N-Channel Scalable Coherent Transceiver
Coherent transceiver family based on the ADALM-PLUTO SDR

TR0x is an N-channel scalable coherent transceiver that employs the ADALM-PLUTO SDR transceiver in order to create inexpensive multi-channel systems. Reconfigurable design techniques deliver high system performance, flexibility and small board space requirements. All these factors enable the use of the TR0x in many new, previously unavailable application scenarios.

Key Features and Benefits

| Scalability from 2 up to 64 and more channels |
| Integrated common TCXO 10/40 MHz, 25 ppm. Higher precision, e.g. 0.1, 0.5, 1.0, 2.0 ppm, available on request. |
| Identical form-factor |
| Cost effective open source software |
| GNU Radio and MATLAB integration |

Configuration

N adapted PLUTO-SDR transceiver

(N) - Pigtailed

CLK_CARD

EXP_CARD (optional)

Applications

- Coherent receiving
- Signal decoding improvement
- Passive radars
- Radiolocation and Earth exploration
- Synchronized receiving on the different frequencies
- Direction finding (pseudo-Doppler and Watson-Watt technique)
- Radio telescope (high sensitivity wide-band pulsar detection)
- Multi-baseline interferometer observations and analysis
- Massive MIMO

Description

We offer different models of multi-channel coherent transceivers to meet your requirements. The current realization of the single channel transceiver is based on the RTL-SDR from Realtek (receiver only) and ADALM-PLUTO SDR from Analog Devices. We plan to add support of other single channel receivers in the future. All our models have been designed to be as flexible as possible using integrative construction components, thereby, a
configuration change of the whole system (e.g. number of channels, addition of different filters, converters etc.) easily possible. Every coherent transceiver has an integrated extension card that provides flexible and expandable connectivity for specific applications.

Moreover, we provide different types of extension cards for the RTL2832U (or RTL2832U-shields) and ADALM-PLUTO SDR. These cards either enhance the characteristics of the single channel receiver (e.g. Filter or Band Extensions), or are used as building blocks to construct the coherent receivers/transceiver (e.g. Clock or Expansion Cards).

The TR0xs are available in varied configurations. The figure below presents the sample configurations for the implementation of the coherent transceiver up to 8 channels using the PLUTO-SDR radio module and the CLK_CARD_PLUTO (Clock card Pluto). The clock card supports two operational modes:

- synchronisation from an external source, e.g. 10 MHz
- synchronisation from an internal source, e.g. standard TCXO 10/40 MHz

**CLR_CARD_PLUTO 40 MHZ**
**CLK_CARD_PLUTO 10 MHZ**

![CLC_K_CARD_PLUTO_10_MHZ](image)

**ADALM-PLUTO SDR modification**

![ADALM-PLUTO_SDR_MODIFICATION](image)
Technical characteristics (per channel)

- ADC and DAC resolution: 12 bit
- One transmitter and one receiver
- Half or full duplex
- Clock: 10/40 MHz
- Temperature compensated oscillator (TCXO): 25 PPM. Higher precision, e.g. 0.1, 0.5, 1.0 ppm, available on request.
- Female antenna port: SMA
- 325 MHz - 3800 MHz (70 MHz – 6000 MHz on early releases)
- USB 2.0 interface; USB powered
- GNU Radio and MATLAB integration
- Operation temperature: -10 to 60 °C

Contact

For more information regarding our N-channel scalable coherent transceiver family please visit www.coherent-receiver.com.