Flight Notes By Flightengr

Guide to Using Your Own Radio with RealFlight

Overview

Like many other current flight simulators, RealFlight will work with any radio or controller that can present itself to Windows as a game controller. This is a more open standard than using proprietary cables that connect to certain brands of RC radios. The InterLink controllers sold for use with RealFlight also work this way. Technically, any Windows game controller will work. You could even fly aircraft in RealFlight using an Xbox controller, although the feel of the sticks is quite awkward since the throttle stick will self-center.

There are three ways to connect your radio to the computer like a Windows game controller:

- Some radios have a USB Game Controller or Joystick mode that is available when you connect the radio to a computer with a USB cable. This includes the Spektrum NX series radios and many radios based on OpenTX or EdgeTX.
- For a wireless connection, there are USB radio receivers that present a normal aircraft receiver to the radio and translate the radio channels into Windows game controller inputs. For Spektrum or DSM-compatible radios, the Spektrum WS2000 USB receiver is currently available. There are other USB receivers out there as well for other radio brands/protocols.
- Somewhat less common than those first two options, there are special USB cables available for specific radios that would connect to a wired training port or another kind of port on the radio.

Even though the idea of using a USB cable may be less desirable than going wireless, there are advantages to the USB cable. Most radios that have a built-in capability to look like a USB game controller/joystick will allow you to use all of the available channels that way. In contrast, the wireless USB receivers are generally limited to eight channels. Additionally, some radios, such as Spektrum NX, will charge the battery while you're connected to the computer via USB.

In general, here are the steps you would go through to use your radio with RealFlight:

1. Set up a model on your radio for use with RealFlight. It's a very simple model (a basic four-channel airplane template) with every available channel assigned to the sticks, switches, knobs, or sliders.
2. Connect your radio to the computer (USB cable or wireless).
3. In RealFlight, map the various channels from your radio to the various virtual channels used by the aircraft models. This is done using the Controller Profile in RealFlight.

This guide will cover those three steps in more detail.

Contents

Section 1 – Set Up a Model on Your Radio

The first thing to do is set up a new model on your radio for use with RealFlight. I suggest setting it up similar to how you would set one up to fly your aircraft, using the same switch positions that you're comfortable using.

Is your radio programmable?
If you're using a radio that is not programmable, such as Spektrum DXe, DXS, or SLT6, then you're not going to be able to change anything on the radio itself. I would not recommend trying to change anything on the radio if you bought it with a real model aircraft. You don't want to do anything that would break the functionality of the radio with that aircraft.

Nonetheless, I'd encourage you to keep reading through this section to understand how the radio's setup affects what you can or can't control in RealFlight.

The setup for RealFlight is a very simple model. Essentially, you want as many inputs on your radio (sticks, switches, sliders, etc.) as possible to be assigned to a radio channel.

The sticks should be set for a basic four-channel airplane with a throttle stick and one channel for each of aileron, elevator, and rudder. Even if you're going to fly helicopters in RealFlight, your radio should be set up for an airplane; RealFlight will apply a pitch curve for the model heli based on your throttle input. If you want to have a throttle curve as well, you'd also do that in the model in RealFlight.

Beyond the four sticks, assign other inputs to other radio channels. Note that Windows only allows the first eight channels to be fully-proportional inputs; anything from channel 9 and up can only be a two- or three-position switch. If you'd like to have a slider or knob for a function in RealFlight, it will have to be on channels 5-8.

Common RealFlight Functions

In addition to the stick controls, these are some common functions in RealFlight that you will likely want to assign to switches on your radio.

- Airplane Flaps
- Airplane Landing Gear
- Receiver Flight Modes (such as SAFE Select On/Off, or trainer Beginner/Intermediate/Experienced modes)
- Helicopter Throttle Hold (all helis in RealFlight use a Throttle Hold on/off switch)
- SAFE Panic Mode or Thrust Reverse (very few models have either of these functions, and both are assigned to the same channel)
- Dual Rate/Expo (some models in RealFlight are already configured with low rates)

If your radio has less than 10 channels, you'll need to choose which of those functions you'd like to add to your radio. Most of these functions have keyboard equivalents, so you'll be able to make them work but not from your radio.

Wireless USB Receiver Limitation
If you plan to use a wireless USB receiver to connect to the computer, you're going to be limited to 8 channels, regardless of how many channels your radio can use.

EdgeTX Joystick Mode – Classic vs. Advanced
EdgeTX added an "Advanced" joystick configuration in version 2.9. I do not recommend using Advanced mode. While it would give you complete control over which channel is assigned to which Windows game controller input, that's not necessary for use in RealFlight. It's much easier to use the Classic mode and do all of the channel mapping within RealFlight.

Section 2 – Connect the Radio to the Computer

Once you have the model set up on your radio, you need to get it connected to the computer.

Option 1 – USB Cable

If you're using a USB cable to connect to the computer, you usually need to tell the radio to act like a game controller or joystick rather than giving you access to the SD card storage in the radio.

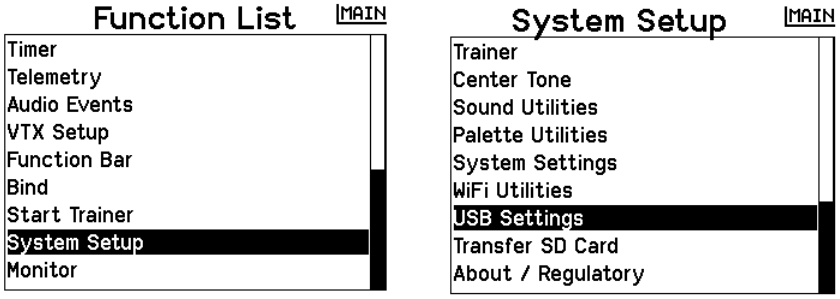
OpenTX/EdgeTX

When you connect a USB cable to your radio, you normally get a popup menu that asks how to connect – Storage, Joystick, or Serial. You'd typically select Storage to access the SD card. Instead, select Joystick to make the radio appear to Windows as a game controller.

Spektrum NX

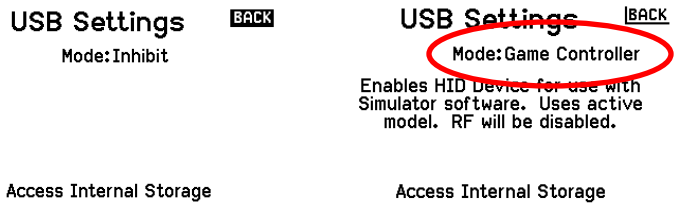
There's an additional setting for the model setup that will tell the radio to function as a game controller. You only need to set this once, and it will stay with the model setup.

Go into the Function List menu, and then the System Setup menu.



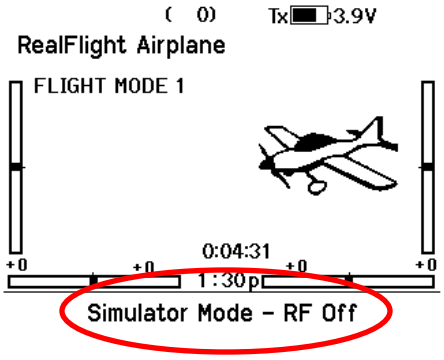
On the System Setup menu, choose "USB Settings".

Change the "Mode" setting from "Inhibit" (off) to "Game Controller".



Then, back out of the USB Settings screen. When you plug in the USB cable connected to the computer, you should hear Windows acknowledge with a sound that a device was connected.

When you back all the way out to the main model screen, and you'll see in the function bar at the bottom of the screen that you're in Simulator Mode, and therefore the radio transmitter is turned off.



Option 2 – Wireless USB Receiver

To use a wireless USB receiver, you'll need to bind your radio to the receiver.

For Spektrum USB receivers, press and hold the bind button while you insert the receiver in the USB port. That will make the orange light start flashing rapidly. Then tell your radio to bind, either through an on-screen menu option or by holding the button down while powering on the radio. If the bind is successful, the orange light on the receiver will stay on solid.

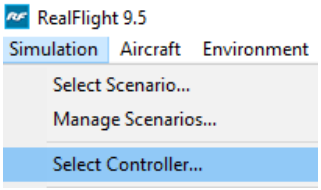
Section 3 – Mapping Channels in RealFlight (Controller Profile)

The models in RealFlight are all associated with a "software radio" inside the program. You can imagine this as having each aircraft wired to the same kind of receiver in a consistent manner. Things such as ailerons, elevator, rudder, flaps, and other features are assigned to the software radio channels so that each model will operate in the same way.

RealFlight uses a "Controller Profile" to map your radio's channels (or game controller inputs) to those internal software radio channels. The Controller Profile is where you tell RealFlight which channel on your radio to use for each function of the aircraft.

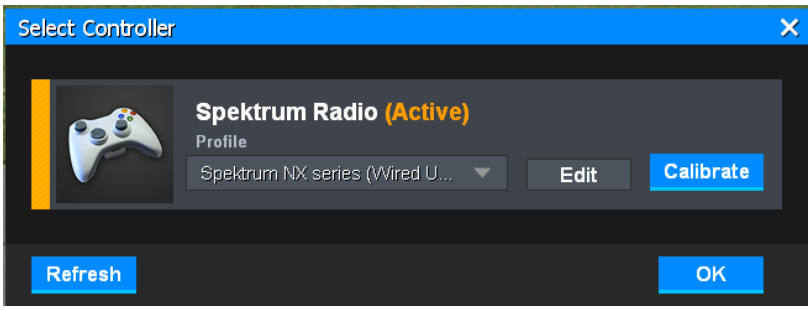
When you use your radio for the first time, it's quite possible that the controls are not going to work properly. You're going to have to help RealFlight identify the controller.

In RealFlight Evolution, press ESC to access the menus, and then choose "Settings", then "Controller", and finally "Configure Controller". In previous versions of RealFlight or in Evolution with legacy menus enabled, go to the Simulation menu, and then choose the "Select controller…" option.



When you choose “Select controller…”, the following window appears. If RealFlight recognizes the radio somehow, then it will automatically select one of its own profiles that will at least make the sticks work correctly but may not have your switches set up in the right order.

In this picture, RealFlight recognized a Spektrum NX radio plugged in via USB. A Spektrum WS1000 or WS2000 will be a “Spektrum Receiver”. If RealFlight doesn’t recognize the device, then it will revert to “Gamepad”. (Note that the picture is usually not representative of the actual radio; it’s just decorative.)



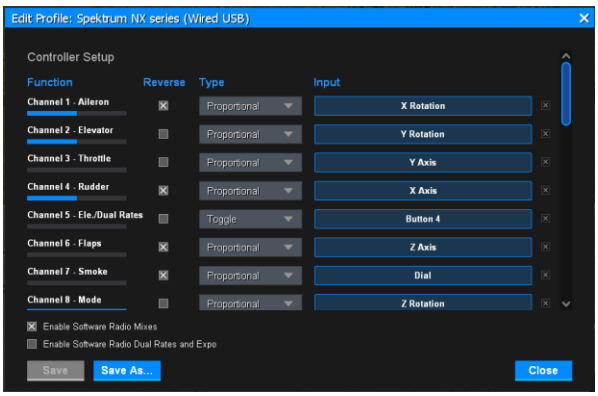
Selecting a Profile

The dropdown list under “Profile” offers a number of different choices. You may choose one that’s close to what you’re really using.

Editing the Profile

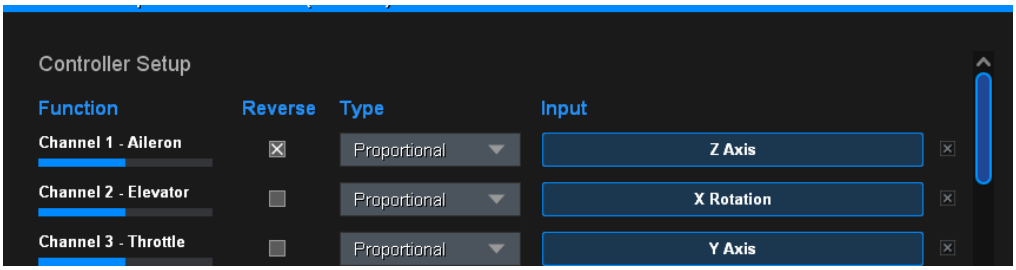
Even after you select the best profile for your radio, it’s quite likely that you’ll want to edit the channel assignments based on how you like to set up your aircraft.

After you select a profile from the list, click “Edit” to see how the channels are mapped.



This is the screen where everything happens!

Let's start by understanding what each column is for.



Function – These are the RealFlight software radio channels that control various features of the model aircraft.

Reverse – You may find that a stick or switch is operating backwards. To correct that, simply check or uncheck the box.

Type – This setting tells RealFlight how the input should behave. For most situations, you want to set this to be "Proportional" to act like a normal input on a radio and to have RealFlight look at the entire range of input from -100% to +100%. A "Toggle" input requires you to flip the switch twice to change from one state to the other (toggle its state, rather than changing state based on the position of the switch.) "Tri-State" combines two inputs to create a three-position switch.

Input – This is the Windows game controller input that is associated with the Function. You don't need to know the names of the Inputs unless you really want to. (The appendices have listings of names for Spektrum NX and WS1000/2000.)

Now let's look at the Functions as shown and what they do in RealFlight. Don't worry if the channel numbers don't line up with the channel numbers in your radio – the numbers are not important in that respect.

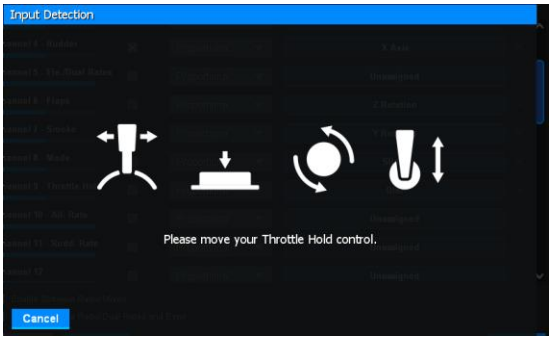
Channel 1 – Aileron	Aileron input
Channel 2 – Elevator	Elevator input
Channel 3 – Throttle	Throttle input (applies to both throttle curve and pitch curve for a heli)
Channel 4 – Rudder	Rudder input
Channel 4 – Ele./Dual Rates	For most aircraft, this is the Dual Rate/Expo switch for all three control axes. If an aircraft has a separate DR/Expo switch for each axis, then this one is Elevator DR/Expo.
Channel 6 – Flaps	Airplane flaps
Channel 7 – Smoke	Usually this is retractable landing gear, but some models use it for a smoke generator
Channel 8 – Mode	Receiver Flight Mode, if equipped (selects between SAFE Select On/Off or SAFE Beginner/Intermediate/Experienced)
Channel 9 – Throttle Hold	All helis use this to simulate the Hold mode where throttle is disabled. In order to spool up in Normal mode, this channel must be configured and the switch set appropriately.
Channel 10 – Ail. Rate	Aileron DR/Expo
Channel 11 – Rudd. Rate	Rudder DR/Expo
Channel 12	This channel would mapped to the button on the InterLink DX controller. Some aircraft use it for SAFE Panic Mode, and others use it for Thrust Reverse.

There are more Functions listed, and many of them are used by the InterLink controllers made for use with RealFlight. You could experiment with them if you like.

Now that you know what the RealFlight channels are for, you can start aligning them with your radio controls. When you move a stick or switch that is assigned to a RealFlight channel, you'll see the blue bar graph move for that channel. With that, you can quickly see if the channel is mapped to the correct control on your radio. Don't worry yet if the bar graph doesn't move all the way to one end or the other at this point; calibration will fix that later.

If you need to change the input for a given Function (RealFlight channel), then simply click the big blue button under Input.

Then you'll see a screen that asks you to move the control on your radio for that Function.

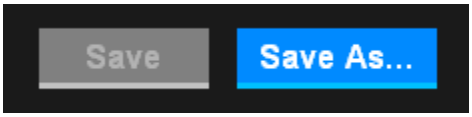


Move the stick or flip the switch at this time. RealFlight will see the movement and automatically assign that Input to this function. (Click “Cancel” or press ESC to get out of this screen if you don’t want to change it or if your control is not detected.)

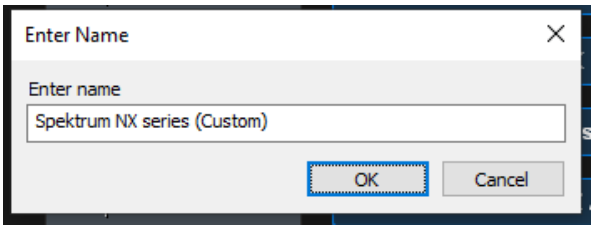
You can go down the list and set all of the Functions appropriately.

If you want to change an Input to “Unassigned”, click the small “X” to the right of the blue button.

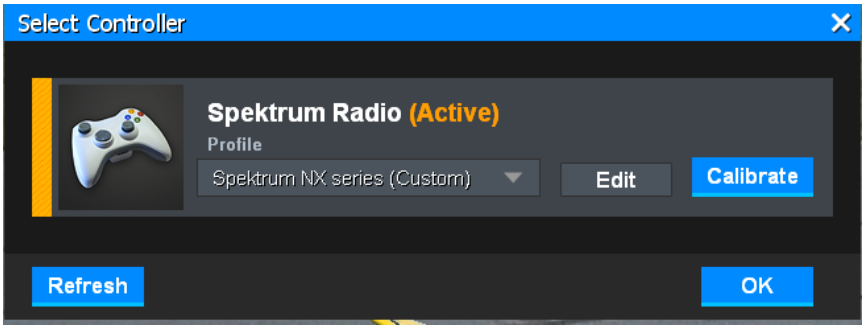
When you’re done making changes, note that you cannot save over one of the default profiles; the “Save” button is grayed out.



So instead, click “Save As…” and give your custom profile a new name.



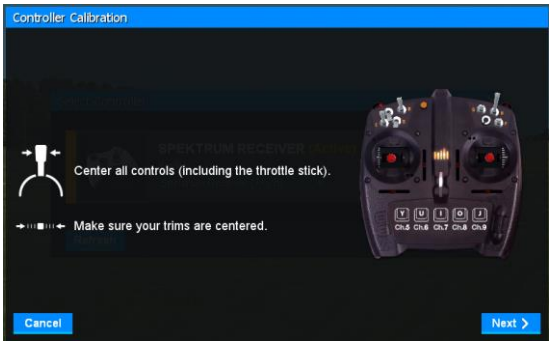
Click “Close” to close the editing screen, and then ensure your custom setup is selected as the active profile.



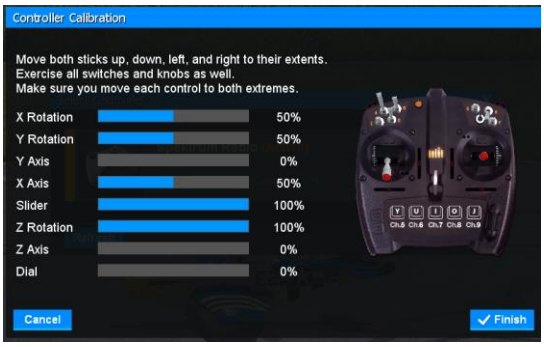
Section 4 – Calibrating the Controller in RealFlight

The process of calibrating the controller ensures that RealFlight correctly associates the full range of each channel in the software with the full range being sent by the transmitter. If the range in the software is not correct, you may have problems controlling the aircraft.

To calibrate the controller, click “Calibrate” on the “Select Controller” window.
The program will ask you to center all controls, which includes the sticks, three-position switches, and knobs/sliders. Also, ensure your trims are centered (0 trim).



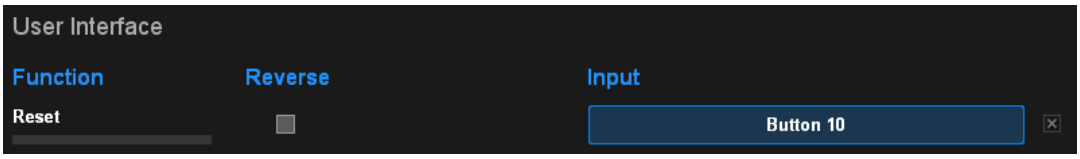
Click “Next”, and the calibration screen appears. On this screen, you will move your sticks all the way from one end to the other, and then flip all switches and the button back and forth through all positions. As you move a control, you’ll see the blue bar move for that channel. When you have moved all of the bars and seen the bars move all the way from 0% to 100%, click “Finish”.



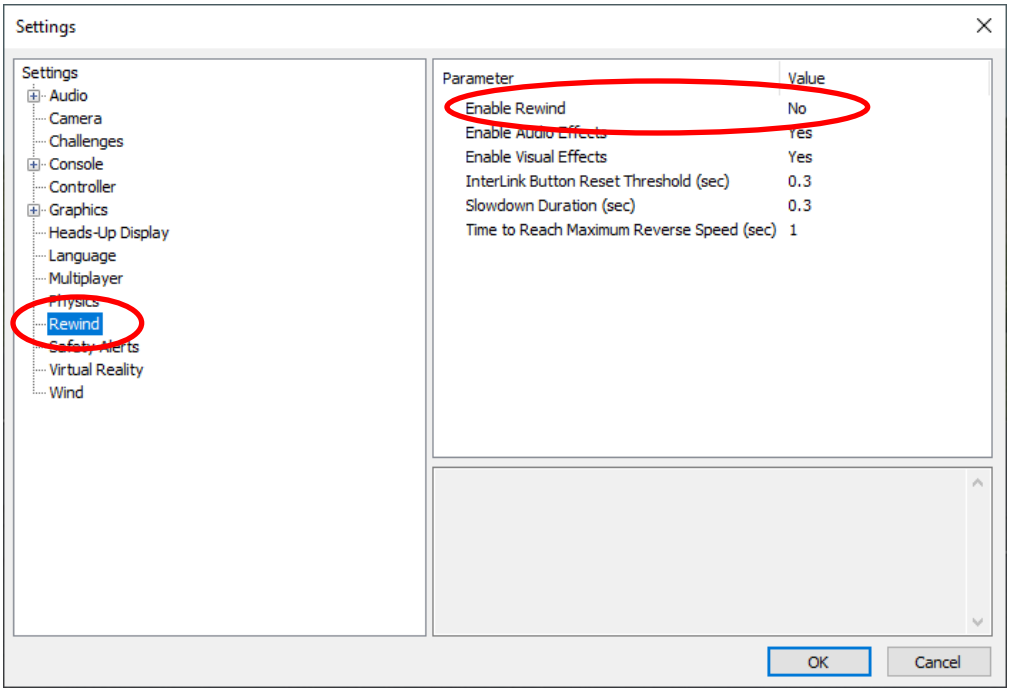
Section 5 – Assigning a Switch to the Reset Function

You can assign a switch or button on your transmitter to perform the Reset function (equivalent to pressing the space bar).

Go back into the Controller Profile and edit it. Scroll way down, past the usual RF channels, and the last section of the list is for "User Interface" settings. You can change "Reset" to one of the channels coming from the transmitter. Map a switch or button to the desired channel on the transmitter, and then flip the switch/press the button as directed to assign the channel to the Reset function.



Another step is necessary! If you stop right there, RF will instead treat your new switch/button as a Rewind function. To make it work like the space bar instead (reset/start over), you need to go into Simulation menu > Settings, find the Rewind category on the left, and then set "Enable Rewind" to "No". Now the button/switch on the TX works like the space bar.



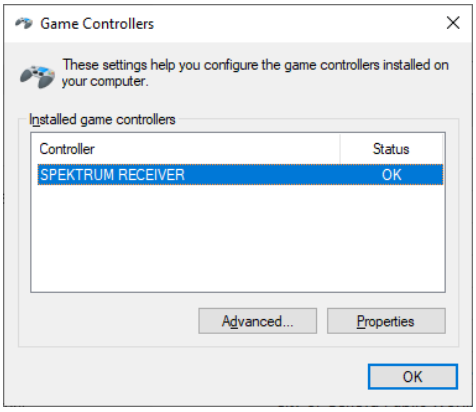
Section 6 – Troubleshooting Controller or Stick Calibration Issues

RealFlight Doesn't See a Controller Connected

If RealFlight doesn't see a controller, then that means Windows doesn't see it either.

To figure out if Windows sees the controller, you can go to the legacy Control Panel applet for Game Controllers. Using the search feature on the Start button or taskbar, enter: joy.cpl Windows should find that program and let you run it.

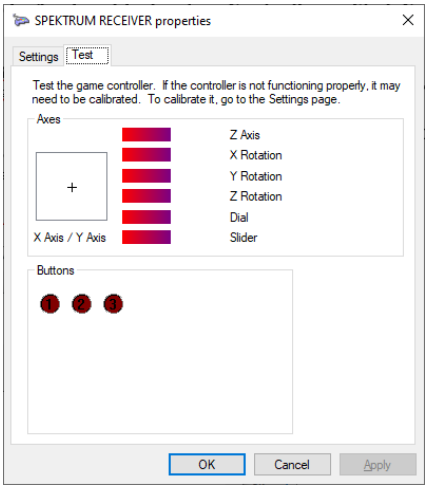
The joy.cpl program looks like this.



Any active game controllers will be listed in this screen.

Testing the Controller in Windows

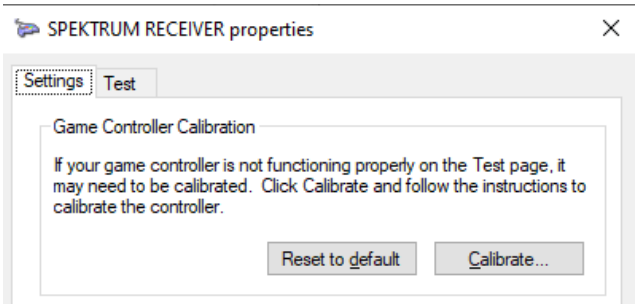
While in joy.cpl, you can test and see if Windows recognizes sticks or switches moving around on your transmitter. Select the controller from the list as shown above, and click "Properties". That will show the Test screen.



As you move the first eight channels around, you should see the plus sign move around in the box or the bars should move back and forth. Additional channels will make buttons light up or go dark.

Calibrating the Controller in Windows

If you notice that you are not getting the full range of movement from the bars or the plus sign on that test screen, then you can calibrate the controller through Windows. Click the “Settings” tab on the Test screen.



Click “Calibrate…” to begin the process. Windows is going to refer to things as if you’re holding an Xbox controller, with terms such as “D-Pad”. You can move your controls around on the radio and guess a little bit as to which one it’s looking for. You won’t mess up the calibration by moving something it’s not expecting you to move.

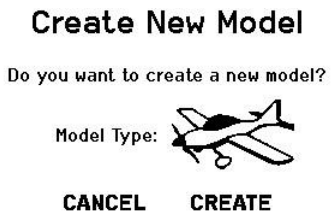
RealFlight Doesn’t See a Switch Move to All Positions

If the switch is working in part but isn’t working completely, that’s usually a calibration issue in ReallFlight. In particular, ensure that you move three-position switches to their center position when RealFlight asks you to center the sticks at the beginning of the calibration process. Then, when moving controls around, cycle switches through all of their positions a couple of times.

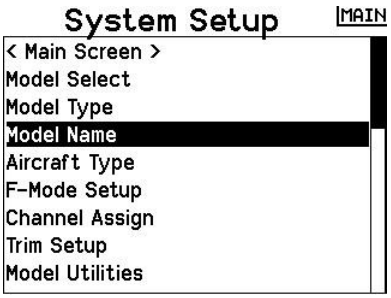
Appendix 1 – Spektrum DX/NX/iX Setup

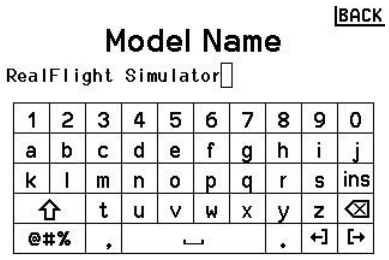
Let's go through a sample configuration of a model setup on a Spektrum NX radio. The screens are nearly identical on a DX radio. An iX radio will look much different, but the general idea is the same and the settings will be very similar.

First, create a new model. Use a standard acro (airplane) model.

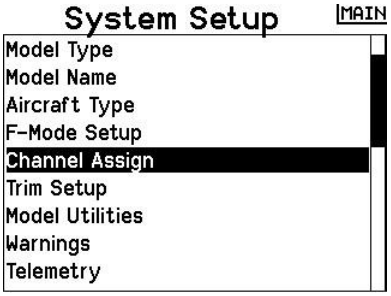


Next, set the name of the new model. I'm going to set it to "RealFlight Simulator".





Next, go to Channel Assign.



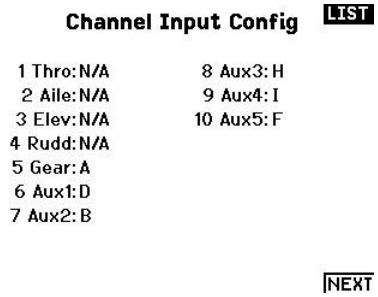
I'm going to set up 10 channels, as the NX allows a USB cable connection that will take advantage of all of the channels on the radio. If you plan to use a wireless USB receiver (necessary for DX or iX, optional with NX), you will only be able to use 8 channels, so you only need to assign switches to Gear, Aux1, Aux2, and Aux3. I chose to put Switch A on Gear, Switch D on Aux1, Switch B on Aux2, and Switch H on Aux3. Depending on which RealFlight

functions/channels you want to use from the radio, you may wish to use different switches. Since I have two more channels available, I put Switch I on Aux4 and Switch F on Aux5.

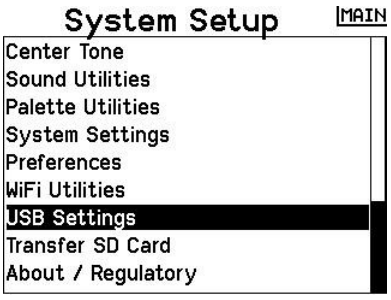
Here's how I plan to use those channels:

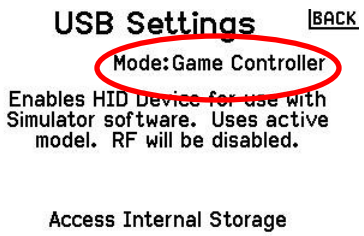
Gear (Switch A)	Gear/Smoke
Aux1 (Switch D)	Flaps
Aux2 (Switch B)	Flight Mode
Aux3 (Switch H)	Heli Throttle Hold
Aux4 (Switch I)	SAFE Panic / Thrust Reverse
Aux5 (Switch F)	Dual Rate/Expo

Set up the Channel Input Config accordingly.

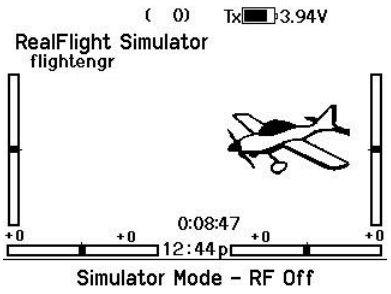


If you have an NX radio and plan to use the USB cable connection, then you can turn that on in the USB Settings screen.

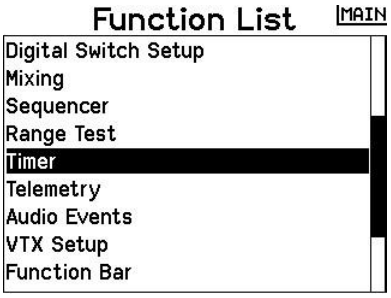


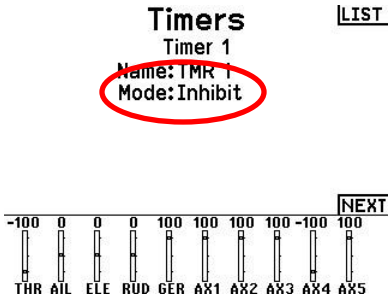


Back out to the main model screen.

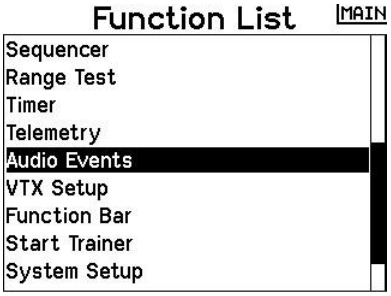


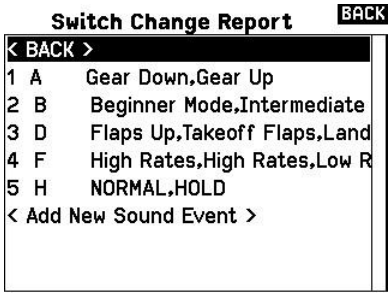
To hide the timer, go to the Function List menu and choose Timer. Change the timer mode to "Inhibit".





Finally, you can add some voice callouts to the switches if you like.





This model is now ready to use with RealFlight.

Appendix 2 – Spektrum WS1000/2000 Game Controller Reference

The WS1000/2000 wireless USB receivers will present up to eight Spektrum radio channels to Windows.

Game Controller Inputs

The following table shows how those channels are mapped to game controller inputs.

Spektrum Radio Channel	Windows Game Control Channel
Throttle (1)	Y-Axis
Aileron (2)	Z-Axis
Elevator (3)	X-Rotation
Rudder (4)	X-Axis
Gear (5)	Y-Rotation
Aux1 or Flap (6)	Z-Rotation
Aux2 (7)	Slider
Aux3 (8)	Dial

Appendix 3 – Spektrum NX Game Controller Reference

The NX series will present up to twenty Spektrum radio channels to Windows depending on how many channels your NX radio offers.

Game Controller Inputs

The following table shows how those channels are mapped to game controller inputs.

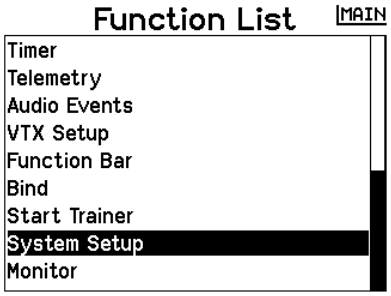
Spektrum Radio Channel	Windows Game Control Channel
Throttle (1)	Y-Axis
Aileron (2)	X-Rotation
Elevator (3)	Y-Rotation
Rudder (4)	X-Axis
Gear (5)	Dial
Aux1 or Flap (6)	Z-Axis
Aux2 (7)	Z-Rotation
Aux3 (8)	Slider
Aux4 (9)	Button 9/10 *
Aux5 (10)	Button 11/12 *
Channels 11-20	Buttons 13-32 *

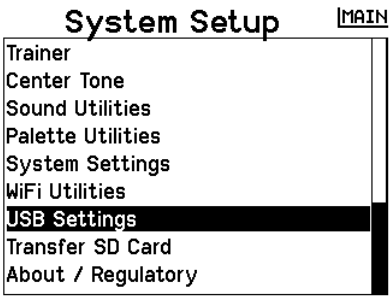
* Windows allows eight channels to be fully-proportional channels, such as sticks, a knob, or a slider. All channels above nine will be represented in Windows as buttons, so you can only use them as two- or three-position switches in RealFlight. Buttons 9 and 10 are both controlled by the same channel but are opposite in value (when one is on, the other is off; at center, both are off).

Configure USB Setup for Game Controller

There's an additional setting for the model setup that will tell the transmitter to function as a game controller.

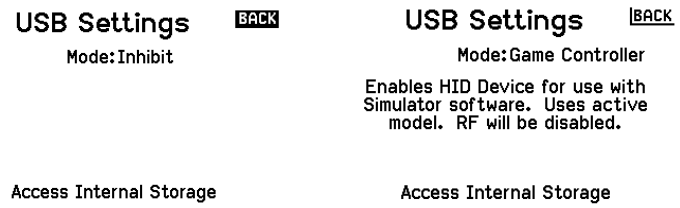
Go into the Function List menu, and then the System Setup menu.





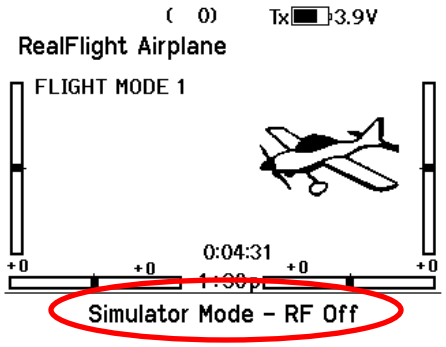
On the System Setup menu, choose “USB Settings”.

Change the “Mode” setting from “Inhibit” (off) to “Game Controller”.



Then, back out of the USB Settings screen. When you plug in the USB cable connected to the computer, you should hear Windows acknowledge with a sound that a device was connected.

When you back all the way out to the main model screen, and you’ll see in the function bar at the bottom of the screen that you’re in Simulator Mode, and therefore the radio transmitter is turned off.



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