# New Arithmetic Controller Engine Microcontrollers

## Ideal for Low Power, High Performance and Small Size

## Smallest available package size integrates EEPROM on chip for easy reprogramming

The ACE1101 and ACE1202 (Arithmetic Controller Engine) devices are dedicated programmable monolithic integrated circuits for applications requiring high performance, low power, and small size. They are fully static parts fabricated using CMOS technology

The ACEx™ devices feature an 8-bit microcontroller core, 64 bytes of RAM, 64 bytes of data EEPROM and up to 2K bytes of code EEPROM. On-chip peripherals include a multi-function 16-bit timer, watchdog/idle timer, and programmable undervoltage detection circuitry. On-chip clock and reset functions reduce the number of required external components. The ACE1101 is available in an 8-pin TSSOP package. The ACE1202 is available in SO8 and SO14 packages.

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## ACE1101 Features

- Arithmetic Controller Engine
- 1K bytes on-board code EEPROM
- 64 bytes data EEPROM
- 64 bytes RAM
- Watchdog
- Multi-input wake-up on all I/O pins
- 16-bit multifunction timer
- On-chip oscillator
    - No external components
    - 1μs instruction cycle time
- Instruction set geared for block encryption
- On-chip power on reset
- Programmable read and write disable functions
- Memory mapped I/O
- Multifunction Low Voltage Detection
- Fully static CMOS
    - Low power HALT mode (100nA at 3.3V)
    - Power saving IDLE mode
    - Single supply operation (2.0-5.5V, 2.2-5.5V, 2.7-5.5V)
- Software selectable I/O options
    - Push-pull outputs with tri-state option
    - Weak pull-up or high impedance inputs

## ACE1202 Features

- Arithmetic Controller Engine
- 2K bytes on-board code EEPROM
- 64 bytes data EEPROM
- 64 bytes RAM
- Watchdog
- Multi-input wake-up on al I/O pins
- 16-bit multifunction timer with difference capture
- On-chip oscillator
    - No external components
    - 1μs instruction cycle time
- Instruction set geared for block encryption
- On-chip power on reset
- Programmable read and write disable functions
- Memory mapped I/O
- Multifunction Low Voltage Detection
- Fully static CMOS
    - Low power HALT mode (100nA at 3.3V)
    - Single supply operation (2.0-5.5V, 2.2-5.5V, 2.7-5.5V)
- Software selectable I/O options
    - Push-pull outputs with tri-state option
    - Weak pull-up or high impedance inputs
- 40 years data retention
- 8-pin and 14-pin SO packages
- In-circuit programming

- 40 years data retention
- 8-pin TSSOP package
- In-circuit programming

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Fairchild Semiconductor announces a first-of-its-kind Arithmetic Controller Engine (ACEx™), a flexible 8-bit microcontroller optimized for low power and high performance **and available in the smallest microcontroller size - an 8-pin TSSOP.** The ACEx microcontrollers feature re-programmable EEPROM, a 16-bit multifunction timer, an internal oscillator, and internal reset to provide the designer with a powerful feature set in a very small package.

The ACEx devices are ideal for low power/battery powered applications such as wireless designs (e.g. cell phones), consumer products, and automotive systems, where high performance, small size, and low cost are key.

The ACEx devices have up to 2048 bytes of program EEPROM and 64 bytes of data EEPROM for configuration and parameter storage, surpassing typical competitive solutions that only provide one-time-programming (OTP) and 16 bytes of data EEPROM. In addition, the Fairchild ACEx devices provide **a monolithic solution with the data EEPROM fully memory mapped to the rest of the controller,** as compared to competitive solutions using two chips in a single package that are linked by $I^2C$ protocol.

The ACEx devices also feature unique in-circuit programming and a simpler protocol, which enables programming after the part is soldered into the printed circuit board. This reduces design time and cost and improves overall time-to-market.

The ACEx Arithmetic Controller Engine can be applied to a wide variety of applications. As examples, for wireless applications, such as cellular phone power management, **the very small size, programmability, and integrated EEPROM of the ACE1101 and ACE1202 reduce cost and extend battery life.** Other features, such as the general purpose 16-bit multifunction timer, idle timer with watchdog, hardware bit coding block, and programmable low battery detection, are ideal for automotive security systems and controller sub-systems.

The new ACE1101 controller is offered in an 8-pin TSSOP package. The ACE1202 controller is available in both 8- and 14-pin SO and DIP packages.

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