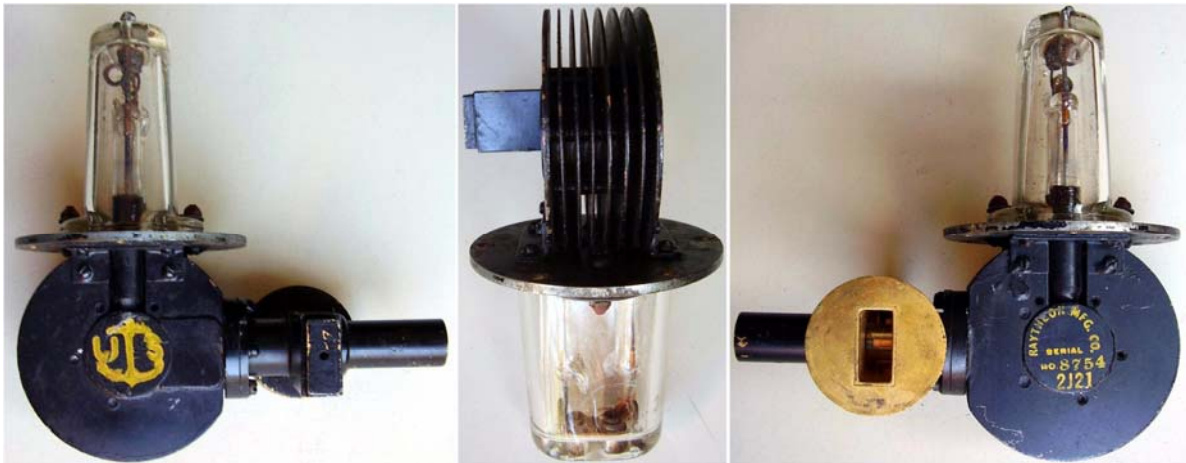


2J21 - Very Early X-Band Magnetron



Click on image to enlarge.

2J21 was the very early X-band magnetron to enter in production in WWII. The first prototype of a magnetron operating at about three times the frequency of the sample brought to America by the Tizard mission was built few months later at M.I.T. Radiation Laboratory, in the summer of 1941. Eighteen quarter wave slot resonators were used, obtaining about 5 kW power pulses, but the magnetron was unstable, with a confusion of many operating modes. The design was improved reducing the slots to twelve. The result was an unstrapped magnetron operating in a mode different by the π one, capable of generating about 10 to 15 kW output pulses with an efficiency from 12 to 15 per cent. This magnetron was the 2J21, discontinued from 1942 and registered to Westinghouse only in December 1945, after the end of war.

Raytheon, the largest magnetron manufacturer, gave its contribution to improve the design and to make the construction simpler. Not known the quantity of 2J21 manufactured in the war, since it was replaced by an improved [2J21A](#) and from 1942 by [725A](#). As already done for S-band magnetrons, we can assume that they formed the anode block by silver-brazing punched copper dishes. Details of such a manufacturing technique can be found looking at the undulated anode surface between the radiating fins of the sample in the above photos.

As far as we know, 2J21 was only used in early productions of RT-10/APS-3. Only few information survived at the end of the war, just this synthetic [data sheet](#) stored in the RMA archives. Most of the few surviving info on APS-3 radar set can be found in this [article from Electronics, June 1948](#), referring to procedures for preparing readable diagrams of complex circuits. From this article we learn that this very early X-band airborne radar used a [715A or B](#) as pulse modulator, [RKR-72s](#) as HV rectifiers, two [724As](#) as TR/ATR, a couple of [723A/Bs](#) as local oscillators in the receiver, [6AC7s](#) in the IF amplifiers and [5FP7](#) CRTs in the indicators.