

Accessibility

Microsoft is committed to making computers easier to use for everyone. Personal computers are powerful tools that enable people to work, create, and communicate in ways that might otherwise be difficult or impossible. The vision of making computers easier to use for everyone can be realized only if people with disabilities have equal access to the powerful world of personal computing.

The issue of computer accessibility in the home and workplace for people with disabilities is becoming increasingly important. Seven to nine out of every ten major corporations employ people with disabilities who may need to use computers as part of their jobs. In the U.S. alone, an estimated 30+ million people have disabilities that can potentially limit their ability to use computers. Additionally, as the population ages, more people experience functional limitations, causing the issue of computer accessibility to become important to the population as a whole.

Legislation, such as the Americans with Disabilities Act (which affects private businesses with more than 15 employees) and Section 508 of the Rehabilitation Act (which addresses government spending), also brings accessibility issues to the forefront in both the public and private sectors.

Microsoft already offers a number of products specifically for users with disabilities and includes features in its mainstream software products to help make them more accessible. Microsoft's two most prominent accessibility products are Access Pack for Microsoft Windows and AccessDOS. Both were developed by the Trace Research and Development Center at the University of Wisconsin–Madison using research funded by the National Institute on Disability and Rehabilitation Research (NIDRR). Also available is Access Pack for Microsoft Windows NT. These products enhance the Windows, MS-DOS, and Windows NT operating systems by adding a variety of features that make the computer more accessible for users with limited dexterity or hearing impairments. Microsoft distributes these utilities at no charge to customers and announces their availability in each of its new products.

Windows 95 offers several enhancements designed to make the system more accessible and easier to use for people with disabilities. In recent years Microsoft has established close relationships with users who have disabilities, organizations representing disabled people, workers in the rehabilitation field, and software developers who create products for this market. Based on their combined input, the following specific design goals were defined for Windows 95:

- Integrate and improve the features from Access Pack that compensate for the difficulties some people have using the keyboard or the mouse.
- Make the visual user interface easier to customize for people with limited vision.
- Provide additional visual feedback for users who are deaf or hard of hearing.
- Provide new APIs and “hooks” for ISVs developing third-party accessibility aids, including those that allow blind people to use Windows.
- Make information on accessibility solutions more widely available and increase public awareness of these issues.

Enhancements designed to meet these goals are included throughout Windows 95. This chapter describes these enhancements, which will make computing easier for people who have disabilities.

Summary of Improvements over Windows 3.1

The primary improvements in accessibility for Windows 95 are the following:

- Make UI elements scaleable
- Compensate for difficulties using the keyboard
- Emulate the mouse with the keyboard
- Support alternative input devices that emulate the keyboard and mouse
- Provide visual cues to tell users when an application is making sounds
- Advise applications when the user has limited vision
- Advise applications when the user needs additional keyboard support due to difficulty using a mouse

- Advise applications when the user wants visual captions displayed for speech or other sounds
- Advise applications when they should modify their behavior to be compatible with accessibility software utilities running in the system
- Optimize keyboard layouts for users who type with one hand, one finger, or a mouthstick
- Include audible prompts during Setup for users who have low vision
- Optimize color schemes for users with low vision
- Include accessibility information in Microsoft product documentation

General Features of Accessibility Enhancement

To provide information about accessibility features and to provide ways of controlling the features, Windows 95 includes several enhancements.

Online Help

An Accessibility section in the Windows 95 contents and index of online Help provides a quick reference and pointer to topics that can help adjust the behavior of the system for people with disabilities.

Controlling the Accessibility Features

In Windows 95, most of the accessibility features described in this chapter are adjusted through the Accessibility Options icon in the Control Panel. Clicking this tool displays the property sheet shown in Figure 118 on the following page, which enables users to turn the accessibility features on or off and customize timings, feedback, and other behavior for their particular needs.

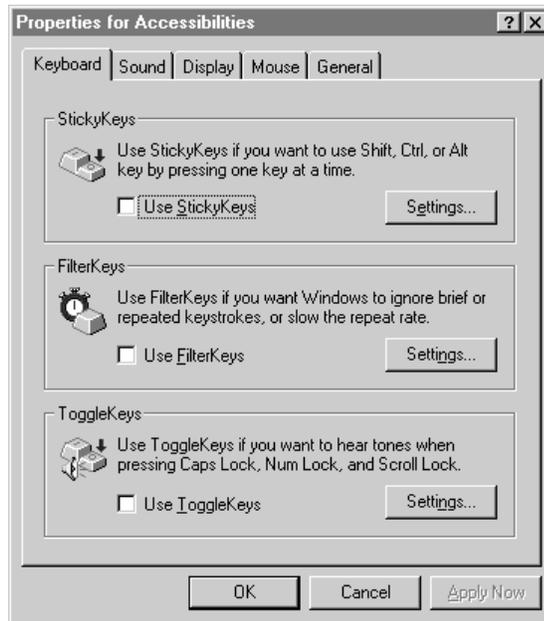


Figure 118. The Accessibilities property sheet

Emergency Hotkeys

Most of the accessibility features described in this chapter are adjusted through the Control Panel. But if users can't use the computer until an accessibility feature is turned on, how can they use the Control Panel to activate it? This chicken-and-egg problem is solved by providing emergency hotkeys with which users can temporarily turn on the specific feature they need. Then, after a feature is turned on, users can navigate to the Control Panel and adjust the feature to their own preferences or turn it on permanently.

If a feature gets in the way or if another person needs to use the computer, the same hotkey can be used to temporarily turn off the feature.

Microsoft has worked hard to ensure that the emergency hotkeys don't get in the way of users who don't need them. Each hotkey is an obscure key combination or key sequence that should not conflict with applications. If a conflict does arise, the hotkeys can be disabled, and the features will still be available as needed.

As an additional precaution, each emergency hotkey plays a rising tone and displays a confirmation dialog box that briefly explains the feature and how it was activated. If users pressed the hotkey unintentionally, this notification allows them to deactivate the feature. It also provides a quick path to a more detailed Help topic and the Control Panel settings for that feature, allowing users to disable the hotkey permanently.

The Accessibility TimeOut

The Accessibility TimeOut turns off Access Pack's functionality after the system has been idle for a certain period of time. It returns the system to its default configuration. This feature is useful on machines shared by multiple users. The Accessibility TimeOut can be adjusted using the Control Panel.

The Accessibility Status Indicator

Windows 95 provides an optional visual indicator, shown in Figure 119, that tells users which accessibility features are turned on, helping users unfamiliar with the features to identify the cause of unfamiliar behavior. The indicator also provides feedback on the keys and mouse buttons currently being “held down” by the StickyKeys and MouseKeys features (discussed later in this chapter). The status indicator can be displayed on the taskbar or as a free-floating window and can be displayed in a range of sizes.



Figure 119. The Accessibility status indicator

Features for Users with Low Vision

Windows 95 offers several enhancements designed to make the system more accessible and easier to use for people with low vision.

Scaleable User Interface Elements

Users who have limited vision or who suffer eyestrain during their normal use of Windows can adjust the sizes of window titles, scroll bars, borders, menu text, and other standard screen elements. These sizes are completely customizable through the Control Panel in Windows 95. Users can also choose between two sizes for the built-in system font.

A Customizable Mouse Pointer

Users who have difficulty seeing or following the mouse pointer can now choose from three sizes: normal, large, and extra large. They can also adjust the color or add animation, both of which can increase the pointer’s visibility.

High-Contrast Color Schemes

The Windows color schemes allow users to choose from several well-designed sets of screen-color options designed both to match users’ individual tastes and to meet their visual needs. The new color schemes in Windows 95 include high-contrast colors designed to optimize the visibility of screen objects, making it easier for users with visual impairments to see them.

High-Contrast Mode

Many users with low vision require a high contrast between foreground and background objects to be able to distinguish one from the other. For example, they may not be able to easily read black text on a gray background or text drawn over a picture. Users can set a global flag to advise Windows 95 and applications that they need information to be presented with high contrast.

Windows 95 also provides an emergency hotkey that allows users to set the computer into high-contrast mode when they can't use the Control Panel or when the current color scheme makes the computer unusable for them. Pressing this hotkey—Left ALT, Left SHIFT, and PRINT SCREEN keys simultaneously—allows them to choose an alternate color scheme that better meets their needs.

Try It!

Take a New Look

1. Imagine you can't read black text on a gray background because all the lines blur together.
2. Press Left ALT+Left SHIFT+PRINT SCREEN until you find a text/background combination that's more suitable to your needs.

Features for Easier Keyboard and Mouse Input

Windows 95 offers several enhancements designed to make inputting information via the keyboard and mouse easier.

StickyKeys

Many software programs require users to press two or three keys at one time. For people who type with a single finger or a mouthstick, that just isn't possible. StickyKeys allows users to press the keys of a key combination one at a time and instructs Windows to respond as if the keys had been pressed simultaneously.

When StickyKeys is turned on, pressing any modifier key—that is, CTRL, ALT, or SHIFT—latches that key down until either the mouse button or a non-modifier key is released. Pressing a modifier key twice in a row locks it down until it is pressed a third time.

The functionality of StickyKeys is adjusted using the Control Panel, or it can be turned on or off using an emergency hotkey, by pressing the SHIFT key five consecutive times.

SlowKeys

The sensitivity of the keyboard can be a major problem for some people, especially if they often press keys accidentally. SlowKeys instructs Windows to disregard keystrokes that are not held down for a minimum period of time, allowing users to brush against keys without any ill effect. When users put a finger on the correct key, they can hold the key down until the character appears on the screen.

The functionality of SlowKeys is adjusted using the Control Panel, or it can be turned on or off using an emergency hotkey, by holding down the Right SHIFT key for eight seconds. (This hotkey also turns on RepeatKeys.)

RepeatKeys

Most keyboards allow users to repeat a key just by holding it down. This feature is convenient for some but can be a major annoyance for people who can't lift their fingers off the keyboard quickly. RepeatKeys lets users adjust the repeat rate or disable it altogether.

The functionality of RepeatKeys is adjusted using the Control Panel, or it can be turned on or off using an emergency hotkey, by holding down the Right SHIFT key for eight seconds. (This hotkey also turns on SlowKeys.)

BounceKeys

For users who “bounce” keys and produce double strokes of the same key or similar errors, BounceKeys instructs Windows to ignore unintended keystrokes.

The functionality of BounceKeys is adjusted using the Control Panel, or it can be turned on or off using an emergency hotkey, by holding down the Right SHIFT key for 12 seconds. Users hear an up-siren after eight seconds, and another double-tone after 12 seconds. Releasing the SHIFT key after the double-tone activates BounceKeys.

MouseKeys

The MouseKeys feature lets people control the mouse pointer using the keyboard. Users don't need to have a mouse to use this feature. Windows 95 is designed to allow users to perform all actions without needing a mouse, but some applications may require one, and a mouse can be more convenient for some tasks. MouseKeys is also useful for graphic artists and others who need to position the pointer with great accuracy.

When MouseKeys is turned on, the following keys navigate the pointer on the screen:

- Press any number key except 5 on the numeric keypad—these keys are also called the direction keys—to move the pointer in the directions indicated in Figure 120.
- Press the 5 key for a single mouse-button click, and press the + key for a double-click.
- To drag an object, point to the object, press INS to begin dragging, move the object to its new location, and press DEL to release it.
- Select the left or right mouse button or both mouse buttons for clicking by pressing the /, -, or * key, respectively.
- Hold down the CTRL key while using the direction keys to “jump” the pointer in large increments across the screen.
- Hold down the SHIFT key while using the direction keys to move the mouse a single pixel at a time for greater accuracy.

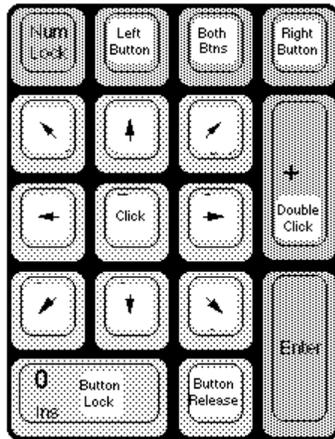


Figure 120. The keys on the numeric keypad that control the mouse pointer

The functionality of MouseKeys can be adjusted using the Control Panel, or it can be turned on or off using an emergency hotkey, by pressing the Left ALT, Left SHIFT, and NUM LOCK keys simultaneously.

ToggleKeys

ToggleKeys provide audio cues—high and low beeps—to tell users whether a toggle key is active or inactive. It applies to the CAPS LOCK, NUM LOCK, and SCROLL LOCK keys.

The functionality of ToggleKeys can be adjusted using the Control Panel, or it can be turned on or off using an emergency hotkey, by holding down the NUM LOCK key for eight seconds.

Try It!

Type with a Pencil

1. Suppose you could only type with a single finger, or with a pencil held between your teeth. How would you press ALT+TAB? Start by pressing SHIFT five times to turn on StickyKeys. (Notice the status indicator on the Taskbar.)
2. Now press ALT and see what happens. Press TAB and you'll have just typed two keys at once with a single finger.
3. Press ALT twice and then press TAB a few times to see the ALT+TAB window and to cycle through all the tasks you have running.
4. When the name of the task you want to switch to is displayed, press ALT one more time to release it.
5. Turn off StickyKeys by pressing two keys at the same time.

Don't Touch That Mouse

1. Press the Left ALT, the Left SHIFT, and the NUM LOCK keys simultaneously.

2. Try dragging and dropping a selection and clicking or double-clicking both the left and right mouse buttons by using your keyboard's numeric keypad. (For details, see the section titled "MouseKeys.")

Test Support for MS-DOS–Based Applications

1. Start an MS-DOS–based application.
2. Try StickyKeys or MouseKeys. All of the accessibility features are available when you are running an MS-DOS–based application. They are available any time you need them, whatever you may be doing.

Features for Users Who Are Deaf or Hard-of-Hearing

Windows 95 offers several enhancements designed to make the system more accessible and easier to use for people who are hearing-impaired.

ShowSounds

Some applications present information audibly, as waveform files containing digitized speech or through audible cues that each convey a different meaning. These cues might be unusable by a person who is deaf or hard of hearing, or someone who works in a very noisy environment, or someone who turns off the computer's speakers in a very quiet work environment. In Windows 95, users can set a global flag to let applications know they want visible feedback, in effect asking the applications to be "close captioned."

SoundSentry

SoundSentry tells Windows to send a visual cue, such as a blinking title bar or screen flash, whenever the system beeps. Turning on this feature allows users to see messages that they might not have heard.

Support for Alternative Input Devices

Windows 95 provides support for the use of alternative input devices, such as head-pointers or eye-gaze systems, with which users can control the computer.

SerialKeys

The SerialKeys feature, in conjunction with a communications aid interface device, allows users to control the computer using an alternative input device. These devices can send coded command strings through the computer's serial port to specify keystrokes and mouse events that are then treated like normal keyboard and mouse input.

Support for Multiple Pointing Devices

The Plug and Play architecture in Windows 95 inherently supports multiple cooperating pointing devices. This capability allows seamless addition of alternative pointing devices, without requiring users to replace or disable the normal mouse.

Features for Software Developers

Windows 95 contains many built-in features designed to make the computer more accessible to people with disabilities. To make a computer running Windows 95 truly accessible, application developers must provide access to their applications' features, taking care to avoid incompatibilities with accessibility aids.

Accessibility Guidelines for Software Developers

As part of the *Windows 95 Software Development Kit* and the *Windows 95 User Interface Design Guidelines*, Microsoft provides developers with documentation that not only outlines these important concepts, but also provides technical and design tips to help ISVs produce more accessible applications. Most of these tips involve very little additional work for developers, as long as they are aware of the issues and incorporate accessibility into application designs at an early stage. By providing this information to application developers, Microsoft hopes to increase the general level of accessibility of all software running on the Windows platform.

Methods for Simulating Input

Windows 95 now allows developers of voice-input systems and other alternative input systems to easily simulate keyboard and mouse input using fully documented and supported procedures.

Chaining Display Drivers

Some accessibility aids, such as screen review packages for low-vision users, need to detect information as it is drawn to the screen. Windows 95 supports chaining display drivers that allow these utilities to intercept text and graphics being drawn, without interfering with the normal computer operation.

New Common Controls

Many accessibility aids have difficulty working with applications that implement nonstandard controls. Windows 95 introduces a whole new set of controls for mainstream software developers, and these standardized implementations are designed to cooperate with accessibility aids.

