Abstract

Universal Serial Bus is one of the high-speed, flexibility, ease-of-use device interface bus. As a robust interface bus, it is get more and more attention and be widely used in many areas such as measuring, automatic control, and communication. The stepper motor control equipment based on USB Interface under Windows platform is based on the master control equipment – personal computer and takes the advantage of its USB interface. The system communicates its control command to the stepper motor control board, which attached to the PC through USB ports, and then master the stepper motor movement.

The stepper motor control equipment based on USB Interface under Windows platform is developed in this paper. The equipment's stepper motor control board use PDIUSBD12 as the interface chip to be attached to USB and AT89C52 as the master control union on board. The firmware of the board is developed under uVisions2 by using Keil51 while the device driver running in PC host is developed under Windows2000/XP operating system by using VisualStudio6.0 , DriverStudio3.1 and Windows2000/XP Driver Develop kits as developing tools.

The main content of the paper is concluded as follows:

(1) Associate with the control communication model of this stepper motor control equipment, the architecture of Universal Serial Bus is analysed and introduced.

(2) Utilizing USB interface chip PDIUSBD12 and master control chip AT89C52, the stepper motor control board is designed.

(3) With regard to the Universal Serial Bus Specification and the features of the system's control command, the firmware of stepper motor control board is implemented.

(4) According to the Windows driver model, the device driver using in PC host is programmed.

Experiments indicate that the system realized the functions of real-time control of the stepper motor and it's features comprehensive functions, steady operation, high reliability and high cost-effectiveness.

Keywords: universal serial bus (USB), stepper motor, control board, firmware, Windows driver model (WDM), device driver, driver develop kits(DDK)