

The BIOS Companion

The book that should come
with your motherboard!

Bonus CD Also Includes:

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Phil
CROUCHER

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The BIOS Companion

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Sources

Which are gratefully acknowledged:

- Experience.
- Many conversations with PC technicians.
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- amibios.txt**, available from Jean-Paul Rodrigue in the University of Montreal, which had useful snippets, especially the explanation of Fast Decode. His BIOS Survival Guide is at www.lemig.umontreal.ca.
- amisetup**, a shareware program from Robert Muchsel, available from <ftp://194.163.64.1/pub/sanisoft/amisetup.zip>.

About The Author

Phil Croucher runs his own consultancy, providing technical writing and training services, and his books and courses are the result of several years' experience of freelance network management, system building and repairs. Other computer-related publications include:

- Communications and Networks (*Sigma Press*)
- Novell NetWare Companion (*Sigma Press*)
- The DR DOS Book (*Sigma Press*)
- Computing Under Protest (*Sigma Press*)
- The PC Engineer's Reference Book (*Sigma Press*)
- Communications, Networks and Windows (*Electrocution*)
- Supporting Windows (*Electrocution*)
- The Hard Disk Database (*Electrocution*)
- The Computer Buzzword Book (*Electrocution*)
- The PC User's Handbook (*Electrocution*)

Clients include (or have included): The Ministry of Defence, Barnardo's, Esselte Letraset Ltd, Rank Hovis, Royal Mail, Enterprise Oil plc, Line-Up Aviation Personnel, Triton Chemicals, Erith College, South Thames College, Kingsway College, Executive Airlines, Martini Airfreight Services and numerous small businesses.

He has been involved with computing since 1986, starting off with a variation of Acorn's BBC computer, the Torch, using its own version of CP/M, called CPN. From there he has fond memories of the Sirius and the Macintosh, but has mostly been involved with IBM compatibles of all shapes and sizes, specialising in Multiuser DOS. He is a regular contributor to *Computer Shopper* magazine, in the UK.

Phil is also qualified to fly helicopters and aeroplanes, having over 6500 hours on 32 types of aircraft. He has at various times been a Chief Pilot and General Manager of several companies, including a third level airline. He is the author of *The Professional Pilot's Manual* (Airlife).

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IPR2021-00663

[Page

The BIOS Companion

The BIOS

The instructions that make a PC work come in three forms; *application programs*, which are loaded by DOS, and *DOS*, which is loaded by a bootstrap loader in the BIOS.

BIOS stands for *Basic Input/Output System*, of which there are several in a PC; a good example is the one on the video card that controls the interface between it and the computer. However, we are concerned with the *System BIOS*, which is a collection of assembly language routines that allow programs and the components of a PC to communicate with each other at the hardware level. It therefore works in two directions and is active all the time your computer is switched on. The idea is that software doesn't have to talk to a device directly; it calls a BIOS routine which does the job instead, but these days the BIOS is often bypassed by 32-bit software anyway. In fact, there are moves afoot to place the BIOS functions into the operating system, starting with Power Management (see *ACPI*).

For the moment, though, the BIOS will work in conjunction with the *chipset*, which is really what manages access to system resources such as memory, cache and the data buses, and actually is the subject of this book, as all those advanced settings relate to the chipset and not the BIOS as such.

On an IBM-compatible, you will find the BIOS embedded into a ROM on the motherboard, together with hard disk utilities and a CMOS setup program, although this will depend on the manufacturer. The ROM will usually occupy a 64K segment of upper memory at F000 if you have an ISA system, and a 128K segment starting at E000 with EISA. Older machines will have two ROMs, labelled *Odd* and *Even*, or *High* and *Low* (they must be in the right slots), but these days there tends to be only one—look for one with a printed label. A *Flash ROM* allows you to change the BIOS code without replacing the chip(s). Flash ROM, or *programmable read-only nonvolatile RAM*, if you want

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