SOUND TALK

FROM THE MAKERS OF "SCOTCH" BRAND MAGNETIC TAPE

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EVEN ORDER HARMONIC DISTORTION IN MAGNETIC TAPE RECORDING

One of the attractive features of magnetic recording is that the media are inherently free of even harmonic distortion; the magnetization characteristic is not necessarily linear but is symmetric for opposite directions of magnetization. However, in practice, playback wave analysis of a sine wave recorded from a distortion free source will frequently show appreciable second and higher even order distortion. When this is found, it is indicative of some defect in the recording equipment, and the purpose of this paper is to point out what these flaws may be and how to determine and correct them.

A possible source of trouble is in the audio amplifiers, both record and playback. Distortion from this cause may be determined by conventional amplifier testing and eliminated by known techniques not peculiar to magnetic recording.

The causes of even harmonic distortion, which are in the recording process itself, all have one thing in common. This is a direct current component or magnetization which prevents the heads from modulating the tape about the point of symmetry, which is the state of demagnetization. The asymmetric influences may be most clearly visualized in their action at the record head, but if the erase head leaves the tape magnetized, the same results may occur. The troubles which lead to asymmetric recording are as follows:

1. PERMANENTLY MAGNETIZED HEADS.

Heads may become magnetized by accidental contact with magnets, by mechanical strains in a magnetic field, or, very commonly, by excessive transient currents occurring in the switching of recording, erasing, or biasing currents.

2. DIRECT CURRENT COMPONENTS IN ERASE OR BIAS CURRENTS.

This is an obvious difficulty; some dubious circuit designs have allowed the D. C. of a tube's plate current to flow through the head, but if such undesirable design is avoided, D.C. can only result from a leaky capacitor or other faulty component.

3. ASYMMETRIC BIAS AND/OR ERASE WAVEFORM.

Even if no D. C. component is present, a waveform with different positive and negative peak values will cause the same effect. This is caused by overload or inadequate design in the high frequency supply.

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