13 5614906 12 17 MA UTILITY PATENT DATE 08/636666 1. PATENT SERIAL MAR 2 5 1997 NUMBER T FILING DATE CLASS 04/23/96 341 SUBCLASS GROUP ART UNIT EXAMINER SERIAL NUMBER 08/636,666 341 176 Hil PATRICK H. HAYES, MISSION VIEJO, CA; KIMTHOA T. NGUYEN, YORBA LINDA, CA. APPLICANTS DATA\*\*\*\* \*\*CONTINUING NONE VERIFIED \*\*FOREIGN/PCT APPLICATIONS\*\*\*\*\*\*\*\*\*\*\*\* NONE VERIFIED \*\*\*\*\* SMALL ENTITY \*\*\*\*\* REIGN FILING LICENSE GRANTED 06/04/96 TOTAL FILING PEE RECEIVED ATTORNEY'S DOCKET NO. STATE OR SHEETS INDEP an priority c AS 8 DRWGS. CLAIMS 35 USC 119 co COUNTRY FILED \$375.00 96030 Verified and Ackno 16 MATK A Galis, BT-HIGHWAY AITheimer THOMAS R VIGIL Ferray -836 SOUTH NORTHWE Suite 4000 DDRESS BARRINGTON-IL -6001 IL 60606 Chicago. METHOD FOR SELECTING A REMOTE CONTROL COMMAND SET J 8,8. DEPT. OF COMM./ PAT. & TM-PTO-436L (Rev.12-94) PARTS OF APPLICATION FILED SEPARATELY NOTICE OF ALLOWANCE MAILED CLAMS ALLOWED Andrew Hill Total Claims Print Claim 6 10 Assistant Examine ISSUE FEE DRAWING Amount Due Date Paid Sheets Drwg. Figs. Dryg. Print Fig. JEAFERV/HOPSAS 64.00 6 a Y PATENT EXAMINER GROUP 2600 ISSUE BATCH Primary Examine NUMBER Label PREPARED FOR ISSUE Area WARNING: The information disclosed herein may be restricted. Unauthorized disclosure may be prohibited by the United States Code Title 35, Sections 122, 181 and 368. Possession outside the U.S. Patent & Trademark Office is restricted to authorized employees and contractors only. Form PTO-436A (Rev. 8/92) (FACE)

# 5,614,906

# METHOD FOR SELECTING A REMOTE CONTROL COMMAND SET

# **Transaction History**

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5/6/1996	Initial Exam Team nn
6/13/1996	Application Captured on Microfilm
6/27/1996	Case Docketed to Examiner in GAU
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## INDEX OF CLAIMS





# US005614906A

# United States Patent [19]

### Hayes et al.

#### [54] METHOD FOR SELECTING A REMOTE CONTROL COMMAND SET

- [75] Inventors: Patrick H. Hayes, Mission Viejo; Kimthoa T. Nguyen, Yorba Linda, both of Calif.
- [73] Assignee: Universal Electronics Inc., Twinsburg, Ohio
- [21] Appl. No.: 636,666

[56]

- [22] Filed: Apr. 23, 1996

- - 825.72

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#### U.S. PATENT DOCUMENTS

4,703,359	10/1987	Rumbolt et al	340/825.69
4,746,919	5/1988	Reitmeier	340/825.72
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[1]	] Patent Number:	5,614,906
[4:	j Date of Patent:	Mar. 25, 1997

	4,959,810	9/1990	Darbee et al 34	0/825.69
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	5,420,573	5/1995	Tanaka et al.	341/176
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3	5,537,463	7/1996	Escobosa et al	379/102
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Primary Examiner—Jeffery Hofsass Assistant Examiner—Andrew Hill

[57]

Attorney, Agent, or Firm-Thomas R. Vigil; Gary Jarosik; Mark R. Galis

#### ABSTRACT

A method for selecting a command set from a group of command sets stored in the remote control. Each remote control command set includes a set of commands for operating at least one of various remotely controllable devices. A command, whose effect is observable in the remotely controlled device is assigned to one of the user actuated keys. The keys are pressed one by one until the user observes the desired effect on the remotely controlled device. The user then signals the remote control to exit the select procedure with the remote control setting the remote control to transmit future commands from the command set including the last transmitted effects observable command having the observed desired effect.

#### 16 Claims, 6 Drawing Sheets















U.S. Patent

5,614,906



FIG. 4

#### METHOD FOR SELECTING A REMOTE CONTROL COMMAND SET

#### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

The present invention relates to a method for selecting a remote control command set from a group of multiple command sets stored in a remote control, for controlling various remotely controllable electronic devices. 10

2. Description of the Related Art Including Information Disclosed Under 37 CFR §§ 1.97-1.99

Heretofore, various systems for providing methods of selecting a remote control command set from a group of multiple command sets have been proposed. Several 15 examples of analogous and non-analogous methods are disclosed in the following U.S. Patents:

	1. N. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	Patentee	20
2	U.S. Pat. No.		
	4,703,359 4,959,810	Rumbolt et al. Darbee et al.	
	5,485,149 German Patent Publications:	Takiguchi et al.	25
1	DE 33 13 493 A1	Telefunken	

The Rumbolt et al., U.S. Pat. No. 4,703,359 discloses a method for adapting a remote control to generate a remote <sup>30</sup> command signal having the appropriate signal structure for controlling a selected one of a plurality of electronic devices. Once the method is initiated, the remote control automatically cycles through the entire list of different format command lists stored within the remote control's internal <sup>35</sup> memory, transmitting a test command to the desired device to be controlled until the user interrupts the cycle. Interrupting the cycle of test commands causes the remote control to transmit future commands using the signal structure of the last test command to interrupting the cycle. <sup>40</sup>

The Darbee et al., U.S. Pat. No. 4,959,810 discloses a universal remote control system that provides for two methods for selecting a remote control command set.

The first method is a step and set procedure in which the list of command sets stored in the remote control are stepped through both forward and backwards allowing a test command from the currently selected command set to be transmitted. The user observes the effects of the test command to determine if the currently selected command set is compatible with the device the user is wanting to control. When the user finds a command set compatible with the device to be controlled, the user exits the procedure with the remote control set to the compatible command set.

The second method is a direct entry—quick set procedure 55 in which the user looks up the make and model of the of the device to be controlled from a printed list of devices. The user then directly inputs a corresponding code associated with the make and model of the device to be controlled to index the proper command set from the remote control's 60 internal command set library.

The Takiguchi et al., U.S. Pat. No. 5,485,149 discloses a method for selecting a set of remote control signals from multiple remote control signal groups, where each group contains multiple sets of remote control signals. Each 65 remote control signal group is assigned to one of the operating keys.

Upon entering a select setting mode, the particular set of remote control signals within one of the signal groups is selected by the number of times the assigned operating key is pressed. A single keypress will select the first set of remote control signals within the remote control signal group assigned to the pressed key. Pressing the same key a second time will select the second set of remote control signals within the assigned remote control signal group. Similarly, subsequent key presses of the same key will select subsequent sets of remote control signals.

The Telefunken, German published patent application DE 33 13 493 A1 discloses a remote control having a table containing multiple columns of control signals each column containing the code signals for operating a particular device and a mechanism for selecting the appropriate column of control signals.

The remote control provides for the selection of the appropriate column of control signals by automatically cycling through the multiple columns of control signals, transmitting a trial command, and observing the effect of the trial command on the device to be remotely operated. When the desired result is observed, the user signals the remote control that a successful command has been transmitted. The remote control then eliminates from consideration all columns of control signals that do not contain the matched successful trial command. If more than one column of control signals match the successful trial command, the remote control repeats the above procedure using a different trial command and cycling through only the remaining columns of control signals until all columns of command signals have been eliminated except one.

#### SUMMARY OF THE INVENTION

According to the present invention there is provided a method for selecting a remote control command set from a group of multiple command sets stored in a remote control, for controlling various remotely controllable electronic devices. The method includes assigning multiple effects observable commands (e.g. a "power off" command) from a group of command sets stored in the remote control to multiple user actuated switches or keys of the remote control.

The user then actuates the switches or keys, one at a time, with the corresponding assigned effects observable command being transmitted. The user continues to actuate keys until the user observes the remotely controlled device responding properly to the transmitted command. The user then terminates the selection procedure with the remote control setting the active command set to the command set from which the successful effects observable command was assigned.

By assigning a single command set to a single user actuated key, the negative effects of a user key actuation that results in a double key actuation or not registering due to failure to fully actuate the key is minimized. If the user suspects the key was not fully actuated, the user can repeat that particular key actuation. If the user inadvertently causes the remote to detect a double key actuation, the remote control merely sends the effects observable command from the assigned command set twice. If the user wishes to actuate a particular key several times in order to confirm its effect on the responding device, he may do so at any point during the process without affecting the process.

The command sets stored in the remote control can be permanently stored in the remote control at the time of

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manufacture or downloaded from an external source. The ability to download command sets from an external source allows the remote control to provide remote control functionality with future devices whose particular transmission protocol or commands have not yet been determined.

The method for selecting a remote control command set from a group of multiple command sets stored in a remote control, further provides for inputting a criteria code for limiting or filtering the list of command sets to be searched through to those command sets that work with devices meeting a particular criteria. In this way, the entire list of command sets do not need to be searched through. Similarly it does not require the user to know all the details about a particular device in order to determine and set the appropriate command set.

Where the number of command sets to be searched through exceeds the number of keys with which the effects observable commands are assigned, the method additionally provides for the ability to page through sub-groups of command sets. Each subgroup being no larger than the number of assignable keys.

Where a remote control provides for multiple modes, each mode providing for the remote operation of a different device (i.e. TV, VCR, cable box, etc.), a different command set can be selected for each of the available modes.

Other objects and advantages of the present application will be apparent from the detailed description and drawings which follow.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of the top face of a remote control incorporating the method for selecting a remote control command set from a group of multiple command 35 sets stored in the remote control.

FIG. 2 is a block diagram of the internal circuitry of the remote control shown in FIG. 1.

FIGS. 3A, 3B, 3C and 3D are each portions of a flow chart that together provide instructions for assisting in the control of the remote control with particular emphasis on the steps that provide for the method of selecting a remote control command set from a group of multiple command sets stored in the remote control.

FIG. 4 is schematic layout of a portion of a BRAND <sup>4</sup> TABLE and of a list of DEVICE ID DATA stored in a memory (RAM) of a microprocessor shown in FIG. 2.

#### DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in greater detail, there is illustrated in FIG. 1 a plan view of the top face of a remote control 10 incorporating the method for selecting a remote control command set from a group of multiple command sets stored in the remote control.

The remote control includes a set of user actuated keys 12, including a power key 14, numeric keys 16, mode keys 18, a magic key 20, and channel up and channel down keys 22.  $_{60}$  The remote control 10 further includes a visual LED 24 and an infra-red LED (not shown), located at the front 26 of the remote control 10.

FIG. 2 is a block diagram of the internal circuitry 28 of the remote control shown in FIG. 1. The internal circuitry 28 is 65 similar to the circuitry described in *Escobosa* et al., U.S. Ser. No. 08/251,336, filed May 31, 1994, now U.S. Pat. No.

4 5,537,463, whose specification is incorporated herein by reference.

The internal circuitry 28 includes a control circuit 30, an oscillator circuit 32, a reset circuit 34, a key pad circuit 36, an external data input circuit 38, and an LED driver circuit 40.

The control circuit 30 monitors and controls the overall functioning of the remote control 10. In a preferred embodiment it incorporates a microprocessor 42, with associated semiconductor memory in the form of ROM 44 and/or RAM 46. The semiconductor memory is used to store both program operating instructions and program data for assisting in the control of the remote control 10.

The oscillator circuit 32 provides a clocking signal to the control circuit 30. The reset circuit 34 provides a reset signal to the control circuit when the internal circuitry 28 is initially powered up. The key pad circuit 36 incorporates the user actuated keys 12 and provides circuitry in conjunction with the control circuit 30 for decoding which one of the user actuated keys 12 has been actuated.

The external data input circuit **38** receives data from a source external to the remote control **10**. The particular circuitry can take the form of any one of many traditional forms of communication, whether wired or wireless. In one preferred embodiment the external data communication is accomplished by a magnetic modern similar to the one described in the Escobosa application, U.S. Ser. No. 08/251, 336, filed May 31, 1994, referred to above.

The LED driver circuit 40 is coupled to the control circuit 30 and incorporates the visual LED 24 and the infra-red LED (not shown) located at the front 26 of the remote control 10 and provides the LEDs with driving power in response to signals received from the control circuit 30. The visual LED 24 provides the user with visual feedback concerning the remote control's 10 activity. The infra-red LED provides the signalling capability for sending the remote control signals to the devices to be controlled.

FIGS. 3A, 3B, 3C and 3D are each portions of a flow chart that together provide instructions for assisting in the control of the remote control with particular emphasis on the steps that provide for the method of selecting a remote control command set from a group of multiple command sets stored in the remote control.

FIG. 3A shows the starting point of the instructions to be executed by the microprocessor 42 in controlling the remote control 10. The flow chart begins by waiting for an interrupt or an indication that a key or switch 12 has been pressed or actuated. Upon actuation of a key or switch 12, a determination is made as to which key has been pressed.

If a mode key 18 is pressed the remote control 10 sets the current command set from which commands will be transmitted to the command set chosen for the selected mode. The mode keys 18 preferably include separate mode keys 18 for a TV, a VCR, a Cable Box, as well as any other device for which an infra-red remote control transmitter could be used to remotely control the device.

If a command key is pressed, the remote control 10 transmits the particular operating command associated with the pressed command key from the currently selected command set.

If an enter setup key is pressed the remote control 10 enters a setup mode used to configure the remote control 10. In the preferred embodiment the enter setup key is equivalent to the magic key 20, however it can take any one of various forms including a slider switch or a combination of key presses.

Upon entering the setup mode, the remote control 10 waits until it receives a set up code. If the setup code is a setup function code, the execution of operating instructions of the remote control 10 branches to FIG. 3B to perform instructions to determine which function code has been requested to be performed.

If the setup code is a criteria code, indicating a particular subset of command code sets, the remote control sets the searchable command sets to the command sets meeting the received criteria and branches the execution of instructions to FIG. 3C to perform instructions to select a new command set for the currently active mode.

The criteria code allows the remote control to restrict the number of searchable command sets to only those command sets used with devices meeting a particular criteria and/or to 15 determine a different order of assigning the effects observable commands.

Preferably the effects observable commands will be assigned to the user actuated keys in order of decreasing popularity. However a command set that is not very popular 20 when one considers the entire list of stored command sets used for operating a television, may be the most popular command set used for operating a television manufactured by a particular manufacturer. The use of a criteria code representing a particular manufacturer by the user can be 25 used to establish a different assignment order based on the popularity of command sets following the indicated criteria.

Examples of different possible criteria include codes for different manufacturers, codes for equipment manufactured or purchased between a specified time period, devices sold 30 through a particular retail outlet, etc.

Additionally in some embodiments it is possible to allow for the entry of multiple criteria in order to further isolate the proper command set for operating a particular device.

If the setup code is neither a function code nor a setup 35 code, it is assumed the user inadvertently entered the setup mode and the execution of the operating instructions of the remote control 10 branches to the start of the instructions in FIG. 3A.

FIG. 3B shows the program steps performed when a function code is received after entering the setup mode. First a determination is made to identify which function is being requested to be executed. If the function code is determined to be a download code, the remote control executes a procedure to receive one or more command sets via the external data input. The searchable subset of command sets are defined to include the received command sets and the execution of the operating instructions branches to FIG. 3C.

Similarly, an alternative embodiment can allow the 50 received command sets to supplement the command sets previously stored in the remote control 10.

In the embodiment disclosed in FIGS. 3A through 3D the remote control enters a command set selection procedure after downloading the received data, however it is not 55 necessary for the selection procedure to be entered immediately after downloading of the received data, but can be delayed until the user chooses. Similarly, the data received does not necessarily have to be one or more command sets, but can include updates to already stored command sets or 60 other related data.

If the function code is a search code, the searchable set of commands is defined to include the command sets stored in the remote control without first inputting a criteria code or downloading command sets. This allows the user to directly 65 enter the procedure to select the new command set without first entering a criteria code or performing another function.

FIGS. 3C and 3D shows the program steps for selecting. the new command set from the list of searchable command sets. Initially, as shown in FIG. 3C a determination is made whether the number of searchable command sets exceeds the number of assignable user actuated keys or switches.

If the number of searchable command sets is greater than the number of assignable user actuated keys or switches the searchable command sets are broken up into multiple pages of command sets no greater in size than the number of assignable user actuated keys that can be paged through using the channel up and channel down keys 22. The effects observable commands from the currently selected page, initially the first page, of command sets is assigned to the assignable user actuated keys.

If the number of searchable command sets is equal to or less than the number of assignable user actuated keys or switches, the effects observable commands from the searchable command sets, forming a single page of command sets, are assigned to the assignable user actuated keys.

After the effects observable commands for the currently selected page have been assigned, the remote control 10 waits for a key to be pressed. When a key press has been detected the remote control 10 determines if the key pressed is an assignable user actuated key, a key which has had an effects observable command assigned to it. If it is then the remote control transmits the assigned effects observable command (e.g., a "power off" command) to the device to be remotely controlled and loops back to wait for another key press. The user observes the device to be remotely controlled for a visual indication of a compatible command.

In the preferred embodiment the assignable user actuated keys include the power key 14 and the numeric keys 16. The assignable user actuated keys are assigned in the order of the power key 14 first, followed by the numeric keys 16 in order starting with the "one" key and ending with the "zero" key. Additionally the preferred effects observable command is a power off command.

If the key pressed is a page down command (i.e. a channel down key 22), and a subsequent page of command sets is defined. Then the remote control 10 reassigns an effects observable command from each of the command sets from the subsequent page of command sets to the assignable user actuated keys and loops back to wait for another key press.

If the key pressed is a page up command (i.e. a channel up key 22), and a prior page of command sets is defined, then the remote control reassigns an effects observable command from each of the command sets from the prior page of command sets to the assignable user actuated keys and loops back to wait for another key press.

If the key pressed is an exit setup key (i.e. a magic key 20), then the remote control 10 sets the current command set for the currently selected mode to the command set corresponding to the effects observable command assigned to the last pressed assigned key. Typically the user exits the setup procedure when the user observes the desired effect on the device to be controlled by the remote control 10, indicating that a compatible command set has been located.

In this way a method for selecting a compatible command set from a library of multiple command sets can be realized. Similarly different command sets can be selected for each of the different device modes by selecting the mode key 18 corresponding to the desired mode prior to entering the setup procedure.

Often times, a plurality of brands of electronic devices, e.g., television sets may share a device entry code. For example, the Panasonic code, 035, is also the entry code for

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7 a private labelled television set sold by Montgomery Wards. This is illustrated in FIG. 4.

Additionally, as shown in FIG. 4, the priority order may be different from brand name to brand name, even though they use the same device entry code. For example the Sony number 1 code is 033, but this device entry code is only the Wards number 2 code.

From the foregoing description, it will be apparent that the method for selecting a remote control command set from a group of multiple command sets stored in a remote control, for controlling various remotely controllable electronic devices of the present invention has a number of advantages, some of which have been described above and others of which are inherent in the method of the invention. Also it will be understood that modifications can be made to the method for selecting a remote control command set described above without departing from the teachings of the invention.

I claim:

1. A method for selecting an appropriate one of a plurality <sup>20</sup> of command sets stored in a remote control having a plurality of assignable user actuated switches or keys for controlling a remotely controllable electronic device, comprising the steps of:

- (a) assigning an effects observable command from each of said plurality of command sets to one of said plurality of assignable user actuated switches or keys, each assigned, effects observable command to be transmitted when the corresponding one of the assignable user  $_{30}$  actuated switches or keys is actuated;
- (b) actuating sequentially and individually each one of the plurality of assignable user actuated switches or keys, to individually transmit each assigned effects observable command until the proper effect is observed;
- (c) halting the actuating of the plurality of assignable user actuated switches or keys; and
- (d) setting the remote control to transmit future remote control commands from the command set containing the last transmitted effects observable command.

2. The method of claim 1, further comprising the step of receiving the plurality of command sets from an external source prior to the step of assigning an effects observable command.

3. The method of claim 2, wherein said external source <sup>45</sup> communicates with the remote control via a wireless signal transmission.

4. The method of claim 2, wherein said external source communicates with the remote control via a wired signal transmission.

5. The method of claim 2, wherein said external source communicates with the remote control via a magnetic modem coupled to a telephone handset.

6. The method of claim 1, further comprising the step of receiving a code input from the user and wherein said code 55 input is used to identify a subset of command sets meeting a particular criteria, from which said effects observable commands are assigned from.

7. The method of claim 6, wherein said particular criteria refer to command sets which control electronic devices <sup>60</sup> manufactured by a specific manufacturer.

8. The method of claim 6, wherein said particular criteria refer to command sets which control electronic devices manufactured within a specific time period.

 The method of claim 6, wherein said particular criteria refer to command sets which control electronic devices sold through a particular retail outlet.

10. The method of claim 1, wherein said effects observable command is a power off command.

11. The method of claim 1, wherein said plurality of assignable user actuated switches or keys include a power key and numeric keys.

12. The method of claim 1, wherein said remote control further includes a plurality of user actuated mode keys for selecting one of a plurality of modes and said method further includes the step of selecting one of the plurality of modes prior to the step of assigning an effects observable command, such that, the method for selecting an appropriate one of a plurality of command sets can be performed to separately set a different command set for each mode.

13. The method of claim 1, wherein said remote control further includes a page down user actuated key and a page up user actuated key and, when the number of command sets exceed the number of assignable user actuated switches or keys, said method further includes the steps of; assigning an effects observable command from each of said plurality of command sets in a subsequent group of command sets to one of said plurality of assignable user actuated switches or keys, when a page down user actuated key is actuated; and assigning an effects observable command from each of said plurality of command sets in a prior group of command sets to one of said plurality of assignable user actuated key is actuated; and assigning an effects observable command from each of said plurality of command sets in a prior group of command sets to one of said plurality of assignable user actuated switches or keys, when a page up user actuated key is actuated.

14. The method of claim 1, wherein the order of said effects observable commands from said plurality of command sets is assigned to said plurality of assignable user actuated switches or keys based upon decreasing popularity of usage of each of said command sets.

15. The method of claim 14, further comprising the step of receiving a code input from the user and wherein said code input indicates a particular criteria and is used to further determine the order said effects observable commands are assigned to said plurality of assignable user actuated switches or keys based upon decreasing popularity of usage of each of said command sets conforming to said criteria.

16. An apparatus for selecting an appropriate one of a plurality of command sets stored in a remote control having a plurality of assignable user actuated switches or keys for controlling a remotely controllable electronic device, comprising:

means for assigning an effects observable command from each of the plurality of command sets to one of said plurality of assignable user actuated switches or keys:

means for transmitting said effects observable command when the corresponding one of said plurality of assignable user actuated switches or keys is actuated;

means for indicating the halting of the actuation of the plurality of assignable user actuated switches or keys; and

means for setting the remote control to transmit future remote control commands from the command set containing the last transmitted effects observable command. PATENT APPLICATION SERIAL NO. 18/636666

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE FEE RECORD SHEET

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# 08/636666

PATENT USSN - New U.S. Patent Application Atty Docket <u>96030</u>

#### IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

New pate	Regular	Applicant(s): Patrick H. Hayes and Kimthoa T.
	Convention	Nguyen
	File Wrapper Continuation Divisional/Continuation	Serial No.
	Continuation-in-Part Reissue Application	Title: METHOD FOR SELECTING A REMOTE CONTROL
	PCT National Phase	COMMANT SET
	PCT Application	PCT No.

#### CERTIFICATE OF EXPRESS MAIL DEPOSIT

"Express Mail" Mailing Label No. EM 311368749 US Date of Deposit: \_\_\_\_\_ April 23, 1996

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The docum	ments enclosed with and being filed with this paper are:
x	application transmittal letter
x	Patent application:
	12 pages of specification
	<u>3</u> pages of claims containing <u>16</u> claims
1 J J J	x Abstract of the Disclosure
	6 sheets of drawings containing 7 FIG'S.
	x executed Declaration and Power of Attorney
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	from parent application
	specification and claims in foreign language
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2 A	translation of PCT Article 19 Amendment
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Patent Assignment Recordation Cover Sheet

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#### Application for Letters Patent

OF the UNITED STATES OF AMERICA by -

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and

KIMTHOA T. NGUYEN 5671 Lynnbrook Plama Yorba Linda, California 92686

All being citizens of -

the UNITED STATES OF AMERICA

For:

METHOD FOR SELECTING A REMOTE CONTROL COMMAND SET

08/636666

#### ETHOD FOR SELECTING A REMOTE CONTROL COMMAND SET BACKGROUND OF THE INVENTION

#### 1. Field of the Invention.

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The present invention relates to a method for selecting a remote control command set from a group of multiple command sets stored in a remote control, for controlling various remotely controllable electronic devices.

2. Description of the related art including information disclosed under 37 CFR §§ 1.97-1.99.

Heretofore, various systems for providing methods of selecting a remote control command set from a group of multiple command sets have been proposed. Several examples of analogous and non-analogous methods are disclosed in the following U.S. Patents:

U.S. Patent No.	Patentee
4,703,359	Rumbolt et al.
4,959,810	Darbee et al.
5,485,149	Takiguchi et al.
German Patent Public	ations

DE 33 13 493 A1

Telefunken

The Rumbolt et al., U.S. Patent No. 4,703,359 discloses a method for adapting a remote control to generate a remote command signal having the appropriate signal structure for controlling a selected one of a plurality of electronic 25 devices. Once the method is initiated, the remote control automatically cycles through the entire list of different format command lists stored within the remote control's internal memory, transmitting a test command to the desired device to be controlled until the user interrupts the cycle. 30 Interrupting the cycle of test commands causes the remote control to transmit future commands using the signal structure of the last test command transmitted prior to interrupting the cycle.

The Darbee et al., U.S. Patent No. 4,959,810 discloses a 35 universal remote control system that provides for two methods for selecting a remote control command set.

The first method is a step and set procedure in which the list of command sets stored in the remote control are stepped through both forward and backwards allowing a test command from the currently selected command set to be transmitted. The user observes the effects of the test command to determine if the currently selected command set is compatible with the device the user is wanting to control. When the user finds a command set compatible with the device to be controlled, the user exits the procedure with the remote control set to the compatible command set.

The second method is a direct entry - quick set procedure in which the user looks up the make and model of the of the 10 device to be controlled from a printed list of devices. The user then directly inputs a corresponding code associated with the make and model of the device to be controlled to index the proper command set from the remote control's internal command set library.

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The Takiguchi et al., U.S. Patent No. 5,485,149 discloses a method for selecting a set of remote control signals from multiple remote control signal groups, where each group contains multiple sets of remote control signals. Each remote control signal group is assigned to one of the operating keys. Upon entering a select setting mode, the particular set of remote control signals within one of the signal groups is selected by the number of times the assigned operating key is pressed. A single keypress will select the first set of remote control signals within the remote control signal group assigned to the pressed key. Pressing the same key a second time will select the second set of remote control signals within the assigned remote control signal group. Similarly, subsequent key presses of the same key will select subsequent sets of remote control signals.

The Telefunken, German published patent application DE 33 13 493 Al discloses a remote control having a table containing multiple columns of control signals each column containing the code signals for operating a particular device and a mechanism for selecting the appropriate column of control signals.

The remote control provides for the selection of the appropriate column of control signals by automatically cycling through the multiple columns of control signals, transmitting a trial command, and observing the effect of the trial command on the device to be remotely operated. When the desired result

is observed, the user signals the remote control that a successful command has been transmitted. The remote control then eliminates from consideration all columns of control signals that do not contain the matched successful trial command. If more than one column of control signals match the successful trial command, the remote control repeats the above procedure using a different trial command and cycling through only the remaining columns of control signals until all columns of command signals have been eliminated except one.

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#### SUMMARY OF THE INVENTION

According to the present invention there is provided a method for selecting a remote control command set from a group of multiple command sets stored in a remote control, for 5 controlling various remotely controllable electronic devices. The method includes assigning multiple effects observable commands (e.g. a "power off" command) from a group of command sets stored in the remote control to multiple user actuated switches or keys of the remote control.

The user then actuates the switches or keys, one at a 10 time, with the corresponding assigned effects observable command being transmitted. The user continues to actuate keys until the user observes the remotely controlled device responding properly to the transmitted command. The user then 15 terminates the selection procedure with the remote control setting the active command set to the command set from which the successful effects observable command was assigned.

By assigning a single command set to a single user actuated key, the negative effects of a user key actuation that 20 results in a double key actuation or not registering due to failure to fully actuate the key is minimized. If the user suspects the key was not fully actuated, the user can repeat that particular key actuation. If the user inadvertently causes the remote to detect a double key actuation, the remote 25 control merely sends the effects observable command from the assigned command set twice. If the user wishes to actuate a particular key several times in order to confirm its effect on the responding device, he may do so at any point during the process without affecting the process.

The command sets stored in the remote control can be permanently stored in the remote control at the time of manufacture or downloaded from an external source. The ability to download command sets from an external source allows the remote control to provide remote control functionality with 35 future devices whose particular transmission protocol or commands have not yet been determined.

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The method for selecting a remote control command set from a group of multiple command sets stored in a remote control, further provides for inputting a criteria code for limiting or

filtering the list of command sets to be searched through to those command sets that work with devices meeting a particular criteria. In this way, the entire list of command sets do not need to be searched through. Similarly it does not require the 5 user to know all the details about a particular device in order to determine and set the appropriate command set.

Where the number of command sets to be searched through exceeds the number of keys with which the effects observable commands are assigned, the method additionally provides for the 10 ability to page through sub-groups of command sets. Each subgroup being no larger than the number of assignable keys.

Where a remote control provides for multiple modes, each mode providing for the remote operation of a different device (i.e. TV, VCR, cable box, etc.), a different command set can be selected for each of the available modes.

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Other objects and advantages of the present application will be apparent from the detailed description and drawings which follow.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of the top face of a remote control incorporating the method for selecting a remote control command set from a group of multiple command sets stored in the 5 remote control.

FIG. 2 is a block diagram of the internal circuitry of the remote control shown in FIG. 1.

FIGS. 3A, 3B, 3C and 3D are each portions of a flow chart that together provide instructions for assisting in the control 10 of the remote control with particular emphasis on the steps that provide for the method of selecting a remote control command set from a group of multiple command sets stored in the remote control.

FIG. A is schematic layout of a portion of a BRAND TABLE 15 and of a list of DEVICE ID DATA stored in a memory (RAM) of a microprocessor shown in FIG. 2.

#### DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in greater detail, there is illustrated in FIG. 1 a plan view of the top face of a remote control 10 incorporating the method for selecting a remote 5 control command set from a group of multiple command sets stored in the remote control.

The remote control includes a set of user actuated keys 12, including a power key 14, numeric keys 16, mode keys 18, a magic key 20, and channel up and channel down keys 22. The 10 remote control 10 further includes a visual LED 24 and an infra-red LED (not shown), located at the front 26 of the remote control 10.

FIG. 2 is a block diagram of the internal circuitry 28 of the remote control shown in FIG. 1. The internal circuitry 28 15 is similar to the circuitry described in <u>Escobosa et al.</u>, USSN 08/251,336, filed May 31, 1994, now U.S> Patent No.55637,463, whose specification is incorporated herein by reference.

The internal circuitry 28 includes a control circuit 30, an oscillator circuit 32, a reset circuit 34, a key pad circuit 20 36, an external data input circuit 38, and an LED driver circuit 40.

The control circuit 30 monitors and controls the overall functioning of the remote control 10. In a preferred embodiment it incorporates a microprocessor 42, with associated 25 semiconductor memory in the form of ROM 44 and/or RAM 46. The semiconductor memory is used to store both program operating instructions and program data for assisting in the control of the remote control 10.

The oscillator circuit 32 provides a clocking signal to 30 the control circuit 30. The reset circuit 34 provides a reset signal to the control circuit when the internal circuitry 28 is initially powered up. The key pad circuit 36 incorporates the user actuated keys 12 and provides circuitry in conjunction with the control circuit 30 for decoding which one of the user 35 actuated keys 12 has been actuated.

The external data input circuit 38 receives data from a source external to the remote control 10. The particular circuitry can take the form of any one of many traditional forms of communication, whether wired or wireless. In one

preferred embodiment the external data communication is accomplished by a magnetic modem similar to the one described in the Escobosa application, USSN 08/251,336, filed May 31, 1994, referred to above.

The LED driver circuit 40 is coupled to the control circuit 30 and incorporates the visual LED 24 and the infra-red LED (not shown) located at the front 26 of the remote control 10 and provides the LEDs with driving power in response to signals received from the control circuit 30. The visual LED 10 24 provides the user with visual feedback concerning the remote control's 10 activity. The infra-red LED provides the signalling capability for sending the remote control signals to the devices to be controlled.

FIGS. 3A, 3B, 3C and 3D are each portions of a flow chart that together provide instructions for assisting in the control 15 of the remote control with particular emphasis on the steps that provide for the method of selecting a remote control command set from a group of multiple command sets stored in the remote control.

FIG. 3A shows the starting point of the instructions to be executed by the microprocessor 42 in controlling the remote control 10. The flow chart begins by waiting for an interrupt or an indication that a key or switch 12 has been pressed or Upon actuation of a key or switch 12, actuated. 25 determination is made as to which key has been pressed.

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If a mode key 18 is pressed the remote control 10 sets the current command set from which commands will be transmitted to the command set chosen for the selected mode. The mode keys 18 preferably include separate mode keys 18 for a TV, a VCR, a 30 Cable Box, as well as any other device for which an infra-red remote control transmitter could be used to remotely control the device.

If a command key is pressed, the remote control 10 transmits the particular operating command associated with the pressed command key from the currently selected command set.

If an enter setup key is pressed the remote control 10 enters a setup mode used to configure the remote control 10. In the preferred embodiment the enter setup key is equivalent to the magic key 20, however it can take any one of various

forms including a slider switch or a combination of key presses.

Upon entering the setup mode, the remote control 10 waits until it receives a set up code. If the setup code is a setup 5 function code, the execution of operating instructions of the remote control 10 branches to FIG. 3B to perform instructions to determine which function code has been requested to be performed.

If the setup code is a criteria code, indicating a 10 particular subset of command code sets, the remote control sets the searchable command sets to the command sets meeting the received criteria and branches the execution of instructions to FIG. 3C to perform instructions to select a new command set for the currently active mode.

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The criteria code allows the remote control to restrict the number of searchable command sets to only those command sets used with devices meeting a particular criteria and\or to determine a different order of assigning the effects observable commands.

Preferably the effects observable commands will be assigned to the user actuated keys in order of decreasing popularity. However a command set that is not very popular when one considers the entire list of stored command sets used for operating a television, may be the most popular command set used for operating a television manufactured by a particular manufacturer. The use of a criteria code representing a particular manufacturer by the user can be used to establish a different assignment order based on the popularity of command sets following the indicated criteria.

Examples of different possible criteria include codes for different manufacturers, codes for equipment manufactured or purchased between a specified time period, devices sold through a particular retail outlet, etc.

Additionally in some embodiments it is possible to allow 35 for the entry of multiple criteria in order to further isolate the proper command set for operating a particular device.

If the setup code is neither a function code nor a setup code, it is assumed the user inadvertently entered the setup mode and the execution of the operating instructions of the remote control 10 branches to the start of the instructions in FIG. 3A.

FIG. 3B shows the program steps performed when a function code is received after entering the setup mode. First a 5 determination is made to identify which function is being requested to be executed. If the function code is determined to be a download code, the remote control executes a procedure to receive one or more command sets via the external data input. The searchable subset of command sets are defined to 10 include the received command sets and the execution of the operating instructions branches to FIG. 3C.

Similarly, an alternative embodiment can allow the received command sets to supplement the command sets previously stored in the remote control 10.

15 In the embodiment disclosed in FIGS. 3A through 3D the remote control enters a command set selection procedure after downloading the received data, however it is not necessary for the selection procedure to be entered immediately after downloading of the received data, but can be delayed until the 20 user chooses. Similarly, the data received does not necessarily have to be one or more command sets, but can include updates to already stored command sets or other related data.

If the function code is a search code, the searchable set 25 of commands is defined to include the command sets stored in the remote control without first inputting a criteria code or downloading command sets. This allows the user to directly enter the procedure to select the new command set without first entering a criteria code or performing another function.

FIGS. 3C and 3D shows the program steps for selecting the new command set from the list of searchable command sets. Initially, as shown in FIG. 3C a determination is made whether the number of searchable command sets exceeds the number of assignable user actuated keys or switches.

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If the number of searchable command sets is greater than the number of assignable user actuated keys or switches the searchable command sets are broken up into multiple pages of command sets no greater in size than the number of assignable user actuated keys that can be paged through using the channel

# Universal Remote Control Exhibit 1002 Page 30

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up and channel down keys 22. The effects observable commands from the currently selected page, initially the first page, of command sets is assigned to the assignable user actuated keys. If the number of searchable command sets is equal to or

5 less than the number of assignable user actuated keys or switches, the effects observable commands from the searchable command sets, forming a single page of command sets, are assigned to the assignable user actuated keys.

After the effects observable commands for the currently 10 selected page have been assigned, the remote control 10 waits for a key to be pressed. When a key press has been detected the remote control 10 determines if the key pressed is an assignable user actuated key, a key which has had an effects observable command assigned to it. If it is then the remote 15 control transmits the assigned effects observable command (e.g., a "power off" command) to the device to be remotely controlled and loops back to wait for another key press. The user observes the device to be remotely controlled for a visual indication of a compatible command.

In the preferred embodiment the assignable user actuated keys include the power key 14 and the numeric keys 16. The assignable user actuated keys are assigned in the order of the power key 14 first, followed by the numeric keys 16 in order starting with the "one" key and ending with the "zero" key. 25 Additionally the preferred effects observable command is a power off command.

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If the key pressed is a page down command (i.e. a channel down key 22), and a subsequent page of command sets is defined. Then the remote control 10 reassigns an effects observable 30 command from each of the command sets from the subsequent page of command sets to the assignable user actuated keys and loops back to wait for another key press.

If the key pressed is a page up command (i.e. a channel up key 22), and a prior page of command sets is defined, then the remote control reassigns an effects observable command from each of the command sets from the prior page of command sets to the assignable user actuated keys and loops back to wait for another key press.

If the key pressed is an exit setup key (i.e. a magic key

20), then the remote control 10 sets the current command set the currently selected mode to the command set for corresponding to the effects observable command assigned to the last pressed assigned key. Typically the user exits the setup 5 procedure when the user observes the desired effect on the device to be controlled by the remote control 10, indicating that a compatible command set has been located.

In this way a method for selecting a compatible command set from a library of multiple command sets can be realized. 10 Similarly different command sets can be selected for each of the different device modes by selecting the mode key 18 corresponding to the desired mode prior to entering the setup procedure.

Often times, a plurality of brands of electronic devices, 15 e.g., television sets may share a device entry code. For example, the Panasonic code, 035, is also the entry code for a private labelled television set sold by Montgomery Wards. This is illustrated in FIG. 4.

Additionally, as shown in FIG. 4, the priority order may 20 be different from brand name to brand name, even though they use the same device entry code. For example the Sony number 1 code is 033, but this device entry code is only the Wards number 2 code.

From the foregoing description, it will be apparent that 25 the method for selecting a remote control command set from a group of multiple command sets stored in a remote control, for controlling various remotely controllable electronic devices of the present invention has a number of advantages, some of which have been described above and others of which are inherent in 30 the method of the invention. Also it will be understood that modifications can be made to the method for selecting a remote control command set described above without departing from the teachings of the invention.

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#### I Claim:

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 A method for selecting an appropriate one of a plurality of command sets stored in a remote control having a
 plurality of assignable user actuated switches or keys for controlling a remotely controllable electronic device, comprising the steps of:

13 CLAIMS

 (a) assigning an effects observable command from each of said plurality of command sets to one of said plurality of
 10 assignable user actuated switches or keys, each assigned, effects observable command to be transmitted when the corresponding one of the assignable user actuated switches or keys is actuated;

(b) actuating sequentially and individually each one of
 15 the plurality of assignable user actuated switches or keys, to
 individually transmit each assigned effects observable command
 until the proper effect is observed;

(c) halting the actuating of the plurality of assignable user actuated switches or keys; and

20 (d) setting the remote control to transmit future remote control commands from the command set containing the last transmitted effects observable command.

 The method of claim 1, further comprising the step of receiving the plurality of command sets from an external source
 prior to the step of assigning an effects observable command.

3. The method of claim 2, wherein said external source communicates with the remote control via a wireless signal transmission.

 The method of claim 2, wherein said external source
 communicates with the remote control via a wired signal transmission.

5. The method of claim 2, wherein said external source communicates with the remote control via a magnetic modem coupled to a telephone handset.

6. The method of claim 1, further comprising the step of receiving a code input from the user and wherein said code input is used to identify a subset of command sets meeting a particular criteria, from which said effects observable commands are assigned from.

7 The method of claim 6, wherein said particular criteria refer to command sets which control electronic devices manufactured by a specific manufacturer.

The method of claim 6, wherein said particular 8. 5 criteria refer to command sets which control electronic devices manufactured within a specific time period.

The method of claim 6, wherein said particular 9. criteria refer to command sets which control electronic devices sold through a particular retail outlet.

10. The method of claim 1, wherein said effects observable command is a power off command.

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11. The method of claim 1, wherein said plurality of assignable user actuated switches or keys include a power key and numeric keys.

12. The method of claim 1, wherein said remote control further includes a plurality of user actuated mode keys for selecting one of a plurality of modes and said method further includes the step of selecting one of the plurality of modes prior to the step of assigning an effects observable command, 20 such that, the method for selecting an appropriate one of a plurality of command sets can be performed to separately set a different command set for each mode.

13. The method of claim 1, wherein said remote control further includes a page down user actuated key and a page up 25 user actuated key and, when the number of command sets exceed the number of assignable user actuated switches or keys, said method further includes the steps of: assigning an effects observable command from each of said plurality of command sets in a subsequent group of command sets to one of said plurality 30 of assignable user actuated switches or keys, when a page down user actuated key is actuated; and assigning an effects observable command from each of said plurality of command sets in a prior group of command sets to one of said plurality of assignable user actuated switches or keys, when a page up user 35 actuated key is actuated.

14. The method of claim 1, wherein the order of said effects observable commands from said plurality of command sets is assigned to said plurality of assignable user actuated switches or keys based upon decreasing popularity of usage of each of said command sets.

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15. The method of claim 14, further comprising the step of receiving a code input from the user and wherein said code input indicates a particular criteria and is used to further 5 determine the order said effects observable commands are assigned to said plurality of assignable user actuated switches or keys based upon decreasing popularity of usage of each of said command sets conforming to said criteria.

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16. An apparatus for selecting an appropriate one of a 10 plurality of command sets stored in a remote control having a plurality of assignable user actuated switches or keys for controlling a remotely controllable electronic device, comprising:

means for assigning an effects observable command from 15 each of the plurality of command sets to one of said plurality of assignable user actuated switches or keys;

means for transmitting said effects observable command when the corresponding one of said plurality of assignable user actuated switches or keys is actuated;

means for indicating the halting of the actuation of the plurality of assignable user actuated switches or keys; and means for setting the remote control to transmit future remote control commands from the command set containing the last transmitted effects observable command.

## ABSTRACT OF THE DISCLOSURE

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A method for selecting a command set from a group of command sets stored in the remote control. Each remote control command set includes a set of commands for operating at least 5 one of various remotely controllable devices. A command, whose effect is observable in the remotely controlled device is assigned to one of the user actuated keys. The keys are pressed one by one until the user observes the desired effect on the remotely controlled device. The user then signals the 10 remote control to exit the select procedure with the remote control setting the remote control to transmit future commands from the command set including the last transmitted effects observable command having the observed desired effect.















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FIG. 4

OMB No. 0651-0011 (12/31/86) PATRICK H. HAYES & KIMTHOA T. NGUYEN Applicant or Patentee: Attorney's 96030 Serial or Patent No .: Docket No .: Filed or Issued: METHOD FOR SELECTING A REMOTE CONTROL COMMAND SET VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS (37 CFR 1.9 (f) and 1.27 (b)) INDEPENDENT INVENTOR As a belo I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9 (c) for purposes of paying reduced fees under Se ection 41 (a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled: METHOD FOR SEL TITNG A REMOTE CONTROL COMMAND SET the specification filed herewith application serial no. filed patent no. iss I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9 (c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9 (d) or a nonprofit organization under 37 CFR 1.9 (e). Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below: no such person, concern or organization 12 persons, concerns or organizations listed below\* \*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27). UNIVERSAL ELECTRONICS INC. FULL NAME 1864 Enterprise Parkway, Twinsburg, Ohio ADDRESS 44087 INDIVIDUAL X SMALL BUSINESS CONCERN □ NONPROFIT ORGANIZATION FULL NAME ADDRESS SMALL BUSINESS CONCERN INDIVIDUAL NONPROFIT ORGANIZATION FULL NAME ADDRESS INDIVIDUAL SMALL BUSINESS CONCERN NONPROFIT ORGANIZATION I acknowledge the duty to file, in this application or patent, netification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue geo or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28 (b)). I hereby declare that all statements made herein of my own knowledge and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledg that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United St s Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this rified statement is directed Kimthoa T. Nguyen Patrick H. Hayes NAME OF INVENTOR NAME NVENTOR NAME OF INVENTOR Signature of Inventor Signam 96 11 Date Date Date Form PTO-FB-A410 (8-83)

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Ibereby declars that I am          In official of the small business concern indexified below:              In official of the small business concern empoyered to as on babil of the concern identified below:              NAME OF CONCERN		STATUS (37 CFR 1.9 (f) and 1.27 (c)) SMALL BUSINESS CONCERN
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Generalized of the small business concern empoyered to act on behalf of the concern identified below:     NAME OF CONCERN		the owner of the small business concern identified below:
NAME OF CONCERN       Iniversal Blactmonics Inc. ADDRESS OF CONCERN         1864       Entemporties Parkway 		A an official of the small business concern empowered to act on behalf of the concern identified below:
ADDRESS OF CONCERN	2.44.14	NAME OF CONCERN In iversal Riectmonics Inc.
Twinsburg, OH 44087         I hereby declare that the above identified small business concern qualifies a small business concern as defined in 13 CFR 121.3-18, reproduced in 37 CFR 13 (d), for purposes of the sources, including these of its atfiliate, does not scende Scendon 14(a) and (b) of Tile 35, Ohling State Code, in that the num of employees of the business concern is the average over the previous fiscal State Code, and that he num of employees of the business concern is the average over the previous fiscal State Code, in that the num of employees of the business concern is the average over the previous fiscal State Code, and that he num of employees of the business concern is the average over the previous fiscal State Code are that induced of the fiscal year, and (2) concerns are offlines of each other when either, (1) the number of particle Code Code Code Code Code Code Code Cod		ADDRESS OF CONCERN 1864 Enterprise Parkway
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to the invention, entitled		I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with res
Patrick H. Hayes and Kimthoa T. Nguyen       (by inventors)         St the specification filed herewith		to the invention, entitledFIROD_FOR_SELECTING A REPORE CONTROL CONTAIN SET
Since the specification filed herewith     application serial no.     patent no.     filed     patent no.     issued     filed     invention is listed below* and no rights to the invention are held by any person, other than the inventor, who could not qualify as a small business     concern under 37 CFR 1.9 (d) or by any concern which would not qualify as a small business     concern or organization having     rights to the invention averring to their status as small entities. (37 CFR 1.27).     NAME     ADDRESS     INDIVIDUAL     SMALL BUSINESS CONCERN     NONPROPTI ORGANIZATI     ADDRESS     INDIVIDUAL     SMALL BUSINESS CONCERN     NONPROPTI ORGANIZATI     taknowledge the duty to file, in this application or patent, notification of thy change in status resulting in loss of entitlement to small entitles us free or any maintenance fee due after the date on which status as a setting is no longer appropriate. (37 CFR 1.28 (b)).     I hereby declare that all statements made betein of my own knowledge the willful false statements made on information and belle     patent willful false statements made betein of my own knowledge that willful false statements in dthe lise is omade     punitable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements     ieopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.     NAME OF PERSON SIGNING     ThereSident     TITLE OF PERSON SIGNING     ThereSident     ADDRESS     SIGNATURE     DATE     YLB-G		(by inventors)
Sights application filed herewith application serial no. bill the specification filed herewith application serial no. bill the showed identified small business concern are not exclusive, each individual, concern or organization having rights to investion is listed below* and no rights to the investion are held by any person, other than the investor, who could not qualify as a small business concern under 37 CFR 1.9 (d) or a nonpoorganization under 37 CFR 1.9 (d) or a nonpoorganization under 37 CFR 1.9 (d) or a nonpoorganization under 37 CFR 1.9 (e). *NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention sverring to their status as small entities. (37 CFR 1.27). NAME ADDRESS INDIVIDUAL SMALL BUSINESS CONCERN NONPROPTT ORGANIZATI A ADDRESS INDIVIDUAL SMALL BUSINESS CONCERN NONPROPTT ORGANIZATI I acknowledge the duty to file, in this application or patent, notification of my change in status resulting in loss of entitlement to small entitles is no longer appropriate. (37 CFR 1.28 (o)). I hereby declare that all statements made berein of my own knowledge are true and that all statements made on information and belied believed to be true; and further that these statements were made with the knowledge that willful false statuments and the files on made pushable by fine or imprisonment, or both, under section 1001 of Tite 18 of the United States Code, and that such willful false statements is properiate. (37 CFR 1.28 (o)). NAME OF PERSON SIGNING Date 'Ling-YG' SIGNATURE DATE		- FALLICK II. 10763 UNICINAL AL INGATON
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If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights to invention is listed below * and no rights to the invention are held by any person, other than the inventor, who could not qualify as a small business concern under 37 CFR 1.9 (d) or a nonpoorganization under 37 CFR 1.9 (d). *NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention as the invention are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27). NAME ADDRESS INDIVIDUAL SMALL BUSINESS CONCERN NONPROPTI ORGANIZATI NAME ADDRESS INDIVIDUAL SMALL BUSINESS CONCERN NONPROPTI ORGANIZATI NAME ADDRESS INDIVIDUAL SMALL BUSINESS CONCERN NONPROPTI ORGANIZATI I acknowledge the duty to file, in this application or patent, notification of the change in status resulting in loss of entitlement to small entitles to the just of the issue fee or alter maintenance fee due after the date on which status as a sentity is no longer appropriate. (37 CFR 1.26 (b)). I hereby declare that all statements made berein of my own knowledge are true and that all statements made on information and belief believed to be true; and further that these statements were made with the knowledge that wilfful false statements and the like so made punishable by fine or imprisonment, or both, under section 1001 of Tille 18 of the United States Code, and that such wilfful false statements is directed. NAME OF PERSON SIGNING DATE DATE DATE DATE DATE DATE DATE DATE DATE	5	X) the specification filed here with
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NAME OF PERSON SIGNING David Gabrielson TITLE OF PERSON OTHER THAN OWNER ADDRESS OF PERSON SIGNING 1864 Enterprise Parkway Twinsburg, OH 44087 SIGNATURE DATE 4.15.96		XD the specification filed herewith     application serial no.     patent no.     patent no.     patent no.     patent no.     issued     issued     issued     invention is listed below and no rights to the invention are held by any person, other than the inventor, who could not qualify as a small busi     concern under 37 CFR 1.9 (d) or by any concern which would not qualify as a small business concern under 37 CFR 1.9 (d) or a nonp     organization under 37 CFR 1.9 (d) or by any concern which would not qualify as a small business concern under 37 CFR 1.9 (d) or a nonp     organization under 37 CFR 1.9 (d).     *NOTE: Separate verified statements are required from each named person, concern or organization having     rights to the invention sverring to their status as amall entities. (37 CFR 1.27).     NAME     ADDRESS     INDIVIDUAL SMALL BUSINESS CONCERN NONPROPTI ORGANIZATI     INDIVIDUAL SMALL BUSINESS CONCERN NONPROPTI ORGANIZATI     I acknowledge the duty to file, in this application or patent, notification of thy change in status resulting in loss of entitlement to small est     status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a se     entity is no longer appropriate. (37 CFR 1.28 (b)).     I hereby declare that all statements made berein of my own knowledge are true and that all statements made on information and bellet     believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made     punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements     is poparatize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.
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SIGNATURE DATE 4.15-96		X the specification filed herewith     application serial no.     patent no.     filed     patent no.     issued     filed by the above identified small business concern are not exclusive, each individual, concern or organization having rights to     invention is listed below* and no rights to the invention are held by any person, other than the inventor, who could not qualify as a small busi     invention is listed below* and no rights to the invention are held by any person, other than the inventor, who could not qualify as a small business     concern under 37 CFR 1.9 (d) or by any concern which would not qualify as a small business concern under 37 CFR 1.9 (d) or a nonp     organization under 37 CFR 1.9 (e).     *NOTE: Separate verified statements are required from each named person, concern or organization having     rights to the invention averring to their status as small entities. (37 CFR 1.27). NAME     ADDRESS     INDIVIDUAL     SMALL BUSINESS CONCERN     NONPROFIT ORGANIZATI NAME     ADDRESS     INDIVIDUAL     SMALL BUSINESS CONCERN     NONPROFIT ORGANIZATI I acknowledge the duty to file, in this application or patent, notification of thy change in status resulting in loss of entitlement to small estatus prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a seentity is no longer appropriate. (37 CFR 1.28 (b)). I hereby declare that all statements made herein of my own knowledge are true and that all statements and the like so made     punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United State Code, and that such willful false statements is directed.  NAME OF PERSON SIGNING Development     David Cabrielson     TITLE OF PERSON THER THAN OWNER
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SIGNATURE DATE 10 16		XU the specification filed here with     geplication serial no.     getent no.     filed     generation of the source identified small business concern are not exclusive, each individual, concern or organization having rights to invention is listed below <sup>2</sup> and no rights to the invention are held by any person, other than the inventor, who could not qualify as a small business concern under 37 CFR 1.9 (d) or by any concern which would not qualify as a small business concern under 37 CFR 1.9 (d) or a nonp organization under 37 CFR 1.9 (d) or by any concern which would not qualify as a small business concern under 37 CFR 1.9 (d) or a nonp organization under 37 CFR 1.9 (d) or a nonp organization under 37 CFR 1.9 (d) or a nonp organization under 37 CFR 1.9 (d) or a nonp organization under 37 CFR 1.9 (d).  *NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27).  NAME ADDRESS I INDIVIDUAL SMALL BUSINESS CONCERN NONPROFIT ORGANIZATI ADDRESS I INDIVIDUAL SMALL BUSINESS CONCERN NONPROFIT ORGANIZATI Action or patient, notification of any change in status resulting in loss of entitlement to small estatus prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a sentity is no longer appropriate. (37 CFR 1.26 (b)). I hereby declare that all statements made betein of my own knowledge are true and that all statements made on information and bellevel to be true; and further that these statements were made with the knowledge? That willful false statements and the like so made punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements igeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.  NAME OF PERSON SIGNINO
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I believe I am the original, inventor (if plural names a on the invention entitled	first and sole inventor (if only one re listed below) of the subject matter	name is listed below) or an origi r which is claimed and for which	nal, first and joi a patent is soug	nt ht
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Transaction History Date 1996 - 99 - 20 Date Information retrieved from USPTO Patent Application Information Retrieval (PAIR) system records at www.uspto.gov



PATENT USSN 08/636,666 Atty Docket 96030

2617

Group Art U

Examiner:

Unknown

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

PATRICK H. HAYES and KIMTHOA T. NGUYEN For: METHOD FOR SELECTING A RMEOTE CONTROL COMMAND SET

Serial No. 08/636,666

Filed: April 23, 1996

ASSOCIATE POWER OF ATTORNEY (37 CFR 1.34)

TO: Assistant Commissioner for Patents Washington, D.C. 20231 Dear Sir:

Please recognize as Associate Attorney(s) in this application, with full power to prosecute and transact all business in the United States Patent and Trademark Office connected therewith:

> Robert E. Browne, Reg. No. 26,150 Mark R. Galis, Reg. No. 36,805 Gary R. Jarosik, Reg. No. 35,906

Please send all future correspondence, including the Letters Patent when issued, to, and direct all future communications to:

> Mark Galis, Reg. No. 36,805 c/o ALTHEIMER & GRAY 10 South Wacker Drive, Suite 3700 Chicago, Illinois 60606 Telephone: 1-312-715-4000 Facsimile: 1-312-715-4800

> > VIGIL & HANRATH

Thomas R. Vigil Reg. No. 24,542

Dated: September 5, 1996

VIGIL & HANRATH 836 South Northwest Highway Barrington, Illinois 60010 Telephone: (847) 382-6500 Facsimile: (847) 382-6895

UNITED STATES DEPARTMENT OF COMMERCE Patent and Trademark Office Address: COMMISSIONER OF PATENTS AND TRADEMARKS Washington, D.C. 20231 SERIAL NUMBER FILING DATE. FIRST NAMED APPLICANT ATTORNEY DOCKET NO. 96030 HAYES P 04/23/96 08/636,666 EXAMINER HILL, A E6M1/1002 THOMAS R VIGIL RT UNIT PAPER NUMBER 836 SOUTH NORTHWEST HIGHWAY BARRINGTON IL 60010 2 261 10/02/96 DATE MAILED: NOTICE OF ALLOWABILITY PARTI 1. A This communication is responsive to \_\_\_\_\_ 2. PAII the claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice Of Allowance And issue Fee Due or other appropriate communication will be sent in due course. 3. Ø The allowed claims are \_\_\_\_\_ 4. C The drawings filed on \_ are acceptable. 5. 🗆 Acknowledgment is made of the claim for priority under 35 U.S.C. 119. The certified copy has [\_] been received. [\_] not be received. [...] been filed in parent application Serial No. filed on 6. D Note the attached Examiner's Amendment. 7. D Note the attached Examiner Interview Summary Record, PTOL-413. 8. 20 Note the attached Examiner's Statement of Reasons for Allowance. 9. 20 Note the attached NOTICE OF REFERENCES CITED, PTO-892. 10. D Note the attached INFORMATION DISCLOSURE CITATION, PTO-1449. PART II. A SHORTENED STATUTORY PERIOD FOR RESPONSE to comply with the requirements noted below is set to EXPIRE THREE MONTHS FROM THE "DATE MAILED" indicated on this form Failure to timely comply will result in the ABANDONMENT of this application. Extensions of time may be obtained under the provisions of 37 CFR 1.136(a). Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL APPLICATION, PTO-152, which discloses that the oath or declaration is deficient. A SUBSTITUTE OATH OR DECLARATION IS REQUIRED. 2. 🞜 APPLICANT MUST MAKE THE DRAWING CHANGES INDICATED BELOW IN THE MANNER SET FORTH ON THE REVERSE SIDE OF THIS PAPER. a. Z Drawing informalities are indicated on the NOTICE RE PATENT DRAWINGS, PTO-948, attached hereto er to Paper . CORRECTION IS REQUIRED. b. 
The proposed drawing correction filed on has been approved by the examiner. CORRECTION IS REQUIRED. Approved dra wing corrections are described by the examiner in the attached EXAMINER'S AMENDMENT. CORRECTION IS REQUIRED. d. N Formal drawings are now REQUIRED. Any response to this letter should include in the upper right hand corner, the following information from the NOTICE OF ALLOWANCE AND ISSUE FEE DUE: ISSUE BATCH NUMBER, DATE OF THE NOTICE OF ALLOWANCE, AND SERIAL NUMBER. Attachments Notice of Informal Application, PTO-152 Examiner's Amendment Diolice re Patent Drawings, PTO-848 (1. C. Substitute PTO-948) Listing of Bonded Draftsmen Examiner Interview Summary Record, PTOL- 413 Reasons for Allowance Notice of References Cited, PTO-892 - Information Disclosure Citation. PTO-1449 Note: Page 7, line 16 of the specification has been updated to include the patent number (i.e. 5,537,463") of the referenced application.

#### Serial Number: 08/636,666

Art Unit: 2617

#### Part III REASONS FOR ALLOWANCE

#### Prior Art Citation

2 -

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Reitmeier (US 4,746,919) discloses a remote controller with key function display provisions.

Sasaki et al. (US 4,825,209) discloses a remote controller with changeable function display.

Amano et al. (US 4,999,622) discloses a programmable remote controller.

Tanaka et al. (US 5,420,573) discloses an audio-visual system in which a single function key is used to control multiple devices.

Zirkl et al. (US 5,453,738) discloses a remote control system with a programmable function table for controlling one or more devices with a single key.

Rumbolt et al. (US 4,703,359), Darbee et al. (US 4,959,810), Takiguchi et al. (US 5,485,149) and Escobosa et al. (US 5,537,463) disclose programmable remote control devices and are notably discussed in Applicant's specification.

#### Serial Number: 08/636,666

Art Unit: 2617

#### Reasons for Allowance

 The following is an Examiner's Statement of Reasons for Allowance:

The prior art does not teach or fairly suggest the novel remote control features set forth in claims 1-16, whereby to program a remote control in a search mode, each key of a plurality of assignable keys is assigned an observable command from corresponding to each of a plurality of command sets. As noted by Applicants in the specification, this avoids erroneous operation often encountered in prior art devices where the same single key is repeatedly pressed to sequentially advance through the plurality of remote control command sets being searched and accidental operation of said same key resulted in error. The instant invention novelly avoids such erroneous operation by assigning separate keys to search through the separate command sets, each key corresponding to a different set.

Any comments considered necessary by applicant must be submitted no later than the payment of the Issue Fee and, to avoid processing delays, should preferably **accompany** the Issue Fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Serial Number: 08/636,666

Art Unit: 2617

#### Contact Information

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Hill whose telephone number is (703) 305-8967.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Examiner Hofsass, can be reached at (703) 305-4717. The fax phone number for this Art Unit is (703) 305-3988.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-8576.

ANDREW M. HILL PATENT EXAMINER GROUP 2609

TENT EXAMINER SUPERVIS GFIDUP-2600

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# Universal Remote Control Exhibit 1002 Page 52

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Attachment Paper No. 2

The drawings submitted with this application were declared informal by the applicant. Accordingly they have not been reviewed by a draftsperson at this time. When formal drawings are submitted, the draftsperson will perform a review.

Direct any inquires concerning drawing review to the Drawing Review Branch (703) 305-8404.

SUBSTITUTE PTO-948



UNITED STATES DEPARTMENT OF COMMERCE Patent and Trademark Office

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## NOTICE OF ALLOWANCE AND ISSUE FEE DUE

THOMAS R VIGIL 836 SOUTH NORTHWEST HIGHWAY BARRINGTON IL 60010

APPLICATION NO.	FILING DATE	TOTAL CLAIMS	EXAMI	NER AND GROUP AR	Y ÜNIT	DATE MAILED
~ 08/636,666	04/23/96	wie.	HILL, A		2617	10/02/96
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THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED.

THE ISSUE FEE MUST BE PAID WITHIN <u>THREE MONTHS</u> FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. <u>THIS STATUTORY PERIOD CANNOT BE EXTENDED.</u>

#### HOW TO RESPOND TO THIS NOTICE:

- I. Review the SMALL ENTITY status shown above. If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:
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   B. If the status is the same, pay the FEE DUE shown

If the SMALL ENTITY is shown as NO:

A. Pay FEE DUE shown above, or

- B. File verified statement of Small Entity Status before, or with, payment of 1/2 the FEE DUE shown above.
- II. Part B of this notice should be completed and returned to the Patent and Trademark Office (PTO) with your ISSUE FEE. Even if the ISSUE FEE has already been paid by charge to deposit account, Part B should be completed and returned. If you are charging the ISSUE FEE to your deposit account, section "6b" of Part B should be completed.
- III. All communications regarding this application must give application number and batch number. Please direct all communication prior to Issuance to Box ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Patents issuing on applications flied on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

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IN THE PATENT AND TRADEMARK OFFICE

HAYES et al.

Examiner: HILL Group Art Unit: 2617 # 4 Mary 1

Filed: 04/23/96

Serial No.: 08/636,666

Title: METHOD FOR SELECTING A REMOTE CONTROL COMMAND SET

#### SUBMISSION OF FORMAL DRAWINGS

Assistant Commissioner of Patents Washington, D.C. 20231

Dear Sir:

In accordance with 37 C.F.R. § 1.85(c), the Applicants submit herewith corrected, formal drawings for the aboveidentified patent application. These drawings are being submitted within three (3) months of the mailing of the Notice of Allowability on October 2, 1996. While it is not believed that any additional fees are required, the Commissioner is authorized to charge our Deposit Account No. 011,156 for any fee deficiencies.

Respectfully submitted,

By: <u>Mark R. Galis (36,805)</u> Altheimer & Gray 10 S. Wacker Drive Chicago, IL 60606-7482 (312) 715-4773

> M/zale Date

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail with sufficient postage addressed to: Assistant Commissioner of Patents, Washington, D.C. 20231 on <u>11/26/66</u>.

Mark R. Galis







age 57







ransaction History Date 119 Date information retrieved from USPTO Patent Application Information Retrieval (PAIR) system records at www.uspto.gov

The United States

of America

m PTO-1584 (Rav. 5/98)

## The Commissioner of Patents and Trademarks

PTO UTILITY GRANT Paper Number

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

#### United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term set forth below, subject to the payment of maintenance fees as provided by law.

If this application was filed prior to June 8, 1995, the term of this patent is the longer of seventeen years from the date of grant of this patent or twenty years from the earliest effective U.S. filing date of the application, subject to any statutory extension.

If this application was filed on or after June 8, 1995, the term of this patent is twenty years from the earliest effective U.S. filing date of the application, subject to any statutory extension.

Buce Commissioner of Patents and Trademarks