8-BIT RISC MICROCONTROLLER BRINGS LIFE TO INTERACTIVE BARNEY™

CHANDLER, Ariz., April 6, 1998 [NASDAQ: MCHP] – He was one of the bright spots in the lackluster 1997 holiday selling season. He is helping scores of children learn key skills such as counting and recognition of letters, shapes and colors. And he does it all through an 8-bit RISC microcontroller solution that provides high performance and low-power consumption.

“He” is Microsoft® ActiMates™ Interactive Barney™, chosen by several organizations as one of the top toys of 1997. Based on the star of the Public Broadcasting System program “Barney & Friends,” the Interactive Barney purple dinosaur is an innovative early-learning system for children age 2 to 5 that works alone, with the VCR or with the PC.

The ActiMates Barney dinosaur moves his head and arms, plays games, sings songs, plays peek-a-boo, and speaks thousands of words. The toy prompts a child to “squeeze my middle toe to sing a song” and when the foot is squeezed, ActiMates Barney launches into “The Wheels On the Bus” or another one of his 17 songs. Cover his eyes, and he plays peek-a-boo. By squeezing ActiMates Barney’s hand, a child can direct the toy to play one of 12 games, including “This Little Piggy Went to Market.” When both hands are squeezed, the ActiMates Barney sings the popular “Clean-Up” song, encouraging children to pick up their toys when they are finished playing.

ActiMates Barney has sensors in his eyes, hands and feet that let a child choose to play games or sing songs. Controlling this ActiMates toy is a PIC16CR65 8-bit RISC microcontroller from Microchip Technology Inc. The device provides the toy’s general control function, directing the signals to and from the sensors within the eyes, mouth, hands and feet for optimum motion control.

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ADD ONE – ActiMates Barney

In developing the Interactive Barney design, a high-speed controller with low power consumption was required. Microchip’s PICmicro™ microcontrollers provide RISC processing capability, which enables the toy to operate in real-time. They create the natural element so important for interacting with children--and brings Interactive Barney to life.

The PIC16CR65 features 4K words of program memory, 192 bytes of RAM and 33 I/O pins. Several peripheral features are available, including three timer/counters, one Capture/Compare/PWM module; brown-out detect module; and one serial port.

Two accessory products are also available for ActiMates Barney. In the TV Pack, which plugs into any VCR, radio signals are sent to the toy, allowing him to interact with the program and verbally reinforce correct responses for colors, letters, numbers, and story comprehension introduced in the ActiMates-compatible video. A similar process in the PC Pack accessory allows the toy to verbally comment on matching, memory building, shape recognition, and word recognition activities as a child works on a PC.

Another PICmicro microcontroller, the PIC16CR63, acts as the “traffic cop” in the VCR and TV pack accessories for data passing between the transmitter in the toy and the VCR. The device takes signals from the PC or VCR and synchronizes them for transmission to the ActiMates Barney toy, allowing the purple dinosaur to respond in the appropriate manner. The PIC16CR63 in the VCR pack accessory processes video data in real-time to extract the encoded data which is transmitted on the video stream. PBS broadcasts of “Barney and Friends” also contain the specially encoded data, which brings the toy to life when it is turned on during the TV show.

All Microchip microcontrollers, including those found in ActiMates Barney, use a Harvard-type architecture that separates the instruction and data paths into two buses, allowing a 14-bit wide instruction word with separate 8-bit wide data, and increasing the memory bandwidth available to the CPU. Increased bandwidth provides increased performance. The two-stage instruction pipeline allows most instructions to execute in a single cycle.

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ADD TWO -- ActiMates Barney

Both devices have strong on-chip peripheral modules to reduce external components, which lowers the system cost and also reduces power consumption, an important factor to the developers of ActiMates Barney. The capture/compare modules in the PIC16CR63 and PIC16CR65 are used in ActiMates Barney to encode and decode the width-modulated pulse transmission radio data stream, and implement a “digital squelch” when no signal is present, saving hundreds of external gates. Seamless migration of code allows Microchip’s devices to integrate easily into other products, lowering the total cost of development and allowing for easier expansion and future product development.

Microchip Technology manufactures the PICmicro family of 8-bit RISC-based microcontrollers – with OTP, Enhanced FLASH, EEPROM and ROM memory technologies; serial EEPROMs and related specialty memory products; and KEELOQ® code hopping devices. These products target thousands of embedded control applications in the consumer, automotive, office automation, communications and industrial markets. Microchip’s quality systems are ISO 9001 certified. Headquartered near Phoenix in Chandler, Ariz., Microchip employs approximately 2,200 people worldwide and has sales offices throughout Asia, Europe, Japan and North America.

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