

波形控制发生器

摘要

本论文主要阐述了一个基于单片机最小系统的工作原理，外部电路和其引脚功能以及 AD9837 芯片（可编程波形发生器）的外部电路以及其各引脚功能，通过将他们连接并根据其引脚性能和三种波形的工作原理设计了对应的单片机程序录入单片机中，而后在实践成功组装了一个完整的波形控制发生器，该波形控制发生器能通过不同按键的选择来决定于示波器上输出哪种波形，并将该波段的频率于 LCD 显示屏上进行显示。本论文重点讲述单片机最小系统及其外部电路设计原理，AD9837 外部电路设计原理和其各引脚功能，三种波形的工作原理和其 C 语言程序设计编写。重点描述制作出一个波形控制发生器的步骤思路和电路连接的原理。

该波形控制发生器主要有以下功能：

- 1: 三种波形的任意输出
- 2: 频率的可控调节
- 3: 波形之间的相互中断
- 4: 频率的外部显示

本波形控制发生器主要步骤如下:

1. 阅读书籍, 查阅资料去充分了解熟悉单片机和 AD9837 芯片的外部电路工作原理及其各引脚所具有的功能。

2. 基于各器件的引脚原理而进行的可靠的连接电路图设计以及显示控制按键和单片机之间的电路设计。

3. 根据 AD9837 提供的三种波形的工作原理和其各引脚性能来使用 KeilC51 软件进行有效的波形程序设计编写。

4. 将程序录入单片机中并于示波器连接, 通过不同按键的选择在示波器上观察相应的处理情况。

关键词: STC89C52 单片机, AD9837 芯片。

Abstract

This paper mainly describes a working principle based on the minimum system of the single-chip microcomputer, the external circuit and its pin functions, and the external circuit of the AD9837 chip (programmable waveform generator) and its pin functions by connecting them and according to their pins. The performance and the working principle of the three waveforms are designed to input the corresponding single-chip microcomputer program into the single-chip microcomputer, and then a complete waveform control generator is successfully assembled in practice. The waveform control generator can determine the output on the oscilloscope through the selection of different buttons. The waveform is displayed and the frequency of the band is displayed on the LCD display. This paper focuses on the minimum system of MCU

and its external circuit design principle, the external circuit design principle of AD9837 and its pin functions, the working principle of three waveforms and its C language programming. The key steps to create a waveform control generator and the principle of circuit connection are described.

The waveform control generator mainly has the following functions:

- 1.Any output of three waveforms
- 2.Controllable adjustment of frequency
- 3.Mutual interruption between waveforms
- 4.External display of frequency

The main steps of this waveform control generator are as follows:

1.Read the books and consult the data to fully understand the working principle of the external circuit familiar to the MCU and AD9837 chip and the functions of each pin.

2.Based on the pin principle of each device, the reliable connection circuit diagram design and the circuit design between the display control button and the single chip microcomputer.

3.According to the working principle of the three waveforms provided by AD9837 and its pin performance, use KeilC51 software for effective waveform programming.

4.Enter the program into the MCU and connect it to the oscilloscope. Observe the corresponding processing on the oscilloscope through the selection of different buttons.

Key Words: STC89C52 microcontroller, AD9837 chip.

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