

Optimized microcontroller solutions for intuitive HMI designs

By Dirk Heinen, Infineon

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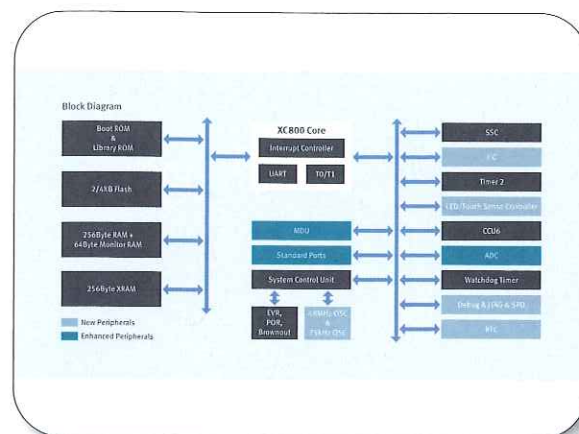


Figure 1. Block diagram of the XC822: inTouch provides innovative, easy-to-use and cost-effective solutions for touch control.

The iPod success story may be the latest and most impressive proof that touch sensing has made its breakthrough to the market. This is not surprising as the benefits of this technology are obvious. Compared to the traditional approach based on mechanical parts, attractive applications like sliding or zooming enable a new dimension for human machine interface (HMI) designs. Moreover displays with touch control are more reliable and robust against wear-out and dirt. Advantages for system designers include reduced bill of material (BOM) costs and higher flexibility in design. Therefore there is an increasing demand to improve HMI design with innovative touch control to make it more intuitive, robust and cost-efficient. With inTouch, Infineon provides cost-effective, scalable and optimized microcontroller solutions for intuitive HMI designs.

The two new MCU series XC82x and XC83x of the XC800 family enable a very cost-effective implementation of energy-saving control concepts. The XC82x derivatives integrate a MDU and a fast ADC to provide a fast PWM unit for sinusoidal commutation with Hall sensors, while the XC83x devices in addition integrate an enhanced vector computer (MDU and CORDIC) to provide full hardware-supported FOC functionality. Addressing efficient power conversion in lighting applications, like current control for LED or power control and ignition

in HID, and single switch topologies with quasi-resonant control as in induction cooking, the XC82x/XC83x MCUs provide a CapCom6 unit clocked at 48MHz and a fast 16MHz ADC with a sample time of only 125ns and a conversion time of about 820ns. The direct hardware link between ADC and CCU6 provides powerful PWM control.

In addition the integrated ADC limit checker realizes a digital comparator with 8-bit resolution. Furthermore the low-cost XC82x and XC83x series offers several new features to provide additional value including touch sensing and LED matrix control, RTC with 32kHz and 75kHz oscillators, and high-current pads for direct drive of stepper gauges. The integrated capacitive touch sensing function allows an attractive switch option. Its ability to drive an LED matrix with up to 64 LEDs, combined with touch sensing while sharing the same pins, makes it unique in the market. In addition direct drive of stepper gauges, over-current detection and slew rate control for optimized EMC behavior enables efficient and intelligent designs. LED displays or stepper motors can be driven with up to 50mA directly from the microcontroller. The technology is based on the capacitive touch sensing principle, optimized for easy use in highly integrated industrial and automotive applications. The capacitive sensing system is a set of conductors

which interact with electric fields, based on the physical effect of the human finger varying the capacitance of the system. In order to make a product out of this concept, a microcontroller is needed. The microcontroller-based control circuit senses and decides whether a touch is incident or not and what action has to be triggered. There are different ways to realize such a solution with a microcontroller. The relaxation oscillator topology used by this approach provides increased robustness against electrical noise and higher reliability with reduced errors. Infineon provides an optimized software library with the basic algorithms for



Figure 2. The color wheel application kit offers a flexible control solution to adjust LED colors with a touch wheel, based on an XC822 microcontroller featuring both capacitive touch and LED supply control.

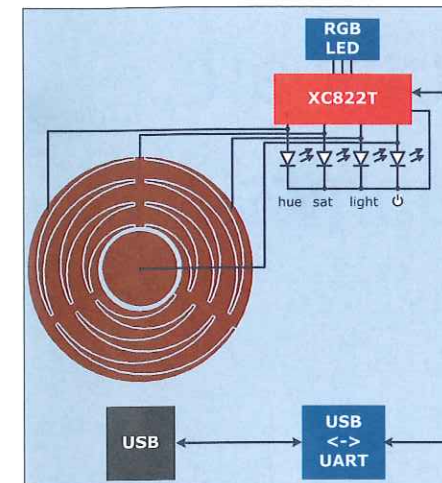


Figure 3. Block diagram of the color wheel application kit

this solution as part of the ROM code, reducing the calibration and adjusting efforts. This leaves flash memory and CPU resources for customer-specific solutions, and designers do not waste time dealing with the basic functionality. The special peripheral unit in the XC82x and XC83x series features a combined solution for touch and LED matrix control through time-multiplexed operation. Operating at high frequency the touch sensing can be combined for example with the control of an LED matrix used in displays. This enables a low pin-count and cheap single-layer PCB solution. For example a standard 12-button keypad can be realized with only 5 pins.

inTouch is the answer to the increasing needs for easy-to-use and cost-effective touch control. The solutions comprise a scalable set of microcontrollers with touch control available for use in industrial and automotive applications. The portfolio includes devices with different flash sizes, numbers of analog input channels, package options, and coprocessor support. To show the capabilities of its advanced touch control solutions Infineon provides the color wheel application kit (figure 2). The KIT_AK_INTouchCW KIT is built around the new XC822T 8-bit microcontroller and is a ready-to-use solution to adjust light color, saturation and brightness using a capacitive touch wheel and button as HMI. The application example code is loaded to the flash memory of the microcontroller and can be accessed and modified with the free development tool chain DAVE Bench. Designers can easily build on this code and develop their own solution with fast time to market. The kit includes an application example code for touch wheel/button and LED color control and the complete documentation and software tools on CD-ROM. A standard USB I/F for power supply and programming access makes a compact and easy-to-use device.

Product News

Microchip: PIC MCUs support multi-function smart-metering

Microchip announces the 8-bit PIC18F87J72 microcontroller family optimised for single-phase, multi-function smart-metering and energy-monitoring applications. Featuring a dual-channel, high-performance 16-/24-bit Analogue Front End, the new MCUs provide an accurate, reliable, easy-to-use and cost-effective solution for developing meters that exceed International Electrotechnical Commission class 0.5 performance. The MCUs integrate 64 or 128 KB Flash programme memory and 4 KB RAM, enabling time-of-use and multi-tariff functions, as well as a high level of peripheral integration, including a LCD driver, hardware Real-Time Clock/Calendar and a Charge-Time Measurement Unit for implementing a capacitive-touch user interface. Energy-calculation firmware, a development board and a reference design are available, providing a complete solution that lowers costs and shortens time to market for a variety of smart-metering and energy-monitoring applications.

News ID 17188

MSC: 16-bit MCU supports interference-free data communication over power lines

MSC now offers the M306S0F8DGP 16-bit MCU from Renesas Electronics. The new MCU enables, to the greatest possible extent, interference-free data communication over existing power lines. The newest member in the successful M16C/6S family combines a M16C core, 64 KB flash and the IT800 powerline communication modem with DCSK modulation on a single chip. The DCSK modulation ensures data transmissions are not disrupted by transients or distortions and thus guarantees extremely reliable communication over existing power lines. The communication methodology of the new MCU adheres to the standard developed by the HomePlug Command and Control industry alliance. As a result, the MCU is particularly suitable for use in energy management systems such as intelligent street lighting control, smart metering and networks within buildings.

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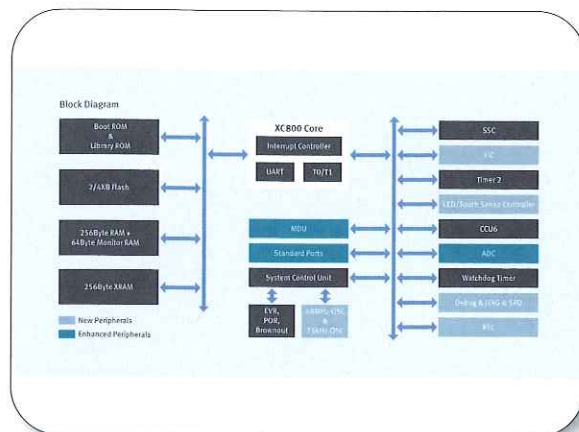


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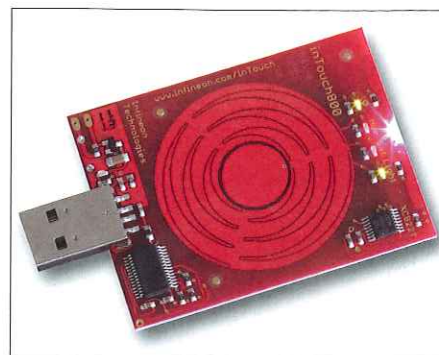


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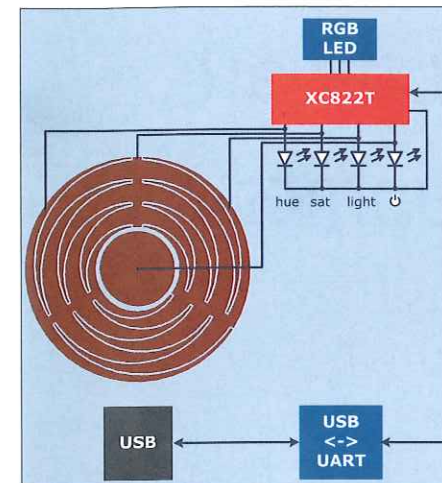


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