Protecting Computer Programs

Recent developments in the U.S. in protecting intellectual property rights in computer and computer programs

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Two events of major significance in the protection of computer software and firmware occurred in the U.S. during the last year. The first, occurring in December 1980, was a major statutory change in the federal copyright laws, relating to computer programs, 17 USC 117; and the second was the first modern decision of the U.S. Supreme Court which has upheld patent claims involving computers or computer programs. In this U.S. Supreme Court case, *Diamond, Commissioner of Patent and Trademarks v. Diehr,* March 3, 1981, 101 S.Ct. 1048, 209 USPQ 1, (1981) the court held that patent claims to an industrial process were not unpatentable merely because they included computer program steps.

SOFTWARE AND FIRMWARE

The present article deals with the types of legal protection which are available for the intellectual property embodied in computer programs, often referred to as "software", and for the "hardware" or "firmware" involving the electrical circuits themselves. Software, or a computer program, is normally employed in the operation of a general purpose computer, which performs calculations or other functions in accordance with instructions included in the program.

Certain simple sequential operations may be accomplished by "hardwired" electrical circuits, in which the sequence of operations is built into the wiring of the circuits.

Microprocessors — "ROMS"

Between the "firmware" of the hardwired circuit and the "software" of the magnetic tape program is the special-purpose computer with an internal configuration especially arranged for doing one specific job. More recently, microprocessors have been developed which can perform the functions of many special-purpose computers, with the only change being the substitution of a new program included in a small memory chip forming part of the small electronic package. One of these memory chips containing program information is known as a "READ ONLY MEMORY", which is usually referred to by its acronym "ROM". These microprocessors have revolutionized the small special-purpose computer business, by making special-purpose computers available at very low cost, with the only change in circuitry being a different, inexpensively programmable Read Only Memory chip.

TRADE SECRET PROTECTION

Trade secret protection will only be mentioned briefly in the present paper. First, it is noted that the strength and viability trade secret law was confirmed in the recent past by a rare unanimous decision of the U.S. Supreme Court in *Aronson v. Quick Point Pencil Co.,* 440 U.S. 257, 99 S.Ct. 1096, 201 USPQ 1, (1979), upholding a trade secret license on a mechanical structure. It is further noted that the 1976 Copyright Act, effective January 1, 1978, (Title 17 of the U.S. Code), states that copyrights arise or subsist upon creation and reduction to tangible form, 17 USC 102. Therefore, publication (which might destroy the trade secret) with notice is not necessary to establish copyright protection. Accordingly, a suitable notice on copyright programs, invoking both copyright protection in the unpublished work, and trade secret protection, is recommended for the initial protection of computer programs. Trade secret protection should also be invoked for the early protection of new computer designs or circuitry.

For completeness, reference is made to the copyright preemption statute, 17 USC 301, and to *Goldstein v. California,* 412 U.S. 546, 93 S.Ct.2303 (1972). The wording of the preemption section does not conflict with the assertion of trade secret rights; and the Goldstein case is of interest for its holding that the pre-1978 federal copyright law had not preempted a California criminal statute relating to record piracy, under which certain persons had been convicted.

HISTORICAL REVIEW

The earliest pertinent case which was reviewed in the legal research for the present paper is a 1908 copyright decision of the U.S. Supreme Court, *White-Smith Music Publishing Co. v Apollo Co.,* 209 U.S. 1, 28 S.Ct. 320 (1908). This decision involved a player piano roll having a pattern of openings (a program?) which caused a piano to play a certain musical composition. The majority decision held that the player piano roll did not infringe a copyright on the sheet music for the composition apparently on the basis, at least in part, that the music on the player piano roller could not be "read", or was not "eye-readable".

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In a reluctant concurring decision Justice Holmes stated (209 U.S. at p. 20) that, "On principle anything that mechanically reproduces that collocation of sounds ought to be held a copy, or, if the statute is too narrow, ought to be made so by a further act. . ." (statute).

Apparently, this Supreme Court decision was carried into the 1909 Copyright Act implicitly, see "Nimmer on Copyright," by Melville B. Nimmer, 1981, Volume 1, Section 2.03 (B) (1); and Congress did not see fit to follow Justice Holmes' advice until December of 1980, at least as to copyright infringement by non-eye-readable computer programs, all as more fully discussed in a later section of this paper.

Now, turning to the Supreme Court patent decisions in recent years involving computers and computer programs, the first recent case of note was *Gottschalk v. Benson,* 409 U.S. 63, 93 S.Ct.253, 34 L.Ed.2d 273 (1972). In that case the Supreme Court was dealing with a method or process for converting from binary coded decimal numbers into pure binary numbers, wholly within the computer. The court held that this algorithm or mathematical formula was akin to the discovery of a law of nature, such as the law of gravity, and therefore was not patentable subject matter.

The next Supreme Court computer case, *Dann v. Johnston,* 425 U.S. 219, 96 S.Ct. 1393 (1976) involved a process for using a computer in bookkeeping operations, and the court sidestepped the question of statutory subject matter, and quite summarily held the claims to be unpatentable over prior bookkeeping systems.

The third case in this set is *Parker v. Flook,* 198 USPQ 193, 98 S.Ct. 2522, 437 U.S. 584 (1978). This case involved a mathematical algorithm or formula for "Updating Alarm Limits". The claims were limited to the petrochemical or oil refining field. However, with three justices dissenting, the court indicated that the presence of "post-solution activity" of a conventional or obvious nature, would not take the case out from under the *Benson* precedent, supra, and held that the claims were directed to unpatentable subject matter. The Supreme Court also suggested that this was an area for Congress to pass legislation, quoting to this effect from its prior decision in *Deepsouth Packing Co. v. Laitram Corp.* 406 U.S. 518, 531; 92 S.Ct. 1700, 1708; 173 USPQ 769, 774 (1972).

The Supreme Court had previously granted *certiorari* to the CCPA Court of Customs and Patent Appeals, in a patent case involving manmade living microorganisms, and this case, *In re Bergy et al,* 563 F.2d 1031, 195 USPQ 344 (CCPA 1977), was pending before the Supreme Court at the time *Flook* supra, was decided on June 22, 1978. On June 26, 1978 the Supreme Court, in an unusual move, vacated the CCPA judgment in the Bergy microorganisms case and remanded to the CCPA for reconsideration, "in the light of *Parker v. Flook*" see *Parker v. Bergy et al.*, 438 U.S. 902, 98 S.Ct. 3119 (1978). It appeared probable at that time that the court was referring to the issue of nonpatentable types of subject matter, such as laws of nature; and it seemed that the Supreme Court was suggesting that manmade living microorganisms might fall within this category, along with computer program related claims, where an Act of Congress might be needed for patentability.

COLLATERAL BACKGROUND FACTORS

In other decisions during the previous 10 or 20 years, the Supreme Court had rarely upheld a patent. During this period of time it appeared that the Supreme Court was ignoring the statutory "unobviousness" standard of invention written into the 1952 patent statute, 35 USC 103. Instead, it seemed that mere unobviousness was not enough for patentability, but that the invention had to have "synergism" or "invention" or something quite above and beyond the "unobviousness" test which Congress had apparently established. The Supreme Court justices were very familiar and knowledgeable in the antitrust field, and their anti-monopoly approach appeared to carry over into the area of patents, regardless of the negative effect of such decisions on inventions and research and development.

One such Supreme Court decision which is fairly typical, which mentions "synergism", and which cites a number of the other Supreme Court decisions in which patents were struck down, is *Sakraida v. Ag Pro, Inc.* 425 U.S. 273, 96 S.Ct. 1532 (1976).

In part because of the anti-patent negativism of the Supreme Court, during the 1900s and 1970s and the precedent-followin decisions by lower courts, inventive effort, and research and development activities and expenditures in the United States were reduced. Larger numbers of the U.S. patents were being granted to foreign inventors than in previous years, 37% in 1980 as compared with 20% in 1960; and the U.S. "lag in technological leadership" became a common speech and press topic in Washington and elsewhere across the nation.

The CCPA decision in the Bergy Case

It was against the foregoing backdrop that the Court of Customs and Patent Appeals prepared its second opinion in the case of *In Re Bergy, Coats and Malik,* and *In Re Chakrabarty,* 596 F.2d 952, 201 USPQ 352 (1979), relating to living microorganisms. The case runs for 50 pages in 596 F.2d, and was written with the clear expectation that the case would go back up to the Supreme Court for thorough review. The decision is exhaustive and detailed, going into the legislative history and structure of the 1952 patent act, the plant patent legislation and many related factors and legal precedents. It seemed to be in the nature of a brief on appeal, covering nearly all possible legal aspects of the case, with many points being directed to the undesirability of requiring that Congress enact new legislation to cover new developments such as manmade living organisms or methods using computer programs.

Incidentally, Judge Giles S. Rich, as one of the drafters of the 1952 Patent Act, was uniquely qualified to formulate the CCPA's *Bergy* and *Chakrabarty* decisions, supra, in which the court reaffirmed its earlier position that the manmade living organisms were patentable even "in the light of *Parker v. Flook*", supra.

Three Pro-Patent Decisions of the U.S. Supreme Court

On June 16 of 1980 the Supreme Court upheld Judge

Rich's CCPA decision on the patentability of living microorganisms, *Diamond, Commissioner of Patents and Trademarks v. Chakrabarty,* 447 U.S. 303, 100 S.Ct. 2204. And less than two weeks later, in the case of *Dawson Chemical Co. v. Rohm and Haas Co.,* 448 U.S. 176, 100 S.Ct. 2601, decided June 27, 1980, the Supreme Court rendered a second pro-patent decision in holding that there was no patent "misuse" in the refusal by the patent owner to license competitors under its patent involving the use of an unpatentable nonstaple chemical as an insecticide.

Both decisions were rendered by a strongly divided court; a narrow 5 to 4 majority prevailed in each. In both cases, the majority opinion put aside the "monopoly" view of patents and recognized the patent system as a beneficial and worthwhile social institution. In both of the dissenting opinions, the "nation's deep-seated antipathy to monopolies" was mentioned prominently. As noted above, during the last few decades the U.S. Supreme Court had exhibited an antitrust and antimonopoly zeal that had carried over into the patent area. Prior Supreme Court opinions in the patent misuse and antitrust areas had ignored the innovation-fostering nature of the patent system.

In a third pro-patent decision, *Diamond, Commissioner of Patents and Trademarks v. Diehr,* supra, decided on March 3, 1981, less than nine months after the *Chakrabarty* decision, supra, and the *Rohm and Haas* decision, supra, the Supreme Court upheld a patent on an industrial process including a computer program. This latest decision was also by a narrow 5 to 4 margin; and in each of the three cases a different group of justices formed the majority. The principal significance of *Diehr* for persons active in the patent protection of computer related subject matter is that at last, the U.S. Supreme Court has determined that at least some subject matter involving computer programs may be patentable.

Within a week after the *Diamond v. Diehr* decision, the Supreme Court, by an evenly divided court (with Chief Justice Berger abstaining), upheld another computer-related decision of the Court of Customs and Patent Appeals, *Diamond v. Bradley,* _____ US _____, 101 S.Ct. 1495, 209 USPQ 97 (March 9, 1981). The CCPA had held that the claimed invention involved a combination of hardware elements and did not preempt the use of a mathematical algorithm, as forbidden by *Benson,* supra, see *In re Bradley,* 600 F.2d 807, 202 USPQ 480 (CCPA 1979).

It is interesting to note in passing that Chief Justice Burger has sided with the pro-patent majorities in each of the other three pro-patent Supreme Court decisions of the preceeding year. Accordingly, if he had not abstained, we might surmise that the decision would have been a five-to-four affirmance of the lower court decision.

PATENTABLE SUBJECT MATTER IN THE COMPUTER AND PROGRAMMING AREA

In recent years, up to the time of the *Chakrabarty* decision, supra, and the *Diehr* decision, supra, the U.S. Supreme Court had rarely affirmed the Court of Customs and Patent Appeals in patent cases, and had seldom found patentable subject matter in any invention. However, the U.S. Supreme Court has now affirmed two recent CCPA decisions, and in its three pro-patent decisions have emphasized the positive factors of encouraging invention, and research and development, which result from the patent system.

In view of these positive factors, it appears worthwhile to examine in greater detail the type of subject matter which can properly be patented, in the computer and programming areas.

CCPA Computer-related Decisions of the last Decade

With the proliferation of computers and computer programs in the last 20 years, it was inevitable that many computer-related patent applications would be filed in the U.S. Patent and Trademark Office. Now, computers tend to be complex, and the patent applications often have many sheets of drawings, and written descriptions or specifications which are correspondingly lengthy. These "jumbo" patent applications require many manhours of a patent examiner's time, and the handling of the cases was not easily accomodated by the Patent and Trademark Office. It was also felt by many that computer programs were better subject to copyright than to patent protection.

Not unexpectedly, therefore, many patent applications were rejected in the Patent Office as not being directed to statutory subject matter. There was ample early precedent for such rejections as indicated by the statement, "An idea of itself is not patentable", *Rubber-Tip Pencil Co. v. Howard,* 20 Wall. 498, 507 (1874); and the quotation, "A principle in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right," *Le Roy v. Tatham,* 14 How. 156, 175 (1852).

On the other hand, the Court of Customs and Patent Appeals took a more positive view of patentability. As mentioned above, Judge Giles S. Rich of the CCPA had been a member of the drafting committee for the 1952 Patent Act; and the Committee Reports relating to that act inform us that Congress intended statutory subject matters to "include anything under the sun that is made by man". See *Diamond v. Diehr,* supra.

Accordingly, it was not surprising that the CCPA reversed many of the decisions of the Patent Office Board of Appeals, and found patentable subject matter in the computer and computer programming areas.

The first of these decisions to reach the U.S. Supreme Court was the *Gottschalk v. Benson* case, supra. The Supreme Court had moved cautiously in this case, and had cautioned against overbroad interpretation of the decision which was limited to the unpatentability of a mathematical algorithm used wholly within a computer and which preempted the algorithm.

The scenario as outlined above was now repeated, with the Patent Office assuming that the Supreme Court decision was a sweeping condemnation of the patentability of all computer-related inventions; and the CCPA reversing many of the Patent Office Board of Appeals decisions on the basis of the most limited possible construction of the Supreme Court's *Benson* decision, supra.

The next notable step was the *Flook* decision, supra, where the Supreme Court again reversed the CCPA, holding that the nominal "post-solution" activity was insufficient to take the claim out from the scope of the *Benson* decision.

Finally, as noted above, after one more cycle, the Supreme Court has upheld the latest CCPA position in the *Bradley* and the *Diehr* decisions, supra. In addition to the specific facts involved in these two decisions, they had the collateral effect of giving credibility to the underlying earlier CCPA decisions on which the *DIEHR* and *Bradley* decisions, supra, were predicated.

THE TWO-STEP TEST FOR PATENTABILITY OF COMPUTER-RELATED INVENTIONS

The Court of Customs and Patent Appeals had enunciated a two-step test for patentability in its decisions of *In re Freeman,* 573 F.2d 1293, 197 USPQ 464 (CCPA 1978), and *In re Walter* 618 F.2d 758, 205 USPQ 397 (CCPA 1980). This two-step test was used by the CCPA in its decisions in the *Diehr* and *Bradley* cases, supra, and the upholding of these two cases by the Supreme Court lends increased importance to the test.

The two-step test involves first a determination of whether the claims are actually directed to a formula, equation or mathematical algorithm. If the answer to this first question is in the negative, the claims involve statutory subject matter and there is no need to use the second step. However, if the answer to the first question is in the affirmative, one must proceed to the second step.

The second step of the test involves whether the claims taken in their entirety, wholly preempt this mathematical algorithm. In the Walter decision, supra, the CCPA discussed the second step further, and clarified the guidelines for determining patentability of existing patent claims; and these guidelines are also useful in considering how to draft patent claims which will be valid.

Specifically, assuming that the claims do define a mathematical algorithm, if the implementation of the algorithm is couched in terms which (1) define the structural relationships between physical elements in a claimed apparatus, or (2) refine or limit process steps in a method claim, the claim will probably be patentable. If the end product is a pure number, however, as in *Benson* and *Flook,* supra, the claims will normally be invalid as being nonstatutory. On the other hand, if the claimed invention produces a physical thing, such as a noiseless seismic trace, the fact that it is expressed in numerical form will not make the claims nonstatutory, see *In re Johnson, et al.,* 589 F.2d 1070, 200 USPQ 199 (CCPA 1978).

To summarize, the closer the claim approaches a pure mathematical algorithm, the more likely it is to be held unpatentable; while the presence of novel structural limitations or novel process steps where there is a physical change of state or quality, will tend to make a claim patentable.

AMENDMENT TO COPYRIGHT LAWS — PASSED BY CONGRESS ON DECEMBER 12, 1980

Now that some of the specifics of patent protection for computer hardware and software have been considered, we will return to the copyright field and go into significance of the statutory changes in greater depth.

The general nature of the recent changes in the copyright laws was mentioned above. However, the exact wording is of considerable interest and will therefore be set forth here.

First, the 1976 Copyright Act, effective January 1, 1978, initially included at 17 USC 117, the following section which (temporarily) codified the prior law with respect to computer programs:

> **117. Scope of exclusive rights: Use in Conjunction with Computers and Similar Information Systems**
>
> Notwithstanding the provisions of Sections 106 through 116 and 118, this title does not afford to the owner of copyright in a work any *greater* or *lesser* rights with respect to the use of the work in conjunction with automatic systems capable of storing, processing, retrieving, or transferring information, or in conjunction with any similar device, machine, or process, than those afforded to works under the law, whether Title 17 or the common law or statutes of a state, in effect on December 31, 1977, as held applicable and construed by a court in an action brought under this title.
> (emphasis added)

Now, the new statute, identified as H.R. 6933, and effective in December, 1980, included the following relative to Title 17:

> SEC. 12. (a) Section 101 of Title 17 of the United States Code is amended to add at the end thereof the following new language:
> "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."
> (b) Section 117 of Title 17 of the United States Code is amended to read as follows:
>
> **§117. Limitations on exclusive rights: Computer programs**
> Notwithstanding the provisions of Section 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 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.

Accordingly, what has happened is that Section 117 of the Copyright Act has been rewritten — the original Section 117 which preserved the status quo for computer program rights as available under the pre-1978 law, *has been repealed or cancelled.* The new Section 117 deals with an entirely different subject: the rights of the owner of a computer program to make a copy of the computer program, with certain restrictions apparently principally intended to permit normal use and archival protection of the programs.

Now, returning to the effect of the cancellation of original Section 117, it may be noted that Trade Secret and Unfair Competition causes of action had clearly been preserved by original Section 117. There has been some concern that these possible causes of action for computer program subject matter might no longer be available, in view of 17 USC 301, the preemption section of the new copyright law. This preemption section reads as follows:

> **17 USC 301 Preemption with Respect to Other Laws**
> (a) On and after January 1, 1978, all legal or equitable rights that are equivalent to any of the exclusive rights within the general scope of copyright as specified by Section 106 in works of authorship that are fixed in a tangible medium of expression and come within the subject matter of copyright as specified by Sections 102 and 103, whether created before or after that date and whether published or unpublished, are governed exclusively by this title. Thereafter, no person is entitled to any such right or equivalent right in any such work under the common law or statues of any state.

The scope of the preemption section set forth above is somewhat indefinite, and a number of persons expressed concern that the repeal of the prior Section 117 might mean that "Unfair Competition" and "Trade Secret" rights might now be lost. However, the legislative history involving the repeal of original Section 117 is explicitly contra, with the counsel for the cognizant legislative committee and counsel for the Copyright Office both stating that state remedies, such as those involving trade secrets or unfair competition, were not being limited or preempted by the change.

One effect of the amendment was to unequivocally overrule the 1908 *Apollo v. White* case, supra, as to computer programs. As noted above, this is the famous case in which the U.S. Supreme Court held that the piano roll did not infringe the sheet music copyright, although both would produce the same "collocation of sounds". The *Apollo v. White* decision was based on the outdated notion that there should be a significant difference in the treatment of eye-readable and non-eye-readable material; and it is a significant step forward to have finally eliminated this archaic concept in the computer program infringement area.

Effect of "Lease" on Trade Secret Protection

It is noted in passing that the definition of "publication" as set forth in 17 USC 101 includes "distribution of copies...by rental, lease, or lending." It would appear possible, therefore, that the leasing of computer programs, even with suitable confidentiality provisions included in the lease, could be considered to constitute a "publication" which might destroy trade secret rights.

Registration of Copyrights

Copyright protection is invoked by notice, but certain statutory benefits including the right to bring suit accrue from the filing or the registration of a copyright in the U.S. Copyright Office. In computer programs situations, the Copyright Office has indicated that it prefers to register the underlying source code and the Object Code rather than only the Object Code. In this connection, it is noted that in order to use most computer programs without change, one would only need the Object Code; but the Source Code indicates how the program is built up, and it is necessary for easy modification of the program. It is understood that the Copyright Office will give limited registration to Object Code, if the Source Code cannot be made available.

Also, as of the present writing, it is understood that the Copyright Office has no procedure for maintaining computer programs in secrecy while proceeding to register the programs. Accordingly, at such time as formal copyright registration or the program is sought, trade secret protection may no longer be available. In some cases, however, where the program is lengthy only selected portions are required or requested for deposit in the Copyright Office.

RECENT VIDEO GAME COPYRIGHT DECISIONS

There have not been many decisions under the new copyright act, since it came into force only on January 1, 1978, and it normally takes more than two or three years for a Federal case to be tried and a decision rendered. However, a preliminary injunction was granted in a copyright case involving an "audio-visual display" for an electronic or video game called "Scramble", despite the fact that the underlying computer program was not copyrighted, *Stern Electronics, Inc. v. Kaufman,* decided May 22, 1981, U.S. District Court, E.D., N.Y. Similar facts resulted in a similar decision in *Midway Mfgr. Co. v. Drikschneider, D.C., Dist. of Nebraska,* July 15, 1981, where the court mentioned the adequacy of a copyright notice appearing on the video screen.

Protection possibilities

Various possibilities for protecting proprietary rights in computers and computer programs have been outlined above, and the possible effect of recent judicial and legislative changes have been analyzed. It is clear that further case law development will occur. However, certain practical steps to protect proprietary rights in software and firmware include the following:

1. Invoke trade secret protection with a suitable confidentiality legend, before widespread distribution occurs.
2. Put a copyright notice on your program; and mention "unpublished work" when both trade secret and copyright protection are being invoked.
3. Have the proprietary notices, (Trade Secret, and/or copyright) print out as your computer program prints out, or the results of the use of the program prints out.
4. Put copyright notices on your Read Only Memories or on your electronic equipment labels; see *Data Cash Systems, Inc. v. J.S. & A. Group Inc.* CA-7, 1980,_____F2d_____, 208 USPQ 197.
5. Do not call your program licenses "leases", because the lease of a computer program may be construed as a publication which could destroy trade secret protection.
6. In the patent area, the claims should emphasis the structure and the physical aspects of the system or the method. Play down the mathematics as being a small part of the system, and avoid the presentation of claims which wholly preempt a mathematical algorithm. If control can be accomplished by a cam and a mechanical linkage, a "hard-wired" electrical circuit,

or other similar structure, these alternatives should be mentioned in the patent specification.

In summary, the recent decisions of the Supreme Court and the amendment of the copyright statute, 17 USC 117, both appear to be favorable toward the protection of intellectual property rights in computers and computer programs. In the patent field, at least some types of subject matter involving computer programs are patentable; and in the copyright field, computer programs may be copyrighted, and even a non-eye-readable computer program may constitute a copyright infringement. Accordingly, through the judicious use of trade secret, copyright and patent protection, appropriate protection for both computers and computer programs may be secured.