



Ruscool 64 Outputs Configuration

Version 1.0

User Manual

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Ruscool 64 Outputs Configuration

Running the **Ruscool 64 Outputs Config** program allows the user to set up each output as desired. The board has its outputs arranged in eight groups of eight to enable the use of readily available CAT5 cables.

There are also eight inputs available to be used as switches, if required. The first four inputs are reserved for Warning reset switches, and the eighth input is reserved for the Lamp Test. Only inputs 5, 6 and 7 are configurable within this program.

Clicking on the appropriate tab will allow you to configure each of the eight banks of outputs and switches (See the [Switch Configuration](#) section to see how this bank works).

Bank	Category	Description	Offset	Calculation (if any)	ON when value:	On / Min	Max	LampTest?
1	Controls	Battery Switch	3102		between equals	1		<input checked="" type="checkbox"/>
2	Controls	Avionics Switch	3103		between equals	1		<input checked="" type="checkbox"/>
3	Engines	APU Starter	0B58		between equals	1		<input checked="" type="checkbox"/>
4	Engines	APU Volts	0B5C		between equals	22	28	<input checked="" type="checkbox"/>
5	Engines	Engine 1 Oil Pressure	08BA	*55/16384	between equals	0	35	<input checked="" type="checkbox"/>
6					between equals			<input type="checkbox"/>
7					between equals			<input checked="" type="checkbox"/>
8	Engines	Engine 1 Oil Temp	08B8	*140/16384	between equals	70	300	<input checked="" type="checkbox"/>

Lamp Test Trigger
 Offset Switch
 Only trigger Lamp Test if battery bus has voltage

- Click on the “Category” drop-down and choose the item required. If you don’t know which category the item is related to, you can choose (All). Selecting CUSTOM will allow you to enter your own offset details. (If you have an input that doesn't need to do anything other than trigger an output, you can search the FSUIPC Offsets Status document for a range of reserved offsets, then use this as your offset in the Inputs and Outputs programs. Or you can select SWITCH, which gives you the option to directly link an output to one of the three switches on the board) You can select CONDITIONAL to set up multiple conditions for an output (see [Conditional Configuration](#) section).
- There is an option for outputs 7 and 8 on banks 7 and 8 to select WARNING - which has a large range of OR conditions (see [Warning Configuration](#) section)

- Click on the “Description” drop-down and choose the item required. The program will show you the “Offset” as used by FSUIPC. You will notice that some FSUIPC offsets (ie. the different lights) have a suffix after the offset value, and this is automatically catered for in this system.

Where FSUIPC does a calculation on the data, this is shown in the "Calculation (if any)" column.

It is not necessary to use every output in each bank, so they can just be ignored if they are blank. However, if they have been previously configured and you now want them to be unused, you must select (None) from the Category drop-down.

In most situations, it is not necessary for the user to fully understand how FSUIPC works with MS Flight Simulator, but sometimes it is useful to know what sort of values are required in the "On/Min" and "Max" boxes. For example, looking at output 5 on Bank 4 above, you can use this knowledge to drive a red light showing that the engine oil pressure is below 35.

We sell a small program which allows you to monitor values being produced in FSUIPC, but we are able to supply this free of charge if you contact us directly (info@ruscool.co.nz). This offer is only available if you have purchased one of our Ruscool 64 Outputs boards.

You can also set an offset to act as a lamp test, by setting the offset that activates the lamp test (or selecting a switch trigger) and selecting which outputs are to be controlled by this lamp test. (see [Lamp Test Configuration](#) for further details)

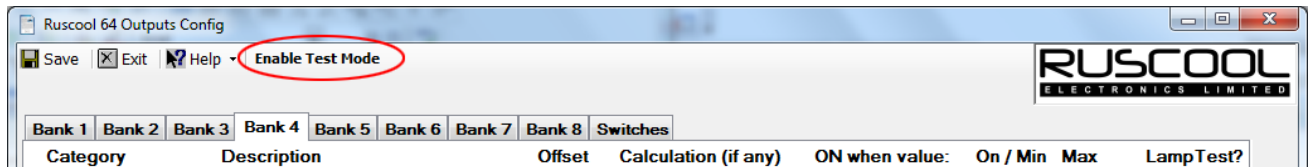
See additional topics:

['Equals' Function](#)

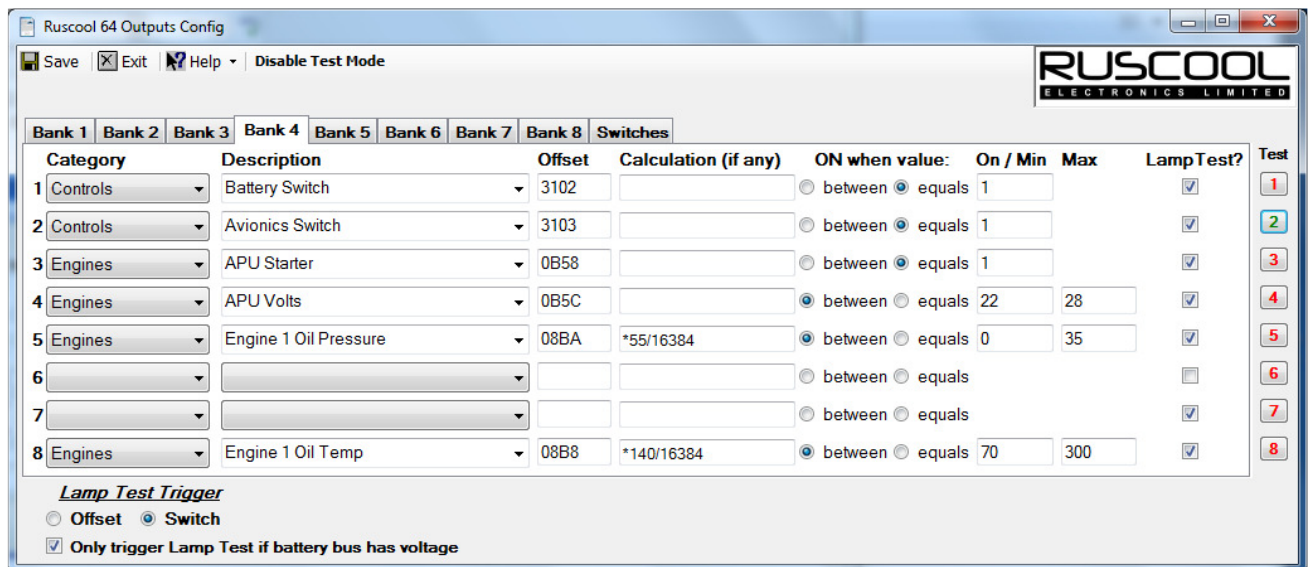
['Between' Function](#)

Testing Outputs

In order to verify your outputs, you can test each output individually from the **Ruscool 64 Outputs Config** program instead of having to configure and run the main **Ruscool 64 Outputs** program. Make sure the Ruscool 64 Outputs board is connected to your computer and turned on. It is not necessary to have Flight Simulator running while you are testing the outputs. Click on the 'Enable Test Mode' button on the menu bar, there will be a slight pause while all outputs are cleared for testing.



You will see an additional column named 'Test' with a button assigned to each output. Only one output can be tested at a time by clicking on the appropriate button. Click on the button again to turn the output off, or click on another button to swap outputs. The test button will turn green when it is on. You can change banks by clicking on the relevant tab, which will clear the outputs ready to test that bank. You can continue to configure the outputs while testing in this manner.



To stop testing, click on the 'Disable Test Mode' button and the connection to the Ruscool 64 Outputs board will be closed and the Test column will be removed.

'Equals' Function

If the item chosen has an ON / OFF function like the "AP Altitude Hold" for instance, then click on the 'equals' button and the appropriate "1" (or relevant value) will pop up in the On/Min box. If this box is not filled in automatically, it is permissible to type in the appropriate information by hand.

You can reverse the function of the 'equals' conditions by changing the "1" to a "0". (The same applies to any other value pairing)

When you choose to use an 'equals' function, the output will go On at the number typed into the box, otherwise it is off.

A further way to use this technique is when an MS Flight Simulator function generates a different number depending on the position of a switch. An example would be using two outputs to perhaps drive two different lights showing when the engine starter switch is in the GEN position or in the START position.

Bank	Category	Description	Offset	Calculation (if any)	ON when value:	On / Min	Max	Lamp Test?
1	Cockpit	Pitot Heat Switch	029C		<input type="radio"/> between <input checked="" type="radio"/> equals	1		<input checked="" type="checkbox"/>
2	Cockpit	Hot Battery Bus Voltage	0D0C-2		<input type="radio"/> between <input checked="" type="radio"/> equals	1		<input checked="" type="checkbox"/>
3	Cockpit	Lights - Beacon	0D0C-1		<input type="radio"/> between <input checked="" type="radio"/> equals	1		<input checked="" type="checkbox"/>
4	Cockpit	Lights - Cabin	0D0C-0		<input type="radio"/> between <input checked="" type="radio"/> equals	1		<input checked="" type="checkbox"/>
5	Cockpit	Lights - Instruments	0D0C-4		<input type="radio"/> between <input checked="" type="radio"/> equals	1		<input type="checkbox"/>
6		Lights - Landing			<input type="radio"/> between <input checked="" type="radio"/> equals	1		<input checked="" type="checkbox"/>
7	Engines	Lights - Logo			<input type="radio"/> between <input type="radio"/> equals			<input type="checkbox"/>
8	Engines	Lights - Navigation	0892		<input type="radio"/> between <input checked="" type="radio"/> equals	1		<input type="checkbox"/>
		Lights - Recognition	0892		<input type="radio"/> between <input checked="" type="radio"/> equals	2		<input type="checkbox"/>
		Lights - Strokes			<input type="radio"/> between <input type="radio"/> equals			<input type="checkbox"/>
		Lights - Taxi			<input type="radio"/> between <input checked="" type="radio"/> equals	1		<input type="checkbox"/>
		Lights - Wing			<input type="radio"/> between <input checked="" type="radio"/> equals	2		<input type="checkbox"/>
		Low Height Warning						
		Main Bus Amps						
		Main Bus Voltage						
		Master Battery Switch						
		Nav Lights						
		No Smoking Alert Switch						
		Panel Autobrake Switch						

Alternative Method:
['Between' Function](#)

'Between' Function

You can click on the 'between' button and then type values in the On/Min and Max boxes (as shown for the Gear Positions below).

Bank	Category	Description	Offset	Calculation (if any)	ON when value:	On / Min	Max	Lamp Test?
1	Controls	Gear Position (Nose)	0BEC		<input type="radio"/> between <input checked="" type="radio"/> equals	16383		<input type="checkbox"/>
2	Controls	Gear Position (Nose)	0BEC		<input checked="" type="radio"/> between <input type="radio"/> equals	0	15380	<input type="checkbox"/>
3	Controls	Gear Position (Left)	0BF4		<input type="radio"/> between <input checked="" type="radio"/> equals	16383		<input type="checkbox"/>
4	Controls	Gear Position (Left)	0BF4		<input checked="" type="radio"/> between <input type="radio"/> equals	0	14380	<input type="checkbox"/>
5	Controls	Gear Position (Right)	0BF0		<input type="radio"/> between <input checked="" type="radio"/> equals	16383		<input type="checkbox"/>
6	Controls	Gear Position (Right)	0BF0		<input checked="" type="radio"/> between <input type="radio"/> equals	0	13380	<input type="checkbox"/>
7					<input type="radio"/> between <input type="radio"/> equals			<input type="checkbox"/>
8					<input type="radio"/> between <input type="radio"/> equals			<input type="checkbox"/>

Lamp Test Trigger
 Offset Switch
 Only trigger Lamp Test if battery bus has voltage

By using a range of numbers (and by using different numbers assigned to the same Offset as shown above) it is possible, for example, to set up a red and green light for each wheel on a Boeing 737 aircraft.

This example on Bank 2 will light a green light on outputs 1, 3 and 5 for when the gear is down and locked, and will light a red light on outputs 2, 4 and 6 for when the gear is in transition. All red and green lights will go out when the gear is up and stowed.

By altering the numbers in the On/Min and Max boxes, you can effectively change the time at which the red and green lights turn on and off.

When you choose to use a 'between' function, the outputs will go On between the two values or equal to the values, and will be Off when outside the values.

Alternative Method:

['Equals' Function](#)

Conditional Configuration

You are able to configure multiple conditions to control each output, if required. You can have a combination of conditions grouped together, and there is also an 'or' section that allows you to have one of two separate condition arguments implemented.

Type in the Description for the output; this will help identify the output within the configuration and also when the main program is running. Then you will need to enter the relevant conditions that will control the output ON status.

The example below turns the Rotor Low RPM output ON when the Rotor RPM % is between 0 and 90 OR the combustion flag is off. (eg. the only time it will be OFF is from 91-100% and the combustion flag is on) This example is suitable for a 'Low Rotor RPM' annunciator in a helicopter.

The screenshot shows a configuration window titled 'Multiple Conditions' with a 'Name' field set to 'Rotor Low RPM'. The window contains a table for defining conditions:

Category	Description	Offset	Type	Calculation	ON when value:	On / Min	Max	
IF	Engines	Engine 1 Rotor RPM % (helo)	0908	Int32	*100/16384	<input checked="" type="radio"/> between <input type="radio"/> equals	0	90
and					<input type="radio"/> between <input type="radio"/> equals			
and					<input type="radio"/> between <input type="radio"/> equals			
and					<input type="radio"/> between <input type="radio"/> equals			
OR	Engines	Engine 1 Combustion Flag	0894	Short		<input type="radio"/> between <input checked="" type="radio"/> equals	0	
and					<input type="radio"/> between <input type="radio"/> equals			
and					<input type="radio"/> between <input type="radio"/> equals			
and					<input type="radio"/> between <input type="radio"/> equals			
OR					<input type="radio"/> between <input type="radio"/> equals			
OR					<input type="radio"/> between <input type="radio"/> equals			

The example below turns the Taxi Light output ON when the gear control is up and either the taxi or landing light is on. (eg. The taxi light is on and the gear control is up OR the landing light is on and the gear control is up) This example is suitable for a warning annunciator on an aircraft where the taxi light is mounted on the nose gear.

The screenshot shows a configuration window titled 'Multiple Conditions' with a 'Name' field set to 'Taxi or Landing Light'. The window contains a table for defining conditions:

Category	Description	Offset	Type	Calculation	ON when value:	On / Min	Max	
IF	Cockpit	Lights - Taxi	0D0C-3	Short		<input type="radio"/> between <input checked="" type="radio"/> equals	1	
and	Controls	Gear Control	0BE8	Int32		<input type="radio"/> between <input checked="" type="radio"/> equals	0	
and					<input type="radio"/> between <input type="radio"/> equals			
and					<input type="radio"/> between <input type="radio"/> equals			
OR	Cockpit	Lights - Landing	0D0C-2	Short		<input type="radio"/> between <input checked="" type="radio"/> equals	1	
and	Controls	Gear Control	0BE8	Int32		<input type="radio"/> between <input checked="" type="radio"/> equals	0	
and					<input type="radio"/> between <input type="radio"/> equals			
and					<input type="radio"/> between <input type="radio"/> equals			
OR					<input type="radio"/> between <input type="radio"/> equals			
OR					<input type="radio"/> between <input type="radio"/> equals			

Save Configuration

The system **does not** automatically save your changes, so it is necessary to press the "Save" button in the top left-hand corner if you wish to save your changes before you exit the program.

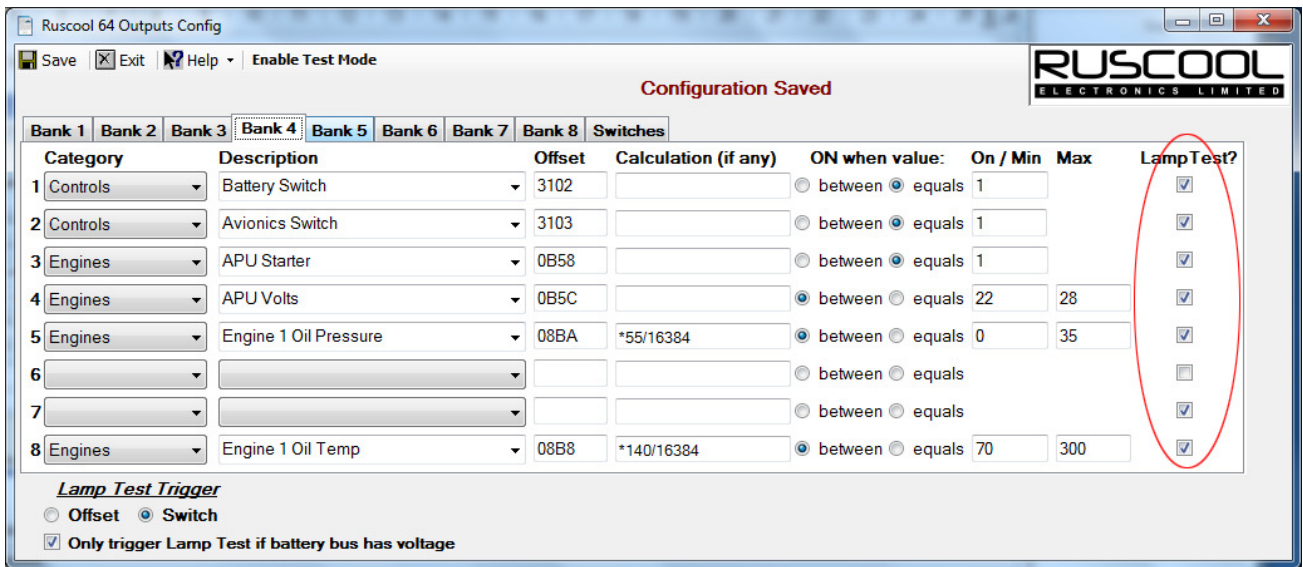
Pressing the "Exit" button will shut down the **Ruscool 64 Outputs Config** program without saving any changes.

Lamp Test Configuration

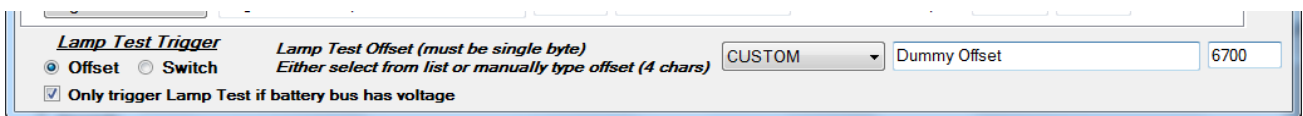
Instead of having to physically wire up all your lights and annunciators to a Lamp Test switch, we have incorporated a simpler solution.

You can choose to connect a Lamp Test 'switch' or assign an 'offset' that will act as a trigger for a lamp test. You can also specify that you only want the lamp test to be triggered when the battery bus has voltage by ticking this box, which looks at the value in offset 2870.

If you connect a Lamp Test switch, it must be used on input 8 as this is hard-coded into the microprocessor on the board.



If you choose not to use a switch, you need to assign an offset that will act as the trigger for a lamp test. This can either be a valid FSUIPC offset, or any unused (reserved) offset that you are using either from a Ruscool 64 Input board, another input controller or from within Flight Simulator. The offset must be a single byte that sends either "1" or "0".



Then any relevant outputs can be ticked to be included in the lamp test.

These outputs will be turned ON whenever the lamp test switch is ON or the trigger offset is ON.

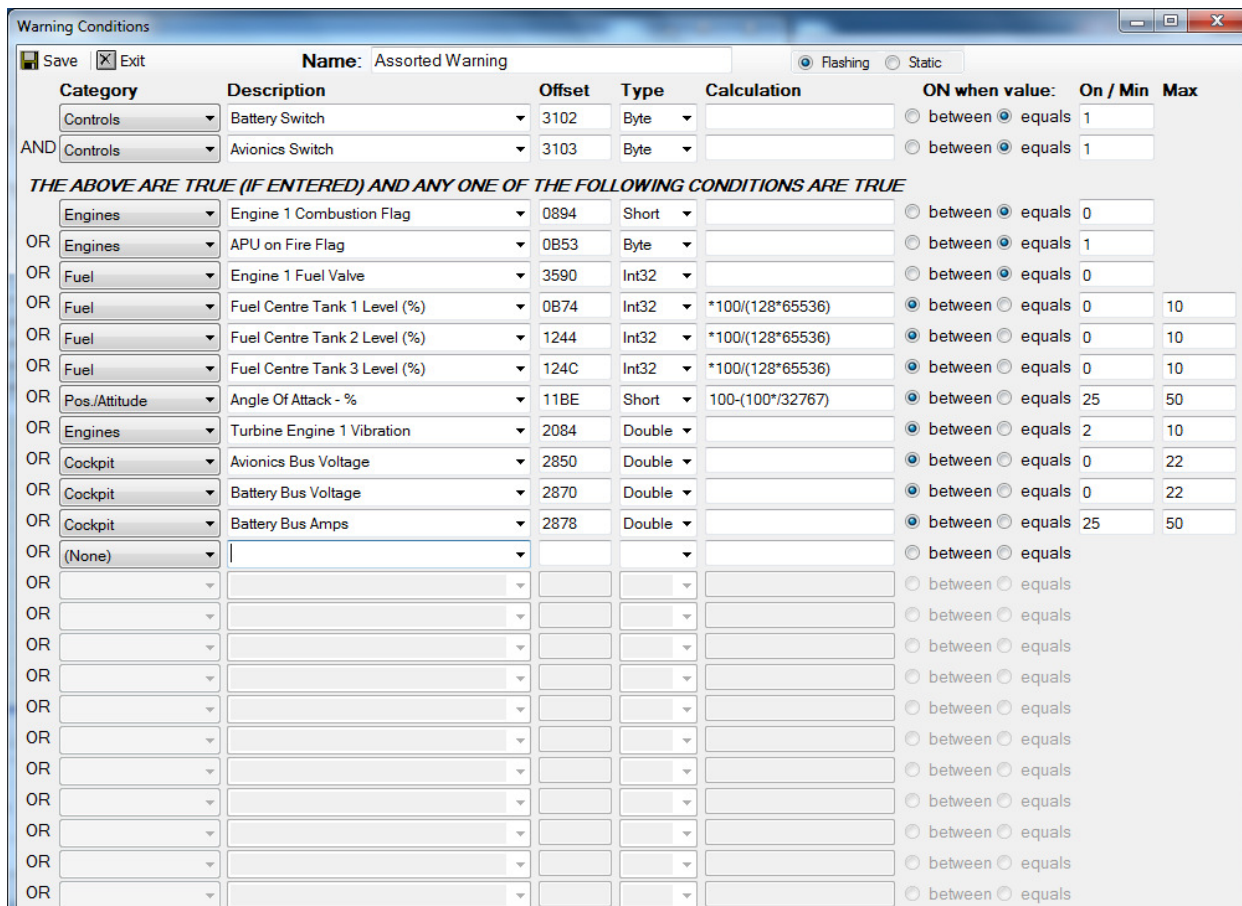
Warning Configuration

Outputs 7 and 8 on banks 7 and 8 are able to be configured as Warnings which are made up of up to 25 'OR' conditions and can also include up to 2 main 'AND' conditions if required. If these outputs are set up as warnings, they can have the appropriate reset switch connected to inputs 1-4 that will reset (turn off) the warning output until any other condition goes true which re-triggers the warning. The reset button can be pressed any number of times to reset warnings. If the warning condition resets itself, or an action by the pilot corrects the fault, the warning lamp will go out.

Type in a Description for the Warning, which will make it easier to identify when running the Ruscool 64 Outputs program. Then enter any conditions you require.

You can also select whether you want the warning light to be a static ON or OFF, or if you want the light to flash.

The example below will light the warning output if the Battery Switch AND Avionics Switch are 'On', and **ANY** of the other conditions are true.

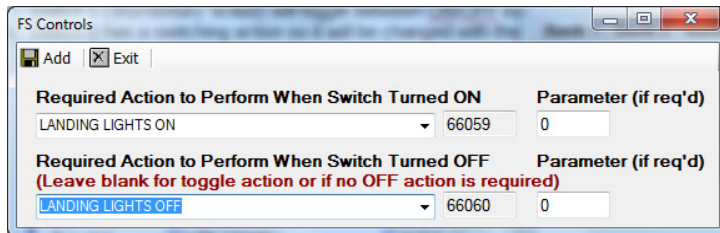


- Dedicated reset buttons:
- Input 1 resets output 7 on bank 7
 - Input 2 resets output 8 on bank 7
 - Input 3 resets output 7 on bank 8
 - Input 4 resets output 8 on bank 8

Switch Configuration

Five of the available eight switch inputs are dedicated to 'Warning Reset' and 'Lamp Test' functions, but the remaining three inputs (5, 6 and 7) are not dedicated and can be configured for use as switches or pushbuttons.

The switches section will handle any FSUIPC offset as well as other items that the FSUIPC offset list doesn't handle. You can use any of the FS Controls that can be configured within the FSUIPC module in Flight Sim and access them directly through this program without assigning them inside the flight sim program. These are normally 65xxx numbers and a list is included within this program by selecting 'FS Controls' from the category dropdown.

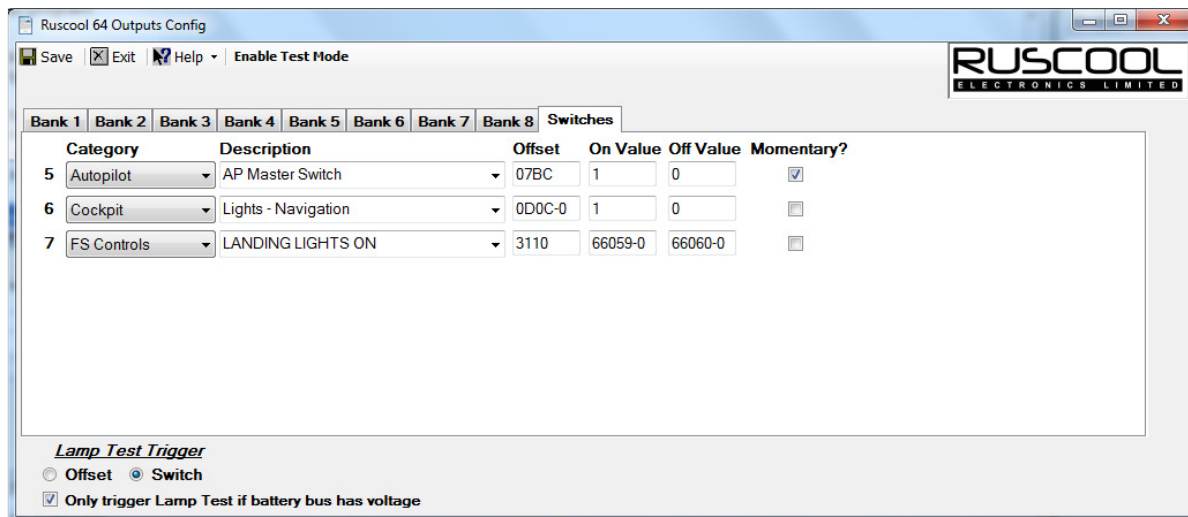


You can also select the 'CUSTOM' category to enter an offset that is not available in the list that comes with this program, and may be specific to an 'add-on' aircraft program.

If an output has been selected to be triggered by a physical switch, that switch will be greyed out in this screen showing 'OUTPUT' as the category and the description will show which bank and output is linked.

With the example below:

Switch 5 ('Momentary' ticked) will toggle between ON/OFF each time the pushbutton is pressed. Switch 6 has a switching action so it will be changed with the switch status. Switch 7 has a switching action that sends FS control values.



NOTE: It is essential that the "On Value" and "Off Value" boxes have values in them as appropriate to the switching function, or else that particular line will not be saved in the configuration file. If using FS Controls, these values should not be manually changed - select "FS Controls" again from the category drop-down to alter your selection.

Running Multiple Boards

If you have more than one Ruscool 64 Output board that you are wanting to run at the same time, there are additional shortcuts in the "C:\Program Files\Ruscool Electronics Ltd\Ruscool 64 Outputs" directory (or the directory where you installed the program when running the setup) that can be copied on to the desktop.

These shortcuts point to exact duplicates of the config and main programs, but have been set up to send an argument of "2" which tells the program to connect to the 'Ruscool 64 Outputs 2' board and use a different configuration file. This can be repeated for up to five Ruscool 64 Output boards by using the correct number in the shortcut.

Alternatively, you can create two additional desktop shortcuts from the "C:\Program Files\Ruscool Electronics Ltd\Ruscool 64 Outputs" directory (or the directory where you installed the program when running the setup). These shortcuts should be named "Ruscool 64 Outputs 2" and "Ruscool 64 Outputs Config 2" or something similar.

To enable these new shortcuts to communicate to the additional setups and circuit boards, right click on the shortcut and add a space and the board number to the end of the Target (outside the quotes). For example, if adding a second board the target should read
"C:\Program Files\Ruscool Electronics Ltd\Ruscool 64 Outputs\Ruscool 64 Outputs Config.exe" 2