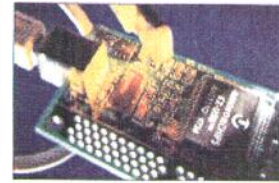


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EDN LEADING EDGE

WHAT'S HOT IN THE DESIGN COMMUNITY

EDITED BY FRAN GRANVILLE

IC changes course of USB enumeration procedure



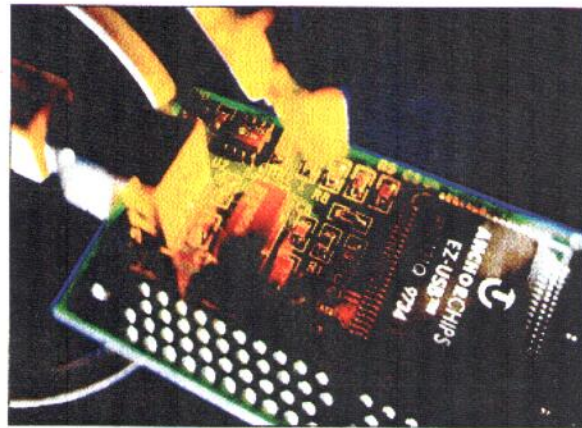
The EZ-USB family of ICs from Anchor Chips integrates a high-performance microcontroller, includes hardware support for low-level USB signaling, and takes a new tack to maximize flexibility in the USB enumeration procedure. These features differentiate

Anchor's ICs from most other USB ICs and provide a single-chip USB implementation that can serve in applications ranging from cost-sensitive peripherals, such as pointing devices, to high-end devices, such as scanners.

The IC incorporates an 8051-compatible core with support from a legion of software-development tools from multiple vendors. Moreover, the core offers a fivefold boost in performance over off-the-shelf 8051 ICs. In addition, although most manufacturers minimize prices by using the microcontroller to handle low-level signal handshakes, the EZ-USB ICs include state machines that offload these task from the microcontroller. The hardware signaling leaves the microcontroller free to handle more peripheral functions and, therefore, allows designers to use the IC in more complex devices.

The ICs also use an enumeration scheme to maximize flexibility in peripherals via downloadable control firmware. The USB standard specifies that a peripheral must go through an enumeration procedure whenever the peripheral connects to the bus. During this procedure, the host assigns the peripheral a unique ID, and the peripheral provides the host with device descriptors that indicate the peripheral's capabilities.

In contrast, the EZ-USB ICs go through this enumeration procedure and establish a baseline configuration. The ICs then download new firmware from the host, simulate a disconnect/reconnect cycle, and repeat the enumeration, providing updated descriptors to the host. This software-based configuration scheme offers several advantages. For example, it simplifies software updates to peripherals, a feature that can be important in a new interface, such as USB. The



The EZ-USB family of ICs integrates an 8051 microcontroller with a USB interface that's handles all USB signaling. The IC supports postage-stamp-sized designs.

software-based configuration also enables you to develop multifunction peripherals. A DSP-based peripheral could take on the role of a modem during one session, for example, and an audio synthesizer during another session.

The company offers three versions of the EZ-USB. The AN2131S integrates 8 kbytes of RAM and 16 I/O lines and costs \$6.36 (10,000). The AN2131Q adds eight more I/O lines and costs \$7.31 (10,000), and the AN2141Q increases memory to 16 kbytes of RAM for \$8.72 (10,000). Anchor also offers an EZ-USB Xcclerator development kit for \$495. The kit includes a development board, an 8051 compiler, a general-purpose USB device driver, and sample firmware and driver code.—by Maury Wright

Anchor Chips, San Diego, CA, 1-619-613-7900, www.anchorchips.com.

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IPR2014-01405, U.S. Pat. 6,493,770