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Moving Image and Sound: Basic Issues and Training

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An Endless Loop: The Brief, Wondrous Life of the 8-Track Audio Tape

Stepping outside, one can see the descendants of the 8-track player everywhere—headphones connected to iPods or cell phones that stream music on demand as wearers of the devices sit on the subway, jog around the neighborhood, or sip coffee in a café. Today, music can be taken everywhere. Listeners can have all the songs they could possibly want on a device that easily fits into a pocket. This was not always the case. Half a century ago, you could not take music with you wherever you went. That all changed with the introduction of the 8-track player. For the first time ever, music became mobile.

While the format is largely the butt of jokes today and generally mocked, it was an important step forward for the audio industry. While there were competing cartridge-based audio formats at the time, including ones that pre-date it, the 8-track was the most prominent and popular. Developed through a collaboration between Lear Jet, Ford, RCA Records, and Motorola, the 8-track first became available in Ford automobiles in 1964, and soon after became available in home units and portable players. The 8-track was notably embroiled in two format wars, first against the four-track, and later against the cassette tape. As a variety of different cartridge and cassette formats flooded the market, the 8-track was the most popular for a time, but eventually fell by the wayside as the cassette tapes gradually took over its market share. Though the 8-track has been an

obsolete format for several decades now and is often mocked, it had a vitally important impact on the audio industry, propelling the technology in a more mobile direction that has persisted to this day.

Prior to the introduction of the 8-track, the main audio playback units found in homes were record players and reel-to-reel tape players. Neither of these units could be used on the go, whether walking or in a car. As 8-tracks were originally conceived for use in automobiles, it is interesting to note that record players were first attempted to be installed in cars in 1956. That year, Chrysler introduced their “Highway HiFi” system: a record player with 7-inch discs that ran at $6\frac{2}{3}$ rpm. The format was chosen because the 12 inch-diameter of $33\frac{1}{3}$ rpm records was too large to install in a car, and the smaller 45 rpm did not play as long. These 7-inch discs could play for about an hour per side. RCA and Norelco also later began to produce automobile record players. While the seemingly obvious issue with having a record player in the car would be that as soon as the car goes over a bump, the needle will jump and skip, this was, shockingly, not a very large issue. According to Consumer Reports, “...both units were able to keep the needle on the record while driving. Of the RCA, we wrote: ‘The stylus did not jump the grooves even when the car was moving at various speeds over broken pavement, cobblestones, and deep holes.’ We gave the Norelco a similar assessment...”¹ These record players, however, were extremely short-lived due to several other factors. The steady stylus, made strong enough to not jostle when the car made sudden movements, wore down the very records it was made to play due to the high pressure involved in holding it in place. It was also reported that these units were prone to breaking and attracted lots of dust and

¹ Sharon Riley, “Record Players Were the Infotainment Systems of the 1950s and ‘60s: Early Adventures in Mobile Fidelity,” *Consumer Reports* 12 Apr. 2014.

debris that affected playback. There is also the issue of the driver needing to change records and reset the needle while simultaneously keeping their eyes on the road. As R.J. King notes, “While consumers can be adventurous, it was quite a stretch to ask a driver to change a record at 70 mph.”² These factors, coupled with the exorbitant costs of these units, led to them being extremely short-lived. Chrysler only offered their Highway HiFi system for 2 years (1956-1958), and RCA’s Victor system was only available for one year in 1961.³

Following the short-lived failure of the Highway Hifi and other car record players, the need for a more portable audio format became clear. The solution to this problem was the cartridge-based audio format. Closed-loop cartridge systems first found a market in the radio field, as they offered several advantages to disc jockeys. The Fidelipac, also known as the NAB cartridge, was developed by George Eash in 1954 and was the first cartridge-based audio format to find success⁴. It featured two tracks recorded onto a ¼” magnetic tape. One of the tracks contained a monaural audio recording and the other track was used for a cuetrack to tell the player to either automatically stop playing the cartridge at the end of the recording or to return to the beginning of the recorded program.⁵ Disc jockeys liked the Fidelipac because the cartridges were significantly less cumbersome than the bulky reel-to-reel players they previously used. Now the DJs just had to slip one of the cartridges into the player and press play, and the cartridges could also be automatically stopped at the beginning of the

² R.J. King, *8 Track: The First Mobile App* (Detroit: Momentum Books, 2015) 50.

³ Riley.

⁴ King 46.

⁵ “The NAB ‘Fidelipac’ Cart Cassette Standard,” 2003, 02 Nov. 2015
<<http://www.radiohistoria.jvnf.org/spotmaster.htm>>

recording.⁶ The automatic cue track could also be used to “relay start” a second player, so it was possible to set up a chain of players to start playing one after another.⁷ Each tape could hold about five minutes of content and could be used to hold music, commercials, station identifications, or even weather reports. The Fidelipac significantly reduced costs for radio stations by offering a more affordable and less-labor intensive alternative to reel-to-reel set ups. While the format did not find widespread consumer use outside of the radio industry, it caught the attention of the men who would go on to develop the 8-track and its first main competitor, the 4-track.⁸

In 1962, Earl Muntz adapted the Fidelipac into what became the 4-track tape, which he dubbed the Stereo-Pak. Earl “Madman” Muntz was a used car salesman in California and had previously sold television sets before turning his attention to the audio industry.⁹ He originally became interested in the Fidelipac to convert it into a car player, and he even initially advertised the 4-track tapes as CARtridges. Like the original Fidelipac tapes, the Stereo-Paks used 1/4” magnetic audiotape. Rather than featuring two tracks however, the 4-track, as its name implies, contains four recorded tracks that comprise either two stereo programs or four monaural programs. One had to manually flip a lever in order to switch from one program to the other. Due to this design, 4-track tapes cannot be rewound and it is advised not to fast-forward them.¹⁰

⁶ King 46-47.

⁷ “The NAB ‘Fidelipac’ Cart Cassette Standard”

⁸ King 46-47

⁹ David Morton, “A History of The Eight Track Tape,” *8-Track Mind* 1995.

¹⁰ “Analog Stereo Formats,” 29 Oct. 2015

<<http://vinylfanatics.com/analoglovers/page10.html>>

At this point in the history of closed-loop tape cartridges, Bill Lear enters the picture, and the 8-track looms on the horizon. Lear's involvement with the 8-track actually started because his daughter, Shanda, went on a date with Muntz's son, Jim. As the story goes, Jim picked up Shanda in a limousine fitted with a Stereo-Pak player. Intrigued by the music system, Shanda had her dad come and inspect it.¹¹ This spurred Bill Lear's interest in the technology. After meeting with Earl Muntz and taking a ride with him in a car equipped with a Stereo-Pak system, Lear became interested in having Muntz's players installed in his Lear Jets, and in 1963 he became a distributor for Muntz Electronics.¹² Upon further examining and working with the Stereo-Pak, Lear realized the system had quite a few problems. Inconsistencies with the motor caused some jarring and vibrations within the player, and "...the rubber drive belt between the capstan and the motorized flywheel was prone to slip, which could stretch the tape".¹³ Further, Lear was not keen the idea of having to use a lever to switch between the tracks on the tape. When Lear approached Muntz with his concerns about the Stereo-Pak and offered a few suggestions on how to fix these issues, an argument ensued. Ultimately, this resulted in Muntz telling Lear to "go fly a kite".¹⁴ Following this dispute, Lear abandoned the idea of trying to adapt the 4-track to his jets and decided to pursue his own, new type of audio cartridge: the 8-track.

While Lear's team initially began work on developing the 8-track tapes and player, the development of the 8-track player was really a collaborative effort between Lear Jet, Motorola, RCA, and Ford. In the summer of 1964, Lear reached out to the CEO

¹¹ King 76

¹² Morton

¹³ King 77

¹⁴ King 77

of Ford Motor Company, Henry Ford II. Lear pitched the idea of having the 8-track installed in Ford automobiles and Ford II was receptive to the idea.¹⁵ With a market for his 8-tracks in place, attaining music to put on the cartridges was the next step. To achieve this, Lear contacted his longtime friends David Sarnoff, who was the director of Radio Corp. of America, or RCA. Sarnoff initially licensed 175 albums for the 8-track, and later expanded the license to include the rest of RCA's music library.¹⁶ With these key players in place, Lear and his team produced 100 players and dozens of cartridges to generate more interest in the device. One of these players was delivered to Oscar P. Kusisto, vice president and general manager of Motorola. Kusisto saw potential in Lear's invention and Motorola subsequently became involved in the project to work on making the player more streamlined, more lightweight, and more affordable.¹⁷ Thus, the development of the 8-track was really a team effort between these four entities: "Motorola would supply the auto and home players, RCA the music, Ford the initial customer base, and Lear the cartridges"¹⁸. With all of the parts now in place to deliver the 8-track to the world, Ford announced on April 3, 1964 that they would offer 8-track players as optional accessories in several of their new 1966 car models, including Mustang, Thunderbird, and Lincoln Continental.¹⁹ Just that first year, 65,000 8-track players were installed in Ford automobiles, and the following year home and portable playback units were introduced, thus marking the beginning of the 8-track era.²⁰

¹⁵ King 80

¹⁶ King 81

¹⁷ King 85

¹⁸ King 103

¹⁹ King 95

²⁰ Morton

At this point in the 8-track story, let's take a step back and examine the design and structure of both the 8-track cartridges and player. The eight tracks of audio are recorded onto 1/4" magnetic, mylar tape that has a lubricated polyester backing. Since the recordings are stereophonic, the eight tracks comprise four programs: "Tracks 1 and 5, 2 and 6, 3 and 7, 4 and 8 are used for the stereo channels. Tracks 1, 2, 3, and 4 are used for the left channel; and 5, 6, 7, and 8 for the right channel".²¹ As is the same with the Fidelipac and the 4-track, the magnetic tape is wound around a central spool and tape is drawn out of the center of the cartridge. The tape is pulled off of the center reel, travels across the opening at the end of the cartridge, where it runs across the player's head, and then is wound back onto the outside of the same central reel. Due to this continuous loop structure, 8-track tapes could not be re-wound.²² The tape runs at 3.75 inches per second and the spool itself is freewheeling, driven solely by the tension from the capstan. At the end of the tape, there is a short splice of aluminum foil. When the strip of aluminum passes the playback head, this signals the head to move 45 degrees. This movement of the playback head switches it to the next recorded program on the tape.²³ One innovation of the 8-track's design that distinguishes it from the other cartridge format is that the pinch roller, the wheel that moves the tape along as it plays is located within the cartridge itself, rather than the player.²⁴ The reproduce head, tape guide, and switching head, meanwhile, are all located within the player. Each cartridge could hold up to 400 feet of

²¹ L.C. Harlow and H.E. Roys, "Some Design Considerations for the Eight-Track Continuous-Loop Magnetic Tape Cartridge and Player," *Journal of the Audio Engineering Society* Vol. 15, Issue 1, Jan. 1967: 29.

²² "Stereo Analog Formats"

²³ Harlow and Roys 29

²⁴ Jason Brabazon, "The Rise and Fall of the 8-Track Tape," *You Really Got Me*, 1994.

tape and was designed to be able to operate for at least 500 hours without requiring lubrication, cleaning, or other maintenance.²⁵

One characteristic quirk of the 8-track is that when the aluminum foil splice passes over the playback head, it emits a clicking sound that is commonly referred to as the “Kerchunk”. Unlike the four-track, which had two programs that record companies thought of as akin to the two sides of an LP (and later the two sides of a cassette). Manufacturers were not sure how to approach the 8-tracks four channels. The major drawback of this set up is that it was not uncommon for a longer song to be recorded onto more than one program. Thus, often in the middle of a song, the 8-track player would have to switch programs. The music would pause, the “Kerchunk” would be audible as the head moved to the next track, and the song would continue. Some cartridge manufacturers tried to avoid this by rearranging the order of the songs on the album to try to get them to fit on the tracks in such a way that they would not be broken up like this. Unfortunately, this was often not the case.²⁶ While some find the “Kerchunk” endearing, many find it annoying as it disrupts the listening experience. This was an unfortunate side effect of the 8-track’s design.

The external design of the 8-track cartridges themselves also featured several innovations. Both sides of the polystyrene plastic cartridge were tapered in order to permit easy insertion into the playback device. The rear and sides of the cartridge feature finger-grip areas that are meant to help drivers orient the cartridges into the players without having to take their eyes off the road. The cartridges were designed to be highly

²⁵ Theodore R. Naimy, “An Eight-Track Stereo Cartridge For Automotive Use,” *Journal of the Audio Engineering Society*, Vol. 15, Issue 1, Jan. 1967: 23

²⁶ Brabazon

durable. They were made to withstand a 200-pound force across the rear of the cartridge when it is forced into a capstan, and also to withstand a two-foot drop onto concrete and other hard surfaces, or even a corner without incurring any damage.²⁷ It was even claimed that an 8-track cartridge could be thrown against a wall, "...with no damage, except to the wall."²⁸ Thus, the plastic 8-track cartridges were highly durable and could withstand quite a bit of external wear and tear.

As for the 8-track players, at least the original Lear-designed ones installed in Ford automobiles, they were built to have a lifespan of over 1,500 playing hours and withstand a range of adverse environmental conditions. They were designed to operate between -20 and 400 degrees Fahrenheit, and function in up to ninety-five percent humidity.²⁹ The playback heads were designed to read the eight channels on the tape from bottom to top, the opposite of the other cartridge formats. The players were also designed to operate seamlessly, with no levers or buttons. In order to begin playback, driver merely needed to insert the tape into the player, and the music recording would begin to play automatically. This was promoted as a safety feature of the 8-track, as the driver could play music without needing to take his or her eyes off the road.³⁰

Many of the design differences between the 8-track and 4-track were reasons why the 8-track ended up being the more popular format. Muntz's 4-track player was designed to fit under the car's dashboard. The player thus hung from a metal plate, with a gap left exposed between the player and the dashboard. This setup meant the player

²⁷ Naimy 24

²⁸ King 78

²⁹ King 89

³⁰ King 78

was susceptible to collect dust and debris. There was also the worry that a small child could get their hand stuck on the exposed parts of the machine, including internal components that were visible in Muntz's design. In contrast, the Lear player was designed to be a self-contained unit. A lightweight, metal blocked the internal components of the machine and flipped up when the tape was inserted, so the player and no exposed areas. If a child were to stick their hand through the metal panel, it would not get very far. Also, the capstan would not engage unless a cartridge was fully inserted into the player, making this design safer, cleaner, and more streamlined than Muntz's player.³¹ It also did not help that the Stereo-paks did not come installed in cars off the assembly line, and were only available as an after-market accessory. Part of the reason why Ford chose to pursue the 8-track rather than the 4-track was that the 8-track player was designed to be integrated into the dashboard.³² Technically, the 4-track tapes did offer higher fidelity recordings than 8-track tapes, but the trade off is how much content they can hold. With double the number of tracks available as recording space, 8-tracks can hold twice as much recorded content as 4-tracks. Despite the better sound quality offered by the 4-track, the 8-track won the format war in large part due to its seal of approval from the automobile industry, namely Ford. While the four-track players sold fairly well in small, regional markets, primarily in California and Florida, where Muntz had his used car lots, it went virtually unheard of in other parts of the United States.³³ As they were first offered in Ford cars, the 8-track players had markets all across the nation. Other auto dealers such as Chrysler and General Motors in 1967 began offering 8-track player

³¹ King 79

³² King 32

³³ Brabazon

options in their cars.³⁴ At the same time, more and more record labels such as Motown, Columbia, and Capitol, followed RCA's lead and began releasing their music catalogs on 8-track.³⁵ By the end of 1966, 8-tracks were outselling 4-tracks by a four-to-one margin, and in 1967 this increased to an eight-to-one margin.³⁶ Thus, the 8-track became the defacto audio cartridge format.

In its early days, the 8-track had quite a few technical problems that needed to be worked out. One of the main issues involved the pressure roller inside the cartridge. Lear's team had initially made the pressure rollers out of polyurethane, which was a cheaper material than the rubber rollers commonly found in reel-to-reel players at the time. The problem with Lear's pressure rollers was that the polyurethane was too soft, which caused the tape to stick to the roller. Additionally, these pressure rollers were prone to wearing out and typically did not last more than a few years. For this reason, many 8-track enthusiasts nowadays tend to replace the pressure rollers in their Lear cartridges that were manufactured prior to 1970. This issue was fixed when RCA developed a much sturdier, hard plastic pressure roller that became the norm among cartridge manufacturers.³⁷

Another problem with the early 8-track cartridges is that graphite tended to buildup on the tape head due to the coating on the back of the magnetic tape. To prevent this, Motorola developed a small plastic scraper to be placed next to the pressure roller.

³⁴ Abigail Lavine, "An Early History of the 8-Track" 06 Nov. 2015
<<http://web.archive.org/web/20120610022110/http://www.8trackheaven.com/archive/early.html>>

³⁵ King 137

³⁶ King 150

³⁷ King 92

This little scraper worked to remove any of the graphite debris from the tape head. To further assist with this problem, RCA offered a Stereo 8 Head Cleaning Tape Cartridge, which ended up being the best selling cartridge in their tape catalog in 1967. This cartridge contained a mildly abrasive tape that helped clean the playback head.³⁸

With this issues resolved, 8-track technology continued to improve over the course of the format's lifetime, and the consumer base expanded. At first, the 8-track was only available in an automobile player, which gained it popularity among those who drove to work, and especially with those who worked for a living, mainly truckers.³⁹ The following year, home and portable playback units were introduced. During the 1966 holiday season, Lear Jet debuted a portable 8-track player that could be powered by either electricity through an A/C cable, or a rechargeable battery. This unit is the very first audio playback device to allow people to listen to music wherever they pleased. It could be taken on walks, to the park, the beach, or anywhere else the user desired to go with ease.⁴⁰ With this mobility factor, the 8-track became popular among adolescents. The possibilities with the 8-track seemed endless. There was even a "Stereolounger" offered, which was a leather reclining chair that had a Lear 8-track player installed in one of the armrests.⁴¹ In 1967 new Lear 8-track players began to include fast-forward buttons and 8-track tape recorders became available beginning in 1970.⁴² Additionally, with more and more record labels releasing albums on 8-track, the genres of music found on the format grew more expansive, from rock, to rhythm and blues, to country, the cartridge appealed

³⁸ King 92

³⁹ "Analog Stereo Formats"

⁴⁰ King 139

⁴¹ King 134

⁴² King 164

to ever-expanding audiences. In addition, movie soundtracks and educational series sold well on 8-track, and RCA also released foreign language learning tapes on the format.⁴³

Nearly all of the 8-track cartridges on the market sold for the uniform price of \$6.98.⁴⁴

A further development to 8-track was made in 1970, with the introduction of the Quad-8. This format utilized quadraphonic audio, or “surround sound”, using four channels to produce independent audio signals.⁴⁵ The Quad-8 is thus an improvement of sound quality over the regular stereo 8-track. To achieve this, the Quad-8 combines tracks in a different way. The tape tracks on a Quad-8 cartridge allocate tracks 1, 3, 5, and 7 into one program, and tracks 2, 4, 6, and 8 into a second program, thus producing four discreet channels of audio output. These cartridges have a small notch in their top left corner that enables Quad-8 players to automatically set up the appropriate track configuration.⁴⁶ Quad-8 and regular stereo 8-tracks were somewhat compatible, as regular stereo 8-track cartridges could be played on Quad-8 players and Quad-8 cartridges could be played on conventional players. However, a conventional 8-track player could not provide the surround sound experience that a Quad-8 player could. The Quad-8 cartridges retailed at \$7.95 each, a full dollar more expensive than stereo 8-tracks tapes, and the Quad-8 tape decks were generally about thirty-percent more expensive than Stereo-8 decks.⁴⁷ Though it offered higher sound quality, the Quad-8 had a shorter lifespan than the regular 8-track. Quad-8 sales reached their peak in 1973-74 and had

⁴³ King 140

⁴⁴ King 150

⁴⁵ King 163

⁴⁶ “8trackheaven.com Frequently Asked Questions,” Mar. 2004. Web. 06 Nov. 2015
<<https://web.archive.org/web/20110107121153/http://www.8trackheaven.com/faq.html#QUADRAPHONIC>>

⁴⁷ King 164

sharply declined by 1976. Some attribute this to the Arab Oil Embargo that took place during those years. The rising oil prices reduced consumer spending, and making the higher cost of the Quad-8 tapes and players less popular than the more affordable stereo 8-tracks.⁴⁸ While the Quad-8 only experienced limited success at the time, it is now highly sought after by 8-track collectors due to its quality surround sound.⁴⁹

While the 8-track experienced great success and popularity in the late 1960s and throughout the 1970s, a new competitor was edging its way into the audio market: the cassette tape. For the second time in its relatively brief life, the 8-track would become embroiled in another format war. While the compact cassette had been around since 1963, for a long time, it had not been considered to be a serious competitor to the 8-track. Early cassettes were intended to be used primarily for monaural recording and were used as for taking dictation.⁵⁰ Cassettes began being utilized for selling pre-recorded music in 1966, but by that time 8-track had the edge over them, particularly due to the backing of the automobile industry. In 1967, Ford considered offering cassette tapes in their cars, but decided against it. A “Sound Off” between the 8-track and the cassette occurred at Ford, where the 8-track was judged to have higher fidelity when tested by playing the same song on both devices. Another issue that Ford had with the cassette player was that it would require drivers to remove the tape, flip it over, and re-insert it into the player in order to hear what was on side two. This was thought to potentially be a distraction for the driver. That issue, combined with the fact that more pre-recorded music was offered

⁴⁸ “8trackheaven.com Frequently Asked Questions”

⁴⁹ “Analog Stereo Formats”

⁵⁰ “Analog Stereo Formats”

on 8-track at this time, led to 8-track edging out the cassette for the time being.⁵¹ This, however, would soon change.

The 8-track and the cassette began competing on equal footing by 1971, when more pre-recorded music was gradually being offered on cassette tapes and new 8-tracks were released that could record audio.⁵² Also at this time, the sound quality of cassettes increased as they began utilizing Dolby noise reduction. Cassettes offered many advantages over the 8-track cartridges. They were smaller and more convenient to store. They offered twice as fast playback speed and higher fidelity, and unlike the 8-track, they could be rewound. Music on cassette tapes also played without being interrupted by the 8-track's characteristic "Kerchunk", and the cassette players themselves were less expensive and more lightweight than the 8-track machines.⁵³ All of these factors combined made the cassette a more desirable product among consumers, and as cassette players began being offered in cars, this spelled the end for the 8-track.

Throughout the late 1970s and early 1980s, 8-track players became less common in cars and homes. Retail stores phased out 8-track cartridges in 1983, though some record clubs such as Columbia House offered them as late as 1989.⁵⁴ Though some independent artists still record on 8-track on occasion, the last major commercial release was Fleetwood Mac's Greatest Hits, released in 1988.⁵⁵ With that, the cartridge era ended.

⁵¹ King 155

⁵² King 164

⁵³ "Analog Stereo Formats"

⁵⁴ "Analog Stereo Formats"

⁵⁵ King 170

Today, the 8-track is viewed as somewhat of a laughable format. Though there are many 8-track enthusiasts and collectors out there still, the format is often looked down upon for its design flaws, particularly the characteristic “Kerchunk”. Currently, not much is being done in terms of preserving the format. In 2010, James “Big Bucks” Burnett opened an 8-track museum in Dallas, Texas. The museum not only featured an extensive collection of 8-tracks, but also an entire overview of the evolution of audio technology, from wax cylinders in iPods. Unfortunately, the museum was closed in July of 2015 and there are currently no plans to relocate the collection.⁵⁶ Meanwhile, there are businesses on the internet such as audio-restorations.com and enhancedaudio.com that offer to digitize 8-track cartridges for a fee. They also offer to remove the characteristic “Kerchunk” from the new digital recording.⁵⁷ Other than the short-lived museum and a few digitization services little is being done to preserve the 8-track. Even what is being done in digitization is not really properly preserving the 8-track. By removing the “Kerchunk” it takes away an integral, if annoying, asset of the format and thus the integrity of the original. While 8-track preservation and reformatting might not be seen as an urgent issue as many of the pre-recorded music offered on 8-tracks was simultaneously offered on other formats such as records, cassettes, and reel-to-reel, and the more popular offerings have certainly been digitally re-mastered, there were some things that were exclusively recorded on 8-track. These works can now be considered at risk until more preservation work is undertaken with the format.

⁵⁶ Robert Wilonsky, “Deep Ellum’s Eight Track Museum to Join Eight Track Tapes on the Extinct Pile in July,” *The Dallas Morning News* 01 Apr. 2015

⁵⁷ “8-Track Restoration” 29 Oct. 2015 <<http://www.enhancedaudio.com/8track.htm>>

In conclusion, while today it is easy to mock and ridicule the 8-track, the format was a vital step forward for the audio industry. It was the first tape format to truly achieve mass-market appeal and the first to be successfully integrated into cars and utilized in portable players. For the first time, music truly became mobile. Nowadays, it is almost taken for granted that one can bring their favorite music anywhere in the world with them, on a device that easily fits in a pocket or purse. The 8-track should be remembered as the great-grandfather of the iPod and other portable music players because it paved the way for their success as well as the success of their predecessors, the cassette and the compact disc. Despite its flaws and odd quirks, the 8-Track was a landmark device for the audio world and should be remembered as such.

Annotated Bibliography

“8trackheaven.com Frequently Asked Questions.” Mar. 2004. Web. 06 Nov 2015

<<https://web.archive.org/web/20110107121153/http://www.8trackheaven.com/faq.html#QUADRAPHONIC>>

This webpage was useful in providing information on the Quadraphonic 8-track, or Quad 8 format. Under the question “What’s the Deal With Quadraphonic 8-Tracks?” the author defines what quadraphonic is, how it works, and how it was implemented into the 8-track format. It also provides information on the time period the format was available and reasons why it was not commercially successful for long.

“8-Track Tape Restoration.” Web. 29 Oct. 2015.

<<http://www.enhancedaudio.com/8track.htm>>

This is the webpage for a service that will digitize 8-track tapes for a fee and transfer the content to a compact disc.

“Analog Stereo Formats.” Web. 29 Oct. 2015.

<<http://vinylfanatics.com/analoglovers/page10.html>>.

The author describes the history of a wide variety of analog formats, including reel-to-reel, 4-track, 8-track, and cassette. The article goes into detail about the technical differences and similarities between these formats in terms of the technology involved in each of them.

Brabazon, Jason. "The Rise and Fall of the 8-Track." *You Really Got Me*. By Doug Hinman.

1994. Web.

<<http://www.8trackheaven.com/archive/history.html>>.

The author discusses the history of the 8-track audio format, from its precursors to its rivalry with the 4-track to its ultimate decline in popularity. It compares the markets for the 4-track and 8-track and compares and contrasts the quality of the two formats. The author also discusses issues with the format, including the “kerchunk” and how songs were recorded onto the tape in unfortunate configurations. The article also touches on the development of the cassette tape and the advantages it offered over the 8-track.

Harlow, L.C. and H.E. Roys. “Some Design Considerations of the Eight-Track Continuous-Loop Magnetic Tape and Player.” *Journal of the Audio Engineering Society*, Vol. 15, No. 1. Jan. 1967.

In this journal article, the authors discuss the design of the 8-track in great detail. They touch on both the internal and external design of the cartridges as well as the design of the players. It describes how the tape moves around the tape path, the configuration of the stereo audio channels and how the head moves to read them at the end of each full cycle of the tape through the player. Also discusses how the exterior of the plastic cartridges were designed especially for the automobile environment and ease of use therein.

King, R.J. *8 Track: The First Mobile App*. Detroit: Momentum Books, 2015.

Print.

The author provides a comprehensive history of the 8-track format, particularly as a collaborative effort between Bill Lear, RCA, Motorola and Ford. The text goes into detail of each of the key engineers involved, particularly Bill Lear, Earl Muntz, Henry Ford II, and John P. King, the author's father and one of the engineers at Ford who helped adapt the 8-track to the automobile environment. The text touches on the format war between the 8-track and the 4-track and, later, the 8-track and the cassette, especially focusing on the role of the car industry as the reason for the 8-track's success. It also describes various 8-track accessories, the process of music licensing for the 8-track, and provides concrete numbers for how many units the 8-track sold in comparison to the competing audio formats at the time.

Lavine, Abigail. "An Early History of the 8-Track." Web. 06 Nov 2015.

<<http://web.archive.org/web/20120610022110/http://www.8trackheaven.com/archive/early.html>>

The author provides a brief-one page summary of the development and early popularity of the 8-track format.

"The NAB 'Fidelipac' Cart Cassette Standard." 2003. Web. 02 Nov. 2015.

<<http://www.radiohistoria.jvnf.org/spotmaster.htm>>

The author provides a description of the Fidelipac, one of the pre-cursors to the 8-track. The article discusses the development of the continuous-loop cartridge technology for the

Fidelipec, technical differences between the Fidelipac and the 8-track, and the widespread use of the Fidelipac in the radio industry.

Naimy, Theodore R. "An Eight-Track Stereo Cartridge for Automotive Use." *Journal of the Audio Engineering Society*, Vol. 15, No. 1, Jan. 1967.

In this journal article, the author discusses the technical requirements needed for the 8-track to work successfully in an automobile environment. Talks specifically about the durability of the 8-track cartridges and the need for them to withstand the conditions of a car, from bumps in the road and surviving falls, to being able to function in extreme temperatures humidity levels.

Riley, Sharon. "Record Players Were the Infotainment Systems of the 1950s and '60s: Early Adventures in Mobile Fidelity," *Consumer Reports* 12 Apr. 2014. Web.
<<http://www.consumerreports.org/cro/news/2014/04/record-players-were-the-infotainment-systems-of-the-1950s-and-60s/index.htm>>.

The author discusses the short-lived car record players, including Chrysler's Highway HiFi system. She talks about the kinds of records that were compatible with the player and how they differed from typical LPs. She compares a few of the different car record players in terms of their quality and discusses their strengths and weaknesses.

Wilonsky, Robert. "Deep Ellum's Eight Track Museum to Join Eight Track Tapes on the Extinct Pile in July." *The Dallas Morning News* 01 Apr. 2015. Web.

<<http://thescoopblog.dallasnews.com/2015/04/deep-ellums-eight-track-museum-to-join-eight-track-tapes-on-the-extinct-pile-in-july.html>>

The author talks about an 8-track museum that operated in Dallas, Texas from 2010 to 2015. It discusses the founder of the museum, what it had in its collection, and why it closed.