Building and Using: The PICPADL kit from Jackson Harbor Press Touch switch keyer paddle / CPO

Introduction: The kit is a pair of adjustable touch switches which can be used with an iambic keyer as a "paddle". The kit also includes a tone output pin which "follows" the I2 (right) input to function like a Code Practice Oscillator (CPO).

General notes on building the PICPADL kit: The PIC microcontroller and the two 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 devices. One decision the builder should make before starting construction of the PICPADL kit is how the project will be mounted in the case. The mounting holes are sized at 1/8 inch for 4-40 (or M3) sized hardware. The pads and traces are small and delicate - a small tipped, low power (25 watts or less) soldering iron should be used.

Building the PICPADL 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:
battery holder or regulated power supply connection
Output keying connector
mounting hardware, 4-40 (or M3) sized
metal enclosure (the kit fits nicely in an Altoids tin)
piezo sounder (speaker) plus a switch for turning it on/off

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 board top view picture for descriptions.

Step 3) Place and solder the components on the main circuit board: Use the top view board photo for information on the placement and orientation of the parts as well as the schematic and silk screen legend. Clip the leads of the through hole parts after soldering.

a) C3, .1 uF, (marked 104), placed at the upper right (on the top view photo) to the right of U1
b) C2, .01 uF, (marked 103), also placed to the right of U1
c) C1, .01 uF, (marked 103), also placed at the bottom right corner of the board
d) the 8 pin socket, orient the notch side towards the right side per the silk screen on the board
e) Q1 and Q2 (marked 2N7000), placed below the socket with the flat face towards the right
f) R1, 20k ohm trimpot, placed on the bottom (***OTHER SIDE)*** of the board
g) R2, 20k ohm trimpot, placed on the top of the board

step 4) Check the board: Before proceeding, take the time to check the bottom of the board for solder bridges. Use the board top picture and bottom view diagrams 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. Insert U1 into the socket. Now double check the orientation of the critical components such as the transistors and U1. After you are convinced that the board is OK, connect the board to a battery (3 Volts to 5.5 Volts maximum) using a VOM to measure the current used, current should be less than a mA (depending on the voltage), if it's more, power down and re-check the board for shorts and polarity problems. If the current is relatively low, power down,disconnect the meter, the board is ready for use.

Wire it up to the output jack and battery. It can then be mounted in a suitable enclosure, preferably metal like an Altoids tin with the touch pads extending through a thin slit cut in the enclosure. This can be done easily on an Altoids tin with a tin snips. If a plastic enclosure is used some kind of metal touch point should be provided for best results. I usually key with the right hand and hold the Altoids tin with my left hand. One alternative might be to wear an anti-static strap but this will probably be too cumbersome.

Using the PICPADL:

The PICPADL should be connected to the keyer and powered up. One or both of the switches may be stuck ON depending on the pot setting. Adjust the pots just past the OFF threshold point. This is a good place to start the adjustments. Then try keying – you may find that hovering a finger close to the touch may turn it ON. You should be able to adjust the pots to the desired touch right for your keying style.

The PICPADL will enter a "sleep" mode after about 45 seconds of inactivity to save power. At 5 volts, the supply current will go from about 0.75 mA when active to 9 uA when sleeping. At 3.8 volts (3 AA Nimh cells), the supply current will go from about .55 mA to 4uA. The PICPADL will awake with the next press of the touch pad, note that this wake up may take a little longer than the normal press.

If the PICPADL is powered with a regulated supply like the Keyer Accessory kit (also from Jackson Harbor Press) a series LED in the unregulated input makes it easy to see when the PICPADL is in sleep mode (low power) OR normal mode (higher power). The LED will be noticeably dimmer in sleep mode.

If there is RF in the shack the PICPADL may create false trailing elements, a Dah may turn into an N (Dah-Dit). Good quality shielded cable from the PICPADL to the keyer or rig should help. Another thing which can be tried is making the series connections between the PICPADL board and the connector (I'm usually using a 3.5 mm stereo jack) with some kind of inductance, a small value choke or multiple turns of hookup wire on a ferrite core. Experimentation will probably be required to find an inductance value that works. Another "easy to try" method of combating RFI is to use a larger ferrite core and wind the shielded cable through it, in a similar fashion to what is done with computer keyboards, mice or wall wart power supplies.

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

Thanks for choosing the PICPADL kit and Best Regards,

Chuck Olson, WB9KZY

List of parts included with the PICPADL kit

Part	Description
C1	.01M or 103 .01 uf multilayer ceramic .1" lead space cap
C2	.01M or 103 .01 uf multilayer ceramic .1" lead space cap
C3	.1M or 104 .1 uf multilayer ceramic .1" lead space cap
Q1	2n7000 n-channel MOSFET
Q2	2n7000 n-channel MOSFET
R1	20k ohm trimpot
R2	20k ohm trimpot
U1	PIC 12F629 8 pin DIP microcontroller IC
	circuit board
	8 pin DIP socket

Items you may need to provide to complete the PICPADL kit:

metal enclosure such as an Altoids tin
4-40 sized mounting hardware (L brackets and machine screws)
2 or 3 cell battery holder or regulated 3 or 5 volt supply (see Keyer Accessory kit)
stereo output jack
piezo sounder with a switch for turning it on/off
solder, wire, good quality desoldering braid