

## DIY Airliner Keyboard Mod: VOR Tracking

### PART 1

In one of our previous videos we set up the radios and autopilot using the modified keyboards. We get a lot of questions on how exactly we do this without any knobs. Here's how we do it.

We assign the Selection Increase and Selection Decrease events to the control yoke.

These two red buttons on the CH yoke. The Saitek yoke has a similar rocker switch.

Then, when you choose an autopilot control or a radio frequency, etc. you can then set the value using those buttons.

This is a natural position because your left hand stays on the yoke while you reach for the panel with your right hand - this is what you would be doing if you were reaching for the panel to twist a knob.

So let's put this into use. Here's a little exercise using the default CRJ700 and some VOR tracking. This is just a demonstration so we won't worry about ATC clearances or vectors.

We're using the Universal Airliner Cockpit enclosure, but the same steps apply with any of our projects that include the Airliner Keyboard Modification.

Let's take off from the Baltimore Washington International airport, KBWI, runway 33L

Set up fair weather.

For this demonstration, we will start by tracking the 330 degree course to the Westminster VOR.

Before we're airborne, let's set up the radios and autopilot. Press the [NAV SEL] button to set the Westminster VOR frequency to 117.90.

Press the [NAV SEL] button twice to select the decimal value.

Press this button [ARROWS] to set the frequency as the active.

Press [VOR1 ID] to identify the station, if possible. You might not get a clear signal until after you takeoff.

Press [CRS SEL] and set the 330 degree course to the VOR

Make sure the you're tracking the VOR, not the GPS. [NAV1/GPS]

Now let's set up the autopilot. Select [ALT HOLD], then [ALT BUG] and set the altitude for 7000 feet.

Select [HDG HOLD]. The magenta line matches our current heading. We're already on the runway, so we don't have to set it to runway heading.

Verify [FD] on.

Verify autopilot off [AP].

At this time, save the flight. I'll show you why at the end of the video.

Use our CRJ700 checklist for correct procedures and airspeeds for takeoff and initial climb. You can print the checklist for free from our website. It is far more useful than the default checklist.

Takeoff and climb the runway heading.

(Gear UP)

Accelerate to 170 knots initially, then accelerate to 200 knots.

Set [SPEED HOLD] when you reach 200 knots.

Turn on the autopilot [AP]

The autopilot is following the runway heading we set, the magenta dotted line.

We have a good signal from the VOR and we're close to intercepting the course, so switch to [NAV1 HOLD] and the autopilot will now navigate by referencing the VOR signal.

Verify that the autopilot is intercepting and tracking to the VOR.

When you reach 7000 feet the autopilot should hold that altitude at 200 knots.

See the distance to the VOR counting down as you fly to it. Don't expect it to count down to zero because you are over a mile above the VOR station.

You're crossing over the VOR. You lose the VOR signal when nearly over the station, that's called the "cone of confusion." Verify that the autopilot is tracking outbound correctly after station passage.

You may need to help by switching back to [HDG HOLD] while crossing over the station. Here we are intercepting the 330 degree radial from the VOR. Remember, VOR radials are closer together when you're this close to the station.

We're established on course, we can switch back to [NAV 1 HOLD]

This triangle shows we are tracking from the VOR.

Continue to track outbound on the 330 degree radial for about 20 miles.

In Part 2 of this video we will set up a different course back to the VOR and use the autopilot to intercept and track the new course.

You can print out a transcript of this video that lists every step we take during this exercise.

## **DIY Airliner Keyboard Mod: VOR Tracking PART 2**

In the first part of this video we set up the flight simulator autopilot, and tracked directly to a VOR. In this video, let's track back to the same VOR on a different course.

We're currently flying outbound on the 330 degree radial from the Westminster VOR.

We will set the autopilot to maintain our heading, but also set the 140 degree course to the VOR.

Then we will turn left to intercept by adjusting the Heading Bug.

Once we're established inbound, we will set the autopilot to track the 140 degree course to the VOR.

Press [HDG HOLD] to set the autopilot to fly your current heading.

Now you can set the new course for the VOR. Press [CRS SEL] and use the yoke buttons to select the 140 degree course to the VOR.

We want to make a left turn for this demonstration. Select [HDG BUG] and click it to the left. The autopilot starts a left turn.

Set the heading bug to an intercept heading of 170 degrees. That's a good intercept angle taking into account our speed and distance from the station.

Don't fly a heading of 140 degrees, we can't intercept the course like that. Fly 170 to intercept. We can see we're slowly getting closer to our new course. The radials are farther apart this far from the VOR.

We're starting to intercept now, so select [NAV1 HOLD].

Verify the autopilot intercepts the new course.

See the distance counting down to the station.

Now let's fly at a higher altitude as we track back to the station.

Press [ALT BUG] and increase the setting to 12,000 to start a climb. It's easy to overshoot the altitude, so just click it back the other way.

Note the autopilot increases thrust to maintain 200 knots during the climb  
...and reduces thrust as it nears 12,000 feet.

This is what we've been tracking all along. This is the Westminster VOR as depicted in flight simulator.

### **IFR Challenge**

Now for an additional challenge, try this flight again in the clouds.

Re-load the saved flight, this will put you back on the runway with the radios and autopilot already set.

Bring throttles to idle and hold the brakes.

In the weather settings, choose User-Defined Weather, Customize and Advanced Weather.

Click the Clouds Tab and choose stratus clouds, overcast, with tops at 12,000 feet and a base of 6000.

Click the Visibility Tab and choose 20 mile visibility from the surface to 8000 feet.

Now click OK three times to return to the airplane.

This exercise will work the same as before, but you won't see anything outside the plane for most of the flight.

We showed you a lot of things in this video, so the transcript is posted on our website. You can print it if you want. Just click the link in the show notes.