

**Technology vs. The Music Industry:**

*Analysis of the legal and technological implications of MP3 technology on the Music Industry*

By Nia Cross

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**Introduction**

For years, bootlegged copies of popular albums of every genre have been offered by music pirates from Los Angeles to New York City. While more than a minor irritant for individual artists, the poor quality of products limited this common enterprise's impact on the music industry as a whole. This is about to change. MP3, the latest advance in technology, poses a significant threat to the way that both artists and their labels do business. MP3, which stands for Motion Picture Experts Group-1 Audio Layer 3, allows users to make near perfect quality copies while simultaneously facilitating use of the Internet as a marketplace for illegal products. These products are illegal because they violate the United States' copyright statute.

As with most technologically inspired industry upheavals, the spread of MP3 technology will spur calls for legislative action to ban the use of the MP3 format. However, outlawing MP3 is neither feasible nor desirable. One way or another, this new technology will revolutionize the music industry and dramatically change how consumers obtain music. At one end of the spectrum is a continuous flow of free, albeit illegal, high-quality music to consumers. At the other end, is an environment where artists can reach consumers without the aid of music labels or distributors, reducing costs for labels that get on-line, and securing more money for artists. This produces a sort of "catch-22" for artists. They can potentially secure greater profits, if the profits are not entirely lost through music piracy.

These factors make MP3 technology a very real threat to the music industry. This paper discusses the technology behind the MP3 mania; how this technology could be used in the music

industry; and the various types of solutions that could be used to solve the problems that the technology poses and that will help make it beneficial to all. The scope of the paper is confined to the transfer of music on the Internet within the United States. The Internet creates issues of jurisdiction concerning legal issues in cyberspace. The jurisdiction question is an entire paper topic itself and will not be discussed here.

### **Technology Aspect**

MP3 was developed by Karl-Heinz Brandenburg at the Fraunhofer Institute, a research lab in Erlangen, Germany. The technology allows users to store music in small files on a computer disc, while maintaining near perfect sound. Creating an MP3 file is relatively simple. A user first copies a song from an audio CD using a process known as “ripping.” Ripping a song requires software called “rippers,” such as the widely used *WinDac32*. *WinDac32*, along with many others, can be downloaded free, for limited use, or for a nominal fee from the Internet (“Net”). The majority, but not all CD-ROM (Compact Disc – Read Only Memory) players currently in use can rip audio. However, as technology continues to improve this capability will become increasingly common.

After a song is ripped from a CD, it is saved as a file in WAV format. Finally, it is run through an MP3 encoder, such as the *XingMP3 Encoder*. Again, like rippers, most encoders can be downloaded from the Net. The encoder will compress a song in WAV format from the typical 36 megabytes to a mere three megabytes.<sup>1</sup> Uploading or downloading files the size of a normal WAV file is a tedious process. It can take as much as five hours to download a single song from the Net. Using MP3, downloading the same song takes only nine minutes. Even more startling,

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<sup>1</sup> Allen, Harry, *Digital Underground*, VIBE, October 1998, available at [www.vibe.com/archive/oct98/docs/digital.html](http://www.vibe.com/archive/oct98/docs/digital.html).

MP3 makes a digital copy that is essentially identical to the original. It is often referred to as a clone rather than a copy because there is no significant degradation in the transfer.<sup>2</sup>

MP3 files can be used in a number of ways. The files can be listened to on the computer using MP3 players like *Sonique* or *MP3 Jukebox*, which look like and are operated like the CD player console which comes standard on Windows based systems. Users can also “burn”<sup>3</sup> their own CDs using a recordable CD-ROM or the user can copy the songs to a minidisc. There are also a number of products being manufactured that will make digital music more portable. A new disc-less technology is entering the market in the form of portable devices that can play MP3 files, yet are highly affordable. Some examples of these devices are the *MPMan* and the *Rio*.

The *MPMan* uses memory instead of discs or cassettes and can digitally store up to 60 minutes of recorded music. The leading producer of the *MPMan* is Nullsoft. Nullsoft sold several thousand *MPMan* devices in one six week period alone.<sup>4</sup> However, the device that is getting the most attention, is the *Rio PMP 300*. Like the *MPMan*, the *Rio* can store up to 60 minutes of digital music and is as small as a pager. Its memory can hold up to 32 megabytes of data. The *Rio* also includes an encoder that converts tracks on a CD into MP3 files.

The *Rio* is currently the focus of litigation between its manufacturer, Diamond Multimedia, and the Recording Industry Association of America (RIAA). The RIAA is the lobbying group for record companies and the music industry. In its lawsuit, the RIAA argued that the *Rio* is governed by the 1992 Audio Home Recording Act. They also argued that the *Rio* does not comply with the Act because it is not registered with the Copyright Office, it does not pay royalties and it does not incorporate the Serial Copy Management System (SCMS), which

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<sup>2</sup> Midgley, Carol, *Musicians Loose Pounds 40m In ‘Theft’ On Internet*, THE TIMES, May 28, 1998, at Home News.

<sup>3</sup> Copy onto a CD.

<sup>4</sup> Snell, Tracy, *Online Revolutions Looms With Disc-free Player*, MUSIC WEEK, August 8, 1998, at pg. 1.

prevents serial copying.<sup>5</sup> However, the court denied the RIAA's motion for an injunction against Diamond Multimedia, and allowed them to release the *Rio*.<sup>6</sup>

The *Rio* itself is not a threat because it has no digital output capability. It can record and play music, but it cannot be used to copy files to another machine, nor upload files back onto a computer.<sup>7</sup> The reason litigation has sprung up around the MP3 player and not the technology itself, is because computers are exempt from the Audio Home Recording Act and devices are not.<sup>8</sup>

Though impressive, MP3 is not the end of the line in terms of audio-compression technology. As we speak, MP3-based products with ever increasing features are entering the market. The most important of these features is anti-piracy technology. MP4, the next generation of audio-compression technology, will contain a level of content protection high enough to satisfy the RIAA.<sup>9</sup> At the same time, new technology is evolving beyond MP3. Vector Quantization Format (VQF), another currently available file compression format, boasts smaller compression size and better quality than MP3. Proponents claim it can compress songs into a file size 30-33% smaller than MP3 with quality even closer to that of the original WAV file.<sup>10</sup>

Whatever file compression process is used, the fact remains that, as the market for the products expands and companies compete, the technology will improve exponentially. MP3 technology is here to stay and will only continue to get better.

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<sup>5</sup> *Ibid.*

<sup>6</sup> *RIAA v. Diamond Multimedia Systems, Inc.*, No. CV 98-8247 (C.D.C.A. October 26, 1998).

<sup>7</sup> Helmore, Edward, *Music: Stop Thief*, THE GUARDIAN, November 20, 1998, available at 1998 WL 18678257.

<sup>8</sup> Takahashi, Dean, *Firm Is Sued In Dispute On Distribution Of Recorded Music Over The Internet*, THE WALL STREET JOURNAL, October 12, 1998, available at 1998 WL-WSJ 18987658. (“[B]ecause manufacturers argued that consumers should be allowed to back up copies of software including any recorded music, without being subject to copyright violations.”)

<sup>9</sup> *Copyright Issue Grows With Recording Market*, by Doug Olenick & Kristen Kenedy, Computer Retail Week, November 24, 1998.

<sup>10</sup> [www.vqf.com](http://www.vqf.com).

## **Potential Uses and Effects of MP3 Within The Music Industry Hierarchy**

This new technology would be of little importance if it could not significantly be used within the music industry. Michael Robertson, owner of MP3.com says that MP3 will allow artists to obtain greater revenues, provide a large selection of music to the consumer, while making it cheaper for the consumer to obtain the music.<sup>11</sup> This vision is startling. MP3 technology could not only create new music sales through new music formats, but also virtually eliminate manufacturing and shipping costs. Furthermore, by allowing direct music exchanges between the person who makes it and the person who wants it, cutting out the middleman, i.e., the record store. Artists would not even need a traditional label. In addition, music could remain available for longer periods because there would be no labor, storage, manufacturing or cataloging costs.<sup>12</sup> Such a system would be especially useful to independent labels and artists. As one New York Times music critic noted, MP3 is a way to “return music to its intangible essence.”<sup>13</sup>

### ***MP3 and Advertisement***

In general, record companies are not comfortable with the prospect of mass piracy that MP3 has been accused of promoting. However, they do appreciate the advantages of using the technology as a PR tool. Most people are accustomed to using the Net for advertising. Most labels have their own website where potential consumers can go and view their new artists and obtain updates on their established artists. However, digital music can take advertising to the next level by allowing the music to speak for itself. Instead of manufacturing and handing out free copies of the newest single to pique consumers’ interests, the label can distribute free “samples” of an artist's new product via the Net. Potential customers can simply download the MP3 file and listen to it at their leisure. However, the real issue lies in what more can be done

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<sup>11</sup> *Digital Underground*, VIBE.

<sup>12</sup> *Ibid.*

with digital music outside of giving it away. How can the industry harness this technology and use it to their benefit.

### ***MP3 and The Record Company***

For the major labels, Robertson's vision has other implications. Jupiter Communications, a new media research firm, published a report in July that urged the major record labels to get tuned in and embrace a technology that could provide lower or nearly nonexistent distribution costs and increased revenue. The report stated that the longer the labels hold out the more revenue that will be lost to piracy and independent labels who have eagerly accepted the new technology.<sup>14</sup> In addition, millions of consumers are downloading MP3 musical recordings on the Net. This process is threatening the record companies' ability to control music distribution.<sup>15</sup>

The record company is the one who controls which artists are signed, how much exposure they receive, and how much money they are advanced. "[T]he popular music business...works on a simple, ruthless premise: you find new artists, bankroll them for a while to see if they take off, then drop them like a stone when they fail."<sup>16</sup> MP3 could demand an entirely different business model. Using this technology, artists would not need a record company. They may not even need a recording studio. Working with an up-to-date PC and the right software, artists could post their songs on the Net, sit back and collect royalties.<sup>17</sup> MP3 will essentially provide disintermediation for the artist.

William Booth, of Sony Music, complains that his company invests millions each year in new writing talent and new composers. In order for the company to recover that money, they need to be paid for the music that is downloaded off the Net. If they are not compensated, they

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<sup>13</sup> *Music: Stop Thief...*, by Edward Helmore, *The Guardian*, November 20, 1998.

<sup>14</sup> *Stream, Too*, *Hollywood Reporter*, August 25, 1998.

<sup>15</sup> Takahashi, Dean, *Firm Is Sued In Dispute On Distribution Of Recorded Music Over The Internet*, THE WALL STREET JOURNAL, October 12, 1998, available at 1998 WL-WSJ 18987658.

cannot continue to make the investment in new talent nor continue to pay people to collect money for the new artists.<sup>18</sup> This problem may be solved with digital distribution via the Net (using MP3 and the like) and changing the services that the label provides. Record companies act as gatekeepers to filter out some acts that may lack popular appeal. The net is essentially an innate egalitarian free-for-all; therefore there will be no limits on what music gets distributed, when it is distributed, and no way to sift through the large numbers of artists who believe they should be the next big thing.<sup>19</sup> Saturation of the marketplace is definitely a problem that may or may not need to be dealt with. While record labels can provide a filtering mechanism for “bad groups,” we must first look at what standard quantifies which groups are considered bad. Currently the record companies decide what people hear and therefore control what the people like. On-line music will allow people to choose for themselves and foster more of a free market. Hubert Delany an analyst at Lazard Freres in New York asserted that he believes the MP3 phenomenon is unstoppable and if the record companies are going to stay current they will have to embrace the idea. The potential effect that MP3 can have on the industry is similar to the way that videocassette recorders changed the movie industry. Just as the movie studios adapted, so must the recording industry.<sup>20</sup>

### ***MP3 and The Distribution Companies***

The distribution component of the current music industry is the point that will be most effected by the new technology. Currently the distributorship is dominated by what could now be termed, the “Big Five” music companies: EMI, BMG, Sony Music, Warner Bros. Records, and Universal. Digital distribution will open the market to additional distributors. The independent

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<sup>16</sup> Hewson, David, *Internet offers the best way of buying music*, SUNDAY TIMES, September 20, 1998.

<sup>17</sup> *Internet offers the best way...* Sunday Times.

<sup>18</sup> Midgley, Carol, *Musicians loose Pounds 40m in 'theft' on Internet*, THE TIMES, May 28, 1998, at Home News.

<sup>19</sup> Helmore, Edward, *Music: Stop Thief*, THE GUARDIAN, November 20, 1998, available at 1998 WL 18678257.

record labels often have to rely on the major labels to distribute their product because they do not have the money or connections to do so themselves. In addition, those that do it themselves often have limited access to retailers and areas of distribution. Many genres of music (i.e. alternative, country, and some rap music), are not considered main stream and are not well received by the major labels. Many of these groups do not want major label representation and enjoy the direct contact that they have with their fans. The Net could open an entirely new channel of distribution. The independent artists could continue their one-on-one contact and subsequently increase their fan base in the process. The musical taste of those that currently use the Net the most is limited to certain genres. Until the Internet market is well received by the general consumer, the major labels will be hesitant to entertain the idea of Internet distribution, for fear of souring their relationship with retailers.

### ***MP3 and The Established Artist***

Currently some well-known artists are using the Net for advertisement, distribution and sales purposes. The Artist Formerly Known As Prince, after freeing himself from his label, sold his album, *The Crystal Ball* over the Net.<sup>21</sup> Souls of Mischief/Hieroglyphics Crew after leaving their label, have produced their own album, and sold it over the Net as well as in stores.<sup>22</sup> The Beastie Boys have put remixes and live recordings on their web site.<sup>23</sup> Frank Black, formerly of Pixie, uses a company that sells his album over the Net for \$8.99 and a single track for \$0.99.<sup>24</sup> David Turin, a LA-based producer, has an on-line label called People Tree. He has recently released songs on-line from Milla Jovovich, Nickelbag, and Porno for Pyros' Perry Farrell.<sup>25</sup>

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<sup>20</sup> Takahashi, Dean, *Firm Is Sued In Dispute On Distribution Of Recorded Music Over The Internet*, THE WALL STREET JOURNAL, October 12, 1998, available at 1998 WL-WSJ 18987658.

<sup>21</sup> *Ibid.*

<sup>22</sup> *Ibid.*

<sup>23</sup> Helmore, Edward, *Music: Stop Thief*, THE GUARDIAN, November 20, 1998, available at 1998 WL 18678257.

<sup>24</sup> *Ibid.*

<sup>25</sup> *Ibid.*

These are just a few examples of the numbers of established artists who are successfully using the Net to market their music. In comparison to other artists, established or famous artists are not in need of other avenues to market their music. “If you’re Madonna or the Spice Girls, then the music industry serves you very well and you make a lot of money the way things work now.” says Michael Robertson. “It’s the other 95 per cent of artists who embrace the Net.”<sup>26</sup> However, the issue is not the current need, but the future necessity. The object of most artists, established artists included, is to make money. Proponents of MP3 say that the most compelling argument for the digital distribution of music is that it will make artists more money by providing disintermediation.

### ***MP3 and The New Artist***

To artists that have not been signed or are new to the industry, MP3 allows for an incredible opportunity to gain exposure faster, more expansively and at a smaller cost than before. They would no longer be required to have an entire album, but could market one or two songs first and see how the audience responds before spending time and money on producing an entire album. This idea follows behind what most web sites are already providing. This idea could be seen as a form of narrowcasting, providing personalized music for the consumer. However, Bob Merlis, a spokesman at Warner Bros., argues that this strategy will bring about a sharp decline in the quality of music. Artists will no longer go through the process of creating an album with a unified theme, but will concentrate their efforts on producing individual pop hits.<sup>27</sup> The validity of this statement will be for the consumer to decide. If the consumer has more music to choose from, he or she will be more critical in deciding to what music to listen. The competition from the larger market will require that the artist put out a higher quality of music. Either way, both

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<sup>26</sup> *Ibid.*

parties win. The new artists get the chance they want and the consumer gets a larger selection of music from which to choose.

### ***MP3 and The Consumer***

From the consumer's viewpoint, MP3 technology provides the ideal way to buy music. No longer are they required to go to record stores to buy or try out music, but they can now have it instantly. Theoretically, this should be the mentality of the average consumer, however the traditional methods of buying music are firmly embedded in the consumer's psyche. People are accustomed to buying music at retail stores or through music clubs. It often takes a while to change people's habits. However, society in general tends to prefer whatever provides the quickest gratification while demanding the least personal effort. Digital distribution of music caters to these traits. Often the idea of going to a retail store and browsing through endless rows of music is enough to keep a person from buying music. The music clubs offer a limited solution to this problem by allowing consumers to shop at home. However, there is a long wait for the music to be shipped. MP3 technology provides a solution to this problem by allowing the consumer to have the best of both worlds through on-line distribution. As with every new change in society, this will require time for people to become accustomed to conducting business over the Net. Moreover, advances in technology will provide greater security and will make people more comfortable with using the Net.

### **Norm-Based Regulation**

Despite its potential positive applications, the threat of piracy has made major record labels hesitant to embrace the new technology. Frank Creighton, head of the RIAA's antipiracy wing says that, seventy-five to eighty percent of the RIAA's piracy resources are focused on the

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<sup>27</sup> Bray, Hiawatha, *New Hit Machine: Your PC with a few clicks of the mouse, a music revolution is shaking the industry*, THE BOSTON GLOBE, November 22, 1998.

new technology area, and half of those resources are focused on MP3 alone.<sup>28</sup> Subsequently, much of the potential of audio compression technology is unexploited because the technology to protect its use does not exist. Jeff Lengyel, marketing manager for CD drive maker Ricoh, says that it is hard to find a good protection scheme because if audio CDs are unable to be copied for the second time, then data CDs will be also. Users should have the freedom to distribute data.<sup>29</sup>

The intermediate solution, until a complete technical solution is found, is to police the Net and try to change the social norms regarding music piracy. Groups like the RIAA and other companies with a vested interest in preventing music piracy, use search algorithms to find those Internet sites that have MP3 files. These sites are investigated to see whether the site owners are engaging in illegal activities. It is a highly frustrating task for the RIAA, but they claim it is having some effect. Many illegal sites are receiving cease and desist letters from artists and the RIAA. Additionally, many MP3 sites that house MP3 related software do not post music files because they do not want the hassle of having to deal with the RIAA.

However, the success of this approach is not unquestioned. Straw, an MP3 site host, says that this approach is essentially pointless because for every site they close down, eighty more go up.<sup>30</sup> The anonymity afforded to members of cyberspace prevents regulation based on norms from really being effective. Most netizens believe that the best characteristic of the Net is its free market/open forum mentality, and using this type of security method will not easily combat this cyberspace social norm. The effort and cost of policing the Net is not, and never will be, proportionate to the return.

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<sup>28</sup> Allen, Harry, *Digital Underground*, VIBE, October 1998, available at [www.vibe.com/archive/oct98/docs/digital.html](http://www.vibe.com/archive/oct98/docs/digital.html).

<sup>29</sup> Olenick, Doug and Kristen Kenedy, *Copyright Issue Grows With Recording Market*, COMPUTER RETAIL WEEK, November 24, 1998, available at 1998 WL 2375840.

<sup>30</sup> *Digital Underground*, VIBE

## **Law-Based Regulation**

The Digital Performance in Sound Recordings Act of 1995 was implemented to augment the United States Copyright Law with respect to webcasting and downloadable music files. Section 106(1) of the Copyright Act states the exclusive rights of the copyright owner in the production of his or her works. This section is subject to the provisions of section 115, which is the compulsory license provision. This provision requires that for those songs that are distributed in the United States, anyone can compel the copyright owner of a song to license the song for a fee. This fee is called the statutory rate and as of January 1998, is set at 7.1 cents.<sup>31</sup> The 1995 Act expanded this provision to cover “digital phonorecord deliveries.” Thus, in theory, downloading digital copies of music from the Net requires the user to obtain a license from the copyright owner.

The difficulty in enforcing the 1995 Act, or any other Internet regulation, does not require an in-depth discussion. Suffice it to say that the very nature of the Net, as both a world-wide collection of individuals and a coherent community with a tradition of defying external regulation, dictates that such laws will be minimally effective at best. It also provides the ultimate incentive for the industry to find code based solutions to the problems that this new technology poses.

## **Code-Based Regulation**

Experts agree that eventual developments in technology will probably address many of the problems posed by MP3 and similar technologies. However, the effectiveness of any solution will depend largely on its adoption as a universal standard. A real issue becomes which of the proposed technological solutions are the best.

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<sup>31</sup> Kohn, Bob, *A Primer On the Law of Webcasting and Digital Music Delivery*, ENTERTAINMENT LAW REPORTER, September 1998, at Legal Affairs.

*HyperCD*, manufactured by HyperLOCK Technologies is an example of encryption technology. Before distributing the CD, the company strips away bits of a music file making it useless. The bits are encrypted and placed in a “security envelope” on the company’s Web site. This allows the owner complete control over when and to whom each portion of the encrypted file is accessed.<sup>32</sup> Ken Parks, the vice president of business development for HyperLOCK, says that, “there are multiple layers of protection, because *HyperCD* has multiple levels of encryption...A pirate would not only have to break through a firewall to get the key and decrypt it, but then they have to figure out where the raw bits go in the encrypted disc file.”<sup>33</sup>

*Record/Play*, developed by Iomega, also uses encryption to protect music, content, and data. It encrypts the music file through a copy protection technique, which binds the content to an Iomega storage product like a CD or zip disk. The file can then only be played from the disc it was originally encrypted to and all copies of this disc will be unreadable.<sup>34</sup>

The *HyperCD* product seems as though it is the answer to most companies’ concerns regarding control over when and how their songs are distributed. However, once the owner of the music has the key, there is nothing stopping him or her from copying the song. It is a good start to solving the piracy problem, but it does not address protecting the music once it has been decrypted and is in digital format. *Record/Play*, on the other hand, addresses this issue because it does not allow the contents from the CD to be transferred to any other medium. Compatibility is an issue with technology like *Record/Play*. A user will be required to use all the software that is necessary to play the CD, in this case the Iomega storage products. Either, Iomega will have a monopoly over mediums used, or different CDs will require different products, making it very

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<sup>32</sup> Reece, Doug, *Multimedia Advances Offer Labels New Tools*, BILLBOARD, July 18, 1998, available at 1998 WL 10914175.

<sup>33</sup> *Ibid.*

costly for the consumer. In addition, this solution does not address the issue of non-musical data. People should have the freedom to copy data for personal use and/or exchange information freely. This can still be done by exchanging the actual CD, but it negates the usefulness of the Net.

AudioSoft File Structure (ASFS), developed by Eurodat, is a container for digital media like MP3. It prevents files from being duplicated by consumers. This is done by authorizing the transfer of files onto the hard drive or CD but disabling the ability to copy the files from the medium on which it was first saved. ASFS also includes a tracking system, which keeps track of when the music is being listened to or purchased. This information allows national collection agencies such as ASCAP to distribute royalties to the proper parties. It also has a security feature, which allows files to be transferred across the Net securely. ASFS has recently been incorporated into Nullsoft's *Winamp MP3 Player*. This technology addresses all the concerns of the industry, except freedom of legitimate access. It is legal to make copies for home use. If the music files cannot be burned on to a CD, then they will be of little use to the average consumer. People are accustomed to portable music. This fact is one of the main motivations behind devices such as the *Rio* and the *MPMan*. If the files cannot be transferred to these devices or to CD, consumers may be resistant to embracing this technology. However, there may come a point when compromises have to be made. If there are no technological solutions that will allow the best of all worlds, something may have to be sacrificed.

Liquid Audio is a software company that requires a person to provide personal information in order to download a free *Liquid Audio* player. This player can play music that is in *Liquid Audio* format but only after the song is paid for. A person can transfer the Liquid Audio files to another

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<sup>34</sup> *IOMEGA: Iomega announces record/play technology initiative*, M2 PRESSWIRE, November 20, 1998, available at 1998 WL 16534531.

computer but the files cannot be played unless they are paid for. The files can also be burned onto a disc, after which the files can be illegally copied from the disc. However, the files also carry a digital watermark. The watermark is encrypted code that identifies the person who paid for the song. This allows easy identification of those people with illegal copies of music. *Liquid Audio* is currently used by several major labels as well as more than 150 independent labels.<sup>35</sup> This solution seems the most plausible because it addresses the main concerns that the industry has in regards to digital distribution. It is not a perfect solution, but as stated before, trade-offs will have to be made in order to address the most compelling concerns. *Liquid Audio*, for the time being, fits the bill.

### **Conclusion**

MP3 and related technologies represent a serious threat to the current music industry giants. Those caught unprepared in their wake will find traditional avenues of distribution closed and formerly reliable streams of revenue diverted. Despite these hazards, the potential benefits of MP3 cannot be ignored. Realizing that potential will require a solution that successfully deals with music piracy without negating the advantages of the technology. Experience has shown that regulation through norms or the law will not be successful; therefore, technological solutions must be found. Currently available software such as *Liquid Audio*, *HyperCD*, *ASFS*, and *Record/Play*, offer early glimpses of possible short-term solutions. Long-term resolution of the MP3 problem will require the close cooperation of software companies, artists, and labels. Until then, *LiquidAudio* is the solution of choice. With this technology in place, the industry can proceed into the age of digital music distribution with confidence.

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<sup>35</sup> Trask, Simon, *Online music delivery pioneer looks to broadband future*, PROSOUND NEWS EUROPE, September 1, 1998, available at 1998 WL 11652396.