Lab 10 - Digital Oscilloscope Familiarization

Introduction

In this lab you will:

- unpack, install and test a Rigol DS2072 digital oscilloscope.

- prepare a receiving report and hand it in at the end of the lab. A receiving report is often required before a company pays for received items.

- familiarize yourself with some features of the 'scope by reading the data sheet and the user guide and answering a few questions.

Unpack and Check Contents

Unpack the instrument and check the contents against the included packing ("Contents") list. If there are any missing items, note this down and inform the instructor.

Installation

Follow the setup instructions in the Quick Guide included with the 'scope.

Set up the instrument on the bench top under the other equipment. Unplug and move the black Lab-Volt chassis to the top shelf if necessary.

Put blue and yellow channel identification rings on the 'scope probes and attach ground leads and grabber tips.

Self-Check and Probe Compensation

Turn on the scope and make sure the start-up self-test completes without errors. Inform the instructor if there are any error messages.

Follow the probe compensation procedure on page 7 of the Quick Guide. Make a note and tell the instructor if you are unable to obtain a square waveform on both channels.

Put the remaining probe accessories, CD, USB cable, Certificate of Calibration and warranty cards in the plastic bag. Hand these in with your receiving report at the end of the lab.

Read the overview section of the Quick Start guide to familiarize yourself with the controls.

Self-Calibration

Press Storage/Default to reset the 'scope configuration.

Run the self-calibration procedure by selecting Utility/Self-Cal/Start (do not connect anything to the inputs). This will take a few minutes and then the instrument will reset itself. Inform the instructor if there are any error messages.

Set Time and Date

Run Utility/System/System-Time/System-Time and use the settings knob to set the system time and date to the current local time as reported by your workstation. This time will be recorded when data is saved to an external drive and helps document your measurements.

Record Serial Number and Options

Record the 'scope model and serial number by selecting Utility/System/System-Info. Double-check that you have recorded the serial number correctly. *Compare the serial number to the serial number of the Certificate of Calibration.* Inform the instructor of any discrepancies.

Run Utility/Options/Installed to view the options. All except one of the 'scopes have limited-duration "Trial Version" of the Trigger and Mem_Depth options. Tell the instructor if you have the 'scope that has the "Official Version" of these two options.

Receiving Report

Before leaving the lab, hand in the accessories and documents (other than the probes and power cable) and a sheet of paper with:

- the title "Receiving Report"

- your name, BCIT ID number and date

- the 'scope model and serial number (check this again)

- a list of any missing items (or "packing list verified")

- a list of any failed tests (or "self-tests passed")

Lab Report

Submit a report to the course web site Dropbox with the above information along with the answers to the following questions. You can read the DS2000 Specifications and User Guide documents on the course web site (Content/Data Sheets) to help you answer the questions.

- What is the sampling rate when two channels are in use?

- How many samples can be stored if one channel is used (assuming no options installed)?

- Does the 'scope detect that 10x probes are being used? If not, how can you get the 'scope to display the correct voltage values?

- How do the input impedance and input capacitance compare to those of the analog 'scope on the bench?

- How many significant digits of accuracy would you expect for a signal period measurement? For a voltage measurement?

- What peak-to-peak voltage would be displayed if the input was a 70 MHz sine wave input with a 1V amplitude?

- If the two channels were connected to the input and output of an amplifier, what measurement function could be used to display the gain?

- What happens if you plug in a USB flash drive and press the front-panel button that has a printer icon?