

Before you start, **read these instructions first** to understand how to install and use this product.

Assumptions

This **Pickup Switch Upgrade™** product is designed to use only one Volume and one Tone control for all of your instrument's pickups. This product is designed to control 3 magnetic pickup coils.

Note: *Active* (uses batteries) or *Pizeo* pickups cannot be used with this product.

Tools Needed

You may need one or more of the following tools (not included with purchase) to install this **Pickup Switch Upgrade™** product (see each product for additional specific tool requirements).

- Wire cutters / Wire strippers
- Regular pliers
- Small Phillips & straight slot screwdriver
- Ohmmeter to measure continuity
- Optional: Soldering iron (25/30 watt max.) with fine tip, rosin-core solder .022" dia.

Preamble

Before you start, completely **remove all strings** from your instrument for easy access to its parts. The strings are probably already old and replacing them will make your instrument sound even more *brilliant* after you install this product.

This upgrade will have you cutting existing wires on your instrument. You may need to make wire connections, increase the length of existing wires and possibly remove body cavity material.

Because you will be making several changes to your instrument, you need to have a plan to install this product.

See the *Reference Drawing* on a later page of this document. Use a pencil to confirm the original circuit of your instrument before you proceed. When you record where the pickup wires (and colors) were removed from your instrument, you have a way to restore it to its original condition should it become necessary. Since there may be a variation of pickup wiring color, you will need to confirm the wire colors used in your original circuit

Adding Extra Wire

If your pickup or input wires are too short to easily reach the specified connection of the green terminal strip on the **S3-Switch** circuit board, here is what to do. Measure out the needed length of the RED or BLACK in the included **PARTS BAG** to permit the wire to reach the applicable connection. A length of 3" (7.62cm) is budgeted for each wire extension. Insert the unstripped end of each wire into the 2-wire UY2 yellow/clear connector and clamp down using regular pliers.

Use pliers to squeeze the UY2 connector top button so it is flush with the body to create a permanent electrical connection. **Verify electrical continuity between the two pickup wires with an ohmmeter (some coil resistance will be present).**

The 71B grey wire nuts are used to make the needed firm and insulated connection to the input jack wires, but let you disconnect the installation if needed.

Note: If either your pickup or input jack wires use a shielded/braided cable, you will need to solder black wire to the shielded cable because the green terminal strip (J1) does not directly accept shielded cable.

BMG SPECIAL UPGRADE

Your assembled and tested **BMG Special** upgrade that is designed to install into a standard BMG Special guitar, and almost any Burns BM Signature, pre-2010 Mk-1, Mk-2 (*and similar clone*) guitar model. It contains our S3-Switch, one tone and volume control. No soldering is needed to install this product. You will use your own pickups and knobs.

The following items are included in a Parts Bag.

- An AweSome Musical Instruments headstock decal to apply to your instrument
- Several business cards to pass out to friends
- An equal length each of black and red insulated wire (to lengthen pickup and input jack wire if needed)
- 4 yellow/clear connectors (UY2) to make pickup wire extension connections if needed
- 2 grey wire nuts (71B) to connect input jack wires to your upgrade product

Preparation

Remove your strings. Remove your existing pickguard attaching screws. Document your existing stock pickup wiring connections (see *Preamble* on page 1) *before* you start.

Disconnect the **input jack** hot and ground wire from your original pickguard and remove your stock pickguard.

Confirm that the **BMG Special** upgrade product you received will lay completely flat and within the routed body cavity with no interference by the wood body. If the upgrade lays flat on your instrument, proceed to the next section, *Terminal Strip*, to continue with the upgrade process.

If your upgrade does not lay flat, your body cavity may have a non-standard dimension preventing the upgrade product from being installed. See *Solving Installation Issues* at the end of this document to resolve this issue.

Cut the **pickup wires** from the switches so all wires are of maximum length. If needed, disconnect the bridge ground wire. Transfer your original pickups to the upgrade you received, confirming that each pickup (bridge, middle, neck) is transferred to the correct position of your upgrade product.

Terminal Strip

Here is how to attach wires to the **green** terminal strip (J1) that is on the printed circuit board. Use a small screwdriver or writing pen tip and press down on the square *release button* located directly above the wire hole. Hold the button down and insert the stripped wire completely into the wire connection hole and then release the button. Lightly tug on the wire to confirm it is firmly gripped by the Terminal Strip. A legend is printed on the circuit board with the name of each terminal strip wire hole from left to right. Attach each wire to the correct terminal strip hole. In all instances, connect the **GND** and **VOL** wires from the Volume/Tone control circuit displayed in **Figure 2** to the wire connection holes on the terminal strip.

S3-Switch (8-hole green terminal strip): [GND] [VOL] [+]NECK [-] [+]MIDDLE [-] [+]BRIDGE [-]

Caution: Do not insert hard items in the wire holes because it will decrease reliable electrical connection.

Connecting Your Wires

There is no industry standard for pickup wire lead colors. More common color pairs for BMG guitars are red/black (neck pickup), white/black (middle pickup) and blue/black (bridge pickup). When connecting *your* pickup wire color pairs to the [+] and [-] pickup connections on the green terminal strip (J1), the black wires will go to the negative [-] terminal.

Determine which wire color for each pickup coil will be attached to the applicable [+] and [-] green terminal strip connector on the **S3-Switch** circuit board.

Determine if there is enough wire length from each 2-wire pickup coil to *comfortably* reach the corresponding connectors on the green terminal strip on the **S3-Switch** printed circuit board. If not, refer to the “*Adding Extra Wire*” topic (page 1 of this document).

Strip off 3/16” (4.76mm) insulation from the end of each pickup wire and also the input jack wires then twist the exposed wire strands so they are tightly bound. Insert the wires of each pickup pair into the correct location on the green terminal strip (J1) using the process described in the above “*Terminal Strip*” topic. Attach the wires using either of the following instructions.

Use the two gray wire nuts (71B) to connect the wires labeled “IN” to the wires on your instrument **input jack**. The red wire goes to the hot lead on the input jack and the black wire goes to the ground lead on the input jack.

Note: If you have a ground wire coming from the bridge (and maybe from body cavity shielding), also connect it to ground lead on the input jack.

Connecting your pickups to our S3-Switch

After transferring your pickups to our upgrade (with each in the correct position):

Connect your NECK pickup coil wire pair to the	[+] _{NECK} [-]	connections on the green terminal strip
Connect your MIDDLE pickup coil wire pair to the	[+] _{MIDDLE} [-]	connections on the green terminal strip
Connect your BRIDGE pickup coil wire pair to the	[+] _{BRIDGE} [-]	connections on the green terminal strip.

S3-Switch Product Identification and Use Summary

Here is a summary of switch use for this product (see **Figure 1** below for switch identification).



Figure 1 – Switch Identification

SW1, SW2 and SW3 are ON-OFF-ON switches that turn on individual pickups in normal or reverse phase
SW4, SW5 and SW6 are ON-ON switches that change select pickups from *parallel* to *series* connectivity

For a Right-Handed Instrument:

SW1 turns on the **bridge** pickup (Coil-1), either in normal phase (down), or reverse phase (up).

SW2 turns on the **middle** pickup (Coil-2), either in normal phase (down), or reverse phase (up).

SW3 turns on the **neck** pickup (Coil-3), either in normal phase (down), or reverse phase (up).

When all of the following switches are **down**, the pickups will be in a *Parallel* circuit.

SW4 when this switch is **up** it puts the **bridge** and **middle** pickups in series. Both pickups must be on.¹

SW5 when this switch is **up** it puts the **bridge** and **neck** pickups in series. Both pickups must be on.¹

SW6 when this switch is **up** it puts the **neck** and **middle** pickups in series. Both pickups must be on.¹

SW4+SW6 when these switches are **up**, all three pickups in *series*. All pickups must be on. SW5 has no effect.

¹ The remaining *non-series* pickup may be either off -or- on (either in regular or reverse phase).

Validating

Connect your instrument to an amplified source with the volume set to low. Turn the switches on and off as described in “S3-Switch Identification and Use Summary” topic above while gently tapping the magnet of the pickup coil that should be “on” with a small screwdriver to confirm pickup response. Also confirm the correct operation of the Volume and Tone controls.

If you receive the stated results, install the pickguard screws. Transfer your control knobs. Next, install a new set of strings. Welcome to the *Grand Canyon Wide* range of AweSome pickup tones.

Figure 2 – Reference Drawings

Use the following image to document/confirm your instrument's original wiring. Be sure to identify wire colors where needed. Use a pencil when doing this.

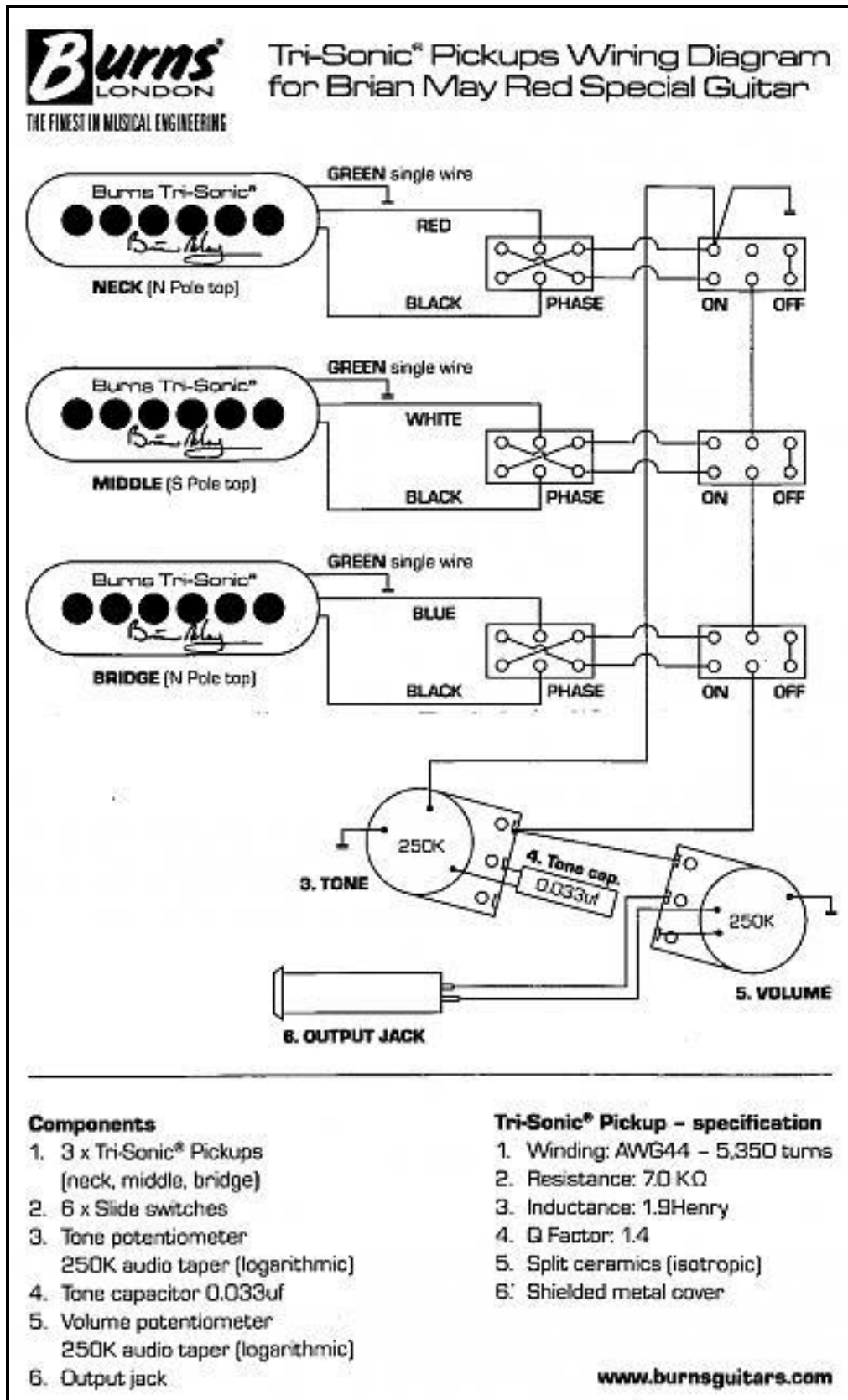
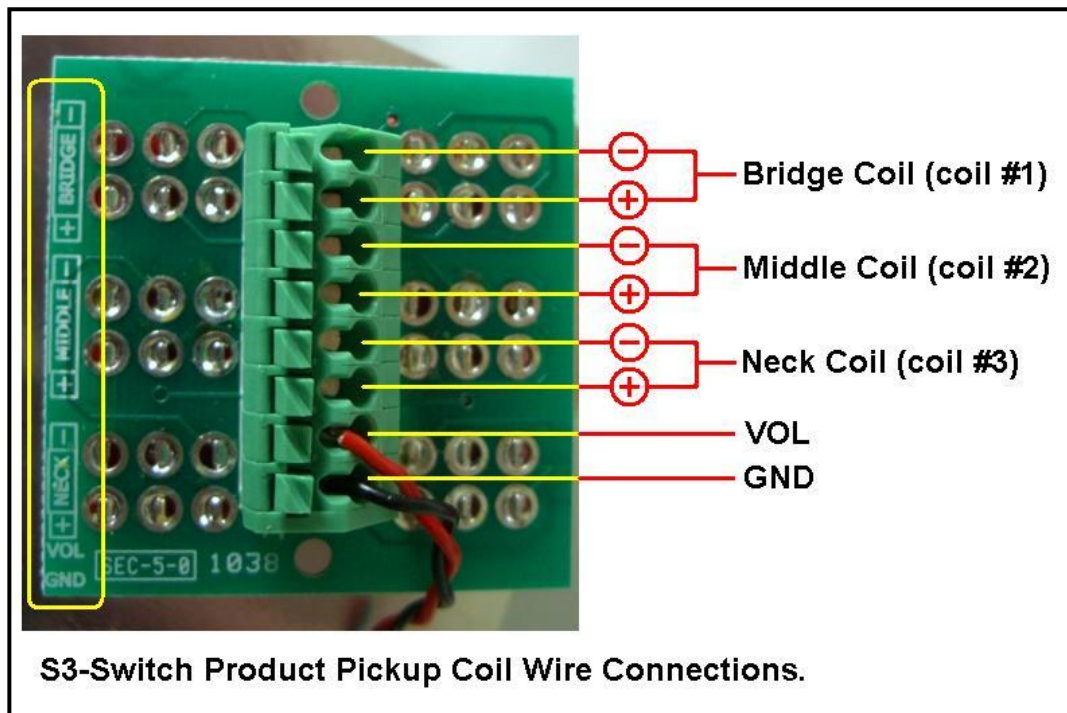
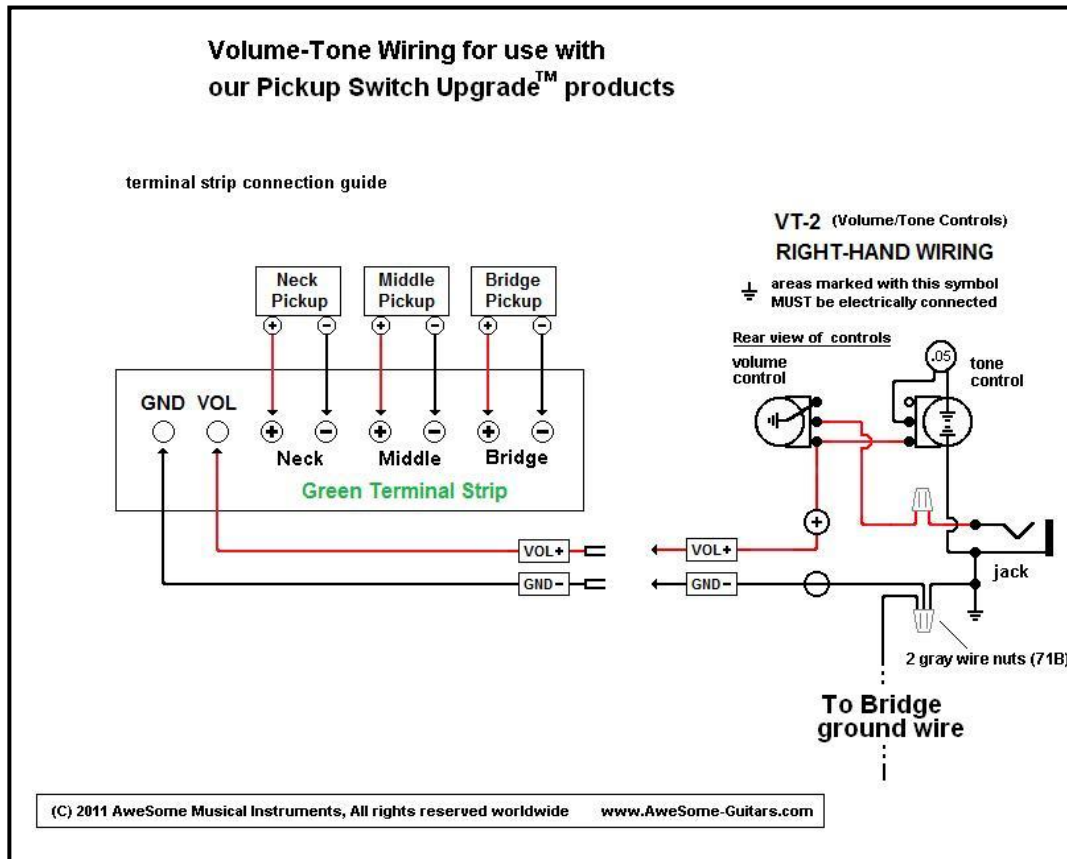


Figure 3 – Electrical Connections

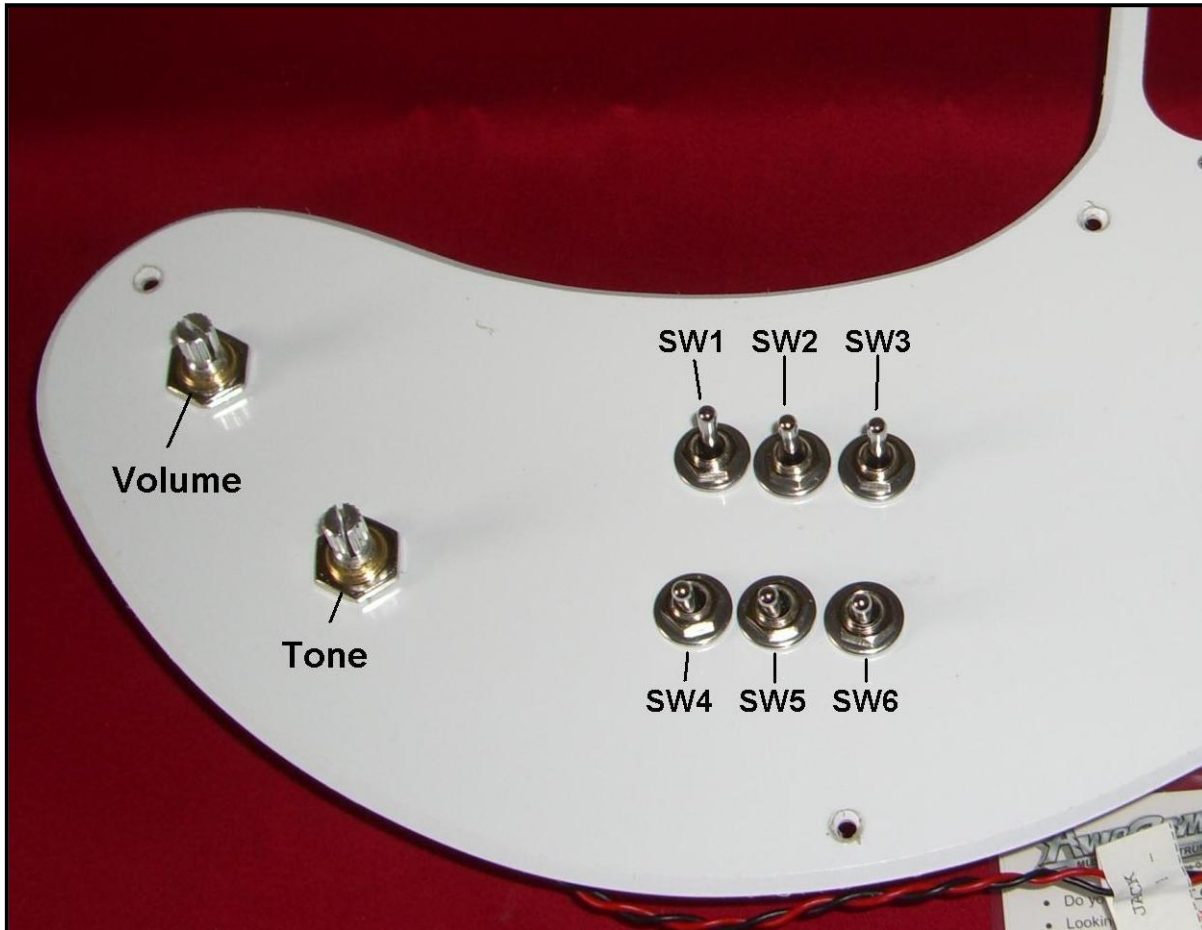
The following drawing identifies where to connect your pickups and input jack to our upgrade product. The **BMG Special** upgrade includes our VT-2 Volume-Tone Control assembly and our S3-Switch product.



HOW THE S3-UPGRADE SWITCHES WORK:

Here is how the mini-toggle switches of the S3-Switch product are laid out.

(rear) SW1 SW2 SW3
SW4 SW5 SW6 (front)



There are really two "groups" of switches: (SW1, SW2, SW3) -and- (SW4, SW5, SW6)

The first group of switches (SW1, SW2 and SW3) are ON-OFF-ON switches used to turn an individual pickup Off and On. The middle position of each switch is Off. The down position turns the pickup On (in *normal-phase*) and the Up position turns the pickup on (in *reverse-phase*). Pretty simple, don't you agree?

Switch SW1 controls the Bridge pickup,
Switch SW2 controls the Middle pickup and
Switch SW3 controls the Neck pickup.

When you use these three switches (**with switches SW4, SW5, SW6 all in the Down position**), you will get 13 different pickup tones from the various combinations of three pickup coils being Off or On (either in *normal-phase* or in *reverse-phase*). These pickup tones are also due to the combination of pickup coils being in a **Parallel circuit**.

The second group of switches (SW4, SW5 and SW6) are ON-ON switches that are used to put *select* pickups into a **Series circuit**. When you are using this second group of switches, consider the following statements.

- When you put two or three pickups in a Series circuit, you create a "*compound*" (i.e., Humbucker) pickup that gives you about 8 to 15 percent More output signal (that gives you a Heavy Metal/Jazz tone).
- All pickups that are in a Series circuit **MUST** be On (either in *normal-phase* or *reverse-phase*). Any non-Series circuit pickup can be either Off or On (either in *normal-phase* or *reverse-phase*). This will combine with the pickup tone produced by the two Series-connected pickups.

Using the Second Group of Switches

Starting with all three switches SW4, SW5 and SW6 in the Down position;

- If you only put switch **SW4** Up, this puts both the Bridge pickup and Middle pickup into a Series circuit. This means you **MUST** turn On both the Bridge pickup and the Middle pickup using switches SW1 and SW2 (either in *normal-phase* or *reverse-phase*) to hear any sound. In this example, the Neck pickup (controlled by SW3) can be either Off or On (in *normal-phase* or *reverse-phase*).
- If you only put switch **SW5** Up, this puts both the Bridge pickup and Neck pickup into a Series circuit. This means you **MUST** turn On both the Bridge pickup and the Neck pickup using switches SW1 and SW3 (either in *normal-phase* or *reverse-phase*) to hear any sound. In this example, the Middle pickup (controlled by SW2) can be either Off or On (in *normal-phase* or *reverse-phase*).
- If you only put switch **SW6** Up, this puts both the Middle pickup and Neck pickup into a Series circuit. This means you **MUST** turn On both the Middle pickup and the Neck pickup using switches SW2 and SW3 (either in *normal-phase* or *reverse-phase*) to hear any sound. In this example, the Bridge pickup (controlled by SW1) can be either Off or On (in *normal-phase* or *reverse-phase*).
- If you put **both** switches **SW4** and **SW6** Up, this puts all three pickups into a Series circuit. This means you **MUST** turn On ALL of the pickups using switches SW1, SW2 and SW3 (either in *normal-phase* or *reverse-phase*) to hear any sound. This gives you an incredible overdriven heavy metal / jazz sound in spades.

In summary, the various combinations and positions of these six switches will give you 35 pickup tones.

Solving Installation Issues

Here is how to solve installation issues that involve insufficient body cavity width and/or depth.

1. The mounting holes for the **BMG Special** upgrade do not line up with the body mounting holes.

You will need to re-drill the needed body holes for the pickguard mounting holes. (see explanation below)

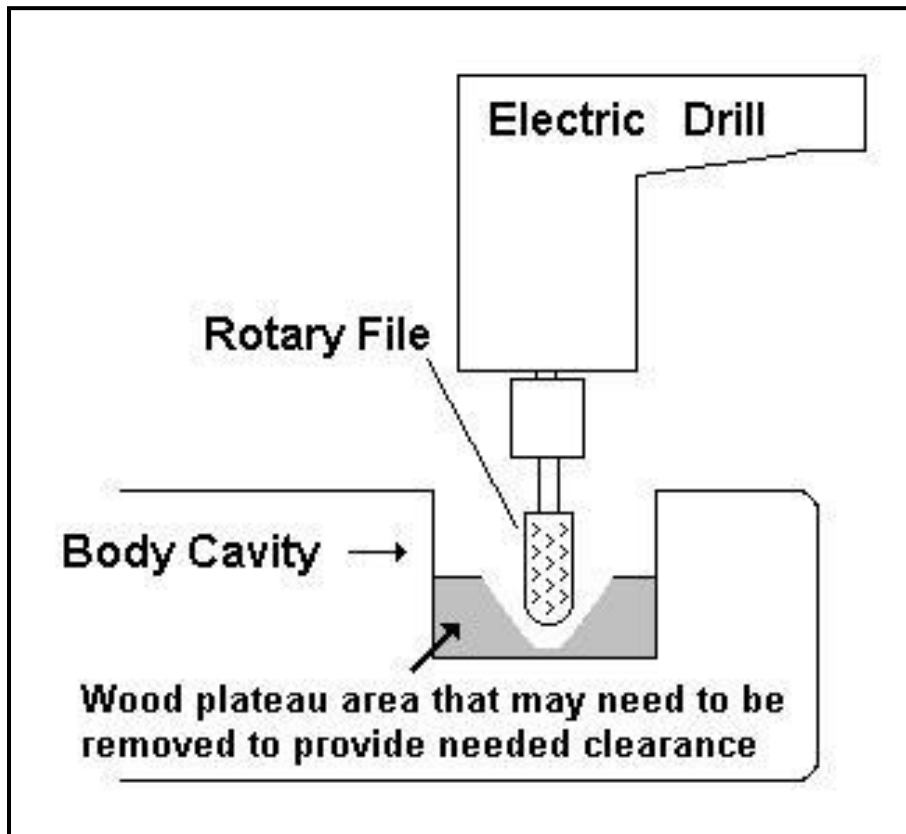
2. The **BMG Special** upgrade does not fit into the body cavity because of insufficient depth.

This may require some body wood material removal so the *standard* **BMG Special** upgrade that you received will completely lay flat on the body.

To solve this body cavity depth issue, you can use a power drill with a rotary file to remove the needed amount of material in the body cavity to permit installation.

The illustrations (below) identify how to use the electric drill and rotary file bit to remove excess material in the body cavity. Also illustrated are two common rotary file bits. The top one is a rasp bit, the lower one is a scraping bit. Either will work.

When using this procedure, it is recommended that you enlist the help of a friend to firmly hold the guitar body while removing the unneeded wood using the rotary file. Also use a blanket or other material between the guitar body and the working surface to prevent the bottom of the body from being scratched.



S3-SWITCH LEGEND

Pickup Phase Switches:

SW1, SW2, SW3 are on-off-on *Phase* switches

Each switch controls one pickup coil in normal phase (Down) or reverse phase (Up) The Center position of the switch is Off

SW1 Controls the Bridge Pickup (coil #1)

SW2 Controls the Middle Pickup (coil #2)

SW3 Controls the Neck Pickup (coil #3)

Pickup Connection Switches:

SW4, SW5, SW6 are on-on Connection switches

These three switches are Down by default (to put coils in parallel)

When **SW4** is Up (puts coils 1 & 2 in series)

When **SW5** is Up (puts coils 1 & 3 in series)

When **SW6** is Up (puts coils 2 & 3 in series)

When **SW4** & **SW6** Up (puts all coils in series)

ALL pickup coils that are in series **MUST** be on to produce sound.

Switching Proof Table to get 35 Pickup Tones from instruments with three single-coil pickups with our S3 Pickup Switch Upgrade.

Switch legend for **SW1**, **SW2** and **SW3**: D = Down, U = Up, no symbol is Off (center position)
 Switch Legend for **SW4**, **SW5** and **SW6**: U = UP, no symbol is Down

SWITCH COMBINATIONS USED BY S3-SWITCH								
##	<u>SW3</u>	<u>SW2</u>	<u>SW1</u>	<u>SW6</u>	<u>SW5</u>	<u>SW4</u>	##	Your description of the pickup sound
1.			D				1.	_____
2.		D					2.	_____
3.	D						3.	_____
4.		D	D				4.	_____
5.		U	D				5.	_____
6.	D		D				6.	_____
7.	U		D				7.	_____
8.	D	D					8.	_____
9.	U	D					9.	_____
10.	D	D	D				10.	_____
11.	U	D	D				11.	_____
12.	D	U	D				12.	_____
13.	U	U	D				13.	_____
14.		D	D			U	14.	_____
15.		U	D			U	15.	_____
16.	D	D	D			U	16.	_____
17.	D	U	D			U	17.	_____
18.	U	D	D			U	18.	_____
19.	U	U	D			U	19.	_____
20.	D		D		U		20.	_____
21.	U		D		U		21.	_____
22.	D	D	D		U		22.	_____
23.	U	D	D		U		23.	_____
24.	D	U	D		U		24.	_____
25.	U	U	D		U		25.	_____
26.	D	D		U			26.	_____
27.	U	D		U			27.	_____
28.	D	D	D	U			28.	_____
29.	U	D	D	U			29.	_____
30.	D	D	U	U			30.	_____
31.	U	D	U	U			31.	_____
32.	D	D	D	U		U	32.	_____
33.	U	D	D	U		U	33.	_____
34.	D	U	D	U		U	34.	_____
35.	U	U	D	U		U	35.	_____

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