Embedded Communications Processor at Core of Videophone's Success

The Project: To develop an interactive videophone with a digital stethoscope and support for various medical peripherals.
The Solution: Use a highly integrated embedded processor that handles numerous communications protocols and minimizes the need for expensive interface logic.

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(click the image to enlarge)

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By Stuart Ross and Chris Hale

The escalating cost of healthcare, the rising tide of an aging population, and the expansion of cost-effective, reliable consumer broadband connections have set the stage for a revolution in home healthcare. With such a set of conditions, the healthcare industry is raising the curtain on innovative and interactive solutions that will substantially reduce the cost of patient care.

Many distinct approaches have evolved with each promising to increase the quality of patient care. These approaches include platforms that provide both real-time interactive home healthcare and automated medical data aggregation. All share the need to integrate effective patient interaction and automated data collection into an agile communications platform while hitting a cost target that provides a suitable return on investment.

Multimedia platforms offer affordable and compelling solutions for telehealth, putting a new face on interactive in-home monitoring and patient care. They can be used in many telehealth applications including pediatrics, geriatrics, mental health, rehabilitation, and cardiology. They also are valuable tools for reaching out to patients who live in remote areas or who may not have access to health care. These

unique devices help decrease nurse workload, nurse/patient home visits, and patient hospitalizations. With the attachment of medical peripherals, the devices also allow for accurate and reliable monitoring of vital signs and help patients stay in compliance with doctor's orders for disease management and control.

The CareStation platform from Motion Media Technology Inc. is one example of a multimedia appliance for the telehealth industry. Central to the CareStation platform is the CS156S videophone, which is built around a ColdFire communications processor from Freescale Semiconductor Inc.

The videophone provides a high level of patient interaction via two-way audio and video as well as the capture of medical telemetry and patient response, thereby extending the care provider-patient relationship remotely. This appliance goes beyond the basic videophone by integrating a digital stethoscope and support for a variety of external medical peripherals into a standalone system that works over both PSTN and IP networks.

Thanks to the multifaceted capabilities of the embedded communications processor, patient data on blood pressure, pulse rate, blood glucose, weight, temperature, blood hemoglobin saturation, and fetal vital signs can be transmitted to the care provider and captured as an integral part of disease management.

The selection of this highly integrated embedded processor as the core control processor was critical to the successful design of the CareStation. It provides affordable high-core performance, versatile and comprehensive on-board peripherals, and integrated communications features. These enable the appliance to minimize the need for additional and expensive interface logic. The result is a clean, simple design that allows the CareStation to support numerous communications protocols such as USB, Fast Ethernet, and RS232 links. It also enables the CareStation to adapt dynamically its operational modes and functions to meet the demands of many different classes of patient care.