

# Pluto SDR

This repo is a compilation of code and resources for the ADALM-PLUTO SDR module for project research of the beamforming concept. The code in the testCode folder has been compiled from other sources as working skeleton code for the AD936x Transceiver for testing purposes.



[Image Source](#)

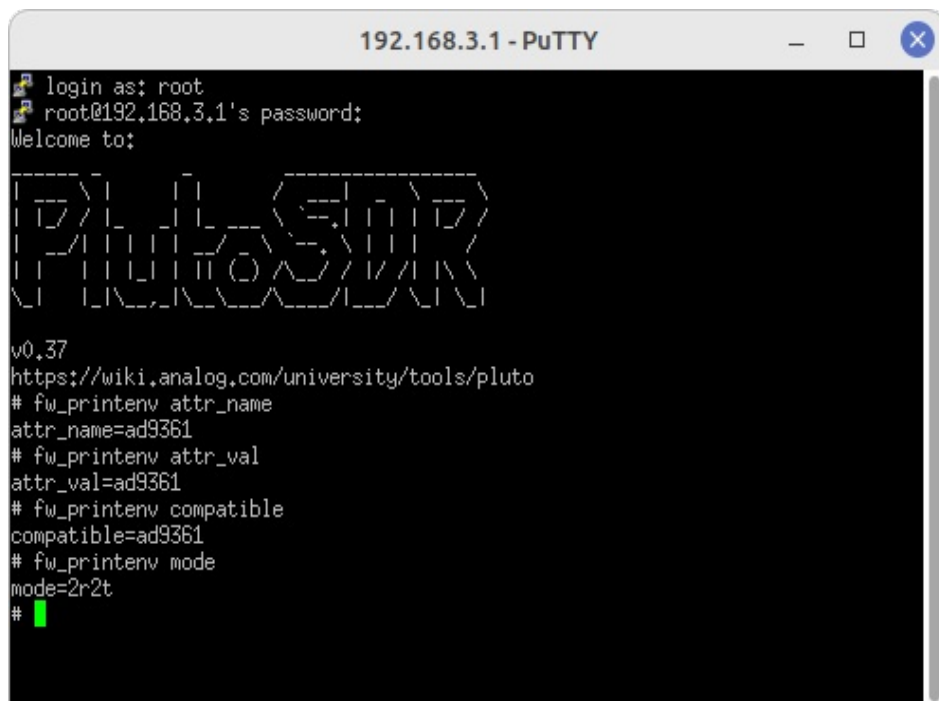
## TX / RX Modification Screenshots:

Pluto Settings for TX and RX Modifications:

```
192.168.3.1 - PuTTY
login as: root
root@192.168.3.1's password:
Welcome to:

  PLUTO SDR
  v0.37
https://wiki.analog.com/university/tools/pluto
# fw_setenv attr_name compatible
# fw_setenv attr_name ad9361
# fw_setenv compatible ad9361
# fw_setenv mode 2r2t
# reboot
```

Verify Updated Firmware & Modified Settings. Note that `root` password = `analog`



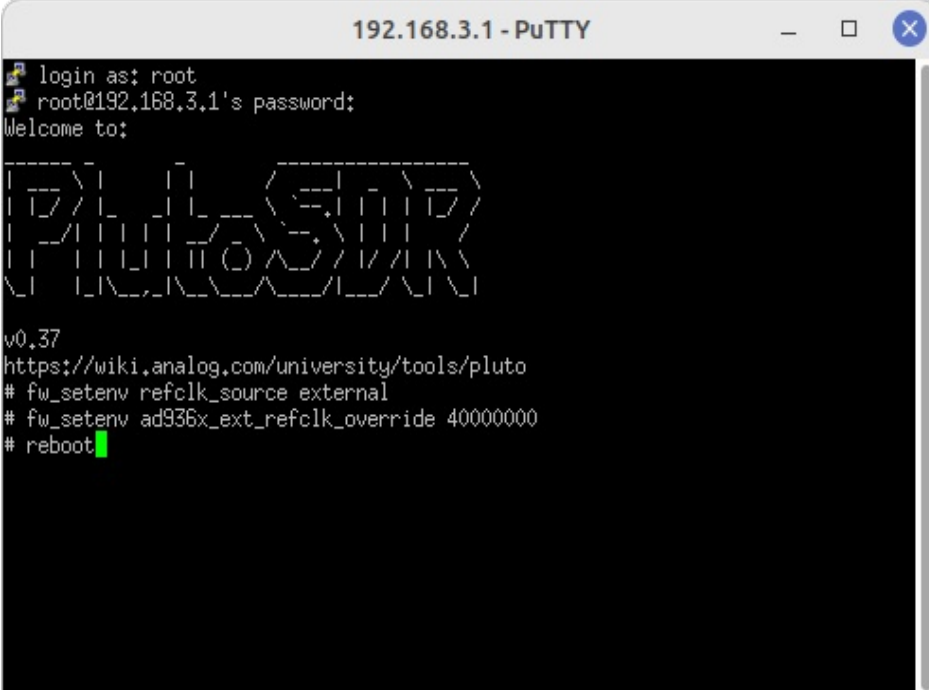
```
192.168.3.1 - PuTTY
login as: root
root@192.168.3.1's password:
Welcome to:

      PLUTO
      v0.37
      https://wiki.analog.com/university/tools/pluto
      # fw_printenv attr_name
      attr_name=ad9361
      # fw_printenv attr_val
      attr_val=ad9361
      # fw_printenv compatible
      compatible=ad9361
      # fw_printenv mode
      mode=2r2t
      #
```

## External Clock Source Modification Screenshots:

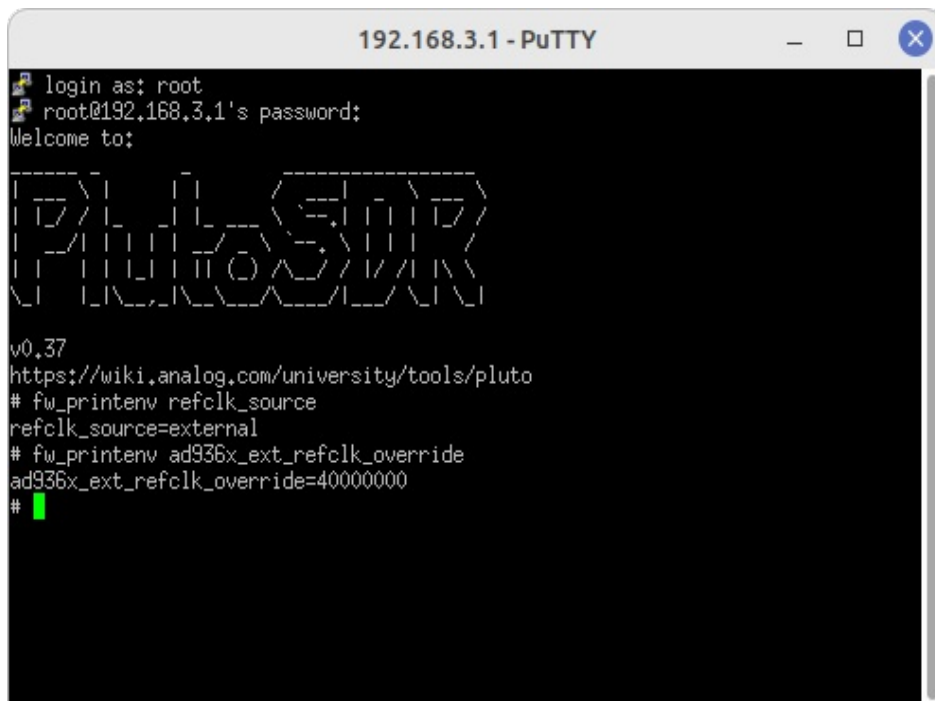
Please note: - The PlutoSDR being modded in this case MUST HAVE A u.FL on the board for an external clock source!! - Make sure to check. The early revision PlutoSDRs did not have them.

Pluto Settings to accept an external 40MHz clock source:



```
192.168.3.1 - PuTTY
login as: root
root@192.168.3.1's password:
Welcome to:
-----
PLUTO
-----
v0.37
https://wiki.analog.com/university/tools/pluto
# fw_setenv refclk_source external
# fw_setenv ad936x_ext_refclk_override 40000000
# reboot
```

Again, Verify the changed settings:

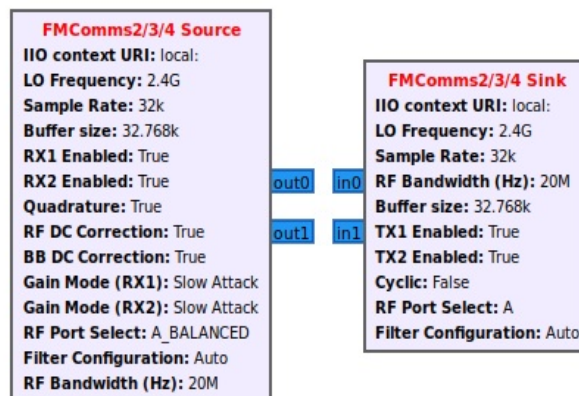


```
192.168.3.1 - PuTTY
login as: root
root@192.168.3.1's password:
Welcome to:

  PLUTOSDR
  v0.37
  https://wiki.analog.com/university/tools/pluto
# fw_printenv refclk_source
refclk_source=external
# fw_printenv ad936x_ext_refclk_override
ad936x_ext_refclk_override=40000000
#
```

## Using a PlutoSDR with GNU Radio

If the PlutoSDR in use has the 2 Channel Tx & 2 Channel Rx Modification: To access all channels use the following blocks: - FMComms2/3/4 Sink - FMComms2/3/4 Source - See Screenshot from GNU Radio Companion:



## Resources:

Enable Dual Receive, Dual Transmit and Expand Tuning Range to 0.7 - 6.0GHz for Rev C and newer Pluto SDR: - Video: [Enable Dual TX & Dual RX](#) - Code: [Jon Kraft: Pluto SDR Labs](#) - Settings Table: [Environmental Settings](#) - Use [PuTTY](#) for Windows or a Terminal in Linux for shell access. - In my case, I connected via the serial COM port with PuTTY in Linux Mint.

Coding Docs: - [Pluto SDR in Python](#)

Pluto SDR Tools and Overview: - [Overview and Introduction](#) - [ADALM-Pluto for End Users](#)

Pluto SDR Quick Start Drivers & IIO Scope: - [Quick Start Resources](#) - [Lib-IIO drivers for IIO Scope](#)

Pluto SDR Firmware Updates: - [Pluto/M2k Firmware](#)

DIY Phased Array using Pluto SDR: - Video: [Build Your Own Phased Array Beamformer](#) - Video: [Monopulse Tracking with a Low Cost Pluto SDR](#) - Video: [Implementing Time Delay For a Low Cost Digital Beamformer](#) - Code: [Jon Kraft: Pluto Beamformer](#) - Video: [Phased Array Beamforming: Understanding and Prototyping](#) - Code: [Jon Kraft: Phased Array Workshop](#) - Video: [Jon Kraft: Rapid Phased Array Prototyping](#)

PyADI-IIO: Python for ADI Industrial I/O Devices: - Web Docs: [AD936x Hardware](#) - Code: [Examples](#), [Test](#), [RF](#) Folders.

ADI Kuiper Linux for Raspberry Pi (Debian 10 Buster): - [Information and Downloads](#) - [Pre-Configured Image](#)

Basic Raspberry Pi Install From Scratch: - [RPi 3B+ Bare Install](#)

Also see the informational documents posted in the [assets-docs](#) folder of this repo.