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MicroConverter®, Dual 16 Bit ADCs with Embedded 62KB FLASH MCU

Preliminary Technical Data   ADuC836

FEATURES

High Resolution Sigma-Delta ADCs
   Two Independent ADCs (16-Bit Resolution)
   16-Bit No Missing Codes, Primary ADC
   13-Bit p-p Resolution @ 20 Hz, 20 mV Range
   16-Bit p-p Resolution @ 20 Hz, 2.56 V Range
Memory
   62Kbytes On-Chip Flash/EE Program Memory
   4 KBytes On-Chip Flash/EE Data Memory
   Flash/EE, 100 Yr Retention, 100 Kcycles Endurance
   In Circuit Serial Download
   High Speed User Bootload (5s Download)
   2304 Bytes On-Chip Data RAM
8051 Based Core
   8051-Compatible Instruction Set (12.58 MHz Max)
   32 kHz External Crystal, On-Chip Programmable PLL
   11 Interrupt Sources, Two Priority Levels
   Dual Data Pointer
   Extended 11-bit Stack Pointer
On-Chip Peripherals
   12-Bit Voltage Output DAC
   Dual 16-Bit ΣΔ DACs/PWMs
   On-Chip Temperature Sensor
   Dual Excitation Current Sources
   Time Interval Counter (Real Time Clock/WakeUp Cct)
   UART and SPI® Serial I/O
   Timer 3 for high speed UART baud rates (incl 115,200)
   Watchdog Timer (WDT), Power Supply Monitor (PSM)
Power
   Specified for 3 V and 5 V Operation
   Normal: 3 mA @ 3 V (Core CLK = 1.5 MHz)
   Power-Down: 20μA max with wake-up cct running

GENERAL DESCRIPTION

The ADuC836 is a complete smart transducer front-end, integrating two high-resolution sigma delta ADCs, an 8-bit MCU, and program/data Flash/EE Memory on a single chip.

The two independent ADCs (Primary and Auxiliary) include a temperature sensor and a PGA (allowing direct measurement of low-level signals). The ADCs with on-chip digital filtering and programmable output data rates are intended for the measurement of wide dynamic range, low frequency signals, such as those in weigh scale, strain-gauge, pressure transducer, or temperature measurement applications.

The device operates from a 32 kHz crystal with an on-chip PLL generating a high-frequency clock of 12.58 MHz. This clock is, routed through a programmable clock divider from which the MCU core clock operating frequency is generated. The microcontroller core is an 8052 and therefore 8051-instruction-set-compatible with 12 core clock periods per machine cycle.

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FUNCTIONAL BLOCK DIAGRAM
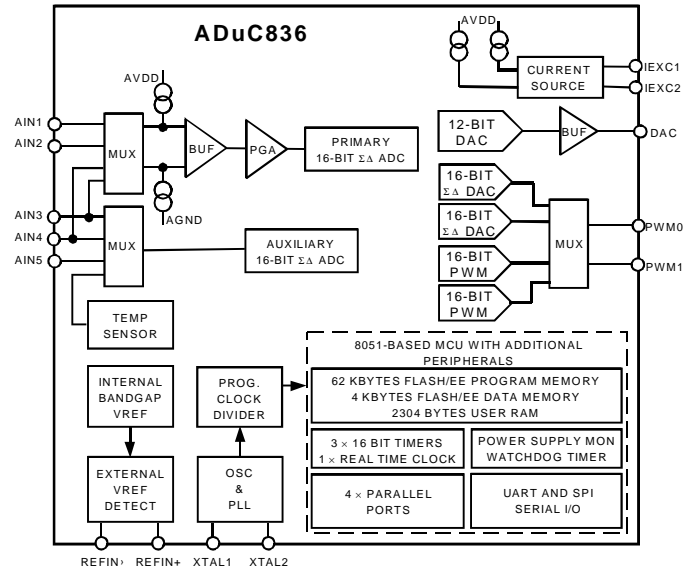
62 Kbytes of nonvolatile Flash/EE program memory are provided on-chip. 4 Kbytes of nonvolatile Flash/EE data memory, 256 bytes RAM and 2 KBytes of extended RAM are also integrated on-chip. The program memory can be configured as data memory in datalogging applications.

The ADuC836 also incorporates additional analog functionality with a 12-bit DAC, dual current sources, power supply monitor, and a bandgap reference. On-chip digital peripherals include two 16-bit ΣΔ DACs/PWM, watchdog timer, real time clock (time interval counter), four timers/counters, and two serial I/O ports (UART and SPI).

On-chip factory firmware supports in-circuit serial download (via UART), as well as single-pin emulation mode via the EA pin. A functional block diagram of the ADuC836 is shown above with a more detailed block diagram shown in figure 11 (page 18).

The part operates from a 3V or a 5V supply. When operating from 3V the power dissipation for the part is below 10mW. The ADuC836 is housed in a 52-lead MQFP package.

APPLICATIONS

Intelligent Sensors (IEEE1451.2-Compatible)
Weigh Scales
Portable Instrumentation
Pressure Transducers
4–20 mA Transmitters