



TT - Report Preamp-Tubes

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Preface

One of the big advantages of tube amps is that you can significantly change the sound by simply changing the tubes - but then the question arises: "How can I know which tubes to use without buying dozens to test?"

This is a frequently asked question, but the answer is difficult, as it depends on very subjective perception. Furthermore, every user has different requirements and preferences as far as tone is concerned, and one listener's perception can be quite different from that of another. Nevertheless it is possible to give a few guidelines, based on experience, feedback from customers, and objective measurements - but if these recommendations can finally deliver THE sound that one seeks can of course not be guaranteed.

This report is a "living" document. This means that it will be expanded at irregular intervals with new information from the daily experience with tube equipment, and from feedback from other users.

I look forward to hearing other opinions and experiences, and am happy to integrate them in this report.

Further documentation: TT-Tube Map (see Tube-Town Home Page under www.tube-town.net)

Expressions, used in this text

The following pairs of tube type designations means the same, when used in the text:

ECC81 - 12AT7

ECC82 - 12AU7

ECC83 - 12AX7

Sovtek 12AX7 – WA, WB, WC

The Sovtek 12AX7 tubes are among the most commonly used tubes, especially for instrument amplifiers. The reason is simple: the tubes are extremely stable and can withstand great stress; in other words, they are roadworthy.

The types differ primarily in gain. The WA has a gain of 80, the WB 90, and the WC nearly 100. The WA then has 20% less gain than the "standard" 12AX7. For this reason, the WA is often used as the input stage (V1) of a guitar amp, as this tube has a low noise level. However, the lower gain results in a reduced dynamic response, which can, in a guitar amplifier, lead to a flat, lifeless sound.

The tonal differences among the types are not particularly large – you can do no wrong with these tubes, but you cannot expect a quantum leap in tone - the tubes are, after all, standard. The tone itself tends to be rich in bass, but a bit thin under extreme conditions. If you search for a transparent, brilliant tone, you will not like these tubes much. On the other hand, if the amplifier gain is too high and must be reduced, or if a shrill output stage is to be tamed, then these types are more interesting.

Tip: If you find a 12AX7WA as the input tube in a guitar amplifier, it can be swapped for a 12AX7 with higher amplification to increase the amplifier's gain. In this case, a selected "V1-Tube" should be chosen.

JJ 12AX7



This tube can be distinguished from other 12AX7-types by its conspicuous short plates. In the past, the short plates led to significant problems, but it appears JJ has corrected them, and the JJ 12AX7 has become a reliable, popular tube, with an average amplification of 105, and a very low noise floor.

No fault can be found with the tone itself: this tube sounds like a tube. Warm, with rich mids, but without excessive bass or highs. This sound is often called "brown Sound," and is produced only by the JJ.

This tube is often used in guitar amplifiers, especially by blues and hard rock players. In an audio amp, where more value is placed on an accurate reproduction, it is a matter of taste, but there are many satisfied users of this tube who will use no other.

Tip: combined with Svetlana/SED output tubes (especially the KT88), a very warm, highly detailed, spatial sound can be obtained.

JJ ECC803

Sounds similar to the "normal" JJ 12AX7, but the overall sound is more fuller and powerfull with a bigger bass. In comparison to its litte brother JJ12AX7 the JJ ECC803 also has much bigger plates and draws much more current if used with standard 12AX7 parameters. The quality of this tube is absolutly OK and it is suited for instrumental amps as well as audio and / or HiFi Tube-Amps

Highly recommende also for use in so called HiGain-Amps where the sounds are often a little bit cold and harsh.



SED 12AX7



The SED 12AX7 - the original Svetlana tube - is a highly detailed representative of the 12AX7 family. The sound is smooth and balanced, and very linear with an amplification of 100. I find this tube to be very attractive for audio amplifiers as well as acoustic amps and microphone preamps. The quality is very high; nevertheless one should use selected versions to ensure the full tonal spectrum is produced.

The SED is not recommended for guitar amps with "bite," as it sounds too tame.

Unfortunately, the SED 12AX7 is no longer produced, and is only with difficulty available.

Elektro Harmonix 12AX7

It is often stated that the EH 12AX7 is a relabeled version of the Sovtek 12AX7LPS. This may have been true in the beginning, but in the meantime an independent tube has developed.

As with most of the tubes from the Reflektor factory, this tube tends towards more bass and somewhat muffled highs, at an average gain of 110. The quality of the EH is very good, and it has a moderate noise floor. Due to the high amplification factor, this type is very dynamic and works very well in instrument as well as audio amplifiers.



Tube-Town 12AX7

This tube is produced in China and is the new version of the 12AX7A, which is often sold under a variety of labels.

In contrast to other current production 12AX7s, the TT 12AX7 has an open high end, producing a brilliant tone, with less emphasis on the bass and middle frequencies. The amplification factor is 110, and the quality of the tubes is good; nevertheless it is recommended that selected tubes be used, as the production tolerances can vary. The tube is particularly



recommended in instrument amplifiers in which an additional "push" of the preamp is required; however, they also work well in audio amplifiers, although they can lead to a distortion of the signal, as the highs are very prevalent.

Tip: the typical Marshall sound is achieved with these tubes in the preamp, and SED EL34s in the power amp.

Tube-Town 7025



This tube works great in classic amp-designs and layouts with a low complexity and a natural tube-sound. In suchs amps this tube produces a smooth, warme and well balanced, vintage-like sound.

We do not recommend this tube for the use in modern HiGain-Amps or in Phaseinverter stages. This is because of how the tube works. Tho we placed it into the family of 12AX7 tubes it is not a real 12AX7 / 7025 tube. The TT 7025 draws much less current if used with static 12AX7 parameters but just like the 5751 which draws much more current than a 12AX7 the TT 7025 works great in all 12AX7 stages due to the fact that these stages are mostyl auto-biased so the tube gets biased automaticly to its best operation point.

Sovtek 12AX7LPS

According to Sovtek, the 12AX7LPS was developed specifically for audio applications. The long plates and the spiral filaments are very conspicuous.

The tube's characteristics show that this tube is a standard 12AX7, but sometimes the microphonics are higher, so that one should use only selected tubes in critical positions. The tube is very linear, with somewhat emphasized bass, but which is never intrusive or annoying. An interesting type for audio applications.



Philips 12AX7



Even though this type is no longer manufactured, and is only available as NOS (new old stock), it must be mentioned here, since it represents the best of the old tube manufacturing art.

The output of the Philips is much higher than that of current production tubes, and the tone is what is in general called "vintage:" very well balanced with clearly defined lows and highs, without becoming muddy. The tube less well-suited for metal sounds, but it is an absolute must for fans of direct, genuine tube sound. Often used in high-end and studio equipment, the tube is immediatly captivating. Selected versions are recommended so that the best possible sound is attained - the high cost is justified by the long life, in any case.

Unfortunately, the Philips has become difficult to obtain.

EI / Ei Elite 12AX7

EI manufactures two types of 12AX7, which differ in the plate construction: the Philips/Siemens design, and the Telefunken design. These tubes are (or were) produced on the same machinery as a portion of the Philips, Siemens, and Telefunken tubes.

The tonal difference lies in the sound stage itself. The Telefunken design sounds somewhat fuller than the Telefunken version. Unfortunately, EI no longer (or very rarely) manufactures anymore, and the future is uncertain; a shame, as these tubes are known and loved for their "brown sound."

A further problem with EI tubes is their greatly varying quality. The tubes manufactured shortly before the closing of EI often suffer from early failure.

One offshoot of the EI 12AX7 is the EI 12AX7 Gold, which is refined in England and equipped with gold-plated pins. The packaging, in contrast to the contents, is identical, but is at the moment available only with difficulty - or not at all.



General Electric 5751 JAN

An absolute highlight, and one of my favorite tubes, the GE 5751 was produced in the USA. This tube sets standards for detail, dynamics, and tone, even if it doesn't quite reach the level of the Amperex.

I especially like the GE in the input stage of guitar amps with a very direct signal path, for example, in old Fender amps, as these tubes can display their full effect in the V1 position. This does not mean that they cannot be used in audio or high-end applications - quite the contrary!

Unfortunately, this tube is long out of production and the worldwide stock is disappearing.

TungSol 12AX7

The only common feature between this 12AX7 and the original TungSol tubes is the name. These have recently been reissued in Russia, and tonally they are very close to the Sovtek 12AX7LPS, with generally high quality. The sound is tight and clear and this tube is often used in the input stage of older Marshall amps. Sounds also pretty good in modern Fender amps especially the ones with a modern overdrive channel.



Electro Harmonix 12AU7 und 12AT7

These two tubes from the Reflektor factory are notable for their robust construction, extremely low noise floor, and high stability. The failure rate of these tubes is nearly zero - an indication of very good and stable production.

The tone is "Russian" - meaning a slight tendency to emphasize the bass, but nevertheless very linear.

When using these tubes for a phase inverter, "balanced" tubes should be used to ensure truly symmetrical operation. Otherwise, there are no faults to be found with the tubes.

JJ 12AU7 and 12AT7

Like the EH tubes, the JJs are of very high quality with a very low failure rate. In contrast to the Russian tubes, the JJs emphasize the mids and show great spatial detail. Unlike the JJ 12AX7, the JJ 12AU7 and 12AT7 are often used for audio applications, when a slightly warmer tone is desired.



TT 12AU7 and 12AT7

These tubes are both providing a smooth and well balanced tone which is a little bit uncharacteristically for "Made in China" tubes. They can be used in guitar/bass amps as well as in audio and HiFi tube amps. They will do a good job in both types of amps where 12AU/ and 12AT7 tubes are needed.

Often 12AT7 and 12AU7 tubes are used in stages which are designed for 12AX7 tubes. This is either to reduce the "maximum power" of the amp or just to make the preamp a little bit gently. The biggest difference in sound will get attained with the 12AU7 instead of a 12AX7 – but at the end it is a question of taste.



Electro Harmonix 6SN7

Electro Harmonix has recently begun producing a new version of the 6SN7, which is of very high quality. The tubes have a very low noise floor and low microphonics with a very linear characteristic; ideal conditions for audio applications. However, this linearity can lead to a response which is too 'transistor-like' for some users. This characteristic should be considered when considering these tubes for amplifiers which already show this tendency.



TT 6SN7

The TT 6SN7 is certainly not one of the prettiest tubes in town, but they are one of the best sounding current production 6SN7. Like the TT12AT7 and TT12AU7, this tube is very warm and soft, highly detailed and with a clear top end; recommended for audio amplifiers and any other tube amp without reservation.

Philips 6SL7 and 6188

The NOS Philips 6SL7 and 6188 tubes are interesting alternatives to current productions 6SL7s for audio use. The 6188 - a military version of the 6SL7 - demonstrates a very high quality and reliability, with extremely warm tone and very detailed reproduction.

JJ ECC88 /6922

Good-sounding and reliable 6922s have become difficult to find. The Philips 6922 sounds good, but the reliability and stability is critical. The JJ 6922 offers a good alternative! Finely detailed, it has a tendency to emphasize the mids, which is not necessarily negative. Quite the contrary, this adds more warmth to the sound, which may be particularly beneficial to an audio amplifier. The reliability is also very good - all in all, a good 6922 for a good price.



Tesla ECC88 /6922

The NOS Tesla ECC88 is similar to the JJ. The Tesla's sound is very close to that of the JJ, with less emphasized mids and a bit better balanced.

JAN Philips ECC88 / 6922

One of the best ECC88 / 6922's - the tone is very well balanced with very fine detail. An ideal tube for hi-fi and high-end applications; but also critical. Especially tubes from the last years of production are critical and tend to microphonics and/or early failure. Tubes with less than 25 hours use are particularly critical. If a tube survives the first 25 hours without problems, it is likely to be stable and reliable.

Electro Harmonix Gold Versions

Various Electro Harmonix tubes are also available in so-called "Gold" versions. The tone and characteristics of these tubes is identical to those of the normal versions. The difference is the pins: these are, as indicated by the name, gold plated. Consequently, use of these tubes makes sense only when a equally high quality socket is used, so that an optimal contact is maintained.

JJ Gold Versions

As with the Electro Harmonix Gold, the JJ Golds have gold-plated pins for better contact and to reduce oxidation. Furthermore, these tubes are selected by the manufacturer for tighter tolerances.