

# **ASSEMBLY MANUAL FOR BUD GUITAR TUBE AMP KIT**

# **Acknowledgements**

This manual was developed and published by:  
TubeDepot.com LLC, Memphis, TN

*Written by:*  
Josh Phelps

*Edited by:*  
Josh Phelps  
Michelle Keller  
Christian Magee

*Design and Artwork by:*  
Josh Phelps  
Ben Siler  
Christian Magee

*Special thanks to the following for their design help:*  
Joe Austin    Ben Siler    Matt Kirby  
Allen Towery    Ryan McCrory

Copyright © 2019  
TubeDepot.com LLC  
1958 Vanderhorn Drive  
Memphis, TN 38134  
(877) 289-7994  
[info@tubedepot.com](mailto:info@tubedepot.com)

## **REGARDING THESE BOOK MATERIALS**

Reproduction, publication, or duplication of this booklet, or any part thereof, in any manner, mechanically, electronically, or photographically is prohibited without the express written permission of the publisher.

The Author, Publisher or Seller assumes no liability with respect to the use of the information contained herein.

For permission and other rights under this copyright, contact TubeDepot.com.

# **Table of Contents**

Preface.....	4
<u>Chapter 1</u>	
Safety.....	5
<u>Chapter 2</u>	
Tools and Supplies.....	7
<u>Chapter 3</u>	
Parts Inventory/Population Charts.....	8
<u>Chapter 4</u>	
Cabinet Construction.....	13
<u>Chapter 5</u>	
Chassis Preparation Part 1.....	14
<u>Chapter 6</u>	
PCB Assembly Part 1.....	14
<u>Chapter 7</u>	
PCB Assembly Part 2.....	16
<u>Chapter 8</u>	
Power/Output Transformer Installation.....	17
<u>Chapter 9</u>	
Chassis Preparation Part 2.....	17
<u>Chapter 10</u>	
Testing.....	20
<u>Chapter 11</u>	
Speaker Installation.....	21
<u>Chapter 12</u>	
Power Up and Testing.....	22
<u>Chapter 13</u>	
Schematic.....	23

# Preface

## **BUD Guitar Tube Amp Kit Introduction:**

The BUD vacuum tube amp kit, employing a timeless tonal recipe that includes a genuine Class-A, low wattage, all-tube signal path, includes everything you will need to complete the kit in a few hours with astounding results. Made up of two 12AX7 gain stages, tone stack, single-ended EL84, American made iron and a Jensen 10" driver, The BUD is an affordable, fun to build, great sounding amplifier kit that will be a revelation for you and your tone.

BUD - All new, living things begin as a bud. Like plants and flowers bud before they bloom - new and seasoned musicians need to BUD. Maybe you're starting a new journey into tubes. Perhaps you might be an old hat looking for a new style. Could it be true that low wattage amps actually sound better and can breathe new life into your tone? Whatever the reason, BUD is the answer.

"Tube amps are expensive," they said. "You can't afford a tube amp. It's out of your reach." That was then, and this is now. Designed for the budget conscious, the all new TubeDepot BUD is a powerful sounding, vacuum tube amp kit you can play in your bedroom, onstage and in the studio. Sounding more like a vintage behemoth, this portable and easy to build kit will astound you with its simple, yet creamy tone.

## **Let's Get a Little Technical:**

For the BUD, we spec'd high-quality, American made Classic Tone Power and Output Transformers. Classic Tone uses only premium materials and paper layer windings - like the vintage era Classics! The BUD Class-A circuit uses a single JJ 12AX7 to drive a single-ended, sweet sounding JJ EL84 power tube. With the included Jensen MOD 10/35 8Ω speaker, this little amp offers a wide spectrum of tone. The 10" speaker delivers the full, rich and creamy tone only a full size driver can convey. The chassis is laser cut and formed right here in Memphis. There's no cutting or drilling that could ruin your hard work with one slip. With all the holes already in place, you'll have no problems with assembly of the chassis components.

The BUD can also be bought as a stand-alone head. Just select the 'No Cab / No Speaker' option when making your selection. The head can be plugged into any guitar cabinet with great results. We use the BUD with our shop Mesa cab loaded with Celestion speakers and it sounds amazing.

# Safety

## WARNING!

TUBEDEPOT™ PRODUCTS ARE INTENDED FOR MUSIC-INDUSTRY PROFESSIONALS AND SERIOUS, PROFESSIONAL-MINDED ENTHUSIASTS. ALL TUBE AMPLIFIERS CONTAIN AND OPERATE ON **LETHAL** VOLTAGE LEVELS. THE **MISUSE** OF YOUR TUBEDEPOT™ PRODUCT OR **FAILURE TO ADHERE TO THE FOLLOWING** DIRECTIVES MAY RESULT IN **DEATH OR SERIOUS BODILY INJURY**.

Customers must check each of the following and click **“I UNDERSTAND”** to proceed:

- ☐ **FOLLOW** all instructions, and observe all safety warnings, stated in the Instructions or Assembly Manual provided with your TubeDepot™ product.
- ☐ **DO NOT** use your TubeDepot™ product in any manner different from its intended, advertised purpose as stated in the Instructions or Assembly Manual provided with your TubeDepot™ product.
- ☐ **DO NOT** test, turn on, or attempt to operate any TubeDepot™ pedal, amplifier, amplifier kit, or any other TubeDepot™ electronic device or system **UNLESS** that device or system has first been properly grounded to a three-pronged AC outlet using an unmodified three-pronged plug.
- ☐ **DO NOT** test, turn on, or attempt to operate any electronic device or system into which any TubeDepot™ vacuum tube, resistor, capacitor, jack, adapter, connector, or any other TubeDepot™ electrical component has been installed **UNLESS** that device or system has first been properly grounded to a three-pronged AC outlet using an unmodified three-pronged plug.

**BEFORE** attempting to install any TubeDepot™ vacuum tube, resistor, capacitor, jack, adapter,

connector, or other electrical component to pre-existing electronic device or system, ensure that device or system is disconnected from its power source.

- ☐ **BEFORE** handling, opening, reaching inside of, or attempting to replace any component of any TubeDepot™ amplifier or any other electronic device containing TubeDepot™ or any other kind of vacuum tube(s), wait at least 10 minutes from the time the device is turned off for tubes to cool down AND disconnected from its power source and drain filter capacitors to ensure any residual electrical charge has dissipated.
- ☐ **NEVER** attempt to test, operate, handle, or touch a TubeDepot™ pedal, amplifier, or any other TubeDepot™ electronic device or electrical component in rain, snow, and other precipitation, wet or damp conditions, in or near standing pools of water, or in the presence of any tangible surface moisture whatsoever.
- ☐ **NEVER** attempt to test, operate, handle, or touch a TubeDepot™ pedal, amplifier, or any other TubeDepot™ electrical device or component with wet or damp hands or while wearing wet or damp clothing.

**DO NOT** attempt to alter or modify any TubeDepot™ product in any manner whatsoever unless in accordance with precise instructions included in the “Recommended Modifications” section of the Instructions or Assembly Manual provided with your TubeDepot™ product. A TubeDepot™ product may be safely modified **ONLY** if the Instructions or Assembly Manual provided with that product contains a “Recommended Modifications” section.

## **I UNDERSTAND**

## **2 Tools and Supplies**

You've got your BUD. Let's get unpacked and BUILD.

Tools Needed for Build - Not Supplied with Kit:

- [Soldering Iron](#)
- [Solder](#)
- [Automatic Center Punch](#)
- [Step Drill Bit](#)
- Cordless Drill
- [Deburring tool](#)
- Drill Bit
- [Wood Glue](#) - to glue cabinet joints
- [Electronics Cleaning Brush](#) - to apply glue to cabinet joints
- Bar Clamps - to clamp cabinet while drying
- Wire Clippers

Optional Tools - Not Supplied with Kit:

- [Helping Hands with Magnifying Lens](#)
- Countersink Drill Bit

# 3 PARTS INVENTORY / POPULATION CHARTS

## 3.1 Parts Inventory

Quantity	Part	Inventory
<b>Large Items</b>		
1	10" Speaker Cabinet with Back Panel and 9" Cleats	
1	BUD PCB	
1	Jensen MOD10/35 - 8Ω	
1	BUD Chassis	
1	Classic Tone 18111 Power transformer	
1	Classic Tone 18030 Output transformer - 4Ω / 8Ω	
<b>Hardware</b>		
8	6-32 Phillips Pan Head - 1/4"	
3	#6 Female/Female Hex Aluminum Standoff - 1/2"	
4	6-32 Phillips Pan Head - 3"	
8	6-32 SAE Flat Washer	
6	6-32 Machine Screw Keps Nut	
4	8-32 Phillips Pan Head - 3/8"	
4	8-32 Machine Screw Keps Nut	
6	Wood Screw, Fine Thread - 1"	
2	Solder Tab with Lock Washer	
2	Rubber Grommets - 3/8"	
2	Rubber Grommets - 1/2"	
1	Lock Washer, Internal Tooth - 1/2"	
1	Locking strain relief	



Control Panel / Chassis Components		
1	Carling SPST Toggle Switch	
1	120V LED indicator	
2	British Style Set-Screw Knob	
2	Glass Fuse (3AG size: 1-1/4" x 1/4" ), Slow-Blow	
1	Fuse Holder with Conical Cap	
1	Switchcraft 11 1/4" Jack	
1	Switchcraft 280, 1/4" Straight Audio Plug	
1	3 Meter - 3 Prong Power Cord	
PCB Components		
2	Belton 9 Pin Miniature PC Mount Socket	
1	JJ ECC83s / 12AX7 Preamp Vacuum Tube	
1	JJ EL84 / 6BQ5 Power Vacuum Tube	
2	1/2 Watt Carbon Film Resistor-10K	
1	1/2 Watt Carbon Film Resistor-12K	
1	1/2 Watt Carbon Film Resistor-33K	
1	1/2 Watt Carbon Film Resistor - 68K	
2	1/2 Watt Carbon Film Resistor-470K	
1	1/2 Watt Carbon Film Resistor-1M	
1	1 Watt Carbon Film Resistor-47	
1	1 Watt Carbon Film Resistor-1.5K	
1	1 Watt Carbon Film Resistor-2.7K	
1	1 Watt Carbon Film Resistor-5.6K	
2	1 Watt Carbon Film Resistor-100K	
1	2 Watt Metal Oxide Power Resistor-10K	
1	3 Watt Metal Oxide Power Resistor-68	
2	3 Watt Metal Oxide Power Resistor-4.7K	
4	Xicon .022μF / 630V	
1	Silver Mica 10pF / 500V	
2	Nichicon 22μF / 450V	
2	Nichicon 1μF / 50V	
1	Silver Mica 500pF / 500V	
1	Nichicon 100μF / 50V	

	1	Nichicon 47 $\mu$ F / 450V	
	1	Alpha 16MM Audio Pot, PCB Mount - Smooth - 250K	
	1	Alpha 16MM Audio Pot, PCB Mount - Smooth - 1M	
	2	1N4007 Diode 1A / 1000V Rectifier	
	1	503 1/4" Jack	
<b>Shielding / Wire / Shrink Wrap</b>			
	2	2" Aluminum Shielding Tape	
	1	20 Ga. Stranded, High-Temperature PVC Wire - Yellow	
	2	20 Ga. Stranded, High-Temperature PVC Wire - Black	
	2	18 Ga. Stranded, High-Temperature PVC Wire-Black	
	2	18 Ga. Stranded, High-Temperature PVC Wire-White	
	1	Black 1/8" Heat Shrink Tubing	

## 3:2 Population Chart

<b>TubeDepot BUD PCB Population Chart</b>		
	<b>Resistors</b>	
	Description	SKU
<b>R1</b>	1/2 Watt Carbon Film Resistor - 68K	R-293-68K
<b>R2</b>	1/2 Watt Carbon Film Resistor-1M	R-293-1M
<b>R3</b>	1 Watt Carbon Film Resistor-2.7K	R-294-2.7K
<b>R4</b>	1 Watt Carbon Film Resistor-100K	R-294-100K
<b>R5</b>	2 Watt Metal Oxide Power Resistor-10K	R-262-10K
<b>R6</b>	1 Watt Carbon Film Resistor-100K	R-294-100K
<b>R7</b>	1/2 Watt Carbon Film Resistor-33K	R-293-33K
<b>R8</b>	1/2 Watt Carbon Film Resistor-10K	R-293-10K
<b>R9</b>	1/2 Watt Carbon Film Resistor-470K	R-293-470K
<b>R10</b>	1/2 Watt Carbon Film Resistor-12K	R-293-12K
<b>R11</b>	1 Watt Carbon Film Resistor-1.5K	R-294-1.5K

<b>R12</b>	1 Watt Carbon Film Resistor-5.6K	R-294-5.6K
<b>R13</b>	1 Watt Carbon Film Resistor-47	R-294-47
<b>R14</b>	1/2 Watt Carbon Film Resistor-10K	R-293-10K
<b>R15</b>	1/2 Watt Carbon Film Resistor-470K	R-293-470K
<b>R16</b>	3 Watt Metal Oxide Power Resistor-4.7K	R-283-4.7K
<b>R17</b>	3 Watt Metal Oxide Power Resistor-4.7K	R-283-4.7K
<b>R18</b>	3 Watt Metal Oxide Power Resistor-68	R-283-68
	<b>Capacitors</b>	
<b>C1</b>	Xicon .022μF / 630V	CP-XI-022-630V
<b>C2</b>	Silver Mica 10pF / 500V	CP-SM-10-500V
<b>C3</b>	Nichicon 22μF / 450V	CP-NI-22-450V
<b>C4</b>	Nichicon 1μF / 50V	CP-NI-1-50V
<b>C5</b>	Silver Mica 500pF / 500V	CP-SM-500-500V
<b>C6</b>	Xicon .022μF / 630V	CP-XI-022-630V
<b>C7</b>	Xicon .022μF / 630V	CP-XI-022-630V
<b>C8</b>	Xicon .022μF / 630V	CP-XI-022-630V
<b>C9</b>	Nichicon 22μF / 450V	CP-NI-22-450V
<b>C10</b>	Nichicon 1μF / 50V	CP-NI-1-50V
<b>C11</b>	Nichicon 100μF / 50V	CP-NI-100-50V
<b>C12</b>	Nichicon 47μF / 450V	CP-NI-47-450V
	<b>Diodes</b>	
<b>D1</b>	1N4007 Diode 1A / 1000V Rectifier	D-1N4007
<b>D2</b>	1N4007 Diode 1A / 1000V Rectifier	D-1N4007
	<b>Potentiometers</b>	
<b>P1</b>	Alpha 16MM Audio Pot, PCB Mount - Smooth - 250K	RV16A-PCB-SMOOTH-250K
<b>P2</b>	Alpha 16MM Audio Pot, PCB Mount - Smooth - 1M	RV16A-PCB-SMOOTH-1M
	<b>Input Jack</b>	
	503 1/4" Jack	P-CHK-503

## 3.3 Wire Population Chart

TubeDepot BUD Wire Population Chart	
Filament	
1	Green from 18111
2	Green from 18111
B <sup>+</sup>	
1	Red from 18111
2	Red from 18111
Wires	
W1	Black from fuse holder side tab
W2	Black + Brown from 18111
W3	Black/White + Brown/White from 18111
W4	White from AC cord
W5	Red/Yellow from 18111
W6	Black from chassis wall tab
W7	Green/Yellow from 18111
W8	Red from 18030
W9	Blue from 18030
W10	N/A
W11	Yellow wire connects to speaker jack tip
Speaker Jack	
Sleeve	Black wire from 18030
Tip	Green from 18030 and Yellow from W11

For 240v operation, remove only Black/White from W2 and Brown from W3. Then connect them together and heat shrink off the excess exposed wire. You'll also need to sub the 120v indicator lamp for a 240v. If you selected your proper wall voltage at the time of checkout your kit will include the correct light.

# 4 Cabinet Construction

## 9" x 3/4" x 3/4" Cleat Installation:

- ☐ **Step 1** - Place assembled cabinet on a flat table with the speaker baffle facing up.
- ☐ **Step 2** - Make sure the rear baffle is inside the cabinet and pushed all the way up toward the control cutout / top side.
- ☐ **Step 3** - Reaching through the speaker cutout, draw a line along the edge where the rear baffle and the side-wall meet. Do this on both sides. **This line is very important because it determines the depth of the rear baffle.**
- ☐ **Step 4** - Use a fine point pencil to create a nice, crisp line.
- ☐ **Step 5** - Apply some glue to one side of the 9" cleats and clamp them in place along the line you drew. Allow these to dry for at least 3 hours.
- ☐ **Step 6** - While the cleats are drying, measure and draw a line 3/8" from the outside edge of the rear baffle. This line should be along the short (9 1/4") edge. Do this on both sides.
- ☐ **Step 7** - Mark three points on each line that represent the screw placements.
- ☐ **Step 8** - Place the cabinet on a flat table, speaker baffle facing down, and put the rear baffle in place making sure the baffle is pushed all the way to the top - toward the control cutout.
- ☐ **Step 9** - Use a countersink drill bit to create 6 countersunk holes on the points that you made.
- ☐ **Step 10** - Use the provided wood screws to fasten the rear baffle in place.

# 5 Chassis Preparation Part 1

- ☐ **Step 1 -** Locate the four grommets. The two larger ones are for the power transformer. The two smaller grommets are for the wires that are on the output transformer.
- ☐ **Step 2 -** Install the two large grommets in the larger holes and the two smaller ones in the smaller holes. These are in place to prevent nicking of wires as they pass through on potentially sharp edges from the holes. Once installed, use a screwdriver shaft or an orange wood stick and work it around for a proper fit.
- ☐ **Step 3 -** Next, install the strain relief. The strain relief goes on the rear panel on the far left side facing the opening of the chassis. It is essential that this is very tight. Only tighten the removable nut at the base at this time. The loose part is going to tie down the AC cord which will be covered later.
- ☐ **Step 4 -** Next, install the fuse holder. Insert the rubber washer then install the holder through the panel first. The large brass nut will go on the inside of the chassis. Hand tighten it to make sure the orientation of the tab is facing upward for easy access and soldering when it's time to install the AC cord. Now, finish tightening the brass nut down and make sure the holder can no longer rotate. Once it's in place, take your fingernail or a flathead screwdriver and slightly elevate the side tab.

# 6 PCB Assembly Part 1

***Tech Tip:*** When working with solder, make sure you have a well-ventilated work space with an exhaust system collecting the dangerous fumes, or even a small, cheaper fan on a bench to help protect you. If you can feel the breeze on your face you know that it's working. There are very bad things in solder that you don't want to breathe in.

- ☐ **Step 1 -** Align pin 9 on your tube sockets with the 9 next to the tube socket cutouts on your PCB.
- ☐ **Step 2 -** Give a visual inspection to make sure that all the pins are going through and the sockets are all the way in.

- ☐ **Step 3 -** Set your soldering iron to 350 degrees centigrade. Solder a single pin on one side while applying a slight downward pressure on the PCB. When the solder connection is dry, this will anchor the socket into place.

***Tech Tip:*** We recommend using Kester solder which you can purchase at [TubeDepot.com](http://TubeDepot.com). While soldering, do not feed solder onto the soldering iron tip. Feed solder only onto a properly heated surface. A properly heated solder connection will be a seamless and shiny connection.

- ☐ **Step 4 -** Solder all of the other pins.

***Tech Tip:*** Solder is not structural, but it can help support the socket pins when you're changing tubes repeatedly through the life of the amplifier. You want to use a little bit of excess solder when you're installing the pins. It will help ensure that none of these solder connections break.

- ☐ **Step 5 -** Flip the board over and solder the pins one at a time from the top side to ensure a good connection on the top pad and bottom pad.

***Tech Tip:*** Go around freely and solder all other connections using a generous amount of solder. A properly heated solder connection will be a shiny, seamless, and solid connection. The pad will be covered in solder and the pin will have a seamless connection.

- ☐ **Step 6 -** Next, insert the input jack into your PCB where the PCB is labeled "input" and solder its pins into place ensuring that solder makes it through and is present on the upper and lower pads.

***Tech Tip:*** It's essential for every solder connection on this amplifier to have a solid connection on the top and on the bottom.

- ☐ **Step 7 -** Insert the potentiometers into P1 (250k) & P2 (1M) then solder them into place from the backside. You will need to slightly bend the outside two pins by gently wiggling the tabs into their holes.

- ☐ **Step 8 -** Take a pair of pliers and pop off the indexing pins located by the shaft base of your pots.

- ☐ **Step 9 -** Locate three 6/32 screws and the three included threaded standoffs then attach the standoffs to the three holes on your PCB.

- ☐ **Step 10 -** Test fit the PCB into the chassis to make sure you have proper alignment on your pot shafts, input jack, tube sockets, and standoff holes.

***Tech Tip:* If the sockets are not 100 percent flush, it's okay because it is very difficult to get those sockets perfectly flush. It's the nature of how they are made. The tube will seat just fine.**

- ☐ **Step 11** - Remove the board and do the final installation of the components of the PCB following the population chart from the front of this manual. Start with the large polarized capacitors (these capacitors must connect their positive side to the “+” symbol on your PCB) and you will have a level/elevated surface to solder the rest of the components so that you are not pressing the resistors down flat against the PCB.

***Tech Tip:* The resistors that will need to be elevated (1/16” air gap spacing under the components can be done with a 3” x 1/4” cut out section of a thick business card) from the board are going to be R17, R16, R5, R6, R4, and R18.**

- ☐ **Step 12** - Install all the remaining components following the population chart in the front of this manual. After all the components have been installed, do a visual inspection and make sure you have a solid and seamless connection on all of the PCB pads on the top side and bottom side. Also make sure you have installed your jumper wire at “J1”. You can use any excess lead that you have clipped off of your other components to make the jumper. Once this is complete, clip off any remaining excess length of the component leads that are protruding from the backside of the PCB.

## 7 PCB Assembly Part 2

- ☐ **Step 1** - Cut two pieces of the 22 gauge black wire that is included with your kit to four inches long.
- ☐ **Step 2** - Repeat with a piece of your yellow 22 gauge wire that is included. Strip your wire back about 1/8”.
- ☐ **Step 3** - Tin the exposed wire tips.
- ☐ **Step 4** - The two black pieces of wire are going to be soldered to the tabs on your AC switch and then they will connect to your PCB through the back side by the two solder pads in front of “switch”.



☐ **Step 5 -** Flip the board over and make sure there is a solid connection on both sides. Clip any excess leads.

☐ **Step 6 -** Solder the yellow wire to W1 through the back side. Once in place, gently fold the wire so that it runs parallel to the bottom side of the board without touching it.

## 8 Power/Output Transformer

### Installation

☐ **Step 1 -** Remove the rubber bands from the transformers, gently straighten the wires from the transformers, and carefully insert them through the holes in the chassis. Be careful not to strain the wires where they come out of the transformers. Find the four 8/32 screws and four corresponding kep nuts.

☐ **Step 2 -** Take the black and white, brown and white, solid black, and solid brown wires from your power transformer and insert them through the grommet on the wall of the chassis closest to the grounding tabs and your AC cord. The remaining wires need to go through the remaining grommet.

☐ **Step 3 -** Gently pull the wires through making sure not to strain them. Gently twist together your green wires and then also twist together the red wires. Now install your 8/32 kep nuts and screws.

***Tech Tip:*** The kep nuts should start to cut into the chassis, which is what you want. You want a solid, tight screw connection. They may spin a little and you'll have to grab the other side with either a crescent wrench or a socket.

☐ **Step 4 -** On the output transformer, the yellow, black, and green wires will go towards the back panel that has the AC cord and the fuse holder. The red, blue, and brown wires will face the front.

## 9 Chassis Preparation Part 2

☐ **Step 1 -** Take two of the 6/32 screws, two soldering tabs, and a pair of pliers; then bend the solder tabs and make sure you leave enough room for one of the 6/32 kep nuts to

fit over the hole. There are two holes by the AC cord on the chassis. Put the screws into these holes. Position these two tabs upward and tighten them down using 2 6/32 screws and kep nuts. Make sure the Phillips head portion of the screw is on the outside of the chassis and the kep nut is on the inside. These must be **VERY** tight and never come loose.

***Tech Tip:* These will make the most important connections in the amplifier. It is absolutely essential that these never come loose under any circumstances.**

- ☐ **Step 2 -** Install the 1/4 inch Switchcraft mono jack into the back panel with the two tabs facing upward so that you can get to it when it's time to solder.
- ☐ **Step 3 -** Locate your AC cord and strip back 7 inches of the jacket AC cord.
- ☐ **Step 4 -** Do a visual inspection of the wires where the jacket was stripped to ensure that there are no nicks or damage to the wires.
- ☐ **Step 5 -** Slide the wires through the strain relief with the green wire facing the left side of the chassis closest to the solder tabs. The sleeving of the AC cord should pass through a 1/2" into your chassis beyond the strain relief then your 7" of exposed internal green, white, and black wires beyond that . Now tighten your strain relief down. This must be very tight.
- ☐ **Step 6 -** Insert your PCB into the chassis. Make sure everything is properly in place. The jack and both of the potentiometers' shaft bases should be flat against the inside wall. Take the remaining three 6/32 screws and place them in the holes for your PCB standoffs and tighten them.
- ☐ **Step 7 -** Screw on the input jack and the volume and tone pot nuts and tighten them down. These need to be snug, but do not over tighten these. Tighten just until they stop.
- ☐ **Step 8 -** Locate the lock washer and the 1/2" shaft Carling switch. Take the spacing washer and thread it back on the shaft with the lock washer. Leave enough space for the thickness of the wall of the chassis. Hand-tighten the switch for right now to allow you to solder these two wires to the AC switch tabs. Once this is done, orient the switch parallel with the PCB and tighten down the switch.

- ☐ **Step 9 -** Take a four inch piece of the 22 gauge black wire and connect it between W1 and the side tab of your fuse holder. The fuse holder side of your black wire should have a V bent into 1/2" of its exposed pre-tinned length and then run through the fuse holder's hole on its side tab. Then pinch down the V with pliers to make a mechanical connection before soldering. Next, take the black wire from your AC cord and solder it to the tip of your fuse holder making a mechanical connection identical to your previous fuse holder connection.
- ☐ **Step 10 -** Solder the white wire from your AC cord to W4 on your PCB.
- ☐ **Step 11 -** Solder the green wire from your AC cord to the closest solder tab on the wall of the chassis making a mechanical connection utilizing a V bend in your pre-tinned exposed wire before soldering the wire into place.
- ☐ **Step 12 -** Solder another piece of your included black 22AWG wire from the remaining solder tab on the wall of your chassis utilizing another V bend mechanical connection before soldering it into place. Then connect the other side to your PCB at W6.
- ☐ **Step 13 -** Follow the wire population chart from the beginning of your manual for information on the remaining wire connections. Triple check your chart before proceeding with the testing phase of your assembly. **Make 100% sure none of the wires in the amplifier will make contact with any of the resistors in the amp. Specifically make sure that the blue wire that connects to W9 does not go over R16/R17 but instead it should go around the other side of C12. Once it's soldered to W9, hold it in place to neighboring wires with a small zip tie.**

***Tech Tip:*** If you live in the United States and you have 120 wall voltage, you need to confirm that you have a 120 voltage indicator light. If you live elsewhere and you have 240 voltage make sure that you have a 240 voltage indicator light and also see the note on the bottom of your wire population chart for 240v wiring changes that need to be made.

# 10 Testing

Now that you've completed your amplifier, it's time to do some testing to make sure that it is safe before we check voltages or proceed with anything else.

- ☐ **Step 1 -** Using a dim bulb tester, plug the AC cord in and have your power set to ON. Turn on the tester's switch.

***Tech Tip:*** If you don't have a dim bulb tester you can probably get away with using a power strip with a switch, but do not touch the chassis until you've concluded it is safe to do so.

- ☐ **Step 2 -** Take a digital multimeter and set the meter to AC volts. Take one lead—it doesn't matter which—and anchor it on the chassis. Use one of the chassis bolt holes to anchor it. Take the other lead and touch it to the test box which is grounded to the wall's ground. If the multimeter goes to 0 volts AC that lets you know there is zero AC voltage. Switch to DC voltage and repeat the process. If there is no voltage on the chassis, then you can safely touch the chassis.

***Tech Tip:*** It's a good idea to label your tube sockets. If you flip your tube amplifier over and look on your PCB, it's labeled 12AX7 and EL84 on the socket. Also, if you have a dummy load, it's wise to use one during the next phase of testing in case there is an incorrect connection as you could damage your output transformer. If you do not have a dummy load, you can use your speaker, but be aware that you will hear pops and they can be startling.

- ☐ **Step 3 -** Now, with your tubes installed, turn the dim bulb tester/amplifier back on and after allowing the tubes to heat for roughly 60 seconds, repeat the previous steps checking only for DC this time. If your bulb doesn't glow and you get a zero volts reading, you are safe to proceed with your amplifier plugged directly into a wall outlet.
- ☐ **Step 4 -** Switch your meter to DC volts and starting on your EL84, you should get these voltages +/- 5%
  - pin 3 – 3 vdc
  - pin 9 – 161 vdc
  - pin 7 – 178 vdc

- ☐ **Step 5** - With your meter still set to DC volts, move to the 12AX7 and you should get these voltages +/- 5%
- pin 8 – 1.1 vdc
  - pin 3 – .9 vdc
  - pin 1 – 114 vdc
  - pin 6 – 126 vdc

## 11 Speaker Installation

- ☐ **Step 1** - Take your two pieces of black and white 18AWG wire and gently twist these together. You want to connect one end of your black wire to your negative tab on your speaker tab with a V bend mechanical connection before soldering. Then do the same with the white wire on the speaker's positive tab.
- ☐ **Step 2** - Next, slide the barrel of your Switchcraft 1/4" male plug over your wires connected to your speaker. Then connect (solder) your black wire to the sleeve (the lower longer tab) of the jack and then do the same with the white wire, but connect it to the smaller upper tab.
- ☐ **Step 3** - Gently close the pinching tabs on your jack's base around the wires before screwing the barrel into place.

***Tech Tip:*** Be very careful that you don't over tighten these tabs because they will cut through this jacket easily and your amplifier won't work.

- ☐ **Step 4** - Turn your speaker cabinet around with the speaker facing up. You will line your speaker up with the four t-nuts and install the bolts.
- ☐ **Step 5** - Now, take your back panel. It ships with an arrow drawn with a pencil; you can erase this when you're done. **This does not indicate center.** This indicates the top side that will be by the handle of your amplifier. Turn that around facing you. Take the back and locate the center point of the back panel and put a pencil mark on the edge at the center point. Next, find the center point of your chassis. This is an 8 inch chassis, so 4 inches from either side will get you to your center point. It's always better to double and triple check this beforehand. Measure three or four times, drill once.
- ☐ **Step 6** - Now that you have your center point on your chassis and your back panel, bring your chassis up to the edge. Keep it about 1/16 of an inch from the edge. Do not

make it flush. Make sure it's squared. You can take something like a small Phillips head screwdriver and stick it through the hole. There is another hole on the other side. This will allow you to get right where you need to be. Find that hole and once you feel that you are in it, find the center point and then press to make an indentation.

- ☐ **Step 7 -** Do the same on all four of these and do not move the chassis at all until you have completed this.
- ☐ **Step 8 -** Once you've completed making your four indentions, circle the indentions and you can go back over these with your center punch to make a more defined spot to provide a more accurate drilling hole.

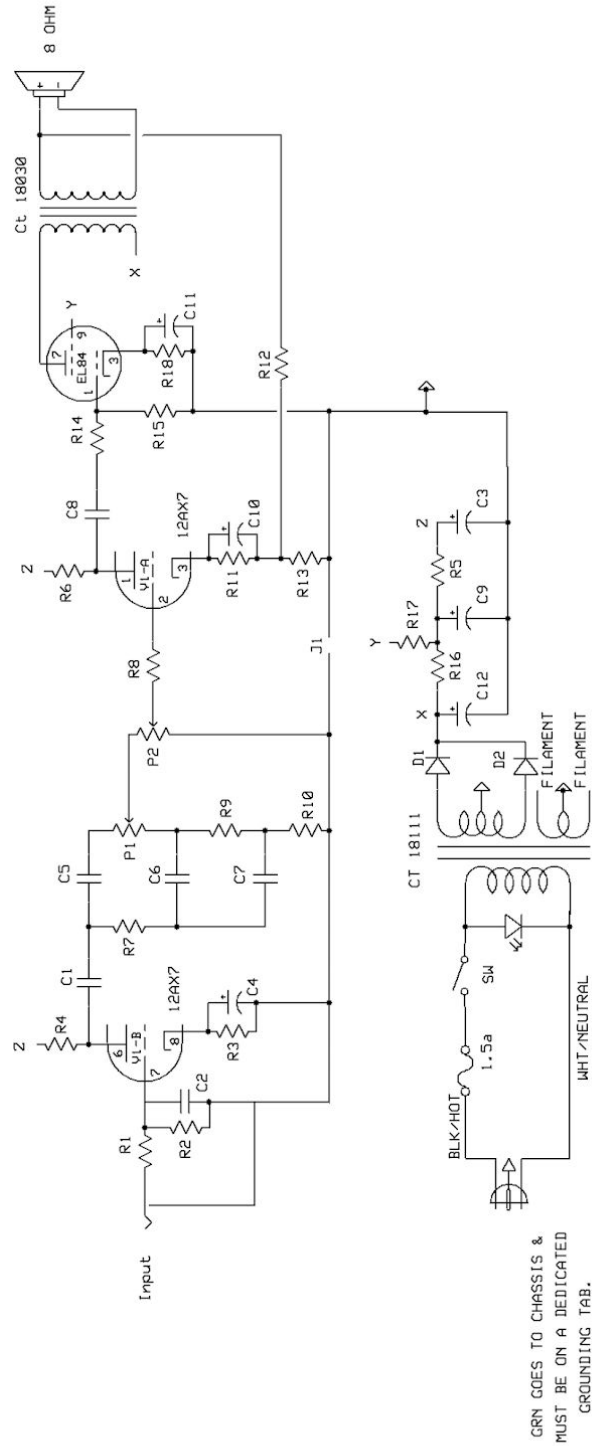
***Tech Tip:*** This next step you can do by hand, but it's nice to have a drill press. Either way you want to have some kind of backing material to prevent blowout.

- ☐ **Step 9 -** Turn on your drill press and drill all the holes that you indented. If you do this right you should have clean holes on both sides.
- ☐ **Step 10 -** Take your included shielding tape and cut it into three 8 inch long strips. Install your aluminum strips to cover everywhere your chassis will make contact with the wood and across the wood where the internal exposed area of the chassis will be.

## 12 Power Up and Testing

- ☐ **Step 1 -** Install your chassis to the back panel of your cabinet. Take the connector from your speaker and plug it into the output jack on the amplifier. Make sure you have your speaker wire oriented where it cannot make contact with the hot tubes during operation. Next, place the back panel/chassis into the cabinet and install the 4 wood screws that hold it into place.
- ☐ **Final Step -** Now that we've completed the amplifier, check for functionality and hook up the guitar.

SEE POPULATION CHART FOR ALL COMPONENT VALUES  
& VOLTAGE RATINGS.



TubeDepot

Bud Amplifier

Josh Phelps Rev 1.0 11/28/2019 Page #1 of 1