Operating Manual for the Huber Heights Amateur Radio Club CW Trainer

We hope you will enjoy your CW Trainer and find it helpful.

Morse Code consists of a short sound (a "dit" depicted as "·"), a long sound (a "dah" depicted as "–"), and the periods in which there is no sound in between them. An "element" can refer to either a dit or a dah. The various elements are combined in specific ways to make up the "language" of Morse Code. Your trainer has two basic modes of operation:

The "Send" mode is one in which you sound out the dits and dahs and, if the timing is right, the Liquid Crystal Display (LCD) will display the character you sounded out. The other mode is "Receive," in which the LCD shows a character and the speaker will sound out the dits and/or dahs that make up that character. It will repeat this character 8 times, then move on to another character.

The Receive mode has 4 sets; each set has 13 characters. Set 1 has characters that consist of 1, 2 or 3 elements. Set 2 is made up of 4 element characters (plus one three element one, the "W"); Set 3 consists of the ten digits, 0 – 9, and three punctuation characters – period, comma and question mark.

Set 4 consists of two characters that are sounded out together. Some of these are:

"CQ" - used to call out to anybody to respond to you; "DE" - used to indicate "from" and is followed by your call sign; "73" – stands for "best regards" and is used to sign off; "HI" – used to respond to a humous remark, similar to "lol" in text messaging. Other items in this set are common two-letter English words.

<u>How to use your trainer:</u>

The default mode is "Send," in which you will sound out characters and, if your timing is acceptable, the character will show on the LCD screen. To advance to the "Receive" mode, hold down the key for one second and let up on the key as soon as you hear the sounds change. You should now be in Set 1. To advance to the next set, briefly tap on the key in the silence between the sounds. (If it doesn't work, you may have tapped *during* the production of the sounds. Try again.) Briefly tapping during Set 4 puts you back into Send mode.

Keep the timing consistent! The trainer will adjust to the speed you use, and will adjust within a character or two to a new speed, but don't expect the microcontroller to correctly interpret your dit and dahs if they are at random lengths. (The human brain can't do this either.) It doesn't read your mind.

Note – When you pause for a while, the microcontroller will wait a second or two before displaying the last character. Also, note that it displays on the second row; when the second row is full of your characters, it moves the second row to the first row, leaving the now empty second row to display more characters.

If you're new to Morse code, check out the following section:

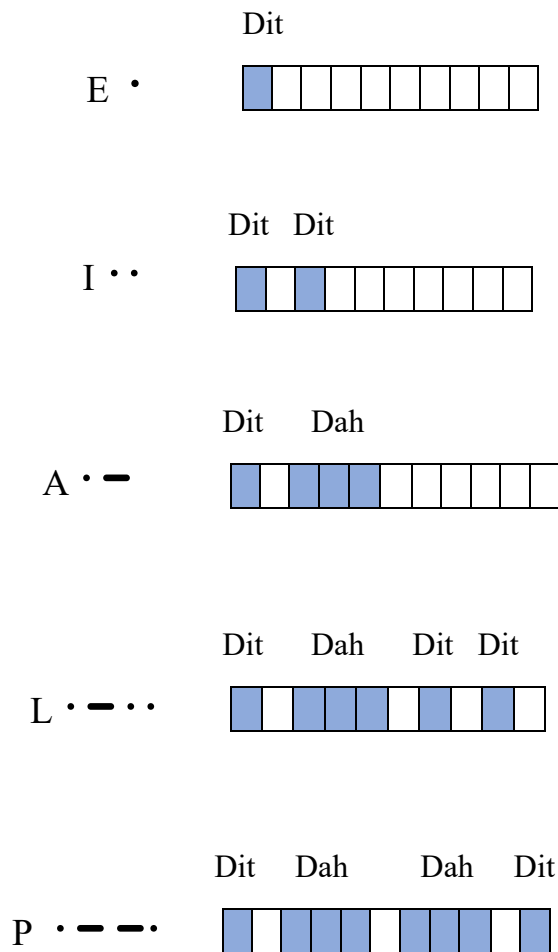<u>Best practices of sounding out Morse code</u>

Hold the key with your index finger on the top of the knob, and with your thumb and middle finger on the sides of the knob, and move the knob up and down. Don't use just the index finger to tap the knob; it doesn't give enough control.

A dah "−" is three times the length of a dit "·" The time between elements within a character is the length of a dit. The time between characters is the length of three dits (or one dah). The time between words is seven dits.

| DIT | DAH (3 DITs) | Time between Characters – 3 DITs | Time between words – 7 DITs |
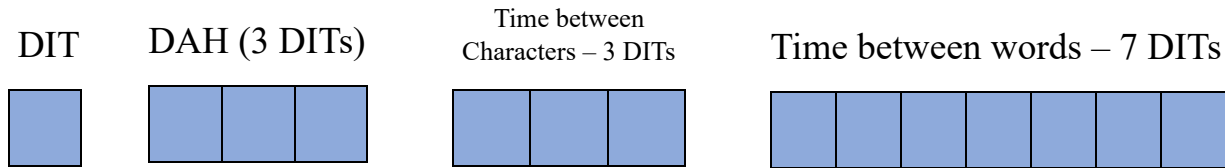
Below, you can see the timing of a selection of letters:

Dit

E ·

Dit Dit

I ··

Dit   Dah

A · −

Dit   Dah   Dit Dit

L · − ··

Dit   Dah   Dah   Dit

P · − − ·

Troubleshooting:

If you sound out a character and it displays as something other than what you intended, then most of the time it is due to one of two things – the length of time between two elements was longer than a dit and the algorithm interpreted it as two separate characters, or you sounded out a dit when you meant a dah (or vice versa).

Some examples of the first type:

You want to sound out an "L" (· − · ·).   You see an "A" (· −) then an "I " (· ·) on the LCD. There was too big an interval between the first two elements and the last two elements and the algorithm interpreted it as two characters.

You want to sound out an "A" (· −). You see an "E" (·) then a "T" (−) on the screen. Again, the length of time between elements was too long and the algorithm interpreted it as two separate characters.

Some examples of the second type:

You want to sound out a "L" (· − · ·). You see an "P" (· − − ·) on the LCD. You sounded out a dah (the long sound) as the third element rather than a dit.

Again, in trying to sound out an "L" (· − · ·), you see an "H" (· · · ·). You sounded a dit instead of a dah for the second element.

Of course, nothing will display on the screen if whatever you sound out is **not** a valid combination of elements in Morse code.

Practice your rhythm by sounding out the same character several times in a row.

In Receive mode, the characters are sounded out at a speed of 20 words per minute. This is too fast to count the number of dits and/or dahs; it is difficult to get up to speed if you rely on counting. Instead, note that each character has a distinct **rhythm**. You need to learn the **rhythm** of each character. Practice listening and copying the characters down on paper; eventually, you will learn the character and will only have to glance down at the LCD to check if you are correct.

Hope you enjoy your journey into the world of CW!   73

Morse Code

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