

DRAE MORSE TUTOR

FACILITIES

OFF/ON	This switch powers up the Tutor, however the transformer is still energised when the switch is off. Therefore the Tutor should be UNPLUGGED WHEN NOT IN USE.
CONTINUOUS	Selects either continuous morse or sets of five/on character(s) when the "groups"/"single" buttons respectively are pressed. When switched to continuous, the "single" button starts continuous morse.
LETTERS/MIXED	Selects either the 26 letters of the alphabet, or all letters, numbers and punctuation.
VOLUME	Adjusts the audio power to the speaker and "Phone" socket.
CHARACTER SPACE	Adjusts the space between characters. It should be set to the same or lower (anticlockwise) position as the "Dot Rate".
DOT RATE	Adjusts the length of each dot or dash between 6 and 24 words per minute approximately. When set up to 12 o'clock position, the speed is approximately 12 words per minute.
PHONES	Audio output is available on a 3.5mm jack socket to drive 8 ohm (or higher) headphones or external speaker.
KEY	The Morse Tutor can be keyed via the 3.5mm jack socket.
SINGLE	Starts a single character or when the tutor is set to continuous, starts a continuous pattern of random morse.
REPEAT	Repeats last character every time it is pressed. After a group, it will repeat only the last character of a group.
KEY	Can be used to key the audio, but is no substitute for good quality morse key.

USING THE MORSE TUTOR

Initially it is best to learn the morse characters by using the "Single" button to select a character, then identify the character by slowing the "Dot Rate" to the 12 o'clock position (approximately 12 wpm) and use the "Repeat" key to learn the sound of this character. You can use the "Single" button to select another character.

/Continued

When you have learned a few characters, set the Tutor to "Continuous" and try to pick out the characters you have learned. Return to learning more characters, then, when you know most of the characters, try to read groups of 5 characters. Remember that the results you achieve with the Tutor will be worse than when reading actual morse transmissions. The Tutor favours long characters while normal morse favours short characters, also, the Tutor's output is random, and whilst missed characters can be guessed from the output of a real message it is much harder to do so in the Tutor. When practising sending morse, it is best to select a character with the "Single" button, then copy the character with the key (internal or external). Use the "Repeat" key to allow your ear to compare the Tutor's sound with your own. Now try the character again with the key, with the Repeat button, etc., etc., until you replicate the correct morse pattern.

CIRCUIT DESCRIPTION

The Morse Code is stored in a PROM (IC6). This is 256 addresses x 4 bits. The first bit (on pin 9) contains the letters, the second bit flags the end of each character, the third bit the numbers and the fourth bit flags the end of the number characters.

When the "Single" button is pressed, a flip-flop (IC3a) is reset. This starts a multivibrator (IC5a and IC5c) running at 50KHz which clocks two binary counters (IC7 and IC8). These count down because their up/down lines are controlled by the IC3a. The output of the counters select an address on IC6. When the "Single" button is released, the counters continue counting until a "1" on pin 10 or 12 of IC6 flags the end of a character. IC3b selects either the output of pin 10 or 12 by controlling IC11. This is random if the Tutor is set to "Mixed" since IC3b will toggle with the output from IC8. If the Tutor is set to "Letters", pin 10 is always selected. The output of IC11 clocks IC3a setting it. When IC3a is set, the up/down line of the counters changes to "UP", then (after a delay due to the monostable IC2b) the first multivibrator formed by IC5a and IC5c stops, the final edge moving the counters forward one count. This changes the address to IC6 and removes the "1" which sets IC3a. A slow multivibrator formed by IC5c and IC5b now starts. Its speed is controlled by IC6 as an output on pin 9 or 11 (letters or numbers) of sequences of 010 for a dot, or 01110 for a dash. The 1s enable gate IC9c, passing an audio tone generated by a multivibrator (IC9a and IC9b) to the audio amplifier down, the slow clock generator via gate IC4b. For "Repeat", S3 generates a very short pulse which is only just long enough to cycle the counters back to the start of the character just sent, hence the character repeats.

For groups, instead of a single pulse from S2, S4 resets IC1, which issues a pulse from monostable IC2a which resets IC3a. This pulse whose length is controlled by the character, thereby starting another character after a delay set by R15. After 5 characters, IC1 via IC4c, stops the monostable. If "Continuous" morse is selected, S7 disables IC4c and IC2c initiates a new character after each character has finished.