G5584A
Labware MiniHub

User Guide

For Research Use Only. Not for use in diagnostic procedures.

Original Instructions

Agilent Technologies

Notices

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

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

Contents

Preface

This preface contains the following topics:

About this guide

Who should read this guide

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

Job role	Responsibilities
Installer	Unpacks, installs, and tests the device before it is used.
Integrator	Configures hardware and writes software.
Lab manager, administrator, or technician	• Manages the automation system that contains the device • 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 device 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 G5584A Labware MiniHub, the operation of the hardware components, and the use of the diagnostics software and ActiveX control.

Software version

The G5584A Labware MiniHub requires the following software versions at a minimum:

- Microsoft Windows 10 64-bit operating system
- One of the following:
  - VWorks Automation Control software v13.1.0 and MySQL 5.7
  - Labware MiniHub ActiveX control v13.1.0

This guide documents Labware MiniHub Diagnostics v13.1.0, which can be invoked from either the VWorks software or Labware MiniHub ActiveX control.

Note: The Labware MiniHub ActiveX control is included in the VWorks ActiveX Controls installer.

Related guides

The *G5584A Labware MiniHub User Guide* should be used in conjunction with the following documents, if applicable:

- *G5584A Labware MiniHub Safety and Installation Guide*. Presents the safety precautions, emergency stop procedure, site preparation information, and installation instructions.
- *Automation Solutions Products General Safety Guide*. Describes the general safety precautions, intended product use, and the list of safety labels for the Automation Solutions products.
- *Applicable robot user guide*. Explains how to set up the robot and set teachpoints at integrated devices. For example, see the *BenchCel Microplate Handler User Guide* for details on how to set the BenchCel teachpoints at the Labware MiniHub.
- *Applicable automation control 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 Agilent Automation Solutions user guides" on page viii
Reporting problems	"Reporting problems" on page 60

Accessing Agilent Automation Solutions user guides

About this topic

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

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 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 website*. You can search the online knowledge base or download the latest version of any PDF file from the Agilent website at www.agilent.com/chem/askb.

Accessing safety information

Safety information for the Agilent Automation Solutions devices appears in the *Automation Solutions Products General Safety Guide* and 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

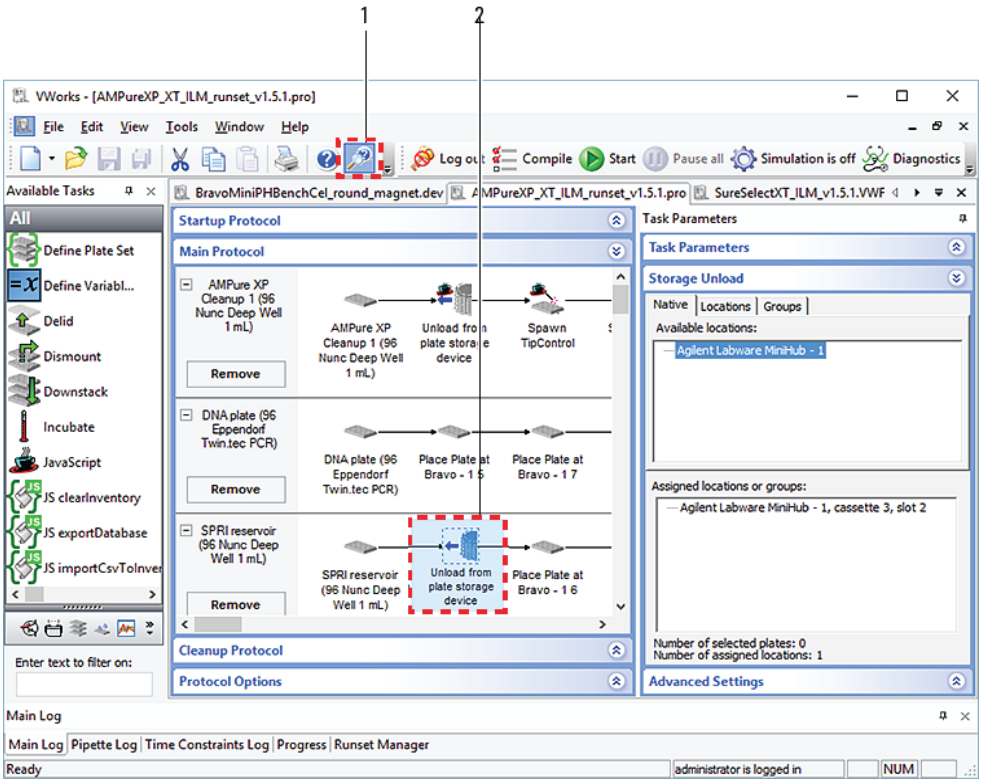
Knowledge base topics are displayed using web browser software such as Microsoft Internet Explorer and Mozilla Firefox.

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 10 desktop, select **Start** > **All apps > Agilent Technologies > VWorks Knowledge Base.**

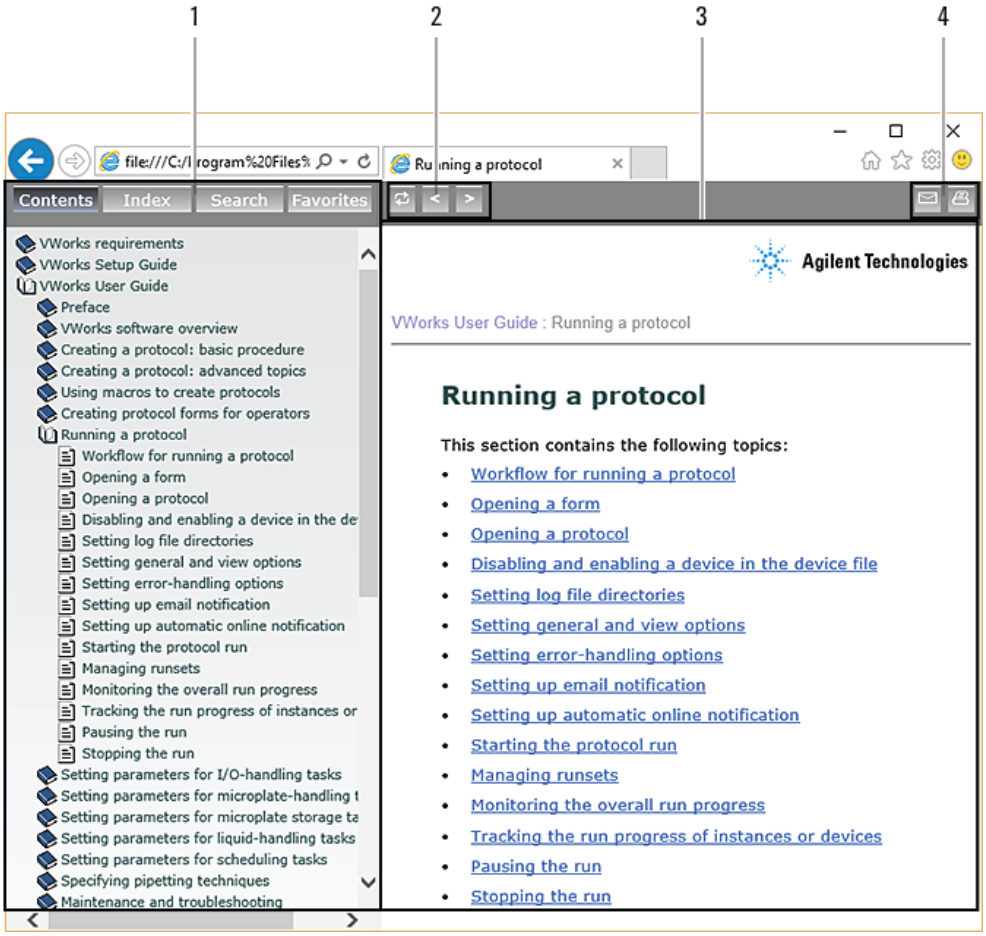
Opening the help topic for an area in the VWorks window



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.

1 Introduction

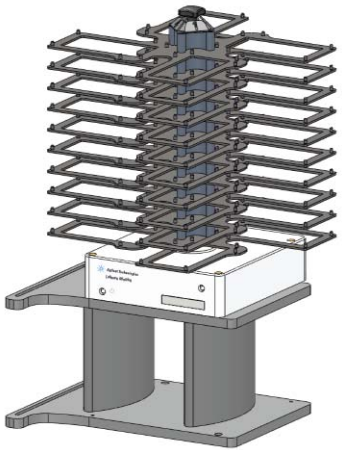
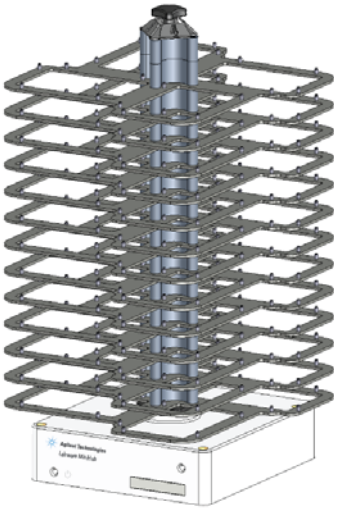
This chapter contains the following topics:

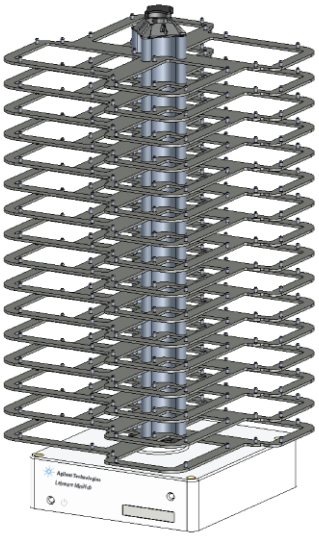
About the Labware MiniHub

Description

The Labware MiniHub is a rotating random-access labware storage device. Up to four labware can be placed on each shelf. 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 options of the G5584A Labware MiniHub are available:

Option	Description
BenchCel Configuration (option 010) 	This option 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. The option is typically installed on risers, as the figure shows.
Integration Configuration (option 020) BenchBot Robot 	The Integration Configuration is for workstations or systems that have the BenchBot Robot or Direct Drive Robot (DDR). For the BenchBot, this option enables 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.

Option	Description
Integration Configuration (option 020) Direct Drive Robot 	For the DDR, this option enables 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.

Related information

For information about...	See...
Labware MiniHub safety	*G5584A Labware MiniHub Safety and Installation Guide*
Preparing the lab for the Labware MiniHub installation	*G5584A Labware MiniHub Safety and Installation Guide*
Installing the Labware MiniHub	*G5584A Labware MiniHub Safety and Installation Guide*
Hardware components	"Hardware overview" on page 4
Software overview	"Software overview" on page 8

Safety information

Before you operate the Labware MiniHub, ensure you have read the following guides and are trained in the safe operation of the device.

- *Automation Solutions Products General Safety Guide*
- *G5584A Labware MiniHub Safety and Installation Guide*

Related information

For information about...	See...
Safety precautions	*G5584A Labware MiniHub Safety and Installation Guide*
Labware MiniHub description	"About the Labware MiniHub" on page 2
Hardware components	"Hardware overview" on page 4
Software overview	"Software overview" on page 8

Hardware overview

About this topic

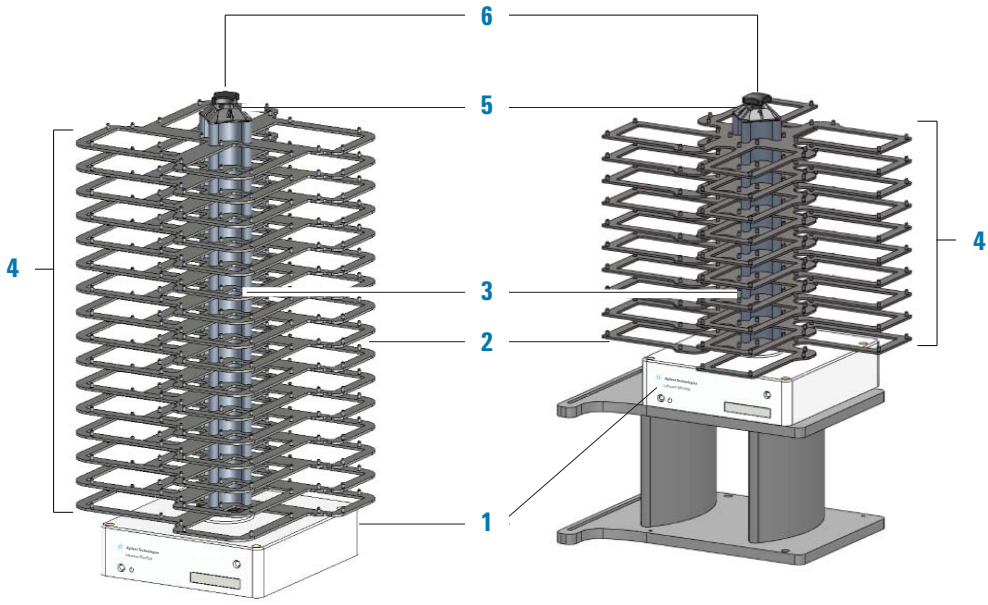
This topic describes the following Labware MiniHub features:

- Main components
- Power supply
- Status lights

Main components

The following figure and table describe the main components of the Labware MiniHub.

Figure Main components: Integration Configuration (left) and BenchCel Configuration (right)



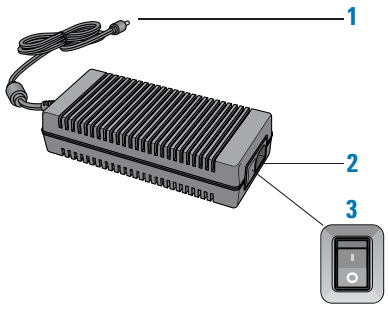
Item	Name	Description
1	Base	White structure at the bottom of the MiniHub that attaches the MiniHub to the target surface. The base contains the electronics and hosts the connection panel and the indicator lights. The base for the MiniHub BenchCel Configuration attaches to an integration-plate assembly (ikit) for integration with the BenchCel Microplate Handler.
2	Shelves	Flat area on which you can place labware. Locating pins at the edges of the shelves hold the labware securely in place.
3	Spacers	Metal spacing blocks that you can add or remove at the center of the MiniHub to adjust the distance between shelves. 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	Cassettes	Columns of shelves. The MiniHub consists of four cassettes, each identified by the number on the cassette cap.
5	Cassette cap	Metal label with numerical identification of each cassette. The numbers are used in Labware MiniHub Diagnostics and in VWorks software.

Item	Name	Description
6	Black knob	Component at the top of the MiniHub that locks the spacers and shelves in place.

Power supply

The power supply is the component that supplies electrical power to the Labware MiniHub.

Figure Power supply

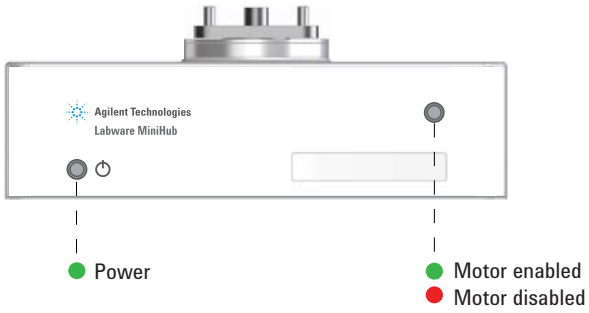


Item	Name	Description
1	Labware MiniHub cable connector	Connects the Labware MiniHub to the power supply unit.
2	Power inlet	Connects the power supply unit to the power source. Use only the supplied power cord.
3	On/off switch	Turns on **(I)** and off **(O)** the power supply.

Status lights

On the base of the Labware MiniHub are two status lights, as the following figure shows.

Figure Status lights on Labware MiniHub base (front view)



Status light	Description
Power 	Indicates whether the power is on or off: • Green light is illuminated when the power is on. • Green light is off when the power is off.
Motor status	Indicates whether the motor is enabled or disabled. • Red light indicates the motor is disabled. When you turn on the Labware MiniHub, the red light turns on. • Green light indicates that the motor is enabled. When you initialize the Labware MiniHub, the green light turns on.

Related information

For information about...	See...
Labware MiniHub description	“About the Labware MiniHub” on page 2
Labware MiniHub safety	“Safety information” on page 4
Software overview	“Software overview” on page 8

Software overview

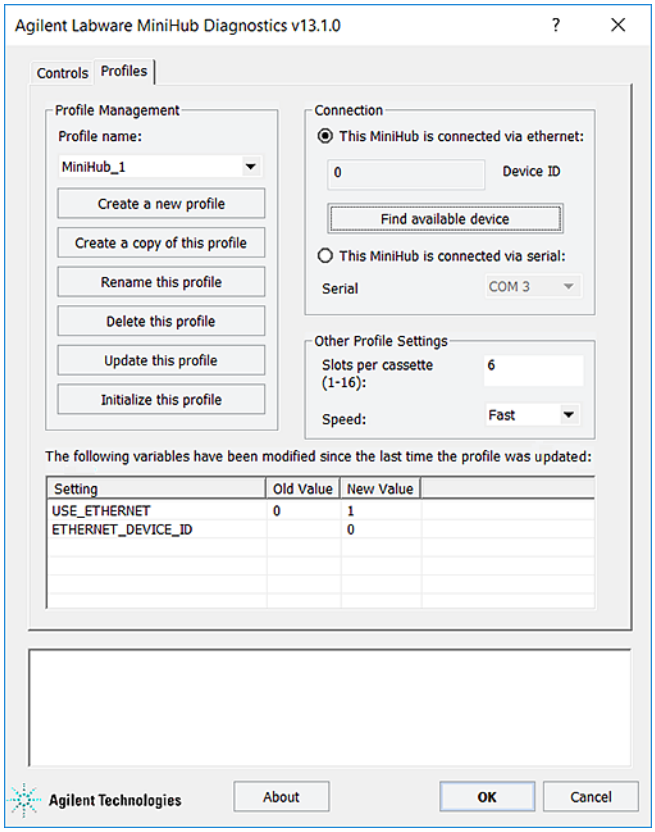
About this topic

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

- Labware MiniHub Diagnostics
- Laboratory automation software

Labware MiniHub Diagnostics

The following figure shows the Labware MiniHub Diagnostics dialog box.



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 26.
- *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 Configuration. For instructions, see "Setting the home position" on page 32.

- *Diagnose problems*. For information on diagnosing and troubleshooting problems, see "Using device diagnostics" on page 39 and "Maintenance and troubleshooting" on page 55.

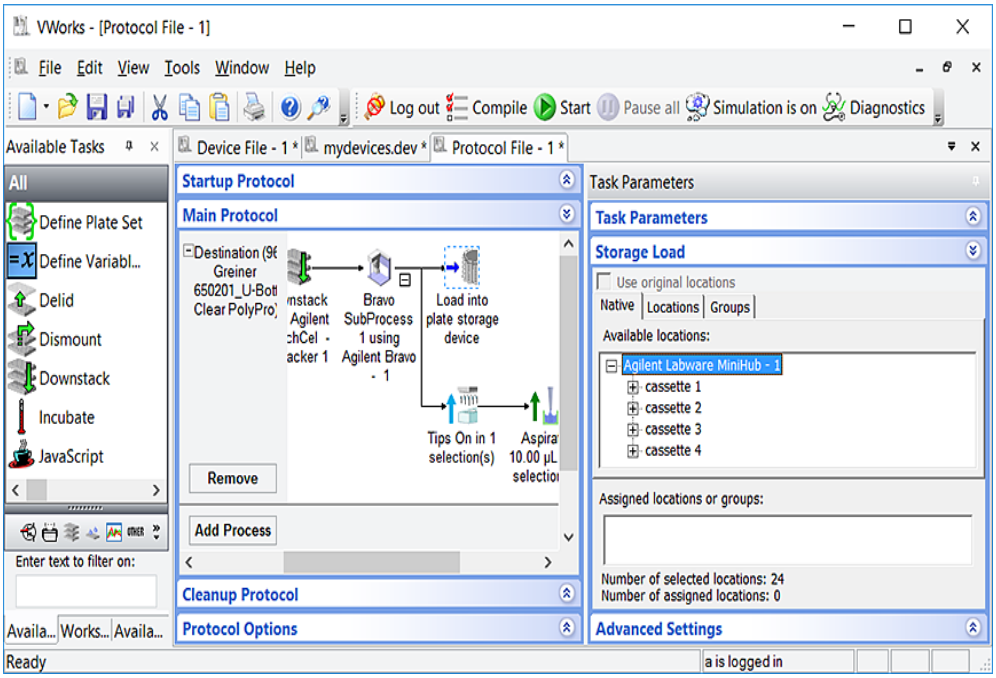
Access to Labware MiniHub Diagnostics depends on the automation software you are using.

Laboratory automation software

You can use either the VWorks software or third-party automation software to operate the Labware MiniHub in protocol runs. The Labware MiniHub ActiveX control permits third-party automation software to interface with the Labware MiniHub.

VWorks software

The following figure shows the VWorks window.



The VWorks software allows you to:

- *Set up the Labware MiniHub*. During setup, you create a device file for the Labware MiniHub. For setup information, see "Setting up the device" on page 13.
- *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 Labware MiniHub. 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*.

Labware MiniHub ActiveX control

The Labware MiniHub ActiveX control allows automation control software other than the VWorks software to interface with the device. For more information, see "Labware MiniHub ActiveX control" on page 67.

Related information

For information about...	See...
Labware MiniHub description	"About the Labware MiniHub" on page 2
Labware MiniHub safety	"Safety information" on page 4
Hardware components	"Hardware overview" on page 4
Labware MiniHub ActiveX control	"Labware MiniHub ActiveX control" on page 67

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.	*G5584A Labware MiniHub Safety and Installation Guide*
2	Install the Labware MiniHub.	*G5584A Labware MiniHub Safety and Installation Guide*
3	Turn on the Labware MiniHub.	"Turning on and off the Labware MiniHub" on page 15
4	Install the VWorks software, or integrate the MiniHub ActiveX control.	One of the following: • *VWorks Automation Control Setup Guide* • "Labware MiniHub ActiveX control" on page 67
5	*VWorks software only*. Start the VWorks software and log in.	*VWorks Automation Control User Guide*
6	*VWorks software only*. Create a new device file (if not already done).	"Creating a VWorks device file" on page 16
7	*VWorks software only*. Add the Labware MiniHub in the device file.	"Adding and deleting a Labware MiniHub in the device file" on page 18
8	Create a Labware MiniHub profile and set the profile parameters.	"Creating Labware MiniHub profiles" on page 26
9	Set the MiniHub home position.	"Setting the home position" on page 32
10	Set robot teachpoints at the Labware MiniHub.	Both of the following: • "Setting robot teachpoints" on page 37 • Automation system or robot user documentation
11	*VWorks software only*. Set the Labware MiniHub device properties.	"Setting Labware MiniHub properties" on page 19

Step	For this task...	See...
12	*VWorks software only*. Verify that the labware you plan to use is defined in the Labware Editor for the robot that you are using. *BenchCel Configuration only*. Ensure that the **Stack holding method** is set to **Hold with stacker grippers** to ensure precision performance.	*VWorks Automation Control Setup Guide*
13	*VWorks software only*. Ensure that MySQL 5.7 is installed on the computer, and that the database connection is enabled in the VWorks options.	*VWorks Automation Control Setup Guide*
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	"Safety information" on page 4
Hardware components	"Hardware overview" on page 4

2 Setting up the device

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

If you are using a different lab automation software and want to integrate the Labware MiniHub using ActiveX control, see "Labware MiniHub ActiveX control" on page 67.

Setup workflow for the VWorks software

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 off the Labware MiniHub" on page 15
2	Start the VWorks software and log in.	*VWorks Automation Control User Guide*
3	Create a device file.	"Creating a VWorks device file" on page 16
4	Add the Labware MiniHub in the device file.	"Adding and deleting a Labware MiniHub in the device file" on page 18.
5	Set the Labware MiniHub properties in VWorks software.	"Setting Labware MiniHub properties" on page 19
6	Verify that the labware you plan to use is defined in the Labware Editor for the robot that you are using. *BenchCel Configuration only.* Ensure that the **Stack holding method** is set to **Hold with stacker grippers** to ensure precision performance.	*VWorks Automation Control Setup Guide*
7	Ensure that MySQL 5.7 is installed on the computer, and that the database connection is enabled in the VWorks options.	*VWorks Automation Control Setup Guide*

Turning on and off the Labware MiniHub

Turning on the Labware MiniHub

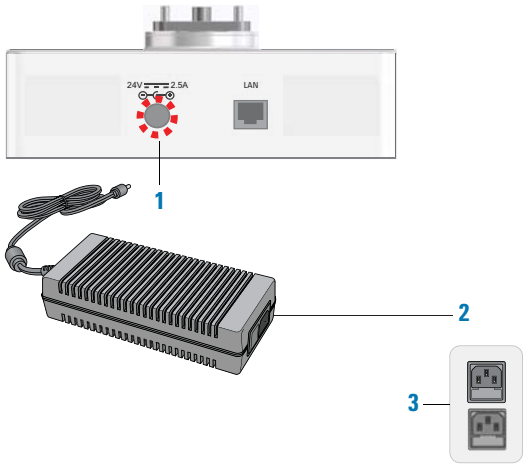
CAUTION The Labware MiniHub will rotate during the startup process. Obstructing the Labware MiniHub while it is rotating will cause an error.

To turn on the Labware MiniHub:

1 Ensure that the power supply is connected:

   a The power supply cable connects to the **24V** port (1) on the MiniHub base, as the following figure shows.

   b The power cord connects to the AC power entry on the (2) power supply on one end and to a (3) power source with grounded circuit on the other end.



2 On the power supply, press the power switch to the **on (I)** position.

   On the Labware MiniHub base, the green power light ( ) turns on.

Turning off the Labware MiniHub

To turn off the Labware MiniHub:

On the power supply, press the power switch to the **off (O)** position. On the Labware MiniHub base, the green power light ( ) turns off.

Related information

For information about...	See...
Safety information	*G5584A Labware MiniHub Safety and Installation Guide*

For information about...	See...
Adding the Labware MiniHub in the device file	"Adding and deleting a Labware MiniHub in the device file" on page 18
Creating profiles for the MiniHub	"Creating Labware MiniHub profiles" on page 26
Setting teachpoints	"Setting robot teachpoints" on page 37

Creating a VWorks device file

About this topic

This topic explains how to create a device file in the VWorks software. If you already have a VWorks device file you want to use, skip this step and proceed to "Adding and deleting a Labware MiniHub in the device file" on page 18.

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 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
- Bravo Platform
- Platepad

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 example, C:\VWorks Workspace\Device Files.

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

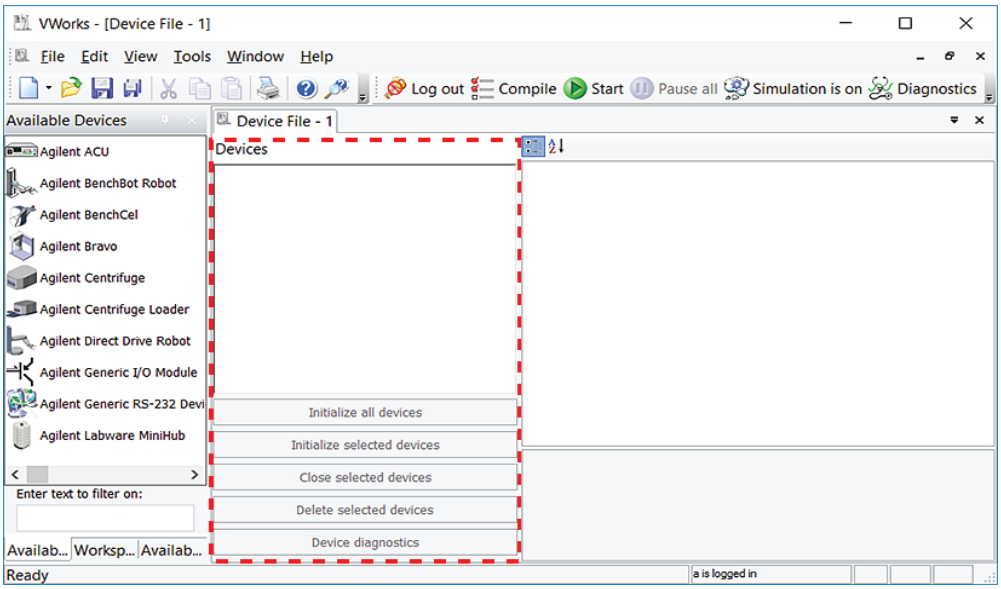
Procedure

If you are setting up a lab automation system, such as a 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 other 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

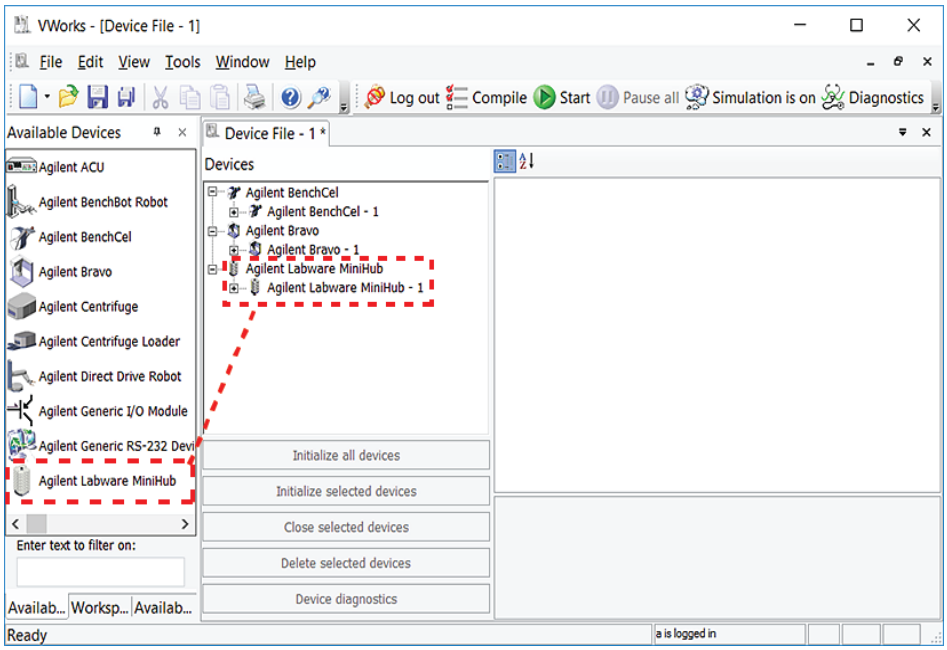
For information about...	See...
VWorks software	• *VWorks Automation Control Setup Guide* • *VWorks Automation Control User Guide*
Adding the Labware MiniHub in the device file	"Adding and deleting a Labware MiniHub in the device file" on page 18
Creating profiles for the MiniHub	"Creating Labware MiniHub profiles" on page 26
Setting teachpoints	"Setting robot teachpoints" on page 37

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.**

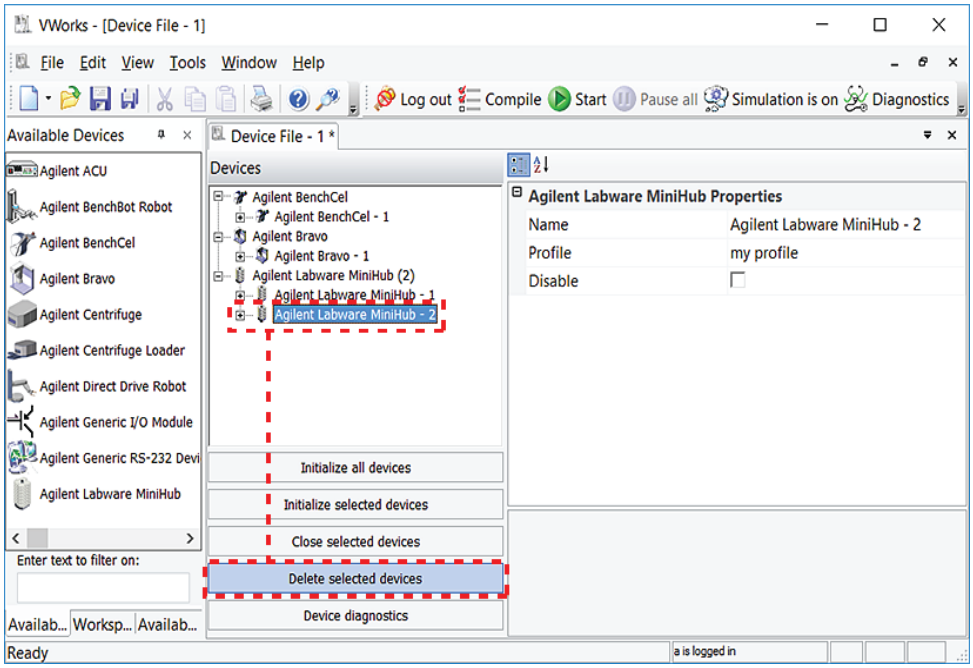
2 If you have multiple Labware MiniHub devices in the system, repeat step 1 to add the other Labware MiniHub devices.

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 26
Editing profiles	"Editing and managing profiles" on page 29
Setting up Labware MiniHub properties in the device file	"Setting Labware MiniHub properties" on page 19
VWorks software	• *VWorks Automation Control Setup Guide* • *VWorks Automation Control 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.

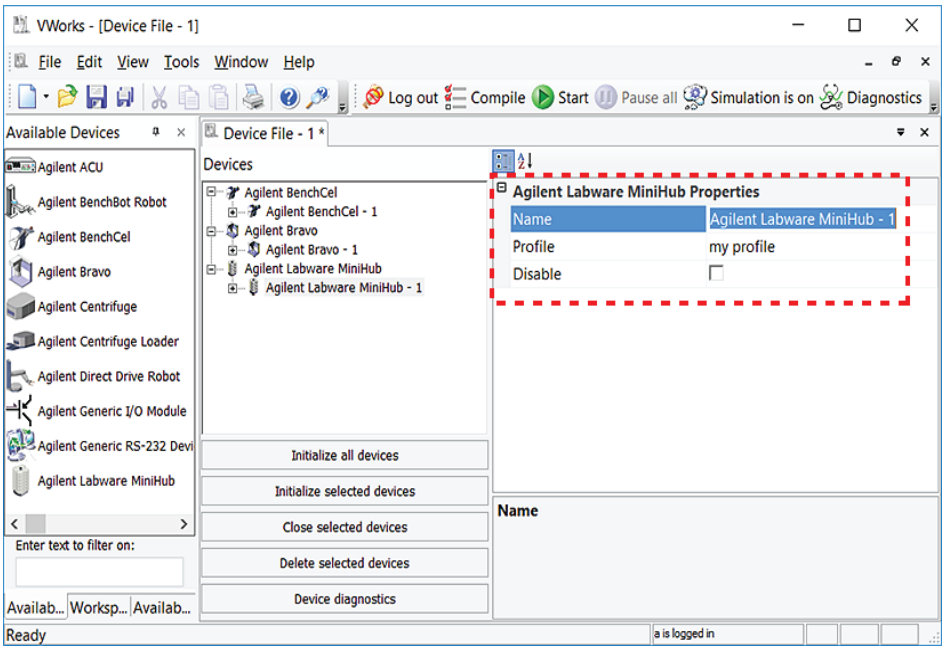
The instructions in this topic assume that you have already:

- 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:

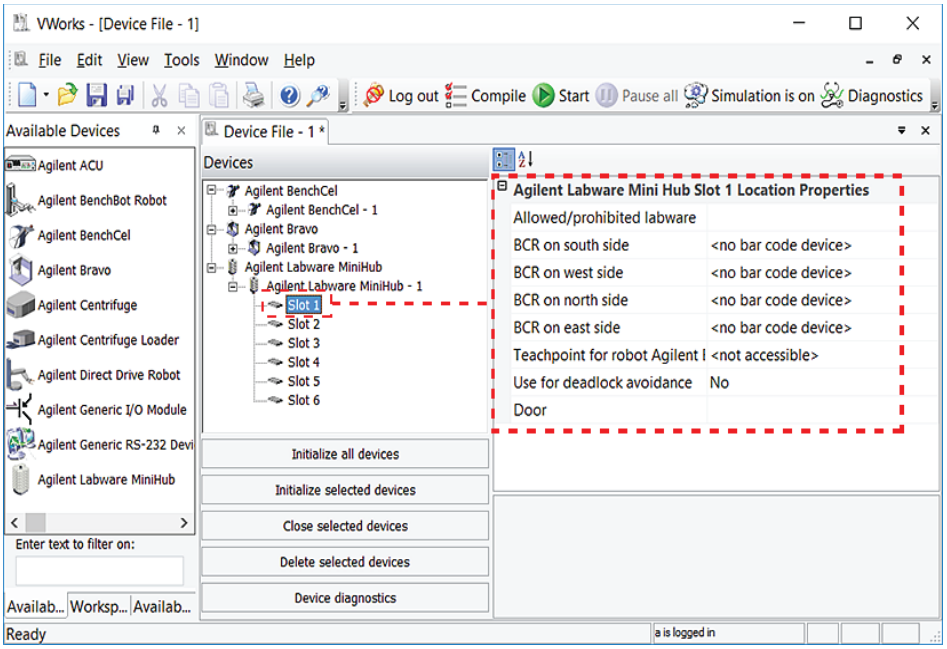
1 In the **Labware MiniHub Properties** area of the device file, type or select the following:



Property	Description
Name	The name of the Labware MiniHub.
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 26, 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.
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>**.

Parameter	Description
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 26
Editing profiles	"Editing and managing profiles" on page 29
VWorks software	• *VWorks Automation Control Setup Guide* • *VWorks Automation Control User Guide*

3 Configuring profiles and setting teachpoints

This chapter contains the following topics:

Configuration workflow

About this topic

This topic presents the workflow for configuring the Labware MiniHub in Labware MiniHub Diagnostics. This step is required whether you are using the VWorks software or a different automation control software with the Labware MiniHub ActiveX control.

Workflow

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

Step	For this task...	See...
1	Create a profile for the Labware MiniHub.	"Creating Labware MiniHub profiles" on page 26
2	Edit or rename the profile.	"Editing and managing profiles" on page 29
3	Set the Labware MiniHub home position.	"Setting the home position" on page 32
4	Set robot teachpoints.	"Setting robot teachpoints" on page 37

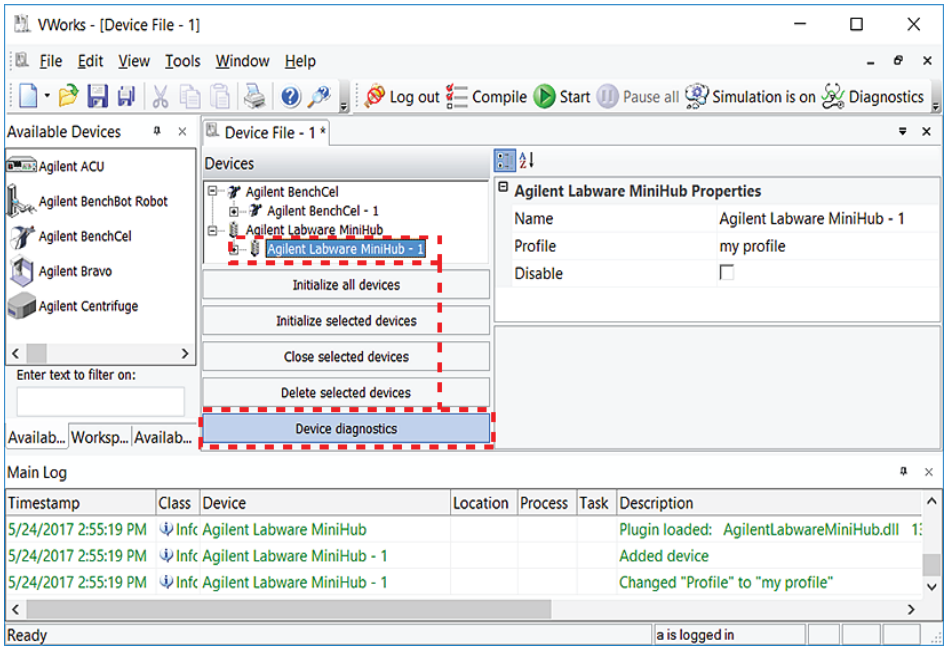
Opening Labware MiniHub Diagnostics

About this topic

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 control software

To open Labware MiniHub Diagnostics using Labware MiniHub ActiveX control, call the ShowDiagsDialog method. For details, see "Labware MiniHub ActiveX control" on page 67.

Related information

For information about...	See...
Creating profiles	"Creating Labware MiniHub profiles" on page 26
Setting the home position	"Setting the home position" on page 32
Setting robot teachpoints	"Setting robot teachpoints" on page 37
Configuring the MiniHub	"Configuration workflow" on page 24

Creating Labware MiniHub profiles

About profiles

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

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

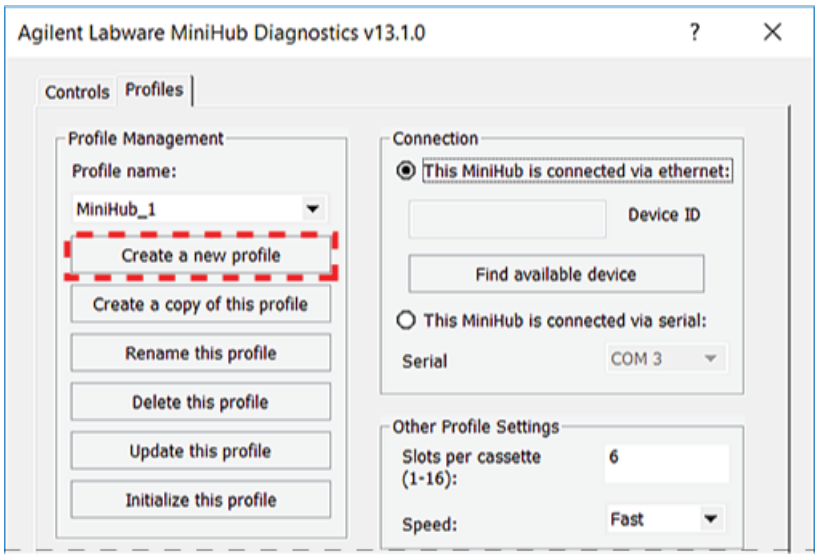
You use the Labware MiniHub Diagnostics software to create and manage Labware MiniHub profiles.

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 VWorks device file" on page 16. 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. Open Labware MiniHub Diagnostics.
2. In the Labware MiniHub Diagnostics dialog box, click the **Profiles** tab.



3. In the **Profile Management** area, click **Create a new profile**. The Create Profile dialog box opens.
4. In the **Create Profile** dialog box, type a name for the new profile, and click **OK**. The name appears in the Profile name list.

   Note: If this computer controls multiple Labware MiniHub devices, identify the device in the profile name, for example, the device serial number.

5 Under **Connection**, select **This MiniHub is connected via ethernet**, and then click **Find available device.**

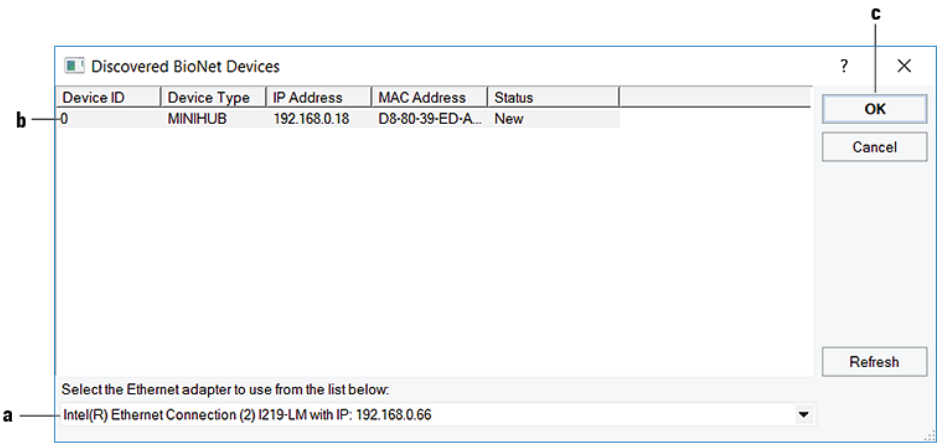
Note: If you have an earlier model device, you may select **This MiniHub is connected via serial**, and then select which **COM** port on the computer you are using.

6 In the **Discovered BioNet Devices** dialog box that opens:

a Click the **Select the Ethernet adapter to use from the list below** list, and select the correct adapter for the device connection.

b In the list of devices that appear, select the MiniHub device. If multiple MiniHub devices are on the network, use the **MAC Address** to identify the MiniHub device for this profile. To successfully communicate with the MiniHub device, the **Status** column must display **New** or **Matched**.

c Click **OK**.



7 In the **Other Profile Settings** area, set the following parameters:

Profile parameter	Description
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 BenchCel Configuration has a maximum of 10 slots. • The Integration Configuration has a maximum of 16 slots. The DDR can access up to 16 slots. The BenchBot can access up to 13 slots.

Profile parameter	Description
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.

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

9 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 29
Setting the home position	"Setting the home position" on page 32
Setting robot teachpoints	"Setting robot teachpoints" on page 37
Configuring the MiniHub	"Configuration workflow" on page 24

Editing and managing profiles

About this topic

This topic assumes that you have opened Labware MiniHub Diagnostics.

Editing profiles

To edit a profile:

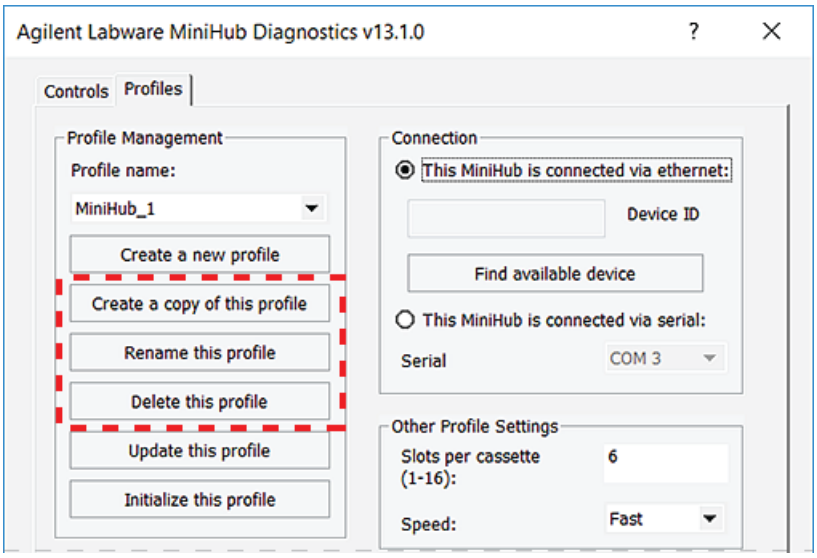
1. In the **Profiles** tab, select the profile you want to edit in the **Profile Management** area.
2. Modify the profile information.

   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 **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 26
Setting the home position	“Setting the home position” on page 32
Setting robot teachpoints	“Setting robot teachpoints” on page 37
Configuring the MiniHub	“Configuration workflow” on page 24

Initializing the Labware MiniHub

About this topic

To establish communication between the computer and the Labware MiniHub, you initialize the MiniHub device. You can initialize the Labware MiniHub in the following ways:

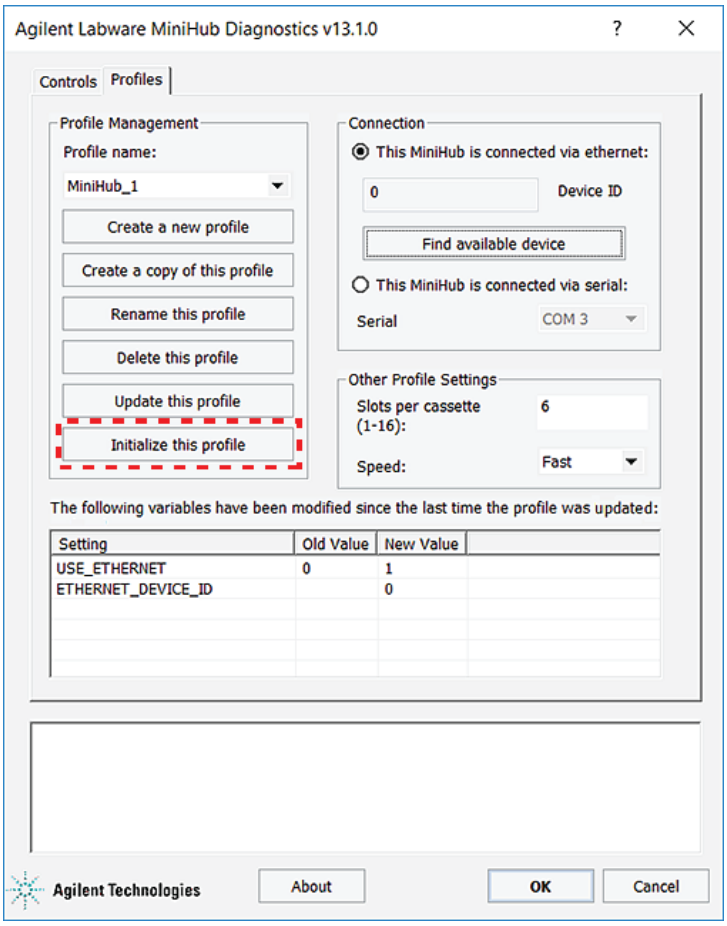
- *Labware MiniHub Diagnostics*. To control the Labware MiniHub using Labware MiniHub Diagnostics, initialize the profile in Labware MiniHub Diagnostics.
- *VWorks window*. To control the Labware MiniHub from the VWorks window, for example, to run a protocol, initialize the device in the VWorks window. For instructions, see the *VWorks Automation Control User Guide*.

Initializing the device in diagnostics

To initialize the device in diagnostics:

1. Open Labware MiniHub Diagnostics. For instructions, see “Opening Labware MiniHub Diagnostics” on page 25.
2. In the **Profiles** tab, select the profile, and then click **Initialize this profile**.

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



If you are using the Labware MiniHub ActiveX control, see "Labware MiniHub ActiveX control" on page 67.

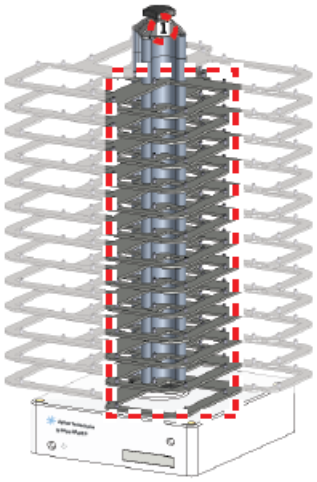
Related information

For information about...	See...
Creating profiles	"Creating Labware MiniHub profiles" on page 26
Setting the home position	"Setting the home position" on page 32
Setting robot teachpoints	"Setting robot teachpoints" on page 37
Configuring the MiniHub	"Configuration workflow" on page 24

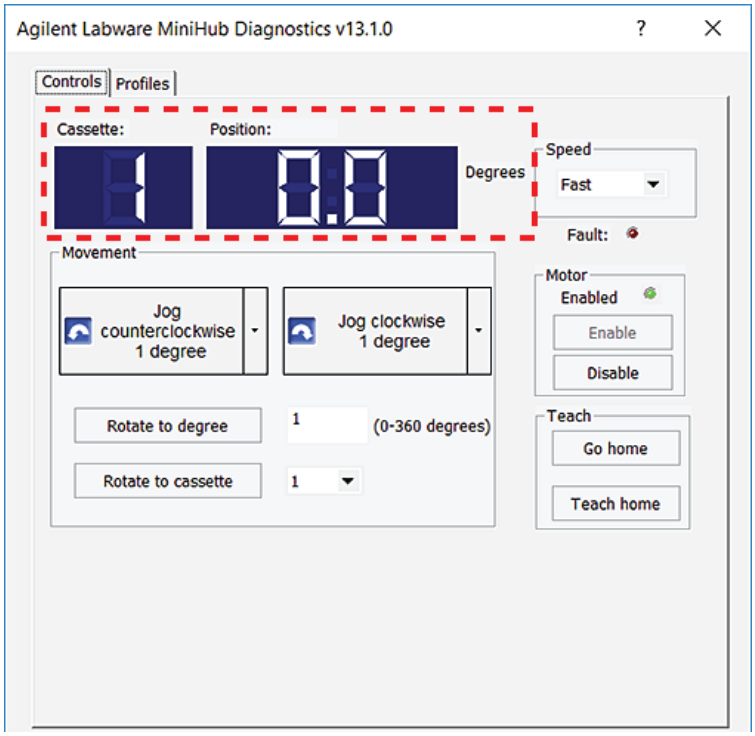
Setting the home position

About the home position

The Labware MiniHub home position is the position at which the automation 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 0.0.



Before you start

Make sure you do the following:

- *BenchCel Configuration*. Load the labware you want to use in one of the stackers, and then downstack a labware. The BenchCel robot should be holding the labware.
- *Integration Configuration*. Use the robot (BenchBot or DDR) to pick up the teaching jig or microplate from a platepad. The robot should be holding the teaching jig or microplate.

Procedure

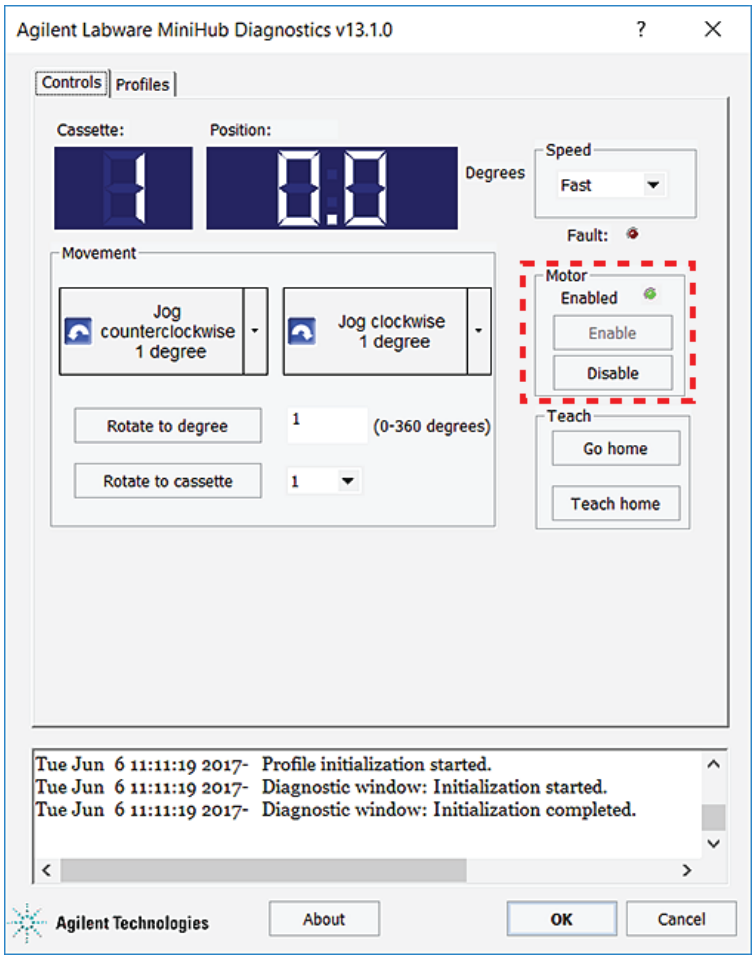
To set the Labware MiniHub home position:

1 Disable the robot (BenchCel, BenchBot Robot, or DDR) so that you can manually move the robot arm.

For instructions, see the corresponding robot user guide, for example, the *BenchCel Microplate Handler User Guide*.

Note: For the DDR and BenchBot, the robot must to be in Teach mode.

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 Labware MiniHub.



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

In the following figures, notice that cassette 1 is facing the robot.

Figure BenchCel Microplate Handler integrated with MiniHub (top view)

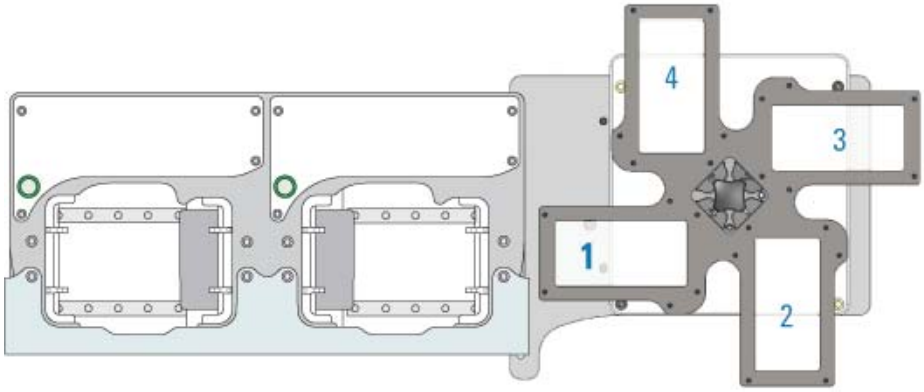
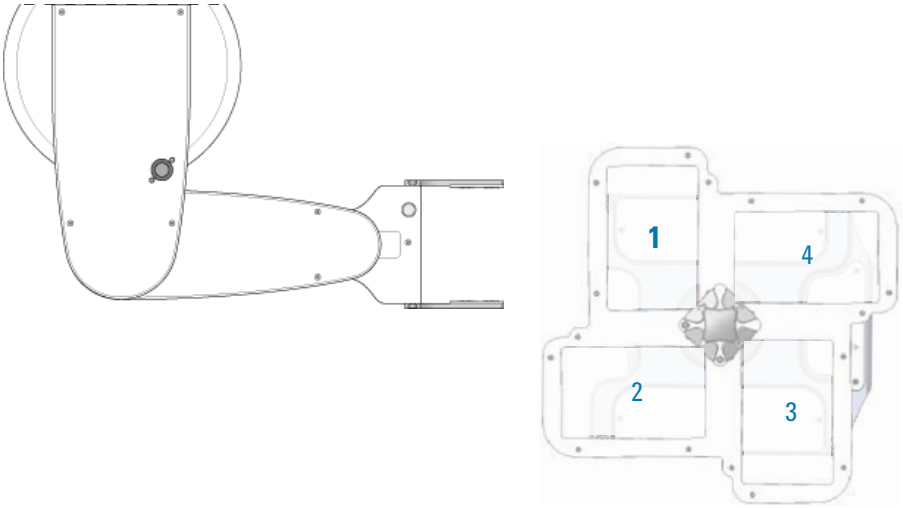


Figure Direct Drive Robot integrated with the MiniHub (top view)

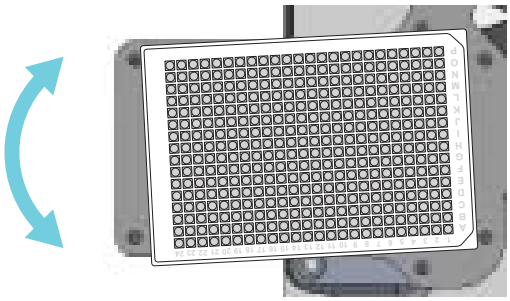


4 Move the robot so that the microplate held in the gripper sits in MiniHub shelf 1, the bottom-most shelf, in cassette 1.

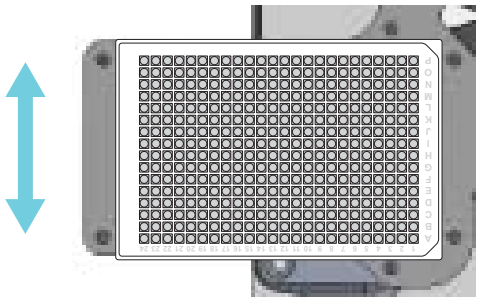
Note: You can place the microplate in any cassette-1 shelf. However, because you will need to set a robot teachpoint at each shelf later, it is convenient to start with shelf 1 in this procedure.

5 Check the position of the microplate. You might have to rotate the Labware 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 Labware MiniHub slightly to adjust the microplate position.



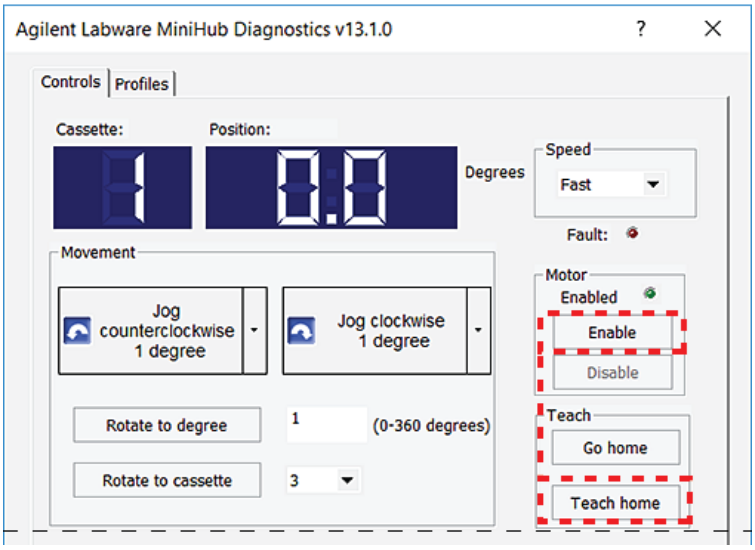
BenchCel Configuration only. If the microplate is sitting too far forward or backward, and adjusting the BenchCel robot and MiniHub manually do not solve the problem, unlock the MiniHub integration plate. Move the MiniHub-integration plate assembly forward or backward until the microplate is seated correctly in the slot.



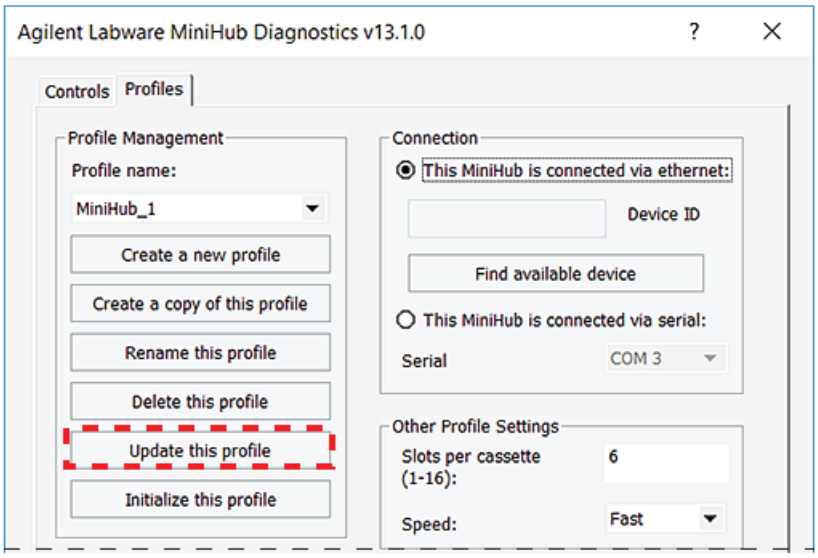
6 In the **Controls** tab:

a Click **Enable** under **Motor** to re-enable the motor.

b Click **Teach Home.** Notice that the **Position** value is set at 0.0.



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 26
Editing and managing profiles	“Editing and managing profiles” on page 29
Setting robot teachpoints	“Setting robot teachpoints” on page 37
Configuring the MiniHub	“Configuration workflow” on page 24

Setting robot teachpoints

About setting robot teachpoints

After setting the Labware MiniHub home position, you set the robot teachpoints at each shelf in cassette 1. To set, edit, and verify robot teachpoints, see the robot user guide, for example, the *BenchCel Microplate Handler 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 Labware MiniHub motor is enabled. For instructions, see "Enabling and disabling the motor" on page 43. In addition, make sure the Labware MiniHub is at its home position. For instructions, see "Rotating the MiniHub to a specific position" on page 47.

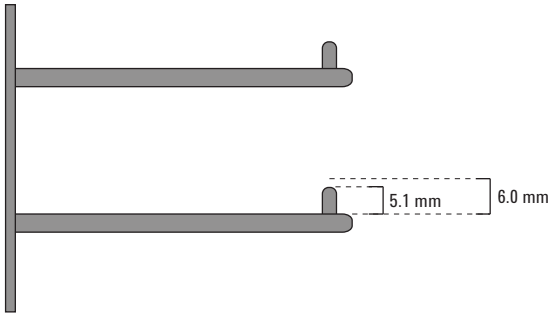
BenchCel Configuration only. Ensure that the labware definitions specify that the **Stack holding method** is set to **Hold with stacker grippers** to ensure precision performance.

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 (side view)



About verifying teachpoints

Ensure that you verify the robot teachpoints at the Labware MiniHub before you use the Labware MiniHub. For instructions, see the applicable robot user guide, for example, the *BenchCel Microplate Handler User Guide*.

Related information

For information about...	See...
Labware specifications	*G5584A Labware MiniHub Safety and Installation Guide*
Creating profiles	“Creating Labware MiniHub profiles” on page 26
Editing and managing profiles	“Editing and managing profiles” on page 29
Setting the home position	“Setting the home position” on page 32
Configuring the MiniHub	“Configuration workflow” on page 24

4 Using device diagnostics

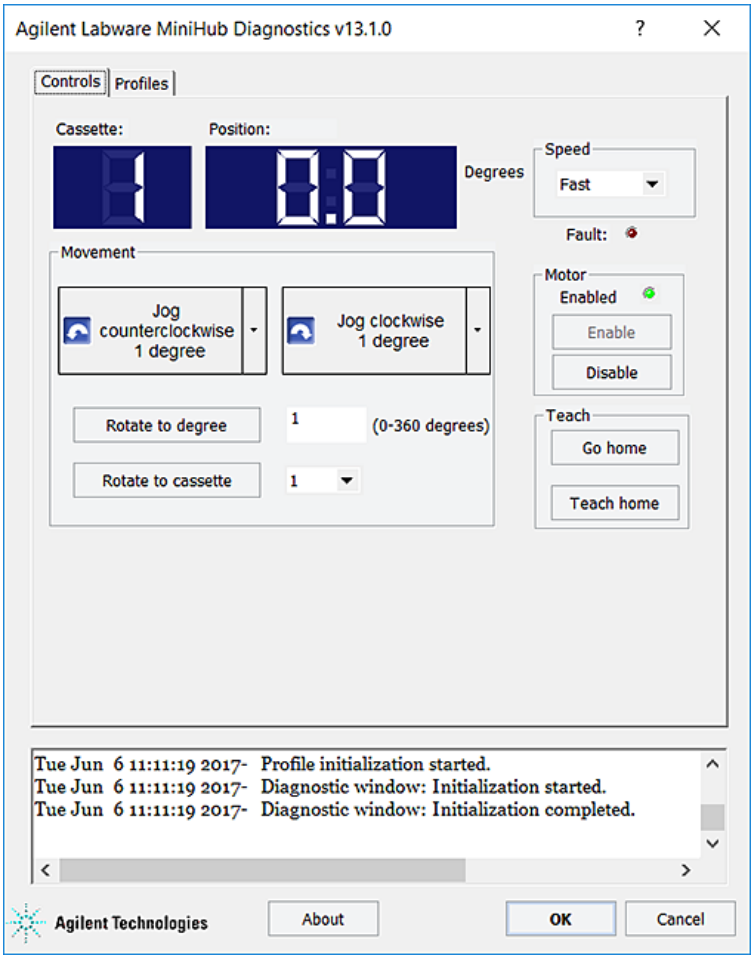
This chapter explains how to use the provided software tools to diagnose and troubleshoot the Labware MiniHub.

This chapter contains the following topics:

Note: See "Quick reference" on page 61 for an overview of Labware MiniHub Diagnostics.

About Labware MiniHub Diagnostics

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. The commands and parameters available in the Controls tab can help you troubleshoot problems.



Related information

For information about...	See...
Opening Labware MiniHub Diagnostics	"Opening Labware MiniHub Diagnostics" on page 25
Checking the Labware MiniHub's current position	"Checking the current position of the device" on page 41
Enabling and disabling the MiniHub motor	"Enabling and disabling the motor" on page 43
Changing the rotation speed	"Changing the rotation speed" on page 45

For information about...	See...
Rotating to a specific position	"Rotating the MiniHub to a specific position" on page 47
Teaching the home position	"Setting the home position" on page 32
The fault indicator	"Checking the fault indicator" on page 52
Viewing the log area	"Viewing the log area" on page 53
Profiles tab	"Creating Labware MiniHub profiles" on page 26

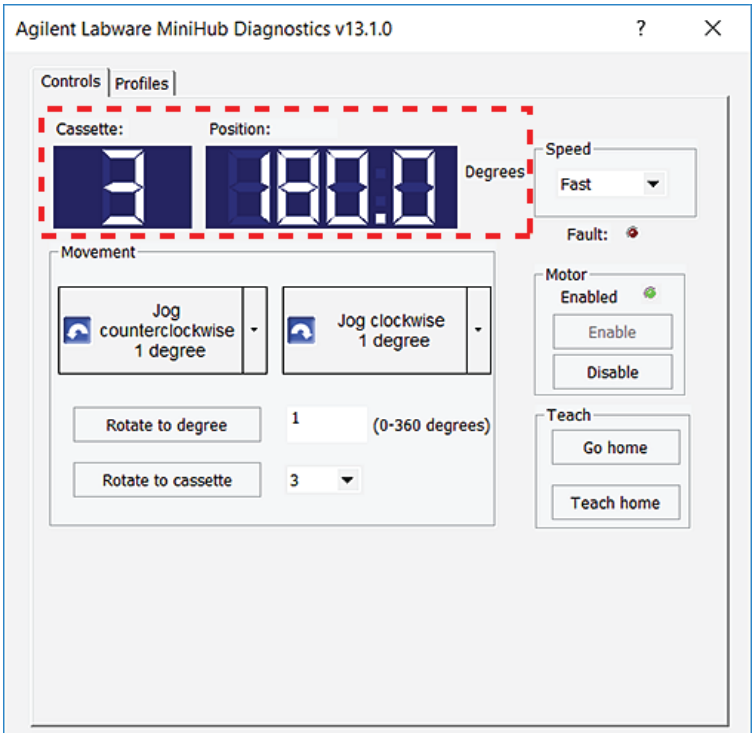
Checking the current position of the device

Procedure

To check the current position of the MiniHub:

1 If you have not already done so, open diagnostics. For instructions, see "Opening Labware MiniHub Diagnostics" on page 25.

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

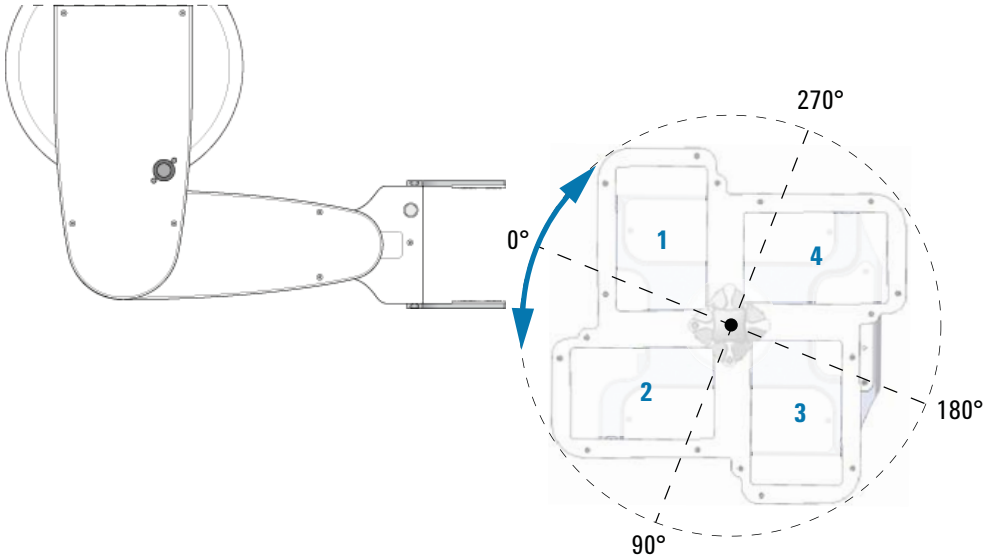


- **Cassette**. Indicates the cassette that is currently facing the robot. For example, a Cassette value of 3 indicates that cassette 3 is facing the robot. A dash (—) indicates that the Labware MiniHub is between cassette positions.
- **Position**. Indicates the position of the Labware MiniHub relative 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 (home)	0°
2	90°
3	180°
4	270°

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



Related information

For information about...	See...
Opening Labware MiniHub Diagnostics	“Opening Labware MiniHub Diagnostics” on page 25
Enabling and disabling the MiniHub motor	“Enabling and disabling the motor” on page 43
Changing the rotation speed	“Changing the rotation speed” on page 45

For information about...	See...
Rotating to a specific position	"Rotating the MiniHub to a specific position" on page 47
Teaching the home position	"Setting the home position" on page 32
The fault indicator	"Checking the fault indicator" on page 52
Viewing the log area	"Viewing the log area" on page 53
Profiles tab	"Creating Labware MiniHub profiles" on page 26

Enabling and disabling the motor

About this topic

Disabling the MiniHub motor allows you to rotate the Labware 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 Labware MiniHub 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 disable the Labware MiniHub motor:

In the **Controls** tab, click **Disable**. In the **Motor** area, the green **Enabled** light turns off.

On the MiniHub base, the motor status light turns red.

To enable the Labware MiniHub motor:

In the **Controls** tab, click **Enable.** In the **Motor** area, the green **Enabled** light turns on.

On the MiniHub base, the motor status light turns green.

Figure Motor area in the Controls tab

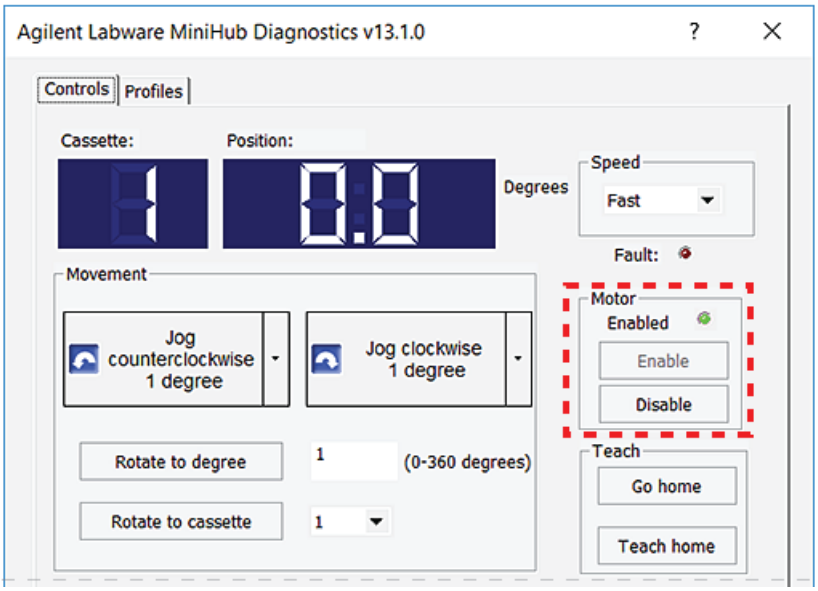
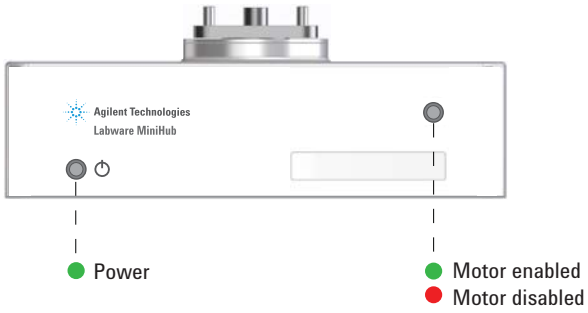


Figure Status lights on Labware MiniHub base (front view)



Related information

For information about...	See...
Opening diagnostics	"Opening Labware MiniHub Diagnostics" on page 25
Checking the Labware MiniHub's current position	"Checking the current position of the device" on page 41
Changing the rotation speed	"Changing the rotation speed" on page 45
Rotating to a specific position	"Rotating the MiniHub to a specific position" on page 47
Teaching the home position	"Setting the home position" on page 32
The fault indicator	"Checking the fault indicator" on page 52
Viewing the log area	"Viewing the log area" on page 53

Changing the rotation speed

About this topic

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 Labware MiniHub.

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

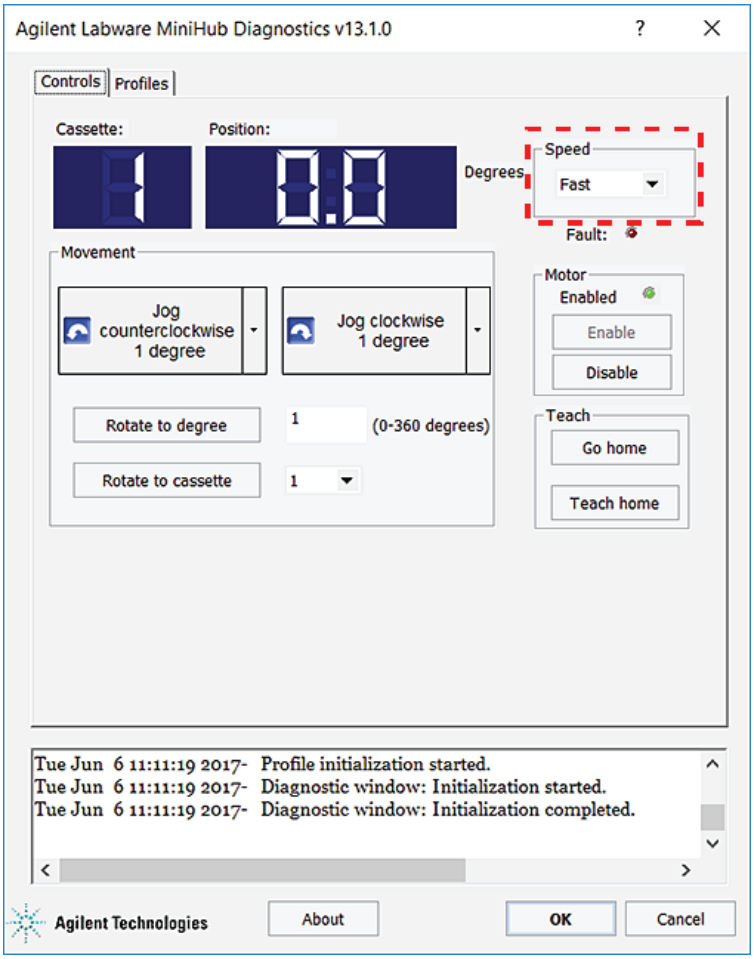
Procedure

To select the diagnostic rotation speed:

1 If you have not already done so, open diagnostics. See "Opening Labware MiniHub Diagnostics" on page 25.

2 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.
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...
Opening Labware MiniHub Diagnostics	"Opening Labware MiniHub Diagnostics" on page 25
Checking the current position of the Labware MiniHub	"Checking the current position of the device" on page 41
Enabling and disabling the MiniHub motor	"Enabling and disabling the motor" on page 43
Rotating to a specific position	"Rotating the MiniHub to a specific position" on page 47
Teaching the home position	"Setting the home position" on page 32
The fault indicator	"Checking the fault indicator" on page 52
Viewing the log area	"Viewing the log area" on page 53

For information about...	See...
Profiles tab	“Creating Labware MiniHub profiles” on page 26

Rotating the MiniHub to a specific position

About this topic

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

- Rotating to a specific cassette
- Rotating the Labware 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. Remove any obstacle that might prevent the Labware MiniHub from rotating.

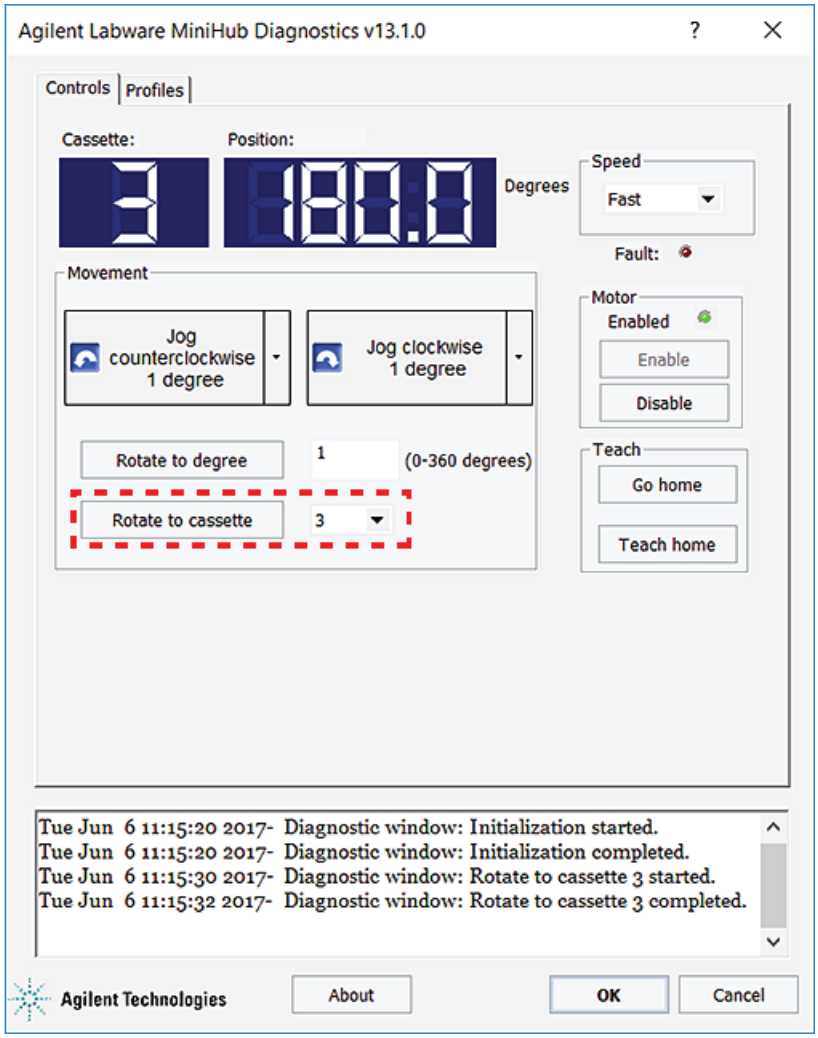
For instructions on how to open diagnostics, see “Opening Labware MiniHub Diagnostics” on page 25.

Rotating to a specific cassette

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

To rotate to a specific cassette:

1. Move the automation robot away from the Labware MiniHub. For instructions, see the applicable robot user guide, for example, the *BenchCel Microplate Handler User Guide*.
2. In the **Controls** tab, select the desired cassette from the **Rotate to cassette** list, and then click **Rotate to cassette.** The Labware MiniHub rotates until the desired cassette faces the robot. The Cassette box displays the current cassette position.


Agilent Labware MiniHub Diagnostics v13.1.0
Controls
Profiles
Cassette:
Position:
3
180.0
Degrees
Speed
Fast
Fault:
Movement
Jog counterclockwise 1 degree
Jog clockwise 1 degree
Motor
Enabled
Enable
Disable
Rotate to degree
1
(0-360 degrees)
Teach
Go home
Rotate to cassette
3
Teach home
Tue Jun 6 11:15:20 2017- Diagnostic window: Initialization started.
Tue Jun 6 11:15:20 2017- Diagnostic window: Initialization completed.
Tue Jun 6 11:15:30 2017- Diagnostic window: Rotate to cassette 3 started.
Tue Jun 6 11:15:32 2017- Diagnostic window: Rotate to cassette 3 completed.
Agilent Technologies
About
OK
Cancel

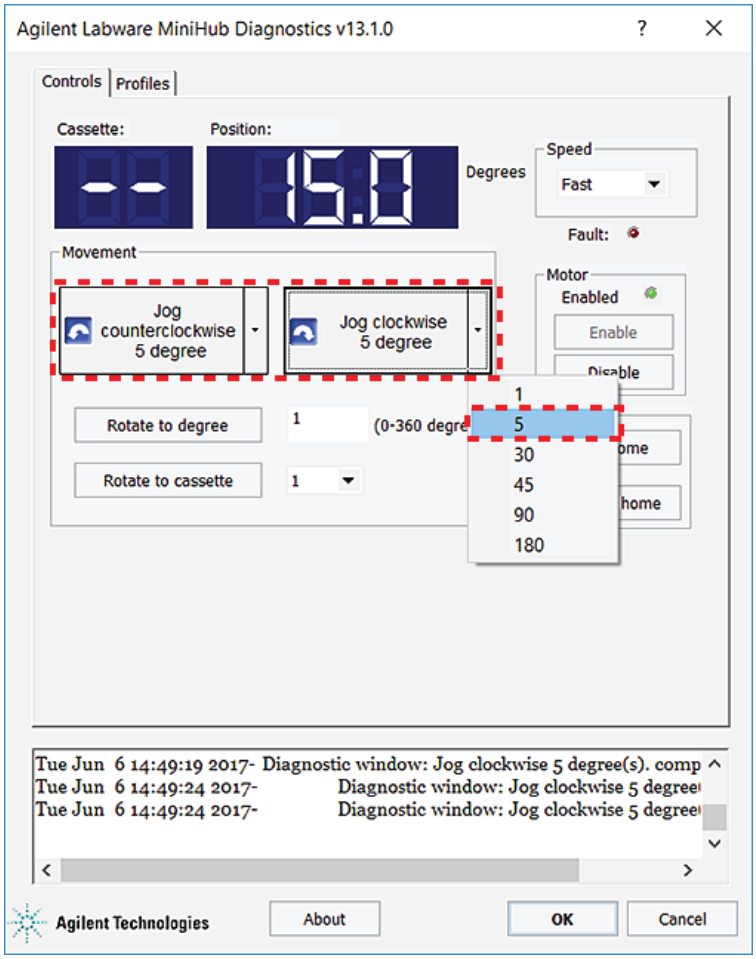
Rotating the Labware MiniHub in set increments

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

To rotate the Labware MiniHub in set increments:

1. Move the automation robot away from the Labware MiniHub. For instructions, see the applicable robot user guide, for example, the *BenchCel Microplate Handler User Guide*.
2. In the **Controls** tab, under **Movement**, click the arrow on the right of either **Jog** button, and then click the jog increment (degrees): 1, 5, 30, 45, 90, or 180.
3. Click the **Jog** button to jog the Labware MiniHub in the corresponding direction:

Command	Description
Jog counterclockwise	Rotates the MiniHub counterclockwise by the displayed degrees relative to its current position.
Jog clockwise	Rotates the MiniHub clockwise by the displayed degrees relative to its current position.



4 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

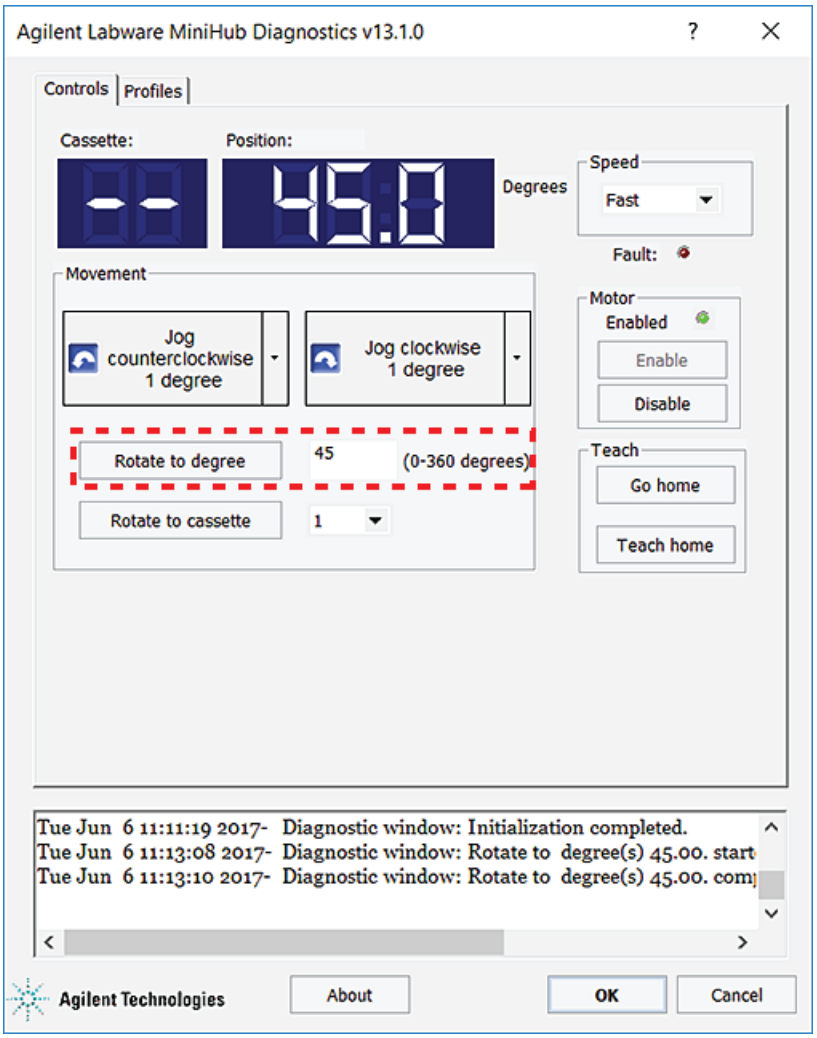
You can rotate the stage so that cassette 1 is at a specified number of degrees from the home position, 0°.

To rotate the MiniHub a specific number of degrees:

1 Move the automation robot away from the Labware MiniHub. For instructions, see the applicable robot user guide, for example, the *BenchCel Microplate Handler User Guide*.

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



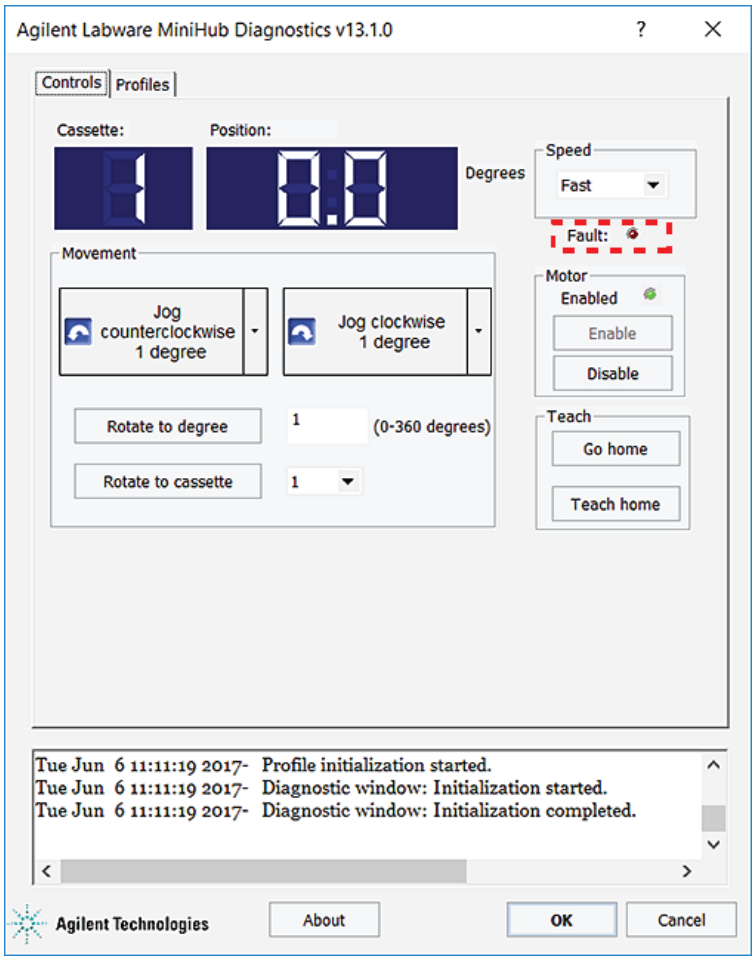
Related information

For information about...	See...
Opening Labware MiniHub Diagnostics	“Opening Labware MiniHub Diagnostics” on page 25
Checking the current position of the Labware MiniHub	“Checking the current position of the device” on page 41
Changing the rotation speed	“Changing the rotation speed” on page 45
Enabling and disabling the MiniHub motor	“Enabling and disabling the motor” on page 43
Teaching the home position	“Setting the home position” on page 32
The fault indicator	“Checking the fault indicator” on page 52
Viewing the log area	“Viewing the log area” on page 53
Profiles tab	“Creating Labware MiniHub profiles” on page 26

Checking the fault indicator

About controller faults

If an error occurs during operation, the red Fault light turns on in the Controls tab in Labware MiniHub Diagnostics.



Read the message in the error dialog box, and then check "Maintenance and troubleshooting" on page 55 for actions you can take to resolve the error. After the error is resolved, the Fault light in the Labware MiniHub Diagnostics dialog box turns off.

Related information

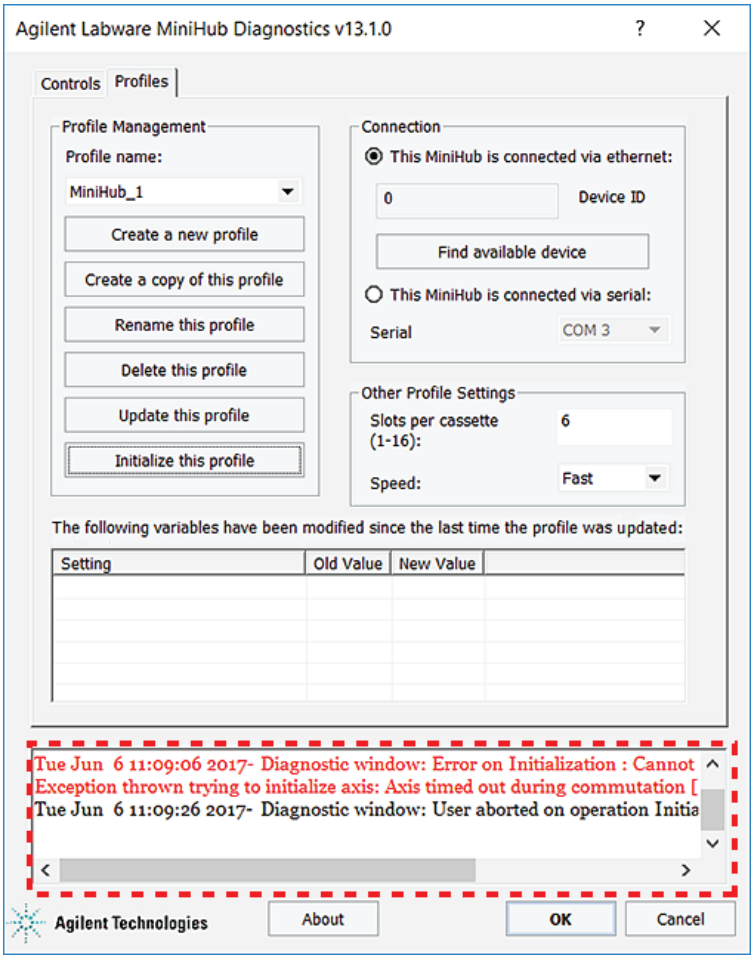
For information about...	See...
Opening Labware MiniHub Diagnostics	"Opening Labware MiniHub Diagnostics" on page 25
Viewing the log area	"Viewing the log area" on page 53

For information about...	See...
Profiles tab	"Creating Labware MiniHub profiles" on page 26

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...
Opening Labware MiniHub Diagnostics	“Opening Labware MiniHub Diagnostics” on page 25
Checking the current position of the Labware MiniHub	“Checking the current position of the device” on page 41
Enabling and disabling the MiniHub motor	“Enabling and disabling the motor” on page 43
Clearing controller faults	“Checking the fault indicator” on page 52

5
Maintenance and troubleshooting

This chapter describes how to maintain the Labware MiniHub and how to troubleshoot potential problems. This chapter contains the following topics:

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 off the Labware MiniHub" on page 15 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	*G5584A Labware MiniHub Safety and Installation Guide*
Reporting problems	"Reporting problems" on page 60

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 57
- "Homing and other problems" on page 57

If you are still experiencing problems with the Labware MiniHub after trying the solutions, contact Agilent 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 *G5584A Labware MiniHub Safety and Installation Guide*.
	The power supply on/off switch is set to the **off (O)** position, or the Labware MiniHub is not connected to the power supply or the power source.	Verify that the Labware MiniHub power supply on/off switch is set to **on (I)** and that the power supply is connected properly. See "Turning on and off the Labware MiniHub" on page 15.
The power 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 is initialized, and that the profile specifies the correct device ID. For details, see "Creating Labware MiniHub profiles" on page 26.
	The Labware MiniHub is not connected to the controlling computer.	Make sure the Ethernet cable and connections to the computer are secure and in good condition.
	Either an error occurred or the motor is disabled. An obstruction may be preventing the Labware MiniHub from rotating.	Check the motor status light on the base. See "Status lights" on page 7. • If the motor status light is red: Remove any obstacles in the path of the Labware MiniHub. Re-enable the motor using Labware MiniHub Diagnostics. See "Enabling and disabling the motor" on page 43. • If the motor status light is green, see "Checking the fault indicator" on page 52.

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 32.
	The encoder might be dirty or damaged.	Contact Agilent Automation Solutions Technical Support.
	A communication error might have occurred.	Make sure the Ethernet cable and connections to the computer are secure and in good condition.

Problem	Cause	Solution
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 37. Check for and replace bent shelves.
The Labware MiniHub has stopped and the motor status light on the base is red.	The motor is disabled, possibly because an obstacle prevented the Labware MiniHub from rotating.	Remove the obstacle, click **Retry**, and resume operation. Reinitialize the Labware MiniHub. If the problem persists, power cycle the device.

Related information

For information about...	See...
Labware MiniHub components	"Hardware overview" on page 4
Hardware problems	"Troubleshooting hardware problems" on page 56
Reporting problems	"Reporting problems" on page 60

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.

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 Agilent Automation Solutions Technical Support.

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

Communication errors

The following error messages are caused by communication problems:

- The command timed out.
- Attempted to communicate without being connected, please connect and retry the operation.
- Failed to connect.
- TCP connection has not been established.

Check the following causes and try the corresponding solutions:

Cause	Solution
The Ethernet cable is not connected properly.	Verify that the Ethernet cable is in good condition and securely connected. Power cycle the device, and try to reconnect.
The device profile specifies the wrong device ID for this Labware MiniHub.	Verify that the device profile specifies the correct device ID. See "Creating Labware MiniHub profiles" on page 26. Reinitialize the profile. If the problem persists, power cycle the device.

Motor control errors

The following error messages are typically caused by an obstacle in the path of the Labware MiniHub rotation.

- Axis timed out during commutation.
- Axis timed out during homing.
- Homing failed and the number of retries has been exceeded.
- Motor has gone over I2T current limit either by a spike or for a length of time.
- Move timed out.
- Position is outside its limit range.

Check the following causes and try the corresponding solutions:

Cause	Solution
An obstacle outside the Labware MiniHub is preventing it from rotating.	Remove any obstacles that are preventing the Labware MiniHub from rotating. Try rotating the Labware MiniHub again.
The labware is not properly seated in the alignment features of the shelves and is preventing the Labware MiniHub from rotating. The robot teachpoints might be set incorrectly, the Labware MiniHub has moved after the teachpoints were set, or the shelves are bent.	Verify that all labware are properly seated within the alignment features of their respective shelves. Check for and replace bent shelves. Check the robot teachpoints at the Labware MiniHub to ensure that the robot is placing the labware in the shelves correctly. See "Setting robot teachpoints" on page 37. Retry the operation.

Related information

For information about...	See...
Labware MiniHub component names	"Hardware overview" on page 4
Hardware problems	"Troubleshooting hardware problems" on page 56

For information about...	See...
Reporting problems	“Reporting problems” on page 60

Reporting problems

Contacting Automation Solutions Technical Support

If you find a problem with the Labware MiniHub, contact Agilent Automation Solutions Technical Support. For contact information, see Notices on the back of the title page.

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 base.

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.

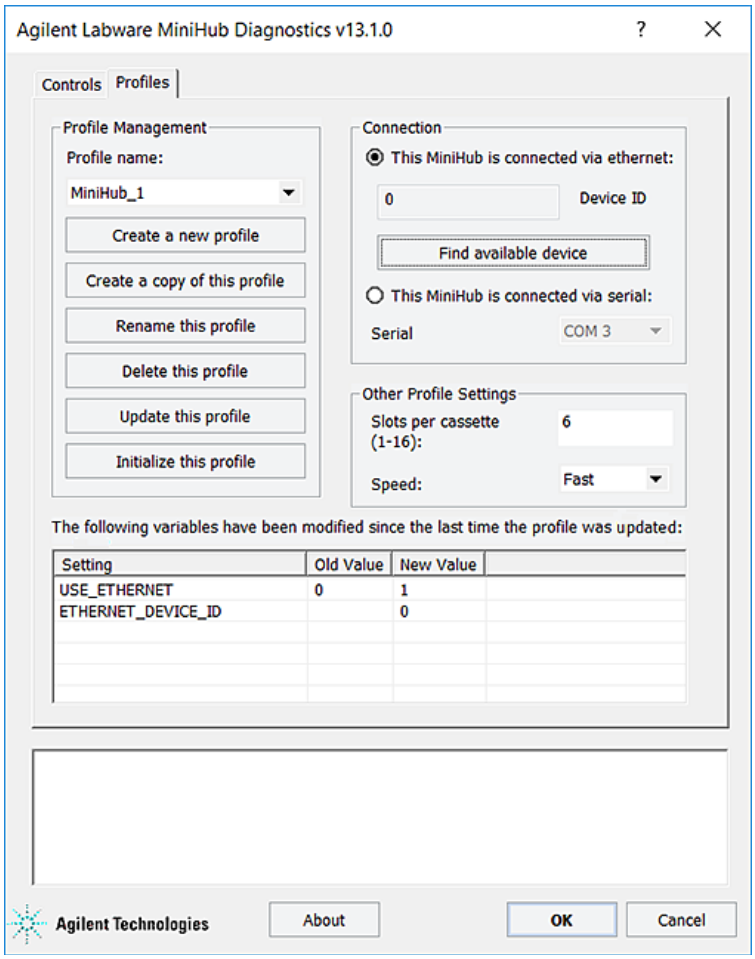
Related information

For information about...	See...
Troubleshooting hardware problems	“Troubleshooting hardware problems” on page 56
Software error messages	“Troubleshooting error messages” on page 58

A
Quick reference

This appendix contains the following topics:

Profiles tab



Profile Management area

Control	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.

Connection area

Control	Description
This MiniHub is connected via ethernet	*Available only for G5584A MiniHub*. Specifies an Ethernet communication connection between the device and the computer.
Device ID	Displays the device number of the Labware MiniHub that is communicating with the computer.
Find available device	Opens the Discovered BioNet Devices dialog box, which lists the connected devices that the software finds.
This MiniHub is connected via serial	*Available only for earlier models of the Labware MiniHub*. Specifies a serial communication connection between the device and the computer.
Serial port	The COM port of the computer that is connected to the Labware MiniHub.

Other Profile Settings area

Control	Description
Slots Per Cassette	The number of shelves in each Labware MiniHub cassette.
Speed	The rotational speed of the Labware MiniHub during protocol runs. The selections are: • *Slow*. Turns the Labware MiniHub at 25% of the factory-set maximum speed. • *Medium*. Turns the Labware MiniHub at 50% of the factory-set maximum speed. • *Fast*. Turns the Labware 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 lists all the changes you have made in the Profiles tab.

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.

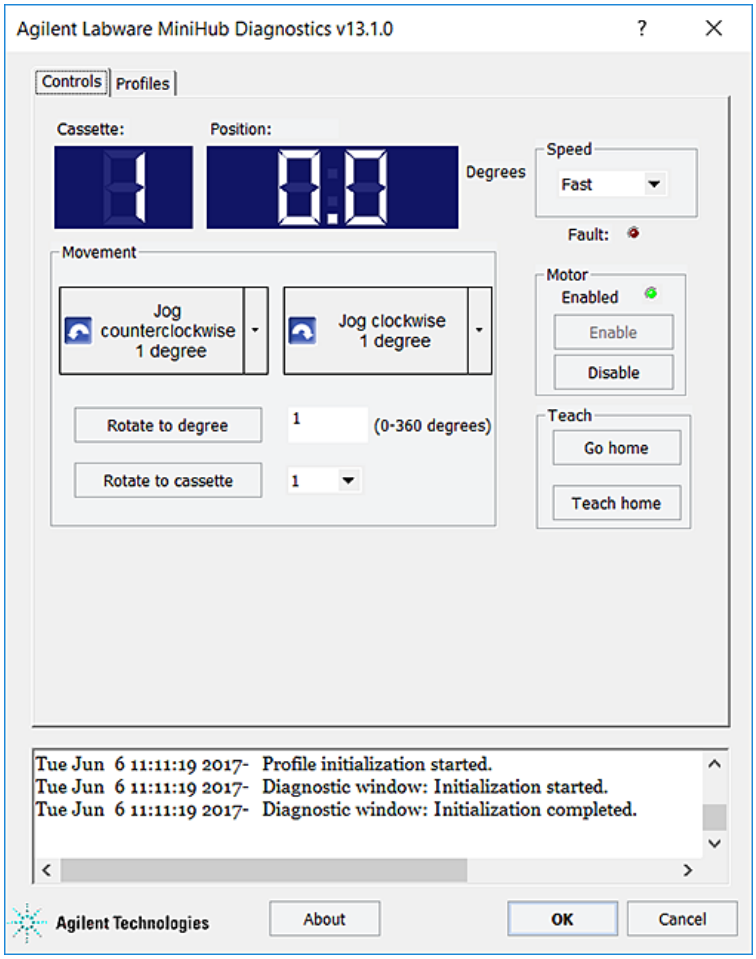
Commands

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

Related information

For information about...	See...
Opening Labware MiniHub Diagnostics	"Opening Labware MiniHub Diagnostics" on page 25
Profiles	"About profiles" on page 26
Creating a profile	"Creating a Labware MiniHub profile" on page 26
Establishing communication	"Initializing the Labware MiniHub" on page 30
Controls tab	"Controls tab" on page 65

Controls tab



Status area and commands

Control or indicator	Description
Cassette	The cassette currently at the home position.
Position	The current position of the Labware MiniHub, in degrees.
Speed	The rotational speed of the Labware MiniHub while you are in diagnostics. The selections are: • *Slow*. Turns the Labware MiniHub at 25% of the factory-set maximum speed. • *Medium*. Turns the Labware MiniHub at 50% of the factory-set maximum speed. • *Fast*. Turns the Labware MiniHub at 100% of the factory-set maximum speed. To set the rotation speed for protocol runs, go to the Profiles tab.

Control or indicator	Description
Fault	The light that indicates whether the Labware MiniHub has encountered an error. If the light is on, an error has occurred.

Movement area

Control	Description
Jog counterclockwise	Turns the Labware MiniHub counterclockwise by the selected degree increment: 1, 5, 30, 45, 90, or 180.
Jog clockwise	Turns the Labware MiniHub clockwise by the selected degree increment: 1, 5, 30, 45, 90, or 180.
Rotate to degree	Turns the Labware MiniHub so that cassette 1 is at the specified number of degrees from the home position.
Rotate to cassette	Rotates the Labware MiniHub to the specified cassette, for example, the home position at cassette 1.

Motor area

Control	Description
Enable	Turns on the Labware MiniHub motor.
Disable	Turns off the Labware MiniHub motor.

Teach area

Control	Description
Go home	Turns the Labware MiniHub to the home position.
Teach Home	Sets the home position.

Related information

For information about...	See...
Clearing controller faults	“Checking the fault indicator” on page 52
Setting the home position	“Setting the home position” on page 32
Profiles tab	“Profiles tab” on page 62

B
Labware MiniHub ActiveX control

This appendix contains the following topics:

Note: The Labware MiniHub ActiveX control has been verified to work in Visual Studio 2015.

About the Labware MiniHub ActiveX control

What is the Labware MiniHub ActiveX control

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

How the Labware 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 Labware MiniHub ActiveX control enables third-party applications to interface with the Labware MiniHub.

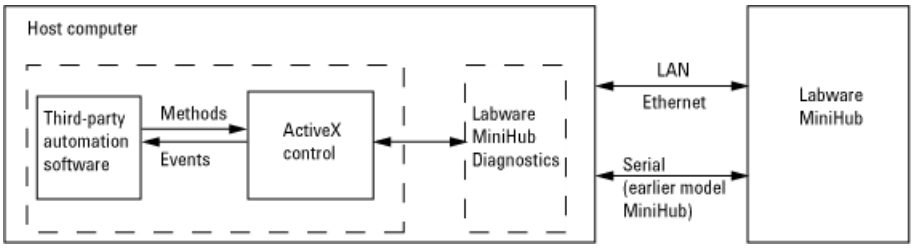
Each ActiveX control consists of a collection of the following:

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

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

The following figure illustrates the use of the Labware 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 Labware MiniHub ActiveX control generates events, the third-party application must implement handlers for them.

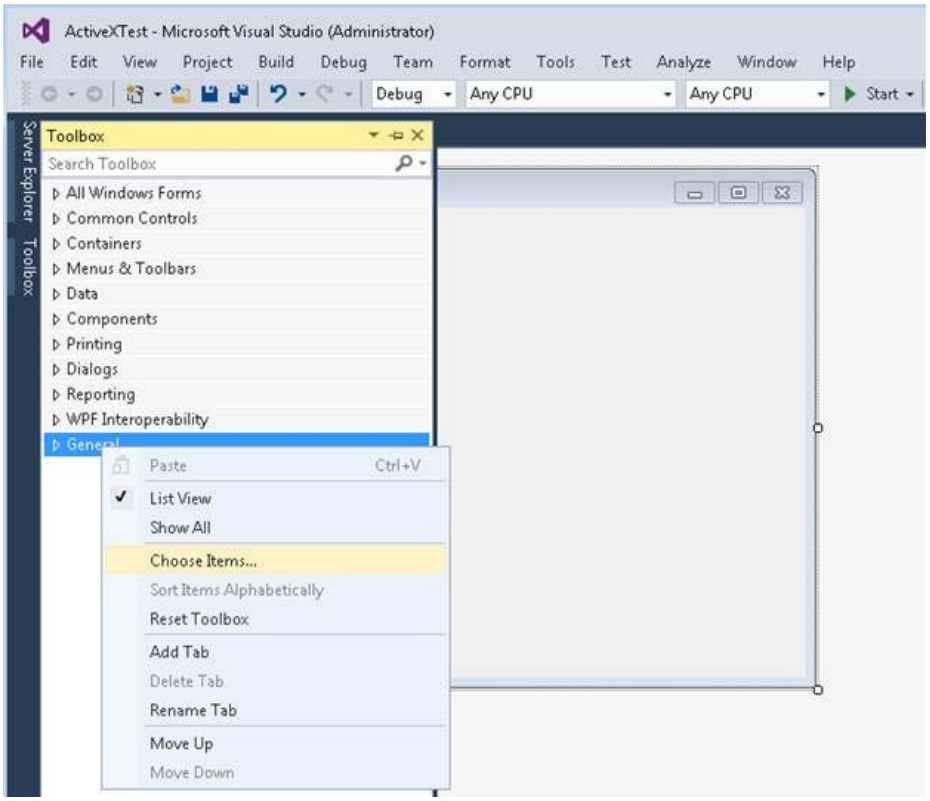


Using the ActiveX control

The Agilent ActiveX control is a Windows-based control. To use the control, you place it on a form or window. The form can be visible or hidden. The following procedure provides an example of how to set up the control using Microsoft Visual Studio.

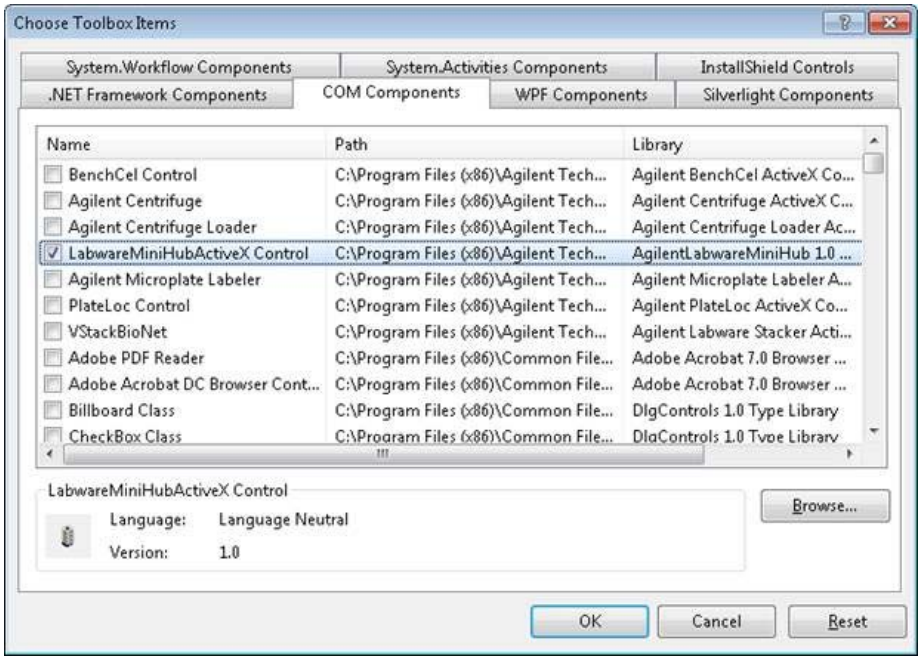
To set up the ActiveX control using Visual Studio:

1. In Visual Studio, open the project form in the **Forms Designer**.
2. Right-click in the **Toolbox** area, and select **Choose Items** from the shortcut menu.

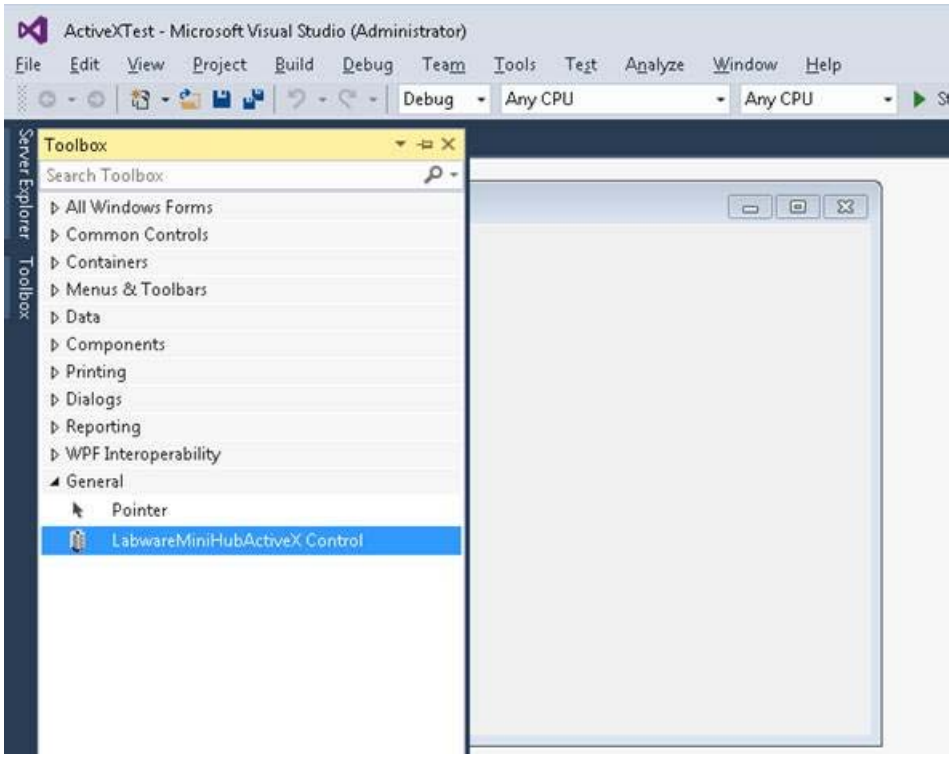


3 In the **Choose Toolbox Items** window, click the **COM Components** tab, and select the check box of the desired control.

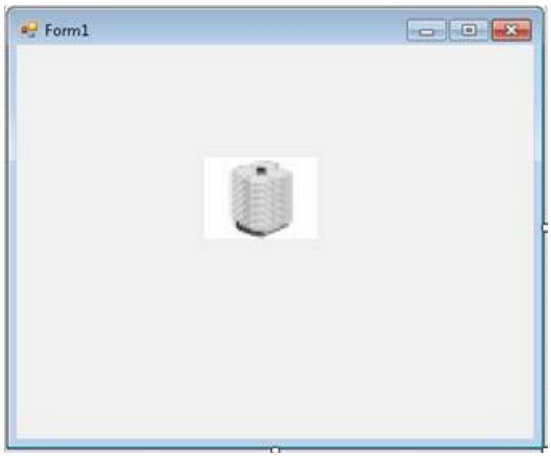
For the MiniHub ActiveX, select the MiniHub Control check box.



4 Click **OK**. The selected control appears in the Toolbox area.



5 Drag the control onto your form.



Related information

For information about...	See...
Integrating the Labware MiniHub ActiveX control	Installation instructions in the release notes
Labware MiniHub ActiveX properties	“Properties” on page 71

For information about...	See...
Labware MiniHub ActiveX methods	“Methods” on page 74
Labware MiniHub ActiveX events	“Events” on page 88

Properties

About this topic

This topic describes the following properties:

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 Labware MiniHub ActiveX control” on page 68
Integrating the MiniHub ActiveX control	Installation instructions in the release notes
MiniHub ActiveX methods	“Methods” on page 74
MiniHub ActiveX events	“Events” on page 88

Methods

About this topic

The topic describes the following methods:

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 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 Labware MiniHub ActiveX control” on page 68
Integrating the MiniHub ActiveX control	Installation instructions in the release notes
MiniHub ActiveX properties	“Properties” on page 71
MiniHub ActiveX events	“Events” on page 88

Events

About this topic

This topic describes the following events:

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 Labware MiniHub ActiveX control” on page 68
Integrating the MiniHub ActiveX control	Installation instructions in the release notes
MiniHub ActiveX properties	“Properties” on page 71
MiniHub ActiveX methods	“Methods” on page 74

C
Orderable spare parts

This appendix lists the Labware MiniHub spare parts you can order from Agilent Technologies.

Spare parts list

Part name	Part number
Shelves	
• Landscape (Integration Configuration)	G5508-00013
• Portrait (BenchCel Configuration)	G5400-00036
Spacers	
• 25.1 mm	G5508-20014
• 8.4 mm	G5508-20015
Rods, 6-mm threaded	
• Integration Configuration	
– DDR (46.6 cm)	G5508-20012
– BenchBot (41 cm)	G5508-20016
• BenchCel Configuration (30 cm)	G5508-20013

Related information

For information about...	See...
Reporting problems	“Reporting problems” on page 60
Reconfiguring the shelves	*G5584A Labware MiniHub Safety and Installation Guide*
Safety information	*G5584A Labware MiniHub Safety and Installation Guide*

Agilent Technologies

User Guide

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