

What Are some of the best usage of timer 555 IC?

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The 555 timer IC is a versatile and widely used integrated circuit that can be employed in various electronic circuits. Here are some of the best applications of the 555 timer:

1. **Astable Multivibrator:** The 555 timer can be configured as an astable multivibrator or a free-running oscillator. In this mode, it generates a continuous square wave with a fixed frequency and adjustable duty cycle. This functionality is useful in applications such as generating clock signals, timing circuits, tone generators, and LED flashers.
2. **Monostable Multivibrator:** The 555 timer can also function as a monostable multivibrator or a one-shot timer. In this mode, it produces a pulse of a fixed duration when triggered. This feature is useful for applications like time delays, debouncing switches, and pulse width modulation.

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By using the timer in astable mode and varying the control voltage or the timing resistors and capacitors, you can create adjustable PWM signals. PWM is commonly used in motor speed control, dimming LED lights, and generating analog voltage levels.

4. **Frequency Divider:** The 555 timer can act as a frequency divider when combined with other logic gates or flip-flops. By using appropriate configurations, you can divide the input frequency by 2, 4, 8, or other integer values. Frequency dividers are often used in digital systems, frequency synthesis, and clock division circuits.
5. **Touch Sensor:** The 555 timer can be used in touch-sensitive circuits to detect human touch or proximity. By utilizing the capacitance change caused by a touch, the 555 timer can trigger an output signal, which can be used to control various applications like touch switches, touch lamps, or touch-based interfaces.
6. **Voltage-to-Frequency Converter:** The 555 timer, along with additional components, can be utilized as a voltage-to-frequency converter. By converting an input voltage into a corresponding frequency, it enables applications such as analog-to-digital conversion, frequency measurement, and voltage-controlled oscillators.

These are just a few examples of the many applications of the 555 timer IC. Its simplicity, low cost, and versatility make it a popular choice for a wide range of electronic projects and circuits.

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Steven J Greenfield

Studying electronics as long as I could pick out my own books. · Author has **3.6K** answers and **16.2M** answer views · Updated 5y

✕

Originally Answered: What are some neat ways to use the 555 timer?

What are some neat ways to use the 555 timer?

I've only used 555s for PWM thus far. What are some other useful 555 topologies?

Tons of things.

Wired up as a monostable, it can be used to measure capacitance. A second 555 timer will provide regular clock pulses. I started making these in the late '70s to measure a variety of things. You can measure capacitors down to a resolution of 0.1pF with a 4 digit DMM. Or measure the level of liquid by immersing insulated wires into the liquid, and the tank does not have to be grounded. Some types of sensors vary capacitance when measuring whatever they are designed for. Connected a bit differently, it can work as a touch switch.

Theremin: Use one 555 as a clock to trigger two others set up as monostables. Each one measures capacitance on an antenna on a Theremin. The output of one is used to control a voltage controlled oscillator, which could be another 555 timer, and the other output is used to control a voltage controlled amplifier.

Here is my circuit for a capacitance meter as I drew it up in 1985:

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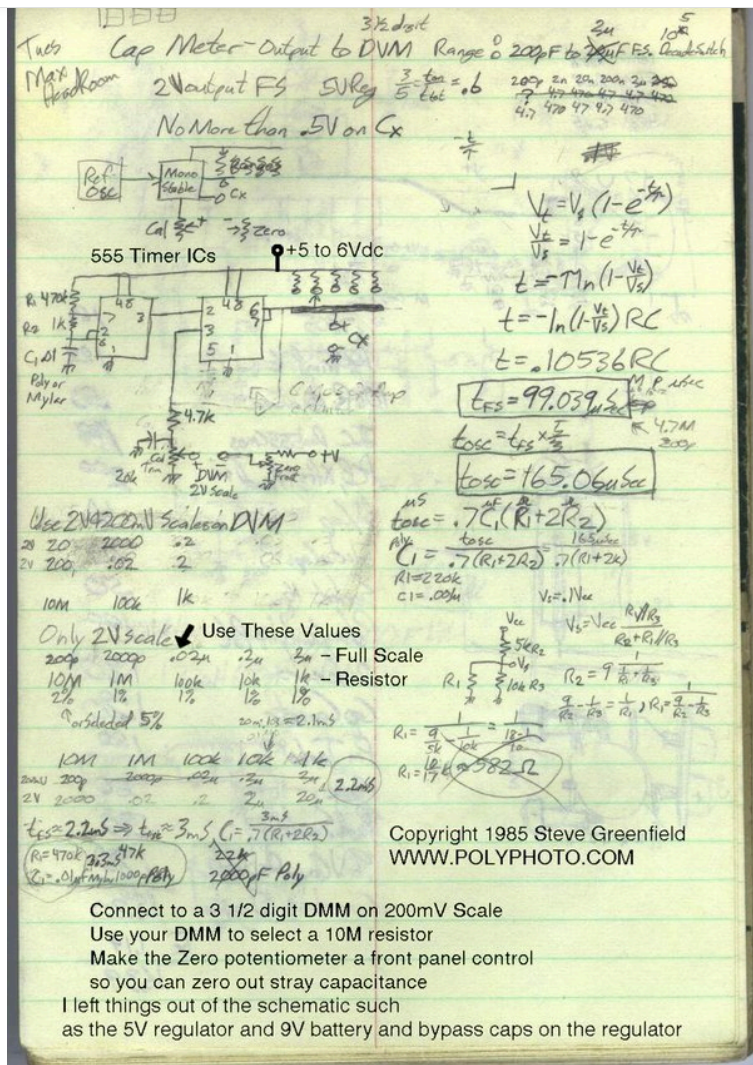
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With a constant current drive to charge the capacitor rather than a resistor, you can turn a 555 timer into a linear PWM, and even use it as a class D audio amplifier.

I've used a CMOS 555 with a driver transistor, small transformer, and feedback to make a crude low standby current charger for a Xenon flash tube, which was then used in sci fi blaster props. The whole circuit drew about 30uA once the capacitor was charged up, so it could be left turned on all the time. When the capacitor reached full voltage, the feedback signal would shut down the 555 timer. A little RC filtering on the feedback allowed the charge to pass just above the cut-off voltage, thereby accomplishing hysteresis with only the addition of a resistor and capacitor.

I built an 8 channel mini stage lighting controller with 555 timers. Zero crossing pulses triggered eight 555 timers wired as monostables. When the monostables turned off, a short pulse from a second 555 monostable fired off a Triac.

A 555 timer, especially the CMOS version, can oscillate up high enough to oscillate in the AM radio band. In this way, and using the two nulls you get when turning an AM radio in a circle, I made a transmitter hunt game as part of a Laser Tag game.

timing capacitor and buffered it using an Op Amp, then sending that triangle wave to an LM3914 bar-dot LED display driver.

If you just need one Schmitt trigger, a 555 timer works fine. The setpoints are 1/3 and 2/3 of Vcc. The 2/3 point can be adjusted from pin 5, the lower setpoint is always 1/2 of the upper setpoint. It also acts as an inverter.

A 555 set up as a monostable works great as a tachometer for your car. As with my capacitance measuring circuit above, you smooth the output pulses into DC and measure it with a meter of some kind. I even built a wireless tachometer, using a second 555 to receive and condition the incoming signal. I put a potentiometer on pin 5 to lower the upper setpoint and therefore reduce the voltage between the upper and lower setpoint, then another potentiometer to bias the inputs to pins 2 and 6 so, absent signal, it was biased halfway between the two set points. Then a collapsible antenna was connected, through a series capacitor to provide some DC isolation in case the antenna touched anything grounded or with voltage on it.

I'd just connect it to my car battery for power (a battery works, but it works better if grounded), pull out the antenna, and set it for the proper number of cylinders and cycles (2 cycle or 4

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to keep discharging the capacitor on a 555 wired as a monostable and with a timing of 120us. As soon as one pulse is missed, the monostable fires. It can even fire off another monostable set to a much longer time. So a pulse 50us long every 100us, that if wired to an LED would be invisible if missed, can fire off a 0.5 second blink that I -can- see.

The old Lazer Tag/Survivor Shot sets used a 57.6kHz carrier with 1.8kHz modulation. I made a variety of things using several 555 timers on those frequencies including force fences, compatible taggers, grenades, etc.

With a 555 timer and some feedback, you can make a switch mode power supply to create a higher voltage, or a negative voltage. It can drive a fluorescent tube from a battery, or charge a capacitor for a xenon flash (camera flash), or create a negative voltage for an Op Amp circuit, or a higher negative voltage for an air ionizer.

You can use a 555 with a transistor and some logic counter ICs to build a coil/transformer ring tester.

Wow... what else can I think of. I've made -so- many projects with 555 timers.

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Assistant

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The 555 timer IC is a versatile component widely used in various electronic circuits. Here are some of the best and most common applications of the 555 timer IC:

1. Astable Multivibrator

- **Description:** The 555 timer can be configured as an astable multivibrator, generating a continuous square wave output.
- **Usage:** This configuration is commonly used in clock pulses, LED flashers, and tone generation circuits.

2. Monostable Multivibrator

- **Description:** In this mode, the 555 timer generates a single output pulse of a specified duration in response to a trigger signal.
- **Usage:** It can be used for timer applications, such as delay timers, pulse width modulation, and debounce circuits for switches.

3. PWM (Pulse Width Modulation) Generation

- **Description:** The 555 timer can be configured to produce a PWM signal by adjusting the duty cycle.
- **Usage:** This application is useful in motor speed control, light dimming, and heating control systems.

4. Tone Generator

- **Description:** By using the 555 timer in an astable configuration, you can create audio tones.
- **Usage:** This is often used in alarm systems, sound effects for toys, and simple musical applications.

5. Frequency Generator

- **Description:** The 555 timer can generate different frequencies based on the resistor and capacitor values used in the circuit.
- **Usage:** Useful in frequency synthesizers and signal generators for testing purposes.

6. LED Chaser/Flasher

- **Description:** The 555 timer can control multiple LEDs in a sequence or flash them at specific intervals.
- **Usage:** Commonly used in decorative lighting, toys, and visual indicators.

7. Capacitance Measurement

- **Description:** The charging and discharging time of a capacitor can be measured using a 555 timer.
- **Usage:** This application helps in designing capacitance measurement circuits.

8. Temperature Sensing and Control

- **Description:** The 555 timer can be integrated with temperature sensors to create a temperature control system.
- **Usage:** Used in thermostats and temperature-sensitive applications.

applications.


- **Usage:** Common in appliances that require a delay before starting or stopping operations.

10. Frequency Divider

- **Description:** The 555 timer can be used to divide the frequency of an input signal.
- **Usage:** This is useful in clock applications and digital circuits.

Conclusion

The 555 timer IC's flexibility and ease of use make it a staple in electronic projects, from simple hobbyist applications to complex industrial systems. Its ability to function in various configurations allows for a wide range of creative uses in timing, pulse generation, and signal processing.

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Can you explain how to set up a 555 timer in astable mode?



What components do I need for a basic 555 timer circuit?



How do I calculate the frequency of a 555 timer circuit?



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Manjunath Pai H

Former 30+ yrs in Electronics Engg and loved it. · Author has **2.7K** answers and **6.6M** answer views · 8y

1.The most popular use is as a clock (a square wave generator, an astable multivibrator) for low frequency circuits the hobbyists construct.

2.Next one is building Timers for setting various timing for switching ON/OFF certain other circuits.

3. Waveform generators- square, triangular and even sine (with wave shapers ofcourse)

4. Class D amplifier using PWM property of IC555 to amplify audio signals.

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Richard James Nelson

Former (Retired) Senior Technical Writer at AMF. at AEMF Foundation (1999–2007) · Author has... · 9mo

Originally Answered: What are some neat ways to use the 555 timer?

The term "neat" will be dependent on the reader. There are many books filled with 555 timer circuits and applications. These have the details to build the circuits yourself. The 555 IC was one of those genius designs that tweaked the world. I suspect that many of these books are available for down load.

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Keith Brown

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For a posterity purpose I used a 555 to provide a temporary power on , to illuminate a LCD display for a donar legacy device -

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Mukul Vaishnav

Working in Electronics field since last 8 years · Updated 9y

Originally Answered: What are some neat ways to use the 555 timer?

You could make hundreds of circuits using 555 timer IC. There are a lot of circuit ideas already available on internet or if you have known the concepts of 555 timer, you could think many more yourself

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[555 Timer Circuits](#)



Abhiroop Sen

Tinkering with 555,4017,Op-Amps and Voltage Regulator IC. · Author has 67 answers and 174K a... · 9y

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From a simple LED Flasher to a Line Following Robot Using 555 Timers,the ideas are endless.

Just visit this webpages and read about 555 Timer IC i.e How it works,the internal structure of the IC etc.

Here's a number of sites which shows cool projects made by 555 Timer IC.

1.www.555-timer-circuits.com

2.www.electroschematics.com/555-circuits

3.www.makezine.com/2012/08/24/555-timer-weekend-projects



Rich DeAngelis

Electronic engineer, test, manufacturing and design in many industries. · Author has 1.1K answers and 3M answer views · 4y

Related **What are the disadvantages of a 555 timer?**

What are the disadvantages of a 555 timer?

Let me make this clear. I love the 555 timer. I use it often, and I even have the pinouts memorized as well as ways to use it. But it is not ideal.

For a while there was a newer chip (Back in the 1970s) that overcame a lot of the design challenges of the 555, but it never caught on and I have never been able to find it for sale anywhere. It was the 322 chip, and I have two of them stashed away. I wish that would be as common as the 555. But I think it's lost to history. Even an internet search finds no real information on this extinct chip. So we are stuck with just the 555.



The original 555 used a lot of current. There are newer CMOS 555s that are much better in this regard, so that's not a big issue. Even though, the 555 is able to drive a lot of output current, so it can be used as a buffer/amplifier without timing functions for some circuits. It can operate over a wide voltage range, so it is easy to use the 555 to interface with various logic levels from 3.3 logic up to about 15 volt logic. Also it's cheap, and even cheaper if using a 556 two-in-one package.

But some of the drawbacks are:

The 555 is not really able to create very square 50% square waves with out a lot of external circuitry or a divider circuit.

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frequency modulation is not very linear either.

The 555 is not very accurate with temperature changes. It has been designed to reduce changes from the power supply voltage, but it still has an affect on timing accuracy.

The 555 can not handle frequencies much above 1 MHz or so. Something like a 32 MHz clock is completely out of the question.

Pulse width modulation can be done with the resistors, but can't handle the full range from 1 to 99%. At best it can only do about 1% to 50% modulation - and that's at lower frequencies.

The 555 in normal wiring has a fixed output pulse polarity. We have to play some tricky wiring in order to create an inverted output timing pulse.

The trigger input for mono-stable timing is fixed to a negative pulse input. It can't accept a positive pulse input directly.

The timing capacitor input is not high impedance. This reduces it's usefulness for accurate very long time durations. An op-amp can improve that a lot.

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exponential, not linear. If it was linear, we could use that voltage as a ramp, sawtooth, or triangle waveform output with suitable buffering.

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Steven J Greenfield

Studying electronics as long as I could pick out my own books. · Author has **3.6K** answers and **16...** · 5y

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Can a 555 timer be used as the practical use of a timer?

Define "practical".

For timing what? It won't be even close to as accurate and repeatable as the cheapest crystal oscillator.

But if you want an egg timer, it is more than accurate enough. You are limited by the tolerances of the timing resistors and capacitor. Also limited by the temperature drift of the same. And by the drift over time. Noise and variations in power supply voltage will affect the accuracy somewhat.

With careful selection of the resistors and a regulated voltage source, my cost

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Naren Nagarajan

Lived in Hyderabad, Telangana, India (2022–2022) · Author has **1.3K** answers and **4M** answer views · 8y

Related **What interesting projects we can do with IC 555 TIMER?**

The 555 is an eminently hackable chip and there are numerous websites that have really innovative applications for this chip. For e.g. 47 Projects to Do With a 555! [<http://www.instructables.com/id/47-projects-to-do-with-a-555/>]

But in over 25 years of using the 5...



Nimisha Chitriv

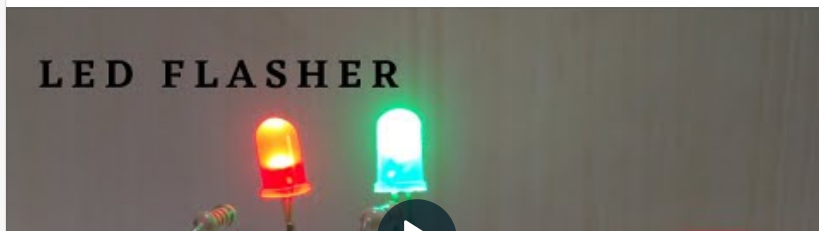
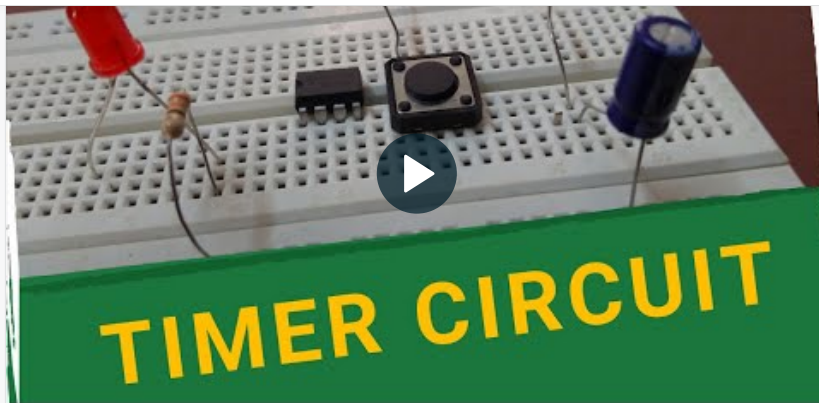
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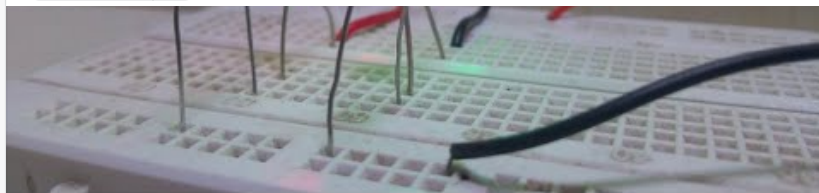
There are a number of projects you can do with 555 IC the most common ones being:

1. Interval timer
2. Dual LED Flasher
3. Single LED flasher

If you wish to try any of the above circuits you can click on the link below and try them out



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Jacob Herbold

I've designed ICs and PCBs for a variety of applications · Author has **198** answers and **469K** answer views · Updated 6y

Related **What are common IC useful for electrical engineers to know like the 555 timer?**

Mr Jeynes has a nice list. So if memorization is what you're into go for it.

It seems like a very old school approach to electronics to me. From a time when engineers kept shelves full of IC data books.

Many of the ICs on that list are not very high performance electrically or cost wise. Many of those old school common ICs are intended for 5 V or higher supply voltages. These ICs are rarely, in my experience, designed into new circuits. Knowing them is probably not beneficial. You would be better off knowing more about how to pick the right Op Amp and how to design better oscillators, mono-stables and so on with lower voltage and more power efficient ICs than a 555. Work on circuit design techniques not memorizing some product numbers.

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many people over the years. If I remember right it wasn't intended as a product at all, just a technology demonstrator.

I have rarely wanted an LM317 instead of a low dropout linear regulator. Now a complete switching regulator can be had in IC size packages and for low cost. The 317 is of limited use.

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Henry Jeynes

Aspiring EE · Author has **1.6K** answers and **2.7M** answer views · 7y

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- 555 (as already mentioned)
- 556 (dual 555)
- LM358 (op amp)
- LM386 (audio amplifier)
- CD4017 (decade counter)
- 74HC595 (CMOS serial-in parallel-out shift register, available in other variants)

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- 79xx (negative voltage version of 78xx)

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- LM1117 (voltage regulator)
- Various other 74 and 4000 series logic chips

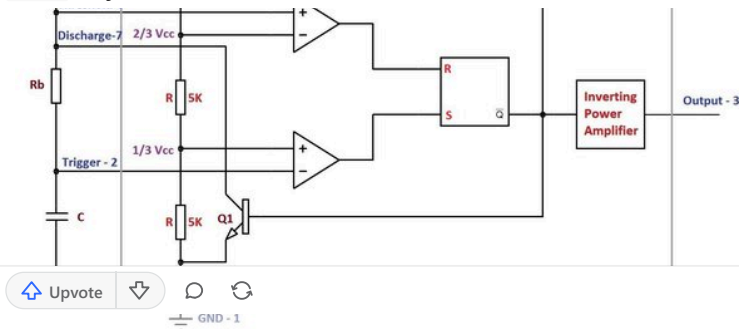
This is by no means a full or comprehensive list of jellybean ICs. There are many more to list.



Loring Chien

Electrical Engineer for 45 years & IEEE Sr. Life member · Author has 66.8K answers and 239.4M a... · 5y

Related **Why is the IC timer called 555?**



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I find the class D amplifier using the IC 555 interesting. Using this circuit, you can even amplify a sine wave in PWM mode, making it to amplify music.



Quang Nguyen

Studied at University of Queensland · Author has 266 answers and 1M answer views · 3y

Related **What are common IC useful for electrical engineers to know like the 555 timer?**

Uhm, I am probably the least qualified electronics engineer to answer this question. It's mainly because the stuff people consider classic are rarely suitable in modern electronics when microcontrollers are involved.

Let's think about a few examples, shall we.

- 555 IC - yeah, well, you are much better synthesised a clock signal or PWM out of a MCU then feed it to supportive electronics to create the right waveform. That way you enjoy the high accuracy of crystals/oscillator. In addition, most MCUs have built-in PLL so you could generate frequency higher than your oscillator, which is impossible to do

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- 78 series of linear regulator and LM317 for adjustable voltage - I practically don't remember the number of times I have to dissuade people from using linear regulators when a SMPS is the better alternative. Even if you need stable, low noise rails LDOs are still the more efficient choice. So besides a few hi-fi audio apps, I couldn't think of a situation where you would find "normal" regulators to be suitable.
- 74 series of logic ICs - why do you need them if you have a MCU? Even if you need high speed digital then FPGAs or PLCs are the far superior choice.
- Baseline opamps like LM358 or LM324 - this is probably the most relevant ICs out of all the classic, but I am not in a hurry to get them. Nowadays I will use opamps either for dead simple things or for critical designs, no in between. If such is the case the classic opamps are not the most appropriate choice in my experience, although you certainly can live with them.

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Sameer Bobade

Electrical engineer, system designer · Author has 143 answers and 751.1K answer views · 8y

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It's a general purpose timing device that can be used almost anywhere timing is required. Some examples -

1. Timing for traffic light
2. SMPS / switching regulator

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Roy McCammon

40+ years as an Electrical Engineer · Author has 4.2K answers and 4.1M answer views · 7y

Related **What are the real-time, practical applications of the 555 Timer? Where is it used in our day-to-day, usable devices?**

The best thing about the 555 is its beefy output driver. I would ordinary use a CMOS variant such as the 7555 for timing, but I might hang a 555 on the output as a moderate powerful output.



Mark Aitchison

B.E.(hons) in Electrical and Electronics Engineering, University of Canterbury, New Zealand (Graduated 1979) · Author has 513 answers and 479K answer views · Updated 3y

Related **What are the uses of a 555 timer IC?**

NOTE This question changed from "what are the uses...?" to "How does it work...?"; my original answer to the uses remains, but scroll down to the bottom for a brief explanation of how it works....

The main original three or four uses (depending on how you count them):

1. Oscillator ("astable" mode; squarewave signal generator)
2. Bistable ("comparator with memory")
3. Monostable (pulse lengthener or shortener)
4. Timer ("microseconds to hours"), e.g. an egg timer... really a special; case of monostable operation.

Which lead to many uses, like:

- squarewave signal generator
- voltage level detector with hysteresis
- FM signal generator
- Oscilloscope timebase
- PWM motor control
- Class D amplifier
- DC-to-DC converters, including buck/boost switchmode power supply
- Triangle wave or sawtooth signal generator (needs an opamp or external transistor as well)
- AM signal generator
- Logic Inverter
- 3.3V CMOS to 5V TTL signal level converter
- TTL to CMOS converter (level shifter)
- key debouncer
- car windscreen wiper controller
- touch-sensitive switch
- camera flash relay
- camera shutter tester
- room resonance tester
- simple frequency meter
- Voltage Controlled Oscillator
- Guitar fuzz effect

Basically how it works:

Most 555 circuits run with the "trigger" and "threshold" pins (2 & 6 in the normal package) connected together; in this simplified configuration the 555 is basically an inverter with hysteresis - a "Schmitt Trigger", in effect, like one sixth of a 74HC14 IC, and simple oscillator circuits that work for a Schmitt Trigger will work for the NE555 (e.g. a simple resistor from

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pin 8 to pin 1 that supply 2/3 of VCC and 1/3 of VCC to the two comparators' other input pins).

The 555 has three more pins: the RESET (pin 4) that must be connected to pin 8 (VCC) unless you actually want to reset the device, and a "(Frequency) control" (pin 5) that can directly change the voltage at the 2/3 point (and indirectly at the 1/3 VCC point to pin 2's comparator) - this can change the frequency, but in a slightly complicated way; you can ignore it, but I'd suggest connecting a 0.1uF capacitor from pin 5 to ground to avoid any stray high frequency pickup at that pin... just in case.

It also has a "discharge" output (pin 7) that can be used instead of pin 3 to take an output (via resistor) to the timing circuit; many circuits use this method for their oscillator design but it is more complicated (pin 7 is basically an "open collector" output, so it can pull the voltage **down**, but not **up** - you need pull-up resistors to the supply voltage, and then it is difficult to get a perfect 1:1 mark:space ratio (i.e. the square wave output will be high longer than it is low). The discharge pin is great for timer circuits, but you're better off using pin 3 for oscillators, in my opinion, unless you actually want a specific duty cycle (mark:space ratio). Also be careful not to have the resistance between pin 7 (or pin 3) and the capacitor too low else you get high current peaks that cause inaccuracy in timing (and if really low could blow the internal transistors). I wouldn't got much below 330 ohms for accuracy (most datasheets suggest a 1 kilohm minimum, but that is for circuits with two resistors, RA and RB being 1k or more), and (depending

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ohms between pin 7 (not pin 3) and the timing capacitor... but the other resistor, RA, from pin 7 to Vcc, has to be considerably higher and so this circuit still doesn't allow much higher frequencies, just shorter "low" durations while the "high" period has to be relatively long. Confused? Then it is best to stick to the simple circuit that takes the feedback from pin 3!

Even with that pin 3 choice there are plenty of options if you *want* to complicate matters - some good modifications if you want accurate frequencies over 1MHz that involve ceramic filters or crystals or LC circuits, but you have to avoid excess voltages on the inputs at

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The 555 is a pretty useful device - there are so many circuits for it that I could suggest if readers have specific needs.

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1 of 12 answers



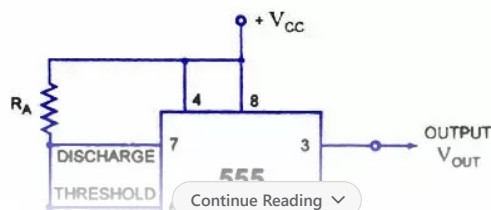
Amal Syed

Former Sr.Systems Engineer at Cognizant (company) (2017–2019) · Author has 112 answers and ... · 9y

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You have to wire up 555 to work in Monostable Mode, which will give a pulse width of 5 minutes.

Circuit is as given below :



Chandan Mishra

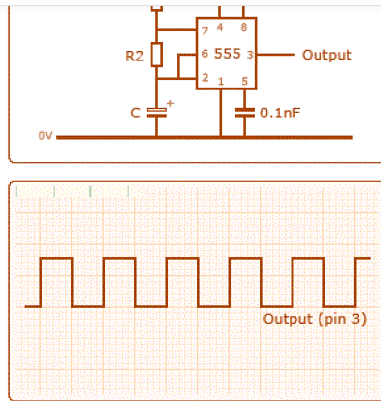
Electronics and Communication Engineer · Author has 66 answers and 188.5K answer views · 8y

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The 555 has three main operating modes, Monostable, Astable, and Bistable. Each mode represents a different type of circuit that has a particular output.

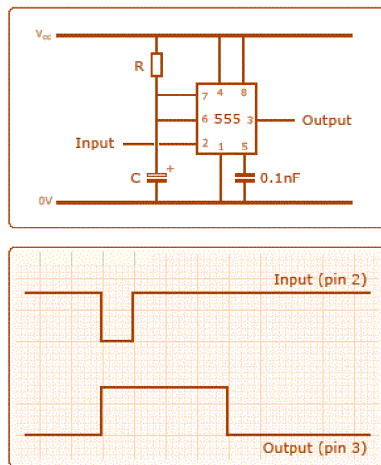
Astable mode

An Astable Circuit has no stable state - hence the name "astable". The output continually switches state between high and low without without any intervention from the user, called a 'square' wave. This type of circuit could be used to give a mechanism intermittent motion by switching a motor on and off at regular intervals. It can also be used to flash lamps and LEDs, and is useful as a 'clock' pulse for other digital ICs and circuits.



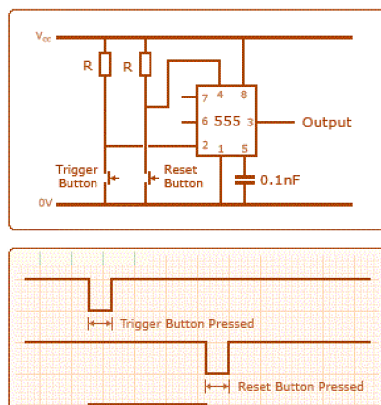
Monostable mode

A Monostable Circuit produces one pulse of a set length in response to a trigger input such as a push button. The output of the circuit stays in the low state until there is a trigger input, hence the name "monostable" meaning "one stable state". This type of circuit is ideal for use in a "push to operate" system for a model displayed at exhibitions. A visitor can push a button to start a model's mechanism moving, and the mechanism will automatically switch off after a set time.



Bistable Mode (or Schmitt Trigger)

A Bistable Mode or what is sometimes called a Schmitt Trigger, has two stable states, high and low. Taking the Trigger input low makes the output of the circuit go into the high state. Taking the Reset input low makes the output of the circuit go into the low state. This type of circuit is ideal for use in an automated model railway system where the train is required to run back and forth over the same piece of track. A push button (or reed switch with a magnet on the underside of the train) would be placed at each end of the track so that when one is hit by the train, it will either trigger or reset the bistable. The output of the 555 would control a DPDT relay which would be wired as a reversing switch to reverse the direction of current to the track, thereby reversing the direction of the train.



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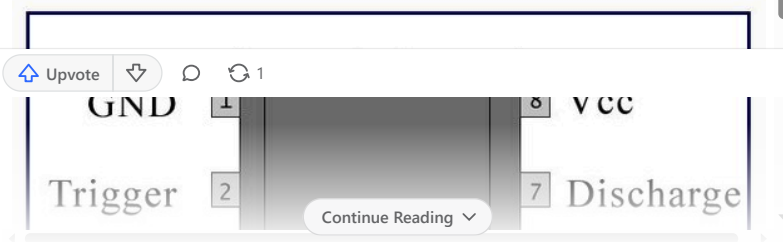
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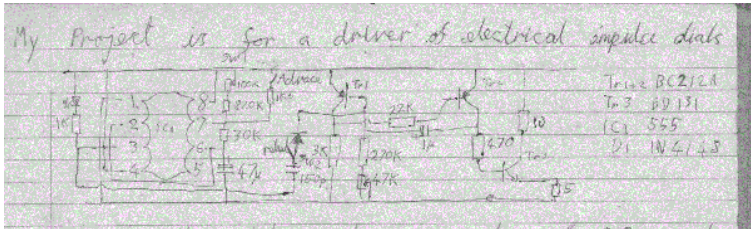
555 timer IC is a well-known component used in electronics, it is generally used in many applications for its robust and stable properties. The timer got its name from the three 5kohm resistor in series connected in a voltage divide pattern. It comes in a 8 pin DIP(dual-in-line-package) as shown,



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Gives 0.2 seconds, so change 1μ to 10 or 15.

You don't need the switches.

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This question isn't just limited to the 555, this is a fundamental quality of any clock or signal. I've normally heard a symmetric duty cycle called 50% duty cycle, but it's easy enough to infer they are equivalent.

A symmetric duty cycle in any clock or waveform generator would be one that is high for $1/2$ cycle, and low for the other $1/2$ cycle.

The humble 555 timer

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Its in the data sheet.

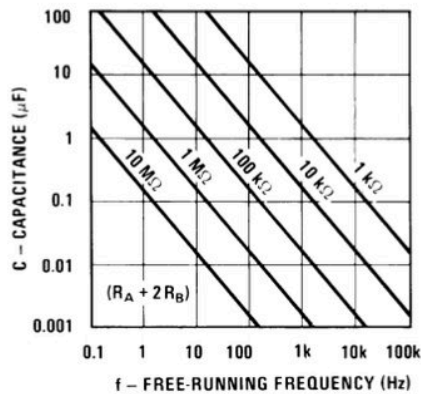


Figure 16. Free Running Frequency

Its not stated directly but its not going to be a whole lot more than 100 KHz.

it s a combination of the rise and fall times of the device output and delays in the comparator and flip flop and the ability to charge and discharge current fast enough

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Absolutely not

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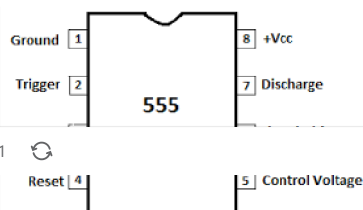
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555 IC is also known as 555 timer IC. This IC is mostly used in circuits related to time such as

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... (text partially obscured) ... as CD4017 IC can also be used to make an LED chaser circuit and the chase speed is controlled by 555 timer IC. It is an eight pin IC. Commonly "NE 555" is written on the IC. Its pin out and pin function is shown in the picture. I hope this helps.



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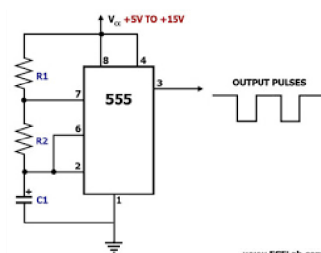
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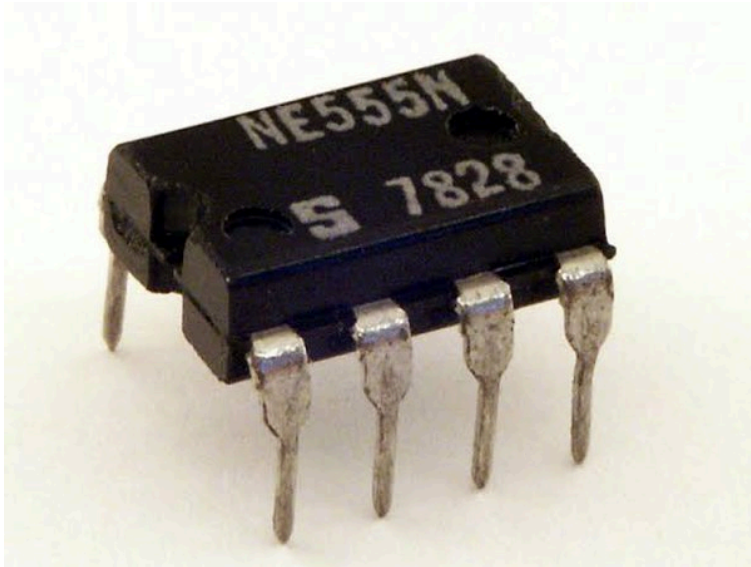
Related **What is inside a 555 timer?**

Hello there,

Let's see little basics before studying the internal structure of 555 timer.

First of all, its a monolithic timer circuit which is capable of generating time delays and produce oscillations along with numerous other applications. This IC has 8 pins in it and when we talk about 556 timer then it comprises of 14 pins and is called as dual timer IC.

This is how the 555 IC looks like-



555 was first designed in 1971 by Hans Camenzind. Low cost, accuracy, efficiency, consistency has made it extremely popular in electronics. By using components like resistors, capacitors the IC can be configured as astable, monostable and bistable multivibrator.

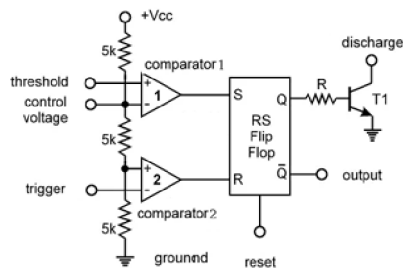
It undoubtedly has long list of uses, to enlist few of them -

555 timer is required in: pulse width modulation, pulse position modulation, Ramp generator, Astable, bistable, monostable multivibrator, pulse generator, Relaxation oscillators, timer circuits, etc.

Now, let's talk about the inside of 555.

The internal structure is precisely classified into various blocks for better understanding. They are-

1. Voltage divider network (this is made of three 5K ohms resistors)
2. Comparator (designed using opamps)
3. Flip-flop (we use RS flip-flop in 555 timer)
4. Discharge
5. Output



The above diagram demonstrates the internal structure of IC clearly.

And if you are interested in learning more about 555 timer IC, then this will help you -

555 TIMER IC

Conceptual viva voce

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Thank you ❤️

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Use the same circuit the 555 datasheet offers as the astable, but omit the resistor to the

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the 50% duty cycle. The resulting signal remains symmetrical independently from the values of R or C.

Strange enough, neither Signetics (555's original manufacturer) nor all other second source manufacturers do not communicate this straightforward and fair solution. They offer a much more complicated (and less advantageous) application instead.

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The 555 timer IC is a masterpiece IC than can be used to perform umpteen number of tasks. From basic hobbyists circuits to what not - 555 timer IC can do it all.

It has three modes of operation - Astable, Monostable & Bistable.

You can use these different modes to make -

- Pulse Generator
- Switching Circuit

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- PWM

Apart from these direct uses of a 555 timer IC - it can be also used in places where you can make your hardware do the task that needs a micro-controller instead. You can control Servo Motors, Sensors, Multiplexers and De-multiplexers and control the signal transmission at any voltage level using a few add-ons.

This cheap, 5 INR worth IC can do wonders and is the stepping stone for any beginner not only conceptually but also in building the interest for electronics. Thus, this IC is IMPORTANT.

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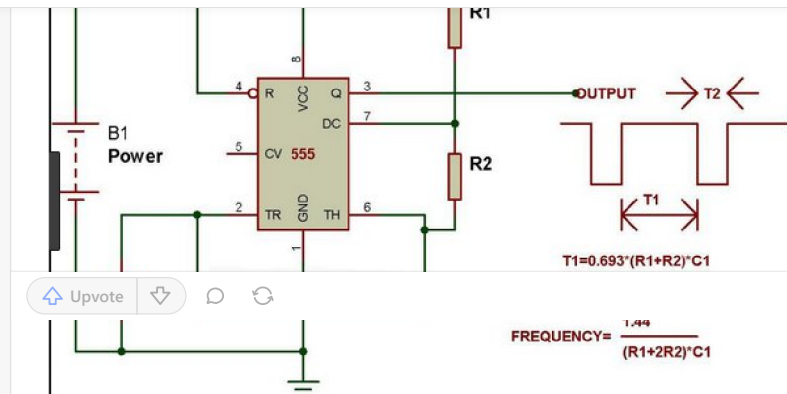
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Related **What is the frequency range of a 555 timer in astable mode?**

The Max frequency range of the 555 timer IC in astable mode is from 500-kHz to 2-MHz.

Astable Multivibrator mode of 555 timer IC is also called Free running or self-triggering mode. Astable mode works as a oscillator circuit, in which output oscillate at a particular frequency and generate pulses in rectangular wave form.



You can also use the frequency formula in the picture if you have the values of R1, R2 and C1.

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Typically, the IC 555 timer can work in 3 modes. Monostable where it functions as a one shot delay timer, Bistable which adds a reset capability to a one shot timer for interrupting and restarting a timing cycle and Astable which is an oscillator (electrical pendulum if you will). 555s have been used to generate a clock signal (although not one with a very accurate frequency) to drive the power transistors that invert DC to AC in the transformer. You could use

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You program its function by the connections and the values of the external components. It is no programmable beyond that.

You can, however, construct a circuit with the functionality of any 555 circuit with a small microcontroller. It can exceed the 555 operation in almost all respects. For example, getting long timing periods with a standard 555 is difficult due to leakage. A few minutes is about the limit. It is also not very accurate and will drift with time, supply voltage, and temperature. With a microcontroller, you can easily make a time period of months or years, with accuracy of .005% if you use a crystal.

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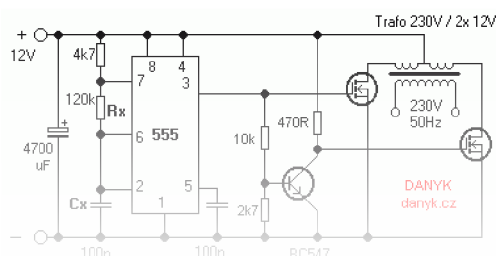
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astable 555, with the values in the diagram, you'll calculate a value of 58hz. Hence per second

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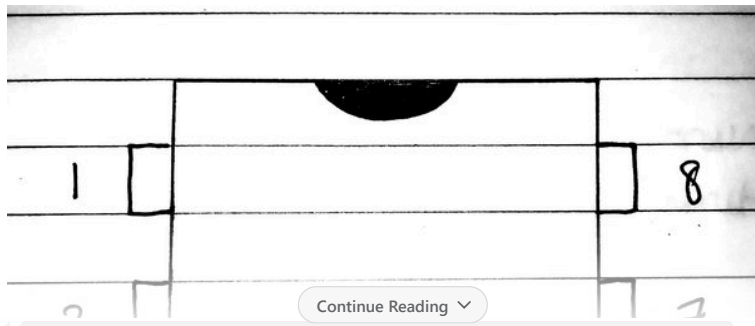


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Pin5 does that work.



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