MAGNETIC RECORDING

WIRE AND TAPE

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GENERAL THEORY

IN this chapter it is intended to describe very shortly the basic theory of magnetic recording and to give a background for the more practical designs given later.

Firstly, it must be explained that in spite of Poulsen's historic achievements at the beginning of this century, magnetic recording is an extremely young science and has only been made practicable for the home constructor in the last year or so. To a large extent, the reason is that there was no suitable recording medium available outside laboratories. Now it is possible to get wire and coated tape from a number of manufacturers.

There are two main types of medium. Fine magnetic wire .004 ins. in diameter; and a plastic (or paper) tape $\frac{1}{4}$ in. wide and coated with either the red (Fe203) or black (Fe304) oxides of iron. Other mediums such as coated paper discs and tubes or steel tape are in use, but are neither suitable for nor available to the experimenter.

The advantages and disadvantages of tape and wire are greatly argued, but the main points are as follows:

	WIRE
Cost per hour	40s.
Output on playback	Fairly high
Bulk per hour	$\frac{5}{8}$ins. x $2\frac{7}{8}$ins. diameter wide spool
Mechanical handling	Slightly complicated
Ease of editing	Difficult
Speed of playing	24ins. per sec.
	TAPE
Cost per hour	35s. at double track
Output on playback	Low
Bulk per hour	$\frac{3}{8}$ins. wide x 7ins. diameter reel at double track
Mechanical handling	Simple
Speed of playing	$7\frac{1}{2}$ins. per sec.

The above speeds of playing are comparable and are suitable for high quality music, other standard speeds for tape are $3\frac{1}{2}$ ins. per sec., 15 ins. per sec. and 30 ins. per sec. The first is usually used for recording speech and the last two for studio equipment.

Thus the wire scores on bulk per hour and output and the tape scores on the mechanical side, as it needs no mechanism to keep the layers wound evenly and can be handled and loaded with ease.

Now, knowing the materials at our disposal, a brief summary of the methods of recording and playing back with them is required.