Using Year 2000 Checker

The Year 2000 Checker tests your system to determine if your PC's RTC, BIOS, DOS and Windows clocks are year 2000 hardware compliant. It can repair problems in the way these clocks handle the transistion and spanning of dates and leap years from the 1900s through the 2000s. It does this by installing the Y2Kfixer.com program, and adding a line in your AUTOEXEC.BAT file that causes this program to run each time you start your PC.

Note Even if you uninstall Safe & Sound, the Y2Kfixer.com program remains installed to continuously protect your PC from Y2K clock problems.

To determine if your system is Year 2000 hardware compliant:

1. Click the Start button and do one of the following:
   - Choose the Safe & Sound command from the Start menu, click the Tools button and choose the Year 2000 Checker command.
   - Choose the Programs > Safe & Sound > Year 2000 Checker command.

   The Year 2000 Checker Window appears.
2. Click Next >.

   Y2K Checker tests your computer system for compliance. It displays a circled red X beside the dates that are non-compliant and a check mark in a green box for those dates that are compliant.
3. Click Next >.

   If the Y2K Checker finds dates that are non-compliant, it copies the Y2Kfixer program to your Windows directory and adds a line to your AUTOEXEC.BAT file that causes this program to run each time you start your PC. The Y2Kfixer program ensures that your PC's dates remain accurate after January 01, 2000.

   Note If the RTC clock fails, but the BIOS clock checks out okay, the Year 2000 Checker indicates that your PC is year 2000 hardware compliant because the BIOS contains a fix.
4. Click Finish.

   If your system clocks were inaccurate, the Y2Kfixer.com program is installed on your PC. Each time you start your computer, this program runs to correct the date as necessary. Even if you uninstall Safe & Sound later, the Y2Kfixer.com program remains installed so it can continue to protect your system's dates each time you start your PC.

   Note You should leave the Y2Kfixer.com program on your system if it is installed to ensure on-going protection of your PC clock dates.

Related Topics

- What is the Year 2000 Problem?
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- What are the RTC, BIOS, DOS, and Windows Clocks?
- How to Ensure Y2K Compliancy of Your PC's Clocks
- What Dates Does Year 2000 Checker Test and Why?
- What Other Y2K Problems Must You Resolve?

What is the Year 2000 Problem?

The countdown is on to the year 2000. So what's all the hubbub about this date in the computer world?

For nearly a millennia, we have been abbreviating the year to simply two digits in date notations. Almost universally, people understand that 12/01/98 means December 1, 1998. Unfortunately, most computers and software followed suit. For details about why this happened, see "Why Do We Have Y2K Problems With Our Computers?".

The problem in a nutshell is simple math (which is the language of computers). Computers and software most often allocate two digits for the year, both when storing the information and when displaying it on the screen. Starting in the year 2000, our data will span two centuries. For that reason, four digits must be used to accurately sort, calculate and compare years in the 1900s and 2000s.

The human eye can instantly recognize that 00 means the year 2000 and 95 means 1995. Therefore on screen displays, dates are likely to still only show two-digit years. But the underlying storage and calculation of dates must change.

Using two digits for the year works fine when all the dates are in the same century. However, when dates span centuries, calculation problems can arise unless computers use four-digit years. For instance, when subtracting 06/01/95 from 06/01/05 to determine a person's age, a computer using two digits would produce an incorrect result of -90 instead of 10 (the accurate result).

Why is the Y2K Issue So Urgent?

The year 2000 is the beginning of the Gregorian calendar year that culminates with the start of a new century and a new millennium. It is also the year whose first tick of our clock's second hand will test the date handling of computers and software worldwide. What makes this issue urgent is that the deadline for bringing computers and software into Year 2000 (Y2K) compliancy is fixed. We simply cannot turn back the clock and still have meaningful data.

So will our computers and software accurately handle this transition from dates in the 1900s to dates in the 2000s? Or will our computers suddenly miscalculate the date and reset computer clocks to some date only meaningful to the developers, such as January 1, 1990 or January 4, 1980? Or worse yet, will our computer systems stop working entirely? These situations are all possible. And the Y2K problem is massive, affecting governments, private sector business and home users alike.

For this reason, U.S. Government agencies estimate they will spend $2.3 billion between the 1996 and 2000 fiscal years bringing government computer systems into compliancy before the beginning of the year 2000. Solving the Y2K issue is the most massive example of human cooperation and teamwork to date. In that respect, achieving total compliance before 2000 will be something to celebrate in itself.

Why Do We Have Y2K Problems With Our Computers?

The Year 2000 issue is a problem now, because of design decisions made two or more decades ago by engineers and programmers. These people knew that the turn of the century loomed only 20 years in the future. However, they were confident that their products would only have a five to ten year lifespan. Hardware wears out, and software is enhanced (at that time approximately once every year a new release of software was made available).

There were other factors involved in those early decisions to use a two-digit year. Screen “real estate” (or the area on the screen available for displaying information) has always been a precious commodity. Also the standard method of noting dates by hand and in printed forms used only the last two digits of the year. For these reasons, and for reasons associated with the storage space needed to store dates, developers opted to go with only two digits to represent the year (that is, 93 is 1993, 86 is 1986, and so on).

These developers were confident that their products would be “wall art” long before the next century commenced. In that regard, they were right. The earliest microcomputers (such as Z80 and 8080 CPUs) and their software have long been obsolete and are now in some cases collectors items.

What these developers did not predict was that the standard methods of storing dates that they defined would become “etched in stone.” They did not foresee that their hardware and software, although long out of production, might remain in use long into the future due to replacement costs. Neither did they expect that using two-digit years would start a chain reaction of backward compatibility and design stasis that has caused developers to scramble en masse to find and fix every single occurrence of Y2K non-compliance in hardware and software alike.

What are the RTC, BIOS, DOS, and Windows Clocks?

Safe & Sound's Year 2000 Checker can test the four clocks on your PC. They are the RTC, BIOS, DOS and Windows clocks.

The *RTC (Real Time Clock)* is a device in your computer that maintains the time (measuring elapsed time) even when you turn off or unplug your PC. Accurate time measurement is needed on your PC, and not just so that you can use your computer as a timepiece either. Your PC uses accurate time to perform a flow of computing tasks. The RTC clock gives your computer the ability to perform tasks in order.

The *BIOS (Basic Input/Output System) clock* is stored in firmware, such as PROM (Programmable Read Only Memory) or EPROM (Erasable Programmable Read Only Memory). When you start your computer, the BIOS reads the date and time from the RTC. The BIOS is your PC's "traffic cop," which dictates how software interacts with all the peripheral devices in your computer, including the RTC clock. Most software gets the date and time from the BIOS, DOS, or Windows clocks. Non-compliant BIOS clocks have reset themselves from 12/31/1999 to 01/01/1900 when the year 2000 begins.

The *DOS (Disk Operating System) clock* gets its date and time from the BIOS clock, and then makes the current date and time available to you or to any application that requests it. You can change the DOS date and time in an MS-DOS Prompt window using the DATE or TIME commands. Non-compliant DOS clocks have reset themselves from 12/31/1999 to 01/04/1980 (the date when DOS was originally released, and before which it did not need to support a current date).

Note Although seemingly transparent, MS-DOS still runs underneath Windows 95, so the Year 2000 Checker fixes the DOS date if it is non-compliant.

The *Windows clock* gets its information from the DOS clock, and makes the date and time available to Windows applications, or to you via the Date/Time control panel. Non-compliant Windows clocks have also reset themselves from 12/31/1999 to 01/04/1980.

How to Ensure Y2K Compliancy of Your PC's Clocks

Safe & Sound's Year 2000 Checker can instantly determine exactly what the four primary clocks on your computer will do on certain milestone dates without some form of correction or intervention. It can also bring these clocks into compliancy by installing the Y2Kfixer.com program, and adding a line to your AUTOEXEC.BAT file that causes this program to run each time you start your computer. Even if you uninstall Safe & Sound, the Y2Kfixer.com program remains on your system so it continues to be Y2K compliant.

What Does Year 2000 Checker Test and Why?

The Safe & Sound Year 2000 Checker tests each of the four clocks for the following dates. In each case, it starts the tests a few seconds before the date and verifies that the transition to the next day's date is accurate.

01/01/2000

This date is the 2000 rollover. In some applications that perform forecasting or handle future dates, this date will be reached before the actual calendar date. Examples of this include banking, accounting and project management software. In many cases, these programs may begin using 01/01/2000 when the previous year begins on 01/01/1999 or even earlier. The Year 2000 Checker tests to make sure that all four clocks transition accurately from a few seconds before 01/01/2000 into the next day.

02/29/2000

The year 2000 is a leap year, so the Year 2000 Checker verifies that this date is accurate.

The rule for determining leap years is:

- Years divisible by 4 are leap years except for years ending in 00.
- Years ending in 00 that are divisible by 400 are leap years.

Reports have been made of computers failing to accurately consider 2000 a leap year (and instead making the year 2001 a leap year).

03/01/2000

Some BIOS clocks go correctly to February 29, 2000 but then continue to an inaccurate date of 02/30/2000. So the Year 2000 Checker tests not only 02/29/2000, but also that it then moves accurately to the first day of March (03/01/2000).

01/01/2002

The Year 2000 Checker tests 01/01/2002 to ensure that farther down the road your clocks are still handling dates accurately. It also confirms that the clocks do not consider the year 2002 to be a leap year.

What Other Y2K Problems Must You Resolve?

After you ensure that your PC's clocks are Y2K compliant using Safe & Sound's Year 2000 Checker, you still need to verify that the software you use, and your data itself, is also Y2K compliant.

Check the ways that you use dates in your data (such as embedding dates in identifiers like serial numbers). Also check with your computer vendors for Year 2000 compliance in all new products or updates you acquire. If you are using older software, it is an excellent idea to update it.

If you have custom software, its programmers must examine the source code, looking for not only two-digit dates, but also for obscure times when dates, week counts, or even day of the week calculations are performed. If an inaccurate calculation of leap years is made, even the day of the week can be thrown off.

If your PC is connected to a LAN, be aware that networking software synchronizes the server clock with your PC's clock whenever you connect to a server. This means that LAN servers must be accurate, or they could update workstation clocks resetting them all to the wrong date.

Year 2000 Checker Test Methods

Your PC has four clocks where date and time information is gathered and stored. From the lowest level clock to the highest, these are the RTC (real time clock), the BIOS, DOS and Windows clock. The RTC clock is a hardware subsystem, and the other subsystems are software based. At each subsystem level, Year 2000 Checker will set the date and time, and get the date and time from that level and all levels below it.

If any clock fails to respond with the proper date and time, a  appears next to the test.

If all clocks respond properly to the test, a  appears.

Numerous dates are tested at all subsystem levels. Only January 1, 2000 problems can be fixed by the Y2K Repair Facility. All other problems require either a replacement BIOS or an operating system update.

Note The first RTC clock test fails on most PCs. All known RTC chips fail to update the century. This failure can be overcome by the system BIOS on a year 2000 compliant system. The *Y2K Repair Facility* will not be installed unless non-RTC tests fail (BIOS level or above).

Year 2000 Checker Repair Methods

The *Y2K Repair Facility* (Y2KFIXER.COM) is installed on your hard drive. A line is added in the AUTOEXEC.BAT file that causes this program to run each time you start your PC. This ensures year 2000 hardware compliance whether the system is turned on or off during the transition to the next millenium.

Warning The Y2KFIXER.COM program does *NOT* fix software packages, such as spreadsheets and databases, that represent dates with only a two-digit year. Contact the software manufacturer to determine if your version is year 2000 compliant.

Year 2000 Checker Window

This Window contains the following options:

Y2K Compliancy Testing List
After you start Year 2000 Checker and click the Next > button, your RTC, BIOS, DOS, and Windows clocks are each tested to see how they transistion through four critical dates. For details, see What Dates Does Year 2000 Checker Test and Why?.

Next > / Finish
Until you finish testing your PC's clocks, this button is titled Next >. Click the Next > button to begin testing important Y2K date hardware compliancy on your PC's clocks.

Once the clocks have been tested and either your PC has been determined to be compliant or the Y2Kfixer.com program has been added to your system, this button is titled Finish. Click the Finish button to exit Year 2000 Checker.

Cancel
Click the Cancel button to close Year 2000 Checker without finishing the Y2K compliancy testing.

< Back
Click the < Back button to step backward through the Year 2000 Checker Wizard windows.

Address Space

The sum total of all possible memory addresses available at a given time. This is 4 GB (gigabytes) on a 386 or later PC in protected mode.

Launch Pad

The Launch Pad is a window where you can place application and document icons so you can conveniently access them.

Benchmarks

A benchmark is a standardized task that tests various devices for measurements, such as speed.

BIOS

The BIOS (or Basic Input/Output System) contains buffers for sending information from an application to the hardware device, such as a printer, where the information should go.

Buffers

A buffer is a temporary storage location for information being sent or received.

Bytes

A byte is eight bits of information composed of zeros and ones, one of which may be a parity bit. Most character sets, such as ASCII, use one byte to represent each character (letter, number, or special symbol).

Cache

A cache is part of the computer's memory used to temporarily store recently accessed information. A cache is designed on the premise that recently used information may be needed again soon. Keeping information available in cache reduces the time it takes for an application to obtain the information again.

Cluster

A cluster is a unit of storage allocation usually consisting of four or more 512-byte sectors.

Conventional Memory

Conventional memory is the first 640 K (kilobytes) of RAM (random access memory).

CPU (Central Processing Unit)

The “brain” of your computer. This is main computer chip that controls all activity that takes place on a computer.

Diagnostics

Diagnostics are tests run to detect faults in a computer system. Diagnostics tests are run to detect faults before they become serious problems so the faults can be corrected.

Directories

Directories are locations within a volume on a drive where you can store files or subdirectories. In Windows, directories are equivalent to folders that appear on the desktop in a drive window.

Discardable Memory

Discardable memory is memory used by an application that it has marked as discardable. Windows can reallocate the discardable memory to a different application if it needs to.

DLLs (Dynamic Link Libraries)

A DLL is an executable code module that can be loaded on demand and linked at run time. DLLs can be shared among multiple applications and independently updated, transparent to the applications. DLLs can also be unloaded when they are no longer needed.

DMA (Direct Memory Access)

DMA is a fast method of moving information from a storage device or LAN interface card directly to RAM which speeds processing time. DMA is direct memory access by a peripheral device that by-passes the CPU to save time.

Expanded Memory

DOS running on the Intel 80286, 80386, or 80486 family of computers can only address one megabyte of memory at one time. Expanded memory is the memory located between the base memory (either 512 K or 640 K) and one megabyte. Expanded memory is reserved by DOS for housekeeping tasks, such as managing information that appears on the screen.

Extended Memory

Memory above one megabyte in 80286 and higher PCs. Extended memory can be used for RAM disks, disk caches, or Windows, but it requires the CPU to run in a special mode (protected mode or virtual real mode).

FAT (File Allocation Table)

The FAT is an index to the location where all the information is stored on a floppy disk or hard drive. The FAT is extremely important because the system uses it to store and retrieve files containing information.

GDT (General Description Table)

The GDT is a table that is basic to the operation of protected mode. This table contains data structures (descriptors) that describe various regions of memory and how they may be accessed. Windows uses the GDT for system devices. *See LDT.*

Global Heap

The Global Heap is the general pool of memory available to Windows applications.

GPF (General Protection Fault)

An error condition caused by an application when it attempts to perform an operation not allowed by the operating system. Windows uses GPFs to determine and control the state of the currently executing application. GPFs that are unexpected by Windows cause a system error message to appear.

HMA (High Memory Area)

The HMA is the first 64 K of extended memory. If you use DOS 5.0, you can save memory by loading DOS into the HMA. Do this by adding the DOS=HIGH setting to your CONFIG.SYS file and restarting your PC.

Interrupt

A temporary suspension of a process caused by an event outside that process. More specifically, an interrupt is a signal or call to a specific routine. Interrupts allow peripheral devices, such as printers or modems, to send a call to the CPU requesting attention.

I/O (Input/Output) Device

An I/O device is any piece of computer hardware that can exchange information with the CPU. Examples of I/O devices include network cards, printers, speakers or other sound devices, or devices connected to the serial or parallel ports of your PC such as external modems.

Kernel

The Kernel is the part of a computer operating system that performs basic functions such as switching between tasks.

LDT (Local Descriptor Table)

The LDT is a secondary data structure table that contains additional information about various regions of memory and how they can be accessed. Windows uses the LDT for programs.

Linear Memory

Linear memory is the currently defined address space of the system that Windows uses to allocate memory to Windows applications.

Local Heap

The Local Heap is a region of memory allocated for local use by an application.

Locked Memory

Locked memory is memory used by an application that cannot be relocated or discarded by Windows.

Mapping

Mapping is the process of assigning physical memory (RAM) to a particular linear address range.

Mode Switch

A mode switch is a transition made by the CPU when changing from one mode of operation to another. For example, switching from real or protected mode, or a transition between different levels of protection. *See Ring 0, 1, 2, 3*.

Modules

A module is a device driver loaded by Windows.

Paging

The process of saving information stored in RAM to the swap file on the system hard drive so Windows can make the RAM available at a different linear address.

Parallel Port

The parallel port is a connector on the back of your PC and on some peripheral devices. With the appropriate driver software installed and a parallel cable connected to the parallel ports on your PC and a peripheral device, the two can communicate with each other. Parallel transmissions have no EIA standard, but most equipment follows a quasi-standard called the Centronics Parallel Standard.

PCI (Peripheral Component Interconnect) Bus

The PCI Bus is a local motherboard specification (that provides connector slots on the motherboard for installing peripheral cards). The PCI Bus, designed by Intel, offers a high performance, peripheral component level interface to the CPU bus.

Physical Memory

Physical memory is the RAM (Random Access Memory) installed in your PC. *See Random Access Memory (RAM).*

Protected Mode

A mode of operation of 80286 or later CPUs which allows access to more than 1 MB of memory.

RAM (Random Access Memory)

RAM (Random Access Memory) is also called physical memory. It is installed in your PC on SIMMs (Single Inline Memory Modules) or DIMMs (Dual Inline Memory Modules). RAM is volatile, extremely high-speed storage used by your computer for processing information.

Real Mode

A mode of 80286 or later CPUs, where the CPU operates substantially like an older 8086 CPU and can address directly only 1 MB of memory.

Resources

Resources are objects that Windows and its applications can use, such as the buttons on the screen that you can click.

Ring 0, 1, 2, 3

Different levels of protection in protected mode, where programs having varying degrees of freedom of operation. Ring 0 (zero) is least protected and has direct access to all hardware in the system.

Sector

A sector is a pie-shaped portion of a hard disk. A disk is divided into tracks and sectors. Tracks are complete circuits and are divided into sectors. Under DOS, a sector is 512 bytes.

Serial Port

A serial port is an input/output port (connector) that allows the transmission of information out at one bit at a time, as opposed to parallel which transmits eight bits, or one byte at a time.

Swap File

The swap file is created by Windows on the system hard disk. It uses the swap file to copy information stored in part of the linear address space so it can reallocate the RAM used at that location to another linear address space.

Swapping

Swapping is the process of saving to disk or restoring from disk the contents of RAM so that the RAM can be used elsewhere in linear memory.

System Resources

System resources are a series of data structures kept by Windows. System resources are managed by the Windows User and GDI programs and maintain information about objects that appear on your screen.

32BDA (32-Bit Disk Access)

32BDA is a process in Windows where the device driver that accesses the disk runs entirely as a 32-bit program at Ring 0 (zero).

32BFA (32-Bit File Access)

32BFA is a process in Windows where the DOS file operations are controlled by a program, or set of devices, that operate entirely as 32-bit programs at Ring 0 (zero).

Unlocked Memory

Unlocked memory is physical memory that Windows can copy to the swap file on disk, and whose linear address can be changed whenever Windows chooses.

UMB (Upper Memory Block)

The UMB is the area in memory between 640 K and 1 MB that have RAM mapped into them by memory managers, such as Network Associates' Netroom or MemMaker. *See Expanded memory.*

V86 Mode (Virtual 8086 Mode)

V86 mode is a mode of operation of 80386 or later CPUs where programs, originally designed to run in real mode, can run as sub-programs to a protected mode control program or operating system.

Video Memory

Video memory, called VRAM, is physical memory installed on your PC's video card that is used for displaying information on the screen.

Virtual Memory

Virtual memory is the amount of memory that exists either as physical memory (RAM) or on the hard drive (in the swap file). When a part of memory that is located in the swap file is accessed by an application, Windows reads the information into RAM.

VMs (Virtual Machines)

Virtual machines (also called Virtual DOS machines or VDMs) are created in Windows 95/98 when you open a MS-DOS Prompt window. The VDM is a software emulation of a separate computer, offering all the services that the DOS application expects of a PC.

VxDs (Virtual Device Drivers)

VxDs are used in Windows to communicate with all physical hardware in the system. This prevents any application from having direct access to a piece of hardware. Instead, it communicates only through the VxD for that hardware.

Windows Registry

The Windows 95/98 Registry file contains user, application, and computer-specific configuration information in a central location that was kept in various .INI files in Windows 3.1. The Registry contains settings that determine how your computer runs.