

PrecisionTM

Microplate Pipetting System

Operator's Manual



Precision™ Microplate Pipetting System **MANUAL UPDATE**

P/N 7111000, Revision D1

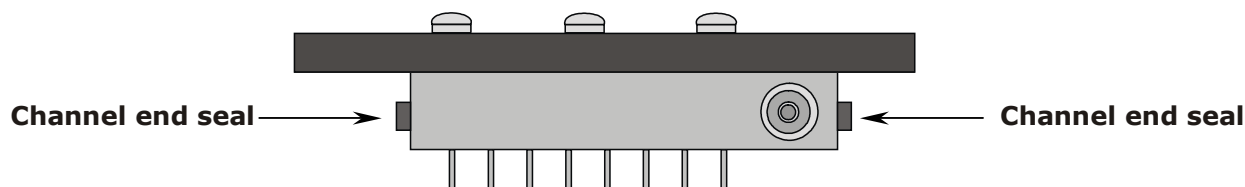
January 2005

This Manual Update contains changes to the Precision Microplate Pipetting System Operator's Manual for Precision models with the **dispensing manifold** (8-Channel Plus, 12-Channel Plus, and Universal).

These changes will be incorporated in the next full revision (Rev E) of the Operator's Manual, in **Chapter 8, Maintenance**, (To clean the manifold tubes and channels, page 211).

- **Lubrication of channel-end seals:** Do not apply lubricant to the two channel-end seals when reinserting the seals after cleaning the manifold. Use **alcohol** to assist with reinsertion of the channel-end seals.
- **Color of channel-end seals:** The two channel-end seals may be black **or** gray (the manual currently states that the seals are black).

DISPENSING MANIFOLD





PrecisionTM Microplate Pipetting System Operator's Manual



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Revision D
Bio-Tek[®] Instruments, Inc.

Notices

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Revision History

Revision	Date	Changes
A	5/00	• First issue.
B	6/02	• Added text throughout concerning 12-Channel and Universal models, and Precision Power software. Added Performance section to Chapter 1. • Updated model titles to “8-Channel” and/or “Plus,” where appropriate. • Added new chemical compatibility caution, page vi. • Updated Notices, Document Conventions, Package Contents, etc. • Updated Appendices B and D; added new Appendix E.
C	10/03	• Incorporated grease-kit instructions for linear way maintenance. • Made minor improvements to the Intended Use Statement, and to acceptance test and specifications descriptions.
D	8/04	• Revised product name to conform to latest product naming structure. • Added new text throughout manual concerning compatibility/operation of Precision with the Bio-Stack. • Updated warnings/cautions/safety info in Preface. In Chapter 1, revised specs and Technical Support sections, added Optional Accessories list and new section on Applications Support. • Revised unpacking/repackaging artwork and instructions in Chapter 3. • Updated Performance Verification section, Chapter 7 with information from latest Precision IQ-OQ-PQ Procedures (PN 7111017) and revised Decontamination instructions in Chapter 8. • Revised error codes, Chapter 9 and added new Appendix E, Chemical Compatibility. • Reformatted for cosmetic effect.

Intended Use Statement

- The Precision Microplate Pipetting System supports most liquid handling protocols for 96- and 384-well plates, including reagent addition, serial dilutions, and sample transfers.
- This system has its own on-board software for instrument control. Alternatively, it is designed for use with PC-based software: Bio-Tek's Precision Power™ for Windows® software provides the user with PC control of the instrument for enhanced functionality.
- The Precision can be used as a stand-alone instrument, or can operate with standard robotic systems, such as Bio-Tek's Bio-Stack Microplate Stacker.
- **In the European Union:** This product may **only** be used for Research and Development and other non-clinical uses.
- **In all other jurisdictions:** This product may be used for Research and Development and *in vitro* Diagnostic Use.

Quality Control

It is considered good laboratory practice to run laboratory samples according to instructions and specific recommendations included in the assay package insert for the test to be conducted. Failure to conduct Quality Control checks could result in erroneous test data.

Repackaging and Shipping



If you need to ship the instrument to Bio-Tek for service or repair, contact Bio-Tek for a Return Materials Authorization (RMA) number, and be sure to use the original packing. Other forms of commercially available packing are not recommended and can void the warranty. If the original packing materials have been damaged or lost, contact Bio-Tek for replacement packing.

Chapter 1

Introduction

This chapter introduces Bio-Tek’s Precision Microplate Pipetting System. Product information, including hardware and software features and technical specifications, is presented here. See **Chapter 2, Instrument Description** for more in-depth information including the principles of operation and component descriptions.

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Product Overview

Bio-Tek's Precision™ Microplate Pipetting System is an affordable, innovative solution for automating liquid handling in your laboratory. A unique hardware design combined with powerful and versatile on-board software allow for a smooth transition from your manual methods to automation with the Precision. The instrument supports a wide variety of fluid transfer operations for both 96- and 384-well microplates, including:

- Sample transfer
- Plate replication
- Serial dilutions
- Reagent addition
- Mixing within a well
- Continuous reagent dispense (using the manifold)

You'll find the Precision does not limit you to using just a few types of reagent vessels or microplates. We've designed the hardware and the software to allow you to create custom "Specification Files" for some of the supplies already in use at your laboratory. To get you started, the instrument comes pre-installed with Specification Files for some common lab products, including Rainin FinePoint™ 250 µl tips, Labcon® 50 µl and 200 µl tips, Nunc flat 1 x 8 microstrips / 96-well microplates, Corning Costar® 384-well microplates, and Bio-Tek's 4-vessel reagent holder.

And just as we've given you Specification Files for some common lab products, we've also put together a few "Programs" for you (see the list in **Appendix B**). A **Program** simply contains a sequence of commands to perform a fluid transfer. Programs are created, modified, and run from the instrument's Main Menu. You can run the existing programs, modify them, or create new ones.

Variations

The Precision is available in four models. All models support 96- and 384-well microplates and are robot-compatible.

Bio-Tek PN	Model	Description
PRC384	8-Channel Precision	Instrument with 8-channel pipette.
PRC384M	8-Channel Precision	Instrument with 8-channel pipette and syringe pump with 8-channel dispensing manifold. The manifold allows for rapid plate filling.
PRC384/12	12-Channel Precision	Instrument with 12-channel pipette and syringe pump with 12-channel dispensing manifold for rapid plate filling.
PRC384U	Universal Precision	Instrument with 12-channel pipette and two platforms for dispensing into a column of 8 wells or a column of 12 wells. This instrument includes a syringe pump and both an 8- and 12-tube manifold for rapid plate filling.

Precision Power™ Software is also available for creating, editing, and running programs on the Precision. Precision Power is a Microsoft Windows-based software tool developed by Bio-Tek Instruments, Inc. for simplifying the programming of the Precision. The user has the advantage of a full computer keyboard, mouse, graphic display, and intuitive software to simplify the programming process. In addition, Precision Power offers increased functionality not available on the base instrument, including nested loops, more commands per program, and supply replenishing during program execution.

Compatibility With the Bio-Stack System

Many Precision instruments are compatible with Bio-Tek's **Bio-Stack™ Microplate Stacker**. (Please refer to the table below for a list of compatible models.)

In this configuration, Bio-Tek's **Precision Power™ Software** and **Bio-Stack™ PC Control Software** are installed on a host PC equipped with two serial ports. Precision Power uses one port to control the Bio-Stack via the **ActiveX component** of the Bio-Stack PC Control Software, and the other port to control all functionality of the Precision.

The Bio-Stack can rapidly and systematically transfer microplates one at a time to and from the Precision, and includes:

- Removable stacks (one input and one output) that can hold up to 30 microplates each.
- Optional restacking of plates to maintain correct sequencing.
- The ability to continue processing a stack of plates following the aborting/failure of one plate.
- The ability to pause processing to allow the user to add more plates to the input stack or to remove some from the output stack.

If you have purchased the Bio-Stack to operate with your Precision, an accessory kit (PN 7110004) is included with the Bio-Stack that contains the Bio-Stack PC Control Software and hardware for aligning the two instruments. Refer to the Bio-Stack Operator's Manual for instructions on mechanical alignment, and to the Precision Power User's Guide or Help System for instructions on configuration of the Precision for operation with the Bio-Stack

If you are interested in purchasing the Bio-Stack, refer to the table below to determine if your Precision is compatible with the Stacker. Please note that some of the instruments that are compatible may need to be upgraded with **new basecode software**. Contact your local dealer for more information.

The following models are compatible	
8-Channel, 8-Channel Plus, Universal in 8-channel mode	With serial numbers >187931
The following models are not compatible	
8-Channel, 8-Channel Plus, Universal in 8-channel mode	With serial numbers < 187931
Universal in 12-channel mode	All serial numbers
12-Channel Plus	All serial numbers

Hardware Features

- External membrane keypad with 25 alphanumeric keys and 2-line x 24-character LCD display
- 8-channel and/or 12-channel pipette
- Optional syringe pump and 8-channel and/or 12-channel manifold, with priming trough
- Six-station and/or 4-station supply platform, with components that are easily removed for cleaning
- External 24-volt power supply compatible with 100-240 V~ @ 50-60 Hz
- Bi-directional serial RS-232 COM port (25-pin male connector)
- Parallel port
- Controllable flow rates and volumes provided by 8- or 12-channel positive displacement pipette syringe pumps, and an optional positive displacement manifold syringe pump
- Accurate and repeatable pipette, manifold, and supply platform positioning provided by multiple stepper motors

Software Features

The on-board, menu-driven software supports:

- Ability to create programs to perform fluid transfers
- Ability to create detail and specification files for inclusion in programs
- User-definable file names, resulting in the rapid recall of files
- Ability to edit, copy or delete files
- Ability to send file contents to a printer
- Ability to “lock” files to avoid unintentional modification
- Validation utility checks programs for errors
- Easy-to-update basecode software
- Storage of up to 80 programs, 80 detail files, and 80 spec files
- Pre-defined QC programs
- Specification measurement utility to configure the software for use with a wider variety of tips and vessels

Package Contents

- Precision™ Microplate Pipetting System
- Power cord (PN 75089)
- External 24 VDC power supply (PN 61062)
- RS-232 cable (PN 75053)
- Printer cable (PN 71072)
- Waste collection bin for used tips and for residual fluid (PN 44284)
- 1 box of Labcon 200 pipette tips (PN 98195)
- 4 Bio-Tek reagent vessels, 50 ml capacity (PN 7112122) for Precision 8-Channel, 8-Channel Plus, and Universal models
- 3 Bio-Tek reagent vessels, 65 ml capacity (PN 7112113) for Precision 12-Channel Plus, and Universal models
- 4 holders for tips or reagent vessels (PN 7112117)
- 4 holders for microplates or microstrip holders (PN 7110509)
- 1 set spare pipette tip o-rings (PN 19458): 8 o-rings for 8-channel pipette, 12 o-rings for 12-channel pipette
- Set of shipping materials (PN 7113002)
- Unpacking (PN 7111005) and packing (PN 7111006) instructions
- Shipping document kit (PN 94075) including Warranty Card, Certificate of Compliance, and FDA Certification
- Declaration of Conformity (PN 7111002)
- Grease kit for periodic cleaning and lubrication of the linear ways and motor screws (PN 7110017)
- Operator's Manual (PN 7111000)

For manifold models only:

- One 2-liter supply bottle with cap, Luer fitting, and tubing (PN 4070515)
- Syringe inlet and outlet tubing (PN 7110516 and 7110517)
- Stylus for cleaning the dispense tubes (PN 2872304)
- Priming trough (PN 7112112)
- Manifold priming trough drain set (PN 7110015)
- Hanger tube (PN 7112050)

Optional Accessories

- Dispense manifold tubing for DMSO (PN 7110530)
- Spare dispense manifold tubing (PN 7110523)
- Spare dispense manifolds
 - 12-channel (PN 7110550S)
 - 8-channel (PN 7110549S)
- Spare reagent bottle (2 L) with cap and connector (PN 4070515)
- Protective aerosol cabinet (PN 7113003)
- Spare reagent reservoirs
 - 1 x 12 (PN 7112113)
 - 1 x 8 (PN 7112122)
- Spare pipette tip o-rings (PN 19458): 8 o-rings for 8-channel pipette, 12 o-rings for 12-channel pipette
- Bio-Tek blue test dye solution (PN 7773001) and wetting agent solution (PN 7773002) for liquid testing
- Precision Power Software (PN PRCPWR)
- Precision Power Software Version 2 Upgrade (PN PRCPWR UPGRADE V2)
- Precision ActiveX Programmer's Package (PN 7110008)
- Precision Service Manual (PN 7110001)
- Installation-Operational-Performance Qualification (IQ-OQ-PQ) Procedures (PN 7110524)
- Bio-Stack Microplate Stacker (PN BIOSTACK)

❖ **Note:** Precision Power Software Version 2 Upgrade is required for operation of the Precision with the Bio-Stack.

Many other accessories are available for the Precision. Contact Bio-Tek for more information.

Technical Specifications

Supplies

	The Precision is initially configured for use with the tips and vessels listed here; however, the instrument can be configured to support a wider variety of tips and vessels, as described later in this manual.
Tips	Bio-Tek 250 µl pipette tips (manufactured by Rainin®) Bio-Tek 50 µl pipette tips (manufactured by Labcon®) Bio-Tek 200 µl pipette tips (manufactured by Labcon®)
Vessels	Nunc™ flat 1 x 8 microstrips / 96-well microplate Nunc™ round 1 x 8 microstrips / 96-well microplate Corning Costar® 384-well microplate Bio-Tek's reagent reservoirs

Electrical

Primary Main Power to External Power Supply:	100-240 V~ @50-60 Hz
Secondary DC Output from the External Power Supply:	24 VDC 48 Watts

Physical

Dimensions:	Instrument only: 15" D x 21" W x 16" H (38.1 cm x 53.3 cm x 40.6 cm) Instrument with optional aerosol cabinet: 17.5" D x 23" W x 17.5" H (44.5 cm x 58.4 cm x 44.5 cm)
Weight:	Instrument only: 28 lbs. (12.7 kg) Instrument with optional aerosol cabinet: 38 lbs. (17.2 kg)

Environmental

Operating conditions	15°-35°C (59°-95°F)
Relative humidity	10-80% (non-condensing)

Hardware

Pipette	8-channel and 12-channel, 120 µl maximum displacement per channel
Manifold	8-channel and 12-channel, for dispensing fluid only
Supply bottle volume	2 liters
User interface	External membrane keypad with 25 alphanumeric keys and 2-line x 24-character LCD display

Performance

Precision	Pipette precision is $\leq 2.0\%$ CV, when dispensing 100 µl per well of deionized water with 0.1% Tween® 20 with either FD&C #1 blue or #5 yellow dye. Touch off dispensing technique shall be used with an excess aspirated volume of not less than 10 µl. The temperature of the instrument under test and the reagent shall be the same during testing. Manifold precision is $\leq 3.0\%$ CV typical, when dispensing 100 µl per well of deionized water with 0.1% Tween® 20 with either FD&C #1 blue or #5 yellow dye.
Accuracy	Pipette accuracy is $\leq 2.0\%$, when dispensing 100 µl per well of deionized water with 0.1% Tween® 20. Touch off dispensing technique shall be used with an excess aspirated volume of not less than 10 µl. The temperature of the instrument under test and of the water solution shall be the same during testing. Manifold accuracy is $\leq 2.0\%$ typically, when dispensing 100 µl per well of deionized water with 0.1% Tween® 20.

Chapter 2

Instrument Description

Chapter 1 provided an introduction to the Precision Microplate Pipetting System. This chapter goes into greater detail by discussing the principles of operation and introducing important components. The information provided here is important for the operation, customization, and maintenance of the instrument.

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Principles of Operation

The Precision Microplate Pipetting System is a microprocessor-driven device with adequate memory for performing all functions described in this manual, and for the storage of up to

- 80 program files,
- 80 specification files, and
- 80 detail files.

All three file types are created, stored, and run using the on-board software via the 2-line x 24 character display and external keypad. In addition, these files may be created and run using **Precision Power** software loaded on a host PC. If you have purchased Precision Power to control your Precision instrument, please refer to the **Precision Power User's Guide** for more information on creating and running program, specification, and detail files. If you would like to purchase Precision Power, please contact your local dealer for more information.

Supply Types

Each program defines the required **supply types** (tips, reagent vessels, microplates, etc.), and their locations, tip and vessel specifications, and many aspirate and dispense parameters. Before a program can be run, the operator is responsible for loading the necessary supplies. Depending on the program and instrument model, the pipette or manifold handles fluid delivery.

Pipette Design

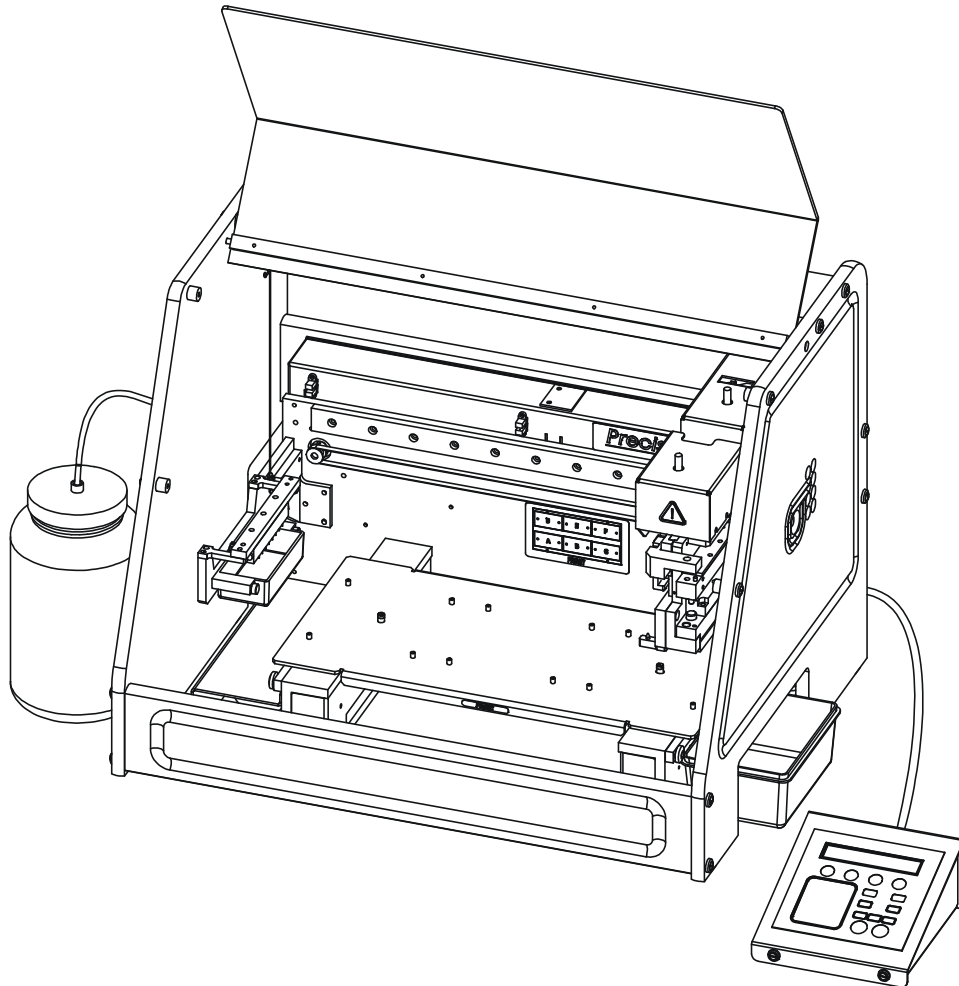
The unique **pipette design** provides a reliable way to pick up and seal the tips, and also ensures the long life of the seals. The pipette has eight or twelve channels terminating in tapered stainless steel tips that mate with disposable pipette tips. The pipette moves in the z- (up/down) axis to pick up tips and to aspirate and dispense fluid, and in the x- (left/right) axis to access the different stations on the supply platform.

Supply Platform

The **supply platform** has six or four stations (depending upon the model) that can accommodate tip containers, reagent vessel holders, and microplates. The platform is arranged in two rows of three stations, or (one row of four stations). It moves in the y (back/ forward) axis to orient the appropriate row under the path of the pipette and manifold. The ability of the platform to move in the y-axis allows the pipette and manifold to access both 96- and 384-well microplates, and makes the instrument compatible with robotic plate handlers.

Dispensing Manifold

The Precision 8-Channel Plus, 12-Channel Plus and Universal models have a **dispensing manifold**, in addition to the pipette. The manifold with its positive displacement pump allows for the direct dispensing of reagent to 96- and 384-well microplates. The manifold moves in the x- and z-axes.



Components

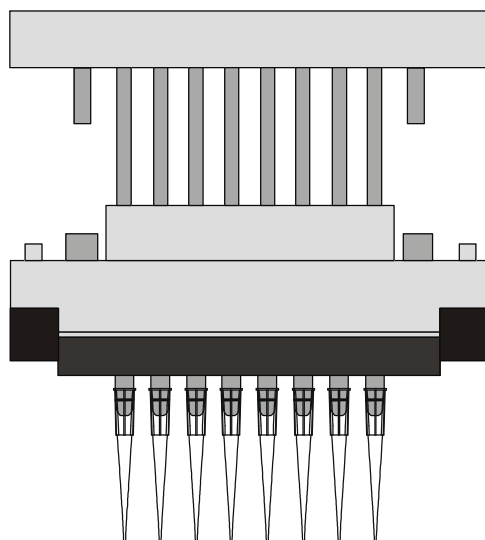
This section introduces several important components of the Precision.

❖ All figures shown in this chapter and throughout the manual are eight-channel models.

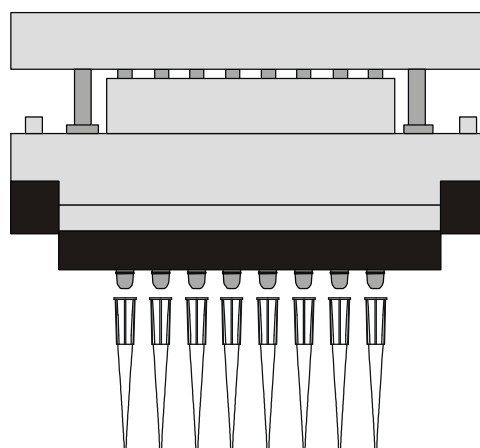
Pipette

The pipette uses individual syringes and disposable pipette tips to perform fluid transfers. The pipette “shuttle” (the entire pipette mechanism) travels in the z- (vertical) axis when picking up tips, aspirating fluid, dispensing fluid, and disposing of tips. It travels in the x- (horizontal) axis when moving from station to station. Each individual stainless steel pipette tip has an o-ring seal where it mates with the disposable tip to hold it securely in place. The maximum volume of each pipette channel is 120 μL .

The drawing below is of an eight-channel pipette head. The image on the left shows the positioning of the pipette mechanism after tips have been engaged. The drawing on the right shows the positioning of the mechanism when disposing of the used tips. The stripper plate is pushed down until the tips disengage. They can be dropped into the waste collection bin or into the tip rack.



Pipette with 8 disposable tips engaged



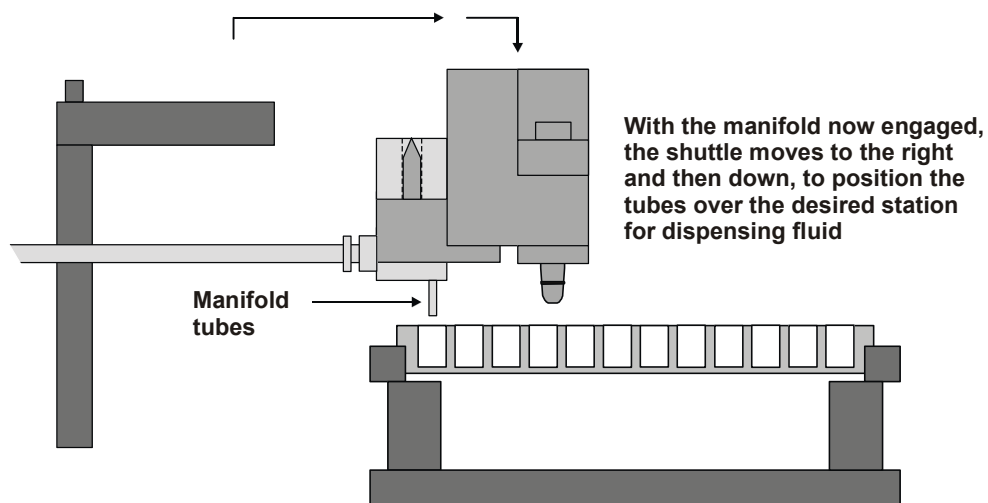
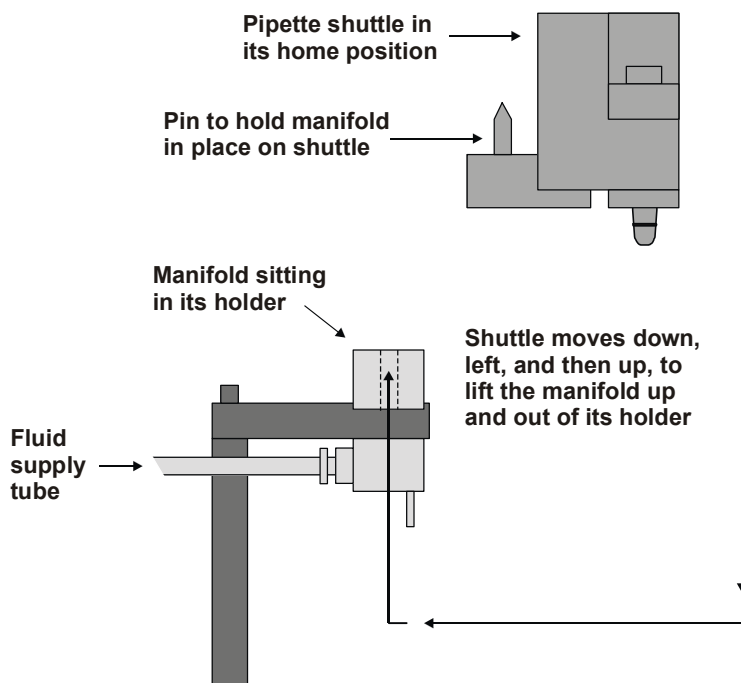
Pipette stripping off used tips

Manifold

When fitted with the appropriate accessory hardware, the pipette “shuttle” has the ability to retrieve an 8- or 12-channel dispensing manifold. The manifold does not aspirate. An external 2-liter supply bottle containing reagent or other solution is the source of fluid for the manifold. The manifold is particularly beneficial because it can perform rapid loading of a single solution to multiple microplates.

The manifold must be primed prior to use. This can be done automatically at the start of the program or manually through a utility section of the software. When the manifold is in its home position, it sits above the priming trough.

The pipette shuttle transports the manifold in the x- and z-axes, and the supply platform moves in the y-axis, allowing the manifold to dispense to both 96-well and 384-well plates, at any supply station. The drawings on the following page show how the pipette shuttle retrieves the manifold by lifting it up and out of its holder, and then positions it over a plate for dispensing. The view is from the front of the instrument.



Supply Platform

The supply platform used with a Precision™ in the eight-channel configuration has six “stations” labeled A-F. The stations are arranged in a 2 x 3 matrix, as shown in the drawings on the following page.

Precision models such as the Universal in 12-channel configuration and the 12-Channel Precision, have a supply platform with four stations labeled A-D. The stations are arranged in a 1 x 4 matrix.

Any station in the six-station or four-station platforms can be used for *any* supply, such as a tip tray, a reagent vessel holder, a microplate, or a microstrip holder.

The entire supply platform moves in the Y, or front-to-back, axis to provide the pipette and manifold with access to both rows of stations, and to accommodate 384-vessel plates. When pipette tips are used, they can either be returned to the tip tray or discarded into the detached waste container on the right side of the instrument.

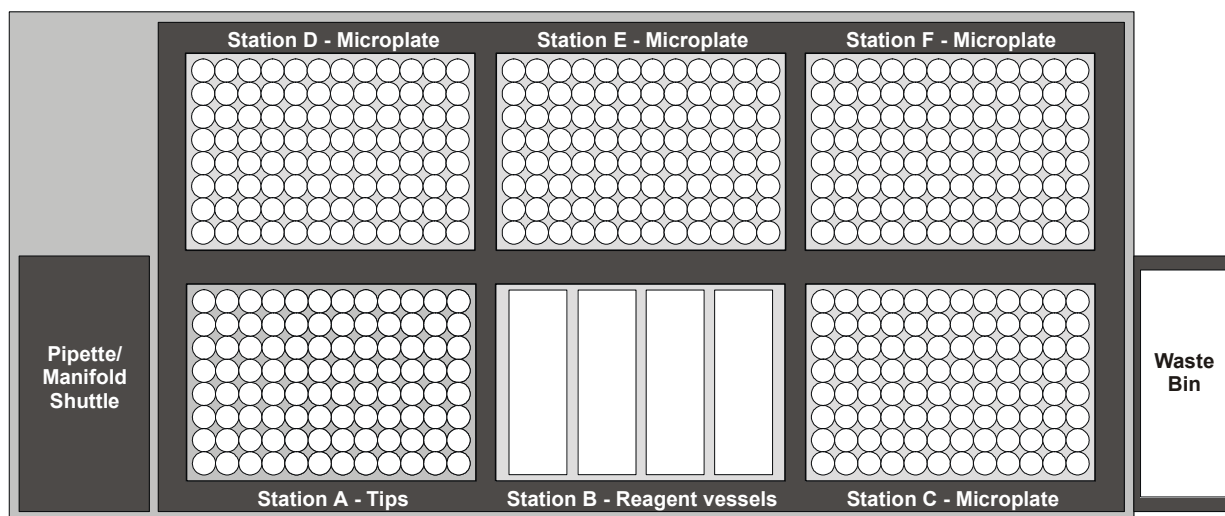
- ❖ The Universal model also has the six station (A-F) supply platform for operation in the 8-channel configuration.

Alignment of the Supply Platform With the Bio-Stack

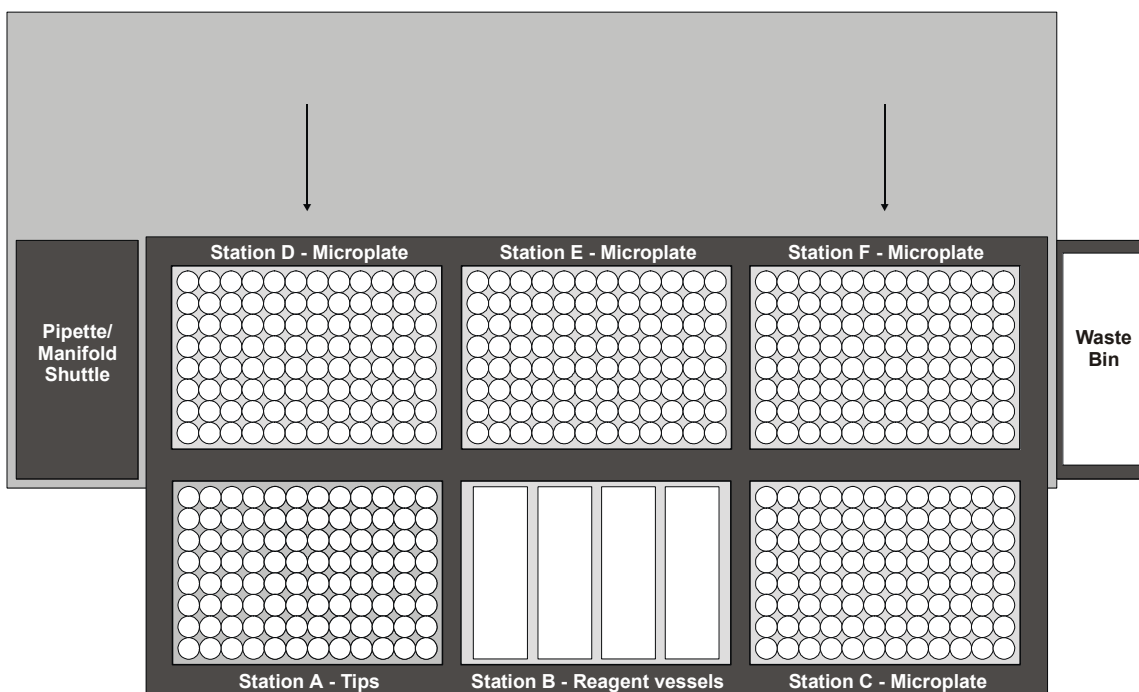
If you have purchased Bio-Tek's **Bio-Stack™ Microplate Stacker** for operation with the Precision, the supply platform must be aligned with the Stacker, using the alignment hardware and **Instrument|Precision Series|Configuration** feature in **Precision Power™ Software**. (Special aligning plates and posts also must be attached to the two instruments.)

Please refer to the Bio-Stack Operator's Manual for instructions on mechanical alignment, and to the Precision Power User's Guide or Help System for instructions on configuration of the Precision for operation with the Bio-Stack.

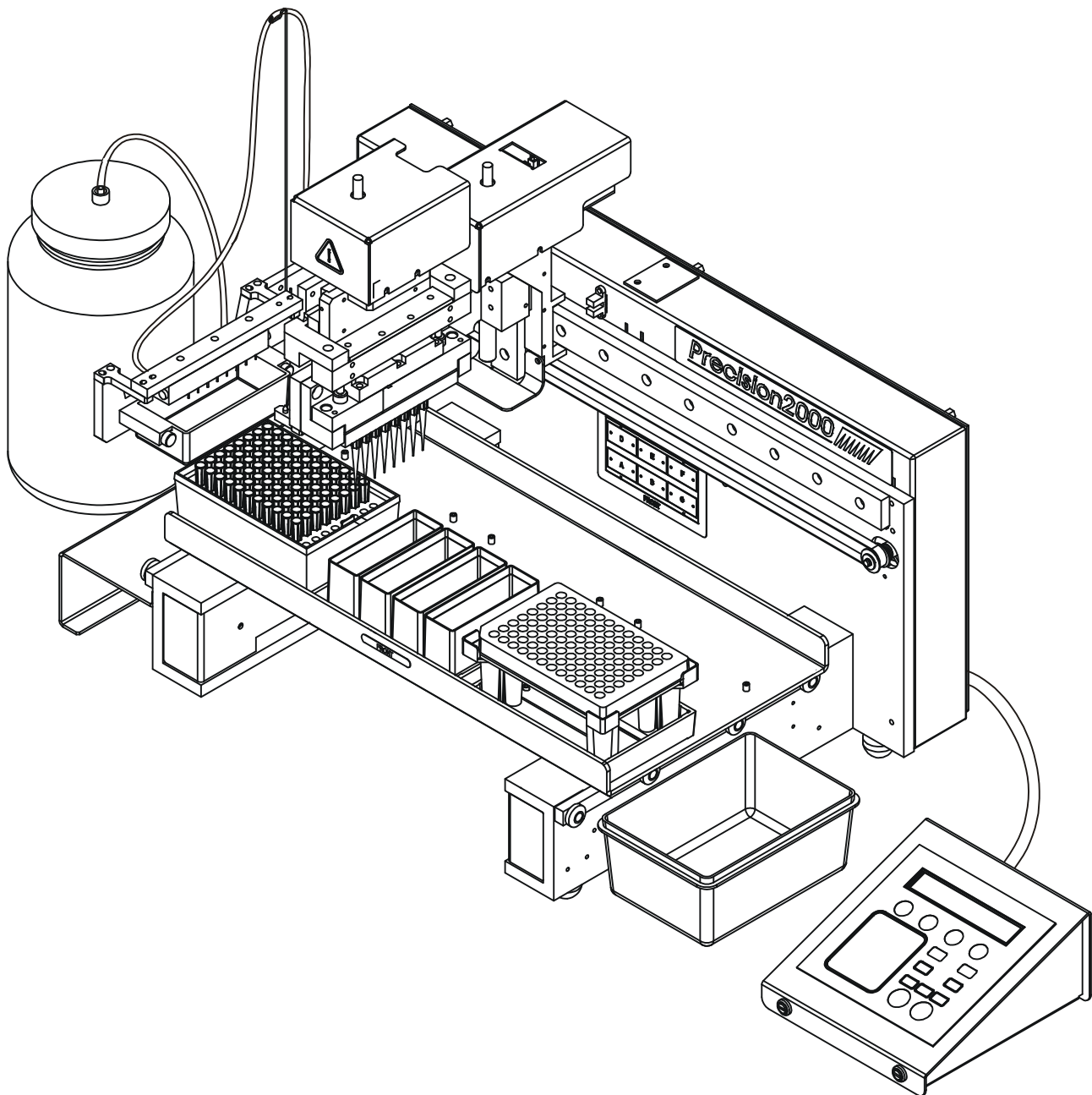
- ❖ The Bio-Stack can be aligned with supply stations A, B, or C, however, if two Bio-Stacks are used with the Precision, the Stackers must be positioned at stations A and C in order to allow adequate spacing between the two instruments.



Supply platform is positioned so that the pipette/manifold can access stations A, B, and C.



Supply platform is positioned so that the pipette/manifold can access stations D, E, and F.



This drawing shows the 6-station supply platform with tips at Station A, Bio-Tek's reagent vessels at Station B, and a 96-well microplate at Station C.

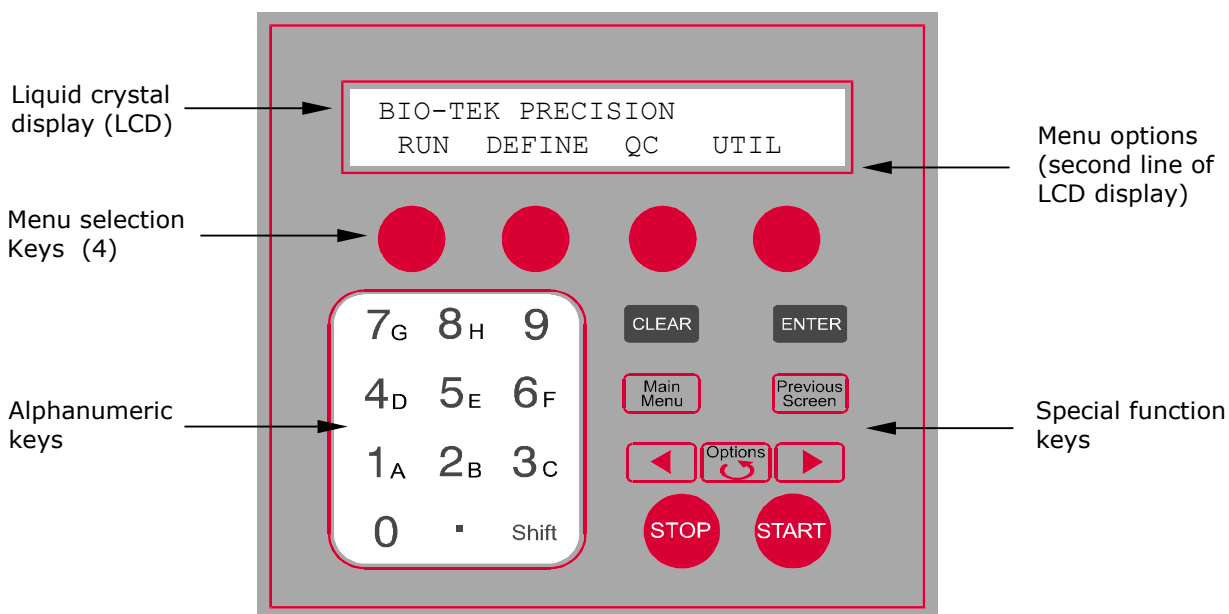
On-Board Software

All Precision models are installed with the same basecode and configuration software. The hardware configuration is set via a dip switch and is detected by the software.

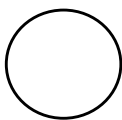
- The **basecode software** controls the instrument operations and provides an interface for accessing, creating, and manipulating protocols (pickup, aspirate, and dispense sequences), and for running various utilities. The basecode also stores tip and vessel specifications.
- The **configuration software** contains various configuration items for the instrument, including printer and report format files, and sample programs.
- The software part numbers and version information can be viewed from the instrument front panel, by selecting **UTIL → TESTS → CHKSUM**.

External Keypad

The external keypad with its 2-line x 24 character display provides access to the on-board software:



Keypad Description



The keypad has four **menu selection keys**, one below each selectable menu option. Press a key to select the menu item displayed above it. For example, from the **Main Menu**, press the leftmost key to select RUN, the rightmost to select UTIL.

Main Menu

Exit the current screen and return to the **Main Menu**.

Options

To scroll through the different options within a program, press the **Options** key or the **Shift + Options** key combination.

ENTER

Pressing **ENTER** generally saves the current screen settings and advances to the next screen in a series.

Previous Screen

Pressing **Previous Screen** generally saves the current screen settings (if they are valid) and returns control to the screen most previously viewed.

CLEAR

Press **CLEAR** to clear all characters when editing a file name or other text.



Press the ◀ (reverse) arrow to move the cursor to the left in the LCD display.



Press the ▶ (forward) arrow to move the cursor to the right in the LCD display.

START

To start running a program, press the **START** key.

STOP

To stop running (abort) a program, press the **STOP** key.

Chapter 4

Getting Started

The goal of this chapter is to introduce you to the Precision on-board software and get you to the point where you can confidently create and run simple programs. A *program* is a file created through the keypad and stored in the software. It contains an ordered list of commands to tell the instrument how to perform a fluid transfer. You'll learn all about programs in this chapter!

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Introduction

The Precision Microplate Pipetting System is both **powerful** and **easy to use**. How many times in your life have you heard such a claim? Stay with us for the next hour or so, and hopefully you will agree. We'll give you the basics on the next few pages, and tell you where to find more detailed information if you need it.

You are probably very familiar with manual pipettes, and what you can and cannot accomplish with them. Think of the Precision simply as an 8- or 12-channel pipette operated by a robot with you at the controls, telling the robot what to do. You can tell the robot to pick up tips, aspirate fluid, dispense fluid, and dispose of tips, just like you do manually.

You might be thinking, 'Why did I purchase this instrument when I can accomplish the same tasks with the manual pipette?' Because with just a few simple commands you can put the robot to work, leaving you free to do something else – hopefully something more pleasant and productive! And odds are, the robot will move more quickly and aspirate and dispense more accurately than even the most talented human beings.

The Hardware

Take a look at the instrument. It has a robot-controlled 8- or 12-channel pipette, possibly an 8- or 12-channel dispense manifold, an 8" x 17" platform with six or four supply stations, and an external keypad with a 2-line display. The supply stations can hold pipette tips, reagent troughs, and microplates.

When you run a program, the pipette travels from left to right / down and up to pick up tips, aspirate fluid, and dispense fluid. The manifold also moves from left to right/ down and up, and is used specifically to dispense fluid.

See **Chapter 2, Instrument Description**, for detailed information on the different hardware components.

The Software

On-board (Basecode) Software

Believe it or not, you can create, modify, and run even the most complex programs using just the keypad and its 2-line display. The software interface was designed with you in mind – the Main Menu provides easy access to the functions you will use most often, RUN and DEFINE (run programs and create or edit programs). Programs are stored under unique file names for easy recall.

❖ **Note:** **Appendix A** contains "menu maps," showing all of the possible function paths in a flowchart format.

Precision Power Software

Bio-Tek Instruments, Inc. has developed **Precision Power™**, a software program that further simplifies the programming of the Precision. Precision Power runs in a Microsoft Windows-based PC environment and allows the user to create, edit, and run programs using the computer's full keyboard, mouse, and graphic display.

Precision Power provides enhanced functionality as well, and is necessary for certain applications, such as operation of the Precision with Bio-Tek's **Bio-Stack™ Microplate Stacker**. In this configuration, Precision Power and the **Bio-Stack™ PC Control Software** must be installed on the controlling PC. Precision Power uses one serial port on the PC to control the Bio-Stack (via the **ActiveX™** component of the Bio-Stack PC Control Software) and a second serial port to control the Precision.

If you have purchased the Bio-Stack for operation with the Precision, please refer to your Bio-Stack Operator's Manual for information on initial setup and installation of the Bio-Stack with the Precision, and to the Precision Power User's Guide or Help System for information on configuration of the Precision for operation with the Bio-Stack.

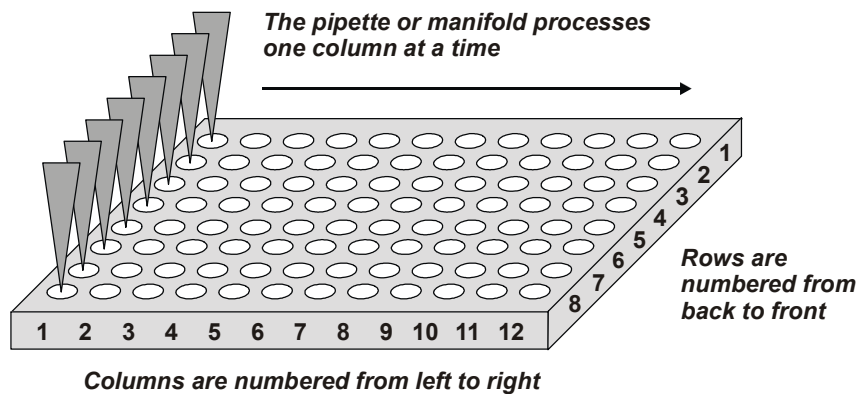
Call Bio-Tek Instruments, Inc. to learn more about the Precision Power application.

The Supplies

Before running a program to perform a fluid transfer, you need to load any required **supplies** onto the platform. "Supplies" can include pipette tips, reagent troughs, microstrips, and microplates. As you learn more about the software and its terminology, you will find that all possible supply types fall into one of just two categories: Tips or Vessels.

Tips is used when referring to the components of a rack of pipette tips. **Vessels** is used when referring to the components of any other supply, such as a reagent holder or a microplate.

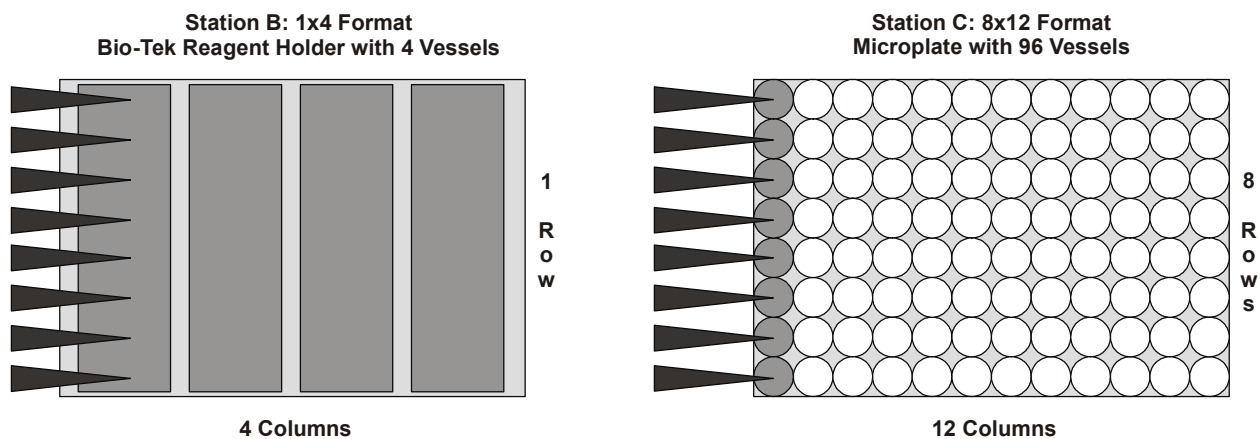
Tips and vessels are arranged in *row by column* formats. As the pipette or manifold moves across the supply platform, each station is processed one column at a time. The illustration on the following page shows the format of a standard 96-well microplate in an 8 x 12 format.



On the Precision, a rack of tips is defined as having 8 or 12 rows (because the pipette has 8 or 12 channels), with up to 12 columns. This 8 x 12 or 12 x 8 format is consistent with the way tips are usually packaged.

Vessels, on the other hand, can be arranged in many different formats. This allows the hardware and software to support a variety of reagent troughs, microstrips, and microplates. The software defines *one vessel* as the smallest entity capable of holding fluid.

The drawing below shows Bio-Tek's reagent holder at Station B and a standard microplate at Station C. The reagent holder has 4 vessels, in a 1 x 4 format. The microplate has 96 vessels, in an 8 x 12 format. In the drawing, the pipette tips are shown aspirating fluid from Column 1 at Station B, and then dispensing fluid to Column 1 at Station C.



We have much more to tell you about the different vessel formats and how they are specified in the software, but this is enough information to get you started. All of the example vessels in this chapter are in the 1 x 4 or 8 x 12 format.