

Sqord helps keep children active with TI's eZ430™-Chronos



home activity redeem profile

Company:

Sqord

Challenge:

Designing a multi-device system is a familiar job for engineers. The Sqord team's particular challenge was building an ultra-portable data logger for recording personal activity data that would be transferred wirelessly to a PC to monitor exercise over time. And since it was for pre-teens, it also had to be cool.

Solution:

The system's wristwatch data logger includes TI's CC430F6137 micro-controller (MCU) with an integrated wireless transceiver, an accelerometer, LCD display and battery monitor. A USB dongle links the watch to a PC for processing activity data and displaying it on the Web. TI's eZ430™-Chronos development kit provided the complete hardware/software solution.

Customer benefit:

As a University of North Carolina startup, Sqord had limited financial and engineering resources but tight deadlines. With TI's Chronos solution, designers delivered a working prototype six weeks after opening the kit. System price is less than \$50 – less than half that of brand name products from other sports apparel companies.

“While we were in the pre-design phase, TI was always responsive to our requests, but once we had the kit we really didn't need any technical support. We just used the wiki and TI's white papers. Six weeks after receiving the kit we were logging data on a prototype.”

–Dan Bedard, lead designer for the Sqord project and senior research device engineer at the Renaissance Computing Institute (RENCI).

The challenge

Design flexibility was particularly important to Sqord because success depended on engaging middle-school students in a social media community to improve basic health by raising activity levels. The data logger had to be cool and fun, which would almost certainly require design iterations. A number of more typical design goals were also on the table including minimizing system cost, design cycle time, battery life, software development simplicity, integration with web applications and royalty payments. Limited design resources mandated that original software development be kept to a minimum. Budget restrictions meant Sqord preferred an open-source, royalty-free protocol stack.

The application

For most teens, overall health is directly related to exercise and activity. But the average time spent doing exercise drops from three hours at age nine to just 43 minutes at age 13. Sqord aims to change that with social media and an application that uses a three-axis accelerometer to approximate activity levels by measuring and analyzing the device's motion throughout the day.





“Overall, our first pilot was a huge success. Not only did the results exceed expectations in terms of the increase in physical activity, but we also found the Chronos to be the perfect solution for us based on the device’s functionality and ease of use.”

–Coleman Greene, Founder of Sqord

The data logger transfers its raw data wirelessly to a PC over a wireless link where it is processed and later displayed graphically on a website along with each student’s health profile.

The solution

Sqord took advantage of many of the features of the CC430F6137 MCU, the Chronos development kit and its extensive software. A bandpass filter was easily implemented in software, the MCU had ample flash memory to store a day’s worth of activity and the ultra-low power MSP430™ MCU platform delivered at least six weeks of battery life. The kit’s software libraries

accounted for the short development cycle. “Ninety percent of the software we used in the design was available from the libraries,” says lead designer, Dan Bedard, for the Sqord project and senior research device engineer at the Renaissance Computing Institute (RENCI), which incubated the Sqord project in the Carolina Launch Pad program.

OEM customer benefits

The target audience couldn’t be happier: “My friends keep asking me where they can get one of the watches so they can compete with me,” says one of the 11- to 12-year

olds at Durham Academy, Durham, NC. Sqord founder Coleman Greene calls the pilot successful, primarily because the students quickly formed a mutually supportive community to improve their health. But the project also hit its <\$50 per unit price target, delivered the initial working prototype in six weeks and kept design costs low as well.

From a design perspective, Bedard lists the easy interfacing of two MCUs – one in the watch the other in the dongle – as an important time saver and TI’s off-the-shelf SimpliciTI™ protocol as major factors in the short design cycle.

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