



AD20msp430

GSM/GPRS/DCS1800/PCS1900 *SoftFone*™ Baseband Chipset

REDUCE TOTAL SYSTEM COST WHILE IMPROVING BATTERY LIFE IN GSM HANDSET AND GPRS TERMINAL DESIGNS

The AD20msp430 baseband processing chipset uses a combination of GSM system knowledge and advanced analog and digital signal processing technology to provide a new benchmark in GSM/GPRS terminal design.

The *SoftFone*™ architecture is entirely RAM-based. The software is loaded from FLASH memory and is executed from the on-chip RAM. This allows fast development cycles since no ROM code turns are required. Furthermore, the handset software can be updated in the field to enable new features.

Combined with the Analog Devices "Othello" RF chipset, a complete multiband handset design contains less than 200 components, fits in a 20 cm² single sided PCB layout, and has a total bill-of-materials cost 20-30% lower than previous solutions.

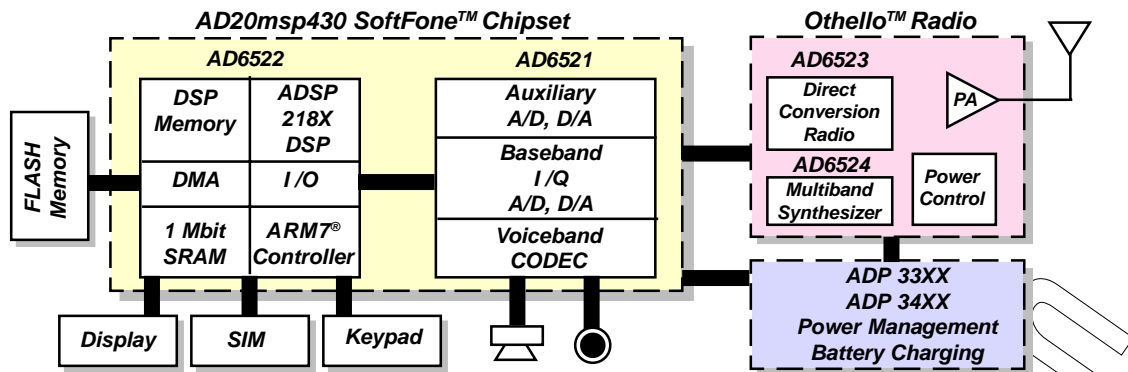
The AD20msp430 is Analog Devices' 4th-generation GSM baseband chipset, providing additional features, longer standby time, and lower cost through a system approach to the design.



FEATURES

- Supports all voice codec algorithms FR (full-rate), EFR (enhanced full-rate), and HR (half-rate) for compatibility with all GSM networks
- Provides data services in standard circuit-switched (14.4 kbps), HSCSD (57.6 kbps), and GPRS (up to 115 kbps) modes
- 1 Mb on-chip SRAM, plus 8K DSP Program Memory, 8K DSP Data Memory, and 4K DSP Cache
- Standby current of 1 mA allows 6 weeks between battery charges (1000 mAh battery)
- Complete software protocol stacks available for voice and data applications
- Full suite of evaluation/development tools available, including form-factor reference design
- Programmable interface to Universal System Connector for feature addition or system debugging





BOM COST REDUCTION THROUGH SYSTEM ENGINEERING SKILL

The AD20msp430 chipset is comprised of two chips, the AD6522 DSP-based baseband processor and the AD6521 voiceband/baseband mixed-signal codec. Together with the award-winning "Othello" radio chipset, the AD20msp430 allows a significant reduction in the component count and bill-of-materials (BOM) cost of GSM voice handsets and data terminals.

The software and hardware foundations of the AD20msp430 chipset enjoy a long history of successful integration into GSM handsets. This is Analog Devices' 4th generation of GSM chipsets, each of which has passed numerous type-approvals and network operator approvals in OEM handsets. In each generation, additional features have been added, while cost and power have been reduced.

Numerous power-saving features have been included in the AD20msp430 chipset to reduce the total power consumption. A programmable state machine allows events to be controlled with a resolution of one-quarter of a bit period. This reduces current in standby mode to 1 mA. This allows a handset to operate in standby mode for up to 1000 hours on a battery charge.

The AD20msp430 chipset uses the SoftFone™ architecture, where all software resides in RAM or FLASH memory. Since ROM is not used, development time is reduced and additional features can be field-installed easily. A basic dual-band GSM terminal typically requires a single 8Mb FLASH memory chip.

A FULL SET OF DEVELOPMENT TOOLS AND SOFTWARE

There are two processors in the AD20msp430 chipset. The DSP processor is the ADSP218x core, proven in previous generations of GSM chipsets, and operated at 65 MIPS in the AD20msp430. The microcontroller is an ARM7TDMI, running at 39 MIPS. Both processors are field-proven in digital wireless applications.

The AD20msp430 chipset is fully supported by a suite of development tools and software. The development tools allow easy customization of the DSP and/or ARM® controller software to allow handset and terminal manufacturers to optimize the feature set and user interface of the end equipment. Software is available from Analog Devices' software partner TTPCom for all layers, including both voice and data applications, and is updated as new features become available.

Software written for the AD20msp430 will not go out of date. The system DMA and interrupt controllers are designed to allow easy upgrades to future generations of DSP and controller cores. The display interface can be used with either parallel or serial-interface displays.

System development can be shortened by the use of the debugging features in the AD20msp430. Most critical signals can be routed under software control to the Universal System Connector. This allows system debugging to take place in the final form factor. In addition, the architecture includes high-speed logger and address trace functions in the DSP and single-wire trace/debug in the ARM controller.

ANALOG DEVICES: A LEADER IN GSM

An established supplier of components and solutions to GSM handset manufacturers, Analog Devices has an incomparable track record of high-volume, low-cost manufacturing and delivery. The company has provided mixed-signal and baseband processors for millions of GSM handsets worldwide over nearly 10 years. The AD20msp430 was the first open-market chipset/software solution to achieve Type Approval. Our software partner TTPCom is a product-development and engineering company based in the United Kingdom. Formed in 1988, TTPCom is a leading independent developer of GSM technology worldwide.

ANALOG DEVICES IN COMMUNICATIONS

Analog Devices is recognized for its unparalleled technical capabilities in analog, digital, and mixed-signal processing used in RF signal processing, data conversion, interfaces, and total system design. The company develops and offers customers a wide range of innovative wireless and broadband wired communications products including solutions for GSM, CDMA (Code Division Multiple Access); cellular base stations/software radio; RF and IF (intermediate frequency) circuits, and xDSL. The company is committed to supplying the communications industry with the highest performance solutions at the lowest possible cost.

AD20msp430 COMPRISES:

- **AD6522 GSM Digital Processor**
The AD6522 digital engine includes two high-performance, low-power programmable processors. The DSP engine uses the latest version of the ADSP218x core, operating at 65 MIPS, and handling the vocoder and channel codec functions. All vocoder algorithms (FR, EFR, and HR) are supported. The microcontroller is the ARM7 RISC engine, operating at 39 MIPS, and handling the protocol stack and man-machine interface (MMI) functions.
The digital processor also includes ciphering and Viterbi functions, as well as a range of debugging tools and interfaces for the FLASH memory, keypad, display, SIM card, IrDA, and USC ports. All instructions execute from on-chip RAM.
- **AD6521 Voiceband/Baseband Codec**
The AD6521 chip contains all analog and mixed-signal functions. These include the I/Q channel A/D and D/A converters, high-performance multichannel voiceband codec, and several auxiliary A/D and D/A converters for AGC (automatic gain control), AFC (automatic frequency control), and power-amplifier ramp control. The AD6521 is intended for use with the Analog Devices Othello™ GSM direct-conversion RF chipset.
- **Software and Development Tools**
A complete set of development tools and emulators is available from Analog Devices, including hardware and software development tools, and a reference design.

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