TELECOMMUNICATION APPARATUS SERVING AS AN INTERFACE BETWEEN A DIGITAL COMPUTER AND AN ANALOG COMMUNICATION MEDIUM

This application includes two microfiche exhibits. Exhibit 1 contains five (5) fiches with a total of three hundred fifteen (315) frames. Exhibit 2 contains four (4) fiches with a total of two hundred thirty-five (235) frames.

TECHNICAL FIELD

The present invention relates to a communication apparatus for transmitting and receiving analog voice and data signals to and from a communication medium in the same session. More particularly, the present invention relates to a telephonic apparatus which also serves as an interface between a computer and a communication medium for transmitting and receiving analog voice and data signals in the same session.

BACKGROUND OF THE INVENTION

Telephonic apparatuses to transmit and receive analog voice signals to and from a communication medium are well known. The transmission and reception of digital data signals to and from a communication medium has typically been accomplished by the use of a modem. A modem is a device which modulates the digital signal, i.e., converts the digital signal to an analog signal for transmission along the communication medium and demodulates or converts the analog signal received from the communication medium into a digital signal. The modem, in turn, is interfaced to a computer or other source of digital data. Various patents disclose or teach the use of a modem with a computer to transmit and to receive digital data signals to and from a communication medium. See, for example, U.S. Pat. Nos. 3,825,905; 4,040,014; 4,085,449 and 4,232,293.

U.S. Pat. No. 4,378,470 discloses an interface circuit for connection to non-dedicated telephone lines for a telephonic apparatus and a modem.

However, none of the prior art references discloses or teaches an apparatus in which the analog voice and digital data signals can be transmitted to and received from a communication medium in the same session. A session is a time period commencing when an originating party has placed a call to an answering party or parties, communicates with that party, and then terminates the call.

In the prior art, devices to detect various status tones or supervisory tones are known. Status tones are tones such as ringing tone, ring back tone, dial tone, busy tone, etc. Typically, these tones have been discriminated from one another on the basis of presence and duration of energy. For example, if the amount of energy present exceeds two seconds in duration, then it's probably a dial tone. A burst of energy not exceeding one-half second is a busy tone. This discrimination is contextual and is based upon a fixed threshhold. Further difficulty is that these tones are not always accurately held to a particular frequency.

There is also known in the prior art programmable electrical keys, i.e., switches whose functions can be set by a computer program. However, the problem of changing the labels of these programmed keys or of knowing what function has been programmed has not been addressed. To the extent that any labelling technique is known, it consists of simply affixing a tag or other designation to the associated key.

SUMMARY OF THE INVENTION

The present invention relates to an interface apparatus between a digital computer and an analog communication medium. The apparatus comprises telephonic means for transmitting and receiving voice signals to and from the medium, and modem means for communicating with the computer and the medium for transmitting and receiving data signals to and from the medium for the computer. A switch means switches the connection of the telephonic means to the medium and the modem means to the medium. The apparatus further has an interrupt means for interrupting the operation of the computer for causing the computer to be in communication with the modem and being responsive to said apparatus and for switching the switch means to connect the modem means with the medium.

In addition, in the present invention, transmission of data signals to the other like apparatus can be made while the other like apparatus is unattended. Thus, data messages can be transmitted and received by the other like apparatus even if the user is away or if the other like apparatus is in use.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of the apparatus of the present invention with a computer.

FIG. **2** is a block diagram of the apparatus of the present invention.

FIG. **3** is a block diagram of a portion of the diagram of FIG. **2**, in greater detail.

FIG. **4** is a symbolic address map of the memory contents of the computer shown in FIG. **1**.

FIG. **5** is a block diagram showing the apparatus of the present invention used in teleconferencing.

FIG. **6** is a block diagram of the protocol of the data stream transmitted and received with the apparatus of the present invention.

FIG. **7** is a detailed circuit diagram of a portion of the apparatus shown in FIG. **3**.

FIG. **8** is a circuit diagram of a portion of the tone detection circuit of the apparatus of the present invention.

FIG. **9** is a circuit diagram of another portion of the tone detection circuit of the apparatus of the present invention.

FIGS. **10–12** and **13*a*** and **13*b*** are circuit diagrams of portions of the apparatus of the present invention.

FIG. **14** is a partial perspective view of the keyboard portion of the apparatus of the present invention.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring to FIG. **1**, there is shown an apparatus **10** of the present invention. The apparatus **10** is coupled to a computer system **20**, via cables **22**. The apparatus **10** is also coupled to telephone line **24** or lines **24*a*** and **24*b*** (as shown in FIG. **2**).

The computer system **20** can be any type of computer. Preferably, the computer system **20** has a standard RS232C interface port. The cable **22** is connected between the RS232C port of the computer system **20** and with the apparatus **10**. To the computer system **20**, the apparatus **10** is treated as another peripheral device connected to the system **20**. An example of a suitable computer system **20** is the IBM Personal Computer.