Design of Temperature Measuring and Controlling System Based on STM32

Xiangtong Kong, Chunping Wang, and Shuying Sun

Department of Optical and Electronic Engineering,
Ordnance Engineering College, Shijiazhuang, 050003, China
kongxiangtong28@163.com

Abstract. In the DIP devices' quick release system's design, the temperature adjustment of the solder is needed to protect the circuit. In this paper, a intellective temperature control and measure system is designed, which is based on the STM32 series micro-controllers. The structure of the system's hardware is introduced detailed. For the Fuzzy-PID temperature control strategy, the system can adjust the temperature of the solder accurately.

Keywords: DIP, temperature control, STM32, Fuzzy-PID.

1 Introduction

For most of the DIP package devices' disassembly tools, misconduct will result in a tilt of the circuit board copper foil or the damage to the peripheral devices, even cause the circuit board scrap accident[1]. For the above defects, we designed a tin bath for the disassembly technique based on local heating. As the disassembly device needs accurate temperature of the solder, while the traditional analog temperature control method's accuracy is not higher enough to meet the requirements, therefore, to design a convenient and accurate temperature measuring and controlling system is very important.

The design of the temperature control system based on MPU can significantly improve the efficiency and accuracy of temperature control. The microcontrollers of STM32 family is produced by STMicroelectronics which is a type of 32-bit, sustain real-time simulation and tracking, based on the ARMv7 architecture. It also has the advantages of high performance, low cost and low power consumption [2].

This paper describes a design of temperature measurement and control system based on the microprocessor STM32F103R8. By using a simple touch-screen-based interactive systems, we can facilitate the achievement of real-time display and precise control the temperature.

2 The Structure of the DIP Rapid Removal Tools

The traditional commonly used removal tools, such as the hot air gun, tin stove ,have the problems of the heating area is too large ,So it's easily to damage the surrounding

D. Yang (Ed.): Informatics in Control, Automation and Robotics, Volume 2, LNEE 133, pp. 253–258.
springerlink.com

devices. In order to solve these problems, The designed heated Tin bath tooling is shown in Figure 1.

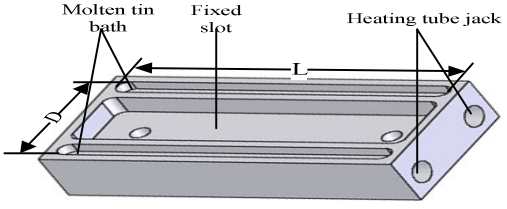

Fig. 1. The Schematic diagram of heated tin bath tooling

The jack of the Heating tube is located in the below of the molten tin bath, by inserting the Heating tube to heat up the solder. The model of the Heating tube is BaKon1323. The structure is shown in Figure 2.

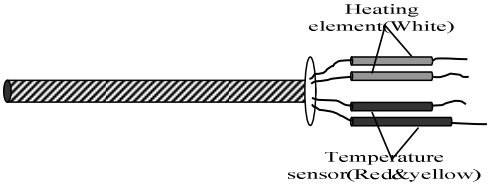

Fig. 2. The Schematic diagram of the BaKon1323

3 Temperature Control System Hardware Design

The system mainly consists of the micro-controller module, the data acquisition module, the temperature control module, and interactive module and other components. The overall structure of the system is shown in Figure 3.

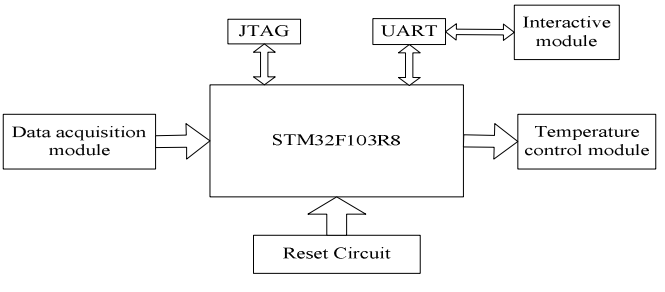

Fig. 3. System block diagram

3.1 The Micro-controller Module

The Micro-controller module is made up of the STM32F103R8 and its peripheral circuit, mainly used for the data transmission and processing, which is the core of the system. The operating frequency of this type microprocessor is 72MHz, with 128K bytes of Flash