

RFID reader-writer based on DSP

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Abstract. The RFID reader-writer has designed based on DSP in the paper, the reader-writer is mainly composed of reception and launch antenna module, DSP control module, receiver module, A/D conversion module, the digital baseband processing module, D/A conversion module, transmitter module, the first filter module, the second filter module and the interference signal collection module. Because of the function of DSP control module and filter module, the interference is eliminated, and the sensitivity of RFID reader is improved, which solves the problem that the interference signal of transceiver and leakage is restricted to sensitivity of read and write RFID.

1. Introduction

Radio frequency identification RFID technology, also known as radio frequency identification (RFID), is a communication technology. It can identify specific targets through radio signals and read and write related data without identifying the system to establish mechanical or optical for contacting with specific targets. And RFID is noncontact. RFID technology is widely applied With the development of society and the improvement of people's living standard, such as library, access control system, food safety traceability, logistics management and so on. Radio frequency identification system [1-5] is mainly composed of RFID reader-writer and tag, information is transmitted through the wireless electromagnetic wave between the reader-writer and tag. When signals are transmitted between the electronic tag and RFID reader-writer, signal has been leaked. Because this leaked signal becomes an interference signal of the receiver, and the receiver will be blocked, the receiving signal will be distortion. At the same time, due to the noise interference signal will enter into the receiver, the isolation of radio frequency identification [6-9] is limited between the transmitter and the receiver. In order to solve this problem, a solution of interference signal leakage between the transmitter and the receiver is proposed by limited the RFID reader-writer sensitivity in this paper.

2. The design of RFID reader-writer based on DSP

The RFID reader-writer has been designed based on TI's TMS3705 base station chip in this paper, and the base station chip is used to design the base station transmitting and receiving circuit, and the base station antenna is designed. The transmitting the data by radio frequency card is received by the radio frequency base station antenna , and the data flow from the base station's output foot is sent to the input port of the microprocessor. The base station only completes the reception and rectification of the signal, and the demodulation and decoding of the signal is done by the microprocessor. The timing for the decoding operation is simulated based on the duration of the input signal at the high level and the low level by the microprocessor. The popular coding methods now have Manchester coding and Biphase coding.

The RF card used in this system is RFM001 read-write card. The read and write characteristics of RF cards include EEPROM storage allocation, synchronization signal, transmitting frequency, card control logic, writing card and other card operation command format.

The RFID reader-writer based on TMS3705 DSP chip includes antenna module, DSP control module, receiver module, A/D conversion module, the digital baseband processing module, D/A conversion module, transmitter module and a first filter module; the emission signal of the external tag is transmitted to the receiver module by the antenna module and DSP control module, signal output end of the receiver module is connected with the digital baseband processing module and the A/D converter; signal output end of the digital baseband processing module is connected with D/A conversion module and signal input end of transmitter module, transmit signals will be transmitted to the outside world tag through the first filter module and the antenna module.

The RFID reader-writer system also includes the interference signal acquisition module and the second filter module. The interference signal acquisition module collects the interference signal in the receiver module, and the interference signal is transmitted to the DSP control module through the second filter module. The interference signal acquisition module is used to collect the signal containing the characteristics of the interference signal from the signal received by the receiver, and the signal is transmitted to the DSP control module through the second filtering module. the schematic diagram of a RFID reader-writer is shown in Figure 1, and the circuit diagram of a RFID reader-writer is shown in Figure 2 .

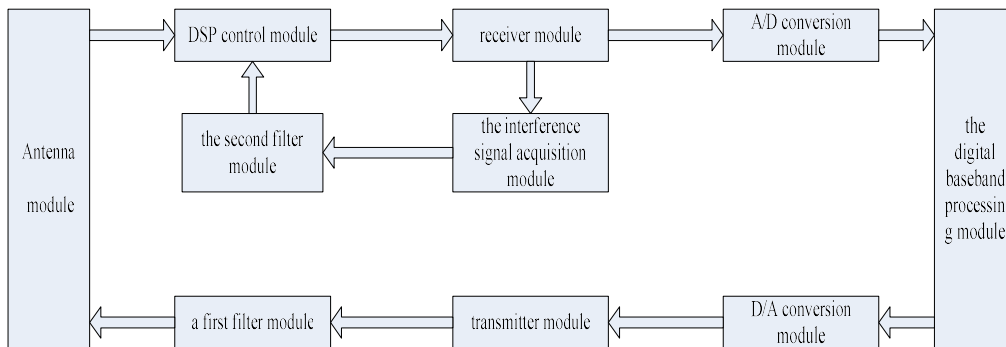


Fig.1 the schematic diagram of a RFID reader-writer

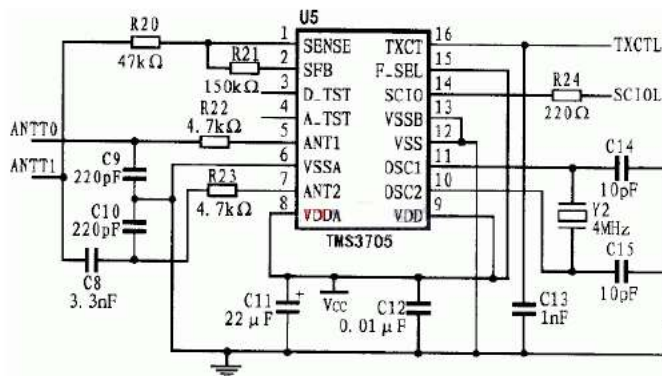


Fig.2 the circuit diagram of a RFID reader-writer

3. Conclusions

A RFID reader-writer is designed by TMS3705 DSP in this paper. The reader-writer can identify specific targets through radio signals and read and write related data without identifying the system to establish mechanical or optical for contacting with specific targets. Because of the function of DSP control module and filter module, the interference is eliminated, the sensitivity of RFID reader is improved, which solves the problem that the interference signal of transceiver and leakage is restricted to sensitivity of read and write RFID.

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