SYSTEM AND METHOD FOR SYNCHRONOUS PROCESSING OF MEDIA DATA ON AN ASYNCHRONOUS PROCESSOR

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Application No. 60/637,872, filed 22 Dec. 2004, which is incorporated herein by reference.

FIELD OF THE INVENTION

The present invention relates generally to media processing. More particularly, the present invention relates to audio stream processing.

BACKGROUND OF THE INVENTION

In the field of telecommunications processing, the development of the private branch exchange (PBX) provided medium to large size enterprises with the ability to provide numerous telephony services without relying upon a central carrier for the provision of the services. Thus, a PBX could provide a medium to large sized enterprise with the ability to provide employees extensions from a central number, each extension being served by a voicemail or other telephony service, without relying upon the telephone service carrier to provide these services. PBX equipment is dedicated equipment designed to service only standard telephony needs. Although this provided a cost effective solution for a number of companies, standard PBX systems are too costly for smaller enterprises, and do not provide the level of telephony service functionality required by many industries.

To provide a simpler solution aimed at smaller markets, standard personal computing platforms have been used as the basis for telephony services. These systems have typically relied upon dedicated expansion cards to provide both a connection to the telephone network (or to a PBX served network) and to provide much of the call processing required. A number of drawbacks to this solution have arisen. Dedicated processors, or digital signal processors (DSP), are typically required on the interface cards as operating systems such as Microsoft Windows XP, Linux and Apple's OS X are not truly designed to perform real time processing on asynchronous streaming data. The dedicated processors are provided on the expansion cards, and typically require a dedicated memory on the card as well. This increases the cost of the card, and also has other adverse side effects including increasing the heat generated in the computer chassis.

In many applications, personal computers with the dedicated expansion cards are used to perform a number of telephony and non-telephony activities. These systems are often used to process the audio in a number of ways, including call logging and recording. Furthermore, the resources of the computer can be used for other telephony functions, such as using the hard drive of the personal computer as storage for both call recording and voice messaging services. The programmability of the personal computer allows monitoring and other related functions to be triggered by any number of variables including time of day, the number dialled, the number a call is received from, the detection of signalling tones originating from either the local or remote phone, and other such variables that will be apparent to those skilled in the art.

These systems can also be deployed in environments such as call centers, where the computer can be used to support non-telephony functions such as databases that access the phone number of the remote party to allow a call operator to access information such as call history and products purchased to allow simplified customer service. As a result, the host computer cannot be treated as a dedicated system because other applications related to, but not directly supporting, the telephony functionality must be able to run on the processor without either degrading the media processing or being degraded by the media processing.

One skilled in the art will appreciate that in addition to audio processing, these system are often employed in the handling of video for videoconferencing and other related functions. The host processor is often employed to adjust the display of the video streams to suit the needs of the viewer. As the video processing for display, and the video processing for both the receiving and transmitting, along with the accompanying decoding and encoding, must be performed in real time, the use of expensive dedicated hardware has been relied upon to provide the stability demanded by users.

Therefore, it is desirable to provide a computer based system for processing media stream data that would have the media data processing carried out on the computer processor and that would not require DSPs on interfacing boards connected to the computer. Further, it is also desirable that the computer-based system provides excellent real-time processed media data while allowing undisrupted performance of other applications running on the computer.

SUMMARY OF THE INVENTION

It is an object of the present invention to obviate or mitigate at least one disadvantage of previous host media processing systems.

In a first aspect, the present invention provides a method of processing media data received from a plurality of sources in a non-real time system. The method comprises steps of: receiving a stream of media data units from at least one of the plurality of sources and transferring the received data units to a processor input buffer; generating a clocking signal associated with the at least one source; generating an override interrupt in accordance with the clocking signal and a required processing action to indicate the transfer of data units to the processor input buffer; suspending processing in response to the generation of the override interrupt; performing the required processing action on the data units in the processor input buffer, storing the result of the required processing action in a processor output buffer and clearing the interrupt; and transferring the data from the processor output buffer to at least one of the plurality of sources. The override interrupt can be, for example, a deferred procedure call in a Microsoft Windows environment, or a tasklet in a Linux environment.

According to embodiments of this aspect, the step of transferring the received data units to a processor input buffer can include initiating a direct memory access operation to transfer the data units to the processor input buffer. The step of receiving a stream of media data units can include receiving data frames from one or more of a private branch exchange network, public switched telephone network, channel bank, locally connected phones or a packet network. And, the step of generating a clocking signal can include extracting a clocking signal from at least one source. The method can include a further step of dividing the required processing action into a series of required processing actions, and each of the series of required processing actions can be performed in a portion of the clocking signal period. For example, the portion of the clocking signal period can be less than 50%.