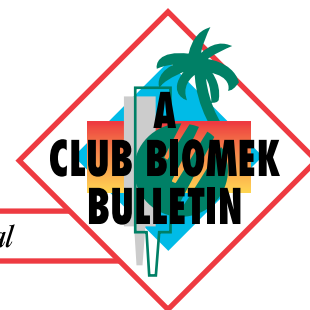


# T<sup>3</sup> UPDATE



*New tips, tricks and techniques to help keep your Biomek® 2000 performing to its fullest potential*

Volume No. 4

Spring 1997

**W**e have been very busy since our last issue of T<sup>3</sup> Update, in which we announced the acquisition of SAGIAN, Inc. Starting with this issue, we officially blend elements of the past SAGIAN newsletter, Sage Advice, with T<sup>3</sup> Update. So all Beckman Robotics products and services will be covered in T<sup>3</sup> Update, as well as parts and accessories available at SAGIAN.

About the merger: The benefits of both companies are being combined to enhance our offering in products and services to the molecular biology and drug discovery marketplace. We will add to the existing upgrade path available to Biomek® workstation owners, Sideloaders owners and CORE system owners. The options available for users to increase “process control” through automation will continue to increase because of this exciting addition to the Beckman family. The SAGIAN Division is officially integrated into the Biotechnology Development Center at Beckman, where the Biomek 2000 program development team operates.

Commenting on the acquisition, Chairman and CEO Lou Rosso emphasized that Beckman “is an acknowledged leader in systems for laboratory automation” and that the acquisition “furthers our strategy of advancing the efficiency and productivity of laboratory processes.” More details are enclosed in the announcement section of this issue, as well as an FAQ section specifically addressing Beckman/SAGIAN merger issues.

We have also invented some new things for Biomek workstations that should have broad appeal: The Gripper Tool for the Biomek 2000 allows for the movement of plates and filtration collars around the domain of the worksurface. In addition, the Gripper brings full automation to the Plasmid Purification procedure. See the hardware section of this issue for more details.

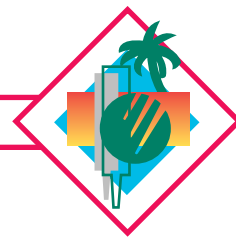
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## HARDWARE INTEGRATION

### GET A GRIP!

The development of the Biomek<sup>®</sup> 2000 Laboratory Automation Workstation around a tool-based approach provides for additional functionality through the development of novel tools. One key to future expansion of the Biomek platform is the ability to move



Figure 1. The Gripper Tool.

plates on and off worksurface positions or in and out of different peripheral components. To accomplish this functionality, the Gripper Tool was developed (Figure 1). This tool allows the user to perform a variety of microplate moves within the envelope of the Biomek 2000.

The new Gripper Tool is a continuation of enhancements available for the Biomek 2000 workstation. The tool increases capacity of the workstation by:

- allowing plate stacking on the worksurface
- rearranging labware for filtration manifold uses
- loading plates into peripherals (i.e. plate readers, temperature cyclers\*\*, etc.)

\*\* many thermal plates used in thermal-cycling are too flexible for the gripper tool to accurately access and move

Any standard rigid microplate, including lids, may easily be moved around the workstation, even if the plate is partially full. The user has control of where — and how strong — the fingers grip to accommodate other vendors' plates. With the control of the gripper tool and the addition of the 96-Plasmid Purification Kit, we are now able to fully automate the Plasmid Purification Kit introduced in the last issue of T<sup>3</sup> Update. Of course, other solid phase extraction methods may also be developed and easily executed on the workstation. With BioWorks™ Version 2.0, the user has further control of peripheral access through Device Edit.

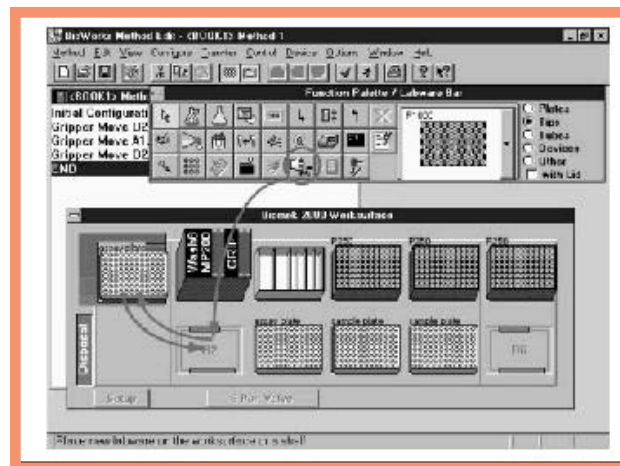


Figure 2. BioWorks Method Edit Screen depicting the point-and-click approach.

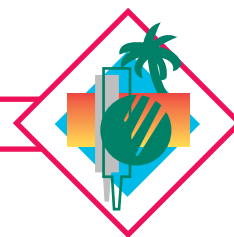
Control of access will depend largely on the type of plate carrier. This enhancement for the Biomek 2000 will affect many of the assays currently used with the Biomek. It will simply add more automation and increase the uninterrupted time away from the workstation. As a user, you have control to further enhance assays in ELISAs, kinetics, receptor binding, DNA purification, solid-phase extraction, mother/daughter plate replication and more. Technical Information Bulletin T-1832A provides a detailed overview of the new Gripper Tool and its capabilities. The new Gripper Tool requires the new BioWorks 2.0 operating system; please refer to the Software section of this issue for more information about BioWorks 2.0. For additional information, contact your Biomek representative.

## SOFTWARE INTEGRATION

### BIOWORKS VERSION 2.0 IS HERE

Regardless of the methods running on your Biomek 2000 system, an upgrade to version 2.0 of BioWorks will improve your system's performance. All Biomek 2000 instruments can be upgraded to BioWorks 2.0.

The upgrade to BioWorks 2.0 includes a new CPU board inside the Biomek 2000. If there is a Tip Disposal accessory on the workstation, it must be upgraded to the new larger Disposal option, which also accommodates plates. If there is a Side Loader on the system, it must be performed with a Hand Upgrade, and if there is a Plate Reader on the Side Loader, a Mini-Stack must be installed. There are many features in BioWorks 2.0 that add value to the operation of your Biomek 2000 system. A "Top-10" list



looks something like this:

10. Control of the NEW Gripper Tool
9. Device definitions
8. Faster operation due to new workstation CPU hardware
7. Lid handling on the Biomek worksurface
6. Expanded Side Loader capabilities and movements
5. Improved Side Loader alignment procedure
4. Increased throughput—methods completed up to 20% faster
3. Improved Side Loader movements and better alignment
2. New functionality with Gripper Tool and Devices
1. Labware and device layering on the worksurface

In Addition:

- The Labware database was expanded
- Labware Edit was enhanced to provide access to Gripper Tool (and Side Loader) related parameters
- Reservoirs may now be labeled
- The workstation program can now be downloaded from the PC to the Biomek 2000 by selecting Download/FLASH in the Diagnostics Module.
- Copy from Other Source has been added as an option in Lab Book Manager.
- Plate Reader operation has been enhanced to permit parallel operation of kinetic reads with other workstation operation

The Labware edit and definition screen in BioWorks 2.0 is modified to include Gripper Tool specifications (grip location, etc.). Figure 3 shows an example of this new editing screen.

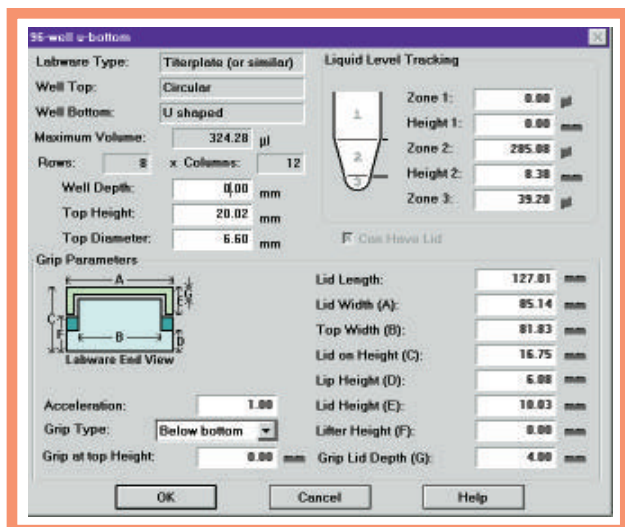


Figure 3. The Labware Definition Screen in BioWorks.

### SPOTLIGHT ON DEVICE EDIT IN BIOWORKS™ 2.0



A new category of items for the Biomek<sup>®</sup> worksurface has been created. This category, called “Devices,” has been added to the Labware Bar and includes the Heater/Cooler Block, the tip rack holder, and the 96-Filtration System vacuum manifold base and collars. “Devices...” has also been added under the Edit Menu in the Edit Module so new devices can be created for both the worksurface and the Side Loader (Figure 4).

Using Device Edit, the positions and dimensions of items such as plate readers, thermal cyclers, temperature control devices, etc., can be defined by the operator. Device Edit is applicable for items on the worksurface or in a Side Loader Portal in BioWorks.

A key feature of Device Edit is the use of the pipette transfer screen. Once a device has been aligned in the system, it is accessed in the same fashion as a standard plate on the worksurface. For example, the pipette transfer screen is used to move liquids from a modular reservoir on

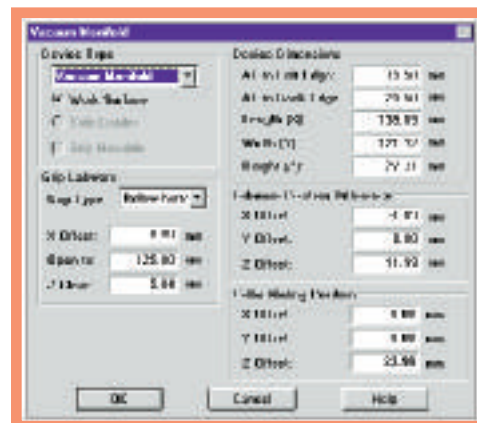


Figure 4. Alignment of Device using Device Edit screen.

the Biomek worksurface into a thermal cycler by using the standard pipette transfer function from the function palette in BioWorks.

The new lightning bolt icon in the function palette of BioWorks 2.0 is where you will find “Device Control” for pre-defined devices (other than the Biomek Plate Reader). The new icon replaces the Heater/Cooler Block (HCB) icon. If a Heater/Cooler Block or Vacuum Manifold is placed on the worksurface, then the palette button and menu item are enabled, and selecting the icon and then the location with the device calls up the appropriate device control dialog.

Since the Vacuum Manifold is now a defined device, the Valve



Unit, which controls the vacuum, is turned on and off with Device Control, instead of BioScript™ CV commands.

### ENHANCED DDE FUNCTIONALITY IN BioWORKS 2.0

One of the many exciting new features of BioWorks 2.0 is the addition of Dynamic Data Embedding (DDE) for BioScript. DDE allows Windows\* applications to share data and communicate.

BioWorks 1.4 offered some DDE control for running methods and retrieving the status of the Biomek by other applications. For BioScript users BioWorks 2.0 exceeds this, permitting great flexibility by allowing a BioScript to communicate with DDE applications running on the PC.

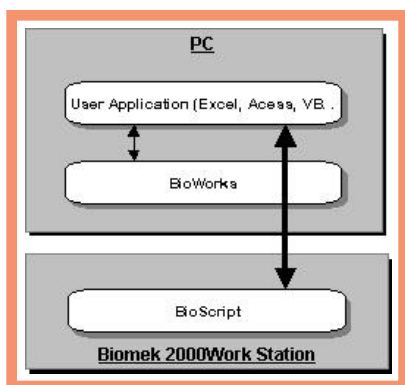


Figure 5. BioScript DDE Communication

BioScript can help DDE clients access data from spreadsheets, databases, user-developed applications and much more. Most Windows\* applications support DDE. One use for DDE and BioScript is to access data in Excel spreadsheets for determining what wells of a plate to process or how to process them in work listing and smart pipetting applications (changing volumes). Another use is to request data from the user, such as the number of plates to process in methods, where there are different number of samples to process each time the method is run. BioScript can also provide data to the applications running on the PC. This data could be used to display the progress of the script, or provide data to an application such as Excel so that new commands could be sent to the Biomek Work Station.

There are many possibilities for two-way communication between the Biomek 2000 and other applications. For BioScript users, DDE significantly improves the ability to create custom applications and control them.

A Technical Information Bulletin will soon be published to describe in detail the simple process of DDE communications in BioScript. For more information, please contact your Biomek representative.

## LABWARE INTEGRATION

The following new Labware has been added to the BioWorks labware catalog in BioWorks Version 2.0:

- SAGIAN four-well Refillable Reservoir
- PE-9600 MicroAmp\* Tray
- Flash\* Plates from DuPont NEN
- Cryo vials (Cryo v-bottom) from NUNC

## ANNOUNCEMENTS

### MERGER WITH SAGIAN, INC.

In the last issue of T3-Update, we announced the acquisition of the Robotics division of SAGIAN, Inc. This acquisition adds significant resource to our internal development capabilities for future robotics invention and enhancement. In addition, it adds more optional peripherals to choose from for existing systems.

In this issue, we will introduce a new section to our newsletter detailing items from SAGIAN. This will help to clarify the process of knowing where to go for information about products and services from Beckman and SAGIAN.

### KEY FACTS ABOUT THE MERGER:

- The transaction was completed December 1996
- All SAGIAN management has remained in place, including all the original founders
- All SAGIAN employees will remain in Indianapolis

### FAQS: FREQUENTLY ASKED QUESTIONS ABOUT THE MERGER

#### Q: Why did Beckman Purchase SAGIAN?

**A:** After a very successful marketing alliance from March to December 1996 that focused on development and sales of CORE systems, Beckman decided that an acquisition would enhance our investment in the drug discovery marketplace. SAGIAN has three of the leading technologies for the automation of the drug discovery process: SAMI Software, the ORCA Linear Robot System, and the Multi-Pette 96 Channel Pipettor.



**Q: Why did SAGIAN agree to be purchased?**

**A:** SAGIAN was investigating several channels to expand internationally and further advance its technology. One of these options was partnership with a larger reputable organization. Beckman's offer gave SAGIAN the ability to pursue the global market with a company that has similar goals in the drug discovery marketplace.

**Q: Why didn't Beckman buy another robot company?**

**A:** Beckman was not looking for just a "robot company." With expertise in system integration and software development, SAGIAN is more than just a "robot company." With a strong engineering group and the ability to rapidly prototype and complete hardware projects, SAGIAN has a very complementary skill set to Beckman's competencies in quality, service and support.

**Q: What will happen with the Sideload arm?**

**A:** Nothing. It will continue to be an option to consider for handling more sample capacity in a system.

**Q: Where will products be manufactured?**

**A:** Manufacturing locations will not change until the advantages of Beckman's capacity and facilities are advantageous. The ORCA and other SAGIAN peripherals will continue to be built in Indianapolis. All standard CORE products will adhere to Beckman quality standards to conform to our ISO 9001 Quality registration.

*If you have questions about this information or an issue that is not covered here, please contact your Biomek or SAGIAN sales representative.*

**ROBOTICS PERIPHERALS AVAILABLE**

The chart below shows the range of peripherals available from Beckman. Some of these items are CORE system certified, others are not. This detail is explained in the chart. Over time, some custom peripherals will become CORE system certified and be available as CORE system components. We will update this list regularly. Contact your Biomek or SAGIAN sales representative for information about these items.

ITEM	CORE/ Custom
<b>DETECTORS</b>	
MDC V-Max™	CORE
MDC T-Max™	CORE
MDC S-Max™	CORE
BMG Fluostar™	CORE
BMG Fluostar '97™	Custom
BMG Lumistar™	Custom
Wallac Victor™	Custom
Wallac TriLux™	CORE
<b>PROCESS DEVICES</b>	
Multi-Pette	Custom
Plate Sealer	CORE
Lidding Station	CORE
Filtration Manifold	Custom
Plate Shaker	CORE
Microplate Carousel	CORE
Bar Code: Reader	CORE
Bar Code: Print and Apply Station	Custom
CO2 Incubator	CORE
CS Incubators	CORE
MDC= Molecular Devices Corporation.	

*Figure 6. Robotic peripherals. Note: Some items are not available in all areas outside the United States. Please contact your local Beckman representative.*



**BIOMEK CORE SYSTEMS**

In Volume 2 of T<sup>3</sup> Update, we introduced CORE systems to our product portfolio. These systems, built around the SAGIAN, ORCA and SAMI Software, provide significant productivity gains for all assays. The advantages of “plug-and-play” components (process devices, detectors, incubators, etc.) are inherent in the systems, all of which are available as part of an upgrade path that can start with a Biomek workstation and grow into a large CORE system configuration.

SAMI Software is the heart and soul of CORE systems. A method editor and assay scheduler, SAMI enables all of the devices in the system to perform multitask operations. In this fashion, the output of the system improves. SAMI also works within the typical variability of a modern laboratory, where day-to-day sample load can change dramatically, but assays/methods stay the same. In these situations, SAMI schedules a new work-flow based on the number of plates to be processed through the existing method. Specific resources are dragged and dropped onto the worktable as needed in a method and then a schedule is built around the number of samples to be processed.

As new peripherals are added to CORE systems, an icon will be available for SAMI, which includes the communication requirements to the new device, and a device method edit screen. In this manner, CORE systems achieve plug-and-play versatility while delivering assay flexibility.

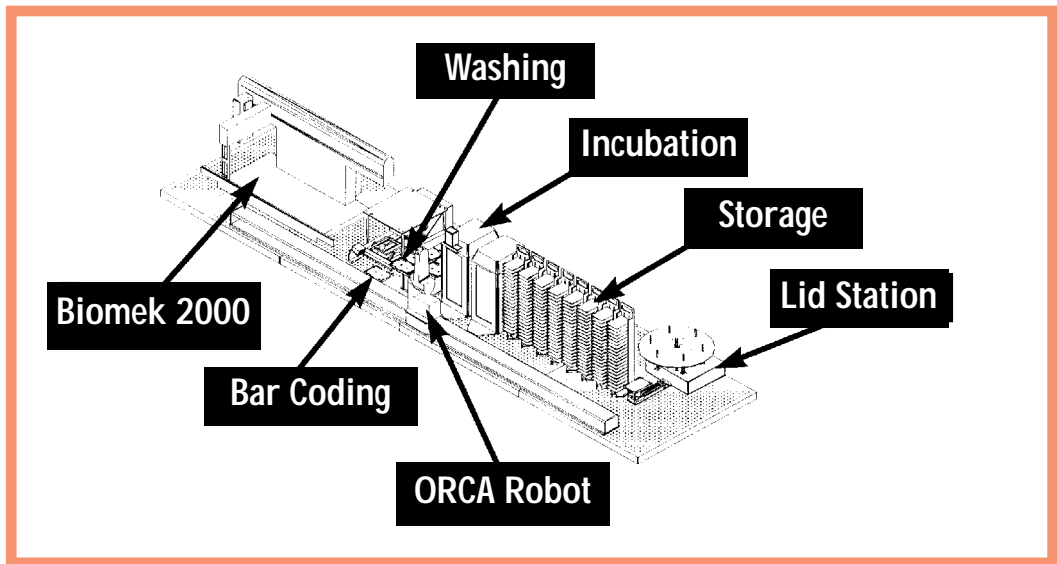
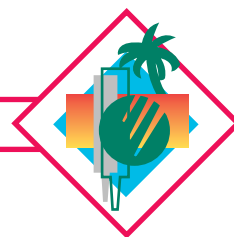


Figure 7. Typical CORE System configuration.



Figure 8. SAMI Method Editor.



1997 TRADE SHOWS AND MEETINGS

Trade Shows

- AAPS .....November 3–5
- Eastern Area Symposium .....November 16–21

Meetings

- HPLC '97 .....June 22–27
- High Throughput Screening .....June 25–27
- Health Physics .....June 29–July 3
- Drug Discovery .....August 11–14
- Genome Sequencing .....September 13–18
- Human Genetics .....October 28–November 1
- Bioprocessing .....November 3–6
- Solution Interaction & Macromolecules .....November 15–17
- Nucleic Acid .....November 19–21
- Cell Biology .....December 13–17



CLUB BIOMEK®

CLUB BIOMEK ACTIVITIES

Another Club Biomek function was held recently at the Lab Automation Conference in San Diego, Calif. The event featured food, camaraderie and entertainment. The highlight of the evening was the "Phantom Fantasy," featuring a hypnotism demonstration. The event was held at The Abbey, an old church converted into a restaurant and special-events location.



Three attendees of Lab Automation Conference take time out for fun.

Conference goers participate in hypnotism demonstration.



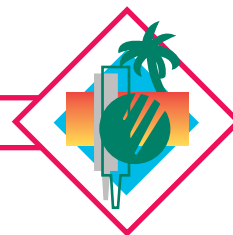
Under the influence of the 'Phantom.'



COOL STUFF FOR HOT METHODS

Impress your friends with cool Club Biomek merchandise! To show that we're serious in making Biomek methods available at our Web site, we're offering you the choice of a Club Biomek towel or shirt just for submitting to us a method you have run with your Biomek 2000. FAX your method to us at (714) 773-6611 and indicate your merchandise request (please include size if requesting a shirt: M, L or XL).

*Limit: One item per method; available while supplies last.*



## TECHNICAL AND APPLICATION BULLETIN INDEX

The following information is available from Beckman.

*Technical(T) and Application(A) Information Bulletins*

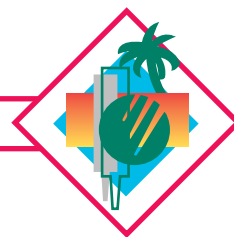
- T-1709 The Automation of Three Clinically Important ELISAs with the GenELISA V2.1 System
- T-1710A A Method for Interfacing the High-Density Replication System with the Biomek 1000 Side Loader
- T-1711 Preparation of High-Density Colony Filters for Screening Cosmid Libraries
- T-1713 Hybridoma Screening Using the High-Density Replicating System on the Biomek 1000 Automated Laboratory Workstation
- T-1721 Complete ELISA Automation Using the Biomek 1000 SL and SL Incubator
- A-1743 Validation of the Biomek 1000 BioRobotics System for LAL Endotoxin Testing Using the BioWhittaker Kinetic-QCL System
- A-1749 Complete Automation of Endotoxin Detection Using the Biomek 1000 BioRobotics System for LAL Endpoint Assays
- A-1759A Use of the Biomek Workstation for Ki Determinations
- A-1764A ELISA Automation: A Biomek 1000 to Biomek 2000 Comparison of Clinical ELISAs
- A-1765A Automation of HIV Proteinase Enzyme Assay Using Scintillation Proximity (SPA) Technology
- A-1766A High-Throughput DNA Sequencing Reactions Using the Biomek 2000 BioRobotics System
- A-1767B Contamination-Free PCR Preparation of Multiple Samples Using the Biomek 2000 Laboratory Automation Workstation
- A-1802A Radioimmunoassay Automation: Development of a Single-Step Assay Using the Biomek 2000 Laboratory Automation Workstation Integrated with the MicroBeta PLUS 96-Well Scintillation/Luminescence Detector
- A-1826A High Throughput Purification of Plasmid DNA Using the 96-Plasmid Purification Kit on the Biomek 2000 Laboratory Automation Workstation
- BA96-3145 Biomek 2000 Laboratory Automation Workstation: Modifying Pipetting Tool Specifications in BioWorks Software
- BA96-3146 Biomek 2000 Laboratory Automation Workstation: Introducing New Labware Specifications into BioWorks Software

- T-1809A Integration of the Biomek 2000 and Wallac MicroBeta Trilux Microtiter Plate Scintillation/Luminescence Detector
- T-1832A The Gripper Tool: Expanding the Functionality of the Biomek 2000 Laboratory Automation Workstation  
**NEW!**
- T-1833A Colony Selection with an Automated 384-Pin High-Density Replicating Tool (HDRT)  
**NEW!**

## ARTICLE REPRINTS

The following article reprints are available from Beckman.

- 007-134 A Flexible, Integrated System for Automation of Hybridoma and ELISA Procedures, E.W. Stewart and N.C. Appleby
- 007-135 Automated Sanger Dideoxy Sequencing Reaction Protocol, J. Zimmerman, H. Voss, C. Schwager, J. Stegemann and W. Ansoerge, Federation of European Biochemical Societies, 223: 432-436 (1988)
- 007-137 Automation of Dideoxynucleotide DNA Sequencing Reactions Using a Robotic Workstation, R. K. Wilson, A.S. Yuen, S.M. Clark, C. Spence, P. Arakelian and L.E. Hood, BioTechniques 6: 776- (1988)
- 007-138 Automated Methods for Single-Stranded DNA Isolation and Dideoxynucleotide DNA Sequencing Reactions on a Robotic Workstation, E.R. Mardis and B. A. Roe, BioTechniques, 7: 840- (1989)
- 007-182 Detection and Quantification of Gene Amplification Products by a Nonisotopic Automated System, M. Holodniy, M.A. Winters and T. C. Merigan. BioTechniques 12: 37-39 (1992)
- 007-320 Pharmaceutical Biotechnology International (1995).  
Limited quantities available. Includes Biomek 2000 Ad, CE Ad, Beckman Corporate Profile and High-Throughput Screening Article.



## FREQUENTLY ASKED QUESTIONS

### QUESTIONS

1. I have difficulty or errors when opening windows, methods or lab books in BioWorks.
2. When I use serial dilution selected from the function pallet, droplets of sample are drawn up into the pipette tips after mixing the source and the software does not allow a tip touch. How can I resolve this?
3. When I run a method using the P200L tool and the MP200 tool I waste tips because the MP tool always starts with a fresh column of tips and the P200L will start at the next available tip even if there were clean tips left in the box prior to switching to the MP200. Any suggestions?
4. How do I know the order in which labware and holders are stacked on the worksurface window using version 2.x BioWorks?
5. When executing a function in a method with “no tip change” selected followed by a function with “tip change always,” the tips change too soon. Why?

### ANSWERS

1. Check your hard drive. From the DOS prompt, check drive C: using the CHKDSK command. Verify that no bad files are found. If bad files are found, run CHKDSK/ f to correct the file problems. The recovered files will appear in the root directory for you to check and delete if necessary. Later versions of MS DOS, versions 6.0 and 6.2, use SCANDISK, which actually corrects more problems than CHKDSK. Use SCANDISK when possible.
2. When setting up a serial dilution, choose pipette transfer instead of serial dilution. Set up your source and destination as the same plate. Pipette from column 1-11 at the source and column 2-12 at the destination. This option offers full functionality of all parameters.
3. Assign different tip boxes to each tool. Label the tip box. Note: Be careful when labeling tip boxes. If the tips are completely used but you need more tips, it will only continue if another tip box has the identical label.
4. Click the right mouse button on the worksurface location in question and a list of labware and holders is displayed in the order of bottom to top.
5. When a function in a method has “tip change always,” it will always start this function with clean tips. Example: If the prior step is a “Mix” with “no tip change,” and the following step is a “Pipette Transfer” with “tip change always,” the “Mix” function will discard tips even though you selected “no tip change” so the “Pipette Transfer” can start with fresh tips.

\* All trademarks are property of their respective owners

## **BECKMAN**

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# FREQUENTLY ASKED QUESTIONS



*Return via FAX to: Beckman Instruments (714) 773-6611*

In an effort to fulfill Club Biomek's desire to be responsive to Biomek® 2000, Side Loader and CORE system owners, we provide this space for you to direct any questions or comments you have to Beckman. Until the interactive user site is finished on the Beckman Home Page, please write out your Biomek questions and FAX them to Beckman Instruments, Inc., (714) 773-6611. Include your name, address, and e-mail address, and we will immediately answer your questions. Of course, you can still call Beckman Product Support at (800) 4BIOMEK or (800) 854-8067.

QUESTIONS: \_\_\_\_\_  
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