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US 5034948 A

(58) Field of Search
UK CL (Edition K) **H4K KFD KOT**
INT CL⁵ **H04Q 11/04**

(54) **Communications device**

(57) A communications device such as an adapter card for a personal computer 20 sets up voice calls from a local telephone 30 to a remote telephone 50 via a digital network e.g. ISDN. The device may be a computer 20 equipped with an ISDN adapter (without a special part for telephone support) and it can be used to set up voice calls from a conventional ISDN telephone 30 with the advantage that the conventional ISDN telephone and computer can operate separately in the event of power or equipment failure. The device comprises logic for sending a call signal to the network to establish a call via the network to the local telephone, and call transfer logic for sending further signals to the network to transfer the established call to the remote telephone in response to a confirmation signal from the network indicating that the local telephone has been answered.

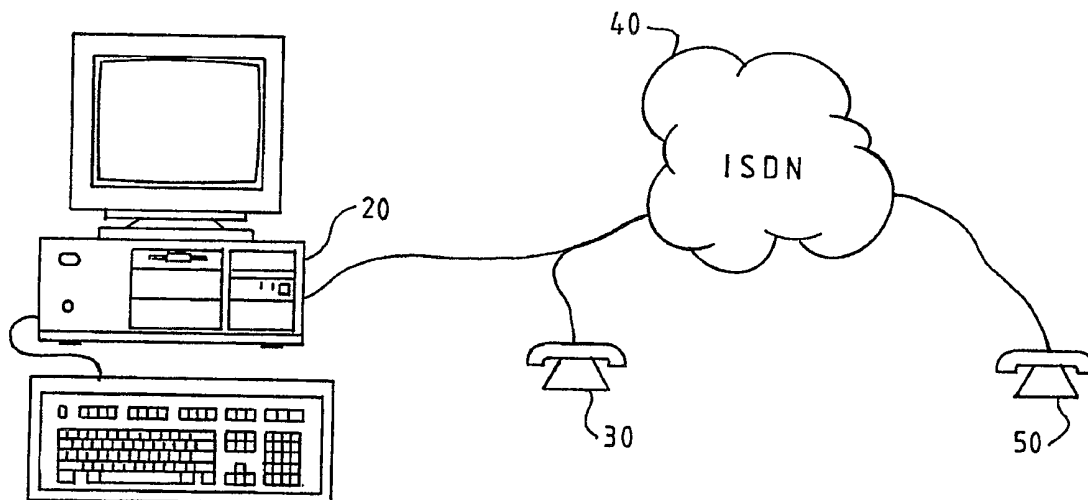


FIG. 1

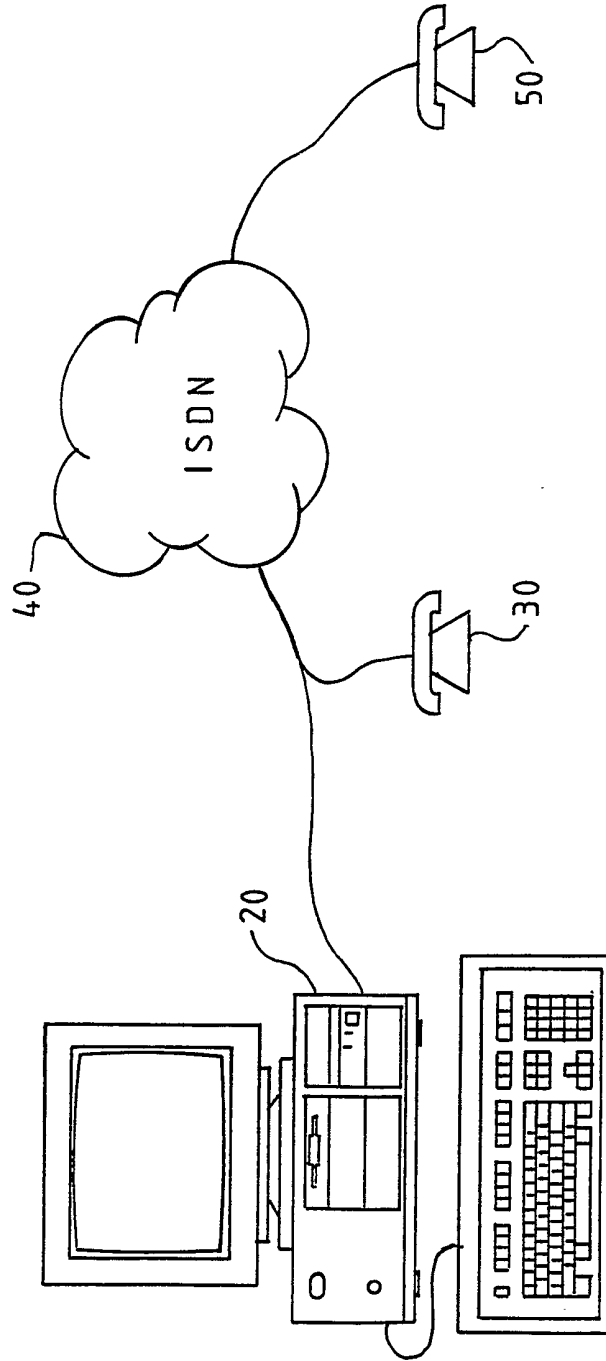


FIG. 1

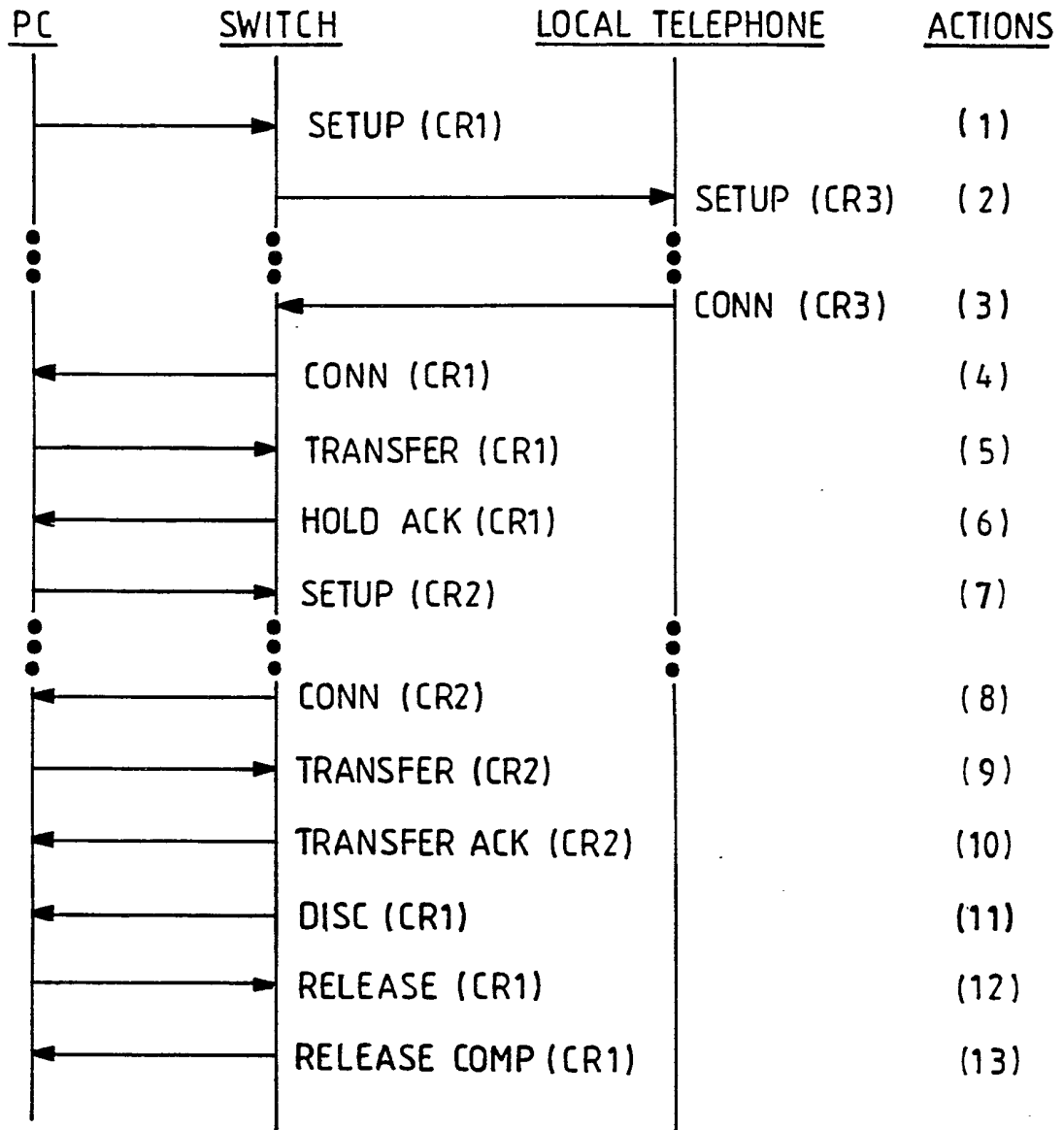


FIG. 2

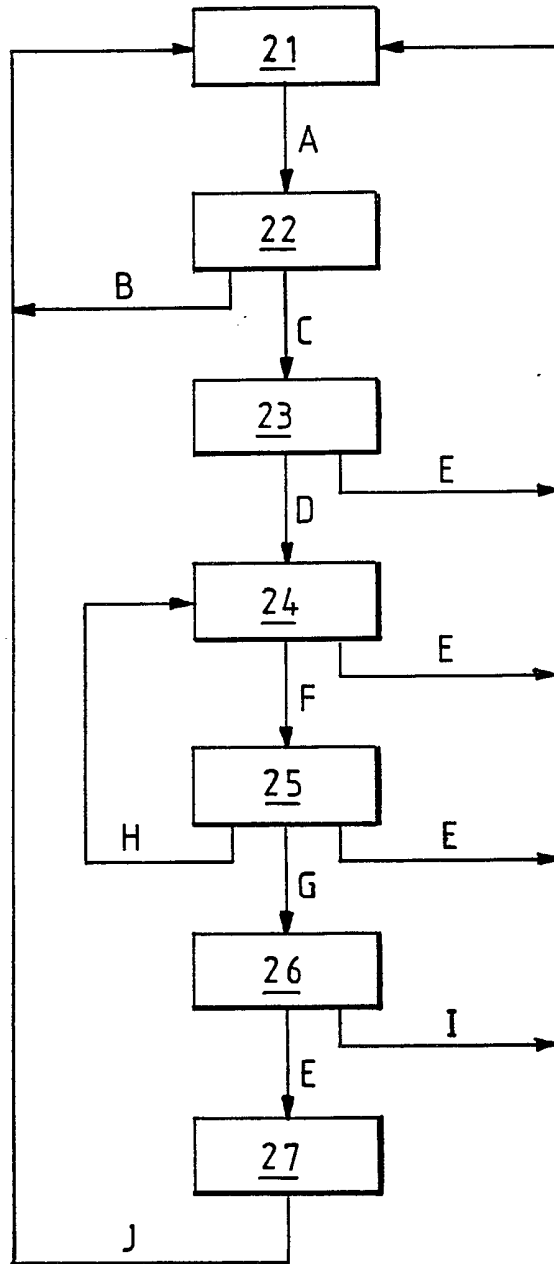


FIG. 3

COMMUNICATIONS DEVICE

This invention relates to the setting up of voice calls by communications devices in a digital network.

One way of setting up voice calls over an Integrated Services Digital Network (ISDN) by a computer involves an ISDN adapter installed in the computer which has a port for connection to a specially-adapted telephone or headset which is dedicated for use with the particular adapter.

This arrangement has a number of problems associated with it.

First, the telephone, being dedicated for attachment to the ISDN adapter, cannot be used standalone to communicate over the network. Secondly, when the computer is powered off, so is the telephone. This is a problem in emergency situations where power is lost and telephone contact is required. Thirdly, system and application software is required for the telephone to operate. Such system software normally needs homologation and, if not designed correctly, could lead to the application software also requiring homologation. Fourthly, if a software problem is encountered the user might have to restart the computer before the telephone can be used again. In the worst case, if the computer suffers a hardware failure, then the telephone is not available until after the computer is repaired.

It is the object of the invention to solve these problems.

Accordingly, one aspect of this invention provides a communications device, connectable to a digital network, for setting up a voice call to a remote telephone via the network, the device comprising logic for sending a call signal to the network to establish a call via the network to a local telephone, characterised by call transfer logic for sending further signals to the network to transfer the established call to the remote telephone in response to a confirmation signal from the network

indicating that the local telephone has been answered, thereby establishing a voice call between the local telephone and the remote telephone.

In this way, a computer equipped with an ISDN adapter can be used as a communications device to set up voice calls from a conventional ISDN telephone, thus obviating the need for a dedicated telephone and allowing the local telephone and the controlling computer to operate independently thereby solving the above-mentioned problems of power failure and dependence on hardware and software reliability.

An embodiment of the invention uses an ISDN telephone and a personal computer having an ISDN adapter installed without the special port for telephone support. The ISDN telephone and the ISDN adapter can either be connected to the same passive bus, which has the advantages that the cost of two ISDN lines is avoided and the ISDN adapter can monitor incoming calls to the telephone, or they can have separate ISDN numbers.

The invention enables an application program in the computer to be used to make connections between the local ISDN telephone and remote telephones.

An embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawing, wherein:

Figure 1 is a schematic diagram showing the arrangement of computer, ISDN network and telephones in one embodiment of the invention;

Figure 2 shows the ISDN message flow between the computer, ISDN network and local telephone;

Figure 3 is a state table for the computer.

This embodiment of the invention involves an ISDN telephone and a personal computer having an ISDN adapter arranged generally as shown in Figure 1. Personal computer 20, which has a suitable ISDN adapter (not

shown) installed, and local telephone 30 are connected via an ISDN passive bus to ISDN network 40. Remote telephone 50 is also connected elsewhere to the network 40.

The call setting up process is initiated by the supply to the computer 20 of the number of the remote telephone. The number of the remote telephone is either supplied by direct user entry or by another method such as user selection of an entry in an application directory.

The procedure followed by the system is shown in Figure 2 and is as follows. First the computer attempts connection to the local telephone 1, the number of which is stored in the system. The local telephone is sent 2 notification from the network of the connection request.

If the local telephone receives an external call prior to the call from the computer reaching it, ie between steps 1 and 2, then the computer indicates this to the user on its display, so that the user does not pick up the local telephone expecting connection to the remote telephone, when they are actually connected to an incoming call. It will be understood that other messages, such as ALERTING, may be exchanged before connection with the local telephone is established.

When the local telephone is answered by the user, it accepts connection 3 and the connection between the computer and the local telephone is complete 4.

In response to receiving confirmation that the call to the local telephone has been answered, the computer requests 5 transfer of the connection to the local telephone. The ISDN switch responds to the transfer request by placing the connection to the local telephone on hold 6. When this happens, the computer attempts 7 connection to remote telephone 50. During this phase other messages, such as ALERTING, may also be exchanged before connection with the remote telephone is established.

On receiving notification that the connection to the remote telephone is complete 8, the computer requests transfer of its connection to the remote telephone 9. When the transfer is acknowledged the local telephone and the remote telephone are connected 10. Finally, the computer removes 11, 12, 13 the unwanted call reference, which is no longer needed.

If a connection cannot be made to the remote telephone, the user can terminate the attempt to connect by replacing the local telephone receiver. The loss of connection to the local telephone will be indicated by ISDN messages to the computer, which will terminate its attempt to connect to the remote telephone. Alternatively the user could use the computer to terminate the attempt to connect to the remote telephone. This would allow him the option of attempting to connect to an alternative remote telephone while still keeping his call to the local telephone held, pending transfer.

Figure 3 is a state table for the computer with the following states:

- 21 Null state;
- 22 Calling local telephone;
- 23 Connected to local telephone;
- 24 Local call transferred, placed on hold;
- 25 Calling remote telephone;
- 26 Connected to remote telephone;
- 27 Remote connection with no local connection,

and the following actions or indications:

- A Attempt connection to local telephone;
- B Failure to connect to local telephone;
- C Notification of connection to local telephone;
- D Local connection transferred;
- E Local telephone receiver put down, connection broken;
- F Attempt connection to remote telephone;

- G Notification of connection to remote telephone;
- H Failure to connect to remote telephone;
- I Remote connection transferred;
- J Release remote connection.

CLAIMS

1. A communications device, connectable to a digital network, for setting up a voice call to a remote telephone via the network, the device comprising logic for sending a call signal to the network to establish a call via the network to a local telephone,

characterised by

call transfer logic for sending further signals to the network to transfer the established call to the remote telephone in response to a confirmation signal from the network indicating that the local telephone has been answered, thereby establishing a voice call between the local telephone and the remote telephone.

2. A communications device as claimed in claim 1 wherein the call transfer logic comprises logic for sending a call signal to the network to establish a call to the remote telephone and logic for sending, in response to a confirmation signal indicating that the remote telephone has been answered, a request signal to the network to transfer to the local telephone the established call to the remote telephone.

3. A communications device as claimed in claim 2 comprising logic for sending a release signal to the network to release the device from the established calls to the remote telephone and the local telephone in response to an acknowledgement signal from the network indicating that the transfer is complete.

4. A communications device as claimed in any preceding claim wherein the call transfer logic responds to a signal from the network indicating that the local telephone is engaged by terminating any attempt to connect to the local telephone, the device comprising means responsive to detection of such a signal by the call transfer logic for indicating to the user detection of said signal.

5. A communications device as claimed in any preceding claim wherein the call transfer logic responds to a signal from the network indicating that the receiver of the local telephone has been replaced by terminating any attempt to connect to the remote telephone.
6. A communications device as claimed in any preceding claim comprising a storage device for storing a directory of telephone numbers and means responsive to a predetermined user input operation for enabling a user to select the number of the remote telephone from the directory of stored telephone numbers.
7. A communications device as claimed in any preceding claim including a storage device for storing the number of the local telephone.
8. A communications device as claimed in any preceding claim in the form of an adapter card for a personal computer.
9. A communications device as claimed in any preceding claim for use with an Integrated Services Digital Network.
10. A communications device as claimed in any preceding claim including a personal computer.

**Patents Act 1977
Examiner's report to the Comptroller under
Section 17 (The Search Report)**

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Relevant Technical fields

(i) UK CI (Edition K) H4K (KOT, KFD)

(ii) Int CI (Edition 5) H04Q 11/04

Databases (see over)

(i) UK Patent Office

(ii)

Search Examiner

G N CHAPMAN

Date of Search

30 OCTOBER 1992

Documents considered relevant following a search in respect of claims

1 TO 10

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
A	US 5034948 (MIZUTANI) - note figure 1	



Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).