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World's First Helical Scan Video Tape Recorder



Toshiba made a major contribution to the growth of Japan's economy in the 1980's with its helical scan videotape recorder which are in use around the world by hundreds of millions.

When black-and-white television broadcasting in Japan began in 1953, there was a need for devices that could electronically record and playback the video signals of nonlive broadcasts. At that time, programs were recorded on movie film and played back by converting the film images to electric signals.

Although the open-reel magnetic tape recording method was on the market for recording audio signals, since recording video signals required as much as 100 times the bandwidth used for recording audio signals, tape speed would need to be increased to 19 meters/second. However, since recording and playing back video images on movie film required long processing times and high costs, expectations were high for using a magnetic recording method.



RCA in the U.S. and BBC Laboratories in the U.K. had responded by increasing tape speeds to several meters/ second, but it was the American star Bing Crosby who funded, with his own money, development of a recording device that split video signals into ten simultaneous tracks. This experiment showed that if the relative speed of the tape and the magnetic heads could be increased by doubledigit amounts, video signals could be recorded on magnetic tape. This led to the idea of the rotating head. In 1956, a U.S. firm called Ampex succeeded in developing a practical device based on the recording method it had invented: using four rotating heads placed at 90-degree intervals across the width of a two-inch wide tape to record and playback one-fourth of the signal using each of the four heads.

But since this method combined the signal segments from these four heads into a single video image, it had drawbacks in that some color distortion arose from the characteristics of the individual heads, and joints were visible between signal segments. For this reason, in 1954 Toshiba began research into a recording method using diagonal heads. By forming a single diagonal, long track on two-inch-wide tape, it was possible to record a video signal on one tape using one head, with no joints. This helical

scan method was invented by Dr. Kenichi Sawazaki of the Mazda Research Laboratory.

However, it is extremely difficult to run a device with stability when the head is constantly in contact with the tape, and only after much testing was an experimental prototype (Toshiba's first videotape recorder) announced, in 1959. This attracted attention from around the world, and made a major impact when announced at a meeting of the Society of Motion Picture Television Engineers (SMPTE) held at the Ambassador Hotel in Los Angeles. Broadcasting use videotape recorders needed to be compatible, however, the technology adopted as standard was Ampex's four-head method. But, as far as industrial videotape recorders were concerned, since the manufacturing cost using Toshiba's helical scan method was one-tenth or less that of the fourtrack method, Toshiba's helical scan method was adopted. The all-in-one open-reel videotape recorder was standardized in 1969 and introduced to the market for general use. Subsequently, this method was also used for home video recorders using the cassette β (beta) and VHS formats. Today, hundreds of millions of videotape recorders are in use around the world, and even broadcasting-use recorders use the helical scan method. The helical scan videotape recorder has earned high credit as a technology in use around the world, and it made a major contribution to the growth of Japan's economy in the 1980's.



Helical scan VTR
(black-and-white)
developed by
Dr.Sawazaki



Standardized I-Type VTR

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