

# Simple Projects

Simple Electrical and Electronics Projects

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January 8, 2018 / Simple Projects

## Sensorless BLDC motor control with Arduino – DIY ESC

### DIY ESC with Arduino UNO

This topic shows how to build a sensorless brushless DC (BLDC) motor controller or simply an ESC (Electronic Speed Controller) with an Arduino UNO board.

There are two types of brushless DC motors:

#### Labels:

[7-SEGMENT](#)  
[74HC595 ADC](#)  
[BLDC MOTOR](#)  
[BME280 BMP280](#)  
[DAC DC MOTOR](#)  
[DHT11 DHT22](#)  
[DS18B20 DS1307](#)  
[DS1621 DS1631](#)  
[DS3231 GPS](#)  
[HC-SR04](#)  
[ILI9341 TFT](#)

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Controlling a sensed BLDC motor is easy since we know the rotor position like what was done in the project below:

### [Sensored brushless DC motor control with Arduino](#)

The commutation of the sensed BLDC motor is done according to the hall effect sensors state.

Sensorless BLDC motor doesn't have any sensor to detect its rotor position, its commutation is based on the BEMF (Back Electromotive Force) produced in the stator windings.

The main advantage of sensorless BLDC motor control is lower system cost and the main disadvantage is the motor must be moving at minimum rate to produce sufficient BEMF to be sensed.

### How it works:

When the BLDC motor rotates, each winding (3 windings) generates BEMF opposes the main voltage. The 3 generated BEMF signals are  $120^\circ$  out of phase which is the same as the hall effect sensor signals. The figure below shows

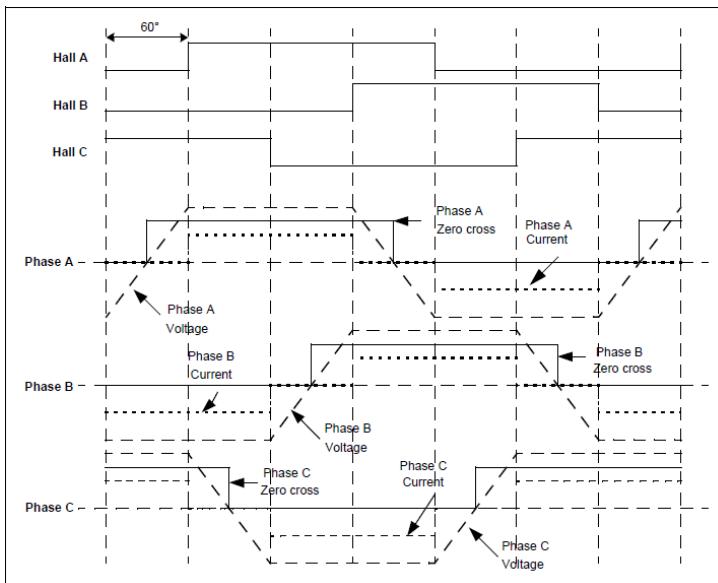
LM35 LM335  
LM4040  
MMC/SD CARD  
NOKIA 5110 PWM  
REMOTE CONTROL  
ROTARY ENCODER  
RTOS  
SSD1306 OLED  
ST7735 TFT  
ST7789 TFT  
STEPPER MOTOR  
THYRISTOR TRIAC  
UART ULN2003  
USB VGA

### Archives

- [March 2020](#)
- [February 2020](#)
- [January 2020](#)
- [December 2019](#)
- [November 2019](#)
- [October 2019](#)
- [September 2019](#)
- [August 2019](#)
- [July 2019](#)

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As shown in the figure above, the BEMF signals are not synchronized with the hall effect sensor signals (phase shift of 30°). In every energizing sequence, two windings are energized (one connected to positive and the other to negative) and the third winding is left open (floating). The floating winding is used to detect the zero crossing, thus, the combination of all 3 zero cross over point are used to generate the energizing sequence. Totally we've 6 events:

- Phase A zero crossing: from high to low and from low to high
- Phase B zero crossing: from high to low and from low to high
- Phase C zero crossing: from high to low and from low to high

## How to detect the zero crossing

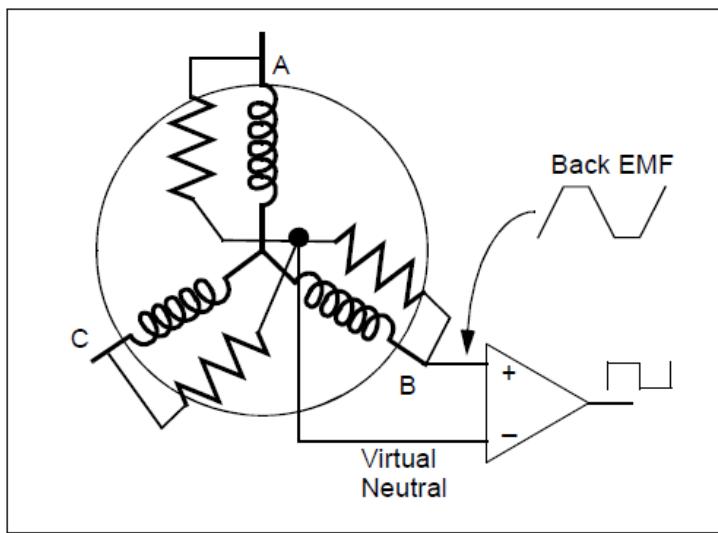
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- [January 2019](#)
- [December 2018](#)
- [November 2018](#)
- [October 2018](#)
- [September 2018](#)
- [August 2018](#)
- [July 2018](#)
- [June 2018](#)
- [May 2018](#)
- [April 2018](#)
- [March 2018](#)
- [February 2018](#)
- [January 2018](#)
- [December 2017](#)
- [November 2017](#)
- [September 2017](#)
- [August 2017](#)
- [July 2017](#)
- [June 2017](#)
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events is by using comparators. The comparator has 3 main terminals: 2 inputs (positive and negative) and an output. Comparator output is logic high if the positive voltage is greater than the negative voltage, and logic low if the positive voltage is lower than the negative voltage.

Basically 3 comparators are needed for this project, connections are done as shown in the figure below (example for phase B). Each phase requires a similar circuit.



The virtual natural point is the same for all the 3 comparators, it is generated using 3 resistors. When the BEMF generated in the floating (open) winding crosses the zero point towards positive side, the comparator output makes a transition from low-to-high. When the BEMF generated in the floating winding crosses

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circuits, one on each of the phases gives three digital signals corresponding to the BEMF signal in the windings. The combination of these three signals is used to derive the commutation sequence.

- [ESP8266](#)
- [NodeMCU](#)
- [Interface with BMP280 Sensor and ST7789 TFT](#)

## Hardware Required:

- Arduino UNO board
- Brushless DC (BLDC) motor
- 6 x 06N03LA N-type mosfet (or equivalent)
  - [datasheet](#)
- 3 x IR2104S (IR2104) gate driver IC – [datasheet](#)
- 6 x 33k ohm resistor
- 3 x 10k ohm resistor
- 6 x 100 ohm resistor
- 3 x IN4148 diode
- 3 x 10uF capacitor
- 3 x 2.2uF capacitor
- 2 x pushbutton
- 12V source
- Breadboard
- Jumper wires

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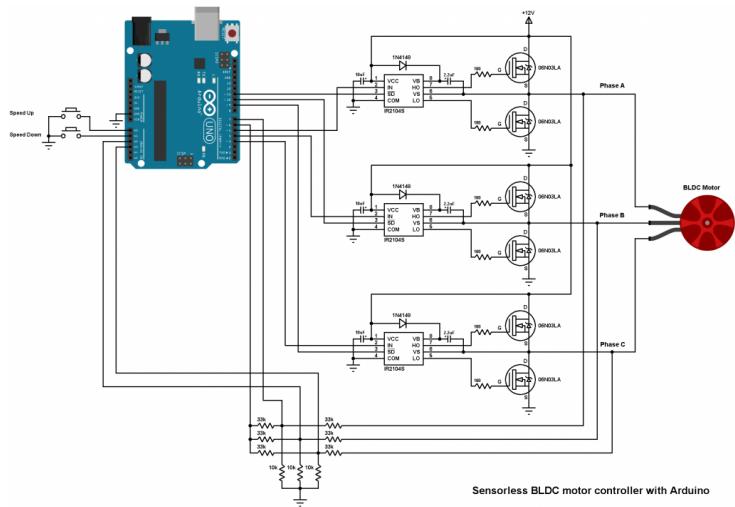
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## Sensorless BLDC motor control with Arduino circuit:

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Note that all grounded terminals are connected together.

In the circuit there are 2 pushbuttons, one is used to increase BLDC motor speed and the 2nd one is used to decrease it.

The first three 33k (connected to motor phases) and the three 10k resistors are used as voltage dividers, because we can not supply the microcontroller with 12V, the other three 33k resistors generate the virtual natural point. The virtual natural point is connected to Arduino pin 6.

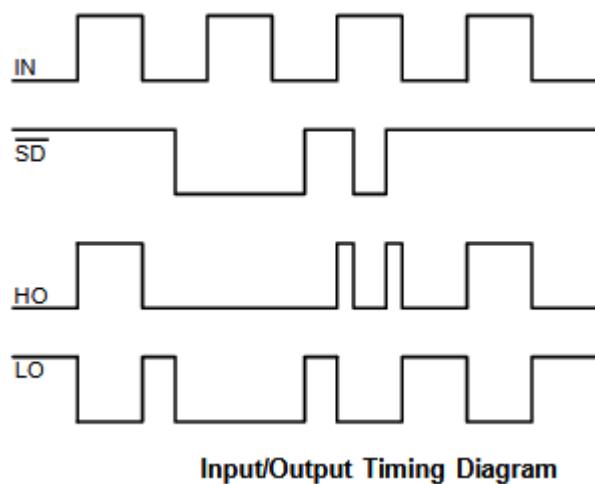
The Arduino UNO board is based on the ATmega328P microcontroller which has one ~~analog comparator~~. The positive input of this

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(ADC4) or A5 (ADC5). So I connected the virtual natural point to the positive pin of the analog comparator (pin 6), phase A BEMF to pin 7 (AIN1), phase B BEMF to pin A2 and phase C BEMF to pin A3. Each time the comparator compares the virtual point with the BEMF of one phase (this is done in the software). This minimizes the hardware needed and simplifies the circuit.

The IR2104S chips are used to control high side and low side mosfets of each phase. The switching between the high side and the low side is done according to the control lines IN and SD. The figure below shows input and output timing diagram:



The SD lines of the three IR2104S are connected to pins 11, 10 and 9 respectively for phase A, phase B and phase C. The Arduino

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## Sensorless BLDC motor control

### with Arduino code:

The code below does not use any BLDC motor library.

As mentioned above, Arduino pins 9, 10 and 11 can generate PWM signals where pin 9 and pin 10 are related with Timer1 module (OC1A and OC1B) and pin 11 is related with Timer2 module (OC2A). Both Timer modules are configured to generate a PWM signal with a frequency of about 31KHz and a resolution of 8 bits. The duty cycles of the PWM signals are updated when a pushbutton is pressed (speed up or speed down) by writing to their registers (OCR1A, OCR1B and OCR2A).

The analog comparator compares the positive input AINO (Arduino pin 6) with the negative input which can be AIN1 (pin 7), ADC2 (pin A2) or ADC3 (pin A3). When the positive pin voltage is higher than the negative pin voltage, the output of the analog comparator ACO is set, and when the positive pin voltage is lower than the negative pin voltage, ACO is cleared.

In this project I used the analog comparator interrupt and I used its interrupt on rising  
(transition from low to high) and interrupt on

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To fully understand the code, please read the ATmega328 datasheet!

```

C
1  /* Sensorless brushless DC (BLDC) motor control
2   * This is a free software with NO WARRANTY
3   * https://simple-circuit.com/
4   */
5
6  #define SPEED_UP          A0
7  #define SPEED_DOWN         A1
8  #define PWM_MAX_DUTY      255
9  #define PWM_MIN_DUTY      50
10 #define PWM_START_DUTY    100
11
12 byte bldc_step = 0, motor_speed;
13 unsigned int i;
14 void setup() {
15     DDRD |= 0x38;           // Configuration
16     PORTD = 0x00;
17     DDRB |= 0x0E;           // Configuration
18     PORTB = 0x31;
19     // Timer1 module setting: set clock
20     TCCR1A = 0;
21     TCCR1B = 0x01;
22     // Timer2 module setting: set clock
23     TCCR2A = 0;
24     TCCR2B = 0x01;
25     // Analog comparator setting
26     ACSR = 0x10;           // Disable
27     pinMode(SPEED_UP, INPUT_PULLUP);

```

## Sensorless BLDC motor control with Arduino video:

The video below shows how project is working.

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Sensorless brushless DC (BLDC) ...



#### References:

Microchip AN970 document

<https://www.microchip.com/>



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#### BLDC MOTOR

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## NEC remote control decoder with PIC16F887 and mikroC compiler »

**152 comments**

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**Lutfu** says:

[January 22, 2018 at 2:57 pm](#)

Good work..

**Reply**

---



**Mohammed Aslam** says:

[February 18, 2018 at 9:15 pm](#)

Please help me, my mosfet is overheating and motor just vibrates and not turning on.

**Reply**

---



**Simple Projects** says:

[February 20, 2018 at 11:55 am](#)

Check your mosfets, they may be damaged, and recheck you circuit connections!

**Reply**

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In the video there is only 5 capacitors, but the circuit shows 6 capacitors and the arduino uno default timer2 frequency is ~61 khz, but you explained and coded default prescale, can u please provide the full report with the virtual ground resistor design. Please help me i am on my major project..

### Reply

---



**Simple Projects** says:

[March 1, 2018 at 10:42 am](#)

In my circuit it should be 7 capacitors (the 6 capacitors shown in the schematic diagram and one between (+) and (-) of the 12V source). The biggest capacitor in the video is for 12V source. It could be done just as shown in the schematic diagram.

The frequency of Timer2 PWM signal is about 31KHz because when it is ON its register TCCR2A = 0x81 which means WGM20 bit = 1 (PWM phase correct mode) and therefore: freq =  $16000000/(N*510)$  = 31372Hz where N is the prescaler = 1 (TCCR2A = 1), you can check it with a real oscilloscope or even by Proteus simulation. All data are

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**parijat pandey** says:

[August 2, 2019 at 12:25 pm](#)

hey Simple projects,  
I have tried the same circuit with mosfet  
P55NF06 and irf1404, and with ic 2104. My  
motor starts and the next moment get stuck  
at one point and makes a lot of noise. Do  
you have anything to say about it. Your reply  
will be helpful.  
thanks and regards,  
Parijat

[Reply](#)



**Khurram Shahzad** says:

[March 29, 2020 at 3:55 am](#)

i think change the motor wires 1 side to 2 side

[Reply](#)



**Mohammed Aslam** says:

[March 5, 2018 at 3:22 am](#)

Thank you, and what you used as power source  
Lipo battery or power supply. And the design of  
virtual ground and back emf

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**Simple Projects** says:

**March 9, 2018 at 11:34 am**

I used 12V power supply for both the Arduino and the 3-phase bridge, a battery (Li-ion, Li-po ..) can be used for powering both of them.

**Reply**

---



**Mohammed Aslam** says:

**March 11, 2018 at 5:10 pm**

I also used 12v power supply, but when i see the voltage across power supply dropping to 5v or lower when turning on motor and motor vibrates and try to turn but not rotating. Also tested with lipo battery but motor condition is same and i am using STP105N3LL mosfet. Could you please verify the program and also the circuit diagram,

**Reply**

---



**Praveen Choudhary** says:

**March 8, 2018 at 10:31 pm**

which BLDC motor are you using and what are its rating...?

**Reply**

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March 8, 2018 at 11:02 pm

It's A2212 1000KV, it's well used in quadcopters, even PC cd-rom (dvd-rom) sensorless BLDC motor (spindle motor) works fine.

[Reply](#)

---



**GARA SHASHI KUMAR** says:

March 9, 2018 at 12:02 pm

Can we use any power mosfet of high current rating?

[Reply](#)

---



**Praveen Choudhary** says:

March 10, 2018 at 8:58 am

Can you suggest any alternative Mosfet to mosfet 06N03LA..?

[Reply](#)

---



**Mohammed Aslam** says:

March 11, 2018 at 5:06 pm

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**Mohammed Aslam** says:

[March 15, 2018 at 4:41 pm](#)

Can you please share the power supply specifications used in the video, voltage and current readings..

[Reply](#)

---



**W. Schrijen** says:

[March 18, 2018 at 4:54 pm](#)

nnnn

[Reply](#)

---



**WS** says:

[March 26, 2018 at 5:04 pm](#)

In the interrupt routine you make a difference between odd and even steps. Why?

[Reply](#)

---



**Genheart G. D. King. S** says:

[April 9, 2018 at 4:14 pm](#)

Please help me, if i use 48v bldc motor, what

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**GANESHAPERUMAL** says:

[April 10, 2018 at 3:02 pm](#)

How to change the frequency to 16 kHz in this program

[Reply](#)

---



**Patel** says:

[April 19, 2018 at 5:33 am](#)

I run this simulation in proteus , but it gives error.

[Reply](#)

---



**Godwin Sam** says:

[June 9, 2018 at 6:26 am](#)

Is it possible to run the bldc on both the direction

[Reply](#)

---



**Simple Projects** says:

[June 9, 2018 at 7:59 am](#)

Yes it can be done by changing commutation sequence in the code.

[Read more](#)

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June 18, 2018 at 5:03 pm

Good job! But can you please explain what does ISR(ANALOG\_COMP\_vect) exactly doing?

**Reply**

---



**Simple Projects** says:

June 18, 2018 at 5:15 pm

It's the analog comparator interrupt service routine (ISR), the analog comparator is used to detect zero crossing events and at any event the analog comparator interrupts the microcontroller in order to update the commutation state.

**Reply**

---



**ante** says:

June 21, 2018 at 2:24 pm

Thanks for the quick reply! I understand that this is an interrupt service routine and that is updating commutation state. I just do not understand why "i" is decremented by 1 in "for" loop when ACSR.ACO is "1" or "0" and why loop is counting to 10.

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these cases going from 1 to 0 (rising period of bemf) and from 0 to 1 (falling period of bemf), but can not figure out why "i" is decremented by 1 and why is counting to 10.

[Reply](#)

**jojo** says:

[June 21, 2018 at 7:40 am](#)

did you reach the rated rpm of the motor? if not how many rpm you got?

[Reply](#)

**ripperpc** says:

[June 24, 2018 at 8:05 am](#)

Hi! I'm having issues understanding the commutation code:

1 – ex:

```
void BH_AL(){  
PORTB = 0x08; // 0000 1000 >> PB3 >> PIN 11  
ON  
PORTD &= ~0x28; // 0010 1000 CLEAR >> PD5,  
PD3 >> PIN 5 OFF, PIN 3 OFF  
PORTD |= 0x10; // 0001 0000 SET >> PD4 ON >>  
PIN 4 ON
```

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ON COMPARE, PWM PHASE CORRECT 8 BIT >> PB2  
>> PIN 10

Why did we set pin PB3 when we clear it ?

2-

I am trying to convert this code to run on my hardware, the gate drivers have separate input for High and Low side FETs, I think I shall be able to do that with inverted output PWMs, any comments here ?

**Reply**

---



**Simple Projects** says:

[June 25, 2018 at 10:49 am](#)

See the post below, it's a little bit different, I used IR2101 instead of IR2104 gate driver. The IR2101 has separated gate control inputs for high side and low side mosfets.

**Reply**

---



**haseeb khan** says:

[June 28, 2018 at 4:57 pm](#)

Will this circuit operate for BLDC ceiling fan motor of 350 RPM, 12V, 2.5A. If not what need to be changes. Can you please tell me sir? Thankyou..

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**sougata banerjee** says:

[July 3, 2018 at 6:49 am](#)

sir can i replace push button with a  
potentiometer?what will be the change in code??

[Reply](#)

---



**Simple Projects** says:

[July 3, 2018 at 8:07 am](#)

You can try it by your self but doing that may  
cause some problems to the analog  
comparator because it's used for zero crossing  
detection and the analog comparator share the  
same multiplexer with the analog-to-digital  
converter (ADC).

[Reply](#)

---



**sultan** says:

[January 5, 2020 at 8:30 pm](#)

sir can i replace push button with a  
potentiometer?what will be the change in  
code??

[Reply](#)

---

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This topic may help you:

[\*\*BLDC Motor control using Arduino |\*\*](#)  
[\*\*Speed control with potentiometer\*\*](#)

[\*\*Reply\*\*](#)

---



**GIANNHS** says:

[July 20, 2018 at 9:48 am](#)

Good evening. We can make the trend at 36volt  
and the changes are needed

[\*\*Reply\*\*](#)

---



**GIANNHS** says:

[July 20, 2018 at 7:39 pm](#)

It can work your design with the following engine I  
have .. N5065 1820W 320KV Outrunner Brushless  
Motor For Electric Skate Board DIY Kit New

[\*\*Reply\*\*](#)

---



[\*\*ahmed adel\*\*](#) says:

[August 11, 2018 at 11:30 pm](#)

how can i control pwm and direction instead of  
potentiometer like commercial esc

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**Simple Projects** says:

[August 21, 2018 at 11:36 am](#)

<https://simple-circuit.com/arduino-sensorless-bldc-motor-controller-esc/#comment-339>

[Reply](#)

---



**Stefan** says:

[August 19, 2018 at 10:52 pm](#)

Hello. Nice work thank you! Do you think, is it possible to check that engine is started after start procedure? If engine will not start correctly or its blocked. I tried to check bemf but when engine is fixed, the comparator goes crazy...

[Reply](#)

---



**Philip** says:

[September 20, 2018 at 3:24 pm](#)

As you say, when stationary, there's no BEMF signal at all, and since there's no (defined) hysteresis on the comparator it'll just be triggering on noise. The traditional means of detecting operation is a stall counter – increment a variable every millisecond or so  
using a timer interrupt and resetting every

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there's no correct sequence in say half a second then disable – or start a restart routine.

## Reply

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Igor says:

[September 6, 2018 at 9:38 pm](#)

Hello, very good job.

It's works perfect, i try it in my project and need to make some changes( revers, startup by button, current restart(when its high, and higher speed by make the pwm is higher) and therer some problems.....

For example- try to make the revers by button- wrote some lines of code to stop the motor and use bldc move in another way- but the motor after perfect work stops after i press the button-and start work crazy.....

Can you help me with code( can and want to simmelar pay for it)

can you connect with me by e-mail(for example)

Best regards, Igor

## Reply

---



GARA SHASHI KUMAR says:

[October 14, 2018 at 4:43 pm](#)

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**Thiago Borges do SIllo** says:

[October 19, 2018 at 3:53 pm](#)

Good job! But if i use a power supply higher than 12v, what resistor should i use for the virtual point and voltage divider? If i dont make any change, can i damage my microcontroller?

[Reply](#)



**Simple Projects** says:

[October 19, 2018 at 4:44 pm](#)

Of course you may damage your Arduino microcontroller. Make sure that the input voltage doesn't exceed 5V (for the ATmega328P)

[Reply](#)



**Igor** says:

[December 7, 2018 at 10:37 pm](#)

Dear Sir, I really need you to communicate with me any comfortable way!!! Please reply me.

[igorsimplemes@gmail.com](mailto:igorsimplemes@gmail.com)

+79853377798

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Alex says:

April 1, 2019 at 6:42 am

congratulations for your project, I have seen this same circuit all the same in another project, the only difference is the output uses the N-type mosfet IRF840 and fed with 400 volts, the voltage divider of the BFEM the resistances are of the same value as samples in the circuit, nomas that changes to 5 watts, my question is if there is higher bfem with 400 volts the divider has the same resistance values but at 5 watts, but the working voltage is 400 volts there is no risk of damaging the arduino .  
How to use this circuit that you propose with 400 volts with the IRF840, and resistance values that must be put in the divider,  
thanks for your contributions

[Reply](#)



Simple Projects says:

April 1, 2019 at 8:13 am

Increasing the voltage without changing voltage divider resistors may damage the Arduino. Project the circuit diagram is for 12V BLDC motor (just use voltage divider equation).

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[Reply](#)**Alex** says:[April 4, 2019 at 1:45 am](#)

thanks for your comments, if the 06N03LA is for 25v Vds, for the irf840 it is 8 A, 500 Volts would be to calculate the voltage of the divider and the value of the resistors, I need to know the CFEM, thanks again, if you have more data to be able to operate it with irf840 at 400 volts, I thank you in advance

**anil kadam** says:[October 29, 2020 at 4:00 pm](#)

FOR 100 VOLTS USE 370K AND 10K RASISTERS  
AND FOR 400 VOLTS USE 370K WITH 2.7K

[Reply](#)**Orhan** says:[December 11, 2018 at 10:35 am](#)

What can I use instead of 06N03LA mosfet. I

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[Reply](#)**Atakan Çetin** says:**December 27, 2018 at 8:59 pm**

We have 3 capacitors (values are:10microFarad) and we finished the circuit. But our second condenser(in the middle) blew up 2 times and we don't know main problem. Our energy source is city network and 12VDC converter. Can you help us? Thanks...!

[Reply](#)**Wunsch\_Fee** says:**March 30, 2019 at 4:03 am**

a copper strip which passes from the 12-volt Arduino area into the motor area and it is felt that there is the potential for a back-EMF voltage spike to be fed back along that copper track and damage the IR2104 chip or even the Arduino board itself. It is suggested that the introduction of a fast Schottky diode in those links would block that possibility.

[Reply](#)

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i am using this ESC circuit to run a compressor, its working fine but the flow rate is not up to the mark so i want to increase the speed of the compressor, to do so should i try a higher voltage supply or can the speed increased by the code itself? if so then please help me with the code to increase the speed of the compressor.

[Reply](#)

---



**Simple Projects** says:

[February 2, 2019 at 4:43 pm](#)

The is no thing to with the code to increase the maximum speed of your motor, the code give the maximum speed when the PWM duty cycle = 255.

Increasing the voltage may increase the speed (you should use your motor nominal voltage), but be careful, with this circuit diagram you shouldn't exceed 20V, unless you change the back emf resistors.

[Reply](#)

---



**Keerthi Shree** says:

[February 3, 2019 at 6:23 am](#)

*Circuit is working but speed is less how can I get ?*

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[ACCEPT](#)

Instead of 06N03LA mosfet I am using P55NF06  
mosfet is it responsible for low speed

[Reply](#)

---



**Simple Projects says:**

[February 3, 2019 at 8:14 am](#)

The duty cycle of the PWM signal may be vary from 0 to 100%, so the motor reaches its maximum speed when the duty cycle = 100% which is represented in the code by 255.

The maximum speed depends on type of motor (max speed, voltage ...).

The P55NF06 should work without any problem.

[Reply](#)

---



**Keerthi Shree says:**

[February 9, 2019 at 8:29 am](#)

if we have to change any schematic diagram when we are using ir2101 ic

[Reply](#)

---



**Simple Projects says:**

[February 9, 2019 at 8:44 am](#)

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modifications to the code, visit this project:

### **Brushless DC motor controller using Arduino and IR2101**

#### **Reply**

---



**Keerthi Shree says:**

**February 11, 2019 at 1:56 pm**

```
void AH_BL(){  
    PORTB = 0x04;  
    PORTD &= ~0x18;  
    PORTD |= 0x20;  
    TCCR1A = 0; // Turn pin 11 (OC2A)  
    PWM ON (pin 9 & pin 10 OFF)  
    TCCR2A = 0x81; //  
}  
  
void AH_CL(){  
    PORTB = 0x02;  
    PORTD &= ~0x18;  
    PORTD |= 0x20;  
    TCCR1A = 0; // Turn pin 11 (OC2A)  
    PWM ON (pin 9 & pin 10 OFF)  
    TCCR2A = 0x81; //  
}
```

can you please explain the logic  
behind the above code.

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I have used

- 1) IRF3205 n-channel MOSFET instead of 06N03LA N-type mosfet
- 2) IR2102 gate driver IC instead of IR2104S (IR2104) gate driver IC

I simulate the schematic in proteus using the above mentioned components.

I don't get any error message.

At the same time I don't get any output.BLDC motor refuse to rotate.

Is there any problem of using different MOSFETs and ICs ?Please help me to get my output.This is my final year project.

Thanks in advance...

### Reply

---



**Simple Projects** says:

**February 8, 2019 at 5:57 pm**

1) Although it may work, but the IRF3205 is not a good choice for this application (slow).

2) You can't use the IR2102 directly without doing some modifications to the application code (if you want to use it you've to make some modifications to the code, read the datasheet of the two devices!).

I don't know if you can simulate this application using Proteus, it's better to do it in

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**ACCEPT**



**Vignesh S** says:

**February 21, 2019 at 5:49 pm**

I have completed this project using the components

Driver chip – IR2104S

N-Channel MOSFET – P55NF06

BLDC motor is same as yours

The problem is the motor doesn't start automatically.

I switched on the power supply and rotate manually by fingers with full speed settings using speed up push button. After only my motor rotates.

There is no problem with the speed control. But how can I start the motor automatically. What is the problem behind this?

please help me to find a solution for this.

Thanks in advance.

**Reply**



**Vignesh S** says:

**February 27, 2019 at 2:38 pm**

would you please reply to my previous question... I am struggling with it for more than a week...

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ACCEPT



**Simple Projects** says:

**February 27, 2019 at 9:35 pm**

I think you've to make some modifications to  
motor starting code:

```
while(i > 100) {
```

...

```
}
```

just do some experiments!

**Reply**

---



**Roy** says:

**March 2, 2019 at 6:33 am**

Does anyone know where I can buy this circuit  
board complete ready to use.

**Reply**

---



**jm Cornil** says:

**March 7, 2019 at 12:09 pm**

Great work ! Thank You very much

**Reply**

---

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ACCEPT

I have ir2103. What do I have to change?

**Reply**

---



**Simple Projects says:**

**March 10, 2019 at 9:21 pm**

Yes you can use it but you've to do some modifications to the code.

**Reply**

---



**vSam5 says:**

**November 8, 2019 at 2:01 am**

Hello can you send me the right code i am in need and thanks ..

**Reply**

---

**Vishnu Bharathan says:**

**March 28, 2019 at 1:42 pm**

Sir, while uploading the program,it shows some undeclared identifiers, they are

- bldc\_move
- AH\_BL
- AH\_CL

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**ACCEPT**

- BEMF\_C\_RAISING
- SET\_PWM\_DUTY

This is a part of my academic project.....please help.

Thanks in advance.

### **Reply**

---



**Wunsch Fee** says:

[March 29, 2019 at 1:39 am](#)

Hello. Great work.

Question, and request I Got a Samsung 3 phase 36 pol BLCD motor.

Would like to set the speed to 3000RPM. And display it on 4 digit display( working on it), by counting the Zero crossing. Can U please help me by the Zero Counting with i can work and later display?

Kindly Regards

### **Reply**

---



**Alex** says:

[April 5, 2019 at 5:07 am](#)

This is the project that you mention the samgsun 36 poles engine, the output IRF840

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[ACCEPT](#)

IRF840 alimentado with 400 volts, and the divider of voltage of the CFME the resistance equal value nomas that are of 5 watts, and this is what it was consulting if it will have the problem of greater contrainduccion in the divider and damage the arduino , I'm going to have to perform tests with 12 volts, small motor, change the output mosfet with a higher voltage and larger motor, and change the value of the voltage divider, since the samsung 36 poles engine project is all same as the one that shows simple projects, as I have mentioned the only changes that are the mosfet, higher voltage, and higher watts in the CFME divider resistors, there is someone who wants to comment or suggest something, I do not know what damage the arduino, or the best one,

Thanks to Simple Projects, for their orientations and illustrative videos

## Reply

---



**nico** says:

[April 21, 2019 at 6:35 pm](#)

hello alex!

i am on exactly the same set up as you are talking about...i use a chopper board GTZ

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[ACCEPT](#)

severals mistakes by assembling and creating the board that manage those 3 phases motors...i will receive this week 20 more IRF840 because i burned up the first 6 i used this week to try ....

i started this project by patrick kelly video on you tube, but i understand now that patrick kelly was inspired probably by this site and this page (here is the link of patrick video talking about our subject

[https://www.youtube.com/watch?](https://www.youtube.com/watch?v=CDEhclk9gDk)

**v=CDEhclk9gDk** ), i am not at the moment, able to say if it will work because it miss the 6 transistor on my board, but what i can say ,is that patrick kelly did some mistake on the shematic he showed and that you can eventually upload on internet (check the video and go to upload the documentary in link with it and tell me what you think about it)....my motor is a direct drive from a washing machine LG, the goal is to supply it perfectly with the board i made, if you want, lets exchange in private, tell me if you want to have my email adress, i think it could be constructiv for each others to share our experiences and knowledge about it...

hoppefully reading you soon mate...

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ACCEPT



Alex says:

April 22, 2019 at 6:33 am

Thanks nico

good that you are also in this idea and project to feed the motor with 36 poles with more voltage, I have the same intensity and I am working on it, if your mail interests me to have a faster communication and comment more so we can detail more if we manage to operate with more voltage and with these more economic schemes, since I have been reviewing the pwm drivers and the VFD are high cost, we will save I wait for your mail and thanks for contributing

[Reply](#)



Alex says:

April 22, 2019 at 6:58 am

hello Nico again and review the schematic information again, and if I corrected it where it indicates that there was the problem in the voltage divider from where the feedback is taken, I change the value of the resistors with

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[ACCEPT](#)

Schottky diode, we must be careful I see in corrected pdf scheme that in the illustrations of connections did not make the changes, in the scheme of construction of the plate with the components there if made the change, it was right that the divisor was wrong, so good that corrected, since I was discussing this situation to see if anyone could help, maybe Patrick Kelly out there read me the comment hahaha, well I already corrected  
regards we are in contact

### Reply

---



**Alex** says:

[April 22, 2019 at 7:11 am](#)

the friend Wunsch Fee comments below that the arrangement is not enough that the program can not keep the mosfet open, we will try it with voltages 100 to 300 ..., well one more comment is given that you can not have more revolutions of 2000 rpm for the conditions of the engine, with 1000 to 2000 rpm are enough for my projects

[SEE YOU SOON](#)

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[ACCEPT](#)



April 22, 2019 at 7:32 am

friend Nico can not find chopper board  
GTZ 1000 from ali express to supply the  
power, can you provide me the link  
please

---

**Reply**



**nico** says:

April 24, 2019 at 12:30 am

helo alex: here is my mail adress:  
**azurider@hotmail.fr** lets discuss over  
there,there is so much to say about  
it...



**Zoltán Sandor Pente** says:

March 30, 2019 at 4:36 pm

damn i cant upload my changed code to be  
cheked out

---

**Reply**



**Mandeesh Singh** says:

April 4, 2019 at 1:20 pm

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ACCEPT

Rest the entire circuit is same as yours. But the issue is, the motor runs only once and then, starts vibrating. Even when we press the switches, the sound of vibration is changing but motor doesn't move. Any comments, what may be wrong?

### Reply

---



**Wunsch Fee** says:

[April 5, 2019 at 1:58 pm](#)

Its not enough. A shkotty diod need to beplaced in the Back FM way, otherwise it eill damage the Half wave drive, and the Arduido to... I working on another circuit feed with Sinus wave form generated by Arduino. The earlier mentiond code dos not hold the Mofet oppen, insted its gives out small peek's.. +. The waveformis decrease as the Half wave is operats, and changing electric phase.

### Reply

---



**Alex** says:

[April 22, 2019 at 7:19 am](#)

Wunsch Fee very interesting what you mentioned, and of the circuit that you are building you could share it since you have it, thanks for your comments

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**Wunsch Fee says:**

[April 5, 2019 at 2:09 pm](#)

Maandish Shing

Its tray's to rotat in the wrong direction. Because of the Fix linear wave generation Its just workingin one direction. There sould be a code, if no BEMF detekted in a among of time, contoler should stop eweryting, and restart "Start up" process.

[Reply](#)

---



**nico says:**

[April 24, 2019 at 1:05 am](#)

i think if it rotate the wrong direction,just try to reversed 2 phases on 3,because it is what we are doing into buildings when an asynchronous motor does not rotate as we would....let me know what do you think about this idea 😊

[Reply](#)

---



**Wunsch Fee says:**

[April 5, 2019 at 2:34 pm](#)

Alex.

I readed the projekt. Ther are some fault in tha circuit. They have "repaired it". because of the

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efficient/sufficient for a High Voltage Unit. This code can't hold the Mosfet open. Instead it makes a PMW( many small peek's) output.. which is not efficient for this type of motor, as it is a induction motor.. elektro magnetik field is indicated.. and the magnet on the rotor is respondin of the EMF( pull push) .

<http://www.afug-info.de/Schaltungen-Eigenbau/PIC-Sinus-PWM/img/PWM-Sinus.jpg>

**Reply**

---



**Alex** says:

[April 6, 2019 at 4:39 am](#)

Wunsch Fee, thank you very much for the information, I will review the data, if you have something to help us in that project, some novelty, some circuit that makes the motor samsug of 36 poles to 400 volts work, I thank you for informing us, thanks for share

**Reply**

---



**rachman** says:

[April 10, 2019 at 5:18 am](#)

why pwm duty max 255?

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ACCEPT



**nico** says:

[April 24, 2019 at 1:08 am](#)

honnestly i have no idea and thats nice to read  
thois question: if i have good memory it a  
parameter of starting?

[Reply](#)

---



**Alex** says:

[April 23, 2019 at 6:31 am](#)

friend Nico can not find chopper board GTZ 1000  
from ali express to supply the power, can you  
provide me the link please

[Reply](#)

---



**nico** says:

[April 24, 2019 at 12:46 am](#)

<https://fr.aliexpress.com/item/1000-w-DC-12-V-24-v-AC-110-v-220-v-380-v-haute-fr/32866924746.html?spm=a2g0s.9042311.0.0.40696c379d8uT6>

here is the chopper board, you have to put a  
bridge rectifier to the output you ll choose in  
order to get the voltages claimed by the  
commercial ...this board give a maximum  
voltage of 153 vcc 20KHZ by using a bridge

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[ACCEPT](#)

-is somebody here able to explain me this phenomene? the fact of breaking hyper frequency built for high voltage??

i use this board according to patrick kelly specifications,my direct drive motor is able to handle 310VDC,but i have a supposition by extrapolation: even my DD motor is preview for a maximum of 310VDC,am sure it can support 400 vdc,why? simply because the particularity of this set up is the capacity to run the motor with hight voltage/low amps instead of low votage/hight amps,then ,no amps means basiquely no heat,if no heat no problem with the copper vanish of coil,it wont burn out ,could somebody confirm my theory?

at this time of my project, the board i built looks okay,all stable while supply by the 368 VDC,for the power side,12 volt for the command side,5 volt for the arduino,all is stable,no burning wires,but at the moment IRF840 are not mounted on the circuitry because i burned up the last 6 i had with the first board i built,am suppose to receive 20 IRF 840 more while this week,then i will try again.....

**Reply**

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ACCEPT

by the way i have a question: i have a minus for each voltages (12VDC,5VDC,368VDC), on the shematic of simple project the whole set up is in 12vdc,so of course all minus can be connect all togther,but....whats about a multi voltages set up as mine baased on patrick kelly? does it be dangerous to loop minus of each voltages together? at the moment they are all separated, and i think it is better....? throught?

about the shottky diode you guys are talking about in order do not let high voltages damage the microcontroler (in my case a IR2104),yes you have to install a shottky diode,i use a SCS320AHGC9 rated at 650 volts,20 amps and 115 watt,the maximum that patrick kelly propose into the second video he did to mentionned this missing from the first video....it has to be placed after the condensator to the line 6 of the IR2104 or any kind of microcontroler equivalent....as it is placed on the positiv of the high voltage for the power side board,it protected from the hight voltages return the microcontroller.....

**Reply**

---

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thanks Nico for the data, this is inverter at high frequency and must be rectified, next comments, if the inveror is 12 volts, and the output 368 vcd, the current estimate 2 amperes, it gives 736 watts at the output, as we have to consume the same in the battery we have,  $736/12 = 61$  amperes, and if we do not generate more than 736, to be able to return these and the profit that is proposed to generate with the generator, all well theoretically.

my first test will be to feed it with 120 AC, and then rectify it, you get 169.2 vdc. and assuming that the same is consumed, it should be minus 2 amp \* 169.2 = 338.4 watts

I mention these calculations so I want to avoid the high consumption of the battery, it is true is half power.

there are more I want to comment and your doubts, my friend, I continue later

## Reply

---



nico says:

[April 24, 2019 at 1:16 am](#)

some link about patrick kelly,i have to mentionned that i mixed the shematic of simple

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[ACCEPT](#)

ajust in the good way the minus side of the high voltage power side....

FIRST VIDEO OF PATRICK KELLY

<https://www.youtube.com/watch?v=CDEhclk9gDk>

SECOND VIDEO OF PATRICK KELLY (correctiv one about shottky diodes)

<https://www.youtube.com/watch?v=iZpHFoxiNJM>

guys i have good hope that with several brains to understand this circuitry,we ll get the point for sure! 😊 😊

[Reply](#)



nico says:

[April 24, 2019 at 1:23 am](#)

THE ORIGIN OF THIS PROJECT IS HERE WITH GERARD MORIN, but be vigilant: gerard set up used 3 hall sensors effects ...basiquelly,patrick kelly seemed to upgrade gerard's concept by proposing a electronic gestion sensor less,here is the main difference between both set up,for those who did not know.... 😊

[https://youtu.be/AAIxGYpi\\_5s](https://youtu.be/AAIxGYpi_5s)

[Reply](#)

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[ACCEPT](#)

THIS IS THE NEXT VIDEO OF THE FIRST I PUT  
BEFORE: gerard looped up the system for 11  
hours...

ps: please noticed the amazing torque of this  
direct drive motor into the precedent  
video....gerard says ,600 watt in for 10KW of  
mechanical power out,witche for me makes  
completely sens because this electronic set up  
allow this kind of motor to work half fully with  
lentz law:

-phase 1 + phase 2 ON /phase 3 OFF = when coils  
of phase 1 and 2 are pulsed on it become repulsive  
for magnets while phase 3 switch is OFF become  
attractive for magnets....

now transpose this first line to the 3 phases and it  
is what is suppose to do the code....

[https://youtu.be/aOLnf\\_gP7K8](https://youtu.be/aOLnf_gP7K8)

**Reply**



**Alex** says:

[April 24, 2019 at 6:02 am](#)

you have to check the video well what Gerard  
Morin showed, I do not see anything special,  
the motor powered by the big battery,  
connected to the inverter to move the motor at  
a speed of 98 rpm (low power consumption),

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Gerard measures cd of the batteries in AC, this is an error, the charger that charges the battery accordingly.

I do not know exactly where the 160 volt source of the generator is, and I did not see the small battery charger.

If the battery is charging it may be a long time, but the battery that is connected to the inverse without charging will be discharged.

the comments of the video is not available hurts, so you can not clarify things.

With all that I comment if I make a mistake, make the comments, what I say is with all respect to Mr. Morin, but do not be fooled when things are not right.

## Reply

---



**nico** says:

[April 24, 2019 at 1:32 am](#)

in others words,when 12 coils that are composing a phase are OFF,the rotor use only the attractive intrinsec power of magnet,this energy is for free,thats why this torque and thats why this tiny consumption in the configuration of high voltage/low amperes.....  
actually this all i guess and i think am not that bad ,right?

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[ACCEPT](#)



Alex says:

April 24, 2019 at 3:41 am

contributing with Nico

If this is how it works, two phase in repulsion and one that takes advantage of the attraction, and so it goes alternating phases, what you have the low consumption with respect to the power you have is; it is the frequency, and the higher voltage supply, there is efficiency, when turning on and off the mosfet.

the proposed speed of 3600 rpm has not been obtained, the maximum that has been seen in the videos is around 2000 rpm, it is said that the conditions and characteristics of the engine was not built for high speed, which have achieved 2000 rpm , they achieve it with special and expensive drivers.

but we are still friends, we have to seek and achieve efficiency.

As for the video that Gerard shows, he used an Anhmeim controller BSCKB1-120081 with a voltage of 160 vcd output. it seems to me that the speed it reaches is 1600 rpm.

Thomas Buie is improving the program and showing the system project as the pdf file shows.

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ACCEPT



**nico** says:

[April 24, 2019 at 1:43 am](#)

am even sure we could run even definitely better in terms of consumptions by this :

-phase 1 ON /phase 2 OFF / phase 3 OFF

why? because my guessing is "if we have 2 phases OFF then we have 2 times more attraction, so 2 times more a free intrinsic attractive energy used between magnets and rotor coils ?"

at least instead of only one phase OFF and 2 phases ON, we manage 2 phases OFF and only 1 phase ON.....

what you guys think about this idea? am I completely fucked? haha

thanks for reading me 😊

[Reply](#)



**nico** says:

[April 24, 2019 at 10:34 pm](#)

am stupid, this exactly how it works already, and how it has to work.... lol don't pay attention to this post

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[ACCEPT](#)



Alex says:

April 24, 2019 at 3:51 am

To turn on a phase can not, it has to be in pair.  
since the phases are connected in star  
configuration.

What they present in the document is in draft is to say what is experiencing Thomas Buie, there is a video where they show their actual operation, but it is good that you are working on it, like the video present here

<https://youtu.be/Cnf8Zp4-SKg>

In the video Thomas Buie details the challenges and advances he has with the program and his intention to achieve what is shown in the document, he really sees a guy very dedicated to the work, he also says that he needs resources and asks for support and donations from money, if really for these projects it takes time, dedication and efforts, and resources.

we will follow the advances and contributions  
see you soon

**Reply**



nico says:

April 24, 2019 at 2:29 pm

i think you re right about thomas attitude,what

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ACCEPT

washing machine running perfectly by arduino  
actual code so,i guess there is probably  
multiples adjustments to realise on the code,to  
make it efficient enough to run such this kind  
of motor,right?

if simple project could interact with us about  
ours comments,it would be awesome....

### [Reply](#)

---



**nico** says:

[April 24, 2019 at 2:32 pm](#)

ALEX, thomas showed the oscilloscope screen and we can clearly see that waves are not well formed,he even tells that "it is not what he expected and something is wrongs with thoses actuals waves" ,i think we should go back to fundamentals in order to crate 2 perfect half waves ,because even thomas seems not abble at the moment,to re created such perfects half waves ?

### [Reply](#)

---



**Alex** says:

[April 24, 2019 at 3:56 am](#)

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[ACCEPT](#)

[Reply](#)**Alex** says:[April 24, 2019 at 5:41 am](#)

If you can give me your email to send you an information

[Reply](#)**nico** says:[April 24, 2019 at 7:48 am](#)[azurider@hotmail.fr](mailto:azurider@hotmail.fr) 😊[Reply](#)**Alex** says:[April 25, 2019 at 4:20 am](#)

Hi Nico

You mention that you have already assembled the project and that you only wait for the IRF840.

I consider that the program that presents here simple projects, is already practical.

1.- Start the project as it is presented here, with the voltages output that proposes 12 volts that are applied to the mosfet. in your case they would be the mosfet IRF840

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[ACCEPT](#)

Simple projects.

4.-change the engine and put the 36 coils and feed the output of the mosfet to about 48 to 60 volts.

5. If the motor moves and it is working, raise the voltage to about 80-100 volts.

6.- Depending on the results, and if they are good, increase the output voltage of the mosfet to about 169 cd. (rectify the 120 AC, you get the 169 CD.) If you can check the revolutions in each voltage increase

7.- And see the results, if they are favorable, if you want to increase the voltage

What I am saying is that if the Simple Projects project is already functional, it has to be coupled to the 36 poles motor.

The project of Thomas and Gerard of the pdf, as we commented already it was corrected the system of protection and the divider of voltage. performing the steps would have a valuation that is obtained in each voltage increase, it is a matter of proving it.

## Reply

---



wunschfee says:

[April 27, 2019 at 8:58 am](#)

Here my email address to

wunschfee@freenetmail.hu

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[ACCEPT](#)

I used a 0.8A 90volt power suply. For testing my  
gol is a 650v/1100v motor driver. Because on  
higher voltage takes less amper.

Gerald Morris uses a external Motor driver circuit  
which has a Hall effect sensor, and it's a Frequency generator  
Motor driver, not a PWM driver. The built-in 4  
channel twin Tacho signal generator is working fine  
in my setup. <https://ibb.co/FxxJCv9>

I just received a NAND chips to try out.

## Reply

---



**nico** says:

[May 3, 2019 at 1:07 pm](#)

i just send you an email with a link to check it 😊😊

## Reply

---



**Alex** says:

[April 30, 2019 at 10:30 pm](#)

wunschfehler thanks for sharing  
but the link is no longer available  
can give more details if it worked in some way  
with 100 volts, and show the video  
see you soon

## Reply

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what the mosfet use? except 06N03LA. what similiar mosfet 06N03LA?

**Reply**

---



**wunschfee says:**

**May 4, 2019 at 11:38 pm**

Alex please send me a email. And gone send you the Hall sensor pin layout.

**Reply**

---



**Alex says:**

**May 5, 2019 at 9:13 am**

ok

[alexkentm@gmail.com](mailto:alexkentm@gmail.com)

**Reply**

---



**wunschfee says:**

**May 4, 2019 at 11:42 pm**

I'm whaiting for my 4CH oscilloscope & function/Arb. waveform generator. I mad successful kontakt with Nico. Till the Oscilloscope not arrives, i can't chek the malfunction of my cirkuit.

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Pascal says:

May 23, 2019 at 1:22 pm

Very nice guide. From what I see, only one PWM should be required, since all three PWM Generators are outputting the same frequency and same duty cycle, so only one PWM pin could simplify both hardware and software.(Correct me when I am wrong)

It would be interesting to see the specific operation to not only control the speed, but also control it's direction. Good project anyways!

[Reply](#)

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renemeschuh says:

May 26, 2019 at 12:49 pm

i run this code with few modifications on a Samsung BLDC drum like gerard morin did in his videos. as i did more research on the circuit i noticed that the duty-cycle went down automaticaly to the min-duty-cycle that i set in the code. the motor starts automaticaly with a duty-cycle of 240 when the voltage is set to 90V or more. then when i increase the voltage to 200V the drum automatically 'corrects' its given duty-cycle and decreases it. can you give me a hint why this is happening? i did this testing only on the big

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and like to comment i would be very happy 😊 thx  
and big regards from austria.

## Reply

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**Simple Projects says:**

**May 26, 2019 at 1:22 pm**

The duty cycle is set by the Arduino microcontroller and it's not related to motor supply voltage.

Since the resolution of the PWM signal is 8-bit, the duty cycle may vary between 0 and 255. If duty cycle is zero the motor will stop. Using a min duty cycle prevents the motor from stopping, you can test which minimum duty is adequate for your application.

Also, the duty cycle is controlled from the 2 push buttons, after your motor starts try decreasing the duty cycle!

## Reply

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**renemeschuh says:**

**May 26, 2019 at 2:44 pm**

it behaves exactly as you mentioned and can be clearly seen in the serial monitor if we do the necessary addition to the code. what we

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[Reply](#)**Simple Projects** says:[May 27, 2019 at 2:04 pm](#)

There is no need for the PWM library! you can change the frequency with Timer1 and Timer2 registers (TCCR1A, TCCR1B, TCCR2A and TCCR2B), ATmega328P datasheet shows how to do that.

[Reply](#)**renemeschuh** says:[June 2, 2019 at 4:35 pm](#)

yes but there only a few options. i would like to run the drum with for example 120kHz. if i use 0x01 for TCCR1A the frequency is preset to 31kHz. don't understand how to achieve this.

**Wunsch Fee** says:[June 26, 2019 at 9:45 am](#)

hello. I have build my circuit for the same Samsung BLDC drum.  
It did not worked.

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mosfet is opened all the time.

I think because of the virtual point the resistors need to be changed.

## Reply

---



**Wunsch Fee** says:

[June 26, 2019 at 10:15 pm](#)

Hello renemeschuh. I have build my circuit for the same Samsung BLDC drum.

It did not work.

Can you send me your modifications?

[wunschfee@freemail.hu](mailto:wunschfee@freemail.hu).

I don't get any signal after the 2104 and the mosfet is opened all the time.

I think because of the virtual point the resistors need to be changed.

## Reply

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**mprrjames** says:

[June 5, 2019 at 1:31 am](#)

Hey I tried this circuit with the IR2101 and 2104, the code and everything works well. I'm able to run an old alternator as bldc even. Now I want to scale it up a bit and use TO-220's. Could you recommend some fets for a 24v system? I was

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**mprrjames** says:

[June 5, 2019 at 1:36 am](#)

If i'm only using the two buttons to control the speed, is there any advantage of using the lm339 over the internal comparators? And should I tie the rest of the analog in pins to gnd for noise immunity? cheers

[Reply](#)

---



**anon1** says:

[August 13, 2019 at 4:39 am](#)

How do I turn the clockwise with one button and with another button change the rotation counterclockwise?

[Reply](#)

---



**Noel** says:

[August 18, 2019 at 8:29 am](#)

hi! good day! can i use that device to my disc type direct drive washing machine motor? please help. is that devise is available in the market? where can i buy a ready device that you are using. please help

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**Noel** says:

[August 19, 2019 at 11:14 am](#)

is it possible to use that device to higher voltage bldc motor? example to 320v dv motor? the we can find in a washing machine.

[Reply](#)

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**wunschfee** says:

[August 21, 2019 at 11:21 am](#)

Noel Nop we tayed it.  
The algorithm mast be changed for Mosfet drive.  
And if you manage to get it to work, then its Only works on low speed.

Mr james.the 2 botton control is speed control. No stop or direction control.  
To Direction managing U need a min 2, optimal 3 Hall sensors and a table to detect rotation, and adapte algroithm Wave generation. Or separat Back EMf commperator... .

[Reply](#)

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**ripon** says:

[September 24, 2019 at 5:05 pm](#)

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**Simple Projects** says:

[September 24, 2019 at 5:08 pm](#)

You may use 25V 2200 uF.

[Reply](#)

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**Jacob** says:

[February 7, 2020 at 12:40 am](#)

Hello nice work on the above but I was wondering if I was using 36 v and was power a bigger motor would this still work I am going to use better mosfets because I am expecting more current but my main concern was the gate driver will it work with 36v?

[Reply](#)

---



**arian** says:

[March 7, 2020 at 11:13 am](#)

Hi simple circuit, can you give me the proteus file for this project? thanks

[Reply](#)

---



**Simple Projects** says:

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[Reply](#)**Praveenkumar** says:[March 18, 2020 at 12:51 pm](#)

Sir please explain me , why we need to connect drive's 6 pin with MOSFETs Source drain supply

[Reply](#)**Simple Projects** says:[March 18, 2020 at 7:14 pm](#)

An N-type MOSFET to be ON you've to apply a sufficient voltage between its gate (G) and source (S) pins, and that's what the IR2104 does. Each time the IR2104 applies this voltage using pins 7 & 6 for the upper mosfet and pin 5 (& of course the GND or com pin) for the lower mosfet.

[Reply](#)**Praveen Kumar** says:[March 18, 2020 at 12:54 pm](#)

My next question is the circuit which you used in speed control bldc in youtube is same or not the circuit which you posted in web blog

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**Praveenkumar** says:

**March 18, 2020 at 8:44 pm**

Hai simple circuit... Why we need to connect driver  
ic's 6 th pin with MOSFETs D & S connection

**Reply**

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**Praveenkumar** says:

**March 18, 2020 at 8:47 pm**

I tried this circuit , the motor getting vibrate.. I  
dosent rotate..

**Reply**

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**Praveenkumar** says:

**March 18, 2020 at 8:54 pm**

Sorry for this question... Really this circuit will  
work.. please reply... If there is any modifications  
should do in circuit means.. please let me know..

**Reply**

---



**Amir Ridzuan** says:

**April 5, 2020 at 4:18 am**

Hi i used ipp055n03 istead 06n03la and used 23a

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**Yassin Zwin** says:

[May 2, 2020 at 11:23 pm](#)

The code is for a specific integrate drive,

[Reply](#)

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**Amir Ridzuan** says:

[April 15, 2020 at 3:36 am](#)

Hi can you provide the flowchart for the arduino code?

[Reply](#)

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**panos nikas** says:

[May 4, 2020 at 3:27 pm](#)

I use 6 output 600v ir2130 driver with ir840 and irfp450 .I use also opto isolated HPCPL2531. THE 12V 1KV MOTOR work very good.I replace the B-EMF resistor with tow 270k and 4,7k.for each of the 3 comparators so.i have 2.5v for the half of 320vdc.I try to connect a bldc air conditionihg compressor and all make boom. Have you any idea how to continue?

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Hi, I really can't understand the debounce code into the interrupt routine, can anyone explain it to me?

```
void INT_EXT_ISR(void){  
    // BEMF debounce  
    for(int8 j = 0; j < 20; j++) {  
        if(bldc_step & 1) {  
            if(input(PIN_B0)) j -= 1;  
        }  
        else {  
            if(!input(PIN_B0)) j -= 1;  
        }  
    }  
    bldc_move();  
    SET_PWM_DUTY();  
}
```

Thanks in advance

## Reply



**Brian** says:

[May 26, 2020 at 6:04 am](#)

I think it works something like this (going off the original code – not what's copied and pasted in your post above):

1) The Analog Compare Interrupt Fires

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- 3) "Debounce" glitches by making sure we get 20 consecutive correct readings
- 4) If any of the readings are incorrect, decrement the counter so the last measurement (with the wrong logic level) doesn't count
- 5) Eventually exit the for loop and increment to the next step of the commutation sequence

## Reply

---



**Brian** says:

**May 26, 2020 at 5:55 am**

Hi,

Great tutorial! I build this on a PCB and all is working well 😊

One question about the commutation sequence functions (i.e AH\_BL):

```
void AH_BL(){  
    PORTB = (1<<PHB_EN);  
    PORTD &= ~(1<<PHB_IN) | (1<<PHC_IN));  
    PORTD |= (1<<PHA_IN);  
    TCCR1A = 0; // Turn pin 11 (OC2A) PWM ON (pin 9  
& pin 10 OFF)  
    TCCR2A = 0x81; // Clear on compare match and  
    PWM_PHASE_CORRECT
```

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For this step, we set PHB Low Side to be ON since it's /SD pin is being driven HIGH and are allowing PHA High Side IN pin to be PWM'd ON and OFF but the /SD pin for PHA is never asserted?

How does the IR2104 IC pass through the PWM input signal without the /SD pin being asserted?

### Reply

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**Brian** says:

**May 26, 2020 at 10:57 pm**

After some careful review, think I figured it out:

- \* PHB /SD is set to be logic HIGH
- \* PHA IN is also set to be logic HIGH
- \* PHA /SD is PWM'd ON/OFF.
- \* When ON: So IR2104 IC passes sets HO: HIGH and LO: LOW
- \* When OFF: HO: LOW and LO: LOW

Mistook the PWM to be connected to the IN pin, when in actuality it's connected to /SD

### Reply

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**praveenkumar** says:

**July 15, 2020 at 12:57 pm**

*Hi @Brian, are you really done this project?*

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can touch with me via mail  
[praveenkumar36gct@gmail.com](mailto:praveenkumar36gct@gmail.com).. this is my  
MAIL ID ..i tried but didn't get proper output ..  
meanwhile the motor produce noise.. please  
make some favour.. im waiting for your kind  
reply..

[Reply](#)

---



**Amir Ridzuan** says:

[July 11, 2020 at 3:56 am](#)

Hi I done the circuit with mosfet ipp055n03 and  
gate driver ir2104 and connect to bldc motor and  
arduino code as same as you but my bldc motor  
cannot rotate and make noise. But at some time, I  
try push the motor shaft, the motor rotates for a  
few seconds and then stop rotate and make noise  
again. Is there anyone has solution for this?

[Reply](#)

---



**Aravindh Jayaraman** says:

[August 15, 2020 at 7:58 am](#)

I kinda have the same problem.. When i press  
reset on Arduino the motor rotates for a few  
seconds and then it gets stuck and makes  
screeching noise.

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Tori says:

August 20, 2020 at 9:30 pm

Hello. Me and my friends have tried to adapt this project into one where we can supply the motor with up to 150V while reducing the voltage incoming to Arduino to protect it from destruction. It worked, but somehow strange – the motor only starts rotating when the PwM duty cycle is set to maximum (255) and the motor actually turns off immediately after we try to reduce it. We can't find any fault in the schematics or in the script. Do you please have any advice on what might be causing that and how to fix it? Thank you in advance for reply!

[Reply](#)



Deepam Bhanpiya says:

August 27, 2020 at 4:33 am

I have required of block diagram of sensorless bldc motor control with arduino uno. so, plz request you to send it quickly

[Reply](#)

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