



Thank you for purchasing the Highlander iP-1 Integrated Pickup System.

At Highlander we appreciate that it takes years of practice, dedication and personal growth for an acoustic musician to develop the skills and spirit necessary to express themselves fully through their music. Through years of practice, dedication and personal growth our highly skilled team is crafting amplification equipment for these musicians that is so pure, we can all fully appreciate and be moved by the true spirit of their music.

Built to take the rigors of the road, you can rely on a Highlander.

For more information please visit our web site.

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870 Capitolio Way, Unit 3, San Luis Obispo, CA 93401

THIS INSTALLATION SHOULD ONLY BE UNDERTAKEN BY AN EXPERIENCED LUTHIER OR A GOOD WOODWORKER WITH EXPERIENCE WORKING ON ACOUSTIC STRINGED INSTRUMENTS.

Using the wrong techniques or tools could result in permanent damage to your guitar. Highlander is not responsible for any damage resulting from the installation of this pickup system.

Parts Included:

Qty. Description

- 1 Pre-wired iP-1 Pickup/Preamp Assembly
- 2 Battery Holder Clips for 9 Volt Battery
- 2 Pieces of Self Adhesive Velcro® for cable strain relief

Tools Required:

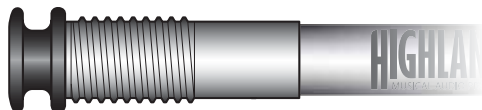
- 1) HAND DRILL or ELECTRIC DRILL (cordless preferred)
- 2) MILLING MACHINE or ROUTER AND SADDLE SLOTTING JIG
Used for routing the groove
- 3)* 17/32" (13.5mm) DRILL BIT, RELIEVED ON RAKE EDGES
Used for drilling guitar end block for the strap jack
- 4)* 9/16"-12 TPI NC TAP & MACHINIST'S TAP HANDLE
Used for threading end block to accept the strap jack
- 5)* 1/16" (1.6mm) DIAMETER BALL ENDED END MILL
Used for routing the groove in the bottom of the saddle slot
- 6) 3/32" (2.5mm) TWIST DRILL BIT
Used for drilling both holes in the saddle slot for the pickup
- 7) MILLING MACHINE or DISC / BELT SANDER or
MACHINIST'S VISE AND FILE. STRAIGHT EDGE
Used for reducing saddle height to
compensate for the pickup thickness

* The following installation tools are available from Highlander:

- 17/32" drill bit
- 9/16"-12TPI tap bit
- 1/16" router bit

These tools are available individually or as the 'iP-installation kit'

About the Output Jack



The iP-1 is turned on when a guitar cord is plugged in and turned off when it is unplugged, saving the battery.

This innovative screw thread is designed to stay in place regardless of variations in the end block as it expands and contracts due to humidity and temperature changes.

By eliminating the typical machine thread and nut, our preamp will never come loose and require the awkward task of tightening a nut at the end pin block inside the guitar.

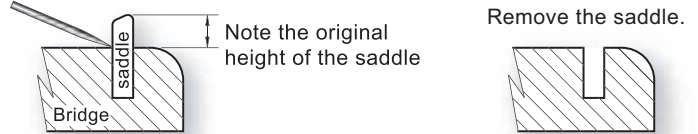
The elegant strap button holds the strap securely and will never untwist or loosen.

iP-1 INSTALLATION

The information presented here has been greatly enhanced over the years by listening to the craftsmen who have installed countless numbers of these pickups. Thank you.

1 Preparation

- ▶ Remove the strings. Lightly scribe a line on the saddle or make a note of the saddle height. This is useful as a guide when reseating the saddle at the original height.



2 Modification

- ▶ Drill a 17/32" (13.5mm) hole. Be sure to drill at 90° to end block. Use a relieved bit to avoid wood tear out or end block splitting.

One way to drill a clean hole is to ream out the hole with a tapered reamer until the drill bit goes 0.1" (2.5mm) into the hole (through the side). Then drill the hole through the block. Note: Some people run the drill in reverse.

- ▶ Thread with a 9/16"-12TPI tap (at 90° to end block).

- ▶ Prepare the bridge for the pickup. See details of 'Preparing the Bridge' below.

5 Install Pickup

See details of the pickup installation on the next page.

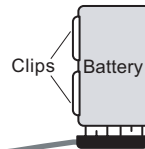
3 Install Preamp

- ▶ Pass the pickup and battery snap through the end-pin hole.
- ▶ Insert the preamp into the end-pin hole, apply a little wood glue (like Elmers') to the thread and screw the preamp into the end-pin hole by hand. Use a chamois or rubber grip if necessary. Do not use pliers or anything similar as the strap nut may be damaged.
- ▶ Turn the wires inside the guitar to prevent twisting. Untwist all the wires before continuing. Excessive twisting of the black pickup cable may cause hum.

4 Install Battery

- ▶ Thoroughly clean the area. Push both clips onto a 9V battery and attach the connector.
- ▶ Peel the backing off the clips and press in place on the back of the guitar.

Applying a light coat of lacquer to the area where the battery clips are to be attached significantly improves adhesion. Wait until the lacquer is fully dry before applying the clips.



Excess cable is held in place on the back of the guitar with Velcro®. Cables should be loosely coiled. The Velcro® ensures the cable will not be pinched. AVOID SHARP BENDS, KINKS or TWISTS IN THE CABLES.

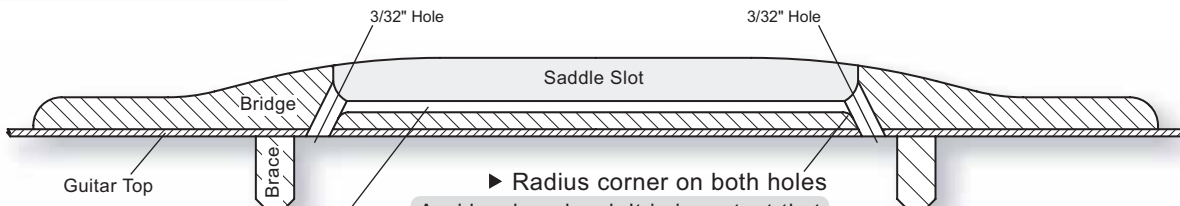
The battery position shown in this diagram is one possible placement option. The battery can also be mounted on the neck block. The actual position will depend on the type of instrument involved, and the needs of the musician using it.

Preparing the Bridge

The performance of the Highlander Pickup is optimized by embedding it in a groove in the bridge. This 'couples' the pickup to the sound board of the guitar capturing all of its energy, vitality and nuances.

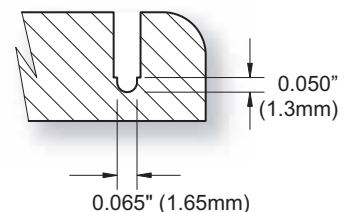
2a Drill Two Holes for the Pickup

- ▶ Drill two 3/32" (2.5mm) holes at an angle as shown below. Being careful not to damage the Brace (or other parts of the structure), try to get as close to a 45° 'hole angle' as possible.



▶ Radius corner on both holes
Avoid a sharp bend. It is important that the pickup is bent around a radius. If a 90° 'hole angle' is unavoidable then make the radius as large as possible.

Groove Dimensions



2b Route the Pickup Groove

- ▶ Route a Groove for the pickup using a saddle router jig and router with a 1/16" (0.0625") (1.6mm) ball ended cutter. The groove should be 0.05" (1.3mm) deep. The groove should extend from one 3/32" hole to the other, it should be smooth and flat. Any irregularities in the groove may cause string imbalance.

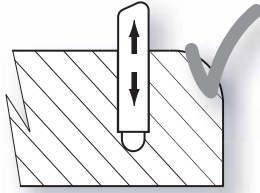
Installing the Pickup

Consistent String Balance is achieved with this 'Two Hole' installation.

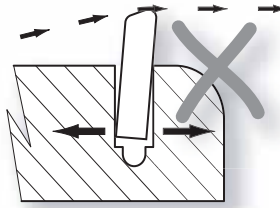
The consistent string balance achieved with this 'two hole' installation technique is due to the mechanical symmetry of having the same type of bend at each end the pickup. This causes the mechanical forces such as sound vibrations that are acting on the pickup to be well balanced throughout the pickup.

5 Check the 'Saddle Fit': This is important information for the correct operation of all under saddle pickups.

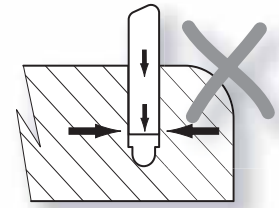
- The saddle should move freely up and down in the saddle slot.



- **Too loose** and the saddle can bind under string tension.



- **Too tight** and the saddle may not be fully seated.

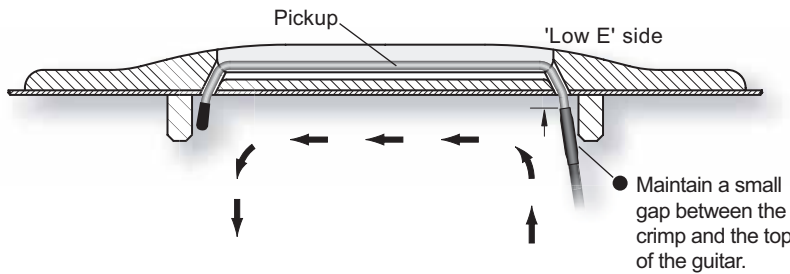


- To help maintain the 'Saddle Fit' during variations in humidity and temperature, lightly wax the bridge and the inside of the saddle slot. Be sure to remove any excess wax from the slot and especially the groove.
- Polishing the sides of the saddle helps create a smooth, sliding fit.

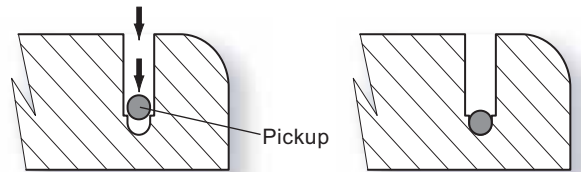
Note: These types of 'Saddle Fits' may sound o.k. acoustically, however, the saddle needs to be in full contact with the pickup for a good amplified sound and to insure the best acoustic tone and sustain.

5a Install the Pickup in the Groove

- ▶ Pass the pickup up through the hole at the 'Low E' side of the bridge and then down through the hole at the 'High E' side of the bridge.

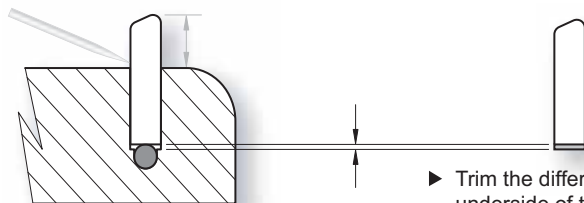


- Maintain a small gap between the crimp and the top of the guitar.



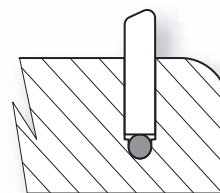
- ▶ Using the saddle or a piece of wood, apply just enough pressure to seat the pickup in the groove.

5b Trim and Install the Saddle

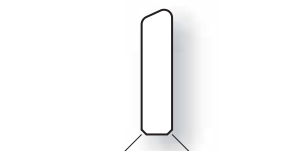


- ▶ Measure the difference in saddle height using either the line scribed or the height measured in step 1.

- ▶ Trim the difference from the underside of the saddle. The underside of the saddle must be really flat. Check with a straight edge.



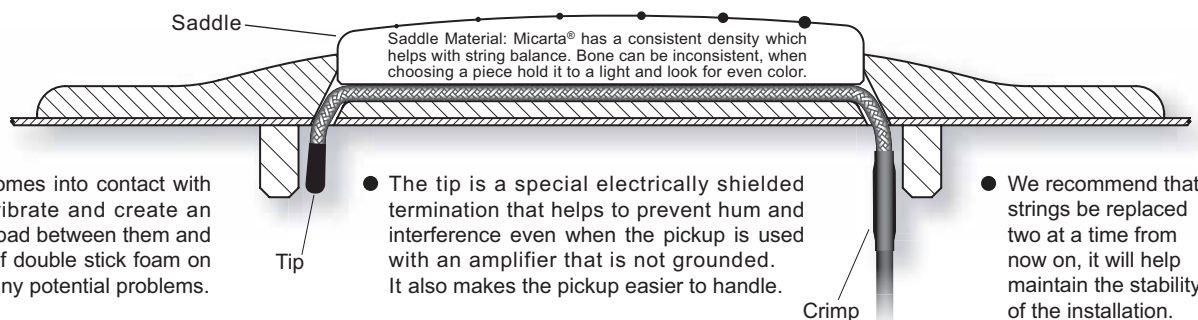
- ▶ Check the saddle height.



- ▶ Once the original saddle height is achieved, chamfer and deburr the bottom edges of saddle to help prevent binding.

5c Restringing

- ▶ Press the saddle down firmly on to the pickup and replace the strings. Start with the 'D' String. While tensioning it, press the saddle back (away from the sound hole) and down to prevent the saddle from binding in the saddle slot. Next, replace the 'G' String then the rest of the strings. Plug in and check the string balance and sound quality of the installation.



- If the tip or the crimp comes into contact with the brace they could vibrate and create an unwanted sound. A soft pad between them and the brace (like a piece of double stick foam on the brace) can prevent any potential problems.

- The tip is a special electrically shielded termination that helps to prevent hum and interference even when the pickup is used with an amplifier that is not grounded. It also makes the pickup easier to handle.

- We recommend that strings be replaced two at a time from now on, it will help maintain the stability of the installation.

The pickup will not function correctly if the tip is placed under the saddle, the tip must be inserted in the hole as illustrated above. Removing the tip of the pickup or the use of solvents, super glue or lacquer on the pickup will compromise its operation and will void the warranty.