INTERNATIONAL STANDARD

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 9995-1:1994(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. 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.

International Standard ISO/IEC 9995-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 18, *Document processing and related communication*.

This first edition supersedes all or part of

ISO 1090:1981

ISO 1091:1977

ISO 1092:1974

ISO 1093:1981

ISO 2126:1975

ISO 2530:1975

ISO 3243:1975

ISO 3244:1984

ISO 4169:1979

ISO 8884:1989.

For complete details, see annex A of this part of ISO/IEC 9995.

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 section*

— *Part 6: Function section*

— *Part 7: Symbols used to represent functions*

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

Annex A of this part of ISO/IEC 9995 is for information only.

Introduction

In the years prior to the existence of ISO/IEC 9995 the keyboard layout of information technology equipment (ITE) such as personal computers, workstations, and computer terminals was determined by standards which were originally intended for typewriters, adding machines and the like. This led to the fact that designers of office machine keyboards had to choose from the sometimes inconsistent standards, which in turn led to the existence of widely dissimilar keyboard layouts.

ISO/IEC 9995 defines a framework for the layout of keyboards for ITE. The functions to be performed by keyboards are grouped into four categories that correspond to the four physical sections of the keyboard.

Application of ISO/IEC 9995 in the design of keyboards will provide the user with a unified, predictable interface between the user and office machines by dividing the keyboard into functional areas and sections and allocating functions to keys. One of the major tasks is to accommodate the larger and/or multiple 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.

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Information technology — Keyboard layouts for text and office systems —

Part 1:
General principles governing keyboard layouts

1 Scope

ISO/IEC 9995 specifies various characteristics of keyboards used by ITE e.g.

a) personal computers, workstations, computer terminals, VDTs (visual display terminals), typewriters, etc, having an alphanumeric keyboard;

b) calculators, telephones and automated teller machines having a numeric keypad.

The keyboard defined in ISO/IEC 9995 is the conventional linear keyboard, which is physically divided into sections and the sections into zones within which the keys are laid out.

In this part of ISO/IEC 9995, the sections of the keyboard are identified and the general shape and relative placement of the sections are specified. Spacing of keys and physical characteristics are covered in this part of ISO/IEC 9995 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 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 may 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.

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.

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

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 may 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.

2 Conformance

2.1 Conformance with part 1

Equipment is in conformance with ISO/IEC 9995-1 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 at 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 reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 9995. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this part of ISO/IEC 9995 are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 9241-4:—[1], *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 4: Keyboard requirements.*

4 Definitions

For the purposes of this part of ISO/IEC 9995, the following definitions apply.

4.1 active position: The 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 1 In general, the active position is indicated in a display by a cursor.

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

4.3 capitals lock state: A 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. National standards or usage may determine which graphic characters are affected by this state.

4.4 control function: An action that affects the recording, processing, transmission, or interpretation of data.

4.5 function key: A key whose primary purpose is the input of a control function. Function keys are found in all sections of the keyboard.

4.6 graphic character: A character, other than a control function, that has a visual representation normally handwritten, printed or displayed.

4.7 graphic key: A key whose primary purpose is the input of a graphic character or of an element of a graphic character. Certain of these keys may also have a secondary purpose for input of a control function.

4.8 graphic symbol: A visual representation of a graphic character, a control function, or a combination of one or more graphic characters and/or control functions.

4.9 group: A logical state of a keyboard providing access to a collection of graphic characters or elements of graphic characters. Usually these graphic characters or elements of graphic characters logically belong together and may be arranged on several levels within a group. The input of certain graphic characters, such as accented letters, may require access to more than one group.

4.10 group select: A function that, if activated, will change the keyboard state to produce characters from a different group.

4.11 key effect: The effect that results when a key is actuated, depending on the level in force, and possibly by the concurrent operation of a qualifier key or keys. The key effect may be the generation of a graphic character or of a control function.

4.12 level: A logical state of a keyboard providing access to a collection of graphic characters or elements of graphic characters. Usually these graphic characters or elements of graphic characters logically belong together, such as the capital forms of letters. In certain cases the level selected may also affect function keys.

1) To be published.

4.13 level select: A function that, if activated, will change the keyboard state to produce characters from a different level.

4.14 level lock state: A state that, if activated, will result in the generation of the characters assigned to a specific level.

4.15 lock state: The state set by actuating a lock key, singly or in combination with a qualifier key.

4.16 primary group layout: The 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.

4.17 qualifier key: A key the operation of which has no immediate effect, but which, for as long as it is actuated, modifies the effect of other keys. A qualifier key may be, for example, a level select key or a control key.

4.18 secondary group layout: The allocation of the graphic characters of group 2 to the keys of a particular keyboard.

4.19 section: A block of keys, mostly with some functional relationship.

4.20 zone: A part of a keyboard section defined in ISO/IEC 9995.

5 Divisions of the keyboard

For the purpose of this standard 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 International Standard the keyboard is considered to be divided logically into groups and levels and physically into sections and zones.

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.

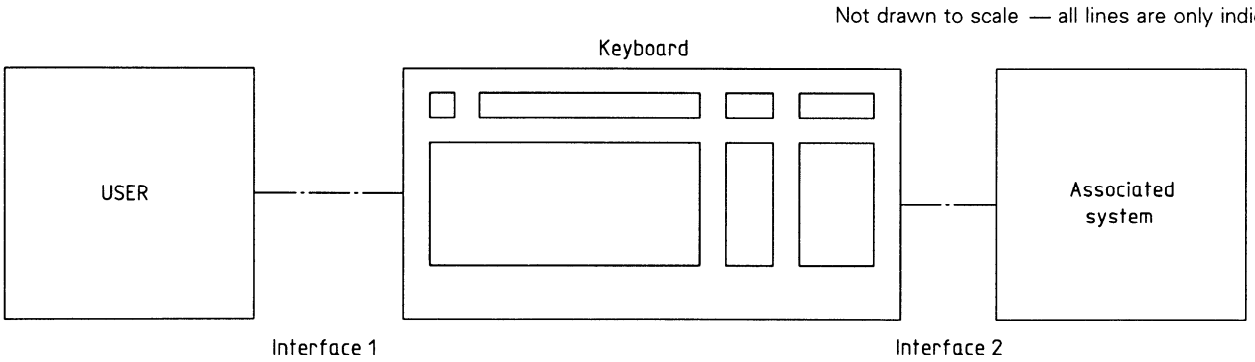

Figure 1 — Keyboard interfaces

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, which did not exist in previous standards, 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 details of sections and zones are defined in subsequent parts of ISO/IEC 9995.

The various functions that can be performed by a keyboard are grouped into four categories, arranged in four keyboard sections as follows:

— alphanumeric section, zones ZA0 - ZA4;

— editing section, zones ZE0 - ZE2;

— function section, zones ZF0 - ZF4;

— numeric section, zones ZN0 - ZN6.

Each of the sections may be regarded as consisting of a central core (zone 0) surrounded by other zones which may be used for supporting function keys or other related keys.

In figure 2 the general arrangement of sections and zones is shown.

6 Requirements

6.1 Placement of sections

ITE keyboards including office machine 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 section, if present, to the right of the alphanumeric section

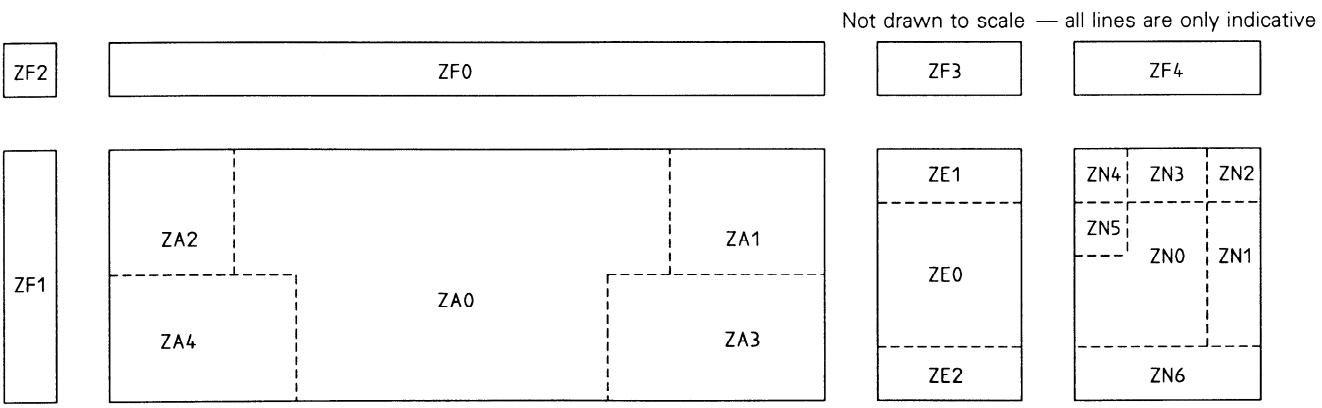

Figure 2 — Layout of sections and zones (ZA0 to ZA4 Alphanumeric section, ZE0 to ZE2 Editing section, ZF0 to ZF4 Function section, ZN0 to ZN6 Numeric section)

— numeric section, if present, to the right of both the alphanumeric section and the editing section, if present

— function section, if present, above and/or to the left of the other sections

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

The general arrangement is shown in figure 2.

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 four separate sections: the alphanumeric section, the editing section, the numeric section, and the function section.

Depending on the user requirements, and for compatibility with existing keyboards, the grid of the alphanumeric section can be angled (see figure 3) or square (see figure 4). ISO/IEC 9995 expresses no preference for either the square or angled alphanumeric section, nor does it specify the angle.

All the sections are envisaged as being divided into a number of zones. In the case of the function section the zones are not necessarily contiguous, and the numbering system reflects this.

In the case of overlapping sections, the columns affected shall be identified by both numbers of the overlapping sections.

The layout of the grids of the different parts of a keyboard are shown in the figures 3 to 7. The reference row and the relevant reference columns have been shaded to permit easy identification.

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 reference row of the alphanumeric section, the editing section, the numeric section, and zone ZF1 of the function section. Rows above the reference row are identified by the sequence B, C, D, E and so on, as far as necessary. Rows below the reference row, if provided, are identified by the sequence Z, Y, X and so on, as far as necessary.

Row K is designated as the reference row of the zones ZF2, ZF0, ZF3 and ZF4 of the function section. Rows above the reference row K are identified by the sequence L, M, N 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 the alphanumeric section and of zone ZF0 of the function section. 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.