

Tape Recorder and Magnetic tape

A tape recorder is an analog device that uses magnetic tape to record audio for playback and data for storage. The tape itself is a thin plastic strip coated by a layer of *ferric oxide powder*. Ferric oxide is a natural element existing in hematite ore and rust, it's often used for metal polishing as well as on magnetic tapes.

Originally, recording was done by using steel wire, invented by Valdemar Poulsen in 1900. It wasn't until 1928 that magnetic tape was first invented for recording sound by Fritz Pfleumer. Early tape recordings were done by using reel-to-reel recorders, reel-to-reel tape was common until the invention of the compact cassette tape in 1964.

Analog to Digital

From audio to data, information storage and recording has progressed from analog to digital. Here's a look at some past and current storage devices; (A) reel-to-reel tape, (B) compact cassette, (C) Sony's first Walkman, (D) compact disk and (E) mp3 player; the iPod.



A reel-to-reel tape recorder.

The Magnetic Recording System

There are two parts to any magnetic recording system: the recorder itself and the tape it uses as the storage medium. Reel-to-reel recording refers to the form of magnetic tape audio recording in which the recording medium is held on a reel, rather than being securely contained within a cassette.

The reel-to-reel format was used in the very earliest tape recorders, including the pioneering German Magnetophons of the 1930s.

In 1964, the compact cassette was introduced and quickly it went into mass production. Compact cassette achieved a period of popularity in the 1990s until CDs and mp3 players took over.

■ analog ■ digital



B compact cassette tape.



C Sony's first Walkman

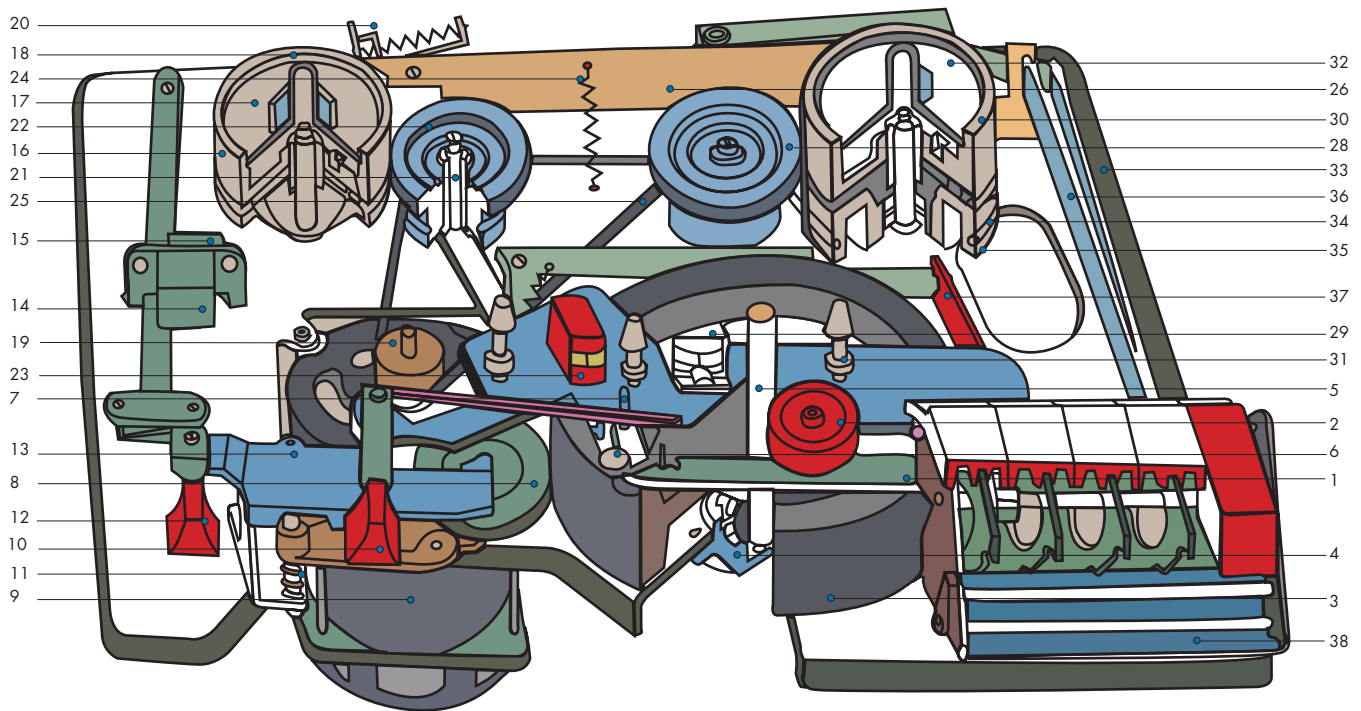


D compact disc (CD)



E mp3 player: the iPod

Description of Operation: Tape Recorder



F 1970s single motor tape recorder

Electrical

Current flowing in the coils of the electromagnet causes the magnetic material on the tape to align in a manner proportional to the original signal. The signal can be reproduced by running the tape back across the tape head, where the reverse process occurs; the magnetic imprint on the tape induces a small current in the read head which approximates the original signal. This is then amplified for playback.

Mechanical

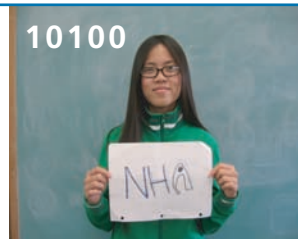
Professional recorders usually use a simple three-motor scheme. One motor with a constant rotation speed provides traction for the leading wheel. The leading wheel is usually combined with a flywheel to ensure that the tape speed does not fluctuate. The other two motors apply constant torque to maintain the tape's tension or wind the tape quickly.

- 1 - lever, moving the pressing wheel
- 2 - rubber covered wheel, to press the tape to the flywheel (stabilizes the tape traction speed)
- 3 - flywheel (stabilizes the tape traction speed)
- 4 - lower axis holder
- 5 - leading wheel (determines the tape traction speed)
- 6 - spring
- 7 - detail, pressing the tape to the magnetic heads
- 8 - intermediate wheel
- 9 - electric motor
- 10 - rewind activation control
- 11 - 15 - tape traction speed selector
- 16, 34 - cloth-covered surface to create the friction force
- 17, 30 - bottom of tape holder, rotates with constant speed
- 18, 32 - top side of the tape holder
- 19 - 22, 25, 28, 35 - belt gear to rotate tape holders at reduced speed
- 23 - erasing magnetic head
- 24 - spring
- 26 - brake
- 21, 27, 31 - tape directors
- 29 - universal magnetic head, for playing & recording
- 33 - pusher to apply the brakes
- 36, 37 - additional levers
- 38 - operating controls.

Sources

en.wikipedia.org/wiki/Tape_recorder
 electronics.howstuffworks.com/cassette.htm

Digital–Analog Design Punch Cards is a set of research cards designed and produced by the students of DSGD 186, Digital Applications Methodology, a third-year graphic design course at San Jose State University, Fall 2006. The set, composed of 1+26 cards, is by no means complete. Each topic was chosen and researched by the students, based on a theme presented by the instructor Pino Trogu, with help from Mauro Panzeri. This is card number 20 and it was designed by **Nha Tran**.



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