

# MFJ-419 CW Elmer

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Morse code remains a skill that many enthusiasts find useful and enjoyable to learn. For those interested in learning Morse code, there are many tools and techniques available, one of which I wrote about in Product Review in the February 2023 issue of *QST*. Another of these tools is the MFJ-419 CW Elmer, a small and portable device designed to help individuals learn to encode and decode Morse code at specific speeds. Having used the MFJ-419 myself for the past 2 months, I can vouch for its effectiveness as a learning tool.

## Description

The MFJ-419 CW Elmer is a multi-function training device that allows you to learn, receive, and send Morse code with a straight key. It's small and portable, measuring 3.75 × 2.25 × 1 inch, with a small screen (two lines of 16 characters) that displays characters and menu options, a power button, a menu button, a key jack, a headphone jack, and a micro-USB port. The device runs on a 9 V battery and can be powered by a micro-USB cable.

The MFJ-419 has a variety of features, making it a useful tool for learning Morse code. Send mode allows you to practice sending Morse code at your own pace. Receive mode allows you to listen to Morse code transmissions and learn the characters. Analyze mode provides feedback on your transmission speed and timing. The USB text mode allows you to send text to the MFJ-419 so you can practice listening to real messages. Exercise mode helps you practice making dits and dahs with the correct length and with proper spacing between characters and words.

## First Impressions

Included with the CW Elmer was a sheet that said the user manual could be found on the MFJ website. I found that the manual was not available, so I contacted technical support and the PDF manual was promptly emailed to me.

I removed the battery cover, installed a 9 V battery in place, and reinserted the rear cover (see Figure 5). The entire case was made of a decent-quality plastic, and the battery fit inside the case well. I flipped the CW Elmer over so I could see the LCD, and turned the device on by pressing one of the two buttons on the side of the unit. When I pressed the black button, the



CW Elmer started the boot-up sequence (**CQ DE CW-ELMER**).

## Menus and Settings

I didn't read the instruction manual at first, but the first line on the screen read **CW-ELMER**, and the second line flashed multiple options. Every 2 seconds, a new option appeared: **SETTINGS**, **SEND**, **RECEIVE**, or **EXERCISES**. There is a red button on the side of the CW Elmer that has multiple uses, one of which accesses menus and sub-menus (see Figure 6). In hindsight, I probably should have accessed the **SETTINGS** menu first; instead, I accessed the **RECEIVE** menu. I rebooted the device a few times to make certain what I was hearing when the CW Elmer sounded off the introduction of "CQ DE CW-Elmer." Ultimately, at the speed at which the CW Elmer was set, my brain was having trouble separating spacing, and I couldn't automatically recognize certain tones. I may have heard the CW tone for the letter R, but I was uncertain that that's

## Bottom Line

The CW Elmer is a small package full of features allowing the user to understand what is needed to improve sending and receiving Morse code. It is a great tool to learn CW in an easy-to-use, straightforward device.



**Figure 5** — A view showcasing the back of the CW Elmer, which contains a rear-firing speaker and cover that houses a 9 V battery (not included).

what it was, because I was unable to hear the delay between letters.

I accessed the **SEND** menu to begin practicing. However, this was also when I realized just how poor my timing was at the default speed. Before going any further, I accessed the **SETTINGS** menu and adjusted the speed. The default speed turned out to be 15 WPM, which I thought I was doing really well with, especially when sending. I do remember being told to send only as fast as I could receive. Because I had to listen and restart the CW Elmer multiple times with pretty poor timing while sending, I reduced my speed to 10 WPM. On the main screen, I pressed the red button, and when **SETTINGS** was displayed, I saw the **SETTINGS** menu on the top LCD and multiple options on the bottom, including **WPM**, **TIMING**, **CHARS**, and **SIDETONE**. Additionally, there is an **ABOUT** section that shows the version number. The final option within the **SETTINGS** menu is **CANCEL**, which sends you back to the main menu. To access any of these options, tap the red button during the 2 seconds that option is displaying. The options are 5 to 40 WPM in 5 WPM increments.

After you change the speed by pressing the red side button, the unit saves the settings and takes the user back to the main menu. I returned to the **SETTINGS** menu and selected **TIMING MODE**. There are multiple options in timing mode: **NORMAL**, **FARNSWORTH 18**, and **FARNSWORTH 25**. The Farnsworth method is generally considered to be an effective way to learn Morse code. It allows individuals to recognize the patterns of Morse code characters at a higher speed, which makes it easier for them to send and receive Morse

code quickly later on. I chose to stay with the default method, **NORMAL**. Next, within the settings, I chose my character set. The options to choose from are letters only; a combination of letters and numbers; and numbers, letters, and special characters. I started with letters and numbers. Finally, in the **SETTINGS** menu, I selected the sidetone option and which tone I heard best/liked the most. The options for the sidetone are from 200 to 1000 Hz, in 200 Hz increments. I chose 800 Hz for my sidetone.

I briefly tested my sending skills with the CW Elmer. I plugged a 3D-printed straight key into the **EXT KEY** port and found I could navigate through the menus with the key.

### Practice with Sending

I accessed the **SEND** menu and selected **KEY CODE**. In this menu, I could practice sending characters. I practiced the alphabet for a while and confirmed I could use the red button as a straight key. I quickly realized another issue I had been having with Morse code, which was that my timing wasn't yet perfect. I was able to slowly type the alphabet in Morse code, with a space showing between each character on the screen, but when I attempted to send at normal speed, without any spacing, I was basically just coding a bunch of nonsense. This was when I discovered the importance of timing. After practicing sending for a while, I ventured over to the **EXERCISES** menu, which has exercises specifically designed to help you understand, hear, and send characters and spacing with the proper timing.

You can select a few different options from the **EXERCISES** menu: **. DIT TIME**, **\_ DAH TIME**, **DIT ^ DAH PAUSE**, **WORD^WORD PAUSE**, **A^B PAUSE**, and **CANCEL**. Each of these methods helps with timing within a specific area of sending characters. For example, selecting the **. DIT** option shows me my speed (10 WPM). I must tap the straight key and ideally press it for 120 ms. During my first attempt, I held down the **. DIT** for 150 ms. This indication of 150 ms meant I was holding the key for too long, and I needed to release the key quicker to have a shorter dit tone. My second attempt was 129 ms, which is within the acceptable range for a dit. This proved to be one of the most valuable learning tools for me. Not only do I have the opportunity to hear the tone and the tone length, but now I can process what may need modification. After just a few days, I felt more confident listening to QSOs and picking up bits and pieces. My advice on sending is to use the same straight key you would like to use for CW.



**Figure 6** — A side view of the MFJ-419 CW Elmer includes a micro-USB port for power or for use with a terminal client, such as *Tera Term*. A power button controls if the unit is on or off. An external key port allows the user to use their own straight key while practicing Morse code but also allows practicing Morse code with no key, by utilizing the red **KEY** button. The **KEY** button can also act to navigate through the menus. Finally, an HP port allows the user to use the CW Elmer with headphones for better hearing or to be considerate of others in the area.

During my time with the CW Elmer, I switched keys three times. Switching between a 3D key, an older straight key, and the side button threw off my timing in relation to dits and dahs. Stick with one key to eliminate variables while learning. At that point, I had not looked at the printed manual, and I soon felt it was necessary to use it, as there was valuable information regarding options I wanted to try, especially the **RECEIVE** menu.

### Receive Practice

There are three options within the **RECEIVE** menu: **RANDOM**, **USB READER**, and **CANCEL**. Depending on the previously chosen settings, the CW Elmer operator will be presented with random characters; characters and numbers; or letters, numbers, and special characters. Whichever combination you choose, the characters are sent at the speed set by the operator in the **SETTINGS** menu. Additionally, not only are the characters randomly generated based on the operator's selection, but they are also grouped in a combination of three to seven characters. At first, I struggled with this, but over time I recognized that this trains you to always listen and anticipate what may be next.

When using the receive feature, I did not look at the LCD and instead focused on the tone. This allowed my brain to process better “on the fly,” without relying on the visualization of the character while learning to decode. When the string of characters stopped, I had enough time to determine which characters I could process and which ones I could not, and then look at the screen to see which characters were displayed. I practiced this for 20-minute sessions throughout the day and made a list of characters I could frequently process or need to work on more. For the characters I still needed to work on, I practiced by going to the **SEND** menu and sending that letter over and over, making sure I heard the sounds for the character I was working on. I also repeated the sending process until I instantly recognized the tones for the single character they had become.

### 3D-Printed Stand

Before learning any more, I felt I had a slight issue with the CW Elmer, but the truth is that I may just have been utilizing it incorrectly. I wanted to look at the 16-character × 2-line screen, but the case had to be flat on the desk, table, or other surface. This also made it difficult for me to hear the sounds. The alternate solution was to stand the CW Elmer up at a 90-degree angle from the surface area. This allowed me to hear the CW Elmer but not see the LCD. This issue enabled me to jump into a CAD program and make up an MFJ-419 CW Elmer 3D-printed stand (shown in red in Figures 5 and 6), which sits at two different angles and allows the operator to see and hear the device well, in both positions. This may have been an oversight in development and a necessary modification for ease of use. The file is available for anyone to print at [www.thingiverse.com/thing:5928755](http://www.thingiverse.com/thing:5928755). In the future, a simple solution might be to add foldable legs on the sides of the device, as standard.

### Using Personalized Text

I had been learning all about proper spacing and sending habits, but I really wanted to attempt the USB reader functionality. The USB reader allows users to upload their own CW text to be heard and decoded. This is when you should use the manual, which clearly explains how to send files and text via a micro-USB and *Tera Term*. The user manual states that drivers should be automatically detected and installed, but you should also download the FTDI drivers, if this is not the case. Using Windows 11, the drivers were detected as unsupported. I followed the instructions in the MFJ manual, downloaded the drivers, and after a few system reboots, Windows properly recognized the device.

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Following the instructions in the manual, I used *Tera Term* to access the CW Elmer from my computer. My goal was to upload a text file to the CW Elmer so I could practice real words. There are many text files to choose from; ultimately, I created a list of the top 100 words used in CW/Morse code and saved this list in a .txt file format, as required by the CW Elmer. After saving the list, I noticed it froze while accessing text from the USB in the **RECEIVE** menu. The manual states that I should be able to listen to short messages or long books if I desired; however, my initial observation showed that the text file had stopped being read after 62 characters. I created a new text file with 3,200 words. This time, after 147 characters, the CW Elmer stopped sending me code. My final attempt was a file with 20 words, and after 56 characters, the CW Elmer again stopped.

I reached out to MFJ customer support, and they quickly noted that I had missed the step in the manual to enable the **XON/XOFF** in the *Tera Term* software. Without it, an overflow occurs, and the MFJ-419 seemingly stops giving out characters. With the handshake in place, a buffer overflow is prevented. After enabling this option, I had no issues uploading files and playing them back.

It's nice to be able to put in a list of common words that may be useful for me to learn, even some on repeat, so I can hear them multiple times and become familiar with the tones. Hearing "CQ" and signal reports has been most helpful, as well as just putting a letter I have been struggling with into the text file many times over.

Hearing the constant letter on repeat trained my brain to instantly recognize the series of tones with the associated character.

The final major feature I have come to appreciate is the **ANALYZE** feature. While practicing sending code with the CW Elmer, the keying technique is being analyzed in the background. Accessing the **ANALYZE** menu shows the operator's statistics for dit and dah times, counts, and averages, as well as maximum and minimum key time. This has allowed me to better understand how I am performing overall while sending code.

## Conclusion

All in all, this device is helping me in my quest to learn Morse code. I have found it to be useful in improving both my sending and receiving. I believe anyone learning Morse code would appreciate the CW Elmer's features. This isn't the only option for practicing CW/Morse code, but I have found it useful in my daily travels — I even let the receive feature play tones to me on my daily walk. I always use the headphone jack so as not to disturb the people around me. I've used most of the features of the device without reading the manual first, which is a good sign of how straightforward this device is to use. But the manual is easy to follow and understand, and it's useful for this simple-to-operate device.

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