LushOne Contour Synth Module
# Build Instructions

Getting started

- If you can build the LushOne base module then then building the Contour should be easy

- Remember:
  - Accuracy and neatness is more important than speed
    - Get it working first time
  - These instructions will guide you but I assume you are familiar with basic techniques and equipment

- All components except the power-in are mounted on the circuit board – no slow, fiddly point to point wiring!

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Build order

Build in any order you like, but I suggest:

- Patch sockets

- Trimmer resistors

- ICs

- Resistors, capacitors

- Transistor, diodes

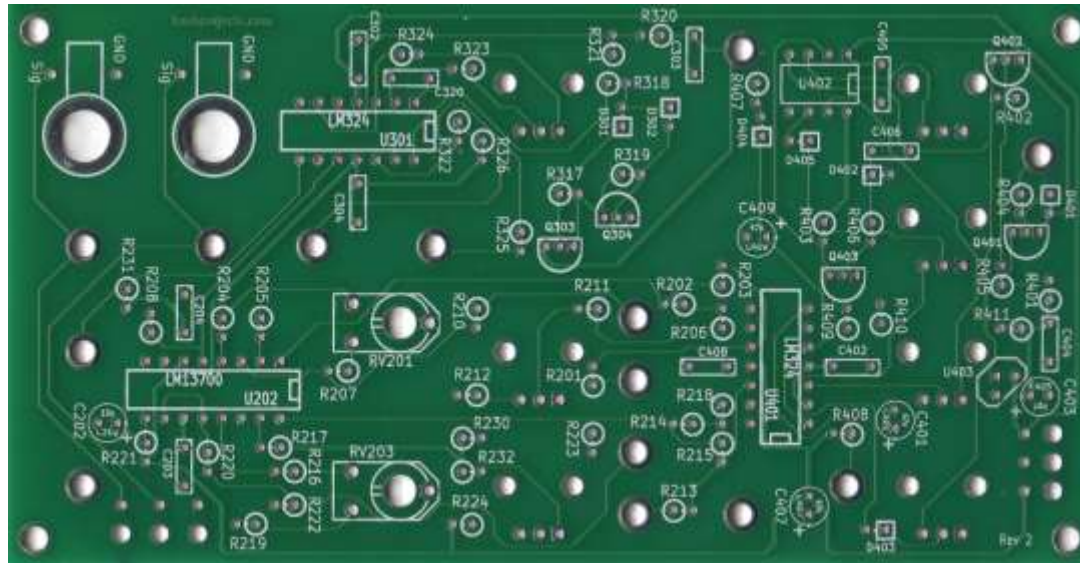- External connectors

- Power leads

- Variable resistors

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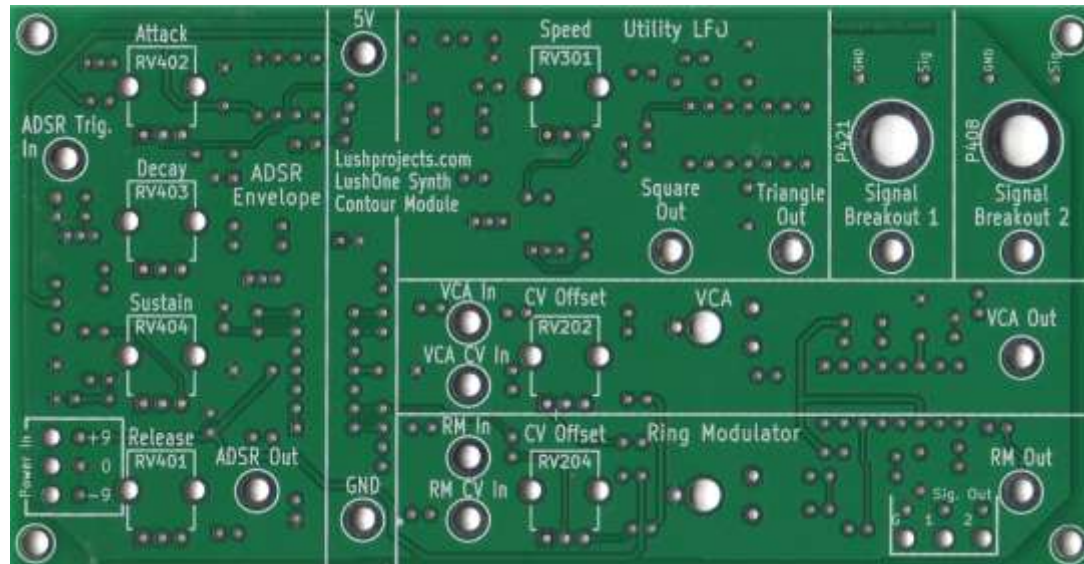
Front

The following components are mounted from the front:

- Patch sockets

- Variable resistors (but not trimmers)

- Breakout phono connectors

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Back

The following components are mounted from the back:

- Everything not on the front!

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Patch sockets

- 14 small silver patch sockets fit from front of board

- Fit in the large, labelled circles
  - Not the four mounting holes in the extreme corners
  - Not in the holes in the centre of RV201 and RV203 used for adjustment

- Solder round rim on back

- Suggest you fit first so you can make them sit nicely flush with the board

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Trimmer resistors

RV201	100R
RV203	100R

- The two trimmers RV201 and RV203 are used to adjust the balance of the VCA and Ring Modulator

- Fit from the back of the board
  - Centre hole allows adjustment to be made from the front

- Adjustment instructions are later

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ICs

Designation	Type	Comment
U202	LM13700	16 Pin
U301	LM324 or LM2902N	14 Pin
U401	LM324 or LM2902N	14 Pin
U402	7555 of equivalent	8 Pin
U403	78L05	3 Pin transistor-style case

- All ICs are mounted from the back
- ICs are provided unsocketed
  – You can add sockets if you like!
- Positions and orientations are marked on the silk-screen
  – Pin 1 also has a square pad
- The voltage regulator has the same case as the transistors – check the labels!
  – Orientation is shown on silk-screen

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Resistors

Resistor	Value
R324	100R
R407	330R
R204, R207, R216, R219	470R
R231, R326, R408	1k
R202, R212, R214, R221, R224, R230, R232, R318, R401, R402, R403, R409, R411	4.7k
R205, R217, R320, R321, R322, R325, R410, R406, R404	10k
R222	18k
R405	22k
R210	27k
R208, R220	33k
R201, R203, R206, R211, R213, R215, R218, R223, R317, R319, R323	100k

- All resistors are mounted from the back
- Resistors are all mounted vertically
- Labels are not in a set position relative to the symbol – look for the closest label
- The round silk-screen symbol shown above shows the resistor locations

Value	Colours
100R	Brown, Black, Brown, Gold
330R	Orange, Orange, Brown, Gold
470R	Yellow, Purple, Brown, Gold
1k	Brown, Black, Red, Gold
4.7k	Yellow, Purple, Red, Gold
10k	Brown, Black, Orange, Gold
18k	Brown, Grey, Orange, Gold
22k	Red, Red, Orange, Gold
27k	Red, Purple, Orange, Gold
33k	Orange, Orange, Orange, Gold
100k	Brown, Black, Yellow, Gold

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Capacitors

C402

C409

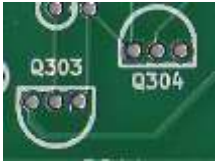| Designator	Value	Type
C320, C406	10n	Ceramic
C203, C204, C302, C303, C304, C402, C404, C405, C408	100n	Ceramic
C202, C403	10u	Electrolytic
C401, C407, C409	47u	Electrolytic

- All capacitors are mounted from the back
- Capacitors are marked with one of the symbols shown above
- For electrolytic capacitors the "+" lead (longer lead) is labelled and indicated by the square pad.

Value	Marking
10n	103
100n	104

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Transistors, diodes

Q303, Q401, Q402, Q403	2N3904 NPN
Q304	2N3906 PNP

D301	1N4148
D302	1N4148
D401	1N4148
D402	1N4148
D403	1N4148
D404	1N4148
D405	1N4148

- All Transistors and diodes are mounted from the back.
- Transistors are marked showing the package orientation. Check you have the transistors and not the voltage regulator!
- There are both NPN and PNP transistors – check you have the right one
- Diodes are all vertically mounted and shown with the square symbol.
  - The diode's stripe should be towards the printed square / square pad

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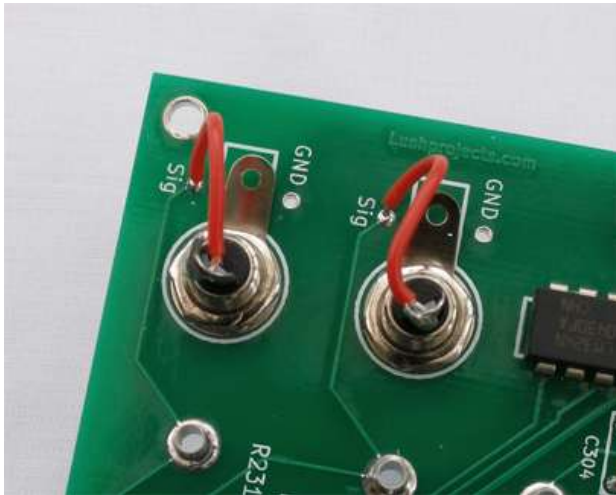
Connectors

- Take the two phono connectors and fit in to sockets P408 and P421 from the front.
- You can leave off the earth tab as the board already provides an earth connection
- Screw on from the back
- Connect a short wire from the "sig" terminal on the board to the centre of the phono
  – Extra red wire is included in the kit for this

- If you wish to connect to external panel mounted connectors (eg to provide 3.5mm jack interworking) then the "Sig Out" connectors on the bottom of the board are wired to the Breakout ports

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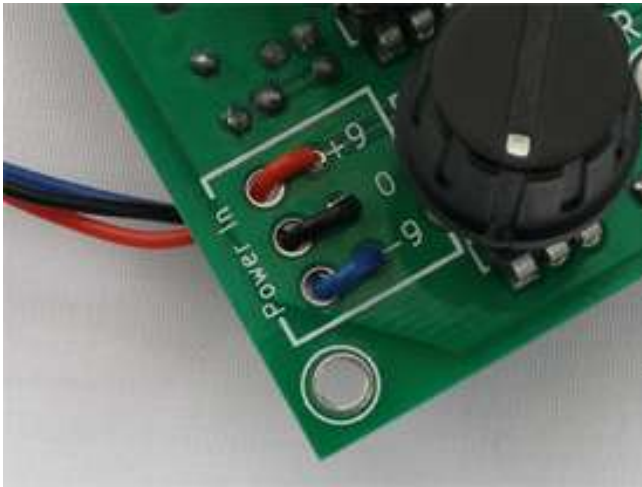
Power leads

- The LushOne contour can be connected to the LushOne base module for power

- Connect three leads to the LushOne "Power In" connectors

- Suggest:
  - Red = +9V
  - Black = 0V
  - Blue = -9V

- Connect other end of power leads to the spare terminals next to the Power In on the LushOne base

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Variable resistors

RV202	10k
RV204	10k
RV301	10k
RV401	10k
RV402	10k
RV403	10k
RV404	10k

- Seven variable resistors are mounted where shown on front of board
- You may need to bend the pins slightly to make them sit properly

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Checking time

- Congratulations – building should now be complete!
  - Take a break
- Time to check:
  - No parts left-over
  - All parts (particularly ICs) in the right way
  - No bad solder joints or unsoldered joints
  - Power connectors on correctly (very important!)
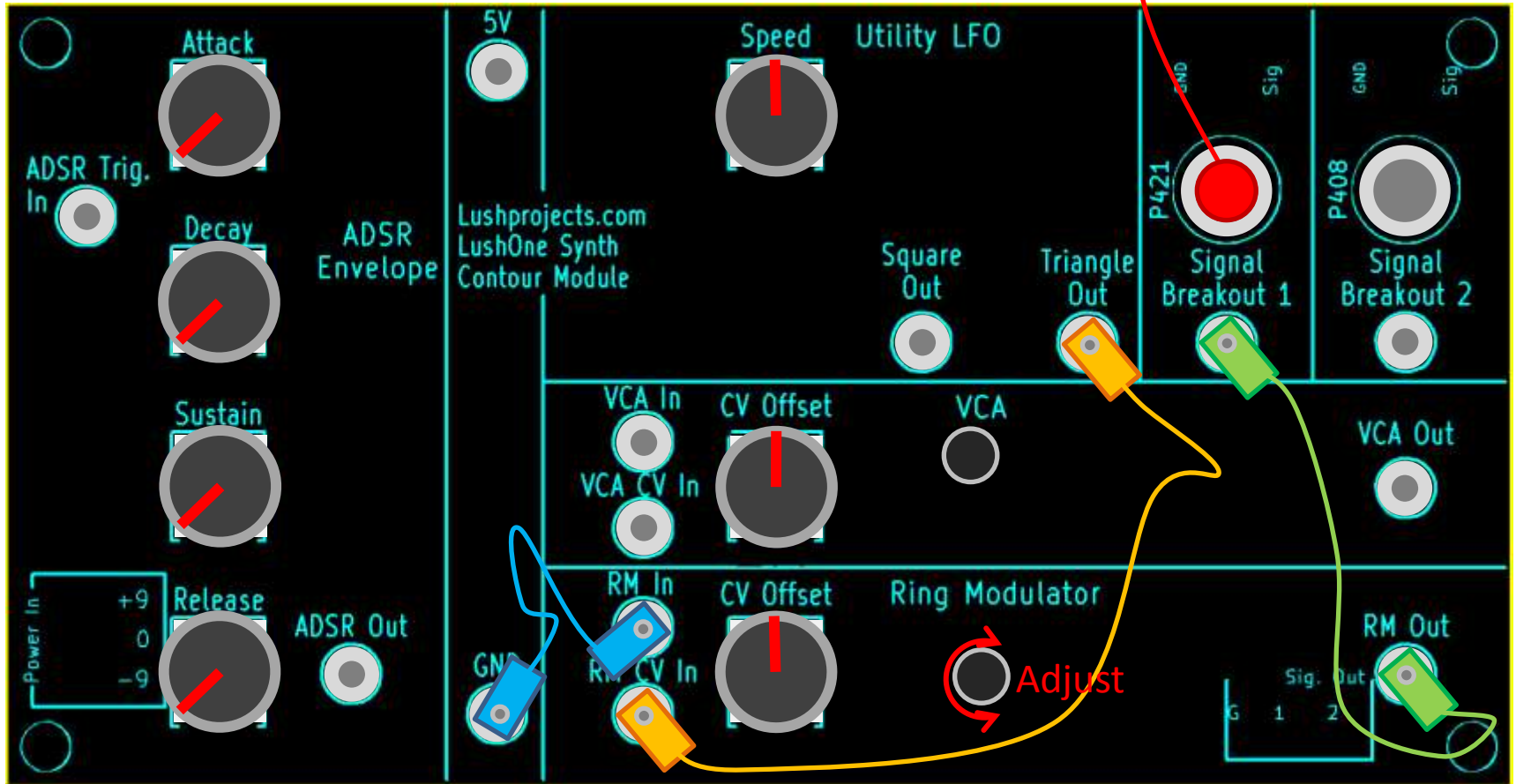 - No solder bridges or other problems
- Good luck

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Adjusting the trimmer resistors - VCA

- Set up board as shown. Note position of controls and speaker connection
- Power-on. You will probably hear a low note through speakers
- Slowly adjust VCA trimmer for quietest sound out (least CV breakthrough)
- Quietest point should be near centre of adjustment range
- Don't expect silence (this is real analogue with real imperfections)

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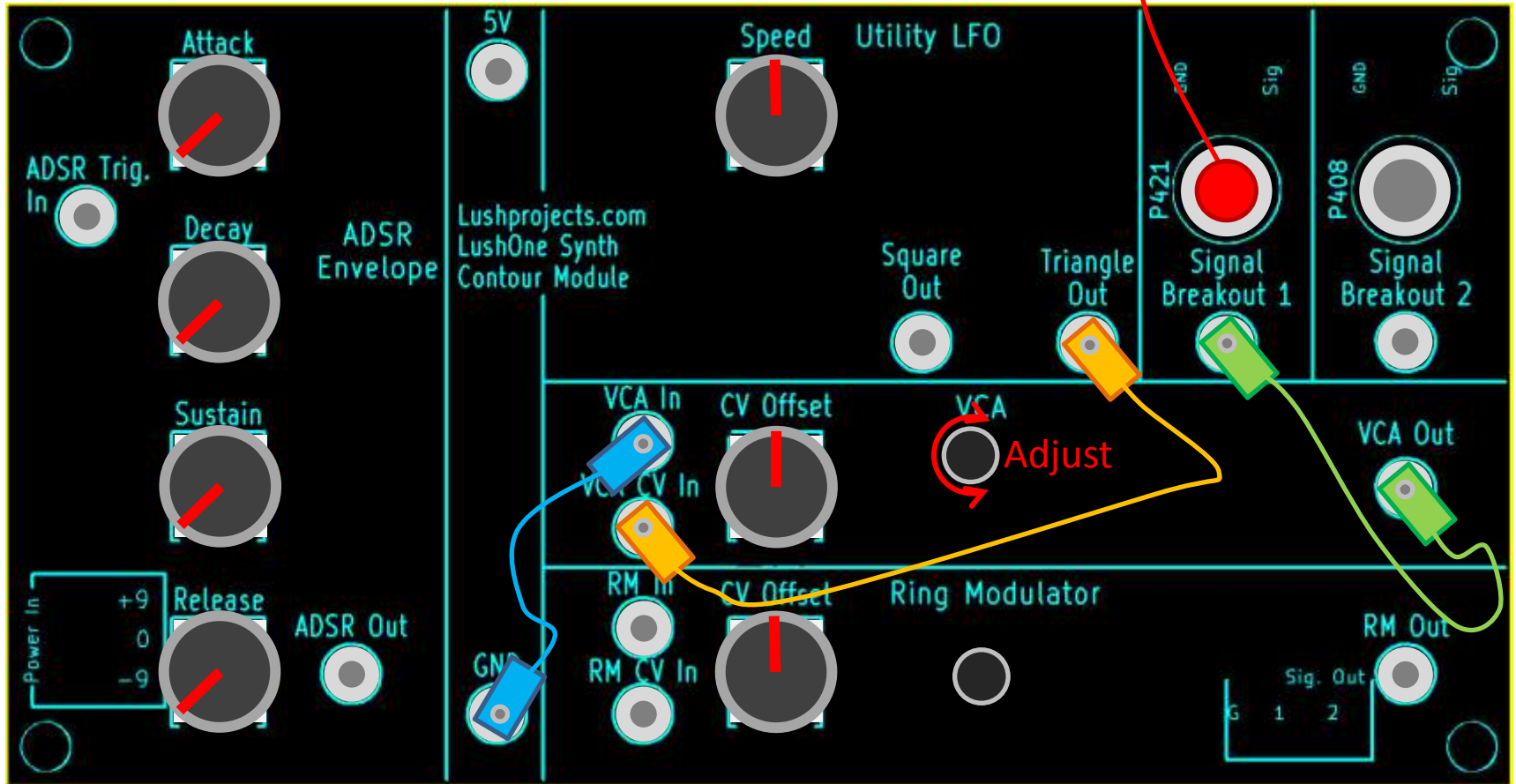
Adjusting the trimmer resistors – Ring Modulator

- Set up board as shown. Note position of controls and speaker connection
- Power-on. You will probably hear a low note through speakers
- Slowly adjust RM trimmer for quietest sound out (least CV breakthrough)
- Quietest point should be near centre of adjustment range
- Don't expect silence (this is real analogue with real imperfections)

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You're done!

...now go play

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