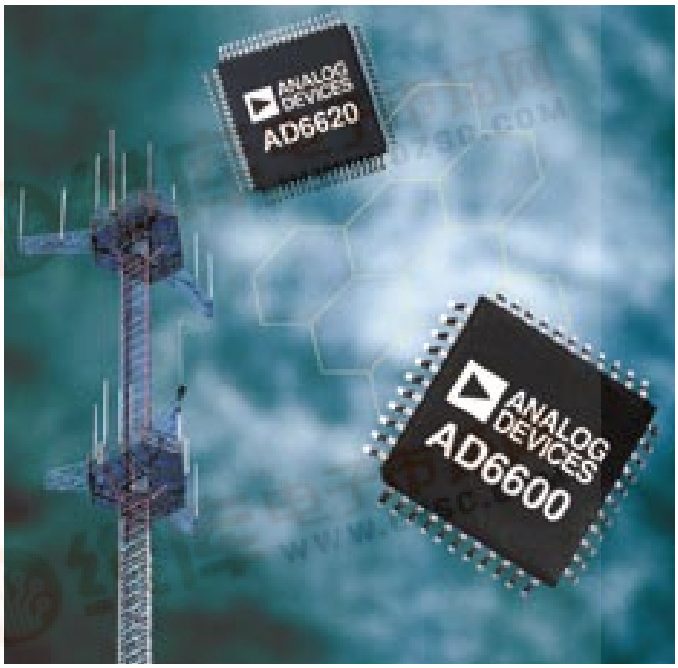
AD6600/AD6620 Diversity Receiver Chipset



Analog Devices' streamlined, highly integrated solution reduces component count, cost and time-to-market for diversity receivers.

HIGHLY INTEGRATED CHIPSET REDUCES SIZE AND COST OF BASE STATION RECEIVERS

Analog Devices' innovative Diversity Receiver chipset delivers two IF-to-baseband diversity channels in a compact, comprehensive solution that incorporates Automatic Gain Control, Received Signal Strength Indicator, high-resolution Numerically Controlled Oscillator and digital filtering on-chip.

The chipset comprises Analog Devices' AD6600 dual-channel IF sampling analog-to-digital converter and AD6620 dual-channel decimating receiver chip. Configured with the appropriate external components, it can address a variety of air interface standards, including GSM, CDMA, IS136 and PHS, as well as proprietary modulation schemes for paging systems and wireless fixed access receivers.

Based on Analog Devices' next-generation receiver architecture, the Diversity Receiver replaces sensitive analog filters with digital filters for significant cost and size reductions.

Complete reference designs show the optimal layout for reducing noise and minimizing cross-channel coupling.

FEATURES

- Dual-channel: integrates two IF-to-baseband diversity channels
- Fewer discrete components: cuts manufacturing costs
- On-chip digital filters eliminate need for high-cost analog IF filter for reduced bill of materials cost
- Accepts common intermediate frequencies for cellular, PCS, paging (70-250 MHz A_{in})
- Small outline, surface-mount plastic packaging (44-pin TQFP, 80-pin PQFP): reduces receiver size, simplifies micro- and pico-cell designs
- High dynamic range: 80 to 100+ dB, depending on channel bandwidth, sample rate and filter characteristics
- Easily interfaces to general-purpose DSPs
- Complete radio reference designs reduce your engineering investment

COST-SAVING INNOVATIVE DESIGN

Analog Devices' advanced receiver architecture lets you take advantage of tight on-chip integration of conversion and filtering functions for a high-performance diversity radio.

This innovative approach eliminates front-end mix-down stages and enables high-frequency IF sampling at 70–250 MHz.

Specifically designed for narrowband cellular/PCS receivers, the Diversity Receiver is ideal for applications such as GSM and CDMA, where multiple calls are processed in a single RF channel.

In this dual-channel design, analog RF filters are replaced by digital filters that are more easily manufactured and assembled, require no factory "tweaking" and do not vary in performance over time or as a result of temperature changes.

The bottom line: lower manufacturing and bill of materials costs — as well as reduced inventory requirements.

CUTS TIME-TO-MARKET

Analog Devices offers a complete solution and full support for diversity radios.

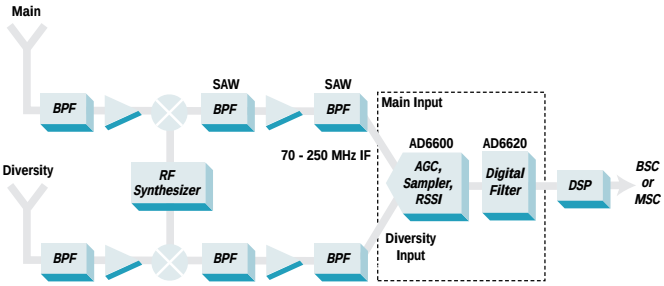
Because the same core components can be used for different air interface standards, you can bring base station equipment to market quickly and cost-effectively. With minimal design change, your base station receiver can readily accommodate different air interface standards.

Analog Devices' support services — including detailed reference designs using the AD6600/AD6620 chipset — help streamline your development efforts.

DIGITAL COMPONENTS OPTIMIZE SYSTEM PERFORMANCE

By reducing the number of analog RF components, the AD6600/AD6620 Diversity Receiver optimizes the performance of your base station radio.

IF Sampling Diversity Receiver



The most demanding filtering takes place in the digital signal processor, dramatically reducing the burden on the front-end analog IF filter. Characteristics for bandwidth, passband ripple and stopband rejection are specified through software, not through sensitive and costly surface acoustical wave (SAW), crystal and ceramic devices. You get the filtering precision you need — in a more easily manufactured solution.

HIGH DYNAMIC RANGE

Automatic gain control through a built-in peak detector ensures optimum receiver sensitivity. This unique feature enables the AD6600 to perform its own automatic gain ranging on a sample-by-sample basis.

The AD6600 provides 90 dB of instantaneous dynamic range; the AD6620 yields an additional 12-25 dB of processing gain, depending on bandwidth and sample rate.

ANALOG DEVICES: LEADING BASE STATION SUPPLIER

At the forefront of next-generation receiver technology, Analog Devices is an established supplier of integrated circuits used in current cellular base station subsystem designs.

We have the largest market share of mixed-signal integrated circuits in base stations worldwide. And we also hold a leadership position in high-speed conversion technology and high dynamic range sampling.

ANALOG DEVICES IN COMMUNICATIONS

Analog Devices is committed to supplying the communications industry with the highest-performance solutions at the lowest possible cost. We meet the needs of today's broadband wired and wireless markets with leadership capabilities in analog, digital and mixed signal processing, RF signal processing, data conversion, interfaces and total system design.

DIVERSITY RECEIVER CHIPSET

Analog Devices' Diversity Receiver chipset consists of:

- AD6600 dual-channel IF sampling ADC chip

The AD6600 is a mixed-signal receive chip designed to directly sample IF signals at frequencies up to 250 MHz A_{in}.

The chip includes an 11-bit 20 MSPS ADC, input amplifiers, automatic gain ranging circuitry, 450 MHz Track/Hold, digital RSSI outputs, references and control circuitry. Digital signals are CMOS/TTL compatible.

Each of its two analog input channels (A and B) has its own attenuator stage. Attenuation levels are set by the on-chip automatic RSSI circuitry.

Units are packaged in a 44-pin Thin Quad Plastic Flatpack (TQFP).

- AD6620 dual-channel decimating receiver chip

The AD6620 is a dual-channel 65 MSPS decimating receiver that maintains a spurious free dynamic range (SFDR) greater than 100 dB. Its four cascaded signal processing elements are a digital tuner, two fixed coefficient filters and a programmable coefficient decimating filter.

The AD6620's RAM-based architecture enables anti-aliasing, matched filtering and static equalization functions to be combined in a single chip.

Units are packaged in an 80-pin Plastic Quad Flatpack (PQFP).

REFERENCE DESIGNS

AD6600/AD6620 Diversity Receiver reference designs indicate all required external components in the optimal PCB layout that minimizes cross-channel coupling for the lowest possible noise interference. Designs, along with a complete set of application notes and technical white papers, are available for individual air interface standards.