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

1   Use of figures and letters in telephone numbers

1.1   For the automatic international service, it is preferable that the national numbering plan should not involve the use of letters (associated with figures). The use of letters in national number plans may, however, be necessary for national reasons. For example, countries using letters in their subscriber numbers will naturally use them in their national numbering.

1.2   For the automatic international service to countries using letters in telephone numbers, it would be helpful, in a country where letters are not used:

a) to include in the directory a table for converting into figures the letter codes of exhanges in countries with which an automatic service is available;

b) to supply, at the time of opening this automatic service, a booklet of instructions containing the conversion table to the main subscribers to the international service.

1.3   It would also be desirable, in countries with letters in the telephone numbers, that subscribers with considerable international traffic should be asked to show on their letterheads, below their national telephone number, the international number with figures only. (See Recommendation E.123.)

2   Rotary dials (see Figure 1/E.161)

2.1   For countries which have not yet adopted any specific type of dial, the figures on the dial should be arranged in the following order: 1, 2, 3, . . ., 0.

2.2   The dial shown in Figure 1/E.161 uses the arrangement of letters and figures employed by some European Administrations. It may be convenient that the dials or pushbotton sets used by international operators for semiautomatic operating in Europe have this arrangement of letters and figures.

Note - On the North American dials and keysets, the digit 0 is not associated with letters O and Q but with the word *operator*, the letter O being associated with digit 6.

Figure 1/E.161

3   Pushbuttons or keys

3.1   *10 pushbuttons*

3.1.1   *Arrangement and numbering*

The standard arrangement and numbering for pushbuttons corresponding to the digits 1 to 0 is as shown below:

Extensive research has shown that this arrangement leads to shorter entry times and lower error rates than other arrangements[1].

Where a need exists within an Administration for a 2 5 array or a 5 2 array for use on special telephone apparatus, the arrays should be as shown below:

Note - User dialling performance on these special arrays is slightly inferior to that on the standard array given above.

In view of the fact that purely numerical numbering plans are now recommended and that the association of letters to digits is not the same in different countries[2], it is not desirable to standardize letter symbols for the pushbuttons corresponding to each of the digits. In cases where a mixed letter-and-digit dialling system is still in use in a country, the letters associated with the figures in the dialling system of the country concerned may, of course, be included on the corresponding pushbuttons of this country's telephone sets (see Figure 2/E.161).

Figure 2/E.161

The preferred and recommended arrangement for the keys of a separate numeric keypad on a multi-functional terminal used both for the entry of telephone number information and data is the standard arrangement shown at the beginning of this section.

Exceptionally, for devices intended to be used principally for data entry but which may sometimes be used to enter telephone number information, the arrangment whereby the first and the third row of the standard CCITT arrangement are interchanged may be used.

Also exceptionally, telephone number information may be input from the row of numeric keys,

1 2 3 4 5 6 7 8 9 0

of an alpha-numeric keyboard.

3.1.2   *Symbols*

The symbols for these buttons are the digits 1 to 0 as indicated in the arrangements of § 3.1.1 above. These buttons are to be known as button 1, button 2, etc.

3.2   *12 pushbuttons*

3.2.1   *Arrangement*

For 12 pushbuttons the standard arrangement shown in § 3.1.1 above is extended by two additional buttons, one to the left and the other to the right of the button 0, thus making a pattern of four horizontal rows of three buttons each forming a 4 3 array.

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1 An annotated list of literature references is available in the article cited in [1].

2 Thus, for example, on the North American dials and keysets, the digit 0 is not associated with letter O and Q but with the word *operator,* the letter O being associated with the digit 6.

Two buttons may also be added to the 5 2 array shown in § 3.1.1 above. These should be located below and in line with buttons 9 and 0, thus making a 6 2 array.

3.2.2   *Symbols*

On the 4 3 array, the symbol on the button which is immediately to the left of the button 0 (on the 6 2 array, the corresponding button is located below 9, and on the 2 6 array to the right of button 5) and which, according to Recommendation Q.23, is used to transmit the frequency pair 941 Hz, should have a shape easily identified as the general shape shown in Figure 3/E.161.

Figure 3/E.161

The symbol will be known as the *star* or the equivalent term in other languages.

On the 4 3 array, the symbol on the button which is immediately to the right of the button 0 (in the 6 2 array, the corresponding button is located below the button 0) and which, according to Recommendation Q.23, is used to transmit the frequency pair 941 Hz and 1477 Hz, should conform in shape to the specifications given in Figures 4/E.161 or 5/E.161. This symbol shall consist of four lines of equal length (b), forming two pairs of parallel lines. One pair is horizontal while the other is vertical or inclined to the right at an angle of 80 ° as shown in Figure 5/E.161. It will be seen that two pairs of parallel lines overlap. The ratio a/b, where a is the overlap, shall be between 0.08 and 0.18.

Figure 4-5/E.161

The preferred values are:

- in Europe[1]

    a = 90 ° with a/b = 0.08

- in North America[2]

    a = 80 ° with a/b close to the upper limit of 0.18.

The symbol will be known as the *square* or the most commonly used equivalent term in other languages[2].

The additional buttons with these symbols will be placed as shown below:

Standard 4 3 array

1   2   3

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[1] No information is available at the present time as to which of these values would be preferred in other continents.

[2] In some countries an alternative term (e.g., "number sign") may be necessary for this purpose, unless further investigation indicates that "square" is suitable for the customer.

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         4    5    6

         7    8    9

         *    0    #
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      6 2 array
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         1    2

         3    4

         5    6

         7    8

         9    0

         *    #
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3.3   *Dual mode and engraving*

Dual mode and engraving of the buttons * and # are acceptable on telephones and on multi-functional terminals.

3.4   *Design of symbols*

Symbol size and the line thickness should be appropriate to provide optimal recognition.

3.5   *Use of colours*

The question of standardization of pushbutton and symbol colour for international purposes is still not settled. In the meantime, colours different from the digit buttons and symbols should not be used.

3.6   *Position of figures, letters and symbols on push-button sets*

In all push-button dials, the figures, letters and symbols should be unambiguously associated with the corresponding buttons, preferably, if adequate space is available, by being on the faces of the buttons themselves.

4   Additional pushbuttons for use on telephones

4.1   *General*

For purposes other than dialling, additional pushbuttons may be required on a telephone. For example, a telephone may have a pushbutton to recall during an active call, control logic (e.g., a register) or an operator, or to effect the transfer of an active call to another station. To prevent subscriber confusion it may be desirable that the symbols used on those pushbuttons which have identical functions be standardized.

4.2   *Specific recommendations*

4.2.1   *Register recall pushbutton*

For the recall of a register during an active call the following methods are possible:

– a switchhook flash,

– a depression of one of the pushbuttons of the normal 10 or 12 button array,

– a depression of another pushbutton specially provided for this purpose - the register recall pushbutton.

From the human factors viewpoint the depression of a pushbutton for register recall seems to be preferable to the use of a switchhook flash.

If a special register recall pushbutton is used, this pushbutton should be designated with the symbol R (capital) on or next to the pushbutton. The pushbutton should be clearly distinguishable and spatially separated from the standard 12-pushbutton array.

This symbol is recommended because:

a)   it symbolizes the term "Recall" in a number of languages;

b)   studies have shown that it is subject to minimal auditory and visual confusion;

c)   it avoids the difficulties inherent in specific technical terms for any lay subscribers.

The exact position, shape and colour of the button should not be standardized at the present time. Such standardization would inhibit design innovation and be unnecessarily restrictive.

Note - Description of a 16-pushbutton layout has been deleted from this Recommendation owing to lack of use of this arrangement. Reference to 16 pushbutton sets can be found in the CCITT *Red Book*, Fascicle II.2, Recommendation E.161, § 3.3 and Annex A.

Reference

[1]   *The layout of digits on push-button telephones* - a review of the literature. TELENo. 1, 1982 (copies available at the Library of the Swedish Telecommunication Headquarters, S-12386 FARSTA).