

Kilo-Line Recording Storage Tube

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A new recording storage tube, designated the QK685, has been designed using the Raytheon Tube Type QK464 as a prototype.

Special attention was devoted to achieve very high resolution, improved uniformity, and reduced output capacitance, along with the most typical requirements for ruggedizing and designing for operation under extremes of altitude, temperature, and vibration.

The basic objective of the development program, obtaining resolution in excess of 1,000 TV lines per diameter as measured at 50 per cent modulation, was obviously dependent on the spot size of the electron gun at the target and deflection angle used.

A studied empirical approach was followed in an attempt to optimize the gun design. A slotted target structure sealed into a simulated storage tube permitted accurate measurements and comparison of the spot size of the beam at the target for each of the many gun designs tried.

Further improvement in the resolution is obtainable by increasing the deflection angle, but this approach is limited because of the requirement that electron rays strike the storage screen orthogonally for optimum uniformity. To make use of this method of increasing resolution, it was therefore necessary to design an improved collimating lens. To investigate collimating lens designs, a lens-analyzer tube was constructed with a number of laminated sections, insulated from each other, so that the voltage on each lens section could be controlled independently.

From this study a simple 3-step collimating lens was designed. The combination of improved spot size, increased deflection angle, and improved collimation resulted in a tube design meeting all uniformity and resolution requirements.

Other basic improvements developed and incorporated into the tube include a novel dynamic-gettering technique, decreased output capacitance for the storage assembly, a more rugged gun and envelope design, and the ability to meet military environmental specifications.