

## Setup and Mixing

**Setup:** Volume VI is the last installment of Project Extra and it will help you get started with the process of setting up your airplane, but the final outcome is entirely in your hands. No one can tell you how to set up your model to work just right for your personal preferences. In fact, Erik Richards and I will be setting up two separate programs/models on his radio for this Extra—one for his style of flying and one for mine. Our preferences and styles are that different. Only *you* know how you like your airplane to fly and feel.

Anyone setting up an aircraft of this size and caliber should have plenty of experience with final adjustments by the time he or she gets to this model. One of the last things to think about before flying an airplane equipped with a gasoline engine (that you may not do with smaller models) is to Loctite all of the metal-to-metal hardware that does not need field assembly. Use thread locker that is made for hand-tool removal. That usually means the blue formula, but check the label.

I'm assuming that you know about basic preflight and finishing procedures for a new aircraft: installing, charging, and checking your batteries, sealing any exposed wood in the engine compartment, range checking, and other procedures common to modeling, so I won't go into those steps. But you know as an experienced modeler that all of those things are important for a successful aircraft. Again, if you have questions, get help from someone who has the experience. There's a terrific article on range checking at <http://horizon.hobbyshopnow.com/articles/1079.asp>

In this issue we'll look at basic programming for the Extra so that all of the servos work together and you have some idea of how to setup a large aerobatic plane. I'll give you some guidelines for balance and control throws and discuss standard trimming for a precision aircraft. I'll be using the JR 10X radio for the examples because that's what I use, but you can do most of these things with any of today's computer radios.

Refer to your transmitter's instruction manual, and remember that many functions that perform the same tasks are referred to with different names by the different manufacturers. Each of these topics could encompass an entire article in itself, so I'll be limited to the basics. You'll want to expand the information on your own with a little experimentation, practice, and some help from your friends. Another source of information on how to set up an aerobatic airplane is <http://horizon.hobbyshopnow.com/articles/1169.asp>. Click on the PDF download for the whole article.



**Field Assembly is rather straightforward. Slide the wings onto the wing tube. Hook up the servos. Fasten the wing to the fuselage, and bolt on the hatch.**

**Mixing:** If you followed our plan for Project Extra, the airplane uses two rudder servos ganged inline and connected to a bellcrank for the pull-pull system. I like to match my rudder servos utilizing a multipoint mix in my transmitter. Even with four servos on the rudder of my 40% models, I match two sets of two servos with MatchBoxes then use a multipoint mix to match the two pairs.

With the JR 10X the two servos are plugged into separate channels: Rudder and Aux2. Since the servos will be hard connected to each other, it's important that each servo's full range of motion matches perfectly.

A multipoint mix has the advantage over other methods, including MatchBoxes, in that there are as many as five positions that can be adjusted, and you can tailor the mixing points to just those spots that need attention. For the servo/bellcrank arrangement, first adjust the linkages between the aft servo and the bellcrank. As we discussed in Volume IV of this series, the linkages must be centered and run parallel to each other so that they have equal movement without binding. Check that there is no binding in any movement before you power up any servos.

It's also a good idea to have any servo arms and linkages removed before powering up a servo for the first time. We found some interference between the ball link and the bellcrank and had to add some washers to the inside of the connection to spread the arms slightly and make clearance. The bind was not visually evident, and we wouldn't have found this problem if the servos had been powered up.

Once the movement is clean, you can install the second set of linkages, but don't connect them to the second servo arm just yet. I like to adjust the linkage so I can see the connection point looking through the hole in the ball links. Then with the transmitter, move through the travel and note where the ball doesn't follow the connection point precisely. I usually adjust the endpoints and neutral first. Most of the time that's all that's needed, but if there are places during transition that do not line up, just create an adjustment point and line it up. Bolt it up, and you're ready to hook the cables to the rudder.

Follow the same basic procedures with the ailerons, but the mix is done using the MatchBox. The instructions that come with the MatchBox are clear, and the procedure is simple. The 10X has a preprogrammed mix for dual elevators, and we used flaperons for the ailerons so that differential mixing was available if needed. I'll write more about that later.



**When ganging two servos for rudder pull-pull system, bolt one end of control rod to servo arm; leave other open for alignment. Make sure that your servos are correctly centered before you make any adjustments. Erik used a set of dial calipers.**

Before we get to the point of setting up any part of the radio, we need to ensure that all of the controls are working the correct direction—especially the ailerons. Don't

go any further until everything is correct! Standing behind the airplane looking at it as if it were flying away, move the aileron stick left; the left aileron should be up and the right aileron should be down. Move the stick right and the right aileron is up and the left aileron is down. Do it now; don't wait 'til later.



**Be very careful to always check for correct control-surface directions before the airplane leaves your shop.**