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Perkins Electro-Acoustic Research Laboratory. Hand-Builders of Fine Music-Reproduction Equipment

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Iso-Socket Installation Instructions

The Pearl Iso-Socket is available in both chassis-mounting and (printed) circuit board configurations, either of which can be used in vertically- or horizontally-mounted applications. Iso-sockets can be used in new construction and retrofit applications where an old socket must first be removed.

This instruction provides installation information for all configurations as follows:

Sec. 1 - Chassis-mounted, vertical installation (Go back):

Seen in Fig. 1 is the Iso-socket in 125% cross-section and in Fig. 3 overleaf the mounting hole pattern into which it fits, shown to-scale

Note that this pattern is exactly that used in the great majority of conventional, chassis-mounting tube sockets. Because of this, retrofitting Iso-sockets is a simple matter as far as existing metal work is concerned.

All one need do is carefully unwire the existing socket, drill out the rivets holding it to the chassis, tidy up the chassis, screw in the Iso-socket such that the gap between pins 1 and 9 is in the same position as the original and re-wire. It's a good idea to make a pictorial of the original wiring as this will greatly aid the re-assembly process, memory not being all that reliable here.

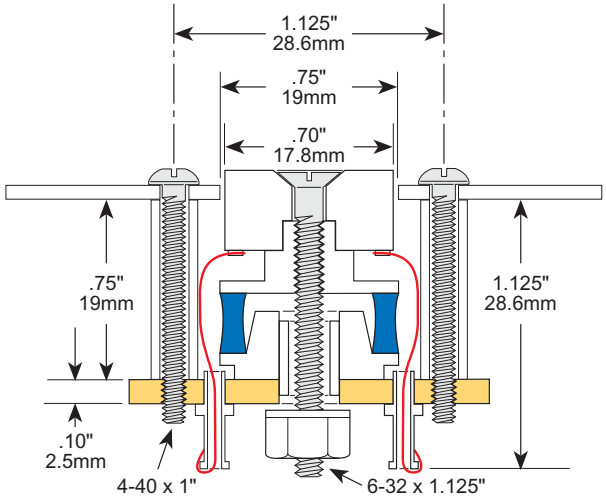


Fig. 1. The Pearl chassis-mount Iso-socket is shown above in 125% cross-section. Note that it fits straight into the holes used by the great majority of conventional 9-pin chassis-mount sockets thus making retrofit into older equipment a simple matter.

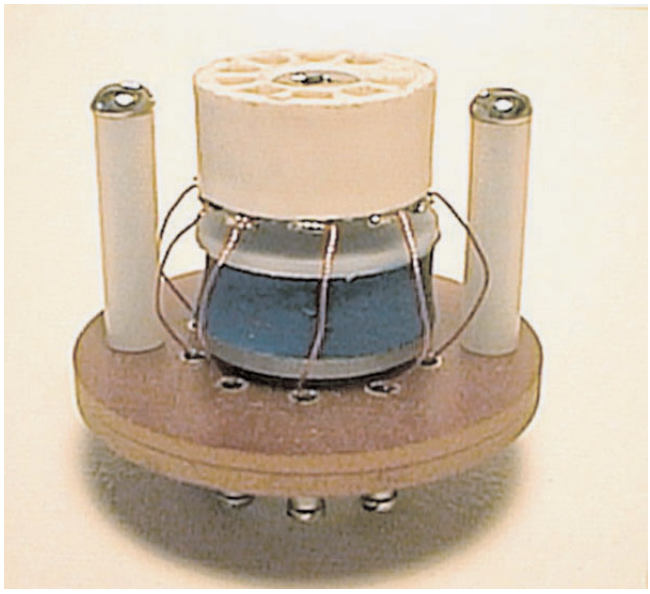


Fig. 2. The Pearl chassis-mount Iso-socket is shown above. The mounting pattern into which it fits is shown in Fig. 3. overleaf.

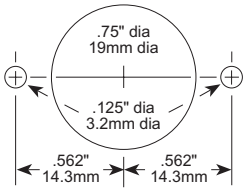


Fig. 3. The mounting hole pattern into which the 9-pin chassis-mount Iso-socket fits is shown above. Note that this pattern is the same as that used by the great majority of conventional 9-pin chassis mount sockets and on that account retro-fitting Iso-sockets into existing equipment is very straightforward

Sec. 2 - Chassis-mounted, horizontal installation (*Go back*):

Because the vibration isolating/absorbing elastomer used in the Iso-socket is of low and temperature sensitive durometer—durometer being a measure of elastomer softness—unsupported, cantilevered tubes mounted into horizontally fitted Iso-sockets can droop with both time and temperature. Potential solutions to this problem are two:

1 - the use of a much harder elastomer
2 - arrangement of support for the cantilevered tube.

Because option (1) will essentially ruin the vibration isolation characteristic of the Iso-socket it is not viable.

Option (2) requires the use of either:

a) a temperature resistant, low durometer material or,
b) fitting and subsequent support of a Pearl tube cooler.

Low durometer, high-temperature resistance, and long working-life being, at this time, something of a mutually exclusive set of elastomer characteristics, option is (a) not viable and we are left to work up another method of solving the problem.

By fitting and subsequently "softly supporting" a Pearl tube cooler an elastomer used to support the tube/cooler will not have to withstand the sorts of temperatures encountered if the elastomer was placed in direct contact with the hot envelope of the tube. This is a viable solution and one that we have implemented. While we can supply .50" dia. x .25" thick "pads" of elastomer suitable for supporting a cooler-fitted tube, arrangements for mounting the pad are very much application-specific and we must therefore leave the development of such arrangements to the installer.

Sec. 3 - Board-mounted, Vertical installation (*Go back*):

a) new construction

i) printed circuit board

Installation of Iso-sockets onto new PCBs is straightforward. The socket is easily glue mounted into the .250" dia center hole specified in the PCB pad immediately below. Loctite 495 is the ***low viscosity, fast setting*** cyanoacrylate glue recommended in this application.

Referring to Fig. 1 it can be seen that a .250" dia x .050" long shoulder extends from the bottom of the Iso-socket's mounting surface. This automatically centers the socket atop the .250" dia. hole in the substrate, leaving only the matter of correctly indexing the socket with the PCB's pads. Note and maintain the clearance between the self-locking nylon nut and the bottom side of the substrate, as shown in Fig. 1.

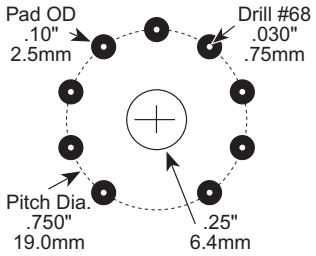


Fig. 4. The recommended PCB pad for 9-pin Iso-sockets is shown above at 125% scale.

Fig. 5. Shown above is the (printed) circuit board mounting version of the Iso-socket along with the recommended Loctite 495 mounting glue. Note the socket's tinned flying leads.

Having successfully indexed and glued the Iso-socket onto the substrate it remains to thread the nine, tinned, flying leads through the correct holes, loop the leads to allow the socket body some latitude in movement and solder the leads to the board.

This is illustrated in Figs. 6 & 7.

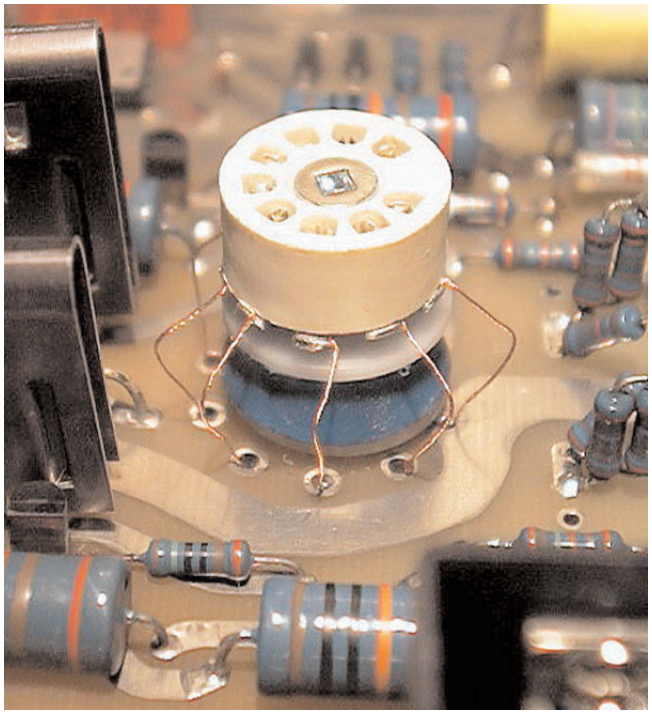


Fig. 6. Here the Iso-socket is shown correctly indexed and glued onto the PCB substrate. The tinned leads have been looped and are ready for soldering to the PCB's pads. (*Go back to Fig. 14*)

Fig. 7. The installation is here shown completed. Upon completion of soldering be ***absolutely certain*** to carefully and thoroughly clean ***all traces*** of solder flux from the board. Acetone is recommended for this purpose.

SEC. 3 - BOARD-MOUNTED, VERTICAL INSTALLATION (*Go back*):

a) new construction

ii) point-to-point wired circuit board

To terminate the flying leads of Iso-sockets installed onto point-to-point wired circuit boards we recommend the use of staked turrets.

The turrets we use are one style of many made by Keystone Electronics of Astoria, NY, USA and are part no 1540-2. To stake them into holes drilled with a number 42 drill we use an automatic center punch made by Eclipse of England.

The punch and turret are shown to the right.

Click here to access Keystone's website and once there type < 1540-2 > or < 1540-3 > into the search box on the lower right of the page to see which Keystone distributors have stock. Note that the 1540-2 part is suited to fitting into substrates that are .062" thick while the 1540-3 is suited to substrates .093" to .100" thick.

Click here to pull a Google web search for the criteria < "automatic center punch" >.

Click here to for Electrosonic's page listing the Eclipse punch here described.

Click here for Amazon's page showing General Tools automatic center punch.

The substrate drill pattern for the turret-terminated Iso-socket is shown at 125% scale in Fig. 10 .

Fig. 8. Shown above are the Keystone, Astoria, NY solder turret and Eclipse, England automatic center punch we use to terminate the flying leads of our Iso-sockets when fitted onto point-to-point wired circuit boards. See Fig. 9 for an enlarged view of the turret

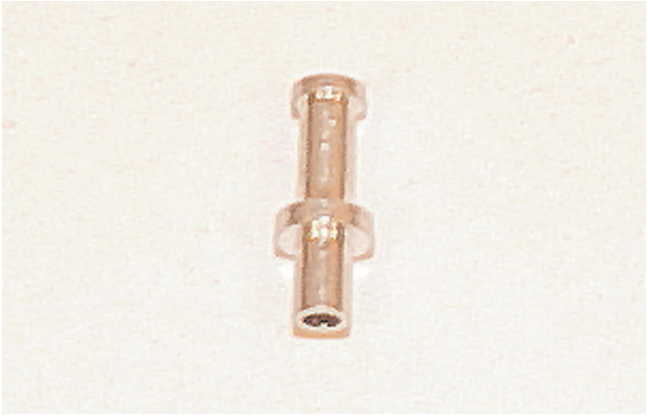


Fig. 9. Shown above is the Keystone 1540-3 turret, suitable for use with a .093" to .100"thick substrates.

For details regarding the mounting of Iso-sockets to substrate see the *previous section*

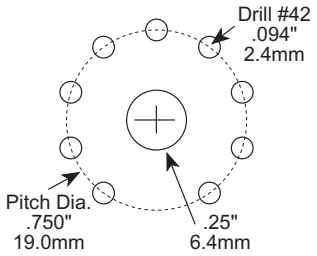


Fig. 10. The drill pattern for turret-terminated Iso-sockets is shown above at 125% scale.

SEC. 3 - BOARD-MOUNTED, VERTICAL INSTALLATION (*Go back*):

b) retrofit to printed circuit board

In this section it is assumed that an existing socket must be removed from a printed circuit board before the Iso-socket can be installed.

While there are various methods to remove the existing socket, you need to know that there are several ways that you can cause both physical and electrical damage if great care is not exercised.

Many designs of the last few years have been hybrids, using both tubes and solid-state devices—bipolar, FET, and MOSFET. While bipolar devices are slightly more tolerant of static discharge than (MOS)FETs, it's good practice to treat all devices with the same care.

Quite often the base or gate of a device will be connected directly to one of the tube elements, and being so wired is subject to static assault from any procedures used to replace the socket. Therefore, get the schematic of the piece of gear you are planning to modify and see if the possibility of damage to solid-state devices exists. If it does, simply use standard, static precautions and, additionally, wire a *temporary* jumper from gate to source or from base to emitter of any devices connecting directly to the tube. ***Remember to remove the jumpers when you are finished…***

For those unfamiliar with the desoldering of multi-legged devices, the simplest and safest approach is to find a reputable company in your area doing board-level computer repairs. They will be replacing multi-pin, static-sensitive devices every day and can easily wire in the temporary anti-static safety jumpers, remove your old sockets, re-route any PC traces that run directly under the original socket, and fit the Iso-Sockets.

If you want to do the job yourself, the easiest way is to snip the leads off the socket from the component side of the PC board, thereby freeing the plastic body of the socket. From there it's a simple matter to individually unsolder the remaining stubs of socket lead. Use solder wick or a solder-sucker tool to prevent damage to the PC board by the inadvertent application of too much heat. If the equipment is laid out so that you can't get at the socket leads from the top, you'll have to do the job the old-fashioned way. You'll need at minimum some solder wick and a manual desoldering pump is a great help.

Remove as much of the joint as possible using the pump and use the wick to pull out the rest. When you have cleaned out as much solder as you can, use a pair of needle-nosed pliers to grasp the socket pin in question and re-heat the joint. When the remaining solder melts move the pin away from the side walls to the center of the hole. Either hold it there until the PC pad cools off, or wiggle it slightly so that any joint that's made by the remaining solder is a cold one and therefore mechanically weak. Repeat this procedure for all of the pins. Having done so, just a little luck will result in the socket pulling free with only a gentle, wiggling tug. If not, find out which pins are still stuck, and repeat the "cold joint, wiggling procedure" until the socket can finally be pulled free of the PC board. ***Do not use excessive force***, as this can result in the removal of the through-plating, the via,between the top- and bottom-side traces on a double-sided PC board. Sometimes this will happen regardless, so ***always solder the flying leads from the new Iso-socket onto the PC pads on both sides of the board.***

Clean the board thoroughly with a solvent such as acetone prior to fitting the new sockets. After installing the Iso-sockets remember to remove the anti-static, safety jumpers.

To Get Started You'll Need:

- Electric drill with 1/4˝ bit
- X-Acto knife or single-edge razor blade
- A cleaning solvent, such as acetone, straight alcohol, freon tape-head cleaner, etc.
- Small-tip soldering iron
- Teflon insulated wire-wrap wire
- Small screwdriver
- Some Q-Tip swabs with paper or wood shafts

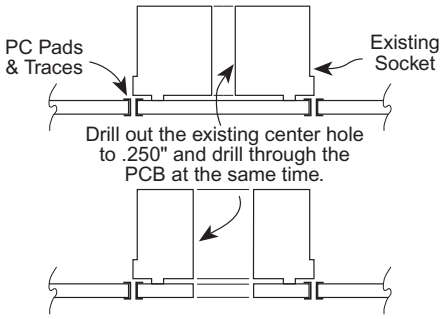


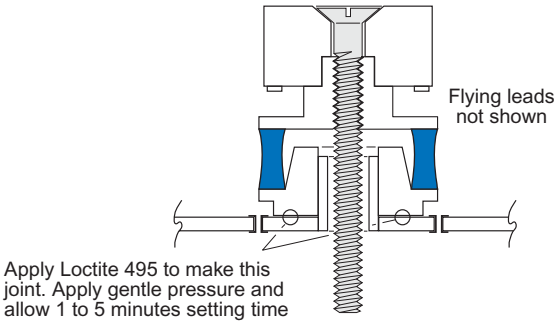
Fig. 11. Using a .25", 6.4mm drill, drill through the center hole in the existing socket and on through the PCB. Note that as a conventionally sharpened drill bit exits the PC board, the board will tend to "climb" the bit. Be careful not to let this happen.

Once the PCB has been drilled through you can remove the socket by any of the methods earlier described.

That done, any PCB traces that have been drilled through or upon which the Iso-socket will sit when glued in place must be "moved" which is to say they must be cut, peeled off the board and electrically re-routed around the base of the socket using Teflon™ insulated wire wrap wire.

Finally, de-burr the hole on both sides.

Fig. 12. Using acetone, clean the Iso-socket base and the area around the hole you've just drilled free of grease, flux and other contaminants. Carefully apply a ***small*** amount of Loctite 495 to the abraded base of the Iso-socket, ***do not*** try to spread the glue, its viscosity is very low and it readily spreads to a thin, even film once the socket base is positioned in contact with the PCB. Because '495 is a moisture-curing adhesive, it will cure faster if you exhale heavily on the glue-covered surface before assembling the Iso-Socket onto the PC board. ***Be sure*** to orient the gap between pins 1 and 9 on the socket with the same gap in the ring of solder pads before you allow the socket's base to come in contact with the board. Once you've set the socket into the board give it a small twist to the left and then back to the right to help spread the glue. Work quickly and carefully, you don't have much time . . . ***Be sure*** you have the indexing correct . . .



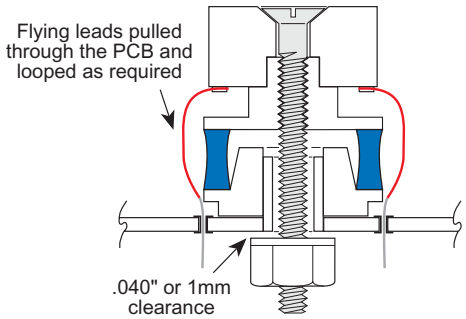


Fig. 13. Having accurately set the socket into the hole in the PCB you can either hold it in place by hand for a minute of two while the glue dries or—once you are somewhat practiced with this procedure—you can screw the self-locking, nylon nut onto the the socket's through bolt and, overtightening it slightly to compress the elastomer, use it as "clamp" to hold the socket down while the glue dries.

Once the glue has hardened adjust the nylon nut to have about .040" or 1mm between its shoulder and the bottom side of the PCB. Note that this nut is only a pullout stop, ***it is not in any way intended to hold the socket onto the PCB.***

Fig. 14. Insert the tinned, Litz flying leads through the PCB pads, being sure to loop them to provide slack so that the socket can move to accommodate tube insertion and removal. For illustration of this see Fig. 13 above or *jump back* to Fig. 6, noting that '6 has a hyperlink that will bring you back here.

Once the leads are properly in place and formed go ahead and solder them in, being certain to solder both sides af the PCB to cover off the possibility of an inadvertently damaged via between the component and solder sides of a double-sided PCB causing an open, or, worse, an intermittent connection.

Remember to remove all temporary, anti-static jumpers you might have put in place.