International Protection for Computer Software

Intellectual-property issues are of growing international **concern.** Problems like commercial piracy[1] that occur in domestic markets have international counterparts. The United States currently enjoys a strong competitive position in international software markets, and appropriate intellectual-property protections and enforcement can help maintain our position and reduce piracy.

With an emphasis on software protections, this appendix briefly reviews existing multilateral and bilateral treaties that help protect the intellectual property of a U.S. national via copyright and patent.[2]

international *Conventions and Treaties*

Copyright is the predominant form of software protection in the United States and abroad. In most countries, computer programs per se are not in principle eligible for patent protection (although interpretations of these policies vary in practice among the various patent offices and courts). However, in some countries (including the United States) certain types of computer-implemented processes and algorithms can be patented.[3]

Copyright and patent protections abroad are substantially similar in form to those in the United States, and have most of the same advantages and liabilities. Sui generis protection for software has been proposed but has not had much of an international impact thus far.[4]

Copyright

Copyright protection abroad is provided for U.S. nationals principally through the Berne Convention and the Universal Copyright Convention.[5] The United States formally joined the Berne Convention in March 1989. The treaty was first established in 1886 and is the primary multilateral agreement in the world dealing with copyright. It is administered by the World Intellectual Property Organization (WIPO), an agency of the United Nations. Berne's fundamental principle of "national treatment" requires each member nation to provide the same protection to works of nationals of other member nations as it does to works of its own nationals. Berne requires that a nation provide certain minimum rights in order to join the convention, including moral rights for the author[6] and automatic protection, thus eliminating the former

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[1] "Piracy" has been defined as "the reproduction and sale of copyright material without the consent of author or publisher," by Publishers Association and the International Federation of Phonogram and Videogram Producers on Behalf of the U.K. Anti-Piracy Group, 1986, cited in Mark L. Damschroeder, "Intellectual Property Rights and the GATT: United States Goals in the Uruguay Round," *Vanderbilt Journal of Transnational Law,* vol. 22, No. 2, 1988, p. 368, footnote 1.

In this paper, OTA uses the term "piracy" to mean unauthorized commercial reproduction and sale, not unauthorized private (noncommercial) copying. (For a discussion of the legal status of private copying, see U.S. Congress, Office of Technology *Assessment, Copyright and Home Copying: Technology Challenges the Law,* OTA-CIT-422 (Washington, DC: U.S. Government Printing Office, October 1989), ch. 3.)

[2] Only a few countries have extensive trade secret laws.

[3] The Supreme Court has not ruled on whether computer programs per se are patentable subject matter, but has ruled that computer-implemented algorithms that are deemed "mathematical algorithms" per se are not statutory subject matter. Courts have thus held that a computer process or algorithm is statutory subject matter unless it falls within a judicially determined exception like the one for "mathematical algorithms" per se. U.S. Patent and Trademark Office (PTO) examiners use a two-part test to decide whether patent claims containing ''mathematical algorithms" are statutory subject matter. (U.S. Patent and Trademark Office, "Patentable Subject Matter: Mathematical Algorithms and Computer Programs," 1106 O.G. 4, Sept. 5, 1989).

In this paper, OTA sometimes uses phrases like "patents for software-related inventions," "software-related patents," or "patenting algorithms" to refer generally to patent protection for computer-implemented processes and algorithms. The PTO considers terms like "software patents" to be a misnomer because they may be interpreted to mean that a computer program per se (i.e., the sequence of coded instructions itself) is patentable, as opposed to the underlying computer process it carries out. (M. Keplinger, G. Goldberg, and L. Skillington, PTO, comments on draft paper, Dec. 18, 1989, pp. 1-2.)

[4] The World Intellectual Property Organization (WIPO) proposed sui generis Model Provisions on the Protection of Computer Software providing a mixture of patent and copyright protection. The model provisions were not based on the principle of national protection, instead giving computer software explicit and absolute rights and protection in all signatory nations. Intended as a guideline for national legislatures, the model provisions have not been adopted.

[5] While copyright tends to extend similar protection in most countries, there are national differences. In West Germany, for example, computers are considered a functional work and must meet a relatively high standard of "originality." One estimate suggests that 90 percent of programs will fail to meet that standard. (From the *Inkasso* case, cited by Ian A. Staines, "An Assessment of the European Commission's Proposal for a Council Directive on the Legal Protection of Computer programs," *The Computer Lawyer,* vol. 6, No. 9, September 1989, p. 21.)

[6] Moral rights "are separate from the economic rights of the author and concern what are usually called rights of paternity and integrity. The right of paternity is* right to be named as author of a work; the right of integrity is the right to object to distortion, other alteration of a work, or derogatory action prejudicial to the author's honor or reputation in relation to a work. Article 6bis of the [Berne] convention provides that authors shall have the rights of paternity and integrity. Congress concluded that present law, including unfair competition law and State and common law protection [such as libel, defamation, or misrepresentation], provides sufficient moral rights to fulfill the obligations of the Berne Convention. Therefore, it is not necessary for the implementation act to include additional moral rights." (U.S. Copyright Office, Circular 93a: The United States Joins the Berne Union, February 1989, p. 3.)

Under the Constitution, the United States does not accept a "natural right" theory of copyright giving inherent moral rights to the fruits of one's own labor. The United States has historically considered economic incentives for creativity as the basis for copyright protection.

U.S. requirements for formal notice and registration.[7] The latter two provisions were perceived as substantial barriers to entry by the United States.

The United States is also a member of the Universal Copyright Convention (UCC), which was established and adopted by the United States in 1955. It is administered by the United Nations Educational, Scientific, and Cultural organization (UNESCO), an agency of the United Nations. The United States withdrew from UNESCO in 1984 but adheres to the Convention.[8] UCC is also based on the principle of national treatment but it provides less protection than the Berne Convention and has lower minimum standards. In nations that agree to both Berne and UCC, Berne takes precedence.

The Berne Convention is recognized in 79 nations, which gives U.S. nationals protection in 24 countries where there was no previous copyright agreement.[9] The United States has bilateral copyright agreements with 33 nations as well, often in addition to common Berne or UCC membership.[10] Japan, the members of the European Community (EC), Australia and Canada are members of both conventions, while the Soviet Union is a member of the UCC only.[11] While this leaves a large number of nations in which U.S. works are not protected, the geographic scope of copyright protection is broad. The procedures are simple: once copyright exists for a work in a member nation, it applies in all other signatory nations, according to their own laws. Computer programs are not specifically mentioned in either convention, but are commonly agreed to be included.[12]

Patent

Securing patent protection in foreign countries is a much more difficult process than obtaining a copyright. Patents for any invention are difficult to obtain, due to the rigorous standards of novelty and nonobviousness. A patent must be applied for in each country where it is to be valid-there is no universal patent process.[13] This results in expenditures of time, money, and expert help needed for dealing with differences in languages and requirements.

In most countries software per se is not considered patentable. In many countries (including the United States) patents can be obtained for computer-implemented processes and algorithms (see footnote 3). In some nations (including Canada the USSR, and members of the European Economic community) a patent will not be granted if the novel step is the computer program itself, although in these countries merely having a computer program as part of the invention need not automatically disqualify it from patent consideration.[14]

The United States is a member of the oldest and most extensive patent treaty, the Paris Convention established in 1883. This Convention is based on "national treatment," where both domestics and foreigners are accorded the same treatment. However, there is no requirement that software-related inventions be considered patentable.

Other conventions exist that make international patent protection more convenient, although still not easy. Through the European Patent Convention (EPC), a single application for a patent is valid in up to 11 Western European member nations. The patentee must pay an extra fee for each country included, but only goes through a single application and examination. The EPC does not, however, provide uniform protection; a patent is subject to the existing laws in each of the member countries. A second convention is the Patent Cooperation Treaty, which provides for: 1) an international search report for prior art, 2) a preliminary examination report for some countries, and 3) the option to delay applying for a foreign

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[7] The Berne Convention Implementation Act has repealed the mandatory copyright notice requirement (the encircled "c," date, and name of the copyright owner) and eliminated the requirement to register a work at the Copyright Office. Although foreign authors need not register, there are significant incentives for a U.S. citizen to register because for them registration is a precondition for a copyright lawsuit, award for attorney's feea, and statutory damages. (U.S. Copyright (Mice, Circular 93a, op. cit., footnote 6, p. 3.)

[8] The United States is active on an intergovernmental committee for the UCC and also contributes to and supports the copyright-related activities of UNESCO.

[9] Figures from the U.S. Copyright *Office, Circular* 93: Highlights of U.S. Adherence to the Berne Convention, April 1989, and Circular 93a, op cit., footnote 6. Additional members may have joined since these circulars were published.

[10] U.S. Copyright Office, Circular 38a: International Copyright Relations of the United States, July 1989.

[11] Ibid.

[12] See, for example, Ingrid M. Arckens, "Obtaining International Copyright Protection for software: National Laws and International Copyright Conventions," *Federal Communications Law Journal,* vol. 38, August 1986, pp. 283-300. Max W. Laun, "Improving the International Framework for the Protection of Computer Software," *University of Pittsburgh Law Review, vol. 48,* summer 1987, pp. 1151-1184.
There are questions, however, about exactly what protection extends to (i.e. is "look and feel" protected by copyright, what is included in fair use, etc.), similar to the debates currently occurring in the United States over copyright protection for software.

[13] The European Patent Convention, described in more detail later, does provide multinational recognition of a patent. The European Patent office (EPO) makes it somewhat easier to obtain patent rights in Europe.

[14] In Canada, a program is not patentable but an invention involving a computer program would not be rejected outright. In Greece, computer programs per se are unpatentable. In Brazil, computer programs are not patentable, but semiconductor-chip firmware is patentable; in New Zealand computer programs can be patented only indirectly, by patenting hardware programmed in accordance with the program. South Africa has a statutory exclusion for computer programs. In the USSR, patent applications are not accepted for amination if the claimed subject matter is an algorithm or computer program. (Baxter-Sinnott, *World Law and Practice,* vol. 2A (New York, NY: Matthew Bender, 1985), pp. 2A-10 to 2A-12.)

patent for up to 30 months after the initial filing. An applicant must still file in each country (or region such as theEC)separately,but has greater assurance of being

Trade Secret

Trade secret has been the traditionally favored method of protection for mainframe and minicomputer software developers in the United States. However, most countries outside the United States and Western Europe do not recognize either domestic or international trade secret protection, although they may have laws concerning confidential business information that may be similar if less extensive. Japan is developing a trade secret law; however, it is not formulated to protect software.[15] No international conventions for trade secret exist. The validity of trade secret protection for mass-marketed software (commonly used for PC software) is question-able in the United States and there are signs that "shrink-wrap" licensing may not be considered valid in the European Community in the future.[16]

Bilateral Negotiations

Bilateral agreements are another way to protect intel-lectual property abroad. In 1984, Congress amended the Trade and Tariff Act of 1974 to require that intellectual-Property protection be considered in awarding benefits under the Generalized System of Preference (GSP) for trading partners.[17] Another clause of the 1974 Act section 301, gave the president the power to restrict imports in retaliation for foreign trade practices that unfairly restrain U.S. trade. This was strengthened in the Omnibus Trade and Competitiveness Act in 1988. The amendment, known as "Special 301," directs the U.S. Trade Represen-tative (USTR) to identify "priority countries" that provide inadequate or ineffective intellectual-property protection. If it is determined that sufficient progress is not being made by these nations, the USTR may bring an unfair trade practice case against the offending country .[18] These pieces of legislation attempt to move countries with historically weak protection towards international stand-dards.

For example, the Republic of Korea Singapore, and Taiwan have recently negotiated intellectual-property agreements with the United States. The United States began bilateral negotiations with each nation in the early 1980s. Then the United States began to apply trade leverage around 1985, often through the GSP system or section 301 of the Trade Act. Maintaining relations with the United States is important to each of these countries for economic and security reasons. Singapore and Tai-wan, as emerging centers of high technology in the Region, will benefit from stronger protection laws. The laws of all three nations protect software expressly under copyright, and to the extent established by international standards, although only Korea has joined the Paris Convention and the UCC.[19]

Trade and Competitiveness Issues in the Global Economy

If the reasons for domestic intellectual property protec-tion are principally economic, the same is true for international protection. Software protection has both direct and indirect effects on trade and competitiveness. Commercial piracy and loss of royalties result in direct revenue losses to U.S. firms and the U.S. economy. Appropriate intellectual-property protection can encour-age investment and innovation and indirectly strengthen the U.S. economic position in high technology and in the business and manufacturing industries supported by computers and software.[20]

The United States is the world's leading innovator and producer of computer software. Estimates of market shares, volume, and revenues vary, but one European study estimates that the United States supplies 70 percent of the world's software and accounts for half the world demand.[21] Another article claims that IBM, the largest software developer in the world, accounts for 60 percent of volume in world software sales and perhaps 70 percent of world operating profits.[22] Western Europe is estimated to have 10 percent of world sales and the Japanese 15 percent. The Soviet Union contributes practically no sales

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[15] Pamela L. Hamilton, "Protections for Software Under U.S. and Japanese Law: A Comparative Analysis," *Boston College International and Comparative Law Review,* vol. 7, summer 1984, p. 390.

[16] Michael D. Scott, "Europe 1992: The Impact of Unification on Non-European Computer Companies," *International Computer Law Advisor,* May 1989, p. 5. See also the section on maintaining software as a trade secret in app. A.

[17] R. Michael Gadbaw and Time J. Richards (eds.), *Intellectual Property Rights: Global Consensus, Global Conflict?* (Boulder and London: Westview Press, 1988) especially p. 6; and Robert P Benko, *Protecting Intellectual Property Rights (Washington, DC: American Enterprise Institute, 1987),* p. 11.

[18] Ann Main, *Pursuing* U.S. Goals Bilaterally: Intellectual Property and 'Special 301 '," *Business America,* vol. 110, No. 19, Sept. 25, 1989, p. 6.

[19] These particulars were all taken from Gadbaw and Richards, op. cit., footnote 17, chs. 8,9, 10.

[20] "Intellectual property rights promote innovation and intellectual creativity. Their protection and enforcement are essential to the expansion of ternational trade, investment, economic development, and.. the beneficial distribution of technology." ("United States Proposal for Negotiations on %-Related Aspects of intellectual Property Rights," *International Computer Law Advisor,* June 1989, p. 13.)

[21] Commission of the European Communities, "Green Paper on Copyright and the Challenge of Technology--Copyright Issues Requiring Immediate Action," June 1988, pp. 171-172.

[22] Figures cited in Gene Bylinsky, "The ~@ Tech Race: Who's Ahead? *Fortune,* vol. 114, Oct. 13, 1986, p. 28.

to the West, trying instead to catch up with Western state-of-the-art.[23] The United States is also the international leader in electronic databases: two-thirds of all databases available on world markets are U. S.-based.[24] According to one estimate, the total revenues generated for the U.S. computer and data processing industries from foreign markets came to $22 billion in 1987; approximately $8 billion of that was from Software.[25]

International Piracy and the Third World

Commercial piracy results in direct revenue losses to U.S. firms, through loss of sales, loss of royalties, and/or loss of investment opportunities.[26] However, redress of piracy abroad is often difficult and can involve issues of technology transfer and assistance to developing nations. Most of the industrialized, developed countries have strong intellectual-property protections, whereas many of the lesser-developed countries either do not have strong intellectual-property laws or do not enforce them.

Nimmer and Krauthaus[27] give two possible reasons for this lack of enforceable protection. The first is uncertainty about the ambiguous position of software in relation to copyright or patent protection. The United States spent several years deciding whether and how much to protect software in the realms of copyright and patent. More recently, Western Europe and Japan have developed protection schemes for software. In the Third World, where software development itself is much younger, legal solutions to protection may be slower than in the more advanced nations.

The second is a North-South trade and technology transfer issue, with the views of advanced nations in conflict with those of the lesser-developed nations. Advanced nations want to protect the computer and software industries that are strong sectors in their economies and want to promote free trade to benefit from these investments. lesser-developed countries want low-cost access to technology in order to promote and modernize business. Many also want to encourage a fledgling domestic programming industry. The advanced nations argue that strong software protection will encourage both domestic innovation and foreign investment; for some nations this argument may be well received, but for others whose development as a high-technology center is much further in the future, if at all, there is less urgency.

GATT Negotiations

Intellectual property has been included in the current Uruguay Round of GATT negotiations, scheduled to conclude in 1990. The GATT (General Agreement on Tariffs and Trade) is the major document regulating trade in the world, and has not traditionally included intellectual property within its sphere.[28] 'The objective of a GATT intellectual property agreement would be to reduce distortions of and impediments to legitimate trade in goods and services caused by deficient levels of protection and enforcement of intellectual property rights:' the U.S. position states.[29] The European Economic Community, Japan, and several other nations have also submitted proposals in support of including intellectual property issues in the GATT negotiations, and the United States is trying to get support from nations such as South Korea and Singapore that already have developed intellectual-property laws.[30]

If a GATT agreement is reached, the parties would adopt laws with a sufficient amount of intellectual-property Protection-' 'sufficient" to be determined relative to domestic law and international standards. It would cover patents, copyrights, trademarks, trade secrets, and semiconductor mask works.[31] Conciliation and dispute settlement procedures would be invoked when informal meetings fail to settle differences between two nations. Finally, strong enforcement measures would allow border control and the withdrawal of GATT concessions if the terms fail to be honored. Enforcement is a particularly important issue to many U.S. software manufacturers, since currently there is often little they can do and few remedies against foreign infringers.[32]

[23]Ibid.

[24]Clarence J. Brown, 'The Globalization of Information Technologies," *The Washington Quarterly, vol.* 11, winter 1988, p. 94.

[25]U.S. International Trade Commission, "'he Effects of Greater Economic Integration Within the European Community on the United States," July 1989, ch. 4, p. 39.

[26]A fuller breakdown and discussion of the many ways through which companies experience revenue loss can be found in a study by the U.S. International Trade Commission, "Foreign Protection of Intellectual Property Rights and the Effect on U.S. Industry and Trade," February 1988, ch. 4.

[27]Raymond T. Nimmer and Patricia Krauthaus, "Classification of Computer Software for Legal Protection: International Perspectives," *International Lawyer,* vol. 21, summer 1987, pp. 733-754.

[28]However, in the preceding round of negotiations (the Tokyo Round) an anticounterfeiting code was discussed.

[29]"United States proposal for Negotiations. . .," op. cit., footnote 20, p. 13.

[30]Gadbaw and Richards, op. cit., footnote 17, chs. 8 and 9.

[31]Text of the proposal submitted by the United States to the GATT, printed in "United States Proposal for Negotiations. . .,'' Op. Cit., footnote 20, pp. 15-16.

[32]See Damschroeder, op. cit., footnote 1; Gadbaw and Richards, op. cit., footnote 17, ch. 2; and Dana Williamson, "Addressing Inadequate Intellectual Property protection in the Uruguay Round," *Business America,* vol. 110, No. 9, Sept. 25,1989, pp. 4-5.

Innovation and Competition

Continued innovation is of great importance to a high-technology industry such as software. Intellectual-property protection encourages innovation by providing incentives for creation and providing some security for investors. This promotes international competition; if innovation increases domestically, the United States can continue to outshine foreign competitors. The United States is thus far the leading and most innovative software producer in the world. Not only has the industry developed earlier here than in other countries, but there is also a large installed hardware base and domestic market which makes investment less risky. So far, U.S. industry's position in the world market and the individualistic approach and enterprise of start-up companies have kept the United States ahead of all competition.

However, there is fear of foreign competition, especially from the Japanese.[33] The Japanese are funding efforts in programming R&D; they planned to spend $125 billion over 10 years, according to one estimate.[34] Artificial intelligence is a major project in Japan; known as the "fifth generation" project, the general goal is to make computers think more like humans. Some U.S. researchers fear that Japanese experience in this area could give them a head start in parallel processing and other cutting edge programming techniques.

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[33]For example, Charles Ferguson *at* MIT points out how the Japanese *took control* of the initially American semiconductor industry, and are now the world leaders. (Thomas Kiley, "High Tech Heresy," *New England Business,* vol. 10, November *1988,* pp. 62-66.) Also see Dewey, Ballentine, Bushby, Palmer, and Wood, "Japanese *Software: The* Next Competitive Challenge," prepared for ADAPSO, January *1989.*

[34]Brown, op. cit., footnote 24, p. 90.