

Clockwise from Bottom Left: The board featuring the JLM99V Class-A op amp; the preamp close to completion; and Guy Harrison looking thrilled with the finished product!

# JLM MONO MIC PREAMP KIT

We all love a quality product, especially one you can make yourself.

**Text:** Guy Harrison

 JLM Audio in Brisbane has been servicing and supplying equipment to the audio industry for many years now. Indeed, there are precious few studios in Queensland that don't own a piece of JLM gear.

With a long history in equipment repair, there are very few faulty audio devices that haven't landed on Joe Malone's workbench at one point or another. Armed with the experience of having brought so much audio equipment back to life, Joe has created his own brand of extremely popular DIY kits that follow some of these classic design principles, albeit with design additions and modifications of his own added to the mix. Combining modern components and a contemporary appreciation for issues of impedance and connectivity with traditional circuit designs, JLM Audio has created some very cost effective, high quality pro audio equipment that is championed by engineers and musicians all over the globe.

If you've ever wanted a quality piece of audio equipment that's designed to a standard, not a price point; if you've been chasing that vintage sound but lack the requisite vintage budget; if you've got some basic soldering skills but have always thought building a circuit was beyond you, then hopefully this article will help launch your DIY audio career.

## DOING IT OURSELVES

JLM Audio kits are many and varied, ranging from simple VU meter kits through to more complex Opto Compressors and multiband EQs. Today we're building the JLM Mono mic pre for review.

Supplied in a cast aluminium Jiffy box with silk screening, the circuit board and components supplied in the JLM Mono kit are accessed by four screws on the base of the box. All controls and switches are on the top of the case. These include: power on/off, phantom power, pad and phase reverse switches. In the centre we find a large (and funky) chicken-head knob that controls gain; below this a smaller knob for impedance matching, XLR in and out, and a connector for DC input.

The JLM Mono is a transformer balanced mic preamp with an electronic balanced output. It's tough and rugged, and equally at home in the studio or on location – for servicing the latter, two 9V batteries (or NiMH rechargeable batteries) fit inside the aluminium enclosure, supplying 18V phantom power when required. If AC power is available a JLM SMPS (wallwart-style) power supply drives the preamp – and charges the NiMH batteries in circuit if fitted – while simultaneously boosting phantom power to 48V. The other advantage of being connected to the AC juice is that you'll

enjoy increased headroom on the pre. The JLM Mono is designed to run on a Burr Brown Dual OPA2604AP op-amp as standard. Alternatively, you can opt to fit two JLM 99V (or comparable footprint) op-amps, though in this latter configuration the battery power option is lost. As a bonus you can swap between the two different op-amp types with no component changes, effectively giving you two or more audio flavours from the one box – simply plug-’n’-play. Nifty indeed! Additionally, there’s a choice of two input transformers – these are soldered to the board however, so there’s no plug ‘n’ play option here, but it’s nice to have the sonic options.

#### PARTS

Included in the JLM Mono kit is everything you need to build the preamp yourself: the aforementioned silk-screened aluminium Jiffy box, an etched single-sided PC board, input transformer, resistors and capacitors of various values, a few diodes, three potentiometers, four LEDs, four toggle switches, two chassis-mount XLR connectors, a DC input connector, two 9V battery terminals, an op-amp and socket, two knobs and a piece of Lexan that you cut to size yourself to stop the circuit board shorting on the case. For the ‘AT review preamp’ construction I’ve decided to go with both optional extras on the kit so I will be installing NiMH rechargeable batteries (\$25) and also fitting the JLM 99V op-amp (\$75).

After laying all the parts out in a logical manner so you can get an idea of what’s what, the next step is to sort out the resistor values. Resistors are coded with coloured bands to define values – sounds straightforward, but in reality it’s not. Unless you spend a lot of time looking at resistors it’s difficult to decipher one from the other. So before construction began – as most serious electronics enthusiasts do – I checked resistor values with a meter, not just my eyes. It’s a simple matter of turning your multimeter to read resistance (Ohms), placing the probes on each end of the resistor and reading off the values. Once all your resistors are labelled – there are 13 different resistors in the Mono kit – its time to view the circuit board.

#### COME TOGETHER

The PC board is clearly etched making it easy to see what goes where. All resistor values are marked and the first step is to get them into position. As this kit can be built with a number of different input transformers there are four resistor values and one capacitor value that vary based on the transformer you’re using.

All the info for the build of this kit is available on the JLM website. It’s here where we find the info about which resistors and capacitors fill these positions. For the AT build we will be using the OEP 262A3C / VTX input transformer. A quick look on the JLM Audio website build thread reveals that for the OEP 262A3C/VTX transformer fitted to normal version Mono, we need these components:

- RPad = 120R
- RGain = 68R
- Rload = 10k
- RZobel = Linik
- Czobel = 390pF
- Impedance pot 100k-log

This information also informs us that, of the two pots supplied for the impedance adjustments, the 100k-log pot is the one we’ll be using.

#### ARMED & DANGEROUS

Armed with this knowledge we can now go ahead and place our resistors in position. Resistors have no polarity so you can install them either way around. I prefer to leave the capacitors mentioned above to one side for now, mainly because it’s much easier to solder components of the same height. The only resistor that oddly doesn’t get mentioned above is the one marked ‘Fuse’, though it’s easy enough from the pictures on the website to see that it’s 10Ω.

Now for the diodes: unlike resistors, diodes *do* have a polarity, and to help get this right the circuit board is clearly labeled with a white band at one end matching the white band on the diode. Simple! Once these

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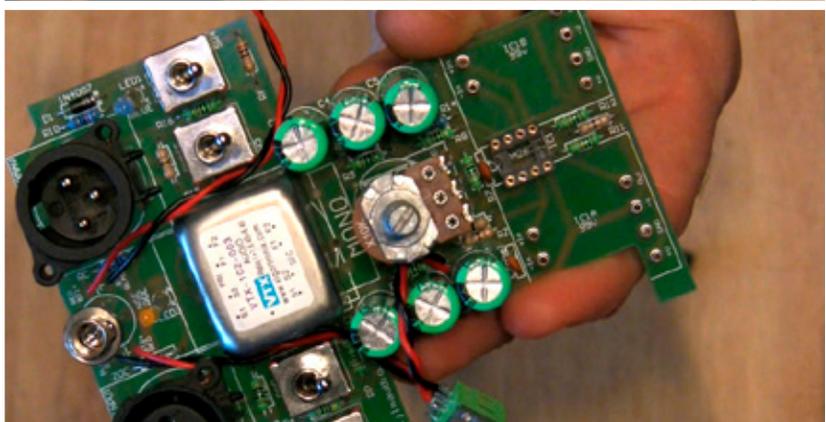
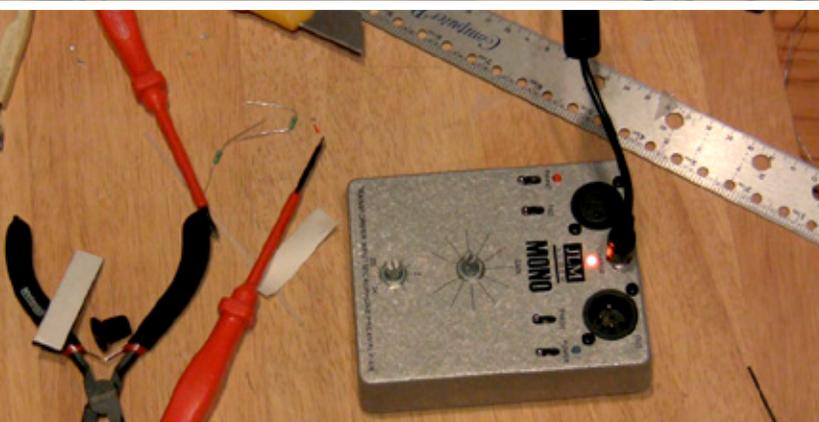
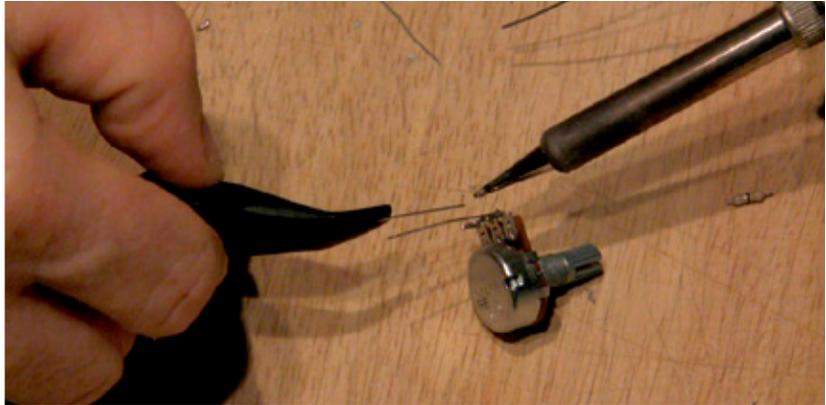
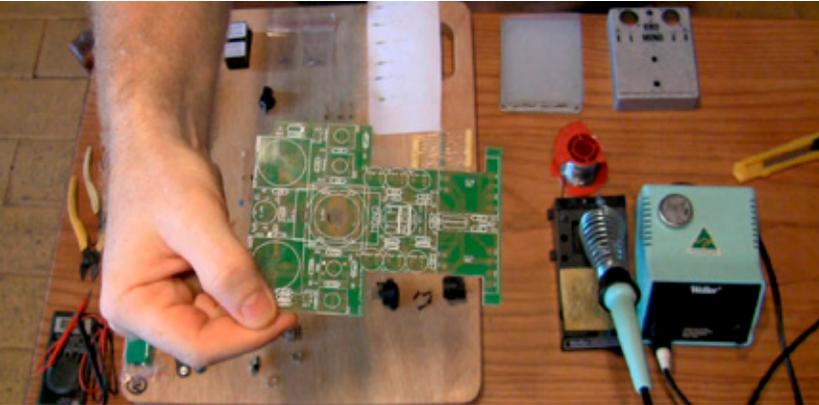
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Clockwise from Bottom Left: The preamp gets its first dose of power – and lights up!; the circuit board is clearly labelled so even the newbies can work it out; the legs of the gain pot get their extensions courtesy of the off-cuts from the diodes – nothing is wasted!; preamp close to completion; there are spaces on the circuit board for two op-amp options.

are soldered and trimmed up it's time to fit the op-amp IC socket followed by the capacitors.

There are two different capacitor sizes used in the JLM Mono. The larger ones are all of the same value and flank the gain pot position on the PC board. Capacitors have polarity too: again, marked on both the PC board and the capacitors themselves. Press the caps into position and solder them up.

Toggle switches for power, pad and phase are next on the agenda followed by the XLR sockets. Once these are in position, it's time to test the fit of the components to make sure all our toggle switches and XLRs line up correctly with the top cover. Once you're satisfied, solder them into position.

#### INPUT TRANNY

Next to the input transformer: this is where things get a little tricky. The input transformer has to be modified somewhat to fit onto the board and will also fit in backwards, which means you can accidentally install it the wrong way around. Clearly this is not what we want to do so take care with this step. After some considerable time spent moving the ground leg of the transformer I was able to finally solder the transformer into place. (This has since been rectified in version two of the JLM Mono, which is now available.)

Next to the DC connector. The legs saved from trimming up the diodes come into play here and are used to extend the legs of the DC connector. This is a fiddly job and you'll need a vice or PC board holder (and patience) to do the job properly. Next, solder up the LEDs and gain pot, which also get the leg extension treatment. Now is also a good time to install the smaller capacitors. Finally, after you've fitted up the battery terminals and impedance pot, we're ready to slot the circuit board into the top of the case... we're beginning to see the light at the end of the tunnel.

A couple of stick-on foam pads help secure the batteries in place and after some trimming of the polycarbonate

Lexan thermoplastic sheet we're ready to clip in the NiMH batteries and screw up the back plate.

#### WE'RE DONE!

Phew! I feel like I've worked for it, but she's a beautiful sight, and frankly, I've never been so pleased to see a blue LED light up! Now to see if the baby passes audio...

It's a tense moment as I connect the cables; but when the amplified sound of my own voice finally caresses my ears it becomes clear that even a simpleton can follow some well-written instructions and get a result! [Don't be so hard on yourself Guy! – Ed.] Fair chance you can too. Now we can finally move onto the more important discussion: how it sounds.

#### THAT MONO SOUND

In testing, this JLM Mono mic pre oozes quality, and it's not just my 'manufacturer's bias' speaking here either. The Mono pre offers plenty of clean gain and against my DAW interface preamps there's simply no contest. The Mono is far more open and transparent sounding, and gives all of my mics a new lease on life. Even my humble Shure SM58 has displayed obvious sonic improvements.

Switching from the Burr Brown Dual OPA2604AP op-amp to the JLM 99V was simple enough. In this configuration the Mono really shines. The 99V gives the lows more weight and definition, and the tops a lovely sheen. Joe describes the JLM 99V op-amps as "a Neve on steroids" and while I see the comparison I'd have to say it's not quite as thick and syrupy as a Neve, but it does sound huge!

The JLM Mono is a stellar pre in its own right. With its rugged build quality it would make a great mobile recording pre. Meanwhile, if the studio is your game, fit up the 99Vs and reap the rewards. If you've been putting off your first DIY build go grab your soldering iron and a JLM Mono Kit. It's time for action! ■

#### NEED TO KNOW



##### Price

Kit: \$150  
JLM 99V: \$75  
PSU: \$49  
Input Transformer: \$40 - \$60

##### Contact

JLM Audio  
(07) 3891 2244  
sales@jlmstudio.com  
www.jlmstudio.com

##### Pros

Rugged build quality.  
Great sound.  
A bargain, provided you don't charge yourself too much for labour.

##### Cons

No paper manual.  
Full headroom of the unit is only possible with 'optional' power supply.

##### Summary

There are very few excuses preventing genuine audio enthusiasts from building one (or several) of these Mono preamps. If the question of 'how do they sound?' is stopping you from attempting the build, fear not. The JLM Mono sounds great and would make a worthy addition to your preamp collection.