



# NOTVAM

NOTICE TO VIRTUAL AIRMEN

#2

23-Sept-2004

## **GoFlight hardware compatibility with add-on aircraft for Microsoft® Flight Simulator**

*Doyle Nickless*

As our venerable flight simulation hobby continues to expand, so does the number and complexity of software and hardware “add-ons” for Microsoft’s Flight Simulator product. When it comes to add-on aircraft compatibility with GoFlight hardware, we get our share of questions. Many current and soon-to-be owners of GoFlight modules often ask, “If I buy such-and-such aircraft from Whizmo Sims, will it be compatible with my GoFlight cockpit control system?” Or, “I’ve had my GF-MCP for 6 months now and it’s been working fine with all the Flight Sim “stock” aircraft. But I just downloaded the FlappyBird from FlyHigh Software and I can’t get the autopilot to work quite right.”

In this NOTVAM I’ll discuss the fundamental cause of these compatibility issues, and also let you know what we are doing at GoFlight to address them.

### **Microsoft’s Flight Simulator SDK**

Microsoft encourages software developers to create add-ons for its Flight Simulator product in much the same way it fosters application support for the Windows® operating system. The company does this by publishing a software development kit known as the *Flight Simulator SDK*. This is a documentation and code package that is freely available from Microsoft. It is what software developers use to create various types of add-on products for Flight Simulator – including add-on aircraft, scenery, cockpit panels, and sounds. (Incidentally, GoFlight modules communicate with Microsoft Flight Simulator using certain “hooks” provided in this SDK.)

### **The “one size fits all” autopilot**

Our most common compatibility issue is related to autopilot operation -- specifically, the autopilot controls that are found in a modern-day Boeing or Airbus airliner. If you’re a fan of airliners, you’ve probably noticed that the autopilots for the Boeing jets built into Flight Simulator (B737, 747, and 777) are much simpler than their real-world counterparts – the revered MCP, or “Mode Control Panel.” Functions like LNAV, VNAV, FLCH, and bank limit are completely missing from the autopilots on the “stock” aircraft in Flight Simulator. This isn’t just a panel layout issue. In fact, Flight Simulator’s built-in autopilot contains NO support for these functions. Nor does it contain support for other complex systems, such as EFIS and CDU, that are found aboard these craft in the real world. This was done by design to ensure that all the MSFS built-in aircraft are easier to fly with less complexity to master. This turns out to be excellent for virtual airmen who are just getting their feet wet flying the airliners, but for those more experienced simmers who increasingly crave realism, it becomes a significant limitation. And that’s the time when many newbie-turned-enthusiasts start shopping for some of the more true-to-life “heavy metal” add-ons...

## Going beyond the basic autopilot

Now, suppose you're a software developer who wants to produce the most REALISTIC and STUNNING Boeing 7x7 for Flight Simulator that the world has ever seen (substitute 'x' here for your favorite number – '3', '4', 'E'..? ☺). Okay, in order to capture the market and clinch next year's coveted "Bravo Zulu" award, you're going to have to make the cockpit in this thing as close to 100% true-to-life as possible. That means the MCP has to have VNAV, LNAV, etc, etc... And what about the EFIS controls? No support in the SDK for those at all! (Notice they're not in the built-in Boeings either?) But – since the built-in Microsoft Flight Simulator autopilot does not support these functions – what are you going to do?

The most obvious solution is to create an independent MCP and EFIS, and all of its underlying logic, and not communicate with the built-in Flight Simulator autopilot at all. In fact, while our aircraft is flying, we will need to make sure that the built-in Flight Simulator autopilot is never allowed to control the aircraft. Instead, our own autopilot logic will handle the job.

This is, in fact, the way that most of the currently-available airliner add-on packages have been implemented. The data related to the autopilot, EFIS, and many other more complex systems are managed independently of the core Flight Sim program. Because of this, the core Flight Sim program and other add-on programs do not have access to this data.

## What Can Be Done?

So you can see that the fundamental issue we're dealing with is that "Product A" is unable to communicate with "Product B." This issue can be addressed in a number of ways and with varying degrees of success, but unfortunately, there is not one obvious solution that can be used universally by all add-ons. Here are some of the possibilities:

1. Add-on aircraft developers work with other add-on developers (hardware, panels, etc.) to work out a custom communications solution between products. To an industry outsider, this one probably seems the most obvious, but I have found it to be almost impossible in practice.
2. "Information broker" software is used to translate data between formats used by Product A and Product B, allowing at least some interaction between products. An example of this is Peter Dowson's *FSUIPC*.
3. Microsoft implements a more sophisticated autopilot, and other systems, in future versions of Flight Simulator. This would make it unnecessary for add-on aircraft developers to create their own complex systems logic for MCP, EFIS, overhead panel and other functions.
4. A committee is formed to develop a specification for "extended sim data." This committee includes representatives from most significant FS add-on companies. The specification would include naming conventions, data type, size, unit, range, increment, and usage information for simulator data. The specification could potentially become a standard for implementation of data that does not (yet) exist in Microsoft Flight Simulator as well as in other non-Microsoft simulators.

I'm confident that this problem will be addressed in the near future (likely 1-2 years) and solutions will begin to emerge. If you are a GoFlight customer and are affected by this compatibility issue now, we realize that it can be frustrating, and we thank you for being patient. It is a complex issue and part of the "growing pains" being felt

within our quickly expanding hobby. Also, it's important to note that this issue affects all add-on products, not just those produced by one company or another.

### Key Mapping to the rescue ... partially

A partial solution to the compatibility problem we've been discussing is available right now, and it's a technique known as *key mapping*. Although key mapping is useful in certain ways, you must understand that it's a half-baked solution when used with most GoFlight modules. This is because key mapping does not enable the displays and LEDs on your GoFlight modules to stay in sync with the corresponding aircraft systems. But at least you will be able to have much better "hands on" control of the aircraft than you would by simply clicking on the screen with the mouse.

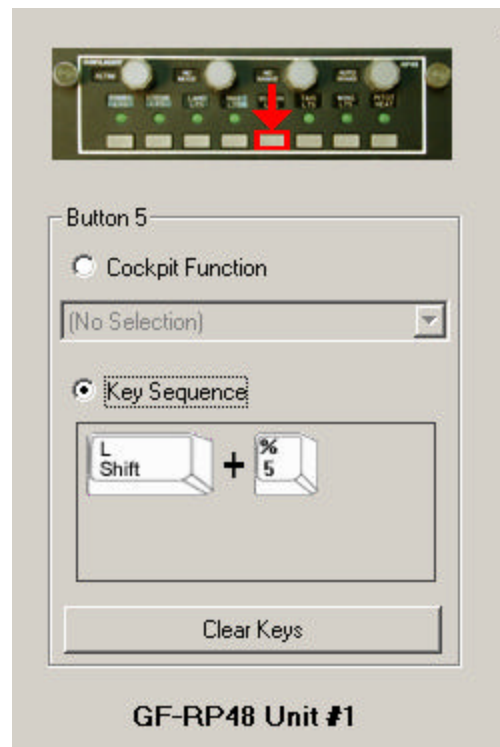
### Use of Key Mapping

To set up key mapping for the controls on your GoFlight modules, you can use either GFConfig or the registered version of FSUIPC, an add-on software package developed by Peter Dowson.

Key mapping support in GFConfig is currently limited to GF-P8 and GF-RP48 buttons, and is thus much more limited than the support provided by FSUIPC. Using the registered version of FSUIPC, you can set up key mapping for the knobs, buttons and switches on GF-45, GF-P8, GF-RP48, GF-T8, GF-LGT, GF-166 and GF-MCP modules.

### Key mapping using GFConfig

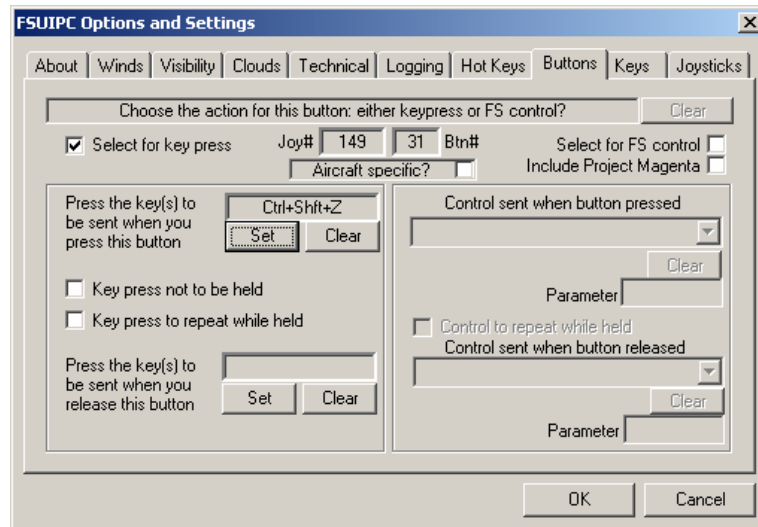
1. In the device view, select a module which supports key mapping (currently GF-P8 or GF-RP48.)
2. In the configuration view for the selected module, select a control by either clicking in the device view or physically activating the control (example: push a button.)
3. Select the **Key Sequence** radio button.
4. Push the keys on the keyboard exactly as you wish them to be sent during the simulation. Verify that the icons representing the keys appear in the configuration view. If you make a mistake and wish to re-specify the key sequence, click the Clear Key Sequence button and then push the keys on the keyboard again.



For more information about key mapping support provided in GoFlight software, please refer to the online help information installed along with GFConfig.

### Key mapping using FSUIPC

1. First, make sure that you have the registered version of FSUIPC version 3.20 or later, rather than the standard version. There is a charge for registration. For more information about FSUIPC and other software developed by Peter Dowson, visit Peter's Web site at <http://www.schiratti.com/dowson.html> .
2. With all GoFlight modules connected to your computer, run Flight Simulator.
3. From the main menu, select **Modules**, then **FSUIPC** .
4. Select a control on a GoFlight module by pushing, turning, or otherwise moving the control until FSUIPC displays a Joy# and Btn# value. FSUIPC displays a unique Joy# for each GoFlight module, and a zero-based Btn# value associated with that module.
5. Click on the **Buttons** tab.
6. Click on the checkbox labeled **Select for key press** so that the check mark is shown.
7. Note that there are two similar control clusters on the left side of the dialog, each with a **Set** and **Clear** button. The top cluster allows you to designate a key sequence that is sent when a button is pressed (or other type of switch is activated) while the bottom cluster is used to designate a key sequence that is sent when a button is released (or other type of switch is deactivated.) For most buttons and rotary knob movements, you will only need to designate only a key sequence for a "press" action and not a "release" action. For other multi-state controls such as toggle switches or a gear lever, you might find it useful to designate a different key sequence for a "press" action than for the "release" action.
8. Click the **Set** button in the control cluster associated with either a Press (switch activate) or Release (switch deactivate) action.
9. Using your keyboard, press the keys that represent the sequence to be mapped. FSUIPC now displays a description of the key sequence in the edit box next to the **Set** and **Clear** buttons.
10. If you make a mistake entering the key sequence, click the **Clear** button and repeat Step 9.



Example: Key mapping the ALT knob on GF-MCP Unit #1 using FSUIPC.

### Key mapping for your favorite B737??

One of the most popular add-on aircraft packages available today is the *737 Next Generation* product from a company named Precision Manuals Group. The developers of this software package had the foresight to define a large number of key commands that are used for controlling various systems on the 737NG aircraft. These key commands make it possible to control the associated aircraft systems not only with your keyboard, but with any device which can generate the key commands. GoFlight modules can generate these key commands using either the key mapping facilities built into its interface software, or through the key mapping facility provided in FSUIPC.

The following tables show just how extensive the key mapping support for 737NG is in the current version of the product. The tables list all of key commands you can use to control the MCP, EFIS, Panel Switcher, and other miscellaneous cockpit functions in the Precision Manuals Group 737NG aircraft.

If you prefer to print out these lists from within Flight Simulator, you can select **PMDG** from the main menu, then **Key Commands** and finally clicking on the **Print** button.

### 737NG MCP Key Commands

Num	Command	Key Combination
1	(No Command)	(No Assignment)
2	(No Command)	(No Assignment)
3	MCP Press A/P Disconnect	Z
4	MCP Arm Autothrottle	Shift+R
5	MCP N1 Button	Ctrl+Shift+N
6	MCP SPD Button	Ctrl+M
7	MCP CO Button	Shift+I
8	MCP FLCH Button	Ctrl+I
9	MCP VNAV Button	Ctrl+V
10	MCP LNAV Button	Ctrl+N
11	MCP VORLOC Button	Ctrl+O

12	MCP APP Button	Ctrl+A
13	MCP HDG Select	Ctrl+H
14	MCP ALT HLD Button	Ctrl+Z
15	MCP V/S Button	Ctrl+P
23	MCP CMD L Button	A
24	MCP CMD R Button	Tab+A
25	MCP CWS L Button	(No Assignment)
26	MCP CWS R Button	(No Assignment)
27	MCP Flight Director L	Ctrl+F
28	MCP Flight Director R	Tab+F
29	MCP Increase Bank Limit	Ctrl+Shift+L
30	MCP Decrease Bank Limit	Ctrl+Tab+L
31	MCP Increase Course	Ctrl+Shift+D
32	MCP Decrease Course	Ctrl+Tab+D
33	MCP Increase Altitude	Ctrl+Shift+Z
34	MCP Decrease Altitude	Ctrl+Tab+Z
35	MCP Increase Speed	Ctrl+Shift+V
36	MCP Decrease Speed	Ctrl+Tab+V
37	MCP Increase Heading	Ctrl+Shift+H
38	MCP Decrease Heading	Ctrl+Tab+H
39	MCP Increase V/S	Ctrl+Shift+P
40	MCP Decrease V/S	Ctrl+Tab+P
41	MCP Increase Course Fast	(No Assignment)
42	MCP Decrease Course Fast	(No Assignment)
43	MCP Increase Altitude Fast	(No Assignment)
44	MCP Decrease Altitude Fast	(No Assignment)
45	MCP Increase Speed Fast	(No Assignment)
46	MCP Decrease Speed Fast	(No Assignment)
47	MCP Increase Heading Fast	(No Assignment)
48	MCP Decrease Heading Fast	(No Assignment)
49	MCP Increase V/S Fast	(No Assignment)
50	MCP Decrease V/S Fast	(No Assignment)
51	MCP Set TO/GA	Ctrl+Shift+G
52	MCP Reset TO/GA	Ctrl+Tab+G

### 737NG EFIS Key Commands

Num	Command	Key Combination
53	EFIS Press Mins	Shift+Tab+M
54	EFIS Increase Mins	Ctrl+Shift+M
55	EFIS Decrease Mins	Ctrl+Tab+M
57	EFIS Reset Mins	Ctrl+Shift+Tab+M
58	EFIS Press BARO	Shift+Tab+B
59	EFIS Increase BARO	Ctrl+Shift+B
60	EFIS Decrease BARO	Ctrl+Tab+B
62	EFIS Press Baro STD	Ctrl+Shift+Tab+B
63	EFIS Press FPV	Ctrl+Shift+Tab+V
64	EFIS Press MTRS	Ctrl+Shift+Tab+R
65	EFIS Increase NavL	Ctrl+Shift+1
66	EFIS Decrease NavL	Ctrl+Tab+1
68	EFIS Increase NavR	Ctrl+Shift+2
69	EFIS Decrease NavR	Ctrl+Tab+2
71	EFIS Increase ND Mode	Ctrl+Shift+F12
72	EFIS Decrease ND Mode	Shift+Tab+F12
73	EFIS Press ND Mode CTR	Ctrl+Shift+Tab+F12
74	EFIS Increase ND Range	Ctrl+Shift+F11
75	EFIS Decrease ND Range	Shift+Tab+F11
76	EFIS Press ND Range TFC	Ctrl+Shift+Tab+F11
77	EFIS Press WXR	Shift+Tab+F1
78	EFIS Press STA	Shift+Tab+F2
79	EFIS Press WPT	Shift+Tab+F3

80	EFIS Press ARPT	Shift+Tab+F4
81	EFIS Press DATA	Shift+Tab+F5
82	EFIS Press POS	Shift+Tab+F6
83	EFIS Press TERR	Shift+Tab+F7

### 737NG Panel Switcher Key Commands

Num	Command	Key Combination
84	Panel Switcher Press M	Ctrl+Shift+Tab+1
85	Panel Switcher Press Z	Ctrl+Shift+Tab+2
86	Panel Switcher Press A	Ctrl+Shift+Tab+3
87	Panel Switcher Press L	Ctrl+Shift+Tab+4
88	Panel Switcher Press F	Ctrl+Shift+Tab+5
89	Panel Switcher Press O	Ctrl+Shift+Tab+6
90	Panel Switcher Press T	Ctrl+Shift+Tab+7
91	Panel Switcher Press R	Ctrl+Shift+Tab+8
92	Panel Switcher Press I	Ctrl+Shift+Tab+9

### 737NG Miscellaneous Key Commands

Num	Command	Key Combination
93	Autobrakes Increase Pos	U
94	Autobrakes Decrease Pos	Tab+U

## Controlling the 737NG MCP and EFIS using GoFlight hardware

Given the availability of all these key commands for the 737NG aircraft, here's an example of how you can completely control the plane's MCP, as well as most EFIS functions and the autobrake control, using three GoFlight modules -- one GF-MCP module and two GF-RP48 modules.

The following table lists my suggested key mappings between each GoFlight module control (button or knob) and a corresponding control on the 737NG MCP, using FSUIPC as the key mapping software.

Once you become comfortable with the key mapping process, you will likely want to make changes to these mappings to better suit the physical layout of your cockpit.

As you are setting up the key mapping associations, here are some important points to note:

1. FSUIPC assigns Joy# values to GF-MCP modules beginning with GF-MCP Unit 1 as Joy# 149, Unit 2 as Joy#150, etc.
2. FSUIPC assigns Joy# values to GF-RP48 modules beginning with GF-RP48 Unit 1 as Joy#174, Unit 2 as Joy#175, etc.
3. FSUIPC represents any control action from a GoFlight module as a Btn#, even for controls that are not physical buttons; for example, the turn of a rotary knob or the "down" action of the disengage bar. For rotary knob movements, FSUIPC distinguishes between fast and slow turns in a given direction by assigning different Btn# values, as you will see in the table that follows.
4. Make sure that any controls on GF-RP48 modules that you want to key-map don't already have other functions assigned in GFConfig; otherwise, there will be a configuration conflict. You can verify this by running GFConfig, selecting the GF-RP48 unit you are going to key-map through FSUIPC, and look at the function list. All controls that you plan to key map should show "No Assignment" as their assigned function.
5. In versions of GFConfig up to and including version 1.33, there isn't an option to turn off or re-assign autopilot functions for the individual buttons and knobs on the GF-MCP. When you map these controls through FSUIPC as I describe here, you'll notice that the GF-MCP displays and button LEDs continue to light up and show values although they won't match the settings you see on the 737NG panel's MCP. This happens because the GF-MCP is still communicating with Flight Simulator's built-in autopilot, even though it is never activated. PMDG's self-contained autopilot logic makes sure that the Microsoft autopilot remains deactivated. A workaround for this is to delete the file **GFMcP2k4.dll** from your Flight Simulator 2004 Modules folder. Once you do this, the next time you run Flight Simulator, all displays and LEDs on the GF-MCP will remain unlit. Even so, you'll still be able to map the controls through FSUIPC as described here. Like most workarounds, there is a catch -- each time you run GFConfig and exit, this DLL file is re-copied to the Flight Simulator Modules folder. Future releases of GFConfig will support individual control assignment on the GF-MCP, which will eliminate the need to delete

this DLL. But in the meantime, you may wish to add the task “Delete DLL” to your pre-flight checklist.

### GF-MCP Key Mappings for 737NG Basic Functionality

The following key mappings permit the GF -MCP to control most of the basic functionality of the MCP on the 737NG aircraft. I've intentionally tried to associate most of the basic functions with the labeling on the GF -MCP panel, but you might wish to reassign the functions to more closely match the layout of the 737's MCP – it's completely up to you.

GF-MCP Control	FSUIPC Btn#	Action: Key Combination	737NG MCP Command
NAV Button	0	Press: Ctrl+D	MCP Press VOR LOC button
HDG HOLD Button	1	Press: Ctrl+H	MCP Press HDG SEL button
IAS/MACH HOLD Button	2	Press: Ctrl+M	MCP Press SPEED button
SEL Button	3	Press: Shift+I	MCP Press CO button
ALT HOLD Button	4	Press: Ctrl+Z	MCP Press ALT HOLD button
APPR Button	5	Press: Ctrl+A	MCP Press APP button
B/C Button	6	Press: Ctrl+P	MCP Press V/S button
A/P CMD Button	7	Press: A	MCP Press CMD A button
Disengage Bar Down	8	Press: Z	MCP Press A/P Disconnect
Disengage Bar Up	8	Release: Z	MCP Press A/P Disconnect
CRS Knob CCW* Fast	12	Press: Ctrl+Tab+D	MCP Decrease Course
CRS Knob CCW Slow	13	Press: Ctrl+Tab+D	MCP Decrease Course
CRS Knob CW Slow	14	Press: Ctrl+Shift+D	MCP Increase Course
CRS Knob CW Fast	15	Press: Ctrl+Shift+D	MCP Increase Course
HDG Knob CCW Fast	16	Press: Ctrl+Tab+H	MCP Decrease Heading
HDG Knob CCW Slow	17	Press: Ctrl+Tab+H	MCP Decrease Heading
HDG Knob CW Slow	18	Press: Ctrl+Shift+H	MCP Increase Heading
HDG Knob CW Fast	19	Press: Ctrl+Shift+H	MCP Increase Heading
IAS/MACHKnob CCW Fast	20	Press: Ctrl+Tab+V	MCP Decrease Speed
IAS/MACHKnob CCW Slow	21	Press: Ctrl+Tab+V	MCP Decrease Speed
IAS/MACH Knob CW Slow	22	Ctrl+Shift+V	MCP Increase Speed
IAS/MACH Knob CW Fast	23	Ctrl+Shift+V	MCP Increase Speed
V/S Wheel Up Fast	24	Ctrl+Tab+P	MCP Decrease V/S
V/S Wheel Up Slow	25	Ctrl+Tab+P	MCP Decrease V/S
V/S Wheel Down Slow	26	Ctrl+Shift+P	MCP Increase V/S
V/S Wheel Down Fast	27	Ctrl+Shift+P	MCP Increase V/S
ALT Knob CCW Fast	28	Ctrl+Tab+Z	MCP Decrease Altitude
ALT Knob CCW Slow	29	Ctrl+Tab+Z	MCP Decrease Altitude
ALT Knob CW Slow	30	Ctrl+Shift+Z	MCP Increase Altitude
ALT Knob CW Fast	31	Ctrl+Shift+Z	MCP Increase Altitude

\* CCW = counterclockwise turn, CW = clockwise turn.

## GF-RP48 Key Mappings for 737NG MCP, EFIS, and Autobrakes

The following key mappings show how two GF-RP48 modules can be used to control additional functions on the 737NG MCP, the EFIS, and the autobrake system on the aircraft.

GF-RP48 #1 Control	FSUIPC Btn#	Action: Key Combination	MCP Command
Button 1	0	Ctrl+F	MCP Toggle Flight Director SW
Button 2	1	Shift+R	MCP Toggle Autothrottle SW
Button 3	2	Ctrl+Shift+N	MCP Press N1
Button 4	3	Ctrl+I	MCP Press LVL CHG
Button 5	4	Ctrl+V	MCP Press VNAV
Button 6	5	Ctrl+N	MCP Press LNAV
Button 7	6	A	MCP Press CMD A
Button 8	7	Tab+A	MCP Press CMD B
Knob A CCW Fast	8	Ctrl+Tab+M	EFIS Decrease MINS
Knob A CCW Slow	9	Ctrl+Tab+M	EFIS Decrease MINS
Knob A CW Slow	10	Ctrl+Shift+M	EFIS Increase MINS
Knob A CW Fast	11	Ctrl+Shift+M	EFIS Increase MINS
Knob B CCW Fast	12	Ctrl+Tab+B	EFIS Decrease BARO
Knob B CCW Slow	13	Ctrl+Tab+B	EFIS Decrease BARO
Knob B CW Slow	14	Ctrl+Shift+B	EFIS Increase BARO
Knob B CW Fast	15	Ctrl+Shift+B	EFIS Increase BARO
Knob C CCW Fast	16	Ctrl+Tab+L	MCP Decrease Bank Limit
Knob C CCW Slow	17	Ctrl+Tab+L	MCP Decrease Bank Limit
Knob C CW Slow	18	Ctrl+Shift+L	MCP Increase Bank Limit
Knob C CW Fast	19	Ctrl+Shift+L	MCP Increase Bank Limit
Knob D CCW Fast	20	Tab+U	Autobrakes Decrease Pos
Knob D CCW Slow	21	Tab+U	Autobrakes Decrease Pos
Knob D CW Slow	22	U	Autobrakes Increase Pos
Knob D CW Fast	23	U	Autobrakes Increase Pos

GF-RP48 #2 Control	FSUIPC Btn#	Action: Key Combination	MCP Command
Button 1	0	Shift+Tab+F1	EFIS Press WXR
Button 2	1	Shift+Tab+F2	EFIS Press STA
Button 3	2	Shift+Tab+F3	EFIS Press WPT
Button 4	3	Shift+Tab+F4	EFIS Press ARPT
Button 5	4	Shift+Tab+F5	EFIS Press DATA
Button 6	5	Shift+Tab+F6	EFIS Press POS
Button 7	6	Shift+Tab+F7	EFIS Press TERR
Button 8	7	Ctrl+Shift+Tab+F11	EFIS Press ND Range TFC
Knob A CCW Fast	8	Ctrl+Tab+1	EFIS Decrease NavL
Knob A CCW Slow	9	Ctrl+Tab+1	EFIS Decrease NavL
Knob A CW Slow	10	Ctrl+Shift+1	EFIS Increase NavL
Knob A CW Fast	11	Ctrl+Shift+1	EFIS Increase NavL
Knob B CCW Fast	12	Shift+Tab+F12	EFIS Decrease ND Mode
Knob B CCW Slow	13	Shift+Tab+F12	EFIS Decrease ND Mode
Knob B CW Slow	14	Ctrl+Shift+F12	EFIS Increase ND Mode
Knob B CW Fast	15	Ctrl+Shift+F12	EFIS Increase ND Mode
Knob C CCW Fast	16	Shift+Tab+F11	EFIS Decrease ND Range
Knob C CCW Slow	17	Shift+Tab+F11	EFIS Decrease ND Range
Knob C CW Slow	18	Ctrl+Shift+F11	EFIS Increase ND Range
Knob C CW Fast	19	Ctrl+Shift+F11	EFIS Increase ND Range
Knob D CCW Fast	20	Ctrl+Tab+2	EFIS Decrease NavR
Knob D CCW Slow	21	Ctrl+Tab+2	EFIS Decrease NavR
Knob D CW Slow	22	Ctrl+Shift+2	EFIS Increase NavR
Knob D CW Fast	23	Ctrl+Shift+2	EFIS Increase NavR

### Using key mapping with other add-on aircraft

You can use the key mapping techniques I've described here for controlling similar systems on other add-on aircraft packages as well. Just be sure that the systems on those aircraft can be controlled using key commands, and you're good to go. This information can usually be found in the software documentation or online if the developer of the aircraft has a Web site.

---

### A Note About NOTVAMs

GoFlight's NOTVAM documents are published at sporadic intervals, and are intended to provide flight simulation enthusiasts with in-depth technical and operational information about various aspects of flight simulation, in particular when applied to use with GoFlight's products. Whew! That was a long sentence... The subjects addressed in NOTVAMS are often prompted by suggestions from GoFlight's customers, and also from often-asked questions posed to our support department. If you have a particular question or subject you would like to see addressed in a future NOTVAM, please send us a note via e-mail to: [notvams@goflightinc.com](mailto:notvams@goflightinc.com).

We realize that the name *NOTVAM* (pronounced "NOTE-vam") sounds similar to the name "NOTAM", an abbreviation for the official "Notice to Airmen" publication produced at regular intervals by the United States Federal Aviation Administration (FAA). The FAA's NOTAM is used to notify real-world pilots about aviation-related news that may affect them while in flight (*real* flight) or on the ground (*real* ground.) In contrast, NOTVAMs, on the other hand, are published by GoFlight, Inc., and are meant only for flight simulation use. GoFlight, Inc. does not intend in any way to confuse real-world or simulator pilots regarding these terms, but only to enhance the overall experience of flight simulation enthusiasts. The subjects covered by NOTVAMs deal only with flight simulation for entertainment and/or training purposes.

### Legal Stuff

---

Microsoft is a registered trademark of Microsoft Corporation.

Windows, Windows 98, Windows 2000, Windows Me, and Windows XP are registered trademarks of Microsoft Corporation.

All other products or product names mentioned in this document are trademarks or registered trademarks of their respective companies.



11855 SW Ridgecrest Drive, Suite 205 – Beaverton, Oregon, USA 97008  
Tel: 503-671-9317 Fax: 503-671-0168