



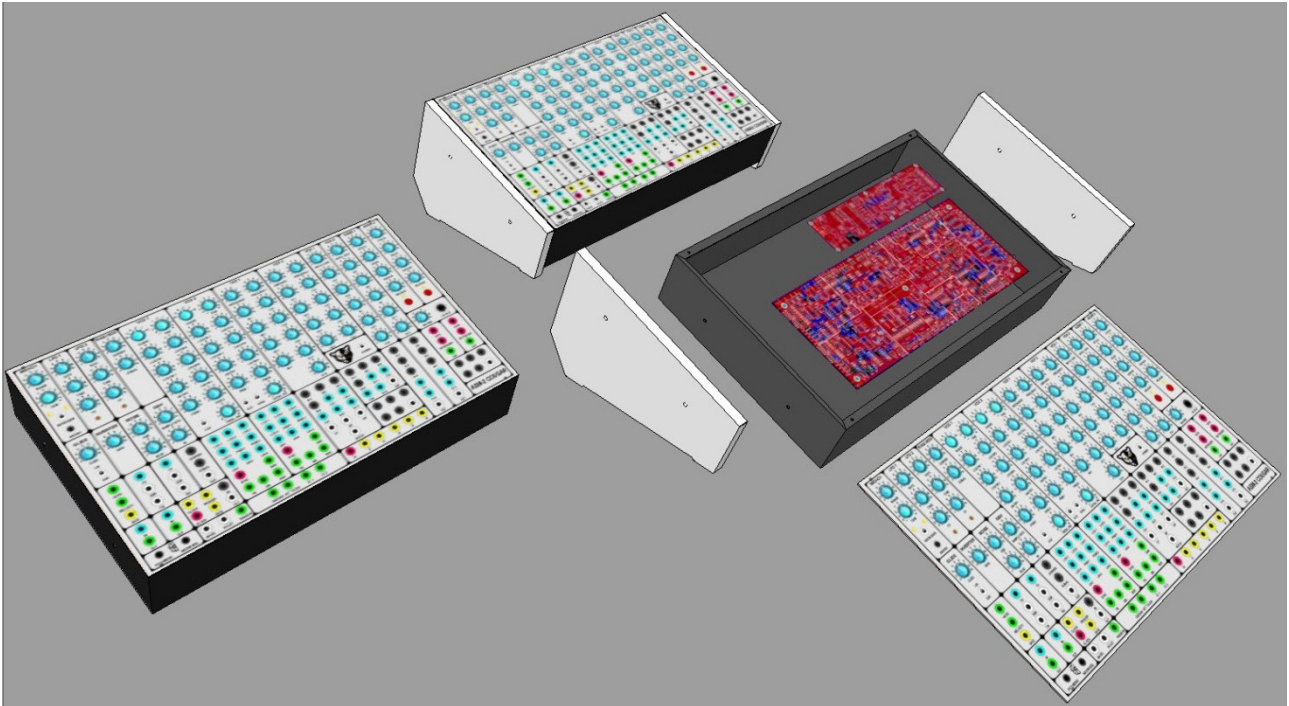
ASM-2 Cougar V1

Construction Notes

ASM-2 PCB Revision V2.3
Cougar Expander PCB Revision P0.1
Octave PCB Revision V2

February 5, 2020

Construction



The ASM-2 Cougar requires the assembly of 2 main PCBs (ASM-2 and Expander) and 2 sub-assemblies (3U Octave). Refer to the relevant build guides for each item:-

1. [ASM-2 \(3D Model\)](#)
2. [Expander \(3D Model\)](#)
3. [3U Octave \(3D Model\)](#)

As always, we recommend building the boards up in layers starting with the smaller components like resistors and diodes and moving up to the largest components. If you have IC Sockets then fit them after the resistors and diodes. If not, then I would suggest leaving the IC's until last. Normal anti-static precautions should be followed throughout, especially when handling the ICs. Please pay particular attention to the orientation of the ICs, diodes and electrolytic/tantalum components. Please refer to our [General Construction Notes](#) for general build information.

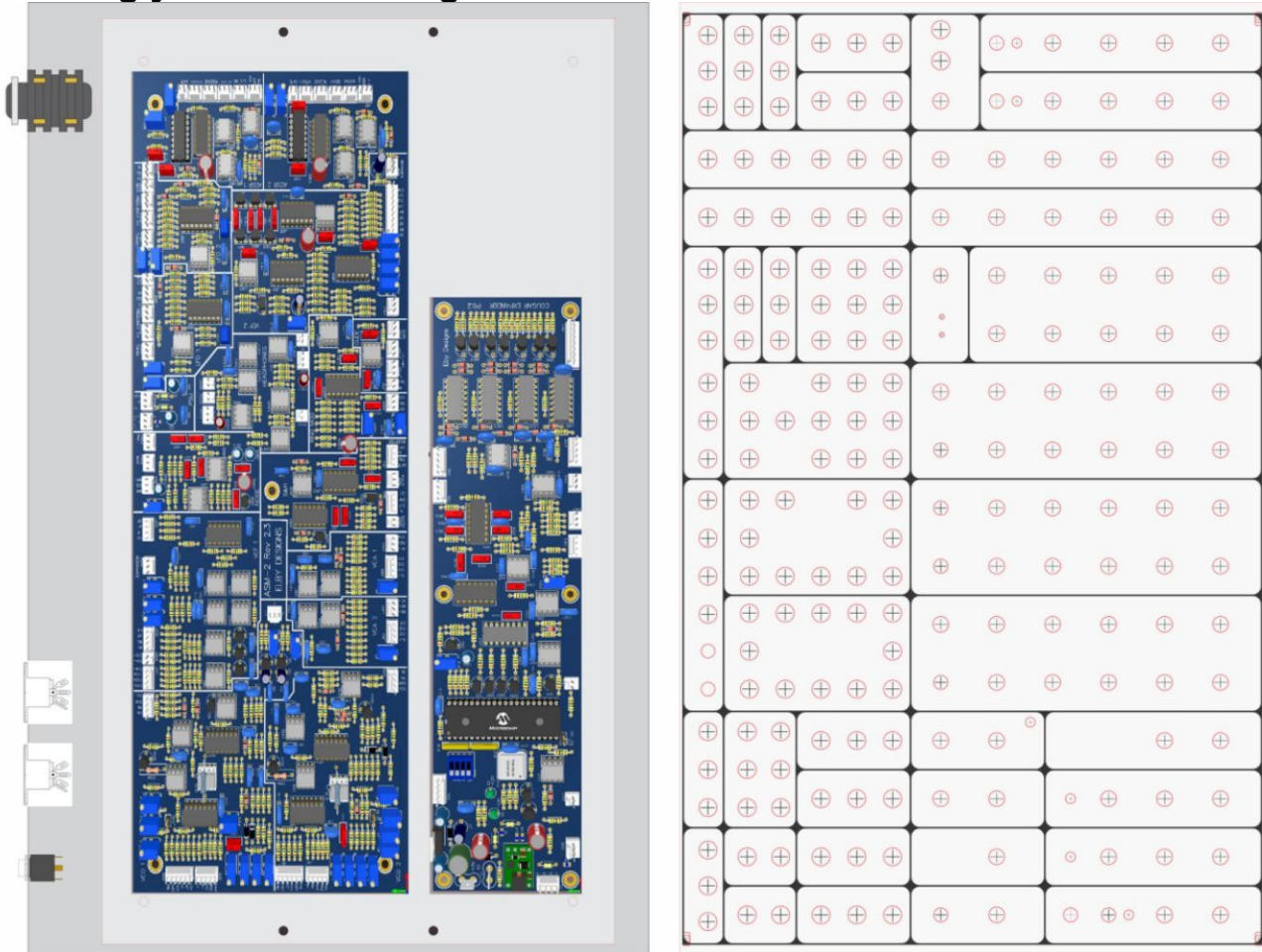
The 3U Octave and Expander boards involve some surface-mount components (0805 and SO-8 on the Octave PCBs and 0805 on the Expander PCB) but these should be easily handled by most competent constructors.

NOTE:

A front panel design error has resulted in the Pulse Divider section not including a [RESET] socket. We recommend replacing one of the divider outputs, such as [/8] with a [RESET] socket

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Housing your ASM-2 Cougar



The following notes assume that you are building your ASM-2 Cougar in to either our 84HP Boat, a Studio 500 or a Studio 700.

- You will need to prepare the enclosure by drilling a couple of holes to accommodate:-
 1. DC Input jack
 2. MIDI IN socket
 3. (optional) MIDI THRU socket
 4. AUDIO OUT jack

NB: The Studio 500 and Studio 700 already have a few holes pre-drilled that can be adapted to take the above parts.

- Using the ASM-2 and Expander PCBs as a reference, fit their respective mounting kits to the [Synth Base Plate](#).
- Install the Synth Base Plate using the Synth Base Plate Mounting Kit. This kit includes 6x M4 Spacers that support the Base Plate in the base of the Studio Enclosure. Four of these spacers should be placed in the four corner positions of the Base Plate, the remaining two should be positioned in two of the central mounting points.

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- Install the 2 main PCBs
- Mount all the panel components

Wiring your ASM-2 Cougar

Before starting your wiring, you will need to make a decision with regards the operating functionality of your ASM-2 Cougar. The ASM-2 Cougar is designed as a fully patchable system which means that you MUST install at least 1 or 2 patch leads before you will be able to get any sound out of it. If this is how you want your system then skip the following paragraph....

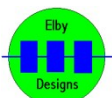
.... APPLIES TO 3.5mm JACKS ONLY!!!!

Although you will not have the supporting labels on the front panel, it is possible to pre-wire at least some 'common patches' by utilizing the normalizing (switching) contact on the jacks. This allows you to preselect an input or output signal that can be overridden by inserting a jack plug. A typical example would be to connect the [GATE] output of the MIDI Interface to the [GATE] inputs of the ADSRs. The ADSRs will then automatically trigger on receipt of a MIDI Note ON message without requiring that you patch this connection. If you need a patch where, for example you wish to trigger, say, ADSR2 from, say, the S&H, then by inserting a patch lead from the [SH&H GATE] output to the [ADSR2 GATE] input, you override (disable) the [MIDI GATE] signal. As mentioned before, there is no label to indicate this internal connection so it is something you will need to 'remember'. However, as many of the internal connections would be ones you would use, this shouldn't be an issue. And if you are getting an unwanted control from an internal connection, simply insert an unused patch lead in to the relevant jack. The decision to include internal connections will require addition inter-panel wiring to be added in the next step....

To reduce the amount of panel-to-board wiring you should wire up all the 'common' points on the front panel. Tinned copper wire can be used to wire all the 0V connections, especially to the jacks (only if using 3.5mm jacks). The jacks supplied in our Hardware Kits are PCB-mounting, so you will need to ensure a good solder connection at each point.

When all the inter-panel wiring is complete you can proceed to the main panel-to-board wiring. Lay the front panel face down in front of the boat. All the panel-to-board wiring will run 'up' the panel, up and over the front edge of the enclosure and then 'around' the pcbs to their respective points. This approach will keep the component areas of the pcbs free allowing easy access to the trimpots as well as access to the components for testing and servicing etc.

We suggest that you wire the unit connector-by-connector. Most wires in any given connector go either to the same component or go to a nearby component. You can then route the first wire from the connector to its component pin. Crimp and insert the wire in the connector and solder to its mating panel component. You can then use this wire as a guide for the remaining wires in the connector: take the new wire, place one end above its connector pin, run the wire alongside the first wire and up to its respective panel component pin. Add approximately 10mm to the length and cut. Repeat for the other wires in the connector.



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Wires in any one connector will usually have similar signal characteristics and so can usually be bundled together. Do not twist wires in the bundles unless otherwise instructed. Having the wires bundled together can greatly ease tracing wiring between the pcb and panel. Also, by defining the main routes from the panel to the boards to follow the columns of the front panel, will also ease access to the unit by allowing the cables to 'fold with the panel'.

Now crimp all these wires at the pcb end and insert them in to the connector.

Form the wires out of the connector to ensure there is no stress on the crimps and then run all the new wires along the first wire (keep the wires all snug together).

Where these wires all meet the front panel we suggest tying them together either with a short piece of excess wire or a cable-tie. This will allow you to release your hold on the wires and to then route and terminate each wire, keeping the route tidy and removing any excess cable before soldering. The image to the right gives an example of this.



Colour-coding can also be a powerful tool for assisting with servicing your unit should it be needed. There are a few different schemes that can be applied. Unfortunately, unless you have access to an large selection of multi-coloured cables, any colour scheme will involve some compromise.

The recommended approach is to special colours for the power rails and to use standard colours to represent pin numbers of the connectors.

In this scheme we reserve three colours for power rails. The remaining wire colours are assigned a numerical sequence number and these correlate to the pin numbers in the connector. Using striped colours for the power rails also allows the plain colours (Red, Black and Blue) to be used as 'numerical' colours

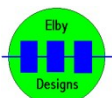
RED/WHITE	+Ve power (eg +12V, +9V and +5V)
BLACK/WHITE	0V
BLUE/GREY	-Ve power (eg -12V and -9V)

ASM-2 Cougar Construction Notes

BROWN	'1'
RED	'2'
ORANGE	'3'
YELLOW	'4'
GREEN	'5'
BLUE	'6'
VIOLET	'7'
WHITE	'8'
GREY	'9'
PINK	'10'
BLACK	'11'

If a connector has one or more power pins in it then those pins take on their respective 'power colour'. For example, J701 on the Expander is a 5-pin connector with 2 pins connected to power. The colour scheme for this connector would then be:-

Pin 1	BROWN	'1'
Pin 2	RED/WHITE	POWER (+Ve)
Pin 3	ORANGE	'3'
Pin 4	YELLOW	'4'
Pin 5	BLACK/WHITE	POWER (0V)



ASM-2 Cougar Construction Notes

Wiring Charts for the individual sections of the ASM2-Cougar

[ADSR1](#)
[ADSR2](#)
[AUDIO](#)
[CGS36](#)
[GLIDE](#)
[HEADPHONE](#)
[INVERTER](#)
[LFO1](#)
[LFO2](#)
[MIDI](#)
[MonoDAC](#)
[Noise](#)
[Octave](#)
[Panel Components](#)
[Power](#)
[Power Wiring Overview](#)
[Ring Modulator](#)
[Sample & Hold](#)
[Splitter](#)
[VCA 1](#)
[VCA 2](#)
[VCF 1](#)
[VCF 2](#)
[VCO 1](#)
[VCO 2](#)

Please note that the colours used in these documents are purely to assist with identification of each wire and do not imply any specific colour scheme.

