Show Me ...

...How To Wire Up 7-Segment Displays

Summary

This tutorial will show you how to wire up 7-segment displays to a SIM-board USB Output Module, and then show you how to test the displays in the SIM-board Universal Controller, and how to assign an action to the displays in the software to show the autopilot altitude value in Flight Simulator 2004.

You will need...

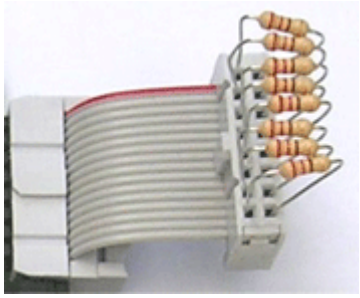
- a SIM-board USB Master Module
- a SIM-board USB Output Module (16-digit output module or MAXI output module in 16-digit mode)
- 2 USB cables
- some 7-segment displays (this tutorials assumes use of the white displays available at our shop in common-cathode form)
- a 12V DC power supply with standard 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

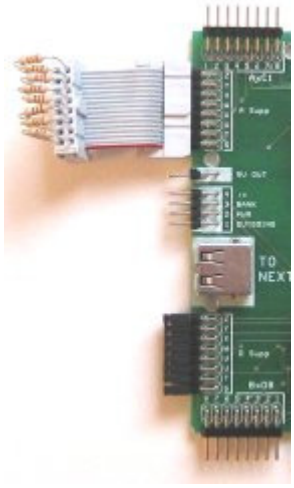
Take one of the ribbon cable assemblies supplied with your SIM-board USB Output Module and insert 8 of the supplied resistors into one end of the cable assembly, as shown *(right)*.

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 "A Supp", located above the USB connector socket at the top of the left 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 "C Supp" bank, located at the top of the right 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.

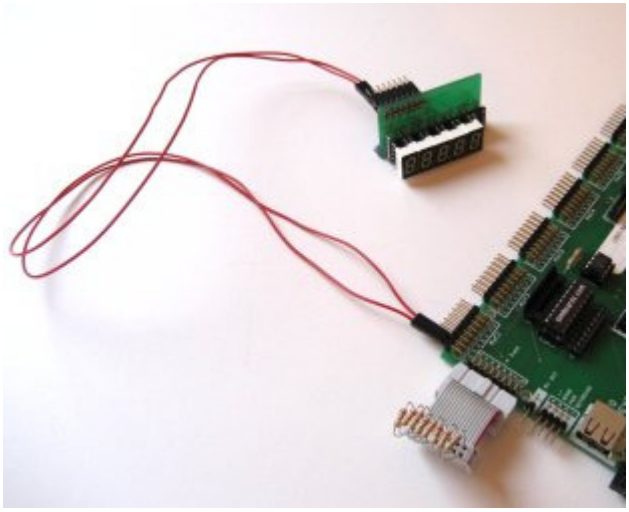
The 8 resistors and 8 jumpers provide the configuration to allow 8 digits to be used. *(To use digits 9 to 16, you can use the second supplied ribbon cable assembly and the remaining resistors to connect to the "B Supp" bank, and 8 of the remaining jumpers to connect to the "D Supp" bank.)*

Step 5: Connect the A to DP segment connections

Connect the A to G and DP segment pins to the pins marked "1" to "8" respectively of the bank marked "AxC1".

In the example shown, our 7-segment display holder is being used to mount the 7-segment displays, and the bottom row of the header pins on the rear of this holder unit are the pinouts for the A segment (left-most bottom row of header) to DP (right-most).

The image shows the A and B segments have been connected so far. Repeat this step for the remaining 6 segment pin connections.

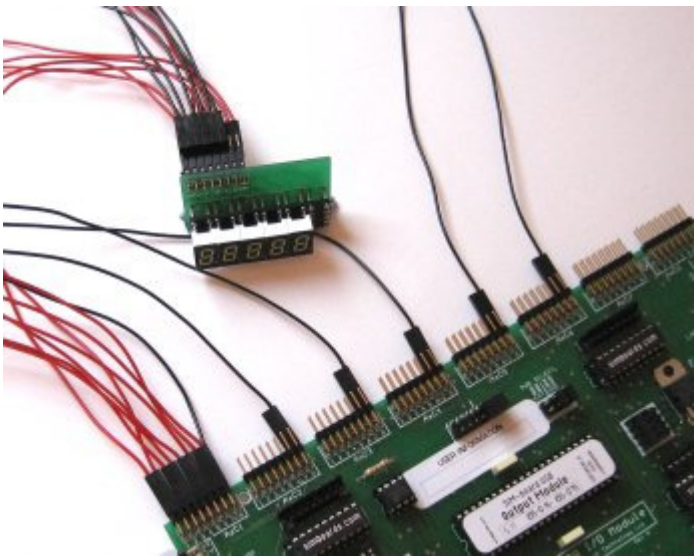


Step 6: Connect the individual display connections

Now connect the common-cathode pin of each digit to any bottom row pin of the banks "AxC1" through to "AxC8", one wire per bank.

The image shows 6 black wires connecting to the first 6 banks on the bottom row pins. Each black wire is the common-cathode (common negative) connection for each of the 6 possible digits, taken from the top row of the pinout header on the rear of the 7-segment holder unit.

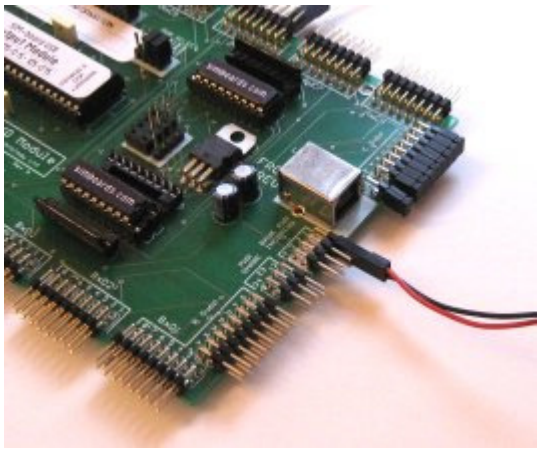
In the example shown, there are 6 digit connections to the Output Module, but only 5 physical digits in the holder. Thus, another digit can be fitted at a later date if required.



Step 7: Connect the power source wires to the Output Module

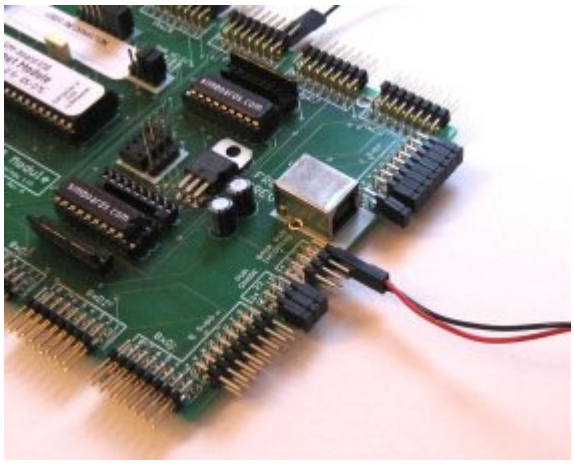
The 7-segment displays require power to operate, and you must supply a DC power source to the Output Module to enable the digits to light up. To do this, connect a pair of wires to the pin pair marked "BANK PWR INCOMING" pin pair "1", located just below the USB socket on the right edge of the SIM-board 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 8: Connect the power sharing jumpers

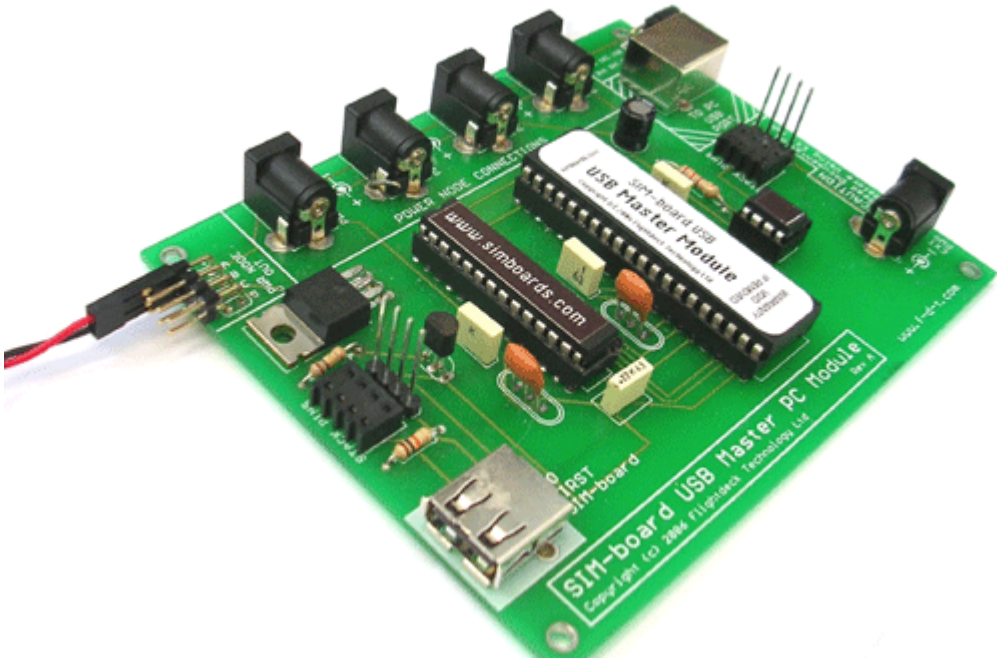
Next, fit 3 of the supplied jumpers over the 3 pin pairs of the "PWR SHARE" bank, located immediately below the "BANK PWR INCOMING" bank. This serves the function of sharing the single power source across all 4 operating banks, allowing all 16 digits (maximum) to be powered from the same source.



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

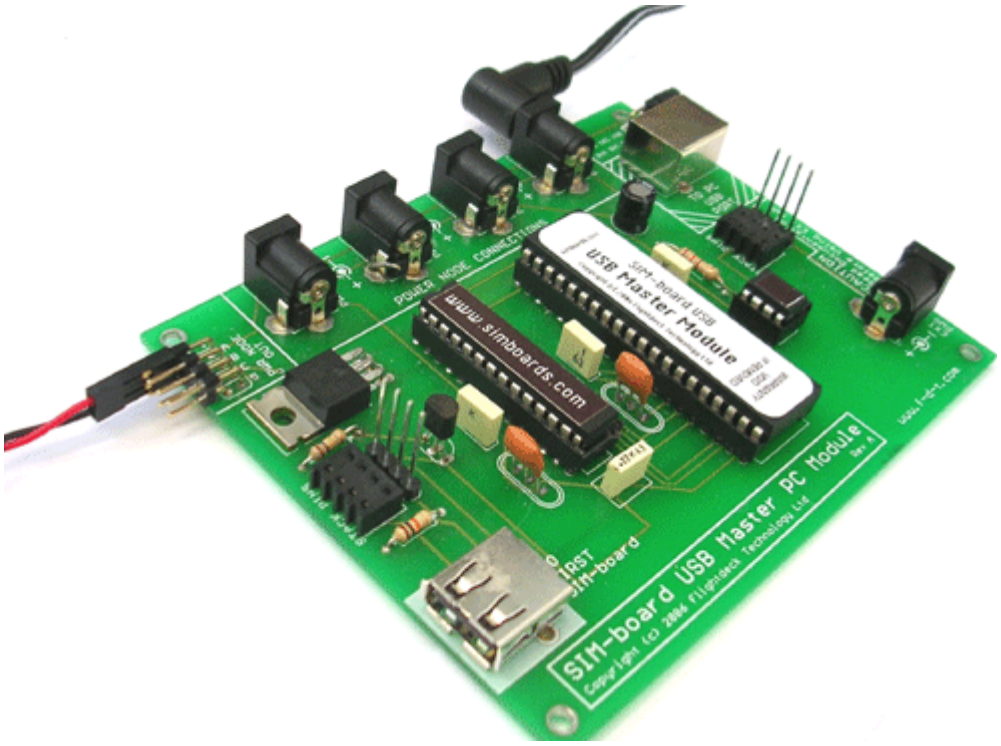
Connect the other end of the power wires that you connected to the Output Module in step 7 to the pins marked "PWR NODE OUT A" on the SIM-board USB Master Module.

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 10: Connect the power source directly to the Master Module

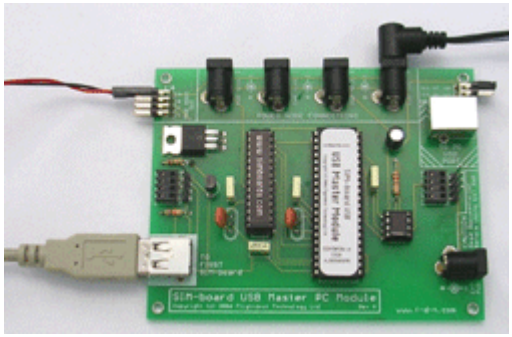
Connect a 12V DC power supply fitted with a standard 2.1mm DC jack to the socket marked "PWR NODE A" in the "POWER NODE CONNECTIONS" area at the top of the *SIM-board USB Master Module*. Ensure the DC supply jack has a "center-positive" arrangement (this means the inner hole of the jack is the positive, and the outer barrel is the negative).



Step 11: Connect the Master Module and Output Module together

Now that we have made our digit 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 12: 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 13: 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 14: Install the SIM-board USB drivers

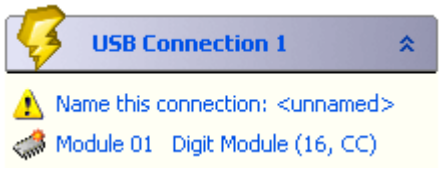
(If you have already installed the Windows driver file for SIM-boards USB, skip this step and go straight to Step 15).

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 15: Load the SIM-board Universal Controller software

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



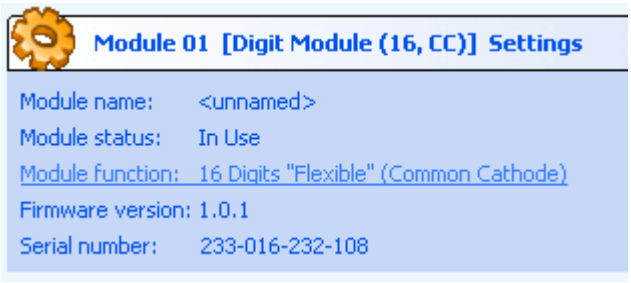
A few seconds after loading, a new "USB Connection" will be listed in the left hand side of the window, and the Output Module will be listed as "Module 01 Digit Module".

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

Step 16: 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 Cathode arrangement, we must also ensure that the software tells the Output Module that we want it to operate in Common Cathode mode, and in digit (not LED) output 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. Select the function from the list that refers to 16 digits, common cathode mode.

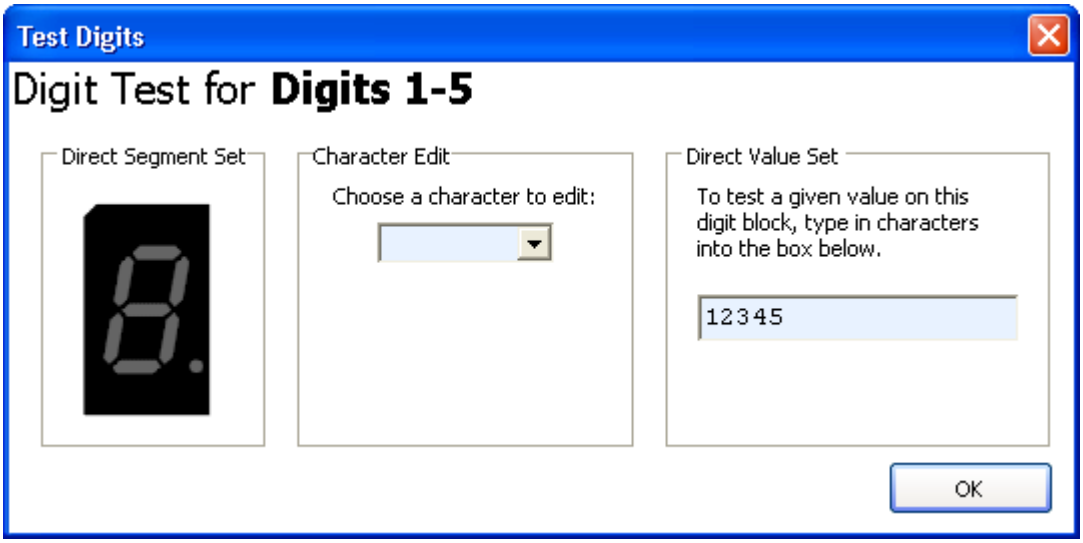


Step 17: Test the digits

To test the digits, first expand the "Node 1 : Digit" node and increase the "Number of digits" parameter to 5.

Now click on the green circular disc to the left of the text "Node 1 : Digit" to show the digit test window. Type in some test numbers (the example shows 12345) and the entered numbers should appear on your digits.

If this test performs correctly, you have successfully wired up your digits. You can use the image of the segment display to click on individual segments to light them up, in case you need to debug your wiring to ensure you have the correct segments on the correct pins.



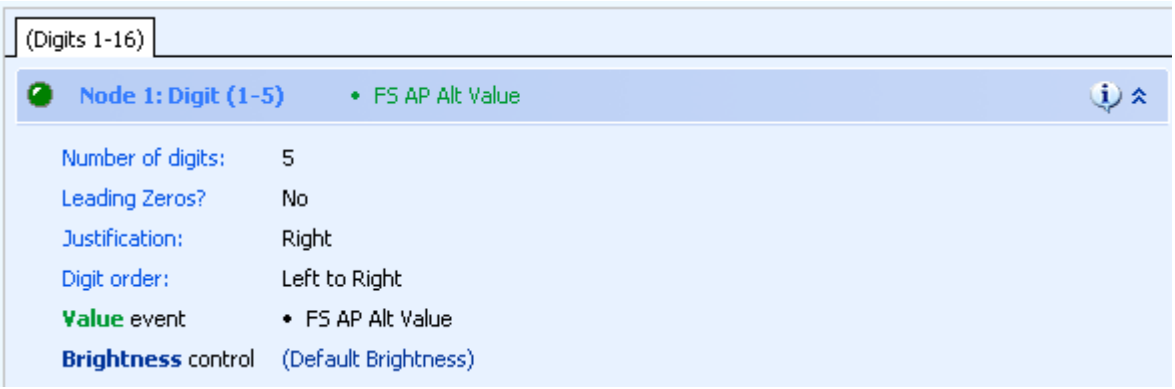
Step 18: Assign a Flight Simulator function to a test node

Having verified that the digits are operating correctly in test mode, you can now assign a function to automatically show a value depending on a given aircraft condition within flight simulator.

For this example, we will use the default FS autopilot altitude window value.

Click on Node 01 to expand the node and reveal its configuration settings. Then click on "Value event" and from the list that pops up, select "FS AP Alt Value" from the "FS : Autopilot" subsection. Click "Select" to assign this action to this node.

Now click the "Leading Zeros?" parameter and change it to read "No". This will prevent leading zeros from appearing for altitude values of less than 5 digits (ie. 500 will be shown instead of 00500 when 500 feet is set in the window).



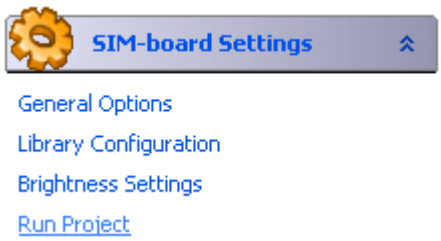
Step 19: Load Flight Simulator

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 20: 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 block of 5 digits you defined earlier. 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.



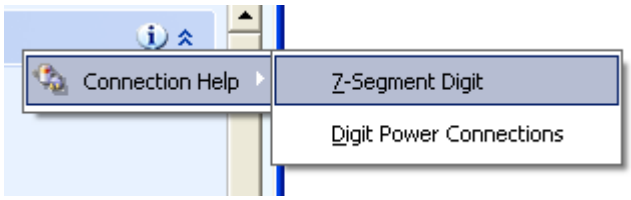
To test your project, minimize the SIM-board Universal Controller window and use your mouse to increase and decrease the autopilot window value. When you perform these actions, your digit block will reflect the new values.

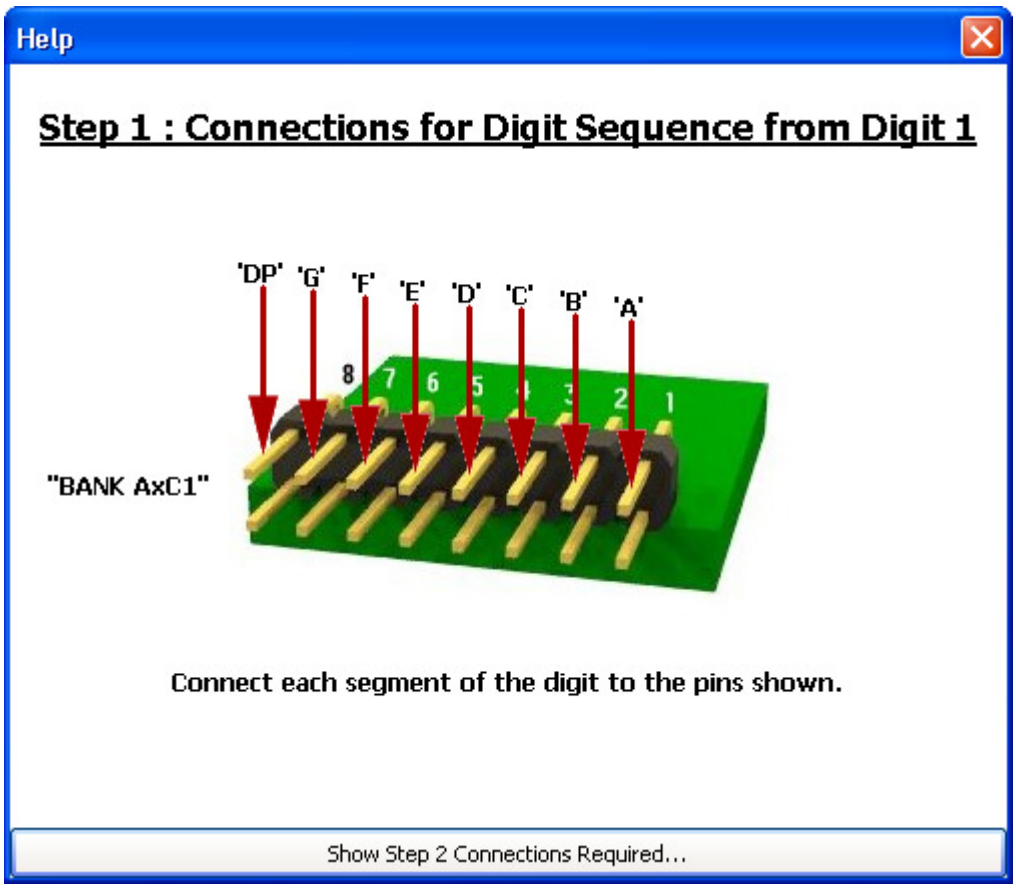
Congratulations! You have now made your first project using 7-segment displays with a SIM-board USB Output Module.

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

Step 21: 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.





previous
(How To Wire Up LEDs to an Output Module)

next
(How To Common Switch Connections)

❶ Try the Support Section ❷ View the FAQs ❸ E-mail us here!