1978 corvette

Including Limited Edition

Electrical Troubleshooting Manual
1978
CORVETTE
ELECTRICAL
TROUBLESHOOTING
MANUAL

Corvette Electrical Troubleshooting Manual Survey
These survey questions are designed to give Chevrolet your thoughts and comments on the "real world" value of our Corvette Electrical Troubleshooting Manual. Read the introductory pages carefully before you move on to the circuit analysis pages. Then, after you have become familiar with the content and layout of the manual, please take a few moments to clip out and fill out the questionnaire. Your answers will aid us greatly in the development of future Electrical Troubleshooting Manuals.
When you have completed the questionnaire, fold the sheet as indicated to form a stamped, self-addressed letter, tape it closed and drop it into the mail.
Thanks for your help.

ELECTRICAL DIAGNOSIS SURVEY
1. How much of your time is spent on electrical work?
   _____ Most. I am an electrical specialist.
   _____ A lot. I do quite a bit of electrical repair.
   _____ A little. Not my primary job but I do some.
   _____ Not much. I am primarily engaged in other areas.
2. My initial impression is that this manual will:
   _____ Prove useful frequently.
   _____ Prove useful occasionally.
   _____ Might be useful.
   _____ Will not be useful.
3. Would you like to see this approach used on other Chevrolet models?
   _____ Yes
   _____ No
4. Considering the material covered, what is your opinion of the size of the manual?
   _____ Convenient.
   _____ Awkward.
5. Do you anticipate a change in your diagnosis time as a result of your using this manual?
   _____ A significant reduction in diagnosis time.
   _____ Some reduction in diagnosis time.
   _____ Probably no reduction in diagnosis time.
6. Would you buy this manual?
   _____ Yes
   _____ No
7. Do you:
   _____ Prefer this approach to that normally published in the Service Manual?
   _____ Prefer the Service Manual approach?
8. If you have been using the 1977 Corvette Electrical Troubleshooting Manual during the past year, give us your opinion of its worth.
   _____ Extremely useful. Referred to manual constantly.
   _____ Useful. Kept manual handy.
   _____ Referred to manual occasionally.
   _____ Found manual to be of little use.
9. Do you think that this diagnosis manual could replace the foldout circuit diagrams normally provided in the Chevrolet Wiring Diagram Booklet?
   _____ Yes
   _____ No
10. What is your job classification?
    _____ Mechanic / Technician
    _____ Service Manager
    _____ Write - up
    _____ Other (Please Specify)

11. Comments
IMPORTANT SAFETY NOTICE

Proper service and repair is important to the safe, reliable operation of all motor vehicles. The service procedures recommended by Chevrolet and described in this service manual are effective methods for performing service operations. Some of these service operations require the use of tools specially designed for the purpose. The special tools should be used when and as recommended.

It is important to note that this manual contains various Warnings, and Cautions which should be carefully read in order to minimize the risk of personal injury to service personnel or the possibility that improper service methods will be followed which may damage the vehicle or render it unsafe. It also is important to understand that these Warnings and Cautions are not exhaustive. Chevrolet could not possibly know, evaluate and advise the service trade of all conceivable ways in which service might be done or of the possible hazardous consequences of each way. Consequently, Chevrolet has not undertaken any such broad evaluation. Accordingly, anyone who uses a service procedure or tool which is not recommended by Chevrolet must first satisfy himself thoroughly that neither his safety nor vehicle safety will be jeopardized by the service method he selects.

Be sure to read the Introduction on pages 2 and 3 before using this Manual.
SYSTEMATIC TROUBLESHOOTING

1. Verify the Complaint
   Check the problem yourself to be sure it was correctly and completely stated.
   If practical, ask the owner to demonstrate the problem. Don't troubleshoot half a problem!

2. Understand Circuit Operation
   Be sure you understand how the circuit was designed to operate before you attempt to understand how it failed.

3. Test the Circuit and Locate the Fault

4. Repair the Fault

5. Recheck Circuits for Proper Operation

WIRE SIZE AND INSULATION COLOR

Wire size and insulation color is included on the schematic to help identify each circuit. When two wire insulation colors are shown, the first is the overall color and the second is the stripe color. Black wires are always ground. Wire size is given in AWG (American Wire Gauge).

Bk = Black
Brn = Brown
Grn = Gray
Or = Orange
Pnk = Pink
Lt Blu = Light Blue
Dk Blu = Dark Blue
Lt Grn = Light Green
Dk Grn = Dark Green
Ppl = Purple
Red = Red
Tan = Tan
Yel = Yellow
Wht = White

Example: 20 Dk Blu/Yel
20 gauge wire, dark blue overall color, with a yellow stripe.

In addition to a fuse, the windshield wiper motor is also protected by a circuit breaker. If the motor overheats, due to overloading caused by heavy snow, etc., the wipers will remain stopped until the motor cools. Be sure to correct the cause of overloading.

Also, a circuit breaker, mounted on the toe panel protects the power window circuit if vehicle is so equipped.

ELECTRICAL TROUBLESHOOTING

Most automotive electrical troubleshooting can be efficiently performed with three basic tools:

- Test Light
- Self Powered Test Light
- Jumper Wire

FUSE AND CIRCUIT BREAKER DATA

<table>
<thead>
<tr>
<th>Circuit</th>
<th>Ampere Rating</th>
<th>Circuit Breaker or Fuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headlamp Circuit</td>
<td>30 amp</td>
<td>Circuit Breaker</td>
</tr>
<tr>
<td>Power Window Circuit</td>
<td>20 amp</td>
<td>Circuit Breaker</td>
</tr>
<tr>
<td>Backup Light &amp; Turn Signals</td>
<td>25 amp</td>
<td>AGC Fuse</td>
</tr>
<tr>
<td>Heater/Air Conditioning</td>
<td>20 amp</td>
<td>AGC Fuse</td>
</tr>
<tr>
<td>Radio, Automatic Trans., Rear Defogger</td>
<td>20 amp</td>
<td>AGC Fuse</td>
</tr>
<tr>
<td>Instrument Lights</td>
<td>6 amp</td>
<td>AGC Fuse</td>
</tr>
<tr>
<td>Tail Lights (Side Marker &amp; Parking Lights)</td>
<td>20 amp</td>
<td>SFE Fuse</td>
</tr>
<tr>
<td>Clock, Lighter, Courtesy, Anti-Theft Alarm, Glove Box, Dome Stop/Hazard Warning, Key Warning Buzzer, Horns</td>
<td>20 amp</td>
<td>SFE Fuse</td>
</tr>
<tr>
<td>Gauges/Telltale Lights, Seat Belt Buzzer Light, and Relays (Power Window Relay), Cruise Control Wipers/Washers</td>
<td>10 amp</td>
<td>AGC Fuse</td>
</tr>
<tr>
<td></td>
<td>25 amp</td>
<td>AGC Fuse</td>
</tr>
</tbody>
</table>

LIGHT BULB DATA

<table>
<thead>
<tr>
<th>Application</th>
<th>Candle Power</th>
<th>Trade Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headlight — Outer</td>
<td>4000</td>
<td>5001</td>
</tr>
<tr>
<td>Headlight Beam Indicator</td>
<td>194</td>
<td></td>
</tr>
<tr>
<td>Parking and Directional Signal</td>
<td>2,2 - 24</td>
<td>1157 N.A.</td>
</tr>
<tr>
<td>Tail and Stop-Directional Signal</td>
<td>3, 32</td>
<td>1157</td>
</tr>
<tr>
<td>License Plate Light</td>
<td>168</td>
<td></td>
</tr>
<tr>
<td>Backup Light</td>
<td>1156</td>
<td></td>
</tr>
<tr>
<td>Instrument Center Cluster</td>
<td>192</td>
<td></td>
</tr>
<tr>
<td>Instrument Panel Cluster</td>
<td>194 92</td>
<td></td>
</tr>
<tr>
<td>Electric Clock</td>
<td>194</td>
<td></td>
</tr>
<tr>
<td>Courtesy Light (Overhead)</td>
<td>214-2</td>
<td></td>
</tr>
<tr>
<td>Radio Dial</td>
<td>161</td>
<td></td>
</tr>
<tr>
<td>Stereo Indicator</td>
<td>160</td>
<td>DS410</td>
</tr>
<tr>
<td>Electroclear Indicator</td>
<td>.15</td>
<td>2102D</td>
</tr>
<tr>
<td>Brake System Warning Light</td>
<td>194</td>
<td></td>
</tr>
<tr>
<td>Directional Signal Indicators</td>
<td>194</td>
<td></td>
</tr>
<tr>
<td>A/C or Heater Control Panel Light</td>
<td>558</td>
<td></td>
</tr>
<tr>
<td>Side Marker — Front</td>
<td>168</td>
<td></td>
</tr>
<tr>
<td>Side Marker — Rear</td>
<td>168</td>
<td></td>
</tr>
<tr>
<td>Courtesy Lights (Front)</td>
<td>906</td>
<td></td>
</tr>
<tr>
<td>Seat Belt Warning Light</td>
<td>194</td>
<td></td>
</tr>
<tr>
<td>Transmission Control Light</td>
<td>161</td>
<td></td>
</tr>
<tr>
<td>Low Fuel Light</td>
<td>194</td>
<td></td>
</tr>
<tr>
<td>Generator Light</td>
<td>194</td>
<td></td>
</tr>
<tr>
<td>Spare Tire, Underhood Light</td>
<td>168</td>
<td></td>
</tr>
<tr>
<td>Cigarette Lighter Light</td>
<td>1445</td>
<td></td>
</tr>
<tr>
<td>W/S Washer &amp; Light Switch Light</td>
<td>194</td>
<td></td>
</tr>
<tr>
<td>Turn Signal Flasher</td>
<td>2 Lamp Type</td>
<td></td>
</tr>
<tr>
<td>Hazard Warning Flasher</td>
<td>6 Lamp Type</td>
<td></td>
</tr>
<tr>
<td>Underhood Light</td>
<td>93</td>
<td></td>
</tr>
</tbody>
</table>

* Light Emitting Diode

Test Light

The TEST LIGHT is a 12 volt light bulb with a pair of convenient length test leads attached. See figure A.

Voltage Check

The TEST LIGHT is used to check for the presence of voltage. See figure B.

Figure A — Test Light
In troubleshooting this circuit, use the TEST LIGHT to test for voltage at each component. If check “A” indicates voltage present you know the fault is in one of the two switches or the red or yellow wire. If check “B” indicates voltage present, the fault is isolated to either the normally open switch or the yellow wire.

Short to Ground Check
See figure C. This circuit is shorted to ground - the wire between the two switches is rubbing on the car frame when the car is driven. To troubleshoot, remove the fuse and connect your TEST LIGHT across the fuse terminals. Work your way down the circuit moving the harness back and forth. When the TEST LIGHT comes on, you have moved the harness such that the wire is shorted to the frame. When the TEST LIGHT goes out, you have moved the harness such that the wire is not shorted to the frame. Continue moving the harness until you locate the shorted point.

Self Powered Test Light
The SELF POWERED TEST LIGHT is a light bulb, battery and test leads all connected together. See figure D.

The SELF POWERED TEST LIGHT bulb will light when the test leads are connected together, either directly or through a circuit wire. Figure E shows use of the SELF POWERED TEST LIGHT in testing a BLOWER SWITCH for correct operation.

CIRCUIT BREAKER

Figure F

DOUBLE POLE SWITCH

Figure D

DUAL FILAMENT LIGHT BULB

Figure C

ELECTRIC CHOKE HEATER

Figure B

REFERENCE FINDERS

Figure A

RELAY

Figure 7

REVERSIBLE MOTOR

Figure 8

SPICE

Figure 9

BATTERY

Figure 10

FUEL GAUGE SENDER

Figure 11

CIRCUIT NUMBER

Figure 12

CONNECTOR

Figure 13

CAPACITOR

Figure 14

FUSE

Figure 15

GROUND

Figure 16

HIGH PITCH HORN

Figure 17

TURN SIGNAL FLASHER

Figure 18

2 SPEED MOTOR

Figure 19

LIGHT BULB
(INDICATES REMAINDER
OF BULB IS SHOWN
ELSEWHERE)

Figure 20

20 DK BLU/YEL 20 GAUGE WIRE
DARK BLUE OVERALL COLOR
WITH A YELLOW STRIPE

Figure 21

CIGAR LIGHTER

Figure 22

2 SPEED MOTOR

Figure 23

CHOV-01-78-VF
CIRCUIT OPERATION

The GENERATOR is used to operate all vehicle electrical equipment and to charge the battery. Alternating current is generated in the stator or field winding as the field rotates. The alternating current is then passed through the diode bridge to direct current by the rectifier bridge. The capacitor at the output terminal eliminates noise that would otherwise cause radio signal interference. The amount of current produced by the generator is controlled by the regulator. When the generator output voltage is too low, the regulator increases the current flowing through the generator field which increases the generator's output voltage. Field current is supplied directly from the generator output port by the diode trio to from the battery through the GENERATOR warning light.

At low engine speed, current flows from the battery, through the GENERATOR warning light and finally through the generator field to ground. The GENERATOR light is on when the alternator field current is being supplied by the battery. As engine speed increases, the generator output voltage increases and the generator field current is supplied by the generator (through the diode trio). With both the same voltage on each side of the GENERATOR light circuits 29 and 35) the GENERATOR light goes off.

The voltmeter measures the voltage of the vehicle's electrical system. With the engine running, the voltmeter measures the voltage produced by the generator. When the engine is off, and the IGNITION KEY on, the voltmeter measures battery voltage.
CIRCUIT OPERATION

Starter

When the IGNITION SWITCH is moved to the Start position, current flows through circuit 1, through the CLUTCH START or NEUTRAL SAFETY SWITCH and to terminal 8 on the SOLENOID SWITCH.

Current flows down through the Pull-In and Hold-In windings which work together magnetically to engage the DRIVE SHIFT LEVER. Pull-In winding current also flows through the STARTER MOTOR, causing it to rotate slowly and move proper mechanism of gear teeth.

After the drive gears mesh, the Motor Contacts in the SOLENOID SWITCH close, bypassing the Pull-In winding and applying full battery voltage to the STARTER MOTOR. With full voltage, the STARTER MOTOR cranks the engine.

When the IGNITION SWITCH is released, current stops flowing in circuits 5 and 6. Current from circuit 2 keeps flowing to terminal M, up through the Pull-In winding and down through the Hold-In winding. The reverse current in the Pull-In winding cancels the magnetic effect of the Hold-In winding and the SOLENOID SWITCH reopens the drive mechanism and motor contacts, which stops the current flow to the STARTER MOTOR.

COMPONENT LOCATION

<table>
<thead>
<tr>
<th>Component</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery</td>
<td>Behind driver, under floor</td>
</tr>
<tr>
<td>C117</td>
<td>Near clutch safety switch</td>
</tr>
<tr>
<td>C118</td>
<td>Near anti-theft switch</td>
</tr>
<tr>
<td>Clutch Start Switch</td>
<td>On clutch bracket</td>
</tr>
<tr>
<td>Neutral Safety Switch</td>
<td>On clutch bracket</td>
</tr>
<tr>
<td>Starter</td>
<td>Right rear engine</td>
</tr>
</tbody>
</table>

Figure A

Figure B
**CIRCUIT OPERATION**

**Ignition**

The IGNITION COIL, DISTRIBUTOR and HEI MODULE are combined in one unit. Power is supplied directly to the IGNITION CIRCUIT when the IGNITION SWITCH is in Start or On.

**Magnetic Pickup** - As the TIMER CORE rotates, a magnetic circuit closes each time a spark plug is to fire. See Figure A. The magnetic circuit is like an electric circuit with the magnet acting as battery and the POLE PIECES and SHAFT acting as wires. The pointed teeth on the POLE PIECE and TIMER CORE act as a switch. When the teeth separate, the SWITCH opens. When the teeth come together, the switch closes and a magnetic pulse flows through the pickup coil. The magnetic pulse produces a voltage in the PICKUP COIL. This voltage is induced only when the pointed teeth of the CORE are passing the POLE PIECE, causing the magnetic circuit to rapidly close and open.

**HEI Module** - The HEI MODULE contains an AMPLIFIER and an ELECTRONIC SWITCH. The AMPLIFIER increases the power of the PICKUP COIL voltage to operate the ELECTRONIC SWITCH.

**Ignition Coil** - The IGNITION COIL stores magnetic energy in its iron core when its primary is connected between the battery voltage and ground. High voltage is produced in its secondary only when the primary circuit is opened. The primary is connected to ground through an electronic switch in the HEI MODULE.

**System Operation** - As the rotating CORE teeth and the POLE PIECE teeth come together, magnetic energy flows from the PERMANENT MAGNET. The magnetic energy passes through the PICKUP COIL and generates a small pulse of electric energy. This electric energy is increased by the HEI MODULE, which closes its ELECTRONIC SWITCH. The closed switch passes a large current through the IGNITION COIL PRIMARY. The PRIMARY currents create magnetic energy, which is stored in the iron frame of the COIL.

As the rotating core teeth leave the POLE PIECE teeth, their magnetic energy is suddenly reduced. The electric pulse from the PICKUP COIL is then reduced, and the ELECTRONIC SWITCH opens. As the switch opens, the PRIMARY magnetic energy in the IGNITION COIL frame quickly falls. The quick fall of magnetic energy produces a high voltage in the IGNITION COIL secondary. The high voltage passes to the DISTRIBUTOR ROTOR, and then to a SPARK PLUG to fire the mixture in the proper cylinder.

**ELECTRONIC SWITCH** in the HEI MODULE closes only when the CORE teeth approach the POLE PIECE teeth. When the teeth are leaving each other, the ELECTRONIC SWITCH opens. When the teeth are not moving, the ELECTRONIC SWITCH stays open.

---

**COMPONENT LOCATION**

- C111: Page 11, Figure B: Engine bullhead
- Distributor Assembly: Figure B: Top of engine
- Radio Noise Capacitor: Figure B: Near distributor

---

**Figure A - Magnetic Pickup Operation**

**Figure B - Distributor**
HEADLIGHTS / BACKUP LIGHTS

- Headlights: On All Times (See Page 6)
- Backup Lights: On with Ignition (Switch on ON)

- Light Switch
- Circuit Breaker
- Dimmer Switch (on some models)
- Directional Indicator Switch

- Pedometer
- Informed Instrument (tachometer)
- Interior Light Switch

- Left Headlights
- Right Headlights
- Dual Beam Lights
- Alternator Ground
- Rear Window Ground (Mounted on Side of Left Corner Framed Member)
CIRCUIT OPERATION

Headlights

The HEADLIGHTS are controlled by the LIGHT SWITCH, which has power to it at all times. The HEADLIGHTS come on only when the switch is pulled out to the final position. The LIGHT SWITCH contains a self-resetting circuit breaker which protects only the HEADLIGHTS (the PARK and DOVE light circuits are protected by their own fuses). The circuit breaker will trip open when it overheats from an overload or short in the circuits. It will then cool and re-close. If the overload re-occurs, the power will be "blown" on and off, The DIMMER switch selects the two LOW BEAM lights or the four HIGH BEAM lights and the INDICATOR light.

If neither HIGH BEAM nor LOW BEAM lights come on, try a replacement LIGHT SWITCH and DIMMER SWITCH. These switches can be installed on the car's harness connection before re-mounting, to ensure that the fault has been corrected.

If only HIGH BEAM or LOW BEAM lights come on, suspect the DIMMER SWITCH. Notice that the HIGH BEAM INDICATOR light is fed from the interior side of CONNECTOR C115.

If the HIGH BEAM INDICATOR light does not come on when the HEAD LIGHTS are bright, check the SPEEDOMETER/TACHOMETER INSTRUMENT CLUSTER ground by observing proper lighting of the TURN SIGNAL LIGHTS or the BRAKE LIGHT.

Backup Lights

The BACKUP LIGHTS operate from the IGNITION SWITCH in the On position. Protection in provided through the BACKUP/DIRECTION SIGNAL fuse. The lights are controlled by the BACKUP LIGHT SWITCH.
CIRCUIT OPERATION

Direction Signals

The DIRECTION SIGNAL LIGHTS are powered by the 20 amp DER SIG BK UP FUSE. Voltage is available when the IGNITION SWITCH is in the On position. When the DIRECTION SIGNAL SWITCH is in the Off position, the DIRECTION SIGNAL FLASHER output voltage on circuit 15 has no current path to ground.

Moving the DIRECTION SIGNAL SWITCH to the Right position applies voltage from circuit 16 to circuits 15 and 19. The switch also disconnects circuit 19 from the BRAKE LIGHT switch and supplies the RIGHT STOP/TURN filament from the DIRECTION STOP SIGNAL FLASHER.

Circuit 15 supplies the following lights:
1. RIGHT TURN INDICATOR
2. RIGHT FRONT TURN
3. RIGHT FRONT MARKER

The combined current from these lights heats the element in the DIRECTION SIGNAL FLASHER and causes its contact to open. When the current stops, the FLASHER closes and again powers the light. This blinking continues until the lights are turned off and the element can remain cool.

The RIGHT FRONT MARKER LIGHT is connected between circuit 15 and circuit 9. How the marker operates depends on whether circuit 9 is On or Off.

Circuit 9 has many filaments connected in parallel to ground, and provides a low-resistance path for current. If circuit 9 is Off, powered by the LIGHT SWITCH, the RIGHT FRONT MARKER current will flow from circuit 15 to circuit 9, then through the many filaments to ground. This will cause the markers to blink together with the turn light.

With the PARKING LIGHTS On, circuit 9 will be at 12 volts. Current will flow through the RIGHT FRONT MARKER to circuit 15 and then to ground through the RIGHT FRONT TURN filament and the RIGHT TURN INDICATOR. When the FLASHER blinks On, 12 volts is supplied directly to circuit 15. Now both terminals of the RIGHT FRONT MARKER are at 12 volts, making the marker go out. By this method, the RIGHT MARKER will blink Off when the FRONT TURN blinks On.

Hazard Warning

The HAZARD WARNING circuit is powered at all times through the 20 amp STOP HAZARD fuse. When the HAZARD SWITCH is in the Normal position, the TRAFFIC HAZARD FLASHER output voltage on circuit 27 has no current path to ground.

When the HAZARD SWITCH is pushed into the HAZARD position, all four TURN filaments are connected to the TRAFFIC HAZARD FLASHER. The parallel path through these four filaments heats the TRAFFIC HAZARD FLASHER element. When the element heats, the FLASHER CONTACT closes and supplies full power to the filaments. With the-contact closed, the element is bypassed. When the element cools, the FLASHER contact opens again and turns Off the four TURN LIGHTS. This blinking continues until the HAZARD SWITCH is pulled back to the Normal position.

When the HAZARD FLASHER circuit is operating, the STOP LIGHT SWITCH can also bypass the TRAFFIC HAZARD FLASHER and stop it from blinking. The four TURN LIGHTS will stay On until the BRAKE pedal is released. The FRONT MARKERS will also come On during HAZARD FLASHER operation when the PARKING LIGHTS are Off.

STOPLIGHTS

The STOPLIGHTS are powered by the 20 amp STOP HAZARD fuse, which is hot at all times. When the STOP LIGHT SWITCH is closed by depressing the brake pedal, voltage is applied to circuit 17. If the DIRECTION SIGNAL SWITCH is Off, both STOP/TURN filaments come On. If the DIRECTION SIGNAL SWITCH is turned for left or right turns, the corresponding STOP/TURN filament is disconnected from circuit 17, and only one STOP/TURN filament is powered by the STOP LIGHT SWITCH.

COMPONENT LOCATION

<table>
<thead>
<tr>
<th>Component</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>C115</td>
<td>Engine bulkhead</td>
</tr>
<tr>
<td>C124</td>
<td>Under left side instrument panel</td>
</tr>
<tr>
<td>Direction Signal Flasher</td>
<td>Figure B</td>
</tr>
<tr>
<td>Direction Signal/Hazard Switch</td>
<td>Behind rear pocket</td>
</tr>
<tr>
<td>Hazard/Stop Fuse</td>
<td>Page 10, Figure A</td>
</tr>
<tr>
<td>Light Switch</td>
<td>Figure C</td>
</tr>
<tr>
<td>Radio Noise Capacitor (Direction Signal Flasher)</td>
<td>Attached to directional signal flasher</td>
</tr>
<tr>
<td>Stop Light Switch</td>
<td>Figure H</td>
</tr>
<tr>
<td>Tail Fuse</td>
<td>Page 10, Figure A</td>
</tr>
<tr>
<td>Traffic Hazard Flasher</td>
<td>Page 10, Figure A</td>
</tr>
</tbody>
</table>
CIRCUIT OPERATION

Radio

The RADIO DIAL LIGHT is powered through the 5 amp INST LPS fuse. Its brilliance is controlled by the Rheostat mounted on the Light Switch. The RADIO ELECTRONICS are powered through the 10 amp RADIO fuse. If you suspect an open SPEAKER or wiring leading from the RADIO to the SPEAKER, test using your ohmmeter. A continuous circuit will read 2 to 4 ohms and you will hear a "pop" from the speaker.

See Figure B for installation, AM adjustment and stereo checkout.

COMPONENT LOCATION

C126   Page 13, Figure A   Rear of radio
C127   Page 13, Figure A   Right side instrument panel
C128   Figure D          Rear of radio
C129   Figure D          Rear of radio

1. (a) Turn Balance Knob to extreme clockwise direction and the right hand speaker should operate.  
(b) Turn Balance Knob to counter-clockwise direction and the left hand speaker should operate.

2. When tuned to an FM multiplex (stereo) signal, the round yellow light on front of multiplex unit should shine.
COMPONENT LOCATION

Antenna Motor
Antenna Relay
CLK LTR ANT Fuse
RADIO Fuse

CIRCUIT OPERATION

The ANTENNA RELAY is energized when the IGNITION KEY is turned to Accessory or On, and the RADIO is turned On. The ANTENNA MOTOR is powered from the CLK LTR ANT Fuse through the switched relay contacts, and the antenna extends upward. When the antenna is fully extended, the UP switch opens and antenna motor power is interrupted.

When the IGNITION KEY or the RADIO is turned off, the ANTENNA RELAY is de-energized. The ANTENNA MOTOR is powered from the CLK LTR ANT Fuse through the normally closed relay contacts, and the antenna retracts. When the antenna is fully retracted, the DN switch opens and antenna motor power is interrupted.
CIRCUIT OPERATION

Heater

The HEATER BLOWER is powered through the 25 amp HEATER A/C fuse. Blower speed is set by adding resistance in series with the BLOWER MOTOR. The more resistance added, the slower the BLOWER MOTOR runs. The BLOWER MOTOR runs whenever the IGNITION SWITCH is On.

COMPONENT LOCATION

Blower Motor .......... Figure B .......... Plenum
Blower Resistor .......... Figure D .......... Plenum
Blower Switch .......... Figure C .......... Part of heater control
C103 .......... Page 12, Figure C .......... Under hood and thermostat switch
C104 .......... Figure B .......... Near radio capacitor
C105 .......... Figure E .......... Left side of console near cigar lighter
C403 .......... Page 12, Figure C .......... Near anti-theft hood switch
HEATER A/C Fuse .......... Figure A .......... Fuse panel
Radio Capacitor .......... Figure B .......... Blower motor frame
CIRCUIT OPERATION

A/C - Heating

The A/C - HEATER circuit is powered through the 25 amp A/C HEATER fuse. The FUNCTION CONTROL SWITCH provides power to the 4 speed BLOWER MOTOR in all positions except OFF. In the OFF position, a by-pass circuit operates the BLOWER MOTOR on Low speed whenever the IGNITION KEY is in the On position.

When the REAR WINDOW DEFROSTER is On, the BLOWER MOTOR will not operate in High Speed. The HIGH SPEED BLOWER RELAY cannot energize when the REAR WINDOW DEFROSTER is on because 12 volts is applied to the ground side of the HIGH SPEED BLOWER RELAY by the 192 circuit.

When the FUNCTION CONTROL SWITCH is set to Max (Cool) the HIGH SPEED BLOWER RELAY is energized (circuit 52) and voltage is supplied directly to the BLOWER MOTOR regardless of the position of the BLOWER SWITCH. The BLOWER MOTOR also operates at high speed when the FUNCTION CONTROL SWITCH is set to Normal (Cool), Vent, Heat or Defrost and the BLOWER SWITCH is set to On.

The A/C CLUTCH is controlled by the FUNCTION CONTROL SWITCH. COMPRESSOR LOW PRESSURE CUT-OFF SWITCH. The FUNCTION CONTROL SWITCH causes compressor operation during Max and Normal air conditioning. The COMPRESSOR LOW PRESSURE CUT-OFF SWITCH is a normally closed safety switch that opens to prevent compressor operation if refrigerant pressure is low. Operation without refrigerant can damage the compressor. The THERMOSTATIC SWITCH prevents ice buildup on the evaporator coil by opening below 35°F. The 10° F SPEED SOLENOID increases engine throttle setting whenever the A/C system is operating. The increased throttle setting results in constant engine idle RPM with or without A/C operation.
### Component Location

<table>
<thead>
<tr>
<th>Component</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/C Compressor Clutch Solenoid</td>
<td>F, C</td>
</tr>
<tr>
<td>Blower Motor</td>
<td>C</td>
</tr>
<tr>
<td>Blower Resistor</td>
<td>C</td>
</tr>
<tr>
<td>Blower Switch</td>
<td>A</td>
</tr>
<tr>
<td>C103</td>
<td>Page 12, Figure C</td>
</tr>
<tr>
<td>C125</td>
<td>B</td>
</tr>
<tr>
<td>C130</td>
<td>H, G</td>
</tr>
<tr>
<td>C136</td>
<td>H, G</td>
</tr>
<tr>
<td>C155</td>
<td>H, G</td>
</tr>
<tr>
<td>C156</td>
<td>H, G</td>
</tr>
<tr>
<td>C403</td>
<td>Page 12, Figure C</td>
</tr>
<tr>
<td>C404</td>
<td>Figure C</td>
</tr>
<tr>
<td>Compressor Low Pressure</td>
<td>G</td>
</tr>
<tr>
<td>Cut-Off Switch</td>
<td></td>
</tr>
<tr>
<td>Function Control Switch</td>
<td>A</td>
</tr>
<tr>
<td>HEATER A/C Fuse</td>
<td>D</td>
</tr>
<tr>
<td>High Speed Blower Relay</td>
<td>C, H</td>
</tr>
<tr>
<td>Idle Speed Solenoid</td>
<td>F</td>
</tr>
<tr>
<td>Idle Speed Solenoid</td>
<td>F</td>
</tr>
<tr>
<td>High Speed Blower Relay</td>
<td>C, H</td>
</tr>
<tr>
<td>Idle Speed Solenoid</td>
<td>F</td>
</tr>
</tbody>
</table>

---

**Figures:**
- **Figure A:** Diagram of a blower switch and A/C wiring harness.
- **Figure B:** Detail of a C125 component.
- **Figure C:** Diagram of an evaporator blower and resistor.
- **Figure D:** Diagram of a blower and resistor.
- **Figure E:** Close-up view of the idle speed solenoid.
- **Figure F:** Diagram of an A/C compressor and clutch solenoid.
- **Figure G:** Diagram of a compressor and low pressure cut-off switch.
- **Figure H:** Diagram of a high speed blower relay and switch.
- **Figure I:** Diagram of a high speed blower relay and switch.
CIRCUIT OPERATION

Seat Belt Warning

The SEAT BELT WARNING LIGHT comes on for 3 to 10 seconds when the IGNITION KEY is turned to On or Start. The WARNING BUZZER sounds for 4 to 8 seconds if the driver has not buckled his seat belt before turning the IGNITION KEY to On or Start.

Headlight Warning

The BUZZER sounds if the headlights or parking lights are on when the IGNITION KEY is turned to Off or Lock, and the INSTRUMENT LAMP switch is set to any position but off.

Ignition Key Warning

The IGNITION KEY WARNING BUZZER sounds when the driver's door is opened and the IGNITION KEY is turned to Off, Lock (key not removed from lock cylinder), or Accessory position.

One miniature buzzer is used for all three circuits. It is located within the BUZZER WARNING UNIT. When troubleshooting these circuits, remove the BUZZER WARNING UNIT and test the wires in CONNECTORS C122 (2 wires), C123 (4 wires) and the permanently attached wire which goes to the INSTRUMENT FUSE.

Circuit 237 should read less than 15 ohms to ground.

Circuit 238 should read zero ohms to ground with the IGNITION KEY inserted and the DRIVER'S DOOR open.

Circuit 80 should read zero ohms to ground with the IGNITION KEY in place and the L/H DOOR open.

Circuit 8 should read between 0 and 12 volts with the light switch set to either headlight or parking light position. Voltage depends upon rotation of light switch.

Circuit 39 should read 12 volts with the IGNITION KEY in Start or On position.

Circuit 40 should read 12 volts at all times.

Circuit 150 should read zero ohms to ground at all times.
CIRCUIT OPERATION
The TACHOMETER, GAUGES and BRAKE WARNING LIGHT are powered through the 10 amp GAUGES FUSE when the IGNITION SWITCH is in Start or On.

COMPONENT LOCATION
- Brake Pressure Switch: Figure B, On frame below brake booster
- C115: Figure D, Engine bulkhead
- Coolant Temperature Sender: Figure D, Left side engine
- Fuel Gauge Sender: Figure D, Fuel tank
- GAUGES Fuse: Figure A, Fuse panel
- Oil Pressure Sender: Figure D, Left side engine
- Park Brake Warning Switch: Figure C, Center console
- Printed Circuit Board: Figure C, Instrument panel

Figure A

Figure B

Figure C

Figure D
CIRCUIT OPERATION

The COURTESY LIGHTS are powered at all times through the CLK LTR CTSY Fuse. Notice that both the CLOCK and CIGAR LIGHTER are also powered from the CLK LTR CTSY Fuse. There are three switches within the LH DOOR SWITCH. All close to ground when the doors are opened. The 20 gauge white wire controls the COURTESY LIGHTS. The 18 gauge light blue wire controls the ANTI THEFT CIRCUIT (see page 18). The 20 gauge tan wire is part of the key alarm circuit (see page 18). The RH DOOR SWITCH contains two switches, the 20 gauge white wire controls the COURTESY LIGHTS and the 18 gauge light blue wire, the ANTI THEFT CIRCUIT. The COURTESY LIGHT and DOME LIGHT delay option is added by installing C121 and connecting the white wires as shown. Power is supplied from the CLK LTR CTSY and GAUGES Fuse block supplied to these. The INTERIOR LIGHT TIMER was an internal heating element for light delay. The interior lights turn on immediately when either door is opened. The lights remain on for 10 to 20 seconds after both doors are closed.

COMPONENT LOCATION

<table>
<thead>
<tr>
<th>Component</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>C115</td>
<td>Figure A Behind fuse block</td>
</tr>
<tr>
<td>C121</td>
<td>Figure A Left instrument panel</td>
</tr>
<tr>
<td>Cigar Lighter</td>
<td>Center console</td>
</tr>
<tr>
<td>CLK LTR CTSY</td>
<td>Fuse Panel</td>
</tr>
<tr>
<td>GAUGES Fuse</td>
<td>Fuse Panel</td>
</tr>
<tr>
<td>Courtesy Switch</td>
<td>Door latches pillar</td>
</tr>
<tr>
<td>Interior Light Timer</td>
<td>In instrument panel harness Above</td>
</tr>
<tr>
<td>Speedometer/Tachometer</td>
<td></td>
</tr>
</tbody>
</table>

Figure A

Figure B

Figure C

REAR WINDOW DEFOGGER TIMER RELAY

INTERIOR LIGHT TIMER

TO "BAT"

TO "IGN"
CIRCUIT OPERATION

Rear Window Defogger

The REAR WINDOW DEFOGGER consists of a heater grid on the rear window, a WINDOW HEATER CONTROL, with INDICATOR LIGHT and control switch, and a TIMER RELAY. When the IGNITION SWITCH is turned to Start or On, power is available to the WINDOW HEATER CONTROL. When the CONTROL SWITCH is moved to the On position, the relay in the TIMER RELAY closes and applies power to the WINDOW HEATER. (The CONTROL SWITCH is spring-loaded and automatically returns to the center position when released.) After approximately 10 minutes, the TRANSISTORIZED TIME DELAY CIRCUIT in the TIMER RELAY automatically turns the WINDOW HEATER Off. Moving the CONTROL SWITCH to the Off position will turn the WINDOW HEATER off at any time. When the WINDOW HEATER is On, 12 volts is applied to the ground side of the A/C HIGH SPEED RELAY and it will not energize. The A/C FAN cannot be operated in High Speed when the REAR WINDOW DEFOGGER is On.

Horn

The HORN CIRCUIT consists of the HORN RELAY, HORN SWITCH and the HIGH and LOW PITCH HORNS. Power is fed to the HORN RELAY at all times. When the HORN SWITCH is depressed, the relay coil is grounded, its coil is energized, and its contacts close. Power is then fed through the relay contacts directly to the horns.
COMPONENT LOCATION

Rear Window Defogger
C143  Figure E  Left side
RADIO TCS SOL Fuse  Figure A  Fuse panel
Window Heater  Figure B  Rear window
Window Heater Control  Figure C  Left side console

Horn
C114  Figure D  Lower steering column
C115  Figure F  Engine bulkhead
Horns  Figure G  Near head lights
Horn Relay  Figure G  Above fuse panel
Horn Switch  Figure G  Steering wheel
CIRCUIT OPERATION

Cruise Control

The Cruise Control is powered by the 20 amp GAUGES Fuse and can be turned on when the IGNITION SWITCH is in the On or Start position. The system is turned on by energizing the solenoid coil in the REGULATOR. Note that the LOW SPEED SWITCH in the REGULATOR locks the entire CRUISE CONTROL system out below 30 mph. Above 30 mph, the system is turned on when the driver presses the ENGAGE SWITCH to the Engage position (Figure B, position A). The REGULATOR SOLENOID is held closed by the small current that passes through the 40 ohm resistance wire during Cruise (Figure B, position A). The system is turned off by (1) depressing the brake pedal or (2) allowing vehicle speed to fall below 30 mph while the ENGAGE SWITCH is held in Trim position, or (3) pushing ENGAGE SWITCH to Trim position and then releasing switch quickly.

ENGAGE SWITCH POSITIONS

A = CRUISE
B = ENGAGE
C = TRIM

COMPONENT LOCATION

C141 . . . . . . . . . . . . . . . . . . Figure C . . . . . . . . . . . . . . . . . . . . Near stop switch
Cruise Release Switch . . . . . . Figure C . . . . . . . . . . . . . . . . . . . Top of brake pedal
Engine Switch . . . . . . . . . . . . Figure B . . . . . . . . . . . . . . . . . . . Steering column
GAUGES Fuse . . . . . . . . . . . . Figure A . . . . . . . . . . . . . . . . . . . Fuse panel
Regulator . . . . . . . . . . . . . . . Figure B . . . . . . . . . . . . . . . . . . . Left fender, near brake cylinder
Resistance Wire . . . . . . . . . . . Figure D . . . . . . . . . . . . . . . . . . . Front left fender encourage
CIRCUIT OPERATION

Power Windows

The power windows are operated by motors having two field windings that control the direction of rotation. To move the window down, one field coil is energized. To move the window up, the other field coil is energized. The WINDOW SWITCH is normally off. When the SWITCH is momentarily set to the up or down position, power is fed to one field coil of the motor which moves the window.

The power window motors require a large current for their operation. The current is supplied through the POWER WINDOW RELAY and the 30 amp CIRCUIT BREAKER in the FUSE BLOCK. The relay provides power only when the IGNITION SWITCH is in the Start or On position. Power for the relay coil is supplied through the GAUGES FUSE.

When troubleshooting, if neither window operates, look for faults in circuitry that is common to both window motors - the fuse, the circuit breaker and the relay. If a window operates in one direction only, replace the switch first.

COMPONENT LOCATION

* Accessory Circuit Breaker - Figure B
* Fuses Panel - Figure B
* Power Window Relay - Figure B
* Center Console - Figure B
* Window Motors - Figure A
* Inside Door - Figure A
* Window Switches - Figure C
* Center Console - Figure C

CAUTION

Ensure electrical connectors from WINDOW MOTOR before working on window regulator.

WARNING

Do not remove the window motor from the regulator without referring to the procedure in section 20 of the 1976 Passenger Car Service Manual. The regulator area has a high voltage and can cause severe injury if it is removed without finding the correct gear in position.
CIRCUIT OPERATION
Control and Instrument Lights

The GAUGE and INSTRUMENT LIGHTS are powered through the C-AMP INST LPS fuse. Their brilliance is controlled by the DIMMER (DIMOSTAT) mounted on the LIGHT SWITCH.
CIRCUIT OPERATION

Power Door Locks

The POWER DOOR LOCKS are powered at all times through the CLK LTR CTSY Fuse. The door lock actuators automatically lock or unlock the doors depending on the direction of current flow through the actuators.

To lock the doors, either DOOR LOCK SWITCH is momentarily pressed to LOCK. Current flows through the closed switch(es), through the actuators, and back through the open switches to ground. To unlock the doors, either DOOR LOCK SWITCH is pressed to Unlock and current flows in the opposite direction through the actuators to unlock the doors.

ANTI THEFT/POWER DOOR LOCK

31

CIRCUIT OPERATION

Anti Theft Circuit

The ANTI THEFT CIRCUIT is powered at all times through the CLK LTR CTSY Fuse. The circuit is armed when the driver closes the ANTI THEIFT CONTROL SWITCH (key operated). The ANTI THEIFT HORN will sound if any one of 6 switches is momentarily closed. These switches are:

1. the LH and RH COURTESY LIGHT SWITCHES - closed by opening either door
2. the ANTI THEFT HOOD SWITCH - closed by opening the hood
3. the ANTI THEFT WARNING SWITCH - closed by forcefully removing the ANTI THEIFT CONTROL SWITCH
4. the LH and RH ROOF PANEL SWITCHES (Late Production).

When any of these switches is closed, the ANTI THEIFT RELAY is energized which sends the ANTI THEIFT HORN until the ANTI THEIFT CONTROL SWITCH is turned off or the battery is exhausted. The FLASHER causes the ANTI THEIFT HORN to pulse on and off.

Notice that in Design No. 2, if the ANTI THEIFT PROTECTOR SWITCH is closed (usually as a result of forcible removal of the ANTI THEIFT CONTROL SWITCH), the ANTI THEIFT HORN will continue to sound after the ANTI THEIFT CONTROL SWITCH is turned off. Also, the ANTI THEIFT HORN will sound any time the ANTI THEIFT PROTECTOR is closed - regardless of whether the alarm has been set or not.
CIRCUIT OPERATION

When the IGNITION SWITCH is in the "On" position, power is available to the CONTROLLER ASSEMBLY.

When the WASH SWITCH is momentarily closed, the WASHER PUMP MOTOR is grounded, and current flows through the CONTROLLER ASSEMBLY to operate the wiper. The wiper can be operated with the WIPER SWITCH in any position. If the WIPER SWITCH is in the "On" position, the CONTROLLER ASSEMBLY turns on power to the WIPER MOTOR for 3 to 5 lowspeed sweeps and then turns power off.

The WIPER MOTOR also operates when the WIPER SWITCH is set to "Low," "High," "Delay," or "Mist.

When the WIPER SWITCH is in any of these positions, the PARK RELAY is energized (9V circuit). The PARK RELAY contacts by-pass the PARK RELAY contacts when the wipers are operating, and current flows through the IN-LINE FUSE through the CONTROLLER ASSEMBLY, through the WIPER MOTOR, and through the WIPER SWITCH to ground. When the WIPER MOTOR is moving to the "Off" position, the PARK RELAY contacts open, and the PARK SWITCH supplies motor power. The wipers operate at low speed until the wipers are parked.

WIPER MOTOR speed is controlled by the action of the WIPER SWITCH connected to the WIPER MOTOR (91 circuit). The WIPER MOTOR operates at low speed when its SHUNT FIELD coil is grounded through the 91 circuit. The WIPER MOTOR operates at high speed when its SHUNT FIELD is grounded through the 20 ohm resistor located inside the WIPER MOTOR.

When the WIPER SWITCH is set to "Delay," the amount of delay between wipes is controlled by rotating the DELAY REEDSWITCH knob. The CONTROLLER ASSEMBLY determines the time between sweeps.

The WIPER MOTOR contains a CIRCUIT BREAKER which removes power temporarily if the motor is stalled.

COMPONENT LOCATION

C112, C113, C115, C526, C527, C528

Wiper Motor: Page 33, Figure B
Wiper Motor: Page 33, Figure B
Wiper Motor: Page 33, Figure B
Wiper Motor: Page 33, Figure B
Wiper Motor: Page 33, Figure B
Wiper Motor: Page 33, Figure B

Wiper Switch: Page 33, Figure B
Wiper Switch: Page 33, Figure B
Wiper Switch: Page 33, Figure B
Wiper Switch: Page 33, Figure B
Wiper Switch: Page 33, Figure B

Controller Assembly: Figure A, C
Controller Assembly: Figure A, C
Controller Assembly: Figure A, C
Controller Assembly: Figure A, C
Controller Assembly: Figure A, C
Controller Assembly: Figure A, C

IN-LINE Fuse: Figure A, C
IN-LINE Fuse: Figure A, C
IN-LINE Fuse: Figure A, C
IN-LINE Fuse: Figure A, C
IN-LINE Fuse: Figure A, C
IN-LINE Fuse: Figure A, C

Left side of instrument panel, above light switch
Left side of instrument panel, above light switch
Left side of instrument panel, above light switch
Left side of instrument panel, above light switch
Left side of instrument panel, above light switch
Left side of instrument panel, above light switch

Figure A
Figure B
Figure C
Figure D
Figure E
Figure F
Figure G
Figure H
Figure I
Figure J
Figure K
Figure L
Figure M
Figure N
Figure O
Figure P
Figure Q
Figure R
Figure S
Figure T
Figure U
Figure V
Figure W
Figure X
Figure Y
Figure Z
CIRCUIT OPERATION

When the IGNITION SWITCH is in the ACCESSORY or ON position, power is available to the WIPER MOTOR and the WASHER PUMP MOTOR through the WIPER FUSE. The WASHER PUMP MOTOR operates when the momentary WASH SWITCH is closed grounding the WASHER PUMP MOTOR.

The WIPER MOTOR operates when the WIPER SWITCH is set to Low or High. One section of the WIPER SWITCH is connected to the PARK RELAY coil (92 circuit) and energizes the relay during both Low and High speed operation. The PARK RELAY contacts bypass the PARK SWITCH when the wipers are operating. When the WIPER SWITCH is moved to OFF, the PARK RELAY contacts open, and the PARK SWITCH supplies motor power until the wipers are parked.

WIPER MOTOR speed is controlled by the position of the WIPER SWITCH connected to the WIPER MOTOR (9 circuit). The WIPER MOTOR operates at a Low speed when its SHUNT FIELD coil is grounded through the 91 circuit. The WIPER MOTOR operates at a high speed when its SHUNT FIELD coil is grounded through the 9 circuit. The WIPER MOTOR operates at a High speed when its SHUNT FIELD coil is grounded through the 91 circuit. The WIPER MOTOR operates at a High speed when its SHUNT FIELD coil is grounded through the 91 circuit.

COMPONENT LOCATION

C112  ... Figure B  ... Wiper motor
C113  ... Figure B  ... Wiper motor
C115  ... Figure B  ... Engine bulkhead
C628  ... Figure B  ... Wiper Washer Control
Wiper Fuse  ... Figure A  ... Fuses panel
Wiper Motor  ... Figure B  ... Left front fender
Wiper Pump Motor  ... Figure B  ... Left front fender
Wiper Washer Control  ... Page 25, Figure A  ... Left side of instrument panel, above light switch