Copyright Protection of Systems Control Software Stored in Read Only Memory Chips: Into the World of Gulliver's Travels

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INTRODUCTION

THE advent of personal and small-business computers demonstrates the dramatic influence of new technology on modern society. As with the introduction of television, around which a vast entertainment programming industry grew, software\(^2\) pro-

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1. This Comment has been submitted to the Nathan Burkan Memorial Competition, sponsored by the American Society of Composers, Authors and Publishers.

   The reference to \textit{Gulliver's Travels} is taken from Apple Computer, Inc. v. Franklin Computer Corp., 545 F. Supp. 812, 825 (E.D. Pa. 1982) [hereinafter cited as \textit{Apple I}, \textit{rev'd and rem.}, 714 F.2d 1240 (3d Cir. 1983)]. Judge Newcomer used this analogy to indicate that the complexity of the issue can lead to false syllogisms in order to conclude that copyright protection should be used for certain kinds of computer programs. In this Comment, the rationale of \textit{Apple I} will be defended.

2. The term “software” will be used as the generic term for computer programs which instruct the computer to perform various functions, such as balancing a checkbook. The Copyright Act of 1976 defines a computer program as a “set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result.” Copyright Act of 1976, Pub. L. No. 94-553, 90 Stat. 2541 (codified as amended at 17 U.S.C. § 101 (1982)) [hereinafter cited as the 1976 Copyright Act]. A computer does not perceive what people perceive; a word, like “DIVIDE”, in a computer program appears to the computer as a string of O's and 1's or a pattern of switch settings.

The role of software is illustrated in the following description:

   An old-fashioned automobile that can be started only with a crank requires a person to make a series of adjustments more or less directly to the engine; in a modern car, of course, you need only turn a key and a system of electrical and mechanical devices does the rest. In the modern computer, software has developed in such a way as to fill this role of go-between. On one end you have the so-called end user who wants to be able to order up a piece of long division, say, simply by supplying two numbers to the machine and ordering it to divide them. At the other end stands the actual computer, which for all its complexity
gramming has developed alongside a burgeoning computer market. This booming software industry includes not only entertainment software, such as video games, but also educational and business software, such as music instruction, word processing, and accounting programs. Without software programs, a computer would be as inefficacious as a television without programs or a phonograph without records.

Developers of software, possessing technical expertise, naturally seek profit from the marketing of their programs. Like authors and inventors, software developers desire legal protection against the unauthorized use of their work. Although judicial

is something of a brute. It can perform only several hundred basic operations, and long division may not be one of them. The machine may have to be instructed to perform a sequence of several of its basic operations in order to accomplish a piece of long division. Software—a series of what are known as programs—translates the end user's wish into specific, functional commands for the machine.


The term "hardware" will refer to the fixed components of a computer, like the video display, casing, and electronic circuitry.


Piracy, which can include either reproducing copyrighted or uncopyrighted programs or selling such reproductions, understandably concerns people in this field. "Most software developers and vendors view piracy as a threat that poses increasing danger to the personal computer industry." Freiberger, Pirates Bedevil Angry and Frustrated Software Vendors, InforWorld March 22, 1982, at 33. However, there are some people involved who see piracy in light of marketplace realities. Steve Jobs, Apple Computer's Chairman of the Board, stated that "[a]s the price of software comes down, the economic reasons for copying will for the most part go away." Id. at 38. At present, demand far exceeds supply of new and more advanced software to utilize technological improvements in personal computers. Sales this year are expected to reach $10 billion, up from $2.7 billion just three years ago; projections indicate that sales of software for personal computers, "the fastest growing part of the software industry," will increase by 44% annually over the next five years. See Software: The New Driving Force, Bus. Wk., Feb. 27, 1984, at 74-75, [hereinafter cited as Bus. Wk.]. Although it is not known how many computer programs exist, estimates vary from 8,000 to 40,000. Time at 56.

4. This desire raises the specter of alternate means of securing protection of computer programs, such as patent or trade secret law. To obtain a patent, a work must have utility, novelty and unobviousness. 35 U.S.C. §§ 101-103 (1982). Prior to 1981, the patentability of computer programs was denied, see Parker v. Flook, 437 U.S. 584 (1978), but in Diamond v. Diehr, 450 U.S. 175 (1981), the Court held that software which resulted in changing an article "to a different state or thing" may be patentable. Nevertheless, it is unclear
treatment of software copyrightability might seem to be of interest only to industrial insiders and intellectual-property lawyers, the resolution of this issue will substantially affect the national computer market, including both large companies and individual consumers. Indeed, judicial rulings determining to what extent protection should be afforded various software programs may govern the long-term availability, price, quality, and form of software for low-cost computing services for business and individual users.6

Many of the legal questions involving software copyrightability stem from both the purpose of the programs and the medium on which they are placed. In addition, the function and physical nature of the programs is relevant to one of the ultimate issues in this area: is a particular software program a creative expression or is it simply a component of the machine? This issue compels an examination of computer programming itself. Programming can be produced in three different language levels. High level languages, like BASIC, COBOL or FORTRAN, are written in words and symbols that are readily comprehensible with training.6 Assembly language instructions, an intermediate level language, consists of mnemonic or alphanumeric symbols.7 These two languages may be referred to as source code which comprise source programs. Finally, programs consisting of machine-readable language, the lowest level language, are commonly labelled “object

whether or not software programs per se are patentable. See Stern, Another Look at Copyright Protection of Software: Did the 1980 Act Do Anything for Object Code?, 3 COMPUTER L.J. 1 (1981); Hohmann, supra note 3, at 10.

Another factor militating against pursuit of a patent is that it usually takes two years for a patent application to reach the United States Office of Patents and Trademarks, and even then the application may be denied or challenged. The life span of various computer programs, especially for arcade games, is considerably shorter than two years. See Hohmann, supra note 3, at 11; Tripoli, Legal Protection of Computer Programs, RCA ENGINEER, Jan.-Feb. 1984, at 40. One author suggested that it may be because of the unsettled area of law that there has not been an overwhelming number of applications for either copyright or patent protection. See M. GEMIGNANI, LAW AND THE COMPUTER 98-106 (1981).

5. Recent articles in general information magazines depict the ramifications of copyright protection for software. See, e.g., Press & Sandza, The Bandits vs. the Lawyers, NEWSWEEK, Dec. 20, 1982, at 76.

6. An illustration of an instruction in high-level language is:
   LET Z = X + Y
   IF Z = A, THEN GO TO 60
This instruction indicates that if Z is equal to some variable A, the computer should go to line 60 and carry out the instruction given there.

7. For example, STO A means “store A into memory;” ADC commands “add with carry.”
code" programs. A computer can only operate or execute a program that is in object code. Since computers only function with digital data expressed in object code, such programs must be contained in a memory mechanism such as a read-only memory (ROM). A ROM chip or cartridge containing a software program and inserted into a computer is designated "firmware" by the computer industry; use of the term firmware indicates that the hardware and software are so integrated that the functions of each merge.

Software programs may be classified according to the function they perform. Application programs allow the computer to perform certain specific assignments; the tasks may range from word processing, accounting, and balancing checkbooks to graphics and video games. Systems control software (or operating systems programs) controls the internal functioning of the computer's components, such as the memories and printer. Thus, systems control programs facilitate the operation of applications software.

Initially, federal courts varied in opinion as to the copyrightability of computer programs embodied in ROM chips.

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8. Object code or machine-readable language is comprised of two symbols, that is, a binary language consisting of O's and 1's.

9. See generally M. Gemignani, supra note 4, at 80-82; Stern, supra note 4, at 2-4.

10. A ROM is a postage-stamp-sized silicon chip containing thousands of chemically printed switches. The object code is etched onto the chip in a pattern of opened and closed switches (O's and 1's, or high and low voltages). The contents of a ROM are fixed once they are programmed into the chip or integrated circuit. Alternative methods of storing object code include the use of magnetic tapes and "floppy disks" (flexible magnetic plastic disks that look similar to 45 rpm records). These differ from the ROM in that the material stored on these media can be erased and the disk or tape re-used to store other information, in much the same way that a cassette tape can be erased and re-used. For a brief, introductory overview of the workings of a personal computer, see Turing, Computers Made Easy, Electronic Fun with Computers and Games, Dec. 1982, at 84.


12. For a list of best-selling applications and systems control software, see Bus. Wk., supra note 3, at 77.

13. This term will be used to mean that a work is able to fall under the protection of copyright laws. See Stern, supra note 4, at 6.
Although it was not questioned that the 1976 Copyright Act and the 1980 Computer Software Act\(^4\) clearly afforded copyright protection to source code programs, the courts were divided as to whether or not such protection was to be extended to object code programs.\(^5\) In 1982 the Third Circuit Court of Appeals held that the applications software program for the video game “Defenders,” written in object code and stored in a ROM, was copyrightable.\(^6\) This decision thus broadened the scope of copyright protection for computer programs. Recently, the Third Circuit further contributed to what this Comment contends to be an erosion of fundamental copyright principles by determining that systems control software falls within the sphere of protection granted by the new copyright statutes.\(^7\)

This Comment contends that the extension of copyrightability status to operating system machine-readable computer programs is not only unmerited, but also signals a dangerous change in what qualifies for copyright protection. Courts must examine the characteristics and functions of object code programs under the criteria for copyrightability stated in the legislation. Defining the nature and uses of systems control software and weighing competing policy considerations\(^8\) make this a complex and diffi-


\(^{15}\) Compare Apple I, 545 F. Supp. 812 (E.D. Pa. 1982), rev'd and rem., 714 F.2d 1240 (3d Cir. 1983) (Apple failed to establish reasonable probability that object codes were entitled to copyright protection) and Data Cash Systems, Inc. v. JS&A Group, Inc., 480 F. Supp. 1065 (N.D. Ill. 1979) (object code in ROM is not copyright protected) aff’d on other grounds, 628 F.2d 1038 (7th Cir. 1980) with Tandy Corp. v. Personal Micro Computers, Inc., 524 F. Supp. 171 (N.D. Cal. 1981) (an object code is a work of authorship, and a ROM is a tangible medium of expression under the Copyright Act) and GCP Corp. v. Chance, 2 COPYRIGHT L. REP. (CCH) ¶ 25,464 (N.D. Cal., Aug. 31, 1982) (object code in ROM was copyright protected since the source code was copyrighted).

\(^{16}\) Williams Elec., Inc. v. Artic Int'l., Inc. 685 F.2d 870 (3d Cir. 1982).

\(^{17}\) Apple Computer, Inc. v. Franklin Computer Corp., 714 F. 2d 1240 (3d Cir. 1983) [hereinafter cited as Apple II]. Early this year the Ninth Circuit followed the Third Circuit’s rationale by holding that the Copyright Acts make no distinction between computer programs that directly interact with the computer use and those that simply manage the computer system. Apple Computer, Inc. v. Formula International, Inc., 562 F. Supp. 775 (C.D. Cal. 1983), aff’d, 725 F.2d 521 (9th Cir. 1984).

\(^{18}\) In order to give authors and inventors incentive to create various forms of intellectual property, the Constitution provides that Congress “shall have power . . . to 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,” U.S. CONST. art. I, § 8, cl. 8. This power, however, conflicts with the basic tenet of our political economy: free
culty task. The recent litigation over copyright protection for object code, regardless of use, poses analytical challenges for the courts. Object code itself does not explicitly fall within the statutory language of what is covered by the Copyright Acts. Object code is software which is both not written down and furthermore can be perceived only by a machine, not a person. Object code thus fails to come under the literal requirements of the 1980 Act. When the object code loaded into a ROM contains an operating system program, there are even more reasons not to shield it with the armor of copyright protection. An examination of the legislative history and resulting copyright provisions and an analysis of certain court decisions preceding Apple v. Franklin, will illuminate the meaning and consequences of the Third Circuit's competition in the market place. Hence, any grant of copyrights, which is an exclusive right, should be made on the basis that a privileged monopoly outweighs market competition. See Herbert Rosenthal Jewelry Corp. v. Kalpakian, 446 F.2d 738, 742 (9th Cir. 1971).


Copyright protection subsists, in accordance with this title, in original works of authorship fixed 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. Works of authorship include the following categories:

(1) literary works;
(2) musical works, including any accompanying words;
(3) dramatic works, including any accompanying music;
(4) pantomimes and choreographic works;
(5) pictorial, graphic, and sculptural works;
(6) motion pictures and other audiovisual works; and
(7) sound recordings.

(Emphasis added). The construction of the statute urged here maintains that the perception, reproduction, or other communication must be directed toward a human audience and not toward a mechanical one; otherwise, the phrase "either directly or with the aid of a machine or device" is rendered superfluous. Thus, to the extent that a ROM is directed toward and perceived by a machine (the computer), a program contained thereon is uncopyrightable.

20. This Comment does not deal with the copyrightability of the audiovisual displays apart from the computer programs used to produce them. Recent cases have held that such an audiovisual display is protected under copyright law. See, e.g., Midway Mfg. Co. v. Artic Int'l, Inc., 704 F.2d 1009 (7th Cir. 1983); Atari, Inc. v. North Amer. Philips Consumer Elec. Corp., 672 F.2d 607 (7th Cir. 1982); Stern Elec., Inc. v. Kaufman, 523 F. Supp. 635 (E.D.N.Y. 1981), aff'd 669 F.2d 852 (2nd Cir. 1982). One test for determining copyright infringement is how close one video game's theme and characters resemble that of another game. The applicability of the "substantial similarity test" is discussed in Comment, Federal Copyright Law in the Computer Era: Protection for the Authors of Video Games, 7 U. Puget Sound L.Rev. 425, 425 n.3, 426 n.4 (1984).

opinion in *Apple II*.

I. TRACING THE STATUTORY HISTORY

A. Scope of Protection For Computer Programs Under the 1909 Copyright Act

Under the 1909 Copyright Act, protection for computer programs was tenuous at best. A year before the 1909 Copyright Act, the Supreme Court decided *White-Smith Music Publishing Co. v. Apollo Co.*, a case which involved a player-piano roll having a pattern of openings which made a piano play a musical score. The Court held that the player-piano roll did not infringe the copyrighted original sheet music because the player-piano could not be read by a human being, that is, the player-piano roll was not "put in a form which others can see and read." The *White-Smith* decision was implicitly incorporated into the 1909 Copyright Act. More recently, the Supreme Court held in *Goldstein v. California* that copyrighting sheet music would not prohibit unauthorized recording of the original composition under the 1909 Copyright Act. Taken together, the *White-Smith* and *Goldstein* decisions did not protect copyrights on source codes or programs from being duplicated on magnetic tapes or disks since such machine copies were not to be considered as infringing source programs because they are not "eye-readable." The "eye-readable" requirement of the 1909 Copyright Act reflected the fact that copyrightable objects should in some manner communicate expressions of ideas.

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23. 209 U.S. 1 (1908).
24. Id. at 17.
27. A disk is "[a] circular piece of magnetic material housed in a square jacket, sort of like a record album. It spins inside a 'disk drive' and is used to store data, as a tape recorder stores sounds." Turing, supra note 10, at 85.
28. "These two cases imply that since computer programs represent tangible expressions of intellectual labor, they are copyrightable, but copyrights on source programs will not prevent unauthorized duplication of the program on punched cards or magnetic tapes. . . ." Rose, Protection of Intellectual Property Rights in Computers and Computer Programs: Recent Developments, 9 Pepperdine L. Rev., 547, 558 (1982).
to people. It is the expression of an idea, rather than the idea itself, that is copyrightable.\textsuperscript{29}

Despite the uncertainty of the copyrightability of computer programs, the United States Copyright Office in 1964 began to accept and register software. This was partly due to the Copyright Office's policy of resolving doubtful issues in favor of registration where possible.\textsuperscript{30} Also, eligibility for registration required that the program be published and that the copies of the program be in language intelligible to humans. In this way the eye-readability test of White-Smith was met. Nonetheless, since computer programs did not meet this test, they were not, under White-Smith, within the stated protection of the 1909 Copyright Act.\textsuperscript{31} Even before the enactment of the 1976 Copyright Act, however, the focus of copyright law was expanded to include functional and commercial, as well as expressive, works.\textsuperscript{32}

\textsuperscript{29} See infra note 48.

\textsuperscript{30} See Boorstyn, Copyrights, Computers and Confusion, 63 J. Pat. Off. Soc'y 276; United States Copyright Office, Copyright Registration for Computer Programs (1964), reprinted in 11 Bull. Copyright Soc'y 361 (1964). The Copyright Office decided that copies of programs in eye-readable/human-intelligible form would be registered, but a program which could not be visually perceived would have to be deposited with a printout. Id.

Opinion is divided over the Copyright Office's policy. Stern states that this action "facilitates access to the courts to resolve the copyrightability issue." Stern, supra note 4, at 14. In contrast, Mary Beth Peters, chief examining officer of U.S. Patent Office, said recently, "The way the Copyright Office developed how they deal with the electronic video games is a history in how not to deal with the new technology. It is close your eyes and register what you have in front of you." Hohmann, supra note 3, at 11. The Copyright Office's policy has since been overhauled: anyone who desires to copyright an object code must also send a source code or source format on paper. In certain circumstances, the office may register an object code if it is accompanied by up to fifty pages of source code; that amount of source code suggests that there might be "some kind of copyrightable authorship." Id. at 11.

\textsuperscript{31} This anticipates the important question of whether or not object code is considered protected by the 1980 Act. It is clear, though, that if object code could not be considered eye-readable, copying an object code would escape copyright law prohibitions. "Seen on a written page, a microinstruction (object code) is composed of a string of O's and I's. These correspond directly . . . to strings of high and low voltages stored in a special place inside the computer." T. Kidder, supra note 2, at 99.

\textsuperscript{32} See Mazer v. Stein, 347 U.S. 201 (1954) (copyright protection afforded to statue as a work of art although used as a lamp base; here the work could be separated from its mechanical function); Reiss v. National Quotation Bureau, Inc., 276 F. Supp. 717 (S.D.N.Y. 1921) (code book of meaningless coined code words developed for cable use deemed copyrightable); Harcourt Brace & World, Inc. v. Graphic Controls Corp., 329 F. Supp. 517 (S.D.N.Y. 1971) (copyright protection extended to symbols designating questions and response spaces on exam answer sheet).
B. The 1976 Copyright Act and The 1980 Computer Software Act

Judicial construction of the 1976 Copyright Act demonstrates the continued vitality of the distinction between copyrightable works of authorship and uncopyrightable methods of operations. Section 102(a) of the Act designates seven categories which may constitute copyrightable items, all representing works that are directed to a human audience. In contrast, section 102(b) of the Act provides that "[i]n no case does copyright protection for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work." As an illustration of the distinction between the two sections, consider Rembrandt's painting "The Raising of the Cross" depicting Jesus on the cross. The artist could claim copyright protection for the actual representation he made of Christ and copies of that painting; however, he could not prevent others from portraying Christ crucified or from using the same process to create a painting. Determining the copyrightability of an operating system program depends on whether it is within the scope of section 102(a) or whether it more accurately falls within the ambit of section 102(b).

In addition, the 1976 Copyright Act granted authors exclusive rights to their works with respect to reproduction, preparation of derivative works, distribution of copies (or phonograph

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33. In Baker v. Selden, 101 U.S. 99 (1879), the Court pointed out that the plaintiff did not have the exclusive privilege to utilize the bookkeeping system contained in his books simply because the books were copyrighted. Id. at 103. The Court in Mazer v. Stein, 347 U.S. 201 (1954), described the distinctions Baker made, stating: "[A] copyright gives no exclusive right to the art disclosed; protection is given only to the expression of the idea—not the idea itself." Id. at 217.

34. 17 U.S.C. § 102(a) (1982). See supra note 19 for the seven areas listed. The ultimate purpose of the works in each of the categories is to communicate via the human senses.


36. A derivative work is a new item of authorship based upon and containing recognizable elements of an earlier work. Only the elements not taken from the prior work are copyrightable. Stern, supra note 4, at 14 concludes:

Like any other work of authorship, a derivative work based on a source program must be fixed in a copy, which is perceivable by or otherwise communicated to human beings. Object code therefore has no higher status as a derivative work than it does as an original work or as a copy of an original source code work.

Although Stern may be theoretically correct about the necessity that a copyrighted
recordings), and public performance and display. There was some doubt regarding section 117 of the Act, which explicitly left unresolved the issue of using a copyrighted work (including a computer program) "in conjunction with automatic systems capable of storing, processing, retrieving, or transferring information, or in conjunction with any similar machine or process." The apparent effect of section 117 was to preserve the status quo for computer programs.

Congress was uncertain as to whether the act of inputting and storing (i.e. copying) an entire dictionary, a computer program, or other copyrighted work by processing it into an information storage retrieval system for later retrieval or printout constituted copyright infringement. Therefore, section 117 was adopted as a means of allowing the passage of a revised statute without committing Congress to a position on the computer problem until further studies were conducted. Also, the National Commission on New Technological Uses of Copyrighted Works (CONTU), established in 1974, was still studying the issue of protecting computer programs, another factor Congress considered in deciding that section 117 should neither create any new protection nor limit any rights that were in force prior to the 1976 Act.

CONTU recommended two provisions to replace the 1976 version of section 117 which were adopted December 12, work must be intended for human perception, neither the statutory language nor court decisions have come to an agreement on whether or not human perception is a requirement for copyright protection.


39. Rose suggests that "in effect, Congress declared a moratorium on further legislative action regarding copyright status of computer programs. . . ." Rose, supra note 28, at 559.

40. Some concern has been expressed about allowing copyrights of computer programs to extend protection to the methodology and processes adopted by the programmer, rather than to merely the "writings" expressing his ideas. Section 102(b) is intended, among other things, to make clear that the computer program, and the actual processes or methods embodied in the program, are not within the scope of copyright law. See H.R. REP. No. 1476, 94th Cong., 2d Sess. 116, reprinted in 1976 U.S. CODE CONG. & AD. NEWS 5659, 5661.

41. Id. at 5661.

42. NAT'L COMM'N ON NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS, FINAL REPORT (1978) [hereinafter cited as the CONTU FINAL REPORT], reprinted in 5 COPYRIGHT, CONGRESS, AND TECHNOLOGY: THE PUBLIC RECORD 1 (N. Henry ed. 1980) [hereinafter cited as Henry edition].
Copyrightability of ROMs

1980. Section 117 now states that it is not an infringement for the owner of a copy of a computer program to make copies or adaptations needed in utilizing the program or copies for archival purposes. This implies that one who is not an owner of a copy of a computer program is infringing on a copyright by copying a computer program. In addition, the amendment expanded section 101 to read: "A 'computer program' is a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result." 45

While many commentators have praised the new legislation as broadening computer program copyright protection to acts that are not explicitly included in the 1980 revision of section 117, this conclusion is not supported by specific legislative language. 46 Although Congress made it clear that "expressions" are within the scope of copyright protection, actual processes, methods or ideas embodied in the program are not.47 Accordingly, the question of whether systems control software constitutes a work of authorship remains open to dispute. As will be discussed below, the answer to this problem is an important element in determining whether copyright protection extends to such programs in object code lodged in a ROM. 48

44. Id. See Boorstyn, supra note 30, at 282.
45. See 17 U.S.C. § 101 (1982). This definition is similar to other definitions of computer programs: "A computer program is basically a plan that controls the activity of the computer, directing the calculations needed to solve a problem . . . ." Banzaff, Copyright Protection for Computer Programs, 64 COLUM. L. REV. 1274 (1964).
46. See, e.g., Rose, supra note 28; Boorstyn, supra note 30; Program Writers Get Expanded Protection, COMPUTER CAREER NEWS, Jan. 12, 1981, at 3.
47. Stern argues that since section 101, 17 U.S.C. § 101 (1982), does not mention object code programs, such programs might not secure copyright protection. Stern, supra note 4, at 9. The Apple I and Data Cash decisions indicate that this is a justifiable conclusion.
48. H.R. REP. No. 1476, 94th Cong., 2d Sess. 57, reprinted in 1976 U.S. CODE CONG. & AD. NEWS 5659, 5670. The dichotomy between ideas (which are not copyrightable) and expressions of ideas (which are copyrightable) is one of the cornerstones of copyright law. For example, if a photographer were to shoot a sunrise, he would have a copyright to that picture; no one could legally copy that photograph without his permission. Yet the photographer cannot prevent others from standing next to him and taking a picture of that same sunrise. An "expression," such as a novel, song or painting is a valid work of authorship within the meaning of section 102(a). 17 U.S.C. § 102(a) (1982).
49. This issue will be analyzed in the other parts of this Comment. See infra notes 116-56 and accompanying text. Among various factors to consider are the extent to which systems control software can be characterized as a functional device or as a derivative.
The 1980 Computer Software Act states that only a "copy" of a work is an infringement of a copyrighted work. A "copy" is defined by statute as the material objects in which a copyrightable work (original work of authorship) is fixed or embodied and from which the work can be "perceived, reproduced or otherwise communicated, either directly, or with the aid of a machine or device." The present uncertainty exists because even though an operating system program may be "fixed" in a "stable, tangible medium of expression," that program may not be an expression or work of authorship under the statute, because it is devoid of any purpose to directly communicate with a person.

Copyright law has evolved as technological advances have been developed. Although the courts are reluctant to expand the list of works protected by copyright without clear legislative directive, recent cases have increased the copyrightability of computer-related items. Despite the fact that a majority of cases have held that application software in object code lodged inside a ROM falls within the realm of copyright law, a comparison and examination of cases that divide in opinion on this issue illustrates the reasoning process the courts use in determining whether or not to grant copyright protection. Far from being a moot debate, such an analysis not only shows that there are valid arguments for denying copyright status to such works, but it also foreshadows

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50. "Fixed" here is the equivalent of "embodied." For example, a literary work such as a novel is fixed in a book.


52. See infra notes 101-20 and accompanying text. This is true whether the operating system program is written in object code or source code, or embodied on a ROM chip or floppy disk. However, it is when an operating system program is in object code lodged on a ROM chip that it is best demonstrated that copyright protection should not be extended to that type of program.


54. Atari, Inc. v. North American Philips Consumer Elec. Corp., 672 F.2d 607 (7th Cir.), cert. denied, 459 U.S. 879 (1982) (copyright protection for audio-visual displays); Williams, 685 F.2d 870 (copyrightability of application software in ROMs); Apple II, 714 F.2d 1240 (systems control software in ROMs copyrightable).

the Apple II\textsuperscript{58} decision. Even if one ultimately concedes that the majority view regarding application software is correct, it does not necessarily validate the Apple II decision determining that operating system programs are copyrightable.

II. A Review of Court Rationale Prior to Apple II

A. Differing Opinions on the Splitting on the Issue of Object Code Copyrightability

As interesting as the scholarly analysis in this area has been,\textsuperscript{57} it is the courts which illuminate the practical difficulties of interpreting the 1980 Computer Software Act. Two factually similar cases, Data Cash Systems, Inc. v. JS&A Group, Inc.,\textsuperscript{58} and Tandy Corp. v. Personal Micro Computers, Inc.\textsuperscript{59} involved the unauthorized unloading of object code from a ROM chip. The district courts hearing the cases divided on the issue of whether this act constituted an infringement of a copyrightable work.

In Data Cash Systems, Inc. v. JS&A Group, Inc. the district court held that the unloading of object code from a ROM chip is not a copyright infringement of any form of the program.\textsuperscript{60} Data Cash had retained a consultant to design and develop a computer program for a computerized chess game, "Compuchess." To create such a game, the program went through several stages using an assembly process to create a program in object code which was...

\textsuperscript{56.} 714 F.2d 1240.


\textsuperscript{58.} 480 F. Supp. 1069 (1979), aff'd on other grounds, 628 F.2d 1038 (7th Cir. 1980).


\textsuperscript{60.} The defendant took a ROM containing the plaintiff's object code and placed it in a lower-priced, inexpensive imitation game. The district court reasoned that object code was not a "copy" of copyrighted source code; in any event, object code was viewed by the court as being an uncopyrightable utilitarian device. Data Cash, 480 F. Supp. at 1065.
embodied in the ROM chip. The ROM chip was then installed into the computer as part of the circuitry.\textsuperscript{61} When Data Cash marketed Compuchess in 1977, it mistakenly believed that it was not technologically feasible to unload a ROM chip. A competitor purchased a lower-priced “knockoff” game on the market, containing a ROM chip unloaded from the Compuchess ROM. This allowed the competitor to sell a game that contained Data Cash’s program without incurring any of the costs of developing its own program. Data Cash had only copyrighted the source code,\textsuperscript{62} not the object code on the ROMs.\textsuperscript{63}

The Data Cash court denied a preliminary injunction against the defendants, utilizing common law principles and the 1909 Copyright Act. Judge Flaum said that at common law a ROM chip is not a copy, just as a completed building is not a copy of an architectural blueprint upon which the building is based.\textsuperscript{64} The court then reasoned that at common law a copy of a computer program is another computer program in its written form (\textit{i.e.} the flow chart or source phase) because these are comparable technical writings. A ROM chip, however, is a mechanical embodiment of a source code and not a copy of it.\textsuperscript{65} This conclusion is based on the 1909 Copyright Act which, along with the White-Smith decision, stated that a copy must be in a form which one can “read and see” with the naked eye.\textsuperscript{66}

Data Cash seems to be vulnerable to criticism for failing to apply the 1976 version of section 117, which would have compelled the copyrightability and protectability of the program as fixed in the ROM. Consequently, the court would have recognized

\begin{itemize}
  \item \textsuperscript{61} Id. at 1068. See T. Kidder, supra note 2, at 42.
  \item \textsuperscript{62} See supra text accompanying note 2.
  \item \textsuperscript{63} See supra note 10.
  \item \textsuperscript{64} Data Cash, 480 F. Supp. at 1068-69. Boorstyn argues that the copying of a ROM is an infringement because the old concept of eye-readable copies has changed. A copy is now considered to be an infringing copy if the work fixed therein is capable of being reproduced, perceived, or communicated by machines. A ROM clearly has the capability of reproducing the program, with the aid of a machine, so that it is communicable to a person. Boorstyn, supra note 30, at 284. See infra note 67.
  \item \textsuperscript{65} “[A]t common law a copy of a computer program is another computer program in its flow chart or source phase because these are comparable technical writings. While the ROM is the mechanical embodiment of the source program, it is not a ‘copy’ of it.” Data Cash, 480 F. Supp. at 1068.
  \item \textsuperscript{66} See supra notes 23-31 and accompanying text.
\end{itemize}
duplication as an act of infringement.\textsuperscript{67} This, however, is an erroneous reading of the \textit{Data Cash} decision. The court stated that even if the 1976 Copyright Act applied, copying a ROM would not be actionable.\textsuperscript{68} The court reasoned that in its object phase, the computer program is a mechanical device which, like the electrical wiring in an automobile engine, is engaged in the computer to become an essential part of the mechanical process.\textsuperscript{69} Mechanical devices which cannot qualify as pictorial, graphic or sculptural works are not writings, and thus may not obtain copyright protection.\textsuperscript{70} It is probable, therefore, that the \textit{Data Cash} decision would not be changed in light of the 1976 Copyright Act.\textsuperscript{71}

Given the same issue, and similar facts, the district court in \textit{Tandy Corp. v. Personal Micro Computers, Inc.}, held that copyright laws do protect a program fixed in the form of a ROM chip.\textsuperscript{72} \textit{Tandy} involved a personal computer which contained a built-in programming routine designed to interpret one computer language code system into another so that the computer could perform problems and tasks assigned to it.\textsuperscript{73} Tandy claimed that defendant copied its program, changing only certain items which identified the program as Tandy's, and subsequently used the program in its own home computer. The defendant argued that ROM chips were not "copies" of the original computer program within the federal copyright laws and, therefore, a ROM chip which is a copy of another ROM chip does not infringe the copyright covering the original program. Tandy responded by claiming that this type of fixation was covered by the 1976 Copyright

\textsuperscript{67} Boorstyn, supra note 30, at 283.
\textsuperscript{68} Data Cash, 480 F. Supp. at 1066.
\textsuperscript{70} 1 M. Nimmer, Nimmer on Copyright § 218(F) (1978).
\textsuperscript{72} Tandy, 524 F. Supp. 171 (1981).
\textsuperscript{73} See generally, T. Kidd, supra note 2, for an excellent discussion on the development of source code and object code. Source code can be transformed into object code in various ways. "Typically, in the course of compilation, each source code statement will be replaced by one or more lower level statements. In between these lower level statements, 'linking statements' may be inserted. Some statements in the source code version may disappear." Stern, supra note 4, at 3. This distinction between object code and subject code may lead to the unavailability of copyright protection of the former.
Applying 17 U.S.C. sections 101 and 102, the court said that a computer program is a work of authorship subject to copyright protection, and that a silicon chip is a "tangible medium of expression," such as to make a program fixed in a form subject to copyright laws. Thus, the practice of unloading and reloading a program from a ROM chip is an infringement of a copyright on a source program. The court regarded amended section 117 as not intending to provide a loophole by which someone could duplicate a computer program fixed on a silicon chip. Any other interpretation would render the theoretical ability to copyright computer programs virtually meaningless.

There has been some criticism of the Tandy decision. The court relied heavily on the finding that the copying of the program had involved, as an intermediate step, production of hard copy (listing) of the copyrighted material. Some have argued, however, that because current technology allows copying a ROM chip without the production of a listing, that is, no "intermediate" stage, the Data Cash rationale—that in order to qualify for copyright protection, the copyrighted work must be eye-readable and non-utilitarian—cannot be dismissed. In addition, the Tandy court's comments concerning a computer program being "fixed" in a ROM chip ignore the statutory requirement that a "copy" of

74. Tandy, 524 F. Supp. at 173.
75. Id.
76. Unloading and reloading a ROM is possible not only for video game programs, but for any type of program lodged in a ROM. See Stern, The Case of the Purloined Object Code: Can It Be Solved? Part I, BYTE, Sept. 1982, at 420, 426.
77. See 2 M. Nimmer, NIMMER ON COPYRIGHT § 8.08 (1982). In a third case, the International Trade Commission (ITC) refrained from ruling whether plaintiff Midway Corporation was protected by copyright law when a competitor unloaded plaintiff's object code from a ROM and reloaded it into its own ROM. Certain Coin Operated Audio-Visual Games and Components Thereof, 2 COPYRIGHT L. REP. (CCH) ¶ 25,298 (Int'l Trade Comm'n Investigative Report, June 25, 1981). Midway, a United States distributor of video arcade game machines, purchased the rights to the "Galaxian" video game from the Japanese creator. After Midway marketed the game in the United States, other importers started to introduce similar games with duplicated ROMs. Apparently, the ITC was hesitant to fill in the void in the 1976 Copyright Act, regarding the copyright status of computer programs, when Congress had not. Id. See Stern, supra note 76, at 426.
78. Stern, supra note 4, at 6.
79. Tandy, 524 F. Supp. at 175.
80. Kramsky, supra note 71, at 350.
a program be made before an infringement can be found. Since the statute requires that a computer program be "fixed" as well as unlawfully "copied," focusing only upon the "fixed" aspect is insufficient to determine if copyright protection is implicated.

Finally, the Tandy court's language implies that the computer understands and reads object code like a person reading a literary work (including a source program). A computer, however, does not perform this in the sense a person does. Thus, the court's holding assumes that non-human perception or communication to a non-human is covered by the Computer Software Act. Yet, it is not clear whether "perceived" and "communicated" in the statutory definitions of "copy" and "fixed" actually intend human perception and communicability. As an illustration, compare the magnetic audio data on a cassette tape to an object code stored in ROM. It is illegal to copy a protected audio cassette with a home tape recorder because the function of the cassette is to reproduce a song or some other audio message to a human being. However, it may not be illegal to copy or unload a ROM chip with a stored object code because there is no intention of using the ROM chip to communicate with another person.

The court in GCA Corp. v. Chance, following the Tandy court reasoning, rejected the defendant's assertion that copyrighting only the program in source code does not secure protection for the program in object code. In GCA the plaintiff was granted copyrights on certain programs in source code, including its "diagnostic system and its operating system series," although the programs were used in object code. The court found that since a source code comes within the scope of copyright protection and that "the object code is the encryption of the copyrighted source code"...
code,” the two forms are to be dealt with as one work.87 Thus, object code is protected by the copyright of the source code.88

Professor Boorstyn has argued that the new statutory definition of “copy” includes ROMs as material objects in which a program can be fixed or embodied and from which a program can be perceived, reproduced, or otherwise communicated with the aid of a machine or device. Therefore, the 1976 Copyright Act apparently should afford copyright protection to a computer program fixed in a ROM to the same extent that a work fixed on a magnetic tape, magnetic diskette, phonograph record, or motion picture film is afforded such protection.89 The ROM, which is a semiconducting silicon chip, contains electrical “instructions” which play an “electromechanical” role in enabling the programs to communicate with users.90 Other media which contain a work, such as audio tape or film, possess signals that transmit the work directly to the listener or viewer; thus, these media do not merely perform a subsidiary function in a series of electromechanical routines which ultimately produce an expression on a computer screen.91

While the 1976 Copyright Act’s definition of a computer program might include object code program, the Act stops there and does not provide that unloading a program from a ROM or otherwise electronically duplicating a program in object codes violates copyright protection by making an unlawful copy.92 The three aforementioned cases, plus the two Third Circuit cases to be analyzed below, seem to indicate that the exclusive right to a program fixed in a ROM is questionable.93

87. Id. at 720.
88. Id.
89. Boorstyn, supra note 30, at 283.
90. See supra note 10.
91. Even conceding that a ROM chip may be a viable medium in which to fix a copyrightable work, that does not mean that all programs which are capable of being embodied in a ROM chip are copyrightable. See infra notes 116-56 and accompanying text.
93. It must be remembered that since the majority of cases hold that application software in ROMs is copyrightable, this analysis involves a first impression interpretation of heretofore uninterpreted statutory provisions to new technology. See supra note 20 and accompanying text. The examination of these five cases provides a paradigm for the expansion of copyright law and sets the stage for the Apple II decision. See infra notes 123-155 and accompanying text.
B. An Apparent Split in the Third Circuit Regarding the Copyrightability of Object Code Computer Programs in ROMs

In Williams Electronics, Inc. v. Artic International, Inc., the first case dealing with a copyrighted computer application program in the video game context, the plaintiff received three copyright registrations relating to the video game "Defenders," which Williams manufactures and sells. One of the copyright registrations was for the computer program. The defendant Artic is a seller of electronic components of video games. Artic sold circuit boards, produced by others, that contained electronic circuits, including a microprocessor and memory devices. These ROMs used a computer program that is nearly identical to Williams' "Defenders" program. The result was a game and audiovisual effect "virtually identical" to "Defenders." Williams brought suit for infringement of its copyrights. The district court issued a permanent injunction against Artic. On appeal, Artic challenged the trial judge's conclusions with respect to infringement and the validity and scope of Williams' copyrights.

Artic raised several arguments concerning the copyrightability of ROMs. Artic argued that there is no copyright for ROMs since they are a utilitarian object or machine part. The Third Circuit disagreed, concluding that Williams' effort to protect its artistic expression of programs fixed in ROMs no more restricted the plaintiff's use of ROMs than a valid copyright restricts an author's use of books; both meet the statutory fixation requirement. Artic next contended that a distinction must be made between source code and object code, arguing that source code is copyrightable and object code is uncopyrightable. The court interpreted Artic's theory to be that a computer program-stored ROM chip does not satisfy the statutory requirement of being fixed in a material object because a "copy" must be intelligible to human beings and must be intended as a medium of communication to human beings. Although the court formulated the issue of human-intelligibility, it did
Judge Sloviter reasoned that Congress intended for a broad interpretation of the terms "fixation" and "copy," which include technological advances such as those present in the case at bar. He found "that the 'fixation' requirement is met whenever a work is 'sufficiently permanent or stable to permit it to be . . . reproduced, or otherwise communicated' for more than a transitory period."\(^{101}\) The court rejected Arctic's claim that the broad language of the statute be interpreted so as to limit the infringement of a computer program to copying the program with other media, such as magnetic disks or tapes, but not to the duplication of a computer program fixed on a silicon chip.\(^{102}\)

The Williams court implicitly sidestepped deciding whether a ROM is part of the machine, and thus avoided determining whether an object stored in a ROM is a utilitarian device which is not within copyright protection. The district court in *Apple Computer Inc. v. Franklin Computer Corp.*\(^ {103}\) did deal with this issue, however, as well as several others in an exhaustive opinion concerning the copyrightability of object code stored in a ROM.

Apple moved for a preliminary injunction against Franklin, accusing Franklin of infringing the copyrights on the computer programs used in the Apple II personal computer. The programs were in object code and stored in ROM chips housed inside Apple computers. Apple contended that Franklin "stole" the logic and structure of its system.\(^ {104}\) There was some basis for Apple's claim in that Franklin's computer, the Ace 100, is Apple-compatible; that is, it is designed to run most of the software written for Ap-
Franklin maintained that Apple deprived non-Apple owners of the opportunity to take advantage of the wealth of Apple-compatible material that exists in the market place. Further, Franklin stated that it created a system compatible with Apple-compatible software, which out of necessity shared a great deal of the essential structure of the Apple II, especially the structure of the Apple II's operating system. Apple, on the other hand, argued that whether in a ROM or on a floppy disk, object code is a form of expression and a work of authorship, not an idea or process, and that a ROM is a tangible medium of expression, not a mechanical device.

After noting that opinion has been divided on how to deal with object codes when authorship is involved, and how to treat ROMs in general, the court determined that a major issue was whether Apple's computer programs are "fixed" expressions of an author's "original work." The court found that, in the case of computer programs, it is not clear whether the program designer's idea of the operating system program, the ROM, is the "original work of authorship." If the programmer envisioned the flow chart of operations that the program would perform, copyright protection would apply since it would be an original work. However, it may be that the designer imagined the architectural structure of the ROM and the overlay of microswitches that would be most economical and efficient for the system. If this were the case, the court responded, the designer may be said to have been an engineer designing a utilitarian aspect of the machine and no copyright protection could attach to it.

Judge Newcomer additionally questioned whether Apple's

105. Id. at 814-15.
106. Id. at 815.
107. Id.
108. Id. at 821-23. The idea of authorship tacitly goes to the issue of an intent to communicate with other people. Id.
109. "To make the machine execute just one of its two hundred or three hundred basic instructions, the coder usually has to plan the passage of hundreds of signals through hundreds of gates." T. Kidder, supra note 2, at 100.
110. From the description given supra note 109 and accompanying text, it is logical to take the view that this is the case. Judge Newcomer notes that although ROMs may be entitled to copyright protection as three-dimensional works of art, it is equally plausible to view ROMs containing object codes as a physical device with an essentially useful purpose or function. This latter view seems the more correct one to take due to the nature of ROM chips. See supra notes 4-11 and accompanying text.
computer operating system constitutes a form of expression or, instead, an uncopyrightable idea or process.

[I]t is not clear that object code, which was not designed to be "read" by a human reader and can only be read by an expert with a microscope and patience, is a language of description. It cannot teach. It can be used to control the operation of the computer. For these reasons, it may be more accurate to say that operating systems are an essential element of the machine . . . . Similarly, it may be more accurate to say that object code in its binary form or chip form is a useful version of the machine's electrical pulse. 111

Further, the court noted that while copyright protection only subsists in original works of authorship, 112 the process of constructing a chip is not so much a work of authorship as the product of engineering knowledge focused on obtaining a desired function or output. Apple did not distinguish the form of the work from its utilitarian purpose. By arguing that these works are "literary works," Apple had suggested that their function and form merged because each work as a whole conveys information. The test for copyright protection requires both separability and independence from the utilitarian aspects of the article, 113 which Apple failed to show. Finally, the court indicated that there are doubts as to the copyrightability of the Apple programs because the expressions embodied in the object code are not directed to a human being. 114

For purposes of copyright protection, the expression, no matter how indirect or exotic, must be intended for human perception and understanding. 115 Judge Newcomer concluded that the concept of language means an ability to create human interaction; the Copyright Act only protects the fixed expression of language. 116

The factual situations are similar in both Apple I and Williams Electronics. However, to reach their respective conclusions, the courts approached the issues from different viewpoints. Although the Williams reasoning may be correct in pointing out that Artic's position would limit computer program copyright protection, per-

115. Id.
116. Id. at 825. The court's language is unequivocal as to the necessity of intending communication between humans. The court logically concludes that since object code is simply meant to instruct a computer, it is not deemed to invoke copyright protection.
haps that is the purpose of copyright protection. Judge Newcomer's analysis goes to the heart of the matter: authorship and communicability. The facts indicate that engineers create object code, which is intended to allow the computer to perform various tasks. Object code is not properly protected under this analysis since it is a functional device, rather than a literary work, that does not communicate anything to a person. Yet such a result may not be satisfying in light of the practical approach seen in Williams, since it would appear to allow others to unfairly use the object code.

C. Lessons From The Pre-Apple II Cases

Both Williams and Apple I highlight the practical difficulties courts face in interpreting the 1976 Copyright Act and the 1980 Computer Software Act when applied to an area that is not expressly covered by these acts. However, the two cases may be reconciled on the basis of the two programs having two different purposes. In Williams, the output was the video game "Defenders"; the Apple I case involved a computer that had a compiler program (input-output routine).\footnote{117. "This is a computer program which tells the computer how to take the information which is put into the computer by an operator in one computer language and translate that information into a more simplified 'machine' language which the computer can understand." Tandy, 524 F. Supp. at 173. See supra notes 2 and 49 and accompanying text.} This distinction, however, conflicts with the Data Cash and Tandy decisions, which involved the reverse circumstances. In Data Cash a computer program for a video game was not copyrightable, while in Tandy a compiler computer program for a personal computer was protected by the 1976 Copyright Act. Tandy is premised on the superficially attractive rule that a program fixed in a ROM should be protected if its purpose is to generate an image to attract and engage a human audience. This rule, however, ignores the fact that an object code itself is not meant to convey meaningful information to a person. Both Apple I and Data Cash use a human communication criterion for denying copyright protection to the object code lodged in a ROM.\footnote{118. See supra notes 64-66, 114-116 and accompanying text.} The rationale applied in Williams and Tandy would defeat the statutory requirement that a work be one of original authorship, and be an expression of an idea rather than a utilitarian, functional object. The process of constructing a chip is more an
application of engineering principles than a creative expression.\(^\text{119}\) The Copyright Acts should be construed to protect only human communications directed at human audiences. Any other interpretation would disregard the distinction the law draws between the utilitarian purpose and the idea itself.\(^\text{120}\) To hold that a copy of an object code fixed in a ROM chip entails copyright infringement of a source code is analogous to saying that a lamp with a base in the figure of a Greek goddess is copyrightable as a lamp as well as a statuette. If the lamp and the base-statue are inseparable, nothing may be copyrighted.\(^\text{121}\) Here, the object code is inseparable from the machine itself and has no author.

While the practice of unloading a ROM and reloading it in another machine or device appears to violate the spirit, although not the letter, of copyright law, the courts should be careful not to weaken the exceptions to copyrightability for objects that are utilitarian in nature and not an original work of authorship. This suggests that Congress should state its policy toward such practices. However, it may not be a simple or correct solution to say in so many words that object code fixed in ROMs are now protected. Both \textit{Data Cash} and \textit{Apple I} have held that a communication directed to a human audience is a necessary prerequisite to the acquisition of copyright protection for an item. This requirement is consistent with the copyright provisions. However, most courts have determined that certain types of programs stored in ROM chips should receive copyright protection regardless of immediate communicability with people.\(^\text{122}\) Even if this is a valid interpreta-

\(^{119}\) Judge Newcomer's analysis in \textit{Apple I} questions the patentability of object code since it is not a new or useful art, machine manufacture, or composition of subject matter, or any new or useful improvement thereof. 545 F. Supp. at 824. See 35 U.S.C. § 101 (1976). See also Pope & Pope, \textit{Protection of Proprietary Interests in Computer Software}, 30 ALA. L. REV. 527, 539 (1979).

\(^{120}\) In \textit{Apple I}, Judge Newcomer concluded that "to go beyond the bounds of [protection only expressions of ideas] would be ultimately to provide copyright protection to the programs created by a computer to run other computers. With that, we step into a world of Gulliver, where horses are 'human' because they speak a language that sounds remarkably like the one humans use. It is an intriguing analogy but false." 545 F. Supp. at 825.

\(^{121}\) Esquire, Inc. v. Ringer, 591 F.2d 796 (D.C. Cir. 1978), \textit{cert. denied}, 440 U.S. 908, \textit{reh'g denied}, 441 U.S. 917 (1979) (register's interpretation of regulation attempting to define boundaries between copyrightable works of art and noncopyrightable industrial designs bars copyright registration of overall shape or configuration of utilitarian article no matter how aesthetically pleasing was reasonable).

\(^{122}\) \textit{See supra} notes 53-56 and accompanying text.
tion of the copyright provisions, the recent Third Circuit decision in *Apple II* significantly extends this reasoning to programs that do not have as their immediate or ultimate purpose communication with humans. In addition, the *Apple II* court uses other principles of copyright law to grant certain software programs unwarranted protection.

III. **Apple II: Into Dangerous New Frontiers**

In reversing the district court's opinion in *Apple I*, the Third Circuit in *Apple II*\(^{123}\) determined that systems control software programs merit copyright protection.\(^{124}\) By granting copyrightability status to these programs, the court violated certain cornerstones of copyright law. The decision demonstrates that underlying copyright principles are easily manipulated to accommodate awe-inspiring advances in the sciences. Although the *Apple II* court discussed Franklin's claims under traditional tenets of copyright law, the analysis indicates that the court misapplied the law to the facts.

After reaffirming *Williams*\(^{125}\) on the issues of the copyrightability of software expressed in object code\(^{126}\) and software lodged on a ROM,\(^{127}\) the Third Circuit in *Apple II* addressed the "heart" of Franklin's contention in the appeal: that systems control software, as distinguished from application software, is not the "proper subject of copyright 'regardless of the language or medium in which they are fixed'"\(^{128}\) After acknowledg-

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123. Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240 (3d Cir. 1983) [hereinafter cited as *Apple II*].
124. The court in Apple Computer, Inc. v. Formula Int'l, Inc., 725 F.2d 521 (9th Cir. 1984) followed the rationale of *Apple II*. Prior lower court decisions found certain operating systems copyrightable without analysis of this issue. See Tandy, 524 F. Supp. at 173; GCA Corp. v. Chance, 217 U.S.P.Q. (BNA) 718 (N.D. Cal. 1982), 2 Copyright L. Rep. (CCH) ¶ 25,464. The *Apple II* case was the first appellate decision to explicitly discuss this issue.
125. 685 F.2d 870 (3d Cir. 1982).
126. *Apple II*, 714 F.2d at 1246-49. For a review of the facts in *Williams*, see supra notes 103-07 and accompanying text.
127. *Apple II*, 714 F.2d at 1249.
128. *Id.* (quoting Brief for Appellee at 15). The *Williams* court said:
The issue in this case is not whether plaintiff . . . could protect the ROM itself under the copyright laws. Rather, before us is only plaintiff's effort to protect its artistic expression in original works which have met the statutory fixation requirement through their embodiment in the ROM devices.
685 F.2d at 874. It is contended here that *Apple II* involved non-artistic, non-communic-
edging that this issue had not been involved in the Williams case, the court turned to Franklin's principal arguments. 129

A. Systems Control Programs as "Processes" or "Methods of Operation"

Franklin characterized an "operating system" as a method of operation, process or system which is uncopyrightable under section 102(b) of the 1976 Copyright Act. 130 To bolster this contention, Franklin cited the doctrine espoused in Baker v. Selden: 131 a plaintiff's copyright of books does not grant him the sole right to utilize the process elucidated in the books. 132 From these principles, Franklin argued that employment of a method of operation does not violate a copyright on the description of the method, that purely utilitarian works are not afforded copyright protection and that a monopoly may not be obtained for an idea under copyright law. 133

129. Id. at 1249-54.

130. Id. at 1250. Section 102(b) states: "In no case does copyright protection for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work." 17 U.S.C. § 102(b) (1982).

Two of the fourteen operating systems involved in this litigation were described by the Apple II court as follows:

(1) Autostart ROM is sold as part of the Apple Computer and is embedded on a ROM chip. The program has also been published in source code as part of a copyrighted book, the Apple II manual. When the computer's power is turned on, Autostart ROM performs internal routines that turn on the circuits in the computer and make its physical parts (e.g. input/output devices, screen, and memory) ready for use. . . .

(13) Apple 13-Sector Boot ROM is stored in a ROM located on the disk controller card plugged into the Mother Board. By turning on numerous circuits on the card and in the Apple II computer, this program causes other parts of the disk operating system used for 13-sector format disks to load.

Apple II, 714 F.2d at 1244 n.4. Of the fourteen programs submitted for copyright registration, eleven were registered with the Copyright Office under the "Rule of Doubt," indicating that the Copyright Office was not able to determine whether or not those programs contained copyrightable material. Appellee's Brief at 10-12 & n.4.


132. The Court declared that "copyright of a work on mathematical science cannot give to the author an exclusive right to the methods of operation which he propounds." 101 U.S. at 103.

133. 714 F.2d at 1250. Franklin asserted that

Baker stands for several fundamental principles, each presenting what we be-
The Apple II court rejected the contention that an operating system program is a process by stating that it, like an application program, instructs the computer to perform a task; there should be no distinction between copyright protection for these two types of programs. It would appear, however, that the two programs have a fundamental difference in purpose. A system control software program is an essential part of the machine and has as its "primary" function the exploitation or use of an idea. CONTU Commissioner Nimmer, in his concurrence with the CONTU Final Report, implied that CONTU had over-extended protection for certain kinds of software:

[I]t may prove desirable to limit copyright protection for software to those computer programs which produce works which themselves qualify for copyright protection . . . . A program designed for a computer game would be copyrightable because the output would itself constitute an audiovisual work. . . . On the other hand, programs which control the heating and air-conditioning in a building, or which determine the flow of fuel in an engine, or which control traffic signals would not be eligible for copyright because their operations do not result in copyrightable works.

Operating systems designed to operate the computer itself are analogous to the latter programs Commissioner Nimmer mentions, for they act as monitoring devices within and for the computer. In his dissent in the CONTU Final Report, Commissioner Hersey stated that "copyright protection [should] not extend to a computer program in the form in which it is capable of being used to control computer operations." The court con-
rectly indicated that the "medium is not the message" but it failed to properly characterize the message. Even if the operating system is embodied in a different type of memory device it still is effectively part of the machine once it is used; a systems control program is qualitatively different than an application program and should be classified as a method of operation, inherently incapable of being copyrighted.

The Third Circuit in *Apple II* used the rationale of *Mazer v. Stein*, the CONTU majority opinion, and the statutory definition of computer programs to conclude that an operations program does not fall within the exclusion of utilitarian works from copyright protection. Taken together, the court indicates that these three sources suggest that the use of a program is irrelevant and that there is no distinction between an operating program and an application program. However, under the *Baker-Taylor*
doctrine an operating system may be characterized as an essential component of the computer since it controls the operation of the machine rather than instructs or explains the operation. Additionally, Commissioner Hersey in dissent argues that such a program is a machine control element, a mechanical device, having no purpose beyond being engaged in a computer to perform mechanical work. . . . It is clear that the machine control phase of a computer program is not designed to be read by anyone; it is designed to do electronic work that substitutes for the very much greater human labor that would be required to get the desired mechanical result.

By its nature, an operating system program performs a utilitarian function, rather than ultimately to communicate with a person. The mistake the Apple II court made was to look at the medium of the program, rather than the program itself. Although there is no stated distinction in section 101 between systems control programs and application programs, the spirit of the 1976 Copyright Act focuses on the protection of works or objects that ultimately will communicate with people. A systems control program is never intended to communicate with a person, and thus should not be copyrightable.

145. CONTU FINAL REPORT, supra note 42, at 28, Henry edition at 61 (Commissioner Hersey dissenting).

146. Id. Thus, an application program in object code should be copyrightable. See Midway Mfg. Co. v. Artic Int’l, Inc., 547 F. Supp. 999 (N.D. Ill. 1982), aff’d, 704 F.2d 1009, cert. denied, 104 S.Ct. 90 (1983) (program for visual display of video game in object code protected by copyright). However, a systems control program should not be afforded such protection. An operating system seems to merge its utilitarian function and expressive purpose so that they are indistinguishable. See Esquire v. Ringer, 591 F.2d 796, 798-800, cert. denied, 440 U.S. 880 (1978).

Franklin contended that such a program also intertwined idea and expression so that they were inseparable. See also Herbert Rosenthal Jewelry Corp. v. Kalpakian, 446 F.2d at 742. The Third Circuit held that if alternate ways of expressing the idea are available, there is no merger since a variety of expression shows that it is the expression, not the idea, that is receiving copyright protection. See also Franklin Mint Corp. v. National Wildlife Art Exchange, Inc., 575 F.2d 62 (3d Cir. 1978), cert. denied, 439 U.S. 880 (1978); Dymow v. Bolton, 11 F.2d 690 (2d Cir. 1926). While this is a clever argument, it still does not answer Franklin’s other contentsions.

147. See supra note 19.
B. Systems Control Programs as Works of Authorship

Although the Apple II court mentioned computer programs in relation to works of authorship under section 102(a), it did not examine the substance of the underlying program. Rather, the court focused on the copyrightability of computer programs in general, stating that a "computer program, whether in object code or source code, is a 'literary work' and is protected from unauthorized copying, whether from its object or source code version." However, if material is to be eligible for copyright protection as a literary work, it must have a "communication purpose." Since a systems control program does not have any expression that functions to communicate, it therefore should not be protected under copyright law as a literary work.

Apple's systems control programs in this suit are methods of operation of the computer "involving fundamental routines of the machine which manage the functions of the machine." These programs are a series of electrical signals or instructions that enable a computer to perform in a particular mode. Apple's operating programs are comprised of electrical signals that are components of an electrical mechanism. These programs control the electromechanical operation of the computer and, therefore, are utilitarian and functional devices, unqualified for copyright protection. The Apple II court failed to address whether or not an

149. 714 F.2d at 1249.
150. Brief for Appellee, supra note 133, at 34. Franklin quoted the Synercom court's test, "the litmus seems to be whether the material proffered for copyright undertakes to express," Synercom Technology, Inc. v. University Computing Co., 462 F. Supp. 1003, 1011 (N.D. Tex. 1978). The Apple II court stated that "[t]he definition of 'literary works' in section 101 includes expression not only in words but also 'numbers, or other . . . numerical symbols or indicia', thereby expanding the common usage of 'literary works.' " 714 F.2d at 1249. Yet these methods are simply other ways to communicate; the court itself calls them "expressions."
151. Brief for Appellee, supra note 133, at 35.
152. See generally supra note 11, and Brief for Appellee, supra note 133, at 34-38. Charles Weddington, a program developer, stated that "[t]he operating system essentially is a program that is internal to the computer and manages the internal functions of the computer . . . ." quoted in Brief for Appellee, supra note 133, at 26.
153. See generally supra note 11, and Brief for Appellee, supra note 133, at 34-38.
154. "It is possible to have an 'original work of authorship' without having a 'copy' or 'phonorecord' embodying it, and it is also possible to have a 'copy' or 'phonorecord' embodying something that does not qualify as an original work of authorship." H.R. REP' No. 1476, 94th Cong., 2d Sess. 53, reprinted in 1976 U.S. CODE CONG. & AD. NEWS 5666.
operating systems program is a work of authorship, thus allowing the medium (here a computer program embodied on a ROM chip), instead of the message, to be the determinative factor in affording copyright status.\(^{155}\)

Apple's operating system programs are intra-computer instructions that are part of the computer's operating process. Since these programs function to command the computer to produce positive and negative electrical signals, they have a noncommunicative purpose to a human audience. Whether or not such programs are written in source code or object code, or are fixed on a floppy disk or in a ROM chip, does not affect their copyrightability. Even though a work may be fixed, it may be uncopyrightable since it does not constitute a literary work. This is the situation in Apple II, where Apple's programs are not literary works even though they are fixed in a ROM chip. Scrutiny of the nature of the work (operating system program), rather than simply the category (computer program) or medium (ROM chip), reveals the Third Circuit's error of allowing copyright protection to Apple's programs.

**CONCLUSION**

As sophisticated technological achievements have been introduced into commercial products, the courts have shown a willingness to undermine basic principles of copyright law in order to grant copyrightability to works that under a strict statutory construction of the copyright laws would not receive protection. By cloaking systems control programs with copyright status, courts like the one in Apple II have brought copyright law to the position Judge Newcomer foresaw:

To go beyond the bounds of this protection would be ultimately to provide copyright protection to the programs created by a computer to run other computers. With that, we step into the world of Gulliver where horses are

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155. 714 F.2d at 1253-54; see also Apple Computer Inc., v. Formula Int'l, Inc., 725 F.2d 521 (9th Cir. 1984) (following Apple II) and Hubco Data Prods. Corp. v. Management Assistance, Inc., No. 81-1295, slip op. at 10-11 (D. Idaho Feb. 3, 1983) (rejecting defendant's contention that a systems control program "cannot be copyrightable because it is a machine process.")

It is interesting to note that after nineteen months of litigation, Apple and Franklin have settled out of court. Franklin agreed to pay Apple $2.5 million and not to copy any of Apple's software. Bus. Wk., Jan. 25, 1984, at 67.
"human" because they speak a language that sounds remarkably like the one humans use. It is an intriguing analogy but false.156

In carving out an increasingly broad area of copyright protection, the courts are rendering factors such as ultimate communicability with humans and methods of operation meaningless. Rather than attempting to make tortured interpretations of the Copyright Act, or to attempt constantly to update the Copyright Act, perhaps a quasi-copyright or quasi-patent legislation could be developed. In the meantime, it would bode well for the Copyright Act if the judiciary would use some restraint in dealing with technological and scientific cases instead of being blinded to the true nature of the works seeking to be protected.

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