

TUBE TECHNOLOGY

A Look at the 2A3 Output Triode Tube

BY JOHN VUOLO

The 2A3 was one of the most popular tubes of the 1930s and was perhaps the most frequently used output triode of all time. Today it's used more exclusively in hi-fi products and is noted for offering exceptional linearity and sound quality. This medium-power, direct-heated triode was designed and introduced by RCA circa 1932 and was intended to be a double-power version of the popular 45 (1929). The 2A3 could produce up to 3.5 watts in single-ended mode, which was sufficient to power the new better-sounding, but relatively inefficient, moving coil speakers of that

time. For powerful applications, the 2A3 was often used in push-pull (sometimes paralleled) products like disk-cutting lathes, early jukeboxes, cinema amplifiers, and electric organs and pianos by Hammond, Wurlitzer, and the like.

TUBE EVOLUTION

The initial version of the 2A3 was a mono valve/plate construction with a modest 15-watt plate dissipation, but RCA introduced a more powerful bi-plate design in the later 1930s. Roughly speaking, the bi-plate 2A3 was two 45 triodes in a single



2A3 RCA



2A3 RCA National Union,
single plate 1930s

tube that sometimes shared a single plate and was supposedly easier to manufacture. However, the earlier mono-plate (single valve) version is regarded as having superior sound quality and is highly sought after today, having only been in production for a few years (the VT-95 is the US military version of the valve). RCA seems to have been the most prolific manufacturer of the 2A3, but other American companies, like Sylvania, General Electric, Raytheon, and Tung-Sol, manufactured the 2A3 as well. Early mono-plate valves were also manufactured under the old Cunningham (RCA) and Arcturus names. It was manufactured in Europe by Brimar in England and Fivre in Italy. The USSR made a close copy of the 2A3 dubbed the 2S4S/2C4C.

The 2A3 and its variations were quite commonly used in the early part of the Golden Age of hi-fi from the late 1940s. Bigger output triodes, like the 300B, were hardly used., Perhaps some of the earliest commercial OTL (Output Transformer Less) amplifiers used 2A3's to drive high-impedance 500-ohm speakers, but its descendent, the 6AS7, would prove more suitable for this task. Due to the increased power efficiency offered by output pentodes and beam tetrodes they largely disappeared for commercial use by the mid 1950s, when companies like Brook Electronics ceased production. It seems the last NOS (new-old-stock) production of the 2A3 occurred some time in the 1960s.

2A3 OFFSPRING

The 2A3 is also notable for spanning many variations. The 6A3 is a standard-sized, 6.3-volt cathode heater version of the 2A3 valve, which uses a 2.5-volt heater. The 6A3 is a dual-plate design that came out a few years after the 2A3 (circa 1934/5). Long out of production, Sovtek is now manufacturing it again.

Next came the 6B4G (1935/6), which is essentially a 6A3 using the then-newly



2A3 Sylvania Philco,
single plate 1930s

2A3 Raytheon,
single plate 1930s



2A3 RCA Westinghouse, manufactured in Canada

introduced octal 8 pin base. The 6B4G appears to have been a popular variant of the 2A3 used in amplification into the 1950s, but it is rarely used today, especially compared with the 2A3. The USSR made a copy of the 6A3, called the 4S4S, and a copy of the 6B4G, called the 6S4S/6C4C. Interestingly, Philips/Sylvania manufactured some modified 6AV5GA TV sweep pentodes that were triode connected internally to become plug-in 6B4G replacements for military use. More recently Sovtek made the 6B4G again, but has since stopped production.

On the heels of that design came the octal 6A5/6A5G (1936/7), which used an indirect heater. The 6B4G can be substituted with the 6A5 for low-noise applications. The 6A5 led to the 6AS7G, which came out in 1946, and the similar but smaller 6080. Both are lower-impedance double triodes that were primarily intended to be voltage regulators but have found popular use in OTL amps.

Perhaps the last in the 2A3 lineage is the smaller 12B4/12B4G 9-pin valve with a lower plate dissipation of approximately 6 watts.

NEW INTEREST IN AN OLD TUBE

In Japan interest in triodes like the 2A3 and Western Electric 300B increased in DIY circles from the late 1960s. However, in commercial terms, the story of the 2A3 resumes in the mid 1980s when Shuguang in China began production of the valve again (in bi-plate form). Around the same time, Audio Innovations brought out two high-end 2A3/6B4G amplifiers that gained positive reviews in the West. This in part helped lead to the reintroduction of triode amplification from the 1990s onward in the exclusive domain of hi-fi reproduction. The 300B triode has become more common since the 1990s thanks to the greater output power (2.5x) it offers. Nonetheless, the 2A3 has regained some of its old popularity today as a specialist low-power tube used principally in high-end amplification. A variety of good quality 2A3 valves are in continuous manufacture today by companies like Sovtek, JJ, and Shuguang. Some are modified designs, offering higher power mono-plates, mesh plates, etc.

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Top right: 2A3 RCA
Silvertone, single plate 1930s
Bottom: 2A3 Tung Sol,
made in USA

