

RF Receiver/Transceiver Integration Services

Services

Building “RF to Ethernet” Solutions
From Spectrum’s SDR Platforms



Benefits

- Rapidly integrate Spectrum’s off-the-shelf modems with a variety of radio frequency (RF) receivers/transceivers (including custom designs) that saves up to 6 months of integration effort
- Reduce your resource burden for non-core development and integration and immediately begin development with a complete RF to Ethernet solution
- Leverage Spectrum’s extensive integration experience to mitigate schedule and technical risk

Applications

Ideal for software defined radio (SDR) platforms requiring an RF front-end, such as military communications (MILCOM) and satellite communications (SATCOM) applications:

- Deployable Tactical Communications Systems
- Satellite Gateways and Terminals
- Signals Intelligence Systems
- Rapid-Prototyping and Development Systems

Features

- Integration services from Spectrum Application Engineering Services team, experts in wireless subsystem design for defense applications
- Support can be provided for various multiple access schemes, including Time Division, Frequency Division and Code Division
- Frequency Hop capability
- Time tagging/scheduling resolution greater than 0.5 nanosecond resolution
- Doppler calculation/correction
- Remote configuration and reporting
- Spectrum hardware abstraction to a set of application programming interfaces (APIs) that facilitates ease-of-use
- Component device abstraction for operation in the Software Communications Architecture (SCA) (optional)
- Enhance image rejection due to co-design of RF, IF and baseband filtering
- Ability to work on ITAR and DoD-controlled projects
- RF control library with standardized APIs

Description

Spectrum’s Applications Engineering and Services (AES) team has extensive experience integrating its commercial off-the-shelf (COTS) Software Defined Radio (SDR) subsystems to various COTS RF receivers and transceivers. Spectrum’s integration services has saved customers up to 6 person months of effort. Spectrum understands how to optimize its SDR subsystems to help meet application-specific requirements and can assist with system design to tailor to specific parameters such as IF, frequency plans, sample rates, integration of control interfaces and testing of integrated systems.

Spectrum’s RF receiver/transceiver integration services will accelerate your prototyping and development activities. In addition to the physical integration, Spectrum has developed a core set of flexible and configurable software and field programmable gate array (FPGA)-based radio control components that enable communications signal processing and waveform development. The infrastructure components abstract the RF subsystem and are presented to the user as a set of APIs which makes programming the Spectrum platform easier. The APIs enable the developer to receive and transmit continuous or burst signal types such as Time Division Multiple Access (TDMA), Frequency Division Multiple Access (FDMA), Code Division Multiple Access (CDMA) and Frequency Agile signals.

The core of the infrastructure components consist of optimized and fully programmable up and down converters and a time event engine. The up/down converters have programmable interpolation/decimation factors and filter taps to control bandwidth. Typical tuning resolution in RF units is large relative to the fine resolution required by modems. Spectrum has developed a solution that allows the center frequency, as programmed by the user, to decompose into coarse and fine adjustments which are then sent to the RF and up/down converters respectively to achieve the required effect. If known a priori, tables of center frequencies and attenuation pairs can be entered for frequency agile signals.

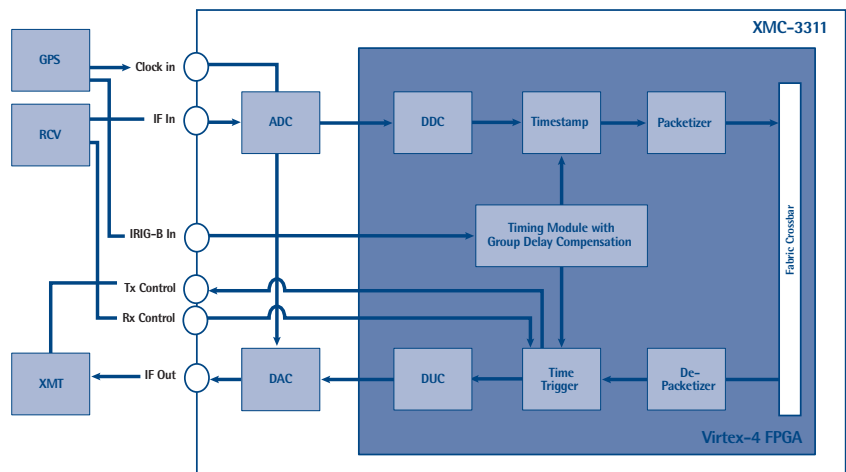


Figure 2. Example Implementation

The time event engine runs synchronously with the sample clock that is driven by an external GPS time frequency reference's IRIG-B and 10 MHz signals. The Time of Day and 1 Pulse Per Second (PPS) references are derived from a GPS IRIG-B input signal. The 10 MHz reference is phase locked to the local oscillator of the RF units and the sample clock of the SDR. The sample clock also drives a set of counters which are used as an offset from the 1 PPS for high resolution time for data tagging and transmission scheduling.

The developer initializes and dynamically controls the radio control components through APIs from a general purpose processor or digital signal processor. The processor sends and receives packets of time stamped 16 bit complex samples. Multi-channel configuration transceivers or receivers are also supported.

Spectrum can rapidly integrate its off-the-shelf modems with a variety of RF receivers/transceivers (including custom designs) that saves your team up to 6 months of integration effort. This can reduce your resource burden for non-core development and integration and allow your team to immediately begin development with a complete RF to Ethernet solution

[Customization]

Spectrum's Application Engineering Services team can integrate any of its SDR platforms (3U and 6U CompactPCI, PCI/PCI-X, VME) to any COTS or custom RF receiver/transceiver based on your application requirements. They will help you map your application requirements to the platform and tailor the platform to your specific needs. In addition, the team has extensive SCA expertise and can develop application software/firmware components to speed your time to deployment. Specific off-the-shelf application components and customization supports:

- QPSK modulation/demodulation
- TDM/TDMA processing
- WCDMA processing
- FPGA or software based polyphase resampling
- FSK modulation/demodulation
- FFT
- Frequency hopping
- Doppler calculation/correction
- SCA development
- Waveform component development
- System examples

[Ordering Information]

For more details on RF receiver/transceiver integration and other AES services, please contact your Spectrum sales representative.

- SERVICES-804 Application Engineering Services IV
- SERVICES-805 Application Engineering Services III
- SERVICES-806 Application Engineering Services II
- SERVICES-807 Application Engineering Services I
- SERVICES-808 Program Management Services
- SERVICES-809 Project Management Services
- SERVICES-801 Senior Industry Services
- SERVICES-802 Principle Engineering Services
- SERVICES-803 System Architect Services