RETROAKTIV

PG-800 MINI

CONTROLLER FOR ROLAND JX-8P, SUPER JX & MKS-70

Installation Manual & User Guide

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GETTING STARTED

Thank you for purchasing a PG-800 Mini controller. This product allows for hands-on programming of the Roland JX-8P, Super JX, and MKS-70 synthesizers.

The PG-800 Mini is available as a stand-alone desktop unit that conects to the JX via a cord, or it can be mounted directly inside of the instrument itself. (JX-8P and Super JX models only) The PG-800 Mini was designed to take advantage of the blank panel space in the JX-8P and Super JX, where it fits easily into the upper right corner of the synth.

This product was based on a project by Bas at Poesboes.com entitled "Fitting your PG-800 with a new processor". His article can be viewed at this URL: https://tinyurl.com/yc87fns2 This project would not have been possible without Bas and we appreciate his generousity and technical assistance. The firmware in the PG-800 Mini is different from the firmware available from Bas. Be aware of this if you ever need to flash the firmware in your unit. Firmware updates can be found at the PG-800 Mini product page at www.RetroaktivSynthesizers.com.

Many versions of the original JX firmware do not respond correctly to the WRITE command from the PG-800. By default, the WRITE button on the PG-800 Mini will act as a SCRATCH PROG and RANDOM PROG generator. To disable this function and allow the WRITE button to send WRITE commands to the synth, hold down MANUAL while powering up.

To begin using the programmer (Desktop unit), simply plug the 6-pin DIN cable into the PG-800 Mini and the synth. If you have a PG-800 Mini installed in your JX, the programmer starts up as soon as the synth is powered on.

FEATURES

The PG-800 Mini allows for easy, hands-on programming of Roland JX-8P, Super JX, and MKS-70 synthesizers. While incorporating all of the features of the original PG-800, the PG-800 Mini adds some useful new features.

- **RANDOM PROGRAM GENERATOR** - Holding the WRITE button for .8 seconds will generate a random sound.

- **SCRATCH PROGRAM** - Tapping the WRITE button once (for less than .8 seconds) will generate a basic program, which serves as a useful starting point when creating a new sound.

- **MANUAL** - Tapping the MANUAL button once will transmit the panel positions of all 44 controls to the synthesizer.

- **COPY/PASTE** - To copy the state of the PG-800 Mini's controls without actually transmitting them to the instrument, hold MANUAL for .8 seconds or more. Once the copy has been made, holding the MANUAL button will transmit the stored panel state to the synth. Once pasted, the memory will be cleared, and holding MANUAL will act as the copy function once again.

- **DISABLE PG-800 MINI** - Holding WRITE and MANUAL down together for 1 second will disable transmissions from the PG-800. This is useful if using the JX in a performance. Once in disable mode, tapping manual will return the PG-800 Mini to its normal state. Any controls that were moved while transmission was disabled will be updated upon enabling transmission.

- **WRITE MODE**- Holding the MANUAL button down on power-up will disable RANDOM/SCRATCH generators and WRITE button will transmit the "WRITE" message to the JX. Whether this function works correctly on a JX will depend on JX firmware. WRITE MODE is off by default.

PCB BUILD NOTES

The PG-800 Mini is available as a DIY bare PCB kit, as well as a fully assembled "internal" unit. This section is for people building their own units and installing units into the chassis of a JX-8P or JX-10P.

Construction of the circuit board is simple, but following these steps will make the process go as smoothly as possible.

- Begin by installing components on the bottom side of the PCB. Take care when installing the small components underneath the processor. Do not get solder into the through-hole pads where the processor mounts to the top-side of the board. Do not install the DIN jack, buttons, or pots yet. C9 should be omitted. It is only used as a provision in which more filtering is needed on the ADC.

- Now build the power supply on the top side of the board. Take care that the solder joint on C42 does not make contact with the large regulator fin on U18. The + side of the polarized caps is indicated with a bold black line or a black dot.

- J1 is an ISP jack, and can be populated with any .1" breakaway pins. This jack is only used if you need to flash the firmware.

- Use a socket for the main Atmel processor.

- Make sure that all pots are straight before soldering them into your PCB. If they aren't straight, they will not be able to fit through the front panel.

INTERNAL INSTALLATION

1 Begin by cutting out the drill template around the outside edge. The template shows the front panel, as well as where the PCB will be. Each pot and switch centerpoint is marked with a black circle. These holes should be .25" in diameter. There are 6 mounting holes indicated by a crosshairs pattern. These holes should be .125" in diameter. Position the template on the synth so that the PG-800 Mini PCB sits directly to the right of the JX front panel PCB as shown below. The two should not touch. When the drill template is in position, tape it down and use a center punch to mark the hole locations. BE SURE THAT YOU HAVE PCB CLEARANCE BEFORE YOU DRILL!

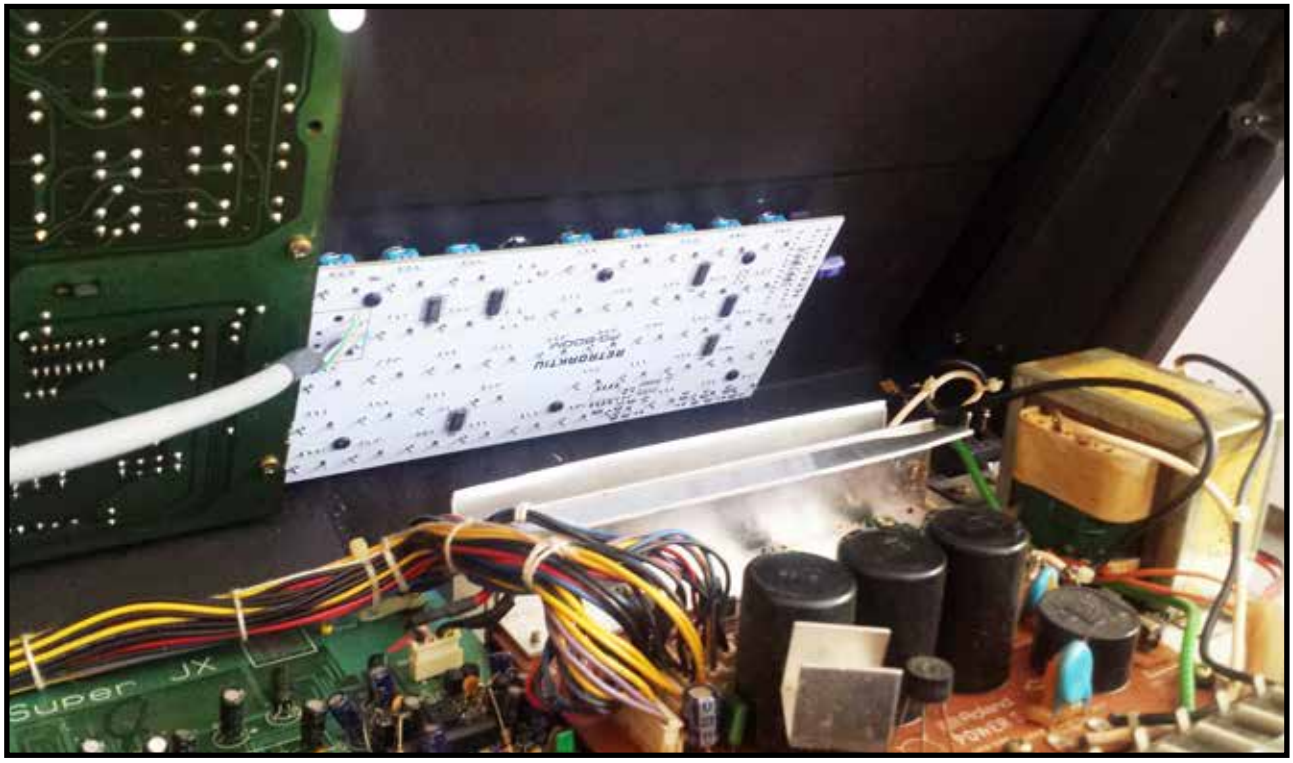

FIGURE 1 - PG-800 MINI installed in a Super JX

2 Now that the drill template is in position, 50 holes must be drilled. There are two ways of doing this. The recommended (hard way) to do this is to remove the top half of the JX from its base by unscrewing the 4 hinges that attach the two halves of the synth. This requires that the main boards be unscrewed, so that the hinge screws can be accessed. Disconnect any wires attaching the top and bottom halves of the synth. Now the top half of the synth can be placed on a drill press or other drilling jig (stabilizing the chassis is of key importance when drilling.). A drill press will generally yield the best results (fewer burrs, cleaner cut) than using a hand drill. The holes will be cleanest if there is something solid like scrap wood etc. under the surface you are drilling on.
The second way of doing this is by using a hand drill and carefully drilling all of the holes by hand. Obviously drilling into the power supply board or leaving any metal shavings in the synth is to be avoided. Always vacuum out the synth if there are any bits of metal left after drilling.

3 Deburr all holes, especially on the top surface of the synth. Burrs on the top surface will show up as bumps under the graphic overlay, which is unsightly. When deburred, test fit the PCB through the holes to be sure of clearances and widen any holes where the pots are chafing the front panel. When you are happy with the fit, carefully stick down the graphic overlay. Be sure that it is straight, and that all of the holes align, especially the 6 mounting holes.

4 When the overlay is placed, use the screws and spacers to create 6 standoffs as shown in the figure below. These standoffs are what the PG-800 Mini will mount to. This must be done with the graphic overlay applied to the panel. Insert the black screws (through the front panel facing side) into the 6 small mounting holes in the panel. From the underside of the front panel, screw these into the threaded standoffs included with the kit. Do this for all 6 mounting holes.

Figure 3 - Standoffs for mounting PCB

Figure 4 - Mounting PCB to panel

5 Use the remaining 6 screws to secure the PCB to the panel as shown in Figure 4.

6 Try closing the lid of the JX. Be sure that the PCB is not too close to the transformer or the power supply heat sinks. Some Super JX synths have a taller heat sink. The heat sink can be trimmed or reshaped at the top to allow for a bit more clearance. This isn't necessary, but it serves as insurance that the bottom of the PG-800 Mini can't make contact with the heat sink if the lid is able to open and close. Trimming or bending the heat sink should only be done in a Super JX, and only if necessary. In all installations, it is recommended that you use cardboard to shield any metal surface (such as the transformer, transformer leads, or heat sinks) directly below the PG-800 Mini. Use a square of cardboad, then cut squares out of the corners, which will allow the cardboard to be folded into a 3, 4, or 5 sided cube. Secure this in place over the PSU, exposed transformer leads, etc. Cable ties or tape can be used to hold the protective barrier in place.

Figure 5 - Protecting from shorts

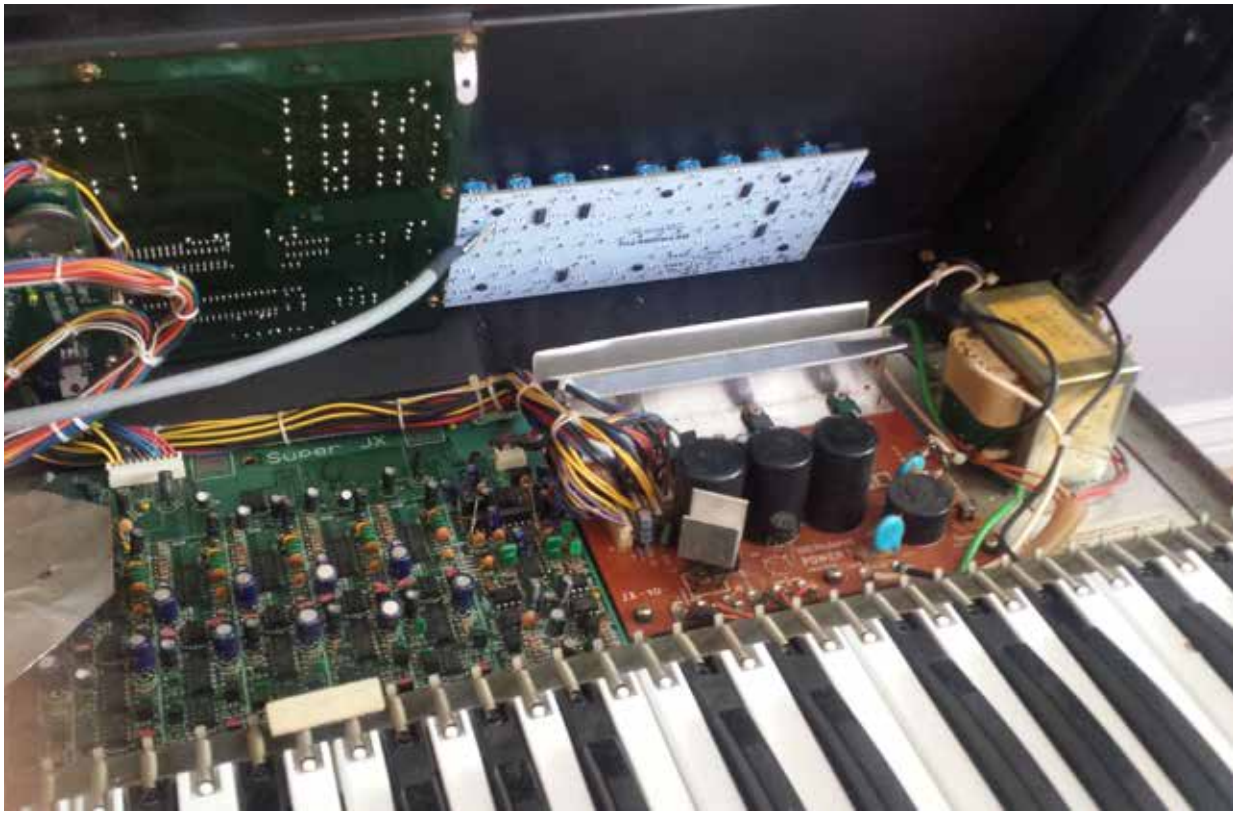

Figure 6 - Super JX with heat sink modified. (L shape bent into fin, and rear fin trimmed by 10mm)

7 When you have secured the PCB to the panel and ensured a good fit, with plenty of clearance, use the 5-pin multi-conductor wire and connect the 5 wires from the PG-800 Mini to the JX as shown in the wiring diagrams. The 5 connections on the PG-800 are indicated on the top side of the PCB where the DIN jack terminates. These 5 connections must be connected to the Jack PCB on the Super JX, and the Main PCB on the JX-8P. The recommended spot to solder to is directly below the DIN jack on the JX. Be sure that your pin orientation is correct when you solder. (Don't solder the wires in the mirror image where pin 1 is actually pin 6, etc.) Use figures 8, 9, and 16 to locate the correct pins to solder to. The diagram shown in figure 16 shows the pin numbering of the female DIN jack from the front. Remember that the numbering will mirror that if looking at the male DIN cable from the rear. Verify this before soldering anything. If the wiring is mirrored, it will likely destroy the PG-800 Mini. Mirroring would cause +15V from the JX to be routed to the PG-800's ground and destroy the Atmega processor. Triple check your connections.

WIRING DIAGRAMS

The PG-800 MINI is connected to the JACK PCB of the JX synth via 5 wires. Match the connections shown in the following diagrams with the connections marked on the PG-800 Mini.

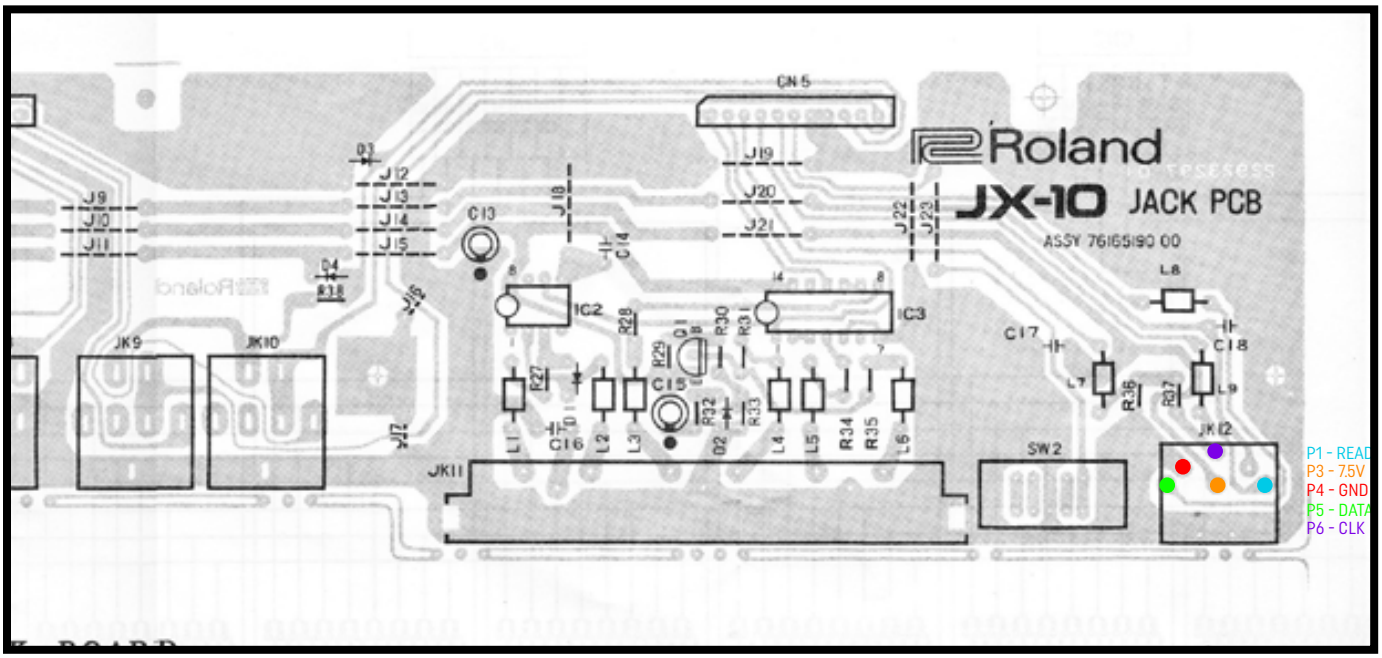

Figure 7- Super JX Wiring Points

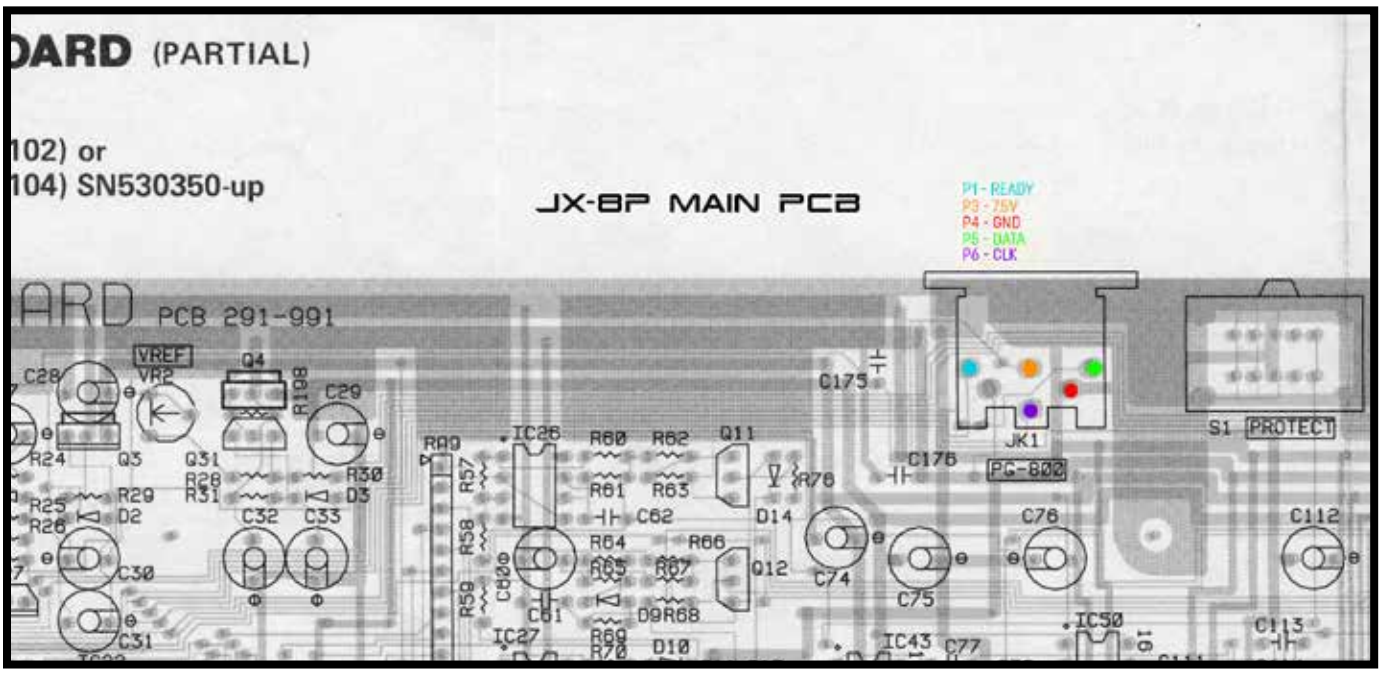

Figure 8- JX-8P Wiring Points

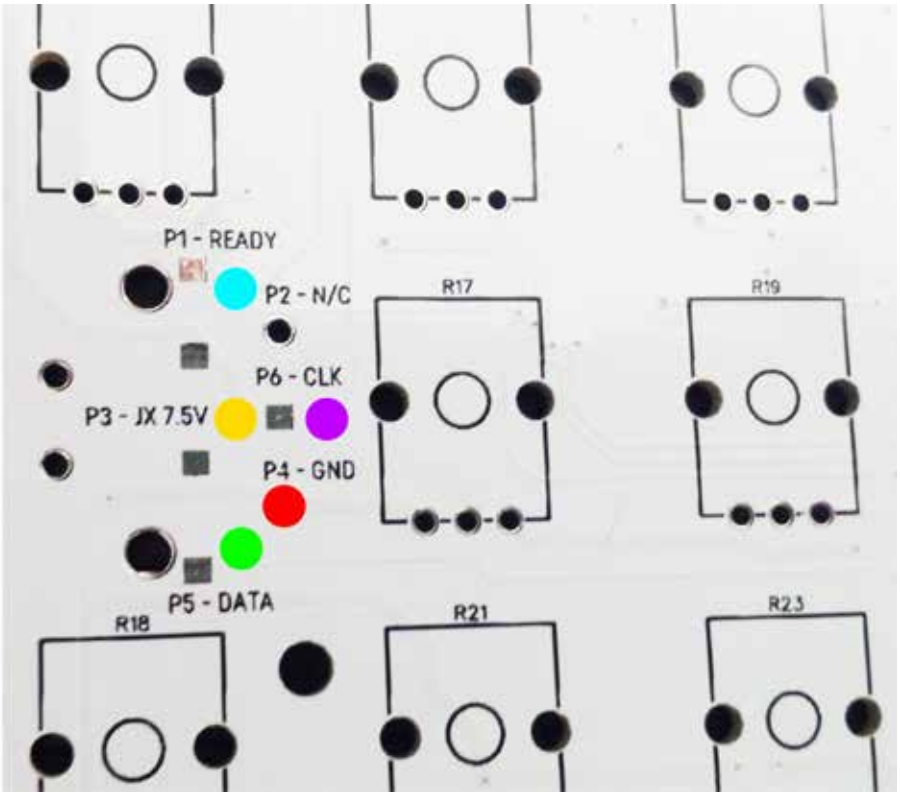

Figure 9- PG-800 Mini Wiring points (Top view of PCB)

Figure 10 - Wire from PG-800 Mini to Jack PCB of Super JX

DESKTOP CHASSIS ASSEMBLY

1 Start with the top piece (the front panel) of the enclosure. Apply overlay before this step. Use the screws and short standoffs included and with the panel side facing down and create 6 male standoff posts as shown in Figure 11.

Figure 11 - Top piece of enclosure (with panel applied) with 6 standoffs

2 Fit PCB onto standoffs as shown below.

3 Secure the PCB to the standoff posts using the long hex standoffs.

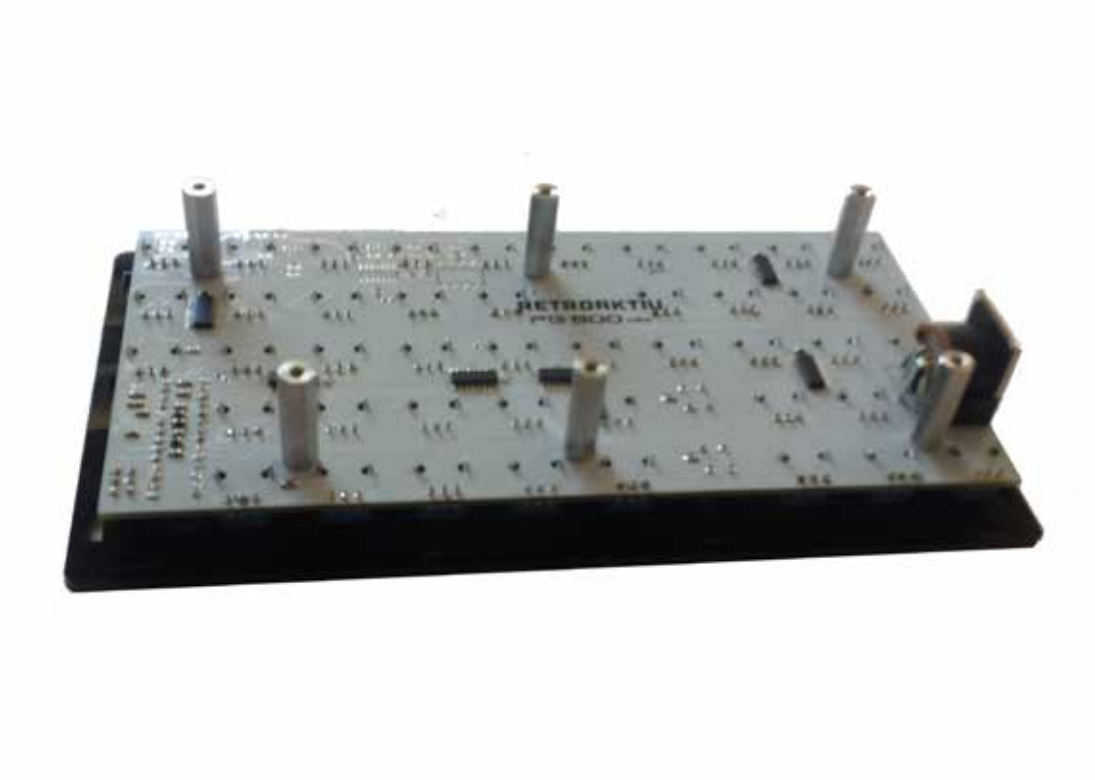

Figure 13 - PCB secured using long standoffs

4 Attach sides. Short sides are keyed and only fit in one way.

Figure 14 - Sides attached

5 Secure the bottom piece of the enclosure using the remaining 6 screws. Don't overtighten the screws. Apply the 4 non-slip feet and the enclosure is finished.

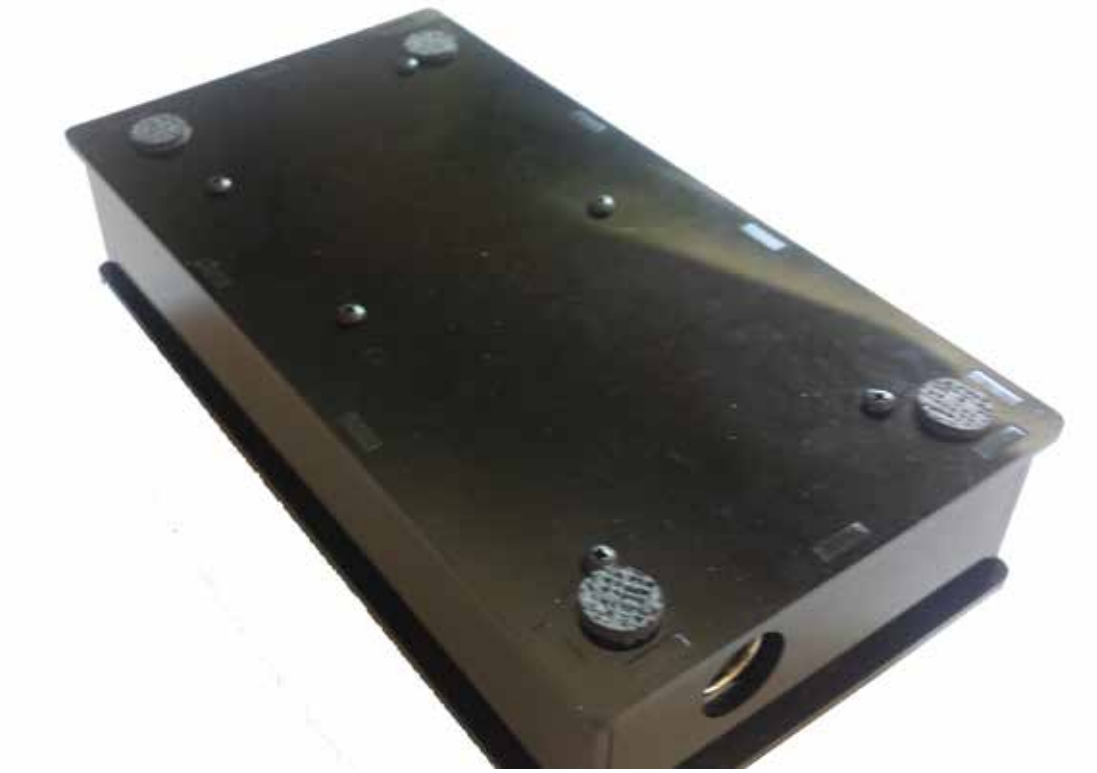

Figure 15 - Bottom secured

BUILDING CONNECTOR CORD

The PG-800 MINI connector cable only uses 5 pins of a 6-pin connector. Pin 5 of the connector (+15V on the JX) should not be connected on either side of the cable. Pin 1 should go to pin 1, pin 2 to pin 2, and so forth. Be sure that you have threaded the cable through the rubber connector sleeves BEFORE you do any soldering. Otherwise you won't be able to reassemble the connector. Pin numbers are marked on the inside of the pin connector.

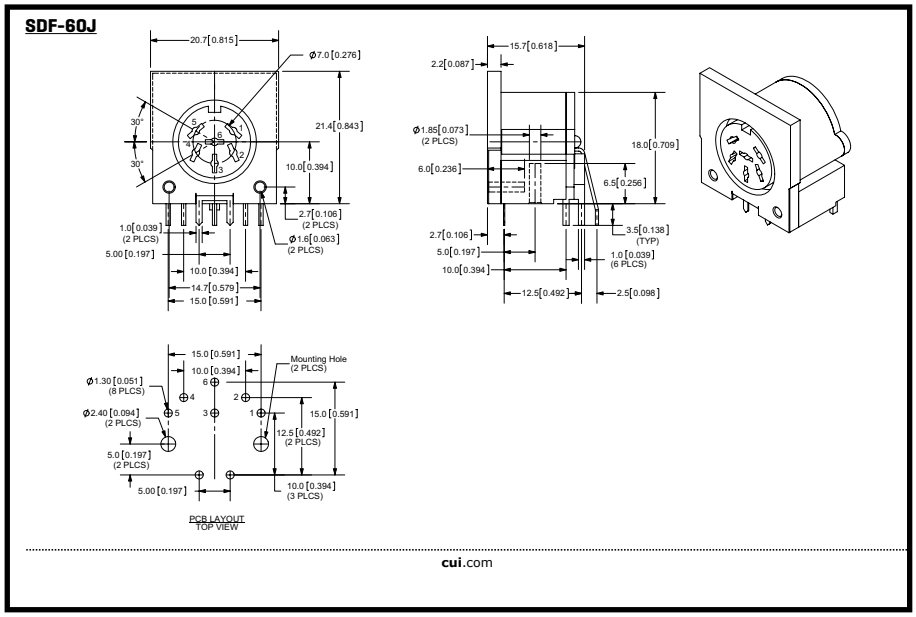

Figure 16 - 6 pin DIN connector diagram (Courtesy of CUI.com)

PARTS LIST LINKS

Full Mouser parts lists are available for this project. To access the project cart, enter the following URL:

http://www.mouser.com/Tools/projectcartsharing.aspx

Then enter the access code corresponding with the project build you want to order:

PG-800 Internal - 792ad29e9f

PG-800 Desktop - 86c52ef1a6

THANK YOU

Thank you for using Retroaktiv products. Please visit us on the web at www.RetroaktivSynthesizers.com for product updates, new products, or to contact us. Enjoy the PG-800 Mini!