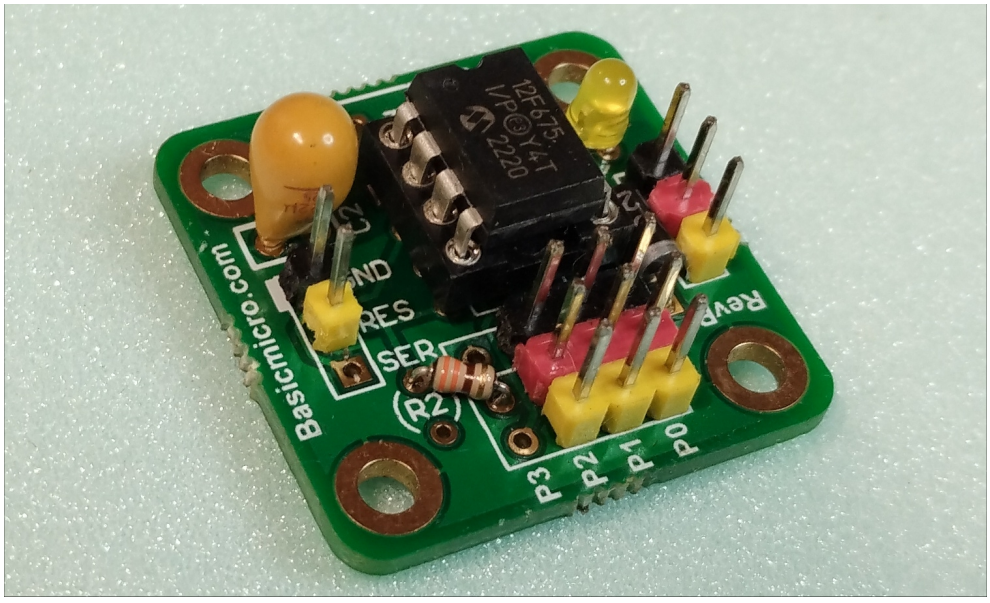
Single-Channel Compound Actuator Emulator using modern servos to replace old escapements on a 'period' S/C Tone set:



This module exactly emulates the operation of a compound escapement setup such as the Elmic Compact and Corporal for rudder, kick-up elevator and quick-blip throttle. If you're more familiar with the old motorised actuators such as the Minimite and Minimo, this module works just the same way.

There's quite a weight saving too over the old actuators when using 5 gramme servos, and with much greater reliability, especially over rubber-driven escapements which failed on a regular basis!

Please note this is not related to the 2.4ghz S/C project, although it shares the same escapement emulation engine I developed for the 2.4g encoder. The S/C radio link remains as it was, 27mhz A.M. super-regen or superhet, but with modern micro-servos replacing the old escapements inside the model.

Operation:

This will be familiar to the Single-Channel enthusiast, but do take time to practise the cadence until its second nature. All S/C actuators and escapements have a 'natural' cadence or rhythm which your button-thumb must learn:

Right rudder - Press & hold
Left rudder - Press, release, press & hold
Kick-up elevator - Press, release, press release, press & hold
Throttle – a quick 'tap' of the button

Failsafe:

The emulator incorporates a 'failsafe' whch will close the throttle if no signal is seen for 60 seconds. In reality its very unlikely a powered S/C model would fly without a correction during this time, so a minute's inactivity is seen as a loss of signal. Normal operation continues during failsafe, its just the throttle that is closed – it can be opened again if our model is stable enough to fly itself for a full minute and have an unwanted failsafe!

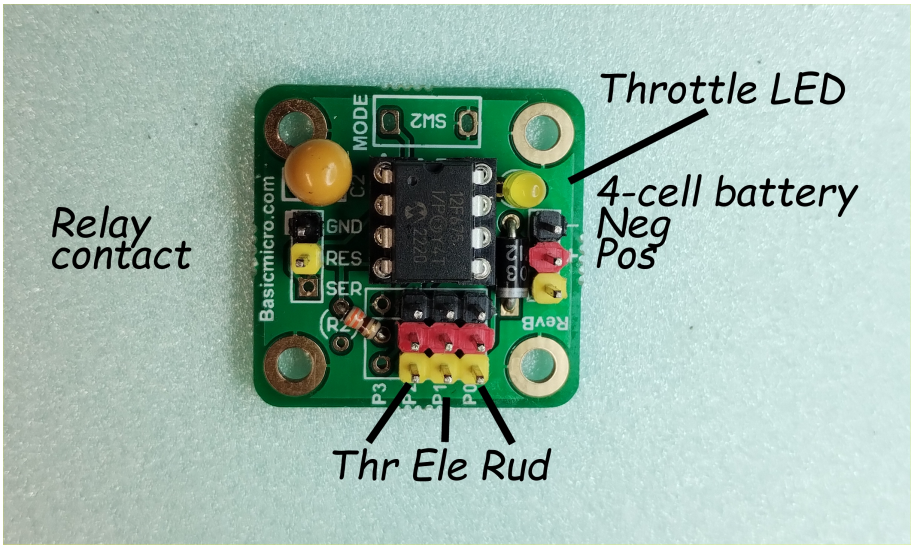
In a glider the throttle failsafe could possibly be used to trip a dethermalizer.

Connecting up

Power is from four NiCd or NiMh cells connected to the battery header unless the throttle connection is actually an ESC for an electric model in which case the BEC within the ESC would power the module and the rudder/elevator servos.

GND and RES are connected to the S/C relay 'make' contact, such that they are connected when the tone button is pressed. Some, but not all, single-channel tone receivers have an open-collector output which can be directly connected without a relay – check the receiver schematic.
The Ripmax 'Pathfinder' is one example of a receiver that can be directly connected.

The actuator emulator is assembled on a commercial PCB with coloured headers for the servos, S/C receiver, and 4-cell battery (unless using an ESC/BEC on throttle)



The servos are plugged in as follows:

P0: Rudder – one for right, two for left
P1: optional kick-up Elevator – third press
P2: optional quick-blip throttle – 3 position sequential with LED off/flash/on for low/medium/high

Note that the on the servo connection headers, the 'signal' wires are nearest the edge of the board, and servo negatives nearest the chip.

Videos:

Current version: https://youtu.be/zCujbsL5iW0 and from 2010 https://youtu.be/dMemPuQUhfk

Availability:

Email me on phil@philg.uk or contact me via the forums & I'll make one for you.
I can also do tiny inline 'single function' ones for rudder-only (ie no PCB)

Technical:

The Actuator Emulator uses a PIC microcontroller with the program written in PIC assembler.

Note:

Battery is 4.8v and pos/neg is annotated on the board, but if the throttle is driving an ESC, the BEC will power the emulator and the servos, so no actuator battery should be connected.

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