Mother of All Keyers

Power on: On startup, the device displays a splash screen for five seconds, followed by 'Electronic Key' (the first option name), and finally the current speed setting. The screen then goes dark. It is dark for the 'Electronic Key' and 'Straight Key' options and illuminated for other options.

Navigation buttons: The left button on top is the 'Option' button and the right is 'Select'. Pressing the 'Option' button steps through the option list and pressing 'Select' selects or enters the currently displayed option. Pressing the 'Option' button while running an option returns to the 'Current option' display, from which the same or another option may be selected.

Setting speed: The speed potentiometer (knob on the front) changes speed within a pre-determined range of approximately 5 to 35 words per minute. (The upper end of this range has not been tested.) The speed potentiometer is sensed whenever any option is first selected. Pressing the 'Select' button in some other contexts also senses and resets the speed. For example, in 'Electronic key' mode, turning the knob and pressing 'Select' sets the device to the new speed. (Pressing select without changing the speed does nothing.)

New in version 1.0.3.2: Pressing the 'Select' button in any option except sending practice options invokes 'Speed adjustment mode'. Turning the speed knob changes speed continuously in this mode, while current speed is displayed on the LCD. Pressing 'Select' again exits speed adjustment and continues the previously selected option.

Key: A straight key or paddle may be plugged into the front panel jack (lower right). Connections are standard for a right-hand paddle (iambic key). The 'Straight key' function uses the dash side of the key.

Audio: An inside-the-case audio sine wave oscillator (WB9WBM QST, February 2017, pages 46-47) is powered from the Arduino 5 volt input, and requires external amplification. The rear jack on the right hand side is the oscillator's output (amplifier input). The tone may be changed by adjusting a trimmer potentiometer on the oscillator PCB. Another trimmer on the same PCB adjusts output drive level.

Transmit: In 'Electronic key' or 'Straight key' mode the device can key a transmitter. Or in any of its modes it can key an external oscillator. This transmit function uses an electronic switch, not a relay (specifically 1/4 of a 4016 quad bilateral switch). Current and voltage limitations are as documented within the IC's datasheet.

Display: The Arduino sketch for this keyer supports either a 20 x 4 or 16 x 2 character cell LCD. To use with the smaller LCD, change the value of the ROWS and COLS constants near the top of the sketch; then re-compile and load the modified sketch. Some option names have been shortened to a somewhat cryptic form, in order to fit within a 16 character display line.

Explanation of Options

Electronic Key: Plug an iambic key into the key jack and use it in the normal way.
Straight key: Plug a straight key into the key jack and use it in the normal way.

Listening Practice Options

5 Alpha Groups: This option generates 5-character groups consisting of alphabetic letters only, at the pre-selected speed.
5 Alpha-num Grps: This option generates 5-character groups, consisting of a mixture of alphabetic letters and numeric digits, but not including punctuation characters.
Rand Pseudo-text: Due to Arduino memory size limitations it is not possible to store a large volume of natural language text. The 'Rand Pseudo-text' option generates text that resembles English language sentences. Generated pseudo words look similar to English words and most are pronounceable. Punctuation is included. The form of the text generated [such parameters as word length and sentence length, etc.] is determined by arrays and variables defined near the top of the sketch. These arrays and variables may be modified experimentally to produce different flavors of generated text. As distributed, they reflect a combination of lexical analysis and guesswork.
AlpNumPseudo-txt: This option is almost the same as the 'Rand Pseudo-text' option, except for occasional substitution of a numeric string in place of a made-up word. In contrast to the 5 Alpha-num Grps option, numbers are not mixed with letters in the same group, rather presented as separate numbers-only groups in this option.
Pseudo callsigns: This option generates callsign-like strings, many of which could be real callsigns. Formatting rules are embedded in the rndpcs() function, but may also be deduced from the form of observed strings.

Sending Practice Options

Sending Practice: The idea for this option came from a 'CW Trainer' designed by Tom Lewis (http://www.qsl.net/n4tl/). The LCD screen displays a string (generated by one of the listening practice options). To practice sending, key in the displayed string. Each correctly keyed character will be echoed (as lowercase), while incorrectly keyed characters will be echoed in the way the program interpreted them, or as '*' if not a recognized Morse character.
Listen and send: This option is similar to the preceding one, except that displayed text is also sounded out. Therefore, one can attempt to reproduce the sound of the characters, as they were heard, as well as the memorized dot-dash sequence for each character.

Note: The program's decoder forgives extra space between letters. For example, the text MOAK could be keyed-in as "m o a k", or "mo ak", etc. Characters must not be too closely spaced, however.