

BajusSoftware



Panel Builder 3

User Manual

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Introduction

Panel Builder 3 is an add-on Avionics Package that allows the creation of custom Instrument Panels to interface with several Flight Simulator Programs.

Typically instrument panels are displayed on a separate monitor in full-screen mode. A mask can be used to cover unused portions of the monitor to resemble a real-life instrument panel more closely

Panel Builder 3 can be run on the same computer as the flight simulator software. It is recommended though to utilize an additional computer for this purpose for performance reasons. You can also a third computer with a second copy of Panel Builder.

Instruments are 'free floating' in the screen. They can be resized, moved around the screen, and combined into a predefined panel. For the latter purpose, a management tool called Panel Builder 3 is provided. Panel Builder 3 allows the building of instrument panels for different aircraft types and provides a mechanism for starting and stopping all instruments.

Some instruments contain configuration options that are accessible via a right click menu option. This is used for setting ranges and/or color bars on the instrument, calculations, and performance related options. This allows using the same instrument for a slow piston powered airplane or a high-performance turbine powered airplane.

The same instrument can be used multiple times in a panel. This allows for example to build panels for multi-engine aircraft or for defining a pilot and co-pilot instrument panel.

Capabilities and Features

Multiple Flight Simulators supported.

Currently supported are X-Plane (V11.0 & V12.0 and above), MS Flight Simulator X & 2020, Lockheed Martin Prepar3D (V4 and V5 and above), DCS World and Condor & Condor2.

All Interfaces are included in the base package.

A Lua Script for the A2A C172 and PA28-180 is also included.

The same Panel can be used with all supported Flight Simulators except for DCS World and Condor. For DCS and Condor, there are separate Panel Builder 3 packages available.

Modular Design

Instruments (Panel Builder) and Interface software are separate modules. This enables adding new interfaces for other flight simulators without changing the instrument software. The interface software is always installed in the same computer as the flight simulator. The instruments (Panel Builder) can be installed on a separate, networked computer.

Vector based Instruments

Allows the sizing of instrument to match a cut-out mask or to set them to the required size for easy reading.

No images are used to draw instruments on the screen. Instruments are always crisp and easy to read in any size.

Network support

Panel Builder is typically installed on one or two networked computers. This will lower the performance impact the external panel has on the flight simulation software. It also provides additional screen real estate for the panels. A third computer with an additional copy of Panel Builder can also be added to support very large instrument panels.

Interface Configuration

The X-Plane Flight Simulator Interface can be fully configured to allow for customization and enabling the support of new flight simulator features in the future.

Fixed Wing, Helicopter and Soaring Instruments

The base program includes the Standard Six instruments. Additional instruments can be added by purchasing instrument add-on packs.

'Free-floating' Instruments	All instruments provided can be moved anywhere on a monitor. This allows accurate placement of instruments on a predefined back-ground graphic or cut-out mask. They can be locked in place to avoid accidental moving.
'Free-sizing' Instruments	All instruments can be resized in fine increments. This is useful to fit instruments into a panel mask
Configurable Instrument Ranges	Many instruments can be configured to match the aircraft's performance data. This configuration allows the use of all instruments in different aircraft types. The configuration is stored within an instrument for a specific panel.
Multiple-use Instruments	Each instrument can be used multiple times within the same panel. This allows the use of engine instruments for multi-engine aircraft and to design a pilot and co-pilot panel.
Commercial Applications	The Commercial version licenses the user to deploy Panel Builder in a commercial environment and for resale as part of a complete flight simulator environment. Each deployment does require the purchase of a separate license. Commercial Licenses include ALL instrument add-ons free of charge.

Technical Requirements

Hardware	Processor	Any Dual Core Processor or greater
	Memory	8GB (32 Bit), 16GB (64 Bit)
	Disk Space	1 GB (approx.)
Operating Software	Windows 7	32 or 64 Bit
	Windows 8	32 or 64 Bit
	Windows 8.1	32 or 64 Bit
	Windows 10	32 or 64 Bit (recommended)
	Windows 11	64 Bit
Flight Simulator	X-Plane	V9, V10, V11 or V12 or greater
	MS Flight Simulator X	SP2 or Steam
	MS Flight Simulator 2020	Any Version
	Lockheed Martin Prepar3D	Version 3.4, 4.5, 5 or 6 or greater
	DCS World	Any version
	Condor/Condor2	Any version

Prerequisites

The following libraries and add-ons are required for the operation of Panel Builder 3 and Interfaces. Some are included as indicated, others are not because of Copyright restrictions.

Panel Builder 3

All versions

Microsoft .Net Framework 4.8

Panel Builder X-Plane Interface

X-Plane 10/11/12 Interface Microsoft C++ Runtime 2019

Panel Builder SimConnect Interfaces

Interface FSX	Microsoft .Net Framework 2.0
Interface MSFS	Microsoft .Net Framework 4.8
Interface Prepar3d V3	Microsoft .Net Framework 4.8
Interface Prepar3d V4	Microsoft .Net Framework 4.8
Interface Prepar3d V5	Microsoft .Net Framework 4.8

The LUA Script Option for A2A C172 & PA28-180 aircraft (FSX & Prepar3D) requires a *licensed* copy of FSUIPC for FSX or Prepar3D

Panel Builder DCS World Interface

No prerequisites. The interface is a LUA script running within DCS.

Panel Builder Condor & Condor2 Interface

No prerequisites. There is no interface. Data is exported from Condor directly imported into Panel Builder 3.

Integration Scenarios

This section describes different scenarios Panel Builder can be used with. Each scenario requires different installation procedures and network configuration.

There are two distinct scenarios. The number of monitors attached on a computer does not affect any installation or configuration options if the multiple monitors are configured to expand the desktop area (virtual desktop across multiple monitors).

Single Computer - Single or multiple Monitors

Diagram



Computer 1 - Flight Simulator & Instruments

Module Selection

Computer	Flight Simulator Installed	Panel Builder Modules Required
Single Computer	X-Plane 10, 11 or 12	Interface for X-Plane 10, 11 or 12 Panel Builder 3 + Instrument Packs
	Microsoft Flight Simulator FSX & 2020	Interface for Microsoft FSX or FS2020 Panel Builder 3 + Instrument Packs
	Lockheed Martin Prepar3D V3, V4 & V5	Interface for Prepar3D V3.4, V4.5 or V5.X Panel Builder 3 + Instrument Packs
	DCS World	Interface for DCS World Panel Builder 3 + DCS Instrument Packs
	Condor/Condor2	Panel Builder 3 + Condor Instrument Packs

Two computers - Single or multiple monitors

Diagram



Computer 1 - Flight Simulator



Computer 2 - Instruments

Module Selection

Computer	Flight Simulator Installed	Panel Builder Modules Required
Computer 1	X-Plane 10, 11 or 12 Microsoft Flight Simulator 2020 Lockheed Martin Prepar3D V3, V4, V5 DCS World Condor/Condor2	Interface for X-Plane 10, 11 or 12 Interface for Microsoft FSX or FS2020 Interface for Prepar3D V3.4, V4.5 or V5.X Interface for DCS World <i>Edit UDP.ini file</i>
Computer 2	-	Panel Builder 3 + Instrument Packs

Two computers - Single or multiple monitors (2 Panel Builders)

Diagram



Computer 1 - Flight Simulator & Instruments



Computer 2 - Instruments

Module Selection

Computer	Flight Simulator Installed	Panel Builder Modules Required
Computer 1	X-Plane 10, 11 or 12	Interface for X-Plane 10, 11 or 12 Panel Builder 3 + Instrument Packs
	Microsoft Flight Simulator FSX or 2020	Interface for Microsoft FSX or FS2020 Panel Builder 3 + Instrument Packs
	Lockheed Martin Prepar3D V3, V4 or V5	Interface for Prepar3D V3.4, V4.5 or V5.X Panel Builder 3 + Instrument Packs
	DCS World	Interface for DCS World Panel Builder 3 + Instrument Packs
Computer 2	-	Panel Builder 3+ Instrument Packs

Note: This installation requires 2 Panel Builder (and Instrument) Licenses!

Note: This installation does not work with Panel Builder 3 Condor!

Three computers - Single or multiple monitors (2 Panel Builders)

Diagram



Computer 1 - Flight Simulator



Computer 2 - Instruments



Computer 3 - Instruments

Module Selection

Computer	Flight Simulator Installed	Panel Builder Modules Required
Computer 1	X-Plane 10, 11 or 12	Interface for X-Plane 10, 11 or 12
	Microsoft Flight Simulator FSX or 2020	Interface for Microsoft FSX or FS2020
	Lockheed Martin Prepar3D V3, V4 or V5	Interface for Prepar3D V3.4, V4.5 or V5.X
	DCS World	Interface for DCS World
Computer 2	-	Panel Builder 3+ Instrument Packs
Computer 3	-	Panel Builder 3+ Instrument Packs

Note: This installation requires 2 Panel Builder (and Instrument) Licenses!

Note: This installation does not work with Panel Builder 3 Condor!

Installation Procedure

Panel Builder is installed using a multi-step process. The installer software is installed first which allows the selection of the different modules to be installed on each computer (or on a single computer). The different modules are:

- Panel Builder 3
- X-Plane 10, 11 or 12 Interface - plugin
- Microsoft Flight Simulator FSX & 2020 Interface - simConnect
- Prepar3D V3.4, V4.5 & V5 Interface - simConnect

Depending on the Panel Builder and Flight Simulator you are using, choose the appropriate interface module in Step 2.

Step 1

Install the Panel Builder Install package on each computer that will be part of the overall Flight Simulator System.

Locate the Installer Program in Windows Explorer and double-click on *PanelBuilder3.exe*. Typically this file will be located in your Downloads folder after you clicked on the download link provided in the order confirmation.

Run the Panel Builder Installer on each computer and choose which modules should be installed on each computer. The selection of modules is dependent on the integration scenario applicable to your simulator system as described in the previous chapter.

Step 2

Configure each interface module of Panel Builder for:

- Networking
- Performance

This step is not required if you install everything on a single computer. All modules have been preconfigured and no changes are necessary. If you have a **dual** computer setup, you need to configure the Panel Builder Network Settings.

Step 3

Configure Panel Builder Network for a two-computer simulator configuration. There is no need to make any changes if you are using a single computer.

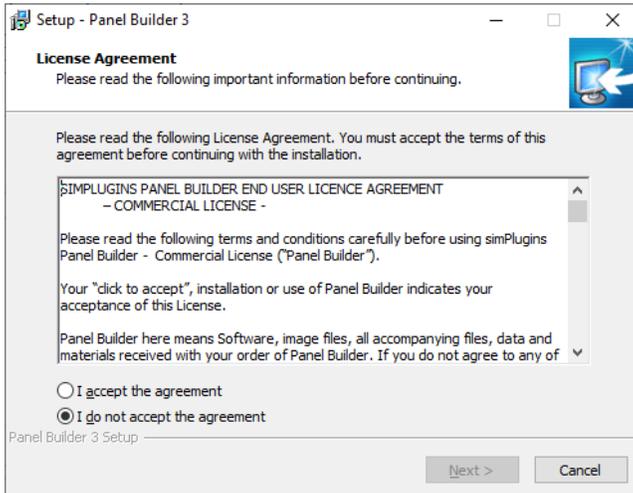
Step 4

Configure Panel Builder program options. This configures how Panel Builder operates under certain situations.

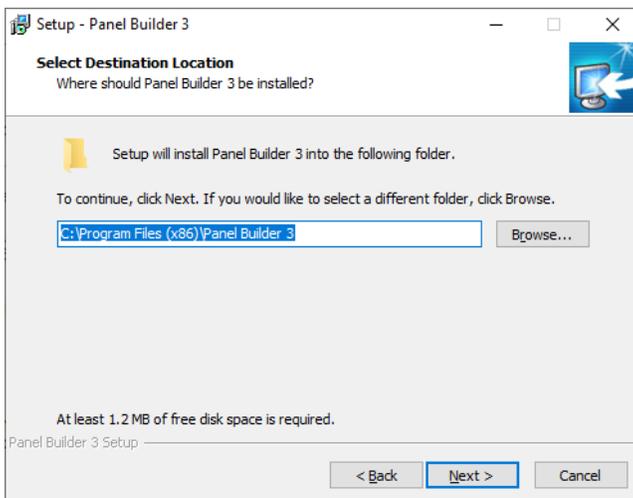
Step 1 - Install Panel Builder and Interface(s)

Copy the installation package to each computer that is part of your flight simulation system.

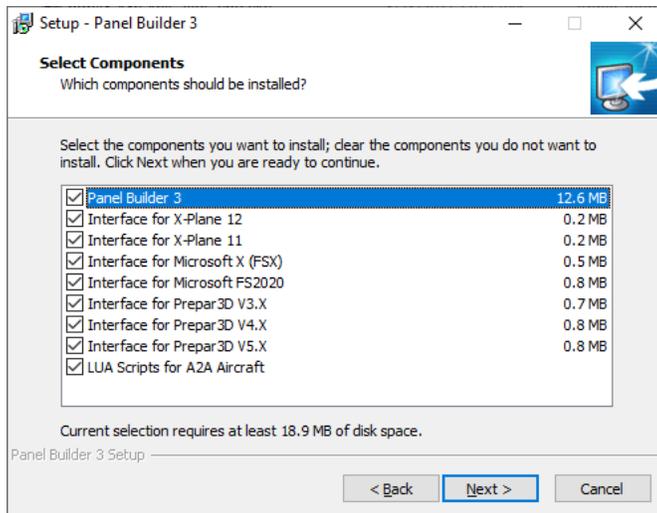
Start the installation program on each computer by locating the installation program and double click it. This will launch the installation.



Read the License agreement (either Home or Commercial Version). In order to proceed you need to accept the license agreement. Click on [Next >].



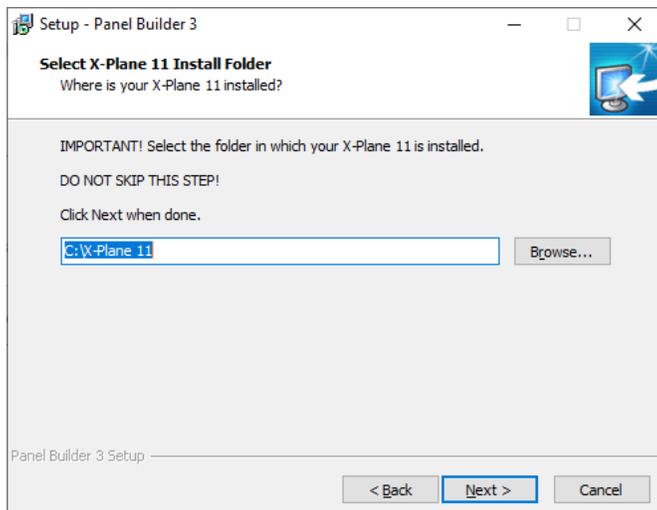
Select the installation folder using [Browse] or use the default. Click on [Next >].



Note: The available components depend on the version of Panel Builder you install, Panel Builder 3, Panel Builder 3 DCS or Panel Builder 3 Condor.

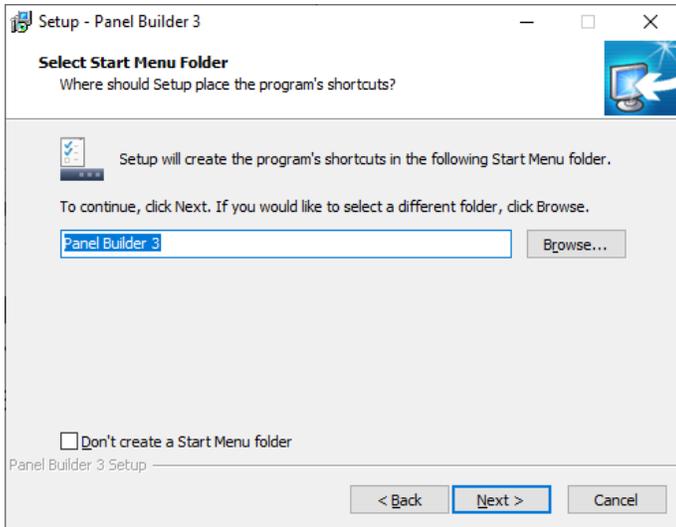
Note: If you are using the C172 or PA28 aircraft from A2A in FSX or Prepar3D, install the LUA scripts as well. This ensures correct data export for those aircraft.

Select what parts of Panel Builder to install. Click [Next >].

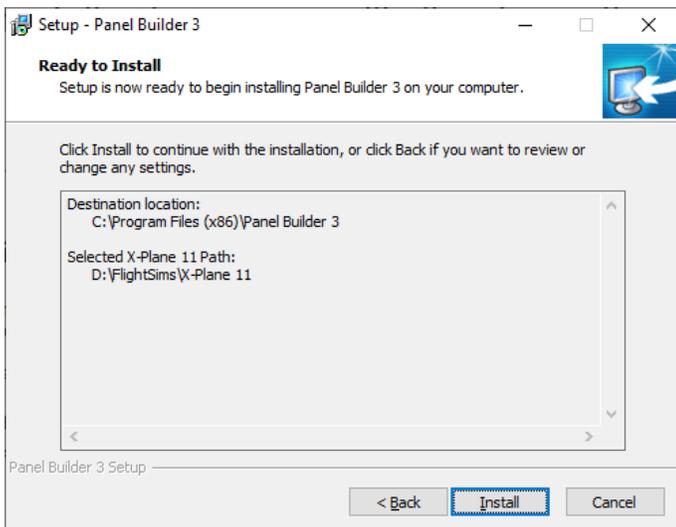


If you have selected the X-Plane 11 and/or 12 Interface, you need to specify the main X-Plane folder where X-Plane 11 or 12 is installed. Use the [Browse] button to locate that folder. The selected folder will be verified.

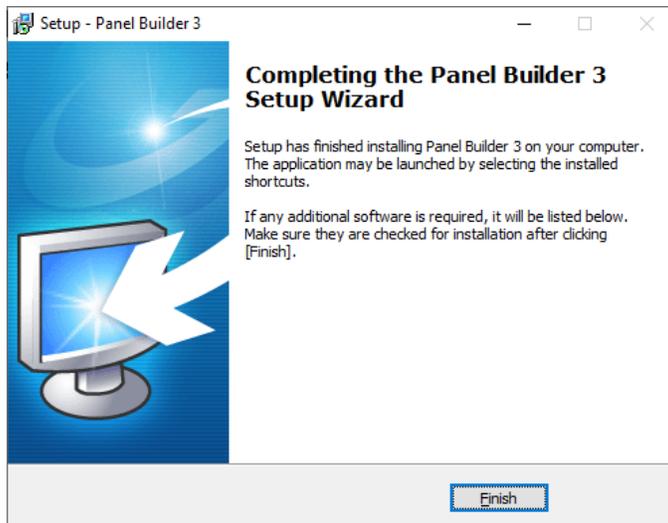
Click on [Next >].



Here you can specify the name of the Start Menu folder for all Panel Builder shortcuts. Click on [Next >].



Here it shows you what you have selected in the previous step. Click on [Install], otherwise go back to change your selection.



After the install finishes, additional software might be required. They will be listed in this page. Make sure you select them and follow the instructions on the screen to install them. Possible options are C++ Libraries and/or the .Net Framework 4.8.

This finishes the Panel Builder installation.

If you have a networked, two computer simulator system, repeat the procedure and select the appropriate features.

Step 2 - Interface Network Configuration

All modules of Panel Builder communicate using a network protocol (UDP). The Interface software receives data from the flight simulator and sends the appropriate data to each instrument, either on the same computer or to a second computer. Even if both the flight simulator software and Panel Builder is installed on the computer, communication is still performed using the network protocol.

Each Flight Simulator Interface and Panel Builder has a configuration screen for setting networking parameters.

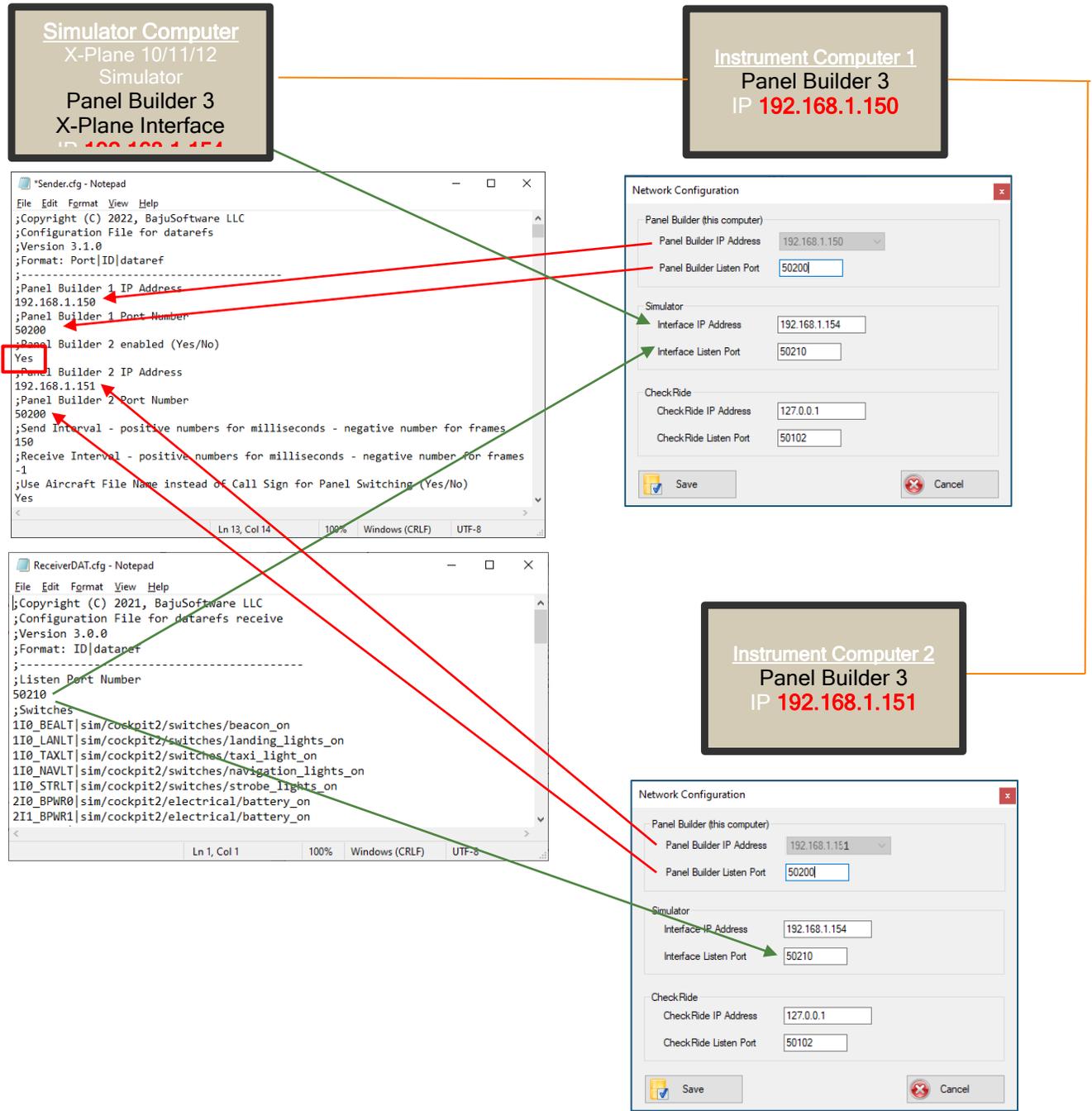
Furthermore, network configuration requires also port numbers for each component of Panel Builder. Port Numbers use a default setting after installation of Panel Builder and will not to be changed in most cases. There are circumstances where a port number is already in use by a different program to Panel Builder. In this case the port number will need to be changed to a different value.

All components of Panel Builder have been preset and those values should work for all single computer installations. The following pages are for your information and in the case where you need to make changes to the network if you have a networked, 2 or 3 computer simulator setup.

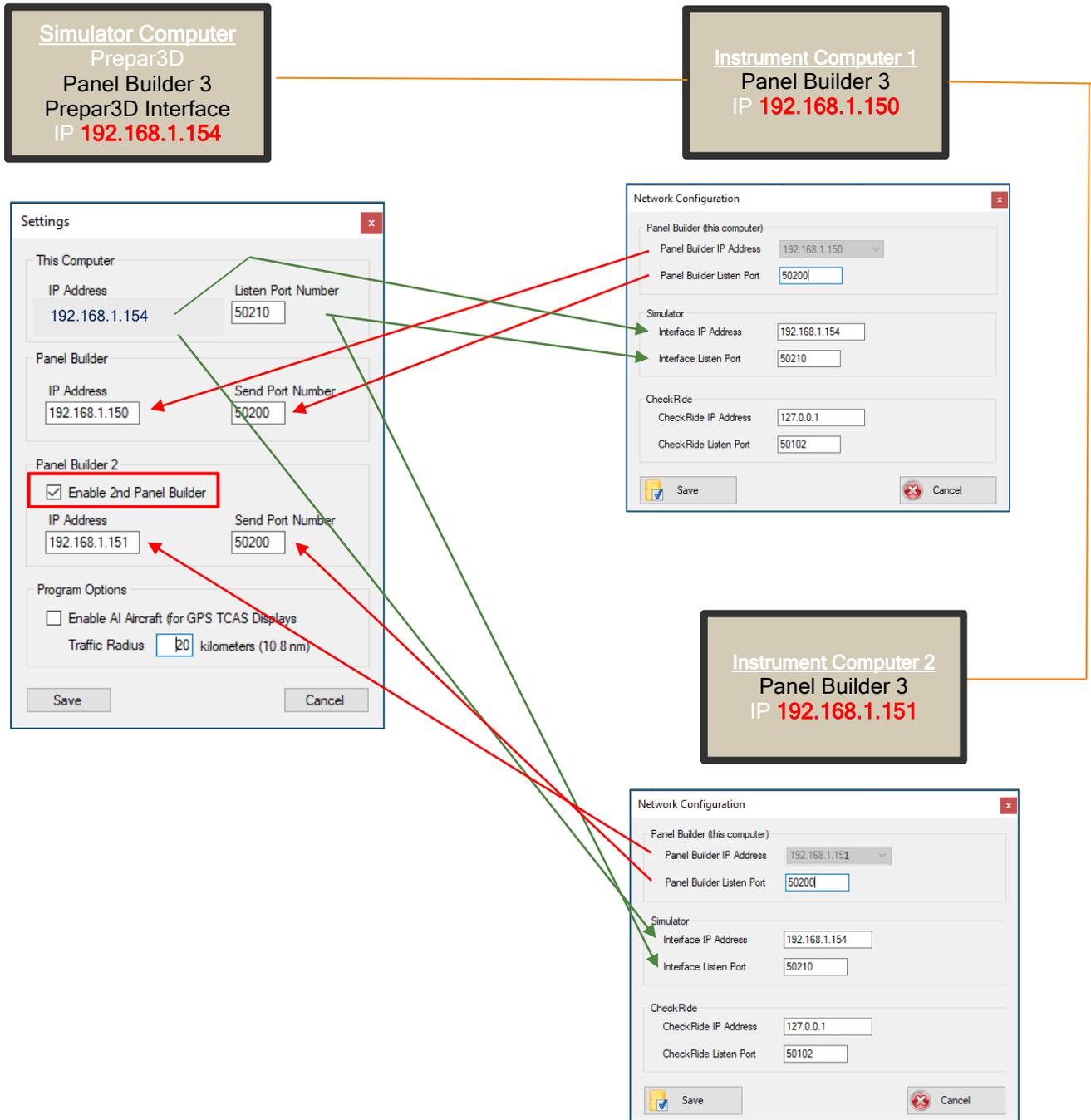
Generally:

1. Single Computer - no changes required for network settings
2. Dual Computer - change IP addresses (see following pages)
3. Three Computers - change IP addresses (see following pages)

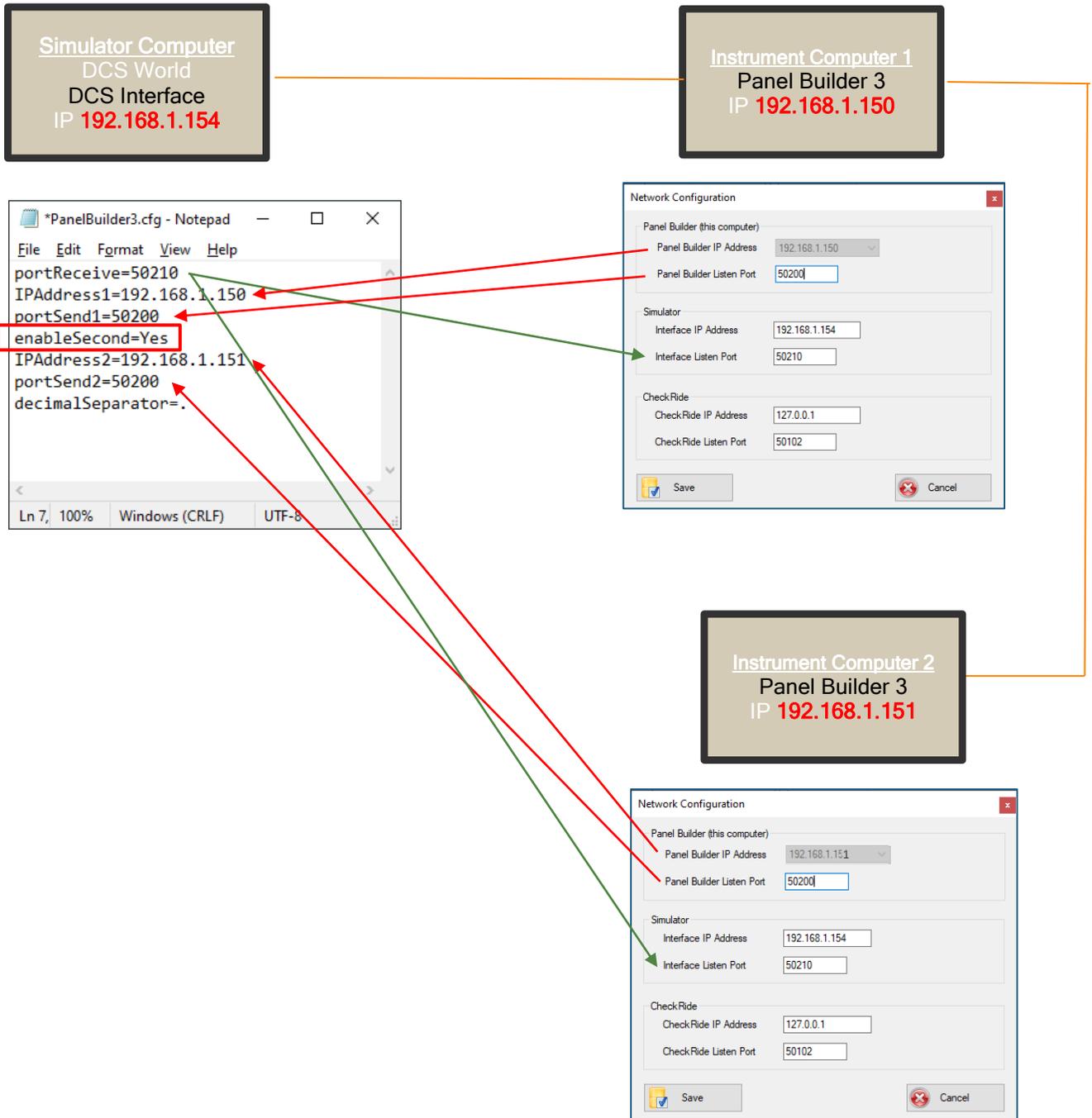
Dual & Triple Computer Overview - X-Plane 10/11/12:



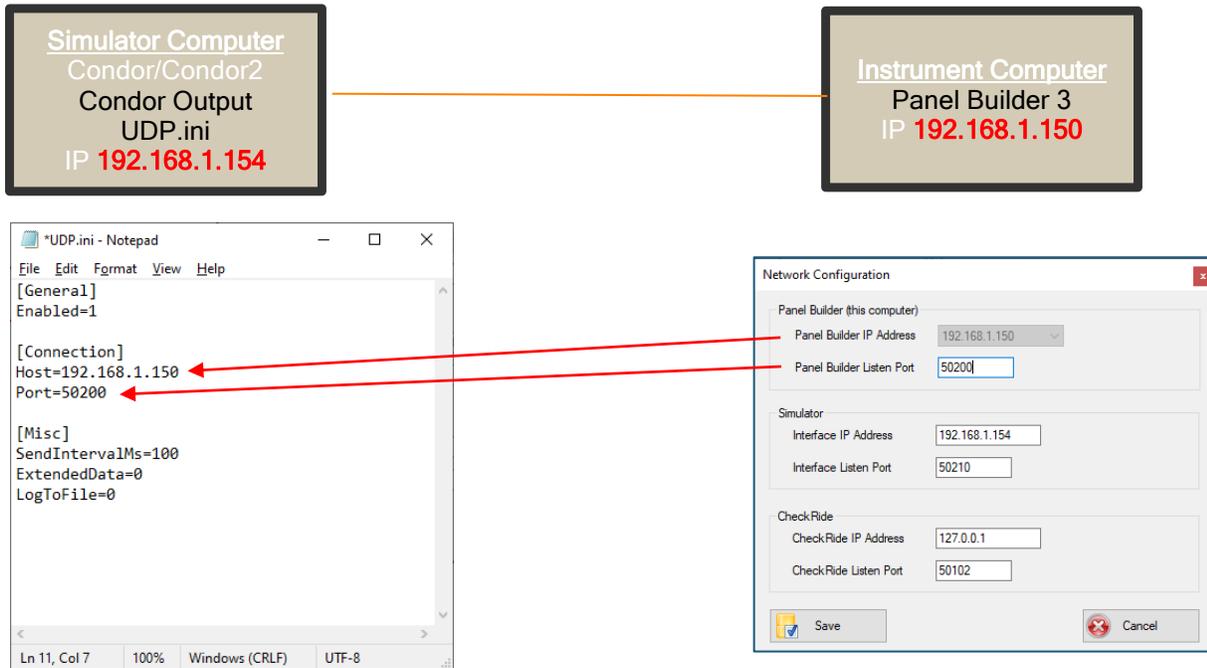
Dual & Triple Computer Overview - SimConnect (Microsoft FS & Prepar3D):



Dual & Triple Computer Overview - DCS World:



Dual Computer Overview - Condor & Condor 2:



Note: Condor only sends data, it does not provide a facility to receive data from Panel Builder 3.

Configure X-Plane 10/11/12 Interface

There is no need to change any network values unless you have a two or three computer setup

The plugins for X-Plane were installed under

```
...\X-Plane 10(11or12)\resources\plugins
```

There are several configuration files for the plugin.

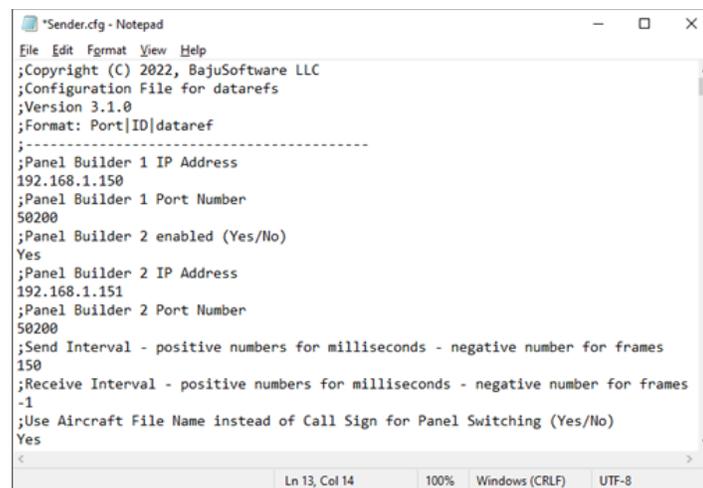
In folder ...\PanelBuilder3

<i>Sender.cfg</i>	<i>X-Plane send dataref values</i>
<i>ReceiverCMD.cfg</i>	<i>X-Plane receive commands (momentary)</i>
<i>ReceiverCMDTOG.cfg</i>	<i>X-Plane receive commands (toggle)</i>
<i>ReceiverDAT.cfg</i>	<i>X-Plane receive datarefs</i>

In folder ...\PanelBuilder3Fast

<i>ReceiverDAT.cfg</i>	<i>X-Plane receive values for datarefs (fast execution like dials)</i>
------------------------	------------------------------------------------------------------------

The first part of the network settings is in Sender.cfg:



```
*Sender.cfg - Notepad
File Edit Format View Help
;Copyright (C) 2022, BajuSoftware LLC
;Configuration File for datarefs
;Version 3.1.0
;Format: Port|ID|dataref
;-----
;Panel Builder 1 IP Address
192.168.1.150
;Panel Builder 1 Port Number
50200
;Panel Builder 2 enabled (Yes/No)
Yes
;Panel Builder 2 IP Address
192.168.1.151
;Panel Builder 2 Port Number
50200
;Send Interval - positive numbers for milliseconds - negative number for frames
150
;Receive Interval - positive numbers for milliseconds - negative number for frames
-1
;Use Aircraft File Name instead of Call Sign for Panel Switching (Yes/No)
Yes
Ln 13, Col 14    100%    Windows (CRLF)    UTF-8
```

Panel Builder 1 IP Address

the **IP address** of your first computer where Panel Builder 3 is installed on. 127.0.0.1 is the default. No need to change it unless you have a 2 or 3 computer setup.

Panel Builder 1 Port Number

the Port Number Panel Builder 1 listens on. This setting has to match what has been configured in Panel Builder 3. 50200 is the default.

Panel Builder 2 Enabled

if you have a second Panel Builder, change this setting to *Yes*. Otherwise leave it at *No*.

Panel Builder 2 IP Address

the **IP address** of your second computer where Panel Builder 3 is installed on. 127.0.0.1 is the default. No need to change it unless you have a 3 computer setup.

Panel Builder 2 Port Number

the Port Number Panel Builder 2 listens on. This setting has to match what has been configured in Panel Builder 3. 50200 is the default.

Send Interval

How often X-Plane sends data to the Instrument PC in Milliseconds (Default = 150 milliseconds)

Receive Interval

How often X-Plane processes received data. Default -1 (every frame). Do not change unless instructed to do so.

The rest is in ReceiverDAT.cfg (under *PanelBuilder3*)

```

ReceiverDAT.cfg - Notepad
File Edit Format View Help
;Copyright (C) 2021, BajuSoftware LLC
;Configuration File for datarefs receive
;Version 3.0.0
;Format: ID|dataref
;-----
;Listen Port Number
50210
    
```

Listen Port Number

The port number this interface listens on for data received from Instruments. 50210 is the default.

and ReceiverDAT.cfg (under *PanelBuilder3Fast*)

```

ReceiverDAT.cfg - Notepad
File Edit Format View Help
;Copyright (C) 2020, BajuSoftware LLC
;Configuration File for datarefs
;Version 3.0.0
;Format: ID|dataref
;-----
;Listen Port Number (IMPORTANT! Needs to be Listen Port Number in PanelBuilder/ReceiverDAT.cfg + 1)
50211
    
```

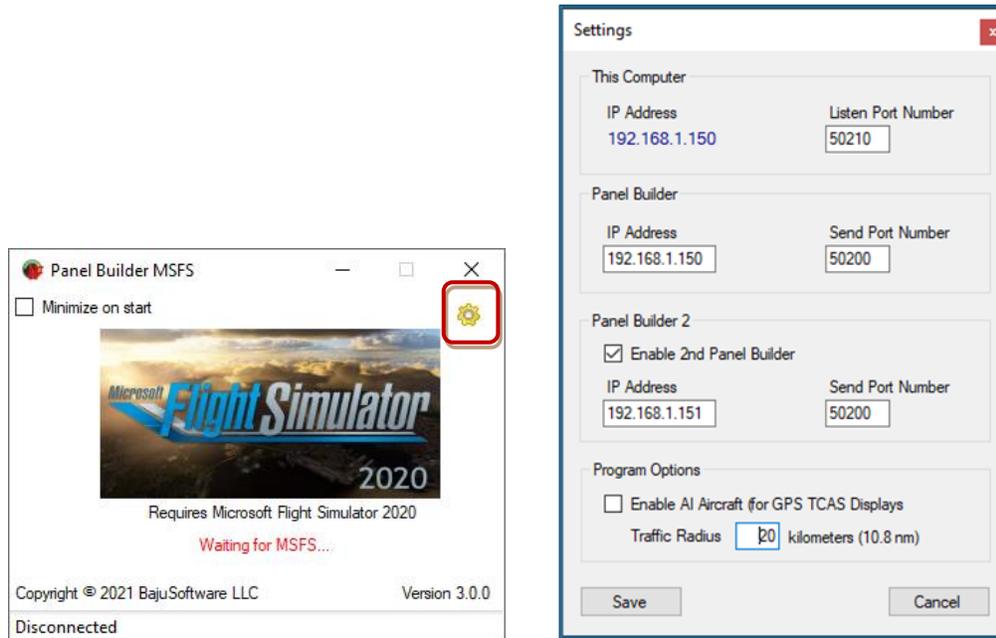
Listen Port Number

The port number the interface listens on for data received from Instruments. 50211 is the default. This number needs to be one number higher than the port number in the ReceiverDAT.cfg file under *PanelBuider3*

Configure MS Flight Simulator 2020 & FSX SimConnect Interface

There is no need to change any network values unless you have a two or three computer setup

Launch the Panel Builder MSFS or FSX Interface program.



Click on the [Network Configuration] Button.

This Computer*IP Address*

shows the IP Address of this computer. This can be used to configure Panel Builder 3 Network Settings.

Listening Port

specifies the port number the MSFS Interface 'listens' on. This is used for receiving settings from the instruments for example setting the barometer in the Altimeter. This setting has to match what has been configured in Panel Builder 3 Network Settings.

Panel Builder*IP Address*

Defines the IP address where Panel Builder is installed on. Change the value to match your setup. The default is 127.0.0.1 which specifies the local computer (single computer setup)

Send Port Number

is the listening port as configured in Panel Builder 3 Network Settings.

Panel Builder 2

Enable 2nd Panel Builder

Check this option if you have a 2nd networked computer for Panel Builder.

IP Address

Defines the IP address where the second Panel Builder is installed on. Change the value to match your setup.

Send Port Number

is the listening port as configured in Panel Builder 3 Network Settings.

Click on [Save] to save the settings.

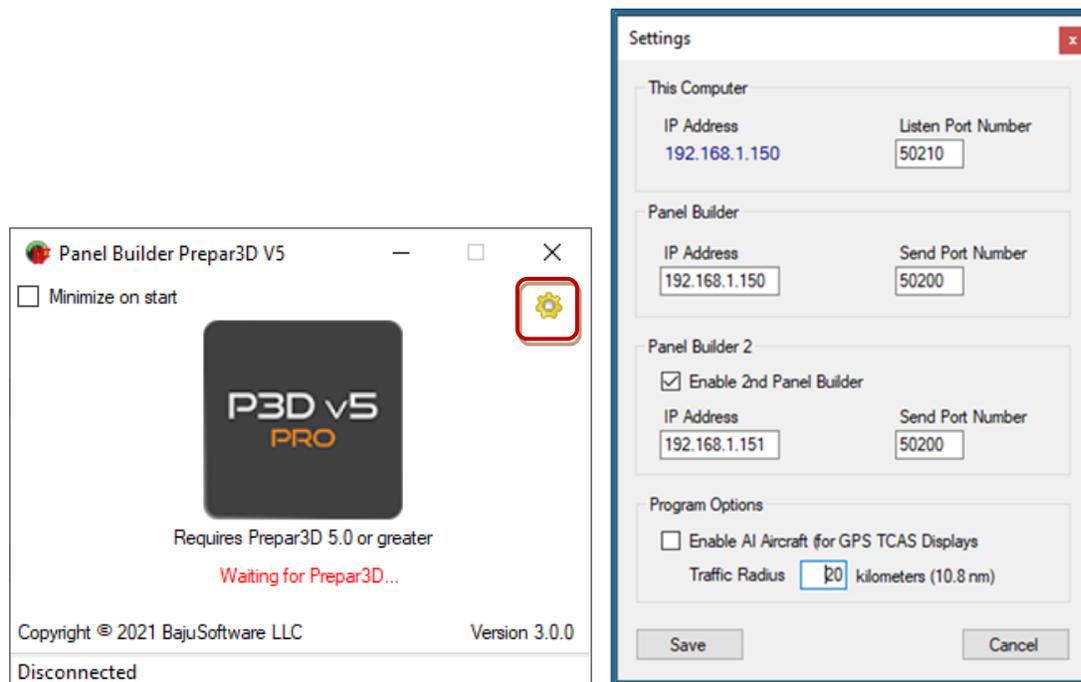
The Interface will connect automatically to the Flight Simulator when it is running.

Note: Change the port numbers only if there is another program already using the same port numbers.

Configure Lockheed Martin Prepar3D V3, V4 & V5 SimConnect Interface

There is no need to change any network values unless you have a two or three computer setup

Launch the Panel Builder Prepar3D V3, V4 or V5 Interface program.



Click on the [Network Configuration] Button.

This Computer

IP Address

shows the IP Address of this computer. This can be used to configure Panel Builder 3 Network Settings.

Listening Port

specifies the port number the Prepar3D Interface 'listens' on. This is used for receiving settings from the instruments for example setting the barometer in the Altimeter. This setting has to match what has been configured in Panel Builder 3 Network Settings.

Panel Builder

IP Address

Defines the IP address where Panel Builder is installed on. Change the value to match your setup. The default is 127.0.0.1 which specifies the local computer (single computer setup)

Send Port Number

is the listening port as configured in Panel Builder 3 Network Settings.

Panel Builder 2

Enable 2nd Panel Builder

Check this option if you have a 2nd networked computer for Panel Builder.

IP Address

Defines the IP address where the second Panel Builder is installed on. Change the value to match your setup.

Send Port Number

is the listening port as configured in Panel Builder 3 Network Settings.

Click on [Save] to save the settings.

The Interface will connect automatically to the Flight Simulator when it is running.

Note: Change the port numbers only if there is another program already using the same port numbers.

Configure A2A Lua Interface for C172 and PA28

There is no need to change any network values unless you have a two or three computer setup

If you are using the A2A C172 and/or PA28 aircraft for FSX or Prepar3D, you also need to change the lua script for Panel Builder 3 for A2A. This script provides custom instrument data for those aircraft.

The Panel Builder 3 A2A Lua script is located in the simulator's Modules folder, the same folder where FSUIPC is installed in. It is different for FSX and P3D.

There script's filename is:

```
ipcready.lua
```

To configure the network you need to modify this file. Use your favorite text editor (like Notepad) and open the file:

```

ipcready.lua - Notepad
File Edit Format View Help
|-- Panel Builder Lua script for A2A C172 & A2A Cherokee 180
-- Use in combination with FSX or P3D Interface
-- Used to extract local variables for customized A2A data
-- Author: R.Hussel
-- Version 2.2
-- Copyright (C) 2014 - 2022, BajuSoftware, LLC. All rights reserved.

-- Version 1.1 - Feb 2017: Added Check for Aircraft Type to avoid local var probl
-- Version 1.2 - Dec 2017: Distribute uncompiled script for compatibility with P:
-- Version 1.3 - Feb 2018: Added Cherokee 180 processing
-- Version 1.4 - May 2020: Modified the aircraft compare strings for changed aircr
-- Version 2.0 - May 2022: Added Networking for Panel Builder 3. No FSUIPC Interf
-- Version 2.1 - Aug 2022: Changed PA Autopilot Lights to write to Autopilot Data
-- Version 2.2 - Oct 2022: Added 2nd Panel Builder send capability

package.path = package.path..";\\LuaSocket\\?.lua"
package.cpath = package.cpath..";\\LuaSocket\\?.dll"

--UDP settings
socket = require("socket")

-- First Panel Builder
send = socket.udp()
host = "127.0.0.1"
port = 50200

-- Second Panel Builder
send2 = socket.udp()
enable2 = "NO"
host2 = "127.0.0.1"
port2 = 50200

```

First Panel Builder

Change the *host* to the IP Address of your computer where the first Panel Builder is installed on.

Change the *port* to the value of your computer where the first Panel Builder is listening on.

Second Panel Builder

Change the *host2* to the IP Address of your computer where the second Panel Builder is installed on.

Change the *port2* to the value of your computer where the second Panel Builder is listening on.

You also need to set *enable2* to *YES* if you have a second computer with Panel Builder.

Configure DCS World Interface

There is no need to change any network values unless you have a two or three computer setup

The Panel Builder 3 DCS World interface is located in:

```
C:\Users\[windows user name]\ Saved Games\DCS\Scripts.
```

There are 3 parts to the interface:

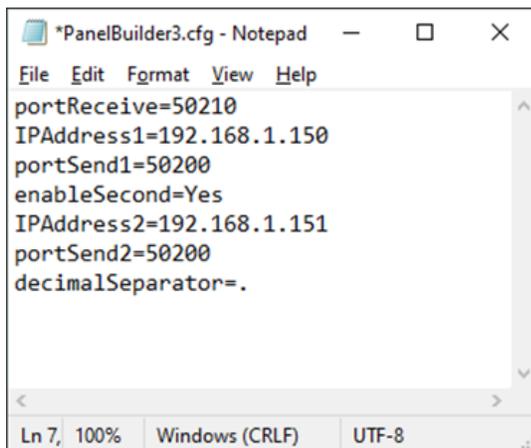
1. `Export.lua`
2. `PanelBuilder3.cfg`
3. `PanelBuilder3.lua`

`Export.lua` is the file to instruct DCS world to use the `PanelBuilder3.lua` file for data export.

`PanelBuilder3.cfg` is the configuration file for the LUA script.

`PanelBuilder3.lua` is the LUA script to define the data to be exported to Panel Builder 3.

To configure the network you need to modify the `PanelBuilder3.cfg` file. Use your favorite text editor (like Notepad) and open the file:



Change the `IPAddress1` to the value of your computer where the first Panel Builder is installed on.

Change the `IPAddress2` to the value of your computer where the second Panel Builder is installed on. You also need to change `enableSecond` to `Yes`.

Change the port numbers only if there is another program already using the same port numbers.

Note: You also need to change the decimal separator to match your Windows country specific setting.

IMPORTANT!

If you have already other LUA scripts for DCS, the `Export.lua` file needs to be modified to add Panel Builder 3 to it. The `Export.lua` is only installed by Panel Builder 3 if it doesn't already exist.

Use your favorite text editor (like notepad) and edit the file

`Export.lua`

Add the following 2 lines at the end of the file:

```
local PanelBuilder = require("lfs")
dofile(PanelBuilder.writedir() .. "Scripts\\PanelBuilder3.lua")
```

Save the file. This ensures that the `PanelBuilder3.lua` script is started when starting a mission.

Note: If you remove Panel Builder 3 from your computer, you need to delete the 2 lines you added to your `Export.lua` file

Configure Condor & Condor 2 Interface

You need to make changes even if you have only a single computer setup! Only 1 or 2 Computer setups are supported!

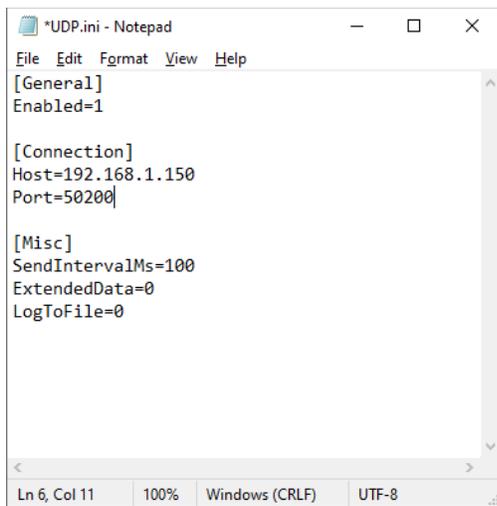
There is no Panel Builder 3 Condor Interface. Condor has the ability to output data directly via the network. This facility has to be enabled within Condor.

The file to modify is located under:

C:\Program Files (x86)\Condor

The file is called UDP.ini

Use your favorite text editor (like notepad) and edit the file.



[General]

Enabled=1 - this enables the data output via the network.

[Connection]

Host=127.0.0.1 for a single computer setup (this is the default in the file).

or

Host=XX.XX.XX.XX for a dual computer setup specifying your second computer's IP address

(don't use XX.XX.XX.XX but the actual IP address like 192.168.1.150).

Port=50200 - this is the Panel Builder 3 default port.

[Misc]

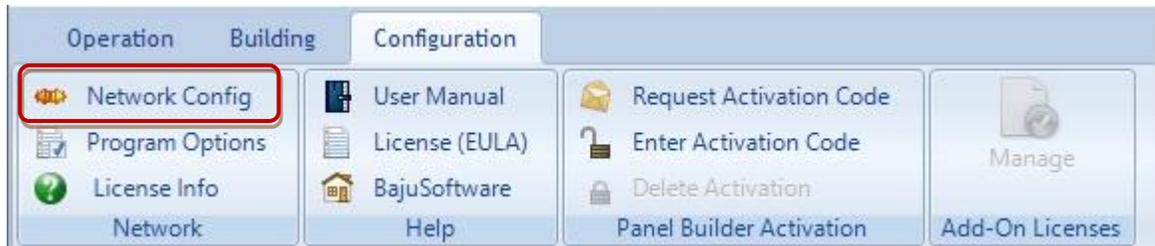
SendIntervalMs=100 - 100 milliseconds between output.

Save the file. Now you can start Condor.

Step 3 - Panel Builder Network Configuration

There is no need to change any network settings unless you have a 2-computer setup.

Start Panel Builder and select the [*Configuration*] tab, then [*Network Config*].



Panel Builder (this computer)

Panel Builder IP Address

shows the IP Address of this computer. This can be used to configure Panel Builder 3 Interface Network Settings.

Panel Builder Listening Port

specifies the port number Panel Builder 'listens' on. This is used for receiving data from the Flight Simulator. This setting has to match what has been configured in Panel Builder 3 Interface Settings.

Simulator

Interface IP Address

specifies the IP Address of computer that has the Flight Simulator installed.

Interface Listen Port

specifies the port number the Interface 'listens' on. This is used for receiving data from Panel Builder. This setting has to match what has been configured in Panel Builder 3 Interface Settings.

CheckRide*CheckRide IP Address*

specifies the IP Address of computer that has the CheckRide® System installed.

CheckRide Listen Port

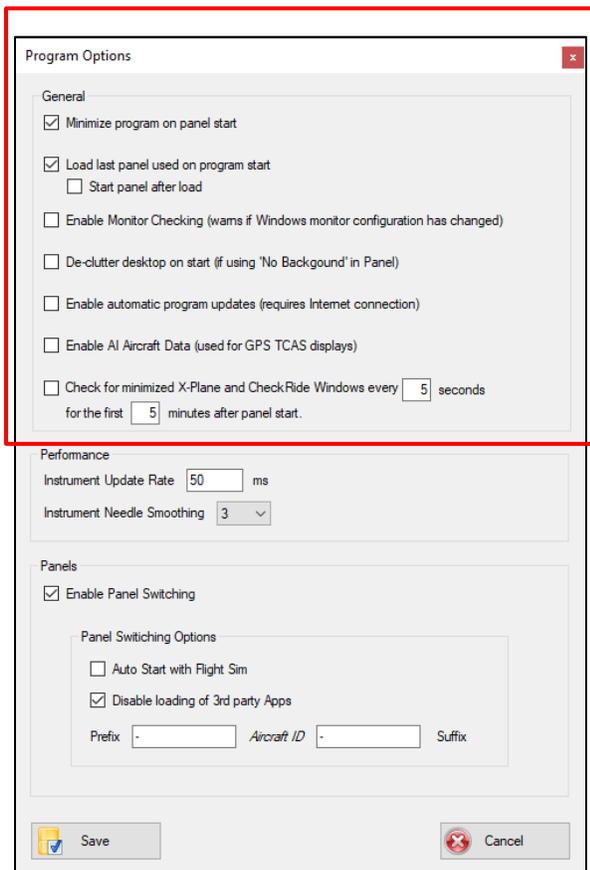
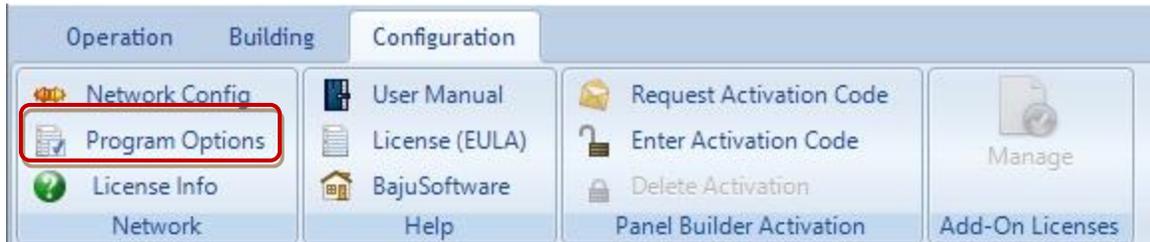
specifies the port number CheckRide® 'listens' on. This is used for receiving data from Panel Builder. This setting has to match what has been configured in CheckRide®.

CheckRide® Network Settings is used for integration into the BajuSoftware CheckRide® System. If you don't have CheckRide®, disregard this part of the configuration.

Step 4 - Panel Builder Program Options

Panel Builder program options option specify how Panel Builder operates in certain situations.

Go to the *Configuration* tab and select *[Program Options]*.



General

Minimize program on panel start

This option will minimize the Panel Builder Windows every time a panel starts. To make is visible again, click on the icon in the windows bar on the bottom of the monitor

Load last panel used on program start

Loads the last panel used automatically when Panel Builder starts. There is an option to also start it up.

Enable Monitor checking

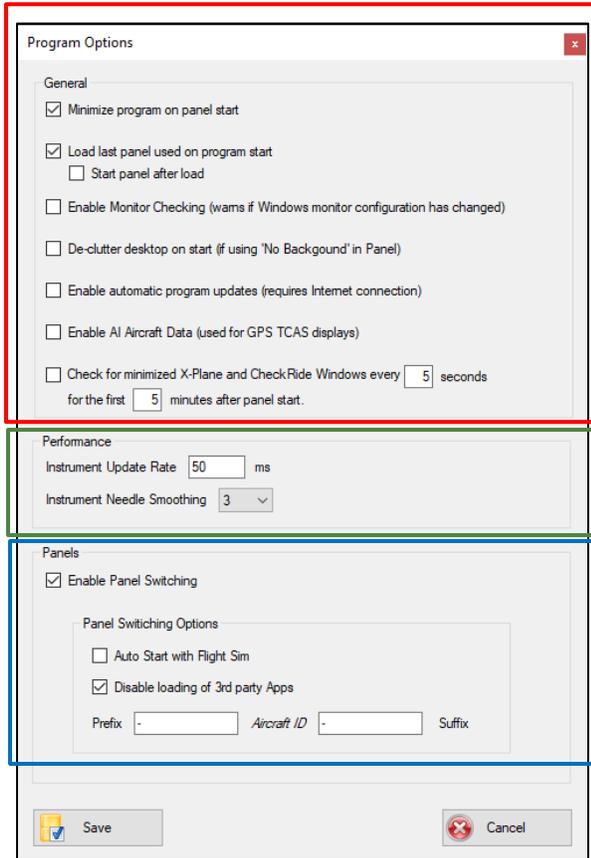
Panel Builder checks if the monitor configuration has changed since the last time a panel was saved and gives a warning when starting a panel.

Declutter desktop on start

This option applies only to panels without a background. It will hide all desktop windows and minimize any running programs on panel start and restores them on panel stop.

Enable automatic program updates

Checks every time when Panel Builder starts if a new version is available and provides an option to update. This option is only shown if an update feature has been included for your version.



Enable AI Aircraft Data

This option enables GPS data for AI aircraft in the Flight Simulator. This is only used for Panel Builder Instruments that provide TCAS style data. Leave it disabled otherwise. Not available for *Panel Builder DCS & Condor*.

Check for minimized X-Plane and CheckRide®

This option maximizes any minimized X-Plane and CheckRide® Windows for the times specified to un-hide them in case they minimize. This feature is only available on request.

Performance

Instrument Update Rate

Specifies the update rate for all instruments. The default is 50 milliseconds. Change this value if the instruments seem to be updating 'sluggishly'.

Instrument Needle Smoothing

Specifies the smoothing factor for instrument needles. Change this value if instrument needles seem to be 'jumpy' during movements.

Panels

Enable Panel Switching

Enables the automatic loading and starting of panels when an aircraft changes in the flight simulator.

For a detailed description see chapter *Adding a New Panel (Automatic Panel Switching)*

Licensing

Panel Builder comes in two versions, Home Version and Commercial Version. The Home Version is intended for home use only, which means that you can use Panel Builder on your home network only. The Commercial Version is intended for commercial applications. The Commercial Version is typically used for integration into commercial Flight Simulators, Flight Training, to be shown at Exhibitions and Shows and other commercial applications. In general, any use that is outside of the home requires a Commercial License.

All versions are distributed using the same Installation Package and each version is enabled by a specific *Serial Number*.

All Panel Builder 3 Versions and Add-Ons are activated via an Activation Code.

A *Serial Number* and E-Mail address must be provided to request an *Activation Code*. The *Serial Number* is sent via E-Mail after purchasing Panel Builder.

Panel Builder provides a facility to enter this activation code. See next chapter for more information.

If no Activation code is present, the software reverts to Trial Mode. Trial Mode has the following restrictions:

- The panel runtime is limited to 10 Minutes.
- Trial Mode is clearly indicated on the Panel Builder Main Screen



To return to a licensed mode, an activation code must be entered.

Licensing Glossary

<i>E-Mail Address</i>	The E-Mail address the <i>Activation Code</i> is used with and sent to
<i>Serial Number</i>	Identifies the product purchased
<i>Install Code</i>	A Hardware code generated on the computer to identify each computer
<i>Activation Code</i>	The Code use to 'unlock' the software from Trial Mode

Software Activation Panel Builder

When Panel Builder starts the first time after installation, the license is checked. The following information is shown on the bottom of the main screen if no license/activation has been found:



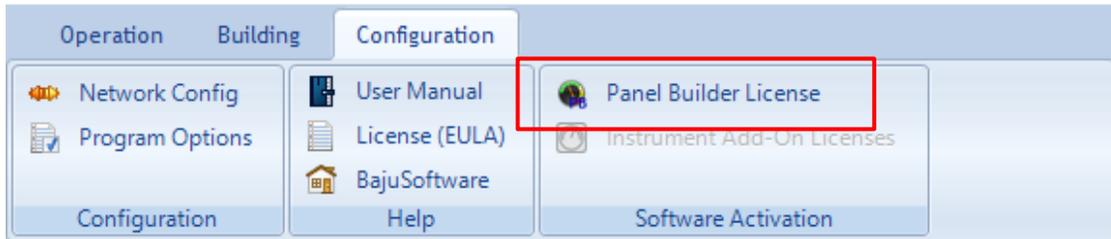
The Software activation is a 2-step process. Step 1 is requesting an activation code and step 2 is entering the activation code into Panel Builder 3.

After purchasing a license for Panel Builder 3, an order confirmation is sent to you via E-Mail. The order confirmation contains the Serial Number and a Download link for the software. If you do not receive this order confirmation, please log a support request at

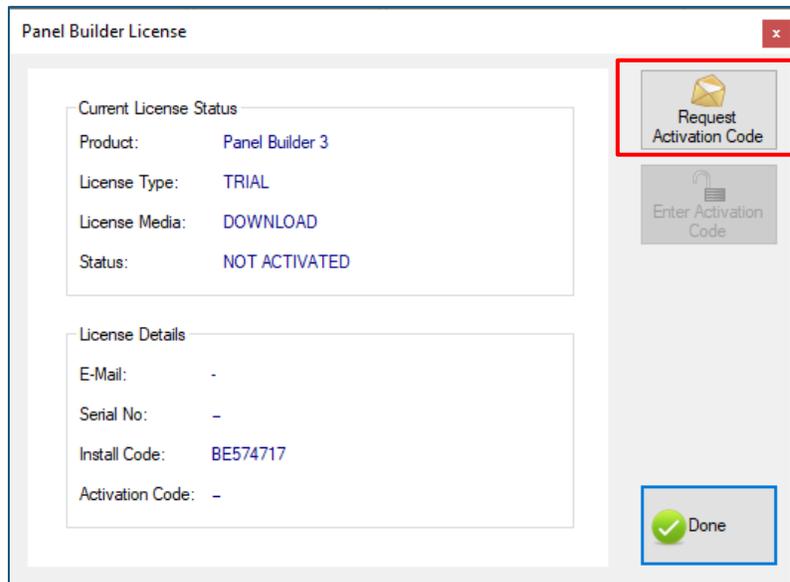
<https://www.bajusoftware.com/support.php>

The next 2 chapters describe the exact process for the Software Activation.

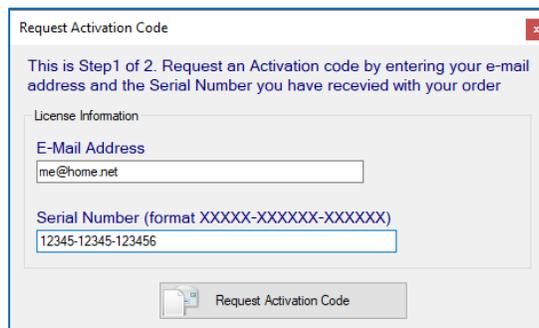
Step 1- Request an Activation Code



This option shows you the current status of the Panel Builder 3 Activation. The top group shows the current activation and the bottom group the details for the activation. Note, the Install Code shown is generated by the program and used for the activation code.



Choose the button *[Request Activation Code]*



Enter your E-Mail address and the Serial Number you received with the order confirmation. **Note:** Make sure you enter the Serial Number **including** the dashes.

Click on *[Request Activation Code]*

Send Activation Code Request

Your E-Mail Address
me@home.net

Install Code (generated)	Serial Number
BE574717	12345-12345-123456

Option 1: Request Online (if connected to the Internet)

Request Now

It can take up to 30 Minutes until you receive your Activation Code.
Don't send multiple requests! Be patient! Check your E-Mail SPAM folder as well!

Option 2: Manual request

Manual Request

IMPORTANT! This is a manual request that can take up to 24hours to be processed!

Done

You now have **2 options**, depending if this computer is **connected** to the Internet or not.

If it is connected to the Internet, click on *[Request Now]*. This will contact our license server and an e-mail is sent to you with the Activation Code.

If it is **not connected** to the Internet, click on *[Manual Request]*.

Manual Activation Code Request

Enter the details below at

E-Mail Address: me@home.net
SerialNumber: 12345-12345-123456
Install Code: BE574717

OK

You have to use another computer that has Internet connectivity to enter the information displayed in the box above. Use a web browser and go to

<https://www.bajusoftware.com/rego/activation.php>

The website looks like this:



Manual Activation Request

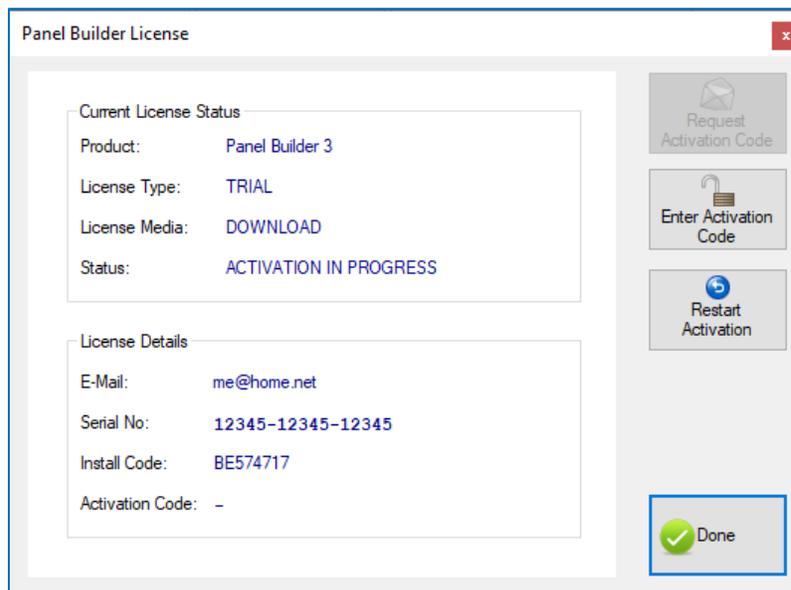
After pressing [Submit], your data is verified and an Activation Code will be sent to the specified E-Mail address. This can take up to 30 Minutes.
Check your E-Mail SPAM folder as well!

E-Mail Address:	<input type="text"/>
Re-Type E-Mail Address	<input type="text"/>
Serial Number:	<input type="text"/>
Install Code:	<input type="text"/>
<input type="submit" value="Submit"/>	

- E-Mail Address:** This is the E-Mail address the Activation Code will be sent to.
- Serial Number:** The Serial Number was sent via E-Mail with the Order Confirmation. *Enter the number including the dashes!*
- Install Code:** The Install Code is generated within the Software you are trying to activate.

Follow the instructions and enter the information requested. Make sure you enter the data correctly, it is case sensitive, including the E-Mail address! An e-mail is sent to the entered E-Mail address. If you don't receive the e-mail within 20 Minutes,

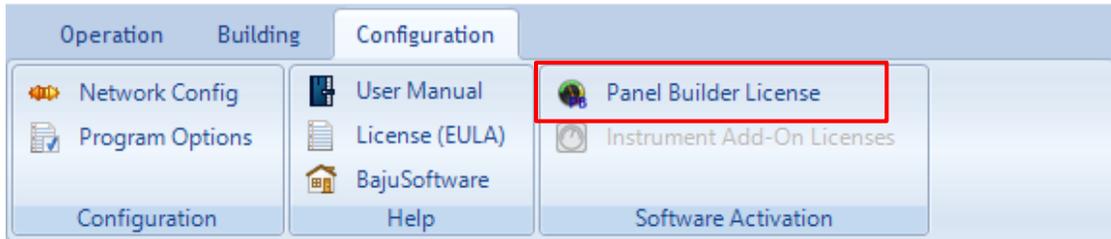
After this first step, the window will look like this:



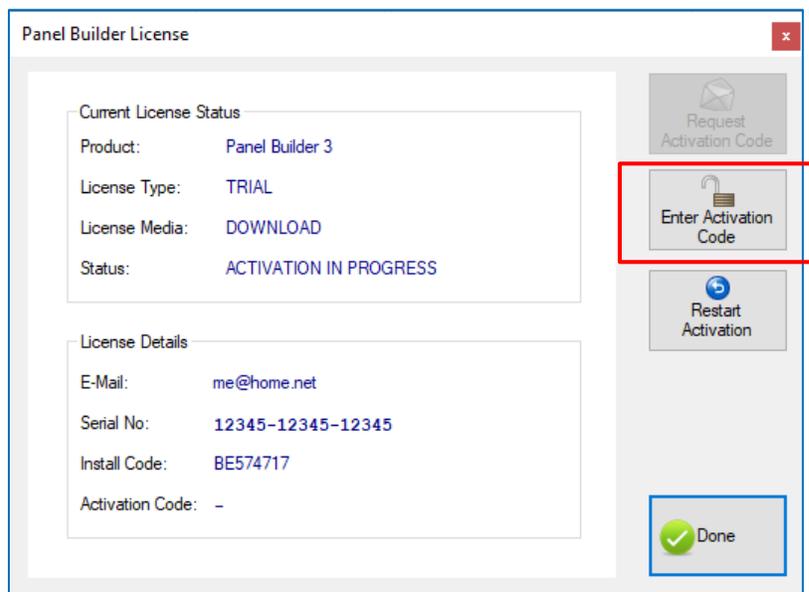
It shows that the activation is in progress. You can then restart the activation if required, i.e. you made a mistake with the email or serial number. If you have received the e-mail with the Activation Code, you can continue to Step 2.

Step 2- Enter the Activation Code

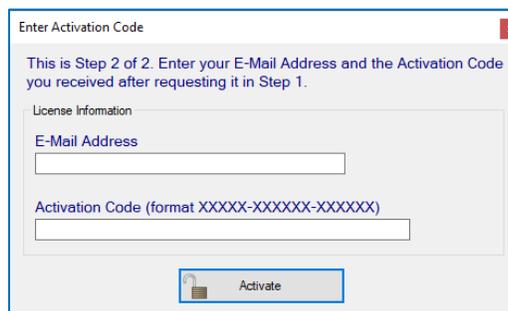
STOP! If you have not received the E-Mail with the Activation Code, you cannot proceed!



Choose the button *[Enter Activation Code]*.



The following data entry box will appear:



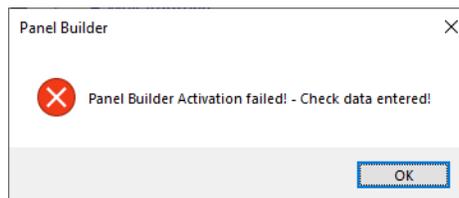
Enter the E-mail address and Activation code and click on *[Activate]*.

If you have entered the correct information:



After clicking on [OK], Panel Builder shuts down. Restart Panel Builder, it is now activated.

If you made a mistake during entering the data:



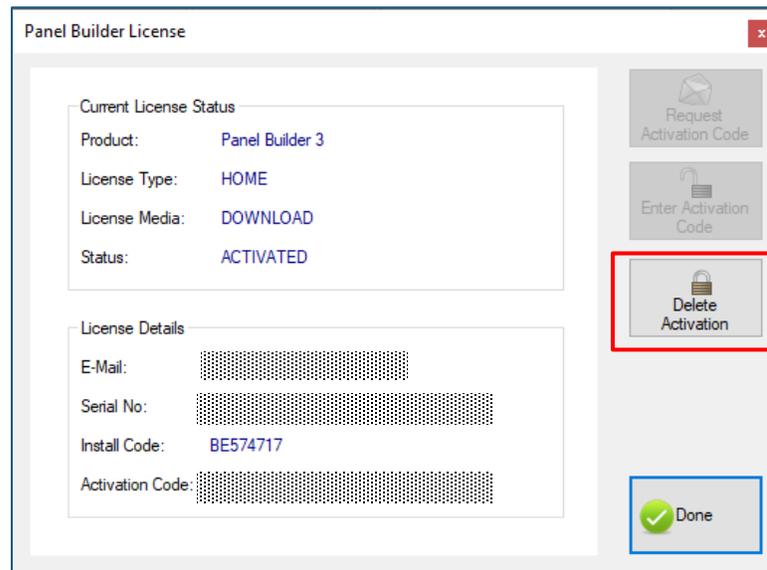
Click on [OK] and check you entered data and try again.

Delete Activation

If at any time you wish to delete the current license:



Choose the menu option [*Panel Builder License*] on the *Configuration* tab:



Then select the button [*Delete Activation*].

IMPORTANT! Deleting the Panel Builder 3 License will also delete all Add-On Licenses! If you want to delete individual Add-On Licenses, see the next chapter

After the deletion of the activation, Panel Builder shuts down.

Software Activation - Instrument Add-Ons

Note: Activation for Add-Ons is not required for Commercial or Professional Licenses, the menu option will therefore not be shown. All add-ons are included for free for Commercial and Professional Licenses.

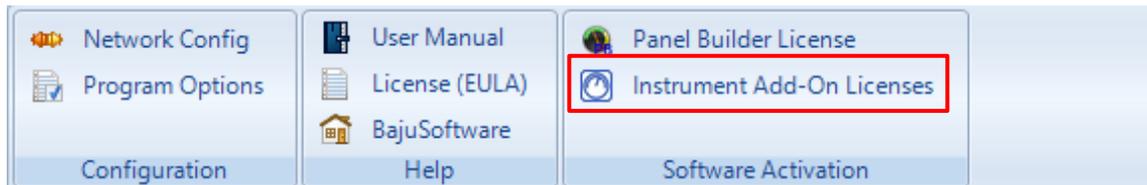
Like the main Panel Builder 3 product, Instrument add-ons are also activated using the Serial Number provided with the order confirmation.

Any Instrument Add-On can be downloaded and installed any time. They will run in trial mode until activated, meaning that when an instrument from a non-activated instrument add-on is used, it will run for 10 Minutes before becoming invisible.

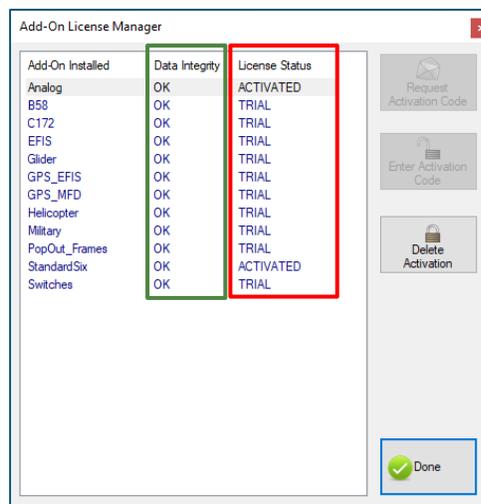
Note: Add-Ons can only be activated if Panel Builder 3 itself has been already activated, i.e. The menu option was disabled until then.

Note: *The Standard Six* Instruments are part of the base Panel Builder product and do not need to be activated separately.

To check the status of any installed add-ons, go to the *Configuration* tab and click on the *Instrument Add-On Licenses* option:



The following window will show all installed Add-Ons and their license status:



The **last column** shows the license status, *TRIAL* when in trial mode and *ACTIVATED* when fully activated.

The **second column**, Data Integrity, shows if an installed add-on is verified for its content. If the *Data Integrity* shows anything but *OK*, the data for the instrument add-on is not consistent with what is expected. An add-on with a non-OK data integrity cannot be activated. Also, instruments within the add-on will not start if used in a panel. To remedy this issue, uninstall the add-on, and if required delete the add-on folder. Contact support if you need help.

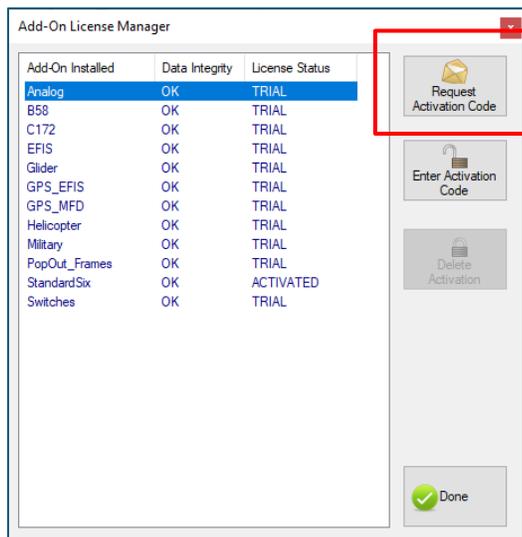
The activation of an add-on is basically the same as for the main Panel Builder product. This is a 2-step process with

1. Request an Activation Code
2. Enter the Activation Code

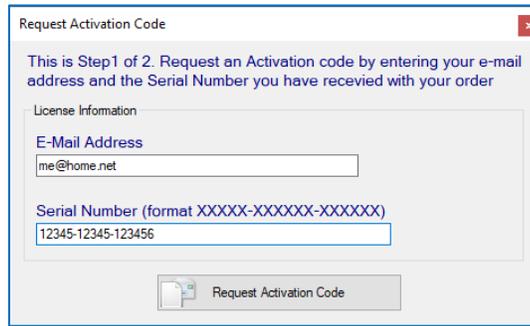
Step 1- Request an Activation Code

Before performing this step, make sure you have received the Serial Number of the Instrument Add-On you purchased. Check your e-mail with the order confirmation.

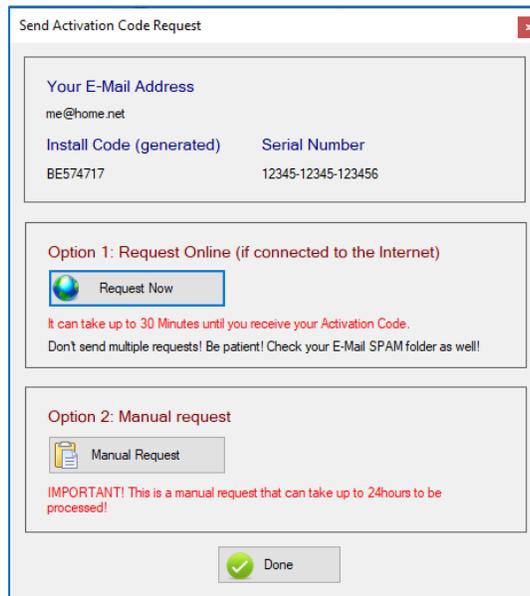
Select the Add-On you want to activate and click on *Request Activation Code*.



Enter your e-mail address and the Serial Number you received. Important! Enter the Serial number including the 'dashes'!



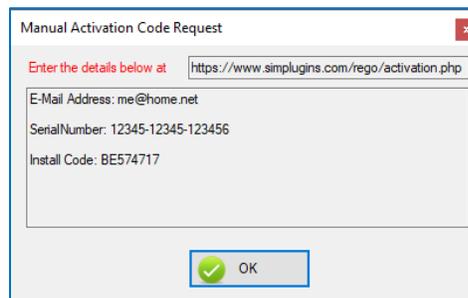
Click on [Request Activation Code]



You now have 2 options, depending if this computer is connected to the Internet or not.

If it is connected to the Internet, click on [Request Now]. This will contact our license server and an e-mail is sent to you with the Activation Code.

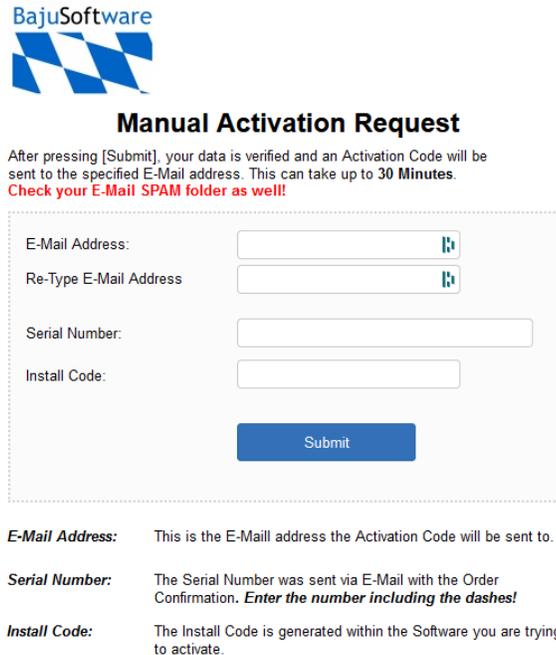
If is it not connected to the Internet, click on [Manual Request].



You have to use another computer that has Internet connectivity to enter the information displayed in the box above. Use a web browser and go to

<https://www.bajusoftware.com/reg/activation.php>

The website looks like this:



The screenshot shows the Bajusoftware logo at the top left. Below it is the title "Manual Activation Request". A paragraph of text explains that after clicking "Submit", the user's data is verified and an activation code is sent to their email address within 30 minutes, with a red warning to check the SPAM folder. Below this is a form with four input fields: "E-Mail Address", "Re-Type E-Mail Address", "Serial Number", and "Install Code". A blue "Submit" button is at the bottom of the form. Below the form are three explanatory lines: "E-Mail Address: This is the E-Mail address the Activation Code will be sent to.", "Serial Number: The Serial Number was sent via E-Mail with the Order Confirmation. Enter the number including the dashes!", and "Install Code: The Install Code is generated within the Software you are trying to activate."

BajuSoftware

Manual Activation Request

After pressing [Submit], your data is verified and an Activation Code will be sent to the specified E-Mail address. This can take up to 30 Minutes.
Check your E-Mail SPAM folder as well!

E-Mail Address:

Re-Type E-Mail Address:

Serial Number:

Install Code:

Submit

E-Mail Address: This is the E-Mail address the Activation Code will be sent to.

Serial Number: The Serial Number was sent via E-Mail with the Order Confirmation. **Enter the number including the dashes!**

Install Code: The Install Code is generated within the Software you are trying to activate.

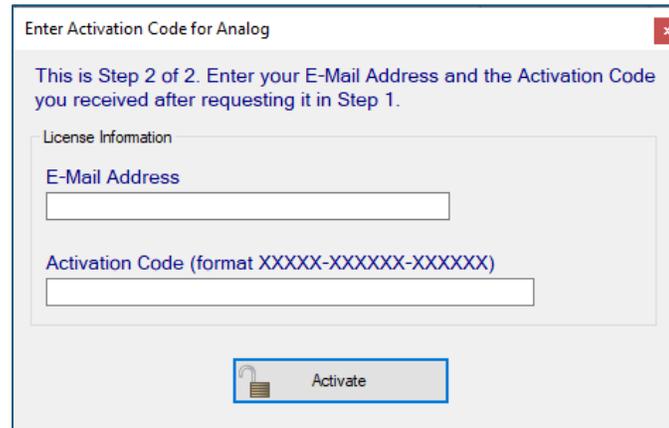
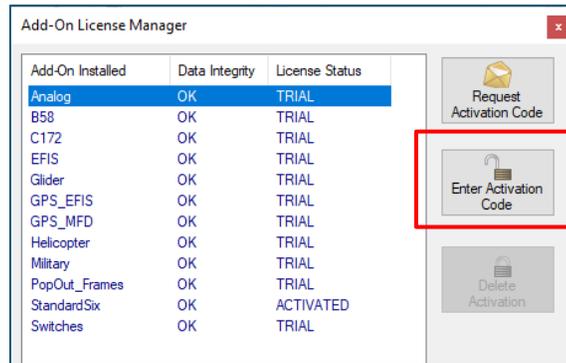
Follow the instructions and enter the information requested. Make sure you enter the data correctly, it is case sensitive, including the E-Mail address! An e-mail is sent to the entered E-Mail address. If you don't receive the e-mail within 20 Minutes,

Check your E-Mail SPAM folder!

Step 2- Enter the Activation Code

STOP! If you have not received the E-Mail with the Activation Code, you cannot proceed!

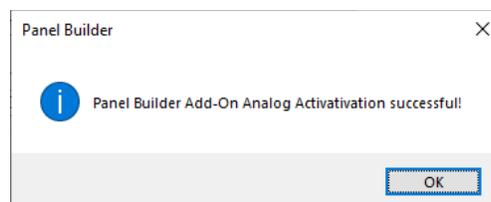
Select the Add-On you want to activate and click on *Request Activation Code*.



Enter the same e-mail address you used when requesting the activation code (it is case sensitive!) and the activation code you have received via e-mail. Enter the 'dashes' as well!

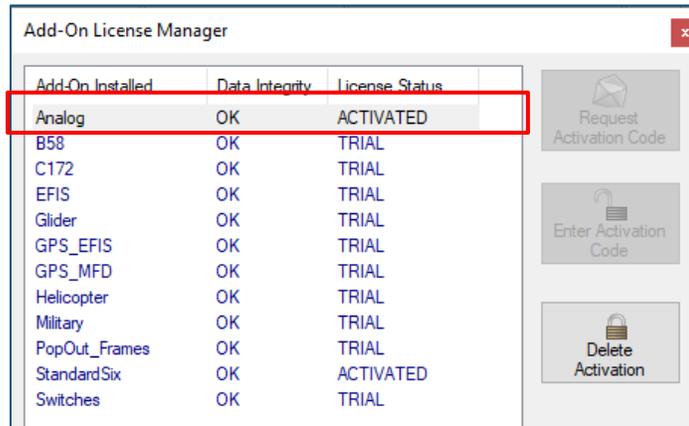
Click on [Activate]

If the data has been entered is correct the following message appears:



Click on [OK]. The window closes.

To verify that the add-on has been activated, click on *Manage* icon in the *Add-On Licenses* group to check if the Activation status has been updated:



The Add-On has been activated and is ready for use. The runtime limitation has been removed.

If you get the following error:

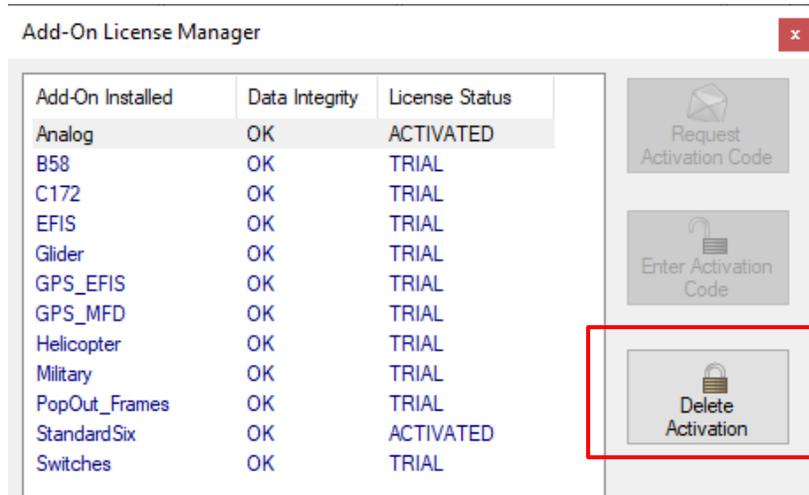


There was an error when entering the activation code and/or the e-mail address. Did you enter the dashes in the activation code? Is the E-Mail exactly the same when you requested the activation code?

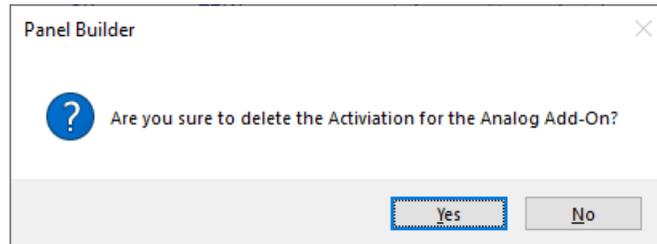
Click on [OK] and try again.

Delete Activation

You can also delete an activation code for and add-on. Go to the *Configuration* tab and click on [*Manage*] in the Add-On Licenses group:



Select the Add-On you wish to de-activate, and click on [*Delete Activation*]. There will be a confirmation box before the deletion:

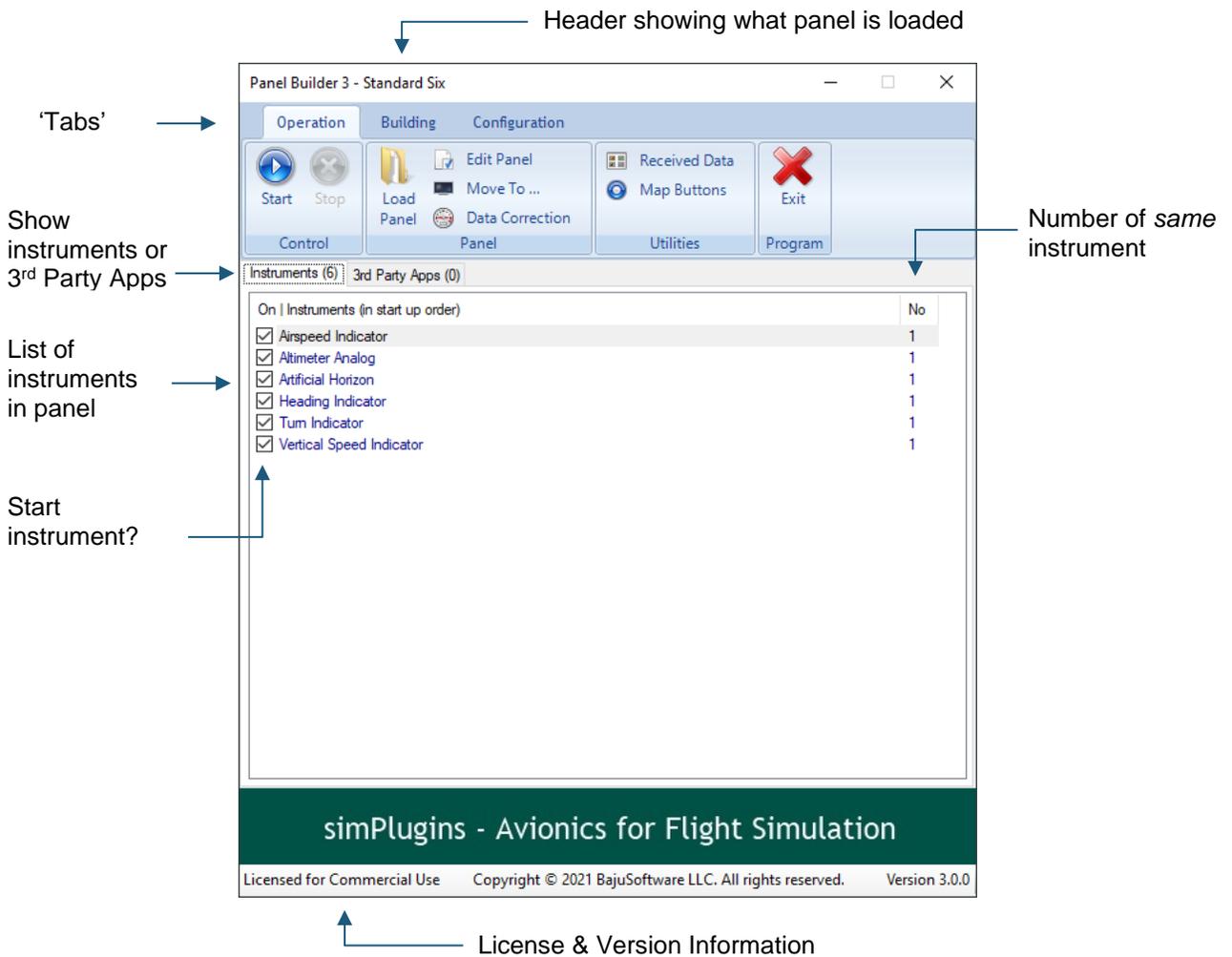


Using Panel Builder

Overview

After installation, you should have an icon for 'Panel Builder 3' on your desktop where you installed the Panel Builder on. Double click it. This will launch the Panel Builder Program that allows you to

- Start and Stop all Instruments for a panel
- Build new panels
- Set the networking options to connect to the flight simulator interface
- Set other program options for the operation of Panel Builder

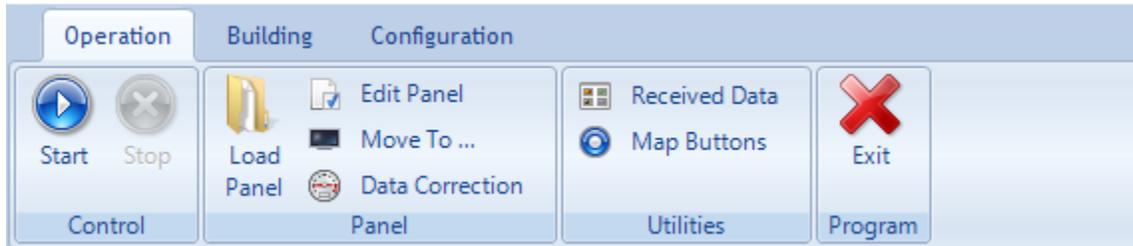


The program contains three main sections ('tabs'):

- *Operation* - contains functions to work with an existing panel.
- *Building* - functions associated with editing or creating panels.
- *Configuration* - functions to configure certain settings.

Operation

This section allows you to interact with existing panels. The menu looks like this:

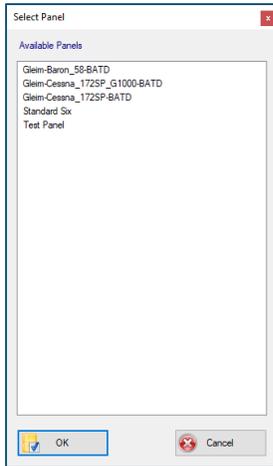


[Start]	Starts the currently loaded panel
[Stop]	Stops the currently running panel
[Load Panel]	Load a panel from a list of available panels
[Edit Panel]	Change general panel settings related to panel background, which monitor to use and panel protection
[Move To...]	Allows you to move the panel and all instruments to a different monitor
[Data Correction]	Make adjustments to the data received from the flight simulator
[Received Data]	Display the data that is being received from the flight simulator
[Map Buttons]	Map buttons to instruments for functions that the flight simulator does not provide
[Exit]	Exit Panel Builder (will also shut down the panel one is running)

Note: Not all program options listed above are available when a panel is running. For those functions you need to stop the panel first before making changes.

Loading and a Starting Panel

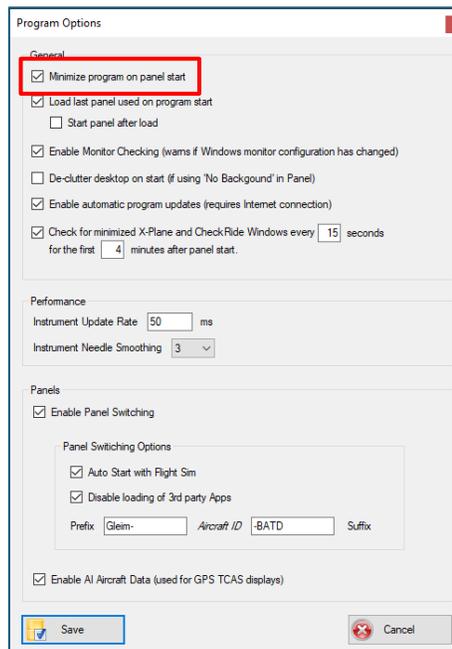
Load a panel by clicking the **Load Panel** icon and selecting a panel from the list:



The panel is loaded and all instruments contained are shown.

Click on the **[Start]** button. All shown instruments in the list that have a checkmark in front of them will be started and shown on the computer monitor.

The Panel Builder program will be minimized if it has been configured to do so. Go to *Program Options* under the *Configuration Tab*:



Now you can start your flight simulator and your instruments should come alive!

Note: When using Microsoft Flight Simulator or PREPAR3D you also need to start the Panel Builder MSFS or Panel Builder Prepar3dV5 interface program on your flight simulator computer to establish a connection after you started the flight simulator program. X-Plane does not require anything else as the interface is a 'plugin' that starts when X-Plane starts.

Stopping a panel

To stop a running panel, click on the [Stop] button.

If the program has been minimized, you need to restore it first by clicking on the icon in the Windows Bar. If the Windows Bar is not visible because of the panel configuration, click the

Windows key  on your keyboard to make it show first.

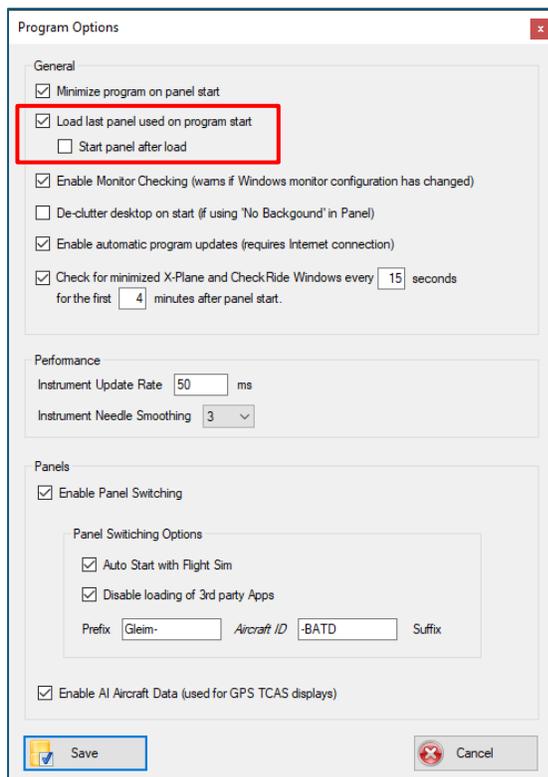
Auto-Start a Panel

There are 2 ways to automatically start a panel:

1. Change a program option
2. Change the desktop shortcut

Change Program Option

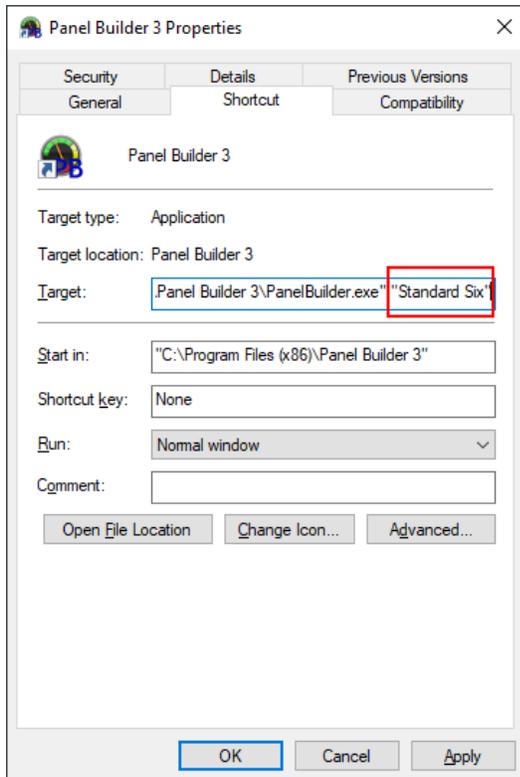
Select the tab Configuration and then click on Program Options:



Select the option highlighted above and also check the 'Start panel after load'. This will the automatically load the **last panel used** and start it.

Change Desktop Shortcut

You can automatically start a panel by modifying the desktop shortcut for Panel Builder. Right click on the shortcut and select Properties, then select *Shortcut*.



Add the name of the panel between double quotes at the end of the Target line. You also need a space before the first quote.

Click on [OK] to save the changes.

Now every time you double click on Panel Builder, it will load and start the panel specified.

If you want to start the panel when your computer starts, copy the shortcut into the *Windows Autostart* folder:

Windows 10:

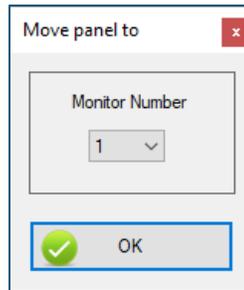
```
C:\Users\[YOUR USER NAME]
\AppData\Roaming\Microsoft\Windows\Start
Menu\Programs\Startup
```

See also chapter about *Command Line Options*.

Move Instruments to a different Monitor

If you have more than one monitor connected to your computer, you can move the instruments to a different monitor if required. Select *Move To ...* in the *Operation Tab*.

Select which monitor you want the panel to appear on, then click on [OK]:



This will change the configuration for the panel to a different monitor. You can now launch the panel.

Note: the monitor numbers might not correspond to the monitor numbers when using the Windows - Display Options program (Windows shows all known monitors, if enabled or not)

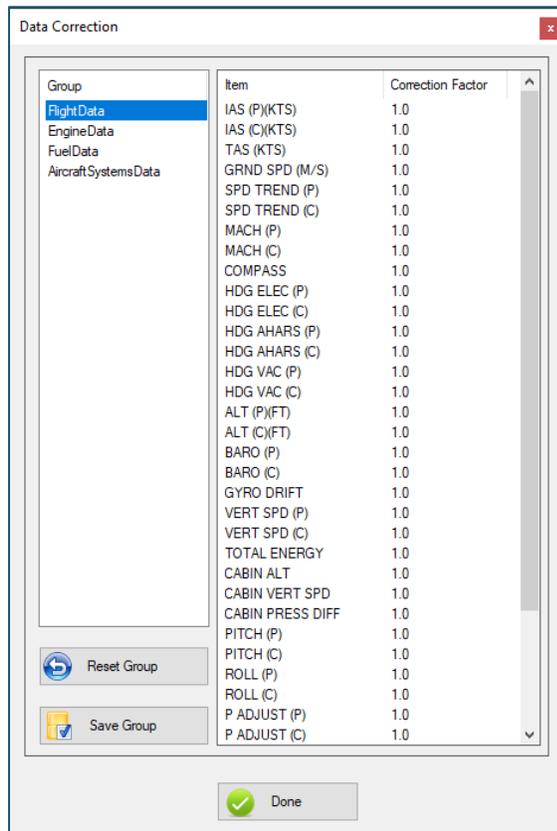
IMPORTANT! If your panel 'spreads' across multiple monitors, do not use this option!

Data Correction

Sometimes it is necessary to adjust the data being sent from the flight simulator. This might be necessary to allow for different units of measure or is related to add-on aircraft that not always send the correct values.

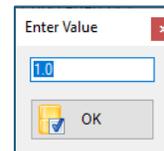
Note: all changes made here are specific to the currently loaded panel. Each panel has its own set of data corrections!

Select *Data Correction* from the *Operation Tab*:



Select the *Group* first. All data points related to the group are displayed. (P) and (C) denote Pilot/Copilot data.

Chose a data point by double clicking it to enter a correction factor ('value'):



Click [OK]. The value is changed and displayed in the list.

Now make other changes to any other values for the same group.

IMPORTANT!

Before clicking on [Done] or selecting a different group, you need to save the changes by clicking on [Save Group]

The value entered is a correction factor, meaning that the value received from the Flight Simulator will be multiplied by the value entered.

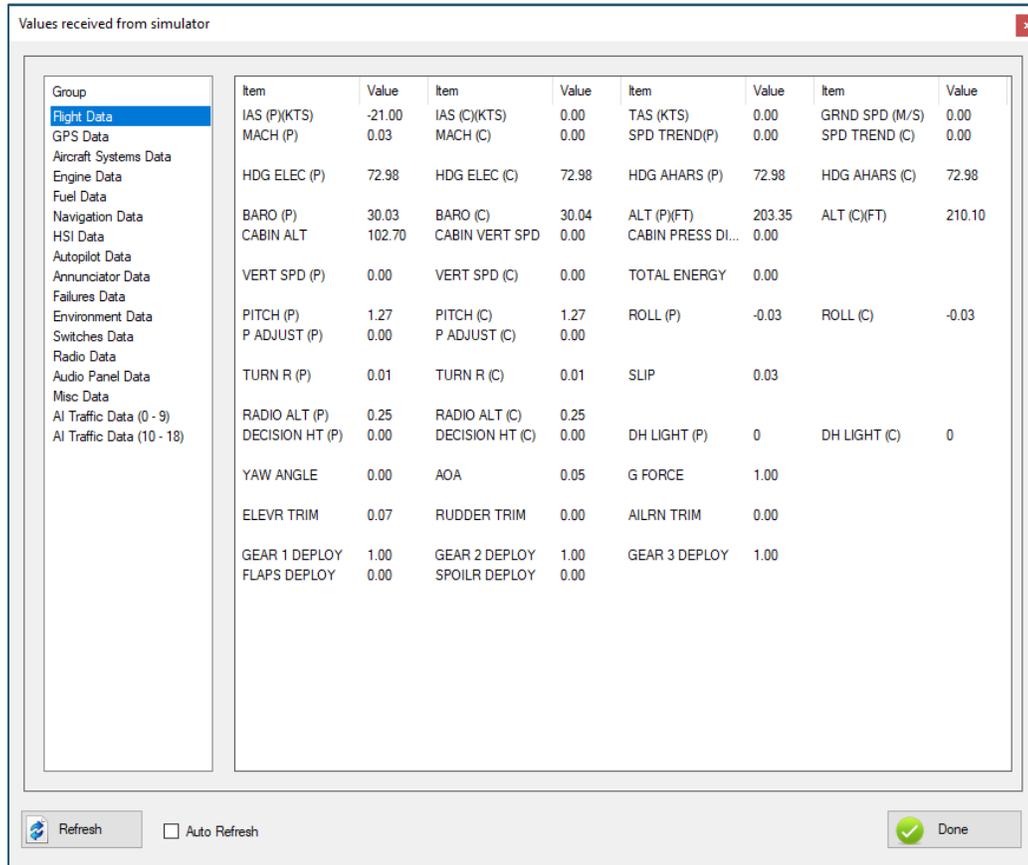
Valid example values are:

- 1.3 - add 30% to the value received
- 0.7 - reduce value received by 30%
- 1.3 - add 30% to the value received and negate the value (make it negative).
- 0.7 - reduce value received by 30% and negate the value (make it negative).

The [Reset Group] button resets **all** values in the currently selected group back to 1.0

Show Received Data

Panel Builder has the facility to show all received data from the flight simulator. Select the option *[Received Data]* from the *Operation* tab:



Select the data group to be displayed on the left.

Use the *[Refresh]* button to refresh the currently displayed data.

Click on *Auto Refresh* to refresh the data automatically.

(P) after a data item denotes Pilot data.

(C) after a data item denotes Copilot data.

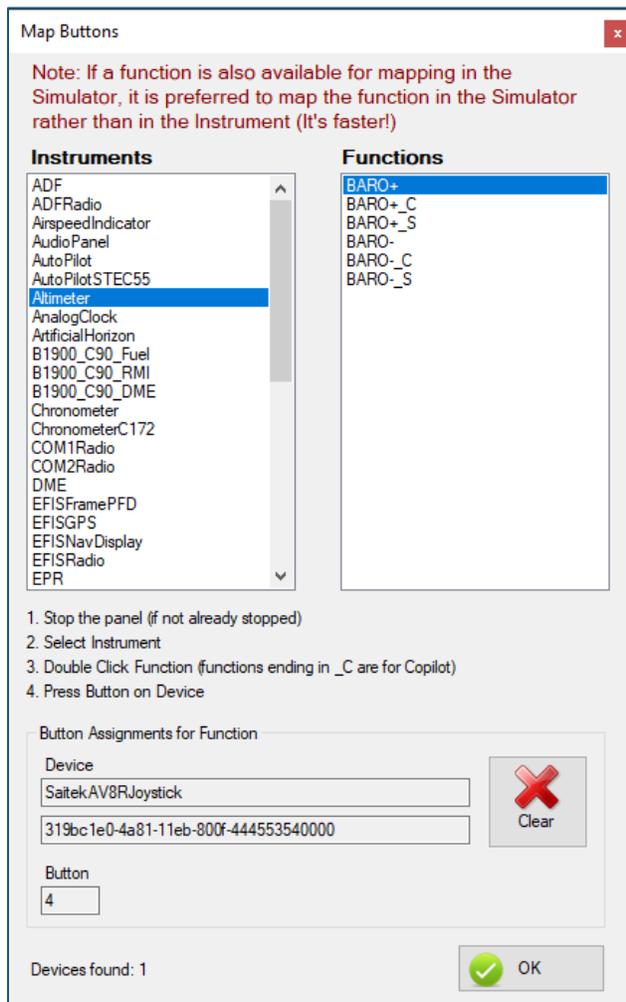
Note: If you have applied any data correction (see previous chapter), the values shown will reflect any data correction made.

Map Buttons

Map Buttons allows you to map hardware buttons or encoders to Panel Builder Instruments.

Note: Most functions found in Panel Builder Instruments (e.g. the Barometer knob on the Altimeter) have an equivalent function in the flight simulator. It is always preferable to map any hardware buttons in the flight simulator rather than in this function. This is for performance reasons as only one change has to be sent (from the simulator), rather than two (to and from the simulator).

Select [*Map Buttons*] from the Operation tab:



Follow the instructions on the screen how to map buttons:

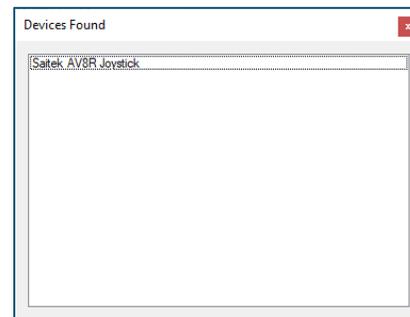
1. Select Instrument in list
2. Double click the function on the right
3. Click on the button or turn dial you want to map.

The device and button ID will be displayed for the pressed button.

To clear an assignment, select the function and press the [Clear] button.

Note: Any buttons mapped are for the currently loaded panel, meaning that mapped buttons are panel specific.

To show what devices are available for mapping buttons, double click in the 'Devices Found' label on the bottom left:



Multiple Instances

It is possible to run multiple instances of Panel Builder on the same computer. This might be useful if you want to use multiple monitors for the instrument panel.

Rather than using a single Panel Builder instance to control a panel that 'spreads' across multiple monitors, you could create a separate panel for each monitor and then start Panel Builder multiple times, one for each panel/monitor. The advantage is that you could assign different backgrounds/images for each panel.

Notes:

1. Only the first instance of Panel Builder processes any data received from the simulator. If you shut this instance down, you need to shut down all other instances as well and restart them to continue processing data again.
2. The second and any subsequent Panel Builder instances are only used for managing additional panels. All Network and Application configuration must be done in the first instance. The appropriate icons are disabled/not visible in subsequent instances. The same applies for using the Data Correction and Button Mapper functions.
3. All panels used are saved for each instance separately, allowing you to automatically start all panels.

Command Line options

There are two (2) command line options available to add to the Panel Builder shortcut on the desktop.

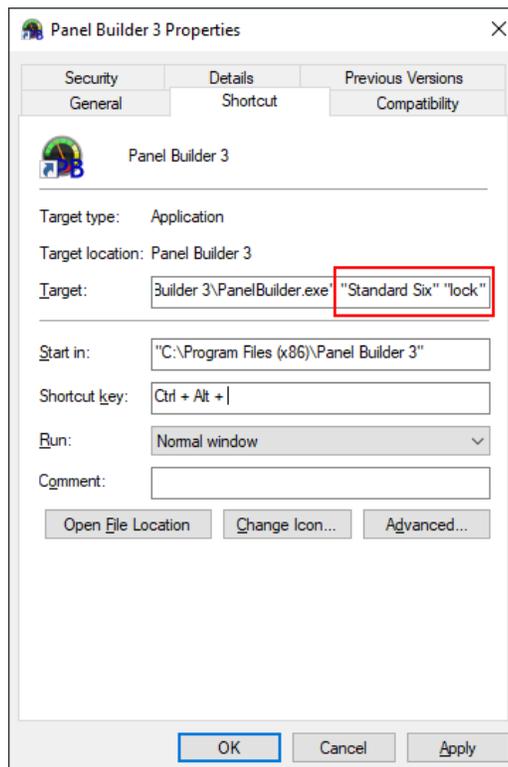
1. *“Panel Name”*

Add a panel name to load and start a specific panel. If the panel name has any spaces, you need to surround the whole name with double quotes, e.g. “Standard Six”. We recommend to always use double quotes.

2. *“lock”*

Adding the second command line option *lock* will disable all user interface buttons, except the [Exit] button. This will prevent changes being made to the panel after shutting down a panel. Note: you also need to specify the first command line option (a panel name)!

To modify the shortcut, right click on the Panel Builder 3 icon on the desktop and choose *Properties*:



Under the *Shortcut* tab, add the command line options to the end of the Target Line. You need a space between all options.

Building Panels

Multiple panels can be configured for different aircraft types. Each panel configuration contains

- Name of the panel (e.g. the aircraft type)
- A Background Image or a Background Color
- Instruments included in panel
- Position and size of each instrument on the screen
- Data Correction (see previous chapter)
- Mapped hardware buttons (see previous chapter)

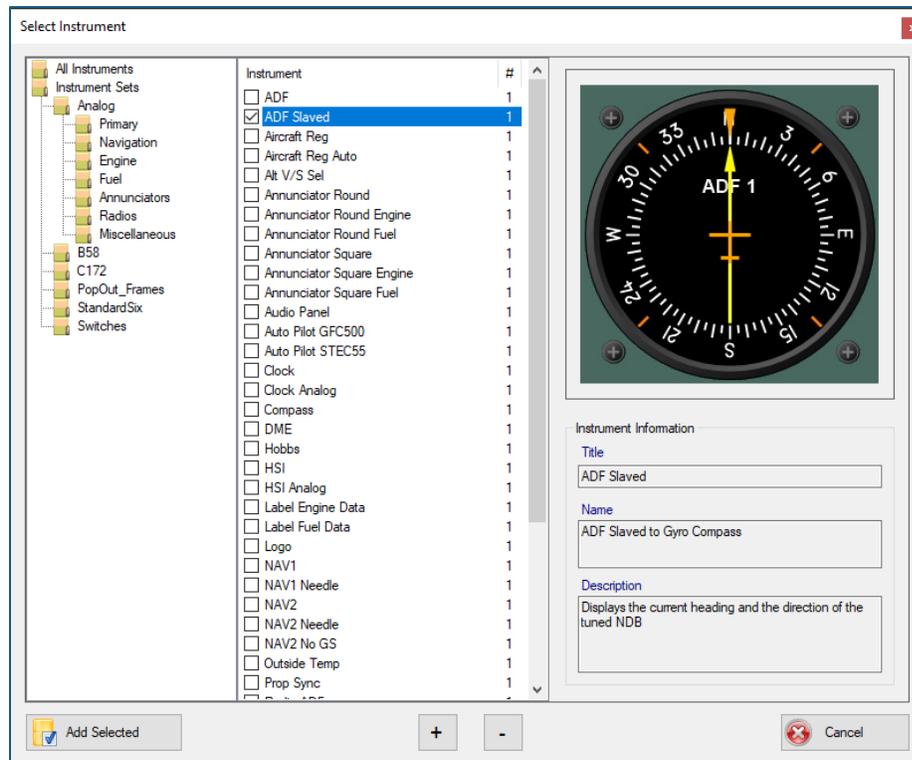
Select the *Building* tab.



Modifying an existing panel

Choose a panel by clicking the *[Load Panel]* option under the *Operation* tab and select a panel from the list. Then click on the *Building* tab.

Adding an Instrument



Click on *Add Instrument*. The window as shown above will appear.

Instruments are organized by instrument add-ons/sets shown on the right side. Then a further grouping is made by type of instrument. Expand each group by clicking the [+] icon or by clicking on the group. You can also use the *All Instruments* group.

An image and description will be shown for each instrument.

Check each instrument to be added to the panel and click on *[Add Selected]*.

You can also specify how many of each instrument should be added by increasing the counter [+] and [-]. This is useful when adding engine instruments for multi-engine aircraft.

All instrument's initial position is in the top left corner. So it will happen that all newly added instruments sit on top of each other. Simply drag each instrument into its final position. To set the location of an Instrument, the panel needs to be 'started'.

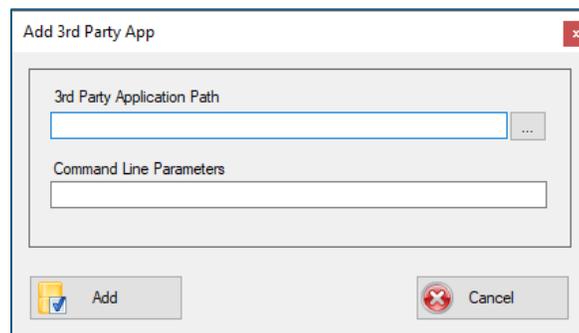
Click on the *[Start]* Button to start the panel. See below for how to move and re-size an instrument.

When you stop the panel or at any time the position of an instrument is changed, it will be saved automatically.

Adding/Removing a 3rd Party Application

If you want to add a 3rd party program/app to be started with the panel, you can add it to the panel. For example you have a GPS application from another vendor.

Click on [Add 3rd Party App] from the menu:



Enter or browse to the app/program. Optionally you can add any program line parameters for the app/program if required.

All 3rd party apps are shown in the *3rd Party Apps* tab of the instrument list. To remove the 3rd party app/ select it in the list and click on *[Remove]* button.

Removing an Instrument from the Panel

The delete an instrument, select the instrument in the list and click on the *[Remove]* button.

Moving and Resizing an Instrument

You can re-locate an Instrument by simply dragging it to a new position on the screen.

If you want to change the size of an instrument, use the wheel on the mouse to change the size.

Each Instrument's size and position is saved automatically with the panel configuration.

There is a facility to 'lock' the instruments to the position to avoid accidentally moving it. **Right Click** on the instrument and a menu will be shown. Click on 'Lock Size & Position' to toggle the locked/not locked option:



Those operations require that a panel is 'running', i.e. the panel has been started and all instruments of the panel are displayed.

By default all instruments are placed at the top left corner of the monitor. To move it to its proper location, left click and drag the instrument around the monitor.

To reset the position of an instrument select the instrument in the instrument list of Panel Builder and choose *[Reset Inst Position]* from the menu. This will reset it to the top/left position.

Note: To reset the size of an instrument select the instrument in the running panel and right click on the instrument to choose *Reset Size* in the menu.

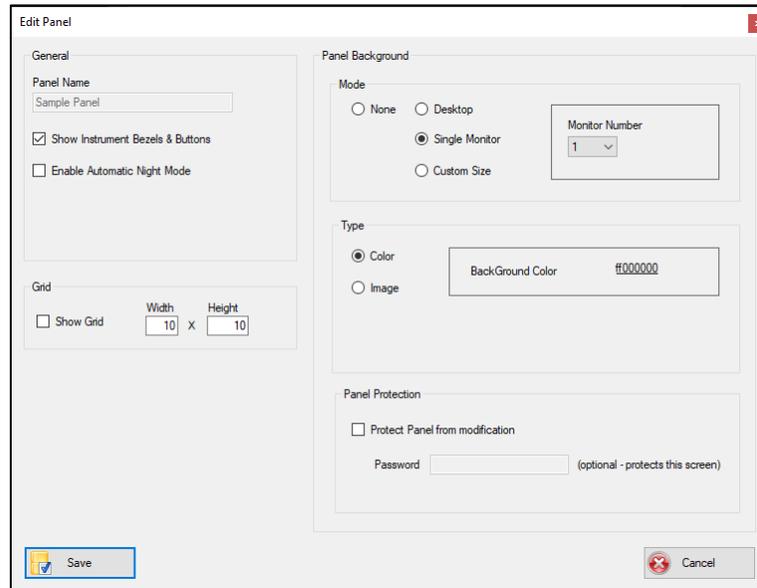
Changing the Start Order of Instruments

To change the order in which instruments are started, select the instrument in the instrument list and use the *[Move Up]* and *[Move Down]* Buttons.

Note: Instruments are started first, then any 3rd party apps.

Adding a New Panel

To add a new panel, click on the *[New Panel]* button in the *Building* tab.



Panel Name

Enter the name of the panel e.g. the aircraft type. Panel Names have to be unique.

Show Instrument Bezels & Knobs

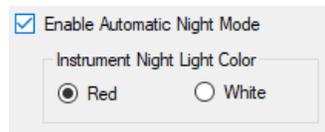
This will either show/or hide the bezels, mounting screws and any knobs for the instruments.

This is useful for cockpit builders who use a mask in front of the monitor. A mask could be made from cardboard or other thin material, or if a monitor is integrated into a full instrument panel.

Note: There is an override for this setting for each individual instrument in the panel. Right click on the instrument (when the panel is running) and choose 'Hide Bezel (Override)'.

Enable Automatic Night Mode

This will automatically switch all instruments in the panel to a red or white glow color for analog instruments to simulate night lighting or a reduced brightness for EFIS and other electronic displays. The switching occurs when the time in the flight simulator switches to night time:



Panel Background

Four modes of panel backgrounds are available:

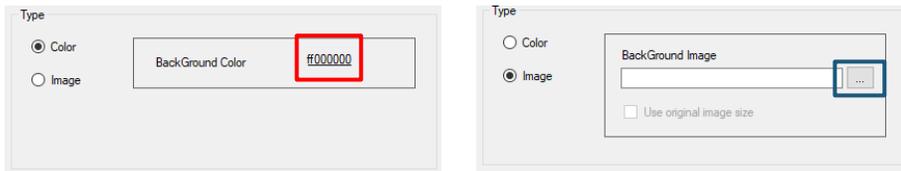
None

Just as the name implies. The instruments will be placed on the desktop as is without a background

Desktop

This fills the desktop area with the selected color or image. If you have multiple monitors connected it will span all monitors.

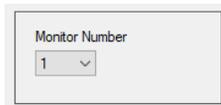
You can specify a background color or an image as a background:



Clicking on the **color link** opens a color selector. For the image, use the **browse** button to locate your image file.

Single Monitor

As above, but the background will be restricted to the monitor specified. This only applies to multi-monitor setups. A dropdown box to select the monitor will be shown:

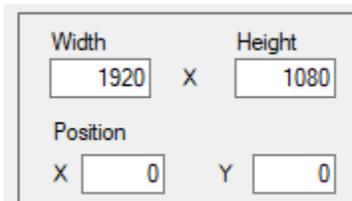


Note: the monitor numbers might not correspond to the monitor numbers when using the *Windows - Display Options* program (Windows shows all known monitors, if enabled or not)

You can specify a background color or an image as a background.

Custom Size

Here you can specify what size and what position the background should be. This is useful if you don't want a background that fills a whole monitor. Enter the size and position of the wanted background:



You can specify a background color or an image as a background.

Show Grid

You can display a grid for the background to assist in aligning your instruments. Select the 'Show Grid' option and specify a grid size in pixels.



Grid

Show Grid Width: X Height:

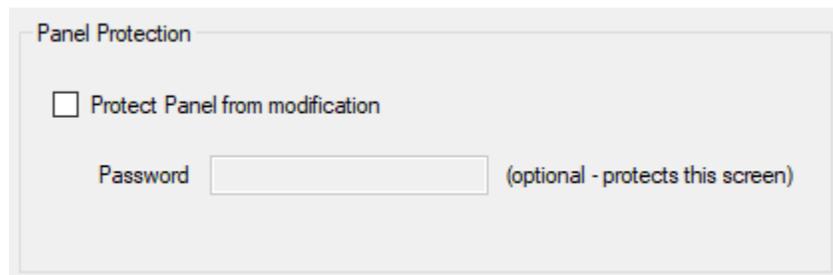
Note: if you select 'None' as the background, the grid option is not available.

Panel Protection

You can protect a panel from modification by checking 'Protect Panel from modification'.

The effect is that all menu options relating to panel changes and the right click menu for each instrument will be disabled.

To further protect this option to be disabled, a password can be set for this 'Edit Panel' screen. A password will then need to be entered from now on to access the 'Edit Panel' option.



Panel Protection

Protect Panel from modification

Password (optional - protects this screen)

Note: this is a setting per panel!

Click on [Save] to add the new panel. Do not proceed adding instruments to the new panel. See the chapter '*Modify an existing Panel*' for a detailed description.

Adding a New Panel (Automatic Panel Switching)

You can create panels that automatically switch to the appropriate aircraft when loaded by the flight simulator. You can create a specific panel for each aircraft you have in your flight simulator. Whenever you switch the aircraft in your simulator, Panel Builder will load and start the matching panel.

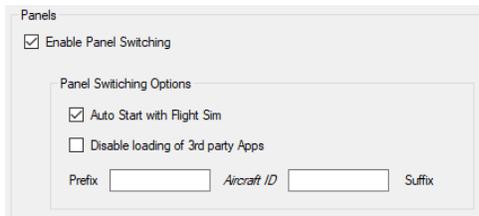
All you have to do is include the ATC call sign of the aircraft somewhere in the panel name.

The ATC call sign is also displayed in the *Misc. Data* section in the [Received Data] function under **PANEL SWITCH**. Your Flight Simulator has to be started and the aircraft you want to use has to be loaded:

Group	Item	Value	Item	Value	Item	Value	Item	Value
Flight Data	AIRCRAFT REG	N172SP						
GPS Data								
Aircraft Systems Data	PANEL SWITCH	N172SP						
Engine Data								
Fuel Data	SIMULATOR	XPLANE						
Navigation Data								
HSI Data	SIM IS PAUSED	0						
Autopilot Data								
Annunciator Data								
Failures Data								
Environment Data								
Switches Data								
Radio Data								
Audio Panel Data								
Misc Data								

In this case the call sign is *N172SP*. Now create a new panel and give it the Panel Name *Cessna 172 N172SP*. You can also copy an existing panel and rename it accordingly. Proceed to add instruments to the panel as usual.

The final thing to do is to enable automatic panel switching. Go to the menu *Configuration* tab, then select *[Program Options]*.



Click on 'Enable Panel Switching'.

Additionally, you can also check the 'Auto start with Flight Sim' box. This will start a panel even if there is no panel running at the time, i.e. when Panel Builder has been started but no panel is active.

Disable loading of 3rd party Apps, means that any 3rd party apps are not loaded when a panel is switched. This is important for any 3rd party apps that change X-Plane configuration files.

Prefix and *Suffix* specifies what characters to use for prefixing and suffixing the Aircraft ID. The default is no prefix and suffix. It might be necessary to add a prefix and/or suffix to distinguish between different aircraft, especially if you use the X-Plane option to use filenames instead of aircraft call signs. If you modify them, you need to adjust your panel names accordingly.

Now continue adding panels for your other aircraft. All you need to do is to load the aircraft into your simulator and the call sign will be displayed in *Received Data*.

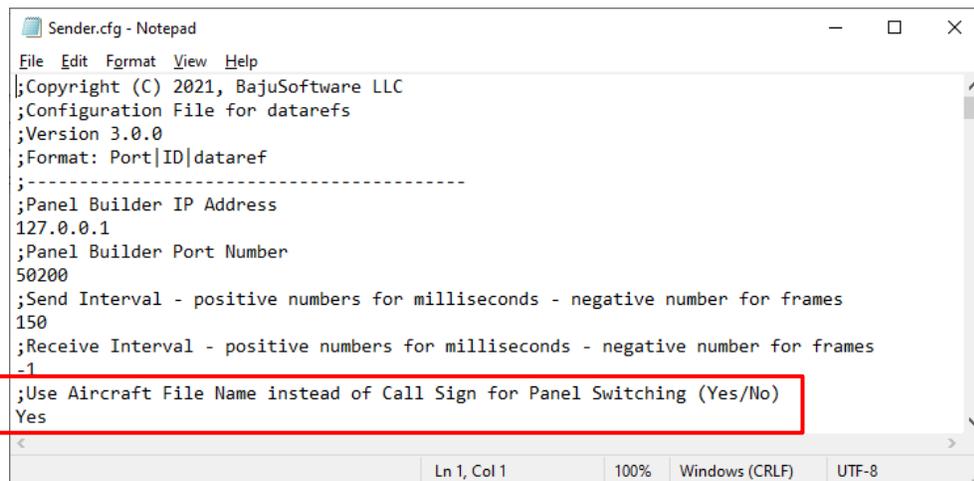
X-Plane only option:

There is an option for X-Plane users to use the *aircraft filename* instead of the *ATC call sign*. This feature was necessary to distinguish between different versions of the same aircraft, e.g. the C172 with Analog or the G1000 panel. Both have the same ATC call sign and automatic panel switching would not work in this case.

To enable this feature you need to modify the Panel Builder config file of the X-Plane plugin. The plugin config file is located here:

```
...\X-Plane 10(11or12)\resources\plugins\Panel Builder 3\Sender.cfg
```

Double click the file to edit it (or use your favorite text editor):



```
Sender.cfg - Notepad
File Edit Format View Help
;Copyright (C) 2021, BajuSoftware LLC
;Configuration File for datarefs
;Version 3.0.0
;Format: Port|ID|dataref
;-----
;Panel Builder IP Address
127.0.0.1
;Panel Builder Port Number
50200
;Send Interval - positive numbers for milliseconds - negative number for frames
150
;Receive Interval - positive numbers for milliseconds - negative number for frames
-1
;Use Aircraft File Name instead of Call Sign for Panel Switching (Yes/No)
Yes
```

Change the **No** to a **Yes** under the section to use the file name instead of the call sign. Save the file. You need to restart X-Plane if it was running.

Now the aircraft filename is displayed in Panel Builder rather than the call sign. Use this information to name your panel as explained previously.

We strongly recommend to use a prefix and suffix ('|' or '#' or '-') to uniquely identify each aircraft from other panels not part of panel switching!



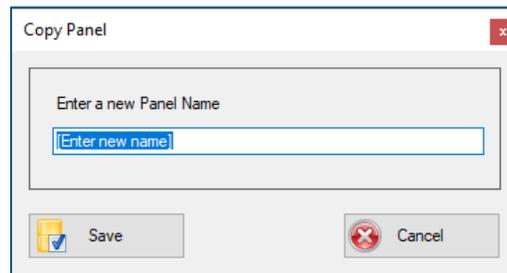
Example: Cessna C172 with Analog Instruments

Deleting a panel

To delete a panel click on the *[Delete Panel]* button in the *Building* tab. Please note that the configuration for all Instruments in that panel will also be deleted.

Copying a panel

To copy panels, click on the *[Copy Panel]* button in the *Building* tab. You will be prompted for a new Panel Name.



After entering a new name, the current panel will be copied and the copied panel with the new name will be opened.

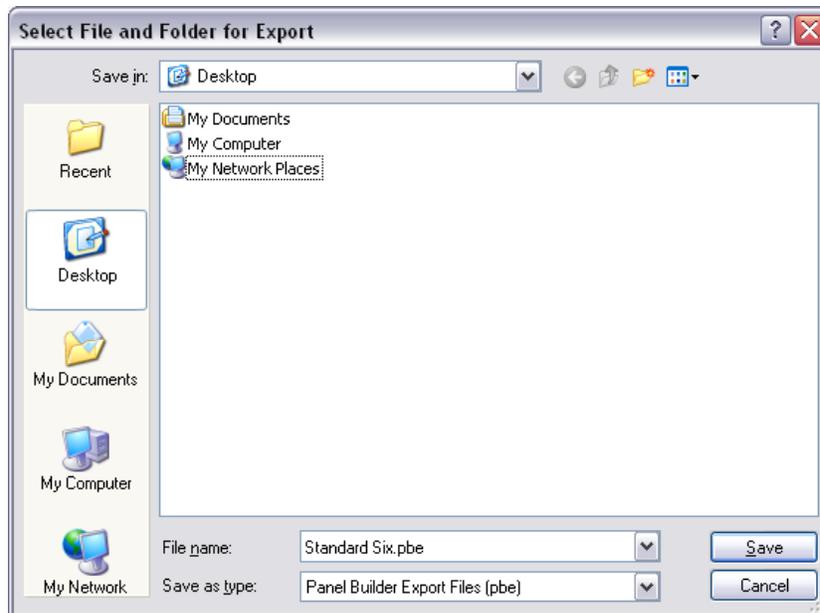
Exporting a Panel

This function allows you to export a complete panel configuration and import it on another computer with Panel Builder installed. All instrument locations, sizes and configurations and the panel background will be exported.

Choose the *Building* tab, then *[Export Panel]*



A dialog will show to select where the export file should be saved to. This can be a local drive, a networked computer drive or a thumb drive.



Click on [Save] to finalize the export function.

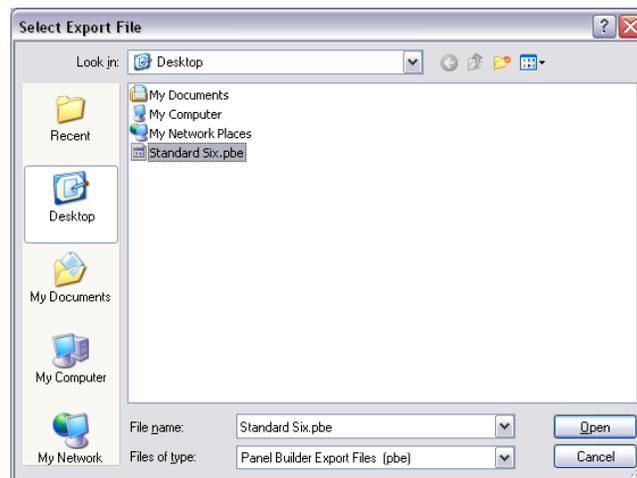
Importing a Panel

This allows you to import a previously exported panel configuration. Please note that when importing a panel that the screen size of the exported panel is the same size or less then the screen size of the target computer.

Chose the *Building* tab, then [*Import Panel*]



A dialog will show to select where the export file should be imported from. Browse to the location where the export file was saved to and click on [Open].



If the same panel exists already, a warning will be displayed. Otherwise the panel will be imported.



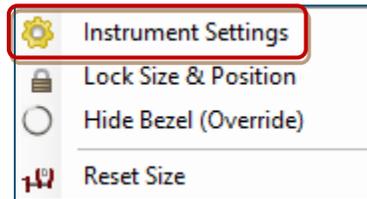
Note: You can rename the Export File before importing it. The file name will become the panel name after importing.

Configuring Instruments

Many instruments have a configuration option to adjust them to various parameters. This allows each instrument to be customized to a specific aircraft type.

Many engine instruments require that a specific instrument is added multiple times to a panel in order to display data for multi-engine aircraft. Again, each of those instruments needs to be configured to specify what engine the instrument is used for.

Start the panel, the right-click with your mouse on the instrument and select *[Instrument Settings]* from the pop-up menu:



Adjust any setting required and click on the save button.

Airspeed Indicator Settings

Display for (X-Plane Only!)

Pilot

Display Range

Max Speed 200 knots

Color Arcs (knots)

White	41	VSO	to	85	VFE
Green	47	VS1	to	128	
Yellow	128	VNO	to	160	
Red	160	VNE			

Labels / Ticks

Interval 20

Save Cancel

Example: Airspeed Indicator

Note: Each adjustment you make to an instrument is specific to this instrument and the panel it is contained in.

Using instrument buttons and dials

Many instruments contain buttons and dials (knobs). All those elements are fully functional and can be used with a mouse. Those elements have been improved for use with a touch enabled monitor. A multi-touch monitor is not required, a simple single touch monitor is sufficient.

Element	Mouse	Touch-Screen
Button	Left-Click on button	Touch button on screen
Single Knob (Dial)	Left-Click on knob and hold Move mouse clock or anti clock wise in a circular motion.	Touch knob and move finger in a circular motion clock or anti clock wise.
Dual Knob (Radios)	<p><i>Outside dial</i> Left-Click just outside of knob and hold.</p> <p>Move mouse clockwise or anti clockwise in a circular motion.</p> <p><i>Inside dial</i> Left-Click on inside of knob and hold.</p> <p>Move mouse clockwise or anti clockwise in a circular motion.</p>	<p><i>Outside dial</i> Touch just outside of knob and move finger in a circular motion clockwise or anti clockwise.</p> <p><i>Inside dial</i> Touch just inside of knob and move finger in a circular motion clockwise or anti clockwise.</p>

Interface Modification

X-Plane

You can configure each dataref that drives the instruments using the Panel Builder plugin.

This facility gives you the freedom to change datarefs once they become obsolete or are superseded by a new dataref without requiring a program update.

The plugins for X-Plane 10, 11 or 12 were installed under

```
...\X-Plane 10(11or12)\resources\plugins
```

There are several configuration files for the plugin.

In folder ...\`X-Plane 10(11or12)\resources\plugins\PanelBuilder3`

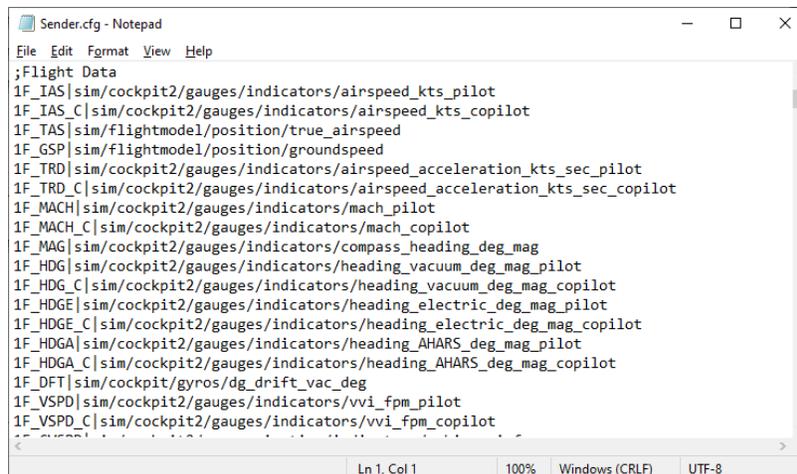
<i>Sender.cfg</i>	<i>X-Plane send dataref values</i>
<i>ReceiverCMD.cfg</i>	<i>X-Plane receive commands (momentary)</i>
<i>ReceiverCMDTOG.cfg</i>	<i>X-Plane receive commands (toggle)</i>
<i>ReceiverDAT.cfg</i>	<i>X-Plane receive datarefs</i>

In folder ...\`X-Plane 10(11or12)\resources\plugins\PanelBuilder3Fast`

<i>ReceiverDAT.cfg</i>	<i>X-Plane receive values for datarefs (fast execution like dials)</i>
------------------------	------------------------------------------------------------------------

Use notepad or any other text edition to modify the datarefs in the above listed configuration files.

Make a backup copy first! Also note that those files will be overwritten by a software upgrade. Always keep a copy of the original and your modified files.



```
Sender.cfg - Notepad
File Edit Format View Help
;Flight Data
1F_IAS|sim/cockpit2/gauges/indicators/airspeed_kts_pilot
1F_IAS_C|sim/cockpit2/gauges/indicators/airspeed_kts_copilot
1F_TAS|sim/flightmodel/position/true_airspeed
1F_GSP|sim/flightmodel/position/groundspeed
1F_TRD|sim/cockpit2/gauges/indicators/airspeed_acceleration_kts_sec_pilot
1F_TRD_C|sim/cockpit2/gauges/indicators/airspeed_acceleration_kts_sec_copilot
1F_MACH|sim/cockpit2/gauges/indicators/mach_pilot
1F_MACH_C|sim/cockpit2/gauges/indicators/mach_copilot
1F_MAG|sim/cockpit2/gauges/indicators/compass_heading_deg_mag
1F_HDG|sim/cockpit2/gauges/indicators/heading_vacuum_deg_mag_pilot
1F_HDG_C|sim/cockpit2/gauges/indicators/heading_vacuum_deg_mag_copilot
1F_HDGE|sim/cockpit2/gauges/indicators/heading_electric_deg_mag_pilot
1F_HDGE_C|sim/cockpit2/gauges/indicators/heading_electric_deg_mag_copilot
1F_HDGA|sim/cockpit2/gauges/indicators/heading_AHARS_deg_mag_pilot
1F_HDGA_C|sim/cockpit2/gauges/indicators/heading_AHARS_deg_mag_copilot
1F_DFT|sim/cockpit/gyros/dg_drift_vac_deg
1F_VSPD|sim/cockpit2/gauges/indicators/vvi_fpm_pilot
1F_VSPD_C|sim/cockpit2/gauges/indicators/vvi_fpm_copilot
Ln 1, Col 1 100% Windows (CRLF) UTF-8
```

A complete reference of datarefs and commands can be found under the X-plane plugins folder in a file called `DataRefs.txt` and `Commands.txt`.

MS Flight Simulator 2020/X and Prepar3D SimConnect

There are no customizations available for the interface with the exception of the Data Correction facility for a panel.

DCS World

The DCS World Interface is a LUA script that is run within DCS. The LUA script can be freely modified, but we strongly suggest to make a backup copy of it first. The LUA script is located in:

```
C:\Users\[windows user name]\ Saved Games\DCS\Scripts.
```

The interface LUA script is called `PanelBuilder3.lua`.

Besides modifying the script, the Data Correction facility in Panel Builder can be used.

Condor & Condor 2

There are no customizations available as there is no interface. The data is exported directly from Condor/Condor2 to Panel Builder. You can use the Data correction facility within Panel Builder.

Annunciator Configuration

This chapter describes the various annunciator instruments available in Panel Builder 3 Analog Instrument Add-On. There are 2 sets of 3 Annunciator types, one set is round, the other square. The 3 annunciator types reflect where the data is taken from:

Annunciator round/square: data from *annunciator data* (values ON/OFF)

Note: not all annunciator values are available for all simulators (see table below). If a wanted annunciator is not available, use the *Fuel* or *Engine* annunciator instead if possible.

Right-click on instrument to configure:

The screenshot shows the 'Annunciator Settings' dialog box. At the top, the 'Data Point' is set to 'Cabin Door Open'. Below this, there are two sections: 'Labels' and 'Values'. The 'Labels' section has a 'Text' input field and a 'Color' dropdown menu currently set to 'White'. The 'Values' section has two radio buttons: 'Light when ON' (which is selected) and 'Light when OFF'. At the bottom, there is a 'Color' section with radio buttons for 'Blink', 'Red' (selected), 'Green', 'Blue', and 'Yellow'. 'Save' and 'Cancel' buttons are at the bottom.

Annunciator Fuel round/square: data from *fuel data* (values need to be configured in instrument for 'ON' condition)

Right-click on instrument to configure:

The screenshot shows the 'Annunciator Settings' dialog box. At the top, the 'Data Point' is set to 'Fuel Qty (1)'. Below this, there are two sections: 'Labels' and 'On between'. The 'Labels' section has a 'Text' input field and a 'Color' dropdown menu currently set to 'White'. The 'On between' section has two input fields: the first is '0.0' and the second is '1.0 (inc.)'. At the bottom, there is a 'Color' section with radio buttons for 'Blink', 'Red' (selected), 'Green', 'Blue', and 'Yellow'. 'Save' and 'Cancel' buttons are at the bottom.

Annunciator Engine round/square: data from *engine data* (values need to be configured in instrument)

Right-click on instrument to configure:

Annunciator Data Exceptions

Annunciator Data Point	X-Plane	Lockheed Martin Prepar3D	Microsoft Flight Simulator
Auto Feather Arm (1)	X		
Auto Feather Arm (2)	X		
Auto Feather Arm (3)	X		
Auto Feather Arm (4)	X		
Autopilot Disconnect	X	X	X
Autopilot Trim Fail	X		
Cabin Door Open	X		
Crossfeed On	X		
De-Ice Boots On	X		
Engine 1 Chips Detected	X		
Engine 2 Chips Detected	X		
Engine 3 Chips Detected	X		
Engine 4 Chips Detected	X		
Engine 1 Fire	X	X	X
Engine 2 Fire	X	X	X
Engine 3 Fire	X	X	X
Engine 4 Fire	X	X	X
External Power On	X		
Fuel Pressure Low (1)	X		
Fuel Pressure Low (2)	X		
Fuel Pressure Low (3)	X		
Fuel Pressure Low (4)	X		

Annunciator Data Point	X-Plane	Lockheed Martin Prepar3D	Microsoft Flight Simulator
Fuel Quantity Low	X		X
Gear Warning	X	X	X
Generator Off (1)	X	X	X
Generator Off (2)	X	X	X
Generator Off (3)	X	X	X
Generator Off (4)	X	X	X
Hydraulic Pressure	X		
Ice Detected	X		
Ice Vane Extended (1)	X	X	X
Ice Vane Extended (2)	X	X	X
Ice Vane Extended (3)	X	X	X
Ice Vane Extended (4)	X	X	X
Igniter On (1)	X	X	X
Igniter On (2)	X	X	X
Igniter On (3)	X	X	X
Igniter On (4)	X	X	X
Inverter Failed	X		
Inverter 1 Off	X		
Inverter 2 Off	X		
Lights Beacon On	X	X	X
Lights Navigation On	X	X	X
Lights Landing On	X	X	X
Lights Strobe On	X	X	X
Lights Taxi On	X	X	X
Low Voltage	X		X
Low Vacuum	X		X
Master Caution	X		
Master Warning	X		
N1 High (1)	X		
N1 High (2)	X		
N1 High (3)	X		
N1 High (4)	X		
N2 Low (1)	X		
N2 Low (2)	X		
N2 Low (3)	X		
N2 Low (4)	X		
Oil Pressure Low (1)	X		
Oil Pressure Low (2)	X		
Oil Pressure Low (3)	X		
Oil Pressure Low (4)	X		

Annunciator Data Point	X-Plane	Lockheed Martin Prepar3D	Microsoft Flight Simulator
Oil Temperature High (1)	X		
Oil Temperature High (2)	X		
Oil Temperature High (3)	X		
Oil Temperature High (4)	X		
Pitot Heat Off	X		
Prop Heat On	X		
Prop Sync On	X		
Reverser On (1)	X		
Reverser On (2)	X		
Reverser On (3)	X		
Reverser On (4)	X		
Rotor High	X		
Rotor Low	X		
Stall Warning	X	X	X
Window De-Ice On	X		

Instrument Exceptions

This chapter describes exceptions or instrument limitations for each flight simulator.

X-Plane

There are no exceptions or limitations. All instruments were designed with X-Plane features in mind.

Lockheed Martin Prepar3D

Prepar3D does not have any Copilot data available. Any instruments that have a Copilot setup option will only work with the 'Pilot' option.

The exceptions are the HSI Instruments (Analog & EFIS):

- When selecting 'Pilot' for the HSI, the data displayed will be either NAV1 or GPS.
- When selecting 'Copilot' for the HSI, the data displayed will be fixed to the NAV2 source.

Microsoft Flight Simulator (MSFS)

Microsoft Flight Simulator does not have any Copilot data available. Any instruments that have a Copilot setup option will only work with the 'Pilot' option.

The exceptions are the HSI Instruments (Analog & EFIS):

- When selecting 'Pilot' for the HSI, the data displayed will be either NAV1 or GPS.
- When selecting 'Copilot' for the HSI, the data displayed will be fixed to the NAV2 source.

MSFS does not have the facility to set the transponder ident

Microsoft Flight Simulator X (FSX)

FSX does not have any Copilot data available. Any instruments that have a Copilot setup option will only work with the 'Pilot' option.

The exceptions are the HSI Instruments (Analog & EFIS):

- When selecting 'Pilot' for the HSI, the data displayed will be either NAV1 or GPS.
- When selecting 'Copilot' for the HSI, the data displayed will be fixed to the NAV2 source.

FSX does not have the facility to set Standby ADF Frequencies.

FSX does not have the facility to set the transponder mode or ident.

DCS World

DCS World exports unique data for each aircraft module. For this reason, only instruments from the DCS Instrument Add-On range will work with DCS. There is an add-on for each of the supported aircraft. Only those instruments will work with the matching DCS aircraft module.

Currently supported:

- Tupolev ST-25T (built-in) - use the Panel Builder DCS Standard Six Instruments
- Mustang TF-51D (built-in) - use the Panel Builder DCS Standard Six Instruments

- Mustang P51D (module) - use the Panel Builder DCS Add-On P51D Instruments
- Spitfire LFMkIX (module) - use the Panel Builder DCS Add-On Spitfire Instruments
- Gazelle SA342M (module) - use the Panel Builder DCS Add-On Gazelle Instruments
- Bell UH-1H “Huey” (module) - use the Panel Builder DCS Add-On Huey Instruments

Condor & Condor2

Condor exports data directly to Panel Builder. For this reason, only instruments designed for Condor will work. Any other instrument from the standard instrument range or DCS will not work with Condor.

Panel Builder 3
User Manual Version 3.4.X

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