There is described a remote control for civilian electronic apparatuses of the type in which with at least one multiple-function key there are associated more than one command function, which functions are switchable by means of a function switching device which is equipped with an appropriate control. The remote control is characterized in that it comprises a visual display device (12, 112 or 212) which visually displays in an unambiguous manner the function which is associated at that moment with at least one of the multiple-function keys, the arrangement being such that the indication displayed by the visual display device (12, 112 or 212) changes when the control of said function switching device is actuated.
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Description

Remote control equipped with a device for the visual display of selected functions.

The present invention relates to a remote control equipped with a device for the visual display of selected functions associated with multiple-function keys.

In the field of civilian electronic apparatuses, especially of video and audio apparatuses, such as television sets, video recorders, stereo systems, satellite receivers and the like, and of audio-visual systems, just as in the field of electronic apparatuses in general, as is well known, remote controls are utilised for the remote actuation and regulation of the functions of said apparatuses.

Since the number of possible commands and the number of possible regulating settings increases considerably as the complexity and the sophistication of such apparatuses increase, the number of keys which are present on the remote controls increases in step with this. Then, when the number of keys becomes fairly large, recourse is had in general to the technical solution of associating numerous functions with each key of a group of multiple-function secondary keys, assigning to a command for sequencing the functions the possibility of changing the association between each multiple-function secondary key and each one of the functions associated with that key.

In this way, the principal functions are unambiguously associated with an exclusive key of the remote control, while the secondary functions are assigned, in groups, to a certain number of multiple-function keys, in such a manner that each key can effect various commands, depending upon the status of the command for sequencing the functions.

Since, nevertheless, in proximity to each key there is an inscription or a symbol relating to the function performed by that key, such symbols are two-fold or three-fold, in accordance with the multiple-function keys, and their indication becomes ambiguous accordingly.

There are also further reasons for the increase in the number of keys of a remote control: for example, the manufacturers of remote controls supplied separately as replacement parts or accessories, in addition to supplying remote controls with all the functions identical to those of the original remote control for the various types of apparatuses, also supply remote controls with improved services, such as self-learning, in order to adapt to the codes of any
apparatus, preprogramming in order to have, on a single remote control, the information relating to a large number of remote controls, or the possibility of controlling a plurality of apparatuses, even from different manufacturers.

In all these cases, it is obvious that the functions which can be associated with each key will increase to a disproportionate extent and the method currently employed and consisting in defining the functions by means of a multiple inscription or a functions table carried on said remote control or in the instruction booklet, proves to be very disadvantageous for the user of the remote control.

The principal object of the present invention is, therefore, to make all those functions which are not linked in an unambiguous manner to the principal keys of the remote control clear and easy to recognise and to access.

A further object of the present invention is to provide an improved remote control of simplified and immediate application.

Yet a further object of the present invention is to provide an improved remote control which has a simple and economical structure and is suitable for mass production.

According to the present invention, a remote control for civilian electronic apparatuses of the type in which with at least one multiple-function key there are associated more than one command function, which functions are switchable by means of a function switching device equipped with an appropriate control, is characterised in that it comprises a visual display device which visually displays in an unambiguous manner the function which is associated at that moment with at least one of the multiple-function keys, the arrangement being such that the indication displayed by the visual display device changes when the control of said function switching device is actuated.

The principal advantage which is obtained with the remote control equipped with a device for the visual display of selected functions according to the present invention consists in a significant simplification in the use of said remote control on the part of the user, determined by the fact that the function associated with each key at any instant is clearly shown on said remote control.

A further advantage consists in the possibility of increasing, to such extent as is desired, the number of functions associated with each secondary key, without thereby generating confusion or doubts on the part of the user, even an inexperienced user.

Yet a further advantage consists in the possibility of displaying all the symbols with which the user is familiar, thus making the remote control easy
to use.

A further advantage consists in the possibility of replacing many separate remote controls associated with separate apparatuses, even from different manufacturers, with a single remote control which is capable of acting on all the apparatuses, at the same time retaining all the functions and the symbols associated with the keys of the individual remote controls.

Finally, yet a further advantage consists in the possibility of keeping down the manufacturing, construction and assembly costs of a remote control according to the invention.

The present invention will be further clarified hereinbelow and other advantages will be highlighted by the description of certain practical embodiments of the remote control equipped with a device for the visual display of selected functions according to the present invention, this description being given on a purely illustrative and non-limiting basis, with reference to the accompanying drawings, in which:

Figure 1 is a front view and shows a first embodiment of the remote control equipped with a device for the visual display of selected functions according to the present invention;

Figure 2 is a front view, similar to Figure 1, and shows the remote control with the device for the visual display of selected functions activated;

Figure 3 is the block diagram of the electronic circuit of the remote control of Figure 1;

Figure 4 is the electrical wiring diagram of the electronic circuit of the remote control of Figure 1;

Figure 5 is a front view and shows a second embodiment of the remote control equipped with a device for the visual display of selected functions according to the present invention; and

Figure 6 is a front view and shows a third embodiment of the remote control equipped with a device for the visual display of selected functions according to the present invention.

With reference to the accompanying drawings, and in particular to Figures 1 and 2 thereof, it is seen that a remote control 10 according to the present invention is equipped with a visual display device 12 for the visual display of the functions associated with four multiple-function secondary keys 14.

The visual display device 12 has been constructed with a device incorporating dot matrix liquid crystals, each one of which may be illuminated or not illuminated.

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The remote control 10 also comprises a key 16, which is associated with an electronic device for switching the functions and serves to indicate the successive functions associated with the keys 14, while a key 18 is similarly associated with the electronic device for switching the functions and serves to indicate the preceding functions associated with the keys 14.

The remote control 10 further comprises a sequence selection key 20, which is also associated with the electronic device for switching the functions and serves to store in memory a priority sequence among all the sequences of functions associated with the keys 14.

On the remote control 10 there are also present the usual principal keys 22, which are unambiguously associated with the standardised functions.

With reference now to Figures 3 and 4 as well, it is seen that the electronic circuit of the present remote control comprises a microprocessor 24, which controls the visual display device 12 via a driver device 26 for interfacing with the visual display device 12.

For its functioning, the microprocessor 24 accesses a memory 28, containing instructions and data, and receives commands from the user via a keyboard 30, comprising the keys 14, 16, 18, 20 and 22.

The functioning of the present remote control 10 takes place in the manner described hereinbelow.

To each of the keys 14 corresponds a zone of the visual display device 12 adjacent to said key and associated with that key, on which zone there are exhibited the symbols relating to the function currently associated with the individual keys 14 through the function switching device managed by the microprocessor 24.

For example, in Figure 2, the visual display device 12 shows that with the keys 14' and 14'' on the left in said Figure 2, there are associated at that particular moment the functions relating to the regulation of the treble tones, namely a reduction on the left (key 14') and an increase on the right (key 14''), while with the keys 14''' and 14'''' on the right, still in Figure 2, there are associated at that particular moment the functions relating to the regulation of the bass tones, namely a reduction on the left (key 14''') and an increase on the right (key 14'''').

When the user actuates the key 16 in order to activate the successive sequence of secondary commands, then the symbols relating to the new functions selected and associated at that moment with the keys 14 appear on the visual display device 12.

In a similar way, when the user actuates the key 18 in order to acti-
vate the preceding sequence of secondary commands, then the symbols relating to the new functions selected and associated at that moment with the keys 14 appear on the visual display device 12.

By actuating the key 20, it is possible to store in memory the sequence which is currently in use, giving it the character of a priority sequence, which, for example, reappears automatically when the remote control is not used for more than a certain predetermined time, or reappears automatically upon the activation of the remote control.

In this way, besides the standardised principal functions associated in an unambiguous manner with the keys 22 and always present on the remote control, there are in addition other possible secondary functions which can be activated by the keys 14 and the recognition symbols of which are represented, as already stated, on the zone of the visual display device 12 adjacent to said keys 14.

Thus, in the case where the apparatus which is being actuated by means of the remote control 10 exhibits numerous functions in addition to the standard ones, for example functions relating to more than one apparatus to be remotely controlled, it is possible to access such functions through the function sequence forward key 16 or reverse key 18.

In the case where reference is made to a remote control of the type capable of remotely controlling more than one apparatus, it is possible to provide that the key 20 for selecting the priority sequence permits the selection of the order in which the various sequences of symbols are to follow one another on the visual display device 12, on activation of the remote control, not only for the principal apparatus but also for other secondary apparatuses.

Figures 1 and 2 show a remote control 10 equipped with a dot matrix liquid crystal visual display device 12 composed of two juxtaposed pairs of elements with 12x12 dots. In the remote control 10 each pair of elements is managed in such a manner as to form a matrix of 12x24 dots, which is associated with two of the multiple-function keys 14.

It is, however, obvious that it is possible to use visual display devices with a different number of addressable dots, depending on the fineness of the symbols which it is desired to represent. In fact, it is only necessary that the dimension of the matrix should be such as to permit the generation of graphic symbols in a manner which is readily discernible by the user.

It is likewise obvious that the number of multiple-function keys 14 can be increased or even decreased, depending upon the design requirements. There may, for example, be provided a second group of multiple-function keys.
which is disposed above the visual display device 12, in such a manner as to refer to symbols exhibited in the upper half of said device.

Furthermore, the visual display device may be constructed by means of any display device which changes its visual appearance as the sequence of functions associated with the multiple-function keys changes.

A second embodiment of the remote control according to the present invention is shown in Figure 5, in which elements similar to those of Figures 1 and 2 are indicated by the same reference numeral preceded by the digit 1.

In the remote control 110 of Figure 5, use is made of a visual display device 112 formed by a series of light-emitting diodes (LED), only one of which is energised at any one instant.

The remote control 110 comprises four multiple-function keys 114, all the possible functions of which are listed in a table 132 of inscriptions.

In the functioning of the remote control 110, a key 116 permits the sequence of functions which is associated with the multiple-function keys 114 to be advanced, while a key 118 permits said sequence of functions which is associated with the multiple-function keys 114 to be reversed.

Each time the key 116 or the key 118 is actuated, the following or preceding LED is energised in the LED sequence on the visual display device 112, thus indicating the new line of inscriptions in the table 132 so as to show unambiguously the functions which are at that moment associated with the multiple-function keys 114.

The key 120 serves to store in memory the priority sequence, while the keys 122 are the usual keys relating to the standardised primary functions.

A third embodiment of the remote control according to the present invention is shown in Figure 6, in which elements similar to those of Figures 1 and 2 are indicated by the same reference numeral preceded by the digit 2.

In the remote control 210 of Figure 6, use is made of a visual display device 212 formed by a rotatable roll, which bears a series of inscriptions 232 which appear at a window equipped with a magnifying lens.

The remote control 210 comprises four multiple-function keys 214, all the possible functions of which are listed in a table of inscriptions which is disposed cylindrically on the roll. A single line of this table appears in the window of the visual display device 212.

In the functioning of the remote control 210, a knob 216 permits the rotation of the roll and thus permits the sequence of functions which is associated with the multiple-function keys 214 to be forwarded and reversed through a series of contacts disposed along a circumference and cooperating
with a brush.

Each time the knob 216 is actuated, a new line of inscriptions is shown in the window of the visual display device 212, thus indicating unambiguously the functions which are at that moment associated with the multiple-function keys 214.

The keys 222 are the usual keys relating to the standardised primary functions.

Naturally, it is possible for the visual display device of the remote control according to the present invention to adopt even other forms: it is only necessary that said device should exhibit, at each instant and in an unambiguous manner, the association between each multiple-function key and the function actually associated with it.

Although only some preferred embodiments of the remote control equipped with a device for the visual display of selected functions have been specifically illustrated and described herein, it is to be understood that minor variations may be made in the construction thereof without departing from the spirit and scope of the invention as defined by the appended claims.
Claims

1. Remote control for civilian electronic apparatuses of the type in which with at least one multiple-function key there are associated more than one command function, which functions are switchable by means of a function switching device which is equipped with an appropriate control, characterised in that it comprises a visual display device (12, 112 or 212) which visually displays in an unambiguous manner the function which is associated at that moment with at least one of the multiple-function keys, the arrangement being such that the indication displayed by the visual display device (12, 112 or 212) changes when the control of said function switching device is actuated.

2. Remote control according to Claim 1, characterised in that said visual display device comprises a visual display device (12) incorporating dot matrix liquid crystals which are individually addressable in order to be illuminated or not illuminated.

3. Remote control according to Claim 2, characterised in that said visual display device (12) incorporating dot matrix liquid crystals is managed by a microprocessor (24) through a driver device (26) for interfacing with the visual display device (12).

4. Remote control according to Claim 2 or 3, characterised in that said dot matrix has a dimension of 12x12 dots available for the symbol of each multiple-function key.

5. Remote control according to Claim 1, characterised in that said visual display device comprises a set (112) of light-emitting diodes (LED), only one of which is energised at any one instant.

6. Remote control according to Claim 5, characterised in that the symbols relating to the multiple-function keys (114) are disposed in a table (132) of inscriptions and the light-emitting diodes each indicate one of the lines or of the columns of the table (132).

7. Remote control according to Claim 1, characterised in that said visual display device (212) comprises a rotatable roll, which bears a series of inscriptions (232) which appear at a window.

8. Remote control according to Claim 7, characterised in that said window is equipped with a magnifying lens.

9. Remote control according to Claim 7 or 8, characterised in that the symbols relating to the multiple-function keys (214) are disposed in a table of inscriptions which is disposed cylindrically on said roll and a single line of this table appears in the window of said visual display device (212).
10. Remote control according to any one of Claims 7 to 9, characterised in that a knob (216) is provided for the rotation of said roll and for forwarding and reversing the sequence of functions which is associated with the multiple-function keys (214).

11. Remote control according to Claim 10, characterised in that said knob (216) causes the forwarding and reversing of the sequence of functions which is associated with the multiple-function keys (214) through a set of contacts disposed along a circumference and cooperating with a brush.

12. Remote control according to any one of the preceding claims, characterised in that it comprises four multiple-function keys (14, 114, 214).

13. Remote control according to any one of the preceding claims, characterised in that it comprises a device which, through the actuation of a key (20, 120), stores in memory the sequence which is currently in use, giving it the character of a priority sequence, which reappears automatically when the remote control is not used for more than a certain predetermined time, or reappears automatically upon the activation of the remote control.

14. Remote control according to any one of Claims 1 to 12 and of the type capable of remotely controlling more than one apparatus, characterised in that said remote control comprises a device which, through the actuation of a key (20, 120), stores in memory the sequence which is currently in use, giving it the character of a priority sequence, which reappears automatically when the remote control is not used for more than a certain predetermined time, or reappears automatically upon the activation of the remote control, not only for the principal apparatus but also for at least one other secondary apparatus.
INTERNATIONAL SEARCH REPORT

I. CLASSIFICATION OF SUBJECT MATTER

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl. 5 H03J1/00; H04B1/20

II. FIELDS SEARCHED

Classification System

Classification Symbols

Int.Cl. 5 H03J; H04B

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched

III. DOCUMENTS CONSIDERED TO BE RELEVANT

Category Citation of Document, with indication, where appropriate, of the relevant passages

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11 October 1990
see column 3, line 49 - column 4, line 17; figure 1

IEEE TRANSACTIONS ON CONSUMER ELECTRONICS
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pages 59 - 69
PLATTE ET AL. : 'A new intelligent remote control unit for consumer electronic devices.'
see page 61, right column, line 16 - page 63, right column, line 16

IV. CERTIFICATION

Date of the Actual Completion of the International Search

19 APRIL 1993

Date of Mailing of this International Search Report

2 9 04. 93

International Searching Authority

EUROPEAN PATENT OFFICE

Signature of Authorized Officer

PEETERS M.M.G.

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