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Information Technology — Keyboard layouts for alphanumeric inputs

Élément introductif — Élément central

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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

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

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

ISO/IEC TR 9995, which is a Technical Report of type 3, was prepared by Technical Committee ISO/TC JTC 1, *Information Technology*, Subcommittee SC 35, *User Interfaces*.

This Technical Report based on International Standard series ISO/IEC 9995.

Introduction (Hirneise)

In today's information age, computer systems are found in all areas of business and private life.

They simplify locating electronic information, allow exchange of electronic data and help to increase efficiency in business. The man-machine interface enables dialogue to be conducted between the user and the computer system. Particularly for the keyboard input of alphanumeric data, a common, standardized interface is desirable to minimize the need for users to adjust to different layouts when using different information and communication technology systems.

This Technical Report (TR) describes the practical layout and the allocation of symbols imprinted on keycaps of alphanumeric and numeric keyboards in light of current requirements and usage. In contrast to the aging international standard ISO/IEC 9995 (Keyboard Layouts for text and office systems) in current use, this TR emphasizes today's important goals, for instance:

- apply to all alphanumeric and numeric keyboards across the widest spectrum of applications and environments
- focus on the primary function-groups and the allocation of keycap symbols, while concurrently allowing more flexibility for innovation
- encourage the adoption and use of this TR by providing clear requirements with minimum complexity for developers, purchasing agents, test houses and users
- achieve broad international acceptance of this TR that includes references to localized layouts in various countries
- this TR might supersede the current ISO/IEC 9995 series of standards in the future

Ergonomic requirements for keyboards (except those relating to layout and primary keycap symbols) are exclusively specified ISO 9241-4. (Note that ISO 9241-4 will soon be replaced by the ISO 9241-4xx series.) This TR complements the ISO 9241-4xx series by addressing these exceptions. Examples include issues such as:

- repositioning of the numeric-/editing section on the left to the alphanumeric section for left-handed people
- Repositioning function-groups (e.g. numeric-/editing) to support a more natural posture when shifting between keys and a mouse because of a possible shorter keyboard width.

1 Scope (Hirneise)

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

- Personal Computers, Workstations, Computer Terminals, Visual Display Terminals;
- electronic typewriters and other machines with alphanumeric and numeric keyboards;
- mobile computer systems and multimedia devices with hardware- or virtual 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.

2 Normative references (Schreml)

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 time 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 9241-4:1998, *Ergonomic requirements for office work with visual display terminals (VDTs) – Part 4: Keyboard requirements*.

ISO DIS 9241-400:2005, *Ergonomics of human system interaction – Physical input devices – Part 400: Guiding principles, introduction and general design requirements*.

ISO DIS 9241-410:2006, *Ergonomics of human system interaction – Physical input devices – Part 410: Design criteria for products*.

((the scheduling is not yet fixed, it depends from publication of ISO 9241-410)) ISO NP 9241-420, *Ergonomics of human system interaction – Physical input devices – Part 420: Ergonomic selection procedures*.

((the scheduling is not yet fixed, it depends from publication of ISO 9241-420)) ISO/IEC 646: 1991, *Information technology – ISO 7-bit coded character set for information interchange*.

ISO 7000: 2004, *Graphical symbols for use on equipment – Index and synopsis*.

ISO/IEC 9995-7, *Information technology – Keyboard layouts for text and office systems – Part 7: Symbols used to represent functions*

ISO/IEC 10646-1: 2003, *Information technology – Universal Multiple-Octet Coded Character Set (UCS) - Part 1 : Architecture and Basic Multilingual Plane*

IEC 60417-1: 2000, *Graphical symbols for use on equipment – Part 1: Overview and application*

ISO/IEC 9995-related TR

IEC 60417-2: 2000, *Graphical symbols for use on equipment – Part 2: Symbol originals*

IEC 80416-1: 2001, *Basic principles for graphical symbols for use on equipment – Part 1: Creation of symbol originals*

ITU-T Recommendation E.161, Arrangement of figures, letters and symbols on telephones and other devices that can be used for gaining access to a telephone network

((if there is no direct standard reference in the text, the referenced documents should be moved to "Bibliography"))

3 Terms and definitions (Schreml)

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

3.1 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.

3.2 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.

3.3 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.

3.4 control function
An action that affects the recording, processing, transmission, or interpretation of data. ((To be discussed in WG1, if all definitions are necessary or others to be added))

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

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

3.7 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 also have a secondary purpose for input of a control function.

3.8 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.

3.9**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.

3.10**group select**

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

3.11**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.

3.12**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.

3.13**level select**

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

3.14**level lock state**

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

3.15**lock state**

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

3.16**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.

3.17**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.

3.18**secondary group layout**

The allocation of the graphic characters of group 2 to the keys of a particular keyboard.

3.19**section**

A block of keys, mostly with some functional relationship.

3.20**zone**

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

4 General specifications

For the purposes of this document, the following general specifications apply.

4.1 Division 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 keyboard sections as follows:

- alphanumeric section: ZA0 alphanumeric zone, ZA1 and ZA2 function zones (see figure 1);
- editing-/function section, no zones available
- numeric section: numeric zone ZN0 and function zone ZN1 (see figure 2).

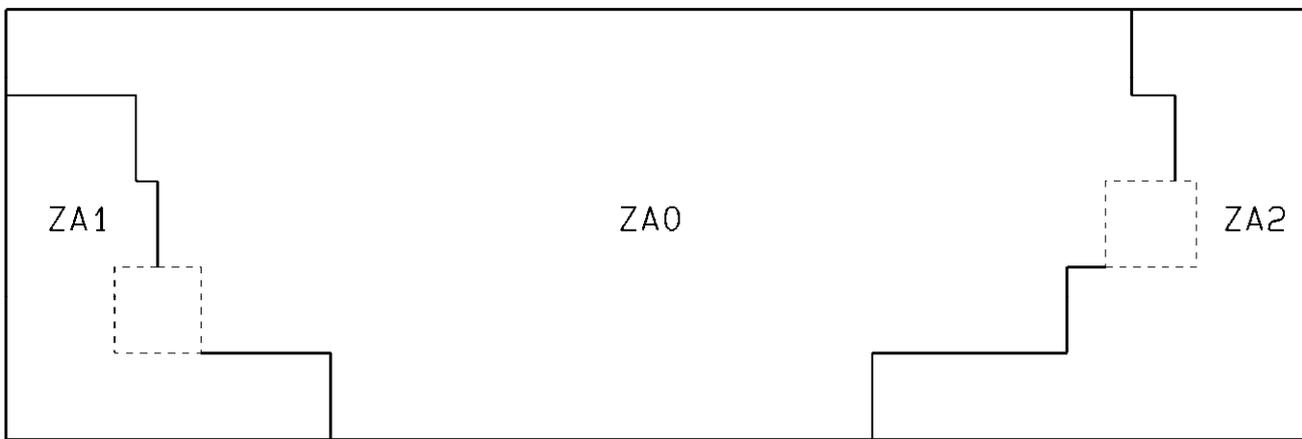


Figure 1 — Layout of zones - Alphanumeric section

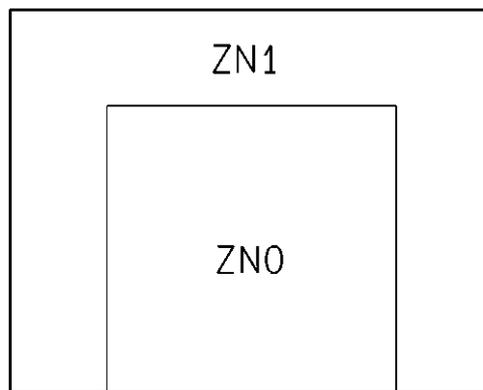


Figure 2 — Layout of zones - Numeric section

4.2 Key position numbering system

The numbering system specified in this document is related to a set of layout charts, each based on a grid (intersection of rows and columns).

4.2.1 Principle of the grids

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 (figure 3 and figure 4)
- the numeric section (figure 5)
- the editing-/function section (figure 6)

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

The reference row and the relevant reference columns have been shaded to permit easy identification, see 4.2.3.

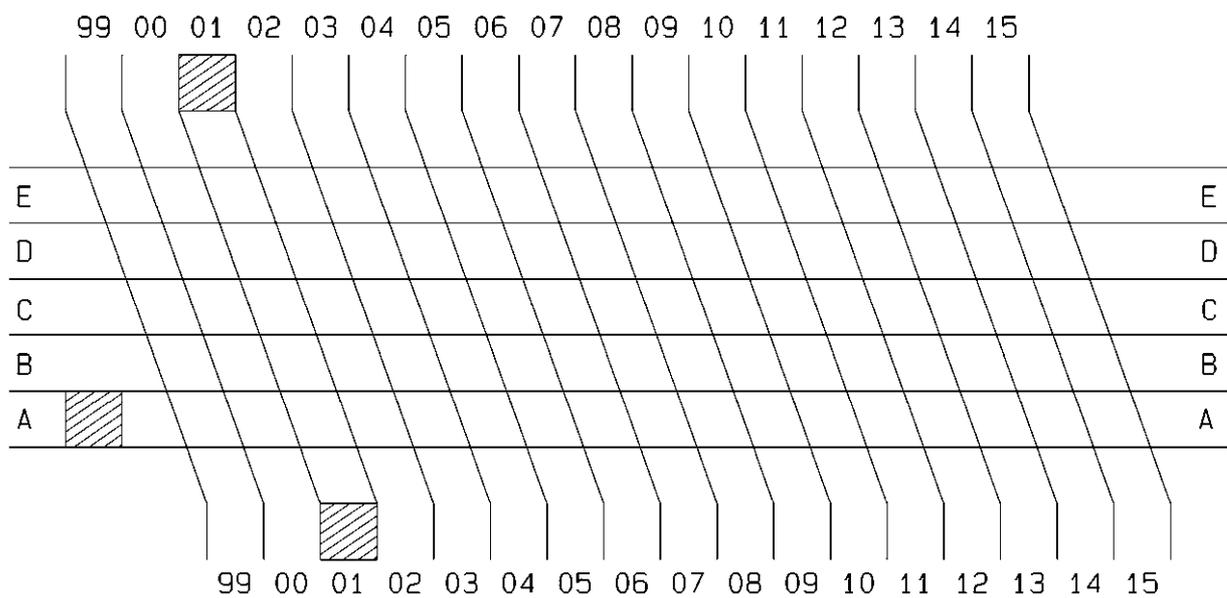


Figure 3 — Angle grid - Alphanumeric section

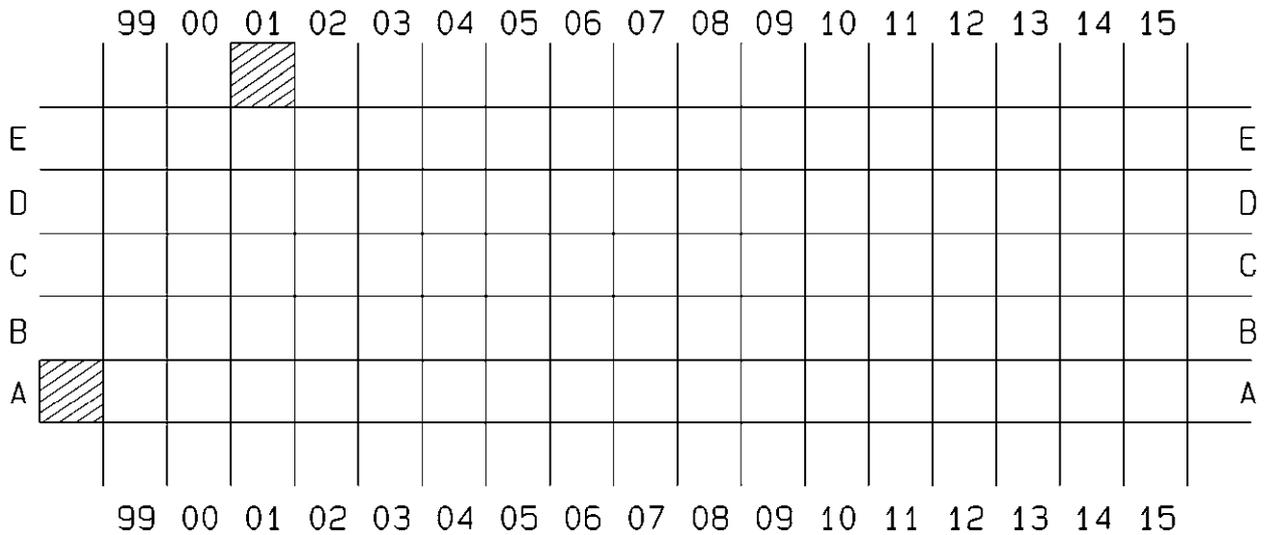


Figure 4 — Square grid - Alphanumeric section

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). This document expresses no preference for either the square or angled alphanumeric section, nor does it specify the angle.

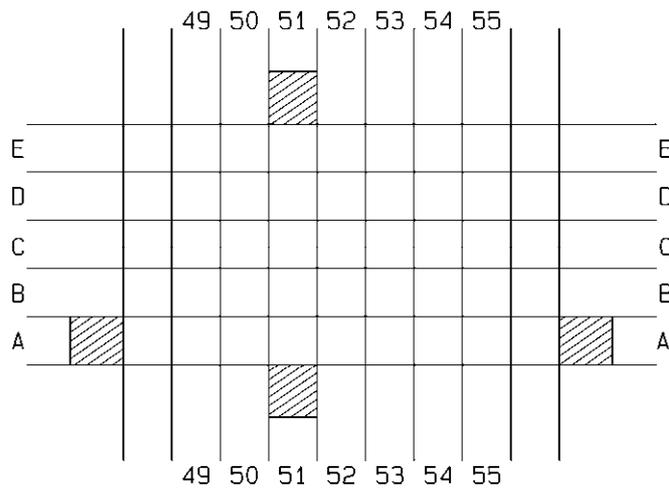
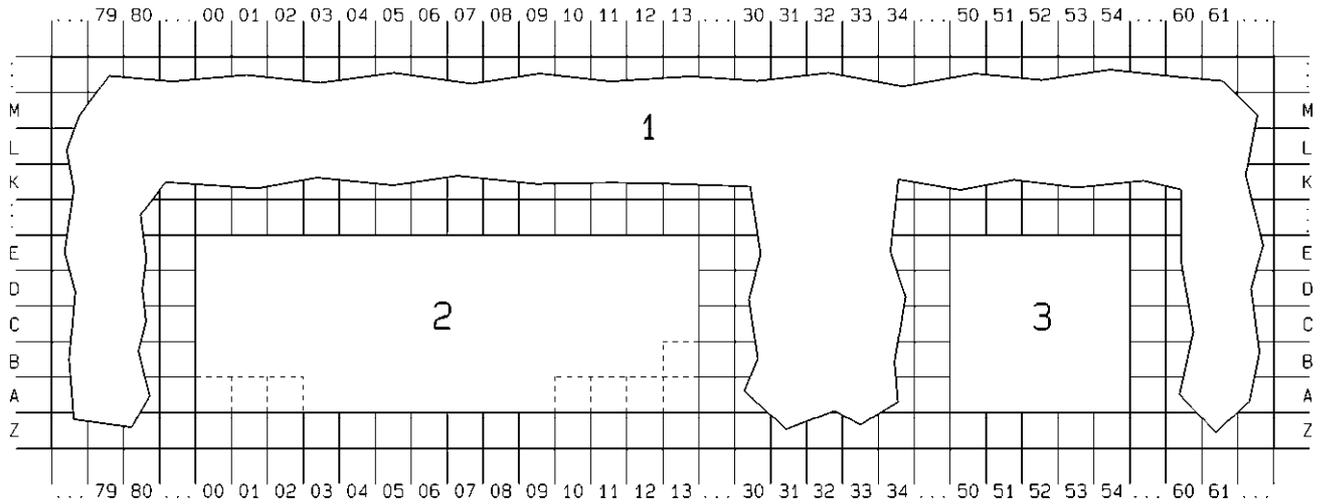


Figure 5 — Numeric section

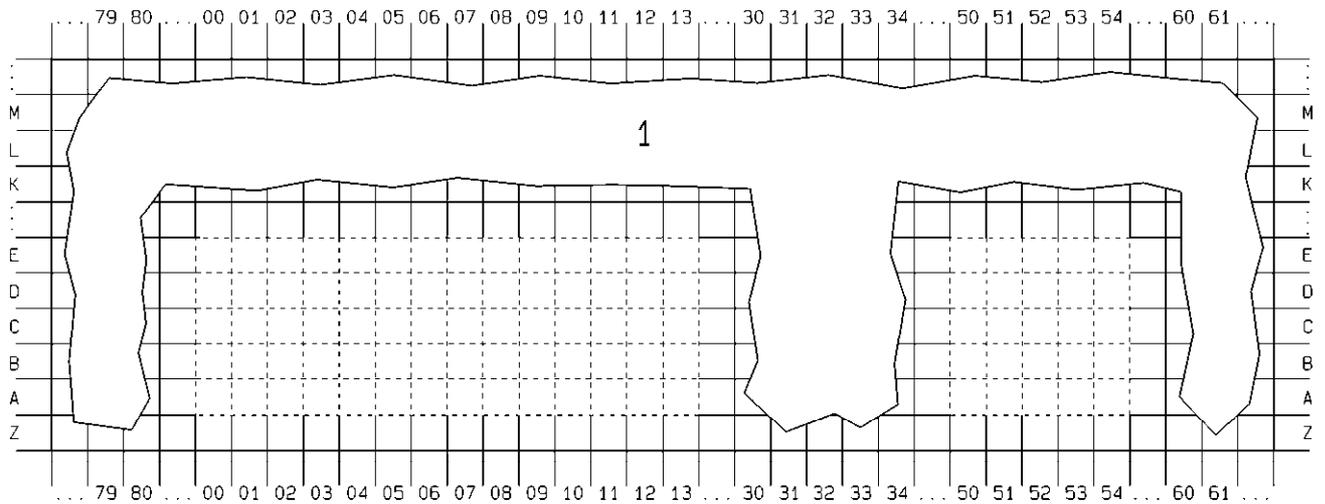
((Figure 6 – three different proposals for decision at the WG1 meeting in Berlin February 2006; the German proposal 6b is recommended))



Key

- 1 Editing / function section
- 2 Alphanumeric section
- 3 Numeric section

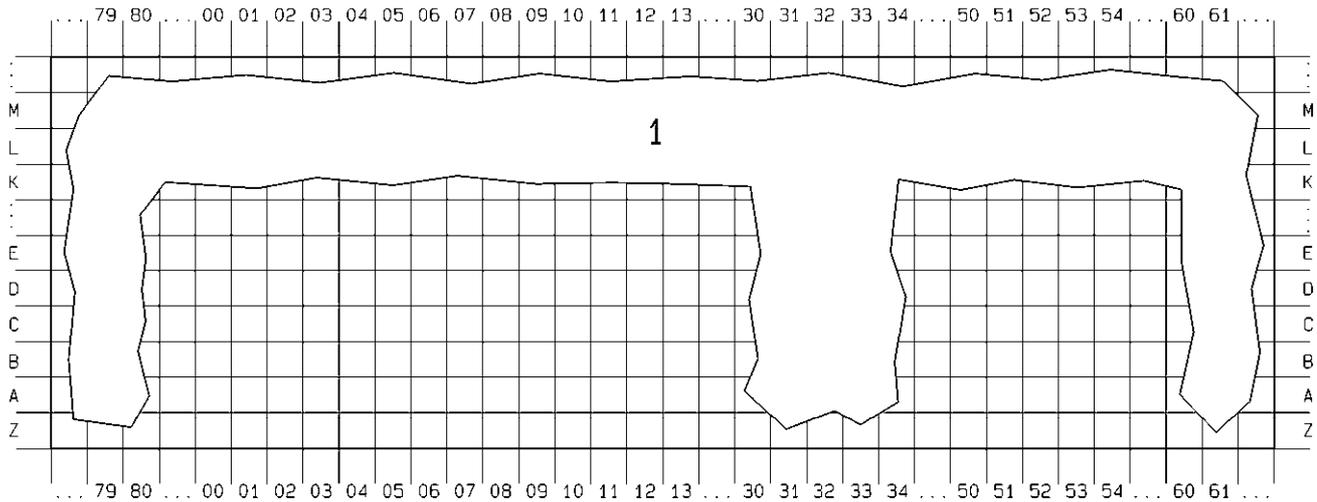
Figure 6 a) – Editing / function section



Key

- 1 Editing / function section

Figure 6 b) – Editing / function section



Key

1 Editing / function section

Figure 6 c) – Editing / function section

4.2.2 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 and the numeric 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.

Each column is identified by a two-digit number.

Column 01 is designated as the reference column of the alphanumeric 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.

Column 51 is designated as the reference column of the numeric section. Columns to the right of the reference column are identified by the sequence 52, 53, 54 and so on, as far as necessary. Columns to the left of the reference column are identified by the sequence 50, 49, 48 and so on, as far as necessary.

4.2.3 Reference positions for the rows and columns

The 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 editing- or 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 editing- or function keys right 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 editing- or function keys right beyond the numeric section.

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

4.2.4 Key location numbering requirements

If a description of a keyboard uses a numbering system and/or layout charts other than those described in 4.2.1 and 4.2.2, information shall be provided about how to map that numbering system on to the system specified in this document. It shall be contained in a product description that accompanies the keyboard.

4.3 Description of executing Functions (Reference to ISO/IEC 9995-7)

Description of executing functions given in ISO/IEC 9995-7 apply.

5 Requirements

For the purpose of this document the following requirements apply.

5.1 General (Michalla)

((to be done))

- Divisions of the keyboard
- Key arrangement and distances
- Key labelling and symbol positioning
- Symbols used for functions (Reference to ISO/IEC 9995-7)

5.2 Alphanumeric section (Koldehoff)

This chapter contains requirements concerning the arrangement of keys in the alphanumeric section.

5.2.1 Arrangement and location of keys in the alphanumeric zone of the alphanumeric section

The graphic keys and the space bar shall be arranged in the alphanumeric zone of the alphanumeric section.

5.2.1.1 General keyboard arrangement

There shall be 45 or more graphic keys and the space bar in the alphanumeric zone of the alphanumeric section. They shall be arranged as follows:

- the space bar in row A, extending, as a minimum, from position A03 to A07;
- 10 keys or more in row B in positions B00 to B11;
- 11 keys or more in row C in positions C01 to C15;
- 12 keys or more in row D in positions D01 to D15;
- 12 keys or more in row E in positions E00 to E15.

This arrangement accommodates existing ISO and national layouts and is flexible enough to allow possible extended versions, especially for national linguistic requirements. The precise boundary of alphanumeric zone will be dependent on the number of keys and their configuration.

In order to implement the complementary layouts as specified in chapter 5.2.4.2 , 48 graphic keys are required.

5.2.1.2 Harmonized 48 graphic key keyboard arrangement

On a harmonized keyboard there shall be 48 graphic keys and the space bar in the alphanumeric zone of the alphanumeric section. The 48 keys shall be arranged as follows:

- the space bar in row A, extending, as a minimum, from position A03 to A07;
- 10 keys in row B in positions B01 to B10, or, if there is no key in position E13, 11 keys in positions B00 to B10;
- 12 keys in row C in positions C01 to C12;
- 12 keys in row D in positions D01 to D12;
- 13 keys in row E in positions E00 to E12, or, if there is no key in position B00, 14 keys in positions E00 to E13.

5.2.1.3 Allocation of graphic characters

The allocation of graphic characters is determined by either a national standard or by national usage.

When the characters of the Latin alphabet are allocated to the keys of the alphanumeric zone, the following requirements apply:

- a) the 83 invariant graphic characters of ISO 646 shall be accommodated. These characters are:
 - the 26 small letters a to z of the Latin alphabet;
 - the 26 capital letters A to Z of the Latin alphabet;
 - the ten digits zero to nine, see "b)" below;
 - exclamation mark; quotation mark; percent sign; ampersand; apostrophe; asterisk; left parenthesis; right parenthesis; plus sign; comma; hyphen, minus sign; full stop; solidus; colon; semicolon; less-than sign; equals sign; greater-than sign; question mark; low line;
 - the character space, see "c)" below;
- b) the digits zero to nine shall be allocated to the keys in row E;
- c) the character space shall be allocated to the space bar in row A.

5.2.2 Arrangement and location of keys in the function zone of the alphanumeric section

The function keys shall be arranged in the function zone of the alphanumeric section.

5.2.2.1 Level 2 select

Two keys for the function level 2 select shall be provided in row B, one at each end of the row of graphic keys. All or part of the left-hand level 2 select key shall be in position B99. The right-hand level 2 select key shall be adjacent to the right-hand end of the row of graphic keys.

5.2.2.2 Capitals lock/Level 2 lock/Generalized lock

One key for the lock function shall be provided in row C, adjacent to the left-hand end of the row of graphic keys. All or part of this key shall be in position C00.

5.2.2.3 Level 3 select

For keyboards with characters allocated at level 3, at least one key for the function Level 3 select shall be provided in row A, adjacent to the right of the space bar.

5.2.2.4 Tabulation

One key for the function tabulation shall be provided in row D, adjacent to the left-hand end of the row of graphic keys. All or part of this key shall be in position D00.

5.2.2.5 Return

One key for the function return shall be provided. All or part of this key shall be in row C, adjacent to the right-hand end of the row of graphic keys. It is recommended that this key occupies row C and row D.

5.2.2.6 Backspace/Backward erase

One key for the function backspace/backward erase shall be provided in row E, adjacent to the right-hand end of the row of graphic keys.

5.2.2.7 Alternate (Alt)

If one key for the function alternate is provided it shall be allocated in row A, adjacent to the left of the space bar.

5.2.2.8 Control (Ctrl; Strg)

If one key for the function control is provided it shall be allocated in row A, left of the space bar and the key for the function alternate.

5.2.2.9 Function (Fn)

If one key for the function function (Fn) is provided it shall be allocated in row A, left of the space bar and the key for the function alternate.

5.2.2.10 Group select

For keyboards with characters allocated in more than one group, a Group select function shall be allocated to a key or a combination of keys in the alphanumeric section, outside of the alphanumeric zone (ZA0).

Specifically, for the harmonized 48 graphic key keyboard arrangement, when characters are allocated in more than one group, the Group select function shall be activated by holding a Level 3 select key depressed while depressing a Level 2 select key or vice-versa.

Optionally, if one key can be dedicated to the Group select function, in this case it is recommended to be placed adjacent to a Level 3 select key.

For the input of graphic character repertoire of collection 281 (titled MES-1) as specified in amendment 1 to ISO/IEC 10646:1-2000. Specifically for group 2, the activation of group 2 with the Group select function is recommended to be latching for the next character entered and for this character only. In other words, activation of group 2 changes the logical state of the keyboard so that all keys involved in this activation can be released, and still, the next key typed will be selecting a character in group 2. After typing such a character in this mode, the keyboard then reverts back automatically to the group active before group 2 was activated.

NOTE It is recommended, when a group which defines a complete script (e.g. Katakana, Hiragana, Cyrillic, Greek, Arabic, Hebrew) is selected, that the group be locked in this position until another group select or a de-selection is done (e.g., after Katakana is selected, returning to Group 1 is typically done by deselecting

Katakana). The exact way to activate the group selection with a Group Select function is not standardized at this point. It is recommended that at the minimum any Group locking, except for group 1 and group 2, be visually indicated by an appropriate means (e.g. lamp, LCD or screen indication). Ideally the actual group in use should at any time be identified to the user.

5.2.3 Mapping of numeric section in the alphanumeric section

If the alphanumeric section is expanded by a reproduction of the numeric section (e.g. if no numeric section exists), the digits shall be allocated as shown in table 1 and the functions shall be allocated as shown in table 2.

Table 1 — Numeric zone

Key	Digit
B07	digit zero
B09	decimal separator
C07	digit one
C08	digit two
C09	digit three
D07	digit four
D08	digit five
D09	digit six
E07	digit seven
E08	digit eight
E09	digit nine

Table 2 — Function zone

Key	Function
B10	addition
C10	subtraction
D10	multiplication
E10	division

5.2.4 Keyboard layout

The layout of a keyboard shall conform to one of the following layouts:

- a national keyboard standard (see 5.2.4.1);
- a national keyboard layout established by common usage in a particular country;
- the complementary Latin group layout as defined in clause 5.2.4.2.

5.2.4.1 National keyboard layouts

The following currently valid national keyboard layout standards have been identified:

- France: to be added
- Germany: DIN 2137
- Sweden: SS 66 22 41

UK: BS 4822
USA: ANSI INCITS 154
To be continued..

((more examples to be added by SC35/WG1))

5.2.4.2 Complementary Latin group layout

The complementary Latin group layout specified in this chapter requires a keyboard with 48 graphic keys. This complementary layout is provided for those cases where no national keyboard layout standard or common national usage keyboard layout is available. It may also be used in those cases when the primary layout is based on a non-Latin script.

The allocation of the characters of the complementary Latin group shall be as defined in Table 3.

It is not mandatory to show the graphic symbols of all graphic characters on keytops. Duplicates of complementary Latin group layout characters already shown on the keyboard should not be shown in the common secondary group layout (group 2).

The names of the graphic characters shown in the table are those used for the equivalent coded graphic characters in other ISO/IEC Standards, for example in the most recent version of ISO/IEC 10646-1. The convention there is to use capital letters for the names to indicate that they are coded graphic characters. As this part of this International Standard does not specify coding, the convention of using only capital letters was not retained here. Otherwise the names of the graphic characters are identical with those in the relevant ISO/IEC coding standards.

The names chosen to denote the graphic characters are intended to reflect their customary meaning. However, this part of this International Standard does not define and does not restrict the meanings of graphic characters. Nor does it specify a particular style or font design for imaging the graphic characters.

5.2.4.2.1 Operation of keys with diacritical marks

Diacritical marks are the following:

Acute Accent; Breve; Caron; Cedilla; Circumflex Accent; Diaeresis; Double Acute Accent; Grave Accent; Macron; Ogonek; Ring Above; Tilde.

Diacritical marks appear above or below certain letters, and all of them are non-spacing characters. Actuating a key with a diacritical mark, followed by actuating a key with a letter, shall indicate that the graphical symbols of the two characters are intended to be combined. Actuating a key with a diacritical mark, followed by actuating the space bar, shall indicate that the diacritical mark is intended to appear as a graphic character of its own (i.e. free-standing).

Table 3 — Allocation of the graphic characters of the complementary Latin group

Key	Level 1	Level 2
E00	Asterisk	Plus Sign
E01	Digit One	Exclamation Mark
E02	Digit Two	Quotation Mark
E03	Digit Three	Pound Sign
E04	Digit Four	Dollar Sign
E05	Digit Five	Percent Sign
E06	Digit Six	Ampersand
E07	Digit Seven	Apostrophe
E08	Digit Eight	Left Parenthesis
E09	Digit Nine	Right Parenthesis
E10	Digit Zero	Equals Sign
E11	Solidus	Question Mark
E12	Cedilla	Ogonek
D01	Latin Small Letter q	Latin Capital Letter Q
D02	Latin Small Letter w	Latin Capital Letter W
D03	Latin Small Letter e	Latin Capital Letter E
D04	Latin Small Letter r	Latin Capital Letter R
D05	Latin Small Letter t	Latin Capital Letter T
D06	Latin Small Letter y	Latin Capital Letter Y
D07	Latin Small Letter u	Latin Capital Letter U
D08	Latin Small Letter i	Latin Capital Letter I
D09	Latin Small Letter o	Latin Capital Letter O
D10	Latin Small Letter p	Latin Capital Letter P
D11	Diaeresis	Ring Above
D12	Tilde	Macron
C01	Latin Small Letter a	Latin Capital Letter A
C02	Latin Small Letter s	Latin Capital Letter S
C03	Latin Small Letter d	Latin Capital Letter D
C04	Latin Small Letter f	Latin Capital Letter F
C05	Latin Small Letter g	Latin Capital Letter G
C06	Latin Small Letter h	Latin Capital Letter H
C07	Latin Small Letter j	Latin Capital Letter J
C08	Latin Small Letter k	Latin Capital Letter K
C09	Latin Small Letter l	Latin Capital Letter L
C10	Acute Accent	Double Acute Accent
C11	Circumflex Accent	Caron
C12	Grave Accent	Breve
B00	Smaller-Than Sign	Greater-Than Sign
B01	Latin Small Letter z	Latin Capital Letter Z
B02	Latin Small Letter x	Latin Capital Letter X
B03	Latin Small Letter c	Latin Capital Letter C
B04	Latin Small Letter v	Latin Capital Letter V
B05	Latin Small Letter b	Latin Capital Letter B
B06	Latin Small Letter n	Latin Capital Letter N
B07	Latin Small Letter m	Latin Capital Letter M
B08	Comma	Semicolon
B09	Period	Colon
B10	Hyphen	Low Line

NOTE If there is no graphic key provided in position B00, then the graphic characters of key B00 shall be allocated to a graphic key in position E13.

It is recommended that the method used for the deletion of a character should also be used to cancel a partially-constructed character, such as a diacritical mark without a following letter or a following Space character.

5.2.4.3 Common secondary group layout

The common secondary group layout specified in this chapter requires a keyboard with 48 graphic keys. This layout requires the provision of a second group. The graphic characters of group 1 and the layout of these on the keyboard are defined by the relevant national keyboard layout standard or established by common usage. The graphic characters of the common secondary group (group 2) are those of the repertoire specified in collection 281 (titled MES-1) as specified in amendment 1 to ISO/IEC 10646-1:2000 that are not found as group 1 characters in all national keyboard layouts nor in layouts established by common usage in a particular country. This leads to a certain duplication of graphic characters between the group 1 layouts and the layout of the common secondary group (group 2). However, it allows the graphic characters of the common secondary group and their allocation to keys to be always the same for their use with any established Latin group layout.

The allocation of the characters of the common secondary group (group 2) shall be as defined in Table 4.

NOTE The repertoire of MES-1 (collection 281) of ISO/IEC 10646-1 is identical to the union of the character repertoire of ISO/IEC 6937:1994 with the character EURO SIGN (which has not yet been encoded in any version of ISO/IEC 6937 and at time of publication of this International standard there was no plan to update ISO/IEC 6937 to that effect). ISO/IEC 6937 was historically the prime reference for the repertoire used by ISO/IEC 9995-3 before it was amended to allocate a keyboard position to the euro sign. The reference to ISO/IEC 6937 having been deprecated for this International standard, it has not been included in the current list of normative references. This does not preclude to implement the repertoire of ISO/IEC 6937 as a subset but this is now outside the scope of this International standard. Implementations of subsets of MES-1 are allowed if they are declared specifically as mentioned in the conformance clause.

Table 4 — Allocation of the graphic characters of the common secondary group (group 2)

Key	Level 1	Level 2	Level 3
E00	Not Sign	Soft Hyphen	
E01	Superscript One	Inverted Exclamation Mark	
E02	Superscript Two	Vulgar Fraction One-Eighth	
E03	Superscript Three	Pound Sign or Number Sign	
E04	Vulgar Fraction One-Quarter	Euro sign	Dollar Sign or Currency Sign
E05	Vulgar Fraction One-Half	Vulgar Fraction Three-Eighths	
E06	Vulgar Fraction Three-Quarters	Vulgar Fraction Five-Eighths	
E07	Left Curly Bracket	Vulgar Fraction Seven-Eighths	
E08	Left Square Bracket	Trade Mark Sign	
E09	Right Square Bracket	Plus-Minus Sign	
E10	Right Curly Bracket	Degree Sign	
E11	Reverse Solidus	Inverted Question Mark	
E12	Cedilla	Ogonek	
D01	Commercial At	Ohm Sign	
D02	Latin Small Letter l with Stroke	Latin Capital Letter L with Stroke	
D03	Latin Small Ligature oe	Latin Capital Ligature OE	
D04	Pilcrow Sign	Registered Sign	
D05	Latin Small Letter t with Stroke	Latin Capital Letter T with Stroke	
D06	Leftwards Arrow	Yen Sign	
D07	Downwards Arrow	Upwards Arrow	
D08	Rightwards Arrow	Latin Small Letter i without Dot	
D09	Latin Small Letter o with Stroke	Latin Capital Letter O with Stroke	
D10	Latin Small Letter Thorn	Latin Capital Letter Thorn	
D11	Diaeresis	Ring Above	
D12	Tilde	Macron	
C01	Latin Small Ligature ae	Latin Capital Ligature AE	
C02	Latin Small Letter Sharp s	Section Sign	
C03	Latin Small Letter Eth	Latin Capital Letter D with Stroke	
C04	Latin Small Letter d with Stroke	Feminine Ordinal Indicator	
C05	Latin Small Letter Eng	Latin Capital Letter Eng	
C06	Latin Small Letter h with Stroke	Latin Capital Letter H with Stroke	
C07	Latin Small Ligature ij	Latin Capital Ligature IJ	
C08	Latin Small Letter Kra	Ampersand	
C09	Latin Small Letter l with Middle Dot	Latin Capital Letter L with Middle Dot	
C10	Acute Accent	Double Acute Accent	
C11	Circumflex Accent	Caron	
C12	Grave Accent	Breve	
B00	Vertical Line	Broken Bar	
B01	Left-Pointing Double Angle Quotation Mark	Less-Than Sign	
B02	Right-Pointing Double Angle Quotation Mark	Greater-Than Sign	
B03	Cent Sign	Copyright Sign	
B04	Left Double Quotation Mark	Left Single Quotation Mark	
B05	Right Double Quotation Mark	Right Single Quotation Mark	
B06	Latin Small Letter n preceded by Apostrophe	Music Note	
B07	Micro Sign	Masculine Ordinal Indicator	
B08	Horizontal Bar	Multiplication Sign	
B09	Middle Dot	Division Sign	
B10	Dot Below	Dot Above	

NOTE If there is no graphic key provided in position B00, then the graphic characters of key B00 shall be allocated to a graphic key in position E13.

It is not mandatory to show the graphic symbols of all graphic characters on keytops. Duplicates of primary group 1 graphic characters should not be shown in group 2. Where small and capital forms of a letter exist, only the capital form need be shown.

The names of the graphic characters shown in the table are those used for the equivalent coded graphic characters in other ISO/IEC Standards, for example in the most recent version of ISO/IEC 10646-1. The convention there is to use capital letters for the names to indicate that they are coded graphic characters. As this part of this International Standard does not specify coding, the convention of using only capital letters was not retained here. Otherwise the names of the graphic characters are identical with those in the relevant ISO/IEC coding standards.

The names chosen to denote the graphic characters are intended to reflect their customary meaning. However, this part of this International Standard does not define and does not restrict the meanings of graphic characters. Nor does it specify a particular style or font design for imaging the graphic characters.

5.2.4.3.1 Operation of keys with diacritical marks

Diacritical marks are the following:

Acute Accent; Breve; Caron; Cedilla; Circumflex Accent; Diaeresis; Dot Above; Double Acute Accent; Grave Accent; Macron; Ogonek; Ring Above; Tilde.

Diacritical marks appear above or below certain letters, and all of them are non-spacing characters. Actuating a key with a diacritical mark, followed by actuating a key with a letter, shall indicate that the graphical symbols of the two characters are intended to be combined. Actuating a key with a diacritical mark, followed by actuating the space bar, shall indicate that the diacritical mark is intended to appear as a graphic character of its own (i.e. free-standing).

It is recommended that the method used for the deletion of a character should also be used to cancel a partially-constructed character, such as a diacritical mark without a following letter or a following Space character.

5.3 Numeric section (Koldehoff)

This chapter contains requirements concerning the arrangement of keys in the numeric section.

5.3.1 Arrangement and location of keys in the numeric zone of the numeric section

This chapter contains requirements concerning the arrangement of digits, decimal separator and telematic functions.

5.3.1.1 Character arrangement

The keys shall be arranged in the numeric zone and be located as illustrated in Figure 7

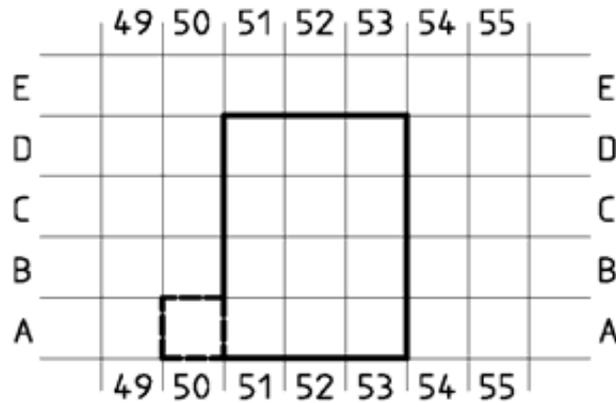


Figure 7 — Arrangement of characters in the numeric zone

The characters to be allocated to the keys of the numeric zone are the digits zero to nine.

The ten digits zero to nine shall be allocated to ten keys of the numeric zone in one of two ways: The “1-2-3” layout or the “7-8-9” layout.

Table 5 — Digits located in the numeric zone

Key	“7-8-9” layout	“1-2-3” layout
A 52	digit zero	digit zero
B 51	digit one	digit seven
B 52	digit two	digit eight
B 53	digit three	digit nine
C 51	digit four	digit four
C 52	digit five	digit five
C 53	digit six	digit six
D 51	digit seven	digit one
D 52	digit eight	digit two
D 53	digit nine	digit three

No office function is allocated to the key in position A51. Recommended functions are:

- space character, for possible use as triad separator;
- single zero, increasing the area from which the digit zero can be entered;
- double zero.

No function is allocated to the key in position A50. Recommended functions are:

- single zero, increasing the area from which the digit zero can be entered;
- double zero;
- triple zero, in addition to a single zero or in connection with the double zero on the key in position A51.

5.3.1.2 Decimal separator and telematic functions

The decimal separator shall be allocated to the key in position A 53.

The telematic functions initiator and terminator allocated to the keys in positions A51 and A53 are determined in the relevant ITU-T Recommendations and the actual shape of the symbols is specified in CCITT recommendation E.161.

The telematic functions initiator and terminator allocated to the keys in positions A51 and A53 are determined in the relevant ITU-T recommendations and the actual shape of the symbols is specified in CCITT Recommendation E.161.

NOTE The decimal separator key allocated in position A53 is a function key and this key is intended in no way to be an alphanumeric key. Its function is, during input, to indicate that the integer part of a number being entered has ended and that any further series of digits entered immediately after it shall be for the decimal part of the number, without any dependency on the presentation of the decimal separator. It is recommended that the labeling of this function use the function symbol 62 as defined in ISO/IEC 9995-7, or, in countries where no ambiguity exists, any other unique national symbol used to indicate this function (such as comma or full stop).

5.3.2 Arrangement and location of keys in the numeric zone of the numeric section

If the functions allocated to the keys of the function zone of the numeric section are "enter, the four arithmetic operators and the Numeric lock", the functions shall be allocated as shown in Table 6 and figure 8

Table 6 — Functions located in the function zone

Key	Function	Conventional symbol
A-B54	enter	
C-D54	addition	+
E 54	subtraction	-
E 53	multiplication	x
E 52	division	÷
E 51	Numeric lock	

If the functions allocated to the keys of the function zone of the numeric section are "the four arithmetic operators, equals and enter/addition", the functions shall be allocated as shown in Table 7 and figure 8

Table 7 — Functions located in the function zone

Key	Function	Conventional symbol
A-B54	addition or enter	Country or language dependent
C-D54	equals	=
E 54	division	÷
E 53	multiplication	x
E 52	subtraction	-
E 51	addition	+

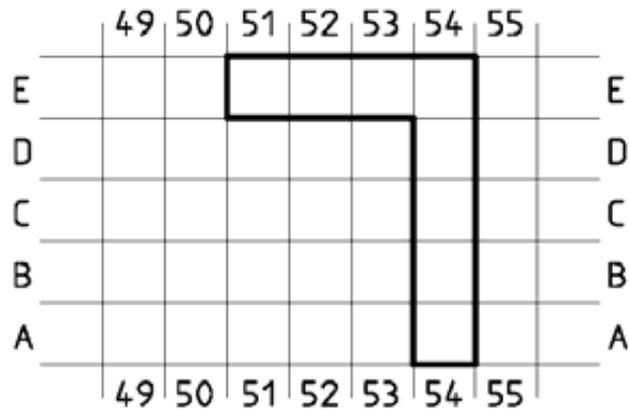


Figure 8 — Location of functions in the function zone

If other functions are allocated to the numeric section the allocation may differ from table 6 or 7.

5.3.3 Allocation of letters to the keys of a numeric zone

The 26 letters of the Latin alphabet are associated with the digits as shown in table 8 and are allocated to the keys as shown in that table. The association of a letter with a digit is made only as a mnemonic aid to the user of the keyboard. No numerical value is given to the letter.

When a key is actuated, the signal sent to the associated system shall be the same as the signal which is sent for the digit which is allocated to the key.

Table 8 — Allocation of letters to the keys and association of the letters to the digits

Key	Letters	Office and telematic function
A52		Digit zero
D51		Digit one
D52	ABC	Digit two
D53	DEF	Digit three
C51	GHI	Digit four
C52	JKL	Digit five
C53	MNO	Digit six
B51	PQRS	Digit seven
B52	TUV	Digit eight
B53	WXYZ	Digit nine

5.4 Editing/Function section (9995-5; -6) (Schreml)

This subclause introduces the concept of the editing cursor keys.

5.4.1 Arrangement and location of editing cursor keys (9995-5)

The four basic cursor control functions are: Cursor up, Cursor down, Cursor left, Cursor right.

The cursor keys shall be arranged in one of two ways: The “cross” arrangement (see 5.4.1.1) or the “inverted T” arrangement (see 5.4.1.2). This document does not indicate a preference for a particular arrangement.

5.4.1.1 “Cross” arrangement

The “cross” arrangement is shown in figure 9 as located in rows A, B and C. It may alternatively be located in rows B, C and D or in rows Z, A and B, or partially in between this rows.

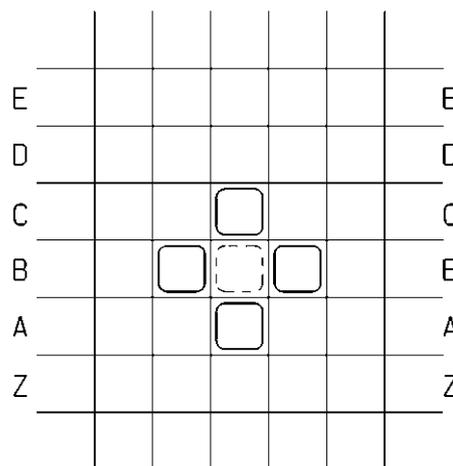


Figure 9 — “Cross” arrangement

5.4.1.2 “Inverted T” arrangement

The “inverted T” arrangement is shown in figure 10 as located in rows A and B. It may alternatively be located in rows B and C or in rows C and D or in rows Z and A, or partially in between this rows.

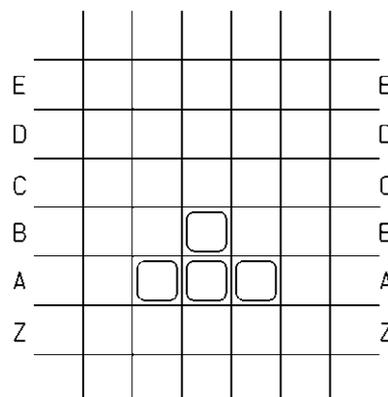


Figure 10 — “Inverted T” arrangement

5.4.2 Arrangement and location of additional editing keys (ISO/IEC 9995-5)

Location arrangements for additional editing keys are not specified in this document. The arrangement of keys with editing functions must be expedient. Examples for editing functions are: Delete, Insert, Next Page, Previous Page.

Possible arrangements are shown in figure 11 and figure 12.

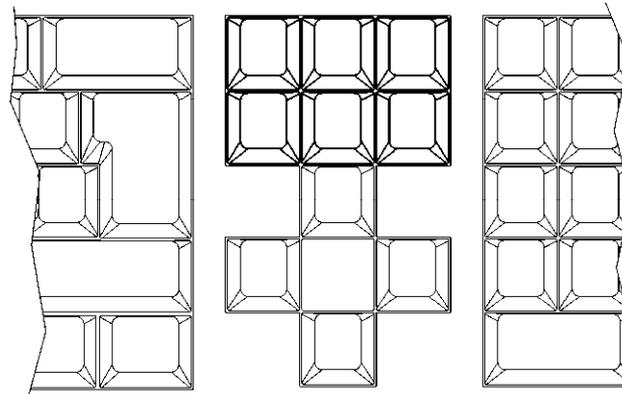


Figure 11 — Example 1: Arrangement and location of additional editing keys

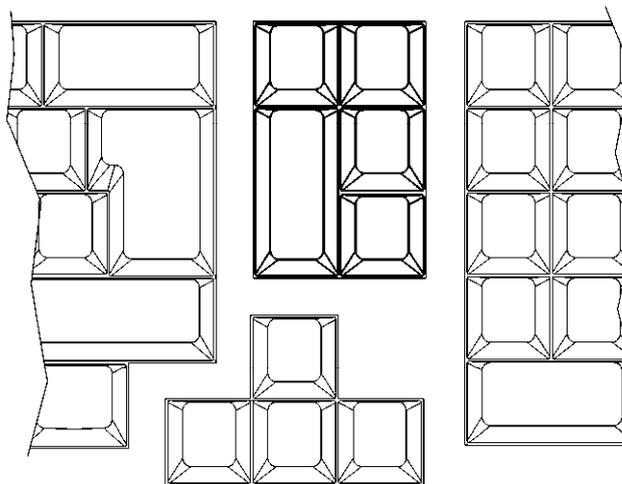


Figure 12 — Example 2: Arrangement and location of additional editing keys

5.4.3 Arrangement and location of function keys (9995-6)

If the control function Escape is provided, it shall be located in row K or above and in column 00 or left. This key shall be distinct from the other keys to prevent inadvertent actuation. Location of other function keys are not specified in this standard.

5.5 Arrangement and location of additional function keys (internet, audio/video, etc.) (to be done)

6 Conformance (to be done)