DISK RECORDING

VOLUME 2 DISK PLAYBACK AND TESTING

An anthology
of articles on
disk recording
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Society
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disk recording VOLUME 2

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Volume 1 GROOVE GEOMETRY AND THE RECORDING PROCESS covered the following topics:

Groove Geometry; Disk Recording Systems; Cutterheads and Lathes; Styli and Lacquer Blanks; Record Pressing; High-Density Disk Technology; Standards and Invention; and Related Reading.

preface

In 1893, when Emile Berliner first flattened the recording cylinder into the now familiar disk, Thomas Edison gave it little chance of succeeding. It was not until 1928 that Edison finally conceded, insuring that the cylinder would take its place among the museum oddities of the past. In a speech given at an Audio Engineering Society convention in 1960, held at the Alexandria Hotel in Los Angeles, George Brown, head of the then-existing Ampex United Stereo Tape operation, gave the phonograph record ". . . five years to get off the market." As a result, many manufacturers of disk-cutting equipment gave up their traditional crafts and embraced that modern miracle, tape, as "the great stringy hope." IBM changed its dictating machines to magnetic belts and the computer industry raced headlong into the consumption of reels and reels of digital tape, while consumers started a love affair with reel-to-reel, eight-track cartridges, and compact cassettes.

Those consumers of music whose habit it was to put a tall stack of records on the changer and to turn them over when all had been played, rightfully found the endless eight-track cartridge much handier. And those who enjoyed music in their automobiles, who had gone through several disappointments at the hands of 16⅔-r/min car record players, naturally fled to the magnetic medium.

Then came video and, again, the word was tape: easy to edit, easy to erase and reuse, easy to handle and non-wearing; but unfortunately, available in no fewer than six incompatible standards.

But the disk record would not die! Its well-engineered replication process; its large 12-inch by 12-inch point of purchase advertising area; its convenient storage; its high storage density; the rapid access it affords without long and tedious winding; its durability and its ever-improving quality all testify to the rightness of the disk medium. Where one deals with a permanently prerecorded medium, it would seem economically odd to use magnetic tape, since one of its biggest advantages over the disk is its erasability, reusability, and almost unlimited duration of play, even, at times, at the expense of quality.

Even IBM went back to disk for its latest dictating system, while it is apparent that disk storage has revolutionized computer-memory density and access speed. The circle was further closed when special phonograph records were made by direct-to-disk techniques with telling improvement in quality.

Of course, a great deal of progress has been made since Berliner's first disk record: progress in material selection, in plating and stamping, in turntable design, in pickup and tone-arm construction, in groove geometry, high-density cutting, and last, but not least, in the cutting lathe. The pages in this two-volume anthology tell of this progress and also of the research and development which made such progress possible. The readers will learn from these volumes how audio engineering drew on the mechanical, electrical, and material engineering sciences to achieve an outstanding system for speech and music reproduction. It should be stressed that such progress could be obtained only by international cooperation on both the engineering and marketing level.

Now the disk faces a new challenge as a storage medium for video information. The recording of video has been a spooled-ribbon medium for about as long as phonograph recording has existed. Optical sprocketed film, still the king of the motion-picture industry, soon found its match in magnetic recording, replacing one linear-motion medium with another.

But in 1976, 58 years after the first such experiments, the world's first video disk was marketed by Telefunken-Decca. Technology is now available to produce laser-recorded and -played disks, and traditionally cut and replicated disks which are playable equally on laser, electrostatic, and pressure-pickup players.

As a fall-out of this high-density video-disk technology, there are now proposals for small, very-long-playing, multichannel audio disks, one even encased in a cassette! It is hoped that this two-volume Anthology will encourage future study and research. Volume 1 concentrates on the recording process, while Volume 2, soon to be published, deals with the playback of records. The Appendix of Volume 2 will feature a thorough patent review going back more than 100 years.

One thing is certain: the mechanical disk has developed during a 100-year perod when standards could grow in an orderly fashion. Today, the long-playing record is one of the world's best standardized storage media. Never again, I feel, will any system, regardless of how simple, capture the world with a single standard equally respected in Beijing, Berlin and Baltimore.

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In Volume 1 of this Disk Anthology we covered the groove geometry as well as the process of creating the groove structure. Volume 2 concentrates on the reproduction of the groove in all of its aspects. The number of significant papers in this area is so extensive that it will be necessary to create yet another book, Volume 3. It will be exclusively devoted to a painstakingly assembled Patent Review of the disk recording field going back to the 1870s, featuring reproductions of the significant illustrations of most of those patents. I feel that such a thorough insight into inventions in this field, whether or not they were ever used, will help to stimulate creativity and will prevent inventors of tomorrow from embarking on research which duplicates work done long ago.

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Stephen F. Temmer

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