Installing UHD 4.8, GNU Radio 3.11, and RFNoC on Ubuntu 24.04.2 (VMware)

This guide walks you through installing the **latest UHD 4.8**, **GNU Radio 3.11**, and **RFNoC** support on **Ubuntu 24.04.2** running in **VMware**.

✅System Preparation

1. Install Dependencies

```
sudo apt update
sudo apt install -y \
  cmake g++ python3-dev python3-mako python3-numpy python3-gi \
  libboost-all-dev libgmp-dev swig libusb-1.0-0-dev \
  libfftw3-dev libcomedi-dev libcppunit-dev libgsl-dev \
  libqwt-qt5-dev libqt5svg5-dev python3-pyqt5 \
  liblog4cpp5-dev libzmq3-dev libsndfile1-dev \
  git pkg-config doxygen graphviz python3-sphinx \
  python3-lxml liborc-0.4-dev python3-setuptools
```

> ✅ **Note**: `python3-setuptools` is **required** to build the UHD Python components (e.g., `pyuhd`, `usrp_mpm`). If missing, `make` will fail at the final stages with a `ModuleNotFoundError`.

♒UHD 4.8 Installation (Latest)

2. Clone UHD 4.8 from Source

```
cd ~/src
git clone --branch UHD-4.8 https://github.com/EttusResearch/uhd.git
cd uhd/host
mkdir build && cd build
```

3. Configure UHD with RFNoC

```
cmake -DENABLE_RFNOC=ON ..
```

4. Build and Install UHD

```
make -j$(nproc)
sudo make install
sudo ldconfig
```

5. Download Firmware and FPGA Images

```
sudo /usr/local/lib/uhd/utils/uhd_images_downloader.py
```

🈳GNU Radio 3.11 Installation

6. Clone GNU Radio

```
cd ~/src
git clone --recursive https://github.com/gnuradio/gnuradio.git
cd gnuradio
```

7. Checkout GNU Radio 3.11 Branch

```
git checkout maint-3.11
git submodule update --init --recursive
```

8. Build GNU Radio

```
mkdir build && cd build
cmake -DENABLE_GR_UHD=ON -DENABLE_GR_FFT=ON -DENABLE_GR_ANALOG=ON \
      -DENABLE_GR_BLOCKS=ON -DENABLE_GRC=ON ..
make -j$(nproc)
sudo make install
sudo ldconfig
```

🧪 Testing UHD and GNU Radio

9. Verify UHD Installation

```
uhd_config_info
uhd_usrp_probe
```

You can confirm the UHD version from the output, e.g.:

```
[INFO] [UHD] UHD version: 4.8.0.x
```

10. Verify GNU Radio Version

```
gnuradio-config-info --version
```

This should return something like:

```
3.11.x
```

11. Verify RFNoC Support

```
uhd_usrp_probe | grep RFNOC
```

If RFNoC blocks are listed or not marked as disabled, RFNoC is properly built in.

12. Launch UHD FFT Tool

```
uhd_fft --args="type=usrp1" --freq=10e6
```

13. Start GNU Radio Companion

```
gnuradio-companion
```

Build a simple flowgraph with `UHD: USRP Source` and `QT GUI Sink` to verify.

🛑VMware USB Passthrough

14. Connect USRP to VM

- Shut down VM
- In VMware settings:
- Add USB Controller (2.0 or 3.0)
- Add USRP USB device
- Boot VM and verify with `uhd_find_devices`

☣️Optional: Set Environment Variables

15. Add to `~/.bashrc`

```
export PATH=/usr/local/bin:$PATH
export LD_LIBRARY_PATH=/usr/local/lib:$LD_LIBRARY_PATH
export PYTHONPATH=/usr/local/lib/python3/dist-packages:$PYTHONPATH
```

```
source ~/.bashrc
```

✅Summary

Component	Version	Status
Ubuntu	24.04.2	✅Installed
UHD	4.8.x	✅From source
GNU Radio	3.11.x	✅From source
RFNoC	Enabled	✅Verified
VMware USB	Yes	✅Connected

For questions or troubleshooting, refer to:

- Ettus UHD Docs
- GNU Radio Wiki