

White Paper
Skyartec Radio Systems
Updated 09/14/09

Findings and Observations:

1. In analyzing the appropriate radio systems available to go with the new FMA Direct Model Shop RTF's, the main criterion was that the CPII be adjustable using a proportional control.
2. The 4 and 5 Channel systems do not support this out of the box.
3. The 7 Channel system does support this. CPII remote can be set up on the control identified as V3 on the 7 Channel transmitter, provided that dip switch #5 (labeled Gyro) is positioned UP.
4. Along the way, while using the 7 Channel system, we discovered an unusual and potentially fatal anomaly that is described below.
 - a. The following criteria must be met in order to experience the anomaly:
 - i. TX dip switch #9 must be in the DOWN position. This is required on the Cessna for normal aileron operation on servos Ch1 and Ch6
 - ii. TX dip switch #10 must be in the UP position.
 - iii. FLIGHT MODE (FM) switch must be DOWN (labeled position 1).
 - iv. When the above criteria are met, control V1 acts as a sub-trim control affecting the neutral position of the aileron servos. The aileron control stick moves back and forth based on the new center position dictated by the position of V1.
 - v. When the FM switch is positioned UP (NORMAL), the new center positioned is remembered.
 - vi. At best, changes to the above settings result in minor to major trim changes when flipping the FM switch.
 - vii. In the worst case, what makes this potentially fatal is that if while the FM switch is positioned DOWN, control V1 is moved clockwise past its neutral, the result is that the aileron control sticks can not over-ride the new center. There is essentially no aileron control and the ailerons will go hard over when FM switch is in position 1.
 - b. It is important to note that when TX dip switch #9 is in the UP position, the radio changes function from coupled ailerons (on Ch1 and Ch6) to elevon control (on Ch1 and Ch2). This is the required position for the FunJet.
 - c. In the case of (b) above, TX dip switch #10 has no effect. Also, control V1 has no effect and the function of the FM switch changes to dual rates. In this situation, other than a slight trim change to the model when switching between high and low rates, there are no ill effects. This situation is *not* considered potentially fatal. The customer should be made aware that the switch labeled FLIGHT MODE functions as a rate switch when flying the FunJet and that the model may require re-trimming when switching between low and high rates.

- d. There is a workable solution to the potentially fatal anomaly described above as it relates to the Cessna. During production, we will need to ascertain whether the procedure is necessary. The radios may be O.K. out of the box, or they may require the procedure I will describe to eliminate the potentially fatal condition. Once the condition is remedied, and the TX dip switches are set correctly, controls V1 and the FM switch are essentially rendered “disabled”.

Model and Transmitter Setup:

In the remainder of this document, I will detail a procedure to eliminate the fatal nature of control V1 and the FM switch when the 7 Channel radio is used to fly the Cessna model. The procedure negates the need to alter the transmitter electrically. The procedure permanently fixes the condition so long as the conditions described above in 4a are not encountered by a curious customer, the solution is final. In the event that a customer decides to alter the settings of TX dip switch #9, #10 and controls V1 and the FM switch, this white paper will be available to remedy.

The following analysis is based on the Skyartec 7 Channel, 2.4 GHz system.

Following are the RX Channel Definitions broken down by model type:

Setup for Cessna 182 (Mode 2 assumed)

Stick or Control Label	Corresponding RX Ch #	Function
Ail	1	Aileron (on y harness)
Elv	2	Elevator
Tht	3	Throttle (ESC)
Rud	4	Rudder
V3	5	CPII Remote (proportional)
N/A	6	Not used
Gear	7	Not used (optional CPII Remote ON/OFF)

Setup for FunJet (Mode 2 assumed)

Stick or Control Label	Corresponding RX Ch #	Function
Elvn 1	1	Left Elevon
Elvn 2	2	Right Elevon
Tht	3	Throttle (ESC)
Rud	4	Not used
V3	5	CPII Remote (proportional)
N/A	6	Not used
Gear	7	Not used (optional CPII Remote ON/OFF)

In order to achieve the above, and to know that flight surfaces will go in the proper direction based on the aircraft servos and servo installation, the following tables detail the correct TX dip switch settings:

(all of the following servo reversing switch positions need to be verified on the actual airplanes as I was switching switches around a lot during my analysis)

TX Dip Switch Settings Cessna 182

TX Dip Switch #	Setting UP/DOWN	Notes
1	DOWN	
2	DOWN	
3	UP	
4	DOWN	
5	UP	Activates V3 for CPII RMT
6	DOWN	
7	DOWN	
8	DOWN	
9	DOWN	Sets coupled ailerons Ch1/Ch6
10	DOWN*	Defines Final Position, see procedure below, implement if required.
11	DOWN	
12	UP	Switch to DOWN changes TX to Mode 1

TX Dip Switch Settings FunJet

TX Dip Switch #	Setting UP/DOWN	Notes
1	UP	
2	DOWN	
3	UP	
4	DOWN	
5	UP	Activates V3 for CPII RMT
6	DOWN	
7	DOWN	
8	DOWN	
9	UP	Sets elevon mix Ch1/Ch2
10	DOWN*	Procedure below not required for FunJet TX. We may choose to implement the procedure across the board, or make sure we never ship a FunJet TX for use with a Cessna airplane.
11	DOWN	
12	UP	Switch to DOWN changes TX to Mode 1

*Procedure for eliminating V1 and FM switch interaction with aileron trim setting for Cessna 182:

1. Turn TX and RX power ON.
2. Make sure TX dip switch #9 is positioned DOWN.
3. Position TX dip switch #10 DOWN.
4. Confirm the procedure is required as follows: with FM switch in either position, and with aileron stick and trim at neutral, moving V1 should result in no motion of the aileron servos away from center. If you get any motion, perform the remainder of this procedure.
5. Position TX dip switch #10 UP (during the procedure).
6. Position FM switch DOWN (marked position 1).
7. Rotate V1 back and forth very slowly around neutral while at the same time switching FM switch UP (Normal) and DOWN (position 1). Goal is to eliminate any change in servo position of ailerons between FM switch UP and FM switch DOWN.
8. Position TX dip switch #10 DOWN (Final location).
9. Check that the procedure was successful as follows: with FM switch in either position, moving V1 should result in no motion of the aileron servos away from neutral. If you still get any motion, repeat the procedure.

OUTCOME: V1 and FM switch interaction with ailerons will be eliminated regardless of FM switch position. Do not alter the position of TX dip switch #10 after this procedure is complete.