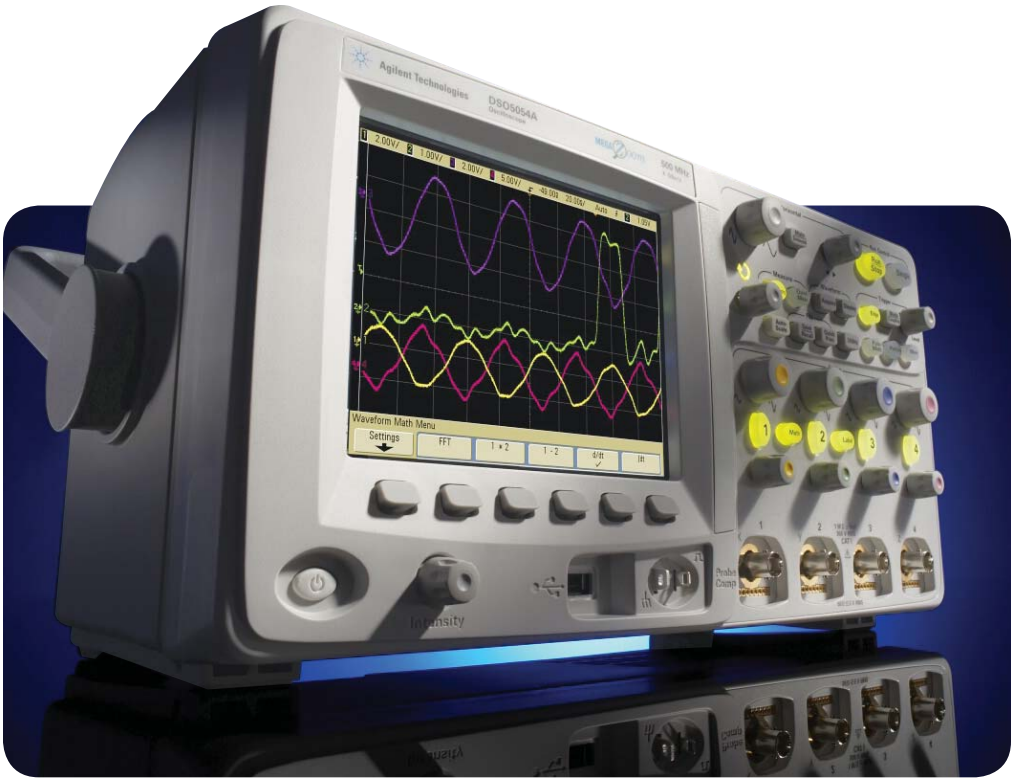
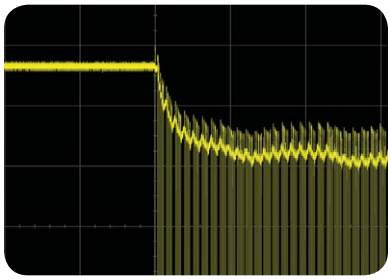
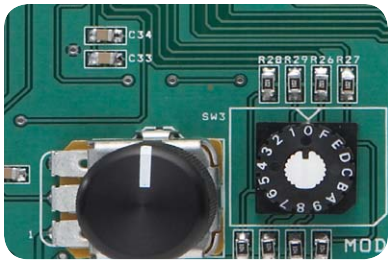
Agilent 5000 Series
Portable Oscilloscopes

Demo Guide

DSO5012A DSO5014A
DSO5032A DSO5034A
DSO5052A DSO5054A







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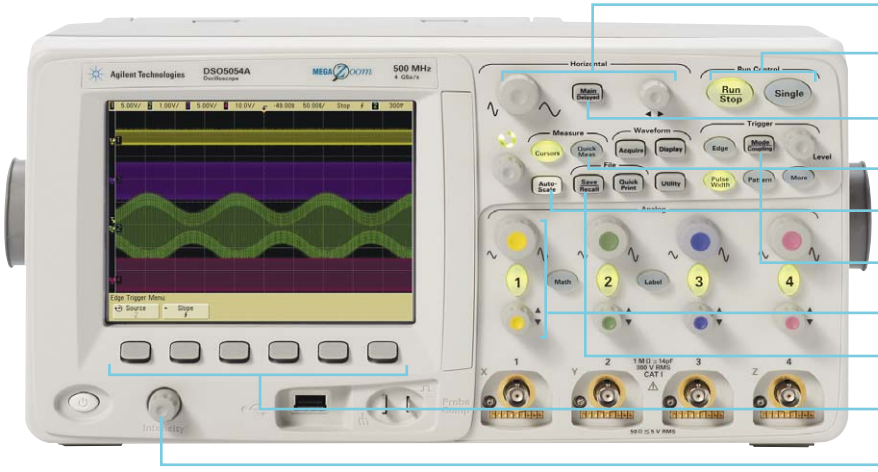
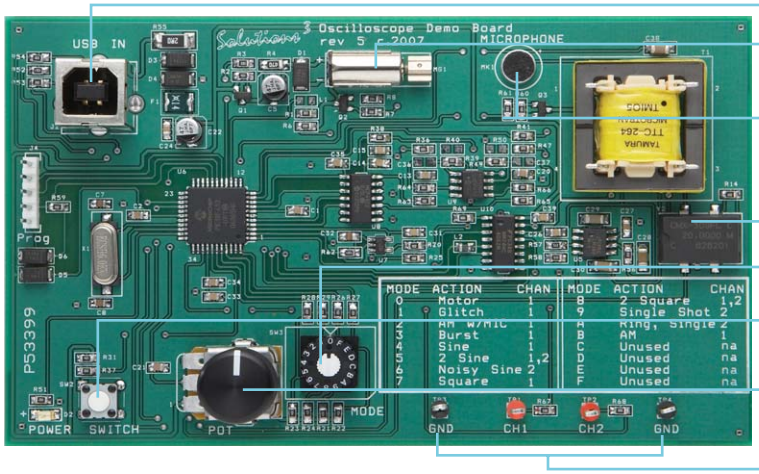
Take a few minutes to get to know the next-generation portable oscilloscope – the Agilent 5000 Series. With 1 Mpts memory, an XGA-resolution display with 256 levels of intensity grading, and a fast 100,000 wfms/s update rate, the new 5000 Series will show you more than what you thought possible for a portable oscilloscope.

If you would like to go further, feel free to evaluate the same signals on the oscilloscope you are using today with the comparative procedures inside.

Controls Used in This Demo Guide



Horizontal Knobs
Run and Single-Shot
Main/Delayed Mode
Quick Meas
Autoscale
Trigger
Channel 1 Controls
Save/Recall Menu
Menu Soft Keys
Waveform Intensity



USB B
Motor
Microphone
20 MHz Clock
Mode
Switch
Potentiometer
GND / CH1 / CH2 / GND

Need a demo board?

Please contact Agilent or your local Agilent distributor.

Lab 1

Viewing a motor start-up sequence using a high-definition display and deep memory

This motor start-up sequence presents two major challenges for traditional oscilloscopes:

1. Capturing a start-up sequence requires acquiring data at a high rate for a long period of time. Shallow-memory oscilloscopes experience a significant degradation in their sample rate, which can result in under-sampling and aliasing.

2. Complex signals have lots of data buried in them – data that is not easily observable using traditional digitizing oscilloscopes that have limited display intensity gradation.

1 Your demo kit should come with a USB cable. The USB connection provides power to the demo board. Connect the 'A' receptacle of the cable to a USB host port on the back panel of the 5000 Series. Connect the 'B' receptacle of the cable to the demo board.

2 Connect the channel 1 probe to the test points labeled CH1 and ground (GND).

3 Set the demo board's MODE dial to 0 to activate the MOTOR signal.

4 Set the potentiometer to the 12 o'clock position (see diagram on page 3).

Agilent 5000 Series

Press **Save/ Recall** and **Default Setup** to ensure the scope is in an initial known state.

Using the **Intensity** knob below the display, adjust the waveform intensity to approximately 50%.

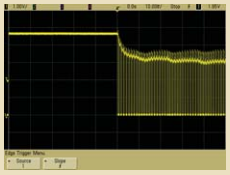
While pressing down on the **Switch** button on the demo board, press **Autoscale** on the scope.

Press the **Trigger** Mode menu button and switch the triggering mode from Auto to Normal.

Using the horizontal timebase knob, adjust the timebase to 10 ms/div. This allows you to see the first 50 ms of start-up time.

Press **Single** to make a single-shot acquisition.

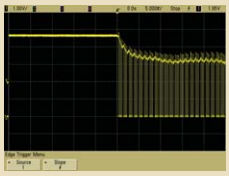
Activate the motor by pressing down on the **Switch** button.



Preferred Zooming Technique

Press the **Main/Delayed** menu button and select the **Delayed** sweep mode. You can adjust the zoom with the horizontal control knobs. This gives you a "forest and trees" view of your signal.

Now, zoom in on the signal by turning the horizontal timebase knob in a clockwise direction. The more you zoom, the more detail you will see about each controller pulse. You can also pan with the horizontal offset knob (◄►) to see any part of the trace you wish.



Tektronix TDS3000B Series

Press **Save/Recall**, **Recall Factory Setup** and **OK Confirm Factory Init.** to ensure the scope is in an initial known state.

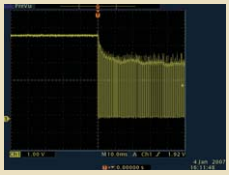
Using the **Waveform Intensity** knob on the front panel, adjust the waveform intensity to approximately 50%.

While pressing down on the **Switch** button on the demo board, press **Autoset** on the oscilloscope.

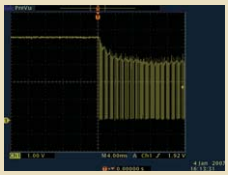
Using the **Horizontal Scale** knob, adjust the timebase to 10 ms/div.

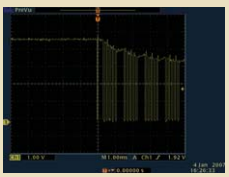
Press **Single Seq**.

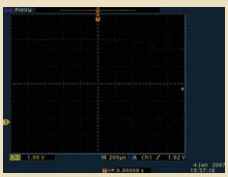
Activate the motor by pressing down on the **Switch** button.



Now, zoom in on the signal by turning the **Horizontal Scale** knob in a clockwise direction.







Lab 2

Discovering an infrequent glitch with fast waveform update rates

Some design problems you can anticipate...others, you can't. If you don't know what you are looking for, advanced triggering capability will not get you very far. This is where waveform update rate becomes critical. The higher the waveform update rate, the greater the probability of capturing intermittent signal glitches and anomalies.

Let's see the impact of waveform update rate when it comes to acquiring and viewing an intermittent glitch that occurs in the signal, on average, only once every 40,000 cycles.

1. Your demo kit should come with a USB cable. Connect the 'A' receptacle of the cable to a USB host port on the back panel of the 5000 Series. Connect the 'B' receptacle of the cable to the demo board. The USB connection provides power to the demo board.

2. Connect the channel 1 probe to the test points labeled CH1 and ground (GND).

3. Set the demo board's MODE dial to 1 to activate the GLITCH signal.

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If you did not try Lab 1:

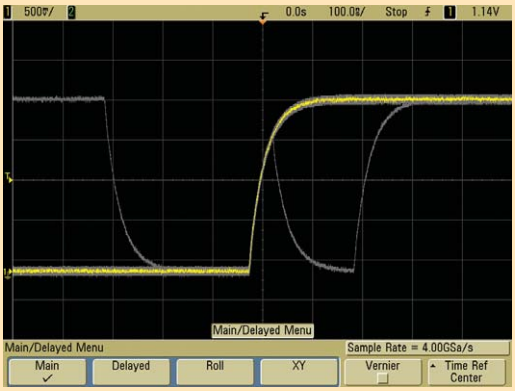
Press **Save/Recall** and **Default Setup** to ensure the scope is in an initial known state. Press **Trigger** mode and switch from Auto to Normal triggering.

Using the **Intensity** knob, adjust the waveform intensity to 100%.

Press **Autoscale** on the scope.

Using the **Horizontal Time/Div** knob, adjust the timebase to isolate one rising edge (100 ns/div).

Over a period of 10 seconds, count how many times you see the glitch appear?



Now you can isolate the glitch using a **Pulse Width** trigger.

Tektronix TDS3000B Series

If you did not try Lab 1:

Press **Save/Recall**, **Recall Factory Setup** and **OK Confirm Factory Init.** to ensure the scope is in an initial known state.

Using the **Waveform Intensity** knob on the front panel, adjust the waveform intensity to 100%.

Press **Autoset**.

Using the **Horizontal Scale** knob, adjust the timebase to 100 ns/div.

Using the **Vertical Scale** knob, adjust the volts/div to 500 mV/div.

Using the **Vertical Position** knob, move the waveform down by approximately 2 divisions to better fit on the screen.

Over a period of 10 seconds, count how many times you see the glitch appear on the signal?

Lab 3

Viewing a complex, AM-modulated signal with a high-definition display and deep memory

Oscilloscopes are first and foremost viewing tools – they help you to see what is going on in your design. Today's complex signals combine slow signal trends, with fast signal transitions. **Deep memory enables you to capture signals over long periods of time while maintaining a faster sample rate.** In this lab, you will see how even a relatively slow signal can become aliased when using a shallow memory scope.

Our lab's signal uses amplitude modulation to mix a slower voice signal (kHz) with a faster carrier wave (MHz).

1. Your demo kit should come with a USB cable. Connect the 'A' receptacle of the cable to a USB host port on the back panel of the 5000 Series. Connect the 'B' receptacle of the cable to the demo board. The USB connection provides power to the demo board.

2. Connect the channel 1 probe to the test points labeled CH1 and ground (GND).

3. Set the demo board's MODE dial to 2 to activate the AM w/MIC signal.

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If you did not try Lab 1 or Lab 2:

Press **Save/Recall** and **Default Setup** to ensure the scope is in an initial known state. Press **Trigger** mode and switch from Auto to Normal triggering.

Using the **Intensity** knob, adjust the waveform intensity to approximately 50%.

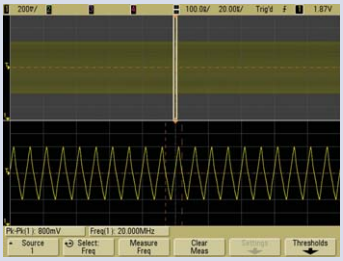
Press **Autoscale**.

Turn the **Horizontal Time/Div** knob in a counter-clockwise direction. When you reach 20 µs/div, you will be viewing signals in the 5 kHz voice range.

Push the **Main/Delayed** button under the **Horizontal** section of the front panel. What is the sample rate at 20 µs/div?

The AM carrier frequency is 20 MHz. By how many times are you oversampling?

Select **Delayed** for a "forest and trees" view. Then use **Quick Meas** to select a frequency measurement. What is the frequency of the carrier wave?



Tap gently on or whistle into the **Microphone** input on the demo board. Observe the display responsiveness.

Tektronix TDS3000B Series

If you did not try Lab 1 or Lab 2:

Press **Save/Recall**, **Recall Factory Setup** and **OK Confirm Factory Init.** to ensure the scope is in an initial known state.

Using the **Waveform Intensity** knob on the front panel, adjust the intensity to approximately 50%.

Press **Autoset**.

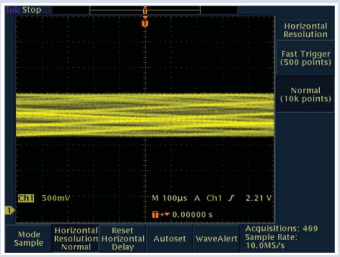
Using the **Vertical Scale** knob, adjust the volts/div to 500 mV/div.

Using the **Vertical Position** knob, move the waveform down by approximately 2 divisions to center it on the screen.

Press the **Acquire** Menu button to view the current sample rate.

Turn the horizontal time/div knob in a counter-clockwise direction to 20 µs/div to view kHz signals. At what t/div setting do you begin to see aliasing?

Select **Measure** then **Frequency**. What is the frequency of the carrier wave?



Zoom back to 10 µs/div. Tap gently on or whistle into the **Microphone** input on the demo board. Observe the display responsiveness.

Need a demo board?

Please contact Agilent or your local Agilent distributor.

Available in English, Spanish, French, German, Italian, Simplified Chinese, Traditional Chinese, Japanese, Korean, Russian, Portuguese.

http://www.agilent.com/file/5000demo

www.agilent.com

For more information on Agilent Technologies' products, applications or services, please contact your local Agilent office.

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