GNU Radio and IIO Devices: gr-iio

Radio is a free & open-source software development toolkit that provides signal processing blocks to implement software radios or other generic processing. This articles focuses on using IIO based devices like PlutoSDR, AD-FMCOMMS2-EBZ, AD-FMCOMMS3-EBZ, AD-FMCOMMS4-EBZ, ARRADIOand AD-FMCOMMS5-EBZ within Radio itself. This support is currently provided in an out-of-tree (OOT) module called ***gr-iio***.

Linux Installation

Dependencies

gr-iio requires a few main dependencies:

- libiio
- libad9361
- Radio and its development packages
- swig (Optional for python support)

Since Radio can come from many different sources and with many different packages includes we will try to cover all the necessary dependencies but this can differ depending on packaging. If you have built and installed gnuradio from source yourself you should be good to go. Otherwise, consult the GNU Radio Wiki for further documentation on the development installation.

Most dependencies do have pre-built binaries available on github (libiio, libad9361) or can be build from source as below.

Download and build libiio

Libiio requires the following packages:

- libxml2
- libxml2-dev
- bison
- flex
- cmake
- git
- libaio-dev

Install with apt:

```
(sudo) apt install libxml2 libxml2-dev bison flex cmake git libaio-dev libboost-all-dev
```

If you want the documentation for the C you will require doxygen:

```
(sudo) apt install doxygen
```

If you want the backend add libusb support:

```
(sudo) apt install libusb-1.0-0-dev
```

If you want zeroconf add avahi support:

```
(sudo) apt install libavahi-common-dev libavahi-client-dev
```

Build and install libiio from source:

```
git clone https://github.com/analogdevicesinc/libiio.git
cd libiio
cmake .
make
sudo make install
cd ..
```

Download and build libad9361-iio

Build and install libiio from source:

```
git clone https://github.com/analogdevicesinc/libad9361-iio.git
cd libad9361-iio
cmake .
make
sudo make install
cd ..
```

GNU Radio and gr-iio

If you did not install libiio from source you will need the following packages as well:

- bison
- flex
- cmake
- git
- libgmp-dev

Install with apt:

```
(sudo) apt install bison flex cmake git libgmp-dev
```

For Radio 3.7+ to enable python support requires swig:

```
(sudo) apt install swig
```

GNU Radio 3.7

On Ubuntu 16.04 or newer Radio can be installed from the package management. The installed version should be compatible with the gr-iio package build from source. Libiio and gr-iio may also be available from the package management, but to get the latest and most feature complete work, it’s recommend to build it from the latest github sources.

```
git clone https://github.com/analogdevicesinc/gr-iio.git
cd gr-iio
cmake .
make
sudo make install
cd ..
```

```
sudo ldconfig
```

GNU Radio 3.8

Since Radio 3.8 is not fully mainstream across package managers 3.8+ support requires a non-master branch, specifically upgrade-3.8. To get Radio 3.8+ consult the GNU Radio wiki.

gr-iio in 3.8+ requires liborc-dev

```
(sudo) apt install liborc-dev
```

Build and install gr-iio from source:

```
git clone -b upgrade-3.8 https://github.com/analogdevicesinc/gr-iio.git
cd gr-iio
cmake .
make
sudo make install
cd ..
sudo ldconfig
```

Post installation

For 3.7, Radio will recommend you include

```
/usr/local/lib${type}/python${PYVER}/site-packages/gnuradio
```

or

```
/usr/local/lib${type}/python${PYVER}/dist-packages/gnuradio
```

in your PYTHONPATH during installation. If this is not the case you will need to modify the cmake command for the gr-iio configuration above with:

```
cmake -DCMAKE_INSTALL_PREFIX=/usr .
```

For 3.7, certain binary installs of Radio, python binding are placed in a competing folder to Radio's built-in blocks. This may require you to manually copy blocks between the /usr/lib and /usr/local/lib. If you receive import error for iio_swig this is likely the case. To remedy this move the blocks between the necessary folders:

```
cp -r /usr/local/lib/python2.7/dist-packages/gnuradio/iio
/usr/lib/python2.7/dist-packages/gnuradio/
```

This is due to the iio python blocks being placed in the gnuradio subfolder. This is required since the iio language binding for python would overwrite these blocks.

For 3.8, make sure the gr-iio swig interface is on your PYTHONPATH. Otherwise, you will get import errors in python. The common command would be (depending on and install location):

```
export PYTHONPATH=$PYTHONPATH:/usr/lib/python{PYTHON VERSION}/{site or dist}-
packages
```

The added path is the location of the newly installed **iio** folder.

On the ZedBoard / ZC702 / ZC706 / ZCU102

Radio and the gr-iio blocks are installed by default on the latest image. If you want to install Radio on your host consult the official GNURadio Wiki.