

# Universal PCB

# Valve Junior Chassis Conversion Guide

**Valve Jr Chassis Conversion Guide** 

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### 1. Introduction

This guide contains instructions for the "conversion" of an Epiphone Valve Junior, Harley Benton GA-5 or Legacy Valve Edition chassis and cabinet into a host for the construction of Tube (AKA Valve) amps based on the <u>Wattkins Universal</u> <u>PCB</u>.

The Universal PCB has mounting points & tube socket positioning such that it is easy to 'gut' a Valve Junior chassis and re-purpose it as the basis of a high quality guitar tube amp.

To simplify this guide the Epiphone Valve Junior, GA-5 & Legacy Valve Edition will collectively be referred to as the VJr.

This guide assists you through the conversion by providing instructions in:

- removing the stock VJr chassis from its cabinet,
- extracting the stock VJr PCB,
- drilling out the chassis to take the new Universal PCB,

### 2. Electrical Shock Warning



Building tube amplifiers involves working with, or around, high voltages. Working inside a tube amplifier can be dangerous if you don't know the basic safety practices. Building, modifying, or repairing tube amplifiers should only be performed by trained personnel.

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# 4. Project Overview

Building a tube amp based on the Universal PCB is a fun & rewarding project that can be completed by an inexperienced builder in a day or two.

This guide has been put together specifically to allow you to re-use a VJr chassis and Cabinet as a convenient base for such a project. Typically when building a Universal PCB based amp you'd use a 'blank' standard 16"x8" sized chassis and purpose built cabinet, but an unused surplus to requirements VJr may provide a cost effective alternative.

### 4.1 Here's what you'll need:

#### 4.1.1 Parts:

• A surplus to requirements VJr ;-)

#### 4.1.2 Tools:

- Standard screw driver
- Needle nose pliers
- Power drill (corded or cordless)
- 3/16", 5/16", 7/16", 1/2" Metal cutting bit
- Unibit, stepbit or punch to drill two 1¼" / 28mm & one ¾" / 20mm holes)

# 5. Let's get started...

OK. So you're ready to start. Let's get that VJr chassis out of the cabinet.

#### 5.1 Remove the VJr chassis

Take off the back panel by removing the seven (7) screws using a Phillips head screw driver.



Be careful pulling off the back panel. They are typically stuck onto the chassis. Slowly pull from each side to prevent the tolex from lifting off the panel.





Locate the screw caps on the top of the VJr. Using a standard screw driver, the smaller the better, pry up the caps until you can pull them out of their sockets.



# 5.2 Remove the VJr's Stock Components

A few of the stock VJr parts can be reused but many just need to be discarded. The tubes, tube retainers, and stock circuit board need to be removed.

#### 5.2.1 Remove the Tubes and Tube Retainers

It's as simple as:

- lift the tube retainer off the power tube,
- turn the retainer shield until the spring lifts the shield off the per-amp tube,
- pull the tubes out, and
- unclip the power tube retainer.

The tubes are useful but the other items can typically be discarded. They will not be reused in most Universal PCB based amps.

Now that the tubes and their hardware have been removed we can take a look inside. This is a version 2 VJr. You can tell by the green board and the rectified DC heater supply. Version 3s have a black board.









#### 5.2.2 Remove the Output Transformer from the Chassis

#### To remove the Output

Transformer (OT), disconnect its wire leads from the main amp circuit board and the output jack circuit board.

Pull these two spade connectors from the main circuit board.

You don't need to label the leads if you are discarding the OT to build a Push/Pull amp.

However, you might want to label



them (Input 1,Input 2, 4 out, 8 out, 16 out & Ground) just in case you want to reuse it in an SE build.

(I've never bothered ! It's an OK OT as long as you're using a V3 Epi, but the earlier versions are really not so good.)

Unscrew the output jacks from the chassis and separate the board from the chassis. The board will be glued to the chassis.

It may require some extra work to pick the glue off. Be careful not to damage the board or the output jacks. They will typically be reused with the chassis.



output jack board and pull the lead out. Remove the fastening nut at the star

grounding post and remove the output board's ground wire.

Clean up any remaining solder off the board to assist in the installation of the new transformer later in the build. Now that all of the leads are free, remove the mounting bolts to separate the transformer from the chassis.

Keep the nuts & bolts. You could use them to mount the new OT.





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Keep the output jack board with its ground wire attached.



The new OT you are going to use will need a new chassis mounting hole as it is almost certainly going to be larger than the stock VJr one.

Continue to use the hole closest to the edge of the chassis, and mark where the new one needs to be drilled. You could drill it now, or do it along with the rest of the drilling later.

#### 5.2.3 Clean up the Power Transformer

The stock VJr's Power Transformer (PT) provides leads for various mains supply voltages. The extra leads are fastened to dead posts on the stock circuit board for storage. We are going to clean up the inside of the chassis by pulling any unused power transformer leads outside of the chassis cavity.

Disconnect these three (3) leads from the stock VJr circuit board.



Version 1 and 2 VJr will have 12v secondary taps tied off and tucked inside the chassis. These need to be pulled outside and secured as well.



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After the leads are all pulled outside the chassis, bundle them together and tie them off.

You'll have to unscrew the PT from the chassis to provide enough room to use the PCB as the drill hole guide.

With almost all amps you could be building, if you have the money we strongly advise you to buy a higher quality PT and use it rather than the stock unit.

Sell it on eBay. People often pay stupid money for gear like that.

# 5.2.4 Remove the Volume Potentiometer

Unscrew the fastening nut from the volume potentiometer.



Pull the volume pot back into the chassis. Leave it connected to the stock VJr circuit board.



The volume pot will be glued to the chassis. This part will NOT typically be reused, so use whatever force you need.

# 5.2.5 Remove the Stock VJr Circuit Board

Disconnect these four (4) leads from the stock VJr circuit board.

Lift the ground wire from the star ground post.

Unplug the input jack wire at the circuit board.

Remove the six (6) screws fastening the circuit board to the chassis. Keep them. You'll use them to attach the new PCB.





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Remove the stock circuit board and pull all of the power transformer leads to the rim of the chassis.



You may as well salvage the ground wire from the stock circuit board for use later.

Unscrew the input jack and remove it from the chassis. Set it aside for reuse. You may use it for this project or construct a completely new input jack complex and use it in another build.



# 6. Prepare the Chassis

#### 6.1 Layout and Drill

Additional and enlarged holes need to be drilled in both the front panel & bottom of the chassis to cater for transformers, PCB & tube sockets and control potentiometers usually used with amps based on the Universal PCB.

#### 6.1.1 Layout the PCB for Drilling the VJr Chassis

Since the Universal PCB (and the previous generation Tweed 5E3 PCB) was designed to use the stock VJr chassis standoffs, one method to mark the additional chassis holes is to install the board.

(Note that the following photos show use of a Tweed 5E3 PCB. The Universal PCB has the same physical dimensions & drilling requirements)

Lay the circuit board in the chassis, align the stock mounting studs, and install two or three screws to fasten the board. With the board aligned to the chassis, mark the two additional stand-off & tube socket drill locations as shown.



You will also drill out the existing EL84 hole to make it wide enough for the second octal base.

I prefer laying the PCB on the outside of the chassis & marking the new drill holes on the outside as I only have a hand drill to use. Make sure you lay the PCB out with the 'PCB top' laying on the chassis so that the new holes are in the correct location!

Notice the PT has been unbolted from the chassis so that it can be moved over enough that the PCB can be lined up correctly with the existing stand-offs. You could just remove it entirely at this stage.



Mark the existing stand-offs so that you can use them to line up the PCB & then lightly tape it to the chassis.

Use a felt tip marker to then mark where the

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new drill holes are to go.

This way you will be able to drill the chassis holes from the outside of the chassis with a hand drill and not drill holes in the top of your workbench!

The blue arrow points to the existing power tube hole that you'll need to enlarge to cater for the Octal base.

Note the circled grommet. This is a new hole that you should drill to take the OT 'input' wires that connect to the PCB. I find it a bit of a squash trying to get all of the wires from the new OT through the one existing hole.

#### 6.1.3 Drilling the Chassis base

Whilst the Universal PCB uses the stock stand-offs, the circled one still needs to be removed. It's too close to the new hole you need to drill out for the first noval socket. Don't worry though. We add two more stand-offs to more than make up for it.

Start by setting the center of each hole to be drilled. A center punch is often used. If you don't have one, use a really small drill bit first to set the 'centre'.



Then use the 'right' size drill bit to enlarge the hole appropriately. I use a step bit (AKA Unibit) to do the really large holes.

You want to drill the Noval (9-pin) holes so that the socket 'lip' rests against the chassis. The Octal (8-pin) socket holes need to allow the socket to slip all the way through.

De-burr or countersink each hole to ensure no sharp edges will cause injury or component failure. I use a Dremel with a grinding stone bit.

Notice that the existing VJr EL84 power tube hole needs to be enlarged to cater for the Octal socket.

The second Octal socket hole isn't shown in the picture here. It's started from fresh.

Make sure that the Octal sockets can fit through the hole. The Noval socket wants to rest up against the chassis, but

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the Octal is 'thicker' & needs to actually pass through for everything to fit nicely.

When doing a scratch build, both Noval sockets will fit snug against the chassis but when doing this VJr chassis conversion, the second is going to be 'free' as the existing hole is quite wide.

#### 6.1.2 Layout a Faceplate for drilling

Professional grade faceplates can be designed & fabricated to suit the chassis you are installing the Universal PCB into. Search around & ask at the <u>Wattkins</u> (and related) web site(s). If you are using a faceplate we highly recommend you use it to lay out the front panel drill locations. It's much more accurate to use the actual faceplate than it is to use a drill plan printout.

If you are using a <u>'Universal Chassis'</u> the front (and rear) chassis holes are already drilled & it is a matter of sourcing a faceplate to suit the pre-drilled chassis, rather than the other way round

If you have a faceplate, align the faceplate with the front of the chassis and trace each drill location.



If you are going to use one of the faceplate designs & get it fabricated yourself at your local Trophy Store (but haven't got it yet) and are desperate to drill the front panel you could print a copy from your Laser printer & stick it on the chassis front instead of using the actual plate itself.

Make sure you print the design at 'native resolution' and don't scale it to fit the print page size of your printer.

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	Taucert	4	9	4	9	4	9	2.5			
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STANDER		TONE		INST VOL		Mic Vol		INST		MIC	

I find I still need to use my Dremel (with grinding stone bit fitted) to get the drill holes 'perfect' even when I use the actual faceplate, so don't be too stressed doing this if you really want to get on with things.

Affix the printed copy to the chassis with a generous amount of glue stick or tape. Drill the holes using the print out as the guide.

If you are using the real panel, once you've marked the circles on the chassis where you will need to drill, remove the panel, & then go for it.

Your old "surplus to requirements" VJr chassis is now ready to be used for something useful ;-)