

TESORO CIBOLA



GROUND BALANCE & PINPOINT BUTTON MODIFICATION

By Sven Stau
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Get some added performance by replacing the internal factory fixed GB with an external user friendly, fully adjustable control. It is a fairly simple mod.



I have to give credit to Keith Southern of Georgia to first posting this mod. From his own words:

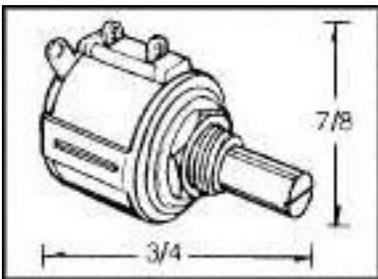
"It really has turned out to be a beneficial mod that I believe exceeds the Vaquero. The Vaquero and Cibola look the same but have a different I.C chip in them for the disc range and such. And the Cibola seems to have won out on the iron handling abilities compared to the Vaquero in my opinion any way. Seems the Cibola can tolerate a faster sweep speed also without losing depth like the Vaquero does.

So this is probably the best of both worlds. Plus it really gets down there in the bad ground now. I have targets buried in my yard it wouldn't touch till the ground balance mod it was way to positive for the soil now it eats up the deeper items that a Nautilus can't even hit because of all the blow back from the hot ground.

The mod works great and the all metal is smooth and deep as I have seen in a detector....."

First off, let's make it perfectly clear that your Tesoro Warranty will be void if you do any modifications to your Tesoro metal detector. If you screw up, it's junk!!!

Parts needed:



Bourns Precision 10 turn Potentiometer, 50K ohms, Mouser Part #652-3540S-1-503L

<http://www.mouser.com/Search/ProductDetail.aspx?qs=v8eK7PNYWrvZdWZgRONwJq%3d%3d>

Interesting facts about Trim Pots can be viewed at this website:

<http://sound.westhost.com/pots.htm>

Adding a toggle switch to switch back and forth from All Metal to Discriminate mode like the Tejon completes the GB mod. The toggle switch replaces the pinpoint button. You can use any type of toggle you like, spring back toggle or non spring back toggle. I decided on a small 2 position on/off, with no spring back. This way I can hunt either mode.

I used this toggle:

Mountain Switch, Mini Mouser part #1055-TA2120-EVX

http://www.mouser.com/Search/Refine.aspx?Keyword=1055-TA2120-EVX&Ns=P_SField



Anti-static Wrist Strap, this is worn to ground yourself out. Protects sensitive electronic components and computer boards from ESD (electrostatic discharge) damage.

Can be purchased at Radio Shack:

<http://www.radioshack.com/sm-anti-static-wrist-strap-with-cord--pi-2103245.html>

Lastly, you will need some thin wire, any color will do as long as they are two different colors.

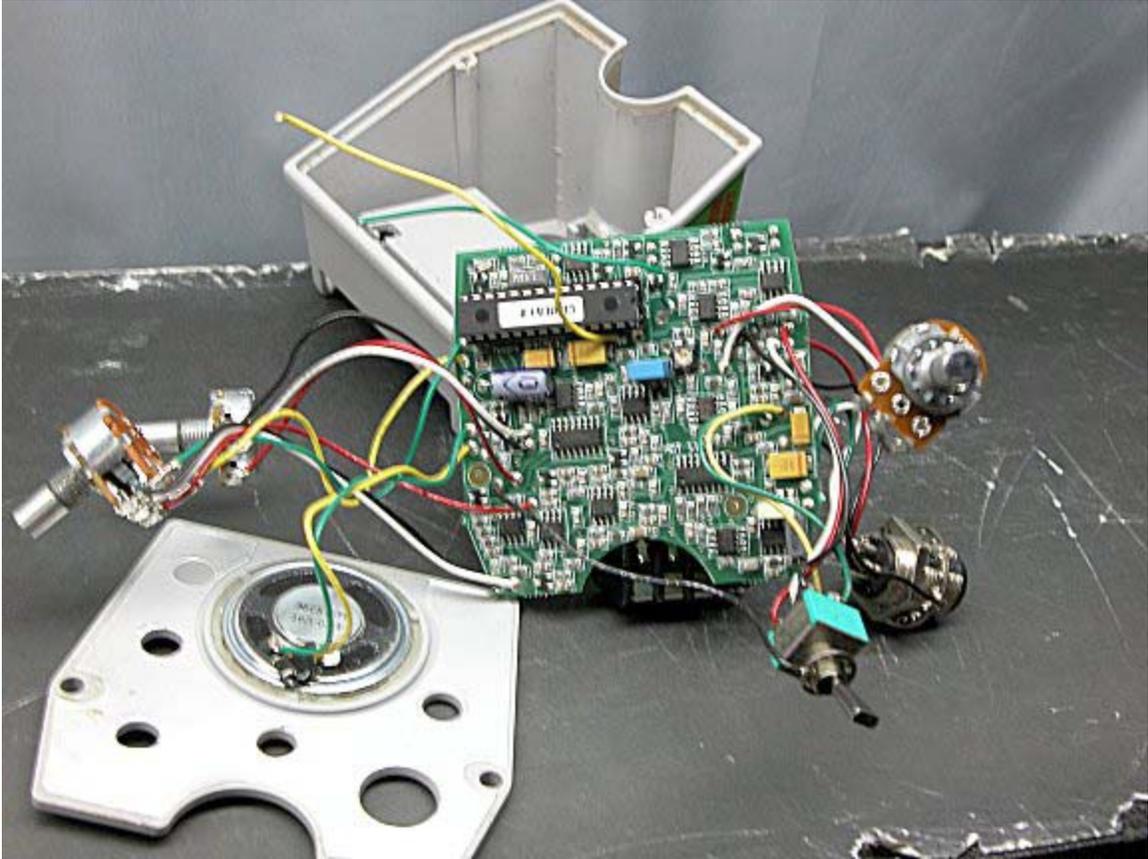
If you have a parts computer sitting around, there's plenty of good colorful wire inside.

Let's begin the mod. Put your Anti-static wrist strap on and ground it out. Make sure the Cibola 9 volt battery has been removed.

Remove the control housing off the upper arm rest, there is a small screw under the armrest that holds it in place. Once the control housing has been removed. You will spot a large diameter hole pre-drilled into the armrest. This is where to toggle switch will slide down into. Just like the Tejon and the *Vaquero*.

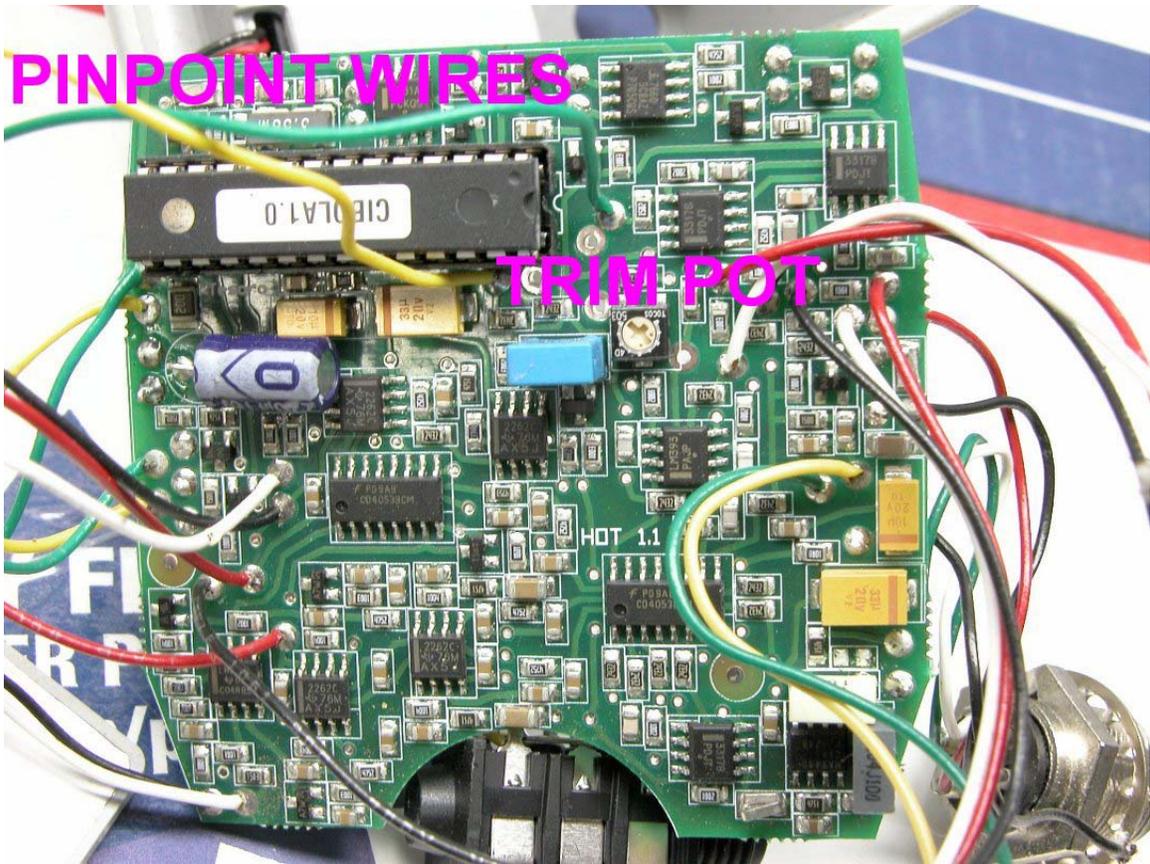
Remove all knobs off the faceplate. Next step is important. Take different color Sharpie markers and color the ends of each pot shaft. Write down the color and what control function they are for. This way you know exactly what hole on the face plate they will be going back into.

Remove the faceplate, there are two screws holding it in place. Carefully pull it out of the control box housing. Loosen up all pot knobs as well as the pinpoint button. Remove the pots and snip the green & yellow wires off the pinpoint button. Make sure you keep the two pinpoint wires away from everything while you work. Option, if it makes things easier for you, de-solder the speaker wires, and re-solder later.



Take the Bourns pot and trim the shaft back with a Dremel tool about $\frac{1}{4}$ " using a fiber wheel. Do a little at a time so as not to heat up the shaft too much and possibly melt the internals of the pot. I only did this to bring the knob closer to the faceplate. You will be replacing the pinpoint switch with this pot. The hole in the faceplate is a little bigger than the pots screwed body. This makes for some slop. I hunted around for a plastic washer that was the same thickness as the faceplate and Dremel'd it to a precise fit. Now the pot fit perfect in the hole. Lay the faceplate aside for now.

Pull the circuit board out carefully. Locate the internal trim pot.



It has to be removed, don't waste your time trying to de-solder it. It is much faster to take a pair of precision wire cutters and carefully slide the jaws under the trim pot contact tabs, there are 3 tabs. Pull up on the pot slightly and snip the tab. It takes about 10 seconds to snip all three.



Get two lengths of colored wire, these will be soldered to the circuit board. Do not waste your time trying to solder the wires to the tabs the trim pots were snipped from. There are two pads with holes in them above and below where the trim pot was removed from. You will use these holes. Look at the picture above and below. Solder wires to these two tabs. These are the same holes used on the Vaquero circuit board.



You will notice there are 3 contacts on the orig. trim pot as well as on the external Bourns pot you will be using. Tesoro only uses two of the pots contacts. You may ask why there 3 trimmer contacts soldered to the circuit board? Two are being used, the third was just soldered to a dummy pad that provides no function.

Look at the photo where I soldered the “blue” wire. This wire will be soldered to tab position on the Bourns pot tab numbered 2. The other “white” wire will be soldered to Bourns pot tab numbered 3. Number 1 tab will not be used at all. Once your soldered up, the GB mod is done.

Word of caution, if you soldered the wires to the wrong tabs, the GB control will work in reverse!! If soldered correctly, turning the GB knob clockwise makes the detector go positive and counterclockwise goes negative.

The nice thing about a 10 turn GB control is you get a much finer control adjustment than using a $3\frac{3}{4}$ turn control used on the Tejon and Vaquero.

Time to add the toggle switch under the armrest. First drill a small 1/8" hole under the control housing directly on top of where the large hole in the armrest is. The two pinpoint wires (green, yellow) will be pulled thru the hole in the housing. Set the housing aside.

Take your armrest, center punch thru the hole a dimple from inside directly in the center where your switch will be inserted. Drill a hole for the switch, probably 1/4" hole, take your toggle switch and make sure it fits.

Now solder the toggle to the two wires to the toggle. Time to reassemble. Carefully insert and reposition all the pots in their correct holes, tighten up all the nuts. Carefully push the circuit board back in place and position the pot wires inside the housing so the faceplate can be pushed gently back on flush with the housing. Screw in the face plate screws, not too tight.

Take the toggle and insert it into the armrest, tighten up the nut. Depending upon your preference, position it so that when pushing the toggle forward it switches the detector into Disc. Mode or All Metal mode. Then reattach the housing to the armrest. Extra toggle switch wire will be pushed into the armrest. You are done!!!



Time to replace your control knobs. I put some small o-rings underneath them to keep dirt, etc out of the pots. As well as to put slight tension on the GB and Threshold controls. Less chance for them to be accidentally bumped changing your GB setting.



You can use any knobs you like, matching or otherwise. The bourns pot has a $\frac{1}{4}$ " round shaft, so any knob that is made for $\frac{1}{4}$ " shafts can be used. I had one laying around from an old Garrett detector and used it for the GB. When I get around to it my Cibola will have all matching knobs.

Knobs can be purchased from:

http://mouser.com/Search/Refine.aspx?N=254090&Keyword=knobs&Ns=P_SField%7c0&FS=True

www.jameco.com

A note about the toggle switch. Keith Southern used a different one:

"Pinpoint wires are connected to a three position toggle switch pull it for momentary push it for all metal lock or center is discriminate. Just remember on the switch when its in the off position center in this case the wires are an open circuit so its in disc when you turn on the switch you connect the wires and put it in all metal."

Here's a picture of a Silver Sabre U-max that I mod'd a few years ago. When I got it completely finished all knobs matched. It worked great. Sort of a mini Tejon.



