



# Application Note

## Bourns® Model PDB182-GTRB Blend-Balance Guitar Potentiometers



Model PDB182-GTRB

Electric guitar manufacturing is a multi-billion dollar industry with major manufacturers established worldwide. From the introduction of the first mass-produced electric guitar in 1950, guitarists have been mesmerized with advances in technology and the wide array of after-market parts commercially available for guitar upgrades. Specialty products such as the Bourns® PDB182-GTRB allow the guitarist multiple functions utilizing a single control. This application note addresses utilizing a PDB182-GTRB to blend and balance two pickups in an electric or bass guitar.

### **Bourns® Model PDB182-GTRB Blend-Balance Guitar Potentiometer**

The Bourns® PDB182-GTRB Blend-Balance Guitar Potentiometer is designed to allow the guitarist to blend and balance two pickups with a single 18 mm package size potentiometer. The potentiometer is designed with two independent elements adjusted by a single shaft. Each element has a unique taper as follows:

- Element #1 has a linear output increasing from 0 % to 100 % output over 50 % of the mechanical travel in the clockwise direction. The element then stays at 100 % output for the remaining 50 % of mechanical travel. This output curve is identified in figure 1 as the “M” taper.
- Element #2 is at 100 % output over the initial 50 % of mechanical travel in the clockwise direction. The output decreases linear 100 % to 0 % over the remaining 50 % of mechanical travel. This output curve is identified in figure 1 as the “N” taper.

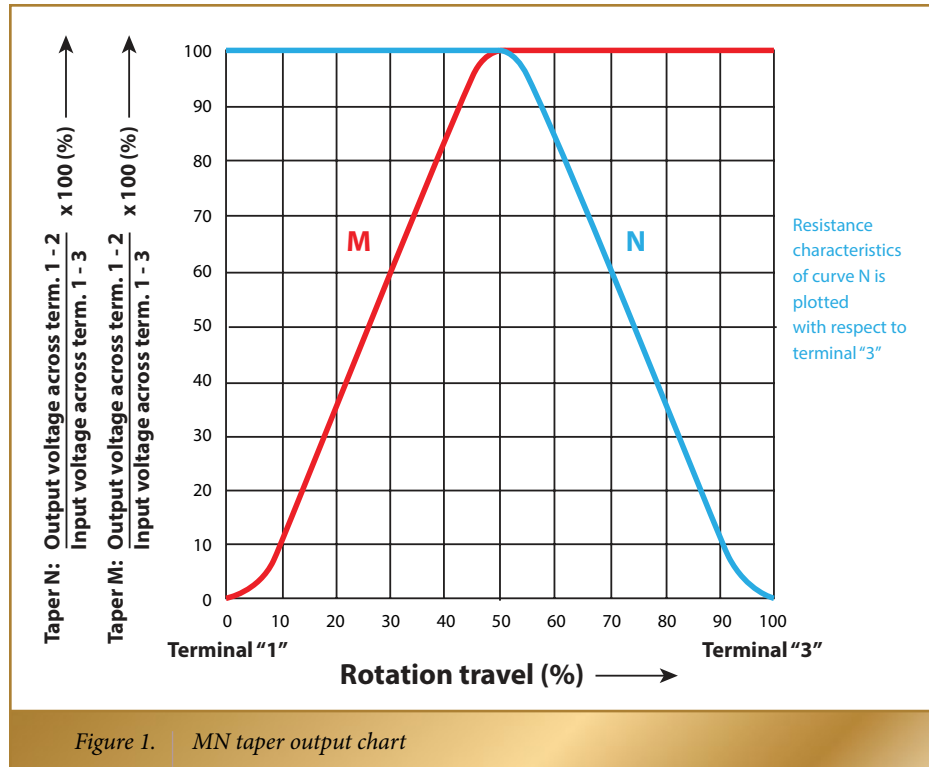
# Bourns® Model PDB182-GTRB Blend-Balance Guitar Potentiometers

## Bourns® Model PDB182-GTRB (Continued)

Figure 1 shows both tapers superimposed on each other. At 50 % of mechanical/electrical travel, both pickups are in the full “on” position. The PDB182-GTRB features a center detent position indicating 50 % of mechanical/electrical travel.



Model PDB182-GTRB



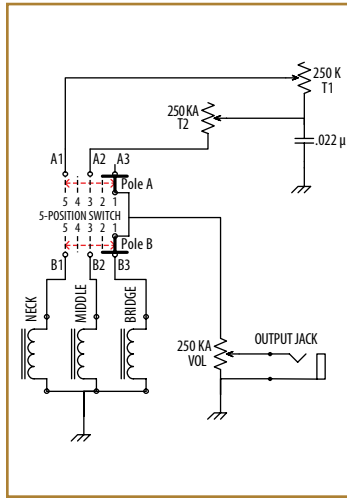
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Model PDB182-GTRB

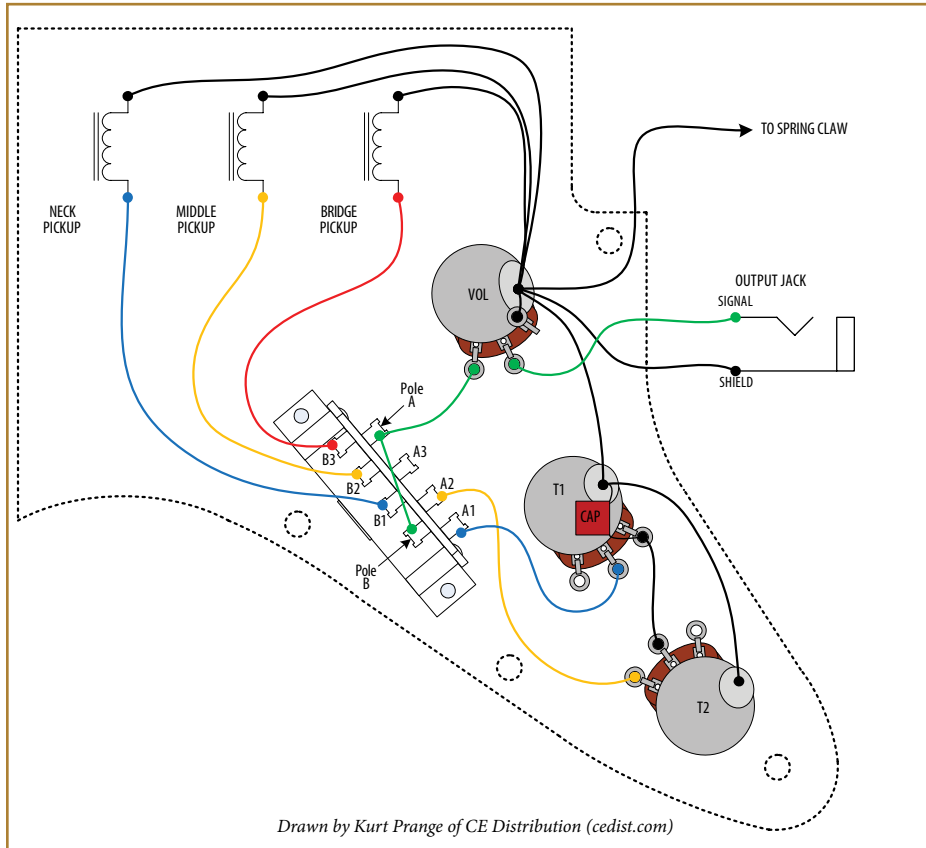
## Bourns® Model PDB182-GTRB (Continued)

There are several ways to wire the PDB182-GTRB Blend-Balance Guitar Potentiometer. This application note will provide a common way of replacing a tone potentiometer with a blend-balance potentiometer, providing added tonal flexibility to a guitar. Figure 2 shows a standard wiring diagram for a guitar with three single-pole pickups with a master volume and 2 tone controls, and 5-position switch on-board.



| Pickup Selector Switch Position | Neck Pickup | Middle Pickup | Bridge Pickup | TONE CONTROL IN EFFECT |
|---------------------------------|-------------|---------------|---------------|------------------------|
| Position 1                      |             |               | ON            | No Tone Control        |
| Position 2                      |             | ON            | ON            | T2                     |
| Position 3                      |             | ON            |               | T2                     |
| Position 4                      | ON          | ON            |               | T1 & T2                |
| Position 5                      | ON          |               |               | T1                     |

- Common tone capacitor values include .022  $\mu$ F, .047  $\mu$ F and .1  $\mu$ F
- Note: using a smaller capacitor value produces a brighter sound.



Drawn by Kurt Prange of CE Distribution (cedist.com)

Figure 2. Wiring diagram for standard electric guitar.

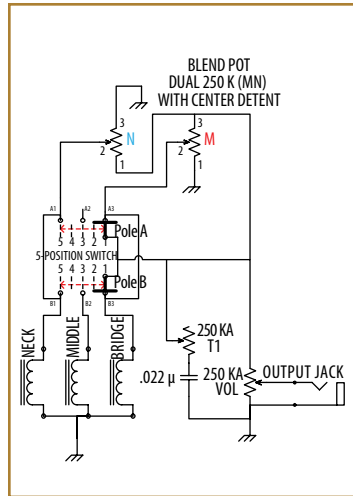
# Bourns® Model PDB182-GTRB Blend-Balance Guitar Potentiometers

## Bourns® Model PDB182-GTRB (Continued)

Figure 3 shows a modified wiring diagram for a guitar with three single-pole pickups with a master volume, master tone, blend-balance control, and 5-position switch on-board. In the matrix, you will see the added tonal flexibility and capability from replacement of a tone potentiometer with a blend-balance potentiometer.

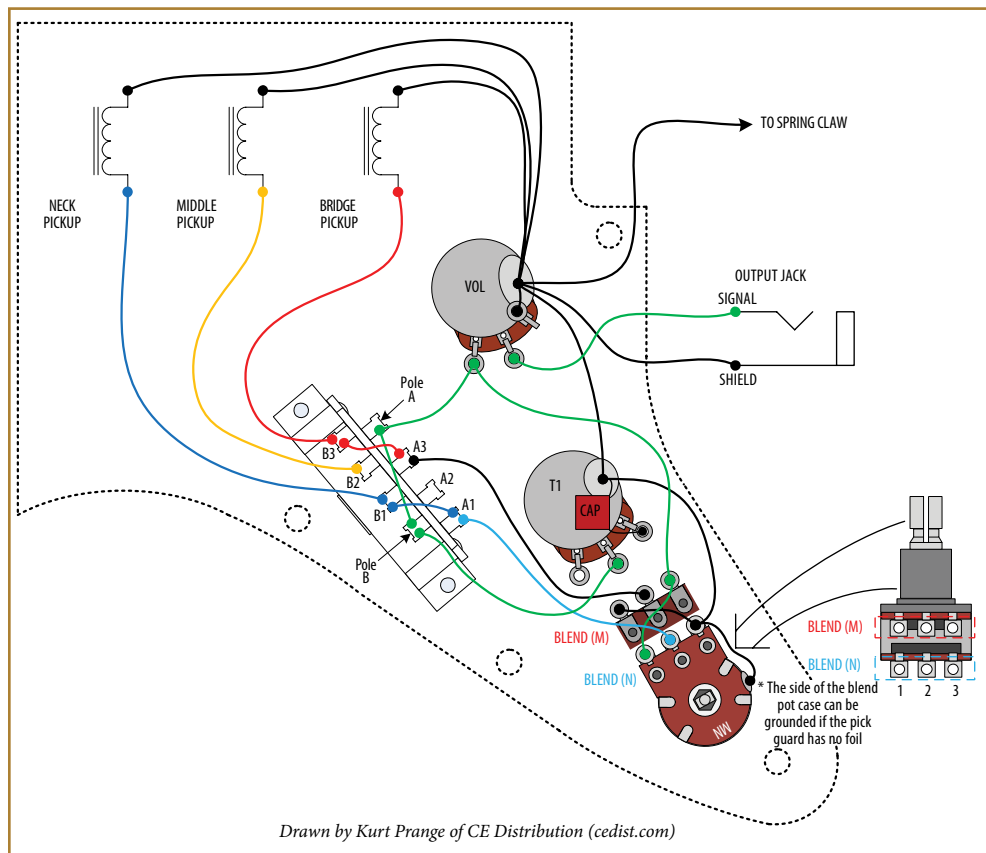


Model PDB182-GTRB



| Pickup Selector Switch Position | Neck Pickup | Middle Pickup | Bridge Pickup | Blend Pot Effect  |
|---------------------------------|-------------|---------------|---------------|---|
| Position 1                      | ON          |               | ON            | Turn Blend Pot CW of detent to FADE OUT NECK (FULL CCW IS SILENT)   |
| Position 2                      | ON          | ON            | ON            | Turn Blend Pot CW of detent to FADE OUT NECK (FULL CCW IS SILENT)   |
| Position 3                      |             | ON            |               | MIDDLE PICKUP ONLY (slight change in tone with Blend Pot change)    |
| Position 4                      | ON          | ON            | ON            | Turn Blend Pot CCW of detent to FADE OUT BRIDGE (FULL CW IS SILENT) |
| Position 5                      | ON          |               | ON            | Turn Blend Pot CCW of detent to FADE OUT BRIDGE (FULL CW IS SILENT) |

- The master tone control is in effect for every switch position and all pickups at once.
- The volume pot works normally.



Drawn by Kurt Prange of CE Distribution (cedist.com)

Figure 3. Wiring diagram for modified electric guitar with added blend-balance control.

## Bourns® Model PDB182-GTRB Blend-Balance Guitar Potentiometers

### OTHER BOURNS® GUITAR POTENTIOMETERS AVAILABLE

Bourns® Sensors and Controls Product Line now offers a full line of guitar potentiometers including the following:



Model PDB182-GTRB

- Model 82 Vintage Guitar Potentiometer
- Model 95 Premium Guitar Potentiometer
- PDB241-GTR Series Standard 24 mm Guitar Potentiometer
- PDA241-HRT Series 24 mm Guitar Potentiometer with high torque
- PDB181-GTR Series 18 mm Mini-Guitar Potentiometer
- PDB183-GTR Series 18 mm Guitar Potentiometer with push-pull switch for phase switching capability

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