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A Profile of Dolby Laboratories: An Effective Model for Leveraging Intellectual Property

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I. INTRODUCTION

¶1 The story of Dolby Laboratories, Inc. (“Dolby Labs”) is in many ways the story of Ray Dolby.¹ By all accounts, Ray Dolby is the consummate engineer and inventor who created and sustained a thirty-seven year dynasty in an industry characterized by rapid development. Ray Dolby, an electrical engineer and physicist, helped develop the first consumer VCR while still a college student working part-time at Ampex Corporation.² Although founded in London, Dolby Labs was established as a New York corporation and then relocated its headquarters to San Francisco, California in 1976.³ For the next twenty-five years, almost every innovation in analog tape noise reduction would originate from the company’s San Francisco and London locations. Through his mastery of leveraging intellectual property (“IP”), Ray Dolby built alliances with the recording industry, reproduction manufacturers, and consumer electronics manufacturers that arguably exceeded Microsoft[®] Windows[®] dominance in the computer industry.⁴ Even today, “[t]he most popular analogue noise reduction system [in] tapes is the Dolby[®] noise reduction (“Dolby[®] NR”).”⁵ Virtually all cassette players, from the cheapest portables to

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¹ Dolby Labs, *A History of Dolby Laboratories: The Company’s Founding*, at <http://www.dolby.com/company/is.ot.0009.History.html> (last visited Feb. 2, 2004).

² *Id.*

³ *Id.*; see also Dolby Labs, *Commercializing the Dolby System*, at <http://www.dolby.com/company/les-ih.html> (last visited Feb. 9, 2004).

⁴ For example, virtually all tape recorders on the market with noise reduction use Dolby technology. In contrast, there are many competitive personal computer operating systems available, including Microsoft Windows, Apple OS2, Linux, etc.

⁵ Tamás Báko, *Physical and Analog Noise Reduction Techniques*, at <http://www.mit.bme.hu/~bako/zaozeng/chapter3.htm> (last visited Feb. 2, 2004).

high-end audiophile home systems and professional decks contain one or more forms of Dolby® NR.⁶

In the early 1990s, Ray Dolby recognized that technology was shifting from analog tape to digital audio and video. This perspective will address how Dolby Labs leveraged its intellectual capital to create worldwide audio standards for digital broadcasts and digital video disks (“DVD”).⁷ The perspective will begin by providing background about the creation of Dolby Labs, followed by a brief description of the technology that created the Dolby “Empire”. Lastly, this perspective will outline the commercial applications used by Dolby Labs, under the direction of Ray Dolby, to capitalize on its technology.

II. HOW NOISE REDUCTION WORKS

Understanding how Noise Reduction (“NR”) works requires an understanding of what causes “noise” on analog tapes. Analog tapes record sound by magnetizing microscopic iron particles that are imbedded in the tape.⁸ Random particles in the tape create a high-frequency hiss.⁹ In louder recorded passages, the volume of the recorded signal covers the hiss.¹⁰ However, in softer passages, or silent spots between music (or when spoken words are recorded), the hiss is more noticeable.¹¹ This hiss increases during multi-track recording.¹²

Dolby® NR systems use electronic circuitry to pre-emphasize high frequencies before they are recorded to make them louder than normal (i.e., louder than the hiss).¹³ Then, during playback, Dolby® NR systems reverse the process to lower the boosted parts back to normal.¹⁴ This process restores the music to its normal audio levels while reducing the noise. “Unlike simple noise filters, Dolby® NR systems make no attempt to remove noise once it has been mixed in with the music. Rather, it prevents noise from

⁶ Consumer Guide, *Single-Transport Cassette Decks (Reviews)*, at <http://products.consumerguide.com/cp/electronics/background/index.cfm/id/11221.htm> (last visited Feb. 2, 2004).

⁷ See Exhibit #1.

⁸ Marshall Brain, *How Tape Recorders Work*, in *How Stuff Works*, at <http://electronics.howstuffworks.com/cassette4.htm> (last visited Feb. 2, 2004).

⁹ Carl R. Nave, *Noise Reduction in Tape Recording*, in *Hyperphysics*, at <http://hyperphysics.phy-astr.gsu.edu/hbase/audio/tape4.html#c2> (last visited Feb. 8, 2004) (on file with the Northwestern Journal of Technology and Intellectual Property).

¹⁰ Carl R. Nave, *Noise Reduction in Tape Recording*, in *Hyperphysics*, at <http://hyperphysics.phy-astr.gsu.edu/hbase/audio/tape5.html#c2> (last visited Feb. 8, 2004) (on file with the Northwestern Journal of Technology and Intellectual Property); see also Dolby Labs, *A History of Dolby Laboratories: The Decision to Manufacture Professional Equipment*, at <http://dolbysearch.dolby.com/company/is.ot.0009.history.02.html> (last visited Mar. 28, 2004); John H. Lienhard, *Episode No. 721: Ray Dolby, Engines of Our Ingenuity*, at <http://www.uh.edu/engines/epi721.htm> (last visited Apr. 1, 2004).

¹¹ Lienhard, *supra* note 10.

¹² Interview with Kevin Smith, Music Writer and Producer (Nov. 2003). Smith, a musician, writer, and producer who has been in the music recording industry for years, has written and produced nationally used jingles and contributed to a Grammy nominated album.

¹³ See Exhibit #2 for a technical depiction of Dolby® NR.

¹⁴ Nave, *Noise Reduction in Tape Recording*, *supra* note 10 (on file with the Northwestern Journal of Technology and Intellectual Property).

being added to the music as it is being recorded in the first place.”¹⁵ Ray Dolby, through Dolby Labs, patented this technology and began a calculated process of selling this technology to recording studios.¹⁶

III. DOLBY LABORATORIES’ COMMERCIAL APPLICATION

¶5 Dolby Labs capitalized on its technological innovations by advertising the benefits of its technology to the music industry.¹⁷ In the early days of sound recording, studios recorded live music directly to a master disk.¹⁸ While effective at preserving the quality of sound, this method made it virtually impossible to correct errors without starting the entire song over again.¹⁹ Also, technology for recording multiple tracks (i.e., using separate channels for instruments and vocals recorded at different times) was not available.²⁰ The creation of analog tape enabled multi-track recording and, more importantly, the ability to correct a portion of a recording by rewinding the tape and then recording over the same section.²¹ Studios, however, were initially slow to transition to using analog tapes because of the hiss.²² Consequently, they would often re-record the entire song on a new disk, which wasted time and resources.²³

¶6 Dolby Labs marketed their patented technology as a method for enabling recording studios to be more efficient and creative.²⁴ With Dolby[®] technology, recording studios could attempt different musical and lyrical ideas and simply erase those they did not want. One by one, London recording studios began to use Dolby[®] NR systems in their recordings.²⁵ By 1972, forty-two London studios were using Dolby[®] equipment to create their master tapes.²⁶ Shortly thereafter, recording studios in the United States began to see the value of using Dolby[®] NR, and Dolby Labs opened their San Francisco office.²⁷

¹⁵ Beoworld, at <http://www.beoworld.co.uk/dolby.htm> (last visited Nov. 17, 2003) (on file with the Northwestern Journal of Technology and Intellectual Property); see also Exhibit #2.

¹⁶ U.S. Patent No. RE30,468 (issued Dec. 30, 1980); see Dolby Labs, *A History of Dolby Laboratories: The Decision to Manufacture Professional Equipment*, supra note 10.

¹⁷ See Dolby Labs, *A History of Dolby Laboratories: The Decision to Manufacture Professional Equipment*, supra note 10.

¹⁸ Steven E. Schoenherr, *Tainter Lateral-cut Electroplate Record*, at <http://history.acusd.edu/gen/recording/electroplate.html> (last visited Feb. 8, 2004).

¹⁹ *Id.*

²⁰ See Second Sufis, *Second Sufis Technical Manual: Music and Technology*, at <http://www.secondsufis.com/techman.html> (last visited Mar. 4, 2004).

²¹ Dolby Labs, *History of Dolby Laboratories: The Decision to Manufacture Professional Equipment*, supra note 10; Marshall Brain, *How Tape Recorders Work: The Tape*, at <http://electronics.howstuffworks.com/cassette1.htm> (last visited Feb. 12, 2004).

²² See Dolby Labs, *Commercializing the Dolby System*, at <http://www.dolby.com/company/les-ih.html> (last visited Feb. 9, 2004); see also Dolby Labs, *A Chronology of Dolby Laboratories 1965 to 1969, Dolby Laboratories, Inc.*, at http://www.dolby.com/company/chronology1965_1969.html (last visited Feb. 8, 2004).

²³ Interview with Smith, supra note 12.

²⁴ See Dolby Labs, *Commercializing the Dolby System*, supra note 22.

²⁵ *Id.*

²⁶ Dolby Labs, *A Chronology of Dolby Laboratories 1965 to 1969, Dolby Laboratories, Inc.*, supra note 22.

²⁷ See supra note 1; see Dolby Labs, *A History of Dolby Laboratories: The Decision to Manufacture Professional Equipment*, supra note 16.

IV. DOLBY'S BUSINESS MODEL

¶17 Dolby Labs' success in its quest to "pursue genuine, long term improvements in sound quality" has been achieved through the diligent use of several key concepts in most, if not all, of the company's markets.²⁸ These concepts include a focus on innovation, a unique business strategy, and the use of intellectual property to create brand awareness resulting in long-term value transference.

¶18 First, the success of Dolby Labs can be attributed to the persistent use of several key overriding principles. These principles include a philosophy not to manage the business for growth's sake and a focus on innovation and patent protection.²⁹ During a rare interview in 1986, Ray Dolby clearly articulated one of his general principles when he said, "I don't go into any area that I can't get a patent on, [otherwise] you quickly find yourself manufacturing commodities."³⁰ This focus on patent protection has led to the company's procurement of 780 patents in twenty-eight countries and Dolby Labs' success is enabled by an intense focus on innovation.³¹

¶19 Unlike companies that normally "try to protect themselves by keeping technology static," Dolby Labs maintains its edge by taking the lead in generating the ideas that will ultimately displace its own technologies.³² Through this innovation, the company consistently creates products that are easy to use and compatible with both new and existing technologies.³³ For example, after inventing Dolby[®] technology for audio tapes, Ray Dolby invented switch-able tape players that could play either Dolby[®] NR or regular tapes at the push of a button.³⁴ In addition, the Federal Communication Commission ("FCC") adopted Dolby Labs' digital television technology as the national standard partly because of its compatibility with existing spectrum technology.³⁵

¶10 Continuous innovation also ensures that Dolby Labs rarely goes beyond its own laboratories for technology. For example, in 1998, when the company announced that it would license compression technology directly from another audio technology developer, Ramzi Haidamus, then the Dolby Digital Technology Licensing Manager,³⁶ pointed out that this was only the second time that Dolby Labs had gone outside for technology.³⁷ That same year, Dolby Labs partnered with Lake Technology in a licensing agreement

²⁸ Dolby Labs, *Dolby Laboratories Today*, at <http://www.dolby.com/company/is.ot.0011.dolbytoday.html> (last visited Feb. 8, 2004).

²⁹ Richard Halstead, *Silence Golden for SF-Based Dolby*, S.F. BUS. J., Jun. 23, 1986; Lienhard, *supra* note 10.

³⁰ Halstead, *supra* note 29.

³¹ Dolby Labs, *Worldwide Statistics*, at <http://www.dolby.com/stats> (last visited Feb. 9, 2004); *see* Lienhard, *supra* note 10.

³² Lienhard, *supra* note 10.

³³ David Sims, *Fast Forward: Ray Dolby: The Edison of His Generation*, 15-2 REEL WEST, Jun.-Jul. 2000, at http://www.reelwest.com/magazine/archives/vol15_2/fast_forwr.html (last visited Feb. 2, 2004).

³⁴ Lienhard, *supra* note 10.

³⁵ *See In re Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service*, MM Docket No. 87-268, FCC 96-493, ¶53 (Dec. 17, 1996), available at 1996 WL 741383.

³⁶ Mr. Haidamus now heads Dolby's subsidiary, Via Licensing, as its General Manager. Press Release, Dolby Laboratories, *Dolby Laboratories Launches New Patent-Licensing Subsidiary* (Nov. 25, 2002), available at http://www.dolby.com/press/pr_pr_0211_VIA.html (last visited Feb. 2, 2004).

³⁷ The first time was for technology from Bang & Olufsen. *See* Jon Iverson & Barry Willis, *Audio for DVD Seminar*, STEREOPHILE, Jun. 29, 1998.

giving Dolby Labs access to Dolby® Headphone technology.³⁸ Dolby’s subsequent three million dollar investment in Lake Technology was the first time the company had ever taken an equity stake in a strategic relationship.³⁹

¶11 Second, in conjunction with Ray Dolby’s business principles, Dolby Labs adheres to a clearly articulated business strategy. As early as 1967, Ray Dolby adopted a two-pronged business strategy for creating brand awareness: (i) developing and manufacturing equipment for the commercial/professional market and (ii) licensing the same technology for consumer equipment.⁴⁰ Ray Dolby’s motivations behind these two approaches are simple. He believed that Dolby Labs could best provide the “hands-on, highly customized approach” that would benefit the “smaller, but very demanding professional market.”⁴¹ Ray Dolby also believed that “licensing the company’s technologies would lead to higher and more consistent revenues from manufacturers, would build trust in Dolby Labs as a partner, and would enable the company to grow while remaining independent of . . . external money sources.”⁴²

¶12 Ray Dolby’s licensing program consisted of several innovative components. First, he did not charge individual consumers for using an audio product that has Dolby® technology.⁴³ In a 2001 interview, Ray Dolby was asked why “[i]nstead of charging a royalty on the music, or on the chips, [he] opted to license [his] technology to manufacturers of tape decks and insisted they must use the Dolby® name on any product that uses Dolby® technology.”⁴⁴ He responded that it would have been difficult to get integrated circuit companies to pay royalties—something they had never done.⁴⁵ It would also been difficult to collect royalties by monitoring cassette sales around the world.⁴⁶ Licensing in this way, allowed Dolby Labs to more easily monitor the manufacturers and thereby remain unaffected by illegally dubbed or pirated tapes as they still needed to be played on Dolby®-equipped decks for optimal sound quality.⁴⁷

¶13 As a second component of Dolby Labs’ consumer market licensing strategy, Dolby Labs “cut royalties to the bone” and set fees that were “so cheap it wasn’t worth the trouble of dodging them.”⁴⁸ Third, Dolby Labs charged every licensee the same rate.⁴⁹

³⁸ Press Release, Dolby Laboratories, Dolby Laboratories Invests in Lake Technology (Dec. 11, 2001), available at http://www.dolby.com/press/pa_pr_0112_LakeDraftRelease.html (last visited Feb. 2, 2004).

³⁹ *Id.*

⁴⁰ Sims, *supra* note 33.

⁴¹ Press Release, Dolby Laboratories, Dolby Surpasses Major Milestone: One Billion Licensed Products Sold (May 15, 2002), available at http://www.dolby.com/press/co_pr_0205_onebillion.html (last visited Feb. 2, 2004).

⁴² *Id.*

⁴³ Alex Grove, *Ray Dolby Sounds Off: Ray Dolby Leads Dolby Laboratories into New Markets*, RED HERRING, Jan. 1999, at <http://redherring.com> (last visited Feb. 2, 2004) (on file with Northwestern Journal of Technology and Intellectual Property).

⁴⁴ Barry Fox, *Loud and Clear*, 169 NEW SCIENTIST 46 (Feb. 10, 2001), available at <http://archive.newscientist.com/secure/article/article.jsp?rp=1&id=mg16922775.100> (last visited Feb. 2, 2004) (password required to access document) (on file with Northwestern Journal of Technology and Intellectual Property).

⁴⁵ *Id.*

⁴⁶ *Id.*

⁴⁷ *See id.*

⁴⁸ Lienhard, *supra* note 10.

⁴⁹ Grove, *supra* note 43.

This licensing approach was eventually adopted by Dolby Labs' competitors.⁵⁰ Finally, Dolby worked closely with its licensees, helping them eliminate common design mistakes and ensure high quality.⁵¹

¶14 Ray Dolby's early strategy is notable for several reasons. First, always an innovator, Ray Dolby rebelled against conventional wisdom of the time, which ultimately resulted in the company's cultivation of a successful licensing program inspiring "countless" other companies to adopt similar strategies.⁵² Second, Ray Dolby rejected funding from investment bankers who insisted he drop his licensing strategy before they invested in his struggling company.⁵³ To date, the company remains privately held.⁵⁴ This independence has allowed Dolby Labs to "pursue goals on its own timetable, without the constant distraction of shareholder expectations" and is thought to be a critical factor in the company's success.⁵⁵ Ironically, the success of Ray Dolby's "ill-advised" licensing program generated consistent revenues and allowed the company to remain independent of external money sources—rare for a large technology company.⁵⁶ Lastly, this two-prong approach allows Ray Dolby to "serve the entire 'chain' of sound-related activities."⁵⁷

¶15 Finally, Dolby Labs has long recognized that "trademarks are one of [its] most valuable assets."⁵⁸ Currently, the company has 771 trademark registrations in ninety-six countries and consistently places its mark on every product.⁵⁹ As a result, the awareness of the Dolby brand name grew as the use of the company's products grew. The company generously allows its licensees to use its trademarks but takes active steps to promote their proper use, including dedicating a portion of their website to the appropriate use of the Dolby trademark.⁶⁰ In addition, Dolby Labs demonstrated its willingness to protect the Dolby name and trademark when, in 1986, the company filed for and was granted a preliminary injunction against a musician who used the stage name "Thomas Dolby."⁶¹

V. LEVERAGING INTELLECTUAL CAPITAL TO BUILD AN EMPIRE

¶16 Dolby Labs took its business strategy into several markets, including cassette decks, movie theaters, home theaters and digital television sets. This effective business strategy enabled Dolby Labs to dominate in each of these respective markets. Dolby[®]

⁵⁰ *Id.*

⁵¹ *Id.*

⁵² Sims, *supra* note 33; *see* Dolby Labs Press Release, *supra* note 41.

⁵³ *See* Dolby Labs Press Release, *supra* note 41.

⁵⁴ Dolby Labs, *Dolby Laboratories Today*, *supra* note 28.

⁵⁵ Sims, *supra* note 33. Ray Dolby is the company's sole shareholder and board member, although he has taken recent steps to provide stock options to Dolby shareholders. *See* Chris Forrester, *Ray Dolby: IPO for Dolby Labs*, in ADVANCED-TELEVISION.COM, at <http://db.advanced-television.com/4dcgi/Privilege%20Pages/interviews/dolby.html> (last visited Mar. 4, 2004).

⁵⁶ *See* Dolby Labs Press Release, *supra* note 41; Sims, *supra* note 33.

⁵⁷ *See* Dolby Labs Press Release, *supra* note 41.

⁵⁸ Dolby Labs, *Trademarks*, at <http://www.dolby.com/tm/> (last visited Feb. 2, 2004).

⁵⁹ *See* Dolby Labs, *Using Dolby Trademarks*, at http://www.dolby.com/tm/info/Using_Dolby_TMs.html#General (last visited Feb. 2, 2004); Dolby Labs, *Worldwide Statistics*, at <http://www.dolby.com/stats> (last visited Feb. 2, 2004).

⁶⁰ Dolby Labs, *Using Dolby Trademarks*, *supra* note 59.

⁶¹ *Dolby v. Robertson*, 654 F.Supp. 815 (N.D.Cal. 1986).

technology has become the premiere technology for cassette decks and movie theaters, and Dolby Labs is making similar strides in the home theater and digital television markets.

A. Cassette Decks

¶17 In the mid 1960s, the music industry began to introduce consumer-friendly open-reel tape machines.⁶² However, it was the creation of the audiocassette that led to Dolby Labs' dominance. Dolby[®] NR was used to create sound fidelity in cassettes that was close to a newly pressed record.⁶³ By 1977, cassettes became the most popular music format, with their sales equaling then exceeding that of records.⁶⁴

¶18 Nevertheless, a problem for consumers arose: if a tape was pre-recorded using Dolby[®] NR, then playback on a non-Dolby[®]-equipped tape player meant that pre-emergent compressed high frequencies were too loud.⁶⁵ As indicated on Cambridge Soundworks' website, "that meant it required encoding on the professional end and decoding on the consumer level," which created an incredible network externality opportunity.⁶⁶ Cambridge Soundworks continues: "This was a monumental moment in the electronics business as it helped establish the business principle of licensed technology."⁶⁷ In an act of IP leveraging that Ray Dolby would later repeat again and again, Dolby Labs began to license its technology to tape deck manufacturers.⁶⁸ Since patented Dolby[®] technology was used to create NR, Dolby[®] technology was best suited for the playback machine. Like the present day "Intel inside" for personal computers, Dolby used ingredient marketing to become synonymous with NR, which came standard on every brand of tape player.⁶⁹

¶19 Beginning in the mid-1970s and continuing through the 1980s, audiocassettes became the preferred medium for commercial music because they required less care than albums, were more easily distributed, and from the consumer viewpoint, enabled a portability that albums could not.⁷⁰ Cassette decks were in portable radios, "boom

⁶² Marshall Brain, *Cassette*, in How Stuff Works, at <http://electronics.howstuffworks.com/cassette4.htm> (last visited Feb. 2, 2004).

⁶³ For a picture of one of the first consumer tape decks to use Dolby[®] NR, with the Dolby trademark on its front surface, see Dolby Labs, *A Chronology of Dolby Labs 1970 to 1979*, at http://www.dolby.com/company/chronology1970_1979.html (last visited Feb. 11, 2004).

⁶⁴ Team One, Sociology 143, Duke University, *Music CD Industry: The History of Recorded Music*, at <http://www.soc.duke.edu/~s142tm01/history4.html> (last visited March 3, 2004).

⁶⁵ Nave, *Noise Reduction in Tape Recording*, *supra* note 10.

⁶⁶ Cambridge Soundworks, *Dolby Laboratories: A Short History*, at http://www.hifi.com/store/category.cgi?category=hmc_library_staff8 (last visited Feb. 2, 2004).

⁶⁷ *Id.*

⁶⁸ See Dolby Labs, *A Chronology of Dolby Labs 1970 to 1979*, *supra* note 63.

⁶⁹ "Ingredient marketing" is a process in which a company markets an established ingredient that is contained within its own product as a part of its overall selling strategy. Examples of ingredient marketing include computer manufacturers stating "Intel Inside"; Diet Pepsi placing the NutraSweet logo on its cans to indicate its product contains a better sweetener than saccharine; household cleaners including the Clorox logo on packaging, etc. Dolby Labs does this when it requires manufacturers to put the appropriate Dolby logo on a product. See Joseph Arthur Rooney, *Branding: A Trend for Today and Tomorrow*, 4 J. PRODUCT & BRAND MANAGEMENT 48-55, 48 (1995), available at http://www.brandingkorea.com/file_upload/branding_trend.pdf (last visited Mar. 3, 2004).

⁷⁰ Recording Industry Association of America (RIAA), *Audio Technologies: History of Recordings*, at <http://www.riaa.com/issues/audio/history.asp#vinyl> (last visited March 3, 2004).

boxes,” and automobiles. All of these devices carried the Dolby trademark.⁷¹ By 1984, the Sony[®] Walkman[®] personal tape players also displayed the Dolby trademark.⁷²

B. Movies and Theaters

¶20 The application of Dolby[®] technology in movie soundtracks followed its application in records and audio tapes. In the 1970s, moviemakers were still using traditional soundtrack techniques, which had remained relatively unchanged since the 1930s.⁷³ “The tracks were optically printed along the edge of the film, but were noisy, of poor quality, and degraded a little every time the film was shown.”⁷⁴ Dolby Labs recognized an opportunity to enhance the moviegoers’ experience by applying its NR and frequency extension to this recording process.⁷⁵ In 1976, Dolby Labs seized this opportunity and entered the film industry.⁷⁶ *A Star Is Born* was the first film to use Dolby[®] Stereo with encoded surround effects.⁷⁷

¶21 Dolby Labs was to become the most recognized name in cinema sound.⁷⁸ *Star Wars* was released in 1977 using Dolby[®] Stereo⁷⁹, and won an Oscar for “Best Achievement in Sound.”⁸⁰ By December 1977, twelve films were recorded using Dolby[®] Stereo surround.⁸¹ By 1992, films released in Dolby[®] Stereo had won an incredible fifteen consecutive “Best Achievement in Sound” Academy Awards.⁸² In 1991, all films nominated in this category were encoded with Dolby[®] Stereo.⁸³

¶22 After Dolby[®] technology was used in movies, expansion into theaters was a natural extension. Dolby Labs began this process with George Lucas’s *Star Wars*.⁸⁴ In Dolby Labs’ first foray, the value of its trade name was transferred to certified-Dolby[®] theaters; thereby assuring moviegoers that the movies’ sound quality would be rich and full.

¶23 This new format and certification was an effective transference. Customers began looking for theaters that bore the Dolby trademark and many theater chains began to

⁷¹ Dolby Labs, *Commercializing the Dolby System*, at <http://www.dolby.com/company/les-ih.html> (last visited Feb. 20, 2004).

⁷² Dolby Labs, *Welcome to Dolby Laboratories*, at <http://www.dolby.com> (last visited Feb. 2, 2004).

⁷³ Alan Kraemer, *Two Speakers Are Better Than 5.1*, IEEE SPECTRUM (May 2001), at http://www.cs.huji.ac.il/~poastPC/docs/IEEE_Spectrum_Articles/vsound.html.

⁷⁴ *Id.*

⁷⁵ “Frequency extension,” enables a broader (wider) frequency spectrum than could be created in the older optical tracks, i.e., higher highs and lower lows. See Wild West Electronics, *D-E-F*, in Audio Glossary, <http://www.wildwestelectronics.net/def.html> (last visited Feb. 11, 2004).

⁷⁶ See Dolby Labs, *A Chronology of Dolby Labs 1970 to 1979*, *supra* note 63; Cambridge Soundworks, *supra* note 66.

⁷⁷ *Id.*

⁷⁸ Grove, *supra* note 43.

⁷⁹ Dolby[®] Stereo is an “optical soundtrack format introduced at Society of Motion Picture and Television Engineers (SMPTE) convention in Toronto.” Dolby Labs, *A Chronology of Dolby Laboratories 1970 to 1979*, *supra* note 63; see also Academy of Motion Picture Arts and Sciences, *The Academy Awards*, at <http://www.oscars.org> (last visited March 3, 2004).

⁸⁰ Dolby Labs, *A Chronology of Dolby Laboratories 1970 to 1979*, *supra* note 63.

⁸¹ Dolby Labs, *A Chronology of Dolby Laboratories: 1990 to 1999*, at http://www.dolby.com/company/chronology1990_1999.html (last visited Feb. 2, 2004).

⁸² *Id.*

⁸³ *Id.*

⁸⁴ *Id.*

incorporate the Dolby trademark in print advertisements.⁸⁵ Similarly, film producers highlighted their use of Dolby[®] technology in movies trailers.⁸⁶ As mentioned earlier, Dolby Labs provides cinemas with advertising and promotional guidelines for using its trademarks.⁸⁷

¶24 However, up to this point in time, theater stereo sound was still analog. Dolby would experience its first stumble by failing to anticipate the real impact of digital audio on movie theaters. Dolby Labs believed that analog sound recorded using Dolby[®] SR, their latest NR product, was superior to digital sound. It was convinced that Hollywood studios would not spend money to convert to digital sound.⁸⁸ However, Dolby Labs could not have been more wrong.

¶25 In 1990, entrepreneur/scientist Terry Beard, with funding from and in partnership with Steven Spielberg, Universal Pictures and other investors, created Digital Theater Systems[®] (DTS[™]). Spielberg's *Jurassic Park* (1993) was the first film released in DTS[™] on 876 screens.⁸⁹ By 2001, more than twenty thousand screens worldwide had incorporated DTS[™] playback systems.⁹⁰

¶26 Dolby Labs fell behind DTS[™] as the leading supplier of theater sound systems. Former Dolby Labs president Bill Mead said, "[DTS[™]] scared the hell out of Dolby."⁹¹ Dolby Labs quickly retrenched and began working on its own digital sound system and demonstrated its digital formats in 1991.⁹² In 1994, *Speed* was the first film to be released in Dolby[®] Digital ("DD").⁹³ From there, Dolby Labs marketed aggressively to motion picture studios with remarkable results. In 1995, 20th Century Fox, Paramount, and Warner Brothers each announced that all future releases would be in DD. By 1996, 4,000 theaters worldwide were equipped for DD.⁹⁴ In 1998, the number of theaters both in the US and worldwide that were equipped with DD surpassed those equipped for DTS[™].⁹⁵

¶27 Latecomer Sony Picture Studios introduced the more expensive Sony Dynamic Digital Sound[®] (SDDS[®]) in 1994 after Dolby Labs and DTS[™] were entrenched in the marketplace.⁹⁶ Sony's technology is based on eight channels, which they believed

⁸⁵ Michael Coate, *The Original First-Week Engagements of Star Wars*, THE 70MM NEWSLETTER (2003), available at http://www.in70mm.com/news/2003/star_wars/star_wars_1977.htm (last visited Mar. 7, 2004).

⁸⁶ *Id.*; see Dolby Labs, *Filmgoer FAQs*, at <http://www.dolby.com/tech/m.ot.0006.FilmgoerFAQ.html#q15> (last visited Mar. 7, 2004) (explaining that the Dolby and/or THX logos may appear on the same film marquee of advertisement.).

⁸⁷ Dolby Labs, ADVERTISING AND PROMOTIONAL GUIDELINES FOR CINEMAS (2000), available at <http://www.dolby.com/tm/info/AdPromoGuidelines.pdf> (last visited Mar. 7, 2004); Dolby Labs, *Information: Dolby Trademark Use in Digital Broadcasts 3*, available at http://www.dolby.com/trademark/co_in_0112_TrademarkUseInDigitalBroadcast.pdf (last visited Mar. 4, 2004).

⁸⁸ Halstead, *supra* note 29.

⁸⁹ DTS Online, *DTS Online*, at <http://www.dtsonline.com> (last visited Feb. 2, 2004).

⁹⁰ DTS Online, *Cinema*, at <http://www.dtsonline.com/cinema> (last visited Feb. 2, 2004).

⁹¹ Grove, *supra* note 43.

⁹² See Dolby Labs, *Chronology of Dolby Laboratories: 1990 to 1999*, *supra* note 81.

⁹³ *Id.*

⁹⁴ *Id.*

⁹⁵ Dolby Labs, *Screen Count: North America*, at <http://www.dolby.com/movies/SMPTE.NorthAmerica.html> (last visited Feb. 2, 2003); Dolby Labs, *Screen Count: Worldwide*, at <http://www.dolby.com/movies/SMPTE.Worldwide.html> (last visited Feb. 2, 2004).

⁹⁶ Thomas R. King, *Digital Sound Gets Star Turn In Hollywood*, WALL ST. J., Mar. 9, 1993, at B1.

provided even more discrete tracks and more panning.⁹⁷ Unfortunately the late arrival of SDDS[®] even forced Castle Rock Pictures, a Sony producer, to release two major movies using the rival DTS[™].⁹⁸ While Sony gathered some momentum, it never quite caught up with DD or DTS[™].⁹⁹

¶28 This preponderance of multiple digital formats was taking a toll on theater owners. The pricing for the digital formats ranged from US\$6,000 for DTS[™] to US\$14,000 for SDDS[®] while Dolby[®] Digital was priced at US\$10,000 per screen.¹⁰⁰ Notably, Dolby Labs reduced its pricing to that level from US\$20,000 in the first few years. Theater owners were increasingly trying to determine which format to use, were installing two of the three, or were installing different formats on different screens for more flexibility. Ron Reid of Cinemark USA, a 1,033-screen chain, said, “We’re trying to be on the cutting edge of technology, but I think that’s a lot to ask of exhibitors.”¹⁰¹

C. Home Theater and DVD

¶29 Once again, Dolby Labs’ intellectual capital, in the form of relations with the music and sound industry secured its competitive advantage in moving beyond quadrasonic sound. “Unlike the quadrasonic sound of the 1970s, Dolby[®] Surround quickly gained marketplace acceptance. For one thing, the multiple channel configuration and its ideal utilization it were firmly established within one industry (film) in advance of its introduction to another.”¹⁰² In no time, this applied to U.S.-based DVDs.

¶30 Dolby Labs leveraged the value that it had created in the movie/cinema market to the home theater market by continuing to utilize the business strategy of creating innovative ideas, developing brand awareness in a new innovation, and then transferring this value to another innovation. A home theater system is a home version of a cinema, typically, a combination of a large television and multiple speakers positioned in precise locations to provide a viewing experience similar to that experienced in a cinema.¹⁰³ There are usually at least five speakers in a home theater system.¹⁰⁴ Dolby Labs has created three home theater versions of cinema technology: Dolby[®] Surround (“DS”), Dolby[®] Surround ProLogic[®] (“DP”) and Dolby[®] Digital 5.1 (“DD5”).¹⁰⁵

¶31 DS is the consumer version of cinema theater surround sound, which provides a way to separate sound on four channels from VHS tapes, broadcast television shows and other analog sources.¹⁰⁶ DS encodes four channels of information (left, right, center, and

⁹⁷ Interview with Chris Carpenter, *On The Mixing Stage With SDDS/8 Channels* (Sept. 25, 1996), available at <http://www.sdds.com/pdfs/four.pdf> (last visited Feb. 2, 2004).

⁹⁸ King, *supra* note 96.

⁹⁹ See Dolby Labs, *Screen Count: North America*, *supra* note 95; See Dolby Labs, *Screen Count: Worldwide*, *supra* note 95.

¹⁰⁰ King, *supra* note 96.

¹⁰¹ *Id.*

¹⁰² Dolby Labs, *A History of Dolby Laboratories: Dolby Surround and Home Theater*, at <http://www.dolby.com/company/is.ot.0009.History.12.html> (last visited Mar. 4, 2003).

¹⁰³ Herb Greenberg, *Home Theater*, FORTUNE.COM, Dec. 1, 1997, at <http://www.fortune.com/fortune/articles/0,15114,379930,00.html> (last visited Feb. 2, 2004).

¹⁰⁴ Dolby Labs, *The Dolby Guide to Home Theater Sound*, at <http://www.dolby.com/ht/Guide.HomeTheater.0110.html#s1.1> (last visited Feb. 3, 2004).

¹⁰⁵ Fast Forward, *Ray Dolby: The Edison of His Generation*, 15 REEL WEST (May-Jul. 2000) at http://www.reelwest.com/magazine/archives/vol15_2/fast_forwrd.htm (last visited Feb. 2, 2004).

¹⁰⁶ Dolby Labs, *Home Theater*, at <http://www.dolby.com/ht> (last visited Feb. 2, 2004).

a single surround channel) on two regular stereo soundtracks.¹⁰⁷ The four original channels can be reconstructed via a DP decoder.

¶32 DP creates the home theater equivalent to the technology used in cinemas.¹⁰⁸ DP takes the four channels of surround sound created using DS and reproduces the sound in the home.¹⁰⁹ There is an additional fifth channel, which only reproduces low frequency sounds.¹¹⁰ Similarly, DD5 provides multi-channel surround sound for digital devices (i.e. DVDs, digital broadcast television and CDs).¹¹¹ At its introduction, DD5 placed a six-channel digital optical soundtrack in addition to a four channel audio track on cinema film.¹¹² The primary difference between DP and DD5 is that DD5 uses six channels to reproduce sound, while DP uses only five.¹¹³ Additionally, DD5 is more dynamic than DP technology because it is capable of handling a wider range of frequencies and is relatively immune to wear.¹¹⁴ Moreover, DD sound is more discrete than that of its analog counterparts.¹¹⁵

¶33 More recently, Dolby Labs introduced an improved decoding process called Dolby[®] Surround Pro Logic[®] II (“DPII”). DPII provides a listening experience similar to Dolby[®] Digital 5.1 by deriving five channels, including two full-range surround channels, not only from programs encoded in Dolby[®] Surround (such as movie videos), but also from regular stereo material (such as music CDs). The result is improved spatiality and more accurate localization of sounds on Dolby[®] Surround material, and an enveloping, lifelike sound field on regular stereo recordings. DPII is an improved version of DP, which provides more convincing three-dimensional sound.¹¹⁶

¶34 Dolby Labs utilized its innovations in the home theater market by licensing its DS, DP, DPII and DD technologies to consumer manufacturers. This is a strategy that proved to be profitable to Ray Dolby. In December 1995, Dolby[®] technology was selected by the National Television Standards Committee (“NTSC”) as the standard for surround sound on all NTSC DVDs.¹¹⁷ However, European Laserdiscs selected the MPEG-2 system for its Digital Video Broadcasting standard and was expected to do the same for European DVDs. This admittedly would “inhibit global traffic in pre-recorded discs.”¹¹⁸ However, Dolby Labs was still able to leverage its position as the standard for American DVDs, the largest number being produced, as making sense for Europe. When Europe decided to follow NTSC’s lead, Dolby[®] technology became the worldwide standard for

¹⁰⁷ *Id.*

¹⁰⁸ Michael Jones, *Surround Confusion*, at <http://www.audioenz.co.nz/2001/0404.html> (last visited Feb. 2, 2004)

¹⁰⁹ *Id.*

¹¹⁰ *Id.*

¹¹¹ *Id.*

¹¹² Dolby Labs, *The Evolution of Dolby Film Sound*, at <http://www.dolby.com/tech/mp.br.0102.EvolutionOfSound.html> (last visited Feb. 2, 2004)

¹¹³ See Dolby Labs, *Home Theater*, *supra* note 106.

¹¹⁴ See Dolby Labs, *The Evolution of Dolby Film Sound*, at <http://www.dolby.com/tech/mp.br.0102.EvolutionOfSound.html> (last visited Mar.3, 2004).

¹¹⁵ Greenberg, *supra* note 103.

¹¹⁶ Dolby Labs, *Technologies*, at <http://www.dolby.com/lic/technologies> (last visited Feb. 2, 2004).

¹¹⁷ See Dolby Labs, *Home Theater*, *supra* note 106.

¹¹⁸ Peter Willis, *Surround-sound Standards Polarise*, ELECTRONICS WORLD 952 (Nov. 1995), available at <http://www.softcopy.co.uk/electronicworld/> (last visited Jan. 24, 2004).

DVD home surround sound. As indicated in IEEE Spectrum¹¹⁹, by 2001, “virtually every movie [was] encoded in Dolby® Stereo as one of its audio formats; most are also encoded in Dolby® Digital 5.1.”¹²⁰

¶35 In 1997, while there were two formats currently available: both DTS™ and Dolby® Digital were available in the home theater, Dolby Labs was already seen as the winner. Fortune Magazine’s Herb Greenberg said,

[b]ecause Dolby Digital is the standard audio format for DVD movies, and is used in DBS satellite transmissions as well, it clearly has the greater momentum of the two. Not surprisingly, most digital surround receivers use Dolby Digital, too, and almost always incorporate Dolby Pro Logic, the most widely used analog surround system.¹²¹

D. High Definition Television / Digital Television

¶36 Dolby Labs once again used its foundational business model to establish its technological empire. By transferring the value of its position in the home theater market, Dolby® technology became the world standard in the digital television (“DTV”) market.¹²²

¶37 In 1993, FCC was searching for the U.S. national standard for DTV.¹²³ Grand Alliance was a group of researchers that was to provide a recommendation for the FCC on which technology would be best suited as the national standard.¹²⁴ At the time Grand Alliance was to make its recommendation to the FCC, the Alliance was at a stalemate, such that one critical vote could determine whether or not Dolby Labs would be recommended by Grand Alliance.¹²⁵ To assist in ensuring that Dolby Labs was recommended, Dolby Labs petitioned electrical engineering Professor Jae S. Lim of the Massachusetts Institute of Technology (“MIT”) to be the swing vote in the company’s favor.¹²⁶ To induce Professor Lim to vote according to Dolby Labs’ prerogative, Dolby Labs offered a phenomenal US\$30 million to MIT.¹²⁷ Professor Lim made the recommendation and Dolby Labs was nominated by Grand Alliance as the recommended choice for the national standard for DTV.¹²⁸

¶38 After being recommended by Grand Alliance as a viable candidate for the national standard, Dolby Labs had to prove its superiority over DTS™. To accomplish this, Dolby Labs provided the FCC with evidence that their technology was capable of

¹¹⁹ The Institute of Electrical and Electronic Engineers (“IEEE”) is a non-profit, technical professional association of more than 380,000 individual members in 150 countries. See IEEE, *About IEEE*, at http://www.ieee.org/portal/index.jsp?pageID=corp_level1&path=about&file=index.xml&xsl=generic.xsl (last visited Feb. 2, 2004).

¹²⁰ Kraemer, *supra* note 73.

¹²¹ Greenberg, *supra* note 103.

¹²² See Jones, *supra* note 108.

¹²³ *Id.*

¹²⁴ Kenneth Winstein, *MIT Getting Millions for Digital TV Deal*, 122 THE TECH 54, available at <http://www-tech.mit.edu/V122/N54/54hdtv.54n.html> (last visited Jan. 23, 2004).

¹²⁵ *Id.*

¹²⁶ *Id.*

¹²⁷ *Id.*

¹²⁸ *Id.*

providing DTV.¹²⁹ Although not theoretically superior to DTS's™ technology, Dolby Labs technology was proven to operate effectively (unlike DTS™, which was merely theory at the time of HDTV technology).¹³⁰ In November 1995, Dolby Labs pulled another coup when the FCC chose Dolby Labs as the United States standard for DTV.¹³¹

¶39 Despite undercover tactics employed by Dolby Labs, its strategy prevailed. In 1995, Fox Sports announced that it would broadcast in DD 5.1 and will encourage its affiliates to also broadcast in DD 5.1.¹³² Soon after, Comcast followed its lead and announced that it too would be broadcasting using DD 5.1.¹³³

VI. CONCLUSION

¶40 By all accounts, Ray Dolby's vision prevailed: his company achieved ubiquity and its name became synonymous with superior sound.¹³⁴ "Wide-spread adoption of many of [Dolby Labs'] technologies occurred because of extensive customer support and quality control, attractive licensing programs, compatibility of new and existing technologies, and Dolby's willingness to follow long-term objectives."¹³⁵ Dolby Labs has become a global powerhouse for innovation by using its intellectual capital strategies of innovation, brand awareness and transference, being crowned the worldwide standard for DVDs and DTV.¹³⁶ As the audio industry moves from analog to digital technologies, Dolby Labs' licensing program continues to be successful and generates forty to fifty percent of its revenues.¹³⁷ Dolby Labs continues to heavily promote its consumer technology licensing program and provides potential licensees with a wealth of information on its website, including descriptions of its technology, an online licensing application, and extensive information about the company's license qualification and approval process.¹³⁸ The company has moved from its "steady as it goes" category with revenues of US\$28 million in 1986 to its current high growth classification with a growth rate of fifteen

¹²⁹ *Id.*

¹³⁰ *Id.*

¹³¹ *Id.* Incidentally, Dolby Labs never honored their agreement with Professor Lim and MIT never received the promised money. Dolby Labs attempted to take legal cover under a narrow provision within the contract made between Dolby Labs and MIT, thereby, narrowly escaping liability. However, the case was settled for US\$30 million. *Id.*

¹³² *Fox Sports' New Live Coverage in 5.1*, 5 DTV AUDIO UPDATE 1 (Feb. 2003), available at http://www.dolby.com/professional/tv/audio/dtvupdate/pa_nw_0302_DTVAudioUpdate.pdf (last visited Feb. 2, 2004).

¹³³ *Comcast SportsNet Ramps Up for Surround Sports*, 5 DTV AUDIO UPDATE 2 (Feb. 2003), available at http://www.dolby.com/professional/tv/audio/dtvupdate/pa_nw_0302_DTVAudioUpdate.pdf (last visited Feb. 2, 2004).

¹³⁴ Mike Snider, *Ray Dolby: Audio Innovator*, USA TODAY MAG., Dec. 27, 2000.

¹³⁵ Sims, *supra* note 33.

¹³⁶ See *A Chronology of Dolby Laboratories: 1990 to 1999*, *supra* note 81.

¹³⁷ *Meet the Engineers: Ray Dolby, Engineer & Inventor*, NAT'L ENGINEERS WEEK, (Feb. 16-22, 2003), available at <http://www.eweek.org/2002/Engineers/theengineers/page6.shtml> (last visited Feb. 2, 2004); Halstead, *supra* note 29.

¹³⁸ Dolby Labs, *Licensing Home Page*, at <http://www.dolby.com/lic/> (last visited Apr. 18, 2004); Dolby Labs, *Apply for a License*, at <http://www.dolby.com/lic/license/> (last visited Apr. 3, 2004); Dolby Labs, *Dolby Laboratories Licensing Information*, at <http://www.dolby.com/trademark/co.ot.0204.LicInfo.pdf> (last visited Apr. 3, 2004).

percent and 2002 estimated revenues of US\$135 million.¹³⁹ The total number of products licensed by Dolby Labs went from 30 million in 1990 to over 1.1 billion in 2003.¹⁴⁰ The number of licenses granted by Dolby Labs totaled 190 in 1990 and soared to 1,875 in 2003.¹⁴¹ A similar trend can be seen in the number of digital theaters equipped with Dolby Labs technology, which totaled 15,000 in 1992 and 38,000 in 2002.¹⁴²

¶41 As the ultimate test of Dolby's licensing prowess, the company recently launched Via Licensing.¹⁴³ This wholly-owned subsidiary will "create and manage horizontal patent-only licensing programs on behalf of third-party companies and organizations" in an effort to "leverage Dolby's expertise and infrastructure to promote and enable a wide range of new technologies and standards."¹⁴⁴ According to Bill Jasper, Dolby's President, the intent is to:

use Dolby licensing know-how to help unify the consumer electronics, personal computer, entertainment, telecommunications, and broadcasting industries around technically sophisticated technologies and standards from a wide range of sources around the globe [to] enable these industries to open new markets and develop next-generation consumer and professional products¹⁴⁵ . . . Via Licensing Corporation will work closely with IP rights owners to offer comprehensive patent licensing programs from multiple patent holders, thereby eliminating the need to contact numerous companies and engage in individual negotiations to acquire these rights.¹⁴⁶

The subsidiary was recently appointed as the administrator for the joint licensing of MPEG-2 AAC (Advanced Audio Coding) on behalf of AT&T, Dolby Labs, Fraunhofer, IIS, and Sony.¹⁴⁷

¶42 Several changes are on the horizon for Dolby Labs. The retirement of Ray Dolby from his grassroots corporation, will undoubtedly create challenges for Dolby Labs. In anticipation of his retirement, it is anticipated that Dolby Labs will become a publicly traded corporation.¹⁴⁸ The next phase of Dolby[®] technology is likely held in Dolby[®] Headphone technology, which take the surround sound of a five-speaker home theater and produces it using a two-speaker headphone.¹⁴⁹ From the profitable platform currently

¹³⁹ Halstead, *supra* note 29; Forrester, *supra* note 55; Lizette Wilson, *With eye on its future, fast-growing Dolby Labs buys 3rd S.F. Building*, SAN FRANCISCO BUS. J., Nov. 2, 2002; *see also* Exhibit #3.

¹⁴⁰ *See A Chronology of Dolby Laboratories: 1990 to 1999*, *supra* note 81.

¹⁴¹ *Id.*

¹⁴² *Id.*

¹⁴³ Press Release, Dolby Laboratories, *Dolby Laboratories Launches New Patent-Licensing Subsidiary* (Nov. 25, 2002), available at, http://www.dolby.com/press/pr_pr_0211_VIA.html (last visited Feb. 2, 2004).

¹⁴⁴ *Id.*

¹⁴⁵ *Id.*

¹⁴⁶ *Id.*

¹⁴⁷ Press Release, Via Licensing, *Via Licensing Corporation Assigned MPEG-2 AAC Patent Licensing Program*, (Jan. 30, 2003), available at, http://www.vialicensing.com/news/via_pr_viaAssignedMPEG-2.html (last visited Feb. 2, 2004).

¹⁴⁸ Fox, *supra* note 44.

¹⁴⁹ Dolby Labs, *Welcome to Dolby Laboratories*, at <http://www.dolby.com> (last visited Feb. 2, 2004).

in place by Dolby Labs, it can be predicted that the next wave of technological innovation by Dolby Labs will undeniably be a success.

Exhibit #1: Highlights from the history of Dolby Labs.¹⁵⁰

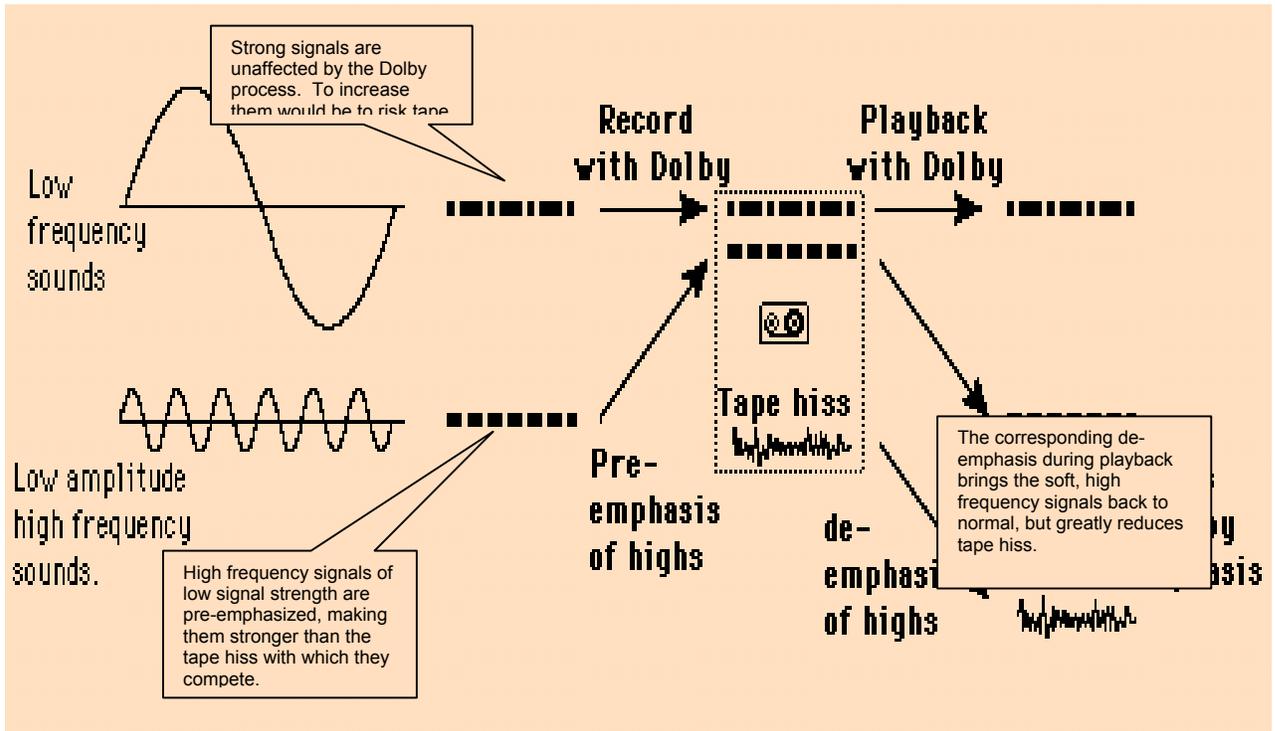
Date	Event
1965	Ray Dolby founds Dolby Labs.
1965	Ray Dolby's company pioneers Dolby® NR and markets it to recording studios in London, England.
1967	Dolby Labs signs first license agreement with a consumer product manufacturer (Koss' open reel tape deck).
1970	Dolby Labs introduces unit for encoding pre-recorded cassettes for mass production of prerecorded tapes.
1970	Fifth company (Revox) signs license agreement with Dolby Labs.
1971	Dolby Labs grants licenses to 30 companies, including Sony, Panasonic, Harmon-Kardon, and Advent Fisher.
1974	Dolby Labs demonstrates Dolby® FM radio broadcast system for FCC, and is approved for US later that year.
1975	100 US radio stations broadcast in Dolby® FM.
1976	Dolby® Stereo releases its first film, <i>A Star Is Born</i> , with surround sound.
1977	Dolby Labs Licensing Corp is established with responsibilities for all licensing activities
1977	Opening of <i>Star Wars</i> and <i>Close Encounters of the Third Kind</i> increases public awareness of Dolby® Stereo and trigger further theater installations of Dolby® Stereo.
1979	Dolby Labs receives Scientific and Engineering Award for "improved film sound recording and reproduction system" from the Academy of Motion Picture Arts and Sciences.
1981	Total number of consumer products with Dolby® B-type NR manufactured to date surpasses 100 million.
1982	DL introduces technology to incorporate Dolby® B-type NR in portable cassette tape players.
1982	Sony Walkman® introduced with Dolby® NR.
1984	Dolby introduces Dolby® AC-1 technology for television satellite and cable broadcasts.
1984	Australian Broadcasting Corp adopts Dolby® Surround for broadcast satellite transmissions.
1986	The 1,000th film with Dolby® Stereo is released.
1987	CBS broadcasts Super Bowl XXI in Dolby® Surround.
1990	Dolby demonstrates the advanced Dolby® NTSC TV system combining stereo and digital audio.
1991	HBO announces expanded use of Dolby® Surround on original programming.
1991	Film industry demonstrations by Dolby of the superiority of stereo digital over analog technology.
1992	<i>Batman Returns</i> is the first Dolby® film to be released.
1992	BMG Classics announces that all of its new prerecorded audio cassettes will use Dolby® Sound.
1993	Digital HDTV Grand Alliance selects Dolby® Digital for US HDTV system.
1994	Fox Network begins broadcasting entire NFL season in Dolby® Sound.
1995	Patent for Dolby® Surround expires and Dolby stops paying for the license. ¹⁵¹
1995	Dolby® Surround becomes international standard for NTSC (National Television Standards Committee) countries and is mandatory on DVDs manufactured for sale in US and optional on DVDs to be sold elsewhere.
1995	Dolby® Surround encoders and first licensing program for Dolby® Surround media.
1995	Warner Brothers, 20th Century Fox, and Paramount select Dolby® Surround as primary release format.
1996	FCC announces Dolby® Surround as the standard for digital broadcast television. ¹⁵²
1997	Dolby® Digital classified as mandatory audio coding for PAL/SECAM DVD discs, making Dolby Labs the worldwide standard.
1997	Canada and South Korea adopt Dolby® Digital as their broadcast standard.
1998	More theaters worldwide (13,037) equipped for Dolby® Digital than any other sound format.
1998	Australia selects Dolby® Digital as audio standard for digital broadcast television.
1999	German satellite broadcaster selects Dolby® Digital.
2001	British Sky Broadcasting selects Dolby® Digital for the first use of digital broadcast in England.
2002	Number of licensed products sold surpasses one billion.

¹⁵⁰ Dolby Labs, A Chronology of Dolby Laboratories 1965 to 1969, *supra* note 22; Dolby Labs, A Chronology of Dolby Labs 1970 to 1979, *supra* note 63; Dolby Labs, A Chronology of Dolby Laboratories 1980 to 1989, at http://www.dolby.com/company/chronology1980_1989.html (last visited Apr. 4, 2004); Dolby Labs, A Chronology of Dolby Laboratories: 1990 to 1999, *supra* note 81; Dolby Labs, A Chronology of Dolby Laboratories, at http://www.dolby.com/company/chronology2000_present.html (last visited Apr. 4, 2004).

¹⁵¹ See *Scheiber v. Dolby Laboratories, Inc.*, 293 F.3d 1014 (7th Cir. 2002).

¹⁵² See Telecommunications Act of 1996, Pub. L.A. No. 104-104, 110 Stat. 56 (1996).

Exhibit #2: Visual representation of how Dolby® NR works.¹⁵³



¹⁵³ Nave, supra note 9.

Exhibit # 3: Select annual revenues for Dolby Labs.

Year	Revenue (US\$ millions)
1986 ¹⁵⁴	28
1995 ¹⁵⁵	40
1997 ¹⁵⁶	100
2000 ¹⁵⁷	120
2002 ¹⁵⁸	135

¹⁵⁴ Halstead, supra note 29.

¹⁵⁵ John F. Allen, *A Brief Look at Dolby's 30 Years*, BOX OFFICE MAGAZINE SERIES, 1995, available at http://www.hps4000.com/pages/dolby/a_brief_look_at_dolbys.pdf (last visited Apr. 8, 2004)

¹⁵⁶ Grove, supra note 43.

¹⁵⁷ Snider, supra note 134.

¹⁵⁸ Forrester, supra note 55.