Appendix B

Bench Oscilloscope Tektronix: Model TDS 2014B

Figure 1: Tektronix TDS 2014B

The Tektronix oscilloscope is an instrument that allows you to view and analyze electrical waveforms in a graphical form. The oscilloscope will be used to analyze voltage signals from the circuits that you create in lab. Its primary function is to graph an instantaneous signal voltage as a function of time.

The waveforms sampled by the oscilloscope are displayed on a color digital phosphor screen. This oscilloscope is capable of displaying four signals at once, thus it is a four channel scope. The bandwidth or resolution of the scope is up to 100 MHz. The horizontal time scale can be adjusted from 1 ns to 10s.

The probes that you will use with the Tektronix Oscilloscope are the professional probes that come with the oscilloscope. We would like all students to become familiar with using these types of probes. However, you must be **VERY CAREFUL** when using these probes. Treat them with respect.

You can find a user's manual online and you are encouraged to skim through it. The more you know about the equipment you will be using, the easier it will be to use.

In order to be able to save any data from this oscilloscope, **you will need a USB flash disk (Less than 2GB)**. These can be hard to find these days, but your TA should have access to some if you want to save any measurements from the bench scope. You can save the readings you take as either *.bmp files to insert into your document or *.csv files to use the data in another graphing program.

Adjusting the Scales on the Oscilloscope:

You can use the [*Auto Set*] button on the oscilloscope to automatically adjust the view of the waveform. To carry out manual adjustments, use the Vertical and Horizontal [*Scale*] adjustment on the oscilloscope to adjust the voltage and frequency divisions. The lower knob in the vertical section controls how zoomed in you are vertically, changing it will change the visible amplitude. The lower knob in the horizontal section controls the zoom settings with respect to frequency. These controls only affect how you view the waveform, not the characteristics of the waveform.

Measuring Signal Parameters on the Oscilloscope

1. Press [*Measure*].
2. Scroll through the measurement tasks by pressing [-*keep pressing the same button*-].
3. Find the [*frequency*] task and press its button.
4. Find the [*amplitude*] task and press its button.
5. Find the [*RMS*] task and press its button.
6. Leave the measurement menu by pressing [*Menu Off*].

How To Save A Screenshot From The Oscilloscope:

In order to save a screen shot of a waveform on the Tektronix Oscilloscope, **you must use a USB flash disk (Less than 2GB).** You need to be sure the scope is set to print to a file to your disk instead of trying to print to a printer.

You can save a screen image, the oscilloscope settings, or waveform data to a file on the USB flash drive through the Save/Recall menu. Each save option operates in a similar way. As an example, to save a screen image file to a flash drive, follow these steps:

1. Insert a USB flash drive into the USB Flash Drive port.
2. Push **UTILITY ► Options ► Printer Setup** and set the following options: Print Button: Save All to files
   - Ink Saver: On, Off Prints the screen image on a white background when you select On.
   - Layout: Portrait, Landscape Printer output orientation
   - File Format: JPEG
3. Access the screen you want to save.
4. Push the **SAVE/RECALL** front panel button.
5. Select the Action ► Save Image ► Save option.

The oscilloscope saves the screen image in the current folder and automatically generates the file name.

Using the Save Function of the PRINT Front Panel Button

You can set the PRINT front panel button to write data to the USB flash drive as an alternative function. To set the function of the PRINT button to save data, access one of the following options:

SAVE/RECALL ► Save All ► PRINT Button

5UTILITY ►Options ► Printer Setup

NOTE. *An LED by the PRINT button lights to indicate the alternative SAVE function that writes data to the USB flash drive.*

Saves All to Files: The Saves All to Files option lets you save the current oscilloscope information to files on the USB flash drive. A single Saves All to Files action uses less than 700 kB of space on the flash drive. Before you can save data to the USB flash drive, you need to change the PRINT front panel button to the alternative SAVE function. To do so, select the **SAVE/RECALL ► Save All ► PRINT Button ► Saves All to Files** option.