

NI PCI-6133 Linux Installation Report

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1 What is needed?

- 4x PCI-6133 card [1] + RTSI cable [2]
- Linux driver for the NI PCI-6133 card → DAQmx version 8.0.2 (the latest one for Linux) [3].
- Operation system: As can be seen from DAQmx 8.0.2 README file, supported operating systems are Red Hat Linux and OpenSUSE. OpenSUSE system 11.2 was chosen.
- Hardware requirements of OpenSUSE 11.2 (minimal): Pentium III 500 MHz, 512 MB RAM, HDD: 3 GB (LabView Development System requires next 2 GB of HDD space)
- LabView Development System: It must be compatible with DAQmx [4]. The „newest” one is LabView 8.0.6 ¹.

2 Installation instructions

2.1 OpenSUSE 11.2 (90 minutes)

Download the OpenSUSE 11.2 from website [5]. Follow installation instructions in README file. It is recommended to update the system before LV installation.

2.2 LabView 8.6 Full Development System (30 minutes)

At present one installation DVD is stored in GOLEM room (NI (Czech Republic) provides the installation disc).

As root, run installer: `$ sh ./INSTALL`

If license agreement is show during installation press *Shift+ZZ* to exit editor and then press *y* to continue.

2.3 DAQmx 8.0.2 (20 minutes)

Download the DAQmx 8.0.2 from website [3].

Mount the .iso file: `$ mount -t iso9660 -o loop NIDAQmx802f0.iso <mount location>`

Go to the folder: `$ cd /mnt/`

As root, run installer: `$ sh ./INSTALL`

During the DAQmx installation two problems appeared. Both problems are solved on NI support webpage.

2.3.1 Kernel Source Error

The problem is described in detail on the website [6]. Following lines of code solved the problem:

```
$ zypper update
$ zypper install kernel-source kernel-devel kernel-headers kernel-syms gcc ...
... make glibc-headers glibc-devel
$ cd /usr/src/linux-<version>
$ zcat /boot/symvers-<version>.gz > Module.symvers
$ make cloneconfig
```

¹If writing code in newer LabVIEW version save the file using `Save for Previous Version`.

```
$ make modules_prepare
```

After these steps DAQmx installation should continue.

2.3.2 No installed files found

The problem is described in detail on the website [7]. Solution is to remove `dpkg` installer and use `rpm` installer instead of `dpkg`.

After these steps DAQmx installation should continue.

3 PCI-6133 Configuration

The cards are configured using `nidaqmxconfig` utility. Detailed description of DAQmx can be found on the website [8]. The RTSI cable is the only part of the system which must be configured:

- Export setup file from system to your working directory: `$ nidaqmxconfig --export myconfig.ini`
- Add information about RTSI cable to `myconfig.ini`: The following lines specify cards connected with RTSI cable
`[DAQmxRTSICable RTSICable0]`
`RTSI.ConnDevs = Dev1, Dev2, Dev3, Dev4`
- Import setup file to system: `$ nidaqmxconfig --import myconfig.ini`

4 Testing

Synchronization test of the PCI-6133 cards with RTSI cable was done. The AI4 channel on each card was connected to signal generator. Data acquisition with sampling frequency 2.5 MS/s was triggered by signal generator connected to PF01 input on one of the card. 10 μ s interval was acquired. No time shift between cards was observed on 10 microsecond scale as can be seen in figure 1.

References

- [1] National Instruments website, *NI PCI-6133 14-Bit, 2.5 MS/s/ch, Simultaneous Sampling Multifunction DAQ*, <http://sine.ni.com/nips/cds/view/p/lang/cs/nid/201937>
- [2] National Instruments website, *RTSI Bus Cables*, <http://sine.ni.com/nips/cds/view/p/lang/cs/nid/12631>
- [3] National Instruments website, *NI-DAQmx 8.0.2 - RedHat, SUSE*, <http://www.ni.com/download/ni-daqmx-8.0.2/2322/en/>
- [4] National Instruments website, *NI-DAQ and LabVIEW Version Compatibility (for Windows)*, <http://digital.ni.com/public.nsf/allkb/B0D5630C0A50D5C6862578E800459248>
- [5] OpenSuse mirror webpage, *openSUSE-11.2-KDE4-LiveCD-x86-64.iso*, <http://mirrors.vbi.vt.edu/mirrors/linux/opensuse/discontinued/distribution/11.2/iso/>
- [6] National Instruments website, *Kernel Source Error*, <http://digital.ni.com/public.nsf/allkb/369916CDA5B0336C86257BFE0069BB8A>

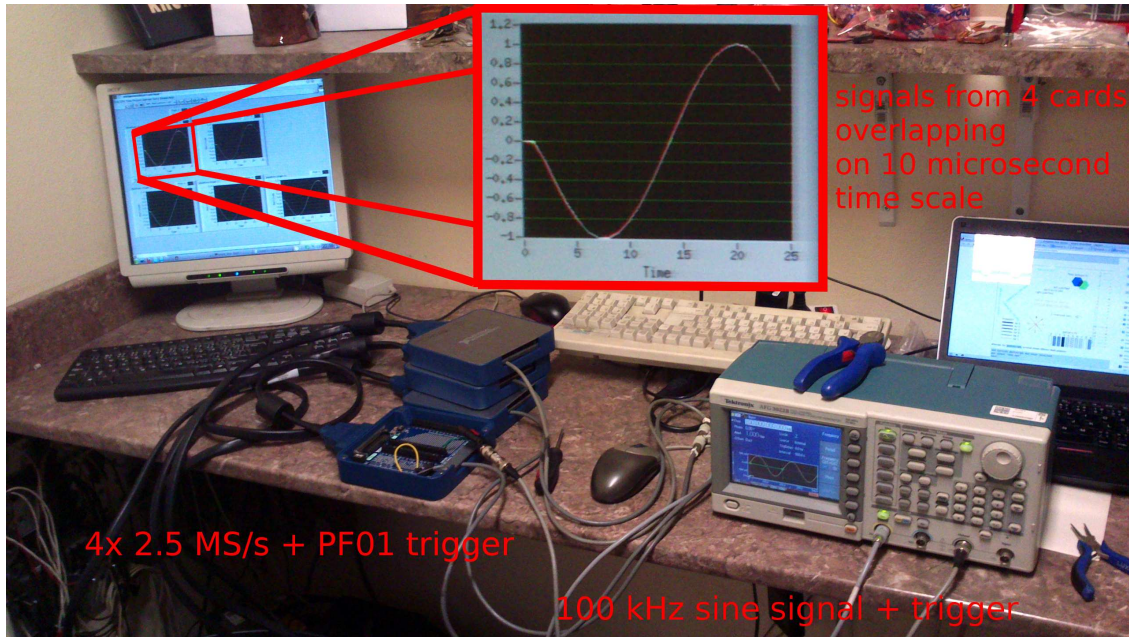


Figure 1: Synchronization test of four PCI-6133 cards using signal generator.

- [7] National Instruments website, *nilsdev and other utilities missing*, <http://forums.ni.com/t5/Multifunction-DAQ/Successful-SUSE-linux-and-DAQmx-install-nilsdev-and-other/td-p/1979595>
- [8] National Instruments website, *Using nidaqmxconfig for NI-DAQmx 8 for Linux*, <http://www.ni.com/white-paper/4620/en/>

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