

TEKSCOPE
Dec '69



CATHODE RAY TUBES

The heart of any oscilloscope is the cathode ray tube. The ceramic post-deflection accelerator CRT's developed for the Tektronix 7000-Series Oscilloscopes offer significant improvements over CRT's currently available. The 8 x 10 cm viewing area provides a large bright display with high writing speed. Both the 7504 and 7704 can easily record an 8-cm single-shot photo of their risetime, using standard Tektronix P31 phosphor, without employing film fogging techniques.

The new Tektronix CRT's use a frame-grid construction. Frame-grid CRT's employ scan expansion and provide a very good compromise of deflection sensitivity and writing speed. Because frame-grid conductors run only in the vertical direction, electron-beam transmission is nearly 50% greater than most mesh construction tubes. The result is a high writing-speed tube with very good linearity and sensitivity (e.g., the 7704 CRT vertical sensitivity is ≈ 3.3 v/cm) over a full 8 x 10 division scan.

Good horizontal sensitivity is achieved by placing the frame grid as far forward as possible into the post-accelerator field. This causes the field lines to curve around the front of it sufficiently that the effect on the electron beam is similar to a curved horizontal plane. Thus many of the advantages of a mesh are obtained with few disadvantages.

Tektronix CRT's are designed to provide single-shot writing speeds sufficient to record a transient at the risetime limit of the instrument. Writing speed is specified with no film fogging using P31 phosphor, the optimum phosphor for general purpose viewing and long-life characteristics.

The 7504 CRT is operated at 18 kV and provides a specified minimum writing speed of 2500 cm/ μ s (with C-51 camera) using Tektronix standard P31 phosphor with no film fogging.

The 7704 CRT is operated at 24 kV and provides a specified minimum writing speed of 3300 cm/ μ s (with C-51 camera) using Tektronix standard P31 phosphor with no film fogging. This photographic writing speed is more than twice that of the Type 454 with P31 phosphor (identical camera systems).

The 7704 incorporates a special face plate design to ensure that X-ray radiation is attenuated well below the TV standard recommended by the National Council on Radiation Protection and Measurement (100% duty cycle raster with full intensity). In addition, circuitry has been included to limit the maximum possible high voltage to keep the specification well within this figure.

The R5030 CRT is a dual beam 6½-inch ceramic mono-accelerator CRT. This unique tube provides a full 8 x 10 div (div = 1.27 cm) coverage for both electron guns with deflection defocusing better than 1.5 to 1 on any axis. The large divisions provide 50% greater viewing area than conventional 8 x 10 cm designs. The tube provides a bright high-resolution display which minimizes operator fatigue.

A novel dynamic geometry circuit maintains excellent geometry in this tube over the wide extended deflection angles. An additional deflection element is placed between the two sets of vertical deflection plates and corrects the beam at the deflection extremes (i.e. upper edge of lower gun display and lower edge of upper gun display). The correction voltage minimizes geometry problems providing an excellent overall geometry.

The new Tektronix tubes employ a new female type neck connector for the deflection elements that is essentially flush with the glass. As a result, tubes may be removed without worrying about the pins catching and bending, or breaking off. A new male connector on the deflection leads simplifies CRT replacement.

The ceramic construction provides greater strength, lighter weight, and improved internal graticule edge lighting. This construction technique also allows tighter tolerances and decreases development time, due to our well-developed ceramics technology.