

United States Patent [19]

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Vallillee et al.

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- [54] **WIRELESS TELEPHONE REMOTE CONTROL SYSTEM**
- [75] **Inventors:** George W. Vallillee, Kentwood; James F. MacKay, Grand Rapids, both of Mich.
- [73] **Assignee:** Datalogic Corporation, Grand Rapids, Mich.

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[21] Appl. No.: 139,264

[22] Filed: Oct. 18, 1993

[51] Int. Cl.⁶ H04M 11/00

[52] U.S. Cl. 379/352; 355/57; 355/58; 355/61

[58] **Field of Search** 379/352, 355, 379/58, 356, 354, 357, 216

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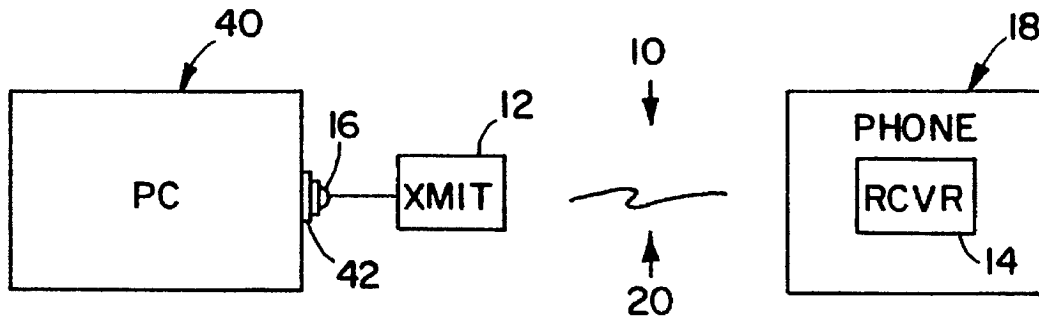
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Assistant Examiner—Jacques M. Saint-Surin
Attorney, Agent, or Firm—Warner Norcross & Judd

[57] **ABSTRACT**

A telephone remote control system for direct control of the dialing sequence of a telephone from a personal computer. The remote control system includes an RF transmitter unit mounted on a personal computer and an RF receiver unit within a phone. The transmitter receives dialing commands from a personal computer and transmits those commands to a receiver unit via an RF signal. The receiver unit receives the dialing commands from the transmitter unit and directly controls the dialing sequence of the telephone.

18 Claims, 3 Drawing Sheets



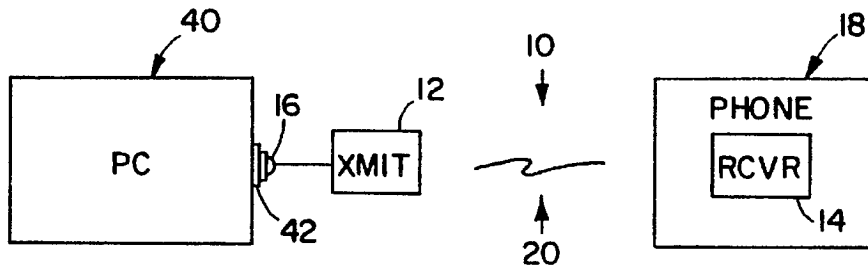


FIG. 1

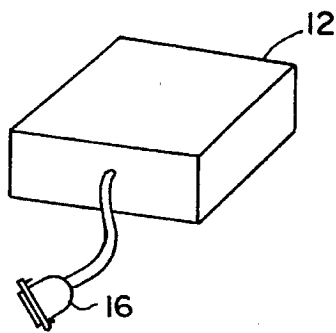


FIG. 2

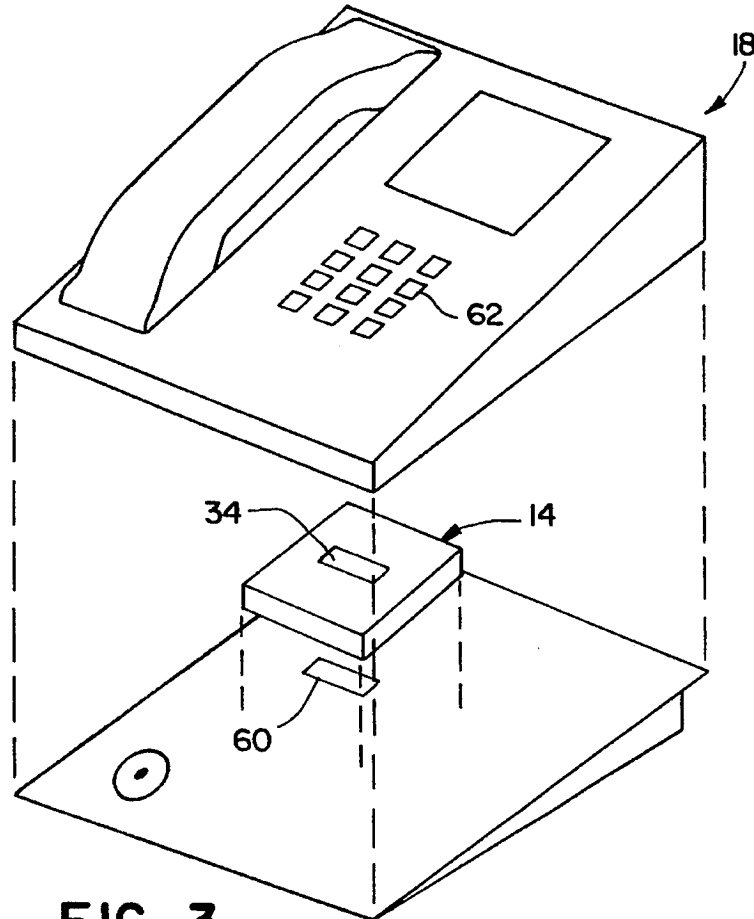


FIG. 3

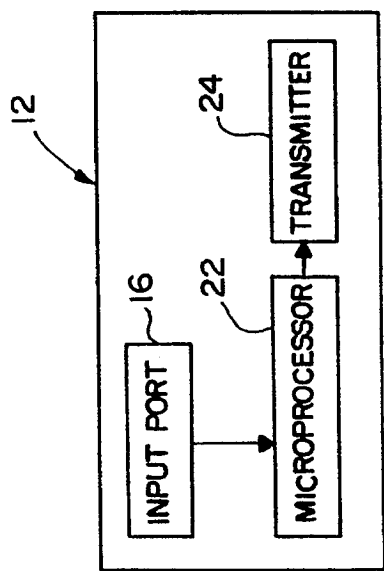


FIG. 4

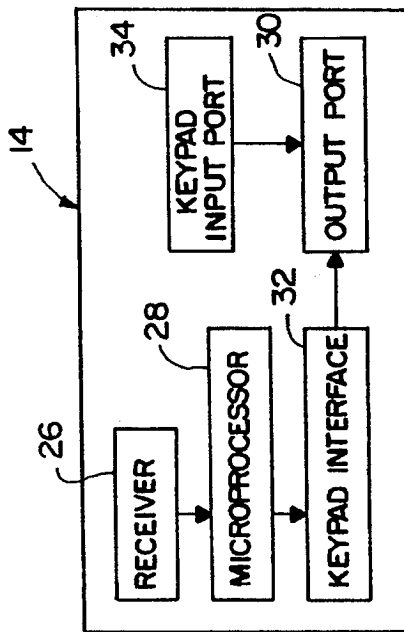


FIG. 5

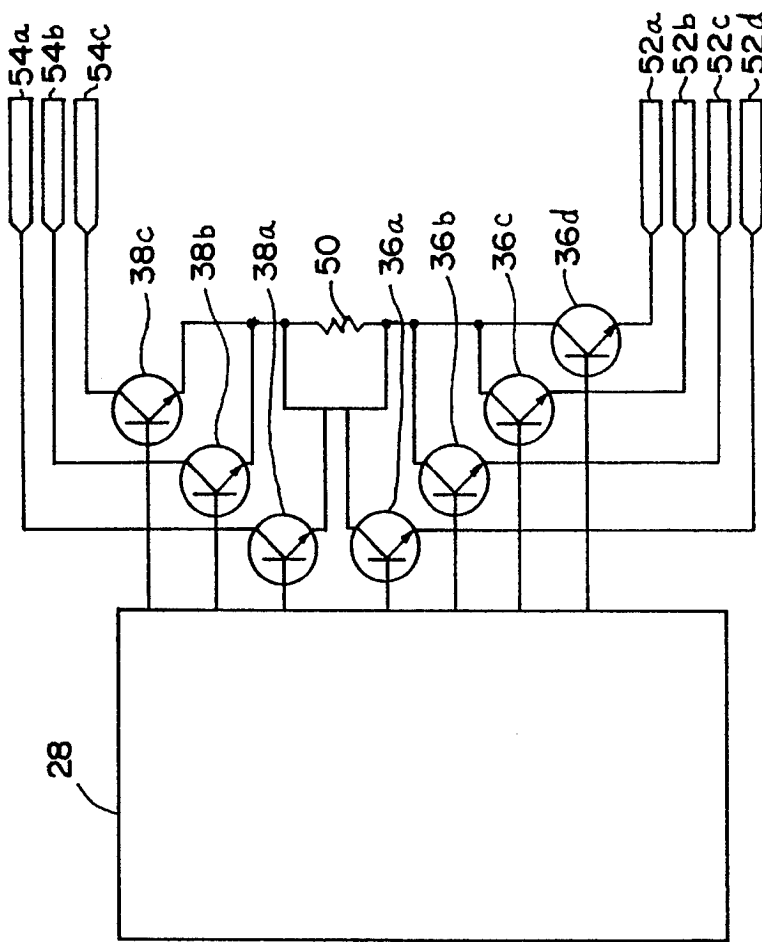


FIG. 7

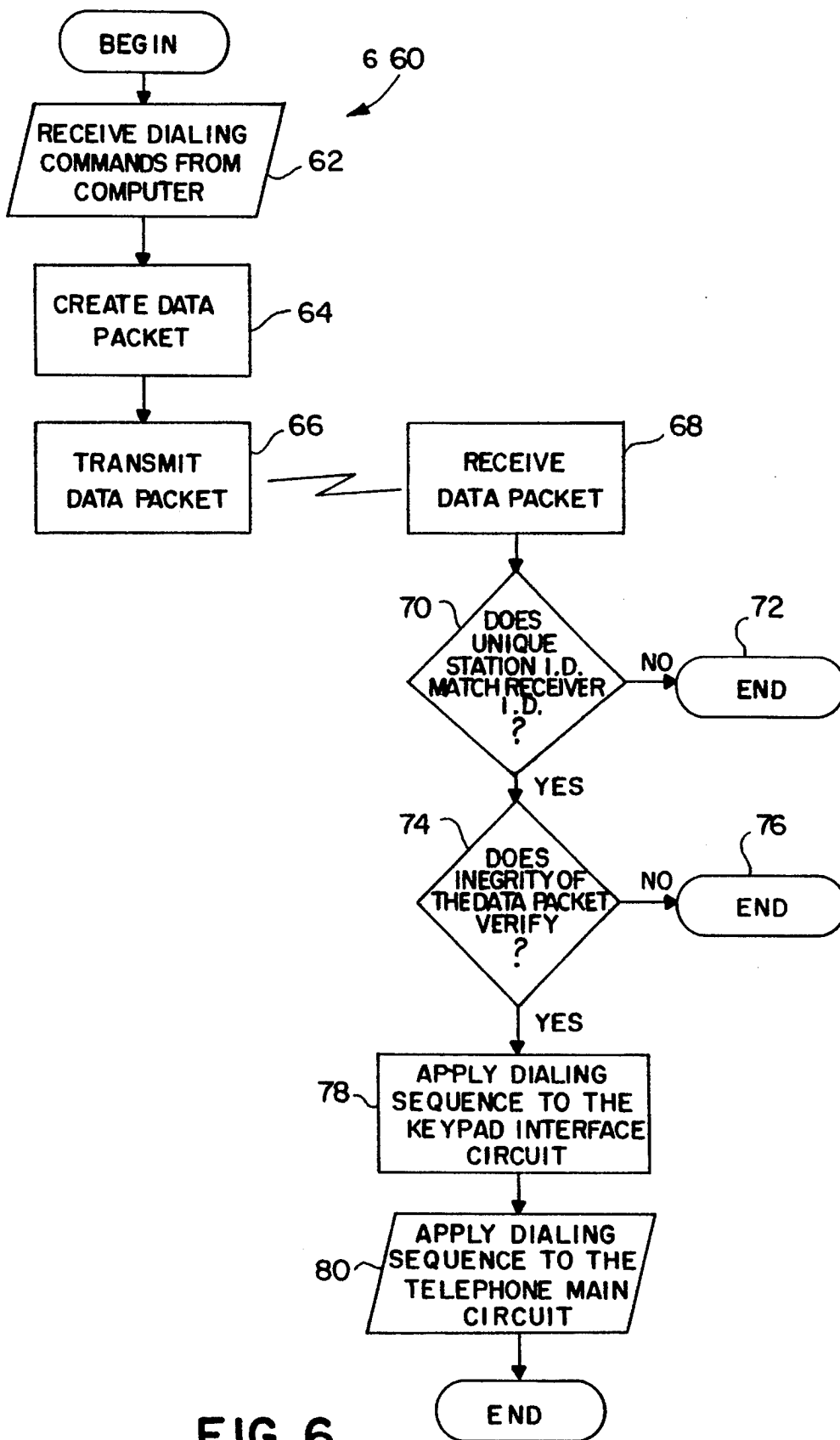


FIG. 6

WIRELESS TELEPHONE REMOTE CONTROL SYSTEM

BACKGROUND OF THE INVENTION

The present invention relates to a telephone remote control system.

Computers are often used to maintain extensive data bases which may include records for customers, suppliers, clientele and more. The data bases often store the telephone number(s) of the individuals contained in each of these records. To fully exploit the information stored in these data bases, it is desirable to have the ability to automatically dial the stored telephone numbers directly from the computer. There are a variety of methods for achieving this type of computer autodialing.

First, some telephone manufacturers have provided an RS-232 interface on their telephone work stations for autodialing and other telephone/PC control functions. This method is relatively expensive and the selection of telephones including such an interface is limited.

Second, computer autodialing can be achieved through the use of a modem connected to a dedicated line with an auxiliary single line telephone attached to the modem for voice transmission. This method adds the expense of a dedicated line and results in the inability to use the primary phone and its features.

Third, some computer users have attempted to avoid the need for a dedicated line by purchasing a voice/data switch for manually or automatically switching a single line between voice and digital transmission. Voice/data switches such as "Intelemate II," available from Datalogic Corporation of Grand Rapids, Mich., pass DTMF tones from a modem through the PBX to the telephone company central office. However, it has been found that some PBXs and telephone company central offices are unable to recognize analog DTMF tones for addressing instructions. Further, the cost of a voice/data switch and a modem make this alternative economically undesirable.

Finally, a computer operated system for dialing telephone numbers is disclosed in U.S. Pat. No. 4,868,848 issued Sep. 19, 1989 to Magnusson et al. This system includes a dialing circuit coupled to the printer port of the computer. The dialing circuit provides DTMF dialing signals to an existing telephone line. This system only functions with PBXs and telephone company central offices that recognize analog DTMF tones.

SUMMARY OF THE INVENTION

The aforementioned problems are overcome by the present invention wherein a wireless telephone remote control system provides direct wireless control of the dialing sequence of a telephone from a personal computer. The system includes a transmitter unit to be mounted on a computer and a receiver unit mounted within the controlled phone. The transmitter unit mounts on and receives signals through the serial port of a personal computer. The transmitter unit recognizes standard Hayes "AT" command set instructions and appears to the computer to be a modem. This allows the system to be driven by any of a multitude of autodialing software packages available on the market today. The transmitter unit receives dialing instructions from the computer and forms a data packet including a unique station identifier, the digits to be dialed, and a checksum to

validate the data. The data packet is then transmitted using conventional wireless RF technology.

The receiver unit is connected internally to the telephone's main circuit and directly controls the dialing sequence of the telephone while still allowing use of the telephone's manual key pad. The receiver unit receives the data packet transmitted by the transmitter unit, verifies that the data packet is directed to that unit, verifies the integrity of the data packet, and then sends the appropriate dialing sequence to the telephone's main circuit.

In this manner, the present invention provides a simple and effective means for remote control of a telephone from a personal computer without the need for a modem or a dedicated line. The wireless technology used to communicate with the receiver unit eliminates the need for unsightly, unmanageable and restrictive hard wiring. Further, direct control of the existing telephone renders the system compatible with all PBXs and telephone company central offices regardless of whether they recognize DTMF tones. Finally, the system allows full use of the existing telephone's functions and features.

These and other objects, advantages, and features of the invention will be more readily understood and appreciated by reference to the detailed description of the preferred embodiment and the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of the present invention;

FIG. 2 is a perspective view of a transmitter unit of the present invention;

FIG. 3 is an exploded perspective view showing the installation of a receiver unit in a conventional telephone;

FIG. 4 is a block diagram of a transmitter unit;

FIG. 5 is a block diagram of a receiver unit;

FIG. 6 is a flow chart of the primary steps involved in the present invention; and

FIG. 7 is a schematic diagram of the keypad interface circuit.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The wireless telephone remote control system of the present invention is illustrated in FIG. 1, and generally designated 10. The remote control system includes a transmitter unit 12 and a receiver unit 14, which comprise a pair (see FIGS. 2 and 3). Each transmitter unit 12 and receiver unit 14 pair are assigned matching unique station identifiers which enable remote control commands to be addressed to the proper telephone.

I. Transmitter Unit

As shown in FIG. 4, the transmitter unit 12 generally includes a microprocessor 22, a transmitter 24 and an RS-232 input port 16. The RS-232 input port 16 allows the transmitter unit 12 to interface with a personal computer 40 via a standard RS-232 COM port, such as the computer's serial port 42.

The microprocessor 22 is interfaced with and receives 62 command instruction from the computer 40 through the RS-232 input port 16 in a manner well known to those skilled in the art (see FIGS. 4 and 6). The microprocessor 22 recognizes standard modem commands and is of a type well known to one skilled in the art. One such microprocessor is the "PIC 16C57" manufactured by Microchip, which is compatible with standard Hayes "AT" code. As a result of

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