Generic Telemetry Chip for Power and Bidirectional Data Telemetry in Implantable Microsystems

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Thanks to advances in microtechnology, stand-alone subcutaneous operation of biomedical microsystems is now not only possible, but is facilitating important new applications, such as auditory and visual prostheses and bio-signal recording.

To be *implantable*, a microsystem, in general, needs to receive its operating energy from the outside and be able to communicate with the external world bidirectionally. Implantable microsystems, independent of their application, require wireless interface modules with the general block diagram of Figure 1. Data, clock, and power are transferred to the microsystem via the *forward telemetry link*, and a *reverse telemetry link* transmits data from the system to the outside world.

To help minimize the time and effort in designing wireless interface modules with the same general functionality, a generic telemetry chip (GenTel) has been designed for power and bidirectional data telemetry in implantable biomedical microsystems. Figure 2 shows a photograph of the fabricated chip, which measures 2.2mm x 2.2mm. The programmability available in the regulated supply voltage (~2V–5V) and its current delivery (up to 15mA), a similar programmability available for carrier frequencies and bit rates of the forward and reverse telemetry links, and the option of performing data encoding for reverse data telemetry are among the features that make this chip a generic solution for a variety of implantable biomedical microsystems. ■

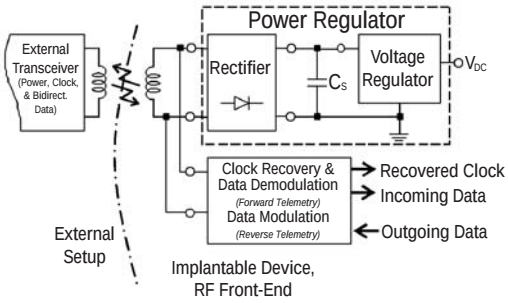

Figure 1 – General block diagram for the bidirectional wireless interface module.

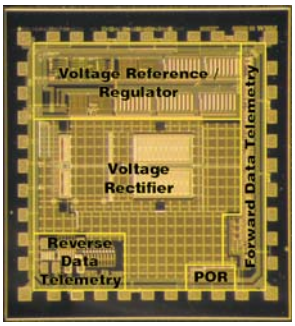

Figure 2 – GenTel chip die.