

# Linear Lab Tools Matlab Install Instructions

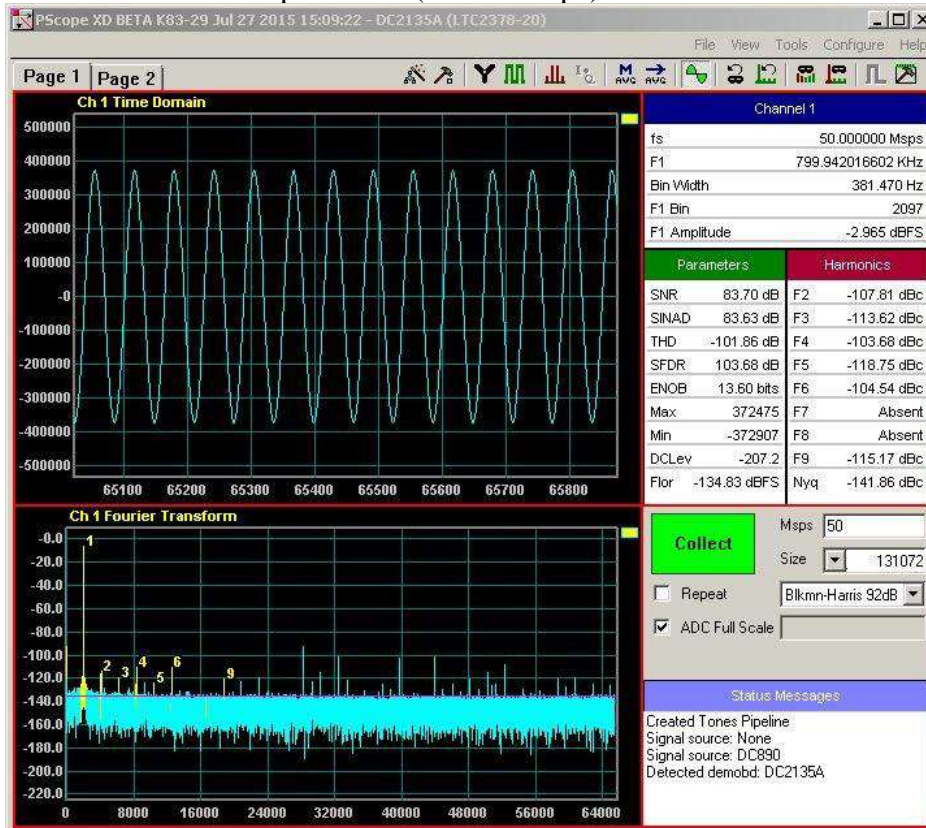
## LinearLabTools Step-by-step installation for Matlab users. Updated September, 2020

Currently LinearLabTools supports Demo Circuits for legacy LTC parts only. For other Analog Devices parts similar functionality can be achieved in [ACE](#) if it supports the part.

This document assumes you have Matlab installed and are familiar with it. If this is not the case you may be able to get started faster by using the [Python Instructions](#). Python is free and open source, and the instructions include directions for installing it.

## Demo-board Setup

- Follow the instructions in the Demo Manual or Evaluation Kit Manual for the demo-board.
  - This will include downloading software such as PScope or LTDACGen depending on the part.
    - If the instructions mention QuikEval or some other software, it is unlikely that it is supported by LinearLabTools.
  - It will also include proper hardware setup including clock and power connections.
- Once the Hardware is setup properly, the software will be able to collect or generate data as shown in the example below (from PScope).



- **NOTE:** If you are having errors in PScope due to hardware issues, you will get similar errors in Linear Lab Tools.
- Once the hardware is working properly and communicating with the host computer, quit the software before proceeding to avoid communication conflicts with LinearLabTools programs.

## Installing LinearLabTools

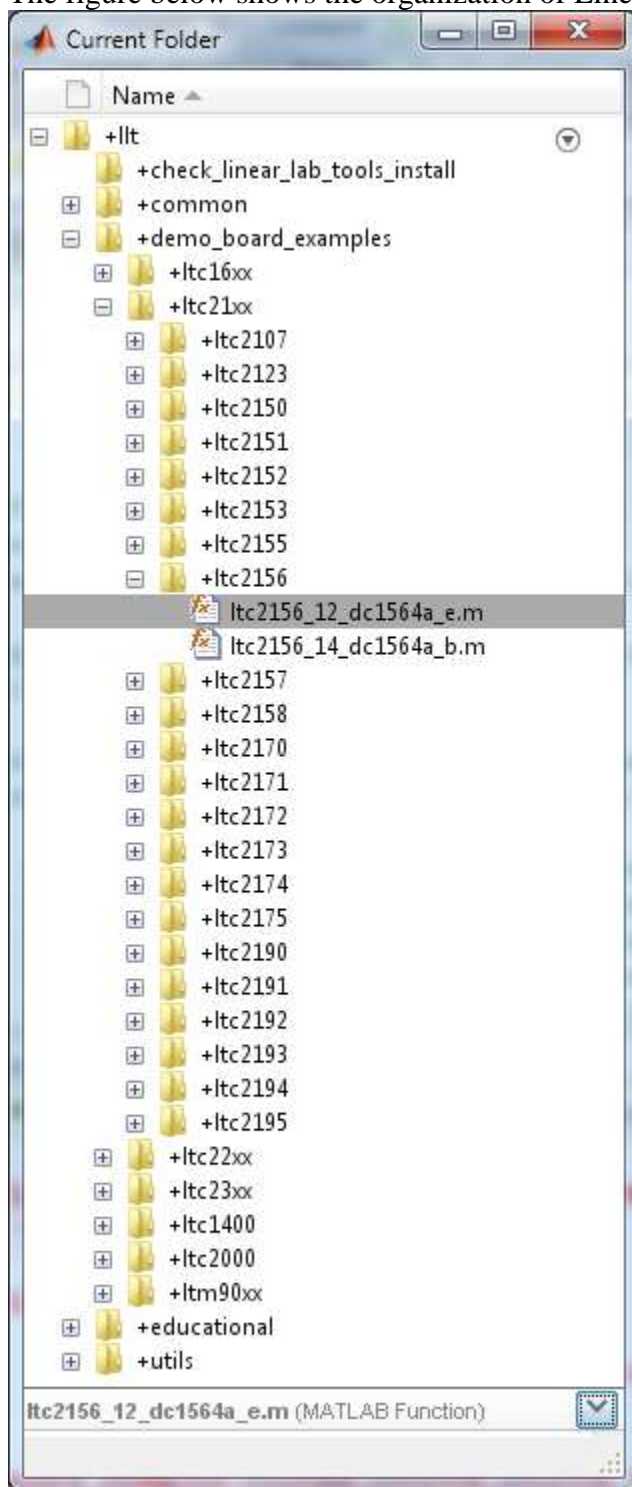
- Note that both 32-bit and 64-bit installers are provided.
  - The [32-bit installer](#) is only for 32-bit systems.
  - The [64-bit installer](#) includes everything needed to use LinearLabTools with 64-bit Matlab, as well as 32-bit Matlab on 64-bit computers.
- Run the installer and follow the directions.
- Pay attention to where it gets installed, usually that is under Analog Devices in your Documents folder.

## Matlab Path

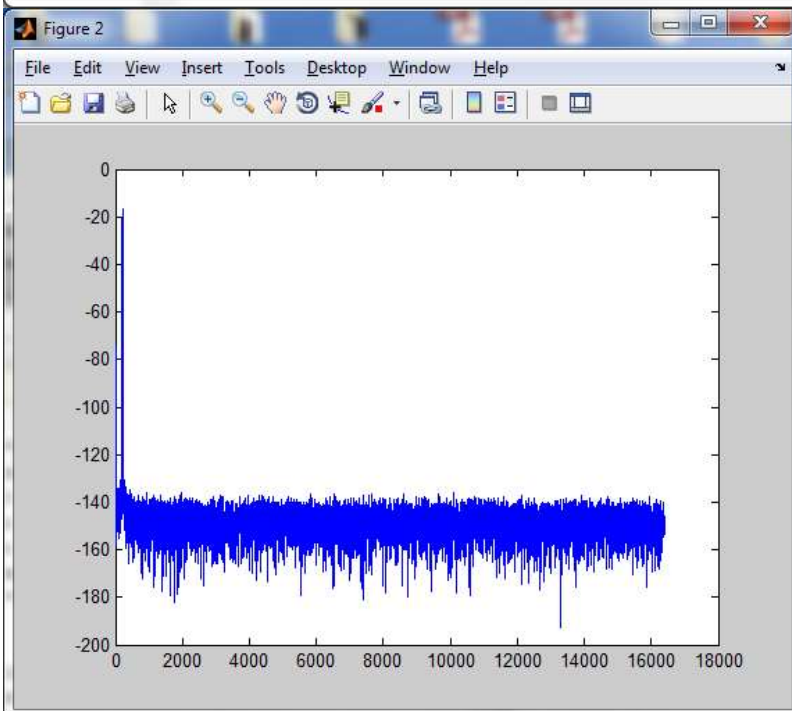
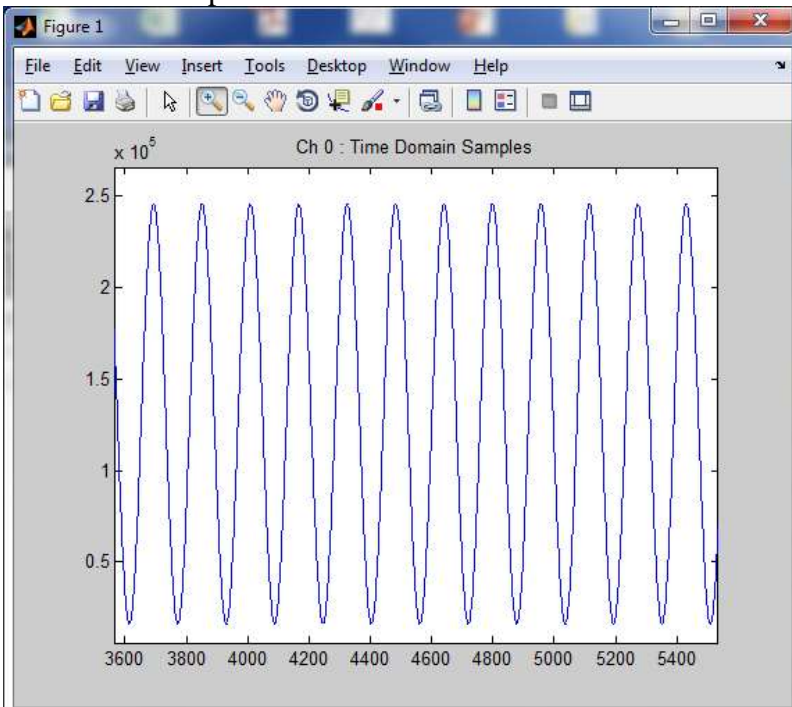
- Add the absolute path to the "linear\_lab\_tools\matlab" or "linear\_lab\_tools64\matlab" folder before running any scripts.
  - This can be added to the startup.m:  
<https://www.mathworks.com/help/matlab/ref/startup.html>
  - Or use the Set Path icon in the environment section of the home tab of the top ribbon menu.

## Communicating with the Hardware

- The figure below shows the organization of LinearLabTools:



- To run the example Matlab script for your demo board type:  
l1t.demo\_board\_examples.(l1c##xx).(part number).(example file) e.g.  
l1t.demo\_board\_examples.l1c23xx.l1c2378.l1c2378\_20\_dc2135a
- Press the enter key.
- The script will go through the basic operations of capturing data from the board, then display time and frequency domain plots. Exact operations may vary from board to board.
- You should see plots similar to those below:



- When run with no outputs as above, each demo-board example makes a time domain plot and a frequency domain plot for each channel and writes the data to a text file.
- You can also call the function passing it several parameters and returning the data for each channel.
  - For example:

#### **Calling collect function from Matlab**

```
num_samples = 16*1024;
spi_registers = [];
is_verbose = false;
do_plot = true;
do_write_to_file = false;
data = ltc2378_20_dc2135a(num_samples, spi_registers, is_verbose,
do_plot, do_write_to_file);
```

- Most functions have a signature similar to the one above. See the code for additional information.
- Many parts do not have SPI configuration, for these pass [] for the SPI registers.
- For other parts, look at the code for an example of correct SPI register format.
- For parts with multiple channels replace data with something like [ch0, ch1, ... chn] for the function output.
- At this point, data from the demo board is stored in an array in the program.
  - You can then extend the functionality of the program as required for your evaluation.
    - You can incorporate other test hardware such as signal generators, etc.
  - You can also call the function from your existing Matlab code.