
**Information technology — User
interface guidelines on menu
navigation —**

**Part 2:
Navigation with 4-direction devices**

iTeh STANDARD PREVIEW
*Technologies de l'information — Directives sur la navigation dans les
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Partie 2: Navigation avec des commandes quadridirectionnelles

ISO/IEC 17549-2:2015

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: [Foreword – Supplementary information](#).

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, Subcommittee SC 35, *User interfaces*.

ISO/IEC 17549 consists of the following parts, under the general title *Information technology — User interface guidelines on menu navigation*:

— *Part 2: Navigation with 4-direction devices*

The following part is planned:

— *Part 1: Framework and convergence matters*

Introduction

Contemporary information equipment on which the display area is associated with 4-direction devices includes sophisticated and complex functionalities within one piece of such equipment.

The equipment needs to be operated in terms of changing default settings and to be customised for individual user. In such scenario, a 4-direction device is used to navigate menu shown in the display area, where the menu are normally structured.

This part of ISO/IEC 17549 intends to provide guidelines for design and use of menu structures, as well as recommended types of navigation with the 4-direction devices.

Note that each figure in this document, although it is not always “image”, includes the alternative text(s) in accordance with ISO/IEC/TS 20071-11. The alternative text(s) are information only.

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Information technology — User interface guidelines on menu navigation —

Part 2: Navigation with 4-direction devices

1 Scope

This part of ISO/IEC 17549 gives guidelines on the design of navigation methods for selection menus with use of a 4-direction device. A 4-direction key is an example of a 4-direction device. The guidelines are applicable to any information equipment on which the display area is associated with the 4-direction device.

This part of ISO/IEC 17549 also provides recommendations for parameters for display screen settings, character sets, and languages in use.

This part of ISO/IEC 17549 is not applicable to safety-related uses on menu navigation.

2 Normative references

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

ISO 1503, *Spatial orientation and direction of movement — Ergonomic requirements*

ISO/IEC Guide 37, *Instructions for use of products by consumers*.

IEC 82079-1, *Preparation of instructions for use — Structuring, content and presentation — Part 1: General principles and detailed requirements*.

3 Conformity

A navigation method is in conformity to this International Standard if it meets all requirements of [5.1](#), [5.2.2](#), and [7.1](#) of this part of ISO/IEC 17549.

4 Terms and definitions

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

4.1

4-direction device

set of physical controls, commonly keys, only one of which is activated at any time, consisting of up-, down-, left- and right controls for respective functionality

4.2

ladder menu

list of items displayed vertically in one dimension, one of which to be selected

**4.3
menu bar**

set of one dimensional menu items that is always standing-by at the root of a menu hierarchy

Note 1 to entry: A menu bar provides tabular functionality and it is different from a “rolling menu”.

**4.4
focus**

<4-direction devices> highlighted result of action done by a user through an input device

Note 1 to entry: If the number of keys is one, the action is “next”. If the number of keys is two, the actions are “previous” and “next”. Selecting a key enables highlighting of the next item visually, auditorily, and or tactually to show the action can be activated.

**4.5
activating**

action done by a user through a validation key, which enables activation of a focus or an item pointed at

**4.6
navigation history feedback**

visual, tactile and/or audio interface output displayed after a user navigation, which enables a user to know the paths he has already explored

Note 1 to entry: For example, items already explored are highlighted in a different colour if the user already navigated to there.

**4.7
separator bar**

visual, tactile and/or audio interface output that is rendered in order to facilitate recognition of groups of items categorizations or the start or end of a list

**4.8
sub-menu indicator**

visual, tactile and/or audio interface output that is rendered in order to facilitate navigation when a sub-list of items is available and which enables user to know if he is dealing with a navigation item or not

**4.9
tile menu**

set of options displayed with a number of rows and columns, one of which to be selected

5 Basic considerations

5.1 Common and general ergonomic aspects

The following basic ergonomic aspects are taken into account when designing the user interfaces where navigation with a 4-direction device is considered:

- a) users should be able to change menu languages at the highest level of menu hierarchy;
- b) control shall be consistent both in design and operation including meeting requirements in ISO 1503;
- c) menu items should be in plain texts or comprehensible icons as far as applicable, and in agreement with the relevant provisions in ISO/IEC Guide 37 and IEC 82079-1;
- d) control shall be bidirectional and enable the user to return to the previous operation;
- e) a clear feedback should be given when user is at the end of list and when he is at the start, and the end and start feedback should be different;
- f) for broad and deep menu lists, navigation history feedback shall be provided;

- g) important and most frequently used menu items should be simple and comprehensible, and placed at the start of the list;
- h) a ladder menu including an item that should logically be first selected by a user should be short and such a menu item shall be placed as first item in the list;
- i) in the case that a substantial number of options is required for an item of ladder menu, the most frequently selected option should be the default option;
- j) item categorisation that depends on functionality should be shown to user (separation bars, sounds...); a sub-menu should present a title semantically linked to the upper-menu, and as far as possible all the cascading hierarchy should be showed to the user;
- k) the user interface should make a clear separation between navigation functions (browsing between items without any modification) and action functions (implying system modification, as adding something, deleting something, calling someone, activating something...). Consequently items for navigation should be displayed differently from items for action;
- l) where possible hierarchies shall be organized to be broader than deeper. It has been shown¹⁾ that a two level hierarchical menu (32 items at the first level and 16 for each sub-level) is better than a three level hierarchical menu (8 × 8 × 8). Moreover that 32 × 16 is better than 16 × 32;
- m) a list longer than three items should enable wrap-round manipulation. For example, scrolling beyond the end of the list should return to or render the beginning of that list (see 5.2 for screen rendering this.);
- n) focusing rendering should be available through visual and audio information, and should also be available through tactile information as appropriate;
- o) separator bar rendering should be available through visual and audio information;
- p) start/end list rendering should be available through tactile information;
- q) tactile display should be available at least for end/start feedback and item validation;
- r) each list element (items, feedbacks, separator bars, sub-menu indicators, focus indicators...) shall enable visual display, audio display, and if possible tactile display;
- s) navigation items should be displayed through texts or icons, with an added visual icon (for example:
 - ▶ the graphical symbol IEC 60417-5107B or → the graphical symbol IEC 60417-5022), with audio alternative (specific sound such as «bip», or «sub-menu», or «link»;
- t) the list of menu for attributes and the list of menu for selecting associated values should not be in the same list; and
- u) when user goes back in a hierarchical menu, the item selected from the upper menu shall be the one linked to the sub-menu previously selected.

5.2 Designing rendering (display screen, audio display, tactile display)

5.2.1 Visual design of ladder menu

The provisions given in 5.1 apply.

5.2.2 Visual designing of tile menu

Where a 4-direction device is used with a tile menu visible on a screen, design of the navigation through tile menus on the screen is an important consideration. Guidance provided by this standard is limited

1) Miller, D. P. (1981). The depth/breadth tradeoff in hierarchical computer menus. Proceedings of the Human Factors Society, 296-300. Parkinson, S.R., Sisson, N., & Snowberry, K. (1985). Organization of broad computer menu displays. International Journal of Man-Machine Studies, 23, 289-297.

to the design of the focus operation through the tile menu and does not deal with the design of menus and the remote controller. Design issues of the tile menu navigation within a display screen (e.g. the navigation of focus between menus) are only addressed with respect to the ergonomic issues related to user controls.

The following general rules apply for navigating in the tile menu :

- a) moving wrap-around shall be so that the user continues to move into any menu item by activating one direction key in a remote controller;
- b) moving from left to right shall be so that the user moves a highlighted item in the menu from left to right by pressing the right-key;
- c) moving from up to down shall be so that the user moves a highlighted item in the menu from up to down by clicking the down-key; and
- d) moving in zigzag way shall be so that the user moves a highlighted menu item in the shortest path between the initial and final menu items.

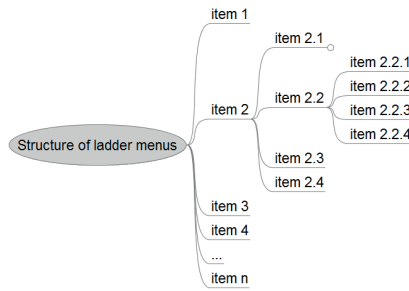
6 Recommended practice on structure of and operation of ladder menus

6.1 Ladder structure

The ladder menu should be structured as shown in [Figure 1](#) as an example, where the menu bar laid vertically at the top is optional. The lists of items depicted vertically are the ladder menu classified according to hierarchies. The highlighted ones are selected options among menu items. In most cases, one of the horizontal or vertical ladder menu is activated and shown on the screen.

Focus on one of the menu items in the menu bar is moved by down- or up-keys, or left- or right-keys. Focus on one of the items in the ladder menu is moved by left- or right-keys, or up- or down-keys, respectively, depending on vertical or horizontal layouts. Among the ladder menus in the hierarchy, focus is moved by an up- or down key, or a left- or right key.

In the example of [Figure 1](#), when “Item 2” is focused by down- or up-key, the associated ladder menu to “Item 2” will pop-up (“Item 2.1,” “Item 2.2,” ..., and “Item 2.4”). Further when “Item 2.2” in the popped up ladder menu is selected and or activated, yet another ladder menu of the lower hierarchy (“Item 2.2.1,” “Item 2.2.2,” ... and “Item 2.2.4”) results, and so on.



NOTE 1 Primary alternative text: Tree representation of the logical structure of a ladder menu.

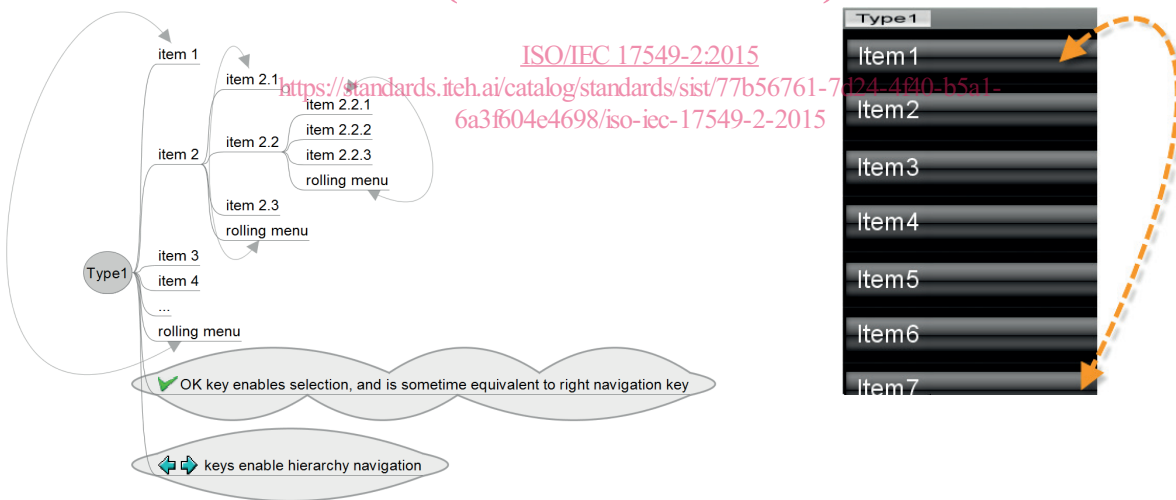
NOTE 2 Secondary alternative text: Hierarchical organization including three levels of item lists (1, 2, 3, 4, and 2.1, 2.2, 2.3, 2.4, and 2.2.1, 2.2.2, 2.2.3, 2.2.4).

Figure 1 — Structure of ladder menus, an example

6.2 Recommended types of operation of the ladder menus for the hierarchy

The recommended practice includes the following three types.

Type 1: The focus of operation is moved up or down endlessly in a ladder menu by an up- or down-key, respectively; the focus is also moved among the lower hierarchy and the higher hierarchy of ladder menus by right- or left-key, respectively, as shown in Figure 2.



NOTE 1 Primary alternative text: Tree representation of a Type 1 ladder menu and a screen view of one hierarchy level on a mobile phone.

NOTE 2 Secondary alternative text: Tree representation of a Type 1 ladder menu including three levels of item lists. At each level, arrows from top to down show that each list is a loop (rolling menu). Comment indicates that for each level «Ok» key enables selection, and is sometimes equivalent to the right-key, and «left-right» keys enable hierarchy in-depth navigation. On the right side of the figure a vertical list view on a mobile phone screen is shown. The list of titles is situated at the top of the screen, and five items are vertically displayed. A round arrow express that this is a rolling menu.

Figure 2 — Type 1: rolling up-down start/end menus with left-right navigation keys