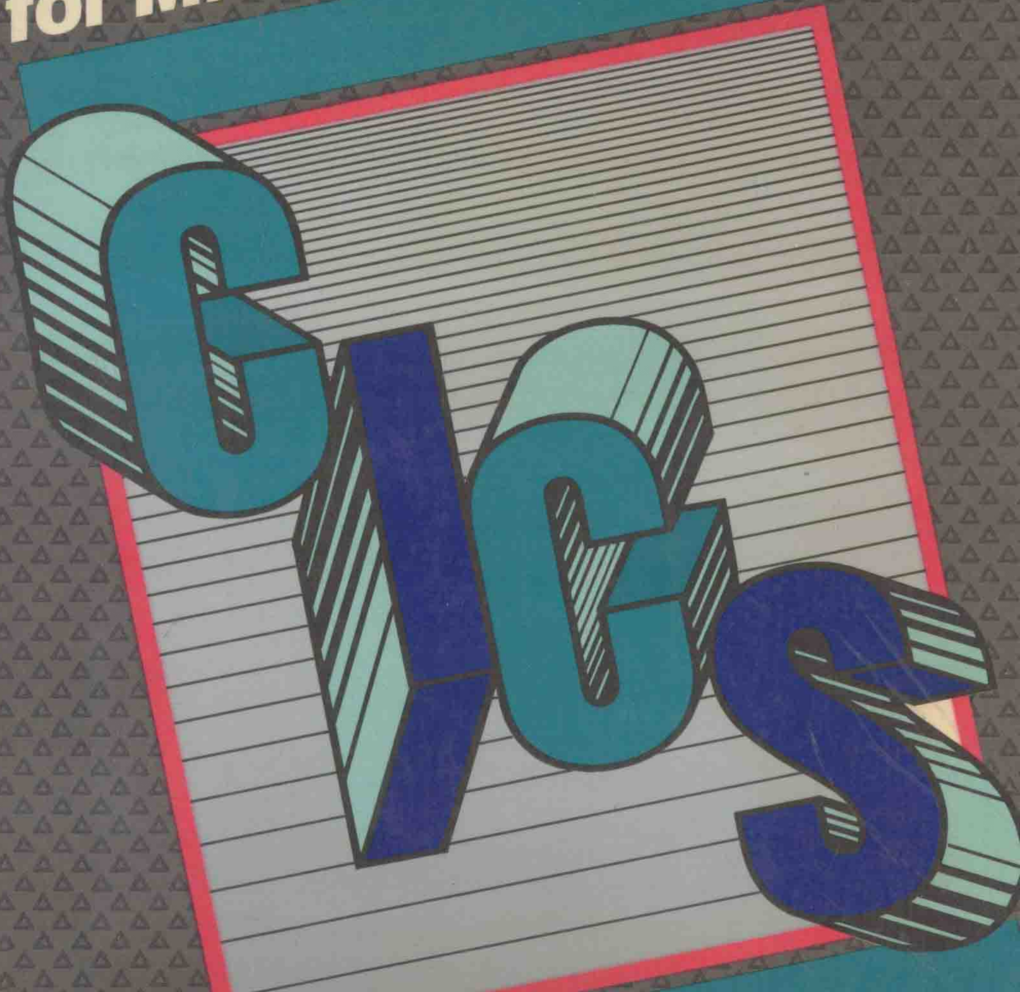
Computing That Works

CICS for Microcomputers



Joseph LeBert

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Joseph J. Le Bert

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To my wife, Maryann, who encouraged me,
and to my children, Joseph, Dorothy, and Jean,
who inspired me.

PREFACE

CICS for Microcomputers is for you if you wish to gain a strong foundation in COBOL command-level CICS (Customer Information Control Systems) design, coding, and concepts. CICS which was originally available only on IBM mainframe computers can now be executed on microcomputers using software that makes it *highly* compatible with mainframe CICS. All program examples in this text were translated, compiled, and debugged on an IBM PC/XT using CICS software available from Realia, Inc.; Micro Focus; and Triangle Software Company. The programs ran exactly as intended with only minor *design* modifications. They should be equally compatible with any additional microcomputer CICS software that becomes available. The vendors supply screen generators that make the creation of basic mapping support (BMS) code easy, and they have debugging tools that are easy to use. These tools consist of interactive source code debuggers and a microcomputer version of the mainframe's execution diagnostic facility (EDF). Application programmers, system analysts, and project leaders should find *CICS for Microcomputers* easy to read, as well as an ideal reference book. It can be used as a textbook in a one-semester course for information processing, business, and computer science majors. Familiarity with COBOL, 3270 terminals or microcomputer monitors, data processing concepts, and the DOS operating system is the only prerequisite to understanding this book. Knowledge of the mainframe's virtual storage access methods (VSAM) or the microcomputer's indexed sequential access methods (ISAM) is helpful but not required. The use of ISAM in CICS application programs is similar in a microcomputer environment to the use of VSAM on mainframes.

The original intent in preparing this book was to substantially rewrite parts of my text *CICS Made Easy* in order to reflect differences between the use of CICS on a mainframe and on a micro. The main differences that exist are due to restrictions of the DOS operating system that prevent multitasking and multiterminal support. The OS/2 operating system will eliminate some of these restrictions and should make microcomputer CICS even more compatible with its mainframe counterpart. The use of program function keys on a micro simulates the use of the corresponding keys on a mainframe. For instance, F1 is used in place of PF1, and Ctrl-End might be used to erase to the end of a field. The stated objective of software vendors currently marketing CICS for microcomputer use is to achieve as high a level of compatibility with mainframe CICS as possible. With this objective in mind it was decided that this book would contain most of the material presented in *CICS Made Easy.* That book was written for mainframe computer users. Consult the CICS user's guide for your microcomputer software to note any minor differences that are due mainly to the lack of multitasking and multiterminal support.

A new chapter has been added that describes the color attributes which are likely to be used in a microcomputer environment. A second new chapter was added that gives a brief introduction to additional commands and concepts that are supported by microcomputer CICS software. This latter chapter also discusses numeric editing considerations and contains code for a flexible edit module that should satisfy most of your editing needs. That module was developed and tested using Micro Focus's PC-CICS but should work equally well using Realia's Real-CICS or Triangle's CICS/pc; it will also work on a mainframe computer. Several appendixes have been added that should be of interest to both current and potential microcomputer users of CICS software. The ease of program development, simulation, and testing on a micro should improve productivity and the quality of CICS systems. System prototyping prior to starting detailed system design and program development should become commonplace. Personnel trained in the mainframe use of CICS will likely use CICS on micros, while those who learn CICS on a micro may want to use it on a mainframe. Most mainframe command-level COBOL CICS applications that access only VSAM files can be run using existing microcomputer software with *no* changes required.

Training costs and employees' learning curves should be reduced as those new to CICS are able to use the theory they learn immediately on a micro without the fear of *crashing* a mainframe system. Ambitious employees may be encouraged and motivated to improve their CICS skills on their own microcomputers. The quality of design and programming is likely to improve, and the number of persons knowledgeable in CICS is sure to expand rapidly. This will increase the supply of individuals who are able to implement the transition of a mainframe system to a more flexible interactive microcomputer system.

Extensive use of CICS on microcomputers is expected for both program development and testing. The ability to transport CICS code between mainframes and micros with little or no change required will increase the appeal of microcomputer development and testing. Any mainframe programmer who has *crashed* a CICS test region due to a bug in his or her program will appreciate the use of micros for testing. When a mainframe CICS region crashes, *all* users of that region are disabled and are unable to proceed until technical support personnel restart CICS. Data processing managers and technical support personnel, who are under pressure to bring up a crashed region, will feel a sense of relief as testing and debugging shifts to micros. The ability to translate and compile programs without being placed at the bottom of the list of a mainframe queue AWAITING EXECUTION will please programmers and make them more productive. The ability to easily print screen images should be welcomed by designers and programmers who do not have ready access to a nearby printer. Technical support personnel will be able to respond more easily to requests for program control table (PCT), processing program table (PPT), and file control table (FCT) entries. These entries will have been pretested and can be presented to the systems programming group as a unit instead of having to be submitted as individual entries when they are needed.

Online systems which send, receive, and process data via a terminal are here to stay and will soon exceed the number of batch systems in many companies. CICS makes it easy for a programmer to code instructions that facilitate online functions. The more you learn about CICS, the better prepared you will be to play a significant role in the transition from batch to online systems.

This book takes a very simple nuts-and-bolts approach toward CICS commands and concepts. It does not attempt to convey every detail of CICS; many of these details are confusing to the beginner. I believe that once you master the material in this book, you will be prepared to develop and maintain most CICS programs. The initial foundation gained from this book will provide you with the knowledge and confidence to pursue advanced studies in CICS. You will not be overwhelmed with terminology at the start—only those terms and concepts which will actually be used are introduced as needed. A person unfamiliar with CICS will benefit most from this book by reading it from start to finish. Experienced CICS programmers can read those chapters which cover the material that they wish to review.

CICS for Microcomputers illustrates techniques and concepts through numerous simple examples and programs. Designers and programmers using this text should become productive very quickly. The programs in the examples employ a simple structured programming style which eliminates most GO TO's without confusing you with numerous nested IF statements. The examples can serve as models for future programs and should result in increased programmer productivity.

Maintenance should be reduced because most of the program code is reusable. If you have a good model to begin with, it should comprise as much as 80 percent of the code required for similar programs. It follows that if you start each program with a substantial percent of its code pretested, program development should be quicker and easier.

Many CICS concepts and examples in the text are associated with COBOL commands and techniques with which you are familiar. The best way to learn anything is through examples and use; you will master these principles quite easily by using them when writing and testing your own programs.

Chapter 1 defines a typical CICS system as viewed by a user and introduces basic terms and concepts.

Chapter 2 is devoted to designing maps which are easy to work with. Map design and conversational flow from screen to screen play an important role in the success or failure of an online system. Several map design guidelines are presented to make your screen design more effective.

Pseudoconversational programming, a technique which minimizes computer main storage requirements, is explained in Chap. 3 and is used for all programs throughout the text. System and programming documentation standards, discussed in Chap. 4, are essential to the success of a CICS system. Emphasis has been placed on those standards and documentation methods which are most effective and easiest to create and maintain.

Chapter 5 presents short easy-to-understand programs which build a foundation for the more comprehensive programs introduced in later chapters.

Chapter 6 on basic mapping support (BMS) explains how assembler language macros are coded in order to create maps: BMS maps are included with program examples. Chapter 7 is devoted to the use of assembled BMS maps. It is easy to create BMS maps when you have models to use for new maps, but their use can cause much difficulty if you do not understand certain fundamentals. Map attribute usage and its relation to physical and symbolic maps are covered extensively. You will probably use a map generator for creating your own BMS maps, but it is important to understand the basic BMS entries.

Program control commands, covered in Chap. 8, aid in the design of programs which communicate with one another. They are necessary in order to design effective systems and to develop efficient programming techniques. Chapter 11 on file control presents and explains all the commands that you are likely to use. File control is easier in CICS programs than is the case in a batch environment.

Chapters 9, 10, 12, 13, 14, 15, and 17 are devoted, with complete examples, to the following programs, respectively: menu, linked, inquiry, addition, change, deletion, and browse. Commands and concepts which have been presented are discussed on a section-by-section basis. All programs function as a part of a simplified system, enabling you to see the relation of the parts to the whole. This should prepare designers for new system development. High-quality work is more important than ever in online systems because it is difficult to conceal poor design and programming in an online environment.

Temporary storage, for which creative programmers will find many applications, is covered in Chap. 16. Several paging techniques, which can be coded with or without using temporary storage, are discussed. The browse program uses temporary storage queues for its paging routines. Routines used to accomplish forward and backward paging are presented. Methods for resetting a browse starting point and for returning a selection to an invoking program are also explained.

Chapter 18 on debugging and testing concentrates on the execution diagnostic facility which is available with all command-level CICS mainframe systems. Appendix G explains microcomputer software that simulates the use of mainframe EDF. Techniques are explained that can decrease the amount of time required to debug CICS programs.

Chapter 19 explains the use of color and other attribute extensions that are likely to be used for microcomputer CICS systems because of the availability of color monitors. The use of these attributes with CICS is the same on microcomputers as on mainframe computers.

Chapter 20 gives a brief introduction to additional CICS commands and concepts that are available to microcomputer users. The FORMATTIME command is covered in more detail, and possible applications of its use are explained. This chapter discusses numeric editing and contains code for a flexible module that should satisfy most of your editing needs.

Appendix C briefly reviews some basic DOS commands and concepts, such as the use of batch files, which may be helpful in a microcomputer environment.

Appendix D presents more detail on the following CICS tables: PCT, PPT, and FCT. This material should be helpful to applications programmers who may need to become more familiar with the basic entries in these tables in order to use CICS in a microcomputer environment.

Appendix E highlights the features of Realia's RealCICS software, App. F that of Micro Focus's PC-CICS, and App. G that of Triangle Software Company's CICS/pc. These companies are working to improve the early releases of their software which already provide an impressive simulation of mainframe CICS. Each company's stated goal is to make the software as compatible with mainframe CICS as is possible within the constraints of the microcomputer's operating system. The companies also provide some easy-to-use development and testing tools which should increase overall CICS development and maintenance productivity.

Appendix H contains the source code for the DEMO system's initialization screen. This program will also initialize the common work area (CWA) for the software which supports this feature. Appendix I contains complete BMS maps for program examples in this text that do not include the full code for their maps. Appendix J is a quick reference to CICS command formats and to the chapter in which they are explained.

Online systems have been around for many years. The extent of their application over the next few years should far exceed all that has been done in the past. Without knowledgeable and competent data processing personnel and users, this transition will not occur smoothly. I hope that this book will be successful in preparing you for the role you will play in putting your company on line.

Joseph J. Le Bert

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CICS for Microcomputers contains much information gathered through experience and contact with knowledgeable associates. I am grateful for the help obtained from the numerous proofreaders of my original CICS text, *CICS Made Easy.* I would like to thank the highly professional personnel at Micro Focus; Realia, Inc.; and Triangle Software Company for assisting me in evaluating their CICS software for this book. Most of all I want to thank my wife Maryann and children Joseph R., Dorothy, and Jean for their patience and understanding for the countless times that I was home but not with them.

About the Author

Joseph J. Le Bert has played a major role in the development, programming, and maintenance of numerous online and batch systems while functioning as a consultant, project leader, and senior programmer analyst at several companies. He predicts that the use of online interactive systems will grow rapidly, replacing many obsolete batch systems. He is the author of *CICS MADE EASY,* published by McGraw-Hill in 1986, and coauthor with James B. Massoni of *Advanced Interactive Cobol for Micros: A Practical Approach* published by Prentice-Hall in 1988.

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