VWorks Automation Control

Setup Guide

Agilent Technologies

Notices

User Guide Part Number

G5415-90060

July 2009

Contact Information

Agilent Technologies, Inc.
Automation Solutions
5301 Stevens Creek Blvd.
Santa Clara, CA 95051
USA

Technical Support: 1.800.979.4811
or +1.408.345.8011
service.automation@agilent.com

Customer Service: 1.866.428.9811
or +1.408.345.8356
orders.automation@agilent.com

European Service: +44 (0)1763853638
euroservice.automation@agilent.com

Documentation feedback:
documentation.automation@agilent.com

Web:
www.agilent.com/lifesciences/automation

Acknowledgements

Microsoft and Windows are registered trademarks of the Microsoft Corporation in the United States and other countries.

Adobe and Acrobat are trademarks of Adobe Systems Incorporated.

Warranty

The material contained in this document is provided "as is," and is subject to being changed, without notice, in future editions. Further, to the maximum extent permitted by applicable law, Agilent disclaims all warranties, either express or implied, with regard to this manual and any information contained herein, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Agilent shall not be liable for errors or for incidental or consequential damages in connection with the furnishing, use, or performance of this document or of any information contained herein. Should Agilent and the user have a separate written agreement with warranty terms covering the material in this document that conflict with these terms, the warranty terms in the separate agreement shall control.

Technology Licenses

The hardware and/or software described in this document are furnished under a license and may be used or copied only in accordance with the terms of such license.

Restricted Rights Legend

If software is for use in the performance of a U.S. Government prime contract or subcontract, Software is delivered and licensed as "Commercial computer software" as defined in DFAR 252.227-7014 (June 1995), or as a "commercial item" as defined in FAR 2.101(a) or as "Restricted computer software" as defined in FAR 52.227-19 (June 1987) or any equivalent agency regulation or contract clause. Use, duplication or disclosure of Software is subject to Agilent Technologies' standard commercial license terms, and non-DOD Departments and Agencies of the U.S. Government will receive no greater than Restricted Rights as defined in FAR 52.227-19(c)(1-2) (June 1987). U.S. Government users will receive no greater than Limited Rights as defined in FAR 52.227-14 (June1987) or DFAR 252.227-7015 (b)(2) (November 1995), as applicable in any technical data.

Safety Notices

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

Contents

Preface

This preface contains the following topics:

About this guide

Who should read this guide

Job roles

This user guide is for people with the following job roles:

Job role	Responsibilities
Integrator	Someone who writes software and configures hardware controlled by VWorks software.
Lab manager, administrator, or technician	Someone who is responsible for: • Developing the applications that are run using VWorks software • Developing training materials and standard operating procedures for operators
Operator	Someone who performs the daily production work using VWorks software and solves routine problems. Your organization may choose to create its own procedures for operators including the procedures in this guide.

What this guide covers

This guide describes how to:

- Install the VWorks software
- Migrate protocols from previous versions of the VWorks software
- Define labware
- Specify pipette speed and accuracy
- Track and manage labware using a database inventory system
- Manage user accounts
- Implement ActiveX

This guide does not provide instructions for writing protocols, running protocols, troubleshooting protocols, or operating devices using the VWorks software. For information about these topics, see the *VWorks Automation Control User Guide*, relevant Agilent Technologies device user guide or third-party user documentation.

Software version

This guide documents VWorks software installer 10 and later.

Related guides

The *VWorks Automation Control Setup Guide* should be used in conjunction with:

- *VWorks Automation Control User Guide*
- Agilent Technologies device user guides
- Third-party device user documents

Related information

For information about...	See...
Accessing user guides for Automation Solutions products	"Accessing Automation Solutions user guides" on page viii
VWorks software licenses	"About upgrading a VWorks software license" on page 2

Accessing Automation Solutions user guides

About this topic

This topic describes the different formats of Automation Solutions user information and explains how to access the user information.

Where to find user information

The Automation Solutions user information is available in the following locations:

- *Knowledge base*. The help system that contains information about all of the Automation Solutions products is available from the Help menu within the VWorks software.
- *PDF files*. The PDF files of the user guides are installed with the VWorks software and are on the software CD that is supplied with the product. A PDF viewer is required to open a user guide in PDF format. You can download a free PDF viewer from the internet. For information about using PDF documents, see the user documentation for the PDF viewer.
- *Agilent Technologies website*. You can search the online knowledge base or download the latest version of any PDF file from the Agilent Technologies website at www.agilent.com/lifesciences/automation.

Accessing safety information

Safety information for the Agilent Technologies devices appears in the corresponding device user guide.

You can also search the knowledge base or the PDF files for safety information.

Using the knowledge base

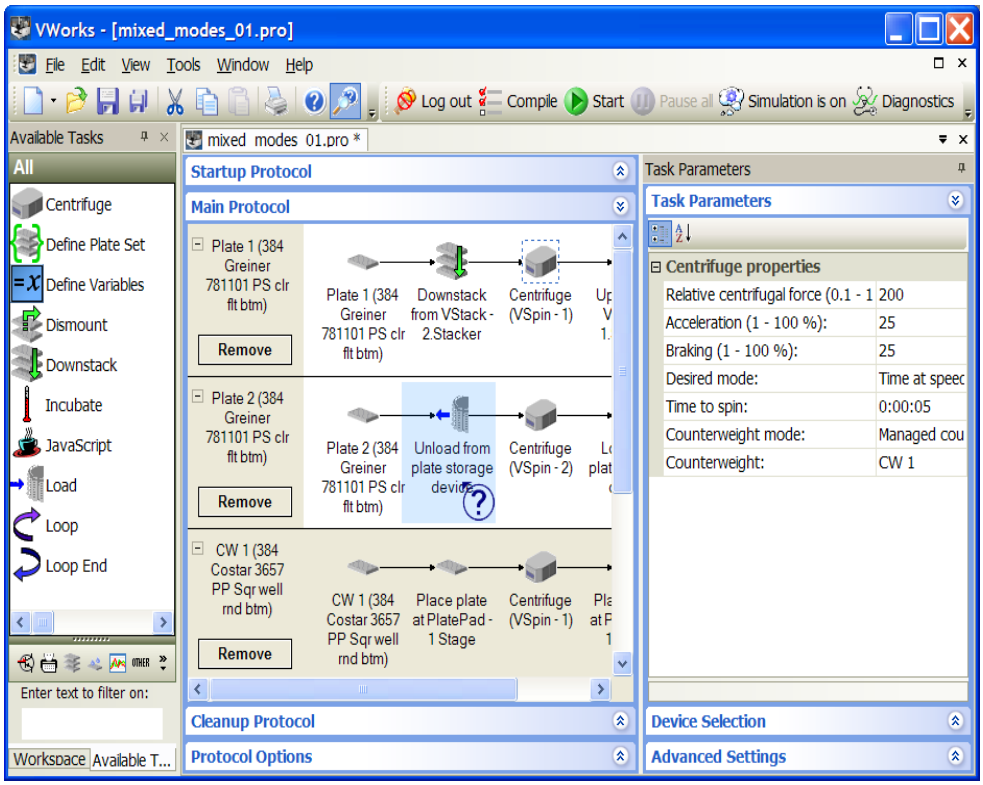
Knowledge base topics are displayed using web browser software such as Microsoft Internet Explorer and Mozilla Firefox.

Note: If you want to use Internet Explorer to display the topics, you might have to allow local files to run active content (scripts and ActiveX controls). To do this, in Internet Explorer, open the Internet Options dialog box. Click the **Advanced** tab, locate the **Security** section, and select **Allow active content to run in files on my computer.**

To open the knowledge base, do one of the following:

- From within VWorks software, select **Help** > **Knowledge Base** or press F1.
- From the Windows desktop, select **Start** > **All Programs > Agilent Technologies > VWorks** > **User Guides** > **Knowledge Base.**

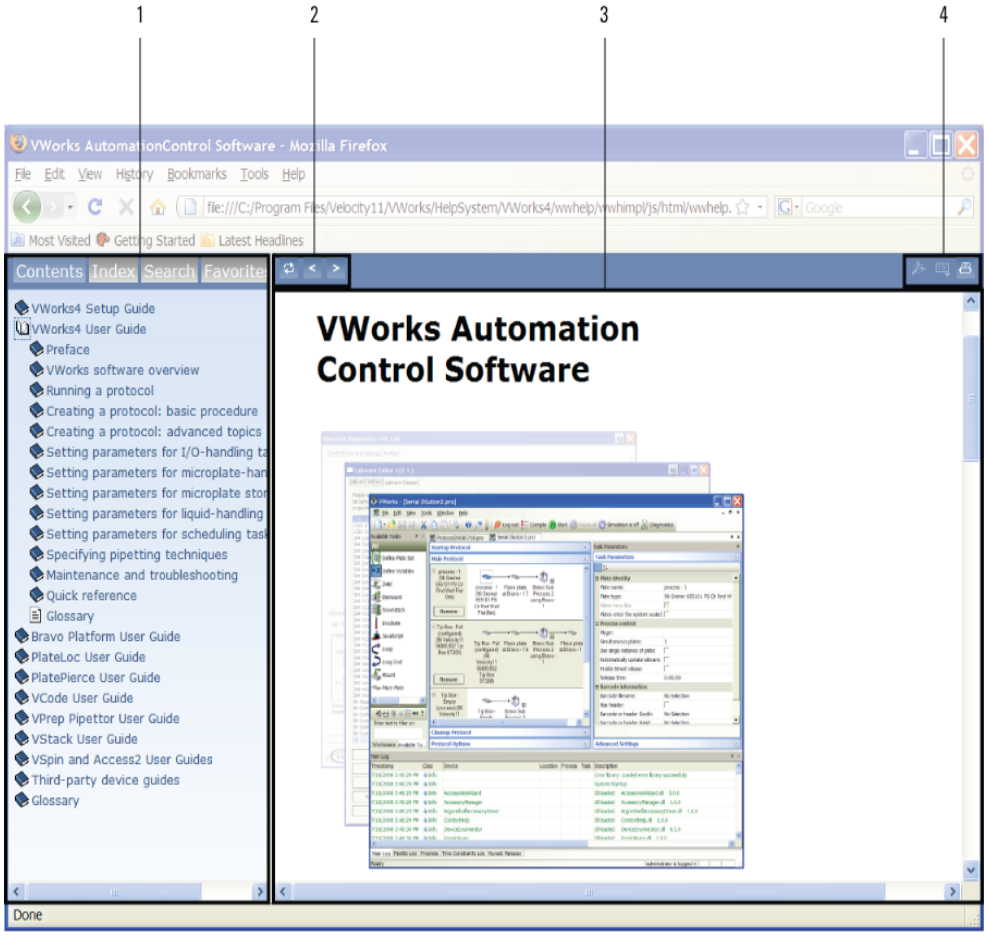
Opening the help topic for an area in the VWorks window



To access the context-sensitive help feature:

1. In the main window of the VWorks software, click the help button  . The pointer changes to  . Notice that the different icons or areas are highlighted as you move the pointer over them.
2. Click an icon or area of interest. The relevant topic or document opens.

Features in the Knowledge Base window



Item	Feature
1	*Navigation area.* Consists of four tabs: • *Contents.* Lists all the books and the table of contents of the books. • *Index.* Displays the index entries of all of the books. • *Search.* Allows you search the Knowledge Base (all products) using keywords. You can narrow the search by product. • *Favorites.* Contains bookmarks you have created.
2	*Navigation buttons.* Enable you to navigate through the next or previous topics listed in the Contents tab.
3	*Content area.* Displays the selected online help topic.
4	*Toolbar buttons.* Enable you to print the topic or send documentation feedback by email.

Related information

For information about...	See...
Who should read this guide and what this guide covers	“About this guide” on page vi
VWorks software licenses	“About upgrading a VWorks software license” on page 2
Contacting Agilent Technologies	“Reporting problems” on page 114

1 Installing and setting up the VWorks software

This chapter contains the following topics:

About upgrading a VWorks software license

About this topic

If you have already purchased a license for the latest version of the VWorks Automation Control software, you can obtain license upgrades. For example, if you have an instrument license, you can upgrade to a system license. This topic describes the available license packages for the VWorks software. To upgrade your license, contact Automation Solutions Customer Service. After acquiring a license upgrade, see "Installing the VWorks software" on page 3 for details on activating the new licence.

If you have a previous version of the VWorks software, uninstall it before installing the latest version of the VWorks software. See "Uninstalling the VWorks software" on page 6.

Available license packages

The following license packages are available for the VWorks software.

This package...	Is used for...
Simulation license	Running the VWorks software in simulation mode. This license is useful for testing protocols on computers that are not controlling any devices.
Instrument license	Controlling a Bravo Platform or Vertical Pipetting Station in a standalone mode.
BenchTop license	Controlling a benchtop workstation, such as the BenchCel Workstation, with up to 10 integrated devices.
System license	Controlling an automated system, such as the BioCel System, with no limit on the number of integrated devices.
VWorks Application Programming Interface license	Controlling the VWorks software using an external system.
VWorks Hooks Interface license	Integrating with LIMS, sample, and workflow management systems by providing a callback interface to hook into key VWorks software events.
VWorks Device Driver Interface license	Writing device drivers using a COM interface.
VWorks Software Developer Kit license	Interfacing with the VWorks software using the VWorks Application Programming Interface license, VWorks Hooks Interface license, and VWorks Device Driver Interface license.
VWorks Watcher license	Monitoring a folder for new files, and then running a predefined JavaScript function whenever a new file appears in the folder.

Note: The device drivers that you receive are based on the type of license that you purchase.

Related information

For information about...	See...
Installing the VWorks software and activating a license	"Installing the VWorks software" on page 3
Uninstalling the VWorks software	"Uninstalling the VWorks software" on page 6
Migrating a protocol created with a previous version of the VWorks software	"Migrating files created in VWorks3, VWorks4, or BenchWorks" on page 7

Installing the VWorks software

Before you begin

CAUTION If you have been using the BenchWorks, VWorks3, or VWorks4 software to control your devices, contact Automation Solutions Customer Service for assistance. Do not attempt to migrate files until you have received their guidance. Depending on your system configuration, additional firmware upgrades may be required to prevent damage to your devices.

If you have a previous version of the VWorks software, uninstall it before installing the new version. See "Uninstalling the VWorks software" on page 6.

If you are upgrading the license for a current version of the software, for example, from an instrument license to a system license, you do not have to reinstall the software. However, you must activate the upgraded license. See "Activating the software license" on page 4.

Computer requirements

If your organization uses a computer other than one configured by Agilent Technologies, make sure the computer meets the following minimum requirements:

- Computer system
  - Microsoft Windows XP with Service Pack 3 or Microsoft Windows Vista with Service Pack 1
  - 2 GHz or faster 32-bit (x86) processor, multicore preferred
  - 2 GB system memory
  - 40 GB hard drive capacity with 10 GB free space
  - 1280 x 1024 pixel screen resolution

  - Microsoft Internet Explorer 6.0 or Mozilla Firefox 1.0 with JavaScript enabled (required for using the context-sensitive help and knowledge base)
  - A PDF viewer, such as Adobe Reader (required for opening the user guide PDF files)
- Communications interface using one of the following:
  - Dedicated 10BaseT or faster Ethernet card (two network cards if connecting to your local area network)
  - RS-232 DB9 serial port, if you are controlling a device via a serial connection

To facilitate the setup process, a software installation CD is supplied. You can use the CD to install the necessary software and setup configurations.

Installing the software

To install the software:

1. Insert the VWorks software CD into the computer CD-ROM drive. The software installer should start automatically.

   If installer does not start, navigate to the CD-ROM drive, and then double-click **VWorks_buildx.x.x.exe**.
2. Follow the instructions that appear on the screen.
3. On the last page of the installation wizard, do one of the following:
   - If this is a new installation, select **Launch VWorks Activation Program** to obtain a license. Click **Finish** and proceed to step 4.
   - If you already have a current license, clear the **Launch VWorks Activation Program** check box. Click **Finish** to complete the installation process.
4. Follow the instructions in the VWorks Software Activation dialog box to obtain a license file for the VWorks software.

Activating the software license

To activate the software license:

1. After you obtain the license file (VWorks.vln), place the file in the folder that contains the VWorks software. For example, if you installed the software in the C:\Program Files\Agilent Technologies\VWorks folder, place the VWorks.vln file in that folder.

   Note: If you have a simulation license and you want to use the VWorks inventory management feature, see "Workflow for setting up a MySQL database" on page 140.
2. Start the VWorks software.

CAUTION If the BenchWorks, VWorks3, or VWorks4 software was installed on the computer previously, do not attempt to migrate files until you have received guidance from Automation Solutions Customer Service. Depending on your system configuration, additional firmware upgrades may be required to prevent damage to your devices.

Related information

For information about...	See...
Upgrading software license	"About upgrading a VWorks software license" on page 2
Uninstalling VWorks software	"Uninstalling the VWorks software" on page 6
Migrating protocols created with BenchWorks, VWorks3, or VWorks4	"Migrating files created in VWorks3, VWorks4, or BenchWorks" on page 7
Reporting a problem with the software	"Reporting problems" on page 114

Uninstalling the VWorks software

About this topic

If you have a previous version of the VWorks software, you must first uninstall it before installing the new software. This topic explains how to uninstall the previous version.

Uninstalling the software

To uninstall the VWorks software:

1. On the Windows desktop, click **Start** > **Control Panel**. The Control Panel window appears.
2. Double-click **Add/Remove Programs**. The Add or Remove Programs window appears.
3. Select the VWorks software you want to uninstall, and then click **Change/Remove**. The removal process might take a few minutes.

When the removal process is finished, the following folders and files may remain depending on the version of the VWorks software:

...\VWorks folder:

- Users folder
- VWorks.vln file

...\VWorks Workspace folder:

- Barcode Input Files folder
- Protocol Files folder
- Device Files folder
- RunSet Files folder
- Scripts folder
- VWorks folder

Typically, uninstalling the VWorks software without removing the registry files is sufficient. However, you can remove the Automation Solutions files from the registry if you do not intend to run the VWorks software on the computer again, or if you want a completely fresh start with VWorks software. For assistance, contact Automation Solutions Technical Support.

Related information

For information about...	See...
Converting protocols created with previous versions of the VWorks software	"Migrating files created in VWorks3, VWorks4, or BenchWorks" on page 7
Reporting a problem	"Reporting problems" on page 114

Migrating files created in VWorks3, VWorks4, or BenchWorks

About this topic

Before you can use the new VWorks software to run the protocols that you created using the BenchWorks, VWorks3, or VWorks4 software, the protocols and associated files must be updated for compatibility. This topic describes some of the file compatibility issues and procedures for file migration.

Although the new software includes a file migration feature, numerous post-migration adjustments may be required. Agilent Technologies strongly recommends that you contact Automation Solutions Customer Service before attempting a file migration procedure.

IMPORTANT After the protocols are migrated, you can modify the protocols to take advantage of new VWorks features, such as task looping, time constraints, and task groups.

Before attempting file migration

CAUTION Do not attempt to migrate files until you have contacted Automation Solutions Customer Service for guidance. Careful planning and preparation is required to optimize the migration process. Depending on your system configuration, additional firmware upgrades may be required to prevent damage to your devices. Make sure you are aware of any limitations or post-migration adjustment requirements.

- Contact Automation Solutions Customer Service for guidance.
- Verify whether any firmware upgrades are required.
- Make a backup copy of the files and Windows registry entries to be migrated, including:
  - Profiles
  - Devices
  - Protocols
  - Runsets
  - Labware
  - Liquid classes
  - JavaScript

Preparing for file migration

This section provides a partial list of some file migration limitations and post-migration adjustment requirements. Contact Automation Solutions Customer Service for guidance on issues that impact your configuration and how to take advantage of the latest enhancements in the new software.

Potential migration issues

Issue	Description
User account passwords	During file migration, all user account passwords are reset to `password`. After migration, verify the user accounts. As an Administrator, you can change `password` to a default password that complies with your organization's user account policies.
Devices	• *Name changes*. During file migration, the software changes the device names in the migrated files. Verify the device name changes in the protocols and device files before running any protocols. See the following table for a list of name changes. • *Vertical Pipetting Station shelves*. Standard, Reagent, and Shaking shelves can be migrated. The following shelves will be converted to Standard shelves and must be reconfigured after the migration: Filter, Servo, Tipbox, and Tip Chute. • *Device files*. Before you can run a migrated protocol, the protocol must be associated with a device file.
Liquid class specifications	If no liquid class was specified in the VWorks3 software, the following VWorks3 VPrep parameters are moved into the Liquid Library after migration: Aspirate velocity, Aspirate acceleration, Dispense velocity, Dispense acceleration
JavaScript parameters	The latest VWorks software contains various enhancements that resulted in the renaming of some variables. Your scripts may require editing to make them work in the latest software. For guidance, contact Automation Solutions Customer Service.

Devices name changes

During file migration, the software changes the device names in the migrated files.

Old name	New name
Access2 Automated Microplate Loader	Automated Centrifuge Loader, or Centrifuge Loader
Bio IO	BioCel I/O Interface
Delid Station (Vacuum), Tip Box Delidder	Vacuum Delid Station
PlatePierce Seal Piercing Station	Microplate Seal Piercer
Shuttle Robot Microplate Rotator	Shuttle
VCode Barcode Print and Apply Station	Microplate Labeler
Velocity11 Conveyor	Microplate Conveyor

Old name	New name
Velocity11 Phantom Human Robot	Phantom Robot
Velocity11 Robot	3-Axis Robot
VMix Mixing Station	Mixing Station
VPrep Pipetting System	Vertical Pipetting Station
VShuttle Rotating Microplate Mover	Rotator
VSpin Microplate Centrifuge	Microplate Centrifuge
VStack Labware Stacker	Labware Stacker

Migrating a single protocol

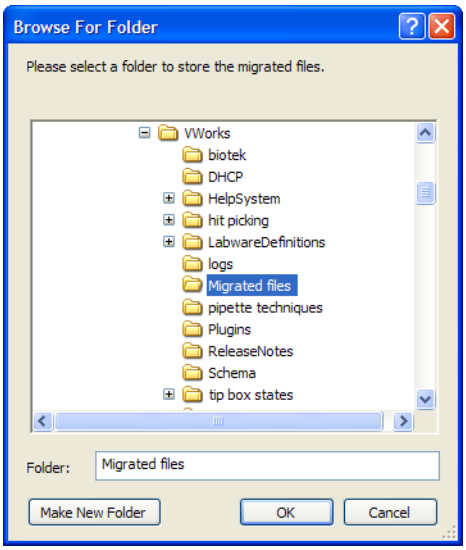
IMPORTANT This procedure is for VWorks users that have Administrator or Technician privileges and are familiar with the file migration limitations for their particular system.

IMPORTANT The first time you start the VWorks software on the computer, a message appears stating that some settings from the previous software version were found. The message asks whether to migrate these settings. The message refers only to global settings, not to protocols.

CAUTION Before you attempt to migrate a protocol, contact Automation Solutions Customer Service for guidance. Careful planning and preparation is required to optimize the migration process. Depending on your system configuration, additional firmware upgrades may be required to prevent damage to your devices. Make sure you are aware of any limitations or post-migration adjustment requirements.

To migrate a single protocol:

1. Make sure you are prepared for file migration. See "Before attempting file migration" on page 7.
2. Start the VWorks software.
3. Select **File > Open**.
4. Locate and select the protocol, and then click **Open**.
5. When the warning appears stating that you are opening a protocol created in an older version, click **OK**.
6. In the **Browse for Folder** dialog box, select a folder or create a new folder for the migrated protocols, and click **OK**.



The migration starts. All associated files (device, profiles, teachpoints, labware definitions, and liquid definitions) are migrated and the new files appear in the newly created destination folder.

7 In the Migration Tool dialog box, read the message describing whether the migration was successful and any warnings that were encountered during the migration. Click **OK**.

8 In the VWorks software window, check the **Log** area for error messages.

The VWorks software notifies you of any changes to task parameters that occurred during the VWorks software development. For example, auto tip tracking is available in the latest version but was not previously available.

9 Double-check the device file.

10 Verify the protocol is intact, and save the new protocol file.

Note: The new VWorks software installs default profiles. When you migrate a protocol, the software automatically migrates the associated profiles unless a naming conflict occurs. If a default profile has the same name as a profile that you created previously, the software displays a warning message.

IMPORTANT After migration, you can modify the protocols to take advantage of new features in the VWorks software, such as looping, time constraints, and task groups.

Migrating a folder of files

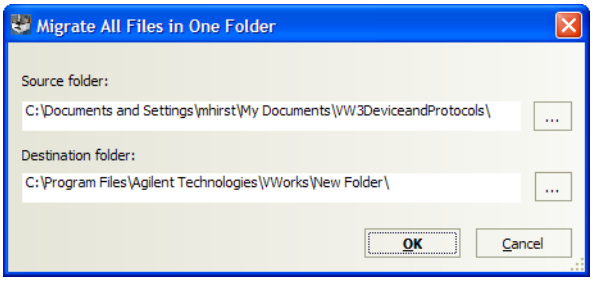
IMPORTANT This procedure is for VWorks users that have Administrator or Technician privileges and are familiar with the file migration limitations for their particular system.

IMPORTANT The first time you start the VWorks software on the computer, a message appears stating that some settings from the previous software version were found. The message asks whether to migrate these settings. The message refers only to global settings, not to protocols.

CAUTION Before you attempt to migrate a protocol, contact Automation Solutions Customer Service for guidance. Careful planning and preparation is required to optimize the migration process. Depending on your system configuration, additional firmware upgrades may be required to prevent damage to your devices. Make sure you are aware of any limitations or post-migration adjustment requirements.

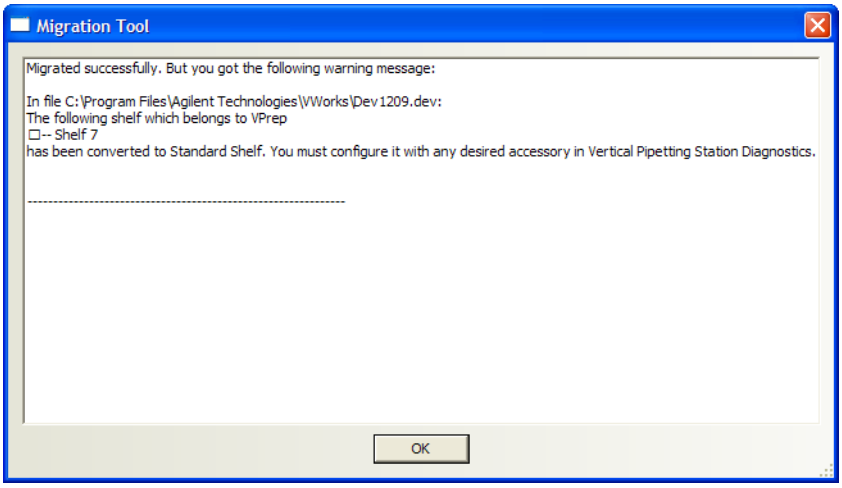
To migrate a number of protocols stored in one folder:

1. Make sure you are prepared for file migration. See "Before attempting file migration" on page 7.
2. Start the VWorks software.
3. Select **Tools** > **Migrate all files in a folder**. The Migrate All Files in One folder dialog box appears.



4. Select the source and destination folders and click **OK**.

   The migration starts. All associated files (device, profiles, teachpoints, labware definitions, liquid definitions) are migrated and the new files appear in the newly created destination folder.
5. In the Migration Tool dialog box, read the message describing whether the migration was successful and any warnings that were encountered during the migration. Click **OK**.



Note: The new VWorks software installs default profiles. When you migrate protocols, the software automatically migrates the associated profiles unless a naming conflict occurs. If a default profile has the same name as a profile that you created previously, the software displays a warning message.

6. Double-check the device files.
7. Verify the protocols are intact, and save the new protocol files.

IMPORTANT After migration, you can modify the protocols to take advantage of new features in the VWorks software, such as looping, time constraints, and task groups.

Related information

For information about...	See...
Different file types and how they are related	*VWorks Automation Control User Guide*
Setting up user accounts	"Managing user accounts" on page 105
Devices supported by the VWorks software	*VWorks Automation Control User Guide*

2 Defining labware

This chapter contains the following topics:

About defining labware with the Labware Editor

Labware defined

Labware is a physical object such as a microplate, lid, or tipbox that will be acted upon by the tasks stored in your protocol.

The VWorks software requires all labware that will be handled by the automation system to be defined in the labware database.

Labware entry defined

A labware entry is the collection of properties or parameter values that describe a specific type of labware. This information is used by the VWorks software to command the robot and other devices to do tasks based on the information in the definition.

All labware parameters are entered and accessible through the Labware Editor.

Labware Editor defined

The Labware Editor is the VWorks software interface through which you can enter information about labware.

You must be logged in as an administrator or technician to use the Labware Editor.

Types of information stored

Two main types of information are stored in the labware database:

- Information about the labware properties
- Information about labware classes

About labware properties or parameters

Labware has physical properties such as width, length, and number of wells. Labware can also have non-physical properties, such as robot-handling speed, robot grip offsets, and microplate-handling options.

After labware is defined in the Labware Editor, all you have to do is select the type of labware to use each time you set up a protocol.

About labware classes

Labware classes are sets of labware entries, grouped so they are easier to manage than many individual labware entries.

Labware classes are used in combination with the device manager to restrict which types of labware can be used on which devices during a protocol run. This prevents wasted runs and damage to the devices on the platform.

An example of how damage can be prevented by labware restriction is where a tipbox that is too tall for a device crashes into the device as the robot delivers it.

Related information

For information about...	See...
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Overview of the Labware Editor	"Labware Editor overview" on page 16
Opening the Labware Editor	"Opening the Labware Editor" on page 21

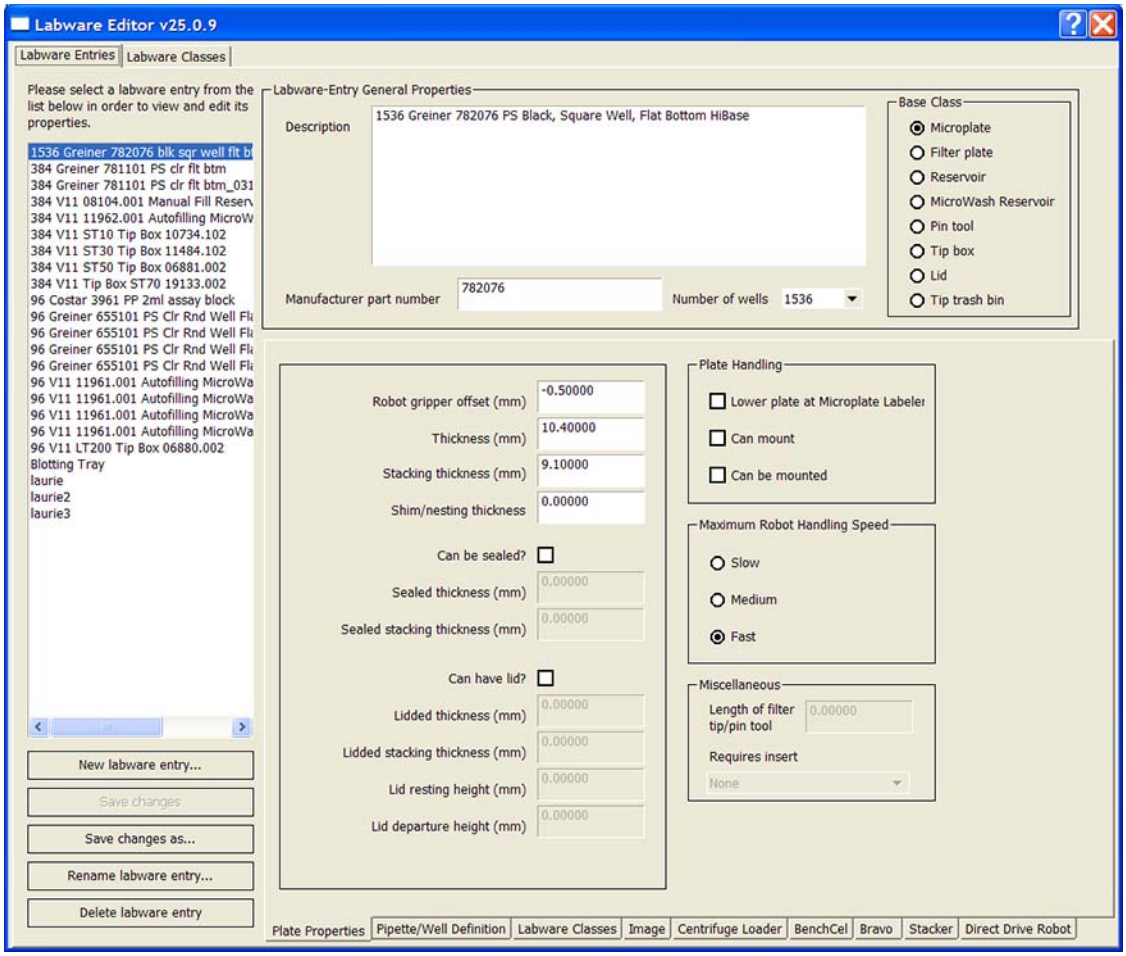
Labware Editor overview

Labware Editor tabs

The Labware Editor has two tabbed pages:

- *Labware Entries*. Provides tools for creating and editing labware definitions
- *Labware Classes*. Provides tools for creating and editing labware classes and the labware entries for each class.

Labware Entries tab



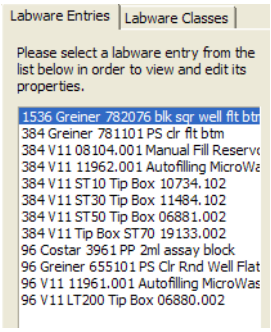
Sub-tabs

The Labware Entries tab contains the following sub-tabs that contain the properties associated with a labware entry.

To find out more about...	See...
Plate Properties tab	"Setting microplate properties" on page 28
Pipette/Well Definition tab	"Setting tip and well properties for pipetting" on page 32
Labware Classes tab	"Using labware classes example" on page 37
Image tab	"Adding a labware image" on page 40
Centrifuge Loader tab	"Setting Centrifuge Loader properties" on page 41
BenchCel tab	"Setting BenchCel Workstation properties" on page 42
Bravo tab	"Setting Bravo Platform properties" on page 46
Stacker tab	"Setting Stacker properties" on page 48
Direct Drive Robot tab	"Setting Direct Drive Robot properties" on page 51

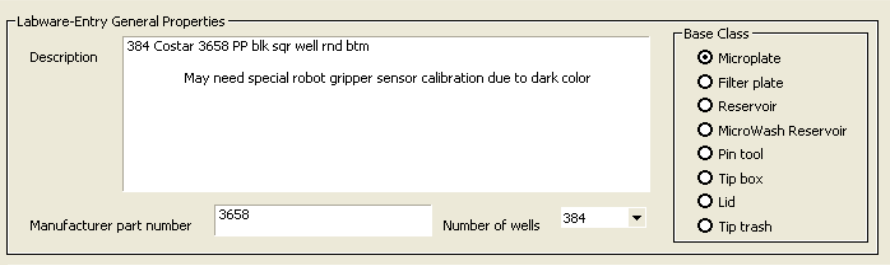
Labware selection list

The labware selection list, which is the left-hand column, displays the list of labware definitions and allows you to select the labware entry that you want to edit.



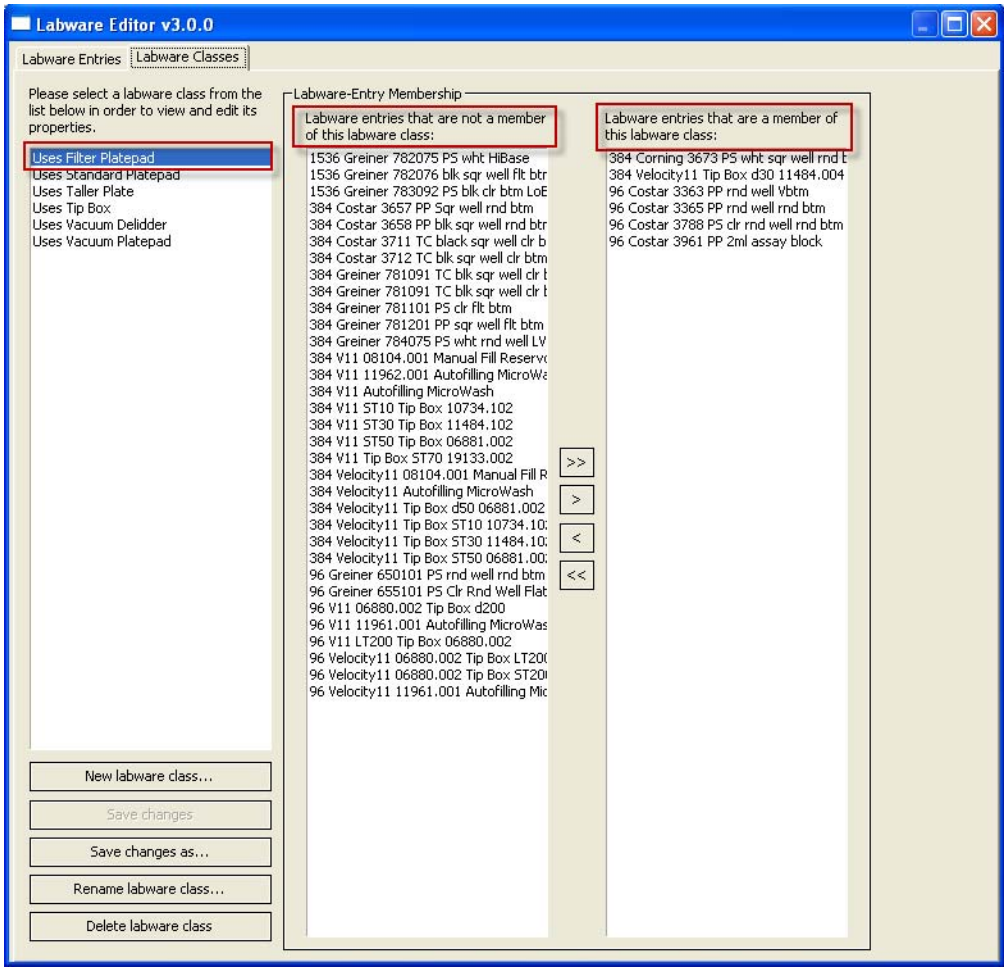
Labware-Entry General Properties area

The Labware-Entry General Properties area displays the labware properties that apply across all sub-tabs.



Labware Classes tab

You use the Labware Classes tab to create labware classes and assign defined labware to a labware class.



Related information

For information about...	See...
The Labware Editor	"About defining labware with the Labware Editor" on page 14
Workflow for defining labware in the Labware Editor	"Workflow for defining labware" on page 19

Workflow for defining labware

Labware standards and considerations

IMPORTANT All labware used with Agilent Technologies products must conform to the American National Standards Institute (ANSI) microplate standards. This includes deepwell and PCR plates. A group within the Society for Biomolecular Sciences (SBS) recommends and maintains the standards. Visit www.sbsonline.org for more information, or contact your labware's manufacturer.

Vertical Pipetting Station users. In addition to the ANSI standards for labware, Vertical Pipetting Station shelves 1 and 2 have a height restriction to ensure clearance for the pipette head. The maximum height of the labware that you can use on shelves 1 and 2 depends on several factors, such as the type of pipette head, tip size, and type of shelf.

Note: The software displays an error message if you select a labware definition that exceeds the maximum allowable height for shelves 1 and 2.

Workflow

The following table presents the sequence of steps to define labware for devices that use the VWorks software.

Note: Some of these steps may be omitted, depending on your system configuration.

Step	For this task...	See...
1	Add the labware entry to the Labware Editor.	• "Opening the Labware Editor" on page 21 • "Adding a labware entry" on page 23
2	Set the general properties of the labware.	"Setting general properties" on page 26

Step	For this task...	See...
3	Set the microplate properties. *BioCel System 3-Axis Robot only*. Set the robot gripper offset.	"Setting microplate properties" on page 28
4	*Bravo Platform or Vertical Pipettor only*. Set the pipetting properties.	"Setting tip and well properties for pipetting" on page 32
5	Assign the labware to a class.	"Creating and assigning labware classes" on page 34
6	*Optional*. Add a labware image.	"Adding a labware image" on page 40
7	*Centrifuge Loader only*. Set the robot gripper offset if using a Centrifuge Loader.	"Setting Centrifuge Loader properties" on page 41
8	*BenchCel Workstation only*. Set the robot and stacker gripping positions.	"Setting BenchCel Workstation properties" on page 42
9	*Bravo Platform only*. Set properties for the Bravo gripper, if applicable.	"Setting Bravo Platform properties" on page 46
10	*BenchCel Workstation and Labware Stacker only*. Set the gripper and sensor settings and any microplate notch positions.	"Setting Stacker properties" on page 48
11	*Direct Drive Robot only*. Set the robot gripper offsets and the grip force.	"Setting Direct Drive Robot properties" on page 51
12	Save a new or edited labware entry.	"Adding a labware entry" on page 23

Related information

For information about...	See...
The Labware Editor	• "About defining labware with the Labware Editor" on page 14 • "Labware Editor overview" on page 16
Opening the Labware Editor	"Opening the Labware Editor" on page 21

Opening the Labware Editor

About this topic

You use the Labware Editor when you want to view, add, delete, edit, or rename labware entries or labware classes. This topic explains how to open the Labware Editor from the Tools menu and protocol editor in the VWorks software. See the device user guide for details on how to open the Labware Editor from the device diagnostics software.

Before you start

You must be logged in as an administrator or technician to open the Labware Editor.

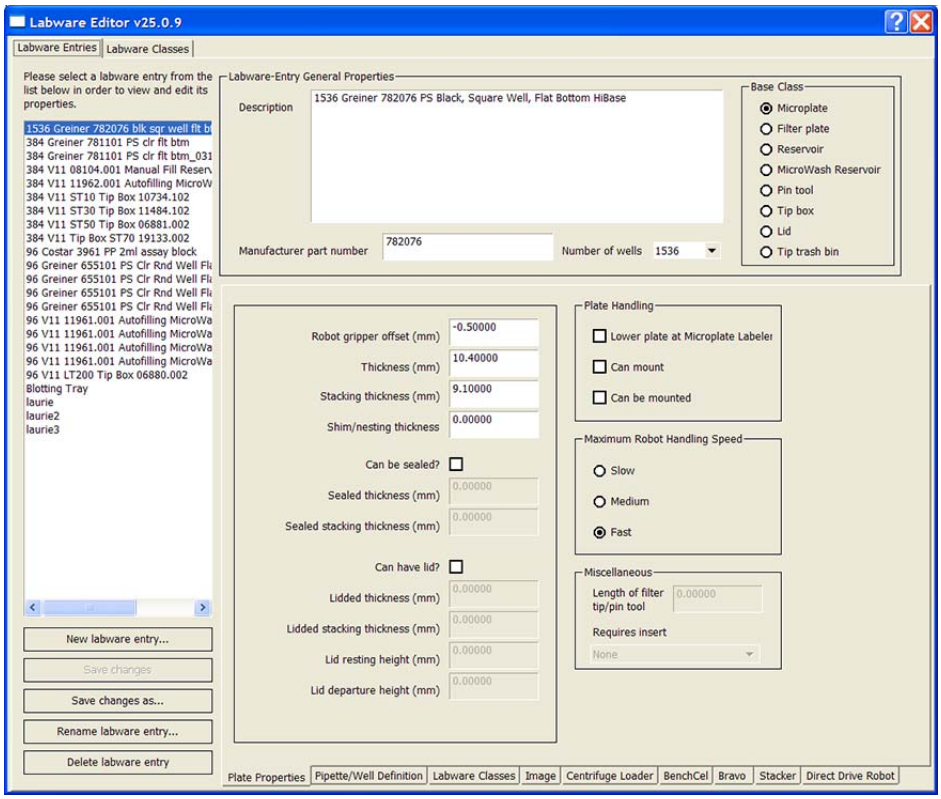
If you are adding labware, make sure you have the following:

- Calipers
- Two samples of the labware you are adding

Procedure

To open the Labware Editor from the Tools menu:

In the **VWorks** window, choose **Tools** > **Labware Editor**. The Labware Editor window opens.

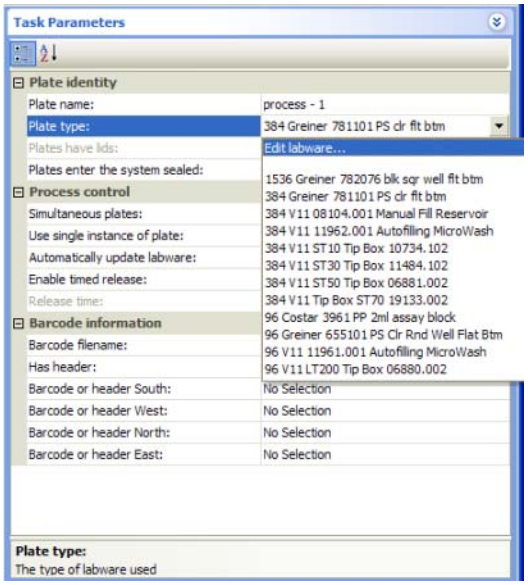


To open the Labware Editor from the protocol editor:

1. Open a protocol file (**File** > **New** > **Protocol** or **File** > **Open**). This opens the Main Protocol area with Process-1 and a list of Plate properties in the Task Parameters area.

   Note: If the Task Parameters area is empty, click **Add Process** in the Main Protocol area.

2. Select **Edit labware** from the Plate type list under Plate identity.



Related information

For information about...	See...
The Labware Editor	• "About defining labware with the Labware Editor" on page 14 • "Labware Editor overview" on page 16
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Adding a labware entry	"Adding a labware entry" on page 23

Adding a labware entry

Before you start

You must be logged in as an administrator or technician to perform this procedure.

Before you add a new labware entry:

- Check to see if it is already defined in the Labware Editor.

  Some common labware and some Agilent Technologies labware comes already defined in the VWorks software.

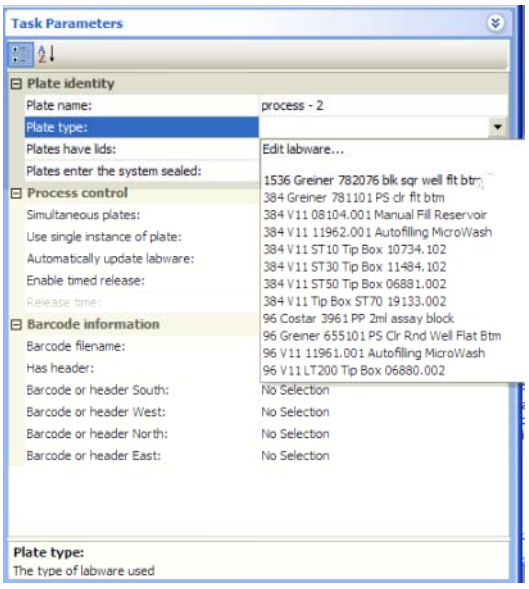
- Contact Automation Solutions Technical Support with the definition you need.

  Automation Solutions Technical Support maintains a large collection of labware definitions and might be able to supply you with what you need. However, these labware definitions will still require some fine-tuning for each particular system. The generic definitions available for some microplate types are a good starting point.

To find out if a type of microplate is already defined:

1. In the **VWorks** window, click **Main Protocol**, and select the microplate icon in a process.
2. In the **Plate identity** area, click the **Plate type** list and look for the microplate name.

   If the list does not contain an entry for the microplate type, it is not yet defined.

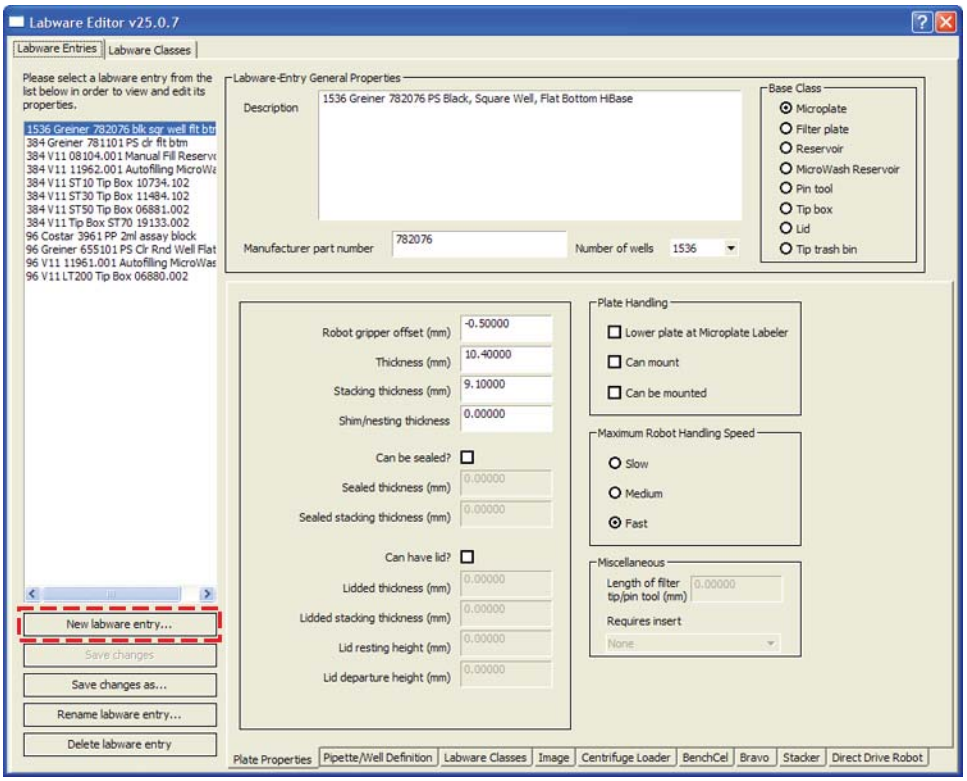


Procedure

To add a labware entry:

1 Open the **Labware Editor**.

2 In the **Labware Entries** tab, click **New labware entry** at the bottom left of the window.



Note: You can save time by using a definition for a similar labware type as a template. Select the pre-existing definition in the list, click **Save changes as**, and enter a name for the new labware definition.

3 In the **New Labware Entry** dialog box, type a name for the labware type, and click **OK**.

For clarity, enter a detailed name for the labware that includes labware-specific information. For example, the name should include the number of wells, the manufacturer's name and part number, and descriptive terms, such as *square-well*, *flat-bottom* or *tipbox*.

The new entry appears in the labware list.

To save the labware entry:

1 Edit the properties as appropriate for the labware type. See "Workflow for defining labware" on page 19.

2 Click **Save changes** to save the newly defined labware entry.

Related information

For information about...	See...
The Labware Editor	• "About defining labware with the Labware Editor" on page 14 • "Labware Editor overview" on page 16
Plate Properties tab	"Setting microplate properties" on page 28
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Opening the Labware Editor	"Opening the Labware Editor" on page 21

Setting general properties

About general properties

The general properties describe the type of labware that is being entered into the database and are visible on all of the sub-tabs of the Labware Editor.

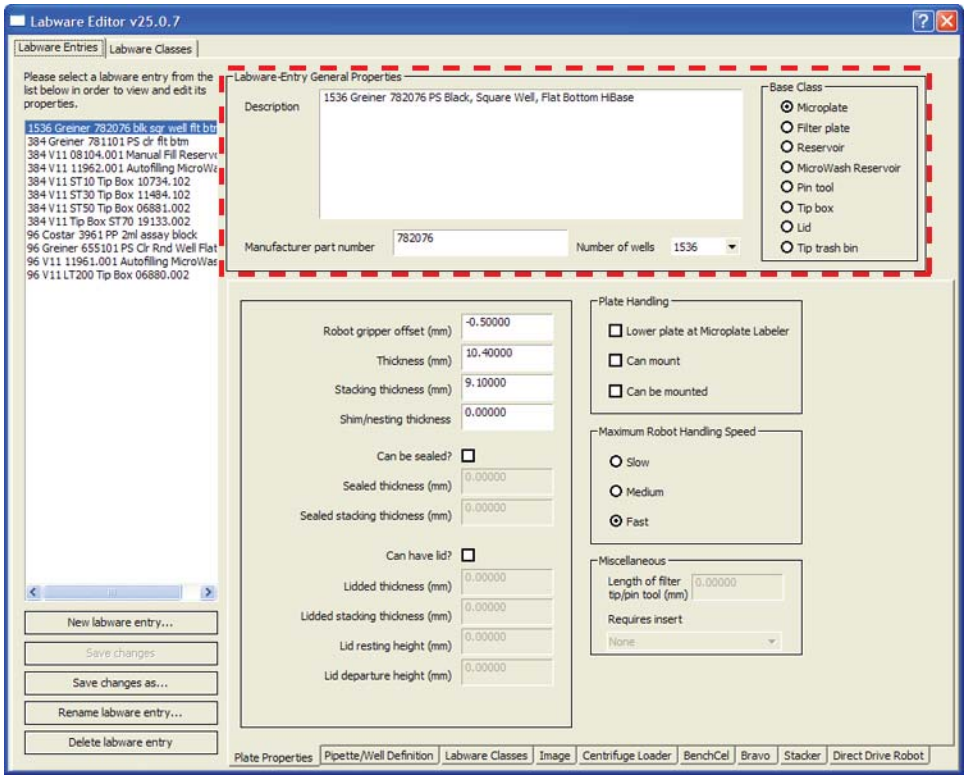
Before you start

- You must be logged in as an administrator or technician to perform this procedure.
- You must first create an entry for the labware.

Procedure

To define the general properties of a piece of labware:

1. Open the **Labware Editor**.
2. In the **Labware Entries** tab, select the labware from the list.
3. Under **Labware-Entry General Properties**, type a detailed description of the labware in the **Description** box.



4. In the **Manufacturer part number** box, type the appropriate number for your reference.
5. In the **Number of wells** list, select the number of wells in the microplate.

If you are defining a tipbox, this is the number of tips that the box can hold.

6 In the **Base Class** area, select one of the options.

The option you select determines which Labware Editor properties are available. For example, when a base class of **Microplate** is selected, the **Length of filter tip/pin tool (mm)** property is unavailable.

Note: The Pin tool base class is not used.

Related information

For information about...	See...
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Setting microplate properties for labware	"Setting microplate properties" on page 28

Setting microplate properties

Before you start

You must have a technician or administrator user account to perform this procedure.

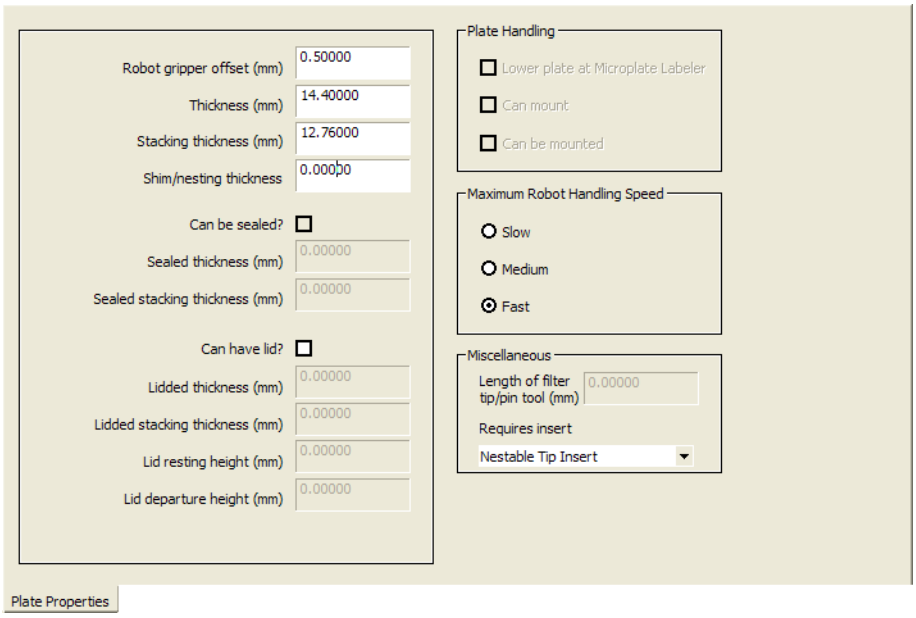
Setting microplate properties

To set microplate properties:

1 Open the **Labware Editor**.

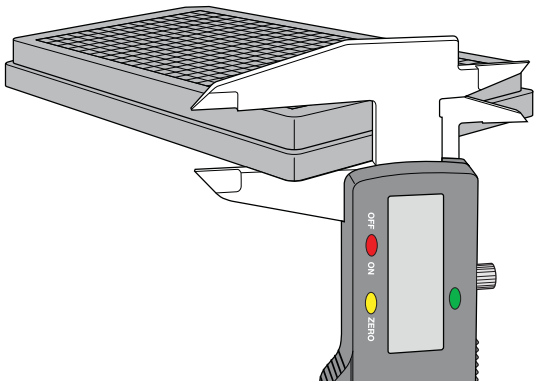
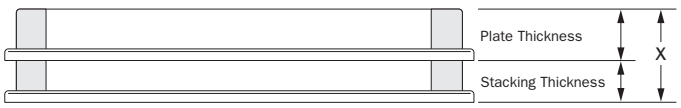
2 In the **Labware Entries** tab, click the **Plate Properties** sub-tab.

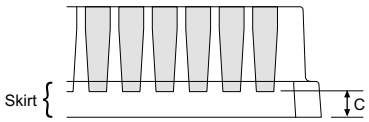
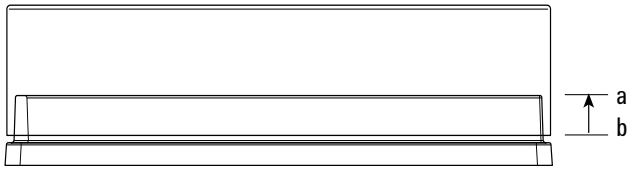
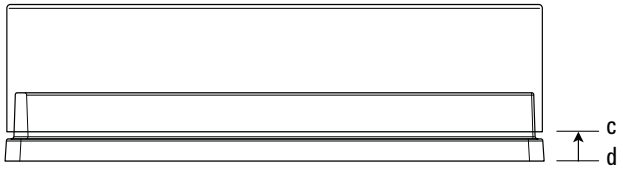
Figure Plate Properties sub-tab

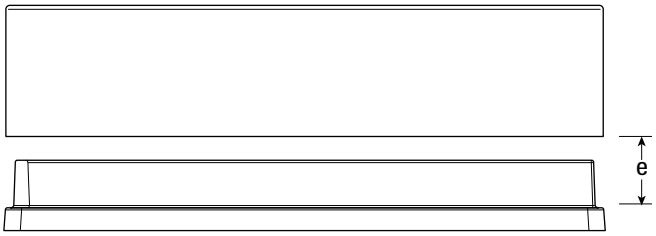


3 Enter the values for the available parameters according to the labware type you are defining. The following table describes each parameter.

Note: The Base Class you select in the General Properties section determines which microplate properties are available.

Parameter	Description
Robot gripper offset (mm)	*Note:* Applies to the 3-Axis Robot in the BioCel Systems only. The Direct Drive Robot ignores this value, and uses the gripper offset values on the Direct Drive Robot tab. The height (mm) of the gripper above any teachpoint when the VWorks software is picking up or placing a microplate of this type. The value is typically 0–3 mm. *Note:* The offset could be a negative value, indicating it is below the teachpoint. This parameter is used by the VWorks software when running protocols. The gripper offset parameter in the device Diagnostics software performs the same function when picking and placing labware using commands in the Diagnostics software.
Thickness (mm)	The distance from the bottom of the microplate skirt to the top of the microplate. For a tipbox, this is the distance from the bottom of the box to the top of the tips. To increase the number of contact points, measure the distance at the corner of the microplate or tipbox (using calipers). This method prevents the calipers from angling inward, which can produce inaccurate measurements. 
Stacking thickness (mm)	The thickness of two stacked microplates minus the thickness of one microplate. Measure the distance using calipers. Example: Thickness of two stacked microplates (x) = 23.14 mm Thickness of one microplate = 14.14 mm Stacking thickness: 23.14 mm - 14.14 mm = 9.00 mm 

Parameter	Description
Shim/nesting thickness	The distance between the bottom of the microplate skirt and the exterior bottom of the wells. (Shown as c below.) 
Can be sealed?	The option to include the microplate seal.
Sealed thickness (mm)	The thickness of the microplate with a seal in place. Available only if **Can be sealed?** is selected.
Sealed stacking thickness (mm)	The stacking thickness of the microplate with a seal in place. Available only if **Can be sealed?** is selected.
Can have lid?	The option to include a microplate lid.
Lidded thickness (mm)	The thickness of the microplate with a lid in place. Available only if **Can have lid?** is selected.
Lidded stacking thickness (mm)	The stacking thickness of the microplate with the lid in place. Available only if **Can have lid?** is selected.
Lid gripper offset (mm)	The height (a) above the lid resting height (b) at which the gripper can grip the lid. 
Lid resting height (mm)	The height (c) above the bottom of the microplate (d) at which the bottom of a microplate lid rests. 

Parameter	Description
Lid departure height (mm)	The height (e) above the lid resting height to which the lid is lifted. 
Plate Handling	
Lower plate at Microplate Labeler	The option to lower the microplate on the Microplate Labeler stage if the microplate has a thick skirt. This allows the Microplate Labeler to place the label above the thick skirt.
Can mount	The option to place this microplate on top of another microplate. This property is for filter plates that are placed on top of waste plates during filtration steps of a protocol. This option can also be used to mount lids onto microplates.
Can be mounted	The option to place another microplate on top of this microplate. This property is for collection microplates that collect filtrate from filter plates during the filtration steps of a protocol. Many different microplates might be able to fit under any one type of filter plate. **IMPORTANT** The wells of the waste plate must have a large enough diameter that the filter plate does not stick on the waste plate. The robot must be able to pick up the filter plate without the waste plate lifting up with it. This option can also be used to mount lids onto microplate.
Maximum Robot Handling Speed	
Maximum robot handling speed	The maximum speed at which the robot can move this type of microplate. In addition to this microplate-specific speed, you set the general robot speed via the Tools > Options menu in the VWorks software. If these speeds are different, the robot uses the slower of the two speeds. *Note:* To increase throughput, you can use a higher speed when the robot is not carrying labware. For details, see the *VWorks Automation Control User Guide*.
Miscellaneous	
Length of filter tip/pin tool (mm)	The length the filter nozzle extends below the bottom edge of the skirt. Use a caliper to measure the length.

Parameter	Description
Requires insert	The option to require an insert for use with nestable tipboxes.

Related information

For information about...	See...
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Setting general properties for labware	"Setting general properties" on page 26
Setting Direct Drive Robot properties for labware	"Setting Direct Drive Robot properties" on page 51

Setting tip and well properties for pipetting

When to set the pipetting properties

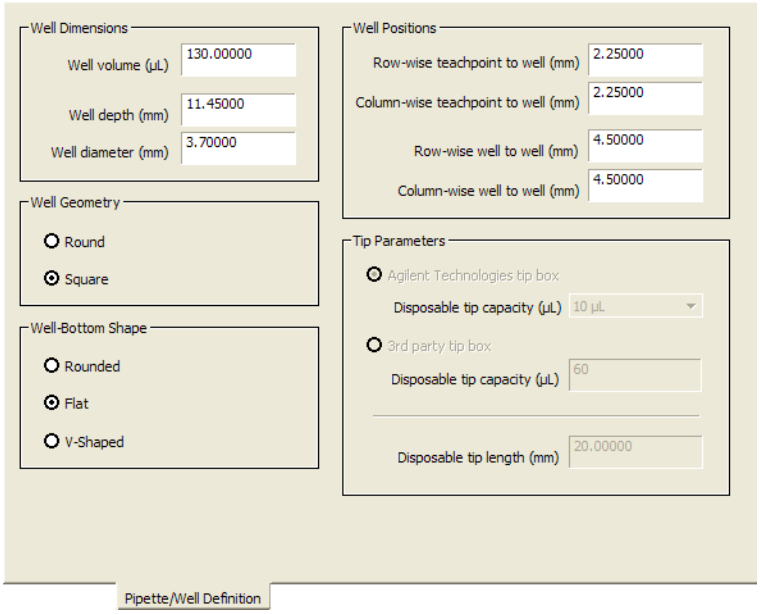
If the VWorks software is controlling a Vertical Pipetting Station or a Bravo Platform, you must set the properties for the labware type in the Pipette/Well Definition sub-tab.

Setting properties

To set pipette/well properties:

1. Open the **Labware Editor**.
2. In the **Labware Entries** tab, click the **Pipette/Well Definition** sub-tab.

Figure Pipette/Well Definition sub-tab



3 Enter the values for the available parameters according to the labware type that you are defining. The following table provides a description of each parameter.

IMPORTANT Use calipers to carefully measure the labware you are defining in the Labware Editor.

Parameter	Description
Well volume	Maximum volume (µL) of fluid for one well.
Well depth	Distance (mm) from the top of the microplate to the bottom of the well.
Well diameter	Diameter of the well (mm).
Well Geometry	Shape of the wells: round or square.
Well-Bottom Shape	Shape of the well bottoms: rounded, flat, or V-shaped.
Row-wise teachpoint to well	Distance (mm) from the teachpoint to the center of the A1 well along the row (letter axis). This setting should be 0 mm for standard 96-well microplates and 2.25 mm for standard 384-well microplates.
Column-wise teachpoint to well	Distance (mm) from the teachpoint to the center of the A1 well along the column (number axis). This setting should be 0 mm for standard 96-well microplates and 2.25 mm for standard 384-well microplates.

Parameter	Description
Row-wise well to well	Distance (mm) from well-center to well-center across the row. This setting should be 9 mm for standard 96-well microplates and 4.5 mm for standard 384-well microplates.
Column-wise well to well	Distance (mm) from well-center to well-center across the column. This setting should be 9 mm for standard 96-well microplates and 4.5 mm for standard 384-well microplates.
Disposable tip capacity	Volume capacity (µL) of the disposable tips when labware is a tipbox.
Disposable tip length	Length (mm) of the disposable tips being used when labware is a tipbox.

Related information

For information about...	See...
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Setting general properties for labware	"Setting general properties" on page 26
Setting microplate properties for labware	"Setting microplate properties" on page 28

Creating and assigning labware classes

About labware classes

When you configure a device for the VWorks software, you can associate the device with labware classes to indicate what labware can (and cannot) be used with the device. Associating a device with a labware class is performed in the device file under the Allowed/prohibited labware property.

For example, if you have a Microplate Vacuum Alignment Station on a Bravo platform, you might want to set up a labware class from which tube racks are excluded. (Most types of tube racks will cause an error on the Microplate Vacuum Alignment Station).

VWorks software is provided with six labware classes already defined:

- Uses Filter Platepad
- Uses Standard Platepad

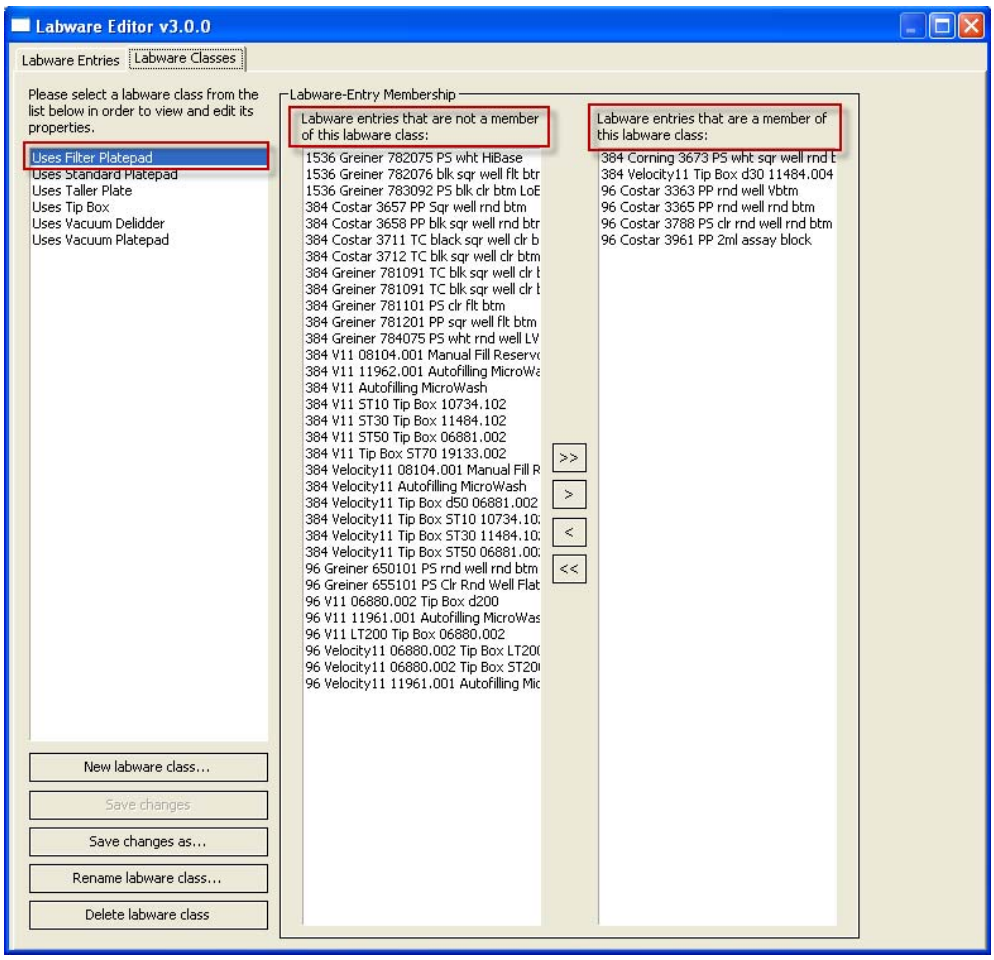
- Uses Taller Plate
- Uses Tip Box
- Uses Vacuum Delidder
- Uses Vacuum Platepad

These default classes should be enough for your microplate handling needs. However, if you want an additional special class that is excluded from a particular device or set of devices, you can create a new class.

About creating and assigning labware classes

The Labware Classes tab in the Labware Editor provides the tools for creating and managing labware classes and labware entry membership.

Select a class (in the left-most column) to see the labware entries that are members and non-members for that class (right two columns). In the example below, the class Uses Filter Platepad is selected and the labware that are members and non-members of this class are displayed.



Creating labware classes

To create a new labware class:

1. Open the **Labware Editor**.
2. In the **Labware Classes** tab, click **New labware class**.
3. In the **New Labware Class** dialog box, enter a name for the labware class and click **OK**.

   The class appears in the list of labware classes.

Note: You can also create a new labware class by clicking **Save changes as** and entering a different name.

Assigning labware classes

To associate a specific piece of labware with a labware class:

1. Open the **Labware Editor**.
2. In the **Labware Classes** tab, select an item from the middle column.
3. Click > to move the labware entries or labware classes to the right-hand column.

   To select more than one item, use SHIFT+click or CTRL+click. If you want to move all entries, click >>.
4. Click **Save Changes** to save your changes.

Note: You can also assign labware to a class using the Labware Classes tab on the Labware Entries tab. This may be more convenient when you are defining a new piece of labware and want to assign it to an existing labware class.

Related information

For information about...	See...
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
An example demonstrating the use of labware class	"Using labware classes example" on page 37

Using labware classes example

Example

You have configured shelves 2, 4, and 6 of a Vertical Pipettor as devices that are accessible by the system's robot. You are using a mix of microplates, some of which are too tall to fit on shelf 2. By using labware classes, you will ensure that the robot will never try to place the wrong type of labware on shelf 2.

The labware has been defined and added to the Labware Editor but it still has the default settings for class membership.

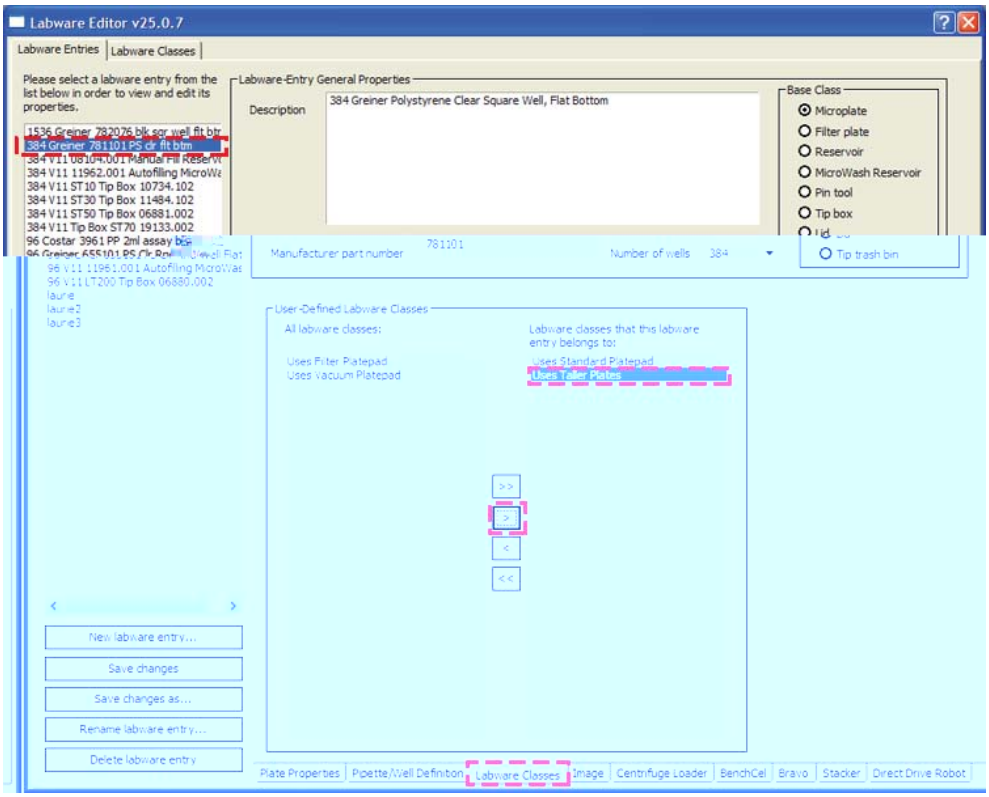
You need to:

1. Assign the tall labware to the appropriate labware class.
2. Restrict shelf 2 from using any labware that is a member of the Uses Taller Plates class.

Assigning the labware to a labware class

To assign the labware:

1. Open the **Labware Editor**.
2. In the **Labware Entries** tab, select the labware from the list, and then click the **Labware Classes** sub-tab. The classes that the labware are and are not a member of is displayed.
3. Select **Uses Taller Plates** from the **All labware classes** area, and then click > to move the class to the **Labware classes that this labware entry belongs to** area.
4. Click **Save changes**.

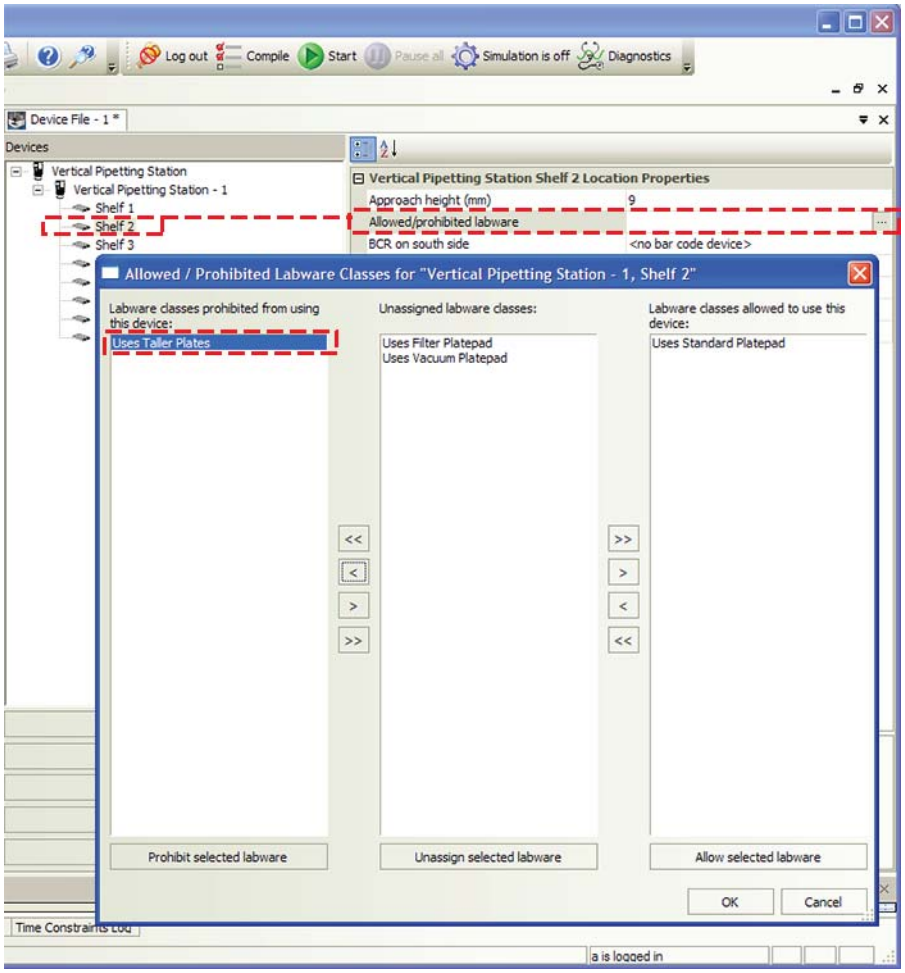


Setting restrictions for shelf 2

To restrict shelf 2:

1. In the **VWorks** window, open the device file, and ensure the correct Vertical Pipetting Station device is selected.
2. In the **Devices** list under **Vertical Pipetting Station**, select **Shelf 2**.
3. Under **Shelf 2 Location Properties**, click the **Allowed/prohibited labware** field, and then click the [...] button. The Allowed/Prohibited Labware Classes dialog box opens.
4. In the **Unassigned labware classes** area, select **Uses Taller Plates**, and then click **<** to move it to the **Labware classes prohibited from using this device** area.
5. Click **OK**.

Figure VWorks software main window (partial) and Allowed/Prohibited Labware Classes dialog box.



Related information

For information about...	See...
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Labware classes	"Creating and assigning labware classes" on page 34

Adding a labware image

About labware images

To make it easier for operators to identify a labware type, you can insert an image of it in the Labware Editor.

Before you start

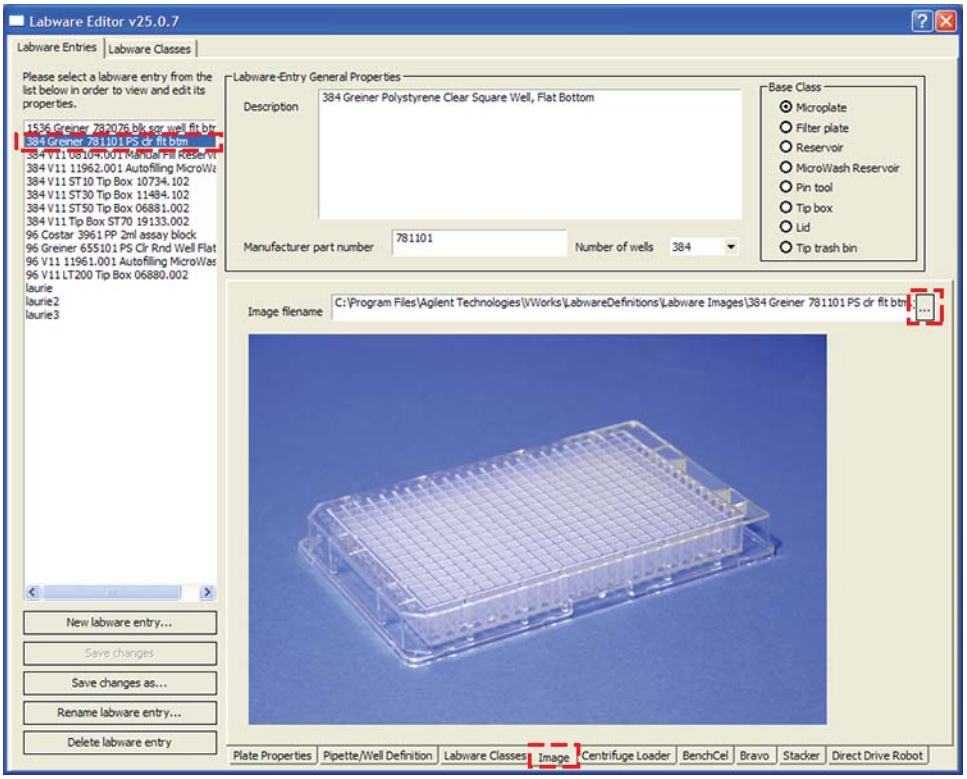
Make sure the image file you want to add is either the JPG, GIF, or BMP format.

Procedure

To insert an image:

1 Open the **Labware Editor**.

2 In the **Labware Entries** tab, select the labware in the left column, and then click the **Image** sub-tab.



3 At the **Image filename** box, click the [...] button to locate the file.

4 In the **Open** dialog box, select the image file and click **Open**.

The image appears below the file name.

5 Click **Save changes**.

Related information

For information about...	See...
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Using the Labware Editor	"Labware Editor overview" on page 16

Setting Centrifuge Loader properties

When to set Centrifuge Loader properties

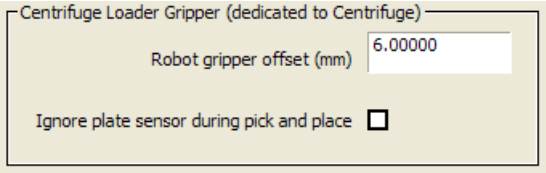
If you are operating a Centrifuge with an Centrifuge Loader, set the corresponding properties in the Centrifuge Loader sub-tab of the Labware Editor.

You must be logged in as an administrator or technician to perform this procedure.

Procedure

To set Loader properties:

1. Open the **Labware Editor**.
2. In the **Labware Entries** tab, click the **Centrifuge Loader** sub-tab.
3. In the Robot gripper offset (mm) box, type the distance from the bottom of the microplate where the robot can grip the microplate.
4. *Optional.* Select the **Ignore plate sensor during pick and place** check box if you want to ignore the microplate sensor, for example if you are using a black microplate that has a finish and skirt that would otherwise avoid detection.



For information about...	See...
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Using the Labware Editor	"Labware Editor overview" on page 16

Setting BenchCel Workstation properties

About the BenchCel Workstation properties

The BenchCel Workstation X-Series and R-Series each have their own gripper offsets and positions. When you add a new labware entry, default parameter values are automatically inserted for both series. These values are approximate and should be ignored because the labware you are defining may be different.

Any labware that you are using with the X-Series must be redefined to work with the R-Series BenchCel Workstation because the parameter values are different for the same piece of labware.

Note: You must also define a subset of the Stacker properties (under the Stacker sub-tab) because they apply to the built-in stackers of the BenchCel Workstation.

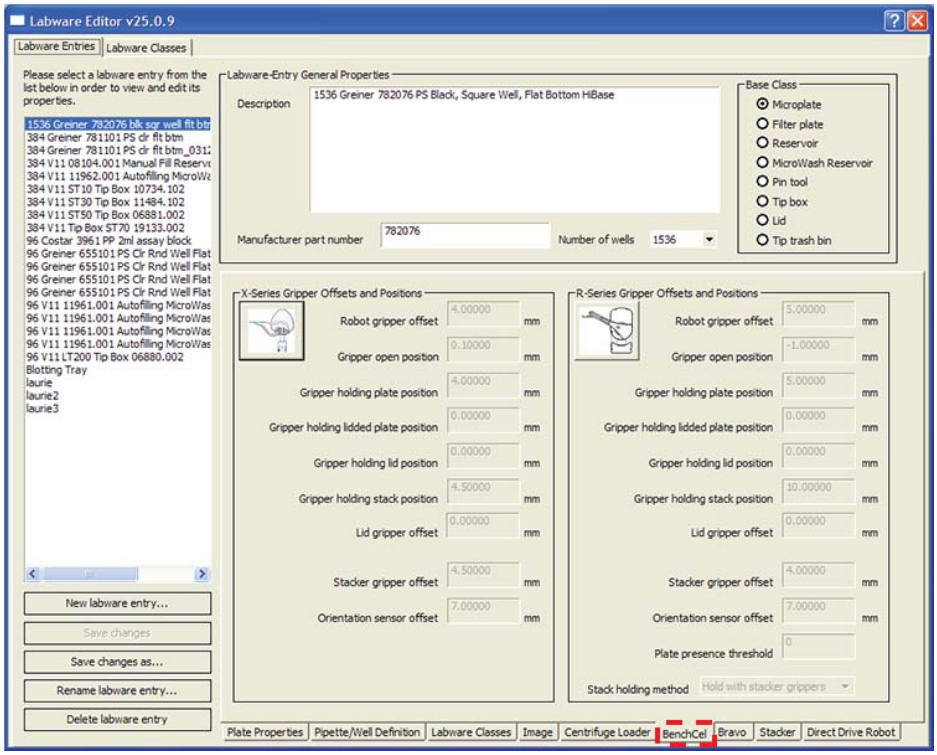
Procedure

To define the BenchCel Workstation properties:

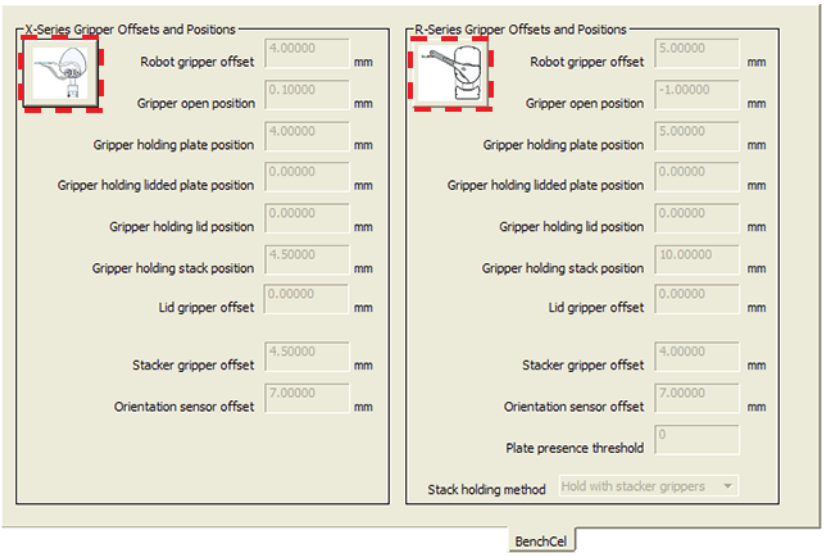
1 Open the **Labware Editor**.

2 In the **Labware Entries** tab, click the **BenchCel** sub-tab.

Figure BenchCel sub-tab



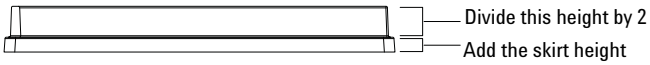
3 Click the button that corresponds to the BenchCel Workstation type that is currently operating and for which you are defining the labware.



IMPORTANT Make sure you enter values for the correct model of the BenchCel Workstation. Fields for X-Series and R-Series BenchCel Workstations can be enabled regardless of the type of BenchCel Workstation that you are operating.

4 Measure the labware and enter the values for the following fields.

Parameter	Description
Robot gripper offset (mm)	The distance from the bottom of a microplate to where the robot grippers will hold the microplate. **IMPORTANT** Make sure that the gripper points do not close at the edge of the skirt. Otherwise, the gripper can slip onto the body of the microplate and drop the microplate.
Gripper open position (mm)	The distance the grippers move from the home position as the robot releases a microplate. A larger value moves the grippers closer together. A smaller value opens the grippers wider. Set this to –1 for R series and 0.1 for X Series BenchCel Workstations.
Gripper holding plate position (mm)	The distance that the grippers move inward from their home position when holding a microplate that is not in a stack. A larger value moves the grippers closer together and holds the microplate tighter. A smaller value opens the grippers wider. *Note:* How tightly the robot grippers should hold a microplate depends on the microplate material and design. You might want to run some tests to optimize the parameter.

Parameter	Description
Gripper holding lidded plate position (mm)	The distance that the grippers move inward from home position when holding a lidded microplate. An increasing value moves the grippers closer together and holds the lidded microplate tighter. A decreasing value opens the grippers wider.
Gripper holding lid position (mm)	The distance the grippers move inward from home position when holding a microplate lid. Increasing the value moves the grippers closer together and holds the lid tighter. Decreasing the value opens the grippers wider. In general, type a value that is less than Gripper holding plate position to open the grippers slightly. Holding the lid too tightly might cause the microplate to be lifted with the lid.
Gripper holding stack position (mm)	The distance the grippers move inward from the home position when holding a microplate that is in a stack. A larger value moves the grippers closer together and holds the microplate tighter. A smaller value opens the grippers wider. Note: Because the weight of the entire stack will be on the robot grippers, you should use a value greater than the Gripper holding plate parameter.
Stacker gripper offset (mm)	The distance from the bottom of a microplate to where the stacker grippers will hold the microplate. Be careful not to grab the microplate on the top edge of the skirt where the stacker grippers could slip onto the microplate body. Change this value only if the stacker is not gripping the microplates correctly.
Orientation sensor offset (mm)	The distance from the bottom of a microplate to where the orientation sensors will check for notches. You can calculate the initial offset as follows: Determine the halfway distance between the top of the microplate and the top of the microplate skirt, and then add the height of the skirt.  See the *BenchCel Microplate Handling Workstation User Guide* for details on how to determine the optimum Orientation sensor offset.

Parameter	Description
Stack holding method	*R-Series only*. The option that specifies how the stacker holds the stack of microplates: • *Hold with stacker gripper*. For the greatest precision, select this method, for example, if your microplate has a narrow gripping tolerance requiring a specific stacker gripper offset. Holding the stack with grippers results in slower cycle time than the Hold with shelf method. • *Hold with shelf*. For faster cycle time, select this method if your microplate has a wider gripping tolerance and does not require a specific stacker gripper offset.

Related information

For information about...	See...
Using the Labware Editor	"Labware Editor overview" on page 16
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Setting general properties for labware	"Setting general properties" on page 26

Setting Bravo Platform properties

When to set Bravo properties

If you are operating a Bravo Platform that has a robot gripper, use this procedure to ensure that the parameter values are set correctly.

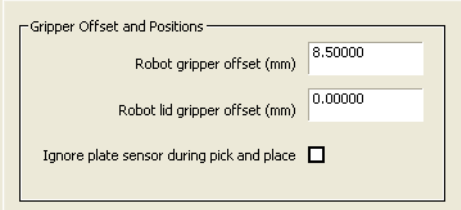
Note: The Bravo robot gripper is an optional feature.

You must be logged in as an administrator or technician to perform this procedure.

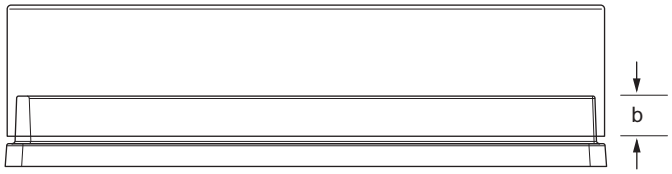
Procedure

To set Bravo Platform properties:

1. Open the **Labware Editor**.
2. In the **Labware Entries** tabs, click the **Bravo** sub-tab.
3. Under **Gripper Offset and Positions**, type the **Robot gripper offset**. This is the height (mm) of the gripper above any teachpoint when the Bravo gripper is picking up or placing a microplate of this type.



4. Enter the **Robot lid gripper offset**. This is the height (mm) above the lid resting height at which to grip the lid. (Shown as *b* below.)



5. Select **Ignore plate sensor during pick and place** to tell the robot gripper to ignore the feedback from the microplate sensor during a pick and place for this labware. Typically, this is selected when troubleshooting.

Related information

For information about...	See...
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Using labware classes	"Creating and assigning labware classes" on page 34

Setting Stacker properties

When to set Stacker properties

If you are using a Stacker or a BenchCel Workstation in your automation system, you must set the properties in the Stacker sub-tab of the Labware Editor.

You must be logged in as an administrator or technician to perform this procedure.

Before you start

BenchCel Workstation users. Make sure you have read the sections of the *BenchCel Microplate Handling Workstation User Guide* that describe the location and function of the stacker sensors.

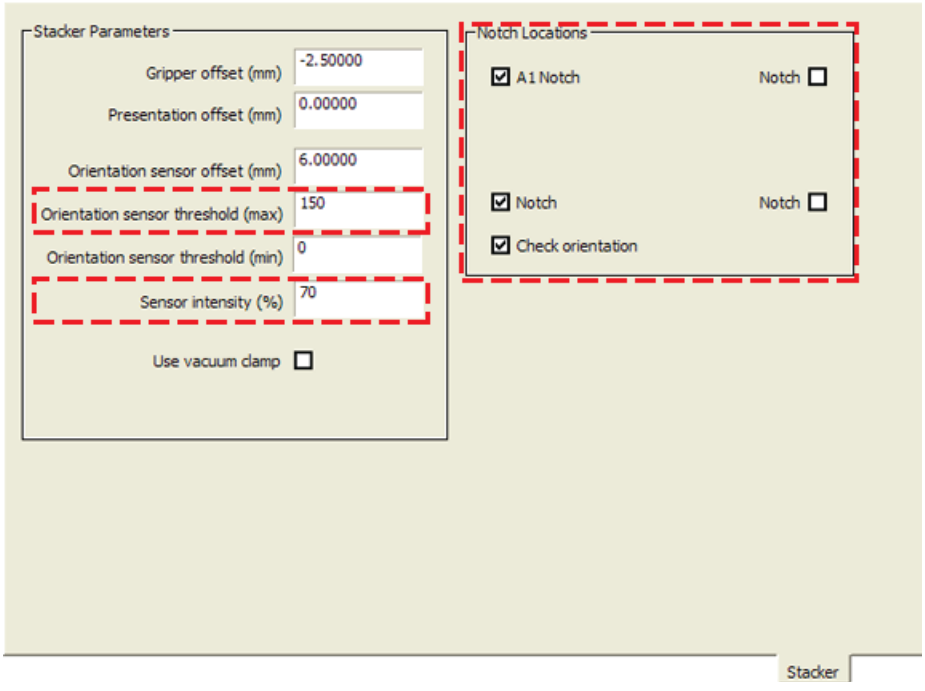
Setting properties

To set stacker properties:

1. Open the **Labware Editor**.
2. In the **Labware Entries** tab, click the **Stacker** sub-tab.
3. Enter the values for the available properties according to the labware you are defining.

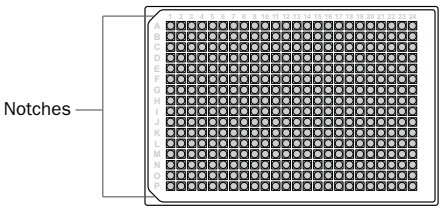
   BenchCel Workstation only. Set only the maximum orientation sensor threshold, sensor intensity, and notch locations. The other settings are used by the Stacker.

Figure Properties required for the BenchCel Workstation



The following table provides descriptions of each parameter.

Parameter	Description
Stacker only. Stacker gripper offset	Adjusts the height at which the microplate stage stops for the grippers to grip the microplate, with respect to the Stacker's grip teachpoint. Change this value only if the stacker is not gripping the microplates correctly.
Stacker only. Presentation offset	You should never need to change this value. Adjusts the height of the Stacker plate stage with respect to the presentation teachpoint of a Stacker.
Stacker only. Orientation sensor offset	Adjusts the height at which the orientation checking sensors view the microplate, with respect to the sensor.
Orientation sensor threshold (max)	Specifies the highest value that an orientation sensor can register when sensing a notch. Any sensor reading above this value indicates that a solid microplate wall is present. Any sensor value below this threshold indicates that either a notch, or no microplate is present. If the stacker does not sense a notch when it should, you will get a "wrong plate type" or a "plate rotated 180 degrees" error message. Adjust the sensor threshold value. The maximum value is 255.
Stacker only. Orientation sensor threshold (min)	Indicates whether a microplate was downstacked or is present on the stage. This threshold specifies the lowest value that an orientation sensor can register and still consider a notch to be present. If the orientation sensor returns a value below this threshold, an error message appears stating that no microplate is present on the stage. If the stacker does not sense a notch when it should, a "wrong plate type" or a "plate rotated 180 degrees" error message appears. In this case, adjust the sensor threshold value.
Sensor intensity	Sets the percentage of maximum sensor intensity for all sensors. If the sensor intensity is set too low, a microplate will not be detected even though one is present. If it is set too high, the sensors might become saturated, causing failure to detect the orientation of a microplate. This parameter adjusts for the fact that clear, black, and white microplates reflect light differently. For example, white microplates generally reflect more light so the sensor intensity should be set lower.

Parameter	Description
Stacker only. Use vacuum clamp	Instructs theStacker you are using a vacuum clamp in the Stacker stage to grasp the microplate during delidding.
Notch Locations	• *Check orientation.* Turns on microplate-orientation checking based on the selected notch locations for your microplate. The notch locations are ignored when this check box is cleared. • *Notch location check boxes.* Select the corresponding notch or notches for your microplate. For BenchCel Workstations, the A1 well of the microplate is positioned in the far, left corner as you face the front of the BenchCel Workstation. For BioCel Systems, the A1 well of the microplate is positioned in the far, left corner from the perspective of the robot.  **IMPORTANT** The Stacker has only two orientation sensors for detecting notches. If the wrong microplate is loaded and an orientation sensors detect notches, the sensors will not flag an incorrect orientation for the wrong microplate. **IMPORTANT** If the orientation sensors detect notches in the correct location, the sensors will not flag an incorrect orientation for the wrong microplate.

Related information

For information about...	See...
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Using the Labware Editor	"Labware Editor overview" on page 16

Setting Direct Drive Robot properties

When to set Direct Drive Robot properties

If you are using the Direct Drive Robot in your automation system, you must specify the robot properties for the labware that the robot will handle. Because the weight, material, and design varies, you specify the properties for each labware type.

You must be logged in as an administrator or technician to perform this procedure.

About the robot gripper offset properties

The robot gripper offset parameters tell the Direct Drive Robot where to grip a given labware type when transferring it from one device to another. Each device within a system can pose different accessibility challenges when transferring the labware. For example, some devices can have a deep, recessed area, whereas others are more flat. Some devices might have tall flanges that make it impossible for the robot to grip a microplate at a very low point.

The Direct Drive Robot uses three types of gripper offset ranges to determine the most compatible grip position for the labware type:

1. *Gripper offset range for the labware*. Specified on the Direct Drive Robot tab in the Labware Editor for each labware definition.
2. *Gripper offset range for pick-location device*. Specified in the DD Robot Diagnostics software for a given device (device A).
3. *Gripper offset range for place-location device*. Specified in the DD Robot Diagnostics software for a given device (device B).

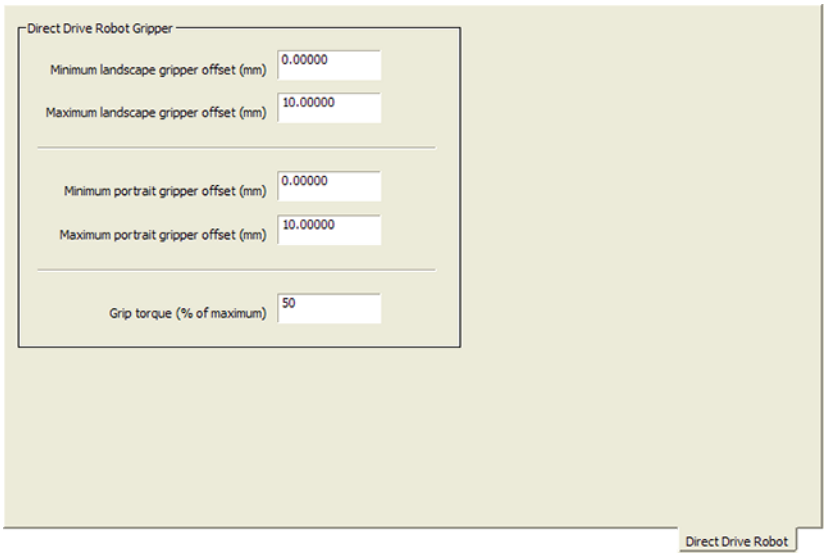
If the three gripper offset ranges overlap, the robot can use the smallest common gripper offset to perform a direct labware transfer from device A to device B without regripping the labware. If the three ranges do not overlap, the software attempts to plan a path through one or more regrip stations. If the robot cannot perform the transfer without risking a physical collision, an error message appears at the time of the requested labware transfer and the run cannot continue.

To provide the system with the greatest flexibility for identifying a grip position that works for all locations, you should set the widest possible range for each gripper offset parameter.

To set Direct Drive Robot properties:

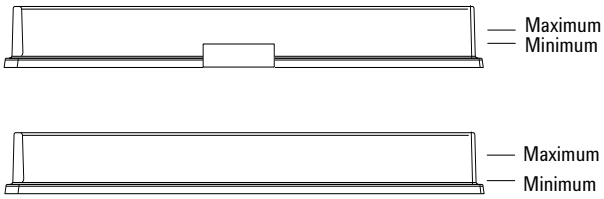
1. Open the **Labware Editor**.
2. In the **Labware Entries** tab, click the **Direct Drive Robot** sub-tab.

Figure Direct Drive Robot sub-tab



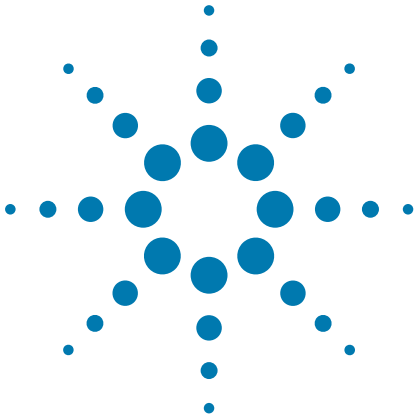
3 Enter the values for the following properties according to the labware type that you are defining.

Parameter	Description
Landscape gripper offset (mm)	• *Minimum*. The distance from the bottom of the microplate to the lowest point where the robot grippers can hold the microplate in landscape orientation. Default: 0 mm • *Maximum*. The distance from the bottom of the microplate to the highest point where the robot grippers can hold the microplate in landscape orientation. Default: 10 mm The minimum and maximum values depend on the given microplate features and the robot gripper arms, which are 3 mm tall. For example, if the microplate has a 4-mm tall skirt, you could set the gripper offset range from 0 mm (minimum) to 2 mm (maximum). At the minimum, the gripper will be flush with the bottom of the microplate, while at the maximum the robot can still grip the microplate securely.

Parameter	Description
Portrait gripper offset (mm)	• *Minimum*. The distance from the bottom of the microplate to the lowest point where the robot grippers can hold the microplate in portrait orientation. Default: 0 mm • *Maximum*. The distance from the bottom of the microplate to the highest point where the robot grippers can hold the microplate in landscape orientation. Default: 10 mm The long sides of some microplates have a raised section in the middle of each side. In this case, set the minimum gripper offset higher than the uneven surface to ensure that the robot can grip the microplate evenly and securely. The following example shows how the range can vary depending on the microplate features. 
Grip torque percentage	The grip force with which the robot grips the microplate, where 100% is the maximum gripping force. A smaller value grips the microplate with less force than a greater value. The force with which the robot can grip a microplate depends on the microplate weight, material, and design. You should run some tests to optimize the setting.

Related information

For information about...	See...
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Using the Labware Editor	"Labware Editor overview" on page 16
Direct Drive Robot	www.agilent.com/lifesciences/automation



3 Specifying pipette speed and accuracy

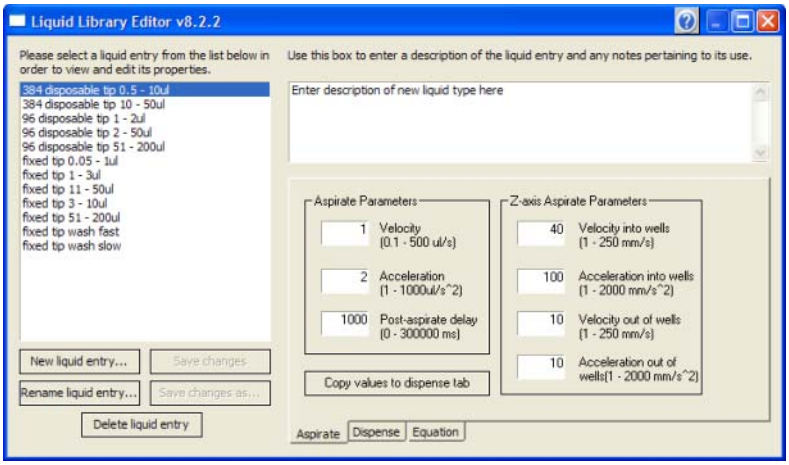
This chapter contains the following topics:

About liquid classes

Liquid Library Editor defined

The Liquid Library Editor provides tools for users with technician or administrator privileges to enter values for properties that affect pipetting speed, accuracy, and precision.

Figure Liquid Library Editor window



Default liquid library entries

When installing VWorks software, you might have elected to install the default liquid library entries. These entries are provided as examples and thus might only approximate your particular reagents. For the best performance, you should create your own liquid library definitions.

When to use the Liquid Library Editor

You use the Liquid Library to fine-tune the volume aspirated or dispensed by your Bravo Platform or Vertical Pipetting Station.

IMPORTANT Verify the pipetting of your Bravo Platform or Vertical Pipetting Station. Accurate and precise pipetting depends on a variety of factors including the liquid properties.

Liquid classes defined

The values entered into the Liquid Library Editor can be saved as a collection, known as a liquid class. Using liquid classes saves time when writing protocols because you do not have to enter values for the liquid properties every time you create a protocol.

Types of liquid classes

You might want to create different classes for different:

- Types of liquids

For example, water versus DMSO

- Volumes of liquids

  For example, 1 µL versus 200 µL

- Liquid operations

  For example, washing versus mixing

Liquid library database defined

The data that represents a liquid class is saved to the liquid library database, which is maintained in the Windows registry.

Using a liquid class

When preparing for a protocol run, you select the liquid class that you want to use. During the run, the liquid class values are referenced for pipetting operations.

Calibrating the Bravo Platform and Vertical Pipetting Station

The Liquid Library Editor also has an equation editor that can be used to calibrate the Bravo Platform and Vertical Pipetting Station.

Related information

For information about...	See...
Opening the Liquid Library Editor	“Opening the Liquid Library Editor” on page 58
Creating a liquid class	“Creating a liquid class” on page 59
Calibrating your pipettor	“Calibrating the pipettor” on page 62

Opening the Liquid Library Editor

Before you start

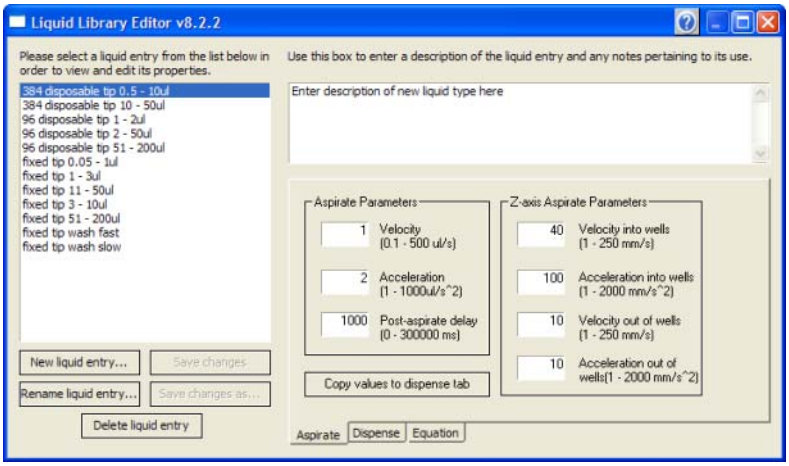
You must be logged in as an administrator or technician to open the Liquid Library Editor.

Procedure

To open the Liquid Library Editor from VWorks software:

1 Select **Tools > Liquid Library Editor**.

The Liquid Library Editor opens.



Related information

For information about...	See...
Liquid classes	“About liquid classes” on page 56
Creating a liquid class	“Creating a liquid class” on page 59
Calibrating your pipettor	“Calibrating the pipettor” on page 62

Creating a liquid class

About this topic

This topic describes how to create a liquid class using the Liquid Library Editor.

You must be logged in as an administrator or technician to perform this procedure.

Liquid compatibility

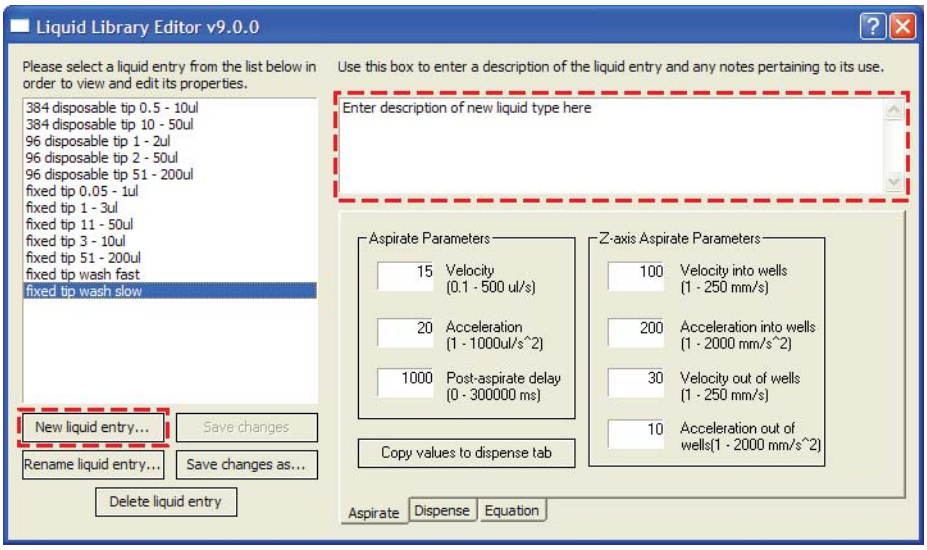
WARNING **Agilent Technologies products are intended to be used with non-hazardous liquids. Please contact Automation Solutions Technical Support before using any non-aqueous solvents or solvents generally considered to be hazardous.**

Procedure

To create a liquid class:

1 Open the **Liquid Library Editor**.

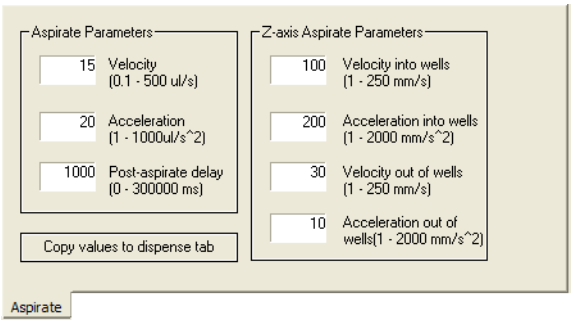
2 Click **New liquid entry**.



3 In the **New Liquid Entry** dialog box, type a name for the liquid class and click **OK**.

4 *Optional.* In the box at the top right of the **Liquid Library Editor** window, type a note describing the entry for your records.

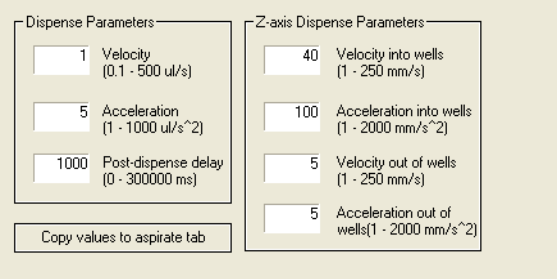
5 On the **Aspirate** tab, type the values for the following aspirate parameters.



Note: The upper limits for some of the parameters might not be achievable for the device you are using.

Aspirate	Definition
Velocity (µL/s)	Specifies the speed of the aspiration stroke.
Acceleration (µL/s^2)	Specifies acceleration during the aspiration stroke.
Post-aspirate delay (ms)	Specifies the time the pipettor waits after aspiration is complete before moving the tips out of the wells.
Z-axis velocity into wells (mm/s)	Specifies how fast the pipettor moves as the tips enter the wells.
Z-axis acceleration into wells (mm/s^2)	Specifies the acceleration of the pipettor as the tips move into the wells.
Z-axis velocity out of wells (mm/s)	Specifies how fast the tips leave the wells.
Z-axis acceleration out of wells (mm/s^2)	Specifies the acceleration of the pipettor as the tips move out of the wells.

6 Click the **Dispense** tab and enter values for the dispense properties.



The following table describes the dispense parameters.

Dispense	Definition
Velocity	Specifies the maximum speed of the dispensing stroke, in microliters per second.
Acceleration	Specifies acceleration during the dispensing stroke, in microliters per second squared.

Dispense	Definition
Post-dispense delay	Specifies the time the pipettor waits after the dispense stroke before moving the tips out of the wells, in milliseconds.
Z-axis velocity into wells	Specifies how fast the pipettor moves as the tips enter the wells, in millimeters per second.
Z-axis acceleration into wells	Specifies the acceleration of the pipettor as the tips enter the wells, in milliliters per second squared.
Z-axis velocity out of wells	Specifies how fast the pipettor moves as the tips leave the wells, in millimeters per second.
Z-axis acceleration out of wells	Specifies the acceleration of the pipettor as the tips leave the wells, in millimeters per second squared.

7 Click **Save changes**.

The changes are now stored in the liquid library database.

Related information

For information about...	See...
Liquid classes	“About liquid classes” on page 56
Opening the Liquid Library Editor	“Opening the Liquid Library Editor” on page 58
Calibrating your pipettor	“Calibrating the pipettor” on page 62

Calibrating the pipettor

About calibrating the pipettor

You can improve the accuracy of pipetted volumes by:

- Calibrating the pipettor
- Plotting the actual volume dispensed as a function of the set dispense volume
- Calculating the polynomial coefficients of the plot
- Entering the coefficients into the liquid library equation editor

Do you need to calibrate your pipettor?

Pipetting accuracy is the ability to dispense an absolute volume of liquid. In practice, the volume that is actually dispensed by a pipettor may be different from the dispense volume that you select. This difference is the absolute error.

In some protocols, as long as you dispense an excess of liquid, the actual volume pipetted is not important. In other protocols, pipetting accuracy can be a critical factor. You must remember, though, that every step of an experiment has error and there is no point taking time to improve the accuracy of pipetting to four significant digits if another step in your protocol has error at the third significant digit.

If you are sure that the overall error of the experiment is limited by pipetting accuracy, and error at this number of significant figures makes a practical difference to you interpretation of the data, consider performing an accuracy calibration.

Method overview

This section gives an overview of the method you can use to measure pipetting accuracy. It does not give a detailed procedure because that depends on exactly how you choose to conduct the experiment.

To calibrate a pipettor, an independent method of measuring dispensed volume is required. One method is to dispense a solution of fluorescein dye and measure the fluorescence emitted from each microplate well.

IMPORTANT Whichever method you use, verify that the error in the detection method is significantly smaller than the pipetting error. Otherwise, the error you detect might be from the detection method and not the pipetting error.

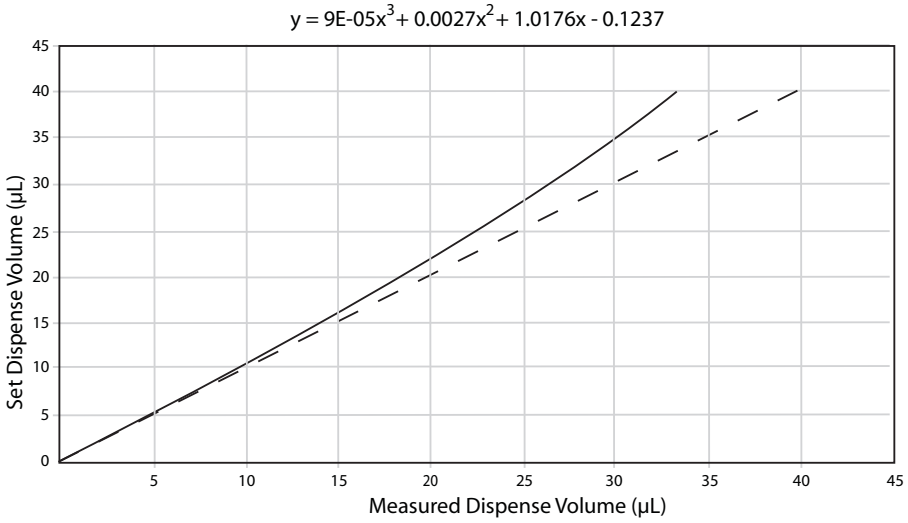
The overall method is:

1. Perform a series of pipetting operations in which different volumes are pipetted.
2. Measure the volumes of dispensed liquid using the independent measuring method.
3. In a spreadsheet program, tabulate the dispense volumes that you set in the software against the measured volumes.
4. Plot a graph, with the set dispense volume on the y-axis and measured dispense volume on the x-axis.

The plot will be a curve, reflecting the fact that absolute error is a function of the magnitude of the measurement.

5 Use the statistical functions of the spreadsheet program to fit a curve to the data.

Your result might look like this:



The dashed line is a reference line, where the set dispense volume equals the measured dispense volume. The equation is the polynomial for the line, calculated by the spreadsheet program.

6 Enter the curve information into the equation editor of the Liquid Library Editor.

If you repeat the experiment, you will find that the curve is much closer to a straight line. This is because the equation you entered adjusts the action of the servo motor that determines aspirate and dispense volumes, thereby calibrating the dispense.

Using the equation editor

You use the equation editor in the Liquid Library Editor to enter the calibration curve data and correct for pipetting inaccuracy.

To enter a polynomial into the equation editor:

1 Open the Liquid Library Editor.

2 Click the **Equation** tab to display the equation editor.

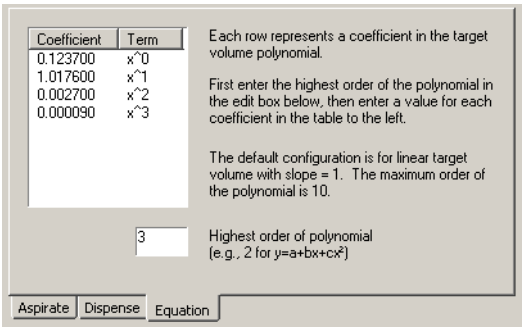
3 In the **Highest order of polynomial** text box, enter the value for the highest order of the polynomial.

This is the largest exponent in the equation and tells you how many terms are in the equation. For example, if the highest order of the polynomial is 3, the equation will have the general form: $y = a + bx + cx^2 + dx^3$, where 'x' is the volume specified by any pipettor task that uses this liquid class. With an exponent of three, four rows are added to the equation editor table.

4 In the Coefficient/Term table, enter the coefficient and exponent for each of the terms in the equation, starting with the zero order term.

To enter a value, single-click the **Coefficient** table row twice. Note that the exponents are already entered for you and cannot be edited.

The following example is for the curve displayed in the previous graph.



5 Click **Save changes**.

Related information

For information about...	See...
Liquid classes	“About liquid classes” on page 56
Opening the Liquid Library Editor	“Opening the Liquid Library Editor” on page 58
Creating a liquid class	“Creating a liquid class” on page 59

4 Tracking and managing labware in storage

This chapter contains the following topics:

About labware inventory management

About this topic

This topic provides the background information you need to understand how to use the labware inventory manager to track groups of microplates moving into and out of a microplate storage device.

Who should read this

Read this topic if your lab automation system has a storage device such as a Liconic StoreX, Heraeus Cytomat PLC, or an Agilent Technologies Plate Hub Carousel and you are using, or want to set up, inventory management with a database.

Before you start

Before creating protocols that use the storage device, make sure you have read the device driver user documentation for your particular storage device as well as “Resolving labware inventory problems” on page 102.

Barcode tracking versus inventory management

Barcode tracking

Barcode tracking without an inventory system is limited because the microplate locations are stored in memory and are lost when you exit the VWorks software.

Inventory management

The inventory management system allows long-term tracking of microplates because barcode data is permanently stored in a database. This is useful for lab automation systems with devices that store microplates for a long time, such as a Heraeus Cytomat PLC and Liconic StoreX.

Required database

To use inventory management, you must have an SQL database set up, either on the computer that runs the VWorks software or a computer that is on the same local area network.

How microplates are stored

The long-term storage devices supported by the VWorks software store microplates in cassettes and slots. A cassette is a vertical rack that has many slots, with each holding one microplate.

Information that is stored

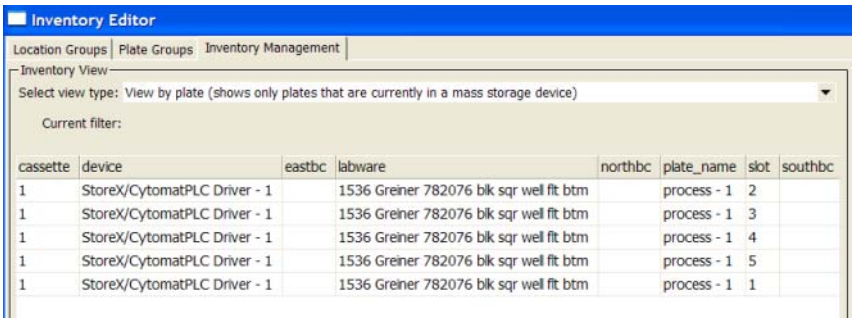
The inventory maintains a list of microplates located in a long-term microplate storage device.

The information contained about each microplate in the inventory includes:

- Device in which the microplate is located
- Cassette and slot location of the microplate
- Name of the group or location to which it belongs
- Labware type
- Any north-side, south-side, east-side, and west-side barcodes

  Note: West side barcodes are tracked only if an optional barcode reader is used.
- Volume of the wells in the microplate

The list of microplates in the inventory is displayed in the Inventory Editor dialog box. An example view is shown below.



The list of microplates in the inventory is updated every time the robot moves a microplate into or out of a storage device. The list is current at all times.

Inventory manager

The Inventory Editor dialog box provides the tools for you to manage the labware inventory. From here you can:

- Create plate groups
- Create location groups
- Review information about labware in a group
- Import groups from a barcode file
- Change the labware type associated with labware in the database
- Delete labware from the database
- Inventory the labware in a storage device

Plate groups and location groups

With long-term storage devices, typically only a sub-set of the labware stored in the device is used in one protocol. You can set up two different types of labware sub-sets, called plate groups and location groups. Which you choose for a particular protocol depends on what you are planning to do.

A plate group is a group of labware based on the unique database identifier for that labware.

A location group is a group of slots that are not based on information in the labware database.

Inventory management tasks

The following tasks are used with the inventory management system. These are the tasks that move labware in to and out of a storage device:

- Load
- Unload
- Incubate at microplate storage device

About manually moving labware

Keeping the database synchronized

The database cannot track labware that you manually add, remove, or move. To keep the database synchronized with the storage device, load and unload the microplate storage device robotically, or periodically reinventory the storage device.

Instead of manually adding labware to the storage device, write a protocol to downstack and load the labware. Instead of manually removing labware from the storage device, write a protocol to unload and upstack the labware.

If you must manually load and unload labware

If you must manually load and unload labware, create a protocol to load or unload the exact labware that you are manually adding or removing, and then simulate the protocol in the software.

With an appropriate protocol, the simulated run accurately changes the labware listed in the database without actually moving any labware.

Terminology

The following terms are used to describe the movement of labware in the system.

Term	Definition
Unload	The act of moving labware from a storage device into the system.
Load	The act of moving labware from the system into a storage device.
System	Labware that are being processed by the current protocol are considered to be in the system. For example: • Labware on a platepad is in the system. • Labware in a plate hotel is in the system. • Labware being incubated in an incubator is in the system. • Labware half-way up a Stacker rack is not in the system, unless it will be moved during the current protocol. • Labware being stored in a Plate Hub Carousel is not in the system unless it will be moved during the current protocol.

Database backup

The inventory management database can be backed up onto another computer using a software utility. Contact Automation Solutions Technical Support for more information about the software utility.

Related information

For information about...	See...
Inventory groups, plate groups and location groups	"About inventory groups" on page 72
Setting up the database	"Setting up the database" on page 69
Moving labware in and out of a storage device	• "Loading labware into storage devices" on page 79 • "Unloading labware out of inventory" on page 85 • "Moving labware between storage devices" on page 82
Incubating labware	"Using a plate group to process labware" on page 88
Using barcode input files	"Creating a plate group with a barcode input file" on page 93

Connecting to the inventory management database

Who should read this

Read this topic if your lab automation system has a storage device, such as a Liconic StoreX, Heraeus Cytomat PLC, or Agilent Technologies Plate Hub Carousel, and you are using or setting up inventory management with a database.

Setting up the database

Before you can connect to the database, you must install and configure the inventory management database. To set up the inventory management database, contact Automation Solutions Technical Support for assistance.

Connecting to the database

The database connection is specified in the VWorks software.

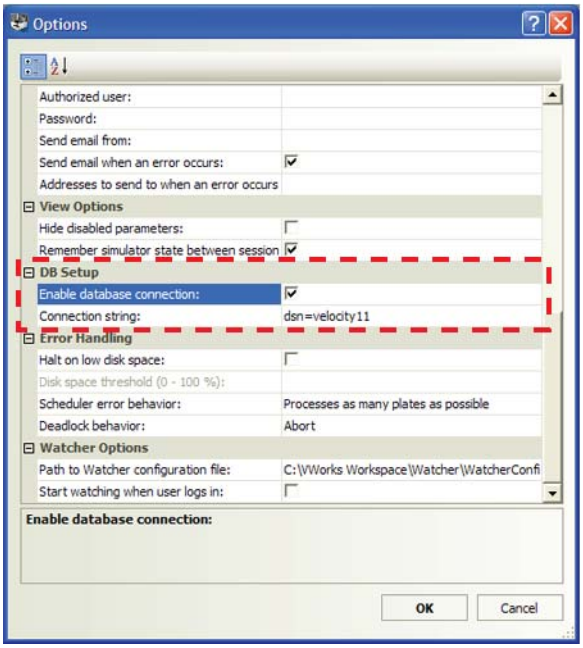
To connect to the database:

1 In the **VWorks** window, choose **Tools** > **Options**. The Options dialog box appears.

2 Under **DB Setup**, verify the following, and then click **OK**.

- **Enable database connection** is selected.
- **Connection string** is `dsn=velocity11`.

  Note: Velocity11 is the factory-default database name specified in the ODBC. If you changed the name in the ODBC, you must update the Connection string field in the Options dialog box.



Related information

For information about...	See...
Inventory groups, plate groups and location groups	"About inventory groups" on page 72
Moving labware in and out of a storage device	• "Loading labware into storage devices" on page 79 • "Unloading labware out of inventory" on page 85 • "Moving labware between storage devices" on page 82
Incubating labware	"Using a plate group to process labware" on page 88
Using barcode input files	"Creating a plate group with a barcode input file" on page 93
Specifying the database name in the ODBC	"Resolving labware inventory problems" on page 102

Opening the inventory editor

Who should read this

Read this topic if your lab automation system has a storage device such as a Liconic StoreX, Heraeus Cytomat PLC, or an Agilent Technologies Plate Hub Carousel and you are using inventory management with a database.

Before you start

Before you can open the inventory editor, the inventory database that the editor communicates with must be installed and configured.

Opening and closing the inventory editor

To open the inventory editor:

Select **Tools** > **Inventory Editor.**

Alternatively, select a **Load** or **Unload** task in a protocol and click **Edit location groups** or **Edit plate groups**.

To close the inventory editor:

Click  in the top-right corner of the window.

Related information

For information about...	See...
Setting up the inventory management database	"Setting up the database" on page 69
Inventory groups, plate groups and location groups	"About inventory groups" on page 72
Moving labware in and out of a storage device	• "Loading labware into storage devices" on page 79 • "Unloading labware out of inventory" on page 85 • "Moving labware between storage devices" on page 82
Incubating labware	"Using a plate group to process labware" on page 88
Using barcode input files	"Creating a plate group with a barcode input file" on page 93

About inventory groups

Who should read this

Read this topic if your lab automation system has a storage device such as a Liconic StoreX incubator, Heraeus Cytomat PLC, or Agilent Technologies Plate Hub Carousel.

Inventory groups defined

An inventory group is a group of labware or slots that is a subset of the labware listed in the inventory.

Types of inventory groups

There are two types of inventory groups:

- Location group
- Plate group

Location groups

Location groups are used to move labware to and or from a specific location in the storage device.

Example:

In this example, a location group that contains slots 1–10 in cassette 1 is created.

When an Unload task uses this location group, the robot moves whatever labware are in cassette 1, slots 1–10, regardless of the identity of the labware, out of the storage device and into the system.

When a Load task uses a location group, it moves the labware that are in the system into cassette 1, slots 1–10 of the storage device, regardless of the identity of the labware.

When to use

Location groups are used when:

- The storage device is being filled or emptied.
- The groups of labware are removed from the lab automation system and replaced with other groups of labware on a regular basis. This would be done by replacing a cassette of labware with a new one.

Plate groups

Plate groups are used to move specific labware to or from the storage device, but without regard for the location. Plate groups can be used when operators do not routinely remove and replace whole cassettes of labware.

When a labware is first moved into the system by the system's robot, such as when it is downstacked, it is assigned an identifier in the database. After that, the VWorks software tracks where that labware is at all times. This tracking

does not require the labware to have barcode labels, the VWorks software tracks what it does with every labware during a protocol and so is able to track where each labware goes. Plate groups make use of this tracking system.

Note: You cannot use a plate group with a Load task, unless a native location or location group is associated with it– you must specify a location group. You can associate a plate group with the location group so that the labware that are loaded are immediately loaded into a plate group as well.

Note: When you load into a plate group you must also load into a location group, native location, or choose return to original locations, otherwise the software will not know where to put the labware.

Example:

A plate group in a storage device contains the following microplates:

- Plate 26
- Plate 31
- Plate 41
- Plate 107

These microplates are scattered around the storage device, not necessarily in adjacent slots of the same cassette. When the Unload task uses this plate group, it moves these microplates out of the storage device and into the system.

When to use

Plate groups are typically used in compound management systems where labware are housed in the storage device almost permanently.

For each protocol, a different plate group is unloaded, run, and then loaded back to a storage device. As long as the identification of the labware is tracked, the labware can be stored in any open location.

Group membership

A single labware can be a member of more than one plate group.

Related information

For information about...	See...
Creating a location group	"Creating and managing location groups" on page 74
Creating a plate group	"Creating and managing plate groups" on page 76
Moving labware in and out of a storage device	• "Loading labware into storage devices" on page 79 • "Unloading labware out of inventory" on page 85 • "Moving labware between storage devices" on page 82
Incubating labware	"Using a plate group to process labware" on page 88

For information about...	See...
Using barcode input files	• "Creating a plate group with a barcode input file" on page 93 • *VWorks Automation Control User Guide*

Creating and managing location groups

Who should read this

Read this topic if your lab automation system has a storage device such as a Liconic StoreX incubator, Heraeus Cytomat PLC, or Agilent Technologies Plate Hub Carousel.

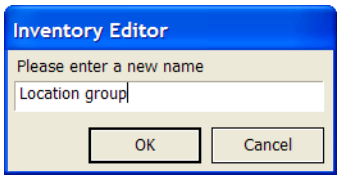
Procedure

To create a location group:

1 Select **Inventory Editor** from the **Tools** menu.

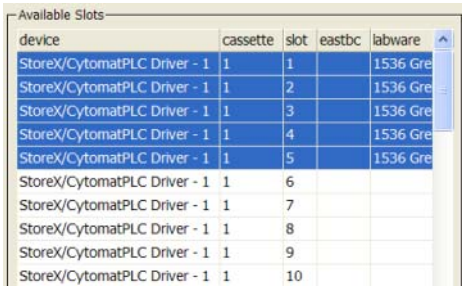
2 Click the **Location Groups** tab.

3 Click **Create new** and enter a name for the group.



4 Click **OK**.

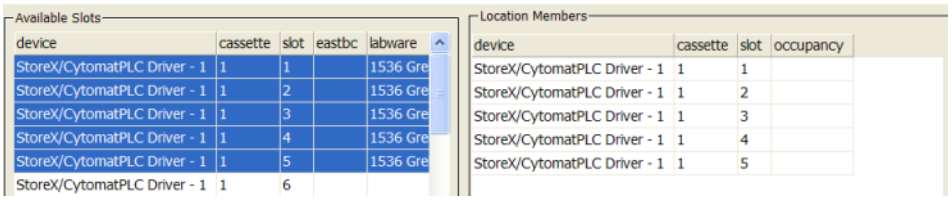
5 Select a group of slots in the **Available Slots** area.



You can use CTRL+click or SHIFT+click to select more than one slot.

6 Drag the group into the **Location Members** area.

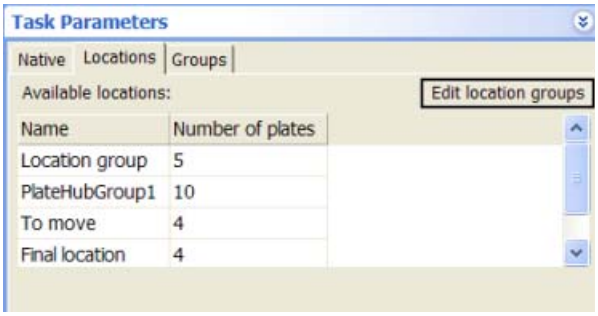
Note: The slots do not have to be adjacent to each other.



7 Click **Save Changes**.

8 Close the inventory editor.

The location group is listed in the Available locations area of the Load/Unload Task Parameters toolbar.



Deleting a location group

To delete a location group from the inventory:

1 Open the inventory editor.

2 Select a location group in the **Saved Locations** group box.

3 Click **Delete**.

Related information

For information about...	See...
Creating a plate group	"Creating and managing plate groups" on page 76
Opening the inventory editor	"Opening the inventory editor" on page 71
Moving labware in and out of a storage device	• "Loading labware into storage devices" on page 79 • "Unloading labware out of inventory" on page 85 • "Moving labware between storage devices" on page 82
Incubating labware	"Using a plate group to process labware" on page 88

For information about...	See...
Using barcode input files	• "Creating a plate group with a barcode input file" on page 93 • *VWorks Automation Control User Guide*
Using storage tasks in a protocol	*VWorks Automation Control User Guide*

Creating and managing plate groups

About this topic

This topic describes how to create a plate group, which is a list of specific labware that can be moved to or out of a labware storage device without regard for which slots they are stored.

Who should read this

Read this topic if your lab automation system has a storage device such as a Liconic StoreX incubator, Heraeus Cytomat PLC, or Agilent Technologies Plate Hub Carousel.

Procedure

To create a plate group:

1 Select **Inventory Editor** from the **Tools** menu.

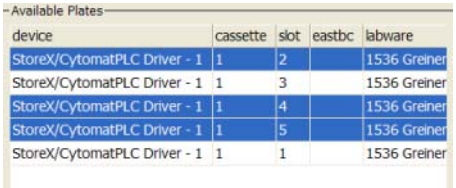
2 Click the **Plate Groups** tab.

3 Click **Create new** and enter a name for the group.

4 Click **OK**.

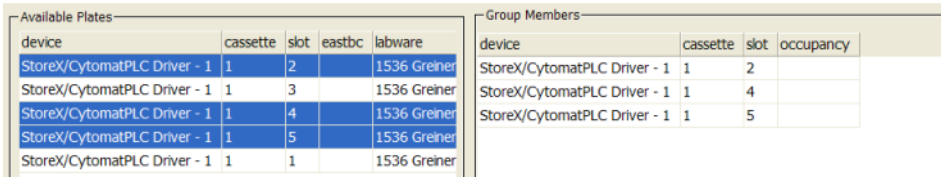
To add labware to the plate group:

1 Select a group of available labware.



You can use CTRL+click or SHIFT+click to select more than one labware.

2 Drag the group into the **Group Members** area.



3 Click **Save Changes**.

4 Close the inventory editor.

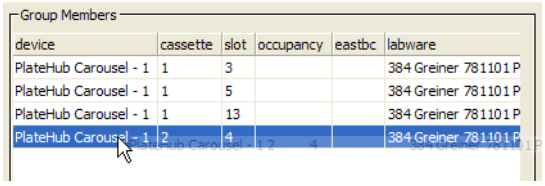
The plate group is listed in the Available groups area of the Groups tab in the Load/Unload Task Parameters toolbar.

Changing the processing order

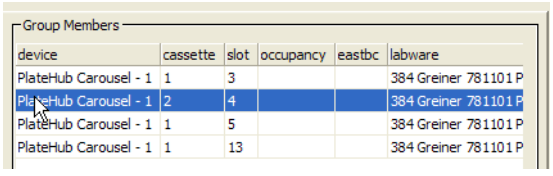
You can change the order in which the labware in a plate group will be processed.

To change the processing order:

1 In the plate group list, select a labware.



2 Drag it to another position in the list.



Deleting a plate group

To delete a plate group from the inventory:

1 Open the inventory editor.

2 Select the plate group in the **Saved Groups** group box.

3 Click **Delete**.

Related information

For information about...	See...
Creating a location group	"Creating and managing location groups" on page 74
Opening the inventory editor	"Opening the inventory editor" on page 71
Moving labware in and out of a storage device	• "Loading labware into storage devices" on page 79 • "Unloading labware out of inventory" on page 85 • "Moving labware between storage devices" on page 82
Incubating labware	"Using a plate group to process labware" on page 88
Using barcode input files	• "Creating a plate group with a barcode input file" on page 93 • *VWorks Automation Control User Guide*
Using storage tasks in a protocol	*VWorks Automation Control User Guide*

Loading labware into storage devices

About this topic

This topic describes how to add labware into a storage device in the system. You do this when filling the device. Adding labware into the system adds the labware identifications into the record that the VWorks software tracks in the system.

Who should read this

Read this topic if your lab automation system has a storage device such as a Liconic StoreX incubator, Heraeus Cytomat PLC, or Agilent Technologies Plate Hub Carousel.

Ways to fill a storage device

There are two ways to fill an empty storage device with labware.

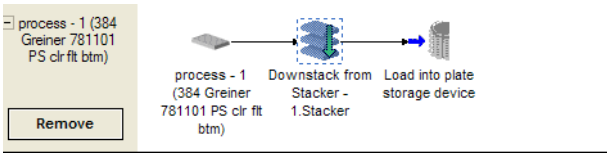
- Robotically
- Manually

Loading labware robotically

To load labware robotically, the labware are placed in a stacker, downstacked and moved to the storage device.

To load labware robotically:

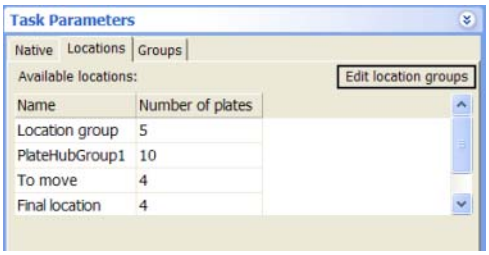
1 Create a protocol.



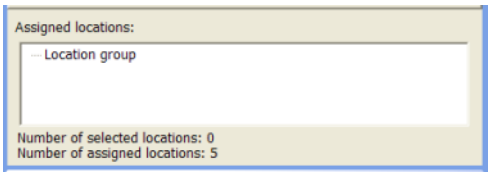
2 Make sure that the **Downstack** task is configured to use the stacker.

3 Create a location group.

Make sure that the location group is listed in the Available locations area of the Load Task Parameters toolbar.



4 Drag the group into the **Assigned locations** area.



5 Click **Start** and resolve any error messages.

Note: If you are using the simulator to "virtually" load labware, make sure that simulation mode is on before you click Start.

6 In the **Number of Cycles** dialog box, enter a number that is equal to or less than the number of labware you want to load into the storage device.

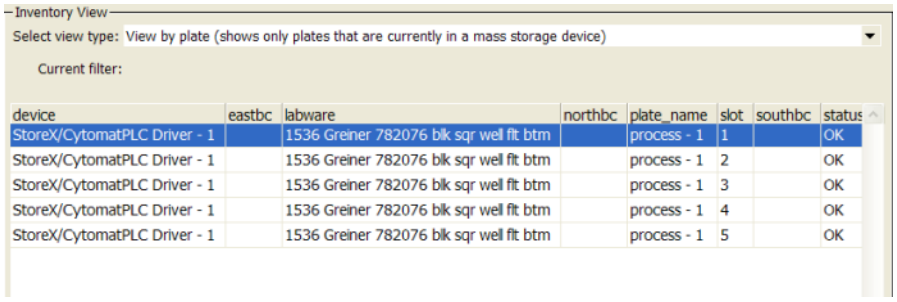
7 Click **OK**.

8 To confirm that the labware are in the inventory:

a Click the **Load** task.

b Click **Edit location groups** to open the inventory editor.

c Click the **Inventory Management** tab.



Loading labware manually

Labware can be loaded manually two ways:

- Cassettes of labware are physically put in to the storage device and a run is simulated to create the matching list of plates in the inventory
- Cassettes of labware are physically put into the storage device, manually added to the inventory and then re-inventoried

  Note: To load by reinventory, the storage device must have a barcode reader.

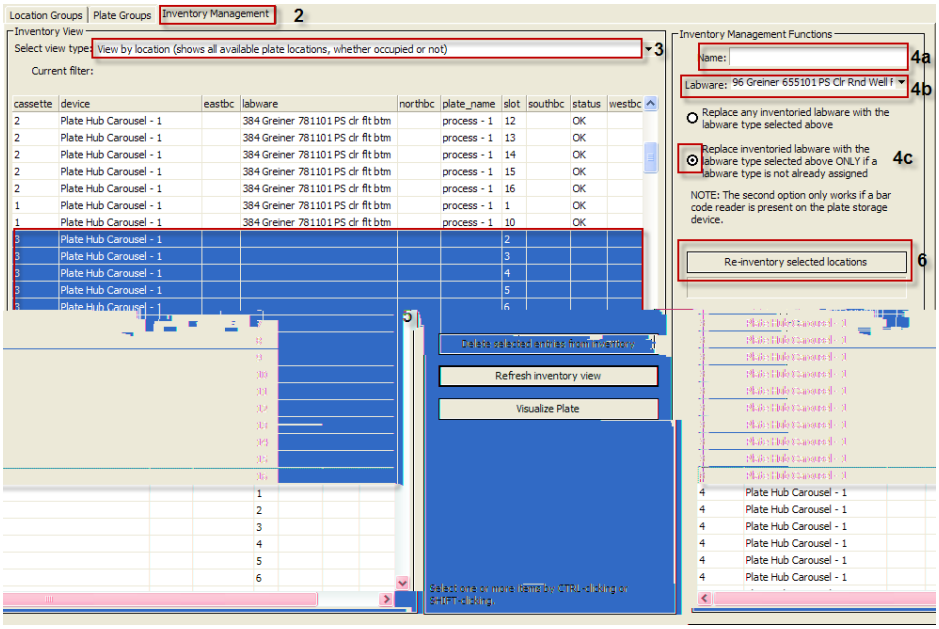
To load labware manually using a simulated run:

1. Physically load the cassettes of labware into the storage device.
2. Follow the procedure to load labware robotically, but turn on the simulation mode. To do this, click **Simulation is off.** The button label changes to display Simulation is on.

   Make sure that the location group matches the cassettes that you loaded.
3. Click **Start** to run the simulator.
4. In the **Number of Cycles** dialog box, enter a number that is equal to or less than the number of labware you want to load into the storage device.
5. Review the inventory editor to make sure that the labware listed in the inventory match the labware actually in the device.
6. To turn off the simulation mode, click **Simulation is on**. The button label changes to display Simulation is off.

To load labware manually and then re-inventory:

1. Physically load the cassettes of labware into the storage device.
2. Open the Inventory Editor and click the **Inventory Management** tab.
3. From the **Select view type** list, select **View by location (shows all available plate locations whether they are occupied or not**.
4. In the **Inventory Management Functions** area:
   - **a** Enter the name of the labware in the **Name** field.
   - **b** Select the labware type from the **Labware** list.
   - **c** Select **Replace inventoried labware with the labware type selected above ONLY if a labware type is not already assigned**. (This prevents you from accidently overwriting an occupied slot with the wrong labware type).
5. Select the slots into which you loaded the labware. Use SHIFT+click or CTRL+click to select more than one item.
6. Click **Re-inventory selected locations**.



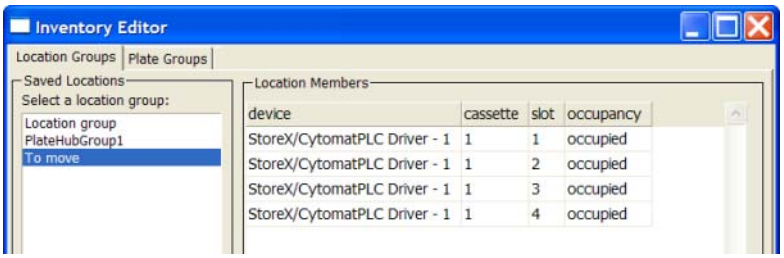
The inventory editor opens.

3 Click the **Inventory Management** tab and note the device, cassette, and slot locations of the microplates that you want to move.

In this example, the microplates will be moved from PlateHub, cassette 1, slots 1–4.

4 Click the **Location Groups** tab and create a location group for these microplates.

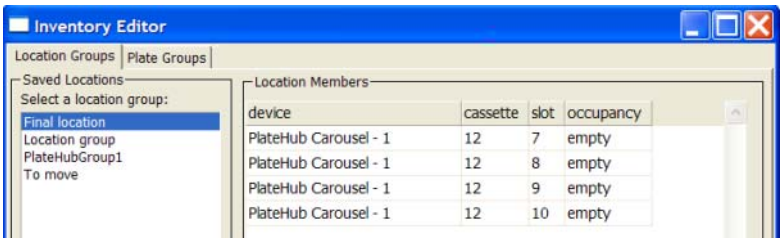
Note: The labware do not need to be in adjacent slots for them to be in a location group.



5 In the **Inventory Management** tab, note the device, cassette, and slot numbers for the destination slots.

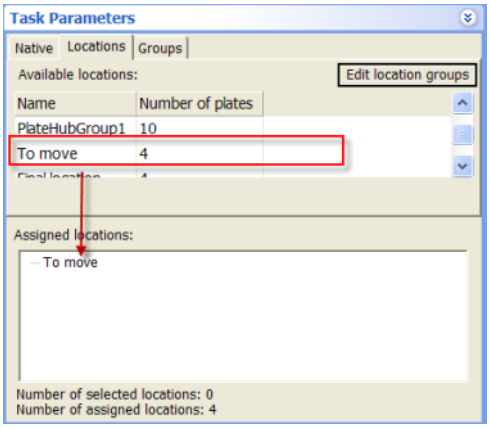
In this example, the microplates will be moved to PlateHub2, cassette 12, slots 7-10.

6 Click the **Location Groups** tab and create a location group for these slots.

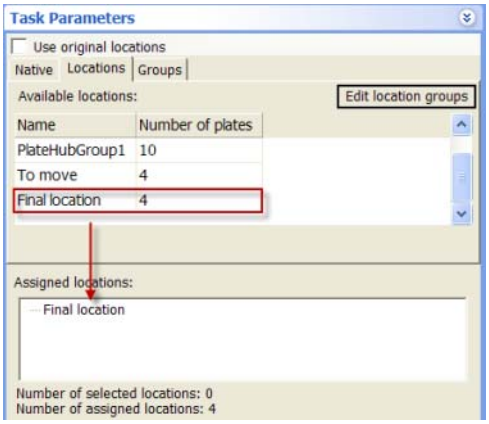


7 Click **Save changes** and close the inventory editor.

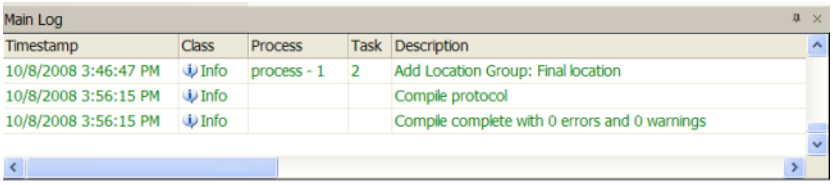
8 Select the **Unload** task, and in the **Task Parameters** area drag the location group in the first device to the **Assigned locations** area.



9 Select the **Load** task, and in the **Protocol Task Parameters** area drag the location group in the second device to the **Assigned locations** area.



10 Compile the protocol and check for errors.



11 Click **Start** to start the run.

12 In the **Number of Cycles** dialog box, type the number of microplates that you are moving and click **OK**.

13 Open the inventory editor, and click the **Inventory Management** tab to make sure that the microplates moved as expected.

Related information

For information about...	See...
Creating a location group	"Creating and managing location groups" on page 74
Creating a plate group	"Creating and managing plate groups" on page 76
Opening the inventory editor	"Opening the inventory editor" on page 71
Moving labware in and out of a storage device	• "Loading labware into storage devices" on page 79 • "Unloading labware out of inventory" on page 85
Incubating labware	"Using a plate group to process labware" on page 88
Using barcode input files	• "Creating a plate group with a barcode input file" on page 93 • *VWorks Automation Control User Guide*

For information about...	See...
Load and Unload tasks	*VWorks Automation Control User Guide*

Unloading labware out of inventory

About this topic

This topic describes how to remove plates that are in a storage device from the system. Removing labware from the system also removes the labware identification from the system records.

Who should read this

Read this topic if your lab automation system has a storage device such as a Liconic StoreX incubator, Heraeus Cytomat PLC, or Agilent Technologies Plate Hub Carousel.

Ways to unload labware

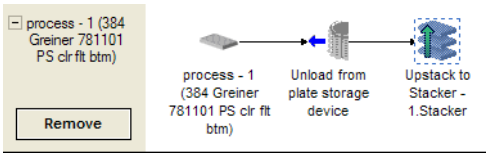
There are two ways to remove labware from a plate storage device.

- Robotically
- Manually

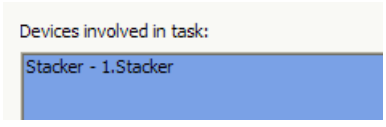
Unloading labware robotically

To unload labware from a storage device robotically:

1 Create a protocol.



2 Make sure that the **Upstack** task is configured to use the appropriate stacker.



3 In the inventory editor, identify the labware that you want to move:

a Click the **Unload** task.

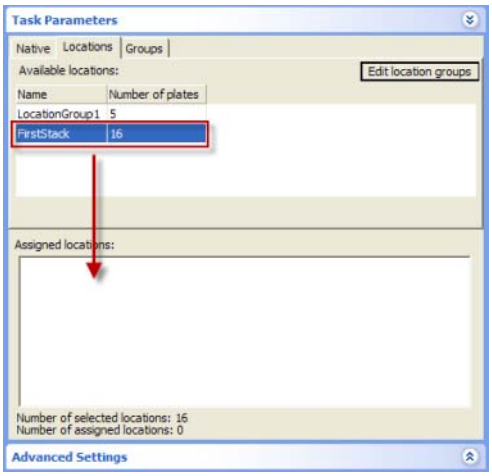
b Click **Edit location groups** to open the inventory editor.

c Click the **Inventory Management** tab. Note the device, cassette and slot numbers for the labware that you want to remove.

4 If necessary, create a location group in the inventory editor that contains the labware you want to remove.

Save the changes and confirm it by making sure it is listed in the Available locations area on the Locations tab of the Load Task Parameters toolbar.

5 Drag the location group into the **Assigned locations** area.



6 Click **Start**.

7 In the **Number of Cycles** dialog box, enter a number that equals the number of plates you want to remove from the storage device.

8 Click **OK**.

9 Confirm that the plates are no longer in the inventory:

a Click the **Load** task.

b Click **Edit location groups** to open the inventory editor.

c Click the **Inventory Management** tab.

Unloading a storage device manually

To unload a storage device manually, cassettes of labware are physically removed from the storage device and a run is simulated to unload the matching list of labware from the inventory.

To unload plates manually using a simulated run:

1 Physically remove the cassettes of labware from the storage device.

2 Follow step 1 to step 5 in the procedure above for unloading a storage device robotically.

3 Click **Simulation is off** to turn on the simulator.

4 Click **Start**.

5 In the **Number of Cycles** dialog box, enter a number that equals the number of labware you want to remove from the storage device.

6 Click **OK**.

7 Confirm that the labware are no longer in the inventory:

a Click the **Load** task.

b Click **Edit location groups** to open the inventory editor.

c Click the **Inventory Management** tab.

To unload labware manually and then reinventory the database:

1 Physically unload the cassettes of labware from the storage device.

2 Open the Inventory Editor and click the **Inventory Management** tab.

3 From the **Select view type** list, select **View by location (shows all available plate locations whether they are occupied or not**.

4 Select the slots from which you unloaded the labware. Use SHIFT+click or CTRL+click to select more than one slot.

5 In the **Inventory Management Functions** area, click **Delete selected entries from inventory**. Click **Yes** to the message asking if you are sure you want to delete the selected labware. The labware is deleted from the database.

6 Click **Re-inventory selected locations**.

Related information

For information about...	See...
Creating a location group	"Creating and managing location groups" on page 74
Creating a plate group	"Creating and managing plate groups" on page 76
Moving labware in and out of a storage device	• "Loading labware into storage devices" on page 79 • "Moving labware between storage devices" on page 82
Incubating labware	"Using a plate group to process labware" on page 88
Using barcode input files	• "Creating a plate group with a barcode input file" on page 93 • *VWorks Automation Control User Guide*

Using a plate group to process labware

About this topic

This topic shows an example protocol where a plate group is moved out of a Plate Hub Carousel, transferred to a liquid-handling device where liquid is aspirated, and then loaded back into the same or different locations of the Plate Hub Carousel.

Who should read this

Read this topic if your lab automation system has a storage device such as a Liconic StoreX incubator, Heraeus Cytomat PLC, Agilent Technologies Plate Hub Carousel.

Before you start

- Place the labware in a Plate Hub Carousel (or other) storage device and make sure the labware are stored in the inventory editor.
- Create a plate group containing the labware that you want to process.

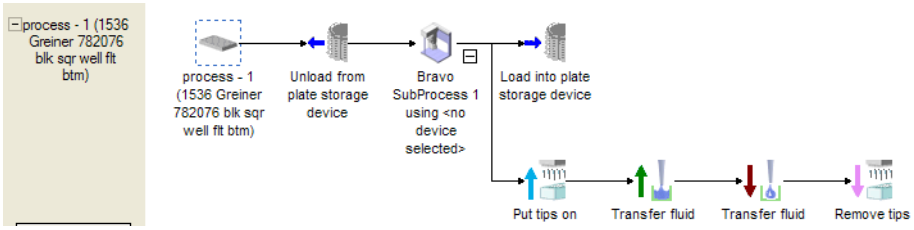
To enable the software to track individual plates:

- Under **Protocol Options**, select the **Dynamically assign empty slot to load to storage device** option.

Processing a plate group and returning the plates to the original location

To process a plate group:

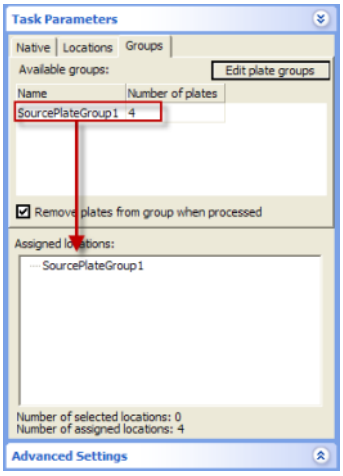
1 Create a process like the one shown below.



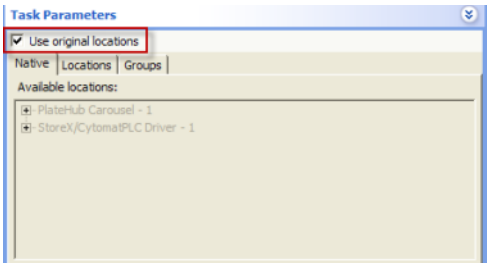
2 Select the **Unload** task, and in the **Task Parameters** area, click the **Groups** tab and drag the plate group to the **Assigned location** area.

3 If you want the labware to be handled in the same numerical order or will not be reusing the labware, select **Remove plates from group when processed**.

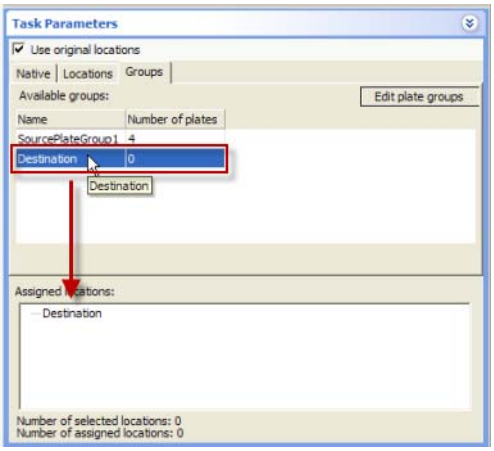
Note: The labware can be loaded back into the group during the Load task execution.



4 Select the **Load** task and then select **Use original locations**. The Locations and Native tabs will become unavailable.



Optional. You can reassign the labware back to the original group or to a new plate group. Click the **Groups** tab and drag the plate group from the **Available groups** area to the **Assigned locations** area.



5 Click **Start**.

6 In the **Number of Cycles** dialog box, enter a number that is equal to or less than the number of labware that you want to process from the group.

7 Click **OK**.

8 To confirm that the labware have been returned to their original position in the inventory:

a Click the **Load** task.

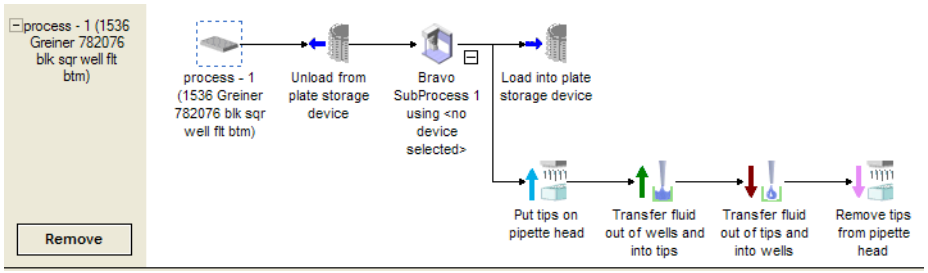
b Click **Edit location groups** or **Edit plate groups**.

c Click the **Inventory Management** tab.

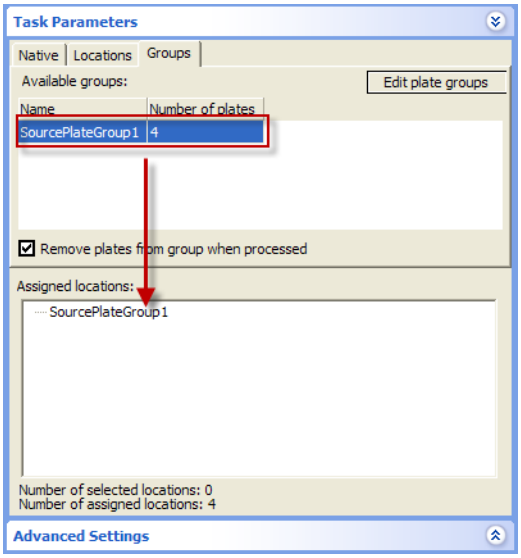
Processing a plate group and returning the labware to a different location

To process a plate group:

1 Create a protocol like the one shown below.

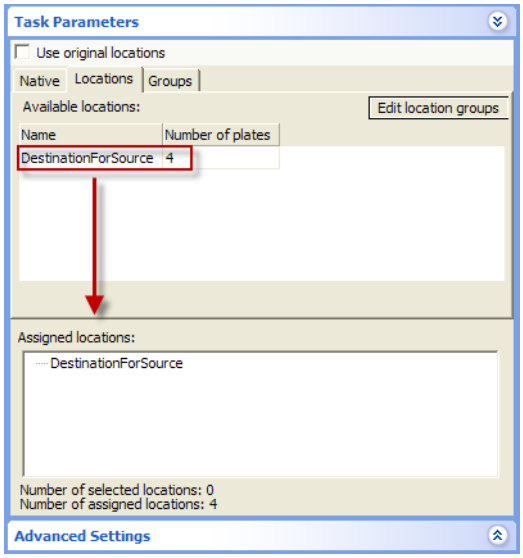


2 Select the **Unload** task and in the **Task Parameters** toolbar, click the **Groups** tab and drag the plate group you created at the beginning to the **Assigned locations** area.

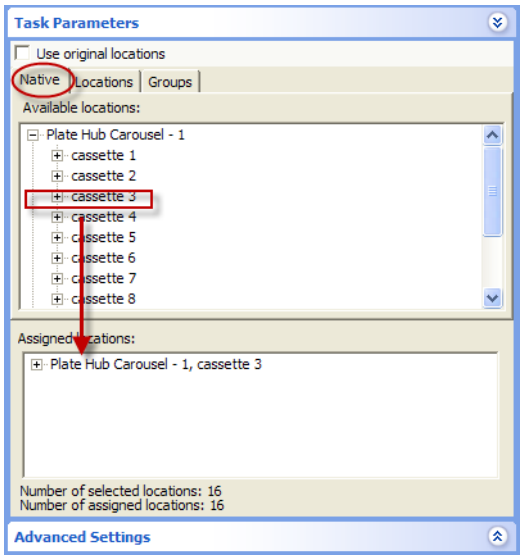


3 Select the **Load** task and in the **Task Parameters** toolbar choose one of the following ways to load the labware into a different location.

- Specify a pre-defined location group to load to. To specify a pre-defined location group, click the **Locations** tab and drag the location group in the **Available locations** to the **Assigned locations** area.



- Assign specific locations to load to without using a location group. To assign specific locations without defining a location group, click the **Native** tab and drag the locations from the **Available locations** area to the **Assigned locations** area.



4 Click **Start**.

5 In the **Number of Cycles** dialog box, enter a number that is equal to or less than the number of labware that you want to process from the group.

6 Click **OK**.

7 To confirm that the labware have been returned to their assigned positions in the inventory:

   a Click the **Load** task.

   b Click **Edit location groups** or **Edit plate groups**.

   c Click the **Inventory Management** tab.

Related information

For information about...	See...
Software inventory	"About labware inventory management" on page 66
Creating a plate group	"Creating and managing plate groups" on page 76
Moving labware in and out of a storage device	• "Loading labware into storage devices" on page 79 • "Unloading labware out of inventory" on page 85 • "Moving labware between storage devices" on page 82
Using barcode input files	• "Creating a plate group with a barcode input file" on page 93 • *VWorks Automation Control User Guide*
Starting a run	*VWorks Automation Control User Guide*
Load and Unload tasks	*VWorks Automation Control User Guide*

Creating a plate group with a barcode input file

About this topic

This topic describes how to use a barcode input file to create a plate group. This is the most efficient way to create a plate group if you previously used a barcode input file to label a collection of labware that are now stored in a storage device.

Who should read this

Read this topic if your lab automation system has a storage device such as a Liconic StoreX incubator, Heraeus Cytomat PLC, or Agilent Technologies Plate Hub Carousel.

Procedure

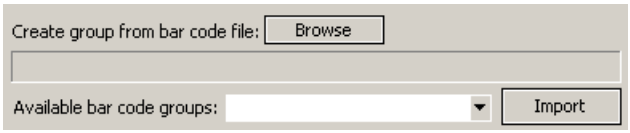
IMPORTANT All labware with barcodes listed in the selected barcode input file series must already be in the storage device.

To create a plate group with a barcode input file:

1 Open the inventory editor.

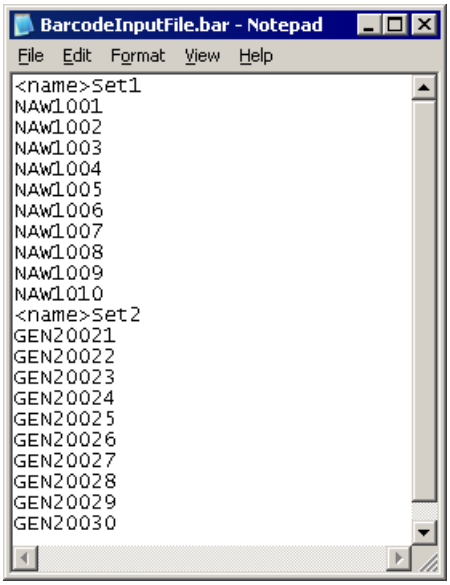
2 Click the **Groups** tab.

3 Click the **Browse** button and navigate to the .bar file that you want to use.



4 From the **Available Barcode groups** list box, select the group that you want to use.

In the following example of a barcode input file, the options would be Set1 and Set2.



5 Click **Import**.

The labware labeled with west-side barcodes listed in the series will be used to create a group and will appear in the **Plates currently in the selected group** list.

6 In the **Inventory Management** tab, specify a labware type for each labware.

Related information

For information about...	See...
Software inventory	"About labware inventory management" on page 66
Opening the inventory editor	"Opening the inventory editor" on page 71
Using the labware selection list	"Reinventorying the labware inventory" on page 100

Inventory editor views and filters

About this topic

This topic describes how to make the inventory editor easier to work with by showing only the items in the inventory editor that are relevant at the particular time.

Who should read this

Read this topic if your lab automation system has a storage device such as a Liconic StoreX incubator, Heraeus Cytomat PLC, or Agilent Technologies Plate Hub Carousel.

Inventory editor views

There are three ways to view the labware in the inventory editor.

To set the view:

1. Open the inventory editor.
2. Click to select the **Inventory Management** tab.
3. From the **Select view type** list, select one of the following options:

View	Description
View by plate	Displays every labware in the inventory. This is the most frequently used view.
View by location	Displays both labware and slots.
View unassigned plates	Displays labware that were orphaned during previous runs, or the labware that are in the system but not in a storage device.

Filtering displayed labware

To simplify your view of the database, you can filter the records that are displayed.

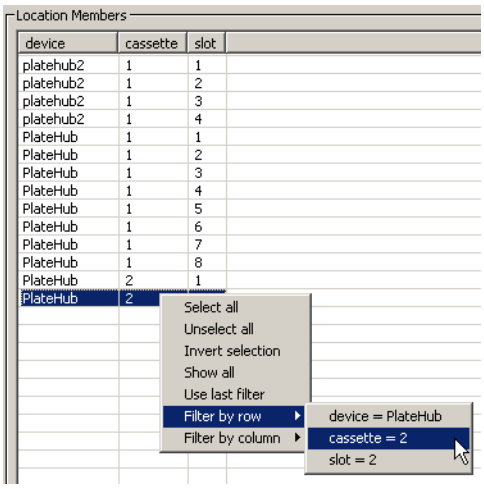
To filter the labware records:

1. Right-click on a list in any of the tabbed pages of the inventory editor and select **Show all**.
2. Right-click on a particular cell and select from the available filtering options.

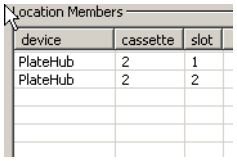
View	Description
Use last filter	Returns the display of items to that displayed when the last filter was applied
Filter by row	The items that have the same value as the selected item in the row are displayed

View	Description
Filter by column	The items that have the same value as the selected item in the column are displayed

The items that have the same value as the selected item in the row are displayed.



The result is that only those plates in cassette number 2 are listed.



To show all labware records:

Right-click on the database list and select **Show all**.

Related information

For information about...	See...
Software inventory	"About labware inventory management" on page 66
Opening the inventory editor	"Opening the inventory editor" on page 71

Auditing plate volumes in the inventory editor

About this topic

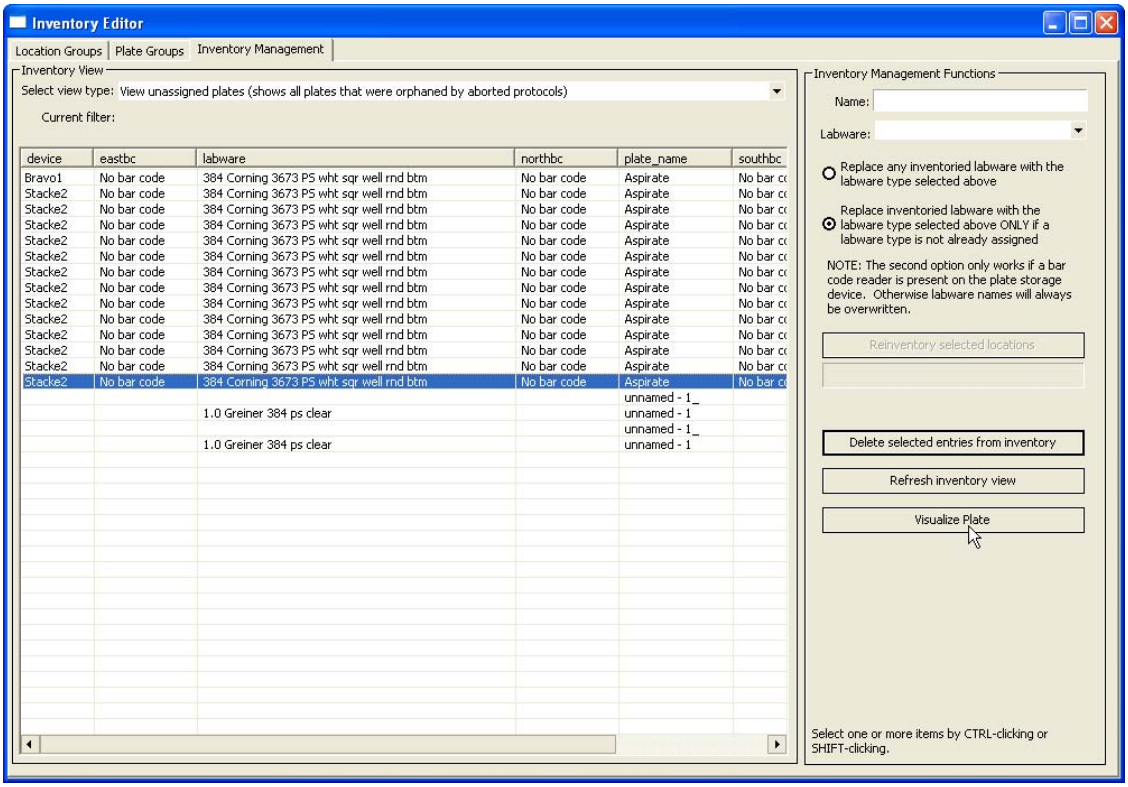
The VWorks software tracks the pipetting tasks performed on the labware during a protocol run, calculating the volume resulting from those tasks, and storing the information in the database. When the labware is displayed in the software, the volume is represented with color.

This topic describes how to use the inventory editor to audit the volume in a labware.

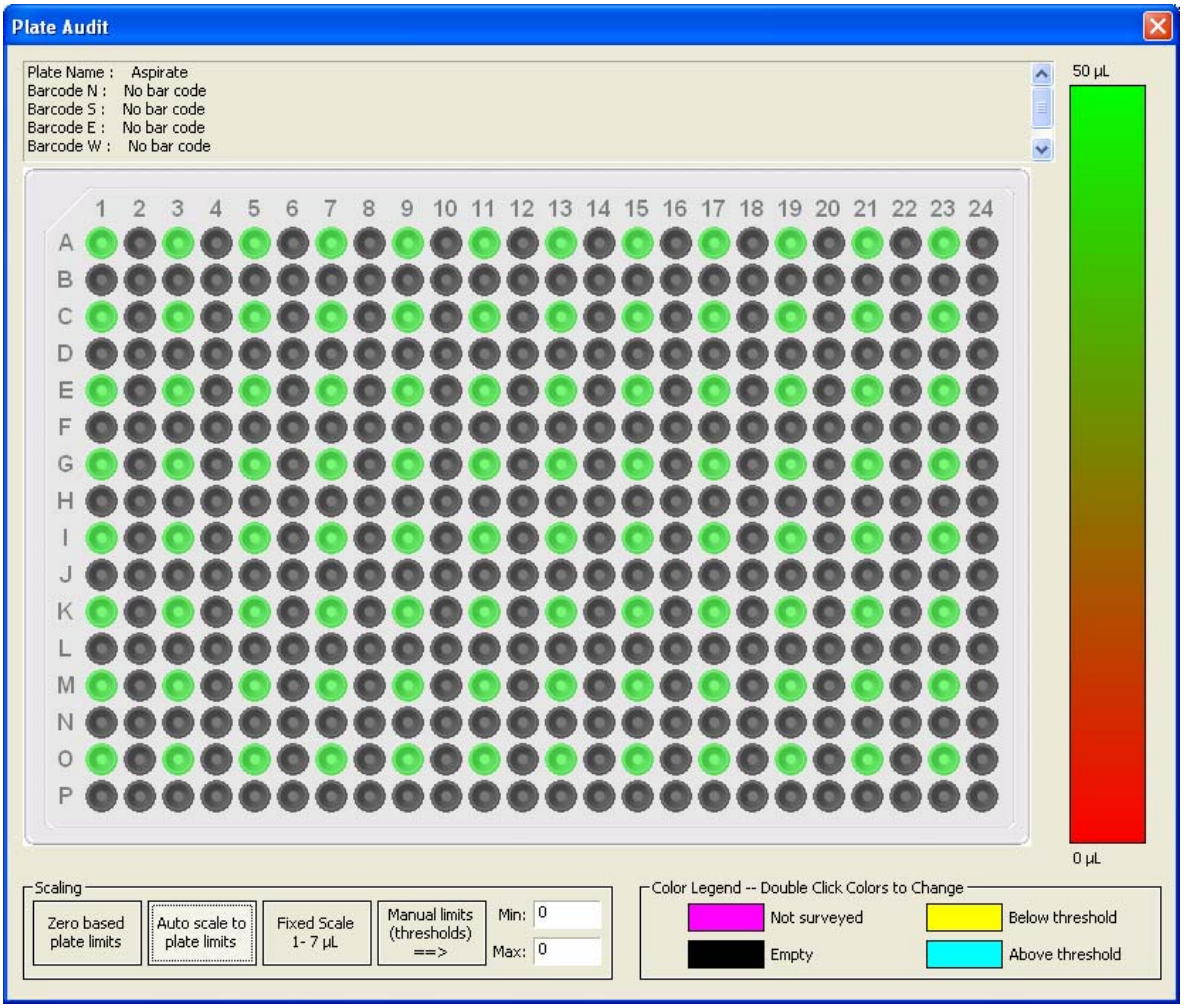
Procedure

To audit the volume of a labware:

1. Open the inventory editor.
2. Click the **Inventory Management** tab.
3. From the **Select view type** list, select the view.
4. Select the labware you want to audit.



5. Click **Visualize Plate**. The Audit Plate dialog box opens.



The liquid volume is displayed on the right. You can change the limits of this scale in the Scaling area.

Click this button...	To...
Zero based plate limits	Set the gradient limits from 0 µL to the highest volume found in the labware.
Auto scale to plate limits	Set the scale limits to the lowest and highest volume found in the labware.
Fixed Scales 1-7 µL	Set the minimum and maximum limits to 1 µL and 7 µL, respectively.
Manual limits (thresholds)	Manually set the lower and upper limits. Enter the value (in µL) in the Min and Max boxes.

The color legend indicates the following conditions.

Condition	Description
Not surveyed	The well is not available for measurement.
Empty	The well is empty.
Below threshold	The well is below the lower limit set by the user.
Above threshold	The well is above the upper limit set by the user.

Double-click on a color in the legend to change it.

Related information

For information about...	See...
Software inventory	"About labware inventory management" on page 66
Opening the inventory editor	"Opening the inventory editor" on page 71

Reinventorying the labware inventory

About this topic

This topic describes how to use the reinventory feature of labware inventory.

This feature can be used to check for mismatches by comparing the identities of the labware actually in a storage device to the labware that the inventory database says should be in the storage device.

The reinventory feature can also be used to enter barcode information for labware that have been manually placed into the storage device.

Note: Reinventorying requires that the storage device has a barcode reader.

Who should read this

Read this topic if your lab automation system has a storage device that includes an optional barcode reader.

About performing an inventory

The accuracy of the inventory database can be checked by performing a new inventory of the database. You can perform an inventory of the entire storage device or part of it.

The device's barcode reader checks all selected slots for the presence of a barcode and reads those that it finds. The results are checked against the inventory database.

IMPORTANT For reinventorying to be successful, each labware must have a unique barcode.

Reinventorying logic

If a labware is found in a slot that, according to the inventory database, should be empty, a line is added to the inventory editor for that slot and the labware barcode is recorded. If that barcode is already associated with another slot in the database, the previous association is deleted. In doing this, the system assumes that the labware has been manually moved.

If the inventory has a line for a labware in a particular slot, but the inventory finds no labware in that slot, the line is removed from the inventory. However, the data in the system that is associated with the labware is not deleted. If in the future, a labware with an identical barcode is returned to the system, when the next inventory is performed the data can be reassociated with it.

Procedure

To reinventory the storage device:

1. Open the inventory editor.
2. Click the **Inventory Management** tab.
3. From the **Select view type** list box, select **View by location**.

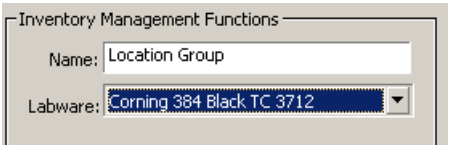
This lists the labware in the inventory database by location.

4 Select the labware that you want to inventory.

You can use SHIFT+click to select a range of listed labware.

5 In the **Name** box, type the name of the location group.

6 From the **Labware** box, select the type of labware.



7 Select one of the following options.

Option	Comments
Replace any inventoried labware with the labware selected above	Labware for all selected items are replaced with the labware displayed in the list box. This overwrites labware already assigned.
Replace inventoried labware with the labware selected above ONLY if a labware is not already assigned	Labware for all selected items that do not already have a labware entry are replaced with the indicated labware.

8 Click **Reinventory selected locations**.

A barcode reader reads each labware in the storage device and adds the barcode data to the inventory database.

Related information

For information about...	See...
Inventory groups, plate groups and location groups	"About inventory groups" on page 72
Moving labware in and out of a storage device	• "Loading labware into storage devices" on page 79 • "Unloading labware out of inventory" on page 85 • "Moving labware between storage devices" on page 82
Changing the labware associated with labware record in the inventory database	"Reinventorying the labware inventory" on page 100
Inventory editor filters	"Inventory editor views and filters" on page 95

Resolving labware inventory problems

About this topic

This topic describes how to check and test the Windows Open Database connection that is used by the VWorks software inventory management system.

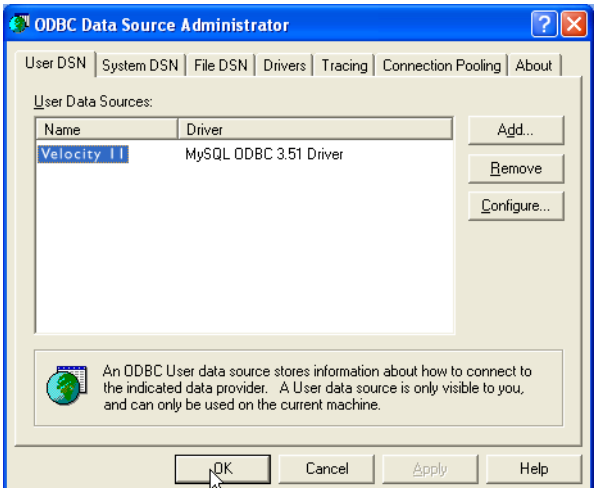
Checking the database settings

The inventory management database uses a Windows Open Database Connectivity (ODBC) interface. If you encounter inventory management problems, you may need to check the database settings.

To check the database settings:

1 In Windows, navigate to **Start > Control Panel** > **Administrative Tools** > **Data Sources (ODBC)**.

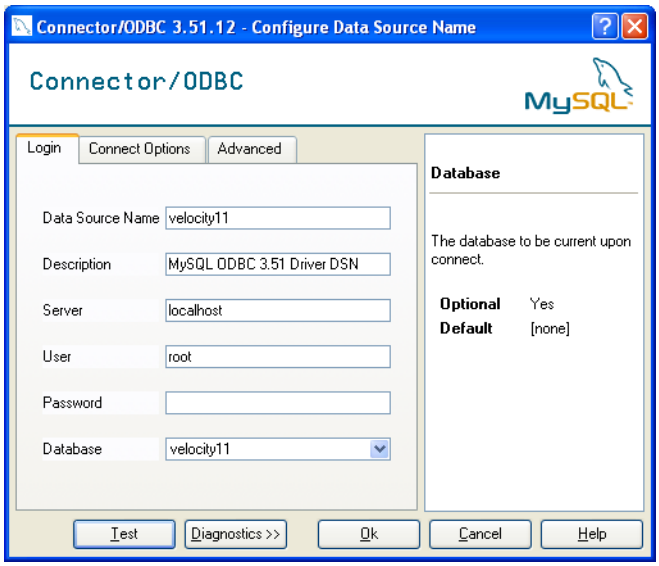
The ODBC Data Sources Administrator dialog box opens.



2 Click the **System DSN** tab.

3 Click **Configure**.

The Connector/ODBC dialog box opens showing the database settings.



The **Data Source Name** and **Database Name** fields must both contain `velocity11`.

Testing the connection

To test the database connection:

1. Follow the procedure in "Checking the database settings" on page 102 to open the **Connector/ODBC** dialog box.
2. Click **Test**.

   A message appears and confirms a successful connection.

Related information

For information about...	See...
Inventory groups, plate groups and location groups	"About inventory groups" on page 72
Moving labware in and out of a storage device	• "Loading labware into storage devices" on page 79 • "Unloading labware out of inventory" on page 85 • "Moving labware between storage devices" on page 82
Changing the labware associated with plates in the inventory database	"Reinventorying the labware inventory" on page 100
Inventory editor filters	"Inventory editor views and filters" on page 95

5 Managing user accounts

This chapter contains the following topics:

Planning user accounts and privileges

The role of user accounts

You must have a user account to log in to VWorks software. Your user account is associated with a user role that determines the privileges you have to perform particular functions. Users are added and assigned privileges by an Administrator.

The effect of privileges

Privileges have the following effects:

- If you do not have the privilege to perform a function associated with a particular menu command, the text of the command is gray.
- If you do not have the privilege to perform the functions accessed from a particular tabbed page, the tab is not visible to you.
- In some cases, if you do not have the privilege to perform an operation, when you attempt the operation you get an error message telling you that your privileges are insufficient.

User roles and privileges

User roles enforce the following privileges:

User role	Has privileges to...
Guest	• Log in and log out. • Access the Knowledge Base through the Help menu. • Use context-sensitive help.
Operator	• Perform guest functions (see above). • Operate devices in real-time using diagnostics software. • Run protocols.
Technician	• Perform operator functions (see above). • Create and save protocols. • Manage devices through the device manager. • Perform all of the functions listed in the Tools menu (except managing users).
Administrator	• Perform technician functions (see above). • Manage user accounts. • Run a protocol that contains compiler errors.

Related information

For information about...	See...
managing user accounts	“Managing user accounts” on page 108
Setting up email notification	“Setting up email for error notification” on page 110

Managing user accounts

About user accounts and passwords

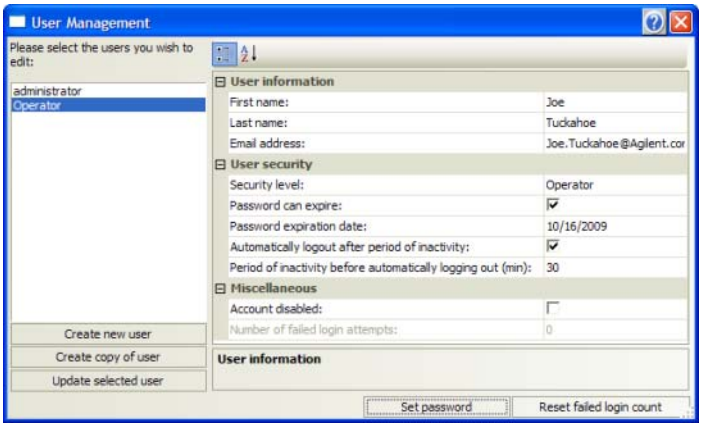
User accounts and passwords use the following conventions:

- User accounts can be disabled but not deleted.
- User names and passwords are case-sensitive.
- Passwords must contain six or more characters.
- If a user enters an incorrect password five times consecutively, the user is locked out until an administrator resets the account.

Adding a user account

To add a user account:

1. Select **Tools** > **User Management**.
2. In the **User Management** dialog box, click **Create new user** and enter a name for the user.
3. In the Set Password dialog box, enter the password twice for the new user.
4. Enter values in the **User information**, and **User security** areas.



5. Click **Update selected user** to save changes, and then close the dialog box.

Disabling a user account

You cannot delete a user account, but you can disable it.

To disable an account so that the user cannot log in:

1. Select **Tools** > **User Management**.
2. Select the account.
3. Select the **Account disabled** check box.
4. Click **Update selected user** to save changes, and then close the dialog box.

Resetting a user account

If a user mistypes the password five consecutive times, the user is locked out of the account until an administrator resets the account.

To reset an account:

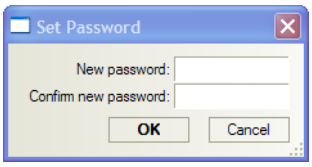
1. Select **Tools** > **User Management**.
2. Select the account.
3. Click **Reset failed login count**.
4. Click **Update selected user** to save changes, and then close the dialog box.

Changing a password

An administrator can reset the password of any account. Technicians can change their own passwords at Log in.

To reset a password:

1. Select **Tools** > **User Management**.
2. Select the account.
3. Click **Set password**, enter the new password twice and click **OK**.



4. Click **OK** to the Password Update message.

Related information

For information about...	See...
User accounts	"Planning user accounts and privileges" on page 106
Setting up email notification	"Setting up email for error notification" on page 110

Setting up email for error notification

About email error notification

Email setup in the VWorks software enables you to do the following tasks:

- Automatically be notified by email or pager when errors occur during a protocol run
- Send a bug report to Agilent Technologies

Requirements for email notification

Before you can send an email from VWorks software, the controlling computer must:

- Be connected to a network with internet access
- Have network access to an outgoing mail server that supports one of the authentication methods available through the VWorks software.

Procedure

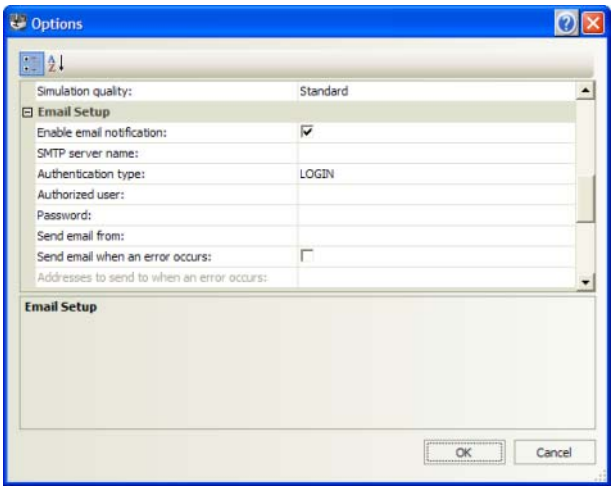
To set up the outgoing mail server:

1. Select **Tools > Options**.
2. In the **Email Setup** area make sure **Enable email notification** is selected.
3. Enter the name of your **SMTP server name** (outgoing email server).
4. If the server requires a user name and password:
   a. Select the **Authentication type** from the list.

      IMPORTANT The authentication type is critical. Check with your network administrator to determine the best authentication network for your email server. (NTLM is typically used when Microsoft Exchange is the email server.)

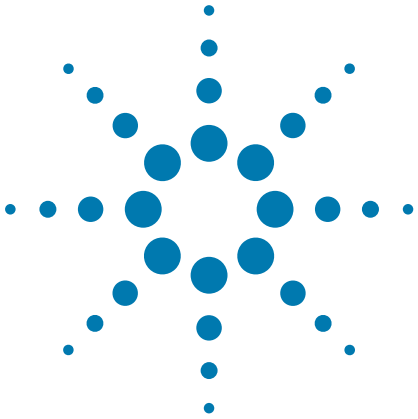
   b. Enter your **Authenticated user** name and **Password** for the selected authentication type.
5. Next to the **Send email from** field, enter the email address you want to use for auto-generated crash reports.
6. Select **Send email when an error occurs**, then next to **Addresses to send to when an error occurs**, enter the address to which you want the email delivered.

   Note: Multiple email addresses must be separated with a semicolon.
7. Click **OK** to save the email setup information and close the dialog box.



Related information

For information about...	See...
Using user accounts	"Planning user accounts and privileges" on page 106
Managing user accounts	"Managing user accounts" on page 108



6 Troubleshooting problems

This chapter contains the following topics:

About troubleshooting guidelines

For problems that you encounter after installing the software, you try to locate a solution using the guidelines in one of the following documents:

- *VWorks Automation Control User Guide*
- Applicable user guide for the device

If you are unable to resolve the problem, see "Reporting problems" on page 114.

Reporting problems

Contacting Automation Solutions Technical Support

If you find a problem with the VWorks software, contact Automation Solutions Technical Support at one of the following:

Europe

Phone: +44 (0)1763853638

email: euroservice.automation@agilent.com

US and rest of world

Phone: 1.800.979.4811 (US only) or +1.408.345.8011

email: service.automation@agilent.com

Note: You can also send a software bug report from within the VWorks software.

Reporting hardware problems

When contacting Agilent Technologies, make sure you have the serial number of the device ready. See the device user guide for the location of the label.

Reporting software problems

When you contact Automation Solutions Technical Support, make sure you provide the following:

- Short description of the problem
- Software version number
- Error message text (or screen capture of the error message dialog box)
- Screen capture of the About VWorks software dialog box.
- Relevant software files

To find the VWorks software version number:

In the VWorks software, select **Help > About VWorks.**

To find the Diagnostics software version number:

1 Open **Diagnostics.**

2 Read the version number on the title bar of the diagnostics window.

To send compressed protocol and associated files in VZP format:

In the VWorks software, select **File > Export** to export and compress the following files:

- Protocol file
- Device file (includes the device profile and teachpoint file)
- Labware definitions
- Liquid classes
- Pipette techniques
- Hit-picking files
- Plate map files
- Barcode files
- Error library
- Log files

Reporting user guide problems

If you find a problem with this user guide or have suggestions for improvement, send your comments using one of the following methods:

- Click the feedback button () in the online help.
- Send an email to documentation.automation@agilent.com.

Related information

For information about...	See...
Troubleshooting problems with the VWorks software	*VWorks Automation Control User Guide*
Troubleshooting problems with a device controlled by the VWorks software	Applicable user guide for the device

7 VWorks ActiveX control

This chapter contains the following topics:

About the VWorks ActiveX control

What is the VWorks ActiveX control

The VWorks ActiveX control is the software component that allows the VWorks software to interact with a third-party lab automation system.

How the VWorks ActiveX control is used

In an Agilent Technologies automation system, the VWorks software runs in standalone mode, and the ActiveX control is not used. The operator uses the VWorks software, which is already configured to control the devices in the system. However, some integrations, such as those with LIMS, require that a third-party application control the VWorks software. The VWorks ActiveX control enables third-party applications to interface with the VWorks software. Through the ActiveX control, the third-party application can create an instance of the VWorks software, schedule protocol runs, and display various VWorks dialog boxes.

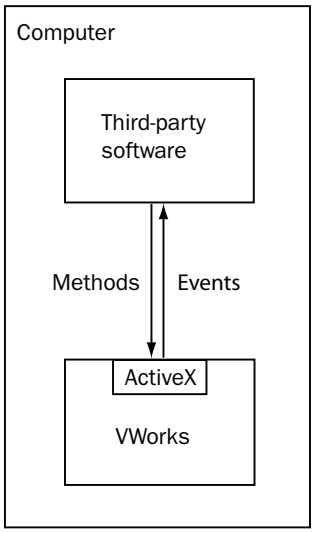
Each ActiveX control consists of a collection of the following:

- *Methods*. Functions that can be called to invoke individual operations
- *Properties*. Variables that are used in methods (for example, speed = fast)
- *Events*. Notifications that methods have completed or resulted in errors

To ensure proper integration, you must know the available methods and properties for the ActiveX control.

The following diagram illustrates the use of the VWorks ActiveX control in a lab automation system environment. Actions you perform are conducted through ActiveX methods. System responses are relayed back through ActiveX events.

Note: Although the VWorks ActiveX control generates events, the third-party application must implement handlers for them.



Integrating the VWorks ActiveX control

When integrating the VWorks ActiveX control in a third-party lab software:

1. Install the VWorks ActiveX control. To install the VWorks ActiveX control:
   a. Insert the VWorks software CD into the controlling computer CD-ROM drive.
   b. In the CD folder, double-click VWorks Installer.exe.
   c. Follow the directions in the installation wizard window.
2. Open the Command Prompt window and type VWorks/register to register the application program interface.
3. Refer to the description of the Methods and Properties in this section.

Related information

For information about...	See...
VWorks ActiveX methods	"Methods" on page 120
VWorks ActiveX events	"Events" on page 132
VWorks ActiveX enumerated types	"Enumerated types" on page 136

Methods

AbortProtocol

Description

Aborts the protocol run that is in progress.

Parameters

None

Returns

Name	Type	Description
returnCode	V11ReturnCode	See"Enumerated types" on page 136.

Visual C++ example

```
VWorks4Lib.V11ReturnCode retCode;
retCode = oVWorks4COM.AbortProtocol();
```

Visual Basic .NET example

```
Dim retCode as VWorks4Lib.V11ReturnCode
retCode = oVWorks4COM.AbortProtocol()
```

CloseProtocol

Description

Closes the specified protocol file.

Parameters

Name	Type	Description
protocol	BSTR	The protocol file path.

Returns

Name	Type	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136. *Note:* returnCode is RETURN_SUCCESS if the file closed successfully.

Visual C++ example

```
VWorks4Lib.V11ReturnCode retCode;
retCode = oVWorksCOM.CloseProtocol("myprotocol.pro");
```

Visual Basic .NET example

```
Dim vwRetCode As VWorks4Lib.V11ReturnCode
vwRetCode = oVWorksCOM.CloseProtocol("myprotocol.pro")
```

CompileProtocol

Description

Compiles the protocol and is used with the LogMessage event.

Parameters

Name	Type	Description
protocol	BSTR	The protocol file path.
errorCount	*LONG	The number of errors found.
warningCount	*LONG	The number of warnings found.

Returns

Name	Type	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

```
VWorks4Lib.V11ReturnCode retCode;
LONG errCount, wrnCount;
retCode = oVWorks4COM.CompileProtocol ("c:\\myprotocol.pro",
&errCount, &wrnCount);
```

Visual Basic .NET example

```
Dim retCode as VWorks4Lib.V11ReturnCode
Dim errCount, wrnCount as Long
retCode = oVWorks4COM.CompileProtocol ("c:\myprotocol.pro",
errCount, wrnCount)
```

EnumerateUsers

Description

Returns the list of users with VWorks accounts.

Parameters

None.

Returns

Name	Type	Description
user	*VARIANT	The user name.
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual Basic .NET example

```
Dim oEnumerateUsers As Object = Nothing
Dim retCode As VWorks4Lib.V11ReturnCode
Dim sUsers As String = ""

retCode = oVWorksCOM.EnumerateUsers(oEnumerateUsers)

If Not (oEnumerateUsers Is Nothing) Then
Dim i As Integer
For i = 0 To oEnumerateUsers.GetLength(0) - 1
sUsers = sUsers & oEnumerateUsers(i) & " , "
Next
End If
```

GetSimulationMode

Description

Gets the simulation mode state.

Parameters

None.

Returns

Name	Type	Description
mode	VARIANT_BOOL	The value that indicates the simulation state: • True = The simulation mode is on. • False = The simulation mode is off.

Visual C++ example

```
VARIANT_BOOL bSimMode;
bSimMode= oVWorksCOM.GetSimulationMode();
```

Visual Basic .NET example

```
Dim bSimMode as Boolean
bSimMode= oVWorksCOM.GetSimulationMode()
```

GetTipStates

Description

Gets the state of the tipboxes in a protocol for automated tip tracking.

Parameters

Name	Type	Description
protocol	BSTR	The protocol file path.

Returns

Name	Type	Description
TipStateXML	BSTR	The current status of the tipboxes.
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual Basic .NET example

```
Dim TipStateXML As String = ""
Dim retCode As VWorks4Lib.V11ReturnCode
retCode = oVWorksCOM.GetTipStates("c:\myprotocol.pro",
TipStateXML)
```

LoadProtocol

Description

Loads the protocol for a run.

Parameters

Name	Type	Description
protocol	BSTR	The protocol file path.

Returns

Name	Type	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

```
VWorks4Lib.V11ReturnCode retCode;
retCode=oVWorks4COM.CompileProtocol("c:\\myprotocol.pro");
```

Visual Basic .NET example

```
Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM.CompileProtocol ("c:\myprotocol.pro")
```

LoadRunsetFile

Description

Loads the runset file.

Parameters

Name	Type	Description
runset	BSTR	The runset file path.

Returns

Name	Type	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

```
VWorks4Lib.V11ReturnCode retCode;
retCode=oVWorks4COM.LoadRunsetFile ("c:\\myrunset.rst");
```

Visual Basic .NET example

```
Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM.LoadRunsetFile ("c:\myrunset.rst")
```

Login

Description

Logs into VWorks software using the provided user name and password.

Parameters

Name	Type	Description
userName	BSTR	The user name.
password	BSTR	The password.

Returns

Name	Type	Description
loginResult	V11LoginResult	See "Enumerated types" on page 136.

Visual C++ example

```
VWorks4Lib.V11LoginResult retCode;
loginResult= oVWorksCOM.Login("user1","mypassword!");
```

Visual Basic .NET example

```
Dim loginResult as VWorks4Lib.V11LoginResult
loginResult= oVWorksCOM.Login("user1","mypassword!")
```

Logout

Description

Logs out the current user session.

Parameters

None.

Returns

Name	Type	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

```
VWorks4Lib.V11ReturnCode retCode;
retCode = oVWorksCOM.Logout();
```

Visual Basic .NET example

```
Dim retCode as VWorks4Lib.V11ReturnCode
retCode = oVWorksCOM.Logout()
```

PauseProtocol

Description

Pauses the protocol run that is in progress. The tasks that are in progress will be finished. No new tasks will be started.

Parameters

None.

Returns

Name	Type	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

```
VWorks4Lib.V11ReturnCode retCode;
retCode = oVWorksCOM.PauseProtocol();
```

Visual Basic .NET example

```
Dim retCode as VWorks4Lib.V11ReturnCode
retCode = oVWorksCOM.PauseProtocol()
```

ReinitializeDevices

Description

Reinitializes devices.

Parameters

None

Returns

Name	Type	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

```
VWorks4Lib.V11ReturnCode retCode;
retCode=oVWorks4COM.ReinitializeDevices ();
```

Visual Basic .NET example

```
Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM. ReinitializeDevices ()
```

ResumeProtocol

Description

Resumes the protocol run.

Parameters

None.

Returns

Name	Type	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

```
VWorks4Lib.V11ReturnCode retCode;
retCode = oVWorksCOM.ResumeProtocol ();
```

Visual Basic .NET example

```
Dim retCode as VWorks4Lib.V11ReturnCode
retCode = oVWorksCOM.ResumeProtocol ()
```

RunProtocol

Description

Starts the protocol run.

Parameters

Name	Type	Description
protocol	BSTR	The protocol file path.
runCount	LONG	The number of times to run the protocol.

Returns

Name	Type	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

```
VWorks4Lib.V11ReturnCode retCode;
retCode=oVWorks4COM.RunProtocol ("c:\\myprotocol.pro",2);
```

Visual Basic .NET example

```
Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM.RunProtocol ("c:\myprotocol.pro",2)
```

SetSimulationMode

Description

Sets the simulation mode.

Parameters

Name	Type	Description
mode	VARIANT_BOOL	The value that sets the simulation state: • True = Turns on the simulation mode. • False = Turns off the simulation mode.

Returns

Name	Type	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136. *Note:* returnCode is always RETURN_SUCCESS.

Visual C++ example

```
oVWorksCOM.SetSimulationMode(VARIANT_TRUE);
oVWorksCOM.SetSimulationMode(VARIANT_FALSE);
```

Visual Basic .NET example

```
oVWorksCOM.SetSimulationMode(True)
oVWorksCOM.SetSimulationMode(False)
```

ShowDiagsDialog

Description

Displays the device diagnostics dialog box.

Parameters

None

Returns

Name	Type	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

```
VWorks4Lib.V11ReturnCode retCode;
retCode=oVWorks4COM.ShowDiagsDialog ();
```

Visual Basic .NET example

```
Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM. ShowDiagsDialog ()
```

ShowLoginDialog

Description

Displays the User Authentication (or login) dialog box.

Parameters

None

Returns

Name	Type	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

```
VWorks4Lib.V11ReturnCode retCode;
retCode=oVWorks4COM.ShowLoginDialog ();
```

Visual Basic .NET example

```
Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM. ShowLoginDialog ()
```

ShowManageUserDialog

Description

Displays the User Management dialog box.

Parameters

None

Returns

Name	Type	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

```
VWorks4Lib.V11ReturnCode retCode;
retCode=oVWorks4COM.ShowManageUserDialog ();
```

Visual Basic .NET example

```
Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM. ShowManageUserDialog ()
```

ShowOptionsDialog

Description

Displays the Options dialog box.

Parameters

None

Returns

Name	Type	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

```
VWorks4Lib.V11ReturnCode retCode;
retCode=oVWorks4COM.ShowOptionsDialog ();
```

Visual Basic .NET example

```
Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM. ShowOptionsDialog ()
```

ShowPlateGroupEditorDialog

Description

Displays the Plate Group Editor dialog box.

Parameters

None

Returns

Name	Type	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

```
VWorks4Lib.V11ReturnCode retCode;
retCode=oVWorks4COM.ShowPlateGroupEditorDialog ();
```

Visual Basic .NET example

```
Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM. ShowPlateGroupEditorDialog ()
```

ShowTipStateEditor

Description

Displays the Tip State Editor dialog box.

Parameters

Name	Type	Description
Protocol	BSTR	The protocol file path.

Returns

Name	Type	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

```
VWorks4Lib.V11ReturnCode retCode;
retCode=oVWorks4COM.ShowTipStateEditor
("c:\\myprotocol.pro");
```

Visual Basic .NET example

```
Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM. ShowTipStateEditor
("c:\myprotocol.pro")
```

ShowVWorks

Description

Displays or hides the VWorks software window.

Parameters

Name	Type	Description
showOrHide	VARIANT_BOOL	The value that displays or hides the window: • TRUE = Display the window. • FALSE = Hide the window.

Returns

Name	Type	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

```
VWorks4Lib.V11ReturnCode retCode;
retCode=oVWorks4COM.ShowVWorks (VARIANT_TRUE);
```

Visual Basic .NET example

```
Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM. ShowVWorks (True)
```

Related information

For information about...	See...
VWorks ActiveX control	"About the VWorks ActiveX control" on page 118
VWorks ActiveX events	"Events" on page 132
VWorks ActiveX enumerated types	"Enumerated types" on page 136

Events

LogMessage

Description

The LogMessage event occurs every time a message is posted to the log.

Parameters

Name	Type	Description
session	LONG	The session ID.
logClass	LONG	The type of log event: Error, Warning, or Event.
timeStamp	BSTR	The time at which the error occurred.
device	BSTR	The device name. An empty string is permitted.
location	BSTR	The location. An empty string is permitted.
process	BSTR	The process plate name. An empty string is permitted.
task	BSTR	The task name. An empty string is permitted.
fileName	BSTR	The protocol file or device file name. An empty string is permitted.
message	BSTR	The the error message text.

Returns

None.

MessageBoxAction

Description

The MessageBoxAction occurs when a user response is required.

Parameters

Name	Type	Description
caption	BSTR	The title of the message.
message	BSTR	The message body.
session	LONG	The session ID.
type	LONG	The type of message: 0 = MB_OK 1 = MB_OKCANCEL 2 = MB_ABORTRETRYIGNORE 3 = MB YESNOCANCEL 4 = MB_YESNO 5 = MB_RETRYCANCEL

Returns

Name	Type	Description
actionToTake	LONG*	The value that indicates the action to take: 1 = OK 2 = CANCEL 3 = ABORT 4 = RETRY 5 = IGNORE 6 = YES 7 = NO

ProtocolComplete

Description

The ProtocolComplete event occurs after startup, cleanup, and main protocols are finished.

Paramters

Name	Type	Description
session	LONG	The session ID.
protocol	BSTR	The protocol file path.
protocol_type	BSTR	The type of protocol: Startup, Main, or Cleanup.

Returns

None.

ProtocolAborted

Description

The ProtocolAborted event occurs when the operator or automation client aborts the protocol run.

Parameters

Name	Type	Description
session	LONG	The session ID.
protocol	BSTR	The protocol file path.
protocol_type	BSTR	The type of protocol: Startup, Main, or Cleanup.

Returns

None.

RecoverableError

Description

The RecoverableError event occurs whenever an error is displayed and expects the operator to abort, retry, or ignore the error.

Parameters

Name	Type	Description
session	LONG	The session ID.
device	BSTR	The device name. An empty string is permitted.
location	BSTR	The location. An empty string is permitted.
description	BSTR	The description of the error.

Returns

Name	Type	Description
actionToTake	*LONG	The value that indicates the action to take: • 0 = Abort • 1 = Retry • 2 = Ignore

Name	Type	Description
vworksHandlesError	*VARIANT_BOOL	Value values are: • TRUE = Allows the VWorks software to handle the error. the VWorks software will not display the error message. • FALSE = Prevents the VWorks software from handling the error.

UnrecoverableError

Description

The UnrecoverableError event occurs when an error is displayed and does not expect the operator to respond with a decision.

Parameters

Name	Type	Description
session	LONG	The session ID.
description	BSTR	The description of the error.

Returns

None.

UserMessage

Description

The UserMessage event occurs when a User Message task occurs.

Parameters

Name	Type	Description
session	LONG	User message tasks can prompt user for data entry.
caption	BSTR	
message	BSTR	
wantsData	VARIANT_BOOL	

Returns

Name	Type	Description
userData	*BSTR	Allows user to enter data if wantsData = True.

Related information

For information about...	See...
VWorks ActiveX control	"About the VWorks ActiveX control" on page 118
VWorks ActiveX methods	"Methods" on page 120
VWorks ActiveX enumerated types	"Enumerated types" on page 136

Enumerated types

V11ReturnCode

Description

Indicates the method call status.

Constants

Name	Value	Description
RETURN_SUCCESS	0	The method was called successfully.
RETURN_BAD_ARGS	1	The method contains bad arguments.
RETURN_FAIL	2	The method call failed.

V11LoginResult

Description

Indicates the login status.

Constants

Name	Value	Description
LOGIN_SUCCESS	0	The login was successful.
LOGIN_FAIL	1	The login failed.
LOGIN_DISABLED	2	The login was disabled.
LOGIN_EXPIRED	3	The login period passed.
LOGIN_TOO_MANY_FAILED_ATTEMPTS	4	Too many login attempts were made and failed.

Name	Value	Description
LOGIN_NOT_ENOUGH_AUTHORIZATION	5	Higher access priveleges are required to perform the requested action.

Related information

For information about...	See...
VWorks ActiveX control	“About the VWorks ActiveX control” on page 118
VWorks ActiveX methods	“Methods” on page 120
VWorks ActiveX events	“Events” on page 132

A
Setting up a MySQL database

This chapter contains the following topics:

Workflow for setting up a MySQL database

About this topic

The VWorks labware inventory management feature requires an SQL database. An SQL database may already be set up if the computer was configured by Agilent Technologies to control a device that uses a database, for example, a Plate Hub Carousel.

If you have a VWorks simulation license and your computer was not configured by Agilent Technologies, you must install and configure the SQL database before you can use the inventory management feature.

Workflow

The following procedures are for the Microsoft Windows XP operating system.

Step	For this task...	See...
1	Download the installation files, install and configure a MySQL database.	"Installing and configuring a MySQL database" on page 141
2	Set up a MySQL ODBC in Windows	"Setting up a MySQL ODBC in Windows" on page 145
3	Connect to the VWorks inventory management database	"Connecting to the inventory management database" on page 69

Installing and configuring a MySQL database

About this topic

Read this topic if you have a VWorks simulation license and want to use the VWorks labware inventory management feature.

This topic describes how to install and configure the MySQL database, which is required for the inventory management feature.

Note: The database may be configured already if the computer was provided by Agilent Technologies and your system contains a device that requires a database, such as a Plate Hub.

Obtaining the installation software

Download the installation files for the generally available (GA) releases of the following software for the Windows platform:

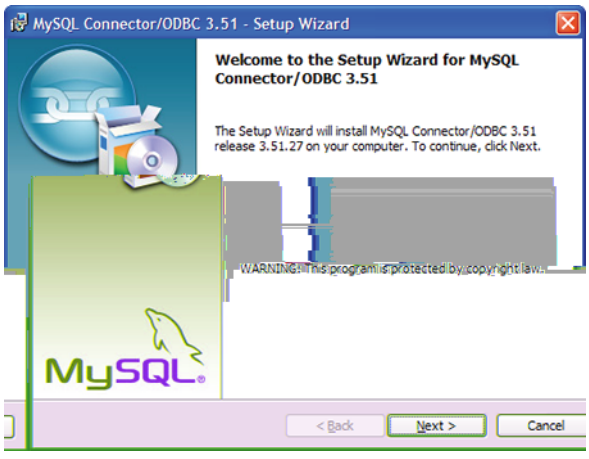
- MySQL Connector/ODBC 3.51 (Windows msi installer)
  http://dev.mysql.com/downloads/connector/odbc/3.51.html
- MySQL Server 5.x (Windows Essentials)
  http://dev.mysql.com/downloads/mysql/5.0.html

Installing the software

The following procedures are for the Microsoft Windows XP operating system.

To install MySQL Connector/ODBC:

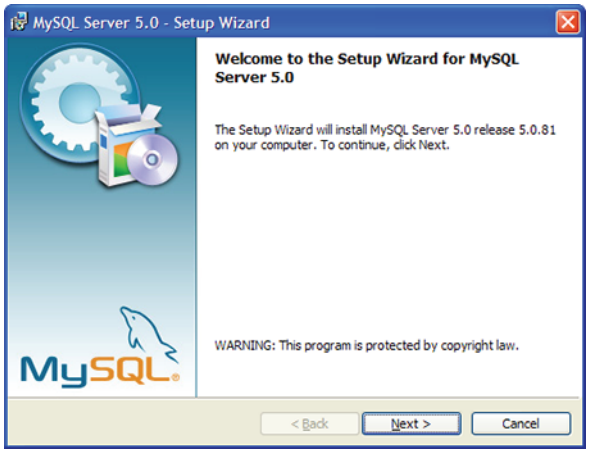
1 Double-click the installation file (*.msi). The MySQL Connector/ODBC Setup Wizard appears.



2 Click **Next** to start the wizard. Select the **Typical** setup, click **Next**, and follow the instructions that appear on the screen.

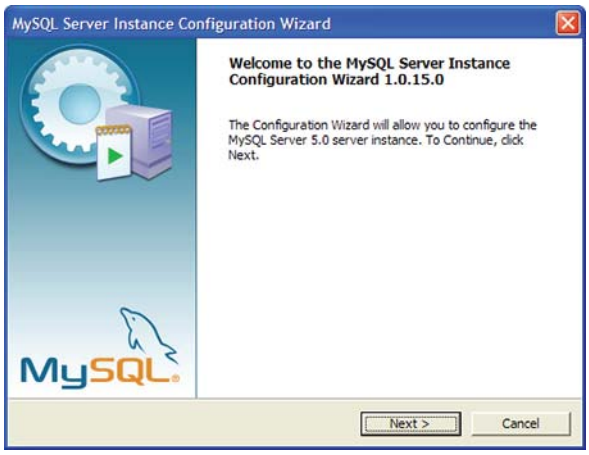
To install MySQL Server:

1 Double-click the Windows Essentials MySQL installation file (*.msi). The MySQL Server Setup Wizard appears.



2 Click **Next** to start the wizard. Select the **Typical** setup, click **Next**, and follow the instructions that appear on the screen.

3 On the Wizard Completed page, select the **Configure the MySQL Server now** check box, and then click **Finish**. The MySQL Server Configuration wizard appears.

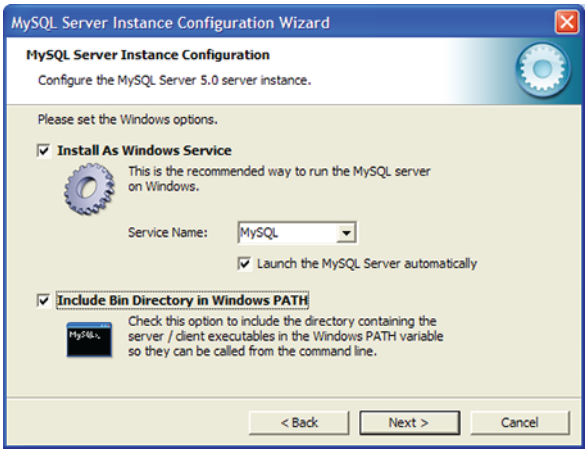


4 To start the configuration wizard, click **Next**.

5 Choose the **Standard Configuration**, and then click **Next**.

6 When the Windows options page appears, select the following check boxes, and then click **Next**:

- **a Install as Windows Service**
- **b Launch the MySQL Server automatically**
- **c Include Bin Directory in Windows PATH**



7 On the Security options page, do the following, and then press **Next**:

a Select **Modify Security Settings**

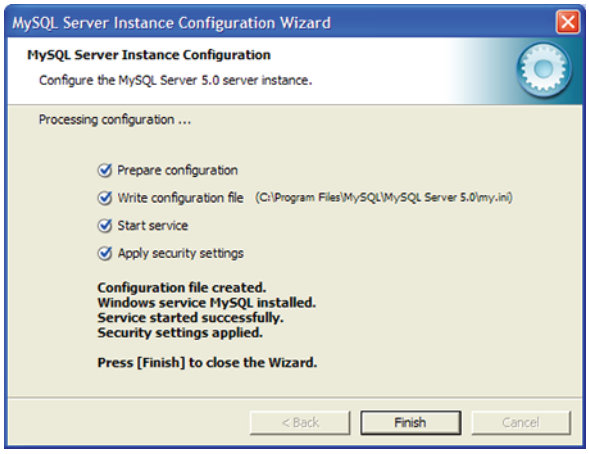
b Enter the password as `velocity11`

c Select **Enable root access from remote machines**

d Select **Create An Anonymous Account**

8 On the Ready to execute page, click **Execute** to start the configuration file creation.

9 When the configuration file has been successfully created and the security settings have been applied, click **Finish**.



Related information

For information about...	See...
Setting up a MySQL database	"Workflow for setting up a MySQL database" on page 140
How to set up a MySQL ODBC connection in Windows	"Setting up a MySQL ODBC in Windows" on page 145
VWorks labware inventory management feature	"About labware inventory management" on page 66
How to connect to the VWorks inventory management database	"Connecting to the inventory management database" on page 69

Setting up a MySQL ODBC in Windows

About this topic

Read this topic if you have a VWorks simulation license and want to use the VWorks labware inventory management feature. If your computer was not configured by Agilent Technologies, you must install and configure the SQL database before you can use the inventory management feature.

This topic describes how to set up the MySQL ODBC in Microsoft Windows.

Before you begin

Make sure you have the following file:

\Program Files\Agilent Technologies\VWorks\Schema\velocity11_mysql5.sql

Procedure

To set up a MySQL ODBC connection:

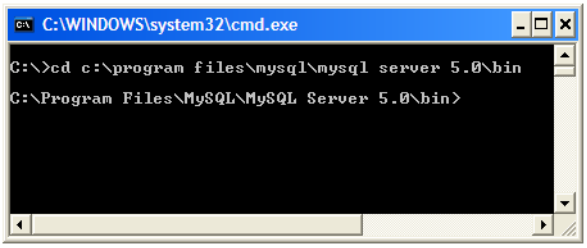
1. Copy the velocity11_mysql5.sql file to the following folder on the computer:

   \Program Files\MySQL\MySQL Server 5.0\bin\

2. From the Windows desktop, open a command window as follows:
   a. Choose **Start > Run**.
   b. In the Run dialog box, type `cmd`, and click **OK**.
3. In the command window:
   a. Type the following and press ENTER:

      ```
      cd c:\program files\mysql\mysql server 5.0\bin
      ```

      This command changes the directory to the MySQL Server 5.0 program directory.

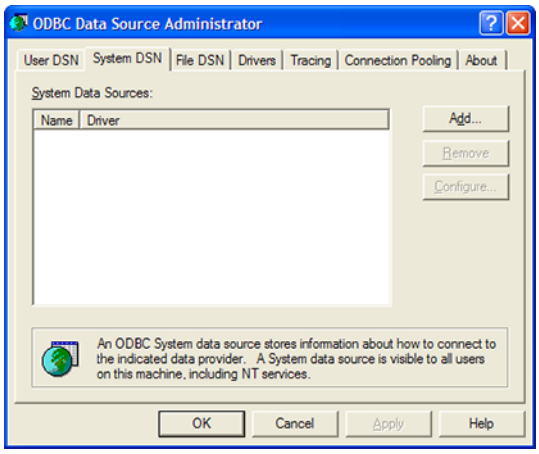
   b. To copy the provided velocity11 database file into the MySQL Server program, type the following and press ENTER:

      ```
      mysql < velocity11_mysql5.sql
      ```

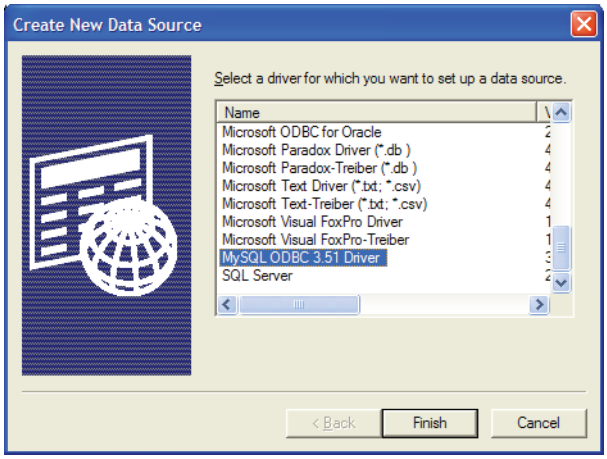
   c. Close the command window.
4. To open the ODBC Data Source Administrator:
   a. Choose **Start > Control Panel**, and then double-click **Administrative Tools**.
   b. Double-click **Data Sources (ODBC)**. The ODBC Data Source Administrator window appears.

IMPORTANT Remove any previously defined MySQL ODBC Driver Sources before continuing.

5 Click the **System DSN** tab and press **Add** to create a new data source.

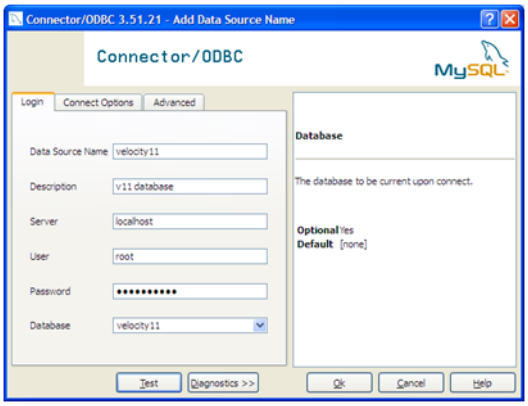


6 In the Create New Data Source window, select **MySQL ODBC 3.51 Driver**, and then **Finish**.



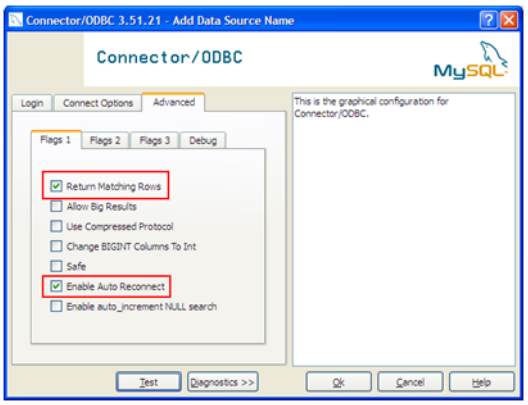
7 In the Connector/ODBC 3.51.21-Add Data Source Name window, click the **Login** tab, and enter the following to define your data source:

- **Data Source Name**: `velocity11`
- **Description**: `v11 database` (optional)
- **Server**: `localhost`
- **User**: `root`
- **Password**: `velocity11`
- **Database**: `velocity11`



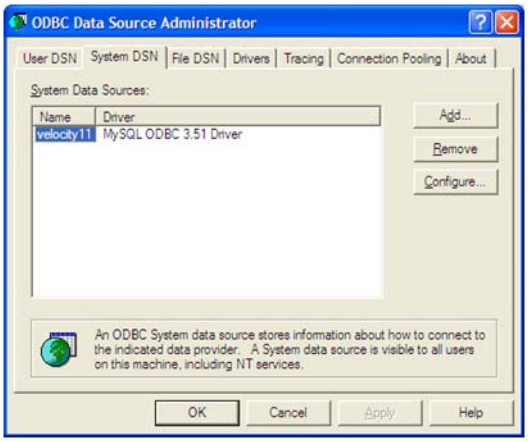
8 Click the **Advanced** tab, and on the **Flags 1** page, select the following:

- **Return Matching Rows**
- **Enable Auto Reconnect**



9 To verify that the data source file is properly configured, press **Test**. A message appears telling you that the connection was successful. Click **OK**.

10 On the **System DSN** tab, verify that **velocity11** appears in the **System Data Source** box, and then click **OK**.



Related information

For information about...	See...
The steps to follow for setting up a MySQL database	"Workflow for setting up a MySQL database" on page 140
How to install and configure MySQL	"Installing and configuring a MySQL database" on page 141
VWorks labware inventory management feature	"About labware inventory management" on page 66
How to connect to the VWorks inventory management database	"Connecting to the inventory management database" on page 69

Glossary

clamps (BenchCel) The components inside of the stacker head that close and open the stacker grippers during the loading, unloading, downstacking, and upstacking processes.

controlling computer The lab automation system computer that controls the devices in the system.

cycle See seal cycle.

deadlock An error that occurs when the number of locations available in the system is less than the number of microplates in the system. Because the microplates cannot move to the expected locations, the protocol pauses.

device An item on your lab automation system that can have an entry in the device file. A device can be a robot, an instrument, or a location on the lab automation system that can hold a piece of labware.

device file A file that contains the configuration information for a device. The device file has the .dev file name extension and is stored in the folder that you specify when saving the file.

downstack The process in which a microplate is moved out of the stack.

error handler The set of conditions that define a specific recovery response to an error.

home position The position where all robot axes are at the 0 position (the robot head is approximately at the center of the x-axis and at 0 of the z-axis, and the robot arms are perpendicular to the x-axis).

homing The process in which the robot is sent to the factory-defined home position for each axis of motion.

hot plate (PlateLoc) A heated metal plate inside the sealing chamber that descends and presses the seal onto the plate.

insert A pad placed under the plate to support the bottom of the wells for uniform sealing.

location group A list of labware that can be moved into or out of particular slots in a storage device.

plate group A list of specific labware that can be moved into or out of a storage device without regard for the slot locations.

plate instance A single labware in a labware group that is represented by the process plate icon.

plate stage The removable metal platform on which you load a plate.

plate-stage support The structure on which you load a plate stage. The plate-stage support extends when the door opens.

profile The Microsoft Windows registry entry that contains the communication settings required for communication between a device and the VWorks software.

process A sequence of tasks that are performed on a particular labware or a group of labware.

protocol A schedule of tasks to be performed by a standalone device, or devices in the lab automation system.

regrip station A location that enables the robot to change its grip orientation (landscape or portrait), or adjust its grip at the specified gripping height. Grip height adjustment might be necessary after a robot picks up a labware higher than the specified gripping height because of physical restrictions at a teachpoint.

robot grippers The components that the robot uses to hold labware.

run A process in which one or more microplates are processed. In a standalone device, the run consists of one cycle. In a lab automation system, a run can consist of multiple cycles that are automated.

safe zone The boundary within which the robot is allowed to move without colliding with external devices.

seal cycle The process in which a single plate is sealed on the PlateLoc Sealer.

seal entry slot The narrow entry on the back of the PlateLoc Sealer where the seal is inserted into the device.

seal-loading card A rectangular card that is used to facilitate the seal loading process on the PlateLoc Sealer.

seal-roll support The triangular structures at the top of the PlateLoc Sealer where a roll of seal is mounted.

sealing chamber The area inside of the PlateLoc Sealer where the seal is applied to a plate.

shelves (BenchCel) The components inside of the stacker head that provide leveling surfaces for the microplates, thus ensuring accurate robot gripping, during the downstacking process.

stacker grippers The padding at the bottom of the stacker racks that hold microplates when a microplate is loaded, downstacked, or upstacked.

subprocess A sequence of tasks performed as a subroutine within a protocol. Typically the subprocess is performed by a single device type, such as the Bravo device.

task An operation performed on one or more labware.

task parameters The parameters associated with each task in a protocol. For example, in a labeling task, the parameters include the label value.

teachpoint A set of coordinates that define where the robot can pick up or place labware and the location of a known object.

teachpoint file The XML file that contains the settings for one or more device teachpoints.

touch screen The interface on the front of the PlateLoc Sealer where sealing parameters are set, the seal cycle can be started or stopped, and the seal cycle can be monitored.

upstack The process in which a microplate is moved back into the stack.

waypoint A set of coordinates that define a location the robot passes through on its way to a teachpoint.

workspace The boundary within which the robot can move without limitations.

Index

Agilent Technologies

User Guide

G5415-90060