

723A - X-Band Early Reflex Klystron



A sample of 723A made by Raytheon, left and middle, near an improved 723A/B to show the visible differences, Click on image to enlarge.

The design of microwave components suitable for use in a radar system operating around 10 GHz started in the first half of 1941. We know that a prototype of the first X-band magnetron was assembled at M.I.T. in summer 1941 and the production of the [2J21](#) started few months later in the same year. As local oscillator the attempt of scaling down a 3 GHz design, the Sperry or the Western Electric ones, failed due to many reasons. The most important limitations were the difficulty to maintain the proper spacing in the gap and the power losses in the glass walls within the resonating cavity.

The new approach at Western Electric was to move the resonator inside a metal evacuated envelope. The first X-band klystron to be produced was the 723A, designed to operate in a quite narrow band around 9375 MHz, the frequency of the 2J21 and later of the 725A transmitter magnetron. RF was coupled to outside waveguide via a coaxial probe extending from the quasi-octal base. Tuning was obtained flexing a diaphragm in the metal envelope by means of a tuner formed by a fixed strut on one side and a couple of steel strips on the opposite side.

Heater operated at 6.3 V drawing 440 mA. 25 mW typical output.

The design was soon improved for an extended tuning range and better performances, with the introduction of [723A/B](#), mechanically tunable from 8.7 to 9.5 GHz, and eventually evolved in the industry standard [2K25](#). The most visible differences between 723A and 723A/B were the lengthening of the tuning struts, moving their welding from the body side to the base ring, and the protection of the output lead with a rexolite insulation.