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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
30 November 2000 (30.11.2000)

PCT

(10) International Publication Number
WO 00/72558 A1

(51) International Patent Classification[7]: H04M 1/64, H04J 3/26, H04Q 7/20, G06F 17/60, H04L 1/16

(21) International Application Number: PCT/US00/14465

(22) International Filing Date: 24 May 2000 (24.05.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/318,884 26 May 1999 (26.05.1999) US

(63) Related by continuation (CON) or continuation-in-part (CIP) to earlier application:
US 09/318,884 (CON)
Filed on 26 May 1999 (26.05.1999)

(71) Applicant and
(72) Inventor: WEINGARTEN, Walter, Jay [US/US]; 2nd Floor, 2801-B Avenue P, Brooklyn, NY 11229 (US).

(74) Agents: MARKOWITZ, Michael, I. et al.; Abelman, Frayne & Schwab, 150 East 42nd Street, New York, NY 10017-5612 (US).

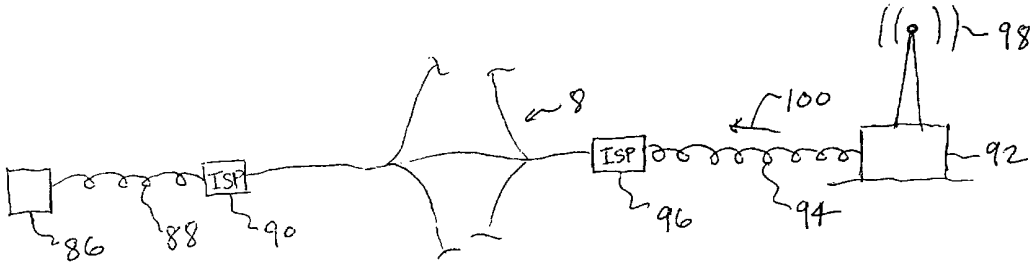
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, 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), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *With international search report.*

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.

(54) Title: TRANSPARENT SYSTEMS FOR COMMUNICATION OVER COMPUTER NETWORKS



(57) Abstract: Telephonic and radio systems for communication over computer networks conduct audio and other forms of communication over computer networks upon entry of appropriate input on devices included within the telephonic and radio systems.

WO 00/72558 A1

TRANSPARENT SYSTEMS FOR COMMUNICATION OVER COMPUTER NETWORKS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of application number 08/687,180, filed on July 25, 1996.

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

This invention relates to systems for communicating over computer networks and, more particularly, to systems allowing for communication of data over computer networks for the benefit of a user with improved ease of access to the data for the user.

DESCRIPTION OF THE RELATED ART

Computer networks interconnecting a large number of computers owned by different users are proliferating at an ever accelerating rate. One extremely popular and well known network is the Internet which links many hundreds of thousands of computers owned by almost as many businesses, educational institutions, governmental agencies, and individuals.

There has been much interest of late in using the Internet and other computer networks to conduct long-distance telephone conversations. The advantage of using the computer networks in this fashion involves avoiding using the conventional long-distance telephone network, and incurring telephone company charges.

Such efforts commonly have involved the use of a software package installed on a personal computer (PC) equipped with a sound card, microphone, and speakers enabling the PC to produce audible sounds, such as audible sounds encoded on CD-ROM (compact disk - read-only memory) disks which are placed in CD-ROM disk drives in certain personal computers. The software package allows a first user of a PC to employ the sound card, microphone, and speakers as the equivalent of a telephone, with the sound card, microphone, and speakers either receiving the first user's voice for transmission to a second user with whom the first user is conversing or transmitting the second user's voice to the first user. Some versions of such software allow only half duplex use, or in other words, either conversant may either talk or listen, but not both simultaneously, but more recent versions allow full duplex use equivalent to conventional telephone communications where conversants may talk and listen simultaneously. Such software includes "Internet Phone" produced by VocalTec Inc., of Northvale, New Jersey, "WebTalk" produced by Quarterdeck Corp. of Santa Monica, California, and "WebPhone" produced by NetSpeak Corporation of Boca Raton, Florida.

The audio signal in appropriate digital form travelling over the Internet from a PC will normally enter the Internet just like any other digital data through a local Internet Service Provider (ISP). The appropriate digital form will be in groups of digital information known as

packets, each packet containing both the data representing the audio signal and control information telling the Internet what to do with the packet. Since these ISPs exist worldwide as "gateways" to the Internet, persons with PCs connected to the Internet can conduct telephone conversations at no added cost over the access charges paid to their ISP. Because of poor voice quality, delays, and lost connections experienced during Internet conversations, special servers have been or will be installed at many ISPs to handle the increase in Internet traffic due to Internet voice communications.

One callback and Internet access provider, International Discount Telecommunications Corp. (IDT) of Hackensack, New Jersey, has demonstrated a prototype that purportedly allows a PC anywhere in the world having enough memory, a microphone, speakers, a sound card, and an IDT account to be connected to a telephone in the United States.

Despite the rapid advances and improvements in Internet telephony, several disadvantages remain. The participants in any such conversation all require PCs to conduct a conversation, all of the PCs must be connected to the Internet for the conversation to begin, and all of the PCs must have the same Internet telephony software as no software package currently being marketed is compatible with any other package. The IDT prototype requires one PC with peripherals online for a conversation to occur.

In addition, the sound cards and speakers as well as insufficient PC memory cause communication problems. For example, frequent volume adjustment to the speakers is necessary on both ends of the communications link to obtain audible communication and control of background noises.

The potential of the Internet and other computer networks to communicate other forms of information beside telephone conversations in a transparent and easily accessible manner has only been barely attempted. One of these largely unexplored areas is the use of computer networks to communicate live radio broadcasts and other forms of recorded audio communication. There appear to be Internet radio services, as well as traditional radio stations, that allow users of computers to access audio channels and conventional radio programming over the Internet, *see New York Times*, May 17, 1999, p. C11. However, it would be particularly advantageous if live radio broadcasts or other audio communication would be accessible to a user with a device possessing the general appearance and simplicity of use associated with a conventional radio.

The present invention makes substantial progress in presenting practical "information appliances" to communicate information to a user which is desired in real time with improved ease of access to the information for the user.

SUMMARY OF THE INVENTION

The present invention comprises devices which connect directly to the Internet or other computer network without the need for a PC being present between the devices and the computer network.

In a first embodiment of the invention, the telephonic device comprises a custom designed telephone hardwired with a microcontroller. The custom designed telephone is equipped with a separate alphabetic keypad as well as a numeric one. The microcontroller is programmed so as to respond to the dialing of the alphabetic host address, which is analogous to an electronic mail (e-mail) address, or its equivalent, a number known as the Internet Protocol (IP) address, of the telephone of the party called by sending out an appropriate signal to the telephone of the party called over the Internet, thus causing the telephone of the party called to ring. The party called then can pick up the telephone and the telephone conversation can commence. The telephone of the party called is of the same custom design as the telephone of the calling party. Both custom designed telephones are constantly connected to the Internet through the ISP of each party and are, thus, ordinarily unavailable for traditional use.

A second embodiment of the invention differs from the first embodiment in that the microcontroller is not integral with the telephone, but is contained in an electronic box plugged into the phone, but separate

from it. This embodiment allows the use of a telephone which only differs from a conventional telephone by the presence of a separate alphabetic keypad. This telephone can be unplugged from the system and used as a conventional telephone, as contrasted to the custom designed telephone included in the first embodiment of the invention.

A third embodiment of the invention involves the use of conventional telephones, Central Exchange (centrex), Private Branch Exchange (pbx), or a PC-based switching system (pcex), and the Internet. In this embodiment, one conversant is able to use a telephone to call a centrex, pbx, or pcex connected to the Internet. The call goes go through the Internet to a second centrex, pbx, or pcex which completes the call through the regular telephone lines.

A fourth embodiment of the invention is similar to the first embodiment of the invention in that a custom designed telephone hardwired with a microcontroller is disclosed. However, the microcontroller is programmed so that the telephone need not always be connected to the Internet to make and receive telephone calls over the Internet and can, thus, be used as an ordinary telephone when calls are not being made over the Internet. The microcontroller is programmed so that when a call over the Internet is initiated by dialing the telephone number of a called telephone, the alphabetic host address or IP address of the calling telephone, and the alphabetic host address or IP address of the called telephone, the calling telephone first calls over the conventional

telephone lines, transmitting the alphabetic host address or IP address of the calling telephone to the called telephone and then hangs up. The called telephone, having a microcontroller programmed in a manner compatible with that of the calling telephone, then dials the alphabetic host address or IP address of the calling telephone, while the calling telephone dials the alphabetic host address or IP address of the called telephone, resulting in both of the telephones being connected to the Internet only when a voice conversation between the owners of the telephones occurs.

A fifth embodiment of the invention differs from the fourth embodiment of the invention in that a device or devices capable of sending and/or receiving data other than an audio signal over the Internet is incorporated into the telephone.

A sixth embodiment of the invention allows a user to listen to live or prerecorded radio broadcasts by use of the Internet. In this way, radio stations traditionally broadcasting by the wireless mode, which indeed defines conventional radio, can increase their available bandwidth for broadcasting greatly, and a new mode of communication which can be named "Internet network radio" will be born. The radio station and the user's "Internet radio" are both connected to the Internet by conventional telephone lines.

A seventh embodiment of the invention differs from the sixth embodiment in that the radio station broadcasts in wireless mode to its ISP instead of being connected to it by conventional telephone lines.

An eighth embodiment of the invention differs from the sixth embodiment in that the user's "Internet radio" is connected in a wireless manner to its ISP rather than through conventional telephone lines.

A ninth embodiment of the invention differs from the sixth embodiment of the invention in that both the radio station and the "Internet radio" communicate with their respective ISPs in a wireless manner rather than through conventional telephone lines.

A tenth embodiment of the invention allows a user to listen to live or prerecorded audio information transmitted over the Internet on virtually any subject that can be imagined.

It is an object of this invention to conduct voice conversations over computer networks without the use of computers.

It is a further object of this invention to initiate voice conversations over computer networks despite the absence of any initial working connection between the devices used for the voice conversations and the computer networks.

It is a still further object of this invention to standardize voice communication over computer networks so that incompatible equipment does not prevent such communication.

It is yet a further object of this invention to provide devices capable of enabling voice communications and other forms of data communication simultaneously over computer networks.

It is yet another object of this invention to permit the dissemination of audio information from at least one source, such information being broadcast in real time or being previously recorded, to at least one listener over computer networks.

It is still another object of this invention to allow the dissemination of such audio information to listeners without the use of computers by such listeners.

These and other objects and advantages of the present invention will become more apparent to those of ordinary skill in the art upon consideration of the attached drawings and the following description of the preferred embodiments which are meant by way of illustration and example only, but are not to be construed as in any way limiting the invention disclosed and claimed herein.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic diagram of the first embodiment of the invention.

Fig. 2 is a schematic diagram of the second embodiment of the invention.

Fig. 3 is a schematic diagram of the third embodiment of the invention.

Fig. 4 is a schematic diagram of the fourth embodiment of the invention.

Fig. 5 is a schematic diagram of a telephonic device used in the fifth embodiment of the invention.

Fig. 6 is a schematic diagram of the sixth embodiment of the invention.

Fig. 7 is a schematic diagram of the seventh embodiment of the invention.

Fig. 8 is a schematic diagram of the eighth embodiment of the invention.

Fig. 9 is a schematic diagram of the ninth embodiment of the invention.

Fig. 10 is a schematic diagram of the tenth embodiment of the invention.

Fig. 11 is a plan view of an enhanced Internet radio

Fig. 11A is a view of Fig. 11 taken along section lines 11A-11A.

Fig. 11B is a view of Fig. 11 taken along section lines 11B-11B.

Fig. 12 is a plan view of a remote control device for an enhanced Internet radio.

Fig. 12A is a view of Fig. 12 taken along section lines 12A-12A.

Fig. 13 is a schematic diagram of an arrangement of an enhanced Internet radio, earphones, and a remote control device.

Fig. 14 is a schematic diagram of an enhanced Internet radio, earphones, a remote control device, and speakers in a free-standing configuration.

Fig. 15 is a schematic diagram of an enhanced Internet radio with earphones, a remote control device, and speakers in a wall-mounted configuration.

Fig. 16 is a schematic diagram of an enhanced Internet radio, earphones, a remote control device, speakers in a wall-mounted configuration, and a CD player or hard drive attached to the enhanced Internet radio.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

For a more detailed description of the invention in its several embodiments given only by way of example and not to be construed as limiting the invention in any fashion, we refer to the drawings.

Fig. 1 represents the first embodiment of the invention. In this embodiment, a first telephone 2 and a second telephone 4 are of the same design, each containing a microcontroller 6 allowing the first telephone 2 and the second telephone 4 to make and receive telephone

calls over the Internet 8 or another computer network and a separate alphabetic keypad as well as a numeric one. (It should be understood that a conventional telephone numeric keypad can be used in combination with a separate alphabetic keypad, although the presence of multiple letters over the numbers in such a numeric keypad would be redundant and possibly confusing to the user.) Alternatively, each telephone could have a conventional telephone numeric keypad and extra selection keys such as, for example only, "shift", "ctrl", or "alt", to select between the multiple letters shown over some of the numbers on the conventional telephone numeric keypad. (A conventional telephone numeric keypad could also be used, without any extra selection keys, in a rather inconvenient manner by making use of the keys without letters to select letters.) The first telephone 2 is connected to the Internet 8 through a first conventional telephone line 7 and the ISP 10 of the party owning the first telephone 2 and the second telephone 4 is connected to the Internet 8 through a second conventional telephone line 9 and the ISP 12 of the party owning the second telephone 4.

As an example of the operation of the invention, if the party owning the first telephone 2 wishes to call the party owning the second telephone 4, the party owning the first telephone would preferably dial alphabetic symbols corresponding to the alphabetic host address of the second telephone 4 or the numeric equivalent of the alphabetic host

address, a number corresponding to the IP address of the second telephone 4.

The use of an alphabetic host address would be most convenient to connect a call to those Internet users whose IP addresses for their telephones are dynamically allocated every time they are connected to the Internet. The use of an IP address is a viable alternative convenient to connect a call to those Internet users who have permanent IP addresses for their telephones.

A typical alphabetic host address, which is analagous to an e-mail address, might be jones@johnson.com. If this were an e-mail address, the address would signify that jones is a user on a computer named johnson in the Domain Name System (DNS) domain named com. (The Internet is subdivided into administrative units containing groups of participating computers called domains.) Analogously, since we are dealing with a telephone that is the host, instead of a computer, the address signifies that jones is a user on a telephone named johnson in the Internet domain named com.

The IP address, which is the numeric equivalent of the alphabetic host address, is typically expressed in dot notation. For example, 198.95.262.38 is a typical IP address. Of course, the microcontroller 6 could be programmed so that it would respond without the use of the dots or the dots could be replaced by the use of the "*" key on the typical touch tone telephone keypad.

It should be noted that an IP address identifies one network interface on a host. Thus, if a host, in our case, a telephone, has two or more network interfaces (see fifth embodiment of invention below), the host will have a different IP address for each network interface. Each IP address, as presently assigned by the authorities responsible for assigning such addresses on the Internet, is a 32-bit binary number written as 4 fields, 8 bits each, separated by dots. (The typical IP address given above is the decimal equivalent of the binary address.) Due to the sheer number of devices being connected to the Internet, the available addresses are running low. Any extension of the IP addressing system to cover additional addresses, whether IPng (Internet Protocol Next Generartion), also known as IPv6 (Internet Protocol, Version 6), or another subsequent scheme which is numerically based, can be easily accomodated by the invention as disclosed herein.

In any event, the microcontroller 6 of the first telephone 2 is programmed to send out a signal 14 which is relayed by the ISP 10 of the party owning the first telephone 2 and the ISP 12 of the party owning the second telephone 4 to the second telephone 4 causing the second telephone 4 to ring. The owner of the second telephone 4 can then pick up the second telephone 4 and a conversation can begin between the owner of the first telephone 2 and the owner of the second telephone 4.

The signal 14 travels over the Internet 8 using the TCP/IP (Transmission Control Protocol/Internet Protocol) suite of protocols for

transmission of data over the Internet. Since the type of communication ordinarily to be effected by the invention disclosed herein is simple voice, text, audiovisual, or visual communication where everything is transmitted in realtime mode and data may be easily resent if corrupted in the transmission, those protocols in the TCP/IP suite which do not perform extensive error checking on packets sent may be used, instead of those more appropriate for data where visual and mathematical accuracy is a critical consideration. Thus, User Datagram Protocol (UDP), which causes data to flow on the Internet without error checking, may be used by the microcontroller 6 of the telephones 2,4 to transmit voice instead of the more conventional TCP which provides for such error checking. This will allow for more efficient transmission of voice by the disclosed invention than would be possible if conventional PCs using TCP to transmit voice were used.

The embodiment of the invention depicted by Fig. 1, however, requires that the first telephone 2 and the second telephone 4 be "dedicated" telephones constantly connected to the Internet 8 and therefore unavailable for use with the conventional telephone network unless they are connected to the telephone network over Integrated Services Digital Network (ISDN) lines, a Digital Subscriber Line (DSL), or cable television lines, which would possibly allow each telephone to be used for calling over the conventional telephone lines even though they are also connected to the Internet.

A second embodiment of the invention is shown in Fig. 2. A first telephone 20 and a second telephone 24 are connected to the Internet 8. The first telephone 20 has an electronic box 28 connected to it, the electronic box 28 containing a microcontroller 6. The second telephone 24 has an electronic box 32 connected to it, the electronic box containing a microcontroller 6.

Similarly to Fig. 1, the first telephone 20 is connected to the Internet 8 through a first conventional telephone line 25 and the ISP 40 of the party owning the first telephone 20 and the second telephone 24 is connected to the Internet 8 through a second conventional telephone line 33 and the ISP 42 of the party owning the second telephone 24. The functionality of the microcontroller 6 is identical to that described in connection with Fig. 1. However, its physical location has changed from inside the telephones 2,4 shown in Fig. 1 to outside the telephones 20,24 shown in Fig. 2 and inside separate electronic boxes 28,32. The telephones 20,24 have the alphabetic and numeric keypads or, alternatively, a conventional telephone numeric keypad with extra selection keys, as described for the telephones 2,4 shown in Fig. 1. Alternatively, the alphabetic keypad or extra selection keys may be placed on the separate electronic boxes 28, 32. Finally, the operation of the invention, upon the party owning the first telephone 20 dialing the alphabetic host address or IP address of the second telephone 24, would be the same as

that described in Fig. 1 upon the party owning the first telephone 2 dialing the alphabetic host address or IP address of the second telephone 4.

The advantage of the embodiment shown in Fig. 2 over that shown in Fig. 1 is that the telephones 20,24 can be unplugged from their respective electronic boxes 28,32 and used as conventional telephones communicating over the conventional telephone network since they have at least a numeric keypad. The telephones 2,4 shown in Fig. 1, on the other hand, cannot ordinarily be used as conventional telephones since they are constantly connected to the Internet.

Fig. 3 shows a third embodiment of the invention. In this embodiment, a first conventional telephone 50 and a second conventional telephone 52 can make and receive telephone calls over the Internet 8. This is possible because the first telephone 50 and the second telephone 52 are connected to telephone switching equipment 54 that is connected to the Internet 8, instead of to the conventional telephone network. This telephone switching equipment can be in the form of a centrex 56, pbx 58, or pcex 60. This telephone switching equipment 54 will work in an analagous manner to that found in the conventional telephone network, but it will be connecting subscriber telephones connected to the Internet 8 to each other.

As an example of the operation of the invention in accordance with this embodiment, if the party owning the first telephone 50 wishes to call the party owning the second telephone 52, the party

owning the first telephone 50 will simply dial the telephone number of the party owning the second telephone 52. Then the signal 64 produced by the first telephone 50, instead of traveling solely on the conventional telephone lines, will first travel over the conventional telephone lines 68 to telephone switching equipment 54, which may be any one of centrex switching equipment 56, pbx switching equipment 58, or pcex switching equipment 60, connected on one side to the first telephone 50 through the conventional telephone lines 68 and on the other side to the Internet 8. This switching equipment 54 will relay the signal 64 through the Internet 8 such that it is received by a second arrangement of switching equipment 54, which may again be any one of centrex switching equipment 56, pbx switching equipment 58, or pcex switching equipment 60, which is connected on one side to the Internet 8 and on the other side through conventional telephone lines 69 to the second telephone 52. The second arrangement of switching equipment 54 relays the signal 64 through conventional telephone lines 69 to the second telephone 52. When the second telephone 52 receives the signal 64 it rings and the party owning the second telephone 52 can pick up the receiver and a conversation can begin.

This third embodiment of the invention allows the use of completely conventional telephones and switching equipment to speak over the Internet, but requires that the switching equipment be connected to the Internet.

Fig. 4 shows the fourth embodiment of the invention. Analagously to the first embodiment shown in Fig. 1, there are a first telephone 70 and a second telephone 72 connected to the Internet 8 and capable of making and receiving calls over the Internet 8. Each telephone 70,72 is custom designed and contains a microcontroller 74. Each telephone has both a numeric keypad and an alphabetic keypad or, alternatively, a conventional telephone numeric keypad with extra selection keys as previously described in connection with the telephones 2,4 shown in Fig. 1. Analogously to Fig. 1, the first telephone 70 is connected to the Internet 8 through a first conventional telephone line 75 and the ISP 76 of the owner of the first telephone 70 and the second telephone 72 is connected to the Internet 8 through a second conventional telephone line 77 and the ISP 78 of the owner of the second telephone 72. However, unlike the embodiment of Fig. 1, the telephones 70,72 need not always be connected to the Internet 8, but may also be used for calls over the conventional telephone lines without the use of ISDN lines because of the method by which Internet telephone calls are connected. To demonstrate this method of operation, we consider a concrete example.

If the owner of the first telephone 70 desires to make a call over the Internet 8 to the owner of the second telephone 72, the owner of the first telephone 70 would dial the alphabetic host address or the IP address of the first telephone 70 and the alphabetic host address or the IP address of the second telephone 72 followed immediately by the regular

telephone number of the second telephone 72. Of course, the order of dialing the various alphabetic host or IP addresses and the telephone number is only given by way of example and may be varied depending on the programming of the microcontroller 74.

The microcontroller 74 in the first telephone 70 would be programmed to respond to the dialing of the combined alphabetic host or IP addresses and the telephone number by transmitting, over the conventional telephone lines 80 connecting the two telephones 70,72, the alphabetic host address or the IP address 82 of the first telephone 70 to the second telephone 72. The first telephone 70 would then terminate the connection with the second telephone 72. The second telephone 72 would then dial the alphabetic host or IP address of the first telephone 70, causing a connection to the first telephone 70 through the ISP 78 of the owner of the second telephone 72 and the ISP 76 of the owner of the first telephone 70. While the second telephone 72 is dialing the alphabetic host or IP address of the first telephone 70, the first telephone 70 is dialing the alphabetic host or IP address of the second telephone 72, causing a connection to the second telephone 72 through the ISP 76 of the owner of the first telephone 70 and the ISP 78 of the owner of the second telephone 72. (It should be understood that "handshaking" or the process through which both telephones 70, 72 connect to each other can occur through numerous methods well known to those skilled in the art. For example, after the initial transmission of the alphabetic host address or IP address

82 of the first telephone 70 to the second telephone 72 over the conventional telephone lines 80, it may only be necessary for either one of the first telephone 70 or the second telephone 72 to dial the alphabetic host address or IP address of the other telephone for the telephones 70,72 to be connected to each other over the Internet.) Thus, both telephones 70,72 have been connected to the Internet 8 through the special dialing sequence on the first telephone 70 and by the special subsequent calling sequence previously described and they are only connected to the Internet 8 for conducting a telephone conversation by the special dialing sequence on one of the telephones 70,72 specified above. If a regular telephone number is dialed, the telephones 70,72 would react as a conventional telephone, placing the call over the conventional telephone lines 80.

This embodiment thus allows the telephones 70,72 to make and receive calls over the Internet 8 when desired or, if the Internet 8 is too busy or for some other reason is unsuitable for communication, over the conventional telephone lines 80.

The fifth embodiment of the invention differs from the fourth embodiment of the invention in the telephones used. These telephones 80, one of which is shown in Fig. 5, differ from the telephones 70,72 shown in Fig. 4 insofar as they incorporate a device or devices 82 capable of sending or receiving or sending and receiving data over the Internet other than audio data and insofar as they have added functionality over that described for the telephones 70,72 and thus require a

microprocesser 84 programmed to perform such additional functions. These telephones 80 will function, as did the telephones 70,72 in the fourth embodiment of the invention, to establish a telephone conversation between the owners of the telephones.

However, once such a conversation is established one or the other of the conversants may wish to use the device or devices 82 on the telephone to send data other than voice to the other conversant. Of course, in such an instance the device or devices 82 on the two telephones involved must be compatible to send or receive, as required, the data desired. This device or devices 82 may include, but are not limited to, facsimile transmission devices, including devices which can process color facsimiles or even three-dimensional facsimiles which are created by laser mathematically measuring solid objects, devices which can send or receive live or recorded video with or without an accompanying sound track, devices which can send or receive still pictures, and screens of all types for displaying text or graphical data. Since, as explained earlier, any such device or devices 82 must each have a separate IP address, the IP address of the device 82 called to receive data will be entered prior to such transmission taking place.

For example, assume the owner of a first telephone 80 which has a device 82 comprising a color facsimile transmitting device wishes to send a color facsimile to a second telephone 80' having a device 82' comprising a color facsimile receiving device. The owner of the first

telephone 80 would enter the IP address or, equivalently, the alphabetic host address of the device 82' on the first telephone's keypad and this would cause the microcontroller 84 to establish a connection over the Internet to the device 82'. The color facsimile could then be sent from device 82 to device 82' while the owners of the two telephones 80,80' are conversing, provided that the telephone lines to the respective ISP's of the owners of the two telephones 80,80' will accomodate such simultaneous data transfer.

It should, of course, be understood that the telephones included in the fifth embodiment of the invention could be used to transmit data other than audio communication even in the absence of a telephone conversation. This would be done by following a process completely analagous to that described in the fourth embodiment of the invention for initiating a telephone call except that IP addresses or alphabetic host addresses of the sending or receiving or sending and receiving devices would be used, instead of IP addresses or alphabetic host addresses of the telephones into which those sending or receiving or sending and receiving devices are incorporated.

All embodiments of the telephonic devices described above using IP addresses or alphabetic host addresses to initiate a conversation between users of two telephonic devices could possess the ability to recognize a limited number of telephone numbers by the availability of a memory in the telephonic devices storing such limited number of telephone

numbers and their equivalent IP or alphabetic host addresses. In addition, the use of such IP or alphabetic host addresses may be rendered unnecessary in the future if telecommunications companies owning or operating the conventional telephone network assign telephone numbers to these telephonic devices.

Fig. 6 shows a sixth embodiment of the invention. In this embodiment, an Internet radio 86 is connected by conventional telephone lines 88 to an ISP 90 providing Internet services to the user of the Internet radio 86. A radio station 92 is also connected by conventional telephone lines 94 to an ISP 96 likewise providing Internet services to the radio station 92. Although the radio station 92 may be a conventional radio station, it may also be a private transmitter in a residential or other nonconventional location.

When a user of the Internet radio 86 desires to "tune in" to the radio station 92 and listen to whatever audio communication is then being broadcast by that radio station 92, the user activates the Internet radio 86 which may be battery powered or connected to a conventional electrical outlet just like a conventional radio. The user then tunes the Internet radio 86 to the station's frequency precisely in the same manner that the user would tune a conventional radio to that frequency. Upon being tuned to the frequency of the radio station 92, the Internet radio 86 will immediately transmit in audible form the broadcast of the radio station 92.

The process which insures this result is as follows. The radio station 92, at the same time that it generates radio waves 98 corresponding to the audible sounds being generated by a live event or by audio tapes being played in its studio, sends out a digital signal 100 over the conventional telephone lines 94 connecting it to its ISP 96. That digital signal 100 preferably also corresponds as fully as do the radio waves 98 to the audible sounds being generated by a live event or by tapes being played in its studio. Of course, the audible sounds being generated in its studio would be generated by a "live performance" by, for example, players of some musical instruments, singer, or talk show, or by audio tapes being played which could be of any such previous live performance. The digital signal 100 would be "broadcast" to those of the ISPs on the Internet 8 agreeing to receive that signal. Assuming that the user of the Internet radio 86 has the Internet radio 86 connected to an ISP 90 agreeing to receive the digital signal 100, tuning the Internet radio 86 to the frequency of the radio station 92 will cause the digital signal 100 to travel from the ISP 90 over the conventional telephone lines 88 to the Internet radio 86. Once the digital signal 100 is received at the Internet radio 86, the Internet radio 86 will reconvert the digital signal 100 into the original audible sounds generated live at the studio of the radio station 92 or generated by the data recorded on the audio tape played at the studio.

The Internet radio 86 comprises a microcontroller just as the telephonic device previously described does. That microcontroller is

programmed to convert the selection of a frequency in the tuner of an Internet radio 86 into a digital signal sent by the Internet radio 86 to the ISP 90 which will cause the selection of the digital signal sent by the radio station corresponding to the frequency tuned to from all of the radio digital signals received by the ISP 90.

There are several advantages of this embodiment of the invention over conventional radio transmission and reception. First, it greatly reduces any problem that the radio station might face if it desires to transmit large quantities of information simultaneously. Instead of being limited to a strictly defined bandwidth in airwaves that are increasingly crowded and subject to atmospheric disturbances and interference from other transmission sources, the radio station can transmit over a "dedicated" bandwidth of the Internet to certain select users, with the size of the bandwidth only subject to its economic capacity to pay for it and the overall capacity of the Internet. Atmospheric disturbances for the most part need no longer be feared for their potential interference with quality transmission and reception. Second, the limited range of its transmission by atmospheric means due to rapid signal attenuation is replaced by the transmission through the Internet which is only limited by the geographical extent of the Internet and the ISPs to which it wishes or is able to transmit the signal. On the other hand, this embodiment of the invention makes the Internet radio 86 not portable as it must be connected to conventional telephone lines 88, where a conventional radio can be

easily carried about, being operable in wireless mode. This feature is, of course, balanced by the fact that an Internet radio 86 can receive signals from any and all stations transmitting to its ISP largely independent of weather conditions, (excluding perhaps solar flares, or other atmospheric electromagnetic disturbances) be they a few miles away or halfway around the globe, whereas conventional radios, excluding shortwave models, are strictly limited in the stations that can be received to those within a comparatively short distance.

Figure 7 shows a seventh embodiment of the invention. This embodiment differs from the sixth embodiment in that the radio station 102 in this embodiment is not connected to its ISP 104 through conventional telephone lines, but relies on the radio waves 106 of its conventional radio transmission to connect with its ISP 104. Alternatively, the radio station 102 may broadcast at frequencies normally used for cellular telephones or at any other frequencies that may prove convenient.

The embodiment, of course, assumes that the ISP 104 is capable of receiving wireless communications as well as communications over the conventional telephone lines. Once the radio waves 106 of the conventional analog radio transmission of the radio station 102 are received by the ISP 104, the radio waves 106 are converted to digital signals 108 which are sent over the Internet 8 as in the sixth embodiment and received by those ISPs 110 agreeing to receive the digital signals 108

corresponding to the radio broadcast of radio station 102. As in the sixth embodiment, the Internet radio 112 will receive the digital signals 108 corresponding to the radio broadcast of the radio station 102 when it is tuned to the frequency of the radio station 102. The seventh embodiment of the invention saves the radio station 102 the additional expense of being connected to the ISP 104 through conventional telephone lines and any associated equipment needed to convert its otherwise wireless radio broadcast into a digital signal to be sent over telephone lines to the ISP 104.

Of course, the advantage of greatly increased bandwidth available to the radio station for broadcasts by digital signals sent to its ISP may be somewhat affected by possible interference from other transmission sources and by atmospheric disturbances because of the wireless transmission between the radio station 102 and its ISP 104. It should be noted that these factors may also cause degradation of analog and digital radio signals in general, cellular telephone signals, and other analog and digital wireless transmissions. However, if wireless transmissions are sent in digital form such degradation may not prevent successful reception of transmissions due to the availability of numerous and effective error correction schemes. These factors can also be minimized if the ISP 104 is located in proximity to the radio station 102 and is able to receive signals over a large bandwidth, even though such a bandwidth may be impossible to employ if wireless transmission is desired

directly between the radio station 102 and the user of the Internet radio 112.

Figure 8 shows an eighth embodiment of the invention. The embodiment differs from the sixth embodiment in that the ISP 120 of the user of the Internet radio 124 is not connected to the Internet radio 124 by conventional telephone lines. Instead, wireless transmission 122 is relied upon from the ISP 120 to the Internet radio 124. However, as in the sixth embodiment, the radio station 114 sends out a digital signal 126 over conventional telephone lines 116 to its ISP 118, which, in turn, relays that digital signal over the Internet 8 to the ISP 120. The ISP 120 must have the capability of transmitting that digital signal as a wireless transmission 122, intended for the Internet radio 124. The Internet radio 124 in this embodiment must have the capability of receiving the wireless transmission 122, similarly to a conventional radio, in addition to or instead of the capability of receiving digital signals 100 over conventional telephone lines 88 possessed by Internet radio 86 in the sixth embodiment of the invention.

The advantage of this embodiment of the invention over the sixth embodiment of the invention is the result that the Internet radio 124 becomes truly portable as a conventional radio is. The Internet radio 124 may be portably carried by a person or may be installed in an automobile, ship, train, airplane, or other means of transportation. In contrast to a conventional radio, however, the limit of its portability is not the strength

of the broadcast from the radio station 114, but rather the strength of the wireless transmission 122 from its ISP 120 and the medium by which that wireless transmission 122 is conducted to the Internet radio 124, either being wholly atmospheric or using one or more satellites.

Figure 9 shows a ninth embodiment of the invention. This embodiment differs from the sixth embodiment in that both the radio station 126 and the ISP 128 of the user of the Internet radio 130 are transmitting in a wireless mode to the ISP 132 of the radio station 126 and the Internet radio 130, respectively. As previously indicated, the advantage of greatly increased bandwidth available to the radio station 126 in the sixth embodiment may be somewhat affected by the abandonment of a conventional telephone line connection between the radio station 126 and the ISP 132, although, as before commented, the use of digital wireless transmissions and a proximity between the radio station 126 and the ISP 132 may largely obviate any such possible effect. As further previously indicated, the Internet radio 130 in this embodiment becomes truly portable as a conventional radio is.

In this embodiment, both the ISP 132 of the radio station 126 and the ISP 128 of the user of the Internet radio 130 must have, respectively, the capability of receiving wireless transmission and the capability of transmitting such transmission, and must have, respectively, the capability of converting wireless transmission to digital signals capable of traversing the Internet and the capability of receiving such digital

signals and converting them to wireless transmission if the wireless transmissions are assumed to be analog. To the extent, however, that the wireless transmissions are digital, no conversions between analog and digital signals will be necessary. Furthermore, the Internet radio 130 must have the capability of receiving the wireless transmission from the ISP 128 similar to the wireless reception capability of Internet radio 124 in the eighth embodiment of the invention.

Figure 10 shows the tenth embodiment of the invention. This embodiment differs from the sixth through ninth embodiments of the invention in that the Internet radio 132 is no longer receiving audio data from a broadcasting radio station which is simultaneously broadcasting such audio data by conventional radio waves through the atmosphere. Instead, the source of the audio data is what may be termed an "Internet radio station" 134. Such an Internet radio station 134 would be capable of transmitting the range of live, prerecorded, or archival radio broadcasts that a conventional radio station would, with the crucial difference that simultaneous wireless transmission would not occur. Instead, all such audio data would be channeled exclusively by conventional telephone lines 136 to the ISP 138 of the Internet radio station. This would produce the previously discussed advantages of greatly increased bandwidth available to the sixth embodiment of the invention, while saving the Internet radio station the expense of both the equipment and power consumption involved in conventional wireless transmission. The digital signal 140 sent out by

the Internet radio station 134 would, as in the sixth embodiment of the invention, be relayed over the Internet 8 to the ISP 142 of the user of the Internet radio 132, again assuming that the ISP 142 has agreed to receive the digital signal 140.

In the tenth embodiment of the invention, the ISP 142 is shown as transmitting by wireless transmission 144 data contained within the digital signal 140. As previously noted, the ISP 142 must have the capacity to produce such a wireless transmission 144 and to convert the digital signal 140 into the wireless transmission 144 if an analog wireless transmission is used. Such a transmission 144, as previously noted, would make the Internet radio 132 truly portable in the same manner that a conventional radio is truly portable, assuming again that the Internet radio 132 can receive such wireless transmission 144. It should be understood, however, that, as in previous embodiments, the Internet radio 132 can be connected by conventional telephone lines to its ISP 142 if no wireless transmission capability of the ISP 142 exists or if the Internet radio 132 cannot receive wireless transmission.

Although the Internet radio, as previously described, has minimal differences from a conventional radio, such differences being transparent to the user, i.e., a microcontroller, an enhanced version of the Internet radio incorporating within itself many of the capabilities traditionally associated with personal computers, yet easily used by the ordinary consumer, is disclosed below. Such an enhanced Internet radio

is shown in several views in Figures 11, 11A and 11B. This enhanced Internet radio 146 allows for an interactive menu of virtually unlimited audio selections, including, but not limited to, live audio broadcasts from major radio stations, historical audio, entertainment audio, educational audios, multi-casting and private custom broadcasts for specialized audiences with common interests. Internet radio 146 can also display on its LED (Light Emitting Diode) or active matrix or passive matrix LCD (Light Crystal Display) type screen 148 media such as music lyrics and text to teach vocabulary and diction of songs or audiobooks to teach musical scores, biographical information, motion and still commercial advertising and marketing information, and motion and still graphical pictures and text to enhance the mood and listening experience.

In another embodiment of the Internet radio (not shown), the video read-out screen can also be worn as a visor sunglasses type device either separately or as a one-piece unit to provide for automatic hands-free viewing.

In general, the Internet radio can have any variety of downloading capability onto storage, the storage being fixed or removable for subsequent replaying of audio, text and image files. Examples of such storage are memory flash cards, hard, floppy, and hybrid drive combinations, standard and digital audio tapes and any other storage mediums that may present themselves. The storage device, if removable, can be used in an independent walkman type device for portable playing

of the files stored. The radio can be connected to the Internet through ordinary phone lines, DSL (Digital subscriber Lines) enhanced telephone lines, Sonet, ATM (Asynchronous Transfer Mode), ONU (Optical Network Line), T1, T3 ISDN, cable television lines, and so forth. The radio can be attached to the Internet via physical wire or wireless and antennae using wireless technologies such as Spread Spectrum technology, cellular technology, satellite technology and so forth. The enhanced Internet radio can be a portable walkman type device that can replay previously downloaded audio, text, or images or receive audio media and associated text or image files via wireless transmission. The audio and other associated files can be downloaded singly from individual servers and devices or in bulk off central databases with digitized media placed on a computer server to allow for virtually unlimited audio, image, and text files. The radio can accept user input to pay for selected audio and associated files, such as credit card information, pin number, electronic fingerprint, etc., and advertisers can play commercials to provide payment for artists, producers, actors, and studios whose music, audio, and graphics or text is transmitted to the consumer at no cost.

The enhanced Internet radio can offer musical bass and treble equalizing through hardware or software methods. It can also receive and send e-mail in all text, image, and audio forms and can offer a touch screen to provide for input. Such input capability by touch screen or other equivalent method known to those with ordinary skill in the art

would optionally allow a user of an enhanced Internet radio to interact with, for example, a radio station transmitting music to which the user is listening by selecting music which the user desires to hear. Of course, in such a case the radio station would, most probably, be required to possess a server or other equivalent electronic equipment to effectively handle the potential myriad of requests from listeners. Furthermore, any capability to handle multiple types of interaction with users would only increase the demands on such electronic equipment.

The enhanced Internet radio can also be capable of receiving standard am/fm radio broadcasts from radio stations not connected to the Internet and, as well, can be combined with other appliances.

In the particular embodiment of the enhanced Internet radio shown in Figures 11, 11A, and 11B, the touch screen 148 shows a world map which allows the user to indicate by touch a particular geographical area of the world from which he wishes to receive a broadcast. For example, in Figure 11, the user has indicated the eastern half of the United States (indicated in black). The upper part of the screen indicates the time and the radio station and particular program being listened to. There is also on the screen a touch record button 150 giving the user the capability to record the broadcast or another audio selection being played. A mute button 152 allows the user to mute a selection while it is being recorded. The source button 154 allows the user through another screen (not shown) to select a radio station or other source on the Internet or a

compact disc (CD), which may be loaded into the enhanced Internet radio, as a source of audio to be played for the listener.

Of course, the CD may be of the type to which audio data can be written as well as read, and, in that case, audio obtained from the Internet may be recorded by a CD placed in the enhanced Internet radio as it is being listened to by a user. The mode button 156 may, through other screens (not shown), allow the listener to do such things as obtain a timed record of a certain audio selection, set the time kept by the enhanced Internet radio, or adjust the bass, treble, and balance of an audio selection. The station button 158 allows a user, through other screens (not shown), to select a particular station or source on the Internet to which the user wishes to listen. The volume button 160 allows the user to adjust the volume, through other screens (not shown), showing graphically the volume level and its adjustment in real time.

Figure 11A, a side view of the enhanced Internet radio, shows a power switch 162 for turning the unit on and off, a power outlet 164 for wired operation, a CD connection 166 for connection to a CD player playing a CD external to the unit, a connection for earphones 168 to allow the user to listen to the unit through earphones, and a speaker connection 170 to allow the unit to be plugged into speakers for enhanced sound during play. Although the unit can be operated in the wired mode as previously stated, battery-powered operation is equally feasible. A side view also shows a telephone jack connection 172 so that the unit can be

connected to conventional telephone lines. As previously stated, however, the unit can be operated in a wireless mode so that it connects to the Internet by wireless reception instead of through conventional telephone lines. The top view, Figure 11B, shows an eject button 174 for use in removing a CD placed in the enhanced Internet radio for playing and/or recording purposes.

Associated with the enhanced Internet radio is an optional remote control device, controlled by either manual entry or voice entry, of which views are shown in Figures 12 and 12A. The remote control device has the capacity to search the memory of the enhanced Internet radio 146 by such categories as subject, station name, program title or location of station. The database being searched is, of course, internally stored in the memory of enhanced Internet radio 146.

Several alternative configurations of the enhanced Internet radio and peripheral accessories are possible.

Figure 13 shows an enhanced Internet radio 176, with earphones connected 178, and the remote control device 180.

Figure 14, in addition to the components shown in Figure 13, adds a set of speakers 182, 184 supported by a shelf 186 on a wall 188, which also supports the enhanced Internet radio 190.

Figure 15 shows the speakers 192, 194 mounted some distance away from the enhanced Internet radio 196 on a supporting wall.

The enhanced Internet radio 196 is communicating in a wireless fashion with the speakers 192, and 194.

Figure 16 shows speakers 198, 200, enhanced Internet radio 202, and the remote control device 204, but adds a unit capable of holding multiple CDs or a hard drive 206 attached to the enhanced Internet radio 202. The enhanced Internet radio 202 is capable of reading and playing audio data stored on the CD or hard drive unit 206 or of storing audio data on the CD or hard drive unit 206.

It should be understood that all references to the Internet herein are meant to be exemplary only since this invention will allow telephonic or other data communications over other computer networks than the Internet such as, for example only, Bitnet, local area networks (LANs), and wide area networks (WANs) by analogous methods well known to those with ordinary skill in the art. It should also be understood that music or other sounds as well as the human voice may be transmitted over the telephonic devices contemplated herein, just as conventional telephones can transmit a variety of sounds. It should also be understood that when we have referred to conventional telephone lines connecting the telephones or any of the other devices in any one of the embodiments above to either an ISP or telephone switching equipment, such conventional telephone lines can include high capacity lines, such as, for example, a T1 line, a line primarily carrying cable television (with or without a cable modem), a Digital Subscriber Line (DSL), or an ISDN

line, which will allow many telephones or any of the other devices to be connected to the ISP or switching equipment over one high capacity line. This can be done so long as a network server, which is a dedicated computer, or other equivalent device acts as an interface between the high capacity line and the individual telephones. Finally, all references to a microcontroller should be understood as being exemplary only since any programmable electronic device will serve the purpose contemplated by this invention just as effectively.

It should also be understood that, in the sixth through tenth embodiments of the invention, the radio station to which the user of an Internet radio is listening may, optionally, decide to eliminate the need for an ISP interposed between it and the Internet through the use, at the radio station, of a server or equivalent electronic equipment normally used by ISPs to connect their customers to the Internet. The radio station, in such a case, would be connected directly to the Internet without the use of an ISP and would, thus, become its own ISP.

While preferred embodiments have been described herein, it will be understood by those with ordinary skill in the art that various modifications, changes, or alterations may be made to the invention disclosed and described herein without departing from its scope or its equivalent as claimed in the appended claims. For instance, it may easily be imagined that one of the telephonic devices described herein may be connected to more than one computer network simultaneously upon

suitable programming of its microcontroller or that the telephone switching equipment described in connection with Fig. 3 may be connected to and allow communication on more than one computer network simultaneously.

Other modifications too numerous to mention will easily occur to one of ordinary skill in the art.

What is claimed is:

1. A device for receiving digital signals corresponding to audio communication from at least one source of audio communication and causing at least one user of said device to hear said audio communication, said means comprising:

a means for selecting a source from said at least one source; and

a means for converting said digital signals into said audio communication; said device for receiving digital signals being connected to at least one computer network, said digital signals traveling over said at least one computer network.

2. A device for receiving digital signals as claimed in Claim 1, wherein said connection to said at least one computer network comprises conventional telephone lines and a provider of service with respect to said at least one computer network.

3. A device for receiving digital signals as claimed in Claim 1, wherein said connection to said at least one computer network comprises a wireless connection between said device for receiving digital signals and a provider of service for said at least one computer network.

4. A device for receiving digital signals as claimed in Claim 1, wherein said at least one source comprises a radio station.

5. A device for receiving digital signals as claimed in Claim 4, wherein said radio station is connected to said at least one computer network by conventional telephone lines and a service provider for said at least one computer network.

6. A device for receiving digital signals as claimed in Claim 4, wherein said radio station is connected to said at least one computer network by wireless communication with a service provider for said at least one computer network.

7. A device for receiving digital signals as claimed in Claim 1, wherein said at least one source comprises a means for storing said audio communication.

8. A device for receiving digital signals as claimed in Claim 1, wherein said device for receiving digital signals further comprises a LED (Light Emitting Diode) or active matrix or passive matrix LCD (Liquid Crystal Display) screen.

9. A device for receiving digital signals as claimed in Claim 1, wherein said device for receiving digital signals further comprises a means for recording said audio communication.

10. A device for receiving digital signals as claimed in Claim 1, wherein said device for receiving digital signals further comprises earphones and speakers.

11. A device for receiving digital signals as claimed in Claim 1, wherein said device for receiving digital signals further comprises a means for controlling treble, bass and balance of said audio communication.

12. A device for receiving digital signals as claimed in Claim 1, wherein said device for receiving digital signals further comprises a means for controlling volume of said audio communication.

13. A device for receiving digital signals as claimed in Claim 1, wherein said device for receiving digital signals further comprises a means for searching, by at least one criterion, a database contained within said device for receiving digital signals.

14. A device for receiving digital signals as claimed in Claim 1, wherein said device for receiving digital signals further comprises a means for storage of said audio communication.

15. A device for receiving digital signals as claimed in Claim 1, wherein said digital signals comprise digital signals representing text corresponding to said audio communication.

16. A device for receiving digital signals as claimed in Claim 1, wherein said digital signals comprise digital signals representing graphics corresponding to said audio communication.

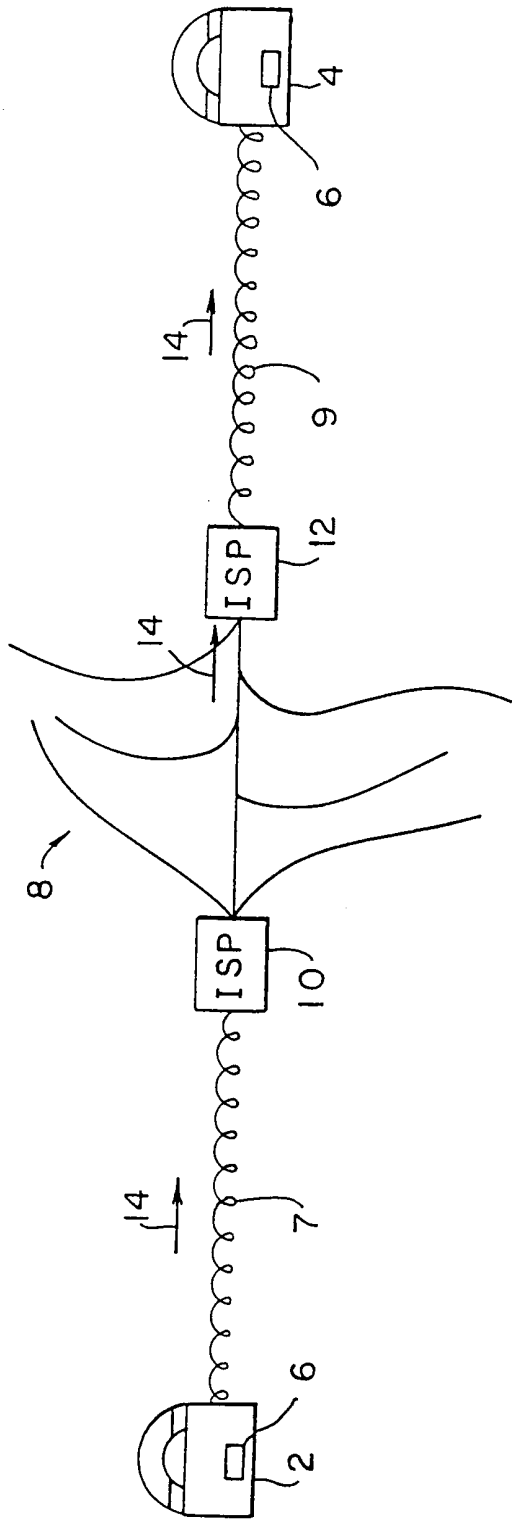


FIG. 1

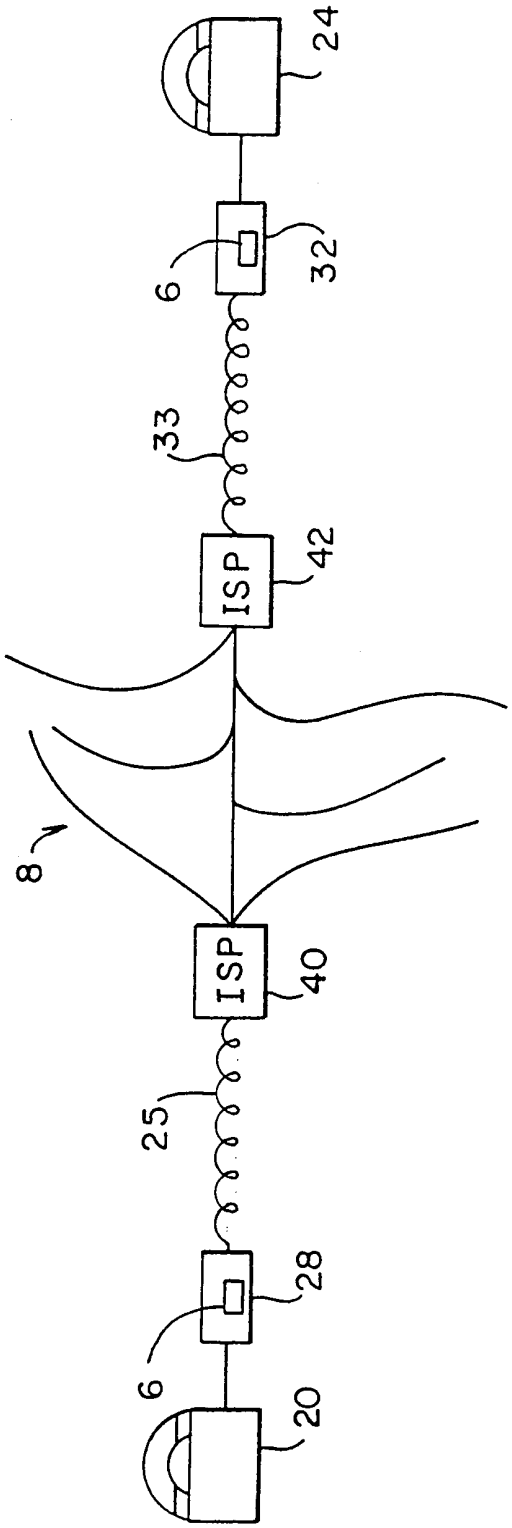


FIG. 2

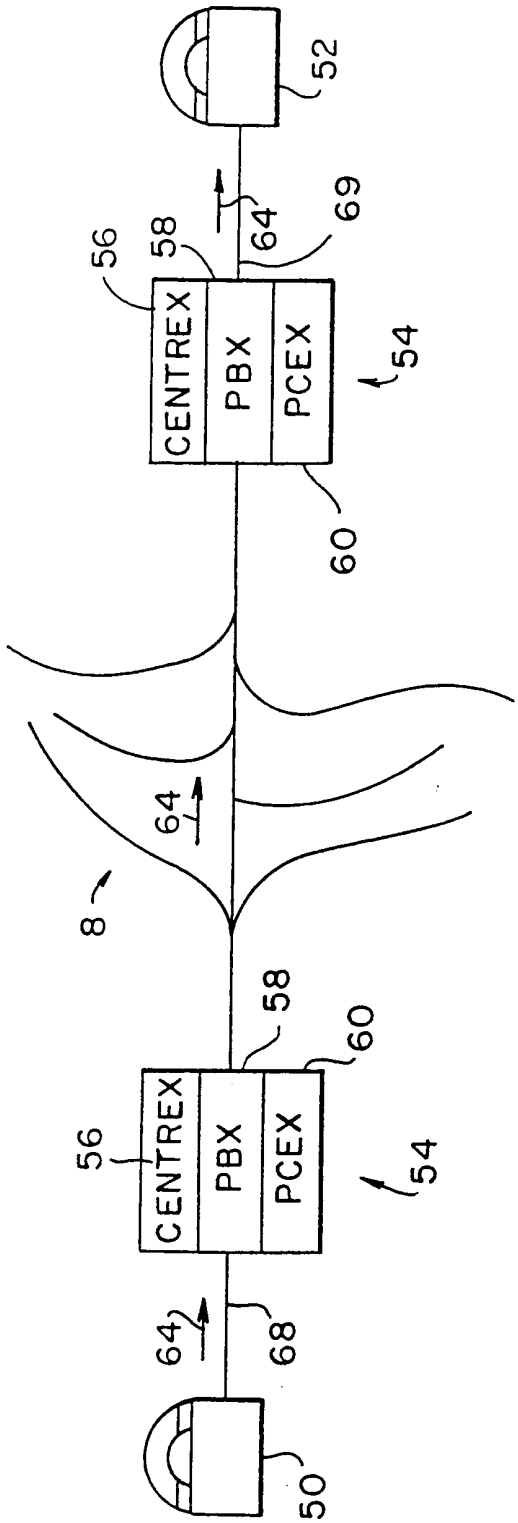

52
69
64
58
56
CENTREX
PBX
PCEX
54
60
64
8
58
60
56
CENTREX
PBX
PCEX
54
64
68
50

FIG. 3

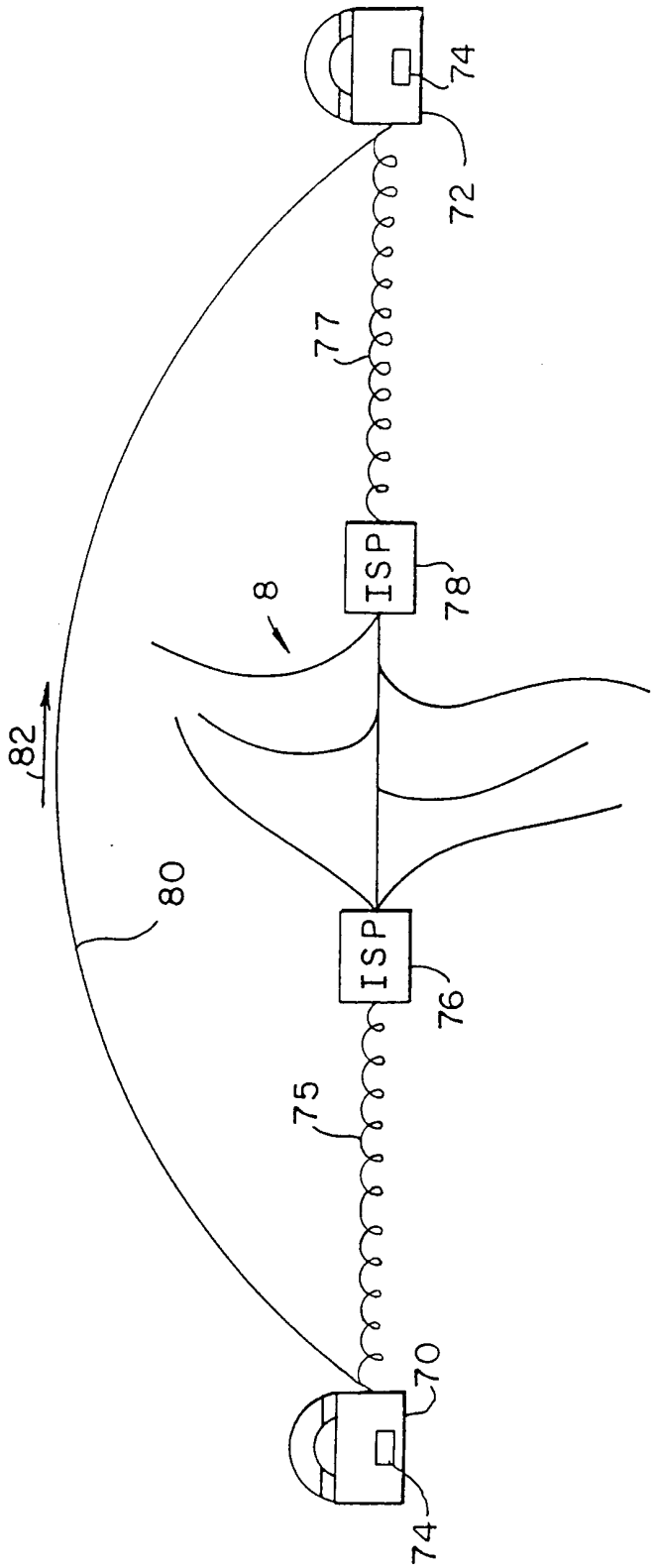


FIG. 4

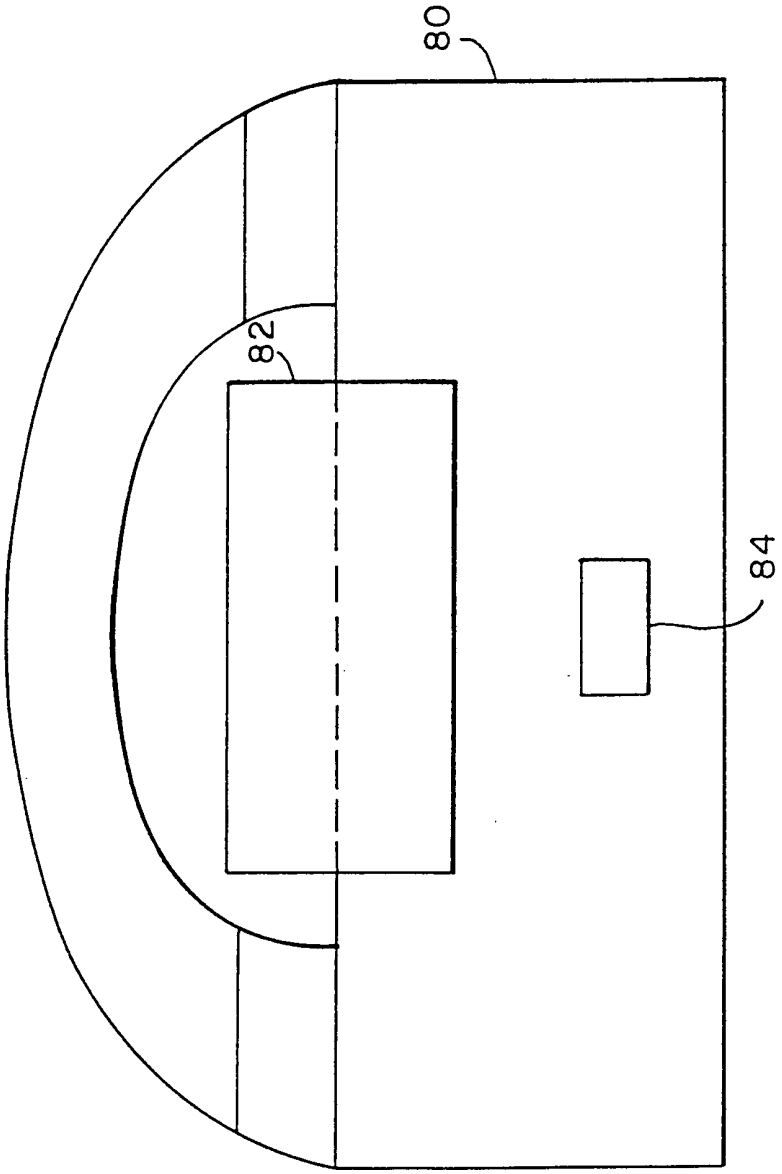


FIG. 5

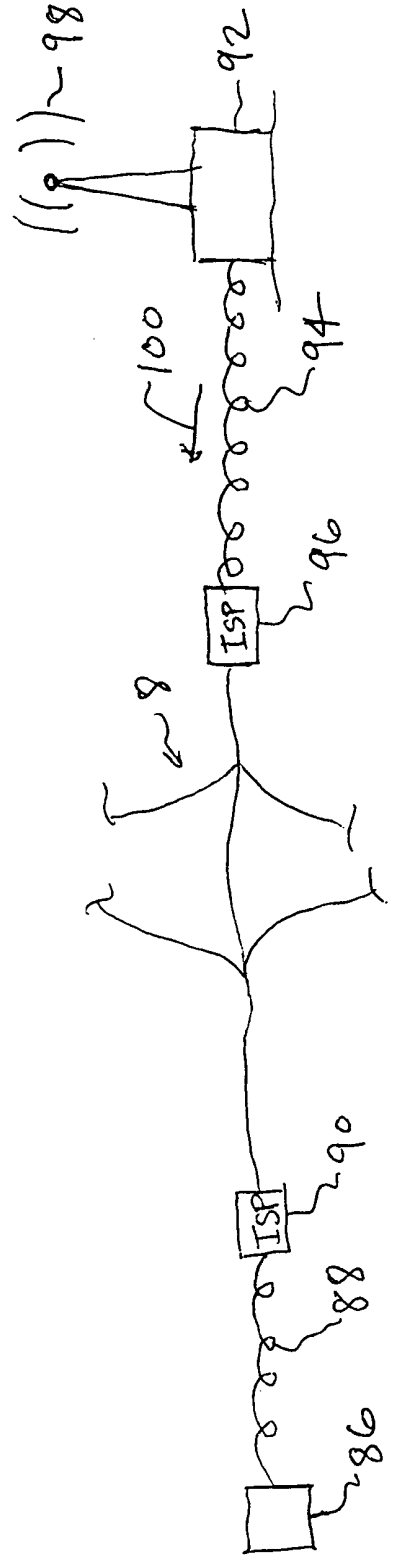
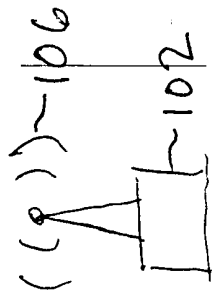


Fig. 6



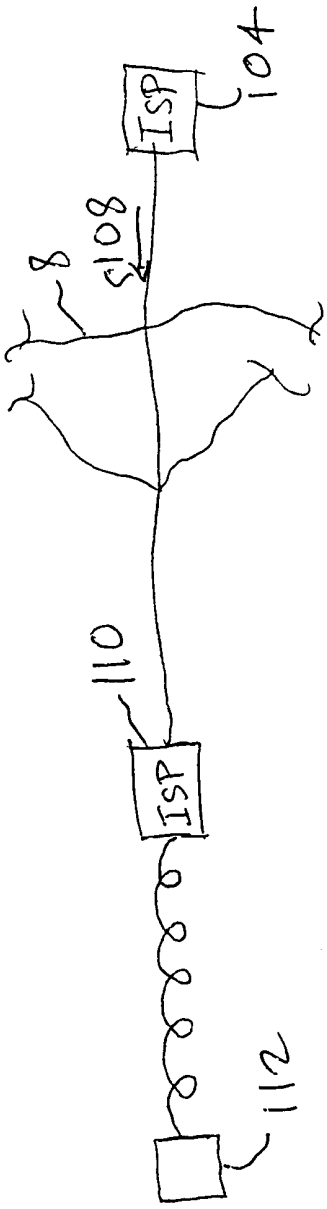


Fig. 7

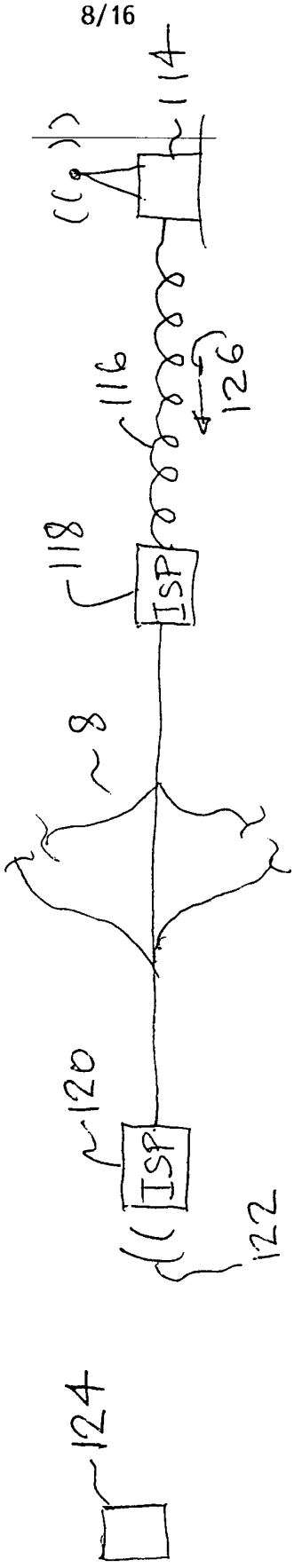
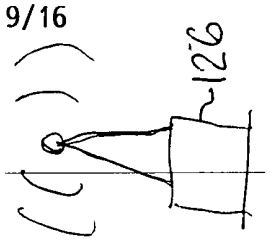


Fig. 8



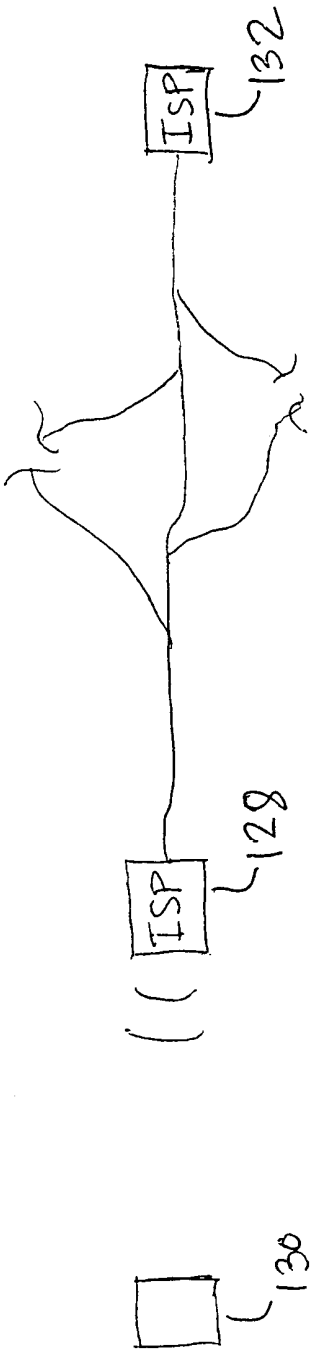


Fig. 9

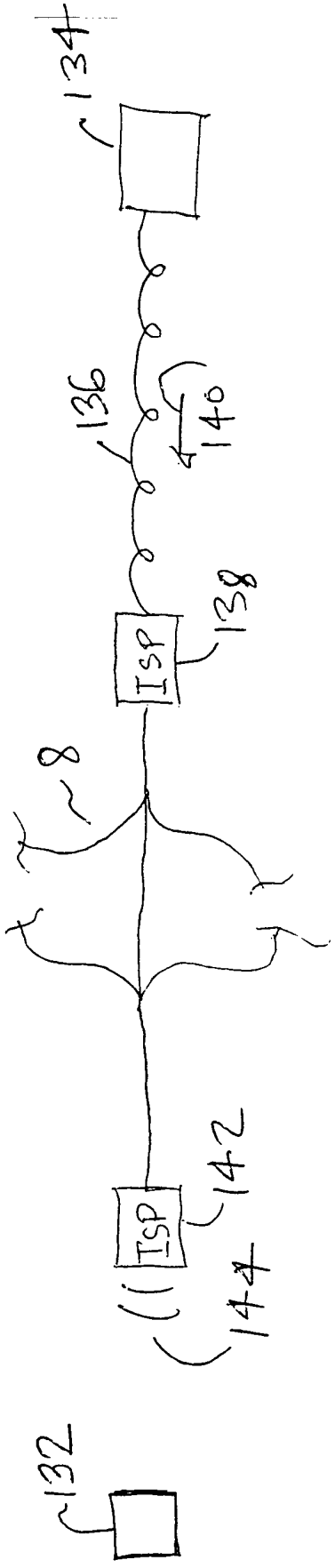


Fig. 10

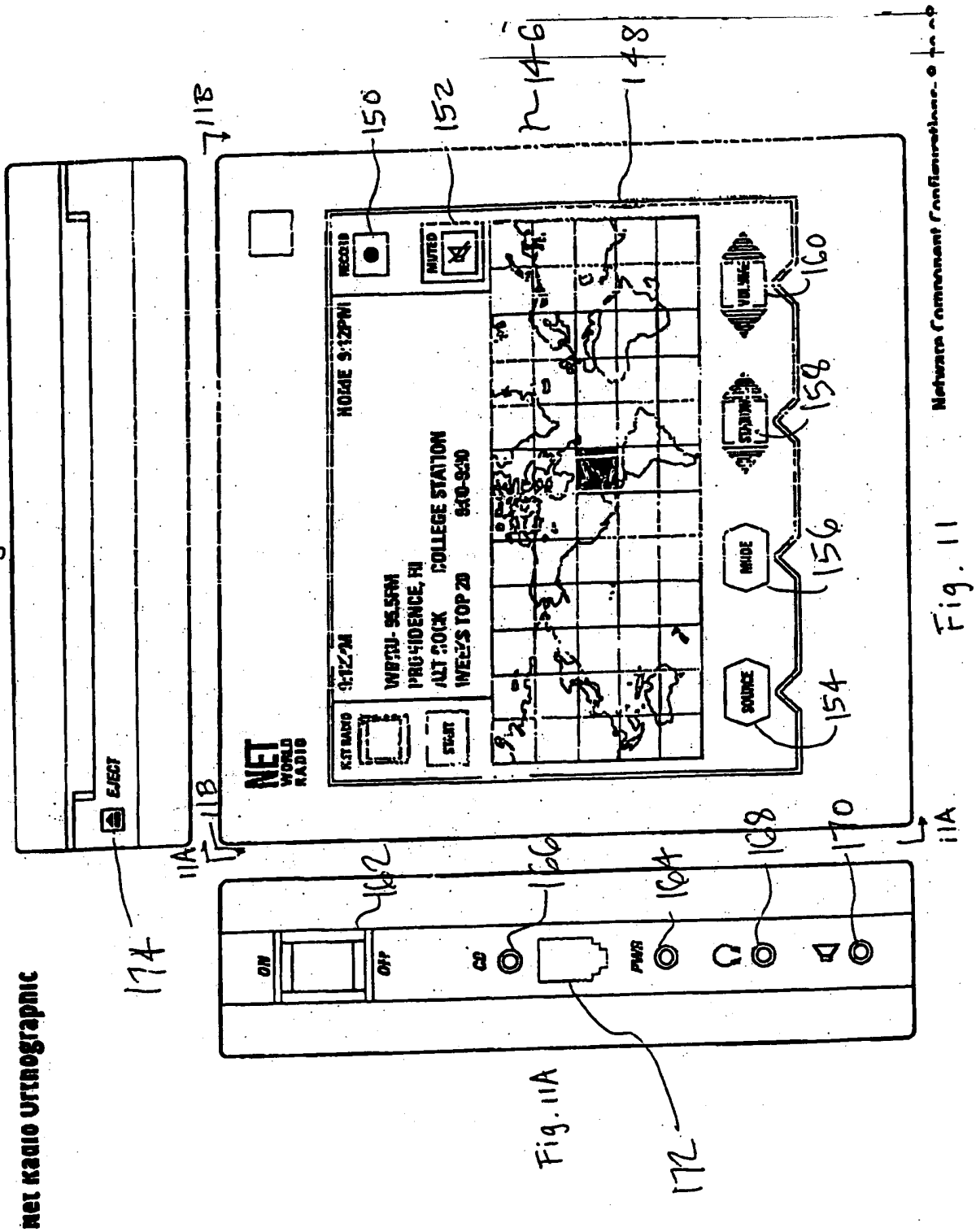


Fig. 11B

Fig. 11

Fig. 11A

Net Radio Orthographic

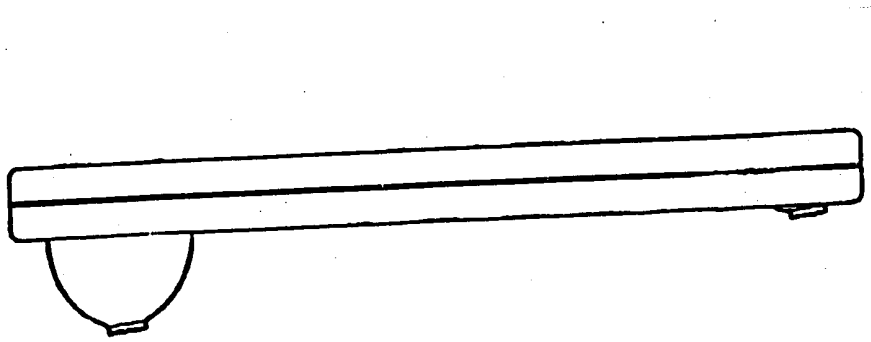
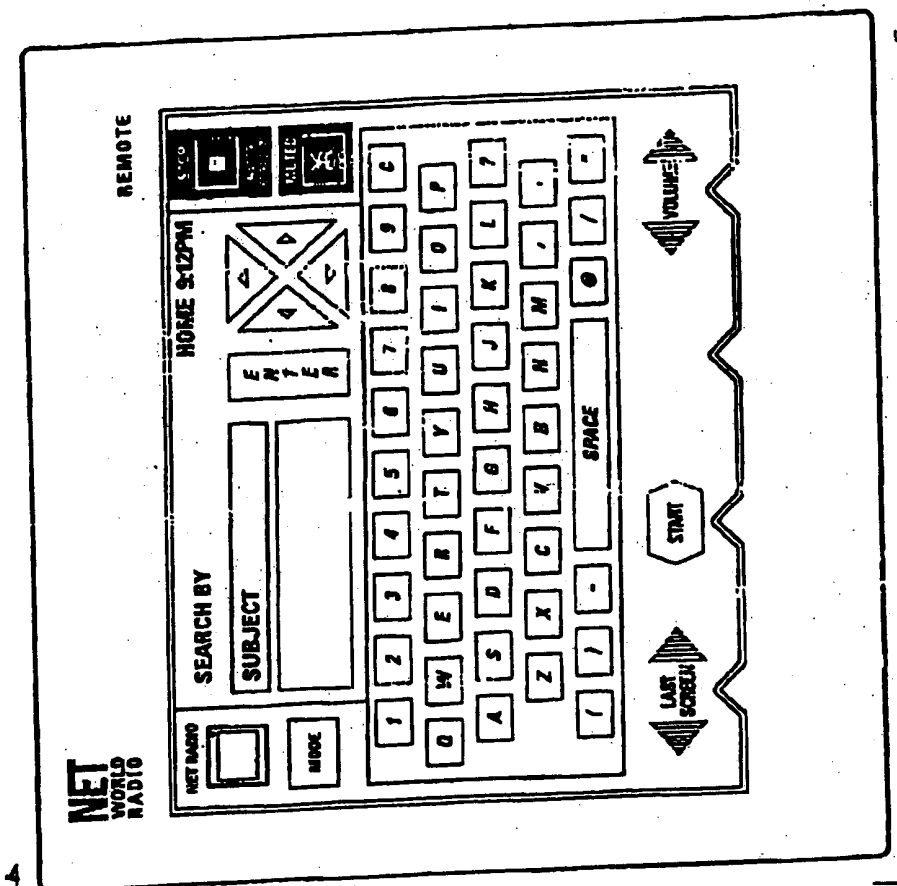


Fig. 12A



12A

Fig. 12

Remote Keyboard Orthographic

Netware Component Configurations- 8.20.98

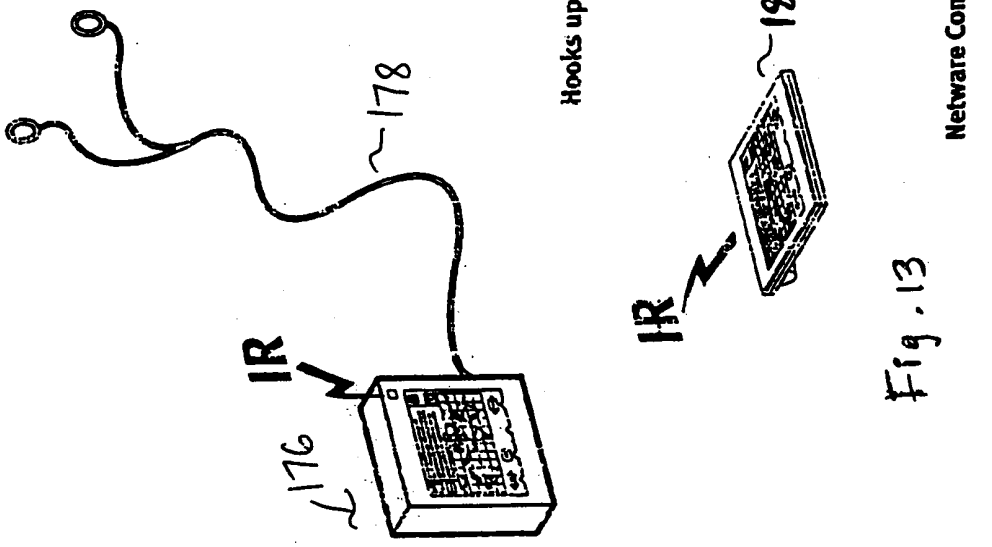

Hooks up to existing audio equipment
178
IR
176
IR
180
Netware Component Configurations- 8.20.98

Fig. 13

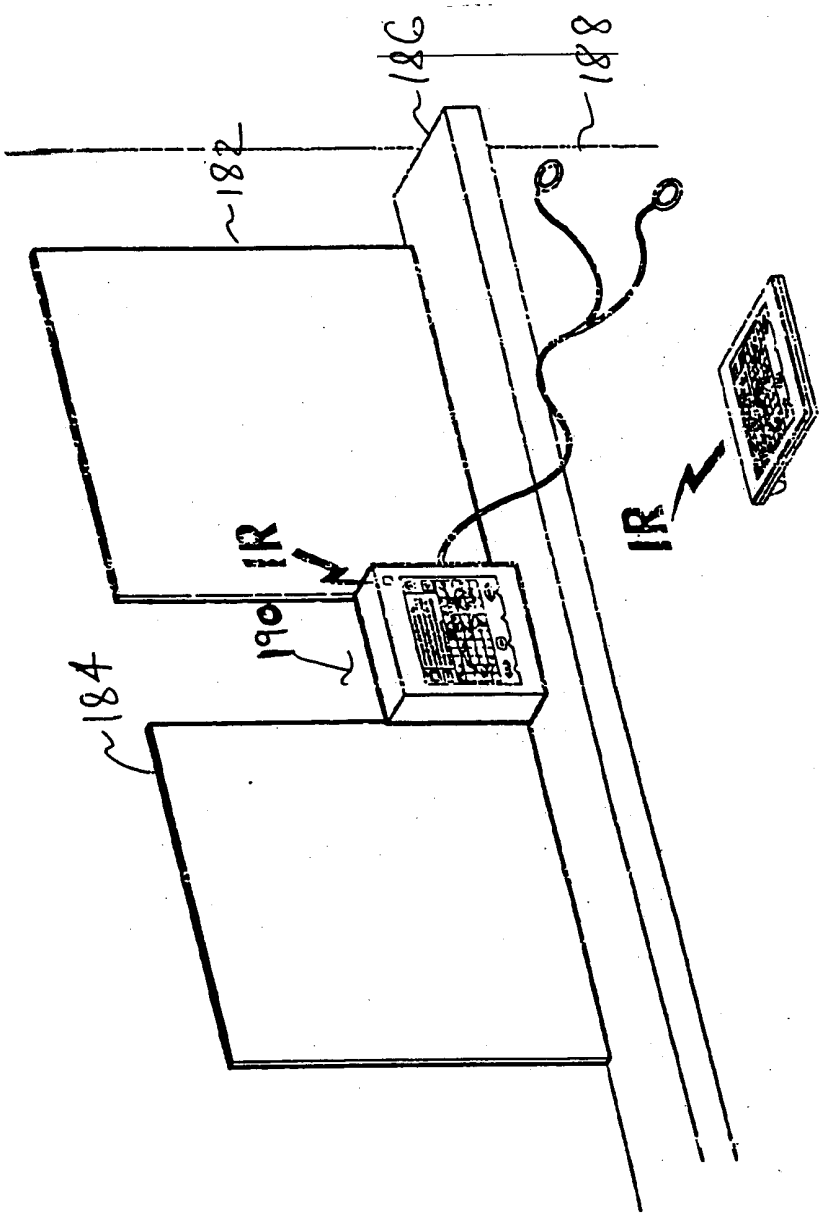


Fig. 14 - Netware Component Configurations- 8.20.98

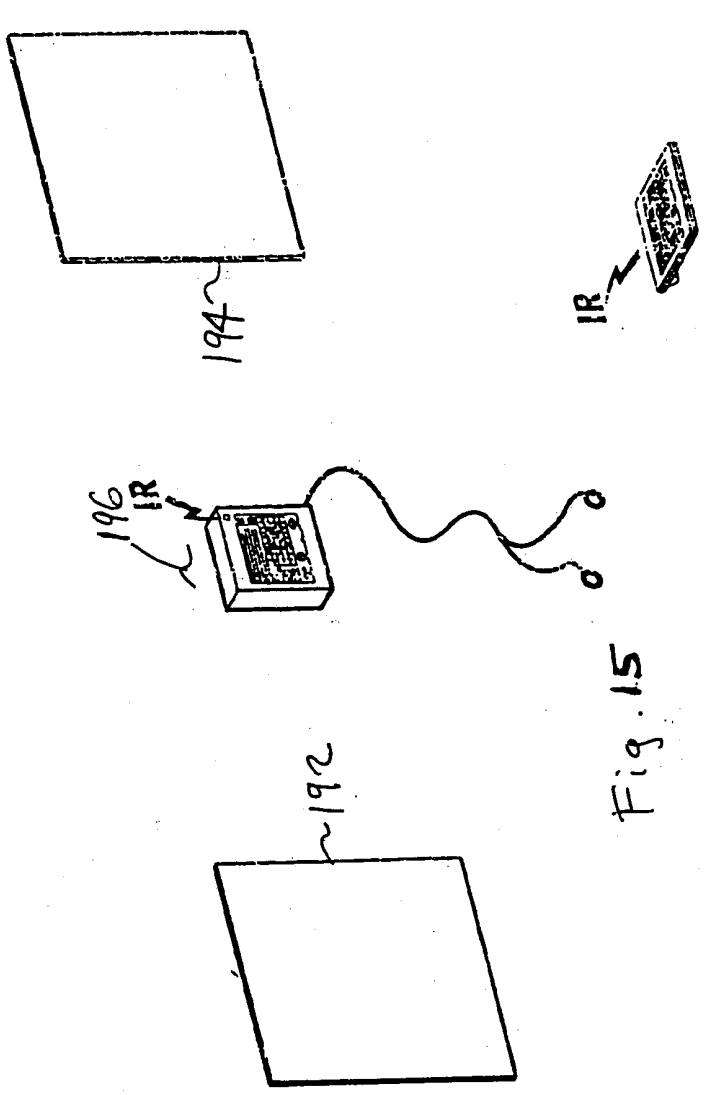


Fig. 15

Netware Component Configurations- 8.20.98

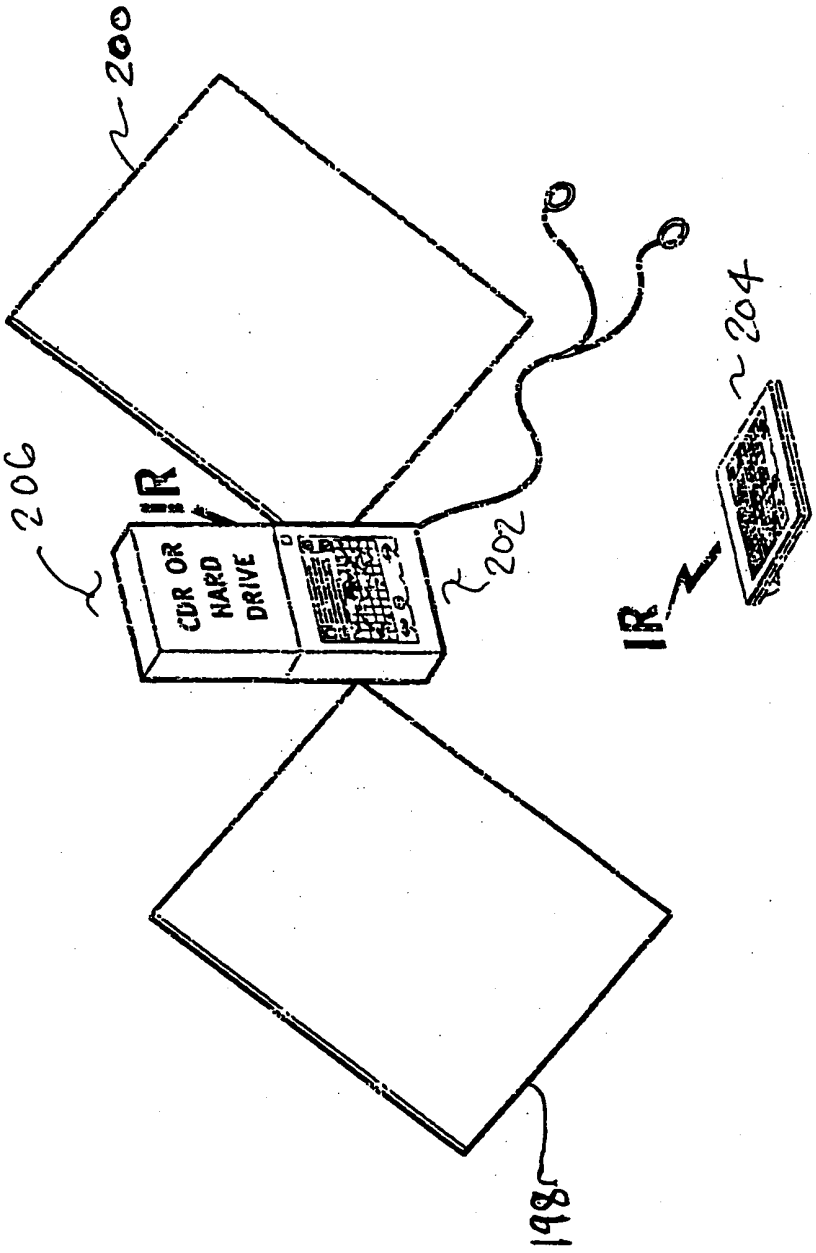

200
206
IR
CDR OR HARD DRIVE
202
IR
204
198
Netware Component Configurations- 8.20.98

Fig. 16

INTERNATIONAL SEARCH REPORT

Form PCT/ISA/210 (second sheet) (July 1998)
FILE COPY - DO NOT MAIL

International application No.
PCT/US00/14465

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :H04M 1/64; H04J 3/26;H04Q 7/20; G06F 17/60; H04L 1/16
US CL :Please See Extra Sheet.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 379/88.17,900,908; 370/336,338,349; 455/33.1,53.1,54.1,403,450; 705/1,32,44

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

none

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

EAST/WEST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,726,984 A (KUBLER ET AL) 10 MARCH 1998, Col. 99, lines 20-57.	1-3,7-10,13-16
X	US 5,727,002 A (MILLER et al.) 10 March 1998, Col. 16, line 55 through Col. 17, line 8.	1
X	US 5,895,454 A [HARRINGTON] 20 April 1999, Col. 5, lines 25-47 and Col. 6, lines 9-14.	1
A	US 5,673,316 A (AUERBACH et al.) 30 September, 1997, Col. 1, lines 54-65.	1
X	US 5,615,380 A (HYATT) 25 MARCH 1997, Col. 5, lines 18-37.	11-12

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

*	Special categories of cited documents:	"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
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"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		

Date of the actual completion of the international search 24 JULY 2000	Date of mailing of the international search report 14 AUG2000
Facsimile No. (703) 305-3230	Authorized officer AND Telephone No. ALLAN HOOSAIN (703) 305-4012

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/14465

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4,511,768 A (PATEL) 16 APRIL 1985, Col. 2, lines 17-32	11-12
X	US 5,550,825 A (McMULLAN, Jr. et al.) 27 August 1996, Col. 1, lines 5-27.	4-6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/14465

A. CLASSIFICATION OF SUBJECT MATTER:
US CL :

379/88.17,900,908; 370/336,338,349; 455/33.1,53.1,54.1,403,450; 705/1,32,44