SOTABEAMS External DSP Audio Filter

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In the age of software-defined transceivers, you may think no one needs an external audio filter. If you've had the pleasure of operating a recent desktop transceiver with digital signal processing (DSP) features or a software-defined radio (SDR) transceiver, you know their signal-filtering abilities are excellent.

But there are still a lot of older analog transceivers in use, not to mention all those low-power (QRP) kit transceivers. Of course, for older transceivers that will accommodate them, there are crystal and mechanical intermediate-frequency (IF) filters you can install. Good IF filters can provide a major performance boost, but they often come with significant price tags.

An alternative is to perform filtering at the audio stage.

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Based in the United Kingdom, SOTABEAMS is known for offering useful products for amateurs who enjoy portable operating (as in *SOTA* — Summits on the Air) where size, weight, and power consumption are critical factors. Many portable operators use low-power transceivers, and the majority of these are analog radios.

With this group in mind, SOTABEAMS has developed a series of DSP audio filter modules that can be installed within many transceivers. For those who would rather not take that approach, they also offer an external audio filter that incorporates one of their DSP modules and adds a few controls. That's what I'll be evaluating in this review.

The SOTABEAMS external DSP filter is tiny — just 3⅓ × 2½ × 1 inches. At the front of the enclosure, there is a volume control on the left side (labeled **VOL**), a red **LVL** LED that warns when you are feeding too much audio to the filter, and a green **SIG** LED that lights when you've properly tuned the target signal. More about that in a moment. There is also a small toggle switch (**W/N**) to select wide or narrow filter bandwidths.

At the rear of the filter, shown in Figure 3, you find two 3.5-millimeter jacks for the audio inputs and outputs, as well as a coaxial dc power socket. You can power the filter from any dc source that can supply 5 to 15 V at about 70 mA.

When ordering, you must specify the desired filters:

SSB + CW (Wide: 2,700 Hz and Narrow: 300 Hz)

CW wide + CW narrow (Wide: 1,000 Hz and Narrow: 300 Hz)

SSB wide + SSB narrow (Wide: 2,700 Hz and Narrow: 2,400 Hz)

For this review, I chose the SSB + CW configuration. Note that filter bandwidths are fixed at the values shown above, and they are not adjustable. Measurements in the ARRL Lab confirmed that both filters are very close to their specified bandwidths. Swept frequency response plots are available from **www.arrl.org/qst-in-depth**.

Putting the Filter to the Test

Using an analog HF transceiver, I attached a cable between the radio's headphone jack and the input of the SOTABEAMS filter. At the filter output, I plugged in a set of headphones. (Later I also tried a small speaker and was surprised at how loud the filter output could get.)

Bottom Line

The SOTABEAMS external DSP audio filter can improve selectivity to help separate signals on crowded bands. It's especially useful with simple QRP transceivers and older analog transceivers without DSP features or narrow IF filters.

Figure 3 — The SOTABEAMS DSP filter rear panel has jacks for dc power, audio in, and audio out.

I turned up the transceiver volume until I achieved a comfortable listening range with the filter's **VOL** control while not causing its red **LVL** LED to flash. With the 2,700 Hz filter mode selected, I browsed a few SSB signals and was impressed with how well the SOTABEAMS filter enhanced the overall audio quality. I really didn't expect to hear a significant effect, but the SOTABEAMS filter made an obvious improvement.

The best was to come when I switched to CW. A CW contest taking place during the weekend after I received the filter provided an ideal environment for testing. Tuning into the CW portion of 20 meters, several signals popped through the 2,700 Hz filter simultaneously. When I switched the SOTABEAMS filter to narrow, however, the effect was pronounced. What was previously a chaotic mess became far easier to navigate.

Keep in mind that the filter is working at audio frequencies rather than RF, so its performance can be affected by such things as AGC pumping from strong nearby signals (where the desired signal level rises and falls as the receiver reacts to those nearby signals). Even so, the ability of the SOTABEAMS filter to impose a significant degree of order on the cacophony was remarkable. You can download an MP3 audio file and listen to the SOTABEAMS filter in action at **www.arrl.org/qst-in-depth**.

Switching back to the wide filter, I tuned again while watching the signal-tuning LED. This LED is driven by an independent DSP filter centered in the CW passband at 750 Hz. So, whenever I saw the green **SIG** LED pulsing to the beat of a CW signal, I knew I could immediately switch to the narrow filter and find that it was perfectly tuned. This became one of my favorite features.

A Worthwhile Addition

An external audio filter — even a DSP model such as this one — can't work miracles. It won't match the performance of a quality IF filter, and it will fall far short of what can be achieved in a software-defined radio. Still, the SOTABEAMS DSP filter made a vast improvement to my analog QRP radio, especially for CW operating, and it did so at an attractive cost.

Manufacturer: SOTABEAMS, Macclesfield, United Kingdom; **www.sotabeams.co.uk**. Price: $73.44.

RigExpert Stick Pro 0.1 – 600 MHz Antenna and Cable Analyzer

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I reviewed the RigExpert Stick 230 antenna and cable analyzer in the June 2020 issue of *QST*, so I was interested in taking a look at the new Stick Pro. Like the Stick 230, the Stick Pro is quite compact, making it convenient for field measurements. It can be carried around your neck with the included lanyard, or it easily fits in a pocket or go bag. The Stick Pro adds some nice features compared to the Stick 230, such as a TFT color display, extended frequency range, and both audible and tactile feedback whenever you press a key. However, the operation and features of both analyzers are quite similar. More information is available in the manual available on the RigExpert website.