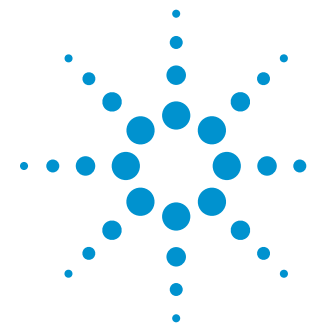Quick Demo Guide

1000A/B Series Oscilloscope

Engineered to give you more scope than you thought you could afford

Agilent's 1000 Series oscilloscopes deliver the performance and features you expect in a big scope — and the portability and low price you require in a small one.
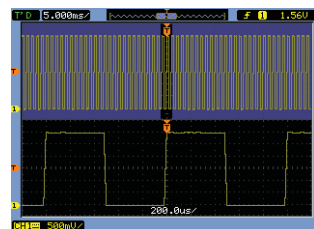
Exploring the basic user interface

Initial connection: Connect channel 1 to the Probe Comp pin on the front panel of the scope; (**A**) = DSO1000A / (**B**) = DSO1000B

Vertical controls

1. The Vertical controls are color-coded to match the waveform. Use the **larger knob** to set volts/division in 1-2-5 sequence. Press the knob to enter "Vernier (**A**)/Fine(**B**)" mode. This lets you adjust in increments as small as 0.5 mV (at 20 mV/div setting).

2. Press [**Channel 1**] to view the vertical menus (press the button next to **1/2** to see all the menu options).

3. Press [**Channel 1**] again to turn the channel off. Press it a third time to restore the channel.
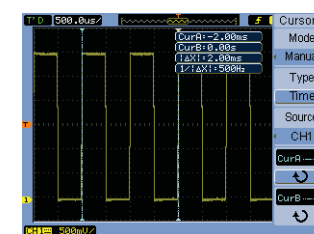
Horizontal controls

1. In the Horizontal section, turn the **large knob** to control the time/div setting in a 1-2-5 sequence.

2. Press the **large knob** to turn on the zoom display mode. This gives you a "forest/trees" view. The large time/div knob now controls the width of the zoom window. Press the knob again to turn off the zoom.

3. Pressing [**Menu/Zoom**](**A**)/[**Horiz**](**B**) gives you access to other time base options. X-Y and Roll mode are found in here.

4. The **small knob** controls the delay/offset from the trigger point. Pressing the knob resets the delay/offset to zero.

Trigger controls

1. [**Force**](**A**)/[**Force Trigger**](**B**) creates a trigger in absence of a qualifying event.

2. Pressing [**Trigger Level**] sets the trigger level to 50% between the peaks of the trigger source.

3. Use Trigger [**Menu**](**A**)/[**Trig Menu**](**B**) to select different triggering modes, including **Edge**, **Pulse**, **Video**, **Pattern (A only)** and **Alternate**.
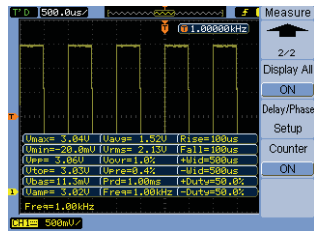
Cursor controls

1. Press [**Default Setup**] [**AutoScale**] [**Menu On/Off**]

2. Press [**Cursors**] to turn on cursor measurements. Cursors can be set to Manual, Track, Auto or Off.

3. Select **Manual**. Turn the **Selection knob** to position Cursor A on a desired edge, showing time relative to trigger.

4. **Clear the 4th soft key CurA** and **select the 5th soft key CurB**. Repeat to position Cursor B on another edge. |**ΔX**| shows the delta time value between CurA and B.

5. Press [**Cursors**] again. Now, Cursors track waveform automatically.

Anticipate ___ *Accelerate* ___ *Achieve*

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Quick Demo Guide
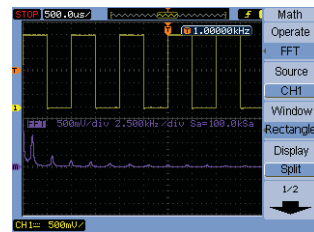
Advanced features

Automatic measurements

1000 Series supports 23 automatic measurements. Let's explore few of them.

1. Press **[DefaultSetup] [AutoScale]**

2. Press **[Measure](A)/[Meas](B)**. Verify that the source is CH 1. Press **Time** and use the selection knob (which is now illuminated) to **Freq**.

3. Press **1/2** to see the page 2 of the **Measure** menu. Note that the DSO1000A/B scopes offer an integrated 6-digit hardware frequency counter. Toggle **Counter** to ON.

4. Toggle **Display all** to ON. The display now shows 18 of the 23 measurements.

> The frequency of the signal is 1 kHz. Now, let's try to find out the frequency content of the signal.
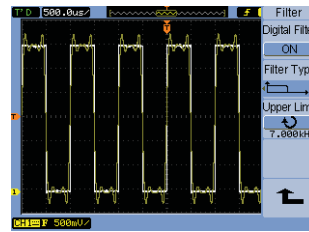
Math

1000 Series offers 4 waveform math; A+B, A-B, AxB or FFT.

1. Press **[Measure](A)/[Meas](B)** to turn off measurements.

2. Press **[Math]** in the Vertical section. Select **Operate** and select FFT.

3. Display says the horizontal scale is 2.5 kHz/div. You can see there are almost no frequency component beyond 20~25 kHz.

> You now know the frequency content of the signal. Let's now apply a software filter to see how a time domain signal changes.
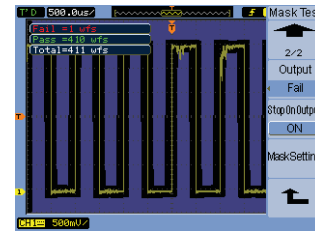
Software filter

Software filters allow you to isolate signal spectral components. This is a useful tool for isolating ripple currents, modulated signals, or simply for minimizing noise.

1. Press **[Math]** again to turn it off.

2. Press **[Ref]** and select **Save**. The white waveform is your reference waveform.

3. Press **Channel 1**.

4. Select **Digital Filter**.

5. Toggle **Digital Filter** to ON.

6. Use the **Selection knob** to change the **Upper limit** bandwidth from 1 kHz to 25 kHz. Watch the 1 kHz square wave gain edge definition.

7. At 25 kHz, the original waveform is almost restored. Let's continue to increase to 49 kHz.

8. Now, the reference waveform and channel 1 are nearly identical.

9. Select **Filter Type**. High-pass, band-pass, and band-reject filters are also available.

> A signal can change with the frequency contents. Now, let's explore the way to stop scope acquisition automatically when an unexpected signal is observed.
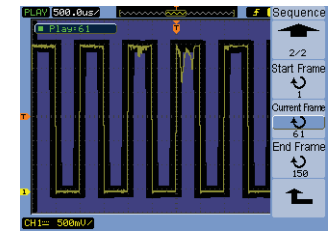
Go/No-go mask testing

The mask test function monitors waveform changes by comparing the waveform to a predefined mask.

1. Press **Digital Filter** to turn it off.

2. Press **[Ref]** twice to turn Ref off.

3. Press **[Utility]** and select **Mask Test**. Select **Enable Test ON** to enable the mask test.

4. Select **1/2**. Create a mask by selecting **Mask Setting** and **Create Mask**. You now created a mask for your signal.

5. Select **1/2**, an up arrow (⬆), and **2/2**. Select **Operate** to run or stop the test. Toggle **Msg Display** to ON to display a summary.

6. Wiggle or briefly disconnect the probe connected to Channel 1 to create a failure and stop the mask test.

> You now know how to test a signal against its limit. Now, find out the way to record signals, in order to observe what occurred before a mask failure.

Sequence mode

You can record, play back and store waveforms from any input channel or from the mask test output. The ability to record mask test output is very useful for capturing anomalous waveforms over a long period of time.

1. Toggle **Msg Display** to OFF.

2. To record the waveforms, press **[Acquire]** and select **Sequence**.

3. Select **Mode** and then select **Record**.

4. Turn the **Selection knob** to increase the number of recorded frames to **200**. You can record up to 1000 frames.

5. Press **Operate** to record waveforms in the scope's memory. Wiggle or briefly disconnect the probe **while recording**.

6. Select **Mode** and then select **Play back**.

7. Select **Operate** to show the 200 stored waveforms. Observe the wiggled signal. Press **Operate** to stop viewing.

8. Press **1/2** and then **Current Frame**. You can manually scroll through recorded waveforms. Find your wiggled signal.

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