Keysight Technologies
BenchVue Lab 2018 Software

Demo Guide

KEYSIGHT TECHNOLOGIES

Table of Contents

BenchVue Lab

Introduction

Keysight's BenchVue software platform comes with an intuitive interface and removes the need to program, making it simple to control, analyze measurements and quickly build automated tests with Keysight instruments. The BenchVue Lab application builds upon this foundation and is designed as a lab management solution, providing centralized instrument lab configuration, data logging and automation for educators managing teaching labs.

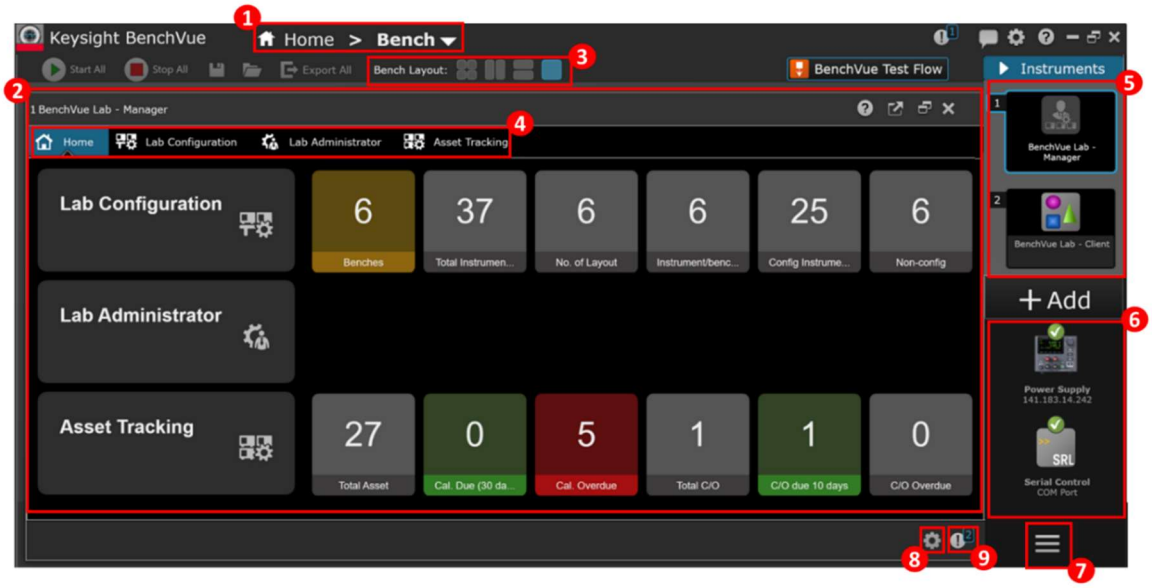
This solution consists of the Manager and Client apps – the Manager app acts as the main software application installed on the lab administrator's PC for centralized control and management, while the Client app runs on test bench PCs and connects all the instruments at individual test benches.

Key features and benefits

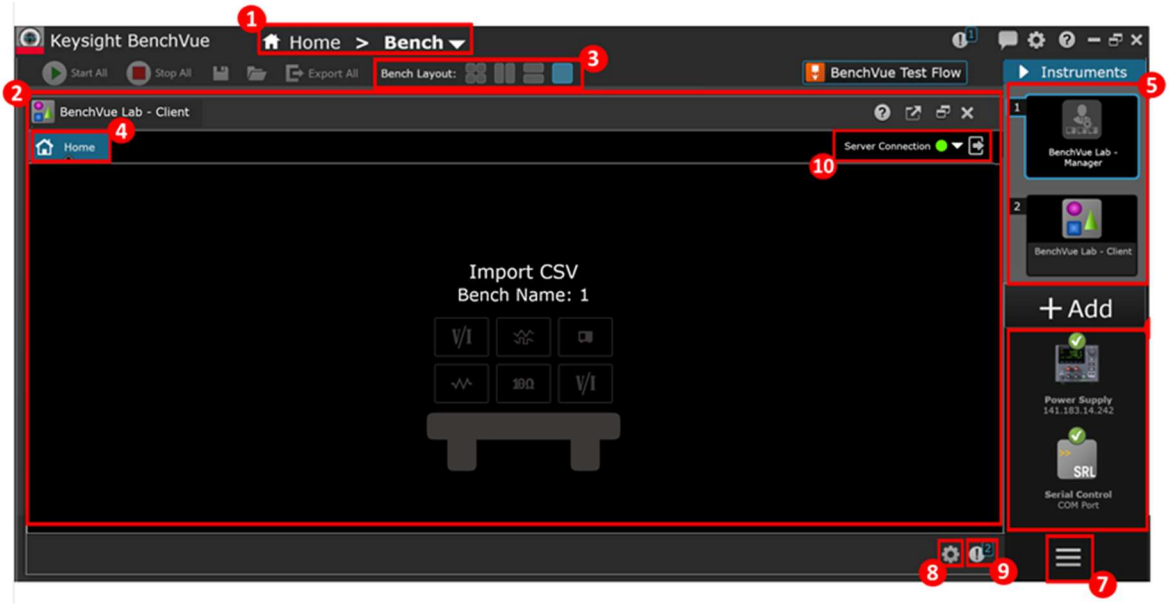
- **Streamline and simplify lab management, saving lab administrators and educators time and freeing them to focus on teaching.** BenchVue Lab provides overview connection statuses of all instruments via a customizable home screen with widget control, and allows administrators to configure the measurement settings of all instruments at once, all from a single admin PC. With this single software platform, administrators also can easily track asset inventories; changes to the asset list – such as when instruments are sent for calibration or removed from the lab on loan – are automatically updated in software's lab configuration status.
- **Enhance the learning experience of students by utilizing BenchVue Lab as an education lab teaching software platform.** Full desktop and BenchVue application sharing allows for easy remote monitoring and student assistance in the test lab. With the BenchVue Lab client app installed at each test bench computer, students can easily control instruments, log data and screen shots, and automatically join lab sessions.
- **Easily integrate the software into the existing lab setup.** BenchVue Lab supports over five hundred Keysight test and measurement instruments, and will also connect to non-Keysight test instruments that are compliant with the VISA connection protocol. Together with an intuitive GUI and the ability to import CSV files, BenchVue Lab enables educators to quickly set up and configure large labs.
- **Save on investment.** Educators can take advantage of the BenchVue Education Lab and Control Collection bundle, which consists of:
    - One BenchVue Lab manager app license, which acts as the main software application installed on the administrator's PC for centralized control and management
    - Fifty BenchVue Lab client app licenses, which runs on test bench PCs and connects all the instruments at individual test benches
    - Fifty BenchVue EDU network licenses, which allows access to the Pro versions of thirteen control, automation and analysis apps on the BenchVue software platform
    - And unlimited student licenses

BenchVue Lab at a glance

BenchVue Lab – Manager



BenchVue Lab – Client

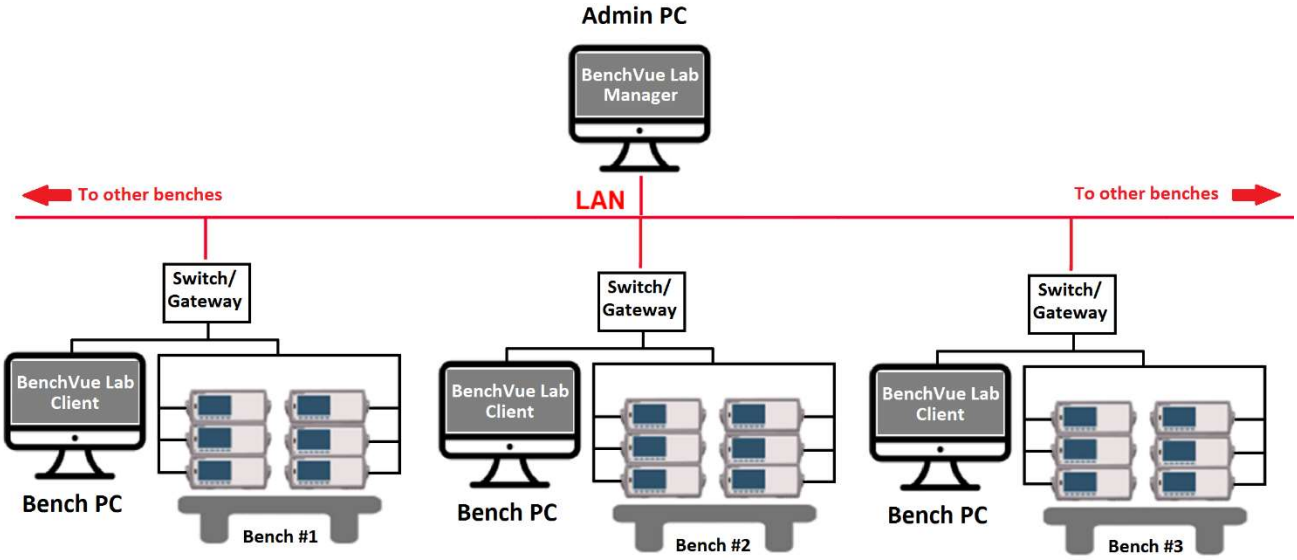


1. BenchVue platform navigation directory. Click the pull-down menu to navigate the platform:
    a. Bench – The BenchVue applications that are currently running.
    b. Applications – The list of all BenchVue applications, its details and licensing information.
    c. Data Manager – Saved measurement data logs.
    d. Library – Database for the latest instrument manuals, software, FAQs, videos, etc.
2. Bench application main window.
3. Bench layout options to split to multi-window display of all the currently running bench applications.

4. The BenchVue Lab application navigation tabs which comprise four main tabs – Home, Lab Configuration, Lab Administrator and Asset Tracking.
5. Application Panel that list all BenchVue applications currently running.
6. Instrument panel that list all connected instruments.
7. Manage the list of instruments.
8. Application settings.
9. Notification panel.
10. BenchVue Lab – Client application server connection panel.

Lab System Setup

A typical customer lab setup includes an admin PC installed with BenchVue Lab – Manager software and a number of test benches (BenchVue Lab can support up to a maximum of 100 benches). Each test bench may be equipped with up to 6 instruments. The instruments on the test benches can be connected directly to the admin PC in a LAN system via a multiple-port network switch or gateway. In an alternative lab setup, each test bench may also include a Bench PC, which may be a fixed desktop or a student's mobile PC. Each of the Bench PC is installed with the BenchVue – Client software that are readily connected to the BenchVue Lab – Manager which acts as the server.



Requirements for Demo

- **PC with system requirements**
  - Operating System – Microsoft Windows 10: 32-bit & 64-bit (Professional, Enterprise, Education, Home versions); Microsoft Windows 8: 32-bit & 64-bit (Professional, Enterprise, Core); Microsoft Windows 7: SP1 and later 32-bit & 64-bit (Professional, Enterprise, Ultimate, Home Basic, Home Premium)
  - CPU – 1 GHz or faster (>2 GHz is recommended for optimum performance)
  - RAM –2 GB (>3 GB is recommended for optimum performance)
  - Interface support – LAN/USB/GPIB/RS-232

- **BenchVue Platform Software.** Free trial can be downloaded from the following URL: https://www.keysight.com/my/en/software/application-sw/benchvue-software/benchvue-complete-control-collection.trial.html?checked=y
- **Keysight basic instruments**
  - DMM
  - Function Generator
- **Two GPIB cables**

Getting Started

Install BenchVue Lab Application

First, install the BenchVue platfrom software. Free trial can be downloaded from the following URL: https://www.keysight.com/my/en/software/application-sw/benchvue-software/benchvue-complete-control-collection.trial.html?checked=y.

Launch the platform application Windows Start>All Apps>Keysight BenchVue. On the BenchVue window, click the 'BenchVue platform navigation directory' to expand the dropdown menu and select 'Applications'. The main window will be populated with all applications including those that are currently not installed. Select 'Lab Manager' application and click 'Install' to start installing the application.

BenchVue Lab Software Licensing

After the installation has completed, you may choose to purchase the license options or start a free 30-day trial. After the trial period expires, you will be required to purchase a software license to continue to use the application. Keysight's flexible licensing options allow you to select the license type and license terms that best fit your software needs. For more information on BenchVue software free trials and licensing options, go to www.keysight.com/find/benchvue_apps.

Lab Configuration

Configure Bench Layout

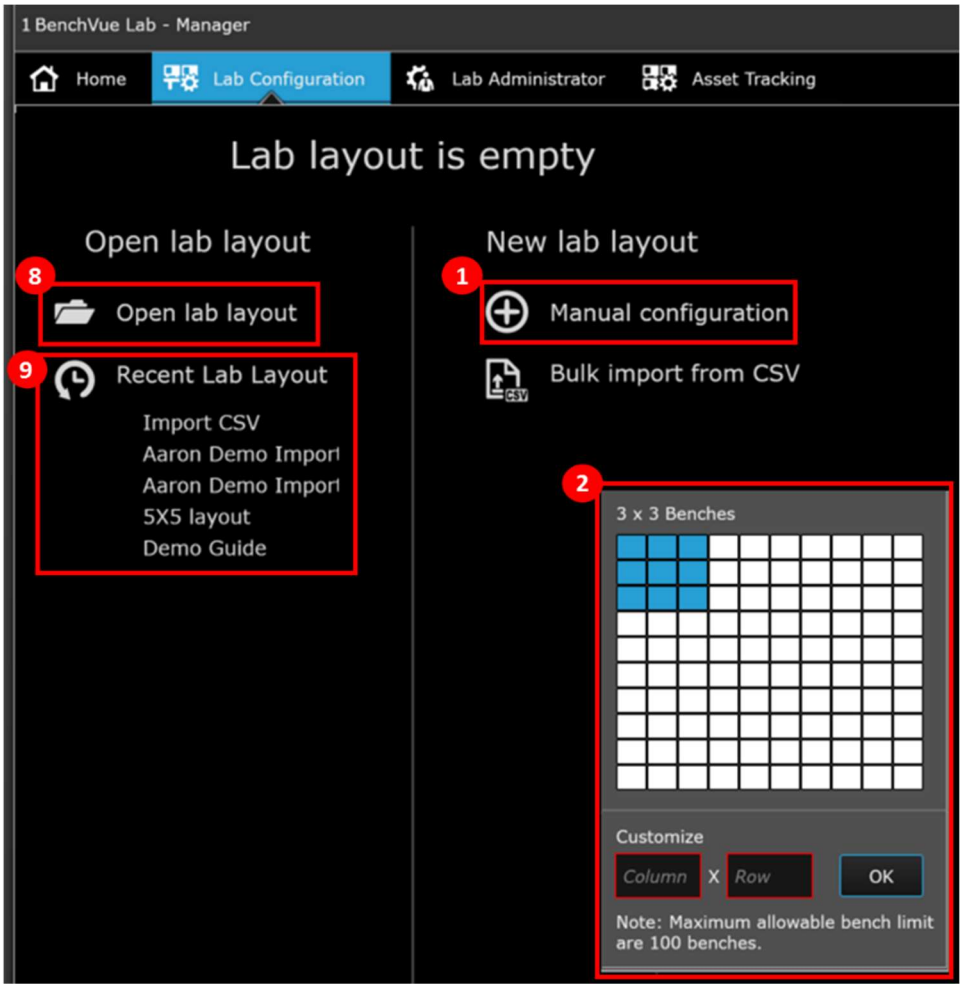
The Lab Configuration Tab allows you to configure your lab layout, number of benches, type and number of instruments, name of the benches etc. according to your actual lab layout. There are two options to configure your lab layout - either manually or by importing from a CSV file (refer to user manual for guidelines to import lab layout from a CSV file). Multiple lab layouts can be saved and easily interchanged to allow flexibility for different classes sharing a lab.

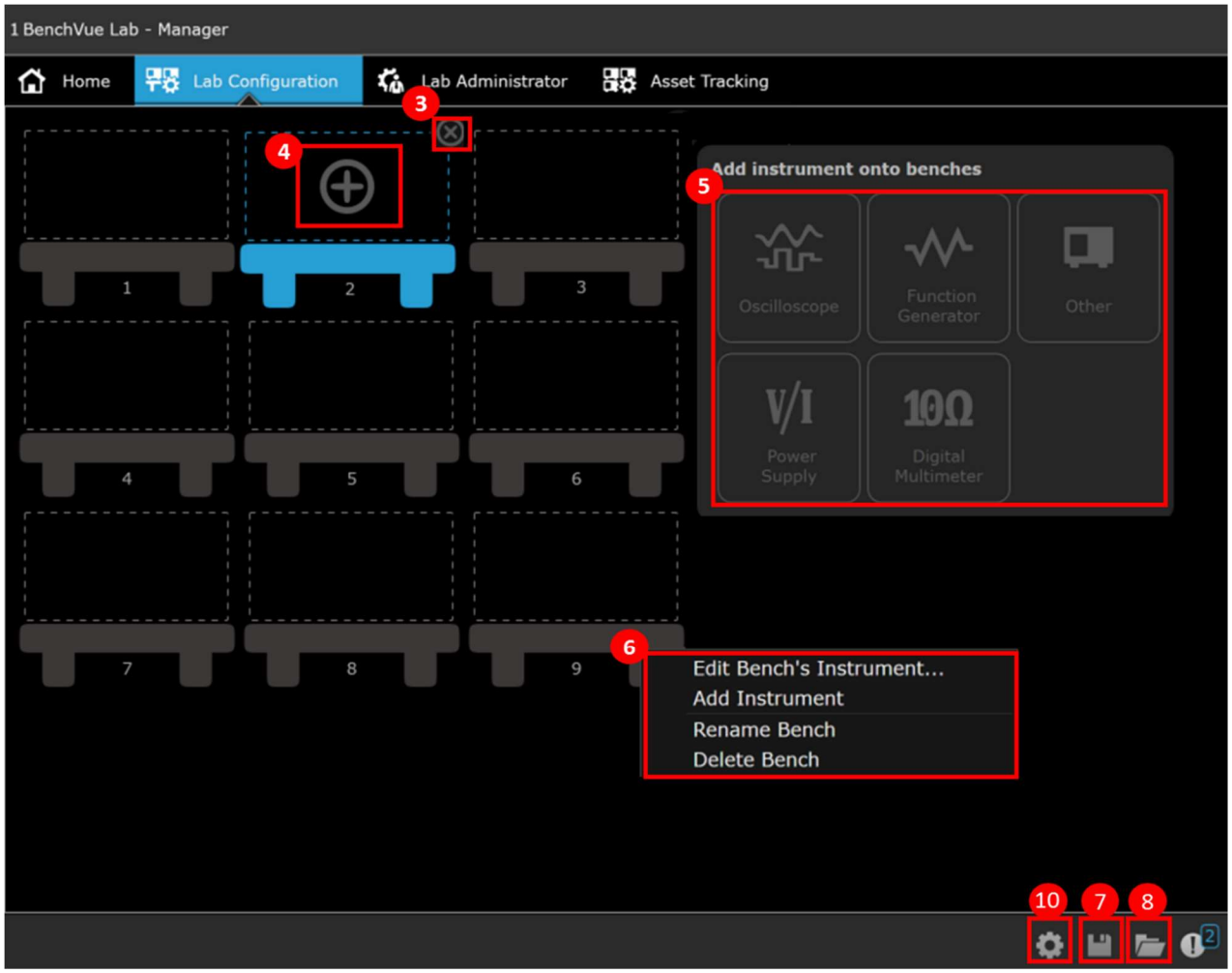
To configure the bench layout manually,

1. Click 'Manual Configuration'
2. Select the total number of rows and columns of test benches. For e.g. select 3 X 3 (the maximum limit is 10 X 10 benches).
3. The benches can be deleted to match your actual lab layout. For e.g. delete a row of benches in the middle to represent the aisle between the rows of benches by hovering your mouse cursor over

the selected bench and click the ‘X’ icon at the top-right. Alternatively, you may remove the bench by right-clicking the selected bench>Delete Bench.

4. To add instrument onto the test benches, move your mouse cursor over one of the benches and click the ‘+’ icon that appears.
5. Select the type of instrument, for e.g. select function generator. Function generator will be added automatically on all the benches. There are four pre-configured basic instrument types, namely oscilloscope, function generator, power supply and digital multimeter (DMM). Other types of instrument can be added as ‘Other’ category.
6. Additional instruments may be added (up to six instruments per bench) by right-clicking on any of the benches>Add Instrument. For e.g. add DMM to all the benches. You may edit the bench’s instrument or rename the bench by right-clicking the selected bench and select the options from the pop-up menu.
7. The lab layout and any changes can be saved into a file by clicking the ‘Save Lab Layout’ icon.
8. The saved lab layout can be opened by clicking the ‘Open Lab Layout’ and select the saved file.
9. All recently used lab layout will also be listed on the ‘Lab Configuration’ tab homepage.
10. To return to the homepage, click the gear icon>close lab layout (please note that any unsaved changes will be discarded).

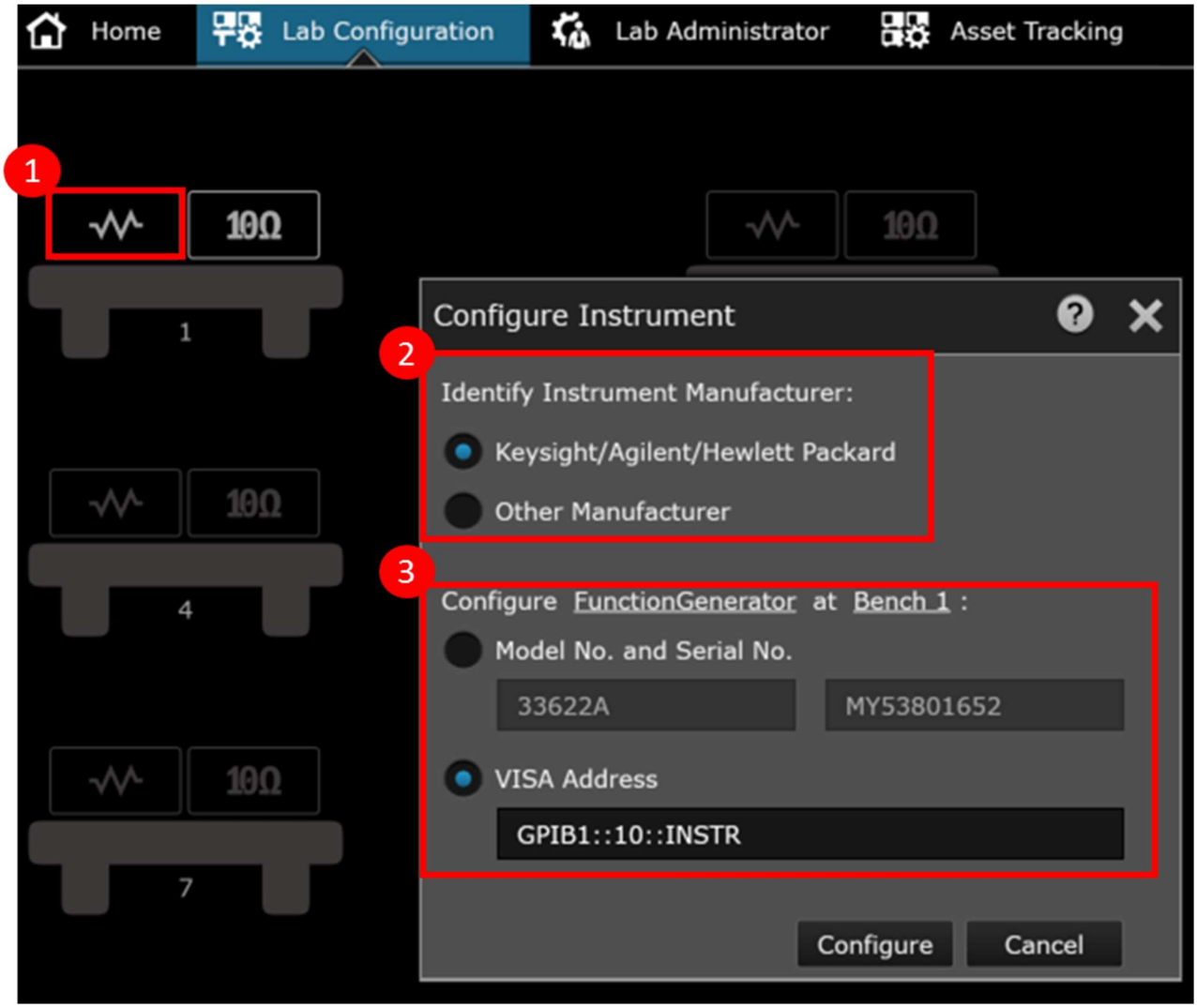




Configure Instruments

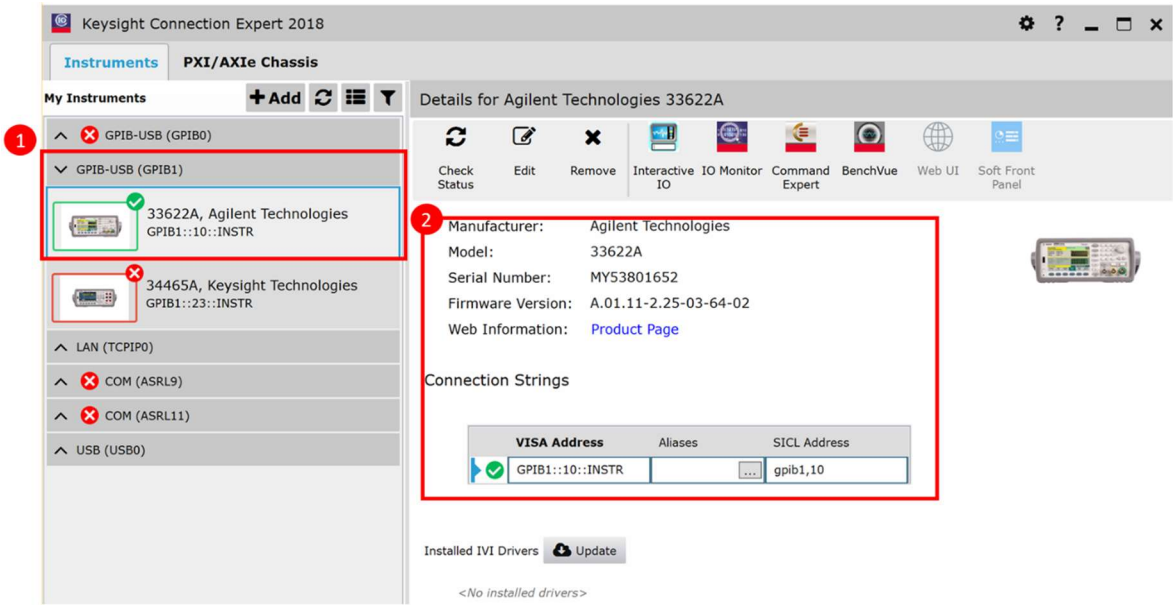
The instrument added to the test bench initially appear as greyed-out icon indicating configuration has not been completed. To configure the function generator and DMM on bench 1:

1. Connect the instruments to the PC via LAN/GPIB/USB/RS-232
2. Click on the instrument icon.
3. On the pop-up menu, select the instrument's manufacturer.
4. There are two ways to configure the instrument - either input the instrument's model number and serial number or its VISA address.



The instrument's model no., serial no. and VISA address can be readily acquired from the Keysight Connection Expert application. The Keysight Connection Expert application should have been installed automatically together with the BenchVue Software installer. To launch Keysight Connection Expert, click Start Menu>All Applications>Keysight Connection Expert. BenchVue Lab currently supports over 500 instruments from both Keysight and non-Keysight manufacturers that comply with IEEE-488 protocols. Connect the instruments to the PC via GPIB cables.

1. The instrument is automatically detected and appear on the list of instruments grouped according to the respective connection interfaces.
2. Click on the instrument. Copy the model no. and serial no. or VISA address and input to the BenchVue Lab Manager.



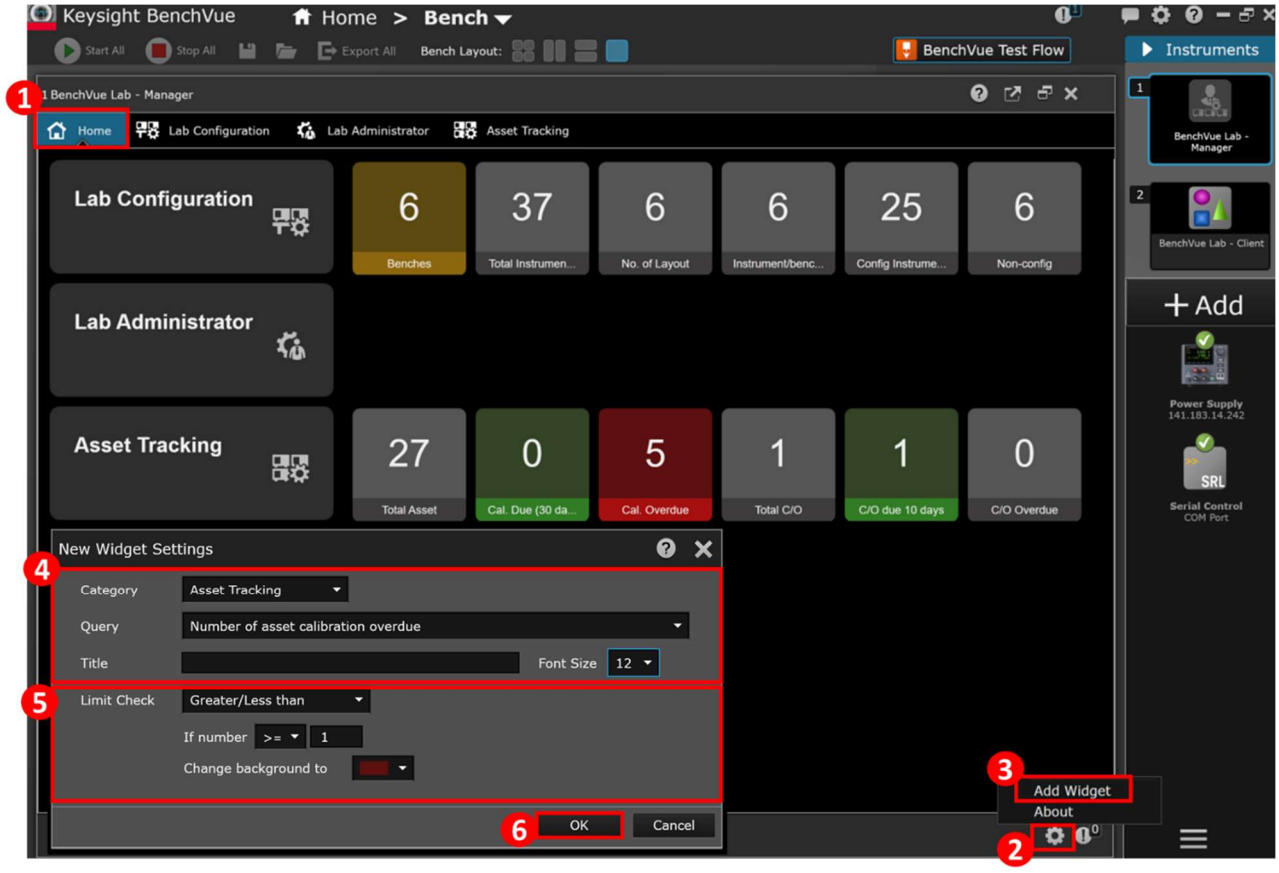
Homepage Dashboard

BenchVue Lab 'Home' displays a dashboard that provides a one-page overview on the lab information, instrument statuses, pending actions required and other types of reminder notification. The dashboard is highly customizable with various widgets which can be added and configured to automatically change color codes to indicate certain status according to the user's customization. These will readily provide an overview information to the lab manager and/or lecturer at one glance.

Add/Edit New Widget

To add a widget to the homepage dashboard:

1. Click the 'Home' tab.
2. Click the 'Application Setting' icon.
3. Select 'Add Widget'.
4. In the 'Category' pull-down menu, select either 'Lab Configuration or 'Asset Tracking' category. 'Lab Configuration' category include widgets of lab information such as total number of benches, instruments, configured or non-configured instruments etc. Whereas 'Asset Tracking' category include widgets of assets registered and its status such as the total number of assets, the number of asset currently with calibration schedule overdue and the number of assets currently being checked-out etc. You may select the type of widget in the 'Query' pull-down menu and then input the title that would appear on the dashboard and select the font size.
5. Optionally you may customize the 'Limit Check' to specify a certain condition, for example, for calibration overdue widget, you may specify the limit check greater than or equal to 1 instrument, change background color code to 'red' indicating there is 1 or more instrument currently needs to be calibrated. There are several options in the pull-down menu that you may customize the widgets according to your preference or application.
6. Click 'OK' to complete adding the widget.



To edit/delete/clone the widget, hover your cursor over the selected widget, click the 'more option' icon at the top-right of the widget and select the desired options – to edit/remove/add new/clone widget.

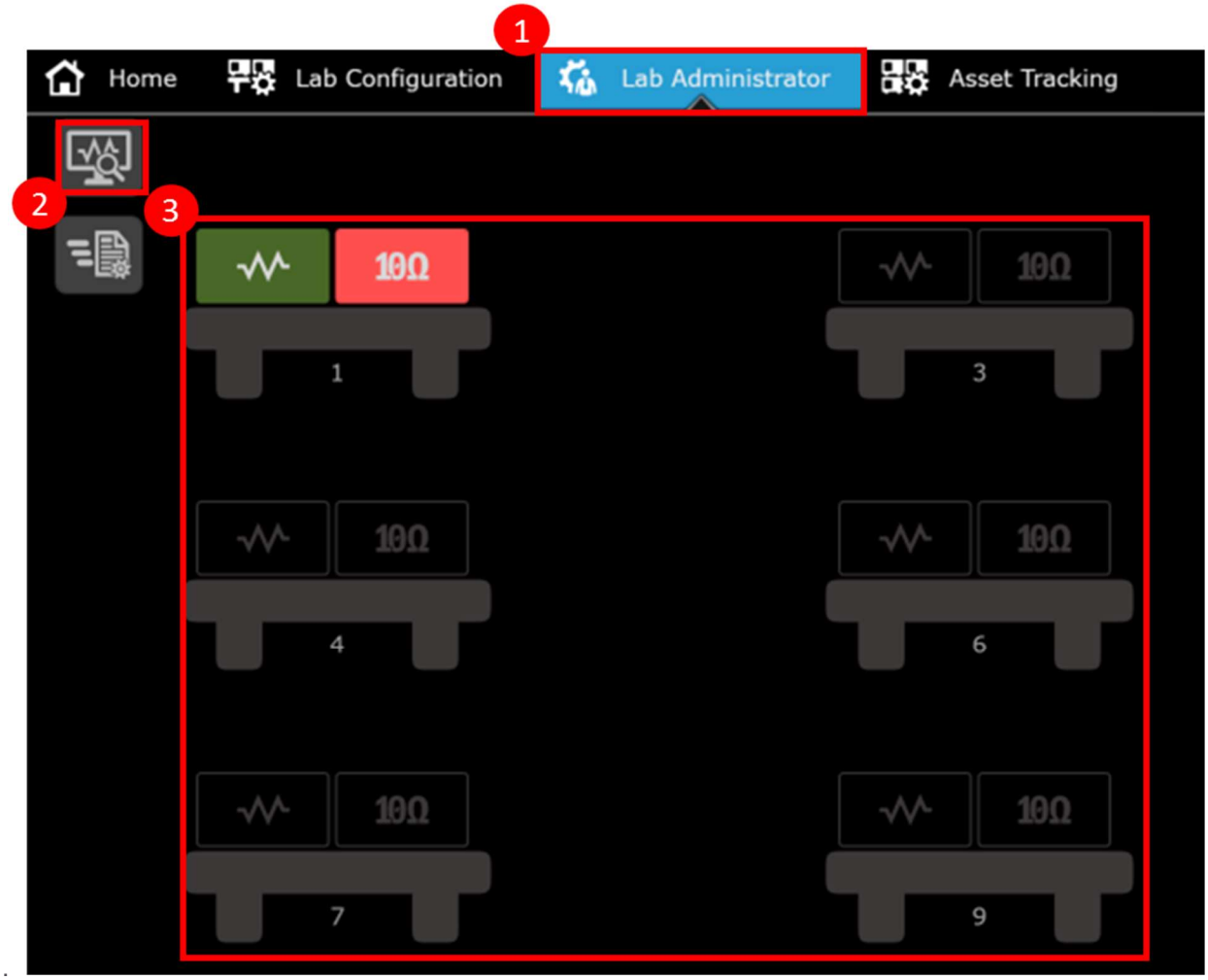
Lab Administrator

Check Instrument Status

Lab administrator allows the lecturer or/and lab manager to monitor the current instrument connection status. This feature provides the lecturer/lab manager a quick overview of the current instrument connection status and easily identify which instrument and on which bench that is not correctly connected.

To check the instrument status,

1. Click on the 'Lab Administrator' tab and
2. Click on the 'Check Instrument Status' icon at the top left.
3. The connection status of all configured instruments will be updated and displayed in the following color codes:
    - Green – connected and active
    - Red – disconnected or connection error
    - Grey-out – Instrument that are not configured yet



Configure Measurement State/Settings of All Instruments at Once Seamlessly

Lab administrator also allows the lecturer or/and lab manager to configure the measurement state/settings of all the instruments on the benches in bulk easily. This feature enables centralize control for lecturer/lab manager to quickly reset or send a pre-set measurement state/setting to all the instruments at once for a specific measurement session.

To send a pre-set measurement state/setting,

1. Click the 'Send Instrument Configuration' icon
2. On the pop-up menu, click the arrow icon for drop-down menu of the desired instrument type. Function Generator is selected for this example. Save the attached function generator demo state file below:

Function Gen Demo State.state

3. Click 'Add to recent configuration list' to browse and select the saved function generator state file.

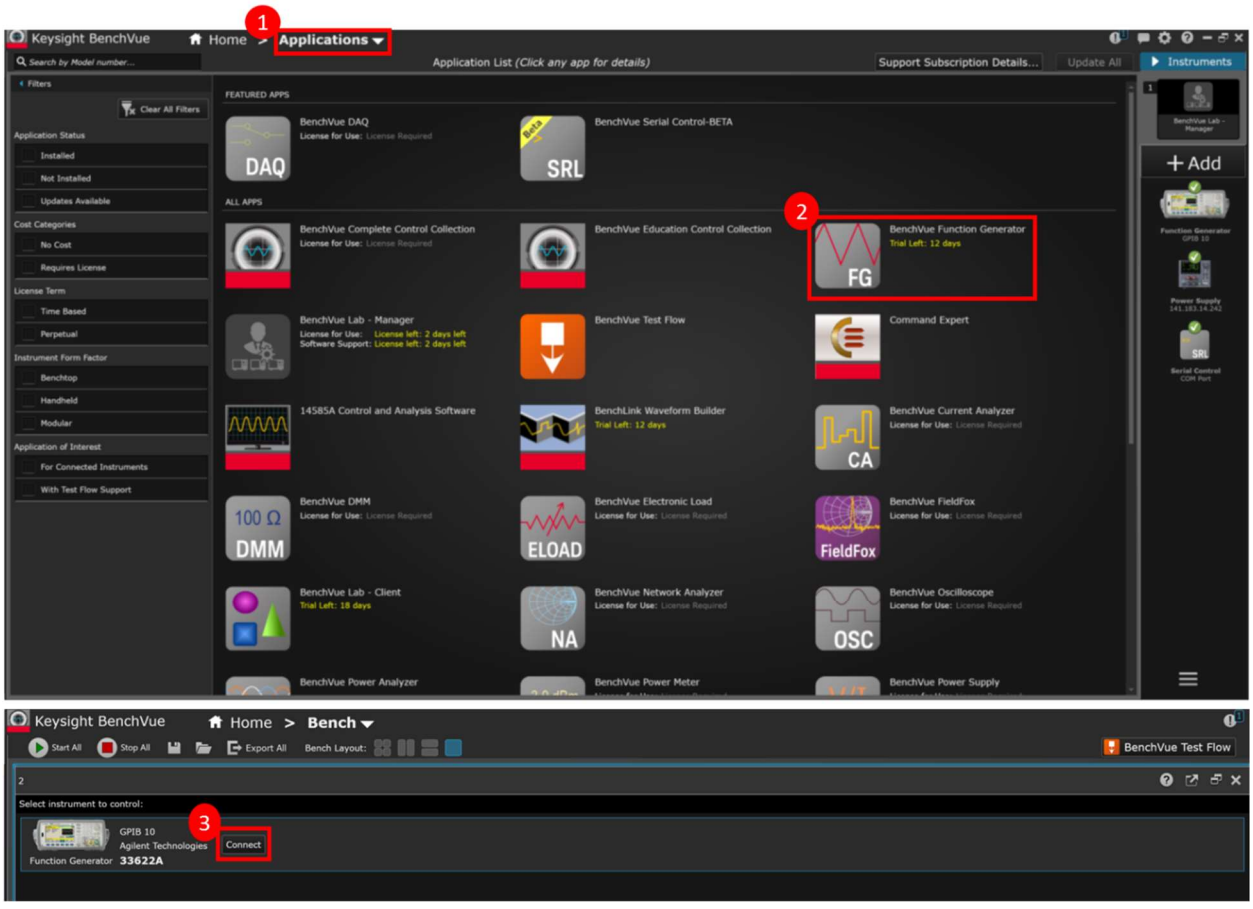
4. Click ‘Send configuration file to ALL instruments.’ The measurement state/settings for all the instruments connected to BenchVue Lab Manager will be automatically configured according to the state file for Channel 1:
    - Amplitude: 1 mVpp
    - Offset: 5 V
    - Frequency: 1 kHz
    - Phase: 0 deg
5. You may easily remove all selected state files by clicking ‘Clear All Selected Configuration File.’
6. You may also reset all the settings of the instruments to default by clicking ‘Send Default Configuration (Reset).’ The default configuration:
    - Amplitude: 100 mVpp
    - Offset: 0 V
    - Frequency: 1 kHz
    - Phase: 0 deg

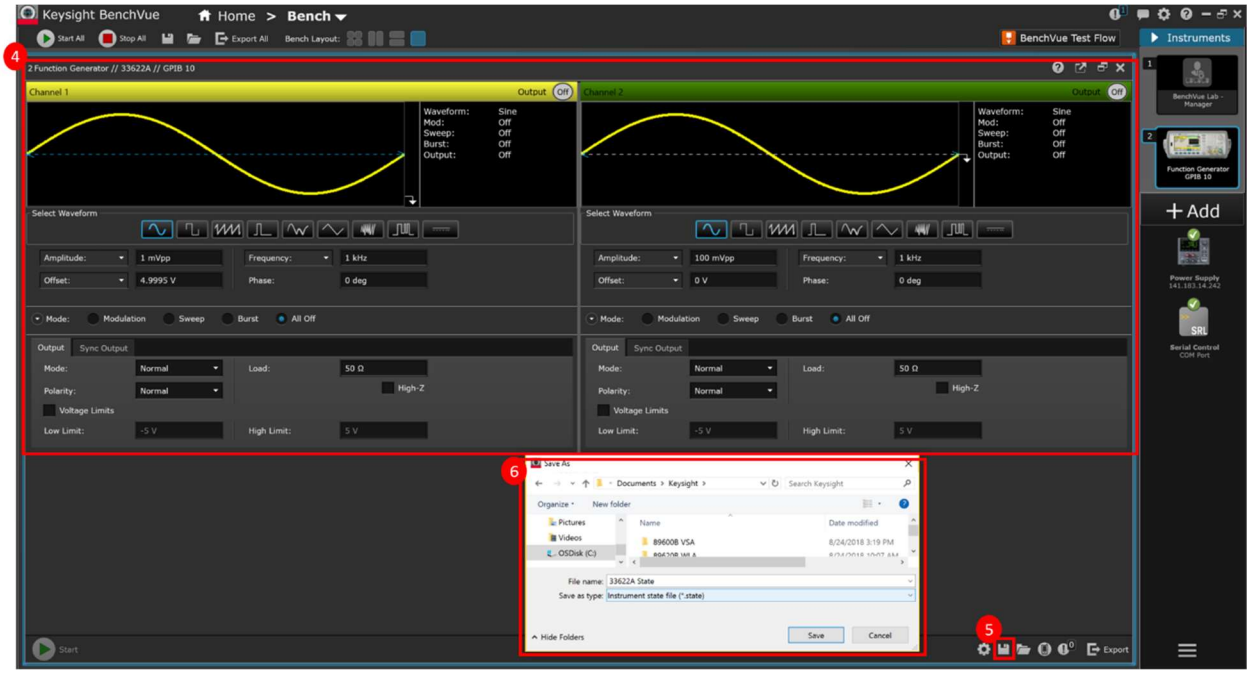
To create/save a new preset measurement state file,

1. Go to the ‘Application’ tab on the BenchVue platform.
2. Launch the BenchVue Application for the desired instrument type. For this example, a state file of function generator is created by launching the ‘BenchVue Function Generator’ app. You may install and activate the free 30-day trial for the Function Generator App for access.

3. Once the Function Generator App is launched, click ‘Connect’ to the instrument. The instrument must be connected and powered on.
4. Configure the desired measurement setting and parameters, for example Channel 1:
    - Amplitude: 1 mVpp
    - Offset: 5 V
    - Frequency: 1 kHz
    - Phase: 0 deg
    - Other parameters remain as default

    Note: If the instrument is currently acquiring measurement, the state file cannot be saved. The measurement acquisition must be stopped first.
5. Click the ‘Save’ icon.
6. You may rename the state filename and change the directory of the saved file. The instrument state file is saved in a proprietary format *.state file extension and can now be used to configure all the instruments at once via BenchVue Lab Manager.

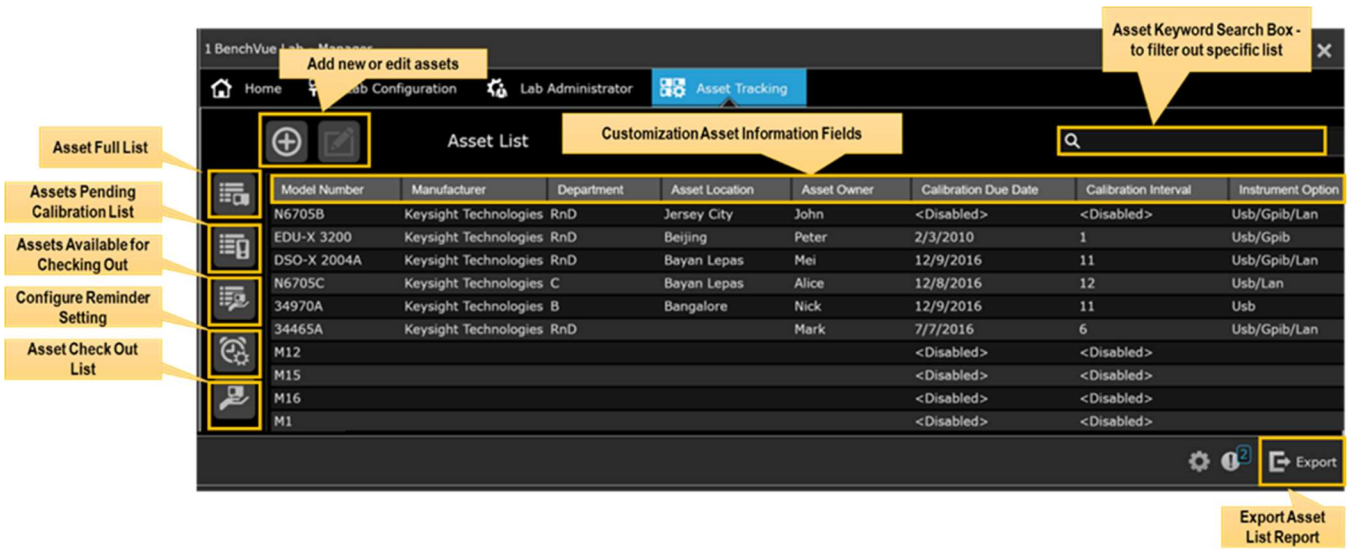




Asset Tracking

Asset Tracking in a Glance

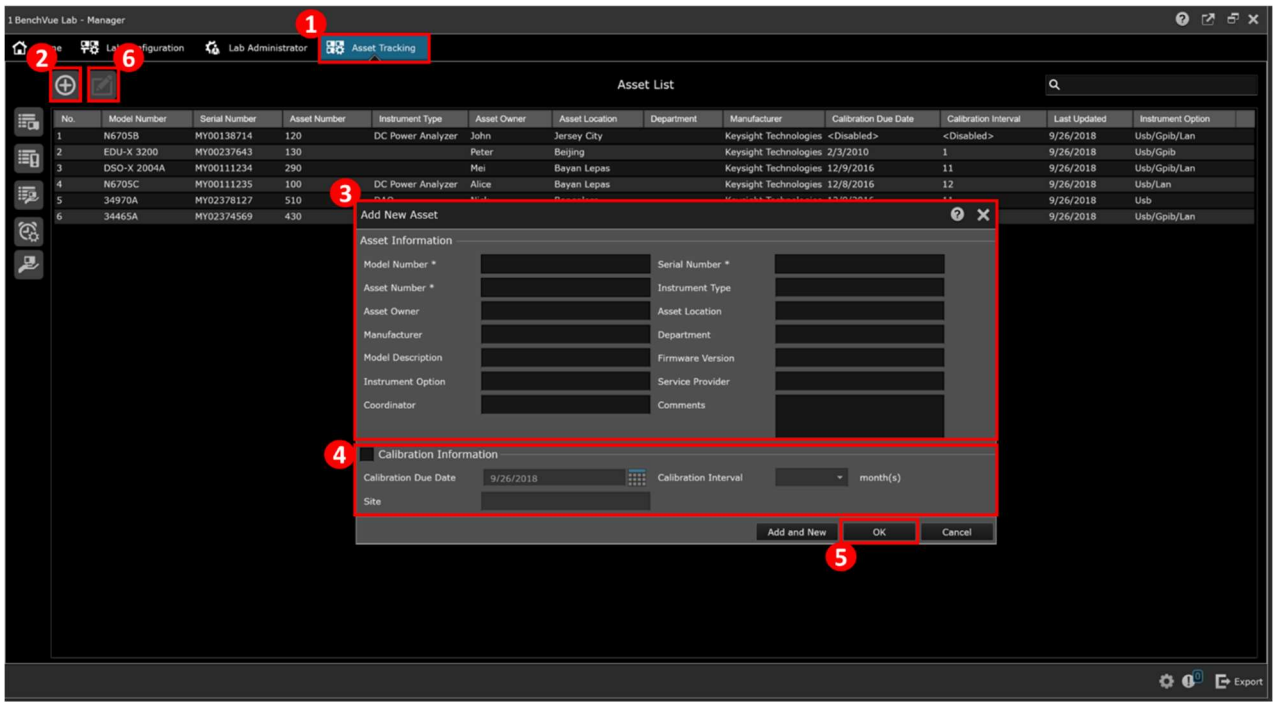
BenchVue Lab Manager Asset Tracking provides intuitive management tool for lecturer and/or lab manager to easily keep track of a long list of assets in the lab including but not limited to instruments, equipment and accessories. The Asset Tracking is designed to manage instrument loaning, instrument calibration schedule tracking with e-mail reminder/alert system and asset reports viewing as well as export. Items may be added to the asset tracking list manually, import from lab layout and/or import from CSV file.



Add New Asset Manually

To add new asset manually,

1. Go to the ‘Asset Tracking’ tab
2. Click the ‘Add New Asset’ icon
3. Input the asset information. The asset’s ‘Model Number’, ‘Serial Number’ and ‘Asset Number’ are mandatory fields that need to be filled. Other fields are optional and can be provided to allow easy filtering, searching or categorization of the assets in the future.
4. If applicable, calibration information can also be provided, typically for test and measurement instruments that require intermittent calibration. The system will notify the lecturer and/or lab manager in the notification icon, homepage dashboard and email notification. Please refer below on how to configure and customize the notification system.
5. Click ‘OK’ to save the entry. The asset will now be on the ‘Asset Full List.’
6. To make changes, click ‘Edit’ to edit the selected entry. If any modification to the entry is made, the date for last update is automatically recorded.

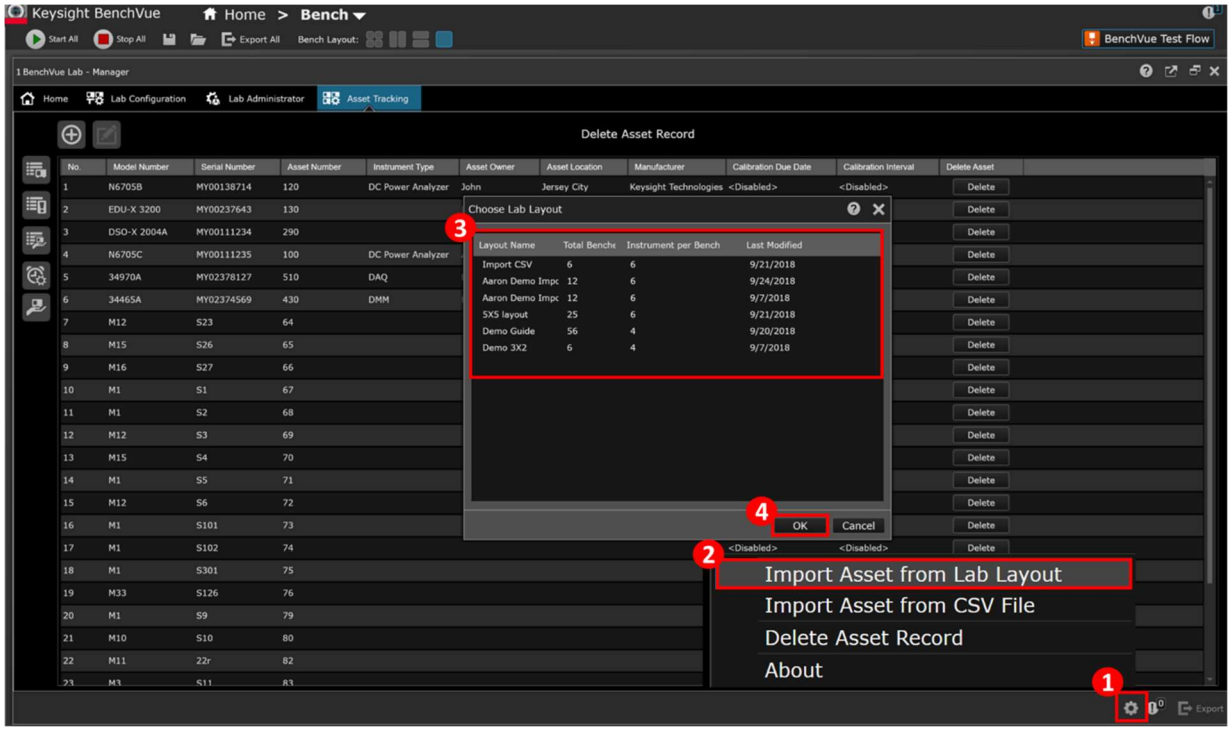


Import Asset from Lab Layout

You may quickly import all the instruments from the lab layout previously configured into the Asset Tracking list. To import asset from lab layout,

1. Click on the ‘Application Settings’ icon at bottom-right
2. Select ‘Import Asset from Lab Layout’
3. Select the desired lab layout
4. Click ‘OK’ to add all the configured instruments from the selected lab layout. Note that only instruments that had been previously configured with Model No. and Serial No. will be added.

Instruments that were configured with VISA address without the mandatory Model No. and Serial No. information cannot be added to the Asset Tracking list and an error message will appear. The Model No., Serial No. and Asset No. must be unique for each entry, otherwise an error message indicating duplicity will appear.



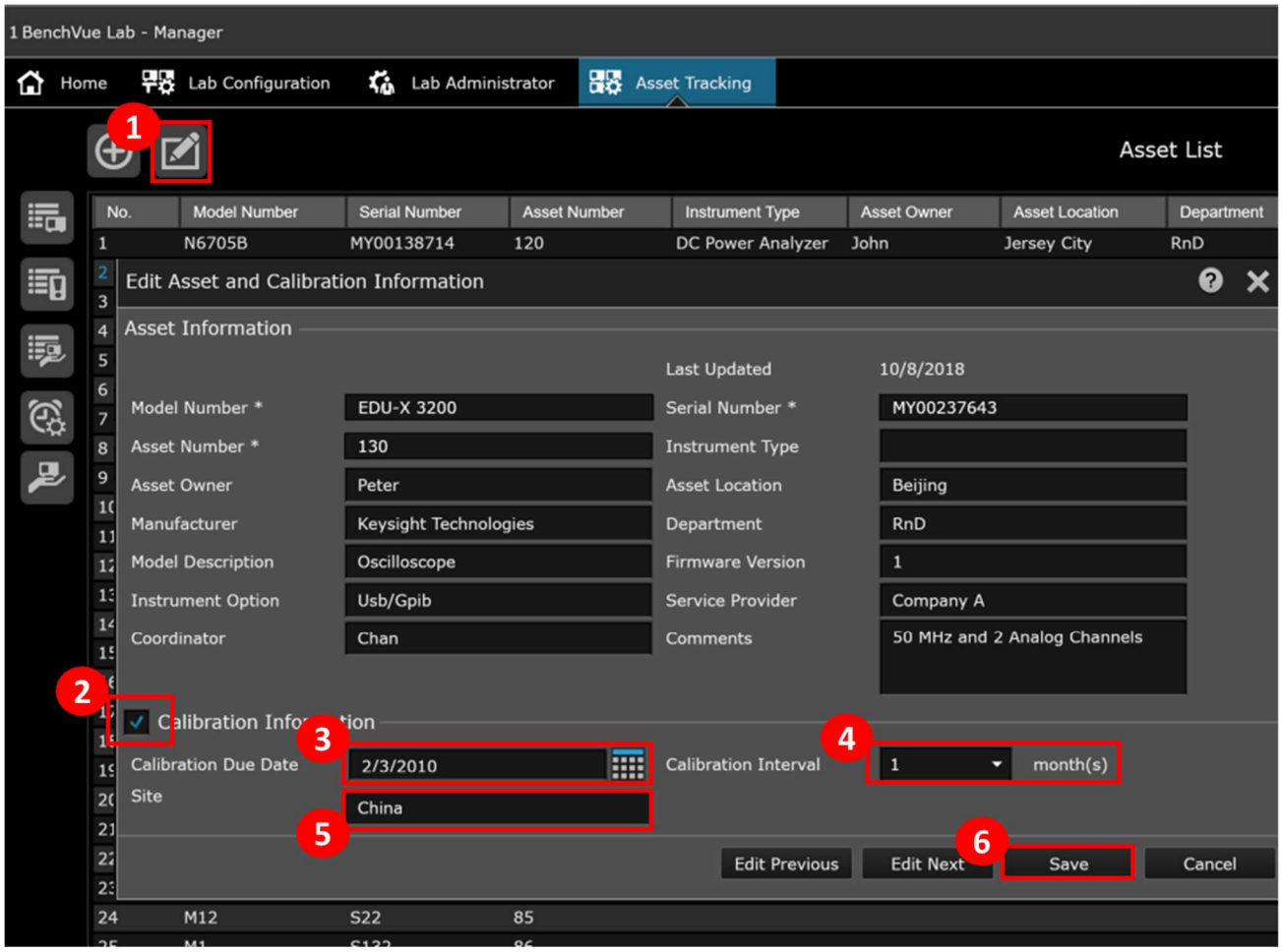
Managing Instrument Calibration

BenchVue Lab Manager include management tools to keep track of instrument calibration. Calibration information can be added to each asset by:

1. Selecting the desired asset and click ‘Edit Asset’ icon
2. Click the ‘Calibration Information’ checkbox
3. Input the ‘Calibration Due Date’ directly MM/DD/YYYY or via the calendar app. This is the first calibration due date. A notification message will appear when the date is approaching and/or on the actual date. The notification settings are customizable with an optional reminder via e-mail (please refer to the ‘Configure Reminder Setting’ below)
4. Select the number of months in ‘Calibration Interval’ to determine the recurrent calibration schedule.
5. Input the calibration ‘Site’ for the location of which calibration center.
6. Click ‘Save’ to save the changes for current entry.

To view the list of instruments currently with calibration due date over lapsed, click ‘Pending Calibration Asset’ icon. The list will of asset will appear in red indicating calibration overdue. The ‘Remaining Days’ information in negative value indicates the number of days has lapsed since the calibration due date.

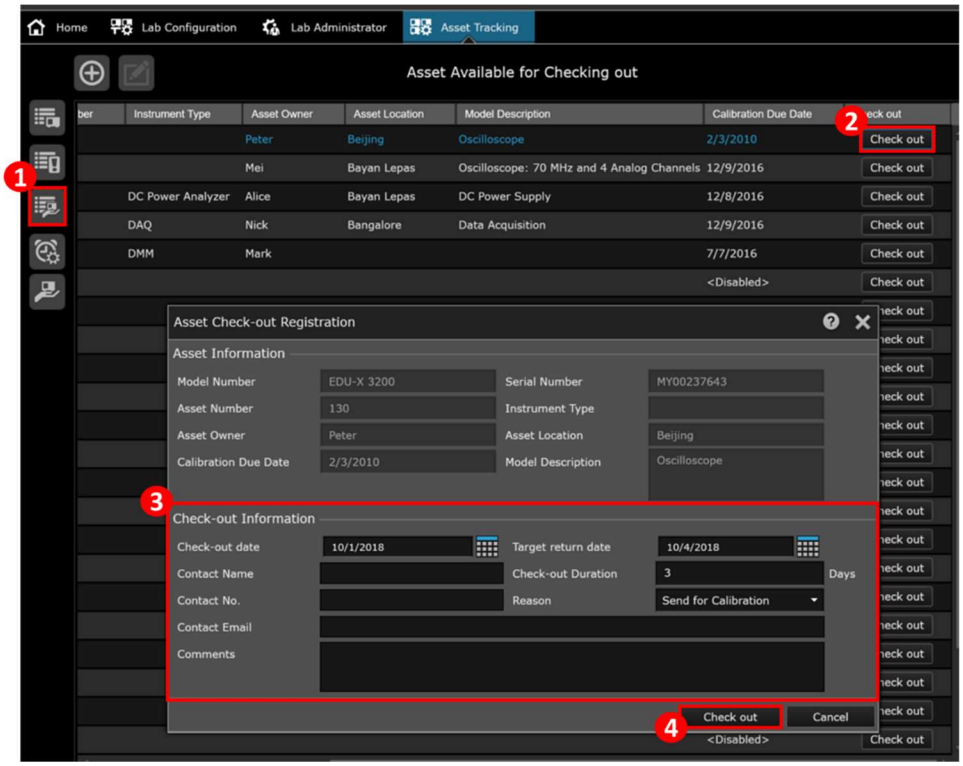
After calibration has been completed, click ‘Edit Asset’ icon on the selected instrument to update the ‘Calibration Due Date.’ The system will automatically track the next recurrent calibration due date.



Asset Checking Out

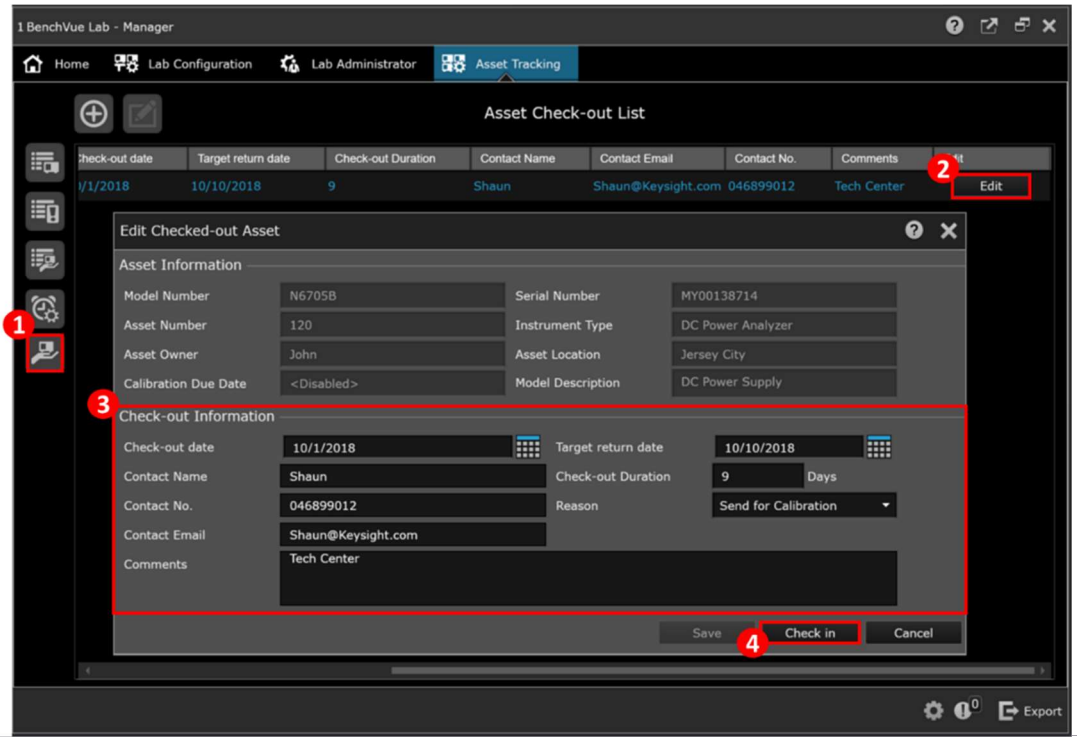
Asset checking out feature is useful for tracking the physical location of the instruments where it is often sent out for loan or calibration. To check out an item,

1. Click the 'Asset Available for Check Out' icon. The list shows items that are currently available in the lab.
2. Select the desired item for checking out and click the 'Check Out' icon
3. Fill in the 'Check-Out Information' including check-out date, target return date, contact name, number and e-mail etc. A notification message will appear when the target return date is approaching and/or on the actual date. The notification settings are customizable with an optional reminder via e-mail (please refer to the 'Configure Reminder Setting' below). You can also easily select the reason for check-out in a drop-down menu for either 'Send for Calibration' or 'Send for Loan.' For other reason, you may select 'Other' and input the 'Comments' section for specification.
4. Click 'Check Out' to check out the item. The item will now be removed from the 'Asset Available for Check Out' list.



To view all the items currently being checked-out and to edit the ‘Check-Out Information’

1. Click the ‘Asset Check-Out List’ icon.
2. Click the ‘Edit’ icon of the desired item.
3. You may edit the ‘Check-Out Information’ and click ‘Save’ to save the changes.
4. To check in the item when it is returned, click the ‘Check In’ icon. The item will now be moved back to the ‘Asset Available for Check Out’ list.



Configure Reminder Settings

The BenchVue Lab Manager provides automatic reminder notification for instrument calibration due date and asset check-out end date. The reminder notification settings are customizable according to the user preferences. To configure reminder settings:

1. Click on the 'Configure Reminder Settings' icon
2. Check the 'Perform reminder scan' checkbox to enable reminder scan. You may customize how often (i.e. daily, weekly or monthly) and at what time the system performs reminder scan on the lab assets for notification for calibration and/or asset check-out reminder.
3. Check the 'Calibration Reminder' checkbox to enable calibration reminder. You may customize the number of days prior to expiration date and/or on the expiration date. The type of notification (i.e. Message, Warning or Alert) that appear on the notification panel can also be customized to distinguish the calibration reminder from other types of notifications.
4. You may also choose to send e-mail notification to the e-mail address recipients configured. First, you need to setup the e-mail sender by clicking the 'E-mail Setup' button. In the E-mail settings' pop-up menu, select the 'Custom' radio button and input the username, password, server and port information. Please refer to the respective E-mail provider for Fowarding and POP/IMAP setup guide. In this example shown, an Gmail account is used for the setup. Please visit the following URL for Gmail setup and troubleshhoot guide:
   https://support.google.com/mail/answer/7104828?hl=en&visit_id=636739814384206357-3541955164&rd=1
   Additional, you may need to enable less secure apps access:
   https://support.google.com/accounts/answer/6010255?p=lsa_blocked&hl=en&visit_id=636739814384206357-3541955164&rd=1
5. Check the 'Check-Out Reminder' checkbox to enable check-out reminder. You may customize the number of days prior to check-out date and/or on the check-out end date. The type of notification (i.e. Message, Warning or Alert) that appear on the notification panel can also be customized to distinguish the check-out reminder from other types of notifications.
6. You also configure E-mail notification for check-out reminder similarly by following Step 4.

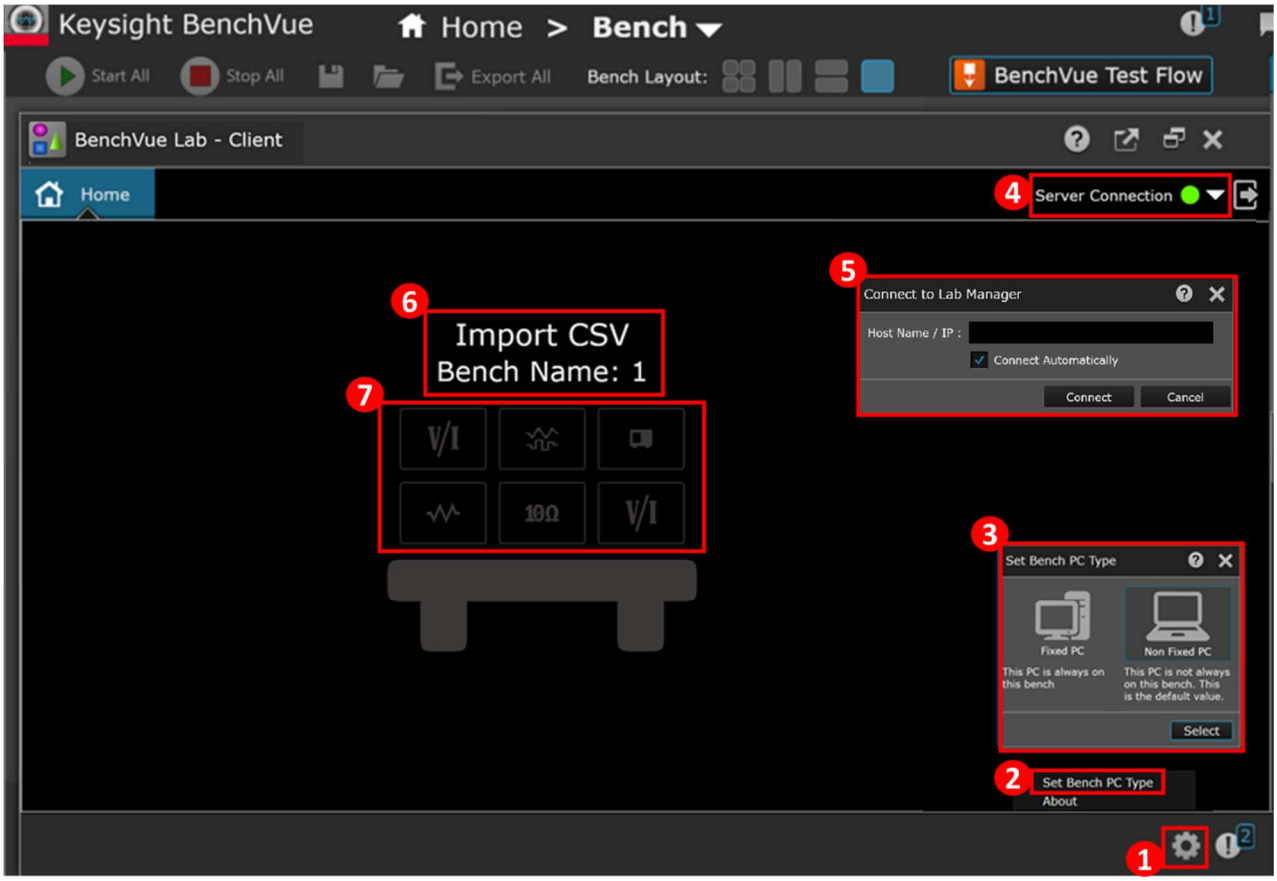
BenchVue Lab – Client Configuration

BenchVue Lab – Client app is designed for test bench PCs and connects all the instruments at individual test benches. The BenchVue Lab – Client readily links with the BenchVue Lab – Manager installed on the main Admin PC via LAN connection.

To launch BenchVue Lab – Client on the test bench PC, go to Application tab>select BenchVue Lab – Client> Launch. If the app is yet to be installed, you will need to install the app first by clicking 'Install'. After the installation is completed, you will now be able to launch the app. Once the client app is launched,

1. Configure the PC type by clicking the 'Application Setting' icon
2. Click 'Set Bench PC Type'.
3. Select either Fixed PC for a dedicated PC that is permanently used for the test bench or Non-Fixed PC for a non-permanent mobile PC, i.e. student's mobile PC. Click 'Select' to confirm selection.
4. Click the 'Server Connection' panel to connect to the BenchVue Lab Manager installed on the Admin PC.

5. Input either the Host name ID or the IPv4 address of the Admin PC and click ‘Connect.’ You may choose to select the ‘Connect Automatically’ checkbox for future connections. Please note that the test bench PC and the Admin PC must be connected in the same network via LAN cables.
6. Select the desired ‘Test Bench Name’ as designated in the lab layout by the BenchVue Lab – Manager.
7. You may configure the connected instruments on the test bench. Please refer to the guide above on how to configure instruments.



Learn more at: www.keysight.com

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at: www.keysight.com/find/contactus