

OpenCPI plutosdr_rx.rcc Test App Guide

OpenCPI Release: v2.3.4

Revision History

Revision	Description of Change	Date
v1.7	Initial release.	04/2020

1 Description

This application is intended to perform a hardware-in-the-loop test of the plutosdr_rx.rcc worker. It tests to ensure that the default values and the expected possible min/max values are applied successfully for the various RF frontend parameters. It also tests that plutosdr_rx.rcc property writes do not override the plutosdr_tx.rcc worker property writes when both exist in the OAS. Note that RX data fidelity is not verified within this test.

2 Hardware Portability

This application is intended to test plutosdr_rx.rcc, which is by design specific to the plutosdr platform.

3 Execution

3.1 Prerequisites

The following must be true before application execution:

- The OpenCPI plutosdr platform is available.
- The following assets are built for the HDL/RCC platform which correspond to the intended HDL/RCC runtime containers, and their build artifacts (FPGA bitstream file/shared object files) are contained within the directory list of the OCPI_LIBRARY_PATH environment variable.
 - empty assembly with one of the *plutosdr* containers for the desired HDL platform
 - plutosdr_rx.rcc for plutosdr TYPE_p configurations
 - plutosdr_tx.rcc for plutosdr TYPE_p configurations
 - ad9361_config_proxy.rcc
- The application itself (plutosdr_test) must be built.
- The current directory is the applications/plutosdr_rx.test directory.

3.2 Command(s)

The full test is run with the following command:

```
./<target-dir>/plutosdr_rx_test
```

A software-only test can be run which performs testing on the plutosdr_rx.rcc software calculation routines (no hardware actuation).

```
./<target-dir>/plutosdr_rx_test swonly
```

4 Verification

An application exit status of 0 indicates success, and non-zero indicates failure. Either PASSED or FAILED will also be printed to the screen.

5 Troubleshooting

The application will occasionally fail with the following printed to screen:

```
variable: actual_ad9361_config_proxy_val, expected value: 2083340, actual value: 2083340 \
EXPECTED
Calibration TIMEOUT (0x16, 0x10)
Exception thrown: Worker ad9361_config_proxy produced error during execution: \
ad9361_set_tx_sampling_freq() returned: -110
FAILED
```

The plutosdr_rx.rcc endpoint proxy controls the ad9361_config_proxy.rcc device proxy which wraps the ADI No-OS library for SPI command/control of the AD9361. A known defect of the AD9361 hardware/No-OS library is that the AD9361 hardware will occasionally fail to calibrate when No-OS sets low sample rate values (such as 2083340 sps in example above), resulting in a calibration timeout. When this occurs, No-OS prints to the screen:

```
Calibration TIMEOUT (0x16, 0x10)
```

Neither of the ad9361_config_proxy.rcc/plutosdr_rx.rcc workers yet implement a mechanism for overcoming this AD9361/No-OS shortcoming.