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Show Me ...

...How To Create & Test a Daisy-Chain of Modules

Summary

This tutorial will show you how to form your chain of SIM-board USB function modules, how to arrange the "LAST MODULE?" jumpers, and how to decide which method is best to power the modules. It will show you how to create your chain using USB cables as the link between each module. Other linkage options are available to use if you prefer - please refer to the "Show Me How" index of tutorials for a guide to these other methods of linkage.

You will need...

- a [SIM-board USB Master Module](#)
- one or more [SIM-board USB Function Modules](#)
- [USB cables](#)
- latest version of the [SIM-board Universal Control software](#)
- (optional) a 9V or 12V DC power supply with standard 2.1mm jack (center-positive)

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.



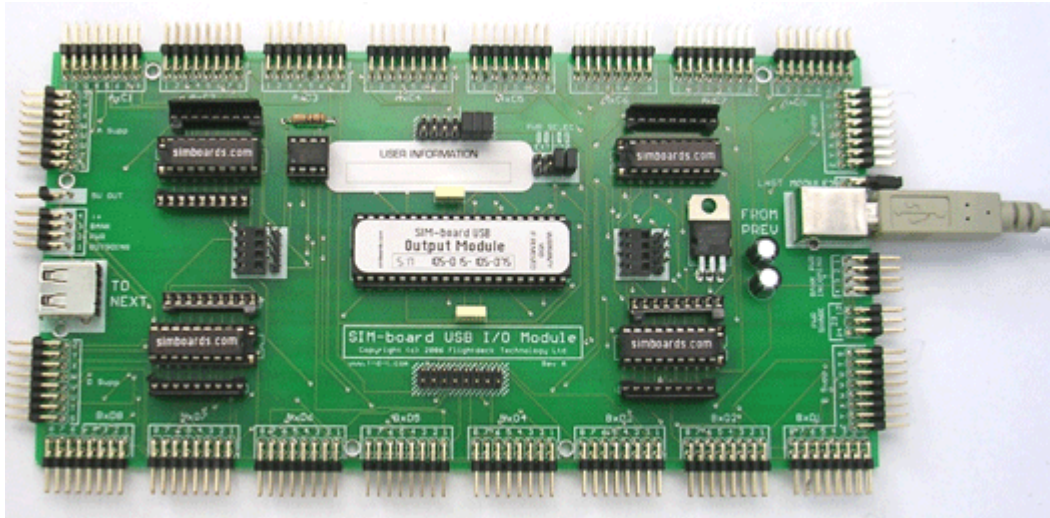
Step 1: Connect your Master Module and first Function Module

Connect the flat end (A-male end) of a USB cable to the USB socket marked "TO FIRST SIM-board" on your SIM-board USB Master Module.



Step 2: Connect your Master Module and first Function Module (part 2)

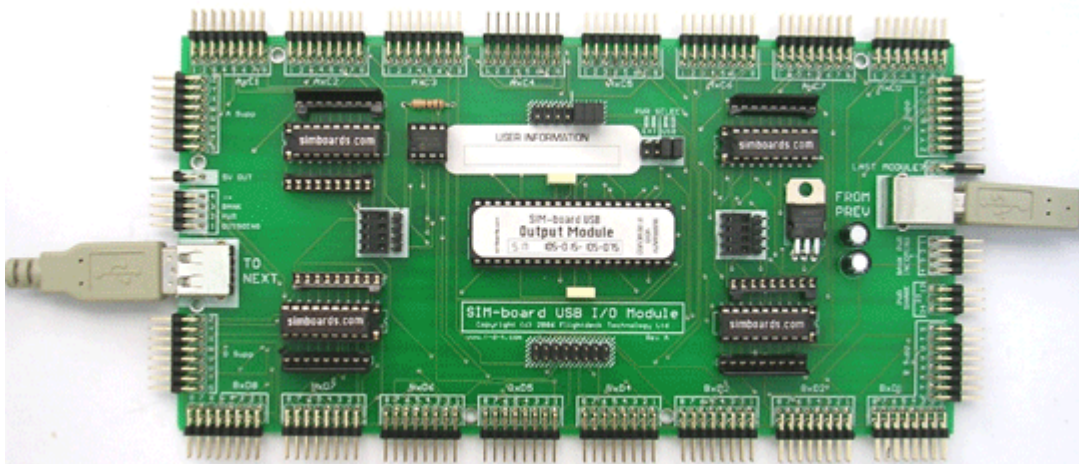
Connect the other end of the USB cable (the B-male box end) to the USB socket marked "FROM PREV" on one of your SIM-board USB Function Modules.



Step 3: Connect further function modules together

If you have more than one function module, connect another USB cable to the USB socket labelled "TO NEXT" on your first SIM-board function module, and connect the other end to the next SIM-board function module at the "FROM PREV" socket.

Repeat this step until you have as many function modules as you need in your chain.



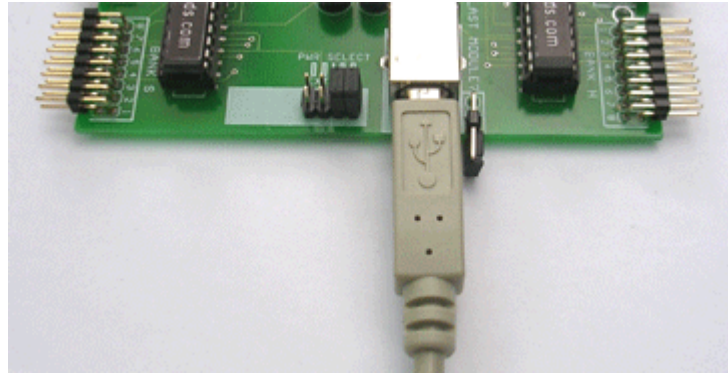
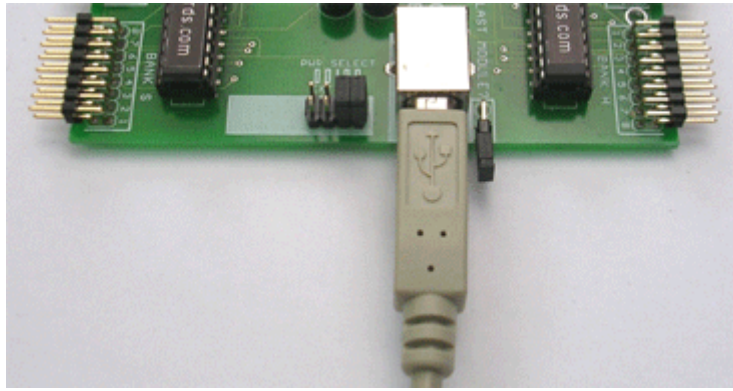
Step 4: Configure the "LAST MODULE?" jumpers

Each SIM-board USB Function Module has a pair of pins marked "LAST MODULE?", located just above the "FROM PREV" USB socket on the right-hand edge of each module.

This jumper is used to configure the modules in the chain in this manner:

- If the module is the last module in the chain, this jumper should be left on the pins, covering both pins securely.
- For all other modules, this jumper should be removed from the pins. You can either remove it entirely, or secure the jumper over just one of the pins as a convenient place to store it (be careful not to lose this jumper in case you need it at a later time!)

The pictures below show the "LAST MODULE?" pin configuration for the last module in the chain (top picture) and for the other modules in the chain (bottom picture).



Step 5: Choose how to power your SIM-boards

The SIM-board USB Module chain can be powered in one of two ways:

- **From the USB port of your computer.**

This method requires no external power supply - you just plug your Master Module into your USB port and the modules are powered. However, it is only suitable for use with a chain of modules that does not exceed a certain distance (nominally 10 metres maximum), and is only suitable for use on computers that have a truly "powered" USB port to which the Master Module will be connected.

- **From an external power supply.**

This method must be used if the total length of your chain exceeds a certain distance (nominally 10 metres), or if you have tried running your chain from the USB port but experience problems. This method ensures a stable voltage reaches each module in your chain, but does require some important configuration on each module before use.

The above choices are configured on each module by jumpers.

By default, your SIM-board Function Modules ship with a default setting of USB power. This means that you need not change any of the power jumper settings to get started, and that you can just plug your Master Module into your computer's USB port and your chain will work off power supplied by your USB port.

It is recommended that, for simplicity, you use the default setting of USB power to power your chain, unless you are connecting more than 5 modules together or the total length of the chain exceeds about 10 metres. In this case, you should skip this step and move on to Step 6 now.

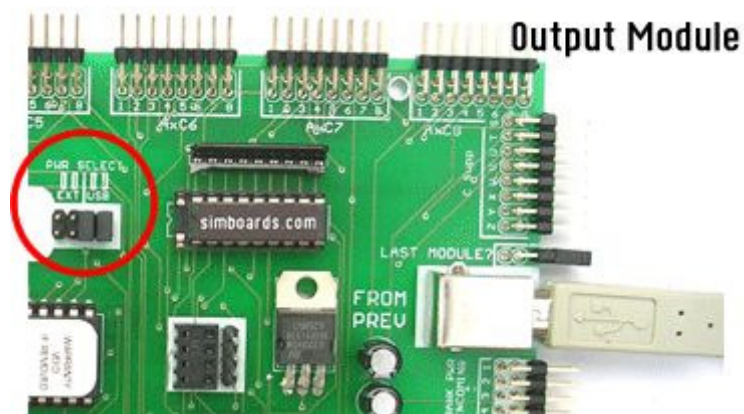
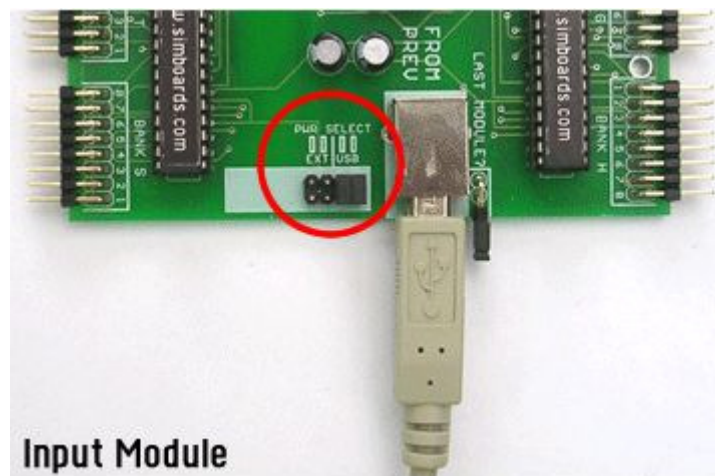
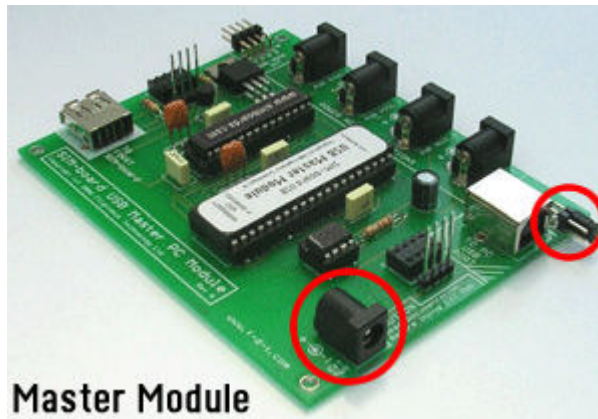
The remainder of this step gives instructions on how to set the power select jumpers to use USB power. If you want to use external power to power your chain, skip this step and move on to Step 6 now.

To use the default setting of USB power:

- on your SIM-board Master Module:
 - ensure that there is no DC power supply connected to the "EXT PWR" DC socket at the bottom right edge of the module;
 - ensure that there is a jumper connected across the pin pair marked "BUS SRC USB" located just above the "TO PC USB PORT";
 - ensure that the "BUS SRC EXT" pin pair has **no** jumper fitted;
- on your function modules:
 - ensure that each module has 2 jumpers fitted over the 2 pin pairs marked "PWR SELECT"

USB", and that the 2 pin pairs marked "PWR SELECT EXT" have **no** jumpers fitted. The "PWR SELECT" pins are located just below the "FROM PREV" port on Input Modules, and at the far right side of the function label fitted to your Output Modules.

Ensure you have checked each module in your chain, including the Master Module, for the correct jumper settings before proceeding. You can now move directly to Step 7.



Step 6: How to power your chain using External Power (optional)

Only perform this step if you have chosen not to use USB power to power your chain. Otherwise, skip this step and move to Step 7.

The remainder of this step gives instructions on how to set the power select jumpers to use an external power source to drive your chain. If you want to use USB power instead, move back to Step 5 now.

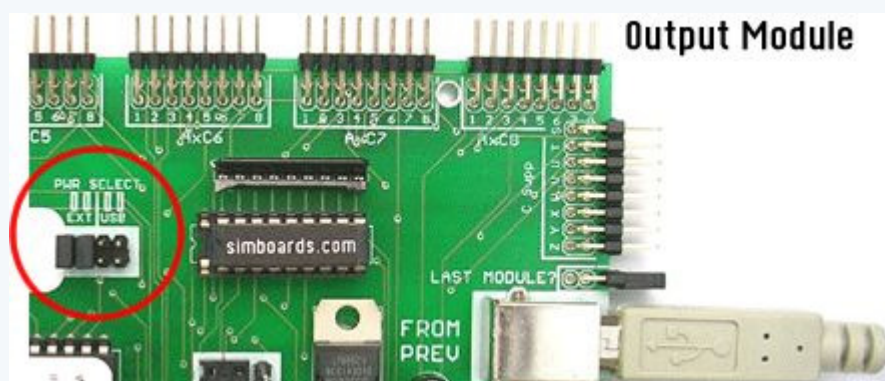
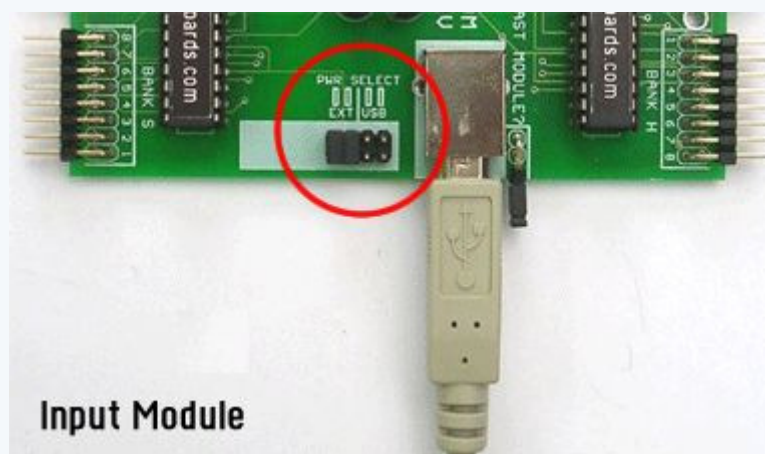
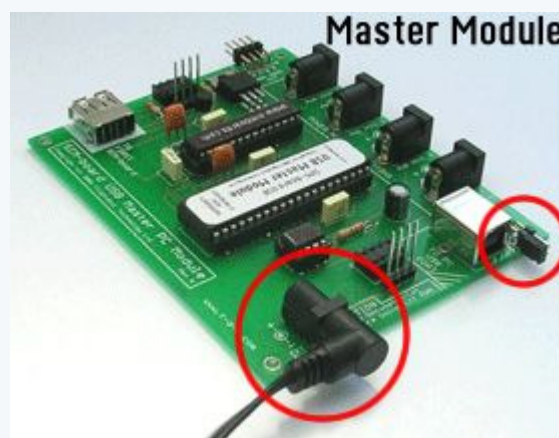
To use the EXTERNAL POWER setting to power your chain:

- on your function modules:

- ensure that each module has 2 jumpers fitted over the 2 pin pairs marked "PWR SELECT EXT", and that the 2 pin pairs marked "PWR SELECT USB" have **no** jumpers fitted. The "PWR SELECT" pins are located just below the "FROM PREV" port on Input Modules, and at the far right side of the function label fitted to your Output Modules.
- on your SIM-board Master Module:
 - ensure that there is a jumper connected across the pin pair marked "BUS SRC EXT" located just above the "TO PC USB PORT";
 - ensure that the "BUS SRC USB" pin pair has **no** jumper fitted;

Ensure you have checked each module in your chain, including the Master Module, for the correct jumper settings before proceeding.

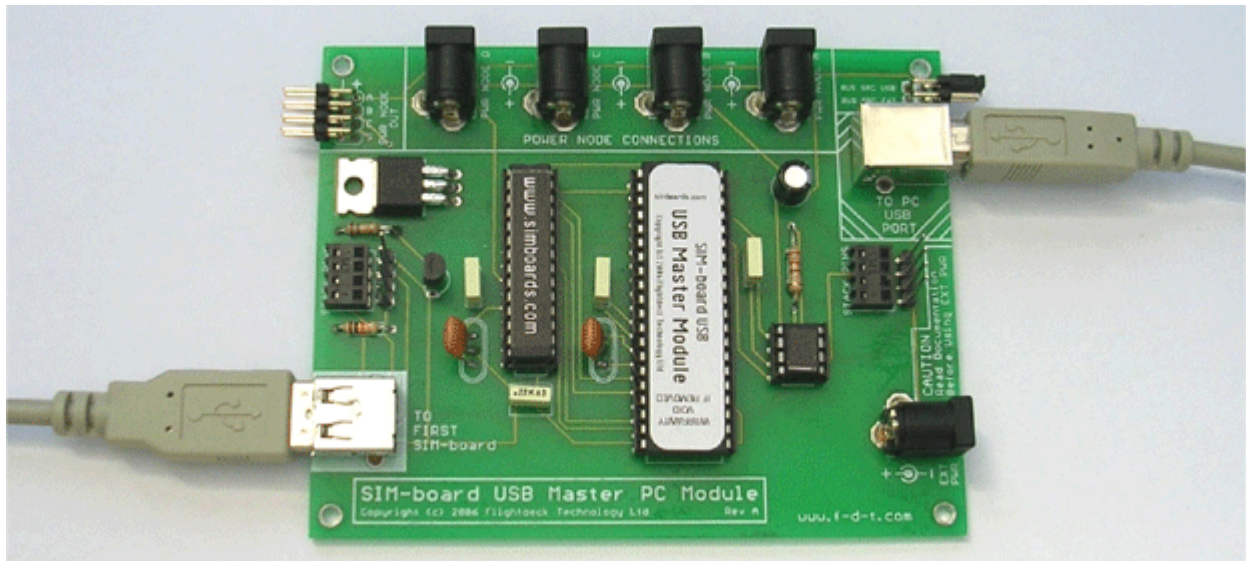
Once you have verified that all the modules have the correct jumper settings, you can now connect your DC power source. A good choice for a power supply is one that outputs 9V or 12V DC, and is capable of delivering around 1A of current - this will give you plenty of power to drive a good number of modules. **Ensure the supply is fitted with a standard 2.1mm DC jack, with a center-positive connection.** This means that the center part of the jack is the positive connection, and the outer barrel is the negative connection. If you are unsure, do **not** connect the power supply and seek further assistance. Check the back of the power supply for a diagram similar to the one printed on the Master Module near the "EXT PWR" DC socket to determine if it is a center-positive supply.



Step 7: Connecting your Master Module to your PC

You have now set up your modules in a chain, configured the "LAST MODULE?" jumper for each function module, and ensured the correct power select setting has been set on each module.

You are now in a position to connect your chain to your PC. To do this, connect the B-male (box) end of a USB cable to the port marked "TO PC USB PORT" on your Master Module, and connect the other end (the A-male flat end) to the PC USB port.



Step 8: 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 9).

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).

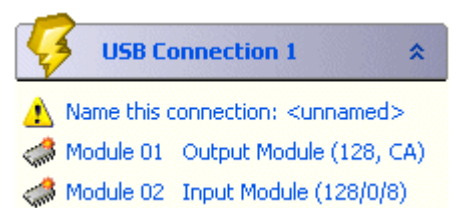


Step 9: Load the SIM-board Universal Controller software

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 a list of modules connected in your chain will appear. In the example shown on the right, we have 2 modules in our chain.

Note that the modules will not necessarily be shown in chain order when they appear in the software. This is because the modules do not care where they are in the chain and their operation is entirely independent of their position. If you have multiple modules of the same type, you will most likely wish to name each module according to where the module is placed physically in your simulator environment (for example: "overhead left"). To do this, click on each module in the list in



turn and compare the serial number shown in the Module Settings area to that printed on your physical SIM-board function modules. This will identify which module is which, rather than the position of each module in the chain. Use the "Name this module" function to give each module a name if you wish, to enable easier tracking in your project.

You can now click on any listed module to access the nodes of that module, and start to configure and test the nodes with your hardware items. For a tutorial on how to wire up your hardware items to the various modules, [return to the "Show Me How..." series index](#).

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