

Efficient operation of the monitoring device requires that the inductive power transmission from the reader and to the data carrier is adjustable in strength. In case excessive power is transmitted to the data carrier, the excessive power will be lost and in case insufficient power is transmitted to the data carrier, the data carrier will not be able to carry out its intended functions. Efficient operation of the monitoring device therefore requires a power control loop, where the data carrier sends information to the reader, enabling the reader to control the strength of the power transmission such that both excessive and insufficient power transmissions are avoided. It is also required that the strength of the power transmissions can be varied in a power efficient manner.

US-A-6073050 discloses an efficient RF telemetry transmitter system including a first stage and a second stage. The transmitter system sends power and data to an implant device using pulse-width modulation of a high fixed frequency clock signal, e.g. a 49 MHz clock signal, within the first stage in order to provide efficient generation of an RF output signal in the second stage. Pulse-width modulation of the fixed frequency clock signal is used in order to optimally set the drive level of the output signal of the first stage. ON/OFF keying, or another modulation scheme, further modulates the clock signal with data in the first stage. The second stage includes a Class-E amplifier circuit.

It is a feature of the present invention to provide a monitoring device with improved means for inductive power transmission, hereby providing a monitoring device with reduced power consumption.

It is still another feature of the present invention to provide an improved method for controlling the strength of the inductive power transmission.

SUMMARY OF THE INVENTION

The invention, in a first aspect, provides a monitoring device according to claim 1.

According to the first aspect, there is provided a monitoring device consisting of a reader and a data carrier, wherein the reader

comprises a control unit, a memory, a digital signal generator, an output driver, a resonance capacitor and a transmitter coil wherein the digital signal generator is adapted for supplying a digital bit sequence selected among, at least two, bit sequences stored in the memory, wherein the bit sequences stored in the memory are pulse density modulated in order to represent distorted analog sine signals with a fixed first-order harmonic frequency and variable amplitude, whereby the strength of the magnetic field generated by the transmitter coil can be varied dependent on the bit sequence selected by the control unit, and wherein the bit sequences stored in the memory have been optimized with respect to the strength of another harmonic frequency.

This provides a monitoring device with reduced power consumption.

The invention, in a second aspect, provides a method according to claim 132.

According to the second aspect, there is provided a method for controlling the strength of an inductive power transmission between

a reader and a data carrier in a monitoring system by controlling the strength of a magnetic field generated by the reader of the monitoring device, said method comprising the steps of: determining the desired strength of the magnetic field, selecting a digital bit sequence from a memory, having bit sequences stored in the memory that are pulse density modulated in order to represent distorted analog sine signals with a fixed first-order harmonic frequency and variable amplitude, generating a digital signal by reading out said bit sequence with a predetermined clock frequency, generating a magnetic field by passing said digital signal through an output driver and a resonator circuit comprising at least a capacitor and a coil, and having bit sequences stored in the memory that have been optimized with respect to the strength of another harmonic frequency of the digital signal.

This provides a power efficient method for controlling the strength of an inductive power transmission between a reader and a data carrier in a monitoring system.

Further advantageous features appear from the dependent claims.