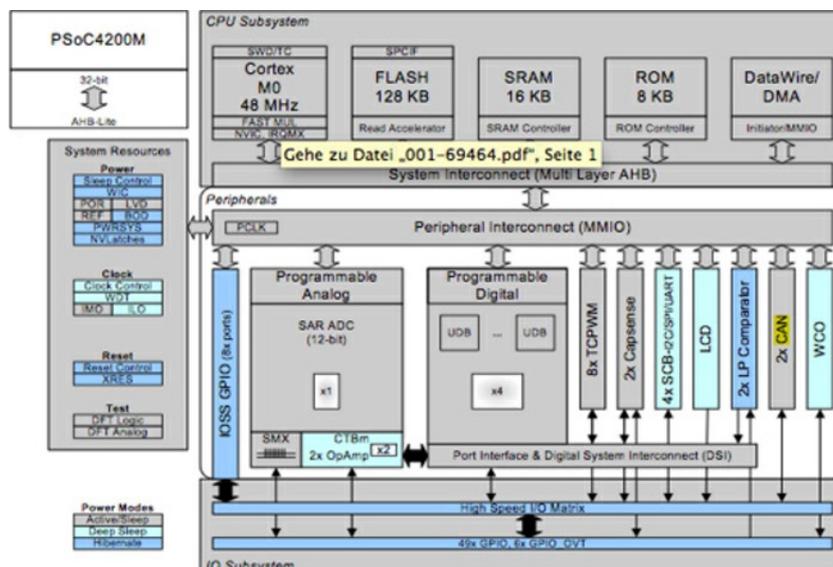SYSTEM-ON-CHIP

Additional programmable blocks

Cypress Semiconductor introduced a product family from its PSoC 4 programmable system-on-chip architecture at Embedded World. The PSoC 4 M series expands the PSoC 4 architecture by delivering dual CAN interfaces, among others.

Block diagram of the PSoC 4200M (Photo: Cypress)

THE PRODUCT FAMILY, BASED ON THE PSOC 4 PLATFORM architecture, is a combination of a micro-controller with digital programmable logic, programmable analog, programmable interconnect, analog-to-digital conversion, operational amplifiers with comparator mode, and standard communication and timing peripherals. The PSoC 4 M products are compatible with members of the PSoC 4 platform.

The additions of this series include dual CAN ports, more programmable analog and digital blocks, 128 KiB flash memory, a direct memory access controller, and 55 general purpose I/Os with the 32-bit ARM-Cortex-M0 core. This makes the series a fit to replace existing 8- and 16-bit applications. Additionally, these devices extend the design flexibility of the PSoC architecture to a range of sensor-based systems in home appliance, automotive, and system management control applications. "Our PSoC 4 portfolio enables customers to replace their 8- and 16-bit MCU-based products and seamlessly migrate to a 32-bit ARM platform for as low as 25 cents," said John Weil, vice president of PSoC marketing at Cypress.

The series delivers 16 programmable digital blocks including eight timer/counter/PWM blocks, four serial communication blocks, and four Universal Digital Blocks. Universal Digital Blocks are the company's programmable digital blocks containing two programmable logic devices, a programmable data path, and status and control registers. The programmable digital blocks can implement coprocessors to offload compute-intensive tasks from the included ARM Cortex-M0 core, which traditionally were only available in 8- and 16-bit platforms. Further, the blocks enable engineers to create emerging or custom serial communication interfaces in the available programmable hardware, such as support for pulse-density modulation microphones and the USB Type-C configuration channel protocol.

The series delivers 12 programmable analog blocks including four configurable operational amplifiers, four current-output digital-to-analog converters (IDACs), two low-power comparators, a 12-bit SAR ADC, and a Cap Sense capacitive touch-sensing block. The programmable analog blocks enable engineers to create on-chip, custom analog front ends to support end-product features like sensors for wearable devices without increasing product costs, size or power consumption. The Cap Sense capacitive touch-sensing technology enables engineers to add user interfaces with features like proximity sensing and water tolerance.

The PSoC 4 M series is built on the low-power PSoC 4 architecture and offers five low-power modes to minimize system power consumption.
It supports a low leakage retention power mode, using only 150 nA while retaining SRAM, programmable logic, and the ability to wake up from an interrupt. It also offers a non-retention stop mode down to 20 nA with a GPIO wakeup capability.

The Pioneer Kit features the PSoC 4200M device with CAN peripherals (Photo: Cypress)

Series development kit

The CY8CKIT-044 PSoC 4 M series Pioneer Kit is an expandable development kit that enables engineers to evaluate and create unique designs with a PSoC 4 M series device. It includes Arduino Shield, Digilent Pmod, and Raspberry Pi compatible connectors,

enabling customers to pick from a variety of third-party expansion boards. The kit features a set of on-board sensors, including an ambient light sensor, a 3-axis accelerometer and a temperature sensor. It also has an on-board RGB LED, a user-button, and a 1-Mbit Cypress F-RAM device.