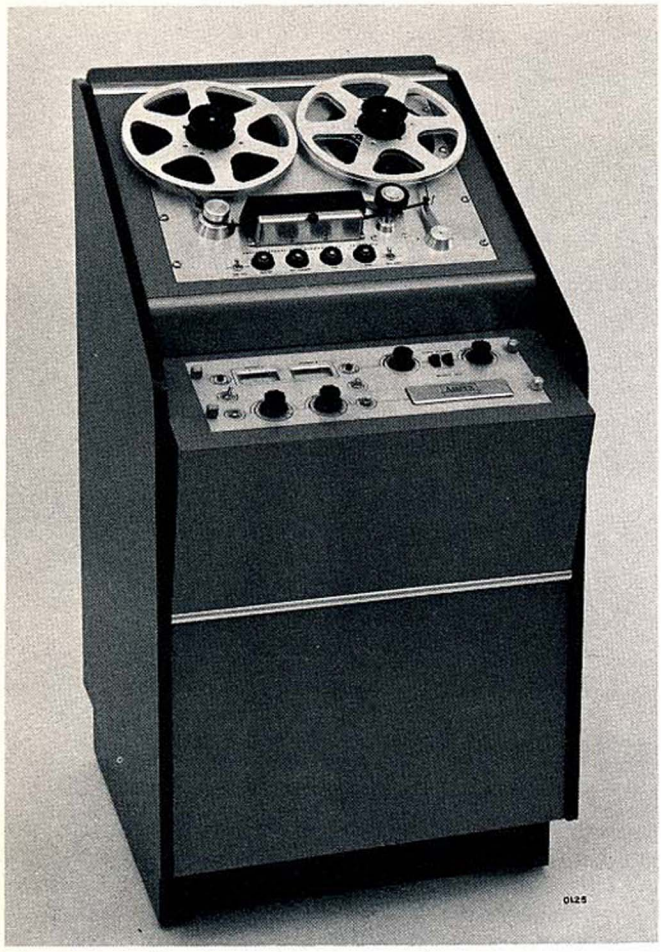


A console mounted Ampex Model 354, two channel recorder/reproducer.

WHY MAGNETIC TAPE?

There are many advantages to recording on today's high quality magnetic tape, using professional grade equipment. No other device can offer comparable fidelity of reproduction. Tape provides the convenience of immediate playback without processing, and the economy of being able to erase and rerecord. It furnishes a large storage capacity in a minimum space. Technically one of its greatest attributes is a gradual overload characteristic which exacts a minimum penalty for slightly incorrect record level adjustments. Audio recordings can be stored indefinitely or replayed thousands of times with no deterioration of signal. And tape still is the only practical means of recording professional quality stereophonic sound; though two track discs are used extensively in home music systems, the original master recordings for those discs are made on tape.

Magnetic recording has made possible the presentation of three, four, and six channel sound in the motion picture theater. In this instance, of course, the magnetic material is striped on film rather than on the usual plastic backing.

BASIC COMPONENTS OF A MAGNETIC TAPE RECORDER

Magnetic Tape

Modern magnetic tape consists of a plastic backing, on which is deposited a layer of magnetic material consisting of iron oxide particles suspended in a synthetic resin binder. The iron oxide material is the actual magnetization medium, and since it is in the form of minute particles the recording process must depend on the size, shape, orientation, and uniform distribution of these particles on the tape.

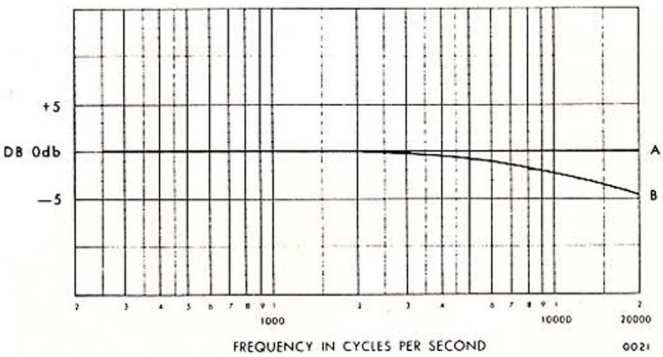
Manufacturers have greatly increased the quality of magnetic tape over the past few years, but it remains true that variations in magnetization within individual wavelengths will occur. The magnitude of these variations will depend on the factors noted in the preceding paragraph.

A random packing density of the oxide particles will impose a random variation of amplitude of a recorded signal, which will appear as noise in the reproduced output. In high frequency applications, where only a surface layer of the tape is involved, the signal-to-noise ratio will be particularly affected.

If the backing which supports the medium is not uniform in thickness, it will create variations in the deposit of oxide coating at the base. In low frequency work the under layers assume importance and such variation in coating will, again, be reproduced as noise.

Any lack of uniformity in the coating implies a lack of perfect flatness at the tape surface, so separation of the tape from the heads will vary. This will affect the output capabilities (see Frequency Response). Suitable polishing of the tape after manufacture will reduce this variation, and some manufacturers are now pre-polishing their professional grade tape. This polishing also minimizes head wear for equipment that will continually run new tape, such as duplicating systems for the commercial recording industry.

Tape width variations can also cause trouble when



The difference in response between polished (curve A) and unpolished (curve B) tape is indicated on this graph. Readings were taken using new tape from the manufacturer (B) and again after mechanical polishing by running the oxided surfaces against each other (A).