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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE TRADEMARK TRIAL AND APPEAL BOARD

Proceeding	92052327
Party	Defendant King of Rock 'N' Roll Music, Inc.
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Submission	Reply in Support of Motion
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Signature	/Jeffrey E. Jacobson/
Date	01/04/2011
Attachments	ReplyBrief A0001.pdf (11 pages)(5953382 bytes) 2 Exhibit A0001.pdf (1 page)(133708 bytes) 3 Google Phonorecord Results.pdf (1 page)(862648 bytes) 4 Exhibit B0001.pdf (1 page)(135988 bytes) 5 Wikipedia Phonorecord page.pdf (1 page)(443600 bytes) 6 Exhibit C0001.pdf (1 page)(135502 bytes) 7 WikiCassette0001.pdf (12 pages)(14225955 bytes) 8 Exhibit D0001.pdf (1 page)(133665 bytes) 9 WalkmanArticle0001.pdf (1 page)(849756 bytes)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE TRADEMARK TRIAL AND APPEAL BOARD

In the Matter of Trademark Registration No. 1,909,802

For the Trademark KING OF ROCK 'N' ROLL MUSIC

Registered December 8, 1995

- x

ELVIS PRESLEY ENTERPRISES, INC. Cancellation No. 92052327
Petitioner,

v.

KING OF ROCK 'N' ROLL MUSIC, INC.
Registrant.

- -x

REPLY MEMORANDUM OF LAW IN SUPPORT OF REGISTRANT'S CROSS-MOTION FOR SUMMARY JUDGMENT AND OBJECTION TO THE BOARD'S DECISION TO CONSIDER PETITIONER'S REPLY BRIEF FILED AFTER 15 DAYS FROM THE DATE OF SERVICE OF REGISTRANT'S RESPONSE TO PETITIONER'S MOTION FOR SUMMARY JUDGMENT HAD EXPIRED.

Registrant hereby objects to the Board's Order of January 4, 2011 in which it (1) denied the parties' stipulated and agreed motion for time to file reply briefs; yet (2) allowed the motion to extend time with respect to Petitioner's response to Registrant's Cross-Motion for Summary Judgment.

The parties' *Stipulated and Agreed Motion for Extension of Time* (Docket No. 13) agreed to and filed on December 1, 2010 stated,

> IT IS HERBEY STIPULATED AND AGREED by the parties that the deadline for Petitioner to file its Reply in Support of its Motion for Summary Judgment in the above captioned action be extended by fifteen (15) days from December 1, 2010 to December 15, 2010. (emphasis added).

On December 15, 2010, after utilizing the fifteen (15) day extension of time, Petitioner then filed **Petitioner's Combined Reply Brief in Support of Its Motion for Summary Judgment** and Petitioner's Response Brief in Opposition to Registrant's Cross-Motion for Summary Judgment (Docket No. 14). As

Registrant's response to Petitioner's Motion for Summary Judgment was filed on November 11, 2010 (Docket No. 11), Petitioner's combined **Reply Brief** was thus filed more than 15 days after service of Registrant's response. Therefore, pursuant to the Board's Order of January 4, 2011, in so far as Petitioner's papers filed on December 15, 2010 (Docket No. 14) combined brief contains a "reply," it cannot be considered by the Board because it was filed with an extension of time in violation of Trademark Rule 2.127(e)(1). However, Registrant would have no objection to the Board considering Petitioner's papers filed on December 15, 2010 (Docket No. 14) **if** Registrant's Reply brief filed and served on January 4, 2011 is also considered. To do otherwise would be extremely prejudicial to Registrant as it would unfairly allow Petitioner to file a Reply brief with an extension of time in violation of Trademark Rule 2.127(e)(1) and it would deny Registrant the same right.

Registrant King of Rock 'N' Roll Music, Inc. ("Registrant") submits this *Reply Memorandum of Law in Support of its Cross-Motion for Summary Judgment*. Registrant has used its trademark in commerce since 1993—a period of approximately 17 years. The record supports this assertion, and contains numerous examples of Registrant's prior use, current use, and plans for future use of the trademark in connection with pre-recorded music. Conversely, Petitioner has provided no evidence of abandonment for the statutory period, or evidence of nonuse with an attempt not to resume. Instead, Petitioner bases its claims on an erroneous definition of the word "phonorecord" in the goods description in Registration No. 1,909,802, and on the fact that Registrant, like virtually all others in the pre-recorded music business, has ceased using the mark in connection with cassettes. *See Reply Exhibit C, Page 3; See also Reply Exhibit D.* Therefore, Petitioner's claims are utterly baseless, and summary judgment should be entered in favor of Registrant.

ARGUMENT

I. PETITIONER HAS NOT MET ITS BURDEN IN PROVING ABANDONMENT OF THE "KING OF ROCK 'N' ROLL MUSIC" MARK.

"Since [trade]mark registrations are presumed valid, the party seeking cancellation of such registration must rebut this presumption by a preponderance of the evidence." *On-Line Careline, Inc. v. America Online, Inc.*, 229 F.3d 1080 (Fed.Cir. 2000). Trademark abandonment occurs when use is discontinued with at intent not to resume such use. 15 U.S.C. § 1127. A *prima facie* case of abandonment requires proof of nonuse for three consecutive years. *Id.* Only if a *prima facie* case is established is the burden shifted to the trademark owner to produce evidence of trademark usage during the statutory period or intent to resume use. *Id.* "The burden of persuasion, however, always remains with the petitioner to prove abandonment by a preponderance of the evidence." *On-Line Careline, Inc. v. America Online, Inc.*, 229 F.3d 1080 (Fed.Cir. 2000).

Here, Petitioner has failed to meet its burden to show nonuse for a period of three years, and thus has not established a *prima facie* case of abandonment. Despite the burden of production never shifting to Registrant due to Petitioner's failure to establish a *prima facie* case, documentary evidence was produced by Registrant that conclusively establishes trademark use. Registrant produced in discovery and submitted as exhibits significant evidence of trademark use on pre-recorded music in the form of compact discs. *Cross-Motion Exhibit #1, Packaging of Pre-Recorded Music*. Registrant also produced evidence of its goods bearing the mark being offered for sale nationwide on Amazon.com and Barnesandnoble.com. *Cross-Motion Exhibit #3, Examples of Retailers Selling Registrant's Goods*. Registrant even went so far as to provide royalty statements that demonstrate payments made to Registrant for sales of goods bearing the mark. *Cross-Motion Exhibit #2, Royalty* Statements. Registrant maintains that use on compact discs also constitutes use on phonorecords due to the actual definition of "phonorecord." Registrant also cited *Hazeltine Corp. v. United* States, 145 Ct. Cl. 138, 145 (1959), for the proposition that a trademark owner can still retain a trademark with the possibility of using it again upon another product of the same class when the public demand for a particular product previously associated with the trademark disappears. Although Registrant has stated that it is not currently using the mark in connection with cassettes, Registrant goes beyond the facts of *Hazeltine* because it <u>is currently</u>

using the trademark in connection with goods in the same class (i.e., compact discs, and has been for approximately 17 years). Therefore, summary judgment should be entered in favor of Registrant because Petitioner has failed to prove abandonment by a preponderance of the evidence, and Registrant has produced evidence of consistent trademark usage.

II. THE "KING OF ROCK 'N' ROLL MUSIC" MARK IS CURRENTLY IN USE AND THEREFORE HAS NOT BEEN ABANDONED.

The goods listed in Registration No. 1,909,802 are "pre-recorded music on phonorecords, cassettes, and compact discs." It is completely undisputed between the parties that Registrant uses, has used, and intends to continue using the trademark in connection with pre-recorded music. Registrant produced documentary evidence that proves such use on compact discs. *See Cross-Motion Exhibit #1,Packaging of Pre-Recorded Music*. Among the various examples of Registrant's trademark use in *Cross-Motion Exhibit #1* is the Bob Hope "Thanks For The Holidays" album which prominently displays Registrant's mark on its packaging. *Id.* The Bob Hope "Thanks For The Holidays" album is also seen in the Amazon.com printout demonstrating use in commerce. *See Cross-Motion Exhibit #3, Examples of Retailers Selling Registrant's Goods*. Despite this evidence, Petitioner seeks cancellation of the *entire* registration on the basis of nonuse in connection with cassettes (despite not proving an intent not to resume), and Petitioner's flawed interpretation of the word "phonorecord."

The U.S. Copyright Act of 1976 defines "phonorecord" as "material objects in which sounds…are fixed by any method now known or later developed..." 17 U.S.C. § 101. The Copyright Act of 1976 took effect on January 1, 1978—more than 15 years prior to the November 26, 1993 application filing date of the subject registration. Not only was such a definition in use at the time of the filing date, but today this definition of phonorecord is widely accepted.

As proof of the acceptance of this definition, Registrant has attached Google search results (accessed on December 22, 2010) for the word "phonorecord." *Reply Exhibit A*. The top three results, among others, all reference definitions of "phonorecord" that are consistent with the definition in the U.S.

Copyright Act of 1976. *Id.* Registrant has also attached the Wikipedia page for "phonorecord" which is useful in ascertaining the consuming public's impression of a word's definition due to the fact Wikipedia's content is written by the general public. *See Reply Exhibit B.* Note that the Wikipedia page that this definition comes from is the top search result listed in the Google search results for the word "phonograph." *See Reply Exhibit A.* Wikipedia states, "A phonorecord is defined by the United States Copyright Act of 1976 to be a material object which embodies sounds…for example cassette tapes, CDs, or albums." *Reply Exhibit B.* Thus, Registrant disagrees with Petitioner that such a definition is "technical" and violates the Trademark Manual of Examination Procedures (hereinafter "TMEP").

Notably absent from the Google search results and the Wikipedia "phonograph" page is a definition remotely similar to the definition Petitioner erroneously cites. In short, there is no evidence to support the notion that "phonorecord" is limited to only a *vinyl record* as Petitioner has incorrectly insisted. To support this strained conclusion, Petitioner cites the Webster's Ninth New Collegiate Dictionary which defines "phonorecord" as "a phonograph record," and has the year "1950" listed in parenthesis. *Petitioner's Reply, Exhibit A.* Assuming the listing of 1950 in parenthesis references the origin of the word's definition, it is hardly surprising that it was then limited to only a "phonograph record." This is because in 1950 the phonograph record was the only widely available material object for which sounds could be fixed; thus, it logically could not have stated "compact discs" or any other medium. Since the origin of the word "phonorecord" predates the development of other mediums (namely, cassettes and compact discs) such a definition from 1950 is hardly surprising. However, as the U.S. Copyright Act, Wikipedia page, and Google search results indicate, the word "phonorecord" has since come to mean *any* material object in which sound can be fixed. Registrant's undisputed continued use of the mark in connection with compact discs thus constitutes use on phonorecords.

Additionally, it must be noted that a change in the nature of the goods sold under a particular mark does not necessarily constitute abandonment of the rights encompassed in said mark. As noted above, the term "phonorecord" refers to all goods listed in Registrant's registration because the definition

of "phonorecord" *includes* all types of formats for pre-recorded music. Simply producing one type of media of pre-recorded music (e.g., compact discs only) would not be a substantial change in the nature of the goods sold under the mark so as to make the continued use of the mark fraudulent and/or abandon the rights contained in that mark. See MCCARTHY ON TRADEMARKS § 17:24, Change in Nature of Goods Sold Under Mark (2010). McCarthy states, "a change in the *type*...of a product sold under the same mark will probably not constitute abandonment of the rights in the old mark." *Id.* (emphasis added). It is submitted here that a change in the type of media format that pre-recorded music is delivered is analogous to a change in the "type, formula, or blend" of a product sold under the same mark that has been held not to constitute abandonment of trademark rights.

A federal court in New York has addressed a similar issue, and is in support of Registrant's position. In Mulhens & Kropff, Inc. v. Ferd Muelhens, Inc., the court stated that the "concept of a trade-mark is not so rigid as to forbid slight variations necessitated by trade discoveries, *newer and more economical methods of making the same product*, or changed manufacturing conditions." 38 F.2d 287, 295 (1929) (emphasis added). Like the plaintiff in the Muelhens case, here, the registrant has adopted a more modern medium for selling pre-recorded music, necessitated by a change in circumstances surrounding the pre-recorded musical work. *See Reply Exhibits C and D.* Further, Registrant continues to sell the same *product*, pre-recorded music, without variation, only in a newer and more economical method in the form of compact discs. The pre-recorded music, not the discs (nor cassettes), is the product. Therefore, it is respectfully asserted that the Registrant has not abandoned the mark, and summary judgment should be entered in favor of the Registrant and against the Petitioner.

Footnotes 1 and 2 in Petitioner's *Combined Reply Brief In Support of Its Motion For Summary Judgment and Response Brief In Opposition To Registrant's Cross-Motion For Summary Judgment* reference various provisions of the Trademark Manual of Examination Procedures that Petitioner alleges Registrant has violated by using the word "phonorecord" in its goods description. In doing so, however, Petitioner ignores the fact that while an applicant must define the goods and services in its application,

"...the examining attorney may require amendment of the identification of goods or services to ensure that it is clear and accurate and conforms to the requirements of the statute and rules. The examining attorney should explain clearly but concisely the reason for requiring an amendment." TMEP § 1402.01(e). Further, the TMEP also states, "If an examining attorney is uncertain as to the acceptability of the language in an identification, he or she should consult with a senior or managing attorney. If still unresolved, questions about an identification of goods or services should be referred to the Administrator for Trademark Identifications, Classification and Practice." *Id.*

Thus, even assuming *in arguendo* that Registrant's goods description is unacceptable as currently written, it should have been dealt with by the examining attorney during the examination process. To now penalize Registrant, as Petitioner demands is the only available remedy, would be incredibly unfair especially in light of Registrant's continued use of the mark since 1993—a period of approximately 17 years. Tellingly, Petitioner has not suggested that these alleged mechanical violations of the TMEP override the overwhelming evidence of Registrant's trademark use, and thus they cannot be the basis for cancellation. Should the Board find that the goods description is not acceptable, Registrant respectfully requests that it be allowed to restrict its goods description to conform to the findings of the Board pursuant to 15 U.S.C. § 1068 and 37 C.F.R. § 2.133(b).

III. IF NECESSARY TO MAINTAIN ITS REGISTRATION, REGISTRANT REQUESTS THE BOARD EXERCISE ITS AUTHORITY TO RESTRICT THE IDENTIFICATION OF GOODS IN ITS REGISTRATION PURSUANT TO 15 U.S.C. § 1068.

The Lanham Act grants the Director authority to "modify the application or registration by limiting the goods or services specified therein." 15 U.S.C. § 1068. If, in a cancellation proceeding, the "[Board] finds that a party whose... registration is the subject of the proceeding is not entitled to registration in the absence of a specified restriction to the involved...registration, the [Board] will allow the party time in which to file a request that the ...registration be amended to conform to the findings of the Board, failing which judgment will be entered against the party." 37 CFR § 2.133(b).

The Board has the power to "rectify" the register by deleting specific goods from the registration that are no longer in use. *Space Base, Inc. v. Stadis Corporation*, 17 U.S.P.Q.2d (BNA) 1216 (TTAB 1990); See also, *Alberto-Culver v F.D.C. Wholesale Corp.*, slip op., U.S.P.Q.2d (TTAB July 9, 1990). A party who "wishes to defend by asserting that it is at least entitled to a registration with a particular restriction" must raise the defense in either its answer or by way of a timely motion to amend its registration to include the restriction. TMBP § 514.03 (citing 37 CFR §§ 2.133(a)-(b)); See also, *ProQuest Information and Learning Company v. Jacques R. Island*, Opposition No. 91158016 (TTAB Febuary 21, 2007). In the context of motions to amend a party's registration, the Board will defer determination until final decision or until the case is decided upon summary judgment. TBMP § 514.03. If the Board determines the defendant is not entitled to continued registration without a timely proposed restriction, "the proposed restriction will be approved and entered." *Id.*

Here, Registrant has moved for leave to amend its *Answer* to add 15 U.S.C. § 1068 as a defense, and to add a proposed restriction on the goods listing in its registration in the event that the Board determines Registrant is not entitled to maintain its registration for all the goods currently listed. Such a determination on Registrant's proposed restriction to its registration should properly be made after the determination of this motion for summary judgment. In the event it is necessary for the Board to review Registrant's proposed modification, and should the Board find that Registrant's proposed modification not be sufficient, Registrant requests it be given time to amend its registration pursuant to 37 CFR § 2.133(b) to conform to the Board's findings. Such a modification would be very simple and would only restrict the goods listing to conform to the Board's findings as to the goods in issue here while preserving "compact discs" in the registration as it is undisputed that Registrant has not ceased use or abandoned the mark in connection with compact discs.

Petitioner provides no argument to explain how nonuse on cassettes, one type of goods in the registration's goods description, constitutes abandonment of the trademark with respect to other goods that are indisputably still in use with the trademark (namely, compact discs). Instead, Petitioner attempts

to analogize the facts of this case with those of fraud cases, and in situations where a mark has become generic. No such similarity exists here, and Petitioner's comparisons are baseless. Thus, Petitioner's contention that the only statutory remedy in this circumstance is cancellation of the entire registration is legally erroneous, and is flatly contradicted by statute in 15 U.S.C. § 1068. As a result, it is well within the Board's authority to limit the goods description in the subject registration if necessary for Registrant to maintain its registration. 15 U.S.C. § 1068; 37 CFR § 2.133(b). See *Space Base, Inc. v. Stadis Corporation*, 17 U.S.P.Q.2d (BNA) 1216 (TTAB 1990). See also, *Alberto-Culver v F.D.C. Wholesale Corp.*, slip op., U.S.P.Q.2d (TTAB July 9, 1990); *ProQuest Information and Learning Company v. Jacques R. Island*, Opposition No. 91158016 (TTAB February 21, 2007).

It must also be noted that prior to moving for leave to amend its Answer, Petitioner was aware of Registrant's use of this defense in Registrant's *Memorandum of Law in Opposition to Petitioner's Motion for Summary Judgment and in Support of Registrant's Cross-Motion for Summary Judgment.* Petitioner did not object to Registrant's use of this unpleaded defense in any fashion in its briefing of the summary judgment motion, and argued the merits by insisting that cancellation of the entire registration is the only remedy available to the Board. Therefore, it is additionally submitted that the Board may treat the Registrant's *Answer* as having been amended (notwithstanding the Board's determination on Registrant's *Motion For Leave To Amend its Pleading)* by agreement of the parties pursuant to TMBP §§ 528.07(a)-(b). See also, *Paramount Pictures Corp. v. White*, 31 U.S.P.Q.2d 1768, 1772 (TTAB 1994) (pleading deemed amended because nonmoving party did not object to motion seeking summary judgment on unpleaded claim).

IV. PETITIONER'S PETITION TO CANCEL IS BARRED BY THE DOCTRINE OF LACHES AND EQUTABLE ESTOPPEL.

"The elements of laches are (1) unreasonable delay in assertion of one's rights against another; and (2) material prejudice to the latter attributable to the delay." Lincoln Logs Ltd. v. Lincoln Pre-Cut Log Homes, Inc., 971 F.2d 732, 23 USPQ 2d 1701, 1703 (Fed. Cir. 1992). "The elements of equitable estoppel are (1) misleading conduct, which may include not only statements and action but silence and

inaction, leading another to reasonably infer that rights will not be asserted against it; (2) reliance upon this conduct; and (3) due to this reliance, material prejudice if the delayed assertion of such rights is permitted." *Id.*

Here, Petitioner had knowledge of the registered trademark since August 8, 1995 by virtue of its registration on the Principal Register. They did not petition for cancellation of the mark or otherwise object to the mark's registration for a period of approximately 15 years. The fact that Petitioner later brought this claim, after remaining silent for an unreasonable 15 years, has caused a material prejudice to Registrant because of its use of the mark in connection with only compact discs (and thus phonorecords) as Registrant had no knowledge, actual or constructive, that such a claim would be brought. Therefore, the petition to cancel is barred by laches. Additionally, Petitioner's silence for 15 years is misleading conduct (in the form of inaction) which Registrant relied on when deciding to use the mark in connection with pre-recorded music on only compact discs (and thus phonorecords). If Petitioner is allowed to bring this cancellation petition after its unreasonable delay and after Registrant relied on its inaction it would cause a material prejudice to Registrant. As a result, in the interest of justice, Petitioner should be estopped from bringing this claim.

IV. CONCLUSION.

WHEREFORE it is respectfully requested that Petitioner's motion for summary judgment be denied it its entirety, and Registrant's cross-motion for summary judgment be granted in its entirety.

Respectfully submitted,

Date: January 4, 2011

THE JACOBSON FIRM, P.C.

By: /Jeffrey E. Jacobson/
Jeffrey E. Jacobson
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New York, NY 10010
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CERTIFICATE OF SERVICE

I, Jeffrey E. Jacobson, hereby certify that a copy of the REPLY MEMORANDUM OF LAW IN SUPPORT OF REGISTRANT'S CROSS-MOTION FOR SUMMARY JUDGMENT AND OBJECTION TO THE BOARD'S DECISION TO CONSIDER PETITIONER'S REPLY BRIEF FILED AFTER 15 DAYS FROM THE DATE OF SERVICE OF REGISTRANT'S RESPONSE TO PETITIONER'S MOTION FOR SUMMARY JUDGMENT HAD EXPIRED.

has been served upon:

Seth A. Rose
Loeb & Loeb LLP
321 North Clark Street, Suite 2300
Chicago, IL 60654

via first class mail, postage prepaid, this 4th day of January, 2011.

/Jeffrey E. Jacobson/

Bennet\lit\king of rock 'n' roll music\summary judgment reply\Reply memo of law

EXHIBIT A

phonorecord Search

Instant is on ▼

About 67,300 results (0.08 seconds) Advanced search

Phonorecord - Wikipedia, the free encyclopedia
A **phonorecord** is defined by the United States Copyright Act of 1976 to be a material object which embodies sounds (other than those accompanying ...
en.wikipedia.org/wiki/**Phonorecord** - Cached - Similar

Copyrights - What is a **phonorecord**?
As defined by the Copyright Act, a **phonorecord** is a physical object in which sounds (except for the sounds that go with a movie or audiovisual work) are ...
www.quizlaw.com/copyrights/what_is_a_**phonorecord**.php - Cached - Similar

Phonorecord - Copyright - Glossary - Legalzoom
PHONORECORD. Material objects embodying fixations of sounds, such as cassette tapes, CDs, or LPs but excluding motion picture soundtracks. ...
www.legalzoom.com/copyrights.../copyright-**phonorecord**.html - Cached - Similar

THE FIRST SALE DOCTRINE AND DIGITAL **PHONORECORDS**
May 31, 2001 ... This iBrief follows various **phonorecord** formats to illustrate the specifics of the First Sale doctrine as it applies to digital **phonorecords** ...
www.law.duke.edu › ... › Duke Law & Technology Review - Cached - Similar

Phonorecords - The IT Law Wiki
Phonorecords are what we think of as copies of sound recordings. ... Somewhat confusingly, the term "**phonorecord**" can also refer to the original object in ...
itlaw.wikia.com/wiki/**Phonorecords** - Cached - Similar

17 USC 407, Deposit of copies or **phonorecords** for Library of ...
17 USC 407, Deposit of copies or **phonorecords** for Library of Congress , Updated October 2005 (BitLaw)
www.bitlaw.com/source/17usc/407.html - Cached - Similar

Cell phone Ringtones are Digital **Phonorecord** Deliveries : Internet ...
Mar 6, 2007 ... "Does a ringtone, made available for use on a cellular telephone or similar device, constitute delivery of a digital **phonorecord** that is ...
www.ibls.com/internet_law_news_portal_view.aspx?s=latestnews... - Cached

U.S. Copyright Office - Copyright Law: Chapter 1
"Copies" are material objects, other than **phonorecords**, in which a work is fixed by any method now known or later developed, and from which the work can be ...
www.copyright.gov/title17/92chap1.html - Cached - Similar

37 CFR 255.5 - Royalty rate for digital **phonorecord** deliveries in ...
37 CFR 255.5 - Royalty rate for digital **phonorecord** deliveries in general. - Code of Federal Regulations - Title 37: Patents, Trademarks, and Copyrights ...
cfr.vlex.com/vid/255-royalty-**phonorecord**-deliveries-19768068

Digital **Phonorecord** Delivery [Patents] Law & Legal Definition
A digital **phonorecord** delivery includes all **phonorecords** that are made for the purpose of making the digital **phonorecord** delivery." ...
definitions.uslegal.com/d/digital-**phonorecord**-delivery-patents/ - Cached

EXHIBIT B

Phonorecord

From Wikipedia, the free encyclopedia

A **phonorecord** is defined by the United States Copyright Act of 1976 to be a material object which embodies sounds (other than those accompanying audio-visual recordings such as movies), for example cassette tapes, CDs or albums.[1]

From the Copyright Act: "Phonorecords" are material objects in which sounds, other than those accompanying a motion picture or other audiovisual work, are fixed by any method now known or later developed, and from which the sounds can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device. The term "phonorecords" includes the material object in which the sounds are first fixed.[2]

References

1. ^ http://www.quizlaw.com/copyrights/what_is_a_phonorecord.php
2. ^ 17 U.S.C. § 101 (2010)

Retrieved from "http://en.wikipedia.org/wiki/Phonorecord"
Categories: Copyright law

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EXHIBIT C

Compact Cassette

From Wikipedia, the free encyclopedia

The **Compact Cassette**, often referred to as **audio cassette**, **cassette tape**, **cassette**, or simply **tape**, is a magnetic tape sound recording format. Although originally designed for dictation, improvements in fidelity led the Compact Cassette to supplant the Stereo 8 track cartridge and reel-to-reel tape recording in most non-professional applications.[1] Its uses ranged from portable audio to home recording to data storage for early microcomputers. Between the early 1970s and the late 1990s, the cassette was one of the two most common formats for prerecorded music, first alongside the LP and later the Compact Disc.[2]

Compact Cassettes consist of two miniature spools, between which a magnetically coated plastic tape is passed and wound. These spools and their attendant parts are held inside a protective plastic shell. Two stereo pairs of tracks (four total) or two monaural audio tracks are available on the tape; one stereo pair or one monophonic track is played or recorded when the tape is moving in one direction and the second pair when moving in the other direction. This reversal is achieved either by manually flipping the cassette or by having the machine itself change the direction of tape movement ("auto-reverse").[3]

Compact Cassette

A TDK D-C60 cassette, a common speech-quality tape with a 60-minute playing time, in a housing similar to that of the original Compact Cassette specification

Media type	Magnetic tape
Encoding	Analog signal
Capacity	Typically 30 or 45 minutes of audio per side (C60 and C90 formats respectively); less common capacities included C15, C20, C30, C120 and C180. See below.
Read mechanism	Tape head
Write mechanism	Magnetic recording head
Usage	Audio and data storage

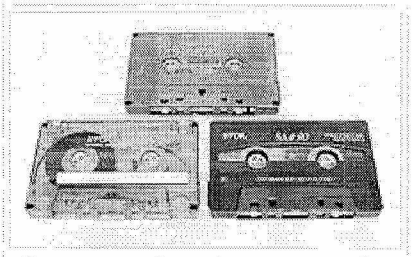
Contents

- 1 History
  - 1.1 Introduction of music cassettes
  - 1.2 Decline
- 2 Features
  - 2.1 Cassette types
  - 2.2 Playback length
  - 2.3 Write-protection
  - 2.4 Tape leaders
  - 2.5 Endless loop cassette
- 3 Cassette players and recorders
- 4 Applications
  - 4.1 Audio
  - 4.2 Home studio
  - 4.3 Home dubbing
  - 4.4 Data recording
- 5 Successors
- 6 See also
- 7 References
- 8 External links

History

In 1935, years before the introduction of the Compact Cassette, AEG, released the first reel-to-reel tape recorder (in German: *Tonbandgerät*), with the commercial name "Magnetophon", based on the invention of the magnetic tape (1928) by Fritz Pfleumer, which was using similar technology, but with open reels, for which the tape was manufactured by BASF. These instruments were still very expensive and relatively difficult to use, therefore were mostly used by professionals in radio stations and recording studios. For private use the (reel to reel) tape recorder was not very common and only slowly took off from about the 1950s. With

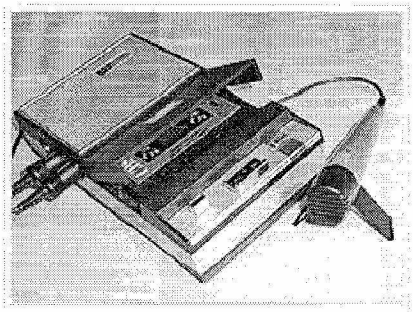
prices between 700 and 1500 DM (which would now be about 3100 to 6700 EUR)[4] still being far too expensive for the mass market and while still using vacuum tubes built very bulky. In the 1960s however the prices dropped, so that reel-to-reel tape recorders could have been found in the better equipped households from then on.



Cassettes of varying tape quality and playing time.

In 1958, following four years of development, RCA Victor introduced the stereo, quarter-inch, reversible, reel-to-reel RCA tape cartridge.[5][6] It was a cassette, big (5" x 7"), but offered few pre-recorded tapes; despite multiple versions, it failed.

In 1962 Philips invented the compact audio cassette medium for audio storage, introducing it in Europe in August 1963 (at the Berlin Radio Show),[2][7][8][9][10] and in the United States (under the *Norelco* brand) in November 1964, with the trademark name *Compact Cassette*.



One of the first (portable) Cassette Recorder from Philips Typ EL 3302 (1968)

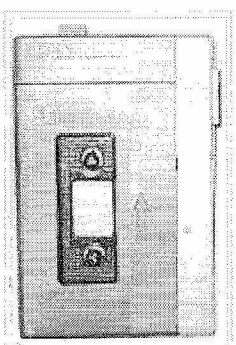
Although there were other magnetic tape cartridge systems, the Compact Cassette became dominant as a result of Philips' decision in the face of pressure from Sony to license the format free of charge. Philips also released the Norelco *Carry-Corder 150* recorder/player in the U.S. in November 1964. By 1966 over 250,000 recorders had been sold in the US alone and Japan soon became the major source of recorders. By 1968, 85 manufacturers had sold over 2.4 million players.[11]

In the early years, sound quality was mediocre, but it improved dramatically by the early 1970s when it caught up with the quality of 8-track tape and kept improving.[2] Cassette went on to become a popular (and re-recordable) alternative to the 12 inch vinyl LP during the late 1970s.[2]

Introduction of music cassettes

The mass production of compact audio cassettes began in 1964 in Hannover, Germany. Prerecorded music cassettes (also known as Musicassettes; M.C. for short) were launched in Europe in late 1965. The Mercury Record Company, a U.S. affiliate of Philips, introduced M.C. to the U.S. in July 1966. The initial offering consisted of 49 titles [12] However, the system had been initially designed for dictation and portable use, with the audio quality of early players not well suited for music. Some early models also had unreliable mechanical design. In 1971 the Advent Corporation introduced their Model 201 tape deck that combined Dolby type B noise reduction and chromium dioxide (CrO_2) tape, with a commercial-grade tape transport mechanism supplied by the Wollensak camera division of 3M Corporation. This resulted in the format being taken more seriously for musical use, and started the era of high fidelity cassettes and players.[1]

During the 1980s, the cassette's popularity grew further as a result of portable pocket recorders and hi-fi players such as Sony's Walkman, which used a body not much larger than the cassette tape itself, with mechanical keys on one side, or electronic buttons or display on the face. Sony even made the WM-10 which was smaller than the cassette itself and expanded to hold and play a cassette.[13]



1979 Sony Walkman

Like the transistor radio in the 1950s and 1960s, the portable CD player in the 1990s, and the MP3 player in the 2000s, the Walkman defined the portable music market in the 1980s, with cassette sales overtaking those of LPs.[2][14] Total vinyl record sales remained higher well into the 1980s due to greater sales of singles, although cassette singles achieved popularity for a period in the 1990s.[14]

Apart from the purely technical advances cassettes brought, they also served as catalysts for social change. Their durability and ease of copying helped bring underground rock and punk music behind the Iron Curtain, creating a foothold for Western culture among the younger generations.[15] For similar reasons, cassettes became popular in developing nations.

One of the most famous political uses of cassette tapes was the dissemination of sermons by the Ayatollah Khomeini throughout Iran before the 1979 Iranian Revolution, in which Khomeini urged the overthrow of the regime of the Shah, Mohammad Reza Pahlavi.

In 1970s India, they were blamed for bringing unwanted secular influences into traditionally religious areas. Cassette technology was a booming market for pop music in India, drawing criticism from conservatives while at the same time creating a huge market for legitimate recording companies and pirated tapes.[16] In some countries, particularly in the developing countries, cassettes still remain the dominant medium for purchasing and listening to music.[17]

Decline

In many Western countries, the market for cassettes has declined sharply since its peak in the late 1980s. This has been particularly noticeable with pre-recorded cassettes, whose sales were overtaken by those of Compact Discs during the early 1990s. By 1993, annual shipments of CD players had reached 5 million, up 21% from the year before, while cassette player shipments had dropped 7% to approximately 3.4 million.[18] The decline continued such that in 2001 cassettes accounted for only 4% of all music sold. Since then, the pre-recorded market has undergone further decline, with few retailers stocking them because they are no longer issued by the major music labels.[17] Sales of pre-recorded music cassettes in the U.S. dropped from 442 million in 1990 to 274,000 by 2007.[19] 2009 saw another record low with 34,000 cassettes sold, and 2,000 of those albums were at least 36 months old, bought at independent retailers in the south Atlantic region, in the suburbs.[20] Most of the major U.S. music companies had discontinued them by late 2002 or 2003. However, as of 2010, blank cassettes are still being produced and are sold at many retail stores, and facilities for cassette duplication remain available. Cassette recorders and players are gradually becoming scarcer, but are still widely available and featured in a notable percentage of Hi-Fi systems.[21]

Cassettes remained popular for specific applications, such as car audio, well into the 1990s. Cassettes and their players were typically more rugged and resistant to dust, heat and shocks than the main digital competitor (the CD). Their lower fidelity was not considered a serious drawback inside the typically noisy automobile interior of the time. However, the advent of "shock proof" buffering technology in CD players, the reduction of in-car noise levels, the general heightening of consumer expectations, and the introduction of CD auto-changers meant that by the early 2000s, the CD player was rapidly replacing the cassette player as the default audio component in the majority of new vehicles in Europe and America.

While digital voice recorders are now common, Compact Cassette (or frequently microcassette) recorders may be cheaper and of sufficient quality to serve as adjuncts or substitutes for note taking in business and educational settings. Audiobooks, church services, and other spoken word material are still frequently sold on cassette, as lower fidelity is generally not a drawback for such content. While most publishers sell CD audiobooks, they usually also offer a cassette version at the same price. In the audiobooks application, where recordings may span several hours, cassettes also have the advantage of holding up to 120 minutes of material whereas the average CD holds fewer than 80.[21]

While cassettes and related equipment have become increasingly marginal in commercial music sales, recording on analog tape remains a desirable option for some, however that method is recently being overtaken by portable digital recorders. Musicians in the indie rock community have showed slight interest in releasing cassettes. Artists such as Dirty Projectors and Deerhunter have made recent titles available on cassette,[20] and Thurston Moore of Sonic Youth has claimed "I only listen to cassettes." [20]

Among the last in the developed countries to leave the compact cassette format are artists and groups belonging to the "dansband" genre, who many still in the early 2000s had released their albums both to CD and to compact cassettes. Since many of their fans now are older, they often belong to a generation who was less interested in buying a CD player. However, also in this genre fewer artists and groups release recordings on compact cassette. As late as 2006, Lasse Stefanz and Torgny Melins released their latest albums to both Compact Cassette and CD.[22]

In India, film and devotional music continues to be released in the audio cassette format due to its low cost.[23]

Botswana-based Diamond studios recently announced plans for establishing a plant to mass-produce cassettes in a bid to combat piracy.[24]

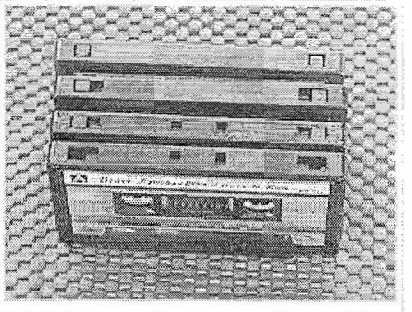
In recent years, the audio cassette format has seen a revival with independent record labels ("indie" labels) preferring to issue releases in this format due to its low cost and the difficulty in sharing tape music over the internet.[25]

Features

The cassette was a great step forward in convenience from reel-to-reel audio tape recording, though because of the limitations of

the cassette's size and speed, it initially compared poorly in quality. Unlike the 4-track stereo open reel format, the two stereo tracks of each side lie adjacent to each other rather than being interleaved with the tracks of the other side. This permitted monaural cassette players to play stereo recordings "summed" as mono tracks and permitted stereo players to play mono recordings through both speakers. The tape is 3.81 mm (0.150 in) wide, with each stereo track 0.6 mm wide and an unrecorded guard band between each track. The tape moves at 4.76 cm/s (1 7/8 in/s) from left to right.[26] For comparison, the typical open reel format in consumer use was ¼ inch (6.35 mm) wide, each stereo track nominally $^{1}/_{16}$ inch (1.59 mm) wide, and running at either 9.5 or 19 cm/s (3.75 or 7.5 in/s).

Cassette types



Notches on the top surface of the audio cassette indicate its type. The rearmost cassette at the top of this picture, with only write protect notches (here covered by write protect tabs), is a Type I. The next cassette down, with additional notches adjacent to the write protect notch, is a Type II. The bottom two cassettes, featuring the Type II notches plus an additional pair in the middle of the cassette are type IV (metal); note the removal of the tabs on the second of these, meaning the tape is write-protected.

Cassette tapes are made of a polyester type plastic film with a magnetic coating. The original magnetic material was based on gamma ferric oxide (Fe_2O_3). Circa 1970, 3M Company developed a cobalt *volume-doping* process combined with a double-coating technique to enhance overall tape output levels. This product was marketed as "High Energy" under its Scotch brand of recording tapes.[27] Inexpensive cassettes are commonly labeled "low-noise," but typically are not optimized for high frequency response. For this reason, some low-grade IEC Type I tapes have specifically been marketed as better suited for data storage than sound recording.

At about the same time, chromium dioxide (CrO_2) was introduced by DuPont, the inventor of the particle, and BASF, the inventor of magnetic recording,[28] and then coatings using magnetite (Fe_3O_4) such as TDK's Audua were produced in an attempt to approach the sound quality of vinyl records. Cobalt-*absorbed* iron oxide (Avilyn) was introduced by TDK in 1974 and proved very successful. Finally pure metal particles (as opposed to oxide formulations) were introduced in 1979 by 3M under the trade name Metafine. The tape coating on most Cassettes sold today as either "Normal" or "Chrome" consists of ferric oxide and cobalt mixed in varying ratios (and using various processes); there are very few cassettes on the market that use a pure (CrO_2) coating.[2]

Simple voice recorders are designed to work with standard ferric formulations. High fidelity tape decks are usually built with switches or detectors for the different bias and equalization requirements for high performance tapes. The most common, iron oxide tapes (defined by an IEC standard as "Type I"), use 120 µs playback equalization, while chrome and cobalt-absorbed tapes (IEC Type II) require 70 µs playback equalization. The recording "bias" equalizations were also different (and had a much longer time constant). BASF and Sony tried a dual layer tape with both ferric oxide and chrome dioxide known as 'ferrichrome' (FeCr) (IEC Type III), but these were only available for a short time in the 1970s. Metal Cassettes (IEC Type IV) also use 70 µs playback equalization, and provide still further improvements in sound quality.[27] The quality is normally reflected in the price; Type I cassettes are generally cheapest, and Type IV usually the most expensive. BASF chrome tape used in commercially pre-recorded cassettes used 120 µs (type I) playback equalization to allow greater high frequency dynamic range for better sound quality, but the greater selling point for the music labels was that the same Type I cassette shell could be used for both ferric and for chrome music cassettes.

Notches on top of the cassette shell indicate the type of tape within. Type I cassettes only have write-protect notches, Type II have an additional pair next to the write protection ones, and Type IV (metal) have a third set in the middle of the cassette shell. These allow cassette decks to automatically detect the tape type and select the proper bias and equalization. Virtually all recent hi-fi systems (with cassette decks) lack this feature; only a small niche of cassette decks (hi-fi separates) have the tape type selector. Playback of Type II and IV tapes on a player without detection will produce exaggerated treble, but it may not be noticeable because typically such devices have amplifiers that lack extended high frequency output. Recording on these units, however, results in very low sound reproduction and sometimes distortion and hiss is heard. Also, these cheaper units cannot erase high bias or metal bias tapes. Attempting to do so will result in "print-through".

Playback length

Tape length is usually measured in minutes of total playing time. The most popular varieties are C46 (23 minutes per side), C60 (30 minutes per side), C90, and C120. The C46 and C60 lengths are typically 15–16 µm thick, but C90s are 10–11 µm and C120s are just

9 µm thick, rendering them more susceptible to stretching or breakage. Some vendors are more generous than others, providing 132 meters (433 feet) or 135 meters (442 feet) rather than 129 meters (423 feet) of tape for a C90 cassette. C180 and even C240 tapes were available at one time, but these were extremely thin and fragile and suffered badly from effects such as print-through, which made them unsuitable for general use.

Although the TDK-D C180 was produced for two decades, it is very rare, because of several technical flaws. The tape had to be so thin that it was nearly transparent and therefore had fewer particles to magnetize, resulting in a poor sound quality and even worse durability. It required a strong motor to be driven, and had high wow and flutter. Finally, it took a relatively long time to rewind.

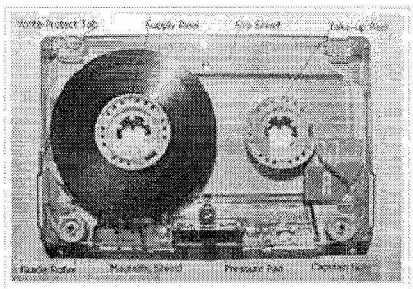
Other lengths are (or were) also available from some vendors, including C10 and C15 (useful for saving data from early home computers and in telephone answering machines), C30, C50, C54, C64, C70, C74, C80, C84, C100, C105, and C110.[27] As of 2010, Thomann still offers C10, C20, C30 and C40 IEC Type II tapes for use with 4- and 8-track portastudios.[29]

Some companies included a complimentary blank cassette with their portable cassette recorders in the early 1980s. Panasonic's was a C14 and came with a song recorded on side one, and a blank side two. Except for C74 and C100, such non-standard lengths have always been hard to find, and tend to be more expensive than the more popular lengths. Home taping enthusiasts may have found certain lengths useful for fitting an album neatly on one or both sides of a tape. For instance, the initial maximum playback time of Compact Discs was 74 minutes, explaining the relative popularity of C74 cassettes.

Write-protection

All Compact Cassettes include a write protection mechanism to prevent re-recording and accidental erasure of important material. Each side of the cassette has a plastic tab on the top that may be broken off, leaving a small indentation in the shell. This indentation allows the entry of a sensing lever that prevents the operation of the recording function when the cassette is inserted into a cassette deck. If the cassette is held with one of the labels facing the user and the tape opening at the bottom, the write-protect tab for the corresponding side is at the top-left. Occasionally, manufacturers provided a movable panel that could be used to enable or disable write-protect on tapes.

If later required, a piece of adhesive tape can be placed over the indentation to bypass the protection, or (on some decks), the lever can be manually depressed to record on a protected tape. Extra care is required to avoid covering the additional indents on high bias tape cassettes adjacent to the write-protect tabs.



Inside a cassette showing the leader at the beginning of side A. The tape "plays" from left to right (though of course an auto-reverse deck can play in either direction). The tape is pressed into close contact with the head by the pressure pad; guide rollers help keep the tape in the correct position. Smooth running is assisted by a slippery liner (slip sheet) between the spools and the shell; here the liner is transparent. The magnetic shield reduces pickup of stray signals by the heads of the player. The tab at the top-left corner of the shell permits recording on the current side.

Tape leaders

In most compact cassettes the magnetic tape was attached to each spool with a leader, usually made of strong plastic (see right-hand image). This leader protected the weaker magnetic tape from the shock occurring when the tape reached the end. Leaders can be complex: a plastic slide-in wedge anchors a short fully-opaque plastic tape to the take-up hub; one or more tinted partly-opaque plastic segments follow; the clear leader (a tintless partly opaque plastic segment) follows that wraps almost all the way around the supply reel before splicing to the magnetic tape itself. The clear leader spreads the shock load to a long stretch of tape instead of to the microscopic splice. Various patents have been issued detailing leader construction and associated tape player mechanisms to detect leaders.[30] Cassette tape users would also use spare leaders to repair broken tapes.[31]

The disadvantage with tape leaders was that the sound recording or playback did not start at the beginning of the tape, forcing the user to cue forward to the start of the magnetic section. For certain applications such as dictation special cassettes containing leaderless tapes were made, typically with stronger material and for use in machines which had more sophisticated end of tape prediction.

Endless loop cassette

Compact cassettes were also made that played a continuous loop of tape without stopping. Lengths available are from around 30 seconds to a standard full length. They are used in situations where a short message or musical jingle is to be played, either

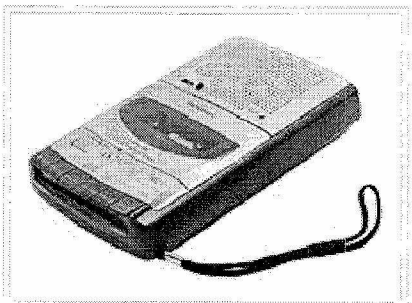
continuously or whenever a device is triggered, or whenever continuous recording or playing is needed. Some include a sensing foil on the tape to allow tape players to re-cue. From as early as 1969 various patents have been issued, covering uses such as uni-directional, bi-directional, and compatibility with auto-shut-off and anti-tape-eating mechanisms.[32]

Cassette players and recorders

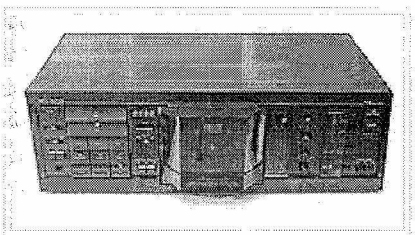
The first cassette machines (e.g. the Philips EL 3300, introduced in August, 1963 [10][33]) were simple mono record and playback units. Early machines required attaching an external dynamic microphone. Most units after the 1970s also incorporated built-in condenser microphones, which have extended high frequency response, but may also pick up noises from the recorder motor. A common portable recorder format still common today is a long box, the width of a cassette, with a speaker at the top, a cassette bay in the middle, and "piano key" controls at the bottom edge. Another format is only slightly larger than the cassette, also adapted for stereo "Walkman" player applications. The markings of "piano key" controls were soon standardized, and are a legacy still emulated on many software control panels. These symbols are commonly a square for "stop", a right-pointing triangle for "play", double triangles for "fast-forward" and "rewind", a red dot for "record", and a vertically-divided square (two rectangles side-by-side) for "pause".

Main article: Cassette deck

Stereo recorders eventually evolved into high fidelity and were known as cassette decks, after the reel-to-reel decks. Hi-Fi cassette decks, in contract to cassette recorders and cassette players, often didn't have built in amplification or speakers. Many formats of cassette players and recorders have evolved over the years. Initially all were top loading, usually with cassette on one side, VU meters and recording level controls on the other side. Older models used combinations of levers and sliding buttons for control.



A typical portable desktop cassette recorder from RadioShack.



Nakamichi RX-505 audio cassette deck

A major innovation was the front-loading arrangement. Pioneer's angled cassette bay and the exposed bays of some Sansui models were eventually standardized as a front-loading door into which a cassette would be loaded. Later models would adopt electronic buttons, and replace conventional meters (which could be "pegged" when overloaded) with electronic LED or vacuum fluorescent displays, with level controls typically either being controlled by rotary controls or side-by-side sliders. BIC and Marantz briefly offered models which could be run at double speeds, but Nakamichi was widely recognized as one of the first companies to create decks which rivaled reel-to-reel decks with frequency response from the full 20–20,000 Hz range, low noise, and very low wow and flutter.[34][35] The 3-head closed-loop dual capstan Nakamichi 1000 (1973) is one early example. Unlike typical cassette decks that use a single head for both record and playback plus a second head for erasing, the Nakamichi 1000, like the better reel-to-reel recorders, used three separate heads to optimize these functions.

Other contenders for the highest, "HiFi" quality on this medium were two companies already widely known for their excellent quality reel-to-reel tape recorders: Tandberg and Revox (consumer brand of the Swiss professional Studer company for studio equipment). Tandberg started with combi-head machines like the TCD 300 and continued with the TCD 3x0 series with separate playback and recording heads. All TCD-models possessed dual capstan drives, beltdriven from a single capstan motor and two separate reel motors. Frequency range extended to 18 kHz. After a disastrous overinvestment in colour television production, Tandberg folded and revived without the HiFi-branch these came from.

Revox went one step further: after much hesitation about whether to accept cassettes as a medium capable for meeting their strict standards from reel to reel recorders at all, they produced their B710MK I (Dolby B) and MK II (Dolby B&C) machines. Both cassette units possessed double capstan drives, but with two independent, electronically controlled capstan motors and two separate reel motors. The head assembly moved by actuating a damped solenoid movement, eliminating all belt drives and other wearable parts. These machines rivaled the Nakamichi in frequency and dynamic range. The B710MKII also achieved 20–20 kHz and dynamics of over 72 dB with Dolby C on chrome and slightly less dynamic range, but a larger headroom with metal tapes and Dolby C. Revox adjusted the frequency range on delivery with many years of use in mind: when new the frequency curve went upwards a few dB at 15–20 kHz, aiming for flat response after 15 years of use and headwear to match.

A last step taken by Revox produced even more advanced cassette drives with electronic finetuning of bias and equalization

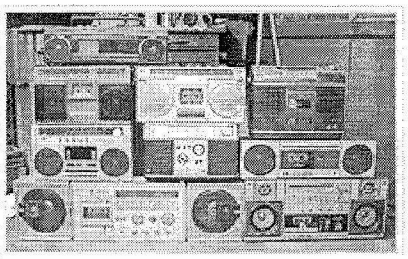
during recording. Revox also produced amplifiers, a very expensive FM tuner and a pickup with a special parallel arm mechanism of their own design. After releasing that product, Studer encountered financial difficulties. It had to save itself by folding its Revox-branch and all its consumer products (except their last reel to reel recorder the B77).

Note that while Nakamichi violated the tape recording standards to achieve the highest dynamics possible, producing non-compatible cassettes for playback on other machines, both Tandberg and Revox kept to the standards and produced cassettes which could be played back on other machines.

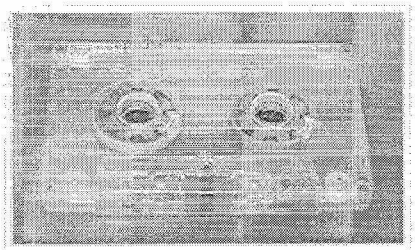
A third company, the well known Danish Bang & Olufsen, invented a special, improved system for improving headroom at high frequencies, to reduce tape saturation despite lower bias levels. This "head room extension method, HX" was called Dolby HX Pro in full and patented. Their finest machine with HX Pro was the Beocord 9000, which indeed performed excellently. However, this machine's transport possessed only a single capstan and a single drive motor - as opposed to multiple motors dual capstan arrangement. This did not make the B&O contender a popular choice with HiFi enthusiasts. Most of them favored Nakamichi, Tandberg or Revox instead, which were all more mechanically complex. HX Pro was adopted by other manufacturers including Technics, while Aiwa incorporated the technology into their top of the range personal stereos, as well as into their static machines.

As they became aimed at more casual users, fewer decks had microphone inputs. Dual decks became popular and incorporated into home entertainment systems of all sizes for tape dubbing. Although the quality would suffer each time a source was copied, there are no mechanical restrictions on copying from a record, radio, or another cassette source. Even as CD recorders are becoming more popular, some incorporate cassette decks for professional applications.

Another format that made an impact on culture in the 1980s was the radio-cassette, aka the ghetto-blaster or "boom box" (a name commonly used only in the USA), which combined the portable cassette deck with a radio tuner and speakers capable of producing significant sound levels. These devices became synonymous with urban youth culture in entertainment, which led to the somewhat derisive nickname "ghetto blaster."


An assortment of radio-cassette players, aka ghetto-blasters or "boomboxes"

Applications for car stereos varied widely. Auto manufacturers in the U.S. would typically fit a cassette slot into their standard large radio faceplates. Europe and Asia would standardize on DIN and double DIN sized faceplates. In the 1980s, a high end installation would have a Dolby AM/FM cassette deck, and they rendered the 8-track cartridge obsolete in car installations because of space, performance and audio quality. As the cost of building CD players declined, many manufacturers offered a CD player, but some cars, especially those targeted at older drivers still offer the option of a cassette player, either by itself, or sometimes in combination with a CD slot. In fact, the 2009 Lexus ES 350 still comes with a cassette player as standard equipment. The newest cars are not often designed to accommodate cassette players, but the auxiliary jack advertised for MP3 players can also be used with portable cassette players.

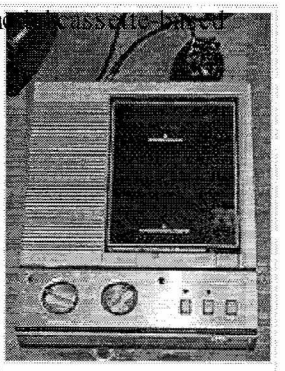

A head cleaning cassette

Although the cassettes themselves were relatively durable, the players required regular maintenance to perform properly. Head cleaning may be done with long swabs, or cassette-shaped devices that could be inserted into a tape deck to polish the heads and remove smudges and dirt. Similarly shaped demagnetizers used magnets to degauss the deck, which kept sound from becoming distorted. A common mechanical problem occurred when a worn-out or dirty player rotated the supply spool faster than the take-up spool or failed to release the heads from the tape upon ejection. This would cause the magnetic tape to be fed out through the bottom of the cassette and become tangled in the mechanism of the player. In these cases the player was said to have "eaten" the tape, and it often destroyed the playability of the cassette altogether, and resulted in the common sight of tangled tape on the side of the road.[36] Cutting blocks, analogous to those used for open reel 1/4" tape were readily available,though mainly used for retrieving valued recordings, could be used to remove the damaged portion of, or repair the break in the tape. Creation of compilations was usually by re-recording rather than splicing sections of songs because of the much smaller tape area.

Applications

Audio

The Compact Cassette was originally intended for use in dictation machines. In this capacity, some later-model cassette-based dictation machines could also run the tape at half speed ($^{15}/_{16}$ in/s) as playback quality was not critical. The Compact Cassette soon became a popular medium for distributing prerecorded music—initially through The Philips Record Company (and subsidiary labels Mercury and Philips in the U.S.). As of 2009, one still finds cassettes used for a variety of purposes such as journalism, oral history, meeting and interview transcripts and so on. However, they are starting to give way to Compact Discs and more "compact" digital storage media.



A dual compact cassette tape based Panasonic answering machine

The Compact Cassette quickly found use in the commercial music industry. One artifact found on some commercially produced music cassettes was a sequence of test tones, called SDR (Super Dynamic Range, also called XDR, or eXtended Dynamic Range) soundburst tones, at the beginning and end of the tape, heard in order of low frequency to high. These were used during SDR/XDR's duplication process to gauge the quality of the tape medium. Many consumers objected to these tones since they were not part of the recorded music.[37]

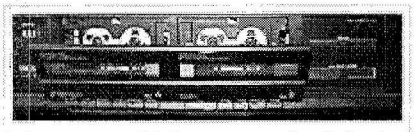
Home studio

In the 1980s, Tascam introduced the Portastudio line of four and eight-track cassette recorders for home studio use.

In the simplest configuration, rather than playing a pair of stereo channels of each side of the cassette, the typical "portastudio" used a four-track tape head assembly to access four tracks on the cassette at once (with the tape playing in one direction). Each track could be recorded to, erased or played back individually, allowing musicians to overdub themselves and create simple multitrack recordings easily, which could then be mixed down to a finished stereo version on an external machine. To increase audio quality in these recorders, the tape speed was sometimes doubled to 3 3/4 inches per second in comparison to the standard 1 7/8 ips; additionally, dbx, Dolby B or Dolby C noise reduction provided compansion (compression of the signal during recording with equal and opposite expansion of the signal during playback), which yields increased dynamic range by lowering the noise level and increasing the maximum signal level before distortion occurs. Multi-track cassette recorders with built-in mixer and signal routing features ranged from easy-to-use beginner units up to professional-level recording systems.[38]

Although professional musicians typically only used multitrack cassette machines as "sketchpads," Bruce Springsteen's "Nebraska" was recorded entirely on a four-track cassette tape.

Home dubbing



An opened Magnavox dual deck recorder with high-speed dubbing

Most compact cassettes were sold blank and used for recording (dubbing) the owner's records (as backup, to play in the car, or to make mixtape compilations), their friends' records or music from the radio. This practice was condemned by the music industry with such alarmist slogans as "Home Taping Is Killing Music". However, many claimed that the medium was ideal for spreading new music and would increase sales, and strongly defended at least their right to copy their own records onto tape. For a limited time in the early 1980s Island Records sold chromium dioxide "One Plus One" cassettes that had an album prerecorded on one side and the other was left blank for the purchaser to use. Cassettes were also a boon to people wishing to tape concerts (unauthorized or authorized) for sale or trade, a practice tacitly or overtly encouraged by many bands with a more counterculture bent such as the Grateful Dead. Blank Compact Cassettes also were an invaluable tool to spread the music of unsigned acts, especially within tape trading networks.

Various legal cases arose surrounding the dubbing of cassettes. In the UK, in the case of CBS Songs v. Amstrad (1988), the House of Lords found in favor of Amstrad that producing equipment that facilitated the dubbing of cassettes, in this case a high-speed twin cassette deck that allowed one cassette to be copied directly onto another, did not constitute the infringement of copyright.[39] In a similar case, a shop owner who rented cassettes and sold blank tapes was not liable for copyright infringement even though it was clear that his customers were likely dubbing them at home.[40] In both cases, the courts held that manufacturers and retailers could not be held accountable for the actions of consumers.

As an alternative to home dubbing, in the late 1980s, the Personics company installed booths in record stores across America which allowed customers to make personalized mixtapes from a digitally-encoded back-catalogue with customised printed covers.

Data recording

The Hewlett Packard HP 9830 was one of the first desktop computers in the early 1970s to use automatically controlled cassette tapes for storage. It could save and find files by number, using a clear leader to detect the end of tape. These would be replaced by specialized cartridges such as the 3M DC-series. Many of the earliest microcomputers implemented the Kansas City standard for digital data storage. Most home computers of the late 1970s and early 1980s could use cassettes for data storage as a cheaper alternative to floppy disks, though users often had to manually stop and start a cassette recorder. Even the first version of the IBM PC of 1981 had a cassette port and a command in its ROM BASIC programming language to use it. However, this was seldom used, as even then floppy drives had become commonplace in high-end machines.

A C2N Datassette recorder for Commodore computers

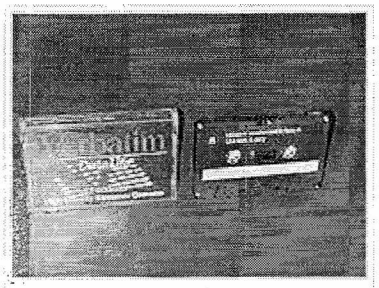
The typical encoding method for computer data was simple FSK which resulted in typical data rates of 500 to 2000 bit/s, although some games used special faster loading routines, up to around 4000-bit/s. A rate of 2000-bit/s equates to a capacity of around 660 kilobytes per side of a 90-minute tape.

Among home computers that primarily used data cassettes for storage in the late 1970s were Commodore PET (early models of which had a cassette drive built-in), TRS-80 and Apple II, until the introduction of floppy disk drives and hard drives in the early 1980s made cassettes virtually obsolete for day-to-day use in the US. However, they remained in use on some portable systems such as the TRS-80 Model 100 line until the early 1990s. Due to the high price of disks, cassettes also remained the primary data storage medium for 8-bit computers, such as the Commodore 64, ZX Spectrum and Amstrad CPC 464, in many countries (for example, the UK, where 8-bit software was mostly sold on cassette until that market disappeared altogether in the early 1990s.)

German-made cassettes sold for computer data recording, circa 1980

In some countries, including the United Kingdom, Poland, Hungary and the Netherlands, audio cassette data storage was so popular that some radio stations would broadcast computer programs that listeners could record onto cassette and then load into their computer.[41] See BASICODE.

The use of better modulation techniques like QPSK or those used in modern modems, combined with the improved bandwidth and signal to noise ratio of newer cassette tapes, allowed much greater capacities (up to 60 MB) and speeds (10–17 kB/s for data rate) on each cassette. They found use during the 1980s in data loggers for scientific and industrial equipment.


An example of a streamer cassette, used exclusively for data storage

The audio cassette was also adapted into what is called a streamer cassette, a version solely dedicated for data storage, and used chiefly for hard disk backups and other types of data. Streamer cassettes look almost exactly the same as a standard cassette, with the exception of having a notch about 1/4 inch wide and deep situated slightly off-center at the top edge of the cassette. Streamer cassettes also have a re-usable write-protect tab on only one side of the top edge of the cassette, with the other side of the top edge having either only an open rectangular hole, or no hole at all. This is due to the whole 1/8 inch width of the tape loaded inside being used by a streamer cassette drive for the writing and reading of data, hence only one side of the cassette being used. Streamer cassettes can hold anywhere from 50 to 160 megabytes of data.

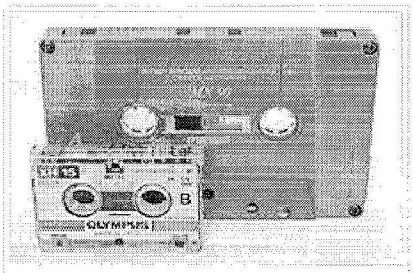
Successors

Elcaset was a short-lived audio format created by Sony in 1976 that was about twice the size, using larger tape and a faster recording speed. Unlike the original cassette, the Elcaset was designed from the outset for sound quality. It was never widely accepted as the quality of standard cassette decks rapidly approached high fidelity.

Technical development of the cassette effectively ceased when digital recordable media such as DAT and MiniDisc were introduced in the late 1980s and early 1990s. Anticipating the switch from analog to digital, major companies such as Sony shifted their focus to new media.[42] In 1992, Philips introduced the Digital Compact Cassette (DCC), a DAT-like tape in the same form

Size comparison of Elcaset (left) with standard Compact Cassette

factor as the compact audio cassette. It was aimed primarily at the consumer market. A DCC deck could play back both types of cassettes. Unlike DAT, which was accepted in professional usage because it could record without lossy compression effects, DCC failed in both home and mobile environments, and was discontinued in 1996.[43]


A Compact Cassette and a microcassette

The microcassette has in many cases supplanted the full-sized audio cassette in situations where voice-level fidelity is all that is required, such as in dictation machines and answering machines. Even these, in turn, are starting to give way to digital recorders of various descriptions.[44] Since the rise of cheap CD-R discs, and flash memory-based digital audio players, the phenomenon of "home taping" has effectively switched to recording to Compact Disc or downloading from commercial or music sharing websites.[45]

Because of consumer demand, the cassette has remained influential on design over a decade after its decline as a media mainstay. As the Compact Disc grew in popularity, cassette-shaped audio adapters were developed to provide an economical and clear way to obtain CD functionality in vehicles equipped with cassette decks. A portable CD player would have its analog line-out connected to the adapter, which in turn fed the signal to the head of the cassette deck. These adapters continue to function with MP3 players as well, and are generally more reliable than the FM transmitters that must be used to adapt CD players to MP3s. MP3 players shaped as audio cassettes have also become available, which can be inserted into any tape player and communicate with the head as if they were normal cassettes.[46][47]

See also

- Cassette culture
- Cassette single
- Compact Disc player
- Digital cassettes
- 8-track cartridge
- Elcaset
- Electronic journalism
- Home Taping Is Killing Music
- List of audio formats
- Microcassette
- Minicassette
- Mixtape
- Pocket Rockers
- PXL-2000
- Receiver (radio)
- VHS

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External links

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After retiring the floppy disk in March, Sony has halted the manufacture and distribution of another now-obsolete technology: the cassette Walkman, the first low-cost, portable music player.

The final batch was shipped to Japanese retailers in April, according to IT Media. Once these units are sold, new cassette Walkmans will no longer be available through the manufacturer.

The first generation Walkman (which was called the Soundabout in the U.S., and the Stowaway in the UK) was released on July 1, 1979 in Japan.

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Although it later became a huge success, it only sold 3,000 units in its first month. Sony managed to sell some 200 million iterations of the cassette Walkman over the product line's 30-year career.

Somewhat ironically, the announcement was delivered just one day ahead of the iPod's ninth anniversary on October 23, although the decline of the cassette Walkman is attributed primarily to the explosive popularity of CD players in the '90s, not the iPod.

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