Templates

1 To create a new antibody template, click **New** located on the top left side of the screen. The **Antibody Template Details** interface appears (Figure 2.16).

Figure 2.16 Antibody Template Details

Save	
Name:	•
Description:	
Clone:	
Host:	
Species Reactivity:	
Antibody Details	
Fluorochrome:	•
Pipetting Details	
Rack Type:	•
Total Volume:	0.0 🗬 🗢
Dead Volume:	0.0 💌 µL
Default Pipetting Volume:	0.0 💭 🗢
Ordering References	
Manufacturer:	
Catalog Reference:	
URL:	

- **2** In the fields provided:
 - a. Enter the antibody Name that will be displayed in other screens and reports.
 - **b.** Enter a **Description** (optional).
 - **c.** Enter the **Clone** (optional).
 - **d.** Enter the **Host** (optional).
 - **e.** Specify **Species Reactivity**, if desired. Any text label may be used for this field. To promote consistency, previously used text labels are automatically suggested by the software as text is typed into the text box.
 - **f.** Under **Antibody Details**, select the **Fluorochrome** from the drop-down list. The fluorochrome identifies the conjugated fluorophore attached to the antibody. This identification is used when assigning antibodies to a cocktail. It also determines which flow cytometer configuration to use with this antibody.

- g. Under Pipetting Details, enter:
 - Rack Type IOTest, CYTO-STAT, BD, MicroVial, MicroVialLV, 12 mL, and 5 mL are the seven reagent rack types supported on the system and represent locations where the vial is stored. This selection sets the labware type for the software, which models the shape and size of the vial for accurate pipetting. For instance, the "LV" version of the Micro Vial is for the low-volume vials, which have a shallower interior. Select the rack type that corresponds to the vial in which the antibody is stored.
 - Total Volume indicates the estimated starting volume for a new vial of this antibody.
 - **Dead Volume** specifies the volume that cannot be retrieved by the Biomek 4000 instrument. This volume may need to be experimentally determined.
 - **Default Pipetting Volume** specifies the amount of antibody transferred in typical panel usage. This is the default value, but it can be changed when setting up a run.
- h. Under Ordering References, enter:
 - Manufacturer name
 - Catalog Reference
 - URL

NOTE Populating these fields is optional.

3 Click **Save** to save the configuration. The newly-defined antibody template appears on the left (Figure 2.17).

Figure 2.17 Newly-Defined Antibody Template

Use this task to	o configure antibody template definiti	ons.	Tasks
Search P New	CD8b-ECD CD8b-ECD, Clone 2ST8.5H7, 100 tests, RUO	Edit	Delete
Contains any: Description Clone Host Species Reactivity Fluorochrome Rack Type	CD29-FTFC CD29-FTFC CD29-FTFC Clone 484LDC9LDH8 (484), 50 CD35-FTFC CD35-FTFC CD35-FTFC CD37-FTC CD37-FTFC Clone BL14, 100 tests, RUO	Sample template	
Manufacturer Catalog Reference URL Options: Case sensitive search	C045RA-FITC C05RAFITC C05	and and a set	
	CD55-FITC C055-FITC Clone J511KSC2.3, 100 tests, R., CA CD66-FITC CD69-FITC Clone H1 2F3 0.5mg LUO Sample template		

4 Repeat this procedure to add additional antibody template configurations.

Editing Antibody Templates

1 To edit an existing antibody template, click the antibody template from the list to select it. (Figure 2.18).

Figure 2.18 Opening an Antibody Template for Editing

Use this task t	o configure antibody template defini	tions.	Task
Parch 9 New PTC x Contains any: Very Name Decription Decription Second Read Network Species Reaching Species Reaching Decription Sack Type Manufacture Output Califord Network Califord Network Ca	D29-FITC CO29-FITC CO29-FITC <td< th=""><th>CD35-FTTC Cone J3D3, 100 tests, RUC Clone J3D3 Hot: IgG1 Moses Species Numa Fuencotroms InftC Ract type: IOTet Volume: too: 200 pL defen: 20 pL Catalog Réference: B1836</th><th></th></td<>	CD35-FTTC Cone J3D3, 100 tests, RUC Clone J3D3 Hot: IgG1 Moses Species Numa Fuencotroms InftC Ract type: IOTet Volume: too: 200 pL defen: 20 pL Catalog Réference: B1836	

2 Click <u>Click</u> located above the name of the antibody template. The Antibody Template Details interface appears (Figure 2.19).

Figure 2.19 Editing an Antibody Template

💥 Use this task to o	configure antibody template defin	itions.		Ta:
		Save		⊘ Cancel
		Name:	CD35-FITC	-
		Description:	CD35-FITC, Clone J3D3, 100 tests, RUO	
		Clone:	J3D3	
		Host:	IgG1 Mouse	
		Antibody Details		
		Fluorochrome:	FITC V	
		Pipetting Details		
		Rack Type:	IOTest 👻	
		Total Volume:	2000.0 💌 µL	
		Dead Volume:	0.0 💌 µL	
		Default Pipetting Volume:	20.0 💌 µL	
		Ordering References		-1
	CD49b-FITC, Clone Gi9, 100 tests, RUO	Manufacturer:	Beckman Coulter	
tor: BCI Service				3/14/2012 10:51:0

3 Make edits as necessary, then click **G** save the configuration.

Deleting Antibody Templates

- **1** To delete an antibody template, select it from the list and click Delete . A confirmation to delete the antibody template appears (Figure 2.20).
- 2 Click Delete to delete the antibody template.

Figure 2.20 Confirmation to Delete the Antibody Template

Antibod	y Cocktail Preparation
⚠	Confirm Delete Are you sure you want to delete the template?
	Delete Cancel

Defining Panels and Cocktails

This is the fourth step to configure the Biomek 4000 ACPrep Software. A cocktail is a set of conjugated antibodies combined into one type of output labware. A panel is a set of one or more cocktails that are typically used together for a sample. Each cocktail has a list of antibodies and each antibody has a pipetting volume.

To create panels and cocktails:

- Create a new panel.
- Define the cocktails assigned to the panel (that is, the number of assay tubes).
- Assign antibodies to be added to the assay tube for each cocktail.

From the **Configuration** menu, click Panels and Cocktails. The **Panel and Cocktails Configurations** screen appears (Figure 2.21).



		(
Use this task to	configure panels and cocktail definitions.		Tasks
Search P teve Search P Ortanas any: Ortanas O	T-Cell Example ★ Exert Fick ★ Nove, Recting 7 cells ★ Two cocktalls with offerent CD45RA antibodia ☆	Solect a panel to vow or edit to details	

Follow the steps below to search, define, edit, or delete panels and assign cocktails.

Searching for Existing Panels and Cocktails

- **1** To search for existing information:
 - **a.** Click Search on the top left side of the screen. A search area opens.
 - **b.** Define your search by clicking on the boxes to the left of the list in **Contains any**
 - **c.** Type the criteria in the **Search** field.

The list of panel configurations to the right automatically updates to show only those items that match the search criteria (Figure 2.22).

Figure 2.22 Search Criteria



2 Click on your item and information about that selection displays to the right (Figure 2.23).

Figure 2.23 Search Results, with Information Displayed for Selected Item

Panel ×	T-Cell Example Basic T-Cell mouse panel (8c)	🔶 🥖 Edit			
Contains any: Panel Name Description	my panel	☆ T-Cell Exa	mple 対		
Flow Cytometer Cocktail Name Antibody Name	Sample Panel	Description:	Basic T-Cell mouse panel (8c) Gallios 📲 📲 📲 📲 📲 📲		
Antibody Fluorochrome		Basic T-Cells	Antibody Name	Pipetting Volume	
Options:			CD69-FITC	10 µL	
Case sensitive search			NKG2-A/C/E-PE	10 µL	
			CD4(L3T4a)-ECD	10 µL	
			CD44-APC	10 µL	
			CD25-PC5.5	10 µL	
			CD8a-APC-Alexa Fluor® 700	10 µL	
			CD62L (L-selectin)-PC7	10 µL	
			CD3e-APC-Alexa Fluor® 750	10 µL	

Creating New Panels and Cocktails

1 To create a new panel, click located on the top left side of the screen. The **Panels and Cocktails Details** interface appears (Figure 2.24).



Save			
Panel Name: Description:		 •	
Flow Cytometer:		~ •	+ Cocktail
Cocktails			
No cocktails defi	fined	Select a cockt	ail to view and edit its details

- **2** In the fields provided to create a panel:
 - **a.** Enter the **Panel Name** that will be displayed in other screens and reports.
 - **b.** Enter a **Description** (optional).
 - **c.** In the **Flow Cytometer** field, select a flow cytometer from the drop-down selection list. Cocktails that are part of the panel will use the list of fluorochromes represented in the flow cytometer configuration. This restricts the selection of antibodies to those supported by the flow cytometer.
 - **d.** Click **+** cocktail to the right of the **Flow Cytometer** field. Additional fields become available to define the cocktail (Figure 2.25).



Antibody Cocktail Preparation			
Use this task to configure panels and cocktail definiti	15.		Tasks
Carcel Carl Longie Carl Longie Carl Longie Long	Sove Parent Narve: Surgie Parent Description: Cocktails X Cocktail X Cocktail PP So Kr P Cocktail P So Kr P Cocktail P So Kr P Cocktail P So Kr P So Kr P Cocktail P So Kr P	Costal Costa	
Operator: BCI Service		3/15/2	012 9:13:44 AM

- **3** In the fields provided to add cocktails to the panel:
 - **a.** Enter the cocktail name.
 - **b.** Select the antibody conjugates included in the cocktail. The field is initially populated with the default volume from the antibody template definition.
 - **c.** An additional field appears to set the pipetting volume (Figure 2.26).

Figure 2.26 Adding Cocktails to a Panel

Antibody Cockia I Freparation				()	
Use this task to configure panels and cocktail definition	ons.				Tasks
2 Search Prew					x
Successor Part Call Standing Contrast price Facil Standing Description Facil Standing Description Facil Standing Contrast price Facil Standing Contrast pring Facil Standing	Panal Namer. Sample Description: Galliot Flow Cytometer: Galliot Cocktails X Cocktail	Pared FITC FITC ECD APC PCS APC-Alexa Fluor 720 APC-Alexa Fluor 720 APC-Alexa Fluor 720 RD1	C029-FITC C029-FITC C029-FC C029-FC C029-FC C029-FC C029-FC C029-FC C029-FC C029-FC C029-FC C029-FC C029-FC C029-FITC	0.0 φ.μ. # 5.0 φ.μ. # 5.0 φ.μ. # 7.5 φ.μ. #	8
perator: BCI Service				 3/15/2012 9	:23:15 AM

4 Repeat Steps 2 and 3 to add more cocktails to a panel.

5 Click **Save** to save the configuration. The newly-defined panel appears on the left (Figure 2.27).



Use this task to	configure panels and its cocktail def	initions.	Tas
Search Image: New Search P Contains any: Image: Name Description Doctorytone Flow Cytometer Cocctail Name Antbody Fluorochrome Options: Case sensitive search Case sensitive search	Image: C-Cell Example Basic T-Cell mouse panel (8c) Image: Comparison of the comparison of th	Edit Sample Panel	Delete

6 Repeat this procedure to create more panels.

Editing Panels and Cocktails

1 To edit panels and cocktails, select the panel from the list, then click *Edit* to open it (Figure 2.28).

Figure 2.28 Opening a Panel for Editing

Hose this task to	configure panels and cocktail defir	nitions.			
Containe any Containe any	Local Competitives general (b) Have Configuration (Configuration) Have Configuration (Configuration)	T-Cell Exal Descriptor Basic T-Cell	mple * Tell Toll House pand (B) Catles Antibody hume (Cole #TC Cole #TC Cole #AC Cole #AC Cole #AC Cole #AC Cole #AC Cole AC Aleas Hearth 70 Cole AC Aleas Hearth 70 Cole AC Aleas Hearth 70	Pipetting Volume 20 pit. 20 pit. 20 pit. 20 pit. 20 pit. 20 pit. 20 pit. 20 pit.	

2 Click Ledit located above the name of the panel. The Panels and Cocktails Details interface appears (Figure 2.29)

Figure 2.29 Editing Panels and Cocktails

Use this task to	configure panels and cocktail defi	nitions.					Tasks
Search Search P ontains any: P P P P P P P P P P P P P		Panel Name: T-Ce	II Example			O Cancel	
		Description: Basis Flow Cytometer: Gal	T-Cell mouse panel (8c)	+ Cocktal			
		Cocktails × Basic T-Cells	Cocktail Name: Basic T PB	*Cells	arne labal PS.	1	
			FITC PE ECD	CD69-FITC NKG2-A/C/E-PE CD4(L3T4a)-ECD	• : • :	10.0 🔹 µl. 10.0 🔹 µl. 10.0 🔹 µl.	
			APC PC5 PC5.5	CD44-APC C025-PC5.5	•	10.0 🔹 µl. 10.0 🔹 µl.	
			APC-Alexa Fluor 700	CD8a-APC-Alexa Fluor® 700	:	10.0 💭 µL 💉]

3 Make edits as necessary, then click **G** save to save the configuration.

Deleting Panels

1 To delete a panel, select it from the list and click **Delete**. A confirmation to delete the panel appears (Figure 2.30).

Figure 2.30 Confirmation to Delete a Panel

Antibod	y Cocktail Preparation
♪	Confirm Delete Are you sure you want to delete the panel?
	Delete Cancel

2 Click Delete to delete the panel.

Deleting Cocktails from Panels

- **1** To delete a cocktail, you must be in the edit screen for the panel. Click ⊠ in Cocktail to delete the cocktail. (Figure 2.31).
 - **NOTE** If there are multiple cocktails in a panel, you can delete all cocktails by clicking is by each cocktail. If you delete all cocktails in a panel, you return to the **Panels and Cocktails Details** (Figure 2.26).

Figure 2.31 Deleting a Cocktail



2 You do not get a confirmation to delete a cocktail. If you delete a cocktail in error, click Cancel on the right side of the screen (Figure 2.32). You return to the Edit screen and the cocktail is available again.

Figure 2.32 Cancel Deleting a Cocktail from a Panel

2 Search C New]				Tas
Search P ortains any: Panal Name Description Row Cytometer Antibody Name Antibody Placechrome storms:	T-Cell Example Enter 1-Cel means point (Ic) Naive (Rostby T-cels Tora caschia with officient CDRRA writes Sample Panel	Panel Name: S Description: Row Cytometer:	mple Panel	+ Cocital	() Cancel
		No codtails define	s Select a co	cital to view and edit its details	

Configuring System Settings Configuring the System

System Operation

Introduction

This chapter describes how to operate the Biomek 4000 ACPrep Software to automate the transfer of antibodies or cocktails into the assay labware.

Prior to running the system, a number of configuration elements, such as panel and flow cytometer configurations, need to be established (see CHAPTER 2, *Configuring System Settings*). Operator access privileges must also be established (see CHAPTER 1, *Accounts and Permissions*). Lastly, it is assumed that the Biomek 4000 Instrument has been properly set up and tested by trained Beckman Coulter Service personnel.

The software allows users to pipette antibodies into assay tubes or microplates using two different approaches: direct (the **Prepare Tubes from Antibodies** workflow) and indirect (the **Prepare Bulk Cocktails** workflow, followed by **Prepare Tubes from Bulk Cocktails** workflow).

The direct approach pipettes aliquots of individual antibodies directly from source vials (for example, IOTest Antibodies) into assay labware.

The indirect approach creates bulk antibody mixtures in volumes up to 5 or 12 mL in an intermediate, empty 5 mL or 12 mL vial. Then, aliquots of the bulk mixtures are pipetted from the intermediate vial into the assay labware.

To prepare a run, identify a list of cocktails to create or transfer to assay labware and verify that the instrument and resources are set up properly to start the run. The steps are:

- 1. Worklist Specify the cocktails to create or transfer to assay labware.
- 2. Deck Setup Specify where antibody vials are located and what output labware to use on the deck of the system. Using the deck layout area, compare items on the system deck with the requirements of the current run.
- 3. Run Start and monitor a run.

Common Operations Across all Workflows

Throughout running workflows on the system, there are several common operations. Those operations are documented here.

Setting the Expiration Date

There are three ways to set the expiration date:

• Click in the **Expiration Date** field. The date highlights automatically (Figure 3.1). Type in the correct date.

Figure 3.1	Setting	the	Expiration	Date
rigare orr	Security	circ	Explication	Ducc

Save											0 C	ancel
Rack Details												
Rack Name:	IOTest (11)				Rack Type:	IOTest						
Rack Barcode:												
Position Detail	s											
		F	osition	Source Name			Remaining	g Volume	Expiration Date		Lot Number	^
				CD44-APC				500 µL	03/08/2012	•		
		IF	A2	unspecified					n/a		n/a	
			A3	unspecified					n/a		n/a	
			Α4	unspecified					n/a		n/a	
			A5	unspecified				n/a	n/a		n/a	
		:	A6	unspecified					n/a		n/a	
		1	B1	unspecified					n/a		n/a	
	0		B2	unspecified					n/a		n/a	
	$\dot{0}$		B3	unspecified					n/a		n/a	
			B4	unspecified					n/a		n/a	
			B5	unspecified					n/a		n/a	

• Click on the date, in the **Expiration Date** field, then click the drop-down menu. A calendar opens. Select the date you need (Figure 3.2).

Figure 3.2 Calendar Option for Setting the Expiration Date

Save									O Cancel
Rack Details									
Rack Name: IOTest (2)				Rack Type: 1	IOTest				
Rack Barcode:									
Position Details									
	F	Position	Source Name			Remaining	Volume	Expiration Date	.ot Number 🔄
		A1	CD44-APC	An	tibody	100%	500 µL	03/30/2012 💌	
	Γ	A2	unspecified				n/a	 March, 2012 	•
		A3						26 27 28 29 1	2 3
		A4						4 5 6 7 8	9 10
		A5						18 19 20 21 22	23 24
	:	A6						25 26 27 28 29	30 31
	1	B1						Today : 3/30/2	1012
		B2						n/a	n/a
		B3						n/a	
		B4						n/a	n/a

• Right-click in the **Expiration Date** field and select **Set Expiration Date** from the pop-up menu. Another pop-up menu appears. Select the option you need (Figure 3.3).

Save									0	Cancel	
Rack Details											
tack Name:	IOTest (2)			Rack Type:	IOTest						
ack Barcode:											
Position Detai	ls										
		Position	Source Name			Remaining	y Volume	Expiration Date	Lot Number	^	
		A1	CD44-APC		Antibody	100%	500 µL	03/30/2012			
		A2	unspecified				n/a	n/a	Set 'Remaining Volun Set 'Expiration Date'	1e • 1	to Today
	000	A3	unspecified					n/a	Delete	Del	to Tomo
		A4	unspecified					n/a	n/a		to Next I to Next I
		AS	unspecified					n/a	n/a	- 1	1
		A6	unspecified					n/a	n/a		
		B1	unspecified					n/a	n/a		
000		B2	unspecified					n/a	n/a		
	0	B3	unspecified					n/a	n/a		
		B4	unspecified					n/a	n/a		
		B5	unspecified					n/a	n/a		

Figure 3.3 Optional Way to Setting the Expiration Date

Selecting an Output Fill Option for Output Racks

If necessary, select an output source from the drop-down list on the left, then select an output fill option from the drop-down list on the right (Figure 3.4).

Figure 3.4 Output Fill Option



NOTE Click Preview to display a graphical representation of the output type.

The four figures below show how three different panels are dispensed differently into a rack, based upon the output fill option selected. In the example below, P=Panel and C=Cocktail.

• **Row with Wrapping** - Rows are on the vertical axis. This selection arranges each set of outputs for a panel into a new row of the output labware (Figure 3.5).

Figure 3.5 Row with Wrapping



• **Column with Wrapping** - Columns are on the horizontal axis. This selection arranges each set of outputs for a panel into a new column of the output labware (Figure 3.6).

Figure 3.6 Column with Wrapping



• **Fill Horizontally** - This selection arranges each set of outputs for a panel horizontally across rows of the output labware (Figure 3.7).





• **Fill Vertically** - This selection arranges each set of outputs for a panel vertically across columns of the output labware (Figure 3.8).

Figure 3.8 Fill Vertically



How the System Handles Input Vials

If you have several source vials of the same antibody, the system software chooses the next available vial for each transfer as follows.

- 1. The correct type of input rack is chosen based on the antibody vial type.
- **2.** The appropriate input rack is sequentially searched by row until a vial with the correct antibody name and sufficient remaining liquid is found.
- 3. This process is repeated for each transfer.

A vial that no longer has enough liquid to perform a given transfer will be skipped and the next available vial will be used. A vial that is depleted will always be skipped.

NOTE There is a certain amount of antibody in each source vial that is not accessible for pipetting. This volume is known as the "dead volume", and must be taken into account when preparing the system for a run.

It is important to understand that:

- It is not possible to pipette more than the available contents of a vial in a single transfer.
- The system will not perform multiple transfers to achieve a desired output volume.

This means that the system will not draw from more than one vial of the same antibody during a run to obtain the amount of antibody you need.

For example, if you have two vials with 500 uL of a source antibody in each vial, and you want 1000 uL of that antibody in your destination, the system will not be able to do this in a single run. There are two options to accomplish this job:

- Complete the job in two runs, where each run transfers one half of the total volume from each vial.
- Manually pipette 1000 μL into one source vial before the run, adjusting the available volume in that source vial to match the new total volume.

How the System Determines the Order of Pipetting Operations

If two output labware items are used in a single run (for example, two 24-position tube racks or two 5 mL vial racks), the system will complete all transfers to one output labware item before starting the second. This allows you to pause the system and remove the first completed output labware from the system while the other output labware is being completed. The run-time status display can be used to determine when the first output labware is complete.

For each output labware, the system will perform all transfers requiring the P1000SL tool before utilizing the P200L tool. This means that all transfer volumes over 100 μ L will occur earlier in the run than transfers of lower volumes. Likewise, all transfer volumes above 20 μ L will occur before transfers of 20 μ L or less. This order occurs for two reasons:

- Smaller volumes are more sensitive to evaporation and should be on the deck as briefly as possible.
- Smaller volumes will be more accurately dispensed when pipetted into liquid.

Aside from transferring larger volumes before smaller volumes, the system will accomplish transfers within each volume range in the order it determines to be most efficient. This order may not be obvious or predictable to the user.

Setting up the Instrument for a Run

This section provides an overview of how to use the **Run Instrument** screens to set up the instrument for a run.

- **1** Log into the Biomek 4000 ACPrep Software.
- 2 Click O on the top right side of the software main screen. The **Run Instrument Menu** screen appears (Figure 3.9). The following options are available:
 - Prepare 'Tubes' From 'Antibodies' (see Preparing Tubes from Antibodies)
 - Prepare 'Bulk Cocktails' (see Preparing Bulk Cocktails)
 - Prepare 'Tubes' From 'Bulk Cocktails' (see Preparing Tubes from Bulk Cocktails)
 - Biomek Actions (see CHAPTER 4, Biomek Actions)

Figure 3.9 Run Instrument Menu Screen

Antibody	Eocktail Preparation		
	Select a task to run the instrumer	at. Run Instrument Menu	Tasks
		Prepare 'Tubes' From 'Antibodies'	
		Prepare 'Bulk Cocktails'	
	1	🔊 Prepare 'Tubes' From 'Bulk Cocktails'	
		K Biomek Actions	
0			
Operator:			1/30/2012 11:05:57 AM

'Prepare' Screens Overview

The **Prepare Tubes from Antibodies**, **Prepare Bulk Cocktails**, and **Prepare Tubes from Bulk Cocktails** screens have a similar layout and are used in the same way. The screens are divided into sections for building a worklist, defining the deck layout, and starting/stopping a run (Figure 3.10).





- 1. Worklist area Create assay lists with panel designations
- 2. Deck Layout area Determine which labware and layout to use for the run
- 3. Run information bar Provides updates on the status of the run and information about any errors

Performing a Run

Before starting a run, perform a pre-run check. Use the pre-run checklist below.

- 1. Ensure that the Biomek 4000 is powered on and ready for operation.
- 2. Ensure that antibody reagent racks are in place.
- **3.** Ensure that all assay tubes or microplates are in place.
- **4.** Ensure that all pipette tips are in place.
- **5.** Ensure that all pipetting tools are in place.
- **6.** Ensure that the tip disposal bag is empty and installed.
- 7. Do not leave any extraneous items on the deck, such as:
 - Framing tools
 - Lids, caps, bottles, or other unneeded labware
 - Tubing or cabling
 - Notebooks, papers, pens, or pencils

Preparing Tubes from Antibodies

From the **Run Instrument Menu** screen, select Prepare 'Tubes' From 'Antibodies' to open the task for preparing assay tubes.

This section describes how to prepare the worklist, set up the system, and perform the run.

Preparing a Worklist

To prepare the worklist, use the **Worklist** area. Figure 3.11 shows an example of a populated worklist.

Wor	Vorklist										
				l	Jsage	~					
	Sample Name	Panel	Cocktails								
×	Sample 1	Sample Panel	Cocktail	1	+						
×	Sample 2	Naive_Resting T cells	Cocktail CD45RA FITC Cocktail CD45RA RD1	2 3	+						
		Naive_Resting T cells	Add								
		Sample Parlet 🗮									

Figure 3.11 Populated Worklist Area - Preparing Tubes from Antibodies

Use this area of the screen as follows:

- Enter or edit the Sample Name.
- The **Panel Name** field has a drop-down list of previously created panels.
- Select and deselect cocktails by clicking 🗹 to the left of the cocktail name in the **Cocktail** column. A deselected cocktail is not included as part of the run or worklist.
- To make a duplicate of a sample, click \pm on the right end of the worklist row for the sample.
- To delete a sample, click \mathbf{x} to the left of the sample name.
- To add a sample to the worklist, click Add

NOTE The recommended minimum amount of reagent to pipette is 5 μ L per transfer. The maximum amount of reagent that can be pipetted is 1000 μ L per transfer.

- 1 Enter the sample name, or use a hand-held barcode scanner to enter the sample ID. See APPENDIX B, *Symbologies for the Optional Barcode Reader* for supported symbologies.
- **2** Select the panel for the sample from the drop-down menu.

3 Click Add . The cocktails included in the panel will populate in the **Cocktails** column. If you do not want to use a specific cocktail, deselect it by unchecking rext to the cocktail name.

- **4** Repeat these steps for each new sample you want processed in this run.
- **5** To help determine which input racks to configure on the deck, click Usage . A drop-down list appears that shows the types of input racks needed and the volumes of individual antibodies required in each rack (Figure 3.12).

Figure 3.12 Usage Drop-Down Screen

				Usage 🗸		
	Sample Name	Panel	Cocktails	CYTO-STAT		
×	Sample 1	Sample Panel	Cocktail	CD45RA-FITC	: 20 µL	
x	Sample 2	Naive_Resting T cells	Cocktail CD45RA FITC	IOTest		
			Cocktail CD45RA RD1	CD3-PC7	: 40 µL	
		Naive Resting T cells	Add	CD37-FITC	: 20 µL	
				CD8-PC7	: 20 µL	
				CD44-APC	: 10 µL	
				CD45RA-RD1	: 10 µL	
					1	

Configuring the Deck

Configuring the deck for a run consists of ensuring that:

- The deck of the instrument physically matches the layout in the software.
- The appropriate layout for assigning destinations is selected.
- The software and vials have an adequate supply of all antibodies to be used in the current run.

To do this, use the **Deck Layout** view, which shows a graphic representation of the deck that includes selection areas for input and output racks.

The necessary volumes for the run configured in the worklist are checked by the software against its internally-monitored list of vials. If the software determines that an insufficient volume of an antibody is present, it will display the required volumes in the **Run Information** area of the screen.

The reagent racks weigh between 1.36 kg (3 lbs) - 5.05 kg (11 lbs). If dropped, they may cause injury. Use caution when handling reagent racks.

Figure 3.13 shows an example of the Deck Layout area.

Figure 3.13 Deck Layout Area



Input Racks

Seven types of antibody vial holders, or racks, are represented in the deck graphic: IOTest, CYTO-STAT, BD, MicroVial, MicroVialLV, 12 mL, and 5 mL. The IOTest rack has a fixed location on the deck due to its physical size. The other rack types are located in the two rack locations at the back of the deck.

IMPORTANT Do not shake antibodies. This generates bubbles, which will be detected by the liquid level sensing system in the tool and may cause an incorrect amount of liquid to be pipetted.

1 To configure the contents of a rack, click on the corresponding input rack graphic (input racks are in the green region labeled **INPUT RACKS**). To create a new rack or select a previously

configured rack, click . The rack selection icon turns blue when you hover over it with the mouse (Figure 3.14).





• A pop-up menu appears, which allows you to create a new rack or select a previously saved rack (Figure 3.15).

6
1
P
P
1

Figure 3.15 Creating a New Rack

NOTE If the rack is already in the pop-up list and you select it, the test will be ready to run if sufficient antibodies are present on the deck. This may require up to three various types of racks.

2 Click we and the **Rack Details** screen appears (Figure 3.16).

Save									00	Cancel
Rack Details										
Rack Name: IOTest			Rack Type:	IOTest						
Rack Barcode:										
Position Details										
	Position	Source Name			Remainin	g Volume	Expiration D	ate L	.ot Number	1
	A1	CD44-APC		~	100%	500 µL	3/30/ 🗉	XPIRED		
	A2	unspecified					n/a			
	A3	unspecified					n/a			
	A4	unspecified					n/a			
	A5	unspecified					n/a			
	: A6	unspecified					n/a			
	B1	unspecified					n/a			
	B2	unspecified					n/a			
	B3	unspecified					n/a			
	B4	unspecified					n/a			
	B5	unspecified					n/a			

Figure 3.16 Rack Details

- **3** In Rack Details, enter the Rack Name (required) and Rack Barcode (optional).
- **4** In **Position Details**, add the antibody information. The graphic to the left of **Position Details** reflects the information as it is entered for each position.
 - **a.** Choose the antibody from the **Source Name** drop-down list. **Remaining Volume** and **Expiration Date** are automatically populated.
 - **b.** Remaining Volume defaults to 100% of the total volume as defined in the antibody template. For information on how to change Remaining Volume, see Step 5.
 - **c.** The **Expiration Date** defaults to the current date and shows as **EXPIRED**. See Setting the Expiration Date in Common Operations Across all Workflows on page 3-2 for details on that operation.
 - d. Enter the Lot Number (optional).

NOTE To quickly add vials to the **Position Details** screen, click Missing Sources . A pop-up screen

appears. Click <u>Auto Populate</u> and the required antibody vials are populated automatically using information that has been previously entered and is available (Figure 3.17). The **Missing Sources** button only appears if the rack is missing resources required for the current worklist.

Figure 3.17 Auto Populating Position Details

IOTest			Rack Type:	IOTest						
	Position	Source Name			Remaining	Volume	Expiratio	n Date	Lot Number	^
	A1	CD44-APC		~	100%	500 µL	3/30/	EXPIRED		
	A2	unspecified					n/a		n/a	
	A3									
	A4	unspecified							n/a	
	A5	unspecified					n/a		n/a	
	A6	unspecified					n/a	CD3-P	C7	-
	B1	unspecified					n/a	CD28-	ECD	1
	B2	unspecified					n/a	CD31-	PE	
000	B3	unspecified					n/a	CD3e-	APC-Alexa Fluor® 700	:
	B4	unspecified					n/a	CD45F	A-RD1	-
	B5	unspecified					n/a		Auto Populate	
		Offest	Fostion Source Name A1 CD4+APC A2 carge diad A3 carge diad A4 carge diad A5 carge diad B2 carge diad B2 carge diad B3 carge diad	Offset Rack Type: 001001 Source Name A1 CD44 APC A2 Integrad field A3 Integrad field A4 Integrad field A5 Integrad field A6 Integrad field B1 Integrad field B2 Integrad field B3 Integrad field B3 Integrad field B3 Integrad field B4 Integrad field B5 Integrad field	Offset Rack Type: IOTest Position Source Name 1 CD4+APC 9 A2 consecting 4 consecting A3 consecting 4 consecting A4 consecting 8 consecting B3 consecting 8 consecting B4 consecting 8 consecting B5 consecting 8 consecting	Offset Rack Type: IDTest Position Source Name Remaining A1 CD44-APC or A2 arrangeofilier/ A3 A3 arrangeofilier/ A4 A4 arrangeofilier/ A4 B3 arrangeofilier/ B3 B3 arrangeofilier/ B3 B3 arrangeofilier/ B3	Position Rack Type: IOTest A CD4+APC 0 00/00 A2 compacting 0/00 00/00 A2 compacting 0/00 0/00 A3 compacting 0/00 0/00 A4 compacting 0/00 0/00 A4 compacting 0/00 0/00 B4 compacting 0/00 0/00 B4 compacting 0/00 0/00 B4 compacting 0/00 0/00 B4 compacting 0/00 0/00 B5 compacting 0/00 0/00 B5 compacting 0/00 0/00 B5 compacting 0/00 0/00 B5 compacting 0/00 0/00	Offset Rack Type: 10/Test Fostion Source Name Remaining Volume Exprasio A1 CD4+APC 100% 500 pt. 3/20/- A2 Important A/20/- A/20/- A/20/- A/20/- A3 Important A/20/- A/20/- A/20/- A/20/- A/20/- A3 Important A/20/- A/20/- A/20/- A/20/- A/20/- A4 Important A/20/- A/20/- A/20/- A/20/- A/20/- B3 Important A/20/- A/20/- A/20/- A/20/- A/20/- B3 Important A/20/- A/20/- A/20/- A/2	Offset Rack Type: LOTest Position Source Name Remaining Volume Expiration Date A1 C044-APC 100% 500 pL 3/00/m EXPIRED A2 Introdection 300 3/00 5/00 pL 3/00/m EXPIRED A2 Introdection 4/00 6/00 6/00 100/m EXPIRED A3 Introdection 6/00 6/00 6/00 100/m EXPIRED A4 Introdection 6/00 6/00 6/00 100/m EXPIRED B3 Introdection 6/00 6/00 100/m EXPIRED 100/m EXPIRED B3 Introdection 6/00 6/00 100/m 100/m <td>Differ Rack Type: IOTest Position Source Name Remaining Volume Expiration Date Lot Number A1 C04+APC 00 100% 500 pL 3/30/ Expiration Date Lot Number A2 congression 04 0.0 <td< td=""></td<></td>	Differ Rack Type: IOTest Position Source Name Remaining Volume Expiration Date Lot Number A1 C04+APC 00 100% 500 pL 3/30/ Expiration Date Lot Number A2 congression 04 0.0 <td< td=""></td<>

- **5** To edit Remaining Volume (Figure 3.18):
 - a. Click in the Remaining Volume field.
 - **b.** Use the up and down arrows to select the correct volume (changes in increments of $2.5 \,\mu$ L).
 - **c.** To select a specific **Remaining Volume**, click in the **Remaining Volume** field and highlight the information. Type the correct volume in the field.

Figure 3.18 Changing the Remaining Volume

🖬 Save								O Cancel
Rack Details								
Rack Name:	IOTest (10)			Rack Type:	IOTest			
Rack Barcode:								
Position Details	•							
		Position	Source Name			Remaining Volume	Expiration Date	Lot Number
		A1	CD44-APC		Antibody	500.0 🔹	3/8/2 EXPIRE	D
		A2	unspecified			n/a	n/a	n/a
	\bigcirc	A3	unspecified			n/a	n/a	n/a
	$\tilde{0}$	A4	unspecified			n/a	n/a	n/a
$\tilde{0}$	$\tilde{0}$	A5	unspecified			n/a	n/a	n/a
0	0	A6	unspecified			n/a	n/a	n/a
$\tilde{0}$	$\tilde{\mathbf{O}}$	B1	unspecified			n/a	n/a	n/a
000	000	B2	unspecified			n/a	n/a	n/a
000	000	B3	unspecified			n/a	n/a	n/a
		B4	unspecified			n/a	n/a	n/a
		B5	unspecified			n/a	n/a	n/a
D This rack is	missing some	B6 sources	needed for the work	list.			Missin	g Sources ^ Ignore

- **6** Change the expiration date to the correct date. See Setting the Expiration Date in Common Operations Across all Workflows on page 3-2 for details on that operation.
- 7 Click Save to save your information.

Output Racks

Output racks are used to locate assay tubes or microplates on the deck. Follow these steps to configure the output racks.

1 Select the output destination from the drop-down list (output racks are in the purple region and labeled **OUTPUT RACKS**) (Figure 3.19).





- If you select anything other than Carousel, the output fill option drop-down list appears.
- 2 See Selecting an Output Fill Option for Output Racks in the Common Operations Across all Workflows section on page 3-3 for details on that operation.
- **3** See Starting a Run on page 3-29 for details on that operation.

Preparing Bulk Cocktails

From the **Run Instrument Menu** screen, select Prepare 'Bulk Cocktails' to open the task for preparing bulk cocktails in either 12 mL or 5 mL vials.

This section describes how to prepare the worklist, set up the system, and perform the run.

Preparing a Worklist

To prepare the worklist, use the **Worklist** area. Figure 3.20 shows an example of a populated worklist.

Figure 3.20	Populated	Worklist Area
-------------	-----------	---------------

Worl	Worklist										
	Cocktail	# of Tests	Assay Volume	Total Volume							
×	Naive_Resting T cells.Cocktail CD45RA 1	1x	30 µL	30.0 🔦	+						
×	Naive_Resting T cells.Cocktail CD45RA 2	1x	30 µL	30 µL	+						
×	Naive_Resting T cells.Cocktail CD45RA 3	1x	30 µL	30 µL	+						
×	Naive_Resting T cells.Cocktail CD45RA 4	1x	30 µL	30 µL	+						
Naiv	ve_Resting T cells.Cocktail CD45RA RD1										

- Select cocktails to prepare. The **Cocktail** field is not editable.
- To make a duplicate of a cocktail, click 🛨 at the end of row for that cocktail.
- To delete a cocktail, click \mathbf{x} to the left of the cocktail name.
- To add a cocktail to the worklist, click
- Edit the **# of Tests** field by using the up and down arrows to change the number in increments of 1. The default is 1x per cocktail.
- Edit the Total Volume field by using the up and down arrows to change the number in increments of 2.5 $\mu L.$
 - **NOTE** Changing either the **# of Tests** or the **Total Volume** fields automatically updates the other field so that the **# of Tests** x the **Assay Volume** = **Total Volume**.
 - **NOTE** If more volume is needed than the capacity of the vial used (5 mL or 12 mL), then the system will split it into two vials.
 - **NOTE** The recommended minimum amount of reagent to pipette is 5 μ L per transfer. The maximum amount of reagent that can be pipetted is 1000 μ L per transfer.

1 Select the cocktail from the drop-down list and click Add

NOTE Based on the cocktail selected, the software automatically populates the **Assay Volume** field and it cannot be changed.

- **2** Change the number in the **# of Tests** field, if necessary, as follows:
 - **a.** Click in the **# of Tests** field.
 - **b.** Use the up and down arrows to change the number in increments of 1.

NOTE Changing the **# of Tests** automatically recalculates the **Total Volume** field.

- **3** Change the number in the **Total Volume** field, if necessary, as follows:
 - **a.** Click in the **Total Volume** field.
 - **b.** Use the up and down arrows to change the number in increments of 10 μ L.

NOTE Changing the **Total Volume** automatically recalculates the **# of Tests** field.

4 To help determine which input racks and antibody vials to configure on the deck, click

Usage . A drop-down list appears that shows the types of input racks needed and the volumes required in each rack (Figure 3.21).

Worklist Usage Cocktail # of Tests Assay Volume Total Volu IOTest Naive_Resting T cells.Cocktail CD45RA 1 × 1x 30 µL CD3-PC7 : 80 µL CD45RA-RD1 : 40 µL Naive Resting T cells.Cocktail CD45RA 2 x 1x 30 µL Naive_Resting T cells.Cocktail CD45R4 3 30 µL × 1x 30 µL + Naive_Resting T cells.Cocktail CD45RA 4 + × 1x 30 µL 30 µL Naive_Resting T cells.Cocktail CD45RA RD1 1

Figure 3.21 Usage Drop-Down Screen

Configuring the Deck

Configuring the deck for the run consists of ensuring that:

- The deck of the instrument physically matches the layout in the software.
- The appropriate layout for assigning destinations is selected.
- The software has an adequate supply of all antibodies to be used in the current run.

To configure the deck, use the **Deck Layout** view, which shows a graphic representation of the deck that includes selection areas for input and output racks.

The necessary volumes for the run configured in the worklist are checked by the software against its internally-monitored list of vials. If the software determines that an insufficient volume of an antibody is present, it displays the required volumes at the top of the window.

<u>A</u> CAUTION

The reagent racks weigh between 1.36 kg (3 lbs) - 5.05 kg (11 lbs). If dropped, they may cause injury. Use caution when handling reagent racks.

Figure 3.22 shows an example of the Deck Layout area.




Input Racks

Seven types of antibody vial holders, or racks, are represented in the deck graphic: IOTest, CYTO-STAT, BD, MicroVial, MicroVialLV, 12 mL, and 5 mL. The IOTest rack has a fixed location on the deck due to its physical size. Place the other rack types in the two locations at the back of the deck.

- **IMPORTANT** Do not shake antibodies. This generates bubbles, which will be detected by the liquid level sensing system in the tool and may cause an incorrect amount of liquid to be pipetted.
- 1 To configure the contents of a rack, click on the corresponding input rack graphic (input racks are in the green region labeled **INPUT RACKS**). To create a new rack or select a previously

configured rack, click . The rack selection icon turns blue when you hover over it with the mouse (Figure 3.23).





• A pop-up menu appears, which allows you to create a new rack or select a previously saved rack (Figure 3.24).

-e
2
1
1
1

Figure 3.24 Creating a New Rack

NOTE If the rack is already in the pop-up list and you select it, the test will be ready to run if sufficient antibodies are present on the deck. This may require up to three various types of racks.

2 Click we and the **Rack Details** screen appears (Figure 3.25).

Figure 3.25 Rack Details

Save										0	Cancel
Rack Details											
Rack Name: IOTest				Rack Type:	IOTest						
Rack Barcode:											
Position Details											
		Position	Source Name			Remaining Vo	lume	Expiration	n Date	Lot Number	^
		A1	CD44-APC		~	100%	500 µL	3/30/	EXPIRED		
		A2	unspecified					n/a		n/a	
		A3								n/a	
		A4	unspecified					n/a		n/a	
		A5	unspecified					n/a		n/a	
		A6	unspecified					n/a		n/a	
		B1	unspecified					n/a		n/a	
		B2	unspecified					n/a		n/a	
		B3	unspecified					n/a		n/a	
	_	B4	unspecified					n/a		n/a	
		B5	unspecified					n/a		n/a	

- **3** In **Rack Details**, enter the Rack Name (required) and Rack Barcode (optional).
- **4** In **Position Details**, add the antibody information. The graphic to the left of **Position Details** reflects the information as it is entered for each position.
 - a. Select the antibody from the Source Name drop-down list.
 - **b.** Enter the **Remaining Volume**. The **Remaining Volume** field is automatically populated based on which antibody is selected.

NOTE Use the up and down arrows to change the **Remaining Volume** in increments of 2.5 μ L.

- **c.** The **Expiration Date** defaults to the current date and shows as **EXPIRED**. See Setting the Expiration Date in Common Operations Across all Workflows on page 3-2 for details on that operation.
- **d.** Enter the **Lot Number** (optional).

NOTE To quickly add vials to the **Position Details** screen, click Missing Sources . A pop-up screen

appears. Click Auto Populate and the required antibody vials are populated automatically using default information (Figure 3.26). The **Missing Sources** button only appears if the rack is missing resources required for the current worklist.

Figure 3.26 Auto Populating Position Details

and Save									O Can
ick Details									
ck Name: IOTest			Rack Type:	IOTest					
ck Barcode:									
sition Details									
	Position	Source Name			Remaining Volu	ime	Expiration	n Date	Lot Number
	A1	CD44-APC		<	100% 50	00 µL	3/30/	EXPIRED	
	A2	unspecified				n/a	n/a		n/a
	A3								n/a
	A4								n/a
	A5	unspecified					n/a		n/a
	A6								n/a
	B1	unspecified					n/a		n/a
	B2								nta
	B3	unspecified					n/a	CD3-P	C7 : 80 μL
								CD45F	A-RD1 : 40 ul
	B4								

5 Click **G** save to save your information.

Output Racks

Ν.

Output racks are used to locate the bulk vial racks on the deck. Follow these steps to configure the output racks.

- 1 See Selecting an Output Fill Option for Output Racks in the Common Operations Across all Workflows section on page 3-3 for details on that operation.
- **2** See Starting a Run on page 3-29 for details on that operation.

Preparing Tubes from Bulk Cocktails

From the **Run Instrument Menu** screen, select Prepare 'Tubes' From 'Bulk Cocktails' to open the task for preparing assay tubes from bulk cocktails.

This section describes how to prepare the worklist, set up the system, and perform the run.

Preparing a Worklist

To prepare the worklist, use the **Worklist** area. Figure 3.27 shows an example of a populated worklist.

Wor	klist						
					Usa	je 🗸	·
	Sample Name	Panel	Cocktails				
×	Sample 1	Sample Panel	✓ Cocktail	1	+		
×	Sample 2	Naive_Resting T cells	Cocktail CD45RA FITC Cocktail CD45RA RD1	2 3	+		
		Naive_Resting T cells	Add				
		T-Cell Example					

Figure 3.27 Populated Worklist Area - Preparing Sample Tubes from Bulk Cocktails

- Edit the Sample Name field by cutting, copying, and pasting text in this field.
- The **Panel Name** field has a drop-down menu of previously-created panels.
- Select and deselect cocktails by clicking 🗹 next to the cocktail name in the **Cocktail** column. A deselected cocktail is not included as part of the run or worklist.
- To make a duplicate of a sample, click 🛨 at the end of the row for that cocktail.
- To delete a sample, click \mathbf{x} to the left of the sample name.
- To add a sample to the worklist, click Add.

NOTE The recommended minimum amount of reagent to pipette is 5 μ L per transfer. The maximum amount of reagent that can be pipetted is 1000 μ L per transfer.

- 1 Enter the sample name, or use a hand-held barcode scanner to enter the sample ID. See APPENDIX B, *Symbologies for the Optional Barcode Reader* for supported symbologies.
- **2** Select the panel for the run from the drop-down menu.

- **3** Click Add . The cocktails included in the panel populate the **Cocktails** column. To remove a cocktail that is not needed, deselect it by unchecking the rest to the cocktail name.
- **4** Repeat these steps for each new sample to be processed in this run.
- **5** To help determine which input racks to configure on the deck, click Usage . A drop-down list appears that shows the types of input racks needed and the volumes of individual antibodies required in each rack (Figure 3.28).

Worklist Deck Layout Microplate (Deep Well) Usage ~ ~ Cocktails Sample Name Panel 5 mL T-Cell Example × Sample 1 ✓ Basic T-Cells T-Cell Example.Basic T-Cells : 80 uL Cocktail CD45RA Sample 2 Naive_Resting T cells Sample Panel.Cocktail : 70 µL × Naive_Resting T cells.Cocktail CD45RA FITC : 40 µL Cocktail CD45RA Naive_Resting T cells.Cocktail CD45RA RD1 : 30 µL X Sample 3 Sample Panel Cocktail Add Sample Panel

Figure 3.28 Usage Drop-Down Screen

Configuring the Deck

Configuring input and output racks consists of ensuring that:

- The deck of the instrument physically matches the layout in the software.
- The appropriate layout for assigning destinations is selected.
- The software has an adequate supply of all antibodies to be used in the current run.

To configure the deck, use the **Deck Layout** view, which shows a graphic representation of the deck that includes selection areas for input and output racks.

The necessary volumes for the run configured in the worklist are checked by the software against its internally-monitored list of vials. If the software determines that an insufficient volume of an antibody is present, it displays the required volumes at the top of the window.

<u>A</u> CAUTION

The reagent racks weigh between 1.36 kg (3 lbs) - 5.05 kg (11 lbs). If dropped, they may cause injury. Use caution when handling reagent racks.

Figure 3.29 shows an example of the Deck Layout area.





Input Racks

•

The holders, or racks, for bulk cocktails are either 12 mL or 5 mL racks.

- **IMPORTANT** Do not shake antibodies. This generates bubbles, which will be detected by the liquid level sensing system in the tool and may cause an incorrect amount of liquid to be pipetted.
- **1** To configure the contents of a rack, click on the corresponding input rack graphic (input racks are in the green region labeled **INPUT RACKS**). To create a new rack or select a previously

configured rack, click . The rack selection icon turns blue when you hover over it with the mouse (Figure 3.30).

Figure 3.30 Selecting a Rack

RACKS
(Input 2)
E

A pop-up menu appears, which allows you to create a new rack or select a previously saved rack (Figure 3.31).

Figure 3.31 Creating a New Rack

1

NOTE If the rack is already in the pop-up list and you select it, the test will be ready to run if sufficient antibodies are present on the deck. This may require up to three various types of racks.

2 Click we and the **Rack Details** screen appears (Figure 3.32).

Figure 3.32 Rack Details - Preparing Tubes from Bulk Cocktails

Save									O Ca	ancel
Rack Details										
Rack Name:	5 mL (2)				Rack Type:	5 mL				
Rack Barcode:										
Position Details										
		F	Position	Source Name			Remaining Volume	Expiration Date	Lot Number	^
			A1	unspecified			n/a	n/a	n/a	
			A2	unspecified			n/a	n/a	n/a	
			A3	unspecified			n/a	n/a	n/a	
			A4	unspecified			n/a	n/a	n/a	
$\circ \circ \circ$			A5				n/a	n/a	n/a	
		:	B1	unspecified			n/a	n/a	n/a	
\mathbf{O}		1	B2	unspecified			n/a	n/a	n/a	
	$) \bigcirc \bigcirc$		B3	unspecified			n/a	n/a	n/a	
			B4				n/a	n/a	n/a	
			B5	unspecified			n/a	n/a	n/a	
			C1	unspecified			n/a	n/a	n/a	
			C2	unspecified			n/a	n/a	n/a	
		J	C3	unspecified			n/a	n/a	n/a	~

- **3** In Rack Details, enter the Rack Name (required) and Rack Barcode (optional).
- **4** In **Position Details**, add the antibody information. The graphic to the left of **Position Details** reflects the information as it is entered for each position.
 - **a.** Choose the antibody from the **Source Name** drop-down list.
 - **b.** Enter the **Remaining Volume** (defaults to 100% of the total volume as defined in the antibody template).
 - **c.** The **Expiration Date** defaults to the current date and shows as **EXPIRED**. See Setting the Expiration Date in Common Operations Across all Workflows on page 3-2 for details on that operation.
 - **d.** Enter the Lot Number (optional).

NOTE To quickly add vials to the **Position Details** screen, click Missing Sources . A pop-up screen

appears. Click Auto Populate and the required antibody vials are populated automatically using default information (Figure 3.33). The **Missing Sources** button only appears if the rack is missing resources required for the current worklist.

Figure 3.33 Auto Populating Position Details

Save								00	Cancel		
Rack Details											
Rack Name:	5 mL (2)			Rack Type: 5 mL							
Rack Barcode:											
Position Detail	s										
		Positi	in Source Name		Remaining Volume	Expiratio	n Date	Lot Number	-		
		A1	unspecified		n/a			n/a			
		A2	unspecified		n/a			n/a			
		A3	unspecified		n/a			n/a			
		A4	unspecified		n/a	n/a		n/a	=		
		A5	unspecified		n/a	n/a		n/a			
$ \circ \circ \circ$	$\mathbf{D} \mathbf{O} \mathbf{O}$	B1	unspecified		n/a			n/a			
\mathbf{O} \mathbf{O}	$\mathbf{O} \mathbf{O} \mathbf{O}$	B2	unspecified		n/a	n/a		n/a			
\mathbf{O} \mathbf{O}	$\mathbf{O} \mathbf{O} \mathbf{O}$	B3	unspecified		n/a		Sample	Panel.Cocktail		: 90	μ
		B4	unspecified		n/a	n/a	Naive_R	Resting T cells.Co	ktail CD45R	A FITC : 40	μ
		BS	unspecified		n/a		Naive_R	kesting i cells.Co	oktaii CD45R	акы: 30	μ
		C1	unspecified		n/a	n/a		Auto	Populate		
 This rack i 	s missing some	source	s needed for the worklist.		1/3		Missing	Sources ^ I	gnore		

5 Click **Save** to save your information.

Output Racks

Output racks are used to locate assay tubes or microplates on the deck. Follow these steps to configure the output racks.

1 Select the output destination from the drop-down list (output racks are in the purple region labeled **OUTPUT RACKS**) (Figure 3.34).

Figure 3.34 Output Destination



- If you select anything other than Carousel, another drop-down list appears.
- **2** See Selecting an Output Fill Option for Output Racks in the Common Operations Across all Workflows section on page 3-3 for details on that operation.

3 See Starting a Run on page 3-29 for details on that operation.

Starting a Run

To start a run for all methods, use the steps below:

1 To start the run, click Start . A reminder to remove the rack lids and vial caps appears (Figure 3.35).

Figure 3.35 Run Reminder

Antiboo	ly Cocktail Preparation
į	Reminder Don't forget to remove rack lids and vial caps.
D	on't show me this message again Continue Cancel

2 Click Continue. A warning message appears regarding homing the instrument (Figure 3.36). The instrument is homed at the beginning of each run to ensure a proper start state, especially after powering on the instrument.

Figure 3.36 Homing Instrument Message



 Table 3.1 Troubleshooting Homing Instrument Cautions

Ensure	Otherwise
No liquid is present in the tips.	Liquid will eject from the tip as part of the homing operation at an arbitrary location on the deck. If liquid is present is the tip, manually remove the tip from the tool, and use precautions to capture the liquid that may remain in tip.
No disposable tips are loaded.	The tip will eject as part of the homing operation.
The pod is not near the front, back, or side of the instrument.	This caution is not relevant for the Biomek 4000 ACPrep system.
No tool is currently loaded on the pod.	The homing operation may damage the tool. Manually unload the tool from the pod.

3 Click C. Another message appears while the instrument completes its homing operation (Figure 3.37).



Homing
Homing the unit, please wait
STOP Stop

- **NOTE** Click **Stop** if you notice an unintended start state (for example, missing tips, lids still on vials, wrong output labware, or foreign items on the deck).
- Once homing is complete, the run begins automatically. The Start button changes to Pause. The progress bar displays the estimated time to complete the run (ETC) (Figure 3.38).

Figure 3.38 Progress Bar - Running

Pause		_
1 0000	ETC: 1 minute and 16 seconds	

4 Once the run begins, the Available Tips dialog shown in Figure 3.39 will appear. This dialog can be used for partially filled tip boxes. Select the first available tip in each tip box. The system can then determine the location of the rest of the tips based on the pattern selected for the tips. The system will track the tips used in each run and present the tips that should be available.

Figure 3.39 Available Tips Dialog Box



- **NOTE** Patterns of tips other than the standard usage order are not supported. Also, empty tip boxes are not supported. It is up to the operator to confirm the physically present tips match those presented by the software.
 - Once tips are specified, click the **Done** button to proceed with the run.

5 To pause the run temporarily, click Pause. The Pause button changes to Resume, and the progress bar changes to yellow (Figure 3.40).

Figure 3.40 Progress Bar - Paused



6 To abort the run, click **×** to the right of the progress bar. A confirmation message appears (Figure 3.41).

Figure 3.41 Abort Run Confirmation Screen



7 Click Abort . The screen shows that the run has been aborted (Figure 3.42).

Figure 3.42 Aborted Run Screen

J	Use this task	to prepare sample tubes.	-				(
-	WTD						
Norl	dist						Deck Layout
			[U	sage	¥	Microplate (Deep Well)
Г	Sample Name	Panel	Cocktails	-			
•	×	Naive_Resting T cells	Cocktail CD45RA FITC	1	+		
	×	Sample Panel	Cocktail	2	+		
	×	T-Cell Example	Basic T-Cells	3	+		

NOTE If a run is aborted, it is important to return the entire system to a safe state before starting another operation. For more information, see CHAPTER 6, *Preventive Maintenance and Troubleshooting*.

- **8** To view a table of actions or errors that occur during the run:
 - **a.** Click the down arrow in the middle of the progress bar to open the table of actions (Figure 3.43).

Figure 3.43 Run Successful Message/Table Access Arrow



NOTE This can be done during the run or after the run is completed.

b. The action table opens. To close the action table, click the up arrow at the bottom of the table (Figure 3.44).

Figure 3.44 Actions Table/Close Table Arrow



Introduction

This chapter describes the actions you can initiate from the **Biomek Actions** screen.

Direct control over movement of the Biomek 4000 is provided by the following actions. Care must be taken when using these actions. Always examine the work area of the instrument before performing any action that causes the instrument to move. Always double-check actions before initiating them to avoid crashing the pod, bridge, tool, or tip into any object. Improper use of these actions can result in damage to the instrument, tools, tips, labware, or accessories and could result in spillage of liquids inside the work envelope of the instrument. If you are uncertain about using an action, in the USA and Canada call Beckman Coulter Technical Support at 1-800-526-7694. Outside the USA and Canada, contact your Beckman Coulter Representative.

Biomek Actions Screen

This section provides an overview of how to use the **Biomek Action** screens.

- **1** Log into the Biomek 4000 ACPrep Software.
- 2 Click On the top right side of the software main screen. The Run Instrument Menu screen appears (Figure 4.1).

Figure 4.1 Run Instrument Menu Screen

ody Cocktal Preparation		
Select a task to run the instrument.	Run Instrument Menu	U Tasks
	Prepare 'Tubes' From 'Antibodies'	
1	Prepare 'Bulk Cocktails'	
	Prepare 'Tubes' From 'Bulk Cocktails'	
\$	Biomek Actions	
ator:		1/30/2012 11:05:57 AM

3 From the **Run Instrument Menu** screen, select Biomek Actions . The Biomek Actions screen appears (Figure 4.2).

Figure 4.2 Biomek Actions Screen

🛞 Antibody Cocktail Preparation	
Use this task to control the Biomek.	Tasks
	x
Home Instrument Raise Pod and Unicod Tool Manual Control	
	~
Operator:	1/27/2012 12:35:04 PM

- Click to home the instrument.
- Click to raise the pod, discard a loaded tip to the trash, and unload the tool to the tool holder.
- Click to display the manual controls screen.

Homing the Instrument

Follow these steps to home the Biomek 4000 instrument.

1 From the **Biomek Actions** menu, select



. A warning message appears

(Figure 4.3). The instrument is homed at the beginning of each run to ensure a proper start state, especially after powering on the instrument. Table 4.1 gives troubleshooting measures for the cautions in the warning message.

Figure 4.3 Homing Instrument Message

Warning	×
1	CAUTION: Before selecting OK to home all axes, make sure: * No liquid is present in the tips. * No disposable tips are loaded. * The pod is not near the front, back, or side of the instrument. * No tool is currently loaded on the pod.
	Cancel

 Table 4.1 Troubleshooting Homing Instrument Cautions

Ensure	Otherwise	
No liquid is present in the tips.	Liquid will eject from the tip as part of the homing operation at an arbitrary location on the deck. If liquid is present is the tip, manually remove the tip from the tool, and use precautions to capture the liquid that may remain in tip.	
No disposable tips are loaded.	The tip will eject as part of the homing operation.	
The pod is not near the front, back, or side of the instrument.	This caution is not relevant for the Biomek 4000 ACPrep system.	
No tool is currently loaded on the pod.	The homing operation may damage the tool. Manually unload the tool from the pod.	

2 Confirm that you have completed the actions listed in the message, then click A pop-up message appears showing the homing operation is in progress (Figure 4.4).

Figure 4.4 Homing Instrument Message



- **NOTE** Click **Stop** if you notice an unintended start state (for example, missing tips, lids still on vials, wrong output labware, or foreign items on the deck).
- When the operation is complete, the system returns to the **Biomek Actions** screen.

Raising the Pod and Unloading the Tool

Follow these steps to raise the pod on the Biomek 4000 instrument.

IMPORTANT Before raising the pod and unloading the tool, ensure that it is safe for the instrument to perform these actions.

1 From the Biomek Actions screen, select

- **2** The pod raises to the maximum Z height.
 - If a tip is loaded, it is discarded into the trash.
 - If a tool is loaded, it is unloaded onto the tool rack.

NOTE If there is any liquid in the tip, it is discarded into the trash along with the tip.

Manually Controlling the Pod

Follow these steps to manually control the pod on the Biomek 4000 instrument.

IMPORTANT Take care when using **Manual Control** to ensure that it is safe for the pod to perform these actions and does not crash into anything located on the instrument deck.

1 From the **Biomek Actions** screen, select . The **Manual Control** screen appears (Figure 4.5). From here, choose where you want to move the pod. See Table 4.2 for further



descriptions of the fields.



	Area	Description					
1	Home D	Moves D-axis to home position. The D-axis is the dispense axis, which controls liquid handling operations.					
		Do not perform this operation with a tool loaded. Damage to the tool or instrument may occur.					
2	Home Z, XY	Moves Z- and then X- and Y-axes to home position.					
3	Vector Builder	Relative moves, which allow the pod to move from its current location to anywhere on the deck, are created using Vector Builder . Each time a Vector Builder button is pressed, the Movement Vector is changed in the corresponding axis by the amount indicated in Delta .					
		• Up and Down move the pod in the Z axis.					
		Left and Right move the pod in the X-axis.					
		Back and Fwd move the pod in the Y-axis.					
		• Squeeze/Aspirate and Unsqueeze/Dispense move the head in the D-axis based upon the selection made in D Units.					
4	Move Z-Max	Moves the pod to highest configured height.					
5	Absolute Move	Builds a vector to an absolute coordinate from the current coordinate.					
6	Current Position	Current location of the pod (after the pod has been homed).					
7	Movement Vector	The amount of movement that occurs when Go is selected. Movement vectors are relative to the current position.					
8	Delta	Sets the magnitude of change the Vector Builder applies to the Movement Vector for each axis.					

 Table 4.2
 Manual Control Selection Areas for the Biomek 4000 Pod

Viewing the Current Position of the Biomek 4000 Pod

The current position of a Biomek 4000 Pod is displayed as four coordinates. Each axis coordinate is the distance from the home position. X-, Y-, and Z-axis coordinates are displayed in centimeters.

To view the current position of a pod:

- 1 From the **Biomek Actions** menu, select . The **Manual Control** screen appears (Figure 4.5). The current position of the pod is shown in **Current Position**.
- 2 Click 🗶 to close Manual Control.

Moving the Biomek 4000 Pod to a Safe Roving Height

To move the Biomek 4000 pod to its highest configured height, use **Move Z-Max** in **Advanced Manual Control**. This helps to avoid collisions when moving the pod around the deck manually.

IMPORTANT Before moving Z-Max, ensure that it is safe for the instrument to perform this action.

From the Biomek Actions menu, select Figure 4.5).
 Click Move Z-Max. The Biomek 4000 moves to its maximum Z-axis height.
 Click X to close Manual Control.

Performing Relative Moves Using the Vector Builder

The use of manual control for the Biomek 4000 pod centers around the building and applying of movement vectors. A movement vector simply indicates the magnitude and direction of motion applied to the pod.

When the point of reference is at the front and center of the unit, positive and negative pod values are as follows:

- **Positive value X** = right motion
- **Positive value Y** = forward motion
- **Positive value Z** = up motion
- **Positive value D** = aspirating motion
- **Negative value X** = left motion
- Negative value Y = back motion
- Negative value Z = down motion
- Negative value D = dispensing motion

Relative moves allow the pod to move from its current location to anywhere on the deck. Relative moves are created in the **Vector Builder** using the **Delta** values, or the vector can be manually edited.

Relative moves are configured using a combination of the **Delta** values and **Vector Builder**. A **Delta** value is the amount of change in an axis that is applied to the **Movement Vector** when a button in the **Vector Builder** is pressed. For example, if the **Delta** value for **X** is 3, each time **Right** is clicked in the **Vector Builder**, 3 cm is added to the X-axis of the **Movement Vector**.

NOTE The move does not occur until **Go** is selected in the **Movement Vector** area of **Manual Control**.

NOTE Use **Auto Clear** when the values in the **Movement Vector** fields must be reset to zero after the move is performed. Turn off **Auto Clear** to retain the values after the move has occurred. Choose **Clear** to set the values back to zero at any time.

To set **Delta** values:

- 1 From the **Biomek Actions** menu, select . The **Manual Control** screen appears (Figure 4.5).
- 2 Enter a value in X, Y, Z, and D to set the Delta value for each axis.
- **3** Enter the desired **X**, **Y**, **Z**, and **D** values in **Movement Vector**.

OR

Click the appropriate buttons in **Vector Builder** (Figure 4.6) until the desired values appear in **Movement Vector** (Figure 4.7). The X, Y, Z, or D value in **Movement Vector** increases by the **Delta** value.

- **NOTE** Choose Clear to change the Movement Vector values to 0.
- **NOTE** Minimum and maximum X, Y, Z, and D values are displayed as a tool tip when hovering over the fields in **Movement Vector**.

Figure 4.6 Vector Builder

📑 Manual Contr	ol		X
Home D	Vector Builder	Delta	
Home Z, XY		Y 0.1 cm	
	Left ← → Right	Z 0.1 cm	
	Ewd.	D 0.1 cm	
Move Z-Max	<u> </u>	−DUnits ©cm	
		cm	
	cm ⊻ 0 cm Z 0 cm D 0	cm	
🔽 Auto Clear		<u>S</u> top	

TIP Hold the button down to repeatedly apply the Delta value to the Movement Vector.

4 Enter a value in **Speed** to specify the percent of the maximum speed of the pod.

5 Click **Go**. The pod moves from its current position to the new position based on the values displayed in the **Movement Vector**. The new position is displayed in **Current Position**.

IMPORTANT Before clicking **Go**, ensure that it is safe for the instrument to perform this action.

6 Click 🗷 to close Manual Control.

Performing Absolute Moves for the Biomek 4000 Pod

Absolute Move allows the pod to move to a specific coordinate position in the workspace of the instrument. Use **Absolute Move** when the coordinates of the desired position are known.

- **NOTE** When an **Absolute Move** is entered, the values displayed in **Movement Vector** reflect the relative move required to physically move the pod to the desired position. Make sure the physical location of the pod is not changed between the time the vector is built and the time the **Go** button is pressed.
- 1 From the **Biomek Actions** menu, select . The **Manual Control** screen appears (Figure 4.5).
- **2** Click **Absolute Move**. The **Absolute Move** screen appears (Figure 4.7).

Figure 4.7 Enter Absolute Move Coordinates



3 Enter the **X**, **Y**, **Z**, and **D** values for the desired position.

NOTE Minimum and maximum X, Y, Z, and D values are displayed as a tool tip when hovering over the fields in **Movement Vector**.

4 Click **OK**. The **Movement Vector** changes to reflect the necessary relative move.

- **5** Enter a value in **Speed** to specify the percent of the maximum speed of the pod to use for the move.
- **6** Click **Go**. The pod moves from its current position to a specified absolute position. The new position is displayed in **Current Position**.

IMPORTANT Before clicking **Go**, ensure that it is safe for the instrument to perform this action.

7 Click 🗴 to close Manual Control.

Biomek Actions Biomek Actions Screen

CHAPTER 5 Reporting

Introduction

This chapter describes how to view and access reports in the Biomek 4000 ACPrep Software.

The following reports are available:

- **1.** Rack Inventory
- 2. Worklist History

Viewing Reports

Follow the steps below to run reports.

- **1** Log into the Biomek 4000 ACPrep Software.
- 2 Click on the top right side of the software main screen. The **Reporting Menu** screen appears (Figure 5.1).

Figure 5.1 Reporting Menu Screen

N Antibody Cocktail Preparation		
re		
Select a task to view a report.	Reporting Menu	
	Rack Inventory	
Operator		2/4/2012 8:41:04 AM

The following options are available:

Figure 5.2 Rack Inventory Screen

- Rack Inventory (see Viewing Rack Inventory Reports)
- Worklist History (see Viewing Worklist History Reports)

Viewing Rack Inventory Reports

Follow the steps below to view or access rack inventory reports.

1 From the **Reporting Menu** screen, select Rack Inventory. The **Rack Inventory**. The **Rack Inventory** screen appears (Figure 5.2).

🋞 Antibody Cocktail Preparation		_ 🗆 ×
Use this task to view rack	: inventory.) Tasks
FiveMillitter 5 mL 5 mL (2) IOTest IOTest (3)	Select a rack to view or edit its details	x
Operator:	2/4/2012	8:59:05 AM
•		

2 From the list on the left side of the screen, select a rack to view. The report regarding that rack opens (Figure 5.3).



5 mL	Export					
5 mL						
5 mL (2)	5 mL (2)					
5 mL (3)	Type:	FiveMilliLit	ter			
IOTest	Dimension:	4 rows x 5	columns			
IOTest		Problem	C	Banaciaina Maluma	Purchase Proto	Lat Montheau
IOTest (2)		Position	Source Name	Remaining volume	Expiration Date	Lot Number
		A1	Sample Panel.Cocktail	4000 μL	3/30/2012	
		A2	Naive_Resting T cells.Cocktail CE	4000 μL	3/30/2012	
		A3	Naive_Resting T cells.Cocktail CE	4000 μL	3/30/2012	
		A4				
		A5				
		B1				
		B2				
		B3				
		B4				

3 To save the report as an Excel Workbook to your computer, click **Export**. The **Export As** window appears. Select where you want to save the report and click **Save** (Figure 5.4).

5 mL	Export	Furnant Ar			vil.
5 mL		Export As			~
5 mL (2)	5 mL (2)	Save in: 🔯 Deski	op 🕒	🖞 🔇 🕫 📂 🛄 •	
5 mL (3)	Type: FiveMilliLiter	My Doc	uments		
IOTest	Dimension: 4 rows x 5 colu	nn: 🧾 SMy Con	nputer		
IOTest		Documents	work Places		
IOTest (2)	Position So	TC 2012-0	2-02 16-05-32.xdsx		
	A1 Sar	nple Devision			
	A2 Na	ve_			
	A3 Na	ve_ 🔗			
	A4	Mu Documents			
	A5	and a second states			
	B1				
	B2	My Computer			
	B3				
	B4				
	B5	My Network File name:	5 mL (2)	✓ Save	1
	C1	Places Save as tu	Excel Workbook (* visv)	Cancel	
	C2	June us ly	Per [Excerworkbook (
	C3				
	C4				

Figure 5.4 Exporting a Report

4 Once your report is saved, a pop-up message appears (Figure 5.5).

Figure 5.5 Successful Export Message

Antibody	Cocktail Preparation	
(i)	Success	
	Export was successful.	
	→ Open File	
	➔ Open Containing Folder	
🕑 Sh	ow details	ОК

Select one of the following options:

- **Open File** opens the exported file in Excel
- **Open Containing Folder** opens the folder where the exported file is saved

Viewing Worklist History Reports

Follow the steps below to view worklist history reports.

1 From the **Reporting Menu** screen, select Worklist History. The Worklist History screen appears (Figure 5.6).

Figure 5.6 Worklist History Screen

Use this task to view w	orklist history.	Tasks
	Select a worklist heltory to view or edit its details	×
Operator:		2/4/2012 11:14:02 AM

- **2** To view a worklist history report, click the timestamp of the worklist history in the list on the left side of the screen. The worklist history report has three sections of information, each available by selecting the appropriate tab (Figure 5.7).
 - Outputs
 - Inputs
 - Run Events

Figure 5.7 Worklist History Report Screen

X 3/1/2012 6:16 AM	Export					Delete	
✓ 3/1/2012 6:15 AM	· · · ·						-
✓ 3/1/2012 5:13 AM	Run Type: Bulk Coo	ktails					
× 3/1/2012 5:11 AM	Operator: Administ	rator					
× 2/11/2012 11:31 AM	Started At: 2/2/201	2 5:12 PM					
✓ 2/2/2012 5:12 PM	Completed At: 2/2/201	2 5:12 PM					
× 2/2/2012 4:25 PM	Status: V Succe	ssful					
✓ 2/2/2012 4:13 PM			~				
× 2/2/2012 4:06 PM	Outputs Inputs	Run Events					_
X 2/2/2012 12:37 PM	5 mL	Position S	ource Name	Pipetted	Volume		
✓ 1/31/2012 11:28 AM		A1 T-	-Cell Example.Basic T-Cells	100%	80 µL		11
✓ 1/30/2012 5:06 PM		A2 T-	-Cell Example.Basic T-Cells	100%	80 µL		Ш.
× 1/30/2012 2:45 PM		A3 Si	ample Panel.Cocktail	100%	70 µL		11
✓ 1/30/2012 1:44 PM		A4					Ш.
✓ 1/30/2012 1:43 PM		A5					11
✓ 1/30/2012 1:39 PM		82					11
✓ 1/24/2012 5:24 PM		83					н
✓ 1/24/2012 3:47 PM		B4					11
× 1/24/2012 3:14 PM		B5					н
× 1/24/2012 2:18 PM		C1					L
		C2					41.

The **Outputs** tab is initially selected and shows the outputs of the selected worklist run (Figure 5.8).

Figure 5.8 Worklist History Report - Outputs Tab

X 3/1/2012 6:16 AM	Export					Delete
✓ 3/1/2012 6:15 AM						
✓ 3/1/2012 5:13 AM	Run Type: Bulk	Cocktails				
× 3/1/2012 5:11 AM	Operator: Adm	inistrator				
× 2/11/2012 11:31 AM	Started At: 2/2/	2012 5:12 PM				
🚽 2/2/2012 5:12 PM	Completed At: 2/2/	2012 5:12 PM				
× 2/2/2012 4:25 PM	Status: V S	uccessful				
✓ 2/2/2012 4:13 PM	Status. + 5	accession				
× 2/2/2012 4:06 PM	Outputs Inp	uts Run Ever	its			
× 2/2/2012 12:37 PM	5 ml	Position	Source Name	Pipetted	Volume	
✓ 1/31/2012 11:28 AM		A1	T-Cell Example.Basic T-Cells	100%	80 µL	
✓ 1/30/2012 5:06 PM		A2	T-Cell Example.Basic T-Cells	100%	80 µL	
× 1/30/2012 2:45 PM		A3	Sample Panel.Cocktail	100%	70 µL	
✓ 1/30/2012 1:44 PM		A4				
✓ 1/30/2012 1:43 PM		A5				
✓ 1/30/2012 1:39 PM		82				
✓ 1/24/2012 5:24 PM		83				
✓ 1/24/2012 3:47 PM		B4				
× 1/24/2012 3:14 PM		B5				
× 1/24/2012 2:18 PM		C1				
ALL 1/24/2012 2:14 DM		C2				-

3 Click on the **Inputs** tab to view the inputs section of the selected worklist history report (Figure 5.9).

Figure 5.9 Worklist History Report - Inputs Tab

X 3/1/2012 6:16 AM	Export								Delete
✓ 3/1/2012 6:15 AM	Laport								Denote
✓ 3/1/2012 5:13 AM	Run Type: Bull	k Cocktails							
× 3/1/2012 5:11 AM	Operator: Adm	ninistrator							
× 2/11/2012 11:31 AM	Started At: 2/2	/2012 5:12 PM							
✓ 2/2/2012 5:12 PM	Completed At: 2/2	/2012 5:12 PM							
× 2/2/2012 4:25 PM	Status: V S	Successful							
✓ 2/2/2012 4:13 PM	Status: • •								
× 2/2/2012 4:06 PM	Outputs Inp	puts Run Ever	its						
× 2/2/2012 12:37 PM	IOTest (3)	Position	Source Name	Remaini	ng Volume	Expiration Date	LotNumber		
✓ 1/31/2012 11:28 AM		A1	CD35-FITC	96%	1910 µL	3/2/2012			
✓ 1/30/2012 5:06 PM		A2	CD44-APC	88%	440 µL	3/2/2012			
× 1/30/2012 2:45 PM		A3	CD27-PC5	99%	1970 µL	3/2/2012			
✓ 1/30/2012 1:44 PM		A4	CD3e-APC-Alexa Fluor® 700	92%	460 µL	3/2/2012			
✓ 1/30/2012 1:43 PM		A5	CD3-PC7	100%	2000 µL	3/2/2012			
✓ 1/30/2012 1:39 PM		A6	CD45RA-RD1	100%	2000 µL	3/2/2012			
✓ 1/24/2012 5:24 PM		82	NKG2-A/C/E-PE	96%	480 µL	3/2/2012			
✓ 1/24/2012 3:47 PM		83	CD4(L3T4a)-ECD	96%	480 µL	3/2/2012			
× 1/24/2012 3:14 PM		B4	CD25-PC5.5	94%	470 µL	3/2/2012			
× 1/24/2012 2:18 PM		B5	CD8a-APC-Alexa Fluor® 700	94%	470 µL	3/2/2012			
✓ 1/24/2012 2:14 PM		B6	CD62L (L-selectin)-PC7	96%	480 µL	3/2/2012			
✓ 1/24/2012 2:11 PM		C1	CD3e-APC-Alexa Fluor® 750	99%	1980 µL	3/2/2012			
• 4/2-1/2012 2.11 PM		C2							

4 Click on the **Run Events** tab to view the events that occurred during the selected worklist run (Figure 5.10).

Figure 5.10	Worklist H	listory	Report -	Run	Events	Tab
-------------	------------	---------	----------	-----	--------	-----

✓ 2/2/2012 5:12 PM	Export		Delete
× 2/2/2012 4:25 PM			
✓ 2/2/2012 4:13 PM	Run Type: Assay Tubes		
× 2/2/2012 4:06 PM	Operator: Administrator		
✓ 2/2/2012 4:05 PM	Started At: 2/2/2012 4:05 PM		
× 2/2/2012 12:37 PM	Completed At: 2/2/2012 4:05 PM		
✓ 1/31/2012 11:28 AM	Status: V Successful		
✓ 1/30/2012 5:06 PM			
× 1/30/2012 2:45 PM	Outputs Inputs Run Ev	nts	
✓ 1/30/2012 1:44 PM	Date/Time Category	Description	<u> </u>
✓ 1/30/2012 1:43 PM	2/2/2012 4:05:32 PM RunState	Running	
✓ 1/30/2012 1:39 PM	2/2/2012 4:05:33 PM LiquidTransl	er Aspirated 80 µL from "T-Cell Example.Basic T-Cells" (5 mL (2) position 1).	
✓ 1/24/2012 5:24 PM	2/2/2012 4:05:33 PM LiquidTrans	er Dispensed 80 µL to (OUT1 position 1).	
✓ 1/24/2012 3:47 PM	2/2/2012 4:05:33 PM LiquidTrans	er Aspirated 40 µL from "Naive_Resting T cells.Cocktail CD45RA FITC" (5 mL (2) position 2).	
× 1/24/2012 3:14 PM	2/2/2012 4:05:33 PM LiquidTransl	er Dispensed 40 µL to (OUT1 position 13).	
× 1/24/2012 2:18 PM	2/2/2012 4:05:33 PM Liquid Frans	ar Aspirated 30 µL from "Naive_Resting 1 cells.Cocktall CD45KA RD1" (5 mL (2) position 3). ar Dispersed 30 µL to (0LE1 partition 3E).	
✓ 1/24/2012 2:14 PM	2/2/2012 4:05:33 PM LiquidTrans	er Aspirated 70 ul from "Sample Panel.Cocktail" (5 ml (2) position 4).	
✓ 1/24/2012 2:11 PM	2/2/2012 4:05:33 PM LiquidTransl	er Dispensed 70 µL to (OUT1 position 37).	
✓ 1/24/2012 1:41 PM	2/2/2012 4:05:34 PM RunState	Stopped	
✓ 1/24/2012 12:35 PM	2/2/2012 4:05:34 PM Information	Completed successfully	-

5 To save the report as an Excel Workbook, click **Export**. The **Export As** window appears. Select where you want to save the report and click **Save** (Figure 5.11).



Figure 5.11 Exporting a Report

6 Once your report is saved, a pop-up message appears (Figure 5.12).

Figure 5.12 Successful Export Message

Antibody Cocktail Preparation	
Juccess	
Export was successful.	
 Open File 	
Open Containing Folder	
Show details	ок

Select one of the following options:

- **Open File** opens the exported file in Excel
- Open Containing Folder opens the folder where the exported file is saved

- **7** To delete any worklist history report:
 - **a.** Select the report to delete.
 - **b.** Click Delete.
 - **c.** Click Delete to confirm and the selected worklist history report is removed (Figure 5.13).

Figure 5.13 Confirmation to Delete Worklist History

Antibod	y Cocktail Preparation
	Confirm Delete
-	Are you sure you want to delete this worklist history?
	Delete Cancel

Reporting Viewing Reports

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CHAPTER 6
```

Preventive Maintenance and Troubleshooting

Introduction

This chapter describes how to provide Preventive maintenance and troubleshoot any issues with the Biomek 4000, pipetting tools, and Biomek 4000 ACPrep Software.

For additional technical support in the USA and Canada, call Beckman Coulter Technical Support at 1-800-526-7694. Outside the USA and Canada, contact your Beckman Coulter Representative.

Preventive Maintenance

Follow the appropriate decontamination and cleaning procedures outlined by the laboratory safety officer.

The P200L or P1000SL tool body contains electronics that may malfunction if liquid enters the tool body. Do not submerge or introduce liquids into the tool body as it may impact the function of the pipetting tool.

The P200L or P1000SL tool body cannot be sterilized by autoclaving. Autoclaving will impact the form and function of the tool rendering it inoperable. Do not place pipetting tools in the autoclave for sterilization.

Perform the following preventive maintenance procedures as needed:

• Keep instrument surfaces clean by washing regularly with a mild detergent solution, making sure not to wet or moisten electrical components.

Risk of chemical injury from bleach. To avoid contact with the bleach, use barrier protection, including protective eyewear, gloves, and suitable laboratory attire. Refer to the Safety Data Sheet for details about chemical exposure before using the chemical.

• Disinfect instrument surfaces on the deck and side modules with a 10% bleach solution followed by a wipe down with distilled water.

NOTE The Biomek 4000 workstation may be exposed to ultraviolet light, if necessary.

- Periodically clean spill trays, located under the deck plate, as needed.
- Wipe off external surfaces of the tools with a damp cloth. Clean the outside surface of the tools using a dilute ethanol solution.
6

Troubleshooting

Troubleshooting the Biomek 4000 Instrument

Perform the troubleshooting techniques provided in Table 6.1 when necessary.

Table 6.1 Troubleshooting the Biomek 4000

lf	Then
All indicator lights are out	Verify the instrument is plugged in and turned on.
Tools not picked up by pod	Ensure tools are located in the proper location in the tool rack. Home the instrument.

NOTE For all other issues with the Biomek 4000 in the USA and Canada, call Beckman Coulter Technical Support at 1-800-526-7694. Outside the USA or Canada, contact your Beckman Coulter Representative.

Troubleshooting Pipette Tools

Table 6.2 provides some causes for pipetting issues. Do not attempt to repair the pipette tools without first contacting Beckman Coulter Service personnel.

NOTE Before using any new or replacement pipetting tool, it must be calibrated by Beckman Coulter Service personnel.

Table 6.2	Troubleshooting	Pipette	Tools
-----------	-----------------	---------	-------

lf	Then
Tool is not recognized or loaded	Make sure tool ID pins are not bent or damaged.
Tool leaks	Tool may be worn or damaged.
Single-channel tool will not pick up tips	Make sure tool is not bent or damaged.
Single-channel tools do not push off tips	Tool may be worn or damaged.
Tool picks up tip rack	Make sure the latch on the tip rack holder is engaged.
Tips dropped by tool	Use new Beckman Coulter tips.

NOTE For all other issues with pipetting tools in the USA and Canada, call Beckman Coulter Technical Support at 1-800-526-7694. Outside the USA or Canada, contact your Beckman Coulter Representative.

Troubleshooting the Biomek 4000 ACPrep Software

Perform the troubleshooting techniques provided in Table 6.3 when necessary. The text highlighted in the error message is the critical portion of the error message.

NOTE Snap is an advanced feature that is not utilized by this system. For this system, **Snap** is equivalent to **Abort**.

Table 6.3 Troubleshooting the Biomek 4000 ACPrep Software

If	Then
Antihody Cocktail Prenaration	Tool not loaded or wrong tool loaded:
From Biomek Method: Error in Load Tool: P200L, Then, If AnyVolumeBelowHigh, Set volume range flags (AnyVolumeX), Let, For OutputIndex = 0 to =UBound(OutputPositions) step 1, Set output information for substeps: Error during Load Tool P200L: Loaded Tool ID does not match	Place correct tool in the rack position and click Retry .
Antibody Cocktail Preparation From Biomek Method: Error in Move to 0 cm, 0°, =C_Height mm, Aspirate, Aspirate, Data Driven Transfer, Let, Let, Run RunDDT, Then, If AnyVolumeBelowHigh, Set volume range flags (AnyVolumeX), Let, For OutputIndex = 0 to =UBound(OutputPositions) step 1, Set output information for substeps: Error during Absolute Move: Tip was not sensed	 Tips are missing or tip box is not present: Place tips and tip box in the correct location and click Retry. In the USA or Canada, call Beckman Coulter Technical Support at 1-800-526-7694. Outside the USA or Canada, contact your Beckman Coulter Representative.
Antibody Cocktail Preparation From Biomek Method: No liquid was detected in well 2. Check probe #1 before continuing. Adjust Manually then Seek Liquid Again Pipette Air Pipette from Bottom Seek Again Abort	 No liquid detected: Ensure the correct rack is on the deck Ensure the vial is in the correct location in the rack Ensure there is sufficient liquid in the vial Then select Pipette from Bottom or Adjust Manually then Seek Liquid Again if an adjustment to the vial needs to be made by hand In the USA or Canada, call Beckman Coulter Technical Support at 1-800-526-7694. Outside the USA or Canada, contact your Beckman Coulter Representative.

6

If	Then
Antibody Cocktail Preparation From Biomek Method: The stop button on the instrument was pressed. When you are ready to continue your method, press OK. The pod will move back to where it was before the stop button was pressed and the method will resume. If you wish to abort the method, you may press the stop button on the toolbar now.	 Stop button as been pressed: Abort the operation Click OK to continue If the Stop button was pressed in an error recovery situation, you may want to click OK, and press Stop again for the instrument to move the pod to a higher height. That will allow access to taller labware. NOTE You may need to click OK two times to clear the Stop button error.
Antibody Cocktail Preparation From Biomek Method: Error in Move to 0 cm, 0°, =C_Height mm, Aspirate, Aspirate, Data Driven Transfer, Let, Let, Run RunDDT, Then, If AnyVolumeLow, Then, If AnyVolumeBelowHigh, Set volume range Flags (AnyVolumeX), Let, For OutputIndex = 0 to =UBound(OutputPositions) step 1, Set output information for substeps: Error during Absolute Move: Tip is clogged	 Tip is clogged — this error has multiple causes: Forgot to remove lids or caps Misalignment of pod Misplacement of the rack Wrong rack is on the deck position Attempted to reuse a tip 1. Correct the problem, then click Retry. 2. If you are unable to recover from this error, click Abort. 3. In the USA or Canada, call Beckman Coulter Technical Support at 1-800-526-7694. Outside the USA or Canada, contact your Beckman Coulter Representative.
Antibody Cocktail Preparation From Biomek Method: Error in Unload Tips, Data Driven Transfer, Let, Let, Run RunDDT, Then, If AnyVolumeLow, Then, If AnyVolumeBlowHigh, Set volume range flags (AnyVolumeX), Let, For OutputIndex = 0 to = UBound(OutputPositions) step 1, Set output information for substeps: Error during Unload Tips: Unknown Error: 32766	 Unknown Tip Error: 32766: The tip was not removed Click Retry In the USA or Canada, call Beckman Coulter Technical Support at 1-800-526-7694. Outside the USA or Canada, contact your Beckman Coulter Representative.

 Table 6.3 Troubleshooting the Biomek 4000 ACPrep Software

Specifications

System Specifications

Table A.1 System Specifications

Item	Description
Environment	Indoor use only
Power Requirements	100-240 VAC, 50/60 Hz
Dimensions	122.2 cm (W) x 49.5 cm (D) x 67.3 cm (H)
	or 48.1 in. (W) x 19.5 in. (D) x 26.5 in. (H)
Weight	67.2 kg (138 lbs)
Pipetting Performance at 5 μ L	Accuracy +/- 20%, Precision 10% CV
Ambient Operating Temperature	5-30°C (41-86°F)
Humidity Restrictions	<85% (non-condensing) @ 30°C (86°F)
Altitude Restrictions	up to 2000 m (6562 ft)
Installation Category	Category II
Pollution Degree	2
Communications to Host	RS-232 port
Biomek Controller Host PC	The following specifications are the minimum requirements needed for the PC.
	CPU : I5-650 (3.2 GHz)-vPro
	RAM:2 GB
	Hard Drive: 250 GB (7200 rpm)
	Ports: Minimum 1 serial port
	DVD: DVD Writer
	Monitor: 22 in. LCD
	Operating System: Windows 7, 64-bit
	Other Software : MS Office 2007, 2005 SQL Server Express Edition, .NET Framework 4.0

Specifications System Specifications

APPENDIX B

Symbologies for the Optional Barcode Reader

Barcode Reader Menu Selection

All symbologies 4 CB (4-State Customer Bar Code) Australian Post Aztec Code **British Post** China Post Canadian Post Codabar Codablock F Code 11 Code 128 Code 16K Code 39 Code 49 Code 93 Data Matrix EAN-JAN-13 EAN-JAN-8 EAN UCC Composite Codes Interleaved 2 of 5 ID-tag (UPU 4-State) Japanese Post

KIX (Netherlands) Post Korea Post Matrix 2 of 5 MaxiCode MicroPDF417 MSI PDF417 Planet Code Plessey Code PosiCode A and B Postnet QR Code **RSS** Expanded **RSS** Limited RSS-14 Straight 2 of 5 IATA Straight 2 of 5 Industrial TCIF Linked Code 30 (TLC39) Telepen UPC-A UPC-A/EAN-13 with Extended Coupon Code

APPENDIX C Parts List

Parts List

Table C.1 Parts List

Description	Part Number
Biomek P20 Tips	717254
Biomek P1000 Tips	B01122 (nonsterile) or B01123 (presterile)
5 mL Amber Vials	B08859
12 mL amber vials	Cole-Parmer catalog # EW-08922-34
24-position rack	BCI 373661
11 mm (white) inserts	BCI 373696
Biohazard Disposal Bags LG/100	970577
Test Tube, 12x75 (package of 250)	2523749

Parts List Parts List

Abbreviations

ANSI — American National Standards Institute	LCD — Liquid crystal display
cm — Centimeter	LED — Light-emitting diode
CPU — Central Processing Unit	mL — Milliliter
D — Depth	MS — Microsoft
ETC — Estimated Time to Completion	rpm — Revolutions per minute
ft — Foot/Feet	SBS — Society for Biomolecular Screening
GB — Gigabyte	SQL — Structured Query Language
GHz — Gigahertz	μ L — Microliter
H — Height	VAC — Volts, Alternating Current
Hz — Hertz	W —Width
in. — Inch	° C — Degree Celsius
kg — Kilogram	° F — Degree Fehrenheit
lbs — Pounds	_

Abbreviations

Glossary

of Tests — The user can specify how much bulk cocktail to prepare by indicating the number of tests they will run. The software will take the total volume of each antibody in a cocktail and multiply that number by the number of tests and calculate the total volume of bulk cocktail to prepare. The other way to specify how much bulk cocktail to prepare is by volume.

- Accuracy The difference between the actual volume pipetted versus the target volume expressed as a percent.
- Accounts and Permissions An integrated set of features that provides control of user access within the software application.
- **ANSI/SBS Microplate Standard** The standard for microplate height dimension as set forth by the Society for Biomolecular Screening.
- **Antibody Cocktail** A mixture of antibodies, typically a subset of a panel, combined into one assay tube. Typically, cocktails are constructed so each lableled antibody is measured by one of the channels on the flow cytometer.
- **Antibody Template Configuration** Information about the characteristics of an antibody that includes name, description, fluorochrome, default pipetting volume, etc.
- **Antibody** Proteins that are found in blood or other bodily fluids used by the immune system to identify and neutralize foreign objects, such as bacteria and viruses.
- **Assay Tubes** Used to designate the destination labware where antibodies are pipetted. For example, 12 x 75 mm polypropylene tubes.
- **Bridge** The structure that moves along the rear support and front rails. The bridge holds the pod and enables movement of the pod in the Y- (front to back) and Z- axes (up and down). Built into the bridge is an indicator light that displays current operational status of the Biomek 4000 workstation. The Biomek 4000 workstation supports only one bridge.
- **Bulk** A bulk volume of an antibody cocktail that is prepared in an intermediate vial. Maximum volume of bulk that can be created in any one vial is either 5 mL or 12 mL, depending on the vial chosen.
- **Calibration** A procedure to standardize the instrument by determining its deviation from calibration references and applying any necessary correction factors.
- Cocktail See Antibody Cocktail.
- D-axis Axis that allows for aspirate, dispense, and tip removal operations. Movement along the axis is vertical.
- **Deck** The physical deck of the Biomek 4000 ACPrep System that hold the racks, pipetting tools, tips, and trash used to automate the application.
- **Deck Layout** Current configuration of the deck.
- **Default Pipetting Volume** The default volume of an antibody specified by the user to be pipetted to a destination when the antibody is selected for inclusion in a cocktail. The default value can be overriden in the cocktail set-up interface.

Direct — Approach that pipettes aliquots of individual antibodies directly from source vials into assay labware.

Expiration Date — The last day a specific vial of antibody reagent can be used.

Field — Area on a screen for entering data.

- **Flow Cytometer** In the Biomek 4000 ACPrep software a flow cytometer refers to a collection of fluorochromes that can be measured by an actual analytical instrument.
- Flow Cytometry Analysis of particles in single particle suspension.
- Fluorochrome Fluorescent chemical compound that emits light of specific wavelengths when excited.
- **Homing** Process of locating the home position. This process must be done every time the instrument is powered up. Instrument home Z-, Y-, X-, and D-axes.
- Icon Pictorial representation for commands or options on an instrument.
- Indicator Lights Displays current operational status of the Biomek 4000 workstation.
- **Indirect** Approach of preparing a bulk volume of an antibody cocktail in an intermediate vial and then transferring an aliquot of the bulk cocktail to an assay tube.
- Input Racks Racks on the deck of the Biomek 4000 that hold reagent vials.
- Intermediate Vial Used to hold bulk antibody mixture until it is pipetted into assay labware.
- Labware Holder Used to hold microplates, tube racks, or tip racks on the Biomek 4000 deck.
- **Liquid Level Sensing** On the Biomek 4000, P200L and P1000SL tools include patented technology that sonically detects the liquid level. Liquid level sensing is performed using an acoustic process involving a transmitter and receiver within the single-channel tools. The transmitter emits a sound wave through the tip that bounces back when it contacts liquid. The receiver detects the wave as it bounces back past the end of the tip.
- Lot Number Vendor information provided to identify a specific batch of antibody reagent.
- Manual Control Allows pods to be moved manually via a software interface.
- Microplate Labware used in liquid-handling procedures.
- Output Racks Used to locate assay tubes or microplates on the deck of the Biomek 4000.
- P1000SL Pipetting tool for the Biomek 4000 ACPrep system used for pipetting volumes between 100 µL and 1000 µL.
- **P200L** Pipetting tool for the Biomek 4000 ACPrep system used for pipetting volumes between 2.5 μL and 100 μL.
- **Panel** A set of one or more cocktails that are typically used together for a sample.
- **Pipette Tips** Disposable tips that are attached to the pipetting tool used to transfer reagents for source vials to destination labware.
- Pipetting Tools Single-channel tools used on the Biomek 4000 pod to aspirate and dispense liquid.
- Pod The movable part of the Biomek 4000 that is used for tool loading/unloading, and liquid-handling.
- **Progress Bar** Graphical display that indicated relative portion of a run that has been completed.
- **Rack Inventory** Information detailing the antibodies and amounts of antibodies stored in any of the racks used on the Biomek 4000 ACPrep system.
- **Rack Type** Type indicates the kind of antibody vial that is housed in the rack. For example, IOTest is used to store IOTest antibodies from Beckman Coulter.
- Remaining Volume The amount of antibody reagent left in a vial following an automated run.

- **Role** The role of a user defines what features in the Biomek 4000 ACPrep Software the user can access. Roles include Administrator, Advanced Operator, and Operator.
- Source Describes the location of a reagent on the system.
- **Tool Rack** Special positioner on the Biomek 4000 used to hold up to five interchangeable tools in a single deck position during a method.
- Total Volume The initial volume of a source once it is added to a rack on the system.
- **Worklist** Area on the screen where antibodies, panels, cocktails, and pipetting volumes are selected in order to create a run.
- Wrapping An output fill option that arranges each set of outputs into a new row or column of the output labware.
- X-axis Pod travel from left to right on the bridge, with larger X-coordinates on the right.
- Y-axis Pod travel from front to back on the bridge, with larger Y-coordinates to the front of the instrument.
- Z Height The veritical coordinate of the Z-axis (up and down motion of the pod).
- Z-axis Pod travel up and down with the Z Height coordinate decreasing as it gets closer to the deck of the instrument.

Glossary

Index

A

absolute Move using in Advanced Manual Control, 4-10 account management opening, 1-2 accounts administering, 1-4 Accounts and Permissions, 1-1 accounts and permissions administering user accounts and permissions, 1-1 overview, 1-1 restoring the administrator password, 1-8 administering user accounts and permissions accounts, 1-4 opening account management, 1-2 roles, 1-5 administrator password restoring, 1-8 Advanced Manual Control Biomek 4000, 4-8 Move Z-Max, 4-8 performing absolute moves, 4-10 performing relative moves, 4-8 selection areas for Multichannel Pod, 4-7 antibody templates creating, 2-11 defining, 2-9 deleting, 2-14 editing, 2-13 searching, 2-10

В

Biomek 4000 Advanced Manual Control Move Z-Max, 4-8 performing absolute move, 4-10

performing relative moves, 4-8 pod performing absolute moves, 4-10 performing relative moves, 4-8 status indicator lights, 1-xvii Biomek actions screen homing the instrument, 4-3 manually controlling the pod, 4-6 performing absolute moves for the Biomek 4000 pod, 4-10 performing relative moves using the vector builder, 4-8 raising the pod and uploading the tool, 4-5 viewing the current position of the Biomek 4000 pod, 4-7 bridge indicator lights, 1-xvii

С

cocktails deleting, 2-21 Common Operations Across all Methods selecting an output fill option for output racks, 3-3 setting the expiration date, 3-2 configuring the system configuring fluorochromes, 2-3 defining a flow cytometer, 2-6 defining antibody templates, 2-9

D

defining antibody templates creating new antibody templates, 2-11 deleting antibody templates, 2-14 editing antibody templates, 2-13 searching for existing antibody templates, 2-10 defining panels and cocktails creating new panels and cocktails, 2-17 deleting cocktails from panels, 2-21 deleting panels, 2-20 editing panels and cocktails, 2-19 searching for existing panels and cocktails, 2-16

Ε

expiration date changing, 3-2

F

flow cytometer defining, 2-6 fluorochromes configuring, 2-3

Η

hardware overview indicator lights, 1-xvii liquid level sensing, 1-xviii

I

indicator lights, 1-xvii

М

manual, updates, iii Move Z-Max using in Advanced Manual Control for Biomek 4000, 4-8 move Z-Max, 4-8 movement vectors understanding, 4-8

Ρ

panels deleting, 2-20 panels and cocktails creating, 2-17 editing, 2-19 searching, 2-16 pipette tools troubleshooting, 6-3, 6-4 preparing bulk cocktails configuring the deck, 3-18 input racks, 3-19 output racks, 3-21 preparing a worklist, 3-16 preparing tubes from antibodies configuring the deck, 3-11 input racks, 3-12 output racks, 3-15 preparing a worklist, 3-9 preparing tubes from bulk cocktails configuring the deck, 3-24 input racks, 3-25 output racks, 3-27 preparing a worklist, 3-22

R

Relative Move movement values defined, 4-8 performing with Biomek 4000, 4-8 using in Advanced Manual Control, 4-8 roles administering, 1-5 run performing, 3-8 running the system 'prepare' screens overview, 3-8 performing a run, 3-8

S

software overview side panel, 1-xx tips for using the software, 1-xxi specifications system specifications, A-1

Т

troubleshooting troubleshooting the Biomek 4000 ACPrep Software, 6-4 troubleshooting the Biomek 4000 instrument, 6-3 typographic conventions, 1-xvi

U

using the software tips, 1-xxi

V

Vector Builder using, 4-9 viewing reports viewing rack inventory reports, 5-2 viewing worklist history reports, 5-4

viewing worklist history reports, 5-3

Index

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