

Building and Operating:
the Iambic to Single paddle kit
from Jackson Harbor Press

Introduction:

In October 2009, W0NFU (Larry Winslow) described a clever circuit in QST (Hints and Kinks, page 61) entitled: Single Paddle operation with Iambic paddles. The idea of the circuit was to allow single paddle operation with a keyer while using a dual lever (also known as an iambic paddle). Why not use a true single paddle ? Because they are less common and sometimes more expensive than iambic paddles (dual lever). The circuit prevented the user from pressing both paddles at the same time by using a 4001 14 pin CMOS IC as an SR flip flop. The Iambic to Single Paddle kit does basically the same thing with an 8 pin PIC microcontroller. The Iambic to Single Paddle kit also provides the option to use the paddles iambically if required for keyer operation.

General notes on building the Iambic to Single Paddle kit

The integrated circuit (U1) and the two keying transistors are MOS devices. This means that they should be handled as little as possible to prevent static damage. The builder should use a grounding strap and anti-static mat if available or at the very least, work on a grounded metal surface and be sure to touch ground prior to touching these parts.

One decision the builder should make before starting construction of the Iambic to Single Paddle kit is how the project will be mounted in the case. Ideally the Iambic to Single Paddle will be mounted in an all metal case to minimize RF pickup - an Altoids tin will work fine. The circuit board can be mounted to the case with 4-40 (1/8 inch) sized hardware. One item to consider is how to mount the LED, either horizontally (as shown on the parts placement diagram) or vertically.

The Iambic to Single Paddle is intended to operate from a 3 Volt source, two AAA or AA cells will work fine.

The components should be inserted a few at a time, soldered in place and then clip the leads. The pads and traces are small and delicate - a small tipped, low power (25 watts or less) soldering iron should be used.

Building the Iambic to Single Paddle kit

Step 1) Get the parts together: All of the board mounted components have been supplied but you will still have to provide off-board items to fully implement the kit. These items include:

- Input connector from Iambic Paddle (dual lever)
- Output connector to external keyer
- metal case, an Altoids or other candy tin will work fine
- mounting hardware, 4-40 sized
- battery holder
- momentary switch (required for iambic operation, optional)

Step 2) Identify and orient the components: Most of the components should be fairly easy to identify and place - see the parts list and the parts placement diagram for descriptions.

step 3) Insert and solder the components on the main circuit board: Use the parts placement diagram for information on the placement and orientation of the parts. Clip the leads after soldering. Here is a suggested sequence for installing the parts:

- a) C1 – small yellow .1 uF capacitor marked 104 - located at the top left corner of the board
- b) 8 pin DIP socket - should be inserted just below C1 with the notch towards the top edge of the board
- c) C3 – small yellow .01 uF capacitor marked 103 - located to the right of the socket
- d) C2 – small yellow .01 uF capacitor marked 103 - located to the right and below C3

Building and Operating the Iambic to Single Paddle kit from Jackson Harbor Press

- e) R2 – 4.7 k (yellow-violet-red-gold) – form the leads of R2 then insert and solder R2 just to the below C2
- f) Q1 – 2n7000 (transistor - TO-92 case) – with the leads of Q1 in a straight line, spaced .1” apart, insert and solder Q1 to the right of R2
- g) Q2 – 2n7000 (transistor - TO-92 case) – with the leads of Q1 in a triangular shape, with the middle lead (gate) pulled back by .1”, insert and solder Q2 to the left of the 8 pin socket
- h) R1 – 1.2 k (brown-red-red-gold) – form the leads of R1 by bending one lead around 180 degrees and then insert and solder R1 as shown at the lower left of the circuit board
- i) D1 - unmarked clear LED – note that D1 has a short lead (on the flat side) which is the cathode or negative lead and that the long lead is the anode or positive lead. Decide how you want the LED to be viewed, the parts placement diagram has it horizontal but it could also be viewed vertically. Then figure out the lead length required for the installation in the desired cabinet. One option would be to mount the LED through the cabinet wall and then solder wires from the LED to the circuit board. After this has been decided, insert and solder the cathode (the short lead on the flat side of the LED) in the ground hole in the bottom left corner of the circuit board. Insert and solder the anode (the long lead) into the hole connecting to R1 (diagonally from the cathode just inserted).

Step 4) Check the board: Before proceeding, take the time to check the bottom of the board for solder bridges. Use the bottom view diagram as a guide to visually check for these shorts. It may help to clean the flux from the board and then use a strong light in conjunction with a magnifying glass to see these problems. Soldering problems are the main source of most problems with kits. Also, double check the orientation of the critical components such as the LED D1. After you are convinced that the board is OK, form the leads of IC U1 to fit in the socket, insert the IC the socket, being sure to follow the parts placement diagram for proper orientation (pin 1 indicated by a notch or dimple should be towards the left side of the board. If you will need the ability to use the iambic capability of the paddles at some time, also connect the optional momentary switch, SW1, as shown on the parts placement diagram and hookup diagram.

Step 5) Solder connecting wires from the board to the input and output jacks and 3 volt battery holder. See the parts placement diagram and the hookup diagram for a visual of all these connections. Note that the dit and dah connections are only important in that they be consistent from the input to the output.

Operation:

Connect the Iambic to Single Paddle input to the paddle. Connect the output of the Iambic to Single Paddle to the keyer paddle input. Powerup the Iambic to Single Paddle by inserting the cells into the battery holder. After the PIC powers up the LED should quickly wink on and off two times. Now use the paddle to send code - the Iambic to Single Paddle kit should follow the dit or dah input except if both are pressed at the same time, in that case, only the paddle lever pressed first will be transmitted to the keyer.

Press and release the switch to turn on the iambic mode (and also turn on the LED). Now if both paddle levers are pressed, the keyer will send alternating dits and dahs if it is in iambic mode. Note that the user can exit iambic mode either with another press and release of the switch OR the mode will time out (and the LED will go off) after about 11 seconds after the last paddle release.

Notes:

Please feel free to email with any questions, comments, suggestion or problems with this kit. My email address is:
wb9kzy@wb9kzy.com

Thanks for choosing the Iambic to Single Paddle kit and
Best Regards,

Chuck Olson, WB9KZY

Copyright © 2011 by Charles J. Olson

Building and Operating the Iambic to Single Paddle kit from Jackson Harbor Press

List of parts included with the Iambic to Single Paddle kit

Ref	marking	Description
C1	104	.1 uf multilayer ceramic .1" lead space capacitor
C2	103	.01 uf multilayer ceramic .1" lead space capacitor
C3	103	.01 uf multilayer ceramic .1" lead space capacitor
R1	brown-red-red-gold	1.2 k ohm 1/4 watt resistor
R2	yellow-violet-red-gold	4.7 k ohm 1/4 watt resistor
U1	12F509	8 pin DIP, programmed PIC microcontroller
D1		bright red LED
		8 pin DIP machined pin socket (for U1)
		circuit board

optional items for iambic operation:

SW1 momentary, normally open switch

Items you'll need to provide to complete the Iambic to Single Paddle kit

optional Metal case (an Altoids tin is fine)

4-40 sized (1/8 inch) mounting hardware

input jack

output jack

3V battery holder (two AAA or AA)

solder, wire