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Guadara et al.

[11] **3,906,472**

[45] **Sept. 16, 1975**

[54] **VEHICLE SAFETY AND CRIME DETERRENT COMMUNICATION SYSTEM**

[75] Inventors: **Joseph G. Guadara; William R. Wesserling,** both of North Bergen, N.J.

[73] Assignee: **Sav-A-Life Corporation,** Union City, N.J.

[22] Filed: **June 26, 1974**

[21] Appl. No.: **483,459**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 290,264, Sept. 18, 1972, abandoned.

[52] **U.S. Cl.**..... **340/224;** 179/1 SW; 325/117; 340/52 R

[51] **Int. Cl.²**..... **H04B 01/44;** G08B 25/00

[58] **Field of Search**..... 340/224, 277, 52 R; 325/111, 117, 118, 15, 16; 179/1 SW, 1 HF, 179/1 VE, 1 PC

[56] **References Cited**

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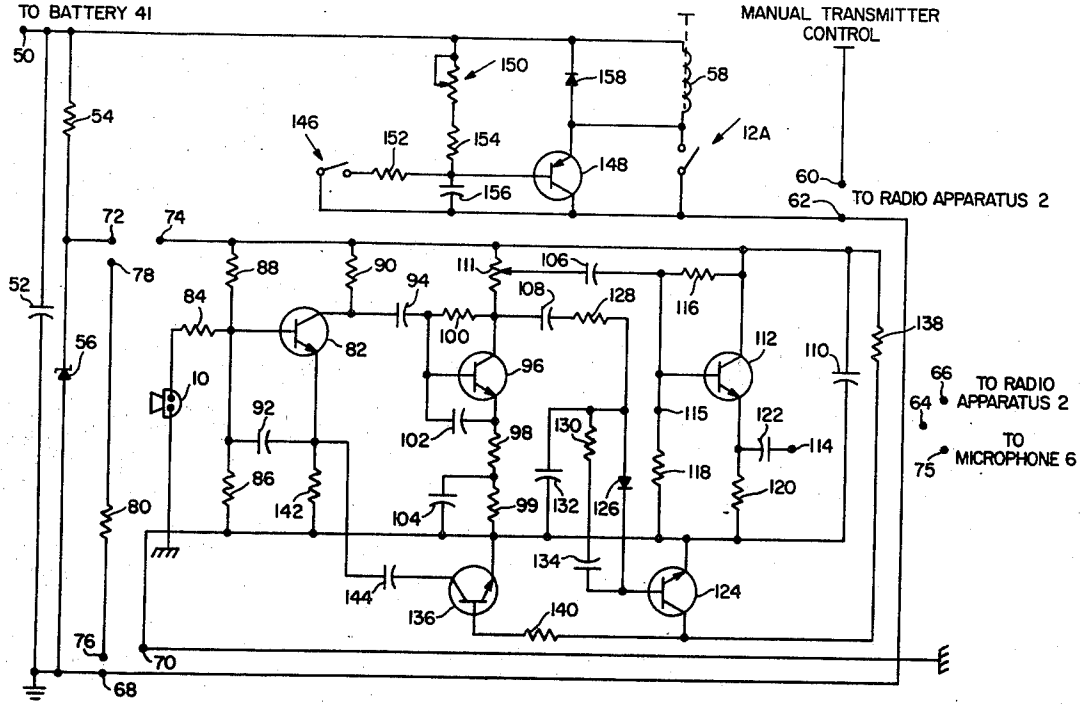
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Primary Examiner—Donald J. Yusko
Attorney, Agent, or Firm—Anthony F. Cuoco

[57] **ABSTRACT**

For use in a vehicle having radio equipment including at least a microphone and a transmitter, apparatus including a second microphone and an adapter for connecting both of said microphones to the transmitter. Switching means are arranged for selectively operating the second microphone, with the switching means and second microphone being disposed for operation without compromising vehicle control and for operation during a distress situation such as a hold-up or the like. Circuitry is provided for enhancing operation of the apparatus by providing timing, amplification, noise suppression and impedance matching functions.

7 Claims, 4 Drawing Figures



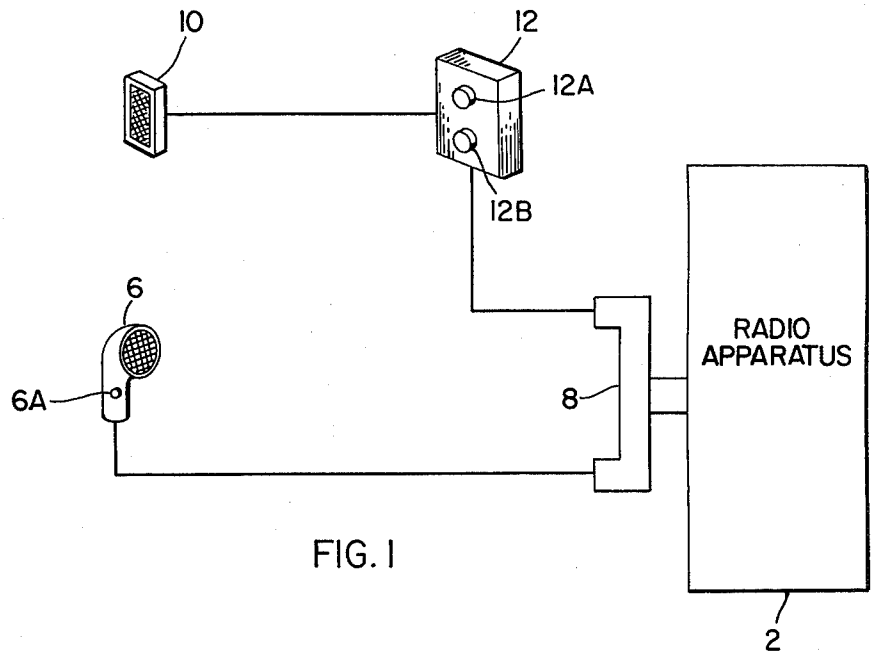

10
12
12A
12B
6
6A
8
RADIO APPARATUS
2

FIG. 1

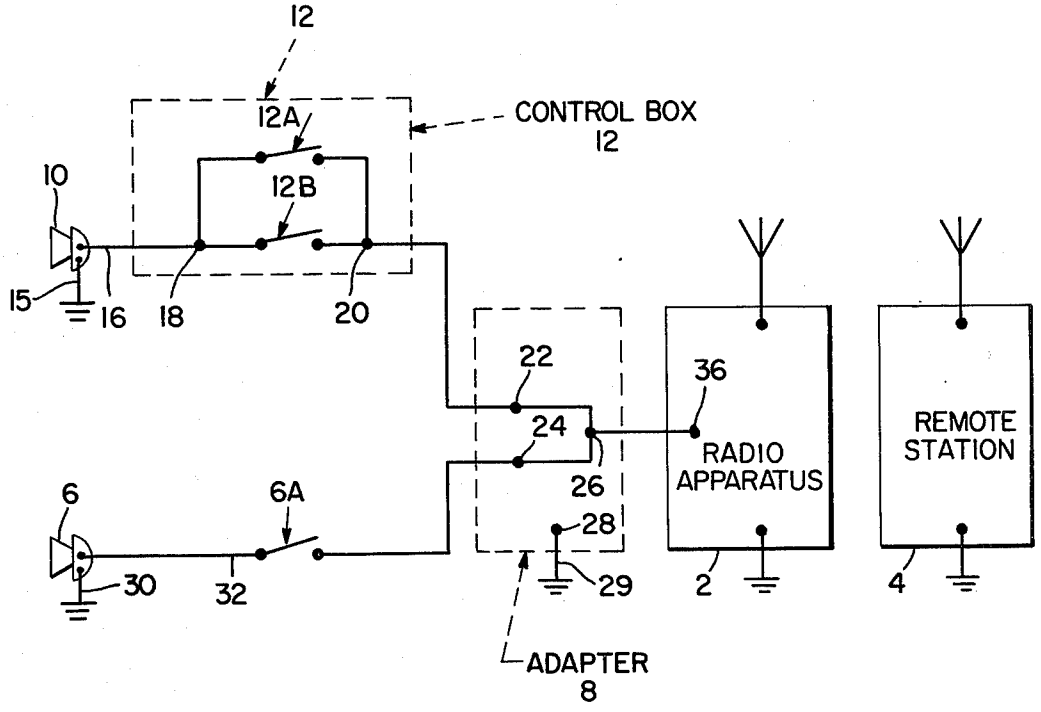

12
12A
CONTROL BOX 12
12B
10
15
16
18
20
22
24
26
36
RADIO APPARATUS
REMOTE STATION
6
6A
30
32
28
29
2
4
ADAPTER 8

FIG. 2

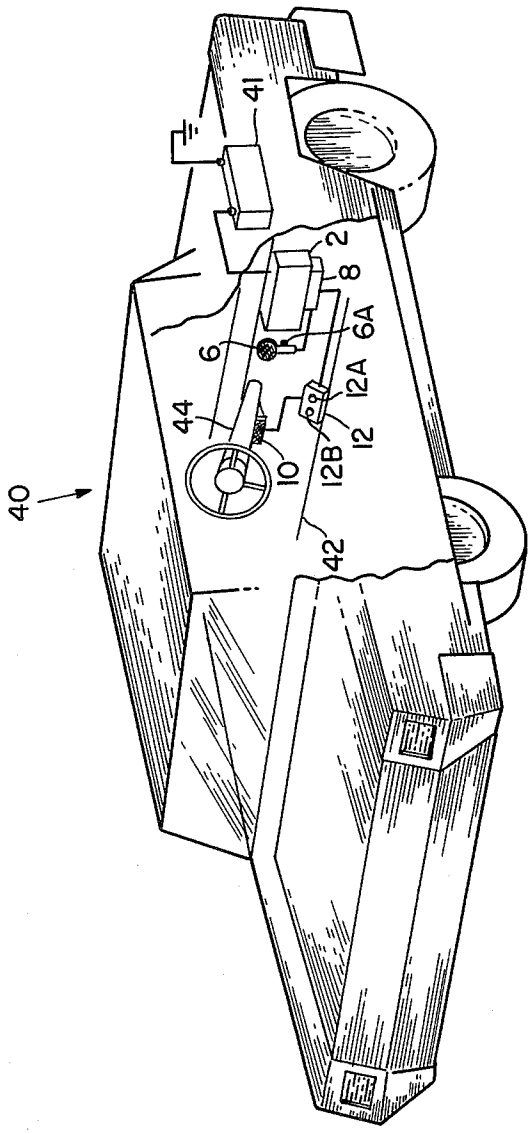


FIG. 3

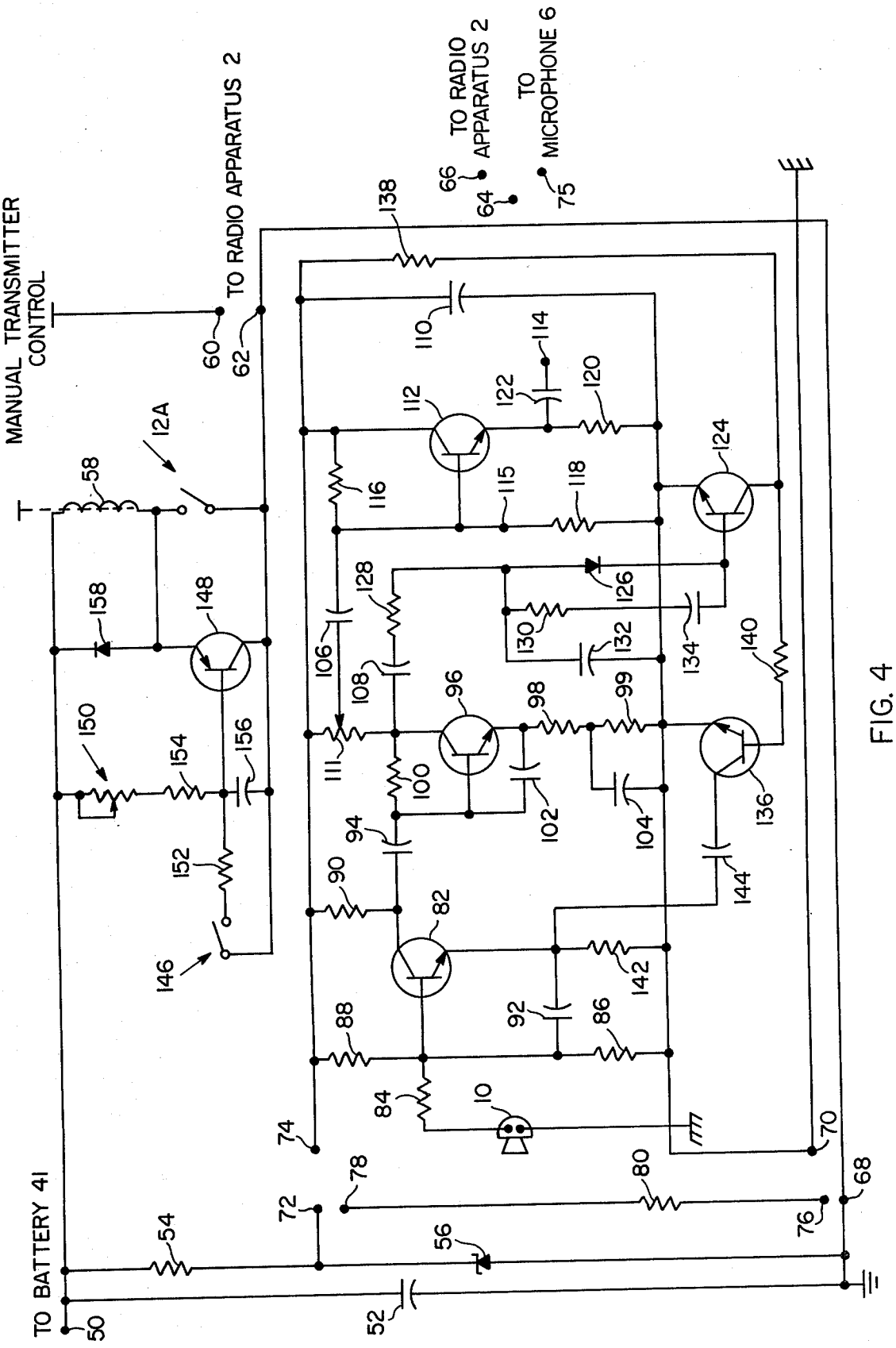

MANUAL TRANSMITTER CONTROL
TO RADIO APPARATUS 2
TO RADIO APPARATUS 2
TO MICROPHONE 6
TO BATTERY 41
12A
10
50
52
54
56
58
60
62
64
66
68
70
72
74
75
76
78
80
82
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86
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156
158

FIG. 4

VEHICLE SAFETY AND CRIME DETERRENT COMMUNICATION SYSTEM

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of U.S. Application Ser. No. **290,264** filed Sept. **18, 1972** and now abandoned.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to vehicle safety and crime deterrent communication systems and, particularly, to communications systems of the type described using radio equipment. More particularly, this invention relates to vehicle radio communications systems which may be operated without compromising vehicle control and which may be operated surreptitiously in a distress situation.

2. Description of the Prior Art

Taxicabs, trucks and emergency vehicles carry radio equipment for communications purposes. In order for the driver of the vehicle to communicate with a remote station he must grasp a microphone in his hand and operate a transmitting switch. In heavy traffic or during hazardous driving conditions, or during high speed turnpike driving such as may be the case for trucks, this would well compromise vehicle control and hence safety.

Additionally, vehicles such as cargo trucks and taxicabs are particularly prone to highjacking or hold-up attempts. By arranging the apparatus of the invention for surreptitious operation the chances for frustrating these attempts are enhanced.

While prior art devices such as described in U.S. Pat. No. **1,993,497** issued in **1935** to Wells and U.S. Pat. No. **3,461,423** issued in **1969** to Trumble are directed to distress situations such as those described, they require complicated equipment and elaborate installation thereof. The system of the invention utilizes existing radio equipment modified to an insignificant extent to accomplish its purpose.

SUMMARY OF THE INVENTION

This invention contemplates a vehicle communication system including radio equipment having at least a transmitter, and first and second microphones and an adapter for connecting the microphones to the transmitter. The first microphone is operated in a conventional manner for overt transmission while the second microphone is arranged for transmission without compromising vehicle control and for surreptitious or covert transmission so as not to attract the attention of an intruder. Circuitry is provided for applying time control and amplification functions to the system when the second microphone is used, as well as for surppressing undesirable noise and matching the microphone impedance to the impedance of the radio equipment being used.

One object of this invention is to provide a vehicle communication system having dual modes of communications, i.e., overt communication and surreptitious communication.

Another object of this invention is to provide a vehicle communication system which is operable without compromising vehicle control and which is surreptitiously operable so as not to attract the attention of a perpetrator of the crime against the vehicle.

Another object of this invention is to provide a system of the type described which uses existing radio equipment in the vehicle.

Another object of this invention is to provide a system of the type described which is simple in construction and easy to install as compared to prior art devices for the purposes intended.

Another object of this invention is to include in a system of the type described circuitry for providing timing, amplification, noise suppression and impedance matching characteristics.

The foregoing and other objects and advantages of the invention will appear more fully hereinafter from a consideration of the detailed description which follows, taken together with the accompanying drawings wherein a preferred embodiment of the invention is illustrated by way of example. It is to be expressly understood, however, that the drawings are for illustration purposes only and are not to be construed as defining the limits of the invention.

DESCRIPTION OF THE DRAWINGS

In the figures, wherein corresponding numerals indicate corresponding parts:

FIG. **1** is a schematic representation showing the components of the invention and their relation to each other.

FIG. **2** is an electrical schematic diagram of the invention.

FIG. **3** is a partially pictorial-partially schematic representation showing an implementation of the invention.

FIG. **4** is an electrical schematic diagram showing circuitry according to the invention.

DESCRIPTION OF THE INVENTION

With reference first to FIG. **1**, the invention features radio apparatus **2** which includes at least a transmitter, but in the preferred embodiment of invention is a conventional two-way radio such as carried by taxicabs, trucks and emergency vehicles and the like for communication between the aforenoted vehicles and a remote station **4** (FIG. **2**). A microphone **6** is connected to radio apparatus **2** through an adapter **8** and is operable through a normally open switch **6A** mounted on the microphone. A microphone **10** is connected to radio apparatus **2** through a adapter **8** and is operable through a control box **12** having normally open switches **12A** and **12B**.

Microphone **6** is of a commercially available type which is held in the hand when used as is well known in the art. A microphone suitable for the purpose intended is described in the Allied Electronics Catalog **720, 1972,** and carries the trade designation, Model **600E**. Microphone **10** which is also commercially available may be, for reasons which will hereinafter become evident, of the miniature, mountable type such as described idn the aforenoted catalog and carries the trade designation, Model **CA5AJ**.

Control box **12** houses switches **12A** and **12B** which are conventional push button type switches. Switch **12A** is pushed and momentarily closed for operating microphone **10** while switch **12A** is pushed and locked closed to operate the microphone and pushed again and opened. It will be understood that switches **12A**

and 12B may be manually operated or operated by foot, and in the latter case are operated similar to a motor vehicle headlight dimmer switch. Adapter 8 will be next described with reference to FIG. 2.

With reference then to the electrical schematic diagram of FIG. 2, microphone 10 has a grounded conductor 15 and a conductor 17 connected to an input terminal 18 of control box 12. Input terminal 18 is connected through normally open switch 12A to an input terminal 20 of the control box and is connected to output terminal 20 through normally open switch 12B connected in parallel with switch 12A.

Output terminal 20 of control box 12 is connected to an input terminal 22 of adapter 8 and which adapter has another input terminal 24, an output terminal 26 and a terminal 28 having a grounded conductor 29 connected thereto. Microphone 6 has a grounded conductor 30 and a conductor 32 connected to input terminal 24 of adapter 8 through normally open switch 6A.

Input terminals 22 and 24 of adapter 8 are connected to output terminal 26. Output terminal 26 is connected to an input terminal 36 of radio apparatus 2 which may transmit signals to and receive signals from remote station 4.

In communicating with remote station 4, microphone 6 is normally used. That is, the microphone is held in the hand and operated through switch 6A to transmit through radio apparatus 2 to the remote station. When transmission is required without compromising vehicle control or during a distress situation such as a hold-up, microphone 10 is selectively operated through control box 12.

To these ends a specific implementation of the invention is shown in FIG. 3, wherein the device described is carried, for purposes of illustration, in a vehicle 40. Radio apparatus 2 may be powered from vehicle battery 41 and is mounted on or under the dash of vehicle 40 in a conventional manner. Adapter 8 is connected as shown in FIG. 2, as are microphone 6, switch 6A, microphone 10 and switches 12A and 12B. Microphone 6 hooks on the vehicle dash when said microphone is not in use and switch box 12 is shown on the floor board 42 of the vehicle, whereby operation of switches 12A and 12B may be accomplished by foot and without the use of the hands. For operation without the hands microphone 10 is mounted on the steering column 44 of vehicle 40.

With aforegoing description in mind it will now be seen that the heretofore noted objects of the invention are met.

Under hazardous driving conditions or when driving at high speed, communication between vehicle 40 and remote station 4 is accomplished by operating microphone 10 through control box 12. Switch 12A is foot-actuated for being momentarily closed, or for sustained transmission, switch 12B is foot-actuated for being locked closed. The location of microphone 10 and control box 12 makes transmission possible without the use of the hands as will now be understood, and vehicle control is thus not compromised.

In the event of a distress situation such as a hold-up switches 12A or 12B and microphone 10, arranged as shown in FIG. 3, may be surreptitiously operated. Thus, conversations between the perpetrator of the crime and the driver of vehicle 40, which may include instructions, threats and/or commands and the like, are transmitted through microphone 10 to remote station 4 without attracting the attention of the perpetrator. These transmissions may be recorded at remote station 4 to assist perpetrator identification. They may also be used to pinpoint the situs of the crime or otherwise provide a crime deterrent as will now be seen.

It is to be understood that the positions of microphone 10 and control box 12 in vehicle 40 as shown in FIG. 3 are for illustration purposes only and these components may be positioned in other locations to serve the purposes intended. For example, control box 12 may be disposed on steering column 44 so as to enable normal operation, but still without appreciably compromising vehicle control. Likewise microphone 10 may be disposed in any convenient location which might render it hidden to enhance the crime deterrent features of the invention. It is thus within the contemplation of the invention to appropriately mount microphone 10 on the dashboard of vehicle 10.

An important feature of the invention resides in the fact that it may be easily installed with only insignificant modification to the vehicle being required. The crime deterrent features of the invention may be further enhanced by arranging for transmission on predetermined frequencies, whereby distress communications may be intercepted by police agencies for early frustration of the crime.

It will now be understood by those skilled in the art that when microphone 10 is used for communication enhancement of transmission characteristics is often desirable and in some cases necessary. For example, for communication during a distress situation it may be advantageous to impart a time control characteristic to switch 12A. That is to say, when the switch is actuated for being momentarily closed as heretofore described, transmission for a selected interval is achieved and after which interval the switch automatically opens to discontinue transmission. Also signal amplification may be required when transmission is accomplished through microphone 10, depending on the disposition of the microphone as aforenoted. Further, under certain conditions of operation it may be desirable to suppress loud extranous noise levels. Additionally, since radio apparatus 2 may have high or low impedance characteristic, means for matching the impedance of microphone 10 to that of the radio apparatus may be necessary for effective communication. The circuitry shown in FIG. 4 accomplishes these purposes as will next be described.

Thus, as shown in FIG. 4, the circuitry is connected at a point 50 to battery 41 (FIG. 3) which applies for purposes of illustration, +12 volts thereto. This voltage is applied across a filtering capacitor 52. A resistor 54 is serially connected to a zener diode 56, and which elements 54 and 56 are connected in parallel with capacitor 52. Zener diode 56 regulates the applied voltage to a predetermined lesser level while resistor 54 maintains a load across the zener diode when the circuit is in the quiescent state. In this connection it is to be noted that when microphone 6 is used for audio transmission, the circuit of FIG. 4 is inoperative, although operation of microphone 10 overrides operation of microphone 6 as will be hereinafter become evident.

When switch 12A is momentarily closed as heretofore noted with reference to FIGS. 1 and 2, a relay coil 58 is energized for a predetermined interval as will be further explained. The relay coil so energized is operative for connecting circuit points 60 and 62 to turn on radio apparatus 2; for connecting circuit points 64 and

66 to connect the circuitry of FIG. 4 to radio apparatus 2; for connecting circuit points 68 and 70 to ground the circuitry; and for connecting circuit points 72 and 74 to apply power to the circuitry. In this connection it is noted that when relay coil 58 is deenergized, circuit points 64 and 75 are connected to connect microphone 6 to radio apparatus 2 and circuit points 68 and 76 and 72 and 78 are connected to connect a ballast resistor 80 across zener diode 56.

With relay coil 58 energized and microphone 10, which may be an ultra high impedance microphone, used for transmission, the signal from the microphone is applied to an amplifier including a transistor 82, resistors 84, 86, 88, 90 and capacitors 92 and 94. The signal thereform is applied to a second amplifier including a transistor 96, resistors 98, 99, 100 and capacitors 102, 104, 106, 108 and 110. The second amplifier raises the level of the signal from microphone 10 to that from microphone 6. A potentiometer 111 may be used by the vehicle operator to manually adjust the signal level as may be desired, depending on the particular use of the communication system.

As heretofore noted, radio apparatus 2 may be of the high or low impedance type, both of said types being commercially available and in use. The circuitry being described is effective for matching the impedance of microphone 10 to the radio apparatus impedance by employing a stage including a transistor 112, resistors 116, 118 and 120 and a capacitor 122. Thus, if a high impedance input is required circuit points 66 and 115 are manually connected during installation of the system and if a low impedance input is required circuit points 66 and 114 are manually connected to provide the appropriate impedance matching characteristics. This feature of the invention provides versatility in applying the device of the invention to vehicles with one or the other types of radio apparatus as will now be appreciated.

In order to suppress undesirable loud audio levels a stage employing a transistor 124, a diode 126, resistors 128, 130 and capacitors 132 and 134 is employed. A portion of the output from transistor 82 is applied to this stage which provides a signal which, when at some predetermined high level, will cause a stage including a transistor 136, resistors 138, 140, 142 and a capacitor 144 to shunt transistor 82 to effectively suppress the loud audio levels.

In order to provide a timing characteristic to transmission via microphone 10, an operator-operable switch 146 is provided. When switch 146 is momentarily closed a timing circuit including a transistor 148, the input to which is manually adjusted by a potentiometer 150 depending on the transmission interval desired, is activated through resistors 152 and 154 and a capacitor 156. During the interval that transistor 148 is conductive, as determined by the adjustment of potentiometer 150, relay coil 58 will remain energized to provide circuit point connections as heretofore described. When the transistor is non-conductive the relay is deenergized and the connections are broken to discontinue transmission. A diode 158 is connected to protect this timing circuit from shorting out when switch 12a is actuated. Switch 146 may be suitably mounted in vehicle 40 so as to be covertly operated when switch 12A is operated as will now be understood.

Although only one embodiment of the invention has been illustrated and described, various changes in the form and relative arrangements of the parts, which will now appear obvious to those skilled in the art, may be mae without departing from the spirit and scope of the invention. Reference is therefore, to be had to the appended claims for a definition of the limits of the invention.

What is claimed is:

1. A system for communicating between a vehicle and a remote station, comprising:
   - radio apparatus including at least a transmitter carried by the vehicle;
   - first and second microphones selectively operable by an operator of the vehicle for communicating with the remote station:
   - the first microphone arranged for being held by the operator when in use;
   - the second microphone discretely disposed within the vehicle;
   - a first normally open switch connected to the first microphone and the transmitter and supported by said microphone, and operator-operable for being closed to connect the first microphone to the transmitter;
   - a second normally open switch connected to the second microphone and supported within the vehicle, and operator-operable for being closed; and
   - circuit means connected to the second switch, the second microphone and the transmitter, and including means effective upon the second switch being momentarily closed for connecting the second microphone to the transmitter, a third normally open switch, and time control means connected to the third normally open switch and to the connecting means and affecting said connecting means upon the third switch being momentarily closed for maintaining the second microphone connected to the transmitter for a predetermined interval.

2. A system as described by claim 1, wherein the circuit means further includes:
   - means connected to the second switch, the first microphone and the transmitter, and effective upon the second switch being closed for disconnecting the first microphone from the transmitter.

3. A system as described by claim 1, wherein the circuit means further includes:
   - means effective upon the second switch being closed for amplifying the output of the second microphone.

4. A system as described by claim 1, wherein the circuit means further includes:
   - means connected to the time control means and effective upon the second and third switches being closed, and operator-operable for varying the predetermined interval.

5. A system as described by claim 3, wherein the circuit means further includes:
   - means connected to the amplifying means and effective upon the second switch being closed, and operator-operable for varying the amplification.

6. A system as described by claim 1, wherein the circuit means further includes:
   - means effective upon the second switch being closed for matching the impedance of the second microphone to that of the transmitter.

7. A system as described by claim 1, wherein the circuit means further includes:
   - means effective upon the second switch being closed for suppressing outputs from the second microphone above a predetermined level.

* * * * *