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ISO/IEC 9995-1

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Information technology — Keyboard layouts for text and office systems —

Part 1: General principles governing keyboard layouts

Technologies de l'information — Disposition des claviers conçus pour la bureautique —

Partie 1: Principes généraux pour la disposition des claviers

Reference number
ISO/IEC 9995-1:2009(E)

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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.

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.

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.

ISO/IEC 9995-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 35, *User interfaces*.

This third edition cancels and replaces the second edition (ISO/IEC 9995-1:2006), which has been technically revised.

The main modifications to the set of parts of ISO/IEC 9995 are as follows.

— The editing section (Part 5) and the function section (Part 6) are merged into one editing and function section (Part 5).

— The new edition reduces the number of zones.

— The new edition relaxes the rules for allocation of symbols of group 1, level 3 in certain situations and more precise multiple group support is added.

— Part 3 adds support of extra Latin characters and adds multiple diacritics entry support for one character.

ISO/IEC 9995 consists of the following parts, under the general title *Information technology — Keyboard layouts for text and office systems*:

— *Part 1 : General principles governing keyboard layouts*

— *Part 2 : Alphanumeric section*

— *Part 3 : Complementary layouts of the alphanumeric zone of the alphanumeric section*

— *Part 4 : Numeric section*

— *Part 5 : Editing and function section*

— *Part 7 : Symbols used to represent functions*

— *Part 8 : Allocation of letters to the keys of a numeric keypad*

Introduction

ISO/IEC 9995 defines a framework for the layout of all alphanumeric and numeric keyboards across the widest spectrum of today's and upcoming applications using keyboards. The functions to be performed by keyboards are grouped into three categories that correspond to the main physical sections of the keyboard.

Application of ISO/IEC 9995 in the design of keyboards will provide the user with a unified, predictable user-machine interface by dividing the keyboard into functional areas and sections and allocating functions to keys. One of the major tasks of a universal-usage keyboard is to accommodate the larger sets of characters required by the various applications for which keyboards are used today. This was achieved by permitting the allocation of more than one graphic character or control function to each of the keys of a keyboard, predominantly in the alphanumeric section.

ISO/IEC 9995 specifies the requirements for keyboard layouts and allocation of keycap imprints (including letters, numerals, symbols, and other markings) on alphanumeric and numeric input devices for all types of information and communication technology apparatus and systems including:

— personal computers, workstations, computer terminals, visual display terminals (VDTs);

— electronic typewriters and other machines with alphanumeric and numeric keyboards;

— mobile computer systems including ultra-mobile personal computers (UMPCs), personal digital assistants (PDAs) and multimedia devices with hardware keyboards (e.g. linear keyboards, foldable keyboards) or virtual keyboards (e.g. touchscreens, projection keyboards);

— electronic document scanners and multifunction devices incorporating alphanumeric and/or numeric keyboards;

— calculators, telephones and automated teller machines having alphanumeric and/or numeric keypads/keyboards.

The primary layout within the alphanumeric zone is established in most countries by a national standard or by national usage. Allocation guidelines are provided in ISO/IEC 9995-2. Complementary layouts are specified in ISO/IEC 9995-3.

ISO/IEC 9995 specifies the allocation of functions (graphic characters and/or control functions) to keys. The graphic characters and the control functions have been given common names intended to be familiar to the users of a keyboard. In general, keyboards are not expected to generate coded control functions, but the operation of a control function key can cause a number of coded control functions to appear in data interchange to achieve the desired effect.

The effects of those keys that affect keyboard states are specified in other parts of ISO/IEC 9995.

Information technology — Keyboard layouts for text and office systems —

Part 1: General principles governing keyboard layouts

1 Scope

This part of ISO/IEC 9995 identifies the sections of the keyboard and specifies the general shape and relative placement of the sections. Spacing of keys and physical characteristics are covered, as are the principles governing the placement of characters and symbols on keys.

This part of ISO/IEC 9995 specifies a key numbering system which applies to all types of numeric, alphanumeric and composite keyboards of information technology equipment (ITE).

This part of ISO/IEC 9995 specifies the principles governing the placement of characters and symbols on keys used on all types of numeric, alphanumeric and composite keyboards of ITE. Although the keyboard defined by ISO/IEC 9995 can be used for different languages, the specifications are written as applying to Latin languages with a character path from left to right and a line progression from top to bottom.

This part of ISO/IEC 9995 defines characteristics related to interface 1 in Figure 1.

2 Conformance

2.1 Conformance with ISO/IEC 9995-1

Equipment is in conformance with this part of ISO/IEC 9995 if it meets the requirements of Clauses 5 to 9. Depending on the intended purpose of the equipment, not all of the described sections and zones need to be implemented.

2.2 General conformance requirement

A keyboard which claims conformance with ISO/IEC 9995 shall as a minimum conform to this part of ISO/IEC 9995 and to all other parts which are relevant to that particular model of keyboard.

Conformance to ISO/IEC 9995-7 does not require conformance to any other part of ISO/IEC 9995.

Conformance to ISO/IEC 9995-8 does not require conformance to any other part of ISO/IEC 9995.

2.3 Claims of conformance

Any claim of conformance with ISO/IEC 9995 shall list the parts of ISO/IEC 9995 to which conformance is claimed.

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 9241-410, *Ergonomics of human-system interaction — Part 410: Design criteria for physical input devices*

4 Terms and definitions

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

4.1
graphic character
character, other than a control function, that has a visual representation, normally handwritten, printed or displayed

4.2
primary group layout
allocation of the graphic characters of group 1 to the keys of a particular keyboard, defined by a national standard or established by common usage in a particular country or group of countries

4.3
secondary group layout
allocation of the graphic characters of group 2 to the keys of a particular keyboard

4.4
key effect
effect that results when a key is actuated, depending on the active level, and possibly by the concurrent operation of a qualifier key or keys

4.5
lock state
state set by actuating a lock key, singly or in combination with a qualifier key

4.6
level lock state
state that, if activated, will result in the generation of the characters assigned to a specific level

4.7
capitals lock state
state that, if activated, will result in the generation of the capital form of all graphic characters on the keyboard for which such a form exists

4.8
control function
action that affects the recording, processing, transmission, or interpretation of data

4.9
group
logical state of a keyboard providing access to a collection of graphic characters or elements of graphic characters

NOTE 1 A group gives access to one collection of characters. Typically, when more than one language is used, multiple groups are required.

NOTE 2 Usually these graphic characters or elements of graphic characters logically belong together and can be arranged on several levels within a group.

NOTE 3 The input of certain graphic characters, such as accented letters, can require access to more than one group.

4.10
section
block of keys, mostly with some functional relationship

4.11
level
logical state of a keyboard providing access to a collection of graphic characters or elements of graphic characters

NOTE 1 Usually these graphic characters or elements of graphic characters logically belong together, such as the capital forms of letters.

NOTE 2 In certain cases the level selected can also affect function keys.

4.12
active position
character position which is to image the graphic symbol representing the next graphic character or relative to which the next control function is to be executed

NOTE In general, the active position is indicated in a display by a cursor.

4.13
group select
function that, if activated, will change the keyboard state to produce characters from a different group

4.14
graphic symbol
visual representation of a graphic character, a control function, or a combination of one or more graphic characters and/or control functions

4.15
level select
function that, if activated, will change the keyboard state to produce characters from a different level

4.16
associated system
system to which the keyboard is attached, probably consisting of a processor and software to handle the keyboard and to run application programs

4.17
qualifier key
key whose operation has no immediate effect, but which, for as long as it is actuated, modifies the effect of other keys

NOTE A qualifier key can be, for example, a level select key or a control key.

4.18
editing key
key whose primary purpose is the input of an editing function

4.19
function key
key whose primary purpose is the input of a control function

4.20
graphic key
key whose primary purpose is the input of a graphic character or of an element of a graphic character

NOTE Certain of these keys can also have a secondary purpose for input of a control function.

4.21
zone
part of a keyboard section defined in ISO/IEC 9995

5 Divisions of the keyboard

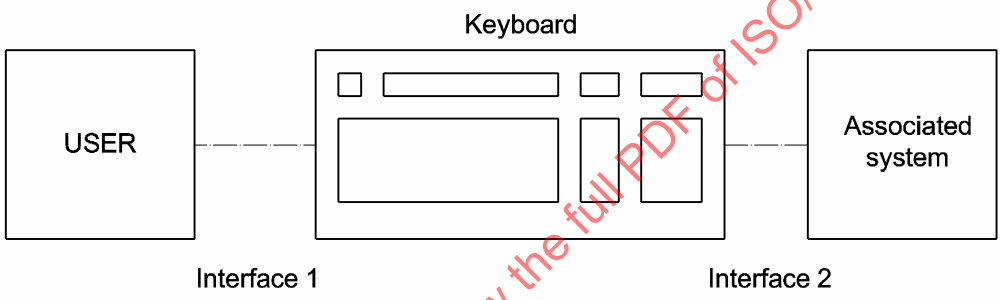
For the purpose of this part of ISO/IEC 9995 the keyboard is considered as an intermediate element between a user and an information processing system. The keyboard is specifically intended as a means for input of information by a human being, see Figure 1.

Simply stated, the keyboard functions as follows:

— the user actuates one or more keys (event at interface 1);

— corresponding signals are sent to the information processing system (event at interface 2).

For the purpose of this part of ISO/IEC 9995 the keyboard is considered to be divided logically into groups and levels and physically into sections and zones.



NOTE Not drawn to scale - all lines are only indicative.

Figure 1 — Keyboard interfaces

5.1 Logical division of keyboard into groups and levels

The graphic characters or control functions which may be accessed by one key are logically arranged in groups and levels. The traditional shift function has been extended to permit access to these different groups and levels. The selection among the available groups and levels is controlled by the user by means of one or more select mechanisms (see Table 1).

Two kinds of select mechanisms are recognized here:

— group select: enables selection among groups;

— level select: enables selection among levels.

The two functions can apply simultaneously. In a hierarchical sense the group is higher than the level; within a group several levels may be defined.

Table 1 — Logical division into groups and levels

Group Select	Level Select	Active Group and Level
None	None	Group 1, Level 1
(default = Group 1)	Level 2 select	Group 1, Level 2
	Level 3 select	Group 1, Level 3
Yes	None	Group n, Level 1
(To group n)	Level 2 select	Group n, Level 2
	Level 3 select	Group n, Level 3

Groups are likely to contain complete or distinctive sets of functions. A keyboard could have any number of groups, practicality of use being a limiting factor.

Within each group, functions (graphic characters and/or control functions) are arranged on up to three levels.

Groups beyond group 1 are accessed via a group select function. Level 1, formerly called the unshifted level, is accessible without a level select function. The level 2 select function provides access to level 2, formerly called the shifted level. Level 3 is accessed through an additional level select function provided for that purpose.

The concept of selecting groups and levels can be applied to sections of the keyboard other than the alphanumeric section.

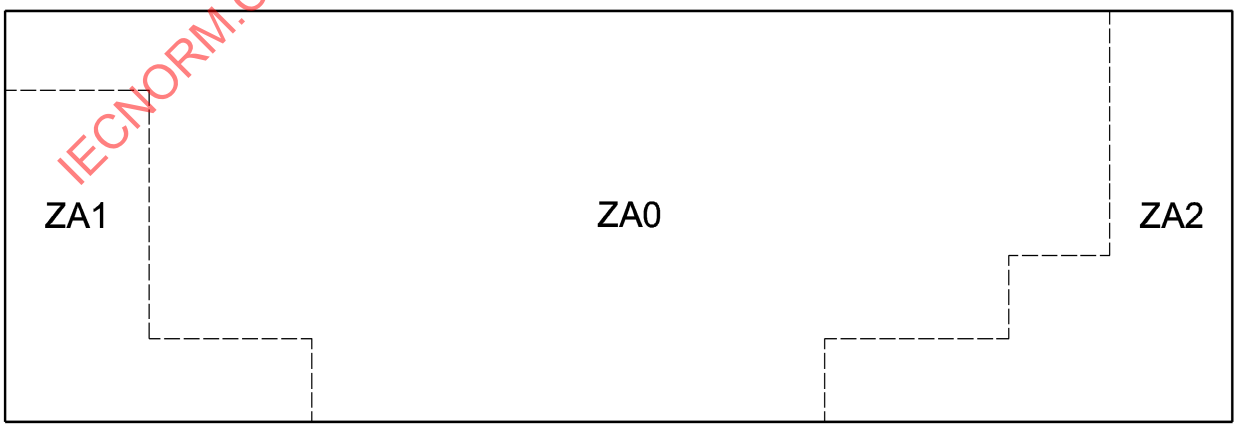
5.2 Physical division of keyboard into sections and zones

This subclause introduces the concept of sections and zones. The various functions that can be performed by a keyboard are grouped into three categories, arranged in three sections as follows:

— alphanumeric section : ZA0 alphanumeric zone, ZA1 and ZA2 function zones (see Figure 2);

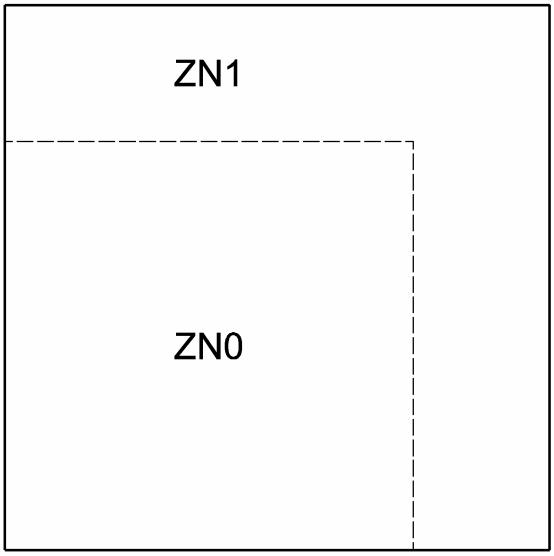
— numeric section : numeric zone ZN0 and function zone ZN1 (see Figure 3);

— editing-and-function section :cursor key zone ZEF0, editing function zone ZEF1 (see Figure 4).



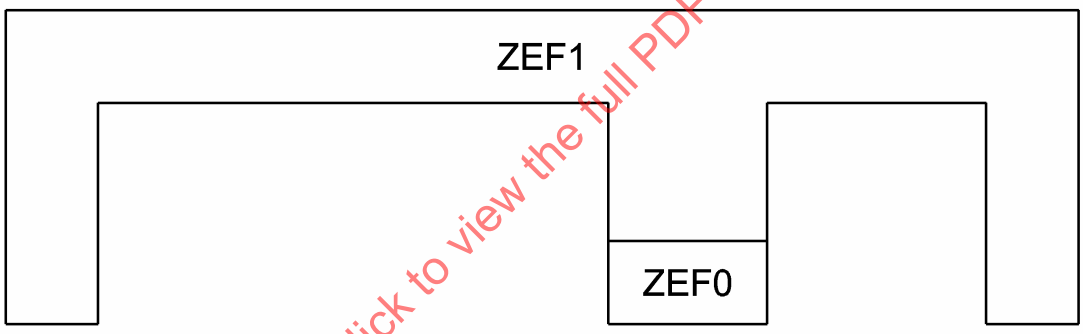
NOTE Not drawn to scale - all lines are only indicative.

Figure 2 — Layout of zones - Alphanumeric section



NOTE Not drawn to scale - all lines are only indicative.

Figure 3 — Layout of zones - Numeric section



NOTE Not drawn to scale - all lines are only indicative.

Figure 4 — Layout of zones – Editing-and-function section

6 Requirements

6.1 Placement of sections

Keyboards may consist of one or more sections all of which are of indeterminate size. Each of the sections can be used in a stand-alone configuration. If an alphanumeric section is present on the keyboard the physical arrangement of the sections shall be as follows:

— editing-and-function section, if present, to the right, above and/or to the left (especially for left-handed people) of the alphanumeric section;

— numeric section, if present, to the right of the alphanumeric section, or to the left (especially for left-handed people);

— if both the editing-and-function section and the numeric section are present, the cursor key zone (see Figure 4) of the editing-and-function section shall be placed between the alphanumeric zone (see Figure 2) and the numeric section.

The exact positions are not standardized, but it is preferred that row A of all sections should be aligned (see Clause 7).

6.2 Methods of indicating allocations to keys

A graphic symbol that represents a graphic character or a control function that is allocated to a key in a particular position on a keyboard, in accordance with ISO/IEC 9995, shall be shown on that key in such a way that the allocation can be observed by the user of the keyboard. The allocation shall be shown by one or more of the following methods, method a) being the usual and preferred one:

a) by visible indications on the keytops in accordance with Clause 8 of this part of ISO/IEC 9995;

b) by visible indications elsewhere on the keyboard;

c) by information contained within a product description that accompanies the keyboard;

d) by information made available to the user by means of associated equipment that is normally used with the keyboard.

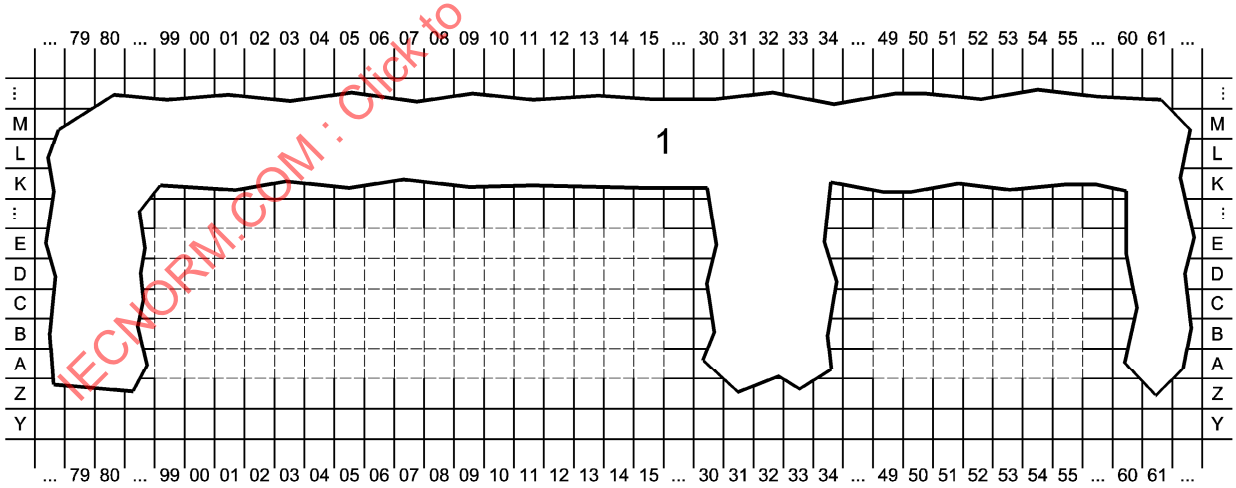
If any allocations are shown by either method c) or d), the corresponding product description or other information shall be provided with the keyboard.

Each allocation of a control function that is shown as specified above shall be identified either by the symbol specified in ISO/IEC 9995-7, or by the name specified there, or by an equivalent name in another language.

7 Key position numbering system

7.1 Principle of the grids

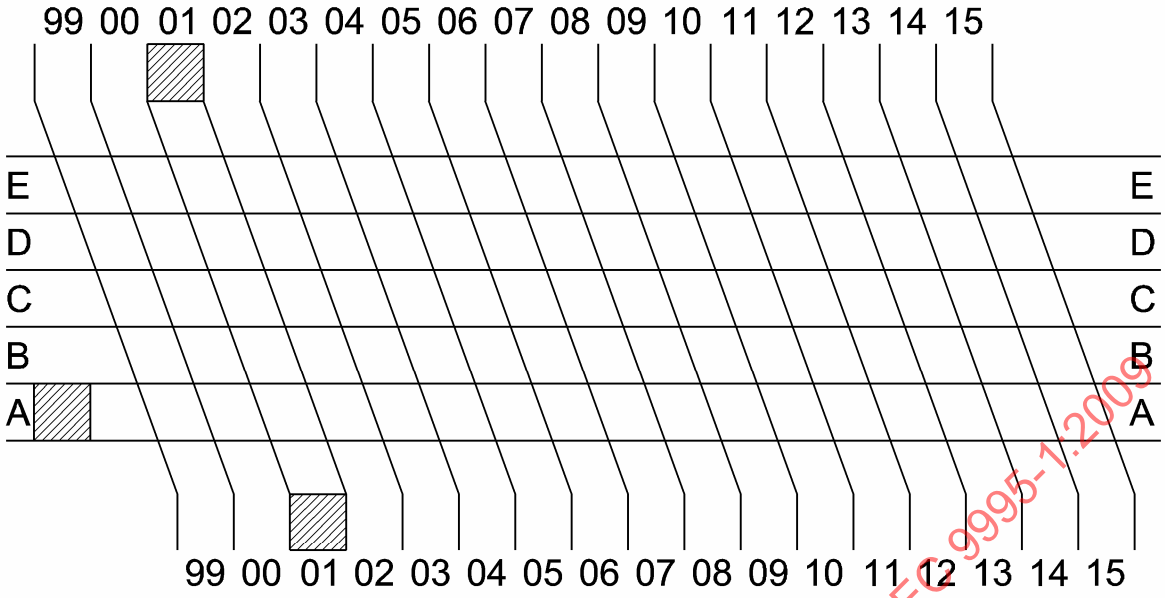
The numbering system specified in ISO/IEC 9995 is related to a set of layout charts, each based on a grid (intersection of rows and columns). The purpose of each grid is to show the relative position of the keys in the layout of one keyboard section. Grids are specified below for three separate sections: the alphanumeric section, the editing-and-function section (see Figure 5) and the numeric section.



NOTE Not drawn to scale - all lines are only indicative.

Figure 5 — Editing-and-function section ("1")

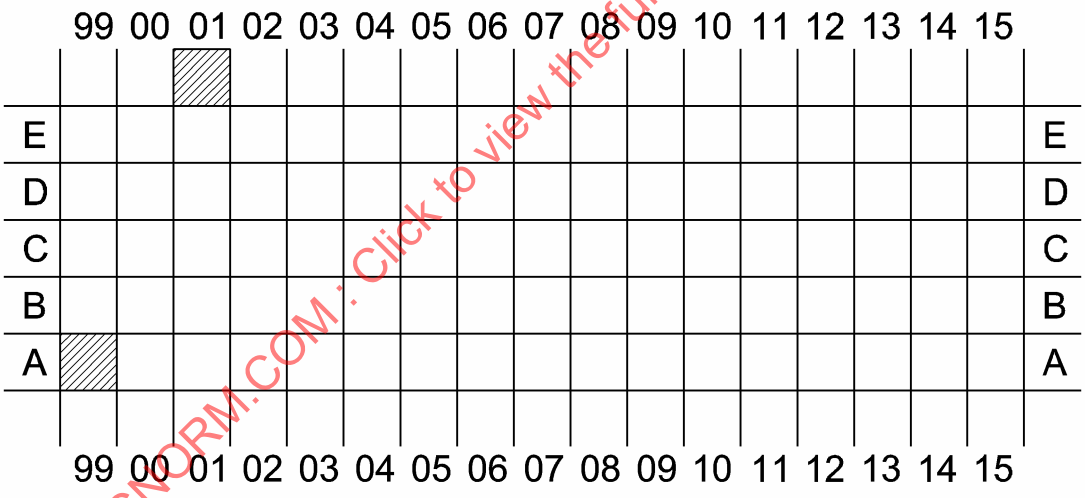
Depending on the user requirements, and for compatibility with existing keyboards, the grid of the alphanumeric section can be angled (see Figure 6) or square (see Figure 7). ISO/IEC 9995 expresses no preference for either the square or angled alphanumeric section, nor does it specify the angle.



NOTE 1 Not drawn to scale - all lines are only indicative.

NOTE 2 The hatched positions indicate reference positions.

Figure 6 — Alphanumeric section (angled grid)



NOTE 1 Not drawn to scale - all lines are only indicative.

NOTE 2 The hatched positions indicate reference positions.

Figure 7 — Alphanumeric section (square grid)

7.2 Designation of key positions

Each key position in each of the grids is identified by the intersection of a row and a column.

The rows and the columns are identified as follows:

Each row is identified by a capital letter of the Latin alphabet.

Row A is designated as the grid reference row of all the sections. Rows above the grid reference row are identified by the sequence B, C, D, E and so on, as far as necessary. Rows below the grid reference row, if provided, are identified by the sequence Z, Y, X and so on, as far as necessary.

Each column is identified by a two-digit number.

Column 01 is designated as the reference column of all the sections. Columns to the right of the reference column are identified by the sequence 02, 03, 04 and so on, as far as necessary. Columns to the left of the reference column are identified by the sequence 00, 99, 98 and so on, as far as necessary.

7.3 Reference positions for the rows and columns

The grid reference rows and the relevant reference columns are defined as follows.

Row A is the row containing the space bar in the alphanumeric section.

Row K is the first row of the editing-and-function keys above the alphanumeric section.

Column 01 is the column containing the key with the digit one in the alphanumeric section.

Column 30 is the first column of the editing-and-function keys on the right side beyond the alphanumeric section.

Column 51 is the column containing the key with the digit one in the numeric section.

Column 60 is the first column of the editing-and-function keys on the right side beyond the numeric section.

Column 80 is the first column of editing-or-function keys on the left side beyond the alphanumeric section.

7.4 Key location numbering requirements

If a description of a keyboard uses a numbering system and/or layout charts other than those described in 7.1 and 7.2, information shall be provided about how to map that numbering system on to the system specified in this part of ISO/IEC 9995. This information shall be contained in a product description that accompanies the keyboard.

8 General principles of key labelling and symbol positioning

This part of ISO/IEC 9995 does not require the labelling of all allocations in all levels of all groups on a key, it does not deal with the color, the shape, the font or even the size of a particular character or symbol on a key. It defines general principles for the placement of these symbols on any key, plus other considerations for uniformity or unambiguity of labelling.

At least one symbol representing a graphic character or a control function shall be shown on every key to which a graphic character or a control function is a located, the space bar excepted.

Symbols which represent functions are defined in ISO/IEC 9995-7.

8.1 Group positions

All symbols that are shown on a key and that represent graphic characters within the same group, shall be placed within the same column on the key. More than one such column of symbols may be placed on the key side by side.

If symbols from more than one group are shown, symbols representing group 1 allocations shall be placed on the far left side of the key and symbols representing group 2 allocations shall be placed on the far right side of the key. Optionally, symbols representing another group's allocations may be placed in the middle column of the key.

If there is no requirement nor software support for more than one group, in a specialized environment, the symbol of the third level of this group may exceptionally be placed in the right column of the key, as shown in Figure 8.

NOTE When this option is used, an end-user would not be able to physically add labels representing extra groups on the right side of the keycap (e. g. stickers to represent Korean group in addition to the non-Korean national group, or in more practical terms for the same writing system, stickers to represent a German group in addition to a Spanish national group).

8.2 Level positions within one group

The placement of symbols representing graphic characters or control functions allocated to different levels in one group is done using different rows in the column assigned to that group. ISO/IEC 9995 allows for up to three levels within any one group.

Two scenarios are possible for their placement.

8.2.1 Labelling of all three levels on the key-top

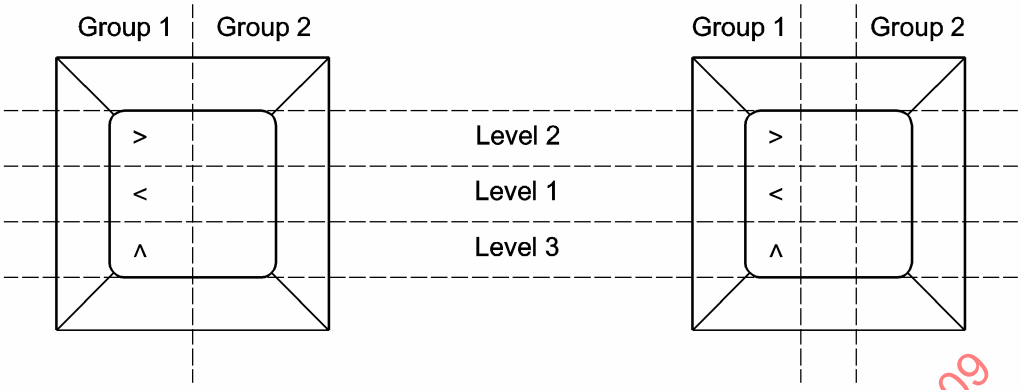
The symbols representing the level 1 allocation shall be placed in the middle third of the group's column of the keytop. The symbols representing the level 2 allocation shall be placed in the upper third of the group's column of the keytop, see Figure 8. The symbols representing the level 3 allocation shall then be placed in the lower third of the group's column of the keytop. In the case when a single symbol represents the first two levels at the same time (like the graphic symbol M representing at the same time capital letter M and small letter m), the symbol may be enlarged and occupy the upper two thirds of the group's column of the keytop.

8.2.2 Labelling of two levels on the key-top, labelling of level 3 on the keyface

In this case the symbols representing the level 3 allocation shall be placed on the front face of the key, in the same column as the symbols representing the allocation of level 1 and 2. The symbols representing the level 1 allocation shall then be placed in the lower half of the group's column of the keytop, see Figure 9. The symbols representing the level 2 allocation shall then be placed in the upper half of the group's column of the keytop. In the case when a single symbol represents both the level 1 and level 2 allocations at the same time (like the graphic symbol M representing at the same time capital letter M and small letter m), this graphic symbol may be enlarged and occupy the upper half of the group's column of the keytop.

If there is no requirement nor software support for more than one group, in a specialized environment, the symbol of the third level of this group may exceptionally be placed in the right column of the key, as shown in Figure 10.

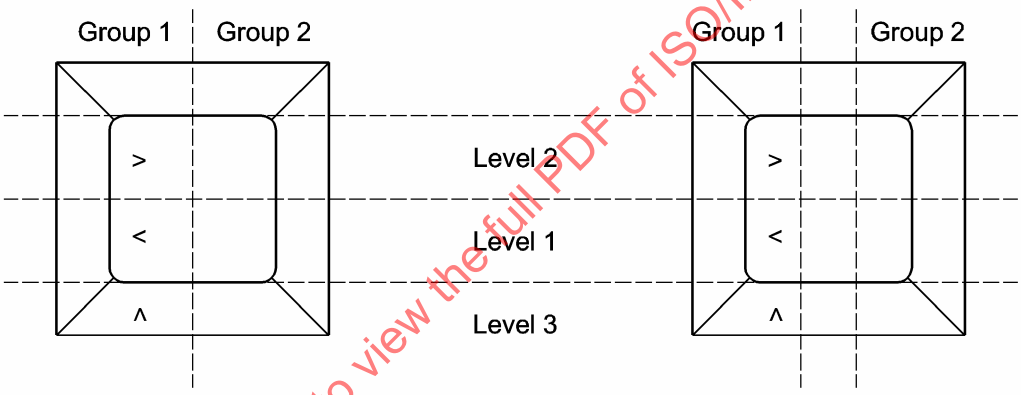
NOTE When this option is used, an end-user would not be able to physically add labels representing extra groups on the right side of the keycap (e. g. stickers to represent Korean group in addition to the non-Korean national group, or in more practical terms for the same writing system, stickers to represent a German group in addition to a Spanish national group).



NOTE 1 The combination of characters used in this figure is for illustration purposes only.

NOTE 2 Not drawn to scale - all lines are only indicative.

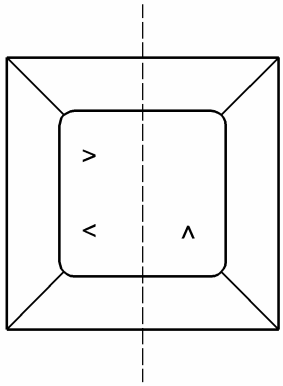
Figure 8 — Three level allocations marked on keytop



NOTE 1 The combination of characters used in this figure is for illustration purposes only.

NOTE 2 Not drawn to scale - all lines are only indicative.

Figure 9 — Two level allocations marked on keytop, one level marked on keyface



NOTE 1 The combination of characters used in this figure is for illustration purposes only.

NOTE 2 Not drawn to scale - all lines are only indicative.

Figure 10 — Exceptional allocation allowed when support for only one group is available