Labware MiniHub

User Guide

Original instructions

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Notices

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Preface

This preface contains the following topics:

- “About this guide” on page vi
- “Accessing Automation Solutions user guides” on page viii

About this guide

Who should read this guide

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

Job role	Responsibilities
Installer	Unpacks, installs, and tests the Labware MiniHub before it is used.
Integrator	Writes software and configures hardware.
Lab manager, administrator, or technician	• Manages the automation system that contains the Labware MiniHub • Develops the applications that are run on the system • Develops training materials and standard operating procedures for operators
Operator	Performs the daily production work on the Labware MiniHub and solves routine problems.

Installers, integrations, lab managers, and administrators are users who must have technical expertise. In addition, lab managers and administrators are individuals or groups responsible for the use and maintenance of the Labware MiniHub and for ensuring that operators are adequately trained.

What this guide covers

This guide describes the Labware MiniHub, the operation of the hardware components, and the use of the diagnostics software.

This guide does not provide instructions for the following:

- VWorks software or third-party software
- Agilent Technologies products, such as the BenchCel Workstation and the BioCel System
- Third-party devices

For more information about these topics, see the relevant user guides for these products.

Software version

This guide documents Labware MiniHub Diagnostics version 1.0.1 or later.

Related guides

The *Labware MiniHub User Guide* should be used in conjunction with the following documents (if applicable):

- *Labware MiniHub Unpacking Guide*. Explains how to unpack the Labware MiniHub in preparation for installation. In addition, packing instructions are provide in case the Labware MiniHub will be moved or kept in storage.
- *Labware MiniHub Safety and Installation Guide*. Presents the safety precautions, emergency stop procedure, site preparation information, and installation instructions.
- *Automation system or workstation user guide*. Explains how to set up the system or workstation and set teachpoints at integrated devices. If you are using the BioCel System, see the *BioCel System User Guide*. If you are using the BenchCel Workstation, see the *BenchCel Microplate Handling Workstation User Guide*.
- *Automation system software user guide*. Explains how to create and run protocols. If you are using the VWorks software, see the *VWorks Automation Control Setup Guide* and *VWorks Automation Control User Guide*.

Related information

For information about...	See...
Accessing related user guides	"Accessing Automation Solutions user guides" on page viii
Reporting problems	"Reporting problems" on page 68

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 safety guide or user guide.

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

Using the knowledge base

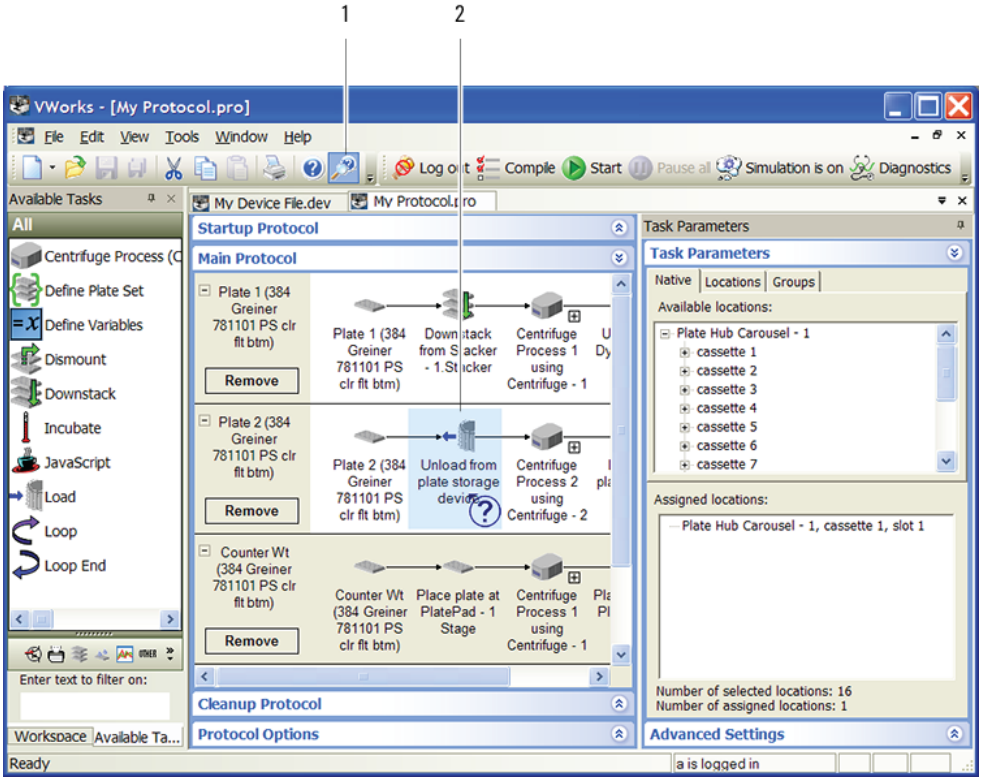
Knowledge base topics are displayed using web browser software such as Microsoft Internet Explorer and Mozilla Firefox.

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.**

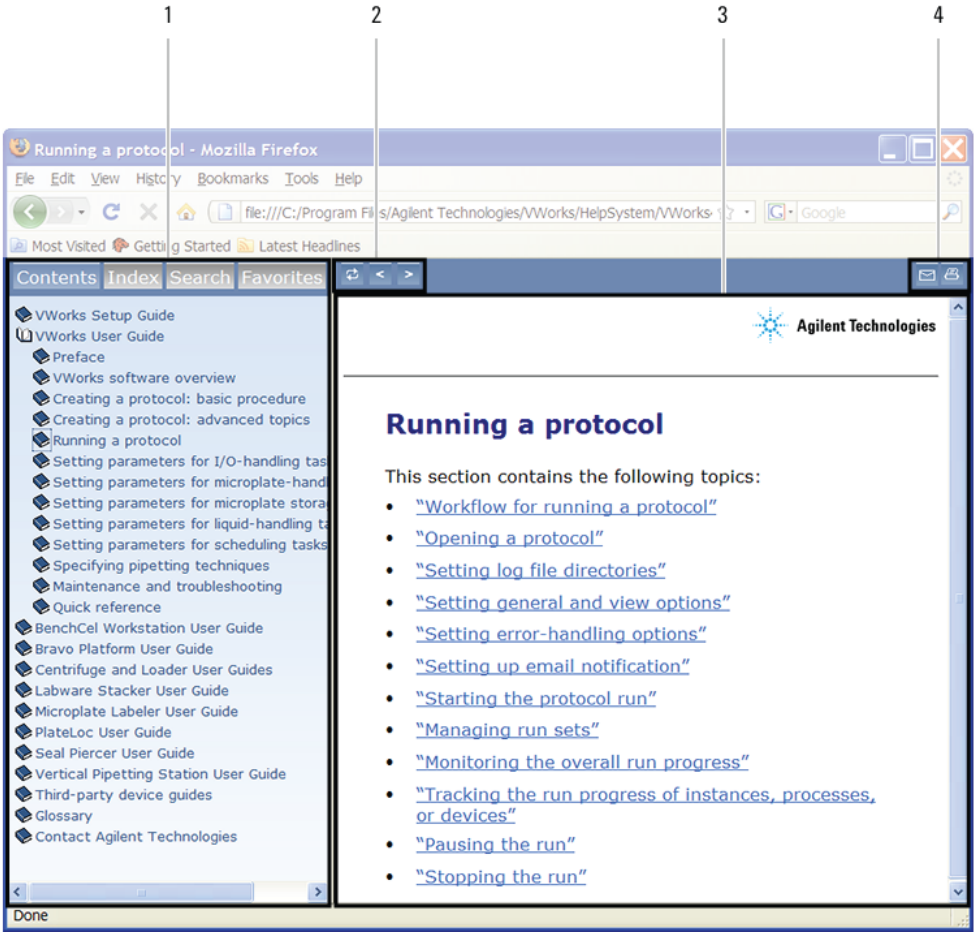
Opening the help topic for an area in the VWorks window



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 to 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	“About this guide” on page vi
What this guide covers	“About this guide” on page vi
Reporting problems	“Reporting problems” on page 68

1 Introduction

This chapter contains the following topics:

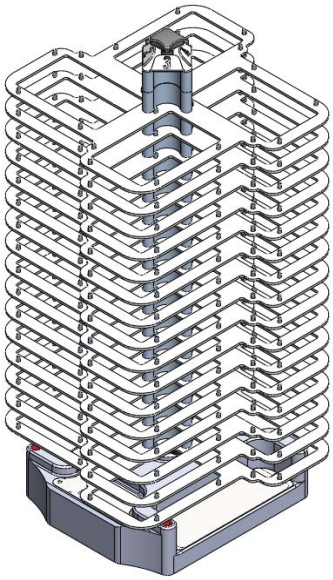
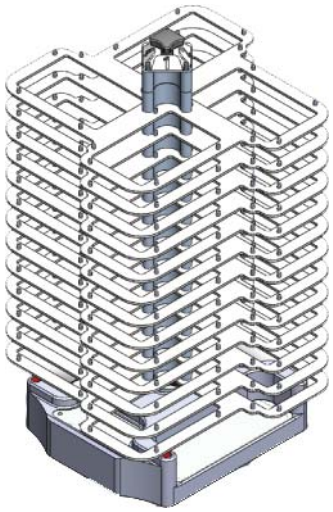
- "About the Labware MiniHub" on page 2
- "Before you operate the Labware MiniHub" on page 4
- "Hardware overview" on page 5
- "Software overview" on page 9
- "Quick start" on page 12

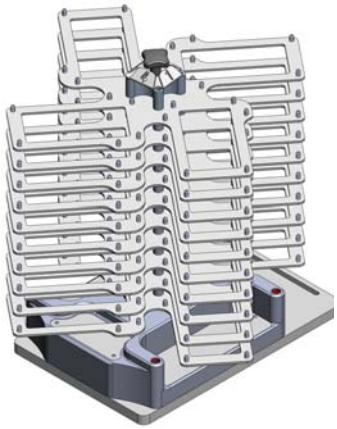
About the Labware MiniHub

Description

The Labware MiniHub is a rotating random-access labware storage device. Up to four labware can be placed on each shelf in either the landscape or portrait orientation. Spacing blocks, also called spacers, can be added or removed to adjust the distance between shelves, accommodating different labware types (microplates, tip boxes, or tube racks).

The following models of the Labware MiniHub are available:

Model	Description
G5471A 	Designed to be integrated in large laboratory automation systems such as the BioCel System. The model permits the following basic configurations: • 16 shelves, with single spacers between shelves, accommodate a maximum of 64 microplates • 9 shelves, with two spacers between shelves, accommodate a maximum of 36 deepwell microplates or tube racks • 6 shelves, with three spacers between shelves, accommodate a maximum of 24 tip boxes Other configurations can be created using different combinations of shelves and spacers.
G5489A 	Designed to be integrated in workstations or systems that have the BenchBot Robot. The model permits the following basic configurations: • 13 shelves, with single spacers between shelves, accommodate a maximum of 52 microplates • 7 shelves, with two spacers between shelves, accommodate a maximum of 28 deepwell microplates or tube racks • 5 shelves, with three spacers between shelves, accommodate a maximum of 20 tip boxes Other configurations can be created using different combinations of shelves and spacers.

Model	Description
G5472A 	Designed to be integrated in the BenchCel Workstation. The model permits the following basic configurations: • 10 shelves, with single spacers between shelves, accommodate a maximum of 40 microplates • 5 shelves, with two spacers between shelves, accommodate a maximum of 20 deepwell microplates or tube racks • 3 shelves, with three spacers between shelves, accommodate a maximum of 12 tip boxes Other configurations can be created using different combinations of shelves and spacers.

Related information

For information about...	See...
Labware MiniHub safety	*Labware MiniHub Safety and Installation Guide*
Preparing the lab for the Labware MiniHub installation	*Labware MiniHub Safety and Installation Guide*
Installing the Labware MiniHub	*Labware MiniHub Safety and Installation Guide*
Hardware components	"Hardware overview" on page 5
Software overview	"Software overview" on page 9

Before you operate the Labware MiniHub

WARNING **For safe operation, it is imperative that you follow the precautions in *Labware MiniHub Safety and Installation Guide*.**

Related information

For information about...	See...
Safety precautions	*Labware MiniHub Safety and Installation Guide*
Labware MiniHub description	"About the Labware MiniHub" on page 2
Hardware components	"Hardware overview" on page 5
Software overview	"Software overview" on page 9

Hardware overview

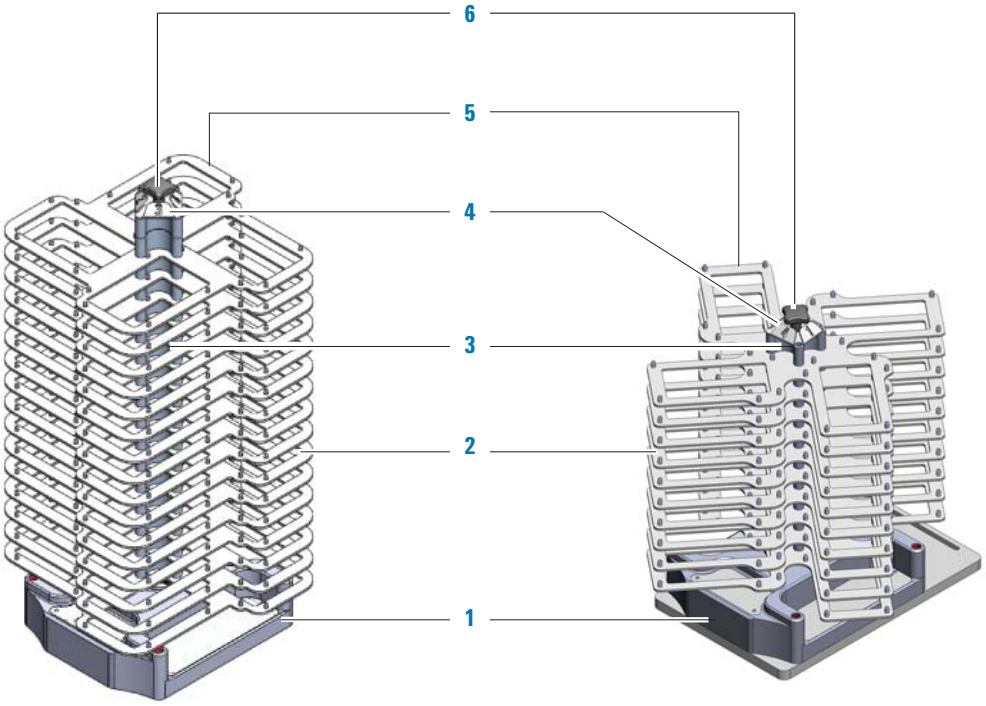
About this topic

This topic describes the following Labware MiniHub features:

- Main components
- Power supply
- Indicator lights

Main components

The following diagram shows the main components of the Labware MiniHub:



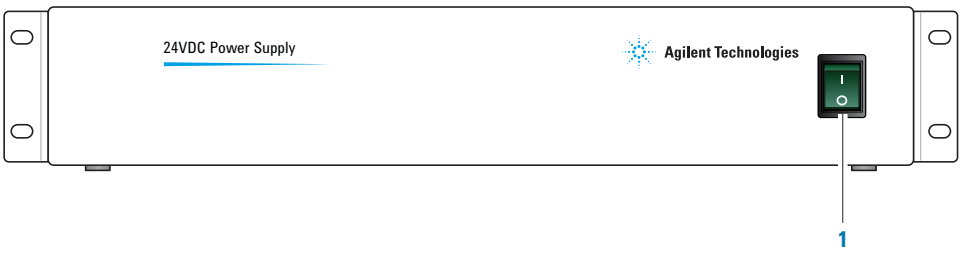
Item	Name	Description
1	Base	Gray structure at the bottom of the MiniHub that attaches the MiniHub to the target surface. The base contains some electronics and hosts the indicator lights.
2	Shelves	Flat area on which you can place labware. Locating pins at the edges of the shelves hold the labware securely in place.

Item	Name	Description
3	Spacers	Metal spacing blocks that you can add or remove at the center of the hub. Two types of spacers are available: • *25.1-mm spacers*. Stacked between shelves to accommodate different labware heights. • *8.4-mm spacers*. Stacked above the top-most shelf to fill the space between the top-most 25.1-mm spacer and the cassette cap. These spacers ensure a tight assembly and are only necessary when a subset of the shelves are used.
4	Cassette cap	Metal label with numerical identification of each cassette. The numbers are used in Labware MiniHub Diagnostics and in VWorks software.
5	Cassettes	Columns of shelves. The MiniHub consists of four cassettes, each identified by the number on the cassette cap.
6	Black knob	Component at the top of the MiniHub that locks the spacers and shelves in places.

Power supply

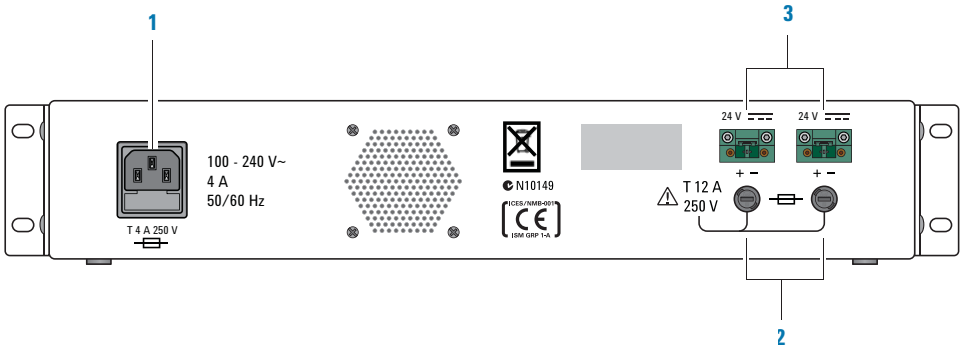
The power supply is the component that supplies electrical power to the Labware MiniHub and is the communication connection between the Labware MiniHub and the controlling computer.

Front



Item	Name	Description
1	Power switch	To turn on the power, press the on (**I**) end of the switch. To turn off the power, press the off (**O**) end of the switch.

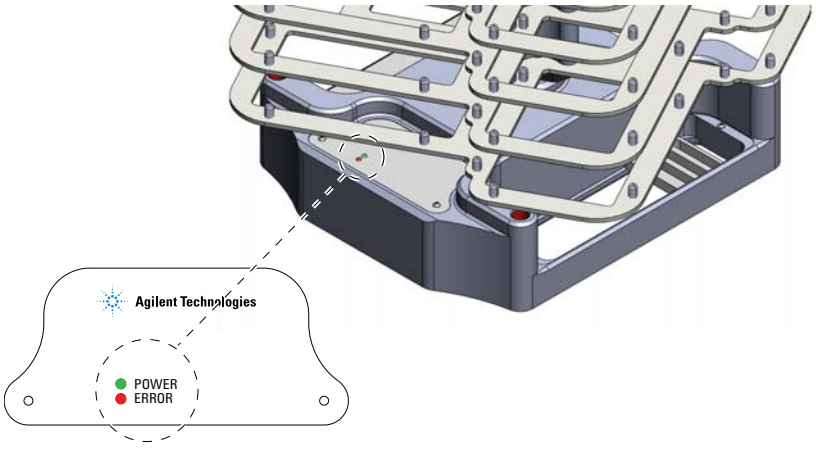
Back



Item	Name	Description
1	Power inlet and fuse housing	Connects the power supply unit to the power source. Use only the supplied power cord. The small compartment immediately below the inlet contains two fuses for power inlet.
2	Fuse housings	Holds fuses for power outlet.
3	Labware MiniHub cable connector	Connects the Labware MiniHub to the power supply unit. Use only the supplied Labware MiniHub cable.

Indicator lights

At the base of the Labware MiniHub are two indicator lights. One light indicates power status, the other light indicates error conditions.



Name	Description
Power	Indicates whether the power is on or off. When the green light is on, the power is on. When the green light is off, the power is off.
Error	Indicates whether an error is encountered. When the red light flashes, an error has occurred. When the red light is off, the Labware MiniHub is operating normally.

Related information

For information about...	See...
Labware MiniHub description	“About the Labware MiniHub” on page 2
Labware MiniHub safety	“Before you operate the Labware MiniHub” on page 4
Software overview	“Software overview” on page 9

Software overview

About this topic

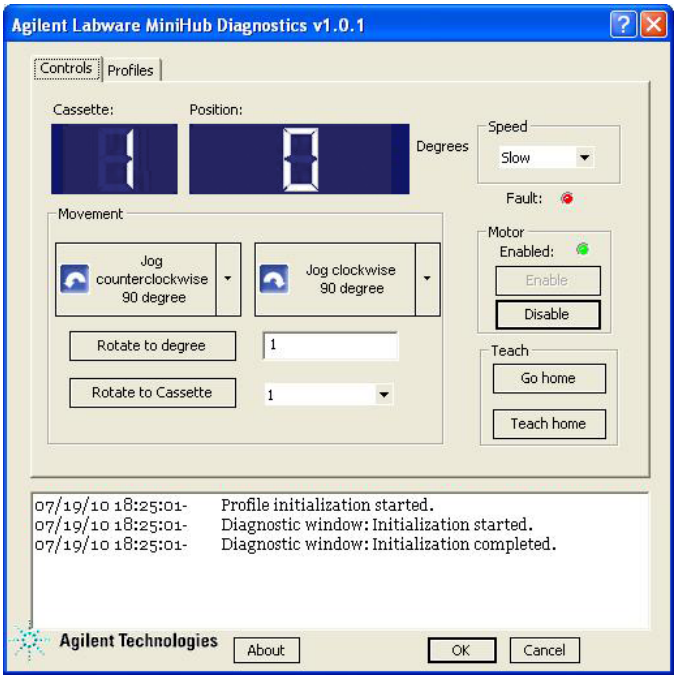
This topic describes the software components you use to operate the Labware MiniHub:

- Labware MiniHub Diagnostics
- Laboratory automation software

Labware MiniHub Diagnostics

The Labware MiniHub Diagnostics software allows you to:

- *Create and manage profiles.* A profile allows you to set up communication between the Labware MiniHub and the controlling computer, configure the Labware MiniHub (tell the software the number of shelves you are using), and set the rotation speed. For instructions, see "Creating Labware MiniHub profiles" on page 30.
- *Set the home position.* The home position is the starting position of the Labware MiniHub relative to the robot in the laboratory automation system or BenchCel Workstation. For instructions, see "Setting the home position" on page 34.
- *Diagnose problems.* Moving and adjusting the Labware MiniHub allow you to diagnose and troubleshoot problems. For information on diagnosing and troubleshooting problems, see "Using Labware MiniHub Diagnostics" on page 41 and "Troubleshooting" on page 61.



Access to Labware MiniHub Diagnostics depends on the automation software you are using. For more information, see "Using Labware MiniHub Diagnostics" on page 41.

Laboratory automation software

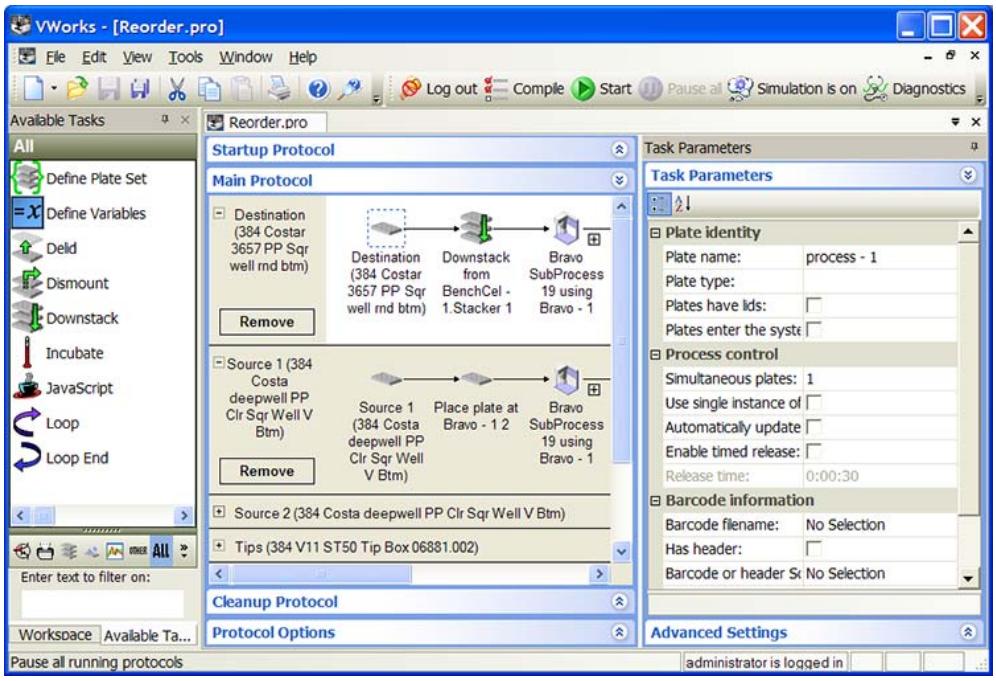
You can use either the VWorks software or third-party automation software to operate the MiniHub in protocol runs. If you plan to use third-party automation software, you will need to use the MiniHub ActiveX control to permit the software to interface with the hub.

VWorks software

The VWorks software allows you to:

- *Set up the Labware MiniHub*. During setup, you need to create a device file for the Labware MiniHub. For setup information, see "Setting up the Labware MiniHub" on page 15.
- *Set up user accounts and privileges*. You can set up different user accounts to enforce access policies. For instructions, see the *VWorks Automation Control Setup Guide*.
- *Define labware*. Labware definitions describe the labware you will use during protocol runs. For instructions, see the *VWorks Automation Control Setup Guide*.
- *Create protocols*. Protocols determine the sequence of tasks you want to automate in a run. For example, you can use a protocol to unload 60 microplates from the Labware MiniHub, apply barcode labels to the microplates, and then reload the microplates to the hub. For protocol-writing instructions, see the *VWorks Automation Control User Guide*.
- *Run, pause, monitor, and stop protocols*. You can start, pause, monitor, and stop a protocol run from the controlling computer. For instructions, see the *VWorks Automation Control User Guide*.

For a full description and instructions on how to use the VWorks software, see the *VWorks Automation Control User Guide*.



MiniHub ActiveX control

Instead of using the VWorks software, you can use another automation control software to operate the Labware MiniHub in protocol runs. The MiniHub ActiveX control allows the automation software to interface with the device. For more information, see “MiniHub ActiveX control” on page 77.

Related information

For information about...	See...
Labware MiniHub description	“About the Labware MiniHub” on page 2
Labware MiniHub safety	“Before you operate the Labware MiniHub” on page 4
Hardware components	“Hardware overview” on page 5
MiniHub ActiveX control	“MiniHub ActiveX control” on page 77

Quick start

Overall setup workflow

The following table presents the basic steps for setting up the Labware MiniHub for operation.

Step	For this task...	See...
1	Prepare the lab for the Labware MiniHub installation.	*Labware MiniHub Safety and Installation Guide*
2	Unpack the Labware MiniHub.	*Labware MiniHub Safety and Installation Guide*
3	Install the Labware MiniHub.	*Labware MiniHub Safety and Installation Guide*
4	Turn on the Labware MiniHub.	"Turning on and turning off the Labware MiniHub" on page 17
5	Install the VWorks software, or integrate the MiniHub ActiveX control.	One of the following: • *VWorks Automation Control Setup Guide* • "MiniHub ActiveX control" on page 77
6	*VWorks software only*. Start the VWorks software and log in.	*VWorks Automation Control User Guide*
7	*VWorks software only*. Create a new device file (if not already done).	"Creating a device file" on page 19
8	*VWorks software only*. Add the Labware MiniHub in the device file.	"Adding and deleting a Labware MiniHub in the device file" on page 21
9	Create a Labware MiniHub profile and set the profile parameters.	"Creating Labware MiniHub profiles" on page 30
10	Set the MiniHub home position.	"Setting the home position" on page 34
11	Set robot teachpoints.	Both of the following: • "Setting robot teachpoints" on page 39 • Automation system or robot user documentation
12	*VWorks software only*. Set the Labware MiniHub device properties.	"Setting Labware MiniHub properties" on page 23

Step	For this task...	See...
13	*BenchCel Workstation only.* Select the stack-holding method in the Labware Editor.	"Selecting the stack-holding method" on page 26
14	Write and run protocols.	One of the following: • *VWorks Automation Control User Guide* • Automation software user documentation

Related information

For information about...	See...
Labware MiniHub description	"About the Labware MiniHub" on page 2
Labware MiniHub safety	"Before you operate the Labware MiniHub" on page 4
Hardware components	"Hardware overview" on page 5

2 Setting up the Labware MiniHub

This chapter explains how to set up the Labware MiniHub in the VWorks software. This chapter contains the following topics:

- "Setup workflow" on page 16
- "Turning on and turning off the Labware MiniHub" on page 17
- "Creating a device file" on page 19
- "Adding and deleting a Labware MiniHub in the device file" on page 21
- "Setting Labware MiniHub properties" on page 23
- "Selecting the stack-holding method" on page 26

If you are using a different lab automation software and want to integrate the Labware MiniHub using ActiveX control, see "MiniHub ActiveX control" on page 77.

Setup workflow

About this topic

This topic presents the workflow for turning on the Labware MiniHub at the power supply and setting it up in the VWorks software.

Workflow

The following table presents the steps for setting up the Labware MiniHub in the VWorks software. After setting up the Labware MiniHub for the first time, you will not likely need to change any of the settings in the procedure.

Step	For this task...	See...
1	Turn on the Labware MiniHub.	"Turning on and turning off the Labware MiniHub" on page 17
2	Start the VWorks software and log in.	*VWorks Automation Control User Guide*
3	Create a device file.	"Creating a device file" on page 19
4	Add the Labware MiniHub in the device file.	"Adding and deleting a Labware MiniHub in the device file" on page 21.
5	Set the Labware MiniHub properties in VWorks software.	"Setting Labware MiniHub properties" on page 23
6	*BenchCel model only*. Select the stack-holding method in the Labware Editor.	"Selecting the stack-holding method" on page 26

Turning on and turning off the Labware MiniHub

Turning on the Labware MiniHub

CAUTION **The Labware MiniHub will rotate during the startup process. Obstructing the Labware MiniHub while it is rotating will cause an error.**

To turn on the Labware MiniHub:

At the front of the Labware MiniHub power supply, press the on/off switch to the on (**I**) position. The on/off switch light turns on. The Labware MiniHub rotates slowly to its factory-set home position.

Turning off the Labware MiniHub

To turn on the Labware MiniHub:

At the front of the Labware MiniHub power supply, press the on/off switch to the off (**O**) position. The on/off switch light turns off.

Related information

For information about...	See...
Safety information	*Labware MiniHub Safety and Installation Guide*
Adding the Labware MiniHub in the device file	"Adding and deleting a Labware MiniHub in the device file" on page 21
Creating profiles for the Labware MiniHub	"Creating Labware MiniHub profiles" on page 30

For information about...	See...
Specifying the stack-holding method	"Selecting the stack-holding method" on page 26
Setting teachpoints	"Setting robot teachpoints" on page 39

Creating a device file

About this topic

This topic explains how to create a device file in the VWorks software. If you have an existing automation system or a BenchCel Workstation, and you already have a device file you want to use, skip this step and proceed to "Adding and deleting a Labware MiniHub in the device file" on page 21.

Devices and device file defined

What is a device?

A device is an item in your lab automation system that has an entry in the VWorks software device file. A device can be a robot, an instrument, or a location in the system that can hold a piece of labware. The following are some examples of devices:

- Automation system robot, such as the Direct Drive Robot
- BenchCel robot
- Labware MiniHub
- PlateLoc Thermal Microplate Sealer
- Microplate Labeler
- Vertical Pipetting Station
- Platepad
- All third-party devices integrated in the lab automation system

What is a device file?

To communicate with and to control the robot and integrated devices, the VWorks software uses a device file that contains the following information:

- List of devices the software will communicate with and control
- Profile of each device (communication method, unique device configuration information)
- System-related configuration information of each device (for example, approach height, barcode access, and so on)

You provide the device information in the VWorks software. The device information is stored in a device (.dev) file that is located in a folder you specify when saving the file.

For detailed information about device files and associations with profiles, teachpoint files, and other VWorks components, see the *VWorks Automation Control User Guide*.

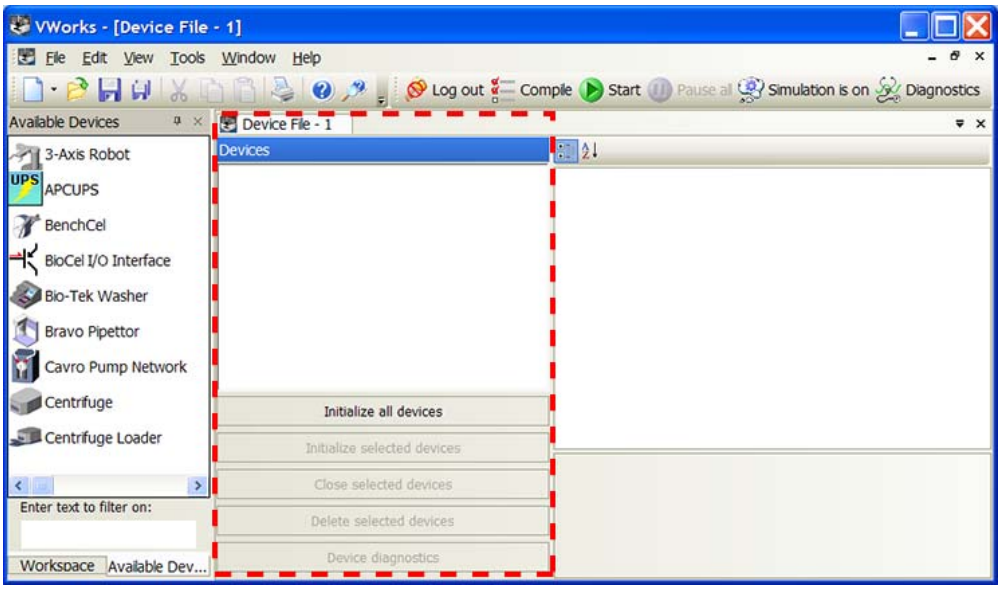
Procedure

If you are setting up a lab automation system such as the BioCel System or the BenchCel Workstation for the first time, you need to create a new device file, and then add the system or workstation robot, the Labware MiniHub, and integrated devices to this file.

Before you create a device file, start the VWorks software and log in. See the *VWorks Automation Control User Guide* for instructions.

To create a new device file:

1 In the **VWorks** window, select **File > New > Device.** A Device File tab appears.



2 Select **File > Save** to save the device file. The file name appears in the Device File tab.

Related information

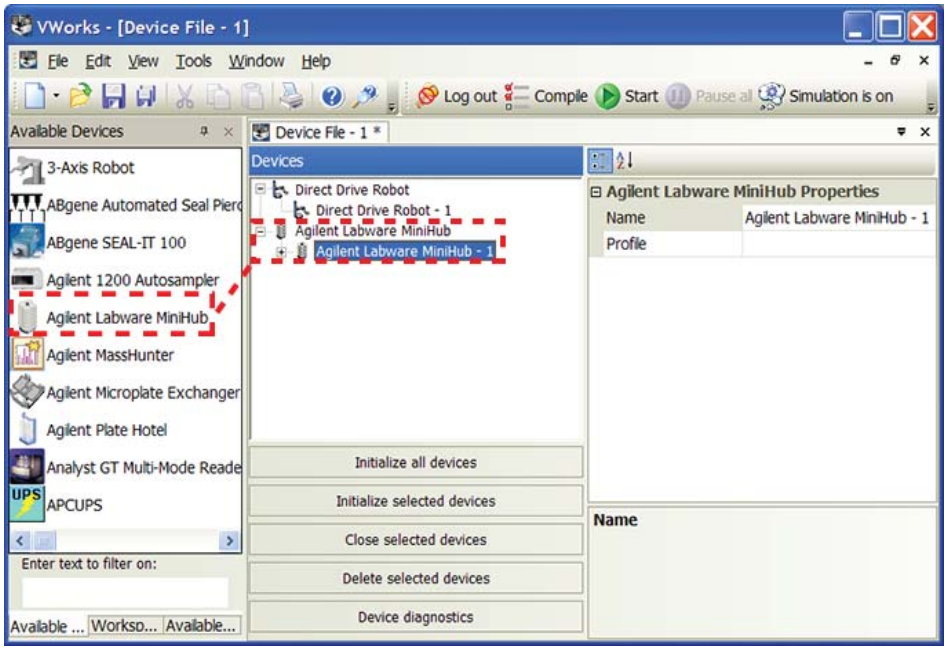
For information about...	See...
VWorks software	• *VWorks Automation Control Setup Guide* • *VWorks Automation Control User Guide*
Adding the Labware MiniHub in the device file	"Adding and deleting a Labware MiniHub in the device file" on page 21
Creating profiles for the Labware MiniHub	"Creating Labware MiniHub profiles" on page 30
Specifying the stack-holding method	"Selecting the stack-holding method" on page 26
Setting teachpoints	"Setting robot teachpoints" on page 39

Adding and deleting a Labware MiniHub in the device file

Adding a Labware MiniHub in the device file

To add a Labware MiniHub in the device file:

1 In the **Available Devices** area, double-click the Labware MiniHub device icon. Alternatively, you can drag the icon from the **Available Devices** area into the **Device File** area.



Notice that in the **Devices** area, the first Labware MiniHub device is labeled Labware MiniHub-1. If you add another Labware MiniHub device, it will appear as Labware MiniHub-2.

If you do not see the Labware MiniHub in the **Available Devices** list, check that the MiniHub plugin file (AgilentLabwareMiniHub.dll) is stored in the following folder: ...\Agilent Technologies\VWorks\Plugins.

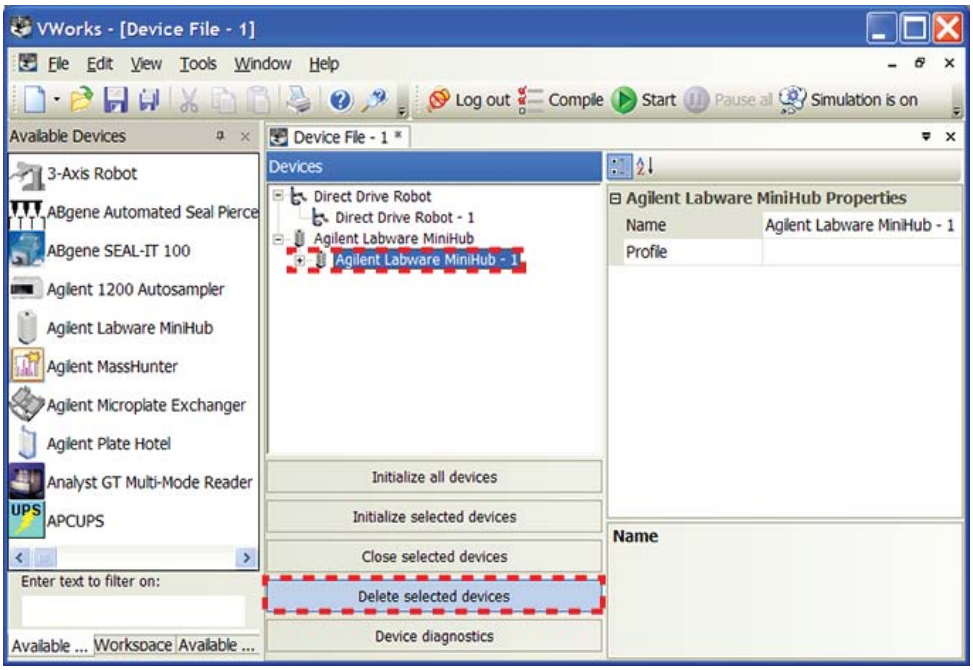
If you added the Labware MiniHub plugin file in the Plugins folder and you have already started the VWorks software, be sure to reload the plugin. To do this, close any open device files and protocol files, and then select **Tools > Reload Plugins.**

2 If you have multiple Labware MiniHub devices in the system, repeat step 1 to add the other Labware MiniHub devices.

Deleting a Labware MiniHub from the device file

To delete a Labware MiniHub from the device file:

1. In the **VWorks** window, select the Labware MiniHub you want to delete in the **Devices** area.
2. Click **Delete selected devices.**



Related information

For information about...	See...
Creating profiles for the Labware MiniHub	"Creating Labware MiniHub profiles" on page 30
Editing profiles	"Editing and managing profiles" on page 33
Setting up Labware MiniHub properties in the device file	"Setting Labware MiniHub properties" on page 23
Specifying the stack-holding method	"Selecting the stack-holding method" on page 26
VWorks software	• *VWorks Automation Control Setup Guide* • *VWorks Automation Control User Guide*

For information about...	See...
Adding the automation system or workstation robot and creating profiles for the robot	• Automation system user documentation, such as the *BioCel System User Guide* • *BenchCel Microplate Handling Workstation User Guide*

Setting Labware MiniHub properties

About the Labware MiniHub properties

In the device file, you can set properties for each device. For the Labware MiniHub, you can name the Labware MiniHub, select the desired profile, and associate the robot teachpoint with each shelf.

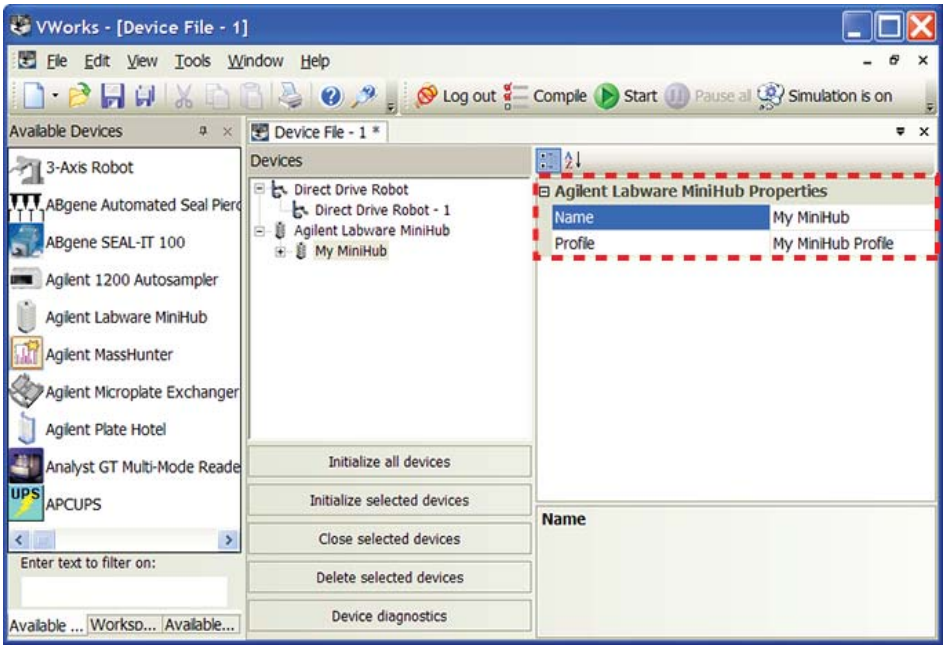
The instructions in this topic assumes that you have already:

- Created a Labware MiniHub profile.
- Set the Labware MiniHub home position.
- Set the robot teachpoints for each shelf.

Procedure

To set the Labware MiniHub properties:

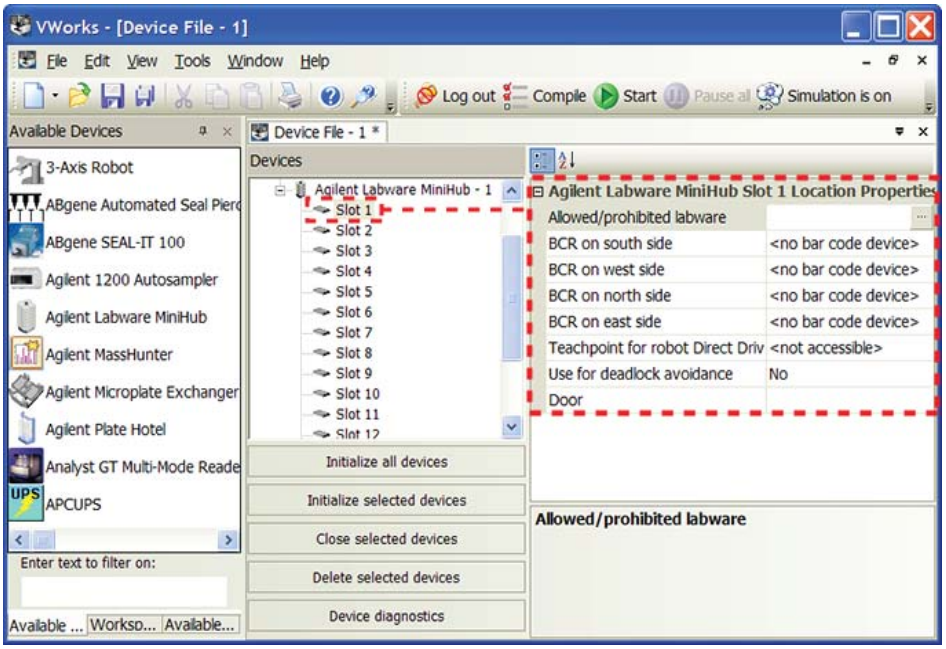
1 In the **Labware MiniHub Properties** area of the device file, type or select the following:



Property	Description
Name	The name of the Labware MiniHub. Type a name for the Labware MiniHub. In the following example, the name for the Labware MiniHub is My MiniHub.
Profile	The profile associated with the device. Select the desired profile from the list. If the profile you want does not appear in the list, or if no profile appears in the list, see "Creating Labware MiniHub profiles" on page 30, and then return to this step to select the profile. **IMPORTANT** Without the profile, you will not be able to establish communication with the device.

2 In the **Devices** area, expand **Labware MiniHub**, and then select **Slot 1.**

3 In the **Labware MiniHub Location Properties** area, set the following parameters:



Parameter	Description
Allow/prohibited labware	Permitted labware class for the selected location. For example, you might specify that only tip boxes are allowed at a given location. For details on labware classes, see the *VWorks Automation Control Setup Guide*.
BCR on south/west/north/east side	The location of the barcode reader and the desired barcode reader device. Use this field only if a barcode reader is installed on the device.

Parameter	Description
Teachpoint for robot <robot_name>	The name of the teachpoint at the selected Slot location. This selection enables the robot to move correctly to and from the Slot location during a protocol run. If the robot teachpoint file contains a teachpoint for this slot, you must select that teachpoint. *Note:* In simulation mode, select **<accessible>.**
Use for deadlock avoidance	The option to permit the location to be used for deadlock avoidance. Select **Yes** to permit labware to be moved to this location to avoid a deadlock in the system. Select **No** if you do not want to move random labware to this location to avoid deadlock. **IMPORTANT** For typical operation, select **No** for the Labware MiniHub.
Door	Not applicable

4 Repeat steps 2 and 3 to set the properties for the remaining slots.

5 Select **File > Save** to save the device file.

6 In the **Device File** area, select the Labware MiniHub, and then click **Initialize selected devices** to establish communication with the device.

Related information

For information about...	See...
Creating profiles for the Labware MiniHub	"Creating Labware MiniHub profiles" on page 30
Editing profiles	"Editing and managing profiles" on page 33
Specifying the stack-holding method	"Selecting the stack-holding method" on page 26
VWorks software	• *VWorks Automation Control Setup Guide* • *VWorks Automation Control User Guide*
Adding the automation system or workstation robot and creating profiles for the robot	• Automation system user documentation, such as the *BioCel System User Guide* • *BenchCel Microplate Handling Workstation User Guide*

Selecting the stack-holding method

About this topic

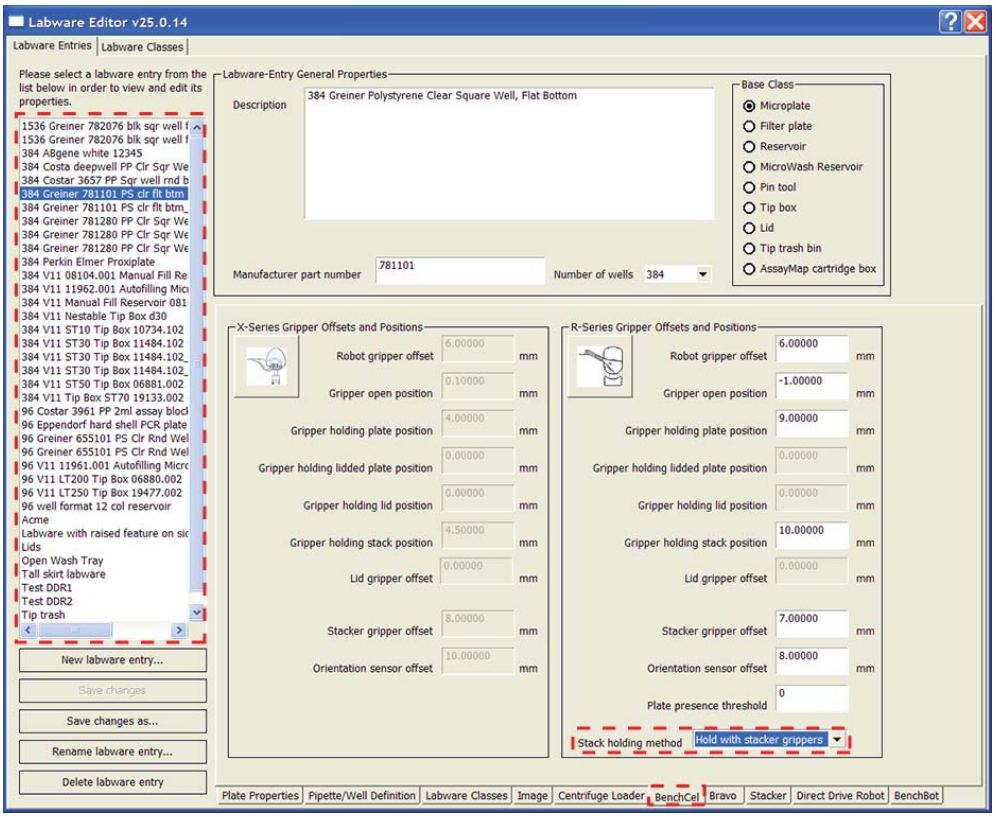
This topic explains how to select the stack-holding method in the VWorks Labware Editor. The instructions are applicable to Labware MiniHubs integrated in BenchCel Workstations only.

Procedure

For precision performance, use the BenchCel stacker grippers to hold the labware in the stacks.

To select the stack holding method:

1. In the **VWorks software**, select **Tools > Labware Editor**.
2. In the **Labware Editor**, select the labware from the list on the left.
3. Click the **BenchCel** tab.
4. In the **Stack holding method** list, select **Hold with stacker grippers**.
5. Click **Save changes**.



Related information

For information about...	See...
Labware Editor BenchCel tab parameters and settings	*VWorks Automation Control Setup Guide*
Labware specifications	"Labware and shelf pitch specifications" on page 32
Creating profiles	"Creating Labware MiniHub profiles" on page 30
Editing and managing profiles	"Editing and managing profiles" on page 33
Setting the home position	"Setting the home position" on page 34
Configuring the Labware MiniHub	"Configuration workflow" on page 30

3 Configuring the Labware MiniHub

This chapter contains the following topics:

- "Configuration workflow" on page 30
- "Creating Labware MiniHub profiles" on page 30
- "Editing and managing profiles" on page 33
- "Setting the home position" on page 34
- "Setting robot teachpoints" on page 39

Configuration workflow

About this topic

This topic presents the workflow for configuring the Labware MiniHub in Labware MiniHub Diagnostics. You will need to perform this step whether you are using the VWorks software or a different automation control software with the MiniHub ActiveX control.

Workflow

The following table presents the steps for setting up the Labware MiniHub in the Labware MiniHub Diagnostics.

Step	For this task...	See...
1	Create a profile for the Labware MiniHub.	"Creating Labware MiniHub profiles" on page 30
2	Edit or rename the profile.	"Editing and managing profiles" on page 33
3	Set the Labware MiniHub home position.	"Setting the home position" on page 34
4	Set robot teachpoints.	"Setting robot teachpoints" on page 39

Creating Labware MiniHub profiles

About profiles

A VWorks device profile is a collection of settings, stored in the Windows registry, that manages how you connect to a device. A Labware MiniHub profile specifies the following:

- COM port used to establish communication between the device and the controlling computer.
- Number of shelves (or slots) in each Labware MiniHub cassette.

You use the MiniHub Diagnostics software to create and manage Labware MiniHub profiles.

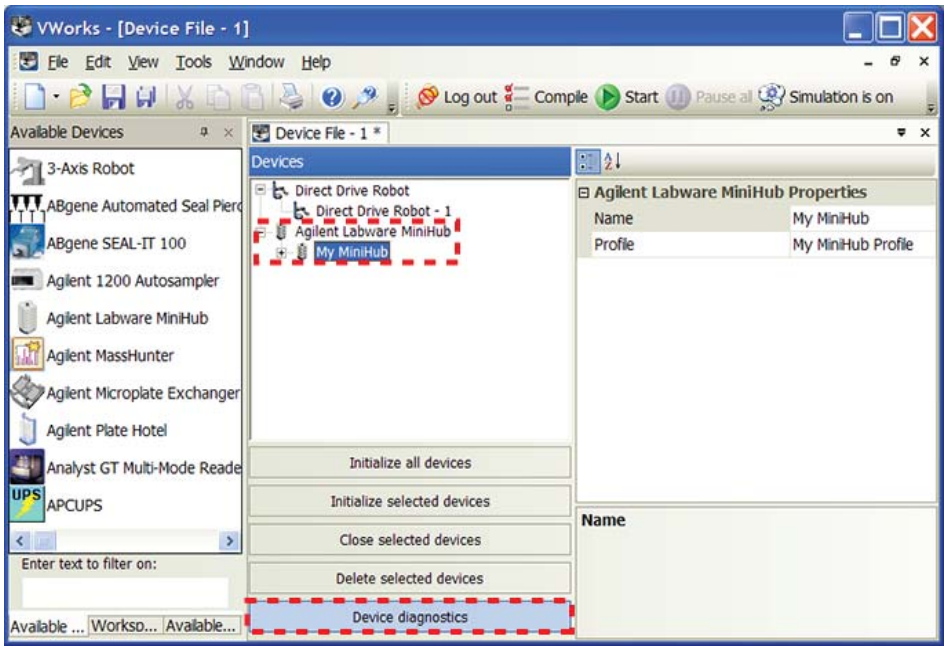
Note: If you are using the VWorks software, be aware that each device in the device file requires a unique profile. For information about device files, see "Creating a device file" on page 19. For a detailed description of the relationships between the device file and profile, see the *VWorks Automation Control User Guide*.

Creating a Labware MiniHub profile

To create a Labware MiniHub profile:

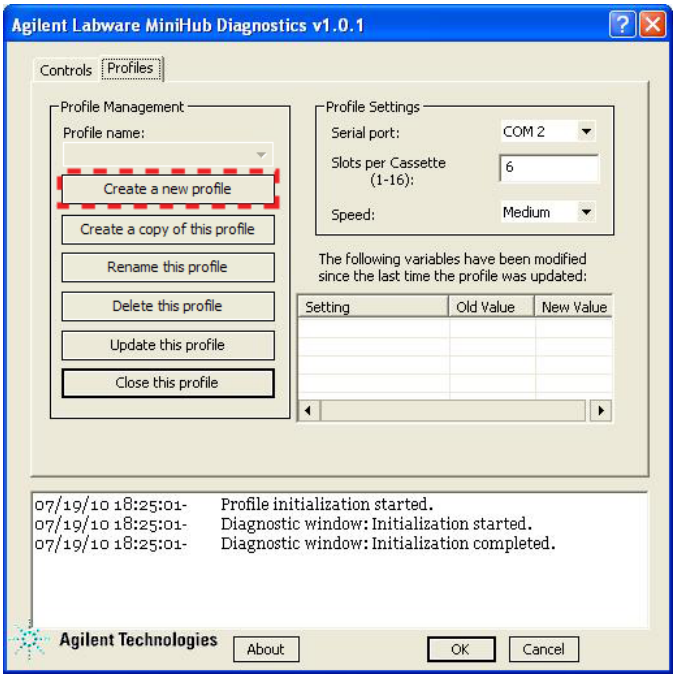
1 Use one of the following methods to open Labware MiniHub Diagnostics:

- In the VWorks software **Devices** area, select the Labware MiniHub name, and then click **Device diagnostics.**



- If you are using a different automation software, call the ShowDiagsDialog method to open Labware MiniHub Diagnostics. For details, see "MiniHub ActiveX control" on page 77.

The Labware MiniHub Diagnostics dialog box opens.



2 If it is not already displayed, click the **Profiles** tab.

3 In the **Profile Management** area, click **Create a new profile**. The Create Profile dialog box opens.

4 Type a name, and click **OK**. The name appears in the **Profile Management** area.

5 In the **Profile Settings** area, set the following parameters:

Profile parameter	Description
Serial Port	The controlling computer COM port that is connected to the Labware MiniHub.
Slots Per Cassette	The number of shelves in each cassette. (A cassette is a column of shelves. The Labware MiniHub consists of four cassettes.) The maximum number of slots possible depends on the Labware MiniHub model: • The system model has a maximum of 16 slots. • The BenchBot model has a maximum of 13 slots. • The BenchCel model has a maximum of 10 slots.
Speed	The speed at which the Labware MiniHub rotates during protocol runs. The three selections are: • *Slow*. Turns the MiniHub at 25% of the factory-set maximum speed. • *Medium*. Turns the MiniHub at 50% of the factory-set maximum speed. • *Fast*. Turns the MiniHub at 100% of the factory-set maximum speed.

6 Click **Update this profile** to save the changes.

7 Click **Initialize this profile** to establish communication with the Labware MiniHub.

CAUTION **The Labware MiniHub will rotate during the initialization process. Obstructing the Labware MiniHub while it is rotating will cause an error.**

Related information

For information about...	See...
Editing and managing profiles	"Editing and managing profiles" on page 33
Setting the home position	"Setting the home position" on page 34
Setting robot teachpoints	"Setting robot teachpoints" on page 39
Configuring the Labware MiniHub	"Configuration workflow" on page 30

Editing and managing profiles

Editing profiles

To edit a profile:

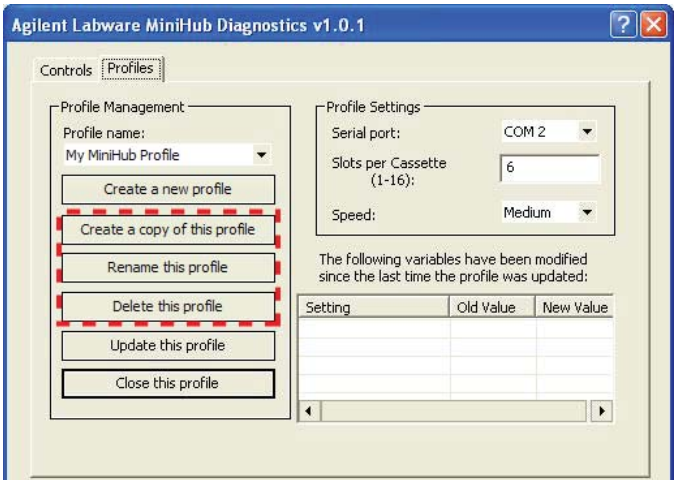
1. In the Labware MiniHub Diagnostics **Profiles** tab, select the profile you want to edit in the **Profile Management** area.
2. Modify the profile information.

   Note: Changes you make in the profile are shown in the table below the Profile Settings area. In addition, the changes are shown in the log area at the bottom of the dialog box.
3. When you are finished, click **Update this profile** to save the changes.

Managing profiles

In the Labware MiniHub Diagnostics **Profiles** tab, you can select an existing profile, and then rename, copy, or delete the profile.

CAUTION A copy of an existing profile references the same home position.



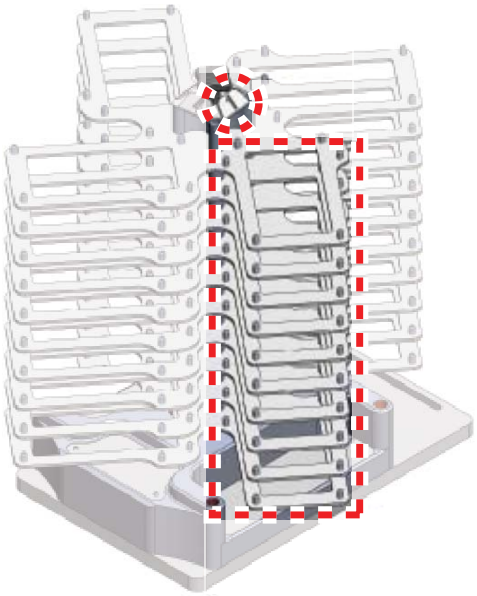
Related information

For information about...	See...
Creating profiles	“Creating Labware MiniHub profiles” on page 30
Setting the home position	“Setting the home position” on page 34
Setting robot teachpoints	“Setting robot teachpoints” on page 39
Configuring the Labware MiniHub	“Configuration workflow” on page 30

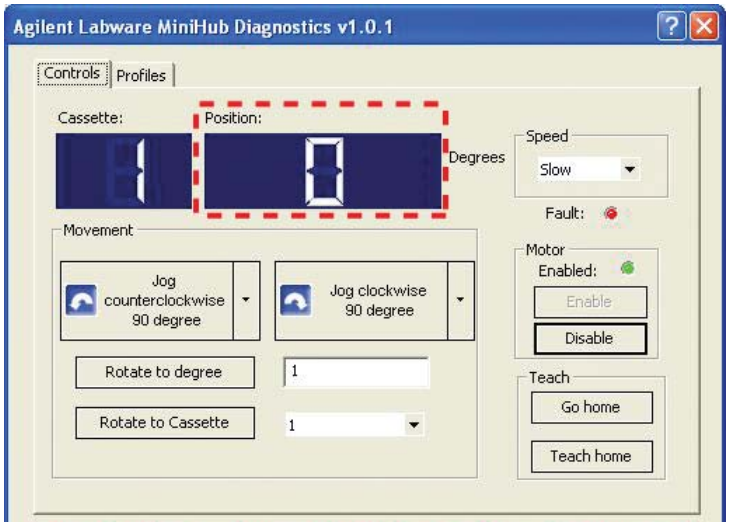
Setting the home position

About the home position

The Labware MiniHub home position is the position at which the automation system robot accesses any slot in cassette 1. Cassette 1 is identified by the number 1 on the cassette cap.



When the MiniHub is in the home position, the Position value in the Controls tab is set at 0.



Before you start

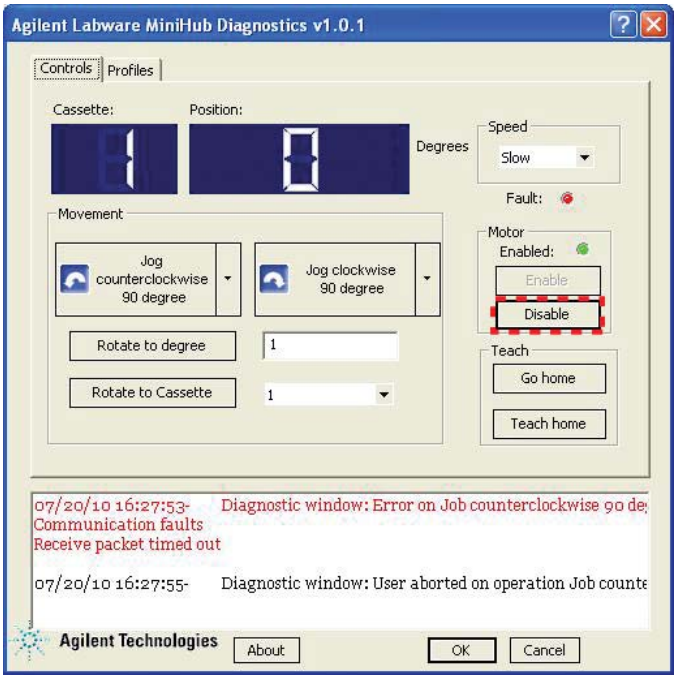
Make sure you:

- Have a teaching jig or standard microplate you want to use for the procedure.
- *System model.* Use the robot to pick up the teaching jig or microplate from a platepad. The robot should be holding the teaching jig or microplate.
- *BenchCel model.* Load the labware you want to use in one of the stackers, and then downstack a labware. The robot should be holding the labware.

Procedure

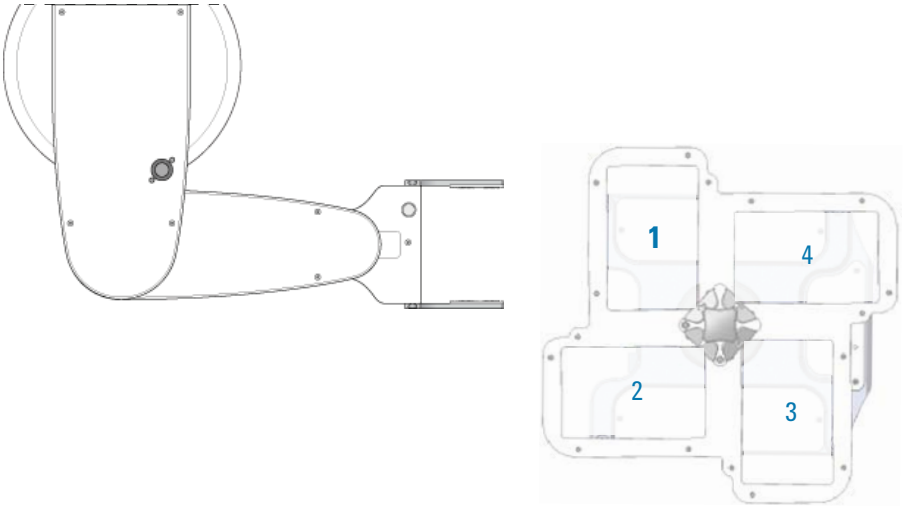
To set the Labware MiniHub home position:

1. Disable the automation system or BenchCel robot so that you can manually move the robot arm. For instructions, see the automation system robot user guide or the *BenchCel Microplate Handling Workstation User Guide*.
2. In **Labware MiniHub Diagnostics,** click the **Controls** tab, and then click **Disable** in the **Motor** area. You should be able to manually rotate the hub.

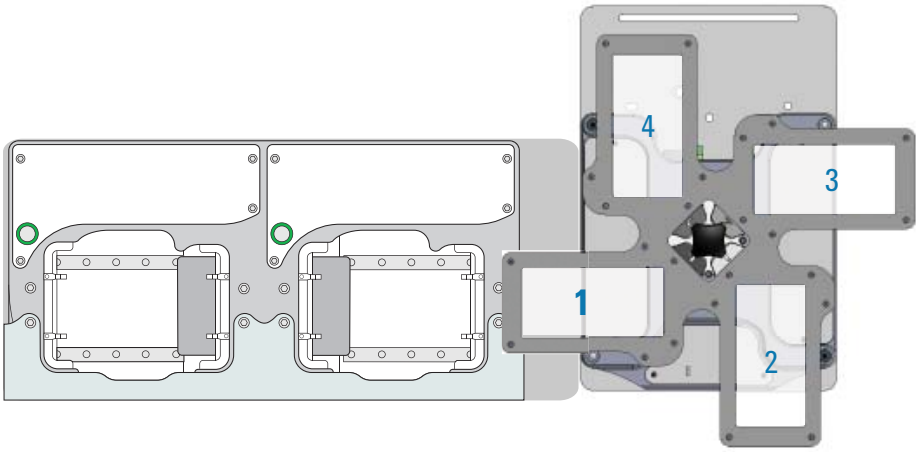


3 Manually rotate the MiniHub so that cassette 1 faces the robot. This is the approximate home position.

The following diagram shows the top view of the automation system robot and the hub. Notice that cassette 1 is facing the robot.



The following diagram shows the top view of the BenchCel Workstation and the hub. Notice that cassette 1 is facing the BenchCel robot.

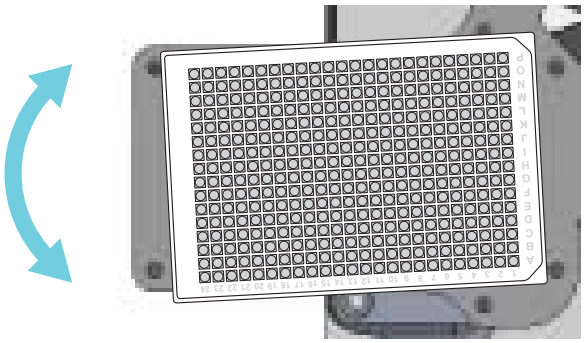


4 Move the robot so that the microplate sits in shelf 1, the bottom-most shelf, in cassette 1.

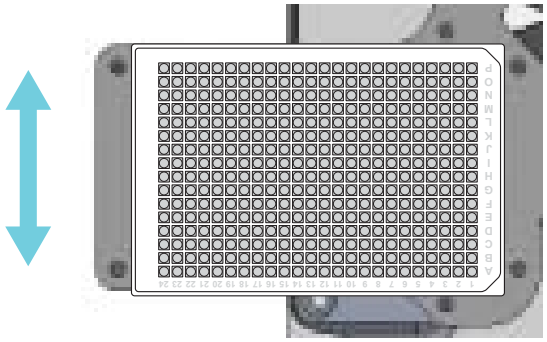
Note: You can place the microplate in any cassette-1 shelf. However, because you will need to set a robot teachpoint at each shelf later, it is convenient to start with shelf 1 in this procedure.

5 Check the position of the microplate. You might have to rotate the MiniHub slightly or move the robot arm until the microplate is seated correctly in the slot.

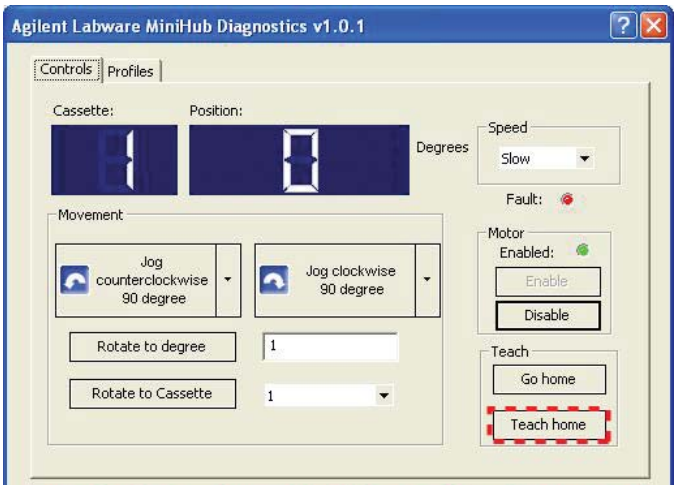
If the microplate is seated at a slight angle to the shelf, rotate the MiniHub slightly to adjust the microplate position.



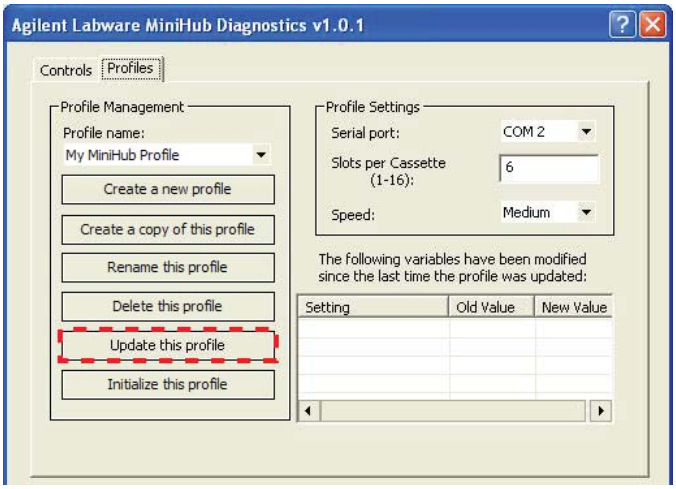
BenchCel model. If the microplate is sitting too far forward (as shown) or backward, and adjusting the robot and MiniHub manually do not solve the problem, unlock the Labware MiniHub integration plate. Move the hub-integration plate assembly forward or backward until the microplate is seated correctly in the slot.



6 In the **Labware MiniHub Diagnostics Controls** tab, click **Teach Home.** Notice that the **Position** value is set at 0.



7 In the **Profiles** tab, click **Update this profile** to save the change.



8 Leave the labware and robot in their current position and proceed to set the robot teachpoints.

Related information

For information about...	See...
Creating profiles	"Creating Labware MiniHub profiles" on page 30
Editing and managing profiles	"Editing and managing profiles" on page 33
Setting robot teachpoints	"Setting robot teachpoints" on page 39
Configuring the Labware MiniHub	"Configuration workflow" on page 30

Setting robot teachpoints

About setting robot teachpoints

After setting the Labware MiniHub home position, you must set robot teachpoints at each shelf in cassette 1. To set, edit, and verify robot teachpoints, see the automation system robot user documentation or the *BenchCel Microplate Handling Workstation User Guide*.

Note: You only need to set teachpoints at all of the shelves in cassette 1. The software will reference these teachpoints when accessing shelves in cassettes 2, 3, and 4.

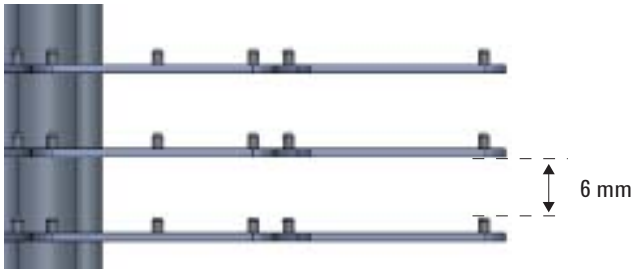
IMPORTANT Before setting the robot teachpoints, make sure the hub's motor is enabled. For instructions, see "Enabling and disabling the motor" on page 46. In addition, make sure the MiniHub is at its home position. For instructions, see "Rotating the MiniHub to a specific position" on page 49.

If you used shelf 1 to set the home position, you can go ahead and set the robot teachpoint at shelf 1 while you have the robot and microplate in position.

About the approach height

IMPORTANT For each teachpoint, set the approach height such that it is greater than the height of the locating pins on the MiniHub shelf and less than the shelf directly above. For example, the locating pins are 5.1 mm tall, so the minimum approach height should be 6 mm if single spacers are used between shelves.

Figure Approach height considerations at each shelf.



About verifying teachpoints

You must verify robot teachpoints after setting them. For instructions, see the automation system robot user documentation or the *BenchCel Microplate Handling Workstation User Guide*.

Related information

For information about...	See...
Labware specifications	*Labware MiniHub Safety and Installation Guide*
Creating profiles	"Creating Labware MiniHub profiles" on page 30
Editing and managing profiles	"Editing and managing profiles" on page 33
Setting the home position	"Setting the home position" on page 34
Configuring the Labware MiniHub	"Configuration workflow" on page 30

4
Using Labware MiniHub Diagnostics

This chapter explains how to use the provided software tools to diagnose and troubleshoot the Labware MiniHub.

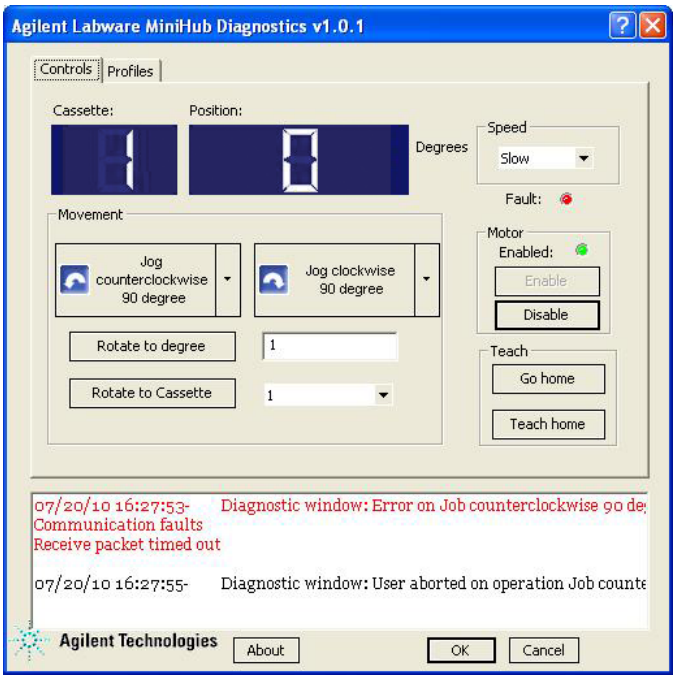
This chapter contains the following topics:

- "About Labware MiniHub Diagnostics" on page 42
- "Checking the MiniHub's current position" on page 44
- "Enabling and disabling the motor" on page 46
- "Changing the rotation speed" on page 47
- "Rotating the MiniHub to a specific position" on page 49
- "Checking the error indicator" on page 52
- "Viewing the log area" on page 53

About Labware MiniHub Diagnostics

Labware MiniHub Diagnostics Controls tab

The Labware MiniHub Diagnostics software allows you to create profiles and control the motions of the Labware MiniHub. The software has two tabs: Controls and Profiles. You mainly use the commands and parameters available in the Controls tab to troubleshoot problems.

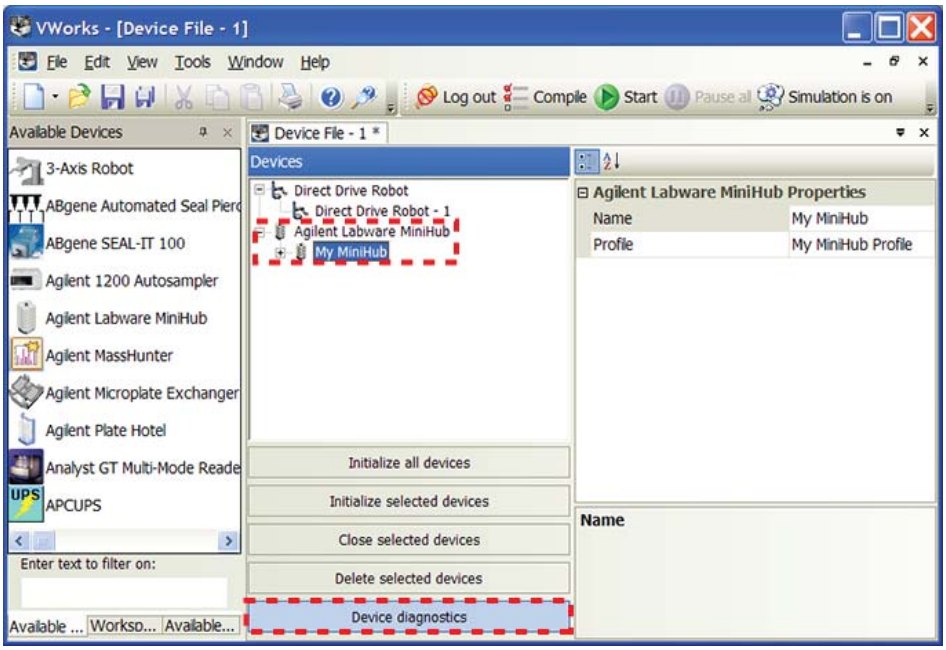


Opening Labware MiniHub Diagnostics

Access to Labware MiniHub Diagnostics depends on the automation software you are using: VWorks software or third-party automation software.

VWorks software

In the VWorks software **Devices** area, select the Labware MiniHub name, and then click **Device diagnostics.**



Third-party automation software

If you are using a different automation software, call the ShowDiagsDialog method to open Labware MiniHub Diagnostics. For details, see "MiniHub ActiveX control" on page 77.

Related information

For information about...	See...
MiniHub ActiveX control	"MiniHub ActiveX control" on page 77
Checking the hub's current position	"Checking the MiniHub's current position" on page 44
Enabling and disabling the MiniHub motor	"Enabling and disabling the motor" on page 46
Changing the rotation speed	"Changing the rotation speed" on page 47
Rotating to a specific position	"Rotating the MiniHub to a specific position" on page 49
Teaching the home position	"Setting the home position" on page 34
Clearing controller faults	"Checking the error indicator" on page 52
Viewing the log area	"Viewing the log area" on page 53
Profiles tab	"Creating Labware MiniHub profiles" on page 30

Checking the MiniHub's current position

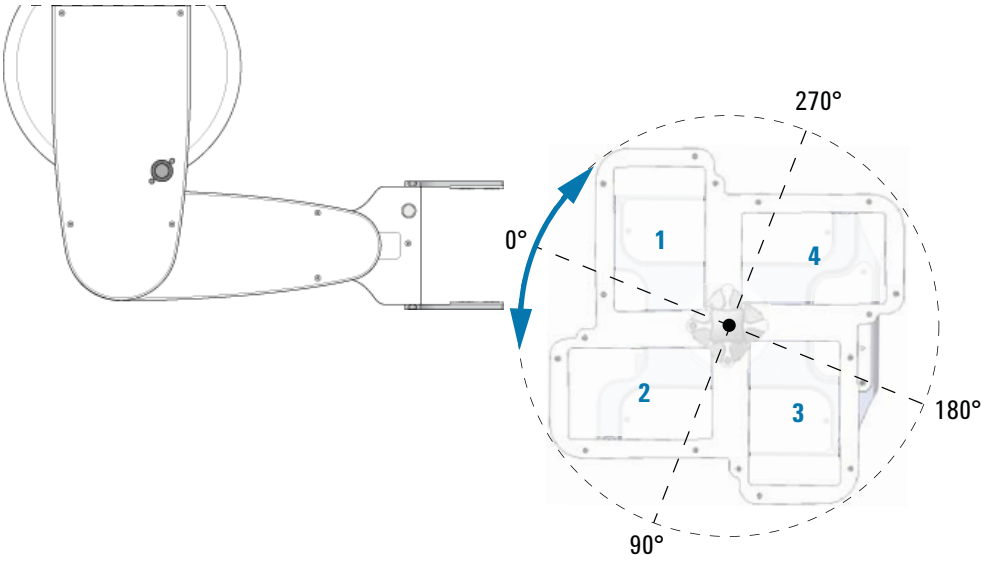
About the Cassette value

The Cassette value in the Controls tab indicates the cassette that is currently facing the robot. For example, a Cassette value of 3 indicates that cassette 3 is facing the robot. A dash (—) indicates that the MiniHub is between cassette positions.

About the Position value

The Position value in the Controls tab indicates the position of the MiniHub relative to its home position. Position values range from 0–360°, counterclockwise from the home position. The Cassette values correspond to the following position values:

Cassette	Position value
1, or home	0°
2	90°
3	180°
4	270°

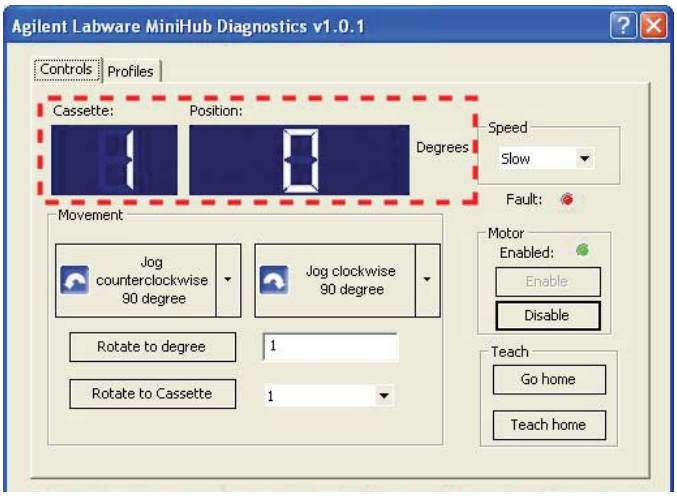


If the MiniHub is between cassette positions, other position values will be displayed. For example, if the MiniHub is exactly between cassette 1 (0°) and cassette 2 (90°), the Position value is 45°.

Procedure

To check the current position of the Labware MiniHub:

In the **Controls** tab, check the values in the **Cassette** and **Position** boxes.



Related information

For information about...	See...
Labware MiniHub Diagnostics	"About Labware MiniHub Diagnostics" on page 42
Enabling and disabling the MiniHub motor	"Enabling and disabling the motor" on page 46
Changing the rotation speed	"Changing the rotation speed" on page 47
Rotating to a specific position	"Rotating the MiniHub to a specific position" on page 49
Teaching the home position	"Setting the home position" on page 34
Clearing controller faults	"Checking the error indicator" on page 52
Viewing the log area	"Viewing the log area" on page 53
Profiles tab	"Creating Labware MiniHub profiles" on page 30

Enabling and disabling the motor

About this topic

Disabling the MiniHub motor allows you to rotate the MiniHub by hand. You might want to do this when you:

- Set the home position.
- Want to remove labware from specific shelves after a run error occurs.

After setting the home position or fixing the error, you can enable the hub's motor to resume operation.

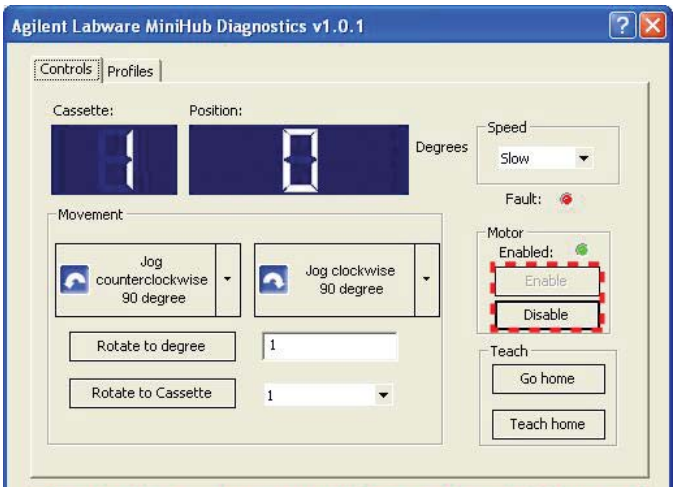
Procedure

CAUTION **The Labware MiniHub might rotate slightly when you enable the motor. Obstructing the Labware MiniHub while it is rotating will cause an error.**

To enable or disable the Labware MiniHub motor:

In the **Controls** tab, click **Enable** or **Disable.**

Note: When the motor is enabled, the green Enabled light turns on in the **Motor** area. When the motor is disabled, the Enabled light turns off.



Related information

For information about...	See...
Labware MiniHub Diagnostics	"About Labware MiniHub Diagnostics" on page 42
Checking the hub's current position	"Checking the MiniHub's current position" on page 44
Changing the rotation speed	"Changing the rotation speed" on page 47

For information about...	See...
Rotating to a specific position	"Rotating the MiniHub to a specific position" on page 49
Teaching the home position	"Setting the home position" on page 34
Clearing controller faults	"Checking the error indicator" on page 52
Viewing the log area	"Viewing the log area" on page 53
Profiles tab	"Creating Labware MiniHub profiles" on page 30

Changing the rotation speed

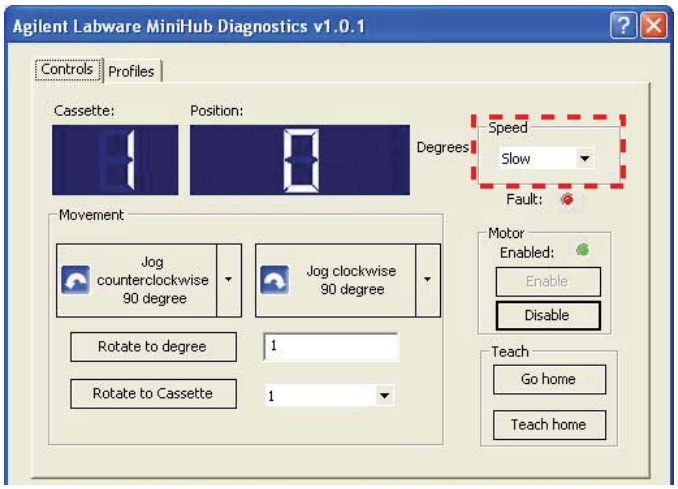
Procedure

You can select the speed at which the Labware MiniHub turns while you are making adjustments in Labware MiniHub Diagnostics. For example, you can select the Slow speed when you are setting up or troubleshooting the hub.

Note: To set the rotation speed for protocol runs, use the Speed selection in the Profiles tab.

To select the diagnostic rotation speed:

In the **Controls** tab, select one of the following speeds from the **Speed** list:



Speed	Description
Slow	Rotates the MiniHub at 25% of the factory-set maximum speed.

Speed	Description
Medium	Rotates the MiniHub at 50% of the factory-set maximum speed.
Fast	Rotates the MiniHub at 100% of the factory-set maximum speed.

Related information

For information about...	See...
Labware MiniHub Diagnostics	“About Labware MiniHub Diagnostics” on page 42
Checking the current position of the Labware MiniHub	“Checking the MiniHub’s current position” on page 44
Enabling and disabling the MiniHub motor	“Enabling and disabling the motor” on page 46
Rotating to a specific position	“Rotating the MiniHub to a specific position” on page 49
Teaching the home position	“Setting the home position” on page 34
Clearing controller faults	“Checking the error indicator” on page 52
Viewing the log area	“Viewing the log area” on page 53
Profiles tab	“Creating Labware MiniHub profiles” on page 30

Rotating the MiniHub to a specific position

About this topic

You can rotate the Labware MiniHub using one of the following methods:

- Rotating to a specific cassette
- Rotating the MiniHub in set increments
- Rotating the MiniHub to a specific position relative to home

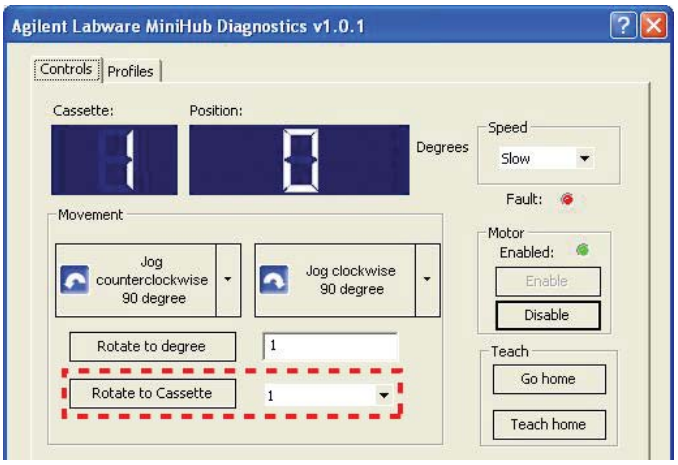
CAUTION Obstructing the Labware MiniHub while it is rotating will cause an error.

Rotating to a specific cassette

You can rotate the MiniHub so that the desired cassette is facing the robot.

To rotate to a specific cassette:

1. Move the automation system or BenchCel robot away from the hub. See the automation system user documentation or the *BenchCel Microplate Handling Workstation User Guide* for instructions.
2. In the **Controls** tab, select the desired cassette from the **Rotate to Cassette** list, and then click **Rotate to Cassette.** The MiniHub rotates until the desired cassette faces the robot. The Cassette box displays the selected cassette.



Rotating the MiniHub in set increments

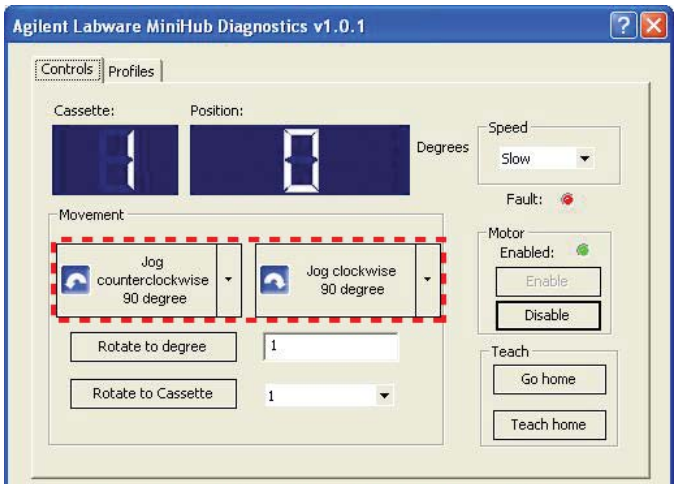
You can rotate the MiniHub clockwise or counterclockwise in set increments from its current position.

To rotate the MiniHub in set increments:

1. Move the automation system or BenchCel robot away from the hub. See the automation system user documentation or the *BenchCel Microplate Handling Workstation User Guide* for instructions.

2 In the **Controls** tab, click one of the following:

Command	Description
Jog counterclockwise	Displays the number of degrees to rotate counterclockwise, relative to its current position. Select the desired number of degrees.
Jog clockwise	Displays the number of degrees to rotate clockwise, relative to its current position. Select the desired number of degrees.



3 Click the **Jog counterclockwise** or **Jog clockwise** button again to rotate the MiniHub the specified number of degrees.

Rotating the MiniHub to a specific position relative to home

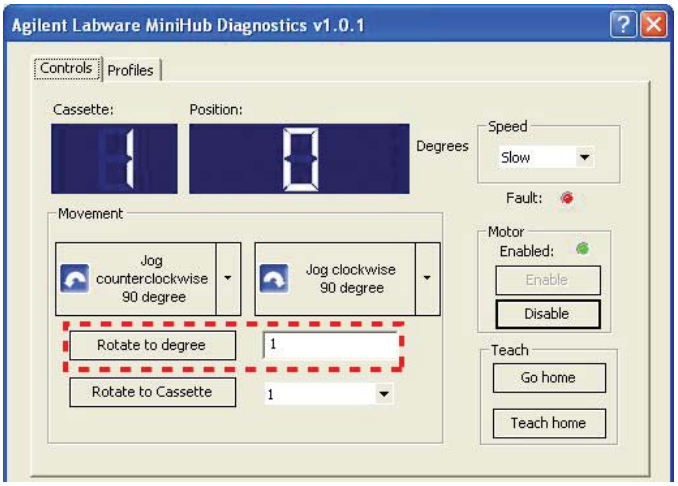
You can rotate the stage so that cassette 1 is at a specified number of degrees from the home position, 0°.

To rotate the MiniHub a specific number of degrees:

1 Move the automation system or BenchCel robot away from the hub. See the automation system user documentation or the *BenchCel Microplate Handling Workstation User Guide* for instructions.

2 In the **Controls** tab, type the number of degrees in the **Rotate to degree** box, and then click **Rotate to degree.**

If you specified an angle between 1° and 180°, the software will rotate the MiniHub clockwise. If you specified an angle greater 180°, the software will rotate the MiniHub counterclockwise.



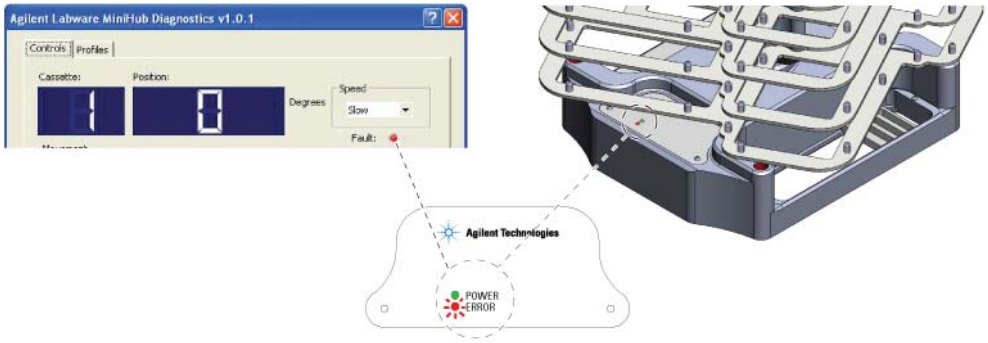
Related information

For information about...	See...
Labware MiniHub Diagnostics	"About Labware MiniHub Diagnostics" on page 42
Checking the current position of the Labware MiniHub	"Checking the MiniHub's current position" on page 44
Changing the rotation speed	"Changing the rotation speed" on page 47
Enabling and disabling the MiniHub motor	"Enabling and disabling the motor" on page 46
Teaching the home position	"Setting the home position" on page 34
Clearing controller faults	"Checking the error indicator" on page 52
Viewing the log area	"Viewing the log area" on page 53
Profiles tab	"Creating Labware MiniHub profiles" on page 30

Checking the error indicator

About controller faults

If an error occurs during operation, the error indicator light at the base turns on and flashes slowly. In Labware MiniHub Diagnostics, the Fault light also turns on.



Read the message in the error dialog box, and then check "Troubleshooting" on page 61 for actions you can take to resolve the errors. After the error is resolved, the Error light at the base and in the dialog box turn off.

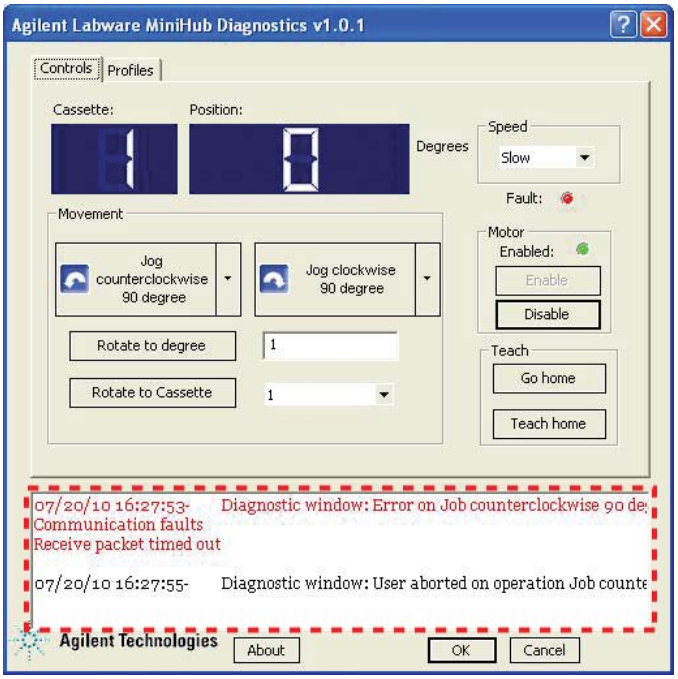
Related information

For information about...	See...
Labware MiniHub Diagnostics	"About Labware MiniHub Diagnostics" on page 42
Checking the current position of the Labware MiniHub	"Checking the MiniHub's current position" on page 44
Enabling and disabling the MiniHub motor	"Enabling and disabling the motor" on page 46
Changing the rotation speed	"Changing the rotation speed" on page 47
Rotating to a specific position	"Rotating the MiniHub to a specific position" on page 49
Teaching the home position	"Setting the home position" on page 34
Viewing the log area	"Viewing the log area" on page 53
Profiles tab	"Creating Labware MiniHub profiles" on page 30

Viewing the log area

About the log area

The log area displays all of the commands issued and the status of the actions while you are working in the dialog box. Error conditions are displayed in red text.



If the Labware MiniHub is integrated in the VWorks software, the information displayed in the log area is also written to the VWorks log file.

Related information

For information about...	See...
Labware MiniHub Diagnostics	"About Labware MiniHub Diagnostics" on page 42
Checking the current position of the Labware MiniHub	"Checking the MiniHub's current position" on page 44
Enabling and disabling the MiniHub motor	"Enabling and disabling the motor" on page 46
Changing the rotation speed	"Changing the rotation speed" on page 47
Rotating to a specific position	"Rotating the MiniHub to a specific position" on page 49
Teaching the home position	"Setting the home position" on page 34

For information about...	See...
Clearing controller faults	“Checking the error indicator” on page 52
Profiles tab	“Creating Labware MiniHub profiles” on page 30

5
Maintaining the Labware MiniHub

This chapter contains the following topics:

- "Cleaning the shelves" on page 56
- "Replacing fuses" on page 57

Cleaning the shelves

Procedure

WARNING **Always turn off the Labware MiniHub and shut down the lab automation system or workstation before performing any maintenance procedure. See "Turning on and turning off the Labware MiniHub" on page 17 and the lab automation system user documentation.**

Be sure to clean up spills on any part of the Labware MiniHub immediately after a protocol run. Use a clean soft cloth to remove the spill. Use clean water or an alcohol-based cleaning solution to remove dirt. Do not use corrosive cleaning solutions.

Related information

For information about...	See...
Safety information	*Labware MiniHub Safety and Installation Guide*
Replacing fuses	"Replacing fuses" on page 57
Reporting problems	"Reporting problems" on page 68

Replacing fuses

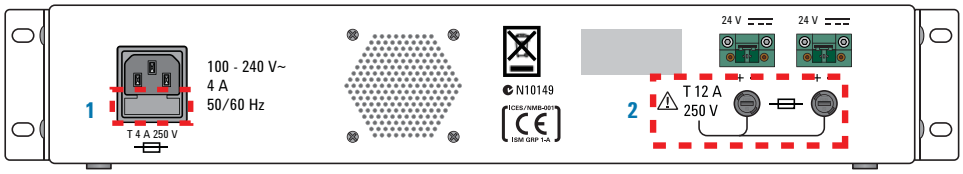
About this topic

This topic explains how to replace fuses in the Labware MiniHub power supply.

WARNING **Only administrators and experienced personnel should perform the procedure in this topic. Alternatively, contact Automation Solutions Technical Support for assistance.**

Fuse location

The Labware MiniHub has four fuses that are accessible from the back of the power supply: two in the rectangular housing below the power inlet, one in each of the two circular housings labeled T12 A, 250 V.



Item	Fuse housing label	Function	Rating (time-delayed)
1	T4A 250V	120–240 V~ power input	4 A, 250 V
2	T12A 250V	24 V DC power output	12 A, 250 V

Materials and tools

Make sure you have the following:

- 1/4-in slotted-blade screwdriver
- Replacement fuse(s)

CAUTION Using an incorrect fuse can damage the Labware MiniHub.

Before you start

WARNING **Always turn off the Labware MiniHub and shut down the lab automation system or workstation before performing any maintenance procedure.**

WARNING **Always disconnect the power cord from the power supply before performing any maintenance procedure.**

Make sure you:

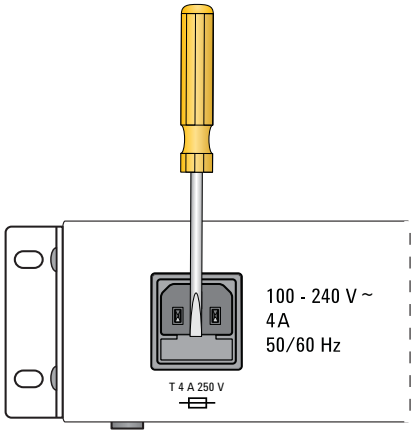
1 Turn off the Labware MiniHub and the lab automation system or workstation. See "Turning on and turning off the Labware MiniHub" on page 17 and the lab automation system user documentation.

2 Disconnect the power cord from the Labware MiniHub power supply. See *Labware MiniHub Safety and Installation Guide*.

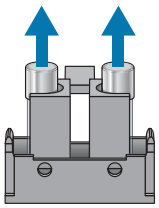
Replacing the 4 A fuses

To replace a 4 A fuse:

1 At the power inlet, use the screwdriver to pry open the housing, and then carefully pull out the fuse cartridge by hand. Two fuses sit in the cartridge.



2 Replace the blown fuse in the fuse cartridge. (A blown fuse has a broken filament.)



3 Slide the fuse cartridge back into the fuse housing.

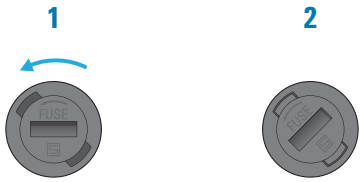
4 Press the cartridge securely into the closed position.

5 Plug in the power cable at the power inlet.

Replacing the 12 A fuses

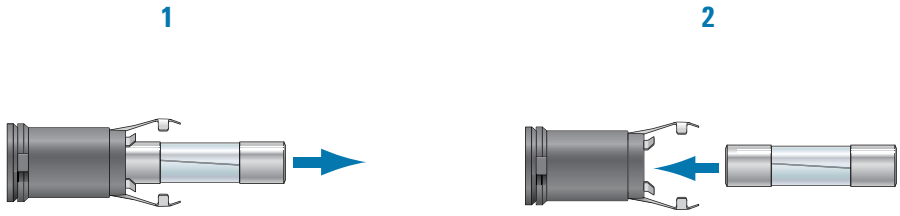
To replace one of the 12 A fuses:

1 Using the screwdriver, turn the fuse holder counterclockwise one-eighth turn (1). The fuse holder moves outward (2).



2 Remove the fuse holder from the housing.

3 Pull out the blown fuse (1) and insert the new fuse (2). (A blown fuse has a broken filament.)



4 Insert the fuse and holder back into the housing.

5 While pressing the fuse holder into the housing, turn the fuse holder clockwise one-eight turn using the screwdriver.

Related information

For information about...	See...
Safety information	*Labware MiniHub Safety and Installation Guide*
Electrical requirements	*Labware MiniHub Safety and Installation Guide*
Cleaning the shelves	"Cleaning the shelves" on page 56
Reporting problems	"Reporting problems" on page 68

6 Troubleshooting

This chapter contains the following topics:

- "Troubleshooting hardware problems" on page 62
- "Troubleshooting error messages" on page 65
- "Reporting problems" on page 68

Troubleshooting hardware problems

About this topic

This topic lists commonly encountered hardware problems, the causes of the problems, and ways to resolve the problems:

- "Communication or power problems" on page 62
- "Homing and other problems" on page 63

If you are still experiencing problems with the Labware MiniHub after trying the solutions, contact Automation Solutions Technical Support.

Communication or power problems

Problem	Cause	Solution
The Labware MiniHub does not turn on.	The electrical requirements are not met.	Make sure the electrical requirements are met. See the *Labware MiniHub Safety and Installation Guide*.
	The Labware MiniHub is not connected to the power supply or the power source.	Connect the Labware MiniHub to the power supply and power source. See *Labware MiniHub Safety and Installation Guide*.
	One or more of the fuses are blown.	Replace the blown fuse(s). See "Replacing fuses" on page 57. If the fuses are blown immediately after replacement, stop using the device and contact Automation Solutions Technical Support.
	If sound of the fan in the power supply is audible, and the Labware MiniHub is working properly, the Labware MiniHub is turned on. However, the light in the switch is broken.	Contact Automation Solutions Technical Support to replace the power switch.

Problem	Cause	Solution
The power switch light is on, but the Labware MiniHub does not rotate.	The Labware MiniHub is not initialized.	In the Labware MiniHub Diagnostics **Profiles** tab, make sure the correct profile and COM port are selected, and then click **Initialize this profile.**
	The Labware MiniHub is not connected to the controlling computer.	Make sure the supplied Ethernet cable with serial adaptor connects the Labware MiniHub and the controlling computer. The device uses serial communication over the Ethernet cable. Make sure the serial-adaptor end of the cable is connected to a serial port at the controlling computer. Make sure the serial port selected in the **Profiles** tab matches the serial port used for this device.
	An error occurred.	Check the Error light on the base. If the light is on, an error has occurred. To clear the error, in Labware MiniHub Diagnostics **Controls** tab, click **Clear Fault.**

Homing and other problems

Problem	Cause	Solution
The Labware MiniHub does not home.	The home position is set incorrectly.	Reset the home position and try again. See "Setting the home position" on page 34.
	The encoder might be dirty or damaged.	Contact Automation Solutions Technical Support.
	A communication error might have occurred.	Make sure the supplied Ethernet cable with serial adaptor connects the Labware MiniHub and the controlling computer. Also, make sure the serial port selected in the **Profiles** tab matches the serial port used for this device. Check that the profile is initialized.
The robot does not place or pick labware correctly at the Labware MiniHub.	The robot teachpoints might be set incorrectly, the Labware MiniHub has moved after the teachpoints were set, or the shelves are bent.	Check and reset the robot teachpoints. See "Setting robot teachpoints" on page 39. See also the automation system robot user documentation or the *BenchCel Microplate Handling Workstation User Guide* for instructions. Check for and replace bent shelves.

Problem	Cause	Solution
The Labware MiniHub has stopped and the Error light at the base is on.	An obstacle prevented the Labware MiniHub from rotating, or a computer error prevented communication with the device.	Remove the obstacle, click **Retry**, and resume operation. Re-initialize the Labware MiniHub. If the problem persists, power cycle the device.

Related information

For information about...	See...
Labware MiniHub component names	"Hardware overview" on page 5
Hardware problems	"Troubleshooting hardware problems" on page 62
Safety	*Labware MiniHub Safety and Installation Guide*
Reporting problems to Agilent Technologies	"Reporting problems" on page 68

Troubleshooting error messages

About this topic

The following tables list commonly encountered error messages, the causes of the errors, and ways to resolve the errors. The error messages are listed by the following categories:

- Communication errors
- Fatal errors
- Non-fatal errors
- Warnings

If you are still experiencing problems with the Labware MiniHub after trying the solutions, or if an error not on the list is displayed, contact Automation Solutions Technical Support.

For protocol-related errors, see the automation system software user guide, such as the *VWorks Automation Control User Guide*.

Communication errors

The following error messages are caused by communication problems:

- Bad CRC8 in receive packet
- Connection not open
- Error access critical section creation failed
- Event queue is full
- Event thread creation failed
- Log access critical section or log timer creation failed
- Receive packet timed out
- Reply list critical section creation failed
- Synchronization failed
- Unable to open connection
- Unable to send packet

Check the following causes and try the corresponding solutions:

Cause	Solution
The Labware MiniHub is connected to the incorrect serial port, or the serial port is already in use by another device.	Check and make sure the correct serial port is used at the controlling computer.
The Labware MiniHub is disconnected from serial port.	Check the Ethernet cable connection at the power supply and at the controller computer.
The Labware MiniHub is not turned on.	Turn on the Labware MiniHub.

Fatal errors

The following fatal error messages are typically caused by hardware errors or problems in the hardware, firmware, or controller. If one of the messages is displayed, contact Automation Solutions Technical Support.

- Amplifier Not Responding
- Register File Checksum Error
- Register File Version Error

Non-fatal errors

The following non-fatal error messages are typically caused by an obstruction or damage to the device.

- Amplifier Short Circuit Error
- Average Current Error
- Excessive Following Error
- Profile Queue Overflow Error
- Stator Alignment Error

Check the following causes and try the corresponding solutions:

Cause	Solution
An obstacle prevented the Labware MiniHub from rotating.	Remove the obstacle, and then try rotating the Labware MiniHub again.
Hardware components in the Labware MiniHub are damaged.	Contact Automation Solutions Technical Support.

Warnings

The following warning messages are displayed if electrical fluctuations occur in the current or voltage.

- Communication Queue Full
- Done Zone Timeout
- Over Current
- Over Voltage
- Profile Queue Overflow
- Profile Queue Underflow
- Under Voltage

Check the following causes and try the corresponding solutions:

Cause	Solution
The electrical requirements are not met.	Make sure the electrical requirements are met. See the *Labware MiniHub Safety and Installation Guide*.
The circuit to which the Labware MiniHub is connected is noisy or overloaded.	Check for noise or overloading in the electrical circuit. Install a UPS as a power backup.

Cause	Solution
The power supply is failing.	Replace the power supply. Contact Automation Solutions Technical Support.

Related information

For information about...	See...
Labware MiniHub component names	"Hardware overview" on page 5
Hardware problems	"Troubleshooting hardware problems" on page 62
Safety	*Labware MiniHub Safety and Installation Guide*
Reporting problems to Agilent Technologies	"Reporting problems" on page 68

Reporting problems

Contacting Automation Solutions Technical Support

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

Europe

Phone: +44 (0)1763850230

email: euroservice.automation@agilent.com

US and rest of world

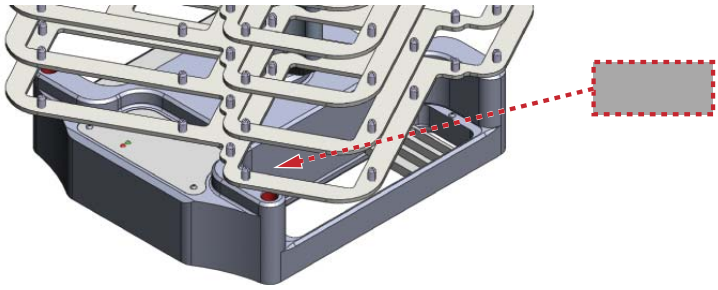
Phone: 1.800.979.4811 (US only) or +1.408.345.8011

email: service.automation@agilent.com

Reporting hardware problems

When contacting Agilent Technologies, make sure you have the serial number of the device ready. You can locate the serial number on the side of the base, as shown.

Figure MiniHub device serial number label location



Reporting software problems

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

- Short description of the problem
- Relevant software version number (for example, automation control software, diagnostics software, ActiveX control software, and firmware)
- Error message text (or screen capture of the error message dialog box)
- Relevant files, such as log files

Reporting user guide problems

If you find a problem with this user guide or have suggestions for improvement, send your comments in an email to documentation.automation@agilent.com.

Related information

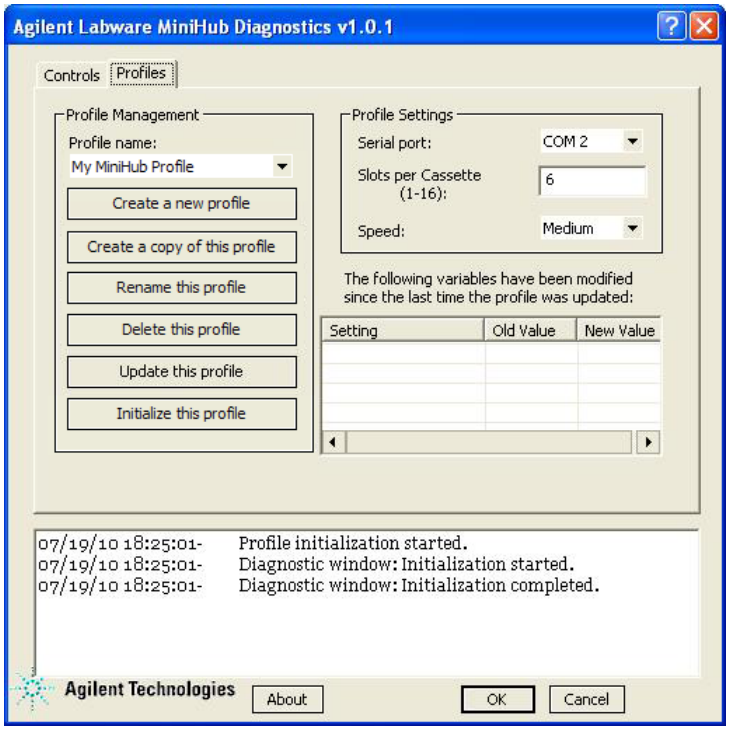
For information about...	See...
Troubleshooting hardware problems	"Troubleshooting hardware problems" on page 62
Software error messages	"Troubleshooting error messages" on page 65
Safety	*Labware MiniHub Safety and Installation Guide*
Reporting problems to Agilent Technologies	"Reporting problems" on page 68

A
Quick reference

This appendix contains the following topics:

- "Profiles tab" on page 72
- "Controls tab" on page 74

Profiles tab



Profile Management area

Selection or command	Description
Profile name	Displays the selected profile. Also allows you to select from the list of available profiles.
Create a new profile	Creates a new profile.
Create a copy of this profile	Creates a duplicate copy of the selected profile.
Rename this profile	Renames the selected profile.
Delete this profile	Deletes the selected profile.
Update this profile	Saves changes to the selected profile.
Initialize this profile	Initiates communication with the device using the selected profile.

Profile Settings area

Selection or parameter	Description
Serial port	The COM port of the computer that is connected to the Labware MiniHub.
Slots Per Cassette	The number of shelves in each MiniHub cassette.
Speed	The rotational speed of the MiniHub during protocol runs. The selections are: • *Slow*. Turns the MiniHub at 25% of the factory-set maximum speed. • *Medium*. Turns the MiniHub at 50% of the factory-set maximum speed. • *Fast*. Turns the MiniHub at 100% of the factory-set maximum speed. To set the rotation speed while you are working in diagnostics, go to the Controls tab.

Log table and log area

The table below the Profile Settings area lists all of the changes you have made in the Profiles Settings area.

The log area displays all commands and actions issued in the Labware MiniHub Diagnostics dialog box. The area is visible in the Profiles tab and the Controls tab.

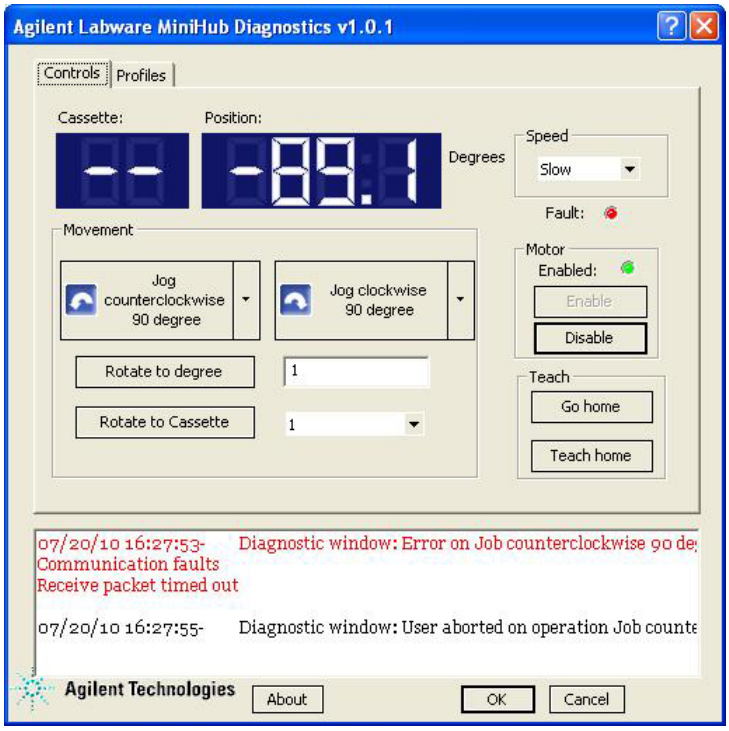
Commands

Command	Description
About	Displays the Labware MiniHub Diagnostics version number and copyright information.

Related information

For information about...	See...
Profiles	“About profiles” on page 30
Creating a profile	“Creating a Labware MiniHub profile” on page 31
Editing profiles	“Editing profiles” on page 33
Managing profiles	“Managing profiles” on page 33
Controls tab	“Controls tab” on page 74

Controls tab



Status area and commands

Box name or command	Description
Cassette	The current cassette at the home position.
Position	The current position of the MiniHub, in degrees.
Speed	The rotational speed of the MiniHub while you are in diagnostics. The selections are: • *Slow*. Turns the MiniHub at 25% of the factory-set maximum speed. • *Medium*. Turns the MiniHub at 50% of the factory-set maximum speed. • *Fast*. Turns the MiniHub at 100% of the factory-set maximum speed. To set the rotation speed for protocol runs, go to the Profiles tab.
Fault	The light that indicates whether the MiniHub has encountered an error. If the light is on, an error has occurred.

Movement area

Selection, parameter, or command	Description
Jog counterclockwise	Turns the MiniHub counterclockwise by the selected degree increment.
Jog clockwise	Turns the MiniHub clockwise by the selected degree increment.
Rotate to degrees	Turns the MiniHub so that cassette 1 is at the specified number of degrees from the home position.
Rotate to cassette	Turns the MiniHub so that the selected cassette is at the home position.

Motor area

Command	Description
Enable	Turns on the MiniHub motor.
Disable	Turns off the MiniHub motor.

Teach area

Parameter or command	Description
Go home	Turns the MiniHub to the home position.
Teach Home	Sets the home position.

Related information

For information about...	See...
Checking the current position of the Labware MiniHub	“Checking the MiniHub’s current position” on page 44
Enabling and disabling the MiniHub motor	“Enabling and disabling the motor” on page 46
Moving to a specific cassette	“Rotating the MiniHub to a specific position” on page 49
Clearing controller faults	“Checking the error indicator” on page 52
Changing the hub’s rotation speed	“Profiles tab” on page 72
Setting the home position	“Setting the home position” on page 34

For information about...	See...
Profiles tab	“Profiles tab” on page 72

B
MiniHub ActiveX control

This contains the following topics:

- "About the MiniHub ActiveX control" on page 78
- "Properties" on page 79
- "Methods" on page 82
- "Events" on page 97

The MiniHub ActiveX has been verified to work with both Visual C++ and Visual Studio .NET in Visual Studio 2008.

About the MiniHub ActiveX control

What is the MiniHub ActiveX control

The MiniHub ActiveX control is the software component that allows third-party lab automation systems to interact with the Labware MiniHub.

How the MiniHub ActiveX control is used

In an Agilent Technologies automation system that is running the VWorks software, ActiveX interfaces are not used to communicate with devices. However, some integrations, such as those with LIMS, require that a third-party application control the Labware MiniHub. The MiniHub ActiveX control enables third-party applications to interface with the Labware MiniHub.

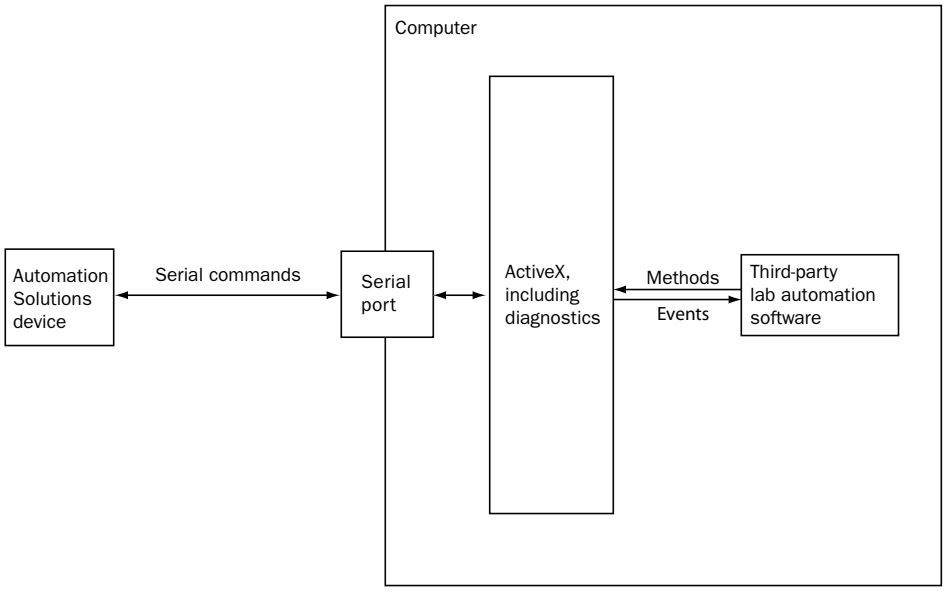
Each ActiveX control consists of a collection of the following:

- *Methods*. Functions that can be called to invoke individual operations
- *Properties*. Attributes or features of the ActiveX control
- *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 MiniHub ActiveX control in a lab automation system environment. Actions you perform are conducted through ActiveX methods. System responses are relayed back through ActiveX events or through return values and variables passed to methods.

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



Related information

For information about...	See...
Integrating the MiniHub ActiveX control	Installation instructions in the release notes
MiniHub ActiveX properties	“Properties” on page 79
MiniHub ActiveX methods	“Methods” on page 82
MiniHub ActiveX events	“Events” on page 97

Properties

About this topic

This topic describes the following properties:

- “Blocking” on page 79
- “ControlPicture” on page 80

Blocking

```
VARIANT_BOOL Blocking
```

Description

Determines whether methods should block until completion or return immediately for asynchronous operation.

Acceptable values

- *VARIANT_TRUE (C++) or True (Visual Basic .NET).* The ActiveX control is forced to block or wait until a method completes before it returns control to the caller.
- *VARIANT_FALSE* (C++) *or False (Visual Basic .NET).* Returns control to the application immediately, and the caller should handle the events accordingly.

Default value

VARIANT_FALSE (C++) or False (Visual Basic .NET)

Blocking affects some methods differently. See each method’s description for the effect. Unless otherwise noted:

- In non-blocking mode (Block = VARIANT_FALSE or False), a method:
  - Starts another thread of execution to perform the given method, returning control to the application immediately.
  - Returns 0 on launching a new thread successfully; otherwise, returns nonzero, and an Error event is fired.
  - If the method is successful, an event indicating completion is fired; if unsuccessful, an Error event is fired.

- In blocking mode (Block = VARIANT_TRUE or True), a method:
  - Is executed.
  - Returns 0 if it completes successfully; returns nonzero otherwise.
- Error message can be reviewed by calling GetLastError().

Visual C++ Example

```
// set the MiniHub in blocking mode
VARIANT_BOOL blocking=VARIANT_TRUE;
m_Minihub.PutBlocking (blocking);
// set the MiniHub in non-blocking mode
blocking=VARIANT_FALSE;
m_Minihub.PutBlocking (blocking);
// returns the blocking value
blocking = m_Minihub.GetBlocking ( );
// user should handle events if non-blocking!
```

Visual Basic .NET Example

```
'set Labware MiniHub in blocking mode
Minihub1.Blocking=True
'set Labware MiniHub in non-blocking mode
Minihub1.Blocking=False
'returns the blocking value
Dim bMode as Boolean
bMode = Minihub1.Blocking
'user should handle events if non-blocking!
```

ControlPicture

```
IPictureDisp*ControlPicture
```

Description

A read-only picture of the Labware MiniHub that can be used in the container's application.

Parameters

None

Visual C++ Example

```
/* the CPicture class will be imported into your project
when the ActiveX is installed */
CButton button;
// create a button
CPicture MinihubPic;
// retrieve the picture
MinihubPic = m_Minihub.GetControlPicture();
// paint the bitmap onto the button
button.SetBitmap((HBITMAP) MinihubPic.GetHandle());
```

Visual Basic .NET Example

```
Dim iPicture As System.Drawing.Image =
Minihub1.ControlPicture()
button.BackgroundImage = iPicture
```

Related information

For information about...	See...
MiniHub ActiveX control	"About the MiniHub ActiveX control" on page 78
Integrating the MiniHub ActiveX control	Installation instructions in the release notes
MiniHub ActiveX methods	"Methods" on page 82
MiniHub ActiveX events	"Events" on page 97

Methods

About this topic

The topic describes the following methods:

- "Abort" on page 82
- "AboutBox" on page 83
- "Close" on page 83
- "DisableMotor" on page 84
- "EnableMotor" on page 84
- "EnumerateProfiles" on page 85
- "GetActiveXVersion" on page 86
- "GetCassetteCount" on page 86
- "GetCurrentCassette" on page 87
- "GetCurrentPosition" on page 87
- "GetFirmwareVersion" on page 88
- "GetHomePositionOffset" on page 88
- "GetLastError" on page 89
- "GetMotorStatus" on page 89
- "GetSlotCount" on page 90
- "GetSpeed" on page 90
- "Ignore" on page 91
- "Initialize" on page 91
- "Jog" on page 92
- "Retry" on page 92
- "RotateToCassette" on page 93
- "RotateToDegree" on page 93
- "RotateToHomePosition" on page 94
- "SetSpeed" on page 94
- "ShowDiagsDialog" on page 95
- "TeachHome" on page 95

Abort

```
long Abort(void)
```

Description

Aborts a current task that is in the error state and clears the error.

Parameters

None

Return

0 if successful

Other value if there was an error

Visual C++ example

```
long lres = m_Minihub.Abort();
```

Visual Basic .NET example

```
Dim ires as Integer
ires = Minihub1.Abort()
```

AboutBox

```
void AboutBox(void)
```

Description

Displays the Labware MiniHub About dialog box that contains the ActiveX version number.

Parameters

None

Return

None

Visual C++ example

```
m_Minihub.AboutBox();
```

Visual Basic .NET example

```
Minihub1.AboutBox()
```

Close

```
long Close(void)
```

Description

Closes the intialized Labware MiniHub profile and disconnects from the Labware MiniHub.

Parameters

None

Return

0 if successful, and fires the CloseComplete event

Other value if there was an error

Visual C++ example

```
long lres = m_Minihub.Close();
```

Visual Basic .NET example

```
Dim ires as Integer
ires = Minihub1.Close()
```

DisableMotor

```
long DisableMotor(void)
```

Description

Turns off the MiniHub's motor.

Parameters

None

Return

0 if successful, and fires the DisableMotorComplete event

Other value if there was an error

Visual C++ example

```
long lres = m_Minihub.DisableMotor();
```

Visual Basic .NET example

```
Dim ires as Integer
ires = Minihub1.DisableMotor()
```

EnableMotor

```
long EnableMotor(void)
```

Description

Turns on the MiniHub's motor.

Parameters

None

Return

0 if successful, and fires the EnableMotorComplete event

Other value if there was an error

Visual C++ example

```
long lres = m_Minihub.EnableMotor();
```

Visual Basic .NET example

```
Dim ires as Integer
ires = Minihub1.EnableMotor()
```

EnumerateProfiles

```
VARIANT EnumerateProfiles(void)
```

Description

Retrieves a list of defined profiles. The strings in this array are the profile names that should be used for the Initialize method.

Parameters

None

Return

An array of profile names

Visual C++ example

```
VARIANT vProfiles = m_Minihub.EnumerateProfiles();
SAFEARRAY *psa = vProfiles.parray;
BSTR* bstrArray;
if
(FAILED(SafeArrayAccessData(psa,reinterpret_cast<void**>(
&bstrArray))))
{
    VariantClear(&vProfiles);
    return;
}
for (ULONG i = 0; i < psa->rgsabound[0].cElements; i++)
{
    MessageBox(CString(bstrArray[i])));
}
SafeArrayUnaccessData(psa);
VaraintClear(&vProfiles);
```

Visual Basic .NET example

```
Dim i as Integer
Dim profileNames() As String
profileNames = Minihub1.EnumerateProfiles()
For i = 0 To profileNames.GetLength(0) - 1
MsgBox profileNames(i)
Next
```

GetActiveXVersion

```
BSTR GetActiveXVersion(void)
```

Description

Retrieves the MiniHub ActiveX software version number.

Parameters

None

Return

ActiveX software version number (string)

Visual C++ example

```
CString ActiveXVer = m_Minihub.GetActiveXVersion();
```

Visual Basic .NET example

```
Dim sVersion As String
sVersion = Minihub1.GetActiveXVersion()
```

GetCassetteCount

```
long GetCassetteCount(short *nCassetteCount)
```

Description

Retrieves the cassette count.

Note: In this version, the cassette count is always 4.

Parameters

short *nCassetteCount

Cassette count value

Return

0 if successful, and fires the GetCassetteCountComplete event

Other value if there was an error

Visual C++ example

```
short ncassettes;
long lres = m_Minihub.GetCassetteCount(&ncassettes);
```

Visual Basic .NET example

```
Dim ires as Integer
Dim shCassCount As Short = 0
ires = Minihub1.GetCassetteCount(shCassCount)
```

GetCurrentCassette

```
long GetCurrentCassette(short* nCassetteIndex)
```

Description

Retrieves the ID of the cassette that is currently at the home position.

Parameters

short* nCassetteIndex

The ID of the cassette that is currently at the MiniHub's home position

Return

0 if successful, and fires the GetCurrentCassetteComplete event

Other value if there was an error

Visual C++ example

```
short curcas;
long lres = m_Minihub.GetCurrentCassettePosition(&curcas);
```

Visual Basic .NET example

```
Dim ires as Integer
Dim shCassette As Short = 0
ires = Minihub1.GetCurrentCassette(shCassette)
```

GetCurrentPosition

```
long GetCurrentPosition(float* fPositionInDegree)
```

Description

Retrieves the MiniHub's current position.

Parameters

float* fPositionInDegree

The current position (0–360) in degrees

Return

0 if successful, and fires the GetCurrentPositionComplete event

Other value if there was an error

Visual C++ example

```
short  curpos;
long lres = m_Minihub.GetCurrentPosition(&curpos);
```

Visual Basic .NET example

```
Dim ires as Integer
Dim siPos As Single = 0
ires = Minihub1.GetCurrentPosition(siPos)
```

GetFirmwareVersion

```
BSTR GetFirmwareVersion(void)
```

Description

Retrieves the Agile controller firmware version number.

Parameters

None

Return

Agile controller version number (string)

Visual C++ example

```
CString str = m_Minihub.GetFirmwareVersion ();
```

Visual Basic .NET example

```
Dim sFirmVer As Strings
sFirmVer = Minihub1.GetFirmwareVersion()
```

GetHomePositionOffset

```
long GetHomePositionOffset(float* fPosition)
```

Description

Retrieves the MiniHub's home position offset, which is the encoder counter value.

Parameters

float* fPosition

The home position offset value

Return

0 if successful, and fires the GetHomePositionOffsetComplete event

Other value if there was an error

Visual C++ example

```
float homepos;
long lres = m_Minihub.GetHomePositionOffset(&homepos);
```

Visual Basic .NET example

```
Dim ires as Integer
Dim siOffset As Single
ires = Minihub1.GetHomePositionOffset(siOffset)
```

GetLastError

```
BSTR GetLastError(void)
```

Description

Retrieves the last known error condition.

Parameters

None

Return

An error string

Visual C++ example

```
CString str = m_Minihub.GetLastError();
```

Visual Basic .NET example

```
Dim sError As String = ""
sError = Minihub1.GetLastError()
```

GetMotorStatus

```
long GetMotorStatus(VARIANT_BOOL* bServoStatus)
```

Description

Checks to see whether the motor is on.

Parameters

VARIANT_BOOL* bServoStatus

The state of the motor:

- VARIANT_TRUE (C++) or True (Visual Basic .NET) if motor is on
- VARIANT_FALSE (C++) or False (Visual Basic .NET) if motor is off

Return

0 if successful, and fires the GetMotorStatusComplete event

Other value if there was an error

Visual C++ example

```
VARIANT_BOOL ismotoron;
long lres = m_Minihub.GetMotorStatus(&ismotoron);
```

Visual Basic .NET example

```
Dim ires as Integer
Dim bMotorStatus As Boolean
ires = Minihub1.GetMotorStatus(bMotorStatus)
```

GetSlotCount

```
long GetSlotCount(short *nSlotCount)
```

Description

Retrieves the slot count (the total number of slots in a cassette).

Parameters

short *nSlotCount

The slot count value

Return

0 if successful, and fires the GetSlotCountComplete event

Other value if there was an error

Visual C++ example

```
short nslots;
long lres = m_Minihub.GetSlotCount(&nslots);
```

Visual Basic .NET example

```
Dim ires as Integer
Dim shSlots As Short
ires = Minihub1.GetSlotCount(shSlots)
```

GetSpeed

```
long GetSpeed(short* pSpeed);
```

Description

Retrieves the MiniHub's current speed.

Parameters

short* pSpeed

The current speed: 0 (slow), 1 (medium), or 2 (fast).

Return

0 if successful

Other value if there was an error

Visual C++ example

```
short nSpeed;
long lres = m_Minihub.GetSpeed(&nSpeed);
```

Visual Basic .NET example

```
Dim ires as Integer
Dim shSpeed As Short
ires = Minihub1.GetSpeed(shSpeed)
```

Ignore

```
long Ignore(void)
```

Description

Ignores the previously issued error and moves to the next step in the task. This is not a recommended course of action, as the errors are issued for a reason. However, ignoring some errors can be appropriate if the operator understands the implications.

Parameters

None

Return

0 if successful

Other value if there was an error

Visual C++ example

```
long lres = m_Minihub.Ignore();
```

Visual Basic .NET example

```
Dim ires as Integer
ires = Minihub1.Ignore()
```

Initialize

```
long Initialize(BSTR Profile)
```

Description

Initializes the profile and starts communication with the Labware MiniHub using the parameters set in the profile. The profile specifies the serial connection used to communicate with the Labware MiniHub. The parameters for each profile can be adjusted in the Diagnostics dialog box on the Profiles page (by calling the ShowDiagsDialog method).

Parameters

BSTR Profile

The name of the profile to be used for initialization.

Return

0 if successful, and fires the InitializeComplete event

Other value if there was an error

Visual C++ example

```
// connect via serial connection specified in the profile
long lres =
m_Minihub.Initialize(_bstr_t("MiniHubprofile"));
```

Visual Basic .NET example

```
'connect via serial connection specified in the profile
Dim ires as Integer
ires = Minihub1.Initialize("MiniHub profile")
```

Jog

```
long Jog(float fDegree, VARIANT_BOOL bClockwise)
```

Description

Rotates the MiniHub a specified number of degrees from its current position.

Parameters

float fDegree

The number of degrees relative to the current position.

VARIANT_BOOL bClockwise

The direction of the rotation. Set Clockwise to VARIANT_TRUE (C++) or True (Visual Basic .NET) to rotate the stage clockwise. Set Clockwise to VARIANT_FALSE (C++) or False (Visual Basic .NET) to rotate the stage counterclockwise.

Return

0 if successful, and fires the JogComplete event

Other value if there was an error

Visual C++ example

```
long lres = m_Minihub.Jog(30.0, VARIANT_TRUE);
```

Visual Basic .NET example

```
Dim ires as Integer
ires = Minihub1.Jog(30.0,True)
```

Retry

```
long Retry(void)
```

Description

Retries the last action after an error occurred.

Parameters

None

Return

0 if successful

Other value if there was an error

Visual C++ example

```
long lres = m_Minihub.Retry();
```

Visual Basic .NET example

```
Dim ires as Integer
ires = Minihub1.Retry()
```

RotateToCassette

```
long RotateToCassette(short nCassetteIndex)
```

Description

Rotates the MiniHub so that the specified cassette is at the 0° position.

Parameters

short nCassetteIndex

The cassette number: 1, 2, 3, or 4.

Return

0 if successful, and fires the RotateToCassetteComplete event

Other value if there was an error

Visual C++ example

```
long lres = m_Minihub.RotateToCassette(1);
```

Visual Basic .NET example

```
Dim ires as Integer
ires = Minihub1.RotateToCassette(1)
```

RotateToDegree

```
long RotateToDegree(float fDegree)
```

Description

Rotates the MiniHub a specified number of degrees.

Parameters

float fDegree

The number of degrees to rotate the MiniHub. A positive value rotates the MiniHub clockwise. A negative value rotates the MiniHub counterclockwise.

Return

0 if successful, and fires the RotateToDegreeComplete event

Other value if there was an error

Visual C++ example

```
long lres = m_Minihub.RotateToDegree(90.0);
```

Visual Basic .NET example

```
Dim ires as Integer
ires = Minihub1.RotateToCassette(90.0)
```

RotateToHomePosition

```
long RotateToHomePosition(void)
```

Description

Rotates the MiniHub so that cassette 1 is at the 0° position. This method is equivalent to the Go Home command in Labware MiniHub Diagnostics.

Parameters

None

Return

0 if successful, and fires the RotateToHomePositionComplete event

Other value if there was an error

Visual C++ example

```
long lres = m_Minihub.RotateToHomePosition();
```

Visual Basic .NET example

```
Dim ires as Integer
ires = Minihub1.RotateToHomePosition()
```

SetSpeed

```
long SetSpeed(short nSpeed)
```

Description

Sets the MiniHub's rotation speed.

Parameters

short nSpeed

The speed value: 0 (slow), 1 (medium), or 2 (fast).

Return

0 if successful

Other value if there was an error

Visual C++ example

```
long lres = m_Minihub.SetSpeed(0);
```

Visual Basic .NET example

```
Dim ires as Integer
ires = Minihub1.SetSpeed(0)
```

ShowDiagsDialog

```
void ShowDiagsDialog (VARIANT_BOOL modal,
short securityLevel)
```

Description

Displays the Diagnostics dialog box that allows the operator to troubleshoot and correct problems. This method can be called before the Initialize method to create a profile. Contents displayed are based on the operator's access level.

Parameters

VARIANT_BOOL modal

The mode of the dialog box. The dialog box displayed can be modal (does not permit users to access the parent window) or modeless (permits users to access the parent window). If the modal mode is desired, set modal to VARIANT_TRUE (C++) or True (Visual Basic .NET). If the modeless mode is desired, set modal to VARIANT_FALSE (C++) or False (Visual Basic .NET).

short securityLevel

The security level the operator has in the dialog box:

0 = Administrator

1 = Technician

2 = Operator

3 = Guest

-1 = No access

Return

0 if successful

Other value if there was an error

Visual C++ example

```
m_Minihub.ShowDiagsDialog(VARIANT_TRUE,0);
```

Visual Basic .NET example

```
Dim ires as Integer
ires = Minihub1.ShowDiagsDialog(True,0)
```

TeachHome

```
long TeachHome(void)
```

Description

Sets the teachpoint at the MiniHub's current position. The home position should be when cassette 1 is at the 0° position.

Parameters

None

Return

0 if successful, and fires the TeachHomeComplete event

Other value if there was an error

Visual C++ example

```
long lres = m_Minihub.TeachHome();
```

Visual Basic .NET example

```
Dim ires as Integer
ires = Minihub1.TeachHome()
```

Related information

For information about...	See...
MiniHub ActiveX control	“About the MiniHub ActiveX control” on page 78
Integrating the MiniHub ActiveX control	Installation instructions in the release notes
MiniHub ActiveX properties	“Properties” on page 79
MiniHub ActiveX events	“Events” on page 97

Events

About this topic

This topic describes the following events:

- "CloseComplete" on page 97
- "DisableMotorComplete" on page 98
- "EnableMotorComplete" on page 98
- "Error" on page 98
- "GetCassetteCountComplete" on page 99
- "GetCurrentCassetteComplete" on page 99
- "GetCurrentPositionComplete" on page 99
- "GetHomePositionOffsetComplete" on page 100
- "GetMotorStatusComplete" on page 100
- "GetSlotCountComplete" on page 100
- "GetSpeedComplete" on page 101
- "InitializeComplete" on page 101
- "JogComplete" on page 101
- "RotateToCassetteComplete" on page 101
- "RotateToDegreeComplete" on page 102
- "RotateToHomePositionComplete" on page 102
- "SetSpeedComplete" on page 102
- "TeachHomeComplete" on page 102

CloseComplete

```
void CloseComplete(void)
```

Description

Occurs when the Close method is successful.

Parameters

None

Return

None

DisableMotorComplete

```
void DisableMotorComplete(void)
```

Description

Occurs when the DisableMotor method is successful.

Parameters

None

Return

None

EnableMotorComplete

```
void EnableMotorComplete(void)
```

Description

Occurs when the EnableMotor method is successful.

Parameters

None

Return

None

Error

```
void Error(short Number, BSTR* Description, long Scode,
BSTR Source, BSTR HelpFile, long HelpContext,
VARIANT_BOOL* CancelDisplay)
```

Description

Fires when an error occurs during any non-blocking method execution.

Parameters

BSTR* Description

The description of the error.

VARIANT_BOOL* CancelDisplay

The option to hide the error message dialog box. Set to VARIANT_TRUE (C++) or True (Visual Basic .NET).

Note: short Number, long Scode, BSTR Source, BSTR HelpFile, and long HelpContext are not used.

Return

None

GetCassetteCountComplete

```
void GetCassetteCountComplete(short nCassetteCount)
```

Description

Occurs when the GetCassetteCountComplete method is successful.

Parameters

short nCassetteCount

The number of cassettes in the MiniHub.

Return

None

GetCurrentCassetteComplete

```
void GetCurrentCassetteComplete(SHORT dCassette)
```

Description

Occurs when the GetCurrentCassettePosition method is successful.

Parameters

SHORT dCassette

The cassette number.

Return

None

GetCurrentPositionComplete

```
void GetCurrentPositionComplete(float fPosition)
```

Description

Occurs when the GetCurrentPosition method is successful.

Parameters

float fPosition

The position, in degrees.

Return

None

GetHomePositionOffsetComplete

```
void GetHomePositionOffsetComplete(float fPosition)
```

Description

Occurs when the GetHomePositionOffset method is successful.

Parameters

float fPosition

The position, in degrees.

Return

None

GetMotorStatusComplete

```
void GetMotorStatusComplete(VARIANT_BOOL bServoStatus)
```

Description

Occurs when the GetMotorStatus method is successful.

Parameters

VARIANT_BOOL bMotorStatus

The status of motor.

Return

None

GetSlotCountComplete

```
void GetSlotCountComplete(short nSlotCount)
```

Description

Occurs when the GetSlotCount method is successful.

Parameters

short nSlotCount

The number of slots in the cassettes.

Return

None

GetSpeedComplete

```
void GetSpeedComplete(short* pSpeed)
```

Description

Occurs when the GetSpeed method is successful.

Parameters

short pSpeed

The current speed: 0 (slow), 1 (medium), or 2 (fast).

Return

None

InitializeComplete

```
void InitializeComplete(void)
```

Description

Occurs when the Initialize method is successful.

Parameters

None

Return

None

JogComplete

```
void JogComplete(void)
```

Description

Occurs when the Jog method is successful.

Parameters

None

Return

None

RotateToCassetteComplete

```
void RotateToCassetteComplete(void)
```

Description

Occurs when the RotateToCassette method is successful.

Parameters

None

Return

None

RotateToDegreeComplete

```
void RotateToDegreeComplete(void)
```

Description

Occurs when the RotateToDegrees method is successful.

Parameters

None

Return

None

RotateToHomePositionComplete

```
void RotateToHomePositionComplete(void)
```

Description

Occurs when the RotateToHomePosition method is successful.

Parameters

None

Return

None

SetSpeedComplete

```
void SetSpeedComplete(void)
```

Description

Occurs when the SetSpeed method is successful.

Parameters

None

Return

None

TeachHomeComplete

```
void TeachHomeComplete(void)
```

Description

Occurs when the TeachHome method is successful.

Parameters

None

Return

None

Related information

For information about...	See...
MiniHub ActiveX control	“About the MiniHub ActiveX control” on page 78
Integrating the MiniHub ActiveX control	Installation instructions in the release notes
MiniHub ActiveX properties	“Properties” on page 79
MiniHub ActiveX methods	“Methods” on page 82

C
Orderable spare parts

This appendix lists the Labware MiniHub spare parts you can order from Automation Solutions. The topics are:

- "Ordering information" on page 106
- "Spare parts list" on page 106

Ordering information

Contacting Customer Service

To order spare parts, contact Automation Solutions Customer Service using one of the following methods:

Contact method	Information
Telephone	1.866.428.9811 +1.408.345.8356
Email	orders.automation@agilent.com

Related information

For information about...	See...
Reporting problems	“Reporting problems” on page 68
Spare parts list	“Spare parts list” on page 106

Spare parts list

Part name	Part number
Shelves:	
• System (G5471A) or BenchBot model (G5489A)	G5508-10000
• BenchCel model (G5472A)	G5400-00007
Spacers:	
• 25.1 mm	G5508-20014
• 8.4 mm	G5508-20015
Rod, one of the following:	
• System model	G5508-20012
• BenchBot model	G5508-20016
• BenchCel model	G5508-20013
Standard integration plate (BenchCel model only)	G5400-20029
Fuses	
• 4 A	5188-8316
• 12 A	5188-8347

To inquire about risers, contact Automation Solutions Customer Service. See “Contacting Customer Service” on page 106.

Related information

For information about...	See...
Ordering information	“Ordering information” on page 106
Reporting problems	“Reporting problems” on page 68
Reconfiguring the shelves	*Labware MiniHub Safety and Installation Guide*
Safety information	*Labware MiniHub Safety and Installation Guide*

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