Show Me ...

...How To Wire Up LEDs to an Output Module

Summary

This tutorial will show you how to wire up LEDs to a SIM-board USB Output Module, and then show you how to test the LED in the SIM-board Universal Controller, and how to assign an action to the LED in the software to light up when the the parking brake is set to on in Flight Simulator 2004.

You will need...

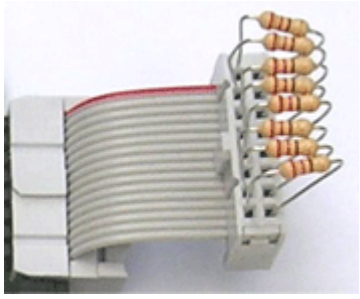
- a SIM-board USB Master Module
- a SIM-board USB Output Module (any type except 16-digit output module)
- 2 USB cables
- some LEDs
- a 9V DC power supply with standard 2.1mm jack (center-positive)
- wire
- crimping tool, some crimps and crimp houses
- wire strippers
- soldering iron
- latest version of the SIM-board Universal Control software
- a registered version of FSUIPC

This "Show Me How..." tutorial is provided in addition to the SIM-board USB Help Documentation. It is recommended you refer to both this tutorial and the Help Documentation for your modules.

Step 1: Set Up Your Resistors

Take one of the ribbon cable assemblies supplied with your SIM-board USB Output Module and insert 8 of the supplied resistors into one end of the cable assembly, as shown *(right)*.

Ensure each resistor is securely in place and that the legs of each resistor are clear of each other.



Step 2: Connect resistor assembly to Output Module

Connect the other end of the ribbon cable assembly to the bank of pins marked "C Supp", located just above the USB connector socket at the top of the right edge of the SIM-board USB Output Module.

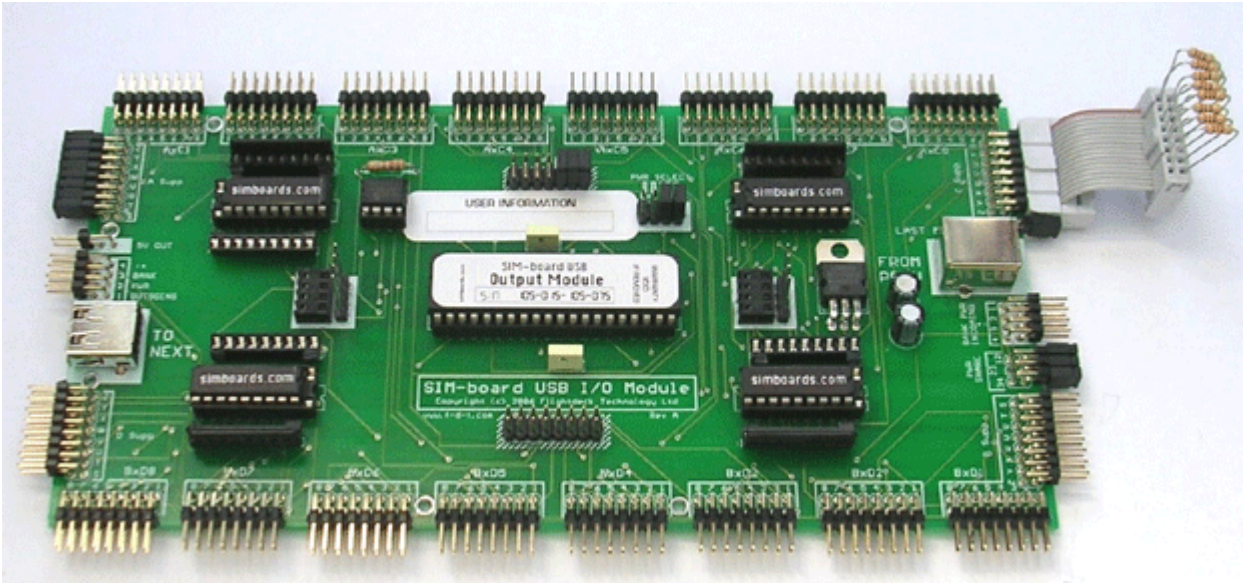
Step 3: Connect the jumpers

Connect 8 of the supplied jumpers to the 8 pin pairs that make up the "A Supp" bank, located at the top of the left edge of the SIM-board USB Output Module.

Step 4: Check your connections are correct

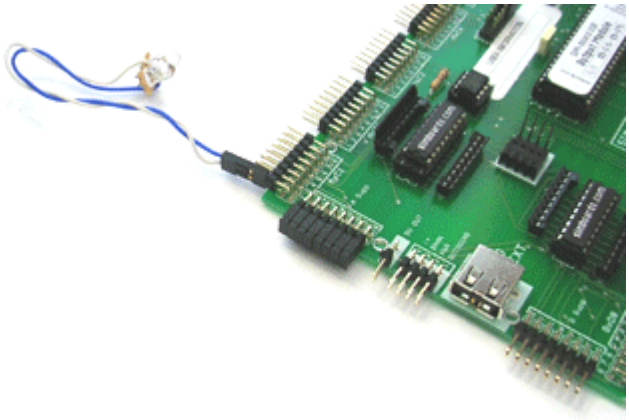
Take this moment to verify that the resistors and jumpers are connected correctly. A picture showing the resistor and jumper connections that you have just made is shown below.

The 8 resistors and 8 jumpers provide the configuration to allow 64 of the LED nodes to be used. *(If your Output Module is capable of driving more than 64 nodes, you can use the second supplied ribbon cable assembly and the remaining resistors to connect to the "D Supp" bank, and 8 of the remaining jumpers to connect to the "B Supp" bank. This combination will allow nodes 65 to 128 to operate as well.)*



Step 5: Connect LEDs

Connect the positive terminal of your LED to the top pin of the pin pair marked "1" of the bank marked "AxC1". Connect the negative terminal to the pin below this.

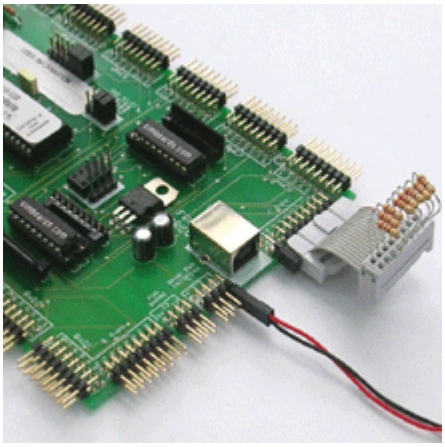


Repeat this step for as many LEDs as you wish, working left to right in sequence along the pins of the top side of the Output Module. This top side of the module will take 64 connections. As described in step 4 above, you can continue your connections along the bottom side of the Output Module, starting at pin 1 of bank "BxD1" as node 65, working along to pin 8 of bank "BxD8" for the 128th (and final) LED connection.

The picture (right) shows an assembly made of a small piece of stripboard cut to size, with 2 ultra-bright white LEDs soldered into place in parallel. The blue wire is the positive connection and the white wire is the negative connection. You can connect LEDs in a similar fashion if desired (often used for cockpit annunciator lights) or you can connect LEDs individually as you require. The picture also shows the blue and white wires have been crimp-terminated and inserted into a 2-way crimp housing, to make a convenient individual connection.

Step 6: Connect the power source wires to the Output Module

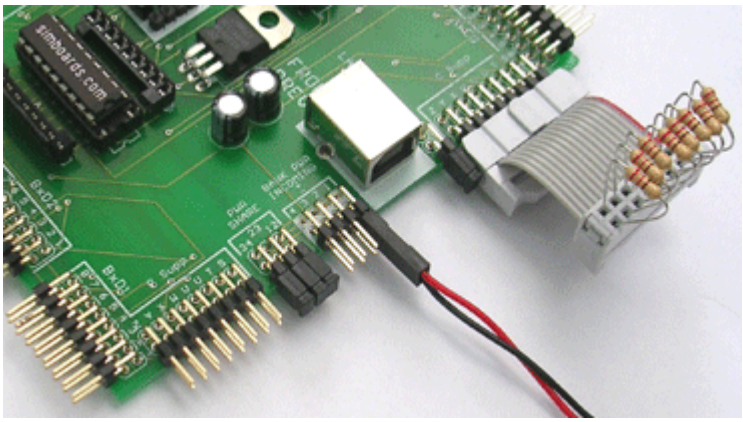
The LEDs require power to operate, and you must supply a DC power source to the Output Module to enable the LEDs to light up. To do this, connect a pair of wires to the pin pair marked "BANK PWR INCOMING" pin pair "1", located just below the USB socket on the right edge of the SIM-board USB Output Module. The wire connected to the top pin represents the positive terminal of the supply, and the wire connected to the bottom pin represents the negative terminal.



The picture shows a pair of wires, red for positive and black for negative.

Step 7: Connect the power sharing jumpers

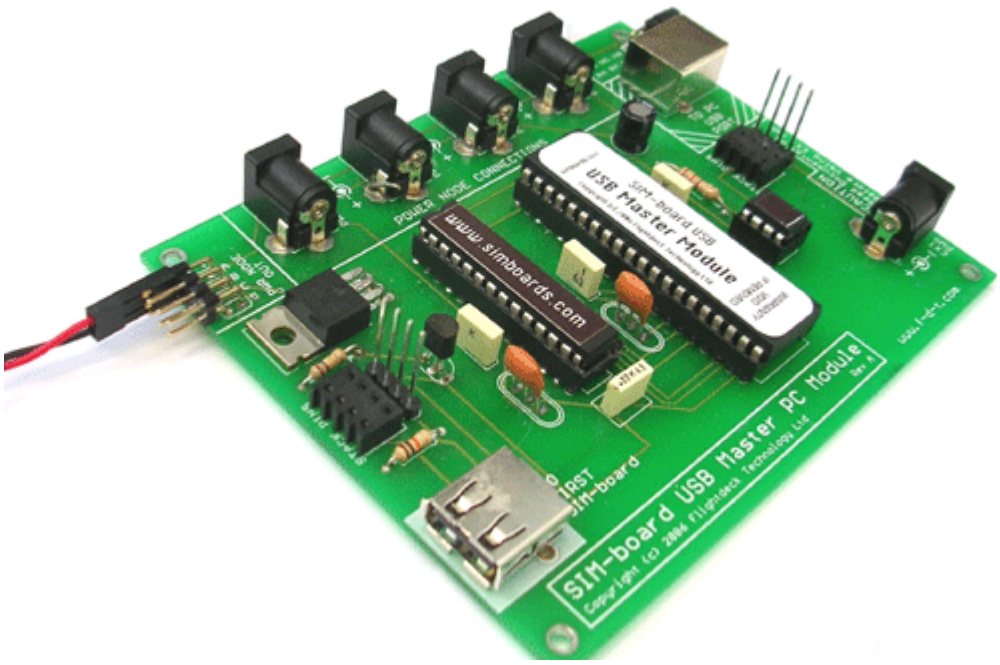
Next, fit 3 of the supplied jumpers over the 3 pin pairs of the "PWR SHARE" bank, located immediately below the "BANK PWR INCOMING" bank. This serves the function of sharing the single power source across all 4 operating banks, allowing all 128 nodes (maximum) to be powered from the same source.



Step 8: Connect the power source wires to the Master Module

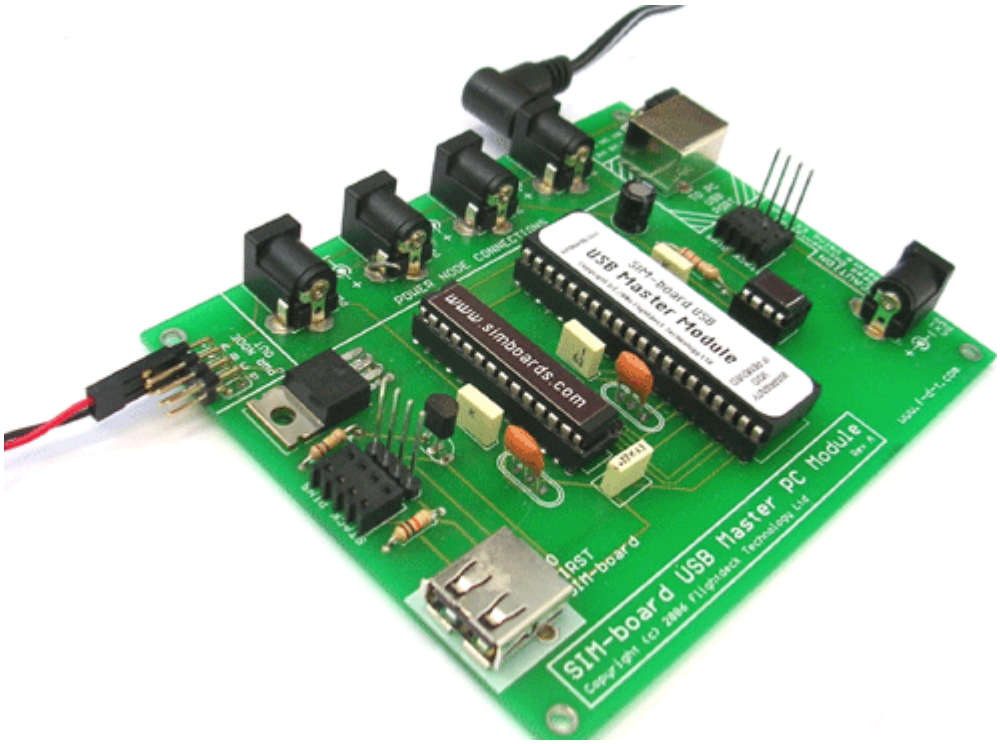
Connect the other end of the power wires that you connected to the Output Module in step 6 to the pins marked "PWR NODE OUT A" on the SIM-board USB Master Module.

Ensure the positive wire (represented by the red wire in the picture) is connected to the top pin of the pin pair, and the negative (black) is connected to the bottom pin of the pair.



Step 9: Connect the power source directly to the Master Module

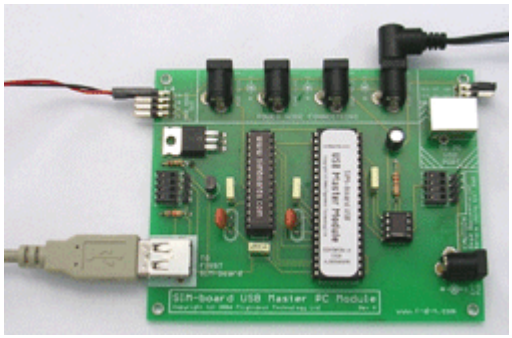
Connect a 9V DC power supply fitted with a standard 2.1mm DC jack to the socket marked "PWR NODE A" in the "POWER NODE CONNECTIONS" area at the top of the *SIM-board USB Master Module*. Ensure the DC supply jack has a "center-positive" arrangement (this means the inner hole of the jack is the positive, and the outer barrel is the negative).



Step 10: Connect the Master Module and Output Module together

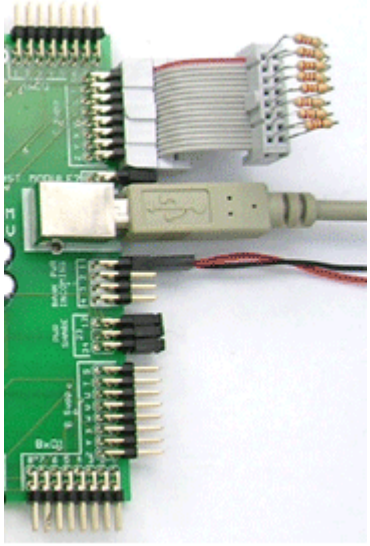
Now that we have made our LED connections and connected our power source to drive them, we can connect our SIM-boards together.

Using a USB cable (A-male to B-male), connect the A-male end of the cable (flat end) to the USB socket marked "TO FIRST SIM-BOARD" on the SIM-board USB Master Module.



Step 11: Connect the Master Module and Output Module together (part 2)

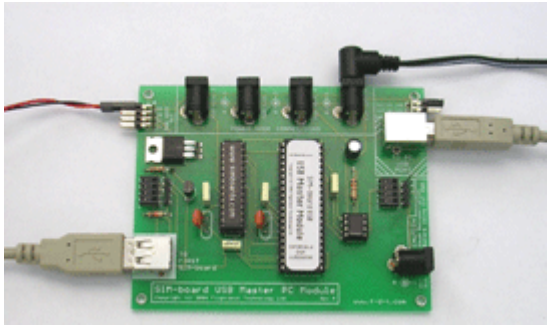
Connect the other end (the B-male or box end) to the USB socket marked "FROM PREV" on the SIM-board USB Output Module.



Step 12: Connect the Master Module to your PC

Using a second USB cable, connect the B-male (box) end of the cable to the USB socket marked "TO PC USB PORT" on the SIM-board USB Master Module.

Finally, connect the other end of the cable to a free USB socket on your PC.



Step 13: Install the SIM-board USB drivers

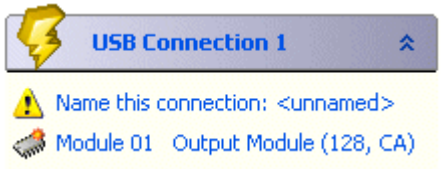
(If you have already installed the Windows driver file for SIM-boards USB, skip this step and go straight to Step 14).

If this is the first time that your SIM-boards have been connected to this USB port on your computer, Windows will attempt to identify the hardware item. A few seconds after you connect the Master Module to your PC, Windows will pop up a "Found New Hardware" dialog box.

You should follow the instructions detailed in the "How To Install the SIM-board USB Windows Driver file" tutorial, which you can access here (it will pop up in a new browser window).

Step 14: Load the SIM-board Universal Controller software

Now load the SIM-board Universal Controller application in the normal way.



A few seconds after loading, a new "USB Connection" will be listed in the left hand side of the window, and the Output Module will be listed as "Module 01".

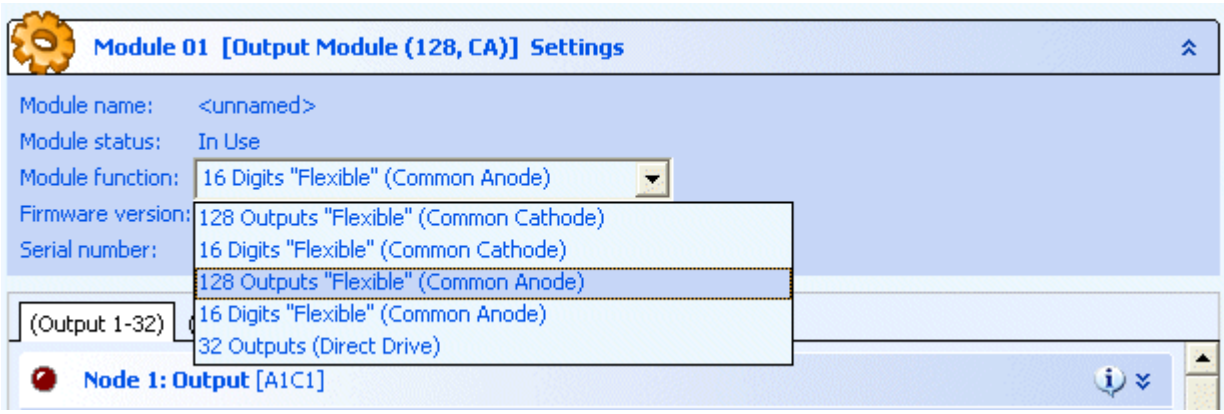
Click on the "Module 01" Output Module entry in the list to display this module's nodes for configuration.

Step 15: Set module function

The first action to take is to verify that the Output Module has the correct configuration set for use. Given that steps 1 to 3 of this tutorial have set up the Output Module for Common Anode arrangement, we must also ensure that the software tells the Output Module that we want it to operate in Common Anode mode.

To do this, click on the current Module Function that is assigned to reveal a drop-down list of options. The list of options shown will depend on the module you have purchased (the picture shows the options for a top-of-the-range SIM-board USB Output Module MAXI version). Select a function from the list that refers to common anode mode.

Note: the default setting for all Output Modules is common anode, so unless you have previously changed this setting, you should not need to alter this setting.



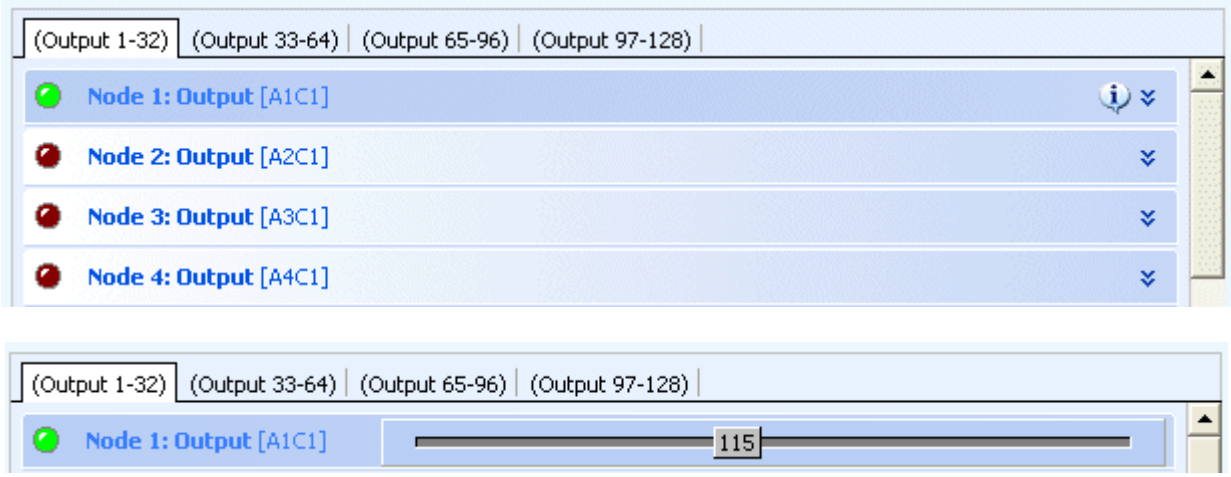
Step 16: Test the LEDs

To test the LEDs, click on the circular disc shape next to the "Node 01" text of node 1.

By clicking on this disc, the LED will toggle on and off and the disc will change colour to represent the current state of the LED (green for on, red for off).

Additionally, right-clicking on the disc will bring up the brightness slider control, allowing you to test the brightness fading of the node. Slide the slider from fully bright (255) to fully dim (0) and back again.

If this test performs correctly, you have successfully wired up your LEDs to the associated nodes.

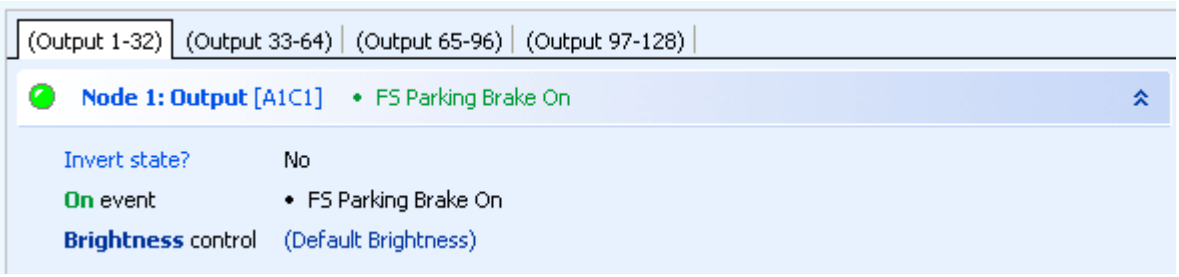


Step 17: Assign a Flight Simulator function to a test node

Having verified that the LEDs are operating correctly in test mode, you can now assign a function to a node to have it automatically turn on and off depending on a given aircraft condition within flight simulator.

For this example, we will use the parking brake indication.

Click on Node 01 to expand the node and reveal its configuration settings. Then click on "On value" and from the list that pops up, select "FS Parking Brake On" from the "FS : Gear" subsection. This action will command the LED to light up when the parking brake is on within flight simulator, and will command the LED off when the parking brake is released. Click "Select" to assign this action to this node.

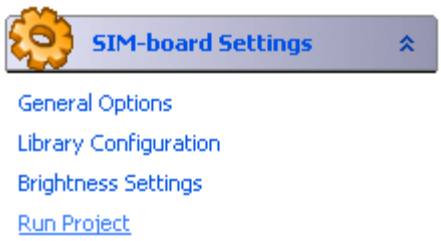


Step 18: Load Flight Simulator

Load Flight Simulator on your PC, or if you are using WideFS over a network, ensure you have Flight Simulator and the appropriate applications of WideFS running and connected properly.

Step 19: Run your test project

From the left hand side of the SIM-board Universal Controller window, select the "Run Project" option. Your simple project will begin to run, meaning that it is now active and commanding the LED as you have set it. If there is a problem with the project, or an error occurs, the details will be shown in the message area at the bottom of the window.



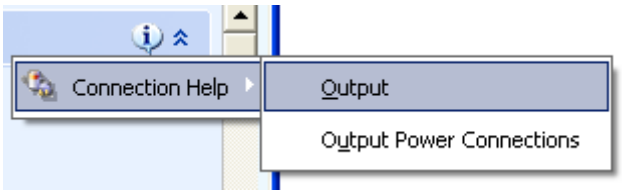
To test your project, minimize the SIM-board Universal Controller window and use your keyboard to toggle the parking brake on and off within flight simulator. The keyboard actions to do this are: period key (.) to release the parking brake (off) and Ctrl-period to set the parking brake (on). When you perform these actions, your LED will turn on and off as appropriate.

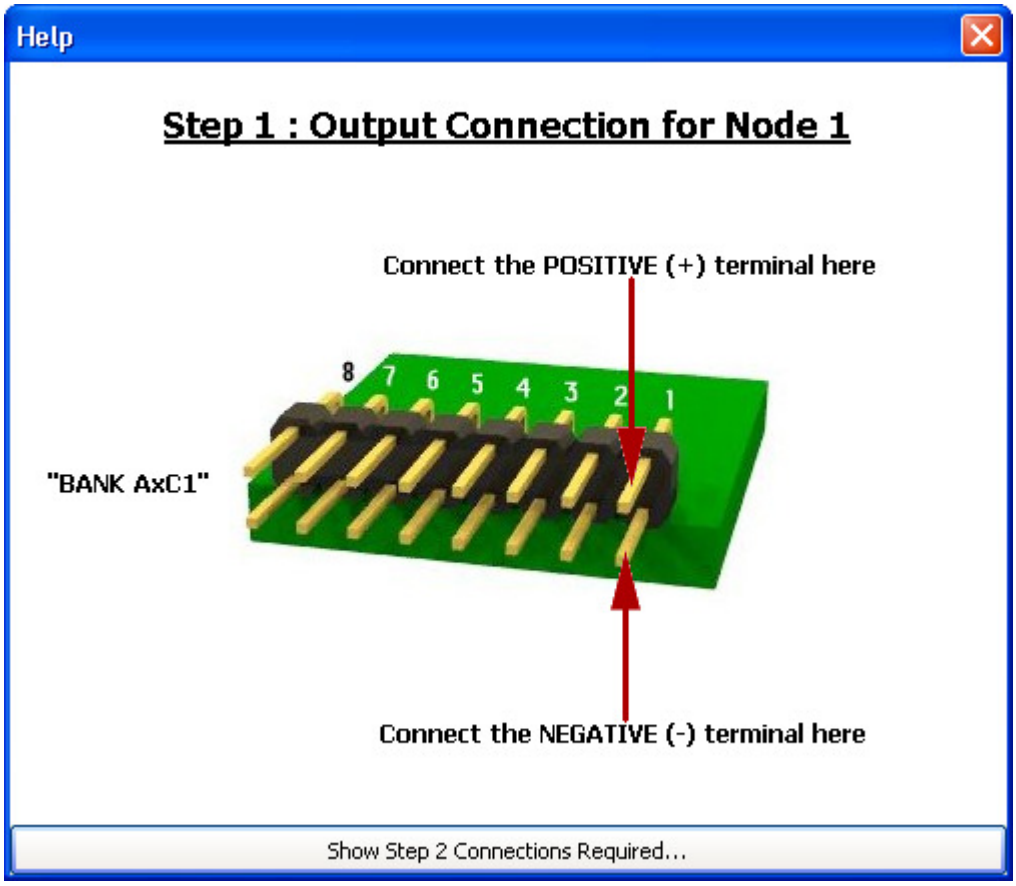
Congratulations! You have now made your first project using LEDs with a SIM-board USB Output Module.

To stop your project, click on "Stop Project".

Step 20: Use the Floating Help Icon

You will notice that as you move your mouse over the nodes, a "floating help" icon appears which when clicked, offers you in-program help with connecting your devices. Help is provided for each node type for each module available in the SIM-board USB series, and will offer you further Step-by-Step instructions on how to wire the given node that you have clicked on.





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