QUICK START GUIDE LJ_UAD_APP Issued by e-Tronix 8 / 2016	PRODUCT: LJ UAD APPLICATION FOR TEST TOWER TEST TOWER TYPE: UADTT6x30ASB SERIAL NUMBERS: 207-002, 207-003, 207-004

Attention document contains important warning that you must follow to prevent damage to the functionality of the product, or connected device!

Quick start guide is an integral part for the product and the customer is obliged to follow it, to prevent damage to the product. If the product is damaged by use in conflict with the Quick start guide or application notes, manufacturer reserves the right to reject warranty service and repair product to the customer's account

Description of the LabVIEW_LJ_UAD application (App).

Objective:

e-Tronix provide basic monitor and record the App function for unit UADTT6x30ASB (in the text below we use „UAD TT“).

Customer can modify according to actual needs and functions.

License:

None. App provided AS IS. No support provided without explicit agreement.

Details:

App is made in Labview 7 and later modified in Labview 2011. Any newer version should open it also.

App is based on *LabVIEW_LJUD - LabVIEW drivers/examples for LabJackUD* which is programming package supplied by company Labjack to their DAQ cards. In UAD test tower (UAD TT) is used DAQ card type U3, code *LJ_dtU3*.

Labjack is great platform with perfect support and examples.

This App is decently modified example called LJLogUAD from Labjack company. See appendix for more info about it.

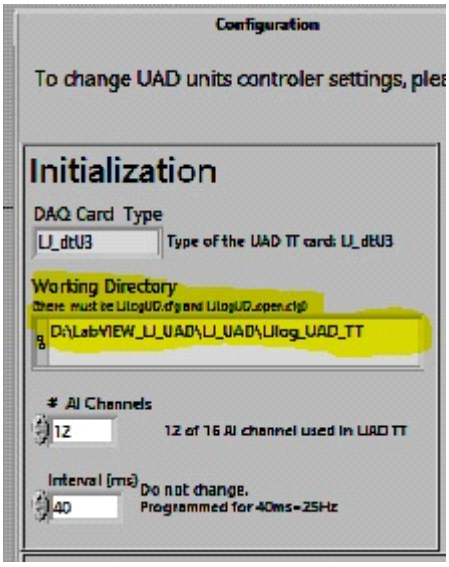
Files:

Main .vi: LJlogUD.vi located in *LabVIEW_LJ_UAD\LJ_UAD\LJlog_UAD_TT*

Supporting files: all in LabVIEW_LJ_UD directory.

Setup files mandatory to be put and Working directory:

LJLogUD.cfg and *LJ_LogUD_open.cfg*. This files define configuration of the App! Be sure you have them in working directory. Working directory is automatically populated and should be same as directory from which .vi run.



Runing the App:

there are two possibility:

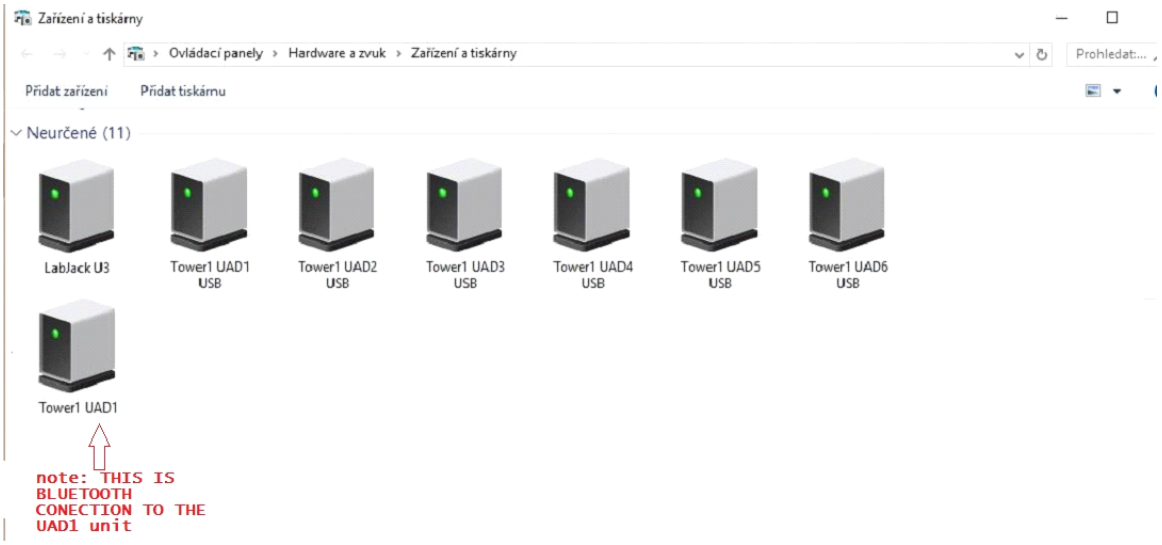
1) Running .vi file from Labview. Need to have Labview development system 2011 or later.

2) Running Exe aplication (executable file) from *LabVIEW_LJ_UAD\LJ_UAD\LJlog_UAD_TT\builds*.

Need to download and install NI Labview 2011 Runtime engine from NI.com web page. (32bit version link : http://www.ni.com/download/labview-run-time-engine-2011/2534/en/). It is 200MB big files. After download, install and then run exe of the App.

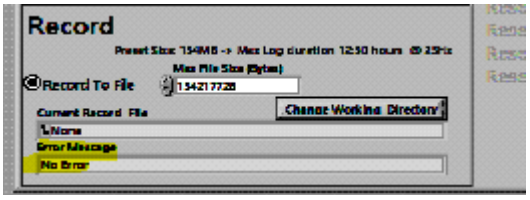
Before start of the application, the UAD TT has to be connected to USB.

Devices and Printers should show prezence of the UAD units and **Labjack U3 DAQ card**. This is successfully installed drivers:

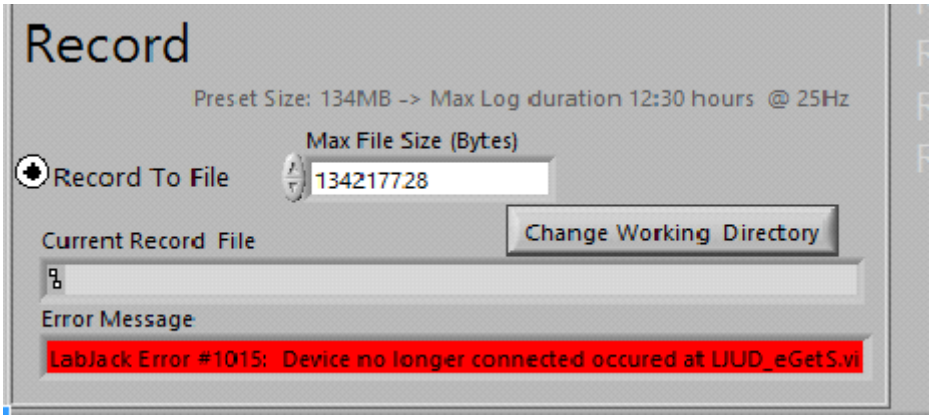


If do not see this, first solve the WIndows USB drivers issue.

After start of the App, the U3 should be found and the error message will say no error:



If there is no DAQ U3 card found in the system (UAD TT not connected right) , error message says something similar to this:



The most ofter is Windows USB driver issues or USB cable issue, faulty USB Hub or USB hub insufficient power.

Content:

there are three pages in the App: Configuration, Monitor and Demand generator.

Configuration page:

where the DAQ card is configured.

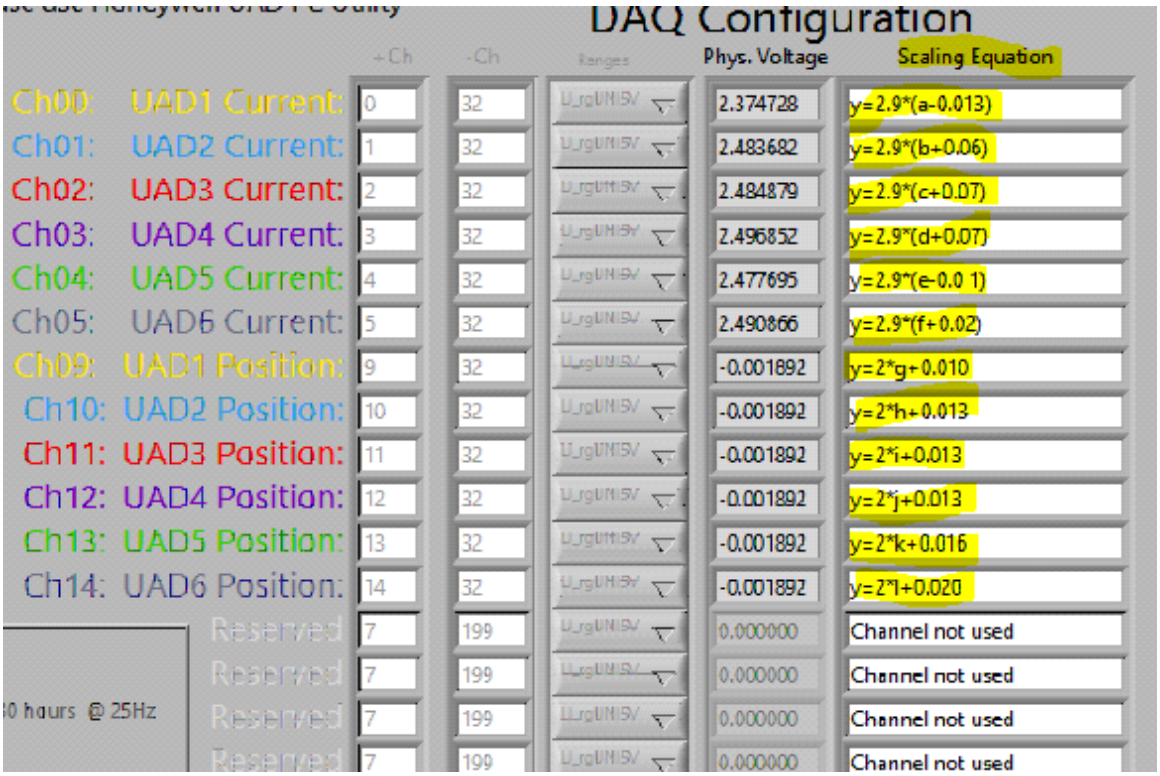
UAD TT has 12 AIN channels using. There are spare 4 channels in the internal LJ U3 DAQ card that are not used.

Warning: +Ch , -Ch , Ranges, DAQ card type etc. has not be changed! It refletcting the hardware setup in UAD TT!

Timing of the program should not change also, the only tested variant is 25Hz loop.

If more speed is needed, a modification can be done using different programing method (using example of LJ_StreamUD instead of LJ_LogUD). Max loop speed should be above 1kHz with this method.

There are scaling equations that are needed to obtain UAD Position and UAD Current values. Equations are based on calibration measurements. But it is reccomended to check and fine tune the scaling equations after 1 months of run -in period to compensate posible drift.



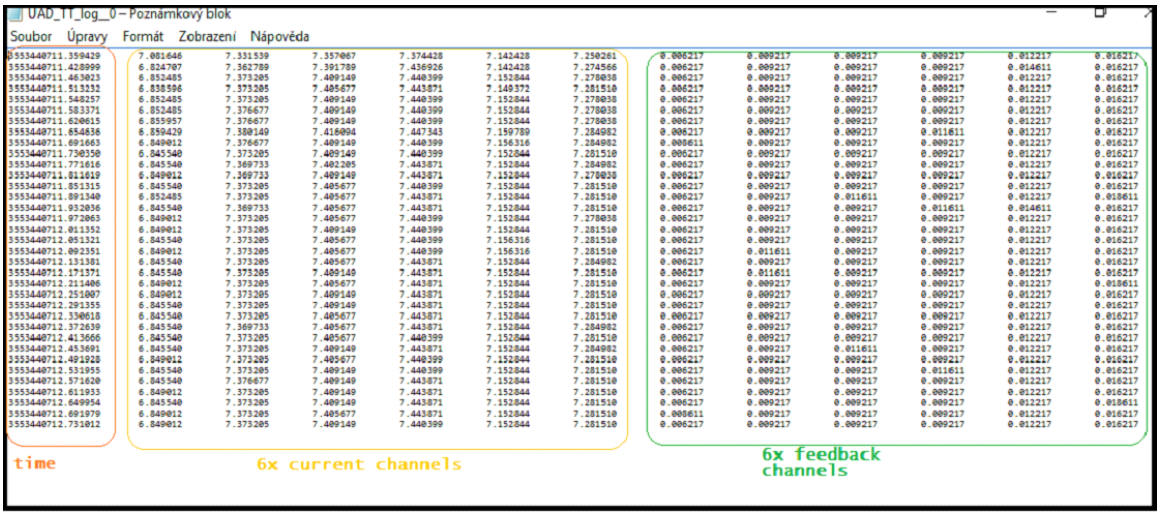
At Configuration page also record can be setup.

The record is done at the loop speed (25Hz) and record all 12 AIN channels.

Format of record: ASCI text file, naming: UAD_TT_log__xxx. dat. xxx incrementaly increase if there are already previous record files in the directory.

Data are organized in columns and delimiter is tab.

example:



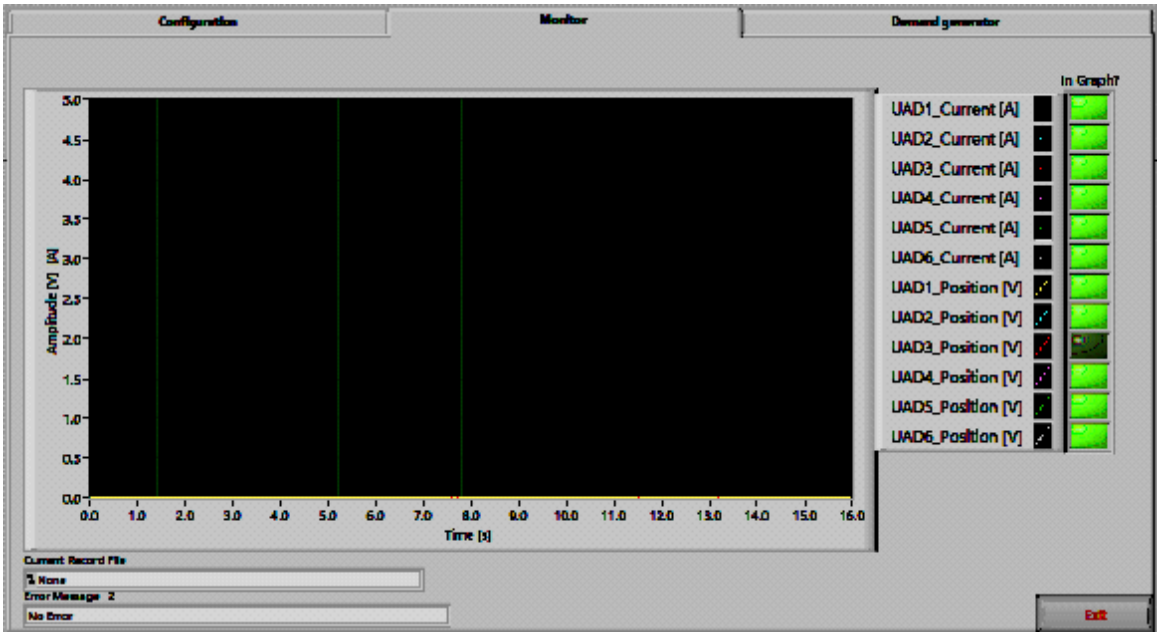
Max file size is suggested to be 134MB to avoid issues. This is enough for 12 and half hours nonstop record.

Monitor page:

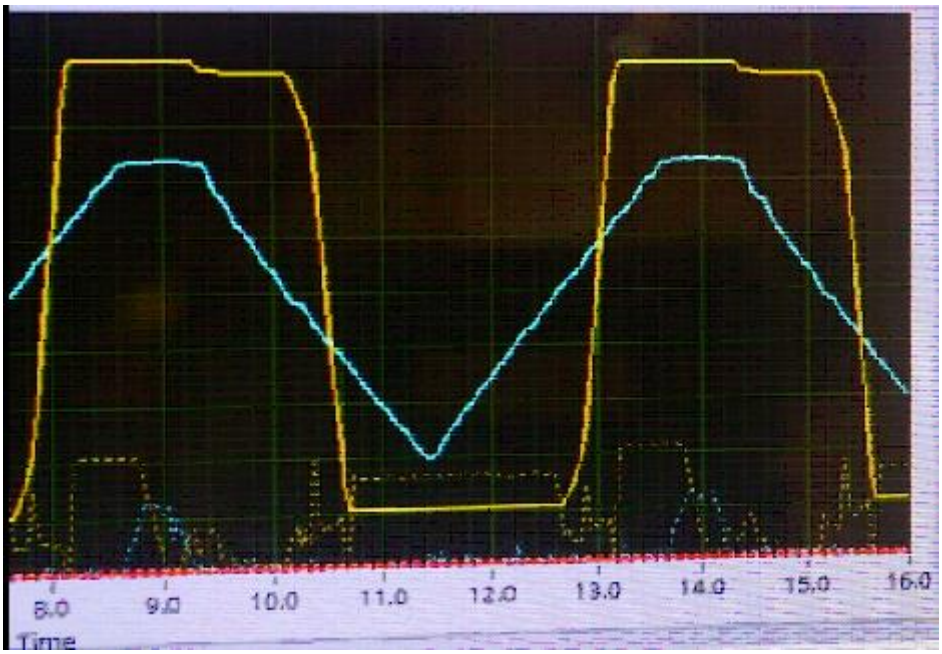
Here is online graph of the measured AIN channels.

Dotted line are Current channels, normal line are Position channels.

It showing last 16 seconds. By the green buttons on right, it can be selected which are visible in the grap and which are hidden. (record is not affected).



Colors match the UAD TT Units color designation. Example UAD1 and UAD2 running two different profiles (from Pararel running UAD PC Utility demand profile):



Page Demand generator:

There is possibility to generate demand signal for UAD TT by many ways.

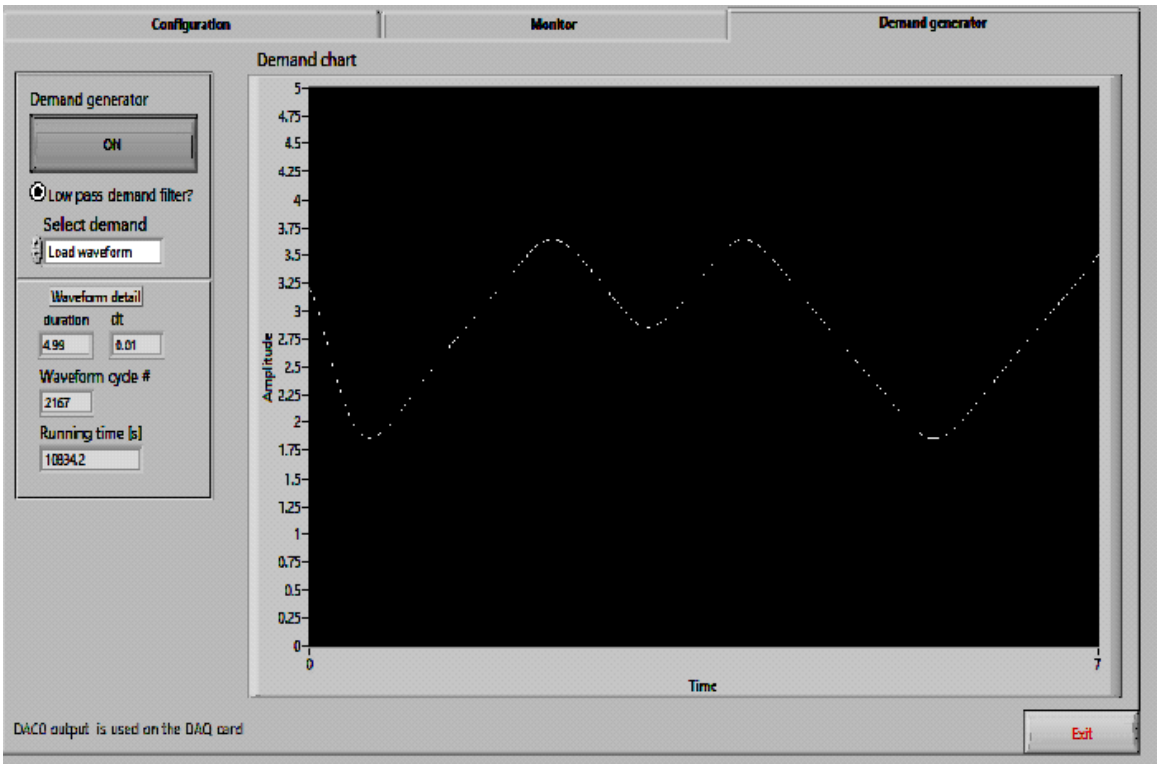
- Using **Ext.In**. and generate same demand signal for all 6 UAD units by voltage signal from external source (programmable power supply or signal generator etc.)
- By using **UAD PC Utility** for demand (one instance running for each UAD Unit in paralell). This provide opportunity to control each UAD unit different demand.
- Using internal UAD TT **LabJack U3 DAQ card** analog output DAO0. This is the method controled in this page.

There is analog output called DAO0 on the LabJack U3 card that can be used for demand generation in similar way like external source.

On this page it is possible to turn off or turn on the demand generation.

warning: be sure there is NO EXTERNAL VOLTAGE connected to Ext.In. when enabling this!

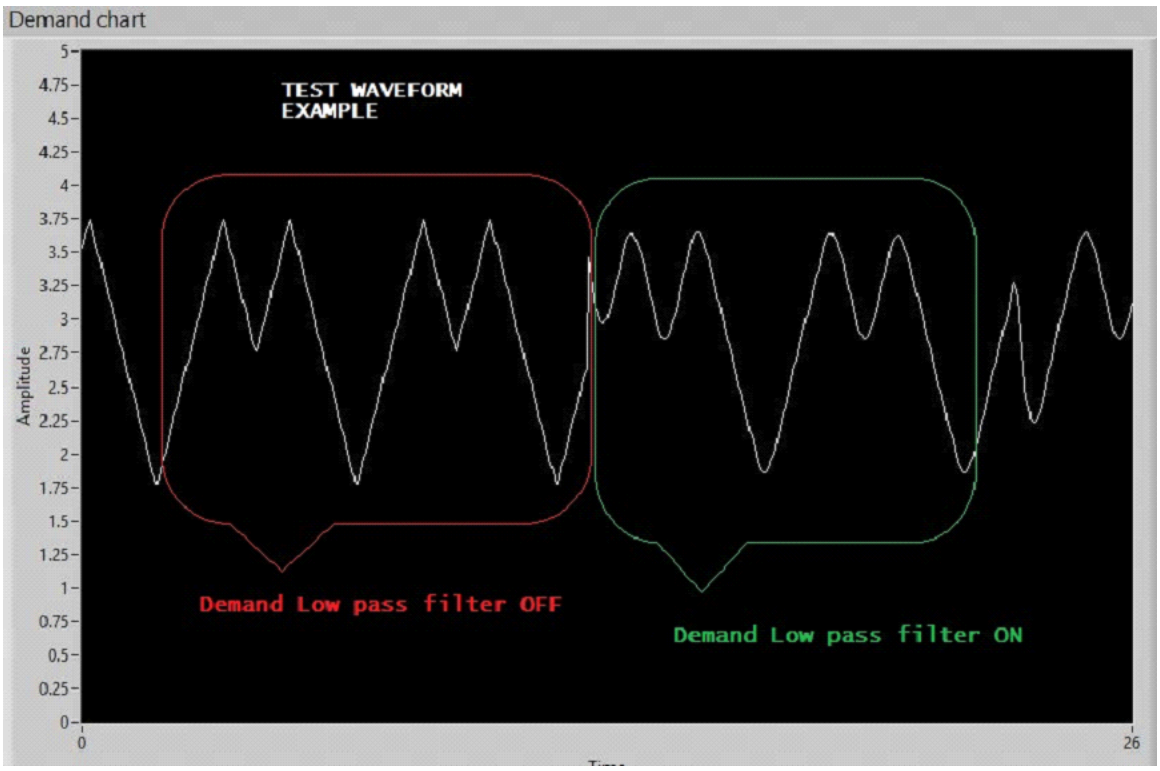
Also contrary, when using external voltage source at Ext.In., be sure you deactivated the Demand generator of internal Labjack card!



After activation of the demand generator, there are three options iplemented and display is showing last 30second of the generated demand in all three options:

- manual control by slide control
- example slow sine signal from 1V to 4V demand signal.
- user specific Waveform can be loaded. Select this variant and navigate to the file with the specific demand waveform. Then this signal will run and be repeated in cycles till the App is finished. There are basic information available on the page like run time and number of cycles elapsed. Format of the file: Labview Waveform. There are many ways how to efectively produce waveforms, see ni.com for options.

There is one neat option added. Low pass filter with cut frequency 1.5Hz applied to the signal. This option can be deactivated or activated by button. If activated, it smooth the response of actuators and is more gentle to the system. Helps UAD controllers to drive fast movements. see effect on example test waveform which is also attached in the package of files.



Application is terminated by button Exit in the right bottom corner.

Before exit, always deactivate the demand generation! Prevent possible onflict with ext.in. demand voltage.

Appendix:

LabVIEW_LJUD - LabVIEW drivers/examples for LabJackUD
support@labjack.com
November 21, 2014
Compatible with LabVIEW 7.1 or higher. Requires the
LabJack UD driver.

Note that National Instruments provides a driver called NI-DAQ
for their hardware. We have to provide our own driver, called
LabJack UD, for our hardware. LabVIEW can talk to either driver,
but realize that some NI tools like Measurement & Automation
Explorer and DAQ Assistant are part of NI-DAQ and thus do
not apply to LabJacks.

These VIs use the LabJackUD Driver for Windows. Before using
the VIs, you should look at Section 4 of the U3/U6/UE9 User's
Guide, and get an understanding of how the LabJackUD driver
interacts with the hardware:

http://www.labjack.com/downloads.php

This LabVIEW archive is kept as close as possible to all of
our other programming examples. At its core, LabVIEW is just
a graphical representation of C or similar, so although
Section 4 of the user's guides is written in a text syntax,
it maps very well to LabVIEW.

The downloadable zip file "LabVIEW_LJUD.zip" extracts to a single
folder called "LabVIEW_LJUD" which contains this readme file, a
.mnu file, and a few subdirectories. The folder can be stored
anywhere, but if you want icons to show up on the LabVIEW function
palette (after restarting LabVIEW), place this folder under:

...\national instruments\labview #\vi.lib\addons\

If the function palette icons are not required, a common place to
store this folder is ...\LabJack\examples\. We have found that most
people, including us, just do this. Instead of using palette icons
to select LabJack VIs, most people just:

1) copy and paste from examples,

... and

2) use the "Select a VI..." balloon from the function palette.

We recommend not having more than one copy of the VIs,and not changing

these VIs. Make a copy in a different directory if, for instance, you wish to modify one of the example VIs. If you download new VIs from labjack.com, delete and replace the entire LabVIEW_LJUD folder.

6000 is added to the LabJack errorcodes to shift them into the LabVIEW user range of 5000-9999.

The \LabJackUD DLL Functions\ directory contains simple VIs that do little more than call functions from the LabJackUD driver DLL.

The \Utility VIs\ directory contains VIs that encapsulate some useful functions. These will often be placed in a user's VI, and require an initial call to open a LabJack.

The \Examples\ directory has various examples. Generally these can be run stand-alone. Generally examples cannot be dropped into your program as a sub-VI. Rather, they demonstrate how to incorporate the driver sub-VIs in your VI, or serve as a starting point for your own VI.