

## Phasing CW filter

Written by Hans Summers

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I saw this article about an unusual type of CW (morse code) filter in the Imperial College university library copy of the August 1988 issue of Radio Communication, the monthly publication of the [Radio Society of Great Britain](#). The article is reproduced here by permission of the [RSGB](#).

[CLICK HERE](#) to read the 2-page article (548KByte file) in Adobe Acrobat .pdf format.

It seemed like a good idea, and so I decided to make it. The photograph below shows the results of my efforts. I used [LM324](#) quad op-amps instead of the TL074 in the article, with a [741](#) for the final adder. I didn't build the audio output stage because I planned to feed the output into another amplifier. I used high quality polystyrene capacitors and 1% tolerance resistors. When I had finished making the circuit I felt I needed to test it, so I built the simple test oscillator shown in the circuit below. This is a simple oscillator circuit using the well known [555](#) oscillator. I could vary the 22K resistor to set the frequency, which I measured with my recently-completed [panel mounting frequency counter](#). The signal strength at the input and output of the filter I *think* I measured using an old digital AC voltmeter.

The results of testing my version of the circuit are shown in the table and graph below. The peak between 200Hz and 300Hz is caused by the square wave output of the test oscillator. The third harmonic of the fundamental frequency at 271.67 Hz occurs at the filter centre frequency of 815 Hz, which is passed through the filter. Ignoring this spurious peak, my test results look very similar to the graph plotted in the article.

I have been using this CW filter in my [HF Receiver](#) for some time, where it can be switched in or out of the circuit. I find that the noise performance of the LM324 adds considerable "hiss" to the audio. If I was building it again, I think I would be sure to use a lower noise op-amp. Also, the sharp response makes it quite difficult to tune the receiver exactly onto the wanted station. For this reason I tend to use a more conventional op-amp bandpass filter for normal reception. Nevertheless, I find this phasing CW filter very useful at times when trying to receive a weak signal, or when there is heavy nearby QRM.

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{gallery}cwfilter{/gallery}