AS3990/91 single chip Gen2 UHF RFID reader solution

- Gen2 protocol reader engine
- ISO 18000-6c
- Compact size
- Low power
- Easy implementation
General Description

The AS3990/91 UHF reader chip is an integrated analog front end and data framing system for a 900MHz RFID reader system. Built-in programming options make it suitable for a wide range of applications in UHF RFID systems. Designed to simplify the design and implementation of an EPC Class 1 - Gen2 reader, this IC requires only a standard 8-Bit microcontroller with minimal other components.

The AS3990/91 comprises the EPC Class 1 - Gen2 protocol (ISO 18000-6c) with digital high speed logic up to the framing level and supports the ISO 18000-6a and ISO 18000-6b Protocol with direct data mode.

Applications

RFID label printers
Add-on module for handheld computers, PDA
Point of sales
UHF RFID reader systems
Hand-held UHF RFID readers
Toll systems
Mobile phones
Shelf readers

Features

- Compliant with ISO 18000 6a, 6b, 6c and EPC - Class 1 - Gen2 protocol using external MCU
- EPC Class 1 - Gen2 framing support using low cost 8-Bit microcontroller
- Direct data mode in the frequency range of 860 to 960 MHz enables propriety Protocol support
- Internal power amplifier with level controlled 20dBm for short range applications (AS3991 version only)
- Modulator using ASK-DSB or PR-ASK modulation
- Automatic selection between I and Q Signal
- Built-in reception low-pass and high-pass filters ensuring no “communication holes”
- On-chip VCO and PLL covering complete RFID frequency range and frequency hopping support
- Selectable receiver gain with AGC
- Supported link frequencies from 40 up to 640kHz
- Oscillator using 20MHz crystal
- Power down, standby and active mode

Functional Description

The Interface to the microcontroller can be either a 4-pin serial date Interface (SDI) or alternatively in case of high data rates are necessary an 8-Bit parallel. The frame management will be done using a 24-Byte FIFO in order to decrease processor work-load and ensure a smooth data stream and correct protocol handling. All low level transmission codec’s and CRC generation is done internally.

In order to reduce the BOM, an integrated can be used to supply the microcontroller. Additional regulators for the RF section suppress disturbances and thus allow noisy main supply.

A 20MHz crystal is used for the reference oscillator. Using this reference, an additional programmable glitch free clock output can be used to clock the microcontroller thus saving costs and current. In addition, by using the integrated power management features modes power-down, standby and active it is possible to shut down or reduce the microcontroller clock and hence save additional power.

The transmitter generates 20dBm output power into 50Ω load and is capable of ASK-DSB or PR-ASK modulation.

The receiver system enables AM and PM demodulation. The receiver also comprises automatic gain control option and selectable gain and signal bandwidth to to cover all specified frequencies from 40 to 640 kHz.