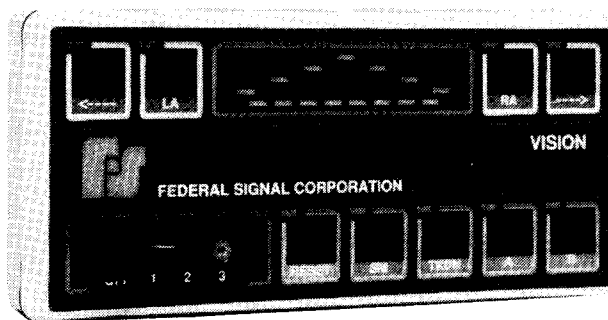
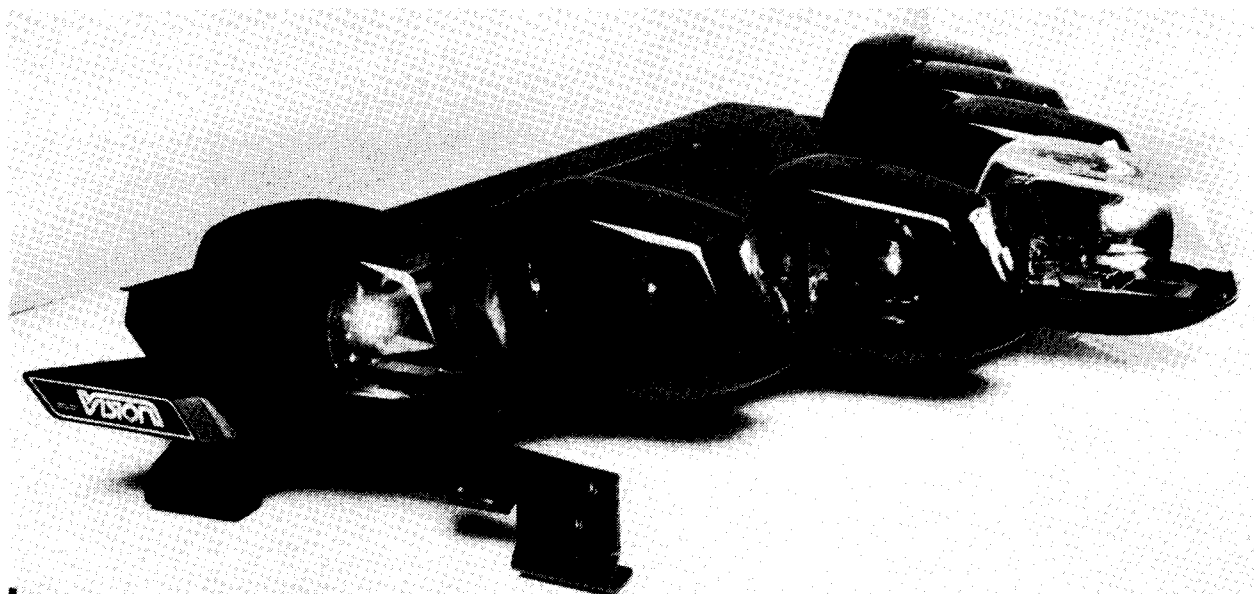


Price \$15.00



VISION®
WARNING SYSTEM
(with Slide Switch Control Head)



HARDWARE INSTALLATION AND MAINTENANCE INSTRUCTIONS

LIMITED WARRANTY

The Signal Division, Federal Signal Corporation (Federal), warrants each new product to be free from defects in material and workmanship, under normal use and service, for a period of two years on parts replacement and one year on labor from the date of delivery to the first user-purchaser.

During this warranty period, the obligation of Federal is limited to repairing or replacing, as Federal may elect, any part or parts of such product which after examination by Federal discloses to be defective in material and/or workmanship.

Federal will provide warranty for any unit which is delivered, transported prepaid, to the Federal factory or designated authorized warranty service center for examination and such examination reveals a defect in material and/or workmanship.

This warranty does not cover travel expenses, the cost of specialized equipment for gaining access to the product, or labor charges for removal and re-installation of the product. Lamps, flash tubes, or batteries are not covered under warranty.

This warranty does not extend to any unit which has been subjected to abuse, misuse, improper installation or which has been inadequately maintained, nor to units which have problems relating to service or modification at any facility other than the Federal factory or authorized warranty service centers.

THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL FEDERAL BE LIABLE FOR ANY LOSS OF PROFITS OR ANY INDIRECT OR CONSEQUENTIAL DAMAGES ARISING OUT OF ANY SUCH DEFECT IN MATERIAL OR WORKMANSHIP.



FEDERAL SIGNAL CORPORATION
Emergency Products

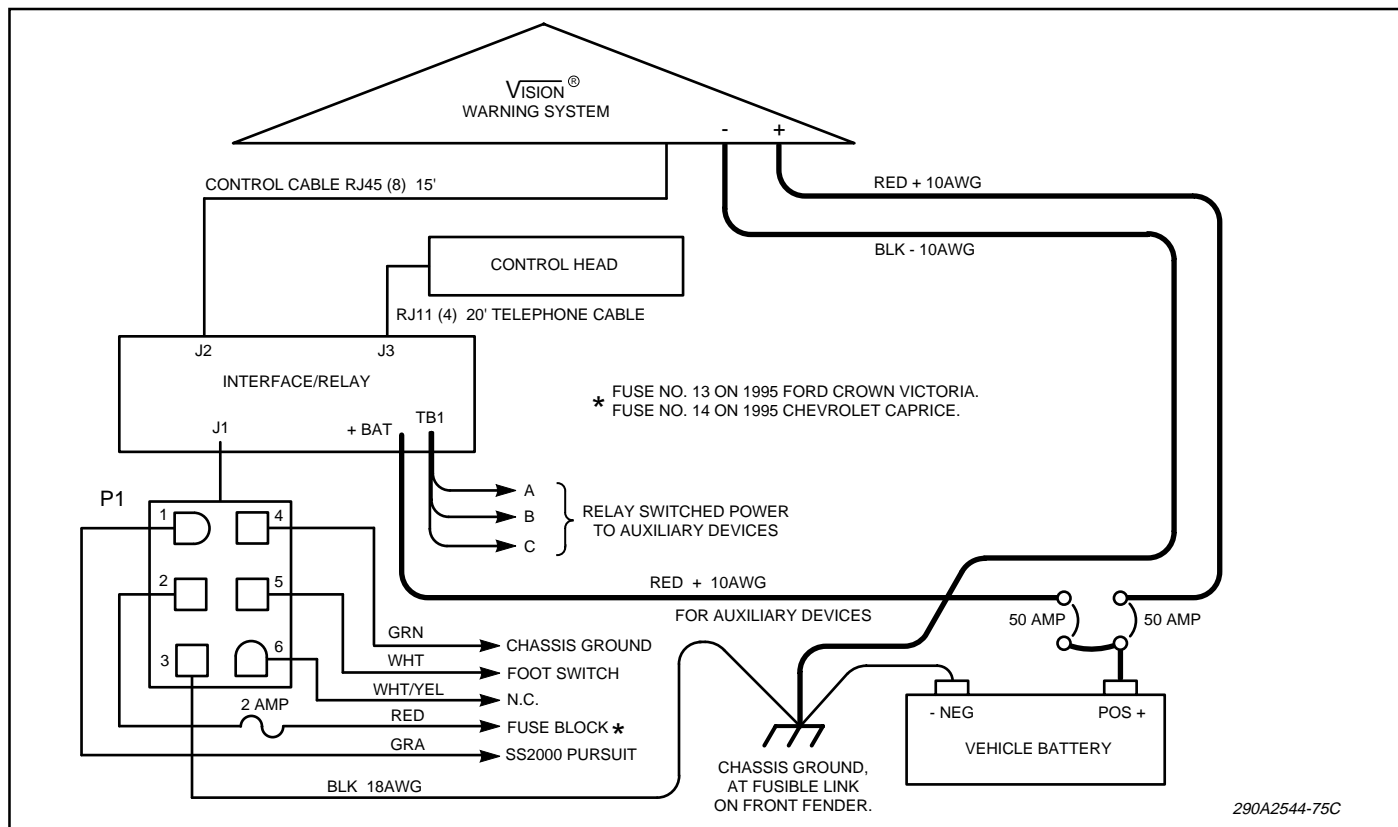
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IMPORTANT WIRING CHECK LIST

WARNING

The Vision® warning system is an advanced microprocessor based warning system. Unlike conventional light bars, malfunctions and/or improper operation **WILL** result if proper installation procedures are not followed. Refer to the accompanying diagram and pay special attention to the "DO & DON'T" list at the bottom of this page. To complete the electrical installation, refer to paragraph 3-7.



CHECK LIST

- | | |
|---|------------------------------|
| 1. Is the 10 ga. red wire from the lightbar connected to one of the two 50-ampere circuit breakers (installed as close to the battery as possible and directly to the positive (+) battery terminal)? (Note: One 50-ampere circuit breaker can be used if the auxiliary relays are NOT used.) | <input type="checkbox"/> YES |
| 2. Is the 18 ga. red wire from the six pin Molex connector (J1-Pin 2) connected to a point on the fuse block that is powered in run and start positions (F13 on 1995 Crown Victoria and F14 on 1995 Chevrolet Caprice)? Use an in-line 2A fuse. | <input type="checkbox"/> YES |
| 3. Is the 10 ga. black wire from the lightbar AND the 18 ga. black wire from the six pin Molex connector (J1-3) connected to the fusible link at the front fender between the negative (-) battery terminal and chassis ground? This is the ONLY chassis ground allowed for these two wires. | <input type="checkbox"/> YES |
| 4. Is the green wire from the six pin Molex connector (J1-Pin 4) connected to chassis ground? | <input type="checkbox"/> YES |
| OPTIONAL AUXILIARY RELAY POWER: | <input type="checkbox"/> YES |
| 5. Is a 10 ga. wire connected to the load side of the other 50-ampere circuit breaker? Route it through the hole labeled +BAT on the interface/relay unit and attach it to LUG 1 on the circuit board. | |

SECTION I

GENERAL DESCRIPTION

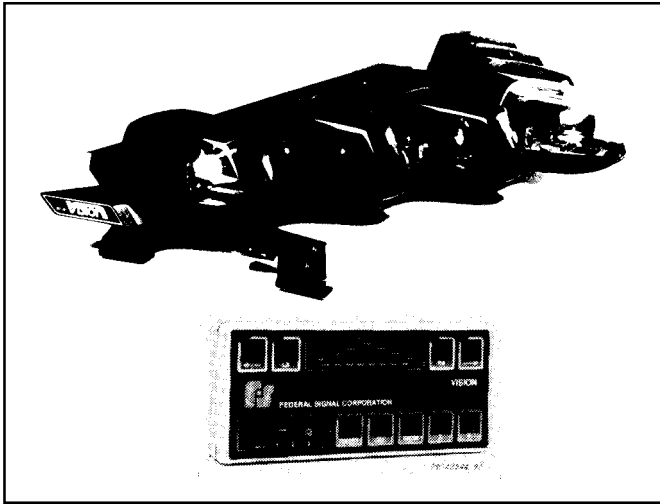


Figure 1-1. Vision® Warning System.

The Federal Vision® warning system (figure 1-1) is a full-featured, programmable warning light system. State-of-the-art microprocessor based technology is used to produce a warning light system with a super-compact, 1" thin control head. All warning system functions and programmable features are available at the Control Head. Replaceable switch function labels are provided for identification of Control Head switches.

V-shaped construction lets the Vision warning system maximize light warning efficiency at crucial 45° angles. The individual domes are shaped to eliminate critical dome angles, which reflect rather than transmit light in other light bars, significantly improving light transmission (brightness).

Vision's revolutionary aerodynamic styling provides superior vehicle fuel efficiency and top speed.

Each of the warning system's seven modular, self-contained and independent lights are pre-programmed to provide a wide selection of warning light patterns. Available patterns include: rotate at 90, 120 or 175 flashes per minute; oscillate to the front, rear, sides and/or angled; as well as steady burn and flashing. Pattern selection can be performed during or after installation without disassembly, wiring changes, or special tools.

Take-down and alley lights have horizontal tracking capability for use as spotlights, or they may be programmed to home to a predetermined position.

Three auxiliary relay outputs are available for control of auxiliary lights and accessories.

An optional user-supplied switch, such as a foot switch, may be used to activate primary warning lighting. An interface is also provided to activate a Federal Model SS2000 SmartSiren® from either the Vision's Control Head or the optional user-supplied switch.

An optional rear directional light, called the SignalMaster™, provides additional warning capability using a common control. The SignalMaster has programmable light patterns which provide supplemental warning for any hazardous situation.

The Control Head's LED display indicates which lights are illuminated. When the optional SignalMaster is installed, the Control Head's LED display simulates the light pattern being executed by the directional light.

The warning system is protected against reversed polarity damage. Relay outputs are protected by automotive-type fuses.

The Vision warning system may be installed in any vehicle with a 12-volt NEGATIVE ground electrical system. The Interface/Relay Unit may be installed in the trunk or under the seat. For simple installation: connection between the Control Head and the Interface/Relay Unit is via a modular telephone cable with standard modular phone connectors at both ends, and connection between the Interface/Relay Unit and the lightbar is via a multi-conductor cable with connectors at both ends.

Other advanced features of the Vision warning system include:

- High degree of reliability through the use of CMOS microprocessor and other integrated circuits.
- Modular construction with easily replaceable circuit boards, domes and lamps to greatly reduce spare parts inventory.
- Quiet, smooth, precise and efficient positioning stepper motors control parabolic reflectors and have a longer life than conventional DC motors.

SECTION II

SPECIFICATIONS

2-1. ELECTRICAL.

Input Voltage	11VDC to 16VDC.
Polarity	Negative ground only.
Operating Temperature Range	-30°C to +65°C.
Standby Current	2.5 amperes (nominal).
Operating Current	30 amperes (nominal).
(SignalMaster and auxiliary functions deactivated)	

2-2. PHYSICAL.

Dimensions:

Interface/Relay Unit	
Height	1-3/8" (3.5cm).
Width	6-3/8" (16.2cm).
Length	4-5/16" (11cm).
Net Weight	1 lb. (.454kg).
Control Head	
Height	3-1/8" (7.94cm).
Width	6-3/4" (17.15cm).
Length	1.0" (2.54cm).
Net Weight	9-5/8 oz. (0.273kg).
Lightbar	
Height	5-7/8" (15cm).
Width	47-3/4" (121.3cm).
Length	28" (71.12cm).
Net Weight	42 lbs. (30.45kg).
Shipping Weight	67 lbs. (30.45kg).

2-3. FEATURES SUMMARY.

- V-shaped construction.
- Seven multi-function 50 watt lamp modules.
 - Rotation at 90FPM, 120FPM, and 175FPM.
 - Oscillation to front, rear, and sides.
 - Alley/take-down lights with manual (sweep or single step) positioning capability.
- Three auxiliary relay-controlled outputs.
- Interface for Federal Model SS2000 SmartSiren activation.
- Mode 3 activation via foot switch (optional).
- User-selectable keyboard configurations with pre-programmed light patterns.
- Optional rear SignalMaster directional light.
- Unauthorized reprogramming prevention.
- One-inch thin control head with slide switch.

SECTION III

INSTALLATION

SAFETY MESSAGE TO INSTALLERS OF WARNING LIGHT SYSTEMS

WARNING

The lives of people depend on your safe installation and servicing of Federal products. It is important to read and follow all instructions shipped with the products. In addition, listed below are some other important safety instructions and precautions you should follow:

Before Installation

Qualifications

- To properly install a warning light system: you must have a good understanding of automotive electrical procedures and systems, along with proficiency in the installation and service of safety warning equipment.

During Installation

- DO NOT connect this system to the vehicle battery until ALL other electrical connections are made, mounting of all components is complete, and you have verified that no shorts exist.
- Locate the control head so the vehicle, controls, and microphone can be operated safely.
- A light system is a high current device. In order for it to function properly, separate ground (-) and positive (+) connections must be made. They should be connected to the battery terminals. A suitable fuse must be installed in the positive lead as close to the battery as practical.
- The Vision warning system is an advanced microprocessor based warning system. Unlike conventional light bars, low voltage conditions (less than 11VDC) may cause it to malfunction or fail to operate. Installation procedures MUST produce reliable and durable ground (-) and positive (+) connections. In addition: the vehicle battery, charging system, and installation wiring MUST have the capacity to supply consistent warning system power at rated current and voltage levels.

- DO NOT install a two-way radio antenna on the lightbar.
- Install the lightbar at least 18-inches away from any two-way radio antenna.
- DO NOT drill additional holes in the lightbar, or install auxiliary devices on the lightbar.
- When drilling into a vehicle structure, be sure that both sides of the surface are clear of anything that could be damaged.
- If wiring is shorted to vehicle frame, high current conductors can cause hazardous sparks resulting in electrical fires or flying molten metal.

After Installation

- After installation, test the warning light system to ensure that it is operating properly.
- Test all vehicle functions, including horn operation and vehicle light systems, to ensure proper operation.
- After testing is complete, provide a copy of these instructions to the instructional staff and all operating personnel.
- File these instructions in a safe place and refer to them when maintaining and/or re-installing the product.

Failure to follow all safety precautions and instructions may result in property damage, serious injury, or death to you or others.

WARNING

When installing equipment inside air bag equipped vehicles, the installer **MUST** ensure that the equipment is installed **ONLY** in areas recommended by the vehicle manufacturer.

Failure to observe this warning will reduce the effectiveness of the air bag, damage the air bag, or potentially damage or dislodge the equipment, causing serious injury or death to you or others.

3-1. UNPACKING.

After unpacking the Vision, examine it for damage that may have occurred in transit. If the equipment has been damaged, file a claim immediately with the carrier stating the extent of damage. Carefully check all envelopes, shipping labels and tags before removing or destroying them.

3-2. COLORED DOME INSERT OPTION INSTALLATION.

WARNING

To provide proper warning colors to the front and/or rear if dome inserts are used, a clear dome must be used with the colored inserts.

- A. Remove and retain the two Torx head screws which secure the dome to the pod.
- B. Carefully remove the dome and set it aside.
- C. Place the front or rear insert in position and ensure that the locating notches are properly positioned on the locating ribs as shown in figure 3-1. If applicable, repeat with the other insert.

CAUTION

Excessive tightening of the Torx head screws will damage the screws.

- D. Replace the dome and secure with the previously removed Torx head screws.

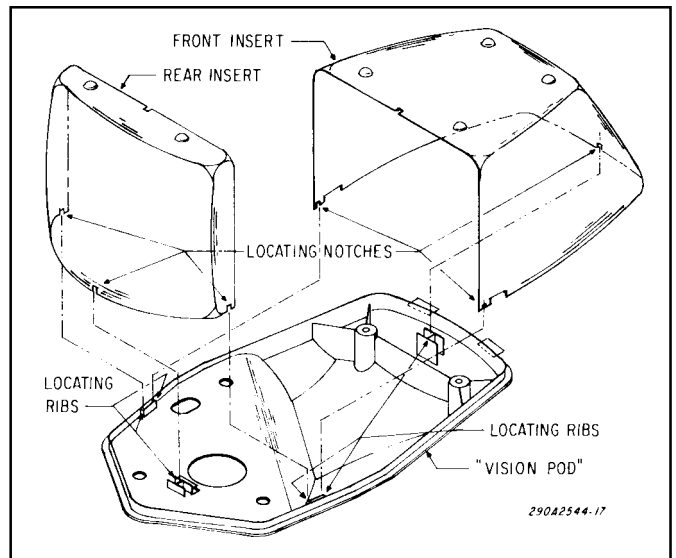


Figure 3-1. Dome Insert Installation.

3-3. LIGHTBAR INSTALLATION.

WARNING

Improper warning system and/or two-way radio system operation may result if a two-way radio antenna is installed on, or within 18-inches of, the lightbar. Before permanent installation of the lightbar or a two-way radio antenna, test the warning system and two-way radio system. **DO NOT** install a two-way radio antenna on the lightbar.

Some installations may require relocation of the two-way radio antenna to a trunk or fender location.

Warning system failure may result if additional holes are drilled in the lightbar, or if auxiliary devices are installed on the lightbar. **DO NOT** drill additional holes in the lightbar, or install auxiliary devices on the lightbar.

Before performing any installation, see figure 3-2 (block wiring diagram); plan all wiring and cable routing. Ensure that the lightbar is installed on the vehicle roof in accordance with the instructions packed with the mounting kit.

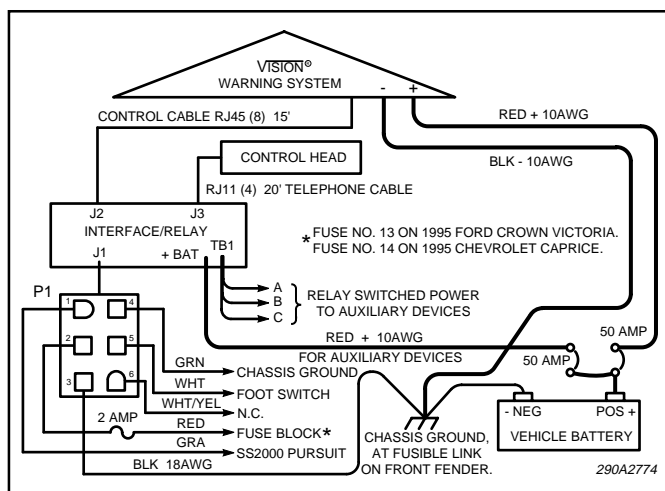


Figure 3-2. Block Wiring Diagram.

3-4. INTERFACE/RELAY UNIT MOUNTING LOCATION SELECTION.

CAUTION

The Vision Interface/Relay Unit housing is NOT waterproof. It must be mounted in a location which is sheltered from falling rain, snow, standing water, etc. Also, it must be installed in an adequately ventilated area. Never install near heater ducts.

Do not mount the Vision Interface/Relay Unit under the vehicle's hood.

When selecting a mounting location for the Vision Interface/Relay Unit and the control head, it is necessary to keep in mind that the control head cable is 20-feet long and the power cable is 4-feet long. Plan all wiring and cable routing before performing any installation.

Some possible Interface/Relay Unit mounting locations are: under the dash, under the front seat, or in the trunk (under the rear deck, near the rear seat speakers, if vehicle is so equipped).

Using the supplied mounting bracket will allow the Interface/Relay Unit to be easily removed for wiring and servicing, should it be needed.

3-5. INTERFACE/RELAY UNIT MOUNTING BRACKET.

To install the Interface/Relay Unit using the mounting bracket, proceed as follows:

A. Use the mounting bracket as a template and scribe two drill positioning marks at the selected mounting location.

CAUTION

Before drilling holes in ANY part of a vehicle, be sure that both sides of the mounting surface are clear of parts that could be damaged; such as brake lines, fuel lines, electrical wiring or other vital parts.

NOTE

If desired, the #14 thread-forming screws may be used in place of the 1/4-20 x 3/4 hex head screws.

B. Drill two mounting holes at the position marks.

C. Secure the mounting bracket to the mounting surface with (2 each) 1/4-20 x 3/4 hex head screws, 1/4 split lockwashers and 1/4-20 hex nuts as shown in figure 3-3.

3-6. CONTROL HEAD INSTALLATION.

Several control head mounting methods are available. The mounting method used will depend on the mounting location, available room, and user preference.

CAUTION

Unreliable switch activation and loss of "tactile feedback" will result if the control head mounting method allows movement. DO NOT mount the control head on padded surfaces.

Choose a location for the control head that allows the vehicle, controls, and microphone to be operated safely at all times.

See figure 3-4. The supplied hinged mounting bracket enables the control head to be mounted in a variety of positions. Positioning the bracket above the unit allows mounting the control head on the underside of the dash. Positioning the bracket below the unit will permit mounting on any horizontal surface.

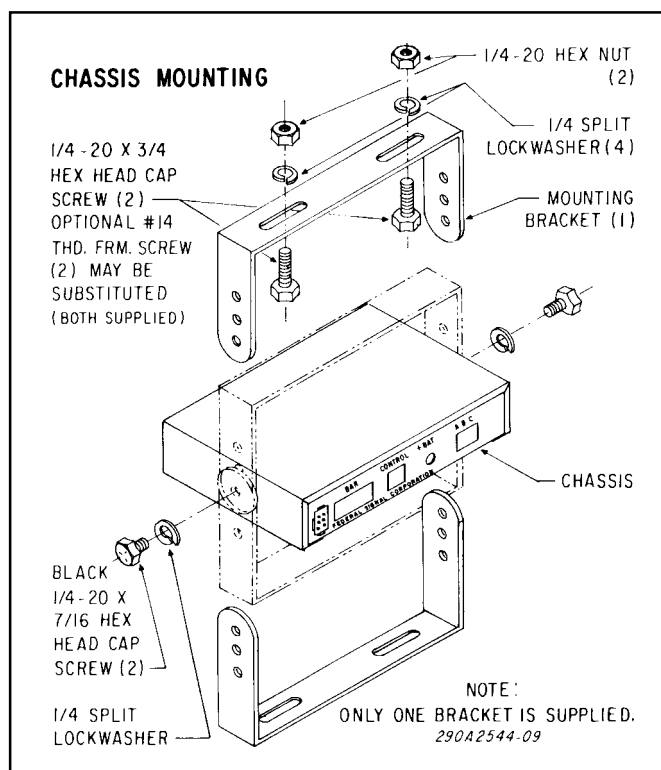


Figure 3-3. Mounting Bracket Installation.

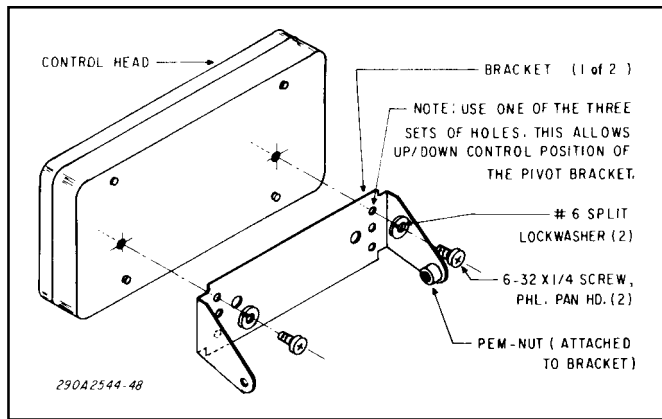


Figure 3-4. Control Head Bracket Assembly.

To mount the control head using the bracket, proceed as follows:

A. Assemble a bracket to the control head using the 6-32 x 1/4 screws and #6 lockwashers. Assemble the other bracket to the control head/bracket assembly using the 1/4-20 x 3/4 hex head screws and 1/4" lockwashers as shown in figure 3-5.

NOTE

The brackets are not symmetrical. After assembling the brackets to the control head, ensure that the assembly can be properly positioned at the intended mounting location. If proper positioning cannot be achieved, reverse the bracket.

B. Use the mounting bracket as a template and scribe two drill positioning marks at the selected mounting location.

CAUTION

Before drilling holes in ANY part of a vehicle, be sure that both sides of the mounting surface are clear of parts that could be damaged; such as brake lines, fuel lines, electrical wiring or other vital parts.

C. Drill two mounting holes at the position marks.

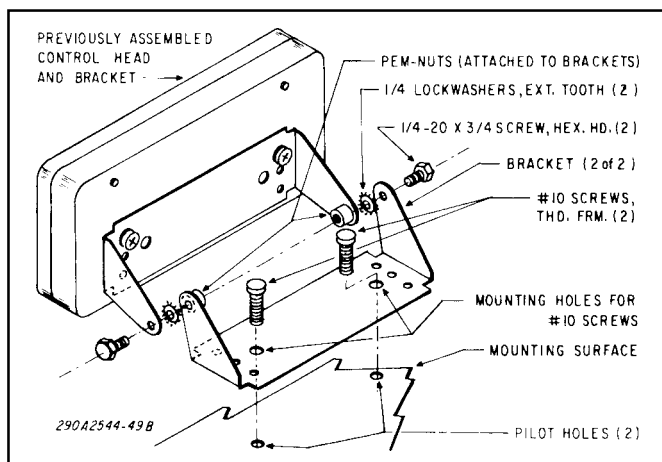


Figure 3-5. Control Head and Bracket Installation.

D. Secure the mounting bracket to the mounting surface with the #10 thread-forming screws as shown in figure 3-5.

3-7. ELECTRICAL INSTALLATION.

WARNING

Failure to observe this WARNING may result in fire, burns or blindness.

If shorted to vehicle frame, high current conductors can cause hazardous sparks resulting in electrical fires or molten metal.

DO NOT connect this system to vehicle battery until ALL other electrical connections are made and mounting of all components is complete.

Verify that no short circuits exist, before connecting to the Positive (+) battery terminal.

To complete this portion of the installation, refer to the block wiring diagram (figure 3-2) and figure 3-6. Proceed as follows:

A. Lightbar Connections.

The lightbar is completely wired at the factory and does not require any additional internal wiring. All the conductors necessary for control of all functions are contained in the cables.

1. Route the lightbar power cable and the control cable into the vehicle.

2. Route the control cable near the location of the previously installed Interface/Relay Unit and secure the cable with user-supplied clamps and hold-downs as required.

3. Plug the control cable's connector into the mating connector on the Interface/Relay Unit.

CAUTION

Before drilling holes in ANY part of a vehicle, be sure that both sides of the mounting surface are clear of parts that could be damaged; such as brake lines, fuel lines, electrical wiring or other vital parts.

4. If necessary, drill a hole in the vehicle firewall. Place a grommet or similar device in the hole to protect the wires against damage from rough edges. Route the power cable into the engine compartment.

To protect the wire, a separate circuit breaker must be connected as close as practical to the positive (+) battery terminal. FUSES ARE NOT ACCEPTABLE. See figures 3-2 and 3-6. Install the supplied two 50-ampere circuit breakers (Federal Part No. 8474176). DO NOT remove the jumper on

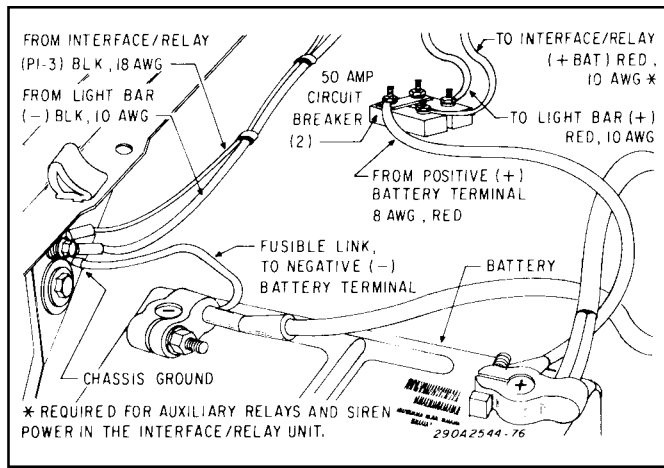


Figure 3-6. Battery Connections.

the battery side of the circuit breakers. Connect the red wire to one of the 50-ampere circuit breakers.

Do NOT make any connections to the battery until all other wiring is complete.

B. Interface/Relay Unit Power Cable Connections.

The Interface/Relay Unit power cable, included in the carton, is equipped with a six-pin plug that mates with the connector on the rear of the Interface/Relay Unit (see figures 3-7 and 3-8). Additional wire (the same gauge or heavier) may be spliced to the leads as required. The various wires on the connector must be connected as follows:

NOTE

Use electrical tape to insulate ANY unused power cable wires.

1. Connection to Power Source (see figure 3-8).

The Vision must operate from a 12 volt **NEGATIVE** ground vehicle electrical system. Therefore, before making any electrical connections, verify the polarity of the vehicle electrical system ground.

NOTE

Transient noise pulses caused by the automotive power system or surge currents due to switching inductive or incandescent lamp loads may cause malfunctions in the Vision if proper wire routing is not followed.

The Interface/Relay Unit red (positive) and black (negative) power cable leads should be as short and direct to the battery or fuse block as possible. Do NOT splice them to lightbar or accessory power leads.

The black (negative) power cable lead should NOT be connected to the vehicle chassis.

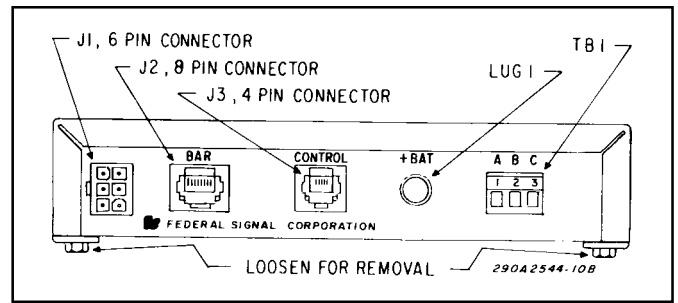


Figure 3-7. Rear View of Interface/Relay Unit.

Power for the Interface/Relay Unit (fused at 2-amperes) can be obtained from the vehicle's fuse block, or a 2-ampere fused, switched circuit.

NOTE

The Vision system does not have an on-off switch. If Interface/Relay Unit power is obtained directly from the vehicle battery, the system will continuously draw approximately 2.5A and will eventually discharge the vehicle's battery. It is recommended that the Interface/Relay Unit power be obtained from a vehicle circuit that is powered in the **run** and **start** positions (see table 3-1). Power can also be obtained from a user-supplied switch (current capacity of at least 2 amps).

CAUTION

Before drilling holes in ANY part of a vehicle, ensure that both sides of the surface are clear of parts that could be damaged; such as brake lines, fuel lines, electrical wiring or other vital parts.

a. Connect the green power cable lead to the vehicle chassis as close as practical to the Interface/Relay Unit. Scrape paint away from the selected bolt hole to assure a good electrical connection to the chassis.

b. Route the red (+) power cable lead to the fuse block (see table 3-1) or user-supplied switch. When the red (+) power cable lead is routed to the fuse block, install the fuse clip adapter (supplied) as shown in figure 3-8.

c. To protect the wires, use an in-line fuseholder and 2-ampere fuse (not supplied). The fuseholder and fuse should be installed in the red (+) lead as close as practical to the power source.

d. Route the black (-) power cable lead through the previously drilled hole into the engine compartment, and through existing clamps and holders toward the battery. DO NOT make any connections to the battery until all other wiring is complete.

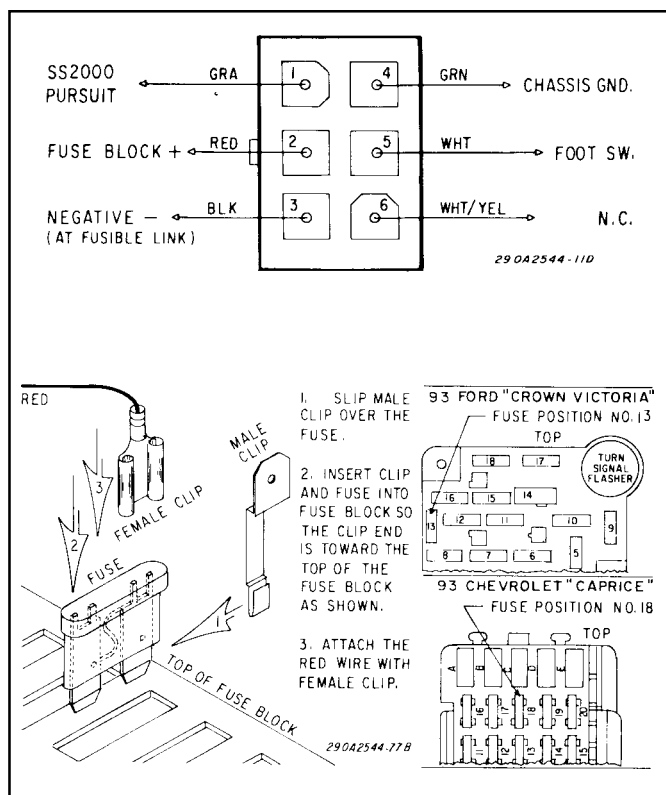


Figure 3-8. Interface/Relay Unit Power Cable and Fuse Clip Adapter Installation.

2. Optional Foot Switch.

The optional foot switch function is activated by momentarily grounding the foot switch input using a user-supplied foot switch (Federal Model SWF) or other equivalent momentary contact SPST switch.

a. Install the foot switch in a location which allows the vehicle, controls, and microphone to be operated safely at all times. In addition, the foot switch should be installed in a location which allows minimum reaction time in an emergency situation.

b. Connect one side of the switch to a RELIABLE chassis ground using #18AWG or larger wire.

c. See figure 3-8. Connect the other side of the switch to the power cable's white wire using #18AWG or larger wire.

3. Optional SS2000 Interface.

The optional SS2000 interface function will activate the Federal Model SS2000 SmartSiren® pursuit function using the Vision control head or optional foot switch described above.

Make of Automobile	1995	1994	1993	1992
Chevrolet Caprice	Fuse 14	Fuse 6	Fuse 18	Fuse 18
Ford Crown Victoria	Fuse 13	Fuse 13	Fuse 13	Fuse 13

Table 3-1. Fuse Block Connection.

a. Using #18AWG or larger wire, connect the power cable's gray wire to the gray wire in the SS2000's power cable.

b. Connect +12V to LUG1 as described in paragraph 3-7.C. below.

C. Auxiliary Connections.

NOTE

Steps 3-7.C.1. through 3-7.C.6. below are necessary ONLY if auxiliary devices are to be controlled by the warning system.

The Vision is configured at the factory to satisfy most installation requirements. Before proceeding with installation, refer to the supplied Operation and Configuration Instructions manual for a description of the "standard" keyboard configurations and for instructions on how to change the configuration (if necessary).

The Vision provides one terminal strip (TB1) for control of auxiliary lights and accessories. A total of three fused relay-controlled outputs are available.

Each output switches a nominal +12-volts to the controlled device. Do NOT use the black wire in the Interface/Relay Unit power cable for grounding the switched device(s). Ground the switched devices separately.

Refer to the installation instructions provided with the auxiliary devices for additional precautions and details.

Fuse current ratings and possible uses for each output are shown in table 3-2.

Complete the wiring to the accessories as follows:

1. Remove the chassis cover by loosening the 2 screws on the bottom of the Interface/Relay Unit. See figure 3-7. Slide the cover to expose the terminal strip.

2. Route a #10AWG red wire through the hole labeled +BAT and attach it to the large lug-type

Outputs	Fuse Rating	Possible Usage
A - C	10 amperes	Auxiliary Devices (Headlight Flasher, Grille Lights, Rear Deck Lights, Trunk Release, etc.)

Table 3-2. Output Ratings.

terminal (LUG1) on the circuit board. Since this wire provides the power source for all relay-switched auxiliary functions, a good mechanical and electrical connection here is important. Also, ensure that there are no loose wire strands which may cause a short circuit.

3. Route this wire through the previously drilled hole into the engine compartment and through existing clamps and holders toward the battery.

4. To protect the wire, Vision, and the auxiliary outputs, connect it to the UNUSED LOAD SIDE of the previously installed 50-ampere circuit breakers. Do NOT make any connections to the battery until all wiring is complete.

5. See figures 3-7 and 3-9. Connect wires from the accessories to TB1-1 through TB1-3 as applicable. Refer to the instructions packed with the accessories for proper wire gauge, current requirements, and any additional instructions. Do NOT exceed fuse ratings shown in table 3-2.

6. Replace the chassis cover. Slide it forward and secure with the two screws.

D. Control Head Connections.

All connections between the Vision control head and Interface/Relay Unit are accomplished by a single 20-foot telephone-type cable (provided). It is terminated with modular-type connectors on each end.

CAUTION

The unit will not operate if the telephone-type cable is improperly wired. If it is necessary to shorten the 4 conductor telephone-type cable, ensure that the connections made to the modular connector are exactly the same as the original cable connections.

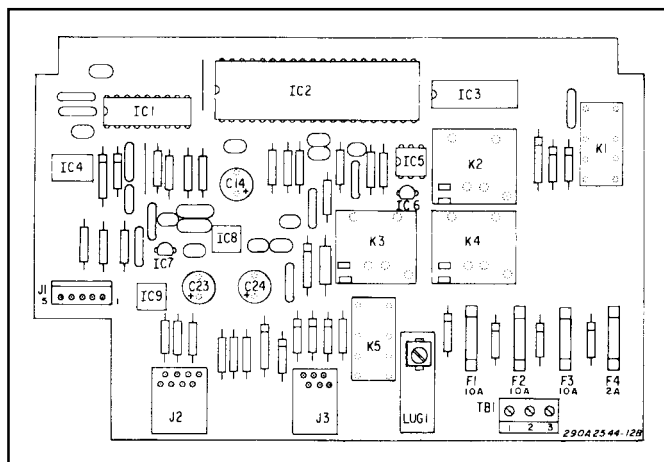


Figure 3-9. Interface/Relay Unit Circuit Board.

To complete this portion of the installation, proceed as follows:

1. Route the 20-foot cable between the control head and the Interface/Relay Unit. Secure the cable with user-supplied clamps and hold downs as required.

2. Insert the modular connector in the mating receptacle on the back of the Interface/Relay Unit. Secure with user-supplied clamps and/or wire ties to provide strain relief.

3. Insert the other modular connector in the receptacle on the control head. Secure with user-supplied clamps and/or wire ties to provide strain relief.

3-8. INSPECTION AND FINAL INSTALLATION.

A. See figure 3-3. Secure the Interface/Relay Unit to the mounting bracket with the BLACK 1/4-20 x 7/16 hex head screws and 1/4 split lockwashers. Ensure all fasteners are properly tightened.

B. Before connection to the power source, perform a visual check of all connections and wiring.

C. Ensure that there are no loose wire strands or other bare wire which may cause a short circuit. Also, all wires must be protected from any sharp edges which could eventually cut through the insulation.

D. Use an ohmmeter to verify that a short circuit does NOT exist between the positive (+) and negative (-) power cable leads. Also, there must be NO short circuits between the positive (+) wires and the vehicle chassis.

WARNING

Failure to observe this warning **WILL** result in severe instantaneous damage to the Vision system.

The reverse polarity protection **WILL NOT** protect against red (+) and black (-) wires mixed in the same connection. Ensure that all positive (red) and negative (black) wires are properly connected together (reds to reds, and blacks to blacks) before connecting to the power source.

E. After performing steps A through D, connect the black (-) wires to the fusible link at the front fender between the negative (-) battery terminal and chassis ground. This is the **ONLY** chassis ground allowed for these wires. See figure 3-6. Secure mechanical and electrical connections are required.

F. See figure 3-6. Connect all red (+) wires to the positive (+) terminal of the power source. Again, secure mechanical and electrical connections are required.

3-9. REPLACEABLE FUNCTION LABELS.

NOTE

Before installing the function labels, it is necessary to understand which functions are activated by the individual switches. Read and understand Section I Operation and Section II Configuration in the supplied Operation and Configuration Instructions before proceeding.

See figure 3-10. Replaceable function labels identify all switches on the control head. A sheet of applicable function legends is supplied.

To install the function legends, proceed as follows:

A. Disconnect the control head cable at the control head. Remove the control head from its bracket (if used).

B. Remove and retain the four screws from the rear of the control head. Separate the control head rear housing (base) from the bezel. Lift the keyboard assembly out through the bezel.

NOTE

It is not necessary to separate the keyboard assembly's two circuit boards.

C. Place the keyboard assembly on the work surface face down. See figure 3-11. Using a small longnose pliers or tweezers, carefully grasp the white edge of the top legend strip and slide the strip out of the keyboard.

D. Select the appropriate labels from the supplied sheet of function legends. Peel the labels from the sheet and apply to the legend strip in the area provided as shown in figure 3-11. Slide the legend strip back into the keyboard.

E. Repeat the above procedure for the bottom legend strip.

F. Reassemble the control head. Reassemble the control head in its bracket (if used), and insert the modular connector in the receptacle.

3-10. TESTING AFTER INSTALLATION.

NOTE

The Vision warning system is supplied with Keyboard Configuration 2 selected.

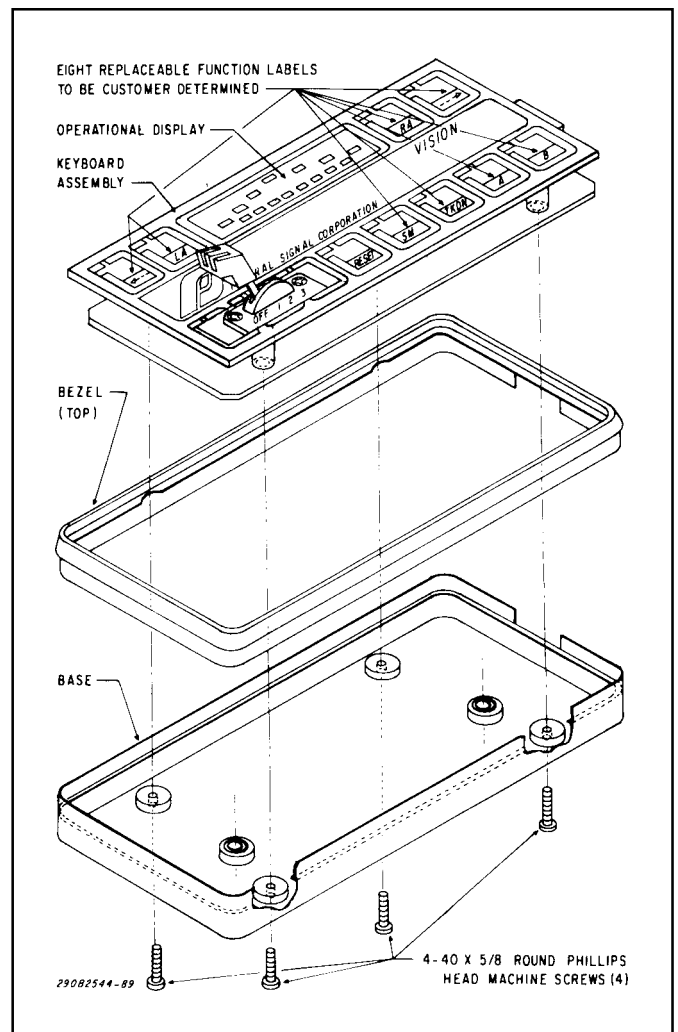


Figure 3-10. Control Head Disassembly.

Before testing, read and understand Section I Operation in the supplied Operation and Configuration Instructions. After installation is complete, test all warning system functions to ensure that all functions and controlled devices operate as intended. Test all vehicle functions, including horn operation and vehicle light systems, to ensure proper operation.

Configuration is described in Section II Configuration in the supplied Operation and Configuration Instructions.

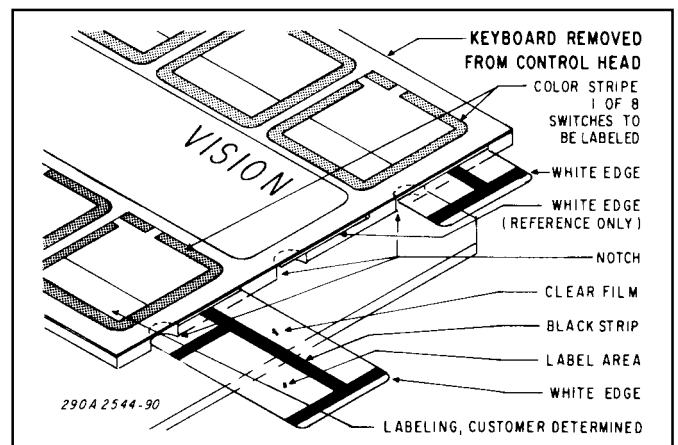


Figure 3-11. Replaceable Function Labels.

SECTION IV OPERATION

SAFETY MESSAGE TO OPERATORS OF FEDERAL SIGNAL LIGHT SYSTEMS

WARNING

The lives of people depend on your safe operation of Federal products. It is important to read and follow all instructions shipped with the products. In addition, listed below are some other important safety instructions and precautions you should follow:

Qualifications

- To properly use a light system: you must have a good understanding of general vehicle operation, a high proficiency in the use of safety warning equipment, and thorough knowledge of state and federal UNIFORM TRAFFIC CODES.

Signaling Limitations

- Be aware that the use of your visual signaling devices does not give you the right to force your way through traffic. Your emergency lights and actions are REQUESTING the right-of-way.
- Although your warning system is operating properly, it may not alert everyone. People may not hear, see, or heed your warning signal. You must recognize this fact and continue driving cautiously.
- Situations may occur which obstruct your warning signal when natural or man-made objects are between your vehicle and others, such as when you raise your hood or trunk lid. If these situations occur, be especially careful.
- The control head's LED display emulates the light pattern(s) being executed by the warning system. The display is intended ONLY as a guide and NOT as an indication of proper warning system operation. Before using the warning system, its operation should be observed from outside the vehicle.

Driving Limitations

- At the start of your shift, you should ensure that the light system is securely attached to the vehicle and operating properly.

- If the unique combination of emergency vehicle equipment installed in your vehicle has resulted in the light/siren controls being installed in a position that does not allow you to operate them by touch only, OPERATE CONTROLS ONLY WHILE YOUR VEHICLE IS STOPPED.

- If driving conditions require your full attention, you should avoid operating the light/siren controls while the vehicle is in motion.

Continuing Education

- File these instructions in a safe place and refer to them periodically. Give a copy of these instructions to new recruits and trainees.

Failure to follow these safety precautions may result in property damage, serious injury, or death to you, to passengers, or to others.

IMPORTANT

System configuration and any changes to the "standard" keyboard configurations (if any) MUST be provided to the operator by the installer or person responsible for programming. It is the operator's responsibility to understand how his particular system is configured (programmed) to operate.

OPERATING INSTRUCTIONS

The Vision control head is designed to assist the operator's selection of functions. Each control head switch is recessed and aids guiding the operator's finger to the switch's center for activation. When a switch is pressed, "tactile feedback" provides function selection indication as follows: a click is felt, a beep is heard, the selected function's LED is illuminated, and the control head's V-shaped LED display indicates which warning system lights are illuminated. If the optional SignalMaster directional light is installed, the control head display emulates the directional light pattern being executed.

Specific operating instructions are provided in the supplied Operation and Configuration Instructions.

SECTION V

CONFIGURATION

WARNING

Property damage, serious injury, or death to you or others may result if the Vision warning system is improperly configured. Configuration, if required, is to be performed at the time of installation. It is NOT intended for operators to “cus-tomize” the Vision’s operation for their individual preferences. It is the USER’s responsibility to determine compatibility, suitability, and ensure proper configuration of the Vision warning system.

The person responsible for configuration MUST be familiar with local codes and procedures for safe emergency vehicle warning system operation.

CONFIGURATION INSTRUCTIONS

The Vision is an extremely versatile and configurable warning system. Take-down lights, alley lights, secondary and primary warning light patterns, and the optional SignalMaster directional warning signals are all available with the “standard” keyboard configurations. Also, control of auxiliary devices (headlight flashers, grille lights, etc.) is available.

For configuration instructions, refer to the supplied Operation and Configuration Instructions.

SECTION VI

SERVICE AND MAINTENANCE

SAFETY MESSAGE TO PERSONNEL SERVICING FEDERAL SIGNAL WARNING SYSTEMS

WARNING

The lives of people depend on your safe servicing of Federal products. It is important to read and follow all instructions shipped with the products. In addition, listed below are some other safety instructions and precautions you should follow:

- Read and understand all instructions in this manual before servicing the warning system.
- To properly service a warning system: you must have a good understanding of automotive electrical procedures and systems, along with proficiency in the installation and service of safety warning equipment.
- Electronic circuit repairs must be performed by a qualified and competent electronic technician.
- DO NOT connect this system to the positive terminal of the battery until servicing is complete, and you have verified that there are no short circuits to ground.
- In order for the warning system to function properly, the ground connection must be made to the **NEGATIVE** battery terminal.
- After repair, test the warning system to ensure that it is operating properly.

Failure to follow all safety precautions and instructions may result in property damage, serious injury, or death to you or others.

6-1. GENERAL.

Most of the component electronic parts used in the Vision are standard items that can be obtained from any TV or electronics shop. In order to reduce equipment down-time, Federal recommends that an entire printed circuit board be replaced. The printed circuit boards are relatively inexpensive allowing you to keep an adequate supply in your repair shop.

For warranty service, contact your local Distributor.

The factory can and will service your equipment or assist you with technical problems that cannot be handled satisfactorily and promptly locally.

Communications and shipments should be addressed to:

Service Department
Federal Signal Corporation
2645 Federal Signal Drive
University Park, IL 60466

1-800-433-9132

(In Illinois) 708-534-3400

6-2. CONTROL HEAD.

The Vision control head consists of two circuit boards stacked on top of each other. See figure 6-1. To disassemble the control head, proceed as follows:

A. Disconnect the control head cable at the control head. Remove the control head from its bracket (if used).

B. Remove and retain the four screws from the rear of the control head. Separate the control head rear housing (base) from the bezel. Lift the keyboard assembly out through the bezel.

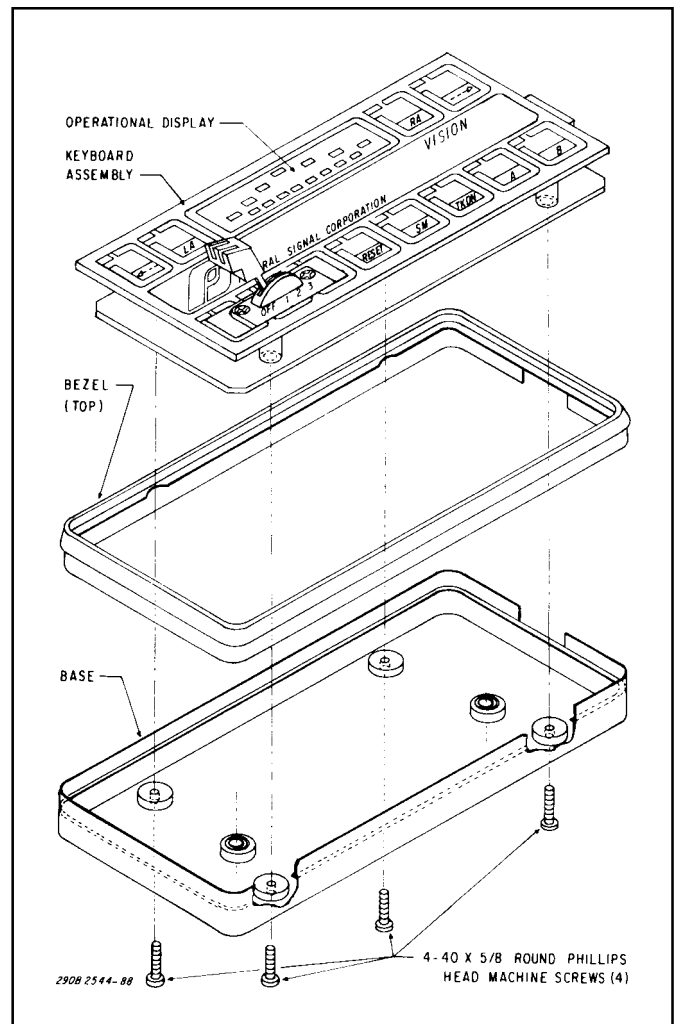


Figure 6-1. Control Head Disassembly.

C. Separate the two circuit boards by gently pulling them apart.

D. Disconnect the green wire at the stud on the keypad circuit board.

E. Observe the slide switch connector's orientation and then disconnect the slide switch connector.

F. After repair or replacement, reconnect the green wire and slide switch connector. Ensure the slide switch connector is reconnected in the proper orientation—white wire toward the edge of the circuit board and the connector's wires away from the component side of the lower circuit board. Reassemble the control head using the previously removed screws. Reassemble the control head in its bracket (if used), and insert the modular connector in the receptacle.

6-3. SLIDE SWITCH REPLACEMENT.

1. Disassemble the control head as described in paragraph 6-2.

2. Observe the orientation of the slide switch. Remove and retain the knob, the two torx head screws and the switch bezel.

3. Place the new switch in position with the same orientation as the old switch.

4. Secure the switch in position using the previously removed switch bezel and torx head screws. Install the switch knob.

5. Reassemble the control head as described in paragraph 6-2.

6-4. INTERFACE/RELAY UNIT.

A. General.

Any competent electronic technician should have little difficulty in tracing a malfunction, should any occur. For emergency replacement of any of the small components, care must be used when soldering. Heat easily damages transistors, capacitors and circuit boards. It is therefore advisable to use longnose pliers or a similar heat sink on the lead being soldered.

CAUTION

To avoid damage to the unit, disconnect all red wires to the unit at the battery before proceeding.

B. Removal for Servicing.

When removing the chassis for servicing, loosen the two hexagon head screws on the underside

of the unit, near the front edge. Slide the entire chassis out of the case as shown in figure 6-2.

C. Printed Circuit Board Removal.

The Vision Interface/Relay Unit consists of one circuit board. See figure 6-3.

To remove the circuit board, proceed as follows:

1. Disconnect the wires from the terminal strip TB1.

2. Disconnect the large red wire at LUG1.

3. Unplug the control head cable and lightbar control cable connectors.

4. Unplug the connector at J1 on the circuit board.

5. The circuit board is secured to the chassis by four stand-offs. Depress the locking tab on each stand-off and gently lift the circuit board off the stand-offs.

D. Control Head Fuse.

A solder-in sub-miniature fuse (F5 on the circuit board) provides short-circuit protection for the control head and cable. F5 is located between R12 and R13 (near J1) on the circuit board. Failure of this fuse, although unlikely, will cause the Vision to be completely inoperative. If failure of F5 is suspected, proceed as follows:

1. Remove the circuit board as described in 6-3.C. above.

2. Check the fuse for continuity with an ohmmeter.

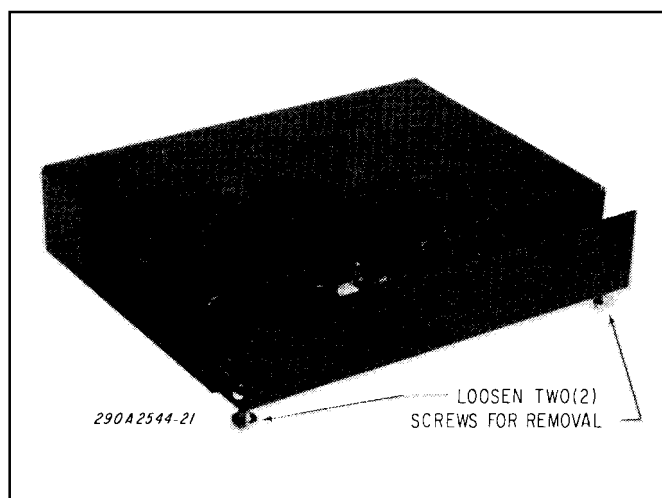


Figure 6-2. Chassis Removal.

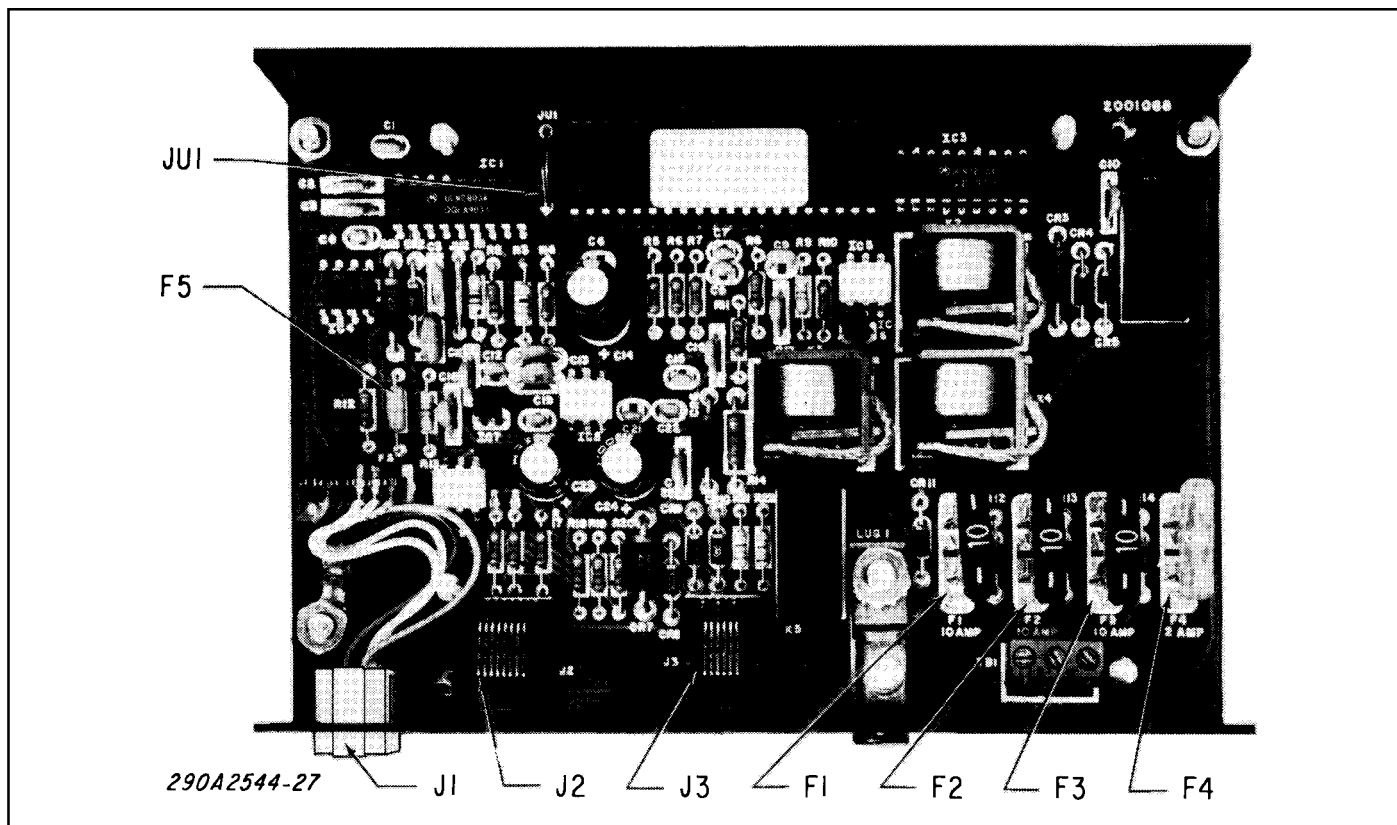


Figure 6-3. Interface/Relay Unit Circuit Board.

3. If fuse failure has occurred, replace with an EXACT replacement (refer to paragraph 6-7.).

NOTE

Failure of the control head fuse is usually the result of a shorted control head cable, or the control head cable was damaged during installation. Ensure that the cause of F5's failure is located and repaired before reapplying power to the unit.

6-5. LIGHTBAR.

A. General.

Any competent electronic technician should have little difficulty in tracing a malfunction, should any occur. For emergency replacement of any of the small components, care must be used when soldering. Heat easily damages transistors, capacitors and circuit boards. It is therefore advisable to use longnose pliers or a similar heat sink on the lead being soldered.

CAUTION

To avoid damage to the unit, disconnect all red wires to the unit at the battery before proceeding.

B. Cover Removal.

See figure 6-4. Remove and retain the four screws which secure the cover on the lightbar. Slide the cover back slightly and carefully lift to remove.

C. Printed Circuit Board Removal.

The Vision lightbar contains two (three if optional SignalMaster is installed) circuit boards. See figure 6-5.

To remove a circuit board, proceed as follows:

1. Remove and retain the fasteners which secure the circuit board to the lightbar.

CAUTION

Unpredictable operation may result if motor cables, or lamp driver cables, are mixed. Before removing cables, mark the cables for proper reconnection when reassembling.

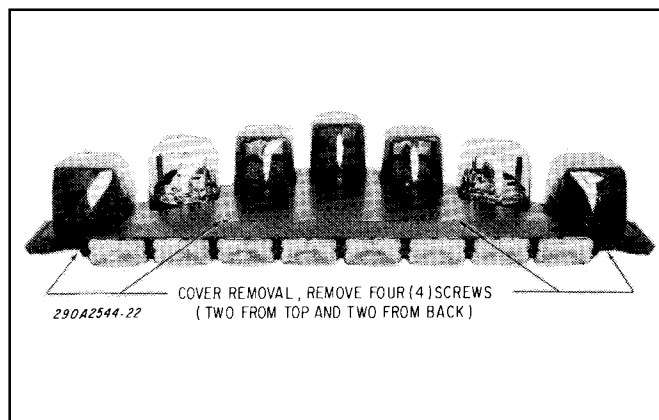


Figure 6-4. Lightbar Cover Removal.

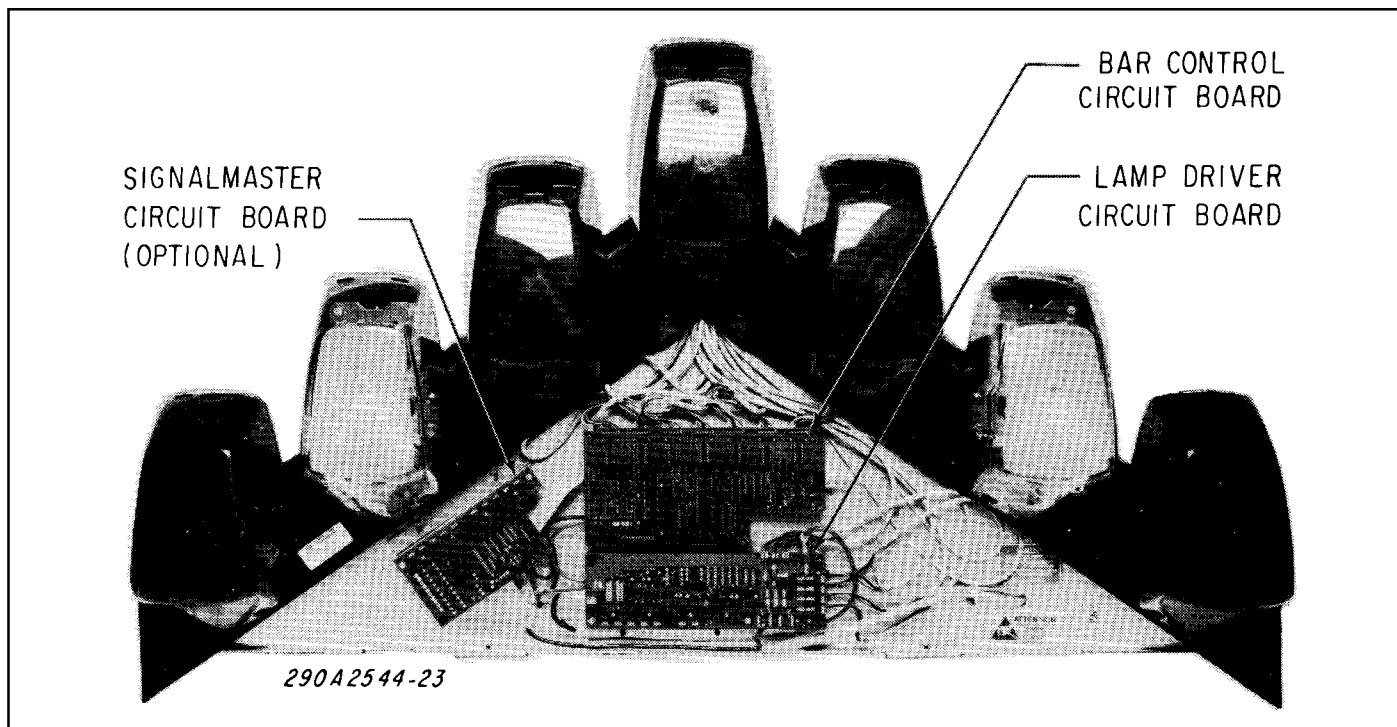


Figure 6-5. Lightbar Circuit Boards.

WARNING

Failure to observe this warning **WILL** result in severe instantaneous damage to the Vision system.

The reverse polarity protection **WILL NOT** protect against reversed red (+) and black (-) wires to individual circuit boards. Ensure that all positive (red) and negative (black) wires are properly reconnected when replacing a circuit board.

2. Disconnect wires and cables as applicable.

3. Repair or replace the circuit board as required.

D. Pod Servicing. (See figure 6-6.)

1. Remove and retain the two Torx head screws which secure the dome to the pod. Carefully remove the dome and set it aside.

2. To gain access to the motor, proceed as follows:

a. Remove and retain the screws which secure the pod to the lightbar extrusion.

Remove and retain the screws which secure the motor support assembly to the pod.

b. Disconnect the six-pin motor cable plug and the three-pin opto isolator cable.

c. Carefully lift the motor support assembly from the pod.

3. After servicing is complete, reassemble the pod by performing the above steps in reverse order.

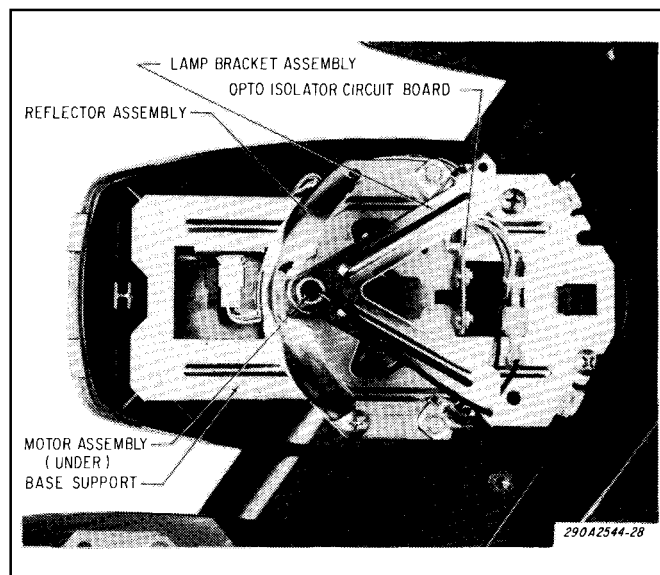


Figure 6-6. Pod Components.

6-6. MAINTENANCE.

A. *Cleaning the Plastic Domes.*

WARNING

Crazing (cracking) of domes will cause reduced effectiveness of light system. Do not use cleaning agents (which will cause crazing) such as strong detergents, solvents, or petroleum products. If crazing of domes does occur, reliability of light for emergency purposes may be reduced until domes are replaced.

Ordinary cleaning of the plastic domes can be accomplished by using mild soap and a soft rag. Should fine scratches or a haze appear on domes, they can ordinarily be removed with a non-abrasive, high quality, one-step, automotive paste cleaner/wax and a soft cloth.

B. *Lamp Replacement.*

WARNING

A serious injury may result if lamp is touched when hot. Always allow lamp to cool before removing.

1. Vision Pods.

a. Remove and retain the two Torx head screws which secure the dome to the pod.

b. Carefully remove the dome and set it aside.

CAUTION

Service life of lamp will be shortened if glass portion is touched. If glass has been handled, clean carefully with a grease solvent.

c. To replace the halogen lamp, twist to unlock and then pull the defective lamp out of the socket. Install a new #795X lamp in the socket (see figure 6-7). Refer to paragraph 6-7 for Federal Signal Part Number.

d. Replace the dome using the previously removed screws.

2. SignalMaster.

CAUTION

Use of higher wattage lamps can result in damage to the lenses.

a. Remove and retain the two screws which secure the lens. Carefully pull the lens straight away from the light assembly.

CAUTION

Service life of lamp will be shortened if glass is touched. If glass has been handled, clean with a grease solvent.

b. Remove the defective lamp by carefully pulling it out of the socket. Install a new lamp (G.E. GH-22) by aligning the pins on the lamp base with the holes in the socket, and carefully pushing the lamp into the socket. Refer to paragraph 6-7 for Federal Signal Part Number.

c. Replace the lens using the previously removed screws.

C. *Cleaning Reflectors.*

WARNING

Scratched or dulled reflectors will cause reduced effectiveness of light system. Avoid heavy pressure and use of caustic or petroleum based products when cleaning. If crazing of reflectors does occur, reliability of light for emergency warning purposes may be reduced until reflectors are replaced.

Use a soft tissue to clean the reflectors.

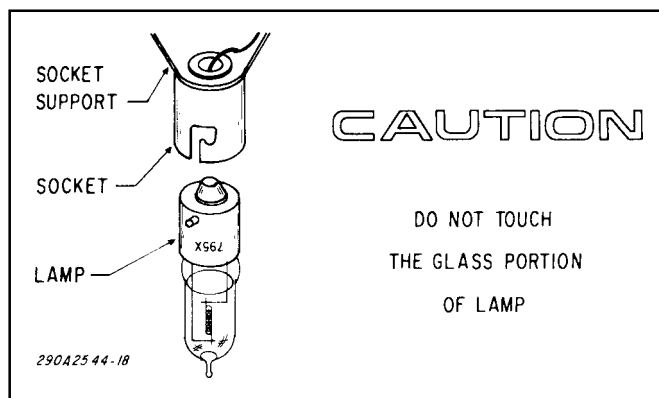


Figure 6-7. Pod Lamp Replacement.

6-7. VISION REPLACEMENT PARTS LIST.

<i>Description</i>	<i>Part Number</i>
Printed Circuit Boards	
Bar Controller PCB (Figure 6-8)	2001082
Lamp Driver PCB (Figure 6-9)	2001081C
Signalmaster PCB (Figure 6-10)	2001080
Opto Sensor PCB	2001079A
Assemblies	
Slide Switch Control Head Assy.	8572244A
Interface/Relay Unit Assy.	8572062
Domes	
Dome, Clear	8572001A
Dome, Red	8572001A-01
Dome, Amber	8572001A-02
Dome, Blue	8572001A-03
Dome, Green	8572001A-04
Dome, C.I.E. Blue	8572001A-05
Dome, Magenta	8572001A-06
Pod Assemblies	
Pod Assy. Drivers Side (no dome)	8572101A
Pod Assy. Center (no dome)	8572101A-01
Pod Assy. Passenger Side (no dome)	8572101A-02
Vision Components	
Lamp (rotator) 50W Hal. Vert. Fil.	8107141A
Lamp (SIGM-8) 27W Hal.	8573007A
Motor And Cable Assy.	175716
Power Cable (2 Conductor)	175733A-01
Power Harness (6 Conductor)	175735B
RJ-11 Data Cable	146863A
RJ-45 Data Cable	146903A
Legend Sticker Card	161832A
Installation Assy. Kit	8572064A
Circuit Breaker, 50 Amp.	8474A138
Circuit Breaker, 2-50 Amp.	8474176A
Mounting Bracket Control Head	85361065A
Mounting Bracket Interface/Relay	85391059A

<i>Description</i>	<i>Part Number</i>
Fuses	
Fuse, 2amp Pico Fuse	148151A-08
Fuse, 2amp Automotive Blade	148A142A-10
Fuse, 5amp Automotive Blade	148A142A-03
Fuse, 10amp Automotive Blade	148A142A-05
Fuse, 15amp Automotive Blade	148A142A-06
Fuse, 20amp Automotive Blade	148A142A
Software And Adaptors	
Pod Deflector Kit	8572223A
DB9 To RJ-45 Adaptor	140318A
RJ-45 To DB9 Adaptor	140322A
Police Software Kit	V-POL-K
General Software Kit	V-GEN-K
Signalmaster Components	
SIGM8 Reflector	8573002A-01
SIGM8 Lens, Clear	8573001A
SIGM8 Lens, Red	8573001A-01
SIGM8 Lens, Amber	8573001A-02
SIGM8 Lens, Blue	8573001A-03
SIGM8 Lens, Green	8573001A-04

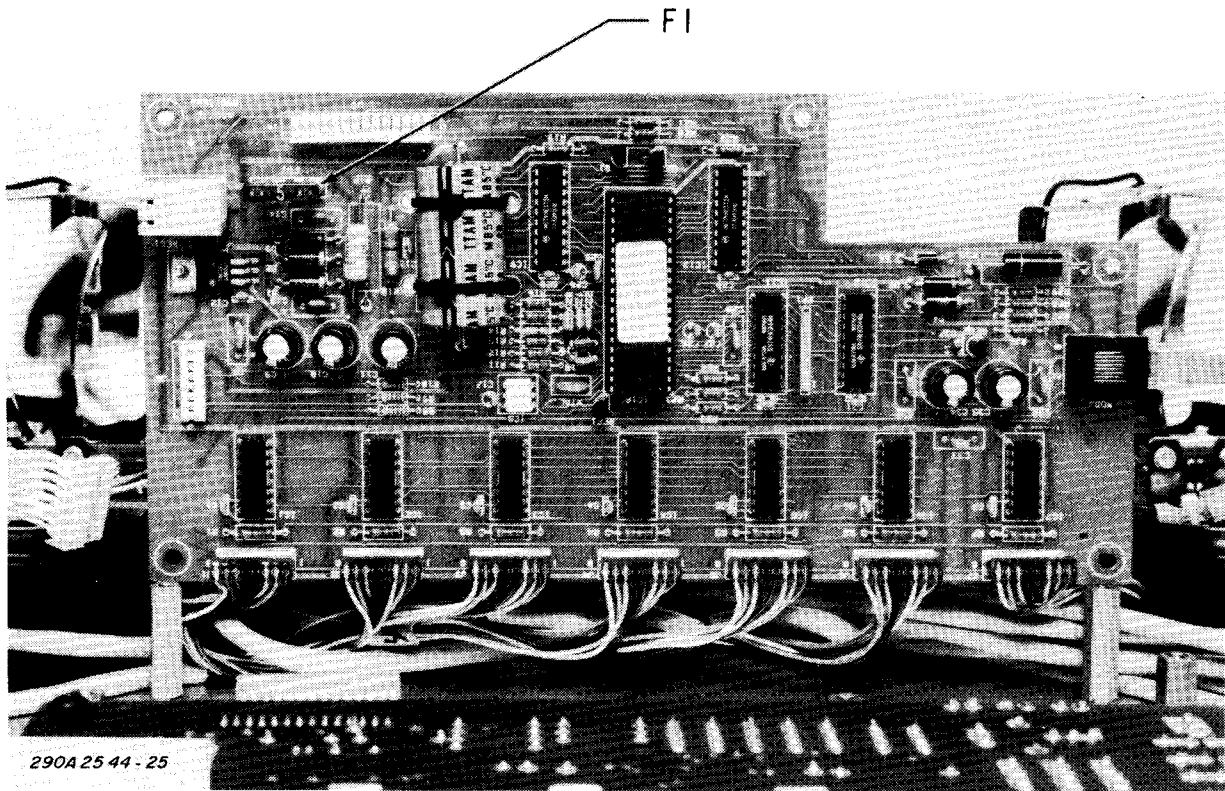


Figure 6-8. Bar Control Printed Circuit Board.

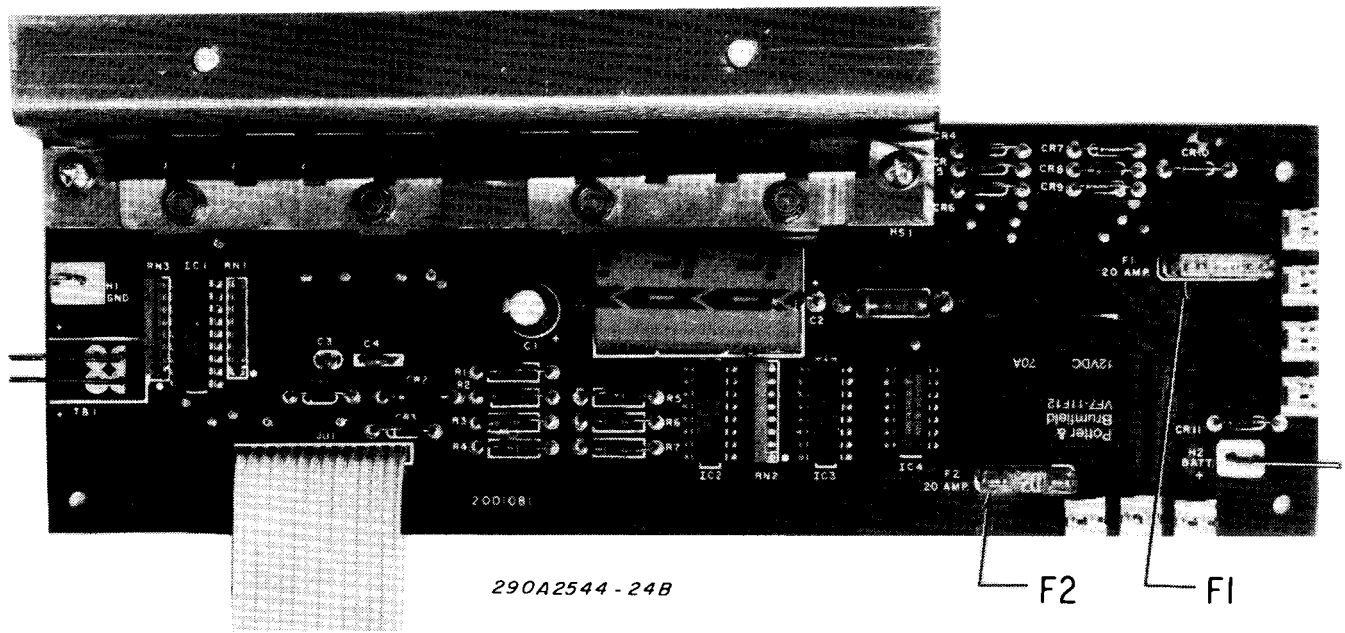


Figure 6-9. Lamp Driver Printed Circuit Board.

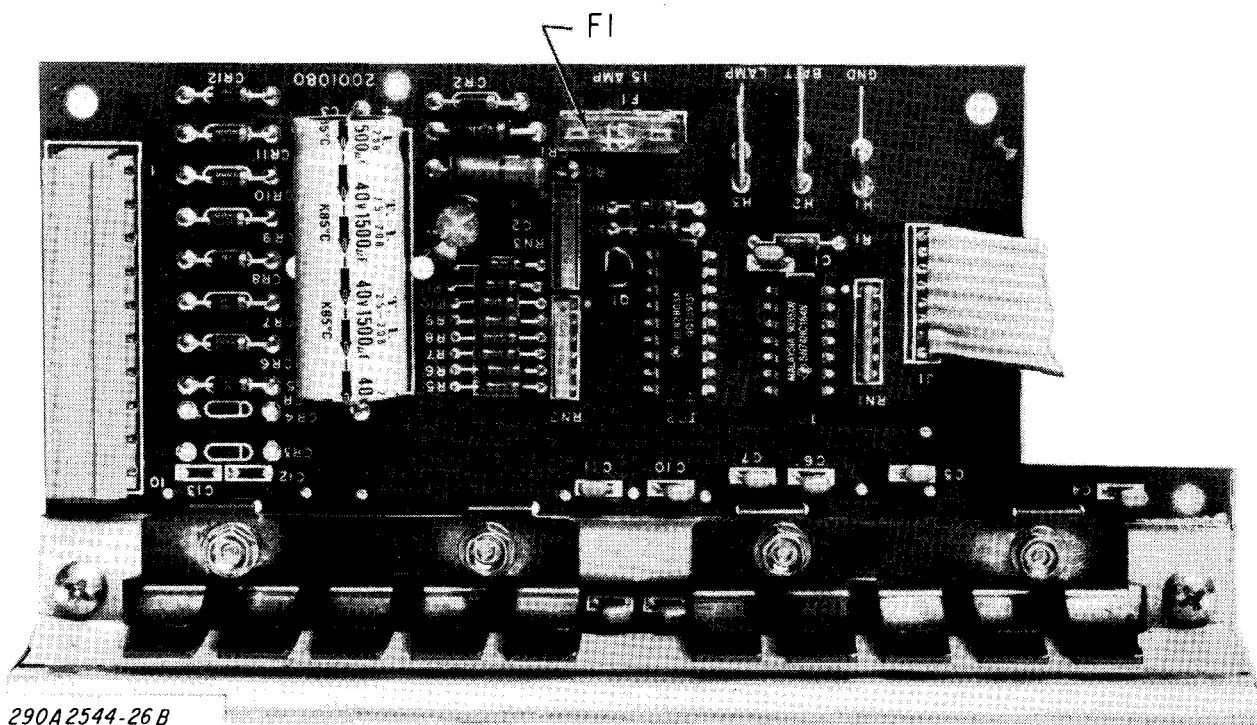


Figure 6-10. SignalMaster Printed Circuit Board.