Brush DC Geared Servomotor Control with Microcontroller

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Abstract. The background of this research is to make it easier for young researchers to develop brush control dc geared servomotor with a microcontroller which is part of the overall control system where there are other control parts such as TX commands obtained from sensor devices received through radio communication, conditioning circuits, and transistor-taransistor logic for the driver for servo-control and other control parts of the bridge brushed dc geared servomotor switching system. Here the research limits itself to the control parts of the dc geared servomotor brush, the control part is in the form of software related to the microcontroller, for the other three parts are discussed in another reset. This limitation only discusses signals from radio, encoder one, encoder two, encoder three, mathematical processing, output command output. The command output is ready to connect to the brush geared dc servomotor.

1. Introduction

1.1 Background

The background of this research is to make it easier for young researchers to develop brush control dc geared servomotor with a microcontroller which is part of the overall control system where there are other control parts such as TX commands obtained from sensor devices received through radio communication, conditioning circuits, and transistor-taransistor logic for the driver for servo-control and other control parts of the bridge brushed dc geared servomotor switching system.

1.2 Formulations

Here the research limits itself to the control parts of the DC geared servomotor brush, the control part is in the form of software related to the microcontroller, for the other three parts are discussed in another reset, namely locking target on missile systems, servo control for missile systems and conventional switching for driving brushes dc geared servomotor. This limitation only discusses signals from radio, encoder one, encoder two, encoder three, mathematical processing, output command output. The command output is ready to connect to the brush geared dc servomotor.

1.3 Identification

Identification of brush dc geared servomotor control problems with a microcontroller is as follows:

a) Input signal: command TX from radio, encoder one, encoder two, encoder three,
b) Mathematical processing,
c) Output signal: command TX to output.
1.4 Research Objectives and Authenticity
The purpose of this reset is to develop a practical, brushed dc geared servomotor control system with a microcontroller according to the target we command.

1.5 Research Uses
The benefits of this research are to find out from the basic principles of control brush dc geared servomotor with a microcontroller and to develop the parts that can still be developed, among other things, software development, so that customer satisfaction can be increased. Brush dc geared servomotor control with a microcontroller can be used for precision motion control TX commands such as in high-speed rockets, for that it needs fast, precise control.

2. Research Method
This research method can be seen in simple terms like the following flowchart image. In carrying out brush dc geared servomotor control with a microcontroller where mathematical processing of the input signal is required to output it as a control signal[13]. In simple terms the research method can be described in figure 1. The following signal processing flowchart:

![Figure 1. Signal Processing Flowchart](image)

3. Results and Discussion

3.1 Results
The results obtained for processing input signals as input and mathematical processing results as output signals are as follows: The received signal is in the form of 4 hexadecimal numbers 8 bit, where the first 2 numbers are the Identification Header, the next 2 hexadecimal numbers are TX command data from outside which is the output of another research entitled locking target on the missile system. 4 received hexadecimal numbers, the first 2 numbers discarded, the last two numbers which are data stored in the buffer [2], with the expectation that each input received is 26 x per second, stored and overwritten in the buffer [2]. Up-to-date data will be found when taking buffer contents, with the aim
of synchronizing the input signal speed with the brush geared dc servomotor mechanical movement which requires mathematical processing time and motor shaft movement time. The following is stressing programming research for the ATmega8535L as follows:

```c
#define DATA_SIZE 2
float x,y;
int encoder=0;
unsigned char data_receivemissile[DATA_SIZE];
interrupt [EXT_INT0] void ext_int0_isr(void) {
    if (PIND.4 == 0)
        encoder++;
    else
        encoder--;
}
unsigned char receive_packetmissile()
{
    unsigned char i,data_check=0, temp ;
    start_data:
    while(getchar()!=0xFF) {};
    temp = getchar();
    if(temp !=0xFF) goto start_data;
    else
    {
        for(i=0;i<(DATA_SIZE+1);i++)
        {
            if(i<DATA_SIZE)
            {
                data_receivemissile[i] = getchar();
                data_check += data_receivemissile[i];
                data_check = (data_check & 0xFF );
            }
            else
            {
                data_check += getchar();
                data_check = (data_check & 0xFF );
            }
        }
        if(data_check==0xFF)
            return(1);
        else
            return(0);
    }
}
void main(void)
{
    while (1)
    {
        int i;
        a:
        if(receive_packetmissile()== 1)
        {
            static unsigned char encoder;
```
x=cos(6.28*encoder/360);
y=sin(6.28*encoder/360);
switch(data_receivemissile[0]) {
    case 0x63 :
        {
            If (x<0)
            {
                PORTB.0=0b00000001;
delay_ms(180);
                PORTB.0=0b00000000;
delay_ms(300);
            }
            else
            {
                PORTB.1=0b00000001;
delay_ms(180);
                PORTB.1=0b00000000;
delay_ms(300);
            }
        }
        break;
    case 0x72 :
        {
            If (x>0)
            {
                PORTB.0=0b00000001;
delay_ms(180);
                PORTB.0=0b00000000;
delay_ms(300);
            }
            else
            {
                PORTB.1=0b00000001;
delay_ms(180);
                PORTB.1=0b00000000;
delay_ms(300);
            }
        }
        break;
    case 0x70 :
        {
            If (x>0)
            {
                PORTB.0=0b00000001;
delay_ms(180);
                PORTB.0=0b00000000;
delay_ms(300);
            }
            else
            {
                PORTB.1=0b00000001;
delay_ms(180);
                PORTB.1=0b00000000;
delay_ms(300);
            }
        }
        break;
    else
    {
        goto a;
    }
}

3.2 Discussion
In controlling the brush dc geared servomotor with a microcontroller, the output can be directly used as input for the conditioning circuit[14][15][16], TTL, the DC geared servomotor brush driver.
4. Conclusions and Suggestions

4.1 Conclusions

Conventional switching to drive brushed dc geared servomotor using conventional switching principles is the basis of switching science for young researchers to be able to adapt to a switching system that is more complex and with better results.

4.2 Suggestions

To make a dc bridge switching system to control the rotation of the brush dc geared servomotor it is very useful to use the dc brush geared servomotor for position control.

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