

# GEAR and DOOR SEQUENCER

## FEATURES:

- o Sequences Door and Gear Servos for Conflict Free Operation of Landing Gear and Doors
- o Operated by the Retract Channel
- o Works With Mechanical or Pneumatic Systems
- o Two Gear Servo Outputs for Optional Scale Alternating Gear Retract Mode
- o P-47 or P-51 Door Modes (Doors stay open or close after gear is down)
- o Built-In Door Servo Reversing
- o Gear Storage Position Selection
- o Various Modes and Door Reversing Easily Set Via Four DIP Switches
- o Individual Door and Gear Servo Speeds Adjustable from 1 to 10 seconds (with proportional servos only) for Scale-like Operation
- o Works with AM, FM and PCM radios
- o No Special Connectors Required
- o Current Consumption is less than 2 mA
- o Microcontroller software/firmware by Sergio Zigras

## OVERVIEW:

The **JOMAR PRODUCTS Gear and Door Sequencer** is an integrated microcontroller based unit that controls and sequences landing gear servo(s) and the gear door servo. It plugs directly into the retract channel of the R/C system with an installed servo connector. The controller sequences the operation of the landing gear servo(s) and the door servo so that only one function is operating at a time. For example, during the landing gear extension sequence the door servo travel is completed before the gear servo(s) are commanded to move. During the retract sequence, the door servo is commanded to the fully open position before the gear servos(s) are commanded to begin retracting. The **Sequencer** operates up to two landing gear servos and one door control servo. A "Y" harness may be used for additional servos. The servos may be plugged directly into the **Sequencer**. No special connector adapters are required. Extensive glitch filtering software checks the retract channel input command, rejects any glitches

and outputs two landing gear servo pulses and one door control servo pulse only between 1.0 ms and 2.0 ms. This decreases the possibility of over driving a servo.

## IMPORTANT NOTE:

The **SEQUENCER** is especially wired for the type of radio system servo connector installed, e.g., Futaba, JR/Hitec/Z, or old Airtronics. The output socket connector polarity is different for old style Airtronics than for other radio brands.

**CAUTION - DO NOT PLUG AN OLD STYLE AIRTRONICS SERVO INTO A SEQUENCER CONFIGURED WITH A FUTABA OR JR/HITEC/Z PIGTAIL. DO NOT PLUG A FUTABA OR JR/HITEC/Z SERVO INTO A SEQUENCER CONFIGURED WITH AN OLD STYLE AIRTRONICS PIGTAIL. SERVO DAMAGE WILL RESULT.**

## INSTALLATION PROCEDURE:

The **Gear and Door Sequencer** microcontroller software assumes that extended or lowered landing gear occurs when the transmitter retract switch is in the wide or 2.0 ms (milli-second) position. Retracted or raised landing gear occurs when the transmitter retract switch is in the narrow or 1.0 ms position.

The gear control servos must be mechanically installed when they are in the 2.0 msec position and the landing gear is extended. The door control servo must be installed so that the door is open when the servo is in the 2.0 msec position.

A simple test may be used to determine the wide or 2.0 ms position of your retract switch. Plug a standard servo directly into the retract channel. When the retract switch is switched from the narrow or 1.0 ms position to the wide or 2.0 ms position, a standard Airtronics or JR servo will rotate clockwise when viewed from the top. A standard Futaba servo will rotate counter-clockwise. A digital pulse meter or oscilloscope may be used instead of the servo.

**IMPORTANT:** If you are using a programmable computer transmitter, the retract channel servo travel volume and end point adjustments will not work with the Gear and Door Sequencer. They must be set to 100% travel and normal end points of 1.0 ms and 2.0 ms before starting actual installation.

Plug the **Gear and Door Sequencer** into the receiver retract channel. Plug the Gear servo into Position 1 and the Door servo into Position 3 as shown in Figure 1. An optional second Gear servo may also be plugged into Position 2. (Note: Position 2 servo output is reversed from Position 1).

Turn on the transmitter and receiver. Flip the retract switch to the wide or 2.0 ms position. The servos will move to the position corresponding to the extended or gear down/doors open position. Mechanical installation must be made with the servos in this position.

**SERVO SPEED ADJUSTMENTS:**

The Door servo and Gear servo(s) travel speeds maybe individually adjusted with an approximate range of from 1 to 10 seconds of travel time. To decrease either the Door servo or Gear servo(s) speed, using a small screwdriver, rotate the appropriate adjustment control counter-clockwise. **CAUTION - Do not force the adjustment control pots beyond their range of travel. This will damage the pot and void the warranty.** The fully counter-clockwise position produces the slowest travel speed and the fully clockwise position produces the fastest travel speed. The **Sequencer** is factory set for fastest travel speed. This servo speed adjustment feature will operate only with proportional or standard servos. Most "retract" servos are just two position and not proportional. This type of "retract" servo cannot be slowed by the **Sequencer**.

The **Gear and Sequencer** case may be opened by removing the two oval locking rings. This is easily done with a thumb nail or thin

screwdriver inserted behind each oval ring. Ensure that the servo speed adjustment controls shown in Figure 1 are set fully clockwise. Set the four DIP switches as desired by following the options in Table 1. Close the case and reinstall the oval locking rings by pressing them into place. Be sure that the servo lead is centered in its opening and not pinched.

**MODE SWITCH OPTIONS:**

**Switch 1 - Door Mode Switch (P-47 or P-51)**

**Switch 2 - Door Servo Reversing Switch**

**Switch 3 - Gear Storage Position Switch**

**IMPORTANT - This switch must be properly set to prevent gear and door cycling when turning on the receiver and transmitter.**

Off Position: Model is normally stored (receiver off) with Landing Gear in the Extended position.

On Position - Model is normally stored (receiver off) with Landing Gear in the Retracted position.

**Switch 4 - Retract Mode Switch**

**TABLE 1: DIP SWITCH SETTINGS**

Dip Switch	OFF	ON
1	Doors Stay Open (P-47 Style)	Doors Close (P-51 Style)
2	Door Servo Normal	Door Servo Reverse
3	Model Stored With Gear in Extended Position	Model Stored With Gear in Retracted Position
4	Gear Servos Operate Simultaneously	Gear Servos Operate Sequentially

