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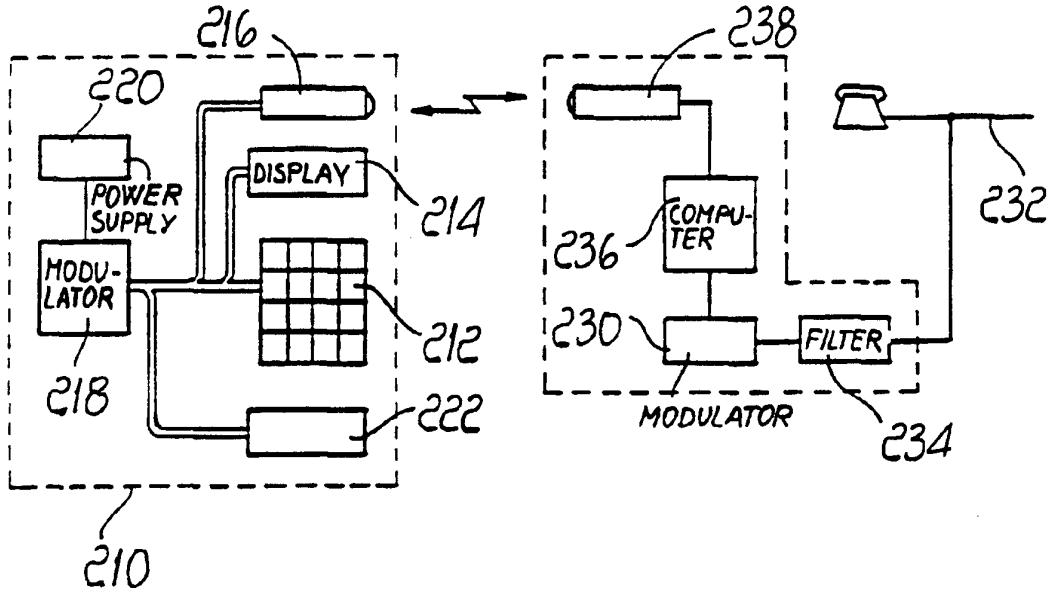

(57) Abstract

The terminal comprises a wireless transmitter (210) for signals, such as infrared or radio signals, which can be operated by the user by means of a keyboard (212), and an overvoice modulator (230) which can be connected directly to a subscriber telephone wire pair (232), which is connected to an overvoice network for connection to a computer network to which a television station can be connected; the modulator (230) is driven by a transducer (238) that is suitable to receive and convert the signals sent by the wireless transmitter (210), so as to send, over the telephone wire pair (232), messages directed to the television station. The transmitter is preferably provided in a handheld size, is preferably provided with television control functions, and can be equipped with a magnetic card reader (222).

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INTERACTIVE TELEVISION TERMINAL

Technical Field

The present invention relates to a terminal for television viewers which allows interaction between the viewer and the television station during programs.

Background Art

The need for so-called interactive television, that is to say for a method of broadcasting television programs in which the viewer can send program-related messages to the station, is currently strongly felt, also because the totally passive condition imposed on the viewer by conventional television is less and less appreciated by the viewer. The degree of desired interaction varies from the basic yes/no choice (answers to television games, program rating, etcetera) to multiple choices (polls, teleshopping, and the like) to the transmission of true free-form tests (didactics).

In an effort to involve viewers as much as possible in their programs, television stations attempt to provide some sort of interaction by inviting their viewers to send in their answers by calling telephone numbers provided for this purpose.

However, this solution is far from being satisfactory for several reasons. Receiving the calls first of all requires several operators, who must devote considerable time to each call in order to identify the caller and take note of his personal data and must often decipher his answer or message. In the case of polls, for example, this entails a processing time that in practice eliminates interaction and forces one to broadcast the results of the poll in a

subsequent program.

Another drawback is that use of the telephone by the viewer is inconvenient because the telephone set can be located far from the television set and because the dialling of the telephone number of the station is an error-prone process that distracts the viewer from the program in which he wishes to take part.

However, the worst drawback of replies by telephone is the fact that they produce very high peaks of calls converging on a same exchange, leading to poor service to other telephone users of the same area and to the complete overload of the exchange. However, since these high peaks of demand on the telephone network last for a very short time and are concentrated in localized times of the day, it is not conceivable to enhance the network, which would be greatly underutilized.

This last drawback is so severe that in practice it has made it impossible to have programs based on the authentic and immediate replies of viewers.

Disclosure of the Invention

A principal aim of the invention is therefore to provide a terminal for interactive television that allows to send and/or receive messages in real time to and from a television station without overloading the telephone network.

An object of the invention is to provide said terminal so that it is easy and straightforward to use for the user.

This aim as well as other objects and advantages which will become apparent from the following detailed description are achieved by the invention with a terminal for

interactive television as defined in claim 1.

Brief description of the drawings

The invention is now described in greater detail with reference to a preferred embodiment illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a block diagram of an interactive television terminal according to a first preferred embodiment of the invention;

figure 2 is a symbolic diagram illustrating the operating method of the invention;

figure 3 is a block diagram of a second preferred embodiment of the terminal according to the invention; and

figure 4 is a block diagram of a third preferred embodiment of the terminal according to the invention.

Ways of carrying out the invention

It is known that the services currently offered by public telephone networks in some countries include networks for interconnecting subscriber outlets, or wire pairs, which are connected to the exchanges, and an independent computer network. The signals arriving from the telephone subscribers and directed to the computer network are fed onto the wire pair by modulating them on a carrier frequency outside the voice frequency range, according to a technique known as "overvoice transmission", so as to avoid interfering with the normal use of the telephone. This interconnection network includes exchange devices located in the exchanges of the public telephone network to receive and demodulate the overvoice messages, decode at least the part of the message that identifies its destination, and then route the

message onto the external computer network, where the message is transmitted to the receiving party.

An interconnection network as outlined above has been installed for example in Italy by Telecom Italia S.p.A. and is known as "Argotel".

According to a first preferred embodiment of the present invention, interactive television is provided by connecting to said computer network the television station that broadcasts the television program for which viewer interaction is required and by providing each viewer, who is also a telephone subscriber, with a terminal as shown in figure 1.

In figure 1, the interactive television terminal comprises an infrared signal transmitter 10 which can be operated by the user by means of a keyboard 12 and has a liquid-crystal display 14 and a digitally-encoded infrared signal transducer 16. The transmitter furthermore includes a processing unit 18, such as a microprocessor or microcontroller with RAM and ROM memory, which is connected so as to supervise the above mentioned components, in addition to a battery-based power supply 20. The transmitter 10 is preferably provided in a portable form, so that it can be easily held in the viewer's hand during use (so-called handheld size).

The terminal according to the first preferred embodiment furthermore includes an overvoice modulator 30 which is electrically connected to a telephone wire pair 32 of the user by means of filters 34, as known in the field. The modulator 30 is driven by a processing unit 36 (also provided with appropriate RAM and ROM) which receives input

signals from an infrared transducer 38 which is preset to receive and convert the signals sent by the infrared transmitter in order to send messages directed to the television station over the telephone wire pair 32.

The modulator 30, the processing unit 36, and the transducer 38 are preferably grouped together in a module which is meant to be placed near the television set or is optionally included in the television set itself.

The transmitter 10 can be advantageously provided so that it also provides the functions of the conventional remote control of the television set, by including in its program ROM a section with appropriate instructions, as is evident to those skilled in the art.

The operating techniques for providing interactive television programs by using the above described terminal are now described with reference to figure 2.

A television set 40 receives, by means of a receiver antenna 42, a television program 44 broadcast by a TV camera 46 by means of a transmitter antenna 48. The television station also has a computer 50, provided with a printer 52 or other display device, which is connected to a computer network, for example the "Argotel" packet-switching network, schematically designated by the reference numeral 54.

A terminal 56 is associated with the television set 40 and is provided with an infrared transmitter 10, as described with reference to figure 1, and is connected by means of a line 58 to the telephone wire pair 60 of the subscriber downstream of the telephone set 62. While viewing the program on the screen of the television set 40, the subscriber can operate the handheld transmitter 10 to

transmit, in overvoice mode, over the line 58, messages such as binary or multiple-choice answers to games, polls, etcetera. The messages comprise, in a per se known manner, in addition to the information decided by the subscriber, codes that identify the subscriber and the recipient of the message, that is to say the television station, according to a preset protocol which is associated with the network (for example Argotel) for connection to the computer network.

The telephone wire pair 60 thus reaches its exchange 64 and carries an overvoice message, in addition to the optional telephone conversation that originates from the telephone 62. The optional telephone conversation is routed in a conventional manner in a switching unit 66, whereas the overvoice message is received by a per se known apparatus 68 which transfers it to the computer network 54, where it is routed to the recipient television station, represented by the computer 50. This computer processes the received messages, converting them into a form that can be used immediately during the television program: depending on the situations, this conversion can produce a named list of answers, a statistical summary, etcetera.

It is evident that the invention offers several simultaneous advantages with respect to the other known or potential methods for communication between the viewer and the television station:

a) for the viewer: the connection is permanently available, without requiring complicated operations such as the dialling of telephone numbers, waiting, frustration in case of a busy line, etcetera: the terminal can be used from the comfort of one's armchair; identification is automatic,

without requiring potentially stressful conversations with operators;

b) for the television station: programs with viewer intervention are no longer threatened by overloading, which reduces the success of the program; it becomes possible to process a very large number of answers automatically at low cost, without requiring considerable personnel to answer several telephone sets; it become possible to extend the range of interactive programs;

c) for telephone subscribers in general: exchange overloads are eliminated.

Figure 3 illustrates a second embodiment of a terminal for interactive television. In figure 3, the components that are identical or correspond to those shown in figure 1 are designated by the same reference numerals with the addition of the prefix "1".

The physical structure of the terminal is similar to the one shown in figure 1, and differs from it because the two infrared transducers 16 and 38 are replaced here by respective radio signal transceivers 116 and 138.

The terminal of figure 3 offers the same performance as the terminal of figure 1, with the additional possibility of bidirectional transmission of the signals by means of the computer connection. The television station can thus send private messages to individual subscribers; these messages are displayed on the liquid-crystal display 114. This allows, for example, to individually report to the participants in the program as to the correctness of their answer or to confirm reception of their message etcetera.

Figure 4 illustrates a third embodiment of a terminal

for interactive television. In figure 4, the components that are identical or correspond to those of figure 3 are designated by the same reference numerals with the addition of the prefix "2" instead of the prefix "1".

The physical structure of the terminal is similar to the one shown in figure 3 and differs from it because in this case a magnetic card reader 222, connected to the processing unit 218, is also associated with the transmitter 210.

The terminal offers the same performance as the terminal of figure 3, with the addition of various kinds of additional service, depending on the operating software provided in the ROM of the processing unit 118. The magnetic card can thus be used to allow participation in a program or to confirm and/or charge a purchase made during a teleshopping program or to record a score on the magnetic card, etcetera.

Some preferred embodiments of the invention have been described and are of course susceptible of equivalent modifications that can be easily devised by those skilled in the art on the basis of the teachings given herein. For example, the liquid-crystal display 14 can be replaced with another type of display, or it may be omitted; the terminal can be provided with additional functions, such as an interface for connection to a printer; the transmission of the signals from the transmitter to the modulator, instead of occurring by means of radio or infrared methods, might also be provided ultrasonically or even by means of an electrical connection; it is furthermore understood that reference to the "Argotel" network is made merely by way of

example, and that the terminal can be associated with other networks having similar performance, as long as they are provided as overvoice networks on the basis of the conventional telephone network.

CLAIMS

1. Terminal for interactive television, for sending messages from a telephone and television subscriber to a station that broadcasts a television program, characterized in that it comprises:

a) a wireless signal transmitter (10), which can be operated by the user by means of a keyboard (12); and

b) an overvoice modulator (30), which can be connected directly to a telephone wire pair (32) of the subscriber, which is connected to an overvoice network for connection to a computer network (54) to which the television station can be connected, said modulator (30) being driven by a transducer (38) which is suitable to receive and convert said signals transmitted by the wireless transmitter (10) in order to send, over the telephone wire pair (32,60), messages directed to the television station.

2. Terminal for interactive television according to claim 1, characterized in that said transmitter (10) transmits infrared signals.

3. Terminal for interactive television, according to claim 1, characterized in that said transmitter (10) transmits radio signals.

4. Terminal for interactive television, according to claim 3, characterized in that said radio signal transmitter (10) is a signal transceiver and in that said transducer (38) is also a transceiver.

5. Terminal for interactive television, according to claim 2, characterized in that said transducer (38) is built into a television set.

6. Terminal for interactive television, according to claim 5, characterized in that said modulator (30) is also built into said television set.

7. Terminal for interactive television according to one of claims 2, 5, or 6, characterized in that the processing unit (18) of said transmitter (10) is furthermore programmed to generate signals for controlling the functions of the television set (40).

8. Terminal for interactive television according to one of claims 1 to 7, characterized in that it furthermore comprises a magnetic card reader (222).

9. Terminal for interactive television according to one of claims 1 to 8, characterized in that it is provided in a handheld size.

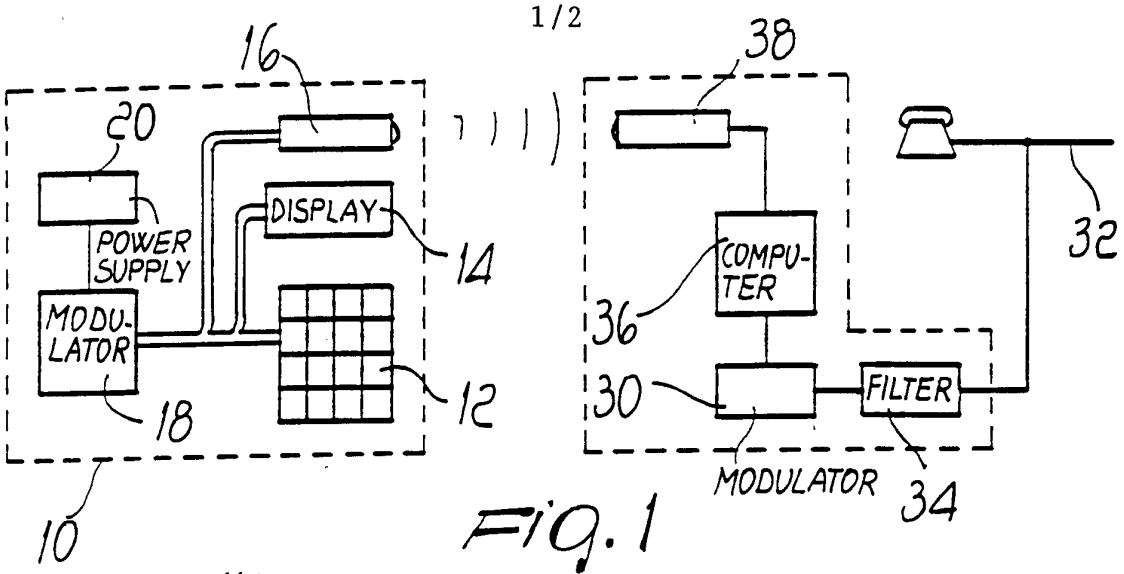

FIG. 1

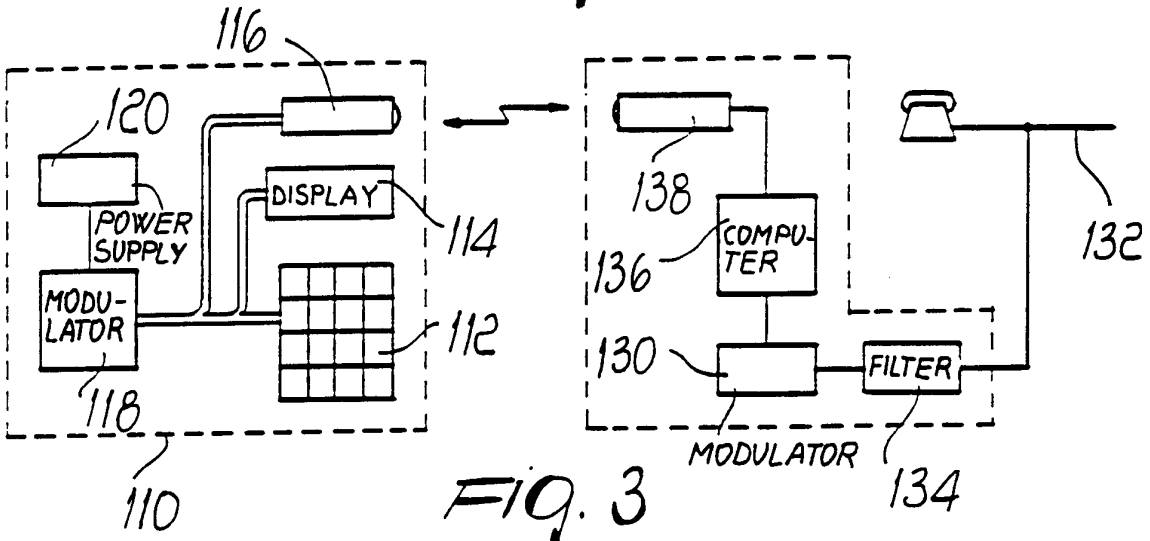

FIG. 3

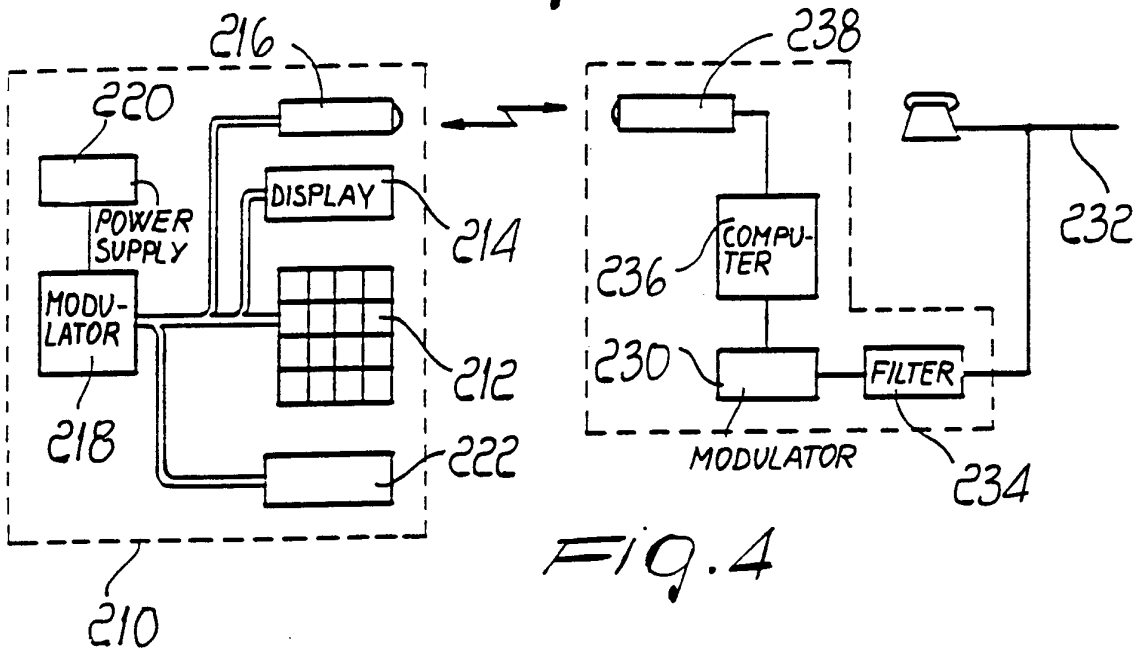

FIG. 4

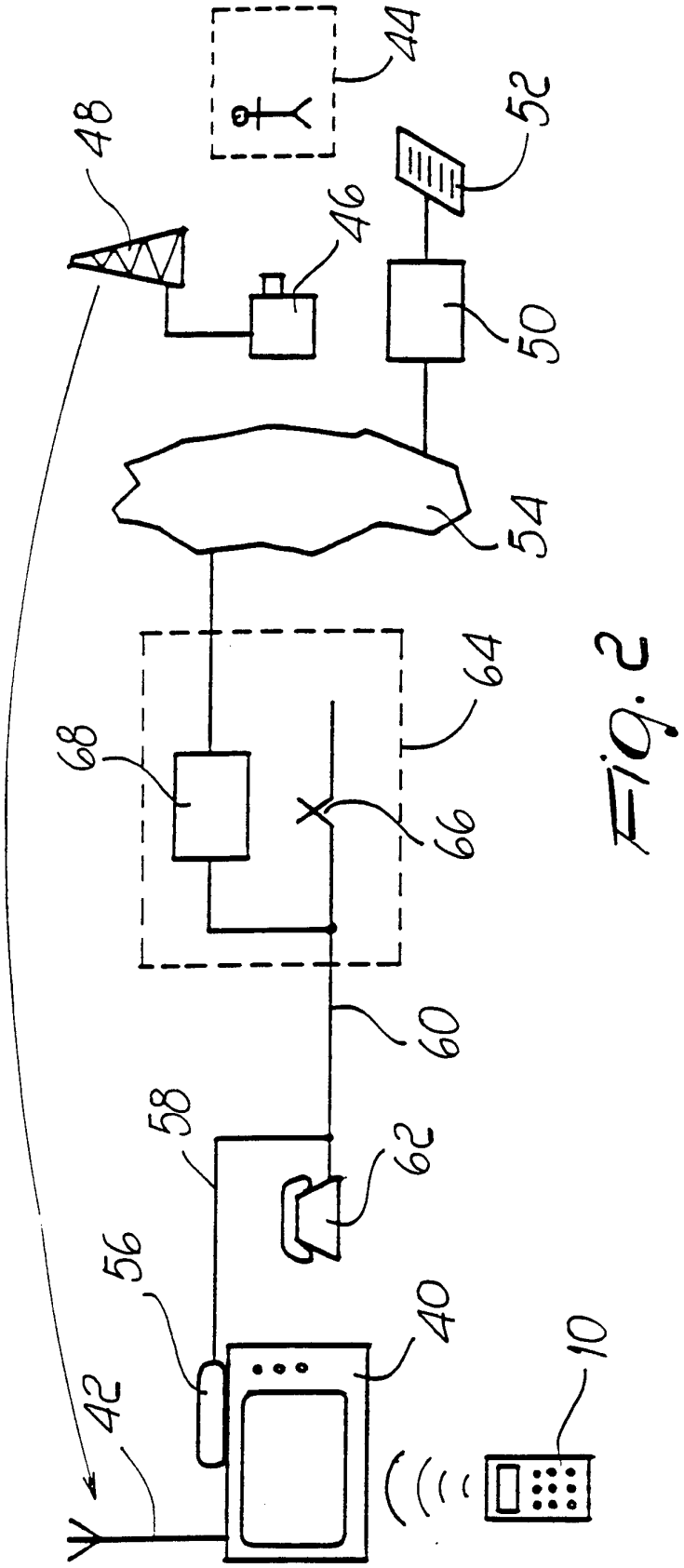

Fig. 2

INTERNATIONAL SEARCH REPORT

Intern. ..al Application No
PCT/EP 94/03845

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04N7/16 H04N7/173

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H04N H04M

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 practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	THE IEEE WESCANEX '91, 29 May 1991, REGINA, SASKATCHEWAN, CANADA pages 309 - 311 KING 'DEVICE FOR THE INTEGRATION OF TELEVISION AND TELEPHONE CONTROL VIA HANDHELD INFRARED REMOTE'	1
A	see the whole document	2-9

Y	GB,A,2 147 476 (MITEL CORP.) 9 May 1985 see abstract	1

A	US,A,5 226 177 (NICKERSON) 6 July 1993 see abstract	1-9

A	US,A,5 144 663 (KUDELSKI ET AL.) 1 September 1992 see the whole document	1-8

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
3 March 1995	0 6. 04. 95
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Greve, M

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FUNKSCHAU, vol.8, no.19, September 1989, MÜNCHEN, DE pages 46 - 51 LÜGGER 'NEUES KONZEPT VERBINDET TV UND TELEFON' see the whole document -----	1-9

INTERNATIONAL SEARCH REPORT

Information on patent family members

Intern. ..al Application No
PCT/EP 94/03845

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
GB-A-2147476	09-05-85	CA-A-	1200938	18-02-86
		DE-A,C	3422265	18-04-85
		FR-A,B	2556531	14-06-85
		JP-A-	60094593	27-05-85
		US-A-	4604741	05-08-86
US-A-5226177	06-07-93	NONE		
US-A-5144663	01-09-92	AU-B-	599646	26-07-90
		AU-A-	7157887	22-10-87
		EP-A-	0243312	28-10-87
		EP-A-	0626793	30-11-94
		JP-A-	63023488	30-01-88
		JP-A-	5244591	21-09-93