Assembly Language Programming for the BBC Microcomputer

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Second Edition

M
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Dedicated to Theresa

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Preface to the First Edition

Every BBC Microcomputer, whether model A or model B, comes equipped with an immensely powerful and very fast assembler. What is more, assembly language statements and BASIC statements can be freely mixed, so hugely increasing the programmer's potential control over the machine.

This book shows you how to establish that control. It assumes that you are proficient in BASIC, for if you are not this is probably not the best time to learn assembly language. But it assumes no knowledge of assembler at all, taking you step by step from the basics to their complex implementation.

Since every user of the BBC Microcomputer assembler will have a working knowledge of BASIC, it is possible to use that knowledge to motivate and illustrate the ideas in assembly language. This book takes that approach, and this should help you to master assembly code, for you will always be acquainted with the fundamental concepts by seeing their connection with BASIC.

I had three types of readers in mind in writing this book. Firstly, all current owners of BBC Microcomputers who want to extend their knowledge into machine code. To help them with self-instruction, this book contains a considerable number of exercises and *a full solution is provided for every one*. Secondly, the teacher or student of computer science who wants to use this text in a structured course. The book is the result of many years of teaching experience, and it is designed according to a teaching strategy that the author has found to be very successful.

And thirdly, those people, already experienced BASIC programmers, who are wondering whether to buy the BBC Microcomputer, when there seems to be so much competition from cheaper and seemingly comparable computers. This book should help to convince them that the BBC Micro is worth the extra expense. Quite apart from its superb BASIC, the Micro possesses an assembler that turns it into a potential 6502 development system in its own right! It also possesses an operating system that is designed to mesh with assembly language programming in an extraordinarily simple way. One of the aims of this book is to show you how to exploit these features to the full.

The book contains more than 75 listings of programs, many of which will be found to be useful utilities in their own right, quite apart from their

value in teaching you assembly language. In particular, it contains a full machine code monitor, a suite of machine code sorting programs which you can use on BASIC variables, a high-resolution screen copy to the Epson printer and a program compactor. There is a companion cassette available with the book if you do not feel you want to type in the programs yourself. The cassette also contains two useful extra utility programs. One is a machine code program which will find the locations of any segment of code in a BASIC program (equivalent to the FIND command found in some utility packages); the other is a machine code program which will replace any segment of code in a BASIC program by any other segment; so, for example, you can change any variable's name in the whole program in an instant.

The book is completely self-contained: full information on the 6502 instruction set is provided throughout and summarised in an appendix. Other appendixes cover floating-point and the user port.

May 1982

Ian Birnbaum
Needlingworth

Preface to the Second Edition

For this new edition I have incorporated all the extra features of OS 1.2 and of BASIC version 2. In particular, much of chapter 9 on interrupts has been rewritten to take advantage of the event-handling facilities of OS 1.2; and throughout the book, all the powerful OS 1.2 calls have been used where relevant. The useful pseudo-instructions of BASIC 2 have been used where they are appropriate, but equivalent methods for BASIC 1 are also included.

The book has been completely reset and any errors in the first edition corrected.

February 1984

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Kingston-upon-Hull