

Nova Kit

- make sure to connect a jumper near the trimpot to complete the circuit
- connect the potentiometer to 3 solder pads provided using small leads
- The control circuit is driven by source power of 5V to 16V connections made to V+ and V-
- Motor is sourced by connection to E+ and E-
- Motor is connected to M+ and M- and if you decide that the motor and the control circuit shares the same power source, which should be below 16V DC, then, do not connect E+ and E- and also solder the link LK1 to accomplish the task

Resistor color code for the kit

10R	brown black black	■	■	■
470R	yellow violet brown	■	■	■
2K2	red red red	■	■	■
10K	brown black orange	■	■	■
33K	orange orange orange	■	■	■



DC Motor Speed Controller Kit

<http://www.novakits.com.hk>

Thank for your purchase of Nova Kit 002, DC Motor Speed Controller

This DC motor speed controller is an ideal appreciation of speed control using pulse width modulation, with contrast to traditional energy or power control and , for power control using rheostat, power is wasted as heat in the rheostat, and when loading on the motor increases, the back emf from the motor is decreased and the motor current increases as a result of difference between applied and back emf increases, this increase in current yield high power waste

The current kit is a relatively simple introduction of motor speed control using pulse width modulation (PWM), for serious user please use another of our Kit, Nova Kit 9 DC Motor speed controller using TL494, which is a dedicated PWM chip

Please read the following assembly instruction carefully and keep the manual within easy reach

Background :

Pulse width modulation refers to the situation where energy is applied in full power at a percentage of repeating time period, this percentage of time is called the duty cycle, if the duty cycle is 100%, full power is given to the load ,if only half of the time power is given to the load, this is 50% duty cycle ,the advantage of this method compared with the rheostat is that the motor is either in on state or off state, and no energy is wastes in power control device like the rheostat which is in series with the motor.

The PWM method can also be used in other loading such as incandescence lamp bulb.

Circuit Description :

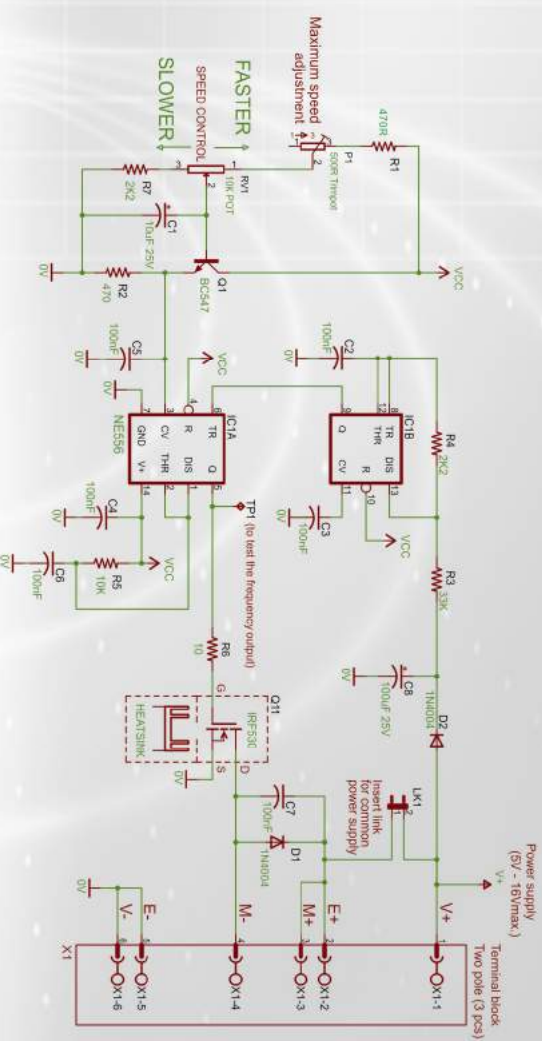
The circuit employs two 555 timer / oscillators, the first oscillator, using IC1B, is configured as astable multi vibrator which gives out a continuous train of rectangular pulse.

The second 555 timer is configured as a one shot, which is edge triggered by the train of rectangular pulse from the first oscillator

By varying the comparator reference level of the one shot ,the length of the one shot generated by IC1A is varied ,This length of time represents the on time, with careful adjustment on the trim pot, the maximum duty cycle can be adjust closed to 100%,if the one shot time is larger than the pulse train width, trip-over will happen and , if you are trimming with a motor in use, the motor speed drops.

The comparator reference level is provided by a potential divider, in series with trim pot and fixed resistor R1,R7, P1 and RV1.

The current drawn by comparator reference of the one shot will upset this potential dividing circuit, Transistor Q1 is used as a voltage follower (buffer) to drive the one shot circuit.



Packaging List :

Resistor (5% 1/4W)	Capacitors
10R	R6
470R	R1,R2
2K2	R4,R7
10K	R5
33K	R3
Trimpot 500R (501)	P1
10K pot, with washer and nut	D1,D2
1N4004	Heat Sink with pin, 25mm height, with M3x8 screw, M3 nut and toothed washer
Heat Sink with pin, 25mm height, with M3x8 screw, M3 nut and toothed washer	NE555, Texas Instrument
IRF530 Mosfet, 10R	IRF530 Mosfet, 10R
Bc547b	Bc547b
14 pin IC socket	14 pin IC socket
3 pole 5.08" terminal block	2 pcs
Nova Kit 002 PCB	1 pcs
ABS plastic box	1 pcs
Instruction	1 pcs