

1969

NEW MODEL TRAINING



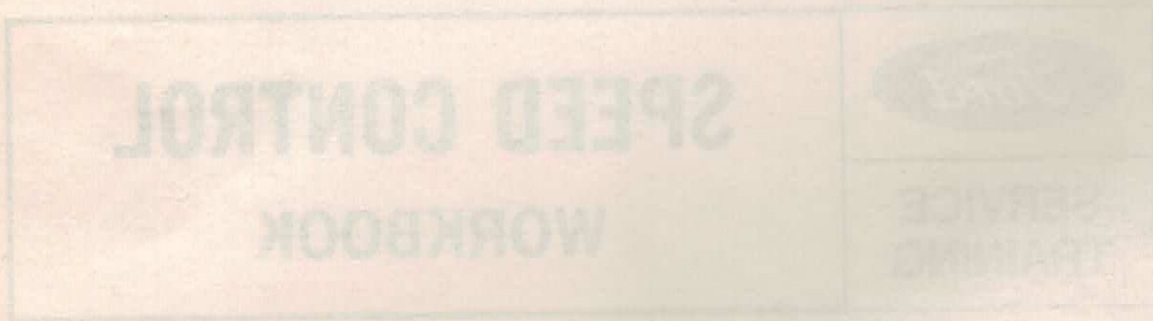
**SERVICE
TRAINING**

SPEED CONTROL

WORKBOOK

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SPEED CONTROL

ANSWER SHEET

Circle the answer on this sheet that indicates the selection you feel best answers the question.

1. A B C
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SECRET
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SECRET

1. The purpose of this document is to provide information regarding the status of the project and the progress of the work.

2. The project is currently in the planning stage and the following information is being provided for your information.

3. The project is being managed by the following personnel:

4. The project is being funded by the following sources:

5. The project is being completed by the following dates:

6. The project is being reviewed by the following committees:

7. The project is being approved by the following authorities:

8. The project is being implemented by the following organizations:

9. The project is being monitored by the following personnel:

10. The project is being evaluated by the following personnel:

11. The project is being reported by the following personnel:

12. The project is being disseminated by the following personnel:

13. The project is being archived by the following personnel:

14. The project is being destroyed by the following personnel:

15. The project is being maintained by the following personnel:

16. The project is being updated by the following personnel:

17. The project is being revised by the following personnel:

18. The project is being replaced by the following personnel:

19. The project is being removed by the following personnel:

20. The project is being deleted by the following personnel:

LAB SESSION SC-I

THUNDERBIRD SPEED CONTROL

Objectives:

Listed below are the objectives of this lab session — a summary of the things we expect you to get out of this segment of your New Model training. If for any reason you feel that you are not learning what we expect you to learn, feel free to ask your instructor for assistance; he's here to help you.

1. You will be able to locate all of the operating controls of the 1969 Thunderbird speed control system.
2. You will be able to locate all of the operational components of the 1969 Thunderbird speed control.
3. You will be able to trace the operational circuits of the 1969 Thunderbird speed control.

Student Activity:

1. As the instructor points out the location of each of the manual controls of the 1969 Thunderbird speed control, locate each control on one of the diagrams in your workbook (Figures 1 through 8). This will assist you in visualizing the relationship between the control and the operational system.
2. As the instructor points out the operational components of the 1969 Thunderbird speed control system, locate the component on one of the diagrams in your workbook. This will assist you in visualizing the relationship between the control and the operational system. At this point check your workbook. Make sure that you have checked each item on the system diagram against the corresponding item on the vehicle.

3. Check the ON circuit diagram in your workbook (Figure 3) and answer this question. What relay is energized when the system is turned on?
- A. Vacuum valve relay
 - B. Coast relay
 - C. On-off relay
 - D. Brake release relay
4. With the ignition switch ON and the system turned on, which one of the three relays will operate when the SET SPEED button is pushed?
- A. Coast relay
 - B. On-off relay
 - C. Brake release relay
5. With the system in operation, which relay will operate when the brake pedal is pushed?
- A. Coast relay
 - B. On-off relay
 - C. Brake release relay

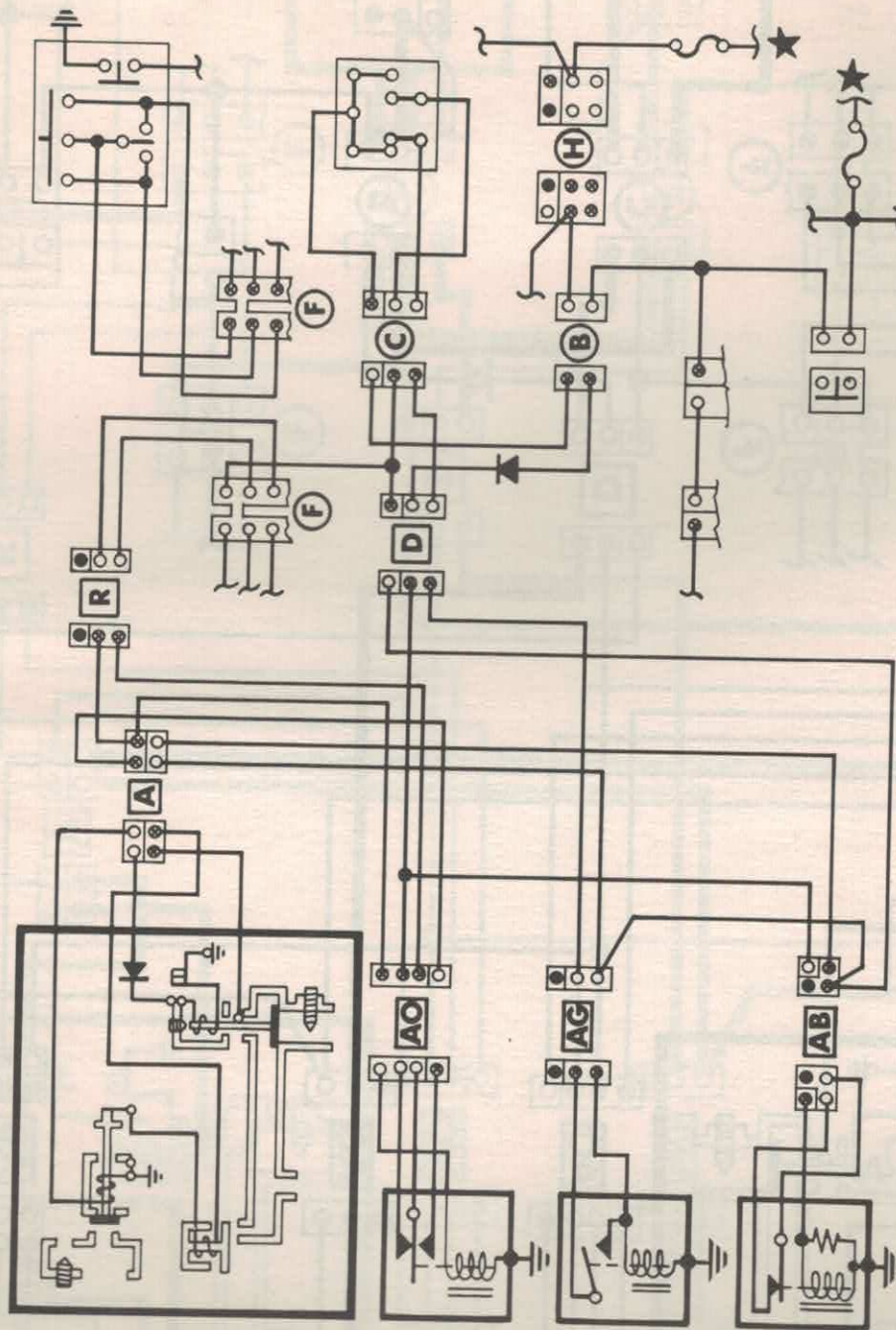
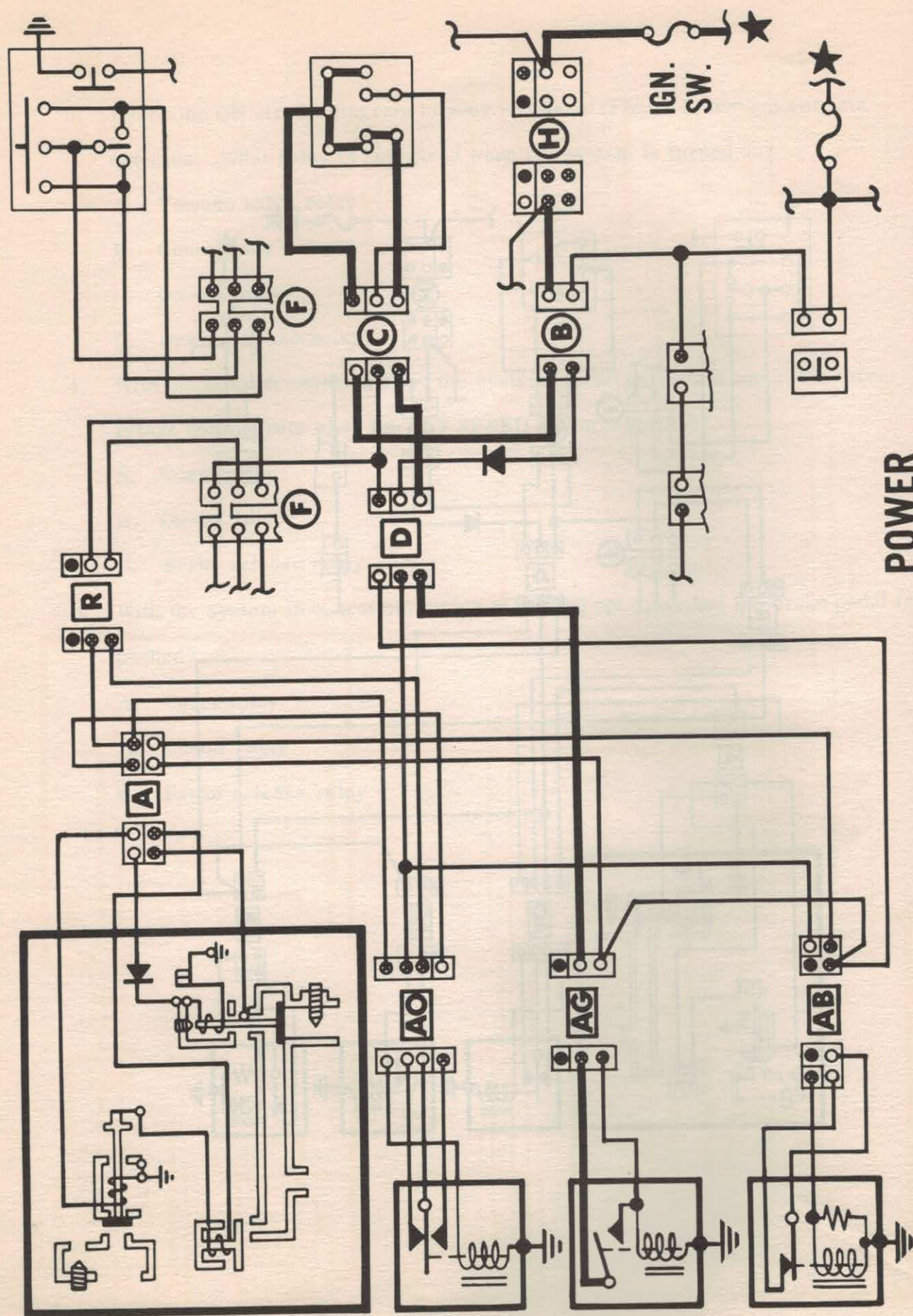


Figure 1 — 1969 Thunderbird Speed Control Schematic



POWER

Figure 2 — 1969 Thunderbird Power Circuit

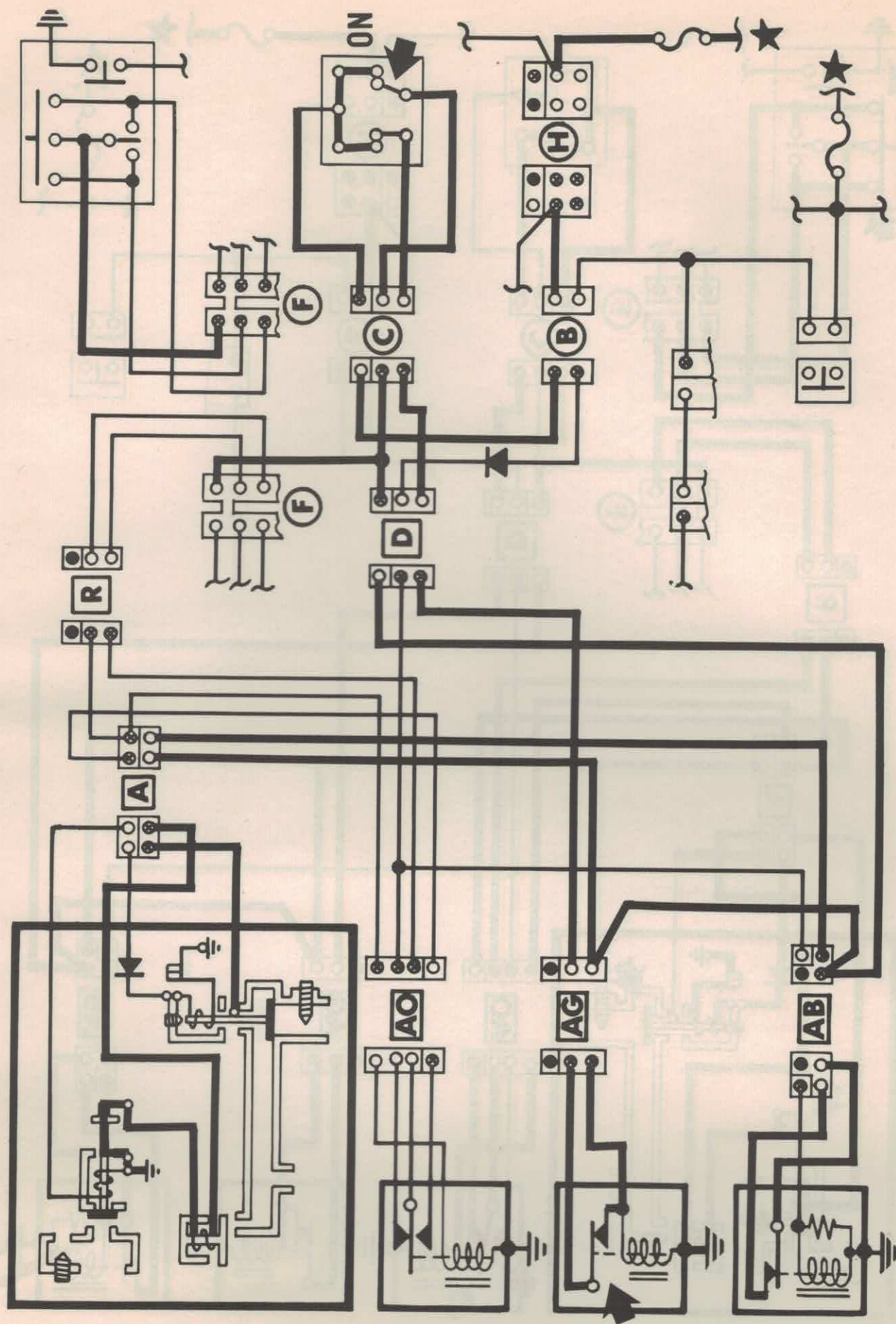


Figure 3 — 1969 Thunderbird On Circuit

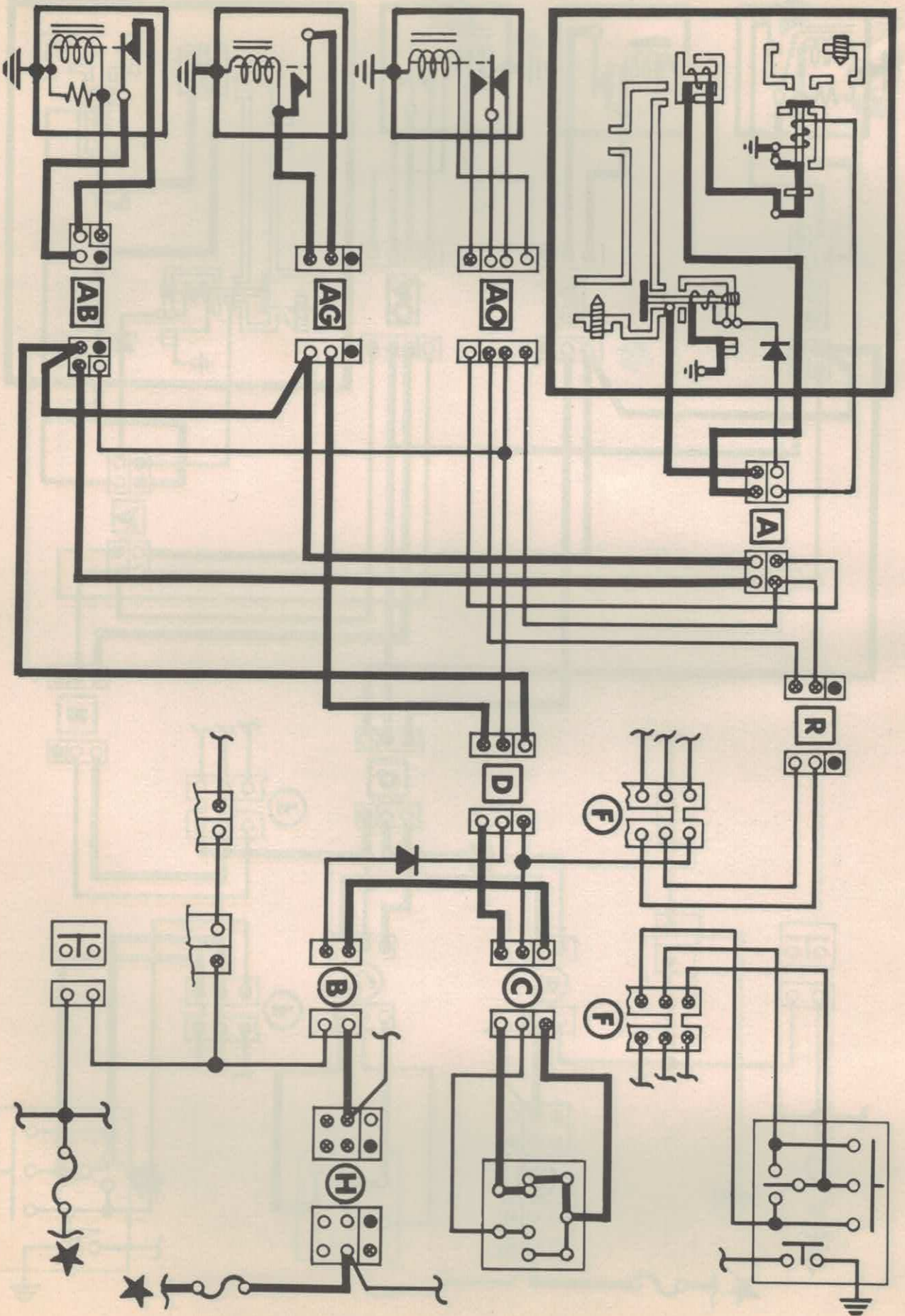


Figure 5 — 1969 Thunderbird Cruise Circuit

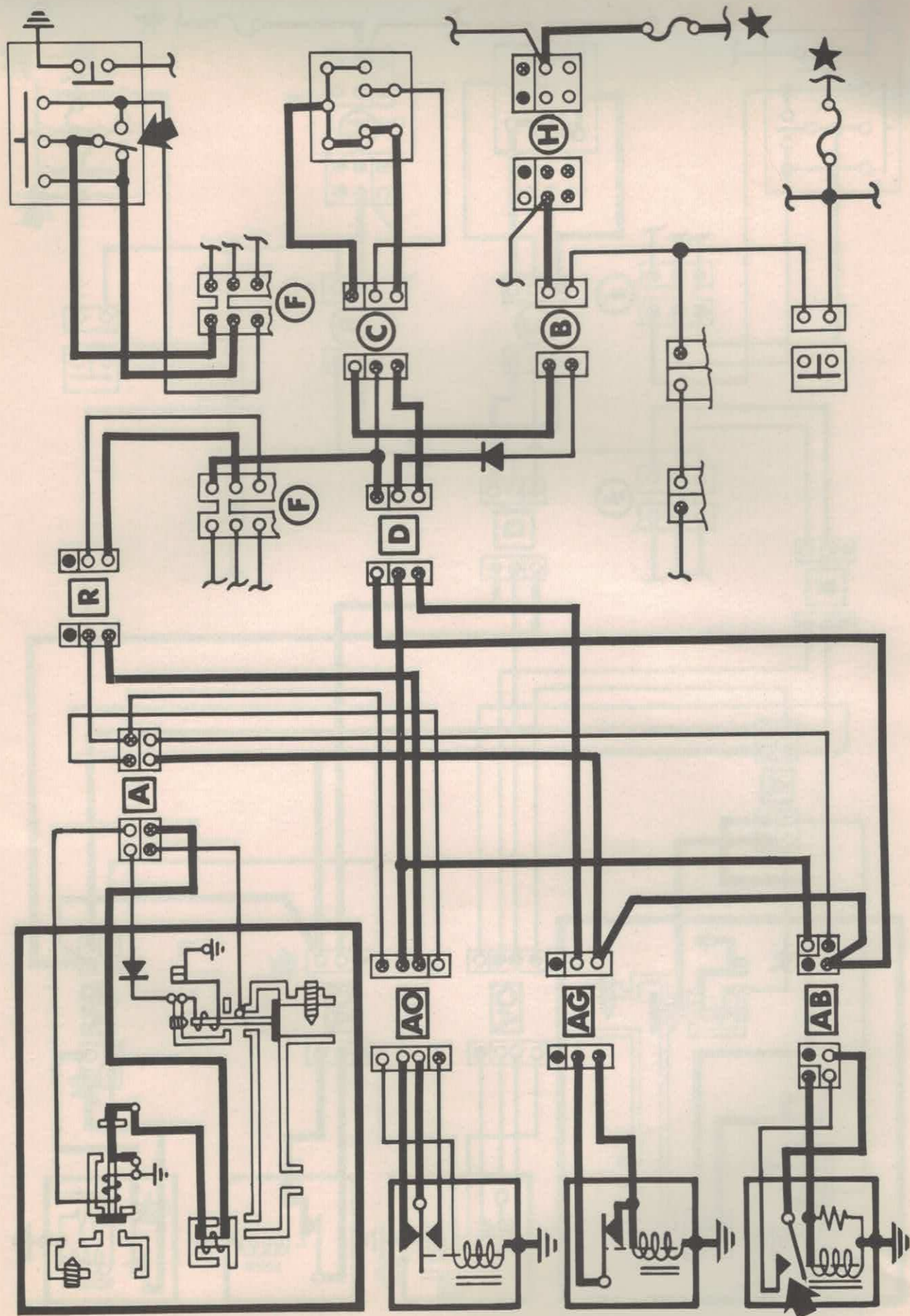


Figure 6 — 1969 Thunderbird Coast Circuit

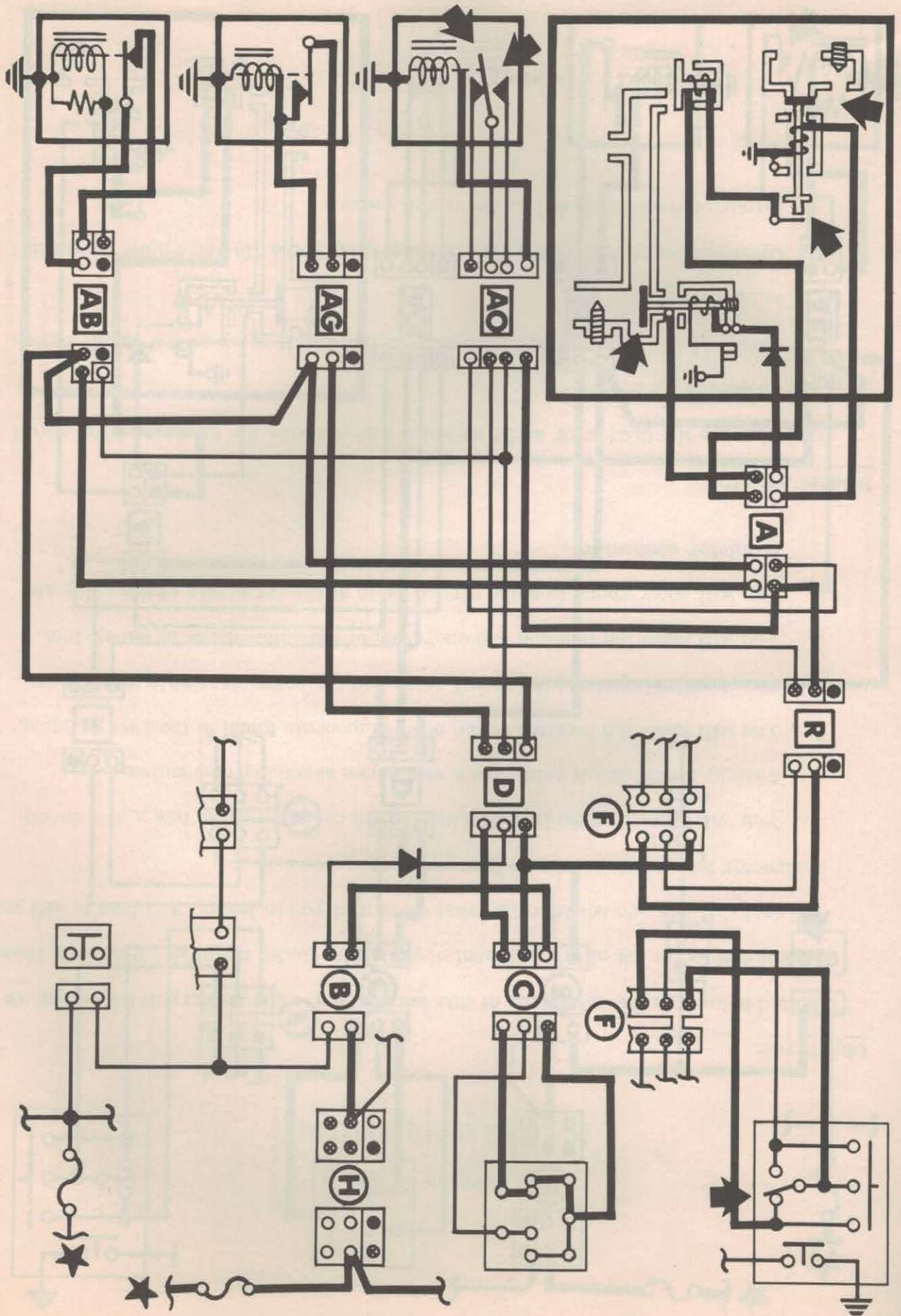


Figure 7 — 1969 Thunderbird Resume Circuit

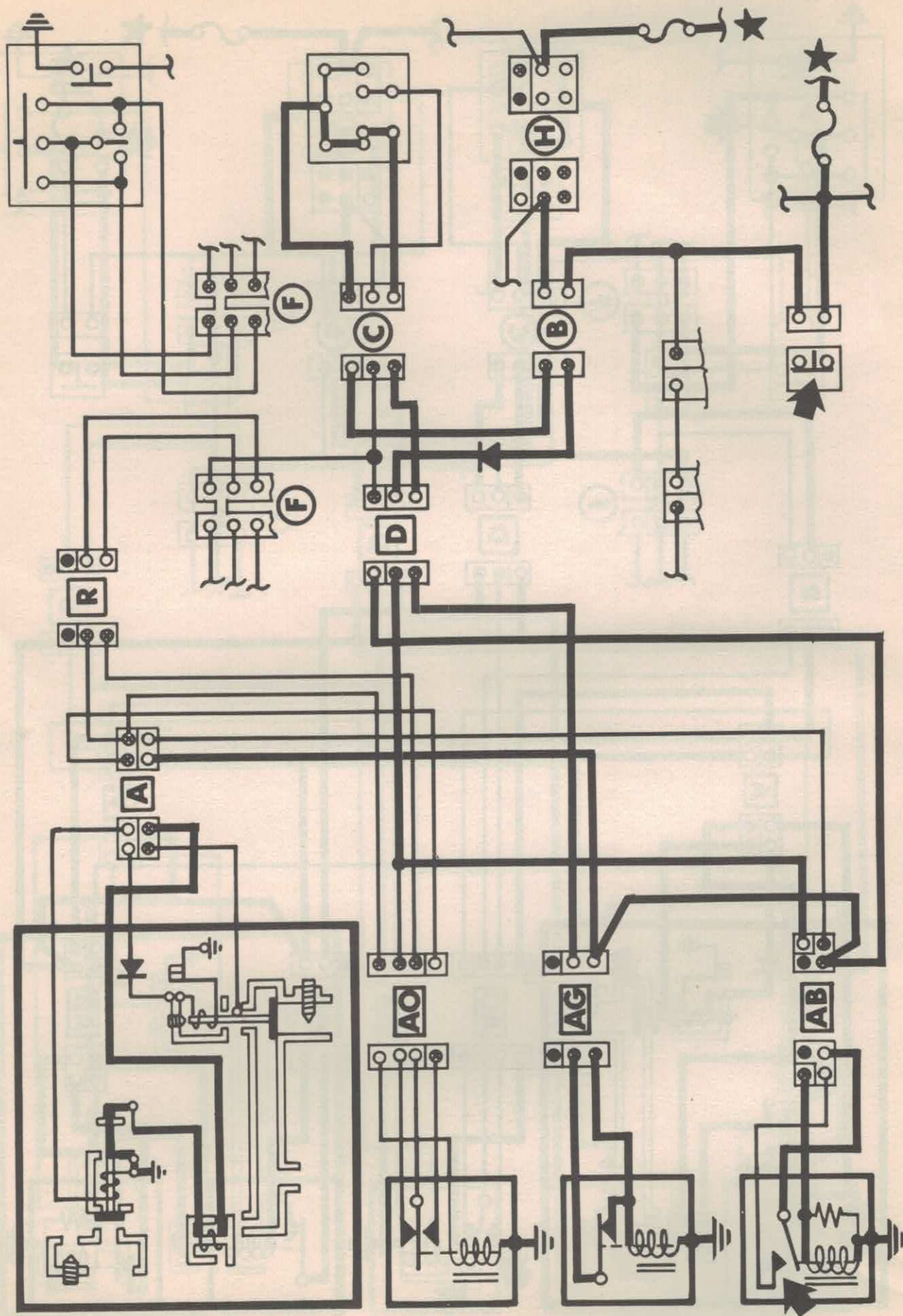


Figure 8 — 1969 Thunderbird Brake Circuit

LAB SESSION SC-II
MUSTANG SPEED CONTROL

Objectives:

Listed below are the objectives of this lab session — a summary of the things we expect you to get out of this segment of your New Model training. If for any reason you feel that you are not learning what we expect you to learn, feel free to ask your instructor for assistance; he's here to help you.

1. You will know that the 1969 Mustang speed control system has a new on/off switch, a new on/off relay and a new servo assembly mechanism.
2. You will know the location of the new components found in the 1969 Mustang speed control system; the on/off relay and the servo assembly mechanism.
3. You will know the function and operation of the components in the system.
4. You will know where to make circuit tests at the terminals of the relay and regulator connectors.

Student Activity:

1. Observe the instructor as he operates and explains the function of the on/off switch.
2. Listen at the regulator for sounds from the on/off relay as the on/off switch is operated.
3. Open your workbook to the circuit diagram (Figure 10) and follow the circuit through the on/off switch to the on/off relay.

Answer this question:

When the ignition switch is turned on, there is power in the speed control system.

What switch will open the power circuit while the engine is running?

- A. Set speed switch
- B. Off switch
- C. Stoplight switch

4. Using the workbook diagram Figure 11 as a reference, answer this question.

When the ON switch is released, what keeps the ON circuit energized?

- A. On-Off relay
- B. Brake release relay
- C. Vacuum valve solenoid

5. Using the workbook diagram Figure 15, at what point is the speed control operating circuit opened when the brakes are applied?

- A. On-Off relay
- B. Set speed switch
- C. Brake release relay

6. Using workbook diagram Figure 12, answer this question.

When is there power at all three terminals of the regulator connector?

- A. ON switch on
- B. Brakes applied
- C. Set speed switch at first detent

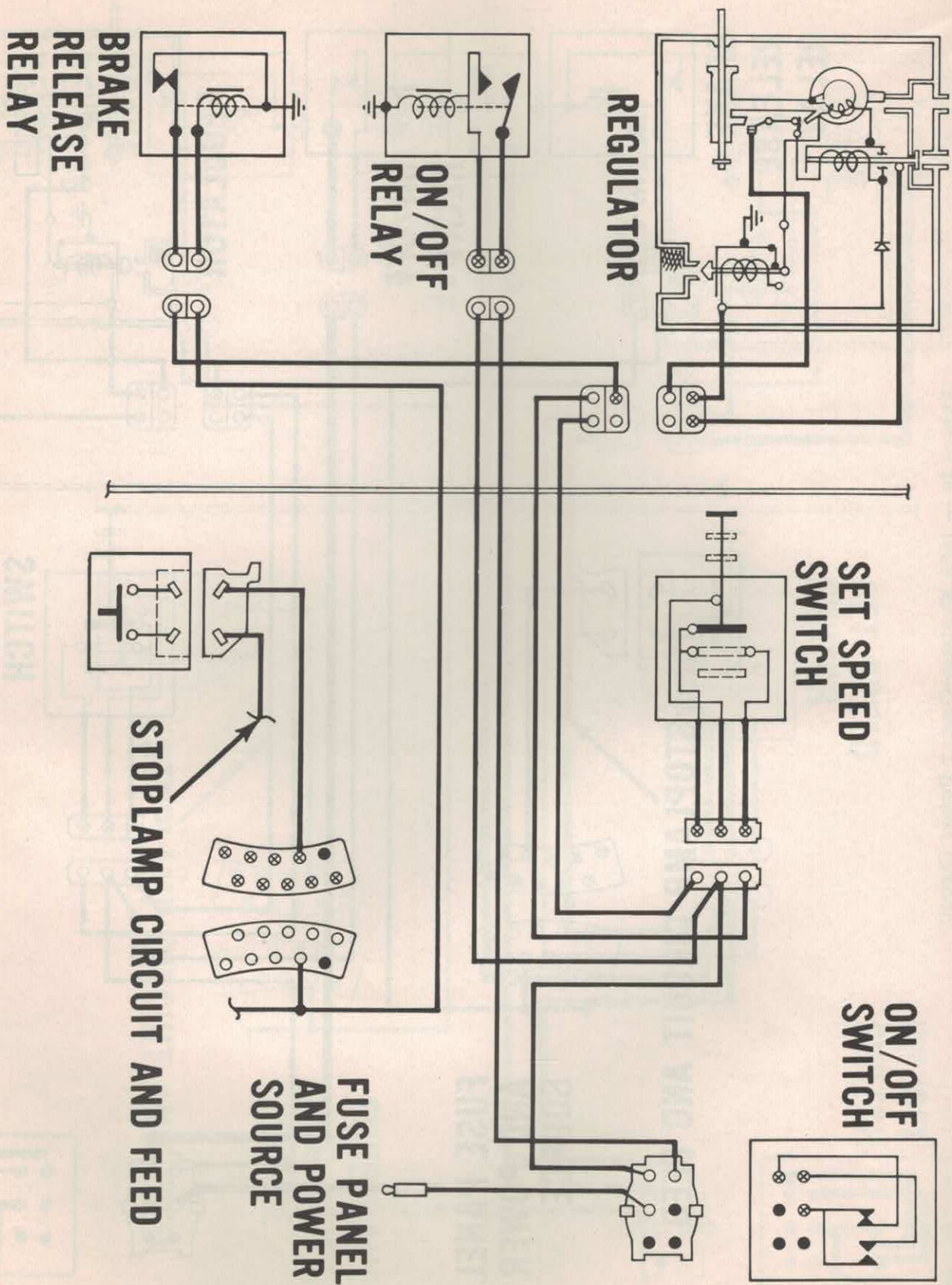


Figure 9 — 1969 Mustang-Cougar Speed Control

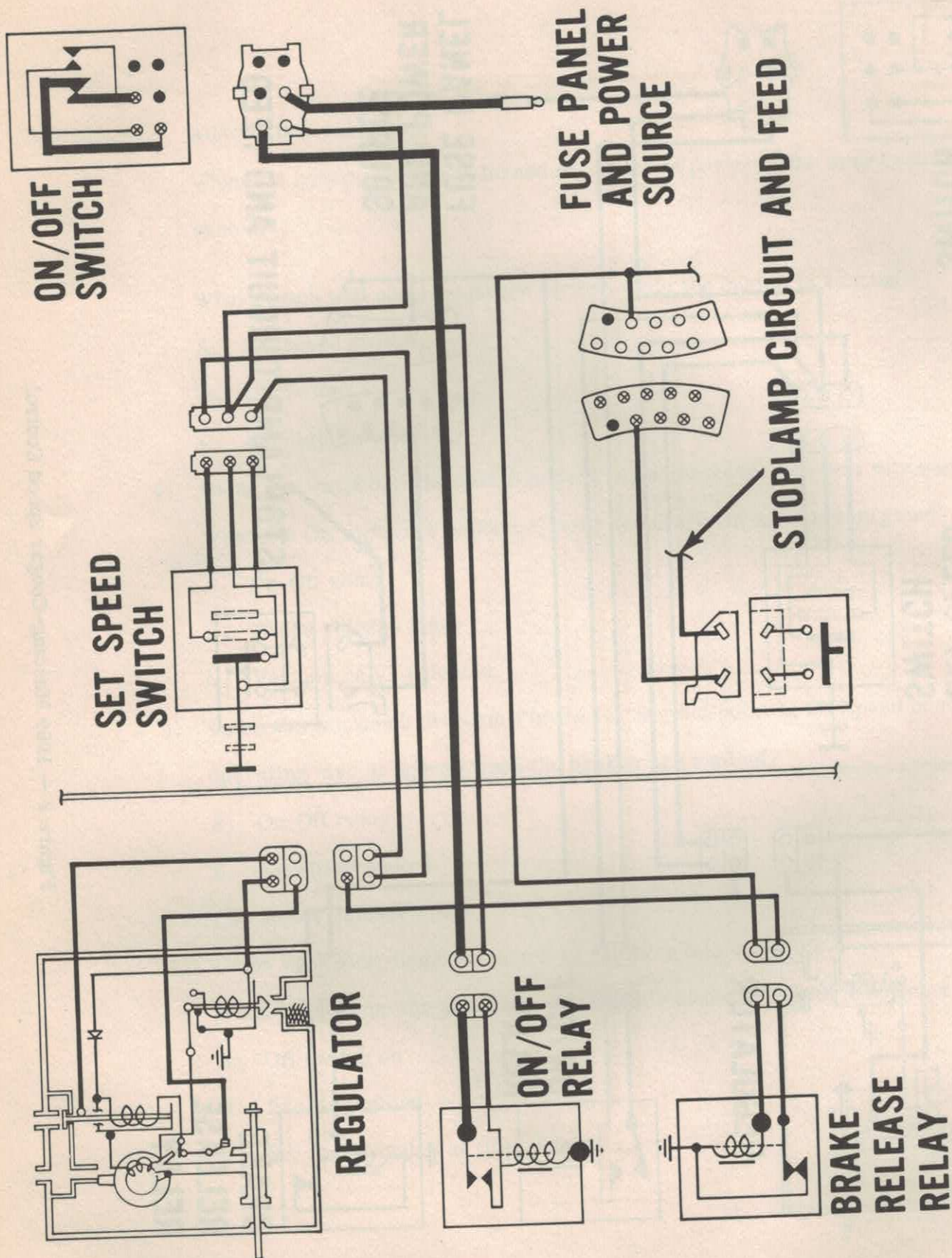


Figure 10 — 1969 Mustang-Cougar Power Circuit

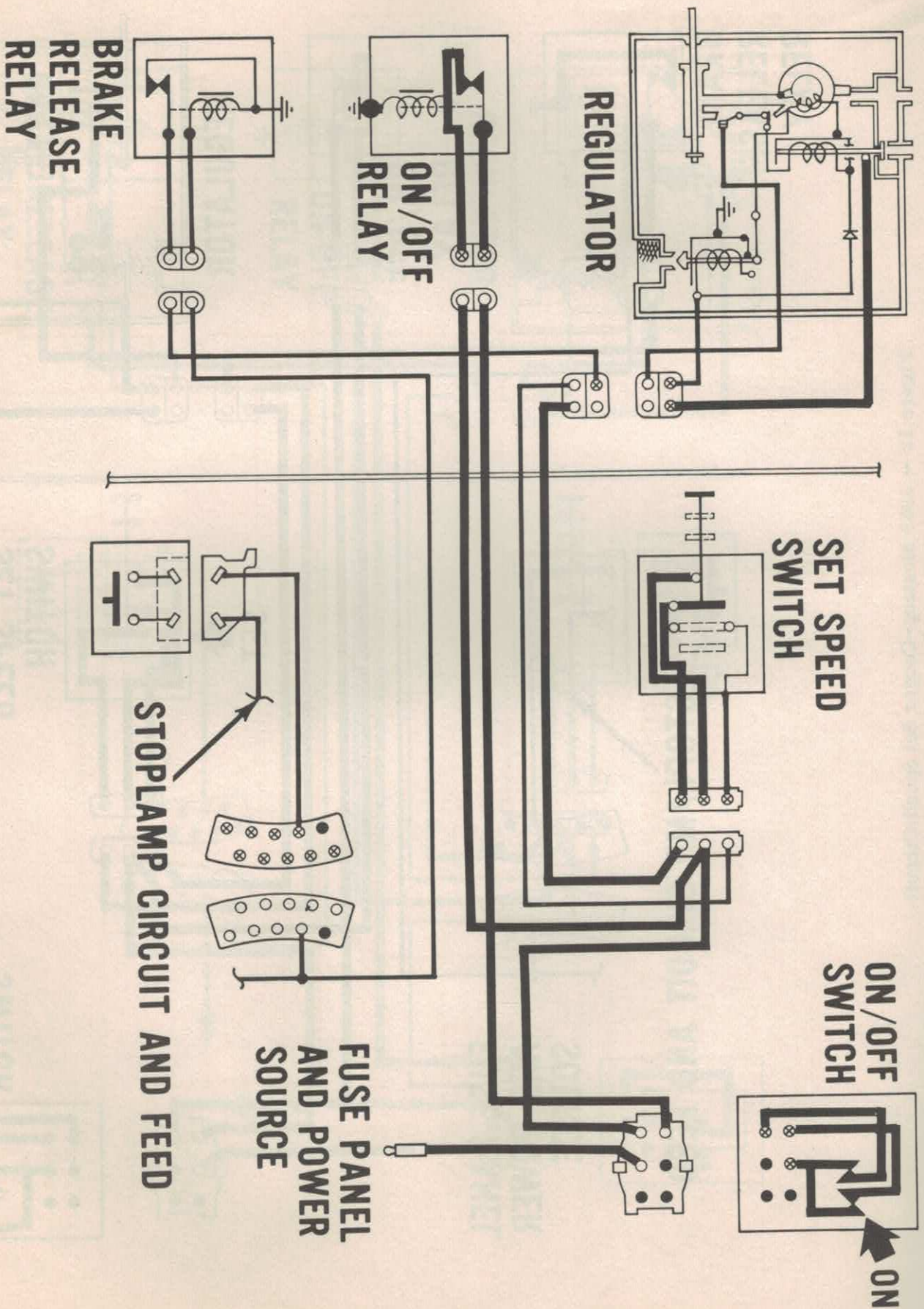


Figure 11 — 1969 Mustang-Cougar On Circuit

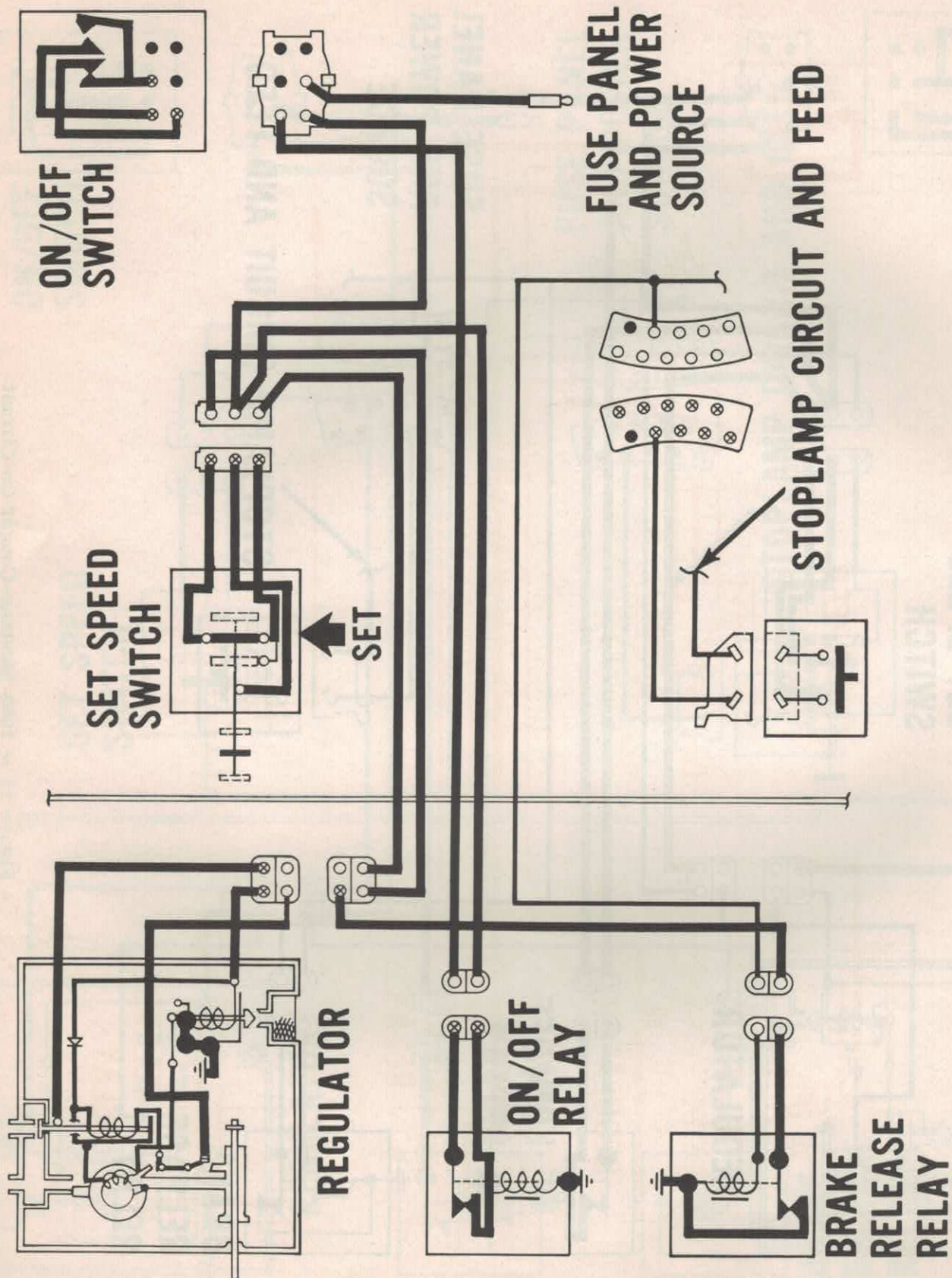


Figure 12 — 1969 Mustang-Cougar Set Speed Circuit

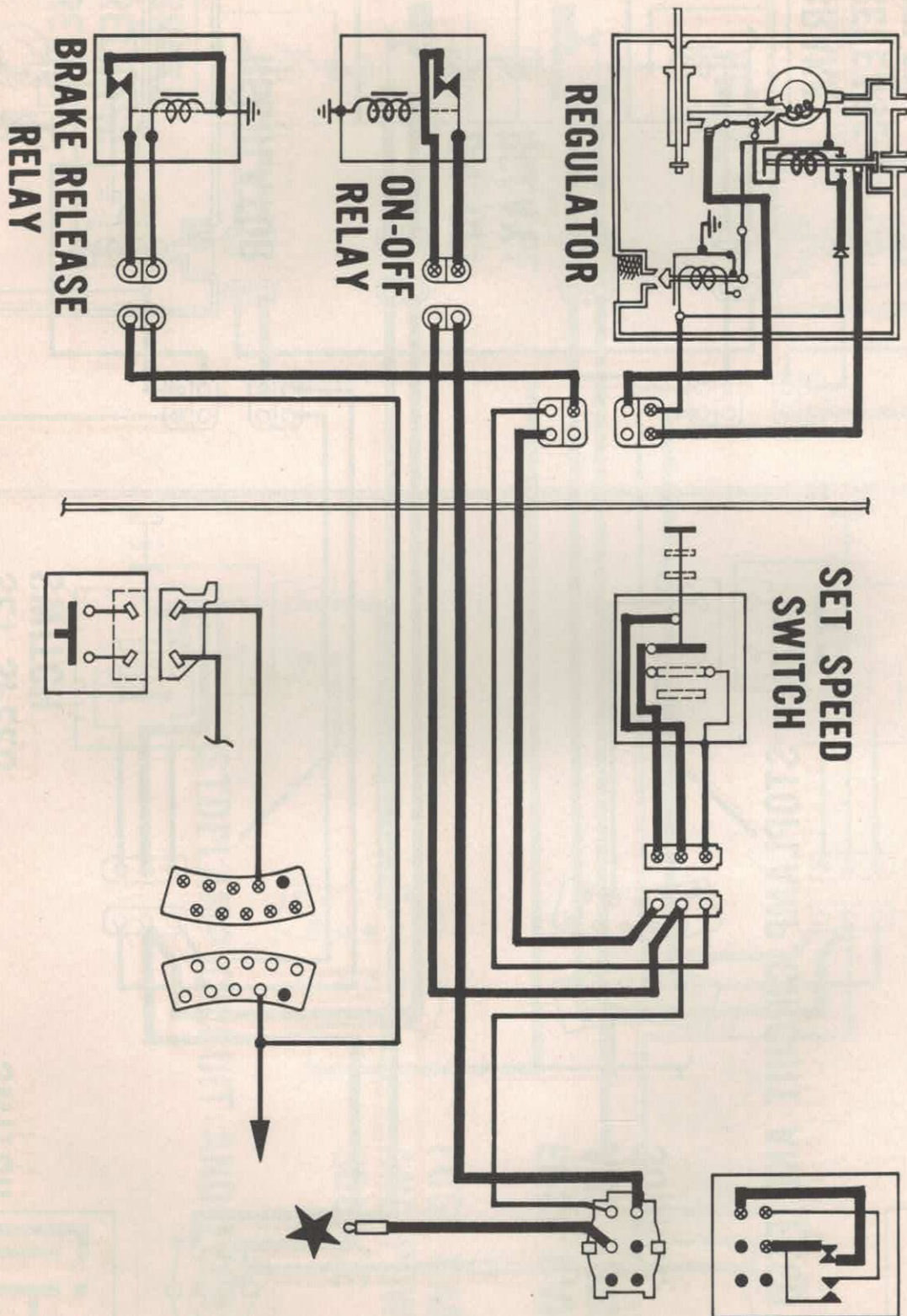


Figure 13 — 1969 Mustang-Cougar Cruise Circuit

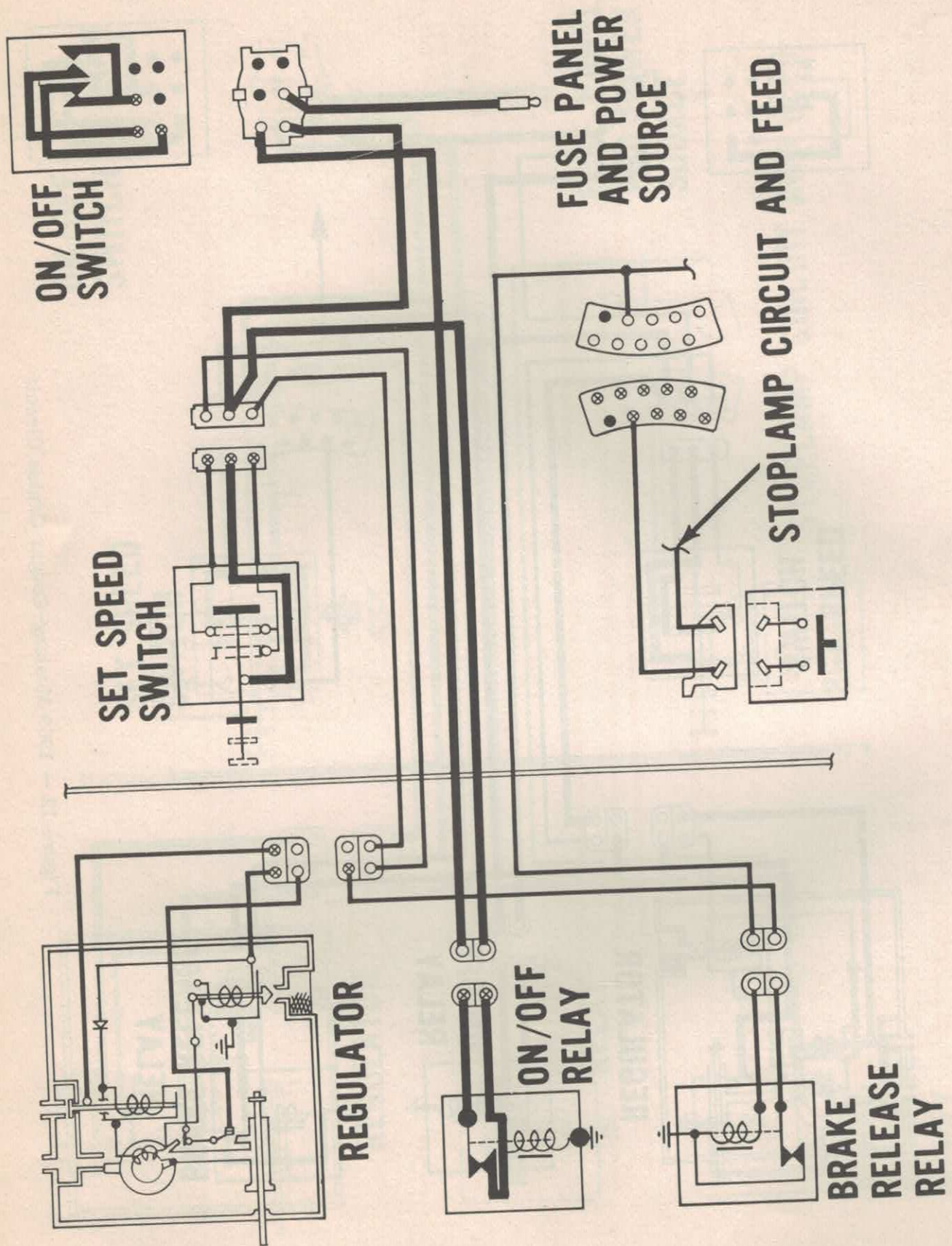


Figure 14 — 1969 Mustang-Cougar Coast Circuit

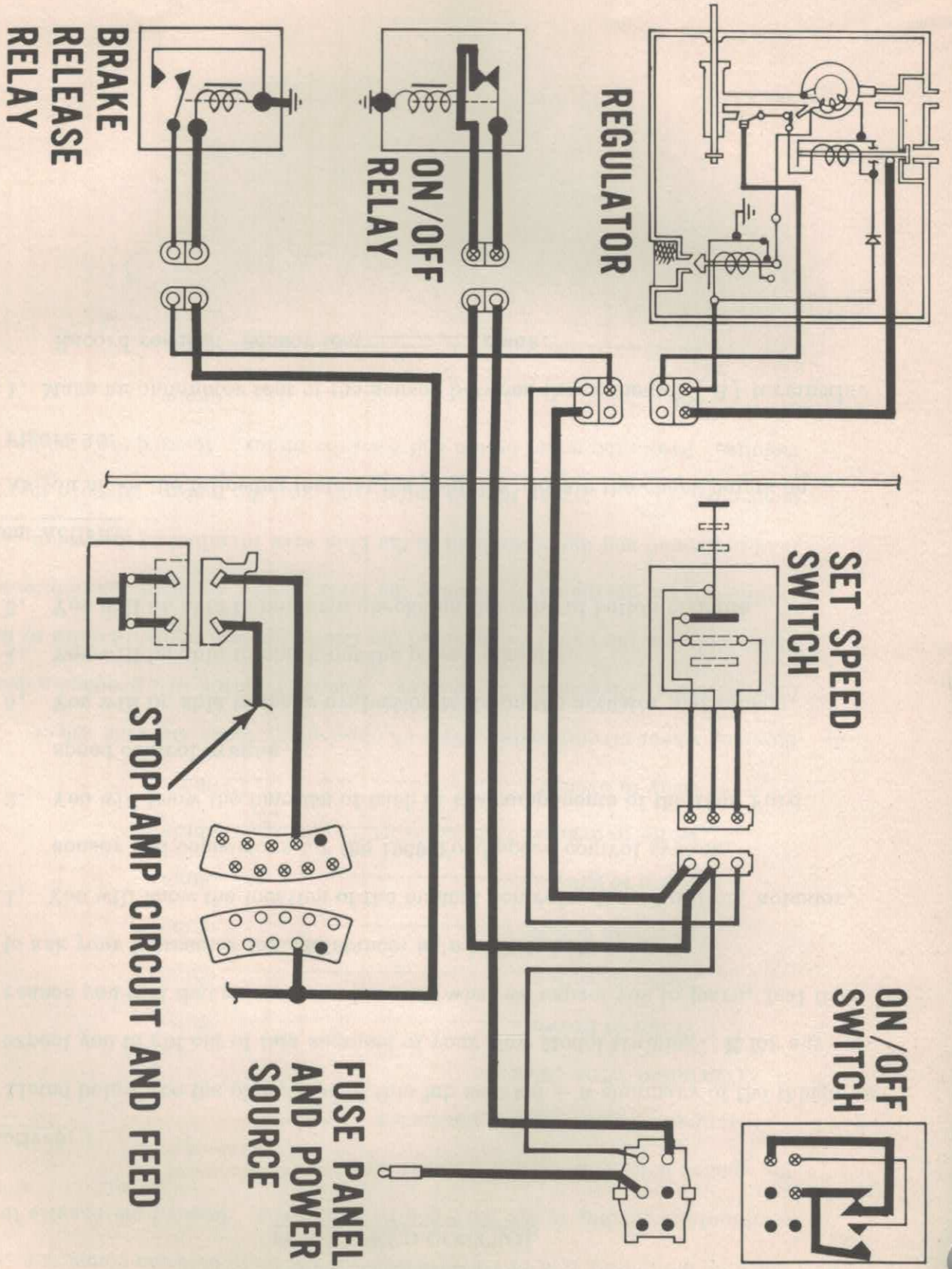


Figure 15 — 1969 Mustang-Cougar Brake Circuit

LAB SESSION SC-III
FORD SPEED CONTROL

Objectives:

Listed below are the objectives of this lab session — a summary of the things we expect you to get out of this segment of your New Model training. If for any reason you feel that you are not learning what we expect you to learn, feel free to ask your instructor for assistance; he's here to help you.

1. You will know the location of the manual controls, the amplifier, actuator, sensor and connectors for the 1969 Ford speed control system.
2. You will know the function of each of the components of the 1969 Ford speed control system.
3. You will be able to make evaluation tests on the actuator and sensor.
4. You will be able to check out the power circuits.
5. You will be able to perform checks on the control button circuits.

Student Activity:

As you make the following tests at the vehicles, locate the check points on Figure 16.

1. Make an ohmmeter test of the sensor between the connector (B) terminals.

Record results. Sensor test _____ ohms.

2. Make an ohmmeter test of the actuator. Make tests between connector terminals according to the wire colors as follows. Record the results in the spaces below.

Actuator Tests — White connector (A)
(Terminal Wire Colors)

Violet to brown _____ ohms

Violet to yellow _____ ohms

Brown to yellow _____ ohms

White to gray _____ ohms

White to orange _____ ohms

Gray to orange _____ ohms

3. Steering wheel circuit tests. With an ohmmeter, make steering wheel circuit tests. Disconnect the battery. The OFF button will produce a dead short and with the battery connected the ON button will apply 12 volts to the ohmmeter and permanently damage the instrument. Connect one ohmmeter lead to ground and the other lead to the blue wire terminal in the green connector (C). Press the set button and read the meter. Record the results. Press the coast button and read the meter. Record the results.

Set _____ ohms

Coast _____ ohms

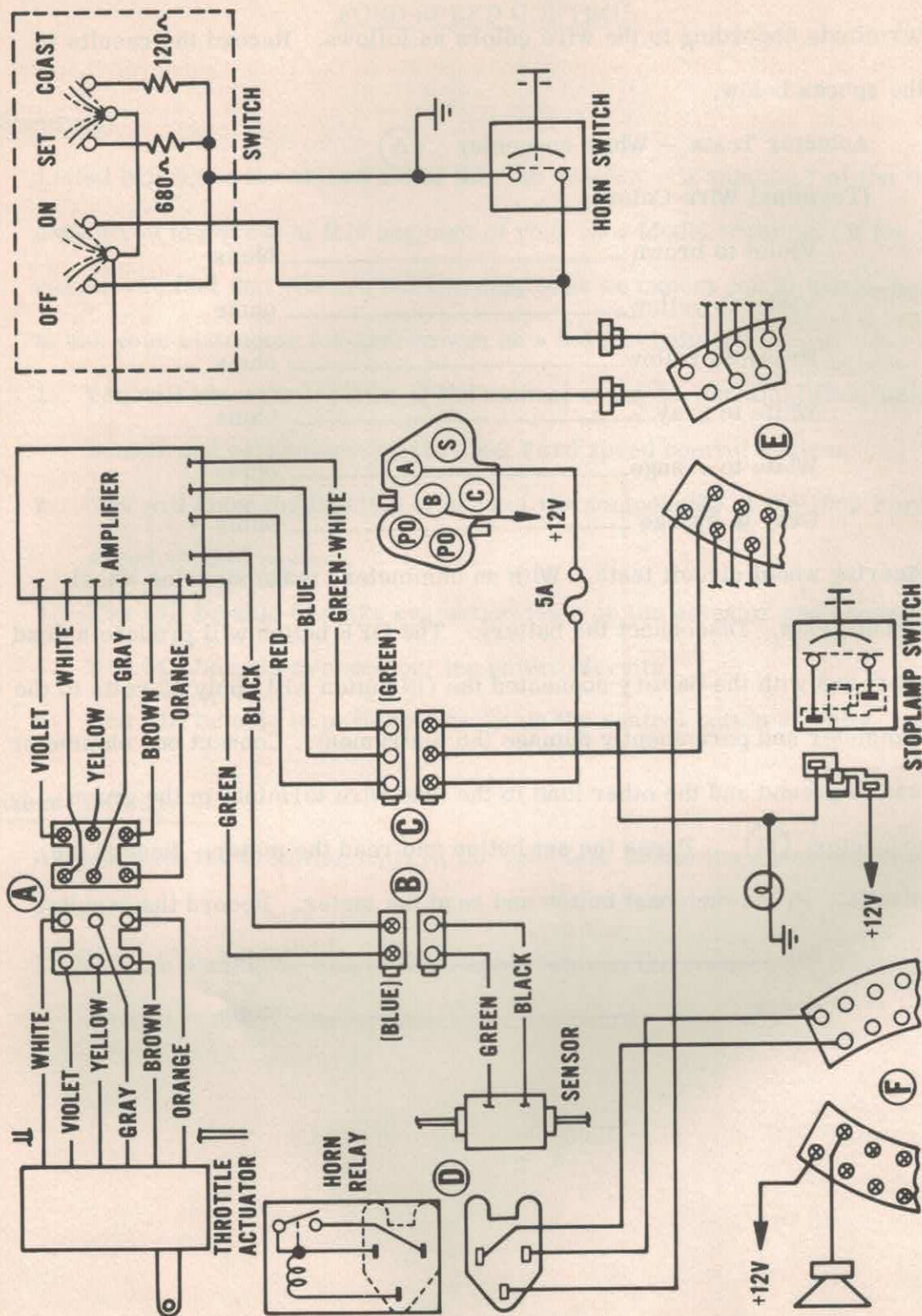


Figure 16 — 1969 Ford-Mercury Speed Control

THUNDERBIRD SPEED CONTROL HIGHLIGHTS

A simplified diagram of the components and circuits of the 1969 Thunderbird speed control system is shown in Figure 17.

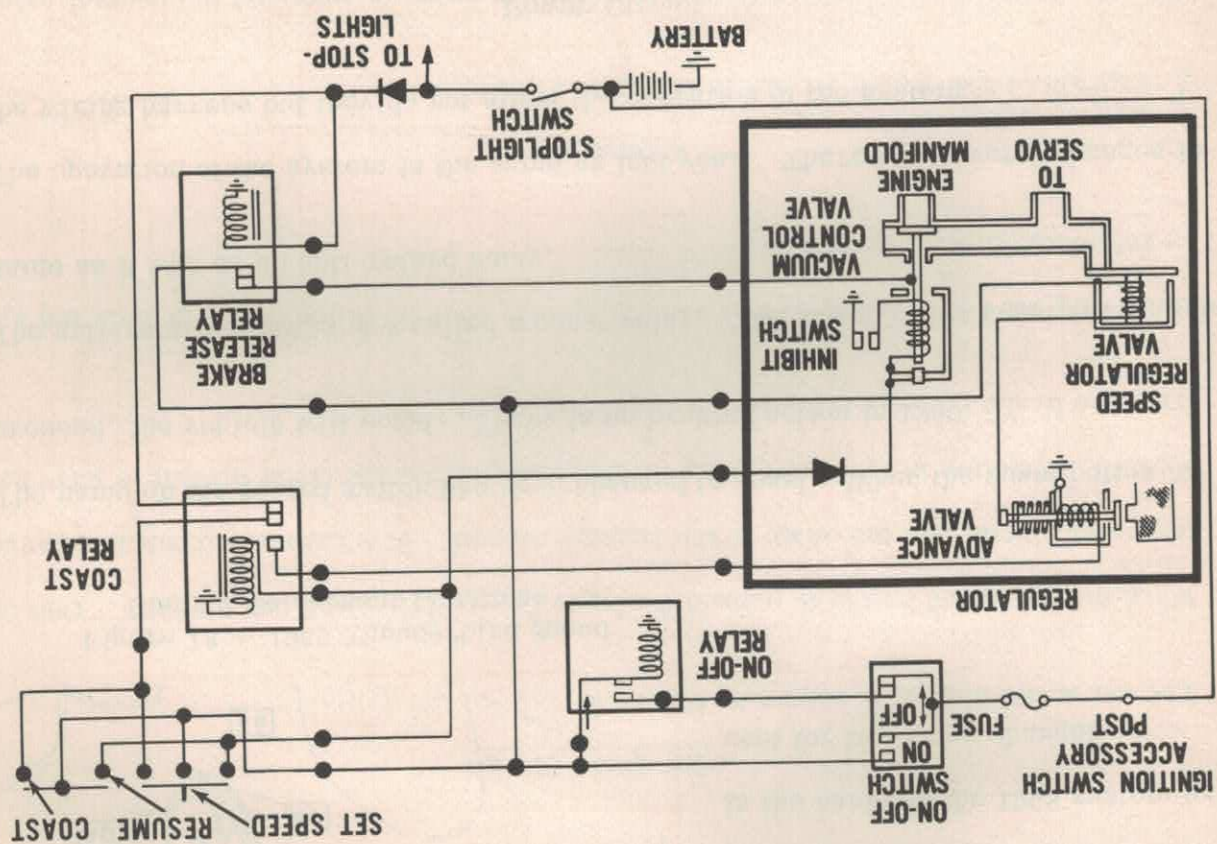


Figure 17 — 1969 Thunderbird Speed Control

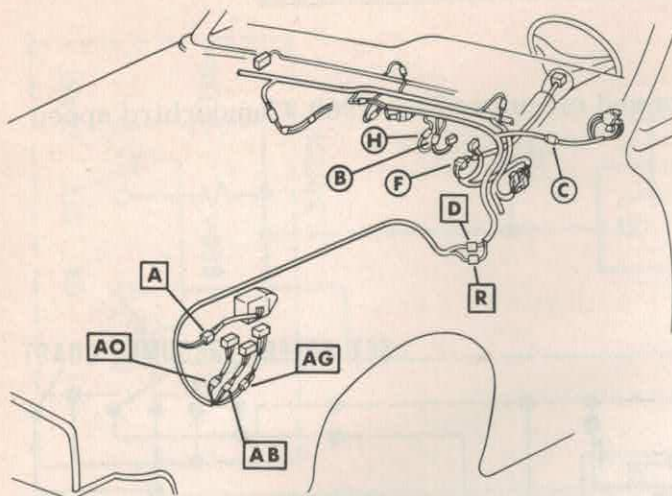


Figure 18 — 1969 Thunderbird Speed Control Component Locations

There are three relays in the 1969 Thunderbird speed control system (Figure 18); the ON/OFF relay, the brake release relay and the coast relay. The balance of the system is the same as the 1968 system except for two name changes.

The name on the retard switch has been changed to coast. When the coast button is pressed, the vehicle will coast. There is no braking action in 1969.

The anti-retard relay is now called a coast relay. The action of the coast relay is the same as it was as an anti-retard relay.

The operation of the system is the same as last year. There are several changes in the wiring harness but they do not affect the operation of the system.

Power Circuit

The power circuit is shown in Figure 2.

When the ignition switch is turned on, power is available to the fuse panel . . . through the on/off switch to the on/off relay.

On Circuit

The ON circuit is shown in Figure 3 and is the circuit that is energized when the on switch is closed.

The power is routed through the brake release relay.

The on/off relay solenoid is energized closing the switch. This switches the power circuit to the operating circuit. This power will hold the relay switch closed after the ON switch is released.

Power is also available in the regulator to the vacuum valve and the control valve.

Set Speed Circuit

The set speed circuit is shown in Figure 4.

When the set speed button is pushed it closes two switches and two circuits. One is the coast circuit and the other is the resume circuit. The resume circuit has caused a switching action in the coast relay so that power from the coast circuit is switched from the brake release relay to the regulator valve.

Releasing the set speed switch at vehicle speeds over 30 miles per hour sets the system in automatic control or cruise.

Cruise Circuit

A diagram of the cruise circuit is shown in Figure 5.

The regulator vacuum valve is open, the advance valve is open and the control valve is controlling the system.

When the set speed button was pushed it closed two switches. One switch closed the coast circuit and the other switch closed the resume circuit.

Coast Circuit

A drawing of the coast circuit is shown on Figure 6. When the coast switch is closed without the resume switch closed, power is applied to the brake release relay solenoid and the switch is opened.

Power is cut off to the regulator vacuum valve. The valve closes. The speed control system is shut down.

The system will coast the same as removing your foot from the accelerator pedal.

Resume Circuit

To get the system back in operation, the resume button must be pressed. This closes the resume circuit switch, turning on the resume circuit (Figure 7).

The resume circuit powers the regulator vacuum valve solenoid. This action opens the valve and applies system power to the solenoid so that it remains under power when the resume switch is opened.

Brake Application — Braking Circuit

When the brakes are applied the speed control system is shut off (Figure 8). With the brakes applied the stoplamp switch is closed. Power is applied to the stoplight circuit and to the coast circuit. The brake release relay solenoid is energized opening the operating circuit.

With the operating circuit open . . . the vacuum valve closes. There is no vacuum to the servo.

When the brake pedal pressure is released the stoplamp switch is opened and power is cut off from the coast circuit. Power is again available at the vacuum valve.

Pressing the resume button, closing the resume circuit, applies power to the vacuum valve solenoid. The vacuum valve opens and the system is back in operation.

System Tests

Tests for the switches and relays are the same as those used in 1968.

Circuit power tests for the complete system can be made at the four connectors near the regulator in the engine compartment.

If the system is okay electrical power will show at the connector terminals as indicated.

A 12 volt test light will serve as a testing device.

A check at the four connectors near the regulator will indicate that the various circuits within the speed control system are operational. For instance at connector AG., middle terminal . . . ignition switch ON.

If there is power, the circuit back to the ignition switch is okay.

At connector A, violet wire . . . ignition switch ON.

Control switch on.

The circuit is complete from "A" connector back through the on/off relay.

The vacuum portion of the system is the same as last year.

MUSTANG SPEED CONTROL HIGHLIGHTS

The 1969 Mustang speed control system is very similar to the 1968 system. Figure 19 shows the engine compartment installation of the 1969 system.

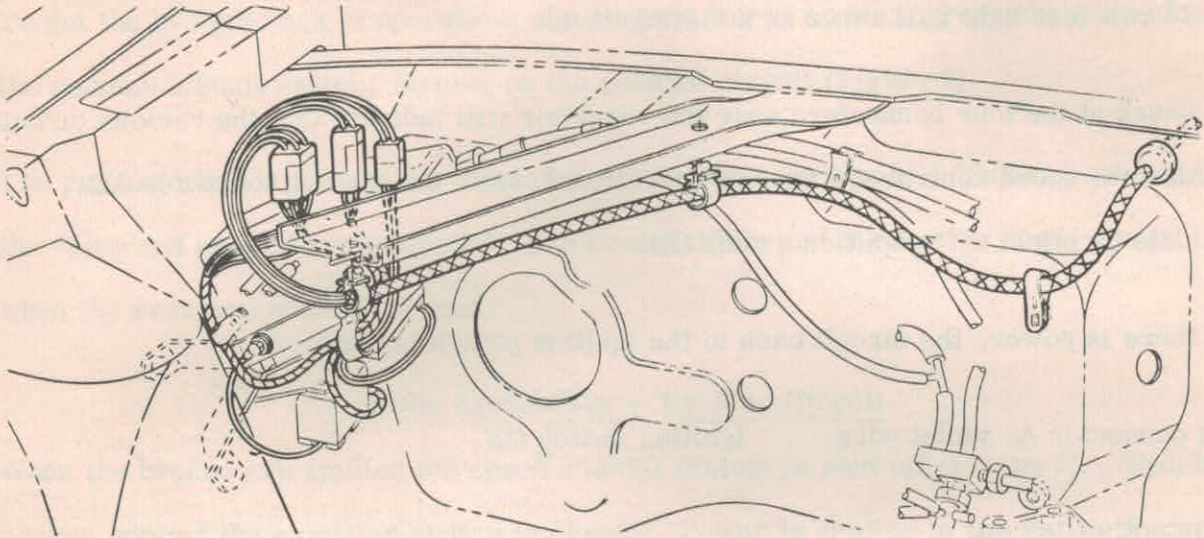


Figure 19 — 1969 Mustang Engine Compartment

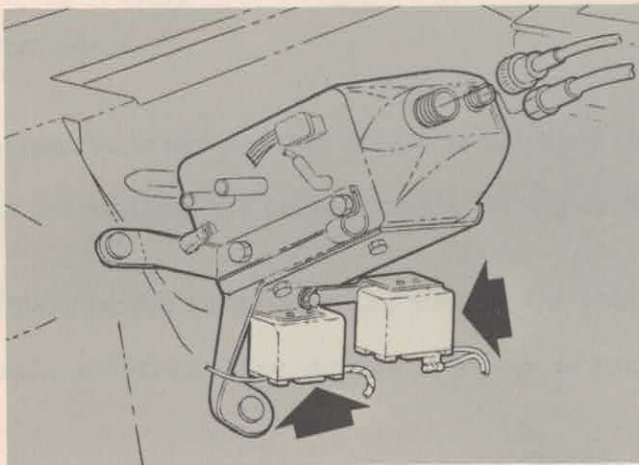


Figure 20 — Mustang Relays

In 1968 there was one relay. The brake release relay.

In the 1969 Mustang speed control there are two relays (Figure 20). An on-off relay and a brake release relay.

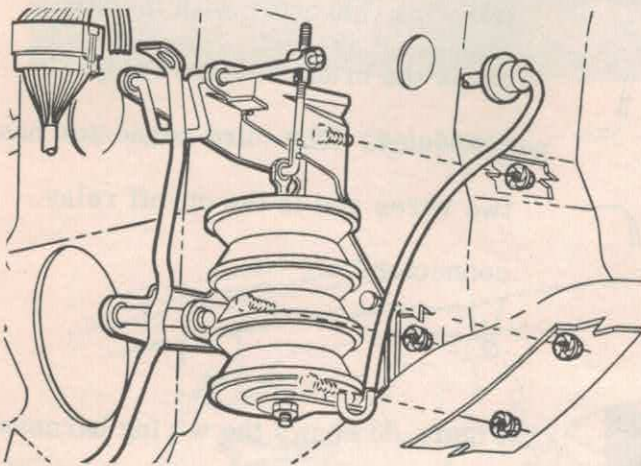


Figure 21 — Mustang Servo

In 1968 there was a servo accelerator connecting mechanism assembly.

For 1969 the Mustang speed control servo has been restyled and moved to the driver's side of the dash panel (Figure 21).

The vacuum hose from the regulator to the servo now goes through the dash panel.

Vacuum from the regulator operates the servo the same as last year but the 1969 Mustang servo is now attached to a bell crank that actuates the accelerator pedal lever.

Clearance between the bell crank and the accelerator pedal lever is pre-set at assembly and should require no adjustment.

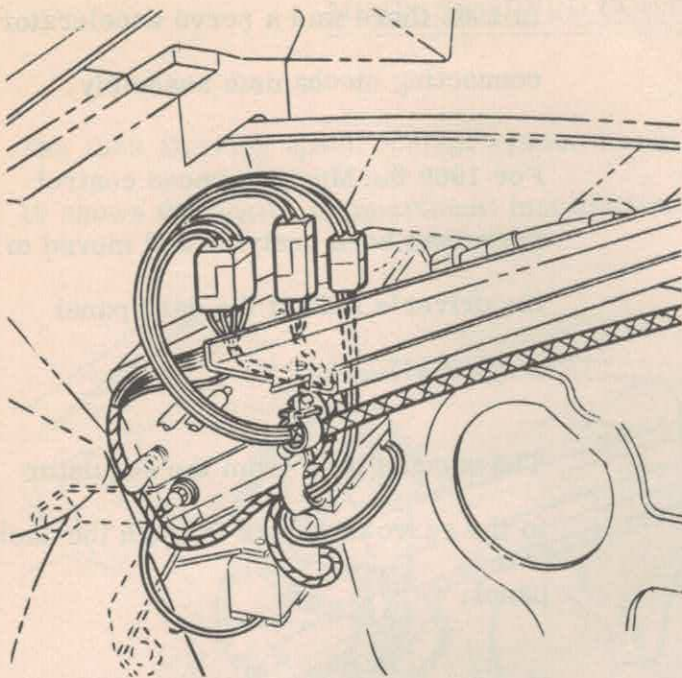


Figure 22 — Engine Compt. Wiring

The engine compartment wiring harness for the 1969 system is shown in Figure 22. There are three connectors near the regulator. The connector with three terminals is the regulator connector. The two wire connector with the step cut is the brake release relay connector. The third connector has two wires and is the on-off relay connector.

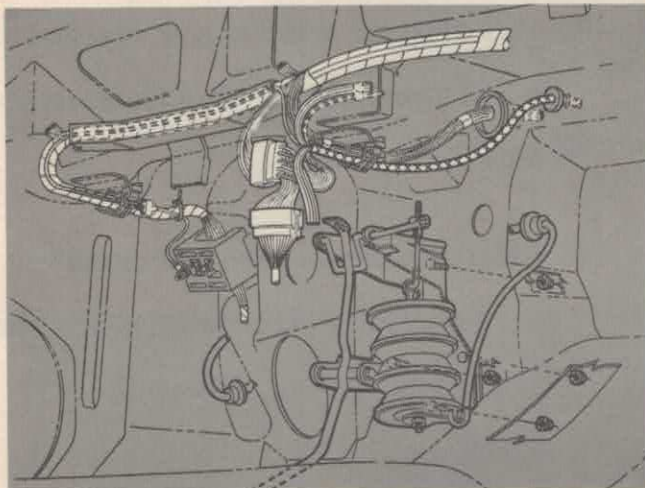


Figure 23 — Passenger Compartment Wiring

Figure 23 shows the wiring harness inside the vehicle. The power supply wire for the speed control is plugged into a lead that goes to the fuse block.

Three wires from the harness go to the on-off switch and three wires go to the turn signal lever.

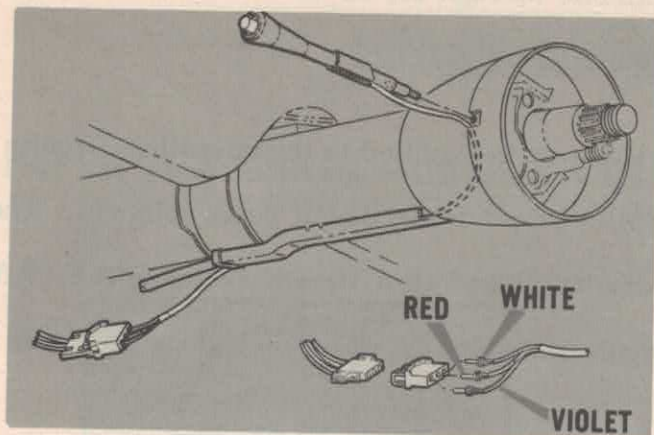


Figure 24 — Turn Signal Wiring

Three speed control wires from the turn signal lever are routed through the steering column. These wires must be removed from the connecting plug if it is necessary to change the turn signal lever (Figure 24). It is important that these wires be properly installed in the connector sleeve.

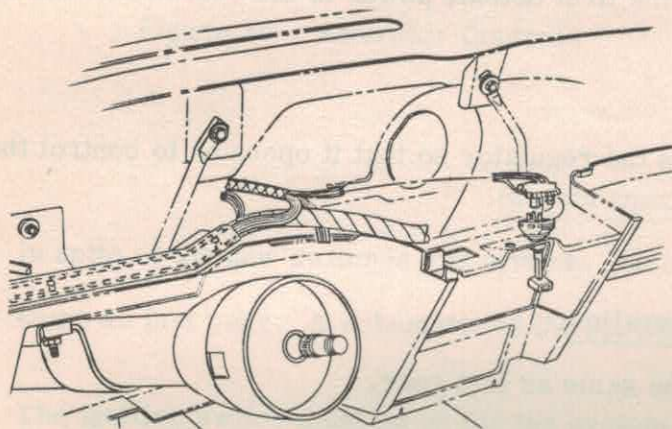


Figure 25 — On/Off Switch and Wiring

There will be no problem of mixing wires at the on-off switch. The connector is a part of the wiring harness (Figure 25).

Figures 9 thru 15 show the simplified wiring diagrams of the system circuits. Notice that in the 1969 system there is a new on-off switch, and a new on-off relay. Only the on-off circuit has changed. The operating circuits are the same.

Using the diagrams let's review the operating circuits of the system . . . If we know how the circuits operate we'll know where to make tests in diagnosing problems.

When the ignition switch is on (Figure 10) power is available through the fuse block to the connector. This is where the speed control connects to the vehicle electrical system.

With the ignition switch ON, power is available through the on-off switch to the on-off relay. The power stops because the switch is open.

When the ON switch is closed, (Figure 11) power is supplied to the operating circuits of the system. Closing the ON switch applies power to the on-off relay solenoid. The solenoid closes the relay switch and it remains closed after the ON switch opens. After the relay switch is closed, the power circuit energizes the solenoid and the switch is held shut.

Next is the set speed circuit. (Figure 12)

When the set speed button is pressed to the first detent, power is introduced into the set speed circuit.

Power in the set speed circuits activates the regulator so that it operates to control the vehicle speed.

Operation

Details of the regulator operation are the same as last year.

After the speed has been set in the system the vehicle will cruise under automatic speed control. This is the cruise circuit. (Figure 13)

To slow down the car without applying the brakes, press the set speed button to fully depressed or second detent position. The vehicle will coast, (Figure 14) the same as removing the foot from the accelerator pedal. When in coast, the operating circuit is disconnected in the set speed switch.

When the brakes are applied system operating power is cut off, (Figure 15). This is how it happens. When pressure is applied to the brake pedal the stoplight switch is closed. Power is applied to the brake release relay solenoid. The brake release relay switch is opened. The system operating circuit is opened and the operating power is cut off.

FORD SPEED CONTROL HIGHLIGHTS

Ford has a new speed control system for 1969. Everything about the system is new.



Figure 26 — Operator Controls

Operator Controls

All operator controls are on the steering wheel cross spoke (Figure 26). The controls are labeled OFF, ON, SET-ACC and COAST.

System Operation

In spite of the new switches and system, the effective operation of the vehicle is the same as last year. A schematic of the system is shown in Figure 16.

The ignition switch must be on for the system to operate and the vehicle speed must be over 30 miles per hour.

As soon as the ignition switch is turned on, power is available to energize the system.

On Control

The system is ready for operation when the ON control button is pushed. The ON button is a spring loaded switch that opens when the pressure is released. But by just pressing on the button . . . closing the switch . . . the operating signal has been placed in the system. This operating signal will be remembered until it is erased by pressing the OFF button or by turning off the ignition switch.

Set Control

The SET button is a spring loaded switch which opens when pressure on the button is released.

Pressing and releasing the SET button closes and opens the switch. This action sends a signal to the system to hold the vehicle speed. The signal is held in the memory when the SET switch is opened.

If the SET button is held down, the signal will tell the system to increase the speed.

Vehicle speed will increase until the SET button is released and the switch is opened.

After the speed is set the cruising speed will be automatically maintained.

Coast Control

Gradual slowing of the vehicle may be accomplished by pressing the COAST button.

As long as the COAST button is held down the coast switch is closed and the vehicle will continue to coast. When the COAST button is released the vehicle speed will automatically be maintained at that speed. That is, unless the speed is below 30 mph.

When the brakes are applied the system is shut OFF.

Cruising speed must be re-established as previously described.

Now let's look at the system components.

System Components

Besides the control switches there are three other components in the system. The three components are the throttle actuator, the sensor and the amplifier.

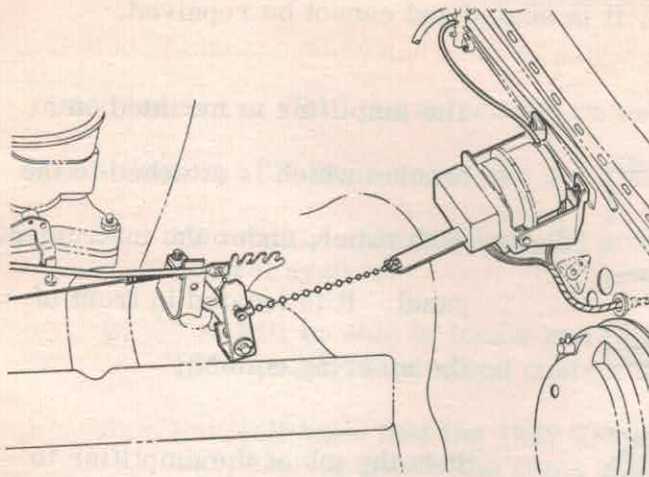


Figure 27 — Actuator

The actuator assembly is attached to the dash panel in the engine compartment. The throttle actuator assembly combines three functions found in the 1968 system, the servo, the vacuum valve, and the control valve.

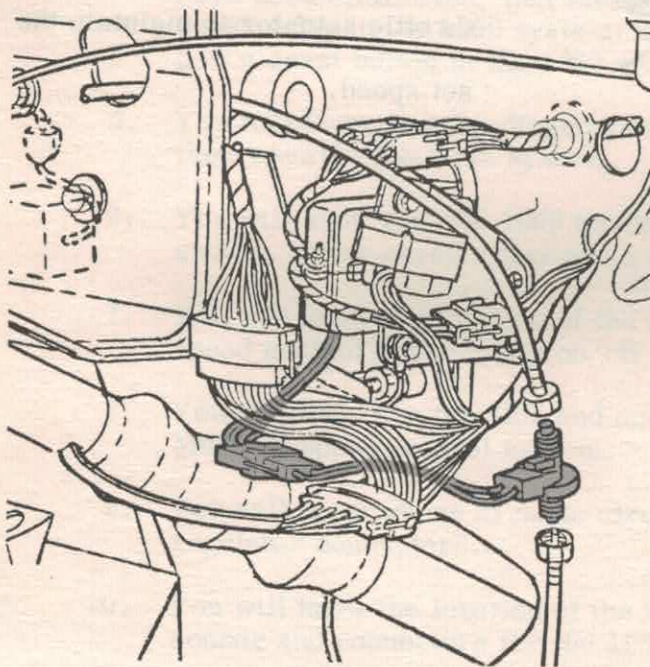


Figure 28 — Sensor and Connector

The sensor is connected into the speedometer cable below the speedometer. The sensor picks up the vehicle speed from the speedometer cable and sends this speed signal to the amplifier.

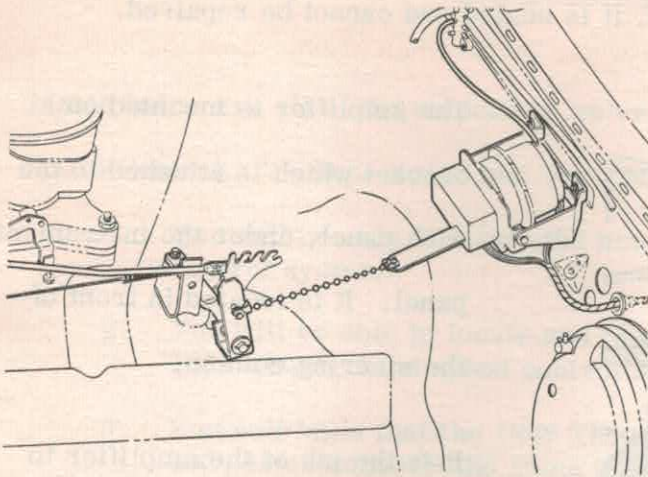


Figure 27 — Actuator

The actuator assembly is attached to the dash panel in the engine compartment. The throttle actuator assembly combines three functions found in the 1968 system, the servo, the vacuum valve, and the control valve.

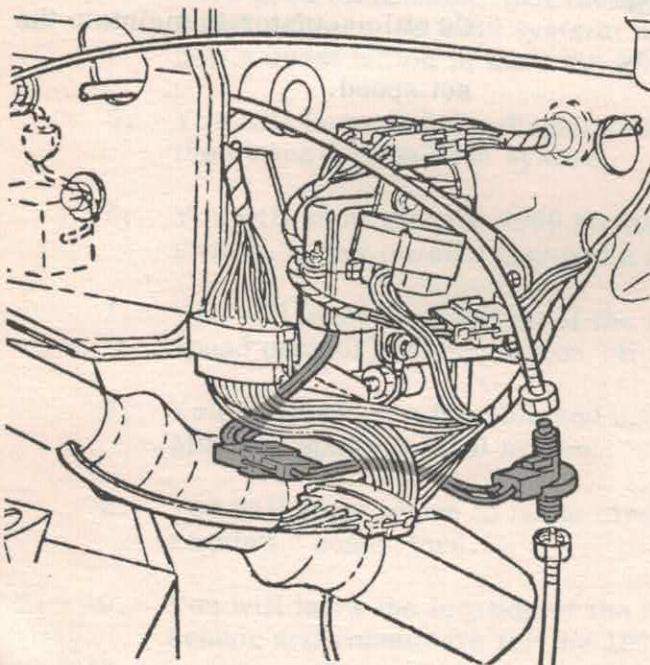


Figure 28 — Sensor and Connector

The sensor is connected into the speedometer cable below the speedometer. The sensor picks up the vehicle speed from the speedometer cable and sends this speed signal to the amplifier.

The amplifier is a black box part, that is, it is sealed and cannot be repaired.

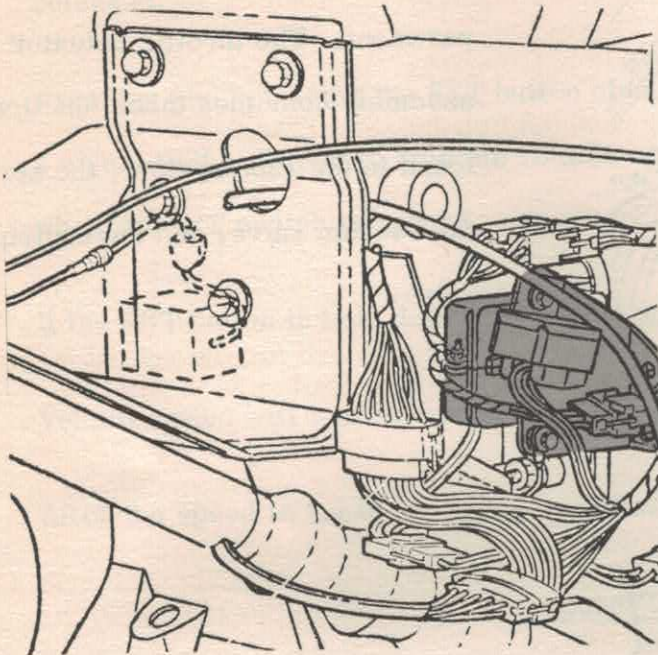


Figure 29 — Amplifier

The amplifier is mounted on a bracket which is attached to the dash panel, under the instrument panel. It is located in front of the steering column.

It is the job of the amplifier to take the speed signal from the sensor, compare it with the set speed signal and then signal the throttle actuator to maintain the set speed.

COURSE OBJECTIVES

Listed below are all of the objectives we've established for the training program on Speed Control. We hope we've met our goals.

1. You will be able to locate the new control of the 1969 Thunderbird speed control system.
2. You will be able to locate and identify the new operating components of the 1969 Thunderbird speed control system.
3. You will know that the 1969 Thunderbird speed control system in operation and performance is the same as the 1968 system except for the retard feature which has been deleted; that the components and controls are located the same in 1969 as in 1968.
4. You will know that while there were five relays in 1968, there are three in 1969; that the stoplight relay and the retard disconnect relays have been discontinued; that the brake retard feature, and thus the brake retard valve, have been eliminated; that the anti-retard relay in the 1968 system is now a coast relay in the 1969 system; that the retard button in the 1968 system is now a coast button in the 1969 system.
5. You will know that the diagnosis and tests for the 1969 system are the same as they were for the 1968 system.
6. You will know that the 1969 Mustang speed control system has a new on/off switch, a new on/off relay and a new servo assembly mechanism.
7. You will know the location of the new components found in the 1969 Mustang speed control system, the on/off relay and the servo assembly mechanism.
8. You will know the function and operation of the components in the 1969 Mustang speed control system.
9. You will know where to make circuit tests at the terminals of the relay and regulator connectors.
10. You will know the location of the manual controls, the amplifier, actuator, sensor and connectors for the 1969 Ford speed control system.
11. You will know the function of each of the components of the 1969 Ford speed control system.
12. You will be able to make an evaluation test on the 1969 Ford speed control actuator and sensor.
13. You will be able to check out the 1969 Ford speed control power circuits.
14. You will be able to perform checks on the 1969 Ford speed control control button circuits.

NOTES

NOTES