ModusToolbox™ Power Suite GUI user guide

ModusToolbox™ Power Suite GUI version 1.1.0

About this document

Scope and purpose

ModusToolbox™ Power Suite GUI is a tool provided as part of the Power Suite ecosystem. The tool helps power systems engineers quickly evaluate, run, and optimize power conversion solutions.

Intended audience

This document helps design engineers and power systems developers understand how to use the Power Suite GUI for creating their Power Suite Power Conversion Library-based solutions in a ModusToolbox™ environment.

Document conventions

Convention	Explanation
Bold	Emphasizes heading levels, column headings, menus and sub-menus
Italics	Denotes file names and paths.
`Courier New`	Denotes APIs, functions, interrupt handlers, events, data types, error handlers, file/folder names, directories, command line inputs, code snippets
File > New	Indicates that a cascading sub-menu opens when you select a menu item

Abbreviations and definitions

The following define the abbreviations and terms used in this document:

- ADC – analog-to-digital conversion
- Application – One or more projects related to each other.
- COM – communication port
- Configurator – A GUI-based tool used to configure a resource.
- CSV – comma separated values
- Dongle – Communication interface: USB to I2C converter
- GUI – graphical user interface
- MCU – microcontroller unit
- OSC – Oscilloscope
- PMB – Power Management Bus (PMBus)
- RMS – root-mean square
- USB – universal serial bus

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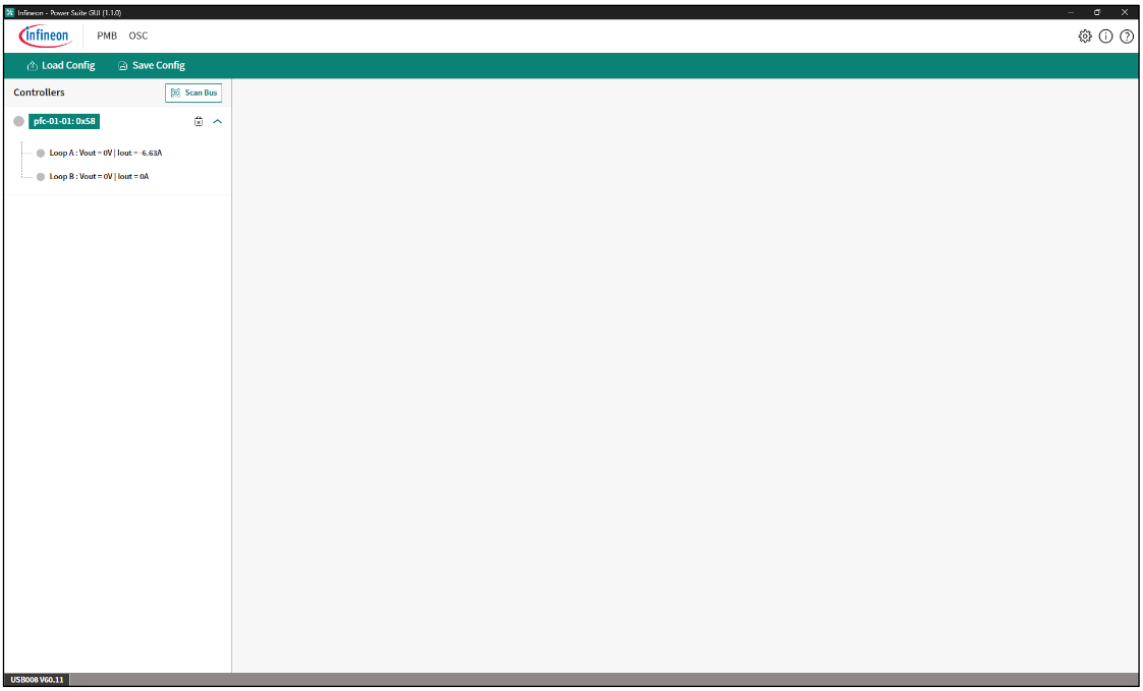
1 Power Suite GUI overview

ModusToolbox™ Power Suite GUI is a graphical user interface with parameters configuration for Power Suite Power Conversion Library-based applications. The GUI is designed to configure, tune, and test the Power Suite Power Conversion Library features on supported power boards.



1.1 Supported devices

- ModusToolbox Power Suite TP-PFC Interleaved Converter Reference Code Example
- ModusToolbox Power Suite TP-LLC Interleaved Converter Reference Code Example

1.2 Main features

- Command Display and Description – Access descriptions of different commands and see their values.
- Command Management – Read and write command values for different loops.
- Command Live Reading – Activate live reading to periodically read the values of different commands.
- Integrated Oscilloscope – Monitor selected signals in real-time using the built-in oscilloscope, which enables the users to visualize and analyze signal behavior.
- Communication Protocol Support – Leverage support for PMBus communication ensuring the compatibility with a range of devices and systems.

1.3 Power Suite GUI digital tools

- PMBus
- Oscilloscope

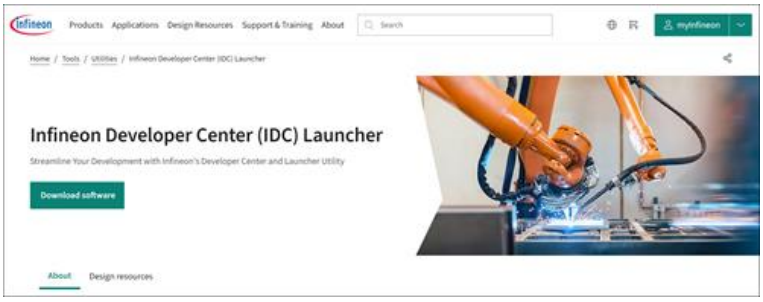
2 Launch the Power Suite GUI

2.1 Install from Infineon Developer Center

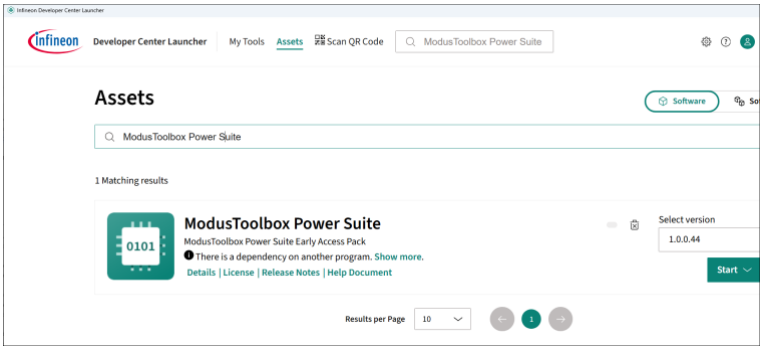
1. Install the Infineon Developer Center (IDC) Launcher:

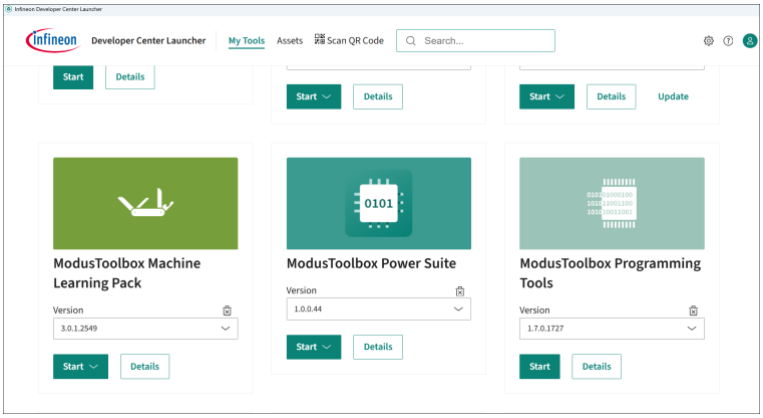
   https://www.infineon.com/design-resources/development-tools/utilities/infineon-developer-center-idc-launcher

2. Open the launcher and log in with "myInfineon" account.



3. Select "Assets", search for and install the “ModusToolbox™ Power Suite Pack”.

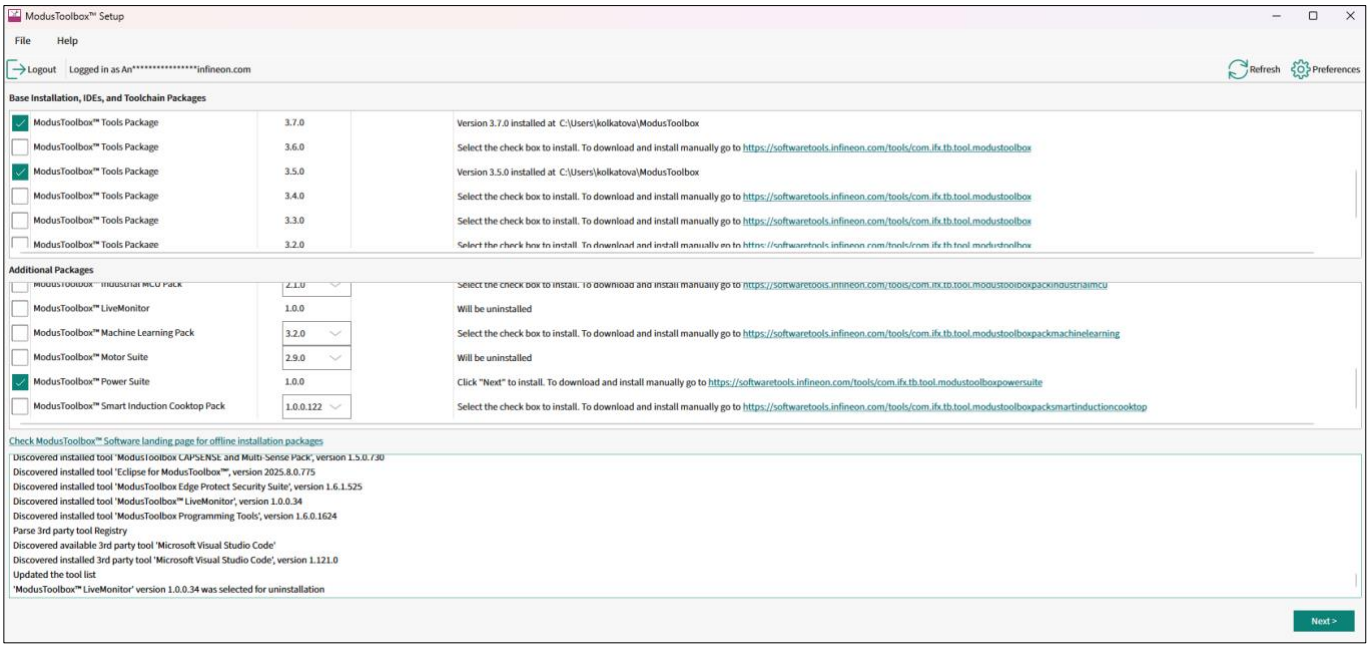




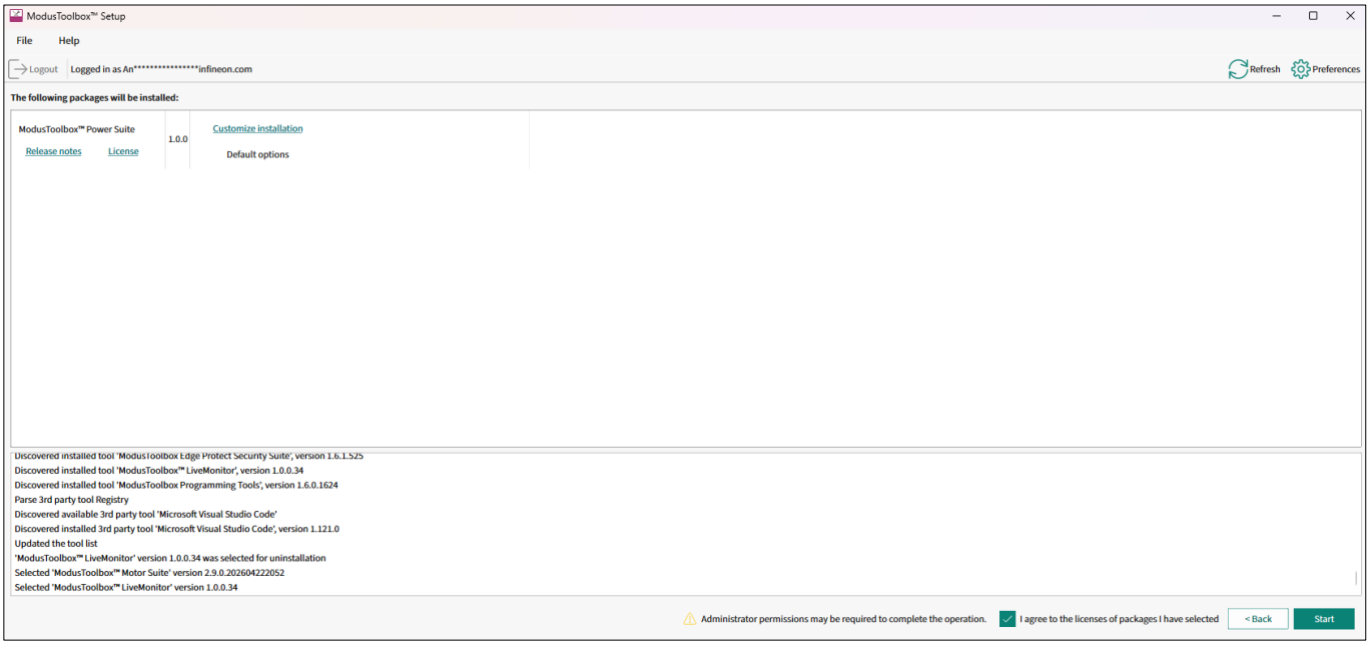
4. Click **Start** to open the EXE file to launch the GUI.

2.2 Install from ModusToolbox™ Setup

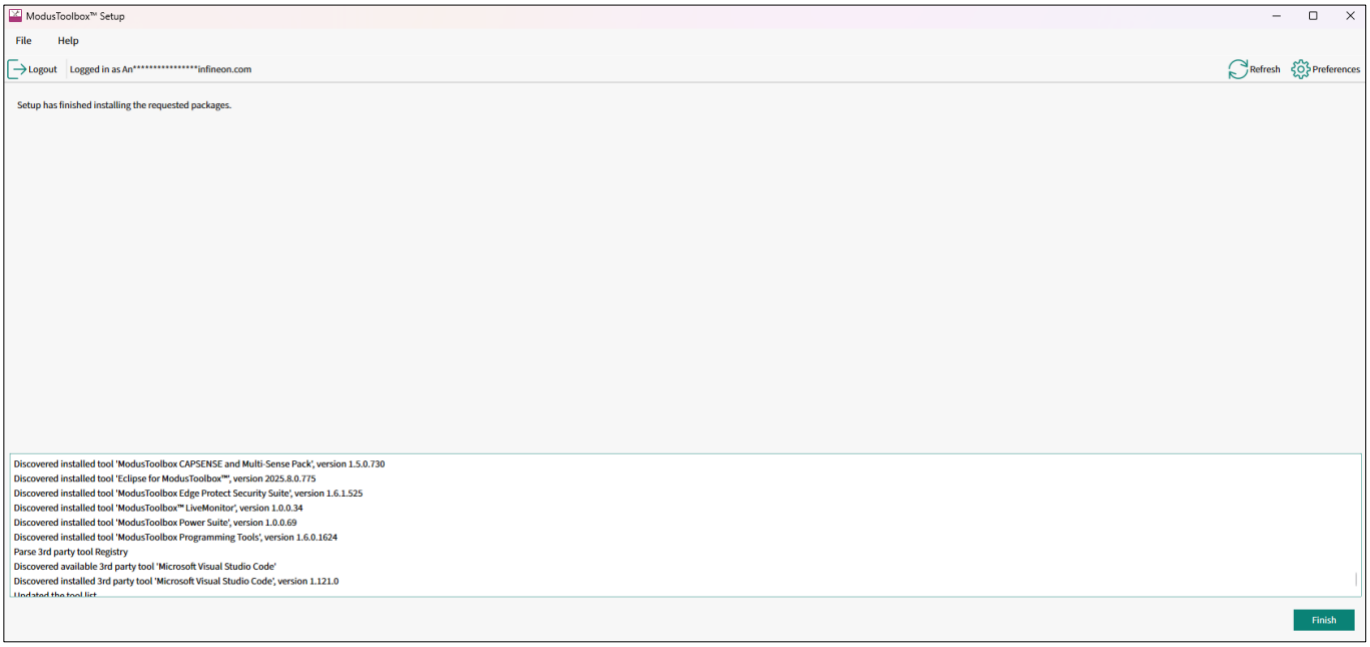
1. Run ModusToolbox™ Setup to select the required tools and dependencies.



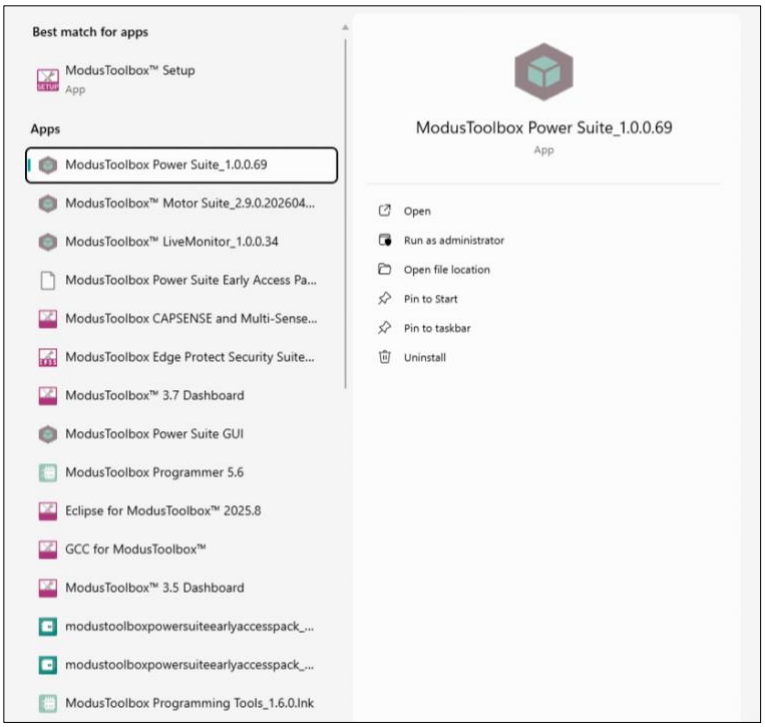
2. Click **Next** to start the installation process.



Launch the Power Suite GUI

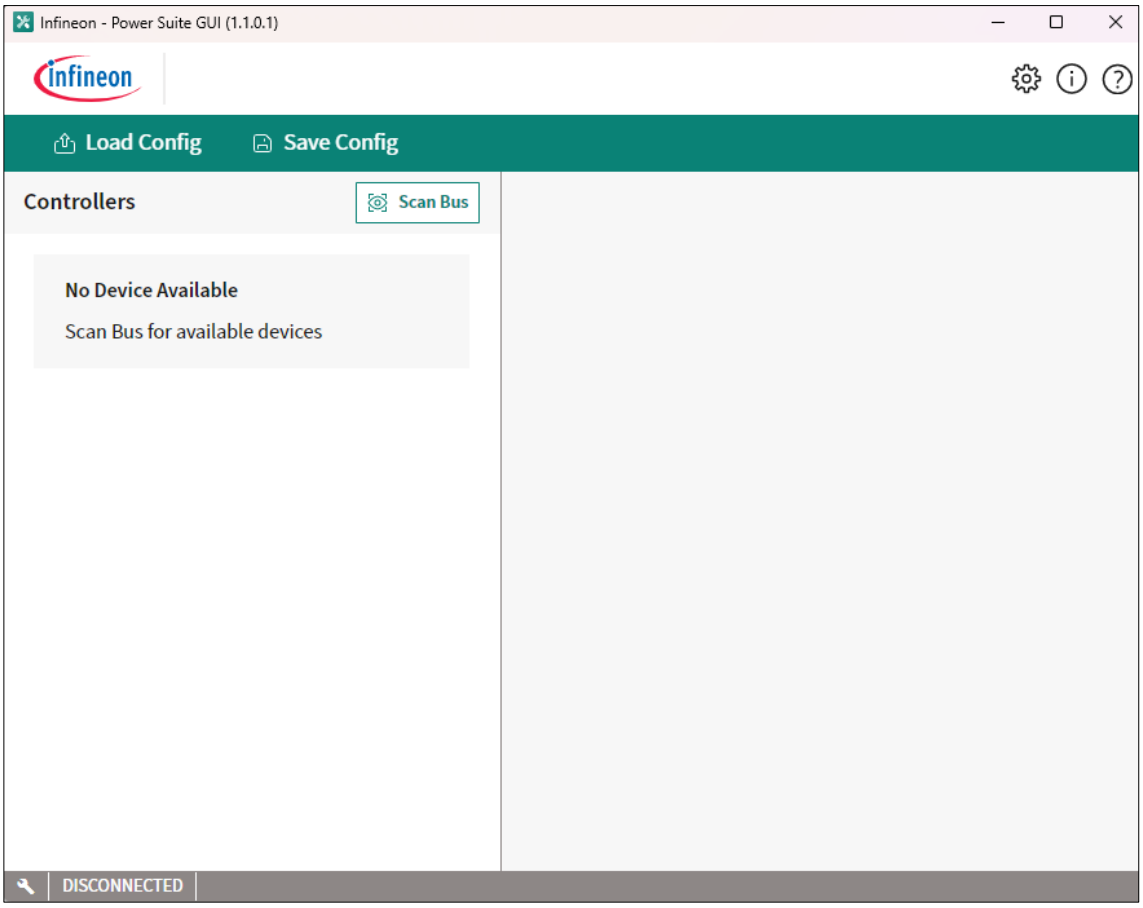


3. Launch application.



2.3 Run application

1. For the first time, the Power Suite GUI opens without any settings configured.



2. Connect a supported device to see the device utility toolbar.

   The tool automatically detects the supported device, and it displays on the **Controllers** panel.

   If the tool does not detect the device automatically, use the **Scan Bus** button.

3 GUI description

The Power Suite GUI contains the various parts to configure the settings and the status bar to provide information and indications.

The following chapters describe the Power Suite GUI panels, panes, and the other GUI parts:

- Device utility toolbar
- Hotbar Manager
- About
- Help
- Action bar
- Controllers panel
- Status bar

3.1 Device utility toolbar

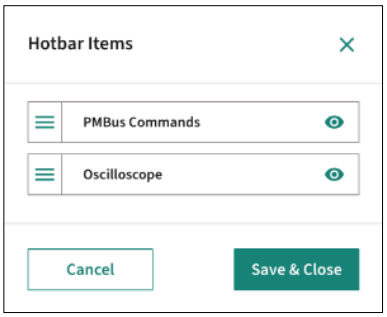


The left side of the bar displays the **PMB** and **OSC** device utility tools if the Power Suite GUI is connected to a supported device. These tools allow the user to communicate, debug, and configure the selected device.

The right side displays the **Hotbar Manager**, **About**, and **Help** icons.

3.1.1 Hotbar Manager

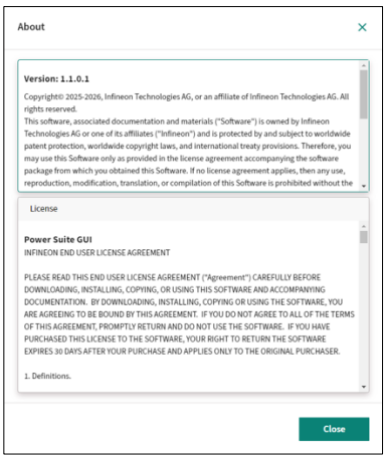
Click  icon to open the **Hotbar Items** window.



To modify the way the **Hotbar** displays its items, use  icons to show/hide;  – pull up/down to change the icons order.

3.1.2 About

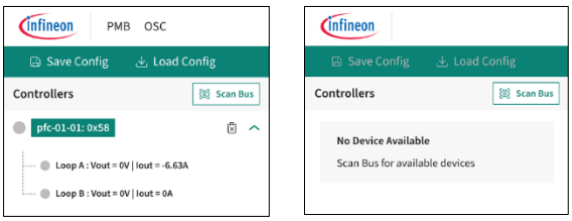
Click icon to see the license information and version in the modal window.



3.1.3 Help

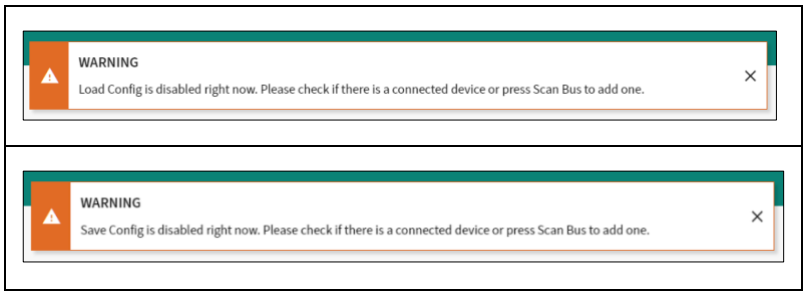
Click icon to see this document in the browser window.

3.2 Action bar



The action bar consists of the **Load Config** and **Save Config** buttons, which allow saving and loading existing projects.

Note that the actions are available only if there is a connected device. Otherwise, a warning notification displays.



Actions

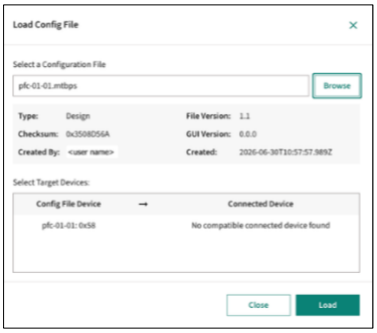
1. Load the configuration file pane

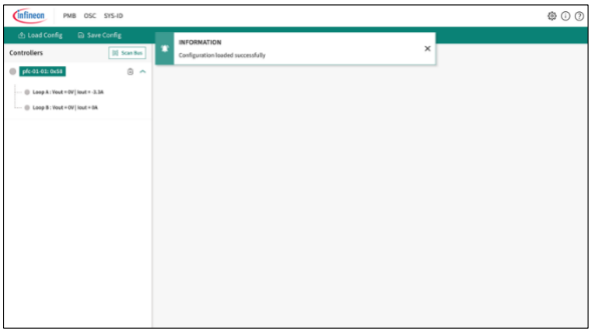
   Click the **Load Config** button to open the window to select an existing project configuration file.

GUI description

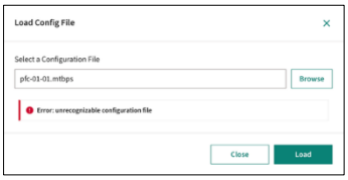


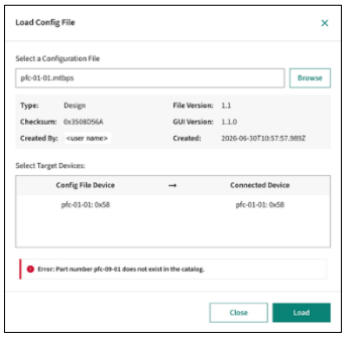
a. if the project file has not been changed and the corresponding device exists, click the **Load** button to apply the configuration from the file





b. if the project file has been changed or the device is unavailable, errors display

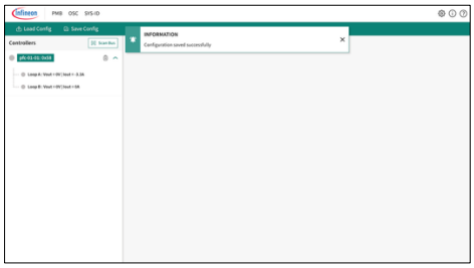


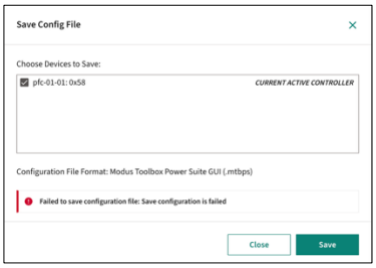




2. Save the configuration.



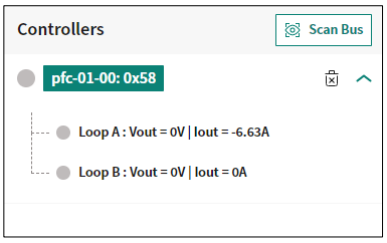




Click the **Save Config File** button to open the window to save the current project configuration in the file. If the action has been completed successfully, the status bar will be updated with the last saved or loaded configuration file.

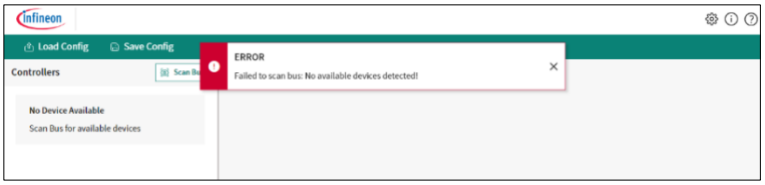
3.3 Controllers panel

The **Controllers** panel displays information about the selected device. Use  icons to remove or collapse the device.



3.3.1 Scan Bus

When the Power Suite GUI detects a dongle, the Scan Bus automatically scans the PMBus address and adds the device. Otherwise, it displays an error.



3.4 Status bar

Displays information about the connected device and last saved or loaded configuration file.

Before connecting to the device:



After connecting to the device, the dongle name displays:



Configuration saved:



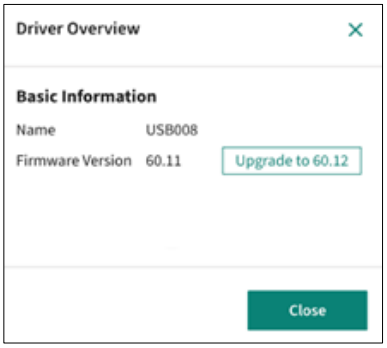
Configuration loaded:



3.4.1 Driver Overview

Click 

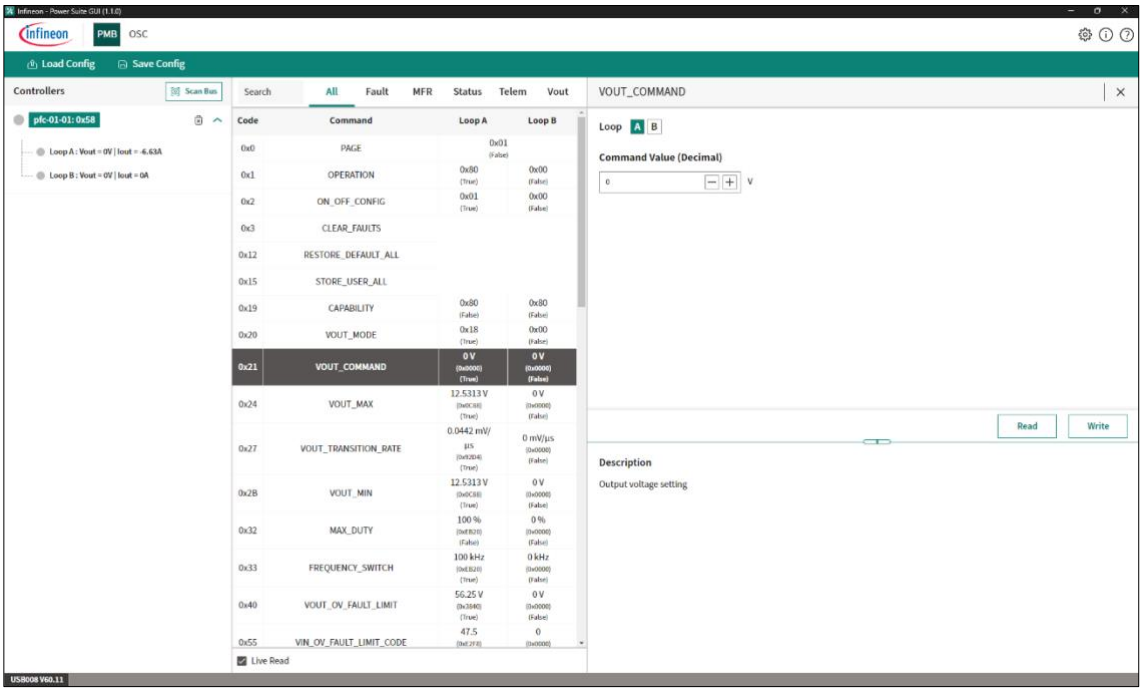
to see the **Driver Overview** modal. It displays the connected device **Basic Information**, **Name**, and **Firmware Version**. The Power Suite GUI can detect the dongle version and allow the user to update it automatically.



4 PMBus

The **PMBus** panel displays the list of configured commands.

Click **PMB** to launch the tool.



PMBus main features

- This open standard protocol defines a means of communicating with power devices. Go to https://pmbus.org/ to see the protocol documentation and specifications.
- Designed to simplify the configuration of PMBus target devices.
- Generates a comprehensive data structure that facilitates efficient middleware configuration.

4.1 PMBus Commands

PMBus commands are used for Oscilloscope. The user can read and write all configured commands manually.

When the PMBus is run for the first time, all read commands execute automatically and continue to do so on every scroll. To stop this behavior, uncheck the **Live Read** checkbox.

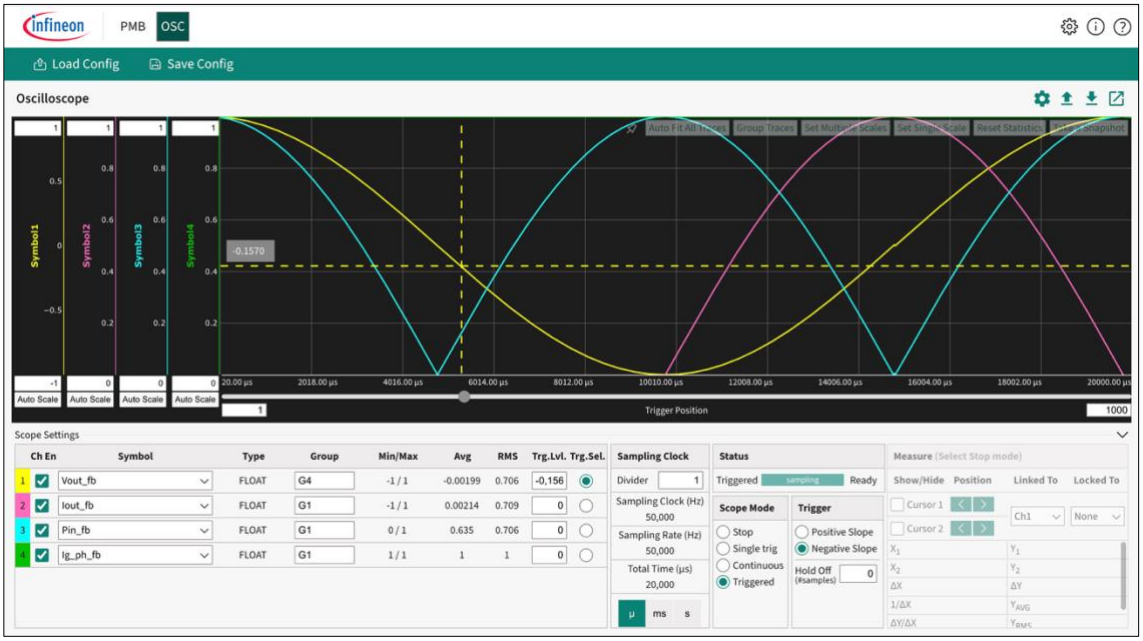
The right side of the panel displays the information on the selected command and available actions:

- **Loop** – Selects which loop command to read or write.
- **Command Value (Decimal)** – Displays in the **.hex* format. You can input a value or increment/decrement it by buttons **+**/**-**. The maximum value depends on the configured command size in bytes. If the input value is bigger, it will be set as the maximal allowed (e.g. **0xhFF** for 1 byte).
- **Read**/**Write** – Used to read or write the command value. Some commands are allowed only to read, some – only to write, some – read and write.
- **Description** – Displays the command description after it is configured.

5 Oscilloscope

The **Oscilloscope** panel has a signal display and scope settings. It reads signal values from a connected Power Suite Power Conversion Library-based device via PMBus in the Power Suite GUI.

Click **OSC** to launch the tool.



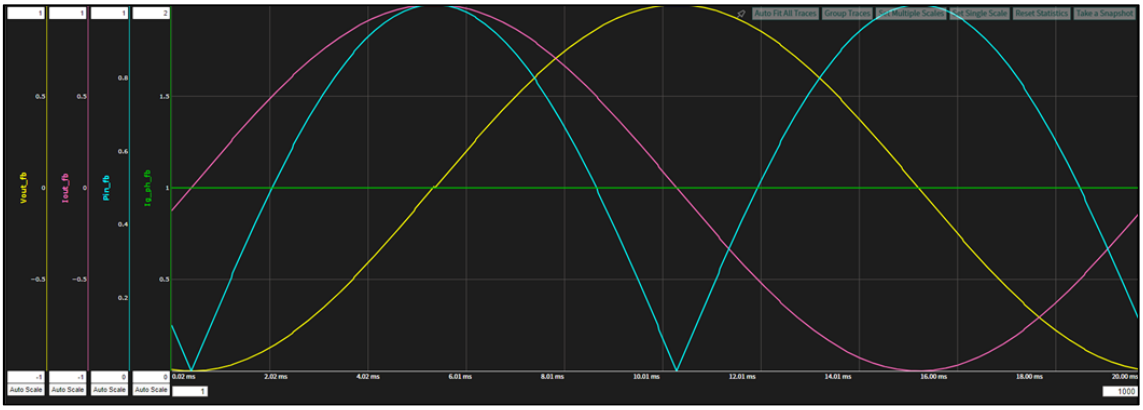
Oscilloscope main features

- Signal display for the selected channels in a visual chart
- Controls and buttons to rescale the axes for the traces
- Trace assignment to different channels
- Enabling/Disabling channels
- Real-time trace statistics display
- Sample rate changing with divider input
- Time unit display settings
- Scope modes to stop or control the sampling procedure
- Trigger slope, position, level and holdoff settings
- Measurement with cursors
- Trace settings
- Export and Import oscilloscope data as CSV file
- Tacking a snapshot of chart

The oscilloscope can work in the background. Open it in a separate window or switch the tool and it will continue working in the selected mode until either another device is selected or the current device deleted.

Note: *Important! The oscilloscope is integrated into multiple GUI tools (i.e. Motor Suite GUI, Power Suite GUI, LiveMonitor). However, only one oscilloscope can be active at a given time for a specific device. Refrain from opening more than one oscilloscope window across different tools (when connected to the same device).*

5.1 Trace display for selected signals (chart)

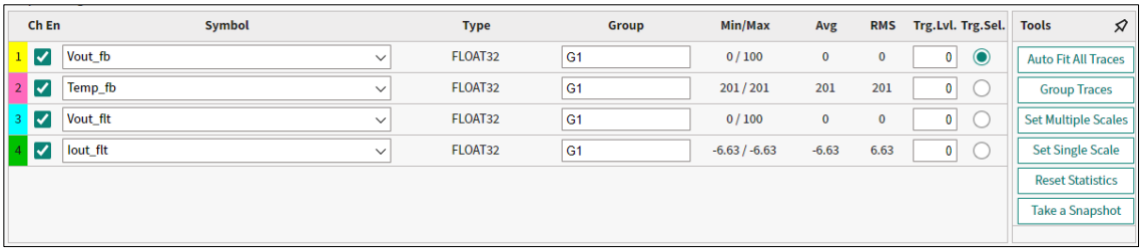


The tool periodically gathers sampling data for the selected signals. The chart displays traces for all channels. Each set of samples contains 1000 data points by default but the firmware configured in the board can be different.

5.2 Tools (quick action buttons)



Use  button to pin the quick actions to the Scope Settings sections.

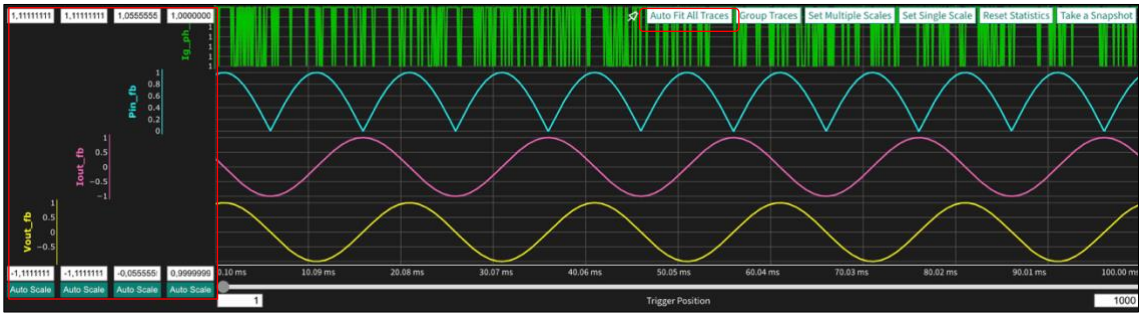


The following chapters describe the quick action buttons usage and their respective panes:

- Auto Fit All Traces
- Group Traces
- Set Multiple Scales
- Set Single Scale
- Reset Statistics
- Take a Snapshot

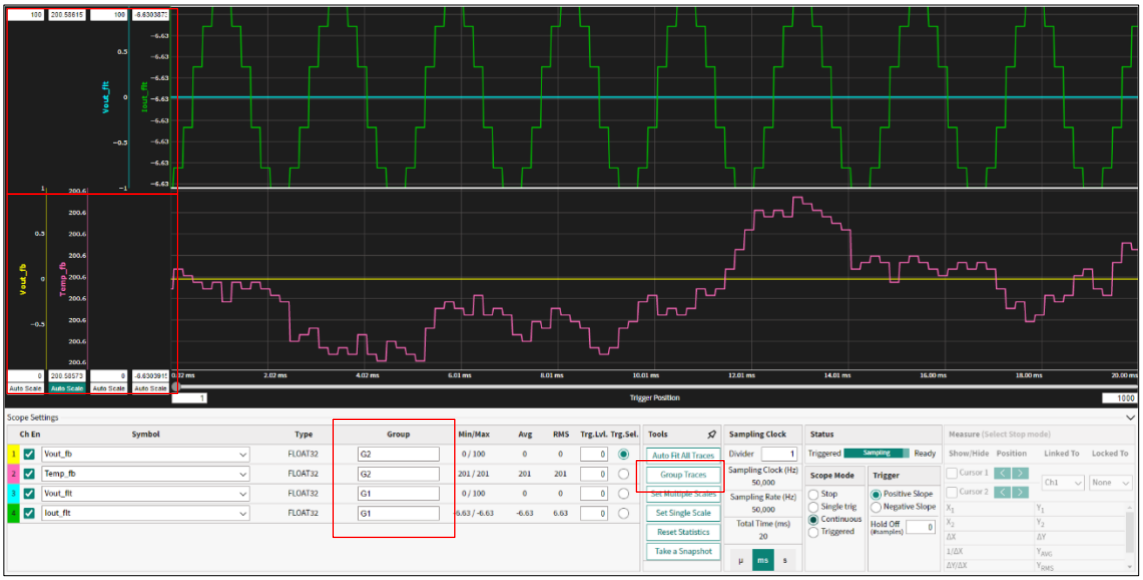
5.2.1 Auto Fit All Traces

Use this button to auto-fit all traces to the chart window so that traces do not overlap. Each vertical axis is used independently within the vertical domain assigned to them. The traces never overlap visually.



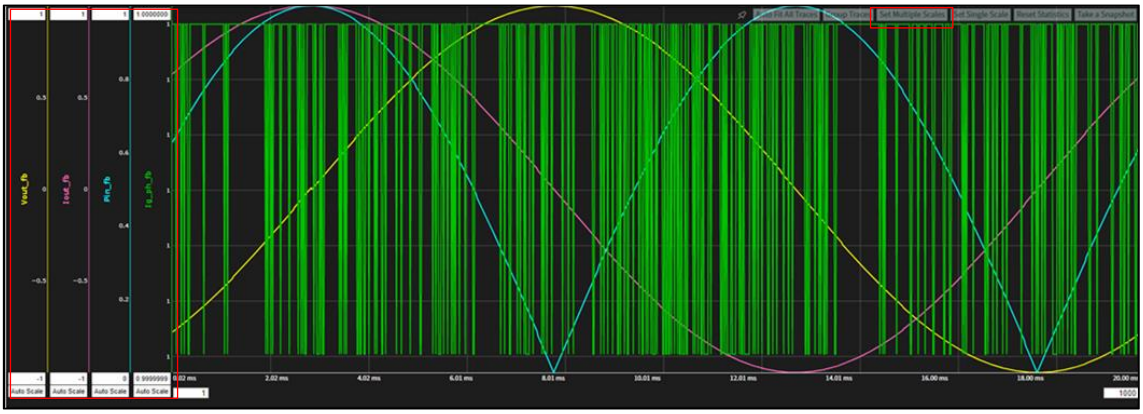
5.2.2 Group Traces

Use the group inputs on the channel settings pane to group traces and assign group names. This button works similar to **Auto Fit All Traces,** but it allows you to decide which traces will share the chart domain assigned to the group.



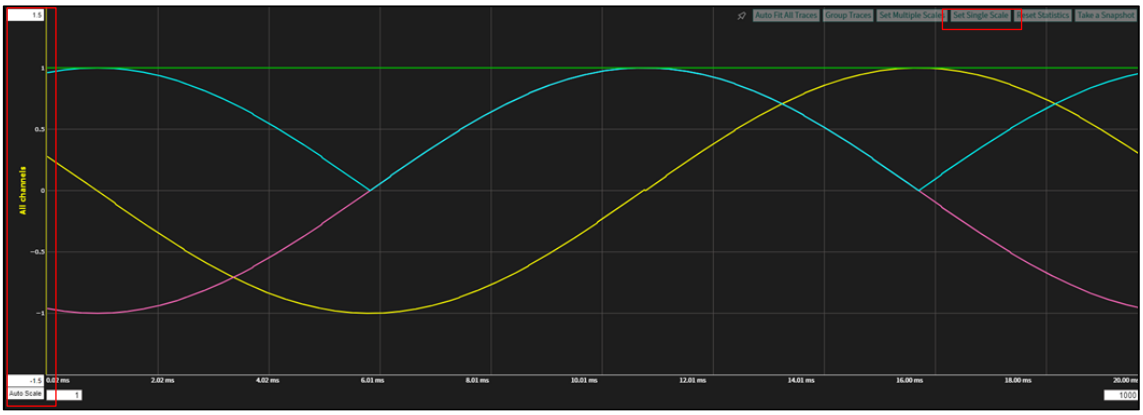
5.2.3 Set Multiple Scales

Use this button to fit traces independently to the chart area in the whole vertical domain. Each trace uses the available space to display the maximum detail.



5.2.4 Set Single Scale

Use this button to position traces so that all vertical axes use the same scale. You can compare the signals data by using the same scale.



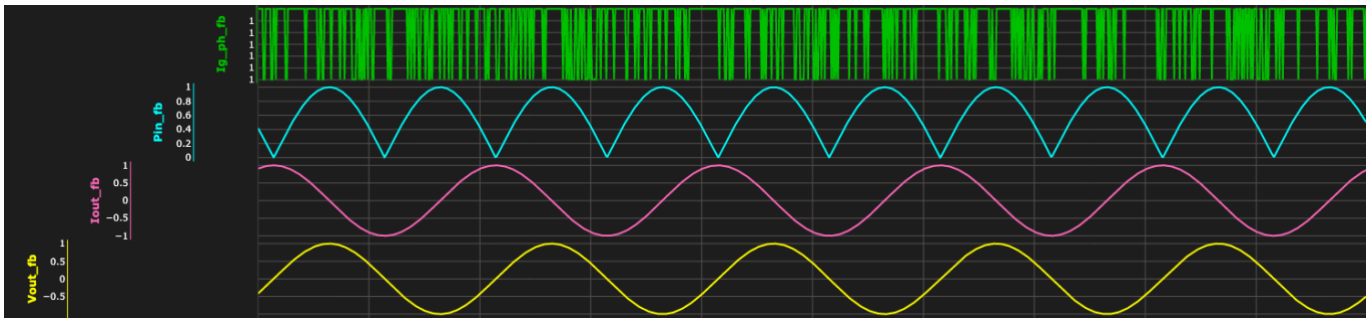
5.2.5 Reset Statistics

Minimum, maximum, average statistics and the root mean square are updated after every new set of data samples. The minimum and maximum are global, so they reflect the whole sampling history. Retrieving data for a long time increases the [min, max] range, and the **Set Multiple Scales** scaling becomes less efficient due to the past outlier values. Click **Reset Statistics** and **Set Multiple Scales** to re-adjust the scaling and display more details on the chart.



5.2.6 Take a Snapshot

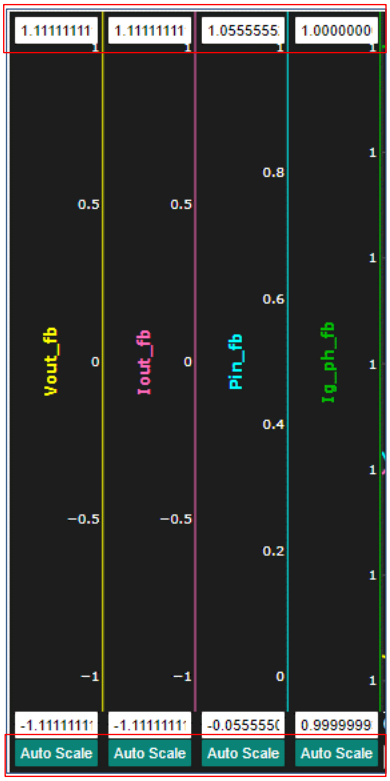
Use this button to capture the latest frame on the chart and save it as a PNG image file.



5.3 Other controls

There are more controls used to scale a single vertical axis.

1. **Auto Scale** buttons



Use these toggle buttons to auto scale the corresponding axis using the signal range. When activated, the pane turns green. After every new sampling, the scale is updated using the upper and lower boundaries of the latest sampling.

2. Scale inputs

Used to apply custom limits to the corresponding axis. The top and lower inputs display respectively the upper and lower bounds of the axis range. Both inputs can be used to modify the selected axis scale.

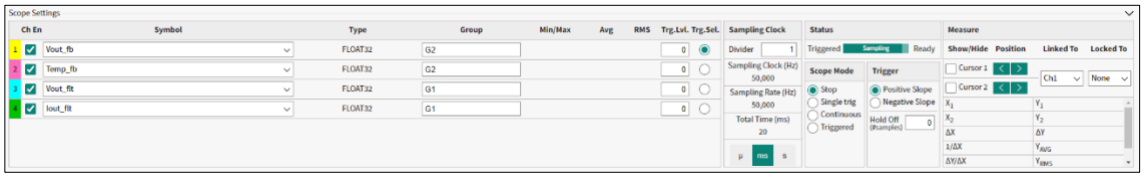
3. Horizontal axis

Oscilloscope

Show the time scale with the active time unit from the scope settings time-based configuration pane. Use the input boxes to set the lower and upper bounds of horizontal axis similar to vertical axes. Note that these inputs display the sampling index, not the time. Assign a value within the range of the number of samples.



4. Scope Settings

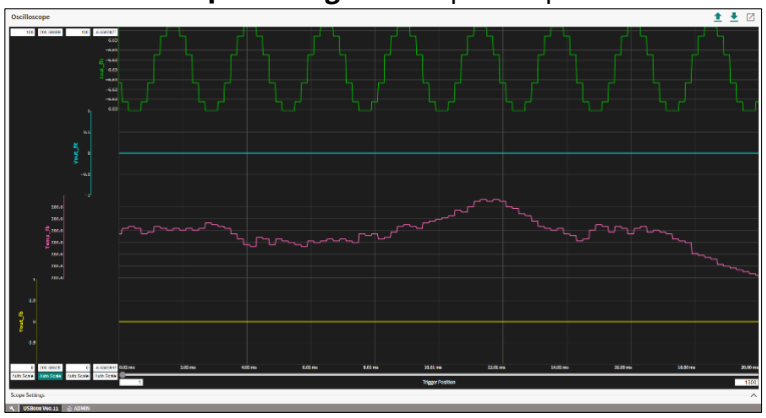


Use the scope settings to adjust the settings for channels, trigger options, and measurements.

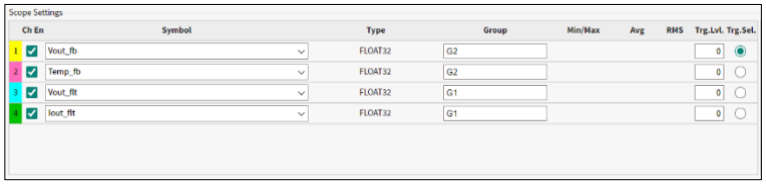
The following chapters describe the groups of the **Scope Settings** pane:

- Channel settings
- Sampling Clock
- Status
- Scope Mode
- Trigger
- Measure

Uncheck the **Scope Settings** to collapse the pane and to see the oscilloscope full view.



5. Channel settings

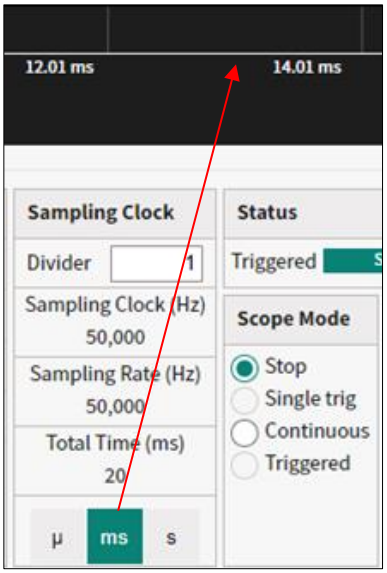


On this pane, you can configure channel and read general information:

- Colored square – Shows the channel number. Its color matches the waveform trace and can be changed in the oscilloscope settings.
- **Ch En** – To enable/disable a channel, check/uncheck this checkbox.
- **Symbol** – To assign a new signal to the channel, select a signal name from the list of symbols on this select box.

- **Type** – Read-only. Displays the data type of the selected signal (e.g. float, int).
- **Group** – Assign a group name to the display groups.
- **Max/Min** – Statistics columns about the data samplings. Calculated based on all previous samplings.
- **Avg** (average) and **RMS** (root mean square) – Calculated based on the latest data set.
- **Trg.Lvl**. and **Trg.Sel.** – Set the trigger channel and trigger level values.

6. **Sampling Clock** (time-based configuration)



- **Divide**r – An integer divisor applied to the hardware clock. Range: 1–200. Increasing this value slows the effective sample rate.
- **Sampling Clock (Hz)** – Read-only. The raw hardware clock frequency.
- **Sampling Rate (Hz)** – Updates automatically. The effective sample rate after applying the Divider (= Sampling Clock ÷ Divider).
- **Total Time (ms)** –The total time window of one full capture frame in the active time base unit.

Use this time-based configuration pane to update the sampling rate:

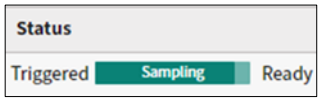
a. change the divider value – enter a number between 1 and 200

b. this updates the sampling rate value, and the frequency of the data sampling changes

c. observe the results on the chart.

Also, you can change the time units (**µs**, **ms**, **s**.) used in the oscilloscope. Default – **ms**. After changing the value, the axis ticks the horizontal axis to update all-time values and units (information boxes, measures, etc.)

7. **Status** (Acquisition Status)

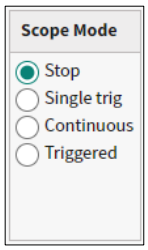


Acquisition Status — Describes the current lifecycle phase of a sampling operation and provides an estimated time to completion. The trigger status indicator displays the sampling state using a progress bar animation:

- **Sampling** – Hardware is actively collecting samples at the configured clock rate.
- **Acquiring** – Data is being transferred from hardware into the GUI application buffer.

- **Loading** – A previously saved recording file is being read from the disk.
- **Complete** – The operation finished.
- **Error** – The operation failed, an error message displays.
- **Imported** – Data is loaded from a file (terminal state after “loading”).
- **Empty** – No operation in progress.

8. Scope Mode



- **Stop** – Stops new data sampling. Halts all data capture. The chart freezes at the last frame. Only cursor measurements are available in this mode.
- **Single trig** – Data is sampled only if the trigger conditions (**Trigger slope**, **Trigger position**…etc.) are met. Captures one complete frame after the trigger condition is met, then switches to **Stop** mode.
- **Continuous** – Samples new data continuously. Captures frames continuously without waiting for a trigger. Useful for always-active signals.
- **Triggered** – Works like **Single trig** mode but samples new data continuously if the trigger conditions are met. Captures a new frame every time a trigger condition is met on the selected trigger channel.

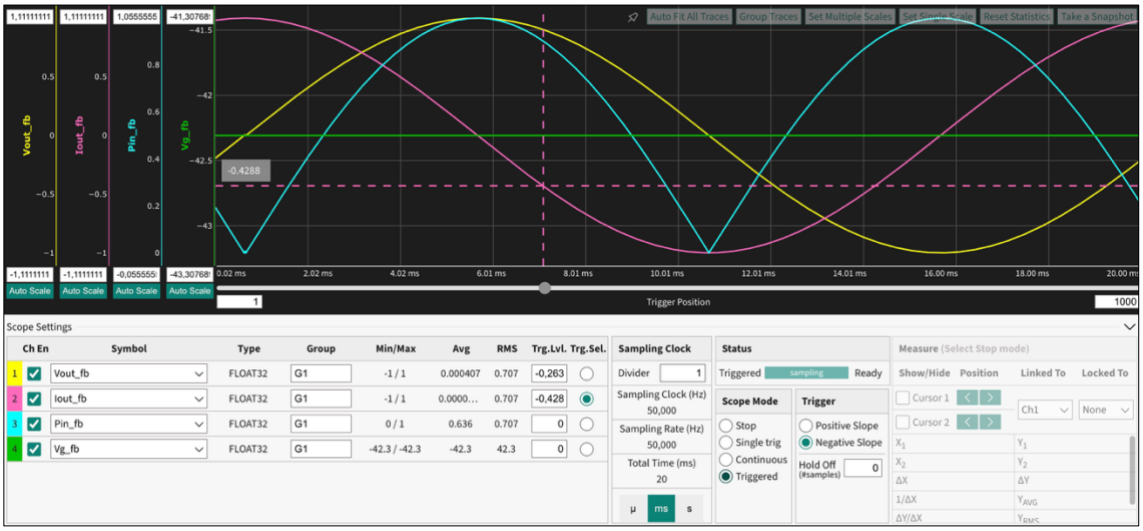
The default trigger channel is channel 1, so **Single trig** and **Triggered** modes test the conditions only for channel 1. The trigger channel can be changed by selecting the **Trg.Sel.** checkbox for the other channels.

Trigger Slope and Hold Off



For Triggered modes, you can select **Positive** or **Negative** Slope, **Trigger Position** and **Trigger Level** values, **Trigger Hold Off**.

Oscilloscope

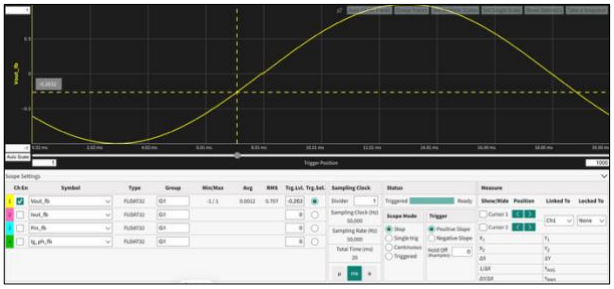


- **Slope** value and **Hold Off** are selected in Trigger Section.
- **Trigger Position** is selected by slider on **X-axis.**
- **Trigger Level** is either selected in the channel settings section by selecting the **Trg.Sel.** radio and input **Trg.Lvl.** value or by drag-and-drop trigger lines on the chart.
- Both trigger lines are not visible in **Continuous** mode.

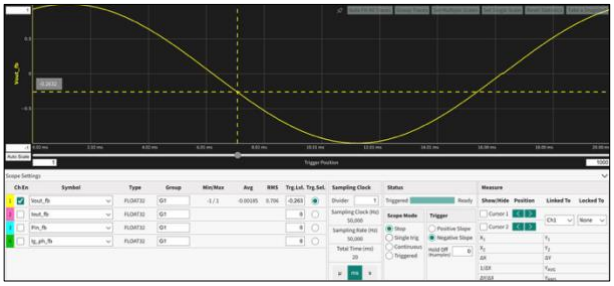
The **Hold Off** input sets the minimum number of samples to be passed after one trigger event before the oscilloscope may trigger again.

For **Positive Slope**, the signal crosses the trigger level while rising; for **Negative Slope** – while falling.

Positive Slope

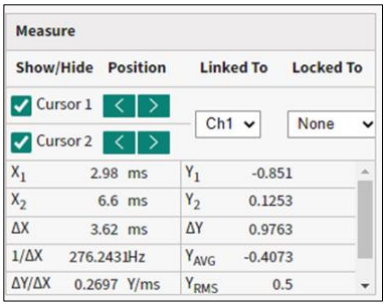


Negative Slope



9. Measure

The **Measure** pane provides the tools to capture statistical data about the signals. Select **Stop** mode to activate the controls in this section.



Note: *The cursor controls are disabled when the scope is in any other mode than **Stop**. Switch to **Stop** mode before enabling the cursors.*

10. Activating both cursors

Activate one of the cursors or both by selecting the relevant checkbox under the **Show/Hide**. The cursors show the position for the linked channel signal.

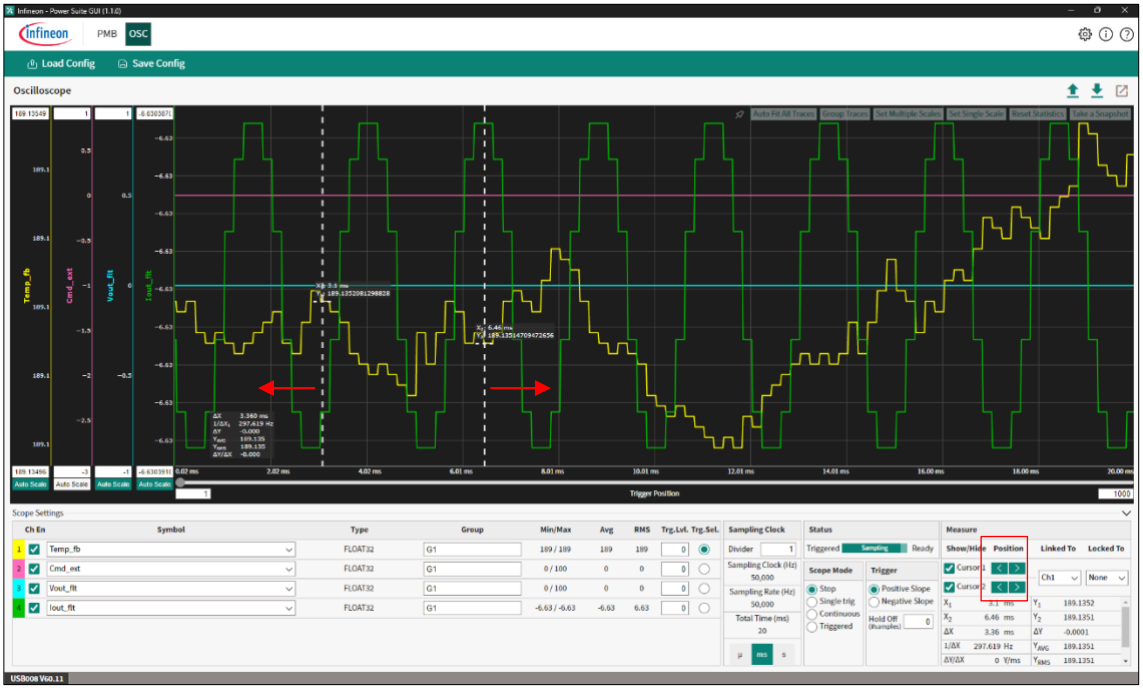


- The statistics are calculated and displayed in the statistics table below the measure controls.
- The statistics are the **X** and **Y** values of cursors and the difference between the two cursor positions. Also, the average, min, max and RMS values of the **Y** values between the cursors are displayed in this table.

Change the cursors positions either by using the arrow keys in the position column or by dragging the cursors in the chart area.

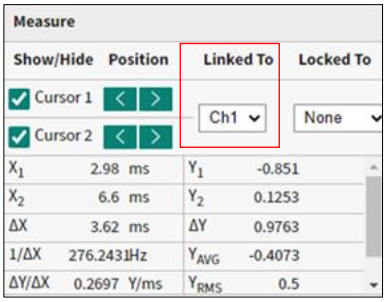
Oscilloscope

11. Moving the cursors



12. Linking a channel to cursors

Link the cursors to different channels. Select the channel name from the **Linked To** box.



Oscilloscope

Lock the cursors so that the distance between the cursors is preserved. If cursor 2 is locked, moving cursor 1 updates the cursor 2 position. The distance between the cursors is always preserved. To change the distance, change the locked cursor position. If the cursor 2 position is changed when it is locked, the cursor 1 position does not change.

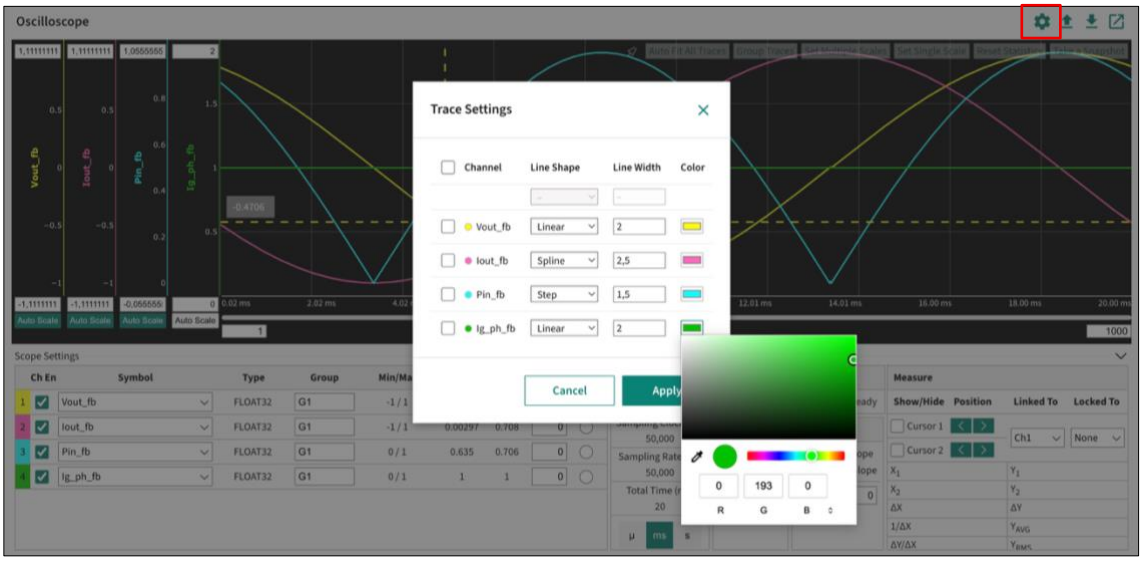


The distance between the cursors remains the same when positioning cursor 1 while it is locked.

13. Measurement

- **X1** – Time position of Cursor 1 in the active timebase unit.
- **Y1** – Signal amplitude at the Cursor 1 position.
- **X2** – Time position of Cursor 2 in the active timebase unit.
- **Y2** – Signal amplitude at the Cursor 2 position.
- **ΔX** – Time difference: X2 − X1.
- **ΔY** – Amplitude difference: Y2 − Y1.
- **1/ΔX** – Frequency derived from ΔX, in Hz. Useful for period measurement.
- **Y_AVG** – Average amplitude between the two cursors.
- **ΔY/ΔX** – Slope (rate of change) between the two cursor positions.
- **Y_RMS** – Root-mean-square amplitude between the two cursors.
- **Y Min** – Minimum amplitude between the two cursors.
- **Y Max** –Maximum amplitude between the two cursors.

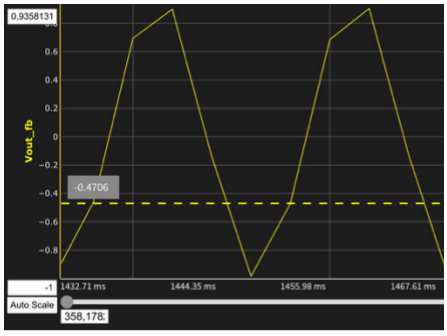
5.4 Trace Settings



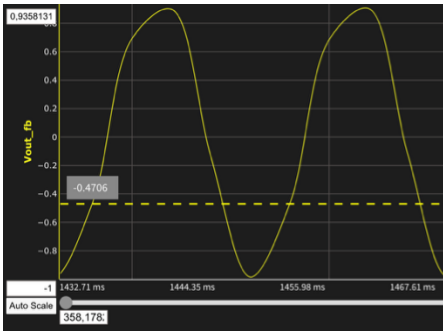
Click  to open the modal window with **Trace Settings**. The user can change the settings for a single or multiple traces: **Line Shape** (**Linear**, **Spline**, **Step**), **Line Width** in pixels and the color on the **Color** picker.

View example with the same data for different line shapes.

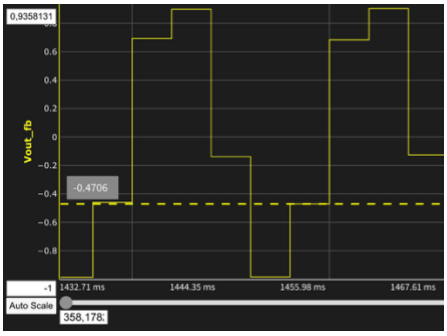
Linear



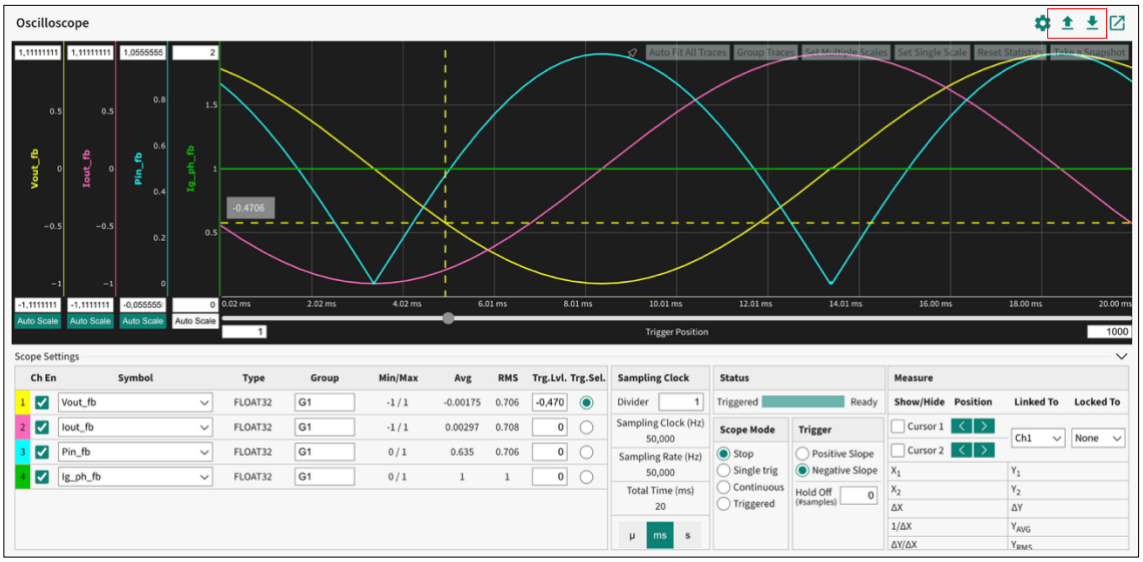
Spline



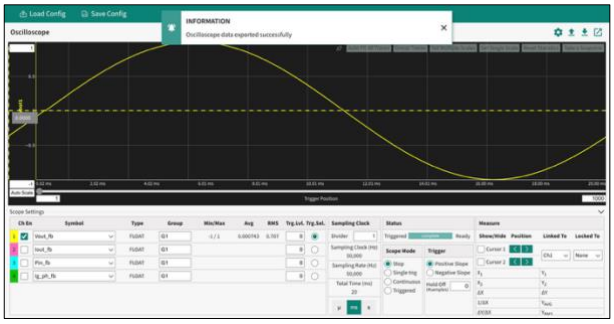
Step



5.5 Export/Import Data

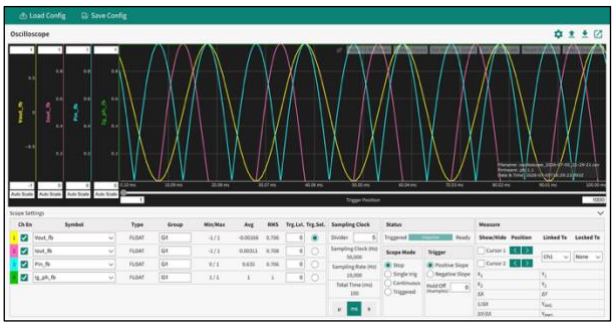


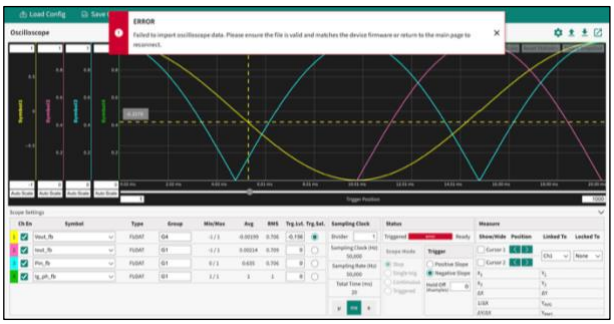
Click  to open the dialog window to save the current oscilloscope data in the **.csv* file. A notification displays about successful export of data or error.



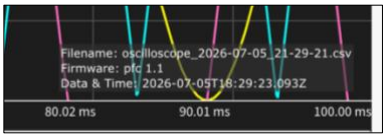


Click  to load and apply oscilloscope data from the previously exported **.csv* file.



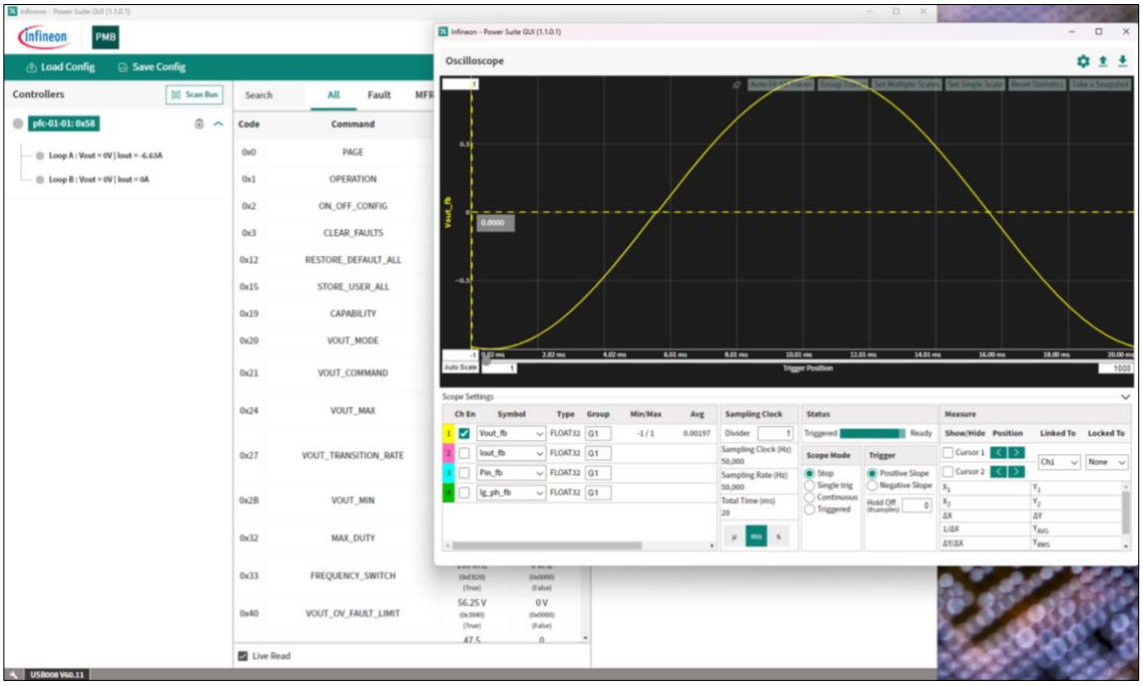


A notification displays the data import information (data was imported and applied) or import error. Import information contains the imported file name, firmware version, data and time of export.



5.6 Open Oscilloscope in Separate Window

Click  to open the oscilloscope in a separate window and continue work with the other tools.



5.7 Chart Navigation

- Click and select the region on the chart background zooms in to the selected region
- Click and drag on **Y-axis** – Pans that channel **Y-axis** range.
- Double-clicking the chart resets the zoom and pan to the default level
- Horizontal range inputs (below chart) are used to set the visible time window precisely.

5.8 Accessibility

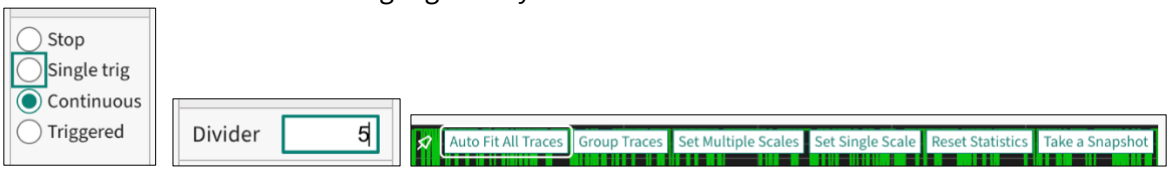
The oscilloscope has the keyboard navigation by the **Tab** and arrow buttons. The navigation components are divided into semantic groups placed left-to-right and top-to-bottom: top scale inputs, tools (quick actions), bottom scale inputs and auto scale buttons, horizontal axis inputs and trigger position, settings collapse button, channel settings, sampling clock, modes and slope settings, measures. Use the following keyboard buttons and combinations:

- **Tab** and **Shift** + **Tab** – To move between the groups forward and backward.
- **Arrow up** ↑ and **Arrow down** ↓ – To move between the components inside a group.
- **Space** – To select/deselect the checkboxes.

Oscilloscope

- **Enter** ↵ - To select a radio button.

The selected element will be highlighted by the outline:



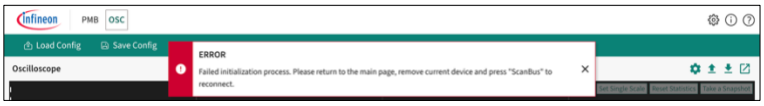
6 Troubleshooting

For most errors that occur during sending commands to PMBus or handling data, a notification popup with instructions how to fix it displays. See some examples below.

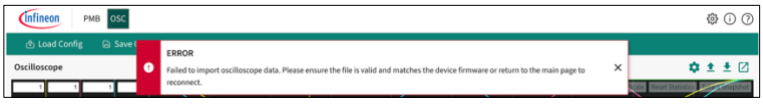
1. From the firmware: the device is possibly disconnected. Check the connection, retry the last command or restart sampling. If it does not help, go to the main screen, remove the device and click **Scan Bus** to add the device again.



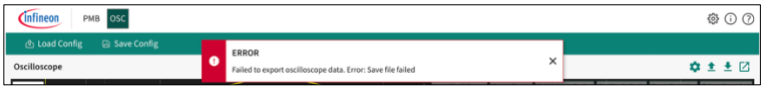
2. From the firmware: initialization did not complete. Check the device connection and go to the main screen, remove the device and click **Scan Bus** to add the device again.



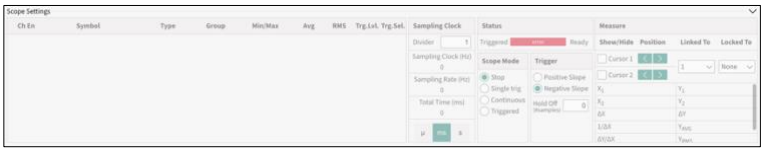
3. “Import data” failed because of the wrong file or disconnection. Verify if the file was changed or the firmware is different, then check the connection and reconnect the device.



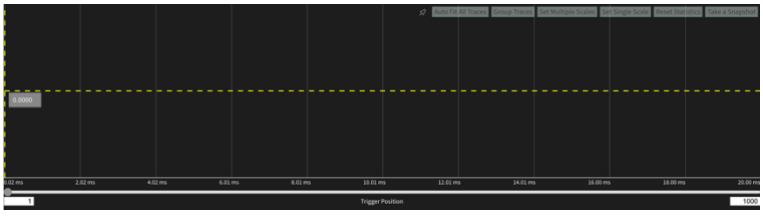
4. “Export data” failed. Check if the saving directory exists and try again.



5. All the controls are disabled, and **Acquisition status** is probably an initialization or import "error”. Check the popup notification and follow the instructions.

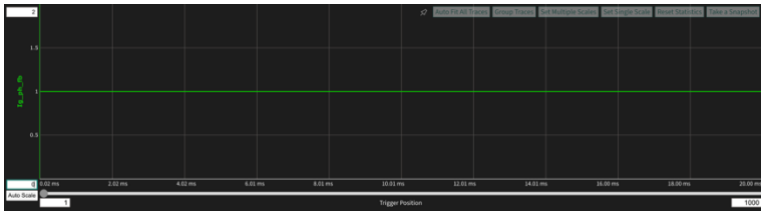


6. No waveform displays on the chart. Means that all the channels are disabled or no signal data is received. Tick **Ch En** for at least one channel. Confirm that the data source is active.

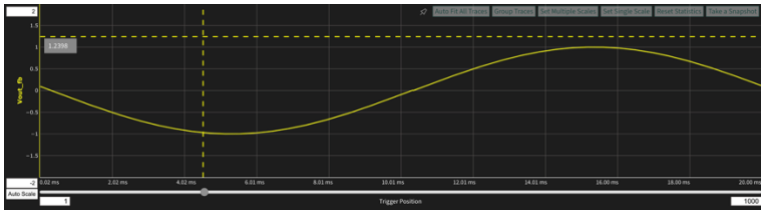


7. The waveform is a flat horizontal line. The signal amplitude is outside the visible **Y-axis** range. Click **Auto Fit All Traces**.

Troubleshooting



8. The cursor measurements show no values. Click the **Stop** radio button, then re-enable the cursors.
9. The cursor fields are empty in **Stop** mode. The cursor is not enabled. Tick the Cursor 1 or Cursor 2 checkbox.
10. The waveform updates too slowly. Possible when the divider is too low resulting in a high sample rate.
11. The trigger never fires. Possible if the trigger level is outside the signal amplitude range or the trigger channel is disabled. Enable the trigger channel, drag the trigger level line onto the waveform. Verify the correct slope is selected.



12. The chart does not respond to the mouse. The dialog from the host application blocks the chart area. Close any open dialogs and click once on the chart.

7 Version changes

This section lists and describes the changes for each version of this tool.

Version	Change descriptions
1.0	New tool.
1.1	Added new functionality: • Load/Save Configuration • Export/Import Oscilloscope data • Triggered modes in Oscilloscope. • Oscilloscope Settings
	Removed unused components.

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