Title
Telephone with means of memorization or indication of data related to incoming and/or outgoing calls

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ABSTRACT OF THE DISCLOSURE

TELEPHONE WITH MEANS OF MEMORIZATION OR INDICATION OF DATA RELATED TO INCOMING AND / OR OUTGOING CALLS

This invention relates to a telephone (12) comprising means of memorization or indication of data related to incoming and / or outgoing calls.

This telephone comprises a detector (30) supplying a line state signal to memorization or indication means (141) so that the memorized or indicated data depend on the state of the line.

Thus, the memorized or indicated data take account of calls received on or sent from a secondary telephone.

FIGURE 2.
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| Invention Title: | Telephone with Means of Memorization or Indication of Data Related to Incoming and/or Outgoing Calls |

The following statement is a full description of this invention, including the best method of performing it known to me/us:-
TELEPHONE WITH MEANS OF MEMORIZATION OR INDICATION OF DATA RELATED TO INCOMING AND/OR OUTGOING CALLS

DESCRIPTION

The invention is related to a telephone comprising means of memorization or indication of data related to incoming and/or outgoing calls.

Telephones are frequently provided with a memory to store information about incoming and/or outgoing calls.

For incoming calls, the calling number is frequently memorized (if it is transferred on the line) together with the date and time of the call, and if the call was answered, together with the duration of the conversation or more generally the connection. A telephone may also comprise an indicator such as a writing on a screen or a flashing lamp, to show that a call was made and that it was not answered. In this case, the indicator disappears when the user performs a step to show that he become aware of the call.

It is also standard practice to memorize outgoing calls with their dates and durations. In particular,
this feature makes it possible to check that invoiced amounts for telephone communications are correct.

This type of telephone is frequently used with other telephones on the same line, in other words with the same number, that may or may not comprise memorization or indication means. For example, the telephone with means of memorizing incoming and/or outgoing calls may be located in the main room of a home, whereas secondary telephones (cordless or with cord) are located in other rooms.

The invention is a result of the observation that the memorized or indicated information may not be reliable when a telephone with a means of memorization or an indication of incoming and/or outgoing calls is used with other telephones on the same line. Information about incoming calls is correct only when the call is answered on the main telephone (the telephone on which the memorization or indication means are installed). Similarly for outgoing calls, the memorized information is only correct when these calls are all made from the main telephone and do not terminate on another telephone.

If an incoming call is answered on a secondary telephone, the main telephone will indicate that the call was not answered. If the communication is made on the main telephone and is continued on a secondary telephone, the displayed time will be the time of the communication on the main telephone and not the total time.

When the main telephone is provided with means of memorizing called numbers and the duration of the
communications, and when a call is dialled on the main telephone and is continued on a secondary telephone, the recorded time is the time of the call made starting from the main telephone and does not include the duration of the communication that is continued on the secondary telephone. Furthermore, if an outgoing call is dialled from a secondary telephone, the data for this call are not recorded.

To solve these problems of reliability in memorizing or indicating data related to incoming and/or outgoing calls when a telephone is connected to a line that can be fitted with other telephones called secondary telephones, the invention includes a telephone that comprises:

- means of recording data related to incoming and/or outgoing calls, and
- a line state detector,

the means of recording data about incoming and/or outgoing calls including means such that these data take account of the signal provided by the line state detector and therefore communications made through the secondary telephone(s) connected to the same line.

Thus in the case of an incoming call, if the main telephone comprises an unanswered indicator, this indicator may be deactivated when the answer is made on a secondary telephone. When the telephone comprises a means of recording the duration of incoming and/or outgoing calls, this recorded time is reliable since it takes account of secondary telephones by means of the signal detected by the line state detector.
If the main receiving telephone comprises memorization of the duration of received calls, and if the answer is made on a secondary telephone, the recorded duration will be the duration of the actual communication independently of which telephone(s) was (were) used to answer the call. If the telephone is provided with an unanswered call indicator, means are provided to deactivate this indicator when the line state detector indicates that the line is busy, in other words a call is being answered.

If the telephone comprises means of memorizing the duration of outgoing calls, possibly with the corresponding numbers when a call is dialled from this telephone, the duration of the call that is recorded corresponds to the total duration, since the end of the call is determined by the line state detector that outputs a signal to stop counting the duration of an outgoing call when the line state detector outputs a signal indicating that the line has changed from the busy state to the ready state.

In one embodiment of a telephone comprising memorization of calling numbers and/or the duration of calling communications, the telephone comprises a called numbers detector such as a DTMF decoder so that it can provide information about called numbers even when the call is dialled from a secondary telephone.

A called numbers detector may be made using filters and corresponding programming of a processor.

For example, the line state detector may be a detector comprising means of measuring the line voltage
or a detector to measure the line activity, in other words a means of measuring the AC signal on the line.

The invention can increase the reliability of data about incoming and/or outgoing calls without complicating the means of making the telephone. In particular, line state detectors are often provided in telephones for other purposes. Furthermore, calling and/or called numbers are usually managed using a microprocessor or micro controller. In this case, the invention simply requires that the processor is reprogrammed to take account of the line state detector, in particular such that communication durations are the real durations, in other words they are independent of which telephone was used for communication on the line concerned.

In this embodiment, the software to be added to make the invention may be downloaded through the telephone line.

The invention thus usually relates to a telephone comprising means of memorizing or indicating data related to incoming and/or outgoing calls; this telephone comprises a detector outputting a line state signal to memorization means or indication means such that the memorized or indicated data depend on the state of the line.

According to one embodiment, means of memorization or indication comprise an unanswered incoming call indicator that remains active until an incoming call has been answered, failure to answer the call being determined from the line state signal output by the detector.
In one embodiment, the telephone comprises means of memorizing communication durations for incoming calls comprising means determining the duration that elapses for these calls between two line state changes. In this case, means of memorization or indication may comprise means of memorizing the received numbers.

According to one embodiment, the means of memorization or indication comprise means of memorizing outgoing call durations determining the duration that elapses for these calls between two line state changes. In this case, means of memorization or indication may comprise a means of memorizing called numbers. These numbers may be detected by a detector of the dialled number on the line, such as a DTMF decoder in order to memorize numbers dialled from other telephones connected to the same line.

In one embodiment, the telephone comprises a processor and means of receiving programming signals through the telephone line to be loaded into the processor memory so that the processor is capable of returning memorized or indicated data as a function of the state of the line.

The invention also relates to a set of at least two telephones including one telephone as described above and one telephone without memorization or indication means.

Other characteristics and advantages of the invention will become clear in the description of some embodiments with reference to the attached drawings in which:
Figure 1 represents a telephone installation comprising a main telephone and secondary telephones.

Figure 2 is a diagram showing a telephone according to a first embodiment of the invention, and

Figure 3 is a diagram similar to that in figure 2 for another embodiment.

Figure 1 diagrammatically shows a telephone installation comprising a line 10 to which a telephone 12 is connected comprising means 14 of memorizing data about incoming and/or outgoing calls. In the remaining description, this telephone 12 with memorization means 14 will be referred to as the main telephone. Secondary telephones 16 and 18 are connected in parallel on the same line 10. The telephone 12 and/or the secondary telephones 16 and 18 may be of the cordless type. For example, telephone 16 is a cordless telephone, in other words there is a base 161 connected by wire to the line 10, while the telephone itself 162 is cordless and communicates with base 161.

The memorization means 14 are capable of performing at least one of the following three functions:

The first function is memorization of incoming calls that had not been answered. In this case, an indicator such as a flashing light signal remains active and must subsequently be deactivated manually.

The second function is an indication of the communication duration for incoming calls, and/or the numbers of these calls (when they are received).
The third function is the communication duration for outgoing calls, and/or the recording of the corresponding numbers.

For each of these three functions, the memorisation means does not provide reliable data if the communication is made entirely or partly from a secondary telephone. Thus for the first function, if the first telephone 12 is not picked up, and if only one of the secondary telephones is picked up to answer an incoming call, then the unanswered incoming call indicator remains active.

When the duration of incoming calls is recorded, this duration only corresponds to the duration of the action taken by telephone 12. For example, if the user answers an incoming call on a telephone 12, and then continues on a telephone 16 or 18 after hanging up the main telephone, the recorded time will not be the duration of the call, but it will be the time between when the line is taken and when use of the main telephone terminates.

If an outgoing call is started from the main telephone and terminates on a secondary telephone, and the main telephone was hung up in the meantime, the duration of the outgoing call that will be recorded will be the time corresponding to the time during which the main telephone takes the line 10. Thus, the data output by the memorization means 14 will not be correct. Finally, if an outgoing call is made solely from a secondary telephone, no data will be recorded in the main telephone.
The invention records reliable data on the main telephone, even if the secondary telephone is involved in the incoming and/or outgoing communication.

In the embodiment of the invention shown in figure 2, the telephone 12 comprises a module 14 for memorization and display of data about incoming calls. Therefore, the telephone 12 comprises an incoming calls detector 22, the output of which is connected to an input to module 14. The telephone 12 also comprises a time-dater 24 that provides date and duration data to module 14. The telephone also comprises a memory 26 providing a telephone directory containing telephone numbers, and possibly other information about numbers.

The telephone also comprises an unanswered calls notification light 28 that is activated by an output signal from module 14. Another type of indication can be provided instead of a light, particularly on a display.

According to the invention, the telephone 12 comprises a line state detector 30 that outputs a signal representative of the line busy state. This signal supplied by the detector 30 is a line state indication and is not an indication that the line is or is not taken by telephone 12. In other words, the detector 30 outputs a line busy signal when any of the telephones connected to the line is picked up. It supplies a line free signal when all telephones connected are hung up.

The line state detector 30 is made in a known manner, and is either of the type that detects the DC
voltage of the line 10, or of the type that detects activity on this line 10 (AC signal level).

The signal output by detector 30 is applied to an input to module 14, to prevent the light 28 from being lit up when the line changes from the free state to the busy state, in other words when the telephone 12 or a secondary telephone is picked up following an incoming call.

The signal output on the input 32 is also used to determine the real duration of the communication, regardless of which telephone is used to answer it. Thus, the displayed duration will be the time between when the line is taken (line busy start) and when the line is no longer taken (all telephones are hung up).

Under these conditions, if an incoming call is answered by a secondary telephone, the duration of the communication will be recorded in the main telephone 12. Similarly, if the main telephone was used to answer and a secondary telephone was used afterwards, the recorded time will always be the time of the actual communication, in other words the total line busy time.

Conventionally, the time-dater 24 is used to determine communication durations and dates. The directory memory 26 is used in a manner known in itself to memorize the name of the caller when the calling number is already in the directory 26 and when the name is not sent by the telephone exchange on the line.

The telephone 40 shown in figure 3 comprises means of memorizing data related to outgoing calls. It comprises a module 42 intended to memorize these data and to control their display. This module 42 receives
information from a time-dater 24 and from a directory 26 similar to the memory with the same reference in the embodiment described with figure 2.

The dialler 44 on telephone 40 outputs a number signal on an input to module 42. This called number is memorized by this module with the called party's name if this number is in the directory 26.

The time-dater can memorize called dates and durations.

According to the invention, the telephone 40 comprises a line 10 state detector 30. This detector is identical to the detector with the same reference in the embodiment shown in figure 2. The signal output by this detector 30 is applied to an input 46 to module 42 such that the data memorized to display outgoing communications are independent of the telephone from which the calls were made or dialled, and are only dependent on the state of the line. Thus, the recorded duration is the duration elapsed between when the line was taken in the first place and when the line was released.

If the call is dialled from the main telephone 40 and is terminated from a secondary telephone, the module 42 records the called number and at the same time the real duration of the communication and not the duration corresponding to the part of the communication done on the main telephone 40 only. If the call is dialled from a secondary telephone, the total duration and the communication may be recorded.

To enable a number called from a secondary telephone to be recorded in the main telephone 40, a
variant of this telephone 40 shown in dashed lines in figure 3 comprises a detector 50 of a number called on the line 10 from another telephone. For example, this detector 50 may be a DTMF decoder.

Regardless of which embodiment is used, the invention makes it possible to make data recorded about incoming and/or outgoing calls dependable, using simple and economic means. When a line state detector 30 is provided in a telephone for a function other than that described for this invention, and when the telephone also comprises a processor, the functions to make the data dependable may be downloaded into the processor in the form of one or more programs. This downloading may be done through telephone line 10.

The detector 50, particularly a DTMF decoder, can also be made using the processor.
The claims defining the invention are as follows:

1. Telephone (12, 40) comprising means of memorizing or indicating data related to incoming and/or outgoing calls, characterized in that it comprises a detector (30) outputting a line state signal to the memorization or indication means (14, 42) such that the memorized or indicated data depend on the state of the line.

2. Telephone according to claim 1, characterized in that the memorization or indication means comprise an unanswered incoming call indicator (28) that remains active when an incoming call was not answered, with this failure to answer being determined from the line state signal supplied by the detector (30).

3. Telephone according to claim 1 or 2, characterized in that it comprises means of memorizing communication times for incoming calls comprising means of determining the time that elapses for these calls between two line state changes.
4. Telephone according to claim 3, characterized in that the memorization or indication means comprise means of memorizing the received numbers.

5. Telephone according to any one of the previous claims, characterized in that the memorization or indication means comprise means of memorizing the durations of outgoing calls determining the resulting duration for these calls between two line state changes.

6. Telephone according to claim 5, characterized in that the memorization or indication means comprise a means of memorizing called numbers.

7. Telephone according to claim 6, characterized in that it comprises a detector of the number dialled on the line, such as a DTMF decoder, in order to memorize call numbers dialled from other telephones connected on the same line.

8. Telephone according to any one of the previous claims, characterized in that it comprises a processor and means of receiving programming signals through the telephone line, to be downloaded into the processor memory such that the processor becomes capable of restoring the memorized data or indicated data depending on the state of the line.

9. Set of at least two telephones including one telephone according to any one of the previous claims
and one telephone without memorization or indication means.

10. Telephone as described herein with reference to the embodiments as illustrated in the accompanying drawings.

11. Set of at least two telephones as described herein with reference to the embodiments as illustrated in the accompanying drawings.

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