T minus ten months

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In the first stage of our ten-part countdown to the year 2000, Roger Gann looks at hardware.

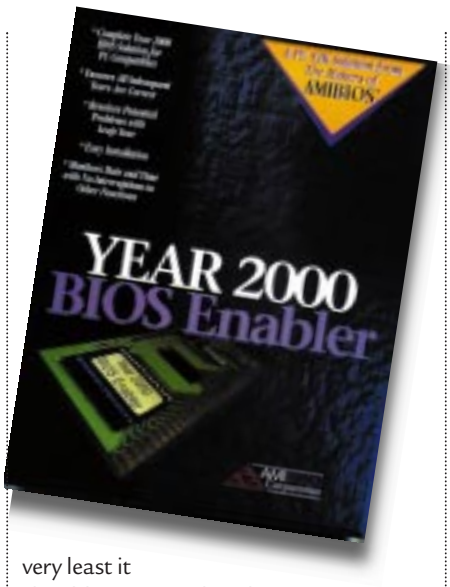
If you are still using a pre-AT, IBM PC or similar and running a recent version of MS-DOS, then you are to all intents and purposes Y2K-compliant. Mac users, too, can sit pretty on New Year's Eve as the internal clock in all Macs will be accurate until at least February 2040. In fact, the latest models are good until the year 29940.

Most PCs are *not* Y2K-compliant. But the reason is simple. When IBM launched its PC-AT in 1984 it included a battery-backed Real Time Clock (RTC) which used digital watch technology to store the date and time. Every time you turned on your PC, you didn't need to enter the date and time because the operating system would retrieve it, via the BIOS, from the RTC.

In fact, there are three clocks running in a PC: the RTC time, the BIOS' interpretation of the RTC time, and the OS clock picked up from the RTC at boot time. Rarely do they stay in perfect sync! Typically, the RTC contains seven registers which store the time and date. The first six are updated automatically whether your system is on or off, with each storing a different value: seconds, minutes, hours, days, months and years. The problem lies with the year's register as only two digits are counted, not four.

DOS will cope but your RTC and BIOS may not

To allow for centuries, a seventh register holds the so-called century data (i.e. 19 or 20). However, the RTC does not automatically update the century registers — something else has to increment from 19 to 20 at the right moment. That something is the BIOS. So, if the RTC is not adjusted, as 31st December 1999 becomes 1st January 2000, its first six registers will correctly roll over but its century register will still read 19. The RTC will assume the year is 1900 and DOS will read it as 1980. Thus, if a PC boots after 31st December 1999, an intelligent BIOS should go into the RTC and replace 19 with 20 when the year changes from 99 to 00. Or, at the very least it should recognise that the 19 is wrong and pass a 20 whenever the OS requests the date. Some BIOSes use 'date windowing' based around a pivot date of, say, 1979. If it sees a year higher than 79 it assumes the century digits to be 19. If it's lower, it uses 20 instead.



At boot time on 1st January 2000, though, an unintelligent BIOS will retrieve a 19 from the RTC's century register and tell the OS that the year is 1900. Another problem lies with PCs which are left on over midnight, New Year's Eve 1999. These will fail to 'roll-over' the date correctly. Luckily, though, most OSes are aware of this and will compensate.

It's easy enough to test this manually. Simply boot to a DOS prompt to avoid any OS 'compensation' and, using the DATE and TIME commands, set the date and time to 23:59 on 31/12/99. Using the free VIEWCMOS utility from www.rightime.com you can see how all three system clocks handle the transition. DOS will cope but the RTC and BIOS may not.

You should also test your RTC's roll-over capabilities by setting the date and time as above, then turning off your PC and waiting a couple of minutes before powering up and checking the date and time. If the year reads 1980, you have a problem. But if the year reads 2000, you're probably OK: your BIOS has changed the century register to 20 and will pass the year 2000 to your OS.

There's no shortage of free utility software to test your PC's clock hardware for you. Ontrack has the Y2K Advisor at www.ontrack.com/op/op_6.asp and NSTL <www.nstl.com/html/nstl_ymark2000.html> has its Ymark 2000 test utility. Of the two, I much prefer the Ontrack software.

What should you do if your PC's clock hardware has a problem? The good news is that you won't have to spend too much money to fix your hardware or cure the problem. If your PC has a flash BIOS, pay a visit to the motherboard manufacturer's web site to check for a BIOS upgrade, which is free. Or, you can add a little shareware program to your AUTOEXEC.BAT file which will correct your system date. Check out www.wsnet.com/~designer/holmesfx. For many users with problem PCs the solution is simply to turn your PC off on New Year's Eve and power it up the next day, entering the correct date, either at CMOS Setup or from a DOS prompt.

Hardware solutions are available, too, in the form of a small ISA card with either some additional, corrective BIOS code like the AMI Year 2000 BIOS Enabler (£55.17) and the Fernlink 2000 Millennium BIOS Board (£58.74), or a replacement Real Time Clock such as Diamond Network Technologies' YIIK board (£46.99) which deals with RTC roll-over problems. These three products all work but they're pricey, non-Plug and Play and eat an ISA slot. For standalone PCs the free fixes listed above are preferable. *(All prices incl VAT).*

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