

**GROOVE TUBES**



**Choosing and Using  
Vacuum Tubes**

**Includes complete information  
on replacement tubes for  
hundreds of amplifiers!**

**2nd Edition**

**\$5.95**

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## About our Company

To understand tubes and tone, you have to get into some history. When we started Groove Tubes, most of our tubes came from Western factories. We took something really good and made it great. These companies gradually dried up and the new supply has been coming from the newly revived 3rd World (Eastern Europe, Russia and China) tube factories. These tubes are close copies of the originals, but are generally inconsistent and of lower quality, which is why the Groove Tubes process is more important than ever. The good news is today there are more tube varieties out there and even more tubes on the horizon. In recent years, we have developed our own new and improved tube designs which we manufacture both abroad as well as here in the USA. These new tubes have increased output power, better tone, and extended life.

## Substitutions

For you Fender types, your American made amp was mostly likely designed to use a 6L6 style tube. Groove Tubes offers 7 different 6L6's to choose from. Most British style amps are designed to use EL34's, but can also use 6550's and/or KT88's with little or no modification. That gives all you Marshall owners 9 power tube types to choose from!

## Modifications and other Fun

It's possible and can be very rewarding to go outside your amp's design boundaries. However, now you're getting into conversions and modifications. Before you get started on your own adventure, we recommend you pick up a copy of Aspen Pittman's *The Tube Amp Book* to get acquainted with tube amp customization procedures. Your favorite music store should have a copy of his book.

## The History of Groove Tubes (Or One Man's Quest for Tube Greatness.)

Groove Tubes started back in the late 70's when Aspen Pittman, founder and visionary, hired some technical folk to explore why tubes sound so different. Driven by curiosity, (Aspen has always had a great fascination with tone and amps, his personal collection of vintage amps hovers around 250+ pieces!) as much as an itch to start a new business, Aspen and these engineers discovered entirely new tube operating characteristics to measure. This became the foundation for Groove Tubes.

In the last 27 years, Groove Tubes has grown from a modest garage workshop to an international business. The company is run by guitar amp tone lovers, and while the organization has long since moved out of the garage, that tinkering workshop vibe has never left their day-to-day operations. The current list of Groove Tube believers is frankly too comprehensive to list; suffice it to say that most professional guitar players are using Groove Tubes in their amps, playing some kind of Groove Tubes amp, or recording with GT tube microphones.

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Now as the established guru for tube tone, it was natural for Aspen to expand his product line to include tube gear. His first breakthrough invention, the Speaker Emulator, allows the output of a tube guitar amp to directly interface with a recording console or a PA mixer. Based on this patent, Aspen formed GT Electronics, which manufactures his unique and innovative designs of tube guitar electronics and more recently tube condenser mics and signal processing for digital recording. The GT professional audio line now offers 11 different serious recording microphones, and four of them are tube designs.

Aspen Pittman is perhaps best known for writing *The Tube Amp Book*, the bible of all tube knowledge and coolness. Now in its 7th reprinting, *The Tube Amp Book* has sold over 100,000 copies, and has awakened (and educated) a modern guitar generation to everything great about tubes. Aspen's products and his book have helped fuel the current tube mania that is sublimely afflicting all guitar players!

So now you're ready to embark on your tube-tone journey. What do you do next? First think about the tone you're going for. Then based on the tube information on these two pages, Power Tube Comparison Chart located in this book, and the Performance Rating Study (#1-#10), make your first tube-tone decision. Next, go to your local music store and buy your first set of Groove Tubes. Your local music store should carry them, but if they don't, call us at 818-361-4500 and we'll direct you to the nearest dealer.

**A word about Biasing.** Always have your amp biased when changing from one power tube type and/or rating to another (preamps are self-biasing). Once bias is adjusted and you re-tube with Groove Tubes, no re-bias is necessary if you stay within one tube rating number in either direction.

### **Changing Tubes:**

1. Turn off amp and unplug it from AC outlet. Allow tubes to cool.
2. Follow tube location guide (inside cabinet wall) or follow current positioning.
3. Power tubes- Release spring clamps at tube's base (if applicable). Grasp top of tube, working it out in a gentle circular motions. Remove one tube at a time.
4. Preamp tube- Same as power tube. Be sure the gap in the pin sequence is correctly aligned with blank space in socket.



## An Introduction to Vacuum Tubes

Guitarists both yesterday and today can be linked by one piece of equipment: The tube amp. With all the strides in transistor amp technology, guitarists still prefer tube amps. Why do tube amp designs sound and feel differently from solid-state? Simply, tubes work differently.

**What is a tube?** A tube is an electronic device consisting of a minimum of four active elements: a heater (filament), a cathode, a grid and a plate. All sealed in a vacuum glass enclosure to prevent parts from burning. Once heated, the cathode begins to emit electrons, which flow from the cathode (negatively charged) toward the plate (positively charged). The grid's purpose is to control this flow, in effect, acting as a valve.

**How do Tubes Work?** When the guitar's pickup produces a small voltage (the result of the string vibrating in the pickup's magnetic field), this signal is applied to the grid, which causes a large current flow from the cathode to the plate. Because of this, a correspondingly large voltage now appears at the plate. A portion of the amp's electronic circuitry, the grid bias control, adjusts the proper voltage setting of the grid. When the grid bias is properly set, the tube is balanced to the circuit, and therefore produces a clean, powerful signal. The plate is connected to an output transformer, matching the impedance to that of the speaker.

**How do Tubes Distort?** As the signal emitting from the plate approaches its maximum potential, the tube gradually begins to react less and less to the original input signal. This results in a type of compression of the signal, and the signal becomes cut off or "clipped." Tube distortion ("clipping") occurs gradually, producing low order distortion which compliments the original signal, creating a warm sound. This is also why it's easy to move between clean and distorted tones.

## Why do Tube Amps all Sound Different?

1. Types and quality of tubes vary.
2. The amount of gain a tube produces varies with each amp's circuit design, some tubes amplify more than others under similar conditions.
3. In practice, we can tell you with experience and certainty that when you have two identical amps, using two identical sets of Matched GT tubes of the same rating number, they will be as close to identical as possible and practically speaking, indistinguishable from each other. This is why we started Groove Tubes nearly 30 years ago, to provide consistency in tube amplification.

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## The 4 amp stages

**Preamp Stage** - Amplifies an incoming guitar or mic signal for tone shaping.

**Signal Processing Stage** -This is where you add the effects, reverb, tone controls, etc.

**Power Amp Stage** -The real workers in your amp. Most amps over 10 watts use an alternating push/pull power amp design- when one tube is on, the other is off. Your amp may have two, four, six or possibly eight power tubes.

**Rectifier Stage** -Converts AC wall electricity to the DC electricity inside your amp. Most modern amps have solid state rectifiers.

## Why Should You Replace Your Tubes?

Glass, metal, lots of little parts... tubes are subject to mechanical problems and are not meant to last a lifetime. Actually, the harder you work your tubes, the faster they wear out. Which means that from time to time you will need to replace your tubes. More reasons to replace your tubes:

1. When one starts to go, it drags the others down with it, decreasing the overall efficiency of the amp, which adversely changes the tone and reduces sustain.

2. The better the tube, the better the tone. Simply put, the best reason to replace your tubes with Groove Tubes is that they'll make your amp sound better and improve your playing

3. When one tube has burned out, the amp won't work right. Simple as that.

Bottom Line. Pay attention to your amp's performance. When you hear the sound begin to deteriorate, it's time to change your tubes. Your amp will last longer. Your tone will always be at its best. Think about it, you don't wait until the strings break before you change them, do you?

## When you should replace tubes; Signs that Your Tubes May be Deteriorating

1. Loss of highs or lows
2. Muddy chords
3. Poor balance in the output levels of various notes
4. Lacks punch
5. Makes funny noises
6. Amp starts sounding weak
7. Power fading up and down
8. No sustain, or fast decay

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## POWER TUBES

### **The 6550/KT88 Family (tube power range from 35 to 50 watts)**

Highest power pentode for use in Marshall, Hiwatt, Ampeg SVT, the GT amps and a few other higher powered amps. Also popular for HiFi amps.

### **The 6L6 Family (tube power range from 20 to 30 watts)**

The choice of most all medium powered Fender amps, and the many Fender-style amps. This specially designed pentode with a beam forming electrode was invented by RCA and has many variations available. It's response is rounder, with a more pronounced midrange character, very chesty and very old time rock'n'roll.

### **The 6V6 Family (tube power range from 12 to 14 watts)**

The choice of most all smaller powered Fender amps and other similar low powered amps (about 15 watts per tube). Warm, round, easily overdriven. Great for recording or practice.

### **The EL34 Family (tube power range from 25 to 30 watts)**

The classic pentode power tube used in Marshall, Hiwatt, Laney, and similar Euro type amps. These tubes have a big bottom and a crisp top end that gets crunchy when pushed hard. It also has sort of a hollow midrange response. The choice of the modern rockers, ala British Rock and Heavy Metal.

### **The EL84 Family (tube power range 12 watts)**

Most common low power pentode, popularized in early Vox AC30 amps. Rediscovered by Matchless amps and now currently used by nearly every tube amp company. Quick, soft overdrive distortion, great for recording.

## PREAMP TUBES

The PREAMP TUBE FAMILY of tubes are used in the first low level stages of tube amps. There are many designs that will interchange and each has its own tone, gain, and response. The best example is the 12AX7 range, that includes more than 6 options (ie: ECC83, 7025 & 5751). These may be interchanged without any modification to the circuit...user friendly, so experiment!

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## The Groove Tubes Process

### The Tube Amp- More than just Power.

Groove Tubes was started and is run by a bunch of guitar amp nuts fascinated with tone, which is what led us to the tube. In the beginning, we noticed that every power tube had its own distortion tendencies (facts that traditional matching techniques were simply not picking up). Since power tubes are combined to work as partners to create your amp's tone, this explained why identical tube amps all sounded different. We knew that tube amps were used for more than just power sources, they were actually being used as rock 'n roll Tone Generators. It's at this point that Groove Tubes departed from traditional thinking and created The Groove Tubes Process, a process that respects tone and has been producing the best sounding tubes for the last 27 years!

### The Groove Tubes Process, Step by Step

We literally go through thousands of tubes, rejecting more tubes than we accept. We put every tube through a rigorous performance test, one at a time, in real amp circuits. The preamp tubes are rejected for adverse microphonics, low output or high noise. Power tubes are more involved, and they go through additional analysis. Here's what we're looking for:

1. Grid Leakage. Causes tube to burn out quickly, and worse yet, to short out and wreak lots of havoc. We throw these tubes out.
2. Weak Vacuum. Tube will act deceptively normal, then just burn out on you (usually at the worst time!). These tubes don't make it past the first round.
3. Gain to Distortion Ratio. The center of all Groove Tubes magic! This measurement tells us if the tube will distort early or later in its power range. Since the tube distortion is rich in harmonics (that's why we love 'em!), the tonality of each tube will vary according to this ratio. Only Groove Tubes sets have been measured and matched to insure longer sustain, wider frequency response and a more musical amplifier!

**Rating and Matching Tubes.** We translate this gain to distortion ratio into a performance scale that can range up to 100 points, then match up the tubes to within 1 point of each other. To simplify things, we reduce the scale to 1-10 before the tubes leave our shop. All power tubes are exactly matched into duets, quartets, sextets and even octets.



## The GT Rating System:

A matched set of Groove Tubes will show a number between 1-10, noting it's our exclusive GT gain to distortion ratio, which is a musically meaningful spec! It is also repeatable each time you change your tubes, and as it's replacing the same type and rating, you will not need to spend a penny to rebias your amp... our tubes and measurement systems are that consistent!

**1-3** Early distortion (wider range of distortion)

**4-7** Normal distortion

**8-10** Late distortion (more cleanpower/headroom)

### More than just Great Tone.

The Groove Tubes Process produces many welcomed improvements:

1. Dramatically Improved Sustain by eliminating phase cancellation (which occurs when dissimilar tones coming from unmatched tubes are combined and cancel out certain frequencies.)
2. Improved Harmonic Balance- All the notes you play will have the same amplitude. (No more dead spots or dull notes!)
3. Longer Life Span- 1st: by eliminating faulty tubes. 2nd: Our balanced sets reduce stress that occurs when a stronger tube is working too hard to make up for its weaker partner, and 3rd: because our sets drive the output transformer evenly- it actually runs cooler!
4. Consistency - Once you've biased your amp for your ideal tube rating number, you will not have to rebias your amp the next time you changed tubes provided you stay with the same tube and rating. The GT rating system is so consistent, you can change tubes yourself with complete confidence.

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## **Groove Tubes. It all Comes Down to Tone.**

When you go into a store and buy other tubes, it's a crapshoot. Without The Groove Tube Process, there's absolutely no way of predicting how a tube will sound. When other tube suppliers claim to have "matched" sets, they're referring to the meaningless measurement of the tube's power. As we learned in the beginning, it's a waste of time to measure power because you simply can't hear variations of power (unlike variations in harmonic distortion). And even if you could, the power measurement is always changing as the tube wears (This measurement wouldn't stay "matched" anyway, but ours do!). Buying Groove Tubes will save you money and a great deal of aggravation, while turning you on to the best tone you're ever heard coming out of your amp! Groove Tubes are more expensive than most other tubes. Now you know why.

### **The Tube-Tone Phenomenon.**

The next time you're experimenting with your tone -- and before you shell out more bucks on effects, gadgets, guitars, another amp -- check your amp head and try out a new set of Groove Tubes.

### **Groove Tubes Warranty:**

Your satisfaction guaranteed, just that simple! But tubes are fragile and can become damaged or even "unmatched" during shipping, they do not "travel well". So we guarantee our tubes for 90-180 days to allow any defects to surface.

- **Preamp tubes:**

Warranted to be free of burn out, excessive noise or microphonics for 180 days from date of purchase.

- **Power Tubes:**

Warranted to be free of burn out for 90 days from date of purchase. If one tube fails, the whole set will be replaced to insure proper matching.

- **GT-Solid Rectifiers & Substi-tubes:**

Warranted for 3 years from date of purchase.

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## TUBE/AMPLIFIER REFERENCE

To use this guide, locate the manufacturer of your amplifier or other tube-based audio product (listed in alphabetical order), and then search for the model. The full complement of Groove Tubes replacement tubes will be listed next to the model name. If you can't find your amplifier model in this guide, contact Groove Tubes for more information.

### 65amps

London	2-12AX7,1-EF86,EL84	Duet,EZ81
Marquee Club	2-12AX7,1-EF86,EL84	Quartet,GZ34
SoHo	2-12AX7,1-EF86	EL84 Duet,EZ81
Royal Albert	3-12AX7,KT77	Duet or 6V6 Duet,SS plugin or 5Y3 or 5U4 or GZ34/5AR4

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### Acoustic

160	2-12AX7,2-12AT7,6L6	Quartet
160	3-12AX7,1-12AT7,6L6	Quartet
164/165	2-12AX7,2-12AT7,6L6	Quartet
164/165	3-12AX7,1-12AT7,6L6	Quartet
G-100T	3-12AX7,1-12AT7,6L6	Quartet
G-60T	2-12AX7,1-12AT7,6L6	Duet
Tube 60	2-12AX7,1-12AT7,6L6	Duet

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### ADA

MB-1	2-12AX7	
MP-1	2-12AX7	
T-100S	2-12AX7,6CA7	Quartet

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### Alembic

Preamp	2-12AX7
F1X	1-12AX7

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### Ampeg

Jet-12 - early 2-6K11,7591 Duet

*Note: some older Jet-12s used 6BK11s instead of 6K11s. This tube is no longer available, and there is no adequate substitute.*

Jet-12	2-12AX7,7591a	Duet
Jet-12R	2-12AX7,1-6U10,7591a	Duet
GS-12R Rocket II	2-12AX7,1-6U10,7591a	Duet
G-12 Gemini 12	3-12AX7,1-6CG7,1-7199,7591a	Duet
GV-15 Gemini - early	4-12AX7,1-6CG7,1-7199,7591a	Duet
GV-15 Gemini	4-12AX7,1-6CG7,1-7199,6L6	Duet
GV-22 Gemini	4-12AX7,1-6CG7, 1-7199,7027	Duet
SB-12	2-12AX7,6L6	Duet,5AR4
B-25	2-12AX7,1-7100,7027	Duet,5AR4
B-22X	4-12AX7,1-6CG7,1-7199,7027	Duet,5AR4
B-42X	4-12AX7,1-6CG7,1-7199,7027	Duet,5AR4
GV-12	1-12AX7,1-6U10,1-12DW7,7591	Duet
AC-12	1-12AX7,1-6U10,1-12DW7,7591	Duet
AX-44C	1-12AX7	
AX-70	1-12AX7	
B-12XT	4-12AX7,7027	Duet,5AR4
VT-40 - later	1-12AX7,2-12DW7,1-6AN8,1-6CG7,7027	Duet

VT-40	3-12AX7,1-6K1 1,1-12DW7,1-6AN8,1-6CG7,7027	Duet
VT-22 - later	1-12AX7,3-12DW7,1-6CG7,1-6AN8,7027	Quartet
VT-22	3-12AX7,1-6K11,1-12DW7,1-6AN8,1-6CG7,7027	Quartet
VT-60	4-12AX7,1-12AU7,6L6	Duet
VT-120	4-12AX7,1-12AU7,6L6	Quartet
V-2	3-12AX7,1-12DW7,1-12AU7,I-6K1 1,1-6CG7,7027	Duet
V-3	4-12AX7,1-12AT7,6550	Duet
V-4	3-12AX7,1-12DW7,1-12AU7,I-6K1 1,1-6CG7,7027	Quartet
V-4B	2-12AX7,1-12DW7,1-12AU7,1-6K1 1,7027	Quartet
V-5	3-12AX7,6550	Quartet
V-7	4-12AX7,1-12AT7,6550	Quartet
V-9	1-12AX7,4-12DW7,1-6CG7,2-12BH7,6550	Sextet
B-15 - early	2-6SL7,1-7199,6L6 Duet,5AR4	
B-15N	3-6SL7,6L6 Duet,5AR4	
B-15S	2-12AX7,1-12DW7,1-12AU7,7027	Duet
B-18	2-6SL7,1-7199,7027	Duet
SVT - early	1-12AX7,4-12DW7,1-6C4,2-12BH7,6550	Sextet

*Note: Early SVTs had 6146 power tubes and have converted to 6550s.*

SVT-II	4-12AX7,2-12AU7,6550	Sextet
SVT-IIP	Preamp 3-12AX7	

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## Audio Research

SP-3 Series	8-12AX7	
SP-6 A and B	6-12AX7	
SP-6E	4-12AX7,2-ECC88	
SP-8	4-12AX7,2-ECC89,1-12BH7	
SP-10	12-ECC88,1-ECC81,2-6L60S	Duet
D75A and D76	4-12AX7,8-6CG7,1-6550A,1-6550	Quartet
D79, D150,D-70/115/250	Call the Groove Tubes Sales Department with your serial number.	

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## Bedrock

1200	5-12AX7,1-EL34	Duet
1400	3-12AX7,1-EL34	Duet
1600	6-12AX7,1-EL34	Quartet

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## Benson

300	3-12AX7,EL34	Duet
400	3-12AX7,EL34	Quartet

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## Bogner

Shiva	7-12AX7 EL34 or 6L6 Duet depending on output transformer	
Ubershall	6-12AX7 EL34 Quartet	
Ecstasy	6-12AX7 EL34 or 6L6 Quartet depending on output transformer	
Metropolis 15	5-12AX7,1-EL84 (reverb) EL84 Duet	
Metropolis 30	5-12AX7,1-EL84 (reverb) EL84 Quartet	
Duende	5-12AX7,6V6 Duet,5AR4 or 5Y3 Rectifier	

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## Carr

Hammerhead	2-12AX7,EL-34	Duet
Rambler	3-12AX7,1-12AT7,6L6GC	Duet
Slant 6V	4-12AX7,2-12AT7,6V6GT	Quartet,5AR4
Slant 6V Double Power	4-12AX7,2-12AT7,6L6GC	Quartet

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**Imperial**

3-12AX7,1-12AT7,6L6GC Quartet

**El Moto**

4-12AX7,EL-34 Quartet

*Note: When an effects loop option is ordered for either the Slant 6V or El Moto please add 1 - 12AU7 to the tube compliment.*

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**Carvin**

VTR 2800 50-watt

1-12AT7,6CA7 Duet

VTR 2800 100-watt

1-12AT7,6CA7 Quartet

VTX 100

3-12AX7,6L6 Quartet

X-B12 30-watt

3-12AX7,6L6 Duet

X-T12 60-watt

3-12AX7,6L6 Duet

X-V112 100-watt

3-12AX7,6L6 Quartet

X-V112 - later

3-12AX7,EL34 Quartet

X-V212 100-watt

3-12AX7,6L6 Quartet

X-V212 - later

3-12AX7,EL34 Quartet

X-V212E 100-watt

3-12AX7,6L6 Quartet

X-60 60-watt

3-12AX7,EL34 Duet

X-60B 60-watt

3-12AX7,6L6 Duet

X-100 100-watt

3-12AX7,6L6 Quartet

X-100B 100-watt

3-12AX7,6L6 Quartet

X-100B - later

3-12AX7,EL34 Quartet

*Note: Some Carvin amps may not be able to use EL34 tubes since pin 1 and 8 were not always wired together. Check your amp if it is an older model. See the 6L6-to-EL34 mod in the Servicing and Modification Section under Fender amps in Aspen Pittman's The Tube Amp Book.*

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**Champion**

R&amp;R 10-watt

1-12AX7,6V6 Duet

R&amp;R 20-Watt

1-12AX7,EL34 Duet

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**Conn**

Strobe Tuner

2-6AQ5,1-6X4,1-5879,1-12AT7,1-12AU7

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**Conrad Johnson**

Premier One

4-6CG7,1-5751,2-6550 Sextets

Premier Three

2-12AX7,5-5751,2-5965

MV-75A

2-6CG7,1-5751,6550 Quartet

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**Cornford**

Harlequin

2-12AX7,EL84 Single

Hellcat

5-12AX7,EL84 Quartet

Hurricane

4-12AX7,EL84 Duet

M.K. 50 H

4-12AX7,6L6 Duet

R.K. 100

4-12AX7,EL34 Quartet

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**Crate**

VFX 5112 / V5212

4-12AX7,EL34 Duet

V30H or V212T

3-12AX7,EL84 Quartet

BV300HB

8-12AX7,2-12AU7,6550 Sextet

BV150H

8-12AX7,6L6 Sextet

BV120H

4-12AX7,6L6 Quartet

V3112

3-12AX7,EL84 Quartet

V1512

3-12AX7,EL84 Duet

V58

1-12AX7,EL84 Single

**Demeter**

TGA-3 6-12AX7,6550 Quartet  
 TGP-3 6-12AX7  
 VTBP/201 6-12AX7  
 VTDB-2 1-12AX7

**Diaz**

CD-100 3-12AX7,1-12AT7,6L6 Quartet

**Dr. Z Amps**

6545 3-12AX7,1-EF86 / 6267,EL34 Duet,5AR4 or solid state.  
 Carmen Ghia 1-12AX7,1-5751,EL84S Duet,5Y3  
 Delta 88 1-EF86 / 6267,1-12AX7,KT88SV Duet  
 KT-45 1-EF86 / 6267,1-12AX7 or 5751,EL34 Duet,5AR4  
 MAZ-18 Jr. 4-12AX7,1-12AT7C,EL84 Duet,5AR4  
 MAZ-18 Jr. "NR" Non-reverb 3-12AX7,EL84 Duet,5AR4  
 MAZ-38 Sr. 4-12AX7,1-12AT7,EL84 Quartet,5AR4  
 MAZ-38 Sr. "NR" Non-reverb 3-12AX7,EL84 Quartet,5AR4  
 Mazerati 1-12AX7,1-5751,EL84 Quartet,5AR4  
 Prescription 3-12AX7,EL84 Quartet, 5AR4  
 Prescription Extra Strength 2-12AX7,1-EF86 / 6267,EL84 Quartet,5AR4  
 Route 66 1-EF86 / 6267,1-12AX7 or 5751,KT66 Duet,5AR4  
 SRZ-65 3-12AX7,EL34 Duet,5AR4  
 Z-28 1-EF86 / 6267,1- 12AX7 or 5751,6V6 Duet,5AR4  
 Stingray / Mantaray / Stangray 1-EF86 (6267),1-12AX7 EL84 Quartet,5AR4

**Dynaco**

PAS Series 4-12AX7,1-12X4  
 Stereo 70 2-7199,1-5AR4,EL34 Quartet  
 MK III 1-6AN8,1-5AR4,6550 Quartet

**Fender**

1959 Bassman - reissue 3-12AX7,6L6 Duet  
 Bandmaster VOS 1-12AY7,2-12AX7,6L6 Duet,5U4  
 Bandmaster OS 6-12AX7,6L6 Duet  
 Bandmaster NS 3-12AX7,1-12AT7,6L6 Duet  
 Bandmaster/Reverb 4-12AX7,2-12AT7,6L6 Duet,5U4  
 Bantam Bass 2-12AX7,1-12AT7,6L6 Duet,5U4  
 Bassman 4x10 OS 1 1-12AY7,2-12AX7,6L6 Duet,5U4  
 Bassman 4x10 OS 2 1-12AY7,2-6925,6L6 Duet,2-5U4  
 Bassman 4x10 OS 3 2-12AY7,1-12AX7,6L6 Duet,2-5U4  
 Bassman 4x10 VOS 1-6SC7,1-6SL7,6L6 Duet,5U4  
 Bassman Top 50-watt 3-12AX7,1-12AT7,6L6 Duet,5U4  
 Bassman Top 70-watt 3-12AX7,1-12AT7,6L6 Duet  
 Bassman Ten 70-watt 2-12AX7,1-12AT7,6L6 Duet  
 Bassman 100 2-12AX7,1-12AT7,6L6 Quartet  
 Bassman 135 2-12AX7,1-12AT7,6L6 Quartet  
 Champ OS 1-6SJ7,6V6,5Y3  
 Champ OS 1-12AX7,6V6,5Y3  
 Champ 12 - 1990 1-12AX7,6L6

Concert	6-12AX7,6L6 Duet,5U4
Concert	6-12AX7,6L6 Duet
Concert 1983	5-12AX7,2-12AT7,6L6 Duet
Deluxe 5C3	1-6SC7,1-12AY7,6V6 Duet,5Y3
Deluxe 5D3	1-12AY7,1-12AX7,6V6 Duet,5Y3
Deluxe 5113	2-12AX7,6V6 Duet,5Y3
Deluxe Brown	3-12AX7,6V6 Duet,5Y3
Deluxe Reverb	4-12AX7 (12AX7),2-12AT7,1-5AR4 6V6 Duet
Deluxe Reverb - 1983	5-12AX7,1-12AT7,6V6 Duet
Dual Showman	3-12AX7,1-12AT7,6L6 Quartet
Dual Showman Head - 1990	4-12AX7,1-12AT7,6L6 Quartet
Dual Showman Reverb	4-12AX7,2-12AT7,6L6 Quartet
Fender 30	4-12AX7,2-112AT7,6L6 Duet,5U4
Fender 75	3-12AX7,2-112AT7,6L6 Duet
Fender 100 PA	4-12AX7,2-112AT7, 6L6 Duet
Fender 160 PS	3-12AX7,1-12AT7,1-12AU7,1-6CA8,6L6 Sextet
Fender 300 PS	2-12AX7,1-12AT7,6V6,6550 Quartet
Fender 400 PS	6-12AX7,1-12AT7,6L6,6550 Sextet
Fender Blues Jr	3-12AX7,1-EL84 Duet
Fender Dual Professional	5-12AX7,1-6V6GT, 6L6 Quartet
Fender Hot Rod Deluxe	3-12AX7,6L6 Duet
Fender Hot Rod Deville	3-12AX7,6L6 Duet
Fender Tonemaster	3-12AX7,6L6 Quartet
Fender Pro Series Twin	7-12AX7,1-12AT7,6L6 Quartet
Fender Pro Series Concert	7-12AX7,1-12AT7,6L6 Duet
Fender Pro Series Pro Reverb	7-12AX7,1-12AT7,6L6 Quartet
Fender Vibrosonic	4-12AX7,2-12AT7,6L6 Duet
Fender Vibro-King	5-12AX7,1-6V6 (EL-84 early models),6L6 Duet
Fender Vibrolux Reissue	5-12AX7,1-12AT7,6L6 Duet
Fender 63 Vibroverb Reissue	5-12AX7,1-12AT7,6L6 Duet
Harvard	1-12AX7,6V6,5Y3
Harvard	1-12AX7,1-6AT6,6V6 Duet,5Y3
Musicmaster Bass	1-12AX7,6V6 Duet
Princeton VOS	3-6SC7,6L6 Duet,5U4
Princeton OS	1-12AX7,6V6,5Y3
Princeton	2-12AX7,6V6,5U4
Princeton Reverb	3-12AX7,1-12AT7,6V6 Duet,5U4
Princeton Reverb - 1983	3-12AX7,1-12AT7,6V6 Duet
Pro VOS	3-6SC7,6L6 Duet,5U4
Pro OS	2-12AY7,1-12AX7,6L6 Duet,5U4
Pro Brown	6-12AX7,6L6 Duet
Pro	3-12AX7,1-12AT7,6L6 Duet,5AR4
Pro Reverb	4-12AX7,2-12AT7,6L6 Duet,5AR4
Quartet Reverb	4-12AX7,2-12AT7,6L6 Quartet
Rack Amp RPWI	2-12AX7,1-12AT7,6L6 Quartet
Rack Guitar Preamp	2-6C10,4-12AX7,2-12AT7
Rack Bass Preamp	2-6C10,4-12AX7
Rack 200-watt amp	2-12DW7,2-12BH7,2-12AX7,6550 Sextet
Reverb Unit OS	1-12AX7,1-12AT7,1-6K6
Reverb Unit	1-12AX7,1-12AT7,6V6
Showman OS	6-12AX7,6L6 Quartet
Showman	3-12AX7,1-12AT7,6L6 Duet,5U4

Super 2x10 V front	2-12AY7,6V6 Duet,5U4
Super 2x10	1-12AY7,2-12AX7,6L6 Duet,5U4
Super VOS	3-6SC7,6L6 Duet,5U4
Super OS	1-12AY7,10-12AX7,6L6 Duet,5U4
Super Brown	5-12AX7,6L6 Duet
Super Reverb	4-12AX7,2-12AT7,6L6 Duet,5U4
Super Reverb	4-12AX7,2-12AT7,6L6 Duet
Super Champ - 1983	1-12AX7,1-12AT7,1-6C10,6V6 Duet
Super Twin	2-12AX7,1-12AT7,1-6CX8,1-6C10,6L6 Sextet
Super Six	4-12AX7,2-12AT7,6L6 Quartet
Super 60 - 1990	2-12AX7,1-12AT7,6L6 Duet
Super 112 - 1990	2-12AX7,1-12AT7,6L6 Duet
Super 210 - 1990	2-12AX7,1-12AT7,6L6 Duet
Tone Master - new model	3-12AX7,6L6 Quartet
Tremolux VOS	1-12AY7,2-12AX7,6L6 Duet,5AR4
Tremolux OS	4-12AX7,6L6 Duet,5AR4
Tremolux Top	3-12AX7,1-12AT7,6L6 Duet,5AR4
Twin VOS	3-6SC7,1-6J5,6L6 Duet,5U4
Twin VOX	3-12AY7,2-12AX7,6L6 Duet,2-5U4
Twin OS	1-12AY, 2-12AX7,6L6 Quartet,5AR4
Twin Cream/Brown	6-12AX7,6L6 Quartet
Twin Reverb	4-12AX7,2-12AT7,6L6 Quartet
Twin Reverb - 1983	5-12AX7,2-12AT7,6L6 Quartet
Vibrolux VOS	2-12AX7,6V6 Duet,5Y3
Vibrolux OS	3-12AX7,1-12AT7,6L6 Duet,5AR4
Vibrolux Brown	4-12AX7,6L6 Duet,5AR4
Vibro Champ	2-12AX7,6V6,5Y3
Vibroverb Brown	4-12AX7,2-12AT7,6L6 Duet,5U4
Vibro King - new model	5-12AX7,1-EL84,6L6 Duet
59 Bassman LTD	3-12AX7,6L6GC Duet,5AR4
Bassman 300 Pro	1-12AX7,1-12AT7 1-6550 Sextet
Pro Junior	2-12AX7,EL84 Duet
Super-Sonic	6-12AX7,2-12AT7 6L6 Duet
Super-Sonic (head)	5-12AX7,1-12AT7 6L6 Duet
57 Deluxe (reissue)	2-12AX7,6V6 Duet,5Y3
57 Twin (reissue)	4-12AX7,6L6 Duet,2-5U4
Blues Deluxe	3-12AX7,6L6 Duet
Blues DeVille	3-12AX7,6L6 Duet
64 Vibroverb Custom	4-12AX7,2-12AT7 6L6 Duet,5AR4
Princeton Recording Amp	3-12AX7,1-12AT7 6V6 Duet

## Gibson

Atlas Medalist	2-6EU7,1-6C4,6L6 Duet
Atlas IV	2-6EU7,1-6C4,6L6 Duet
BA-15RV	3-6EU7,1-12AU7,6V6 Duet,5Y3
Bass 30	2-6EU7,7591 Duet
Bass 50	2-6EU7,EL34 Duet
BR-3	2-7B4,1-W5,6V6 Duet,5Y3
BR-6	1-6SL7,1-6SN7,6V6 Duet,5Y3
BR-6F	1-6SJ7,1-6SN7,6V6 Duet,5Y3
BR-9	1-6SN7,6V6 Duet,5Y3
Duo-Medalist	3-6EU7,1-12AX7,2-12AU7,7591 Duet



**Falcon** 3-6EU7,1-12AX7,2-12AU7,7591 Duet  
**Falcon** 4-12AX7,EL84 Duet  
**GA-Custom** 3-6SJ7,2-6SQ7,2-05,6L6 Duet,5U4  
**GAART-1** 1-12AX7,1-6BM8,5Y3  
**GA-IRVT** 1-7100,1-6EU7,1-6BM8,5Y3  
**GA2-RVT** 4-6EU7,1-12AU7,6V6 Duet,5Y3  
**GA-4RE** 2-6EU7,1-12AU7  
**GA-5** 1-12AX7,6V6,5Y3  
**GA-5T** 2-6EU7,1-6AQ7,6X4  
**GA-6** 1-12AY7,1-6SL7,6V6 Duet,5Y3  
**GA-6 newer** 2-12AX7,6V6 Duet,5Y3  
**GA-8** 1-6EU7,1-6C4,1-6BQ5,6CA4  
**GA-8T** 1-12AX7,2-6BM8,5Y3  
**GA-9** 1-6SJ7,6V6 Duet,5Y3  
**GA-14** 2-12AX7,6V6 Duet,5Y3  
**GA-15** 1-12AX7,1-6SL7,6L6 Duet,5Y3  
**GA-15RVT** 2-6EU7,1-12AU7,1-EL84 Duet  
**GA-16T** 1-12AX7,6V6 Duet,5Y3  
**GA-17RVT** 2-6EU7,1-12AX7,2-6AQ5,6CA4  
**GA-18T** 2-6EU7,1-6CA4,EL84 Duet  
**GA-19RVT** 3-6EU7,1-7199,6V6 Duet,5Y3  
**GA-20** 1-6SL7,2-6SJ7,6V6 Duet,5Y3  
**GA-20T** 1-12AY7,1-12AX7,1-5879,1-6SQ7,6V6 Duet,5Y3  
**GA-20RVT** 3-6EU7,2-12AU7,EL84 Duet,5Y3  
**GA-25** 1-6SJ7,2-05,6V6 Duet,5Y3  
**GA-25RVT** 4-6EU7,1-12AU7,6V6 Duet,5Y3  
**GA-30** 1-6SC7,2-6SJ7,6V6 Duet,5Y3  
**GA-30 Invader** 2-12AX7,1-12AU7,6V6 Duet,5Y3  
**GA-30RV Invader** 3-6EU7,1-12AU7,6V6 Duet,5Y3  
**GA-30RVT Invader** 4-6EU7,2-12AU7,7591 Duet, OA2  
**GA-35RVT Lancer** 1-12AX7,2-6EU7,2-12AU7,7591 Duet, OA2  
**GA-40 early** 1-6SN7,3-6SJ7,6V6,6V6 Duet,5AR4  
**GA-40 Les Paul** 2-5879,1-12AX7,1-6SQ7,6V6 Duet,5Y3  
**GA-40T** 3-6EU7,1-12AU7,7591 Duet,5AR4  
**GA-45RVT Saturn** 4-6EU7,1-12AU7,1-6CG7,6L6 Duet, OA2  
**GA-46 Accordion Pre** 3-12AX7,2-5879  
**GA-46 Accordion Amp** 1-6SN7,6V6,6550 Duet,5AR4  
**GA-50** 2-6SJ7,2-W5,6L6 Duet,5V4  
**GA-50T** 3-6SI7,1-6SN7,1-6SL7,6L6 Duet,5V4  
**GA-55** 2-12AY7,1-6SC7,6L6 Duet,5V4  
**GA-55RVT Ranger** 4-6EU7,1-12AU7,1-6CG7,6L6 Duet, OA2  
**GA-60** 2-6EU7,7591 Duet,5AR4  
**GA-70 Country-Western** 1-12AX7,1-12AY7,1-12AU7,6L6 Duet,5V4  
**GA-75 Recording** 2-6EU7,1-6CG7,6L6 Duet,6C4  
**GA-75W** 1-12AX7,2-6SC7,1-6W7,6L6 Duet,5V4  
**Super Medalist** 2-6EU7,2-12AU7,1-6AU7,1-12AX7,7591 Duet  
**Thor Bass Amp** 2-6EU7,1-6CA7 Duet  
**Titan I, II and III** 3-6EU7,2-12AU7,1-OA2,1-6FQ7,6L6 Quartet  
**Titan Medalist** 3-6EU7,2-12AU7,1-OA2,1-6FQ7,6L6 Quartet  
**Hawk** 3-12AX7,1-EL84 Duet  
**Les Paul TV or JR** 1-6SJ7,6V6,5Y3  
**Skylark T** 1-6X4,2-12AX7,1-EL84

Skylark	1-12AX7,1-6X4,1-EL84
SG Systems 100	1-12AX7,1-8417 Duet
SG Systems 200	1-7015,1-8417 Sextet
EH-150	3-6SQ7,1-6N7, 1-5U4,6L6 Duet
Echoplex	2-6EU7,1-6C4
XFL-3	2-12AX7,1-12AT7
XFL-60/60	4-12AX7,2-12AT7,6L6 Duet or EL34 Duet

## Greer

THUNDERBOLT 30	2-12AX7,EL34 Duet (some with 6L6 Duet),5AR4
CAM 18	2-12AX7,6V6 Duet (some with 6L6 Duet),5AR4
Special 12	2-12AX7,(some w/5879 in V1) 6V6 Duet (some w/ 5881 Duet),5AR4
Rev 50	3-12AX7,EL34 Duet,5AR4
NTG 15	2-12AX7,EL84 Duet,5Y3
MARAUDER 35	2-12AX7,6L6 Duet,5AR4
UNDERDOG 15	2 - 12AX7,6V6 Duet,5Y3

## Groove Tubes

STP-B	1-12AX7
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*NOTE: The following Groove Tubes Electronics products accept a wide variety of tubes without modifying the amp. The owner can customize his/her own amp and change the sound characteristics as desired.*

TRIO	5-12AX7
STP-G	4-12AX7,6V6 Duet or EL34 Duet
STA-1 Preamp	6-12AX7,2 output Duets - EL34,6L6,6550,KT88
D-75 Dual amp	4-12AX7,2 output Duets - 6L6, EL34,6550,KT88
D-120 Dual amp	4-12AX7,2 output Duets - 6L6,EL34,6550,KT88
D-75 Studio	4-12AX7,2-Duets 6550,KT88 or KT90
Soul-o 75	5-12AX7,Duet - 6L6,EL34,6550,KT88 or KT90
Soul-o 150	5-12AX7,Quartet - 6L6,EL34,6550,KT88 or KT90
Soul-o 45	3-12AX7,1-12AU7,1-12AT7,Duet 6L6,EL34,6550,KT88
Soul-o Single	2-12AX7 or any combination of 12AX7,12AT7,12AU7,12AY7, Single output tube - 6V6,6L6,EL34,6550,KT88,EL84 in 928 adaptor
Soul-o 30	5-12AX7,6L6 Duet
Soul-o 50	5-12AX7,6L6 or EL34 Duet

## Hammond

B-3 Preamp	1-12BH7,2-6AU6,2-6C4,1-6X4,1-12AX7,1-12AU7
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## Hiwatt

30W	4-12AX7,EL84 Quartet
30WR	4-12AX7,EL84 Quartet
50	4-12AX7,EL34 Duet
100	4-12AX7,EL34 Quartet
200	4-12AX7,EL34 Sextet
400	5-12AX7,KT-88 (6550) Sextet
C520	4-12AX7,EL84 Duet
D50L	4-12AX7,EL34 Duet
D50LR	4-12AX7,EL34 Duet
D50LRC	4-12AX7,EL34 Duet

D100L	4-12AX7,EL34 Quartet
D100LR	4-12AX7,EL34 Quartet
PRE-1	3-12AX7
PW50	4-12AX7,EL34 Quartet
S50	4-12AX7,EL34 Duet
S50LC	4-12AX7,EL34 Duet
S100L	4-12AX7,EL34 Quartet

## Jim Kelly

Single Channel	2-12AX7,6V6 Quartet
Single Channel Reverb	3-12AX7,1-12AT7,6V6 Quartet
Foot-Actvtd Channel-Switching	3-12AX7,2-12AT7,6V6 Quartet

## Kasha

KA-150	3-12AX7,6550 Quartet
Rockmod-1	4-12AX7
Rockmod-2	5-12AX7
Rockmod-3	5-12AX7

## KMD

GV-60	Transistor preamp with 6L6 Duet
GV-100	Transistor preamp with 6L6 Quartet
GV-100S	Transistor preamp with 6L6 Quartet

## Laney

A50	4-12AX7,EL34 Duet
A100	4-12AX7,EL34 Quartet
PT-50	4-12AX7,EL34 Duet
PT-100	4-12AX7,EL34 Quartet
PT-30	3-12AX7,6V6 Duet
PT-50 MV	3-12AX7,EL34 Duet
PT-50 AOR	4-12AX7,EL34 Duet
PT-100 MV	3-12AX7,EL34 Quartet
PT-100 AOR	4-12AX7,EL34 Quartet
ST-30	4-12AX7,6V6 Duet

## Legend

G-50 and G100	3-12AX7 with transistor amp
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## Leslie

Model 147	1-12AU7,1-OC3,6550 Duet
Model 122	2-12AU7,1-OC3,6550 Duet

## Marantz

Model 7	6-12AX7
Model 8	2-6CG7,2-6BH6,EL34 Quartet
Model 9	1-6CG7,2-ECC88,2-EL34 Quartets

## Markley

40 SR	1-12AX7 with transistor amp
80 SR	1-12AX7 with transistor amp
40 DR	1-12AX7 with transistor amp

80 DR	1-12AX7 with transistor amp
150 DR	1-12AX7 with transistor amp
T 60-watt	3-12AX7,6L6 Duet
T 120-watt	3-12AX7,6L6 Quartet
CD-40	3-12AX7,6L6 Duet
CD-60	3-12AX7,6L6 Duet
CD-120	3-12AX7,6L6 Quartet
CD-212	4-12AX7,6L6 Quartet
RM100 MT	2-12AX7,6L6 Quartet
Preamp DR	1-12AX7
Preamp DB	1-12AX7

## Marshall

Artiste 50	4-12AX7,EL34 Duet
Artiste 100	4-12AX7,EL34 Quartet
10-watt Tremolo	1-12AX7,ECL86 Duet
18-watt Tremolo	3-12AX7,EL84 Duet,1-EZ81
18/20-watt	2-12AX7,EL84 Duet,1-EZ81 (early only)
JTM45	3-12AX7,6L6 Duet,GZ34
50-watt	3-12AX7,6L6 Duet,GZ34
50-watt	3-12AX7,6550 Duet (EL34 in UK)
50-watt Tremolo	4-12AX7,6550 Duet (EL34 in UK)
100-watt	3-12AX7,6550 Quartet (EL34 in UK)
100-watt Tremolo	4-12AX7,6550 Quartet (EL34 in UK)
200-watt (Major)	3-12AX7,KT88 Quartet (6550 in USA)
Model 2000	6-12AX7,6550 Sextet (sometimes EL34)
Model 2001	3-12AX7,12AT7, 6550 Octet (worldwide)
Model 2100 Hi-Gain	3-12AX7,EL34 Quartet
Model 2103	3-12AX7,6550 Quartet (EL34 in UK)
Model 2203	3-12AX7,6550 Quartet (EL34 in UK)
Model 2205	5-12AX7,6550 Duet (EL34 in UK)
Model 2210	5-12AX7,6550 Quartet (EL34 in UK)
Model 2500 Hi-Gain	3-12AX7,EL34 Duet
Model 2501 Hi-Gain	3-12AX7,EL34 Duet
Model 2502 Hi-Gain	3-12AX7,EL34 Duet
Model 3203	1-12AX7,EL34 Duet
Model 4001 Studio 15	2-12AX7,6V6 Duet
Model 4010 1x12	3-12AX7,6550 Duet (EL34 in UK)
Model 4100 Dual Reverb	3-12AX7,EL34 Quartet
Model 4101 Dual Reverb	3-12AX7,EL34 Quartet
Model 4102 Dual Reverb	3-12AX7,EL34 Quartet
Model 4104 2x12	3-12AX7,6550 Duet (EL34 in UK)
Model 4210	5-12AX7,6550 Duet (EL34 in UK)
Model 4203	1-12AX7,EL34 Duet
Model 4500 Dual Reverb	3-12AX7,EL34 Duet
Model 4501 Dual Reverb	3-12AX7,EL34 Duet
Model 4502 Dual Reverb	3-12AX7,EL34 Duet
Model 9001	3-12AX7
Model 9005	4-12AX7,EL34 Quartet
DSL201	4-12AX7,EL84 Duet
DSL401	4-12AX7,EL84 Quartet
DSL50	4-12AX7,EL34 Duet

DSL100	4-12AX7,EL34 Quartet
TSL601	4-12AX7,EL34 Duet
TSL602	4-12AX7,EL34 Duet
TSL60	4-12AX7,EL34 Duet
TSL602	4-12AX7,EL34 Duet
TSL100	4-12AX7,EL34 Quartet
TSL122	4-12AX7,EL34 Quartet
EL34 100/100	2-12AX7,2-12AT7,EL34 Octet
EL34 50/50	2-12AX7,2-12AT7,EL34 Quartet
EL84 20/20	2-12AX7,1-12AT7,EL84 Quartet
JMP-1	2-12AX7
1987X/1987XL	3-12AX7,5881/6L6 Duet
1959SLP/1959SLPX	3-12AX7,EL34 Quartet
2203X	3-12AX7,EL34 Quartet
2203ZW (Zakk Wylde Sig)	3-12AX7,6550 Quartet
2061X	2-12AX7,EL84 Duet
1974X	3-12AX7,EL84 Duet,EZ81
6100	7-12AX7,5881 / 6L6 Duet
JCM600	4-12AX7,EL34 Duet
JCM601	4-12AX7,EL34 Duet
JCM602	4-12AX7,EL34 Duet
JTM600	4-12AX7,EL34 Duet
JTM312	3-12AX7,5881/6L6 Duet
JTM310	3-12AX7,5881/6L6 Duet
JTM610	4-12AX7,EL34 Duet
JTM612	4-12AX7,EL34 Duet
JTM615	4-12AX7,EL34 Duet
JTM622	4-12AX7,EL34 Duet
2204	3-12AX7,EL34 Duet
2555SL (Slash Signature)	3-12AX7,EL34 Quartet
2555	3-12AX7,EL34 Quartet
JTM450S	3-12AX7,KT66 Duet,5AR4
MF350	2-12AX7

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## McIntosh

C-22	6-12AX7
MC-30	1-12AX7,1-12AU7,1-12BH7,6L6 Duet,5U4
MC-40	1-12AX7,1-12AU7,1-12BH7,6L6 Duet,5AR4
MC-60	1-12AX7,1-12AU7,1-12BH7,6550 Duet
MC-75	1-12AX7,1-12AU7,1-12BH7,6550 Duet
MC-240	3-12AX7,2-12AU7,2-12BH7,6L6 Duet,2-5U4
MC-260	3-12AX7,2-12AU7,2-12BH7,2-6550 Duets, 2-5AR4
MC-275	3-12AX7,2-12AU7,2-2-12BH7,2-6550 Duets
MC-350	2-12AX7,2-6DJ8,1-6CG7,1-6BL7,6L6 Octet

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## Mesa/Boogie

Studio 22	5-12AX7,EL84 Duet
Studio Preamp	4-12AX7,1-12AT7
Quartet Preamp	8-12AX7
MK-I 60 - early	2-12AX7,1-12AT7,6L6 Duet
MK-I 60 Reverb - early	4-12AX7,1-12AT7,6L6 Duet
MK-I 60 EQ - early	2-12AX7,1-12AT7,6L6 Duet

<b>MK-I 60 Reverb/EQ - early</b>	3-12AX7,2-12AT7,6L6	Duet
<b>MK-I 10t - early</b>	2-12AX7,1-12AT7,6L6	Quartet
<b>MK-I 100 Reverb - early</b>	2-12AX7,2-12AT7,6L6	Quartet
<b>MK-I 100 EQ - early</b>	2-12AX7,1-12AT7,6L6	Quartet
<b>MK-I 100 Reverb/EQ - early</b>	3-12AX7,2-12AT7,6L6	Quartet
<b>MK-I 100 Reverb - reissue</b>	4-12AX7,1-12AT7,6L6	Quartet
<b>MK-II 60</b>	4-12AX7,6L6	Duet
<b>MK-II 60 Reverb</b>	4-12AX7,1-12AT7,6L6	Duet
<b>MK-II 100</b>	4-12AX7,6L6	Quartet
<b>MK-II 100 Reverb</b>	4-12AX7,1-12AT7,6L6	Quartet
<b>MK-IIB 60</b>	4-12AX7,6L6	Duet
<b>MK-IIB 60 Reverb</b>	5-12AX7,6L6	Duet
<b>MK-IIB 100</b>	4-12AX7,6L6	Quartet
<b>MK-IIB 100 Reverb</b>	5-12AX7,6L6	Quartet
<b>MK-IIB 300</b>	2-12AX7,2-12AT7,6L6	Sextet
<b>MK-IIB 300 Reverb</b>	2-12AX7,3-12AT7,1-6FQ7,6L6	Sextet
<b>MK-IIB Cascode 60</b>	4-12AX7,6L6	Duet
<b>MK-IIB Cascode 60 Reverb</b>	4-12AX7,1-12AT7,6L6	Duet
<b>MK-IIB Cascode 100</b>	4-12AX7,6L6	Duet
<b>MK-IIB Cascode 100 Reverb</b>	4-12AX7,1-12AT7,6L6	Quartet
<b>MMIC 60</b>	4-12AX7,6L6	Duet
<b>MMIC 60 Reverb</b>	5-12AX7,6L6	Duet
<b>MK-IIC 100</b>	4-12AX7,6L6	Quartet
<b>MMIC 100 Reverb</b>	5-12AX7,6L6	Quartet
<b>MMIC Simul 75 Reverb</b>	5-12AX7,1-EL34	Duet,6L6 Duet
<b>MMIC 300</b>	3-12AX7,1-12AT7,1-6FQ7,6L6	Sextet
<b>MMIC 300 Reverb</b>	4-12AX7,1-12AT7,1-6FQ7,6L6	Sextet
<b>MK-II 300 Simul Reverb</b>	4-12AX7,1-12AT7,1-6FQ7,1-EL34	Duet,6L6 Quartet
<b>MK-III 60</b>	4-12AX7,6L6	Duet
<b>MK-III 60 Reverb</b>	5-12AX7,6L6	Quartet
<b>MK-III 100 Reverb</b>	5-12AX7,6L6	Quartet
<b>MK-III Simul 75 Reverb</b>	5-12AX7,6L6	Duet,EL34 Duet
<b>MK-IV</b>	4-12AX7,1-12AT7,6L6	Quartet
<b>Satellite 60</b>	2-12AX7,6L6	Duet
<b>Simul-Satellite</b>	2-12AX7,6L6	Quartet
<b>Simul-Class 290 Stereo</b>	3-12AX7,2-6L6	Quartets
<b>Simul-Class 295</b>	4-12AX7,6L6	Quartet and EL34 Quartet
<b>Simul-Class 395 Stereo</b>	4-12AX7,2-6L6	Quartets
<b>Strategy 400</b>	4-12AX7,6L6	Octet and EL34 Quartet
<b>Strategy 500 Stereo</b>	4-12AX7,1-6550	Quartet and 2-6L6 Quartets
<b>SOB 60 - early</b>	2-12AX7,1-12AT7,6L6	Duet
<b>SOB 60</b>	3-12AX7,6L6	Duet
<b>SOB 60 Reverb</b>	4-12AX7,6L6	Duet
<b>SOB 100 Reverb</b>	4-12AX7,6L6	Quartet
<b>D-180 - early</b>	2-12AX7,2-12AT7,6L6	Sextet
<b>D-180</b>	3-12AX7,1-12AT7,6L6	Sextet
<b>Bass-400</b>	4-12AX7,6L6	Sextet
<b>Bass-400 Plus</b>	4-12AX7,2-6L6	Sextet
<b>50150 Power Amp</b>	2-12AX7,6L6	Quartet
<b>TriAxis Preamp</b>	5-12AX7	
<b>Dual Rectifier Solo Head</b>	5-12AX7,2-5U4	6L6/EL34 Quartet
<b>Triple Rectifier Solo Head</b>	5-12AX7,3-5U4	6L6/EL34 Sextet

Dual Rectifier Trem-O-Verb	6-12AX7,2-5U4 6L6/EL34 Quartet
Dual Caliber 50	6-12AX7,6L6 Duet
Dual Caliber 30	6-12AX7,1-6BQS/EL34 Quartet

*Note: MK-11C and early MK-III Simul-Class models were shipped with a Quartet of 6L6s. MESA/Boogie now recommends that these Simul-Class units be retrofitted with two 6L6s and two EL34s. The EL34s should be placed in the outer-left and outer-right tube sockets, with the 6L6s in the middle. No modifications are required when making this change. Early Strategy 400 amps used twelve 6L6s. Some Bass 400s were shipped with a sextet of 6550s. 6550s and 6L6s are both compatible with the early Bass 400s - no modifications are required.*

20/20 3 - 12AX7/12AX7/12AX7 2 Duets EL84

## Metalhead

Elan MK 11	5-12AX7
Elan MK III	5-12AX7

## Mitchell

Pro 100	4-12AX7,6L6 Quartet
Pro 100 EQ/Reverb	5-12AX7,6L6 Quartet
Pro 100 EQ/Reverb	3-12AX7,1-12DW7,6L6 Quartet
Deluxe	4-12AX7,6L6 Duet

## Mojave Amps

Coyote	3-12AX7,GZ34/5AR4,EL84 Duet
Sidewinder	3-12AX7,GZ34/5AR4,EL84 Quartet
Plexi 45	3-12AX7,GZ34/5AR4,6L6 / KT666 Duet
Scorpion 50 watt	4-12AX7,EL34 Duet
Peacemaker 100 watt	4-12AX7,EL34 Quartet

## Musicman

RD 50	1-12AX7,6L6 Duet
RD 65	6L6 Duet (transistor preamp)
RD 100	6L6 Duet (transistor preamp)
RD 112	6L6 Duet (transistor preamp)
RD 120	6L6 Duet (transistor preamp)
RP 65	6L6 Duet (transistor preamp)
RP 100	6L6 Duet (transistor preamp)
RP 115	6L6 Duet (transistor preamp)
Seventy-Five	1-12AX7,6CA7 Duet
One-Thirty	1-12AX7,6CA7 Quartet
75	6L6 Duet (transistor preamp)
150	6L6 Quartet (transistor preamp)

*Note: Early model used 6CA7, check amp.*

## Musitech

Stereo 240	5-12AX7,1-12AT7,1-5AR4,6L6 Duet,EL34 Duet
Stereo 215	5-12AX7,1-12AT7,6V6 Duet,EL84 Duet

## Nomad

50-watt Channel-switching	4-12AX7,1-12AT7,EL34 Duet
100-watt Channel-switching	4-12AX7,1-12AT7,EL34 Quartet
50 Reverb	6-12AX7,1-12AT7,EL34 Duet
100 Reverb	6-12AX7,1-12AT7,EL34 Quartet

## Orange

80	3-12AX7,EL34 Duet
120	3-12AX7,EL34 Quartet
Tiny Terror	2-12AX7,EL84 Duet
Thunderverb 200	4-12AX7,2- 12AT7,6550 Quartet
Rockerverb 100	4-12AX7,2-12AT7, 6550/ KT-88,or 6L6,or EL34 Quartet
Rockerverb 50	4-12AX7,2-12AT7,6V6 Quartet
Rocker 30	3-12AX7,EL-34 Duet
AD30HTC	4-12AX7,EL84 Quartet,1- 5AR4
AD30R	3-12AX7,EL84 Quartet,1-5AR4
AD30TC	4-12AX7,EL84 Quartet,1-5AR4
AD140HTC	4-12AX7,EL-34 Quartet

## Peavey

Classic 60	2-12AX7,6L6 Duet
Classic 60/60	3-12AX7,2-6L6 Duet
Classic 120	3-12AX7,6L6 Quartet
Classic 120/120	4-12AX7,2-6L6 Quartet
Classic and VTX	6L6 Duet (transistor preamp)
SDuce	6L6 Quartet (transistor preamp)
Heritage	6L6 Quartet (transistor preamp)
Mace	6L6 Sextet (transistor preamp)
MX	6L6 Quartet (transistor preamp)
Roadmaster - early	6550 Quartet (transistor preamp)
Roadmaster - later	4-12AX7,2-12AT7,6L6 Sextet
Rockmaster	3-12AX7,6L6 Quartet
Rockmaster - later	3-12AX7,6L6 Quartet
Encore 65	3-12AX7,1-12AT7,6L6 Duet
TG RAXX	4-12AX7
TB RAXX	4-12AX7
Triumph 60	4-12AX7,1-12AT7,6L6 Duet
Triumph 120	4-12AX7,1-12AT7,6L6 Quartet
Butcher	3-12AX7,6L6 Quartet
Vintage - early	2-6C10,6L6 Quartet
Vintage - later	6L6 Quartet (Transistor Preamp)
VTA 400	3-12AX7,1-6AN8,6550 Quartet
VTA 800	3-12AX7,1-6AN8,6550 Octet
VTB 300	2-12AX7,1-6AN8,6550 Quartet
VTG 300	2-12AX7,1-6AN8,6550 Quartet
Classic 30	3 - 12AX7,EL84 Quartet
Bravo	3 - 12AX7,EL84 Duet
XXX	3 - 12AX7,6L6 Quartet (Option of EL-34 Quartet)
5150	5 - 12AX7,6L6 Quartet

*Note: V4 is the phase inverter in this amp - not V5*

## Polytone

Fusion	4-12AX7,1-12AU7,1-12AT7,6L6 Quartet
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## Randall

RGTES	4-12AX7,1-12AT7,6L6 Quartet
RGT100	4-12AX7,1-12AT7,6L6 Quartet



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RGT100HT

4-12AX7,1-12AT7,6L6 Quartet

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## Rivera

TBR-1 - Rudolph Schenker	8-12AX7,2-KT77 Duet
TBR-1 - Ted Nugent	6-12AX7,1-12AT7,2-KT77 Duet
TBR-1	7-12AX7,2-EW4 Duet
TBR-1M	7-12AX7,2-EL34 Duet
TBR-ISL	7-12AX7,2-EL34 Duet
TBR-2	7-12AX7,2-6550 Quartets
TBR-2M	7-12AX7,2-6550 Quartets
TBR-2SL	7-12AX7,2-6550 Quartets
TBR-2 - John Sykes	8-12AX7,2-6550 Quartets
TBR-2 - Jerry Garcia	5-12AX7,2-12AU7,2-6550 Quartets
TBR-2B	5-12AX7,2-6550 Quartets
TBR-3 Hammer 120	4-12AX7,2-EL34 Duets
TBR-4 Preamp	6-12AX7,EL84 Duet
TBR-5 Hammer 320	4-12AX7,2-6550 Quartets
TBR-6 Preamp	4-12AX7
TBR-7 Power Amp	4-12AX7,2-5881 Duets
M60 Combo	5-12AX7,2-EL34 Duets
M100 Combo	5-12AX7,EL34 Quartet
M100 Combo - Jerry Garcia	5-12AX7,6550 Quartet
S120 Combo	6-12AX7,2-EL34 Duets

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## Roland

Bolt 30	1-12AT7,7391 Duet
Bolt 60	1-12AT7,6L6 Duet
Bolt 100	1-12AT7,6L6 Quartet

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## Seymour Duncan

60-watt Combo/head	3-12AX7,2-12AU7,EL34 Duet
60-watt Convertible	3-12AX7,2-12AU7,EL34 Duet
100-watt Combo/head	6-12AX7,2-12AU7,EL34 Quartet ,5U4
100-watt Convertible	6-12AX7,2-12AU7,EL34 Quartet ,5U4
8440	3-12AX7,EL34 Quartet
KTG-1	2-12AX7,1-12AU7
KTG-2100	2-12AX7,2-12AU7,KT88 Quartet

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## Silvertone

50-watt Reverb	4-12AX7,2-6CG7,6L6 Duet
100-watt Reverb	4-12AX7,2-6CG7, 6L6 Quartet

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## Sound City

Bass 150	2-12AX7,1-12AT7,6550 Quartet
Concord	3-12AX7,2-12AT7,EL34 Quartet
GT-50	1-12AX7,1-12AT7,EL34 Quartet
PA-400	3-12AX7,1-12AT7,EL34 Quartet
PA-200	3-12AX7,1-12AT7,6550 Quartet
MK-IV 120	4-12AX7,1-12AU7,EL34 Sextet
LB-50 Plus	3-12AX7,1-12AT7,EL34 Duet
LB-200 Plus	4-12AX7,1-12AT7,6550 Quartet
50 watt	3-12AX7,EL34 Duet

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100 watt	3-12AX7,1-12AT7,EL34	Quartet
200 watt	3-12AX7,1-12AT7,6550	Quartet

## Spectra

30T	3-12AX7,6V6	Duet
60 T	3-12AX7,6V6	Duet
120 T	3-12AX7,6L6	Quartet
2-12 T	4-12AX7,6L6	Quartet

## Sundown

Formula 50	4-12AX7,6L6	Duet
Rebel 50	3-12AX7,6L6	Duet
Artist Combo	5-12AX7,6L6	Quartet
Rebel 100	3-12AX7,6L6	Quartet
Artist 30 Combo	5-12AX7,6L6	Duet
SD1012C	5-12AX7,6550	Duet
SD1000H	5-12AX7,6550	Duet

## Sunn

Coliseum PA	3-12AX7,1-6AN8,6550	Quartet ,5AR4
Model A	4-12AX7,6550	Quartet
Model A212	4-12AX7,6550	Duet
Model T	4-12AX7,6550	Quartet
Sceptre	1-12AX7,1-12AU7,1-6AN8 ,6550	Duet
Sentura	1-12AX7,1-12AU7,1-7199,6CA7	Duet
Sonic	1-12AX7,1-12AU7,1-6AN8 ,6550	Duet
Solos I	2-12AX7,1-12AU7,transistor-powered	
Spectrum I	1-12AX7,1-7199,6CA7	Duet
Solarus (190L)	1-12AX7,1-12AU7,1-6AN8 ,6550	Duet
100S	1-12AX7,1-12AU7,1-6AN8 ,6550	Duet
200S(190B)	1-12AX7,1-6AN8 ,6550	Duet
1000S	1-12AX7,1-12AU7,1-6AN8 ,6550	Quartet
1200S (350L)	1-12AX7,1-12AU7,1-6AN8 ,6550	Quartet
2000S (350B)	1-12AX7,1-6AN8 ,6550	Quartet

Note: Later models may use 7199. Earlier models may use 6CA7.

## SWR

SS-180	1-12AX7
PB-200	1-12AX7
SM-400 - early	1-12AX7
SM-400 - later	1-12AX7
Baby Blue	1-12AX7
Redhead	1-12AX7
Studio 220	1-12AX7

## THD

4-10	1-12AY7,3-12AX7,6L6	Duet
2-10	1-12AY7,3-12AX7,6L6	Duet
V-Front	1-12AY7,3-12AX7,6L6	Duet
Tweed Head	1-12AY7,3-12AX7,6L6	Duet
4-10 Reverb	1-12AY7,3-12AX7,1-12AT7,6L6	Duet
2-10 Reverb	1-12AY7,3-12AX7,1-12AT7,6L6	Duet
V-Front Reverb	1-12AY7,3-12AX7,1-12AT7,6L6	Duet

Tweed Head Reverb	1-12AY7,3-12AX7,1-12AT7,6L6	Duet
50-watt Rack Head	1-12AY7,4-12AX7,1-12AT7,6L6	Duet
100-watt Rack Head	1-12AY7,4-12AX7,1-12AT7,6L6	Quartet

*Note: 12AX7 can be substituted for 12AY7s for increase in gain. EL34s, 6CA7s, KT88s and 6550s can be substituted for 6L6s with a simple bias-voltage adjustment.*

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## Thunderfunk

50B	5-12AX7,1-12AT7,6550	Duet
100B	5-12AX7,1-12AT7,6550	Duet
SOELS	6-12AX7,2-12AT7,EL34	Duet
100ELS	6-12AX7,2-12AT7,EL34	Quartet
50LS	6-12AX7,2-12AT7,6550	Duet
100LS	6-12AX7,1-12AT7,6550	Quartet

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## Trace Elliot

Hexavalve	3-12AX7,6550	Sextet
Quatravalve	3-12AX7,6550	Quartet
TWInvalve	3-12AX7,6550	Duet
VA350	3-12AX7,6550	Sextet
VR350	3-12AX7,6550	Sextet
GP12XV	3-12AX7	

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## Trainwreck

Liverpool 30-watt	3-12AX7,EL34	Quartet
Express 22-watt	3-12AX7,6V6	Duet,some with EL34 Duet
Liverpool Rocket	3-12AX7,EL84	Quartet,1-5AR4

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## Victoria

518-T	1-12AX7,6V6,5Y3	
20112-T	1-12AY7 or 5751,1-12AX7,6V6	Duet,5Y3
DOUBLE DELUXE	1-12AY7 or 5751,1-12AX7,6V6	Quartet,5Y3 or 5AR4
35210-T	2-12AY7,1-12AX7,6L6	Duet,5U4
35115-T	2-12AY7,1-12AX7,6L6	Duet,5U4
35310-T	2-12AY7,1-12AX7,6L6	Duet,5A4
45410-T	1-12AY7,2-12AX7,6L6	Duet,5AR4
80410-T	1-12AY7,2-12AX7,6L6	Quartet,5AR4
50212-T	1-12AY7,2-12AX7,6L6	Duet,5AR4
80212-T	3-12AX7,6L6	Quartet,5AR4
VICTORI-ETTE	3-12AX7,1-12AT7,EL84	Duet,5AR4
VICTORILUX	3-12AX7,1-12AT7,EL84	Quartet or 6L6 Duet,5AR4
SOVEREIGN	2-12AX7,1-12AT7,1-EF86,1-6BM8,EL34	or 6L6 Duet,5AR4
Regal	3-12AX7,1-12AT7,Use any octal based output tubes or rectifier	
Trem de la trem	3-12AX7,6V6	Duet,5U4

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## Voodoo Amps

V-Plex 25	3-12AX7,6V6	Duet
V-Plex 50	3-12AX7,EL34	Duet
V-Plex 100	3-12AX7,EL34	Quartet
WITCHDOCTOR 10 watt	2-12AX7,6V6 (single), 5Y3	Rectifier
V-Rock 50	3-12AX7,KT77	Duet
V-Rock 100	3-12AX7,KT77	Quartet
V-Reck 50	3-12AX7,KT77	Duet

**Vox**

AC-4	1-7025,1-6267,1-6V4,1-EL84
AC-10	1-7025,1-6267,1-6U8A,1-7189 Duet
AC-15	2- 7025,1-12AT7,1-EL84 Duet + 5AR4
AC-15 - 1982	2-7025,1-12AT7,1-EL84
AC-30	4-7025,1-12AU7,1-EL84 Quartet + 5AR4
AC-30 Reverb	6-7025,1-12AU7,1-EL84 Quartet + 5AR4
AC-30 Reverb - 1992	6-7025,1-12AT7,1-EL84 Quartet
AC-30 Top	7-7025,1-12AU7,1-EL84 Quartet
AC-30 Standard - 1990	6-7025,1-EL84 Quartet
AC-30 Limited - 1990	6-7025,1-EL84 Quartet
AC-50	3-7025,1-12AU7,1-EL34 Duet + 5AR4
AC-100	1-7025,2-12AU7,1-EL34 Quartet
Cambridge Reverb	3- 7025,1-12AU7,1-EL84 Duet + EZ81
V-125	6-7025,1-12AT7,1-EL34 Quartet
V-125	3-7025,1-12AT7,2-7189,1-EL34 Quartet
Concert 501	5-7025,1-EL84 Quartet
Concert 502	5-7025,1-EL84 Quartet
Concert 100	4-7025,1-EL34 Quartet
AC-30 TB - 1986	5-ECC83,1-EL84 Quartet
AC-30 TB/RV - 1996	7-7025,1-EL84 Quartet
AC-30TB/TBX - (1992-2004)	5-ECC83,1-ECC82,1-GZ34,4-EL84
AC30 Custom Classic	3-ECC83,1-GZ34,4-EL84
AC-15TB/TBX/TB2	5- ECC83,1-5Y3,2-EL84

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## Currently Manufactured or NOS Available Tube Types in GT Catalog

### PREAMP TUBES

#### GT Quality Selection Process

All preamp tubes are not made the same, even from the same design, materials and production run. So we need to listen, hand test, measure, and evaluate every Groove Tube preamp tube. The ones that do not make the grade, which we call our "fallout", do not become a Groove Tubes. This fallout can be as high as 60% of the tubes we test! They have been rejected because of high hum or noise levels, adverse microphonics, or weak emissions. This is costly as you may imagine, but it is a calculated expense of our company and why our selected preamp tubes cost a bit more. However, it also means you can count on a GT tube every time to be of the highest quality, and the longest lasting. It's why our faithful customers have kept us in business nearly 30 years!

It is just not possible to build a perfect tube every time because of the high variable factor of the many hand assembly steps and the dozens of critical human controlled processing steps of this tiny electron engine. The "high human factor" along with the critical material processing issues of making tubes results in a wide range of quality in any run ranging from "primo", to "just OK", to "totally useless" for some higher gain, multiple stage lead guitar amps.

Furthermore, even after our tubes have been certified by our unique GT QC process, there remain significant differences in the way different makes of 12AX7 type tubes will work and sound in your amp. In fact, "good/bad tone" can be very subjective. That is why Groove Tubes offers every currently produced preamp tube possible in each type; just because they all sound a bit different and we think that's a good thing!

Choice is the most important part of shaping your tone so we highly recommend personal experimentation on your part, it can go a long way in improving your tone, and is fun too! The good news is preamp tubes are "user friendly", unlike power tubes that may need a trained tech to Bias them up right the first time. But preamp tube replacement requires no special tools; all you need is a bit of knowledge we'll give you here, and then just some soft hands and a little practice.

Each of the following 12AX7 (aka ECC83/7025) tubes are compared subjectively as well as technically to show how close they resemble the original factory spec in several critical areas. The technical reports shown below here represent data measured "on average" and based on thousands of tubes tested from each manufacturer's offerings. Here's what they mean:

**Gain:** This is the amplitude factor or Mu in tube language. A rating of 100% of spec is perfect, but few tubes come even close as you can see. A low gain score here doesn't necessarily mean it will not be the best tube in your circuit, Gain has more to do with how it balances in the design of your preamp circuit and a lower gain type may work better for you. Also, higher gain tube types, such as the 6ECC83S may be "too hot" for an amp designed around a lower GT12AX7R type. However, in vintage amps and cloned designs of those amps, a higher gain tube is usually desirable to get more the vintage results the player is after. Again, try them and hear for yourself; personal taste plays a big part in choosing your preamp tubes. So use this Gain number as a guide and not a hard rule.

**Output:** This is the current the tube draws under use, and is related to Gain. Again, 100% of original spec is perfect, and again few tubes made today are. Output current (rated 1.2Ma for a 12AX7) is kind of like the horsepower behind the signal, muscle of the tube body. A higher percent output level is desirable for complex amp circuits common today. Low output can produce a wimpy or dull tone, but can still be quite suitable for certain amps, and again, depend on the result you are looking for (harp players love small amps with a weaker tone that compresses earlier, for example).

**QV (Quality Variance):** This is kind of our GT Quality Grade, or our indication of how tight tolerances are in any given tube type we process. Here, a LOW % is best as it shows a lower degree of variance between the acceptable ranges of these tubes...they are more consistent. This considers all quality factors including Gain, Output, adverse noise and microphonics as well. However, this rating number is not so meaningful as all GT tubes have already passed our close inspection and have good Gain, Output and no adverse noise or microphonics. But it may be helpful in explaining why you may have had trouble with these same tube types as purchased through other sources or as they came in a stock amplifier as their OEM tube.

## CURRENT GT PREAMP TUBES

OK, now that we've qualified all that... here's our current range of preamp tubes in the GT catalog:



### GT-12AX7-C

Design: Shuguang Tube Factory

Origin: China

Gain: 88%

Output: 92%

QV: 17%

*Nice balanced tone, good round clean and smoother type when distorted. One of our most popular models with Fender and Marshall players alike.*



### GT-12AX7-M

Design: Groove Tubes (reversed engineered from Mullard ECC83)

Origin: China

Gain: 78%

Output: 92%

QV: 60%

*Our exclusive tube, an exact and faithful reissue of the legendary Mullard ECC83/12AX7 design. This was the tube found in most high quality guitar and Hi Fi amps throughout the 50's, 60's and 70's. The design was also licensed and made by Amperex in Holland, and widely used under many brands such as Hewlett Packard, McIntosh, Vox and Marshall.*

*This tube has a complex mica design, which uses 4 different mica insulators in layered structure that actually shock mounts the Cathode and improve both stability and sound quality. (most tubes have just one mica spacer repeated top and bottom).*

*Excellent all around sonic character, it was a favorite from its first release onto the market a few years ago and has only gained in popularity. An excellent replacement for a dull Russian type and adds a vintage clarity and feel to any modern amp. We'd call it a bit rounder, deeper and all around warmer than any others we've tried, except an original Mullard of course (from which ours is virtually undetectable!)*



### **GT-12AX7-R**

Design: Reflector Tube Factory  
Origin: Russia  
Gain: 83%  
Output: 77%  
QV: 42%

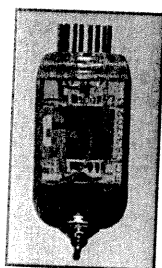
*The first and longest manufactured Russian 12AX7 type. It has the highest use in our OEM new amp industry, due to its rugged design, high consistency and much lower cost...manufacturers love these but they are also the most often replaced in upgrading your preamp stage. However, as most amps were designed around this tube, it is always a safe fall back for the modern Fender amp, which used this tube widely throughout their line over many years. It has perhaps a bit harsher biting tone in overdrive, and also a bit dull in the clean mode, lacking high frequency which makes it a good choice for some higher gain and brighter amps.*



### **GT-12AX7-R2**

Design: Reflector Tube Factory  
Origin: Russia  
Gain: 86%  
Output: 83%  
QV: 42%

*The second offering for the largest tube factory in Russia, with larger plate structure and a brighter tone than the earlier R version from this factory. The large plate size makes this a tube prone to adverse microphonic ringing from higher gain amps.*



### **GT-12AX7-R3**

Design: Reflector Tube Factory  
Origin: Russia  
Gain: 87%  
Output: 83%  
QV: 17%

*The most recent tube from Russia, with a shorter plate than the R2 and a more linear (flat) sonic signature. This makes it more versatile and will work nicely in most circuits, with low noise and hum measurements as well.*





### **GT-ECC83-S**

Design: JJ Factory (formerly Tesla)

Origin: Slovak Republic

Gain: 90%

Output: 112%

QV: 58%

*This tube has terrific output and makes it a great choice for driving the signal thru modern more complex circuits from Bogner, Boogie and others. A wider quality variance means it costs us more to weed out the duds but the good ones are real good! These have a tight, strong and relatively bright tone, which can really liven up a wimpy amp or a tired old vintage amp.*



### **GT-5751M (low gain 12AX7 version)**

Design: Groove Tubes

Origin: China

Gain: 70%

Output: 92%

QV: 17%

*Our exclusive tube, like the 12AX7M, but intentionally made to the spec of a 12AX7 weak sister tube called the 5751. This was a popular tube for early vintage amps (the mic channels used this or a 12AY7 to lower gain and prevent feedback). Same warm round tone and vintage fell as it's sister 12AX7M but the lowered Gain and Output spec make it a better fit for amps like the modern Fender amps which were designed around and came with the lower gain and relatively wimpy sounding Russian 12AX7 tube types. The GT5751M is certainly a great upgrade for any high gain amp amp to improve definition and stability (less squeals!) but it is especially recommended for the Hot Rod Deluxe and similar Fender and Marshal high gain combo series amps.*

**GT-12AT7 C**

**GT-12AY7**

**GT-12AU7-C**

**GT-6072-M (selected for microphones)**

**GT-6201-M (selected for microphones)**



## POWER TUBES

### GT Quality Selection and Matching Process

Matching power tubes is valid and has been a part of tube history since the beginning. That's because power tubes usually work in pairs (or several pairs) and because it is nearly impossible to build any two tubes that will work exactly the same. So at GT we have invented our own system where we "match" them into Duets, and Quartets so your amp can be its best at all times!

Power tubes were traditionally matched for just output power as they were mostly used in radio transmitters and/or receivers for the sole purpose of reproducing music and sounds on the radio. But that is not why or what we use tube for in our guitar amps! In reality, tubes vary only slightly in power, typically less than 5. So, while it's quite easy to measure small differences in power between tubes, it is a meaningless procedure because we cannot HEAR small percentage differences in power. However, as musicians with those picky ears, we can hear small differences in TONE! Interestingly, tubes do vary quite a bit in this way, and because we use tubes today (and yesterday) in musical amplifiers to produce musical tones, the exclusive and still undefeated GT power tube matching systems focus mainly on measuring the differences between TONES the power tubes produce. Then we closely match identical performing power tubes together to produce the World's most balanced and even sounding power tubes sets possible. Long sustain, more punch and balanced frequency response, along with extended useful tube life are earmarks of GT matched tubes.

We had to invent new ways to measure more musical meaningful data from power tubes; our exclusive 1-10 Gain to Distortion ratio system defines our Matched Duets and Quartets from #1 (early Distortion, has softer attack and more compression) on a graduating scale up to #10 (latest Distortion character, more dynamics and headroom before distortion). The largest and most popular matched sets fall between #4 and #7 and these sets are closest to the natural design character for that tube type. We usually recommend a range between #4 and #7 for most applications, and use the lowest numbers to tone down a loud or too powerful amp or else the higher numbers for bass players and rhythm guitarists.

Last important point on choosing a power tube; each different model of a tube in the 6L6 family offering will be made in a different factory and/or of different materials and design, so they each have their own sonic signature and power measurements too. We will give you a brief subjective description of what they sound like as well as typical output power measurements in milliamp to help you compare. However, if listed within a family of tubes, they are all electronically identical and interchangeable with proper qualified installation (NOTE: We HIGHLY recommend

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that you rebias your amp when changing tube type or changing rating number more than 3 points within the same tube type. Once you have selected your favorite tube type and stay within a 3 point range, rebiasing will not be required when replacing worn tubes.

## CURRENT GT POWER TUBES

OK, now that we've qualified all that... here's our current range of Matched Duet and Quartet power tubes in the GT catalog:

### The 6V6 Family

**GT-6V6-C**

**GT-6V6-R**

**GT-6V6-S**

### The 6L6 Family

**GT-6L6-R (formerly "B")**

**GT-6L6-CHP**



*Strong and very focused output as compared to many other 6L6 designs, this tube is highly recommended for "livening up" any stock Fender or Marshall amp coming with the common Russian 6L6R tubes, and it's also a great choice for that vintage tone but with improved punch from those GT heat sink wings on the carbonized nickel plates!*

### GT-5881C



*This classic short bottle high vacuum 5881 was originally made for military applications to fit into field radios and last a really long time! Leo Fender used it in the early low-profile Bassman and Showman heads as it was the only practical tube to fit in the short space. We love the tone of this tube; it's big and round and distorts real sweet. Highly recommended in the modern Fender amps to produce that creamy Blues tone, or fat Steve Cropper signature tone as well.*

**GT-6L6-S**

**GT-6L6-R2**

**GT-KT66-C**



### **GT-6L6-GE**

*This is our flagship GT tube, the one we spent nearly four years developing from scratch after purchasing the original General Electric design, the original RCA grid winding machines that made this tube, and tons of the original materials. Why is there such a demand for this tube?*

*Because it looks and sounds exactly like the original GE6L6 tube, perhaps the best guitar amp tube ever made! Stunning clarity, and tone that is reminiscent of great '50s, '60s and '70s recordings from Carl Perkins through Jimi Hendrix...*

*both of whom mostly recorded through Fender amps from the golden years in a period when they exclusively used this GE tube.*

## **The EL34 Family**



### **GT-EL34-M**

*The GTEL34M is an exact replica of perhaps the most famous power tube of all time, the EL34 as made by Mullard in the '60s. It was the stock tube in all the early Marshall and HIWATT amps. There were a number of variants of the original tube and GT chose the classic XF2 dual getter version to reproduce, as it is perhaps the best example from a span of nearly 15 years that Mullard produced this tube. The tone is unmistakable... that classic big fat tone with well defined chords and single notes. It has no mush when pushed into distortion, just fat power chords and stinging leads. This tube really makes the*

*reissue amps wake up and play like the originals, and is as close as you can get to vintage Marshall heaven without spending a small fortune on a set of NOS tubes on eBay.*

### **GT-EL34-R**

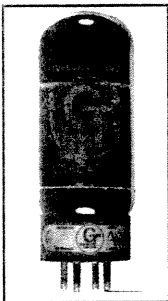
### **GT-E34L-S**



*Check out the power of this GT exclusive tube we introduced more than 12 years ago in a special partnership exclusive with the folks at Tesla, the factory now called JJ. It interchanges with any EL34 application and puts out about 15-20% more power! It also has great tone and it remains one of our best selling tubes of all time. This tube stays tight right up to full power and even in the most overdriven modes, so your power chords really have more power!*

### **GT-KT77S**

## GT-6CA7-GE



*The 6CA7GE is our second flagship GT tube, the sister to the GT6L6GE. This is an exact copy of the legendary General Electric tube that shipped in all those great early Musicman amps (Leo Fender's company after he sold Fender... Leo really liked this tube!). It has very strong power, and it's a very clean and round tone, with a strong midrange tone in overdrive. Much like the 6L6GE, we just can't make enough of them!*

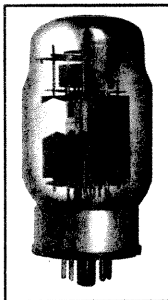
## The 6550/KT88 Family

**GT-6550-C**

**GT-6550-R**

**GT-KT88-C2**

**GT-KT88-SV**



*The GT-KT88SV is a new exclusive GT design with special "heat wings" attached to plate for more power, longer life, and better tone. With the GT-KT88SV, you can expect a big bottom and very dynamic response from the most powerful in its class. It's a great choice for Ampeg SVT and HiFi amps. Expect a punchy tight tone with excellent bass response... great for tight country licks and big round jazz tones. Despite that, the GT-KT88SV is popular with heavy metal and speed players looking for a very clean output section where the majority of their distortion comes from their preamp section of their amp, or via pedals or effects.*

## EL84 TYPES

**GT--EL84-R**

**GT--EL84-S**

## OTHER TYPES

**GT-7027-S**

**GT-7591-R**

## RECTIFIER TYPES

GT-5AR4/GZ34

GT-5U4/GZ32

GT-5Y3/GZ30

GT-6CA4

GT-SS-5AR4/GZ34 (solid-state)

GT-SS-6CA4 (solid-state)

GT-SS-5U4 (solid-state)

## SUBSTI-TUBES

Substl-TUBE 1 6SL7 to 12AX7

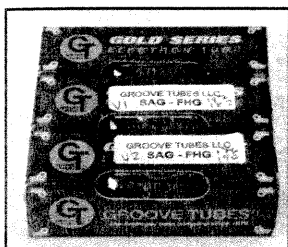
Substl-TUBE 1A 6SN7 to 12AT7

Substl-TUBE 2 6SC7 to 12AX7

Substl-TUBE 3 6SJ7 to 12AX7

Substl-TUBE 928

## SAG PRODUCTS



**SAG-MHG Marshall High Gain**

**SAG-FHG Fender High Gain**

**SAG-FST Fender Soft Touch**

**SAG-AX7-MPI Matched Phase Inverter**

**SAG-AT7-MPI Matched Phase Inverter**

*Specially selected from premium Groove Tubes preamp tubes which have been tested in our normal rigorous fashion to meet the GT standard.*

*Special Applications Group (SAG) kits provide further testing and grading for certain performance characteristics.*

## GT POWER REDUCER



**928-PR Single w/GTEL84s (also available in Duet/Quartet)**

*An adapter which allows class A/B amplifiers such as Marshall and Fender, to replace their output tubes with the EL-84 tube, and operate in class A. This reduces the power of the amplifier. In the case of a 100 watt amp, the output will be about 40 watts. In a typical 50 watt amp, the power will be about 20-25 watts. These will reduce the load on your power transformer, and allow your amp to reach distortion, with a nice AC-30 or EL-84 sound and feel at levels that are lower and more friendly to recording and*

*venues where your amp will not feel, play, or distort at the amplifier's normal higher sound levels.*



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## TUBE CROSS REFERENCE GUIDE

Tubes are often known by several correct model names. These names stem from different industries ordering tubes with additional quality standards or slight changes in the tube's format, i.e., glass container will be noted as "GC" following the model number.

Another source of confusion is the European nomenclature. There is a corresponding name in Europe for nearly all U.S.-made tubes, and vice-versa. We've listed only the common tube models for instrument amplifiers found in our music industry. Occasionally, an amp manufacturer will list the same tube by two names, the first by a common name and the second with an industrial number. The industrial numbers will always be four digits, and usually denote a superior quality (although these days it rarely applies since the tube industry's quality has fallen off sharply).

the most common example of this is the dual-channel Fender amps with reverb and tremolo. These amps will call for the 7025 and the 12AX7 in the same amp for different locations. In this case, the manufacturer is asking for a higher quality tube in the most critical gain stages of the two volume controls and the reverb recovery control section while the tremolo section can use any 12AX7, since this stage of the amp does not contribute to the audio quality of the signal.

All Groove Tubes preamp tubes are performance tested to our own high standards. What follows is our cross reference guide only for tubes known by several names. The corresponding Groove Tubes number will follow the listing.

GROOVE TUBES	INDUSTRIAL	EUROPEAN
GT-7025	7025	ECC83
GT-12AT7	6679	ECC81
GT-12AU7	6189	ECC82
GT-12AX7	7025	ECC83
GT-12AY7	6072	-
GT-12DW7	7247	-
GT-5AR4	-	GZ34/GZ37/U54/U77
GT-5U4	-	GZ32/GZ31/U51/U52
GT-5Y3	6853	GZ30/U50
GT-6CA4	-	EZ81
GT-6CG7	-	6FQ7
GT-6K11	-	6Q11/6Q10
GT-6U10	-	6AC10
GT-6CA7	-	EL34/KT77
GT-6L6	5881	KT66
GT-6V6	7048/5871	-
GT-6550a	6550	KT88
GT-ECC83	7025	ECC83
GT-EL34	-	6CA7/KT77
GT-EL84	-	6BQ5
GT-6DJ8	-	ECC88

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