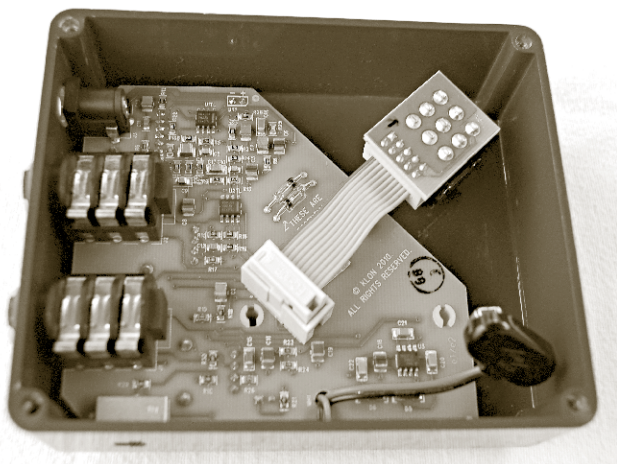


It's a very cool trick and it sounds great. But there are plenty of cheaper clean boost alternatives that can do it.

Still other players love the dirt created by the Centaur. Here's what Nels Cline had to say about his KLON Centaur, "I've written about it before. It's an amp in a box. No more worries in the world of AMP DU JOUR about overdrive tone. It will always be OK. The Centaur



will take care of it. Consumers: It's worth the wait to get one. I've had this thing for years now. What did I ever do without it?"

So while some players use the Centaur as a boost, others enjoy it for its tube-like distortion. And when you look at the long list of players who have used or currently use the KLON Centaur, it doesn't help us to narrow down the tone. Along with Cline, other famous users include: Stone Gossard and Mike McCready from Pearl Jam, Warren Haynes, Britt Daniel from Spoon, David Grissom, Chris Walla from Death Cab for Cutie, and John Mayer. Sure, all of these guitarists have what I would consider to be great tone. But Cline, to Mayer, to Daniel is a pretty wide sea.



Analog Mike likes the Centaur because it's "well tuned to add slight warm overdrive to a tube amp." That's as good of a reason as any.

In the end, the magic of the KLON Centaur might just be that it excels at both pushing a tube amp into sweet overdrive and creating its own natural sounding distortion. The fact that it manages to work well for so many different players and so many rigs is the reason it has achieved legendary status. **TO**

THE 12AX7 TUBE BY: PHIL TAYLOR

The Cornerstone of Guitar Tone



RCA released the 12AX7 tube for public sale on 15th September 1947. Much has been written about the Les Paul, the Strat, Fender and Marshall amps and how these instruments and amplifiers have shaped and defined the sound of music over the decades, but what about the 12AX7 vacuum tube? This thermionic device has been utilized by American and British amp manufacturers since the early 1950s and is the heart and soul of any self-respecting Fender, Laney, HiWatt, Marshall, Boogie or Soldano guitar amplifier. In fact it could be argued that this little

glass tube is the most versatile ever manufactured and one of the great cornerstones of guitar tone. Isn't about time we gave the 12AX7 some proper appreciation?

The 12AX7 was developed by Radio Corporation of America (RCA) at their Harrison, New Jersey factory. The factory site has a long and fascinating history in vacuum tube manufacture. Edison Light Works had been manufacturing light bulbs on the site since 1882, just six years after Edison perfected the incandescent bulb. RCA purchased the plant from Edison Light Works in 1930 and began manufacture of radio tubes,

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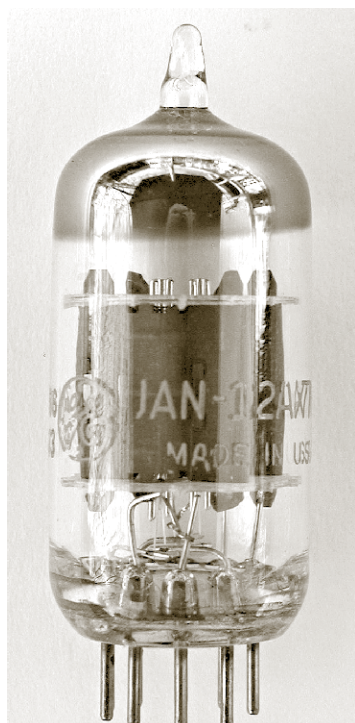
growing the site to cover 9.5 acres with 26 buildings. Over the course of its history RCA produced over 3 billion radio tubes from this site with the 12AX7 being released for public sale on 15th September 1947. The tube was a joint development project undertaken by RCA, Sylvania and General Electric for the US military. At its introduction, it



was heralded as the first twin-triode device engineered for high gain, low noise applications and its high voltage gain made it popular with tube amplifier enthusiasts.

The 12AX7 is one of a family several miniature 9-pin B9A noval tube types developed during the 1940s, which include the 12AY7, 12AT7 and 12AU7. It's interesting to note the 12AU7 actually predates the 12AX7 by a few years. The pins of a B9A tube emerge directly through the glass base – prior to

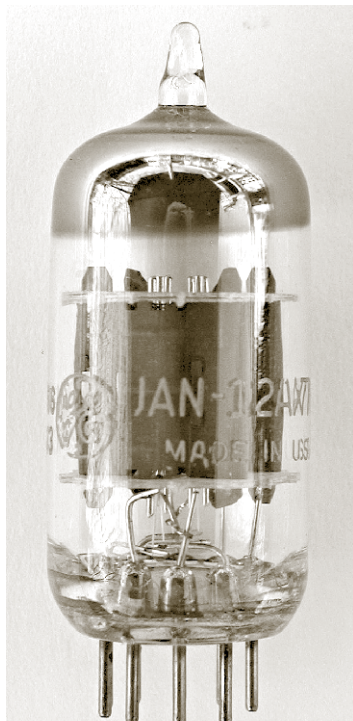
this tubes, such as the 6SN7 were constructed from a glass envelope mounted on a bakelite base. The section of the pin



embedded in the glass base is made from an alloy which has the same coefficient of expansion as the glass to prevent the vacuum of the tube being compromised. As the tube heats up the glass and metal pins expand and if they expand at different rates the seal between them will open up allowing air to enter the tube. Having the pins come through the glass was a real technological achievement and significantly simplified the manufacturing process.

A closer examination of the tube reveals that

there are actually two amplifier sections within the glass envelope – the 12AX7 is twin triode and each section has its own cathode, grid and anode. Only the anodes can be seen though because the anode shrouds the grid, cathode and heater, which are situated within it. The alphanumeric name printed on the side of glass envelope, '12AX7' is not



just a model number, it contains quite a bit of information about the tube. The '12' indicates that the heater (the part that glows orange when the tube is powered up) requires 12 volts to operate; the 'A' indicates the tube is an amplifying component; the 'X' identifies the tube's electrical characteristics, that is the gain factor, plate (anode) resistance, and the '7' the number of active pins.

In early versions of the 12AX7 the heater could only operate in parallel filament circuits (tube guitar amps run the heaters in parallel anyway) however the 12AX7 operates in series or parallel filament circuits. Also,



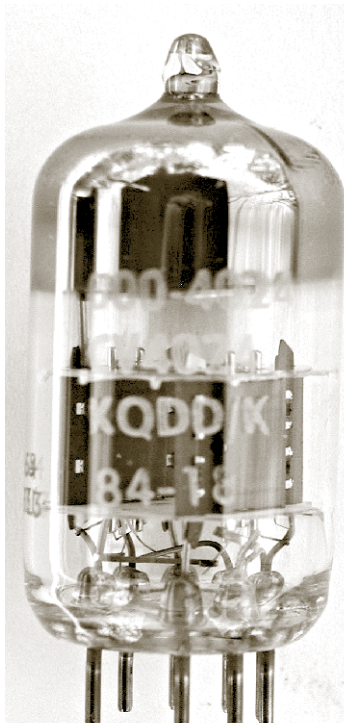
12AX7s manufactured after the mid 1950's feature improved construction with the helically wound heater invented by Sylvania by Gehrke, Huntington, and Granger. Their patent (US2677782-A 2,867,032) highlights longer tube life as major benefit of the invention, however the helical heater also minimizes AC heater supply noise in the tube's output.

The versatility of the 12AX7 represented an excellent business opportunity and the giant Philips – Mullard

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conglomerate watched developments from across the Atlantic with envious eyes and slowly and surely they drew their plans to move in and take a slice of the action. Philips could see that there was plenty of scope to improve the device and tasked their R&D department to work on developing the finest 12AX7 ever made. Meticulous attention to detail was paid to the precision of the control grid windings, electrode metallurgy and improvement of emissive materials used in the cathode resulting in the much sought-after Mullard ECC83. Note: the European nomenclature for the 12AX7 is ECC83; the 12AT7 is ECC81; and 12AU7 is ECC82.

The Mullard ECC83 is a superlative piece of engineering, the high grade materials and well-considered construction



ensure very low noise operation with exceptionally low microphony – vastly superior to any tube manufactured today. Even though the Mullard ECC83 hasn't been manufactured for many decades, it's still possible to find new old stock ones for sale and still in their original boxes! Prices range from 5 to 10 times that of a modern manufacture ECC83, however if you own a vintage or boutique tube amp and guitar it's definitely worth getting hold of a few of these tubes and giving them a whirl. The RCA 12AX7 also has a

deserved reputation for musicality and great tone. New old stock RCA 12AX7s are somewhat rarer and more expensive than Mullard ECC83s, however RCA did manufacture a ruggedized version of this tube – the 7058 – designed for 12V lead-acid battery operation. There are still bargains to be had on this tube...and it functions beautifully in the Effectrode 'Blackbird' tube preamp pedal!

The RCA/Edison factories were demolished relatively recently in 2013. You can find more photographs of the demolition in progress on The Observer Online website and further historical information about RCA on the Hagley Museum and Library website. www.effectrode.com

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