RUSCOOL
ELECTRONICS LIMITED

Ruscool 64 Outputs

Version 1.0

User Manual

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Prerequisites

- Each of the Ruscool 64 Outputs boards can switch up to 1/2 an Amp (500mA)

- A registered version of FSUIPC must be installed within the Flight Simulator software.

- If windows doesn't automatically install the driver, it can be found in the link below:
https://www.silabs.com/products/development-tools/software/usb-to-uart-bridge-vcp-drivers

- Ensure the board is connected to a power supply as well as the computer via a USB cable and turned on. See the 'Typical Connection' section for further details.
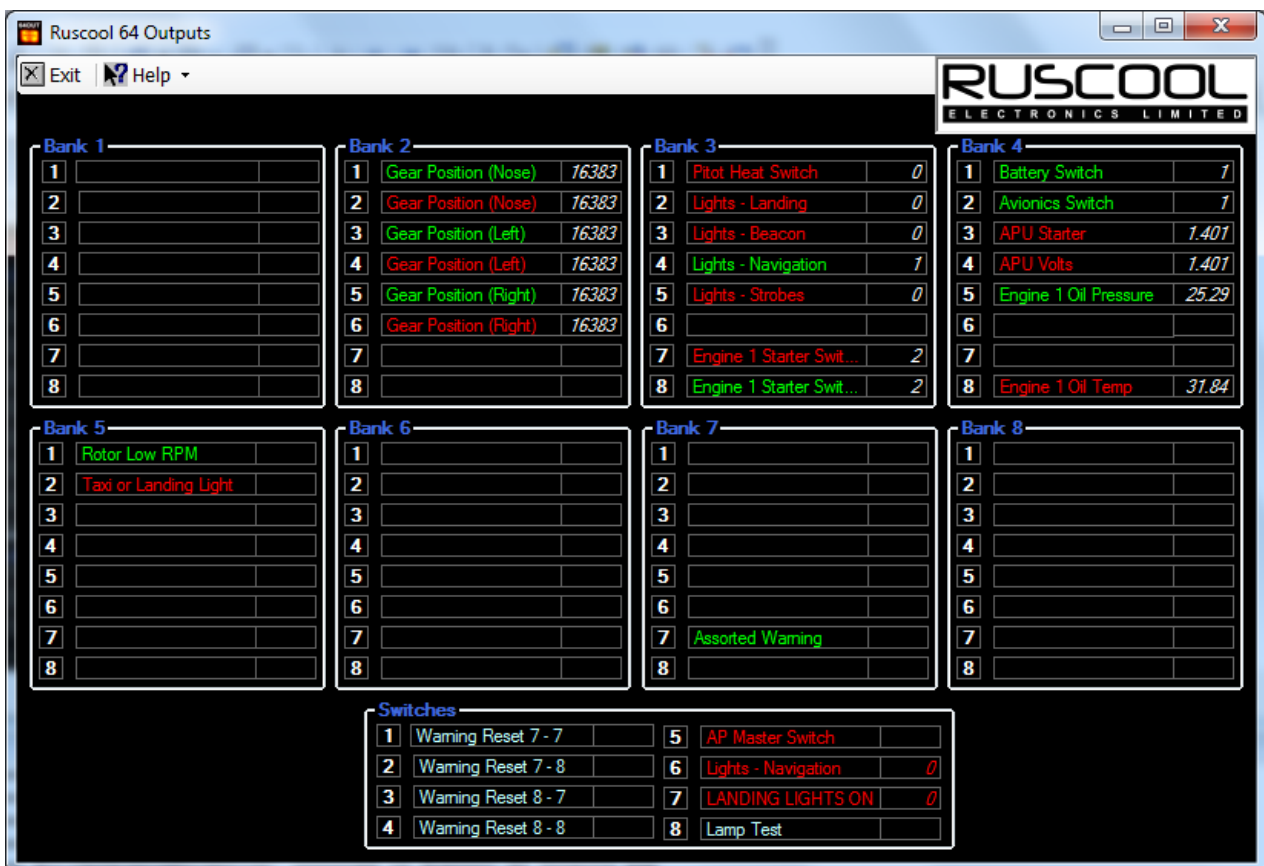
Ruscool 64 Outputs

After running the **Ruscool 64 Outputs Config** program and setting up how you wish to use the various outputs, and "saving" your settings, the main **Ruscool 64 Outputs** program is ready to use.

The **Ruscool 64 Outputs** program can be running before starting Flight Simulator as it will wait for a connection to the Flight Simulator software before the program continues. (The board must be connected first, and it always pays to wait about 10 seconds after powering up the board before running the program).

The **Ruscool 64 Outputs** program starts minimised on the taskbar because while you are flying your simulator it is not normally necessary to see this information. If required, you can bring it back to full size while you are setting up all of the various controls. Because it is sometimes difficult to know what values MS Flight Simulator and FSUIPC are producing for any given condition for each item, we have displayed the numerical or logical data alongside the name of each configured item. (Except for 'Conditional' or 'Warning' outputs which have multiple values, so these are not able to be shown)

The ON / OFF status of each item can be seen from the colour of the description, where it will be Green for ON and Red for OFF.

Make sure that when you have finished viewing the data that the program is **minimised**, not closed, so that the program remains running.
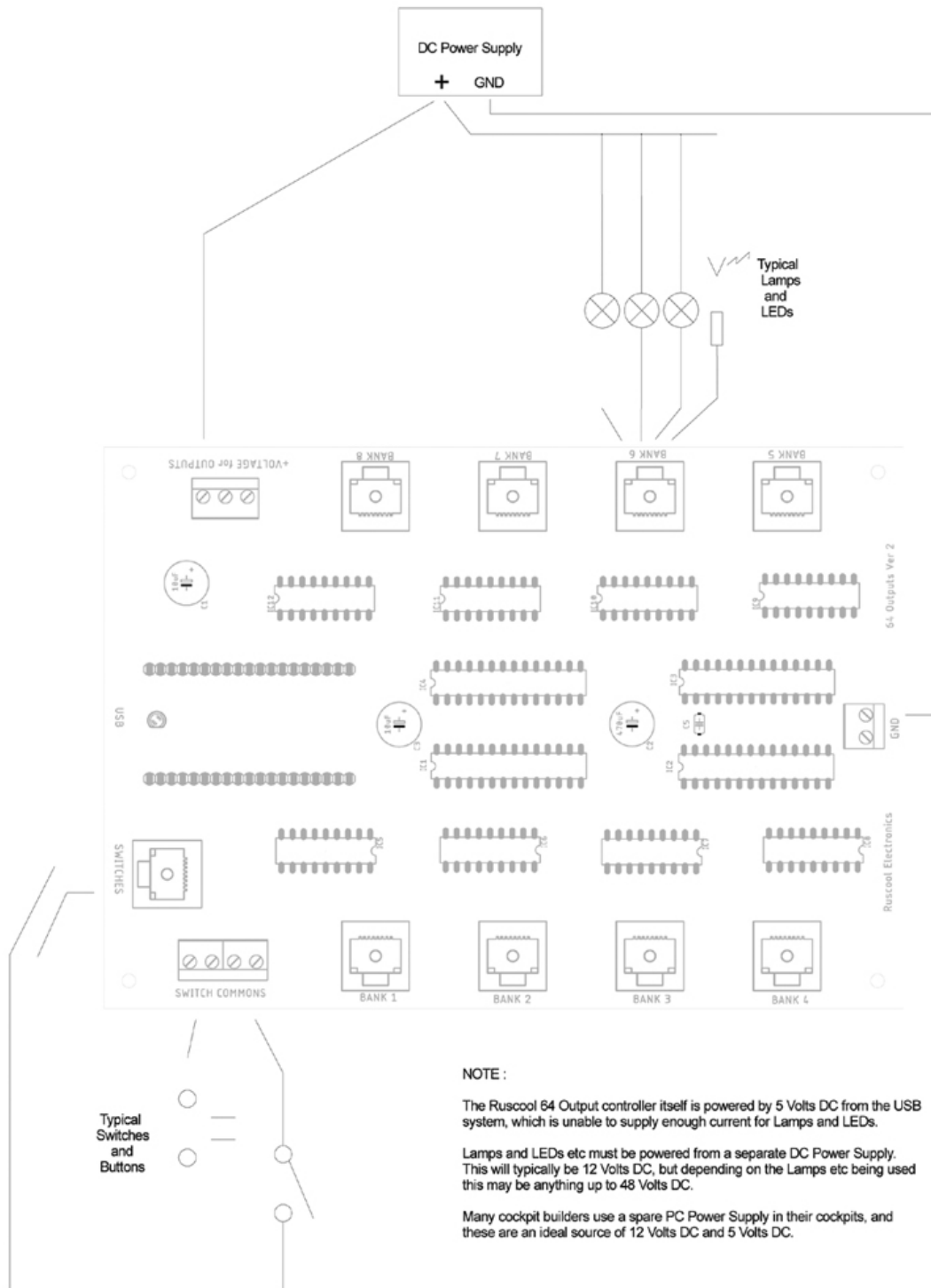
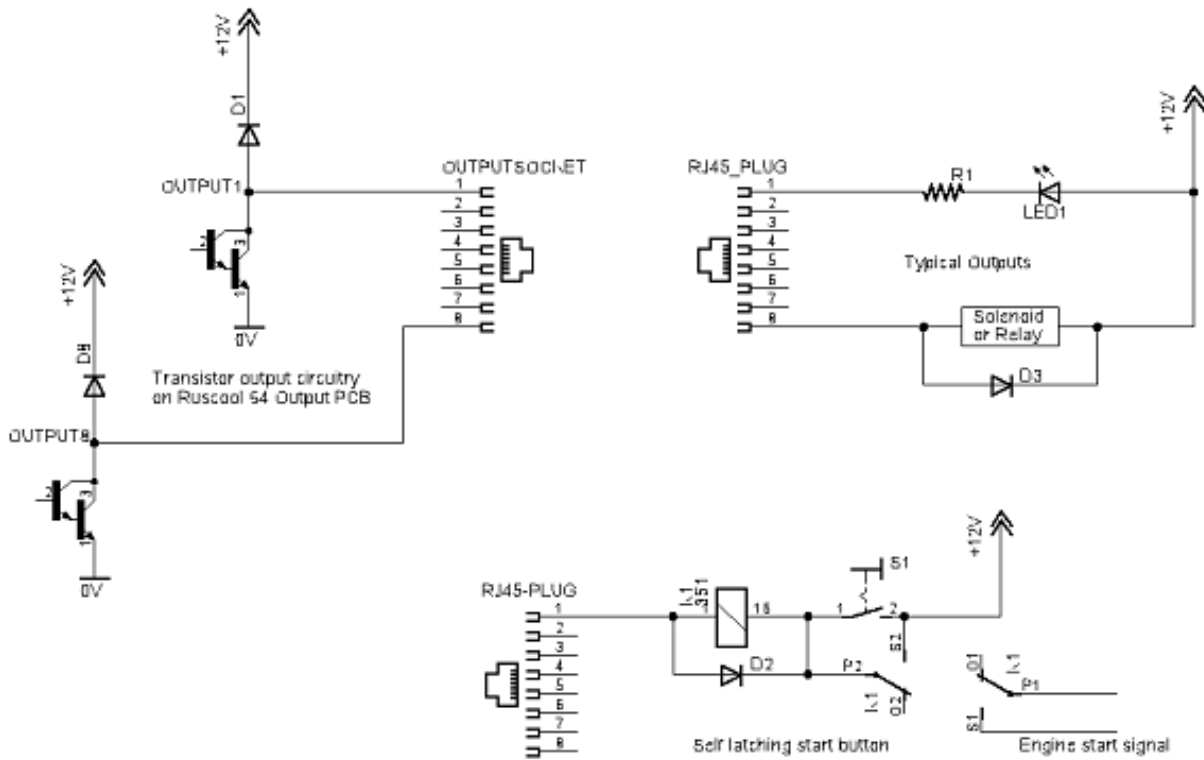Click here to see some examples of how the outputs can be used.

Changing the Configuration
In order to change any of the configured items, it is necessary to close the **Ruscool 64 Outputs** program before running the **Ruscool 64 Outputs Config** program to make and save any alterations. You can then restart the **Ruscool 64 Outputs** program.

Typical Connection

Ruscool 64 Output Board

NOTE :

The Ruscool 64 Output controller itself is powered by 5 Volts DC from the USB system, which is unable to supply enough current for Lamps and LEDs.

Lamps and LEDs etc must be powered from a separate DC Power Supply. This will typically be 12 Volts DC, but depending on the Lamps etc being used this may be anything up to 48 Volts DC.

Many cockpit builders use a spare PC Power Supply in their cockpits, and these are an ideal source of 12 Volts DC and 5 Volts DC.

+ 12 Volts DC
+12V

RJ45 _ PLUG

1
2
3
4
5
6
7
8

GREEN/WHITE   R9   LED9
GREEN   R10   LED10
ORANGE/WHITE   R11   LED11
BLUE   R12   LED12
BLUE/WHITE   R13   LED13
ORANGE   R14   LED14
BROWN/WHITE   R15   LED15
BROWN   R16   LED16

Typical colour sequence in CAT5 cable

Select resistor value
to suit LED
(Typically 470 ohms to 1k)

+12V

D1

OUTPUT1

+12V

D8

OUTPUT8

0V

0V

OUTPUTSOCKET

1
2
3
4
5
6
7
8

Transistor output circuitry
on Ruscool 54 Output PCB

RJ45_PLUG

1
2
3
4
5
6
7
8

R1   LED1

Typical Outputs

Solenoid
or Relay   D3

+12V

RJ45-PLUG

1
2
3
4
5
6
7
8

D2

Self latching start button

S1

+12V

P2

Engine start signal
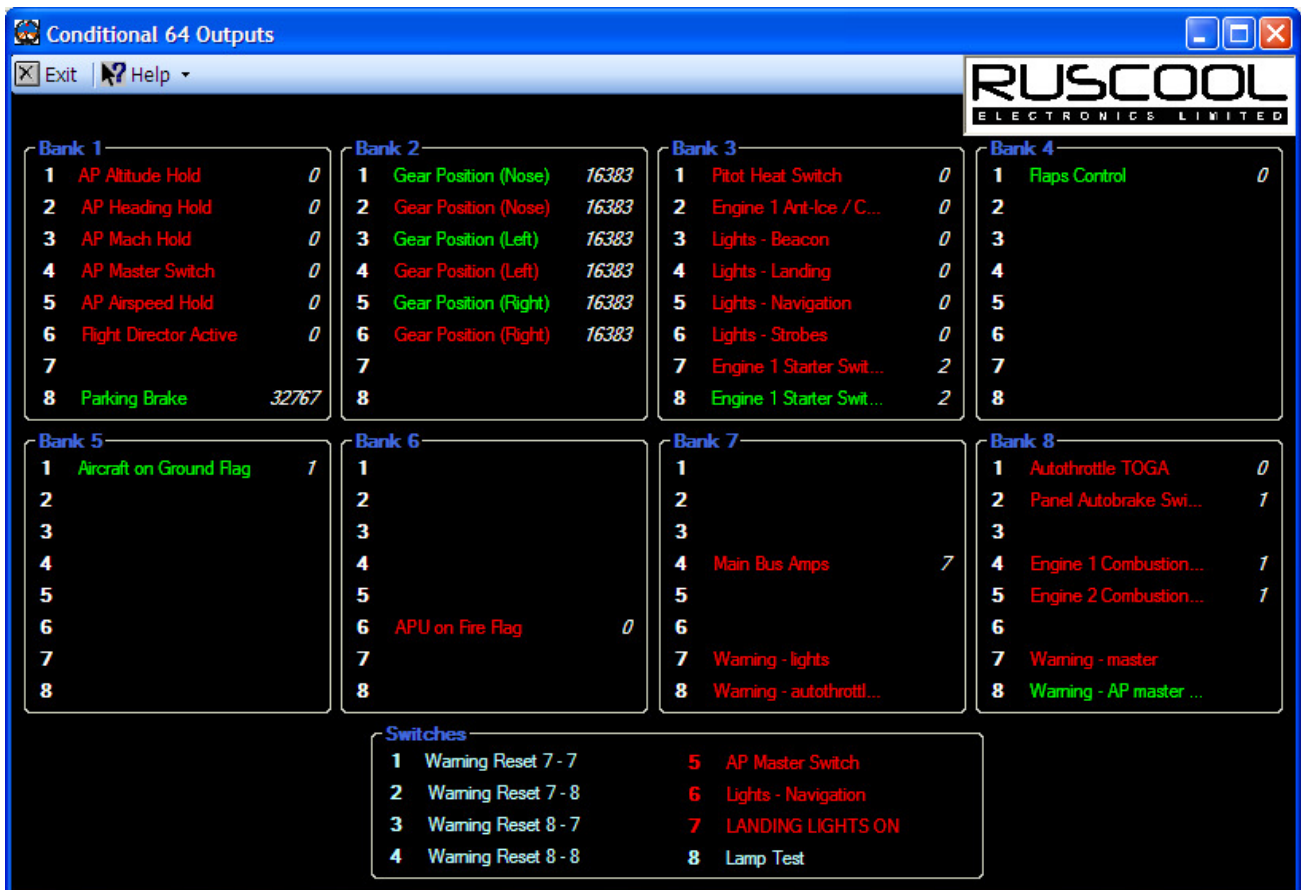
P1

S1

Examples

Some of the items configured below show how versatile the system is, and probably would not be used in an actual simulator cockpit situation (ie. Bank 6 APU on fire flag, and Bank 8 Autothrottle TOGA). To demonstrate some of the configurations we have used, refer to the screenshot below.

Bank 1
Outputs 1 to 5 relate to the Autopilot switch settings, and can drive the indicator lamps or LEDs in the appropriate pushbuttons.

Output 8 can be used to drive the lamp or LED showing the status of the Parking Brake. Note that even though the parking brake is usually just a switch and you might expect it to produce the value of 1 for ON and 0 for OFF, FSUIPC actually produces a value of 32767 for ON and a value of 0 for OFF.

Bank 2
Outputs 1 and 2 are assigned to the same Offset: Gear Position (Nose), and by setting Output 1 as an ON/OFF function driving a Green LED and Output 2 as a RANGE function driving a Red LED, it is possible to have a fully operational system as used by the Boeing 737, etc.

The same applies to the other two sets of gear.
Outputs 3 and 4 are assigned to the same Offset: Gear Position (Left)
Outputs 5 and 6 are assigned to the same Offset: Gear Position (Right)

Bank 3
Outputs 1 to 6 are used to show the status of some of the cockpit switches. If you use pushbuttons as the actual switches in your cockpit, these outputs can drive an LED in the pushbutton to show when the switch selection is active.

Outputs 7 and 8 show the position of the start switch on a Boeing 737 where a value of 1 shows that it is in the "start" position. This can drive an LED annunciator to show "Start Valve Open".

Bank 4
Outputs 4 and 5 show the status of the Fuel Pumps for engines 1 and 2.
(Note that if the description of the function in FSUIPC is too long to fit in this box, the text will be truncated. The full description in these instances is "Eng1 Recip. Fuel Pump Switch", and "Eng2 Recip. Fuel Pump Switch".)

Bank 5
Output 3 shows whether the aircraft is in the air or on the ground. This could be used to trigger the automatic deployment of the speed brake lever for instance.

Outputs 7 and 8 show the status of the Generators on Engines 1 and 2. Note that the text is too long to fit in this box, but a quick reference back to the 64 Output Config program will show you the full description if you have forgotten how you have configured it.

Bank 6
Output 1 shows you when the aircraft has crashed!!!!!   You could use this to trigger a recording of a crash, or set off a flashing light etc.

Output 2 shows the status of the Outer Marker beacon, and could be used to turn on the appropriate indicator on your cockpit panel.

Output 6 shows when the APU is on fire, and you could use it to set off a siren or flashing lights etc.

Bank 7
Output 4 shows how you can use a value or a range of values from, say, an ammeter or voltmeter in the cockpit to activate warnings or trip alarms etc.
Outputs 7 and 8 show Warnings that use multiple conditions to trigger a warning.

Bank 8
Output 1 shows the status of the Autothrottle TOGA switch and could drive a lamp or LED in the button.

Output 5 shows the status of the AutoBrake rotary switch on the cockpit panel. For instance, you can set a value or range of values to turn on indicators or alarms.

Outputs 7 and 8 show Warnings that use multiple conditions to trigger a warning.

In the configuration program, you can choose to reverse the action of any outputs so that, for example, the output is ON when the engine is stopped, and goes OFF when the engine starts. This is so that these outputs can be used to de-energise the latching start relays if you wish to implement them. (So you don't need to hold the start button down with your finger until the engine starts – see the example of how to easily wire up such a system)