

# OpenCPI

## fmcomms\_2\_3\_rx.rcc Test App Guide

OpenCPI Release: v2.3.4

*Revision History*

| Revision | Description of Change | Date   |
|----------|-----------------------|--------|
| v1.4     | Initial release.      | 9/2018 |
| v1.5     | Version bump only.    | 4/2019 |

## Table of Contents

|          |                             |          |
|----------|-----------------------------|----------|
| <b>1</b> | <b>Description</b>          | <b>4</b> |
| <b>2</b> | <b>Hardware Portability</b> | <b>4</b> |
| <b>3</b> | <b>Execution</b>            | <b>4</b> |
| 3.1      | Prerequisites . . . . .     | 4        |
| 3.2      | Command(s) . . . . .        | 4        |
| <b>4</b> | <b>Verification</b>         | <b>4</b> |
| <b>5</b> | <b>Troubleshooting</b>      | <b>4</b> |

# 1 Description

This application is intended to perform a hardware-in-the-loop test of the fmcomms\_2\_3\_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 fmcomms\_2\_3\_rx.rcc property writes do not override the fmcomms\_2\_3\_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 fmcomms\_2\_3\_rx.rcc, which is by design specific to the FMCOMMS2/3 cards. There is nothing about the application that precludes use of any particular HDL platform, assuming that platform includes an FMC slot on which an FMCOMMS2/3 card may be used.

# 3 Execution

## 3.1 Prerequisites

The following must be true before application execution:

- An OpenCPI platform is available w/ an FMCOMMS2 or FMCOMMS3 card plugged into its FMC slot.
- 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 \*fmcomms\_2\_3\* containers for the desired HDL platform
  - fmcomms\_2\_3\_rx.rcc for all TYPE\_p configurations (both fmcomms2 and fmcomms3)
  - fmcomms\_2\_3\_tx.rcc for all TYPE\_p configurations (both fmcomms2 and fmcomms3)
  - ad9361\_config\_proxy.rcc
- The application itself (fmcomms\_2\_3\_rx\_test) must be built.
- The current directory is the applications/fmcomms\_2\_3\_rx\_test directory.

## 3.2 Command(s)

The full test is run with the following command:

```
./<target-dir>/fmcomms_2_3_rx_test
```

A software-only test can be run which performs testing on the fmcomms\_2\_3\_rx.rcc software calculation routines (no hardware actuation).

```
./<target-dir>/fmcomms_2_3_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 fmcomms\_2.3\_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/fmcomms\_2.3\_rx.rcc workers yet implement a mechanism for overcoming this AD9361/No-OS shortcoming.