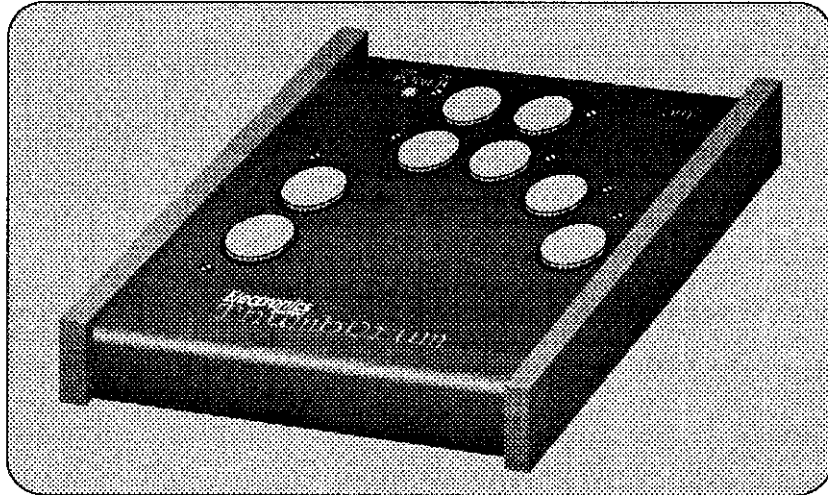




Audio ThumbDrum

Model 9300A
Assembly and Using Manual



It's not easy to lay down a convincing drum part with a synth keyboard. And if you've ever tried your hand at real drums you found out it takes some practice to sound like a pro. On the other hand, you probably sound great when you finger-drum on a table top. That's the idea behind the ThumbDrum, a controller that converts finger drumming into drum sounds.

(c) 1993 PAiA Electronics, Inc.
Portions of this document are excerpted from articles in the June and July 1993 issues of *Electronics Now* magazine, copyright 1993, and are reprinted by permission of the Publisher.

ABOUT THIS MANUAL...

This is the first manual in a set of three manuals.

They are:

- 9300A Assembly and Using Manual (this one)
- 9301 Sensor Board Assembly and Testing Manual
- 9302 Tone Board Assembly and Testing Manual

You obviously have this manual, now check to make sure that you have the other two. Take a good look at them and notice these things:

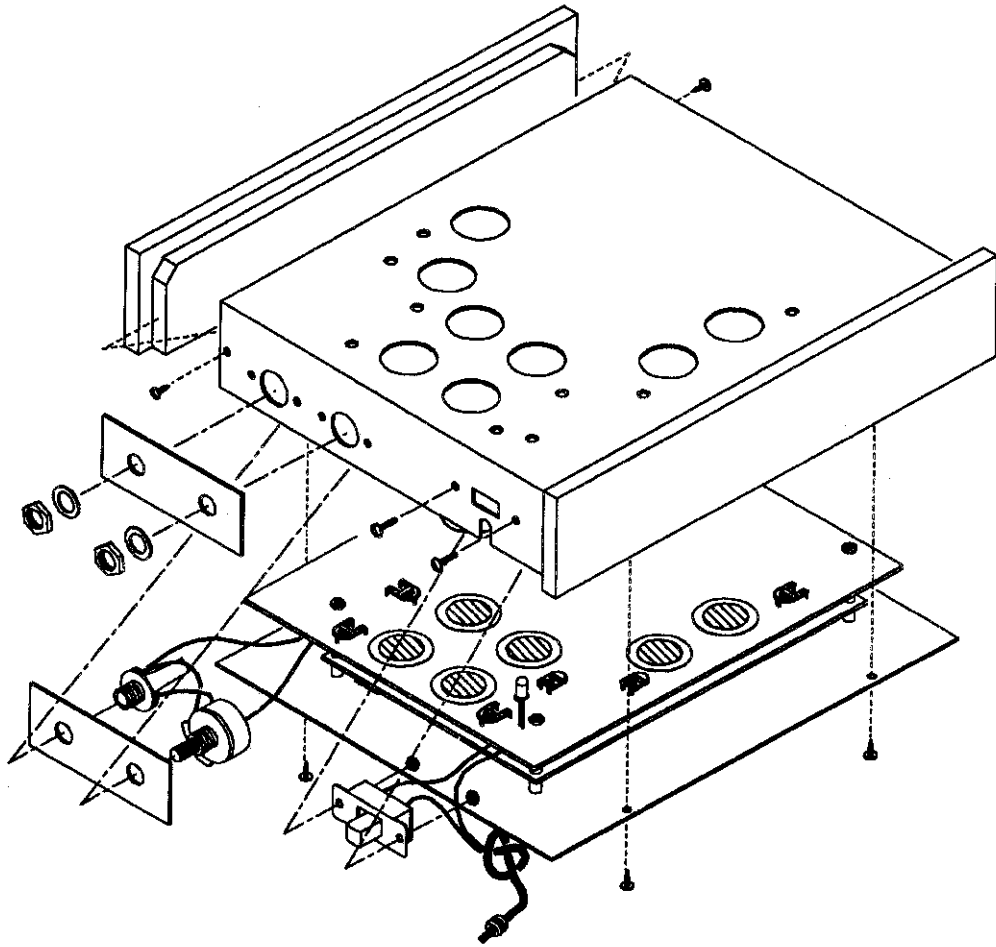
This 9300A manual deals with combining an assembled and tested 9301 Sensor Board and 9302 Tone Board and installing the combination in the ThumbDrum Case. It also has some tips on using the completed unit. There is a list of Case Components and Hardware Items on the last page of this manual. Check the items supplied with the case against this list.

Your assembly process should begin with the Sensor Board as described in the 9301 Sensor Board Assembly and Testing Manual. When you have finished the Sensor Board and are satisfied that it is working properly, assemble and test the Tone Board as described in the 9302 Assembly and Testing Manual. This sequence of Sensor Board first and then Tone Board is recommended because the power supply for the Tone Board is part of the Sensor Board.

Boiler-plate on pages 2 and 3 of the manuals deals with general electronic assembly. If you have never assembled a PAiA kit before, read this once, but it's the same between the two manuals and there's really no need to read it twice. The last page of each manual has a list of the parts that should be supplied with that kit, check the items in the parts bag against this list.

When you have finished with these two sub-assembly tasks, you will return to this manual to install the units in the case.

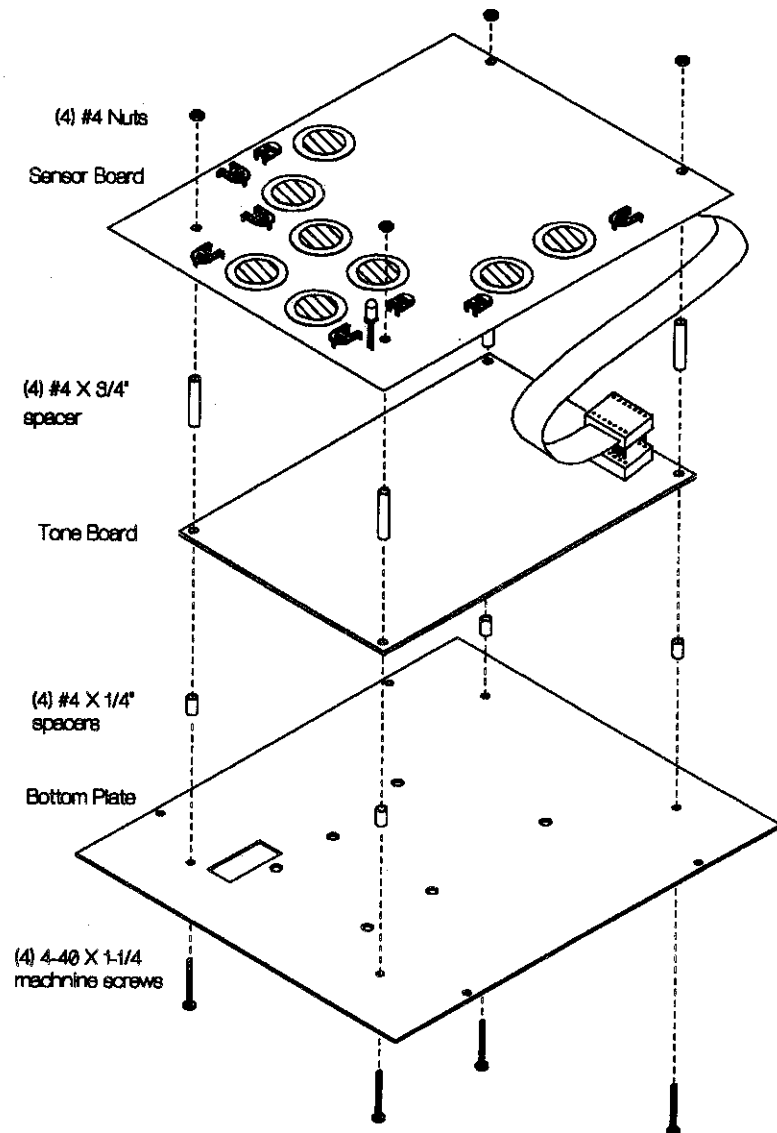
See you back here when you finish the boards . . .



FINAL ASSEMBLY

Final assembly will consist of using long screws and aluminum spacers to form a stack consisting of the Case Bottom, the Drum Tone Board and the Sensor Board. After installing the wood End Caps and attaching the Power Switch, Volume Control and Output Jack to the Case Top, the stacked circuit boards and Case Bottom will slip into the Case Top and be secured. Finally, the foam Percussion Pads will be adhered to the Piezo Sensor Disks.

- () Plug the Sensor Board and Drum Tone Board together as shown in the illustration before beginning to stack them. Notice that the Ribbon Cable exits from the header away from the closest circuit board edge when the header is properly plugged into J1 on the Drum Tone Board.
- () Locate the Case Bottom plate and notice that it is not symmetrical. Pass one of the long (4-40 X 1-1/4") machine screws up through one of the stack mounting holes in the Case Bottom and slide one of the short (1/4") aluminum spacers onto it. Slide the corner of the Drum Tone Board over the screw and be very careful that the board is oriented properly as shown in the illustration. Next slide the long (3/4") aluminum spacer and the corner of the Sensor Board over the screw and finally, finish with a 4-40 nut. Do not tighten this hardware yet, you'll need some slack to install the remaining hardware.
- () Using the remaining long machine screws, short spacers, long spacers and three nuts, secure the last three corners of the stack. Fully tighten this hardware.



Use the Long Machine Screws to make a drum sandwich of bottom plate, short spacer, Tone Board, long spacer and Sensor Board. Secure this stack with nuts on each screw.

Put this assembly aside and trial fit the wooden End Caps into the open case ends as shown in the illustration. When fully assembled, the edges of the Case Bottom plate should be hidden by the front and rear aprons of the case top. If the End Caps do not fit far enough into the case for this to happen, it may be because the right angle cuts of the wood ends are not fitting into the slight radius of the bend in the case top. Use a sharp knife to remove the point of these right angles in the wood end.

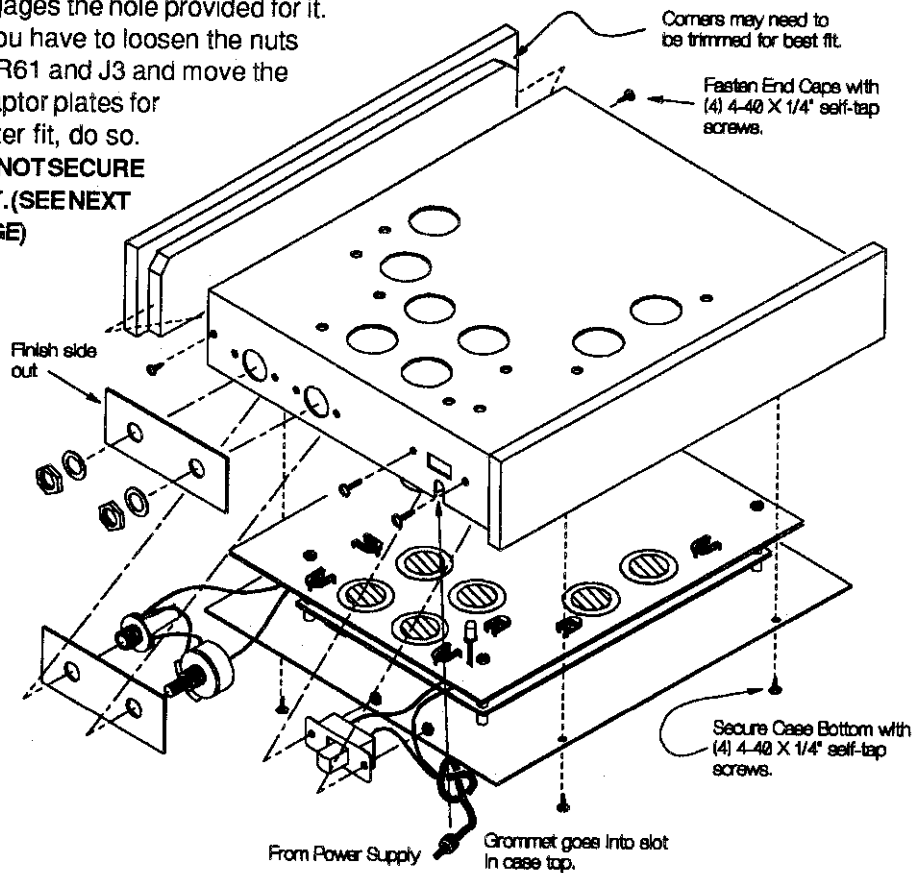
- () When you have assured proper fit, fasten the wood ends in place with the (4) #4 X 1/4" self-tap screws supplied. To keep the wood from splitting and provide a better fit, pilot holes for these screws should be predrilled with a 1/16" drill bit. If a drill is inconvenient, use a small finishing nail as a center punch to make this hole. Having a pilot hole is very important.

Now it's time to mount the Power Switch and other controls from the circuit board stack on the case top.

- () Using the two 4-40 X 1/4" machine screws and the remaining two #4 machine nuts supplied, install the Power Switch S1 from the inside rear of the case top. The switch should be oriented with its Lug #1 (the end lug with the wire soldered to it) away from the closest edge of the case top.

The Volume control R61 and Output Jack J3 are installed in the case top using a pair of Adaptor Plates as shown in the illustration. Locate these Adaptor Plates and note that while they are symmetrical, they have a "finished" side. On the plate that's visible, this side should face out.

- () Pass the threaded bushing of the Potentiometer R61 and Output Jack J3 through the holes in one of the adaptor plates and then through the holes in the case top. Put the other adaptor plate in place (watch finish side) and secure the assembly using the washer and nuts supplied with the pot and jack.
- () Slip the stack of Case Bottom plate and circuit boards into the Case Top. Tilt the end of the Sensor Board to slide it "under" the Volume Control and Output Jack. Be careful that the Power LED on the Sensor Board engages the hole provided for it. If you have to loosen the nuts on R61 and J3 and move the adaptor plates for better fit, do so. **DO NOT SECURE YET. (SEE NEXT PAGE)**

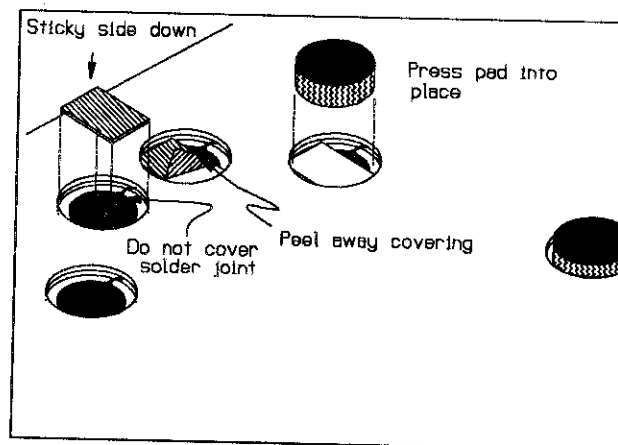


The Case Bottom plate is slightly undersized compared to the Top so that it can move around for best-fit alignment with the holes in the top. When properly aligned, the holes for the percussion pads will be centered over the Piezo Disks and the adjusting holes for the Sensor Board sensitivity trimmers will be accessible through their holes.

It's fairly easy to hold the two halves together using one hand during this adjustment. When you are satisfied with the alignment, use a pencil to mark the locations of the Bottom plate holes over the end caps. Make sure the Rubber Grommet on the power cord is in the slot in the Case Top provided for it before permanently fastening the Bottom plate in place.

- () Secure the Case Bottom plate to the End Caps with the four remaining #4 X 1/4" self-tap screws. As before, pilot holes in the End Caps are very important.
- () Install the (4) self adhesive rubber feet by peeling their backing and placing them in the corners of the Case Bottom plate.
- () Press the knob supplied onto the shaft of the Volume Control.

Flip the unit over and install the Percussion Pads using the Double Stick Foam tape supplied.



-
- () Locate the 3/4" wide strip of double-stick foam tape, cut a 1/2" long piece and remove the paper backing from one side. Press the sticky side of the foam through the hole above the piezo sensor and press it in place. Do not cover the solder joint on the sensor with this tape, primarily because it will result in a tilted percussion pad.
 - () Remove the backing from the top of the tape to expose the sticky surface. Also remove the backing on the foam percussion pad and gently place the pad sticky side down in the hole. Center the pad in the hole and press firmly in place. Once adhered, you should avoid trying to remove the pad.
 - () Similarly, mount the remaining seven foam pads.

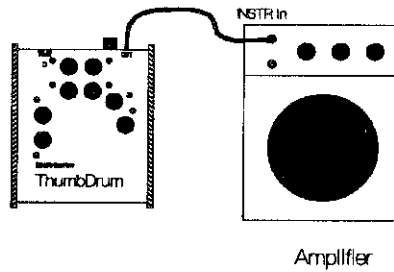
USING THE ThumbDrum

Your checks of the Sensor and Tone Boards when you assembled them should have given you a pretty good feel for what the trimmers do. Sensitivity trimmers are accessible through the case top and should be used to adjust the relative output level of each drum sound. The adjustment trimmers of the Tone Board are accessible through holes in the bottom of the case and are used to set the pitch and sustain of the drum sounds.

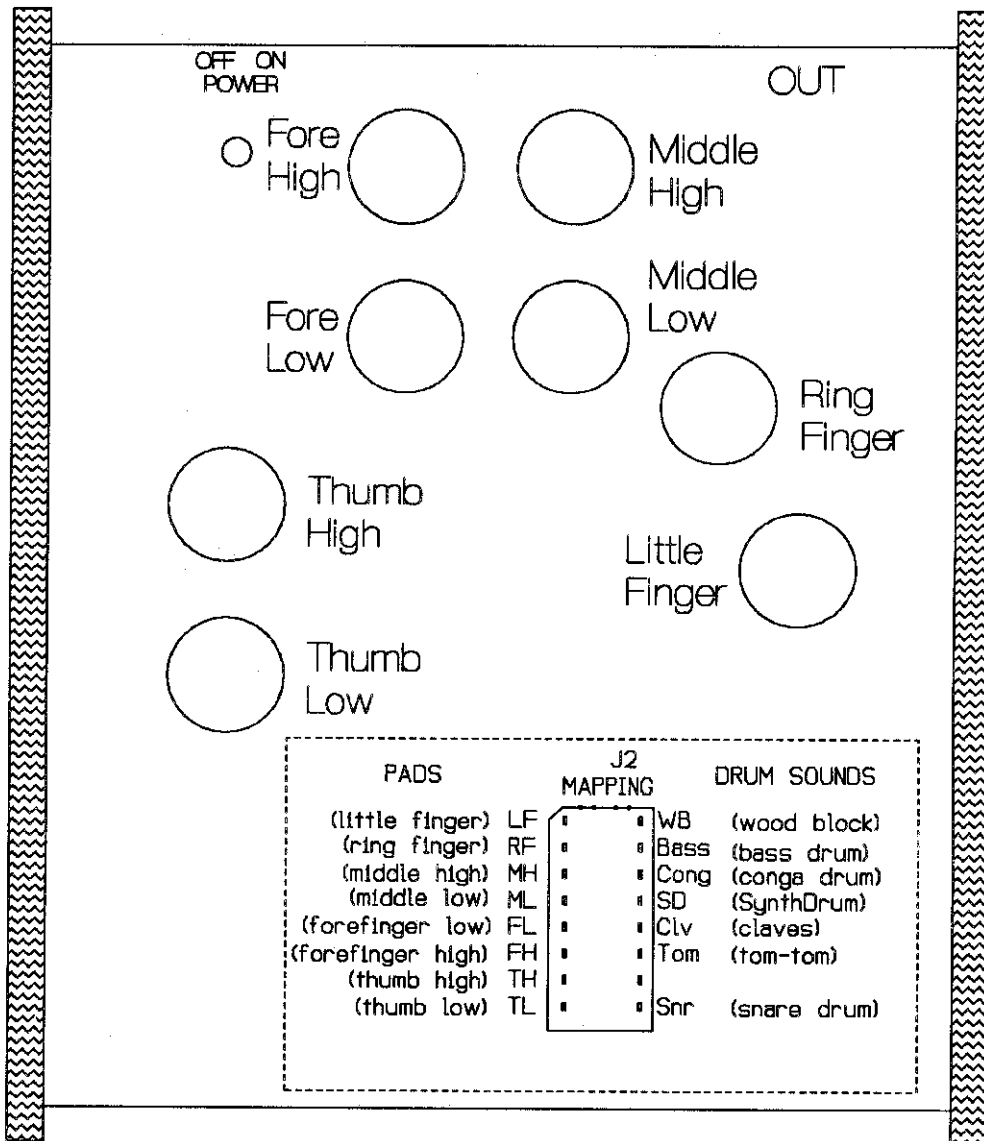
If you decide to change the mapping of pads to drum sounds after playing with the unit for a while, slide the circuit boards out by removing the screws that attach the bottom plate to the end caps and rewire or replace the header in the mapping socket J2.

The Output of the ThumbDrum can drive walk-man style headphones directly, but is really intended to plug into a Guitar or HiFi Amp. Adjust the output level of the ThumbDrum using the Volume Control. Experiment with relative settings of ThumbDrum output and the Volume control of the amplifier being used to find the lowest noise, best sound combination.

To wrap it up, here's some advice about drums generally: whether analog, digital or real, they all want echo and reverb. Running the audio output of even the most expensive electronic sound modules through a simple guitar amp reverb or electronic echo unit will improve the sound, and on simpler devices like the ThumbDrum reverb works magic.



The output of the Audio ThumbDrum is intended to plug directly into Guitar or Hi-Fi Amplifiers.



Use copies of this page to record pad assignments and wiring of Mapping Headers. Write Drum Sound names in the blank circle of the pad and show header configuration with lines indicating wires.

Audio Thumbdrum Case

Packing List

- 1 Case Top
- 1 Case Bottom Plate
- 2 Wooden End Caps
- 2 Control Adaptor Plates
- 8 #4 X 1/4" Self-Tap Screws
- 4 4-40 X 1-1/4" Machine Screws
- 2 4-40 X 1/4" Machine Screws
- 6 #4 Machine Nuts
- 4 #4 X 1/4" Rolled Aluminum Spacers
- 4 #4 X 3/4" Rolled Aluminum Spacers
- 4 Self Adhesive Rubber Feet

PAiA Electronics, Inc.
3200 Teakwood Ln.
Edmond, OK 73013
fax (405) 340-6378
phn (405) 340-6300