METHOD AND APPARATUS FOR INPUTTING CHINESE CHARACTERS IN A TELEPHONE SET, AND TELEPHONE SET WITH A CHINESE CHARACTER INPUT FUNCTION

BACKGROUND OF THE INVENTION

(Field of the Invention)

The invention relates to a method and apparatus for inputting Chinese characters in a telephone set and to a telephone set with a Chinese character input function, whereby the conventional keys of a telephone set are utilized to input Chinese characters for the telephone set.

(Description of the Prior Art)

In view of progress made in the communications technology, telephones have become an indispensable tool in our modern life. The keyboards which are commonly used in telephone sets usually include twelve keys, e.g., 0, 1, 2, ··· and 9, * and #, for inputting the telephone number of a called party so as to establish communication via the telephone network. Recently, progresses in the field of electronics and displays have made it possible to combine a liquid crystal display and a telephone set, thereby enabling the user to check the accuracy of a telephone number that was inputted. In addition, telephone sets with a database function have been realized since telephone sets can now accommodate a larger memory device, such as random access memories or read only memories. For example, by inputting a telephone number, one can search for the associated name and address, or by inputting a name, one can search for the associated telephone number. Thus, how the twelve keys of the telephone set can be utilized to input characters has become an important topic.

The input of characters in a computer is currently accomplished primarily with the use of a keyboard. At present, many methods and apparatus for inputting characters with the use of a keyboard have been developed. Methods which resemble a telephone set input include the method of R.O.C. Patent Publication No. 73889, which is directed to the inputting of a Chinese character

through its Mandarin Chinese pronunciation using numeric keys, and the method of R.O.C. Patent Publication No. 73890, which is directed to the inputting of a Chinese character through its Mandarin Chinese pronunciation in the western system of romanization using numeric keys. In these two patent publications, Mandarin Chinese phonetic symbols, romanizations, and pronunciation tones are assigned to eight added keys, e.g., 1-8, on the right side of a keyboard for inputting Chinese characters, as illustrated in Fig. 14. Every pronunciation is given two codes. For example, the code 11 corresponds to the phonetic symbol "—" or the romanization symbol "I". The code 12 corresponds to the phonetic symbol "ㄅ" or the romanization symbol "b". In addition, R.O.C. Patent Publication No. 119811 discloses a stroke-based input method, where sixteen character roots are used to input Chinese characters. At present, the Chunghwa Telecom Co., Ltd. and Academic Sincica wish to modify the twelve-key stroke-based input method for application in the input of characters in future telephone sets.

A conventional method and apparatus for inputting characters in a telephone set has been disclosed in Japanese Laid-Open Patent Publication No.(Hei) 4-31615. The system block diagram of an embodiment thereof is shown in Fig. 10. As illustrated in Fig. 10, 34 denotes a keyboard portion which includes numeric keys ("0" to "9" keys) and related function keys; 36 denotes a display portion for displaying characters; 38 denotes a timer; 40 denotes a mode display portion of a mobile telephone set; 32 denotes a control portion for controlling the signals of the different portions in the telephone set; 42 denotes a selector portion for selecting between Japanese phonetic and alphanumeric characters; 44 denotes a display memory for display use; 46 denotes a keyboard signal-to-Japanese phonetic converting index portion for converting input keyboard signals into Japanese phonetic symbols; 48 denotes a keyboard signal-to-alphanumeric character converting index portion for converting input keyboard signals into alphanumeric characters; 50 denotes a character converting portion for converting Japanese

phonetic symbols into Japanese characters; and 52 denotes a deciding portion for similarly pronounced Japanese characters to decide among object characters having the same pronunciation.

The operation of the character input method of the aforementioned telephone set can be classified into two types:

In the first type, the ten Japanese consonants (--, K, S, T, N, H, M, Y, R, W) are separately assigned to ten keys, e.g., "0" to "9" keys, as best illustrated in Fig. 12. According to the number of times a key is pressed, one of the five Japanese vowels (a, i, u, e, o) is selected to result in the Japanese phonetic symbol that is desired by the user. As for the voiced and semi-voiced sounds of the Japanese language, they are inputted by using the "*" and "#" keys. For example, when it is desired to input "鈴木" (スズキ or su-zu-ki), 3333 is inputted to obtain "ス", 3333# is inputted to obtain "ズ", and 222 is inputted to obtain "キ". The function keys are then used to perform the required conversion to kanji characters.

The second type uses a double-throw key (C/V). After the left side of the key is pressed repeatedly for a number of times to select the required consonant, the right side of the key is then pressed repeatedly to select the required vowel, thereby resulting in an input Japanese phonetic symbol.

The process flowchart of the aforementioned telephone set is shown in Fig. 11. In step s1101, upon inputting a keyboard signal using the keyboard of the telephone set, step s1105 is then performed to determine if the telephone set is operated in the Japanese phonetic symbol input mode. If no, a normal telephone dialing operation is performed. If yes, step s1110 is performed where "ア" of the Japanese phonetic symbol array is set as the starting position, as shown in Fig. 12. Thereafter, in step s1115, it is determined if the input signal is a signal for Japanese phonetic symbol input. If no, the flow returns to step s1101. If yes, step s1120 is performed to determine if the signal is a column signal. If the signal is a column signal, the flow returns to step s1115 after performing step s1122, where there is a

one-column movement to the right of the Japanese phonetic symbol array. If the signal is not a column signal, step s1125 is performed to determine if the signal is a row signal. If the signal is a row signal, the flow returns to step s1115 after performing step s1127, where there is a one-row movement downwardly of the Japanese phonetic symbol array. If the signal is not a row signal, step s1130 is performed to determine if the signal is a Japanese phonetic symbol decision signal such as that which is generated by operating a memory key. If yes, the flow returns to step s1110 after performing step s1132, where the Japanese phonetic symbol is converted into a kanji character. If no, step s1135 is performed to determine if the input signal is a phrase decision signal. If the signal is not a phrase decision signal, the flow returns to step s1115. If the signal is a phrase decision signal, the character input mode is ended after performing step s1140, where a decision among object characters having the same pronunciation is made. Thus, using "スズキ" as an example, the input sequence for "ス" is left-left-right-right-memory key, the input sequence for "ズ" is left-left-right-right-#-memory key, and the input sequence for "キ" is left-right-memory key.

The drawbacks associated with the aforementioned prior art are as follows:

1. The Chinese character input method that employs added keys only utilize the ten numerical keys, and fail to involve twelve keys. The user would have to undergo special training if there is no scheme that can be followed in the assignment of the Mandarin Chinese phonetic symbols to the keys. Moreover, since the keys of the keyboard of the telephone set are relatively small, all of the Mandarin Chinese phonetic symbols that are assigned to the same key cannot be printed thereon, thereby resulting in inconvenience to the user.

2. The stroke-based input method uses a combination of character roots. As such, there is a need to further reduce the sixteen character roots to twelve, thereby resulting in increased difficulty in learning and using the input method. In addition,

the currently available Chinese character databases permit searching with the use of Mandarin Chinese phonetic symbols as index. An additional processing apparatus for converting from Chinese characters to Mandarin Chinese phonetic symbols is needed if the input is in the form of character roots, thereby increasing the cost of the telephone set.

3. Only English or Japanese inputs are available, and no commercially available Chinese character input method can be found among current character input methods for telephone sets.

4. The twenty-one consonants, three in-between sounds, thirteen vowels and five pronunciation tones of the Chinese language cannot be implemented in the conventional keyboard device such as that used for Japanese.

5. Function keys, such as the aforementioned memory key, are needed to perform the conversion to Chinese characters. As such, additional burden results since the user has to execute a break between phrases. In addition, an error in the Chinese character conversion can occur if the position of the break between phrases is inaccurate.

6. The need for executing function keys other than the twelve keys makes their application not suitable for conventional telephone sets having only twelve keys.

SUMMARY OF THE INVENTION

Therefore, the object of the present invention is to provide a method and apparatus for inputting Chinese characters in a telephone set and to a telephone set with a Chinese character input function, whereby the problems that are commonly associated with the aforementioned prior art can be obviated.

According to one aspect of the present invention, a method of inputting Chinese characters in a telephone set which includes a memory portion, a keyboard portion and a display portion, comprises the steps of:

(a) storing, in the memory portion, a key-to-phonetic table which correlates each keyboard signal of the keyboard portion and number of consecutive occurrences thereof with Mandarin Chinese phonetic symbols, and a dictionary which correlates

Mandarin Chinese phonetic symbols with Chinese characters;

(b) by referring to the key-to-phonetic table, converting input keyboard signals from the keyboard portion into corresponding Mandarin Chinese phonetic symbols;

(c) by referring to the dictionary, converting the corresponding Mandarin Chinese phonetic symbols into corresponding Chinese characters; and

(d) displaying the corresponding Chinese characters on the display portion.

According to another aspect of the present invention, an apparatus for inputting Chinese characters in a telephone set, which includes keyboard means for inputting keyboard signals and display means for displaying numbers or characters thereon, comprises:

key-to-phonetic table means for correlating each of the keyboard signals of the keyboard means and number of consecutive occurrences thereof with Mandarin Chinese phonetic symbols;

dictionary means for correlating Mandarin Chinese phonetic symbols with Chinese characters;

keyboard signal converting means for converting the keyboard signals inputted from the keyboard means into corresponding Mandarin Chinese phonetic symbols with reference to the key-to-phonetic table means;

phonetic-to-character converting means for converting the corresponding Mandarin Chinese phonetic symbols obtained from the keyboard signal converting means into corresponding Chinese characters with reference to the dictionary means; and

control means for controlling the display means to display the corresponding Chinese characters obtained from the phonetic-to-character converting means thereon.

Preferably, the apparatus further comprises database means for containing character search keys and numerical or character information corresponding thereto; and database processing means for searching the database means to find the numerical or character information corresponding to the Chinese

characters obtained from the phonetic-to-character converting means; the control means being adapted to control the display means to display the Chinese characters obtained from the phonetic-to-character converting means or the searched information obtained from the database processing means thereon.

According to a further aspect of the present invention, a telephone set with a Chinese character input function, includes memory means for storing data, keyboard means for inputting keyboard signals, and display means for displaying numbers or characters thereon. The telephone set further includes key-to-phonetic table means, stored in the memory means, for correlating each of the keyboard signals of the keyboard means and number of consecutive occurrences thereof with Mandarin Chinese phonetic symbols; dictionary means, stored in the memory means, for correlating Mandarin Chinese phonetic symbols with Chinese characters; keyboard signal converting means for converting the keyboard signals inputted from the keyboard means into corresponding Mandarin Chinese phonetic symbols with reference to the key-to-phonetic table means; phonetic-to-character converting means for converting the corresponding Mandarin Chinese phonetic symbols obtained from the keyboard signal converting means into corresponding Chinese characters with reference to the dictionary means; and control means for controlling the display means so as to display the corresponding Chinese characters obtained from the phonetic-to-character converting means thereon.

Preferably, the telephone set further includes database means, stored in the memory means, for containing character search keys and numerical or character information corresponding thereto; and database processing means for searching the database means to find the numerical or character information corresponding to the Chinese characters obtained from the phonetic-to-character converting means; the control means controlling the display means to display the Chinese characters obtained from the phonetic-to-character converting means or the searched information obtained from the database processing means thereon.

Based on the construction of the Chinese character input apparatus

of the telephone set of the present invention, when the user operates the keyboard means so as to input a keyboard signal, the control means controls the keyboard signal converting means to convert the keyboard signal into a Mandarin Chinese phonetic symbol or numerical signal with reference to the key-to-phonetic table means.

If the keyboard signal is a numerical signal, the number is shown on the telephone set, stored in a buffer region, and sent to a communications portion to commence dialing and establish communication. Processing is completed if the dialing operation is successful. If the dialing operation failed, the process reverts to the control means to wait for other numerical inputs.

If the keyboard signal is a signal for a Mandarin Chinese phonetic symbol, the input phonetic symbol is shown on the display means. If the input phonetic symbol is not a conversion signal (such as the fourth pronunciation tone or the space key), the phonetic symbol is stored in the buffer region, and the process returns to the control means, which waits for another input from the keyboard means. If the input phonetic symbol is a conversion signal, the Mandarin Chinese phonetic symbol string stored in the buffer region is sent to the phonetic-to-character converting means for converting the same into Chinese characters with reference to the dictionary means. The Chinese characters are stored in the buffer region and shown on the display means, and the process reverts to the control means which waits for further inputs from the keyboard means.

If the keyboard signal is a signal for searching the database means, the database processing means searches the database means, with the use of the character string retrieved from the buffer region as an indexing term, to find a telephone number, address and short note corresponding thereto. After showing the searched data on the display means and memorizing the same in the buffer region, the process returns to the control means which waits for another input signal from the keyboard means.

If the subsequent input signal is a dialing signal, the telephone

number is retrieved from the buffer region to permit execution of a dialing operation for establishing communication. If the input signal is a message transmit signal, the telephone number and short note are retrieved from the buffer region to permit execution of a dialing operation for transmission of the short message.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will become readily understood from the following description of preferred embodiments thereof made with reference to the accompanying drawings, in which like parts are designated by like reference numeral and in which:

Fig. 1 is a schematic block diagram of the preferred embodiment of the present invention;

Fig. 2 is a process flowchart of a control portion of the preferred embodiment of this invention;

Fig. 3 is a process flowchart of a phonetic-to-character converting portion of the preferred embodiment of this invention;

Fig. 4 is a schematic diagram of a dictionary of the preferred embodiment of this invention;

Fig. 5 is a process flowchart of a data processing portion of the preferred embodiment of this invention;

Fig. 6 is a schematic diagram of a database of the preferred embodiment of this invention;

Fig. 7 is a process flowchart of a keyboard signal converting portion of the preferred embodiment of this invention;

Fig. 8A is a schematic diagram of a key-to-Mandarin Chinese phonetic symbol table according to the preferred embodiment of this invention;

Fig. 8B is a schematic diagram of a key-to-western romanization table according to the preferred embodiment of this invention;

Fig. 9 is a schematic view of a mobile telephone set which embodies the present invention;

Fig. 10 is a system block diagram of an embodiment disclosed in the aforementioned Japanese Laid-Open Patent Publication No.(Hei) 4-31615;

Fig. 11 is a process flowchart of the embodiment shown in Fig. 10;

Fig. 12 illustrates a conversion table for converting keyboard signals to the fifty Japanese phonetic symbols in accordance with the embodiment shown in Fig. 10;

Fig. 13 illustrates how the Chinese characters "松下電器 (ma-tu-si-ta-de-n-ki)" are inputted in accordance with the preferred embodiment of the present invention; and Fig. 14 is a schematic view of an embodiment of added keys disclosed in R.O.C. Patent Publication No. 73889.

DETAILED DESCRIPTION OF THE EMBODIMENTS

Fig. 9 is a schematic view of a mobile telephone set which embodies the present invention. The mobile telephone set includes a communications portion, a display portion and a keyboard portion. Fig. 1 is a schematic system block diagram of the preferred embodiment of a telephone set with a Chinese character input function according to the present invention. As shown, 100 denotes a keyboard portion for inputting keyboard signals; 200 denotes a display portion, such as a liquid crystal display, for displaying characters or numbers thereon; 900 denotes a communications portion found in conventional telephone sets and capable of dialing to establish communication or transmitting character information; 600 denotes a buffer region formed from memory devices, such as random access memories, for temporarily storing information therein; 300 denotes a control portion for controlling the data processing flow of the communications portion 900, such as the retrieval of data from the buffer region 600 and, based on the command of the control signals, the transfer of the retrieved data to an object processing portion for processing of the same; 450 denotes a dictionary, such as that shown in Fig. 4, which memorizes a series of Mandarin Chinese phonetic symbols, the corresponding character strings, and the frequency of their use; 400 denotes a phonetic-to-character converting portion, which refers to the dictionary 450, for converting a Mandarin

Chinese phonetic string into a Chinese character string and for executing character changes via the keyboard portion 100 and the keyboard signal converting portion 700, such as selecting among phrases with the same pronunciation, etc.; 750 denotes a key-to-phonetic table, such as that found in Figures 8A and 8B, which memorizes the Mandarin Chinese phonetic symbols corresponding to the keyboard signals and the number of times a particular key is pressed; 700 denotes a keyboard signal converting portion for converting input keyboard signals, based on the keyboard signals transmitted from the control portion 300 and the character strings in the buffer region 600, and with reference to the key-to-phonetic table 750, into Mandarin Chinese phonetic symbols; 850 denotes a database, such as that shown in Fig. 6, which memorizes indexing terms and corresponding telephone numbers, addresses and short messages or notes; and 800 denotes a data processing portion which, based on the indexing terms transmitted from the control portion 300, searches for the corresponding telephone numbers, addresses and short messages or notes in the database 850.

Fig. 2 is a process flowchart of the control portion 300. As shown, in step s201, MFLAG and CURFLAG are set to 0 (number mode), and the buffer region 600 is set to null. Thereafter, in step s205, upon generation of a keyboard input signal from the keyboard portion 100, the flow proceeds to step s210, where it is determined if the input keyboard signal is "#". If yes, step s215 is performed to verify if the buffer region 600 is null. If the buffer region 600 is null, step s204 is performed to verify if MFLAG is set to 0. If yes, MFLAG is set to 1 in step s202 (character mode), and the flow returns to step s205. If MFLAG was verified as not being 0 in step s204, MFLAG is set to 0 in step s203 (number mode), and the flow returns to step s205.

In step s210, if the input keyboard signal is determined as not being "#", the input keyboard signal is memorized in the buffer region 600 in step s220, and MFLAG is verified to determine if it is set to 0 in step s230. If MFLAG is equal to 0, step s240 is performed to determine if the input keyboard signal is "*".

If the input keyboard signal is not "*", step s250 is executed to store the number signals as a number string (telephone number series) in the buffer region 600. After the last number signal has been stored in the number string in the buffer region 600, step s255 is performed, where the number string in the buffer region 600 is provided to the communications portion 900. In step s256, if it has been verified that dialing of the number string has been successfully accomplished by the communications portion 900, communication is established in step s257, and the processing operation is terminated. Otherwise, if the dialing operation has failed or dialing cannot be completed, a communications failure message is displayed on the display portion 200 in step s260 before the flow returns to step s205.

If, in step s240, it has been determined that the input keyboard signal is "*", step s242 is executed to verify if MFLAG is set to 0. If MFLAG is not 0, the last phonetic symbol in the Mandarin Chinese phonetic symbol string and the last character in the Chinese character string in the buffer region 600 are cleared in step s245, and the character input region on the display portion 200 is shown anew in step s246 before the flow returns to step s205. If MFLAG is 0 in step s242, the last number in the number signal string in the buffer region 600 is cleared, and the number input region on the display portion 200 is shown anew in step s241 before the flow returns to step s205.

If MFLAG was verified as not being 0 in step s230, the flow proceeds to the keyboard signal converting portion 700 in step s231. Thereafter, in step s237, it is verified if CURFLAG is set to 1 ("1" indicating a newly input Mandarin Chinese phonetic symbol; "0" indicating correction of an old Mandarin Chinese phonetic symbol). If CURFLAG was set to 1, step s232 is executed to store the converted input Mandarin Chinese phonetic symbol as the last entry in the Mandarin Chinese phonetic symbol string in the buffer region 600. Step s233 is then executed to determine if the converted Mandarin Chinese phonetic symbol is a phonetic-to-character converting signal (such as a tone symbol or a space keyboard signal). If yes, the flow proceeds to step s235 where the phonetic-to-character

converting portion 400 converts the Mandarin Chinese phonetic symbol string into Chinese characters.

Thereafter, step s236 is executed to show anew the characters memorized in the buffer region 600 on the character input region of the display portion 200 before the flow reverts to step s205. If, in step s237, it was verified that CURFLAG is not set to 1, step s238 is executed such that the Mandarin Chinese phonetic symbol replaces the last symbol or character in the Mandarin Chinese phonetic symbol or character lines in the buffer region 600 before step s233 is performed. In step s233, if the converted Mandarin Chinese phonetic symbol is not a phonetic-to-character converting signal, the flow proceeds immediately to step s236.

If, in step 215, it was verified that the buffer region 600 is not null, step s216 is executed so that the character string in the buffer region 600 is retrieved in order to serve as an indexing term in step s217. In step s217, data corresponding to the indexing term is searched by the data processing portion 800, and in step s218, the searched data is memorized in the buffer region 600. The flow then proceeds to step s255, where the number string in the buffer region 600 is provided to the communications portion 900 so that dialing can proceed in step s256.

The process flowchart of the phonetic-to-character converting portion 400 is shown in Fig. 3. As illustrated, after the control portion 300 inputs the character and Mandarin Chinese phonetic symbol strings in step s301, the flow proceeds to step s305, where syllabication of the Mandarin Chinese phonetic symbol string is performed with reference to the dictionary 450. In step s310, using the Mandarin Chinese phonetic syllables as an indexing term, the candidate phrases and the corresponding notes, such as the frequency of use, are obtained with reference to the dictionary 450. The flow then proceeds to step s315, where longer phrases and candidate phrases which have a greater frequency of use are given priority in the conversion from a Mandarin Chinese phonetic symbol string to a Chinese character string. A similar procedure has been taught in R.O.C. Patent Publication No.

089476, entitled "Chinese Character Converting Device (II)," which teaches the importance of the length of phrases and the frequency of their use in the conversion from Mandarin Chinese phonetic symbols to Chinese characters. Thereafter, it is determined in step s320 if the converted characters are correct. If correct, the flow proceeds to step s325, where the new character and Mandarin Chinese phonetic symbol strings replace the original character and Mandarin Chinese phonetic symbol strings before the process is terminated. If the converted characters are incorrect, step s330 is executed to perform correction of Mandarin Chinese phonetic symbols or selection among object phrases with the same pronunciation with the aid of the keyboard portion 100 and the keyboard signal converting portion 700 before step s325 is executed.

The process flowchart of the data processing portion 800 is shown in Fig. 5. In step 501, the control portion 300 inputs a character string, and in step s505, an operation signal (search, record or correction) is inputted with the use of the keyboard portion 100 and the control portion 300. In step s510, it is determined if the operation signal is not a record signal. If yes, the flow proceeds to step s515, where a search of the database 850 for corresponding data is performed with the use of the character string as the indexing term. In step s520, it is determined if the search was a success. If yes, step s525 is executed to determine if the operation signal is a correction signal. If the operation signal in step s525 is not a correction signal, step s540 is performed to display a successful search message, and the corresponding data (such as a telephone number, address and short note) is sent back before processing is terminated. If the operation signal in step s525 is a correction signal, step s530 is performed to correct the corresponding character string via the control portion 300. Thereafter, in step s512, using the input character string as an indexing term, the corresponding data is recorded in the database 850. In step s513, a record complete message is shown on the display portion 200, and the null value is sent back before processing is terminated. In step s520, if it was determined that the search was not a success, step s560 is performed so as to display a search failed

message on the display portion 200, and the null value is sent back before the process is terminated. In step s510, if it was determined that the operation signal is a record signal, the corresponding character string is inputted via the control portion 300 in step s511 before the process flows to step s512.

The process flowchart of the keyboard signal converting portion 700 is shown in Fig. 7. As illustrated, in step s701, the control portion 300 transmits the keyboard signal N and the current character M with the cursor, and sets CURFLAG to 0. In step s705, it is determined if M is a Mandarin Chinese phonetic symbol. If no, the keyboard signal (0-9) is sent back in step s760, and the process is terminated. If yes, step s708 is executed to determine if the M character is null. If yes, with reference to the conversion table 750, the value A [n] [0] is sent back in step s707 before the process is terminated. If no, step s710 is performed to search the conversion table 750 (the key-to-phonetic table being capable of being expressed in array form A [10] [7]) with the use of the keyboard signal N as the indexing term to obtain the array value A [n] [i]. In step s715, the value of i is set to 0, and in step s720, it is determined if A[N][i] is equal to M. If no, step s725 is performed to increment the value of i by 1, and the flow returns to step s720. If yes, it is determined if the value of i is equal to 6 in step s730. If yes, step s732 is executed to set CURFLAG to 1, and the value of i is reset to 0 in step s740. The value of A [N] [i] is sent back in step s750 before the process is terminated. In step s730, if it was determined that the value of i is not equal to 6, step s735 is performed to increment the value of i by 1. Thereafter, it is determined in step s745 if A [N] [i] is null. If yes, the flow proceeds to step s740. If no, the flow proceeds to step s750.

In one example of the input of Chinese characters in the preferred embodiment of a telephone set with a Chinese character input capability in accordance with the present invention, the control portion 300 is initially operated in the number mode (MFLAG=0), and the keyboard portion 100 is operated to input the keyboard signal "7." The display portion 200 shows "7" in the number display

region thereof, and a dialing operation is executed by the communications portion 900. Because the number is not a complete telephone number, the dialing operation is not successful, and the process reverts to the control portion 300 for repeating the aforementioned number input operation until the remaining numbers, such as "556183," have been inputted so that dialing can be automatically performed to establish communication.

If it is desired to input characters, when the keyboard portion 100 is operated to input the keyboard signal "#" under the condition that the buffer region 600 is null, the control portion 300 is operated in the character input mode (MFLAG=1). Thereafter, when the keyboard portion 100 is operated to input the keyboard signal "6," the control portion 300 controls the keyboard signal converting portion 700 to retrieve the array A [5] [i] = {6, ㄇ, ㄘ, ㄙ, null, null, null} from the conversion table 750. At this time, since the current character M with the cursor is null, the value A [5] [0] = 6 is sent back. Thus, the character shown on the character display region of the display portion 200 is "6." If the keyboard portion 100 is operated to once again input the keyboard signal "6," the values sent back by the keyboard signal converting portion 700 after referring to the key-to-phonetic table 750 are "ㄇ" and CURFLAG=0. Thus, the character shown on the character display region of the display portion 200 is "ㄇ". Accordingly, if the keyboard portion 100 is operated two more times to input the keyboard signal "6," the character shown on the character display region of the display portion 200 changes to "ㄘ" and then to "ㄙ". At this time, if the keyboard portion 100 is operated to input the keyboard signal "7," the values sent back by the keyboard signal converting portion 700 are "ㄙ 7" and CURFLAG=1. As such, the characters shown on the character display region of the display portion 200 are "7". If the keyboard portion 100 is operated to input the keyboard signal "7" two more times, the characters shown on the character display region of the display portion 200 are "ㄙㄨ". Thereafter, if the keyboard signal "0" is inputted five times, the characters shown on

the character display region of the display portion 200 will change to "ㄙㄨㄥ". Subsequent operation of the keyboard portion 100 to input the keyboard signal "0" for six times will result in the "SP" phonetic-to-character signal (corresponding to the first pronunciation tone). At this time, the flow proceeds to the phonetic-to-character converting portion 400, which refers to the dictionary 450, to obtain the conversion result "松". The character shown at the character display region of the display portion 200 changes to "松" at this time. Fig. 13 illustrates the key operation sequence for inputting the Chinese characters "松下電器" in accordance with the preferred embodiment of the present invention. If the keyboard portion 100 is subsequently operated to input the keyboard signal "#," the control portion 300 controls the data processing portion 800 to search the database 850 using the character string "松下電器" stored in the buffer region 600 as the indexing term to obtain the corresponding data and display the same on the display portion 200. As shown in Fig. 9, the communications portion 900 can automatically execute a dialing operation to establish communication or transmit a short message.

The invention should not be limited to the disclosed embodiment and should cover different embodiments which do not change the intent thereof. For example, changing the corresponding relationship between the Mandarin Chinese phonetic symbols and the keyboard signals in the conversion table, or increasing the number of times a key is pressed so that less than twelve keys can be used for inputting Chinese characters, or using the frequency of connection, such as bigram, in the selection of phrases for the phonetic-to-character converting portion during conversion are considered as possible modifications of the preferred embodiment.

Accordingly, the present invention offers the following advantages:

1. Only the twelve keys on the telephone set are needed to quickly and effectively input Chinese characters.

2. Ease of input is ensured even when the Mandarin Chinese phonetic symbols

are not printed on the surfaces of the keys because the arrangement used in the conversion table follows the standard sequence of the Mandarin Chinese phonetic symbols. As such, the neat appearance of the key surfaces can be maintained.

3. Because Mandarin Chinese phonetic symbols are employed in the input method of the present invention, there is no need to invest additional time for learning, and it is not easy to forget the input method of this invention.

4. Aside from telephone sets, the present invention can also be applied to the input of Chinese characters in a television set with the use of a remote controller.

As such, the present invention has a wide range of use.

Although the present invention has been described in connection with the preferred embodiments thereof with reference to the accompanying drawings, it is to be noted that various changes and modifications are apparent to those skilled in the art. Such changes and modifications are to be understood as included within the scope of the present invention as defined by the appended claims, unless they depart therefrom.

WHAT IS CLAIMED IS:

1. A method of inputting Chinese characters in a telephone set which includes a memory portion, a keyboard portion and a display portion, comprising the steps of:

(a) storing, in the memory portion, a key-to-phonetic table which correlates each keyboard signal of the keyboard portion and number of consecutive occurrences thereof with Mandarin Chinese phonetic symbols, and a dictionary which correlates Mandarin Chinese phonetic symbols with Chinese characters;

(b) by referring to the key-to-phonetic table, converting input keyboard signals from the keyboard portion into corresponding Mandarin Chinese phonetic symbols;

(c) by referring to the dictionary, converting the corresponding Mandarin Chinese phonetic symbols into corresponding Chinese characters; and

(d) displaying the corresponding Chinese characters on the display portion.

2. An apparatus for inputting Chinese characters in a telephone set which includes keyboard means for inputting keyboard signals, and display means for displaying numbers or characters thereon, said apparatus comprising:

key-to-phonetic table means for correlating each of the keyboard signals of the keyboard means and number of consecutive occurrences thereof with Mandarin Chinese phonetic symbols;

dictionary means for correlating Mandarin Chinese phonetic symbols with Chinese characters;

keyboard signal converting means for converting the keyboard signals inputted from the keyboard means into corresponding Mandarin Chinese phonetic symbols with reference to said key-to-phonetic table means;

phonetic-to-character converting means for converting the corresponding Mandarin Chinese phonetic symbols obtained from said keyboard signal converting means into corresponding Chinese characters with reference to said dictionary means; and

control means for controlling the display means to display the corresponding

Chinese characters obtained from said phonetic-to-character converting means thereon.

3. The apparatus for inputting Chinese characters in a telephone set according to Claim 2, further comprising:

database means for containing character search keys and numerical or character information corresponding thereto; and database processing means for searching said database means to find the numerical or character information corresponding to the Chinese characters obtained from said phonetic-to-character converting means;

said control means being adapted to control the display means to display the Chinese characters obtained from said phonetic-to-character converting means or the searched information obtained from said database processing means thereon.

4. A telephone set with a Chinese character input function, including memory means for storing data, keyboard means for inputting keyboard signals, and display means for displaying numbers or characters thereon, wherein the improvement comprises:

key-to-phonetic table means, stored in said memory means, for correlating each of the keyboard signals of said keyboard means and number of consecutive occurrences thereof with Mandarin Chinese phonetic symbols; dictionary means, stored in said memory means, for correlating Mandarin Chinese phonetic symbols with Chinese characters;

keyboard signal converting means for converting the keyboard signals inputted from said keyboard means into corresponding Mandarin Chinese phonetic symbols with reference to said key-to-phonetic table means;

phonetic-to-character converting means for converting the corresponding Mandarin Chinese phonetic symbols obtained from said keyboard signal converting means into corresponding Chinese characters with reference to said dictionary means; and

control means for controlling said display means so as to display the

corresponding Chinese characters obtained from said phonetic-to-character converting means thereon.

5. The telephone set with a Chinese character input function according to Claim 4, further comprising:

database means, stored in said memory means, for containing character search keys and numerical or character information corresponding thereto; and

database processing means for searching said database means to find the numerical or character information corresponding to the Chinese characters obtained from said phonetic-to-character converting means;

said control means controlling said display means to display the Chinese characters obtained from said phonetic-to-character converting means or the searched information obtained from said database processing means thereon.

