Family of Digital Converters

Analog Devices created the VersaCOMM product family of re-configurable digital converters that perform digital filtering and frequency conversion for high-speed signal processing applications. Designed for compatibility with ADI's world-leading analog-to-digital converters (ADCs) and digital-to-analog converters (DACs), VersaCOMM digital converters are ideal for macro-, micro- and pico-cellular base station designs, and are field-reconfigurable for multi-standard signals including 2G and 3G cellular standards. Other suitable applications include cellular E911 location services, wireless local loop, phased array antennas, digital video, communications test equipment, and ultrasound applications.

VersaCOMM products combine the product capabilities found in application-specific integrated circuits (ASICs), field programmable gate arrays (FPGAs) and digital signal processors (DSPs) to provide the systems engineer with cost effective, field re-configurable products offering shorter time-to-market cycles and lower cost. By using VersaCOMM products, engineering teams can reduce the investment associated with designing in-house ASICs. Using a DSP for the same functions would consume resources within the DSP that could be used more effectively for baseband operations such as adaptive equalizers or RAKE receivers. VersaCOMM digital converters more efficiently perform frequency-conversion and filtering operations, consuming less power and physical space than other alternatives.

The VersaCOMM family presently includes eight products: three digital receive signal processors (RSPs), two digital transmit signal processors (TSPs) and three quadrature digital upconversion/modulators (QDUCs).

The RSP is a re-configurable numeric preprocessor that performs digital tuning, quadrature mixing, channel select filtering and data decimation. In single or multiple carrier applications, the RSP replaces the analog selectivity and tuning functions with digital equivalents.

The AD6620 is a 65 million samples per second (MSPS) single/dual-channel RSP suitable for IS136, GSM, EDGE, and IS95 cellular standards in single or multiple carrier radio architectures. The AD6624 is an 80 MSPS single/dual/quad-channel RSP suitable for IS-136, GSM, EDGE, and IS-95 cellular standards. Additionally, the AD6624 provides non-integer re-sampling, supporting multiple standards from a single ADC sample rate. The AD6634 is an 80 MSPS single/dual/quad-channel RSP with all the capabilities of the AD6624 plus extensions for better support of 3G cellular standards. These extensions include extra filtering, digital AGC, and increased bandwidth output ports to process up to two WCMDA carriers.

The TSP is a re-configurable numeric post-processor that performs data interpolation, pulse shaping and filtering, quadrature modulation, and frequency

tuning. Like the RSP, the TSP defines all of the variable channel characteristics, including data rate, channel bandwidth and channel shape, allowing a single, generic RF transmitter to carry multiple channels and modulation standards simultaneously.

The AD6622 is a 75 MSPS single/dual/quad channel TSP supporting IS-136, GSM, EDGE, and IS95 cellular standards. The AD6623 is a 104 MSPS single/dual/quad channel TSP with all the capabilities of the AD6622 and extensions for multi-mode operation. Extensions for GSM/EDGE include GMSK and 3π/8 8PSK direct modulation, modulation mode switching, and time-slot scaling and ramping. Extensions for IS-95 include all-pass phase pre-distortion. In addition, the AD6623 provides non-integer re-sampling to support multiple standards from a single DAC sample rate.

QDUCs integrate a high-speed direct-digital synthesizer, a high-performance, high-speed 12-bit or 14-bit DAC, digital filters and other DSP functions onto a single chip, to form a complete quadrature digital upconverter device.

The AD9853 is a quadrature phase shift keying 16-quadrature amplitude modulation (QAM) digital modulator with 10-bit DAC. The AD9856 is a 200 MSPS quadrature digital upconverter with 12-bit DAC, primarily intended to function as a universal upstream and downstream I/Q modulator for hybrid fiber coax (HFC) cable network applications. The AD9857 is a 200 MSPS quadrature digital upconverter with 14-bit DAC, intended to function as a universal I/Q modulator and agile upconverter, single-tone direct-digital synthesizer (DDS) or interpolating DAC for communications applications