

# SECTION C

## SIGNAL SYSTEMS

### CONTENTS

Division	Paragraph	Subject	Page
I	120-14	SPECIFICATIONS AND ADJUSTMENTS: Signal Systems Specifications . . . . .	120-26
II	120-15 120-16	DESCRIPTION AND OPERATION: Horns and Control Circuit . . . . . Direction Signal Lamps and Switch . . . . .	120-26 120-27
III		SERVICE PROCEDURES:	
IV	120-17 120-18	TROUBLE DIAGNOSIS: Trouble Diagnosis and Adjustment of Horns . . . . . Trouble-Shooting Direction Signal System . . . . .	120-28 120-29

## DIVISION I SPECIFICATIONS AND ADJUSTMENTS

### 120-14 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 . . . . .	Tung-Sol
Location . . . . .	Fuse Block
For 2-32 CP Lamp Load . . . . .	Type 224
For 3-32 CP Lamp Load . . . . .	Type 323
Flash Rate, Cycles per Min. . . . .	60 to 120
Lamp Bulbs - No. and Candle Power . . . . .	See Fig. 120-12 & 13
Direction Signal and Stop Light Fuse . . . . .	See Fig. 120-9, 10 & 11
Horn - Make and Type . . . . .	Delco-Remy, Solenoid
Horn Amperage Draw at 12 Volts (Either Horn) . . . . .	4.5 to 5.5
Horn Relay and Junction Block Number . . . . .	9779867
Horn Relay Adjustment	
Closing Voltage . . . . .	3.0 to 9.0
Speed Warning Buzzer Number . . . . .	1361529
Amperage Draw @ 14.5 Volts . . . . .	.14 Max.

## DIVISION II

### DESCRIPTION AND OPERATION

#### 120-15 HORNS AND CONTROL CIRCUIT

##### a. Horns and Relay

Two Delco-Remy electrically op-

erated vibrator type horns are mounted in the engine compartment. Both horns are operated simultaneously by a horn relay which is controlled by the horn push button on the steering wheel. One horn is high pitched and the other is low pitched, so that to-

gether 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 button contacts. The high current required by the horns would cause arcing and burning of these contacts.

When the horn button contacts are closed, a small amount of current flows through the relay winding to ground at the horn push button 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 push button 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 horn. 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 inside the steering column jacket and out under the instrument panel. The wire from the horn relay connects at this point.

### 120-16 DIRECTION SIGNAL LAMPS AND SWITCH

#### 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 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 the direction signal lights are flashing, a signal indicator bulb on instrument panel also flashes, producing a green light to indicate the direction for which the signal has been set.

#### 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 a seven 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.

The turn signal actuating plate and base are both formed from plastic. Interference between these two plastic parts provides

the detent feel for right, left and neutral positions of the control lever.

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 is a horn contact ring in a position to depress the horn brush.

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

#### c. Direction Signal Lamp Circuits

Since the direction signal lights are independent of the headlamp lighting switch and thermo circuit breaker, the wiring circuits are protected by a "DIR. SIG." fuse on the fuse block under the cowl. The flasher is also mounted on the fuse block, which serves as a terminal block between the signal switch and the chassis wiring.

#### d. 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 10 ampere "TAIL LTS." fuse on the fuse block.

## DIVISION IV

### TROUBLE DIAGNOSIS

#### 120-17 TROUBLE DIAGNOSIS AND ADJUSTMENT OF HORNS

If a horn button 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 connector for horn wire that enters steering mast jacket (tan wire) and ground wire from horn relay. If horn now blows, horn relay ground circuit in mast jacket or steering wheel has an open. Reconnect wire on connector and check horn wire and horn contacts. Circuit from connector at mast jacket to contact on steering wheel must be complete. To remove horn contact, remove two retaining

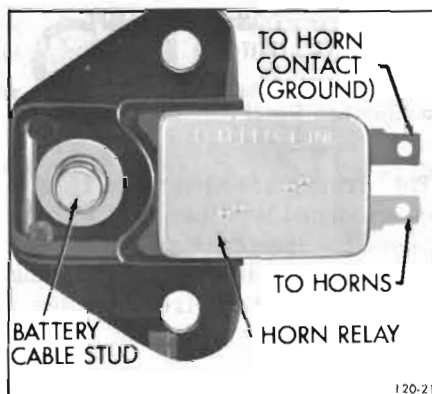


Figure 120-21—Horn Relay and Junction Block Assembly

screws from actuator bar cap. Remove four clutch-head retaining screws from actuator bar. Remove four plastic retaining rivets from actuator plate.

2. To remove horn connector brush, remove actuator bar cap. Remove actuator bar. Lift ground plate and horn connector brush from steering wheel.

3. If horns still do not blow when wire at mast jacket is grounded, unplug double connector from horn relay part of junction block assembly. Then plug a known good relay and junction block assembly onto the connector and press battery terminal of new assembly against old junction block battery terminal stud for a source of current. Ground base of new relay. Have helper try blowing horns. If horns blow, original relay is defective and must be replaced.

4. If horns still will not blow with substitute horn relay trouble is elsewhere. Check wiring connections and wiring throughout horn circuit. See Figures 120-153 to 157 for wiring diagrams.

##### b. Horns Will Not Stop Blowing

1. Pull horn wire from connector on wire that enters mast jacket (tan wire). If horns stop blowing relay is OK, but horn control circuit in jacket is grounded. If

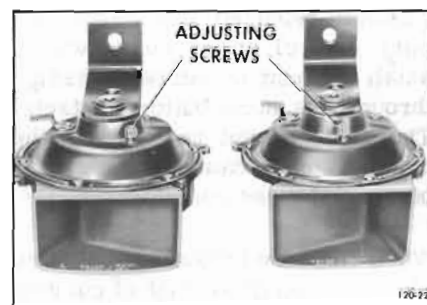


Figure 120-22—Matched Horn Set

horns do not stop blowing horn relay control circuit is grounded. Check horn wire and contacts in mast jacket and steering wheel if horns stopped blowing.

2. If horns still do not stop blowing, unplug double connector from horn relay. See Figure 120-21. Then plug a known good relay onto the connector and make contact with junction block stud.

3. If horns now stop blowing, original relay contacts are sticking and relay and junction block assembly must be replaced. However, if horns still do not stop blowing, control circuit is grounded between relay and connector on wire that enters jacket.

##### 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.

##### d. Voltage Test at Horn

An improperly operated 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 7 volts indicates trouble in wiring or excessive

current draw due to short circuit in horn.

3. Voltage between 7 and 11 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.

#### e. 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 10-56.

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 7 and 11 volts.

#### 120-18 TROUBLE-SHOOTING DIRECTION SIGNAL SYSTEM

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

1. No Signal Anywhere. If there is no signal at any front, rear, or indicator light, first check fuse on fuse block marked "DIR. SIG." Since this fuse also protects the stop light system, functioning stop lights indicate that fuse is OK.

If fuse checks OK, next eliminate flasher unit by substituting a known good flasher. If new flasher does not cure trouble, check signal system wiring connections at fuse block and at signal switch.

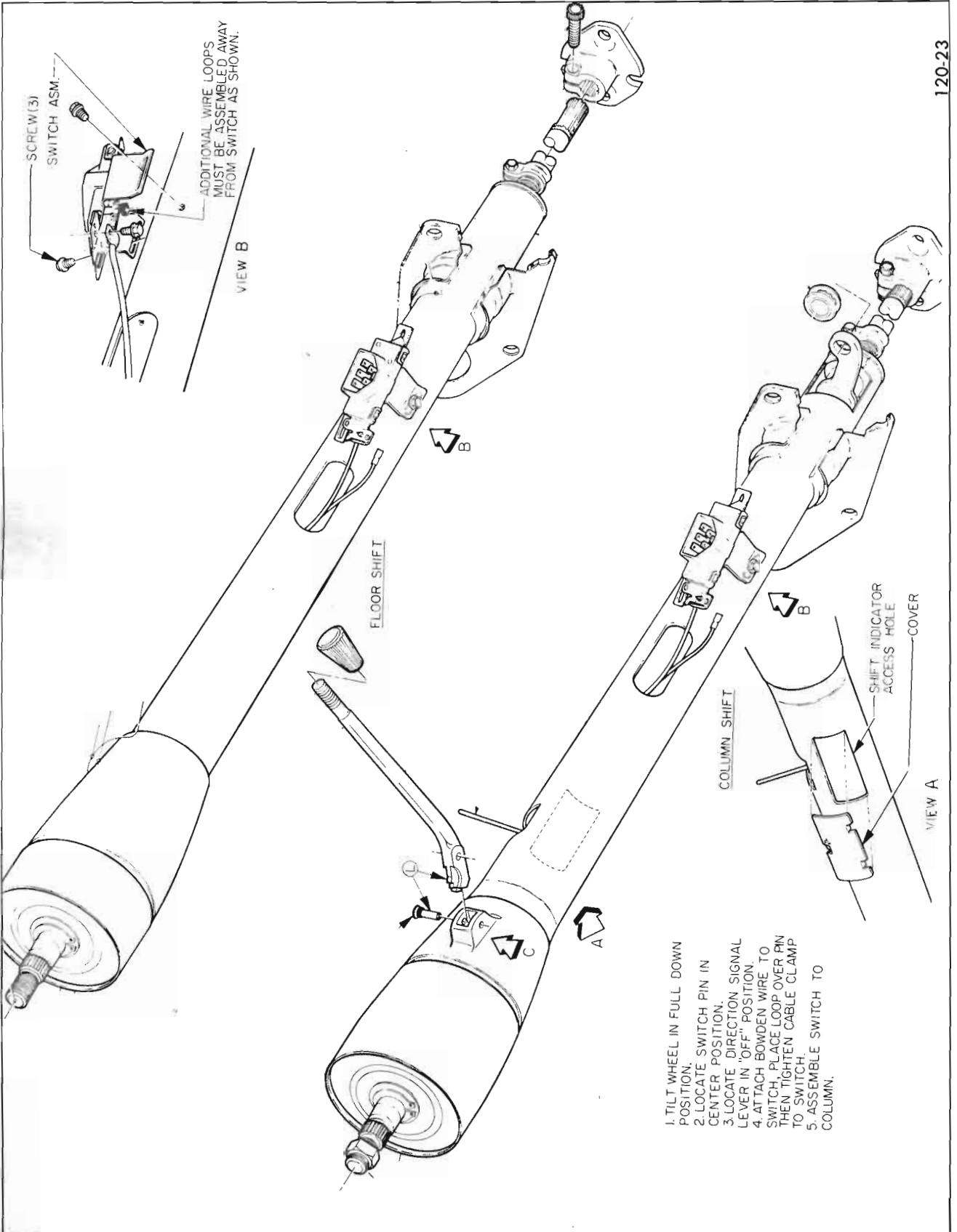
2. Signals One Direction Only. If signal works properly on one side, but there is no signal at front, rear, or indicator light on other side, trouble is in signal switch. If trouble cannot be easily corrected, replace switch assembly.

3. Signal Stays On One Direction. If the indicator light stays on in one direction (does not flash), check for a burned-out light bulb or an open circuit in wire to bulb not lighting.

**NOTE:** If brake stop lights function properly, rear signal light bulbs are OK.

4. Fails to Cancel After Completion of Turn. If signal lights do not turn off after completion of turn, check for worn or broken switch actuator parts or for a broken cancelling cam.

**NOTE:** It is necessary to remove steering wheel to service switch actuator parts.



120-23

Figure 120-23—Typical Turn Signal Switch Installation - Tilt Wheel Special and Skylark

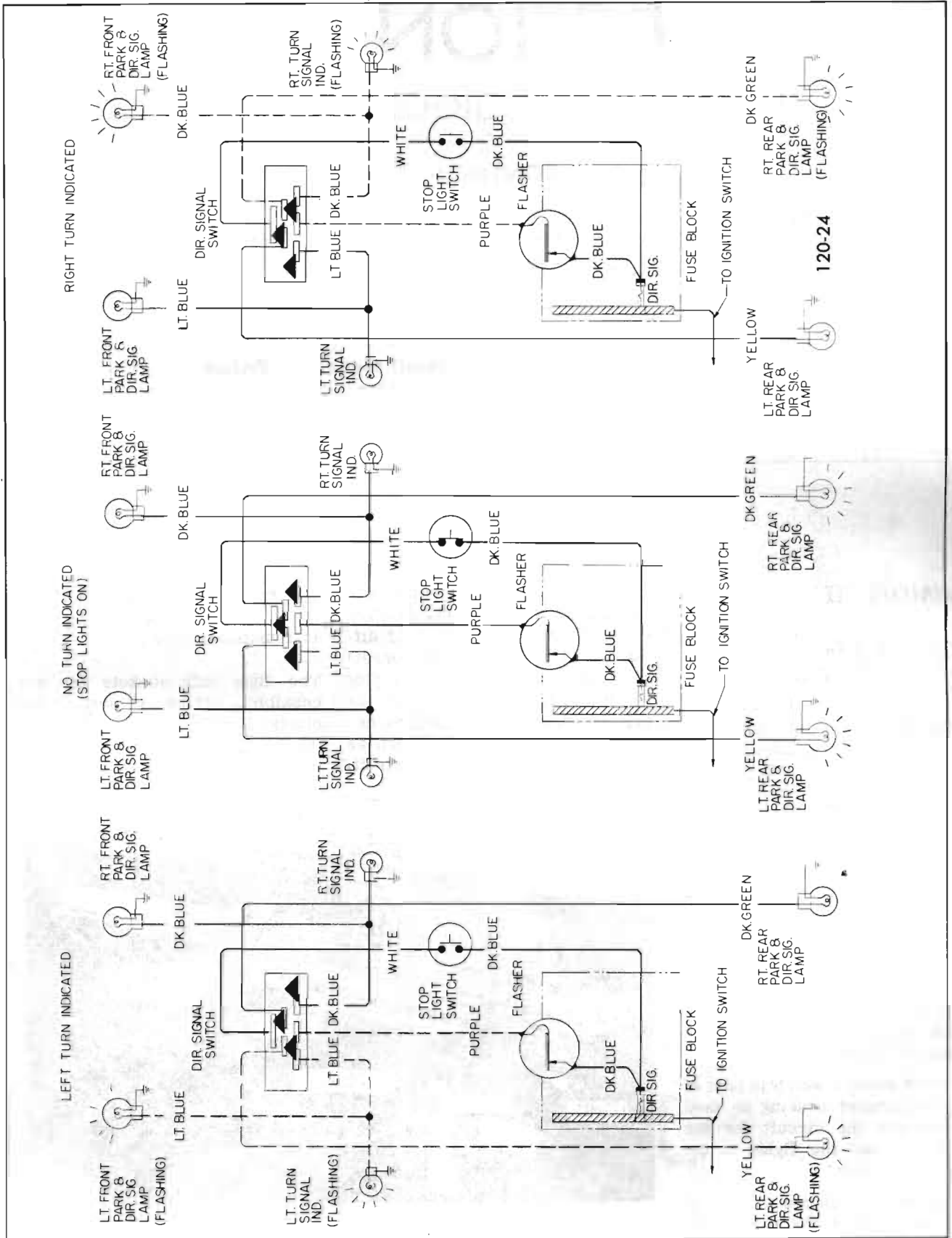


Figure 120-24—Turn Signal Wiring Diagram