

Universal Code Practice Oscillator (uCPO) with built in Morse tutor

uCPO New MK4 Specifications

Now can be used Fully as a standalone tutor
WITHOUT a Morse key.

3 Mode Processor Controlled Morse Oscillator/Tutor

Mode 1:- Straight Key Practice Oscillator

Variable Tone : 400-1000Hz
(via internal trim pot)
AutoSense Key type

Mode 2:- Iambic/bug/Sideswipe Mode

AutoSense Key type
Variable Tone : 400-1000Hz (via internal trim Pot)
Adjustable Speed 10-35wpm
User selectable Iambic A or Iambic B + dot memory

Mode 3:- Morse Tutor Mode

Built in 6 Mode Morse tutor

- 1) Random Letters
- 2) Random Numbers
- 3) Random Prosigns
- 4) Mixed Mode
- 5) International Callsigns (*Advanced mode)
- 6) Contest Mode (*Advanced Mode)
- 7) Adjustable WPM rate (10 to 30+wpm)
- 8) Adjustable Gap (Farnsworth Mode 0-3sec approx)

*Advanced modes

The two advanced modes have been designed to add a bit of realism and interest to your practice sessions, the speed of each 'over' will automatically change by upto +/- 10%. So some will be faster than your set speed and some slower, just like the real world. To make things even more realistic the user can select VariTone mode too. In this mode the pitch as well as the speed will change.

- **Zoom /Decoder Output feature**

Since the world has changed a lot in the past year. Many of us are now not meeting up in clubs for practice sessions and so organisations such as CWops and the CW Academy are using Zoom or Skype for remote training. The uCPO has a built in low level output socket for connecting to a PC or Mac, this output is a sinewave for a cleaner sound. This



output can also let you run decoding software on the computer to test your own sending or to show what the tutor is sending so you can check your own receiving. The uCPO also has a volume limited headphone output for personal practice too. (please note that this output is intended to be used with normal headphones, ear buds, or earphones. Not electronic Noise reduction type like the ones produced by Bose)

The uCPO is built around a clever little processor chip and offers a lot of features. With all these features being controlled by just a single knob and a straight/paddle key the initial setup can seem a little complicated the first time you try it but for many the default settings will be fine,

Default settings

Automatic Key selection

Side Tone Pitch approx 700Hz

Tutor Speed:-17 WPM

Vari-Tone for advanced Tutor modes ON

Iambic B Mode active

This is the new version 4 of the uCPO with improvements over the MK3.

Whats New with the Mk4?

The difference between the two versions is subtle but did require a new PCB to be designed.

Upto now the uCPO needed a Morse key of some kind plugged in in order to use the Morse Tutor side, well after a number of requests the uCPO now has a small push button that allows the user to enter and control the tutor side without the key.

The second change is that some users asked if the low level AUX output level could be given a little boost. The MK4 has approx an extra 6dB boost on this output.

The third change, the tutor always started in 'Letters' mode, now the tutor stores the operating mode in a EEPROM and will remember the last used mode when next turned on.

Finally a minor change was to change the on board pitch control from what was a 25 turn control to a standard single turn board mounted trimmer, this makes more sense as the pitch range is only in the order of a few hundred hertz's (400 to 1000Hz) so they was no real need for a 25 turn trimmer to start with. This makes tone adjustment easy!

SET-UP GUIDE**How to setup the uCPO options**

The instructions below sound complicated but once you have run through them a couple of times you will find you can make the changes in just a few seconds with ease.

- 1) Turn OFF the uCPO.
- 2) Press the key down or if a paddle squeeze both paddles and HOLD.(you can use the push button on the front too)
- 3) Turn on the uCPO, (Still holding the key Or the button!)
After a short delay you will hear the letter 'A' in Morse, adjust the speed control to set the tutor WPM rate.

I suggest setting the control at the 12o'Clock position which will be about 17 wpm character speed. Once you're happy with the speed release the key.

- 4) If you just wanted to change the tutor WPM rate do nothing else. Turn off the unit and then back on to use the new set speed (which will be saved for all your sessions until you change it again)

If you are doing the initial setup or want to change other features carry on and do NOT turn off the unit as above.

- 5) As soon as you release the key (or button) in step 4 hold it again, after a second or two you will hear 'VT' in Morse. This is now going to allow you to set the Vari-Tone feature ON or OFF.

If you want the Vari-Tone (VT) on continue to hold the key. After a second or two you will hear a high pitch tone (2000Hz), this tells you that VT is on. If you wanted this option off then when you hear the 'VT' Morse signal release the key and a second later you will hear a low pitch tone (1000Hz).

- 6) As soon as you hear the low or high pitch tone start hold the key again. You will now hear 'KM' for keyer mode. This mode allows you to set Iambic A or Iambic B with Dot memory. If you continue to hold the key after the KM signal you will hear another high pitch tone, this means you are in Iambic B mode, if you release the key as soon as you hear KM you will hear a low pitch tone. This means you have selected Iambic A mode.

- 7) All settings will be saved in the chip until you repeat this process again at some point in the future.
- 8) Turn off the unit and now you're ready to practice.

How to use the uCPO

The uCPO is easy to use despite having many different modes and uses.

NEW! Using the Tutor mode without a Key

With the unit turned off push and HOLD the small push button on the front of the uCPO while turning it on. Hold the button less than a second and then release. After a short pause the tutor will start, just hold the button for a second to change tutor modes. All the features detailed below in the '**Morse Tutor Mode**' section will be available to you

Straight Key Practice oscillator Mode.

Make sure you have wired your key to a 3.5mm MONO plug. Turn off the uCPO and plug the key into the front panel. Turn on the uCPO, that's it! Adjust the volume to suit. The uCPO automatically senses the straight key since it uses a MONO plug unlike the paddle key.

Paddle/Bug/ Practice Oscillator Mode.

Turn off the uCPO. Plug your key in, turn on the uCPO. Tap away. Now the speed control will be active and you can set the speed from about 10 to 35wpm, the 12o'Clock position is approx. 20 wpm.

Morse Tutor Mode.

If using a paddle key squeeze both paddles when turning on the oscillator or if using a straight key just hold it down on power up. Once turned on release the key within a second or you will enter setup mode. The tutor will now start sending 5 figure letter groups,(first time used, after that it will remember the last used mode) if you now hold the key down or hold the left hand paddle it will switch to random numbers, next press it will switch to Prosigns, then next mode which is all of the above mixed. One more press and you get a more interesting mode, Callsigns, this mode sends random international callsigns but each callsign will be sent at a slightly different speed and pitch (if VT is turned on) , just to make things a little more realistic. The next mode is typical Contest mode, a callsign followed by the standard '5NN' and then a 3 or 4 digit serial number, sometimes this serial number will use Cut numbers (instead of '0' it sends 'T' and instead of '9' it send 'N'), again with random speed and pitch like the callsign mode.

When changing modes the tutor will first send a Morse letter at a higher pitch tone that identifies the new mode ('L' = letters, 'N' = Numbers, 'P' = Prosigns, 'M' = Mixed, 'C' = Callsign, and 'CT' = Contest)

A worthwhile tip. There is no point trying to learn the code with a slow character speed, you will only need to relearn the sound of each letter again when you get on air. It's an easy mistake to learn the code with character speeds that are so slow you learn by counting the dots and dashes. This is a **mistake**. From day one learn the sound of each letter, **DO NOT** count the elements of each letter. Yes it will seem harder at first but it's not a race and the rewards are much higher. So I recommend you use a character speed of around 17 wpm which is a realistic speed used by many operators in the real world. (Start at the speed you want to get to and just increase the gap to start with) I will not be cruel and expect you to start learning Morse at such speeds so the speed control in this mode will allow you to set a gap of your choice upto 3 seconds between characters, this will make the task of learning much easier without you falling into the counting trap! In the setup guide I have explained how to set the Character speed to a suitable value.

Another new feature is the AUX output connection. This is a fixed low level **sinewave** output that can be connected to a computer for practice over the internet via Zoom etc. Another use of this output is to use it to test your sending, connected to a PC running software like CWGet, FLdigi or many others that will decode Morse. This way you can see if what you're sending makes sense, decoders typical struggle with hand sent Morse so if you can get yours decoded you know it's good!

The version 4 also gives a convenient headphone output connection point too. The volume on the headphone socket goes via a limiter to protect your hearing, it will still be more than enough ! (Read the note above about using normal headphones not electronic Noise reduction types)

The tutor functions and other features make this practice oscillator unique and exceptional value.

There is an on-board trimmer pot for pitch adjustment. With the exception of the sockets all the other controls are board mounted. The uCPO will drive a standard 8 ohm (or higher impedance) speaker.

IF making adjustment to the pitch do so while in TUTOR Mode or you will not hear the pitch change as you make adjustments. To maintain accurate Morse timings the pitch control is only read at start-up in practice oscillator modes so if you try to adjust the pitch while in these modes the trimmer control is not read until you turn the uCPO off and back on.

The power to the uCPO needs to be between 6 and 12 volts so a standard 9v battery could be used or ideally 4xAAA batteries for a long battery life.

The SPEED control will only be active in Paddle mode or to set the Gap in tutor modes.

When you want to change between the different modes of the tutor you need to press and HOLD the key (or Button) until you hear the mode Letter from the tutor. One little thing to be aware of is when in either Callsign or Contest mode and you change to the next mode the tutor will Announce the new mode Letter but may have a few letters from the last mode in its buffer that will be played before the new mode starts.

It sounds more complicated than it is, after a couple of goes you will find it very easy to change these options. You can control all of this with just a straight key after all!

The Volume control will adjust the audio level for both the internal speaker and the headphones (if used they will automatically disconnect the internal speaker) but the AUX output level will not change.

I hope you enjoy the uCPO. Best 73 Paul MOB MN

International Morse Code

- 1 dash = 3 dots.
- The space between parts of the same letter = 1 dot.
- The space between letters = 3 dots.
- The space between words = 7 dots.

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

Prosigns

(.)	• — • — • —
(.)	— — • • — —
(?)	• • — — • •
(/)	— • • — •
(=)	— • • • —
(AR)	• — • — •
(BK)	— • • • — • —
(CT)	— • — • —
(VA)	• • • — • —
(KN)	— • — — •