Letters to the Editor: Video Graticules

Dear Sir:

I note with interest the Letter to the Editor from Michael W. Barlow in the March, 1962, *Journal* in which he advocates the so-called CCIR percent scale for video-level measurement as against the IRE scale.

It is true that there was a relation between the IRE scale and the 1.4-v level standard. However, it is not true that the IRE scale was based on the 1.4-v standard. Although the two were placed in use at the same time, the concept of the IRE scale was in existance prior to the time of the meeting at which the 1.4-v level change from the 2-v level was adopted.

The following is quoted from the minutes of a meeting of the Joint Committee of TV Broadcasters and Manufacturers for Coordination of Video Levels, held May 25, 1950, at which these matters were resolved.

"There was unanimous agreement on the following points:

(1) There is need for achieving uniformity in the video signal levels supplied by and to TV broadcasters, whether common carrier facilities are involved or not.

(2) The level of 2 v, peak-to-peak, which is presently part of the standards recommended by the RMA, should be revised downward.

(3) No serious noise problems are introduced by a reduction to a level of 1 v, peak-to-peak.

(4) The scale, recently adopted by the IRE for use with cathode-ray oscilloscopes in measuring video signal levels, is acceptable for making operating measurements.

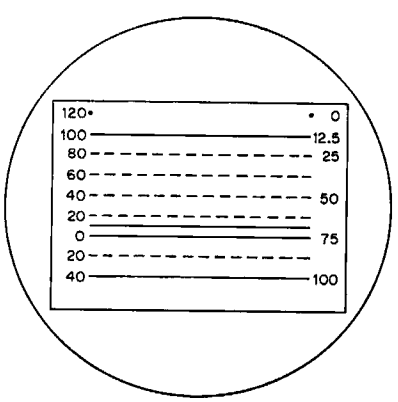
Discussion of Point (4) brought out the desirability of direct correlation between the scale markings and voltage levels in the video signal. It was shown that a 30% reduction from the RMA standard of 2 v, to a new value of 1.4 v would establish the desired correlation. Briefly, the signal levels would be as follows:

(a) blanking level at zero,

(b) white reference level at 100, or 1.0 v,

(c) sync peaks at −40, giving sync pulse amplitude of 0.4 v. This provides a sync ratio of 28.6%.

(d) At the transmitter, zero carrier would be established at 120 on the scale, or 1.2 v. Sync peaks (or maximum carrier) then are 160 units (on the scale) below zero carrier, and the 40 units of sync yield exactly the 25% sync required by the FCC. Furthermore, the 20 units between reference white and zero carrier provide the required nominal 12.5% value for minimum carrier. The scale is illustrated thus:



This fortuitous relationship between an adopted standard and a desired change in levels was largely responsible for the principal action of the Committee which followed the discussion. By a vote of 8 to 1 the Committee recommended the tentative adoption of a new standard level of 1.4 v peak-to-peak, as indicated in the diagram, subject to further revision pending results of tests to be conducted by the various operating groups represented on the Committee."

Incidentally, 1.0 v instead of 1.4 v was considered but not adopted at this same meeting.

A compelling advantage, and one Mr. Barlow omits from his discussion of the two scales, is that mentioned in paragraph (d) of the quoted minutes dealing with the transmitter modulation scale. In this respect I believe the per cent or CCIR scale falls far short in advantage as compared to the IRE scale. Both scales, as he shows them, separate the measurement of the video and synchronizing functions; but only the IRE scale provides easy coordination at the transmitter (see attached scale) and a coherent 100% scale for video in the studio where the signal is noncomposite (no sync).

I suggest, therefore, that with international television about to be extended by satellite relay, efforts to coordinate transmission and level standards would best be served by the international adoption of the so called IRE scale.

I would like, however, strongly to endorse Mr. Barlow's suggestion that television sound transmitters be operated at lower than half the peak visual power. Not many realize, I believe, that in a 50-kw TV transmitter the visual output (with a peak power of 50 kw) is actually less in average power than the 25 kw of the aural transmitter. The visual average power in this case is usually between 12 and 20 kw, reaching a maximum of 30 at black and a minimum of about 5 kw on light pictures. I believe a ratio of four or five to one, instead of two to one, would provide better service as well as reduce transmitter costs.

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Dear Sir:

Mr. Morris gives some interesting background on the choice of 1.4 v and 140 units in the U.S.A. He mentions that the IRE scale has advantages at transmitters, and in studios where noncomposite signals are in use. My contention is that these are local matters only, and any levels and graticules could be used here. It is when programs are exchanged over long links where the local requirements—and therefore graticules—may be different, that a standard graticule is required. I see no reason why the same graticule should be used for both video levels and transmitter levels. In fact, the per cent scale is quite satisfactory for transmitter use too; set the syncs between 0 and −30, and let the whites clip at +75, both levels being clearly marked on a standard per cent graticule. This ratio is the desired 25/62.5, and eliminates the marking of an extra line at +62.5%, and also uses a larger area of the oscilloscope face. At our own transmitters, this indication is of monitoring interest only, exact levels being determined on an r-f envelope monitor.

I have never been in a studio distributing noncomposite signals, but it would appear that the likelihood of mixing "units" and "per cent" is increased even further if only the top 100 divisions of the IRE scale are used.

Retention of the IRE scale seems to be a matter of habit, like the Fahrenheit temperature scale. It is not used in many countries where it might be expected to be, were there any real advantages. Finally—and illogically perhaps—it is when the graticule has been lost or removed that an additional advantage appears. We can all estimate percentages, but who can estimate fourteenths quickly?

On the matter of sound power, a rough calculation for our own stations shows a saving of about one third in capital cost, and one quarter in total operating expenses, if the sound power had been one fifth of vision peak power—with no deterioration of service.

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