Installation & Operating Instructions

3-channel Ultimate Trim Relay Board
Discrete Inputs
25-pin D-sub Connectors
Part No. TRB-03FDDi

The Ultimate Trim Relay Board (UTRB) should be mounted in the aircraft in a convenient location using the attached 4-40 hardware and nylon standoffs or washers to allow for clearance under the printed circuit board (PCB) contacts and for ventilation purposes. CAUTION: Be careful to prevent any of the traces on the top or bottom of the PCB from coming into contact with any part of the aircraft structure or mounting hardware as this could short out the circuits. Terminate your wire bundle from the grip with a male 25-pin connector as shown in the schematic. Terminate your wire bundle from the servos, etc., with a female 25-pin D-sub connector.

There are enough ground pins on the connectors for any possible configuration of grips, e.g., if you have two Infinity grips and are using all of the available switches and buttons, you will need approximately 6 grounds per grip or 12 ground wires total. There are a total of 16 ground pins/sockets between the two connectors on the UTRB. So there are more than enough pins to accommodate any quantity of grounds coming from your grips. You may run out of grounds on the input (GRIPS) connector, and, if so, simply loop any additional ground wires around to the output (SERVOS) connector.

In addition, there are plenty of pins on the input connector to accommodate inputs from both sticks, so where you might have had to splice wires in the past, now there is a pin for every input from the second (copilot) grip. As a matter of fact, there are enough pins/sockets so you shouldn't have to splice any wires at all using the UTRB. Please be aware that the PTT switches for the pilot and copilot grips are on discreet circuits so that each headset's mic is operated independently.

The D-sub connectors' pins are rated at 5 amps continuous. The Omron relays are rated at 10 amps continuous. The flap relay traces have been designed to conduct 5 amps continuously in keeping with the draw of the Usher Enterprises (Van's Aircraft) flap motors or our own RV Flap Actuators. CAUTION: It is important to use the designated pin-outs for the flaps, pins 6 and 8, in the 25-pin connectors as shown in the attached schematic, as this circuit is designated to handle the flap motor amperage. It is also recommended that you use at least AWG 22 wire (AWG 20 is even better) for the flaps. The D-sub machined pins can accept up to a number 20 AWG wire and thus pins 6 and 8 <u>on the servo side</u> could be pinned with AWG 20 wire if the flap motor is any appreciable distance from the TRB. You may also elect to use AWG 20 wire for the supply and ground pins (pins 1 and 15) if there is any appreciable distance involved. AWG 22 wire

can handle the 5 amps, especially on an intermittent basis, so going with AWG 20 is just an additional margin for safety and totally at the discretion of the builder.

Be sure to use a fuse or circuit breaker on each of the power inputs for flaps, pitch, and roll trim circuits for protection. When selecting circuit protection for the supply voltage (pins #1,2 &3), keep in mind that you are protecting the wires for the flap, pitch trim and roll trim inputs and select your fuse size accordingly. Current draw for the Ray Allen servo is approximately 150 milliamps unloaded. Current draw for the Usher flap actuator is estimated to be about 1 or 2 amps unloaded and approximately 5 amps when lowering the flaps with an aerodynamic load. Of course, you may also want to add a speed controller in series with the trim power inputs to control the speed of the trim servos. This is optional and in most cases won't be necessary.

Where there have been issues in the past with circuit breakers popping in the flap circuit, it is almost always because of flaps binding somewhere in the linkage. Be sure that your flaps operate freely to avoid any overload issues.

A word about dual grips and circuit logic, switch priorities. On every large aircraft I ever flew with dual controls, the way the trim priorities work is as follows: If the pilot and copilot trim in the opposite direction, the trim motor stops. Trimming in the same direction has no effect. During the preflight, the check was for the pilot to trim in one direction, copilot in the opposite direction to make the trim motor stop; both trim in the same direction to observe no effect on the trim motor. Repeat for all trim motors in both directions. The logic behind this is that if you have a runaway trim situation, you can stop it by trimming in the opposite direction, hold it, and pull the CB for that trim motor. This logic has stood the test of time. The UTRB is set up this way as well. There really is no need for a copilot isolation switch, also known as a "granddad switch," so that junior can't inadvertently trim the airplane. If this were to happen, just trim in the opposite direction to stop the trim motor. However, for those who still want to isolate the other stick, a simple SPST switch on the grip ground wire is all that is required.

Disclaimer & Warranty:

This part was manufactured by PH Aviation Services, Inc. and should NOT be installed in Certified Aircraft. It is intended for use only in Experimental Aircraft and installed by the builder. There are no warranties expressed or implied and purchaser assumes all risk for the operation of this part. However, the purchaser may return this part for repair, replacement, or full refund if it fails to operate as intended at any time during the first 12 months after the date of purchase.

Return Policy

Normally we accept returns only if the part fails to perform as advertised. We will consider a request for a return on an individual case basis, and, if we agree to accept a return, we will charge for shipping costs and a 10% restocking fee.