555 Pulse Generator Circuit

✔ This circuit was tested and worked properly!
Posted by P. Marian in 555, Audio, Tested with 46 comments
Tagged with: frequency generators

this message might be for you!

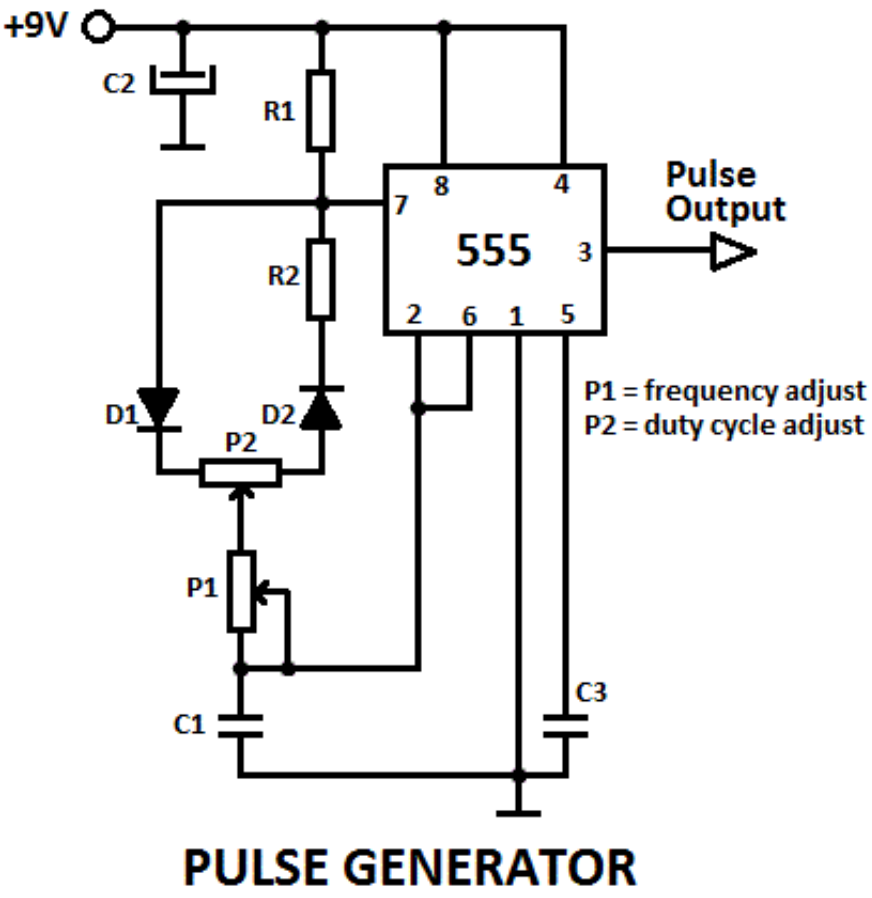
Hi, are you good, I mean really good at mastering the concepts of electronics? Have you ever developed your own circuits, tested and made them function as desired? Then you might want to read this!

This is a pulse generator with adjustable duty cycle made with the 555 timer IC. The circuit is an astable multivibrator with a 50% pulse duty cycle. The difference from the standard design of a 555 timer is the resistance between pins 6 and 7 of the IC composed of P1, P2, R2, D1 and D2.

The diodes D1 and D2 set a definite charging time for C1 which produces a 50% duty cycle in a normal case. The duty cycle (n) is dependent on P1 and P2 in the following manner:

n = 1 + P2/P1

Pulse generator circuit diagram

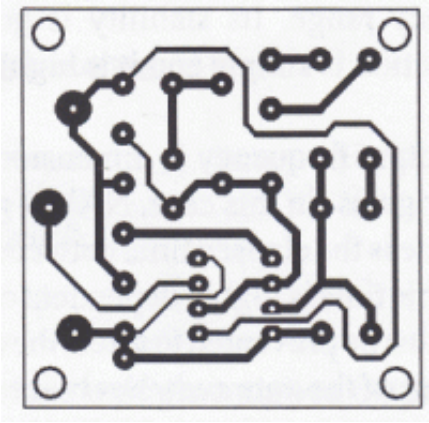


555 datasheet

Oscilloscope Captures

As you can see in the captures the duty cycle is not between 0% and 100% but it is within reasonable range. I've used a 20K for P1, 100K for P2 and 10nF for C1.

Printed circuit layout of the pulse generator

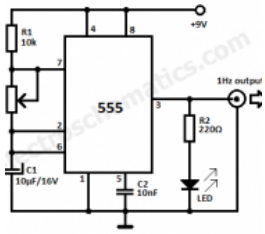


Components List

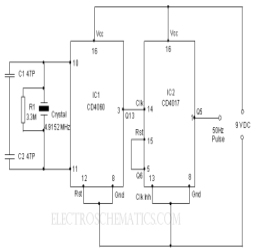
C2 = 10µF
C3 = 0.1µF
R1 = R2 = 4.7K
D1 = D2 = 1N4148
IC = 555
C1, P1 and P2 must be calculated

Search

G+1 2 Tweet Subscribe Like Share 53

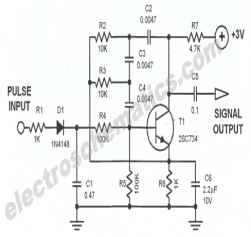


1 Hz Pulse Frequency



50 Hz Pulse Generator

555 Triangle Waveform



Audio Frequency Generator

Ask a Question

46 Responses to "555 Pulse Generator Circuit"

1. *Ed* says: on July 3, 2010 at 1:58 pm
Log in to Reply

I luv PWM's!! been building different ones for about two years now, Thats how I came to electronics intrest @51,,now 54. I like the simplisity of this circuit and the use the infamous 555, but where is the parts list? I could experiment,, but I do that anyway just doing what I am

instructed. Thanks Ed

-  *ElectroSchematics.com* says: on July 3, 2010 at 2:08 pm
reply

  Hi Ed, I published the components list, I hope is ok now.

- *Fatma* says: on March 8, 2014 at 11:05 pm
reply

  svp qui peut m'aider à faire une conception d'un générateur carré avec fréquence variable de 50Hz à 10KHz et rapport cycliquen=50%

- *Steve* says: on March 8, 2014 at 11:46 pm
reply

  I just bought one of these, I don't have it yet though.
  http://www.ebay.com/itm/181096913621

2.  *adrian* says: on July 5, 2010 at 6:42 am
Log in to Reply

   nice circuit and usefull any time..

3. *GuruSantiago* says: on July 19, 2010 at 12:28 am
Log in to Reply

   I like it because it has a 50% duty cycle and the PCB layout is also provided.
   Thank You,
   GuruSantiago

   Want to learn more about electronics?

   The GuruSantiago can help. Checkout his videos here:

   http://www.youtube.com/user/ElectronicsIsFun
   And follow him on twitter @ElectronicsFun

4. *ZERO* says: on July 17, 2011 at 9:39 pm
Log in to Reply

   or you can put the pcb with components?

5. *Zacker* says: on February 8, 2012 at 12:47 am
Log in to Reply

Hi, can you write the value of C1, P1 and P2 because i don't know how to calculate it. Thanks.

- *Yunneck* says: on May 4, 2012 at 7:12 pm
reply

  try this
  http://www.daycounter.com/Calculators/NE555-Calculator.phtml

6. *Johnny* says: on August 16, 2012 at 10:40 am
Log in to Reply

   Heloooo,!! JIM KEITH NE555timer chip which has been configured as a astable multivibrator(oscillator), or square wave generatos just teach me how to enter in the duty cycle and the frequency and the calculator will compute reasonable value for the resistors and capacitors … tanx

7. *joomunm* says: on October 17, 2012 at 7:29 am
Log in to Reply

   Hi,

   Can the duty cycle be adjusted from 0% to 100% without drifting the frequency?

   Thanks.

   -  *Jim Keith* says: on October 18, 2012 at 11:31 pm
   reply

     Independent duty cycle control is not possible using the standard 555 circuit. There may be some improved 555 circuits, but I am unaware of any that do this.

     However, I am working on a novel voltage controlled oscillator (VCO) that may do this well. Stay tuned.

   -  *Jim Keith* says: on October 19, 2012 at 4:00 pm
   reply

     OK, I now have concocted a 555 circuit that does just that. Variation of the duty cycle from 2% to 98% affects frequency less than ±1%.

     Will publish soon.

     it is a dangerous thing to say "never," because you may have to eat your words sometimes.

   - *joomunm* says: on October 19, 2012 at 4:46 pm
   reply

Nice to hear the good news!

Please let me know when you publish it.

Thank in advance.

-  *Jim Keith* says: on October 20, 2012 at 7:34 pm
reply

  Now published. It may be found on home page.

-  *omkar* says: on September 26, 2015 at 4:05 am
reply

  hey can i get the link

-  *TUSHAR* says: on October 16, 2015 at 12:43 pm
reply

  CAN I GET THE LINK FOR THE SAME

-  *warren* says: on September 13, 2013 at 12:21 am
reply

  any luck on the 555 function generator with null frequency drift with duty cycle adjustment?

8.  *taufeqabdullah* says: on July 15, 2013 at 6:30 am
Log in to Reply

   Hi,

   How many pulses does this circuit generate?

   Thanks

9.  *warren* says: on September 13, 2013 at 12:25 am
Log in to Reply

   awesome I am using multisim now to build custom version. thanks for your efforts great job. cant find the your home page. though.

10.  *dilip desai* says: on September 14, 2013 at 10:42 am
Log in to Reply

    good one,i make small type harmonium usin 555 timer ic, is the best for all.

11. *ISMA* says: on November 20, 2013 at 4:12 am
Log in to Reply

    Hi
    Can you to publish then component layer on PCB? Thank….

    - *Jake* says: on October 11, 2014 at 2:24 am
    reply

      Does someone have a picture taken from above the board so I can tell where the components are?

12. *kim* says: on December 5, 2013 at 3:21 pm
Log in to Reply

    hi! i have completed a project to make a pulse generator with less than 50% duty cycle using a 555 timer and 2 potentiometers. but later on, my professor wants me to compute for the time on and time off.
    so here's the problem, the only formula i've got is this,
    Ton=.7(Ra+Rb)C and
    Toff=.7RbC,
    i've used this formula before for astable multivibrators. But unfortunately the answers i've got don't match the output from my actual pcb circuit.
    My other professor told me that i have to use different formula. And again, unfortunalely, i don't know any. So for those who knew, please answer. and thanks in advance! 🙂

13. *steve* says: on January 29, 2014 at 1:17 am
Log in to Reply

    I would like to make this pulse generator. When I shop for the 555 timer I see an endless number of different part numbers. Are all these 555 timers the same?

    -  *Jim Keith* says: on January 29, 2014 at 3:27 am
    reply

      There are subtle differences to keep in mind:
      1. Package style DIP or SMD
      2. Bipolar or CMOS –projects generally use bipolar unless CMOS is indicated
      3. Manufacturer –generally does not matter
      4. Temperature range –generally does not matter

      In most applications, either bipolar or CMOS devices work equally well.

    - *R. Smith* says: on June 18, 2015 at 10:11 pm
    reply

Would you be willing to help me with a project involving a pulse generator? I am trying to replicate a circuit that I did not create. “The pulse generator is functionally comprised of an RC-controlled, free-run oscillator, which drives a buffer amplifier stage. The free run oscillator can be adjusted in the range of 2 MHz to 5 MHz via an adjustable resistor. The buffered amplifier stage drives a clamping inverter which in turn directly gates the 5.8 GHz oscillator section of the RCR.” The RCR is a device that has an internal circuit that is bypassed by the new pulse generator.

14. *Al* says: on February 11, 2014 at 4:19 pm
Log in to Reply

    R1 and R2 can be 1 kolomh or 550 omh. P1 and P2 can be 200-50 kiloomhs, then work must be best.

15. *steve* says: on March 5, 2014 at 7:55 am
Log in to Reply

    Hi, I built this pulse generator with the components listed. I used 10µF capacitor for C1. So far I only get around 1 pulse per second and barely any change when turning pot. The duty cycle seems to have better resolution throughout pot range. I swapped 100k and 20k pot with each other and got pulses up to 3 per second. What I need is a frequency range of around 5 to 200 pulses per second. The duty cycle is not that important for my project. I redid this eight times and never got the frequency to go any faster… Is this timer capable of a faster pulse rate? What am I missing here? Thanks..

    - *Pablo* says: on June 2, 2014 at 5:26 pm
    reply

        Try making C1 smaller.

16. *Al* says: on March 5, 2014 at 10:38 pm
Log in to Reply

    I allso try, not liked me, so I leave it. Better use TL494.

17. *Steve* says: on June 5, 2014 at 8:27 am
Log in to Reply

    Finally found a pulse generator that actually works:

    http://www.rmcybernetics.com/projects/DIY_Devices/homemade_signal_generator2.htm

18. *ishan* says: on June 10, 2014 at 9:14 am
Log in to Reply

what is the purpose of two diodes?

19. *Steve* says: on June 10, 2014 at 9:16 pm
Log in to Reply

Here is the parts list, I made a pulse generator with these parts and it worked.

http://www.digikey.com/short/w7nnn

This is the schematic:

http://www.rmcybernetics.com/projects/DIY_Devices/homemade_signal_generator2.htm

20. *Mike* says: on August 6, 2014 at 11:11 am
Log in to Reply

I used the folling parts and got minim. 4 pules per second up to 30 pules per second with 30-70% duty cyle : C1 = 2,2uF / Pot1 = Pot2 = 50K

21. *Felipe* says: on November 13, 2014 at 2:34 am
Log in to Reply

Hello folks.

The circuit works perfect!.

Here the evidence

https://www.youtube.com/watch?v=XlzYxn-l0Xs&feature=share

22. *Kristian* says: on April 2, 2015 at 8:34 pm
Log in to Reply

Which frequency range can it provide ? I mena from 1 Hz to ..? Without calculation just changing the values of the POT ?

23. *Azman* says: on April 22, 2015 at 4:13 am
Log in to Reply

Dear Electro schematic,
Hi….I have construct and build the circuit. But not working, i dont know why? I have troubleshoot the connection, i check every level voltage, the problem voltage drop at R2 is zero and at R1 is 7.5 V. The power supply is +9 V DC, rite? I dont have +9V DC, i supply 7.5 V…is it working? can I supply 12 V DC? Please help me, Thanks.

24. *oldbeaver* says: on May 3, 2015 at 1:42 am
Log in to Reply

Can some guru of the Forum help me please?

The circuit looks ok, but I need something slightly different, and I am electronic lover, not professional.

Help may be just tell me where they sell a proper kit for what I need, or, tell me tech proper name of what I am looking for.
This is the desired PMW circuit:

+B Voltage: 12-14 VDC
Input signal 1: an almost square signal which varies from 500Hz to 5000Hz app.
Input control voltage: 1 to 6 VDC coming from a control pot.

Needed output: square signal with the same frequency as input (variable) width proportional to control voltage (variable duty cycle, following same input frequency).

Thank you very much in advance.

Oldbeaver.

25. *Steve* says: on May 3, 2015 at 1:46 am
Log in to Reply

I made this one and it works fine, I checked it on my scope:

http://www.rmcybernetics.com/projects/DIY_Devices/homemade_signal_generator2.htm

Here is parts list: http://www.digikey.com/short/w7nnn

OR… these work okay: http://www.ebay.com/itm/181096913621

- *José (Oldbeaver)* says: on May 3, 2015 at 6:26 pm
reply

  Thank you Steve, yr info helped me a lot.

  José

26. *Ra'ed* says: on May 7, 2015 at 2:41 pm
Log in to Reply

thanks for this good way to use 555

I would like to ask small question .

If I use

1n4001
Instead of
1n4148

can the circuit work in the same operation ?

27. *lavender* says: on May 16, 2015 at 8:01 am
Log in to Reply

hello there, I have tested this circuit and it is working , however I would like to know how to calculate its pulse width? when I use to calculate it with astable formula I am not getting the same answer with the simulation.

28. *omkar* says: on September 26, 2015 at 4:11 am
Log in to Reply

hello guys i m designing a pulse generator using fpga and i have designed one.anyone know how to aadjust the on time by default we get 50% i want to reduce it to 25%.please reply with you idea thank you and i am using digital circuits mostly.

29. *itsmesiva88gmail-com* says: on March 12, 2016 at 6:36 am
Log in to Reply

what is the maximum range of frequency can we generate using this circuit?
Is it possible to generate 4.3MHZ?

-  *Jim Keith* says: on March 14, 2016 at 2:26 am
reply

  The most I've ever been able to get out of a 555 is about 2.7mHZ.

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