Pickup problem diagnostics page of www.kinman.com

11-Sept-2017 Rev-11

This document is divided into these sections:

Section 1. Buzzing/static or hum sound from your guitar.

Definitions:

Sound: the musical sounds made by the strings.

Noise: any undesirable interference which is not part of the musical spectrum (as generated by the strings) which radiates from an exterior source such as lighting dimmers, motors etc.

Hum: a low pitched main hum of 50 Hz or 60 Hz. Kinman pickups are hum cancelling.

Buzz: a high pitched 'buzz' that sounds more like an annoying insect than a hum, it is a harmonic of 50/60 Hz hum but behaves differently to hum. Buzz can not be cancelled like hum, it has to be shielded out of vulnerable wiring in your guitar as well as the pickups. That's why you might need shielding installed in your guitar if it's not already present.

Shielding: Any conductive medium acting as a barrier to 'buzz', ineffective against 'hum'. There are several types; can be metal foil lining a cavity in a guitar, it can also be a Black or Silver conductive paint applied to the walls and floor of a cavity and often embedded under the finish. It can also be strands of wires or metal foil wrapped around a cable. The strings are the prime source of shielding for pickups and the human player also. To be effective shielding media must be grounded. Ungrounded shielding actually results in more Buzz than if it was not there at all.

You hear a buzzing static noise:

Don't jump to conclusions yet because it is likely you had a buzz all along but didn't notice it amid the hum and noise coming from your previous set of non-noiseless pickups. Now that you have NoHum pickups the buzz stands alone and becomes more noticeable. But read on anyway to find out if you can solve your problem.

The pickups are not yet installed: This is not a fair test because the pickups are operating without any of the shielding provided by the guitar. Only make judgments about noise after the pickups are installed in the guitar and strings have been put on.

The pickups are installed in the guitar: If you hear a buzz after installing a Kinman pickup it is most likely a shielding issue. The following will help you pin point the cause and offer a solution.

1) A common occurrence is the ground wire to the string or bridge is not connected or has a faulty connection. **Don't reply on a meter to assess a good connection,** if the buzzing is not reduced when you touch the strings while you have the guitar strapped on in a playing position it is a sure sign the strings are not grounded. Solution: Solder the ground wire from the bridge or spring claw (in the case a vibrato bridge is fitted) to the cover of the volume pot or other ground point. When this ground wire is working correctly the buzzing will subside when you touch the strings.

- Some bridges like Telecaster depend on the bridge pressing onto the ground wire and occasionally a solid connection is not obtained. Reposition the ground wire to a fresh

position that assures a solid connection -*or*- put a small strip of copper tape over the exposed ground wire and another onto the bottom of the bridge, the area that contacts the wire.

Still hear buzzing? Proceed to point 2.

2) **Your guitar has shielding:**
If your guitar has shielding but any part of it is not effectively connected to a ground point the buzz will be worse than if there was no shielding at all.

- **Solution**: Metal foil can be visually inspected for continuous connection as well as with a multimeter but shielding paint may not be visible so a multimeter must be used. Look for missing links between different sections of shielding. One example is an isolated pickup, control or output cavity … ground connection can be via a single wire attached to the shielding via a tab and fixing screw or conductive paint can pass through a connecting tunnel between two cavity's. Wires can go direct to a ground point or to another section of shielding and then another wire goes to a ground point, If a tab is loosened or disturbed it may permanently lose connection to the shielding medium. Do not disturb tabs that are fastened with a screw onto the wood and connected to a wire.

To test for connection of embedded shielding paint one has to use a sharp, pointed object like a large sewing needle to pierce through the finish coating into the shielding paint and wood lying beneath. Contacting the probes of a multimeter onto the needles will cause a reading if the shielding has connection between the needles. This method can be used to check for connection between tabs and shielding as well as between different sections of shielding in different cavities or shielding within one cavity. If no reading on the meter it probably indicates bad tab connection or bad paint or bad connection between sections of shielding, depending on where the needles are positioned.

Since it is extremely difficult and expensive to repair bad embedded shielding paint or bad tab connections an economical solution is to apply metal foil shielding over the top of the finish. This and a lot of the other points mentioned in this section are discussed in detail in the shielding section on the Perfect Guitar page of kinman.com

3) **Your guitar DOES NOT have shielding:**
You will hear a buzz when you are NOT in contact with a piece of hardware that is grounded. When you touch the strings, bridge and some of the metal objects that are effectively grounded you become the shield and prevent buzz from entering the electrical system. Some guitar players are satisfied with this because they seldom let go of the strings, or they always turn the volume pot to zero when not playing. If not you may want to consider shielding your guitar.

4) **Also your guitar is a *Telecaster (bridge pickup)*:**
First discover if there is a difference in the buzz when you are touching the strings (but not touching the control panel or metal knobs) and when you are NOT. If there is no difference it indicates the strings are not grounded. They get their ground connection via the 3 mounting screws of the bridge pickup.

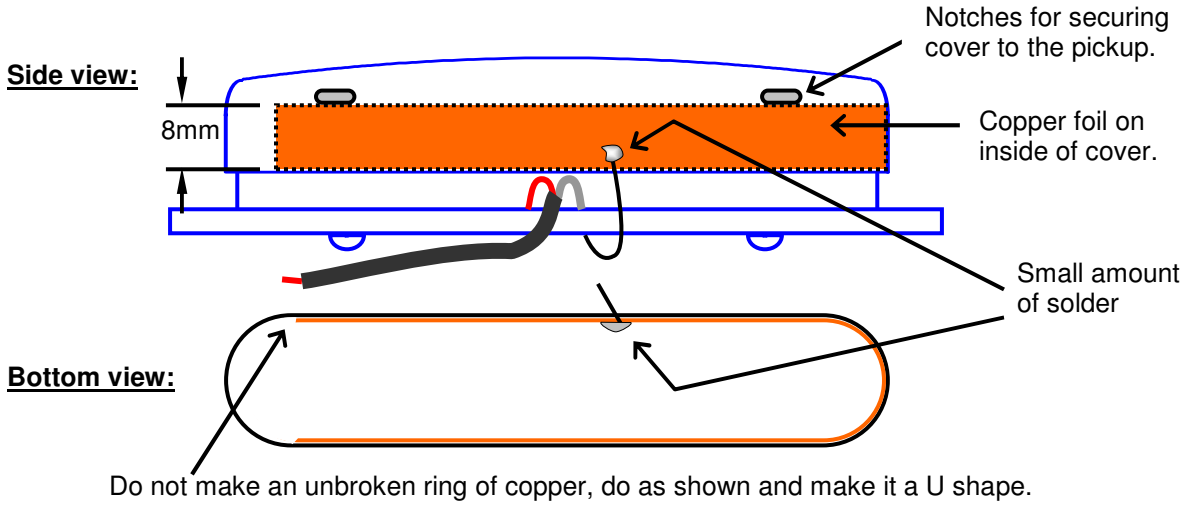
- **Solution**: Adjust the bridge pickup a bit closer to the strings, so the screws come into contact with the metal plate on the bottom of the pickup. This will establish the ground connection to the bridge and the strings and provide shielding for the pickups. The noise will reduce dramatically.

5) **Also your guitar is a *Telecaster (neck pickup)*:**

Even though our Tele covers are moulded plastic there is a thin coating of metal over them to give them the same appearance as a regular Tele neck pickup. This metal coating is extremely thin (1 micron: a human hair is 75 microns) and difficult to ground. Normally when it is touched nothing happens because it is almost impossible to not touch the strings at the same time, the

strings being grounded therefore prevent any buzzing. If in some rare occasion you touch the cover without being in contact with the ground of the guitar (strings or bridge) you will notice a small buzz or hum which shouldn't be a problem under normal playing conditions.

- **Solution:** this buzz can be solved by lining the inside of the cover with adhesive backed copper foil with a small wire soldered to it and connected to a ground point. The 8mm wide strip of copper foil shown in the diagram will solve the buzz. Make sure the copper does not cover the notches.



NOTE: April-2017 our Gen-2 Tele neck pickups are fitted with a grounded metal cover and there is no problem with contact buzz.

You hear a hum:

1) Check to see if there is a metal plate behind the pickguard. Any guitar (genuine vintage, Relic or Reissue) that has a metal plate behind the entire pickguard (not just confined to the control mounting area) may cause hum.
2) Bad solder points can cause hum and noise, especially the ground from the pickups to the back of the Volume pot cover. Check all solder points and re-solder if the slightest bit in doubt.
3) If it's a Strat pickup manufactured before June '04 and you have fitted it to an S1 or similar switching system which provides series connection. Only Hx Strat pickups made after June '04 have the internal architecture that allows series connections.

Also your guitar is a *Telecaster (bridge pickup)*:

1) Bad solder points can cause hum and noise, especially the ground from the bridge pickup to the back of the Volume pot cover. Check all solder points and re-solder if the slightest bit in doubt. I suspect faulty soldering has such an impact because this pickup ground connection also serves to ground the bridge and strings, so any fault is more apparent than otherwise.
2) Also a lot of Tele bridges are made of 'Steel' and that will unbalance the noise cancelling mechanism of the pickup. Bridge materials affect sound character so you may not want to change your steel bridge to brass and endure a small residual noise. Also see next paragraph #3.

- **The test**: The way to tell if the bridge impacts on the hum issue is to drop the pickup out of the bridge and let it sit right in the bottom of the cavity. Then remove the bridge fixing screws and put something under the bridge to hold it away from the pickup by about 6mm

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(1/4”), leaving all strings loose but in place. The pickup should not be close to the bridge. Under this condition the pickup should not output hum.

- **Solution**: Changing the bridge to one made of brass will solve the problem however brass bridges sound different to one made of steel. Some players accept a little bit of hum because they don’t want to change their tone.

Section 2. No sound from any single or all pickups

Definitions:

Conductor: Any part made of metal. Includes wires, terminals, screws, shielding foil, pot covers, control plates, control knobs made of metal, strings, metal hardware of the guitar and the player himself.

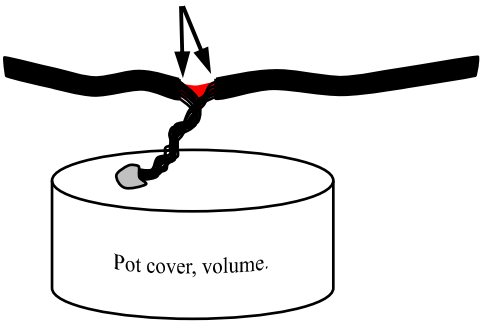
Short circuit: Is where a signal in a conductor is shorted due to that conductor coming into accidental contact with another conductor. If a short exists from a signal part to ground there is no output. Another kind of short is between different signal carrying conductors and that may cause a control or part of the control circuit to not function.

Open circuit: Is where the signal pathway is interrupted when a conductor is broken or disconnected from it’s destination or source.

a) No sound from one pickup (also see next section for any pickups).

- 1) Set the switch to deselect the offending pickup and check the resistance of the pickup with a multimeter. Connect the probes of the multimeter onto the relative terminal of the switch and the cover of the volume pot where the ground is soldered, you should get a reading of between 6Kand 9K ohms. (‘**A**’) If no reading it could mean there is an open circuit caused by a bad solder point or a broken wire in the pickup. (‘**B**’) A low resistance reading or close to zero ohms can mean a partial or full short circuit. Most shorts occur in the cable (the section that is soldered to the cover of the volume pot) as a result of overheating during soldering. To confirm a shorted cable close inspect the Red inner insulation where it is visible through the outer shield wrapping where the ground take-off point is. You are looking for evidence that the outer shield wires have melted into the Red inner as depicted in the diagram.

Look for evidence of bare wires melted into the Red inner at these points



- **Solution for ‘A’**: For open circuit: Rework the solder points on the baseplate of the pickup, being careful not to melt the Red inner of the attached cable. Wipe the tip of the iron across the solder points in the direction of the small section of the point. Do not apply heat for longer then 3 seconds. If still open circuit it could mean an accidentally broken coil wire caused by taking the cover off without undue care. Remove the cover

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having regard to the special instructions for doing so on www.kinman.com >Technical >Perfect Guitar >Removing covers. Inspect the fine coil wires leading to the solder points on the baseplate to see if any are broken. If a broken wire is evident email us for a Return Authorization and then Return to us for rewind.

- **Solution for B**: For short circuit in the hookup cable: Use a sharply pointed object such as a toothpick to prize the wires apart and away from the Red inner. Put a single drop of super glue or other convenient permanent separating medium into the gap between the bare wires and the Red inner to prevent reoccurrence.

2) The pickup stopped working suddenly: Especially if the pickups has been disturbed or tampered with, and sometimes it starts working again.

- Sometimes pickups get damaged during handling because the fine wires of the coil get broken or the Red insulator of the hook-up cable gets melted during soldering causing a short circuit. Jiggling the pickup can sometimes temporarily reconnect the broken wires or open the short circuit causing the pickup to work intermittently.
- **Solution**: Examine the visible coil wires that connect to the baseplate to see if any are broken. If so then you need to contact us about repair.
- **Solution**: refer to solution #2 in 1) above

3) Still no result: Test the magnet charges of the pickup as follows.

The strength of the magnet can be tested by comparing with other magnets using a small wand made from a cut-off from a wound E string, like in the diagram below. Holding the wand at one end in your fingers put the other end onto the top of the magnet and flick it away from the magnet. In this way you can get a good idea of how strong the magnets are just by feeling how much force is required to make the string depart from the top of the magnet. Compare various magnets and see if the suspect one is less strong than any others that are behaving satisfactorily.

- **Solution:** If magnets are not magnetized Contact me. I might be able to instruct you how to or refer you to someone who can recharge the magnets, if not it might be necessary to return to the factory.

b) No sound from 2 or more pickups (also applies to no sound from a single pickup on occasions too).

1) Another common problem concerns a short circuit of the output cable or jack socket. A simple test is to take the little plugs for the output cable out of the Connector Block, connect a guitar cable to the output socket and into a live amplifier. With the amp volume turned down to 1 or 2 touch the tip of the plug on the end of the Red inner of the output cable. If no noise then you have a short circuit in that system. A short circuit on the output system is caused by one of two things:

- The jack socket is mis-aligned in the body cavity causing the hot terminal (the one that pokes out from the socket and contacts the tip of the plug) to come into contact with the cavity wall, causing a short circuit with the shielding medium resulting in no sound.
  - **Solution**: Align the output socket correctly, tighten the retaining nut securely to prevent unwanted rotation in the future.

- too much heat was applied during soldering and the Red sheath has become melted by the wire causing that wire to contact the outer shield conductor. Close inspect both ends of the cable and look for signs of the Red sheath being melted.
  - **Solution**: Use a sharply pointed object such as a needle to prize the wires apart. Put a single drop of super glue into the gap between the conductors to prevent reoccurrence.

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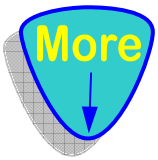
2) Short circuits between conductors is another possibility.
   - Check for obvious signs of conductors being in close proximity that may come into contact occasionally under very little force. One such example is the Bypass filter parts (capacitor and resistor) that are attached to the terminals of the volume pot. If mishandled during installing these parts may come into contact with the pot cover.
     - **Solution**: Manipulate or arrange the wires of these parts so they are not close to another conductor.

   - Metal foil shielding can come adrift and come into contact with a harness conductor causing a short circuit.
     - **Solution**: Identify the piece of shielding responsible for the short circuit and make it secure. This can be a simple piece of sticky tape or an adhesive applied to the back of the foil or it can be a dab of solder to join two pieces of foil.

Section 3 next page >>>>>>



Section 3. Low output and abnormal sound & noises, including Microphonic feedback:

Definitions:

Sound: the musical sounds made by the strings.

Noise: any undesirable interference which is not part of the musical spectrum (as generated by the strings) which radiates from an exterior source such as lighting dimmers, motors etc.

Out of phase: According to the Kinman glossary, Technical …. When 2 pickups or coils are connected in such a way that the current flows are in opposite directions and tend to cancel one another they are said to be out of phase. Position 2 and 4 of a Strat switch is not out of phase, in fact quite the opposite…they are in-phase. Out of phase sounds consist of very little bass, dominate mids and highs with a characteristic 'nasal, honky' sound and have a much lower level than normal in-phase sounds.

Output level: The term applied to the amount of electrical or sonic energy outputted from a pickup or amplifier.

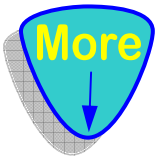
1) One pickup has less output than the others.
   - Most pickups in the bridge position are not as loud as the neck position because the strings vibrate with less amplitude close to the bridge.
     - Read Kinman recommendations about pickup adjustment on www.kinman.com >Tone Workshop >Tone.

2) Certain position of the selector switch you hear a hard, honky sound with lower output. This is out-of-phase sound caused by a reversed pickup connection. Usually this only happens when mixing Kinman's with another brand.
   - **Solution**: Identify which other brand pickup is connected the wrong way and reverse it's connections.

3) One pickup has dark sound and very low output. This is probably a partial short circuit caused by melted Red insulation around the inner wire of the shielded cable.
   - **Solution**: Close inspect the hook-up cable where it terminates to the baseplate and look for signs of the strands of shielding wire melted into the Red sheath surrounding the inner conductor. Using a pointed object like a needle prise the strands of shield wire out of the red plastic sheath and put a single drop of super glue in the gap you just created to prevent recurrence.

4) All pickups have a dull sound or lack sparkle.
   - Stock pots can measure as low as 120K even though they are labeled 250K.
     - **Solution**: Using a multimeter set to Resistance x 100 measure the value of the pots (especially the Volume pot) first disconnecting the wire between the selector switch and the pot. Zero the needle of the meter first by shorting the probes together and adjusting the Zero Ohms knob. If the measured value is less than 230K Ohms then the pots should be replaced with ones measuring more than 230K, the higher the better.

   - The jack socket is mis-aligned in the body cavity causing the hot terminal (the one that pokes out from the socket and contacts the tip of the plug) to come into contact with the cavity wall, causing a partial short circuit with the shielding medium resulting in bad sound.
     - **Solution**: Align the output socket correctly, tighten the retaining nut securely to prevent unwanted rotation in the future.



- The shielded output cable to the Jack socket was overheated during install resulting in a partial short circuit between the Red Inner and the Outer shield.
  - **Solution**: Use a sharply pointed object such as a needle to prize the shield wires apart and away from the Red inner. Put a single drop of super glue or other convenient permanent separating medium into the gap between the bare wires and the Red inner to prevent reoccurrence.

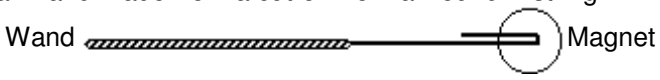
5) A pickup has a thin, nasal, low output sound and you can not get a reading with a resistance meter. This is indicative of an open circuit pickup caused by a broken strand of the copper coil winding. It can also mean on rare occasions a bad solder point on the baseplate.
   - **Solution**: For open circuit: Rework the solder points on the baseplate of the pickup with LeadFree solder if the 'Pb Free' symbol is printed or regular Lead solder if not, being careful not to melt the Red inner of the attached cable. If still open circuit it could mean a broken wire caused by taking the cover off without undue care. Email us for a Return Authorization and then Return to us for rewind.
   - **Solution**: open circuit the above precluded; the pickup should be returned to us for repair.

6) The pickups have an excessively bright sound and you have recently installed new tubes in your amplifier.
   - One customer blamed his new set of Traditional Mk-II when he experienced excessively bright sound. Turns out he fitted new 12AX7 at the same time and one was faulty.

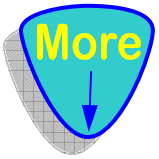
7) When using overdrive/distortion (via amp or a pedal) you get a shrill-like sound.
   - Customers own reply) what I am experiencing is the fact that the Kinman pups are extremely sensitive (this is a good thing) and do a very good job of amplifying all the sounds my guitar is producing. When overdriven through a Tube amp I have to bring down the highs (eq) in order to get a smoother/less harsh tone. My original pups were not as responsive or bright sounding as the Kinmans. I just needed to figure out how to "dial in" the right sounds. Just took some extra tweaking when playing through my Traynor tube amp.

8) One string is dull or dead. This indicates one of the following:-
   - the pickup is installed in wrong orientation. Check that the tallest magnet is under the D-4th string.
   - the G-3rd string may be adjusted higher or lower than the other strings on the bridge saddle. Navigate to >Technical >Adjust & Set-up
   - either a dud string or a dead magnet. These are a rare occurrence but do happen occasionally.

   Test for magnet strength: The strength of the magnet can be tested by comparing with other magnets using a small wand made from a cut-off from a wound E string.



   Holding the wand at one end in your fingers put the other end onto the top of the magnet and flick it away from the magnet. In this way you can get a good idea of how strong the magnets are just by feeling how much force is required to make the string depart from the top of the magnet. Compare various magnets and see if the suspect one is less strong than any others that are behaving satisfactorily.
   - **Solution**: Fit a new string or contact us to arrange re-magnetization as the case may be.



9) Touching any (grounded) hardware such as bridge, strings or metal knobs causes a loud buzz. **Cause**: the output cable has a reversed connection *i.e.* the Hot wire is incorrectly connected to ground.

- **Solution:** check the connections on the jack socket and volume pot. Reconnect output cable correctly with the HOT wire **not connected** to ground terminals at either end.

10) **Microphonic squeal.**

Most often associated with loose windings but can be caused by pickguards (Colorific is one known to sometimes have a problem) and metal covers. Kinman's are 99% wax impregnated and don't have microphonic problems due to coils.

The squealing pickup is a *Telecaster* bridge pickup.

We assure you that Kinman Tele pickups do not squeal because they have robust construction and are thoroughly vacuum wax-potted (twice) to prevent microphonic feedback. There are several things you can do to cure this annoying problem which is actually caused by the steel bridge plate acting like a microphone diaphragm reacting to high SPL (sound pressure level) –or- the pickup not having springs that are rigid enough to prevent it vibrating under extreme sound pressure level. This problem is most often apparent when distortion or gain devices are used but may also happen at clean high volume.

One sure fire test is to remove the pickup out of the bridge and with it resting un-mounted on the face of the guitar plug the guitar to the amp and see if the microphonic feedback persists under the same amplification conditions. If not we can conclude the cause of the problem is the bridge.

Do one or all of the following:-

- Position a block of foam under the pickup. The foam should not apply so much force that the pickup floats on the mounting screws which should remain firmly seated on the bridge plate.
- Position some double sided tape OR place a folded over business card underneath the unsupported leading edge of the bridge plate.
- If the bridge plate is without sides (not the ash tray type) you can bent it slightly in the middle to form a slight arch. This will cause the leading and trailing edges to bear down on the wood with more force thereby inhibiting microphonic movement.
- Brass bridge plates are immune to microphonics, however they do sound different.
- Remove the bridge plate, heat it and then coat some of the underside with a thin layer of hot wax. With the wax still soft refasten it to the guitar. If it cools before you get the screws tightened then play a soft flame to the plate to gently melt the wax again. After tightening the screws quickly wipe the wax ooze off with a soft cloth and some guitar polish. When it cools the wax will act as a removable glue that stops the bridge plate from behaving like a microphone diaphragm.
- Callaham makes excellent Tele bridges that have 2 extra screws at the leading edge to prevent microphonic 'howl'. My favorite one is his all steel Vintage T Model (with 3 sides) fitted with optional 3 stainless steel compensated saddles.

NOTE: Tele squeal is a difficult problem and might not be solved by using just one of the above solutions. It might take some experimenting and two or more of the above. Your persistence will reward you with a squeal free Telecaster.

The squealing pickup is a *Humbucker* with a closed top cover.

In the rare event a Kinman humbucker develops a microphonic squeal (under extreme gain)

it can be remedied by removing the 3rd and 4th pole screws and then squeezing some Blue Tak or other non-hardening mastic type putty at the edge of the hole and between the cover and the top of the pickup. Avoid filling the screw hole with putty. Or if you do be sure to scrape it out with a toothpick. The putty presses on the underside of the cover and stops it vibrating, thereby eliminating microphonic tendencies.

10) You loose tone on hot sweatty gigs.
Dripping sweat can run down the side of the pickups, past the pickguard and onto the baseplate where the cable terminates. Sweat contains salt which is very conductive to signal currents. Clean the baseplate thoroughly (both sides) with a damp cloth, expecially where the cable terminates into the eyelets. Drip some molten candle wax over that point and encase the exposed sections of the cables and eyelets in the wax. This will prevent moisture coming into contact with the wires.

11) My Strat bridge pickup sounds *Shrill*.
The reason all Strat 'bridge' pickups sound shrill is that they do not have a Tone control wired to them. Even when set to position '10' a Tone pot has the effect of lowering the point of resonance and reducing the peak of a pickup. One neat solution is to rewire the Tone pot from the middle pickup to the bridge pickup. With this there is a two-fold benefit in that the middle pickup becomes brighter and thereby improving the position 4 sound (neck + middle). Another way is to use the optional Kinman neck-pickup-mix circuit where the remaining Tone control serves as a Master Tone control and has the same effect on all 3 pickups (including the bridge pickup).

Kinman Goodbye Soldering Harness have a Maser Tone control that works on all pickups.