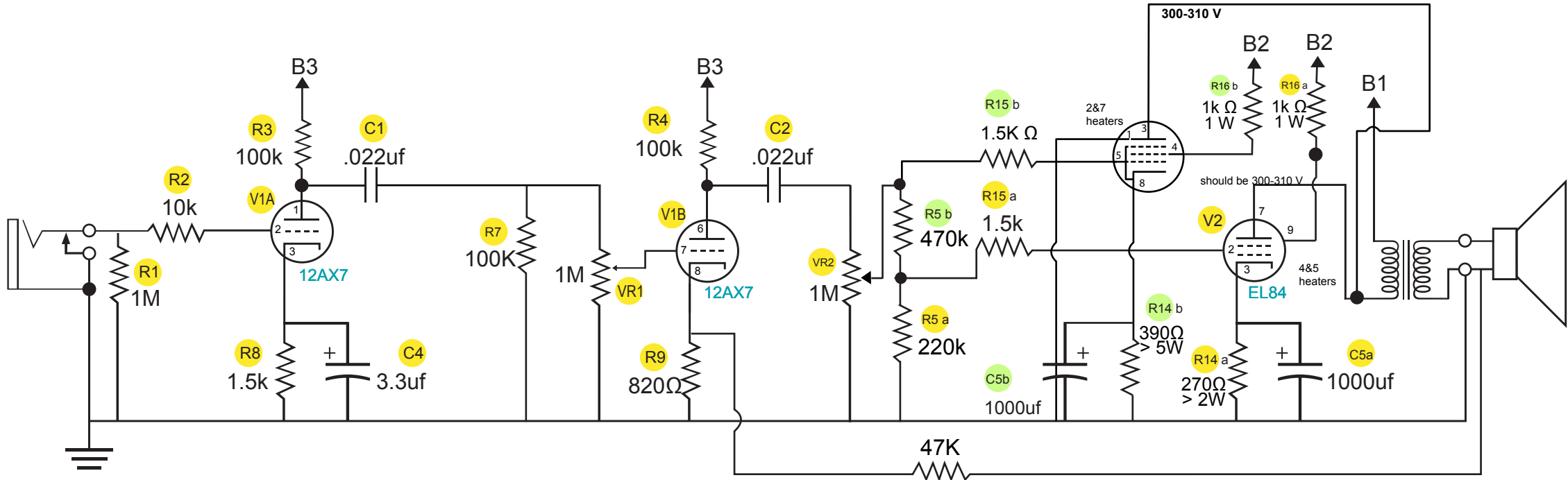


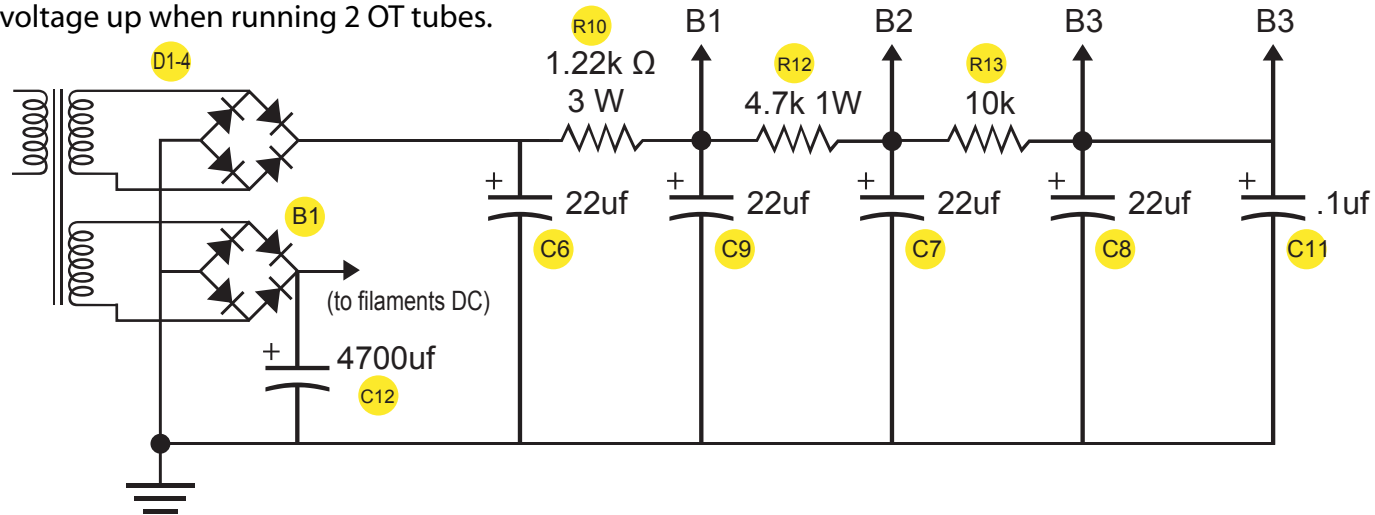
Epiphone Valve Jr. Mods

COMPONENT	VALUES			Based on Version 2 -DC Heater - Head version
	V Jr Original	Silver/Gold "Marshallized" V Jr	"Fenderized" V Jr	Notes
R1	68K	1M	1M	Along with R2, creates a voltage divider that determines how much input signal gets into the amp. Stock only allows half of the signal to enter
R2	68K	10K	68K	See R1. Larger values roll off more high end.
R5	220K			Could replace with a 500K pot for Master Volume Control
R6	1M	Short out, or use 100k for less gain	100K	Along with R7, creates voltage divider for input to second gain stage. NB: Classic Plexi values are R6=R7=470k with 470pF bypass across R6
R7	1M	91K – or 100k if R6=100k used.	100K	Replace with 250K or 500K pot for simple Gain control. Raising the value increases max gain
R8	2.2K	1K or 1.5K	1.5K	12ax7 bias for first gain stage
R9	2.2K	680 to 1k	1.5K	12ax7 bias - Larger values will bias the 2nd preamp stage cleaner, but you shouldn't go any higher than about 1.8k, as then it will start to distort more. 1.5k biases both preamp stages very neutrally for minimum distortion. Lower values provide more "crunch"
R10	220	1K 3 Watt	1K 3 Watt	Reduce the B+ voltage looking for 300-310 volts at EL 84 plate pin 7 (Hint: Two 5 Watt 470 ohm in series put voltage right there on mine)
R14	220	240 -270 1watt	240-270 1watt	Reduce the EL84s dissipation - stock is over the limit of 12 Watts (Hint: can add an 18 ohm or 22 ohm in series , or put 2 470's in parallel, if you can't find a 240)
R15	1.5K	10K	5.6K to 10K	EL84 Grid. Larger values more high end rolloff
C1	.022uf	Mallory 150's	Change to Orange Drops	Coupling cap - Mallory's warmer Marshall tone, Orange Drops sharper Fender like
C2	.022uf	Mallory 150's	Change to Orange Drops	Coupling cap - Mallory's warmer Marshall tone, Orange Drops sharper Fender like
C3	22uf	1uF to 3.3uf 25v	Remove	Affects low frequency -3dB cutoff point (along with R9) Use lower values for H/Bs
C4	22uf	1uF to 3.3uf 25v	Remove OR 10uF reduce if it gets "farty"	Affects low frequency -3dB cutoff point (along with R8) Use lower values for H/Bs.
C5	22uf	1000uf 25v	1000 25v	Help smooth the EL84's distortion tone. Could go up to 2200uF
C6	22uf	Increase to 47uF - 100uF if necessary		Power supply filter - shouldn't really need to change on version 2 models unless you're real fussy about hum
C9		Increase to 47uF - 100uF if necessary		B1 Power supply filter
C12	4700uF 16v			Heater supply filter
VR1	1M	250K or 500 K Analog		Volume Control - very cheap, better quality for less noise, longer life
Output Transformer		Change OT to Hammond 125DSE or 125ESE (Output Jack Mouser 550-10201 Solder to board for combo)	Change OT to Hammond 125DSE or 125ESE (Output Jack Mouser 550-10201 Solder to board for combo)	Stock OT is 7.5k impedance, EL84 is 5k, mismatched impedance means lower output, less than optimum frequency response.
		Add		Notes
Negative Feedback			Install 47k NFB resistor between OT secondary and top of R9 (try running the NFB resistor off any of the impedance tappings)	More clean headroom, with a more sudden breakup characteristic, tightens up the low end. Other values between 47k and 27k may also be used.
Voltage Correction		Measure B+ voltage and increase R10 to 1K, if too high - want 310-315 volts at EL84 anode (pin 7)	Measure B+ voltage and increase R10 to 1K, if too high - want 310-315 volts at EL84 anode (pin 7)	To run EL84 at optimum sweet spot for tone in an SE amp, with slight clipping
Screen Grid Resistor	Potential screen grid damage due to absence of current limiting resistor.	If possible insert 1k 1watt screen resistor into connection to EL84 pin 9 (this involves cutting the trace with a knife / scalpel etc.)	If possible insert 1k 1watt screen resistor into connection to EL84 pin 9 (this involves cutting the trace with a knife / scalpel etc.)	Increase the output tube life, help prevent screen grid melt down
Mini Cat Mod		2.2nF cap in series with 100k, strapped between the EL84's grid and ground	2.2nF cap in series with 100k, strapped between the EL84's grid and ground	Optional. This helps smooth off top end brightness. Shouldn't be required if R15 = 10k or more
Conjunctive Filter			5.6K 10W Resistor in series with a .01uF 600 volt across the primary of the OT	Optional. Takes out some "buzz" from distortion and reduces over brightness
Boost Option		Additional input jack, using a Mission Amps' Turbo Jax		For the gain freaks - http://www.missionamps.com/turbojax.shtml

COMPONENT	VALUES				Based on Version 2 -DC Heater - Head version
	Original	Burchtone's Baby Vox	Hoffman "Schedule 40" Gibson GA-5	Bad Cat Mini Cat	
					Notes
R1	68K	1M	1M	1M	Along with R2, creates a voltage divider that determines how much input signal gets into the amp. Stock only allows half of the signal to enter!
R2	68K	10K	33K	68K	See R1. Larger values roll off more high end.
R3	100K		220K		
R4	100K		220K		
R5	220K		470K	220K	Could replace with a 500K pot for Master Volume Control
R6	1M	100k	Short out	Remove*	*Insert Mini Cat tone control send & return connections where R6 was. Could also insert a Vox TB stack for Baby Vox here.
R7	1M	100k	Remove	220K	
R8	2.2K	1.5k		1.5K	
R9	2.2K	1.5k		1.5K	
R10	220 2W	1K 5W	1.2K 5W	820 5W	Reduce the B+ voltage looking for 300-310 volts at EL84 plate pin 7. For GA-5, B+ needs to be under 300V.
R12	4.7K 3W		125C3A Choke	800 5W	Choke available from Hoffman Amps
R13	10K 3W		27K 3W	22K 3W	
R14	220	250 3W	250 3W	240 3W	Reduce the EL84's dissipation – stock V Jr and Mini Cat are over the limit of 12 Watts!
R15	1.5K	56k	5.6K	1.5K	EL84 Grid. Larger values more high end rolloff
C1	.022uf	0.0022uFMallory 150's			Coupling cap – Mallory's warmer Marshall tone, Orange Drops sharper Fender like
C2	.022uf	0.022uF Mallory 150's			Coupling cap – Mallory's warmer Marshall tone, Orange Drops sharper Fender like
C3	22uF		Remove		Affects low frequency -3dB cutoff point (along with R9) Use lower values for H/Bs
C4	22uF				Affects low frequency -3dB cutoff point (along with R8) Use lower values for H/Bs.
C5	22uF	1000uf 25v		220uF 25V	
C6	22uF	47uF	Increase to 47uF - 100uF if necessary	47uF	Larger values give less hum, and more solid bass. Note – Vjr gives extra stage of filtering vs Mini Cat, so 47uF being used for C6 & C9, rather than 100uF.
C7	22uF			100uF 400V	
C9	22uF	Increase to 47uF - 100uF if necessary	Increase to 47uF - 100uF if necessary	47uF 400V	B+ and B+1 Power supply filters
C8	22uF	Increase to 47uF - 100uF if necessary	Increase to 47uF - 100uF if necessary	220uF 400V	Mini Cat schematic shows 220uF for the preamp. I find this a little hard to believe! Maybe it's meant to be 22uF.
C12	4700uF 16v				Heater supply filter
VR1	1M Log/Audio			1M Log/Audio *	* Mini Cat has 180pF 400V cap between lugs 1 & 2 of VR1
Output Transformer		Change OT to Hammond 125DSE or 125ESE (Output Jack Mouser 550-10201 Solder to board for combo)	Change OT to Hammond 125DSE or 125ESE (Output Jack Mouser 550-10201 Solder to board for combo)		Vjr Stock OT is 7.5k impedance, EL84 needs 5k. Hammond gives much improved frequency response and smooth tone.
	Add			Add	Notes
Negative Feedback			GA5 requires 47k NFB resistor between OT secondary (8 ohm tap) and top of R9.		See http://www.hoffmanamps.com/projects/images/Schedule40GA-5.jpg
Voltage Correction		Measure B+ voltage and increase R10 to 1k, if too high - want 310-315 volts at EL84 anode (pin 7)	Measure B+ voltage (at C9) and increase R10 if above 300V.	Adjust R10 for around 312V at EL84 anode (pin 7)	
Screen Grid Resistor	Potential screen grid damage due to absence of any current limiting resistor.	If possible insert 1k 1watt screen resistor into connection to EL84 pin 9 (this involves cutting the trace with a knife / razor etc.)	Insert 1k 1watt screen resistor into connection to EL84 pin 9 (this involves cutting the trace with a knife / razor etc.) Required for GA5.	Insert 1k 1watt screen resistor into connection to EL84 pin 9 (this involves cutting the trace with a knife / razor etc.) NB: Mini Cat uses 100 ohm stock!	Increase the output tube life, help prevent screen grid melt down. NB: Mini Cat schematic also shows 1.2nF 600V cap between Pin 9 & 7 of EL84, but some reports are that this makes the amp more noisy.
Mini Cat MV				1M Log/Audio	Connect in parallel with R5. Lug connects to C2. NB; Mini Cat schematic is missing the MV's ground connection!
Mini Cat LP Filter				Mini Cat requires 2.2nF cap in series with 100k, strapped between EL84 grid (pin 2) and ground	This helps smooth off top end brightness, as well as fizzyness from distortion tone.
Mini Cat Tone Control				2 X 1M lin pots, 10k & 100k resistors + 2.2nF & 4.7nF caps (400V)	See http://www.schematcheaven.com/newamps/badcat_minicat.pdf for schematic



May have to change R10 to bring voltage up when running 2 OT tubes.



OK, heater currents:
 6V6 -- 0.45A
 EL84 -- 0.76A
 6L6 -- 0.9A
 KT66 -- 1.27A
 EL34 -- 1.5A
 6550 -- 1.6A
 KT88 -- 1.6A
 (possible 2A max)