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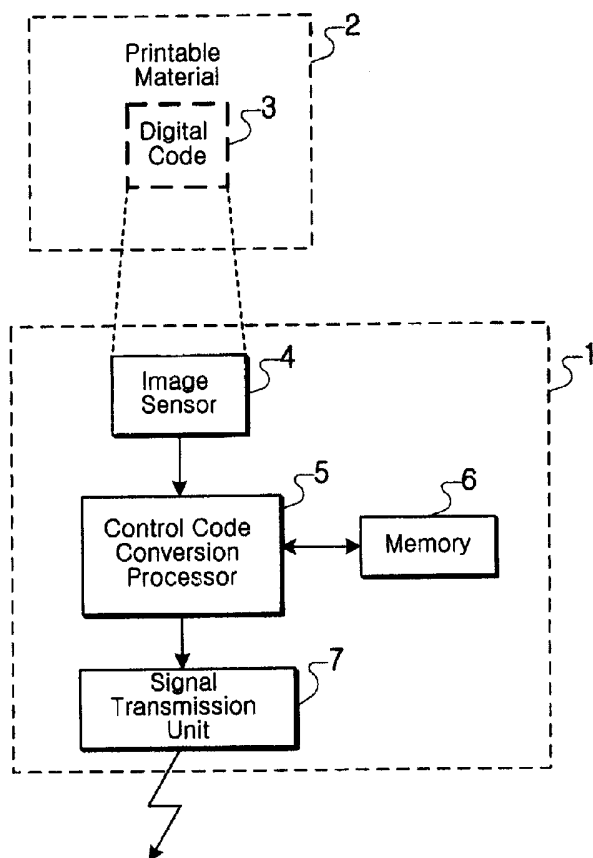
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(54) Title: REMOTE CONTROL SYSTEM USING DIGITAL CODES AND THE METHOD THEREOF



(57) Abstract: A remote control system and method using digital codes is provided, whereby a number of electronic devices can be controlled simply by scanning a digital code printed on distributed printable material using a single remote controller. The remote control system includes an image sensor, a memory, a processor, and a signal transmission unit. The image sensor scans and detects a digital code printed on printable material. The memory stores control codes corresponding to digital codes. Each of the control codes includes a control target device function control code value and a transmission method code value. The processor reconstructs a digital signal input from the image sensor into a unique digital code value, extracts a corresponding control code from the memory, and modulates it into a transmission signal. The signal transmission unit transmits the transmission signal to a corresponding control target device.

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【DESCRIPTION】**【Invention Title】**

REMOTE CONTROL SYSTEM USING DIGITAL CODES AND THE
5 METHOD THEREOF

【Technical Field】

The present invention relates to a remote control system and method, and
10 more particularly to a remote control system and method using digital codes,
wherein a transparent or semi-transparent digital code printed on printable material
is scanned to read a control code of a control target device, thereby allowing easy
control of the control target device.

15 **【Background Art】**

Remote controllers are widely used to remotely control a variety of
electronic devices. Remote controllers transmit a control signal for controlling a
variety of control target devices using a variety of infrared light specified by Infrared
20 Data Association (IrDA). Remote controllers typically use infrared light in the
frequency range of 30kHz to 40kHz and transmit the control signal in binary code
format so that receivers provided on control target devices can correctly receive the
control signal without interference from other light sources. Receivers analyze the
received control signal to detect a control command and then to perform a command
25 desired by the user.

There are a variety of binary coding schemes, including a shift coded signal scheme that varies the order of pulses or spaces between pulses, a space coded signal scheme that varies the length of the spaces between pulses, and a pulse width coded signal scheme that varies the length of pulses. Manufactures adopt different coding schemes. Control signals of a number of manufacturers and models are not compatible with each other since different coding schemes are used for them. Users must suffer the inconvenience of having to use a number of remote controllers when simultaneously using a variety of electronic devices such as a TV, a DVD, a digital set-top box, an MP3 player, and an air conditioner. So-called integrated remote controllers have been developed to overcome such problems and are described, for example, in Korean Patent Nos. 113707, 140962, 131482, 391930, and 198531.

In two-way digital TV environments, which are expected to be available in the near future, it is possible to perform so-called two-way communication whereby the user edits a desired broadcast program or directly purchases a product on a TV screen. However, there are some limitations when using conventional integrated remote controllers in such environments. For example, the user has to set shortcut keys or to operate a number of buttons a number of times in navigating through multi-level menus on the screen. Thus, there is a need to provide a new device that integrates remote controllers of a number of manufacturers and models without requiring multifunctional remote control buttons.

【Disclosure】

【Technical Problem】

Therefore, the present invention has been made in view of the above problems, and it is an object of the present invention to provide a remote control system that integrates remote controllers of a number of manufacturers and models into a single remote controller, regardless of the types of a number of control target devices, thereby providing convenience to the user.

It is another object of the present invention to provide a remote control system that can be efficiently used for control target devices such as two-way digital TVs and MP3 players, thereby providing convenience to the user.

10 **【Technical Solution】**

In accordance with one aspect of the present invention, the above and other objects can be accomplished by the provision of a remote control system for scanning a printed digital code to control a control target device, the remote control system comprising a printed digital code; a sensor for detecting and converting the digital code into a digital signal; a memory for storing control codes corresponding to digital codes, each of the control codes including a control target device function control code value and a transmission method code value; a processor for receiving and reconstructing the digital signal into a unique digital code value, extracting a control code corresponding to the reconstructed digital code value from the memory, and modulating the control code into a transmission signal; and a signal transmission unit for transmitting the transmission signal to a corresponding control target device. Here, the range of the digital code values includes a range of self-setting code values for additional setting of a control function to a control target device and for configuration setting of the remote control system; a range of control target device

control code values for controlling a control target device; and a range of service request code values for accessing the Internet. The range of the digital code values further includes control target device type code values for displaying a currently controlled device. The range of the digital code values further includes button mapping code values for associating additionally set control functions of the control target device with buttons of the remote control system. The digital code includes a self-setting code value, a control target device type code value, a control target device control code value, a button mapping code value, and a self-setting code value that are printed and detected in a specific order. The memory stores a mapping table including control target device function control code values, function control code lengths, and transmission method codes corresponding to digital code values; a mapping table including signal transmission method types corresponding to the transmission method codes; a mapping table including control target device types corresponding to digital code values; and a mapping table including button types of the remote control system corresponding to digital code values, wherein the mapping tables are updated by adding values to the mapping tables. The transmission signal is transmitted according to infrared communication, USB communication, or wireless communication according to a Bluetooth protocol.

In accordance with another aspect of the present invention, there is provided a remote control method of a remote control system for scanning a printed digital code to control a control target device, the method comprising the steps of converting the printed digital code into a digital signal through a sensor and inputting the digital signal to a processor; reconstructing, by the processor, the digital signal into a unique digital code and reading, by the processor, a function control code value and a transmission method code value corresponding to the

digital code from a memory; and modulating, by the processor, the control code into a transmission signal and transmitting the transmission signal to the control target device through a signal transmission unit.

In accordance with another aspect of the present invention, there is
5 provided a remote control method of a remote control system for detecting a printed digital code to control a control target device, the method comprising the steps of a) detecting and converting the printed digital code into a digital signal and reconstructing the digital signal into a digital code value including a series of digits; b) checking whether or not any self-setting code value is present in the digital code
10 value; c) reading and modulating a control code corresponding to the digital code value into a transmission signal and transmitting the transmission signal to a corresponding control target device if no self-setting code value is present in the digital code value; and d) performing additional setting of a control function of the control target device to the remote control system and internal configuration setting
15 of the remote control system based on the digital code value if any self-setting code value is present in the digital code value. The step c) includes the steps of reading and displaying a control target device type corresponding to the digital code value; reading a function control code value, a function control code length, and a binary coding scheme code corresponding to the digital code value; and reading a
20 transmission method corresponding to the binary coding scheme code and modulating the function control code value according to the transmission method repeatedly a plurality of times corresponding to the function control code length. The step d) includes the steps of e) checking whether or not a first digital code in the digital code value is a code indicating start of digital code allocation; f) adding a
25 control function of a control target device based on the digital code value, setting the

control function to a button of the remote control system, and storing the setting of the control function if the first digital code is a code indicating start of digital code allocation; and g) performing internal configuration setting of the remote control system and storing the configuration setting if the first digital code is not a code
5 indicating start of digital code allocation. The step f) includes the steps of reading, displaying, and temporarily storing a control target device type corresponding to the digital code value; reading and temporarily storing a function control code value, a function control code length, a binary coding scheme code corresponding to the digital code value; setting the added control function to a button corresponding to
10 the digital code value and temporarily storing the set control function; and storing the temporarily stored data and terminating digital code allocation if a digital code indicating end of digital code allocation is detected. The step g) includes the steps of displaying information indicating configuration setting; performing configuration setting of the remote control system according to a configuration setting code
15 present in the digital code value and temporarily storing the configuration setting; storing the temporarily stored data and terminating digital code allocation if a digital code indicating end of digital code allocation is detected.

In accordance with another aspect of the present invention, there is provided a remote control method of a remote control system for detecting a printed
20 digital code to control a control target device, the method comprising the steps of detecting and converting the printed digital code into a digital signal and reconstructing the digital signal into a digital code value including a series of digits; combining the digital code value with a carrier code and transmitting a transmission signal modulated according to a specific transmission method if no control code
25 corresponding to the digital code value is present; receiving the transmission signal,

reconstructing a control code from the received transmission signal, and removing the carrier code from the control code; and reading a URL corresponding to the control code, accessing the Internet with the URL, and downloading data. The carrier code and the transmission method are set according to a scheme
5 predetermined according to the control target device.

In accordance with another aspect of the present invention, there is provided a remote control method of a remote control system for detecting at least one digital code printed on at least one spot on printable material to control a control target device, the method comprising the steps of detecting and converting the
10 printed digital code into a digital signal and reconstructing the digital signal into a digital code value including a series of digits; transmitting the digital code value; and retrieving data located at a position corresponding to the received digital code value from a stored file and reading the retrieved data. The file includes one or more data elements that are assigned one or more digital code values at
15 corresponding positions.

In accordance with another aspect of the present invention, there is provided a remote control method of a remote control system for detecting at least one digital code printed on at least one spot on printable material to control an audio device that outputs audio, the method comprising the steps of scanning and
20 converting the printed digital code into a digital signal and reconstructing the digital signal into a digital code value including a series of digits; transmitting the digital code value to the audio device; reading a time data element corresponding to the digital code value from an audio file stored in the audio device, the audio file including a text area and an audio data area, wherein at least one digital code value
25 is combined with at least one corresponding time data element in the text area; and

moving to audio data corresponding to the read time data element and outputting the audio data.

The transmission is performed according to infrared communication, USB communication, or wireless communication according to a Bluetooth protocol.

5

【Advantageous Effects】

According to the present invention, a variety of electronic devices can be controlled simply by scanning a digital code printed on distributed printable
10 material. Thus, remote controllers of a number of manufacturers and models can be integrated and used as a single remote controller and the need to provide multifunctional buttons on the remote controller is eliminated, thereby making it more convenient to use the remote controller.

In addition, according to the present invention, in two-way digital TV
15 environments in which a set-top box is provided to connect a digital TV to the high-speed Internet, a URL contained in a digital code printed on printable material distributed by a number of merchants can be accessed via the Internet simply by scanning the printed digital code, which makes it possible to download a variety of VOD of product commercials, programs, or the like and to purchase
20 products while watching the VOD on the digital TV.

Further, according to the present invention, an MP3 player can be controlled by connecting it to the remote controller via USB, thereby making it possible to locate a correct position of each section of audio data. This enables processes such as directly locating or repeatedly listening to audio data at a desired
25 position with ease.

【Description of Drawings】

FIG. 1 illustrates the configuration of a remote control system according to
5 the present invention;

FIG. 2 illustrates the exterior of a remote controller that is used in the
remote control system according to the present invention;

FIG. 3 is a flow chart of the operation of a remote control system according
to the present invention;

10 FIG. 4 illustrates the order in which digital codes are printed in the remote
control system according to the present invention;

FIG. 5 is a flow chart of the operation of a remote control system according
to Embodiments 1 and 3 of the present invention;

FIG. 6 is a flow chart of the operation of a remote control system according
15 to Embodiment 2 of the present invention;

FIG. 7 schematically illustrates the configuration of a remote control
system according to Embodiment 3 of the present invention;

FIG. 8 is a flow chart of the operation of the remote control system
according to Embodiment 3 of the present invention;

20 FIG. 9 schematically illustrates the structure of conventional MP3 audio
data that provides lyrics;

FIG. 10 schematically illustrates the structure of MP3 audio data that
contains digital codes according to Embodiment 4 of the present invention;

FIG. 11 illustrates an example structure of printable material that contains
25 digital codes in Embodiment 4 of the present invention;

FIG. 12 schematically illustrates the configuration of a conventional MP3 player; and

FIG. 13 is a flow chart of the operation of a remote control system that is applied to an MP3 player according to Embodiment 4 of the present invention.

5

* Description of Reference Numerals of Main Parts of the Drawings

	1: remote control system	2: printable material
	3: digital code	4: image sensor
	5: control code conversion processor	6: memory
10	7: signal transmission unit	8: transmission portion
	9: operation display window	10: mode button
	11: power button	12: direction button
	13: execution button	14: scanning portion
	15: remote controller	21, 25: self-setting code
15	22: control target device type code	23: control target device
	control code	
	24: button mapping code	30: digital TV set-top box
	31: digital TV	32: video server
	33: audio/video interface	34: Internet interface
20	35: Operation System (O/S)	36: device control processor
	37: application program execution processor	
	38: remote control driver	
	39: signal reception unit	40: memory
	41: DVD player	42: speaker
25	43: MP3 decoder	44: display device

45: processor

46: flash memory

47: external input/output device

48: button input device

50: MP3 player

5 **【Best Mode】**

FIG. 1 illustrates the configuration of a remote control system according to the present invention, and FIG. 2 illustrates the exterior of a remote controller according to the present invention.

As shown in FIGS. 1 and 2, the remote control system 1 according to the
10 present invention includes an image sensor 4, a control code conversion processor 5, a memory 6, and a signal transmission unit 7. The image sensor 4 detects a digital code 3 printed on printable material 2. The control code conversion processor 5 reconstructs a digital input signal received from the image sensor 4 into a unique digital code and processes it into a control code suitable for a corresponding control
15 target device. The signal transmission unit 7 modulates and amplifies the processed control code and transmits it to the control target device through an infrared LED or the like.

For the user's convenience, the exterior of a remote controller 15 according to the remote controller system 1 preferably includes a mode button 10, a power
20 button 11, an operation display window 9, direction buttons 12, an execution button 13, a transmission portion 8, and a scanning portion 14. The mode button 10 is used to select a control target device. The power button 11 is used to power on or off the selected control target device. The operation display window 9 displays the selected control target device and the operation thereof. The transmission portion
25 8, which is an input/output device, includes an LED for transmitting an infrared

signal or the like. The scanning portion 14 includes an image sensor or the like.

The printable material 2 includes any printable medium such as paper, plastic, vinyl, a sticker, leather, and an electronic device case. The digital code 3 includes a bar code, a dot code, a carbon pattern code, or the like that are commonly
5 used. The carbon pattern code is most preferable due to the following reason. Since the bar code is printed in black ink, the bar code requires a separate space for printing so that it is separated from other printed portions. On the other hand, since the carbon pattern code is printed with almost transparent carbon material to form a lattice pattern, the carbon pattern code can be printed overlapping with other printed
10 portions without the need to secure a separate space for printing and can also be printed on a sticker and then be attached to printable material. Accordingly, when the digital code has been printed as the transparent carbon pattern code, the user scans an image including the transparent digital code on the printable material 2.

When the bar code or the dot code is used for the digital code 3 to be
15 printed, hundreds of millions of values can be allocated to the digital code 3. When the carbon pattern code is used, about four thousand values can be assigned to the digital code 3.

For efficient use of the digital code 3, the values of the digital code 3 need to be divided according to a variety of purposes. In the present invention, the range
20 of assigned digital code values are divided into a range of self-setting code values required to additionally set functions of the remote control system or to set the configuration thereof, a range of control target device control code values containing function control information required to control the control target devices, and a range of service request code values for shopping or receiving Video On Demand
25 (VOD). In a preferable example where the carbon pattern code is used, about

4,096 digital code values can be divided into a range of self-setting code values, a range of control target device control code values, and a range of service request code values as shown in Table 1. The number of digital code values assigned to each range can be adjusted arbitrarily.

5

[Table 1]

Digital Code Range Table

Range	range of self-setting	range of control target device	range of service request
	code values	control code values	code values
Code (HEX)	00 (0x00)	32 (0x20)	352 (0x160)
	~ 31 (0x1F)	~ 351 (0x15F)	~ 4,095 (0xFFF)
Number of values	32	320	3,744

The range of self-setting code values includes digital code values associated with notification of start and end of digital code allocation in a setting mode for adding control target device control information, digital code values associated with the configuration setting of the remote control system, and the like. A preferred example of the range of self-setting code values is shown in Table 2.

15

[Table 2]

Table of Range of self-setting code values

Digital Code	Control Command
0x01	start of digital code allocation
0x02	end of digital code allocation

0x03	start of LED brightness adjustment of remote controller
0x04	end of LED brightness adjustment of remote controller
0x05	start of operation sound volume adjustment of remote controller
0x06	end of operation sound volume adjustment of remote controller
0x07 ~ 0x1F etc.	

The range of control target device code values includes digital code values indicating control target devices of manufacturers and control functions thereof. The range of control target device code values corresponds to a control target device

5 function control information mapping table (see Table 5) stored in a memory 6 that will be described later. A preferred example of the range of control target device code values is shown in Table 3.

[Table 3]

10 Table of Range of Control Target Device Control Code Values

Digital Code	Control Target Device	Control Function	Description
0x20	NEC VTR	POWER ON/OFF	To power on/off NEC VTR
0x21	NEC VTR	PLAY	To start the play of NEC VTR
0x22	NEC VTR	REC	To start the recording of NEC VTR
...
0x34	LG Air Conditioner	POWER ON/OFF	To power on/off LG air conditioner
0x35	LG Air Conditioner	AIR VOLUME INCREASE	To increase air volume of LG air conditioner

0x36	LG Air Conditioner	AIR VOLUME DECREASE	To decrease air volume of LG air conditioner
...
0x3E	Samsung TV	POWER ON/OFF	To power on/off Samsung TV
0x3F	Samsung TV	VOLUME INCREASE	To increase volume of Samsung TV
0x40	Samsung TV	VOLUME DECREASE	To decrease volume of Samsung TV
...
0x15F	Samsung TV	MBC CHANNEL	To select MBC channel on Samsung TV

The range of service request code values includes digital code values for selecting a product or service when receiving a variety of services such as VOD and online shopping provided over the Internet. A preferred example of the range of service request code values is shown in Table 4. A Uniform Resource Locator (URL) that can be accessed via the Internet is assigned to each product and service. By accessing a desired product or service and service provider via URLs assigned thereto on the Internet, the user can obtain detailed information of the product, purchase the product, and download VOD.

10

[Table 4]

Range of Service Request Code Values

Digital Code Request Service			Description
0x160	Product URL	To access each product's URL on the Internet	
...	
0x33E	Product URL	To access each product's URL on the Internet	

0x33F	Service URL	To access each service's or service provider's URL on the Internet
...
0xFFFF	Service URL	To access each service's or service provider's URL on the Internet

FIG. 3 is a flow chart of the operation of a remote control system according to the present invention.

First, if the user inputs a digital code 3 to the image sensor 4 via scanning
 5 or photography, the image sensor 4 converts the input digital code 3 into a digital signal and transfers the digital signal to the control code conversion processor 5 (S100).

The control code conversion processor 5 reconstructs the digital signal into a unique digital code and reads control target device function control information
 10 and a binary coding scheme for infrared signal transmission, which correspond to the digital code, from the memory 6 (S101).

The control code conversion processor 5 modulates function control code values included in the function control information into a transmission signal using the binary coding scheme, and transmits the modulated transmission signal to the
 15 control target device through the signal transmission unit 7 (S102). The transmission signal is transmitted through wireless communication according to the infrared communication or Bluetooth protocol.

The memory 6 stores a variety of mapping tables of control target device function control codes, function control code lengths, codes of the binary coding
 20 schemes for infrared signal transmission, control target device types, and button mapping codes, which correspond to the digital codes. The mapping tables may be updated or some values may be added thereto.

A control target device function control information mapping table, which contains function control information items corresponding respectively to digital codes, has been stored in the memory 6. A function control information item corresponding to the read digital code is retrieved from the control target device function control information mapping table. The control target device function control information mapping table contains digital codes corresponding to the range of control target device control code values and thus corresponds to the control target device control code range table described above (see Table 3). A preferred example of the control target device function control information mapping table is shown in Table 5 and digital codes thereof are identical to those of the control target device control code range table (Table 3).

[Table 5]

Control Target Device Control Code Mapping Table

Digital Code	Control Target Device Type Code	Binary Coding Type Code	Function Control Code Length	Function Control Code Value	Button Mapping Code
0x20	0x01	0x01	3	0x30, 0x2F, 0x3E	0x02
0x21	0x05	0x03	2	0x7F, 0x02	-
0x22	0x09	0x01	3	0x50, 0x40, 0x20	0x03
0x23	0x04	0x02	4	0x44, 0x32, 0x3A, 0xFE	0x02
...
0x15F	0x01	0x01	2	0x41, 0x42	-

For example, when the digital code value read by the image sensor 4 is

“0x20”, first, the control code conversion processor 5 reads a control target device type code “0x01” corresponding to the digital code value “0x20” with reference to Table 5 stored in the memory 6. The control code conversion processor 5 then reads a control target device type “TV” corresponding to the read control target device type code “0x01” from a control target device type mapping table (Table 7 described later) and displays the read control target device type “TV” on the operation display window 9. Subsequently, with reference to Table 5, the control code conversion processor 5 detects from the digital code value “0x20” that the binary coding scheme code value, which specifies the infrared transmission method, is “0x01”, the function control code value is “0x30, 0x2F, 0x3E”, and the function control code length is “3”. With reference to the control target device control code range table (Table 3), the function control code value indicates “To power on/off NEC VTR”. As will be described later in Embodiment 2, when respective functions have been preset to buttons on the remote controller, corresponding button mapping codes are assigned to the buttons.

In another example, when the read digital code value is “0x15F”, the control code conversion processor 5 detects based on Table 5 that the binary coding scheme code value is “0x01”, the function control code value is “0x41, 0x42”, and the function control code length is “2”. With reference to Table 3, the function control code value indicates “To select MBC channel on Samsung TV”. Such a function can be controlled at a time simply by scanning the digital code value “0x15F” that has been transparently or semi-transparently printed, for example, on printable material having an MBC logo or figure. When the conventional remote controller is used, selecting the MBC channel (Channel 11) requires that a button “1” be pressed twice. However, according to the present invention, the MBC

channel can be selected simply by scanning the digital code value once as described above.

A mapping table of binary coding scheme codes specifying the infrared signal transmission method, which correspond to the binary coding scheme codes of Table 5, is stored in the memory 6. A preferred example of the mapping table of binary coding scheme codes is shown in Table 6.

[Table 6]

Binary Coding Scheme Code Mapping Table

Binary Coding Scheme Code Infrared Transmission Method	
0x01	NEC method
0x02	RC5 method
0x03	ZENITH method
0x04	MITSUBISHI method
...	...

10

Specifically, when the digital code value is “0x20” and the binary coding scheme code value corresponding thereto is “0x01” as in the previous example, the control code conversion processor 5 selects “NEC method” as the infrared transmission method with reference to Table 6 and modulates and transmits the function control code value according to the NEC method.

15

In addition, in the remote control system according to the present invention, the selected control target device type is displayed on the operation display window 9 so that the user can visually confirm the type of the currently controlled device. A preferred example of a control target device type mapping table is shown in Table

7. For example, when the read digital code value is “0x02”, “VTR” is displayed on the operation display window 10. When a plurality of control target devices of the same type are set, the control target device type may be displayed in combination with their respective numbers so that the plurality of control target devices can be differentiated.

[Table 7]

Control Target Device Type Mapping Table

Digital Code	Control Target Device Type
0x01	TV
0x02	VTR
0x03	DVD player
0x04	two-way TV set-top box
0x05	home theater
0x06	air conditioner
0x07	audio player
0x08	satellite set-top box
0x09	terrestrial set-top box
0x0A	etc.

- 10 Further, in the remote control system according to the present invention, once the functions and the transmission method are set according to the digital code read by the image sensor 4 as described above, the functions can be set as those of buttons “10” to “13” on the remote controller 15. This provides convenience to the user when using the remote controller 15 afterwards by allowing the user to perform

a desired function simply by pressing a corresponding button on the remote controller 15. To accomplish this, a button mapping table is set and stored in the memory 6. A preferred example of the button mapping table is shown in Table 8. Specifically, when the read digital code values are "0x01" and "0x02", a function to display the set control target device is set by assigning it to the mode button 10 and a function to power on/off the control target device is set by assigning it to the power button 11.

[Table 8]

10 Button Mapping Table

Digital Code	Button	Description
0x01	MODE	To set control target device
0x02	POWER	To turn on/off the power
0x03	UP	Function corresponding to set value (e.g., channel +)
0x04	LEFT	Function corresponding to set value (e.g., volume -)
0x05	RIGHT	Function corresponding to set value (e.g., volume +)
0x06	DOWN	Function corresponding to set value (e.g., channel -)
0x07	ENTER	Function corresponding to set value (e.g., execution)

According to the present invention, digital code values of the digital code 3 indicating a setting mode for adding control target device control information are printed in a specific order as shown in FIG. 4.

Specifically, a digital code value 21 in the range of self-setting code values (see Table 2), a digital code value 22 specifying a control target device type (see

Table 7), a digital code value 23 specifying a control target device control code (see Table 5), a digital code value 24 for button mapping (see Table 8), and a digital code value 25 in the range of self-setting code values (see Table 2) are sequentially printed in the digital code 3.

5 As will be described later in Embodiment 2, the digital code values 21 and 25 in the range of self-setting code values are located at the start and end of the digital code 3 in order to add a function that has not been set and stored in the memory 6 of the remote control system. If a code value "0x01" in the range of self-setting code values is initially printed and detected in the printed digital code
10 (see Table 2), digital code allocation is initiated and a control function is learned to be set and stored according to the digital code value 22 specifying a control target device type, the digital code value 23 specifying a control target device control code, and the digital code value 24 for assigning a function to a button, which have been sequentially printed, subsequent to the first code value "0x01". The digital code
15 allocation is terminated as the last printed code value "0x02" in the range of self-setting code values is detected.

Preferred embodiments of the present invention will now be described in detail with reference to the accompanying drawings. The following embodiments are provided for an overall understanding of the present invention, and the present
20 invention is not limited to the embodiments.

【Mode for Invention】

Embodiment 1

In this embodiment, a method for operating a control target device by
25 scanning a digital code on printable material using a remote control system

according to the present invention will be described with reference to FIG. 5. FIGS. 5 and 6 are flow charts of the operation of the remote control system according to the present invention.

First, when the user scans an image including a digital code 3 transparently or semi-transparently printed on printable material 2, the image sensor 4 sends the scanned image to the control code conversion processor 5, and the control code conversion processor 5 reconstructs it into a digital code value including a series of digits (S200).

When no digital code of the range of self-setting code values is detected (S201), the control code conversion processor 5 reads a control target device type code corresponding to the reconstructed digital code from the control target device control code mapping table (see Table 5) stored in the memory 6, and then reads a control target device type corresponding to the type code from the control target device type mapping table (see Table 7) stored in the memory 6 and displays the read control target device type on the operation display window 9 (S203). Similarly, the control code conversion processor 5 reads a function control code value, a function control code length, and a binary coding scheme code for the infrared transmission method from the control target device control code mapping table (see Table 5), and reads an infrared transmission method corresponding to the binary coding scheme code from the binary coding scheme code mapping table (see Table 6) (S204). The control code conversion processor 5 then modulates and amplifies the function control code value according to the infrared transmission method repeatedly a number of times corresponding to the function control code length and transmits it to the control device through the signal transmission unit 7 (S205). In this case, since no digital code value 21 in the range of self-setting code

values is present, no digital code value 24 used to assign a function to a button and no digital code value 25 in the range of self-setting code values, which indicates the end of digital code allocation, are printed and detected. When any digital code value in the range of self-setting code values is detected (S201), the control code conversion processor 5 switches to and activates a setting mode described later in Embodiment 2 (S). When the reconstructed digital code is not present in the control target device control code mapping table (see Table 5) stored in the memory 6 (S202), the control code conversion processor 5 switches to and activates an Internet access mode described later in Embodiment 3 (I).

10

Embodiment 2

In this embodiment, a method for adding a function to a button of the remote control system according to the present invention will be described with reference to FIG. 6. This allows the user to control the control target device by pressing the button on the remote controller afterwards without any further scanning operation.

In this case, the digital code 3 on the printable material 2 includes a digital code value 21 in the range of self-setting code values that indicates start of digital code allocation, contrary to Embodiment 1. As described above, if any digital code value in the range of self-setting code values is present in the digital code 3, a digital code value 21 in the range of self-setting code values, a digital code value 22 specifying a control target device type, a digital code value 23 specifying a control code of a control target device, a digital code value 24 for assigning a function to a button, and a digital code value 25 in the range of self-setting code values are sequentially printed and detected.

First, the step of scanning and reconstructing the printed digital code 3 into a digital code value including a series of digits is performed in the same manner as that of Embodiment 1 (S200). When any digital code value in the range of self-setting code values is detected (S201), the control code conversion processor 5 switches to a setting mode (S300). When the first digital code value is "0x01" (S301), digital code allocation is initiated. A control target device type corresponding to the digital code value specifying the control target device type is read from the control target device type mapping table (see Table 7) stored in the memory 6 and the read control target device type is displayed on the operation display window 9 and is temporarily stored in a buffer at the same time (S302). A function control code value, a function control code length, and an infrared transmission method (see Tables 5 and 6) corresponding to the digital code value specifying the control target device control code are read from the memory 6 and are also temporarily stored in the buffer (S303). The digital code value for button mapping is then detected and a function is assigned to a button corresponding to the detected digital code value and this assignment information is also temporarily stored in the buffer (S304). When the detected digital code value is "0x02" in Table 2 (S305), the digital code allocation is terminated accordingly, the values temporarily stored in the buffer are additionally stored in the memory 6 or the values in the memory 6 are updated using those temporarily stored in the buffer, and information indicating the completion is displayed on the operation display window 9 and a sound indicating the completion is output at the same time (S306). Then, the procedure is terminated. On the other hand, when the digital code value is not "0x01" (S301), it is also checked whether or not the digital code value indicates the end of digital code allocation or adjustment (S307). If the digital code value

indicates the end of digital code allocation or adjustment, the digital code value has been erroneously detected or erroneously printed, and thus "ERROR" is displayed on the operation display table 9 (S308). If the digital code value does not indicate the end of digital code allocation or adjustment, the digital code value is one of the remaining digital code values in the self-setting code value range table (see Table 2) indicating internal configuration setting such as "remote controller's LED brightness adjustment" and "remote controller's operation sound volume adjustment", and thus information indicating the configuration setting is displayed on the operation display window 9 (S309). The configuration setting is performed according to a control command in Table 2 corresponding to the digital code value and the configuration setting information is temporarily stored in the buffer (S310). When the digital code value indicating the end of the adjustment is detected (S311), the values temporarily stored in the buffer are stored in the memory 6 and information indicating the completion is displayed on the operation display window 9 and a sound indicating the completion is output (S306). Then, the procedure is terminated.

Embodiment 3

This embodiment relates to a method for accessing a URL corresponding to a digital code, read using a remote control system according to the present invention, via the Internet and downloading and watching VOD on a digital TV. A digital code in the service request code range of Table 4 on the printable material 2 is scanned using the remote controller 15, and the scanned digital code is reconstructed and transmitted to a digital TV set-top box. Then, the user can access a URL corresponding to the digital code via the Internet to download and watch VOD and

the like. This embodiment can be used for a two-way digital TV in such a manner.

FIG. 7 schematically illustrates the configuration of a remote control system according to the present invention that is applied to the two-way digital TV set-top box and FIG. 8 is a flow chart of the operation of the remote control system.

5 This embodiment will now be described with reference to FIGS. 5, 7, and 8.

First, a digital code printed on printable material 2 is scanned and reconstructed, and, when no self-setting code is present, a control target device type code is detected and displayed on the operation display window 9 as described above in Embodiment 1 (S200-S203). However, when the detected control target
10 device control code is not present in the control target device control code mapping table (see Table 5) stored in the memory 6 (S202), the control code conversion processor 5 combines the digital code value with a predetermined carrier code (for example, x0FF) (S400) and modulates and amplifies it into a transmission signal using a predetermined binary coding scheme and transmits the transmission signal to
15 the digital TV set-top box (S401). The carrier code and the binary coding scheme are predetermined by agreement with the digital TV set-top box's manufacturer. Such a transmitted control signal is received by a signal reception unit 39 in a two-way digital TV set-top box 30. The received control signal is reconstructed into a function control code and is then input to a remote control driver 38 of an operating
20 system (O/S) 35 (S402). The remote control driver 38 functions to distribute the function control code to a device control processor 36 and an application program execution processor 37. The function control code combined with the carrier code is input to the application program execution program 37 after the carrier code is removed from the function control code (S403). Of course, general function
25 control codes present in the control target device control code mapping table (see

Table 5) in the memory 6 are input to the device control processor 36 to control the two-way digital TV set-top box 30. Then, the application program execution processor 37 reads a URL corresponding to the function control code from the memory 40 and downloads data such as VOD at the URL from a digital TV service
5 server 32 via the Internet and transmits the downloaded data to a digital TV 31 (S404). According to this embodiment, the user can download desired VOD via the Internet and watch it on the digital TV by scanning a digital code printed on printable material 2 such as a leaflet or flyer.

10 Embodiment 4

In this embodiment, the remote control system according to the present invention is applied to control of an MP3 player. When using printable material containing only text and a conventional MP3 player that outputs audio corresponding to the text, it is difficult to locate a correct position of audio data
15 corresponding to the text, thereby making it difficult to directly locate or repeatedly listen to audio data at a desired position. However, if text, which contains a digital code in each section, is used so that the MP3 player detects the digital code, it is possible to locate a correct position of each audio data section. This is useful especially for application to MP3 players that provide lyrics.

20 FIG. 9 schematically illustrates the structure of conventional MP3 audio data that provides lyrics. FIG. 10 schematically illustrates the structure of MP3 audio data that contains digital codes according to the embodiment of the present invention and FIG. 11 illustrates an example structure of printable material that contains digital codes in the embodiment of the present invention. FIG. 12
25 schematically illustrates the configuration of a conventional MP3 player.

The conventional MP3 player that provides lyrics outputs texts "TEXT 1", "TEXT 2", ..., and "TEXT N" to a display device 44 when times corresponding to "TIME 1", "TIME 2", ..., and "TIME N" are reached, respectively, as shown in FIG. 9. However, in this embodiment, audio data having a structure that substitutes a digital code 1, a digital code 2, ..., and a digital code N for the texts "TEXT 1", "TEXT 2", ..., and "TEXT N" as shown in FIG. 10. Transparent or semi-transparent digital codes indicating the respective positions of a plurality of spots on printable material are printed on the printable material as shown in FIG. 11, and the printed digital code is detected using the remote control system according to the present invention. Thus, a unique digital code is assigned to each specific time value. This makes it possible to correctly locate a desired position.

FIG. 13 is a flow chart of the operation of a remote control system that is applied to an MP3 player according to the embodiment of the present invention. The operation of the remote control system in this embodiment will now be described with reference to FIG. 13.

First, the user directly connects the remote controller 15 according to the present invention to an MP3 player 50 through an external input/output device 47 in the MP3 player 50 using a Universal Serial Bus (USB) (S500). Text, which contains a digital code in each section as shown in FIG. 11, is scanned using the scanner 14 of the remote controller 15 (S501). The control code conversion processor 5 reconstructs the digital code input through the image sensor 4 and transmits the reconstructed digital code to the external input/output device 47 of the MP3 player 50 (S502). A processor 45 detects the digital code and reads a record corresponding to the digital code in the text area as shown in FIG. 10 that is located in a rear portion of an audio file in a flash memory 46 (S503). The processor 45

moves to the position of the requested audio data based on a time value of the record and outputs the audio file to a speaker 42 through an MP3 decoder 43 (S504). Thus, the user can easily access audio data that is located exactly at a position desired by the user.

5 Although novel and basic features of the present invention have been disclosed with reference to a variety of embodiments, the embodiments have been described for illustrative purposes to provide an overall understanding of the present invention. Those skilled in the art will appreciate that various modifications, additions and substitutions can be made to the aspects and details of the invention as
10 disclosed above, without departing from the scope and spirit of the invention, and the modifications, additions and substitutions should be considered as included in the claims.

【CLAIMS】

【Claim 1】 A remote control system for scanning a printed digital code to control a control target device, the remote control system comprising:

- 5 a printed digital code;
- a sensor for detecting and converting the digital code into a digital signal;
- a memory for storing control codes corresponding to digital codes, each of the control codes including a control target device function control code value and a transmission method code value;
- 10 a processor for receiving and reconstructing the digital signal into a unique digital code value, extracting a control code corresponding to the reconstructed digital code value from the memory, and modulating the control code into a transmission signal; and
- a signal transmission unit for transmitting the transmission signal to a
- 15 corresponding control target device.

【Claim 2】 The remote control system according to claim 1, wherein the range of the digital code values includes:

- a range of self-setting code values for additional setting of a control
- 20 function to a control target device and for configuration setting of the remote control system;
- a range of control target device control code values for controlling a control target device; and
- a range of service request code values for accessing the Internet.

25

【Claim 3】 The remote control system according to claim 2, wherein the range of the digital code values further includes control target device type code values for displaying a currently controlled device.

5 【Claim 4】 The remote control system according to claim 2 or 3, wherein the range of the digital code values further includes button mapping code values for associating additionally set control functions of the control target device with buttons of the remote control system.

10 【Claim 5】 The remote control system according to claim 4, wherein the digital code includes a self-setting code value, a control target device type code value, a control target device control code value, a button mapping code value, and a self-setting code value that are printed and detected in a specific order.

15 【Claim 6】 The remote control system according to claim 1, wherein the memory stores:

 a mapping table including control target device function control code values, function control code lengths, and transmission method codes corresponding to digital code values;

20 a mapping table including signal transmission method types corresponding to the transmission method codes;

 a mapping table including control target device types corresponding to digital code values; and

 a mapping table including button types of the remote control system
25 corresponding to digital code values,

wherein the mapping tables are updated by adding values to the mapping tables.

5 **【Claim 7】** The remote control system according to claim 1, wherein the transmission signal is transmitted according to infrared communication, USB communication, or wireless communication according to a Bluetooth protocol.

10 **【Claim 8】** A remote control method of a remote control system for scanning a printed digital code to control a control target device, the method comprising the steps of:

 converting the printed digital code into a digital signal through a sensor and inputting the digital signal to a processor;

 reconstructing, by the processor, the digital signal into a unique digital code and reading, by the processor, a function control code value and a transmission
15 method code value corresponding to the digital code from a memory; and

 modulating, by the processor, the control code into a transmission signal and transmitting the transmission signal to the control target device through a signal transmission unit.

20 **【Claim 9】** A remote control method of a remote control system for detecting a printed digital code to control a control target device, the method comprising the steps of:

 a) detecting and converting the printed digital code into a digital signal and reconstructing the digital signal into a digital code value including a series of digits;

25 b) checking whether or not any self-setting code value is present in the

digital code value;

c) reading and modulating a control code corresponding to the digital code value into a transmission signal and transmitting the transmission signal to a corresponding control target device if no self-setting code value is present in the
5 digital code value; and

d) performing additional setting of a control function of the control target device to the remote control system and internal configuration setting of the remote control system based on the digital code value if any self-setting code value is present in the digital code value.

10

【Claim 10】 The remote control method according to claim 9, wherein the step c) includes the steps of:

reading and displaying a control target device type corresponding to the digital code value;

15 reading a function control code value, a function control code length, and a binary coding scheme code corresponding to the digital code value; and

reading a transmission method corresponding to the binary coding scheme code and modulating the function control code value according to the transmission method repeatedly a plurality of times corresponding to the function control code
20 length.

【Claim 11】 The remote control method according to claim 9, wherein the step d) includes the steps of:

e) checking whether or not a first digital code in the digital code value is a
25 code indicating start of digital code allocation;

f) adding a control function of a control target device based on the digital code value, setting the control function to a button of the remote control system, and storing the setting of the control function if the first digital code is a code indicating start of digital code allocation; and

- 5 g) performing internal configuration setting of the remote control system and storing the configuration setting if the first digital code is not a code indicating start of digital code allocation.

10 **【Claim 12】** The remote control method according to claim 11, wherein the step f) includes the steps of:

 reading, displaying, and temporarily storing a control target device type corresponding to the digital code value;

 reading and temporarily storing a function control code value, a function control code length, a binary coding scheme code corresponding to the digital code value;

15 value;

 setting the added control function to a button corresponding to the digital code value and temporarily storing the set control function; and

 storing the temporarily stored data and terminating digital code allocation if a digital code indicating end of digital code allocation is detected.

20

【Claim 13】 The remote control method according to claim 11, wherein the step g) includes the steps of:

 displaying information indicating configuration setting;

 performing configuration setting of the remote control system according to a configuration setting code present in the digital code value and temporarily storing

25

the configuration setting;

storing the temporarily stored data and terminating digital code allocation if a digital code indicating end of digital code allocation is detected.

5 **【Claim 14】** A remote control method of a remote control system for detecting a printed digital code to control a control target device, the method comprising the steps of:

detecting and converting the printed digital code into a digital signal and reconstructing the digital signal into a digital code value including a series of digits;

10 combining the digital code value with a carrier code and transmitting a transmission signal modulated according to a specific transmission method if no control code corresponding to the digital code value is present;

receiving the transmission signal, reconstructing a control code from the received transmission signal, and removing the carrier code from the control code;

15 and

reading a URL corresponding to the control code, accessing the Internet with the URL, and downloading data.

20 **【Claim 15】** The remote control method according to claim 14, wherein the carrier code and the transmission method are set according to a scheme predetermined according to the control target device.

25 **【Claim 16】** A remote control method of a remote control system for detecting at least one digital code printed on at least one spot on printable material to control a control target device, the method comprising the steps of:

detecting and converting the printed digital code into a digital signal and
reconstructing the digital signal into a digital code value including a series of digits;
transmitting the digital code value; and
retrieving data located at a position corresponding to the received digital
5 code value from a stored file and reading the retrieved data.

【Claim 17】 The remote control method according to claim 16, wherein the file
includes one or more data elements that are assigned one or more digital code values
at corresponding positions.
10

【Claim 18】 A remote control method of a remote control system for detecting
at least one digital code printed on at least one spot on printable material to control
an audio device that outputs audio, the method comprising the steps of:
scanning and converting the printed digital code into a digital signal and
15 reconstructing the digital signal into a digital code value including a series of digits;
transmitting the digital code value to the audio device;
reading a time data element corresponding to the digital code value from an
audio file stored in the audio device, the audio file including a text area and an audio
data area, wherein at least one digital code value is combined with at least one
20 corresponding time data element in the text area; and
moving to audio data corresponding to the read time data element and
outputting the audio data.

【Claim 19】 The remote control method according to any one of claims 8-18,
25 wherein the transmission is performed according to infrared communication, USB

communication, or wireless communication according to a Bluetooth protocol.

5

10

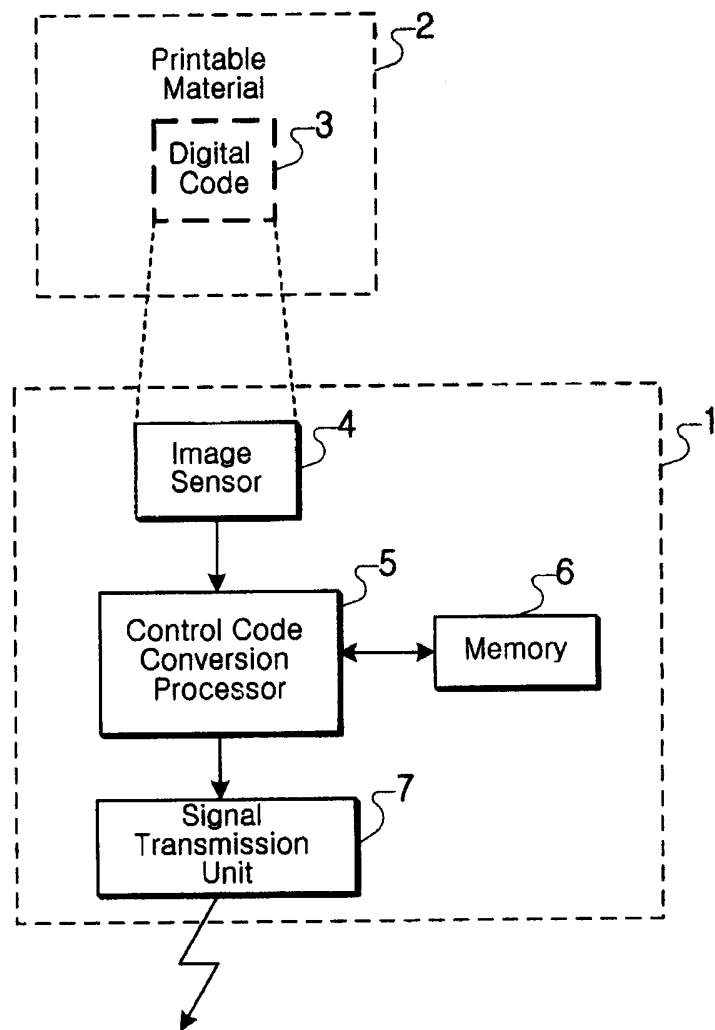
15

20

25

[Drawings]

FIG. 1



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FIG. 2

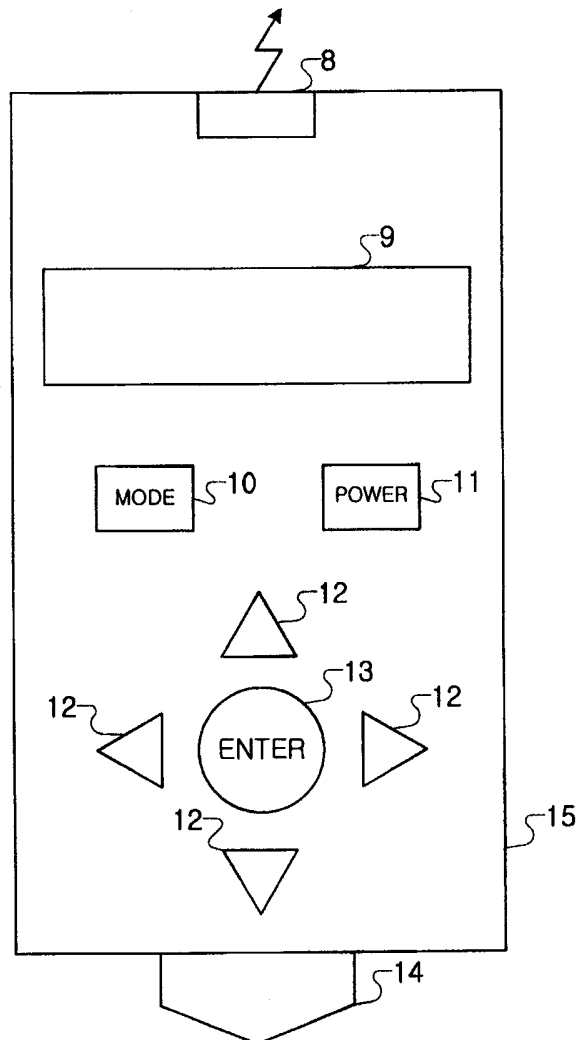


FIG. 3

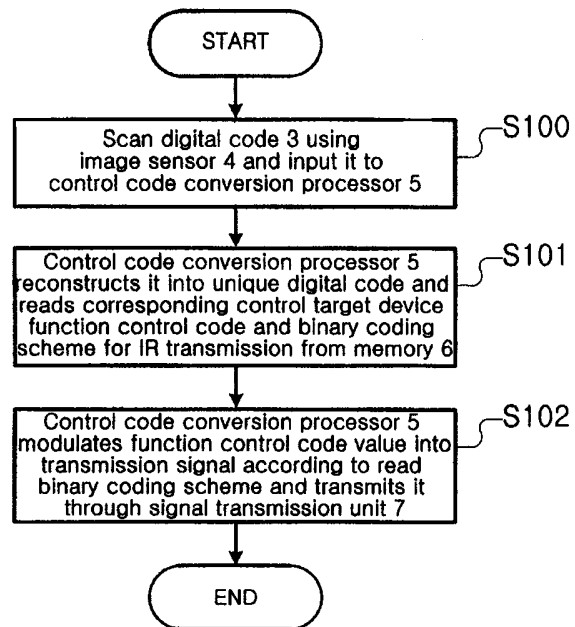


FIG. 4

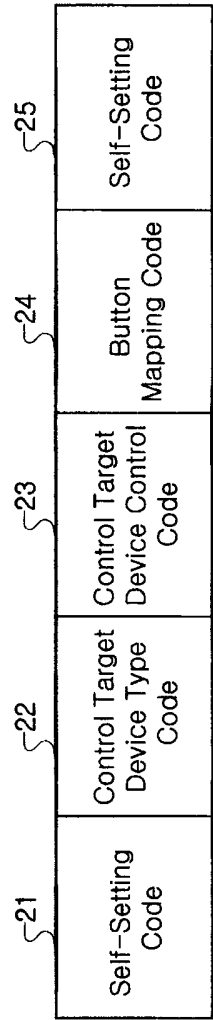


FIG. 5

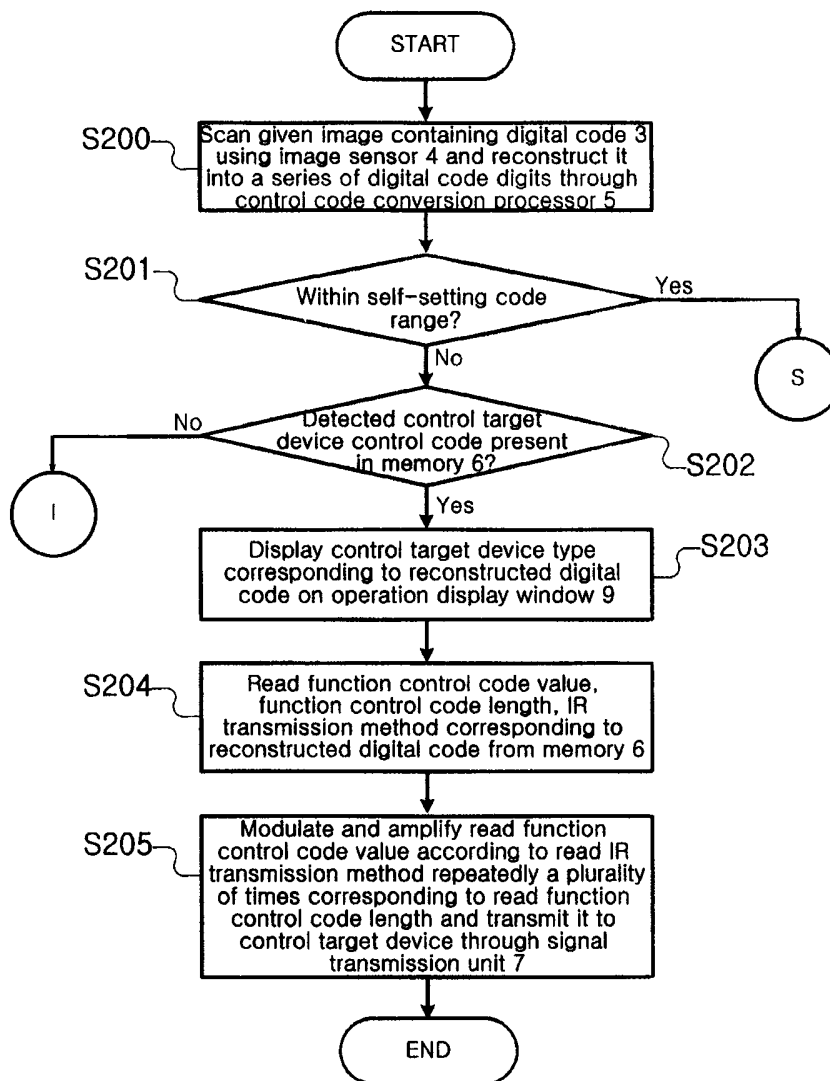
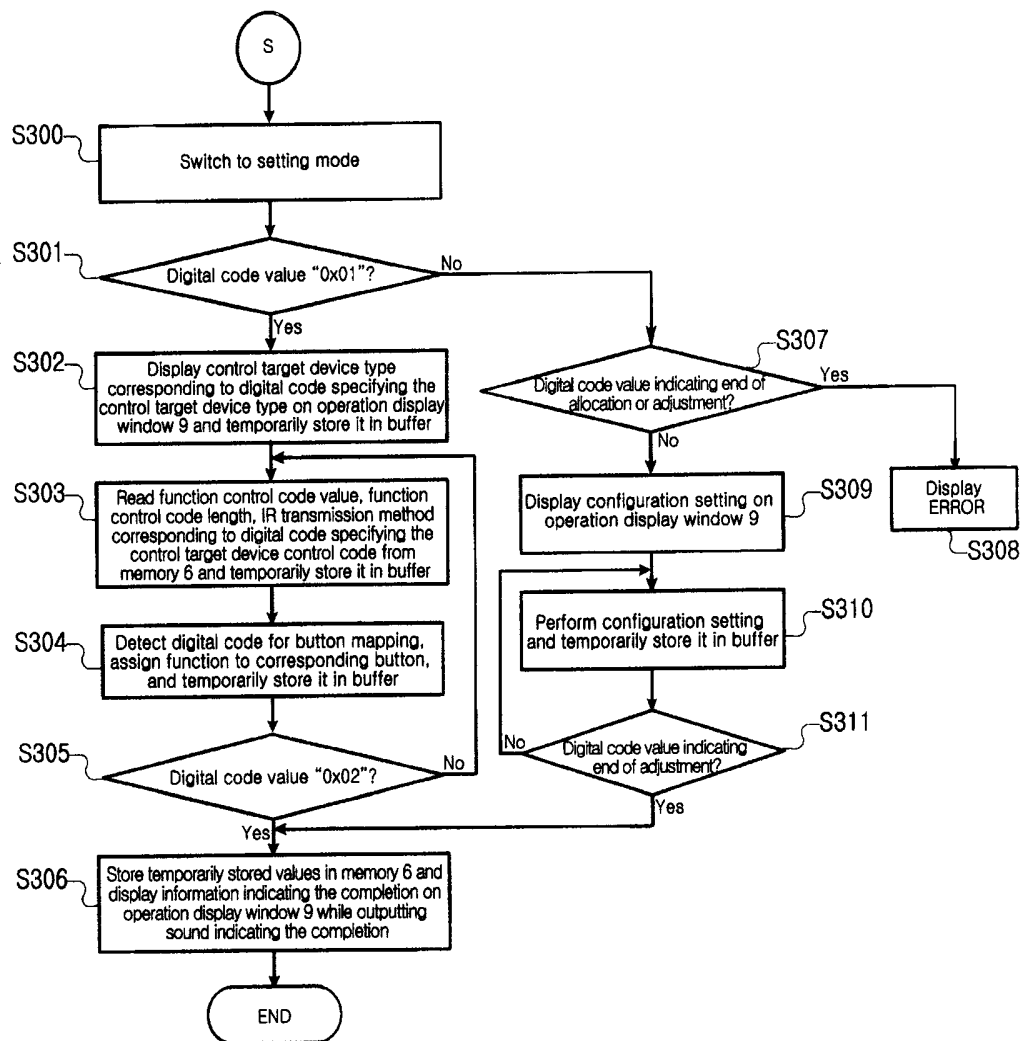


FIG. 6



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FIG. 7

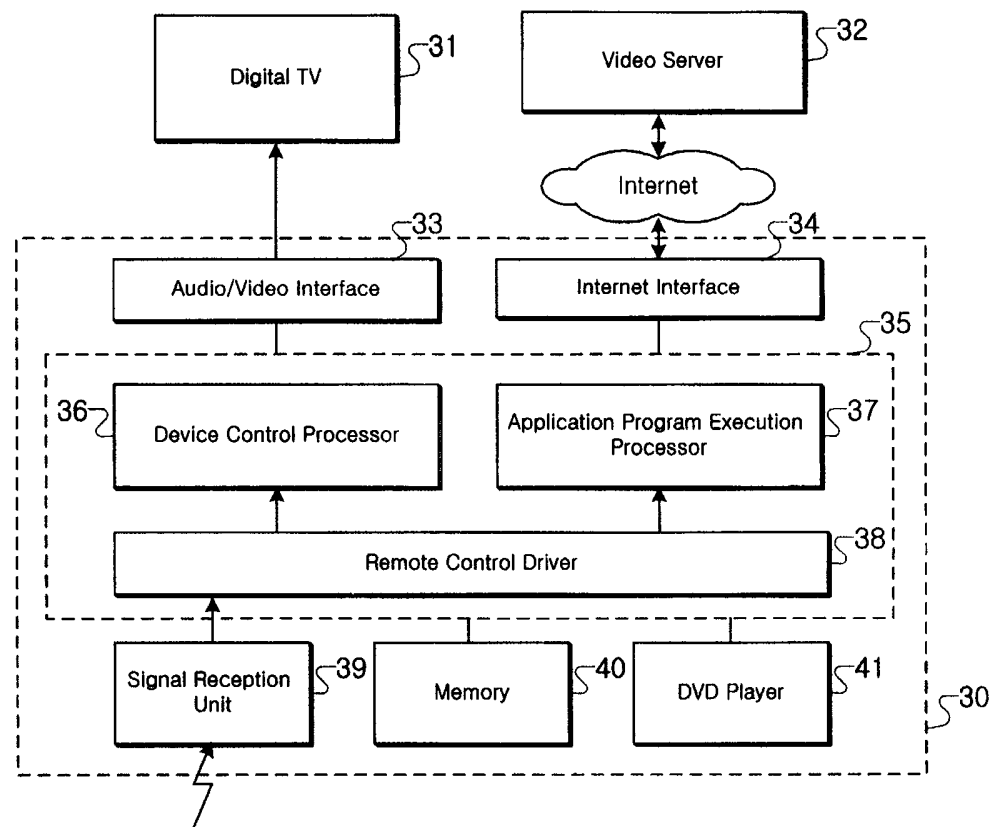


FIG. 8

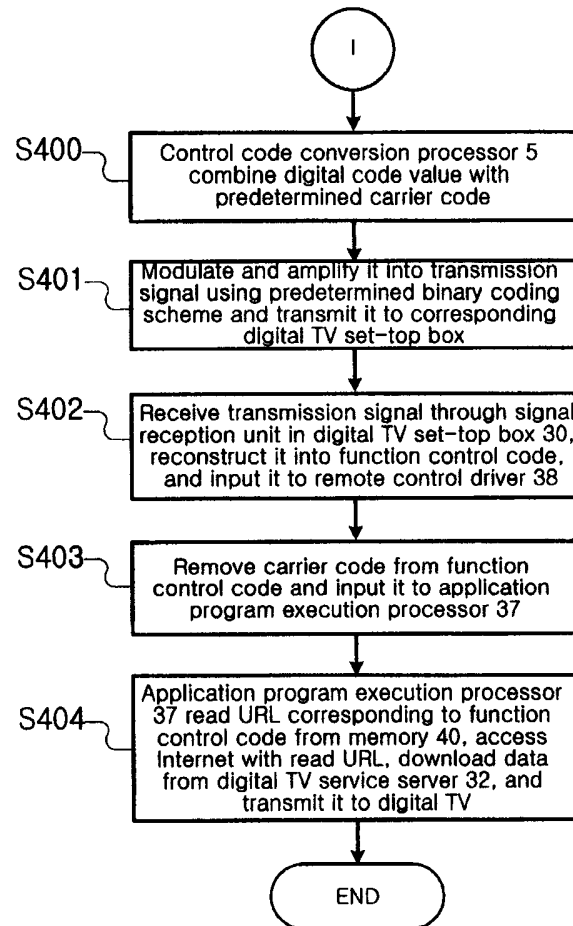


FIG. 9

Audio Data Area	Text Area					
	TIME 1	TEXT 1	TIME 2	TEXT 2

FIG. 10

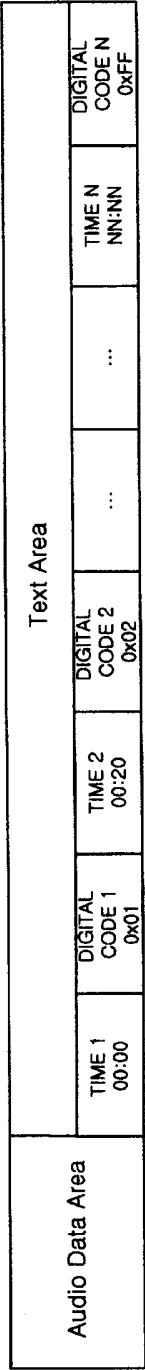


FIG. 11

[0x01] Once upon a time, in the village called Do Hwa there lived a blind man whose last name was Shim. He lost his wife long ago and was barely making a living to grow his young daughter Chung alone.

"Oh, my little dear. Yes, yes, I know you're hungry. I'm going to feed you soon. Wait just a little more, dear.

There, there, that's my little sweetie! You're a very good girl."

[0x02] As usual, the blind man Shim went around from door to door and asked the neighbor women to feed his little baby from their breasts.

"Hello, Gui Deok's mother. I'm afraid to ask you this, but would you please be kind enough to feed my hungry baby?"

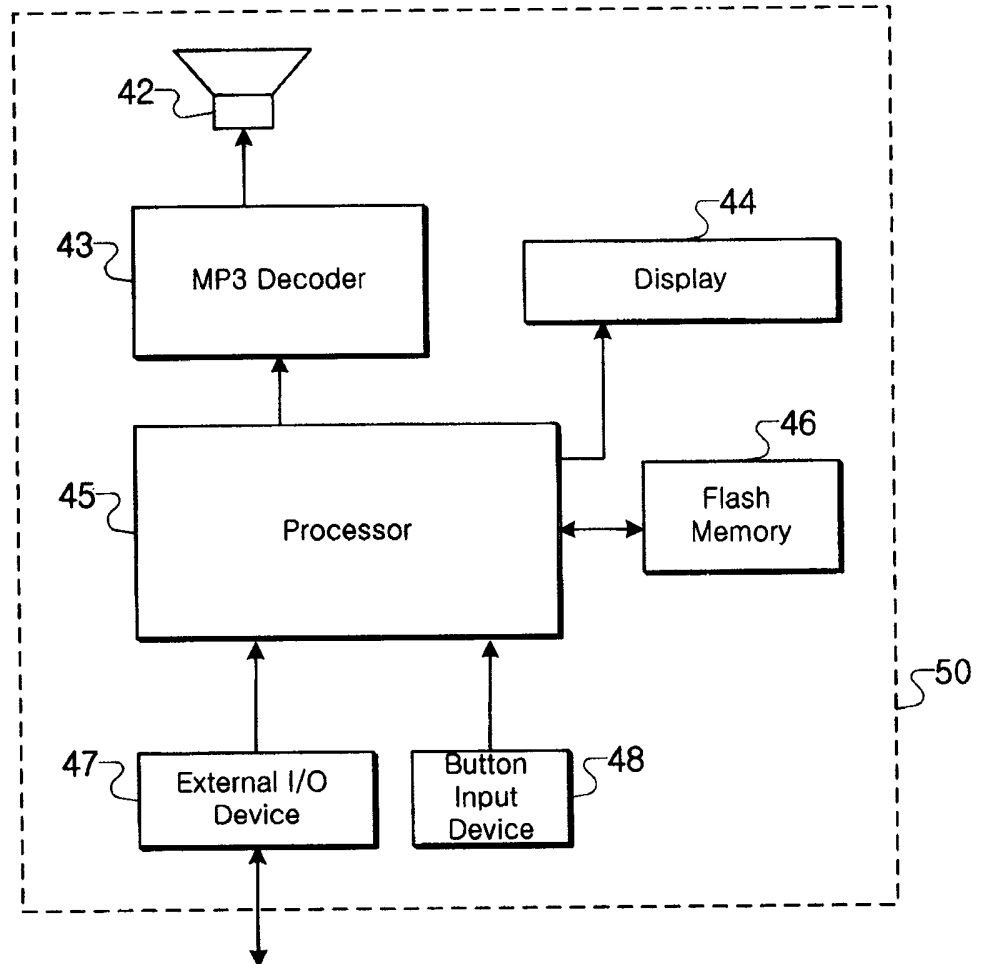
"Of course. Come here, little Chung. How adorable you are! You should grow up healthy and take care of your father."

[0x03] Time has passed by quickly and Chung has grown up and become a beautiful fifteen-year-old girl. Chung took care of her father with the food that she earned from her work

"Father, today I served at a party in the upper village and earned some delicious food. Please, help yourself and enjoy the meal."

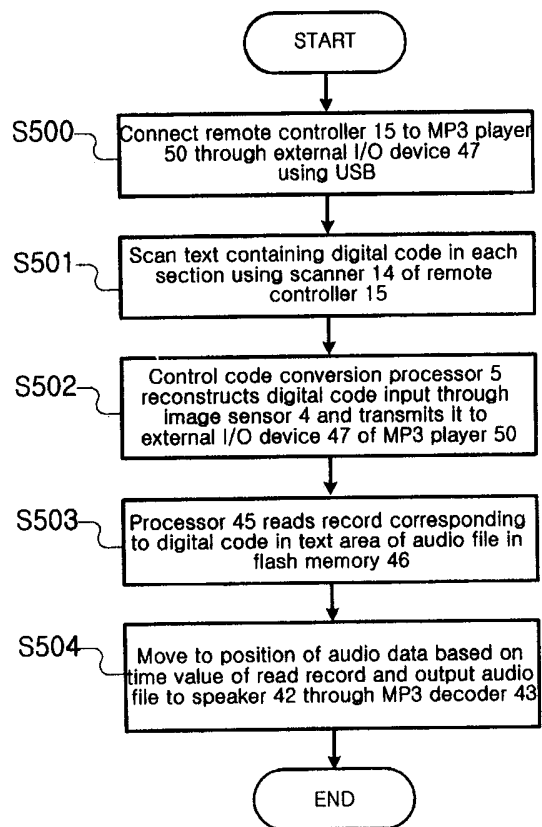
"Oh, my good daughter! You're having a hard time because of me, your blind father."

FIG. 12



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FIG. 13



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2005/003765

A. CLASSIFICATION OF SUBJECT MATTER**G06K 7/10(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 8, G06K 7/10, G08C 19/00, G06K 7/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean patent applications for inventions published since 1975.

Korean utility model applications published since 1975.

Japanese utility models applications published since 1975.

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, KIPASS(Searching system of Korean Intellectual Property Office)

Keywords : remote, control, barcode, and scan

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	US 6,498,567 B1 (XEROX CORP. (US)), Dec.24,2002 column 1, line 66 - column 2, line 13 column 4, line 20 - column 6, line 29 fig.1a - fig.1b fig.3 - fig.4	1, 7, 8, 16, 19 2-6, 9-15, 17, 18
Y A	JP 64-072678 A (MATSUSHITA ELECTRIC IND CO LTD(JP)), Mar.17,1989 abstract the paragraphs related to the fig.1 at the description fig.1	1, 7, 8, 16, 19 2-6, 9-15, 17, 18
A	KR 2000-0028449 A (DAEWOO ELECTRONICS CO., LTD.(KR)), May.25,2000 the paragraphs related to the fig.2 and fig.3 at the description fig.2 - fig.3 claim 1	1 - 19



Further documents are listed in the continuation of Box C.



See patent family annex.

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

22 FEBRUARY 2006 (22.02.2006)

Date of mailing of the international search report

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Name and mailing address of the ISA/KR

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PARK, Sung Ho

Telephone No. 82-42-481-5724



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2005/003765

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US6498567 B1	Dec. 24.2002	JP2001218286A	Aug. 10.2001
JP 64-072678 A	Mar . 17, 1989	None	
KR 2000-0028449 A	May .25.2000	None	