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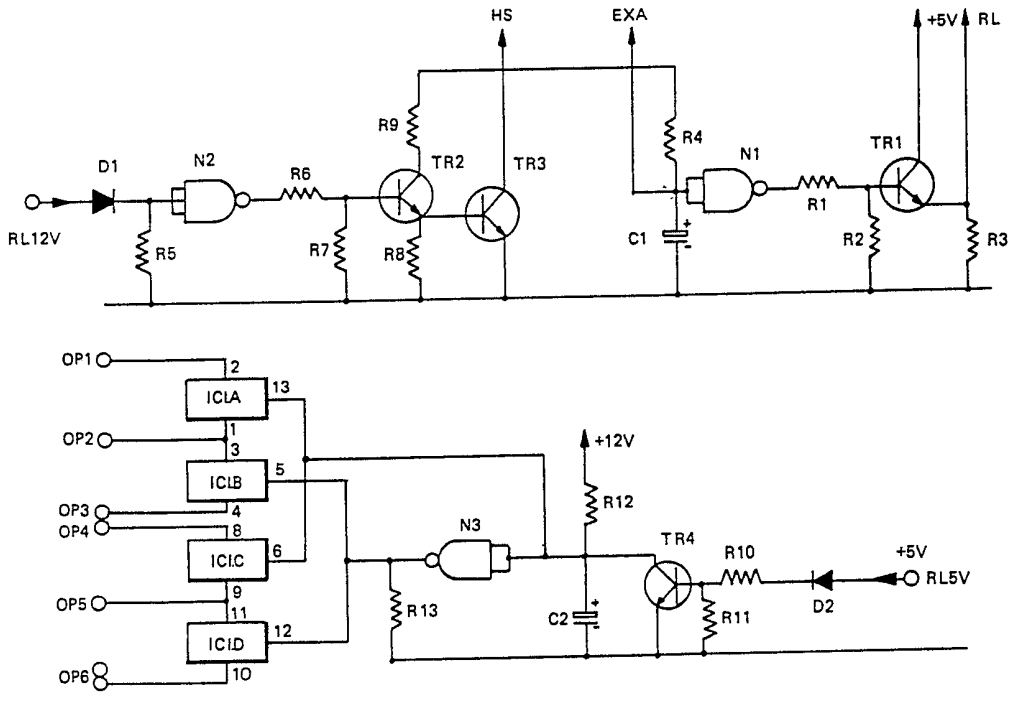
(54) **"Car-borne telephone answering machine"**

(57) An accessory for use with a cellular telephone installed within a vehicle is adapted to enable the telephone to be used with a conventional answering machine.



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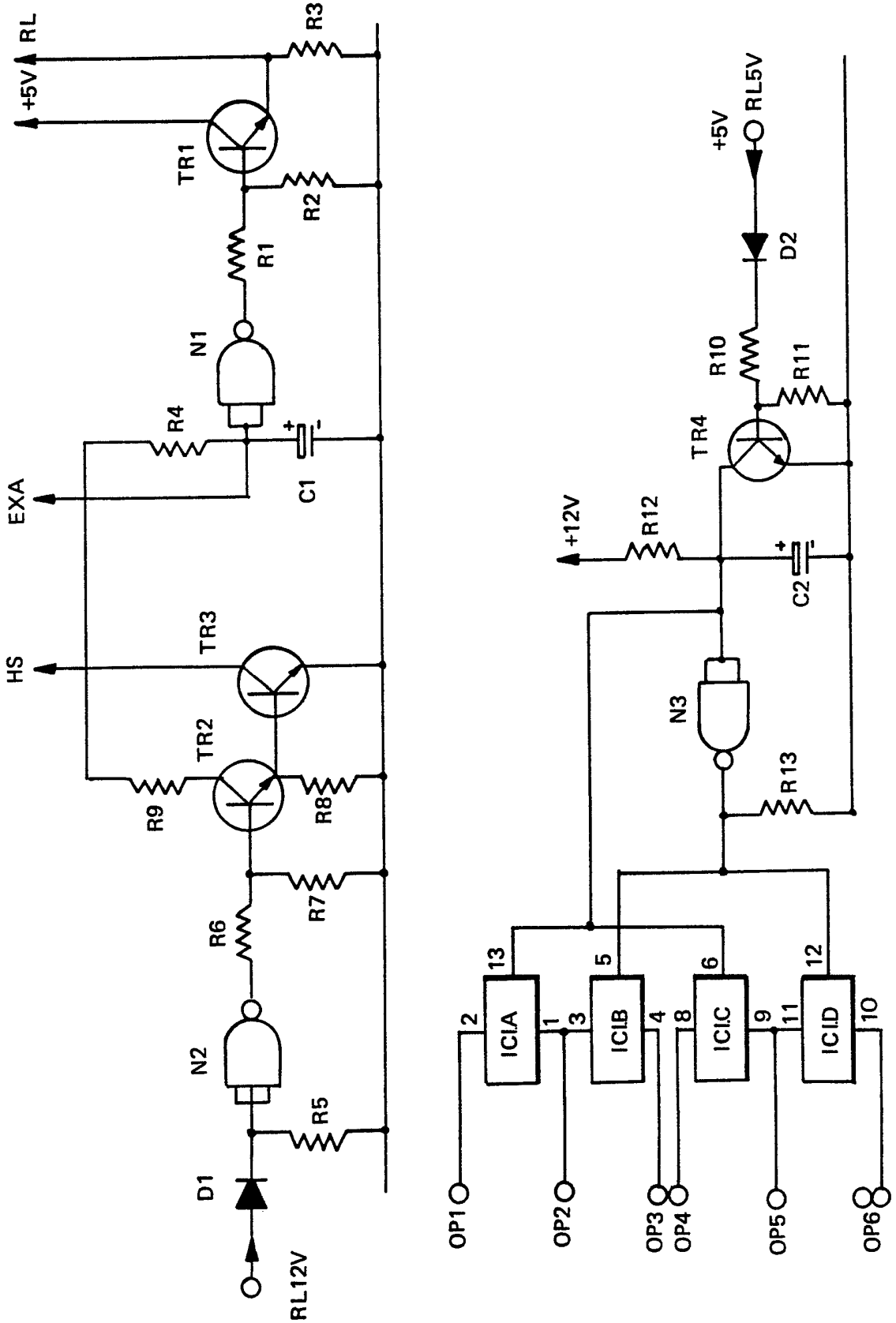
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N2
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CELLULAR TELEPHONE ACCESSORY

The invention relates to an accessory for use with a cellular telephone of the type installed in a vehicle such as a passenger car.

If a call is made to a cellular telephone and the call is not answered after a predetermined number of rings a recording will announce to the caller that nobody is available at that number at the moment. There are many occasions, however, when the caller needs to leave a message for the driver to act upon when he returns to the vehicle. Answer telephones of this type are known in fixed installations but, so far as we are aware, no such answerphone has been installed in association with a cellular telephone.

It is one object of this invention to provide an accessory for the purpose by which a cellular telephone may be activated to leave a message on an answering telephone associated therewith.

According to the invention in one aspect there is provided an accessory to satisfy that need.

In order that the invention may be well understood, it will now be described with reference to the accompanying Figure which shows a circuit diagram of the accessory.

The accessory is intended for use with a Phillips MCR 40 cellular telephone but could be used with similar apparatus; both the telephone and the answering machine are of known type.

The telephone (not shown) includes a hook switch circuit having an input HS, and by which the driver may prevent the telephone from ringing and accept a call. The telephone also has an external alarm line, which has an output EXA which may be connected to the vehicle's horn (not shown) to cause the ringing of the telephone to sound the horn outside the vehicle.

The answering machine (not shown) is of known type and includes a +5V output and a ring line input RL. When a predetermined number of pulses, eg. six pulses, have been applied to the ring line (RL) the answering machine is arranged to be enabled. The answering machine also includes a 12V relay RL 12V which is arranged to be sent from logic high to low, when the machine has been enabled.

The circuitory of the accessory comprises a nand gate N1 whose

inputs are connected together to the external alarm EXA, which is normally held at logic high. The output of N1 is connected via 130 Kohm resistor R1 to the base of transistor TR1, whose collector is connected to the +5V supply from answering machine, and whose emitter is connected to the ring line RL. R2 and R3 are 10 Kohm resistors which are connected between the base and emitter of TR1, and ground respectively. The input of N1 is between a 100 Kohm resistor R4 and a 1 microfarad capacitor C1, and in absence of any calls on the telephone is held high, so that the output of N1 is held low.

In use, an incoming call will cause a series of negative pulses to be applied to the input of N1, so that positive pulses are emitted from the output. These are applied to the base of TR1, which causes the emitter - collector path to conduct, and causes a series of positive pulses to be applied to the ringline RL. After six such pulses have been received by the answering machine, the machine is arranged to be enabled and cause the 12V relay RL 12V within the machine to go low.

The output of the relay RL 12V is connected in series with a diode D1 to the inputs of a two input Nand gate N2, which are also connected through 100 Kohm resistor R5 to ground. The output of N2 is connected in series with the base of transistor

TR2, the emitter of which is connected to the base of transistor TR3. The collector of TR3 is connected to the hook switch HS of the telephone, and the emitter of TR3 is connected to the ground. The collector of TR2 is connected in series with R4 through 1.2 Kohm resistor R9. 320 Kohm and 100 Kohm resistors, R7 and R8, are connected between the base and collector of TR2 and ground respectively.

In use, when the 12V relay RL 12V goes low and D1 stops conducting, the inputs of N2 go low and the output goes high. The base of TR2 goes high, which causes the base of TR3 to go high, which connects the hook switch HS to ground through TR3. Operation of the hook switch thus stops the telephone ringing and puts the telephone in to a transmit mode.

5 volt relay RL 5V is also present within the answering machine and also goes low when the answering machine is enabled. Diode D2 is in series with the relay RL 5V, and through a 68 Kohm resistor R10 to the base of transistor TR4. The collector of TR4 is connected to the input of a two input nand gate N3. 100 Kohm resistor R11 is connected between the base and emitter of TR4. A 100 Kohm resistor R12 is connected to a positive 12V supply and to the collector of TR4. A 1 microfarad capacitor C2 is present between the emitter and collector of TR4.

IC1A, IC1B, IC1C and IC1D comprise four analogue switches. Pins 13, 5, 6, and 7 are the control pins of each switch ICA,B,C, and D respectively, which when held at logic high allow a signal to flow between one side 2, 3, 8, and 11 respectively and the other side 1, 4, 9, 10.

Line OP1 is connected to a ground of the telephone and to pin 2 of IC1A. OP2 is connected to a negative line from the answering machine and to a junction between pins 1 and 3 of IC1A and IC1B. OP3 is connected to pin 4 on IC1B and to a ground of the telephone. OP4 is connected to pin 8 on IC1C and to the RX/audio LF input, on the telephone. OP5 is connected to a pointer line from the answering machine and to the junction between pins 9 and 11 on IC1C and IC1D. OP6 is connected to the line output of the telephone and to pin 10 on IC1D.

In use, when the +5V relay RL5V goes to ground, the inputs to N3 go from high to low through the emitter collector path of TR4. The control pins 13 and 6 of IC1A and IC1C, which are also connected to the input of N3 go low, which prevents conduction between pins 2 and 1 of IC1A and between pins 8, 9 of IC1C. However, the control pins of IC1B and IC1D (5,12 respectively) which are connected to the output of N3 are sent high, which

causes OP2 to be connected to OP3 or the ground of the telephone to be connected to the negative output of the answering machine. OP5 is connected to OP6 or in other words the positive line input of the telephone is to the positive output of the telephone. In this way, a recorded message left on the answering machine may be transmitted to the caller. After the message has finished a signal on the tape will cause the answering machine to re-apply the relay RL 5V so that +5V volts appears on the inputs to N3, which disconnects IC1B and IC, 1D, and simultaneously connects together pins 2 and 1 of IC1A which connects together the ground of the telephone and the negative input of the answering machine, and connects together pins 8 and 9 of IC1D to connect the positive input of the answering machine with the receive pin of the telephone. This allows the callers message to be recorded o the answering machine.

When the caller disconnects or after a predetermined time, the answering machine resets itself and returns 12V to RL 12V which thereby forces the output of N1 low and thereby applies a signal to the hook switch HS to switch off TR3 and thereby stop the telephone from transmitting.

The accessory of the invention enable a conventional answering machine to be used with a cellular telephone.

CLAIMS

1. A vehicle containing a telephone answering machine connected to a cellular telephone also located within the vehicle.

2. A vehicle according to Claim 1, wherein an accessory comprising an electronic circuit is connected between the cellular telephone and the telephone answering machine and operative so that a caller calling that cellular telephone may leave a message upon the answering machine.

3. A vehicle according to Claim 2, wherein the accessory is detachable from the answering machine to enable the answering machine to be used with a conventional telephone.

4. An accessory substantially as described with reference to the drawing.

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