NAMC-SDR

8 Antenna Radio Head

The NAMC-SDR is a flexible software defined radio (SDR) platform for developing, prototyping and testing 5G massive multiple input, multiple output (MIMO and M-MIMO) base station transceiver (BTS) systems and proprietary or standard implementations of UMTS, LTE / LTE-Advanced systems, as well as a variety of applications ranging from cognitive radios to resilient security networks.

We have collaborated with Fraunhofer Heinrich Hertz Institute (HHI) to integrate IDT's IQ compression technology, enabling mobile operators to realize up to three times the effective bandwidth on the optical link in a BTS. The NAMC-SDR can easily scale up to dozens of antennas on the access link, providing higher data rates by advanced beamforming techniques. The NAMC-SDR can also connect to the NAT NAMC-ODSP for baseband processing and be integrated with other NAT products to provide a complete BTS infrastructure solution in-a-box.

Key features

- Flexible software defined radio platform
- Stacked digital interface card and radio frequency front-end
- 2, 4, 6 or 8 transceivers
- CPRI compression technology enables up to 3X effective bandwidth
- 4 X 10 Gbps optical baseband interface with QSFP connector
- 2X 1Gb Ethernet interface
- AMC form factor

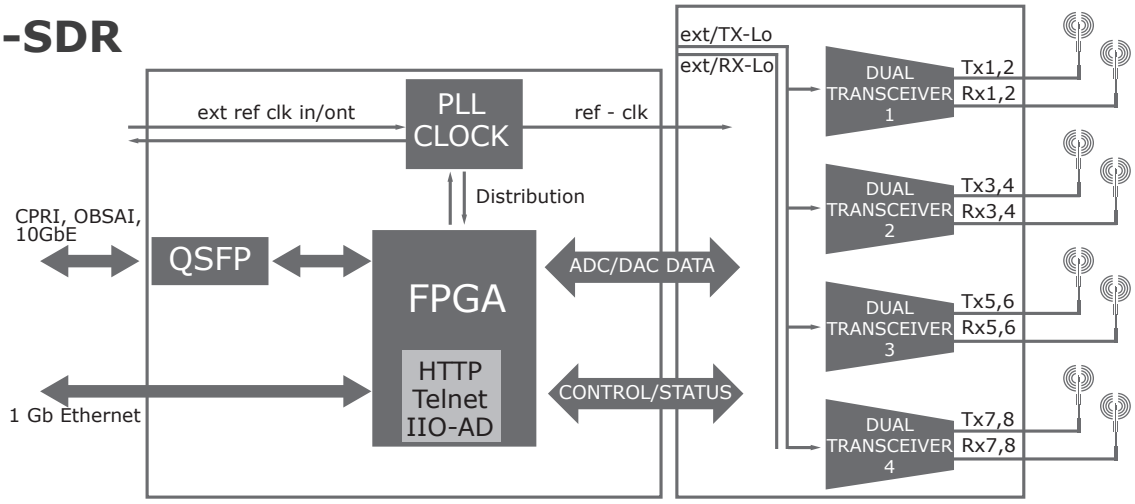
Applications

- 5G base station prototyping
- Massive multiple input, multiple output (MIMO) base station systems
- Supports all LTE bands
- Support for CPRI, OBSAI, 10 GbE
- Smart repeaters
- Frequency scanners

N.A.T. GmbH | Konrad-Zuse-Platz 9 | 53227 Bonn | Germany | Fon: +49 228 965 864 0
info@nateurope.com | www.nateurope.com

Technical Data

NAMC-SDR



Overview

The NAMC-SDR is an eight antenna radio head that provides a flexible software defined radio (SDR) platform for prototyping 5G network base stations and other massive multiple input, multiple output (MIMO) base station transceiver (BTS) systems.

Consisting of a stacked digital interface card and a radio frequency front-end, the NAMC-SDR supports different communication standards with variable signal bandwidths, carrier frequencies and transmit power.

Digital Board

- Xilinx Zynq XC7Z045-2FFG900C AP SoC, consisting of an integrated processing system (PS) and programmable logic on a single die
- The Zynq AP SoC uses a multi-stage boot process that supports both a non-secure and a secure boot
- 1 Gb 32-bit wide DDR3 SDRAM (8X 256 MB x 4 SDRAMs)
- 2X 256 Mbit Quad SPI-Flash for non-volatile storage
- Clock synthesizer, clock jitter attenuator and clock distribution network
- The board provides access to 12 GTX transceivers:
  - Eight of the GTX transceivers are wired to the MicroTCA backplane
  - Four of the GTX transceivers are wired to the QSFP Module connector (QSFP1)
- 4 x 10 Gbps optical lanes for CPRI and 10 GbE to the front panel via QSFP (accepts QSFP or SFP+ modules)
- Marvell Alaska PHY provides 10/100/1000 Mb/s Ethernet communications
- Silicon Labs USB-to-UART bridge device allows connection to host computer through USB connector
- Programmable logic JTAG connector
- 1X SD card slot available, memory extension up to 64 Gbyte, bootable

Analog Board

- Up to 4x AD9361 RF agile transceiver devices each supporting two antennas
- Each transceiver can be fully synchronized up to 4 GHz
- Integrated ADCs/DACs
- Tunable carrier frequency between 70 MHz and 6 GHz
- Up to 56 MHz analog bandwidth
- Noise figure < 2.5 dB
- Each receive (RX) subsystem includes independent automatic gain control (AGC), dc offset correction, quadrature correction, and digital filtering, thereby eliminating the need for these functions in the digital baseband.

Specifications

- 2x2, 4x4 or 8x8 MIMO duplex operation
- Wide carrier frequency range from 70 Mhz up to 6 GHz
- Different clock reference sources
  - Receive and transmit local oscillators referenced on recovered optical interface clock or external clock reference
  - Full synchronized radio frequency and baseband oscillators
- FDD and TDD operation
- Variable bandpass RF filter
- Supporting CPRI 4.1, OBSAI, 10 GbE
- Maximal output power (RMS, CW) of 0 dBm at 2.6 Ghz
- External power amplifiers depending on carrier frequency
- External duplex components such as SAW filters, diplexers and/or TDD switches
- Configurable via optical control and management (C&M) channel, USB or web interface
- Embedded Linux operating system

Power Levels
- Maximum TX Output Power (1 MHz tone into 50 Ω load)
- 8 dBm @800MHz
- 7.5dBm @2.4GHz
- 6.5dbm @5.5GHz
- RF Inputs (Peak Power), Absolute Maximum rating: 2.5 dBm

Received Signal Strength (RSSI)
- Range 100 dB
- Accuracy ±2 dB

RX Gain
- Minimum 0dB
- Maximum
- 74.5 dB @ 800 MHz
- 73.0 dB @ 2.3GHz
- 65.5 dB @ 5.5GHz

Isolation
- RX1 to RX2, RX3 to RX4, RX5 to RX6, RX7 to RX8Isolation
- 70dB @ 800MHz
- 65dB @ 2.4GHz
- 52db @ 5.5GHz
- TX1 to TX2, TX3 to TX4, TX5 to TX6, TX7 to TX8 Isolation
- 50dB @ 800MHz
- 50dB @ 2.4GHz
- 50db @ 5.5GHz

Frequency Stability
- TRx8Mod in standalone mode uses onboard reference oscillator (Connor-Winfield T602-30.72M, temperature compensated crystal oscillator) frequency stability: +/- 0.28ppm @ 30.72MHz (i.e. +/- 672Hz @ 2.4GHz)
- TRx8Mod in RRH mode (TRx8Mod connected to a baseband module or eNB over CPRI): frequency stability depends on baseband module/eNBs built in reference oscillators (reference clock will be recovered from CPRI connection)

Regulatory Compliance
- 2006/95/EC, Low Voltage Directive (LVD)
- 2004/108/EC, Electromagnetic Compatibility (EMC) Directive
- EN 55022:2010, EN 55024:2010
- Class A product
- IEC 60950-1:2005
- EN 60950-1:2006