

# Adjusting Joystick Pots with an Ohmmeter

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The MicroStar Encoder joystick pots can be adjusted and centered using an ohmmeter. This procedure will allow you to set all of the pot positions as you assemble the system. It is still a good idea to perform the voltage tests as a final test before you install the PIC in the Encoder. Here is the procedure:

- 1.) Connect an ohm meter between one end of the joystick pot and the center position (wiper) of the pot.
- 2.) If this is a “right-left” joystick or trim lever, move the stick to the left position and make sure the resistance value goes down. If it does not then move the ohmmeter lead to the opposite end of the pot, leave the center (wiper) pot lead where it is. Now moving the joystick to the left should make the resistance go down.
- 3.) Holding the joystick to the full left position; adjust the pot center position until you record a minimum value. You need to be careful not to go to the pot’s physical limit or you will have a “dead” spot at the left side of the stick. You want a little resistance at the full left position, for example if you are using a 5K ohm pot adjust the center position to get about 100 ohms of resistance.
- 4.) After you have finished the pot position adjustment, lock down the pot and move the stick to the full right position the resistance should increase. The value at the full right position should be around 1200 ohms for a 5K pot.
- 5.) The ohmmeter lead that is connected to one side of the pot, identifies the ground side. The unconnected end of the pot is the power side, and the wiper is the center.
- 6.) You can now solder wires to the pot, use some kind of color code to make sure and keep track of the ground and power side of the pot. You do not want to connect the pot backwards!
- 7.) This procedure needs to be completed for every pot in the radio.
- 8.) On the joystick and trim levers that move up and down, the up position should cause the resistance to decrease. Up is like up elevator, pulling back on the stick or trim lever.

There are a couple of important issues that can cause you problems. I have listed the details below and what you can do to solve the problem.

- 1.) Pot range to large. If the pot range, the maximum value read on the ohmmeter after the center adjustment is complete, is over 1500 ohms you may over range the Encoder. You can fix this by adjusting the value of the “pad” resistors on the Encoder. Listed below are the resistor designators and there default values:
  - a. R41           Aileron       100
  - b. R42           Elevator      100
  - c. R43           Rudder       100
  - d. R44           Throttle      100

e.	R24	Aileron trim	5.1K
f.	R25	Elevator trim	5.1K
g.	R26	Rudder trim	5.1K
h.	R27	Throttle trim	5.1K
i.	R28	CH6	100
j.	R30	CH7	100

The trim channel have “pad” resistor in place already, the other channels have a very low resistance effectively no “pad” resistance. The trim levers can have a resistance range as high as 3K and still function. If you have a range problem on one of the other channels you can increase the “pad” resistance. The total resistance, “pad” plus the pot, should not exceed 10K.

- 2.) Single stick radios typically need a “pad” resistor installed on the rudder stick. This is because the rudder stick on single stick radios has a larger range of motion. When a 5K rudder pot is used, I replace R43 with a 5.1K resistor. I have had to do this with every single stick radio I have tested.