

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTEL CORPORATION,
Petitioner,

v.

VLSI TECHNOLOGY LLC,
Patent Owner.

IPR2019-01196
U.S. Patent 7,246,027

DECLARATION OF DR. JAMES L. MULLINS

I, Dr. James L. Mullins, declare as follows:

1. My name is Dr. James L. Mullins.

2. I have been retained by petitioner Intel Corporation (“Intel”) in the above-captioned *inter partes* review relating to U.S. Patent 7,246,027 to provide opinions on various documents.

I. INTRODUCTION

3. My career as a professional and academic/research spanned more than 44 years including library positions at Indiana University, Villanova University, Massachusetts Institute of Technology, and Purdue University. Appendix A is a true and correct copy of my curriculum vitae describing my background and experience.

4. In 2018, I founded the firm Prior Art Documentation Librarian Services, LLC, located at 106 Berrow, Williamsburg, VA 23188 after purchasing the intellectual property of and successor to Prior Art Documentation, LLC located at 711 South Race Street, Urbana, IL 61801. Further information about my firm, Prior Art Documentation Librarian Services, LLC (PADLS), is available at www.priorartdoclib.com.

5. I have been retained by Intel to offer my opinion on the authenticity and dates of public accessibility of various documents. For this service, I am being paid my usual hourly fee of \$225.00. I have no stake in the outcome of this proceeding

or any related litigation or administrative proceedings, and my compensation in no way depends on the substance of my testimony or the outcome of this proceeding.

II. QUALIFICATIONS

6. I received a Bachelor of Arts degree in History, Religion and Political Science in 1972 as well as a Master of Arts degree in Library Science in 1973 from the University of Iowa. I received my Ph.D. in Academic Library Management in 1984 from Indiana University. Over the past forty four years, I have held various positions in the field of library and information sciences.

7. I am presently Dean of Libraries Emeritus and Esther Ellis Norton Professor Emeritus at Purdue University, and have been since January 1, 2018. I have been previously employed as follows:

- Dean of Libraries and Professor and Esther Ellis Norton Professor, Purdue University, West Lafayette, IN (2004-2017)
- Assistant/Associate Director for Administration, Massachusetts Institute of Technology (MIT) Libraries, Cambridge, MA (2000-2004)
- University Librarian and Director, Falvey Memorial Library, Villanova University, Villanova, PA (1996-2000)
- Director of Library Services, Indiana University South Bend, South Bend, IN (1978-1996)

- Part-time Instructor, School of Library and Information Science, Indiana University, Bloomington, IN (1979-1996)
- Associate Law Librarian, and associated titles, Indiana University School of Law, Bloomington, IN (1974-1978)
- Catalog Librarian, Assistant Professor, Georgia Southern College (now University), Statesboro, GA (1973-1974)

8. I am a member of the American Library Association (“ALA”), where I served as the chair of the Research Committee of the Association of College and Research Libraries (“ACRL”). My service to ALA included service on the editorial board of the most prominent library journal, *College and Research Libraries*. I also served on the Standards Committee, College Section of the Association of College and Research Libraries, where I was instrumental in developing a re-issue of the *Standards for College Libraries* in 2000.

9. I am an author of numerous publications in the field of library science, and have given presentations in library sciences at national and international conferences. During more than 44 years as an academic librarian and library science scholar, I have gained extensive experience with catalog records and online library management systems (LMS) built using Machine-Readable Cataloging (“MARC”) standards. As an academic library administrator, I have had responsibility to ensure that students were educated to identify, locate, assess, and integrate information

garnered from research library resources. I have also facilitated the research of faculty colleagues either directly or through the provision of and access to the requisite print and/or digital materials and services at the universities where I worked.

10. Based on my experience identified above and detailed in my curriculum vitae, which is attached hereto as Appendix A, I consider myself to be an expert in the field of library science and academic library administration. I have previously offered my opinions on the public availability and authenticity of documents in over 40 cases. I have been deposed in one case.

III. BACKGROUND ON PUBLIC ACCESSIBILITY

A. Scope of This Declaration

11. I am not a lawyer, and I am not rendering an opinion on the legal question of whether a particular document is, or is not, a “printed publication” under the law. I am, however, rendering my expert opinion on the authenticity of the document referenced herein and when and how this document was disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art, exercising reasonable diligence, could have located the document.

12. I am informed by counsel that an item is considered authentic if there is sufficient evidence to support a finding that the item is what it is claimed to be. I

am also informed that authenticity can be established based on the contents of the document itself, such as the appearance, content, substance, internal patterns, or other distinctive characteristics of the item.

13. I am informed by counsel that a given reference qualifies as “publicly accessible” if it was disseminated or otherwise made available such that a person interested in and ordinarily skilled in the relevant subject matter could locate it through the exercise of ordinary diligence.

14. While I understand that the determination of public accessibility under the foregoing standard rests on a case-by-case analysis of the facts particular to an individual publication, I also understand that a printed publication is rendered “publicly accessible” if it is cataloged and indexed by a library such that a person interested in the relevant subject matter could locate it (*i.e.*, I understand that cataloging and indexing by a library is sufficient, though there are other ways that a printed publication may qualify as “publicly accessible”). One manner of sufficient indexing is indexing according to subject matter. I understand that it is not necessary to prove someone actually looked at the printed publication in order to show it was publicly accessible by virtue of a library’s cataloging and indexing thereof. I understand that cataloging and indexing by a single library of a single instance of a particular printed publication is sufficient. I understand that, even if access to a library is restricted, a printed publication that has been cataloged and indexed therein

is publicly accessible so long as a presumption is raised that the portion of the public concerned with the relevant subject matter would know of the printed publication. I also understand that the cataloging and indexing of information that would guide a person interested in the relevant subject matter to the printed publication, such as the cataloging and indexing of an abstract for the printed publication, is sufficient to render the printed publication publicly accessible.

15. I understand that evidence showing the specific date when a printed publication became publicly accessible is not necessary. Rather, routine business practices, such as general library cataloging and indexing practices, can be used to establish an approximate date on which a printed publication became publicly accessible.

B. Person of Ordinary Skill in the Art

16. In forming the opinions expressed in this declaration, I have reviewed the documents and appendices referenced herein. These materials are records created in the ordinary course of business by publishers, libraries, indexing services, and others. From my years of experience, I am familiar with the process for creating many of these records, and I know that these records are created by people with knowledge of the information contained within the record. Further, these records are created with the expectation that researchers and other members of the public will use them. All materials cited in this declaration and its appendices are of a type

that experts in my field would reasonably rely upon and refer to in forming their opinions.

17. I have been informed by counsel that the subject matter of this proceeding relates to integrated circuits and computer architecture, including, for example, determining an adjustment signal for a power supply voltage.

18. I have been informed by counsel that a “person of ordinary skill in the art at the time of the inventions” (POSITA) is a hypothetical person who is presumed to be familiar with the relevant field and its literature at the time of the inventions. This hypothetical person is also a person of ordinary creativity, capable of understanding the scientific principles applicable to the pertinent field.

19. I have been informed by counsel that persons of ordinary skill in this subject matter or art would have included someone with at least a master’s degree in electrical engineering or computer engineering, plus at least two years of experience in integrated circuit design, or alternatively a bachelor’s degree in one of those fields plus at least four years of experience in integrated circuit design.

20. It is my opinion that such a person would have been actively engaged in academic research and learning through study and practice in the field, and possibly through formal instruction through the bibliographic resources relevant to his or her research. By the 2000s, such a person would have had access to a vast

array of print resources, including at least the documents referenced below, as well as to a fast-changing set of online resources.

C. Library Catalog Records and Other Resources

21. Some background on MARC (Machine-Readable Cataloging) formatted records, OCLC, and WorldCat is helpful to understand the library catalog records discussed in this declaration. I am fully familiar with the library cataloging standard known as the MARC standard, which is an industry-wide standard method of storing and organizing library catalog information.¹ MARC practices have been consistent since the MARC format was developed by the Library of Congress in the 1960s, and by the early 1970s became the U.S. national standard for disseminating bibliographic data. By the mid-1970s, MARC format became the international standard, and persists through the present. A MARC-compatible library is one that has a catalog consisting of individual MARC records for each of its items. The underlying MARC format (computer program) underpins the online public access catalog (OPAC) that is available to library users to locate a particular holding of a library. Today, MARC is the primary communications protocol for the transfer and

¹ The full text of the standard is available from the Library of Congress at <http://www.loc.gov/marc/bibliographic/>.

storage of bibliographic metadata in libraries.² The MARC practices discussed below were in place during the late 1990s time frame relevant to the documents referenced herein.

22. Online Computer Library Center (OCLC) is a not-for-profit worldwide consortium of libraries. Similar to MARC standards, OCLC's practices have been consistent since the 1970s through the present. Accordingly, the OCLC practices discussed below were in place during the time frame discussed in my opinions section. OCLC was created "to establish, maintain and operate a computerized library network and to promote the evolution of library use, of libraries themselves, and of librarianship, and to provide processes and products for the benefit of library

² Almost every major library in the world uses a catalog that is MARC-compatible. See, e.g., *MARC Frequently Asked Questions (FAQ)*, LIBRARY OF CONGRESS, <https://www.loc.gov/marc/faq.html> (last visited Jan. 24, 2018) ("MARC is the acronym for MACHine-Readable Cataloging. It defines a data format that emerged from a Library of Congress-led initiative that began nearly forty years ago. It provides the mechanism by which computers exchange, use, and interpret bibliographic information, and its data elements make up the foundation of most library catalogs used today."). MARC is the ANSI/NISO Z39.2-1994 (reaffirmed 2009) standard for Information Interchange Format.

users and libraries, including such objectives as increasing availability of library resources to individual library patrons and reducing the rate of rise of library per-unit costs, all for the fundamental public purpose of furthering ease of access to and use of the ever-expanding body of worldwide scientific, literary and educational knowledge and information.”³ Among other services, OCLC and its members are responsible for maintaining the WorldCat database (<http://www.worldcat.org/>), used by libraries throughout the world.

23. Libraries worldwide use the machine-readable MARC format for catalog records. MARC-formatted records include a variety of subject access points based on the content of the document being cataloged. A MARC record for a particular work comprises several fields, each of which contains specific data about the work. Each field is identified by a standardized, unique, three-digit code corresponding to the type of data that follows. For example, a work’s title is recorded in field 245, the primary author of the work is recorded in field 100, a work’s International Standard Book Number (“ISBN”) is recorded in field 020, and the work’s Library of Congress call number (assigned by Library of Congress) is

³ Third Article, Amended Articles of Incorporation of OCLC Online Computer Library Center, Inc., Revised November 30, 2016 (available at <https://www.oclc.org/content/dam/oclc/membership/articles-of-incorporation.pdf>).

recorded in field 050. Some fields can contain subfields, which are indicated by letters. For example, a work's publication date is recorded in field 260 under the subfield "c."

24. The MARC Field 040, subfield "a," identifies the library or other entity that created the catalog record in the MARC format. The MARC Field 008 identifies the date when this first MARC record was created.

25. MARC records also include several fields that include subject matter classification information. An overview of MARC record fields is available through the Library of Congress at <http://www.loc.gov/marc/bibliographic/>. For example, 6XX fields are termed "Subject Access Fields."⁴ Among these, for example, is the 650 field; this is the "Subject Added Entry – Topical Term" field. *See* <http://www.loc.gov/marc/bibliographic/bd650.html>. The 650 field is a "[s]ubject added entry in which the entry element is a topical term." *Id.* The 650 field entries "are assigned to a bibliographic record to provide access according to generally accepted thesaurus-building rules (e.g., *Library of Congress Subject Headings* (LCSH), *Medical Subject Headings* (MeSH))." *Id.* Thus, a researcher can easily discover material relevant to a topic of interest with a search using the terms employed in the MARC Fields 6XX.

⁴ *See* <http://www.loc.gov/marc/bibliographic/bd6xx.html>.

26. Further, MARC records include call numbers, which themselves include a classification number. For example, the 050 field is dedicated as the “Library of Congress Call Number”⁵ as assigned by the Library of Congress. A defined portion of the Library of Congress Call Number is the classification number, and “[t]he source of the classification number is *Library of Congress Classification* and the *LC Classification-Additions and Changes*.” *Id.* Thus, included in the 050 field is a subject matter classification. As an example: TK5105.59 indicates books on computer networks – security measures. When a local library assigns a classification number, most often a Library of Congress derived classification number created by a local library cataloger or it could be a Dewey Decimal classification number for example, 005.8, computer networks – security measures, it appears in the 090 field. In either scenario, the MARC record includes a classification number in the call number field that represents a subject matter classification.

27. WorldCat is the world’s largest public online catalog, maintained by the OCLC, a not-for-profit international library consortium, and built with the records created by the thousands of libraries that are members of OCLC. OCLC provides bibliographic and abstract information to the public based on MARC-

⁵ See <http://www.loc.gov/marc/bibliographic/bd050.html>.

compliant records through its OCLC WorldCat database. WorldCat requires no knowledge of MARC tags and code and does not require a login or password. WorldCat is easily accessible through the World Wide Web to all who wish to search it; there are no restrictions to be a member of a particular community, etc. The date a given catalog record was created (corresponding to the MARC Field 008) appears in some detailed WorldCat records as the Date of Entry but not necessarily all. WorldCat does not provide a view of the underlying MARC format for a specific WorldCat record. In order to see the underlying MARC format the researcher must locate the book in a holding library listed among those shown in WorldCat, and search the online public catalog (OPAC) of a holding library. Whereas WorldCat records are widely available, the availability of library specific MARC formatted records varies from library to library. When a specific library wishes to make the underlying MARC format available there will be a link from the library's OPAC display, often identified as a MARC record or librarian/staff view.

28. When a MARC record is created by the Library of Congress or an OCLC member institution, the date of creation for that record is automatically populated in the fixed field (008), with characters 00 through 05 in year, month, day

format (YYMMDD).⁶ Therefore, the MARC record creation date reflects the date on which the publication associated with the record was first cataloged. Thereafter, the local library's computer system may automatically update the date in field 005 every time the library updates the MARC record (*e.g.*, to reflect that an item has been moved to a different shelving location within the library, or a reload of the bibliographic data with the introduction of a new library management system that creates and manages the OPAC).

D. Monograph Publications

29. Monograph publications are written on a single topic, presented at length and distinguished from an article and include books, dissertations, and technical reports. A library typically creates a catalog record when the monograph is acquired by the library. First, it will search OCLC to determine if a record has already been created by the Library of Congress or another OCLC institution. If a record is found in OCLC, the record is downloaded into the library's LMS (Library Management System) that includes typically the OPAC (online public access catalog by which researchers locate a particular library holding in a user-friendly format), acquisitions, cataloging, and circulation integrated functions. Once the item is

⁶ Some of the newer library catalog systems also include hour, minute, second (HHMMSS).

downloaded into the library's LMS, the library adds its identifier to the OCLC database so when a search is completed on WorldCat, the library will be indicated as an owner of the title. Once a record is created in a Library's LMS, it is searchable and viewable through the library's OPAC, typically by author, title, and subject heading, at that library and from anywhere in the world through the internet by accessing that library's OPAC. The OPAC also connects with the circulation function of the library, which typically indicates whether the record is available, in circulation, etc., with its call number and location in a specific departmental/disciplinary library, if applicable. The OPAC not only provides immediate bibliographic access on-site, it also facilitates the interlibrary loan process, which is when one publication is loaned from one library to another.

E. Periodicals

30. A library typically creates a catalog record for a periodical publication when the library receives its first issue. When the institution receives subsequent issues/volumes of the periodical, the issues/volumes are checked in (often using a date stamp), added to the institution's holding records, and made available very soon thereafter – normally within a few days of receipt or (at most) within a few weeks of receipt.

31. The initial periodicals record will sometimes not reflect all subsequent changes in publication details (including minor variations in title, frequency, etc.).

F. Ownership and date stamp

32. Every library has a different practice or policy on whether or not to date stamp, but all will have an ownership stamp somewhere in the book. The ownership stamp typically appears, on the cover page, verso of the cover page, or a designated page within the book, sometimes even on the top, side, or bottom edge of the monograph or periodical. The ownership and date stamp can also vary from one library to another when the stamp is entered on the monograph or periodical. It could occur when received in acquisitions after shipment to the library, or it could be at time of cataloging.

G. Indexing

33. A researcher may discover material relevant to his or her topic in a variety of ways. One common means of discovery is to search for relevant information in an index of periodical and other publications. Having found relevant material, the researcher will then normally obtain it online, look for it in libraries, or purchase it from the publisher, a bookstore, a document delivery service, or other provider. Sometimes, the date of a document's public accessibility will involve both indexing and library date information. Date information for indexing entries is, however, often unavailable. This is especially true for online indices.

34. Indexing services use a wide variety of controlled vocabularies to provide subject access and other means of discovering the content of documents. The formats in which these access terms are presented vary from service to service.

35. Online indexing services commonly provide bibliographic information, abstracts, and full-text copies of the indexed publications, along with a list of the documents cited in the indexed publication. These services also often provide lists of publications that cite a given document. A citation of a document is evidence that the document was publicly available and in use by researchers no later than the publication date of the citing document.

36. *IEEE Xplore* – The Institute of Electrical and Electronics Engineers is the world’s largest organization for the advancement of technology with some 430,000 members in 160 countries. Known by its acronym IEEE, it has created a database, IEEE Xplore, that provides access to its hundreds of publications and those of its publishing partners. This includes the content of over 170 journals, more than 1,400 conference proceedings, some 5,100 technical standards, 2,000 ebooks and 400 educational courses. In all, more than three million documents, dating from 1872 on, are searchable and available for purchase either through subscription or individually. Many of these records are accessible via Google Scholar.

37. **SpringerLink** – The service provides researchers with access to millions of scientific documents from journals, books, series, protocols, reference works and proceedings. <https://link.springer.com/>.

38. **ProQuest Ebook Central** – This credible content from authoritative, scholarly sources, Ebook Central delivers, with breadth and depth of ebooks from scholarly sources, including University Presses and other top publishers.

39. **Funkschau** – Founded in 1929, Funkschau in its early days was a sheet for technically interested radio listeners and electronics hobbyists and transformed from the late 1940s to the 1980s to a trade journal for the radio and television retailers. It offered retailers a practical overview of current and upcoming technologies. <http://www.funkschau.de/>.

40. **Google Scholar** – This web search engine indexes full text or metadata of scholarly literature, covering numerous formats and disciplines. The size of the database is not published by Google, but researchers have estimated that it contained approximately 160 million items in 2014. (See Oduna-Malea, Enrique, Ayllon, Juan Manuel, Martin-Martin, Alberto, Delgado Lopez-Cozar, Emilio “About the size of Google Scholar: playing the numbers”, Jul 2014. *Scientometrics*, 104(3), pp 1-43, <https://arxiv.org/ftp/arxiv/papers/1407/1407.6239.pdf>.) The database is not limited by type of publication, and includes dissertations, prepublication materials, technical

reports, patents and more. Google Scholar is similar to many subscription databases, e.g., Scopus and Web of Science in its broad subject coverage.

41. **Wisconsin TechSearch (WTS)** – WTS is a set of services offered by the University of Wisconsin Libraries. WTS offers an array of article delivery and research services to any individual or organization who requests the specialized skills of WTS staff in locating and retrieving information, regardless of whether the individual is affiliated with the University of Wisconsin.

IV. OPINION REGARDING AUTHENTICITY AND PUBLIC ACCESSIBILITY

A. Ex. 1014: M. Morris Mano. *Digital Logic and Computer Design*. Prentice-Hall, Inc., 1979. 612 pages. (“Mano”)

1. Authentication

42. I have been asked to opine on Digital Logic and Computer Design (“Mano”). Mano is a book authored by M. Morris Mano published by Prentice Hall, Inc., in 1979. It contains, in 612 pages, 13 Chapters, Appendix, and Index.

43. I have evaluated the Mano reference in two ways: (1) by assessing scans of a copy of Mano (Ex. 1014), provided by counsel, owned by the Library of Congress; (2) by assessing scans of a print copy held by the Cornell University Libraries provided to me at my request through Wisconsin TechSearch (WTS).

44. Ex. 1014, provided by counsel, is a scan of parts of a copy of Mano including, the cover, inside front cover with stamp of the Library of Congress, title page, verso of the title page (copyright) with handwritten call number: “TK7888.3

.M345 Copy 2”; Contents; pages 1-4, and back cover with inventory barcode from the copy held by the Library of Congress.

45. All identifying characteristics, such as stamps and notations, on Ex. 1014, are consistent with library practice and procedure that I have observed during my career as a professional librarian, specifically with those items held by the Library of Congress. I have no cause for concern about the authenticity or accuracy of these identifying attributes. In addition, Mano was found within the custody of a library, the Library of Congress, one of the most likely locations for an authentic publication to be located.

46. Attachment 1014A includes scans provided to me at my request through Wisconsin TechSearch (WTS) on June 18, 2019 from a copy of Mano held by the Cornell University Libraries. Ex. 1014A includes scans of Mano: cover; flyleaf inside front cover with stamp of “Cornell University Libraries, Ithaca, N.Y. Engineering Library,” inventory barcode of “Cornell University Library,” stamp that reads “ENGR. LIBR. JUN 17 1996”, date due slip with various dates with earliest ones: FEB 26, 1997, Aug 24, 1997, SEP 7, 1999, etc.; flyleaf with call number “Engr TK7888.3.M345x 1979”; title page; verso of title page (copyright page) with stamp of “Cornell University Libraries, Ithaca, N.Y.”; and Contents. All identifying characteristics, such as stamps and notations, on Ex. 1014A are consistent with library practice and procedure that I have observed during my career as a

professional librarian. I have no cause for concern about the authenticity or accuracy of these identifying attributes. In addition, Mano was found within the custody of a library, the Cornell University Engineering Library, one of the most likely locations for an authentic publication to be located.

47. After comparison between Attachment 1014A and the corresponding pages of Ex. 1014, I found no difference between the two. Therefore, upon finding Mano in libraries, the Library of Congress and the Cornell University Libraries, I have determined that Ex. 1014, Mano is an authentic document.

48. I conclude and affirm that Mano, Ex. 1014, is an authentic document.

2. Public Accessibility

49. Attachment 1014B is a true and correct copy of the WorldCat entry for Mano. I obtained Attachment 1014B by completing a search on WorldCat on June 18, 2019.

50. Attachment 1014B shows that Mano is the document associated with this WorldCat entry, as verified by the author: M. Morris Mano; title: Digital Logic and Computer Design; publisher and publication date: Prentice-Hall in 1979; and ISBN: 0132145103.

51. Mano could have been located by searching for the author – M. Morris Mano; title: Digital Logic and Computer Design; or by searching the subject headings: *Electronic digital computers; Logic circuits; Digital integrated circuits;*

as well as the subject headings listed toward the bottom of the entry including: *Logic design*.

52. When I searched WorldCat for holdings of Mano in the District of Columbia, the Library of Congress was third on the list among the 395 libraries shown as holding Mano worldwide. When I searched in the State of New York, Cornell University Library was eleventh on the list among the 395 libraries shown as holding Mano worldwide.

53. The searches discussed above could have been performed anywhere in the world by anyone who accessed WorldCat and its predecessor database through an OCLC member library in the 1990s through today.

54. Attachment 1014C is a download I made from the Library of Congress OPAC (online catalog) on June 18, 2019. The document cataloged in this record is Mano as verified by the fields listing the author: M. Morris Mano; title: Digital Logic and Computer Design; publisher and publication date: Prentice-Hall in 1979; and ISBN: 0132145103. I compared the Library of Congress Classification (call number): TK7888.3.M345 with that shown on the copyright page of Ex. 1014, and it is the same on both with the exception of the designation of Copy 2, which is shown elsewhere in the OPAC record.

55. Mano could have been located in the Library of Congress OPAC by searching for the author: M. Morris Mano; title: Digital Logic and Computer

Design; or by searching the subject headings: *Electronic digital computers; Logic circuits; Digital integrated circuits; and/or Logic design.*

56. Attachment 1014D is the MARC record I downloaded from the Library of Congress OPAC on June 18, 2019. The MARC format provides information about the processing of Mano by the Library of Congress. The MARC 955 field is not appearing on the Library of Congress MARC record for Mano. The MARC 005 and MARC 008 fields provide dates of the processing and cataloging of Mano by the Library of Congress. As discussed above, the MARC 005 field is the field used by the cataloging library (in this case Library of Congress) when it was last processed, cataloged or possibly had a change in location or designation. The MARC 005 field on this record for Mano is: 19790803000000.0 which indicates on August 3, 1979 Mano was cataloged and entered into the Library of Congress OPAC. Assuming typical time for labeling, processing and transfer to the shelf, Mano would have been accessible within 10 days, or August 13, 1979.

57. Once Mano was entered into the general collection of the Library of Congress, members of the public could access the book by having it brought to either the Jefferson or Adams Reading Rooms. The collections of the Library of Congress are searchable by subject matter, author, or title such that a skilled searcher could find works in which they were interested. For example, a member of the public could have located Ex. 1014 by searching for the subject field "*Electronic digital*

computers; Logic circuits; Digital integrated circuits; and/or Logic design” in topical term MARC field 650 on the Library of Congress OPAC. Members of the public could read, study, and make notes about a selected work in the Reading Rooms. Further, members of the public were permitted to make photocopies of portions of the works while in the Reading Room. Accordingly, Ex. 1014 was available to the general public when it was available for access by members of the public at the Library of Congress.

58. Attachment 1014E is a download I made from the Cornell University Libraries OPAC (online catalog) on June 18, 2019. The document cataloged in this record is Mano as verified by the fields listing the author: M. Morris Mano; title: Digital Logic and Computer Design; publisher and publication date: Prentice-Hall in 1979; and ISBN: 0132145103. I compared the Library of Congress Classification (call number): TK7888.3.M345x 1979 with that shown on the flyleaf page of Attachment 1014A and the OPAC record. It is the same on both.

59. Mano could have been located by searching Cornell University Library OPAC for the author: M. Morris Mano; title: Digital Logic and Computer Design; or by searching the subject headings: “*Electronic digital computers; Logic circuits; Digital integrated circuits; and/or Logic design*”.

60. As described above, Attachment 1014A is a true and accurate copy of Mano held by Cornell University Libraries as provided to me by the Wisconsin Tech

Services (WTS). Attachment 1014A includes scans of Mano: cover; flyleaf inside front cover with stamp of “Cornell University Library, Ithaca, N.Y. Engineering Library,” inventory barcode of “Cornell University Library,” stamp that reads “ENGR. LIBR. JUN 17 1996”, date due slip with various dates, the earliest ones: FEB 26, 1997, Aug 24, 1997, SEP 7, 1999, etc.; flyleaf with call number “Engr TK7888.3.M345x 1979”; title page; verso of title page (copyright page) with stamp of “Cornell University Libraries, Ithaca, N.Y.”; and Contents. The initial date due stamp indicates that Attachment 1014A was available for check out from the Engineering Library of Cornell University Libraries on February 26, 1997.

61. Attachment 1014A—flyleaf with date due slip—indicates that the book was checked out and due back on February 26, 1997, the earliest date recorded on the date due slip. This is consistent with the cataloging date found in the MARC 905 field, June 11, 1996, in the Cornell University Library MARC record, Attachment 1014F (which I downloaded from the Cornell University Libraries on June 18, 2019).

905 |a19960611120000.0 – June 11, 1996 (remaining digits are check digits)

62. As discussed in the introduction, the 9XX MARC field has been designated as ‘local notes’ for the cataloging library to use as it deems necessary. Cornell University Library (as confirmed with Cornell University Library cataloging

staff) have consistently used the 905 field to indicate date of cataloging and addition of the record into the OPAC of the Cornell University Library.

63. With cataloging completed and addition to the Cornell University Libraries OPAC on June 11, 1996, it would take approximately a week for final labeling and transfer to the Engineering Library shelf, so by June 18, 1996, Mano would have been accessible (consistent with the stamp date of June 17, 1996 shown in Attachment 1014A).

3. Conclusion

64. I conclude that Mano, Ex. 1014, is an authentic document and would have been publicly accessible through the Library of Congress no later than August 13, 1979 and at Cornell University Libraries, June 18, 1996.

B. Ex. 1016: Paul Horowitz and Winfield Hill. *The Art of Electronics*. 2nd Edition. Cambridge University Press, 1989. 1125 pages. (“Horowitz”)

1. Authentication

65. I have been asked to opine on *The Art of Electronics*, 2nd Edition. Horowitz is a book authored by Paul Horowitz and Winfield Hill published by Cambridge University Press in 1989. It contains, in 1125 pages, 15 Chapters, Appendices A-K, Bibliography, and an Index.

66. I have evaluated the Horowitz reference in two ways: (1) by assessing scans of a copy of Horowitz (Ex. 1016), provided by counsel, owned by the Library

of Congress; and (2) by assessing scans of a print copy held by the Purdue University Libraries.

67. Ex. 1016, provided by counsel, is a scan that contains parts of a copy of Horowitz, including the spine, having a label with a printed call number: TK7815.H67 1989; half title page; title page; the verso of the title page (copyright page); having a stamp indicating Library of Congress, Aug 31 1989 (date received by the Library of Congress) and toward the top of the page is a handwritten call number: TK7815.H67 1989; contents, and pages 522-528.

68. All identifying characteristics, such as stamps and notations, on Ex. 1016 are consistent with library practice and procedure that I have observed during my career as a professional librarian, specifically with those items held by the Library of Congress. I have no cause for concern about the authenticity or accuracy of these identifying attributes. In addition, Horowitz was found within the custody of a library, the Library of Congress, one of the most likely locations for an authentic publication to be located.

69. Attachment 1016A are scans provided to me at my request on June 10, 2019 from a copy of Horowitz held by the Purdue University Libraries. It was provided to me through my affiliation with Purdue University. Ex. 1016A includes Horowitz scans: Horowitz, The Art of Electronics and label with call number: TK7815.H87 1989; inside front cover with stamp that reads "Purdue University

Libraries”; title page with stamp in red that reads “Library of the Department of Chemistry, Purdue University”; verso of the title page (copyright); Contents; inside back cover with a label that reads “Heckman Bindery, Inc. July 04” and back cover with barcode inventory label indicating Purdue University Libraries. From my experience as a librarian and administrator of Purdue University Libraries I affirm that all labels and markings are consistent with those observed during my tenure at Purdue.

70. After comparison between Attachment 1016A and the corresponding pages of Ex. 1016, I found no difference between the two. Therefore, upon finding Horowitz in libraries, the Library of Congress and the Purdue University Libraries, I have determined that Ex. 1016, Horowitz is an authentic document.

71. I conclude and affirm that Horowitz, Ex. 1016, is an authentic document.

2. Public Accessibility

72. Attachment 1016B is a true and correct copy of the WorldCat entry for Horowitz. I obtained Attachment 1016B by completing a search on WorldCat on June 9-10, 2019.

73. Attachment 1016B shows that Horowitz is the document associated with this WorldCat entry, as verified by the authors: Paul Horowitz and Winfield

Hill; title: The Art of Electronics, 2nd Edition; publisher and publication date: Cambridge University Press in 1989; and ISBN: 0521370957.

74. Horowitz could have been located by searching for the authors – Paul Horowitz and Winfield Hill; title: The Art of Electronics; or by searching the subject headings: *Electronics; Electronic circuit design; and/or Electronique*.

75. When I searched WorldCat for holdings of Horowitz in the District of Columbia, the Library of Congress was fourth on the list among the 1501 libraries shown as holding Horowitz worldwide. When I searched in Indiana, Purdue University Library was seventh on the list among the 1501 libraries shown as holding Horowitz worldwide.

76. The searches discussed above could have been performed anywhere in the world by anyone who accessed WorldCat and its predecessor database through an OCLC member library in the 1990s through today.

77. Attachment 1016C is a download I made from the Library of Congress OPAC (online catalog) on June 10, 2019. The document cataloged in this record is Horowitz as verified by the fields listing the authors: Paul Horowitz and Winfield Hill; title: The Art of Electronics, 2nd Edition; publisher and publication date: Cambridge University Press in 1989; and ISBN: 0521370957. I compared the Library of Congress Classification (call number): TK7815.H67 1989 with that shown on the copyright page of Ex. 1016, and it is the same on both.

78. Horowitz could have been located by searching for the authors – Paul Horowitz and Winfield Hill; title: *The Art of Electronics*, or by searching the subject headings: “*Electronics; and/or Electronic circuit design*”.

79. The date stamped on Ex. 1016 of August 31, 1989 indicates receipt of Horowitz by the Library of Congress, consistent with library operations and practice, Horowitz would have been publicly accessible through the Library of Congress OPAC no later than 10 days after receipt, therefore, September 10, 1989. Once Horowitz was entered into the general collection of the Library of Congress, members of the public could access the book by having it brought to either the Jefferson or Adams Reading Rooms. The collections of the Library of Congress are searchable by subject matter, author, or title such that a skilled researcher could find works in which they were interested. For example, a member of the public could have located a copy of Ex. 1016 by searching for the subject fields “*Electronics; and/or Electronic circuit design*” in topical term MARC field 650. Members of the public could read, study, and make notes about a selected work in the Reading Rooms. Further, members of the public were permitted to make photocopies of portions of the works while in the Reading Rooms. Accordingly, a copy of Ex. 1016 was available to the general public when it was available for access by members of the public at the Library of Congress.

80. Attachment 1016D is the MARC record I downloaded from the Library of Congress OPAC. The MARC format provides information about the processing of Horowitz by the Library of Congress. In the case of Horowitz, the manuscript was not submitted to the Library of Congress for “Cataloging in Publication” review and processing. On the copyright page it indicates this was performed by the British Library. *See* Ex. 1016. Therefore the 955 field was omitted from the Library of Congress MARC record for Horowitz.

81. Attachment 1016E is a download I made from the Purdue University Libraries OPAC (online catalog) on June 10, 2019. The document cataloged in this record is Horowitz as verified by the fields listing the authors: Paul Horowitz and Winfield Hill; title: *The Art of Electronics*, 2nd Edition; publisher and publication date: Cambridge University Press in 1989; and ISBN: 0521370957. I compared the Library of Congress Classification (call number): TK7815.H67 1989 with that shown on the copyright page of Ex. 1016A, and it is the same on both.

82. Horowitz could have been located by searching for the authors – Paul Horowitz and Winfield Hill; title: *The Art of Electronics*, or by searching the subject headings: “*Electronics; and/or Electronic circuit design*”.

83. On Attachment 1016A, the scans from the Purdue University Libraries copy of Horowitz, the Heckman Bindery label July 04 (July 2004) indicates that the Purdue University Libraries copy of Horowitz was re-bound due to wear (the binding

appearance indicates it is not the original published cover). Therefore, the Purdue University Libraries copy of Horowitz was accessible July 2004.

3. Conclusion

84. I conclude that Horowitz, Ex. 1016, is an authentic document and would have been publicly accessible through the Library of Congress no later than September 10, 1989 and at Purdue University Libraries, July 2004.

V. AVAILABILITY FOR CROSS-EXAMINATION

85. In signing this Declaration, I recognize that this Declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the U.S. Patent and Trademark Office. I also recognize that I may be subject to cross-examination in the case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

VI. RIGHT TO SUPPLEMENT

86. I reserve the right to supplement my opinions in the future to respond to any arguments that the Patent Owner raises and to take into account new information as it becomes available to me.

VII. JURAT

87. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the full knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the U.S. Code.

Dated: _____

June 26, 2019

James L. Mullins

Dr. James L. Mullins

APPENDIX A

JAMES L. MULLINS

Prior Art Document Librarian Services

106 Berrow

Williamsburg, VA 23188

jlmullins@priorartdoclib.com

ph. 765 479 4956

Experience:

- 2018 -** Dean of Libraries Emeritus & Esther Ellis Norton Professor Emeritus
2011 - 2017 Dean of Libraries and Esther Ellis Norton Professor
2004 - 2017 Dean of Libraries & Professor
Purdue University, West Lafayette, IN.
- 2000-2004** Associate Director for Administration, MIT Libraries,
Massachusetts Institute of Technology, Cambridge, MA.
- 1996-2000** University Librarian & Director, Falvey Memorial Library.
Villanova University, Villanova, PA.
- 1978-1996** Director of Library Services, Indiana University South Bend.
- 1974-1978** Associate Librarian, Indiana University Bloomington, School of Law.
- 1973-1974** Instructor/Catalog Librarian. Georgia Southern University.

Teaching::

- 1977-1996** Associate Professor (part-time), School of Library and Information Science,
Indiana University.

Education:

The University of Iowa. Honors Bachelor of Arts in History, Religion and Political Science.
The University of Iowa. Master of Arts in Library Science.
Indiana University. Doctor of Philosophy. Concentration: Academic Library Management.
Emphasis:. Legal Librarianship.

Awards and Recognition:

2017 Distinguished Alumnus Award by the School of Informatics and Computing, Indiana University, Bloomington. Given June 25, 2017.

2016 Hugh C. Atkinson Memorial Award, jointly sponsored by the four divisions of the American Library Association (ALA), June 27, 2016.

2015 ACRL Excellence in University Libraries Award, April 23, 2015.

Named Esther Ellis Norton Professor by Purdue Trustees, December 11, 2011.

International Review Panel to evaluate the University of Pretoria Library, February 20 – 24, 2011. Pretoria, South Africa

Publications: (selected)

A Purdue Icon: creation, life, and legacy, edited by James L. Mullins, Founder's Series, Purdue University Press, 138pp., August, 2017.

“The policy and institutional framework.” In *Research Data Management, Practical Strategies for Information Professionals*, edited by Ray, J M. Purdue University Press, pp.25-44, 2014.

“DataCite: linking research to data sets and content.” In Benson, P and Silver, S. *What Editors Want: An Author's Guide to Scientific Journal Publishing*. University of Chicago Press, pp. 21-23, December 2012.

“Library Publishing Services: Strategies for Success,” with R. Crow, O. Ivins, A. Mower, C. Murray-Rust, J. Ogburn, D Nesdill, M. Newton, J. Speer, C. Watkinson. *Scholarly Publishing and Academic Resources Coalition (SPARC)*, version 2.0, March 2012.

“The Changing Definition and Role of Collections and Services in the University Research Library.” *Indiana Libraries*, Vol 31, Number 1 (2012), pp.18-24.

“Are MLS Graduates Being Prepared for the Changing and Emerging Roles that Librarians must now assume within Research Libraries?” *Journal of Library Administration*. Volume 52, Issue 1, 2012, p. 124-132

Baykoucheva, Svetla. What Do Libraries Have to Do with e-Science?: An Interview with James L. Mullins, Dean of Purdue University Libraries. *Chem. Inf. Bull.* [Online] 2011, 63 (1), 45-49. <http://www.acscinf.org/publications/bulletin/63-1/mullins.php> (accessed Mar 16, 2011).

“The Challenges of e-Science Data-set Management and Scholarly Communication for Domain Sciences and Technology: a Role for Academic Libraries and Librarians,” chapter in, *The Digital*

Deluge: Can Libraries Cope with e-Science?” Deanna B. Marcum and Gerald George, editors, Libraries Unlimited/Teacher Ideas Press, 2009. (a monograph publication of the combined proceedings of the KIT/CLIR proceedings).

“Bringing Librarianship to e-Science,” *College and Research Libraries*. vol. 70, no. 3, May 2009, editorial.

“e Librarian’s Role in e-Science” *Joho Kanri (Journal on Information Processing and Management)*, Japan Science and Technology Agency (formerly Japan Information Center of Science and Technology), Tokyo, Japan. Translated into Japanese by Taeko Kato.

March, 2008.

to Domain Sciences and Engineering: a Role for Academic Libraries and Librarians,” KIT (Kanazawa Institute of Technology)/CLIR (Council of Library and Information Resources) International Roundtable for Library and Information Science, July 5-6, 2007. [Developments in e-science status quo and the challenge](#), The Japan Foundation, 2007.

“An Administrative Perspective,” Chapter 14, *Proven Strategies for Building an Information Literacy Program*, Susan Curzon and Lynn Lampert, editors, Neal-Schuman Publishers, Inc., New York, 2007. pp. 229-237. .

Library Management and Marketing in a Multicultural World, proceedings of the IFLA Management and Marketing (M&M) Section, Shanghai, China, August 16-17, 2006, edited. K.G. Saur, Munchen, Germany, June 2007. 390 pp.

ACRL Research Committee, with Frank R. Allen and Jon R. Hufford. *College & Research Libraries*, April 2007, vol.68, no.4. pp.240-241, 246.

To Stand the Test of Time: Long-term Stewardship of Digital Data Sets in Science and Engineering. A report to the National Science Foundation from the ARL Workshop on New Collaborative Relationships: the Role of Academic Libraries in the Digital Data Universe. September 26-27, 2006, Arlington, VA. p.141. <http://www.arl.org/bm~doc/digdatarpt.pdf>

“Enabling Interaction and Quality in a Distributed Data DRIS,” *Enabling Interaction and Quality: Beyond the Hanseatic League.* 8th International Conference on Current Research Information Systems, with D. Scott Brandt and Michael Witt. Promoted by euro CRIS. Leuven University Press, 2006. pp.55-62. Editors: Anne Garns Steine Asserson and Eduard J. Simons.

"Standards for College Libraries, the final version approved January 2000," prepared by the ACRL College Libraries Standards Committee (member), *C&RL News*, March 2000, p.175-182.

"Standards for College Libraries: a draft," prepared by the ACRL College Libraries Section, Standards Committee (member), *C&RL News*, May, 1999, p. 375-381.

"Statistical Measures of Usage of Web-based Resources," *The Serials Librarian*, vol. 36, no. 1-2 (1999) p. 207-10.

(On a lighter note) "Philly's dining Renaissance," *American Libraries*, vol. 30, no. 1 (Jan. 99) p. 86-90. With Susan Markley. A guide to the restaurants for the American Library Association Meeting in Philadelphia in 1999.

"An Opportunity: Cooperation between the Library and Computer Services," in *Building Partnerships: Computing and Library Professionals*. Edited by Anne G. Lipow and Sheila D. Creth. Berkeley and San Carlos, CA, Library Solutions Press, 1995. p. 69-70.

"Faculty Status of Librarians: A Comparative Study of Two Universities in the United Kingdom and How They Compare to the Association of College and Research Libraries Standards," in *Academic Librarianship, Past, Present, and Future: a Festschrift in Honor of David Kaser*. Englewood, Colorado; Libraries Unlimited, 1989. p. 67-78. Review in: *College & Research Libraries*, vol. 51, no. 6. November 1990, p. 573-574.

Presentations: (Representative)

"How Long the Odyssey? Transitioning the Library and Librarians to Meet the Needs and Expectations of the 21st Century University," David Kaser Lecture, School of Informatics & Computing, Indiana University, Bloomington, IN, November 16, 2015.

Presentation at University of Cape Town, Cape Town, South Africa, August 20, 2015.

"The Challenge of Discovering Science and Technology Information," Moderator, International Federation of Library Associations (IFLA) Science and Technological Libraries Section Program, Cape Town, South Africa, August 18, 2015.

"An Odyssey in Data Management: Purdue University," International Federation of Library Associations (IFLA) Research Data Management: Finding Our Role – A program of the Research Data Alliance, Cape Town, South Africa, August 17, 2015.

Presentation at University of Pretoria, Pretoria, South Africa, August 11, 2015.

Co-Convener with Sarah Thomas, Harvard University, at the Harvard Purdue Symposium on Data Management, Harvard University, Cambridge, MA, June 15-18, 2015.

"Strategic Communication," panel discussion on the Director's role and perspective on library communications at Committee on Institutional Cooperation (CIC) Center for Library Initiatives (CLI) Annual Conference, University of Illinois Urbana-Champaign, May 20, 2015.

"Issues in Data Management," panel discussion moderated by Catherine Woteki, United States Undersecretary for Research, Education & Economics at 20th Agriculture Network Information Collaborative (AgNIC) Annual Meeting in the National Agricultural Library, Beltsville, MD, May 6, 2015.

"Active learning/IMPACT & the Active Learning Center at Purdue University," Florida Institute of Technology, Melbourne, FL, February 11, 2015.

“Science+art=creativity: libraries and the new collaborative thinking,” panel moderator, International Federation of Library Associations (IFLA) 80th General Conference and Assembly, Lyon, France, August 19, 2014.

“Purdue University The Active Learning Center—A new concept for a library,” Association of University Architects 59th Annual National Conference, University of Notre Dame, South Bend, IN, June 23, 2014.

“Big Data & Implications for Academic Libraries,” keynote speaker, Greater Western Library Alliance (GWLA) Cyber-infrastructure Conference, Kansas City, MO, May 28, 2014.

“Research Infrastructure,” panel moderator, Association of Research Libraries (ARL) 164th Membership Meeting, Ohio State University, Columbus, OH, May 7, 2014.

“An Eight Year Odyssey in Data Management: Purdue University,” International Association of Scientific and Technological University Libraries (IATUL) 2013 Workshop Research Data Management: Finding Our Role, University of Oxford, UK, December 2013.

“Purdue University Libraries & Press: from collaboration to integration,” Ithaka Sustainable Scholarship, The Evolving Digital Landscape: New Roles and Responsibilities in Higher Education, libraries as publishers, New York, New York, October 2013.

“Tsinghua and Purdue: Research Libraries for the 21st Century,” Tsinghua University, Tsinghua, China, August 2013.

“Purdue Publishing Experience in the Libraries Publishing Coalition,” Association of American University Presses Annual Meeting, Press-Library Coalition Panel, Boston, Massachusetts, June 21, 2013.

“Indiana University Librarians Day: Purdue University Libraries Ready for the 21st Century,” Indiana University Purdue University Indianapolis (IUPUI), June 7, 2013.

“Purdue University Libraries and Open Access; CNI Project Update,” Coalition for Networked Information, San Antonio, TX, April 5, 2013.

Memorial Resolution, honoring Joseph Brannon, to the Board of the Association of College & Research Libraries, Seattle, WA, January 2013.

“An overview of sustaining e-Science collaboration in an Academic Research Library—the Purdue experience,” Duraspace e-Science Institute webcast, October 17, 2012.

“The Role of Libraries in Data Curation, Access, and Preservation: an International Perspective,” Panel Moderator, 78th General Conference and Assembly, International Federation of Library Associations, Helsinki, Finland, August 15, 2012.

“21st Century Libraries,” moderator of First Plenary Session, International Association of Technological University Libraries 33rd Annual Conference, Singapore, June 4, 2012.

“Planning for New Buildings on Campus,” panel presenter, University of Calgary Building Symposium on Designing Libraries for the 21st Century, Calgary, Alberta, Canada, May 17, 2012.

“Data Management and e-Science, the Purdue Response.” Wiley-Blackwell Executive Seminar-2012, Washington, DC, March 23, 2012.

“An overview of Sustaining e-Science Collaboration in Academic Research Libraries and the Purdue Experience.” Leadership & Career Development Program Institute, Association of Research Libraries (ARL). Houston, TX, March 21, 2012.

“An overview of Data Activities at Purdue University in response to Data Management Requirements.” Coalition for Academic Scientific Computation (CASC). Arlington, VA, September 8, 2011.

“Getting on Track with Tenure,” Association of College and Research Libraries (ACRL) Research Program Committee. Washington, DC, June 26, 2011.

“Integration of the Press and Libraries Collaboration to Promote Scholarly Communication,” Association of Library Collections & Technical Services (ALCTS) Scholarly Communication Interest Group – American Library Association, New Orleans, Louisiana, June 25 2011.

“Cooperation for improving access to scholarly communication,” with N. Lossau (Germany), C. Mazurek (Poland), J. Stokker (Australia), panel moderator and presenter, Second Plenary Session, International Association of Scientific and Technological University Libraries (IATUL) 32nd Conference 2011, Warsaw, Poland. May 29-June 2, 2011.

“Riding the Wave of Data,” STM Annual Spring Conference 2011. Trailblazing & transforming scholarly publishing 2011. Washington, D.C., April 28, 2011.

“Confronting old assumptions to assume new roles: physical and operational integration of the Press and Libraries at Purdue University,” keynote speaker, 2011 BioOne Publishers & Partners Meeting. Washington, D. C., April 22, 2011.

“Are MLS Graduates Being Prepared for the Changing and Emerging Roles that Librarians must now assume within Research Libraries?” University of Oklahoma Libraries Seminar, March 4, 2011, Oklahoma City, Oklahoma.

“The Future Role of University Librarians,” the University of Cape Town, South Africa, February 25, 2011.

Purdue University – a case study. International Council for Science and Technology (ICSTI); Ottawa, Canada. June 9, 2009.

“Reinventing Science Librarianship: Models for the Future,” Association of Research Libraries / Coalition for Networked Information. October 16-17th, 2008, Arlington, VA. Moderator and convener of Data Curation: Issues and Challenges.

“Practical Implementation and Opportunities Created at Purdue University,” African Digital Curation Conference, Pretoria, South Africa, (live video transmission), February 12, 2008.

Keynote speaker. “*Scholarly Communication & Academe: The Winter of Our Discontent*,” XXVII Charleston Conference on Issues in Book and Serial Acquisition, Charleston, South Carolina. November 8, 2007.

Keynote speaker. “*Enabling Access to Scientific & Technical Data-sets in e-Science: a role for Library and Archival Sciences*,” Greater Western Library Alliance (GWLA), Tucson, Arizona. September 17, 2007. A meeting of library directors and vice presidents for research of member institutions.

“*The Challenge of e-Science Data-set Management to Domain Sciences and Engineering: a Role for Academic Libraries and Librarians*,” KIT (Kanazawa Institute of Technology)/CLIR (Council of Library and Information Resources) International Roundtable for Library and Information Science, July 5-6, 2007. Invited to participate by the Deputy Librarian of Congress.

International Association of Technological University Libraries (IATUL), Stockholm, Sweden. June 8, 2007. Invited paper, *Enabling International Access to Scientific Data-sets: creation of the Distributed Data Curation Center (D2C2)*.

“A New Collaboration for Librarians: The Principles of Library and Archival Sciences Applied to the Curation of Datasets,” Symposium of the Libraries and the College of Engineering, University of Louisville, April 6, 2007.

“Purdue University Libraries: Through Pre-eminent Innovation and Creativity, Meeting the Challenges of the Information Age,” Board of Trustees, Purdue University, February 15, 2007.

ARL Workshop on New Collaborative Relationships: The Role of Academic Libraries in the DigitalData Universe, September 26-27, 2006, Arlington, VA. Invited participant.

NARA and SDSC: A partnership. A panel before the National Science Foundation, June 27, 2008.

“Kaleidoscope of Scientific Literacy: fusing new connections,” with Diane Rein, American Section, Annual Conference, New Orleans, June 26th, 2006.

“Leadership for Learning: Building a Culture of Teaching in Academic Libraries – an administrative perspective,” American Library Association, Association of College and Research Libraries, Instruction Section, Annual Conference, New Orleans, June 25th, 2006.

“Building an interdisciplinary research program in an academic library: how the Libraries’ associate dean for research makes a difference at Purdue University,” International Association of Technological University Libraries (IATUL), Porto, Portugal, May 23rd, 2006.

Beyond the Hanseatic League. 8th International Conference on Current Research Information Systems, with D. Scott Brandt and Michael Witt. Promoted by euro CRIS, Bergen, Norway, May 12th, 2006, Brandt and Witt presented in person

“Interdisciplinary Research,” with D. Scott Brandt, Coalition for Networked Information (CNI) Spring Meeting: Project Briefing, Washington, D.C., April 3rd, 2006.

“An Interview with Purdue’s James Mullins,” a podcast submitted by Matt Pasiewicz, on *Educause Connect*, http://connect.educause.edu/James_L_Mullins_Interview_CNI_2005

“Managing Long-Lived Digital Data-sets and their Curation: Interdisciplinary Policy Issues,” Managing Digital Assets Forum, Association of Research Libraries (ARL), Washington, D.C., October 28th, 2005.

“The Odyssey of a Librarian.” Indiana Library Federation (ILF), District 2 Meeting, South Bend, Indiana. October 4th, 2005.

“Is Anyone There?” LAMA, Statistics Section, ALA, Atlanta, June 19, 2002. Research presentation on librarian recruitment at the IvyPlus institutions during the last three years.

"New College Library Standards," Standards Committee Presentation, ALA, Chicago, July 7, 2000.

SUNY Library Directors, Lake George, New York. “*The College Library Standards: a Tool for Assessment.*” April 5, 2000.

Tri-State College Library Association, *Finding You Have Talents You Never Knew You Had*, Penn State Great Valley, March 25, 2000.

Using Web Statistics, American Library Association, New Orleans, June 24, 1999.

Keynote speaker at the JSTOR Workshop, January 29, 30, 1999. University of Pennsylvania, Philadelphia, PA.

"The New Standards for Electronic Resources Statistics," Society of Scholarly Publishers, Washington, D.C., September 17, 1998.

"Evaluating Online Resources: Now that you've got them what do you do?," joint presenter with Chuck Hamaker, LSU, at the NASIG Conference, Boulder, Colorado. June 1998.

"What Employers Are Looking for in New Librarians?" Pennsylvania Library Association, Philadelphia. September 26, 1997.

"The Theory of Matrix Management" panel presentation of the Comparative Library Organization Committee of the Library Organization and Management Section of the Library Administration and Management Association, a division of the American Library Association, Annual Meeting, Chicago, June 24, 1990.

Professional Involvement: (summary of recent emphasis)

The focus for my professional involvement and research has moved recently toward managing massive data-sets. This has resulted in working with faculty in the sciences and technology to determine how librarians can collaborate in managing, curating, and preserving data-sets for future access and documentation. This has included various speaking opportunities as well as participation in planning with the National Science Foundation (NSF) on ways in which librarians can be integrated more completely into the funded research process. Participation in the Kanazawa Institute of Technology/Council of Library Resources Roundtable was particularly rewarding and provided new opportunities to share with international colleagues the issues surrounding data-set management. I was the champion for the creation of the Distributed Data Curation Center (D2C2) at Purdue University (<http://d2c2.lib.purdue.edu/>)

Throughout my career, beginning with my dissertation, I have been actively involved with assessing and evaluating libraries. In the fall of 1999, I contacted twenty-two academic library directors to determine whether the need was also felt by others. The response was overwhelmingly affirmative. This resulted in a meeting at ALA Midwinter, January, 2000. A formal meeting followed at Villanova University in April, 2000. As convenor, I helped to form the University Libraries Group (ULG), modeled after the Oberlin Group for college libraries. The ULG is made up of university libraries that support diverse wide ranging programs through doctoral level, and have a level of support that places them in the top tier of academic institutions. A few of the member libraries, along with Villanova, are William and Mary, Wake Forest, Lehigh, Carnegie-Mellon, Tufts, Marquette, Miami of Ohio, and Southern Methodist.

In 1994, I was appointed to the Standards Committee, College Section, Association of College and Research Libraries. During the next six years, the Committee concentrated on changing the focus of the standards from quantitative analysis of input and output factors to emphasis on assessment of the outcome. Culmination of the work was a re-issue of the *Standards for College Libraries* in 2000. The knowledge gained through my work experience enabled me to formulate the changes needed in the standards. This work allowed for close collaboration with accrediting agencies, both professional and regional.

During this same time another focus emerged, the impact of digital resources. Through my work on the JSTOR Statistics Task Force, standards were developed on the collection of use of electronic databases. This Standard was later adopted in 1998 by the International Consortium of Library Consortia (ICOLC).

In 2002, the American Library Association appointed me to serve as the liaison to the Marketing and Management Section of the International Federation of Library Associations (IFLA).

Professional Service: (representative list)

Nominations Committee, Association of Research Libraries (ARL), 2016.

Steering Committee, Scholarly Publishing and Academic Resources Coalition (SPARC), 2016 – 2018.

James L. Mullins , Prior Art Document Librarian Services, LLC

“Excellence in Library Services,” Chair, Review Team, City University of Hong Kong, Hong Kong, August 24-27, 2015.

Chair, Management Advisory Board, 2015-2017; Member, Scientific Advisory Board, arXiv, Cornell University, 1/1/2013 – July 1, 2017.

Advisory Board for the Wayne State University School of Library and Information Science, July 2012 – 2018.

Advisory Board for Microsoft Academic Search, 2012 – 2015. Redmond, WA.

Transforming Research Libraries, a Strategic Direction Steering Committee of the Association of Research Libraries (ARL), 2012-2015.

Science and Technology section, representing ARL, International Federation of Library Associations (IFLA), Chair, 2013 – 2017; Member, 2011 to present.

Co-chair, Local Arrangements Planning Committee for 2013 Conference, Association of College and Research Libraries (ACRL), a division of the American Library Association (ALA).

Association of Research Libraries Leadership & Career Development Program Mentor, 2011-2013.

e-Science Task Force, Association of Research Libraries. July 2006 – present. Chair, October 2011 – October 2012.

Board of Directors, International Association of Technological University Libraries (IATUL). January 2008 – December 2014.

Midwest Collaborative for Library Services (MCLS); Board Member, October 2010 – December 2012.

Chair, Library Directors, Committee on Institutional Cooperation (CIC), July 2010 – June 2012.

Board of Directors, Association of Research Libraries (ARL); October 2008 – October 2011.

Scholarly Communication Steering Committee, Association of Research Libraries (ARL) 2008-2011.

Editorial Board, *College and Research Libraries*, Association of College and Research Libraries, American Library Association. January 2008 – December 2014.

Chair, Organizing Committee for IATUL Conference 2010, June 21-24, 2010, Purdue University, West Lafayette, Indiana/Chicago, Illinois.

James L. Mullins , Prior Art Document Librarian Services, LLC

Conference Planning Committee for National Conference of the Association of College and Research Libraries, 2009, Seattle, Washington.

Research Committee, Association of College and Research Libraries, ACRL, division of ALA. 2002-2007, chair, 2005-2007.

Association of Research Libraries, Search and Screen Committee, Executive Director. March – January 2008.

Center for Research Libraries, Board of Directors. April 2006 – April 2012.

Academic Libraries of Indiana, Board of Directors, 2004 – present. Vice-president, 2005-2007. President, 2007- 2009.

ALA Representative to the International Federation of Library Associations (IFLA), Marketing and Management (M&M) Section, initial term 2003-2007, re-appointed for second term, 2007-2011.

ALA Nominating Committee - 2005. Appointed as LAMA representative.

Invited to represent Research Libraries at the ACRL/3M Wonewok Retreat to assess Marketing of Academic Libraries, October, 2002.

Hugh A. Atkinson Award Committee, LAMA Representative, ALA, 2001-2005.

Program Committee, Library Administrators and Management Association (LAMA), a division of ALA. 1996-2001.

ACRL, Standards and Accreditation Committee, a division of ALA. Liaison to RBMS Section of ACRL. 1997-2002.

Elected to the Executive Committee of LAMA, LOMS, a division of the American Library Association, 1998-2000. Nominated as Chair/Elect for 2003 – 2005.

Columbia University Press Advisory Committee. 1996 - 2000.

LITA/LAMA Conference Evaluation Committee, Pittsburgh, Pennsylvania, October, 1996.

"New Learning Communities," Coalition for Networked Information, Indianapolis. November 19-21, 1995. Facilitator for invitational, national conference committed to developing collaborative learning and teaching techniques, involving librarians.

Planning Committee-Evaluation. LITA/LAMA 1996 Conference, Pittsburgh. This first conference, to be held jointly between two divisions of ALA, will focus on new technologies within libraries.

Indiana Cooperative Library Services Authority (InCoLSA), elected to Executive Committee, April 1991, served as President in 1993-94. InCoLSA is a statewide network of academic, public, school and special libraries that supports library cooperation for cataloging, interlibrary loan, collection development and application of new technologies.

Governor's Conference on Libraries and Information Services. Served on Planning Committee, Academic Libraries Representative, appointed by the Governor to represent academic libraries in Indiana, Chair, Finance Committee, April, 1989-July 1991.

Indiana Library Endowment Foundation Board, 1984-92. Charter Member, 1984, President, 1988-1992. 2004-2005.

University Service: (Summary)

During my career I have served on search and screen committees for senior positions including chancellor, dean and directors; most recently I have been asked to serve on the search committee for the provost of Purdue University. At MIT service included the Library Council & appointment to the Administrative Council by President Vest, 2001-2003 & Member of the Faculty Committee on the Library System. At Purdue appointed by the President to the Search Committee for the Provost, October 2007 to May 2008; member of the Capital Projects Committee, and IT Operational Oversight Committee as senior academic dean, 2008-2014; Global Council, Global Policy Institute, 2012 – 2016.

Academic Program Excellence and Rankings (APER) project team, 2014.

Representative of the Academic Deans on the Re-engineering Business Operations, Purdue University, 2016 –

Academic Deans Council chaired by Provost – 2004 – present.

University Promotion and Tenure Committee – 2006 – present.

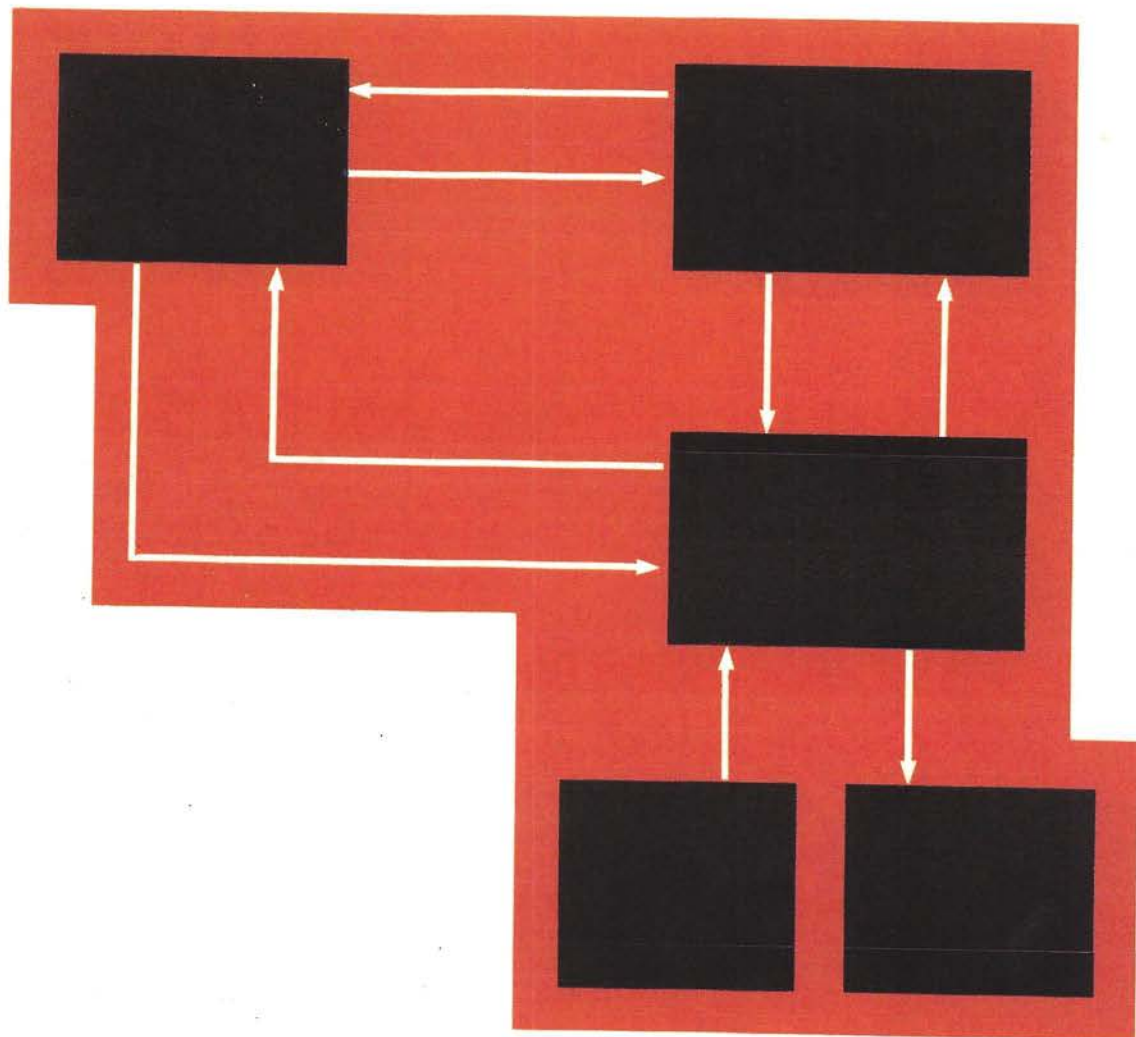
Community Service: (Summary)

Beyond commitment to the profession and the university, there is also a need to support the community in which one lives. Because that belief is very important to me, I have valued my service on numerous boards, committees and councils with a range of concerns. I have been involved with inner city community development (West Washington Neighborhood Organization), historic preservation (West Washington Design Review Board), social services (Center for the Homeless, Madison Center for Mental Health) and community cultural services (South Bend Regional Museum of Art, the George W. Rickey Sculpture Exhibition, the Fischhoff National Chamber Music Competition, the Northern Indiana Center for History).

University Chair of the United Way Campaign, 2006.

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Digital Logic and Computer Design



M. MORRIS MANO

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Digital Logic and Computer Design

M. MORRIS MANO

*Professor of Engineering
California State University, Los Angeles*

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Contents

PREFACE

viii

1 BINARY SYSTEMS

1

- 1-1 Digital Computers and Digital Systems 1
- 1-2 Binary Numbers 4
- 1-3 Number Base Conversion 6
- 1-4 Octal and Hexadecimal Numbers 9
- 1-5 Complements 10
- 1-6 Binary Codes 16
- 1-7 Binary Storage and Registers 22
- 1-8 Binary Logic 25
- 1-9 Integrated Circuits 30
- References 31
- Problems 31

2 BOOLEAN ALGEBRA AND LOGIC GATES

34

- 2-1 Basic Definitions 34
- 2-2 Axiomatic Definition of Boolean Algebra 36
- 2-3 Basic Theorems and Properties
of Boolean Algebra 39
- 2-4 Boolean Functions 43
- 2-5 Canonical and Standard Forms 47
- 2-6 Other Logic Operations 53
- 2-7 Digital Logic Gates 56
- 2-8 IC Digital Logic Families 60
- References 68
- Problems 68

iii

3	SIMPLIFICATION OF BOOLEAN FUNCTIONS	72
3-1	The Map Method	72
3-2	Two- and Three-Variable Maps	72
3-3	Four-Variable Map	77
3-4	Five- and Six-Variable Maps	80
3-5	Product of Sums Simplification	83
3-6	NAND and NOR Implementation	86
3-7	Other Two-Level Implementations	93
3-8	Don't-Care Conditions	100
3-9	The Tabulation Method	102
3-10	Determination of Prime-Implicants	102
3-11	Selection of Prime-Implicants	108
3-12	Concluding Remarks	110
	References	112
	Problems	112
4	COMBINATIONAL LOGIC	116
4-1	Introduction	116
4-2	Design Procedure	117
4-3	Adders	119
4-4	Subtractors	123
4-5	Code Conversion	125
4-6	Analysis Procedure	128
4-7	Multilevel NAND Circuits	132
4-8	Multilevel NOR Circuits	141
4-9	Exclusive-or and Equivalence Functions	145
	References	150
	Problems	150
5	COMBINATIONAL LOGIC WITH MSI AND LSI	154
5-1	Introduction	154
5-2	Binary Parallel Adder	155
5-3	Decimal Adder	161
5-4	Magnitude Comparator	164
5-5	Decoders	167
5-6	Multiplexers	175
5-7	Read-Only Memory (ROM)	182
5-8	Programmable Logic Array (PLA)	189
5-9	Concluding Remarks	195
	References	196
	Problems	196

6	SEQUENTIAL LOGIC	202
6-1	Introduction	202
6-2	Flip-Flops	204
6-3	Triggering of Flip-Flops	210
6-4	Analysis of Clocked Sequential Circuits	217
6-5	State Reduction and Assignment	224
6-6	Flip-Flop Excitation Tables	230
6-7	Design Procedure	233
6-8	Design of Counters	243
6-9	Design with State Equations	247
	References	251
	Problems	252
7	REGISTERS, COUNTERS, AND THE MEMORY UNIT	256
7-1	Introduction	256
7-2	Registers	257
7-3	Shift Registers	263
7-4	Ripple Counters	272
7-5	Synchronous Counters	276
7-6	Timing Sequences	284
7-7	The Memory Unit	289
7-8	Examples of Random Access Memories	294
	References	300
	Problems	301
8	REGISTER TRANSFER LOGIC	305
8-1	Introduction	305
8-2	Interregister Transfer	308
8-3	Arithmetic, Logic, and Shift Micro-Operations	316
8-4	Conditional Control Statements	321
8-5	Fixed-Point Binary Data	322
8-6	Overflow	327
8-7	Arithmetic Shifts	329
8-8	Decimal Data	331
8-9	Floating-Point Data	332
8-10	Non-Numeric Data	335
8-11	Instruction Codes	339
8-12	Design of Simple Computer	344
	References	352
	Problems	352

9	PROCESSOR LOGIC DESIGN	358
9-1	Introduction	358
9-2	Processor Organization	359
9-3	Arithmetic Logic Unit	367
9-4	Design of Arithmetic Circuit	368
9-5	Design of Logic Circuit	376
9-6	Design of Arithmetic Logic Unit	378
9-7	Status Register	382
9-8	Design of Shifter	384
9-9	Processor Unit	386
9-10	Design of Accumulator	391
	References	402
	Problems	402
10	CONTROL LOGIC DESIGN	407
10-1	Introduction	407
10-2	Control Organization	409
10-3	Hard-Wired Control Example 1	415
10-4	Microprogram Control	424
10-5	Control of Processor Unit	429
10-6	Hard-Wired Control Example 2	432
10-7	PLA Control	443
10-8	Microprogram Sequencer	446
	References	453
	Problems	453
11	COMPUTER DESIGN	459
11-1	Introduction	459
11-2	System of Configuration	460
11-3	Computer Instructions	464
11-4	Timing and Control	471
11-5	Execution of Instructions	473
11-6	Design of Computer Registers	479
11-7	Design of Control	484
11-8	Computer Console	493
	References	494
	Problems	495

12	MICROCOMPUTER SYSTEM DESIGN	499
12-1	Introduction	499
12-2	Microcomputer Organization	502
12-3	Microprocessor Organization	506
12-4	Instructions and Addressing Modes	514
12-5	Stack, Subroutines, and Interrupt	523
12-6	Memory Organization	532
12-7	Input-Output Interface	537
12-8	Direct Memory Access	547
	References	551
	Problems	552
13	DIGITAL INTEGRATED CIRCUITS	556
13-1	Introduction	556
13-2	Bipolar Transistor Characteristics	558
13-3	RTL and DTL Circuits	562
13-4	Integrated-Injection Logic (I ² L)	565
13-5	Transistor-Transistor Logic (TTL)	568
13-6	Emitter-Coupled Logic (ECL)	578
13-7	Metal-Oxide Semiconductor (MOS)	580
13-8	Complementary MOS (CMOS)	584
	References	586
	Problems	586
	APPENDIX:—Answers to Selected Problems	589
	INDEX	606

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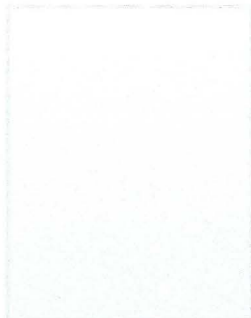
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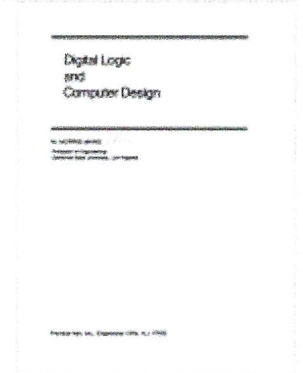
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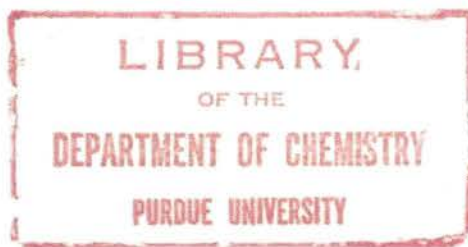
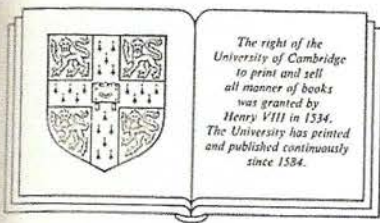
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TO CAROL, JACOB, MISHA

CONTENTS

List of tables	xvi
Preface	xix
Preface to first edition	xxi
CHAPTER 1	
FOUNDATIONS 1	
Introduction	1
Voltage, current, and resistance	2
1.01 Voltage and current	2
1.02 Relationship between voltage and current: resistors	4
1.03 Voltage dividers	8
1.04 Voltage and current sources	9
1.05 Thévenin's equivalent circuit	11
1.06 Small-signal resistance	13
Signals	15
1.07 Sinusoidal signals	15
1.08 Signal amplitudes and decibels	16
1.09 Other signals	17
1.10 Logic levels	19
1.11 Signal sources	19
Capacitors and ac circuits	20
1.12 Capacitors	20
1.13 RC circuits: V and I versus time	23
1.14 Differentiators	25
1.15 Integrators	26
Inductors and transformers	28
1.16 Inductors	28
1.17 Transformers	28
Impedance and reactance	29
1.18 Frequency analysis of reactive circuits	30
1.19 RC filters	35
1.20 Phasor diagrams	39
1.21 "Poles" and decibels per octave	40
1.22 Resonant circuits and active filters	41
1.23 Other capacitor applications	42
1.24 Thévenin's theorem generalized	44
Diodes and diode circuits	44
1.25 Diodes	44
1.26 Rectification	44
1.27 Power-supply filtering	45
1.28 Rectifier configurations for power supplies	46
1.29 Regulators	48
1.30 Circuit applications of diodes	48
1.31 Inductive loads and diode protection	52
Other passive components	53
1.32 Electromechanical devices	53
1.33 Indicators	57
1.34 Variable components	57
<i>Additional exercises</i>	58
CHAPTER 2	
TRANSISTORS 61	
Introduction	61
2.01 First transistor model: current amplifier	62
Some basic transistor circuits	63
2.02 Transistor switch	63
2.03 Emitter follower	65

- 2.04 Emitter followers as voltage regulators 68
- 2.05 Emitter follower biasing 69
- 2.06 Transistor current source 72
- 2.07 Common-emitter amplifier 76
- 2.08 Unity-gain phase splitter 77
- 2.09 Transconductance 78
- Ebers-Moll model applied to basic transistor circuits 79
- 2.10 Improved transistor model: transconductance amplifier 79
- 2.11 The emitter follower revisited 81
- 2.12 The common-emitter amplifier revisited 82
- 2.13 Biasing the common-emitter amplifier 84
- 2.14 Current mirrors 88
- Some amplifier building blocks 91
- 2.15 Push-pull output stages 91
- 2.16 Darlington connection 94
- 2.17 Bootstrapping 96
- 2.18 Differential amplifiers 98
- 2.19 Capacitance and Miller effect 102
- 2.20 Field-effect transistors 104
- Some typical transistor circuits 104
- 2.21 Regulated power supply 104
- 2.22 Temperature controller 105
- 2.23 Simple logic with transistors and diodes 107
- Self-explanatory circuits 107
- 2.24 Good circuits 107
- 2.25 Bad circuits 107
- Additional exercises* 107
- CHAPTER 3**
FIELD-EFFECT TRANSISTORS 113
- Introduction 113
- 3.01 FET characteristics 114
- 3.02 FET types 117
- 3.03 Universal FET characteristics 119
- 3.04 FET drain characteristics 121
- 3.05 Manufacturing spread of FET characteristics 122
- Basic FET circuits 124
- 3.06 JFET current sources 125
- 3.07 FET amplifiers 129
- 3.08 Source followers 133
- 3.09 FET gate current 135
- 3.10 FETs as variable resistors 138
- FET switches 140
- 3.11 FET analog switches 141
- 3.12 Limitations of FET switches 144
- 3.13 Some FET analog switch examples 151
- 3.14 MOSFET logic and power switches 153
- 3.15 MOSFET handling precautions 169
- Self-explanatory circuits 171
- 3.16 Circuit ideas 171
- 3.17 Bad circuits 171 vskip6pt
- CHAPTER 4**
FEEDBACK AND OPERATIONAL AMPLIFIERS 175
- Introduction 175
- 4.01 Introduction to feedback 175
- 4.02 Operational amplifiers 176
- 4.03 The golden rules 177
- Basic op-amp circuits 177
- 4.04 Inverting amplifier 177
- 4.05 Noninverting amplifier 178
- 4.06 Follower 179
- 4.07 Current sources 180
- 4.08 Basic cautions for op-amp circuits 182
- An op-amp smorgasbord 183
- 4.09 Linear circuits 183
- 4.10 Nonlinear circuits 187
- A detailed look at op-amp behavior 188
- 4.11 Departure from ideal op-amp performance 189
- 4.12 Effects of op-amp limitations on circuit behavior 193
- 4.13 Low-power and programmable op-amps 210
- A detailed look at selected op-amp circuits 213
- 4.14 Logarithmic amplifier 213
- 4.15 Active peak detector 213
- 4.16 Sample-and-hold 220
- 4.17 Active clamp 221
- 4.18 Absolute-value circuit 221
- 4.19 Integrators 222
- 4.20 Differentiators 224
- Op-amp operation with a single supply 224
- 4.21 Biasing single-supply ac amplifiers 225
- 4.22 Single-supply op-amps 225
- Comparators and Schmitt triggers 229
- 4.23 Comparators 229
- 4.24 Schmitt trigger 231
- Feedback with finite-gain amplifiers 232
- 4.25 Gain equation 232
- 4.26 Effects of feedback on amplifier circuits 233
- 4.27 Two examples of transistor amplifiers with feedback 233
- Some typical op-amp circuits 233
- 4.28 General-purpose lab amplifier 233
- 4.29 Voltage-controlled oscillator 233
- 4.30 JFET linear switch with R_C compensation 241
- 4.31 TTL zero-crossing detector 241
- 4.32 Load-current-sensing circuit 241
- Feedback amplifier frequency compensation 242
- 4.33 Gain and phase shift versus frequency 243
- 4.34 Amplifier compensation methods 245
- 4.35 Frequency response of the feedback network 247
- Self-explanatory circuits 250
- 4.36 Circuit ideas 250

A detailed look at selected op-amp circuits	213	4.37 Bad circuits	250
4.14 Logarithmic amplifier	213	<i>Additional exercises</i>	251
4.15 Active peak detector	217	CHAPTER 5	
4.16 Sample-and-hold	220	ACTIVE FILTERS AND OSCILLATORS 263	
4.17 Active clamp	221	Active filters	263
4.18 Absolute-value circuit	221	5.01 Frequency response with <i>RC</i> filters	263
4.19 Integrators	222	5.02 Ideal performance with <i>LC</i> filters	265
4.20 Differentiators	224	5.03 Enter active filters: an overview	266
Op-amp operation with a single power supply	224	5.04 Key filter performance criteria	267
4.21 Biasing single-supply ac amplifiers	225	5.05 Filter types	268
4.22 Single-supply op-amps	225	Active filter circuits	272
Comparators and Schmitt trigger	229	5.06 VCVS circuits	273
4.23 Comparators	229	5.07 VCVS filter design using our simplified table	274
4.24 Schmitt trigger	231	5.08 State-variable filters	276
Feedback with finite-gain amplifiers	232	5.09 Twin-T notch filters	279
4.25 Gain equation	232	5.10 Gyrator filter realizations	281
4.26 Effects of feedback on amplifier circuits	233	5.11 Switched-capacitor filters	281
4.27 Two examples of transistor amplifiers with feedback	236	Oscillators	284
Some typical op-amp circuits	238	5.12 Introduction to oscillators	284
4.28 General-purpose lab amplifier	238	5.13 Relaxation oscillators	284
4.29 Voltage-controlled oscillator	240	5.14 The classic timer chip: the 555	286
4.30 JFET linear switch with R_{ON} compensation	241	5.15 Voltage-controlled oscillators	291
4.31 TTL zero-crossing detector	242	5.16 Quadrature oscillators	291
4.32 Load-current-sensing circuit	242	5.17 Wien bridge and <i>LC</i> oscillators	296
Feedback amplifier frequency compensation	242	5.18 <i>LC</i> oscillators	297
4.33 Gain and phase shift versus frequency	243	5.19 Quartz-crystal oscillators	300
4.34 Amplifier compensation methods	245	Self-explanatory circuits	303
4.35 Frequency response of the feedback network	247	5.20 Circuit ideas	303
Self-explanatory circuits	250	<i>Additional exercises</i>	303
4.36 Circuit ideas	250	CHAPTER 6	
		VOLTAGE REGULATORS AND POWER CIRCUITS 307	
		Basic regulator circuits with the classic 723	307

6.01	The 723 regulator	307
6.02	Positive regulator	309
6.03	High-current regulator	311
	Heat and power design	312
6.04	Power transistors and heat sinking	312
6.05	Foldback current limiting	316
6.06	Overvoltage crowbars	317
6.07	Further considerations in high-current power-supply design	320
6.08	Programmable supplies	321
6.09	Power-supply circuit example	323
6.10	Other regulator ICs	325
	The unregulated supply	325
6.11	ac line components	326
6.12	Transformer	328
6.13	dc components	329
	Voltage references	331
6.14	Zener diodes	332
6.15	Bandgap (V_{BE}) reference	335
	Three-terminal and four-terminal regulators	341
6.16	Three-terminal regulators	341
6.17	Three-terminal adjustable regulators	344
6.18	Additional comments about 3-terminal regulators	345
6.19	Switching regulators and dc-dc converters	355
	Special-purpose power-supply circuits	368
6.20	High-voltage regulators	368
6.21	Low-noise, low-drift supplies	374
6.22	Micropower regulators	376
6.23	Flying-capacitor (charge pump) voltage converters	377
6.24	Constant-current supplies	379
6.25	Commercial power-supply modules	382
	Self-explanatory circuits	384
6.26	Circuit ideas	384
6.27	Bad circuits	384
	<i>Additional exercises</i>	384

CHAPTER 7 PRECISION CIRCUITS AND LOW-NOISE TECHNIQUES 391

	Precision op-amp design techniques	391
7.01	Precision versus dynamic range	391
7.02	Error budget	392
7.03	Example circuit: precision amplifier with automatic null offset	392
7.04	A precision-design error budget	394
7.05	Component errors	395
7.06	Amplifier input errors	396
7.07	Amplifier output errors	403
7.08	Auto-zeroing (chopper-stabilized) amplifiers	415
	Differential and instrumentation amplifiers	421
7.09	Differencing amplifier	421
7.10	Standard three-op-amp instrumentation amplifier	425
	Amplifier noise	428
7.11	Origins and kinds of noise	430
7.12	Signal-to-noise ratio and noise figure	433
7.13	Transistor amplifier voltage and current noise	436
7.14	Low-noise design with transistors	438
7.15	FET noise	443
7.16	Selecting low-noise transistors	445
7.17	Noise in differential and feedback amplifiers	445
	Noise measurements and noise sources	449
7.18	Measurement without a noise source	449
7.19	Measurement with noise source	450
7.20	Noise and signal sources	452
7.21	Bandwidth limiting and rms voltage measurement	453
7.22	Noise potpourri	454

Interference: shielding and grounding 455

7.23	Interference	455
7.24	Signal grounds	457
7.25	Grounding between instruments	457

Self-explanatory circuits 466

7.26	Circuit ideas	466
	<i>Additional exercises</i>	466

CHAPTER 8 DIGITAL ELECTRONICS 471

	Basic logic concepts	471
8.01	Digital versus analog	
8.02	Logic states	472
8.03	Number codes	473
8.04	Gates and truth tables	
8.05	Discrete circuits for gates	
8.06	Gate circuit example	
8.07	Assertion-level logic notation	
	TTL and CMOS	484
8.08	Catalog of common gates	
8.09	IC gate circuits	485
8.10	TTL and CMOS characteristics	486
8.11	Three-state and open-collector devices	487
	Combinational logic	490
8.12	Logic identities	491
8.13	Minimization and Karnaugh maps	492
8.14	Combinational functions as ICs	493
8.15	Implementing arbitrary truth tables	500
	Sequential logic	504
8.16	Devices with memory: flip-flops	504
8.17	Clocked flip-flops	507
8.18	Combining memory and sequential logic	512
8.19	Synchronizer	515

- Interference: shielding and grounding 455
- 7.23 Interference 455
- 7.24 Signal grounds 457
- 7.25 Grounding between instruments 457
- Self-explanatory circuits 466
- 7.26 Circuit ideas 466
- Additional exercises* 466
- CHAPTER 8
DIGITAL ELECTRONICS 471
- Basic logic concepts 471
- 8.01 Digital versus analog 471
- 8.02 Logic states 472
- 8.03 Number codes 473
- 8.04 Gates and truth tables 478
- 8.05 Discrete circuits for gates 480
- 8.06 Gate circuit example 481
- 8.07 Assertion-level logic notation 482
- TTL and CMOS 484
- 8.08 Catalog of common gates 484
- 8.09 IC gate circuits 485
- 8.10 TTL and CMOS characteristics 486
- 8.11 Three-state and open-collector devices 487
- Combinational logic 490
- 8.12 Logic identities 491
- 8.13 Minimization and Karnaugh maps 492
- 8.14 Combinational functions available as ICs 493
- 8.15 Implementing arbitrary truth tables 500
- Sequential logic 504
- 8.16 Devices with memory: flip-flops 504
- 8.17 Clocked flip-flops 507
- 8.18 Combining memory and gates: sequential logic 512
- 8.19 Synchronizer 515
- Monostable multivibrators 517
- 8.20 One-shot characteristics 517
- 8.21 Monostable circuit example 519
- 8.22 Cautionary notes about monostables 519
- 8.23 Timing with counters 522
- Sequential functions available as ICs 523
- 8.24 Latches and registers 523
- 8.25 Counters 524
- 8.26 Shift registers 525
- 8.27 Sequential PALs 527
- 8.28 Miscellaneous sequential functions 541
- Some typical digital circuits 544
- 8.29 Modulo- n counter: a timing example 544
- 8.30 Multiplexed LED digital display 546
- 8.31 Sidereal telescope drive 548
- 8.32 An n -pulse generator 548
- Logic pathology 551
- 8.33 dc problems 551
- 8.34 Switching problems 552
- 8.35 Congenital weaknesses of TTL and CMOS 554
- Self-explanatory circuits 556
- 8.36 Circuit ideas 556
- 8.37 Bad circuits 556
- Additional exercises* 556
- CHAPTER 9
DIGITAL MEETS ANALOG 565
- CMOS and TTL logic interfacing 565
- 9.01 Logic family chronology 565
- 9.02 Input and output characteristics 570
- 9.03 Interfacing between logic families 572
- 9.04 Driving CMOS and TTL inputs 575
- 9.05 Driving digital logic from comparators and op-amps 577

- 9.06 Some comments about logic inputs 579
- 9.07 Comparators 580
- 9.08 Driving external digital loads from CMOS and TTL 582
- 9.09 NMOS LSI interfacing 588
- 9.10 Opto-electronics 590
- Digital signals and long wires 599
- 9.11 On-board interconnections 599
- 9.12 Intercard connections 601
- 9.13 Data buses 602
- 9.14 Driving cables 603
- Analog/digital conversion 612
- 9.15 Introduction to A/D conversion 612
- 9.16 Digital-to-analog converters (DACs) 614
- 9.17 Time-domain (averaging) DACs 618
- 9.18 Multiplying DACs 619
- 9.19 Choosing a DAC 619
- 9.20 Analog-to-digital converters 621
- 9.21 Charge-balancing techniques 626
- 9.22 Some unusual A/D and D/A converters 630
- 9.23 Choosing an ADC 631
- Some A/D conversion examples 636
- 9.24 16-Channel A/D data-acquisition system 636
- 9.25 $3\frac{1}{2}$ -Digit voltmeter 638
- 9.26 Coulomb meter 640
- Phase-locked loops 641
- 9.27 Introduction to phase-locked loops 641
- 9.28 PLL design 646
- 9.29 Design example: frequency multiplier 647
- 9.30 PLL capture and lock 651
- 9.31 Some PLL applications 652
- Pseudo-random bit sequences and noise generation 655
- 9.32 Digital noise generation 655
- 9.33 Feedback shift register sequences 655
- 9.34 Analog noise generation from maximal-length sequences 658
- 9.35 Power spectrum of shift register sequences 658
- 9.36 Low-pass filtering 660
- 9.37 Wrap-up 661
- 9.38 Digital filters 664
- Self-explanatory circuits 667
- 9.39 Circuit ideas 667
- 9.40 Bad circuits 668
- Additional exercises* 668
- CHAPTER 10
MICROCOMPUTERS 673
- Minicomputers, microcomputers, and microprocessors 673
- 10.01 Computer architecture 674
- A computer instruction set 678
- 10.02 Assembly language and machine language 678
- 10.03 Simplified 8086/8 instruction set 679
- 10.04 A programming example 683
- Bus signals and interfacing 684
- 10.05 Fundamental bus signals: data, address, strobe 684
- 10.06 Programmed I/O: data out 685
- 10.07 Programmed I/O: data in 689
- 10.08 Programmed I/O: status registers 690
- 10.09 Interrupts 693
- 10.10 Interrupt handling 695
- 10.11 Interrupts in general 697
- 10.12 Direct memory access 701
- 10.13 Summary of the IBM PC's bus signals 704
- 10.14 Synchronous versus asynchronous bus communication 707
- 10.15 Other microcomputer buses 708
- 10.16 Connecting peripherals to the computer 711
- Software system concepts
- 10.17 Programming 714
- 10.18 Operating systems, file memory 716
- Data communications concepts
- 10.19 Serial communication ASCII 720
- 10.20 Parallel communication Centronics, SCSI, IPI, GPIB (488) 730
- 10.21 Local area networks
- 10.22 Interface example: hard packing 736
- 10.23 Number formats 738
- CHAPTER 11
MICROPROCESSORS 743
- A detailed look at the 68008
- 11.01 Registers, memory, and
- 11.02 Instruction set and addressing 745
- 11.03 Machine-language representation 750
- 11.04 Bus signals 753
- A complete design example: signal averager 760
- 11.05 Circuit design 760
- 11.06 Programming: defining task 774
- 11.07 Programming: details
- 11.08 Performance 796
- 11.09 Some afterthoughts 797
- Microprocessor support chips
- 11.10 Medium-scale integrations
- 11.11 Peripheral LSI chips 812
- 11.12 Memory 812
- 11.13 Other microprocessors
- 11.14 Emulators, development logic analyzers, and evaluation boards 821

Software system concepts	714	CHAPTER 12	
10.17 Programming	714	ELECTRONIC CONSTRUCTION	
10.18 Operating systems, files, and use of memory	716	TECHNIQUES	827
Data communications concepts	719	Prototyping methods	827
10.19 Serial communication and ASCII	720	12.01 Breadboards	827
10.20 Parallel communication: Centronics, SCSI, IPI, GPIB (488)	730	12.02 PC prototyping boards	828
10.21 Local area networks	734	12.03 Wire-Wrap panels	828
10.22 Interface example: hardware data packing	736	Printed circuits	830
10.23 Number formats	738	12.04 PC board fabrication	830
CHAPTER 11		12.05 PC board design	835
MICROPROCESSORS	743	12.06 Stuffing PC boards	838
A detailed look at the 68008	744	12.07 Some further thoughts on PC boards	840
11.01 Registers, memory, and I/O	744	12.08 Advanced techniques	841
11.02 Instruction set and addressing	745	Instrument construction	852
11.03 Machine-language representation	750	12.09 Housing circuit boards in an instrument	852
11.04 Bus signals	753	12.10 Cabinets	854
A complete design example: analog signal averager	760	12.11 Construction hints	855
11.05 Circuit design	760	12.12 Cooling	855
11.06 Programming: defining the task	774	12.13 Some electrical hints	858
11.07 Programming: details	777	12.14 Where to get components	860
11.08 Performance	796	CHAPTER 13	
11.09 Some afterthoughts	797	HIGH-FREQUENCY AND HIGH-SPEED	
Microprocessor support chips	799	TECHNIQUES	863
11.10 Medium-scale integration	800	High-frequency amplifiers	863
11.11 Peripheral LSI chips	802	13.01 Transistor amplifiers at high frequencies: first look	863
11.12 Memory	812	13.02 High-frequency amplifiers: the ac model	864
11.13 Other microprocessors	820	13.03 A high-frequency calculation example	866
11.14 Emulators, development systems, logic analyzers, and evaluation boards	821	13.04 High-frequency amplifier configurations	868
		13.05 A wideband design example	869
		13.06 Some refinements to the ac model	872
		13.07 The shunt-series pair	872
		13.08 Modular amplifiers	873
		Radiofrequency circuit elements	879
		13.09 Transmission lines	879

- 13.10 Stubs, baluns, and transformers 881
- 13.11 Tuned amplifiers 882
- 13.12 Radiofrequency circuit elements 884
- 13.13 Measuring amplitude or power 888
- Radiofrequency communications:
AM 892
- 13.14 Some communications concepts 892
- 13.15 Amplitude modulation 894
- 13.16 Superheterodyne receiver 895
- Advanced modulation methods 897
- 13.17 Single sideband 897
- 13.18 Frequency modulation 898
- 13.19 Frequency-shift keying 900
- 13.20 Pulse-modulation schemes 900
- Radiofrequency circuit tricks 902
- 13.21 Special construction techniques 902
- 13.22 Exotic RF amplifiers and devices 903
- High-speed switching 904
- 13.23 Transistor model and equations 905
- 13.24 Analog modeling tools 908
- Some switching-speed examples 909
- 13.25 High-voltage driver 909
- 13.26 Open-collector bus driver 910
- 13.27 Example: photomultiplier preamp 911
- Self-explanatory circuits 913
- 13.28 Circuit ideas 913
- Additional exercises* 913
- CHAPTER 14
LOW-POWER DESIGN 917
- Introduction 917
- 14.01 Low-power applications 918
- Power sources 920
- 14.02 Battery types 920
- 14.03 Wall-plug-in units 931
- 14.04 Solar cells 932
- 14.05 Signal currents 933
- Power switching and micropower regulators 938
- 14.06 Power switching 938
- 14.07 Micropower regulators 941
- 14.08 Ground reference 944
- 14.09 Micropower voltage references and temperature sensors 948
- Linear micropower design techniques 948
- 14.10 Problems of micropower linear design 950
- 14.11 Discrete linear design example 950
- 14.12 Micropower operational amplifiers 951
- 14.13 Micropower comparators 965
- 14.14 Micropower timers and oscillators 965
- Micropower digital design 969
- 14.15 CMOS families 969
- 14.16 Keeping CMOS low power 970
- 14.17 Micropower microprocessors and peripherals 974
- 14.18 Microprocessor design example: degree-day logger 978
- Self-explanatory circuits 985
- 14.19 Circuit ideas 985
- CHAPTER 15
MEASUREMENTS AND SIGNAL PROCESSING 987
- Overview 987
- Measurement transducers 988
- 15.01 Temperature 988
- 15.02 Light level 996
- 15.03 Strain and displacement 1001
- 15.04 Acceleration, pressure, velocity 1004
- 15.05 Magnetic field 1004
- 15.06 Vacuum gauges 1004
- 15.07 Particle detectors 1004
- 15.08 Biological and chemical probes 1012
- Precision standards and precision measurements 1016
- 15.09 Frequency standards
- 15.10 Frequency, period, and interval measurement
- 15.11 Voltage and resistance and measurements
- Bandwidth-narrowing techniques
- 15.12 The problem of signal ratio 1026
- 15.13 Signal averaging and averaging 1026
- 15.14 Making a signal periodic
- 15.15 Lock-in detection 1035
- 15.16 Pulse-height analysis
- 15.17 Time-to-amplitude conversion 1035
- Spectrum analysis and Fourier transforms 1035
- 15.18 Spectrum analyzers
- 15.19 Off-line spectrum analysis
- Self-explanatory circuits 1038
- 15.20 Circuit ideas 1038

15.04 Acceleration, pressure, force, velocity 1004	APPENDIXES 1043
15.05 Magnetic field 1007	Appendix A
15.06 Vacuum gauges 1007	The oscilloscope 1045
15.07 Particle detectors 1008	Appendix B
15.08 Biological and chemical voltage probes 1012	Math review 1050
Precision standards and precision measurements 1016	Appendix C
15.09 Frequency standards 1016	The 5% resistor color code 1053
15.10 Frequency, period, and time- interval measurements 1019	Appendix D
15.11 Voltage and resistance standards and measurements 1025	1% Precision resistors 1054
Bandwidth-narrowing techniques 1026	Appendix E
15.12 The problem of signal-to-noise ratio 1026	How to draw schematic diagrams 1056
15.13 Signal averaging and multichannel averaging 1026	Appendix F
15.14 Making a signal periodic 1030	Load lines 1059
15.15 Lock-in detection 1031	Appendix G
15.16 Pulse-height analysis 1034	Transistor saturation 1062
15.17 Time-to-amplitude converters 1035	Appendix H
Spectrum analysis and Fourier transforms 1035	LC Butterworth filters 1064
15.18 Spectrum analyzers 1035	Appendix I
15.19 Off-line spectrum analysis 1038	Electronics magazines and journals 1068
Self-explanatory circuits 1038	Appendix J
15.20 Circuit ideas 1038	IC prefixes 1069
	Appendix K
	Data sheets 1072
	2N4400-1 NPN transistor 1073
	LF411-12 JFET operational amplifier 1078
	LM317 3-terminal adjustable regulator 1086
	Bibliography 1095
	Index 1101

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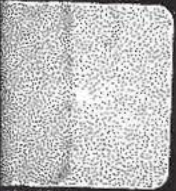
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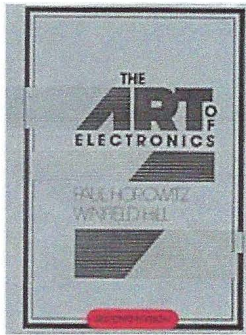
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Contents:

1. Foundations --
2. Transistors --
3. Field-effect transistors --
4. Feedback and operational amplifiers --
5. Active filters and oscillators --
6. Voltage regulators and power circuits --
7. Precision circuits and low-noise techniques --
8. Digital electronics --
9. Digital meets analog --
10. Microcomputers --
11. Microprocessors --
12. Electronic construction techniques --
13. High-frequency and high-speed techniques --
14. Low-power design --
15. Measurements and signal processing --

Appendixes: --

- A. The oscilloscope --
- B. Math review --
- C. The 5% resistor color code --
- D. 1% precision resistors --
- E. How to draw schematic diagrams --
- F. Load lines --
- G. Transistor saturation --
- H. LC Butterworth filters --
- I. Electronics magazines and journals --
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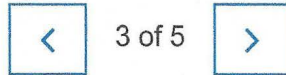
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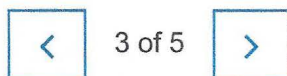
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