

# MFJ 616

## SPEECH INTELLIGIBILITY ENHANCER



"As I got older, my high frequency hearing loss was destroying my ham radio for me..." - Martin F. Jue, K5FLU President and Founder MFJ Enterprises, Inc.

I know I'm not the only ham who can't understand all the speech in a QSO caused by high frequency hearing loss. I developed a solution that I want to share with my fellow hams.

I almost gave up my ham radio hobby. I have been a passionate ham radio operator for over 40 years ever since I was a teenager. I loved every minute of it. Still do, but I almost had to give it up. As I grew older (I'm 56 now) I found myself asking "What did you say?" so often it got downright embarrassing. I can hear pretty good most of the time. I just can't always understand what people are saying and my left ear is weaker than my right ear. It got to where I was having trouble carrying on QSOs. I could hear, but I just couldn't quite make out all the words. My hearing problem almost put a stop to my lifelong hobby. There was no way I was going to give up ham radio...

Research showed me what to do. I searched the literature and spoke to hearing and speech experts. According to their research on intelligibility of speech in hearing English words:

1. The frequencies important for speech intelligibility are the consonant sounds from 500 to 4000 Hz. They contribute 83% of word intelligibility. Frequencies from 500 to 1000 Hz contribute 35% of word intelligibility and 35% of sound energy. Frequencies from 1000 to 4000 Hz contribute 48% of intelligibility but have only 4% of sound energy!

2. In contrast, frequencies from 125 to 500 Hz contribute 55% of sound energy but only 4% to word intelligibility. In other words, nearly half the speech intelligibility is contained in 1000 to 4000 Hz frequency range with only 4% of the speech sound energy. On the other hand, the low frequencies 125 to 500 Hz have most of the speech energy but contribute very little to intelligibility.

How I improved my ability to hear and understand QSOs. The research showed me what to do. First, drastically increase the speech energy above 500 Hz where 83% of intelligibility is concentrated. Second, drastically reduce the speech energy below 500 Hz that contributes only 4% of intelligibility. Amateur radio communications limit audio to about 300 to 2700 Hz. I split the audio band into four overlapping octave ranges centered at 300, 600, 1200, 2400 Hz. I could boost or cut each range by nearly 20 dB to give me full control. This let me maximize speech intelligibility for most kinds of frequency loss. My left ear is weaker than my right ear so I split the output audio into left and right channels with separate 2.5 watt amplifiers. A balance control lets me equalize the perceived loudness to each ear. Now both ears help in improving speech intelligibility!

I couldn't believe my ears!

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I built one and hooked it to my rig.

I boosted the high frequencies, cut the low frequencies, set the volume and adjusted the balanced control so I could hear each side equally loud. I couldn't believe my ears! Speech that I could hear but barely understand before was now highly understandable. I got my ham radio back!

With this concept you'll understand QSOs better and enjoy ragchewing and contesting more, even if you don't have high frequency hearing loss.

It helped me so much I wanted to share this with my fellow hams.

I developed this into an accessory that any ham can use.

I made it immune to RFI, added a front panel phone jack, on/off speaker switch, two selectable transceiver inputs, a bypass switch for in/out comparison and built into 10Wx2.5Hx6D inch aluminum enclosure. Needs 12 VDC.

### Other uses

Replace your rig's audio section for superb audio. Eliminate hum, buzzes, poor frequency response, low power.

Works with SSB, FM, AM, CW -- any voice mode. Use any rig -- ham, marine, aircraft, CB. Use for PA systems, internet phone, radio talk shows.

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