

# SWITCHING BOX FOR SOURCES AND OUTPUTS

This was built following a request for a switch to select either of two sources and switch to either of two amplifiers. So it was decided to try building the equivalent of offerings on EBay but with some refinements, the Author could not match the low prices there anyway.

- 1) It should be low loss with Coaxial cables used throughout.
- 2) The Sources and Outputs to have isolated switched Ground lines to avoid problems with hum loops etc.

The Author had a spare Hammond 1590 die cast box so this saved almost £30 (with postage); it was a left over from building LesBox 4 RIAA Amplifiers. Size 187 x 119 x 52mm, prices as of August 2020. Not included is hardware like nuts/bolts/washers etc., these you probably have in your spares boxes.

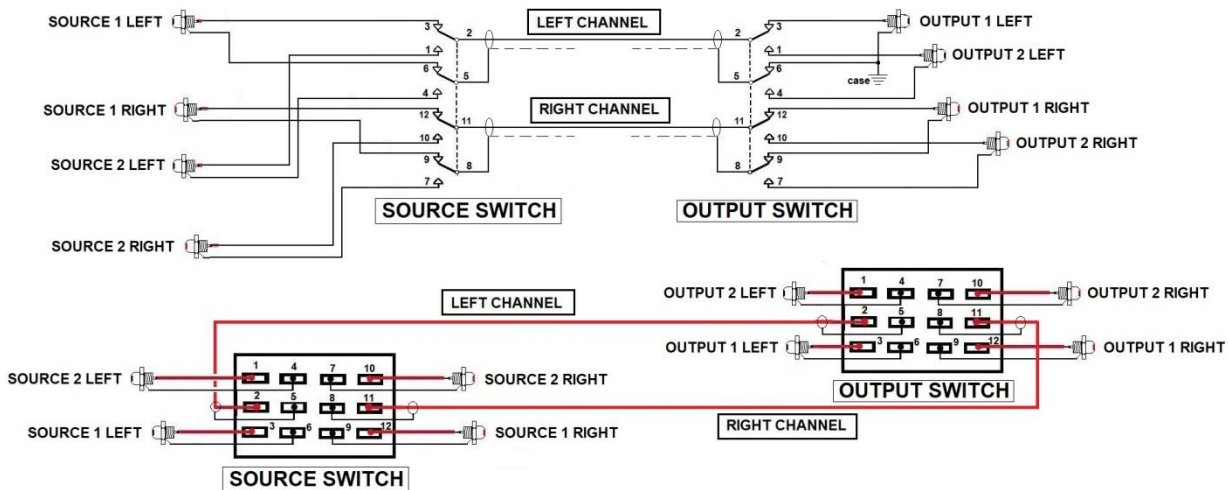
ITEM	DESCRIPTION	UK SUPPLIER	PART No.	PRICE
1	Box, Hammond 1559DBK, 187x 119 x 52	RS	528-7268	29.69
2	Rubber Feet (4 off)	Cricklewood	FTB161	1.62
3	RCA Phono Jack, RED (4 off)	Cricklewood	PCAR	6.00
4	RCA Phono Jack, BLACK (4 off)	Cricklewood	PCAB	6.00
5	4 Pole 2 Way Switch (2 off)	Cricklewood	TM42N	9.00
			Total	52.31
	Less Free Box			22.62
	Postage?			10
			New Total	<b>32.62</b>

The design places all RCA jacks on the rear panel, this will remove any clutter caused by the cables and hopefully will not be seen. The Left channel RCA is mounted above its corresponding Right channel RCA. The labelling may appear to be strange but the sockets are arranged so that when looking from the front of the unit and going from Left to Right, the sockets are SOURCE 1, SOURCE 2, OUTPUT 1 and OUTPUT 2. By placing the SOURCE and OUTPUT switches onto the front panel in the positions chosen, all Source and Output wiring can be kept well apart.

## Case Grounding:

It is important that the case has a Ground attached to aid the screening properties of the case. In this design, it has been decided to use the Left Ground of OUTPUT 1 so it is important to use this output particularly in situations where only one output is required to be used. This single point Ground connection should have no effect on the isolation design aspect of the switching.

## The Circuit.



**SOURCE SWITCH** - The Left and Right circuits are identical apart from the switch sections used.

The selector switches are 4 pole switches, the centre two of the four switches on each switch, are used to switch the Ground wires and may also help to provide a little isolation between the two channels.

In the SOURCE 1 position, (toggle UP), the Source 1 Left input from its RCA Jack is switched to the Left Channel Bus by switch contacts 3 and 2. At the same time the Source 1 Left Ground from its RCA Jack is switched to the Left Channel Bus screen by switch contacts 6 and 5.

The Source 1 Right input from its RCA Jack is switched to the Right Channel Bus by switch contacts 12 and 11. At the same time the Source 1 Right Ground from its RCA Jack is switched to the Right Channel Bus screen by switch contacts 9 and 8.

Switch contacts 1, 4, 7 and 10 are open and thus fully isolate the Source 2 Inputs.

In the SOURCE 2 position, (toggle DOWN), the Source 2 Left input from its RCA Jack is switched to the Left Channel Bus by switch contacts 1 and 2. At the same time the Source 2 Left Ground from its RCA Jack is switched to the Left Channel Bus screen by switch contacts 4 and 6.

The Source 2 Right input from its RCA Jack is switched to the Right Channel Bus by switch contacts 10 and 11. At the same time the Source 2 Right Ground from its RCA Jack is switched to the Right Channel Bus screen by switch contacts 7 and 8.

Switch contacts 3, 6, 9 and 12 are open and thus isolate the Source 1 Inputs.

**OUTPUT SWITCH** - In the OUTPUT 1 position, (toggle UP), the Output 1 Left RCA Jack is connected to the Left Channel Bus by switch contacts 2 and 3. At the same time the Output 1 Left RCA Jack Ground is switched to the Left Channel Bus screen by switch contacts 5 and 6.

The Output 1 Right RCA Jack is switched to the Right Channel Bus by switch contacts 11 and 12. At the same time the Output 1 Right RCA Ground is switched to the Right Channel Bus screen by switch contacts 8 and 9.

Switch contacts 1, 4, 7 and 10 are open and thus fully isolate the Output 2 RCA Jacks.

In the OUTPUT 2 position, (toggle DOWN), the Output 2 Left RCA Jack is connected to the Left Channel Bus by switch contacts 2 and 1. At the same time the Output 2 Left RCA Jack Ground is switched to the Left Channel Bus screen by switch contacts 5 and 4.

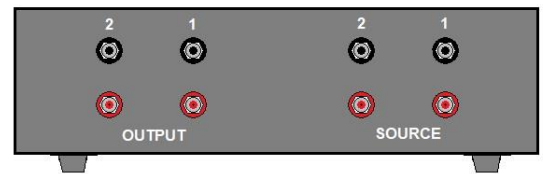
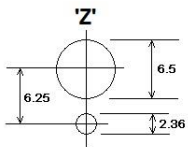
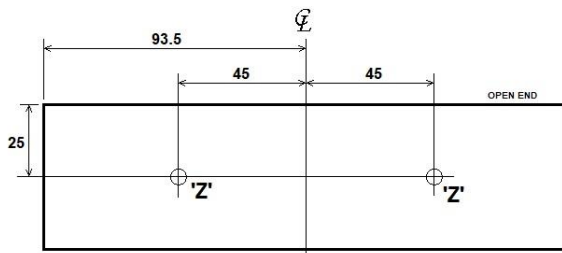
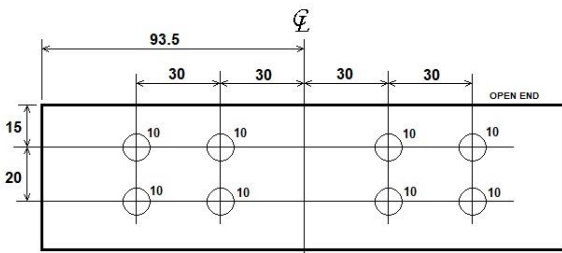
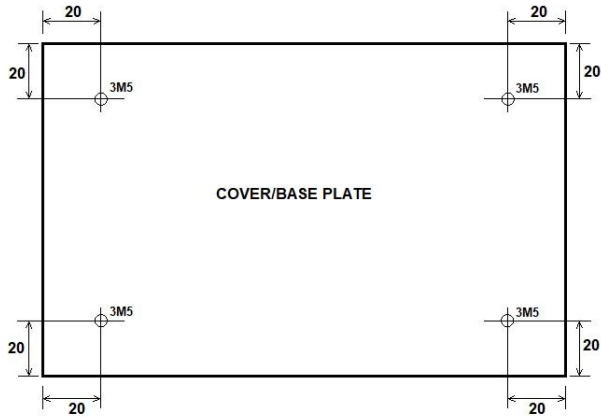
The Output 2 Right RCA Jack is switched to the Right Channel Bus by switch contacts 11 and 10. At the same time the Output 2 Right RCA Ground is switched to the Right Channel Bus screen by switch contacts 8 and 7.

Switch contacts 3, 6, 9 and 12 are open and thus fully isolate the Output 1 RCA Jacks.

As mentioned earlier, the Ground of Output 1 Left is also connected to the case so that it is effectively grounded for screening purposes by the amplifier on output 1.

If hum should be a problem by having unterminated amplifier inputs, then it may be necessary to fit a 6 pole 2 way rotary switch in place of the present Output toggle switch. The extra two poles could be used to short the inputs of the amplifier that is not selected.

# Drawings.



print 100%



The following commissioning tests were carried out and all tests passed.

## Commissioning Tests:-

Check for infinity resistance between any of the RCA Jack inners and outers with respect to the metal enclosure EXCEPT Output 1 Left outer and Source 1 Left outer which should be bonded to the case. In the following, after ascertaining correct continuity, check that there is no continuity to any other RCA Jacks as these should all be isolated.

Both switches set to 1 (UP).

Check continuity exists between the Source 1 Left RCA Jack inner and Output 1 Left RCA Jack inner only.

Check continuity exists between the Source 1 Left RCA Jack outer and Output 1 Left RCA Jack outer only.

Check continuity exists between the Source 1 Right RCA Jack inner and Output 1 Right RCA Jack inner only.

Check continuity exists between the Source 1 Right RCA Jack outer and Output 1 Right RCA Jack outer only.

Source switch set to 2 (DOWN) and Output set to 1 (UP).

Check continuity between the Source 2 Left RCA Jack inner and Output 1 Left RCA Jack inner only.

Check continuity between the Source 2 Left RCA Jack outer and Output 1 Left RCA Jack outer only.

Check continuity between the Source 2 Right RCA Jack inner and Output 1 Right RCA Jack inner only.

Check continuity between the Source 2 Right RCA Jack outer and Output 1 Right RCA Jack outer only.

Source switch set to 2 (DOWN) and Output set to 2 (DOWN).

Check continuity between the Source 2 Left RCA Jack inner and Output 2 Left RCA Jack inner only.

Check continuity between the Source 2 Left RCA Jack outer and Output 2 Left RCA Jack outer only.

Check continuity between the Source 2 Right RCA Jack inner and Output 2 Right RCA Jack inner only.

Check continuity between the Source 2 Right RCA Jack outer and Output 2 Right RCA Jack outer only.

