# *Koch Method Morse Trainer Kit*
Quick Assembly Guide

The Koch Method Morse Trainer (KMMT) is built on a first generation ROOKEY PC board. These first generation boards had no ground plane and were missing a few traces, making them ideal for use as project boards for other devices that use the PICAXE 08M chip. This particular project uses the PICAXE 08M chip to generate random sequences of Morse code characters for practice copy. The KMMT is controlled by 3 push buttons, which start and stop the training session and set the parameters for the generated Morse code.
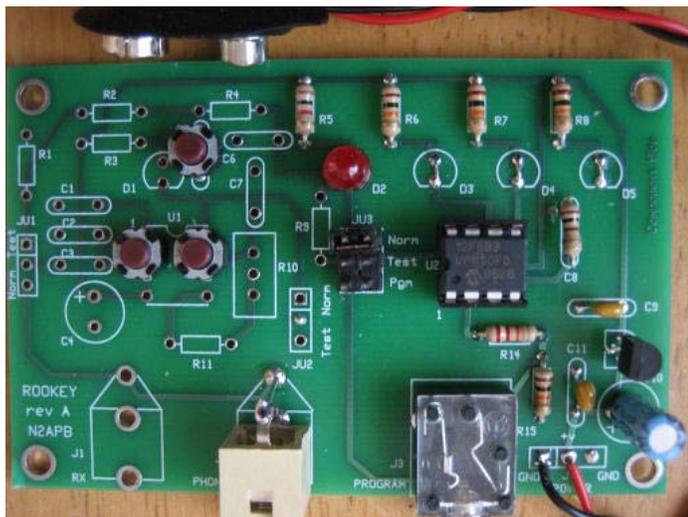
Component placement.
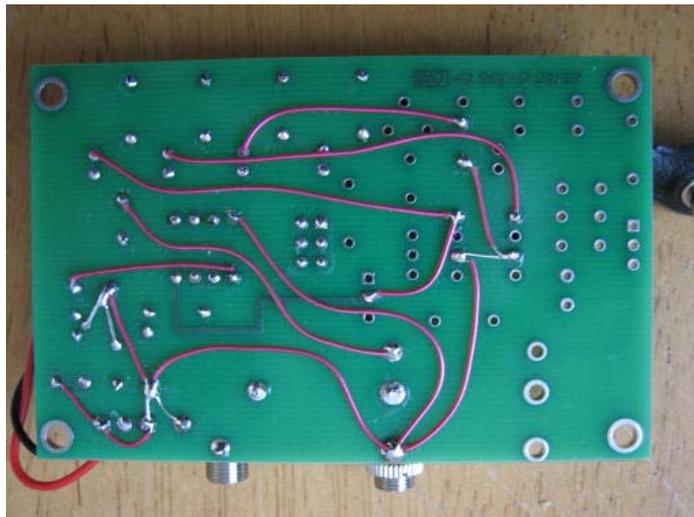
Connections to be added.

When assembling the KMMT kit, solder in all board-mounted parts before you add the wire connections on the solder side of the board. The Kynar insulated wire included in the kit is reasonably temperature tolerant during soldering, but direct contact of the insulation with the soldering iron tip or hot solder will melt it.

Koch Method Morse Trainer
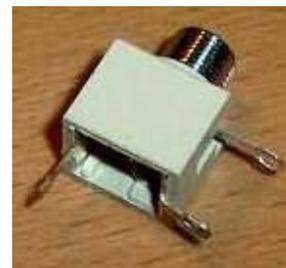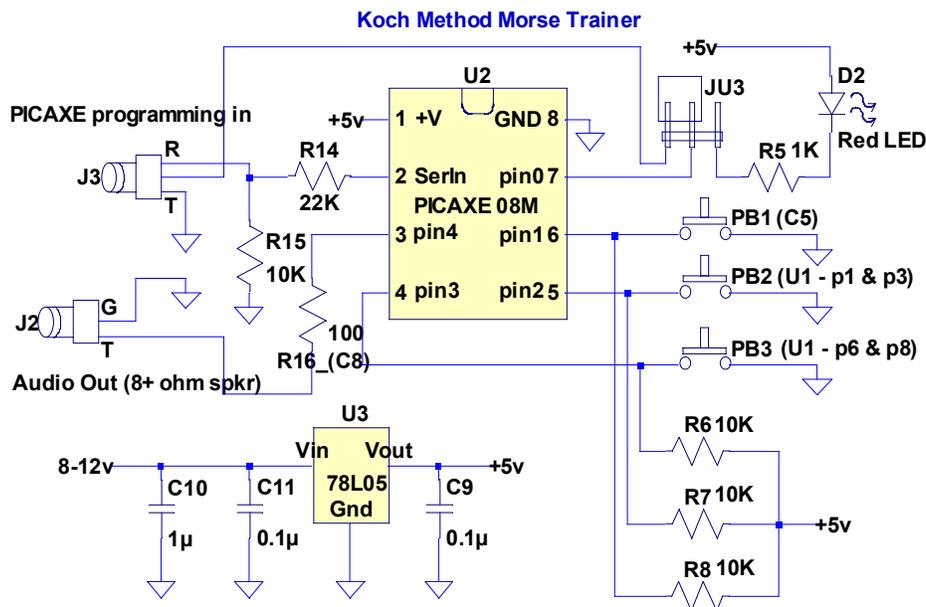
Note there is only ONE socket on the KMMT board.

.

Basic Assembly Steps

1) Attach all small resistor and capacitor components to the pcb.
2) Attach the IC socket at position U2, observing pin 1 orientation by the notch in the socket.
3) Attach the LED in position D2, observing to orient the flat of the LED as shown by the silkscreen guide on the pcb.
4) Attach the blue 1uF electrolytic cap at C10. The negative lead is the side with the black stripe, which gets oriented away from the + symbol on the silkscreen.
5) Attach the voltage regulator U3, oriented as shown on the silkscreen.
6) Attach the pin header to position JU3. Snip off excess lead lengths on the bottom side.
7) Attach the black stereo programming jack at J3.
8) Prepare the mono jack as shown below by bending one lead down as shown in the top photo, next to the schematic on page 1. Attach at positions J1 and J2. Add a wire jumper from the pcb up to the top terminal and shown in the lower photo on page 1.
9) Following the solder side picture, carefully add the Kynar wire jumpers between the solder points. Use the schematic to help avoid mistakes.
10) Attach the battery clip at J4, with the red lead being soldered to the center hole and the black lead soldered to either outer hole.

KMMT Parts List

C9	capacitor, 100nF
C10	capacitor, 1µF
C11	capacitor, 100nF
D2	Red LED, diode
J2	mono 3.5mm socket
J3	stereo 3.5mm socket
JU3	2x3 pin header with jumper
PB1,2,3	miniature push button
R5	resistor, 1 K ohm
R6,7,8	resistor, 10 K ohm
R14	resistor, 22 K ohm
R15	resistor, 10 K ohm
R16 (C8 posn)	resistor, 100 ohm
U2	PICAXE 08M integrated circuit
U3	78L05 5 volt, voltage regulator

Using The Koch Method Morse Code Trainer

This program is an implementation of the Koch Training Method for learning the Morse code. It is recommended that you read Dave Finley's book, "Morse Code: Breaking The Barrier", if at all possible, to get an idea of the principles that this method is based on. In the Koch Method the Morse characters are learnt in a specific order, working with a steadily increasing pool of characters. The effective WPM is left constant at as high a level as possible.

When you power up the board, the 08M program starts and the size of the character pool last used is retrieved from non-volatile (EEPROM) storage, so even if you remove power, the 08M chip will remember where you were in the Koch character pool. Initially this value will be 2, so when you start your very first training session the program will randomly select groups of 5 characters from that pool of two - the letters K and M.The training session is started by pushing Push Button #1 (PB1), which on the recycled 1st generation ROOKEY PC board, is the button mounted in the C5 position. Push Button #2 (PB2) is mounted in the U1 space between pins 1 and 3. Push Button #3 (PB3) is mounted in the U1 space between pins 6 and 8.

While a training session is running, you increase the size of the pool by pressing PB3. The current training session will be paused and the character group count reset. You will hear a bleep sound followed by the last letter in the new, larger character group sounded out in Morse. The training session will then restart. If you hold down PB3 you will hear a bleep followed by the new last character in the pool sounded out in Morse, incrementing over and over. When you hear the character you want to have as the new last character just let go of PB3. If you press PB2 the character pool size will be decreased with similar announcements.

The total number of characters and prosigns in the entire Koch pool is 43, ordered in the following sequence. **K M R S U A P T L O W I PERIOD N J E F 0 Y V COMMA G 5 / Q 9 Z H 3 8 B ? 4 2 7 C 1 D 6 X =(BT) *(SK) +(AR)**

When you press PB1, you will hear a bleep followed by the highest character in the current sized group, and then the training session will start.

Pressing PB1 while a training session is in progress will halt the session. You may have to hold down PB1 for a few seconds for this to happen, especially at the slower speeds. This puts you in the speed set mode and you will get the feedback of 7 Morse dits to confirm you have entered the mode. The characters are ALWAYS sent at fixed WPM rate. In the source code this is set at 17 WPM, but could be made higher by changing the value for "dit_length" in the constants section. The character speed table below equates the dit_length and character WPM values.

In speed set mode, you can adjust the inter-character/inter-group delay, to give you and effective speed of between 5 WPM to 17 WPM, in roughly 1 WPM steps. There are in fact 13 steps altogether. Initially the delay is set at an effective WPM of about 8.5 WPM. Pressing PB3 will shorten the delay (higher WPM), and PB2 will lengthen the delay (lower WPM). The feedback for the change is provided as a high-pitched beep, which is approximately one-half the actual delay length. This was done to make the speed change process less time consuming. Unfortunately there was not enough program memory to write code for saving and recalling the speed setting, but the essence of the Koch method is on keeping the speed constant and expanding the pool of characters as soon as you get 90% accurate copying the smaller pool. When you are done setting the speed, press PB1 to start your training session.

The Morse tone frequency is fixed at 604 Hz in the constants section. Change the value of "def_pitch" to another value if you wish. The pitch table below equates the pitch values with their frequency in Hz.

Reference: "Morse Code: Breaking The Barrier" by Dave Finley, N1IRZ ISBN 1-891237-19-5 Published by MFJ Catalog# MFJ-3400
http://www.mfjenterprises.com/products.php?prodid=MFJ-3400

Have Questions Or Need Help?

You can contact Dave Gwillim by email (**kb2tqx@verizon.net**) with any questions you might have on the construction or use of the KMMT. You can also check the NJQRP web pages (**http://www.njqrp.org**) and look for the page on PICAXE projects. Sometime shortly after Atlanticon 2007, the source code for the KMMT program will be posted there, or you can look for it on the Atlanticon 2007 CD.