Computer Software Piracy: The Need for Integration of Statutory and Technological Protections of Intellectual Property

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COMPUTER SOFTWARE PIRACY: THE NEED FOR INTEGRATION OF STATUTORY AND TECHNOLOGICAL PROTECTIONS OF INTELLECTUAL PROPERTY

The development of new technologies, such as photocopying[1] and other photography techniques,[2] has traditionally presented a substantial challenge to the copyright regime because they facilitate the misappropriation of intellectual property.[3] In recent

[1] *See, e.g.*, Williams & Wilkins Co. v. United States, 487 F.2d 1345, 1362 (Ct. Cl. 1973) (National Library of Medicine and the National Institutes of Health did not infringe copyright by distributing photocopies of articles from medical journals), *aff'd* 420 U.S. 376 (1975). *See also* OFFICE OF TECHNOLOGY ASSESSMENT, INTELLECTUAL PROPERTY IN AN AGE OF ELECTRONICS AND INFORMATION (Ch. 4 at 99 (1987)) [hereinafter OTA] (development of photocopy machine made it less expensive and easier to reproduce printed material). *See generally* M. Nimmer, *Photocopying And Record Piracy: Of Dred Scott And Alice In Wonderland*, 22 UCLA L. REV., 1052 *passim* (1975) (criticizing *Williams* decision); Comment, *Williams & Wilkins Co. v. United States: Library Photocopying of Copyrighted Materials*, 1974 UTAH L. REV. 127 *passim* (1974) (discussion of photocopying problem). But while it is known that photocopying causes some loss to book, magazine and newspaper publishing it is apparently not a serious threat. This is because copying is time consuming and the resultant copy is cumbersome and imperfect. OTA at 99.

[2] *See, e.g.*, Blackmun v. Hustler Magazine, Inc., 800 F.2d 1160, 1161 (D.C. Cir. 1986) (Hustler magazine infringed copyrights on photographs of nude model); Sygma Photo News, Inc. v. High Soc'y Magazine, 778 F.2d 89, 91-92 (2d Cir. 1985) (retouched photograph of actress Raquel Welch in nude used on cover of Celebrity Skin magazine without owner's authorization infringed copyright); Vane v. The Fair, Inc., 676 F. Supp. 133, 135-36 (E.D. Tex.) (plaintiff unsuccessfully sued for infringing use of slides and photographs), *aff'd*, 849 F.2d 186 (1987).

[3] *See* Sony Corp. v. Universal City Studios, Inc. 464 U.S. 417, 430 (1984). "[C]opyright [law] has developed in response to significant changes in [duplication] technology." *Id.* "Indeed, it was the invention of a new form of copying equipment - the printing press - that gave rise to the original need for copyright protection." *Id.* "[I]nnovations in copying techniques gave rise to the statutory exemption for library copying embodied in the . . . copyright law." *Id.* at 430 n. 11. *See also* Encyclopaedia Britannica, Etc. v. Crooks, 447 F. Supp. 243, 248 n. 2. (W.D.N.Y. 1978) (Copyright Act of 1976 was designed to address issues raised by rapidly changing technology). *See generally* W.R. HAWKEN, *Reprographic Technology: Present and Future*, in L.H. HATTERY & G.P. BUSH, REPROGRAPHY AND COPYRIGHT LAW (1964), 39-49 (as copying techniques make copying cheaper, amount of copying increases); N. Henry, Copyright Information, Technology, Public Policy Part II: Public Policies - Information Technology, 1-17 *passim* (1976) ("neo-publishing" technologies, such as photo-

years, however, technologies such as video[4] and audio cassette re-
corders,[5] facsimile machines,[6] personal computers,[7] and satellite[8]
and cable television,[9] have made piracy of intellectual property an
even more inexpensive and simple task. Thus, the traditional chal-
lenge that technological innovation has presented to copyright law

copying and computers, motivate copyright owners to demand more extensive copyright
protection); Note, *Toward a Unified Theory of Copyright Infringement for an Advanced Techno-
logical Era*, 96 HARV. L. REV. 450, 450-51 (1982) (technological advances give impetus to
changes in copyright laws).

[4] *See Sony*, 464 U.S. at 417-18 (5-4 decision determining that use and sale of home video
tape recorders does not constitute copyright infringement); *See also* Columbia Pictures In-
dus. v. Aveco, Inc., 800 F.2d 59, 62-63 (3rd Cir. 1986) (video cassette rental business' in-
store performances of copyrighted works was copyright infringement); Peter Starr Prod.
Co. v. Twin Continental Films, 783 F.2d 1440, 1441-42 (9th Cir. 1986) (defendant repro-
duced plaintiff's copyrighted motion picture and sold 400 copies in Sweden and the United
Kingdom). *But see Sony*, 464 U.S. at 454-55 (videotaping commercially broadcasted televi-
sion for viewing in home at a later date was found to be "fair use"); *See generally*, Note, *The
Betamax Case: Accommodating Public Access and Economic Incentive in Copyright Law*, 31 STAN.
L. REV. 243, 243 (1979) (discussion of threat Betamax poses to copyrighted works broad-
casted on television).

[5] *See* RCA/Ariola Int'l., Inc. v. Thomas & Grayston Co., 845 F.2d 773, 780-81 (8th Cir.
1988) (manufacturer and retailer of cassette tape recording machine were vicariously liable
for infringement of record companies copyright); RCA Records v. All-Fast Sys., Inc., 594
F. Supp. 335, 337 (S.D.N.Y. 1984) (defendant used "Rezound" cassette copying machine
to provide customer with copies of plaintiff's pre-recorded tapes); Elektra Records Co. v.
Gem Elec. Distrib., Inc., 360 F. Supp. 821, 821-22 (E.D.N.Y. 1973) ("Make-a-tape" ma-
chine used for pirating copyrighted recordings).

[6] *See* OTA, *supra* note 1 at 107. (transmitting document by facsimile gives rise to new
form of copyright infringement).

[7] *See* Vault Corp. v. Quaid Software, Ltd., 847 F.2d 255, 255-58 (5th Cir. 1988) (com-
puter program capable of decoding electronic copyright protection on plaintiff's software);
Telerate Sys., Inc., v. Caro, 689 F. Supp. 221, 228, 240 (S.D.N.Y. 1988) (software program
enabling subscribers to copy information from provider's database constituted contributory
infringement); Atari, Inc., v. JS & A Group, Inc., 597 F. Supp. 5, 6-7 (N.D. Ill. 1983)
(PROM-BLASTER device created to copy plaintiff's computer video games). *See generally*
Comment, *The Incompatibility of Copyright and Computer Software: An Economic Evaluation and
a Proposal for A Marketplace Solution*, 66 N.C.L. REV. 977, 980 (1988) (duplication of com-
puter software is easy and cost efficient).

[8] *See* Entertainment & Sports Programming Network, Inc. v. Edinburg Community Ho-
tel, 623 F. Supp. 647, 653-54 (S.D. Tex. 1985) (hotel's unauthorized interception of satel-
lite subscription television programming infringed copyright); National Football League v.
Cousin Hugo's, Inc., 600 F. Supp. 84, 87 (E.D. Mo. 1984) (preliminary judgment granted
to enjoin the unauthorized interception of copyright satellite transmission).

[9] *See* Hubbard Broadcasting, Inc. v. Southern Satellite Sys., 777 F.2d 393, 398-399 (8th
Cir. 1985) (broadcaster alleged that satellite communication company infringed copyright
by retransmitting certain programs into its market), *cert. denied*, 479 U.S. 1005 (1987);
WGN Continental Broadcasting Co. v. United Video Inc., 693 F.2d 622, 623-24 (1982)
(broadcaster alleged that cable TV company infringed copyright by retransmitting pro-
grams without "vertical blanking interval").

has dramatically intensified.[10] This recalcitrant by-product of in-novation is expected to worsen in the future.[11] A forewarning of the future challenge is revealed by the particular vulnerability of mass-marketed computer programs.[12] Computer copying tech-niques are the most cost efficient form of reprography to date.[13] Moreover, it is contended that the inconvenience and cost of liti-

[10] *See* D. JOHNSTON, COPYRIGHT HANDBOOK, 12-13 (1978) "Congress established CONTU to study and make recommendations concerning copyright policies as they relate to mod-ern dataprocessing and reproduction technology." *Id.* For an early discussion of the proliferation of reprography techniques and corresponding intellectual property challenges *see* L.H. HATTERY & G.P. BUSH, REPROGRAPHY AND COPYRIGHT LAW (1964).

[11] *See* Brown, *Copyright Setbacks: Technology Brings Author New Woes*, CABLE TV AND NEW MEDIA LAW & FINANCE, May 1987, 1, 6-7 (new communication technologies have created additional copy problems); OTA, *supra* note 1, at 97. In the future optical disk storage systems may permit a person to collect entire libraries of copyrighted music, videos, books, magazines and newspapers. *Id.* Fiber optic technology has the potential to transfer 100 novels over 100 miles in 1 second. *Id.* Copying, transfer, and manipulation of information and intellectual works has been made more private by technological advances. *Id. See gener-ally* I.S. POOL, TECHNOLOGIES OF FREEDOM, 226, 226 (1983).

> As computers become the printing presses of the twenty-first century, ink marks on paper will continue to be read, and broadcasts to be watched, but other new major media will evolve from what are now but the toys of computer hackers. Videodisks, integrated memories, and data bases will serve the functions that books and libraries now serve, while information retrieval systems will serve for what magazines and newspapers do now. Networks of satellites, optical fibers, and radio waves will serve the functions of the present-day postal system.

Id.

[12] *See* P. Menell, *Tailoring Legal Protection for Computer Software*, 39 STAN. L. REV. 1329, 1337 (software exhibits "public goods" problem in that it is difficult to keep those who do not pay for it from using it, and any additional consumers of the product will not deplete its supply by their use); Vault Corp. v. Quaid Software Ltd., 847 F.2d 255 (5th Cir. 1988). The *Vault* court stated:

> In 1983 it was estimated that twenty to thirty percent of the computer software industry's revenues were siphoned off annually by piracy and the unauthorized re-sale of software. [In 1984 it was estimated] that for every authorized copy of a software program there is one unauthorized program. Loss from unauthorized cop-ies was about $1.3 billion from 1981 to 1984, $800 million in 1985, and $800 mil-lion in 1986.

Id. at 261 n.13; S. BESEN, 261 n.13, *Private Copying, Reproduction Costs, And The Supply Of Intellectual Property*, 2 INFORMATION ECONOMICS AND POLICY 5, 14 (1986). Producers of busi-ness software for computers lost revenues of $1.3 billion between 1981-1984 and project losses of $800 million for 1985. *Id.* One of five copies of WordStar in the U.S. is legiti-mate. *Id.* For every copy of VisiCorp there is at least one pirate copy. *Id.* Illegal copies account for about two to nine times the number of copies sold legally. *Id.* at 14, n. 4.

[13] *See* OTA, *supra* note 1, at 117. Computers present special problems of piracy because copying information can be done at a fraction of the cost and in a fraction of the time that it takes for photocopying or analog and video tape recording. *Id.* The nature of computer-mediated information means that an infinite number of perfect copies can be made and posession of an original copy is not necessary in order to make reproductions of original quality. *Id.* Other reproduction techniques are not capable of producing flawless copies. *Id.*

gation acts as a significant disincentive to enforcing copyright in this area.[14] As a result there is a great need for,[15] and effort towards providing improved protection for computer programs.[16]

Recently, in *Vault Corp. v. Quaid Software, Ltd.*,[17] a software manufacturer argued that by combining legal and technological protections, a balance could be struck whereby the interests of the copyright holder and the copy-owner could both be served.[18] The Fifth Circuit confined their disposition to the legal issues but recognized in dicta that protection was lacking and that legislative cognizance of technological methods of protection might indeed enhance the requisite balance.[19]

The analysis which follows examines first the competing interests at work with any form of intellectual property protection and an overview of the three major protections that have been utilized. These are then considered in the context of computer software; with emphasis on the copyright protection afforded software developers and the statutory rights that have been afforded software users.

The focus then shifts to electronic devices which have been developed to protect copyrighted works, and the ability of these protections to accomodate statutory "fair use", including the software users' rights. Copyprotection of musical recordings and cable television transmissions is examined in order to ascertain the success with which electronic copyprotection can supplement copyright without abridging users' rights. Finally, the problem of computer software piracy is reexamined with a view toward enhanced protection through a partnership of technology and law.

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[14] *See* OTA, *supra* note 1, at 100 (ease with which copyrighted works can be duplicated by individuals in privacy of their home makes litigation difficult). *See generally* POSNER, ECONOMIC ANALYSIS OF LAW 434-38 (1977) (high transaction cost involved in litigation); SALONE, HOW TO COPYRIGHT SOFTWARE 175 (1984) (enforcing copyright varies depending on nature of infringer).

[15] *See supra* notes 7, 12-13.

[16] *See infra* notes 53-54, 69, and 130-136. *See generally* OTA, *supra* note 1, at 117 nn. 56-58 (consideration of various software protection methods).

[17] 847 F.2d 255 (5th Cir. 1988).

[18] *Id.* at 266.

[19] *Id.*

I. PROTECTION OF INTELLECTUAL PROPERTY

The United States Constitution provides that authors and inventors shall have a limited monopoly in the products of their work.[20] Although the immediate benefits inure to the individual the economic incentives are intended primarily to benefit the general public by stimulating creativity and disclosure.[21] The laws of patent, copyright and trade secret are the primary forms used to define and insure this balance. However, since the potential universe of such rights literally includes all that can be imagined, some ideas and expressions are not adequately protected by any one or any combination of these safeguards.[22] Additional protection is derived from contractual licensing agreements[23] and from statutory hybrids which are specifically designed to address the needs of a particular type of product.[24] In the age of sophisticated electronics, increasing attempts are made to develop technological

[20] *See* U.S. CONST. art. I, § 8, cl. 8, which provides that Congress shall have the power "[t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and discoveries." *Id.*

[21] *See, e.g.,* Twentieth Century Music Corp. v. Aiken, 422 U.S. 151, 156 (1975) (Constitution "reflects a balance of competing claims upon the public interest", and that private incentives must ultimately secure broad availability of creative works to society as a whole); Kendall v. Winsor, 62 U.S. 322, 327-328 (1858) (limited monopoly was never designed for exclusive benefit of authors and inventors; benefit to public at large was primary object of monopoly). *See* NEITZKE, A SOFTWARE LAW PRIMER, 1-38 (1984) (general public will benefit if limited monopoly granted to inventor).

[22] *See infra* note 46 and accompanying text.

[23] *See* Note, *Tear-Me-Open Software License Agreements: A Uniform Commercial Code Perspective On An Innovative Contract of Adhesion,* 7 COMPUTER L. J. 261, 262 (1986). "[A shrink-wrap license] consists of a printed agreement placed on the outside of a computer diskette or cassette package . . . enabling the potential customer to read the contract without opening the wrapper." *Id. See generally* Note, *Archival Backup Copying of Software: How Broad A Right?,* 14 RUTGERS COMPUTER AND TECHNOLOGY L. J., 391, 396-403 (1988) (main purpose of shrink-wrap licensing is to avoid transfer of ownership of computer program); Note, *Defining the Scope of Copyright Protection for Computer Software,* 38 STAN. L. REV. 497, 505 (1986) (although courts have not decided whether shrink-wrap licenses are enforceable they probably will not be upheld); E. KEET, PREVENTING PIRACY: A BUSINESS GUIDE TO SOFTWARE PROTECTION, 97-109 (1985) (general overview of contract protection regarding computer software).

[24] *See infra* notes 46-49 and accompanying text.

protection of intellectual property.[25] Efforts to protect computer programs have involved each of these legal and extra-legal techniques.

A. Patents

A patent is in many respects the most powerful legal protection available, providing the patentee an exclusive right to make, use or sell a product for seventeen years,[26] including protection against subsequent independent development.[27] The touchstones of a patent are a rigorous requirement of originality[28] and an inherent utility.[29] Thus, the Patent Act of 1952 is construed to pro-

[25] *See infra* notes 77-79 and 135-136 (discussing technological protection for software); 107-108 (technological protection for digital audio tape machines); 117 (technological protection used for cable television).

[26] 35 U.S.C. § 154 (1984). "Every patent shall . . . grant to the patentee . . . for the term of seventeen years . . . the right to exclude others from making, using, or selling the invention throughout the United States. . ." *Id. See, e.g.,* Zenith Radio Corp. v. Hazeltine Research, Inc. 395 U.S. 100, 135 (1969) ("patentee has exclusive right to manufacture, use and sell his inventions"), *rev'd,* 401 U.S. 321 (1971); Bement v. National Harrow Co., 186 U.S. 70, 88-89 (1902) (owner of patent has right to sell or keep patent, manufacture patented article or license others to manufacture it, or sell article or allow others to sell it). The patent holder may "sell" his exclusive rights by granting them to another and may at the same time retain any other rights not conferred. Bauer v. O'Donnell, 229 U.S. 1, 15 (1912).

[27] *See, e.g.,* SCM Corp. v. Xerox Corp., 645 F.2d 1195, 1204 (2d Cir. 1981) (patentee is within lawful right when excluding others from using patent during statutory period), *cert. denied,* 455 U.S. 1016 (1982); Carson Prods. Co. v. Califano, 594 F.2d 453, 461 (5th Cir. 1979) (patent totally exclusionary for period granted); Cataphote Corp. v. Hudson, 422 F.2d 1290, 1294 (5th Cir. 1970) (patent protects against unlicensed use even where process is discovered by individual research), *aff'd,* 444 F.2d 1313 (1971).

[28] 35 U.S.C. § 102 (1984). "A person shall be entitled to a patent unless (a) the invention was known or used by others . . . or patented or described in a printed publication . . . before the invention thereof by the applicant . . . or (f) he did not himself invent the subject matter . . . " *Id.;* 35 U.S.C. § 103 (1984). "A patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious . . . to a person having ordinary skill in the art to which the subject matter pertains." *Id.*
On the requirement of first inventorship, *see, e.g.,* Alexander Milburn Co., v. Davis Bournonville Co., 270 U.S. 390, 393-94 (1925) (there may be two original inventions only earlier filed patent may establish prior knowledge or invention); *In re* Frilette, 412 F.2d 269, 274 (C.C.P.A. 1969) (statute gives right of patent to first inventor). On the requirement of non-obviousness, *see, e.g.,* Monroe Auto Equip. Co. v. Heckethorn Mfg. & Sup. Co., 332 F.2d 406, 414 (6th Cir. 1964) (patent lacks invention if it is obvious), *cert. denied,* 379 U.S. 888 (1964); *In re* Lechene, 277 F.2d 173, 177 (C.C.P.A. 1960) (patent cannot be obtained if subject matter is obvious to those having skill in the art to which the subject matter pertains).

[29] 35 U.S.C. § 101 (1984). "Whoever invents any . . . new and useful process . . . may obtain a patent therefor . . . ." *Id. See, e.g.,* Brenner v. Manson, 383 U.S. 519, 528-529

vide patent protection to a sufficiently novel and nonobvious process that utilizes a computer[30] but not to computer software itself which, though an item of great utility, is more akin to a literary expression.[31] Therefore, although the first computer programs were patented, today patents are not well suited for most mass-marketed software.[32]

B. Copyrights

Copyrights are counterparts to patents in that while a patent protects an idea (as embodied in a useful product), a copyright protects the expression of ideas.[33] The expression must be an

(1966) (only that which is useful can be patented); Atlantic Works v. Brady, 107 U.S. 192, 200 (1882) (patent law rewards those who advance useful arts). It is contended that the utility requirement does not insist that the invention is more effective than previous products but, rather, that it is operable to the extent of the useful function assigned to it. *Compare* Studiengesellschaft Kohle v. Eastman Kodak Co., 616 F.2d 1315, 1339 (5th Cir.) (product of patented process is useful if it serves identifiable purpose beyond being end product of chemical reactions, without regard to commercial viability), *cert. denied*, 449 U.S. 1014 (1980) *with* McDonnell Douglas Corp. v. United States, 670 F.2d 156, 162-163 (Ct. Cl. 1982) (inadequate computer simulation not reduction to practice and not protected though useful in subsequent development of operable product).

[30] Diamond v. Diehr, 450 U.S. 175, 191-93 (1981) (upholding patentability of process which used computer programmed to receive temperature data to determine optimal time to remove rubber from a press and which automatically opened press at determined time). The court viewed the claim as a process for curing rubber rather than an application of a well known mathematical formula. *Id.* at 191-92. *But see Id.* at 207 (Stevens, J., dissenting) (there is nothing in patent application that suggests anything unusual about temperature reading devices).

[31] *See* Parker v. Flook, 437 U.S. 584, 594-596 (1978) (denying patent protection to program designed to calculate an "alarm limit" for use in connection with widely known catalytic conversion process); Gottschalk v. Benson, 409 U.S. 63, 71-73 (1972) (denying patent protection to program which converted binary-coded decimal numbers into pure binary form). *See generally* R. NIMMER, THE LAW OF COMPUTER TECHNOLOGY § 2.05 (1985) (subject matter requirement makes patentability of computer program unlikely); Note, *Combating Software Piracy: A Statutory Proposal To Strengthen Software Copyright*, 34 DE PAUL L. REV. 993, 1004-1005 (1985) (reconciliation of case law demonstrates that software programs not within patent protection).

[32] *Diamond*, 450 U.S. at 195 (Stevens, J., dissenting) (well established principles of patent law prevent issuance of patent to almost any conceivable computer program). "[D]irect attempts to patent programs have been rejected on the ground of nonstatutory subject matter. Indirect attempts . . . by drafting claims as process . . . should not be permitted, . . . [r]eliable searches would not be feasible or economic because of the tremendous volume of prior art being generated." *Id.* (*quoted in* Gottschalk v. Benson, 409 U.S. 63, 72 (1972)). The "mental steps" doctrine excludes processes involving mental operations from patentable subject matter. *See, e.g., Diamond* at 195; *In re* Meyer, 688 F.2d 789, 794-95 (C.C.P.A. 1982).

[33] *See* 17 U.S.C. § 102 (a-b) (1977). "Copyright protection subsists . . . . in original works of authorship fixed in any tangible medium of expression . . . . In no case does copyright

original one which is fixed in a tangible form.[34] Copyright originality is satisfied by any work of original authorship without regard to the uniqueness or merit of the expression.[35] A "tangible" medium includes both that which is directly perceivable and that which can be perceived with the aid of a machine.[36]

Computer software is protected under the Copyright Act.[37] Conceptually, it is the most appropriate protection for the expression embodied on software,[38] but because software is also a utilitarian item, problems arise in defining what is protected and which uses of software should be permitted.[39] Furthermore, because software is especially susceptible to copying, the protection of

protection . . . extend to an idea . . . regardless of the form in which it is described . . . ." *Id. See also* Welles v. Columbia Broadcasting Sys., 308 F.2d 810, 814 (9th Cir. 1962). "[I]deas per se are not copyrightable . . . ." *Id.* Thus, an author may borrow another's idea though expressed in a copyrighted form. *See, e.g.,* Mazer v. Stein, 347 U.S. 201, 218 (1954) (form rather than mechanical or utilitarian aspects of artistic item protected). *See also* Atari, Inc. v. Amusement World, Inc., 547 F.Supp. 222, 227 (D. Md. 1981) (copyright on ASTEROIDS video game was not infringed by game METEORS which borrowed idea of shooting at space rocks and enemy spaceships while avoiding contact with either).

[34] *See supra* note 33.

[35] *See, e.g.,* Original Appalachian Artworks, Inc. v. Toy Loft, Inc., 684 F.2d 821, 824 (11th Cir. 1982) (element of originality is essential in order to copyright work); Alfred Bell & Co. v. Catalda Fine Arts, Inc., 191 F.2d 99, 103 (2d Cir. 1951) (constitution and statute require that author's contribution be more than "merely trivial" it must be "his own"). *See generally* R. NIMMER, COPYRIGHT § 2.01 (1981) (discussing general qualifications for obtaining copyright protection).

[36] 17 U.S.C. § 102 (a) (1977). ". . . [F]ixed in any tangible medium of expression, now known or later developed, from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device." *Id.* Prior to 1909, the fixation of expression had to be in a form directly perceivable by humans. *See* White-Smith Music Pub. Co. v. Apollo Co., 209 U.S. 1, 7-8 (1908) (perforated piano rolls held not to be copies of compositions because they could not be visually perceived).

[37] 17 U.S.C. § 101 (Supp. 1988). "Defining a computer program for purposes of the Copyright Act as "a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result." *Id. See* H.R. REP. No. 1476, 94th Cong., 2d Sess. 54, *reprinted in* 1976 U.S. CODE CONG. & ADMIN. NEWS 5659, 5667 ("literary works . . . includes . . . computer programs"); *see, e.g.,* Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240, 1249 (3d Cir. 1983) (computer program is 'literary work' within meaning of 17 U.S.C. § 101 regardless of whether in source or object code), *cert. dismissed,* 464 U.S. 1033 (1984).

[38] *See supra* notes 32-36 and accompanying text. *See also,* CONTU Report, *infra* note 53, at 11.

[39] *Cf.* Mazer v. Stein, 347 U.S. 201, 218 (1954) (holding that designer lamps were copyrightable because design separable from lamp). *But cf.* Esquire, Inc. v. Ringer, 591 F.2d 796, 806 (D.C.Cir. 1978) (artistic contemporary design for outdoor lighting held uncopyrightable), *cert. denied,* 440 U.S. 908 (1979).

The permissible uses of software, as laid out in §117, are a by-product of the general incompatibility of utilitarian objects and the copyright laws. *See infra* note 61.

copyright, though appropriate, is often not effective.[40]

C. Trade Secrets

A trade secret protects particular information, processes and designs which give a business a competitive advantage.[41] The most significant element of a trade secret is that it is in fact a secret, at least to the extent that it would be difficult to acquire the information except through improper means.[42] This implies both a requirement that the information was developed through substantial effort and that measures are taken to protect its secrecy.[43] These aspects of the secrecy component render the protection inappro-

[40] *See supra* notes 7, 10-14 and *infra* notes 133-35.

[41] *See* RESTATEMENT OF TORTS § 757, comment b (1939), which provides that "[a] trade secret may consist of any formula, pattern, device or compilation of information which is used in one's business, and which gives him an opportunity to obtain an advantage over competitors who do not know or use it." *Id. See, e.g.*, Van Prods. Co. v. General Welding & Fabricating Co., 419 Pa. 248, 257, 213 A.2d 769, 778 (1965) (like patents, a trade secret must be novel to be protected). *See* Wilken v. Sunbeam Corp., 377 F.2d 344, 346-47 (10th Cir.), *cert. denied*, 389 U.S. 973 (1967). On the other hand, a trade secret need not involve a substantial element of inventiveness; it is sufficient that the process or information is original in the copyright sense. *Cf.* Town and Country House and Home Servs., Inc. v. Evans, 150 Conn. 314, 317, 189 A.2d 390, 393 (1963) (customer lists may be trade secrets); Allen Mfg. Co. v. Loika, 145 Conn. 509, 512, 144 A.2d 306, 309 (1958) (although components of trade secret are widely available, their successful combination may be protected). *See generally* NIMMER, *supra* note 35, at § 3.04 (discussing scope of trade secret subject matter requirements).

In the context of computer software, a trade secret often consists of a particular combination of well known processes for a commercial purpose. *See, e.g.*, Motorola Inc. v. Fairchild Camera & Instrument Corp., 366 F. Supp. 1173, 1186 (D. Ariz. 1973) (trade secrets revealed in product, fully disclosed in patents, generally known to those skilled in trade, or easily acquired by persons in industry through patents, literature or known processes). *See also* Com-Share, Inc. v. Computer Complex, Inc., 338 F. Supp. 1229 (E.D. Mich. 1971) (though existing systems contained similar concepts, functions and common base they differ as to combination and design employed), *aff'd*, 458 F.2d 1341 (6th Cir. 1972).

[42] *Compare* Bowser, Inc. v. Filters, Inc., 398 F.2d 7, 9-10 (9th Cir. 1968) (not misappropriation where defendant learned of trade secret from general commercial sources and independent deduction) *with* Tri-Tron Int'l v. Velto, 525 F.2d 432, 435-436 (9th Cir. 1975) (misappoprition where trade secret information obtained through unsuccessful negotiation and independent deduction).

[43] *See, e.g.*, Space Aero Prods. Co. v. R.E. Darling Co., 238 Md. 93, 102, 208 A.2d 74, 82-84, *cert. denied*, 382 U.S. 843 (1965). The relative amount of secrecy required varies with the circumstances. *See* UNIFORM TRADE SECRET ACT § 1 (trade secret protected so long as there are "efforts that are reasonable under the circumstances to protect its secrecy."). *Compare* Dickerman Assocs. v. Tiverton Bottled Gas Co., 594 F. Supp. 30, 34 (D. Mass. 1984) (written confidentiality agreement appropriated) *with* Kozuch v. CRA-MAR Video Center, Inc. 478 N.E.2d 110, 113 (Ind. Ct. App. 1985) (oral instructions regarding confidentiality appropriate).

priate in most mass-marketed software contexts because the functions and structures of programs are generally apparent to skilled users.[44] While contractual licensing arrangements can, with great success, supplement trade secret protection in some situations, the cost of implementing and enforcing such arrangements is prohibitive for application to most computer software.[45]

D.   Sui Generis Protections

The scope of protection afforded intellectual property through patent, copyright and trade secret law, although extensive, is not complete.[46] Certain products do not fit neatly into any of the safeguards, but Congress has been reluctant to tailor new categories of protection.[47] On occasion, however, a hybrid is deemed desirable to address the needs of a particular product. In 1984, such protection was provided for mask works on semi-conductor chips[48] and a strong argument has been made that a similar ap-

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[44] NIMMER, *supra* note 35, at § 3.01. Once marketed, the "secrets" of a computer program are generally apparent to users with technical skill. *Id*. Moreover, in an environment where skilled employee mobility and entrepreneurship are common, such as in the computer industry, secrecy is difficult to maintain. *Id*.

[45] *See* M. Gilburne, "The Proprietary Rights Pyramid: An Integrated Approach To Copyright and Trade Secret Protection for Software," 1 The Computer Lawyer, 2-9 (1984). For example, licensing agreements to supplement trade secret protection for basic software, such as a typical spreadsheet program, would not be economically sound because, due to the large number of copies sold the relatively low price of the software, and the availability of alternative products, a licensing agreement would be difficult to enforce and would create a disincentive to purchase. *Id*. On the other hand, "vertical market" software, such as a system to handle airline reservations, has relatively few customers, a relatively high price, and generally would involve detailed contractual arrangements apart from trade secret maintenance therefor involving minimal marginal cost and disincentives to purchase. *Id*.

[46] *See, e.g.*, Gottschalk v. Benson, 409 U.S. 63, 71-72 (1972) (discoveries of principles of nature are excluded from patent protection); Graham v. John Deere Co., 383 U.S. 1, 11-12 (1966) (mathematical formulae not protected); O'Reilly v. Morse, 56 U.S. 62, 112-113 (1853) (holding that while Morse could patent use of electromagnetism to produce telegraphic signals, he could not for electromagnetism "however developed"). *See generally* Samuelson, *Creating a New Kind of Intellectual Property - Applying the Lessons of the Chip Law to Computer Programs*, 70 MINN. L. REV. 471, 490 (1985) (discussing "gaps" between patent and copyright law).

[47] *See* Samuelson, *supra* note 46, at 472-74. The Semiconductor Chip Protection Act of 1984 was the first new federal intellectual property law in over 100 years. N.Y. Times, Oct, 1984 at 1, col. 4. *Cf.* CONTU Report, *infra* note 53, at 6. The majority of CONTU commissioners decided against recommending enactment of a special law; they support the enactment of an amendment to the existing copyright law to include protection of computer programs. *Id*.

[48] Semiconductor Chip Protection Act of 1984, PUB. L. No. 98-620, tit III, 98 Stat. 3347

proach should be adopted for software.[49] Many practical consider-
ations advise against special legislation,[50] however, it is submitted
that any future changes in the legal protection afforded software
will occur within the framework of the copyright laws.

II. COPYRIGHT PROTECTION FOR SOFTWARE

Computer programs were first registered with the copyright of-
fice in 1964[51] and were classified as "books" for purposes of the
Copyright Act.[52] A decade later Congress established the National
Commission on New Technological Uses of Copyrighted Works
(CONTU) to research issues related to comprehensive revisions of
the copyright law as it applied to computer software.[53] In 1976,
before CONTU submitted its final recommendations, Congress
amended the Copyright Act to bring computer programs within
its protections.[54] It took subsequent case law, however, to deter-

(codified at 17 U.S.C. §§ 901-914 (Supp. 1988)).

[49] *See* Computer Software Copyright Act of 1980, Act of Dec. 12, 1980, PUB. L. No. 96-
517 § 10, 94 stat. 3028 (codified at 17 U.S.C. §§ 101, 117) (1977)); Samuelson, *supra* note
46, at 507-531. The most compelling reasons for *sui generis* protection for software stem
from its utilitarian nature and the ineffectiveness of copyright laws in providing protection
or establishing limitations on protection. *Id.*

[50] *See Id.* at 481-484. Among the principal practical considerations are the history of
expanding existing bodies of intellectual property law thereby securing a wealth of legal
precedents, including stability with regard to international protection. *Id. See also* S. REP.
No. 425, 98th Cong. 2d Sess. at 12 (1984) ("Copyright system is not only adequate, but
well suited to task at hand.").

[51] *See* Bigelow, *The Challenge of Computer Law*, 7 W. NEW ENG. LAW REV. 397, 401 (com-
puter programs were given "benefit of the doubt" and allowed to be registered for copy-
rights as "literary works"). *See generally* COPYRIGHT OFFICE CIRCULAR, 31 COPYRIGHT L. REP.
(CCH) P 15023 (March 1977).

[52] *See* D. BROOKS & M. KEPLINGER, COMPUTER PROGRAMS & DATA BASES: PERFECTING, PRO-
TECTING & LICENSING PROPRIETARY RIGHTS AFTER THE 1980 COPYRIGHT AMENDMENTS 152
(1981); F. COOPER, LAW AND THE SOFTWARE MARKETEER 35 (1988).

[53] *See* FINAL REPORT OF THE NATIONAL COMMISSION ON NEW TECHNOLOGICAL USES OF
COPYRIGHTED WORKS, [hereinafter CONTU] 20 (1978), *reprinted in substantial part*, 3 Com-
puter L. J. 53 (1981). CONTU's members were appointed by the President and were to
include authors, people who used the copyright material and the general public. *Id.* The
commission stated in part that:
> CONTU was created to provide the President and Congress with recommendations
> concerning those changes in copyright law or procedure needed both to assure pub-
> lic access to copyrighted works used in conjunction with computer and machine du-
> plication systems and to respect the rights of owners of copyrights in such works,
> while considering the concerns of the general public and the consumer.

Id. at 1.

[54] 17 U.S.C. § 117 (1978 & Supp. 1988); *See* H.R. REP. No. 1476, 94th Cong., 2d Sess.
54, *reprinted in*, 1976 U.S. CODE CONG. & ADMIN. NEWS 5659, 5667 (" '[L]iterary works' . . .

mine that copyright protected both source and object code,[55] video display,[56] the sequencing of a program[57] and ROM chips.[58] In 1978, CONTU issued its final report[59] concluding that copyright protection is needed for computer programs in order to promote their production,[60] but recommended that the Act be

includes . . . computer programs.") 17 U.S.C. § 101 (1982 & Supp. 1988). This section defines literary works as "works, other than audiovisual works, expressed in words, numbers, or other verbal or numerical symbols or indicia, regardless of the nature of the material objects, such as books, periodicals, manuscripts, phonorecords, film, tapes, disks or cards in which they are embodied." *Id.*; Bender, *Software Protection: The 1985 Perspective,* 7 W. NEW ENG. L. REV., 405, 420 (1985) (stating CONTU's proposals were incorporated as recommended in Computer Software Copyright Act of 1980). *See also* Vault Corp. v. Quaid Software Ltd., 847 F.2d 255, 259 n.5 (5th Cir. 1988) (citing H.R. REP. No. 1476, 94th Cong., 2d Sess. 54 (1976); Act of Oct. 19, 1976, PUB. L. No. 94-553, 1976 U.S. CODE CONG. & ADMIN. NEWS (90 Stat.) 2541. The amendment came as a response to the "wide range of new techniques for capturing and communicating printed matter, visual images, and recorded sounds [that] have come into use, and the increasing use of information storage and retrieval devices, communications satellites, and laser technology. . . ." H.R. REP. No. 1476, 94th Cong, 2d Sess. 54, *reprinted in,* 1976 U.S. CODE CONG. & ADMIN. NEWS 5659, 5660. The Court in *Vault* agreed with CONTU's recommendation that there should be limitations imposed so that only those individuals in rightful possession of the program copies are freely able to use them without fear of copyright infringement. *Vault,* 847 F.2d at 260.

    [55] Apple Computer, Inc. v. Franklin Computer Corp. 714 F.2d 1240, 1246-1250 (3d Cir. 1983) (affirming copyrightability of software as application programs, operating programs, in either object or source code or embodied in ROM for first time), *cert. dismissed,* 464 U.S. 1033 (1984).

    [56] *See* Stern Elecs., Inc. v. Kaufman, 669 F.2d 852, 855 (2d Cir. 1982) (court found that images and sounds from game screen qualify for copyright protection as audiovisual work); Midway Mfg. Co. v. Strohon, 564 F. Supp. 741, 749 (N.D. Ill. 1983) (copyright protected audiovisual aspect of game).

    [57] Whelan Assoc. Inc. v. Jaslow, 797 F.2d 1222, 1248 (3rd Cir. 1986) (copyright protection extends to "structure, sequence and organization" of software program), *cert. denied,* 479 U.S. 1031 (1987); SAS Institute, Inc. v. S&H Computer Systems, Inc., 605 F. Supp. 816, 831 (M.D. Tenn. 1985) (conclusion of infringement based on copying of organization and structural details). *But see* Plains Cotton Cooperative Assoc. v. Goodpasture Computer Service, Inc., 807 F.2d 1256, 1262 (5th Cir. 1987) (rejecting *Whelan*), *cert. denied,* 108 S.Ct. 80 (1987).

    [58] *See* William Elecs., Inc. v. Artic Int'l, Inc., 685 F.2d 870, 877 (3rd Cir. 1982) (computer ROM chip is copyrightable); Tandy Corp. v. Personal Micro Computers, Inc., 524 F. Supp. 171, 173 (N.D. Cal. 1981) (copying of ROM chip violated 1976 Copyright Act).

    [59] *See* CONTU, *supra* note 53.

    [60] *See* CONTU, *supra* note 53, at 11. The Commission concluded that copyright protection is necessary for computer programs. *Id. But see id.* at 27. (Commissioner Hersey, dissenting) (copyright protection is unnecessary). "In all the months of its hearings and inquiries, this Commission has not been given a single explicit case of a computer 'rip-off' that was not amenable to correction by laws other than copyright." *Id.* at 30; Apple Computer, Inc. v. Formula Int'l Inc., 562 F. Supp. 775, 781 (C.D. Cal. 1983), *aff'd,* 725 F.2d 521 (9th Cir. 1984) (citing Comissioner Hersey, also dissenting in CONTU report, recommending limited protectability for computer programs); CONTU, *supra* note 53, at 26. (Commissioner Nimmer, concurring) (the proposed law is too broad and becomes general missap-

amended to permit the "rightful possessor" of a program to back-up and or adapt a program.[61] Congress enacted CONTU's proposed amendments with only one change in the language.[62]

propriation law). "[I]t may prove desirable to limit copyright protection for software to those computer programs which produce works which themselves qualify for copyright protection." *Id.* at 27. *See generally* R. STALLMAN, GNU EMACS MANUAL 175-84 (1st ed. 1985) (cited in Walters, *Defining The Scope of Software Copyright Protection For Maximum Public Benefit*, 14 RUTGERS COMPUTER AND TECHNOLOGY L. J., 1, 3 n.13 (1988)) (arguing against extending copyright to computer software); S. Breyer, *The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies, and Computer Programs*, 84 HARV. L. REV. 281, 340-350 (1970) (proponents of copyright for computer software do not make convincing case).

  [61] CONTU, *supra* note 53, at 13. The report states that:
> One who rightfully possess a copy of a program, therefore, should be provided with a legal right to copy it to that extent which will permit its use by that possessor. This would include the right to load it into a computer and to prepare archival copies of it to guard against destruction or damage by mechanical or electrical failure.

Id.; see Note, Rutgers *supra* note 23, at 392. The right to make back up copies is "essential because electronically stored information" is especially vulnerable to destruction in many ways. *Id.* "[A] user is at least somewhat negligent if he does not make copies of his programs." *Id.* "[There are] two reasons [for this] 1) one cannot see by visual inspection if a program is intact; and 2) operator error or program 'glitches' can quickly destroy a program." OTA, *supra* note 1, at 102 n. 14. (citing personal communication from Edward Conklin, *Forth, Inc.*, July 23, 1985). Computer programs can easily be destroyed by a number of environmental factors such as a speck of dust, smoke, a minor scratch, or bending the floppy disk. (Telephone Interview with Jonathan Thaler, Systems Programmer and Analyst, CBS Records (Oct. 13, 1988)). However, making archival copies would probably be held an act of copyright infringement because it involves making a "fixed" reproduction of the work. Stern, *Section 117 Of The Copyright Act: Charter of The Software User's Rights Or An Illusory Promise?* 7 W. NEW ENG. L. REV. 459, 466 (1985). It can be argued that back-up copying is a "fair-use" of the copyrighted work. *Id.* Recent cases have rejected the premise. *See, e.g.*, Hubco Data Prods. Corp. v. Management Assistance, Inc., 219 U.S.P.Q. (BNA) 450 (D.C. Idaho 1983); Midway Mfg. Co. v. Strohon, 564 F. Supp. 741 (N.D. Ill. 1983); Micro-Sparc, Inc. v. Amtype Corp., 592 F.Supp. 33 (D.C.Mass. 1984).

  [62] 17 U.S.C. § 117 (Supp. 1988) ("rightful possessor" was changed to "owner"). This section states that:
> [N]otwithstanding the provisions of section 106 ([17 U. S. C. § 106]), it is not an infringement for the *owner* of a copy of a computer program to make or authorize the making of another copy or adaptation of that computer program provided:
>   (1) that such a new copy or adaptation is created as an essential step in the utilization of the computer program in conjunction with a machine and that it is used in no other manner, or
>   (2) that such a new copy or adaptation is for archival purposes only and that all archival copies are destroyed in the event that continued possession of the computer program should cease to be rightful.
> Any exact copies prepared in accordance with the provisions of this section may be leased, sold or otherwise transferred along with the copy from which such copies were prepared, only as part of the lease, sale, or other transfer of all rights in the program. Adaptations so prepared may be transferred only with the authorization of the copyright owner.

Id. [emphasis added]. CONTU proposed that computer programs would be considered within the parameters of copyright provided that "they contained sufficient original authorship . . . they had published, and . . . copies submitted for registration were in human

49

By granting software consumers the right to adapt or back-up their program, section 117 appeared to define the scope of copyright protection for software.[63] However, as is the case in most copyright contexts, litigation is economically feasible only in cases involving commercial infringement. As a result, judicial interpretations of section 117 are sparse. The cases in which it has been an issue involved commercial infringement and in most of these the defendant was charged with contributory infringement[64] for developing and marketing a product that enables others to violate the plaintiff's copyright.[65] The defense in these cases attempts to justify the defendants' activities as legitimate under section 117, claiming that the alleged infringements are designed to enable

readable form." CONTU *supra*, note 53, at 15. *See also* 17 U.S.C. § 101 (Supp. 1988) (computer program is "a set of instructions to be used directly or indirectly in a computer in order to bring about a certain result.").

The CONTU report is considered by the courts to represent the legislative history of § 117. *See* Vault Corp. v. Quaid Software, Ltd., 847 F.2d 255, 260-61 (5th Cir. 1988) The Act's legislative history, contained in a committee report, merely states that the Act, "embodies the recommendations of [the CONTU] with respect to clarifying the law of computer software." *Id.* at 260 (citing H.R. REP. No. 1307 96th Cong. 2d Sess., Pt.1, at 23, reprinted in 1980 U.S. CODE CONG. & ADMIN. NEWS 6460, 6482). *See also Formula*, 725 F.2d at 524 (CONTU report was adopted almost verbatim by Congress); Atari, Inc. v. JS & A Group, Inc., 597 F. Supp. 5, 9 (N.D. Ill. 1983) (CONTU Report used to ascertain legislative intent behind § 117); *Micro-Sparc*, 592 F. Supp. at 35 n.7 (CONTU Report represents the entire legislative history behind § 117); *Midway*, 564 F. Supp. at 750 n. 6. (same).

[63] *See supra* note 62 (section 117 of Copyright Act sets out in detail protections provided). CONTU's rationale for enacting section 117 was to allow those who own copies of programs to place them in their computers without the risk of infringement. Contu *supra* note 53, at 13. CONTU urged that section 117 also to allow owners to make the necessary adaptations so that a generic computer program can be adapted to an individual user's computer. *Id.*

[64] *See* Sony Corp. v. Universal City Studios, 464 U.S. 417, 439 (1984). Contributory infringement lies when the defendant sells a product with constructive knowledge that the customer may use the equipment to make unauthorized copies of copyrighted works. *Id.* The product cannot be capable of "substantial noninfringing uses." *Id.* at 442. *Cf.* 35 U.S.C. § 271(b). The statute designates anyone who "actively induces infringement of a patent" to be an infringer. *Id.*; 35 U.S.C. § 271 (c) (imposes liability on "contributory" infringers).

[65] *See Hubco*, 219 U.S.P.Q. (BNA) at 451 (marketing of product designed to enable owners to upgrade programs to greater capacity); *Midway*, 564 F. Supp. at 741 (marketing modification program designed to complicate program for PAC-MAN video game); *Atari*, 597 F. Supp. at 5 (marketing device for duplication of copyrighted video games). For examples of direct commercial infringement without a charge of contributory infringement, see *Micro-Sparc*, 592 F. Supp. at 33 (marketing of programs in diskette form to owners of program in print form); Apple Computer, Inc. v. Formula Int'l., Inc., 562 F. Supp. 775 (C.D. Cal. 1983) (marketing of operating program on ROM-chip in violation of license), *aff'd*, 725 F.2d 521 (9th Cir. 1984). *See generally* Bender, *supra* note 54, at 468-78 (discussing development of case law under section 117).

software owners to exercise their statutory rights to adapt or back-up their programs.[66] Under the rule articulated in *Sony Corp. v. Universal City Studios, Inc.*,[67] a substantial legitimate use of a product will justify its production in spite of the fact that it may also enable significant copyright infringement.[68]

In an effort to uphold some form of copyright protection for software manufacturers, courts have rejected the defense by giving a narrow construction to section 117.[69] In some situations, however, this construction may have the practical effect of providing unequal protection for similarly situated software owners. For example, some software owners may find that they cannot avail themselves of outside help to adapt their programs,[70] others may find their right to copy limited to making only RAM copies,[71] and others may be able to copy a program only where they can prove their medium is subject to mechanical or electrical failure.[72]

The right to adapt a program is, arguably, less susceptible to concrete legal parameters than its statutory counterpart of archival copying since it can take many different forms involving a wide range of activity.[73] The principal difficulty, then, from the point

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[66] *See, e.g., Hubco,* 219 U.S.P.Q. (BNA) at 456-57 (defendant argued that § 117 legitimized its activities); *Midway,* 564 F. Supp. at 744-745 (same); *Atari,* 597 F. Supp. at 9 (court rejected applicability of § 117); *Micro-Sparc,* 592 F. Supp. at 34 (JS & A invoked § 117 as a defense); Apple Computer, Inc. v. Formula Int'l, Inc., 594 F. Supp. 617, 619 (C.D. Cal. 1984) (contempt proceeding).

[67] Sony Corp. v. Universal City Studios, Inc., 464 U.S. 417 (1984).

[68] *Id.* at 440-56 (finding that Betamax capability of "commercially significant non-infringing uses" was dispositive on issue of actionable contributory infringement).

[69] *See, e.g.,* RAV Communications, Inc. V. Philipp, Bros., Inc., No. 87 Civ. 33676 (S.D.N.Y. April 13, 1988) (LEXIS, Genfed library, Dist file) (statute should be given narrow construction).

[70] *See Hubco,* 219 U.S.P.Q. (BNA) at 456 (Hubco could not avail itself of the "owner" exception the implication being that an "owner" with enough technical expertise could avail itself of exception and make adaptation); *Micro-Sparc,* 592 F.Supp. at 34-35. (without purchasing second copy, only owners willing to input program manually could obtain it in diskette form).

[71] *Apple,* 594 F. Supp. at 620 (necessity to make copy exists only while program is in operation); *Micro-Sparc,* 592 F. Supp. at 34-35. (users may only input program in RAM-chip).

[72] *Atari,* 597 F. Supp. at 9 (right to make archival copy limited to when there is threat of damage by mechanical or electrical failure).

[73] *See, e.g.,* RAV Communications, Inc., v. Philipp, Bros., Inc., No. 87 Civ. 33676 (S.D.N.Y. April 13, 1988) (LEXIS, Genfed library, Dist file) (extent of adaptation permissible under statute to be determined); Midway Mfg. Co. v. Strohon, 564 F. Supp. 741, 746 (N.D. Ill. 1983) (finding of infringement based on copying not adaptation).

of view of a court interpreting this right, is to distinguish between adaptations which were within the purview of the statutory aims and those which, if allowed, would usurp the protections which copyright holders may legitimately expect.[74] The right to make archival copies, on the other hand, involves a very specific activity and one which is analogous to many other copyrighted products. The principle difficulty is merely one of enforcement since the same technology which enables this right to be exercised enables infringement to occur. Faced with such a scenario, a court is bound under *Sony* to allow infringement-enabling technology to be produced and marketed.[75]

In *Vault Corp. v. Quaid Software Ltd.*,[76] Vault, a computer software manufacturer, developed an electronic copyprotection it called PROLOK, which was designed to prevent unauthorized reproduction of copyrighted software.[77] The operational aspect of PROLOK was called a "fingerprint".[78] A copy of a program made from the PROLOK diskette would not contain the fingerprint and a computer could not operate the copied program.[79] Quaid developed a system for software reproduction called CopyWrite.[80] CopyWrite contained a feature called RAMKEY which was designed to unlock the fingerprint, thus enabling copies of PROLOK diskettes to be operational.[81]

Vault asserted that Quaid's product violated the Copyright

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[74] *Compare* CONTU, *supra* note 53, at 13 (right to make adaptation justified in a discussion of computer user's legitimate interest in using software) *with* RAV Communications, Inc. v. Philipps Brothers, Inc., No. 87 Civ. 33676 (S.D.N.Y. April 13, 1988) (Lexis, Genfed library, Dist file) (CONTU list is not exhaustive and an inquiry into scope and purpose of adaptation is required). *See also Midway*, 564 F. Supp. at 745 (where defendant concedes that statutory exception of 17 U.S.C. § 109, which deals with owner's right to resell or display original copy, should not be strained so as to justify modification kit).

[75] *Cf. supra* note 64 and accompanying text.

[76] 847 F.2d 255 (5th Cir. 1988).

[77] *Id.* at 256.

[78] *Id.* A PROLOK diskette is comprised of two parts: the fingerprint and the software program. *Id.* The fingerprint is a small mark physically placed on the diskette and contains information that cannot be altered or erased. *Id.*

[79] *Id.* The PROLOK programs interact with the fingerprint preventing a computer from operating unless it identifies the original diskette in the disk drive. *Id.*

[80] *Id.* at 257. Quaid first developed CopyWrite featuring RAMKEY in response to the original PROLOK diskette and has revised it corresponding to the updated versions of PROLOK. *Id.* at 257-58.

[81] *Id.* at 257. Essentially, RAMKEY informs the computer that the fingerprinted original is in the disk drive. *Id.*

Act[82] alleging, *inter alia*,[83] that Quaid was guilty of contributory infringement by producing a product that enabled computer users to misappropriate copyrighted programs.[84] Quaid successfully defended, arguing that since section 117 permitted an owner to make archival copies of programs, RAMKEY had a substantial non-infringing use and thus did not violate Vault's copyrights.[85] Therefore, even though RAMKEY also has the capacity to facilitate infringement,[86] and CopyWrite derives its primary commercial value from its ability to facilitate reproduction of copyprotected programs,[87] because statutory non-infringing uses were also facilitated by RAMKEY, its validity and legality remain unchecked.[88]

Recognizing the archival copy exception and the underlying policy considerations for protecting users' rights against the monopoly created for copyright holders, Vault asserted that their product represented a means to better satisfy the difficult balance required of intellectual property protection.[89] It claimed that owners of PROLOK software could make archival copies sufficient to protect against mechanical or electronic failure which it asserted were the concerns to which the archival exception was addressed.[90] The court acknowledged the appeal of this possible

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[82] Vault Corp. v. Quaid Software Ltd., 847 F.2d 255, 257 (5th Cir. 1988).

[83] *Id.* In addition to the claim of contributory infringement, Vault asserted that Quaid's activities were actionable on four other grounds: (1) that by loading the PROLOK program into the memory of their computer, Quaid violated §§ 501(a) and 106(1) of the Copyright Act; (2) that the second and latest version of RAMKEY contained a sequence of approximately 30 characters of source code which was identical to a portion of PROLOK's source code, and as such constituted a derivative work within the meaning of the Copyright Act; (3) that by decompiling Vault's program, Quaid violated a Louisiana statute providing for enforcement of shrink-wrap licensing agreements; (4) that the misappropriation violated the Lousiana Uniform Trade Secret Act. *Id.*

[84] *Id.* For a discussion of contributory infringement *see supra* note 64 and accompanying text. *See also* Sony Corp. v. Universal City Studios, Inc., 464 U.S. 417, 434-442 (1984) (background discussion of contributory infringement).

[85] *Vault,* 847 F.2d at 259, 261-262.

[86] *Id.*

[87] *Id.* at 258. (Quaid testified that without RAMKEY feature, CopyWrite would have no commercial value).

[88] *Id.* at 262.

[89] *Id.* at 266. For a discussion of the requisite balance in general terms, *see supra* note 21.

[90] *Vault,* 847 F.2d at 266. Vault demonstrated in court that the systems program recorded on PROLOK disks could be copied and stored, affording the owner protection against erasures to the extent that if the original was damaged due to electronic or mechanical failure, an archival copy of the program could be used to replace it on the

53

merging of statutory and technological copy-protection but felt compelled to dispense with the case in accordance with the current statutory provisions.[91] In doing so, the court suggested that the argument should be addressed to the legislature in order to effectuate a better balance of the competing interests.[92]

As indicated, misappropriation of computer software is rampant.[93] Other industries, such as cable television and the recording industry, face similar problems due to the ease with which copies can be made and the relative unenforceability of the laws protecting copyrights.[94] In each of these industries efforts have been made to protect copyright holders through extra-legal devices[95] and through the incorporation of technological safeguards into statutory schemes.[96] In spite of the limited success in this regard, the gravity of the problem and the difficulty associated with its resolution indicate that further attention to a merger of legal and technological protection of intellectual property is warranted and, consequently, forthcoming.[97]

III. THE RECORDING INDUSTRY: ADVENT OF DIGITAL AUDIO TAPE OPENS UP CONGRESSIONAL DIALOGUE

The recording industry, like the computer industry, is vulnerable to misappropriation of intellectual property because the ability to copy recordings is easily accomplished through unauthorized tape recording.[98] Unlike the computer industry, however, home

original PROLOK disk. *Id*. The court found the words "mechanical and electronic" failure as used in the CONTU report illustrative rather than exclusive. *Id*. at 266-67. *But see* Atari, Inc. v. JS & A, 597 F. Supp. 5, 9 (N.D. Ill. 1983) (no evidence that programs stored in ROM chips could be damaged by mechanical or electrical failure, archival exception does not apply). *See also* Micro-Sparc, Inc v. Amtype Corp. 592 F. Supp. 33, 35-36 (D.C. Mass. 1984) (archival exception does not apply to copying and selling programs which only appear in printed magazine format).

[91] *Vault*, 847 F.2d at 266. The court stated that "it is not our job to apply laws that have not been written." *Id*. (quoting Sony Corp. v. Universal City Studios, Inc. 464 U.S. 417, 456 (1984)).

[92] *Vault*, 847 F.2d at 261 n.13 (summary of extent of computer software piracy).

[93] *See supra* note 12.

[94] *See infra* notes 98, 100 and 112.

[95] *See infra* notes 108 and 117 and accompanying texts.

[96] *See infra* notes 107-109 and 120-121.

[97] *Cf. supra* text accompanying note 19. *But c.f.* Mace Utilities versim 4.10C (1985-87) (discussing potential dangers to software arising from technological protection).

[98] *See* OTA, *supra* note 1, at 100. ("By 1982, 52 percent of Americans over the age of

taping technology has generally involved diminution in quality from the original to the copy.[99] In spite of this, the recording industry asserts that it loses large amounts of money each year through taping,[100] and it has consistently lobbied for enhanced protection.[101] With the advent of digital recording and digital audio tape (DAT) for home use, misappropriated copies are now of the same fidelity as the originals the industry markets.[102]

Like computer software, musical compositions, whether embodied on paper or phonorecords, derive their principle protection from the Copyright Act.[103] Moreover, the relative unenforceability of the protection with respect to non-commercial infringement is prohibitive of litigation in these contexts.[104] The industry has attempted to secure additional protection in a variety of ways. Legislative compromises, such as a blank tape tax, have been unable to overcome resistance from consumer groups and blank tape manufacturers.[105] Although the industry successfully secured the

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13 had used audio tape machines within the previous two years to record phonograph records and other materials."). *See also supra* note 5.

[99] *See* OTA, *supra* note 1, at 102.

[100] *Id.* at 100. Surveys conducted by the International Federation of Phonogram and Videogram Producers indicate that one of four recordings sold worldwide and one of ten sold in the United States is a pirate copy. DiMauro, *Disk, Tape Piracy at 25% Level: Report Shows Some Countries Fight Back,* Variety, July 31, 1985 at 1, 92. Evidence collected for the Recording Industry Association of America suggested that in 1982 the industry sustained losses of more than $1.4 billion in sales. OTA at 101. A recent study conducted in Canada, commissioned by the Music Copyright Action Group asserted that the industry was losing $600,000,000 (Canadian) due to unauthorized copying, an amount "equal to current sales." Lapointe, *Canada Study: Copying is Rampant,* Billboard, March 19, 1988 at 1, col. 3. *But see,* BESEN, ECONOMIC ISSUES RELATING TO NEW TECHNOLOGIES AND INTELLECTUAL PROPERTY at 47-48 (1986) (these studies may grossly overestimate actual harm suffered by musical recording copyright proprietiors).

[101] *Cf. infra* notes 106-108.

[102] *See* OTA, *supra* note 1, at 102.

[103] *See* 17 U.S.C. § 106 (1977) ("Subject to sections 107 through 118, the owner of a copyright under this title has the exclusive rights to do and to authorize any of the following: (1) to reproduce the copyrighted work in . . . phonorecords; . . . (3) to distribute copies or phonorecords of the copyrighted work to the public by sale or other transfer of ownership, or by rental, lease or lending; . . ."). *See also* White-Smith Music Publishing Co. v. Apollo Co., 209 U.S. 1, 15 (1908) (musical compositions have been subject of copyright protection since 1831).

[104] *See supra* note 14 and accompanying text.

[105] *See* 132 CONG. REC. S7498 (daily ed. June 13, 1986) (statement of Senator Mathias) (tape tax provision eliminated from proposed Home Audio Recording Bill). Sales of blank audiocassette tapes in the United States exceeded $336 million in 1986. *'86 Blank Tape Sales Surge,* Billboard, July 18, 1987, at 6, col. 1. A recent attempt to enact a blank tape tax in England was defeated by a vote of 134-37. Hennessey, *U.K. Commons Rejects Tape Levy,*

passage of a record rental bill, the protection it provides is piece-meal at best,' and does not address large-scale commercial infringers.[106]

The introduction of DAT recorders into the United States has been successfully delayed through industry-wide efforts to secure legal protection against what is perceived to be the most signifi-cant threat to the industry's copyright protection to date.[107] Until recently, these efforts have centered around the CBS Copycode system which would have legislatively required that all DAT re-corders sold in the United States be equipped with an anti-copying chip.[108] This movement came to an impasse in the spring of 1988 when the National Bureau of Standards, commissioned by Con-gress to test the system, found that the Copycode system altered the sound reproduction of the machines and that it could be easily bypassed.[109] Although unsuccessful, the debate surrounding Copycode evidenced a congressional willingness to incorporate technological protections into a statutory provision. Although other technological and marketing strategies have been sug-gested,[110] and although the Recording Industry Association of America has threatened to sue any hardware manufacturer who attempts to sell DAT recorders in the United States,[111] it is sub-

Billboard, August 6, 1988 at 1, col. 3. Blank tape taxes have already been enacted in France, West Germany and Portugal, and have been proposed in Spain, Belgium, Italy and the Netherlands. Robertshaw, *Blank Tape Tax Levy Included in U.K. Copyright Reform*, Bill-board, July 11, 1987 at 1, col. 1, 74, col. 4.

[106] *See* 17 U.S.C. § 109 (1977 & Supp. 1988). A renewal of the bill has passed both houses of Congress. Holland, *Record Rental Bill Is Expected to Become Law*, Billboard, August 13, 1988 at 7, col. 1.

[107] *See* 133 CONG. REC. E.714 (daily ed. Mar. 3, 1987) (statement of Rep. Waxman) (dis-cussing DAT problem).

[108] *See* Holland, *House Panel Approves DAT Chip Bill*, Billboard, August 15, 1987, at 5, col. 5, 80, col. 1 (Copycode chip scanner would not allow DAT recorders to reproduce "specially encoded sound recordings.").

[109] *See* Holland, *NBS Sounds Off On Copycode*, Billboard, March 12, 1988, at 1, col. 3, 70, col. 1. (signifying end of Copycode bill).

[110] *See, e.g.*, Terry, *Tensions Easing In DAT Dispute*, Billboard, January 9, 1988 at 3, col. 3. (describing system developed by Dutch hardware company which would prevent tape to tape reproduction but allow unlimited copying from compact disc, eliminating only second generation piracy); Terry, *RIAA Chief: Many Roads Can Lead to DAT Solution*, Billboard, Feb. 27, 1988 at 3, col. 2, 82, col. 3. (suggesting possibility of "dual-inventory" strategies where compact discs and/or digital tapes would carry two prices according to their capabilities).

[111] *See* Dupler, *RIAA Letter Reenforces Its Threat On DAT*, Billboard, June 11, 1988, at 1, col. 5. It has been noted, however, that to win a contributory infringement case such as

mitted that the introduction of the system is inevitable.

IV. CABLE AND SATELLITES: TECHNOLOGICAL PROTECTION SUCCESSFULLY CODIFIED

A major problem facing the cable and satellite television industry is the theft of services.[112] Network operators use various technologies to transmit signals to their viewers,[113] which leaves programming susceptible to piracy.[114] The Copyright Act creates certain rights and protections for program developers,[115] but it is lacking in protection and probably inappropriate for cable television providers.[116]

Thus, as a means of protecting their interest in programming,

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this, particularly after *Sony*, will be difficult. *See Id.* at 90, col. 4 (opinion of Elizabeth Granville, N.Y. copyright attorney).

[112] *See* OTA, *supra* note 1, at 105 ("unauthorized connection to a cable service is a major problem") *See also* G.R. Roberts, *Pirating Signals of Blacked Out Sports Events: A Historical and Policy Perspective*, 11 COLUM. J.L. & ARTS 303 *passim* (1987) (discussing ease with which cable transmissions are pirated); Note, *Telecommunications Pirates America's Newest Criminals?*, 2 ENT. SP. L.J. 167, 171-73 (1985) (same).

[113] *See OTA supra* note 1, at 105-106. Cable television uses a tall antenna and retransmits television signals by wire to its subscribers. *Id.* Similarly, multipoint distribution services (MDS) and "over the air" subscription television (STV) relay television signals through the use of radio signals. *Id.* Subscribers must have a down converter and a special antenna to receive the signals. *Id.* Satellite Master Antennae Television (SMATV) uses geosynchronous communication relay satellites to transmit their signals. *Id.* at 106. The technology allows anyone who owns a satellite dish and a down converter to access programming. *Id.* *See generally* M. Botein, *New Video Technologies in The United States: Regulatory and Intellectual Property Considerations*, 1985 REVUE INTERNATIONALE DU DROIT D'AUTEUR, 67, 73-77 (Fall 1985) ("[B]rief description" of video technologies).

[114] *See, e.g.*, California Satellite Systems v. Seimon, 767 F.2d 1364, 1364 (9th Cir. 1985). The plaintiff CALSAT was a provider of subscription television. *Id.* at 1365. CALSAT did not scramble its signal, but it provided its customers with the equipment required to receive its signal and charged a monthly subscription fee for the service. *Id.* The defendant bought microwave receiving equipment from another company and watched CALSAT's programming without paying a subscription fee. *Id.* *See also supra* notes 8-9 (cable and satellite piracy in other contexts).

[115] *See* 17 U.S.C. § 110 (1978 & Supp. 1988) (exempting certain performance and displays from copyright infringement); 17 U.S.C. § 111 (provision for when secondary transmissions of a primary transmission constitutes a copyright infringement); § 510 (providing remedies for when cable systems alter programming content); 17 U.S.C. §§ 801-10 (deal with royalty tribunal). *See generally* Note, *Copyright Law: Is it Fair to Allow the Manufacture, Sale, or Advertisement of Equipment that Permits the Interception of Cable Television Programs? Home Box Office, Inc., v. Advanced Consumer Technology, Movie Antennae, Inc.*, 11 T. MARSHALL L.J. 201 (1985) (need to define and clarify copyright laws with respect to electronic media).

[116] *See supra* notes 33-40 and accompanying text (discussing rationale for copyright protection).

some network operators encrypt or scramble[117] their signal so that a consumer cannot view it without a decoder box.[118] The scrambling technique, however, has been circumvented by companies which build and market decoding equipment enabling television viewers to watch programs without paying the subscription fee.[119] In this respect the problem is analogous to that in the computer and recording industries. Unlike those industries, however, a symbiosis between legal and technological copyprotection for cable television is created in the Communications Policy Act of 1984 (Cable Act).[120] Section 605 of the Cable Act is applied to prevent unauthorized viewing of encrypted programming.[121]

Prior to 1984, section 605 of the Communications Act did not specifically address unauthorized descrambling of programming, but the courts interpreted the Act to proscribe reception of transmissions not intended for the general public without payment of the subscription fee.[122] In 1984, any doubt surrounding the Act's restriction on unauthorized viewing was ended when Congress amended section 605 to make explicit the prohibition against the decoding or unscrambling of "encrypted" transmissions so long as a marketing system is established.[123] Thus, a balance was struck

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[117] *See* OTA *supra* note 1, at 118 (scrambling or encryption is method of altering signals so they can only be viewed with decoder device at receiving end of transmission).

[118] *See* OTA *supra* note 1, at 105.

[119] *Id.*

[120] 47 U.S.C. §§ 521-701 (1984).

[121] *See* Note, Movie Systems, Inc. v. Heller: *The Unauthorized Interception of Subscription Television*, 17 CREIGHTON L. REV. 1267, 1270 (1984) (section 605 violation relating to television broadcast); Cable TV and New Media Law & Finance, *Application of § 705 to Blacked-Out Games Unclear*, Nov. 1986 at 3.

[122] *See* Movie Sys., Inc. v. Heller, 710 F.2d 492, 495 (8th Cir. 1983) (section 605 prohibits interception of MDS signals without authorization from MDS operator); National Subscription television v. S & H TV, 644 F.2d 820, 826 (9th Cir. 1981) (distribution of decoding device without STV operator's permission violates section 605 of the Communications Act); Home Box Office, Inc. v. Advanced Consumer Technology, Inc., 549 F. Supp. 14, 25 (S.D.N.Y 1981) (upholding judgment of FCC that unauthorized interception of MDS signal violated section 605). *See generally* Note, CREIGHTON L. REV., *supra* note 121, at 1267. (arguing that, although courts generally reject duty to scramble their signals, CATV companies should be required to take reasonable steps to protect their signal).

[123] 47 U.S.C. § 605 (1981 & Supp. 1988). The bill added language that stated in pertinent part that no person shall intercept or receive communications unless "1) the programming involved is not encrypted; and (2) (A) a marketing system is not established . . ." *Id.* See F. W. Lloyd & D. M. Mayeda, *Copyright Fair Use, The First Amendment, and New Communications Technologies: The Impact of Betamax*, 38 FED. COMM. L. J., 59, 74; *See also*, NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, Report 88-233, *Video Program*

whereby the competing interests of the viewing public and the program owners are satisfied. Furthermore, section 553 of the Act prohibits the distribution of equipment solely for the unauthorized interception of cable television transmissions.[124] The Act is of interest because it recognizes and legitimizes the use of technological copyprotection for cable television operators.[125] No such protection exists for the computer industry.

V. COMPUTER SOFTWARE PROTECTION: MISCELLANEOUS SAFEGUARDS IN THE ABSENCE OF CONGRESSIONAL ACTION

In 1977, a survey of contract software developers found that the protection of proprietary rights in software was not a major concern of a majority of these software developers.[126] However, with respect to micro-computers and mass-marketed software, the need for protection was more evident.[127] The legislative response

Distribution and Cable Television: Current Policy Issues and Recommendations, U.S. Department of Commerce, June 1988. "In addressing the challenge posed by the new technology of satellite distribution of video programming, in 1984 the Congress established a comprehensive scheme to balance the rights of copyright owners with the needs of satellite dish viewers." *Id.* at 111. Congress could have simply outlawed home satellite dishes, but instead, it approved the idea of program owners scrambling their programming. *Id.* The law grants the right to receive unencrypted signals, but makes pirating encrypted signals illegal. *Id.*

[124] 47 U.S.C. § 553 (a) (1) (1988). "No person shall intercept or receive or assist in intercepting or receiving any communications service offered over a cable system, unless specifically authorized to do so by a cable operator or as may otherwise be specifically authorized by law." *Id.*

[125] *See* National Football League v. McBee & Bruno's, Inc., 792 F.2d 726 (8th Cir. 1986) (affirming injunction against several St. Louis tavern owners from using satellite receivers to show blacked-out St. Louis Cardinals home games); ON/TV of Chicago v. Julien, 763 F.2d 839 (7th Cir. 1985) (court applied section 605 to enjoin electronics company from selling decoder kits that enabled people to pirate ON/TV's signal); United States v. Beale, 681 F. Supp. 74, 76-77 (D. Maine 1988) (section 605 used to enjoin sale of decoder boxes).

[126] F.W. NIETZKE, A SOFTWARE LAW PRIMER, 26 (1984). The survey found that the following forms of protection were used by contract software developers:
cryptographic coding 0.4%
release of object program only 0.3%
trade secrets 0.21%
copyright 0.2%
patent 0.04%
Id. Physical, technological and contractual devices were the most popular form of copyprotection. *Id.*; G. DAVIS, SOFTWARE PROTECTION PRACTICAL AND LEGAL STEPS TO PROTECT AND MARKET PROGRAMS 3-4 (1985) (describing "web" of software protection).

[127] *Id. See* DAVIS, *supra* note 126 (protecting economic value of software has become of paramount importance). *See also supra* CONTU, note 53, at 9. The first commercial computers were so expensive that only the government could afford to own them. *Id.* Today,

came in the form of the 1976 and 1980 amendments to the Copyright Act.[128] As indicated, section 117 has achieved limited success.[129] Since these amendments, several legislative proposals have been introduced to improve legal protection for computer programs, including an attempt to repeal section 117.[130] The Computer Software Piracy and Counterfeiting Amendments of 1984 would have created severe criminal penalties for software piracy.[131] The Software Rental Act was proposed in 1987[132] and again in 1988.[133] These proposals have yet to be passed, leaving intact the inadequacies of legal protection for software.[134]

Technological protections, not unlike those utilized in the cable television and the recording industry, are also available to the software developer. Technological or physical protection for software can take many forms, such as encryption, software locks, and hardware keys.[135] Electronic protections can be written on the

computers are smaller and much cheaper so that individuals can own them in their homes and offices. *Id.* at 10.

[128] *See supra* notes 54 and 62 and accompanying text; Note, 17 U.S.C. § 117: *Is The Amendment To The Copyright Act Adequate To Regulate The Computer Software Market?*, 7 COMPUTER L.J. 227, 227 (1986) (Congress adopted CONTU's recommendations through amendments to § 117 of the Copyright Act).

[129] *See supra* notes 69-74 and accompanying text.

[130] *See* Note, *supra*, note 128, at 233. Legislation was considered in 1985 that would have: 1) repealed § 117 and a software owner's right to make a backup copy; or 2) limited archival copying to situations where there is a "bona fide need"; or 3) finally prohibited the sale of code-breakers. *Id.*

[131] 27 PAT. TRADEMARK AND COPYRIGHT J. (BNA) 346, 346-47 (Feb. 2, 1984) (statement of Rep. Frank) (raising penalties for software piracy to "maximum of five years imprisonment and or fine of $250,000").

[132] 133 CONG. REC. E 1743 (daily ed. Mar. 19, 1987) (Statement of Rep. Schroeder). The bill would have brought computer software under the Record Rental Amendment of 1984, P.L. 98-450, 98 Stat. 1727, (1984), and require a person who wants to rent a record to obtain prior permission from the copyright owner. *Id. See also* 33 PAT. TRADEMARK & COPYRIGHT J. (BNA) 534 (Mar. 26, 1987) (Rep. Schroeder discussed problem facing consumers who back-up copies of software for their own protection).

[133] 36 PAT. TRADEMARK AND COPYRIGHT J. (BNA) 409, 409 (Aug. 18, 1988) (Sen. Hatch introduced legislation that would add section (c) to 17 U.S.C. 109, whereby computer software would be afforded protection against unauthorized rental of program).

[134] *See supra* notes 69-74. *See generally* Note, *Copyright Protection of Computer Program Object Code*, 96 HARV. L. REV. 1723, 1740-1742 (1983) (arguing that copyright has evolved into general misappropriation law for protection of intellectual labor that is capable of extensive reproduction); Keplinger, *Computer-Software-Its Nature and Its Protection*, 30 EMORY L. J. 483, 495-96 & n.50 (1981) (describing expansion of copyright laws to meet changing needs of society).

[135] *See* OTA, *supra* note 1, at 116 (prevention of unauthorized use of computer software by use of "locks, scrambling and encryption"); KEET, *supra* note 23 at 334 (protection of

software,[136] and some manufacturers are building the programs into the computer.[137] Currently, all of these techniques are susceptible to being decoded or broken in some way.[138] Moreover, physical copyprotection may impinge upon the copy-owner's legal right to copy a program.[139] As an alternative to technological protection, software developers can turn to a variety of marketing strategies that can reduce the attractiveness of software piracy.[140] For example, shrink-wrap licensing purports to define the copy-owner's rights prior to the purchase, but since *Vault*, it is of questionable legal validity.[141] Other approaches are available, such as hot line access providing answers to purchasers, ongoing updates of information, information in the form of printed material and

computer software can occur either through use of "hardware protective devices" or "software locks").

[136] *See supra* note 126; OTA, *supra* note 1, at 117. "Some chip manufacturers are designing computer chips with machine-readable serial numbers and decryption circuits to help software makers more effectively control their products." *Id.*

[137] *See* OTA, *supra* note 1, at 117. The customer would have to link up to the proprietor's computer, upload the program, and pay an on-line user fee. *Id.* at 118. A theoretical solution is to require a personal identifier for software access. *Id.*

[138] *See* OTA, *supra* note 1, at 117; DAVIS, *supra* note 126, at 327 (until infallible technological protection evolves computer industry will have to rely on law for its protection); KEET, *supra* note 23, at 33 (Entire industries have developed and prospered in area of developing software protection and decoding protection). *See generally* Taylor, *The Copy Protection Wars*, PC, Jan. 14 1986, at 165. (describing both hardware and software copy protection techniques).

[139] *See supra* notes 61-64 and accompanying text. *Sony* seriously weakened the concept of "contributory infringement" thus reducing the law's capacity to prevent electronic copy devices in the computer context. *Id. See* Vault Corp. v. Quaid Software Ltd., 847 F.2d 255, 266-67 (5th Cir. 1988) (electronic copyprotection prevented copyowner from exercising statutory rights). *See also* DAVIS, *supra* note 126, at 327 (most technological protections fail because they prohibit making archival copies).

[140] *See* KEET, *supra* note 23, at 33. (marketing strategies, while unable to stop copying, can make it more attractive for individuals to become "legitimate users" of protected software). *See* Thaler, *supra* note 61. Some software marketers have gone as far as viewing piracy as a market reality that can be used to create markets. *Id.* For example, programs are placed on the market then later improved upon and re-released. *Id.* Many of those who copied the first release will want a later release if they find they like the first one. *Id.* Additional sales will result on later releases of the program as consumers find they want it along with documentation and support. *Id.*

[141] *See* Vault Corp. v. Quaid Software Ltd., 847 F.2d 255, 268-70 (5th Cir. 1988) (holding that shrink-wrap license is contract of adhesion, thus unenforceable, and any state law purporting to uphold the shrink-wrap license is preempted to the extent it conflicts with the rights granted by 17 U.S.C. § 117); Note, Rutgers, *supra* note 23, at 397 (congressional intent behind granting certain rights to software users should not be negated by manufacturer's use of shrink-wrap license); Note, COMPUTER L.J., *supra* note 23, at 277 (shrink-wrap licenses are contracts of adhesion, thus not enforceable); NEITZKE, *supra* note 126, at 100-01 (courts are likely to find that shrink-wrap licenses are unenforceable).

bulletins, computer program user membership association and re-
duction in price on future program acquisitions, to discourage
software piracy.[142] In spite of the available options, due to the lack
of adequate legal protection combined with the cost efficiency of
piracy, software theft continues.[143]

CONCLUSION

The goal of intellectual property rights is to promote the com-
mon interest by granting monopolies to individuals. In the age of
sophisticated electronics, such a complex reconciliation is difficult
to maintain by statute alone. Indicia of the ineffectiveness of cur-
rent legal protection is abundant. Technological developments
have provided additional protection, but they either infringe on
users rights or can be defeated by other technology without legal
recourse.

Piracy of computer software occurs at a rate unprecedented in
any other product to date. Unlike audio and video recording, re-
production of computer software is highly cost efficient in terms
of actual expense and undiminished quality. Unlike cable televi-
sion, for which the theft of scrambled signals is prohibited by law,
the copying of computer software is a substantial legitimate use
under section 117.

Codification of users' rights in section 117, allowing adaptations
and the making of archival copies, while furthering some of the
interests at which it is aimed, also serves to enable substantial
piracy in a context already fraught with misapropriation. It is sug-
gested that a reevaluation of section 117 is required. However, it
is also submitted that any investigation should be accompanied by

[142] *See* KEET, *supra* note 22, at 33. The Hotline access to support personnel generally
includes attaching a code number to each piece of software so that when the user needs
help from the 800 service line they must call in the code to get help. *Id.* Someone with a
copy of the program, but no code number cannot get help. *Id.* Documentation updates,
newsletters and product bulletins will contain usage tips, "work arounds" for known
problems, and tips on handling recently discovered bugs all of which maximize the value of
software. *Id.* Product update services such as news of and easy access to new releases in-
form the software owner when there is an improved version of his program available. *Id.*
Finally, natural barriers in documentation, which because of color, shape or packaging
make it difficult and expensive to copy will deter pirates. *Id.*

[143] *See* BESEN, *supra* note 12, at 13-15 & n.14 (estimates appear to have been far below
actual loss incurred as result of both private and commercial copying).

consideration of technologies which can enhance protection and, through codification, prohibit decoding devices. Due to the extent of piracy in intellectual property, any additional protection will further the purposes underlying copyright laws, and can be directed specifically at the product most in need of enhanced protection.

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