INTERNATIONAL STANDARD

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Information technology — User interfaces — Accessible user interface for accessibility settings

Technologies de l'information — Interfaces utilisateurs — Interface utilisateur accessible pour le paramétrage de l'accessibilité

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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ISO/IEC 24786 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 35, *User interfaces*.

Introduction

People with disabilities (e.g. visual, hearing, physical) can experience difficulties in accessing computers and other information/communication technology (ICT) devices. Accessible user interfaces, as described in this International Standard, can help them to operate computers.

In order to effectively operate accessible user interfaces, users need to be able to adjust accessibility settings prior to use. If this is not possible, some people will not be able to access these devices without help from another party.

This International Standard will make the information technologies more accessible by ensuring that people with disabilities can adjust accessibility settings by themselves.

Information technology — User interfaces — Accessible user interface for accessibility settings

1 Scope

This International Standard specifies requirements and recommendations for making accessibility settings accessible. It provides guidance on specific accessibility settings. It specifies how to access and operate the accessibility setting mode, and how to directly activate specific accessibility features.

This International Standard applies to all operating system user interfaces on computers, but can also be applied to other types of information/communication technology, where appropriate.

This International Standard does not apply to the user interface before the operating system is loaded and active.

2 Conformance

The computer is conformant to ISO/IEC 24786 Level 1 if it meets all requirements of Clause 5, but does not meet all recommendations of Clause 5.

The computer is conformant to ISO/IEC 24786 Level 2 if it meets all requirements and recommendations of Clause 5.

3 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 2382-1:1993, *Information technology — Vocabulary — Part 1: Fundamental terms*

ISO 9241-171:2008, *Ergonomics of human-system interaction — Part 171: Guidance on software accessibility*

4 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE The terms StickyKeys™, SlowKeys™, BounceKeys™, FilterKeys™, MouseKeys™, RepeatKeys™, ToggleKeys™, SoundSentry™, and ShowSounds™ are all trademarks of the University of Wisconsin. However, use of the terms is permitted freely, without royalty or license, to describe user interface features that have the functionality and behaviour described in this International Standard.

4.1
accessibility feature
feature (etc.) that is specifically designed to increase the usability of products for those experiencing disabilities

[ISO 9241-171:2008]

4.2
accessibility setting
setting to make the user interface more accessible for people with disabilities

EXAMPLE A setting is provided to turn large text or screen magnification ON for people with low vision.

4.3
accessibility setting mode
mode where the user adjusts accessibility settings

NOTE A user can access almost all the accessibility settings and adjustments for the accessibility features through this mode.

4.4
auditory feedback
function that allows individuals to hear whether their operations (e.g. key input) have been accepted by the computer

NOTE Auditory feedback includes beep sound with key input, alarm sound, etc.

4.5
BounceKeys™
function that only accepts a single keystroke at a time from a key

NOTE BounceKeys™ is designed for users with tremor that causes them to inadvertently strike a key extra times when pressing or releasing the key. Once a key is released it will not accept another stroke of the same key until a (user-settable) period of time has passed. BounceKeys™ has no effect on how quickly a person can type a different key. [ISO 9241-171:2008, Annex E]

4.6
computer
functional unit that can perform substantial computations, including numerous arithmetic operations and logic operations, without human intervention [ISO/IEC 2382-1:1993, 01.03.03]

4.7
FilterKeys™
BounceKeys™ and SlowKeys™ features combined as a package

NOTE The term FilterKeys™ is sometimes used for the BounceKeys™ and SlowKeys™ features packaged together. It is acceptable to make these two features mutually exclusive. However, they can also both be active at the same time (though SlowKeys™ will dominate). [ISO 9241-171:2008, Annex E]

4.8
MouseKeys™
function that allows the user to use the keys on the numeric keypad to control the mouse cursor on screen and to operate the mouse buttons

NOTE MouseKeys™ is designed for users who are physically unable to use a mouse accurately (or at all). [ISO 9241-171:2008, Annex E]

4.9
on-screen keyboard
software that presents a keyboard on the display screen that is operable by a pointing device and that generates input that is identical to that which comes from a physical keyboard

NOTE In ISO 9241-171:2008, 3.19, on-screen keyboard is given as an example of a keyboard emulator.

4.10
RepeatKeys™
facility to control auto-repeat, repeat onset and repeat rate of keys

NOTE 1 RepeatKeys™ is designed to allow use of computers by people who cannot move quickly enough when pressing keys to keep them from auto-repeating. The facilities to adjust repeat onset, repeat rate and to turn auto-repeat off are usually included as part of most keyboard system settings. If these functions are not included, RepeatKeys™ provides them. RepeatKeys™ also ensures that the repeat delay and repeat interval can be set long enough for users who do not have quick response (if the standard maximum value for either of the regular key repeat settings is not long enough). [ISO 9241-171:2008, Annex E]

NOTE 2 The system settings is a panel or window where the user adjusts OS settings. The name of the system settings differs depending on the OS. Common names for this function include control panel and system preferences.

4.11
screen reader
function that reads the characters and other information on the screen aloud to the user to allow access to the information on screen without viewing the screen

4.12
shortcut
operation which immediately invokes an action without displaying intermediate information (such as menus) or requiring pointer movement or any other user activity

4.13
ShowSounds™
user-configurable system flag that is readable by application software and is intended to inform ShowSounds™-aware applications that all information conveyed audibly should also be conveyed visually

NOTE ShowSounds™ is a feature for users who cannot clearly hear speech or cannot distinguish between sounds from a computer due to hearing impairment, a noisy environment, or an environment where sound is not allowed, such as a library or classroom. For example, captions can be shown for recorded or synthesized speech, and a message or icon can be displayed when a sound is used to indicate that new mail has arrived. However, captions cannot be provided for speech output where the speech is reading information that is already visually presented on the screen (e.g. screen readers). [ISO 9241-171:2008, Annex E]

4.14
SlowKeys™
function that causes the keyboard to ignore all keys that are bumped or pressed briefly

NOTE SlowKeys™ is designed for users who have extra, uncontrolled movements that cause them to strike surrounding keys unintentionally when typing. Keystrokes are accepted only if keys are held down for a user-specifiable period of time. [ISO 9241-171:2008, Annex E]

4.15
SoundSentry™
feature providing a visual signal to indicate when the computer is generating a sound

EXAMPLE screen flash, caption bar flash.

NOTE SoundSentry™ is a feature for individuals who cannot hear system sounds (due to hearing impairment, a noisy environment, or an environment where sound is not allowed, such as a library or classroom). SoundSentry™ works by monitoring the system sound hardware and providing a user-selectable indication whenever sound activity is detected. Note that this feature cannot usually discriminate between different sounds, identify the sources of sounds, or provide a useful alternative for speech output or information encoded in sounds. Applications can support the ShowSounds™ feature to provide the user with a useful alternative to information conveyed using sound. SoundSentry™ is just a system-level fallback for applications that do not support ShowSounds™. [ISO 9241-171:2008, Annex E]

4.16
StickyKeys™
function that allows users to press key combinations (e.g. Ctrl-Alt-Delete) sequentially rather than having to hold them all down together

NOTE StickyKeys™ is designed for people who cannot use both hands, or who use a dowel or stick to type. StickyKeys™ works with those keys defined as “modifier” keys, such as the Shift, Alt and Ctrl keys. Usually the StickyKeys™ status is shown on-screen at the user's option. [ISO 9241-171:2008, Annex E]

4.17
Time Out
feature that turns the accessibility features off automatically after an adjustable time when no keyboard or mouse activity occurs

NOTE Time Out is intended to be used on public or shared computers, such as those in libraries, bookstores, etc., where a user might leave the computer with an access feature turned on, thus potentially confusing the next user or leading people to think the computer was broken. [ISO 9241-171:2008, Annex E]

4.18
ToggleKeys™
feature alerting the user when a toggle key has been locked or unlocked

NOTE ToggleKeys™ is a feature for users who cannot see the visual keyboard status indicators for locking (toggle) keys such as CapsLock, ScrollLock, NumLock, etc. ToggleKeys™ provides an auditory signal, such as a high beep, to alert the user that a toggle key such as the CapsLock has been locked, and a separate signal, such as a low beep, to alert the user that a toggle key has been unlocked. [ISO 9241-171:2008, Annex E]

4.19
visual emphasis
function that allows users to change the visual aspects to improve visibility

NOTE Visual emphasis includes adjustment of character size, screen magnification, contrast, luminance, color balance, color tone inverse, gradation, etc.

4.20
visual feedback
function that allows users to know visually whether their operations (e.g. key input) have been accepted by the computer

NOTE Visual feedback includes the key indicators when StickyKeys™ is enabled, visual indication when an on-screen key is pressed, etc.

4.21
voice operation
function that allows users to operate a computer with voice commands through a microphone (e.g. the voice command “Switch to Mail” activates the email application)

NOTE The voice commands usually follow an activation keyword (e.g. “Computer!”) in order to be distinguished from other speech that is not intended as a voice command.

5 Requirements and recommendations

5.1 Accessibility setting mode

5.1.1 Accessibility setting mode before login

The user should be able to access the accessibility setting mode from the login mode. In this case, the accessibility setting mode may not contain all of the setting items but it should contain at least the setting items to turn on and off the following functions; StickyKeys™, SlowKeys™, BounceKeys™, on-screen keyboard, voice operation, visual emphasis, and screen reader.

NOTE This is a recommendation to provide the user access to the accessibility setting mode from the login screen. After login, the computer provides the accessibility setting features as described in Clause 5.1.2.

5.1.2 Contents and interface of the accessibility setting mode

The accessibility setting mode provides the access to the setting items described in Clause 5.2 except shortcuts.

The followings are requirements and recommendations for the user interface of the accessibility setting mode.

a) Keyboard access to all setting items shall be provided.

b) The keyboard access shall not require a user to press two or more keys simultaneously.

c) Pointing device access to all setting items shall be provided.

d) Text size in the setting dialogs shall be twice or more of the usual size.

e) Descriptions of setting items in the natural language shall be presented on screen.

f) Notification of the results of operations shall be provided to the user in both auditory and visual manner.

g) If two different access-feature options are settable at the same point in time, the keys to activate them should not be close to one another.

h) Voice operation access to all setting items should be provided.

i) Natural language should be used for voice operation and screen reader.

j) Text on the screen should be sans-serif letters.

k) Luminance of text on the screen should be at least five times higher than background.

l) Pictograms should be presented on screen for description of setting items.

NOTE In g), Keys A, S, and D are adjacent in QWERTY keyboard. The keyboard access uses A, D, and G rather than A, S, and D, because some user might accidentally hit an adjacent key in the A, S, D case.

5.1.3 Access procedure

5.1.3.1 GUI operation

The following is the requirement of GUI operation to access the accessibility setting mode.

The system settings shall provide access to the accessibility setting mode.

NOTE The system settings is a panel or window where the user adjusts OS settings. The name of system settings differs depending on OS. Some common names for this function include: control panel and system preferences.

5.1.3.2 Keyboard operation

The followings are the requirements and recommendation of keyboard operation to access the accessibility setting mode.

a) On systems that have an operating system-specific key for invoking commands, pressing this key together with “U” shall provide access to the accessibility setting mode.

b) Operating systems should provide a mechanism for users to define a key sequence (not involving the operating system-specific key) as an alternative way to invoke the accessibility setting mode.

c) Pressing Shift key 5 times shall allow the user to turn StickyKeys™ on and off. The default behaviour for StickyKeys™ activation should be to show a dialog at activation. Whenever the StickyKeys™ feature dialog is open the user shall also have the option of opening the accessibility setting mode.

d) Pressing Shift key for 8 s shall allow the user to turn BounceKeys™, SlowKeys™ or FilterKeys™ on and off. The default behaviour when pressing the Shift key for 8 s shall be to show an activation dialog box. Whenever the dialog is open the user shall also have the option of opening the accessibility options mode.

e) Pressing the Help key for 5 s should provide access for a user to the accessibility setting mode.

NOTE 1 In a), Common names for the operating system-specific key for invoking commands include “Windows Logo” on Windows systems and “Command” on Apple Macintosh systems.

NOTE 2 In c) and d), the actions “Pressing Shift key 5 times” and “Pressing Shift key for 8 s” are assigned to StickyKeys™ and FilterKeys™ respectively by ISO 9241-171:2008.

NOTE 3 In e), the Help key is not supported in all keyboards. If there is no Help key, substitute keys (F1 or Insert) are allowed to be used as Help key.

5.1.3.3 Voice operation

The recommended voice command to access the accessibility setting mode is:

Saying “Help” should open the accessibility setting mode.

NOTE The word “Help” is allowed to be replaced with the natural language of each country. A voice command can be initiated by the user by starting the command with a keyword such as “Computer…”.

5.1.3.4 Pointing device operation

The following is the recommendation for pointing device operation to access the accessibility setting mode.

If the pointing device has a sub-button, pressing and releasing the sub-button, and selecting “Help” from menu should open the accessibility setting mode.

NOTE The sub-button is such as the right button of mouse.

5.2 Items of accessibility setting

5.2.1 StickyKeys™

If the computer implements the StickyKeys™ feature, the following requirements and recommendations apply.

Turning StickyKeys™ on and off:

a) The StickyKeys™ feature shall be off by default.

b) The computer shall provide the capability for a user to turn StickyKeys™ on and off from the system settings.

NOTE 1 The system settings is a panel or window where the user adjusts OS settings. The name of system settings differs depending on OS. Some common names for this function include: control panel and system preferences.

c) Pressing the Shift key 5 times with no intervening key presses or mouse clicks shall allow the user to turn StickyKeys™ on or off. Before turning the feature on or off, the computer should (at the user's option) ask the user for confirmation. This dialog shall also provide the user with the option of opening the accessibility setting mode.

d) The user shall be able to disable (and enable again) the confirmation dialog that appears after pressing the Shift key 5 times. The confirmation dialog should be enabled by default. If disabled, StickyKeys™ is enabled or disabled immediately after the Shift key is pressed 5 times.

e) The user shall be able to disable (and enable again) the keyboard shortcut (pressing the Shift key 5 times) for allowing the user to turn StickyKeys™ on or off. It should be enabled by default.

f) Saying “StickyKeys™ ON” should allow the user to turn StickyKeys™ on. Saying “StickyKeys™ OFF” should allow the user to turn StickyKeys™ off.

NOTE 2 The words can be replaced with the natural language of each country. A voice command can be initiated by the user by starting the command with a keyword such as “Computer…”.

g) The computer should be able to provide visual feedback when StickyKeys™ is turned on or off. If such visual feedback is available, the user shall be able to disable (and enable again) the visual feedback. It should be enabled by default.

NOTE 3 The visual feedback can include displaying a status indicator when StickyKeys™ is enabled.

h) The computer should be able to provide auditory feedback when StickyKeys™ is turned on or off by keyboard shortcut. The user shall be able to disable (and enable again) the auditory feedback. It should be enabled by default.

NOTE 4 The auditory feedback can include beeping, click sounds, etc.

EXAMPLE 1 A low-high tone is suggested when StickyKeys™ is turned on, and a high-low tone when StickyKeys™ is turned off. [ISO 9241-171:2008, Annex E]

i) Pressing a modifier key and another key simultaneously shall turn off StickyKeys™. The user shall be able to disable (and enable again) that pressing a modifier key and another key turns off StickyKeys™. It shall be enabled by default.

Latching a modifier key:

j) When StickyKeys™ is enabled, pressing and releasing any modifier key once shall latch the key (as if key was continuously held down). The next (single) non-modifier key pressed (or the next pointing device button action) is modified by the latched ‘modifier’ key(s) (as if all pressed down together).

NOTE 5 Modifier keys include (but are not limited to) Shift, Alt, Ctrl, Option, Command, Meta, Logo.

NOTE 6 Multiple modifier keys can be latched at the same time.

k) The computer should be able to provide visual feedback when a key is latched. If such visual feedback is available, the user shall be able to disable (and enable again) the visual feedback. It should be enabled by default.

NOTE 7 The visual feedback can include displaying the visual representations of pushed keys.

l) The computer should be able to provide auditory feedback when a key is latched. The user shall be able to disable (and enable again) the auditory feedback. It should be enabled by default.

NOTE 8 The auditory feedback can include beeping, click sounds, etc.

EXAMPLE 2 A low-high tone is suggested when a key is latched. [ISO 9241-171:2008, Annex E]

m) Pressing a non-modifier key (or pressing a pointing device button) when in “latched” mode shall modify the key and unlatch the modifier key.

Locking a modifier key:

n) When StickyKeys™ is enabled, pressing any modifier key twice sequentially shall lock the key. All subsequent non-modifier keys pressed, pointing device actions, and any software actions that are altered by modifier key state are modified by the locked modifier key(s).

NOTE 9 Multiple modifier keys can be locked or latched simultaneously in any combination.

o) The computer should be able to provide visual feedback when a key is locked or unlocked. If such visual feedback is available, the user shall be able to disable (and enable again) the visual feedback. It should be enabled by default.

NOTE 10 The visual feedback can include displaying the visual representations of pushed keys.

p) The computer should be able to provide auditory feedback when a key is locked or unlocked. The user shall be able to disable (and enable again) the auditory feedback. It shall be enabled by default.

NOTE 11 The auditory feedback can include beeping, click sounds, etc.

EXAMPLE 3 A high tone is suggested when a key is locked, and a low tone when it is unlocked. [ISO 9241-171:2008, Annex E]

q) Pressing a modifier key once when in “locked” mode shall unlock it.

5.2.2 SlowKeys™

If the computer implements the SlowKeys™ feature, the following requirements and recommendations apply.

Turning SlowKeys™ on and off:

a) The SlowKeys™ feature shall be off by default.

b) The computer shall allow a user to turn SlowKeys™ on and off from the system settings.

NOTE 1 The system settings is a panel or window where the user adjusts OS settings. The name of system settings differs depending on OS. Some common names for this function include: control panel and system preferences.

c) Pressing the right Shift key for 8 s shall allow the user to turn SlowKeys™ on or off. Before turning the feature on or off, the computer shall (at the user's option) ask the user for confirmation. This dialog shall also provide the user with the option of opening the accessibility setting mode.

d) The user shall be able to disable (and enable again) the confirmation dialog that appears after pressing the right Shift key for 8 s. It shall be enabled by default. If disabled, SlowKeys™ is enabled immediately after pressing the right Shift key for 8 s.

e) The user shall be able to disable (and enable again) the keyboard shortcut (pressing the right Shift key for 8 s) for allowing the user to turn SlowKeys™ on or off. It should be enabled by default.

f) Saying “SlowKeys™ ON” should allow the user to turn SlowKeys™ on. Saying “SlowKeys™ OFF” should allow the user to turn SlowKeys™ off.

NOTE 2 The words can be replaced with the natural language of each country. A voice command can be initiated by the user by starting the command with a keyword such as “Computer…”.

g) The computer should be able to provide visual feedback when SlowKeys™ is turned on or off. The user shall be able to disable (and enable again) the visual feedback. It should be enabled by default.

NOTE 3 The visual feedback can include displaying a status indicator when SlowKeys™ is enabled.

h) The computer should be able to provide auditory feedback when SlowKeys™ is turned on or off by keyboard shortcut. The user shall be able to disable (and enable again) the auditory feedback. It should be enabled by default.

NOTE 4 The auditory feedback can include beeping, click sounds, etc.

EXAMPLE For turning SlowKeys™ on by keyboard shortcut, ISO 9241-171:2008, Annex E suggests a double beep after 5 s to cause any inadvertent holding of the Shift key to be stopped; and a low-high tone after 8 s to indicate that SlowKeys™ has been turned on. A high-low tone is suggested when SlowKeys™ is turned off by keyboard shortcut.

i) SlowKeys™ shall be turned off when the computer reboots.

NOTE 5 SlowKeys™ is off at boot time because it makes the keyboard look like it is broken.

Operation of SlowKeys™:

j) When SlowKeys™ is turned on, the keyboard shall not accept any keystrokes unless keys are held down for the SlowKeys™ acceptance time.

k) Auditory feedback should be provided when a key is pressed first (at the onset of the SlowKeys™ acceptance time), and when a key stroke is accepted (after the acceptance time has elapsed). The user should be able to disable (and enable again) the auditory feedback. It should be enabled by default.

NOTE 6 Auditory feedback can include beeping, click sounds, etc.

EXAMPLE A high tone can alert the user when a key is pressed first, and a low tone can alert the user when the key stroke is accepted. [ISO 9241-171:2008, Annex E]

l) The computer shall provide the capability for a user to adjust the SlowKeys™ acceptance time in a minimum range of 0,5 to 2,0 s, with a default value of 0,75 s.

5.2.3 BounceKeys™

If the computer implements the BounceKeys™ feature, the following requirements and recommendations apply.

Turning BounceKeys™ on and off:

a) The BounceKeys™ feature shall be off by default.

b) The computer shall allow a user to turn BounceKeys™ on and off from the system settings.

NOTE 1 The system settings is a panel or window where the user adjusts OS settings. The name of system settings differs depending on OS. Some common names for this function include: control panel and system preferences.

c) Pressing the right Shift key for 8 s shall allow the user to turn BounceKeys™ on or off. Before turning the feature on or off, the computer should (at the user's option) ask the user for confirmation. This dialog shall also provide the user with the option of opening the accessibility setting mode.

NOTE 2 If SlowKeys™ and BounceKeys™ shortcuts are both enabled they will both be activated by holding the Shift key down for 8 s. If both are activated, SlowKeys™ will naturally dominate. If only the BounceKeys™ feature is desired, then the SlowKeys™ shortcut is disabled in the system settings.

d) The user shall be able to disable (and enable again) the confirmation dialog that appears after pressing the right Shift key for 8 s. It should be enabled by default. If disabled, BounceKeys™ is enabled immediately after pressing the right Shift key for 8 s.

e) The user shall be able to disable (and enable again) the keyboard shortcut (pressing the right Shift key for 8 s) for allowing the user to turn BounceKeys™ on or off. It should be disabled by default.

f) Saying “BounceKeys™ ON” should allow the user to turn BounceKeys™ on. Saying “BounceKeys™ OFF” should allow the user to turn BounceKeys™ off.

NOTE 3 The words can be replaced with natural language of each country. A voice command can be initiated by the user by starting the command with a keyword such as “Computer…”.

g) The computer should be able to provide visual feedback when BounceKeys™ is turned on or off. If such visual feedback is available, the user shall be able to disable (and enable again) the visual feedback. It should be enabled by default.

NOTE 4 The visual feedback can include displaying a status indicator when BounceKeys™ is enabled.

h) The computer should be able to provide auditory feedback when BounceKeys™ is turned on or off by keyboard shortcut. If such auditory feedback is available, the user shall be able to disable (and enable again) the auditory feedback. It should be enabled by default.

NOTE 5 Auditory feedback can include beeping, click sounds, etc.

EXAMPLE For turning BounceKeys™ on by keyboard shortcut, a double beep after 5 s can alert the user to a potentially inadvertent holding of the Shift key; and a low-high tone after 8 s to indicate that BounceKeys™ has been turned on. A high-low tone can alert the user when BounceKeys™ is turned off by a keyboard shortcut.

i) If the user-specified debounce time is more than 0,35 s, BounceKeys™ shall be turned off when the computer reboots.

NOTE 6 For long debounce times, BounceKeys™ is off at boot time because it makes the keyboard behave as if it is broken.

Operation of BounceKeys™:

j) When BounceKeys™ is turned on, any additional stroke of the same key shall be ignored if the time between the keystrokes is less than the BounceKeys™ debounce time.

NOTE 7 The user can still type as usual at full speed. Any rattling of keys will be ignored. To type two of the same letter in a row, the user simply waits briefly between key-presses (longer than the debounce setting time).

k) The computer should be able to provide auditory feedback when a keystroke is ignored because of rapid repetition of the same key. If such auditory feedback is available, the user shall be able to disable (and enable again) the auditory feedback. It should be enabled by default.

NOTE 8 A high tone can alert the user when a keystroke is ignored because of rapid repetition of the same key.

l) The computer shall provide the capability for a user to adjust the BounceKeys™ delay time in a minimum range of 0,2 to 1,0 s, with a default value of 0,5 s.

5.2.4 FilterKeys™

If the computer implements the FilterKeys™ feature, the following requirements and recommendations apply.

FilterKeys™ shall be implemented as a combination of SlowKeys™ and BounceKeys™. All requirements and recommendations, as defined for SlowKeys™ (see 5.2.2) and BounceKeys™ (see 5.2.3), apply.

5.2.5 MouseKeys™

If the computer implements the MouseKeys™ feature, the following requirements and recommendations apply.

NOTE 1 MouseKeys™ only works with a computer that has a number pad. However, the computer might have a keyboard that allows for emulation of number pad keys by other keys or the connection of a separate keypad.

Turning MouseKeys™ on and off:

a) The MouseKeys™ feature should be off by default.

b) The computer shall allow a user to turn MouseKeys™ on and off from the system settings.

NOTE 2 The system settings is a panel or window where the user adjusts OS settings. The name of system settings differs depending on OS. Some common names for this function include: control panel and system preferences.

c) Pressing the key combination LeftShift-LeftAlt-NumLock should turn MouseKeys™ on and off (toggle).

d) Pressing Alt 5 times should turn MouseKeys™ on and off (toggle).

e) The user should be able to disable (and enable again) the keyboard shortcut (LeftShift-LeftAlt-NumLock) for turning MouseKeys™ on and off. It should be enabled by default.

f) Saying “MouseKeys™ ON” should allow the user to turn MouseKeys™ on. Saying “MouseKeys™ OFF” should allow the user to turn MouseKeys™ off.

NOTE 3 The words can be replaced with natural language of each country. A voice command can be initiated by the user by starting the command with a keyword such as “Computer…”.

g) When MouseKeys™ is on, the NumLock key should switch the number pad back and forth between MouseKeys™ operation and one of the other two standard modes of number pad operation (number input or key navigation).

h) The computer should allow a user to select whether MouseKeys™ is active when NumLock is on or off. The initial setting should be that MouseKeys™ is active when NumLock is on.

NOTE 4 When MouseKeys™ is active when NumLock is on, the NumLock key switches between mouse pointer navigation (MouseKeys™) and key navigation. Otherwise, the NumLock key switches between mouse pointer navigation (MouseKeys™) and number input.

i) The computer should be able to provide visual feedback when MouseKeys™ is turned on or off. The user shall be able to disable (and enable again) the visual feedback. It should be enabled by default.

NOTE 5 The visual feedback can include displaying a status indicator when MouseKeys™ is enabled, and displaying the visual representations of pushed mouse keys, etc.

j) The computer should be able to provide auditory feedback when MouseKeys™ is turned on or off by keyboard shortcut. If such auditory feedback is available, the user shall be able to disable (and enable again) the auditory feedback. It should be enabled by default.

NOTE 6 Auditory feedback can include beeping, click sounds, etc. In ISO 9241-171:2008, Annex E, a low-high tone can alert the user when MouseKeys™ is turned on, and a high-low tone when MouseKeys™ is turned off.

Moving the mouse pointer with MouseKeys™:

k) When MouseKeys™ is on, the number pad keys in Table 1 shall move the mouse pointer by one pixel, if the key is pressed and released; or repeatedly in increasing steps of pixels if the key is pressed and held down (repetition every 0,5 s in default setting). The direction of movement shall be as defined in Table 1.

Table 1 — Mouse pointer movements in MouseKeys™ mode

Number pad key	Mouse pointer movement
1	down and to the left
2	down
3	down and to the right
4	to the left
6	to the right
7	up and to the left
8	up
9	up and to the right

l) If MouseKeys™ is on, and the Ctrl key is held down, any of the keys in Table 1 should cause the mouse pointer to jump by 20 pixels instead of one pixel, and by 20 times the regular step-size when acceleration kicks in.

m) If MouseKeys™ is on, and the Shift key is held down, any of the keys in Table 1 should cause the mouse pointer to move continuously without acceleration (by one pixel each time), no matter how long the movement key is held down.

n) The computer shall allow a user to adjust the following parameters for holding down a number pad key: repeat rate (in s), acceleration rate, and top mouse pointer speed (maximum speed in number of pixels per step that is reached when holding down a key for a long time).

Clicking and dragging with MouseKeys™:

o) When MouseKeys™ is on, the number pad keys in Table 2 (if available on the number pad) should select the mouse buttons for operation, and the number pad keys in Table 3 shall operate the mouse buttons, as defined in Table 2 and Table 3.

Table 2 — MouseKeys™ - Selecting the buttons to act upon

Number pad key	Mouse button selection
/	select the left mouse button to be controlled with any key in Table 3
*	• on systems with center mouse button: select the center mouse button to be controlled with any key in Table 3 • on systems with no center mouse button: select both left and right mouse buttons to be controlled with any key in Table 3
-	select the right mouse button to be controlled with any key in Table 3

Table 3 — MouseKeys™ - Actions to take with selected mouse button(s)

Number pad key	Action to take with selected mouse button(s)
5	click the selected mouse button(s)
+	double-click the selected mouse button(s)
.	lock down the selected mouse button(s)
0	release all locked mouse buttons

p) When MouseKeys™ is on and the number pad keys in Table 2 have not been pushed yet, pressing the number pad key “5” should operate the left mouse button, and key combination of the number pad key “5” and Ctrl or Tab should operate the right mouse button.

q) The computer should be able to provide visual feedback about the mouse button(s) currently selected. If such visual feedback is available, the user shall be able to disable (and enable again) the visual feedback. It should be enabled by default.

NOTE 7 The visual feedback can include displaying (a) visual representation(s) of the selected mouse button(s).

5.2.6 RepeatKeys™

If the computer implements the RepeatKeys™ feature, the following requirements and recommendations apply.

Turning RepeatKeys™ on and off:

a) The RepeatKeys™ feature should be off by default.

b) The computer shall allow a user to turn RepeatKeys™ on and off from the system settings.

NOTE The system settings is a panel or window where the user adjusts OS settings. The name of system settings differs depending on OS. Some common names for this function include: control panel and system preferences.

Setting operation parameters of RepeatKeys™:

c) The computer shall allow a user to adjust the repeat onset delay, up to a maximum value of at least 2 s.

d) The computer shall allow a user to adjust the repeat interval, up to a maximum value of at least 2 s.

5.2.7 ToggleKeys™

If the computer implements the ToggleKeys™ feature, the following requirements and recommendations apply.

Turning ToggleKeys™ on and off:

a) The ToggleKeys™ feature should be off by default.

b) The computer shall allow a user to turn ToggleKeys™ on and off from the system settings.

NOTE The system settings is a panel or window where the user adjusts OS settings. The name of system settings differs depending on OS. Some common names for this function include: control panel and system preferences.

Operation of ToggleKeys™:

c) When ToggleKeys™ is on, auditory feedback should be provided when any toggle key is locked or unlocked.

EXAMPLE A high tone can alert the user when a toggle key is being locked, and a low tone can alert the user when the key is being unlocked. [ISO 9241-171:2008, Annex E]

5.2.8 SoundSentry™

If the computer implements the SoundSentry™ feature, the following requirements and recommendations apply.

Turning SoundSentry™ on and off:

a) The SoundSentry™ feature should be off by default.