Tektronix TBS1052B-EDU Oscilloscopes

UTA Quick Guide
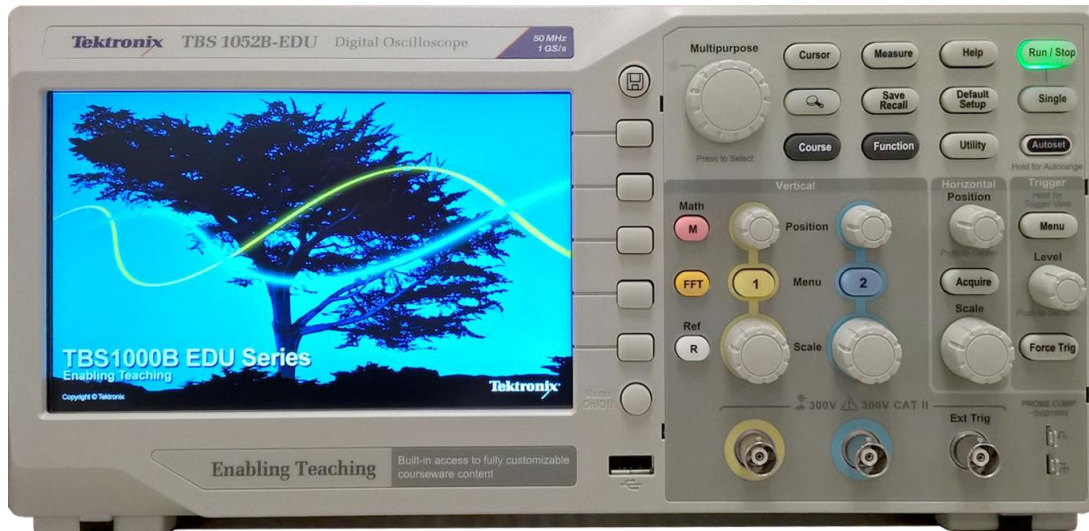
Author / Reviewer	Date	Revision
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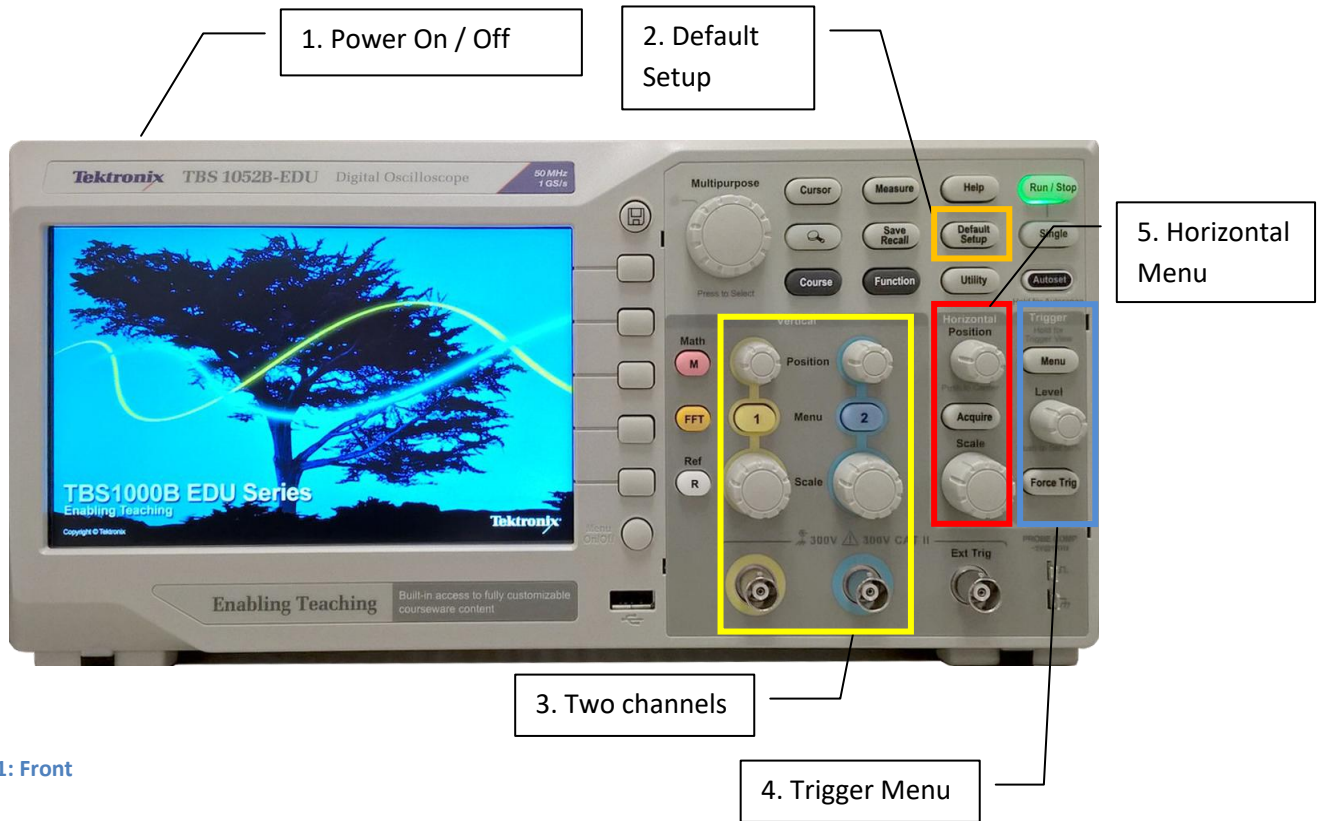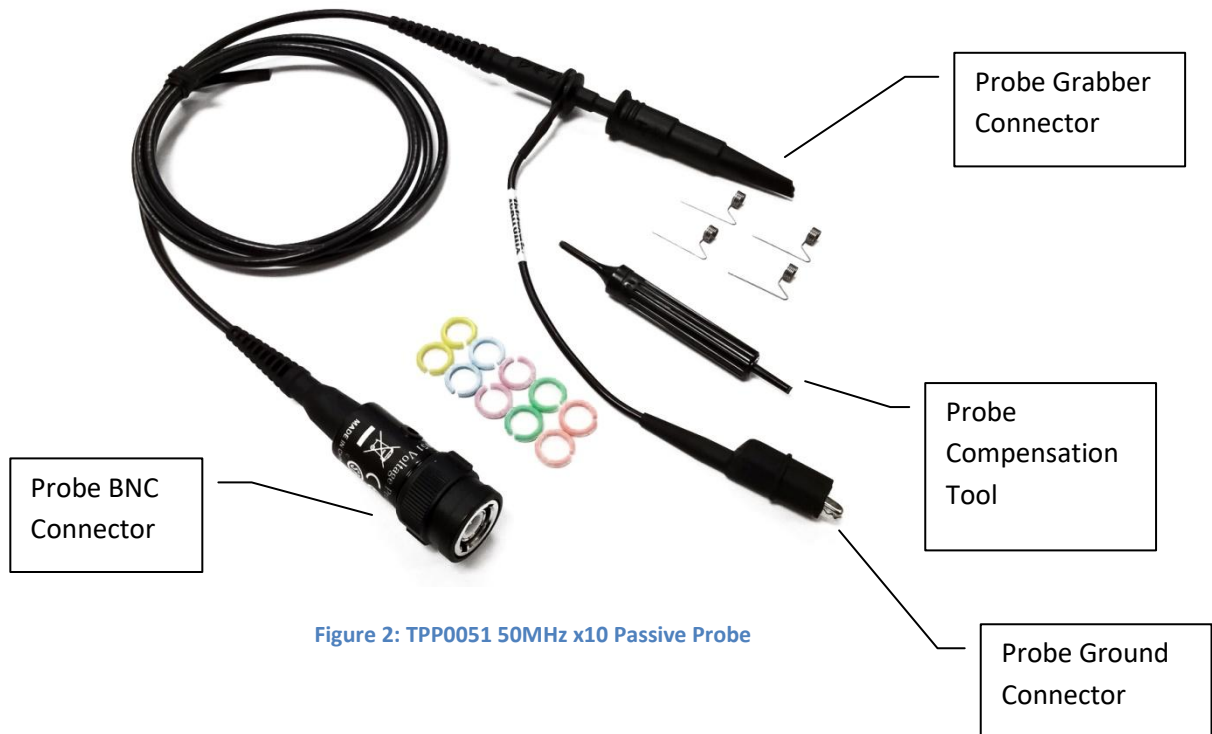5. Horizontal Menu

3. Two channels

4. Trigger Menu

Figure 1: Front

1. Press to turn the TBS1052B-EDU on or off.
2. Press *default setup* to return the Oscilloscope to a known "default" state.
3. The TBS1052B-EDU has 2 channels. Pressing the channel number button will turn on/off the channel. The vertical position button is located above the channel button. The volts per division or scale knob is located below the channel button.
4. Trigger menu – Press the Level knob to place the trigger at the 50% mark of the signal.
5. Horizontal / Time – The time per division, or scale knob is at the bottom of the menu. The horizontal position knob is at the top. You can press this knob to center the signal. Center is based on the slope of the trigger menu.

Probes

Probe Grabber Connector

Probe Compensation Tool

Probe BNC Connector

Probe Ground Connector

Figure 2: TPP0051 50MHz x10 Passive Probe

Probe Compensation

The Tektronix probes must be compensated to produce an accurate waveform.

1. Turn on the TBS1052B-EDU. Wait 40 seconds for the scope to boot up.
2. Insert the Tektronix TPP0051 probe into channel 1. To connect the Tektronix probes, align the BNC connector probe tabs vertically and insert into the channel input then twist the BNC connector right until the tabs are horizontal. To remove the probe, align the tabs vertically and pull the probe off the connector.
3. Connect the Probe tip to the PROBE COMP output as shown in **Figure 3**.
4. Press **Autoset**.
5. If the 5 volt, 1 KHz signal looks like either picture in **Figure 4,** continue to the next step.
6. Insert a probe compensation tool into the hole in the probe BNC connector and adjust it left or right until the signal looks square. See **Figure 5**.
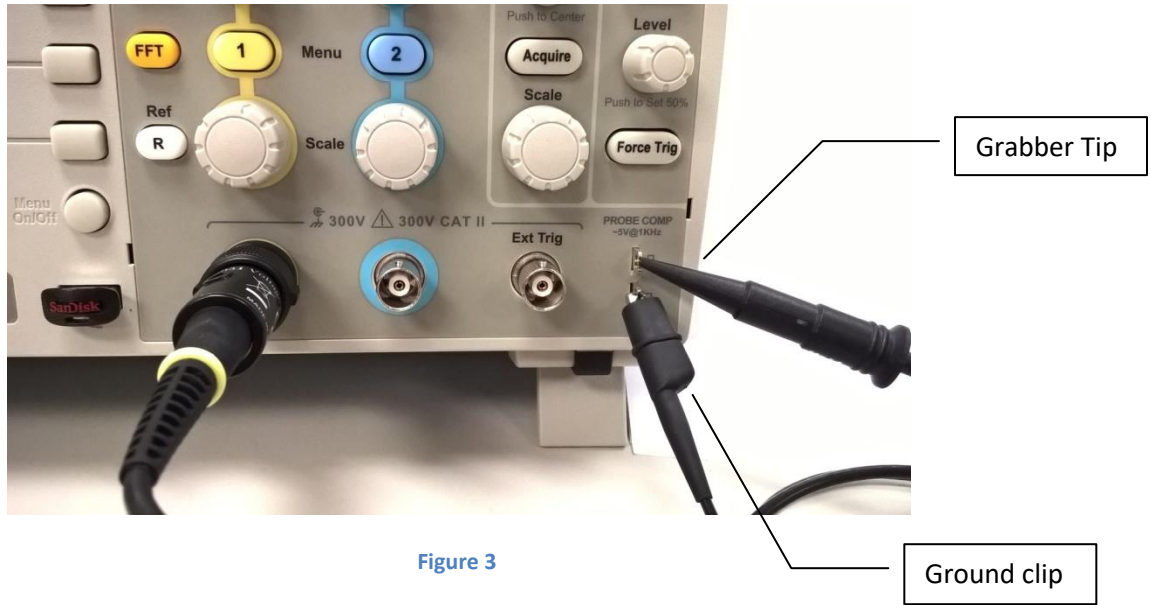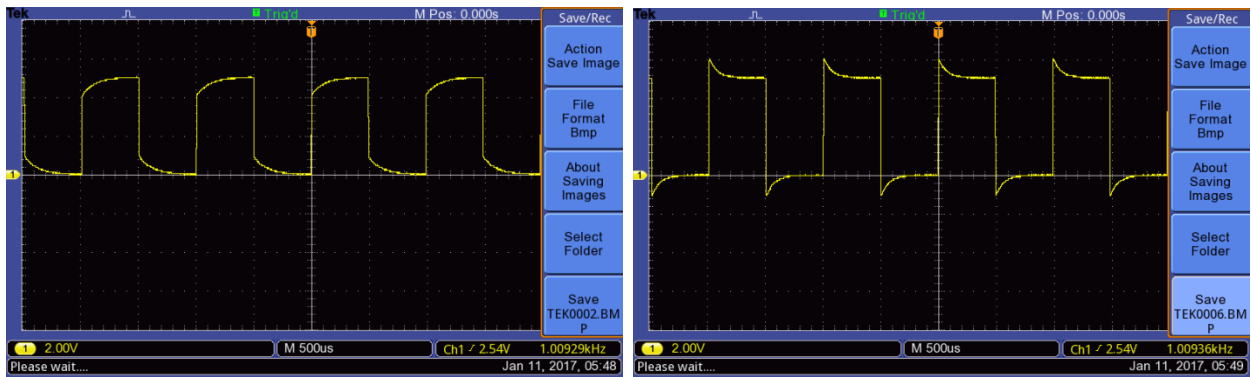
Figure 3

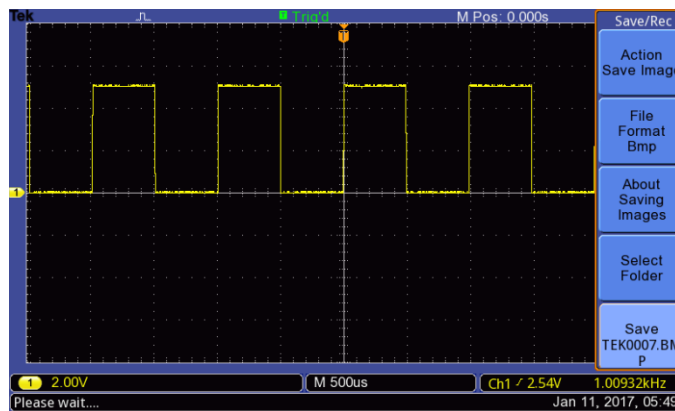Figure 4: Left is an under compensated probe and right is an over compensated probe.

Figure 5: A correctly compensated probe.

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Basics

This section will help you become familiar with adjusting the vertical and horizontal controls, taking continuous or a single measurements and how to adjust the trigger.

Autoset and Default setup

Normally when you are measuring a signal you can press the **Autoset** button and the oscilloscope will automatically adjust the vertical and horizontal scale setting to an appropriate setting and display the peak to peak voltage, mean, period and frequency values. You can adjust this setting following the instructions below. If you ever get the oscilloscope into a setting where you can't see the signal your measuring, you can press the **Default Setup** button to restore the oscilloscope to a predefined state. **Note**: the default setup button does not affect the save / recall settings.

Vertical Menu

The vertical menu allows you to measure the voltage of an alternating current or signal. The screen has 8 blocks going from the bottom of the screen to the top. The value of each square is set by the large control knob (**Scale** knob) below the channel number button. You will normally adjust the vertical **Scale** knob where you can see the largest signal on the screen without having the signal go off the screen.

The position knob above the channel number in the vertical menu moves the entire signal up or down.

By pressing the **channel number (1 or 2)** button, you can bring up the *Coupling* softkey. This will normally be set to *DC*. This means you will see the DC component of the signal with the AC component. By setting the *Coupling* softkey to *AC*, you will remove any DC voltage from the signal you are measuring.

The probes that come with the TBS1052B-EDU are x10 probes. This means a 10 volt peak to peak signal will come into the oscilloscope at 1 volt peak to peak. Because we know the signal is actually 10 times larger, the oscilloscope is defaulted to show the signal it receives as 10 times the actual input. If you use an oscilloscope probe that is not a times 10 probe, you will need to press the **channel number (1 or 2)** button then the *Probe* softkey. This will bring up the *Attenuation* softkey. Press the *Attenuation* softkey and use the **Multipurpose** wheel to select the correct probe attenuation.

Horizontal Menu

The horizontal menu adjusts the time parameters of the oscilloscope. There are 10 blocks going from the left side of the screen to the right side of the screen. The large **Scale** knob in the Horizontal menu will adjust each square to a different time scale, from 50 seconds to 5 nanoseconds. The position knob in the horizontal menu moves the entire signal left and right on the screen. Pushing the **Position** knob will center the signal to the middle of the screen. The **Acquire** button will allow you to take continuous samples or take an average of different sample sizes of the signal.

Trigger Menu

The signal on the screen of the oscilloscope is drawn from left to right many, many times a second. In order for the oscilloscope to draw a repeating signal that is steady (doesn't drift or freeze), it needs to

define a starting point on when to start drawing the signal on the screen. The **Level** knob in the trigger menu sets a horizontal line on the oscilloscope where any time the signal voltage goes above that line, the oscilloscope will start drawing a signal on the screen.

Run / Stop and Single Buttons

Normally you will keep the oscilloscope in the Run mode. The **Run / Stop** button will light up Green to indicate it is in the run mode. Pressing the **Run / Stop** button turns the button red and freezes the screen. If you wish to take one single measurement, simply press the **Single** button. Press the **Run / Stop** button again to turn the run mode back on.

Firmware

Firmware in most test equipment controls the entire device, much like the operating system of a computer. Firmware is programmed into permanent memory of the device, like an EEPROM. Many times test equipment manufacturers will update their firmware to fix bug or add new features to a product. It is important to know the firmware of all your test equipment and keep track of new versions of firmware for your test equipment. The current version of firmware for the Tektronix TBS1052B-EDU oscilloscope is v4.06 as of 01/10/2017.

Checking the firmware

1. Press **Utility** button on the front panel.
2. Press the *–more- page 1 of 3 softkey* twice to get to page 3 of 3. Then press *System Status*. Press *Misc.* to see the firmware, serial number, communication addresses and to see the status of different tests the scope has undergone.
3. The firmware is listed and below the model number. See **Figure 6**.
4. If new firmware is available, **DO NOT INSTALL FIRMWARE YOURSELF**. Contact lab personnel and we will update the Tektronix oscilloscope for you.

Figure 6

Cursors

To obtain manual measurements use the **Cursors** button near the **Multipurpose** wheel.

1. Press the **Cursor** button to access the cursors menu.
2. The default setting is for the cursors to be off. Press the *Type* softkey and use the **Multipurpose** wheel to select either *Amplitude* or *Time*. Then press the **Multipurpose** wheel to select your choice.
3. Selecting *Amplitude* will display new softkeys on the menu. Ensure the *Source* softkey is on the channel you wish to measure. Press *Cursor 1* and use the **Multipurpose** wheel to move the cursor to the top of the signal your interested in. Press *Cursor 2* and use the **Multipurpose** wheel to move the cursor to the bottom of the signal your interested in. The middle softkey will show you the difference in Amplitude between the two cursors.
4. Selecting *Time* will display new softkeys on the menu. Ensure the Source softkey is on the channel you wish to measure. Press *Cursor 1* and use the **Multipurpose** wheel to move the cursor to the start of the signal your interested in. Press *Cursor 2* and use the **Multipurpose** wheel to move the cursor to the stopping point of the signal your interested in. The middle softkey will show you the difference in Time between the two cursors. See **Figure 7**.
5. Pressing the **Menu On/Off** button below the softkeys will hide the menu but leave the cursors on the screen. To remove the cursors, set the top softkey *Type* to *Off*.
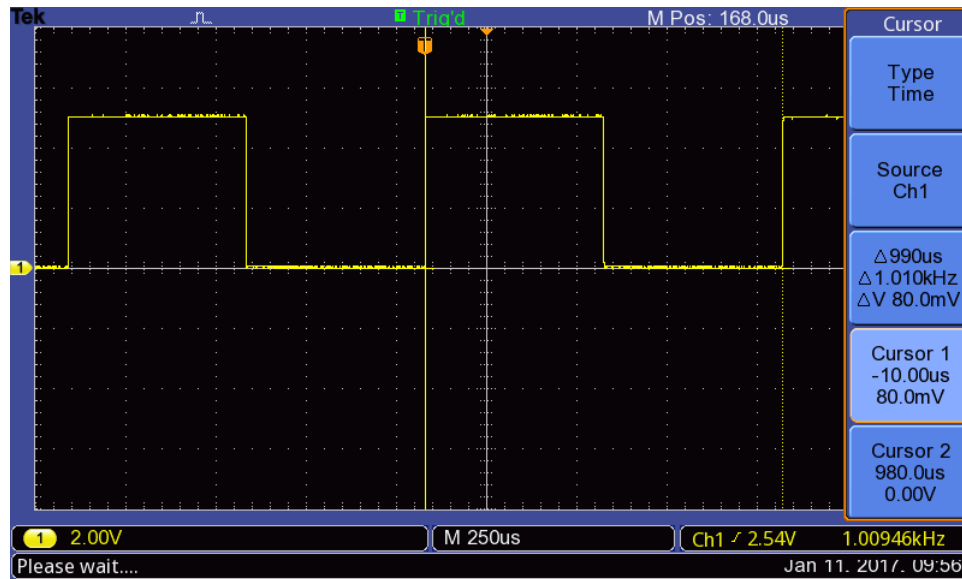

Figure 7

Measurements

The Tektronix TBS1052B-EDU oscilloscope makes a wide variety of automated measurements.

1. Select *Measure*. Select the channel you wish to measure (Ch1 or Ch2 or Math).
2. Use the **Multipurpose** wheel to turn on or off any of the available measurements. See **Figure 8**.
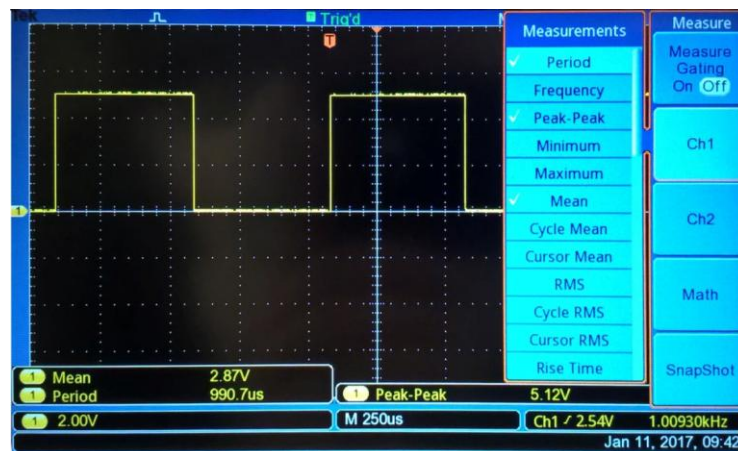

Figure 8: Some of the many measurements the TBS1052B-EDU can measure.

Save / Recall – Screenshots, CSV and Setup

The TBS1052B-EDU has a USB port on the front of the oscilloscope that will accommodate a USB drive. You can save screenshots, comma separated value files (CVS files), and oscilloscope setup information to your USB drive. You can only recall setup information from a USB drive on the oscilloscope.

Saving a BMP/JPG to your USB drive

1. Insert a USB jump drive into the front of the oscilloscope.
2. Press the **Save Recall** button.
3. Press the *Print Button - Prints* softkey. Use the **Multipurpose** wheel to scroll to *Save Image to File* then press the **Multipurpose** wheel to select it. Press the *Select Folder* softkey if you wish to store screenshots into a different folder. You have now set the **Print** button (The button with a small image of a 3.5 floppy disk) to save screenshots from the oscilloscope to your USB drive.
4. If you wish to save your screenshot in a different format, select the softkey *Action*. Use the **Multipurpose** wheel to scroll to Save Image, then press the wheel to select it. Now you can access the softkey *File Format* and select from either BMP or JPG image formats.

Saving CVS to USB drive

1. Insert a USB jump drive into the front of the oscilloscope.
2. Press the **Save / Recall** button, then press the *Action* softkey. Use the **Multipurpose** wheel to scroll to *Save Waveform* then press the wheel to select. The bottom softkey now should indicate *Save TEKXXXX.CVS*. Press the softkey to save the data. Use Excel to open the CVS file.

Saving / Recalling a setup

1. Press the **Save Recall** button.
2. Press the *Action* softkey and select *Save Setup* to save the state of the oscilloscope. Select *Save to Setup* to save the setup into the oscilloscope internal memory. You can save up to 10 setups on the oscilloscope. Select a setup number then press *Save*.
3. If you wish to store the setup on a USB drive. Insert a USB jump drive into the front of the oscilloscope.
4. Press *Action -> Save Setup* softkeys , then press the *Save to softkey* and select *file*. Press Save to store the setup file on your USB drive.
5. To recall a saved setup, simply choose Action -> Recall Setup. Choose *Recall from -> Setup* to see the files in the oscilloscope memory or choose *Recall From -> File* then Select *file* to browse the files on your USB Drive.

More Information

This UTA Quick Guide is intended to familiarize students quickly with the undergraduate lab equipment. For more information on the TBS1052B-EDU please contact EE_UG_LABS@uta.edu to schedule addition training.