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PREFACE

As modern society moves through the early stages of the information age, the legal and technological communities are grappling with problems for which existing rules of law may not apply. Most of these problems center on issues of privacy and proprietorship. How, for example, can individuals control the kinds of data gathered on them and how that data will be used? To what lengths can an employer legally go to protect the transfer of new technological developments to a competitor, given the mobility of personnel within the computer technology field? Can such questions be adequately resolved through the application of existing legal concepts? Or is there a need to design a new system of approaches?

In considering these issues, those familiar with the history of law in Western societies, especially its development in Great Britain and the United States, will no doubt experience some *deja vu*. The legal profession has stood on this threshold before.

During the agrarian age and early years of the industrial revolution, individual rights to be free of unwanted intrusion were indirectly protected under the penumbra of rights granted in property law. However, with technological advancements in optics one individual could intrude upon another in the form of viewing that person without crossing any boundaries of land and thus not violating the narrow trespass theory of *quare clausum fregit*. Several decades later advances in photography removed the need for relatively long durations of posing with its inherent consent. A photographer could obtain and use for commercial gain a non-permitted image of

another without violating provisions against criminal theft or property trespass (*de bonis asportatus*). The rules and protection of the law as it had evolved during the agrarian age were insufficient to cope with these technological challenges. As the bar and bench wrestled with fitting the new problems into the pigeon holes of the old laws, legislators attempted to promulgate prophylactic measures that dealt with individual incidents. The solution, in hindsight, was both simple and somewhat obvious. Eventually the legal community devised the new tort of invasion of privacy.

The legal and technological communities may again be facing dilemmas for which the current system of laws may be incomplete or inadequate. The purpose of this book is to probe that possibility by providing a thorough understanding of the impact computers are having on the laws in our society.

This book is the major component of a three-part course of study and reference. The other two parts are a tape series presented by leading practitioners in the computer law field who discuss typical and special experiences in select problem areas, and a primer in video tape part that supplements the book's introduction to computer technology and terminology.

The intended users of this book are a diverse population ranging from those with general legal expertise but no previous understanding of computers, to computer-knowledgeable non-lawyers, to those having neither sub-

stantial computer nor legal backgrounds, including business persons and students. For the person with a legal background, the book has a familiar format, presenting historical, conceptual and practical aspects of such legal areas as contracts, proprietary rights and privacy. Extensive analyses and citations are presented in language understandable to readers from disciplines other than law. While not using a how-to or case book approach, the book will indicate directions for problem solving which are also extensively supplemented in the tape series. In addition to legal issues arising in the United States, the book examines international considerations, specifically with the Far East and Europe.

For non-lawyers, including academics, government, business and technological professionals, this book provides an introduction to the legal considerations surrounding the adoption and use of computer technology in our society. Readers unfamiliar with computer terminology and function should use the primer video tape supplement since the summary primer presented in the book is intended for review and not as a self-sufficient educational tool. Additionally, the practical problem approaches in the tape series supplement should prove valuable.

This book represents an integrated approach to a complex body of technology and law which has been under study for several years at the Franklin Pierce Law Center in Concord, New Hampshire, U.S.A. Some of the basic materials were initially compiled by a team of selected graduate students and professional experts in the diverse fields of law involved, aided by the guidance of leading

national and international practitioners of computer technology and law. These initial contributions were subsequently shaped into the unified and directed study resulting in this book.

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Concord, New Hampshire, 1985

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TABLE OF CONTENTS

PREFACE	vii
ACKNOWLEDGMENTS	xi

CHAPTER 1 COMPUTER TECHNOLOGY

A Primer on Computers

I. Introduction	3
II. The Computer System	3
Input	6
Spool	6
Compiler/Interpreter	7
Central Processing Unit	7
Operating System	8
Memory	10
Output	12
III. Computer Operation	13
IV. Glossary	15

CHAPTER 2 INTELLECTUAL PROPERTY PROTECTION OF COMPUTER TECHNOLOGY

I. Introduction	39
II. Patents	40
A. Utility	43
B. Novelty and Unobviousness	45
C. Computer Software Patents	49
III. Copyrights	54
IV. Trade Secrets	61
V. Trademarks	67
VI. Mask Protection	73
VII. International Protection	75
VIII. Conclusion	81
IX. Footnotes	83

Tape Supplement: *Future Trends in Software Protection*

CHAPTER 3 LICENSING OF COMPUTER TECHNOLOGY

I. Introduction	97
II. Licensing from the United States' Perspective	97
III. Government Controls on the Export of Software	101
IV. Antitrust Considerations	105
V. Choice of Law in Drafting Licensing Agreements	112
IV. Taxation and Custom Duties Applicable to Licensing Agreements	115
VII. Special Considerations in Licensing to Japan	119
VIII. Special Considerations in Licensing to the European Economic Community (EEC)	122
IX. Conclusion	129
X. Footnotes	131

Tape Supplement: *Government Control of Technical Information*

CHAPTER 4 COMPUTER CONTRACTS

I. Introduction	147
II. Contract Formation	152
III. Breach of Contract	166
IV. Remedies	174
V. Alternatives to Litigation	180
VI. Warranties in Computer Acquisitions	183
A. Express Warranties	183
B. Implied Warranties	188
VII. Tax Planning in Computer Acquisitions	196
A. Purchase	196
Accelerated Cost Recovery System (ACRS)	197
Investment Tax Credit (ITC)	198
B. Lease	200
VIII. Special Considerations in Software Development	
Contracts	204
IX. Conclusion	209
X. Footnotes	211
Tape Supplement: <i>Legal Approaches to Computer Contracting</i>	
Tape Supplement: <i>User-Vendor Computer Litigation</i>	

CHAPTER 5 COMPUTERS AND PRIVACY

I. Introduction	229
II. The Nature of the Concern	229
III. Development of the Right to Privacy	232
A. The Common Law	232
B. The Constitutional Protection of Privacy	235
C. The Federal Legislative Response	237
Fair Credit Reporting Act of 1970	237
Privacy Act of 1974	238
Family Educational Rights and Privacy Act	239
Freedom of Information Act	240
Right to Financial Privacy Act of 1978	240
Fair Credit Billing Act	241
D. State Privacy Legislation	241
IV. The Judicial Response to Information Privacy in the Computer Age	242
V. Evaluation of the Existing Legislative Framework and Possible Future Models to Reconcile the Competing Individual Privacy Versus Organizational Need for Information	245
VI. A Domestic Model—The Fair Credit Reporting Act	248
A. The Need for Accurate Consumer Reports	248
B. Common Law Before the Fair Credit Reporting Act	250
C. Legislative Overview	253
D. Purpose of the Fair Credit Reporting Act	254
E. The Balancing Test—Information v. Privacy	257
Industry's Need for Information	257
Individual's Right to Informational Privacy	260
F. Purpose for Which a Consumer Report May be Used	264

G. Standard of Reasonable Care in the Preparation of a Consumer Report	267
VII. A Foreign Model—The Convention for the Protection of Individuals with Regard to Automatic Processing of Personal Data	272
A. The European Approach to Informational Privacy	272
B. Domestic European Data Protection	277
C. Development of European International Data Protection Law	279
D. The Council of Europe's First Effort at Data Protection Law	280
E. The Next Stage: The European Convention	289
F. Implications of the European Convention for U.S. Data Processing	304
VIII. Conclusion	305
IX. Footnotes	310

CHAPTER 6 COMPUTER CRIME

I. Introduction	331
II. A Workable Definition	331
III. Software as Property	335
IV. Theft of Software	341
V. Current Legislation	344
VI. Evidentiary Problems	349
VII. Prevention and Security	353
VIII. Conclusion	356
IX. Footnotes	358

Tape Supplement: *Evidentiary Considerations of Computers*

CHAPTER 7 ELECTRONIC FUNDS TRANSFER

I. Introduction	371
II. History and Background of Electronic Funds Transfer	372
III. Types of Electronic Funds Transfer	374
A. Non-Consumer Electronic Funds Transfer	374
Automated Clearing Houses	376
Check Authorization/Check Guarantee	377
Wire Transfers	378
Fedwire	379
Bank Wire	380
Clearinghouse Interbank Payment System (CHIPS)	380
Society for Worldwide International Financial Telecommunications (SWIFT)	382
B. Consumer-Related Electronic Funds Transfer	383
Automated Teller Machines (ATM)	383
Point of Sales (POS)	385
Preauthorized Debits and Credits	387
Telephone Bill Paying	388
IV. The Electronic Fund Transfer Act and Regulation E	389
A. History and Purpose	389

B. EFTA or Regulation E	392
V. Legal Issues Faced by Consumers Under EFTA and Regulation E	393
The EFT Act: 15 U.S.C. Section 1693 a through Section 1693 r	394
Definitions, Section 1693 a	394
Regulations, Section 1693 b	397
Terms and Conditions of Transfer, Section 1693 c	398
Documentation of Transfers, Section 1693 d	400
Preauthorized Transfers, Section 1693 e	411
Error Resolution, Section 1693 f	414
Consumer Liability, Section 1693 g	421
Liability of Financial Institutions, Section 1693 h	430
Issuance of Cards of Other Means of Access, Section 1693 i	433
Suspension of Obligations, Section 1693 j	436
Compulsory Use of Electronic Fund Transfers, Section 1693 k	437
Waiver of Rights, Section 1693 l	439
Civil Liability, Section 1693 m	440
Criminal Liability, Section 1693 n	443
Administrative Enforcement, Section 1693 o	443
Reports to Congress, Section 1693 p	443
Relation to State Laws, Section 1693 q	443
Exemption for State Regulation, Section 1693 r	443
VI. Conclusion	444
VII. Footnotes	447
Tape Supplement: <i>Future Trends in Electronic Funds Transfer</i>	

CHAPTER 1 - COMPUTER TECHNOLOGY

A PRIMER ON COMPUTERS

I. INTRODUCTION

The computer has permeated the very fabric of the modern world. Rapid changes abound in the manner of conducting our lifestyles, from contacting associates and purchasing goods to earning a livelihood. These changes, in great part, have occurred due to the acceptance and rapid advancements of computer technology.

During the early stages of computer development, these devices existed as great electronic behemoths secured in sterile and austere surroundings, with a dedicated, specially trained 'priesthood' supporting and directing the new technological marvel. However, the computer has recently become smaller, less expensive and more 'user-friendly' with regard to moderately trained individuals, further permeating the fabric of everyday routine in modern society.

Along with the advancements that computers have provided follows the need to understand the terminology and structure of computers. Ignorance of the capabilities and use of computers, in the near future, will be a handicap as severe as present-day modern language illiteracy. Computer-literacy, therefore, becomes a paramount concern prior to undertaking the study of the various societal and legal responses to the computer in the information revolution.

II. THE COMPUTER SYSTEM

In its simplest form, a computer is a device that can perform computations without human intervention. Such

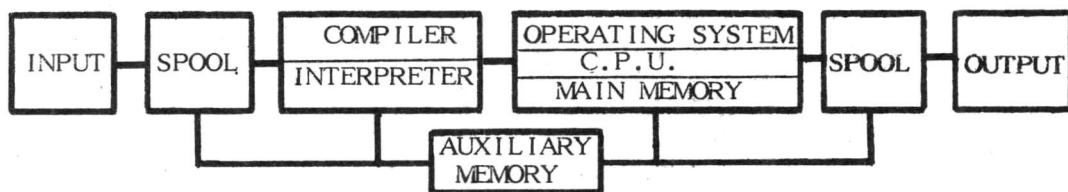
computations can take one of three forms: arithmetic operations, logical operations or input/output operations. Arithmetic operations include the standard mathematical operations of addition, subtraction, multiplication and division along with more complex procedures such as square root, factoring and powers of numbers. Logical operations require the computer to determine states of quality, such as whether one quantity is less or greater than or equal to a second quantity. Input/output operations include the receiving of information by the computer machine and the causing of an action by a machine, such as printing particular numbers on a page or rotating a mechanical robot arm. However, the computer can only perform one of these operations, as directed, at one time, but at such an accelerated rate of operative speed, that the computer appears to be performing many functions simultaneously.

Computer systems are generally subdivided into three general classifications: Mainframe, mini and micro. These divisions are traditionally related to thresholds in size, price, speed of processing and the 'bit' size of the internal electronic processor. The 'bit' is a logical binary digit or on/off switch, and bit size represents the number of bits or size of a logical word that the computer can recognize at one time. The bits are grouped into 'bytes' which represent characters to a computer, with one byte commonly consisting of eight bits, as will be described in more detail later in the chapter. A mainframe computer is represented by large and fast electronic hardware, a 32 bit processor and a pricetag from one-half to \$3 million. Mini-computers have relatively small and fast hardware, about

the size of a large filecabinet with a 16 bit processor and approximately a \$20 thousand to \$200 thousand overall price. Micro-computers have the smallest and slowest of electronic hardware, nominally an 8 bit processor, and are fairly inexpensive, generally between \$100 and \$15 thousand. Such bench marks are not absolute, especially within the last few years, as 16 bit micros and 32 bit minis abound while the operational speed of some micros now comfortably exceeds the best speed of last decade's mainframes.

Far greater specificity can be obtained, however, in the description of the components that comprise a computer system. In general, there are four such basic components: input/output (I/O) devices, a central processing unit (CPU), mass storage devices and software. Of these, the first three are visible, material electronic or electro-mechanical devices called hardware. The last, software, describes the evanescent sets of logical instructions and data used by the computer system electronics in performing directed operations. An even greater degree of understanding can be obtained by schematic representation of the functional modules of the computer system, each module being composed from a set of the four basic components.

A general schematic representation of a computer system would thusly contain the connected basic modules discussed below:



Input

The first of computer system modules is the input device. Such devices share in commonality the ability to convert real-world data and events into electrical impulses. Example input devices include card-reading devices, which sense the location of coded holes punched into paper cards or tapes; keyboards, which recognize the striking of designated characters on a typewriter-like pad; disk and tape readers, which sense the existence of magnetic zones on a metallic oxide coated surface; optical and audio scanners, which sense discrete quantities of differentiated electromagnetic radiation; and many other devices.

Spool

The spooling device is a hardware and software device used to minimize the differences between input/output and computer processing speeds. Since the computer CPU is capable of performing its routine operations very rapidly, generally 1000 to 1 million per second, normal input means are substantially slower than the computer's access needs. For example, the fastest of typists may input from 5 to 10 characters per second. This is at best two orders of magnitude below the operational speed or access/recognition speed of a standard computer CPU. The spooling device, therefore, as a programmed mass storage device, collects data obtained from one or more input devices and holds the data until