Morse Code Generator Circuit and Its Applications

Morse code is very old and versatile technique to send text messages using wireless media. Usually Morse code contains only two signals or characters. One is dot(**.**) and the other is dash(-). Using these two characters or signals, the entire message will be sent to the receiver. If you want to send “Hi Hello World” in Morse code, it will be converted to **“…. .. …. . .- .. .-.. — .– — .-. .-.. -..”** and sent to the receiver. Samuel Morse, Joseph Henry and Alfred Rail designed the electric telegraph system in which electric pulses are sent through the wire and are received by the receiver. A electromagnet is used as a controller at the receiver end to control the electronic pulses. Samuel Morse invented this Morse code for sending the message in encrypted form and later they used to send Morse code signals through these telegraphs. It was very popular way to send messages to the other people. Later Morse code transmission got evolved from telegraphs to radios. Morse code used for sending the audio Morse code message using radio communication (wireless). Using radio communications, the dots and dashes were sent as short and long pulses. People also habituated using Morse code. They can even decode the code just by listening to the code.

Morse code is nothing but sending the message or data in an encrypted form using **.** and -. The receiver will receive the dots and dashes and decrypt it for others people to understanding.

Morse Code for Alphabets, Numbers and Special Characters:

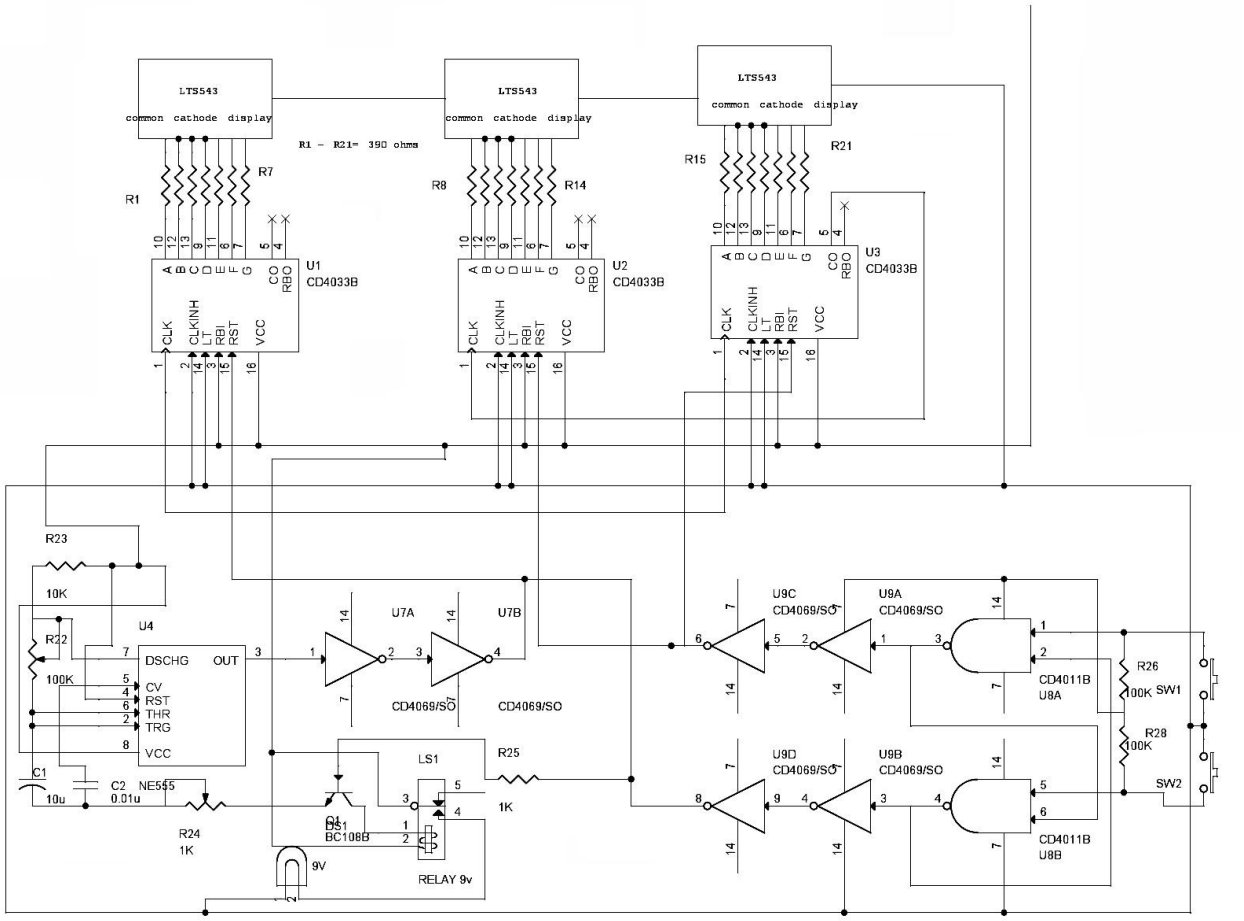
The table given below is the Morse code for alphabets, numbers and special characters:

A	.–	M	––	Y	–.––	6	–....
B	–...	N	–.	Z	––..	7	––...
C	–.–.	O	–––	Ä	.–.–	8	–––..
D	–..	P	.––.	Ö	–––.	9	––––.
E	.	Q	––.–	Ü	..––	.	.–.–.–
F	..–.	R	.–.	Ch	––––	,	––..––
G	––.	S	...	0	–––––	?	..––..
H	....	T	–	1	.––––	!	..–.–
I	..	U	..–	2	..–––	:	–––...
J	.–––	V	...–	3	...––	“	.–..–.
K	–.–	W	.––	4	....–	‘	.––––.
L	.–..	X	–..–	5	.....	=	–...–

World war1 and world war2 changed the usage of Morse code – basic communication, sending messages between the military platoons and head quarters. In the world war 1, there is no radio communication for Morse code but from world war 2, the extensive use of radio communication came to use in navies like American navy, Canadian navy, Australian Navy, British, German navy. They used this Morse code using radio telegraphs and send their messages in encrypted format using Morse code. Not only navy, military also used this Morse code for sending the messages. World war 2 is the theatre for the countries to show there technology, communication system, defense mechanism. Morse code plays the crucial and important role in communications.

Morse Code Generator Circuit:

Circuit diagram of Morse code generator is shown below:



Circuit Diagram Explanation:

- The total circuit will work on three main component switches. They are Timer, BCD and 7segment decoder. The two de-bouncing circuits are created and given to the two switches as shown in the circuit. Completely one debouncing circuit is connected to the reset pin of one decoder and another debouncing circuit is given to the reset pin of remaining two decoders. The debouncing effect is must in this circuit and it plays a vital role for fast switching to send message.
- The lamp is connected to the circuit which will be ON/OFF by the two switches. The SW1 is used for light ON condition and SW2 is used for light OFF condition. When SW1 is pressed, the lamp of the circuit will get ON and the counter connected to switch and BCD to seven segment decoder will counts time period which will display on the seven segment display through BCD to seven segment decoder. The remaining debounce circuit, counter and BCD to 7 segment decode will be in OFF state.
- When SW2 is pressed, light of the lamp will be turned OFF and time for the light OFF is displayed on the seven segment display from the counter and BCD decoder. In this condition, the first switch debounce and related circuitry will be in OFF state.
- As I said earlier, Morse code contains only Dots and Dashes, the light ON period will be considered as dot and light OFF period is considered as dash. Suppose, if you want transmit letter A, the Morse code for letter A is '. And -'. That is, first

we have to generate a dot by switching the SW1 which will light ON the lamp and immediately we have to switch ON SW2 to generating dash by light OFF the lamp. The time period for generating a single dot should be 2 seconds. When counter shows 2, we should immediately leave the key and switch to next key. Time period for dash that is light of period is 6 seconds. Time period for switching the switches from sw1 to sw2 or sw2 to sw1 should be 2 seconds. We use two 7 segment display and 2 digit counter for light off because the time taken by light off condition is greater than light on condition, that is why we use two 7 segment display.

Applications of Morse Code:

Aviation: Morse code is used in the aviation field till today. Previously, they are used to maintain communication between planes or flights and also in ATC (Air Traffic Control). Today, they are used for giving navigation aids to the pilots and ensure that the stations, the pilots using are serviceable; the stations all transmit a short set of identification letters (usually a two-to-five-letter version of the station name) in Morse code.

Radio: Morse code is still used in today communications like radio communication. It is mainly used by radio operators to communicate with each other and also used to distinguish from spark transmission from radio transmission. Still most of the radio amateur uses this Morse code to transmit radio.

Navy: Navy people use this Morse code to send messages to other ships. They will send a distress signal or help to others ship when they are in need. If you see Titanic movie, you can observe that some people click one pointer to send message. That is Morse code signal. As the days change, they will send this distress signal in the form of audio, that audio is also in Morse code. Navy people will signal the other ship using the lights by switching ON and OFF in a code form; that sequence of ON and OFF of light is also in Morse code.

Normal Applications: Morse code is still used by some people to send the distress signals, extensively used in military application and many more aviation submarines even by Government applications.

I still believe – that particular day will come and again people will rely on Morse code for communication. Readers, just don't think that why we are still using Morse code by thinking that we have got more extensive encrypted encoders and even have very strong decoders for decoding the foreign encoded signal. It is our way or duty to maintain old legacy. I believe even in judgement day we can use Morse code for communication.

Source: http://www.electronicshub.org/morse-code-generator-circuit-applications/