



V300GU-X

Graph Tech "Ghost" Piezo Upgrade for the "1st Generation" Line6[®] Variax™ 300e Guitar (Assembly Instructions)

DESCRIPTION

The **V300GU-X** (GraphTech "Ghost" Piezo Upgrade), produced by **H&H Guitars**, was developed to allow the "1st Generation" Line6[®] Variax™ 300e Guitar bridge to be upgraded to the GraphTech "Ghost" piezo saddles without difficulty or mechanical/electrical problems.

In its simplest option, the **V300GU-X** Upgrade consists of the **V300S** Bridge Printed Circuit Board (PCB) only, with the replacement saddles (GraphTech #8000-00) and assembly labor being supplied by the end user. **H&H Guitars**, does, however, supply this upgrade in various stages of completion, including a fully assembled 'replacement' bridge that is ready to be installed. See additional sales literature for more information on the available options, or visit hhguitars.com.

The following instructions apply to all options, with some steps possibly being redundant, depending on the option purchased and the extent of prior assembly.



DETAILED INSTRUCTIONS

Depending on your selection of **Options** (described in the next section of this document), it will be necessary to follow some or all of the subsequent Instructions. Options 1 and 2 require all of these instructions, whereas Options 3 and 4 only require the first and last set of instructions. It is recommended that any potential purchaser/user/Installer of the V300GU-X Upgrade read all of these instructions.

Disclaimer: This is how I perform the work for this Upgrade, in my own shop. You should read these instructions, and be sure that they make sense to you. If you proceed with following these instructions, it signifies that you understand the scope of the work and assume all responsibility for the work you perform.

1. Remove Bridge (**Options 1-4**)

- Remove Strings by detuning completely and then cutting each string.
 - It is not advisable to try to re-use old strings. The curled 'tuner' ends will be nearly impossible to feed back through the complicated Variax bridge, and can actually catch on wiring and damage the bridge PCB or piezo elements.
- Detach the Bridge by removing the 4 (not 5!) bridge screws.
 - The center screw closest to the rear strap button is not a bridge mounting screw and should be left intact at this point.
- Lift the bridge gently until you can reach and disconnect the piezo wiring connector.
 - This connector is unplugged by pulling straight with the wire angle.
- You should now have the bridge in your hands, unattached to the guitar.

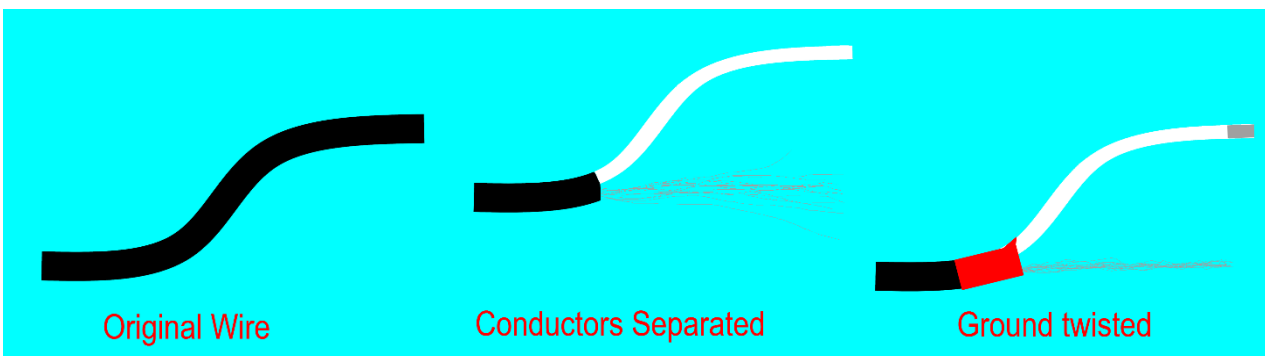
2. Disassemble Bridge (**Options 1-2**)

- Unsolder the individual piezo wiring from PCB.
 - Use tape to prevent the piezo elements from falling completely out of the OEM saddles during removal.
- Unbolt and remove PCB.
 - Save this hardware to reinstall the **V300S** Upgrade bridge in step 4.
- Unscrew and remove OEM Saddles.
 - This hardware should not be needed for the upgrade, but may be used in other ways or sold back to **H&H Guitars**. Contact us if you want to consider this.

3. Assemble Bridge (**Options 1-2**)

- Remove (cut) connectors from saddle wires, leaving wires attached to the saddles approximately 3" in length. Cut the included 3/32" 'heat-shrink' tubing into 6 pieces approximately 3/8" in length and set aside for a later step.

- Use this opportunity to explore good 'stripping' technique for this wire. Using the 'cut-offs', determine the best sizing to avoid damaging the conductors.
- Strip individual wires to approximately 7/8" (outer insulation only).
 - Do not strip the center conductor in this step.
- Separate (unwind) the 'ground' conductor strands from the 'hot' (center) conductor.
 - Twist the strands of the 'ground' conductor to group them, and place a piece of the 'heat-shrink' tubing over both the ground and center conductors, and apply heat to shrink, spaced evenly over the junction of wires (see below).



- Install GraphTech "Ghost" Saddles by feeding the adjustment screws through the backplate, installing the springs, and threading the screws into the saddles.
 - Make sure the adjustment screws are 'started', but do not run in fully.
- Install V300S Replacement PCB, leaving nylon locking nut loose for now.
 - The bolt sequence is as follows: M3 'flat-head' Screw through the center hole in the Bridge Plate, M3 lock washer, M3 Flat nut, M3 lock washer, PCB, and finally, M3 nylon locking nut. Tighten the M3 Flat nut now.
- Feed wires through the corresponding slot in the Bridge Plate and the corresponding hole in the PCB.
 - Tighten the adjustment screws until the spring is fully compressed and the saddles are as close to the backplate as possible (this is helpful to position the wires for the next step). Do not overtighten the screws.
- Pull the twisted 'ground' conductor at a right angle across the solder-pad the cable is routed through, and solder it to the pad. Trim any excess length.
 - These conductors do not have high-temperature insulation. Be careful not to melt the insulation and short the saddle piezo element. This applies to both the outer insulation and the center conductor insulation.
- Cut the center conductor to approximately 5/8" and strip and 'tin' the end.
- Curl the conductor around and solder the end to the appropriate solder-pad. It is advisable to lay the end flat on the pad to solder.

- Confirm that the 'string' holes in the PCB are aligned with the corresponding holes in the Bridge Plate and tighten the nylon locking nut holding the PCB in place.
- Perform a final inspection. Make sure that the solder joints are good (shiny and smooth), and that the wire ends are trimmed. Clean the PCB if necessary.

4. Install Bridge (Options 1-4)

- Place Bridge onto guitar body.
- Insert wire connector from MPCB into the connector on bridge, being careful not to stress either the wires or connectors.
 - This connection is 'polarized' and will only easily connect in the correct orientation. If resistance is significant, investigate the correct placement.
- Insert the 4 bridge mounting screws.
 - Start all screws before fully tightening any.
- Tighten all screws using a cross-over pattern. Make sure that the bridge is fully seated on the body before applying final tightening torque.
- Re-string and tune. Be sure to check intonation and string profile (radius, action) as this will necessarily be different with a new (!) bridge.

There are few things that need to be checked during the steps of Removal, Disassembly, Reassembly, and Installation, but the Installer is cautioned to perform each step as adequately and as completely as possible.

It is advisable to check continuity between the 'Signal' and 'Ground' pads for each string (channel) after soldering is complete. Due to the fragility of the insulation on the wires and the general difficulty in routing, it is possible to have a shorted channel even when the work looks good and correct.

If you have any questions, contact us at [H&H Guitars](#) using one of these eMail addresses to contact our **Sales** (info@hhguitars.com) or **Service** Departments (service@hhguitars.com).



H & H Guitars, Etc.

Texarkana, AR 71854

info@hhguitars.com

service@hhguitars.com



V300GU-X

Graph Tech "Ghost" Piezo Upgrade for the "1st Generation" Line6[®] Variax™ 300e Guitar (Options)

SUMMARY

For the "1st Generation" Variax™ Guitar Model 300e (HardTail), the piezo elements (pickups) are connected to the Main Printed Circuit Board (MPCB) by the use of a Bridge PCB and discrete wiring. Eight individual conductors are used, as there are signals for 6 pickups and a 'ground' (audio circuit common) connection that uses 2 conductors. This is necessary to send hexaphonic (6 individual audio) signals to the MPCB. However, the original LRBaggs piezo elements do not have a 'ground' wire, and connect the common of the circuit through the bridge and saddle, mechanically.

This can (and does) lead to intermittent output from the piezo elements. Most Variax users are familiar with the concept of cleaning the piezo bridge whenever any issues arise, as loss of continuity between the saddle and piezo element is the cause of most issues with intermittent output from the guitar.

H&H Guitars has developed a solution to the problem of 'ground' continuity that exists with the OEM V300e bridge. This involves a new Printed Circuit Board (PCB) that incorporates 'ground' points for each piezo element, and the use of Graph Tech's "Ghost" piezo saddles, which have both a signal wire and a 'ground' wire for connection. Additionally, the "Ghost" saddles incorporate Graph Tech's "String Saver" technology, solving another potential problem. The result is a better-playing, better-sounding, more reliable guitar.

OPTIONS

The **V300GU-X** upgrade is available in 4 different configurations, depending on the needs of the purchaser. These optional configurations are described here to allow you to decide for yourself, starting with a virtual 'DIY Assembly' option and moving up to a full replacement bridge option.

V300GU-1: All that **H&H Guitars** supplies in this option is the **V300S** Replacement PCB, with the "Ghost" saddles being purchased elsewhere. Written instructions are provided, but assembly and soldering skills are necessary, and the result is not guaranteed or warranted. (\$17.50)

V300GU-2: This option is simply the purchase of the individual parts from **H&H Guitars** (saddles and PCB only), with the purchaser making the conversion and all connections. Written instructions are provided, but assembly and soldering skills are necessary, and the result is not guaranteed or warranted. (\$150.00)

V300GU-3: This option requires the purchaser to remove their existing bridge and send it to **H&H Guitars**, where the saddles and PCB will be replaced and all connections completed. It is essentially the same as Option -4, but the bridge plate is the original to the guitar, and as a consequence, the cost is less. This option also includes a 6-month warranty. (\$175.00)

V300GU-4: This option simply requires the purchaser to remove their existing bridge and connect the replacement bridge to complete the upgrade. It obviously incorporates all the components of the OEM bridge, with the use of a replacement bridge plate (used, these are no longer readily available new), with Graph Tech "Ghost" saddles and an **H&H Guitars** V300GU replacement PCB. All connections are complete, and the bridge can be 'swapped out' fairly easily. This is the most expensive option, but includes a complete bridge replacement (and, as a result, a 'spare'), and a 6-month warranty. (\$250.00)



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