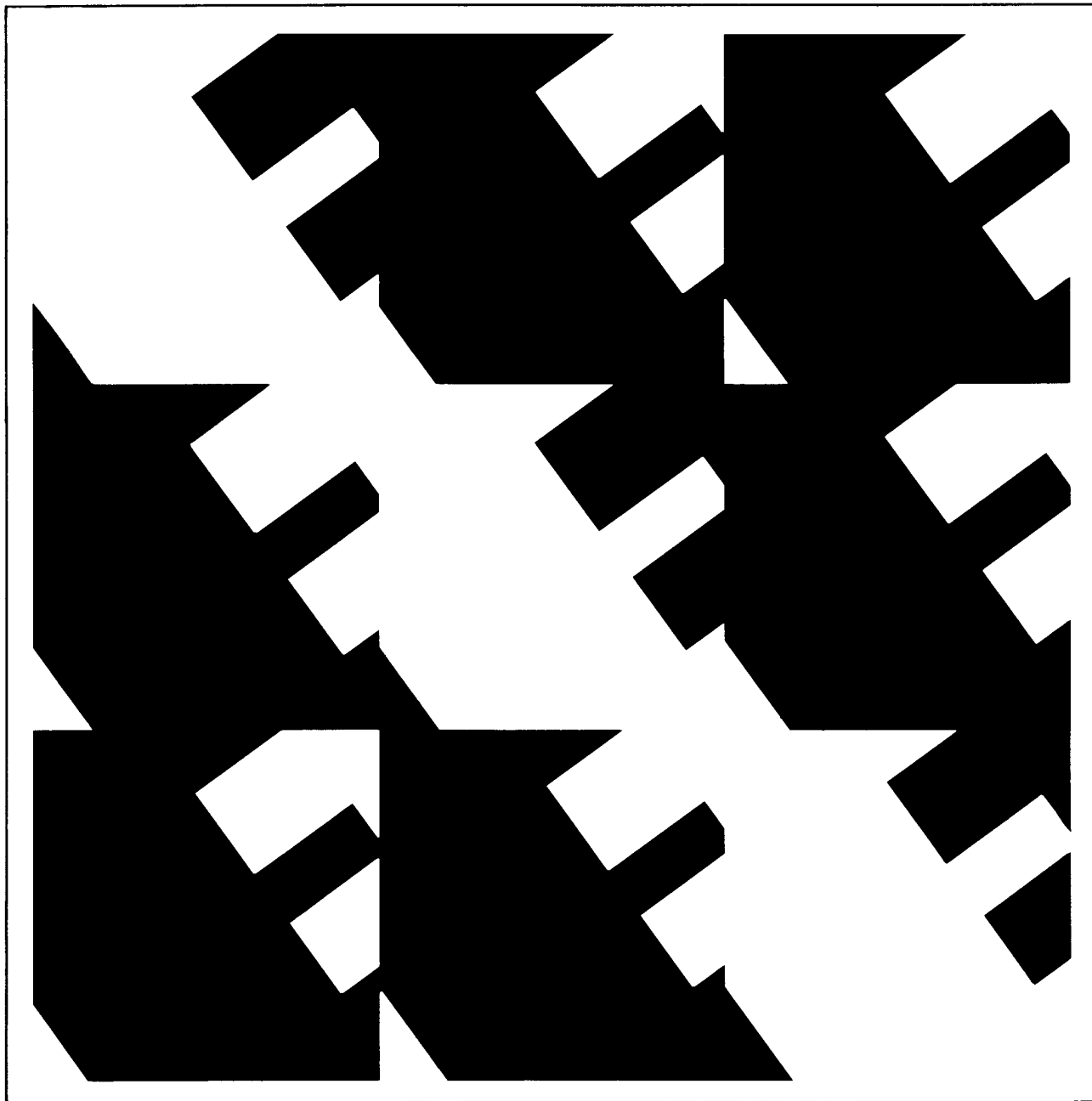


IEEE Standards on Television: Measurement of Luminance Signal Levels



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IEEE Standards on Television: Measurement of Luminance Signal Levels

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1.0 INTRODUCTION

This Standard is a revision of Part 1 of Standard 50 IRE 23. S1 and replaces in all respects this previously issued part of the Standard. The need for the revision stems from the standardization of color television signals in the USA, and the inadequacy of the earlier Standard in providing methods of measuring the luminance component of the color signal. The revision consists primarily of a change in the response characteristics of the oscilloscopes to insure adequate suppression of the color subcarrier. Other minor changes in wording and in the associated figures have been made to bring the standard into accord with present terminology and practice.

1.1 Description

This Standard describes methods of measuring the significant amplitude levels of a monochrome or color television signal, either composite or noncomposite. It is concerned with measurements at points in transmission systems where the signals are at video frequency. The methods described in this Standard are limited to those involving the use of oscilloscopes, and are primarily directed to specifying means of measuring television signal levels for operating purposes.

For the purposes of this Standard, the levels which are significant are the levels of monochrome signals or the levels of the luminance portion of color signals. The peak amplitude excursion of a color signal may exceed, by substantial amounts, the peak amplitude excursions of the luminance portion of the signal, but since subjective brightness is more nearly proportional to the luminance signal than to any other quantity, it is most desirable from the operating standpoint to control and adjust levels using the luminance signal as a gauge. When this is done, monochrome and color signals, interspersed in a given program sequence, will produce approximately the same brightness and contrast when viewed on color or monochrome monitors without supplementary adjustments.

In the succeeding paragraphs of this Standard, the words "luminance signal" will refer to either a monochrome signal or to the luminance portion of a color signal.

Six significant amplitude levels of a composite luminance signal have been defined as follows.¹ These are shown in the right-hand portion of Fig. 1.

Reference White Level. The picture signal level corresponding to a specified maximum limit for *White Peaks*.

White Peak. A peak excursion of the picture signal in the white direction.

Black Peak. A peak excursion of the picture signal in the black direction.

¹ Cf. "IRE standards on television: Definitions of television signal measurement terms, 1955 (55 IRE 23. S1)," *Proc. IRE*, vol. 43, pp. 619-622; May, 1955.

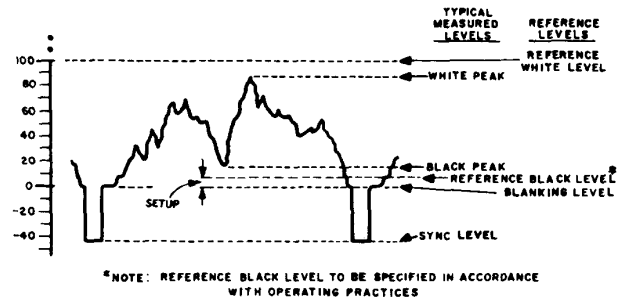


Fig. 1—Significant levels and details of IRE standard scale.

Reference Black Level. The picture signal level corresponding to a specified maximum limit for *Black Peaks*.

Blanking Level. That level of a composite picture signal which separates the range containing picture information from the range containing synchronizing information.

Note: The setup region is regarded as picture information.

Sync Level. The level of the peaks of the sync signal.

This Standard specifies a method of measuring the differences between these levels in a manner permitting ready correlation between the measurements at different parts of a system, regardless of the nominal voltages at the points of measurement.

1.2 Theory of Measurements

1.2.1 General: The method of level measurement prescribed in this Standard is based on the provision of oscilloscopes of standardized characteristics, with a linear scale for indicating the various levels. The scale is the same on all oscilloscopes, but each oscilloscope is calibrated with a voltage related to the nominal signal level at the point where the measurements are to be made. If the gains or losses between two measuring points on a system are normal, therefore, similar scale readings should be obtained for all the significant levels on oscilloscopes at both points regardless of differences in the voltages at the two points.

1.2.2 Scale: The standard scale is shown in the left-hand portion of Fig. 1, together with an illustrative luminance signal to show the relation between the scale and the oscilloscope presentation. It will be observed that the zero or reference point of the scale is placed at the blanking level. The upper part of this scale is marked from 0 to 100 with 100 corresponding to the reference white level. The scale is linear and two additional points (at 110 and 120) are provided to permit reading abnormally high *White Peaks*. The various levels of the picture signal are read on this scale above zero. The lower part of the scale is marked in linear steps from 0 to -50 and on it are read the levels of the sync signal.

Where other scales are used for specific purposes,