



User's Guide



Teacher and Technical Support

For help with SPARKvue and other PASCO products, you can contact PASCO Teacher and Technical Support staff by phone, email, or on the Web.

- Phone: **1-800-772-8700 (in the U.S.)**
+1 916 786 3800 (worldwide)
- Email: support@pasco.com
- Web: www.pasco.com/support/
- Tech Notes: www.pasco.com/support/technical-support/technote/



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Home screen - New look!

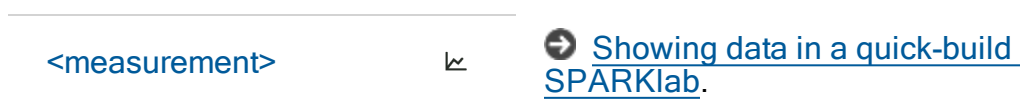
SPARKvue 2.4 includes improvements to the Home screen. It's now easier to use than ever.

Improved SPARKlabs workflows

- **Show** - to quickly start data collection

The Show button at the bottom of the Home screen is gone.

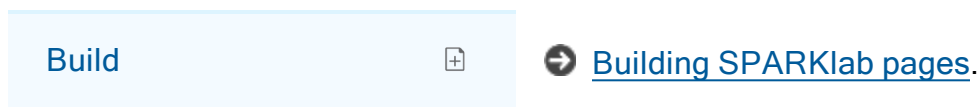
Now, to view quick-build SPARKlab pages (graphs, digits, table, and meter) for a given measurement, just tap or click that measurement on the Sensors panel.



- **Build** - to create a custom lab

The Build button at the bottom of the Home screen is gone.

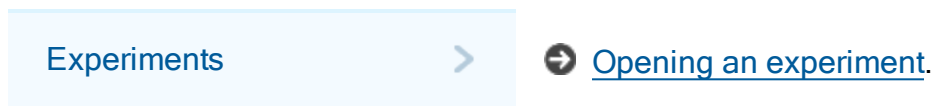
Now, to build a custom SPARKlab, tap or click Build on the SPARKlabs panel:



- **Open** - to open an existing lab

The Open button at the bottom of the Home screen is gone.

Now, tap or click Experiments on the SPARKlabs panel:



New Home screen toolbar buttons

- **Wireless Devices** - Opens the Wireless Devices screen, where you can select wireless devices to connect.



- ➔ [Connecting PASCO wireless sensors.](#)
- ➔ [Connecting the 550 Interface.](#)
- ➔ [Connecting a SPARKlink Air or AirLink 2.](#)



- **Start of Join a Shared Session** - Opens the Connect: Shared Session screen, where you can manually connect to an opened session or start a new session.



➔ [Data sharing using Connect.](#)

- **System Settings** - Opens the System Settings screen, where you can select a language, find the version of SPARKvue, and contact information.



➔ [Setting the language.](#)

➔ [About SPARKvue.](#)

- **Help** - Opens this Help screen.



NEW! Connecting wireless devices




New to SPARKvue 2.4! Effortlessly connect the new line of PASCO wireless sensors with Bluetooth Smart Technology.

The new PASCO wireless sensors and airlink are Bluetooth Smart enabled. They are quickly connected within SPARKvue and available for use without the need to perform system Bluetooth pairing.

Tip: Some PASCO wireless sensors (such as the wireless pressure gauge) can also connect via USB.

To Connect a PASCO wireless device

1. Turn on the PASCO wireless sensor.

The sensor's Bluetooth  light flashes red to indicate that it is broadcasting a signal.

2. In SPARKvue, open the **Wireless Devices** window:

 Tap or Click **Wireless Devices**.



After a moment, the PASCO wireless sensors are listed.

Tip: The devices closest to you appear at the top of the list.

3. Select the sensors you want to connect and tap or click **Done**.

The sensor's Bluetooth  light now flashes green to indicate that it is connected.

4. Select any of the sensor's measurements from the Home screen or within displays.

Note: A Bluetooth Smart wireless device (sensor) can connect to one host at a time and must remain within approximately 10 meters. (The sensor will not show in the list if connected to another host.)

Introduction

- [About SPARKvue](#)
- [Getting started](#)
- [Teacher and Technical Support](#)
- [Downloading experiments](#)
- [Online PDF User Guides \(multiple languages\)](#)

About SPARKvue

SPARKvue software combines multimedia curriculum, real-time data collection, and powerful scientific analysis tools in an easy-to-use, icon-based user interface. SPARKvue is compatible with all PASCO PASPORT sensors and interfaces.

SPARKvue is designed to become the center of your school's discovery-based science learning environment, providing both teacher and student the embedded support for exploring scientific concepts.

SPARKvue includes free pre-installed SPARKlabs™ – standards-based guided inquiry labs in a unique electronic notebook format. These SPARKlabs integrate background content, data collection and analysis, even assessment –all within the same environment. Everything you need is right there in context.

Getting started

There are four basic ways to start an investigation in SPARKvue.

Tip: To get started quickly and learn SPARKvue, plug in a sensor and use: **Show**.

Show - quickly start data collection

Quick-build SPARKlab pages (graph, digits, table, and meter) for an available measurement (such as Sound Intensity), depending on the sensors.

Tip: Great method to quickly get started with a measurement. Just tap or click the measurement you want from the Home screen.

<measurement>



[Showing data in a quick-build SPARKlab.](#)

Build - create a custom lab

Create a custom SPARKlab with your choice of data, displays, text, pictures, videos, assessments, etc.

Tip: Can build simple or extensive labs with multiple pages.

Build



➔ [Building SPARKlab pages.](#)

Open - open an existing lab

Open an embedded SPARKlab experiment and follow the on-screen instructions.

Experiments



➔ [Opening an experiment.](#)

Connect - join or start a shared lab

Join a shared session (or start a shared session yourself) by clicking the **Connect** button.



➔ [Data sharing using Connect.](#)

Starting an experiment

1. [Installing SPARKvue](#)
2. [Launching SPARKvue](#)
3. [Connecting an interface and sensors](#)
4. [Monitoring live data](#)

Installing SPARKvue

1. Download SPARKvue from www.pasco.com/sparkvue/ or insert the SPARKvue USB drive into your computer.
2. Follow the instructions provided with the download or USB drive to complete the installation.
3. Download SPARKvue from the Apple, Google, or Chrome app store.
4. Follow the instructions provided.

Launching SPARKvue

 Tap or Click the SPARKvue icon to launch SPARKvue.



Connecting an interface and sensors

SPARKvue requires at least one sensor to collect data. SPARKvue is compatible with most common on-board sensors such as microphones and light sensors as well as several types of PASCO external interfaces and sensors.

Use the following links to find instructions for connecting interfaces and sensors.

iPad

- [Connecting PASCO wireless sensors](#)
- [Connecting the 550 Interface](#)
- [Connecting a SPARKlink Air or AirLink 2](#)

Android



- [Connecting PASCO wireless sensors](#)
- [Connecting the 550 Interface](#)
- [Connecting a SPARKlink Air or AirLink 2](#)
- [Connecting a USB Link](#)
- [SPARK SLS and SPARKlink](#)
- [Xplorer GLX](#)
- [Connecting multiple interfaces](#)

Windows

- [Connecting PASCO wireless sensors](#)
- [Connecting the 550 Interface](#)
- [Connecting a SPARKlink Air or AirLink 2](#)
- [Connecting a USB Link](#)
- [SPARK SLS and SPARKlink](#)
- [Xplorer GLX](#)
- [Connecting multiple interfaces](#)

Mac

- [Connecting PASCO wireless sensors](#)
- [Connecting the 550 Interface](#)
- [Connecting a SPARKlink Air or AirLink 2](#)
- [Connecting a USB Link](#)
- [SPARK SLS and SPARKlink](#)
- [Xplorer GLX](#)
- [Connecting multiple interfaces](#)

Chromebook

- [Connecting PASCO wireless sensors](#)
- [Connecting the 550 Interface](#)
- [Connecting a USB Link](#)
- [SPARK SLS and SPARKlink](#)


- [Xplorer GLX](#)
- [Connecting multiple interfaces](#)

Connecting PASCO wireless sensors

The new PASCO wireless sensors and airtlink are Bluetooth Smart enabled. They are quickly connected within SPARKvue and available for use without the need to perform system Bluetooth pairing.

Tip: Some PASCO wireless sensors (such as the wireless pressure gauge) can also connect via USB.

1. Turn on the PASCO wireless sensor.

The sensor's Bluetooth  light flashes red to indicate that it is broadcasting a signal.

2. In SPARKvue, open the **Wireless Devices** window:

 Tap or Click **Wireless Devices**.



After a moment, the PASCO wireless sensors are listed.

Tip: The devices closest to you appear at the top of the list.

3. Select the sensor you want to connect and tap or click **Done**.

The sensor's Bluetooth  light now flashes green to indicate that it is connected.

4. Select any of the sensor's measurements from the Home screen or within displays.

Note: A Bluetooth Smart wireless device (sensor) can connect to one host at a time and must remain within approximately 10 meters. (The sensor will not show in the list if connected to another host.)

Connecting a SPARKlink Air or AirLink 2

The bluetooth device can connect to only one host at a time and must remain within approximately 10 meters. (An error message displays if the device is already connected to another system.)

Tip: PASCO bluetooth devices can also connect via USB.

Note: If prompted, enter pass code "1234" for SPARKlink Air devices.

iPad

- I. Use the standard iPad process to pair the PASCO bluetooth device.
- II. Connect sensors as needed.
No configuration in SPARKvue is required.

Android

- I. Use the standard Android process to pair the PASCO bluetooth device.
- II. Once paired, continue to [SPARKvue Bluetooth Configuration](#) .


Mac

- I. Use the standard Mac process to pair the PASCO bluetooth device.
- II. Once paired, continue to [SPARKvue Bluetooth Configuration](#) .




Windows

- I. Use the standard Windows process to pair the PASCO bluetooth device.
- II. Once paired, continue to [SPARKvue Bluetooth Configuration](#) .

SPARKvue Bluetooth Configuration

1. Turn on the AirLink2, SPARKlink Air or other supported bluetooth device.
2.  Tap or Click the **Device Tools** button to open the **Device Tools** screen.



3.  Tap or Click the **Connect Sensor via Bluetooth** button.
SPARKvue searches for available bluetooth sensors and lists the supported devices within range.
Note: In a classroom setting, there may be many devices available for connection. To ensure you are connecting with the correct PASCO device, check the back for its identification number.
Note: If the device is not listed, pair the device using the standard Mac/Windows/Android process before continuing.
4.  Tap or Click **Connect**.
The selected device will change from **Connect** to **Disconnect** upon successful connection.
5.  Tap or Click **OK** twice to close the **Device Tools** screen.
6. Optional: plug in sensors into the bluetooth interface.

To disconnect a device from SPARKvue

1. Tap or Click the **Device Tools** button to open the **Device Tools** screen.



2. Tap or Click the **Connect Sensor via Bluetooth** button.

3. Tap or Click **Disconnect**.

The selected device will change from **Disconnect** to **Connect** upon successful connection.

4. Tap or Click **OK** twice to close the **Device Tools** screen.

Connecting a USB Link

The USB Link contains a single port for a PASPORT sensor.

1. Connect the USB Link to a USB port on your computer (or a powered USB hub connected to the computer).
2. Connect a PASPORT sensor to the USB Link.

Connecting the 550 Interface

The 550 Universal Interface includes two digital inputs, two analog ports, two PASPORT sensor ports, and a 3.2 W function generator.

1. Connect the AC adapter to a wall outlet and to the AC adapter port on the rear of the 550 Universal Interface.
2. Optional: Use the A-to-mini-B USB cable to connect the smaller USB port of the 550 Universal Interface to a USB port on your computer (or a USB hub connected to the computer).



3. Press and hold the power button (🔌) until the green lights on the front flash.

550 Universal Interface: On button



4. Launch SPARKvue.

USB Connection:

The PASCO 550 Interface automatically connects with SPARKvue.

Bluetooth Connection:

5. Tap or Click **System Settings** on the Home Page.



6. Tap or Click Connect Sensor via Bluetooth

7. Find the 550 Interface in the list.

Note: If the desired 550 Interface is not in the list, ensure it is turned on. If still not in the list, then you will need to pair the device in your operating before SPARKvue will find the device.

8. Tap or Click Connect.

9. Tap or Click OK.

10. Tap or Click OK to close **System Settings**.



Adding sensors to the 550

The 550 Universal Interface includes two digital inputs, two analog ports, two PASPORT sensor ports, and a 3.2 W function generator.




PASPORT Sensors

1. Connect the 550 Interface. See [Connecting the 550 Interface](#).
2. Plug the PASPORT sensor into one of the PASPORT ports on the front of the 550 Interface.
SPARKvue automatically recognizes PASPORT sensors.
3. Check the Home Page in SPARKvue for the measurements associated with the PASPORT sensor.

Analog Sensors

1. Connect the 550 Interface. See [Connecting the 550 Interface](#).
2. Plug in the analog sensor into one of the analog ports on the front of the 550 Interface.
3. Click on **[Unconfigured]** under **550 Analog Channel x**
The **Assign 550 Analog Channel** dialog opens.
4.  Tap or Click the sensor from the list.
5. Optional: Change the gain in the **Gain:** selection box.
6.  Tap or Click **OK**.
7. Check the Home Page in SPARKvue for the measurements associated with the Analog sensor.

Digital Sensors

1. Connect the 550 Interface. See [Connecting the 550 Interface](#).
2. Plug in the digital sensor into one of the digital ports on the front of the 550 Interface.
The **Assign 550 Digital Channel** dialog opens.
3.  Tap or Click the sensor from the list.
4.  Tap or Click **OK**.
The **Edit Timer Properties** dialog opens.
5. Optional: Change the Timer Properties.
6.  Tap or Click **OK**.
7. Check the Home Page in SPARKvue for the timing measurements associated with the Digital sensor.

SPARK SLS and SPARKlink

SPARK SLS and SPARKlink include ports for two PASPORT sensors, a temperature probe, and a voltage probe. It is powered either by its AC adapter, or by its rechargeable battery.

- [Connecting a SPARK SLS or SPARKlink](#)
- [Connecting sensors to the SPARK SLS or SPARKlink](#)
- [Connecting an interface and sensors](#)
- [Connecting multiple interfaces](#)

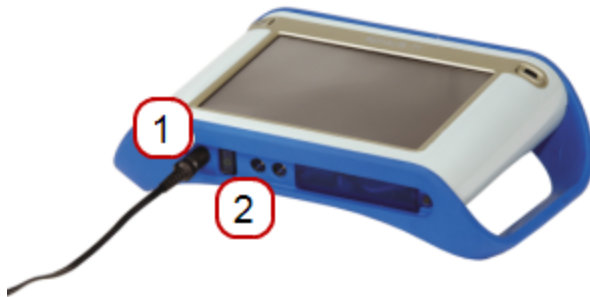
Connecting a SPARK SLS or SPARKlink

1. Use an A-to-mini-B USB cable (such as PASCO part PS-2528) to connect the smaller USB port of the SPARK to a USB port on your computer (or a USB hub connected to the computer).
2. Connect the AC adapter (included with the SPARK) to a wall outlet and to the AC adapter port on the bottom of the SPARK.

You can skip this step if the SPARK battery is charged and you wish to let it run on battery power.

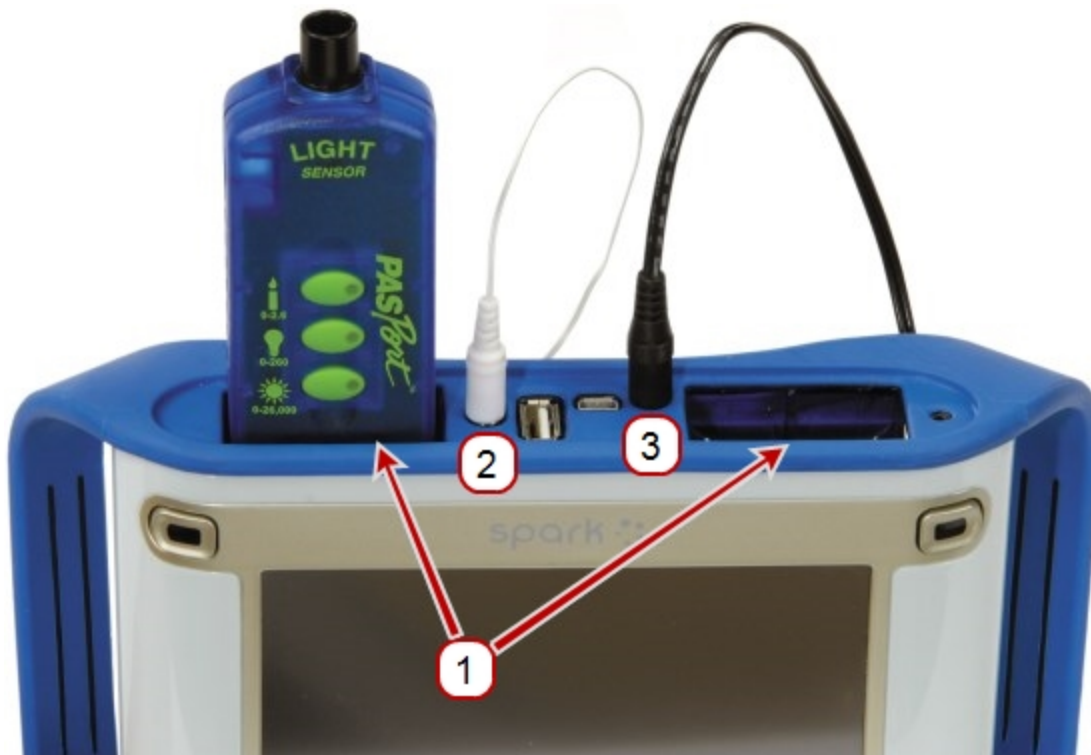
3. Press and hold the power button.
The SPARK turns on and boots up.

1 AC adapter port. 2 Power button.



Connecting sensors to the SPARK SLS or SPARKlink

1 PASPORT ports. 2 Temperature port. 3 Voltage port.



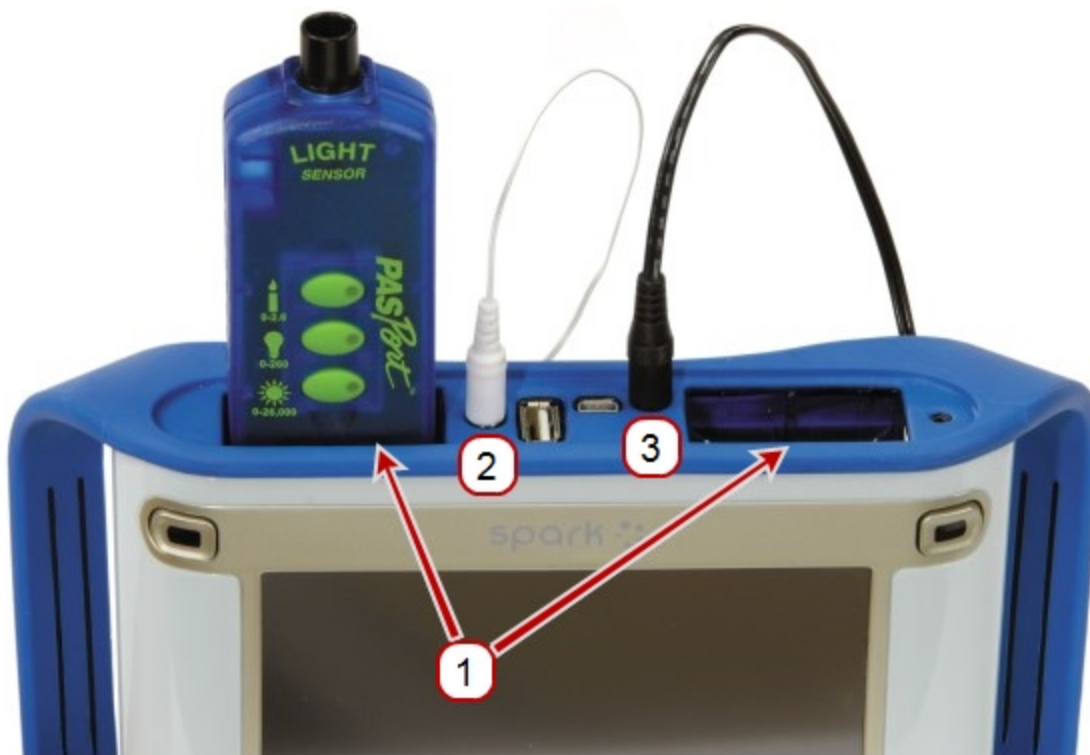
You can use up to two PASPORT sensors plus a temperature probe and a voltage probe.

Complete one or more of the following tasks to connect sensors to the SPARK.

- [Connecting PASPORT sensors to the SPARK SLS or SPARKlink](#)
- [Connecting a temperature probe to the SPARK SLS or SPARKlink](#)
- [Connecting a voltage probe to the SPARK SLS or SPARKlink](#)

Connecting PASPORT sensors to the SPARK SLS or SPARKlink

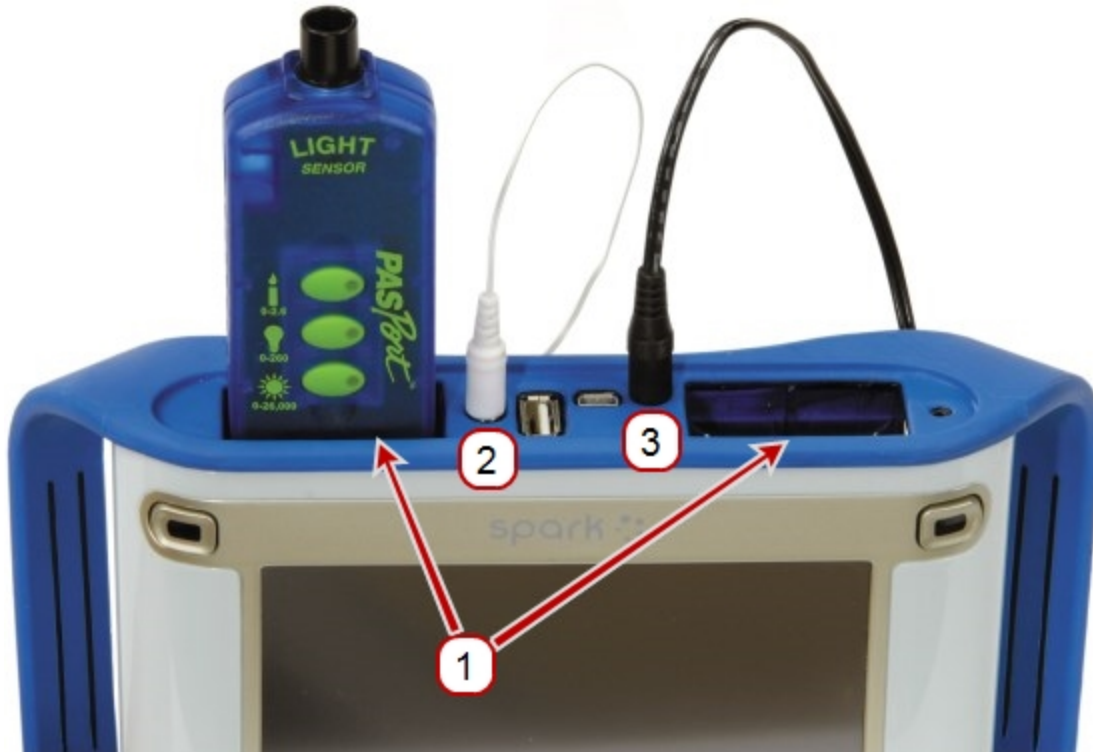
1 PASPORT ports. 2 Temperature port. 3 Voltage port.



1. Plug a PASPORT sensor into one of the PASPORT ports on the top of the SPARK.
2. Optionally, plug a second PASPORT sensor into the other PASPORT port.

Connecting a temperature probe to the SPARK SLS or SPARKlink

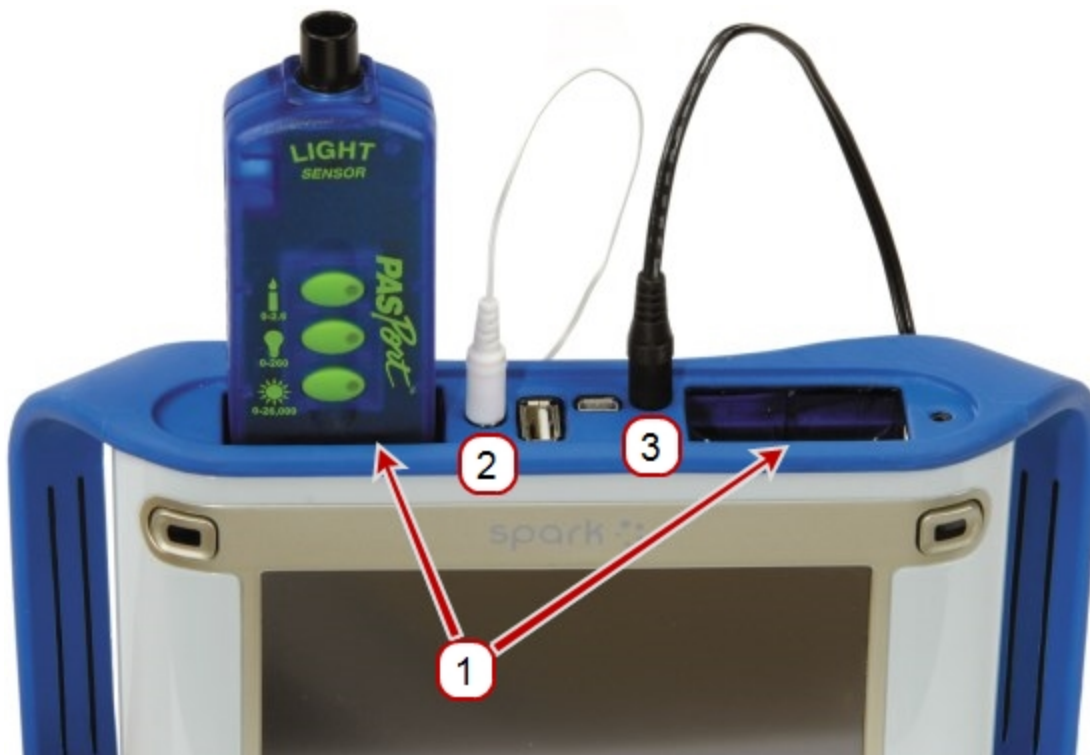
1 PASPORT ports. 2 Temperature port. 3 Voltage port.



Plug the included fast-response temperature probe (or other type of temperature probe) into the temperature port on the top of the SPARK.

Connecting a voltage probe to the SPARK SLS or SPARKlink

① PASPORT ports. ② Temperature port. ③ Voltage port.



Plug the included voltage probe into the voltage port on the top of the SPARK.

Xplorer GLX

The Xplorer GLX includes ports for four PASPORT sensors, two temperature probes, and a voltage probe. When it is not connected to a computer, the device records data and displays it on its own screen; however, when connected to a computer, it passes data through to be recorded and displayed on the computer. It is powered either by its AC adapter, or by its rechargeable battery.

- [Connecting the Xplorer GLX to your computer](#)
- [Connecting sensors to the Xplorer GLX](#)

Connecting the Xplorer GLX to your computer

1. Use USB cable (included with the GLX) to connect the smaller USB port of the GLX to a USB port on your computer (or a USB hub connected to the computer).
2. Connect the included AC adapter to a wall outlet and to the AC adapter port on the right side of the GLX.
You can skip this step if the GLX's battery is charged and you wish to let it run on battery power.
3. Press and hold the power button.

4. The GLX turns on and boots up. If SPARKvue is running, the GLX screen displays a message indicating that it is connected.

Connecting sensors to the Xplorer GLX

You can use up to four PASPORT sensors plus two temperature probes and a voltage probe.

Complete one or more of the following tasks to connect sensors to the GLX.

- [Connecting PASPORT sensors to the GLX](#)
- [Connecting temperature probes to the GLX](#)
- [Connecting a voltage probe to the GLX](#)

Connecting PASPORT sensors to the GLX

1. Plug a PASPORT sensor into one of the PASPORT ports on the top of the GLX.
2. Optionally, plug additional PASPORT sensors into the other PASPORT ports.

Connecting temperature probes to the GLX

1. Plug one of the included fast-response temperature probes (or another type of temperature probe) into one of the temperature ports on the left side of the GLX.
2. Optionally, plug a second temperature probe into the other temperature port.

Connecting a voltage probe to the GLX

Plug the included voltage probe into the voltage port on the left side of the GLX.

Connecting multiple interfaces

- If multiple available USB ports, connect each interface to a USB on the computer.
- If only one available USB port, connect a powered USB hub to the USB port, and connect the interfaces to the hub.

Monitoring live data

Live data from all connected sensors are displayed whenever the **Home** screen is open.

The **Home** screen is the first screen that appears when SPARKvue starts.

If the **Home** screen is not visible, tap or click the **Home** button to return to the **Home** screen.



Moving on from the Home screen

With the Home screen displayed, you are ready to move into a SPARKlab. A SPARKlab is a multiple page environment where your science investigation takes place.

Complete one of the following tasks to show a measurement in a SPARKlab, build a custom SPARKlab, open an embedded SPARKlab, or connect to a shared session.

Show - quickly start data collection

Quick-build SPARKlab pages (graph, digits, table, and meter) for an available measurement (such as Sound Intensity), depending on the sensors.

Tip: Great method to quickly get started with a measurement. Just tap or click the measurement you want from the Home screen.

<measurement>



[Showing data in a quick-build SPARKlab.](#)

Build - create a custom lab

Create a custom SPARKlab with your choice of data, displays, text, pictures, videos, assessments, etc.

Tip: Can build simple or extensive labs with multiple pages.

Build



[Building SPARKlab pages.](#)

Open - open an existing lab

Open an embedded SPARKlab experiment and follow the on-screen instructions.

Experiments



[Opening an experiment.](#)

Connect - join or start a shared lab

Join a shared session (or start a shared session yourself) by clicking the **Connect** button.



➔ [Data sharing using Connect.](#)



Setting up an experiment

- [Downloading experiments](#)
- [Customizing data collection](#)
- [Customizing how numbers are displayed](#)
- [Calibrating sensors](#)
- [Using sensor adapters](#)





Opening an experiment

SPARKvue includes embedded SPARKlab experiments. Additional no-cost labs are available from PASCO. See [Downloading experiments](#).

Complete these steps to open a SPARKlab experiment:

1. Connect the sensors required for the SPARKlab that you wish to do.
2. If there are unneeded sensors connected, disconnect them.
3.   Tap or Click **Experiments** in the **SPARKlabs** pane.



4. Navigate to the folder containing the SPARKlab that you would like to open.
5.   Tap or Click a SPARKlab to preview.
The lab preview opens in the right pane.
6.   Tap or Click the preview to open the lab or the **Open** button.



The SPARKlab opens.

Follow the on-screen instructions to continue your science investigation.

7.   Tap or Click the **Page Navigator** to turn pages.



Downloading experiments

PASCO provides several ready to use experiments for SPARKvue. Go to the experiments web page: <http://www.pasco.com/family/sparkvue/index.cfm> Select a SPARKlab. Scroll through the list of ready-made experiments.

Customizing data collection

You can start recording data using the default settings, or complete one or more of the following tasks to change the sampling rate or sampling mode.




- [Setting the sample rate](#)
- [Putting SPARKvue into periodic sampling mode](#)
- [Putting SPARKvue into manual sampling mode](#)
- [Setting an automatic stop condition](#)

Setting the sample rate

With SPARKvue in periodic sampling mode (the default mode), complete these steps to set how many data points are recorded each second or how much time elapses between data points:

1.  Tap or Click the **Sampling Options** button.



2. The **Sampling Options** screen opens.
3.  Tap or Click the **Sample Rate** box and tap or click a value.
4.  Tap or Click the **Sample Rate Unit** box and tap or click **Hz**, **seconds**, **minutes**, or **hours**.
5.  Tap or Click **OK**.



Putting SPARKvue into periodic sampling mode

In periodic sampling mode (the default mode, sometimes known as “continuous” mode), SPARKvue records data points at regular intervals. If SPARKvue is in manual sampling mode, complete these steps to put it into periodic sampling mode:

1.  Tap or Click the **Sampling Options** button.



The **Sampling Options** screen opens.

2.  Tap or Click **Periodic**.
3.  Tap or Click **OK**.



Putting SPARKvue into manual sampling mode

In manual sampling mode, a single value from each measurement is recorded each time you manually trigger SPARKvue. Complete these steps to put SPARKvue into manual sampling mode:

1.  Tap or Click the **Sampling Options** button.



The **Sampling Options** screen opens.

2.  Tap or Click **Manual**.
3.  Tap or Click **OK**.

Setting an automatic stop condition




When a stop condition is set, SPARKvue automatically stops recording data after a set time interval.

Complete these steps to set a stop condition:

1.  Tap or Click the **Sampling Options** button.



The **Sampling Options** screen opens.

2. Under **Automatic Stop Condition:**, tap or click the **Condition:** box and tap or click **Stop after duration**.
3.  Tap or Click the **Value** box and enter a time value.
4.  Tap or Click the **Units** box and tap or click units of time.
5.  Tap or Click **OK**.

Customizing how numbers are displayed

- [Setting the number of decimal places displayed](#)
- [Setting the number of significant figures displayed](#)






- [Displaying numbers in scientific notation](#)
- [Changing the units of a measurement](#)

Setting the number of decimal places displayed

1.  Tap or Click the **Experiment Tools** button.



The Experiment Tools screen opens.






2.  Tap or Click **Data Properties**.
The **Data Properties** screen opens.
3.  Tap or Click the **Measurement** box and tap or click a measurement or other variable.
4.  Tap or Click the **Number Style** box and tap or click **Fixed Precision**.
5.  Tap or Click the **Digits** box and select the number of digits to be displayed after the decimal point.
6.  Tap or Click **OK**.

Setting the number of significant figures displayed

1.  Tap or Click the **Experiment Tools** button.



The Experiment Tools screen opens.

2.  Tap or Click **Data Properties**.
The **Data Properties** screen opens.
3.  Tap or Click the **Measurement** box and tap or click a measurement or other variable.
4.  Tap or Click the **Number Style** box and tap or click **Significant Figures**.
5.  Tap or Click the **Digits** box and select the number of significant figures to be displayed.
6.  Tap or Click **OK**.

Displaying numbers in scientific notation

1. Tap or Click the **Experiment Tools** button.



2. Tap or Click **Data Properties**.
The **Data Properties** screen opens.

3. Tap or Click the **Measurement** box and tap or click a measurement or other variable.

4. Tap or Click **Number Format**.
The number format options appear.

5. Tap or Click the **Number Style:** box and tap or click **Scientific Notation**.

6. Tap or Click the **Digits** box and select the number of digits to be displayed.

7. Tap or Click **OK**.

Changing the units of a measurement

Do one or both of the following tasks to select different units for a measurement.

- [Changing the units of a measurement in an existing display](#)
- [Changing the default units of a measurement](#)

Changing the units of a measurement in an existing display

Complete these steps to change the units of a measurement displayed in an existing graph, digits display, table, or meter:

1. Tap or Click the **Measurement** button to change; skip to step 4.
2. Or, tap or click the applicable **Display Tools** button to open the tools palette.



1.23



3. Tap or Click the **Properties** button to open the **Properties** screen.



4.  Tap or Click the **Units** box and select a unit of measure.
5.  Tap or Click **OK**.

The display shows the measurement with the selected units.





Changing the default units of a measurement

Complete these steps to change the units that will be used by default when you select a measurement in the future:

1.  Tap or Click the **Experiment Tools** button to open the Experiment Tools screen.



Note: The **Experiment Tools** button is visible in data collection mode.

2.  Tap or Click **Data Properties** to open the **Data Properties** screen.
3.  Tap or Click the **Measurement** box and select a measurement.
4.  Tap or Click the **Units** box and select units of measure.
5.  Tap or Click **OK**.

The next time you select that measurement for display, it will appear with the units that you selected.

Calibrating sensors

Sensor calibration is an optional step that can help to make measurements more accurate.

Complete the following tasks to select a measurement and calibration type and perform a calibration.






1. [Selecting a measurement to calibrate and a calibration type](#)
2. [Performing a calibration](#)

Selecting a measurement to calibrate and a calibration type

1.  Tap or Click the **Experiment Tools** button.



The Experiment Tools screen opens.

2.  Tap or Click **Calibrate Sensor**.
The **Calibrate Sensor: Select Measurement** screen opens.
3.  Tap or Click the **Sensor** box and tap or click the sensor to be calibrated.
4.  Tap or Click the **Measurement** box and tap or click the measurement to be calibrated.
5.  Tap or Click the **Calibration Type** box and tap or click a calibration type.
See the instructions provided with your sensor for information about what type of calibration is appropriate for your sensor.
6.  Tap or Click **Next**.
The **Calibrate Sensor Enter Values** screen opens.
7. Continue to [Performing a calibration](#).

Performing a calibration

After you have selected a measurement to be calibrated and a calibration type (see previous task), you are ready to perform a calibration.


Depending on the calibration type that you have selected, perform a 2-point calibration, a 1-point offset-only calibration, or a 1-point slope-only calibration.

- [Performing a 2-point calibration](#)
- [Performing a 1-point offset-only calibration](#)
- [Performing a 1-point slope-only calibration](#)
- [Calibrating a Drop Count sensor \(example\)](#)

Performing a 2-point calibration


In the **Calibrate Sensor Enter Values** screen, complete these steps:

1. Apply a known quantity to the sensor. For example, place a pH probe in a pH 4 buffer solution.
2. Under **Calibration Point 1** tap or click the **Standard Value** box and enter the known value.
For example, enter the known pH of the buffer solution.
3. Under **Calibration Point 1** tap or click **Read From Sensor**.
The value measured by the sensor is transferred to the **Sensor Value** box.
4. Apply a different known quantity to the sensor. For example, place the pH probe in a pH 7 buffer solution.
5. Under **Calibration Point 2** tap or click the **Standard Value** box and enter the known value. For example, enter the known pH of the buffer solution.

6. Under **Calibration Point 2** tap or click **Read From Sensor**. The value measured by the sensor is transferred to the **Sensor Value** box.
7.  Tap or Click **OK**.
Calibration is complete.


Performing a 1-point offset-only calibration

In the **Calibrate Sensor Enter Values** screen, complete these steps:

1. Apply a known quantity to the sensor. For example, place a temperature probe in ice water known to be 0 °C.
2. Under **Calibration Point 1** tap or click the **Standard Value** box and enter the known value.
For example, enter the known temperature of the water.
3. Under **Calibration Point 1** tap or click **Read From Sensor**.
The value measured by the sensor is transferred to the **Sensor Value** box.
4.  Tap or Click **OK**.
Calibration is complete.

Performing a 1-point slope-only calibration


In the **Calibrate Sensor Enter Values** screen, complete these steps:

1. Apply a known quantity to the sensor. For example, place a dissolved oxygen probe in a bottle known to contain 9.1 mg/L of dissolved oxygen.
2. Under **Calibration Point 2** tap or click the **Standard Value** box and enter the known value.
For example, enter the known dissolved oxygen concentration.
3. Under **Calibration Point 2** tap or click **Read From Sensor**.
The value measured by the sensor is transferred to the **Sensor Value** box.
4.  Tap or Click **OK**.
Calibration is complete.

Calibrating a Drop Count sensor (example)








Tip: The Drop Dispenser has two stopcocks. The top stop cock is used to regulate flow rate and the bottom stopcock is used to turn the flow on and off. The bottom stopcock should either be in the completely open or completely closed position.

The drop counter is calibrated, using the SPARKvue **Experiment Tools** to correlate the number of drops counted to the volume of liquid dispensed from the Drop Dispenser.

1. Attach the Drop Dispenser (syringe, two stopcocks and drop tip) to a support rod.
2. Fill the syringe with titrant.
3. Open both stopcock valves and adjust the valve on the top stopcock so that the drops fall at a rate of about 1 drop per second. Close the bottom valve after the rate is achieved.
4. Connect the Drop Counter and launch SPARKvue.
5. Align the drop tip with the opening in the Drop Counter. Put a graduated 10 mL cylinder under the Drop Counter opening.
6. While on the **Home** screen, open the bottom stopcock to allow titrant to flow.
7. After about 10 mL of titrant is collected in the graduated cylinder, close the bottom stopcock.
8. Record the exact volume from the graduated cylinder.
9. Build the desired display for you experiment.
10.  Tap or Click **Experiment Tools**.



The **Experiment Tools** screen opens.

11.  Tap or Click **Calibrate Sensor**.
The **Calibrate Sensor: Select Measurement** screen opens.
12.  Tap or Click the **Sensor:** box and select **Drop Counter**.
13.  Tap or Click the **Measurement:** box and select **Fluid Volume (ml)**.
14.  Tap or Click the **Calibration Type:** box and select **1 point (Adjust Slope Only)**.
15.  Tap or Click **NEXT**.
The **Calibrate Sensor** screen opens.
16. Under **Calibration Point 2** tap or click the **Standard Value:** box and enter the recorded volume (from step 8).
17. Under **Calibration Point 2** tap or click **Read From Sensor**.
18.  Tap or Click **OK** to exit the **Calibrate Sensor** screen.
19.  Tap or Click **OK** to exit the **Experiment Tools** screen.

Using sensor adapters

- [Connecting a sensor through a Digital Adapter or Photogate Port](#)
- [Connecting a sensor through an Analog Adapter](#)

Connecting a sensor through a Digital Adapter or Photogate Port

The Digital Adapter (PASCO part PS-2159) allows digital switch-type sensors such as photogates and smart pulleys to be connected to a PASPORT interface and used with SPARKvue . It also allows the use of a ScienceWorkshop Motion Sensor (CI-6742A) or Rotary Motion Sensor (CI-6538).

The Photogate Port (PS-2123) is a type of adapter that supports switch-type sensors, but not the Rotary Motion Sensor or Motion Sensor.

Complete these steps to connect and configure a sensor with a Digital Adapter or Photogate Port:

1. Connect the adapter to your PASPORT interface.
2. Connect a digital sensor to the adapter.

You can connect a switch-type sensor to either port of the adapter.

If you are connecting a Motion Sensor or Rotary Motion Sensor, connect the yellow plug to Port 1 and the black plug to Port 2. A list of digital sensors and sensor configurations appears.

3. Optionally, connect a second switch-type sensor to the other port of the adapter.
4. In the list, **tap or click** one of the sensors or configurations to select it and **tap or click OK**.

You may need to **tap or click** the arrows to scroll the list.

5. If SPARKvue prompts you to enter one or more measurements specific to your equipment, enter the value or values and **tap or click OK**. The measurements that you enter will be used to compute data such as the velocity of an object passing through a photogate.

Connecting a sensor through an Analog Adapter

The Analog Adapter (PASCO part PS-2158) allows analog ScienceWorkshop sensors to be connected to a PASPORT interface and used with SPARKvue .

Complete these steps to connect and configure a sensor with an Analog Adapter:


1. Connect the Analog Adapter to your PASPORT interface.
2. Connect an analog sensor to the adapter.

A list of sensors appears.

3.  **Tap or Click** one of the sensors to select it and **tap or click OK**.

You may need to **tap or click** the arrows to scroll the list.



4. Optionally, tap or click the **Gain** box and tap or click a gain setting.
5.  Tap or Click **OK** again.

Data sharing using Connect

- [What is Connect](#)
- [Connecting to an open session](#)
- [Starting a Connect session](#)
- [Change from a Guided Session to Unguided Session](#)
- [Disconnecting from a session](#)
- [Get session information](#)

What is Connect

Connect in SPARKvue allows multiple users to share data from the shared sensors as the data is collected. Sessions can be Guided or Unguided. See [Starting a Connect session](#).

Guided Guided sessions allow a user to control the lab as it progresses. The other session participants follow along in the guided session.

Unguided Unguided sessions allow each user to control their own lab session (for example select page, scaling graphs). The data is still shared across the users in the session.

Tip: Sessions can be changed from **Guided** to **Unguided** at any time in the lab. (Cannot be changed from **Unguided** to **Guided**.)


Connecting to an open session

1. Open the **Connect** window:

 Tap or Click **Connect**.



The **Connect: Shared Session** window opens.

2.  Tap or Click **Manually connect to an opened session** under **Opened Sessions**.

The **Connect to a Session** window opens.

3. Enter the following information:

Session Information

Your Name → Enter your name to identify you to others in the session.

Get the following session information from someone that is already in the session that you want to join. See [Get session information](#).

Session Name → Enter the session name that you want to enter.

Network Configuration

Server Address → Leave as is or change if different from the session that you want to enter.

Port → Leave as is or change if different from the session that you want to enter.

4.  Tap or Click **OK**.

The **Connecting** dialog opens alerting you that the host needs to approve your connection.

After the host approves, the experiment is downloaded to your system and the lab session is opened.

Tip: After connecting, tap or click the multiple user icon to collapse the **Connected** panel.



Starting a Connect session

1. Open the **Connect** window:

 Tap or Click **Connect**.















The **Connect: Shared Session** window opens.

2.  Tap or Click **Start a Shared Session**.

The **Start a Session** window opens.

3. Enter the following information:

Session Information					
Your Name	<p>→ Enter your name to identify you to others in the session.</p> <p>→ Enter a session name. (Others will use the session name to join your session.)</p>				
Session Name	<p>Tip:   Tap or Click the information icon to later recall the Session Name (see Get session information).</p> <div style="text-align: center;"></div>				
Choose a lab for the session	<p>→ If no lab is open or started:</p> <ol style="list-style-type: none">   Tap or Click Select SPARKlab. The Select SPARKlab window opens.   Tap or Click Experiments or Saved Work. Select the desired experiment or lab.   Tap or Click OK. 				
Is this a Guided Session?	<p>→ Select Yes or No.</p> <table border="0"> <tr> <td style="vertical-align: top;">Guided</td> <td>Guided sessions allow a user to control the lab as it progresses. The other session participants follow along in the guided session.</td> </tr> <tr> <td style="vertical-align: top;">Unguided</td> <td>Unguided sessions allow each user to control their own lab session (for example select page, scaling graphs). The data is still shared across the users in the session.</td> </tr> </table> <p>Tip: Sessions can be changed from Guided to Unguided at any time in the lab. (Cannot be changed from Unguided to Guided.)</p> <p>  Tap or Click the information icon to change (see Get session information).</p> <div style="text-align: center;"></div>	Guided	Guided sessions allow a user to control the lab as it progresses. The other session participants follow along in the guided session.	Unguided	Unguided sessions allow each user to control their own lab session (for example select page, scaling graphs). The data is still shared across the users in the session.
Guided	Guided sessions allow a user to control the lab as it progresses. The other session participants follow along in the guided session.				
Unguided	Unguided sessions allow each user to control their own lab session (for example select page, scaling graphs). The data is still shared across the users in the session.				
Network Configuration					
Server	→ Leave as is to use the default server or select My Device to				

use your device as a server.

Tip: If you use your device to host the session, use the information icon to retrieve the IP address (see [Get session information](#)).

Address



Port

↩ Leave as is.

4. Tap or Click **OK**.
5. Invite others to join the session. See [Connecting to an open session](#).
6. As members request connection, approve the connections in the **Approve** section of the **Connected** panel:

Approve all: Tap or Click **Approve All** next to **Approve**.

Approve or reject each member: Tap or Click the approve icon or reject icon next to each member in the **Approve** section .

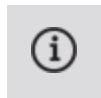
Members connected in the session are listed in the **Connected** section.

Tip: After connecting, tap or click the multiple user icon to collapse the **Connected** panel.



Change from a Guided Session to Unguided Session

1. Tap or Click the information icon in the **Connected** panel.



2. Tap or Click to toggle **Yes** to **No** for **Is this a Guided Session?**

Tip: Sessions can be changed from **Guided** to **Unguided** at any time in the lab. (Cannot be changed from **Unguided** to **Guided**.)

3. Tap or Click **OK**.

Disconnecting from a session

1.  Tap or Click the disconnect button in the **Connected** panel.



2. The **Disconnect** window opens.

3.  Tap or Click **OK**.

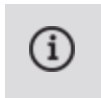
The **Connected** panel closes and you are logged off the shared session.

The lab remains open.

Note: If you are the host, all connected users are disconnected from the session.

Get session information

1.  Tap or Click the information icon in the **Connected** panel.



2. The following can be edited:

Is this a Guided Session? (from **Yes** to **No** only)

3.  Tap or Click **OK**.

Tip: The Session Name is required by other users to connect to the session.

Data recording

The following tasks describe how to record a data run with SPARKvue in periodic sampling mode and manual sampling mode.

Note: Over the course of a science investigation, you can record multiple data runs and sets.

- [Recording a run of periodically sampled data](#)
- [Recording a set of manually sampled data](#)
- [Deleting data runs](#)

Recording a run of periodically sampled data

To record manually sampled data, first put SPARKvue into periodic sampling mode.

With SPARKvue in periodic sampling mode (the default mode, sometimes known as “continuous” mode), complete these steps to record a data run:

1.  Tap or Click the **Start** button.



SPARKvue creates a new data run and starts recording data points into it.

2. To stop recording data, tap or click the **Stop** button.



SPARKvue stops recording data.

3. Repeat these steps to record another data run.

Recording a set of manually sampled data

To record manually sampled data, first put SPARKvue into manual sampling mode.

In manual sampling mode, a single value from each measurement is recorded each time you manually trigger SPARKvue. A series of values is recorded in a data set.

Complete these steps to start a data set, trigger points to be recorded, and close the data set:

1. Optionally, turn to a page in your SPARKlab where you will be able to see your data in a table.

You can record data with any type of display visible (or no display at all), but it is typical to record manually sampled data while looking at a table.

2.  Tap or Click the **Start** button.



SPARKvue creates a new data set. Live data appear in the data displays.

3. When you are ready to record a data point, **tap or click** the **Keep** button.



SPARKvue records a single value from each measurement.

4. Repeat the previous step as many times as necessary to record all of the data that you want in the data set.
5. When the entire set has been recorded, **tap or click** the **Stop** button.



The data set closes.

6. Repeat these steps to record another data set.

Deleting data runs

1.  Tap or Click the **Experiment Tools** button.






The Experiment Tools screen opens.

2.  Tap or Click **Manage Data**.

3.  Tap or Click **Manage Runs**.

The **Manage Runs** screen opens.

4. Do one of the following:

-  Tap or Click **Delete Last Run**.
-  Tap or Click **Delete All Runs**.
-  Tap or Click **Delete Run...** and **tap or click** the run that you want to delete.

5.  Tap or Click **Done**.

6.  Tap or Click **OK**.

Data display

- [Displaying data in a line graph](#)
- [Displaying data in a bar graph](#)
- [Displaying data in a Multiple y-axis graph](#)
- [Displaying data in a table](#)
- [Displaying data in a digits display](#)
- [Displaying data in a meter](#)

Displaying data in a line graph

- [Creating a line graph](#)
- [Showing and hiding the line graph tool palette](#)
- [Adjusting the scale of a line graph](#)
- [Selecting data to show in an existing line graph](#)
- [Selecting data for operation in a line graph](#)
- [Annotating data in a line graph](#)
- [Displaying data in a Multiple y-axis graph](#)

Creating a line graph

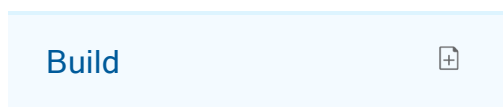


To create a new line graph, do one of the following (A or B):

A. From the Home screen, create a new SPARKlab:



Tap or Click **Build**.



Continue to step 1.

B. Within a SPARKlab, add a new page:



Tap or Click the **New Page** button.



Continue to step 1.

1. **Optional:** Add a background image

- a. Tap or Click the **Select a Background Image** button.



The **Open** window appears.

- b. Tap or Click an image file to select it.

- c. Tap or Click **Open**.

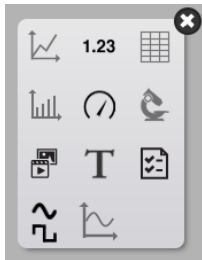
The background image is added to the preview.

2. Select a template from the library.



Scroll up and down to view templates

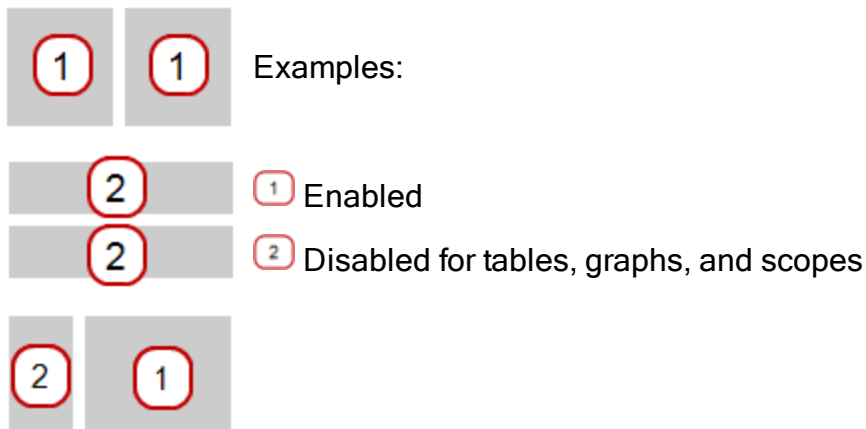
The **Display Selection** opens for each placeholder.






3. Tap or Click the Line Graph icon.



Note: Tables, graphs, and scopes are disabled for some page configurations.

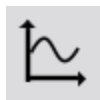


4. Select the data for each display on the page.
 - a.  Tap or Click the display data label(s): **Select Measurement**
or
 - b. Open the display properties and select the data.
 - i.  Tap or Click the **Display Tools** button near the lower or upper left corner of the display.
 - ii.  Tap or Click the **Properties** button.

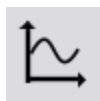


Showing and hiding the line graph tool palette

Show: To show the tool palette, tap or click the **Display Tools** button near the lower or upper left corner of the display.



Hide: To hide the tool palette, tap or click the **Display Tools** button.



Adjusting the scale of a line graph

Do one or more of the following tasks (in any order) to change the range and domain of a graph.

- [Scaling a graph to fit all data](#)
- [Scaling by direct manipulation](#)

Scaling a graph to fit all data

1.  Tap or Click the Tool Palette.






2.  Tap or Click the **Scale-to-fit** button.



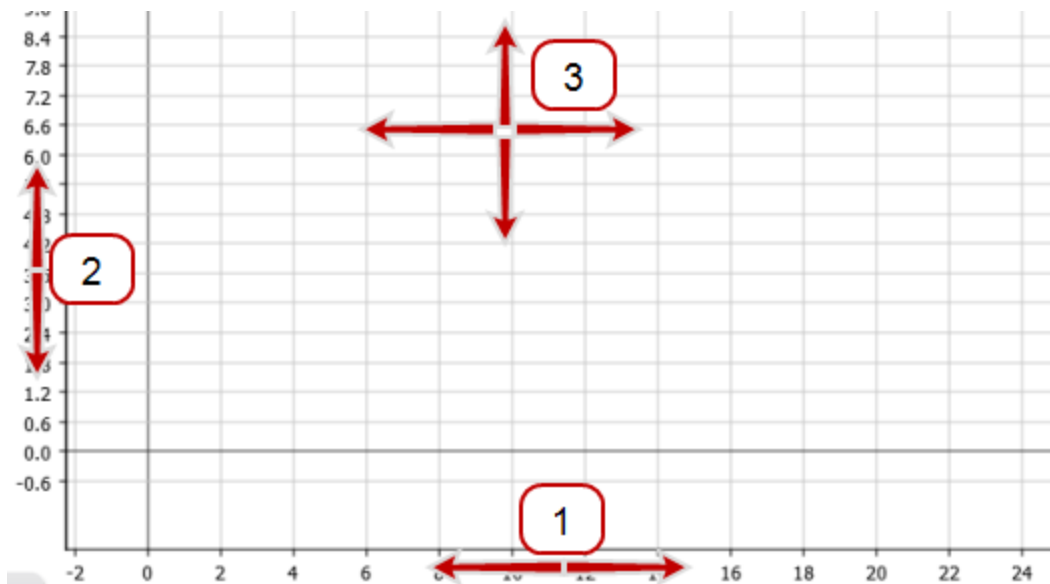
The graph adjusts to fit all data (or selected data).

Scaling by direct manipulation

Complete one or more of these steps in any order:

-  Tap or Click one of the numbers labeling the x-scale and drag it left or right.
The display expands or contracts horizontally.
-  Tap or Click one of the numbers labeling the y-scale and drag it up or down.
The display expands or contracts vertically.
-  Tap or Click the middle of the display and drag it in any direction.
The display moves.

- 1 Expanding and contracting horizontally.
- 2 Expanding and contracting vertically.
- 3 Moving.

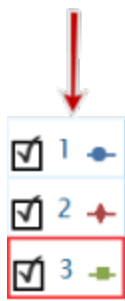


Selecting data to show in an existing line graph

- [Showing and hiding data runs in a graph](#)
- [Changing the variable on the x- or y-axis](#)

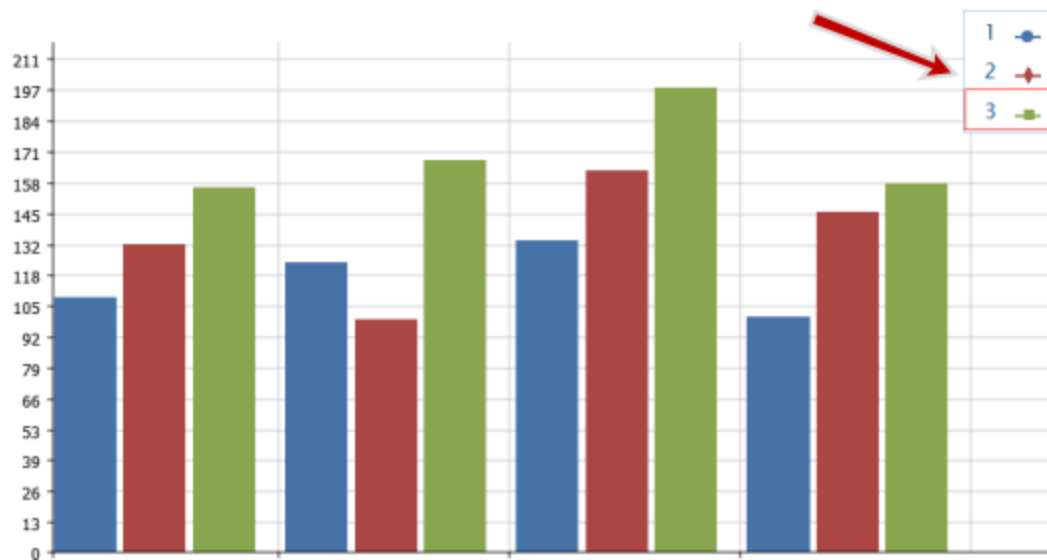
Showing and hiding data runs in a graph

1. Tap or Click the graph legend.
The legend enlarges to show available data runs.



2. Select or clear (tap or click) the check box next to each data run that you want to show or hide.
3. Optionally, tap or click outside the legend to reduce the size of the legend.

Graph legend



Changing the variable on the x- or y-axis

1. Tap or Click the **Measurement** button to change; skip to step 4.
2. Or, tap or click the applicable **Display Tools** button to open the tools palette.



3. Tap or Click the **Properties** button to open the **Properties** screen.




4. Tap or Click the display variable you want to change.
5. Tap or Click the **Measurement** box and tap or click the replacement measurement or other variable.
6. Tap or Click **OK**.

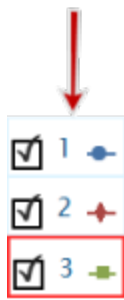
Selecting data for operation in a line graph

- [Selecting a data run for operation in a line graph](#)
- [Selecting part of a data run for operation in a line graph](#)

Selecting a data run for operation in a line graph

In the display legend, a red outline surrounds the run that is selected for operation. Complete these steps to change which run is selected:

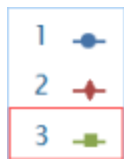
- i.  Tap or Click the legend.
The legend enlarges.



- ii. In the legend, tap or click the symbol (but not the check box) of the run that you want to select.

The red outline moves to the selected run.

Sample Legend



Note: When you apply statistics, such as mean or standard deviation, they are applied to the selected run.

Selecting part of a data run for operation in a line graph

If part of a data run is selected for operation, the selected data points are highlighted. Scale-to-fit, statistics, graph tools, and curve fits are applied only to the selected data points.

Complete these steps to select part of a data run:

1. Optional: select a different data run.

In the display legend, a red outline surrounds the run that is selected for operation. Complete these steps to change which run is selected:

- i. Tap or Click the legend.
 The legend enlarges.



- ii. In the legend, **tap or click** the symbol (but not the check box) of the run that you want to select.

The red outline moves to the selected run.

Sample Legend



Note: When you apply statistics, such as mean or standard deviation, they are applied to the selected run.

2. Tap or Click the **Graph Tools** button to open the tool palette.



3. Tap or Click the **Select** button.



The button changes color.

4. Tap or Click and drag to select data points.
 5. When the desired data points are highlighted, **tap or click done selecting**.
 6. To clear the selection, **tap or click the Select** button again.



Annotating data in a line graph

- [Adding an annotation](#)
- [Editing or deleting an annotation](#)

Adding an annotation

1. If there is more than one data run on the line graph, first select the run that the annotation will be attached to:

- a.  Tap or Click the graph legend.

The legend enlarges.



- b. In the legend, tap or click the symbol of the run that you want to select.

The red outline moves to the selected run.

2.  Tap or Click the **Graph Tools** button to open the tool palette.






3.  Tap or Click the **Select** button.



The button changes color.



4.  Tap or Click one or points on the graph.
5.  Tap or Click **done selecting**.
6.  Tap or Click the **Annotation** button.



7. Enter a note and tap or click **OK**.


An annotation appears on the graph. You can then **tap or click** and then move the annotation.

8.  Tap or Click the **Select** button.

Editing or deleting an annotation

1.  Tap or Click the **Graph Tools** button to open the tool palette.



2.  Tap or Click the annotation that you want to edit or delete. The annotation is highlighted.

3.  Tap or Click the **Annotation** button.



The on-screen keyboard appears.

4. Edit or delete the annotation and **tap or click OK**.

If you delete all the text, the annotation is removed.

If you change the text, the new text appears in the annotation box on the bar graph.

Displaying data in a Multiple y-axis graph

- [Creating a multiple y-axes line graph](#)
- [Working with multiple y-axes](#)
-

Creating a multiple y-axes line graph

To create a new line graph with multiple y-axes:

I. Create a line graph:

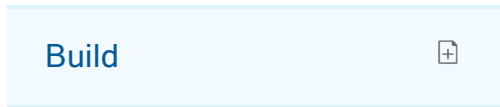
Create a line graph (or use an existing line graph).



To create a line graph, do one of the following (A or B):

- A. From the Home screen, create a new SPARKlab:

Tap or Click **Build**.



Continue to step 1.

B. Within a SPARKlab, add a new page:

Tap or Click the **New Page** button.



Continue to step 1.

1. **Optional:** Add a background image

a. Tap or Click the **Select a Background Image** button.



The **Open** window appears.

b. Tap or Click an image file to select it.

c. Tap or Click **Open**.

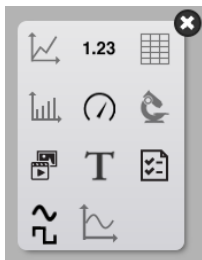
The background image is added to the preview.

2. Select a template from the library.



Scroll up and down to view templates

The **Display Selection** opens for each placeholder.



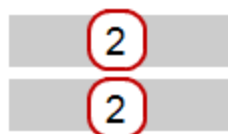
3. Tap or Click the Line Graph icon.



Note: Tables, graphs, and scopes are disabled for some page configurations.



Examples:



1 Enabled



2 Disabled for tables, graphs, and scopes



4. Select the data for each display on the page.
 - a. Tap or Click the display data label(s): **Select Measurement**
or
 - b. Open the display properties and select the data.
 - i. Tap or Click the **Display Tools** button near the lower or upper left corner of the display.
 - ii. Tap or Click the **Properties** button.



II. Add a vertical axis:

1. Open the properties.

- i. Tap or Click the **Display Tools** button near the lower or upper left corner of the display.
- ii. Tap or Click the **Properties** button.



2. Tap or Click **Add Vertical Axis**.
3. Tap or Click **Measurement** and select the second measurement.

Note: Axis **y1** is the outside axis and **y2** is the inside axis.

4. Tap or Click **OK**.

A graph with multiple y-axes displays.

Working with multiple y-axes

Most of the actions you can perform on a single y-axis graph can be performed on multiple y-axes graphs. You can:

- [Adjusting the scale of a line graph](#)
- [Selecting data to show in an existing line graph](#)
- [Selecting data for operation in a line graph](#)
- [Annotating data in a line graph](#)

Lock origin of multiple y-axes

In addition to the typical line graph actions the multiple-y axes can be locked at the same zero point.

1. Open Properties:

- i. Tap or Click the **Display Tools** button near the lower or upper left corner of the display.
- ii. Tap or Click the **Properties** button.



2. Tap or Click on the **Graph Coordinate Information** button.



The button changes color.



The origins of all of the measurements are all locked together.

Displaying data in a bar graph

- [Creating a bar graph](#)
- [Showing and hiding the bar graph tool palette](#)
- [Showing data in bar graphs](#)
- [Annotating data in bar graphs](#)
- [Viewing bar graphs](#)
- [Customizing axes labels and units on bar graphs](#)

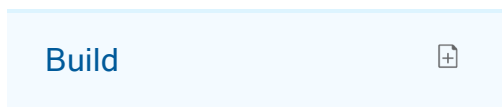
Creating a bar graph



To create a new bar graph, do one of the following (A or B):

A. From the Home screen, create a new SPARKlab:

 Tap or Click **Build**.



Continue to step 1.

B. Within a SPARKlab, add a new page:

 Tap or Click the **New Page** button.




Continue to step 1.

1. **Optional:** Add a background image

- a.  Tap or Click the **Select a Background Image** button.



The **Open** window appears.

- b.  Tap or Click an image file to select it.

- c.  Tap or Click **Open**.

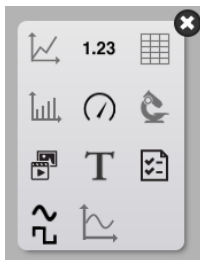
The background image is added to the preview.

2. Select a template from the library.

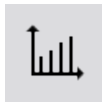


Scroll up and down to view templates

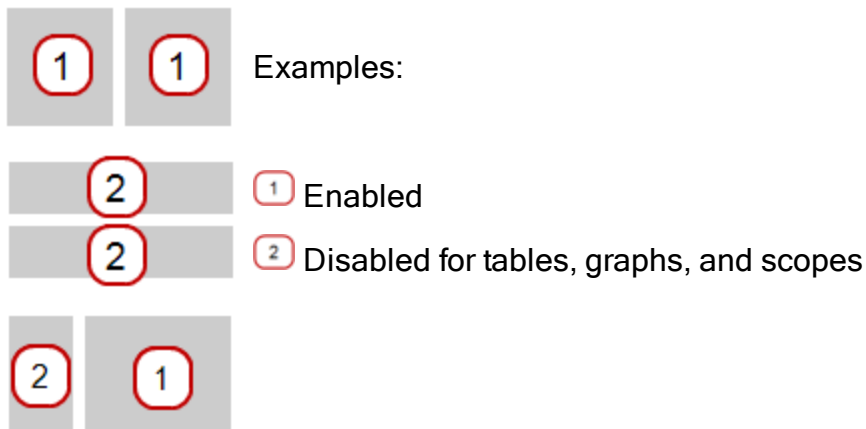
The **Display Selection** opens for each placeholder.



3.  Tap or Click the Bar Graph icon.



Note: Tables, graphs, and scopes are disabled for some page configurations.

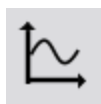


4. Select the data for each display on the page.
 - a. Tap or Click the display data label(s): **X-Axis Variable**, **Y-Axis Variable** or
 - b. Open the display properties and select the data.
 - i. Tap or Click the **Display Tools** button near the lower or upper left corner of the display.
 - ii. Tap or Click the **Properties** button.



Showing and hiding the bar graph tool palette

Show: To show the tool palette, tap or click the **Display Tools** button near the lower or upper left corner of the display.



Hide: To hide the tool palette, tap or click the **Display Tools** button.






Showing data in bar graphs

When you create a new bar graph, the first bar is already created for you. You will need to name the bar and add additional bars in your bar graph and record data for each bar.





- [Adding bars and bar names in bar graphs](#)
- [Editing bars and bar names in bar graphs](#)
- [Adding data in bar graphs](#)
- [Adding additional data runs to a bar graph](#)
- [Adding additional data runs to a bar graph using sensor readings](#)
- [Showing and hiding data runs in a bar graph](#)
- [Selecting data for operation in a bar graph](#)

Adding bars and bar names in bar graphs

1.  Tap or Click the placeholder bar. This will open the bar edit menu. A placeholder bar appears in the bar graph.



Note: This tool will already be active when a bar graph is first created.



2.  Tap or Click the bar with muted color.
3.  Tap or Click the default bar name above the numeric keypad, such as **Bar 1**
4.  Tap or Click in the bar name box, delete the old name, and enter a new name.
5.  Tap or Click **OK**.
A new placeholder bar is automatically added.
6. To name the new bar, tap or click it, and repeat steps 2 through 4.
7. Continue adding the bars you need.
8. When you finish adding bars, tap or click the Bar Add and Edit button to turn off the tool.

Turning this tool off removes the last placeholder bar.



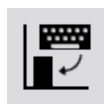
Editing bars and bar names in bar graphs


1. Open Properties:


- i.  Tap or Click the **Display Tools** button near the lower or upper left corner of the display.
- ii.  Tap or Click the **Properties** button.



2.  Tap or Click the **Bar Edit** button.



3.  Tap or Click the bar you want to edit.
The bar edit menu opens.

4.  Tap or Click in the bar name box, delete the old name, and enter a new name.

5.  Tap or Click **OK**.

Adding data in bar graphs

You can add data to bars either manually or through collecting data using a sensor.

- [Entering data into bar graph manually](#)
- [Collecting data for bar graph using a sensor](#)

Entering data into bar graph manually

1.  Tap or Click the **Bar Graph Tools** button to open the tool palette.




2.  Tap or Click the bar you want to edit.

3. Enter a value for the bar.

4.  Tap or Click **OK**.


Collecting data for bar graph using a sensor

It is recommended that the bars are given names either before or during data collection. See [Editing bars and bar names in bar graphs](#) and [Adding bars and bar names in bar graphs](#).

1.  Tap or Click the record arrow to record data for the first empty bar in a data run.




The first bar becomes active and displays the data being collected, and the record button changes to a check mark.

2.  Tap or Click the check mark to stop collecting for the current bar and move to the next bar.

Note: The will remains gray if it does not have a name assigned to it.



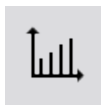
3.  Tap or Click the Stop button to stop collecting data.



Adding additional data runs to a bar graph

You can show multiple data sets in a bar graph at once.

1. If necessary, tap or click the **Bar Graph Tools** button near the lower left corner of the bar graph to open the tool palette.



2. For manually entered data, tap or click the **Run Addition** button.



3. Enter or record the data for each bar.

Adding additional data runs to a bar graph using sensor readings

You can show multiple data sets in a bar graph at once.

1. For data collected using a sensor, tap or click the **Record Arrow**.



2. Tap or Click the **Check mark** to stop collecting for the current bar and move to the next bar.



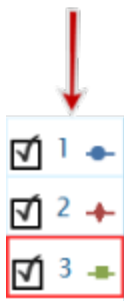
Note: the bar will remain gray if it does not have a name assigned to it.

3. Tap or Click the **Stop** button to stop collecting data.



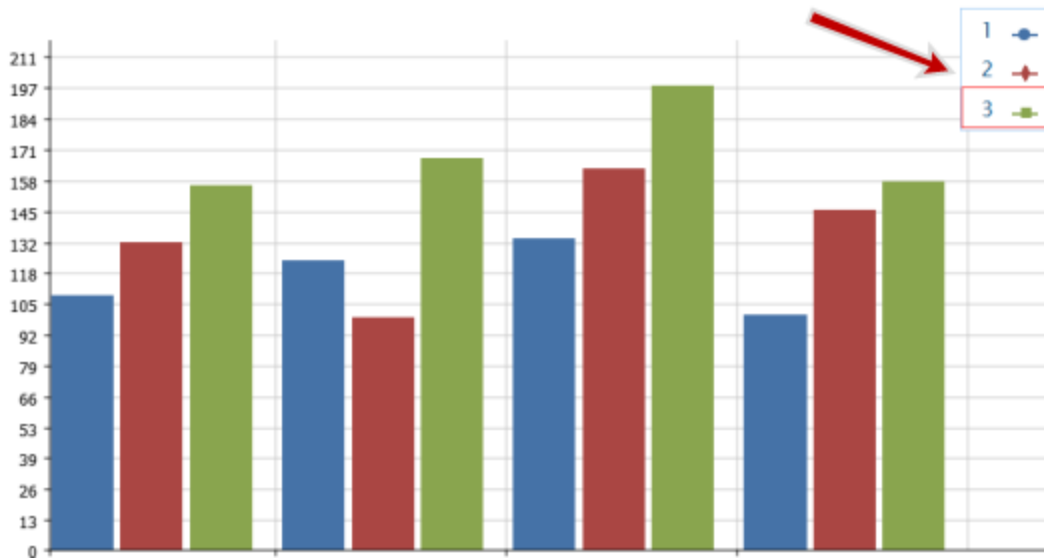
Showing and hiding data runs in a bar graph

1. Tap or Click the graph legend.
The legend enlarges to show available data runs.



2. Select or clear (Tap or Click) the check box next to each data run that you want to show or hide.
3. Optionally, tap or click outside the legend to reduce the size of the legend.

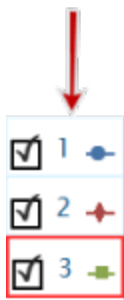
Bar Graph legend



Selecting data for operation in a bar graph

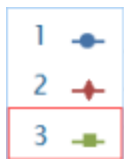
In the display legend, a red outline surrounds the run that is selected for operation. Complete these steps to change which run is selected:

- i. Tap or Click the legend.
The legend enlarges.



- ii. In the legend, tap or click the symbol (but not the check box) of the run that you want to select.
The red outline moves to the selected run.

Sample Legend



Note: When you apply statistics, such as mean or standard deviation, they are applied to the selected run.

Annotating data in bar graphs

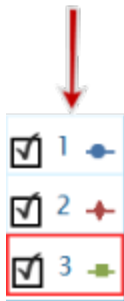
You can add annotation and show numeric values on bars:


- [Adding annotations to bars](#)
- [Editing or deleting annotations to bars](#)
- [Showing numeric values on bars](#)

Adding annotations to bars

If there is more than one data run on the graph, first select the run that the annotation will be attached to:

1.  Tap or Click the graph legend.
The legend enlarges.




2. In the legend, tap or click the symbol of the run(s) that you want to annotate.
3.  Tap or Click the **Bar Graph Tools** button to open the tool palette.



4.  Tap or Click the **Annotation** button.




5.  Tap or Click a bar.
6. Enter a note, and tap or click **OK**.
An annotation appears on the bar graph.

Editing or deleting annotations to bars

1.  Tap or Click the **Graph Tools** button to open the tool palette.



2.  Tap or Click the annotation that you want to edit or delete.
The annotation is highlighted.

3.  Tap or Click the **Annotation** button.



The **Enter Note** screen appears.

4. Edit or delete the annotation text, and tap or click **OK**.

If you delete all the text, the annotation is removed.

If you change the text, the new text appears in the annotation box on the bar graph.

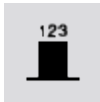
Showing numeric values on bars

To show numeric values at the tops of bars in a bar chart for a data run:

1.  Tap or Click the **Bar Graph Tools** button to open the tool palette.



2.  Tap or Click the **Numeric Values** button.



Numeric values appear at the top of each bar.



3. Tap or Click the **Numeric Values** button to remove the numeric values.



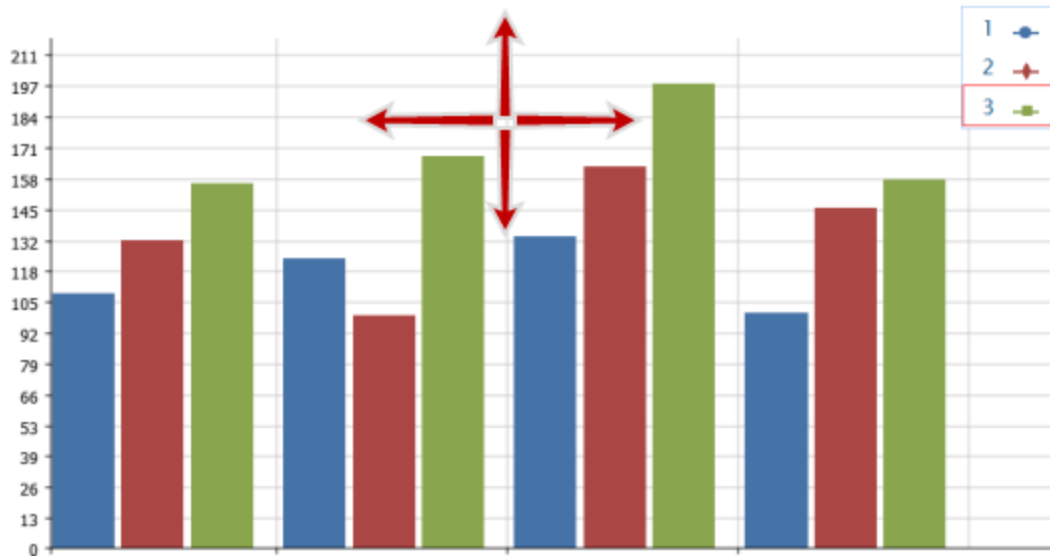
Viewing bar graphs

You can scroll and scale bar graphs to help you view all data in the graph:

- [Scrolling a bar graph](#)
- [Scaling a bar graph to show all data](#)
- [Scaling a bar graph by expanding or compressing the axes](#)

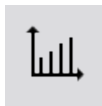
Scrolling a bar graph

To scroll and change the view of a bar graph, tap or click the middle of the graph and drag it up, down, side-to-side, or diagonally.



Scaling a bar graph to show all data

1. Tap or Click the **Bar Graph Tools** button to open the tool palette.



2. Tap or Click the **Scale-to-fit** button.



The graph adjusts to fit all data (or selected data).

Scaling a bar graph by expanding or compressing the axes

You can change the scale of a bar graph by expanding or compressing the X-axis, Y-axis, or both.



To do this, complete one or both of the following actions:

- Tap or Click one of the labels on the X-axis and drag horizontally (left or right).
The graph expands or contracts horizontally, making each bar area wider or narrower.
- Tap or Click one of the labels on the Y-axis, and drag vertically (up or down).
The bars in the bar graph display larger or smaller depending on the scale adjustment.







Customizing axes labels and units on bar graphs

To create an axis label:

1. Open Properties:

- i.  Tap or Click the **Display Tools** button near the lower or upper left corner of the display.
- ii.  Tap or Click the **Properties** button.



2.  Tap or Click the **Measurement** box for either the X-axis variable or Y-axis variable.
3.  Tap or Click **User-entered**.
4.  Tap or Click **Create Data Set**.
The **Define Data Set** box displays.
5.  Tap or Click the **Measurement Name** box.
6. Type the label text, and tap or click **OK**.
7.  Tap or Click the **Unit Name** box (if desired).
8. Type the type of unit, and tap or click **OK**.
9.  Tap or Click **OK**.
The new axis label(s) and unit(s) display in your bar graph.

Displaying data in a table

- [Creating a table](#)
- [Showing and hiding the table tool palette](#)
- [Scrolling a table](#)
- [Selecting data to show in an existing table](#)
- [Selecting cells for operation in a table](#)

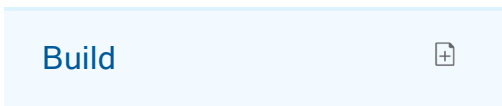
Creating a table



To create a table, do one of the following (A or B):

A. From the Home screen, create a new SPARKlab:

 Tap or Click **Build**.



Continue to step 1.

B. Within a SPARKlab, add a new page:

👆👈 Tap or Click the **New Page** button.



Continue to step 1.

1. **Optional:** Add a background image

a. 👆👈 Tap or Click the **Select a Background Image** button.



The **Open** window appears.

b. 👆👈 Tap or Click an image file to select it.

c. 👆👈 Tap or Click **Open**.

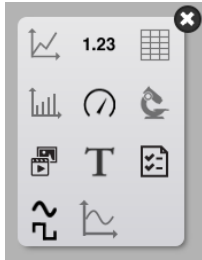
The background image is added to the preview.

2. Select a template from the library.



Scroll up and down to view templates

The **Display Selection** opens for each placeholder.



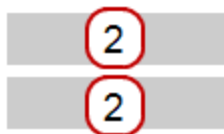
3. Tap or Click the Table icon.



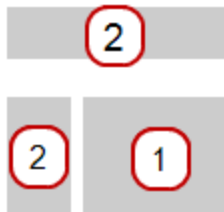
Note: Tables, graphs, and scopes are disabled for some page configurations.



Examples:



1 Enabled



2 Disabled for tables, graphs, and scopes



4. Select the data for each display on the page.
 - a. Tap or Click the display data label(s): **Select Measurement**
or
 - b. Open the display properties and select the data.
 - i. Tap or Click the **Display Tools** button near the lower or upper left corner of the display.
 - ii. Tap or Click the **Properties** button.



Showing and hiding the table tool palette


Show: To show the tool palette, tap or click the **Display Tools** button near the lower or upper left corner of the display.



Hide: To hide the tool palette, tap or click the **Display Tools** button.



Scrolling a table



 Tap or Click the middle of the table and drag it up or down.

1	5.0	114.5
2	7.0	123.2
3	8.0	109.4
4	10.0	133.2
5	12.0	99.4
6	14.0	181.2
7	16.0	141.2
8	18.0	108.1
9	20.0	137.5


Selecting data to show in an existing table

- [Selecting a run for display in an existing column](#)
- [Changing the variable displayed in an existing column](#)
- [Adding a column](#)
- [Removing a column](#)


Selecting a run for display in an existing column

1.  Tap or Click the run number at the top of the column.
A list of available runs appears.
2.  Tap or Click the run that you want to see.




Changing the variable displayed in an existing column

1.  Tap or Click the **Measurement** button to change; skip to step 4.
2. Or, tap or click the **Display Tools** button to open the tools palette.



3.  Tap or Click the **Properties** button to open the **Properties** screen.



4.  Tap or Click the display variable you want to change.
Note: For tables, columns are number 1, 2, 3, etc. from left to right.
5.  Tap or Click the **Measurement** box and tap or click the replacement measurement or other variable.
6.  Tap or Click **OK**.

Adding a column

A table can contain up to six columns. Complete these steps to add a column to a table:

1.  Tap or Click the **Table Tools** button to open the tool palette.




2. Optionally, tap or click a position in the table where the new column will be inserted:

- a.  Tap or Click the **Select** button.




The button changes color.




- b.  Tap or Click the column to the right of where you want the new column to appear.

Note: If you do not **tap** or **click** a position, the new column will be added to the right side of the table.

3.  Tap or Click the **Add Column** button.



A new, empty column is added to the table.

4.  Tap or Click the **Select Measurement** button to select a measurement or other variable to display in the new column.

Removing a column

1.  Tap or Click the **Table Tools** button to open the tool palette.



2.  Tap or Click the **Select** button.



The button changes color.



3.  Tap or Click the column that you want to remove.

4. Tap or Click the **Remove Column** button.



5. Tap or Click **OK**.

Selecting cells for operation in a table

If a group of table cells is selected for operation, the selected cells are outlined. If statistics are displayed, they apply only to the data in the selected cells.

Complete these steps to select cells:

1. Optional: select a different data run.

In the display legend, a red outline surrounds the run that is selected for operation. Complete these steps to change which run is selected:

- i. Tap or Click the legend.

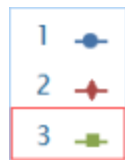
The legend enlarges.



- ii. In the legend, tap or click the symbol (but not the check box) of the run that you want to select.

The red outline moves to the selected run.

Sample Legend



Note: When you apply statistics, such as mean or standard deviation, they are applied to the selected run.

2. Tap or Click the **Table Tools** button to open the tool palette.



3. Tap or Click the **Select** button.



The button changes color.



4. On the table, drag down a column, across a row, or diagonally across rows and columns to select a group of cells.

The selected group of cells is outlined.

1 Selecting cells in a single column. **2** Selecting cells in a single row. **3** Selecting cells in multiple columns and rows.

1	5.0	114.5
2	7.0	123.2
3	8.0	109.4
4	11.0	133.2
5	11.0	99.4
6	11.0	181.2
7	11.0	141.2
8	18.0	108.1
9	20.0	137.5

Diagram illustrating selection methods on the table above:

- 1**: A horizontal red arrow pointing from the first cell of row 1 to the last cell of row 1, indicating selection of a single row.
- 2**: A vertical red arrow pointing from the first cell of row 1 to the first cell of row 7, indicating selection of a single column.
- 3**: A diagonal red arrow pointing from the first cell of row 1 to the last cell of row 6, indicating selection of multiple rows and columns.

5. To clear the selection, tap or click the **Select** button again.

Displaying data in a digits display

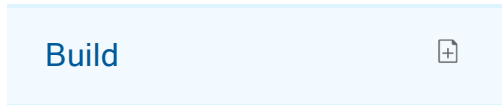
- [Creating a digits display](#)
- [Showing and hiding the digits display tool palette](#)
- [Changing the variable in a digits display](#)

Creating a digits display

1.23 To create a new digits display, do one of the following (A or B):

A. From the Home screen, create a new SPARKlab:

 Tap or Click **Build**.



Continue to step 1.

B. Within a SPARKlab, add a new page:

 Tap or Click the **New Page** button.




Continue to step 1.


1. **Optional:** Add a background image

a.  Tap or Click the **Select a Background Image** button.



The **Open** window appears.

b.  Tap or Click an image file to select it.

c.  Tap or Click **Open**.

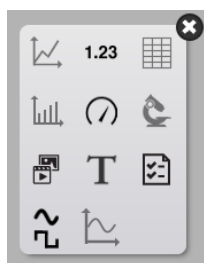
The background image is added to the preview.

2. Select a template from the library.



Scroll up and down to view templates

The **Display Selection** opens for each placeholder.



3. Tap or Click the Digits icon.



4. Select the data for each display on the page.
 - a. Tap or Click the display data label(s): **Select Measurement**
or
 - b. Open the display properties and select the data.
 - i. Tap or Click the **Display Tools** button near the lower or upper left corner of the display.
 - ii. Tap or Click the **Properties** button.



Showing and hiding the digits display tool palette

Show: To show the tool palette, tap or click the **Display Tools** button near the lower or upper left corner of the display.

1.23



Hide: To hide the tool palette, tap or click the **Display Tools** button.

1.23



Changing the variable in a digits display

1. Tap or Click the **Measurement** button to change; skip to step 4.
2. Or, tap or click the **Display Tools** button to open the tools palette.

1.23



3. Tap or Click the **Properties** button to open the **Properties** screen.



4. Tap or Click the display variable you want to change.
5. Tap or Click the **Measurement** box and tap or click the replacement measurement or other variable.
6. Tap or Click **OK**.

Displaying data in a meter

- [Creating a meter](#)
- [Showing and hiding the meter tool palette](#)
- [Adjusting the scale of a meter](#)

- [Changing the variable displayed in a meter](#)
- [Customizing the appearance of a meter](#)

Creating a meter

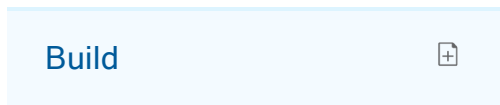


To create a new meter, do one of the following (A or B):

A. From the Home screen, create a new SPARKlab:



Tap or Click **Build**.



Continue to step 1.

B. Within a SPARKlab, add a new page:



Tap or Click the **New Page** button.




Continue to step 1.


1. **Optional:** Add a background image

- a.  Tap or Click the **Select a Background Image** button.



The **Open** window appears.

- b.  Tap or Click an image file to select it.

- c.  Tap or Click **Open**.

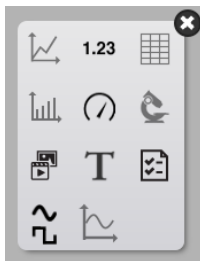
The background image is added to the preview.

2. Select a template from the library.



Scroll up and down to view templates


The **Display Selection** opens for each placeholder.





3.  Tap or Click the Meter icon.



4. Select the data for each display on the page.

- a.  Tap or Click the display data label(s): **Select Measurement**
or
- b. Open the display properties and select the data.

- i.  Tap or Click the **Display Tools** button near the lower or upper left corner of the display.
- ii.  Tap or Click the **Properties** button.



Showing and hiding the meter tool palette

Show: To show the tool palette, tap or click the **Display Tools** button near the lower or upper left corner of the display.



Hide: To hide the tool palette, tap or click the **Display Tools** button.



Adjusting the scale of a meter

- [Scaling a meter to fit all data](#)
- [Setting the scale of a meter](#)

Scaling a meter to fit all data

1. Tap or Click the **Meter Tools** button to open the tool palette.



2. Tap or Click the **Scale-to-fit** button.



The scale adjusts to fit all data for the currently displayed data run.

Setting the scale of a meter




1. Tap or Click the **Meter Tools** button to open the tool palette.




2. Tap or Click the **Properties** button to open the **Properties** screen.




3. For the **Always Scale to Fit:** option tap or click **Off**.

4.  Tap or Click the **Minimum:** box and enter the low value of the desired range.
5.  Tap or Click the **Maximum:** box and enter the high value of the desired range.
6.  Tap or Click **OK**.




Changing the variable displayed in a meter

1.  Tap or Click the **Measurement** button to change; skip to step 4.
2. Or, tap or click the **Display Tools** button to open the tools palette.





3.  Tap or Click the **Properties** button to open the **Properties** screen.





4.  Tap or Click the display variable you want to change.
5.  Tap or Click the **Measurement** box and tap or click the replacement measurement or other variable.
6.  Tap or Click **OK**.

Customizing the appearance of a meter

1. Open Properties:
 - i.  Tap or Click the **Display Tools** button near the lower or upper left corner of the display.
 - ii.  Tap or Click the **Properties** button.



2.  Tap or Click the **Sweep Range:** box and tap or click **Semicircle**, **Small Sweep**, or **Large Sweep**.
3.  Tap or Click **OK**.

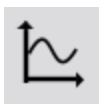
Displaying data in a scope display

Note: Requires a PASCO 550 Interface connected to your device. (This feature will be not be visible when a 550 is not connected.)

- [Creating a scope display](#)
- [Showing and hiding the scope tool palette](#)
- [Setting the trigger of a scope display](#)
- [Adjusting the sample rate of a scope display](#)
- [Adjusting the scale of a scope display](#)
- [Selecting data to show in an existing scope display](#)
- [Selecting data for operation in a scope display](#)
- [Annotating data in a scope display](#)

Creating a scope display

Note: Requires a PASCO 550 Interface connected to your device. (This feature will be not be visible when a 550 is not connected.)

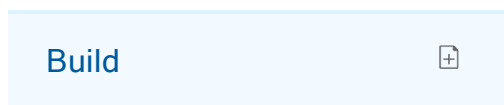


To create a new scope, do one of the following (A or B):

A. From the Home screen, create a new SPARKlab:



Tap or Click **Build**.



Continue to step 1.

B. Within a SPARKlab, add a new page:



Tap or Click the **New Page** button.



Continue to step 1.

1. **Optional:** Add a background image

- a. Tap or Click the **Select a Background Image** button.



The **Open** window appears.

- b. Tap or Click an image file to select it.
- c. Tap or Click **Open**.

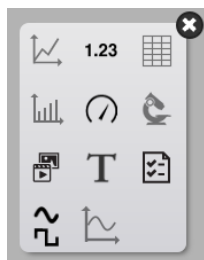
The background image is added to the preview.

2. Select a template from the library.

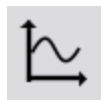


Scroll up and down to view templates

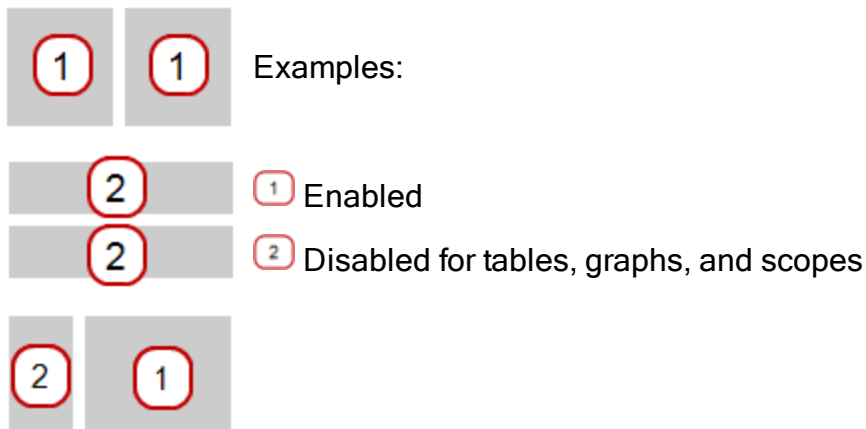
The **Display Selection** opens for each placeholder.



- 3. Tap or Click the Scope icon.



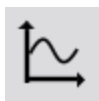
Note: Tables, graphs, and scopes are disabled for some page configurations.



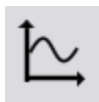
Showing and hiding the scope tool palette

Note: Requires a PASCO 550 Interface connected to your device. (This feature will be not be visible when a 550 is not connected.)

Show: To show the tool palette, tap or click the **Display Tools** button near the lower or upper left corner of the display.



Hide: To hide the tool palette, tap or click the **Display Tools** button.



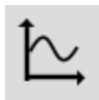
Adjusting the sample rate of a scope display

Note: Requires a PASCO 550 Interface connected to your device. (This feature will be not be visible when a 550 is not connected.)

SPARKvue enters Scope Mode when a scope display is added to any page in the lab. While in Scope Mode, only data that is selected in the scope display is recorded.

Adjusting sample rate while in Scope Mode

1. Tap or Click the Tool Palette.



2. Tap or Click



Increase Data Points (increases sampling rate)



Decrease Data Points (decreases sampling rate)

3. Tap or Click the Tool Palette to close the palette.
4. Record data at the new sampling rate.

Note: Increasing the sampling rate might adversely affect display refresh rate and the ability for your device to process incoming data.

Setting the trigger of a scope display

Note: Requires a PASCO 550 Interface connected to your device. (This feature will be not be visible when a 550 is not connected.)

The Scope display supports positive and negative triggers. The default is no trigger.

1. Open the Scope Tool Palette See [Showing and hiding the scope tool palette](#).
2. Tap or Click one of the triggers:



Rising Edge Trigger



Falling Edge Trigger

The selected trigger is placed on the scope display.



Rising Edge Trigger



Rising Edge Trigger

3. Optional: Drag the trigger up or down to change the trigger threshold.
4. Tap or Click the trigger in the Tool Palette to turn off the trigger.
5. Tap or Click the opposite trigger to toggle between triggers.

Adjusting the scale of a scope display

Note: Requires a PASCO 550 Interface connected to your device. (This feature will be not be visible when a 550 is not connected.)

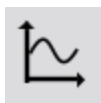
Do one or more of the following tasks (in any order) to change the range and domain of the scope display.

- [Scaling a graph to fit all data](#)
- [Scaling by direct manipulation](#)

Scaling a graph to fit all data

Note: Requires a PASCO 550 Interface connected to your device. (This feature will be not be visible when a 550 is not connected.)

1.  Tap or Click the Tool Palette.



2.  Tap or Click the **Scale-to-fit** button.






The graph adjusts the vertical axis fit all data (or selected data).

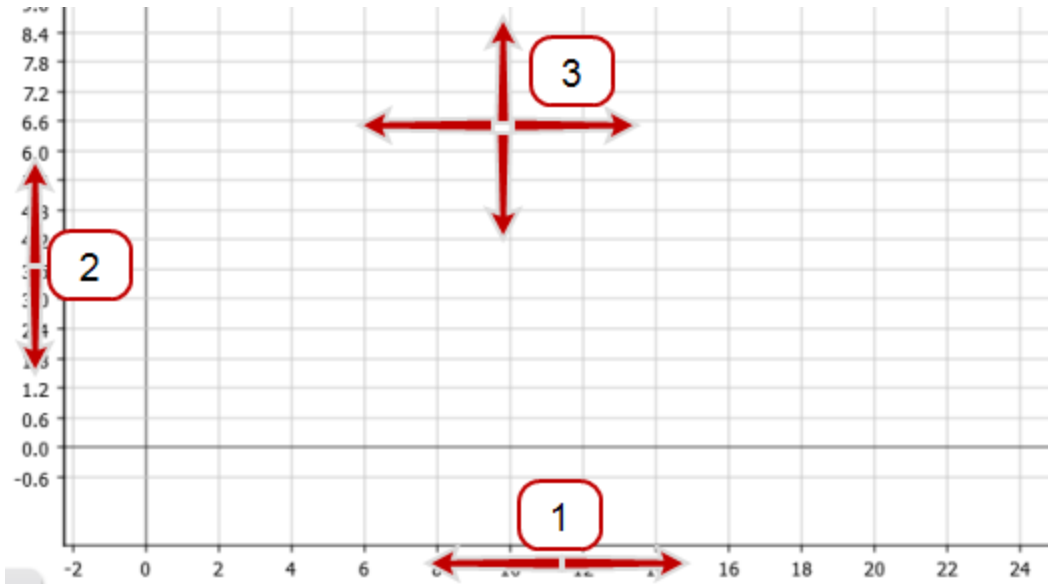
Note: The x-axis is not adjusted.

Scaling by direct manipulation

Complete one or more of these steps in any order:

-  Tap or Click one of the numbers labeling the x-scale and drag it left or right.
The display expands or contracts horizontally.
-  Tap or Click one of the numbers labeling the y-scale and drag it up or down.
The display expands or contracts vertically.
-  Tap or Click the middle of the display and drag it in any direction.
The display moves.

- 1 Expanding and contracting horizontally.
- 2 Expanding and contracting vertically.
- 3 Moving.



Selecting data to show in an existing scope display

Note: Requires a PASCO 550 Interface connected to your device. (This feature will be not be visible when a 550 is not connected.)

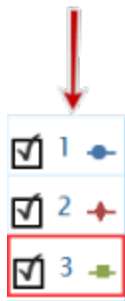
- [Showing and hiding data runs in a scope](#)
- [Changing the variable on the x- or y-axis](#)

Showing and hiding data runs in a scope

Note: Requires a PASCO 550 Interface connected to your device. (This feature will be not be visible when a 550 is not connected.)


1. Tap or Click the legend.

The legend enlarges to show available data runs.



2. Select or clear (tap or click) the check box next to each data run that you want to show or hide.
3. Optionally, tap or click outside the legend to reduce the size of the legend.




Changing the variable on the x- or y-axis

1.  Tap or Click the **Measurement** button to change; skip to step 4.
2. Or, tap or click the applicable **Display Tools** button to open the tools palette.



3.  Tap or Click the **Properties** button to open the **Properties** screen.



4.  Tap or Click the display variable you want to change.
5.  Tap or Click the **Measurement** box and tap or click the replacement measurement or other variable.
6.  Tap or Click **OK**.

Selecting data for operation in a scope display


Note: Requires a PASCO 550 Interface connected to your device. (This feature will be not be visible when a 550 is not connected.)

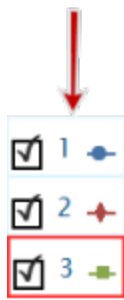
- [Selecting a data run for operation in a scope](#)
- [Selecting part of a data run for operation in a scope](#)

Selecting a data run for operation in a scope

Note: Requires a PASCO 550 Interface connected to your device. (This feature will be not be visible when a 550 is not connected.)

In the display legend, a red outline surrounds the run that is selected for operation. Complete these steps to change which run is selected:

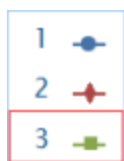
- i.  Tap or Click the legend.
The legend enlarges.



- ii. In the legend, tap or click the symbol (but not the check box) of the run that you want to select.

The red outline moves to the selected run.

Sample Legend



Note: When you apply statistics, such as mean or standard deviation, they are applied to the selected run.

Selecting part of a data run for operation in a scope


Note: Requires a PASCO 550 Interface connected to your device. (This feature will be not be visible when a 550 is not connected.)

If part of a data run is selected for operation, the selected data points are highlighted. Scale-to-fit is and Coordinates are applied only to the selected data points.

Complete these steps to select part of a data run:

- Optional: select a different data run.

In the display legend, a red outline surrounds the run that is selected for operation. Complete these steps to change which run is selected:

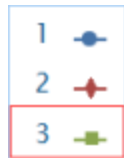
-  Tap or Click the legend.
The legend enlarges.



- ii. In the legend, **tap or click** the symbol (but not the check box) of the run that you want to select.

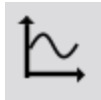
The red outline moves to the selected run.

Sample Legend



Note: When you apply statistics, such as mean or standard deviation, they are applied to the selected run.

2. Tap or Click the **Graph Tools** button to open the tool palette.



3. Tap or Click the **Select** button.



The button changes color.

4. Tap or Click and drag to select data points.
 5. When the desired data points are highlighted, **tap or click done**
 6. To clear the selection, **tap or click** the **Select** button again.



Annotating data in a scope display

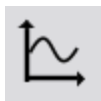
Note: Requires a PASCO 550 Interface connected to your device. (This feature will be not be visible when a 550 is not connected.)

- [Adding an annotation](#)
- [Editing or deleting an annotation](#)

Adding an annotation

Note: Requires a PASCO 550 Interface connected to your device. (This feature will be not be visible when a 550 is not connected.)

1.  Tap or Click **Scope Tool Palette**.





2. Select the location to place the annotation:

- a.  Tap or Click the **Select** button.



The button changes color.



- b.  Tap or Click a single point or drag to select multiple data points.
 - c. When the desired data points are highlighted, tap or click **done**
3.  Tap or Click the **Annotate** button.

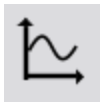



4. The **Enter Note** dialog opens.
5. Enter a note and tap or click **OK**.
6. An annotation appears on the scope trace.
7. Optional: Drag to move the annotation text box.

Editing or deleting an annotation

Note: Requires a PASCO 550 Interface connected to your device. (This feature will be not be visible when a 550 is not connected.)

1.  Tap or Click the Tool Palette.



2.  Tap or Click the annotation that you want to edit or delete.
The annotation is highlighted.

3.  Tap or Click the **Annotation** button.



The on-screen keyboard appears.

4. Edit or delete the annotation and tap or click **OK**.

If you delete all the text, the annotation is removed.

If you change the text, the new text appears in the annotation box on the bar graph.

Creating a new signal generator

Note: Requires a PASCO 550 Interface connected to your device. (This feature will be not be visible when a 550 is not connected.)



To create a signal generator, do one of the following (A or B):

A. From the Home screen, create a new SPARKlab:



Tap or Click **Build**.

Build



Continue to step 1.

B. Within a SPARKlab, add a new page:



Tap or Click the **New Page** button.



Continue to step 1.

1. **Optional:** Add a background image

- a. Tap or Click the **Select a Background Image** button.



The **Open** window appears.

- b. Tap or Click an image file to select it.

- c. Tap or Click **Open**.

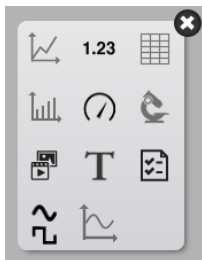
The background image is added to the preview.

2. Select a template from the library.



Scroll up and down to view templates

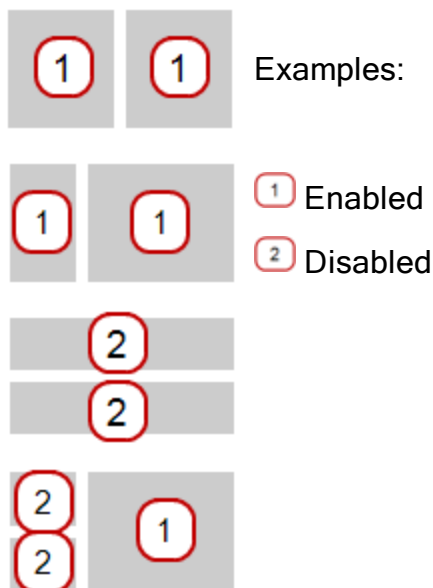
The **Display Selection** opens for each placeholder.



3. Tap or Click the Signal Generator icon.



Note: Signal Generator is disabled for some page configurations. (Signal Generator required 1/3 page or larger.)



4. Set the signal parameters. See [Setting up the signal generator](#).

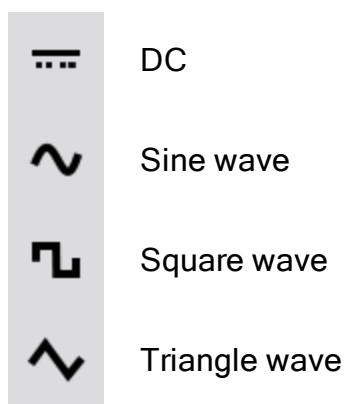
Setting up the signal generator

Note: Requires a PASCO 550 Interface connected to your device. (This feature will be not be visible when a 550 is not connected.)

The PASCO 550 Interface includes a signal generator. You can control the signal parameters within SPARKvue with a 500 Interface attached.



To set up the signal generator:

1. Build a new page with a Signal Generator. See [Creating a new signal generator](#)
2. Set the waveform:



3. Set the condition to turn on the Signal Generator:

On	Always on.
Off	Always off.
Auto	Turns on when start recording. Turns off when stop recording.




4. Set the frequency with one of the following methods:
 - Directly enter the frequency in the **Frequency** box.
 - Use the slider control to move the frequency up or down.
Note: Change the **Range** to define the slider range.
 -  Tap or Click the right or left arrows. Increments are based on the **Range** setting.
5. Set the Amplitude with one of the following methods:
 - Directly enter the frequency in the **Amplitude** box.
 - Use the slider control to move the amplitude up or down.
 -  Tap or Click the right or left arrows.

Recording output voltage and current

Note: Requires a PASCO 550 Interface connected to your device. (This feature will be not be visible when a 550 is not connected.)

The PASCO 550 Interface includes internal voltage and current sensors. These sensors measure the output of the 550 Signal Generator.

The output voltage and current sensors are turned off by default. Use the following steps to turn on these sensors for use in SPARKvue displays:

1.  Tap or Click **Signal Generator Properties**.
2.  Tap or Click **On** for one or both of the following:
 - **Record Output Voltage**
 - **Record Output Current**
3.  Tap or Click **OK**.

The measurements are now available in the measurement list and can be used with any SPARKvue display including the Scope.

Image capture

- [Connecting a camera or other video device](#)
- [Displaying a camera image](#)
- [Showing and hiding the image tool palette](#)
- [Capturing a camera image](#)
- [Switching between live and captured camera images](#)
- [Selecting a captured camera image for display](#)
- [Adjusting the scale and position of a camera image](#)
- [Measuring in a camera image](#)
- [Drawing on a camera image](#)
- [Annotating a camera image](#)
- [Naming an image](#)
- [Deleting and Renaming an image](#)
- [Exporting an image](#)

Connecting a camera or other video device

Connect the camera or other imaging device to your computer. If your computer has a built in camera, it will be detected automatically.

On the Home screen, you will see the camera(s) appear in the Sensors list.

Creating a camera element

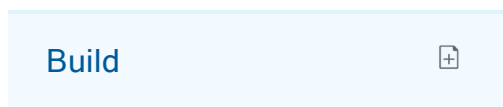


To create a new camera image, do one of the following (A or B):

A. From the Home screen, create a new SPARKlab:



Tap or Click **Build**.



Continue to step 1.

B. Within a SPARKlab, add a new page:



Tap or Click the **New Page** button.



Continue to step 1.

1. **Optional:** Add a background image

- a. Tap or Click the **Select a Background Image** button.



The **Open** window appears.

- b. Tap or Click an image file to select it.

- c. Tap or Click **Open**.

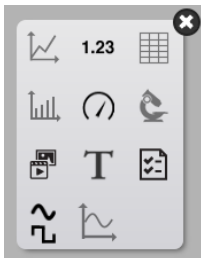
The background image is added to the preview.

2. Select a template from the library.



Scroll up and down to view templates

The **Display Selection** opens for each placeholder.



3. Tap or Click the Camera icon.



4. Tap or Click the **Image Tools** button to initialize the camera. See [Capturing a camera image](#).

Displaying a camera image

From the Home screen

1. In the **Home** screen, tap or click a camera.



A camera image display appears in a SPARKlab.

2. Tap or Click the **Live Image** button at the center of the display.



A live camera view appears in the display.

From within a SPARKlab

1. Tap or Click the **New Page** button.



The build a new page screen opens.

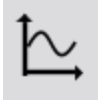
2. Select a template. See [Starting a new SPARKlab page](#)
3. Tap or Click the **Live Image** button at the center of the display.
A camera image display appears in a SPARKlab.
4. Tap or Click the **Live Image** button at the center of the display.



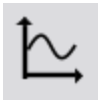
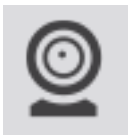
A live camera view appears in the display.

Showing and hiding the image tool palette

Show: To show the tool palette, tap or click the **Display Tools** button near the lower or upper left corner of the display.



Hide: To hide the tool palette, tap or click the **Display Tools** button.

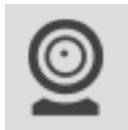



Capturing a camera image

See [Creating a camera element](#) to add a new page with a Camera element.

On the page, perform the following to capture an image:

1.  Tap or Click the **Image Tools** button to open the tool palette.



2.  Tap or Click the **Live Image** button on the tool palette to show a live image if a live image is not displayed.



A live image must be showing before you can capture a still image.

When a live image is showing, the button changes color.



3. Tap or Click the **Capture** button to capture a still image.

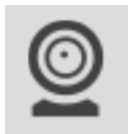


The live image is replaced by the captured still image.

Switching between live and captured camera images

To switch from a captured still image back to a live image:

1. Tap or Click the **Image Tools** button to open the tool palette.



2. Tap or Click the **Live Image** button in the tool palette.



The still image is replaced with a live image.

The **Live Image** button changes color.




To switch from a live image to a previously captured still image:

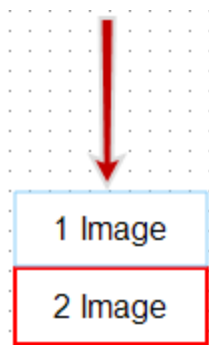
1. Tap or Click the image legend.
The legend expands to show all captured images.



2. Tap or Click the image to display.

Selecting a captured camera image for display

1.  Tap or Click the image legend.
2. The legend expands to show a list of captured images.



3.  Tap or Click the image to display.

Adjusting the scale and position of a camera image

Zooming in

In the tool palette, tap or click the **Zoom In** button.



The display zooms in toward the center.

Zooming out

In the tool palette, tap or click the **Zoom Out** button.



The display zooms in toward the center.

Scale to fit

To show the entire image, tap or click the **Scale-to-fit** button.



Panning a camera image

You can view different parts of an image by panning, or **tap** or **click** a point on the image and drag it left, right, diagonal, up, or down.

Measuring in a camera image

You can use a measurement tool on an image to measure the distance between two points. By default, the distance is reported in pixels (px), but you can calibrate the measurement tool to report the distance in other units.

The following topics describe how to position and calibrate measurement tools.

- [Placing a Measurement tool](#)
- [Moving a Measurement tool](#)
- [Deleting a Measurement tool](#)
- [Calibrating camera image measurements](#)

Placing a Measurement tool

While displaying a still image, complete the following steps.

1.  Tap or Click the **Image Tools** button to open the tool palette.




2. In the tool palette, tap or click the **Measurement** button.



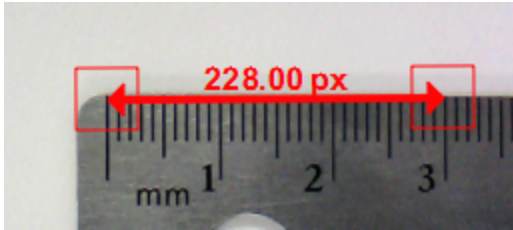
3. Optional: tap or click the color button in the palette to change the color.



4.  Tap or Click the point on the image.
5. Drag the box to the other point in the image.



A leader line with length display on the image.




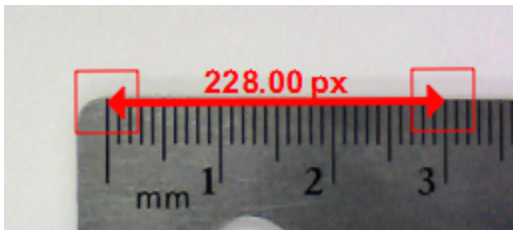
6. If necessary, drag the ends of the measurement tool to the desired location.
7. You can add additional measurement arrows, if needed.

Moving a Measurement tool

Measurements added to images can be moved.

To move a measurement arrow:

1.  Tap or Click the box at one end of the measurement, and drag it to the desired location.



2. If necessary, tap or click the box at the other end of the measurement tool and drag it to the desired location.

Deleting a Measurement tool

Measurements added to images can be removed. To remove a measurement arrow:

1.  Tap or Click the **Image Tools** button to open the tool palette.



2. In the tool palette, tap or click the Measurement button.



The **Measurement** button changes color, and the measurement toolbar appears.

3. In the measurement toolbar, tap or click the **Erase** button.



The **Erase** button changes color.

4. Tap or Click the box at one end of a measurement arrow.
The measurement arrow is deleted.

Calibrating camera image measurements

To calibrate measurements, the image must include an object of known length.

1. Tap or Click the **Image Tools** button to open the tool palette.



2. In the tool palette, tap or click the **Measurement** button.



3. Tap or Click the point on the image at one end of the object of known length.
4. Drag the box to the other end of the object.



A leader line with length display on the image.







5. If necessary, drag the ends of the measurement tool so that it exactly represents the known length.
6. Tap or Click the **Measurement** button again.



7. The **Measurement** button changes color, and the measurement toolbar appears.
8. In the measurement toolbar, tap or click the **Measurement** button.



9. The buttons changes color.
10.  Tap or Click the box at one end of the measurement arrow.
11. The **Image Measurement Properties** screen opens.
12.  Tap or Click the **Known length:** box, type the known length in your desired units, and tap or click **OK**.
13. Optionally, tap or click the **Digits** box and select the number of decimal places that will be displayed.
14.  Tap or Click the Units box, delete the existing units, type the name of the units, and tap or click **OK**.
15.  Tap or Click **OK** to close the Image Measurement Properties screen.

All measurement tools on the image now use the new calibration. Any new measurement tool that you add will also use the new calibration.

Drawing on a camera image

You can draw and erase on image using one of the follow tools.

- [Drawing](#)
- [Erasing](#)
- [Erasing all](#)

Drawing

1.  Tap or Click the **Image Tools** button to open the tool palette.



2. In the tool palette, tap or click the **Draw** button.



- The button changes color and the drawing toolbar appears.



- To change the pen color, tap or click the color button.



- Tap or Click a point on the image and drag to draw lines.
- Tap or Click the **Draw** button again in the tool palette to turn off the drawing pen and hide the drawing toolbar.



Erasing

- Tap or Click the **Image Tools** button to open the tool palette.



- In the tool palette, tap or click the **Draw** button.



- The button changes color and the draw palette appears.
- In the draw palette, tap or click the **Eraser** button.



The button changes color.

- To erase parts of a drawing, tap or click a point on the drawing and drag over it.
- Tap or Click the **Draw** button in the tool palette to close the draw palette.



Erasing all

1. Tap or Click the **Image Tools** button to open the tool palette.



2. In the tool palette, tap or click the **Draw** button.



3. The button changes color and the draw palette appears.
4. In the draw palette, tap or click the **Erase** button.



The button changes color.

5. To erase parts of a drawing, tap or click a point on the drawing and drag over it.
6. To erase all drawings from the image, tap or click the **Erase** button again.
7. Tap or Click **Yes**.
8. Tap or Click the **Draw** button in the tool palette to close the draw palette.



Annotating a camera image

You can annotate an image using one of the follow tools:

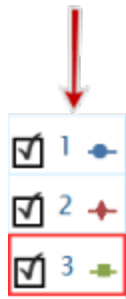
- [Adding an annotation](#)
- [Moving an annotation](#)
- [Editing an annotation](#)
- [Deleting an annotation](#)

Adding an annotation

- Optional: If there is more than one image, first select the image for the annotation:

- Tap or Click the image legend.

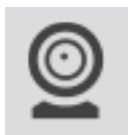
The legend expands.



- In the legend, tap or click the image that you want to select.

The red outline moves to the selected image.

- Tap or Click the **Image Tools** button to open the tool palette.



- Tap or Click the **Annotate** button.



- The Annotation button changes color, and the image annotation bar opens, showing the eraser and text color box.



- Tap or Click the color box until you see the color you want to use.



- Tap or Click the screen in the location to place the annotation.
- Enter a note and tap or click **OK**.

8. An annotation appears on the image and the image annotation bar closes.
9. Optional: Drag to move the annotation text box.

Moving an annotation

You can move the text and pointer arrow on an annotation:

- To move annotation text on an image, **tap or click** the text and drag it to a new location.
- To move an annotation arrow on an image, **tap or click** the point of the arrow and drag it to a new location.


Editing an annotation

1.  Tap or Click the Image Tools button to open the tool palette.



2.  Tap or Click the Annotation button.



3. The Annotation button changes color and the image annotation toolbar displays.
4.  Tap or Click the annotation you want to edit.
5. Edit the text and tap or click **OK**.

Deleting an annotation

1.  Tap or Click the **Image Tools** button to open the tool palette.



2.  Tap or Click the **Annotation** button.



3. The Annotation button changes color and the image annotation toolbar displays.

4. Tap or Click the **Eraser** button on the image annotation bar.



5. The Eraser button changes color.
6. Tap or Click the all annotations you want to delete.
7. When you finish deleting annotations, tap or click the **Eraser** button to turn off the deletion tool.
8. Tap or Click the **Annotation** button to close the annotation toolbar.

Naming an image

1. Tap or Click the **Experiment Tools** button to open **Experiment Tools** screen.




2. Tap or Click **Manage Data** to open the **Manage Data** screen.
3. Tap or Click **Manage Images** to open the **Manage Images** screen.
4. Tap or Click **Rename Image...** to open the **Rename Image...** screen.
5. Tap or Click the image that you would like to rename and tap or click **OK**.
6. Type the new name of the image and tap or click **OK**.
7. Tap or Click **OK** to close the **Manage Images** screen and tap or click **OK** again to close the **Manage Data** screen.

Deleting and Renaming an image


1. Tap or Click the **Experiment Tools** button to open the **Experiment Tools** screen.




2. Tap or Click **Manage Data** to open the **Manage Data** screen.
3. Tap or Click **Manage Images** to open the **Manage Images** screen.
4. Do one of the following:

- To delete all images, tap or click **Delete All Images**, and tap or click **OK**.
 - To delete a single image, tap or click **Delete Image...**, tap or click the image to delete, and tap or click **OK**.
 - To rename an image, tap or click **Rename Image...**, tap or click the image to delete, and tap or click **OK**.
5.  Tap or Click **OK** to close the **Manage Images** screen, tap or click **OK** again to close the **Manage Data** screen.

Exporting an image

1.  Tap or Click the **Sharing** button to open the Sharing screen.



2.  Tap or Click the **Export Images** tab.
3. After saving your images, tap or click **OK** to return to your SPARKlab.

Data analysis

In any display, you can view the statistics of data runs, including minimum value, maximum value, mean value, standard deviation, and count (or number of points). In a graph, the area statistic is also available.

A graph also allows you to apply curve fits; draw predictions; and find coordinates, distances, and slopes on data plots.

- [Analyzing data in a graph](#)
- [Viewing statistics in a table](#)
- [Viewing statistics in a digits display](#)
- [Viewing statistics in a meter](#)

Analyzing data in a graph



- [Viewing statistics in a line graph](#)
- [Applying a curve fit](#)
- [Removing a curve fit](#)
- [Drawing a prediction](#)
- [Finding the x- and y-values of a point](#)
- [Finding the x- and y-difference between two points](#)
- [Finding the slope at a point on a data plot](#)
- [Finding the correlation coefficient \(r\)](#)
- [Displaying the RMSE Root-Mean-Square Error](#)
- [Analyzing data in a multiple-y axes graph](#)
- [Viewing Statistics in a bar graph](#)

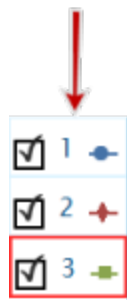
Viewing statistics in a line graph

To see the minimum, maximum, mean, standard deviation, count, and area-under-the-curve of a data run:

1. Optional: select a different data run.

In the display legend, a red outline surrounds the run that is selected for operation. Complete these steps to change which run is selected:

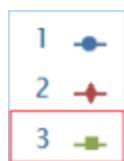
- i.   Tap or Click the legend.
The legend enlarges.



- ii. In the legend, tap or click the symbol (but not the check box) of the run that you want to select.

The red outline moves to the selected run.

Sample Legend



Note: When you apply statistics, such as mean or standard deviation, they are applied to the selected run.

2. Tap or Click the **Graph Tools** button to open the tool palette.



3. Tap or Click the **Statistics** button to open the **Statistics** screen.



4. Tap or Click one or more of the statistics.
Selected statistics are highlighted.

5. Tap or Click **OK**.

Statistics appear on the graph.

6. Optionally, tap or click part of the data set for statistics to be applied to.
See [Selecting part of a data run for operation in a line graph](#).

7. Tap or Click the **Statistics** button to remove the statistics.



Applying a curve fit

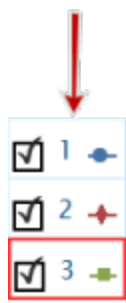
Complete these steps to apply a linear, quadratic, power, inverse, inverse square, or sine fit to a data run:

- Optional: select a different data run.

In the display legend, a red outline surrounds the run that is selected for operation. Complete these steps to change which run is selected:

- Tap or Click the legend.

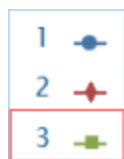
The legend enlarges.



- In the legend, tap or click the symbol (but not the check box) of the run that you want to select.

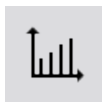
The red outline moves to the selected run.

Sample Legend



Note: When you apply statistics, such as mean or standard deviation, they are applied to the selected run.


- Tap or Click the **Graph Tools** button to open the tool palette.



- Tap or Click the **Curve Fit** button to open the **Curve Fit** screen.



- Tap or Click one curve fit to select it.

5.  Tap or Click **OK**.
The curve and parameters of the curve appear on the graph.
6. Optionally, select part of the data set for the curve fit to be applied to.
See [Selecting part of a data run for operation in a line graph](#).

Removing a curve fit

1.  Tap or Click the **Graph Tools** button to open the tool palette.



2.  Tap or Click the **Curve Fit** button.



Drawing a prediction


Complete these steps to manually sketch on a graph:

1.  Tap or Click the **Graph Tools** button to open the tool palette.



2.  Tap or Click the **Prediction** button.



3. Do one of the following:
 - Trace a continuous curve on the graph.
 -  Tap or Click several locations on the graph to draw a series of connected points.
4. To delete the prediction, tap or click the **Prediction** button.



Finding the x- and y-values of a point

Complete these steps to select a point on a graph and display its coordinates:

- Optional: select a different data run.

In the display legend, a red outline surrounds the run that is selected for operation. Complete these steps to change which run is selected:

- Tap or Click the legend.

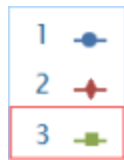
The legend enlarges.



- In the legend, tap or click the symbol (but not the check box) of the run that you want to select.

The red outline moves to the selected run.

Sample Legend



Note: When you apply statistics, such as mean or standard deviation, they are applied to the selected run.

- Tap or Click the **Graph Tools** button to open the tool palette.

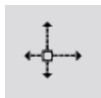



- Tap or Click the **Select** button.



The button changes color.

- Tap or Click a point on the graph.
- Tap or Click **Done**.
- Tap or Click **Graph coordinate information** button.




7. The x- and y-values of the selected point are displayed.
8.  Tap or Click the **Graph coordinate information** button again to clear the selection.

Finding the x- and y-difference between two points

Complete these steps to select a range of points and display the change-in-x and change-in-y between the first and last points in the selected range:

1. Optional: select a different data run.

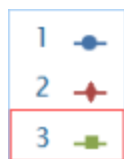
In the display legend, a red outline surrounds the run that is selected for operation. Complete these steps to change which run is selected:

- i.  Tap or Click the legend.
The legend enlarges.



- ii. In the legend, tap or click the symbol (but not the check box) of the run that you want to select.
The red outline moves to the selected run.

Sample Legend



Note: When you apply statistics, such as mean or standard deviation, they are applied to the selected run.



2.  Tap or Click the **Graph Tools** button to open the tool palette.



3.  Tap or Click the **Select** button.

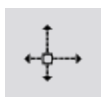


The button changes color.

4.  Tap or Click and drag to select data points.
5. When the desired data points are highlighted, tap or click **done selecting**.
6.  Tap or Click the **Select** button.



7.  Tap or Click the **Coordinates** button.



An annotation with the following information appears on the graph:

- The x- and y-values of the first point in the selected range (x_1 and y_1),
 - The x- and y-values of the last point in the selected range (x_2 and y_2), and
 - The x- and y-differences between those two points (dx and dy).
8. To clear the annotation, tap or click the **Coordinates** button again.
 9. To clear the selection, tap or click the **Select** button again.

Finding the slope at a point on a data plot

Complete these steps to display the slope at a selected point:

1. Optional: select a different data run.

In the display legend, a red outline surrounds the run that is selected for operation. Complete these steps to change which run is selected:

- i.  Tap or Click the legend.

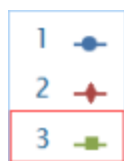
The legend enlarges.



- ii. In the legend, tap or click the symbol (but not the check box) of the run that you want to select.

The red outline moves to the selected run.

Sample Legend



Note: When you apply statistics, such as mean or standard deviation, they are applied to the selected run.

2. Tap or Click the **Graph Tools** button to open the tool palette.



3. Tap or Click the **Slope Tool** button.



The Slope Tool appears on the graph displaying the slope at one point.

The Slope Tool appears in the middle of the data run or, if part of the data run has been selected, in the middle of the selected part.

See [Selecting part of a data run for operation in a line graph](#).

4. Tap or Click the arrows of the point selector to move the slope tool to nearby points.
5. To hide the Slope Tool, tap or click the **Slope Tool** button again

Finding the correlation coefficient (r)

To find the correlation coefficient (r):

- Optional: select a different data run.

In the display legend, a red outline surrounds the run that is selected for operation. Complete these steps to change which run is selected:

- Tap or Click the legend.

The legend enlarges.



- In the legend, tap or click the symbol (but not the check box) of the run that you want to select.

The red outline moves to the selected run.

Sample Legend



Note: When you apply statistics, such as mean or standard deviation, they are applied to the selected run.

- In the legend, tap or click the symbol of the measurement run to analyze.
A red outline appears around the selected run.
- Tap or Click the **Graph Tools** button to open the tool palette.



The line graphs tools palette displays.

- Tap or Click the **Curve Fit** button.



The **Select Desired Curve Fit** screen displays.

5. Tap or Click the **Linear Fit** button, and tap or click **OK**.
The statistics appear on the line graph and the Curve Fit button changes color.
6. To move the statistics box, drag it.
7. To remove the statistics box, tap or click the **Curve Fit** button.



Displaying the RMSE Root-Mean-Square Error

To find the Root Mean Square Error (RMSE):

If more than one data measurement run is displayed, first select a measurement run:

1. Optional: select a different data run.

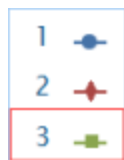
In the display legend, a red outline surrounds the run that is selected for operation. Complete these steps to change which run is selected:

- i. Tap or Click the legend.
The legend enlarges.



- ii. In the legend, tap or click the symbol (but not the check box) of the run that you want to select.
The red outline moves to the selected run.

Sample Legend



Note: When you apply statistics, such as mean or standard deviation, they are applied to the selected run.

2. In the legend, tap or click the symbol of the measurement run to analyze.
A red outline appears around the selected run.

3.  Tap or Click the **Graph Tools** button to open the tool palette.




The line graphs tools palette displays.

4.  Tap or Click the **Curve Fit** button.



The Select Desired Curve Fit screen displays.

5.  Tap or Click a curve fit option, and tap or click **OK**.
The statistics appear on the line graph and the Curve Fit button changes color.
6. To move the statistics box, drag it.
7. To remove the statistics box, tap or click the orange **Curve Fit** button.



The statistics are removed from the line graph.

Analyzing data in a multiple-y axes graph

All of the actions performed on a single y-axis graph can be performed on multiple-y axes graphs.

See [Creating a multiple y-axes line graph](#).

You can perform the following:

- [Viewing statistics in a line graph](#)
- [Applying a curve fit](#)
- [Removing a curve fit](#)
- [Drawing a prediction](#)
- [Finding the x- and y-values of a point](#)
- [Finding the x- and y-difference between two points](#)
- [Finding the slope at a point on a data plot](#)

Viewing Statistics in a bar graph

To see the minimum, maximum, mean bar values; or standard deviation of a data run:

- Optional: select a different data run.

In the display legend, a red outline surrounds the run that is selected for operation. Complete these steps to change which run is selected:

- Tap or Click the legend.

The legend enlarges.



- In the legend, tap or click the symbol (but not the check box) of the run that you want to select.

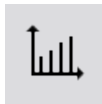
The red outline moves to the selected run.

Sample Legend



Note: When you apply statistics, such as mean or standard deviation, they are applied to the selected run.

- Tap or Click the **Bar Graph Tools** button to open the tool palette.



- Tap or Click the **Statistics** button to open the **Statistics** screen.



- Tap or Click one or more of the statistics options to select it.

- Tap or Click **OK**.

Statistics are added to the chart.

- Tap or Click the **Statistics** button to remove the statistics.



Viewing statistics in a table

To see the minimum, maximum, mean, standard deviation, and count of data runs:

- Optional: select a different data run.

In the display legend, a red outline surrounds the run that is selected for operation. Complete these steps to change which run is selected:

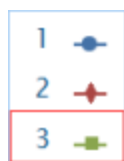
- Tap or Click the legend.
The legend enlarges.



- In the legend, tap or click the symbol (but not the check box) of the run that you want to select.

The red outline moves to the selected run.

Sample Legend



Note: When you apply statistics, such as mean or standard deviation, they are applied to the selected run.

- Tap or Click the **Graph Tools** button to open the tool palette.



- Tap or Click the **Statistics** button to open the **Statistics** screen.



4. Tap or Click one or more of the statistics.
Selected statistics are highlighted.
5. Tap or Click **OK**.
Statistics at the bottom of each column.
6. Optionally, tap or click a group of cells for statistics to be applied to.
See [Selecting cells for operation in a table](#).
7. Tap or Click the **Statistics** button to remove the statistics.



Viewing statistics in a digits display

To see the minimum, maximum, mean, standard deviation, or count of a data run:

1. Optional: select a different data run.

In the display legend, a red outline surrounds the run that is selected for operation. Complete these steps to change which run is selected:

- i. Tap or Click the legend.
The legend enlarges.



- ii. In the legend, tap or click the symbol (but not the check box) of the run that you want to select.
The red outline moves to the selected run.

Sample Legend



Note: When you apply statistics, such as mean or standard deviation, they are applied to the selected run.

2. Tap or Click the **Digits Display Tools** button to open the tool palette.

3. Tap or Click the **Statistics** button to open the **Statistics** screen.



4. Tap or Click one of the statistics to select it.

5. Tap or Click **OK**.

The selected statistic appears in the digits display (instead of the most recently collected value).

6. Tap or Click the **Statistics** button to return the digits display to most recent data.



Viewing statistics in a meter

To see the minimum, maximum, mean, standard deviation, or count of a data run:

1. Optional: select a different data run.

In the display legend, a red outline surrounds the run that is selected for operation. Complete these steps to change which run is selected:

- i. Tap or Click the legend.

The legend enlarges.



- ii. In the legend, tap or click the symbol (but not the check box) of the run that you want to select.

The red outline moves to the selected run.

Sample Legend




Note: When you apply statistics, such as mean or standard deviation, they are applied to the selected run.

2.  Tap or Click the **Digits Display Tools** button to open the tool palette.

1.23


3.  Tap or Click the **Statistics** button to open the **Statistics** screen.



4.  Tap or Click one of the statistics to select it.

5.  Tap or Click **OK**.

The selected statistic appears in the digits display (instead of the most recently collected value).

6.  Tap or Click the **Statistics** button to return the digits display to most recent data.



Calculations and manually entered data

- [Working with calculations](#)
- [Entering data manually](#)

Working with calculations

1. [Opening the calculator screen](#)
2. [Creating a calculation](#)
3. [Displaying a calculation](#)

Opening the calculator screen

1.  Tap or Click the **Experiment Tools** button.



The Experiment Tools screen opens.

2.  Tap or Click **Calculated Data**.

The calculator screen opens.

Creating a calculation


1.  Tap or Click the **Experiment Tools** button.



The Experiment Tools screen opens.

2.  Tap or Click **Calculated Data**.

The calculator screen opens.

3.  Tap or Click **Insert** or enter a name for the calculation, then "=".



















For example: A=

Note: Calculation names cannot contain spaces.





4. Enter the calculation using the procedures in the **Calculation Procedures** table. Calculations may be a combination of measurement data, math functions, and text.

Note: Calculations must include at least one available measurements or user-defined data in calculation.

Calculation Procedures

To...	Do this...
Edit an existing expression	  Tap or Click the 123 or αβγ button.
Start a new expression	  Tap or Click Insert . You can change the name of the expression from the default.
Insert measurement data	  Tap or Click Measurements to insert a measurement data anywhere in the expression.
Select functions	  Tap or Click Math , Trigonometry , Statistics , Special 1 , Special 2 to change function types as needed as you build the expression.
Select DEGor RAD	  Tap or Click RAD or DEG to indicate how angles are measured for the Trigonometry functions..
Add text and numbers	Use the keyboard for text and numbers. Numbers can also be entered using the Math function.
Use Greek letters	  Tap or Click the αβγ button.   Tap or Click CAPS or Shift to switch between lowercase and uppercase Greek letters.
Add superscript/subscript numbers	  Tap or Click the αβγ button.   Tap or Click CAPS or Shift to switch between subscript and superscript numbers.

After you have created your expression, perform the following:

Complete the expression	  Tap or Click Return . SPARKvue may prompt you to enter definitions for variables and constants used in the expression.
Exit the calculator	  Tap or Click done .

Example

Create a calculation for **Work = Force × Distance**

where: Force and Distance are measurements.

1.  Tap or Click the **Experiment Tools** button.



The Experiment Tools screen opens.

2.  Tap or Click **Calculated Data**.

The calculator screen opens.

3. Enter the name for the calculation:

Work (do not use spaces in the name)

4. Enter or tap or click equal sign:

=

5.  Tap or Click the **Measurements** button.

Measurements

6.  Tap or Click Force, Push Positive (measurement under Force Sensor.)

7. Enter or tap or click asterisk (multiply):

*

8.  Tap or Click the **Measurements** button.

Measurements

 Tap or Click Length of String

9.  Tap or Click **Done**.

The calculation is available for use in displays.

10. Enter the calculation using the procedures in the **Calculation Procedures** table.

Calculations may be a combination of measurement data, math functions, and text.

Note: Calculations must include at least one available measurements or user-defined data in calculation.

Creating a calculation in a table


1.  Tap or Click the **Experiment Tools** button.



The Experiment Tools screen opens.

2.  Tap or Click **Calculated Data**.

The calculator screen opens.

3.  Tap or Click **Insert** or enter a name for the calculation, then "=".























For example: A=

Note: Calculation names cannot contain spaces.

4. Enter the calculation using the procedures in the **Calculation Procedures** table.
Calculations may be a combination of measurement data, math functions, and text.

Note: Calculations must include at least one available measurements or user-defined data in calculation.



Calculation Procedures

To...	Do this...
Edit an existing expression	  Tap or Click the 123 or αβγ button.
Start a new expression	  Tap or Click Insert . You can change the name of the expression from the default.
Insert measurement data	  Tap or Click Measurements to insert a measurement data anywhere in the expression.
Select functions	  Tap or Click Math , Trigonometry , Statistics , Special 1 , Special 2 to change function types as needed as you build the expression.
Select DEG or RAD	  Tap or Click RAD or DEG to indicate how angles are measured for the Trigonometry functions..
Add text and numbers	Use the keyboard for text and numbers. Numbers can also be entered using the Math function.
Use Greek letters	  Tap or Click the αβγ button.   Tap or Click CAPS or Shift to switch between lowercase and uppercase Greek letters.
Add super-script/subscript numbers	  Tap or Click the αβγ button.   Tap or Click CAPS or Shift to switch between subscript and superscript numbers.
After you have created your expression, perform the following:	
Complete the expression	  Tap or Click Return . SPARKvue may prompt you to enter definitions for variables and constants used in the expression.
Exit the calculator	  Tap or Click done .

Displaying a calculation

Once you have created a calculation, it is available to be shown in any data display.

Complete these steps to select the calculation for display.

- i.  Tap or Click the **Display Tools** button near the lower or upper left corner of the display.
- ii.  Tap or Click the **Properties** button.



1.  Tap or Click the **Measurement** box and tap or click the calculation.
2.  Tap or Click **OK**.

Entering data manually

Tip: User data can be created using a table. See [Creating a table of manually entered data](#).

1. Open the measurements list in the **Page-build** screen or the **Table Properties** screen.
See [Opening the measurements list](#)
2. Create a empty data set for number or text data entry.
See [Creating a data set for manual entry](#)
3. Prepare a table for data entry.
See [Preparing a table for manual data entry](#)
4. Enter data in the table.
See [Entering data into a manual data set](#)
5. Optionally, display the entered data in other displays.
See [Displaying manually entered data](#)


Opening the measurements list

View the available measurements

1.  Tap or Click the **Home** button.



The available sensors (including cameras) are listed with their respective measurements.

2.  Tap or Click the icon to expand or collapse the list of measurements for each sensor.



Expand List




Collapse List

View the available User-entered Data

1.  Tap or Click the **Home** button.



2.  Tap or Click the **User-entered** tab.
 The User-entered data sets are listed under:
 - **User-entered Number Data**
 - **User-entered Text Data**


Creating a data set for manual entry

Complete one of the following tasks.

- [Creating a data set for manually entered numbers](#)
- [Creating a data set for manually entered text](#)
- [Creating a table of manually entered data](#)

Creating a data set for manually entered numbers

Tip: User data can be created using a table. See [Creating a table of manually entered data](#).

1. In the measurement list under **Experiment Clock**, tap or click **Create Data Set**.
 The **Define the Data Set** screen opens.
2. Select the **Measurement Name:** box and enter a name for the new data set.
3. Optionally, tap or click the box and enter the name of the units.
4.  Tap or Click **OK**.

Creating a data set for manually entered text

Tip: User data can be created using a table. See [Creating a table of manually entered data](#).




1. In the measurement list within the **User-entered Text Data**, tap or click **Create Data Set** under **User-entered Text Data**.

The **Define the Data Set** screen opens.

2.  Tap or Click the **Measurement Name:** box and enter a name for the new data set.
3.  Tap or Click **OK**.

Preparing a table for manual data entry

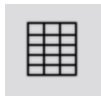
Depending on which screen you see, do one of the following:




1. Build a page using a table. See [Starting a new SPARKlab page](#).
2.  Tap or Click **Select Measurement**.
3.  Tap or Click the data set to use. See [Creating a data set for manual entry](#).
4.  Tap or Click **OK**.
A new table appears displaying the empty data set ready for data entry.
5. Enter data. See [Entering data into a manual data set](#).

Entering data into a manual data set

After creating a data set (see [Creating a data set for manual entry](#)), complete these steps to enter data:

1.  Tap or Click the **Table Tools** button to open the tool palette.





2.  Tap or Click the column header for the User-defined data.
3. Select the data set.
4.  Tap or Click a cell and enter the data.
5. Enter data in a cell:
 - a.  Tap or Click the first table cell where you want to enter data.
 - b. Enter a number or text (depending on what type of data set you created).
6. Repeat the previous step to enter data in other cells.

Displaying manually entered data

Once you have created a data set, it is available to be shown in any data display.

Complete these steps to select the data set for display.

- i.  Tap or Click the **Display Tools** button near the lower or upper left corner of the display.
- ii.  Tap or Click the **Properties** button.



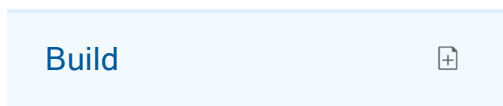
1.  Tap or Click the **Measurement** box and tap or click the data set.
2.  Tap or Click **OK**.

Creating a table of manually entered data

Create a table

A. From the Home screen, create a new SPARKlab:

 Tap or Click **Build**.



Continue to step 1.

B. Within a SPARKlab, add a new page:

 Tap or Click the **New Page** button.




Continue to step 1.

1. **Optional:** Add a background image

- a.  Tap or Click the **Select a Background Image** button.



The **Open** window appears.

- b.  Tap or Click an image file to select it.

- c. Tap or Click **Open**.

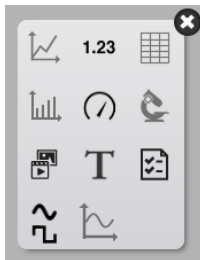
The background image is added to the preview.

2. Select a template from the library.



Scroll up and down to view templates

The **Display Selection** opens for each placeholder.



3. Tap or Click the Table icon.



Note: Tables, graphs, and scopes are disabled for some page configurations.



Examples:






1 Enabled







2 Disabled for tables, graphs, and scopes



4. Select the data for each display on the page.
 - a.  Tap or Click the display data label(s): **Select Measurement**
or
 - b. Open the display properties and select the data.
 - i.  Tap or Click the **Display Tools** button near the lower or upper left corner of the display.
 - ii.  Tap or Click the **Properties** button.



Create the data











1.  Tap or Click the **Select Measurement** button.
Table Properties opens.
2.  Tap or Click the **Measurement** box.
3.  Tap or Click **User-entered**.
4.  Tap or Click one of the following:

User-entered Number Data > Create Data Set	To create a numbered set including unit of measure. Define the Data Set opens. Go to step I.
--	--









User-entered Text Data > Create Data Set	To create a text set (no unit of measure). Define the Data Set opens. Go to step I.
--	---

Calculated Data > Create/Edit Calculation	To create a calculation. See Creating a calculation . Note: Calculations must include at least one available measurements or user-defined data in calculation. Go to step II.
---	---

I. For Create Data Set:

1. Enter a **Measurement Name**.
2. Enter a **Unit Name** if a number set.
3. Optional:   Tap or Click Edit... and edit the data properties.
4.   Tap or Click **OK** to close **Table Properties**.
5.   Tap or Click **OK** to close **Define the Data Set**.
6. Enter your data.
 - a.   Tap or Click a cell within the column for your data.
 - b. Enter a value.
 - c.   Tap or Click another cell and enter data.
Tip: Enter moves to the next cell.
 - d. Repeat until all data is entered.

II. For Create/Edit Calculation:

1.   Tap or Click the **Select Measurement** button.
Table Properties opens.
2.   Tap or Click the **Measurement** box.
3.   Tap or Click **User-entered**.
4. Select the calculation to use under **Calculated Data**.
5.   Tap or Click **OK** to close **Table Properties**.

Building SPARKlab pages

SPARKlab pages can contain a single display or multiple displays determined by the template selected. Multiple SPARKlab pages can be created in a workbook.

Tip: To create a quick SPARKlab to display a single measurement, use **Show**. See [Showing data in a quick-build SPARKlab](#).

See the following for detailed instructions:

- [Starting a new SPARKlab page](#)
- [Adding elements to a SPARKlab page](#)
- [Adding a background image](#)
- [Deleting a SPARKlab page](#)
- [Creating a line graph](#)
- [Creating a digits display](#)
- [Creating a table](#)
- [Creating a bar graph](#)
- [Creating a meter](#)
- [Creating a camera element](#)
- [Creating a media element](#)
- [Creating a text box](#)
- [Creating an assessment](#)
- [Creating a scope display](#)
- [Creating a new signal generator](#)
- [Removing or replacing an image or media file](#)

Showing data in a quick-build SPARKlab

Clicking a measurement in the Home screen is the fastest way to create a SPARKlab to record and display a single measurement. Four pages are offered: Graph, Digits, Table, and Meter.

Complete these steps to show a SPARKlab:

1. Connect a sensor or use an on-board sensor.
2. In the **Home** screen, tap or click the measurement that you would like to show.

<measurement> ↵

A four-page SPARKlab opens.

3. Tap or Click the **Start** button to record data.



- Tap or Click the **Page Navigator** to see your data in the different pages.



Starting a new SPARKlab page

Specific Procedures Based on Display Type

- Tap or Click display type below to open the specific procedure:

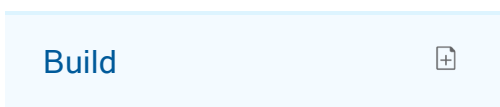
	Line Graph	1.23	Digits		Table
	Bar Graph		Meter		Camera
	Movie		Text Box		Assessment
	Signal Generator		Scope		

Note: Signal Generator and Scope are available when a PASCO 550 interface is connected.

Generic Procedure

- A. From the Home screen, create a new SPARKlab:

- Tap or Click **Build**.



Continue to step 1.

- B. Within a SPARKlab, add a new page:

- Tap or Click the **New Page** button.



Continue to step 1.

1. **Optional:** Add a background image

- a. Tap or Click the **Select a Background Image** button.



The **Open** window appears.

- b. Tap or Click an image file to select it.

- c. Tap or Click **Open**.

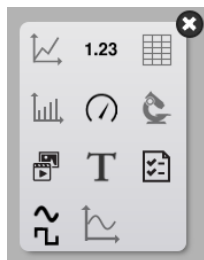
The background image is added to the preview.

2. Select a template from the library.

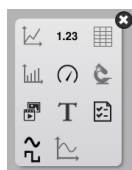


Scroll up and down to view templates

The **Display Selection** opens for each placeholder.

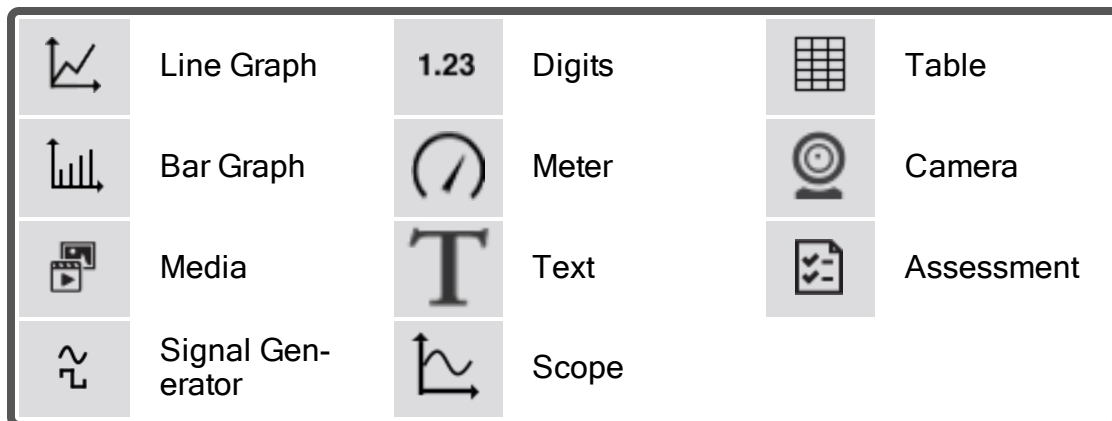
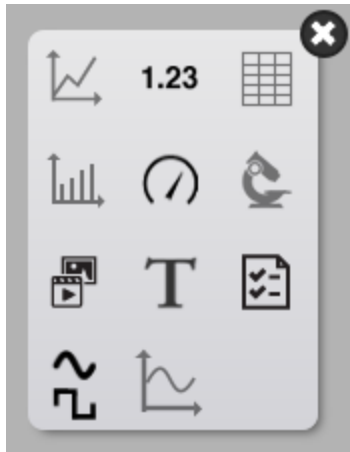


Tip:



If you want only the background to appear on the page, close the display selection.

3. Tap or Click a display type for each placeholder.



4. **For Cameras:** Tap or Click the **Image Tools** button to initialize the camera. See [Capturing a camera image](#).
5. **For Media Boxes:** Tap or Click the **Select a Media File** button and navigate to a supported video file. **Tip:** Use videos to teach concepts in the lab or lab procedures.
6. **For Text Boxes:** Type in text into the Text Box. **Tip:** Try the symbol and Greek letter buttons.
7. **For Rich Text Boxes:** Type in text into the Rich Text Box. **Tip:** Use the formatting tools to enhance the text with color, size, bold, etc.
8. **For Assessments:** Tap or Click the **Add an Assessment** button. See [Authoring an assessment](#).
9. **For other data displays:** Select the data for each display on the page.

- a. Tap or Click the display data label(s), for example: **Select Measurement, X-Axis Variable, Y-Axis Variable, Add an Assessment**
or
- b. Open the display properties and select the data.
 - i. Tap or Click the **Display Tools** button near the lower or upper left corner of the display.
 - ii. Tap or Click the **Properties** button.



Adding elements to a SPARKlab page

SPARKlab pages are built as follows:

1. Selecting a template
2. Adding elements one at a time in the **Build** screen

As elements are added, they are shown in the preview section of the **Build** screen.

Detailed Instructions:

[Starting a new SPARKlab page](#)

Detailed Instructions for Specific Display Type:

	Line Graph	1.23	Digits		Table
	Bar Graph		Meter		Camera
	Movie		Text Box		Assessment
	Signal Generator		Scope		

Note: Signal Generator and Scope are available when a PASCO 550 interface is connected.

Creating a line graph

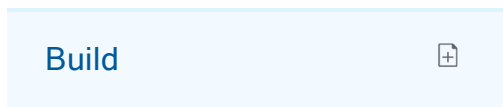


To create a new line graph, do one of the following (A or B):

A. From the Home screen, create a new SPARKlab:



Tap or Click **Build**.



Continue to step 1.

B. Within a SPARKlab, add a new page:



Tap or Click the **New Page** button.




Continue to step 1.


1. **Optional:** Add a background image

a.  Tap or Click the **Select a Background Image** button.



The **Open** window appears.

b.  Tap or Click an image file to select it.

c.  Tap or Click **Open**.

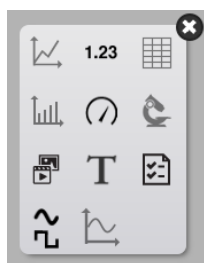
The background image is added to the preview.

2. Select a template from the library.



Scroll up and down to view templates

The **Display Selection** opens for each placeholder.



3. Tap or Click the Line Graph icon.



Note: Tables, graphs, and scopes are disabled for some page configurations.



Examples:






1 Enabled



2 Disabled for tables, graphs, and scopes



4. Select the data for each display on the page.

- a.  Tap or Click the display data label(s): **Select Measurement**
or
- b. Open the display properties and select the data.
 - i.  Tap or Click the **Display Tools** button near the lower or upper left corner of the display.
 - ii.  Tap or Click the **Properties** button.

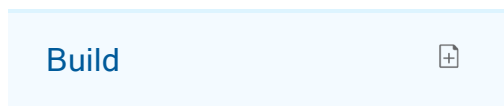


Creating a digits display

1.23 To create a new digits display, do one of the following (A or B):

A. From the Home screen, create a new SPARKlab:

 Tap or Click **Build**.



Continue to step 1.

B. Within a SPARKlab, add a new page:

 Tap or Click the **New Page** button.




Continue to step 1.

1. **Optional:** Add a background image

- a.  Tap or Click the **Select a Background Image** button.



The **Open** window appears.

- b.  Tap or Click an image file to select it.

- c. Tap or Click **Open**.

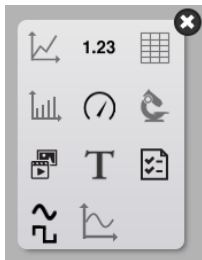
The background image is added to the preview.

- 2. Select a template from the library.



Scroll up and down to view templates

The **Display Selection** opens for each placeholder.



- 3. Tap or Click the Digits icon.



- 4. Select the data for each display on the page.

- a. Tap or Click the display data label(s): **Select Measurement**

or

- b. Open the display properties and select the data.

- i. Tap or Click the **Display Tools** button near the lower or upper left corner of the display.
- ii. Tap or Click the **Properties** button.



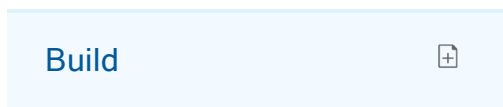
Creating a table



To create a table, do one of the following (A or B):


A. From the Home screen, create a new SPARKlab:

 Tap or Click **Build**.



Continue to step 1.

B. Within a SPARKlab, add a new page:

 Tap or Click the **New Page** button.




Continue to step 1.

1. **Optional:** Add a background image

a.  Tap or Click the **Select a Background Image** button.



The **Open** window appears.

b.  Tap or Click an image file to select it.

c.  Tap or Click **Open**.

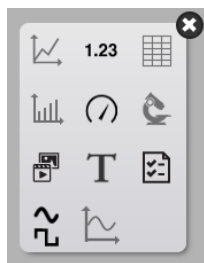
The background image is added to the preview.

2. Select a template from the library.



Scroll up and down to view templates

The **Display Selection** opens for each placeholder.



3.  Tap or Click the Table icon.



Note: Tables, graphs, and scopes are disabled for some page configurations.



Examples:






1 Enabled



2 Disabled for tables, graphs, and scopes



4. Select the data for each display on the page.

- a.  Tap or Click the display data label(s): **Select Measurement**
or
- b. Open the display properties and select the data.
 - i.  Tap or Click the **Display Tools** button near the lower or upper left corner of the display.
 - ii.  Tap or Click the **Properties** button.



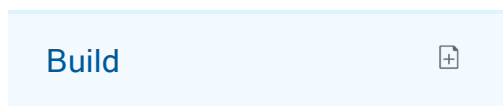
Creating a bar graph



To create a new bar graph, do one of the following (A or B):

A. From the Home screen, create a new SPARKlab:

 Tap or Click **Build**.



Continue to step 1.

B. Within a SPARKlab, add a new page:

 Tap or Click the **New Page** button.




Continue to step 1.

1. **Optional:** Add a background image

a.  Tap or Click the **Select a Background Image** button.



The **Open** window appears.

b.  Tap or Click an image file to select it.

- c. Tap or Click **Open**.

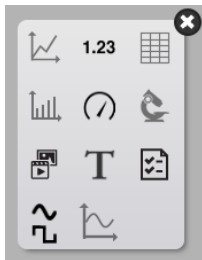
The background image is added to the preview.

2. Select a template from the library.



Scroll up and down to view templates

The **Display Selection** opens for each placeholder.



3. Tap or Click the Bar Graph icon.



Note: Tables, graphs, and scopes are disabled for some page configurations.



Examples:






Enabled



Disabled for tables, graphs, and scopes



4. Select the data for each display on the page.
 - a.  Tap or Click the display data label(s): **X-Axis Variable**, **Y-Axis Variable**
or
 - b. Open the display properties and select the data.
 - i.  Tap or Click the **Display Tools** button near the lower or upper left corner of the display.
 - ii.  Tap or Click the **Properties** button.



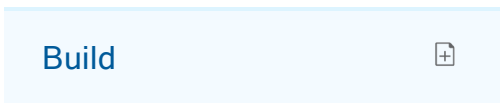
Creating a meter



To create a new meter, do one of the following (A or B):

A. From the Home screen, create a new SPARKlab:

 Tap or Click **Build**.



Continue to step 1.

B. Within a SPARKlab, add a new page:

 Tap or Click the **New Page** button.




Continue to step 1.

1. **Optional:** Add a background image

- a.  Tap or Click the **Select a Background Image** button.



The **Open** window appears.

- b.  Tap or Click an image file to select it.

- c.  Tap or Click **Open**.

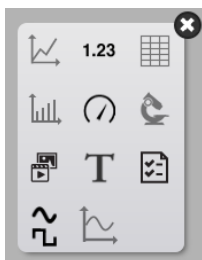
The background image is added to the preview.

2. Select a template from the library.



Scroll up and down to view templates




The **Display Selection** opens for each placeholder.



3.  Tap or Click the Meter icon.



4. Select the data for each display on the page.

- a.  Tap or Click the display data label(s): **Select Measurement**
or
- b. Open the display properties and select the data.
 - i.  Tap or Click the **Display Tools** button near the lower or upper left corner of the display.
 - ii.  Tap or Click the **Properties** button.



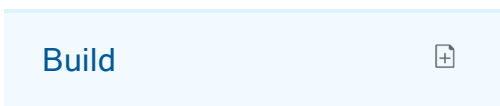
Creating a camera element



To create a new camera image, do one of the following (A or B):

A. From the Home screen, create a new SPARKlab:

-  Tap or Click **Build**.



Continue to step 1.

B. Within a SPARKlab, add a new page:

-  Tap or Click the **New Page** button.




Continue to step 1.

1. **Optional:** Add a background image

- a.  Tap or Click the **Select a Background Image** button.



The **Open** window appears.

- b.  Tap or Click an image file to select it.

- c. Tap or Click **Open**.

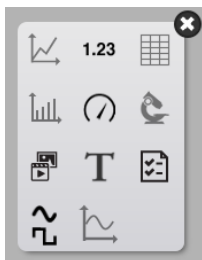
The background image is added to the preview.

2. Select a template from the library.



Scroll up and down to view templates

The **Display Selection** opens for each placeholder.



3. Tap or Click the Camera icon.



4. Tap or Click the **Image Tools** button to initialize the camera. See [Capturing a camera image](#).

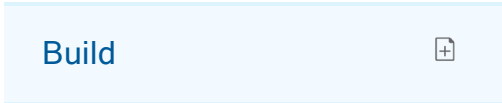
Creating a media element



To create a new media element, do one of the following (A or B):

- A. From the Home screen, create a new SPARKlab:

- Tap or Click **Build**.



Continue to step 1.

B. Within a SPARKlab, add a new page:

👆👈 Tap or Click the **New Page** button.



Continue to step 1.

1. **Optional:** Add a background image

a. 👆👈 Tap or Click the **Select a Background Image** button.



The **Open** window appears.

b. 👆👈 Tap or Click an image file to select it.

c. 👆👈 Tap or Click **Open**.

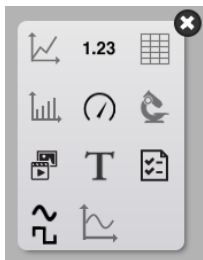
The background image is added to the preview.

2. Select a template from the library.

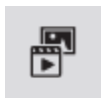


Scroll up and down to view templates

The **Display Selection** opens for each placeholder.



3.  Tap or Click the **Media** icon.



4.  Tap or Click the **Select a Media File** button and navigate to a supported video file. **Tip:** Use videos to teach concepts in the lab or lab procedures.

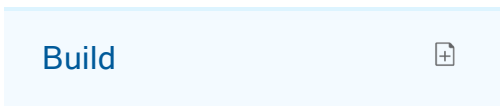
Creating a text box



To create a new text box, do one of the following (A or B):

- A. From the Home screen, create a new SPARKlab:

-  Tap or Click **Build**.



Continue to step 1.

- B. Within a SPARKlab, add a new page:

-  Tap or Click the **New Page** button.



Continue to step 1.

1. **Optional:** Add a background image

- a.  Tap or Click the **Select a Background Image** button.



The **Open** window appears.

- b. Tap or Click an image file to select it.
- c. Tap or Click **Open**.

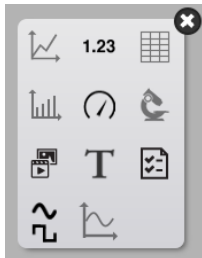
The background image is added to the preview.

2. Select a template from the library.



Scroll up and down to view templates

The **Display Selection** opens for each placeholder.



3. Tap or Click the Text icon.



4. Type in text into the Text Box. **Tip:** Try the symbol and Greek letter buttons.

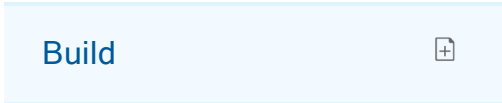
Creating an assessment



To create a new assessment, do one of the following (A or B):

- A. From the Home screen, create a new SPARKlab:

- Tap or Click **Build**.



Continue to step 1.

B. Within a SPARKlab, add a new page:

👆🖱 Tap or Click the **New Page** button.



Continue to step 1.

1. **Optional:** Add a background image

a. 👆🖱 Tap or Click the **Select a Background Image** button.



The **Open** window appears.

b. 👆🖱 Tap or Click an image file to select it.

c. 👆🖱 Tap or Click **Open**.

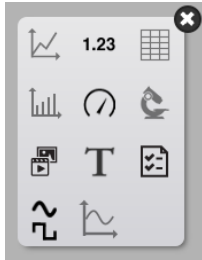
The background image is added to the preview.

2. Select a template from the library.



Scroll up and down to view templates

The **Display Selection** opens for each placeholder.



3. Tap or Click the Assessment icon.



4. Tap or Click the **Add an Assessment** button. See [Authoring an assessment](#).
5. Set the signal parameters. See [Setting up the signal generator](#).

Authoring an assessment

Add an Assessment


- I. Add an assessment to a SPARKlab page. (See [Creating an assessment](#).)
- II. Tap or Click the **Add an Assessment** button.
The Question/Answer panel opens.
- III. Select the **Question Type**:
 - **Multiple Choice**
 - **Drop-down List**
 - **Text Box**

Multiple Choice





1. Enter the question in the top box.
Tip: You can remove the question. Tap or Click .
2. Enter possible answers in the **Answers:** section.
Tip: You can remove the answers, leaving at least one. Tap or Click .
3. **Optional:** Add additional answers.






4. Tap or Click **Correct Answer**.

5. Select the correct answer. **Tip:** You can select multiple correct answers.
6.  Tap or Click **Save**.

Drop-down List

1. Enter the question in the top box.
Tip: You can remove the question.  Tap or Click .
2. Enter possible answers in the **Enter answers on separate lines** section.
Enter multiple possible answers, each on a separate line.
3.  Tap or Click **Correct Answer**.
4. Select the correct answer. **Tip:** You can select only one correct answer.
5.  Tap or Click **Save**.

Text Box

1. Enter the question in the top box.
Tip: You can remove the question.  Tap or Click .
2. **Optional:** Enter a prompt for the answer or instructions in the **Enter prompt:** section.
3.  Tap or Click **Save**.

Locking

Lock the assessment from editing.  Tap or Click **Lock**.



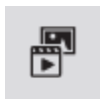
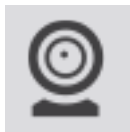
Editing

Edit an existing assessment.  Tap or Click **Edit**.



Removing or replacing an image or media file

 Tap or Click the **Camera Tools** or **Media Tools** button to open the tool palette.



Do one of the following:

- Tap or Click the **Remove** button to delete the image.



- Tap or Click the **Load** button to load a new image file.



Adding a background image

A background image fills the entire SPARKlab page. Elements on the page (data displays, text boxes, and image boxes) are overlaid in front of the background image.

The background image is copied from a saved image file. You can use an image of any size; SPARKvue will re-size and stretch it to fit the page.

Complete these steps in the Page-build screen (see [Starting a new SPARKlab page](#)):

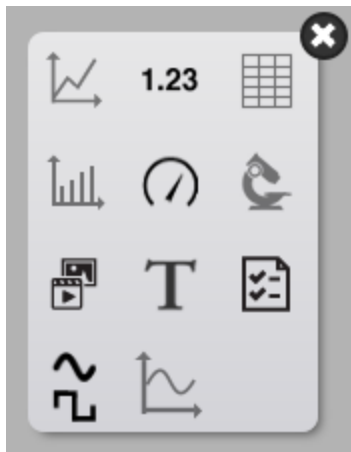
1. Tap or Click the **Select a Background Image** button.



The **Open** window appears.

2. Tap or Click an image file to select it.
3. Tap or Click **Open**.
The background image is added to the preview.
4. Select a template from the library.

Tip:



If you want only the background to appear on the page, close the display selection.

Deleting a SPARKlab page

While viewing the page in a SPARKlab, tap or click the **Delete Page** button.



Saving and sharing

- [Saving a SPARKlab \(Locally and Online\)](#)
- [Printing a lab](#)
- [Exporting data](#)
- [Opening a saved lab](#)
- [Using Online Storage Services](#)

Saving a SPARKlab (Locally and Online)


To save your work locally:

1.  Tap or Click the **Sharing** button to open the **Sharing** screen.




2.  Tap or Click **Save File As**.

The **Save** window opens.

3. Save to the current file or navigate to the folder where you would like to save the lab.
4. Use current file name or enter a file name.
5.  Tap or Click **OK**.

Tip: After you have saved a file once using the procedure above, you can quickly save the file again: tap or click **Save File** instead of **Save File As** in the **Sharing** screen.

To save your work using Online Storage Services:

1.  Tap or Click the **Sharing** button to open the **Sharing** screen.



2.  Tap or Click **Online Storage Services**.

The **Online Storage Services** dialog opens.

3. Select the service you would like to use and follow the instructions for the service. Services include:
 - Google Drive
 - Box

- Dropbox
- Evernote
- FTP
- WebDAV

Note: Depending on your security settings, you may have to **tap or click Allow** to complete the Online Storage Services sign-in process.


Printing a lab

The SPARKlab cannot be printed directly; however, you can capture SPARKlab pages in the journal and print the journal.




Complete these steps to take snapshots of SPARKlab pages and print the snapshots:

1. On each SPARKlab page that you wish to print, **tap or click the Snapshot** button.



2. Each time you **tap or click the Snapshot** button, the Snapshot Quick View appears briefly and an image of the page is added to the journal.
3.  **Tap or Click the Journal** tab.



4.  **Tap or Click Print Journal** to open the **Print** window.
5.  **Tap or Click a printer and tap or click Print.**
6.  **Tap or Click Done** to return to your SPARKlab.




Exporting data

When you export data, a tab-delimited text file is saved that can be opened in another program.

Note that exporting data is **not** equivalent to saving the lab. If you plan to later reopen your work in SPARKvue, you must also save the lab.

1.  Tap or Click the **Sharing** button to open the **Sharing** screen.



2.  Tap or Click **Export Data** to open the **Export Data** window.
3. Navigate to the folder where you would like to save the file.
4. Enter a file name.
5.  Tap or Click **Save**.
6.  Tap or Click **Done**.
7. To view the saved data, open the file in a spreadsheet program, mapping program, word processor, or text editor



Opening a saved lab

1.  Tap or Click the **Home** button to return to the **Home** screen.



2. In the **Home** screen, tap or click **Saved Work**.




3.  Tap or Click the file.
4.  Tap or Click **Open**.
The lab opens.

Using Online Storage Services

The **Online Storage Services** function allows access to several services such as Google Drive, Box, Dropbox, Evernote, FTP, and WebDAV.

- [Open a file from Online Storage Services](#)
- [Save a file to Online Storage Services](#)

Open a file from Online Storage Services

1. If not on the **Homescreen**:  Tap or Click the **Home** button to return to the **Home** screen.



2. Tap or Click **Online Storage Services** in the SPARKlabs pane.



The **Online Storage Services** dialog opens.

3. Select the service you would like to use and follow the instructions for the service. Services include:
 - Google Drive
 - Box
 - Dropbox
 - Evernote
 - FTP
 - WebDAV

Note: Depending on your security settings, you may have to allow the Online Storage Services to sign in.

Save a file to Online Storage Services

1. Tap or Click the **Sharing** button to open the **Sharing** screen.



2. Tap or Click **Online Storage Services**.

The **Online Storage Services** dialog opens.

3. Select the service you would like to use and follow the instructions for the service. Services include:
 - Google Drive
 - Box
 - Dropbox
 - Evernote
 - FTP
 - WebDAV

Note: Depending on your security settings, you may have to tap or click **Allow** to complete the Online Storage Services sign-in process.

Keeping a journal

The journal allows you to keep a record of your work in a series of pictures and captions as your science investigation progresses.

These steps outline the process of keeping a journal. See the following tasks for detailed instructions.

1. Take a snapshot. ([Taking a snapshot](#))
An image of the SPARKlab page is recorded.
2. Optionally, add a caption to the snapshot. ([Adding a caption to a snapshot or editing an existing caption](#))
3. Repeat the previous steps at anytime during your science investigation.
4. Save, export, or print the journal. ([Saving or exporting a journal](#))

Taking a snapshot

At any time during your science investigation, complete these steps to save an image of the SPARKlab page.

1.  Tap or Click the **Snapshot** button.



The SPARK records an image of the SPARKlab page and the thumbnail is displayed with other snapshots.

2.  Tap or Click the close button.



Opening the journal

1.  Tap or Click the **Journal** button.



Adding a caption to a snapshot or editing an existing caption

1. Tap or Click the **Journal** edit button.



2. Tap or Click one of the journal thumbnails.
The Journal edit tools open.

3. Tap or Click the **Name:** box and enter or edit the caption name.
4. Tap or Click the **Notes:** box and enter or edit the notes.
5. Tap or Click **OK**.

Navigating in the journal

1. In the journal, tap or click a thumbnail on the right side of the screen to view a journal entry.
2. Drag up or down to scroll through the thumbnails.

Deleting a journal entry

Note: A journal entry is a combination of a journal snapshot and your optional caption.

Deleting a selected entry

1. Tap or Click the **Journal** edit button.



2. Tap or Click the entry to delete.
3. Tap or Click the **Delete** button to delete the currently visible journal entry.




4. Tap or Click **OK**.

Deleting the last entry

1.  Tap or Click the **Snapshot** button.



2.  Tap or Click the **Delete** button to delete the currently visible journal entry.





3.  Tap or Click **OK**.

Rearranging journal entries


1.  Tap or Click the **Journal** edit button.



2.  Tap or Click the entry to move.
3.  Tap or Click the **Move Journal Entry Up** button or **Move Journal Entry Down** button.



Closing the journal

-  Tap or Click **OK** to close the journal and return to the SPARKlab.

Saving or exporting a journal

Do one of the following to save a journal:

- Save the entire lab. ([Saving a SPARKlab \(Locally and Online\)](#))
The journal is saved as part of the lab.
- Export the journal. ([Exporting a journal](#))
The journal is saved in format that can be viewed in a web browser.

Exporting a journal



When you export a journal, it is saved as a group of files that can be viewed in a web browser.

Note: Exporting the journal is **not** equivalent to saving the lab. If you plan to later reopen your work in SPARKvue, you must also save the lab.

Complete these steps to export a journal:

1. Open the **Export Journal** window.

If you are currently viewing the journal:


- a.  Tap or Click any of the journal pages.
The Journal edit tools open.
- b.  Tap or Click the **Sharing** button to open the **Sharing** screen.



The **Journal** window opens.



- c.  Tap or Click **Export Journal**.

If you are not viewing the journal:

- a.  Tap or Click the **Sharing** button to open the **Sharing** screen.




- b.  Tap or Click **Export Journal**.


2. Navigate to the folder where you would like the journal to be saved.
3. Enter a file name.
4.  Tap or Click **Save**.
Creates a new folder with the file name that you entered and saves a group of text and image files plus an HTML file in it.
5.  Tap or Click **Done** to return to your SPARKlab.
6. To view the journal, open the HTML file in a web browser.

Printing a journal




1.  Tap or Click the **Journal** button.



2.  Tap or Click one of the journal thumbnails.
The Journal edit tools open.

3.  Tap or Click the **Sharing** button to open the **Sharing** screen.



4. The **Journal** window opens.
5.  Tap or Click **Print Journal** to open the **Print** window.
6.  Tap or Click a printer and tap or click **Print**.
7.  Tap or Click **Done** to return to your SPARKlab.


Common tasks

- [Turning pages](#)
- [Returning to the Home screen](#)
- [Entering symbols and Greek letters](#)
- [Opening the About SPARKvue screen](#)
- [Setting the language](#)


Turning pages

-  Tap or Click the arrows of the **Page Navigator** to turn to the next page or previous page.



-  Tap or Click the center of the **Page Navigator** to open a menu from which you can select any page in the SPARKlab.

Returning to the Home screen

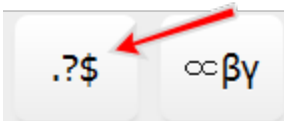
-  Tap or Click the **Home** button to close a SPARKlab and return to the Home screen.



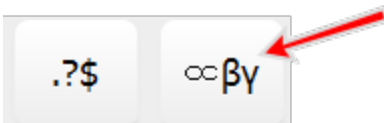
Entering symbols and Greek letters



You can use the on-screen keyboard for symbol and Greek letter input.

- To enter punctuation and other symbols, tap or click the **Punctuation** button.



- To enter Greek letters, tap or click the **Greek Letters** button.



-  Tap or Click **caps** or **shift** to switch between lowercase and uppercase Greek letters.
- To enter subscript and superscript numbers, use the number keys on the Greek keyboard.
-  Tap or Click **caps** or **shift** to switch between subscript and superscript.
- When you have finished entering symbols or Greek letters, tap or click **done**.

Opening the About SPARKvue screen

1.  Tap or Click the **System Settings** button to open the **System Settings** screen.







2.  Tap or Click **About SPARKvue** to view information about the installed version of SPARKvue .

Setting the language

1.  Tap or Click the **System Settings** button to open the **System Settings** screen.



2.  Tap or Click the **Languages** button to open the **Select Language** screen.
3.  Tap or Click the **Languages** box with your current language setting and select a new language from the list.
4.  Tap or Click **OK** to close the **Select Language** screen.
5.  Tap or Click **OK** to confirm your selection.
6. Exit SPARKvue and restart it.



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