(12) PATENT
(19) AUSTRALIAN PATENT OFFICE

(11) Application No. **AU 199955960 B2**
(10) Patent No. **723629**

(54) Title

Apparatus and method for providing music-on-hold service in key telephone system

(51)[6] International Patent Classification(s)
H04M 011/08

(21) Application No: 199955960

(22) Application Date: 1999.10.20

(30) Priority Data

(31) Number	(32) Date	(33) Country
44748/98	1998.10.24	KR
22901/99	1999.06.18	KR

(43) Publication Date : 2000.05.25
(43) Publication Journal Date : 2000.05.25
(44) Accepted Journal Date : 2000.08.31

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(56) Related Art

US 5920616
GB 2318251
JP 07-312778

ABSTRACT OF THE DISCLOSURE

An apparatus and method for providing a music-on-hold service in a key telephone system, in which a previously set one of central office line ports included in a central office line circuit an external music-on-hold melody source. An incoming call externally received via said central office line circuit is connected to the central office line port coupled to the external music-on-hold melody source when an extension associated with the incoming call is busy, thereby controlling the previously recorded music-on-hold melody to be transmitted for the music-on-hold service.

AUSTRALIA

Patents Act 1990

COMPLETE SPECIFICATION

STANDARD PATENT

Applicant(s):

SAMSUNG ELECTRONICS CO., LTD.

Invention Title:

APPARATUS AND METHOD FOR PROVIDING MUSIC-ON-HOLD SERVICE IN KEY TELEPHONE SYSTEM

The following statement is a full description of this invention, including the best method of performing it known to me/us:

APPARATUS AND METHOD FOR PROVIDING MUSIC-ON-HOLD SERVICE IN KEY TELEPHONE SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a key telephone system, and more particularly to an apparatus and method for providing a music-on-hold (MOH) service in a key telephone system.

2. Description of the Related Art

Generally, a key telephone system has an MOH function for providing a service for transmitting an MOH melody, previously recorded, to an originator of an incoming call via a melody transmitter equipped in the key telephone system when the incoming call is conversed into a designated extension or central office line called by the incoming call or when an extension called by the incoming call is busy. As the originator of the incoming call hears the transmitted melody, he can recognize the state in which the calling signal is conversed into the designated extension or central office line or the extension is busy. By virtue of such an MOH melody, he will perhaps experience reduced tediousness while waiting until the called central office line or extension is connected to him.

In order to provide such a convenient MOH service, conventional key telephone systems should have separate hardware such as the above mentioned music transmitter. In addition, it is also necessary to use separate jacks. Due to such a hardware requirement, an increase in the costs occurs. Furthermore, it is required to reduce the number of subscriber's line for such an MOH service.

SUMMARY OF THE INVENTION

Accordingly, an object of the invention is to provide an apparatus and method for providing an MOH service in a key telephone system, which are capable of providing the MOH service without using any separate hardware such as an MOH melody transmitter.

In accordance with one aspect, the present invention provides An apparatus for providing a music-on-hold service in a key telephone system, comprising: a central office line circuit for seizing a central office line, thereby forming a central office communication loop; an external music-on-hold melody source connected to a previously set one of central office line ports included in said central office line circuit, said external music-on-hold melody source serving to transmit a music-on-hold melody, previously recorded, to said central office line port connected thereto for said music-on-hold service; and a control unit for connecting an incoming call externally received via said central office line circuit to said central office line port coupled to said external music-on-hold melody source when a central office line

or extension associated with said incoming call is busy, thereby controlling said previously recorded music-on-hold melody to be transmitted.

In accordance with another aspect, the present invention provides a method for providing a music-on-hold service in a key telephone system connected to an external music-on-hold service via a central office line port, comprising the steps of: (a) checking, in response to an incoming call externally received to said key telephone system via a central office line circuit, whether or not a central office line or extension associated with said incoming call is busy; (b) if it is determined at said step (a) that said central office line or extension is busy, then checking whether or not a music-on-hold service for said key telephone system has been set; and (c) if it is determined at said step (b) that said music-on-hold service has been set, then connecting said incoming call to said central office line port coupled to said external music-on-hold service, and transmitting a music-on-hold melody previously recorded for said music-on-hold service.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects, features and advantages of the present invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings in which:

Fig. 1 is a block diagram illustrating a key telephone system equipped with an external MOH melody source in accordance with an embodiment of the present invention;

Fig. 2 is a flow chart illustrating a procedure for allocating a selected one of office line ports as a port for transmitting an MOH melody from the external MOH melody source in accordance with an embodiment of the present invention; and

Fig. 3 is a flow chart illustrating a procedure for transmitting an MOH melody through the central office line port connected to the external MOH melody source in accordance with an embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

In the following description made in conjunction with preferred embodiments of the present invention, a variety of specific details such as various concrete processing flows are described. The description of such details has been made only for a better understanding of the present invention. Those skilled in the art will appreciate that the present invention can be implemented without using the above mentioned specific details. In the following description of the present invention, a detailed description of known functions and configurations incorporated herein will be omitted when it may make the subject matter of the present invention rather unclear.

Fig. 1 is a block diagram illustrating the configuration of a key telephone system according to an embodiment of the present invention. Referring to Fig. 1, a control unit 108 is illustrated which performs a call switching control while controlling the entire operation of the key telephone system to provide a variety of

services to users. A memory 110 is also provided which includes a read only memory (ROM) stored with programs for executing a basic calling and other functions along with initial service data. The memory 110 also includes a random access memory for temporarily storing data generated during the execution of a selected one of the programs stored in the ROM. A switching unit 102 operates to switch various signals used in the key telephone system under the control of the control unit 108. Also, there is a subscriber circuit 104 which serves to supply communication current to subscriber's telephone sets (not shown) under the control of the control unit 108. The subscriber circuit 104 also interfaces signals between the switching unit 102 and the subscriber's telephone sets. A ring generator 106 generates a ring signal to be supplied to the subscriber circuit 104. Under the control of the control unit 108, a central office line circuit 112 seizes a selected one of central office lines to form a central office communication loop. The central office line circuit 112 also serves to interface signals between the switching unit 102 and the central office lines. Each central office line connects the central office line circuit 102 to an associated central office. A dual tone multi-frequency (DTMF) receiver 114 receives a DTMF signal from the switching unit 102 and analyzes the received DTMF signal, thereby converting the DTMF signal into digital data. The digital data from the DTMF receiver 114 is sent to the control unit 108. The DTMF signal supplied to the DTMF receiver 114 is indicative of a telephone number sent from a central office subscriber or a telephone number sent from an extension subscriber. A DTMF transmitter 116 is also provided which serves to convert digital data output from the control unit 108 into a DTMF signal. The DTMF signal from the DTMF transmitter 116 is sent to the switching unit 102.

The DTMF signal transmitted from the DTMF transmitter 116 is indicative of a central office subscriber's telephone number generated when a call is made from an extension subscriber to call a central office subscriber. An external MOH melody source 118 is coupled to a port, not used, of the central office line circuit. The external MOH melody source 118 serves to transmit an MOH melody, such as music previously recorded, in response to an incoming call associated with an extension or central office line being in a busy state.

Fig. 2 is a flow chart illustrating a procedure for allocating a selected one of office line ports as a port for transmitting an MOH melody from the external MOH melody source in accordance with an embodiment of the present invention. The routine of Fig. 2 is programmed in the memory 110 so that it is executed under the control of the control unit 108 shown in Fig. 1. Now, this procedure will be described in detail, in conjunction with Figs. 1 and 2.

When a program mode key from a key telephone system operator is input to set a spare one, not used, of central office ports as a port for the MOH melody source in order to provide an MOH service, the control unit 108 controls the procedure to proceed from step 200 to step 202 in response to the program mode key. At step 202, a program mode is set. In the program mode, the operator can selectively set conditions of various optional functions provided to the key telephone system. In this case, the operator selects, at step 202, an MOH melody transmitting function in order to implement an MOH service. In response to the selection of the MOH melody transmitting function, the control unit 108 controls

the procedure to proceed step 204 to step 206. At step 206, the control unit 108 receives from the operator the number of a central line port to conduct the MOH service. The control unit 108 then controls the procedure to proceed to step 208, thereby setting the port corresponding to the received port number as a port to be connected to the external MOH melody source 118. At step 210, it is then checked whether or not a setting completion key for completing the setting of the central line port for the MOH service is input. Where no setting completion key input is detected, the control unit 108 controls the procedure to return to step 206 in order to receive a port number. On the other hand, when the setting completion key input is detected, this procedure for setting a central line port for the external MOH melody source 118 is completed.

Fig. 3 is a flow chart illustrating a procedure for transmitting an MOH melody through the central office line port connected to the external MOH melody source in accordance with an embodiment of the present invention. The routine of Fig. 3 is programmed in the memory 110 so that it is executed under the control of the control unit 108 shown in Fig. 1. Now, this procedure will be described in detail, in conjunction with Figs. 1 and 3.

The control unit 108 controls the procedure to proceed from step 300, at which the control unit 108 waits for an incoming call, to step 302. At step 302, the control unit 108 checks whether or not there is an incoming call received from the outside. Where there is an incoming call received from the outside, the control unit 108 controls the procedure to proceed from step 302 to step 304. At step 304,

it is checked whether or not the extension or central office line associated with the incoming call is busy. Where the extension or central office line associated with the incoming call is not busy, the control unit 108 controls the procedure to proceed to step 316. At step 316, the control unit 108 transmits a ring signal to the associated extension or central office line in a conventional fashion in order to allow communications between the originating subscriber and the terminating subscriber of the associated extension or central office line.

When it is determined at step 304 that the extension or the central office line associated with the incoming call is busy, the control unit 108 controls the procedure to proceed to step 306. At step 306, it is determined whether or not the MOH service has been set. Where the MOH service has not been set, the control unit 108 controls the procedure to proceed step 318. At step 318, the control unit 108 executes a control for the incoming call to be simply on standby in a call queue while preventing any MOH melody from being transmitted to the originating subscriber.

When it is determined at step 306 that the MOH service has been set, the control unit 108 controls the procedure to proceed step 308. At step 308, it is determined whether the MOH melody source set for the MOH service is the external MOH melody source 118 or an internal MOH melody source (not shown). The external MOH melody source 118 may include a music playback device such as a CD player or a cassette player. The internal MOH melody source may be a card type melody IC conventionally mounted in a slot of the key telephone system

to provide an MOH service. Where the MOH melody source set for the MOH service is the external MOH melody source 118, the control unit 108 controls the procedure to proceed to step 312. At step 312, a melody output from the external MOH melody source 118 is transmitted to the originating subscriber via the central office line port connected to the external MOH melody source 118. The MOH melody played back from the external MOH melody source 118 is to reduce tediousness which the originating subscriber experiences while waiting until the called central office line is connected to him. This MOH melody may be a melody of popular music or classic music or a speech message or melody recorded for public information about the company. Thus, the originating subscriber can hear the MOH melody while waiting until the called terminating subscriber is connected to him.

Where the MOH source set for the MOH source is the internal MOH melody source, the control unit 108 controls the procedure to proceed to step 314. At step 314, a melody output from the internal MOH melody source is transmitted to the originating subscriber in a conventional fashion.

As apparent from the above description, the present invention provides a key phone system capable of allocating a central office line port, not used, as a port for the MOH service, thereby eliminating a requirement to provide additional hardware for the MOH service. Accordingly, there is a reduction in the costs. The present invention also provides an advantage in that it solves a reduction in the number of available subscriber's lines in conventional key telephone systems due to the fact

that the hardware equipped for the MOH service should occupy a separate slot.

In accordance with the present invention, it is also possible to provide a variety of MOH melodies, as compared to the case using the conventional internal MOH melody source.

While this invention has been described in connection with what is presently considered to be the most practical and preferred embodiment, it is to be understood that the invention is not limited to the disclosed embodiment, but, on the contrary, it is intended to cover various modifications within the spirit and scope of the appended claims.

For the purposes of this specification it will be clearly understood that the word "comprising" means "including but not limited to", and that the word "comprises" has a corresponding meaning.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An apparatus for providing a music-on-hold service in a key telephone system, comprising:

a central office line circuit for seizing a central office line, thereby forming a central office communication loop;

an external music-on-hold melody source connected to a previously set one of central office line ports included in said central office line circuit, said external music-on-hold melody source serving to transmit a music-on-hold melody, previously recorded, to said central office line port connected thereto for said music-on-hold service; and

a control unit for connecting an incoming call externally received via said central office line circuit to said central office line port coupled to said external music-on-hold melody source when a incoming call is conversed into a designated extension or central office line or the extension associated with said incoming call is busy, thereby controlling said previously recorded music-on-hold melody to be transmitted.

2. A method for providing a music-on-hold service in a key telephone system connected to an external music-on-hold service via a central office line port, comprising the steps of:

(a) checking, in response to an incoming call externally received to said key telephone system via a central office line circuit, whether or not an extension or central office line associated with said incoming call is busy;

(b) if it is determined at said step (a) that said extension is busy, then checking whether or not a music-on-hold service for said key telephone system has been set; and

(c) if it is determined at said step (b) that said music-on-hold service has been set, then connecting said incoming call to said central office line port coupled to said external music-on-hold service, and transmitting a music-on-hold melody previously recorded for said music-on-hold service.

Dated this 20th day of October 1999
SAMSUNG ELECTRONICS CO., LTD.
By their Patent Attorneys
GRIFFITH HACK
Fellows Institute of Patent and
Trade Mark Attorneys of Australia

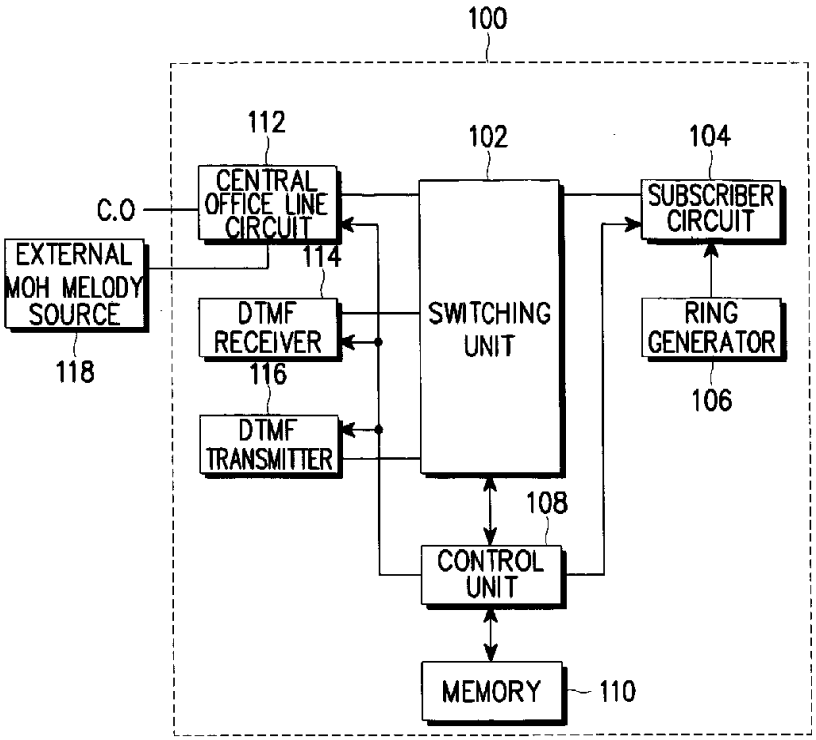
100
112
CENTRAL OFFICE LINE CIRCUIT
C.O
EXTERNAL MOH MELODY SOURCE
118
114
DTMF RECEIVER
116
DTMF TRANSMITTER
102
SWITCHING UNIT
104
SUBSCRIBER CIRCUIT
RING GENERATOR
106
108
CONTROL UNIT
MEMORY
110

FIG. 1

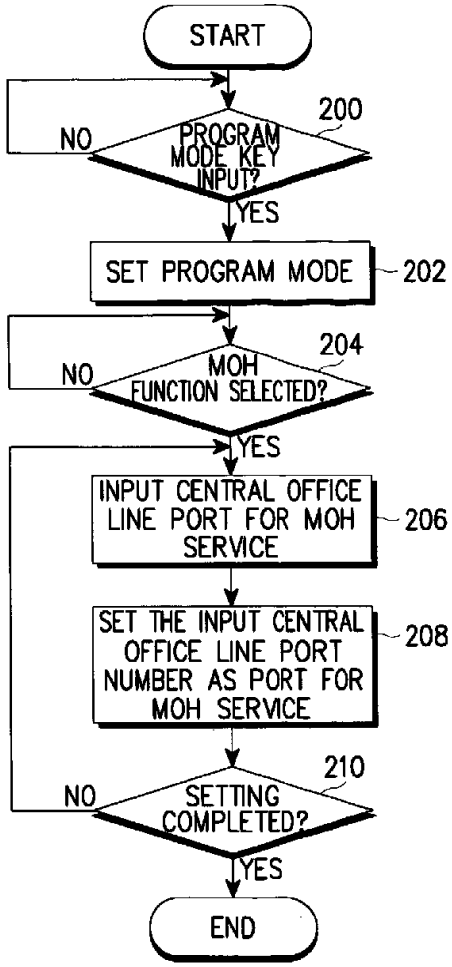
START
200
NO
PROGRAM MODE KEY INPUT?
YES
SET PROGRAM MODE
202
204
NO
MOH FUNCTION SELECTED?
YES
INPUT CENTRAL OFFICE LINE PORT FOR MOH SERVICE
206
SET THE INPUT CENTRAL OFFICE LINE PORT NUMBER AS PORT FOR MOH SERVICE
208
210
NO
SETTING COMPLETED?
YES
END

FIG. 2

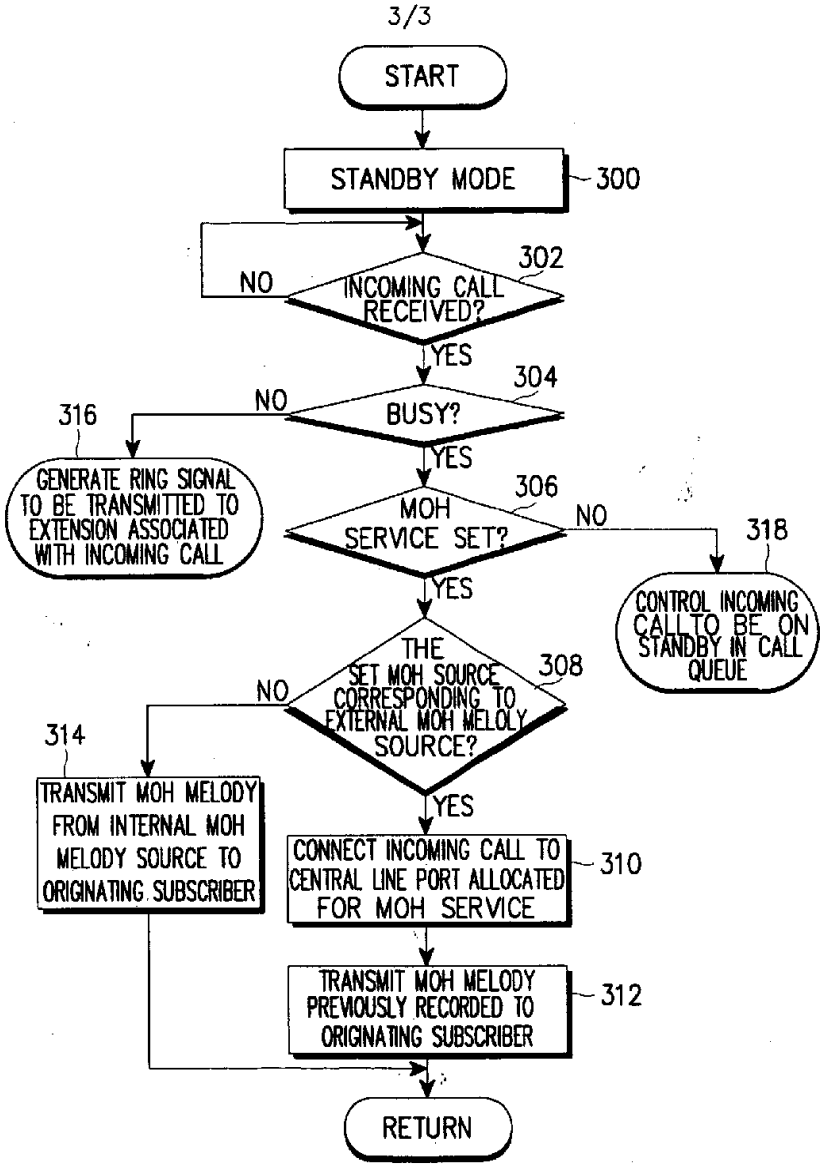
START
STANDBY MODE
300
302
NO
INCOMING CALL RECEIVED?
YES
304
NO
BUSY?
316
YES
GENERATE RING SIGNAL TO BE TRANSMITTED TO EXTENSION ASSOCIATED WITH INCOMING CALL
306
MOH SERVICE SET?
NO
318
CONTROL INCOMING CALL TO BE ON STANDBY IN CALL QUEUE
YES
THE SET MOH SOURCE CORRESPONDING TO EXTERNAL MOH MELODY SOURCE?
308
NO
314
TRANSMIT MOH MELODY FROM INTERNAL MOH MELODY SOURCE TO ORIGINATING SUBSCRIBER
YES
CONNECT INCOMING CALL TO CENTRAL LINE PORT ALLOCATED FOR MOH SERVICE
310
TRANSMIT MOH MELODY PREVIOUSLY RECORDED TO ORIGINATING SUBSCRIBER
312
RETURN

FIG. 3