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## **Zarlink – New kit speeds design / evaluation of medical wireless telemetry systems**

A new development kit that enables faster design and evaluation of wireless telemetry systems linking implanted medical devices with monitoring and programming equipment has been unveiled by Zarlink Semiconductor.



Medical device manufacturers are developing telemetry systems that will support new monitoring, diagnostic and therapeutic applications to improve patient care and lower healthcare costs. Zarlink's ZL70101 radio frequency (RF) transceiver chip is being designed into a range of implanted medical devices, including pacemakers, implantable cardioverter defibrillators (ICDs), neurostimulators, drug pumps and physiological monitors, and associated external monitoring and programming equipment.

The ZLE70101 Application Development Kit (ADK) demonstrates the high data rate, ultra low-power and reliable communication link supported by the ZL70101 transceiver. The highly integrated RF chip delivers data rates up to 800 kbps and operates in the Medical Implant Communication Service (MICS) 402-405MHz band. The chip typically consumes 5 milliamps of supply current in full operation, while incorporating a unique 'wake-up' receiver that allows the device to operate in an extremely low current 250 nanoamp 'sleep' mode.

The ZL70101 chip includes a fully featured media access controller (MAC), designed specifically for MICS applications, that provides forward error correction, cyclic redundancy check and retransmission to achieve an extremely reliable data link.

The ZLE70101 ADK includes all hardware and firmware required to permit customers to test the performance of the in-air communication link between implanted devices and external equipment. A commonly used application microcontroller is used for both the implant and base station platforms to enable rapid integration into a customer's specific system design. An easy-to-use graphical user interface (GUI) running on a Windows-based PC controls and demonstrates the capabilities of a ZL70101-enabled medical telemetry

system. The GUI interfaces to the MICS RF boards via a USB2.0 interface.

The kit includes an Applications Development Platform (ADP100) board that interfaces with the PC through a USB2.0 interface to either the implant or base station mezzanine boards. The Application Implant Mezzanine (AIM100) board performs all MICS related implant communications. This board includes the ZL70101 transceiver, discrete circuits including matching networks for normal data transmission and wake-up operation, an application microcontroller connected to the ZL70101 over an industry-standard SPI bus, and an SMA connector interface to a PCB-based loop antenna. The board operates on an included battery to simulate normal implant operation.

The Base Station Mezzanine (BSM100) board performs all MICS-related base station/monitoring equipment communications processing. The board includes the same features as the AIM100, with the addition of a wake-up transmitter subsystem and a received signal strength indicator (RSSI) filter for performing clear channel assessment (CCA). The BSM100 also includes a dual-band antenna optimized for performance in the MICS band and supporting wake-up signaling.

Also included is a MICS Test Adaptor (MT100) board that enables the probing of key digital and analog signals for the ZL70101 chip on either the implant or base station board. A Programmable Cable Adaptor (PCA100) board and cable enables programming and debugging support for the included applications microcontroller.

The ZLE70101 ADK is supported by extensive documentation, including a ZLE70101 ADK user guide, source code overview and board-level documents with schematics, layout, Gerber files and bill-of-material. To save valuable time in the development process, the ADP100, AIM100 and BSM100 are fully supported by embedded firmware with thoroughly commented source code to help developers quickly understand the programming requirements of the ZL70101 chip while allowing for firmware reuse, says the company.

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