

# Applying Tech: Portable Medical, Part I

### How Are You Influencing Portable Medical Technology?



Clark Hummel  
Application Engineer Manager, Intelligent Motion Systems Inc.

Packing maximum functionality into minimum space is a prerequisite of portable medical device design, with minimizing product size often the key criterion in the design and development process.

Integrated stepper technology, as exemplified by the MDrive family of products from Intelligent Motion Systems, helps designers and engineers successfully achieve their requirements for compact product size. By integrating a stepper motor, drive, encoder, and motion controller into a single compact package, space requirements are greatly reduced when compared to designs using individual components. MDrive integrated products are able to significantly reduce the amount of space required within a device by consolidating components and eliminating wiring. Reducing wiring also reduces the number of potential failure points and results in a more robust device.

In addition, integrated motion control products also reduce the amount of time required to design and develop traditional component-based solutions, reducing development costs and shortening the time-to-market.



Alex Brisbane  
President and COO, KORE Telematics

In order to make portable healthcare a reality, a data connection to the patient is absolutely necessary. With nearly one in every six homes no longer utilizing a landline phone, a simpler and more patient-friendly technology has taken over—wireless data communication. With cellular connectivity, portable monitoring devices transmit medical data in real time, allowing patients to lead more active, independent lives, while still having medical diagnostics reported to a doctor.

Furthermore, with an increasing number of Alzheimer's and other patients "wandering" from caregivers, it is vital to do everything possible to ensure their safe return. Technologies using cellular network services, rather than GPS-based technology solutions, become capable of locating lost individuals, even if they wander inside a building, under a structure or just about anywhere—and ultimately bringing them back to safety faster.

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David Niewolny

Medical Segment Manager, Microcontroller Solution Group, Freescale Semiconductor Inc.

Freescale is a leading supplier of embedded solutions to the portable medical market. The technology we provide as an embedded solution provider ranges from microcontrollers/microprocessors to sensors, analog components, and wireless technology. Each of these items plays a key role in the portable medical space. Freescale's ultra low power microcontrollers, the brain of an embedded system, are enabling portable medical manufacturers to utilize cutting edge technology, such as advanced diagnostic software algorithms, segment and graphical LCD screens, touch sensitive control, and wireless communication, all while consuming a very small amount of power. Looking to the future, Freescale technology will be enabling device manufacturers to eliminate batteries altogether. One of the latest analog technologies, an ultra-low power DC to DC converter, enables IC startup thresholds to be reduced to 0.32 V and offers efficiencies of nearly 90%. This technology has the potential to enable devices that are powered solely by the human body.

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Rajeev Nabar  
Head R&D, Portescap

Miniature motors are the power behind most of today's portable medical devices, including dental hand tools, insulin/implantable pumps, small lab automation systems, and respirators, among others. And with its unique design features, coreless miniature motor technology in particular is having a very positive impact on portable medical devices for the following reasons:

**Size and Weight**—For medical devices to be truly portable, they need to be much more compact and lighter than their desk-mounted predecessors, which are highly supported by small sized miniature motors starting from a frame size of 8.0 mm weighing as low as 3.8 g.

**Performance**—Coreless motors provide torque value ranging from 0.66 to 155 mNm to deliver particularly high performance with the precision and reliability demanded of medical devices.

**Noise and Efficiency**—For the plethora of disposable or continuously operated devices that demand very low noise levels (for medical therapies taking place next to a sleeping/resting patient, devices used in public places, respirators etc.), coreless motors (with noise levels of 45 db for brush DC and 28 db for brushless motors) are highly suitable.

**Operational Life**—Operational life requirements for these battery-powered devices are affected by motor selection. Coreless motors draw low current (e.g., a 16 mm draws as low as 0.1 A of current at 15 volts), provide longer battery life (almost twice the life of iron core motors), and have passed rigorous environmental condition tests, proving their mettle in the field of portable medical devices.



Christine A. Van De Graaf  
Product Manager, Embedded Modules Division, Kontron America

With the portable medical equipment industry booming, medical equipment manufacturers are constantly looking for ways to pack more features and functionality into less physical space. Computer-on-Modules (COMs) are a proven form factor for a range of portable medical electronic applications where they fit mechanically, economically, and functionally. Implementing modular solutions can drive faster time-to-market, reduce development cost, and minimize design risk. Their simplified upgrade paths, scalability, and increased application longevity lead to the potential for increased market share. And with the medical electronics industry quickly moving down a path similar to consumer electronics, portable is now evolving to ultra-portable. COMs have fulfilled early portability requirements with performance, flexibility of design, and easy customization, with today's designers tapping into an even broader range of module-based solutions, including micro and nano options that extend the definition of the word portable even further. Coming COMs developments will increase ruggedness, such as tolerance for shock, vibration, and extreme temperatures, allowing even greater viability for portable medical devices.

By incorporating COMs' inherent low power consumption, extended battery life for high efficiency, and high precision, device manufacturers are giving medical practitioners the ability to make faster, more accurate clinical decisions at the point of care.

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