

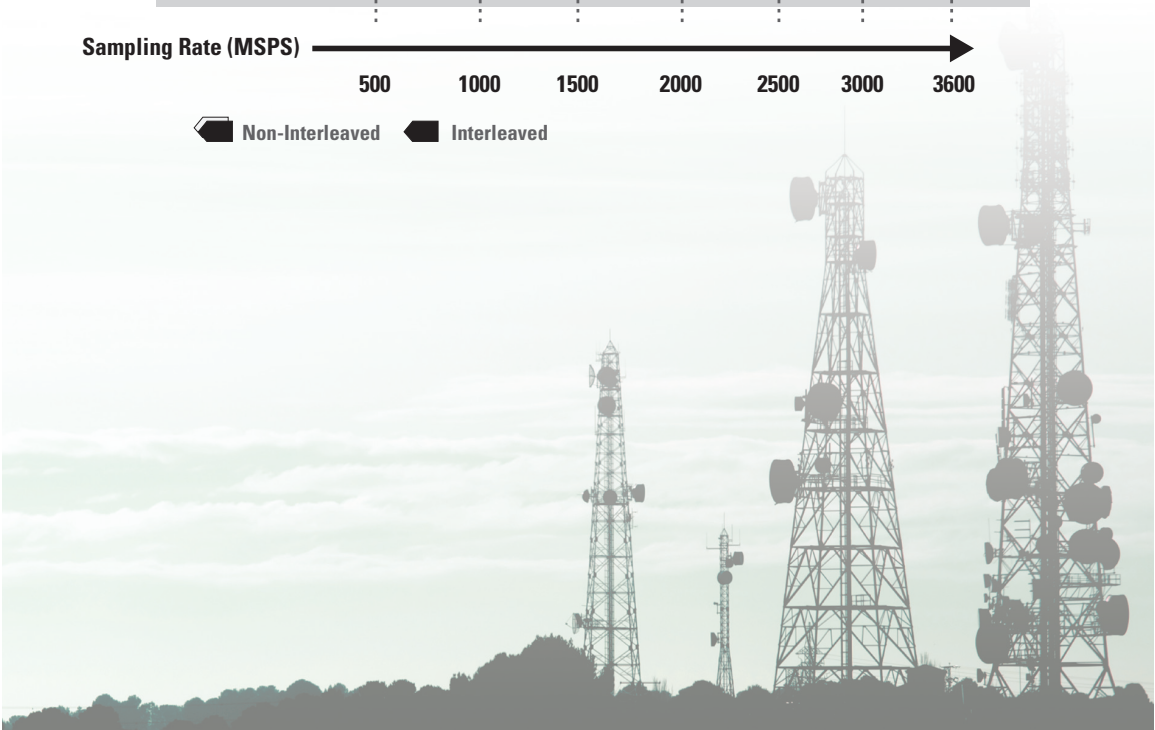
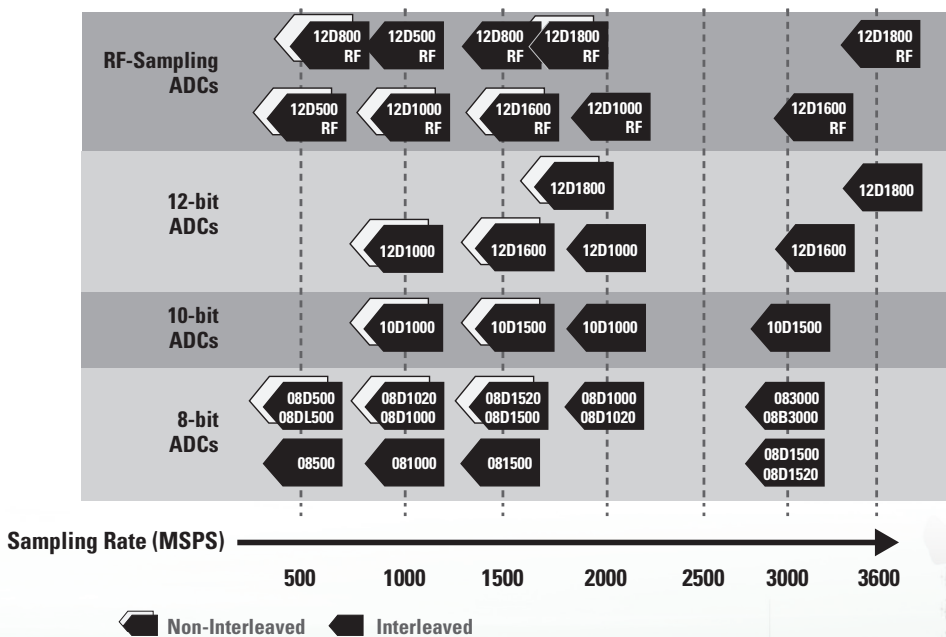
RF-Sampling and GSPS ADCs

Breakthrough ADCs Revolutionize Radio Architectures



RF-Sampling and GSPS ADC Family of Products

Texas Instruments has revolutionized radio architectures and expanded its gigasample-per-second (GSPS) analog-to-digital converter (ADC) portfolio with the direct RF-sampling ADC12Dxx00RF family. These RF-sampling ADCs offer the industry's best performance beyond 2.7 GHz, building on the industry's fastest sampling rates of TI's existing 12-bit ADC family. Together with its wideband amplifiers and low-noise clock & timing solutions, TI enables new RF-sampling and wideband SDR systems that efficiently increase system capacity, scalability, and flexibility while simultaneously reducing system size, weight, power, cost, and design time.



Benefits of RF-Sampling

RF-sampling ADCs solve today's integration challenges. A single direct RF-sampling ADC can replace an entire IF-sampling or ZIF-sampling subsystem of mixers, LO synthesizers, amplifiers, filters, and ADCs, while drastically reducing bill of materials (BOM) cost, design time, board size, weight, and power. In addition, the analog frequency down-conversion function is moved into the DSP, FPGA, or ASIC, where frequencies and bandwidths can be controlled digitally, enabling maximum system flexibility and re-configurability. The 1.8 GHz Nyquist bandwidth of the RF-sampling ADC family ensures the solution can scale up easily for wider bandwidths in future products.

RF-Sampling ADCs benefits include:

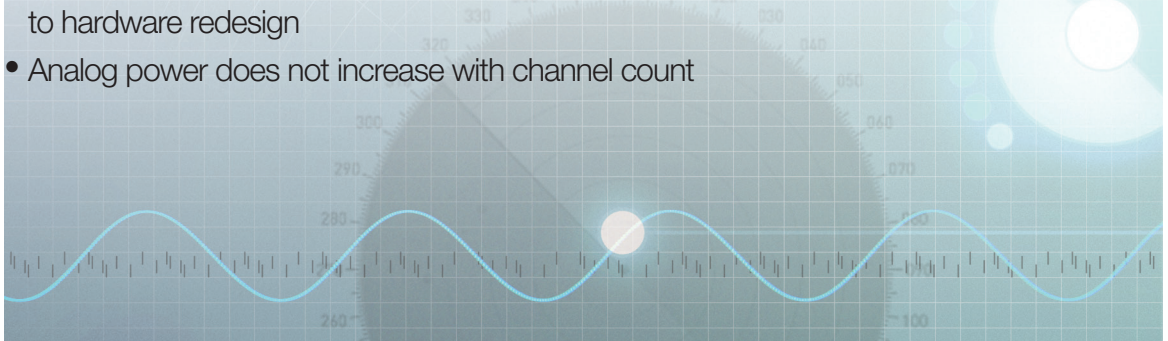
- Reduced system cost
- Reduced system size, weight, and power
- Simplified design
- More flexible, digitally-programmable system
- Reduced RF interference
- Scalable solution

Benefits of Wideband Software-Defined Radio (SDR)

In multi-channel systems, hardware-defined radio (HDR) implementations require a significant amount of analog signal processing for every channel, leading to large board area, high analog design complexity, limited flexibility, and susceptibility to RF interference. A GSPS ADC allows multiple narrowband and wideband channels to be combined into a single ultra-wideband channel, thereby pushing channelization from the analog domain into the DSP, FPGA, or ASIC, where frequencies and bandwidths can be controlled digitally, enabling maximum system flexibility and re-configurability.

An SDR approach offers numerous benefits over a traditional HDR approach:

- Low analog complexity: smaller boards, lower system power and cost
- Less susceptibility to RF interference: less shielding required
- Unlimited flexibility: software programmability of radio and lower R&D compared to hardware redesign
- Analog power does not increase with channel count



ADC12Dxx00RF – Direct RF-Sampling ADC Family

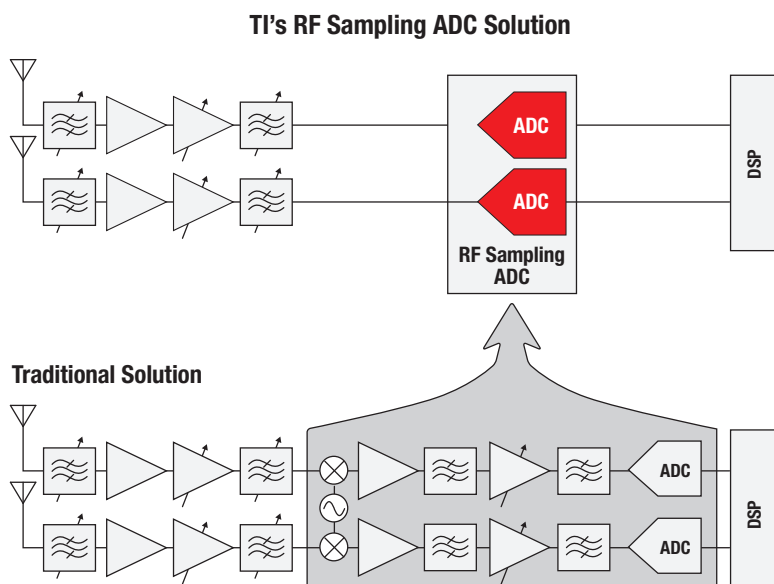
TI's 12-bit direct RF-sampling ADCs deliver the industry's best performance beyond 2.7 GHz at up to 3.6 GSPS. A single direct RF-sampling ADC can replace an entire IF-sampling or ZIF-sampling subsystem, reducing system size, weight, power, cost, and design time. An RF-sampling ADC enables filters and mixers to be implemented in digital, enabling greatly increased system programmability and scalability.

Features

- Industry's best dynamic performance at 2.7 GHz and beyond
- Pin-compatible family from 500 MSPS to 3.6 GSPS reduces design time and cost and makes future upgrades easy
- Pin-compatible with TI's ADC12D1x00 and ADC10D1x00 GSPS ADC families
- Industry's largest high-resolution Nyquist zone of 1.8 GHz
 - Enable wideband SDR
 - Combine multiple wideband and narrowband channels into a single ultra wideband channel
- New interleaved mode more than doubles useable input frequency range
 - Sample higher input frequencies with higher resolution than previously possible

Applications

- 3G/4G Base Stations (Receive and Digital Pre-Distortion Paths)
- Wideband Microwave Backhaul
- Military Communications
- SIGINT
- RADAR/LIDAR
- RF-sampling SDR
- Wideband Communications
- Test & Measurement
- Consumer Multimedia
- Optical Networks



ADC12D1x00 – World’s Fastest 12-bit ADC Family

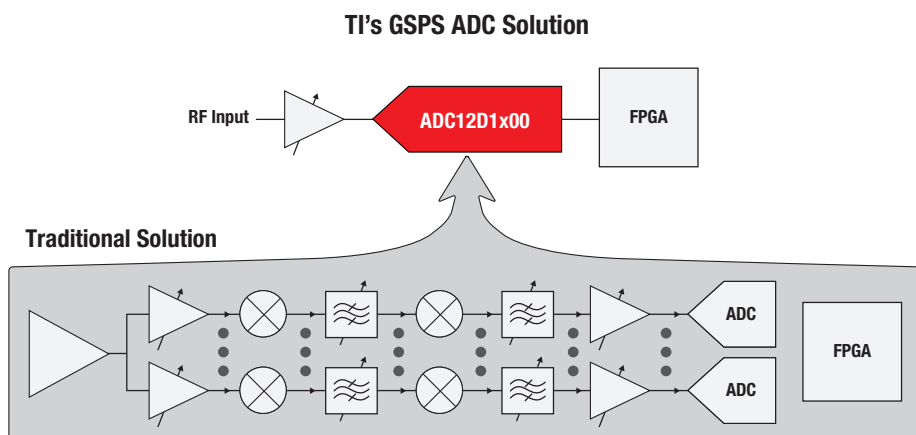
TI’s ADCs offer excellent noise and distortion performance over the industry’s largest high-resolution Nyquist zone to enable a new generation of high dynamic-range, wide bandwidth software-defined architectures and applications. The ADC12D1x00 enables multiple narrowband and wideband channels to be combined into a single ultra-wideband channel, greatly reducing component count and system size, weight, power, and cost. By moving channelization filtering from analog to digital, the ADC12D1x00 also greatly increases the programmability and scalability of systems.

Features

- Industry’s fastest 12-bit ADCs at up to 3.6 GSPS
- Excellent linearity and noise performance over industry’s largest high-resolution Nyquist zone
- Configurable to interleaved or dual mode
- Pin-compatible with TI’s 12-bit ADC12Dxx00RF and 10-bit ADC10D1x00 families
- AutoSync for multi-ADC systems
- Low power dissipation and thermally-enhanced BGA package does not require heat sink
- Programmable gain and offset adjustment per channel

Applications

- Wideband Communications
- Multi-standard/Multi-carrier Basestations
- Military Communications
- SIGINT
- Data Acquisition
- RADAR/LIDAR
- Optical Networks
- Microwave Backhaul
- Multi-tuner Set-top Boxes



Design Resources and References



TI E2E™
Community

E2E High-Speed Data Converter Forum

www.ti.com/e2ehsdc

Get more information on the RF-Sampling and GSPS ADC family of products at

www.ti.com/gigadc

- Watch videos
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