Development of DC motor drive based on TB6612

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Abstract. In this paper, the working principle and method of using TB6612 to drive DC motor are described, and the hardware and software design are given. Based on this, the motor driver chip TB6612, TB6612FNG is the Toshiba Corporation Semiconductor production of a DC motor drive, it has a large current MOSFET-H bridge structure, double channel output circuit, can simultaneously drive 2
One motor. At present, it is widely used in 3D printers and micro motors, and has certain practical value.

0 Introduction:

DC motor is a kind of rotary motor which can convert the DC electric energy into mechanical energy (DC motor) or convert the mechanical energy into direct current (DC generator). The utility model relates to a motor which can realize the conversion of the direct current electric energy and the mechanical energy. When it is operated as a motor is a DC motor, to convert electrical energy into mechanical energy; as a generator is a DC generator converts mechanical energy into electrical energy. The DC motor drive and control system is a research hotspot in recent years. This paper introduces a special control chip TB6612 for DC motor, and provides a design scheme of DC motor drive circuit based on the chip.

1.TB6612 chip introduction.

The TB6612 pin diagram is shown in figure 1. Figure TB6612 drive DC motor using 12V DC, control logic using 5V power supply. In figure PWMA, AIN1, AO1, AIN2 control motor way AO2; PWMB, BIN1, BIN2, BO1 motor control another way BO2; AIN1, AIN2, BIN2 and BIN1 for the 2 logic levels, reversing motor control, PWMA control, PWMB motor speed control logic, specifically refer to table1.

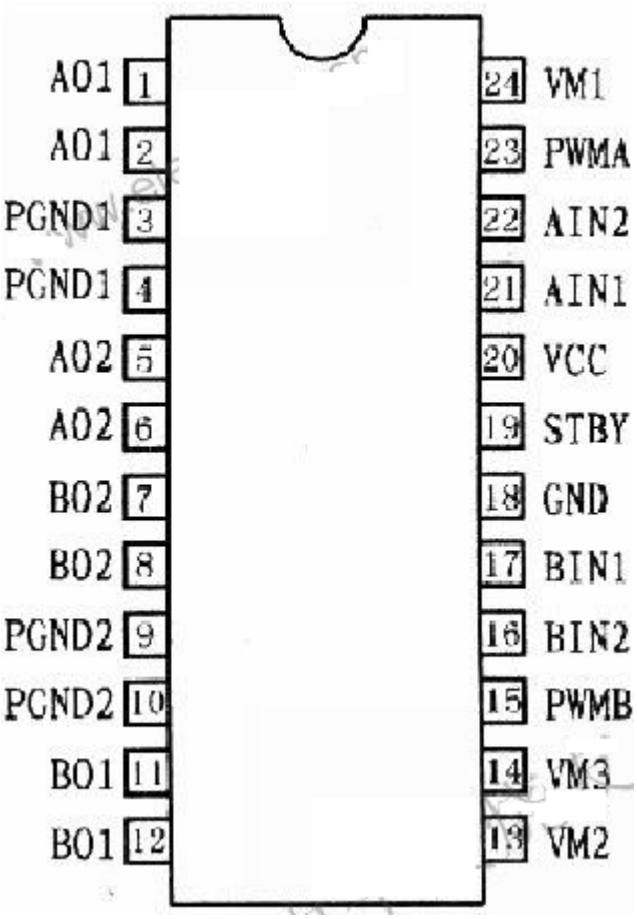

Fig 1. TB6612 pins

Tabel1 Working mode selection of motor

xIN1	xIN2	PWMx	Working mode
0	0	0	stop
0	0	1	stop
0	1	0	stop
0	1	1	Clockwise rotation
1	0	0	stop
1	0	1	Counterclockwise rotation
1	1	0	stop
1	1	1	stop

Table 1 AIN1 represents xIN1 or BIN1, xIN2 represents AIN2 or BIN2, PWMx represents PWMA or PWMB. can be seen from the table, when xIN1=0, xIN2=1, PWMx=1 DC motor is transferred; when xIN1=1, xIN2=0, PWMx=1 DC motor reversal. And in these 2 cases can be used PWM wave duty cycle to control the motor speed, when it is 1, the motor full speed ahead. In other cases, the motor stops running.

2.TB6612 stepper motor drive schematic.

TB6612 stepper motor drive schematic shown in figure 2. Microprocessor using STM32, PB1, PA15, PB3, PB4, PB5, PB0 in the STM32 corresponds to the mouth of the IO. The PB0 and PB1 corresponding to STM32 timer 2 CH2 and CH3, using STM32 2 channel TIMER2 and 3 channel PWM wave output, control of the motor for adjusting range is 0% ~ 100%, the greater the value increasing, the motor speed is faster. PB3, PA15 control all the way forward and reverse the motor, when PB3=0, PA15=1 when the motor is rotating, when PB3=1, PA15=0 motor reversal. The control logic of PB4 and PB5 is consistent with the control logic of PB3 and PA15.

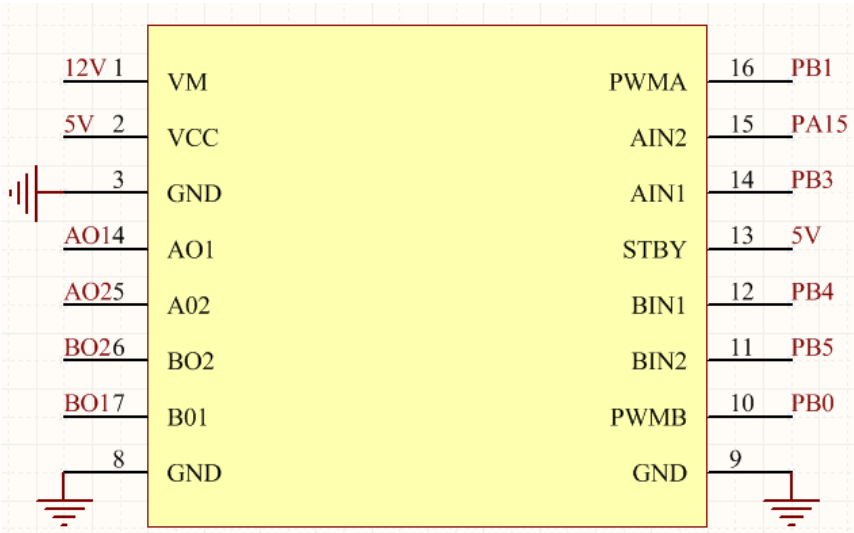

Fig. 2 Schematic diagram of stepper motor drive

3 software programming

In this design, in KEIL 5 under the C programming language. First, initialize the timer and motor, and then use the button to start the motor rotation, and adjust the output frequency of the PWM button, you can control the motor speed. Some code is given as follows:

Part of the code is as follows:

```
void motor_go(void)
{
    AIN1=1;
    AIN2=0;
    BIN1=0;
    BIN2=1;
    }
void motor_back(void)
{
    AIN1=0;
    AIN2=1;
    BIN1=0;
    BIN2=1;
    }
void motor_stop(void)
    {
    AIN1=0;
    AIN2=0;
    BIN1=0;
    BIN2=0;
```

```
    }
TIM2_PWM_Set(36000,0,3,2,18000);
TIM2_PWM_Set(36000,0,3,3,18000);
```

The above code motor_go () to control the motor forward, motor_back () to control the motor reversal, motor_stop () control of the motor to stop. TIM2_PWM_Set (36000,0,3,218000) PB0 set the output duty ratio is 50%, the Fang Bo frequency is 10K, motor speed control; TIM2_PWM_Set (36000,0,3,318000) PB1 set the output duty ratio is 50%, the Fang Bo frequency is 10K, motor speed control.

4 Summary

This paper describes the principle and method of using TB6612 to drive the stepper motor, and gives the specific application. The design has a wide range of applications, can be applied to 3D printers, micro motor control and other fields, has a certain practical value.

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