

Checklist for when you are asked to fix a plane at the field ([3DHobbyShop](#)):

I just was answering some questions in a different thread about setups, and I thought the following post might be helpful. One thing, PLEASE do not read any kind of tone into it. I pretty much fix model airplanes for a living, so I have seen it all and have fixed it all. When I go to fly-ins, people bring me all sorts of airplanes if they have a problem. I know how they fly, and I know going into a diagnosis that all I have to do is:

Make sure the assembly is correct

make sure the accessories are working properly

Make sure the setup values are correct

...and it will fly just like mine.

If someone walks up to my trailer at an event carrying a small plane and says they are having problems, I do listen to their individual story, but I still go through exactly the same checklist no matter what. It's the same checklist I do on my new planes, and yes I still find mistakes on mine sometimes even after flying RC for 31 years.

Here's what I do:

- 1.** Grab every part of the airplane. Pull on every part. Make sure all hinges are glued. Make sure all control horns are glued into the surfaces (I see this a lot). Make sure the pushrod connectors are tight. I have seen every possible part loose. Whole tails. It happens. Check everything by pulling on it.
- 2.** Most of the things the pilots are actually worried about (a gap at the back of a wing, whether they need to change the thrust line, lateral balance) do not matter and are never the problem.
- 3.** I turn on the transmitter, remove the prop and power up the plane. I check high rates to make sure the ailerons move about 30 degrees up and down and are moving approximately the same amount. About half the time, I find that the ailerons are doing something wacky. It's always due to the pilot not understanding the flap programming on his radio and he's flying with flaps activated or mistrimmed and it's all screwed up. I have problems with this every time I buy a new radio too. Make sure you read the manual and understand this.
- 4.** I check to make sure the elevator moves at least 40 degrees up and down, 45 is better. I grab the elevator at the trailing edge and try to move it up and down. There should be very little play. Sometimes I find a lot of play, normally due to a worn-out elevator servo. This is particularly common on HS-65MG because they tend to last a long time and go through several planes, so the top bushing is worn out. If I find this play (you can actually see the servo arm rocking back and forth as you move the elevator) I tell the pilot he needs a new servo before we can proceed.
- 5.** I make sure the rudder moves 40 degrees or so each way (it's not critical exactly how far). If it moves slow or has trouble finding center or will not move all the way (I help it a little by hand and if then it moves all the way it's obvious) I know the tail wheel is causing drag. I go through all of this in the build videos about the tail wheel, but the easy fix at the field is unscrew the bracket on the bottom of the fuse. If that fixes the servo travel, I know. It can fly a few times without the bracket.

6. I take the transmitter and make sure it has 75% expo on all surfaces on high rates. The pilot usually does not have the right expo, and he usually argues with me. He says he doesn't like the expo, or that his friend had some other idea, or some guy on the internet said... Whatever. Everyone needs expo on high rates, whether they know it or not. Make sure it's negative expo on Hitec and Futaba radios. Positive expo on JR and Spektrum.

7. I check the servo endpoint adjustment.

****If it is a Dx6i transmitter, it's never going to be right. That's the way it is. That Tx will not drive servos as far as others, and this is a severe disadvantage. I can get the plane feeling OK, but not great, on a Dx6i. I tell the pilot this. Dx6i's are very much over-represented among pilots who are having problems.****

The endpoints should be very close to maxed out. Some radios will go to 120%, some to 140 or 150. Whatever, it just needs to be maxed out. Normally, it's not, because the servo arms are too long. I change the endpoints to maximum, and if I need to I put the servo connectors into a different hole in the arm so that the throw remains correct.

8. I look to see that low rates are about a third of high rates or so. It's not critical, but I do want to see 35% expo on low rates. Yes, they fight me on this, too.

At this point, I know the controls are setup properly. Almost done.

9. I check to make sure the prop is an APC E, Xoar PJN, or Vox, and that the pitch is 1/2 of the diameter. If not, I tell the pilot to get a new prop.

10. I put the battery in the middle of the tray and strap it down.

11. I hold the plane in my hand and go to full throttle, to make sure it has enough power to pull up out of my hand.

That's it. I take off, trim the surfaces so that it will fly across the field hands off. I fly some low rate stuff then flip to high rates, harrier down, hover a little. I flip back to low rates and show the pilot how to land.

To land I fly at 1/8th throttle with the nose about 15 degrees down below the horizon. I fly along the runway, using the elevator to keep my nose 15 degrees down until it's about 1 ft high, then I cut the throttle and ease off the elevator slightly. Done.

The usual reaction is amazement. What the pilot doesn't usually understand beforehand is that the airframe is just a dumb piece of wood. It's the simplest part of the system. The odds that something is wrong with one of the dumb pieces of wood is very low. The odds that the problem is with one of these high tech parts is very high. I wish I could teach people that.