

## DESCRIPTION

Many prop control programs require just a handful of instructions – the essentials like **HIGH**, **LOW**, **PAUSE**, and **GOTO**. Once the general actions have been identified and coded, the next task to set prop timing. Depending on your particular need, setting prop timing may be simple or may prove to be a bit persnickety. This is where the Prop-Pot can help; with just a bit of code the Prop-Pot allows you to adjust prop timing without rewriting your program.

The Prop-Pot allows you to easily take advantage of the **POT** instruction supported by the Prop-1 controller, as well as the **RCTIME** instruction supported by BASIC Stamp<sup>®</sup> 2-family (BS2) controllers from Parallax, Inc. The Prop-Pot serves as an adjustment dial on your prop. This real-time control allows you to see the effect of your adjustment *while* the prop operates. The result is that you can adjust the timing (or other variable aspect) of your quickly, precisely, and with ease.

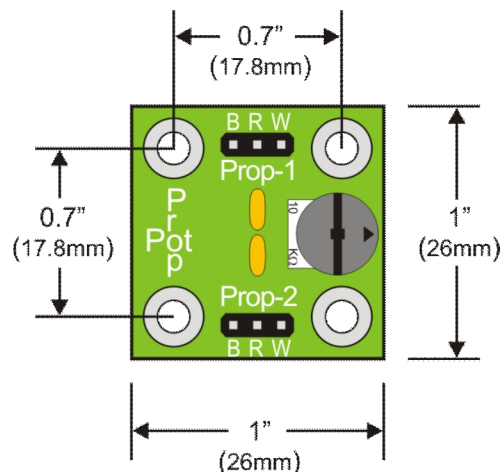
## PRODUCT APPLICATIONS

- Analog control (speed, level, threshold, etc.) for props and automation

## FEATURES & BENEFITS

- Easily connects to the Prop-1 Controller with a servo extender cable (#805-00002)
- Potentiometer can be moved by hand or with a small screwdriver
- Mounting holes for permanent installation
- Compact size: 1" x 1" (25.4mm x 25.4mm)

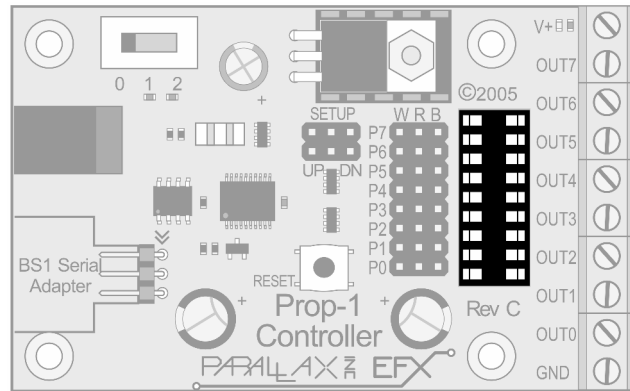
## MECHANICAL



## Connecting to the Prop-1 Controller

Before using the Prop-Pot with you may need to make a small modification to the Prop-1. The Prop-1 controller uses the ULN2803 to drive outputs OUT0..OUT7 when the power switch is set to position 2. Regardless of the power switch setting, the ULN2803 connection interferes with the RC circuitry of the Prop-Pot.

If your prop does not require the use of the high-voltage outputs (OUT0..OUT7) then the simplest modification is to remove the ULN2803 from its socket as shown below.

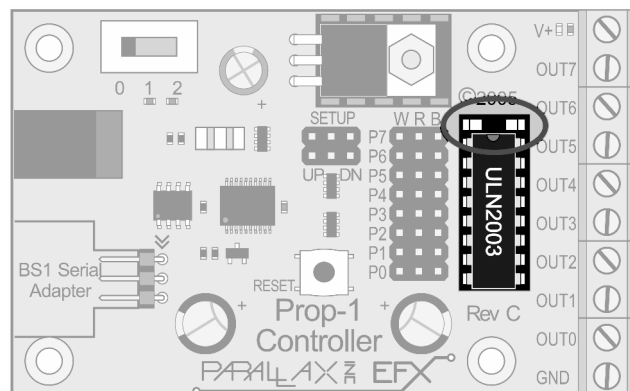


Removal of the ULN2803 is easy with a small-bladed screwdriver. Save the ULN2803 as a spare for other Prop-1 controllers (for protection, push the ULN2803 pins into the black, anti-static foam that the Prop-1 was shipped with – this serves as a perfect chip holder). With the ULN2803 removed the Prop-Pot may be connected to any available I/O pin (P0..P7). Note that if using P6 or P7 (recommended) the SETUP jumper for that pin must be removed.

If your prop requires the use of any of the high-voltage outputs, EFX-TEK recommends that you configure your Prop-1 I/O as follows:

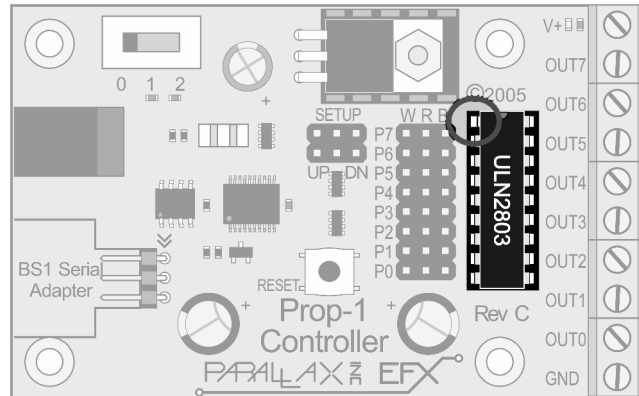
- P7** Prop-Pot connection
- P6** Trigger input (use SETUP jumper as required)
- P5** Output
- P4** Output
- P3** Output
- P2** Output
- P1** Output
- P0** Output

By adopting this configuration the Prop-1 can be adapted to use the Prop-Pot by replacing the ULN2803 with the 7-channel ULN2003 (Digi-Key part number 296-1979-5-ND). The ULN2003A can be aligned such that it does not interfere with Prop-Pot circuitry on P7. Correct alignment of the ULN2003A is shown below – note that the top two pins of the ULN2803 socket are not used.

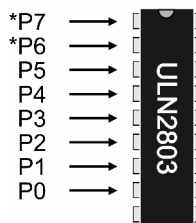


If acquiring a ULN2003 is not convenient, the ULN2803 can be modified to prevent interference with the Prop-Pot circuitry. This modification may also be used when more than one Prop-Pot is to be connected to the Prop-1 controller. *Note that the modification is permanent* – it cannot be reversed, so proceed with caution.

To modify the ULN2803 to be compatible with the Prop-Pot circuitry, remove the associated input pin of the ULN2803 with a diagonal cutter. Be sure that the cut pin is completely removed from the socket before applying power to the Prop-1. The illustration below shows modification of the ULN2803 to allow to be connected to P7.



This technique is useful when two or more Prop-Pot PCBs are going to be connected to the Prop-1 controller. The illustration below shows the ULN2803 pins that are connected to P0..P7 and may need to be clipped.



Remember that only P6 and P7 have SETUP jumpers, so if your prop requires a passive input device (i.e., push-button or switch), you should leave one or both of these pins available for trigger input(s).

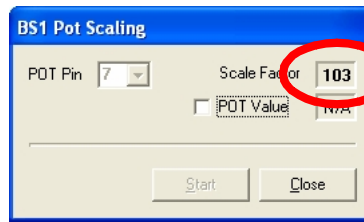
Finally, make the connection between the Prop-Pot PCB (using the Prop-1 header) and the Prop-1 (one of the 3-pin headers, P0..P7) with a servo extender cable, noting the cable colors to PCB markings (W = white, R = red, B = black). If you decide to fabricate your own connections using female post-header sockets, only the W and B pins need to be connected.

## Preparation for Programming

Before using the Prop-Pot in an operational circuit, the board needs to be tested to obtain the correct scale factor for the **POT** instruction. This process should be repeated for each Prop-Pot as small variations in component values can affect the performance of the Prop-Pot in your program.

The calibration test is easy – in fact it is built right in to the Parallax BASIC Stamp Editor. After connecting your Prop-Pot to the Prop-1 controller, connect the Prop-1 to your PC using a serial cable and BS1 Serial Adapter (refer to the Prop-1 documentation of details). Start the BASIC Stamp Editor, the follow the steps below:

1. Click on the *Run* menu, the click *POT Scaling...*
2. In the *BS1 Pot Scaling* dialog, select the pin used by the Prop-Pot from the drop-down
3. Click *Start* to download the test program
4. Rotate the Prop-Pot to both extremes, noting the smallest value displayed for *Scale Factor*
5. Click *Close*



The Prop-Pot / Prop-1 can be demonstrated with a simple program:

```
' {$STAMP BS1}
' {$PBASIC 1.0}

SYMBOL PropPot      = 7           ' Prop-Pot connection pin
SYMBOL Scale        = 103        ' Prop-Pot scale factor
SYMBOL potVal       = B2         ' variable for Prop-Pot value

Main:
  POT PropPot, Scale, potVal      ' read the Prop-Pot
  DEBUG "Prop-Pot = ", #potVal, CR ' display current value
  PAUSE 200                       ' wait 0.2 seconds
  GOTO Main                       ' do it again
```

Run this program (after changing the value for **Scale** to match your Prop-Pot) and then watch the value change as you rotate the Prop-Pot.

## Accessories

---

805-00002      14-inch, 3-pin extension cable; *used to connect the Prop-Pot to the Prop-1 controller*

## Additional Applications

---

For additional ideas and application notes for the Prop-Pot, be sure to visit our web site at the following link:

[www.efx-tek.com](http://www.efx-tek.com)