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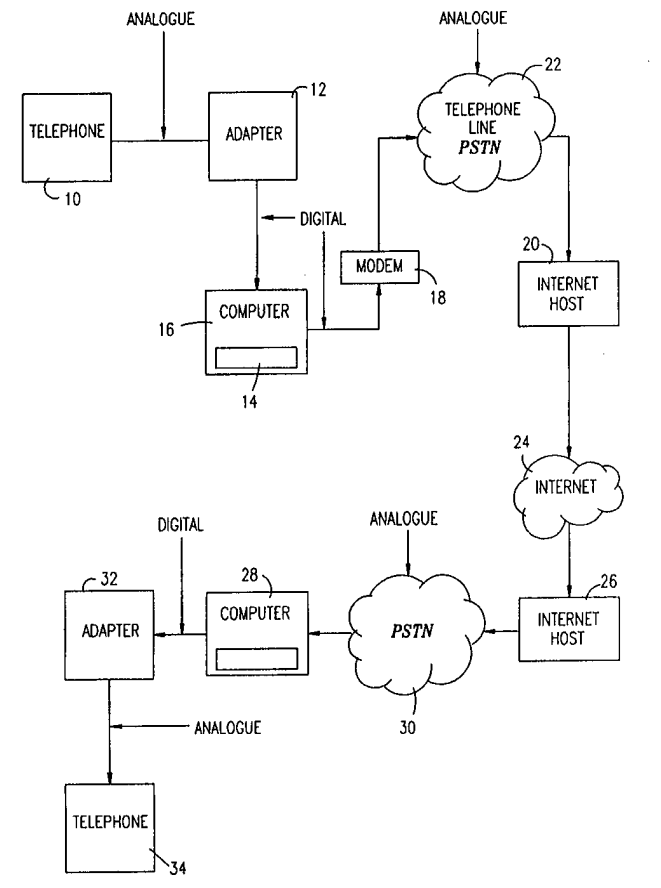
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(54) Title: INTERNET AND INTRANET PHONE SYSTEM

(57) Abstract

An adapter (12) which allows attachment of a standard telephone (10) to a computer (16) as a standard peripheral. The adapter converts analogue signals of the telephone (10) to digital signals of the computer (16) and vice versa. The adapter can also be a stand-alone device (42) allowing the telephone (40) to be attached to a computer network (46). The adapter (42), in this case, contains the computing power to support the necessary network protocols. In this way voice communication is enabled over a computer network (46) without requiring the computers (44) to be equipped with sound cards.



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Internet and Intranet Phone System

Field Of The Invention

The present invention relates to an internet and intranet phone system.

Background Of The Invention

The internet telephone conversation is known. It has been possible for some time to have a voice conversation over the internet, or other forms of computer network using a personal computer with a sound card, microphone, and speakers or an earphone. More recently there have been provided dedicated systems comprising a telephone keypad, receiver and screen. However such devices still require a sound card in order to work.

It is not however currently possible to make use of an ordinary telephone to conduct conversations over the internet. Furthermore it is not at present possible to have any form of voice communication over a computer network without a sound card on each machine participating in the conversation.

Summary of the Invention

According to a first aspect of the present invention there is provided an adapter comprising an analog to digital converter, for connecting a telephone set to a computer.

In an embodiment the adapter may comprise a first output port configured as a telephone socket for attachment of a telephone plug. Preferably the adapter comprises, in addition, one or more additional output ports, likewise configured as telephone sockets and each having a unique address.

The adapter may also have a look-up table for translating numerical address information entered at a key pad of the telephone into addresses on the computer. Alternatively, or additionally, the look-up table may be for translating numerical information entered at a key pad of the telephone into addresses on a network to which the computer is attachable. Alternatively or additionally the lookup table may contain internet addresses and the computer may have access to the internet.

According to a second aspect of the present invention there is provided an adapter comprising an analog to digital converter, for connecting a telephone set to a computer network.

In a preferred embodiment a first output port of the adapter is configured as a telephone socket for attachment of a telephone plug. In a variation of this embodiment the adapter may further comprise one or more additional output ports, likewise configured as telephone sockets and each having a unique address.

Preferably the adapter contains a look-up table for converting numerical data entered at a keypad of the telephone into addresses on the network. The network may for example be the internet.

The adapter may be a standalone device, that is to say an adapter that is able to send data directly to the network without requiring the intermediacy of a computer, and may comprise a module for operating an internet protocol.

According to a third aspect of the invention there is provided the use of a telephone as a peripheral device for a computer.

The telephone may be operatively attached to the computer via an adapter which is operable to convert digital signals output from the computer into analogue signals for input to the telephone and to convert analog signals output from the telephone into digital signals for input to the computer. The telephone is thus usable for conducting voice communication over any network to which the computer is attached.

According to a fourth aspect of the present invention there is provided the use of a telephone as a peripheral device for a computer, the computer comprising control software for managing said telephone. The control software may be encryption software or it may be exchange management software that carries out the types of function provided by office based exchange equipment.

Brief Description Of The Drawings

For a better understanding of the invention and to show how the same may be carried into effect, reference will now be made, purely by way of example, to the accompanying drawings in which,

Figure 1 shows a network operative in accordance with the present invention,

Figure 2 shows another network operative in accordance with the present invention,

Figure 3 shows a plurality of telephones connected to a single computer, in accordance with a further embodiment of the present invention, and

Figure 4 is a flow diagram of a method of operation of an embodiment of the present invention.

Description Of The Preferred Embodiments

Figure 1 shows a network operative in accordance with a preferred embodiment of the present invention.

A telephone 10, which produces analogue signals, is connected to an adapter 12. The adapter 12 translates those analogue telephone signals into digital data so that the telephone can be connected via the adapter 12 to a standard computer 16. The adapter thus allows an ordinary telephone to appear as a peripheral device to a computer. The computer 16 in turn may be connected to a computer network such as a company LAN, WAN, or the internet.

Preferably the adapter not only translates the data into analogue signals but also arranges the data into packets with address information. Address information is of two forms. Firstly there is address information of a target address that the device wishes to communicate with. As the telephone 10 is a standard telephone it is unable to provide internet addressing information in the standard format because individual alphabetic characters are not provided on a standard telephone keypad. It is however possible to input a full numerical IP address or a short code which is used in a lookup table 14 to generate an address recognizable to the internet, or for that matter any other network that may be in use.

The look-up table 14 may be located in the adapter 12 or it may be located in a computer 16 to which the adapter is connected. The computer may be equipped with a modem 18 or network card and is capable of running the necessary protocols to communicate via the network. In the case of the internet this means that the computer is able to run the TCP/IP protocol, for example, and will be able to connect to an internet host 20 via the telephone network 22.

The internet is able, in the standard manner, to determine from the address information how to direct the data packets received from computer 16 over the internet 24 to the correct host 26 of the called party. The host 26 is either already in contact with the computer 28 of the called party or, in a further embodiment, it makes contact via the local telephone network 30. The signal is relayed from the computer 28 to an adapter 32 of the called party, where it is converted into analogue signals and is thus made available to telephone 34.

It is noted that the invention does not require both parties to the conversation to have a telephone connected to an adapter of the invention. It is possible for the calling party to have a computer with standard internet telephone equipment, sound card and software. In this case adapter 32 of the called party need only be provided with software that allows it to deal with sound files of a format produced by the sound card of the calling party. It is also possible, if the calling party has a telephone connected to an adapter according to the invention which itself has access to the public telephone network, PSTN, for the called party simply to have an adapter and telephone without being connected to any computer network. Thus the calling party is able to utilize spare capacity on the network and is nevertheless able to communicate with people not having a presence on that network.

If the network to which the calling party is connected is the internet and the called party does not have an internet connection the table 14 must indicate a remote internet host that is located physically close to the called party, that is to say, preferably a local phone call away. The table must further provide a phone number so that the remote internet host can dial and thus a long-distance or international phone call can be made for the price of two local phone calls.

Figure 2 shows a local network, such as a company intranet. A series of telephones 40 are connected via a series of adapters 42 to a series of computers 44. The

computers are all linked together via a LAN or WAN of any type. A server 46 is provided which links the LAN to the internet and the telephone network.

At present many organizations have WANs of one sort or another linking various sites. However the WAN is rarely used for voice communication between various sites because the computers are not all equipped with sound cards. Thus voice communication has to use the telephone network and spare bandwidth on the WAN is wasted. However, in embodiments of the present invention a sound card is not necessary, neither is the purchase of a dedicated microphone and speakers. All that needs to be done is to connect an existing telephone set, via an adapter of the present invention, to a computer on the network and voice communication via the computer is rendered possible.

Figure 3 shows how more than one telephone 10 may be connected to a single adapter 12. The adapter preferably has more than one port to which a telephone lead may be attached. Each port has a unique address, which is used in preparing headers for packets of data issuing from that port. Thus data packets produced by the adapter can be sent by computer 16 out to the internet without the computer needing to know about the fact that different packets come from different telephones. Similarly incoming packets, because they include the port address, can be directed to the correct port on the adapter without any difficulty and without interfering with conversations being conducted via the other telephones.

Figure 4 is a flow diagram of the operation of the adapter 12. In step S10 the adapter identifies the start of a call. It is sensitive to the tones or pulses used in dialing and records the digits being dialed. The dialed digits are taken to be address information S12. The format of the dialed information is checked in step S14 and if it is found to be in IP address format then that is used directly to address the data packets. If not then the lookup table is used in step S16 to translate into an IP address.

In step S18 a source address is prepared. The source address includes the IP address of the calling party and also, in the case of multiple telephone ports on a single adapter, the address of the port from which the conversation is being sent.

Once the address information is completed and a connection is established, the adapter has the task, step S20, of digitizing the conversation itself. The digitized conversation is arranged in the aforementioned data packets, step S22, and is output to the computer in step S24 as data packets ready for the TCP/IP protocol or the like.

In an embodiment the part of the operation carried out by the computer can also be carried out internally within the adapter so that the telephone does not need to be connected to a computer. In this case the only thing additional ability that the adapter needs is the processing power to support TCP I/P and to carry out the functions of a modem. Also the lookup table 14 is preferably stored internally of the adapter. As an alternative to storing it internally of the adapter it is possible to have it stored on a computer to which the adapter has access.

In an adapter having more than one telephone port, a preferred embodiment is able to recognize the address of another of its own ports when dialed. Thus a conversation between two telephones connected via the same adapter is possible.

An advantage of the present invention is that a standard telephone can utilize qualities of the computer or of the network. For example the computer, or adapter may have encryption software. The encryption software may be any encryption software and may include software that is used for encryption over the telephone network or any software that is used for encryption over the computer networks such as the internet.

Encryption standards that may be used include for example one-way hashed protocols such as MD5 and two-way hashed protocols such as DES.

It is appreciated that the various features of the invention which are, for clarity, described in the contexts of separate embodiments may also be provided in combination in a single embodiment. Conversely, various features of the invention which are, for brevity, described in the context of a single embodiment may also be provided separately or in any suitable subcombination. It is also possible, through use of the appropriate software, to ensure that the appropriate packets are delivered to more than one address. Thus the source telephone acts as a multicast or broadcast system. It is also possible to provide software to support conference calling. That is to say there is provided exchange management software for managing different types of telephone call. At present the software for doing this is generally located in a costly telephone exchange device.

In the appended claims the term "telephone" refers to a telephone suitable for attachment to the public switched telephone network, and includes telephones that produce an output in analog form and which produce tones or pulses in the widely recognized format for dialing and other purposes.

Claims

1. An adapter comprising an analog to digital converter, for connecting a telephone set to a computer.
2. An adapter according to claim 1, further comprising a first output port configured as a telephone socket for attachment of a telephone plug.
3. An adapter according to claim 2 further comprising one or more additional output ports, likewise configured as telephone sockets and each having a unique address.
4. An adapter according to any of claims 1, 2 and 3, further comprising a look-up table for translating numerical address information entered at a key pad of the telephone into addresses on the computer.
5. An adapter according to any of claims 1, 2, 3, and 4, further comprising a look-up table for translating numerical information entered at a key pad of the telephone into addresses on a network to which the computer is attachable.
6. An adapter according to claim 5 wherein the lookup table contains internet addresses and wherein the computer is attachable to the internet.
7. An adapter comprising an analog to digital converter, for connecting a telephone set to a computer network.
8. An adapter according to claim 7, further comprising a first output port configured as a telephone socket for attachment of a telephone plug.

9. An adapter according to claim 8 further comprising one or more additional output ports, likewise configured as telephone sockets and each having a unique address.
10. An adapter according to any of claims 7 to 9, wherein the adapter contains a look-up table for converting numerical data entered at a keypad of the telephone into addresses on the network.
11. An adapter according to any of claims 7 to 10 wherein the network is the internet.
12. An adapter according to claim 11 comprising a module for operating an internet protocol.
13. The use of a telephone as a peripheral device for a computer.
14. The use of a telephone according to claim 13 wherein the telephone is operatively attached to the computer via an adapter which is operable to convert digital signals output from the computer into analogue signals for input to the telephone and to convert analog signals output from the telephone into digital signals for input to the computer.
15. The use of a telephone according to either of claim 13 and claim 14, for conducting voice communication over a network to which the computer is attached.
16. The use of a telephone as a peripheral device for a computer, the computer comprising control software for managing said telephone.

17. The use as claimed in claim 16, wherein the control software includes encryption software.

18. The use of a telephone as claimed in either of claim 16 and claim 17, wherein the control software includes exchange management capabilities.

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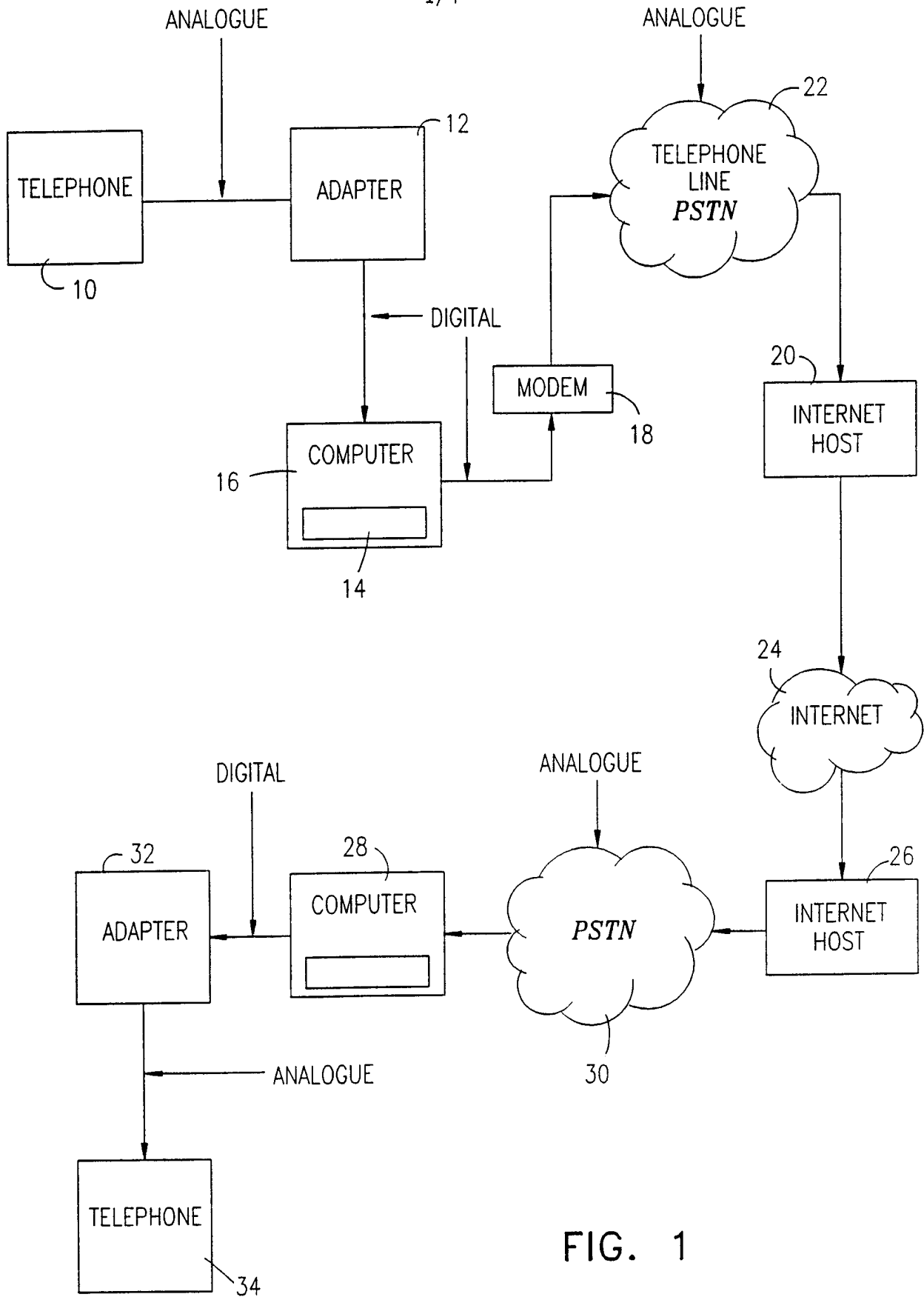
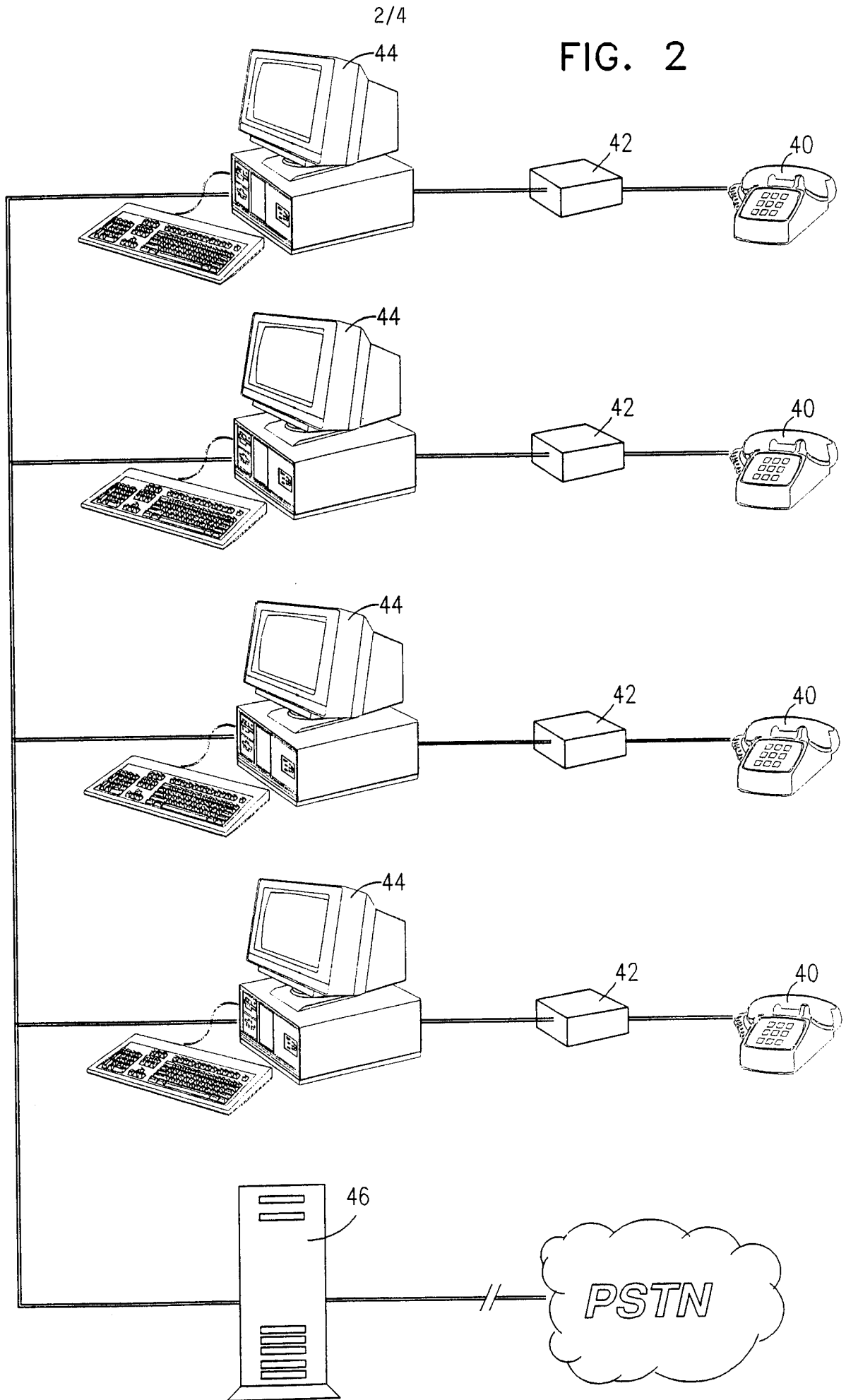


FIG. 1

FIG. 2



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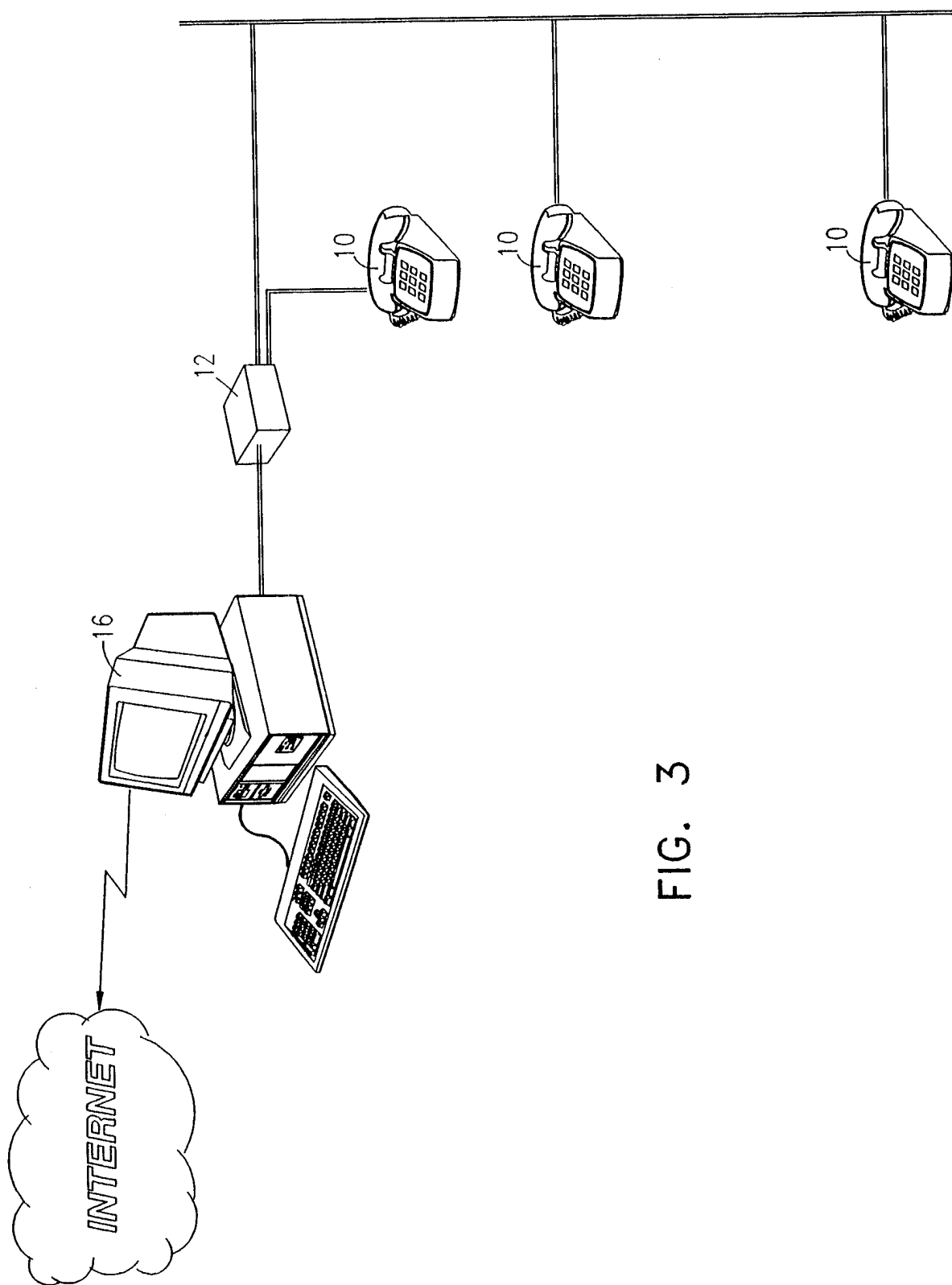
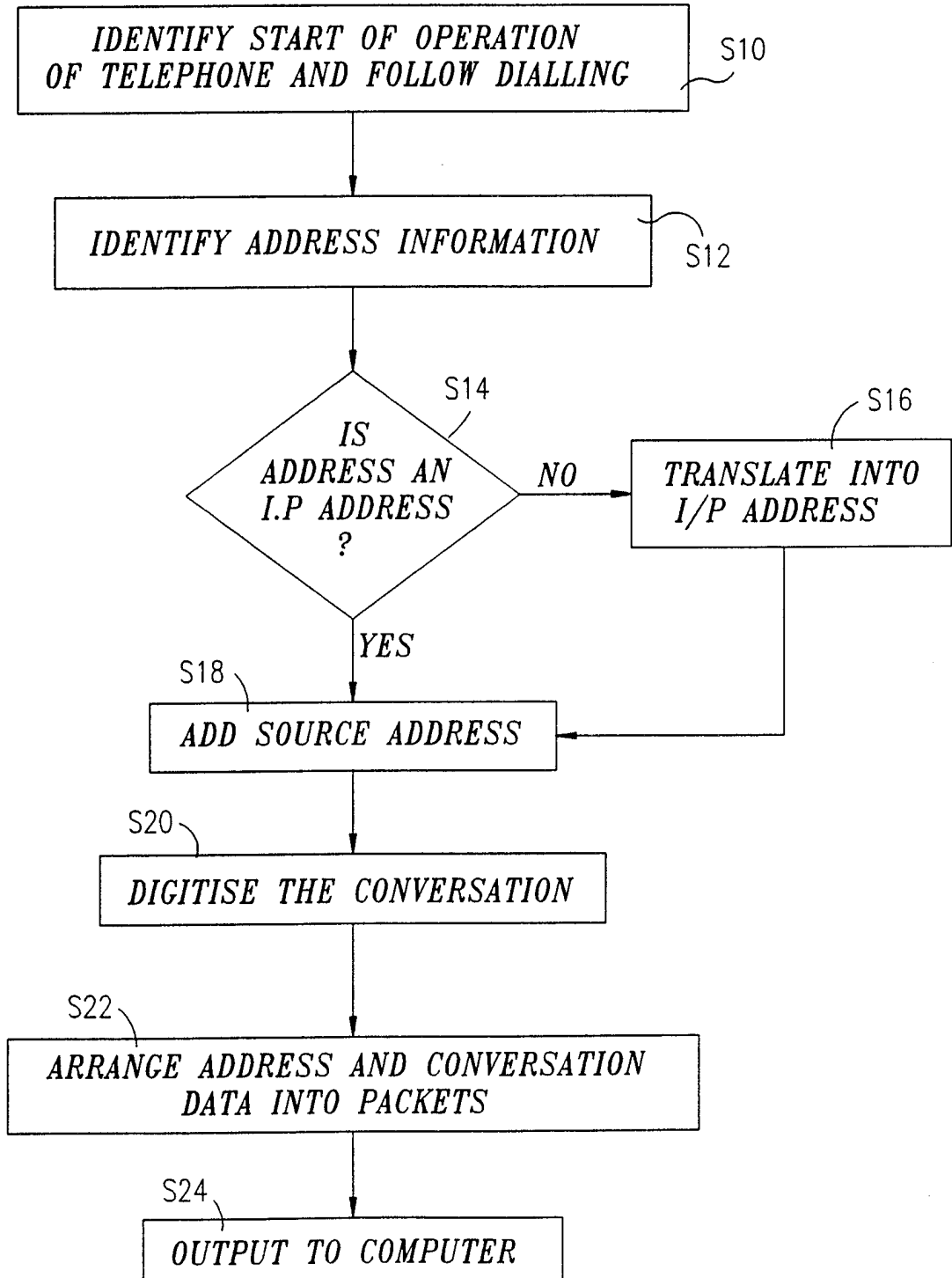


FIG. 3

FIG. 4^{4/4}



INTERNATIONAL SEARCH REPORT

International application No.
PCT/IL98/00106**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(6) :H04M 1/64, 11/00

US CL :379/93.05

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. : 370/352, 389, 392, 402; 379/88, 93.05, 93.09, 93.28, 93.32, 201; 341/155

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

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

APS (adapter, adaptor, telephone, Internet, telephone, computer network, analog, digital, A/D, A-D, look-up table)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,473,676 A (FRICK et al) 05 December 1995, col. 5, line 6 to col. 6, line 59; and col. 8, lines 56-62.	1-18
A, E	US 5,727,047 A (BENTLEY et al) 10 March 1998.	1-18
X	US 5,553,122 A (HABER et al) 03 September 1996, col. 2, lines 14-58; and col. 5, lines 3-17.	1-18
X	US 5,495,246 A (NICHOLS et al) 27 February 1996, col. 1, line 43 to col. 2, line 10; and col. 2, line 35 to col. 3, line 6.	1-18

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

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Date of the actual completion of the international search

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