(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
27 September 2001 (27.09.2001)

PCT

(10) International Publication Number
WO 01/71994 A1

(51) International Patent Classification[7]: H04L 12/66

(21) International Application Number: PCT/KR01/00434

(22) International Filing Date: 19 March 2001 (19.03.2001)

(25) Filing Language: Korean

(26) Publication Language: English

(30) Priority Data:
2000/14112 20 March 2000 (20.03.2000) KR

(71) Applicant *(for all designated States except US)*: **INTER-CONWARE, INC.** [KR/KR]; 9F, Namjun Building, 682, Yoksam-Dong, Kangnam-Gu, Seoul 135-080 (KR).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **KWON, Oh-Choon** [KR/KR]; 5-602, Sin-dong-a Apartment, 44, Myung-il-Dong, Kangdong-Gu, Seoul 134-786 (KR). **KIM, Hyung-Hwan** [KR/KR]; 2-307, Woosung Apartment, 388-7, Poongnap2-Dong, Songpa-Gu, Seoul 138-783 (KR).

(74) Agents: **SONG, Ho-Chan** et al.; Chae & Song Patent & Trademark Office, Rm No. 509, Sung-Ji Heights III, 642-6, Yoksam-Dong, Kangnam-Gu, Seoul 135-080 (KR).

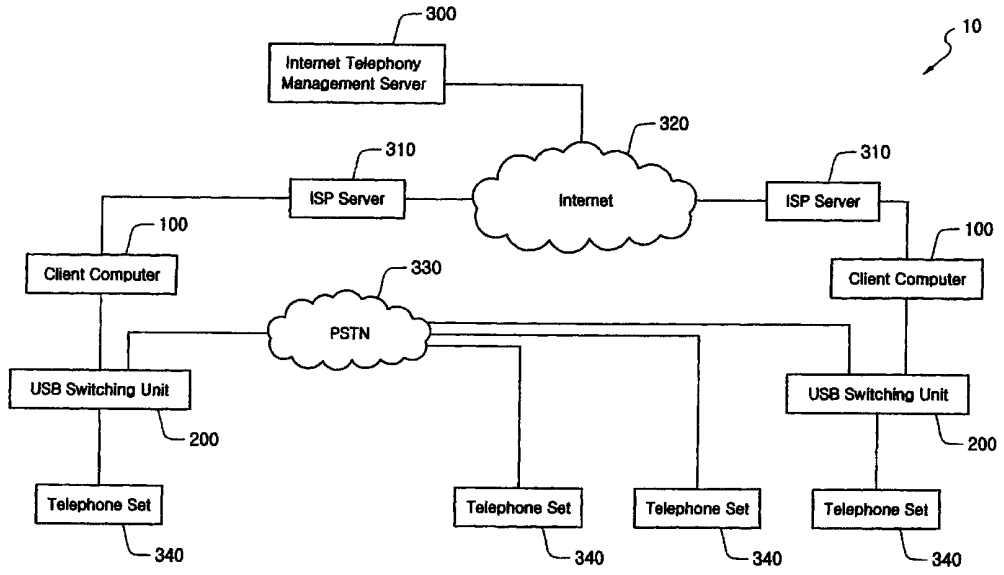
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

[Continued on next page]

(54) Title: METHOD AND SYSTEM FOR TELEPHONE COMMUNICATION



(57) Abstract: An internet telephony system including plural client computers, each connecting to a switching unit and a server computer connected to the client computers with internet and storing users' phone numbers. The switching unit connects to a typical telephone and connects to a line of PSTN. The client computer sends its IP address to the server during the client connecting the internet. A user inputs a telephone number of a person whom the user wants to call. The server informs an IP address corresponding to the telephone number sent by the user's client computer. The user's client computer confirms whether the IP address is accessible. When the IP address is accessible, the switching unit provides a connection of the telephone via internet. When the IP address is not accessible, the switching unit provides a connection of the telephone via a line of PSTN.

WO 01/71994 A1

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

METHOD AND SYSTEM FOR TELEPHONE COMMUNICATION

Technical Field

The present invention relates to a telephony system, and more particularly, to a telephony system in which one of a public switched telephone network (PSTN) and an internet network is automatically selected and connected so that a user can speak over the telephone.

Background Art

Owing to rapid developments of internet technology, it has been possible to make a telephone call using voice over the internet protocol (hereinafter referred to as "VoIP"). For example, there are "Dialpad" services provided by Serome Technology, Inc. located in Seoul, Republic of Korea, and Dialpad Communications Inc. located at Santa Clara, California, U.S.A. In general, an internet telephone means a telephony system connected over the internet network. The user connects with a web address (for example, www.dialpad.co.kr or www.dialpad.com) which can provide services of telephony service providers through a computer connected to the internet network. Then, a server of the service provider transmits a web page, which enables the user to make a phone call, to the user's computer. When the user inputs the telephone number of a person whom the user wants to call, the service provider connects the user via the internet network to a specific location near to the person whom the user wants to call, and also connects the user to the telephone set of the person therefrom, via a line of PSTN. At this time, since the phone call is made directly in the computer, either a

speaker and a microphone, which are connected to a sound card, or a headset in which the speaker and the microphone are unitarily combined is required for making the phone call.

Instead of such a headset, a card device, which can be inserted into a slot formed in the computer, has been developed in order to enable the conventional telephone set to be utilized. By pressing a specific button or a combination of the buttons of the conventional telephone set connected to the card (for example, a combination of #'s and *'s), the user can select a telephone using either the internet or the public switched telephone network (PSTN).

In such a conventional internet telephony system, since the user's voice is transmitted through a service server, there is a problem in that the service server and the internet network connected thereto can be overloaded. Furthermore, since the PSTN must be used midway through the procedure, it does not make use of the telephone call having a perfect PC to PC connection. Accordingly, the service company must bear the expenses. Therefore, since the expense is appropriated by commercial advertisements, there is inconvenience in that the user must see the advertisements.

On the other hand, there is a method wherein a phone call is made between PCs through the internet network. In this case, both PCs must always be turned on and must be connected with the internet network; otherwise, it is impossible to make a telephone call. There is also inconvenience in that the telephone call can only be made when the other party's IP address is known.

Summary of Invention

Taking these problems of the prior art into consideration, the object of the

present invention is to provide an internet telephony system in which, although it is not additionally selected by the user, telephone connection via the internet is provided when a telephone call can be made through VoIP using the internet network, otherwise telephone connection via the PSTN is provided.

Another object of the present invention is to provide an internet telephony system, in which a server of the internet telephone service company will not become overloaded.

In order to achieve the above objects of the present invention, the present invention provides a telephone call connecting method for use in a telephony system, the telephony system comprising a client computer connected to a telephone call connection switching unit which is connected with a telephone set and to a line of a public switched telephone network (PSTN), and a connection management server which can be connected with the client computer through the internet and in which telephone numbers of users of respective client computers are stored. The telephone call connecting method comprises the steps of: transmitting an IP address of the client computer to the management server and maintaining a standby state by the client computer; and making a telephone call, by the user, through the system. The step of making said telephone call further comprises the steps of transmitting the telephone number, inputted from the telephone set, to the management server and confirming an IP address of a person whom the user wants to call; when the IP address of the person whom the user wants to call is accessible, providing connection with the client computer having the IP address via the internet, and connecting the telephone set to the client computer by the telephone call connection switching unit, whereby telephone call connection via the internet can be made; and when the IP address of the person whom the user wants to call is not accessible, connecting the telephone set and the line of the

PSTN by the telephone call connection switching unit, whereby telephone call connection via the PSTN can be made.

According to another aspect of the present invention, the present invention provides a telephone call connection switching device connected with a client computer and also connected with a line of a public switched telephone network (PSTN) and a telephone set for selectively connecting the telephone set with one of the client's computer and the line of the PSTN. The telephone call connection switching device comprises a switching portion for selectively connecting the telephone set with either the line of the PSTN or the client computer, and a control portion for controlling the switching portion.

These objects, the other objects and other features of the present invention will become fully apparent from the detailed description of the preferred embodiment of the present invention, with reference to the accompanying drawings.

Brief Description of Drawings

FIG. 1 is a constitutional view showing the telephony system according to one embodiment of the present invention.

FIG. 2 is a constitutional view of a client computer in the system of FIG. 1.

FIG. 3 is a constitutional view of a USB telephone call connection switching unit in the system of FIG. 1.

FIG. 4 is a constitutional view of a management server computer in the system of FIG. 1.

FIG. 5 is a flowchart showing an operation procedure of a telephony system using the internet when making a telephone call.

FIG. 6 is a flowchart showing an operation procedure of a telephony system using the internet when receiving a telephone call.

Detailed Description of the Embodiments

Hereinafter, an embodiment of the present invention will be explained in detail with reference to the accompanying drawings. Referring to FIG. 1, a telephony system 10 according to an embodiment of the present invention is provided with client computers 100 of respective users, telephone call switching units 200 which are respectively connected thereto, and an internet telephone call management server computer 300. The client computers 100 are connected to the internet 320 through the internet connection service providing server 310 (hereinafter, referred to as "ISP server"). That is, the client computers 100 are connected with the internet telephone management server 300 through the internet 320. Notably, the switching units 200 are connected with the client computers 100. As mentioned below, it is preferable that the switching units 200 are devices using Universal Serial Bus (USB) interfaces connected with USB ports of the client computers 100. The switching units 200 are also connected with the public switched telephone network (PSTN; 330). Conventional telephone sets 340 are connected with the switching unit 200, and also with the PSTN 330.

Referring to FIG. 2, the constitution of the client computer 100 is shown. An communication device 103 such as a modem, is connected with the client computer 100, and consequently connected with the ISP server 310. RAM 104 and ROM 106 are connected with a CPU 102. The client computer 100 is provided with an operating system (OS; 107) and a telephone call connection control program (switching unit

control program; 108). It is preferable that the program resides in the RAM at least when the client computer is turned on.

The controlling program 108 is a software for controlling a hardware of a USB telephone call switching unit, mentioned later, and carries out the functions of switching control through the Universal Serial Bus (USB) port, speaker control, and conversion control of audio signal into digital or analog signal. Specifically, the control program provides a protocol (for example, H.323) needed for an internet telephone (VoIP). Furthermore, user's registration information (name, telephone number, etc.) is inputted, and then it is transmitted to the server together with the IP address. On the other hand, it is preferable to notify the server that the PC is in operation by informing that the IP address is accessible at a predetermined time interval (for example, one minute). When a telephone call is called up, the call is connected and then a notifying message is provided.

When the user makes a telephone call, the control program stands upon receipt of the information that the telephone handset has been picked up, and sends the server the telephone number information inputted through the telephone set. When the IP address of the person whom the user wants to call, which is transmitted from the server, is accessible, connection of the telephone call via the internet is made by connecting with the IP address corresponding to the telephone number information. Alternatively, when the IP address is not accessible, connection of the telephone call via the PSTN is made by transmitting a dial (button input) signal to the PSTN. When the user receives the telephone call, the control program receives an IP address of a person who wants to call to the user and generates a telephone ringing sound. The operation of the control program will be explained in detail again with reference to the operation of the whole system described later.

Data needed for the telephone call connection are stored in a data storage device 110 connected to the CPU 102. First, data of a management server for managing various kinds of information (that is, URL of the management server) are stored. As described later, when the user makes a phone call, the telephone call connection control program 108 should check with the management server whether the computer of the other party is connected or not. Alternatively, the telephone number data, which are frequently used and connected to the switching unit of the computer that is always connected with the internet and has a fixed IP address, can be also additionally stored in the storage device 110. Then, some of the telephone numbers can be directly connected via the internet without need to connect to the management server.

Referring to FIG. 3, the switching unit 200 is a hardware device, which connects between the conventional telephone set and the PC to use an internet telephone or a PSTN telephone. The switching unit 200 is provided with a modular jack connector J1 which can be connected with the telephone, a modular jack connector J2 which can be connected with the PSTN, and a USB connector C1 which can be connected to the USB port of the PC. In addition, it is further provided with a switching portion for connecting the conventional telephone or the internet telephone according to the use condition, an amplifier 203 and a speaker 204 that generate sound when an internet telephone call is called up, and a USB control device (USB control chip; control portion) which can control the switching portion and the speaker accordingly when the signal is received through the USB port. A program needed for controlling the above components and USB communications are stored in this chip. The USB chip 206 used in the present invention can be TUSB3200 of Texas Instruments Incorporated (TI), or a chip of AVANE or PHILIPS. The USB chip device

206 comprises a MCU (Micro Control Unit; 206a), a ROM 206b, a RAM, an I/O and audio interface 206c, a USB interface 206d, and a USB controller.

CODEC 208 is connected with the I/O and audio interface 206c. AK4540, i.e., AC 97 CODEC of AKM and compatible chips available form Sigmatel, Crystal, Analog Device, etc. can be used for the audio CODEC 208. The amplifier 203 connected to the speaker 204 is connected to the CODEC 208. Within the CODEC 208, a sound signal is converted from digital signal into analog signal, and vice versa.

The switching device 200 comprises two relay switches R1, R2 which constitutes the switching portion, as shown in FIG. 3. According to the instructions of the USB control device 206, the relay switches operate to connect the telephone set to the line of PSTN or to the PC. It is constructed as such so that the sound signal passes through the CODEC 208 when the telephone set is connected to the PC.

When the telephone receiver is picked up and a hook switch turns on, it is transmitted to the USB control device 206 through a hook switch sensing line 210, and the relay switches operate to connect the telephone set to the PC as mentioned later. When a call signal transmitted through the line of the PSTN is transmitted to the USB control device 206 through a ring sensing line 212, the relay switches operate to connect the line of the PSTN to the telephone set. As shown, isolators 214, 214a for preventing any abnormal signals from being produced, are installed in the line of the switching unit 200.

Referring to FIG. 4, the constitution of the management server computer 300 is shown. The management server 300 is connected with the internet (network). RAM 304 and ROM 306 are connected to a CPU 302. The management server 300 is provided with an operating system (OS) 307 and an IP address connection management program 308. Various kinds of databases and necessary web pages are stored in the

data storage device 310. The stored database can be, for example, a user database 314. A user is a person having the switching unit 200, who wants to use the internet telephone. First, the user database 314 is made in the form of files classified by users. Fields for user's name, user's ID, password, connectable information such as email address or mailing address, and telephone number are prepared in the files, and the information is inputted therein. Moreover, a field for indicating a connection state with internet which is frequently changeable, and a field for recording the IP address allocated to the relevant user's computer in the connected state, are also prepared.

Web pages may include pages for performing works such as user information management service, which is provided when the user connects to the management server 300, and pages for advertisement, etc. Additionally, since a control program used in the client computer for controlling the USB switching unit is stored in the storage device 310, the user can download it.

With reference to FIGS. 5 and 6, registration and operations of making and receiving a telephone call will be explained.

1. Registration

The user turns on his/her own client computer 100 (500), and connects with the internet 320 (501). At this time, the ISP server 310 connected through the modem 103 allocates the IP address to the client computer 100. (If the client computer can be always connected, a fixed IP address can be allocated.) By operating a web browser, the user connects with the management server 300. At this stage, the user connects the switching unit 200 to the USB port of the client computer 100 (502). The user then connects the telephone set 340 and the line of the PSTN 330 to the switching unit 200 (504). The user also downloads the program for controlling the USB switching unit

200 from the management server 300, and installs it in the client computer 100 (506).

At this time, the control program 108 demands the user registration. The user inputs his/her telephone number in the order of country code, area code and station number. In addition, name and various items needed for registration (for example, ID, password, etc. inputted in the user database) are inputted. Then, the control program 108 sends information on the user to the management server 300 which in turn inputs these materials to the user database (507).

2. Making a telephone call

When the client computer 100 is turned on and is connected to the internet, the control program 108 of the client computer 100 initializes the USB port (508). The switching portion of the switching unit 200 is set to connect the telephone set 340 and the PSTN 330 regardless of whether the client computer 100 is turned on or off. The connection management program 308 of the management server 300 always checks the state of the IP address and waits for the input of the IP address. When the switching unit 200 is initialized, it transmits the telephone number and the IP address allocated to the client computer, and reports to the management server the information that the client computer has been connected to the internet (510). The management server records the inputted telephone number, IP address, and on-line state (512). The control program 308 goes to a standby state (514). On the other hand, as shown in FIG. 3, the switching portion is always maintained to connect the telephone set 340 and the line of the PSTN 330 in the standby state. (However, the present invention is not limited thereto). During the standby state, the management server is always informed of the operating condition of the client computer at the predetermined time interval.

When the user picks up the receiver (handset) of the telephone set 340 in the standby

state (516); the operation of the hook switch is sensed; and accordingly, the connection state of the relay switch in the switching unit 200 is switched (518); and the control program 108 senses the connection state (520) and waits for the input of the telephone number. That is, as mentioned above, voltage changes due to the operation of the hook switch, and the information is transmitted through the sensing line 210 of the hook switch to the USB control device 206. Then, the control device 206 operates the first relay R1 so that the telephone set and the PC are connected with each other. (However, when the client computer 100 is turned off or is not connected with the internet, that is, when the client computer is not in the standby state, the switching of the connection state does not happen.)

When the user inputs the number by pressing down the keypad (buttons) of the telephone set (522), the tone (DTMF) signal is converted into a digital signal and sent to the client computer 100. The client computer 100 then transmits the telephone number to the management server (524). It is preferable that the telephone number including country and area codes identical to those of the person who is making the phone call is sent to the server when the user presses down the telephone number without the area code. Further, when the telephone number is pressed down with the area code included, it is preferable that the telephone number including the country code identical to that of the person who is making the phone call is sent to the server.

The management server confirms and informs the IP address corresponding to the telephone number and the on-line state (526). The control program connects to the IP address of the other party and confirms the on-line state thereof (528). At this time, if the IP address is accessible, the internet telephone call is made (530). Simultaneously, the control program 108 transmits predetermined information to the computer of the other party and the control program of the other party's computer

recognizes this information and drives the switching unit.

When the user puts down the handset to end the telephone call (532), the switching portion of the switching unit activates the telephone set to connect with the PSTN (534). Upon completion of the telephone call, the control program 108 goes into the standby state (536).

If the other party's IP address is not accessible, a command for activating the switching portion is given (538). The switching unit 200 connects the first relay R1, the telephone set and the PSTN (540), and operates the second relay R2 so that the client computer can transmit the tone signal (the other party's telephone number). Thereafter, a telephone call is made through the PSTN. When the handset is put down to end the telephone call (542), it goes into the standby state (538). When a telephone call is made in a situation wherein the other party's IP address is not accessible, the user who makes the telephone call may not know which connection is made between internet connection and PSTN connection. Accordingly, prior to actual connection, when the IP address is not accessible, the control program is preferred to inform via the computer monitor or by a sound via the speaker of the telephone set, that it will be connected to the PSTN.

3. Receiving a telephone call

The client computer 100 senses receipt of the telephone call made via the internet (600), whilst in the above standby state. Then, the speaker 204 within the switching unit 200 is then driven so that bell sound is generated (602). This can be carried out by sending the bell sound made by the PC to the speaker through the CODEC 208. When the user picks up the handset (604), the switching portion of the switching unit connects the telephone set and the PC (client computer) (606). The

control program then connects the telephone call with the other party's IP address (608). In the connected state, the user talks over the internet telephone with the person whom the user wants to call (610). When the user puts down the handset to finish the telephone call (612), the switching portion of the switching unit 200 operates to connect the telephone set and the PSTN (614), and upon completion of the telephone call, it returns to the standby state (616).

In a case where the telephone call is received from the PSTN, a call is sensed and transmitted through the ring sensing line 212 so that although the handset of the telephone set is picked up, the first relay R1 is controlled to maintain the connection between the line of the PSTN and the telephone.

According to the constitution of the present invention, it is convenient and the costs needed for the telephone call can be saved on, since the telephone call is first attempted via the internet by using the telephone switching unit in the PC and when the telephone call via the internet is not made, i.e., when the other party's IP is not accessible, it can be connected via the PSTN. Furthermore, when the telephone call is made through a PC to PC connection, the user wishing to make a telephone call does not need to know the IP address or ID of the person whom the user wants to call. Furthermore, since one client's computer can be directly connected with the other client computer without passing through the management server even when making telephone calls via the internet, the load imposed on the management server and the line thereof can be reduced.

Although the present invention has been described in detail with respect to the preferred embodiment of the invention, it should be understood that a person having an ordinary skill in the art to which the present invention pertains can make various modifications and changes to the present invention without departing from the spirit and

scope of the invention defined by the appended claims. Therefore, these modifications and changes to the present invention will fall within the scope of the invention.

Clams

1. A telephone call connecting method for use in a telephony system, said telephony system comprising a client computer connected to a telephone call connection switching unit which is connected with a telephone set and to a line of a public switched telephone network (PSTN), and a connection management server which can be connected with said client computer through the internet and in which telephone numbers of users of respective client computers are stored, said telephone call connecting method comprising the steps of:

transmitting an IP address of said client computer to said management server and maintaining a standby state by said client computer; and

making a telephone call, by said user, through said system,

said step of making said telephone call further comprising the steps of:

transmitting a telephone number being inputted from said telephone set to said management server and confirming an IP address of a person whom said user wants to call;

when said IP address of said person whom said user wants to call is accessible, providing connection with said client computer having said IP address via the internet, and connecting said telephone set to said client computer by said telephone call connection switching unit, whereby telephone call connection via the internet can be made; and

when said IP address of said person whom said user wants to call is not accessible, connecting said telephone set and said line of said PSTN by said telephone call connection switching unit, whereby telephone call connection via said PSTN can be made.

2. The telephone call connecting method as claimed in Claim 1, further comprising the steps of: connecting with said client computer of a person who has made said telephone call transmitted to said IP address of said client computer of said user who receives said telephone call when said user receives said telephone call during said standby state; and connecting said telephone set and said client computer by said telephone call connection switching unit so that said telephone call connection is made through the internet when said user has a hook switch of said telephone set turned on.

3. The telephone call connecting method as claimed in Claim 1 or 2, wherein said telephone call connection switching unit is connected to a USB port of said client computer; and said unit comprises a switching portion for selectively connecting said telephone set to either said client computer or said line of said PSTN, a speaker, and a control portion for controlling said speaker and said switching portion.

4. A computer readable recording media in which a computer program to be installed in a client computer for connecting a telephone call using an internet telephony system is recorded, said internet telephony system comprising said client computer connected to a telephone call connection switching unit which is connected with a telephone set and to a line of a public switched telephone network (PSTN), and a connection management server which can be connected with said client computer through the internet and in which telephone numbers of users of respective client computers are stored,

wherein said computer program is executed by the following processes of:

transmitting an IP address of said client computer to said management server and maintaining a standby state by said client computer; and

making a telephone call, by said user, through said system,

said step of making said telephone call further comprising:

transmitting a telephone number being inputted from said telephone set to said management server and confirming an IP address of a person whom said user wants to call;

when said IP address of said person whom said user wants to call is accessible, providing connection with said client computer having said IP address via the internet, and connecting said telephone set to said client computer by said telephone call connection switching unit, whereby telephone call connection via the internet can be made; and

when said IP address of said person whom said user wants to call is not accessible, connecting said telephone set and said line of said PSTN by said telephone call connection switching unit, whereby telephone call connection via said PSTN can be made.

5. A method for providing internet telephone call connection information, by a connection management server, in an internet telephony system, said internet telephony system comprising a client computer connected to a telephone call connection switching unit which is connected with a telephone set and to a line of a public switched telephone network (PSTN), and said connection management server which can be connected with said client computer through the internet and in which telephone numbers of users of respective client computers are stored, said method comprising the steps of:

receiving an IP address of said client computer, which said client computer transmits after connecting with said management server, and storing said IP address to be matched with a user's telephone number of said client computer;

receiving said telephone number transmitted for inquiry from said client computer;

searching said IP address corresponding to said telephone number; and

transmitting data of said IP address when said data exits, or transmitting information that shows nonexistence of data when said data do not exist.

6. A telephone call connection switching device connected with a client computer and also connected with a line of a public switched telephone network (PSTN) and a telephone set for selectively connecting said telephone set with one of said client computer and said line of said PSTN, comprising:

a switching portion for selectively connecting said telephone set with either said line of said PSTN or said client computer, and

a control portion for controlling said switching portion.

7. The telephone call connection switching device as claimed in Claim 6, wherein said device is connected to a USB port of said client computer.

8. The telephone call connection switching device as claimed in Claim 6 or 7, wherein said client computer can be connected via the internet and constitutes an internet telephony system together with a connection management server in which telephone numbers of users of respective client computers are stored; and

wherein when a user makes a telephone call through said client computer,

said control portion transmits a telephone number inputted from said telephone set to said management server and confirms an IP address of a person whom said user wants to call;

when said IP address of said person whom said user wants to call is accessible, said control portion provides telephone call connection via the internet by connecting with said IP address via the internet and connecting said telephone set to said client computer; and

when said IP address of said person whom said user wants to call is not accessible, said control portion drives said switching portion such that telephone call connection can made by connecting said telephone set to said line of said PSTN.

Figure 1

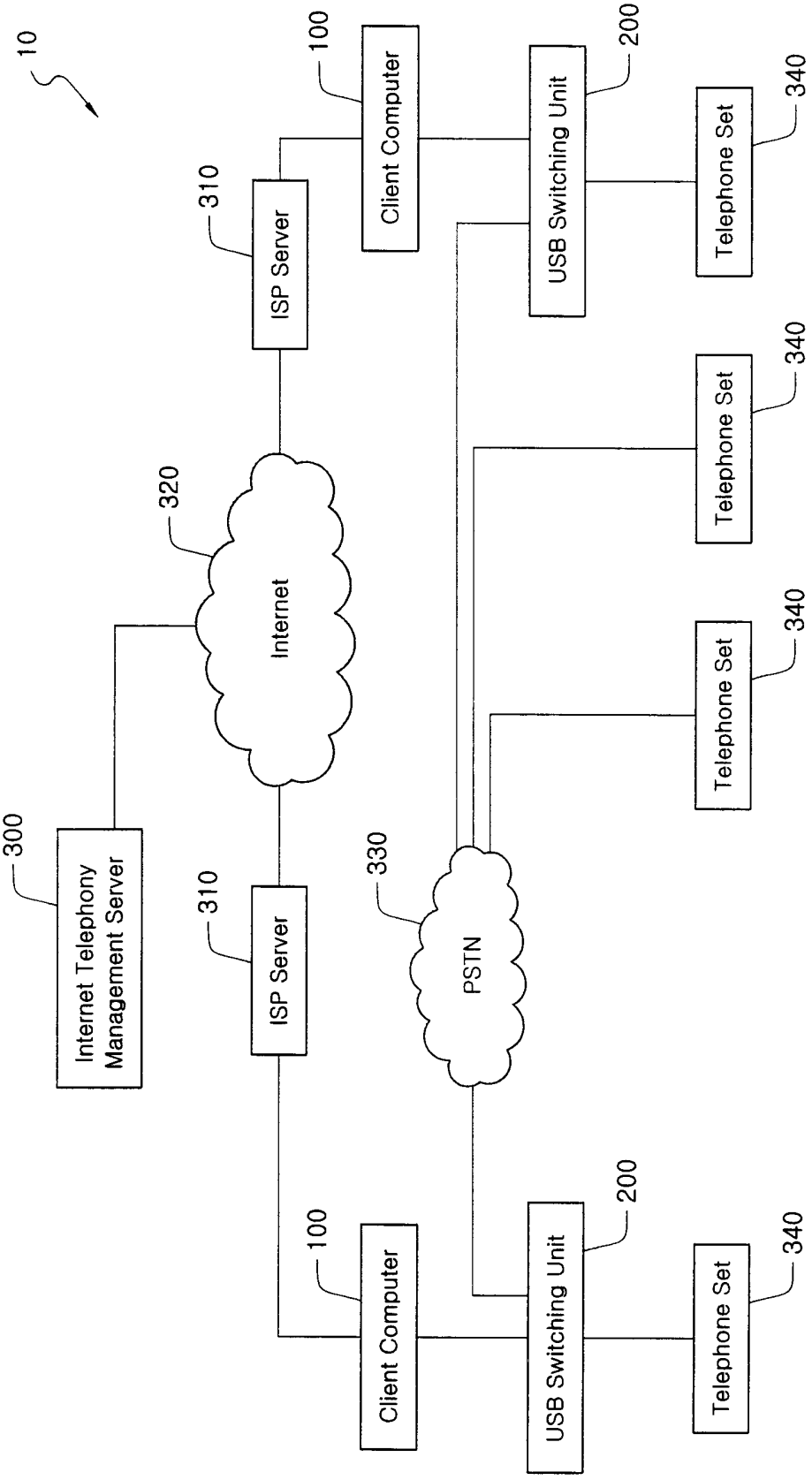

10
100
Client Computer
200
USB Switching Unit
340
Telephone Set
310
ISP Server
320
Internet
300
Internet Telephony Management Server
330
PSTN

Figure 2

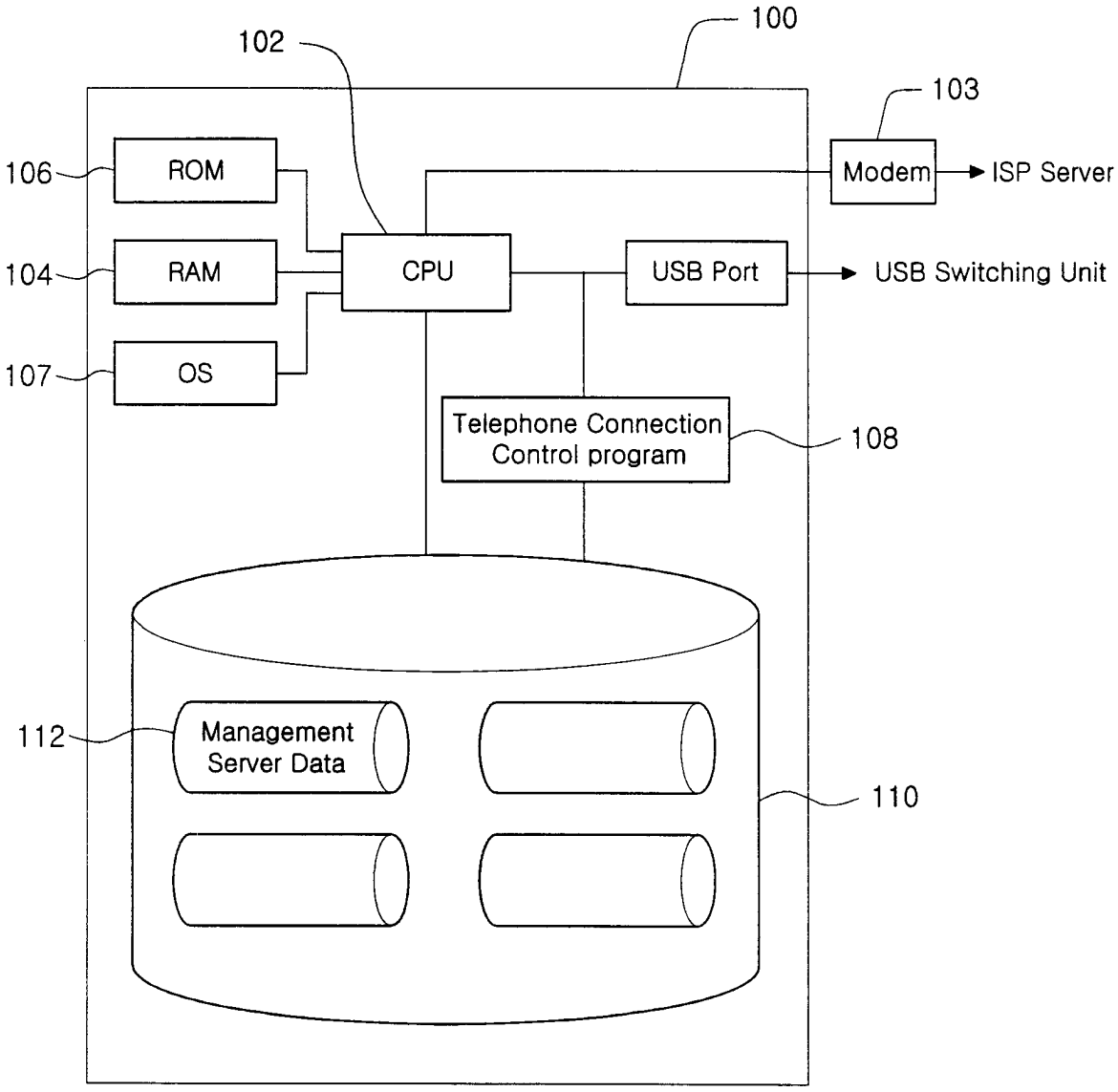

100
102
103
106
ROM
Modem
ISP Server
104
RAM
CPU
USB Port
USB Switching Unit
107
OS
Telephone Connection Control program
108
112
Management Server Data
110

Figure 3

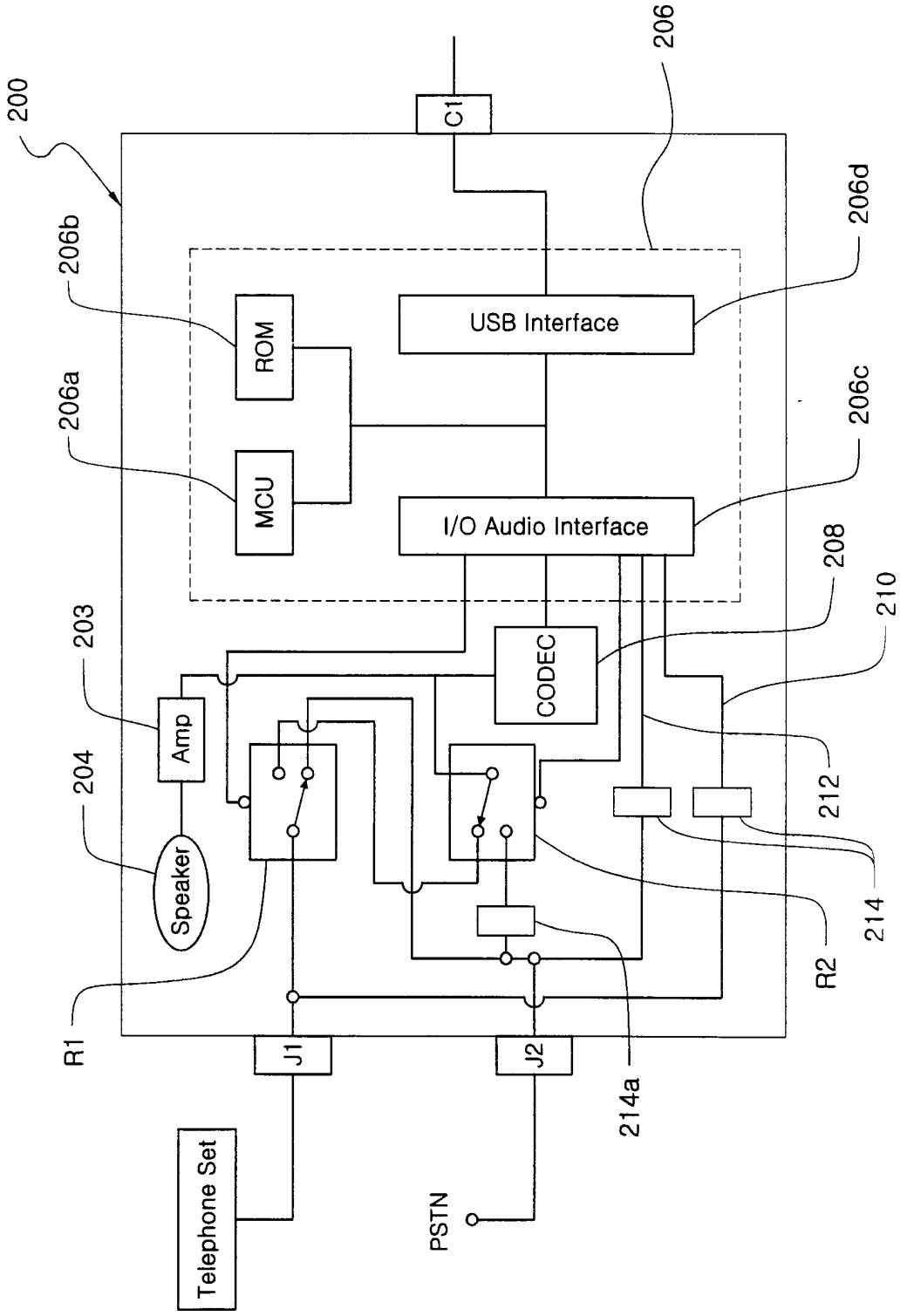

200
206
C1
206d
206b
USB Interface
ROM
206a
206c
MCU
I/O Audio Interface
208
210
203
CODEC
Amp
204
212
Speaker
214
R2
R1
J1
J2
214a
Telephone Set
PSTN

Figure 4

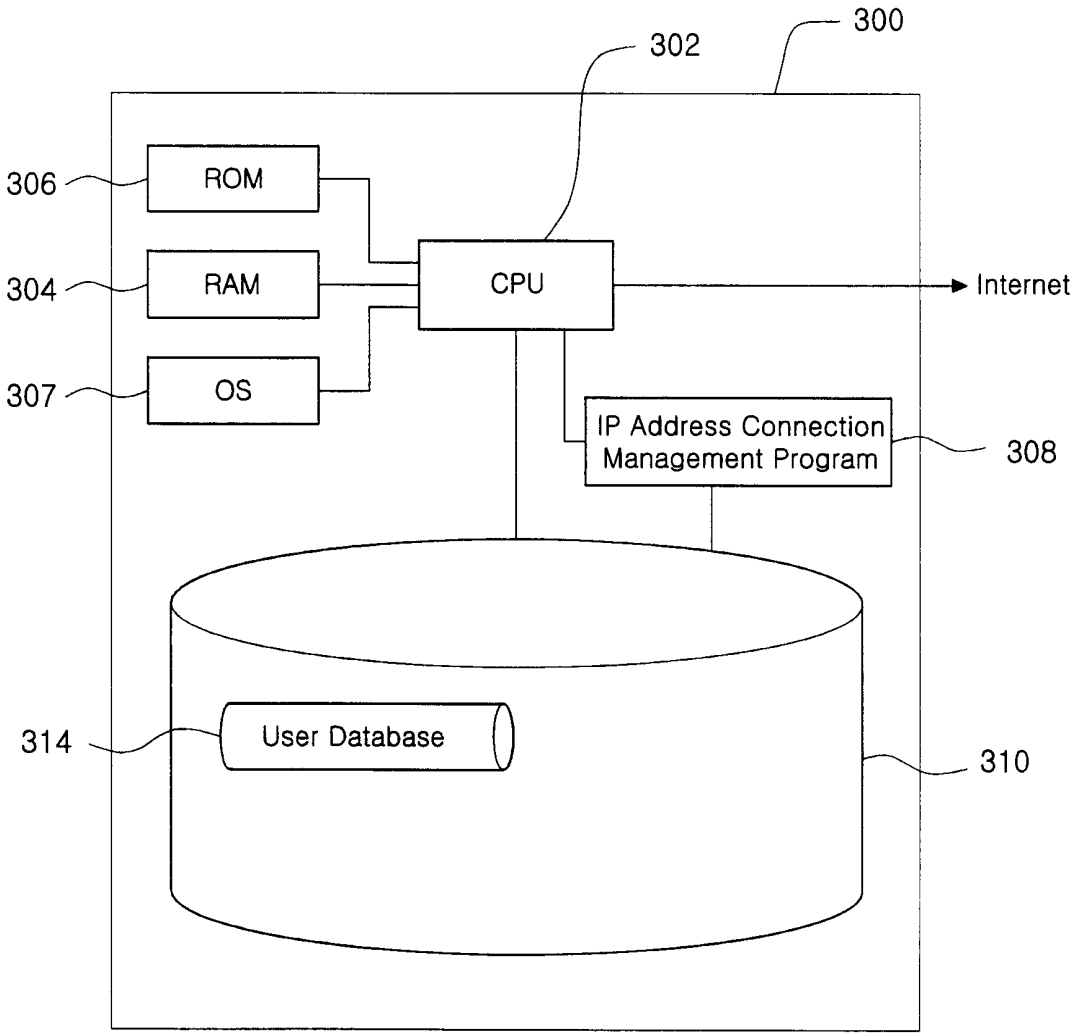

300
302
306
ROM
304
RAM
307
OS
CPU
Internet
IP Address Connection
Management Program
308
314
User Database
310

Figure 5

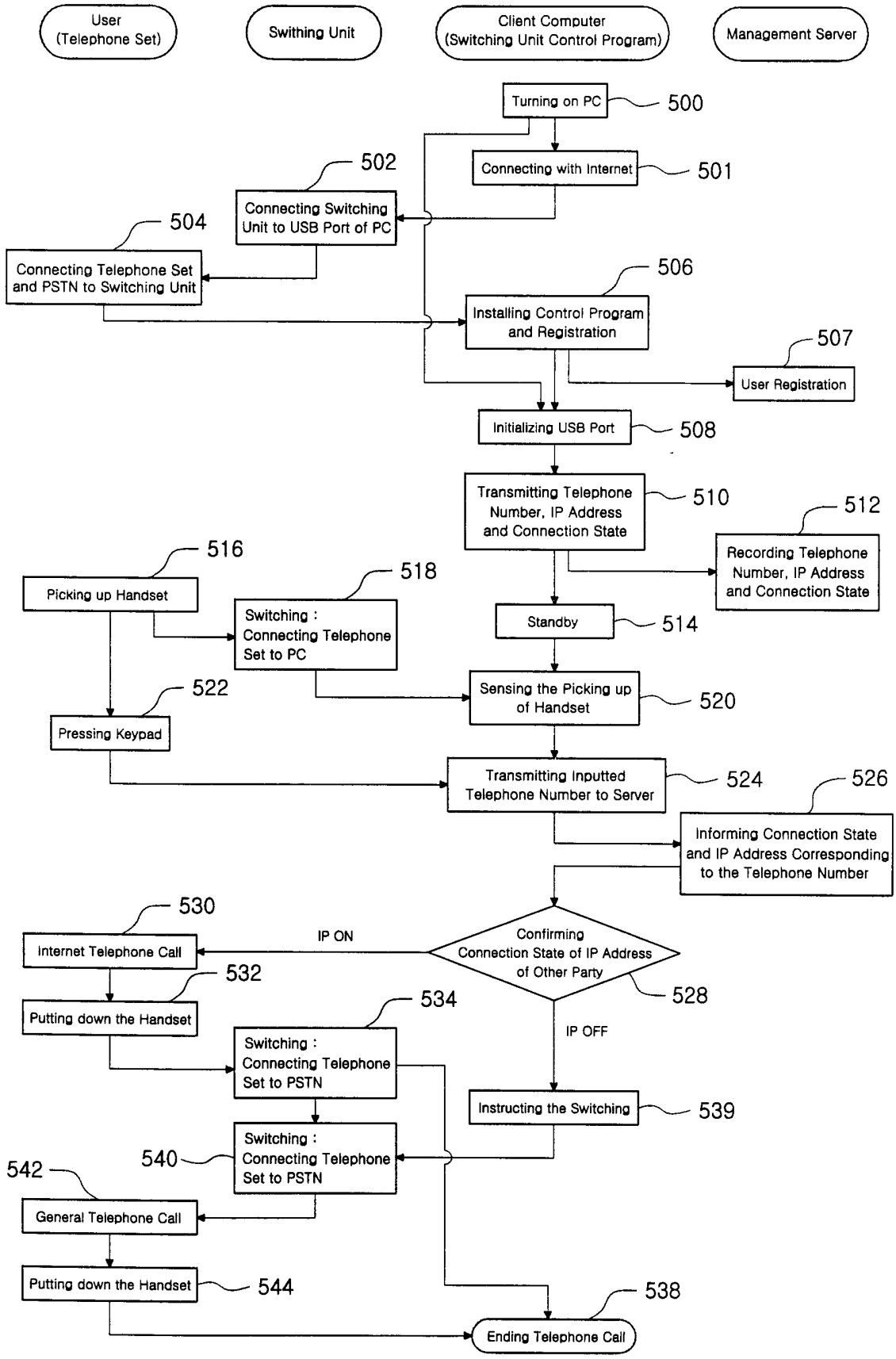
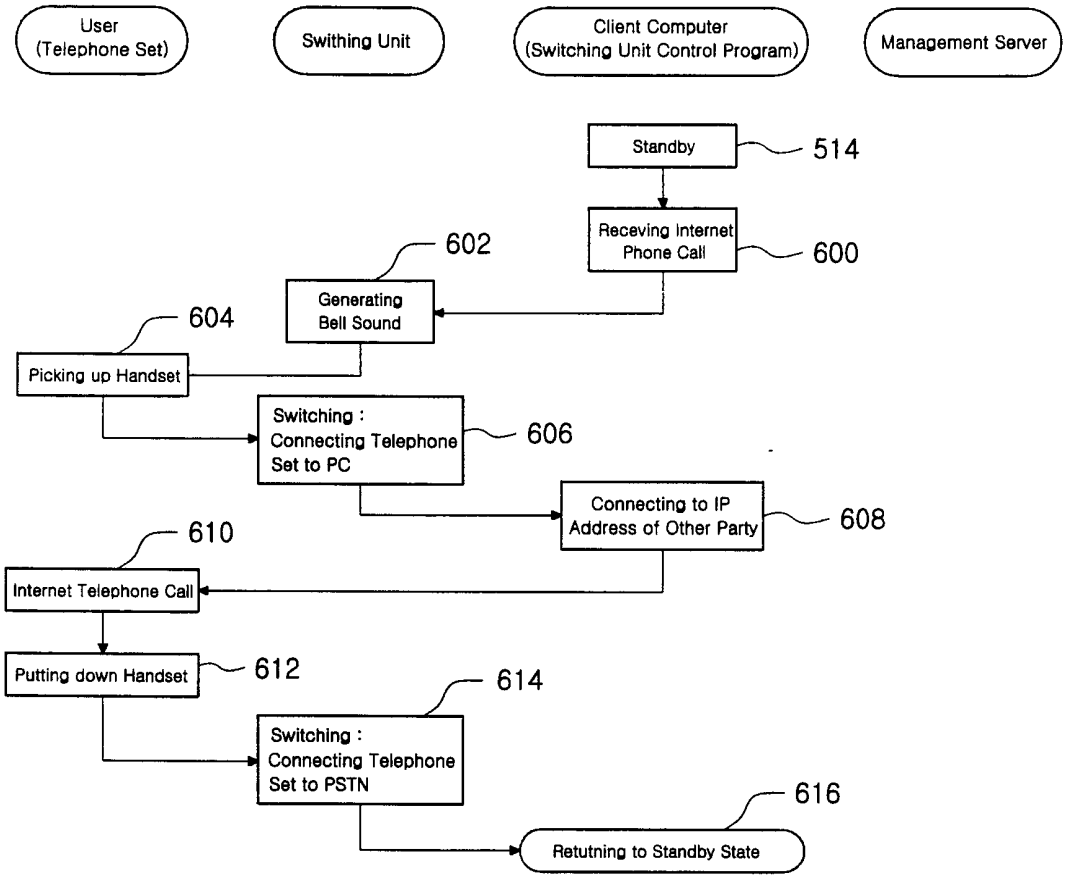

User (Telephone Set)
Swithing Unit
Client Computer (Switching Unit Control Program)
Management Server
Turning on PC
500
Connecting with Internet
501
502
Connecting Switching Unit to USB Port of PC
504
Connecting Telephone Set and PSTN to Switching Unit
506
Installing Control Program and Registration
507
User Registration
Initializing USB Port
508
Transmitting Telephone Number, IP Address and Connection State
510
512
Recording Telephone Number, IP Address and Connection State
516
Picking up Handset
518
Switching : Connecting Telephone Set to PC
Standby
514
522
Pressing Keypad
Sensing the Picking up of Handset
520
Transmitting Inputted Telephone Number to Server
524
526
Informing Connection State and IP Address Corresponding to the Telephone Number
530
IP ON
Confirming Connection State of IP Address of Other Party
528
Internet Telephone Call
532
Putting down the Handset
534
IP OFF
Switching : Connecting Telephone Set to PSTN
Instructing the Switching
539
Switching : Connecting Telephone Set to PSTN
540
542
General Telephone Call
Putting down the Handset
544
538
Ending Telephone Call

Figure 6


User (Telephone Set)
Swithing Unit
Client Computer (Switching Unit Control Program)
Management Server
Standby
514
Receving Internet Phone Call
600
602
Generating Bell Sound
604
Picking up Handset
Switching : Connecting Telephone Set to PC
606
Connecting to IP Address of Other Party
608
610
Internet Telephone Call
Putting down Handset
612
614
Switching : Connecting Telephone Set to PSTN
616
Retutning to Standby State

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR01/00434

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 H04L 12/66

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

B. FIELDS SEARCHED

Minimun documentation searched (classification system followed by classification symbols)
IPC7 H04L 12/00-12/66, HO4M 1/00

Documentation searched other than minimun documentation to the extent that such documents are included in the fileds searched
Korean Patents and applications for inventions since 1990

Electronic data base consulted during the international search (name of data base and, where practicable, search trerms used)
WPI, PAJ "INTERNET", "PSTN", "TELEPHONE", "SWITCH"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 99/14924 A (GENESYS TELECOMMUNICATIONS LABORATORIES INC) 25 MARCH 1999, See the all document.	1-8
A	JP 10-224853 A (SAMSUNG ELECTRON CO LTD) 21 AUGUST 1998, See the all document.	1-8
A	KR 99-17429 A (SAMSUNG ELECTRONICS CO LTD) 15 MARCH 1999, See the all document.	1-8
P, X	KR 00-18243 A (NO, Byung Gyu) 6 APRIL 2000, See Claim 1, 6	1, 2, 6
P, Y		3-5, 7,8
P, Y	KR 00-54231 A (VATEK SYSTEM CO LTD) 5 SEPTEMBER 2000, See Claim 3	3, 7
P, Y	KR 00-37194 A (HAN, Tae Hee) 5 JULY 2000, See Claim 1	4, 5, 8

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevence
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"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 relevence; 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 relevence; 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	Date of mailing of the international search report
13 JUNE 2001 (13.06.2001)	15 JUNE 2001 (15.06.2001)

Name and mailing address of the ISA/KR
Korean Intellectual Property Office
Government Complex-Daejeon, Dunsan-dong, Seo-gu, Daejeon Metropolitan City 302-701, Republic of Korea
Facsimile No. 82-42-472-7140

Authorized officer
KIM, Byung Woo
Telephone No. 82-42-481-5695