SECTION C

SIGNAL SYSTEMS

ALL SERIES

CONTENTS

DIVISION I

TROUBLE DIAGNOSIS

120-18 TROUBLE DIAGNOSIS OF HORNS

If a horn switch contact is constantly grounded, the horns will not stop blowing or if a contact cannot be grounded, the horns will not blow.

There are two basic troubles, which may be caused by a defective horn relay. If neither horn will blow at all, this trouble may be caused by the relay points not making contact. Or if horns will not stop blowing, this trouble may be caused by relay points sticking.

A. Horns Will Not Blow

When horns fail to blow, first check wiring circuit and relay because even a faulty horn will generally make some sort of noise if current is getting to it. If horns are at fault, or tone is poor, adjust each horn for specified current draw as instructed in subparagraph e.

1. Break circuit at steering column connector and ground black with light blue stripe wire coming from horn relay. If horn now blows, horn relay ground circuit in steering wheel has an open. Reconnect steering column connector and check horn wire and horn contacts. Circuit from steering column connector to contacts in steering wheel must be complete.

2. Check wiring connections and wiring throughout horn circuit. See Figure 120-33 for wiring diàgram.

3. If horns still do not blow when wire at steering column is grounded, substitute a gknown good relay. If horns now blow, original relay is defective and must be replaced.

B. Horns Will Not Stop Blowing

1. Break circuit at steering column connector. If horns stop blowing, relay is okay but horn control circuit into steering wheel is grounded. Check horn wire and contacts in steering wheel.

2. Check to see if control circuit is grounded between relay and steering column connector.

3. If horns still do not stop blowing, substitute a known good horn relay.

C. Horn Tone is Poor

If either horn blows only part of the time or tone is poor, adjust current draw at horn, subparagraph e. Poor horn tone can also be caused by horn projector contacting the body.

120-19 TROUBLE-SHOOTING DIRECTION SIGNAL AND HAZARD WARNING FLASHER SYSTEMS

A. Trouble-Shooting Direction Signal System

When either a front or rear signal bulb is burned- out, the indicator light for that direction will stay on. This immediately notifies the driver when any signal light quits operating.

Standard flashers are made to operate either two lamps or three lamps. If one of the lamp bulbs in the circuit burns out, the decreased current draw causes the flasher contacts to close and stay closed. In the same way, if a three lamp flasher is installed by mistake in a car having only two lamp bulbs per side, the lights will light but won't flash. Conversely, if a two lamp flasher is used on a car having three lamps, the too high current draw will cause the lights to flash too fast. See paragraph B for trouble shooting directional signal system.

B. Directional Signal Trouble Diagnosis Chart

Condition	Possible Cause	Correction
Turn signal operates normally one direction but indicator light stays on other direction.	1. Burned out bulb.	1. Place turn signal in direction where indicator light stays on, check turn signal bulbs and replace bulb not lighted.
	2. Open circuit.	2. Check continuity through all connectors. Check for good ground.
Turn signal operates erratically both directions.	1. Defective flasher.	1. Replace flasher.
	2. Intermittent ground.	2. Check front and rear lamp grounds.
Turn signal does not operate in either direction.	1. Blown fuse.	1. Replace fuse. If fuse again blows, check for pinched or grounded wire between fuse and flasher. Insulate.
	2. Defective flasher.	2. Replace flasher.
Turn signal operates normally one direction, but no indicator light other direction - just rapid flasher clicking.	1. Grounded wire between flasher and lamp.	1. Open up Fisher connector to locate trouble to front or rear. Locate pinched wire and insulate. NOTE: Fuse will not blow because flasher acts like a circuit breaker.

	2. Grounded bulb.	2. Replace bulb.
Flashing speed slows down when engine is idling with heavy accessory load.	1. This is normal, since flash time will always slow down as voltage to flasher decreases.	1. Replace flasher only if flash rate drops below 15 flashes during a 15 second period.

C. Trouble-Shooting Hazard Warning Flasher System

Since the hazard warning flasher (mounted on the fuse block) is of the heavy duty type, it will flash any number of bulbs (from one to six bulbs) at a constant rate. Therefore, flashing indicator lights do not necessarily mean that *all* signal bulbs are flashing. See paragraph D for trouble shooting chart for hazard warning flasher system.

D. Hazard Warning Lamp Diagnosis

Condition	Possible Cause	Correction
Inoperative	1. Blown fuse.	1. Replace fuse. If fuse continues to blow, locate and repair short-circuit. NOTE: Short may be in stop lamp circuit.
Lamps light but do not flash (fuse is good).	1. Defective flasher.	1. Remove flasher. Connect jumper wire to both flasher socket terminals. Turn on hazard switch and observe all lamps. If all lamps light, replace flasher.
Lamps do not light (fuse and flasher are good.)	1. Open circuit between flasher and steering column connector.	1. Use 12 volt test lamp to locate and repair open circuit between flasher and steering column connector.
	2. Dirty contacts in steering column connector.	2. Clean and align connector contacts.
	3. Defective wiring from steering column connector to turn signal switch or defective turn signal switch.	3. Use 12 volt test lamp to check brown wire on both sides of steering column turn signal connector. Repair wiring or replace turn signal hazard warning switch as necessary.

DIVISION II

DESCRIPTION AND OPERATION

120-20 HORNS AND CONTROL CIRCUIT

A. Horns and Relay

The Delco-Remy electrically operated vibrator type

horns are mounted in the engine compartment. The horns are operated simultaneously by a horn relay which is controlled by the horn switch on the steering wheel. One horn is high pitched and the other is low pitched, so that together they produce a pleasant blended tone.

The horn relay is an electrical switch which closes the circuit between the battery and the horns when the push button is pressed and opens the circuit when the button is released. The relay permits control of the horns with a small amount of current passing through the horn switch contacts.

When the horn switch contacts are closed, a small amount of current flows through the relay winding to ground at the horn switch contact. This magnetizes the relay core which attracts the flat steel relay armature. The armature has a contact point which makes contact with a stationary point to close the horn circuit. When horn switch is released, current stops flowing through relay winding so that the core loses its magnetism; the armature spring then causes contact points to be separated.

B. Horn Relay Ground Circuit

The steering wheel has an actuator bar mounted across the steering wheel. Fastened to the base of the actuator bar, but insulated from it, is a contact plate which is "hot" at all times. When the actuator bar is rocked, the contact plate contacts a ground plate on the steel hub of the steering wheel to ground the horn relay winding, close the relay contacts, and blow the horns. When the actuator bar is released, two springs move the actuator bar and contact plate assembly clear of the ground plate.

Current is supplied to the contact plate by a spring-loaded brush which rides on the contact ring located at the upper end of the steering column. A wire attached to the contact ring runs down the steering column jacket and out under the instrument panel. The wire from the horn relay connects at this point.

120-21 DIRECTION SIGNAL AND HAZARD WARNING FLASHER SYSTEMS

A. Direction Signal Lamps and Indicators

The front direction signal light is produced by the 32 CP filament in the dual purpose bulb mounted in the front parking lamp. The rear direction signal light is produced by the 32 CP filament in the bulb of the rear lamp assembly. This filament also serves as a stoplight.

When the ignition switch is turned on and the direction signal switch is manually operated to indicate a turn, the front and rear signal lights and the front side marker lamps flash on and off on the side of car for which a turn is indicated. The flashing of signal lights is caused by a flasher which is connected into the proper signal circuit by contacts made in the direction switch when switch is set for a turn.

When lights are turned on, the side marker will flash opposite the signal lights.

When the direction signal lights are flashing, a signal indicator bulb on the instrument panel also flashes. These indicator lights are connected to the front half of the direction signal circuit only.

B. Direction Signal Switch Operation

The direction or turn signal switch is mounted in a housing at the upper end of the steering column mast jacket, just below the steering wheel. The turn signal actuating plate (on the inner end of the control lever) is mounted to a pivot just over and contacting the turn signal switch. This switch is integral with an eight wire harness (about 1-1/2 feet long) and a multiple connector. The switch and a spring-loaded horn brush are both mounted in the switch plate base. See Figure 120-30.

A plastic cancelling cam assembly fits over the steering shaft; the lower end of the cam contacts the steering shaft upper bearing and the upper face of the cam engages the steering wheel hub, causing the cam to turn with the wheel. At the outer edge of the cam there

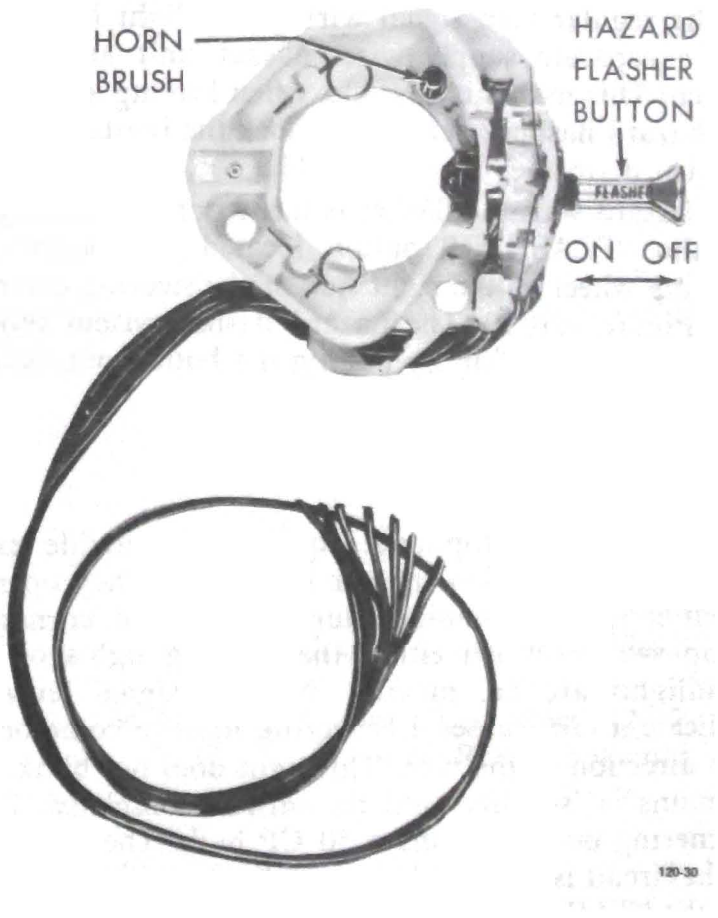

Figure 120-30 - Direction Signal and Hazard Warning Flasher Switch Assembly

is a horn contact ring in a position to depress the horn brush. See Figure 120-30.

Whenever the control lever is in either turn position, a projection on the cancelling cam contacts a spring on the actuating plate once per revolution of the steering wheel. Rotation of the cam in one direction simply snaps the spring but does not move the actuating plate; rotation in the other direction causes the actuating plate to be pushed back to neutral position.

C. Direction Signal and Hazard Warning Flasher Circuits

When signaling for a turn, the selected direction signal lights are supplied with current from the ignition switch, through a "DIR. SIG." fuse, through a direction signal flasher mounted on a spring clip on the parking brake bracket, and through standard contacts in the direction signal switch. See Figure 120-32.

When the hazard warning flasher is turned on, however, the normal direction signal supply is disconnected at the direction signal switch and a new supply circuit is connected into the switch directly from the battery. This new hazard flasher circuit comes through a stop and hazard flasher fuse and through a special heavy duty flasher mounted on the fuse block to the direction signal switch, which now has all contacts closed. See Figure 120-33.

D. Hazard Warning Flasher

The hazard warning feature (standard on all cars) is a system which, when turned on, causes all turn signal lamps to flash simultaneously. This system makes use of the regular turn signal wiring and light bulbs, but has a separate supply wire, flasher unit and off-on switch. This makes is possible, when leaving a car with the hazard flasher operating, to lock the ignition switch and car doors. See Figure 120-33.

The hazard warning flasher is turned on by pushing in on the "FLASHER" button located just below the steering wheel on the right side of the steering column. See Figure 120-30. The hazard flasher system should always be turned off, by pulling the button out, before the car is driven.

E. Cornering Lights

Cornering lights (optional equipment) provide extra light in the direction the car is turning. They operate from a special combined turn signal and cornering lamp switch. When either the parking lights or the headlights are on, moving the turn signal lever to indicate a turn causes a cornering light to come on in the direction of the turn. This light does not blink, but remains on steadily until the turn is completed. Each cornering lamp contains a 50 CP bulb. The cornering light circuit is protected along with the tail light circuit by the "TAIL LGT." fuse on the fuse block.

DIVISION III

ADJUSTMENTS AND MINOR SERVICE

120-22 VOLTAGE TEST AND ADJUSTMENT OF HORNS

A. Voltage Test at Horn

An improperly operating horn and its wiring circuit can be tested by connecting a voltmeter between the horn terminal and ground and noting the voltage while the horn button is pressed. The voltage at the horn gives an indication of the cause of trouble as follows:

1. No. Voltage indicates trouble in horn button, relay, wiring, or ground.

2. Less than 9 volts indicates resistance in wiring or excessive current draw due to short circuit in horn.

3. Voltage between 9 and 11 volts indicates that wiring is okay. Look for sticking or improper adjustment of horn.

4. Voltage above 11 indicates improper adjustment or open circuit in horn due to broken coil lead.

B. Adjustment of Horns

1. Remove horn from car.

2. Connect an ammeter in series with horn and a fully charged 12 volt battery to measure current draw while horn is blowing. Current draw for each horn (either high or low note) should be between 4.5 and 5.5 amperes at 12.0 volts.

3. Adjust to specified current draw if necessary, by turning adjusting screw clockwise to decrease or counterclockwise to increase current draw. Turn only 1/4 of a turn at a time. If adjustment loosens screw excessively, it may be staked with a prick punch. See figure 120-31.

Increasing the current draw increases the horn volume. Too much current will cause a high cut-in voltage which will cause a sputtering sound and may cause horn to stick in cold weather.

4. After each horn has been adjusted individually, sound both horns together to check for proper blend of tone. If adjustment does not provide a satisfactory tone, horn contacts are pitted, making horn replacement necessary.

5. With horns reinstalled on car, connect a volt meter between each horn terminal and ground to check voltage while both horns are blowing. This should be between 9 and 11 volts.

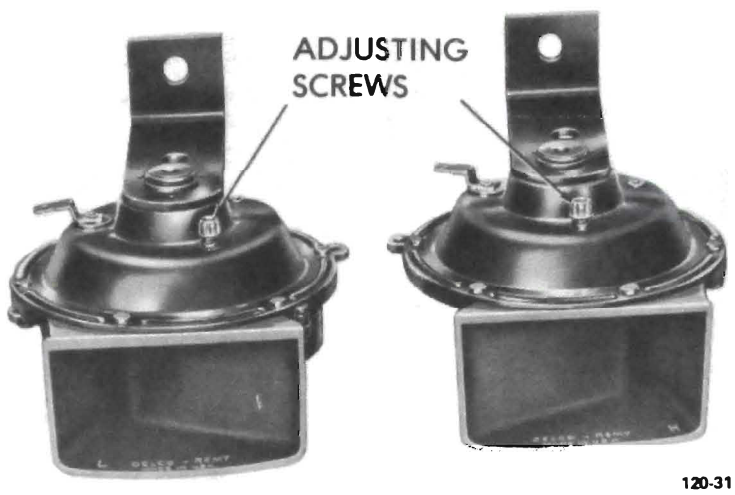

Figure 120-31 MATCHED HORN SET

DIVISION VI

SPECIFICATIONS

120-23 SIGNAL SYSTEMS SPECIFICATIONS

Stop Light Switch, Type	Mechanical
Stop Light Switch, Location	Pedal Mounting Bracket
Direction Signal Switch, Make	Delco-Remy
Direction Signal Flasher, Make	Signal Stat and Tung-Sol
Location	Parking Brake Bracket
For 2-32 CP Lamp Load	383639
For 3-32 CP Lamp Load	3866804
Flash Rate, Cycles per Min.	60 to 120
Hazard Warning Flasher (Heavy Duty)	3883794
Lamp Bulbs - No. and Candle Power	See Lamp Chart, Sect. 120-B
Direction Signal and Stop Light Fuse	See Lamp and Fuse Chart, Sect. 120-B
Horn - Make and Type	Delco-Remy, Solenoid
Horn Amperage Draw at 12 Volts (Either Horn)	4.5 to 5.5

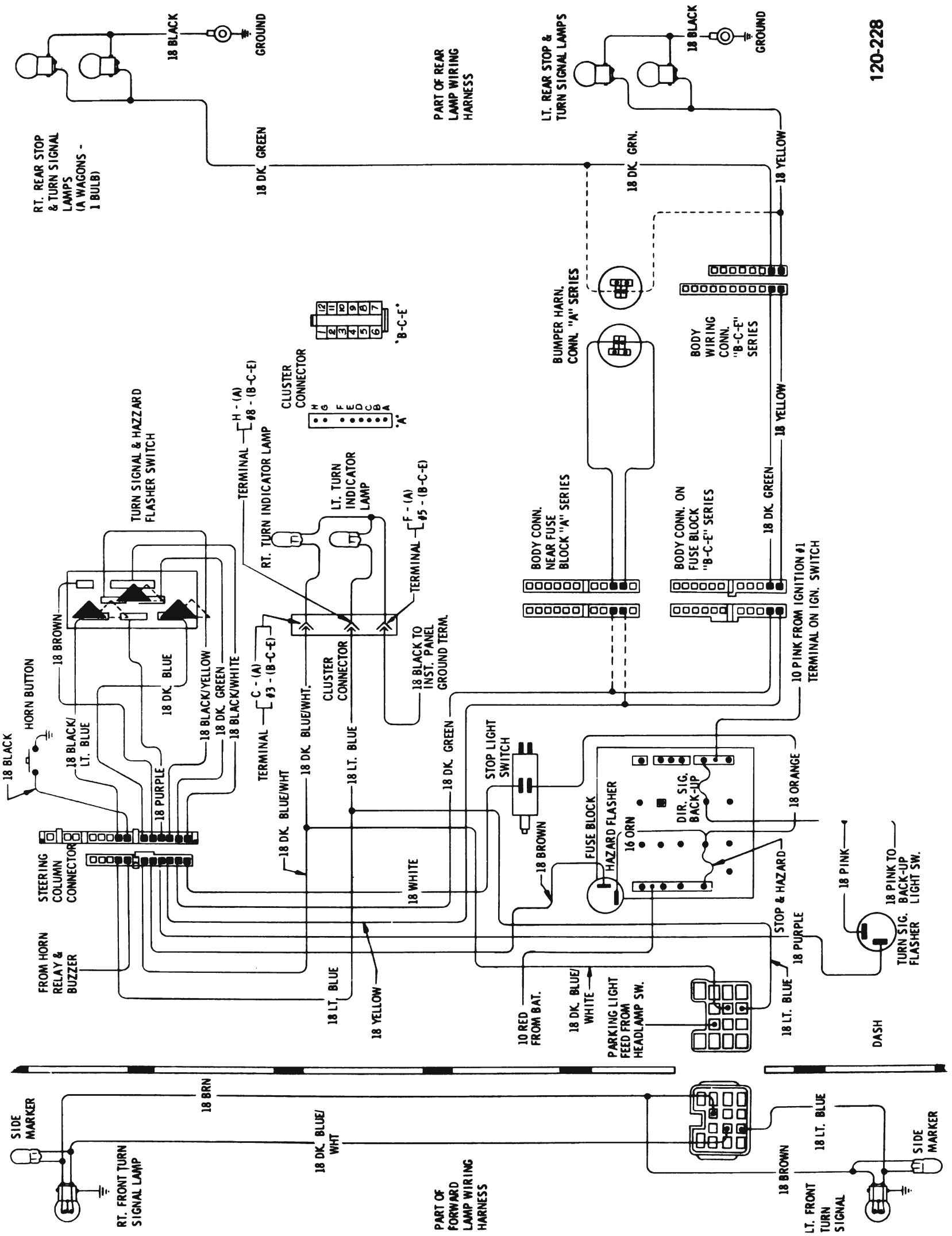

Figure 120-32 Directional Signal Wiring Diagram

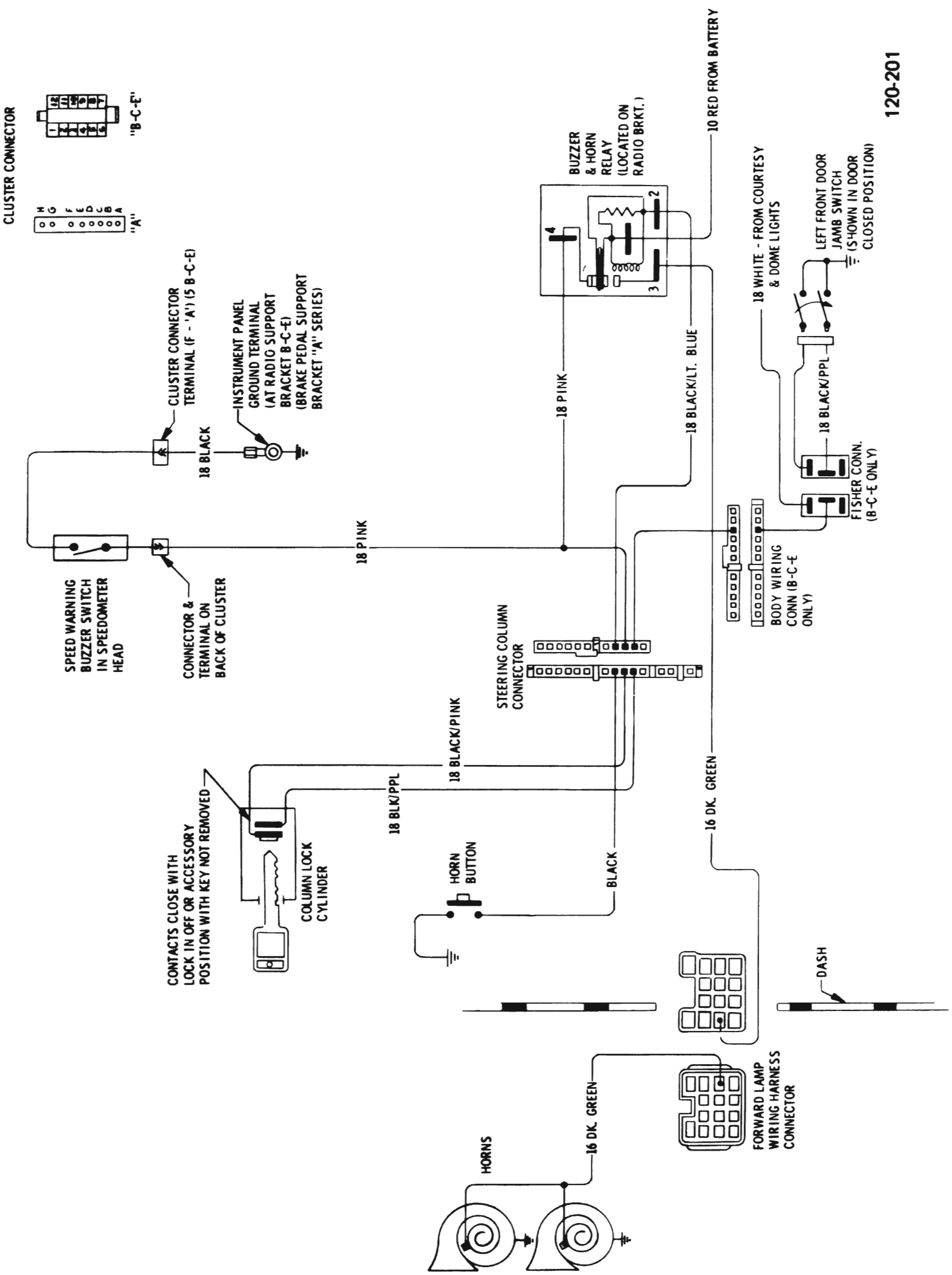

Figure 120-33 Buzzer and Horn Relay Wiring Diagram