The Protection of Computer Software in the People's Republic of China

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THE PROTECTION OF COMPUTER SOFTWARE IN THE PEOPLE’S REPUBLIC OF CHINA

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I. Introduction

In recent years, rapid advances in high technology have made the protection of intellectual property an increasingly critical concern around the world. In the United States, intellectual property laws appear to have attained a level of sophistication necessary to protect high-tech developments. Many other legal systems, however, have not replicated this responsiveness. Developing nations are particularly wanting in the area of intellectual property law. The People’s Republic of China (PRC), for example, lacks a truly effective system for protecting certain kinds of intellectual property, such as
computer software. This lack of protection often results in serious problems for both third world and developed nations.

This Note is concerned with the protection of computer software in the PRC. The article begins by examining the need for intellectual property protection in developing and developed nations. Particular emphasis is given to China's desire to enter into substantive trade relations with the West. The Note continues by focusing more specifically on U.S./China trade relations with a special emphasis on computer exports to the PRC. Following is an examination of what protections China affords intellectual property both through domestic law and international agreements and why this protection is not adequate. Finally, the American system of computer software protection is discussed as a possible model for the Chinese to emulate.

II. THE IMPORTANCE OF INTELLECTUAL PROPERTY PROTECTION

A. The U.S. Perspective

As far as the United States is concerned, the protection of intellectual property is a critical factor in fostering international trade. In fact, the protection of intellectual property rights is vital to the success of U.S. business interests at home and abroad. This point is easily demonstrated by examining the present trade deficit.

Both the quality and the quantity of foreign competition in international trade have increased exponentially in the past fifteen years. As of late, a growing U.S. trade deficit suggests that the tide of international trade competition has turned against the United States. An expansion of U.S. trade abroad appears to be the only solution to this problem. To effectively compete, however, U.S. corporations must be innovative. To the extent that innovation is

2 Id.
3 Id. at 236.
4 Id. at 235. The incredible growth of Japan's automobile industry and its success in marketing automobiles abroad demonstrates the fact that foreign competition against American products has increased sharply.
5 Id. at 236.
6 Id.
7 Id. Innovation in the computer industry has occurred primarily in the U.S. Unfortunately, other countries may soon outpace U.S. computer manufacturers if American ingenuity is not protected abroad.
promoted by an enforceable framework of proprietary rights in new products, the fortunes of high-tech concerns rise and fall with intellectual property protections.

In the context of international trade, U.S. protection of intellectual property helps insulate domestic U.S. markets from foreign entities which pirate American products.\textsuperscript{8} The International Trade Commission (ITC), for example, can halt the sale of pirated items and prevent their future import to the U.S. by enforcing section 337 of the Tariff Act of 1930.\textsuperscript{9}

Foreign protection granted to American companies conducting business abroad is just as important as domestic protection. Foreign intellectual property laws actually assist U.S. corporations in entering foreign markets by assuring that American innovation will not be stolen.\textsuperscript{10} These assurances become increasingly important as trade relations with other countries continue to expand.

In recent years, U.S. exports to developing nations have expanded by more than thirty percent.\textsuperscript{11} Twelve of the fastest growing markets for U.S. exports are in third world nations.\textsuperscript{12} For U.S. companies to profit from expanded trade with developing markets such as China, appropriate intellectual property protection must be granted.

\textbf{B. The Perspective of Developing Nations}

Technological advancement is necessary if meaningful economic growth is to occur in developing countries.\textsuperscript{13} Accordingly, adequate protection of intellectual property could serve these nations by helping them achieve economic parity with more advanced nations.\textsuperscript{14} Intellectual property protection would help accomplish this task by "stimulat[ing] indigenous innovation," just as U.S. protection encourages innovation in this country.\textsuperscript{15}

\textsuperscript{8} Id. at 242.
\textsuperscript{10} Id. at 245
\textsuperscript{11} Id.
\textsuperscript{12} Id.
\textsuperscript{13} Id.
\textsuperscript{14} Id. (Quoting S. Watanabe, Innovation and the Patent System in the Third World: Some Policy Issues, No. 1 WEP 2-22/WP.97 (July 1982)(International Labor Organization, Geneva, working paper). By protecting local author/producers in developing nations, local innovation would hopefully increase.
\textsuperscript{15} Id.
Intellectual property protection would also aid developing countries such as the PRC by ensuring that foreign exports such as agricultural products, medical items, and computer software will be readily available.16 Protective laws will also increase the likelihood of joint-ventures between developed and underdeveloped countries.17

However, third world nations also see certain disincentives to formulating intellectual property laws. A Korean Ambassador to the United States, Kyung Won Kim, has indicated that strict controls on intellectual property exact a high toll from developing nations.18 According to Kim, this problem occurs because the price of high-tech items has increased to a point where developing nations are hard pressed to pay for them.19 Thus, pirated goods have become quite attractive in nations where financial resources are scarce but the need for new products is great.

III. CHINA OPENS ITS DOORS FOR HIGH-TECH ITEMS

One country where the need for new products is especially great is in the People’s Republic of China. In order to help meet its needs, China is determined to end its isolation from the West.20 This new openness is demonstrated by China’s contemporary diplomatic and trade relations.

China has also made changes internally. The PRC is now committed to the policy of evolving into an “industrialized socialist democracy.”21 To accomplish this goal, China’s leadership acknowledges that it must put an end to years of judicial anarchy and implement a strong socialist legal system.22 One reason for improving China’s legal system is to help create favorable conditions for foreign high-tech investors.23 China’s leadership is convinced that a

16 Id. at 245–46.
17 Id. Joint-ventures are particularly valuable to developing nations since wealthier nations provide needed capital and technology to facilitate the development of new products.
19 Id. at col. 4.
21 Id.
22 Id.
23 Id. at 131.
"vital cornerstone" of China’s future lies in the “effective assimilation of modern science and foreign technology.”24

One important aspect of China's high-tech policy is its computer strategy.25 The PRC regards computerization as being necessary to the advance of scientific research, industrial productivity, communications and defense.26 As far as the Chinese are concerned, a strong domestic computer industry is necessary to achieve this goal.27

The Chinese are presently concentrating on the development of a capacity for the “[l]arge-scale production of microcomputers” and software.28 Software is currently a particularly weak link in China's bid for technological parity with the West.29 Research is under way, however, to rectify this problem.30

For the time being, the Chinese must rely upon foreign computers. The PRC invested over 5 billion H.K. (1 billion U.S.) in computers between 1981 and 1985 (the Sixth Five-Year Plan) and experts expect this figure to double during the present five year plan (the Seventh Five-Year Plan).31 Still, in the near future, the PRC hopes to strike an acceptable balance between indigenous products and foreign imports.32 China desires to attain by 1990 the level of technical sophistication present in fully developed nations today.33

IV. DEVELOPMENTS IN U.S. TRADE RELATIONS

To facilitate modernization, China has made great efforts to improve trade relations with the United States. In 1979, the U.S. and China signed an historic trade agreement, which was meant to "create the most favorable conditions for strengthening, in all aspects, economic and trade relations between the two countries" and, to ensure that both countries’ economic interests are respected.34

24 Id. at 139.
26 Id.
27 Id.
28 Id. at 47.
29 Id. at 48.
30 Id.
31 Id. at 44.
32 Id.
33 Id.
34 Agreement on Trade Relations, July 7, 1979, China-United States, art. 1, 31 U.S.T. 4651, T.I.A.S. No. 9630.
More specifically, the PRC agreed to "seek to ensure' that U.S. patents, trademarks, and copyrights would be accorded protection equivalent to that granted in the U.S." The PRC also agreed to "facilitate enforcement of private contractual provisions protecting" industrial property rights. Unfortunately, this agreement has been essentially meaningless since the PRC lacks the effective legislation to enforce its promises.

In more recent years the PRC and the U.S. have taken further steps to increase trade. One critical development has been the adoption of the Export Administration Act and its accompanying regulations. The result of this act has been a significant loosening of "[g]uidelines governing many high-technology exports to China . . . ." There has also been increasing leniency in COCOM restrictions on exports to the PRC.

This new leniency is demonstrated by the U.S. government's increasing flexibility in approving the export of various types of computers to China. Microcomputers and microcomputer software may be shipped from the U.S. to China with few restrictions. Only "supercomputers" are still subject to extensive regulation.

As a result China has purchased more than $1 billion worth of foreign computer technology, much of it from the United States. More recently, however, direct computer imports into China have been restricted to cut back on excessive dependance on foreign equipment. Meanwhile, however, joint-ventures are increasing in number.

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35 Id. at art. VI.
36 Id.
38 Ranagan, Liberalizing Controls on Exports to China, CHINA Bus. REV., Nov.-Dec., 1986, at 49. The U.S. Export Administration Act gives the President authority to regulate the export of goods and technical data generated in the U.S. in order to protect national security interests.
39 Id.
40 Id. COCOM was established in 1949 by the U.S. and its allies to coordinate export control policies toward communist nations.
41 Id.
43 Ranagan, supra note 38, at 50. Super computers represent the apex of computer technology. These machines can perform complex tasks, far beyond the capabilities of ordinary computers, in a relatively short time. They are often used for highly technical and sensitive applications such as advanced weapons design and crypto-analysis.
44 Simon, supra note 25, at 44.
45 Id. at 45.
46 Id.
V. THE PROTECTION OF INTELLECTUAL PROPERTY RIGHTS IN THE PEOPLE'S REPUBLIC OF CHINA

Marxist governments "are traditionally hostile toward private ownership of intellectual property."47 Historically, communist society has labeled personal creations or innovations "products of the society."48 In addition, traditional Confucian philosophy is hostile to the notion than an individual has an inherent property right to an invention or creation.49

Recently, however, with its increase in desire for technology, China has had to balance ideology with more pragmatic concerns.50 This new pragmatism is reflected in China's increasingly modern system for protecting intellectual property.

A. Contractual Agreements

In the PRC, the oldest and most effective form of protection for intellectual property is a contractual agreement.51 When the PRC first opened its doors to foreign investors, contract was the only protection available.52 Contractual protection is often seen today in agreements between Chinese and foreign parties, which provide for breach of contract and damages if intellectual property rights are infringed.53 The foreign owner, however, must rely on the Chinese government to enforce contractual provisions.

B. Patent Protection

Four years ago China passed the 1984 Patent Law which extends statutory protection to patent rights for the first time.54 Unfortunately, however, patent rights in China are only granted for

47 Chwang and Thurston, supra note 20, at 142. Communist hostility towards private ownership of intellectual property stems from an anti-elitist conviction that intellectual property belongs to all of the states inhabitants not just the author or inventor. Id.

48 Id. at 142.

49 Campbell, Making the Right Moves, CHINA TRADE REP., July, 1987, at 5. Traditional Chinese ideology, like Marxism, views intellectual property as belonging to the entire community rather than to the individual. Id.

50 Chwang and Thurston, supra note 20, at 142. The Treaty of 1979 demonstrates the PRC's belief that China cannot develop fully if it remains isolated from the West.

51 Id. at 143.

52 Id.

53 Id.

54 Horsley, supra note 37, at 17.
recent inventions, not for those already patented elsewhere.\textsuperscript{55} This is because the Chinese government has divided its requirement for patentability into the following three components:

(1) before the date of filing a patent application, no identical invention or utility model [can have] appeared publicly in China or abroad; (2) the invention [can] not [have] been publicly used or made known to the public in China by some other means; and (3) no other person [can have] made a patent application for an identical invention or utility made in China . . . .\textsuperscript{56}

If a patent is granted, however, exclusive enjoyment of the right is given to the patentee, who can claim infringement if “another party uses its patent without permission.”\textsuperscript{57} If another party wishes to use the patented property a written license must be obtained.\textsuperscript{58} The patent right to exclusive enjoyment of the property lasts fifteen years for inventions and five years for “designs and utility models.”\textsuperscript{59}

China’s patent law offers little protection to computer software. In China, as in other countries, inventions which pertain to “rules and methods for mental activities” are not patentable.\textsuperscript{60} Since it is possible that computer software represents “rules and methods for mental activities” it is unlikely that most software will be afforded protection under Chinese patent law at the present time.\textsuperscript{61} In fact, a patent will not be granted for computer software unless it is of a type “integrally related” to the computer hardware.\textsuperscript{62} This suggests that only software designed to solve a particular technical problem may be patentable.\textsuperscript{63} Since most software is designed for multiple applications, many programs will not be protected by Chinese patent law.

\textsuperscript{55} Id. at 19. To receive patent protection in the U.S. and many other nations an inventor must meet the requirements of utility, novelty, and non-obviousness. In the U.S. protection is granted for a period of 17 years. This period of protection allows the inventor to monopolize his/her creation by exercising the “negative” right to exclude others from making, using, or selling the item.

\textsuperscript{56} Chwang and Thurston, supra note 20, at 149.

\textsuperscript{57} Horsley, supra note 37, at 20.

\textsuperscript{58} Id.

\textsuperscript{59} Id.

\textsuperscript{60} Chwang and Thurston, supra note 20, at 148.

\textsuperscript{61} Id. at 149.

\textsuperscript{62} Horsley, supra note 37, at 19. China is becoming increasingly flexible about what may be patented, but there is no evidence that most software, which is not “integrally related” to the computer, will be brought under the protection of patent laws.

\textsuperscript{63} Id.
Even if China's patent law offered facial protection to software such protections would often be unenforceable. Evidently, many "foreign companies have avoided [the risk of] formal court proceedings in favor of the informal assistance of [the Chinese government] . . . to bring pressure, sometimes successfully, on Chinese entities accused of infringing proprietary rights."64 This pattern of activity has occurred because Chinese law does not provide a remedy if the infringing party acted without knowledge of the infringement.65 The question then becomes "what kind of proof of lack of knowledge is required . . . ?"66 Few companies are willing to risk lengthy litigation to find an answer to this dilemma.

Another weakness of the Chinese patent system is that obtaining this protection is complicated and time consuming. Applicants for a patent must file with the CCPIT, China Patent Agency (HK) Ltd., or the Shanghai Patent Office.67 All documents filed must be in Chinese68 and if the potential patentee does not have an office in the PRC, patent protection may not be available.69 The lack of an office in China, however, may not affect American companies because of the bilateral trade agreement between the U.S. and China.70 Still, even if all application requirements are met, the application may take up to two years to be processed,71 which is too long to afford protection for software whose useful life may be very short.

C. Copyright Protection

In the U.S., copyright law is the principal means by which computer software is protected, yet in China there is no copyright law at all. However, legislation of this kind is being considered seriously, and "some foreign companies have been asked to comment on various drafts" of the forthcoming law.72 China also has no copyright agreement with the U.S. and is not a member of either the Universal Copyright Convention or the

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64 Id. at 22.
65 Chwang and Thurston, supra note 20, at 147.
66 Id.
67 Horsley, supra note 37, at 18.
68 Id. at 20.
69 Chwang and Thurston, supra note 20, at 150–51.
70 Id. A foreign entity need not have a business office in China if the PRC has entered into a bilateral trade agreement with the applicant's country.
71 Id. at 148.
72 Horsley, supra note 37, at 22.
Berne Convention. One possible reason for the PRC's delinquency in creating a national copyright law or in joining international agreements is its "fear of encouraging the reappearance of a literary elite group." Nevertheless, the State Copyright Bureau was formed in 1985 to help decide what kind of law is required by the PRC if it is to assert its "commitment to membership [in] the international business community and its intention to abide by the internationally accepted rule for doing business." China has also joined the World Intellectual Property Organization which will probably result in China's membership in one or more international copyright conventions.

For now, however, copyrightable works can only be protected by private contractual agreements. Thus, the state itself is "hard pressed to prevent unauthorized" use of potentially copyrightable materials. Experts hope that within the next three to seven years China will enact its own copyright law and join an international copyright convention. But even then, some analysts believe that problems will arise as to the extent to which protection will be afforded to foreign authors.

D. Trade Secret

Trade secret laws "have traditionally provided a means of protecting" for U.S. software abroad. At the present time, China's trade secret law is relatively underdeveloped and hence, the best protection for a trade secret is obtained by contractual agreement. The PRC, however, is making strides toward recognizing that "industrial property and proprietary technology" should be granted...
government protection. This new protection is codified in the January 1986 Interim Provisions of the State Council on Technology Transfer and in the May 1985 Regulations of the PRC for the Administration of Technology Import Contracts. These new regulations require "a Chinese licensee to maintain the confidentiality of the non-public portion of the licensed technology." This protection is limited to ten years. Even greater protection is afforded in China's "special economic zones." 

Although the recent legislation and policy changes appear promising, the new provisions are without any substantive effect. Evidently, in many areas of China, a legal remedy for the disclosure of a trade secret does not exist. This problem is most likely due to the fact that the technology regulations do not specifically mention remedies. Depending on various interpretations of the law then, there may or may not be a cause of action for infringing trade secrets. Thus, a well written and detailed contract is still the best protection against infringement.

VI. INTERNATIONAL AGREEMENTS AND THEIR EFFECT ON CHINESE INTELLECTUAL PROPERTY PROTECTION

A. The World Intellectual Property Organization

The World Intellectual Property Organization (WIPO) is the main entity concerned with intellectual property issues. This organization, of which China is a member, is responsible for having developed a number of important treaties dealing with intellectual
property, including the Paris Convention for the Protection of Industrial Property and the Berne Convention.95 The PRC, however, is not a party to either convention although many experts feel that China will eventually join at least one of them.96

For now, China's membership in either convention would not effectively protect computer software in the PRC because these treaties do not include software within the ambit of their protection.97 There is strong evidence, however, to show that the present international systems, such as the Berne Convention (a copyright convention), can be adapted to include software under their protection.98 Protecting software under the Berne Convention would make a great deal of sense since copyright protection can be obtained quickly and inexpensively in many nations99 and since copyright is "the only adequate form of protection for software marketed on such a massive international scale."100

Currently, however, software is not afforded protection by agreements such as the Berne Convention or the Universal Copyright Convention. Accordingly, it would be advantageous for member countries to redefine what constitutes a copyrightable work to include computer software.101 Even if such a redefinition were made, however, it is critical to understand that these agreements can only offer a foreign author the same proprietary rights as a national of the signatory nation.102 Thus, if China were to become a member of the Berne Convention tomorrow, this act would have little effect since China has no copyright law. Many other countries have failed to protect software under copyright law as well. Hence, a more meaningful action might be the creation of a separate treaty designed to "protect software on an international scale."103

Patents, like copyrights, are also protected under international agreements. The Paris Convention is the most important agreement

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95 Kirk, supra note 93, at 601. The Berne Convention was established to protect literary and artistic works.
96 Campbell, supra note 49, at 5.
97 Bloch, supra note 82, at 304-06.
98 Id. at 306.
99 Id. at 303.
100 Id. at 304.
101 Id. at 306.
102 Id. at 308. In other words, if a foreign author's own country will not protect the author's work, the host nation is not obliged to protect the work either under existing conventions.
103 Id. at 307.
of this type. The Paris Convention, adopted in 1883, grants a foreign patentee the same protection in the host nation as a national of that nation might enjoy. Unfortunately, however, the Paris Convention can afford little protection for software since the U.S. is the only nation to recognize the patentability of certain types of software, at least as of 1985. A number of nations specifically exclude software from categories of subject matter protected by enacted law.

Patent protection is also generally difficult to obtain. For example, the patent laws of many countries require that an invention be completely novel, which means that for improved inventions to be protected, the novelty of the new invention "must not be destroyed by the prior art," which is a difficult requirement to meet. Also, a patent is usually only granted upon public disclosure of the innovation which affords pirates an opportunity to copy items such as software with ease and in a manner which is difficult to detect. A further deterrent to seeking international patent protection is that many patent law systems include compulsory licensing requirements.

International trade secret agreements present another possibility for restricting the use of intellectual property abroad. Many nations have laws which include trade secret protection. Still, software is at present most effectively protected by licensing agreements since trade secret agreements are difficult and expensive to police. Therefore, developing nations such as China will be loath to enforce agreements made vis-a-vis trade secret law because of the phenomenal expense of their implementation and enforcement.

Another problem with applying trade secret protection to computer software arises from the fact that most software is mass marketed, which means that for many purchasers of computer pro-

104 The Paris Convention was established to protect patentable industrial property. See Bloch, supra note 82, at 290, for a thorough discussion of this treaty.
105 Id.
106 Id.
107 Id. at 292.
108 Id. at 293.
109 Id. at 294.
110 Id. at 295. Licensing agreements often require that a patentee grant licenses to competitors to produce the protected item for a predetermined sum. This allows local enterprises to benefit directly from foreign technology.
111 Id. at 298–99.
112 Id.
grams there is no duty to prevent disclosure of the secret.\textsuperscript{113} Thus, trade secret restrictions are only effective for programs that are distributed to a limited degree.\textsuperscript{114} Furthermore, the extended duration of trade secret protection stifles technological development.\textsuperscript{115} The fact that trade secret protections impede technological development provides a disincentive for the enforcement of these laws. This is certainly the case in the PRC, where although official support is given to trade secret protection, the protection is far less substantial than the enactment indicates. This factor completely negates a major advantage of trade secret law which is non-disclosure.

It should now be apparent that where software is concerned, the international conventions leave a great deal to be desired. This is exemplified by the case of U.S./PRC trade relations, where the resultant protection of software is still nominal because the PRC is not fully committed to protecting software in an effective manner. One possible international development which might push China in this direction would be the creation of an international protocol.

\textbf{B. The Creation of an International Protocol}

One positive aspect of the existing conventions is that they have encouraged compromise between various nations despite the fact that their utility may be questioned.\textsuperscript{116} Based on this spirit of international cooperation, it seems possible that a protocol which would be designed to “protect software on an international scale” and could be added to existing conventions, is well within the realm of possibility.\textsuperscript{117} The main advantage of an agreement of this type would be that software protection would not be dependent upon the development of adequate copyright laws.\textsuperscript{118} This would certainly

\textsuperscript{113} \textit{Id.} In a mass market setting, a purchaser has no duty to refrain from disclosing a trade secret because no specific duty arises between the purchaser and the seller/producer by virtue of the software’s sale.

\textsuperscript{114} \textit{Id.} at 299.

\textsuperscript{115} \textit{Id.} at 300.

\textsuperscript{116} Bloch, \textit{supra} note 82, at 306.

\textsuperscript{117} \textit{Id.} at 307. A protocol is a “supplementary agreement among signatory states to a treaty.” See Bloch, \textit{supra} note 82, at 313. This protocol would have to be ratified by each nation in the convention before all the member states could be bound. At present, it appears that a majority of states who are members of the Berne Convention would adopt and ratify such a proposal.

\textsuperscript{118} \textit{Id.} at 308. Bloch seems to indicate that a universally accepted protocol would act as an effective restriction on the use of intellectual property even if a signatory nation had no law of its own. Thus, this eventuality could be extremely useful for business concerns trading
be advantageous in countries which lack laws of this kind, such as China.

A protocol would be helpful to both developed and developing nations. Aside from protecting the high-tech software of developing nations, a protocol would assist developing nations in obtaining the programs they need.119 Furthermore, such protection would protect software development in the third world from piracy, which would hopefully foster development of high-tech industries in these nations.120 Developing nations would also benefit if an agreement of this type were to allow limited compulsory licensing to ensure that at the outset, software will be affordable.121 Provisions of this nature would have to be applied fairly, however, to make sure that the willingness of foreign software producers to export their products would not be seriously diminished.122

C. Preliminary Conclusions on the Chinese Protection of Intellectual Property and the Role of International Agreements in Protecting Computer Software in the PRC

Currently, there is no protocol or existing international convention which can effectively protect computer software in foreign markets. Whether or not appropriate steps will be taken is by no means certain. Meanwhile, software producers which hope to market their products abroad must seek protection in the laws of the foreign marketplace. Unfortunately, in an attractive market such as the People's Republic of China, adequate laws for the protection of computer software do not exist. As we have seen, Chinese patent law can only be used to protect software in limited situations.123 Moreover, Chinese trade secret law, while facially attractive, is of no reliable effect.124 Finally, copyright law, which is an excellent method for protecting computer software, does not exist in modern China.125 Any corporation or individual who markets software in the PRC must rely on contractual agreements to ensure that prop-

119 Id. at 317.
120 Mossinghoff, supra note 1, at 246.
121 Id. at 319.
122 Id. at 320.
123 Horsley, supra note 37, at 19.
124 Id. at 21–22.
125 Id. at 20.
property is granted at least some measure of protection. 126 Since contract law is limited in its uses, at least where intellectual property is concerned, something more than contractual agreements are required in China. The question then becomes what methods of intellectual property protection should be developed in the PRC? One answer may be found in the U.S. system for protecting software.

VII. THE U.S. SYSTEM FOR PROTECTING INTELLECTUAL PROPERTY

The protection of software has only been recently realized. Not long ago, there was “widespread use of multiple and seemingly inconsistent forms of legal protection [for software], such as patent coupled with copyright, trade secret coupled with copyright, or a combination of all three.” 127 To avoid confusion, software producers frequently relied on various licensing agreements to create “a more palatable set of exclusive rights and limitations . . . .” 128 This pattern of activity is reminiscent of that which occurred in China. More recently, developments in U.S. copyright protection have greatly lessened the need to resort to licensing arrangements to protect software.

A. Copyright

In the U.S., of all of the various methods of legal protection, copyright is by far the most easily attainable. 129 This protection is granted under the theory that computer programs are “literary works.” 130 To obtain protection, under 17 U.S.C. § 101 (1982), the author must show only that the program is an “original work[] of authorship” which is “fixed in [a] tangible medium of expression.” 131

[Footnotes]

126 Id.
128 Id.
131 17 U.S.C. §§ 101-02 (1982). Section 102 reads in pertinent part:
   (A) Copyright protection subsists in accordance with this title, in original works of authorship fixed in a 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 . . . literary works . . . .
   (B) In no case does copyright protection for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept,
The protection afforded by this enactment applies to both operational and application programs.\textsuperscript{132} However, copyright law only protects the expression of the idea upon which the program is based.\textsuperscript{133} In other words, "exact reproductions" are prohibited but not the "independent creation of an identical work."\textsuperscript{134} Moreover, copyright law "will [generally] not protect 'utilitarian works,' that is, works that have a usefulness beyond merely the conveying of information or the display of an appearance."\textsuperscript{135} This limited protection would appear to imperil operating programs. This potential problem has been mitigated, however, by the fact that when the U.S. Congress decided that government protection would be granted to computer programs under copyright law, Congress was seeking to protect both the artistic and utilitarian aspects of software.\textsuperscript{136} This approach was taken to both promote an "optimal level of innovation in computer technology, thereby promoting the public interest" and, to benefit society with increased research and development.\textsuperscript{137}

**B. Patent**

The U.S. is one of a relatively small number of countries to recognize the patentability of certain types of software.\textsuperscript{138} Patent protection may be available in the U.S. to "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof."\textsuperscript{139} Thus, software must be "novel, non obvious, and useful."\textsuperscript{140}

\begin{quote}
principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such works.
\end{quote}

\textsuperscript{132} Menell, supra note 129, at 1347. Operating programs are generally built into the computer itself. These programs give the computer the basic ability to perform a myriad of functions in conjunction with application software. Application programs are usually external to the computer itself and help perform particular functions such as word processing.

One method of creating effective network externalities is to proscribe carefully protection for operating programs. This action would hopefully result in one or two highly standardized programs which would in turn create a large, uniform network of users demanding new innovation.\textsuperscript{133} Bloch, supra note 82. See also 17 U.S.C. § 101 (1982).

\textsuperscript{134} Id. at 303.

\textsuperscript{135} Samuelson, supra note 127, at 473.

\textsuperscript{136} Id. at 474–75.

\textsuperscript{137} Menell, supra note 129, at 1330.

\textsuperscript{138} Bloch, supra note 82, at 290.


\textsuperscript{140} Id.
Patent law is dissimilar to copyright law in that it "protects the utilitarian aspects of a work and not just the particular way the invention is expressed."\textsuperscript{141} Traditionally, however, patent law has foreclosed protection "solely for mental processes, scientific principles, laws of nature, or mathematical algorithms."\textsuperscript{142} Therefore, programs were not afforded protection because "they could be characterized as sequences of mental steps and/or mathematical algorithms."\textsuperscript{143} Fortunately, this is no longer the case and increasingly the courts have taken a more liberal attitude toward allowing computer programs to be patented.\textsuperscript{144}

Once a patent is granted, it protects the property, if an invention, for a period of seventeen years.\textsuperscript{145} This relatively short period of protection is socially advantageous because it limits the inventor's monopoly on items of great social use.\textsuperscript{146} Patent law has certain flaws, however, which mitigate against the use of this type of protection by software producers. For one thing, a patent is only secured at great cost and after long delay.\textsuperscript{147} Moreover, "the patentee must make substantial public disclosures if patent protection is granted . . . ."\textsuperscript{148} This allows pirates to gain access to the secrets of any new program protected. Generally then, Patent law is a far less attractive option for protection than is a copyright.

C. Trade Secret

Trade secret laws have also been utilized by software producers. This method of protection, however, is too narrow and ineffective to be a truly viable alternative. One problem with trade secret protection is that it is state regulated and so protection varies considerably from state to state.\textsuperscript{149} Furthermore, the mass marketing of software allows many purchasers to escape any duty to prevent disclosure of the trade secret.\textsuperscript{150} Finally, the duration of trade secret

\textsuperscript{141}Id. at 1347.
\textsuperscript{142}Id. at 1348.
\textsuperscript{143}Id.
\textsuperscript{144}Id. This liberality has resulted in part because the Patent and Trademark Office has been less insistent on defining software as a sequence of mental steps and/or mathematical algorithms.
\textsuperscript{145}Samuelson, supra note 127, at 513. See also 35 U.S.C. § 154 (1982).
\textsuperscript{146}Id.
\textsuperscript{147}Menell, supra note 129, at 1350.
\textsuperscript{148}Id. at 1351. Congress must have been aware of the disadvantages of utilizing patent law to protect software when it legislated the use of copyright law instead.
\textsuperscript{149}Id. at 1353.
\textsuperscript{150}Bloch, supra note 82, at 299.
protection is generally so long, that it has the effect of stifling technological development.\textsuperscript{151}

D. An Economic Critique of the Present System

The U.S. system for protecting software reflects a desire to encourage innovation which will result in quality products for the benefit of the general public.\textsuperscript{152} Social value, however, should also be measured by “the speed at which and extent to which [legal protection] fosters the availability of new, improved, and less expensive products.”\textsuperscript{153} The present system fails in this regard according to some experts.\textsuperscript{154}

Over protection of software creates monopolies which control innovation, resulting in a loss for society.\textsuperscript{155} This loss has occurred because the government has failed to take “network externalities” into account.\textsuperscript{156} The concept of “network externalities” is well demonstrated by the U.S. telephone system if one imagines that only a single individual owned a telephone. Clearly in this scenario, the value of this item would be greatly reduced. It is only when telephones enter into common use that their entire value is fully realized and an effective “network externality” created.\textsuperscript{157}

The question then is whether our present system is preventing the creation of one common network externality and hence, depriving citizens of a truly effective computer system. If everyone had systems which could communicate with each other, the result would be an increase in innovation because there would be a broader need for new computer technology. The U.S. government should consider carefully then, whether intellectual property protection will cause companies to “have the correct incentives to adopt compatible products, thereby enlarging existing networks,”\textsuperscript{158} or whether companies are actually being rewarded for developing “non-compatible product standards”\textsuperscript{159} as some scholars argue is the case.

\textsuperscript{151} Id. at 300. The duration of trade secret protection can be for an unlimited time if the agreement so provides.

\textsuperscript{152} Id.

\textsuperscript{153} Id.

\textsuperscript{154} Id. at 330–31.

\textsuperscript{155} Id. at 340.

\textsuperscript{156} Id.

\textsuperscript{157} Id.

\textsuperscript{158} Id. at 341.

\textsuperscript{159} Id.
Hopefully, the PRC is considering what specific goals it wants to accomplish by implementing intellectual property laws. If China wants to acquire technology and utilize it efficiently, it would be to its advantage to create a legal system which encourages "network externalities." In the eventuality that the PRC imports a myriad of computers which are essentially non-compatible, China will be deterred from its quest to attain technological parity with the West. What can China do to avoid what has happened in the U.S. or just as importantly, what can America do to mitigate the fact that it has failed to create meaningful network externalities?

To begin with, as far as operating programs are concerned, copyright laws are ineffective and counterproductive because their real effect is to favor larger companies' efforts to create similar but non-compatible operating systems to those of smaller companies, thus taking advantage of their greater ability to utilize under-inclusive network externalities. Thus, the net effect is to not only prevent "firms from offering compatible products, but also [to] discourage[] them from coordinating efforts to establish and develop uniform industry-wide standards." The problem is then to determine how to "promote standardization while at the same time encouraging continuing innovation." One solution would be to create a "hybrid" of patent law which would protect novelty, non-obviousness, and usefulness but would not "lock up" an industry standard by allowing protection for an innovation which expresses an old idea in a new way. This "hybrid" would also contain compulsory licensing provisions to assure the creation of large "network externalities" while still rewarding innovation. The protection granted to operating programs would also be of short duration.

Applications systems would be treated in a similar, but more restrictive fashion, since this type of software is only profitable when high volume sales are generated. Any form of protection must ensure that an "adequate return" will be received from the invest-

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160 Id. at 1360.
161 Id. at 1363.
162 Id. at 1364.
163 Id. at 1365. This "hybrid" law would not lock up an industry standard both because it would not restrict the creation of essentially compatible operational systems and because any restriction would be of a short enough duration to prevent the genesis of a harmful monopoly.
164 Id.
165 Id. at 1364.
166 Id. at 1368.
ment. Still, protection should be of a fairly short duration with limited reverse engineering provisions to promote the advancement of application software technology.

E. Legal Critique

The present U.S. system for protecting computer software can also be criticized on a purely legal level. The main contention here is that protecting software with copyright law upsets the traditional balance between patent and copyright law. One way this balance is upset is by having the copyright "rule against protecting utilitarian things" cast aside, indicating that the whole concept could "be re-conceived" to protect an over-inclusive category of items. If this is in fact the case, "a tremendous number of previously unpatentable ... designs [could theoretically] receive federal monopoly rights." Computer programs are generally utilitarian in nature in a strict copyright sense. This is because software is simply "a substitute for certain hardware parts that would otherwise have to be constructed to make a single purpose machine capable of doing precisely the same task that the software could do." Thus, software falls into the "gap" between patent and copyright laws.

Another problem with the copyright protection is that copyright law grants a "long period of protection" which inhibits innovation in software production. "It is one thing to grant a lengthy term of protection to songs, poems, and paintings, and quite another to do so for airplane wings, pumps" and perhaps computer programs.

A final problem occurs because copyright often protects "derivative works." Thus, software producers "could conceivably claim ownership rights in everything generated through the use of [their] programs." Yet, the reasons for affording novelists pro-

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167 Id.
168 Id. at 1371.
169 Id. at 502-03.
170 Id. at 503.
171 Id. at 508.
172 Id. at 510.
173 Id.
174 Id. at 512.
175 Id.
176 Id. at 521.
177 Id. at 523.
tection "from unauthorized translations ... do not support giving software producers ownership rights in everything generated through the use of their programs," especially given the utilitarian nature of this type of property.\textsuperscript{179}

The Chinese are hopefully aware of the potential conflicts within the U.S. system. If the Chinese wish to develop an effective, viable system for protecting computer software, they may have to consider foregoing protecting software through traditional means. Perhaps both the Chinese and the U.S. should consider another attractive alternative: sui generis protection.

VIII. SUI GENERIS PROTECTION FOR COMPUTER SOFTWARE

It is important to realize that there are "gaps" between copyright and patent law through which software falls.\textsuperscript{180} Also, since computer software is substantially important to our economic future and there is a related need to protect software manufacturers, it seems appropriate to grant sui generis protection now.\textsuperscript{181} A sui generis approach would give software manufacturers and authors "the protection they require without distorting copyright law."\textsuperscript{182} This approach has been utilized in the U.S. with respect to computer chips and has achieved satisfactory results.\textsuperscript{183}

Under a sui generis approach, restrictions more akin to patent law could be given. The utility of software for example "makes it appropriate to impose limitations" restricting the period of protection.\textsuperscript{184} This limitation would of course be acceptable because software has a fairly short "commercial life" anyway.\textsuperscript{185} At the same time, unlike patent law, sui generis protection would be easily attainable and would not require public disclosure.

One problem with a sui generis approach, however, is that it does not guarantee international protection.\textsuperscript{186} This problem could be easily mitigated by the fact that "a sui generis approach . . . would allow the United States [or China] to only grant protection . . . [to] those countries which granted equivalent protection to" nationals of the U.S. or the PRC.\textsuperscript{187} Another disadvantage of sui generis

\textsuperscript{179}Id.
\textsuperscript{180}Id. at 490.
\textsuperscript{181}Id. at 510.
\textsuperscript{182}Id. at 511.
\textsuperscript{183}Id. at 514.
\textsuperscript{184}Id. at 524.
\textsuperscript{185}Id. at 514.
\textsuperscript{186}Id. at 483.
\textsuperscript{187}Id. at 486.
-protection is that its over-use could create extremely complicated bodies of law, which would result in ineffective administration and enforcement. This problem could be avoided, however, by drafting a clear and concise set of laws with very definite penalties for violations.

IX. Conclusions

A critical period has been reached in trade relations between the U.S. and China. Both countries have a tremendous amount to gain, but if both countries are to profit on an equitable basis, China must make sure that more effective protection for intellectual property rights are made available. In the area of computer software particularly, more protections are desperately needed. If China wants to continue to enjoy being able to import software from the West, changes will have to be made.

Such changes might include the use of traditional remedies such as patent, copyright, and trade secret law. But even these remedies are not necessarily enough. The best solution may be to create a sui generis system of protection which serves both the author/producer and society.

If this route is foregone, the Chinese could still improve the situation by emulating those aspects of the U.S. system which are useful. To do this, the Chinese should take full advantage of the fact that increasingly, U.S. agencies are seeking to "strengthen ties with developing countries in intellectual property matters." Evidently, the PRC has taken appropriate steps. Recently, the U.S. Patent and Trademark Office provided training to a number of PRC officials involved in the protection of intellectual property rights. Moreover, the U.S. Agency for International Development may begin to offer extensive aid to developing nations which hope to improve their copyright, patent, and trade secret laws. Through the above approaches, China can best balance its own interests with those of its trading partners and attain the level of trade necessary to bring China into the twenty-first century as a major leader in the production of high-technology items.

William P. Fuller V

188 Id. at 502.
189 Mossinghoff, supra note 1, at 247.
190 Id.
191 This information was obtained during a conversation with Mr. William P. Fuller IV. Mr. Fuller is a senior foreign service officer with the United States Agency for International Development.