



# Data Logger

## Moku:Pro User Manual

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The Moku:Pro Data Logger instrument records time series voltages from up to four channels at rates from 10 samples per second up to 10 MSa/s. The data can be logged to the onboard SSD storage or can be streamed directly to the computer using the Moku API.

The resulting logs can be shared to email or cloud services such as iCloud or Dropbox.

The Moku:Pro Data Logger also includes an embedded four-channel waveform generator.





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Ensure Moku:Pro is fully updated. For the latest information, visit:

[liquidinstruments.com](https://liquidinstruments.com)



# User Interface



ID	Button/icon	Description
1	Main menu	The main menu contains controls for switching instruments, switching devices, selecting device clock and user interface modes, and more. See <a href="#">Main Menu</a> .
2	Autoscale	Toggle continuous autoscaling on/off.
3	Ref	Capture/clear a reference trace.
4	Time window	Overview of the logging time history. Drag bars to zoom/select different timescales/time windows.
5	Settings	Show/hide the settings.
6	Clear	Clear the trace history.
7	Signal display	Data traces are displayed in this area. By default, <b>red</b> represents channel 1, <b>blue</b> represents channel 2, <b>teal</b> represents channel 3, <b>yellow green</b> represents channel 4.
8	Bottom left	Double tap here to view entire log history.
9	Grid	Double tap on the grid to on-time autoscale.



# Main Menu

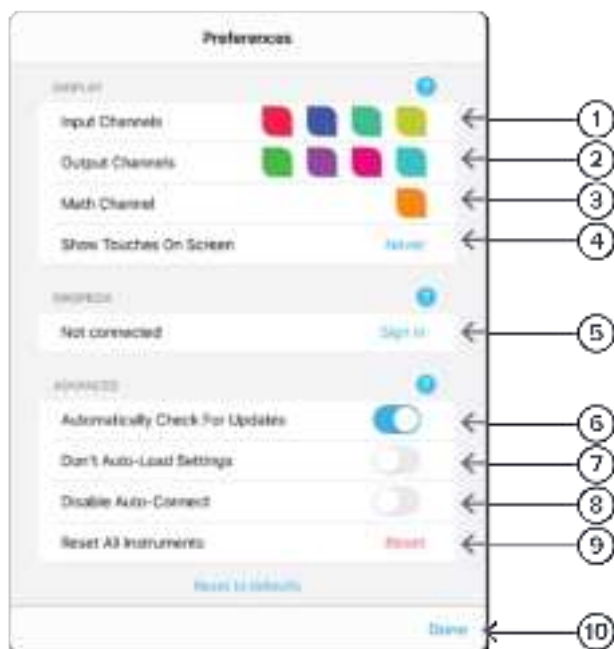
The **main menu** can be accessed by pressing the  icon, allowing you to:





# Preferences

The preferences pane can be accessed via the main menu. In here, you can reassign the color representations for each channel, connect to Dropbox, etc. Throughout the manual, the default colors (shown in the figure below) are used to present instrument features.



## ID Description

1	Tap to change the color associated with input channels.
2	Tap to change the color associated with output channels.
3	Tap to change the color associated with math channel.
4	Indicate touch points on the screen with circles. This can be useful for demonstrations.
5	Change the currently linked Dropbox account to which data can be uploaded.
6	Notify when a new version of the app is available.
7	Moku:Pro automatically saves instrument settings when exiting the app, and restores them again at launch. When disabled, all settings will be reset to defaults on launch.
8	Moku:Pro can remember the last used instrument and automatically reconnect to it at launch. When disabled, you will need to manually connect every time.
9	Reset all instruments to their default state.
10	Save and apply settings.



# Data Logger control panel

Below the main Data Logger trace display is the control panel




ID	Button/icon	Description
1	Status	Logger status, either idle, aborted, waiting, or logging.
2	Share	The sharing button gives access to controls that allow you to save and share your data. See <a href="#">Saving and sharing data</a> .
3	Memory	Displays the used and remaining memory available for logging.
4	Mode	Set acquisition mode as normal or precision.
5	Filename	Configure the prefix to be used on the data filename.
6	Comment	Text entered here will be saved in the file header.
7	Start/stop	Tap to start and top data logging.
8	Log format	Tap to select log format, CSV or LI binary format.
9	Duration	Tap to set log duration, up to 10,000 hours <sup>1</sup> .
10	Start	Tap to configure start delay, up to 240 hrs.
11	Acquisition rate	Tap to configure acquisition rate.

<sup>1</sup> Log may not reach this duration, for example if on-board memory becomes full.



## Sharing and saving data

Tap the share  button to access the file manager, allowing saving and sharing of the captured data logs. Dropbox, Mail, and iCloud service settings are configured in the iPad preferences.



ID	Button/icon	Description
1	All	Tap to select all files.
2	None	Tap to deselect all files.
3	Save options	Tap to share data files to “My Files” or any of these online services.





# Settings

## Acquisition

The acquisition sidebar configures the acquisition parameters of both input channels. The channel 1, channel 2, channel 3, channel 4, and acquisitions sub-panels may be dragged into the main display by tap/hold and dragging.

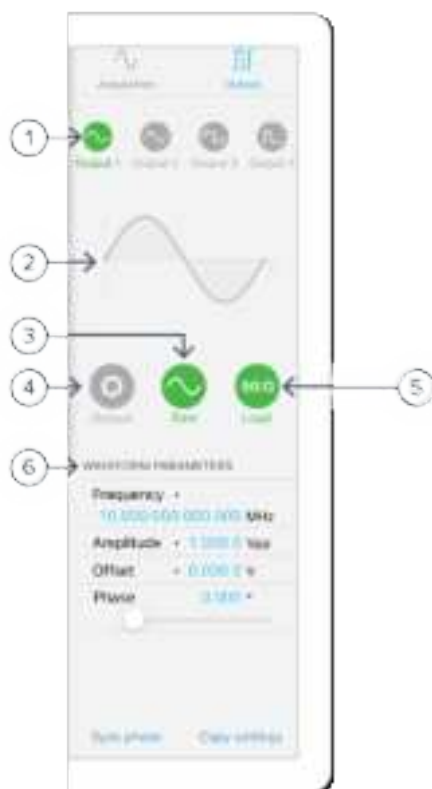


ID	Button	Description
1	Channels 1 settings	Channel 1 (red by default; configurable in main menu preferences), channel 2, channel 3, and channel 4 settings are configurable independently.
2	Coupling	Select AC or DC coupling.
3	Impedance	Select high 1 MΩ or 50 Ω input impedance.
4	Range	Selects the input range, one of 400 mV, 4 V, or 40 V peak-to-peak.
5–8	Channel 2 settings	Configure channel 2 as described above for channel 1.
9	Acquisition settings	Configure acquisition settings.
10	Rate	Adjust the data acquisition rate.
11	Mode	Precision, normal.



## Output

The Moku:Pro Data Logger has a built-in waveform generator capable of generating basic waveforms on the four output channels. For more complex waveforms, see the Moku:Pro Waveform Generator and Arbitrary Waveform Generator user manuals.



ID	Button	Description
1	Configure channels	Tap to configure settings for channels 1 to 4. As illustrated, settings apply to channel 1.
2	Current waveform	Graphical representation of the selected waveform.
3	Waveform selection	Tap to choose between Sine, Square, Ramp, Pulse, or DC waveforms.
4	Enable	Tap to enable/disable channel output.
5	Load	Tap to select either 50 $\Omega$ or 1 M $\Omega$ output load.
6	Waveform parameters	Tap to configure the selected waveform parameters varying according the waveform type selected.



# Instrument Reference

The Moku:Pro Data Logger is designed to be intuitive and straightforward to use.

Up to four channels of time-series voltages are recorded by Moku:Pro, for a specified duration, and at a specified rate.

## Recording a Session

Recording data is done as follows:

1. Configure the channel(s) you wish to record using the acquisition sidebar. Ensure the voltage range, coupling, and impedance are all appropriate for your signals. Use the plotter window to ensure your signal is correctly connected and configured.
2. Configure the acquisition rate and acquisition mode, either normal or precision.
3. Set the recording duration and any comments you want to be saved with the file.
4. Optionally configure the waveform generator outputs.
5. Tap “record”.

### Channel Configuration

Each channel can be enabled or disabled, set to a maximum range of 400 mVpp, 4 Vpp, or 40Vpp, AC or DC-coupled, and 50  $\Omega$  or 1 M $\Omega$  terminated.

### Acquisition Parameters

The acquisition parameters refer to the logging rate and the down-sampling mode used to reduce the Moku:Pro native sampling rate to the logging rate.

The logging rate must be between 10 Sa/s and 10 MSa/s. The maximum logging rate is 10 MSa/s for 1 channel, 5 MSa/s for 2 channels, and 2.5 MSa/s for 4 channels.

Acquisition mode may be either normal or precision. Normal mode down-samples by discarding points between those needed. This causes signals to alias; not desirable for most signals but can be useful for viewing frequency components outside the logging rate.

Precision mode down-samples by averaging, increasing precision and reducing noise. This mode is preferred for most applications.

### File Types

The binary file format is proprietary to Moku:Pro and has been optimized for speed and size. Using the binary format, Moku:Pro is able to reach very high logging rates and very low memory usage.

The binary file can be converted to other formats by the iPad app or the file converter software available from the Liquid Instruments website. This software can convert the binary file to CSV, MATLAB, or NPY formats for access in major scientific software.

### Starting the Log

The red record button should be tapped to start.

The status indicator at the top of the control panel will display logging progress.



The log will stop either when the specified duration has been reached, or when the user taps the record button again to abort.

### **Data streaming**

When configured through the Moku API, the Data Logger can stream over a network, instead of saving directly to the device. More streaming information is in our API documents at [apis.liquidinstruments.com](https://apis.liquidinstruments.com).

## **Accessing your Data**

Data logs can be shared to My Files, Dropbox, Mail, or iCloud. Refer to [Sharing and saving data](#) above.



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