



# Freescale Medical Solutions

Technology for Life



[freescale.com/medical](http://freescale.com/medical)



## Freescall anticipates certain factors driving the medical device market and is well positioned to support the resulting trends.

These factors include aging populations, rising healthcare costs, remote and emerging market growth, and increasing numbers of fitness-minded individuals who proactively manage their health. These market factors, along with advancements in semiconductor technologies, provide the potential for transforming the care that we all receive. Medical imaging technology commonly found in radiology or imaging centers can now be found in ambulatory or combat situations. Clinical equipment formerly relegated to the hospital or doctor's office is now moving into the home. Portable medical equipment such as blood pressure monitors, blood glucose meters and weight scales are now connecting to data aggregators or hubs and transmitting personal health data to the medical cloud. All types of healthcare equipment are being pushed from their roots in clinics or hospitals and into the home.

### Key Challenges

Developers of medical devices face several challenges. The need to balance processing requirements with power consumption, the

need to provide a faster time to market, and the need to navigate the regulatory environment are common to all healthcare applications. Freescale designs a range of embedded products and applicable reference designs that allow developers to choose MCUs, processors, analog, sensors and wireless solutions to meet their design requirements.

### Home Portable

The home portable medical market is one of the fastest growing segments in the medical device industry. Portable home medical devices share the need for long battery life, robust data processing and a wired or wireless communication interface. Freescale MCUs offer the perfect mix of high processing capabilities, low power consumption and analog content. For this sub-segment, the 8-bit S08 JE/JM and LH/LL cores are well suited for designs where cost is a key concern. For greater performance, our Kinetis MCUs built on ARM® Cortex™-M4 and ARM Cortex™-M0+ technology are empowering

analog intensive designs and lowering power consumption, common requirements found in diabetes and cardiac care applications. Furthermore, as a pioneer in the communications market, Freescale offers solutions for wired and wireless interfaces, including USB, IEEE® 802.15.4, sub-Gigahertz, ZigBee® and Bluetooth® Low Energy technology.

Freescale micro-electromechanical system (MEMS)-based pressure and acceleration sensors can be used to acquire physical parameters. User interfaces embedded with proximity sensors enable medical-friendly buttons and touch screens that can be sanitized quickly and easily.

Lastly, Freescale offers a focused, integrated analog portfolio that enables maximum battery life via power management ICs and allows precise and accurate conversion of natural, continuous signals to digital signals that MPUs can process. Medical customers can also benefit from specific custom solutions that leverage our core competencies in precision analog, mixed signal and power management technologies.

### Diagnostics and Therapy

Reliability and accuracy are key considerations for diagnostics and therapy devices. These devices are used in critical

situations when physiological events must be recognized quickly and addressed appropriately. These medical devices need a processing core that is powerful enough to acquire, process and interpret several parameters at once.

A full spectrum of 32-bit processors (Kinetis MCUs built on ARM Cortex-M4/M0+ cores, Vybrid, ColdFire, i.MX and Power Architecture®) offers device designers the right mix of performance and integration. Integrated USB and Ethernet drivers facilitate convenient data transfer from a device to a PC for processing or long-term storage. LCD interfaces, common on Kinetis and ColdFire MCUs and the i.MX family of MPUs, provide clinicians and patients a meaningful way to visualize clinical data in real time. The i.MX53 processor, in particular, is being designed into several patient monitoring applications.

If multicore technology is desired today or in the future, Freescale offers the i.MX 6x and Vybrid product families. The i.MX 6 series unleashes the industry's first truly scalable multicore platform that includes single-, dual- and quad-core families based on the ARM Cortex™-A9 architecture. Together with a robust ecosystem, i.MX 6 series provides the ideal platform to develop a portfolio of end devices based on a single hardware design. Vybrid devices are built on an asymmetrical multiprocessing architecture using ARM cores (Cortex-A5 and Cortex-M4) as the anchor for the platform. The Vybrid portfolio brings to market a unique, low-power system solution that provides customers a way to combine rich applications requiring high-resolution graphical displays and connectivity with real-time determinism. This enables designers to create systems that concurrently run a high-level operating system such as Linux® and a real-time operating system using a single device. Diagnostic and therapeutic medical devices can be positioned for both the home and clinical markets. The Freescale controller continuum enables development on an 8-bit platform for simple home devices which can then be upgraded to 32-bit platforms as new application needs arise for the clinical market. The controller continuum serves as a powerful resource

for building fully integrated, scalable medical solutions for the home or the clinic.

## Imaging

The complexities of medical imaging require extraordinary processing and RF power. Modalities, such as magnetic resonance imaging, computed tomography scans and ultrasound all push the performance limits for advanced integrated I/O, rigorous data processing, powerful display capabilities and high levels of connectivity. Many of these needs are addressed by the Freescale family of Power Architecture multicore processors and RF amplifiers.

The Power Architecture family is designed for applications that require a rich user interface with complex displays and connectivity options with various standard protocols. Freescale RF power amplifiers provide the high output power required to achieve the desired frequency of resonance.

## The Freescale Difference

Through leadership in the Continua® Health Alliance technical working group, Freescale helps to set standards for the industry. Freescale retains a medical doctor on staff and has a Medical Center of Excellence to develop new technologies. Additionally, Freescale offers a robust portfolio of medical-centric development systems, reference designs and application notes that help customers go to market faster. The Freescale Tower System, a modular development platform, saves months of development time through rapid prototyping and tool re-use. By offering several application specific reference designs that include schematics, layouts (Gerber files), and example application code and user interface software, customers can get up and running with their application much more quickly. The 15-year Product Longevity program provides a minimum 15 years of assured supply for devices for medical applications. With an internal review defined in a standard operating procedure, Freescale supports FDA class III or life-critical applications in the U.S. and worldwide. Quality, reliability, supply assurance and company and product longevity are key to understanding the needs of the healthcare market.

**Freescale offers a robust portfolio of medical-centric development systems, reference designs and application notes that help customers go to market faster.**



Freescale is dedicated to helping people live healthier lives by driving innovation and providing high-quality technical solutions that enable the development of breakthrough medical products.

## Summary

From portable medical solutions to diagnostic, patient monitoring and therapy systems, Freescale provides ultra-low-power mixed signal MCUs, high-performance analog, as well as wired and wireless connectivity that help solve true clinical problems. Freescale offers not only one of the strongest portfolios of semiconductor products, but also custom IC development in support of this segment. Vital technology, expertise and leadership make Freescale the trusted provider of high-quality technical solutions that enable the development of breakthrough medical systems from health and wellness to life-critical applications.



Freescale provides a Product Longevity program for the market segments we serve. For the automotive and medical segments, Freescale will make a broad range of devices available for a minimum period of 15 years. For all other market segments in which Freescale participates, Freescale will make a broad range of devices available for a minimum period of 10 years. For more information, visit [freescale.com/ProductLongevity](http://freescale.com/ProductLongevity).

For current information about Freescale products and documentation, please visit [freescale.com/medical](http://freescale.com/medical)



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