

LIQUID INSTRUMENTS

# Moku:Lab user guide

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Liquid Instruments Moku:Lab ©  
Building 38A • Corner of Science and Daley drive  
ACTON • ACT • 2600  
CANBERRA • Australia  
Phone: +61261254325  
Website: [www.LiquidInstruments.com](http://www.LiquidInstruments.com)

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## Introduction

The Liquid Instruments Moku is a high-performance test and measurement device. The Moku uses a combination of the latest hardware acceleration with wireless communication to allow the user to interact seamless with high fidelity data from a multitude of measurement instruments.



FIGURE 1: Front view of the Liquid Instruments Moku. The front interface shows two 200MHz inputs and two 200MHz outputs. The logo/button in between the inputs and outputs lights up with different colors to provide a state identifier.

## Turning on your Moku for the first time

You can turn your Moku on by pressing the center of the Liquid Instruments logo for three seconds. While the system boots up, the dot on the logo will light up red for 15 to 20 seconds. After the system is up, the dot it will turn either blue or white depending on whether or not a network has been setup. A blue indicator signifies that the Moku has not been able to connect to the stored network. A white indicator shows that your Moku has successfully connected to the network and is ready for you to deploy an instrument.

## Connecting the Moku to your network

You can connect your Moku to the wireless network through the settings menu. When configuring your Moku to a network please ensure that the Moku is turned on and you

are connecting the Moku to the same wireless network as your iPad. Finally, make sure that you have the password of your wireless network handy.

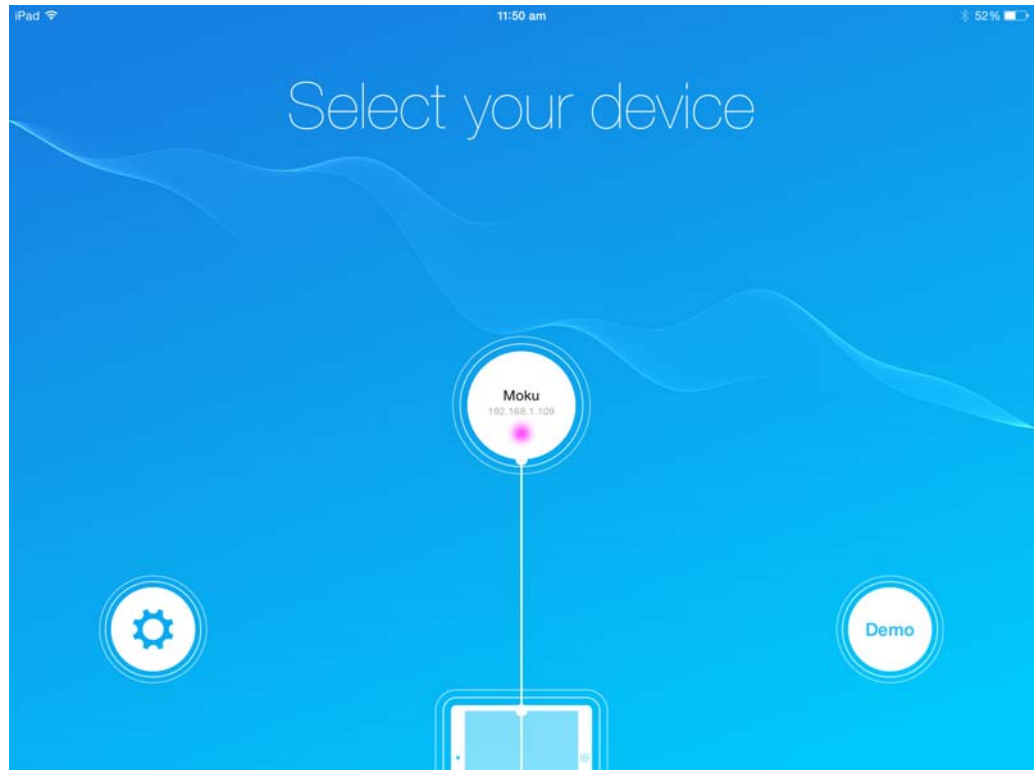


FIGURE 2: Device selection panel.

Once you are in the settings menu press [NETWORK SETUP] to start the network configuration. In the menu, choose your network or, if it is hidden, enter your SSID. Next, enter your password. Once the message appears that the connection was successful, return to the main menu to find your Moku device on the main screen. If the Moku does not appear after 20 seconds, please check that the network SSID of the iPad matches that of the Moku.

## Deploying an instrument

Once the Moku you have connected to your Moku through the selection menu, you can start exploring the selection of instruments. Figure XXX shows the instrument selection panel. Select the instrument you would like to use by touching it on the screen, and press go to deploy the

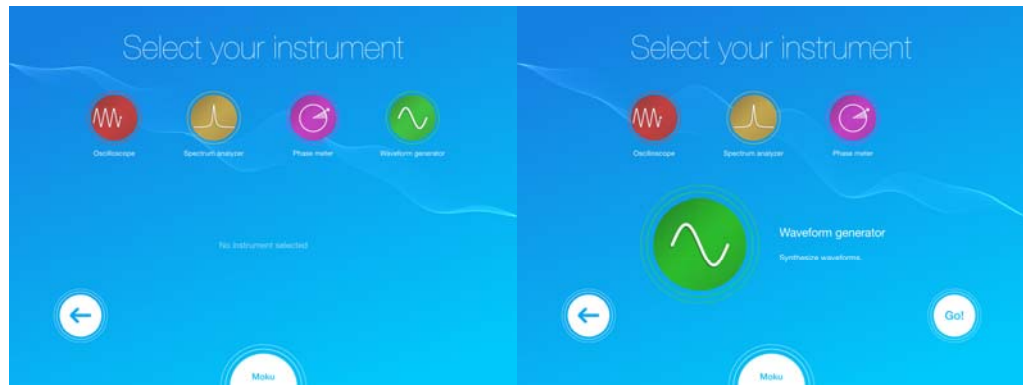


FIGURE 3: Instrument deployment panel: Left) Instrument selection. Right) Instrument deployment

Once you've finished with a particular instrument and you want to use another, go to the main selection menu at the top left corner and select switch instruments. You will return to the instrument selection panel from where you can select your new instrument or, if you have arrived here by accident, return back to your instrument.



FIGURE 4: Returning to the instrument deployment panel from the instrument view.

## Personalizing your Moku

## Connectivity

### Front connectivity

The Moku analog inputs and outputs are situated at the front of the device.



FIGURE 5: Front view of the Liquid Instruments Moku. The front interface shows two 200MHz inputs and two 200MHz outputs. The logo/button in between the inputs and outputs lights up with different colors to provide a state identifier.

### Back panel connectivity

The back of the Moku has several sockets and connector types. Figure XXX displays the back panel

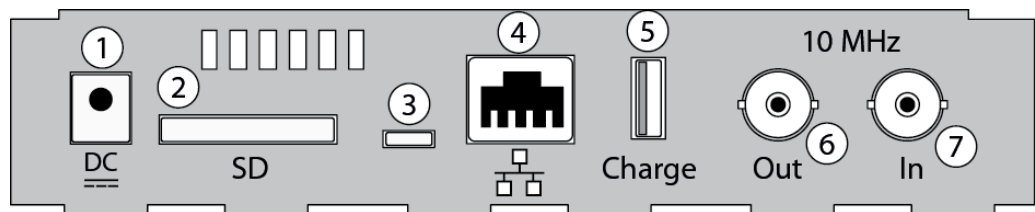
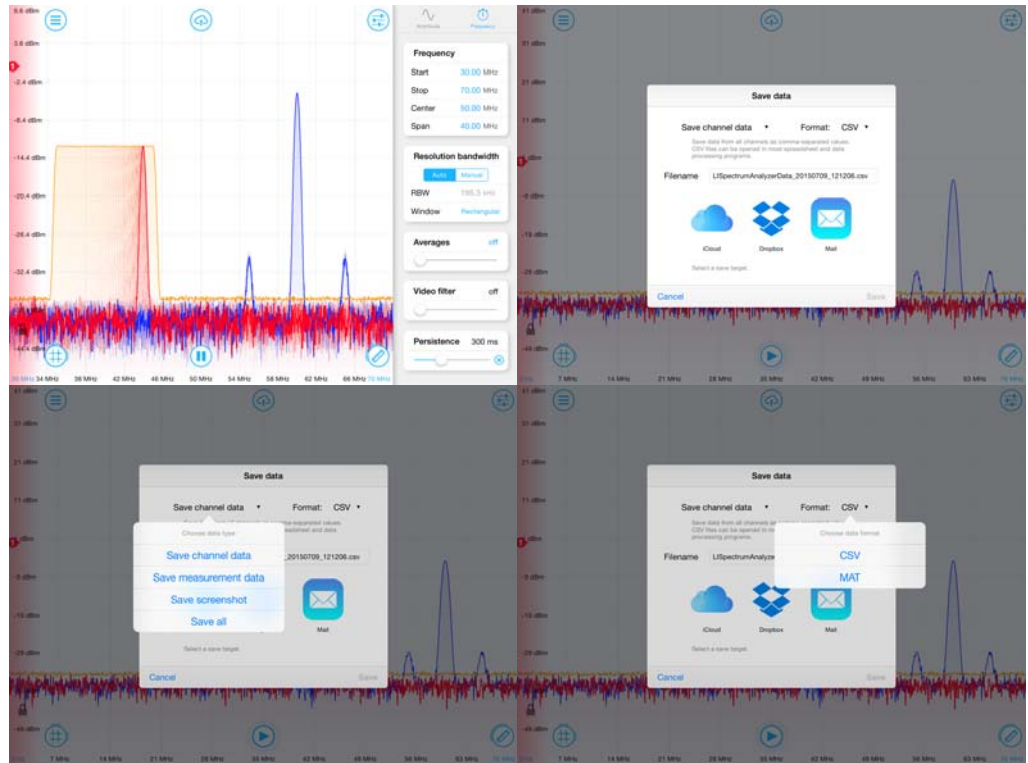


FIGURE 6: Back panel view of the Liquid Instruments Moku..

1. Power plug, 5V-2.5A DC.
2. SD card slot
3. Micro USB
4. Ethernet
5. USB charging port for iPad
6. 10 MHz reference output
7. 10 MHz reference input

## Saving your data

Saving your data is easy. Once you've configured the instrument and you are happy with the data, just press the cloud icon at the top of the screen to access the data saving panel. You can opt to save your data to iCloud, Dropbox, or to send the data using your email account. The four different options of the type of data that you want to save are: Channel data, Measurement data, Screenshot, and Save all. The channel data contains all the data within the two scope channels. The Measurement data has all of the measured parameters, including the trends.



## Typical hardware specifications

### **General connectivity**

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Power supply:  
 Power consumption:  
 Operating environment:  
 Operating altitude:  
 Stored users states:  
 Weight:  
 Acoustic noise:  
 Warm-up time:  
 Warranty:  
 EMC tested to:

### **General connectivity**

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2 x BNC analog input  
 2 x BNC analog output  
 802.11b Wifi  
 SD card  
 USB iPad charger  
 Ethernet  
 10 MHz BNC reference input  
 10 MHz BNC reference output

### **Analog inputs**

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Sampling speed	500 MSPS
Input bandwidth (-3dB)	200 MHz
Amplitude flatness	$\pm 0.25$ dB
Quantization	12 bits
Input ranges	1 V <sub>pp</sub> or 10 V <sub>pp</sub>
Input impedance	50 $\Omega$ or 1 M $\Omega$
Input coupling	DC or AC

### **Analog outputs**

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Sampling speed	1000 MSPS
Output bandwidth (-3dB)	300 MHz
Input bandwidth ( $\pm 0.5$ dB)	150 dB
Quantization	16 bits
Input ranges	2 V <sub>pp</sub> (into 50 $\Omega$ )
Input coupling	DC or AC

### **Clock reference**

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- External reference input



Frequency	10 MHz
Locking range	200 kHz
Level (minimum)	0dBm
Impedance	50 $\Omega$

**- Internal reference output**

Frequency	10 MHz
Accuracy	300ppb
Level	2 V <sub>pp</sub> (into 50 $\Omega$ )
Impedance	50 $\Omega$ , AC coupled

## Statement of conformity

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encourage to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications not expressly approved by Liquid Instruments could void the user's authority to operate this equipment. This product is intended for commercial use only.

Tous les changements ou modifications non expressément approuvés par Liquid Instruments, sont susceptibles d'annuler le droit de l'utilisateur à se servir de cet équipement. Ce produit est exclusivement destiné à un usage commercial.

## FCC RF Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This device and its antenna must not operate in conjunction with any other antenna or transmitter and must be installed to provide a separation distance of at least 20 cm from all persons.