Introduction:
I often get asked the following questions:
1. What joystick do you recommend?
2. Do I really need rudder pedals?
3. Do you have a rudder pedal recommendation?
4. Where can I buy Condor, your recommended joystick, and rudder pedals?
5. Can I run Condor on my Macintosh?
6. What are your Condor *Setup* options?

So, this month, I thought I would finally put my answers is writing. This way, the next time someone asks, I can simply refer them to the August 2011 issue of Soaring Magazine.

Note: The joystick and rudder pedal recommendations in this article are not meant to be product endorsements. Nor are they meant to suggest these are the best products on the market or the only products that will work with Condor. They are simply my recommendations.

Note: Condor-specific terms are in *Italics*.

What joystick do you recommend?
I recommend and use a Logitech Extreme 3D Pro. It is reliable, affordable, durable, available, and actually looks like the control stick in a glider as opposed to something out of a science-fiction rocket movie. The 3D Pro is not a "force-feedback" stick, but for my purposes (glider flight instruction) it is more than adequate.

Do I really need rudder pedals?
If you are using Condor to learn to fly a glider, whether you are a student pilot or transitioning from powered flight, I recommend you use rudder pedals. In fact, if you are one of my students, I require it.

If you are a licensed and experienced glider pilot, you understand the importance and mechanics of maintaining coordinated flight. How you choose to keep the yaw string straight in Condor is up to you. Condor can be set up to provide automatic rudder coordination (like an Ercoupe), or direct rudder control using either the twist grip function on the joystick, a pair of keys on the keyboard, or a rudder pedal controller.

Do you have a rudder pedal recommendation?
I recommend and use the CH Products Pro Pedals. At around $100, they may seem a little pricey, but I haven't had a stitch of trouble with them. They have endured lots of

use and abuse including E.A.A. KidVenture 2010 where, every 10 minutes, for 6 hours a day, over 5 solid days, I had another future glider pilot (ages 7-16) mashing on my rudder pedals.

The Pro Pedals rudder function action is not ideal in that you slide your feet (one foot moves forward as the other moves back), rather than pivoting on your heels and pressing with the balls of your feet as we are accustom to doing in real gliders. For instructional purposes, however, the Pro Pedals are, again, perfectly adequate. The idea, after all, is to train the student to "move" their feet in coordination with control stick inputs, and the Pro Pedals ensure you move your feet.

Where can I buy the Condor Software, the joystick, and the rudder pedals?
My personal recommendation is Cumulus Soaring, Inc. (http://www.cumulus-soaring.com/). As always, Paul Remde has done an amazing job of documenting Condor's features and recently started offering the Logitech Extreme 3D Pro joystick, CH Products Pro Pedals, and Condor software (either downloadable or on disk) individually or as a package. Paul also provides the additional service of making sure the software you receive is upgraded to the latest release.

The Condor software can also be purchased at Condor's website: http://condorsoaring.com/.

Joysticks can be purchased wherever computer gaming controls are sold. I bought mine at Best Buy before Paul started offering them.

Computer gaming stores may have rudder pedals, but I have not seen the CH pedals in stores. I bought mine online (pre-Paul). If you do go online, it pays to shop around. I've seen the CH Products Pro Pedals on sale for as little as $95 and as much as $150 (before shipping).

Does Condor run on a Macintosh?
People are often confused when they see me running Condor on my Mac. The confusion, of course, stems from the days when Macs only ran Mac operating systems on Mac processors, and PCs ran Windows operating systems on Intel processors.

A while back, Apple started using Intel chip sets and redesigned their operating systems to take advantage of the new processors. Today Macintosh "hardware" can be booted up as either a Mac running a Mac operating system or as a "PC" running Windows. "Bootcamp" is the feature of the new Mac operating systems that makes all that possible.

So, it is true that Condor only runs under a Windows operating system, but you can now run Windows on your Mac hardware, so "Go Wild!"

What are your Condor *Setup* options?

After you install Condor, you can customize the software to maximize its performance on your computer system and adapt it to your personal preferences.

Click the **SETUP** button on Condor's main page to invoke the *Setup* panel suite. *Setup* comprises five sub-panels: *Graphics, Sound, Input, Network*, and *Options*.

Graphics
The *Graphics* panel comprises the *Video Options* and *Graphic Options* sections.

Under **Video Options***, Fullscreen Emulation* is the default (recommended) setting. This video option uses all the real estate on your monitor while also allowing Windows task switching. Task switching is enabled under *Windowed* mode as well, but not under *Fullscreen* mode.

The *Screen Resolution* value initially defaults to some really low value (800 x 600), but the drop-down menu you would normally use to reset the *Screen Resolution* is grayed out (not available), as is the *Vertical Sync* parameter. To change either of these parameters, you need to select *Fullscreen* mode, whether you intend to operate in that mode or not. Once there, the *Screen Resolution* and *Vertical Sync* parameters become active and you can set them as desired. Finally, reselect your preferred display mode. I use *Fullscreen Emulation.*

You have to know a lot more about computer graphics than I do to know how, when, and why to set *Vertical Sync, Try Stencil Buffer, Try W-Buffer,* and *Use VB WRITEONLY.* I might be missing out on something, but I have them all unchecked.

In the **Graphics Options** section, I went with Condor's defaults. If you have a really good graphics card, you can bump a lot of the *Graphics Options* up to higher values to take full advantage of your system's capabilities.
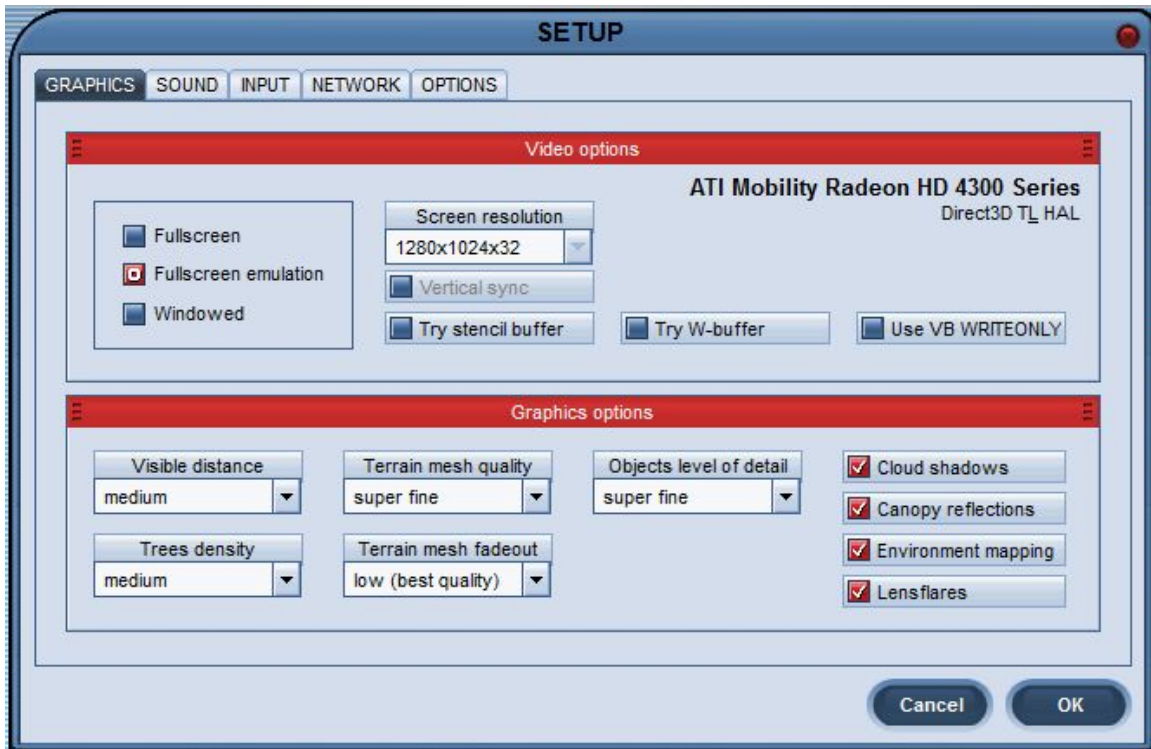
Sound

I went with Condor's defaults. The one option you may want to change on this panel is the *Vario Off When Negative* value. If you don't want to be alerted or reminded by your audio vario that you are flying in sink, check this box.
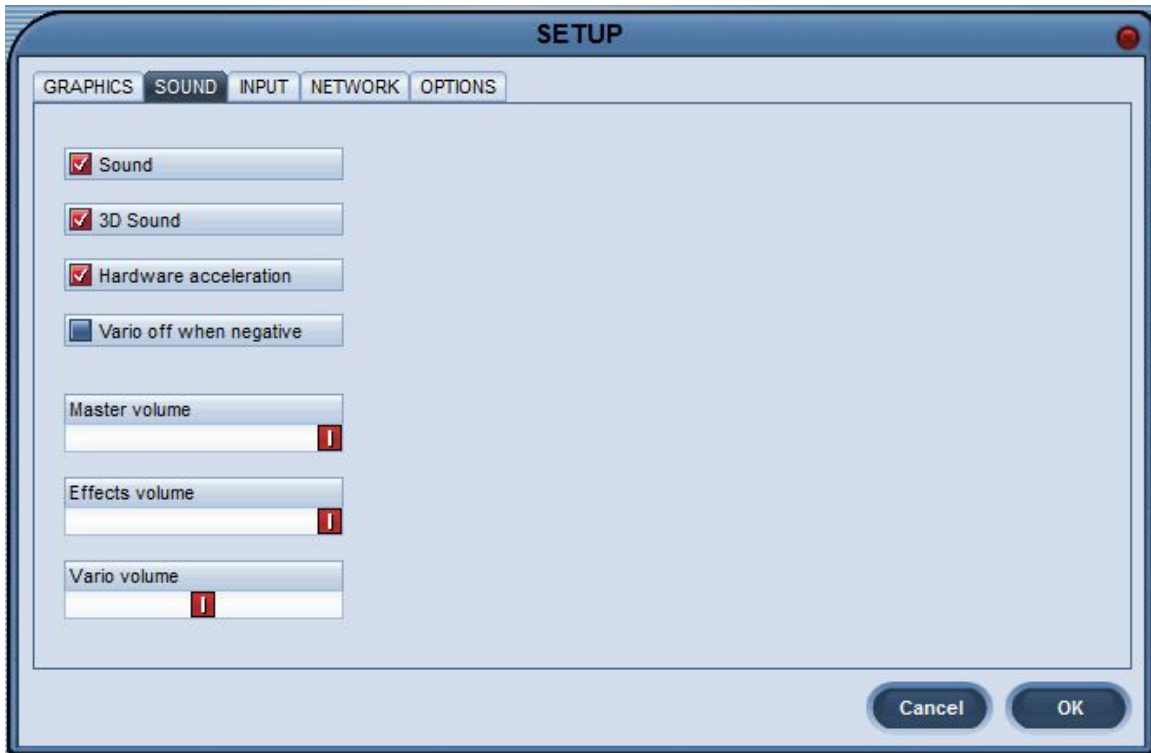
Network

This panel comprises only the *Plane Icons* section. *Plan Icons* are little data tags attached to each of the gliders flying with you in *Multi-Player* (Networked) mode. The *Plane Icons* make other gliders much easier to see, displaying their *Competition IDs* and telling you how far away they are. The *Color* drop-down menu lets you set the *Plane Icon* text color. The *Include Plane Type* option determines whether the *Plane Icon* information includes the glider's make and model (e.g. ASK-28).
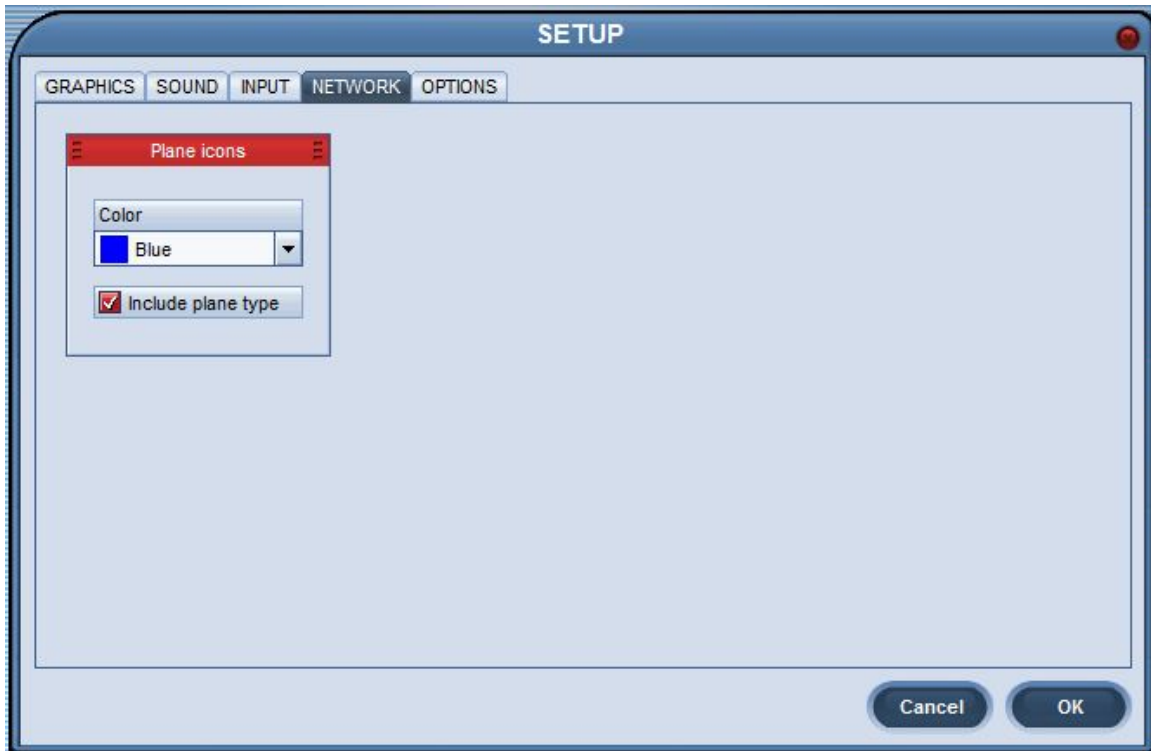
Options
This panel comprises the *Instruments, Miscellaneous*, and *NMEA Output* sections.

The **Instruments** section lets you select the system of measure for things like airspeed, altitude, and variometer readouts. I selected *Imperial* from the *Units* drop-down menu so my instruments would read out in knots. I selected *QNH/MSL* from the *Altimeter Setting* drop-down so my altimeter would readout in MSL rather than AGL. I accepted Condor's defaults for the variometer settings.

In the **Miscellaneous** section, you can change the *Language* selected when you installed Condor. I have had a few people contact me after either failing to properly set this at installation time or after changing it accidentally. Unless you are multi-lingual, I suggest you leave this value set to your native tongue.

I went with the defaults for *Auto View Panning* and *Vertical View Center*, and maxed out *View Smoothing*. I also changed *Screenshots Type* from its default of *BMP* (Microsoft's image file standard) to the more ubiquitous *JPG*.

A *Screenshot* is a picture (image file) of your Condor screen or window at a given instant. To take a *Screenshot*, just hit the "S" key on your keyboard. *Screenshots* are stored in the *Condor/Screenshots* subdirectory. A lot of the in-flight pictures you see in Condor Corner are taken using this feature.

Using the **NMEA Output** section, you can direct Condor to provide this output protocol to the serial port on an external device.   This feature lets you use your real-life navigation hardware and software to navigate in Condor. This is also a great way to learn to use your real life navigation suite.
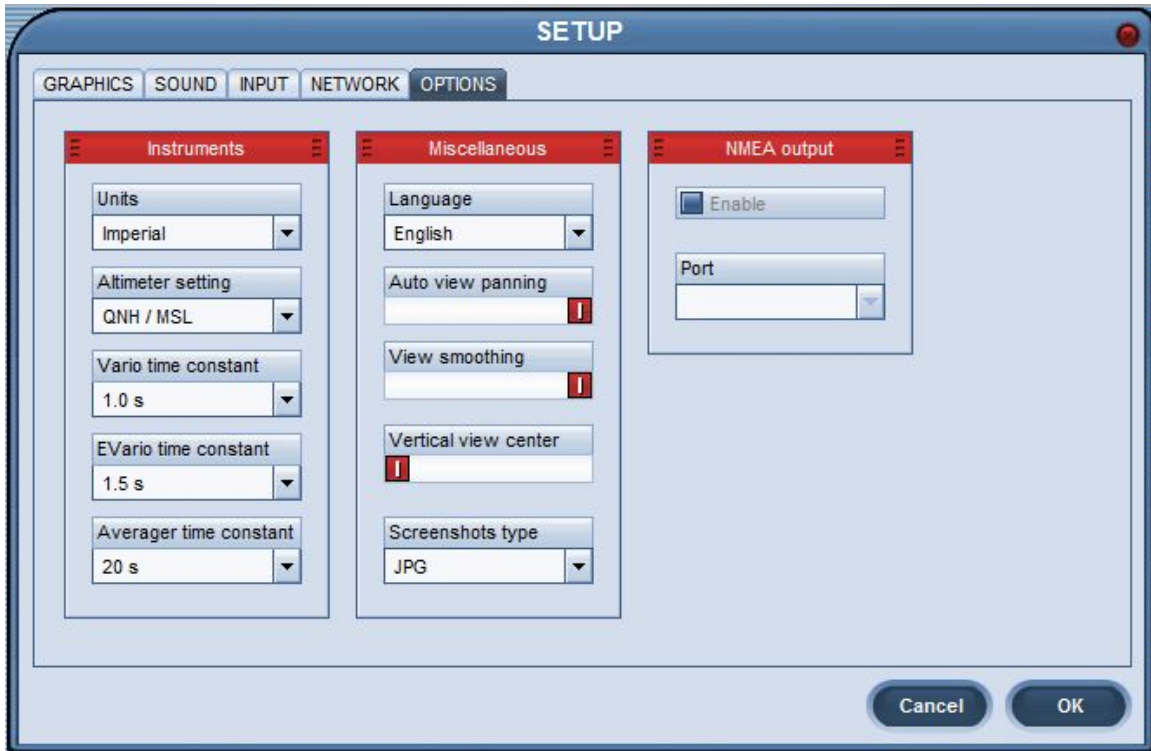
Input
The *Input* panel comprises the *Ailerons, Elevator, Rudders*, and *Options* sections.

I went with the default *Non-Linearity* and *Ratio* settings for **Ailerons** and **Elevator**. I did, however, find the **Rudder** function in Condor to be too sensitive early in its travel, so I made the rudder input less linear by moving the *Non-Linearity* slide bar to the right (centered).

In the **Elevator** section, I found the *Stick Trim Where Available (STWA)* option confusing. When I first saw this option, I thought "Of course I want stick trim if it is available", so I checked the box. Once *STWA* was checked, however, I couldn't get the pitch trim function to work in any of Condor's gliders, so I unchecked the box and wha-la; pitch trim was now available in all the gliders. That made absolutely no sense for a long time. Recently, however, with some help from the kind folks on the Condor Forum, the mystery was solved. I had been equating *Stick Trim* with pitch trim. *Stick Trim* is simply a particular mechanism for setting pitch trim. It is not actually the pitch trim function.

As it turns out, Condor's *Stick Trim Where Available* function works just like the pitch trim system in my real life DG-303. In the DG, I apply stick pressure to establish a specific airspeed/attitude, and then squeeze the stick-based trigger to automatically reset the pitch trim. There are, however, a couple issues with *STWA*. The function doesn't work nearly as well in Condor as it does in my DG and there is no way to know, other than trial/error, which gliders in Condor have stick trim (unless you have flown one of Condor's gliders in real life).

For instructional purposes, I want my students to manually trim the glider, so I leave the *STWA* option unchecked and assign the pitch trim function to a pair of control buttons on the joystick.

In the **Options** section, I left the *Force Feedback* option checked. If you don't have a force-feedback stick (I don't), it doesn't matter how this option is set.

I use my computer's mouse to look around in Condor. Because it is analog in nature, I find moving the mouse around to be much more natural than having my point of view jerked around by the hat switch. To enable mouse-centric panning (looking around), you need to check the *Mouse Look* option. To keep from inadvertently changing your view by bumping the mouse, select the *Left Button for MouseLook* option. This requires you hold the left mouse button down to look around. By the way, with your right hand on the joystick, you need to operate the mouse with your left hand. That takes a little practice.

Selecting Mouse Look does not override the default assignment of Point-of-View (POV) control to the joystick's hat switch.
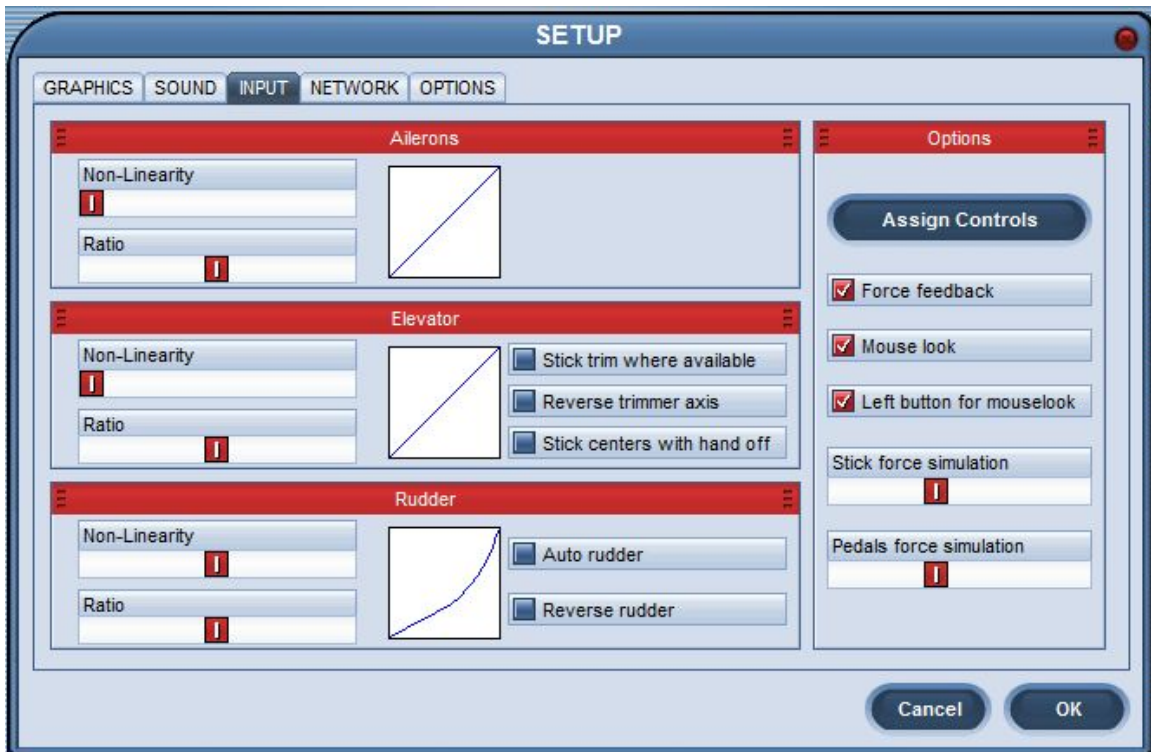
Finally, it is time to set up the joystick and rudder pedals. Click on the ***Assign Controls*** button in the ***Options*** section.
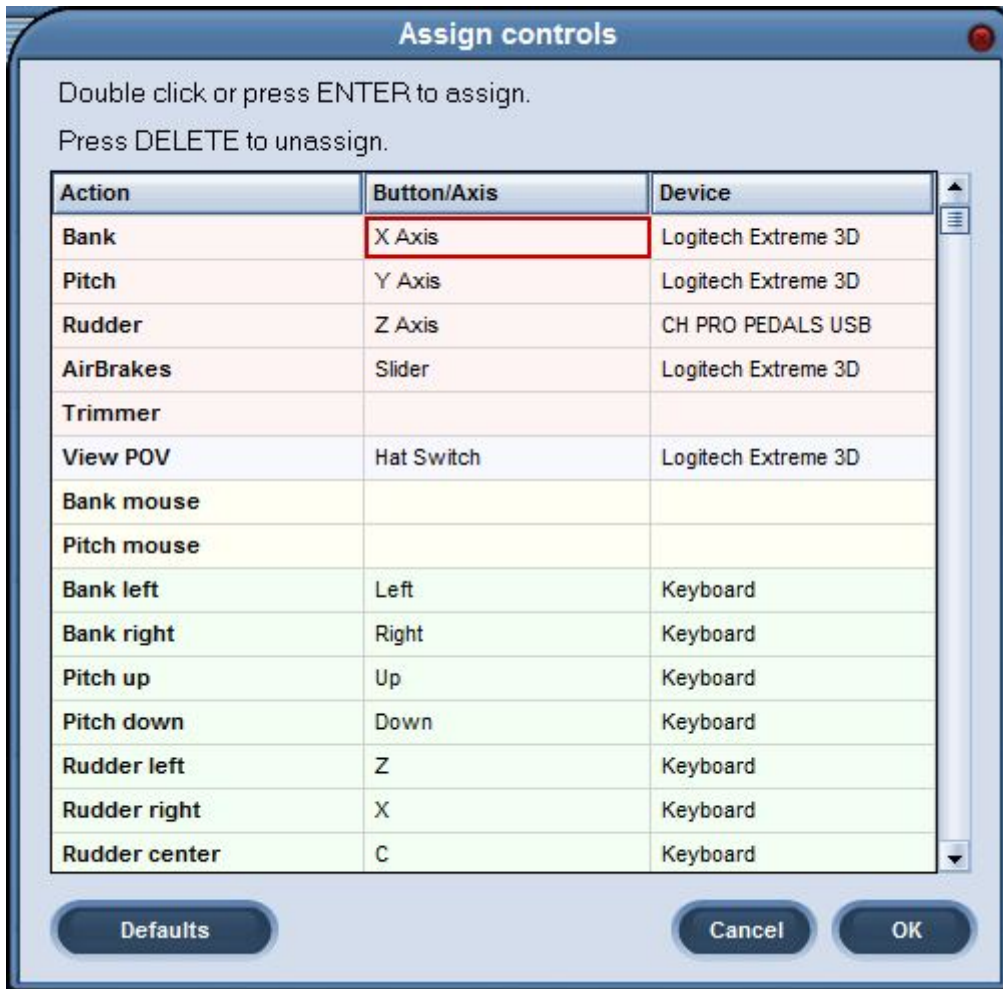
Assign Controls
The *Assign Controls* panel comprises a rather long list of control assignments, each of which is composed of an *Action* (description), *Button/Axis* (assignment), and *Device* (hardware) specification.

By default, Condor assigns each of its myriad control functions to the keyboard. The software will, however, sense the presence of a joystick controller as the application starts, and will automatically reassign some of its control functions to the joystick, including *Bank, Pitch, Rudder, Airbrakes*, and *View POV* (point of view; panning; looking around). For each function reassigned to the joystick, the *Button/Axis* value is displayed (e.g. *X Axis, Slider*), and the *Device* column value changes from *Keyboard* to the name of your joystick; in my case "Logitech Extreme 3D".

Note: Even with the rudder pedal controller connected, Condor will default the rudder function to the joystick.

Condor enables you to manually reassign any control function to any available control on any available device.   For example, you can change any of Condor's keyboard assignments to any other key on the keyboard or to any button/axis on any of your control devices (e.g. the joystick). Reassigning the rudder function to your rudder pedal controller is a good example.
1. Make sure your rudder pedal controller is plugged into a USB jack on your computer
2. Click the *Button/Axis* column to the right of *Rudder* in the *Action* column. Condor outlines the current *Button/Axis* value in red.
3. Double click inside the red *Button/Axis* box. For about 4 seconds, the *Button/Axis* column will display "*Move a joystick axis*". If you do nothing, the message disappears and the *Button/Axis* value reverts back to the current setting.
4. While the "*Move a joystick axis*" message is displayed, move your rudder pedals. Make sure you move the correct axis. Pedal controllers often have multiple axes.
5. Condor will sense the pedal controller input, set the *Button/Axis* value accordingly, and change the *Device* column value to the name of your rudder pedals; in my case "CH PRO PEDALS USB".

Assign controls

Double click or press ENTER to assign.
Press DELETE to unassign.

Action	Button/Axis	Device
Bank	X Axis	Logitech Extreme 3D
Pitch	Y Axis	Logitech Extreme 3D
Rudder	Z Axis	CH PRO PEDALS USB
AirBrakes	Slider	Logitech Extreme 3D
Trimmer		
View POV	Hat Switch	Logitech Extreme 3D
Bank mouse		
Pitch mouse		
Bank left	Left	Keyboard
Bank right	Right	Keyboard
Pitch up	Up	Keyboard
Pitch down	Down	Keyboard
Rudder left	Z	Keyboard
Rudder right	X	Keyboard
Rudder center	C	Keyboard

Defaults   Cancel   OK

Using this same technique, I reassigned all the other common flight control functions to buttons on my joystick. The following "button" assignments are specific to the Logitech Extreme 3D Pro.

- *Trimmer up* (nose up trim)   Button 2
- *Trimmer down* (nose down trim)   Button 4
- *Flaps up*   Button 5
- *Flaps down*   Button 3
- *Gear* extension/retraction   Button 7
- *Wheel Brake*   Button 0
- Tow *Release*   Button 6

For pictures of the Logitech Extreme 3D Pro joystick and CH Products Pro Pedals, link to: http://www.cumulus-soaring.com/condor.htm

Next Time
In the next instruction-related Condor Corner: Glider Flight Instruction at a Distance. Until then, keep those cards and letters coming.   smanley@wisc.edu

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Scott Manley owns, and occasionally actually flies, a DG-303. The back of his pilot's license reads: Commercial pilot: airplane single-engine land & sea; instrument airplane; glider. He lives in Madison, Wisconsin and flies as a commercial pilot, glider flight instructor, and tow pilot for Sylvania Soaring Adventures in Beloit, Wisconsin.