Copyright and Digital Music in the 21st Century

(Note: this subject was chosen as the intersection of personal interests; in addition to my background as a Computer Science major, I am also an amateur musician of more than 20 years experience.)

Copyright law is codified in Title 17. The core of Title 17 is a comprehensive recodification passed in 1976. Copyright specifically covers audio recordings. It applies to works of creative expression fixed in a tangible medium.

Copyright is authorized by the US Constitution to promote the creation of new and useful works. The public policy interest behind the law is specifically not to protect the creators or distributors of the works, but rather to promote that such works will be created and available to the public. Giving authors/composers/artists intellectual property rights in their respective works (as opposed to simple ownership rights of the tangible work, i.e., owning a painting, sculpture, or manuscript) is intended as an incentive to creation.

Protection of written works goes back centuries, since the time of the movable type printing press when a quicker, easier, and cheaper method of producing copies was available than handwritten transcription. Modern printing has given rise to a class of professional writers and a professional printing industry, supported by sales of physical copies of books or other writings. Prior to the invention of the printing press, the amount of time and effort required to compose and write a novel or similar-length work was prohibitive for most of the population; writing a book, easily an effort of weeks or months, would produce but a single copy. There was no market in place for writers to
support themselves in this way, and those who did not have other means of support (family or independent wealth) could not devote such time.

Music, on the other hand, had no equivalent to the printing press until Thomas Edison invented the gramophone scarcely a century ago. Until then, musician/composers were supported by means of patronage, live performance, and private instruction of students (the “3 Ps”). They had no fear of others misappropriating their efforts to secure their patrons or students; live performance was the only means by which a listener might hear a composer’s work without the composer’s consent. Even so, such performances only deprived the artist of income if they substantially conflicted or opposed the artist’s own performances. Performances which did not conflict (say, in another city) did nothing to lessen the artist’s income. Further, unlike written works, musical performances took anywhere from a few minutes to a few hours to perform, depending on the particular composition; there was no limitation to prevent a musician from performing on a daily (or even more frequent, if he chose) basis.

We observe that copyright was entirely unnecessary as an incentive for the great composers of history. From Bach to Tchaikovsky, thousands of masterworks of musical composition were delivered up to the public without any legal protection comparable to copyright. Creation and performance of imaginative works are indications, not of greed, but of humanity. The vast majority of compositions do not garner any financial support or reward; rather, people invent songs and melodies because they derive some pleasure or comfort from hearing such. The works of the old masters are not unusual only for the their quality, but also for the wide and enduring knowledge of them – it is, in fact, such notoriety that determines their status as “classics”. It is in the nature of being a musician,
of singing or playing an instrument, to create new works. Most such works never reach a wide audience. Nonetheless, players performing an opera by Puccini or an orchestra performing a Mozart symphony would be able to support themselves financially with others’ composing efforts.

Edison’s gramophone gave birth to a recording industry. People no longer had to travel to live performances to hear music; the performances could be brought to the people, in other times and places. Recording companies would hire performers (generally on a per-session basis) to record their works, then create masters of such works and use them to produce as many copies as they could sell. The analogue audio quality, however, was relatively poor (by modern standards) and live performances continued to be the best venue to hear music. Further, the vinyl recordings suffered limits of length (there were only so many minutes of music you could squeeze onto a record before the loss of quality become noticeable to the casual listener) and deterioration (as they were played by dragging a needle through a groove, every playing wore down the grooves a bit, destroying the audio information, so it was necessary to purchase new copies after repeated playing). This did not change with the advent of radio. Further, there was no practical means available for consumers to reproduce audio recordings.

So the record companies developed similar to printing/publishing houses. The artists were analogous to the authors, recording engineers were analogous to editors, and records were analogous to books. Record companies required artists in order to have a product to offer; artists who wanted wider audiences had not effective means to get their music heard beyond their local performing areas without the recording and distribution abilities of the record companies.
The standard that evolved was that artists would perform locally, gathering fans (and just as important, gathering evidence of fans: setting up fans clubs, assembling mailing lists, counting attendance at shows, etc.). They would privately fund recordings in local studios (which could be very expensive, easily $50-$100/hour) of singles or demo tapes (typically 2-5 songs), press their records and sell them at their performances. The sales, attendance, and fan club/mailing list numbers would be combined with the demo music and submitted to record companies in attempts to gain a recording contract. If the demo and numbers could convince a record company that the artist’s work would likely sell well enough to make a profit, the artist would be signed to a recording contract.

The artist would then record a full album in a professional studio (typically owned outright by the record company), being charged full rate for the studio time. The artist would have their work promoted at radio stations and events nationwide. And the artist would have to pay for all recording and promotion costs out of their royalties. The record company would provide financial support in the form of an advance against royalties for the artist to live on, provide the recording and promotional staff and facilities (but billing them to the artist), press and sell copies of the albums to distributors (typically owned by the record companies also), and arrange for the artist to go on tour in support of an established act in order to generate fan interest in the music. The upshot was that the record companies were able to write off as losses the costs of supporting new artists who did not achieve wide popularity when such costs should more properly have been characterized as overhead while hiding profits and shifting substantial financial risk to the artists, who made very little money as a supporting tour act and hoped to generate enough
album sales to get them out of the record company’s debt. Very few artists ever sell
enough albums to erase such debt.

Meanwhile, home taping became popular. 8-track, reel-to-reel, and compact
cassette magnetic tapes made it possible for people to make tape copies of albums or
radio broadcasts, as well as record live performances, and share them. The equipment
cost was nominal, well within reach or ordinary incomes. Multi-generational copies
quickly dropped off in quality as new levels of noise were introduced with each copy of a
copy; analogue recording retains this fault to this day. Some people were unable or
unwilling to pay full price to obtain a first-generation recording sold by a record
company, and compromised with slightly lower quality taped copies. More importantly,
people were able to tape and share music that was never released by record companies:
original home recordings and live performances. While many artists did not object to
such “bootleg” recordings of their concerts (the Grateful Dead actively encouraged it,
very successfully), since they were a useful promotional device that did not directly
compete with selling the studio albums or with attending the shows, the record companies
were completely against it. It was not simply a matter of offering a higher sound quality
product for consumers; it was a matter of being the only and exclusive source of an
artist’s music.

Artists (professional and amateur) were able to afford home recording equipment
by the mid-1980s that allowed good-quality recording of original music. Tascam, for
exam, sold a portable 4-track tape recording/mixing unit (the PortaOne) for a few
hundred dollars that allowed recording and mixing of up to ten source tracks with no
individual track being “bounced” more than once. (For comparison purposes, the
Beatles’ masterpiece *Sgt. Pepper’s Lonely Hearts Club Band* album was recorded on 4-track analogue tape, albeit in a professional quality studio.) Such works were not professional quality, but they were easily demo-quality; with what you had previously paid to record one or two songs, you now could record as many as you could think of.

Next in the story came digital recording. Digital recording offered two huge advantages to the consumer: a digital copy of a digital source was identical to the original (no generational deterioration of copies), and there was no physical wear on the source (unlike an album or tape, a CD sounds exactly the same on the 10,000\textsuperscript{th} playing as it did on the first playing). Home tape copies of CDs sounded as good as the tapes and vinyl albums sold by the record companies. CDs did not, however, introduce original home recording to consumers; they were a playback-only medium. The record companies were still the only source of the high-quality recordings.

The turning point in the story came with the home computing revolution. First, everything on computers is stored in digital, not analogue, format. Any music you recorded into a computer was digitized. You could record and save sound files that would not deteriorate with any amount of copying. Then, CD-ROM drives were introduced for computers – which gave consumers the means to directly copy the digital sound recordings in a pure digital-to-digital environment. Then, NeXT Computer Corp. introduced the writeable optic drive – people could “burn” whatever they wanted onto CDs and no longer needed multi-million dollar CD pressing plants to produce new CDs. Finally, the explosive popularity of the Internet provided an easy means for people to transmit and receive the digital recordings over distance for almost no marginal cost.
The modern recording artist does not require a recording contract or large advance to record in the highest quality digital environment. (As of 11/2002, a new 8-track 16-bit/44.1kHz home digital recording workstation with a basic built-in mixing console sells for as little as $300; sound card and software packages to convert a home computer to a recording studio are similarly affordable. There are scores of choices available for such home recording, with a great many in the sub-$1,000 price range.) Nor do modern artists require CD pressing or distribution services; they can release their music directly to listeners over the Internet. The Napster case showed that the RIAA recognized the size of the threat – if alternative source/royalty arrangements could be made, artists could release directly to Napster or similar services and obtain royalties without ever incurring debt to the record labels – and if the record labels were not the exclusive source of the artists’ work, consumers would have no reason to purchase $16 CDs. The only relevant service record companies seem to offer is promotion – but with the odds being that most artists will never sell enough copies to pay off their debt, promotion does not seem to justify the front-end cost to the artist of signing with a record label.

A brief word is in order on the current state of affairs. MP3 compression now allows roughly one minute of sound recording to be stored in roughly 1M of computer memory, which is roughly a 10:1 compression ratio from CD source while maintaining CD-quality sound. Roughly ten times as much music can be stored on a CD if compressed into MP3 format instead of CD audio format, with no discernible loss of quality. Computers can be outfitted with CD-RW burners for $50 or so, and CD-R blank discs now sell for $5 for a spindle of 50. So the marginal cost to burn a copy in MP3 is roughly ten cents per CD-R, or one penny per album. Even keeping things in audio CD
format is only ten cents per album, far less than the cost of a first-class postage stamp or local pay telephone call. And the future holds vastly increased storage space in the form of DVD, which holds 4.7 G of data (more than six times as much as CD). DVD drives and burners are becoming more and more popular and should come down in price as CD drives and burners did. Computer DVD drives with the ability to burn or write data to such discs are already selling in the sub-$300 range.

Further, a standard album length is roughly 40-45 minutes of music because that was the limit of how much you could put on two sides of a vinyl album without losing too much quality. A single CD-R holds roughly 80 minutes of audio CD format sound, or almost two normal albums’ worth. Release in MP3 or similar compressed format and you have roughly 20 times the audio space as a vinyl LP. Release on DVD and you have nearly nine hours of uncompressed, CD audio format music available. Suppose instead of final mixed tracks, the artist, not worrying about per-album royalties, releases an “album” (perhaps on CD, perhaps over the Internet) of original source tracks (lead vocal, backing vocals, lead guitar, rhythm guitar, bass guitar, drums, keyboards, etc., perhaps multiple takes of each), unmixed. They could do so with an average of 20 source tracks per song compressed on CD, and end users could mix their own albums, choosing which source tracks to use, at what levels and with whatever filters or effects they choose, with readily available software packages. Copyright would be retained for the individual source tracks, but any combination of them to a mixed song would be creation of a new work. Artists could include some small number of sample or recommended mix settings (but not the actual mixed songs) if users wanted to produce a standard release version. Amateur (or professional) musicians could combine their own original tracks of vocal or
instrumental performances with the standard source tracks in order to harmonize with the band or replace any band member’s performance with their own. It would be interesting to see whether the courts consider source tracks and the final mixed song to be equivalent for purposes of meeting the “fixed in a tangible medium” requirement. It seems very likely that such mixed works (especially if original tracks are mixed in by the consumer) would be considered new works.

That’s the history and technology background; how does all this fit in to the existing legal framework?

First, we must step back again to the driving policy considerations behind copyright law. Again, the only justification we have for copyright is as an incentive to create works and make them available to the public. The Breyer article shows that the reason we protect various rights under copyright is to motivate publishers and distributors to procure, develop, and distribute such creative works by giving assurances that their efforts may not be undercut. The question is whether new creative works are available in greater quantity or quality if copyright protection includes medium-independent (i.e., network) ‘distribution’ of copies of digital works – copies that in no way deplete the record labels’ or distributors’ inventories or otherwise tax any of their resources. By ‘quantity’ I mean the number of distinct works, not the number of copies (which would surely be far higher with freely available network copying and distribution), and by ‘quality’ I mean artistic quality, not resolution or sound reproduction quality (which is identical to the original with digital copies). The marginal cost per digital copy is zero to both the artist and the consumer – neither the source nor the destination of the copy has additional costs beyond their basic network access. Having a network connection and
downloading a copy of a song doesn’t cost any more than having a net connection but not downloading the song.

Nimmer stated that “[h]istorically, Congress has achieved the objectives of the Constitution’s Copyright Clause by regulating the use of information – not the devices or means by which the information is delivered or used by information consumers – and by ensuring an appropriate balance between the interest of copyright owners and information users.” (Internal quotes omitted.) They veered from that with the DMCA. The DMCA was passed to protect the rights of copyright owners. Note the language the Commerce Committee used in preparing the DMCA: “[T]he digital environment poses a unique threat to the rights of copyright owners, and as such, necessitates protection against devices that undermine copyright interests. In contrast to the analog experience, digital technology enables pirates to reproduce and distribute perfect copies of works – at virtually no cost at all to the pirate.” The Commerce Committee’s language is heavily loaded with biased terms and severely skewed in its assumptions. They frame the discussion as a “threat to the rights of copyright owners”, ignoring the point of view of the general public. Copyright owners only have such rights because they were given to them by Congress, and Congress gave them such rights because it was thought necessary to improve what was available to the public. We should not object to digital copying merely on the basis that it may infringe on a right given to copyright owners; rather, we should examine what effect, if any, such infringement as a type has on the basis for giving such a right: the availability of such works to the people. “[N]ecessitates protection against devices that undermine copyright interests.” The word ‘necessitates’ recognizes the conflict and presupposes that the only possible correct view is the old
hardcopy model – it slams the door on the discussion before the questions can be examined. “[D]igital technology enables pirates to reproduce and distribute perfect copies of works – at virtually no cost at all to the pirate.” ‘Pirates’ is a severely loaded term; suppose such unauthorized redistributors were known as ‘digital liberators’ instead? And the proper question is not what it costs the pirate (although whether the pirates gain profits that should rightly belong in whole or in part to the copyright holders is a different matter, as is the issue of whether these represent lost sales or if the copier would simply do without the work if she had to pay for it); the question should be, is the value to the public of freely available and marginally costless digital copies of desired works more or less than the value to the public of whatever portion of creative works would not be produced in such an environment?

A&M Records v. Napster confirmed clearly that unauthorized digital copying of songs constitutes copyright infringement. Indeed, the RIAA has shown both a decline in record sales and profits generally and a decline in sales through channels in and around highly-connected college campuses. Their assumption is that trading of MP3 files or other digital copies of songs is the reason for reduced sales – that is, that such trading is the reason for the reduction in sales. They characterize such sales as ‘lost’, but have not shown what sales would be in the absence of such trading. The proper comparison would be to compare record sales in and around a highly-wired location with sales in a comparable non-highly-wired location. That is, compare sales figures (or sales figure changes from year-to-year) in and around a highly-connected college campus with sales in and around a non-highly connected comparable college campus in the same metropolitan area. The free variables must be controlled or eliminated as much as
possible to have a valid comparison and show whether such a downturn in the CD market was a direct result of file sharing or was simply a matter of other causes – consumer dissatisfaction with the selection available, prices that are too high for a faltering economy, etc. Additionally, record labels are now producing and distributing copy-protected CDs that cannot be read or copied by computer CD drives; a fair and impartial study would compare sales of such titles to those of the general catalog of titles. It seems fairly obvious that, if such protected titles achieved sales significantly higher than titles subject to trading, the labels would implement such protection for all titles they release. On the other hand, if such copy-protected titles are faring no better in the current market than music that can be readily traded, that would be a clear indication that the current downturn in sales is not due to digital file sharing. If that were the case, then there would be no argument against such file sharing; if it can be shown not to detract from sales, then how could it be a disincentive to the production new works?

Recall the RIAA report on music and the Internet. There was only a slight increase of ownership of MP3 players, when MP3 was the format of file sharing that put Napster out of business. Compare the increase of such ownership (from 9% to 13% of music consumers) to the reduction in CD sales (7.2% reduction in units sold). Does an additional 4% of the music consumer base owning MP3 players translate directly to a 7.2% reduction in sales? It does so only if those buying the players transferred substantially all their music acquisition from purchased CDs to free MP3s and if they were, as a group, previously accounting for roughly twice as many purchases as those music consumers who did not buy MP3 players. The other large objection I have to the report is the slide “When I Hear A Song I Like By An Unfamiliar Artist, I am most likely
to do the following thing FIRST:” Again, severe bias in the wording is obvious; a much better question would have been, “What portion of music that I like enough that I would purchase it do I now download for free instead of purchasing?” That phrasing would have allowed us to get an idea of what sales were lost due to trading; the avoidance of such clear(er) questions and information leads to the strong suspicion that the results would have supported the RIAA’s position as strongly as they wanted.