

# *The U.S. Software Industry: Economic Contribution in the U.S. and World Markets*

Prepared for the



by

Stephen E. Siwek and Harold W. Furchtgott-Roth

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## **Executive Summary**

The computer software industry is the fastest growing major industry in the United States. During the period 1982-1990, the value added by the software industry to U.S. GDP increased at a real annual growth rate of 16.4 percent. For the entire period 1982 to 1992, the software industry grew by 269 percent in real terms, while the remainder of the economy grew by about 30 percent.

The three components of the "core" software industry: custom computer programming services, prepackaged software, and computer integrated design, in aggregate, now account for \$36.7 billion in value added to the U.S. economy. Software is now larger than most manufacturing industries.

The software industry now employs 421,000 people. Since 1987, software employment has risen at an annual rate of 6.6 percent.

U.S. developed software also dominates world markets. U.S. firms hold 75 percent of the global market for prepackaged software and approximately 60 percent of the world market for software and related services. In 1991, foreign sales of U.S. prepackage software vendors were \$17.9 billion.

Even these figures understate the importance of software to the U.S. economy. Software is characterized by both rapid technological innovation and widespread use in downstream markets. For this reason, software product improvements are "leveraged" through subsequent innovations in downstream industries. The benefits of continuous software innovation permeate repeatedly through much of the economy and allow other U.S. industries to compete more effectively in global markets.

Despite these successes, the software industry faces severe problems particularly in overseas markets. Denial of free access to foreign markets and pervasive software theft are two of the most critical problems that now confront this important industry.

## Section 1.

### Introduction

The face of the American economy is constantly changing. In the largest and freest market in the world, American business responds to both the demands of the American consumer and the availability of new technologies. These market and technological forces spawn many new industries and countless new firms. Some flourish while others fail. Occasionally, new industries may revolutionize the way Americans conduct business and lead their daily lives. One of these landmark industries has emerged in the past two decades. It is distinctly American in birth and distinctly promising to the America of the future. This new-born industry is, of course, computer software.

This paper describes the importance of software to the American economy with particular emphasis on prepackaged software for microcomputers. The paper first introduces the different segments of the software industry and measures the size and growth of these segments over time. The paper then examines the importance of U.S. developed software in world markets. In the next section, the paper describes why conventional measures of economic activity dramatically understate the full importance of software to the U.S. economy. The paper concludes with an examination of the threat that software piracy poses to U.S. software developers and publishers.

## Section 2

### The U.S. Software Industry: What Is It?

The software industry is one of the youngest and fastest growing major industries in the United States. The industry, however, is not easily defined, and it is rapidly changing. There is little consensus about which companies are part of the industry or how best to describe the industry's structure either today or in the future. Many different publications have developed their own informal categories. Our primary basis for measuring the size and growth of the computer software industry is the Standard Industrial Classification (SIC) codes used by the federal government.<sup>1</sup> Federal government data collection on business activities is organized around these SIC codes.

Most Americans know little about the computer software industry, due, in large part, to its newness and continuing evolution. Although public awareness has increased significantly, the major firms in the industry may not be as familiar to the American public as companies in other industries such as automobile manufacturing or television production.

As consumers of computer services, Americans need not understand computer technology. To appreciate its benefits, consumers need only know that their telephone calls are handled more efficiently, their purchasing of groceries is more automated, and their withdrawal of cash from a bank is

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<sup>1</sup> Examining the computer software industry with government data over time is difficult because there is no separate classification for the "software industry" and because classifications relating to software have frequently changed.

simplified. Consumers need not even be aware that computers are the ultimate source of many services that make their lives easier and more enjoyable. To many consumers, the benefits of computer services are welcome, but of unknown origin.

Even for those consumers who are aware of the computer technology that underlies these services, it is often lumped in a black box with little distinction between hardware and software. Twenty-five years ago, much computer software was customized for specific machines, and the distinction between hardware and software was often blurred. Much software was developed and distributed by hardware manufacturers.

Before 1970, few firms were dedicated to the creation or distribution of software.<sup>2</sup> Since that time, however, the computer software industry has assumed an independent identity. Thousands of firms have developed for the primary purpose of creating and distributing software. Much of this software remains customized for users with specific application needs. But an increasing share of the market is absorbed by prepackaged software, systems, and applications software for a wide range of users.

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<sup>2</sup> The federal government did not grant a separate code to an industry specifically related to computer software until the 1972 SIC revisions and only then under the industry group "Computer and Data Processing Services" (SIC 737). In that year, the federal government classified the computer and data processing services in three industries: computer programming and software (SIC 7372), data processing services (SIC 7374), and computer related services, not elsewhere classified (SIC 7379). Before 1972, all aspects of computer software were classified under the heading of business consulting services (SIC 7392), together with such service industries as interior decorating and management and public relations. The federal government did not keep track of the SIC 7392 before the 1963 census of services. Prior to 1963, the computer software industry was under the general heading of Business Services (SIC 73).

In 1987, the federal government revised its classification codes for computer software and related industries from three to nine industries.<sup>3</sup> Table 1 (page 7) displays these nine categories. Federal data collection for these nine disaggregated industries is sporadic; some federal government data collection for SIC 737 is still based on the 1972 three-industry standard.<sup>4</sup>

We will refer to the first three industries listed in Table 1—custom computer programming services, prepackaged software, and computer integrated systems design—as the “core” software industries or simply the software industry. The core industries are primarily engaged in the design, development, and maintenance of computer software. References in the popular media to the computer software industry usually include these core industries.

Outside of the core industries, many firms disseminate computer software in the economy. Some of these companies distribute computer software to businesses and consumers,<sup>5</sup> while others manufacture and provide service support for computers and related hardware that are jointly

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<sup>3</sup> Executive Office of the President, Office of Management and Budget, *Standard Industrial Classification Manual 1987*, at 696.

<sup>4</sup> For example, the Bureau of the Census, *1990 Service Annual Survey*, 1992 uses the 1972 classification. As another example, for the 1987 four-digit SIC codes, employment data from the Bureau of the Census and the Bureau of Labor Statistics are substantially different from one another; consequently, we find the employment data based on the 1987 SIC codes to be unreliable.

<sup>5</sup> The distribution function is primarily performed by portions of SIC 5045 and 5734, but also portions of SIC 506, 5112, 53, 5912, 5945, 5961, and 5963.

**Table 1**

**FEDERAL GOVERNMENT CLASSIFICATION OF  
COMPUTER PROGRAMMING, DATA PROCESSING,  
AND OTHER COMPUTER RELATED SERVICES (SIC CODE 737)**

| 1972 SIC Code |                                                        | 1987 SIC Code                                               |
|---------------|--------------------------------------------------------|-------------------------------------------------------------|
| 7372          | Computer programming<br>and software                   | 7371 Custom computer programming services                   |
|               |                                                        | 7372 Prepackaged software                                   |
|               |                                                        | 7373 Computer integrated systems design                     |
| 7374          | Data processing services                               | 7374 Data processing and preparation                        |
|               |                                                        | 7375 Information retrieval services                         |
|               |                                                        | 7376 Computer facilities management                         |
| 7379          | Computer related services,<br>not elsewhere classified | 7377 Computer rental and leasing                            |
|               |                                                        | 7378 Computer maintenance and repair                        |
|               |                                                        | 7379 Computer related services,<br>not elsewhere classified |

Source: Executive Office of the President, Office of Management and Budget,  
Standard Industrial Classification Manual 1987, at 696.

operated with software.<sup>6</sup> In addition, some companies manufacture equipment other than computers that are used exclusively in combination with computer software.<sup>7</sup> Examples of such equipment are calculating machines, point of sale electronic cash registers, and automatic teller machines. Still other firms provide services that have become heavily dependent on computer software, such as the publishing and accounting industries.

In this paper, we will not attempt to measure the importance of software to related firms and industries outside of the core software industries. Consequently, for many purposes our industry definitions will understate both the size of the computer software industry and its importance to U.S. industry.

Moreover, all standard government data on the software industry will necessarily understate the industry's size. These capture information only on those establishments whose *primary* activity is software related. Software development and usage, however, are diffused throughout practically all industries in the economy. Professional computer programmers and specialists—to say nothing of the millions of amateur computer users—have become a necessary in-house resource in many businesses. These large and

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<sup>6</sup> These computer related industries include SIC codes 3571, 3572, 3573, 3574, 3575, 3576, and 3577. Support service is provided by industries in SIC codes 7376, 7377, and 7378.

<sup>7</sup> Many manufacturing industries produce some goods with embedded software. Industries that manufacture equipment in which software applications are particularly common include SIC codes 3578, 3579, 3661, 3663, 3669, 3812, 3825, 3845, and 3861.

important software activities in establishments whose primary product is not software are not captured in the data presented in this paper.

### Section 3

## Size and Growth of the Software Industry in the U.S.

### A. The Core Software Industry

Regardless of how it is measured, the U.S. computer software industry has been growing rapidly. Table 2 (page 11) presents the growth of industry receipts between 1977 and 1992 in billions of 1992 dollars for firms in the core software industries. Receipts increased ten-fold for the entire period reaching more than \$50 billion in 1992.

The increase of industry receipts moves closely with estimates of the growth of industry value added also shown in Table 2. *Value added* is measured as receipts minus material costs, contract service costs, and other costs not directly attributable to the capital and labor of the industry. For the core software industries, the estimated value of the contribution of capital and labor in terms of 1992 dollars increased from little more than \$3 billion in 1977 to more than \$36 billion in 1992.

Measures of industry value added are consistent with measures of aggregate national economic activity such as gross domestic product (GDP). Since 1977, the computer software industry has grown more rapidly than the national economy and has consequently accounted for an increasing share of the national economy. As indicated in Table 3 (page 12), the industry grew from 0.08 percent of GDP in 1977 to more than 0.6 percent of GDP in 1992.

**Table 2**

**REVENUE AND VALUE ADDED OF  
THE CORE SOFTWARE INDUSTRY  
(IN BILLIONS OF 1992 DOLLARS)**

|      | REVENUE | VALUE ADDED |
|------|---------|-------------|
| 1977 | 4.3     | 3.3         |
| 1982 | 11.7    | 10.0        |
| 1987 | 33.7    | 24.5        |
| 1988 | 40.2    | 29.2        |
| 1989 | 44.9    | 32.6        |
| 1990 | 46.5    | 33.8        |
| 1991 | 48.5    | 35.2        |
| 1992 | 50.6    | 36.7        |

Sources: Bureau of the Census, Census of Service Industries, various years,  
Service Annual Surveys, various years, and authors' calculations.

**Table 3**

**CORE SOFTWARE INDUSTRY  
CONTRIBUTION TO GDP**

|      |       |
|------|-------|
| 1977 | 0.08% |
| 1982 | 0.22% |
| 1987 | 0.45% |
| 1988 | 0.51% |
| 1989 | 0.56% |
| 1990 | 0.57% |
| 1991 | 0.60% |
| 1992 | 0.62% |

Sources: Bureau of the Census, Census of Service Industries, various years,  
Service Annual Surveys, various years, and authors' calculations.

The growth of the computer software industry can also be measured by employment. Table 4 (page 14) displays employment in the industry based on two different sources, the Bureau of the Census and the Bureau of Labor Statistics.<sup>8</sup> Both sources of information indicate a clear upward trend, with industry employment exceeding 400,000 in 1992. The share of national employment for the core software industries expanded between 1977 and 1992 from approximately 0.05 percent to 0.35 percent, as shown in Table 5 (page 15).

At first blush, accounting for approximately 0.6 percent of GDP or 0.35 percent of employment may not appear to be an overwhelming achievement for the core computer software industries. The federal government, however, classifies well over a thousand industries (4-digit SIC codes) and 394 industry groups (3 digit SIC codes) in the private sector. Relatively few industries or industry groups are larger than the core software industry.

As noted above (Table 2), the computer software industry achieved \$33.8 billion in value added in 1990 (1992 dollars). Appendix A (page 45) shows value added for the 139 three-digit SIC code industry groups from the manufacturing sector in 1982 and 1990 (1992 dollars).<sup>9</sup> The data in Appendix A reveal that the computer software industry contributed more

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<sup>8</sup> Both sources are presented because their estimates of industry employment differ.

<sup>9</sup> 1990 is the most recent year for which complete value added data are available for all manufacturing industry groups. The manufacturing sector is used as a basis for comparison because of the availability of data and because of the similarity of foreign trade patterns of the software industry with manufacturing industries. Excluded are other services; agriculture, forestry, and fishing; mining; construction; transportation and utilities; wholesale trade; retail trade; finance, insurance, and real estate; and public administration. Measures of value added in 1990 for industries in these other sectors of the economy are not available.

**Table 4**  
**CORE SOFTWARE INDUSTRY EMPLOYMENT**  
(IN THOUSANDS)

|      |     |
|------|-----|
| 1977 | 51  |
| 1982 | 127 |
| 1987 | 306 |
| 1988 | 325 |
| 1989 | 362 |
| 1990 | 387 |
| 1991 | 404 |
| 1992 | 421 |

Sources: Bureau of the Census, Census of Service Industries, various years,  
Bureau of Labor Statistics, Industry Employment reports.

**Table 5**

**CORE SOFTWARE INDUSTRY  
SHARE OF NATIONAL EMPLOYMENT**

|      |       |
|------|-------|
| 1977 | 0.05% |
| 1982 | 0.13% |
| 1987 | 0.27% |
| 1988 | 0.28% |
| 1989 | 0.30% |
| 1990 | 0.32% |
| 1991 | 0.34% |
| 1992 | 0.35% |

Sources: Bureau of the Census, Census of Service Industries, various years;  
Bureau of Labor Statistics, Industry Employment reports.

value added to gross domestic product than all but five of these industry groups: motor vehicles and equipment; aircraft and parts; drugs; electronic components and accessories; and miscellaneous plastic products.<sup>10</sup>

Not only is the software industry large, but it is growing much more rapidly than the remainder of the economy. As shown in Table 6 (page 17), the software industry has consistently grown at a faster pace than the remainder of the economy since 1977. Between 1977 and 1989, the industry attained double-digit rates of real annual growth. Even while the remainder of the economy has barely grown, and even declined, in some recent years, the software industry has continued to grow at least 3.5 percent per year.

Figure 1 (page 18) graphically illustrates the growth of the industry since 1982. The size of the software industry and the remainder of the economy are each normalized to equal 100 in 1982. By 1992, the size of the remainder of the economy had grown to equal 130 or 30 percent larger than 1982. The software industry, in contrast had grown to 369, or 269 percent larger than 1982.

The growth of the software industry exceeds the rate of growth achieved by any other major manufacturing industry during the 1982-1990 timeframe. Appendix A shows that, in the years 1982-1990, the software industry grew at a real annual rate of 16.4 percent. This rate of growth

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<sup>10</sup> Some industry groups outside of manufacturing may also have been larger than the software industry. Note, however, that the software industry constitutes only a portion of its larger industry group SIC code 737: computer programming, data processing, and other computer-related services.

**Table 6**

**REAL ANNUAL GROWTH RATE OF VALUE ADDED FOR  
THE CORE SOFTWARE INDUSTRY  
AND THE REMAINDER OF THE U.S. ECONOMY**

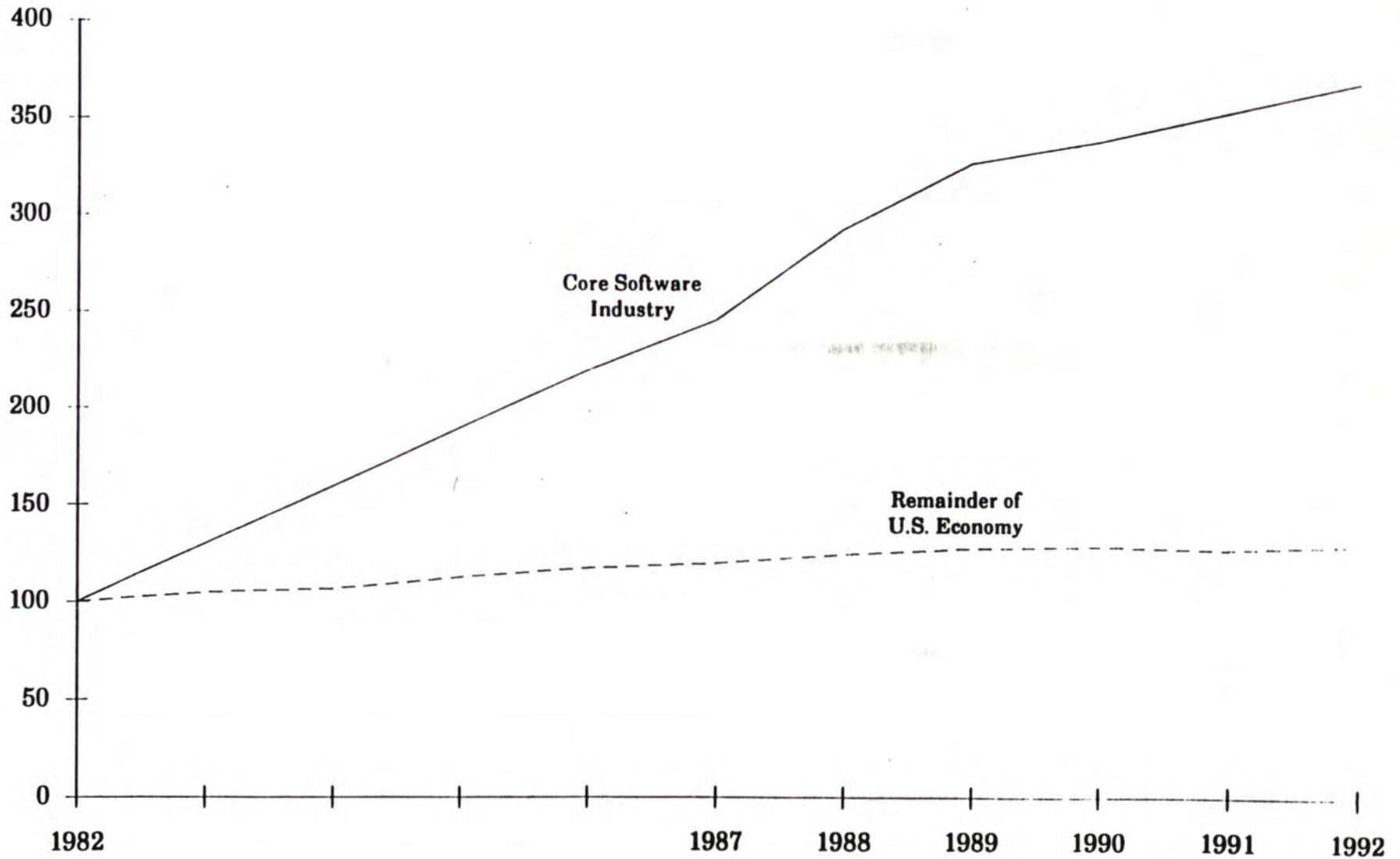
|           | <b>SOFTWARE<br/>INDUSTRY</b> | <b>REMAINDER<br/>OF ECONOMY</b> |
|-----------|------------------------------|---------------------------------|
| 1977-1982 | 24.67%                       | 1.22%                           |
| 1983-1987 | 19.76%                       | 3.80%                           |
| 1988      | 19.08%                       | 3.82%                           |
| 1989      | 11.70%                       | 2.56%                           |
| 1990      | 3.51%                        | 0.79%                           |
| 1991      | 4.41%                        | -1.23%                          |
| 1992      | 4.23%                        | 1.93%                           |

Sources: Bureau of the Census, Census of Service Industries, various years,  
Service Annual Surveys, various years, and authors' calculations.

**Figure 1**

**Growth of Real Value Added  
1982=100**

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surpassed the growth rates exhibited by any other industry shown in Appendix A.

Software industry employment has also grown more rapidly than that of the rest of the economy as shown in Table 7 (page 20). While the remainder of the economy has generated employment growth of little more than two percent per year, employment in the software industry grew at double-digit rates through much of the 1980s, and growth remains above four percent in the 1990s. Figure 2 (page 21) illustrates this growth. Employment in the software industry and in the rest of the economy are each standardized to equal 100 in 1982. Employment in the remainder of the economy grew 17 percent to 117 in 1992, while employment in the software industry grew 233 percent to 333 in 1992.

The double-digit rates of growth for the industry in the 1980s cannot continue forever unless the computer software industry absorbs the entire economy. The current pace of growth reflects the rapid transition of the industry from one of little consequence just fifteen years ago to one of national prominence today. As software emerges as one of the largest industries in the country, its rate of growth will decline towards that of the nation as a whole, as it has for the past three years. Although it is unlikely that the U.S. software sector will continue to outpace the remainder of the economy, it is expected that the industry will retain its status as one of the fastest growing parts of the economy for some time.

#### B. The Prepackaged Software Industry

Within the core software industries, the prepackaged software industry has been growing the most rapidly. As recently as 1987, custom computer

**Table 7**

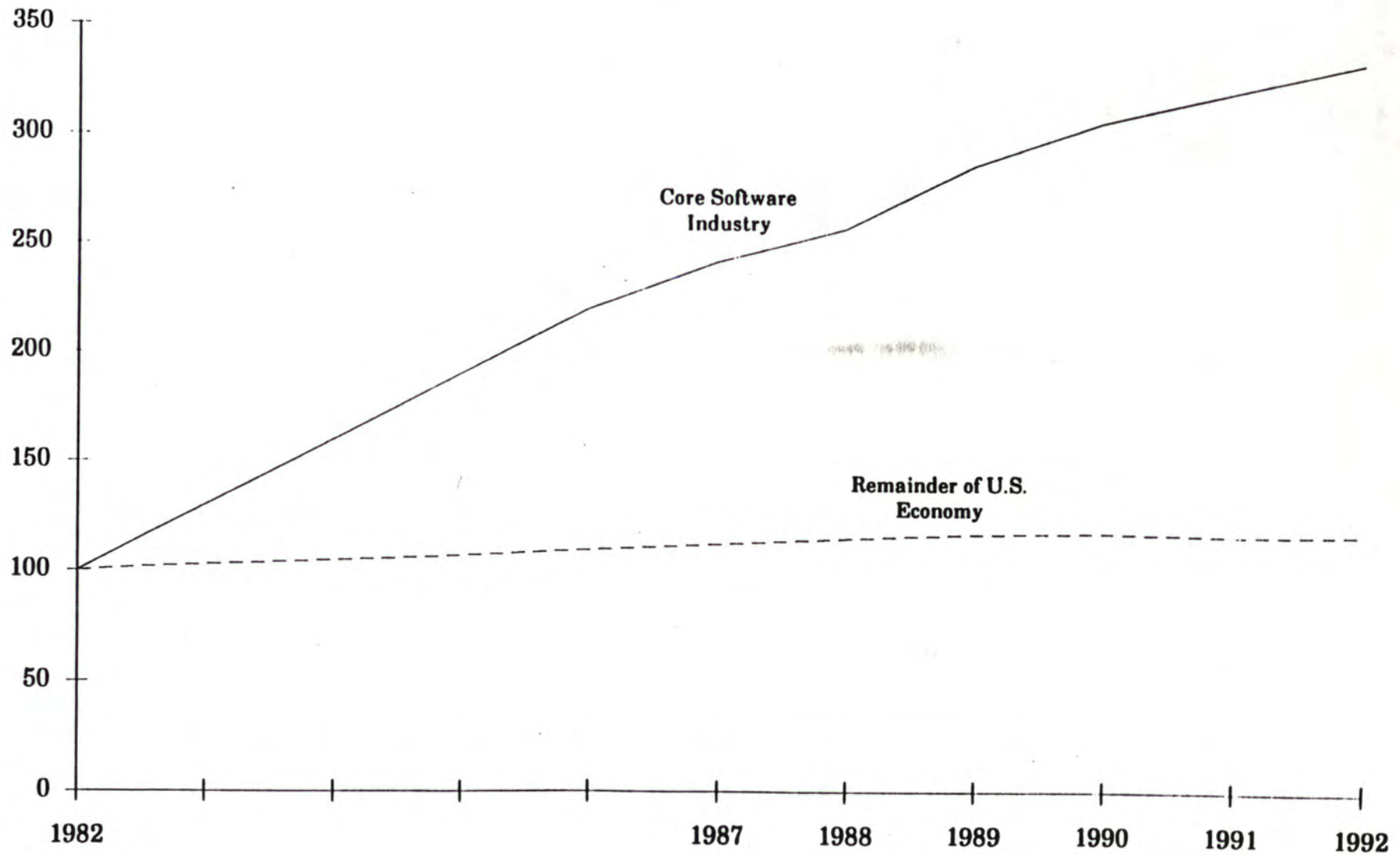
**ANNUAL GROWTH RATE OF EMPLOYMENT FOR  
THE CORE SOFTWARE INDUSTRY  
AND THE REMAINDER OF THE U.S. ECONOMY**

|           | <b>SOFTWARE<br/>INDUSTRY</b> | <b>REMAINDER<br/>OF ECONOMY</b> |
|-----------|------------------------------|---------------------------------|
| 1977-1982 | 19.80%                       | 1.54%                           |
| 1983-1987 | 19.32%                       | 2.41%                           |
| 1988      | 6.21%                        | 2.18%                           |
| 1989      | 11.32%                       | 1.99%                           |
| 1990      | 6.96%                        | 0.42%                           |
| 1991      | 4.41%                        | -0.95%                          |
| 1992      | 4.23%                        | 0.60%                           |

Sources: Bureau of the Census, Census of Service Industries, various years,  
Bureau of Labor Statistics, Industry Employment reports,  
Economic Report of the President 1993, Table B-30, and authors' calculations.

**Figure 2**

**Growth of Employment  
1982=100**



programming services accounted for nearly half of the core software industry receipts and employment, with prepackaged software and computer integrated systems design each accounting for roughly one quarter of receipts.<sup>11</sup> Since then, as shown in Table 8 (page 23), employment in all three segments of the industry has increased, but the growth of prepackaged software has been by far the most rapid.

A common myth is that the prepackaged computer software industry is confined to a few metropolitan areas and has little presence in much of the United States. This myth has no basis in fact. Based on the most recently available data for geographic distribution of the industry, the 1987 *Census of Service Industries*, the core software industry was located in every state, and at least one establishment engaged in prepackaged software was located in every state except for Montana. In 1987, revenue from prepackaged software exceeded \$100 million in fifteen states. Establishments in eight states had core software revenue in excess of \$1 billion, and establishments in thirty states plus the District of Columbia had core software revenue in excess of \$100 million. Nationally, between 1987 and 1992, software industry revenue grew more than 50 percent. Moreover, if the geographic distribution has changed since then, we believe that the industry has become more diffused rather than more concentrated.

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<sup>11</sup> 1987 *Census of Service Industries* .

**Table 8****EMPLOYMENT IN THE CORE SOFTWARE INDUSTRIES**  
**(IN THOUSANDS OF EMPLOYEES)**

|                                   | <b>Computer<br/>Programming<br/>Services</b> | <b>Prepackaged<br/>Software</b> | <b>Integrated<br/>Systems<br/>Design</b> |
|-----------------------------------|----------------------------------------------|---------------------------------|------------------------------------------|
| 1988                              | 125.0                                        | 87.0                            | 92.7                                     |
| 1989                              | 141.4                                        | 99.6                            | 98.5                                     |
| 1990                              | 151.4                                        | 113.5                           | 97.9                                     |
| 1991                              | 154.0                                        | 125.3                           | 99.5                                     |
| 1992 (preliminary)                | 158.0                                        | 132.4                           | 104.5                                    |
| <b>Average Annual growth rate</b> |                                              |                                 |                                          |
| 1988-1992                         | 6%                                           | 11%                             | 3%                                       |

Source: Bureau of Labor Statistics, Industry Employment

## Section 4

### The U.S. Software Industry in World Markets

In 1990, American firms held approximately 60 percent of the world market for software and related services.<sup>12</sup> In prepackaged software, U.S. suppliers captured an estimated 75 percent of the world market in 1991.<sup>13</sup> For *Software* magazine's Top 100 independent prepackaged software vendors, non-U.S. sales in 1991 were 46 percent of worldwide sales.<sup>14</sup> Clearly, U.S. software has become one of America's most important sources of foreign sales.

As shown in Table 9 (page 25), recent estimates by International Data Corp. (IDC) place the worldwide market for prepackaged software at \$52.5 billion in 1991. IDC's definition of prepackaged software includes both sales by independent software vendors and non-custom, commercial software sales of hardware manufacturers. Thus, IDC's estimates exclude consulting and custom programming services.

According to IDC, U.S. vendors captured 75 percent of the world prepackaged software market in 1991. In addition, U.S. vendors recouped approximately 50 percent of their total 1991 revenues in non-U.S. markets. Thus, U.S. prepackaged software vendors, in total, sold \$19.7 billion in

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<sup>12</sup> *Business Week*, "Can the U.S. Stay Ahead in Software?" March 11, 1991, page 98.

<sup>13</sup> U.S. Department of Commerce, *U. S. Industrial Outlook: 1993*, page 26-33.

<sup>14</sup> *Software*, Top 100 Special Edition, June 1992, page 19.

**Table 9**

**FOREIGN SALES OF PREPACKAGED SOFTWARE  
BY U.S. SOFTWARE FIRMS**

|                                                       | <b>1991</b>   |
|-------------------------------------------------------|---------------|
| World Market for Prepackaged Software<br>(\$billions) | <b>\$52.5</b> |
| World Market Share of U.S. Vendors<br>(percent)       | <b>75%</b>    |
| Worldwide Sales of U.S. Vendors<br>(\$billions)       | <b>\$39.4</b> |
| Non-U.S. Share of U.S. Vendor Sales<br>(percent)      | <b>50%</b>    |
| Foreign Sales of U.S. Vendors<br>(\$billions)         | <b>\$19.7</b> |

Source: International Data Corp., as reported in U.S. Department of Commerce,  
*U.S. Industrial Outlook: 1993.*

overseas markets in 1991 (See Table 9). The comparable figure for 1990 was \$17.9 billion.<sup>15</sup>

IDC also estimates that, in 1991, the U.S. market for prepackaged software was \$20.7 billion.<sup>16</sup> Since 50 percent of the sales of U.S. vendors, or \$19.7 billion, were made in the United States, U.S. vendors achieved a 95 percent share of the U.S. prepackaged software market in 1991.

Foreign sales of U.S. prepackaged software have grown dramatically since the mid-1980s. Table 10 (page 27) shows worldwide and non-U.S. sales for the Top 50 "independent" software vendors since 1986. While these data omit foreign software sales for hardware vendors such as IBM and Digital Equipment Corporation (DEC), they do provide some indication of the dramatic growth achieved by U.S. vendors overseas. As Table 10 suggests, since 1986, non-U.S. sales for *Software* magazine's Top 50 independent vendors rose from \$0.9 billion to \$6.0 billion. The share of total sales made abroad for these firms increased from 23.7 percent in 1986 to 48.0 percent in 1991.

#### *Exports of Other Industries*

All of the statistics cited in this section reflect foreign sales of software, not software exports. Foreign sales data differ from export data in that foreign sales typically include some element of value added in the country where the sale was made. This additional element might include a retail markup at the foreign level or some other aspect of distribution or production

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<sup>15</sup> U.S. Department of Commerce, *U.S. Industrial Outlook: 1992*, page 27-25.

<sup>16</sup> *Industrial Outlook, 1993*, page 26-34.

**Table 10**

**TOTAL AND NON-U.S. SALES OF TOP 50 INDEPENDENT  
PREPACKAGED SOFTWARE VENDORS**

|      |                        |        |       |       |
|------|------------------------|--------|-------|-------|
| 1986 | Total Software Sales   | \$3.8  |       |       |
|      | Foreign Software Sales |        | \$0.9 |       |
|      | Percent Non-U.S. Sales |        |       | 23.7% |
| 1987 | Total Software Sales   | \$5.2  |       |       |
|      | Foreign Software Sales |        | \$2.2 |       |
|      | Percent Non-U.S. Sales |        |       | 42.3% |
| 1989 | Total Software Sales   | \$8.3  |       |       |
|      | Foreign Software Sales |        | \$3.7 |       |
|      | Percent Non-U.S. Sales |        |       | 44.6% |
| 1990 | Total Software Sales   | \$10.7 |       |       |
|      | Foreign Software Sales |        | \$4.9 |       |
|      | Percent Non-U.S. Sales |        |       | 45.8% |
| 1991 | Total Software Sales   | \$12.5 |       |       |
|      | Foreign Software Sales |        | \$6.0 |       |
|      | Percent Non-U.S. Sales |        |       | 48.0% |

Source: Software Magazine, "Top 50" or "Top 100" Profiles of the Leading Independent Software Companies, Various Years.

that took place on foreign shores. By contrast, export data, as reported by the U.S. Department of Commerce, reflect only the transaction value at the point of shipping from the United States. For this reason, foreign sales data are typically larger than export data.

Unfortunately, the Department of Commerce does not collect meaningful data on software exports. As a result, one cannot compare the foreign activity of the software industry with the overseas activities of other industries in any precise way. Nevertheless, it is possible to derive some sense of the importance of the software industry as an "exporter" by comparing foreign sales of U.S. prepackaged software vendors (\$19.7 billion in 1991) with the industry export figures shown in Table 11 (page 29).

**Table 11**  
**EXPORTS OF U.S. INDUSTRIES**

| <b>Industry</b>                                                  | <b>1991<br/>(in billions)</b> |
|------------------------------------------------------------------|-------------------------------|
| Aerospace                                                        | \$42.6                        |
| Chemicals and allied products                                    | \$41.7                        |
| Agricultural commodities *                                       | \$39.2                        |
| Motor vehicles, car bodies, and automotive parts and accessories | \$32.9                        |
| Computers and peripherals                                        | \$25.2                        |
| Industrial Machinery                                             | \$19.3                        |
| Electronic components and accessories                            | \$14.9                        |
| Paper and allied products                                        | \$9.3                         |
| Plastics material and resins                                     | \$7.4                         |
| Medical and dental instruments and supplies                      | \$6.8                         |
| Lumber and wood products except furniture                        | \$6.4                         |
| Drugs                                                            | \$5.7                         |
| Textile mill products                                            | \$4.1                         |
| Measuring and controlling instruments                            | \$4.1                         |
| Radio and TV communications equipment                            | \$3.8                         |
| Steel mill products                                              | \$3.8                         |
| Photographic equipment and supplies                              | \$3.8                         |
| Apparel and other textile products                               | \$3.7                         |
| Telephone and telegraph apparatus                                | \$2.6                         |
| Search and navigation equipment                                  | \$2.2                         |

Source: U.S. Department of Commerce, (U.S. Industrial Outlook 1993), except where noted.

\* Source: Economic Report of the President, January, 1993, p. 459.

## **Section 5**

### **Software's Value to the Economy Far Exceeds the Benefits Measured in Government Statistics**

As noted earlier in this report, the U.S. software industry is one of the most rapidly growing industries in America. Employment in the software industry has grown at an annual rate of more than 6 percent since 1987, and the industry's share of U.S. GDP has nearly tripled since 1982. Moreover, the U.S. software industry, and the prepackaged software sector in particular, have been extremely successful in world markets where U.S. prepackaged product holds an estimated 75 percent market share.

But the software industry's importance to the U.S. economy is far greater than even these statistics suggest. Apart from the industry's direct contributions, there are at least three additional reasons why the software industry is important to the American economy:

- Software is characterized by extremely rapid technological innovation.
- Software is used as an input in numerous "downstream" U.S. industries facilitating technological innovation. Moreover, many of these industries are themselves dominant factors in world markets.
- Consumers benefit from software, both from direct use and from the products of downstream industries.

## **Technological innovation in the creation and distribution of software**

The measured growth of software industry revenue and value added over the past decade is unparalleled by major industries in the U.S. economy. Even this growth is understated because of rapid technological change and obsolescence in the industry. Because of price inflation in most industries, one million dollars worth of product produced in 1982 would be worth more than one million dollars of product produced in 1992. In the software industry, however, one million dollars worth of computer software generated in 1982 was typically of lower quality and less useful—worth less in today's market—than one million dollars worth of computer software generated in 1992. Standard measures of industry revenue growth cannot fully capture the technological and quality improvements in the industry.

Figure 3 (page 32) provides a conceptual illustration of the changes in the software market between 1982 and 1992. Price is on the vertical axis and quantity is on the horizontal axis. There are two downward-sloping lines or market demand curves in the diagram, one for 1982-quality software and one for 1992-quality software. Of course, 1992-quality software was not available in 1982, and few people today would settle for 1982-quality software. To illustrate this relationship, the demand curve for 1992-quality is much further to the right of the diagram than the demand curve for 1982-quality software. That is, at any give price, the software market would purchase much more 1992-quality software—if it were available—than 1982-quality software.

Figure 3

Changes in the Software Market Between 1982 and 1992

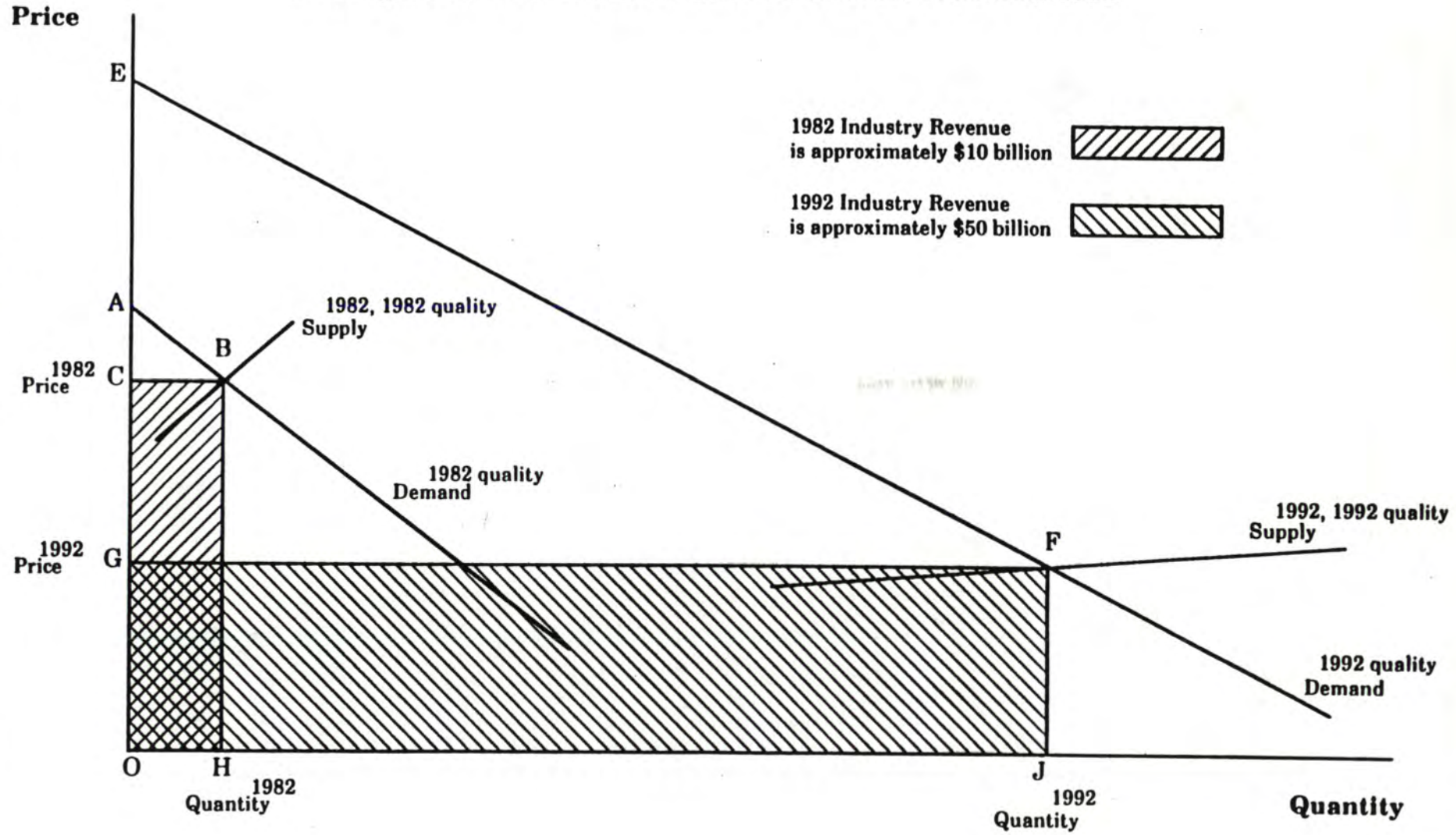


Figure 3 also illustrates the shift in market supply between 1982 and 1992. In 1982, market supply of 1982-quality software is the upward-sloping curve in the upper left-hand portion of the diagram, and market equilibrium is illustrated by the point  $B^{1982}$ . Between 1982 and 1992, technology improved substantially, both through process and product innovation so that the 1992 supply curve shifted downward and to the right in Figure 1; market equilibrium is illustrated by point  $B^{1992}$ . During the decade, price by most measures fell, while both quantity and quality increased enormously.

Market revenue in 1982 is represented by the shaded rectangle OHBC, or approximately \$8 billion.<sup>17</sup> Market revenue in 1992 grows to the rectangle OJFG, or approximately \$50 billion. Yet 1982 industry market revenue based on 1982-quality software would likely have been negligible if it had to compete with 1992-quality software.

How did the technology frontier or supply curve for software expand so substantially in twelve years? Part of the explanation is *process innovation*, better ways of creating software. With process innovation, the same software can be improved and distributed at lower cost. Engineers and programmers today have a better array of tools and procedures with which to develop software. The currently available range of specialized equipment and technology to write and debug software was simply not available ten years ago. Moreover, with an additional ten years of experience, both engineers and firms in this infant industry have become more experienced and more capable to generate new and better software. Not all of the process innovation has

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<sup>17</sup> Slightly less than \$12 billion in 1992 dollars.

been in the development of software. Other areas, such as marketing and distribution, have also become more sophisticated and efficient.

The technology frontier also expanded because of *product innovation*, the creation of new products and services not available ten years ago. Some product innovation involves the evolutionary improvement of preexisting software. Computer operating systems, word processing packages, and spreadsheet packages, for example, are substantially better today than their direct ancestors of just ten years ago. Although much of this improvement is attributable to the availability of faster computers with more memory, part of the improvement is also attributable to improvements in product design and ease of usage.

Much product innovation over the past decade has involved new types of software, that was, at most, a faint dream ten years ago. Within the bounds of current technology, new software products and services have been developed for every application and purpose imaginable in every industry in the country. Product innovation within the software industry is far from exhausted. As technology inexorably improves, new software and applications will find their ways to future markets.

### **Downstream markets**

Software is used in every U.S. industry. The widespread *downstream* use of software in other industries is part of the reason why the software industry is more beneficial to the U.S. economy than industry revenue alone might suggest. Usage in other industries is not unique to software. Clearly, there are other products—*e.g.*, metals, plastics, and chemicals—and services—*e.g.*, legal and accounting—that are used in many downstream

industries. But widespread use is only part of the reason why software is important to the U.S. economy as a whole.

Software is particularly beneficial to the U.S. economy because it combines widespread use with rapid technological innovation. It is this combination of attributes that results in a uniquely large “leveraging” effect of software and innovation on the economy as a whole.

Software has become a primary component of innovation in many industries. Many firms in other industries are constantly applying and developing software in new ways both to make their operations more efficient—process innovation—and to develop new products and services—product innovation. Both of these forms of innovation in other industries shift their technology frontiers outward, leading to lower costs throughout the economy and ultimately to consumers.

Innovations in the software industry reduce software prices, and subsequently reduce software costs in other industries. Assume that a downstream firm can acquire or license the software it currently uses at a lower price and with higher quality. Even if the firm does not change its operations, its production costs will decline and, in a competitive market, its prices fall as well. In a world with substantial uncertainty about price and quality in many markets, businesses benefit from access to a market, such as software, in which prices predictably fall and quality predictably increases.

The presence of the world's preeminent software industry in the United States is important to many downstream industries in competitive world markets. As computer software has become an important source of product innovation and process innovation, many American industries have

increasingly relied upon the rapid adoption of software technology to remain competitive in the world market.

### Consumer surplus

Economists have long recognized that the economic benefits of a product or a market to an economy are not accurately measured by revenue raised in the market. For example, the benefits of water consumption often far exceed the small price paid for water. In the extreme case, the benefits from the air we breathe, which usually is free, are incalculably large. Economists have a concept to describe the value of a product to consumers in an economy, *consumer surplus*.<sup>18</sup> This is approximately how much more consumers would be willing to pay for a product or service than they actually pay. In traditional demand and supply analysis, this is reflected by the area under the demand curve that lies above the market price. Although consumer surplus is difficult to precisely measure, the growth of consumer surplus for computer software is undeniable.

Part of the benefit from the availability of software is how much more consumers and firms would be willing to pay *directly* for software than they actually pay.<sup>19</sup> In Figure 3 (page 32) for 1982, consumer surplus is the triangle ABC. For 1992, consumer surplus is the triangle EFG. Without information on the exact shape and location of industry demand and supply curves, it is impossible to compare precisely industry revenues with consumer

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<sup>18</sup> There is an equally important concept on the supply side of a market, *producer surplus*.

<sup>19</sup> Consumer surplus is not restricted to just the willingness of private individuals to pay for a product or service. Some of the benefits to downstream industries from the application of software are ultimately reflected in increased demand for software.

surplus. Nonetheless, given the rapid technological advancement of the industry, the price decline for 1982 quality software, and the large increase in industry, one can conclude the 1992 industry consumer surplus is much larger than the 1982 consumer surplus.

Ultimately consumers in the United States and around the world benefit from the availability of software developed in the U.S. Some of this benefit is reflected directly in the demand for software. This benefit is also reflected in the demand for improved and lower priced products and services of downstream industries. In either case, industry revenue is likely to understate the total economic benefit of the software industry.

## Section 6

### Problems Facing the U.S. Software Industry

No discussion of the competitiveness of the U.S. software industry would be complete without some mention of the challenges that the industry will face in coming years. In this regard, we believe the software industry's principal concerns may be divided into three main areas: 1) the extent that foreign governments directly support the industry's overseas competitors; 2) the restrictions on access to foreign markets for software; and 3) the lack of protection of intellectual property rights in software, both in the U.S. and overseas. We address each of these areas below:

#### *Foreign Government Policy Initiatives*

In western Europe, the European Community supports several long-term research and development projects in software. These include the European Strategic Program for Research and Development in Information Technologies (ESPRIT) and the European Research Coordination Agency (EUREKA) Software Factory (ESF). ESPRIT is a ten-year project that encompasses microelectronics, information processing systems, and software. ESPRIT's 1990-94 budget is approximately \$2.5 billion.<sup>20</sup> The ESF budget is about \$500 million.<sup>21</sup>

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<sup>20</sup> Department of Commerce, *U.S. Industrial Outlook: 1993*, page 26-34.

<sup>21</sup> Id.

In Japan, the U.S. industry's focus on the 50 billion yen "Fifth Generation Project" seems to have abated. This ten-year effort that sought to develop and market computers that "can reason, draw conclusions, make judgments and even understand the written and spoken word," drew to a close in 1992.<sup>22</sup> While the Fifth Generation Project fell far short of its original goals, there is continuing concern that this massive effort did manage to create a critical mass of Japanese engineers trained in the intricacies of artificial intelligence who may now turn to more promising areas of research such as neural network systems.<sup>23</sup> Japanese firms also continue to experiment with so-called "software factories," although, the Sigma project, a joint government-private sector initiative completed in 1990, has not been particularly successful.<sup>24</sup>

#### *Opening Foreign Markets*

Despite the success of U.S. prepackaged software in world markets, the U.S. industry also continues to face problems of market access and non-tariff barriers. In Brazil, for example, the legal scenario for the marketing and circulation of software is governed by quite restrictive rules.<sup>25</sup> The marketing of computer programs, both of foreign and domestic origin, requires the prior registration of each program with a government agency and is subject to the fulfillment of certain additional formalities. Existing legislation also provides

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<sup>22</sup> E. Feigenbaum and P. McCorduck, *The Fifth Generation*, Reading MA, Addison-Wesley Publishing Company, 1983.

<sup>23</sup> *Business Week*, "A Japanese 'Flop' That Became a Launching Pad," June 8, 1992, page 103.

<sup>24</sup> The May 1990 issue of *Nikkei Computer* labeled Sigma a "\$200 million failure."

<sup>25</sup> Source: Business Software Alliance.

that software produced by foreign capital companies will only be marketed in Brazil if there is no similar domestic product.

Adequate market access may also be denied in connection with government procurement of computer equipment and software. In 1992, for example, the U.S. government reached a wide ranging computer procurement agreement with Japan that is expected to affect the procurement of more than 100 Japanese government and quasi-government agencies. This agreement, which also governs procurement of prepackaged software and services, should be fully implemented by April 1993.<sup>26</sup>

### *Software Piracy*

By many accounts, the unauthorized copying of software is the most serious problem now facing the U.S. software industry, particularly in foreign markets. Software piracy is ubiquitous throughout the world. It occurs because copyright laws and other forms of legal protection for software in some countries are non-existent, unclear, or not enforced with sufficient public commitment.

While software piracy may take different forms, the economic principles that underlie all forms of piracy are the same. In economic parlance, software is a "public good." Since software can be easily copied without causing deterioration or loss of the original copy, software is not consumed in the same way that a ton of steel is consumed. If there were no restrictions on the copying of software, the price of software would fall to a level that would not permit the software developer to recover his or her investment in time and

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<sup>26</sup> Department of Commerce, *U.S. Industrial Outlook*, 1993, page 26-35.

effort. For this reason, developers would have no financial incentive to produce software, and too little would be produced.

Protection of intellectual property through copyright and other means allows software developers to recover their investment in time and effort. Society benefits because developers now have an economic incentive to create new and innovative software and to bring it to the market place.

According to the Business Software Alliance, there are five major forms of software piracy. These include: unauthorized copying among corporate or other institutional end users, piracy from rented software, software counterfeiting, unauthorized loading of software onto hard disks, and bulletin board piracy.

In addition to the software industry, piracy adversely affects other U.S. industries that depend on copyright protection. These industries join together as the International Intellectual Property Alliance (IIPA) in order to identify and analyze foreign markets where protection of intellectual property is inadequate or ineffective. In a recent filing with the United States Trade Representative, the IIPA has identified 28 countries where there exists inadequate intellectual property protection. U.S. software industry losses are estimated to exceed \$2 billion in these countries alone. The software industry's priorities among countries listed include the Republic of Korea, Spain, the Peoples Republic of China, Germany, Singapore, Taiwan, Thailand, Russia, and Poland.<sup>27</sup> BSA estimates that worldwide, the software industry loses \$10-12 billion annually.

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<sup>27</sup> See International Intellectual Property Alliance, "IIPA 1993 Special 301 Recommendations and Estimated Trade Losses Due To Piracy," Submission to the

The ongoing Uruguay Round of multilateral trade talks have also attempted to address intellectual property issues for software. The negotiating text prepared by GATT Director General Arthur Dunkel included various provisions for the extension of copyright protection that would appear to benefit the U.S. software industry.

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United States Trade Representative, February 12, 1993. Also see Business Software Alliance, Fact Sheet, "1993 International Priorities," February 1993.

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***Economists Incorporated***

## **Section 7**

### **Conclusion**

The computer software industry generally, and the prepackaged software industry in particular, are among the largest and fastest growing of American industries. This conclusion holds for a variety of measures: value added, employment, and foreign sales. Standard measures of the size of the industry are likely to understate its total contribution to the U.S. economy. The size and growth of the industry would be even greater with better access to foreign markets and better protection of intellectual property in foreign markets.

## **Appendix A**

### **Size and Growth of the Software Industry Relative to Manufacturing Industry Groups**

The core software industry is large and growing rapidly relative to other industries in the U.S. economy. The table on page 45 compares the value added of the industry with the value added of all 139 industry groups in the manufacturing sector in 1982 and 1990. (All values are in billions of 1992 dollars.) In 1990, the software industry was larger than all of these industry groups except motor vehicles and equipment; aircraft and parts; drugs; electronic components and accessories; and miscellaneous plastic products. The software industry grew more rapidly than all manufacturing industry groups between 1982 and 1990.

**Appendix A**  
**Value Added in U.S. Manufacturing Industry Groups**  
**Sorted by 1990 Value Added**  
**(in Billions of 1992 Dollars)**

| 3 Digit SIC code | Industry Group                                  | 1982        | 1990        | Annualized Growth Rate | 3 Digit SIC code | Industry Group                                  | 1982 | 1990 | Annualized Growth Rate |
|------------------|-------------------------------------------------|-------------|-------------|------------------------|------------------|-------------------------------------------------|------|------|------------------------|
| 371              | Motor vehicles and equipment                    | 49.5        | 74.4        | 5.2%                   | 347              | Metal services, n.e.c.                          | 4.2  | 5.8  | 4.1%                   |
| 372              | Aircraft and parts                              | 42.4        | 48.0        | 1.5%                   | 322              | Glass and glassware, pressed or blown           | 6.5  | 5.7  | -1.0%                  |
| 283              | Drugs                                           | 24.5        | 40.8        | 6.6%                   | 306              | Fabricated rubber products, n.e.c.              | 4.7  | 5.6  | 2.3%                   |
| 367              | Electronic components and accessories           | 30.6        | 39.8        | 3.3%                   | 361              | Electric distribution equipment                 | 6.6  | 5.6  | -2.1%                  |
| 306              | Miscellaneous plastics products, n.e.c.         | 25.9        | 37.1        | 4.6%                   | 345              | Screw machine products, bolts, etc.             | 4.8  | 5.5  | 1.8%                   |
|                  | <b>Software Industry</b>                        | <b>18.6</b> | <b>28.8</b> | <b>18.4%</b>           | 348              | Ordinance and accessories, n.e.c.               | 5.0  | 5.1  | 0.3%                   |
| 357              | Computer and office equipment                   | 33.3        | 33.4        | 0.0%                   | 252              | Office furniture                                | 3.6  | 5.0  | 4.4%                   |
| 275              | Commercial printing                             | 22.7        | 31.0        | 4.0%                   | 241              | Loggins                                         | 3.6  | 4.6  | 3.1%                   |
| 286              | Industrial organic chemicals                    | 17.8        | 30.8        | 7.1%                   | 333              | Primary nonferrous metals                       | 3.3  | 4.6  | 4.0%                   |
| 271              | Newspapers                                      | 22.0        | 28.4        | 3.2%                   | 307              | Fats and oils                                   | 4.0  | 4.4  | 1.1%                   |
| 208              | Beverages                                       | 24.1        | 26.7        | 1.3%                   | 341              | Metal cans and shipping containers              | 6.4  | 4.4  | -4.7%                  |
| 284              | Soaps, cleaners, and toilet goods               | 22.0        | 26.7        | 2.4%                   | 276              | Manifold business forms                         | 3.6  | 4.3  | 2.3%                   |
| 381              | Search and navigation equipment                 | 18.6        | 26.6        | 4.6%                   | 249              | Miscellaneous wood products                     | 3.3  | 4.2  | 3.1%                   |
| 331              | Blast furnace and basic steel products          | 21.2        | 25.4        | 2.3%                   | 228              | Yarn and thread mills                           | 3.3  | 4.0  | 2.3%                   |
| 291              | Petroleum refining                              | 27.8        | 24.4        | -1.6%                  | 279              | Printing trade services                         | 2.9  | 4.0  | 3.9%                   |
| 366              | Communications equipment                        | 23.7        | 23.9        | 0.1%                   | 222              | Broadwoven fabric mills, manmade fiber and silk | 5.0  | 3.9  | -3.2%                  |
| 211              | Cigarettes                                      | 11.7        | 22.0        | 8.3%                   | 336              | Nonferrous foundries (castings)                 | 3.5  | 3.8  | 0.8%                   |
| 267              | Miscellaneous converted paper products          | 17.3        | 22.0        | 3.0%                   | 261              | Pulp mills                                      | 1.6  | 3.6  | 10.8%                  |
| 282              | Plastics materials and synthetics               | 13.6        | 21.9        | 6.2%                   | 254              | Partitions and fixtures                         | 3.0  | 3.6  | 2.5%                   |
| 203              | Preserved fruits and vegetables                 | 17.8        | 21.8        | 2.6%                   | 323              | Products of purchased glass                     | 2.1  | 3.6  | 6.0%                   |
| 384              | Medical instruments and supplies                | 14.0        | 21.7        | 5.6%                   | 229              | Miscellaneous textile goods                     | 2.8  | 3.5  | 2.8%                   |
| 344              | Fabricated structural metal products            | 22.3        | 21.3        | -0.6%                  | 278              | Blankbooks and bookbinding                      | 2.8  | 3.4  | 2.4%                   |
| 282              | Measuring and controlling devices               | 19.4        | 21.0        | 1.0%                   | 365              | Household audio and video equipment             | 4.6  | 3.4  | -3.9%                  |
| 304              | Grain mill products                             | 14.9        | 20.6        | 4.1%                   | 305              | Hose and belting and gaskets and packing        | 2.9  | 3.4  | 1.7%                   |
| 376              | Guided missiles, space vehicles, parts          | 14.2        | 20.6        | 4.7%                   | 343              | Plumbing and heating, except electric           | 2.9  | 3.3  | 1.5%                   |
| 201              | Meat Products                                   | 15.9        | 19.7        | 2.7%                   | 227              | Carpets and rugs                                | 2.5  | 3.1  | 2.9%                   |
| 356              | General industrial machinery                    | 19.1        | 18.0        | -0.8%                  | 277              | Greeting cards                                  | 1.9  | 3.0  | 5.0%                   |
| 262              | Paper mills                                     | 13.0        | 17.7        | 3.9%                   | 295              | Asphalt paving and roofing materials            | 2.5  | 2.9  | 1.9%                   |
| 364              | Metalworking machinery                          | 17.8        | 17.6        | -0.1%                  | 391              | Jewelry, silverware, and plated ware            | 2.6  | 2.8  | 0.9%                   |
| 281              | Industrial inorganic chemicals                  | 12.7        | 17.2        | 3.8%                   | 259              | Miscellaneous furniture and fixtures            | 1.8  | 2.7  | 5.1%                   |
| 205              | Bakery products                                 | 15.4        | 17.1        | 1.3%                   | 221              | Broadwoven fabric mills, cotton                 | 2.4  | 2.6  | 1.3%                   |
| 349              | Miscellaneous fabricated metal products         | 16.7        | 16.4        | -0.2%                  | 226              | Textile finishing, except wool                  | 2.3  | 2.5  | 1.3%                   |
| 359              | Industrial machinery, n.e.c.                    | 14.6        | 16.4        | 1.5%                   | 245              | Wood buildings and mobile homes                 | 2.5  | 2.5  | 0.1%                   |
| 209              | Miscellaneous food and kindred products         | 14.5        | 16.0        | 1.3%                   | 324              | Cement, hydraulic                               | 2.6  | 2.3  | -1.4%                  |
| 386              | Photographic equipment and supplies             | 15.7        | 15.5        | -0.1%                  | 339              | Miscellaneous primary metal products            | 1.4  | 2.3  | 6.0%                   |
| 353              | Construction and related machinery              | 23.7        | 14.9        | -5.7%                  | 314              | Footwear, except rubber                         | 4.1  | 2.3  | -7.0%                  |
| 272              | Periodicals                                     | 10.0        | 14.8        | 5.1%                   | 379              | Miscellaneous transportation equipment          | 2.9  | 2.3  | -2.9%                  |
| 346              | Metal forgings and stampings                    | 14.0        | 14.6        | 0.5%                   | 236              | Girls' and children's outerwear                 | 2.1  | 2.2  | 0.6%                   |
| 273              | Books                                           | 9.7         | 14.2        | 4.9%                   | 234              | Women's and children's undergarments            | 2.5  | 2.0  | -2.9%                  |
| 202              | Dairy Products                                  | 12.1        | 14.1        | 2.0%                   | 325              | Structural clay products                        | 1.4  | 2.0  | 4.5%                   |
| 358              | Refrigeration and service machinery             | 11.7        | 13.0        | 1.3%                   | 374              | Railroad equipment                              | 2.2  | 2.0  | -1.1%                  |
| 335              | Nonferrous rolling and drawing                  | 9.8         | 12.6        | 3.2%                   | 326              | Pottery and related products                    | 1.7  | 2.0  | 1.9%                   |
| 327              | Concrete, gypsum, and plaster products          | 9.5         | 12.5        | 3.4%                   | 395              | Pens, pencils, office, and art supplies         | 1.8  | 1.9  | 0.5%                   |
| 265              | Paperboard containers and boxes                 | 10.7        | 11.8        | 1.3%                   | 299              | Miscellaneous petroleum and coal products       | 1.6  | 1.8  | 1.0%                   |
| 355              | Special industry machinery                      | 10.7        | 11.8        | 1.2%                   | 365              | Ophthalmic goods                                | 1.3  | 1.7  | 4.1%                   |
| 364              | Electric lighting and wiring equipment          | 9.5         | 11.5        | 2.4%                   | 231              | Men's and boys' suits and coats                 | 2.4  | 1.6  | -5.1%                  |
| 369              | Miscellaneous electrical equipment and supplies | 6.1         | 11.0        | 7.5%                   | 321              | Flat glass                                      | 1.2  | 1.5  | 2.5%                   |
| 233              | Women's and misses' outerwear                   | 12.4        | 10.9        | -1.6%                  | 396              | Costume jewelry and notions                     | 1.5  | 1.5  | -0.3%                  |
| 362              | Electrical industrial apparatus                 | 10.4        | 10.8        | 0.4%                   | 238              | Miscellaneous apparel and accessories           | 1.6  | 1.3  | -2.2%                  |
| 251              | Household furniture                             | 9.3         | 10.6        | 1.6%                   | 244              | Wood containers                                 | 1.0  | 1.3  | 2.9%                   |
| 243              | Millwork, plywood, and structural members       | 6.4         | 10.2        | 6.0%                   | 253              | Public building and related furniture           | 0.8  | 1.2  | 4.9%                   |
| 289              | Miscellaneous chemical products                 | 7.8         | 10.2        | 3.3%                   | 334              | Secondary nonferrous metals                     | 0.9  | 1.2  | 3.6%                   |
| 206              | Sugar and confectionery products                | 9.0         | 10.1        | 1.5%                   | 213              | Chewing and smoking tobacco                     | 0.6  | 1.2  | 8.7%                   |
| 373              | Ship and boat building and repairing            | 10.8        | 9.1         | -2.1%                  | 311              | Leather tanning and finishing                   | 0.8  | 0.8  | -0.1%                  |
| 342              | Cutlery, handtools, and hardware                | 8.7         | 9.1         | 0.5%                   | 214              | Tobacco stemming and redrying                   | 0.5  | 0.7  | 6.3%                   |
| 263              | Paperboard mills                                | 5.4         | 8.7         | 6.1%                   | 223              | Broadwoven fabric mills, wool                   | 0.5  | 0.7  | 4.6%                   |
| 287              | Agricultural chemicals                          | 7.4         | 8.6         | 2.0%                   | 224              | Narrow fabric mills                             | 0.7  | 0.7  | 0.8%                   |
| 232              | Men's and boys' furnishings                     | 9.6         | 8.6         | -1.3%                  | 387              | Watches, clocks, watchcases, and parts          | 0.7  | 0.7  | 0.3%                   |
| 352              | Farm and garden machinery                       | 8.9         | 8.5         | -0.5%                  | 316              | Luggage                                         | 0.6  | 0.7  | 0.7%                   |
| 399              | Miscellaneous manufactures                      | 7.0         | 8.4         | 2.3%                   | 328              | Cut stone and stone products                    | 0.4  | 0.6  | 4.7%                   |
| 363              | Household appliances                            | 8.3         | 8.4         | 0.1%                   | 375              | Motorcycles, bicycles, and parts                | 0.6  | 0.6  | 0.6%                   |
| 239              | Miscellaneous fabricated textile products       | 6.5         | 8.1         | 2.9%                   | 393              | Musical instruments                             | 0.7  | 0.6  | -2.5%                  |
| 242              | Sawmills and planing mills                      | 5.4         | 7.7         | 4.5%                   | 317              | Handbags and personal leather goods             | 0.8  | 0.5  | -4.9%                  |
| 351              | Engines and turbines                            | 8.8         | 7.6         | -1.7%                  | 235              | Hats, caps, and millinery                       | 0.4  | 0.5  | 1.2%                   |
| 225              | Knitting mills                                  | 7.3         | 7.3         | 0.0%                   | 302              | Rubber and plastics footwear                    | 0.5  | 0.4  | -4.4%                  |
| 285              | Paints and allied products                      | 5.7         | 7.2         | 3.0%                   | 319              | Leather goods, n.e.c.                           | 0.2  | 0.3  | 4.3%                   |
| 332              | Iron and steel foundries                        | 7.7         | 7.1         | -1.0%                  | 313              | Footwear cut stock                              | 0.2  | 0.2  | -0.8%                  |
| 274              | Miscellaneous publishing                        | 2.8         | 7.1         | 12.2%                  | 212              | Cigars                                          | 0.2  | 0.1  | -3.4%                  |
| 301              | Tires and inner tubes                           | 6.7         | 6.9         | 0.4%                   | 237              | Fur goods                                       | 0.2  | 0.1  | -6.5%                  |
| 329              | Miscellaneous nonmetallic mineral products      | 6.2         | 6.3         | 0.3%                   | 315              | Leather gloves and mittens                      | 0.1  | 0.1  | -6.1%                  |
| 394              | Toys and sporting goods                         | 6.7         | 6.3         | -0.6%                  |                  |                                                 |      |      |                        |

Source: 1982 Census of Manufactures; 1990 Survey of Manufactures; and 1987 Standard Industrial Classification Manual.

## ABOUT THE AUTHORS

Stephen E. Siwek is Director of Financial Analysis, Economists Incorporated, 1233 20th Street, N.W., Washington, D.C. 20036. He is co-author of *International Trade in Films and Television Programs*, American Enterprise Institute/Ballinger Publishing Company, 1988 and has written and lectured on trade in media services in the United States and Europe. Mr. Siwek has served as economic and financial consultant to numerous communications and media corporations and is a member of the Institute of Business Appraisers.

Harold W. Furchtgott-Roth is Senior Economist, Economist Incorporated where he has concentrated on economic issues in international trade and regulation of media. Dr. Furchtgott-Roth wrote his dissertation at Stanford University on the measurement of technological change. Dr. Furchtgott-Roth was Research Fellow at the Brookings Institution. He is a member of the American Economic Association and the Econometrics Society.

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INTERACTIVE MULTIMEDIA ASSOCIATION

November 7, 1993

Commissioner of Patents and Trademarks  
U.S. Patent and Trademark Office  
Box 4  
Washington, DC 20231

attention:

Terri A. Southwick  
Attorney-Advisor  
Office of Legislation and International Affairs

VIA FAX: 703-305-8885 (four pages total)

Dear Ms. Southwick:

Confirming our telephone conversation of last week, I would like to request time to present oral testimony on behalf of the Interactive Multimedia Association at the November 18 hearing on intellectual property and the National Information Infrastructure. An outline of our oral testimony is attached. It is sketchy and tentative, but I think it will meet your needs.

We would also like to be able to supplement our oral testimony with written testimony to be submitted prior to Dec. 10.

Sincerely,

Brian Kahin  
General Counsel  
Director, Intellectual Property Project  
1 Fifth St.  
Cambridge, MA 02141  
617-864-6606  
Fax: 617-864-0610

Outline of IMA testimony for hearing on intellectual property and the National Information Infrastructure initiative, Crystal City Marriott, November 18, 1993:

[These notes are incomplete and are intended only to convey the intended scope of the intended testimony.]

IMA is a 260-member trade association representing the emerging multimedia industry. It addresses the needs of the industry through its work on cross-platform compatibility, intellectual property, industry convergence, public policy, and public awareness.

The IMA Intellectual Property Project was launched in early 1992 to address the range of issues faced by multimedia developers and publishers in clearing and managing the intellectual property rights necessary to produce multimedia products and services. Last April IMA cosponsored a workshop on Technological Strategies for Protecting Intellectual Property in the Networked Multimedia Environment in partnership with the Coalition for Networked Information, the MIT Program on Digital Open High Resolution Systems, and the Science, Technology and Public Policy Program at Harvard's Kennedy School of Government. The Proceedings, the first issue of the IMA Intellectual Property Project Proceedings, will be out by the end of the month.

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Standards to ensure interoperability for information as important to a fully developed NII as standards for communication at lower levels.

It is difficult to generalize about what form of government support or encouragement is needed, and when. Often government involvement is unnecessary or ill-advised. The necessary scale, extensibility, and interoperability of a national information infrastructure requires a broad concern for standards development and some form of government oversight if not participation.

At another level, intellectual property and antitrust law affect standards development. The computer and software industries (as well as courts) are split about the scope copyright in user and machine interfaces. Proprietary claims together with the uncertainty of their rightful scope has stimulated certain concerted standards efforts to develop nonproprietary (or less proprietary) interfaces. On the other hand, protection for trivial interface features or codes will inhibit direct (uncoordinated) efforts to achieve interoperability. The federal

government should develop policy based on economic analysis.

Patents create interoperability problems at two levels. One is the possibility that a common platform or interface may inadvertently incorporate a patented process. An example of this was AT&T's claim that a patent it held was incorporated in the X-Window system developed by MIT and which MIT provided free to industry. To a large extent, this problem would be alleviated by a first-to-file system with pre-grant publication. Because information technology evolves so fast and because the risks of inadvertent incorporation are high, publication should probably occur shortly after filing rather than at the usual 18 months.

Broad system-level patents and patents on abstract processes which cannot be designed around in effect operate as exclusive franchises on information infrastructure. Most of these patents have been granted improvidently because they are obvious or non-novel. However, the strong presumptions presently built into the patent system make it difficult to challenge such patents. Economists (except the few who believe in central planning) warn against the adverse consequences of overly broad patents on innovation.

The National Cooperative Research Act should clearly apply to standards activities as well as other forms of cooperative R&D.

Standards for labeling and encoding should be strongly encouraged but not required. We would like the government to contribute to the process of developing such standards but it should not mandate them. We do not want to follow the HDTV model without a clear. This is a high priority area for the IMA, and we are eager to work with federal agencies and other industry groups.

Licensing systems should be developed where the market requires them. They should be developed by the private sector although the government could conceivably contribute to the standards research and development that may be necessary to implement complex licensing.

There already are a multiplicity of licensing systems, and they will grow in diversity.

It is possible that a unique system could be designed for linear digital video as was done for DART. As with digital audio, it would have to be something hermetically defined so that any mandatory technology would not affect other operating environments.

More ambitious ideas of implementing hardware-based authentication and controlled decryption need careful research and planning. Less secure means of protecting intellectual property are viable for many products and services. The latter

will be much quicker and easier to implement and will diminish demand for more secure but expensive systems. We encourage appropriate government support for research on secure systems, but it should not implementation of lesser levels of protection.

Educating the public is less a problem for content integrators than for owners of music, linear video, and other simple objects, but the multimedia industry is concerned about the needs and perceptions of content owners.

We note that educational efforts may be undermined if reforms are not made in the patent system. Abstract process patents (and extremely expansive interpretations of copyright) that intrude on user activities threaten to undermine public respect for all forms of intellectual property.

Finally the emerging digital environment brings to the fore a number of technical copyright issues, including fair use, that could benefit from a public study conducted by broadly representative commission. Such study should look at the networked digital environment as a whole and encompass patent, trade secret, and contract issues as well. It should learn from and not recreate the limitations of CONTU and the Advisory Commission on Patent Law Reform. It should not be used as an excuse to delay needed changes, rather it should serve as platform for longterm policy development.

-- Brian Kahin, 11/7/93

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**21**

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**Before the Working Group on Intellectual Property  
Information Policy Committee, NII Task Force**

**INTELLECTUAL PROPERTY ISSUES  
AND THE  
NATIONAL INFORMATION INFRASTRUCTURE INITIATIVE**

**Statement of Gary J. Shapiro**

**Group Vice President  
Electronic Industries Association**

**Chairman  
Home Recording Rights Coalition**

**November 18, 1993**

Commissioner Lehman and  
Members of the Working Group:

My name is Gary J. Shapiro. I am Group Vice President for the Consumer Electronics Group of the Electronic Industries Association (EIA/CEG). I also serve as Chairman of the Home Recording Rights Coalition (HRRRC). Each organization is vitally interested in the issues posed and questions asked by the Working Group on Intellectual Property. I applaud the Working Group for conducting this hearing. I am pleased to offer the full resources of the groups I represent in any appropriate advisory capacity.

Interest of the EIA/CEG

The Electronic Industries Association includes in its membership the leading manufacturers of electronics origination, transmission, interface, and display devices. The Consumer Electronics Group represents manufacturers of television and stereo receivers, video and audio recorders and players, personal computers, multimedia devices, and hundreds of other consumer

electronics products. Our industry continually devises new, more efficient, and more economical ways for consumers and business users to receive entertainment and information.

One of EIA's most important services is to provide leadership and resources in setting voluntary technical standards and working with the Federal Communications Commission and other regulatory bodies. EIA took the lead in setting the standards for television (including closed captioning and electronic data broadcasting) and FM and AM radio. EIA is heavily involved in pending proceedings with respect to HDTV, consumer electronics - cable compatibility, and Digital Audio Broadcasting. As industrial and consumer electronics become more fully digital, as they increase in capacity and resolution and in some respects converge, we expect that our standards responsibilities will only increase.

#### Interest of the HRRC

The Home Recording Rights Coalition was formed in 1981, after the U.S. Court of Appeals for the Ninth Circuit had ruled that selling video tape recorders to consumers was contributory copyright infringement. Although that decision was reversed in 1984 by the United States Supreme Court, legislative controversies over home recording, of both audio and audiovisual material persisted.

The HRRC's scope is broader than the EIA and consumer electronics companies: it includes consumer organizations, retail and service associations, and many others. HRRC

generally has opposed any legislation that would restrict the rights of consumers to make recordings at home for private, noncommercial purposes, or that would impose general levies on home recorders or blank media. In the last two Congresses, however, the HRRC supported legislation to establish standards with respect to digital audio, including the Audio Home Recording Act that, effectively, set a conditional access standard for digital audio recorders and digital audio interface devices.

HRRC, as well as EIA, maintains a vital interest in issues bearing on personal use of consumer electronics equipment.

#### Principles for the Information Highway

The Working Group notice poses several very specific questions with respect to intellectual property and the NII. While I do express views on these points, I think precise answers will be developed only over time, as the shape and technologies of the NII evolve. To start, I would like to review where EIA and the HRRC already stand on issues that pertain to key future elements of the NII.

**HDTV:** EIA has worked for a standard. EIA has actively supported the Advisory Committee on Advanced Television Systems (ACATS), and serves on the Board of the Advanced Television Test Center (ATTC). Although fashion in terminology about HDTV has shifted -- to "Advanced Television," then to "High Resolution Imaging Systems," and now simply to "radiated bits" -- the need for a broadcast standard has persisted.

Today, material that is broadcast is also carried over cable

and other closed media. So it is also essential that standards for broadcast and non-broadcast audiovisual media conform to the greatest extent possible. EIA is supporting such convergence through its work, on the one hand, with ACATS and the Grand Alliance, and, on the other, through its joint work with the cable television industry in the Cable Consumer Electronics Compatibility Advisory Group (C3AG).

**Cable TV:** EIA has worked toward compatibility and standards for compression, transmission, and access. Section 17 of the 1992 Cable Act requires the FCC to report to the Congress, and to issue regulations, to enhance compatibility between cable media distribution systems and features of consumer electronics equipment such as televisions and VCRs. The law requires the Commission to consult with both the cable industry and the consumer electronics industry in addressing compatibility issues. In this capacity, EIA is already effectively helping to shape an audiovisual superhighway.

In filings with the Commission, EIA has made several points relevant to the Working Group's interest today:

First, consumers should be able to obtain their cable interface devices -- whether complete TVs or VCRs or ancillary "boxes" -- on the **open market**. Subscribers to media services should not be obliged, for signal security or other reasons, to procure interface devices only from the programming distributor.

Second, to enable consumers to have such freedom, there must **not be multiple standards** for format or transmission of cable signals. In the analog world, the need for special security devices has caused compatibility problems. In the digital world, multiple, inconsistent standards would make a **national**,

**open hardware market impossible.**

Third, accomplishing these goals will require a **national renewable security standard** allowing TVs, VCRs, and interface devices obtained on the open market to be programmed for signal security by the media distributor.

Ultimately the cable and consumer electronics industries, through the C3AG, made joint recommendations that the FCC substantially accepted in its report to the Congress. The industries recommended that future "cable ready" devices include a **standard interface** that is under development in a joint engineering committee. They also agreed that development must proceed toward a **single standard for digital compression and transmission of signals.**

The work toward digital standards includes joint engineering work toward a **national renewable security standard.** For some period, it may be necessary for a cable-ready interface to include a device related to signal security, supplied by the media provider. Ultimately, this function may be integrated into programmable hardware sold on the open market, with security, and perhaps other conditional access codes, furnished through software by the media distributor, on-line or through a card, chip, or other programming device. Whether this objective is appropriate and achievable is under discussion in a working group of a joint engineering committee.

**Intellectual Property:** the HRRC has developed principles for future application. Certainly the technical, media, and political worlds have changed substantially since the Supreme

Court's 1984 decision in Sony v. Universal City Studios. The EIA and the HRRRC are firmly convinced that the Supreme Court made the correct decision in that case, and that its analysis with respect to contributory infringement and fair use remains valid today. The VCR -- the sale of which the Court legitimized -- has been the foundation for a new U.S. entertainment industry, larger than ever and a dominant international exporter. Today, home video, produced for display on VCRs, is by far the largest single source of revenue for the U.S. motion picture industry.

The HRRRC has not, however, remained committed only to the status quo. As I noted, both the EIA and the HRRRC joined the entertainment industry and congressional leaders in recognizing the need for standards, and an end to controversy, with respect to digital audio recorders. The result was the Audio Home Recording Act.

The EIA endorsed the basic provisions of the Audio Home Recording Act in June, 1991. The HRRRC, after polling its membership, did so several months later. In so doing, the HRRRC published a statement of principles, with respect to new technology, that it had applied to its determination to endorse the Audio Home Recording Act:

- (1) **Consumer equity.** Any regulation of new technologies should primarily benefit consumers.
- (2) **Promotion of new technology.** Government regulation should enhance access to new technologies.
- (3) **Legal certainty.** The right to sell and use consumer recording products should be preserved and clarified.

It is from these perspectives that the EIA and the HRRRC address the questions posed by the Working Group.

#### Adequacy of Existing Copyright Law

This question needs to be more specifically stated. To suggest that copyright law is "inadequate" may be to assert that copyright principles need to be expanded so as to embrace new technologies. Or, the same assertion may be meant to say that, because copyright law is inadequate, other means of protecting intellectual property or mandatory product standards should govern instead.

In examining asserted inadequacies of copyright law, this dichotomy between reform and replacement should be kept in mind. We also think that respect for the public domain, and the legitimate rights and expectations of users -- who, increasingly, include patent owners and other copyright proprietors -- should militate against assumptions that new technology necessarily compels either reform or replacement.

#### Adequacy of Fair Use

Given the variety of data, media, device, displays, and users involved in the NII (see Appendix I), it is hard to see how any general revision to fair use would help in addressing the particular issues that will arise. More likely, any general revision would raise new issues for each known issue that it seeks to address.

New technology may, but does not necessarily, change the analysis of fair use principles as they pertain to any particular

application. In this respect, the EIA and HRRC view is:

- (1) The fair use issues addressed by the Supreme Court in Sony v. Universal City Studios were correctly decided. The Court's analysis and reasoning remains valid.
- (2) It should not be assumed that new technology requires a change in the outcome of fair use analysis. While improvements in delivery and copying may change such analysis, the evidence from improvements to date has been that the positive results for copyright proprietors have more than offset the negative potential. The VCR is the best case in point. The burden of persuasion should be on those who claim, for example, that an improved VCR, or changes in media distribution, would lead to a different outcome.
- (3) While improved technology may enable copyright owners to charge different prices to different users, new legal or technical power to achieve such a result should not necessarily be granted to copyright proprietors as a matter of copyright law. If it is demonstrated that change in technology gives users an unfair advantage in a particular case, then consideration may be given as to whether the fair use doctrine is the best vehicle for restoring the copyright balance.

Standards, Labeling, Encoding to  
Identify Conditions on Use; Exchange,  
Interoperability of Different Systems

In light of the variety of material that may flow through the NII, commingling industrial, consumer, and mixed uses, it may be appropriate to provide for identification of contractual conditions that the providers wish to impose on each use. Different types of works may require different conditions or restrictions. The more difficult question, which I address later, is the degree to which copyright law enforcement ought to be available to enforce conditions.

EIA has been a leading proponent of voluntary technical standards and, where appropriate, the setting or acceptance of standards by the FCC. The lesson with respect to non-interactive services has been that confidence in a national system or market that is to rely on universal access requires that the FCC adopt a single standard. The success of television and FM radio, on the one hand, and the problems encountered by AM Stereo, on the other, illustrate this.

The need for standardization of potentially interactive systems is in some respects similar. Clearly, where the objective is universal access at lowest possible cost to consumers, standards are essential. In the FCC cable-consumer electronics proceeding under Section 17 of the 1992 Cable Act, EIA/CEG has argued vigorously that consumers are best served by competition in the markets for display devices (television) and interface (ancillary) devices. The creation of a national market for such devices is not possible if the distributors employ inconsistent standards. Conversely, hardware and software can be offered most economically if a single standard is adopted by the FCC.

There may be some aspects of the NII with respect to which voluntary standards are sufficient, or truly "open architecture" is possible. With respect to material intended for consumer use, however, both the EIA/CEG and the HRRC believe that FCC standards remain essential.

Licensing System(s) for  
Certain Uses, Technical Measures  
With Respect to Unauthorized  
Access and Reproduction

Particular proprietors, or groups, may wish to establish contractual licensing systems with respect to the NII, according to kinds or groups of works. The NII promises to be so dynamic, however, that it seems unlikely that the demand for, and nature of, uses can be accurately predicted. Accordingly, the workability of contractual, and possibly technical, measures ought to be explored before any judgment can be made about the need for, or prospective operation of, any compulsory license.

Cable television systems already use technical conditional access measures so as to make programming available in differently priced "tiers," and on a pay-per-view basis. The question is, will there be a government role to structure, enforce, or extend such systems, based on copyright or some other system of law or regulation?

The Audio Home Recording Act (AHRA) is both instructive and cautionary. In digital audio, products were available on the market in advance of any officially recognized transmission standards. Accordingly, legislation was crafted that addressed the concerns of copyright proprietors, provided for a modest royalty to proprietor and performer interests, and did not fundamentally interfere with consumer recording. As some prior standards were lacking, it was necessary, in crafting such

legislation, to define appropriate coding standards for origination, transmission, and reproduction.

In the world of digital audiovisual works, standards are likely to include conditional access provisions. This is likely to apply to the international, voluntary, Moving Pictures Experts Group (MPEG), documentation of the work of the Grand Alliance and ACATS in setting the HDTV standard, as well as the work toward a standard for digital cable TV and similar services, including "HDTV" implementations.

Thus, the work ongoing with respect to conditional access and transmission standards may be relevant to additional standards work, now ongoing, with respect to reproduction. Once such technical standards, now the subject of a voluntary international conference, are complete, additional questions of concern to copyright-related interests, may be raised. Any conditional access provision in a technical standard may be subject to technical circumvention. This may argue for regulation, either through existing FCC authority or a new grant of such authority to the FCC. This could take the form (as in the case of the AHRA) of specifying a particular technical system or standard, through a Technical Reference Document. Or reference could be made to existing or developing voluntary standards, and their acceptance and enforcement, by the Commission or otherwise.

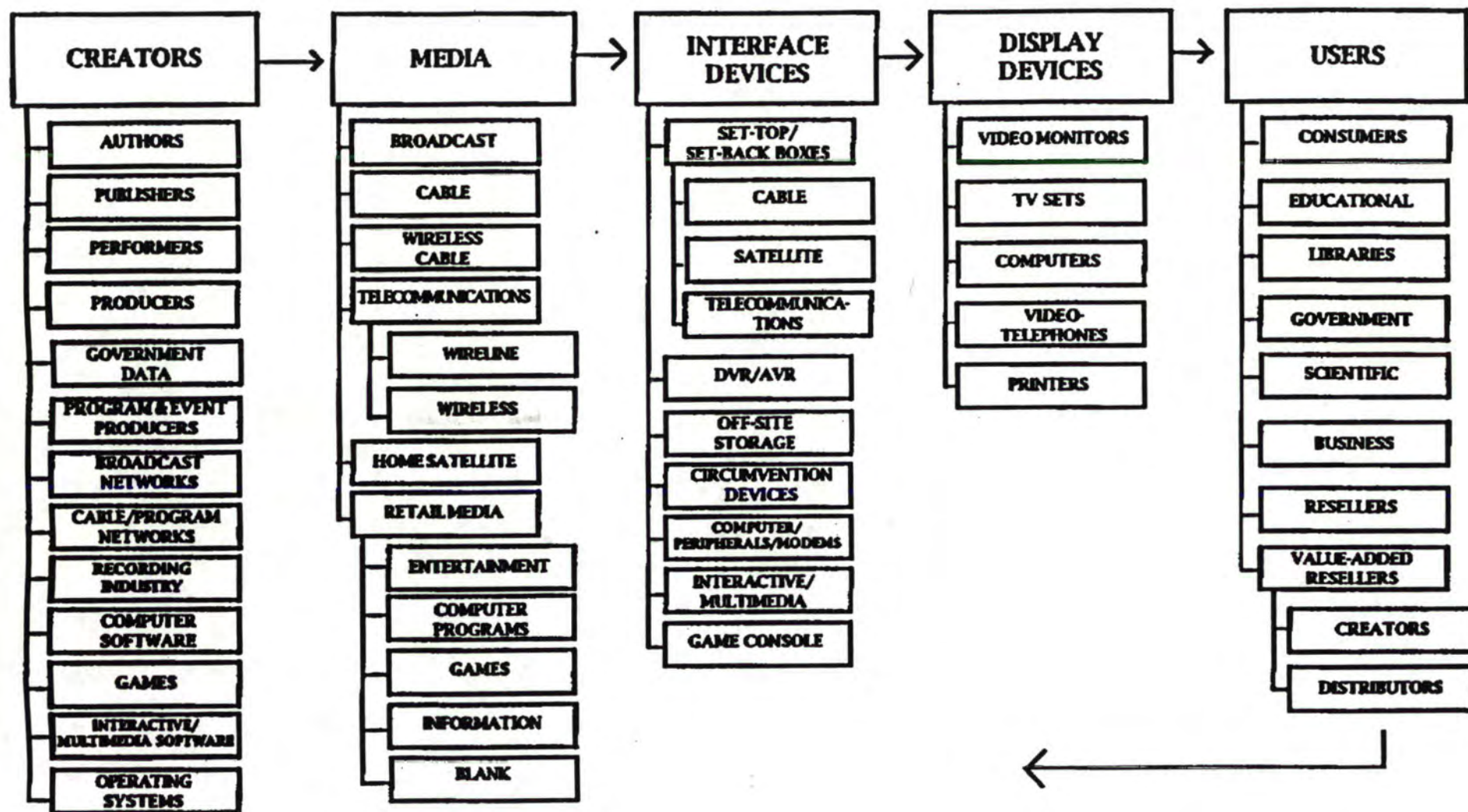
One issue with respect to enforcement of any conditional access standard with respect to reproduction is consistency with fair use obligations. As we indicate above, HRRC and EIA/CEG believe that those obligations have been fairly stated by the Supreme Court and are generally in practice today, to the benefit of all concerned. According to the HRRC principles that I have referred to, as newer technology is applied consumers ought to benefit, or at least not lose, the advantages they enjoy today.

Whether the legitimate expectations of consumers with respect to storing different kinds of data and audiovisual information need to be stated in any law setting or requiring a conditional access standard, or can be worked out according to the operation of such standards in the marketplace, remains an open question. All we can say at this point is that, as we have for a dozen years, both the EIA/CEG and the HRRC will be responsible and vigorous participants as such issues are discussed.

\* \* \*

I appreciate the opportunity to have appeared today. As I indicated at the outset, we recognize the importance of the Working Group's task and we will be pleased to offer any advisory assistance we can.

# DIGITAL AUDIO-VISUAL INTERESTS



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November 5, 1993

Re: Patent and Trademark Office  
Request for Comments on Intellectual Property Issues Involved in the National  
Information Infrastructure Initiative, Hearings November 18, 1993

Written Comments of Dr. Douglas K. Brotz, Adobe Systems Incorporated.

I am please to have this opportunity to address the issues raised by the Notice of hearing and request for public comments published in the Federal Register October 19, 1993. Before addressing the questions listed in the notice, let me address a fundamental issue that is an unwritten assumption in all of the following questions:

Question 0: *What is the NII?*

The National Information Infrastructure (NII) is a term that is used as if it were a single understandable entity. By calling it the "Information Superhighway" an analogy is made to the Interstate Highway System, a project financed by tax dollars and maintained by federal and state government. But the NII is not a government project, and it is not an easily defined entity. It consists of numerous components that already exist, and nearly all components, existing or planned, are in the private sector. Not all components are physical, as broadcast transmissions can be included in the NII. Furthermore, the NII is inseparably linked internationally, without the border crossing checkpoints that the highway system has. Thus, the best definition of NII for discussion purposes is that it is a synonym for "electronic transmission" in any form, either wholly or partially involving transmission within the United States.

With this understanding of the NII, we see that many of the questions are misleadingly phrased. They rely heavily on the Interstate Highway System analogy, as if one set of rules might apply to the NII and another might apply to something that is not in the NII. The issues raised here apply to all electronic transmission, not just to some subset.

Question 1: *Is the existing copyright law adequate to protect the rights of those who will make their works available via the NII? What statutory or regulatory changes, if any, should be made?*

When interpreted to strongly favor the rights of creators, the existing copyright statute is adequate to protect the rights of those who will make their works available via the NII (within the United States). The problem is that the courts have not clarified the meaning of the law, but instead have given confused and contradictory interpretations. Within the United States, we need clear guidelines as to what is protectible and what is not. Since there is really no regulatory agency in charge of copyright rules, this clarification needs to be made by statute, or by the establishment of such an agency.

The boundaries of the United States do not limit the scope of information sent via the NII. Information made available by the NII is automatically available anywhere in the

world. To protect creators' rights adequately, appropriate treaties and trade policies must be in place to harmonize protections worldwide.

*Question 2: Do the existing fair use provisions of the copyright law adequately accommodate the interests of users of the works available via the NII? What statutory or regulatory changes should be made?*

As in Question 1, case law is not settled on what is fair use regarding software and electronic information. Clarification of the law is required before we can know if the law is adequate.

*Question 3: Should standards or other requirements be adopted for the labeling or encoding of works available via the NII so that copyright owners and users can identify copyrighted works and the conditions for their use?*

I would welcome government recommendations, but not requirements, as to labeling or encoding of works. Technology is proceeding quickly in the networking field, and requirements developed today would surely hamstring the development of newer methods in the future. Furthermore, the Berne Convention's prohibition of "formalities" for the conferring of copyright argues against any specialized labeling or encoding requirements.

On the other hand, suggested standards in these areas could help users to identify owners and their requirements for use. One or more suggested standards for encoding could help to reduce the "Tower of Babel" of encodings that might arise in the absence of such suggestions. Once again, however, these standards should remain suggestions, rather than requirements. The field of electronic information providers, users and carriers is too new for sensible requirements to be established today.

*Question 4: Should standards be established to encourage or require the intercommunication or exchange of information and the interoperability of the different types of computer software and systems supporting or utilizing the NII?*

Once again, I agree with suggested standards, but not with requirements, for the same reasons stated for Question 3.

*Question 5: Should a licensing system be developed for certain uses of any or all works available via the NII? If so, should there be a single type of licensing or should the NII support a multiplicity of licensing systems?*

There are a multiplicity of licensing systems in use today. Each creator of a copyrighted work may establish a unique licensing method if so desired. Conforming to an established norm for licensing may make use of an item more attractive to a purchaser, but I do not see why a creator of a work should be compelled to offer the work only under a particular licensing scheme.

In this question the assumption that the NII is a particular entity like the highway network comes out strongly. The NII as it currently exists already supports a multiplicity of schemes. There is no need to mandate particular schemes for all electronically transmitted information.

Question 6: *Are there technical means for preventing unauthorized reproduction or other unauthorized uses of copyrighted works that should be mandated or required to comply with certain standards (similar to the serial copying controls required in digital audio recording devices and digital audio interface devices under the Audio Home Recording Act of 1992)?*

The answer to this question is "No" in two parts. First, means should not be mandated, for reasons similar to those expressed earlier. Second, I am skeptical that technical means actually could exist that would effectively prevent unauthorized reproduction or use.

Technical impediments to authorized copying surely belong at the source of the information. An information provider may require any technical assurance before releasing a copy of a work. However, once the information is released, it will be released to the world of computer users, programmers, and hackers. They will surely be able to devise method to overcome technical protections against copying if they have access to the work at all for their own use. We must rely on the law, enforcement, and education to prevent unauthorized copying and distribution, as any technical means will surely be inadequate and most probably detrimental to the easy use of information lawfully aquired.

Question 7: *What types of educational programs might be developed to increase public awareness of intellectual property laws, their importance to the economy, and their application to works available via the NII?*

As much as I dislike the analogy to the Interstate Highway System, here I could propose the concept of an NII "driver's license" required for access to the information superhighway. Such a license could be part of the user's password for access to key facilities in the NII. A driver's education course could be devised, and even a driving test involving understanding the ethics of intellectual property use could be required for obtaining such a license.

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**Frank W. Connolly**  
Department of Computer Science and Information Systems  
The American University  
119 Clark Hall  
Washington, D.C. 20016

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November 16, 1993

Ms. Terri A. Southwick  
Office of the Commissioner of Patents and Trademarks  
U.S. Patents and Trademarks Office  
Washington, D.C. 20231

Dear Ms. Southwick:

This letter is in response to the solicitation placed in the *Federal Register* (October 19, 1993) seeking comments on Intellectual Property issues involved in the National Information Infrastructure. As the leader of a technology-oriented project of the American Association for Higher Education (AAHE) and an Associate Professor of Information Systems at The American University, I request the opportunity to testify to the Working Group.

Thank you for your kind assistance.

Sincerely,

Frank W. Connolly, Ph.D.

Testimony  
of  
Frank W. Connolly, Ph.D.  
Associate Professor of Information Systems  
The American University  
Washington, D.C.

before  
The Working Group on Intellectual Property  
of the Information Policy Committee  
of the  
National Information Infrastructure (NII) Task Force

Hearing on  
The Intellectual Property Issues  
Involved in the National Information Infrastructure Initiative

November 18, 1993

.. ..

Thank you, Mr. Chairman. My name is Frank Connolly. I am an associate professor of Information Systems at The American University in Washington, D.C. To begin, I want to thank the members of the Working Group for the opportunity to appear at today's hearing in order to express my concerns regarding intellectual property and the NII.

Since 1988 I have been actively involved with issues associated with intellectual property, particularly as they relate to education. I have worked closely with EDUCOM, a consortium of 600 colleges and universities, and AAHE to develop several ethics-related initiatives. At present I head a project seeking wide adoption and discussion of a *Bill of Rights and Responsibilities for Electronic Learners*. This statement is intended as a model for schools and colleges, proposing the rights and responsibilities for individuals and institutions regarding computers and computer networks. A copy of the *Bill* is included in the materials I submitted for your review and consideration and I would be pleased to discuss and explain the tenets of the *Bill* with you.

The focus of my testimony today is on the effects of possible controls placed on NII resources. There is no doubt as to the impact the NII will have on access to information and entertainment products. In addition, the NII holds the *potential* to significantly improve the accessibility and quality of education in this country. It is this educational facet I wish to bring to the attention and consideration of the Working Group. For the NII to fulfill its educational potential, important values need to be weighed.

The announcement of this hearing published in the *Federal Register* (Tuesday, October 19, 1993) read in part:

... the commercial viability of the NII hinges not only upon effectively promoting and encouraging the use of the NII by all types of users, but also on implementing standards and policies for the NII in a manner that assures that the owners of products disseminated through the NII retain sufficient control over those products to prevent unauthorized use.

This statement succinctly presents the conflicting objectives for the Working Group: "promoting and encouraging" use of the NII on the one hand, and controlling use of the NII on the other hand to protect the interests of "owners of products disseminated through the NII." The one seeks to foster open and ready access to resources while the other seeks to measure and limit that access. In considering alternatives for protecting the interests of creators and rights holders, you must also continually weigh the needs of learners and educators within the community of users. Creators and rights holders need protection to ensure their continued efforts and to guarantee the viability and success of the information industry in the United States. This is an important and economically critical factor in your deliberations. However, it is not the highest priority for society.

To achieve its potential the NII will require citizens who understand the capabilities and limitations of electronic highways, and have facility in navigating the intricate highways and byways it will provide. For this to be realized, students and teachers need to access the network and its resources. To pave the highway up to every schoolhouse and classroom in the country and then place protectionist roadblocks to using the texts, images, news clips, musical scores, and data bases the NII offers undermines one of its most critical objectives. Regulations you propose must encourage access to and use of the teaching and learning materials of the NII by exempting such materials from controls appropriate in non-educational settings.

Extending the concept of fair use to the NII is necessary to significantly improve the manner and quality of education. In print contexts, fair use makes limited resources available without permission under specific conditions (i.e., the nature of the work and the use to which the copies will be put, the extent of the copying, and the impact copying will have on the market for the original work). The *spirit* of fair use needs to be extended to and promulgated in the NII. Materials for teaching and learning that would otherwise be protected and controlled must be readily and freely available for non-profit educational purposes without the need for time-consuming procedures to identify rights holders, request permission to use the material, and then negotiate an agreement that requires review by administrative and legal staffs of one's institution.

The very students the NII can benefit most will be hurt if something similar to fair use is not available. Protecting the financial interests of creators and distributors at the expense of teachers and learners will broaden the chasm between

have and have-not colleges, and schools. The resources the NII will make available to enhance teaching and learning are too valuable for intellectual property protections to restrict their reasonable use for instruction in our classrooms.

One objective for the Working Group is "effectively promoting and encouraging the use of the NII . . . ." I propose a parallel objective regarding fair use resources on the NII. You ought to strive for policies, procedures and educational materials "effectively promoting and encouraging" fair use on the NII. Electronic fair use policy for the National Information Infrastructure should take a proactive stance, clearly delineating what is and is not covered by fair use and encouraging educators and students to take full advantage of those resources. An electronic fair use policy should:

- make resources readily available for non-profit education purposes,
- be clearly stated and delineated in policy statements directed to educational institutions,
- provide clear guidelines for determining the limits of fair use for digitized materials in all media,
- encourage and foster the use of materials in education, not just allow it, and
- be widely publicized to educators.

In addition to fair use provisions, your recommendations should propose procedures and practices that facilitate the process of gaining permission from rights holders when that is necessary. Working through the maze of distributors, publishers, and collaborating authors/creators will continue to be a significant and time consuming hassle. Rights holders of materials on the NII need to be clearly identified and facilities for easily communicating with them to request permission to use their creations need to be available. Although permission services are springing up to help ease the administrative of locating rights holders and gaining permission to use materials, but these are of limited benefit to many higher education institutions and most schools. Commercial firms, large research institutions and well endowed colleges may be able to take advantage of the services these firms offer, but public school teachers and faculty at thousands of smaller colleges have no budget to pay for such services. With or without permission services, bureaucratic requirements and convoluted permission procedures on the NII will counter the

objective of "...promoting and encouraging the use of the NII by all types of users .  
.." and significantly limit its educational potential.

The intent of intellectual property law is to advance science and knowledge. To advance science and knowledge in the 21st century means that teachers and learners from kindergarten through graduate school need fair use access to appropriate resources on the National Information Infrastructure. To do less in the name of rewarding creators and authors would be shortsighted and counter to the long term interests of our society and economy.

.. ..

Frank W. Connolly  
119 Clark Hall  
The American University  
Washington, D.C. 20016  
phone: (202) 885-3164  
email: FRANK@American.EDU

## The Bill of Rights and Responsibilities for Electronic Learners

A model computer and computer network policy  
addressing the rights and responsibilities of  
individuals, schools and colleges in the 21st Century.

The Bill of Rights and Responsibilities project is an initiative within the American Association for Higher Education (AAHE). It was begun in 1990 as part of the Educational Uses of Information Technology program of EDUCOM.

oo oo oo

The American Association for Higher Education  
Suite 300  
One Dupont Circle  
Washington, D.C. 20036

## PREAMBLE

In order to protect the rights and recognize the responsibilities of individuals and institutions, we, the members of the educational community, propose this Bill of Rights and Responsibilities for the Electronic Community of Learners. These principles are based on a recognition that the electronic community is a complex subsystem of the educational community founded on the values espoused by that community. As new technology modifies the system and further empowers individuals, new values and responsibilities will change this culture. As technology assumes an integral role in education and lifelong learning, technological empowerment of individuals and organizations becomes a requirement and right for students, faculty, staff, and institutions, bringing with it new levels of responsibility that individuals and institutions have to themselves and to other members of the educational community.

## ARTICLE I: INDIVIDUAL RIGHTS

The original Bill of Rights explicitly recognized that all individuals have certain fundamental rights as members of the national community. In the same way, the citizens of the electronic community of learners have fundamental rights that empower them.

### Section 1.

A citizen's access to computing and information resources shall not be denied or removed without just cause.

### Section 2.

The right to access includes the right to appropriate training and tools required to effect access.

### Section 3.

All citizens shall have the right to be informed about personal information that is being and has been collected about them, and have the right to review and correct that information. Personal information about a citizen shall not be used for other than the expressed purpose of its collection without the explicit permission of that citizen.

### Section 4.

The constitutional concept of freedom of speech applies to citizens of electronic communities.

### Section 5.

All citizens of the electronic community of learners have ownership rights over their own intellectual works.

## ARTICLE II: INDIVIDUAL RESPONSIBILITIES

**Trust:** as certain rights are given to each citizen of the electronic community of learners, each citizen is held accountable for his or her actions. The interplay of rights and responsibilities within each individual and within the community engenders the trust and intellectual freedom that form the heart of our society. This trust and freedom are grounded on each person's developing the skills necessary to be an active and contributing citizen of the electronic community. These skills include an awareness and knowledge about information technology and the uses of information and an understanding of the roles in the electronic community of learners.

### Section 1.

It shall be each citizen's personal responsibility to actively pursue needed resources; to recognize when information is needed, and to be able to find, evaluate, and effectively use information.

### Section 2.

It shall be each citizen's personal responsibility to recognize (attribute) and honor the intellectual property of others.

### Section 3.

Since the electronic community of learners is based upon the integrity and authenticity of information, it shall be each citizen's personal responsibility to be aware of the potential for and possible effects of manipulating electronic information; to understand the fungible nature of electronic information; and to verify the integrity and authenticity, and assure the security of information that he or she compiles or uses.

### Section 4.

Each citizen, as a member of the electronic community of learners, is responsible to all other citizens in that community: to respect and value the rights of privacy for all; to recognize and respect the diversity of the population and opinion in the community; to behave ethically; and to comply with legal restrictions regarding the use of information resources.

### Section 5.

Each citizen, as a member of the electronic community of learners, is responsible to the community as a whole to understand what information technology resources are available, to recognize that the members of the community share them, and to refrain from acts that waste resources or prevent others from using them.

## ARTICLE III: RIGHTS OF EDUCATIONAL INSTITUTIONS

**Educational institutions have legal standing** similar to that of individuals. Our society depends upon educational institutions to educate our citizens and advance the development of knowledge. However, in order to survive, educational institutions must attract financial and human resources. Therefore, society must grant these institutions the rights to the electronic resources and information necessary to accomplish their goals.

### Section 1.

The access of an educational institution to computing and information resources shall not be denied or removed without just cause.

## **Section 2.**

**Educational** institutions in the electronic community of learners have ownership rights over the intellectual works they create.

## **Section 3.**

Each educational institution has the authority to allocate resources in accordance with its unique institutional mission.

# **ARTICLE IV: INSTITUTIONAL RESPONSIBILITIES**

**Just as certain rights are assured to educational institutions** in the electronic community of learners, so too each is held accountable for the appropriate exercise of those rights to foster the values of society and to carry out each institution's mission. This interplay of rights and responsibilities within the community fosters the creation and maintenance of an environment wherein trust and intellectual freedom are the foundation for individual and institutional growth and success.

## **Section 1.**

**The** institutional members of the electronic community of learners have a responsibility to provide all members of their community with legally acquired computer resources (hardware, software, networks, data bases, etc.) in all instances where access to or use of the resources is an integral part of active participation in the electronic community of learners.

## **Section 2.**

**Institutions** have a responsibility to develop, implement, and maintain security procedures to insure the integrity of individual and institutional files.

## **Section 3.**

**The** institution shall treat electronically stored information as confidential. The institution shall treat all personal files as confidential, examining or disclosing the contents only when authorized by the owner of the information, approved by the appropriate institutional official, or required by local, state or federal law.

## **Section 4.**

**Institutions** in the electronic community of learners shall train and support faculty, staff, and students to effectively use information technology. Training includes skills to use the resources, to be aware of the existence of data repositories and techniques for using them, and to understand the ethical and legal uses of the resources.

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GRIFFIN/JOHNSON

AND ASSOCIATES

November 8, 1993

Terri A. Southwick, Esq.  
Attorney-Advisor  
Office of Legislation and  
International Affairs  
U.S. Patent and Trademark Office  
Crystal Park 2, Suite 902  
2121 Crystal Drive  
Arlington, Virginia 22202

Dear Ms. Southwick:

The National Music Publishers' Association, Inc. ("NMPA") requests an opportunity to testify at the November 18 Patent and Trademark Office hearing on intellectual property rights protection and the National Information Infrastructure Initiative. Mr. Edward P. Murphy, President and CEO of NMPA, will deliver NMPA's statement.

Mr. Murphy testified on the issues raised by the digital delivery of copyrighted musical works and sound recordings at a hearing before the House Judiciary Subcommittee on Intellectual Property and Judicial Administration in March 1993. Mr. Murphy's remarks on November 18 will be consistent with points raised in his prior testimony, a copy of which is enclosed.

Please call me at (202) 775-8116, should you have any questions concerning this request.

Sincerely,

  
Susan O. Mann

Statement of  
Edward P. Murphy  
President and Chief Executive Officer  
National Music Publishers' Association, Inc.

before the  
Subcommittee on Intellectual Property and Judicial Administration  
House Committee on the Judiciary

103rd Congress, First Session  
March 25, 1993

Good morning. I am Edward P. Murphy, president and chief executive officer of the National Music Publishers' Association, Inc. ("NMPA").<sup>1</sup>

"It all begins with a song." This statement, acknowledged as simple truth by all facets of the music business, is tribute to the essential creative role of the songwriter in the industry. NMPA's music publisher members share the interest of their songwriter partners in preserving and promoting copyright in musical works. Because the issues before the Subcommittee also affect music copyrights, I am pleased to have the opportunity to present the music publisher community's perspective.

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<sup>1</sup> NMPA, founded in 1917, is a professional trade association representing more than 500 members. Its principal mandate is to protect and advance the interests of the music publishing industry in matters relating to the domestic and international protection of music copyrights. Since 1927, NMPA has maintained a wholly-owned subsidiary, The Harry Fox Agency, Inc. ("HFA"), to provide licensing and royalty collection services for its publisher clients. HFA provides such services to more than 10,000 publishers.

Much of today's testimony has centered on the impact of new systems for the digital delivery of music. As the Chairman and members of the Subcommittee know well, the music business was forced to face the friction between the copyright law and digital technologies early. Last year's enactment of the Audio Home Recording Act<sup>2</sup> resolved a nearly decade-long controversy over the use of digital audio recording devices to copy music for private, non-commercial use. We thank you, Mr. Chairman and members of the Subcommittee, for your leadership and support in making this breakthrough possible.

The advent of electronic digital delivery systems for music raises an even more significant challenge for our legislators to make such systems "copyright-friendly." Digital music delivery systems present a range of fundamental questions about the legal and economic relationships between rights owners and commercial users of music. As the Subcommittee approaches these questions, we urge you:

- to consider carefully the degree to which existing rights extend to digital delivery systems;
- to promote agreement that any amendment of domestic law or international obligation addressing digital delivery systems expressly recognize that digital delivery for reproduction constitutes an exercise of the distribution right in musical works and sound recordings; and

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<sup>2</sup> Audio Home Recording Act of 1992, Pub. L. No. 102-563, 106 Stat. 4237 (1992) (codified at 17 U.S.C. §§ 1001-1010).

- to avoid measures that would compromise existing rights and sources of income for music copyright owners and beneficiaries.

#### Existing Rights and Digital Delivery Systems

As to the first point, it is only reasonable that any adjustment of law or policy to deal with digital delivery systems be based upon a careful assessment of how and to what extent these systems relate to existing rights. From a business standpoint, all of us in the industry have to take an immediate and hard look at how those rights can be exercised to protect our own interests, as well as those of the creative individuals who have entrusted their interests to us.

Music publishers, generally speaking, own and exercise copyrights in musical works or administer music copyrights on behalf of the copyright owner. By authorizing uses of musical works, publishers generate income in the form of royalty payments for their own benefit and that of their songwriter partners. In the United States and worldwide, the primary sources of publisher and songwriter income flow from public performances and the reproduction and distribution of our works in the form of phonorecords.<sup>3</sup>

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<sup>3</sup> Copies of NMPA's "1990-91 International Survey of Music Publishing Revenues" have been made available to the Intellectual Property Subcommittee for distribution to panel members. Others interested in obtaining a copy of the report should write to NMPA at 205 East 42nd Street, New York, New York 10017.

Until now -- that is, until the advent of digital music delivery systems -- the distinction between uses of music that trigger the reproduction and distribution rights and those that trigger the public performance right has been easy to draw. Musical works have been recorded and distributed in the form of compacts discs ("CDs"), cassettes and albums by record companies. They have been broadcast for the public's enjoyment by radio and television stations. Today, distinguishing between a distribution and a communication of music requires closer scrutiny. But, even at this early stage in development and implementation, it is clear that not all systems should be licensed in the same manner.

Digital Audio Broadcasting ("DAB") will significantly improve the quality of terrestrial broadcast systems. DAB technology is expected to eliminate interference problems that plague traditional AM and FM broadcasts, enabling radio signals to be transmitted and received with CD quality. These crystal-clear transmissions will be available, free of charge, over-the-air to the general public.

While DAB is still on the horizon, cable-delivered services that provide 24-hour digital music are already here. These services are offered to consumers for a monthly subscription fee and deliver multiple channels of CD-quality music into the home. Digital Music Express (DMX), for example, offers 32 channels

of non-stop music. Digital Cable Radio Associates (DCR), a second force in this new field, alone boasts 55,000 subscribers and is available to 5 million homes.<sup>4</sup>

Although digital broadcasting and "cable-radio" services have been licensed by music copyright owners via their performing rights societies, these services have the potential for inadvertently providing not just performances, but also for functioning as a delivery system for recorded music -- an exercise of the copyright owner's distribution right. Accordingly, both the method of licensing and the nature of the rights being licensed must be carefully evaluated. For its part, the recording industry has stated, today and at other times, that DAB and DCR-type systems threaten their interests in two ways. First, under U.S. law, they stand to receive no public performance payments. And second, the prospect of digital transmission of entire CDs or the body of work of a particular artist could cut dramatically into record sales. Whatever policy-makers decide with regard to the public performance issue, there may be several approaches to addressing the second concern. For example, in a recent agreement between a partnership comprising Warner Music Group and Sony Software Corporation and the cable service DCR, DCR agreed to limit the number of consecutive cuts it would play from any particular CD or artist. There is also the possibility of requiring technical measures that render such systems "listen-only" services. These and other options may warrant further consideration.

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<sup>4</sup> P. Verna, Time Warner Breaks New Cable Ground, Billboard, p. 1, 80 (Feb. 13, 1993).

Beyond DAB and radio-format cable music systems, there is the "electronic record store." These cable-delivered systems, when introduced, will enable consumers to select music to be electronically distributed to their homes - in real-time or at the speed of data transfer -- to be copied on recording equipment they own or rent. In essence, subscribers will be able to purchase music from their armchairs.

We believe that, over time, these delivery-for-reproduction or "home shopping" services will become an increasingly important part of the subscription music market and of the larger recorded music business. Let me assure you, music publishers have no desire to block or slow the introduction of these services. Although the jury is out, subscription delivery has the potential to stand in the place of CD and cassette sales, and may well represent the future of our reproduction and distribution stream of income. What is important to publishers - and to the songwriters whose works are the spark that ignites our industry -- is that our rights, and the incentives to create that their exercise provides, are not impaired.

#### Delivery for Reproduction and the Distribution Right

In our view, established and world-recognized rights of reproduction and distribution give record companies and music publishers alike a firm basis upon which to seek and receive compensation for the use of their works on subscription delivery-for-reproduction systems. In other words, these systems could be effectively licensed today without the creation of any new right or new

obligation; rather, the clarification and reaffirmation of the existing rights of reproduction and distribution is all that is needed. For this reason, we urge the Subcommittee, in our second point, to promote agreement that any amendment of domestic law or international obligation addressing digital delivery systems expressly recognize that electronic delivery for reproduction constitutes an act of distribution of a musical work or sound recording. Such action would serve to clarify the rights and responsibilities of owners and users of works at a time of transition in the industry.

As I indicated, publishers have greeted the prospect of home-shopping and delivery services with some interest. In fact, NMPA's licensing subsidiary, The Harry Fox Agency -- on behalf of its publisher-principals -- has already licensed one such service, currently in the development stage. In the future, we would expect to license service providers directly -- that is, independent of any agreement between the service and a record company.

#### Preserving a Balance of Rights

This brings me to my third, and final, point. As you consider the ramifications of digital delivery systems, we urge you, in the strongest terms, to guard against approaches that can establish a hierarchy of interests by giving record companies exclusive rights where songwriters and their publisher partners receive only a limited right of remuneration. And we see significant danger in looking to the record rental provisions of the Copyright Act as a model for this very different area of use.

The record rental provision's proportional reduction of royalties formula was reluctantly accepted by music publishers, in large measure, because it was believed that individual record companies would have little, if any, incentive to authorize rental. And, in fact, no record rental market has developed in the United States. It is clear that such a formula would be unfair and wholly inappropriate if applied to a potentially significant system of distribution, such as subscription delivery for reproduction. Parity and fairness demand that owners of the separate and distinct copyrights in the musical works embodied in phonorecords retain the opportunity to license their works separately and at rates which reflect their own, independent business judgment.

As we struggle with sound recording rights, performers' rights and digital delivery issues in the United States, copyright interests abroad are doing so as well. In closing, I'd like to note that a recent hearing convened by the European Commission to examine so-called "neighboring rights," revealed many of the points of view you have heard -- and will hear -- today, brought into even sharper relief by the divide between authors' and producers' protection under the laws of some EC countries.

NMPA looks forward to the Subcommittee's further examination of issues raised by the international Berne Protocol talks, and we look forward to providing our views on matters of shared concern, including proposals to extend the duration of copyright to the life of the author plus 70 years.

Again, on behalf of the members of the National Music Publishers' Association, I thank you for the opportunity to appear before you today. I would be pleased to respond to your questions.

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 9701 Trinidad Dr.  
 El Paso, TX 79925-6069  
 alanh@laguna.epcc.edu gi03@utep.bitnet  
 ahodson@tenet.com mathbuzz@aol



19  
 USA

U.S. PATENT & TRADEMARK  
 OFFICE OF COMMUNICATIONS  
 INTERNATIONAL

93 NOV 15 PM 12:30

Terri A. Southwick  
 Offorney/ADV-OLIA 4664-Patent  
 U.S. Patent & Trademark Office  
 Box 4  
 Washington DC 20231



Dear Ms. Southwick

11/7/93

As an internet user and a Middle  
 School Mathematics teacher working in one  
 of the nation's poorest zip codes, I  
 urge you to keep in mind that ~~that~~ especially  
 disadvantaged students would be adversely  
 affected if any strict copyright laws are  
 enforced, and electronic material is not made  
 readily available to teachers and students.  
 It's hard to persuade principals, but  
 government workers should support us!  
 Thanks *[Signature]*

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90 Sherman Street  
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November 8, 1993

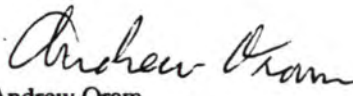
Terri A. Southwick  
Attorney-Advisor  
Office of Legislation and International Affairs  
c/o Commissioner of Patents and Trademarks  
U.S. Patent and Trademark Office  
Box 4  
Washington, D.C. 20231

Dear Ms. Southwick:

I encourage your office to explore the Teleread proposal given to you by David Rothman. This idea will improve access to documents by a broad range of citizens, at reduced costs. I am an editor working with Rothman on a new book for O'Reilly & Associates; I should mention that I speak only for myself here, not my employer.

Two major areas need to be researched. One is the hardware that would make it feasible for average people to read documents. Another is the distributed storage of the database, and means of searching and retrieving from it.

Sincerely,

  
Andrew Oram

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1718 Connecticut Avenue, N.W. / #700  
Washington, D.C. 20009-1148  
Telephone 202 232-3335  
FAX 202 745-0694

**PRELIMINARY COMMENTS OF THE ASSOCIATION OF AMERICAN PUBLISHERS  
TO THE  
WORKING GROUP ON INTELLECTUAL PROPERTY  
OF THE  
INFORMATION POLICY COMMITTEE  
OF THE  
NATIONAL INFORMATION INFRASTRUCTURE TASK FORCE**

**18 NOVEMBER 1993**

The Association of American Publishers welcomes the opportunity to present comments to the Working Group on Intellectual Property Rights of the Task Force on the National Information Infrastructure on these issues of vital concern to the publishing industry.

The members of the Association of American Publishers, like the American publishing industry which AAP represents, are a diverse group of companies with different types of published works in different media sold to different markets and through different distribution channels. Hence, the impact of the National Information Infrastructure on each company is unique. Some of our members are already using the Internet to communicate with authors and/or customers. Some distribute published works over the Internet and eagerly anticipate the additional benefits of the added bandwidth and higher speed facilities envisioned in the National Information Infrastructure. Some publishers believe that print will be the preferred medium for their published works but are concerned that the National Information Infrastructure and the ability of user communities to easily convert print to machine readable works for transmission over the NII might have an adverse impact on not only the sale of the print products but also on the royalty income due from licensed copying and distribution. All of these concerns can be met by careful planning of the NII. We see this hearing as a very useful and important step in alerting the Administration to these concerns and jointly addressing possible solutions.

Three separate publishers, all members of the AAP, have requested the opportunity to appear at the hearing on November 18 to elaborate on separate issues before this Working Group. This preliminary statement will serve as an overview of many of the concerns of the American publishing industry. After the hearing, and the testimony of the publishers, we plan to supplement the record with additional comments.

AAP members are both not for profit publishers, such as the university presses, whose publishing programs serve a scholarly market and are characterized by short print runs and niche markets, and commercial publishers. Our members publish for the consumer market, for education (from elementary and secondary to post graduate schools), for the professional, scholarly and the international markets, and the media in which they publish include printed books and journals, CD-ROM, fully interactive software, online information, and a host of video and audio video products and services. The National Information Infrastructure impacts on these markets and products in a number of ways. The witnesses will address the questions outlined in the Federal Register notice as they impact on the various markets and products. This statement responds to the questions in a more generic manner as they relate to the industry as a whole.

**1. Is the existing copyright law adequate to protect the rights of those who will make their works available via NII? What statutory or regulatory changes if any should be made?**

The basic principles and provisions of existing copyright law presently seem to protect the rights of publishers who choose to use the NII for dissemination of their works, but supplementary provisions may be needed in other laws, and perhaps in the Copyright Act to insure that the fundamental structure of the Copyright Act and its principles and provisions can be adequately implemented in the electronic environment.

There may be some supplemental provisions that will clarify the rights of the copyright owners and insure such clarity to those who would use the copyrighted works. For instance, AAP was pleased to see language in the original High Performance Computing Act of 1991 (P.L. 102-194) that requires the National Research and Education Network to include accounting mechanisms and a copyright management system for dealing with copyrighted works disseminated over the network. We have also sought similar language in the current bills expanding the NREN (S.4 and HR 1757) to, in effect, help insure that applications provided for under the legislation are designed and operated in a manner consistent with the U.S. Copyright Law.

One of the concerns many publishers have voiced is whether the individualized nature of network use makes detection of

infringement more difficult and whether therefore added protection is needed to inhibit infringing usage.

Machine-readable works may be copied more rapidly than printed materials. In testimony before the House Judiciary Subcommittee on Intellectual Property on the WIPO Protocol, AAP joined other industries in suggesting that a rental right for digital works might be necessary to prevent wide scale infringement. Similarly we might want to consider means to detect high speed downloading from the NII. Publishers today have developed such protection for information they voluntarily disseminate over networks, but the concern occurs when a secondary entity might involuntarily post another's copyrighted works on a bulletin board or in an open access database for infringing distribution.

**2. Do the existing fair use provisions of the copyright law adequately accommodate the interests of users of the works available via the NII? What statutory or regulatory changes if any should be made?**

Section 107 of the current statute requires a full "fair use" analysis in each case to determine if a use is fair. Each case is decided on its own merits and facts. At the present time, there appears to be no need to change the statute because the current law provides the necessary criteria. However, we must frankly acknowledge that certain cases in the computer area may be read by some to give broader privilege under fair use to "reverse engineering" or other "intermediate" uses than appropriate. Additionally, our industry has two important fair use cases currently before the courts that are of fundamental importance to the nature and application of the fair use doctrine.

Moreover, that being said, patterns and practices of use that have developed in a print-based world, do not necessarily have the same impact or limitations in an electronic world. By way of example, AAP has issued a statement on Document Delivery and Fee-Based Interlibrary Loan (see attached) that clearly explains why AAP believes that the CONTU guidelines (for sporadic interlibrary loan) included in the legislative history of the Copyright Act of 1976 do not apply to high technology document delivery over the highways of the Information Infrastructure. In this case, at this time, we do not believe the law must be changed, but this statement illustrates the impact of a changed delivery system.

Finally, with respect to this question, we want to note a great concern that results from certain tendencies abroad to legitimize any private use of copyrighted material and, indeed, business entities that serve such users. Fortunately, the claim of privileged, private use has not gained authoritative support in this country. The Betamax case applied the conventional

principle of fair use and did not create a blanket personal use exemption. Other cases have made clear that organizations serving private users do not thereby assume the character of private use; and we were delighted that the Secretariat of the World Intellectual Property Organization recently acknowledged that private use was not exempted by the Berne convention where it interfered with the "normal exploitation of the work and unreasonably prejudiced the legitimate interests of the author."

3. Should standards or other requirements be adopted for the labelling or encoding of works available via the NII so that copyright owners and users can identify copyrighted works and the conditions for their use.

and

4. Should standards be established to encourage or require the intercommunication or exchange of information and the interoperability of the different types of computer software and systems supporting or utilizing the NII?

AAP members are involved in many pilot projects and other such efforts involving delivery of copyrighted published information over the Internet. As these experiments are resulting in a vast knowledge base on various protection schemes, we believe that it is too soon to establish specific standards for encoding or labelling of works. Copyright owners are developing their own such systems. We do believe that the government has a possible role to play in adding to the knowledge base by perhaps providing development funding to explore such means.

By way of example, AAP has a new technology committee that invites technology developers to share new products with our industry. Recently, we have seen presentations by companies that have patents on encryption technology, and on copyright protected means to deliver full books electronically. These are very different technologies and the industry is not prepared to limit itself to any single technology but agrees that additional work must continue to test the applicability of various protection methodologies and the network should allow for many different schemes to so function. Different products will need different levels of protection. Different uses and user communities will also need different interfaces. An open environment will facilitate such experimentation. Government support for such development will also benefit all the players.

AAP believes that the marketplace will continue to develop such labelling or encoding or protection schemes, and can do so with your support. The technology is rapidly changing and advancing. There are too many new innovations at this point to lock into single system or single standard.

We believe that adopting a single set of standards for either copyright protection or operation of the Information Infrastructure could be counter-productive, however, we acknowledge that encouraging the development of diverse systems could prove useful. However, we do not believe that "intercommunication," "exchange," or "interoperability" should in any fashion be used to justify any limitation on copyright protection or any use beyond the conventional parameters of fair use.

5. Should a licensing system be developed for certain uses of any or all works available via the NII? If so, should there be a single type of licensing or should NII support a multiplicity of licensing systems?

NII should certainly support a multiplicity of licensing schemes. As we have seen from our experiences with photocopying, the publishing industry itself contributed seed money to develop the copyright clearance center for inhouse library photocopying of scientific, technical and medical journal literature. The system established in 1978 has certain principles that we continue to support as both the industry and CCC have developed. These principles include the voluntary nature of CCC. A publisher decides whether and what copyrighted works to include in the licensing system and for what uses and at what terms and conditions. This voluntary system has enabled the CCC to develop multiple licensing arrangements.

In addition to the CCC, publishers, themselves, have entered into a variety of photocopy licensing schemes either offering direct license or participating in multiple arrangements. The user community benefits from the choices. Electronic information may in some categories and for some uses serve as the primary form of dissemination of information products. When this is the case, the licensing must be controlled by the copyright holder and not an agency or government controlled entity.

For some uses and some products, collective or collaborative licensing arrangements may develop, for others, the technology of the NII may enable users to deal direct. No single system can respond to the wide variety of copyrighted materials and markets and possible uses.

6. Are there technical means for preventing unauthorized reproduction or other unauthorized uses of copyrighted works that should be mandated or required to comply with certain standards (similar to serial copying controls required in digital audio recording devices and digital audio interface devices under the Audio Home Recording Act of 1992)?

There might be such technical means now or they may be later developed, but, at this point, we do not think that these schemes should be mandated by the government. Instead, as stated earlier, it might be advisable for the government to foster the development of these schemes and encourage cooperative development work among the various players -- the copyright owners, the users, and various other players, libraries, information services, equipment manufacturers, etc. It is important, in this area, to be sure not to confuse protection against serial copying that was addressed in the Audio Home Recording Act with our great concern over the cumulative effect of wide-spread single copying.

7. What types of educational programs might be developed to increase public awareness of intellectual property laws, their importance to the economy, and their application to works available via the NII?

Education campaigns are essential to insure respect for the creativity and the value of copyrighted works. Individual copyright owners and their trade associations have long been involved in such education campaigns. AAP continues to publish materials, to run courses, to visit user communities and to work on such education. Our colleagues in other trade associations are similarly involved. Government awareness campaigns such as the efforts by the Copyright Office and the Patent and Trademark Office during the bicentennial of the copyright law to celebrate creators and creativity were well worth the effort. We would be glad to work with the NII Working Group on Intellectual Property Rights on such programs for the continuing long range effort at copyright awareness.

We hope to supplement this filing after the hearing with a fuller elaboration of the specific testimony of the three publishers.



1718 Connecticut Avenue, N.W. / #700  
Washington, D.C. 20009-1148  
Telephone 202 232-3335  
FAX 202 745-0694

**Statement of the Association of American Publishers (AAP)  
on Commercial and Fee-Based Document Delivery**

The copyright law provides the copyright holder with the exclusive right to control the making of copies of a copyrighted work. Exceptions to this exclusive right are intended to permit limited, occasional copying for individuals in particular circumstances which will not impair the rights of the copyright holder, nor generate regular business-like activities based on usurpation of copyright owners' rights, markets, or materials.

Section 108 of the Copyright Act, for example, specifies that libraries may make copies under certain conditions; among these are that there be no direct or indirect commercial advantage, and that there be no "systematic" copying of even single copies. Moreover, the Act, legislative history and case law make quite clear that copyright owners have valuable and protected interests in the licensing of their rights to others, as well as in the sale of their products; that non-profit uses are subject to the rights of copyright owners; and that de facto coordination of copying and purchase activity among customers, and the development of services -- whether "private" or "public" -- for the specific purposes of providing customers with copies, are beyond the limited exceptions to copyright owners' rights.

It follows that a commercial document delivery service engaging in the copying and redistribution of single and multiple copies of copyrighted articles must secure permission from and (if requested) pay royalties to the copyright holder. The case is not materially different for the newly-emerged, fee-based and technology-enhanced copying and distribution services of libraries. These activities are indistinguishable in purpose and effect from those of commercial document suppliers. They are also not permissible under the CONTU Guidelines governing the copying done to support the practice of interlibrary lending.

The purpose of the copyright law is to ensure authors and publishers the economic wherewithal to devote their energies, talents and funds to the creation and effective packaging and distribution of intellectual works. The publishers' revenue base of sales, subscriptions, and royalties is essential to scholarship, research, education and simple enjoyment of the written word. Its vitality should not be sapped by rampant, unauthorized document supply, whether from commercial or non-profit sectors.

## BACKGROUND TO THE AAP STATEMENT ON DOCUMENT DELIVERY

In order to understand the copyright law's treatment of library photocopying, it is necessary to understand the judicial history that led to the crafting of its text. In 1968, the Williams and Wilkins Publishing Company brought a copyright infringement case against the National Institutes of Health and the National Library of Medicine. NIH had been making photocopies of copyrighted articles for internal distribution and NLM had been distributing photocopies of copyrighted articles for distribution to other libraries under its "interlibrary loan" program.

A hearing examiner determined that such copying was not fair use ("Whatever the bounds of 'fair use' as defined and applied by the courts, defendant is clearly outside those bounds"), but his decision was reversed by the Court of Claims.<sup>1</sup> Reasons for the reversal included certain ambiguities in the language of the 1909 copyright act; a concern that medical science might be hampered by a prohibition on copying due in part to the fact that alternative document delivery systems did not, at that time, exist; the existence of some restrictions on page count and multiple copies in place at NLM and a practice at NIH that did not permit copying for non-NIH personnel; and the fact that, absent photocopying, the delay in waiting for the original article might cause some researchers to forgo use of the materials.

The court also urged Congress to clarify this situation in the new copyright act which was then under consideration. (The Senate Report notes that the opinion of the Court of Claims said the Court was engaged in "a 'holding operation' in the interim period before Congress enacted its preferred solution.") The Supreme Court heard arguments but, because the Justices were evenly divided 4-4, wrote no conclusive opinion establishing national fair use doctrine. That result deprived the case of meaningful precedential weight but allowed the decision below, holding that such photocopying, under the 1909 Act, was fair use, to stand.

### 1976 COPYRIGHT ACT

Congress paid close attention to the Williams & Wilkins case in drafting the 1976 Copyright Act, particularly by prohibiting "systematic" copying:

Section 108 (g): [Libraries'] rights of reproduction and distribution under this

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<sup>1/</sup> Williams & Wilkins Co. v. United States, 487 F.2d 1345 (Ct. Cl. 1973), aff'd by an equally divided Court, 420 U.S. 376 (1975).

section extend to the isolated and unrelated reproduction or distribution of a single copy...but do not extend to cases where the library or archives, or its employee...engages in the systematic reproduction or distribution of single or multiple copies...

The Senate Report, in describing this prohibition, states:

While it is not possible to formulate specific definitions of "systematic copying", the following examples serve to illustrate some of the copying prohibited by subsection (g).

(1) A library with a collection of journals in biology informs other libraries with similar collections that it will maintain and build its own collection and will make copies of articles from these journals available to them and their patrons on request. Accordingly, the other libraries discontinue or refrain from purchasing subscriptions to these journals and fulfill their patrons' requests for articles by obtaining photocopies from the source library.

\* \* \*

(3) Several branches of a library system agree that one branch will subscribe to particular journals in lieu of each branch purchasing its own subscriptions, and the one subscribing branch will reproduce copies of articles from the publication for users of the other branches.

These two examples both reflect and are responsive to the type of copying that was the subject of the Williams and Wilkins case, and has become so troubling for the publishing industry today. The omitted example "(2)" referred to inhouse copying and not document delivery.<sup>2</sup>

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<sup>2</sup>/ The second example reads as follows:

(2) A research center employing a number of scientists and technicians subscribes to one or two copies of needed periodicals. By reproducing photocopies of articles the center is able to make the material in these periodicals available to its staff in the same manner which otherwise would have required multiple subscriptions.

(continued...)

## HOUSE ADDED PROVISIO THAT BECAME LAW

During consideration of the 1976 Act by the House of Representatives (following the Senate action), language was added to Section 108 (g) in response to concerns raised by the library community that on occasion librarians request a photocopy of an article from another library's holdings to satisfy a patron. They pointed out that usually in these cases they would not choose to subscribe to the journal because it had no ongoing relevance to their clientele. These incidental, sporadic and cumbersome-to-fill requests were described as "interlibrary loans," from the days when the actual tangible book or journal was loaned to the requesting library. The House then inserted the following proviso to Section 108 (g):

Provided, That nothing in this clause prevents a library or archives from participating in interlibrary arrangements that do not have, as their purpose or effect, that the library or archives receiving such copies or phonorecords for distribution does so in such aggregate quantities as to substitute for a subscription to or purchase of such work.

## CONTU GUIDELINES ON INTERLIBRARY LOAN

The library and publishing communities met under the auspices of the National Commission on New Technological Uses of Copyrighted Works (CONTU) to develop guidelines for construing the "substitution for subscription/purchase" language of the proviso. They reached agreement with respect to the most common sorts of such interlibrary loans: articles from journal issues under 5 years old. Librarians noted that when they got more than five requests per year for materials from a given title, they typically entered a subscription because that number shows sufficient interest to warrant adding the journal to the library's collection, and because ILL "borrowing" is costly in its own right.

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<sup>2</sup>/ (...continued)

This type of prohibited systematic copying was litigated in the case against Collier, Shannon and Scott, a law firm that systematically made copies of newsletters to avoid buying more than one subscription. It also has relevance in the pending litigation against Texaco. The purpose of this paper is to focus on problems raised for the publishing industry by document delivery services. These problems appear at least as serious as those underlying the "in-house" copying lawsuits.

The CONTU-assisted guidelines appear in the Conference Report and provide some limits as to what copying may be done under the proviso. These guidelines were created in the "low tech" Interlibrary Loan (ILL) environment of the late 1970's: generally cumbersome, slow, unthreatening photocopying designed to fill certain ILL requests incidental to the library's overall activity. The CONTU Report itself indicated that the guidelines would not apply to institutions specializing in document delivery services:

The point has been made that the present practice on interlibrary loans and use of photocopies in lieu of loans may be supplemented or even largely replaced by a system in which one or more agencies or institutions, public or private, exist for the specific purpose of providing a central source for photocopies. Of course, these guidelines would not apply to such a situation.

#### THE PROBLEM TODAY

The problem today is that the advent of post-1976 technologies -- fax machines, computer networks, low-priced scanners and CD-ROM's -- has facilitated the interlibrary delivery of photocopies of articles and chapter-length excerpts from books and generated services focussed on this conduct. Some facilities have begun to charge service fees for providing the copies while not paying royalties to publishers because the copying is, according to them, "interlibrary loan and permissible under the CONTU guidelines." However, as stated above, this copying is far beyond that permitted under CONTU and therefore, may be done only with permission of copyright holders.

Additionally, librarians have vigorously promoted "resource sharing" which amounts to nothing less than the Senate's third example of forbidden coordinated subscription buying to "save money" by filling patron needs from source libraries. This copying and document delivery far exceeds the scope of interlibrary "lending" contemplated by Congress or CONTU in permitting interlibrary loan arrangements under the proviso. When the push for resource sharing and the development of consortia are combined with the new networks and even the existing inter-university network (Internet), one sees a formula for the erosion of publishing revenues in this country, from: (1) lost book and journal subscription sales, (2) lost royalty income from licensing, and (3) lost new product opportunities. The revenue base that now supports publishing relies on multiple opportunities to exploit a product such as income from sales, subscriptions, and licenses. The interlibrary copying without permission and other non-authorized document delivery denies the copyright owner its rights under the law.

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5050 South Lake Shore Drive #3214  
Chicago, Illinois 60615  
November 8, 1993

Terri A. Southwick  
Commissioner of Patents and Trademarks  
U.S. Patent and Trademark Office  
Working Group on Intellectual Property of the  
Information Policy Committee of the  
National Information Infrastructure Task Force  
Washington, D.C. 20231

Re: Copyright and digital information

Dear Working Group:

I would like to respond to the Working Group's invitation for comments on intellectual property issues and the National Information Infrastructure Initiative.

I am gravely concerned about the potential inaccessibility of information due to licenses, contracts, and other legal devices that may surrender the rights of users and libraries. I would agree with Jane C. Ginsburg, the Morton L. Janklow Professor of Literary and Artistic Property Law at the Columbia University School of Law, who wrote recently and I quote that

"... rights under contract are not equivalent to rights under copyright.  
... A contract binds only those who are parties to it. A property right, such as copyright, is "good against the world"; it is not based on any relationship between the party having the right and the party allegedly infringing the right. [1]"

Libraries enjoy certain rights in making information available to their users. Among these rights, fair use ultimately provides a means for all to access information without penalty, to intellectual pursue ideas with complete freedom. As Professor Ginsburg hints, contracts and licenses restrict this sort of access, by surrendering rights which essentially restrict the current advantage in favor of creativity and the imagination. In the final analysis, contracts and licenses define information access on economic terms.

Not all patrons of libraries have the surplus income to purchase information. Libraries are a haven for the information poor, especially those who cannot afford digital data. In the United Kingdom, access to just 30 minutes of a commercial database equals about half of the salary for a week of a family just making it on an average British income [2]. Here in the United States, the information poor are not just the adults and children with barely the funds to put food on the table or clothes on their backs. They are scholars without a pot of research funds, without affiliations to properly endowed institutions. They are undergraduate and graduate students scratching every penny from odd jobs, with not a cent for an electronic surf ride in DIALOG or NEXIS. They are writers

who lose themselves in institutions like the Boston or New York Public Libraries to do their research, because they can afford to pay with their time what they cannot afford to pay with their wallets. Libraries for these are the last great bargain in the world.

Unfortunately, contracts and licenses have already been used with digital media as a means not only to control the market but the user. Official sounding proclamations and documents that appear as licenses try by terror to frighten users, and librarians, into surrendering rights guaranteed by law. These acts by one side try to impose rules on another [3]. Treating customers — readers — like thieves is not good business practice [4]. The wording of some of these documents assumes that all digital information will be copied en masse by everyone as soon as the opportunity presents itself. The copying of digital products, requires time, effort, and money. To assume that digital access means corruption is ridiculous and insulting. To also assume that copyright gives the owner of any work an absolute monopoly over access and use ignores the basic intellectual premise that is the heart of copyright — to promote public welfare by the advancement of knowledge.

As an author, I recognize the dilemma before us. Earlier this year, a librarian in Hungary contacted me electronically and told me how much he enjoyed an article that I wrote in a magazine. He was so taken with the article that he translated it into Hungarian. He asked me if he could post his translation on a discussion list in his country for other librarians. I wrote to him, clearly flattered by his efforts, and told him that I needed to contact my publisher. It was the first time that this publisher had to deal with this particular situation, and there were no mechanisms in place to provide guidance. After great discussion, the publisher decided to charge the Hungarian librarian a standard fee of \$250 for redistribution of the article. \$250 might as well have been \$250,000 in a place like Hungary, where hard currency is not readily available. My Hungarian colleague told me that he couldn't afford it. I in turn argued forcibly with my editors and publishers over the economic value of gaining new readers in Hungary and eastern Europe. After much thought, we all agreed to allow the Hungarian to post the article for free for all to read [5]. This incident highlights the confusion that we all face, and the need to rectify it in a way that is satisfactory to all parties.

We indeed are at a critical juncture in making information available as broadly as possible. Some librarians and publishers are already at work to provide universal access to digital information, without strangling those who can least afford it. Much of this effort is in the spirit of the efforts of Theodore Vail, who transformed phone service at the turn of the century by creating a system of revenue that allowed for a modicum of access to telephones around the country for anyone. There will always be institutions and users who can afford to pay for access, and will even pay a premium. But we have to carefully measure this trade of control and exploitation for access, not surrendering the fundamental rights of readers and libraries. Collective administration should not treat intellectual creative products as simple commodities, nor should all users be damned as pirates or robbers.

To quote Justice Sandra Day O'Connor,

"the primary objective of copyright is not to reward authors, but to promote science and useful arts. To this end, copyright assures authors the right to their original expression, but encourages others to build freely upon the ideas and information conveyed by a work...This result is neither unfair nor unfortunate. It is the means by which copyright advances the progress of science and art [6]."

Libraries in this country are unique in their freedom to make information available. Libraries act as the intellectual agents for everyone, by providing a means of access to information without economic penalty. This right of access should not be lost with the appearance of electronic text. Cooperation between all parties will prove the utility of digital information in ways we barely imagine.

Thank you for this opportunity. If you have any questions, contact me at your convenience.

Sincerely,

Edward J. Valauskas  
consultant to libraries on technology  
columnist for Online, Database, Library Journal, & the Newsletter of the  
Apple Library Users Group

#### Notes

1. Jane C. Ginsburg, "Copyright with walls?: Speculation on literary property in the library of the future," Representations, no. 42 (Spring 1993), p. 62.
2. Trevor Haywood, "Electronic information: the withering of public access," In: New Horizons for the Information Profession. London: Taylor Graham, 1988, p. 202, cited in Dennis J. Reynolds, "The Bill of Rights and beyond: citizen entitlement and information access in an electronic age," In: Dennis J. Reynolds (ed.), Citizen rights and access to electronic information. Chicago: Library and Information Technology Association, 1991, p. 13.
3. Raymond T. Nimmer, "Falling prey to a paper tiger," Computerworld, vol. 23, no. 45 (6 Nov. 1989), p. 134.
4. Stephen Manes, "As a convenience to you, don't read the license agreement," PC/Computer, vol. 4, no. 7 (July 1991), p. 86.

5. The original article was entitled "TurboGopher: Internet access with ease on the Macintosh," and appeared in the March 1993 of Online, pp. 87-89. It was translated into Hungarian as "TurboGopher: egy egyszeru hozzaferesi iehetoseg az internethez a Macintoshrol" and posted on KATALIST, a Hungarian Discussion on librarian systems and databases.

6. Quoted in Howard Fields, "Supreme Court rules original compilations may be copyrighted," Publishers Weekly, (12 Apr. 1991), p. 13.

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University of Pittsburgh

DEPARTMENT OF INFORMATION SCIENCE

November 4, 1993

Mr. Bruce A. Lehman  
Commissioner of Patents and Trademarks  
U.S. Patents and Trademarks Office  
PO Box 4  
Washington DC 20231

Dear Mr. Lehman

I am writing in response to a recent Notice in the Federal Register (58 FR 53917) requesting comments on Intellectual Property Issues in the National Information Infrastructure (NII) Initiative. I would like to offer my comments on the questions you pose that relate to the suitability or desirability of technical standards. The statements I make are my own, and do not reflect official positions of the University of Pittsburgh or its organizational units with which I am affiliated

Since the NII is largely a technological undertaking, the question of standards inevitably arises. Researchers have learned much in the last decade about the process of developing standards and the economic implications of standards<sup>1</sup>. Much of this literature suggests the difficulty of establishing "optimal" standards, particularly when the applications of the standard are unclear. The economic cost of picking the "wrong" standard can result in limitations that hamper the industry in the future<sup>2</sup> and that have real and measurable economic

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<sup>1</sup> For a review of this literature, see Paul A. David and Shane M. Greenstein "The Economics of Compatibility Standards: An Introduction to Recent Research" *Economics of Innovation and New Technology* Vol. 1, pp. 3-42, 1990 (ISSN 1043-8599) and Shane M. Greenstein "Invisible Hands and Visible Advisors: An Economic Interpretation of Standardization" *Journal of the American Society for Information Science* Vol. 43, No. 8, pp. 538-549, 1993 (ISSN 0002-8231).

<sup>2</sup> There are numerous examples of this in everyday life: the QWERTY typewriter keyboard remains in use even though better key layouts exist, and the 640K memory limitation of Microsoft's DOS has resulted in burdensome work-arounds. Another example is the address structure for the Internet Protocol (IP); this will most likely result in the costly conversion of all devices using this protocol.

consequences. Thus, I would urge care in establishing a standard. A good standard for this application is one that is flexible, expandable, and easy to implement. Let me elaborate on these attributes:

Flexible

A flexible standard is one that can be applied to new applications with little difficulty. This is especially important in a system such as the NII, where the information objects and their potential uses are poorly understood.

Expandable

An expandable standard is one that does not have rigidly fixed parameters associated with it (such as 640kbyte maximum memory or 32 bit addresses). In the area of protocol standards, the CCITT E.164 standard is one that is expandable because the address can be increased to accommodate network growth without installing new software in each machine on the network.

Easy and Inexpensive to Implement

A standard that is difficult or costly to implement will impose a significant burden on society if the benefits of the complexity are spurious. In addition, complexity often breeds informal "subsets" of the standard to simplify implementation. This is a particularly big problem if different manufacturers implement different subsets of the standard to optimize their product's performance.

Having addressed some general caveats associated with standards development, let me proceed with the specific questions related to IP in the NII.

*Should standards and other requirements be adopted for the labeling or encoding of works available via the NII so that copyright owners and users can identify copyrighted works and the conditions for their use?*

It is quite reasonable to develop technology that enables this to be implemented. In comparing the alternative standards or approaches, it is especially important that the mechanisms be scalable and searchable.

An approach that is scalable allows for large numbers of copyrighted works to be available without degrading the performance of the NII to the users. With a system of the magnitude of the proposed NII, this is essential. While it is premature to make technical recommendations of the NII architecture, scalability often means that the control resources must be distributed across the network, perhaps associated with the document itself.

If the control resource is searchable, it allows users to select whether they want to view documents based on the level of control specified by the owner. Thus, if a user wanted to view only unrestricted works, s/he could do so.

It is also important that the owner of works be able to offer the work in multiple forms, such as viewable, printable, and revisable. A work in viewable form allows a user to view the document on a computer screen without the ability to store or print it. A printable (or storable) form allows the original image to be printed or stored in such a way that the user cannot electronically revise the document. Finally, a revisable form document is one in which the user has access equivalent to the owner or author; the user could borrow pieces of the text, revise figures, *etc.* as suited to his or her purpose. It is quite possible for a single document format to exist that is capable of handling each of these distribution modes, although this might not be as easily extensible to other works, such as still or moving images.

In today's technology, a document delivered in revisable form might be a text file or one in a proprietary format, such as WordPerfect™ or PowerPoint™ file, for example. An example of a non-revisable file that is storable and printable file would be a Postscript™ file. No direct analogy to a viewable document form exists today.

*Should standards be established to encourage or require the intercommunication or exchange of information and the interoperability of the different types of computer software and systems supporting or utilizing the NII?*

Interoperability is essential if the NII is to take advantage of the synergies that are potentially available in a system of this magnitude. To prevent interoperability is to balkanize the system. Interoperability simply *facilitates* the exchange of information; to *require* information exchange beyond catalog-type information may be inappropriate<sup>3</sup>. Owners of works on the NII should be able to control the distribution of their work. To be an effective national resource, the NII must facilitate the *location* of works; their *distribution* should also be facilitated by the NII, but contingent upon agreement between the owner and the user.

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<sup>3</sup> In *Feist v. Rural Telephone Service Co.*, the Supreme Court held telephone directories to be uncopyrightable. The Court's reasoning may also be applicable to the information required to catalog and index a document. If it is not applicable, changes to the copyright law would be necessary to make location of protected works possible.

That aside, it would be inappropriate to *require* works to be on the network in such a way that they are available only through one type of operating system (such as MS-DOS<sup>TM</sup> or Unix<sup>TM</sup>) or in the format of a particular application (such as Excel<sup>TM</sup> or WordPerfect<sup>TM</sup>). The document representation and storage standards should be "open" in the sense that any application from any manufacturer can read and search them. Thus, a document should not be stored in WordPerfect<sup>TM</sup> or Excel<sup>TM</sup> format, but rather in a form such as the Standard General Markup Language (SGML) that allows any application (such as WordPerfect<sup>TM</sup>, Word<sup>TM</sup>, Xywrite<sup>TM</sup>, *etc.*) to read it. While this is somewhat more costly in the near term<sup>4</sup>, it decouples innovation in application software from the documents themselves<sup>5</sup>. This decoupling allows software developers to innovated independent of the installed base of documents, and without fear of potentially predatory format changes<sup>6</sup>.

As a former participant in, and a current researcher of the standards development process, I would like to offer my recommendations related to the standards that will be necessary for this:

If at all possible, make use of standards that have already been developed and accepted by the marketplace. Doing so avoids the costly standards development process and ensures interoperability with existing products.

In developing any standards that are to be used for this, it is important to work with the private sector to help ensure the adoption of the standard. Private sector input is also helpful to promote implementability<sup>7</sup>.

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<sup>4</sup> The additional cost comes about because most word processors do not currently support international standards such as SGML. Users would have to purchase the SGML compilers to import an SGML document into their word processor.

<sup>5</sup>It will likely be necessary to represent different types of works in different formats. If the format is in the public domain, then this decoupling will be retained.

<sup>6</sup> In a proprietary standard, the owner of the standard has advance knowledge of format changes, and can make format changes that benefits his or her strategic direction. Format changes can also be used in a predatory way to give the vendor of the application software a market advantage over its rivals. As a result, a *public* format standard is necessary.

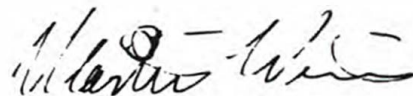
<sup>7</sup> The private sector must ultimately implement the standard, which tends to place the right incentives on implementability. Even with that, standards exist that were developed by the private sector that are difficult or costly to implement, and which may not meet their original goals. This often comes about because of proprietary interest in one technological approach or another. Consequently, while strong private sector involvement is essential, it is not sufficient to guarantee a satisfactory outcome.

Strong government management of the process is essential. The objectives of the management process is to control the interplay of proprietary interests so that the goals and objectives of the standard are retained. Thus, while it is often inappropriate for the Government to develop standards, it is fully appropriate, for the Government as a *customer* to manage the process. In a recent report by the Congressional Office of Technology Assessment, the battles within the standards development community were exposed<sup>8</sup>. These should be avoided at all costs.

As part of the management function, ensure the expendability and flexibility of the standard. As I mentioned above, the standard should be able to handle works of the kind that cannot be imagined today and of the volume that is inconceivable today. The power of networked information is one of creativity and innovation that transcends current categories and structures.

I hope you find these comments helpful. I would be happy to supply additional assistance as needed. In addition to the address and telephone number on the letterhead, I can be reached via Internet mail at [mbw@pitt.edu](mailto:mbw@pitt.edu).

Sincerely,



Martin B.H. Weiss  
Assistant Professor  
Telecommunications and  
Information Science

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<sup>8</sup> US Congress, Office of Technology Assessment *Global Standards: Building Blocks for the Future* TCT-512 (Washington DC: US Government Printing Office) March 1992.

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This marker identifies the place of a tabbed divider. Given our digitization capabilities, we are sometimes unable to adequately scan such dividers. The title from the original document is indicated below.

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**31**

Divider Title: \_\_\_\_\_

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