

# Make your own key (A Morse key project for the home workshop)

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**This key is a single lever SPDT type to be used with an automatic keyer. It can also be used as a left or right hand "sideswiper" straight key with the unused contact screwed in to act as a back stop or back contact. It is not difficult to build but will require the use of a small lathe and mill drill or drill press with a milling attachment. Inch measurements and American screw threads are used throughout.**

The base is milled from a brass (gunmetal) casting. Use care to keep all faces flat and square. A smooth file worked in several directions will remove the milling marks. Leave the edges alone. Drill (No. 36) and spot face 9/16" diameter, 1/6" deep for the four rubber feet. Tap 6-32 for the 1/2" long round head brass screws.

The fulcrum is made from 1" diameter brass round. Carefully mill the 9/16" slot across the round, 1/2" deep. This must be done accurately for the key to have good "feel". Drill (No. 21) and tap 10-32 for the stud. Now smooth the three faces with a file with care to keep them flat. Don't touch the edges. Mark and face off the ends in the lathe.

The lever is cut from 1/4" brass plate. Mill to size. The slot should be a little less than half way through. Again this must be done with care. Try the lever on the fulcrum. The fit must be very close, but there must be no interference. The two surfaces should be flat so that no rocking motion can be felt when pressed together. Drill (7/32") the stud clearance hole. This should be centred on the stud and must not touch the stud when the lever is moved. File and fit, polish with fine emery paper and Brasso, install the stud, spring and nut, oil lightly and try for "feel". If not satisfied, start over. This action must be right or the key will be a failure.

Mark the centre lines on the top of the base for the four mounting screws. Carefully locate and clamp. Start the holes with a centre drill. Drill (3/8") for one contact pillar. While still located, using the drill press, press in the Formica sleeve insulator. Drill (No. 11) the insulator. Repeat at the second contact pillar location. Drill tap drill size (No. 21) for the front fulcrum screw. Drill (No. 11) the clearance hole for the rear fulcrum screw. Turn the base over, and relocate the holes by using the previous drill in the chuck. Clamp. Counterbore the holes. I used end mills for this: 1/2" for the pillars, 5/16" for the rear fulcrum screw, 3/8" for the pillars, 5/16" for the rear fulcrum screw, 3/8" for the front fulcrum screw. Press in the Formica insulating washers. Use a dab of Araldite glue to seal

them against moisture. You may wish to reface these washers in place with the 1/2" end mill, and run the drill through one more time. This insulation material is now in place permanently and cannot be removed.

Mark the base of the fulcrum for the rear mounting screws. Make sure you're marking the rear hold. Left handers may wish to build the key as a mirror image. Clamp, drill (No. 21) and tap 10-32. File off the burrs, and mount it to the base with the rear screw. The 10-32 round head screws have their heads turned down to 5/16" diameter making them into filler head screws. Align the fulcrum (with the lever attached) and tighten. Start the forward tap hole with a hand drill, disassemble, locate and clamp on the drill press and finish drilling the tap hole. Tap 10-32 and fill off the burrs. Drill (No. 11) out the base forward fulcrum mounting hole. When screwed on the base, the fulcrum will be aligned with the centre line.

The contact pillars are made from 1/2" diameter brass round. Cut long and face one end. Make up the two insulating washers. I counterbored these about 1/32" to press on the pillar. With the insulator in place, mark the contact centreline. It should agree with the centre of the lever. Drill (No. 3) counterbore 3/8" diameter, 1/16" deep, and tap the hole for the contact screw (1/4"x32 UNEF). This extra fine screw thread is ideal for an adjustment screw. When finished, face off the top end in the lathe to match the height of the fulcrum. Drill (No. 21) and tap the bottom of the pillar for the 10-32 mounting screw.

The contact screws are made from 5/16" diameter brass round. Face one end. Deposit a large drop of silver brazing alloy on the end. Chuck in the lathe and turn down to 1/4" diameter. Turn the alloy down to 3/16" diameter, shape the contact and polish. It should project about 3/32". Now cut the thread. The thread is V-shaped (60°). This is a shallow and easy thread to cut. Turn the lathe by hand. When close to finished, clean and keep trying the thread. The fit should be very close. Cut long and face off to length. Drill (5/64") the hole for the contact adjustment pin.

Make up the three adjustment nuts. This is straight forward. A knurling tool will be needed. When knurling brass, use compressed air, if available, to keep the tool and work clean. A small shoulder is cut on the spring adjustment nut to centre the spring.

Assemble the key. With the pillars aligned, mark the lever for the contacts. Remove the lever. This should be possible with the contact screw backed

out. The lever contacts are made up on a 1/4" length of 5/16" diameter brass in the same manner as the contact screws. This is then turned down to press into a 3/16" diameter hole drilled in the lever. At the same time drill (No. 11) the hole for the paddle mounting screw and drill (7/64") the hold for the paddle positioning pin.

Use 3/16" Formica for the paddles. It is the brown material used for power boards and is hard and takes a beautiful polish. Never drill through Formica without a backing block. I made a special screw and nut to fasten the paddles to the lever. The slot for the screw was made with a fine hacksaw blade.

Most keys have screw terminals. To keep this key simple and elegant, the three connections are made to solder terminals on the bottom. These are special lugs turned from 3/4" diameter brass round. The excess lug material can be ground off and filed. Watch out! It gets hot.

Brass will take a mirror finish. File the flat surfaces in one direction with a fine smooth file. Clean the file and work after each stroke. Polish with fine emery paper and Brasso. As a final act, take the cutting edge off the corners with a fine file. Go easy on this.

The finished key is very pretty. It is heavy enough to stay in place for all but the rarest DX, or it can be screwed to the bench using spacers in place of the rubber feet. The action is smooth and adjustable. It will be a cherished companion on the operating table and should last a lifetime.

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