Software Defined Radio Framework (SDRF)

Flexible SDR hardware and software solutions for custom waveform development

The cellXica Software Defined Radio Framework (SDRF) provides a set of hardware features, APIs, libraries and tools for the development of custom waveforms, modems and associated higher layer software.

The SDRF is currently available on cellXica’s SC5 range of Software Defined Radios. The SC5 hardware and SDRF are a robust and mature combination; large numbers of LTE/UMTS small cells built on this technology have been deployed commercially since 2013.

Xilinx Zynq device
- Two Cortex-A9 CPU cores
- Kintex programmable logic

Wideband RFIC
- 70 MHz - 4 GHz
- 40 MHz bandwidth

Real-Time CPU Core
- Lightweight, fully pre-emptive real-time operating system
- Optimised for high performance interworking with Linux core
- Tightly integrated with programmable logic (4 Gbps throughput)

Linux CPU Core
- Full 3.x Linux kernel
- SSH, VPN and firewall support

Common Services
- APIs for memory management, messaging, timers, logging and programmable logic access
- Consistent software APIs across both cores
- Programmable logic RTL for clocks and RFIC, memory and CPU interfaces
- Radio driver
- Configuration database with up/downgrade capability

Development Tools
- Command Line Interface (CLI) for human/M2M control and event reporting
- High Speed Logger (HSL) for efficient real-time trace and debug
- Real-Time Monitor (RTM) for off-target bulk data transfer and display
- Real-time OS task monitor and profiler
- Build and deployment tools

Other features are supported, depending on the SC5 hardware variant:
- GPS receiver
- USB (e.g. for WiFi and mass storage support)
- Battery powered operation and charging
- GPIO
**SDR DEVELOPMENT PLATFORM**
- SC5020-based development platform
- Integrated battery and charger
- Power supply: 8.5 – 16 V DC
- Application-specific keypad and 20x4 display
- 2 TX + 2 RX antenna connectors (4 x SMA)
- 10 MHz reference out (BNC)
- Test equipment trigger out (BNC)
- GPS antenna connector (SMA)

**GENERAL PURPOSE MODULE**
- Frequency agile: 70 MHz – 4 GHz
- RF antennas: 2x2 MIMO external (4 x SMA)
- RF output power: +15 dBm (max)
- Dimensions: 120 mm x 75 mm x 19 mm
- Power supply: 6.5 – 16 V DC
- GPS: External antenna (MMCX)
- USB: Type-A Socket

**SMALL CELL MODULE**
- EU (5-band) and US (6-band) variants:
  - EU: Bands 1, 3, 7, 8 and 20
  - US: Bands 2, 4, 5, 7, 12 and 13
- Optional additional frequency agile (70 MHz – 4 GHz) RF path
- RF antennas: 2x2 MIMO external (4 x MMCX)
- RF output power: +15 dBm (max)
- Dimensions: 160 mm x 123 mm x 19 mm
- Power supply: 6.5 – 16 V DC
- GPS: External antenna (MMCX)
- USB: Type-A Socket

**ULTRA PORTABLE**
- Frequency agile: 70 MHz – 4 GHz
- RRF antennas: 1x1 MIMO switchable on-board / external (2 x UFL)
- RF output power: +15 dBm (max)
- Dimensions: 110 mm x 62 mm x 12 mm
- Power supply: 4.7 – 16 V DC via micro-USB
- Optional 3.6V Li-Ion battery with on-board charging
- GPS: External antenna (MMCX)
- Motion sensor
- Real-time clock

**6-CHANNEL RECEIVER**
- 6-channel phase coherent receiver
- Suitable for angle-of-arrival (AoA) applications
- Frequency agile: 70 MHz – 4 GHz
- RF antennas: External high/mid/low frequency per channel (18 x SMC)
- Self-calibration circuitry on-board
- Dimensions: 155 mm x 120 mm x 19 mm
- Power supply: 6.5 – 28V DC
- GPS: External antenna (SMC)