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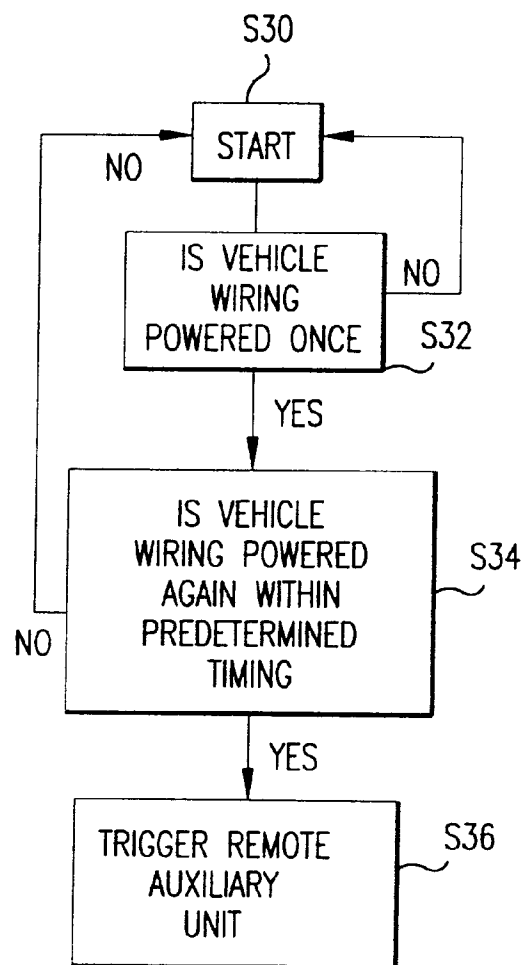
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Société de Protection des Inventions
25, rue de Ponthieu
75008 Paris (FR)**(54) **Auxiliary unit control module for use with existing remote vehicle control unit**

(57) A control unit for an auxiliary vehicle unit which may find particular application in conjunction with an already installed remotely activated vehicle control system, for example an original equipment manufacturer keyless entry or alarm system. An input is connected to a designated wiring of a vehicle which is triggered by the already installed remotely activated vehicle control system. It is then detected whether the designated wiring is triggered at least twice within a predetermined period of time. If it is determined that the designating wiring is triggered twice within the predetermined period of time, then the auxiliary unit is triggered. The auxiliary units may typically be a remote vehicle starter or window roll-up unit, and the designated wirings of the vehicle may typically be door lock or unlock wirings.

**FIG.2**

Description

BACKGROUND OF THE INVENTION

Field of the Invention:

The present invention is directed to a control module for an auxiliary unit which can be activated based on a control of a remote vehicle control system, such as a keyless entry system which is already installed, for example as part of an original equipment, in a vehicle.

Discussion of the Background:

Remote vehicle control systems such as keyless entry systems have become commonplace in vehicles for many years. Keyless entry systems operate to allow a vehicle operator to lock and unlock the doors of the vehicle via a remote key-chain transmitter. Many vehicles come with such keyless entry systems now as standard features from car manufacturers, that is on an "original equipment manufacturer" (OEM) basis. The consumer demand for this type of product has grown steadily and several original equipment keyless entry systems are now on the market.

Most conventional keyless entry systems feature remote transmitters which include at least two or three buttons. Conventionally, the first two buttons are to lock and unlock the vehicle door, and a third button may be for a trunk control. Occasionally, these keyless entry systems also feature a fourth button which may be a panic mode button, which makes the horn and/or lights of the vehicle active when pressed.

Other types of remotely activated control systems can also be installed in vehicles either as original equipment or as after market equipment, for example, such as a vehicle alarm system.

Furthermore, there are several after market auxiliary products which are commonly added to vehicles other than keyless entry or alarm systems. One of the most common type of after market auxiliary product currently available is a remote vehicle starter. A remote vehicle starter operates so that a vehicle operator merely pushes a button on a remote transmitter unit, and the vehicle is automatically started up. This type of device is very beneficial if a vehicle operator wishes to start a vehicle to allow the vehicle to heat up on a cold day, so that the vehicle will be warm prior to the operator actually having to get into the vehicle.

Another type of after market product which is available is a vehicle window roll-up unit, which operates to roll-up a window in the event that a vehicle operator forgets to roll-up an electric window, and the window roll-up unit can roll-up the window even after the vehicle has been turned off.

Conventionally, these auxiliary after market products are controlled by dedicated remote key-chain transmitters. Some of these key-chain transmitters may in-

clude several buttons, one for starting the vehicle, and other buttons for keyless entry, alarm features, panic modes, or other personal security features.

The drawback with these conventional auxiliary units, such as remote vehicle starters and window roll-up units, is that they require their own separate dedicated remote transmitter systems. As a result, if a vehicle already has a keyless entry or vehicle alarm system installed, such as an original equipment, the vehicle operator may not wish to add another auxiliary unit because this vehicle operator may not wish to carry around two separate transmitter units.

SUMMARY OF THE INVENTION

Accordingly, one object of the present invention is to provide a novel control module for an auxiliary unit for a vehicle, which can be activated based on the operation of a remote system, such as keyless entry systems or alarm systems which may come as original equipment manufacture of a vehicle or as after-market products.

One further object of the present invention is to provide such a novel control module which can be used with several types of auxiliary units, and which can be easily installed on the vehicle.

The novel control module of the present invention achieves its objectives by including an input which is connected to a designated wiring of a vehicle which is activated based on a control by an already installed, for example original equipment manufacturer, remote vehicle control unit such as a keyless entry system or alarm system. A detector detects if this designated wiring is triggered at least twice within a predetermined period of time. Further, in the present invention the auxiliary unit is activated when the detector determines that the designated wiring has been triggered at least twice within the predetermined period of time.

Such a device of the present invention may find particular application in devices such as remote vehicle starters and window roll-up units. Further, such a device of the present invention may typically be connected to the door unlock or door lock wiring of a vehicle.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete appreciation of the present invention and many of the attendant advantages thereof will be readily obtained as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings, wherein:

Figure 1 outlines the implementation of the system of the present invention;

Figure 2 outlines a control of the system of the present invention; and

Figure 3 details the control module of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, wherein like reference numerals designate identical or corresponding parts throughout the several views, and more particularly to Figure 1 of the present specification thereof, there is detailed an overall implementation of the system of the present invention.

More specifically, the present invention is particularly directed to control module 10 which is connected to a designated vehicle wiring 5. Furthermore, the control module 10 operates to control an auxiliary unit 20, which may be a remote vehicle starter or a window roll-up unit, as examples only. In Figure 1 the control module 10 is shown as a separate unit from auxiliary unit 20, although the control module 10 also can typically be formed as an integral unit within the auxiliary unit 20.

The present invention has an operation as follows, and as is shown in Figure 2. First, the control module 10 initially determines if the vehicle wiring is triggered once, see step S32. If the vehicle wiring has been triggered once, the control module 10 then determines if the vehicle wiring is triggered again within a predetermined period of time, which for example may be four seconds, see step S34. If the vehicle wiring has been triggered twice within this predetermined period of time, then the auxiliary unit is triggered, see step S36.

The vehicle wiring 5 should be a specific vehicle wiring which is triggered based on a control of an already installed, for example original equipment manufacturer, remotely activated vehicle control system, such as a vehicle alarm system or a keyless entry system. The most common examples of the vehicle wiring 5 will be the door lock or unlock wiring of the vehicle, as typical original equipment manufacturer keyless entry systems have lock and unlock activation buttons which trigger the lock and unlock wirings of a vehicle. However, it is possible for the vehicle wiring 5 to include other wirings which are also activated by the already installed remotely activated vehicle control system, for example original equipment manufacturer, keyless entry systems or alarm systems, such as the trunk or light wirings.

With this operation of the present invention, the auxiliary unit 10 can be triggered based on a control of the already installed remotely activated vehicle control system, for example original equipment manufacturer keyless entry system or alarm system, and thus the auxiliary unit 20 does not require its own dedicated remote transmitter. This provides a significant advantage that an operator of a vehicle which already includes a remotely activated vehicle control system, such as a keyless entry system, can easily install another auxiliary unit 20 without needing a new dedicated transmitter unit for the auxiliary unit 20.

As noted above, the vehicle wiring 5 may typically be the door lock or unlock wirings of a vehicle. As discussed above, the auxiliary unit 20 may typically be a

remote vehicle starter, which operates to remotely start a vehicle when triggered, or may be a window roll-up unit, which rolls up a window when triggered, or any other type of remote vehicle control unit.

Shown in Figure 3 is a specific implementation of the control module 10 of the present invention, which is shown as a demonstrative example of circuitry which can be utilized to implement the control module 10 of the present invention.

The circuitry to implement the control module 10 of the present invention features units 4538A and 4538B, which form a dual "one shot" equivalent circuit, which for example may be model number MC145B manufactured by SGS Thomson Microelectronics. The +T trigger input of 4538A receives the input from the vehicle wiring (e.g. the door lock or unlock wiring) through resistor R1. Two diodes D1 and D2 are connected between resistor R1 and the +T input, diode D1 also being connected to the +12V of the vehicle and the diode D2 also being connected to ground. Also connected to a point between the resistor R1 and the +T input is a capacitor C1, which is further connected to ground. A further resistor R2 is connected to the point between resistor R1 and the +T input, which is also connected between either +12V or ground.

Both sides of the 4538A and 4538B are set up to recognize a same positive trigger from the vehicle wiring input at the +T input. However, the actual input from the vehicle wiring can either be positive or negative going based on whether the resistor R2 is connected to the +12V or ground. If resistor R2 is connected to ground, the one shot equivalent 4538A and 4538B will recognize a leading edge of a positive going trigger from the vehicle wiring input. Conversely, if resistor R2 is connected to +12V, the one shot equivalent 4538A and 4538B will recognize a negative edge of a negative going trigger of the vehicle wiring input. Resistor R1 and capacitor C1 operate to bounce filter the vehicle wiring input. Diodes D1 and D2 operate as a clamp to clamp the input signal at a desired level. Typical values of R1, R2 and C2 may respectively be 1K Ω , 100 K Ω and .1F, as examples only.

When a trigger is detected at the +T input of circuit 4538A from the vehicle wiring input, the circuit 4538A responds with a positive output pulse of approximately 4 seconds at its Q output. This Q output, which is connected to the reset pin of circuit 4538B, forces this reset pin RST of 4538B high, which readies circuit 4538B to respond to an input trigger at its own input +T. Since this reset RST of 4538B was not forced high earlier, the initial trigger input to circuit 4538A does not initially trigger circuit 4538B. Connected between the Q output of 4538A and the reset of 4538B is a resistor R5 in parallel with a capacitor C5. Resistor R5 and capacitor C5 operate as a low pass filter which prevents a voltage from appearing too quickly on the reset RST of circuit 4538B, and thus does not allow circuit 4538B to respond to the initial trigger. Typical values of R5 and C5 may be 100K Ω and .1F, as examples only.

If a second trigger signal from the vehicle wiring input appears at the +T inputs of circuits 4538A and 4538B within the 4 second duration that the reset pin of 4538B has been driven high by the Q output of 4538A, which was generated by the first trigger, then circuit 4538B responds to the second trigger and produces a negative output pulse of approximately a 4 second duration at its $\bar{Q}$ output.

Also connected to the RXCX input of circuit 4538A is a resistor R3, which is also connected to the +12V. Connected between resistor R3 and the input RXCX at one point, and to input CX at a second point, is a capacitor C2, which is also connected to ground. The RXCX and CX inputs control the duration of the output pulse from circuit 4538A based on the values of capacitor C2 and resistor R3. A similar circuit is also formed with respect to circuit 4538B. Typical values of R3, R4 and C2, C3 are 1M Ω and 4.7F, as examples only.

The $\bar{Q}$ output of 4538B is then fed to a timer 555, which for example may be model number TLC555C manufactured by National Semiconductor Corp., through a capacitor C4. Connected to a point between the capacitor C4 and the input to the timer 555 is also a parallel connection of a diode D3 and a resistor R6, which are also connected to +12V. Typical values for C4 and R6 are .01F and 10K Ω , as examples only. The TR input, which is the trigger input of the timer 555, is connected to an input trigger disable through diodes D4 and D5. Connected to a point between diodes D4 and D5 and between ground are also resistor R7 and capacitor C5. The input trigger disable input to the TR input is a disable signal which prevents the timer 555 from triggering when a +12V is applied to this trigger disable, and for approximately two seconds after the +12 voltage is removed. This can be utilized to prevent detecting noise at a time other than when the actual desired signal is being input. Typical values for R7 and C5 are 1M Ω and 2.2F, as examples only. The TH input, which is a threshold level setting input, is also connected to the D input, which is a discharge pin. Also connected to the D input is a capacitor C6, which is also connected to ground, and resistor R8, which is also connected to +12V. Typical values of C6 and R8 are .1 μ F and 4.7 Ω , as examples only.

When the output $\bar{Q}$ of 4538B goes high, the timer 555 is activated through input TR to output a positive output pulse of approximately 400 ms, or any other fixed duration. This output pulse is then input into a base of transistor T1, which in turn supplies a negative going output trigger for the external auxiliary unit 20, which is connected to an output of the transistor T1. Also connected to the base of transistor T1 are resistors R9, R10. Also connected to the output of transistor T1 is a parallel connection of resistor R11 and R12. Typical values for R9, R10, R11 and R12 are 10K Ω , 10K Ω , 1K Ω and 10 Ω , as examples only.

In this way, the circuitry shown in Figure 3 operates to output a negative going output trigger which is fed to

the auxiliary unit 20 when the vehicle wiring 5 is triggered twice within the predetermined, e.g. 4 second, interval.

Obviously, numerous additional modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described herein.

Claims

1. A control unit for an auxiliary vehicle unit for use in a vehicle featuring a previously installed remotely activated vehicle control system, comprising:

an input to be connected to a designated wiring of a vehicle which can be triggered by the remotely activated vehicle control system; detecting means for detecting if the designated wiring is triggered at least twice within a predetermined period of time; and control means for controlling the auxiliary unit to activate when the detecting means detects that the designated wiring is triggered at least twice within the predetermined period of time.

2. The control unit according to Claim 1, wherein the previously installed remotely activated vehicle control system is a keyless entry system.
3. The control unit according to Claim 2, wherein the input is connected to a door unlock wire as the designated wiring of the vehicle.
4. The control unit according to Claim 2, wherein the input is connected to a door lock wire as the designated wiring of the vehicle.
5. The control unit according to Claim 2, wherein the auxiliary vehicle unit is a remote vehicle starter.
6. The control unit according to Claim 3, wherein the auxiliary vehicle unit is a remote vehicle starter.
7. The control unit according to Claim 4, wherein the auxiliary vehicle unit is a remote vehicle starter.
8. The control unit according to Claim 2, wherein the auxiliary vehicle unit is a window roll-up unit.
9. The control unit according to Claim 3, wherein the auxiliary vehicle unit is a window roll-up unit.
10. The control unit according to Claim 4, wherein the auxiliary unit is a window roll-up unit.

11. A control unit for an auxiliary vehicle unit for use in a vehicle featuring a previously installed remotely activated vehicle control system, comprising:
- an input to be connected to a designated wiring of a vehicle which can be triggered by the previously installed remotely activated vehicle control system; 5
 - a detector detecting if the designated wiring is triggered at least twice within a predetermined period of time; and 10
 - a controller controlling the auxiliary unit to activate when the detector detects that the designated wiring is triggered at least twice within the predetermined period of time. 15
12. The control unit according to Claim 11, wherein the previously installed remotely activated vehicle control system is a keyless entry system. 20
13. The control unit according to Claim 12, wherein the input is connected to a door unlock wire as the designated wiring of the vehicle.
14. The control unit according to Claim 12, wherein the input is connected to a door lock wire as the designated wiring of the vehicle. 25
15. The control unit according to Claim 12, wherein the auxiliary vehicle unit is a remote vehicle starter. 30
16. The control unit according to Claim 13, wherein the auxiliary vehicle unit is a remote vehicle starter.
17. The control unit according to Claim 14, wherein the auxiliary vehicle unit is a remote vehicle starter. 35
18. The control unit according to Claim 12, wherein the auxiliary vehicle unit is a window roll-up unit. 40
19. The control unit according to Claim 13, wherein the auxiliary vehicle unit is a window roll-up unit.
20. The control unit according to Claim 14, wherein the auxiliary vehicle unit is a window roll-up unit. 45

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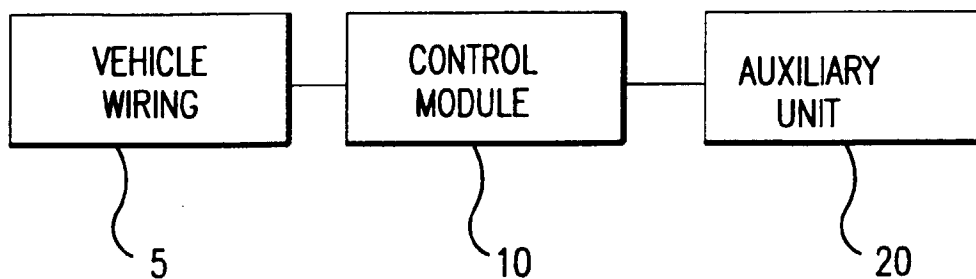


FIG.1

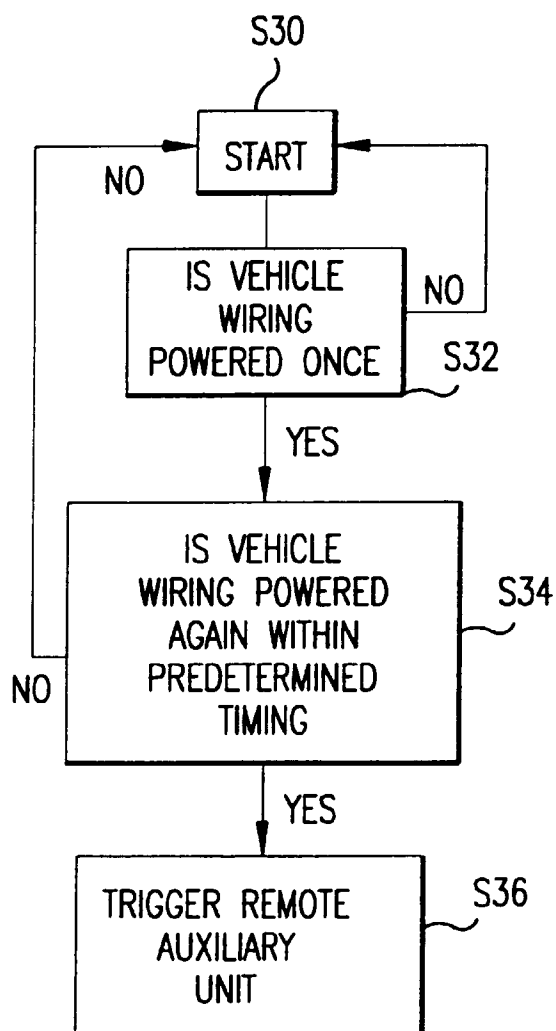


FIG.2

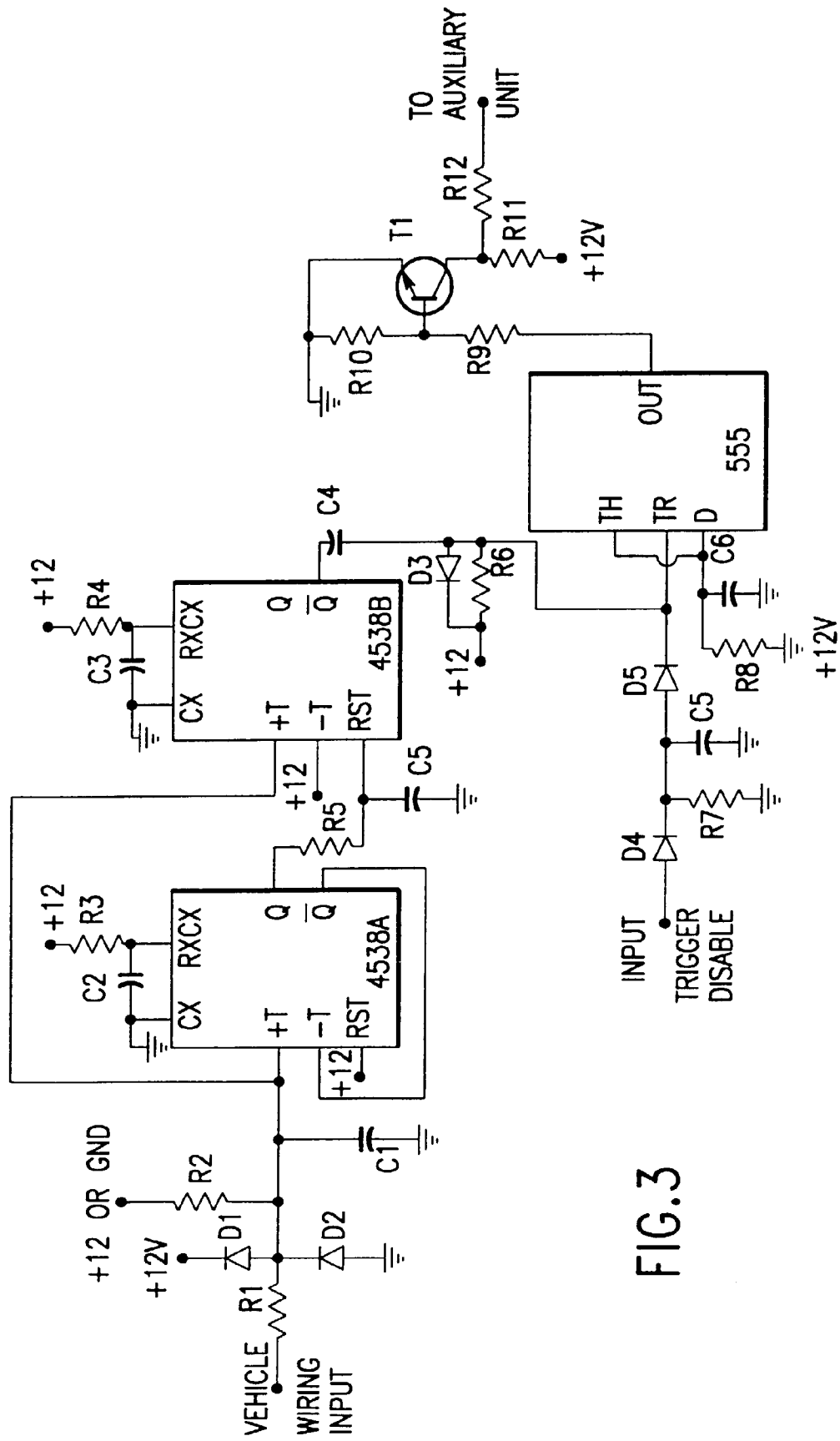


FIG. 3