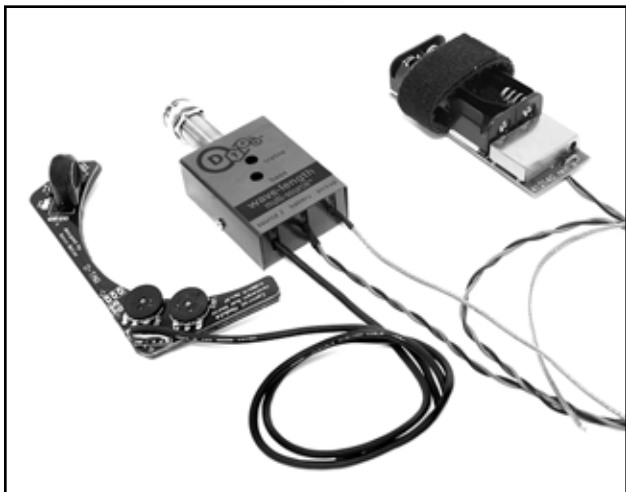


www.dtar.com

D-TAR – Installation Instructions

Multi-Source™

Pickup and Microphone System



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Important Notes – Read First

1. Although it is possible for a skilled end user to install this pickup system, for optimum results, we recommend installation by a professional luthier.
2. Avoid any rough handling of the pickup. Bending, kinking or other physical damage could cause problems with string balance and output level.
3. For optimum performance and balance, the bridge slot must have a clean and flat bottom surface. It should be free of overspray or debris and be a minimum of 1/8" deep with 3/16" or more being preferred. The proper depth slot helps avoid excessive saddle tilt and maintains better saddle contact with the pickup. A minimum of 50% of the total saddle height must be below the top of the slot.
4. Check the saddle-to-slot fit before you begin work. If the saddle is too loose in the slot, it will cause excessive saddle tilt and will usually result in poor coupling to the pickup, low output and unbalanced string response. It is advisable to replace the saddle if it is too loose.
5. The last 1/8" at the end of the pickup is not active. At least 1/4" of saddle must project beyond the E strings for the pickup to produce a balanced string response. If your guitar has inadequate saddle slot extension beyond the outside strings, it will be necessary to drill a small horizontal hole at the appropriate end of the slot to extend the inactive region of the pickup beyond the saddle.

It is important to avoid disrupting the floor of the saddle slot when doing this. To protect the slot, lay a narrow slotted screwdriver under the tip of the drill bit before drilling the horizontal hole. (refer to Fig. 1)

6. The bass trim pot is pre-set for 3dB of boost, and the treble trim pot is set flat. You can adjust these to your personal preference through the two holes on the top cover of the preamp.

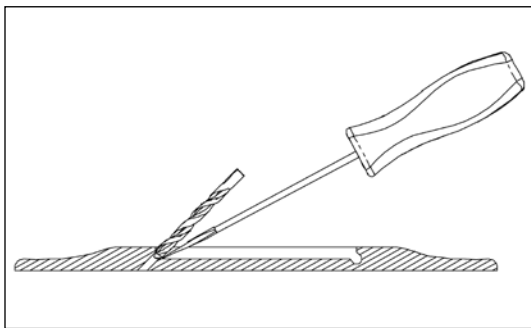
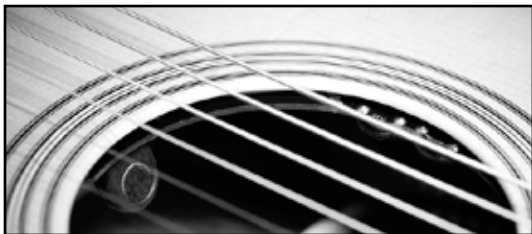


FIGURE 1

Introduction



The Wave-Length Multi-Source is a sensing and amplification system for acoustic guitar that blends an under-the-saddle pickup with a microphone. The pickup is a unitary design, constructed using a single layer of a piezoelectric co-polymer. 100% coverage copper shielding on the pickup insures immunity to external noise fields and quiet operation. The microphone is a miniature, omnidirectional electret condenser selected for linear response and exceptional sonic quality.

A lightweight Control Module, discreetly mounted just inside the sound hole, allows fingertip control of the pickup-to-mic mix ratio. Two low-profile potentiometers are utilized; one for the microphone level and one for master volume. The Control Module also serves as the anchor point for the microphone which is shock mounted using a special absorptive visco-elastic polymer. This feature isolates the mic from undesirable vibration and handling noise; providing detailed, transparent sound quality.

The supporting electronic package is made up of discrete hybrid circuitry, utilizing low noise field-effect transistors configured for class A operation. It provides exceptionally low noise, low distortion, low output impedance, high headroom and long battery life. Two internal adjustable trim pots are provided that allow up to 9dB of bass and/or treble boost on the pickup channel. The bass control can be used to highlight the body resonance and warm up the sound while the treble control can add brilliance and clarity and allow the player to cut through a stage mix. The microphone channel has a two stage frequency roll-off applied to combat any tendency towards low frequency feedback. Finally, for those wishing to customize their system, there is a user-configurable jumper on the PCB that allows the system to be configured for stereo output; assigning the mic to the “Ring” connection and the pickup to the “Tip” connection of the output jack.

The preamp is fully enclosed in a lightweight, anodized aluminum shell giving high immunity to hum and noise. The preamp is directly connected to a special TRS stereo endpin jack equipped with an additional sleeve connection to accommodate switching of the battery ground. The entire unit is powered by a proprietary voltage boost circuit that produces high headroom 18 Volts from two compact AA batteries.

Tools required

1. Electric Drill with ½" chuck.
2. 7/64" and 1/8" drill bits for drilling pickup hole.
3. An acceptable cutting bit to enlarge the endpin hole, some recommendations are:
 - a. Step Drill
 - b. 2 step endpin reamer (Stewart MacDonald #4323)
 - c. 15/32" drill bit with flutes ground for 0-degree rake
4. Small screwdriver with 1/8" wide blade or slightly narrower.
5. Small Crescent wrench for tightening nut on endpin jack.
6. Small Phillips head screwdriver, allen wrench or finishing nail to prevent jack from turning as you tighten the nut.
7. Special home-made preamp insertion tool: A modified ¼" plug attached to a 2 ft. length of 3/16" dia. wooden dowel or stiff copper wire (solid conductor). This will help guide the endpin jack through the hole in the end block from the outside.

Installation

1. Remove the strings from the guitar. If you wish to exactly duplicate the string height, you can scribe a line on the front side of the saddle where it extends above the bridge. You can later use that line as a guide to remove material from the bottom of the saddle to compensate for the thickness of the pickup (~.034").
2. Remove the saddle.
3. Remove the end pin or current end pin jack. If necessary, ream or drill out the hole to 15/32" to accommodate the D-TAR preamp.
4. Drill the pickup hole at a 45 degree angle at the very end of the saddle slot (either end is OK). If you have a 1/8" saddle, a 1/8" drill bit should be used assuming it fits into the slot smoothly. If it feels tight, use a 7/64" bit. Place the blade of the narrow screwdriver under the tip of the drill bit when drilling to avoid removing material from the bottom of the slot.
5. Blow out the slot with compressed air and check for debris or obstructions.
6. Round the inside of the hole where it meets with the bottom of the slot using a small file or knife. This will allow the pickup to make a more gradual transition into the slot and promote better balance. (Refer to Fig. 2).

Installation

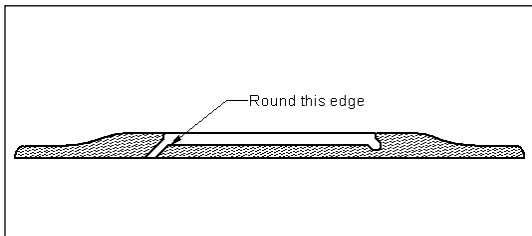


FIGURE 2

7. Using your homemade custom preamp insertion tool, test fit and adjust the nut and lock washer on the end pin jack so that the larger diameter of the jack body is completely within the hole.
8. When the jack depth has been properly set up, slide it into the endpin hole and finger tighten the small flat washer and nut. Place a phillips screwdriver (or allen wrench, finishing nail, etc) through the cross-drilled hole to keep the jack from turning and tighten the retaining nut securely. Do not attempt to keep the jack from rotating by holding the chassis of the preamp. This will damage the preamp and void any warranty.
9. Install the strap button securely. A small length of the threaded portion of the jack should protrude slightly beyond the strap button or minimally be flush with the outer surface. This will insure that the instrument patch cord can be fully plugged into the jack.

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10. Select a location on the back or sides of the guitar and secure the battery holder/power supply. Clean the surface using rubbing alcohol before applying the Velcro.
 11. Working from the inside of the guitar, insert the pickup through the hole drilled in Step 4. Continue sliding the pickup into the slot until it reaches the opposite end or, in the case of a short saddle, until it slides into the shallow hole that was drilled at the far end of the slot. (Refer to note 5 under “Important Notes”).
 12. Insert the saddle into the slot. If you intend to adjust the height, proceed to Steps 13 and 14. If you do not intend to adjust the height, skip to Step 15.
 13. Note the height of the previously scribed line in relation to the top surface of the bridge. This is an indicator of the amount of material that needs to be removed. Leave a small amount of material (.005” to .010”) to be removed by hand sanding.
 - a. The preferred method is to use a vertical mill with a sharp 1/4” diameter end mill turning at around 1000 RPM. Set up your work carefully to ensure even material removal.
 - b. A second method is to use a belt sander with an approx. 150 grit belt. Be careful to keep the saddle perpendicular to the belt and remove material evenly from the entire surface.

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14. Carefully finish-sand the bottom by hand using 320 grit sandpaper on a piece of plate glass or any flat, machined surface. Check flatness of the saddle bottom by marking the entire surface with a pencil and then sanding a few extra strokes. The pencil should be removed evenly. At this point, lightly chamfer all bottom edges of the saddle to remove the sharpness.

15. You now must carefully inspect and adjust the fit of the saddle in the slot.
 - a. The saddle should slide into the slot smoothly and with very little resistance. You should be able to insert and remove it with your fingertips.
 - b. If the fit seems very tight, the sides of the saddle can be sanded with 320 grit sandpaper.
 - c. Polishing or waxing the sides of the saddle will help it to seat properly under string tension and can enhance string balance and output.
 - d. Under some conditions, it can be beneficial to sand a small amount of tilt on the bottom of the saddle to compensate for the natural tilt of the saddle under string tension.
 - e. If the saddle is too loose in the slot, it will cause excessive saddle tilt and will usually result in poor coupling to the pickup, low output and unbalanced string response. It is advisable to replace the saddle if it is too loose.

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16. Double check to make sure the saddle slot is free of debris and that the pickup is fully seated along its entire length. Insert the saddle into the slot in the proper orientation and temporarily tape it in place.
 17. Determine the proper location for the Control Module by dry-fitting it underneath the treble side of the soundhole. When you have found a location that will give you comfortable access to the controls, clean the area with alcohol to remove any oils or sawdust. There is not much movement available. The mic should tuck into the intersection of the x-braces on a steel string guitar. There is more flexibility on a nylon string guitar.
 18. Remove the backing of the double-stick tape and apply the module to the chosen location
 19. Use a cable clip to secure the excess lead wire from the pickup to the bottom of the bridge plate. This will prevent any extraneous noises from being generated by the loose lead. Some people prefer to secure excess wiring to the back and/or sides of the guitar.
 20. Install a fresh set of strings. Before you are completely up to pitch, pull firmly back and down on the saddle to help seat it fully in the slot. Finish tuning, seat the saddle one additional time, install two AA batteries, plug in to a good system and check it out. Any remaining string balance problems can usually be corrected by tapping on the

Installation

front side of the saddle (after first unplugging, of course) using a wooden dowel and a small hammer.

19. If desired, you can make adjustments to the tonal balance by adjusting the Bass and/or Treble controls. Install your home-made preamp insertion tool then remove the endpin strap button and nut and washer. Slowly slide the preamp forward, into view of the sound hole, being careful not to tug the pickup cable. Use a small screwdriver to adjust the appropriate trim pot. Re-install the endpin jack and play.

Converting the output signal to stereo operation

The Wave-Length Multi-Source standard mode of operation is to mix the pickup and microphone's signals together and apply the blended signal to the Tip connection of the endpin jack. It is possible, however, to reconfigure the Multi-Source for stereo operation by changing a single jumper location inside the preamp chassis. In stereo mode, the microphone signal is assigned to the Ring connection and controlled by the Mic knob on the soundboard mounted Control Module. The under-the-saddle pickup is assigned to the Tip connection and is controlled by the Master knob on the Control Module. To take full advantage of the stereo mode it will be necessary to utilize a stereo patch cord or a Y-cable and send the two output signals to independent audio processing. We recommend the D-TAR Solstice, which is a high quality and versatile two channel mixer/blender designed precisely for applications of this nature. For more information see: <http://www.d-tar.com/solstice.shtml>

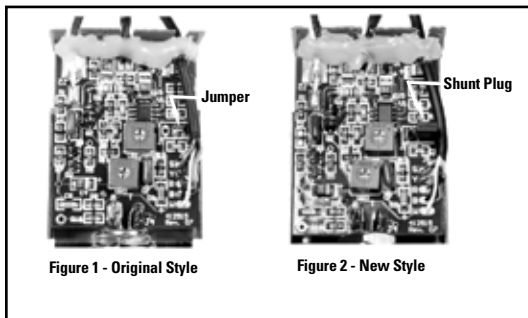
While reconfiguring the Wave-Length Multi-Source for stereo operation is relatively simple, it does require some degree of skill in working with electronics and mechanical assembly. If you are uncertain of your skill level or have no experience working with acoustic guitars, we recommend you take your instrument to an experienced luthier or repairman.

Converting the output signal to stereo operation

To reconfigure the Wave-Length Multi-Source for stereo output, follow these steps:

1. Look inside the guitar and find the cable clamps that secure the pickup lead wire, battery wires and Control Module cables going to the preamp chassis. Loosen only the cable clamps necessary to allow the preamp chassis to be moved as far as the sound hole. Do not attempt to remove the adhesive backed clamps from the guitar; you only need to un-bend them slightly so the cables can be moved.
2. Remove the strap button and outer nut and washer from the endpin jack. Keep this hardware in a safe place so you will not lose it.
3. Carefully slide the endpin/chassis assembly free from the end block of the guitar and move it into view from the sound hole. Do not apply any stress to the any of the cables attached to the preamp, especially the pickup cable.
4. Remove the two small screws that secure the chassis top to the sides. Put the top and screws with the other hardware.
5. Refer to figure 1 (on page 17). If you have the original style product, it will be necessary to cut or remove the small wire jumper indicated and resolder a jumper from the

center connection point to the left connection point. If you have the new style, you can simply remove the shunt plug and re-insert it so that it covers the center and left pins of the header.



6. Re-attach the chassis top, being sure to align the holes in the top with the potentiometer inside. Re-install the preamp in the endpin hole and tighten the nut and strap button securely. Secure the cables back inside the cable clamps so they cannot rattle against the inside of the guitar.

Specifications:

Power supply voltage to circuit	- 18 Vdc
Batteries required	- 2 ea. AA
Current consumption	- 11.0 mA @ 3Vdc
Battery life	- Min. 200 hours using fresh alkaline batteries
Maximum signal swing, @ onset of clip	- 5.7V RMS
Frequency response, pickup channel	- -3dB @ <20 Hz, 30 KHz
microphone channel	- -3db @ 580 Hz, 100 KHz
Gain pickup channel	- -8dB (all controls set flat)
microphone channel	- -2.5dB
Thd 1V out, 1 KHz	- <.005%
1V out, 20 Hz to 20 KHz	- <.03%
Noise, ref. To input: Wideband	- -105dBV
A weighted	- -112dBV
Control function, internal bass trim pot	
- Broadband boost, 0 to 10db @ 40 Hz (pickup channel only)	
Control function, internal treble trim pot	
- Broadband boost, 0 to 9db @ 5.0 KHz (pickup channel only)	
Control function, external Control Module	
- Microphone volume, Master volume	

Limited Warranty / Disposal Guidelines

D-TAR offers the original purchaser a one-year limited warranty on both labor and materials starting from the day this product is purchased from an authorized D-TAR Dealer or as original equipment in an instrument, provided that a qualified, professional repairperson or luthier performed the installation. D-TAR will repair or replace this product, at its option, if it fails due to faulty workmanship or materials during this period. Defective products should be returned to your USA dealer, international distributor, or sent direct to our factory postage prepaid along with dated proof of purchase (e.g., original store receipt) and an RMA number clearly written on the outside of the box. Please call our factory for issuance of an RMA number.

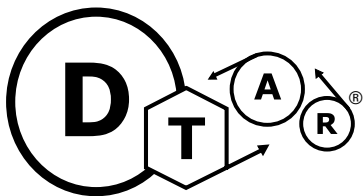
This warranty does not apply to damage to this product or an instrument caused by misuse, mishandling, accident, abuse, alteration, faulty installation or installation by a non-qualified repairperson.

Product appearance and normal wear and tear (worn pain, scratches, etc.) are not covered by this warranty.

D-TAR reserves the right to be the sole arbiter as to the misuse or abuse of this product. D-TAR assumes no liability for any incidental or consequential damages, which may result from the failure of this product. Any warranties implied in fact or by law are limited to the duration of this express limited warranty.

This product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased this product.





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