

How to use a phantom power adaptor with the Behringer FCB1010 UnO

kindly brought to you by patrick voes at <http://www.voes.be/fcb1010>

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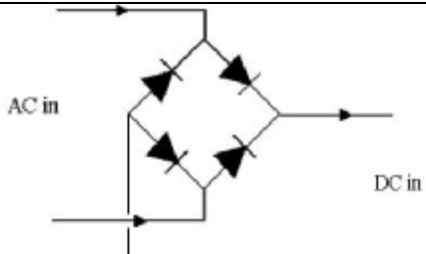

Originally created by Ed Dixon and extended by Marty D

The Behringer FCB1010 pedal is normally powered by an external cable that plugs into a standard 120/240 volt 3-prong wall receptacle. While this works fine, it does require a power cable that runs from the FCB1010 pedal to a wall jack. In many stage/live music setups, this is less than convenient as more cables at ones feet is never a good thing.

Internally the FCB1010 pedal actually runs on 7.5-10V AC current. If one can get a 7.5-10V supply to the right place internally, no external power cable is needed.

Normally the FCB1010 connects to other MIDI gear using the MIDI out connector on the pedal. Standard MIDI cables have 5 wires, but only 3 are actually used for any midi data. This means that the other two can be used to supply the 7.5-10V needed for the unit.

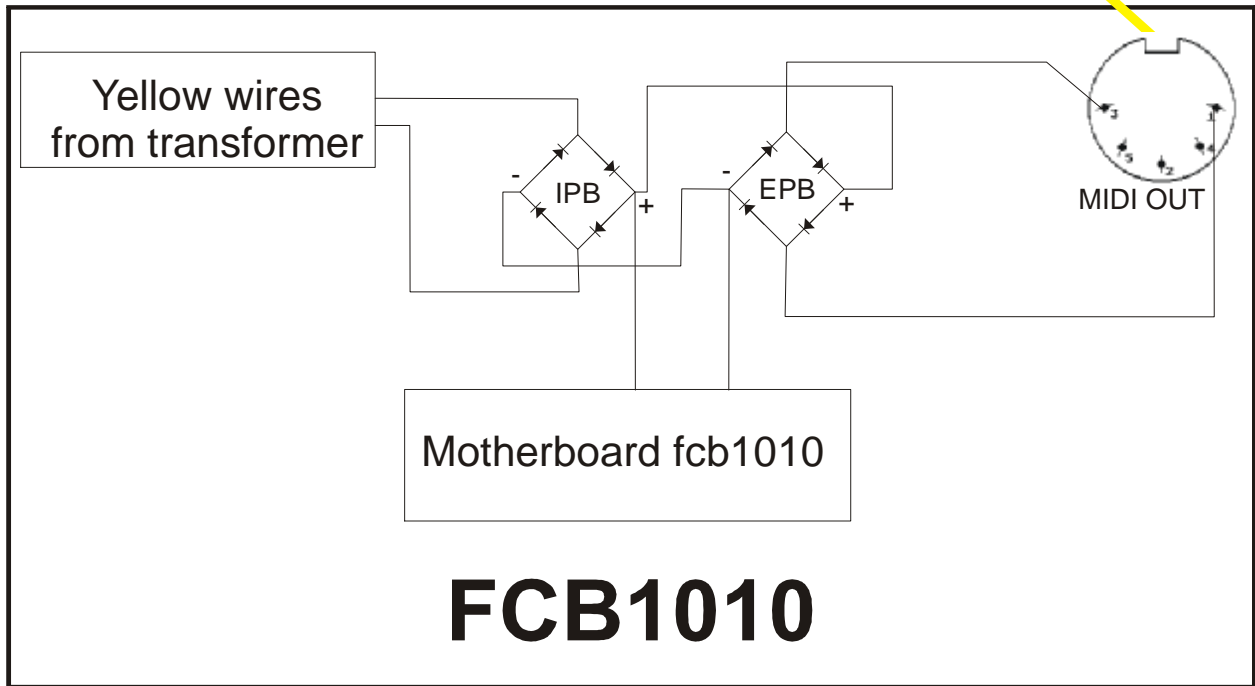
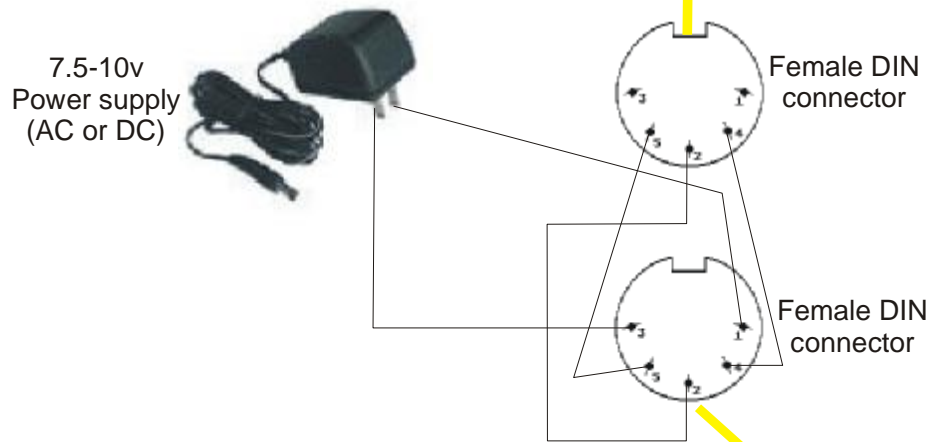
The parts needed for this effort are:

2x female MIDI connectors	
2x bridge rectifiers (the smaller the better)	
1x 7.5-10 volt power supply, AC or DC doesn't matter	

Furthermore we need following tools:

- Wire
- Wire connectors
- Tape
- Soldering tool
- Screw driver

SCHEMATIC PLAN:



OUTSIDE THE FCB1010

A standard MIDI cable will go from the FCB1010 unit to one end of the adaptor. A second standard MIDI cable will go from the other end of the adaptor to what ever MIDI gear you are controlling with the FCB1010.

The power supply will connect to the 2 outerpins of the connector that goes to the FCB1010. The 7.5-10V supply needed will use these 2 wires.

In simple terms, the result connects like the following:

MIDI Gear -----? Adaptor In Adaptor Out -----?

The resulting adaptor can be mounted in your rack, mounted inside an enclosure you choose, taped up in a bundle, or any other approach that works for you. I put mine loose inside the rack. I used a short MIDI cable from MIDI gear to the adaptor input. I then used a standard 15 foot MIDI cable from the adaptor output to the MIDI connector on the FCB1010. I have permanent power strips mounted inside the rack, so I just plugged the 7.5-10V AC or DC supply into the existing power strip.

The 5 pin MIDI connector looks like the following:



It has 5 pins on the back and a sixth ground pin not used. The 5 pins used are in the circle, numbered like this: 3 – 5 – 2 – 4 – 1 . The outerpins 3 and 1 (marked in red) are used for the 7.5-10V supply. The other 3 pins (5-2-4) are wired straight through from one connector to the other.

- A. Connect 3 inner pins. Solder a piece of wire from each of pins (5-2-4) from one connector to the other connector. Be sure each wire connects to the same pin on each end. These wires carry the MIDI data signals.
- B. Connect power supply. Cut any connector off the end of the power supply. Connect one wire to pin 1 on the MIDI connector. Connect the other wire to pin 3.
- C. Tape connections as needed to avoid any other metal or wire touching any connections.

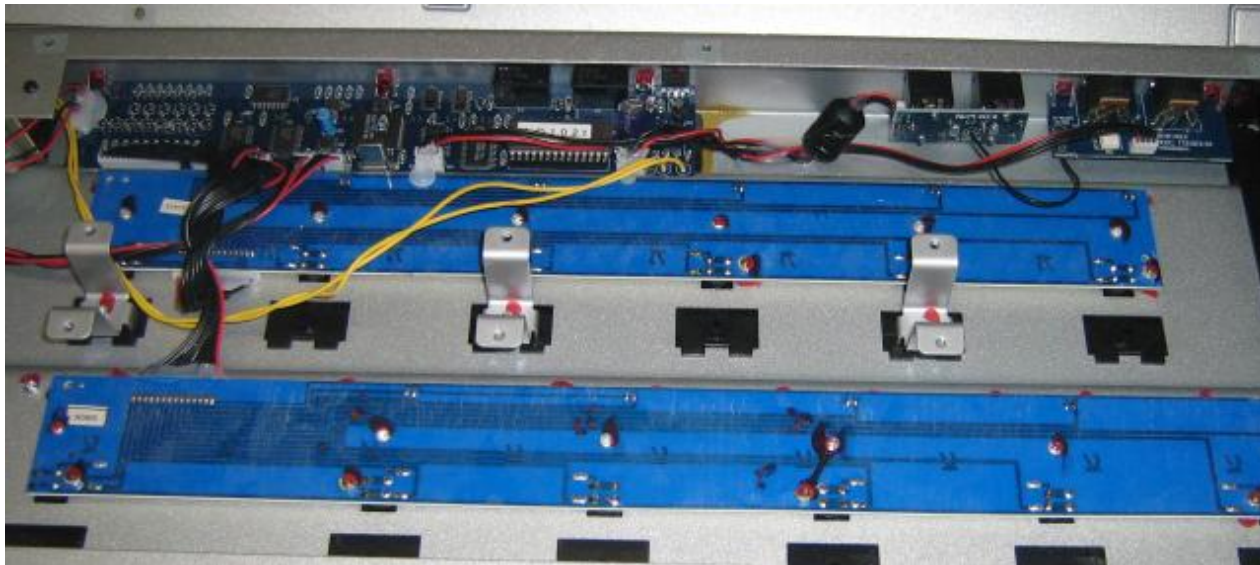
The result looks somehow like the this picture.



INSIDE THE FCB1010

Modifications are needed internally to use the 7.5-10V AC or DC supply coming across pins 3 and 1 to power the FCB1010. There are several ways to do this but I prefer the one where you still can use a standard power chord and yet don't have to use a switch.

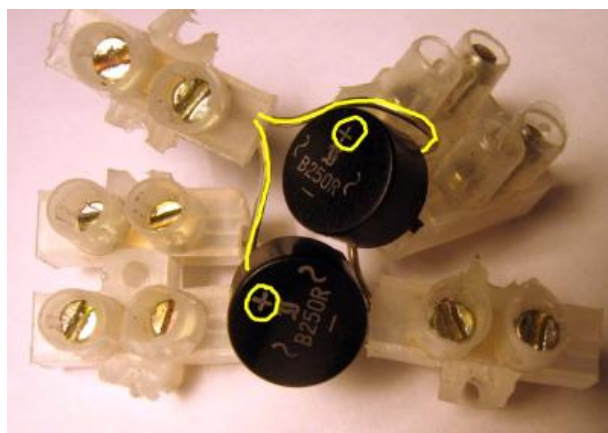
Included below is a picture of the inside of the FCB1010 before the modifications were started:



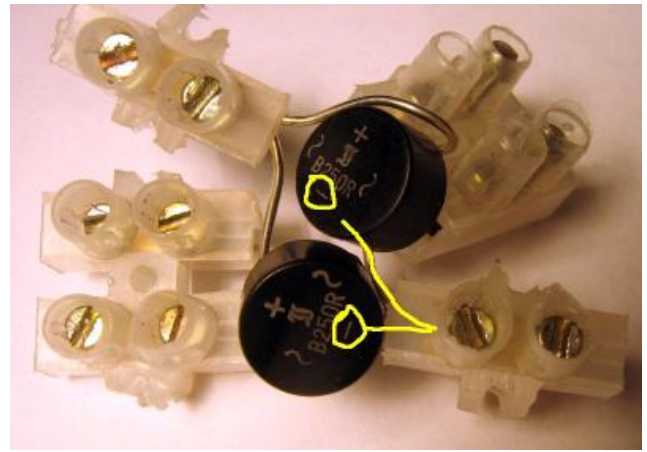
The two yellow wires in the center are the power lines that need to be changed. They connect at the left area to the internal transformer and at the right to the actual circuit board. You can cut them in two or solder them loose and use other wire to connect.

Step 1 – Connecting the rectifiers

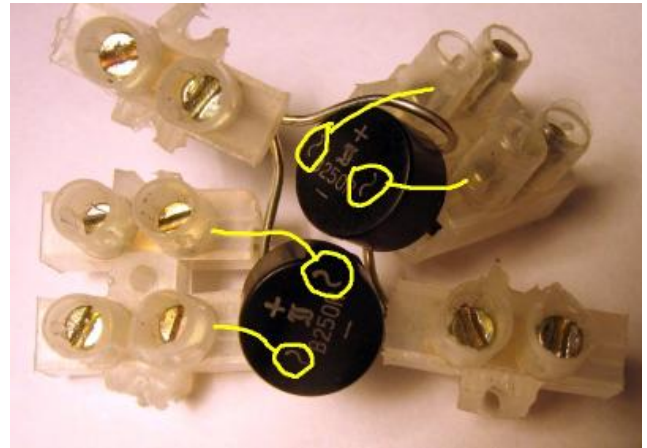
1. Using two bridge rectifiers, the smaller the better (a size only issue).
2. For clarification we will call them, **Internal Power Bridge “IPB”** (connecting to the existing transformer) and **External Power Bridge “EPB”** (connecting to the DIN connector).
3. Attach the two wires + connection points of both bridges using wire connector.



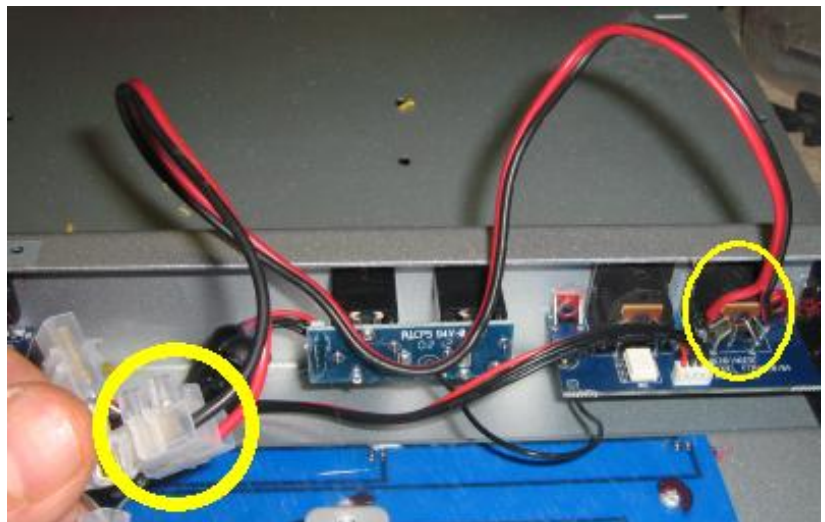
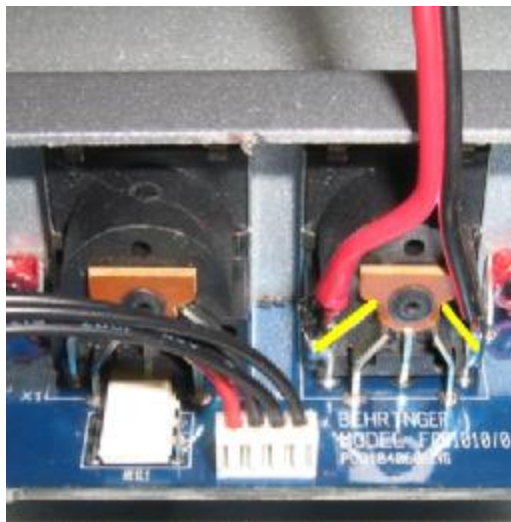
4. Attach the two wires - **connection points of both bridges** using wire connector.



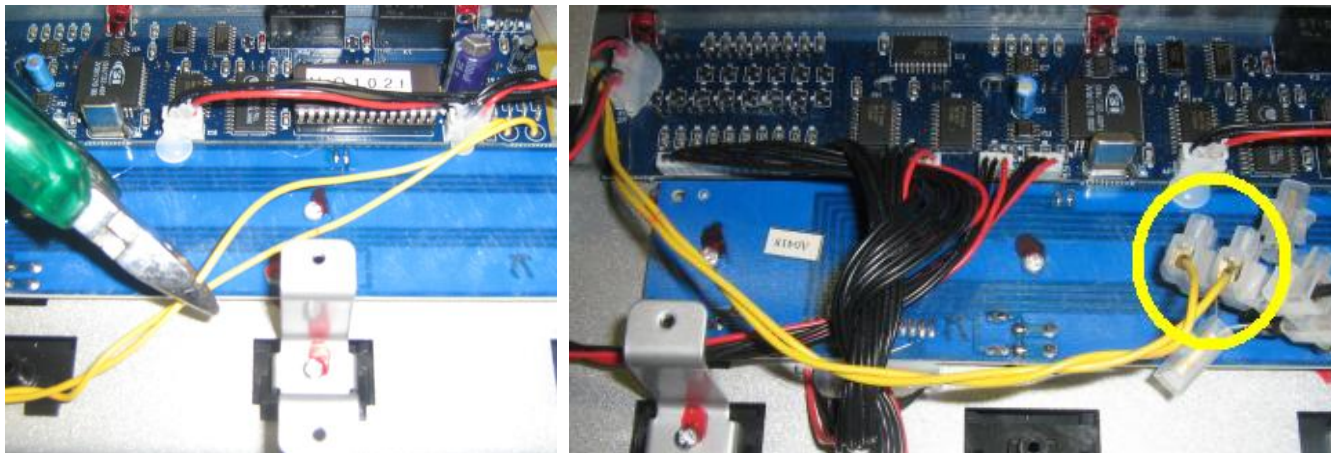
5. Attach The **EPB AC** connections to a double wire connector (polarity not important). And do the same for the **IPB AC** connections.



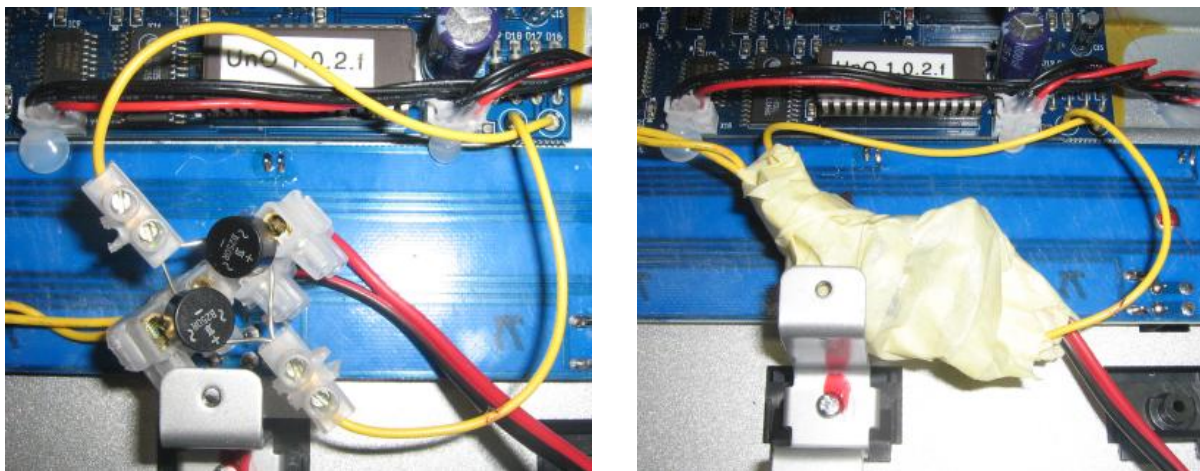
6. Attach two wires from pins **3 & 1 on the output DIN connector** (marked in yellow on the left photo) to the **EPB AC** connection points, using the double wire connector. Polarity not important.



7. Cut the yellow wires from the internal transformer so they can reach the IPB AC points.



8. Attach the remaining short pieces coming from the mainboard to the interconnection jumpers of the two bridges. After testing, tape all the wires in to protect your motherboard.



What happened?

The net result here is that the AC from the internal transformer is PRE rectified by the IPB and is applied to the original bridge on the internal circuit board where the now DC will pass through the original diodes to the 5V regulator.

The external 7.5-10V source, AC or DC, doesn't matter, is rectified if AC, or passes through, if DC, the EPB to the very same point as the DC from the IPB. (junction between the two bridges)

Since the bridges also act as steering diodes, the two dc's will not back up to each others source. As matter of fact, both power sources could be applied at the same time with the one of slightly higher value actually providing the power.

This makes as fool proof of a powering scheme as I think you can come up with. The external power source needs to be at least 6 volts as the internal regulator of the FCB pedal regulates down to 5VDC and a delta of at least one volt is a good idea.

Operational Testing

Put it all back together and then try each combination.

- When the 120/240 cord is connected, the unit should light up with no MIDI cable connected.
- When the MIDI cable is connected, and adaptor power supply plugged, the unit should light up also.

Shown below is a picture of the FCB1010 running off the external supply via adaptor wiring.



I will be mounting the power supply and cables inside my rack so that only the MIDI cable comes out for connection to the FCB1010.