



Direct RF-Sampling ADCs

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ADC12Dxx00RF Direct RF-Sampling ADCs Sample Beyond 2.7 GHz at up to 3.6 GSPS

Breakthrough RF-Sampling ADCs Revolutionize Radio Architectures

National's 12-bit direct RF-sampling ADCs can directly sample input frequencies up to and 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 radio signal path subsystem of mixers, LO synthesizers, amplifiers, filters, and ADCs, drastically reducing bill of materials (BOM) cost, design time, and board size, weight, and power. A wide array of applications such as 3G/4G wireless basestations, microwave backhaul, military, and wideband software-defined radio (SDR) can now achieve the benefits that RF-sampling provides.

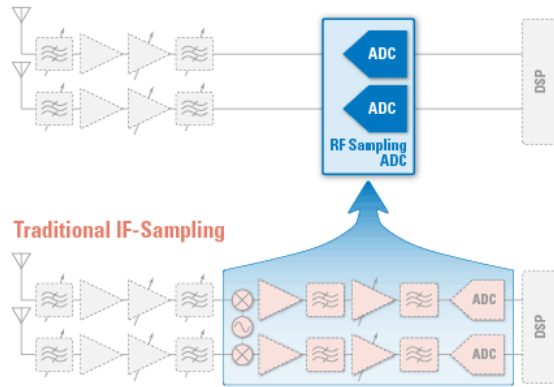
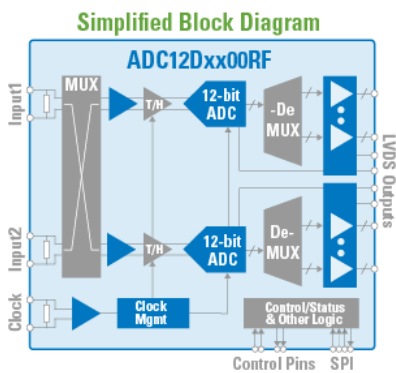
The ADC12Dxx00RF family of ADCs improves upon National's existing 12-bit GSPS ADC products by expanding the frequency range over which National's superior dynamic range can be realized. The ADC12Dxx00RF delivers its excellent noise and linearity performance at RF frequencies beyond the 7th Nyquist zone. These five new ADCs are available in speed grades ranging from dual-channel 500 MSPS to single-channel 3.6 GSPS. They are pin-compatible with National's ADC12D1x00 and ADC10D1x00 families, enabling system designers to reuse a single design for multiple speed and resolution combinations.



RF Sampling A/D Converters

Product ID	Sampling Rate Single/Dual-Channel (MSPS)	Power (W)	IMD3 @ 2.7 GHz (dBFS)	Noise Floor (dBm/Hz)
ADC12D500RF	1000 / 500	2	-69	-150.5
ADC12D800RF	1600 / 800	2.5	-71	-152.2
ADC12D1000RF	2000 / 1000	3.5	-69	-154
ADC12D1600RF	3200 / 1600	4	-70	-154.6
ADC12D1800RF	3600 / 1800	4.4	-64	-155

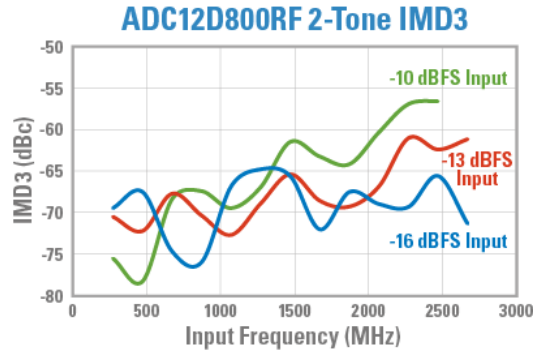
National's Direct RF-Sampling Solution



- Integrated Solution
- Reduced Size, Weight, & Power
- Increased Programmability & Scalability

Unparalleled Performance

- Industry's best dynamic performance at 2.7 GHz and beyond
- Footprint-compatible family from 500 MSPS to 3.6 GSPS
 - Reduce design time and cost and make future upgrades easy by reusing designs at different speed grades
- Footprint-compatible with National's ADC12D1x00 and ADC10D1x00
 - Enable design reuse for different dynamic range requirements
- Industry's largest Nyquist zone of up to 1.8 GHz
 - Enable truly wideband software-defined radio (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



RF-Sampling A/D Applications

The RF-sampling ADC family replaces multiple analog components with a single chip, reducing system cost, size, weight, and power, and saving design time. In addition, their excellent performance over a large range of input frequencies up to and beyond 2.7 GHz enables maximum frequency, bandwidth, and overall system programmability and flexibility in many applications including software-defined radio (SDR) and digital pre-distortion (DPD) in LTE/UMTS basestations, radar, lidar, and signal intelligence (SIGINT).



Basestations

- Allows direct RF-sampling in 3G/4G receive and digital pre-distortion (DPD) signal paths
- Replace entire IF-sampling and ZIF-sampling subsystems of mixers, LO-synthesizers, amplifiers, filters, and ADCs
- 1.8 GHz Nyquist zone enables ultra-wideband and multiband radio designs



Microwave Backhaul

- Enable higher data capacity backhaul link – industry's largest Nyquist zone and best performance beyond 2.7 GHz allows for higher-order modulation over channel bandwidths of at least 1.25 GHz
- RF-sampling capability enables ODU and IDU integration by eliminating entire IF-sampling and ZIF-sampling subsystems
- RF-sampling capability eliminates multiple frequency down-conversion stages



Software-Defined Radio and Military

- Replace multiple frequency down-conversion stages and combine multiple narrowband and wideband channels into a single ultra wideband channel
- Excellent noise and linearity performance beyond 2.7 GHz and industry's largest Nyquist zone enable digital implementation of filters and mixers, allowing for on-the-fly programming of bandwidth and frequency to maximize system agility and flexibility



Test & Measurement

- Enable higher bandwidth scopes and higher resolution, larger bandwidth real-time spectrum analyzers (RTSA)
- Enable higher linearity analyzers

RF Sampling ADC Resources

- [Software Defined Radio: Don't Talk to Me About ENOBs](#) (article)
- [Software-Defined Radio \(SDR\) Information](#)
- [WaveVision 5 Software: Data Acquisition & Analysis Tool](#)
- [Gigasample ADC Eval Boards](#)
- [IBIS Models](#)

Related Products

- [Data Converters](#)
 - [Ultra High-Speed Gigasample ADCs](#)
- [Software-Defined Radio \(SDR\) Architecture](#)
- [Amplifiers](#)
- [Clock & Timing Solutions](#) (Clock Jitter Cleaners, PLLs)
- [Other RF/IF ICs](#)
- [Wireless Infrastructure Solutions](#)

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