

**INSTALLATION AND OPERATING INSTRUCTIONS
FOR
JETSONIC® SERIES
LIGHT AND LIGHT/SOUND SYSTEMS**

I. UNPACKING.

After unpacking the JetSonic, inspect both the light bar and control center (if supplied) for damage that may have occurred in transit. If any unit 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.

II. LIGHT BAR INSTALLATION.

The light bar is completely wired at the factory and does not require any additional internal wiring. Light only systems have one cable connected to the light bar. Light and sound systems have two cables connected to the light bar. In both cases, all the conductors necessary for control of any and all basic and optional functions are contained in the cable(s).

The basic light functions of light only systems must be controlled by a user supplied control head. In order to control the basic light and siren functions found in light and sound systems, the JS control center is required.

Before proceeding, ensure that the light bar has been installed on the vehicle roof in accordance with the instructions packed with the mounting kit. Route the light bar cable(s) as described below.

A. JX* Light Systems.

1. Route the 11-conductor cable into the vehicle and under the dash, near the eventual location of the user-supplied control head.

2. Connect the black lead to chassis ground. DO NOT connect the red lead at this time.

B. Light/Sound Systems.

1. Route the two-conductor power cable from the light bar into the vehicle. Connect the black lead to chassis ground. DO NOT connect the red lead at this time.

2. Route the eight-conductor data cable into the vehicle, under the dash, near the eventual location of the JS control center. When routing the cable, care should be taken to avoid damaging the connector which will eventually be terminated in the control center.

**III. CONTROL CENTER INSTALLATION.
(Light and Sound Systems Only.)**

A. Mechanical.

The JS control center is equipped with a right angle bracket and a selection of mounting hardware and adhesive pads. This makes it possible to mount the control center in a variety of positions using several different methods.

As indicated in Figure 1A, the control center can be mounted above or below any relatively flat horizontal surface, such as the vehicle dash, with the use of the right angle bracket. If desired, the right angle bracket can be attached to the mounting surface by means of the adhesive pads in the accessory kit. The right angle bracket can also be bent for mounting on non-horizontal surfaces.

As shown in Figure 1B, the unit can also be attached directly to a vertical mounting surface by means of 8-18 x 3/4" thread forming screws, 8-32 x 1-1/4" pan head screws and KEPS nuts, or the adhesive pads in the accessory kit.

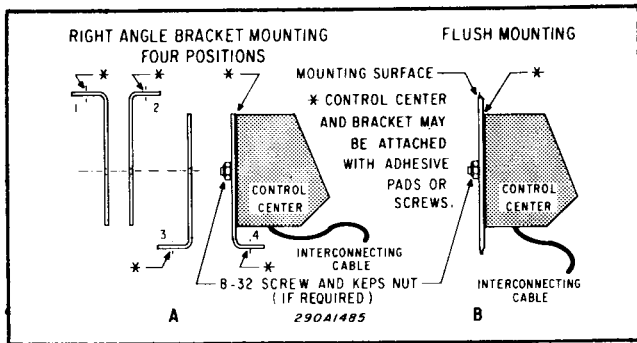


Figure 1. Attachment of Control Center to Right Angle Bracket.

If screws are to be used to mount the control center, use the back of the unit or the right angle bracket (as appropriate) as a template and scribe drill position marks on the mounting surface. Drill holes as appropriate and necessary.

CAUTION

When drilling holes in any part of the vehicle, ensure that both sides of the mounting surface are clear of parts that could be damaged such as brake lines, linkages, wiring, etc.

To mount the control center to the right angle bracket or other surface, proceed as follows:

1. Remove the switch module from the bottom of the control head. To remove the switch module, hold the control head in one hand and grasp the switch module with the other hand. Carefully pull the switch module down. The switch module will remain attached to the control head by means of a wire jumper.

2. Remove the plastic housing from the control head by removing the two screws at the bottom of the unit.

3. Attach the plastic housing to the mounting surface by passing the screws through the holes in back of the plastic housing.

If the adhesive pads (supplied) are going to be used to mount the control head, the surfaces to which the adhesive pads are applied must be clean and dry for proper adhesion. If necessary, use isopropyl alcohol (rubbing alcohol) and water to clean the mounting surfaces.

Direct sunlight causes the adhesive pads to deteriorate in a relatively short period of time. Therefore, do not use the adhesive pads to mount the control center in a location that receives continuous or intense sunlight.

A microphone jack bracket is also supplied with the control center for optional use. This bracket can be attached to the mounting surface with four 8-18 x 1/2" phillips pan head screws or adhesive pads.

Mount the microphone jack bracket, if desired, using the selected method. To install the microphone jack in the microphone jack bracket, proceed as follows (see Figure 2):

1. The microphone jack is part of the interconnecting cable. Completely unscrew the sleeve from the microphone jack.

2. Insert the jack, edge first, into the wide section of the large hole in the microphone jack bracket.

3. Tilt the jack 90° and slide it until it rests in the rounded section of the jack bracket hole.

4. Replace the sleeve on the jack. Tighten the sleeve securely to ensure that the jack is held tightly in the bracket.

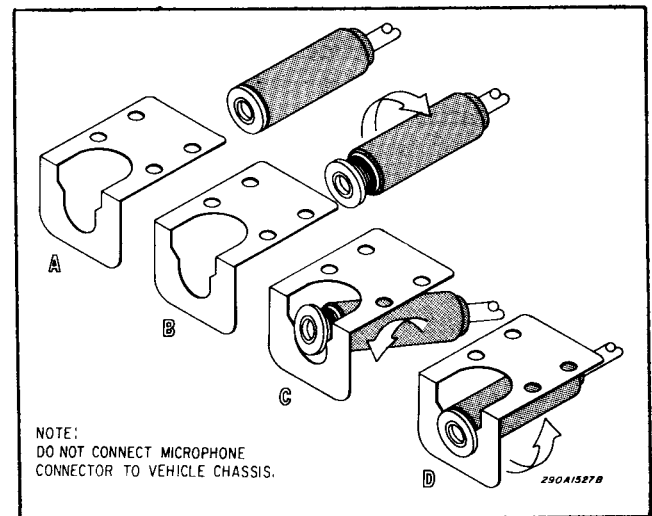


Figure 2. Installation of Microphone Jack in Microphone Jack Bracket.

B. Electrical-JX* Light Only.

For proper light operation, the light bar 11-conductor control cable must be properly terminated inside the user supplied control head. Using figure 11 as a guide, make the appropriate electrical connections shown in Table 1. Ensure that the lines are adequately fused as shown in figure 11.

NOTE

Any of the light bar functions can be activated by applying 12VDC to the appropriate control line.

Table 1. Electrical Connections.

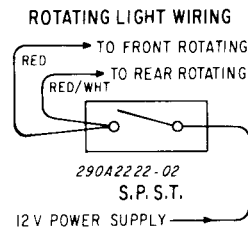
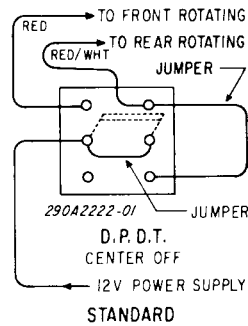
Wire Color	Functions
RED/WHT	Rear Rotating Lights
BRN/WHT	Speaker
BRN	Speaker
BLU	Rear Amber (Flashing)
ORN	Left Alley
YEL	Front (Flashing)
GRN	Right Alley
GRY	Steady Burning Red
RED	Front Rotating Lights
BLK	Power (-)
BLK/WHT	Takedown

NOTE

If front cut-off feature is used, use DPDT (Center Off) switch and wire as shown. If front cut-off feature is not used, use SPST switch and connect RED and RED/WHT cable wires to same switch terminal as shown.

CAUTION

An indicator lamp must be used with the front cut-off feature to indicate that front cut-off is being used.



C. Electrical-Light and Sound System.

The light bar 8-conductor data cable and the control center accessory cable must be properly terminated inside the control center (see Figure 3). All accessories must be correctly connected to the accessory cable for proper operation. Using Figure 12 as a guide, perform the following electrical connections.

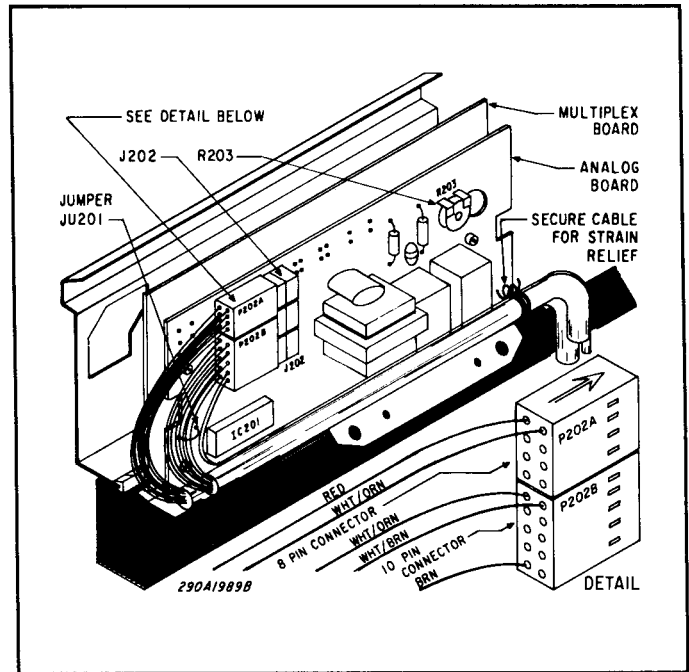


Figure 3. Control Head PC Boards and Cable Routing.

1. Remove the plastic housing from the control head by performing steps II.A.1. and II.A.2.
2. Connect the light bar 8-conductor data cable to the top 8 pins of connector J202 on the rear of the control head analog PC board. Orient the plug (P202A) so that the red wire is toward the top of the PC board and closest to the PC board (red wire up). See detail in figure 3.
3. Connect the control head accessory cable to the bottom 10 pins of connector J202 on the rear of the control head analog PC board. Orient the plug (P202B) so that the brown wire is toward IC201 and closest to the PC board (brown wire down). See detail in Figure 3.
4. Route the cables across the bottom of the PC board as shown in Figure 3. To provide strain relief, secure the cables to the control head bracket with the supplied tie-wrap. NOTE: Route the tie-wrap through the holes in the bracket and tie a knot on top of the cables.
5. Secure the control head to the plastic housing with the two screws removed in step III.A.2.
6. Insert the tabs on the rear of the switch module into the holes at the bottom of the control head. Snap the ball of the switch module into the bottom of the control head.
7. Connect the fused red lead (IGN) of control center accessory cable to the switched side of the ignition switch.

8. Connect the brown lead (GND.) of the control center accessory cable to ground.

9. Connect the RADIO SPKR (speaker) leads of the accessory cable across the two-way radio speaker. If necessary, splice additional two-conductor "zip" cord (installer supplied) to the RADIO SPKR leads. Insulate the splices.

10. If the horn ring will not be used to control siren operation, fold back and insulate the white/brown and tan wires in the control center accessory cable and disregard the following steps in this paragraph. However, if it is desired to operate the siren by means of the horn ring, proceed as follows:

a. Locate the wire that connects the vehicle horn ring switch to the horn or horn relay. Cut this wire.

b. Splice the white/brown wire in the accessory cable to the horn ring side of the wire that was cut in step a. Insulate the splice with wire nuts.

CAUTION

The horn ring transfer circuit of the siren is capable of switching a maximum of 2 amperes. Some vehicles do not have a horn relay and, consequently, will draw more than 2 amperes when the vehicle horn is activated. Consult your vehicle service manual or a qualified mechanic to determine the current required to activate the horn. If it is less than 2 amperes, perform the procedure in step c. If it is greater than 2 amperes, perform steps d. through j.

c. Splice the tan wire in the accessory cable to the horn side of the cut wire. Insulate the splice with wire nuts.

d. Obtain a SPST relay (with a pull-in current less than 2 amperes) of sufficient contact current capacity to activate the vehicle horn. Refer to Figure 4 while performing the following steps.

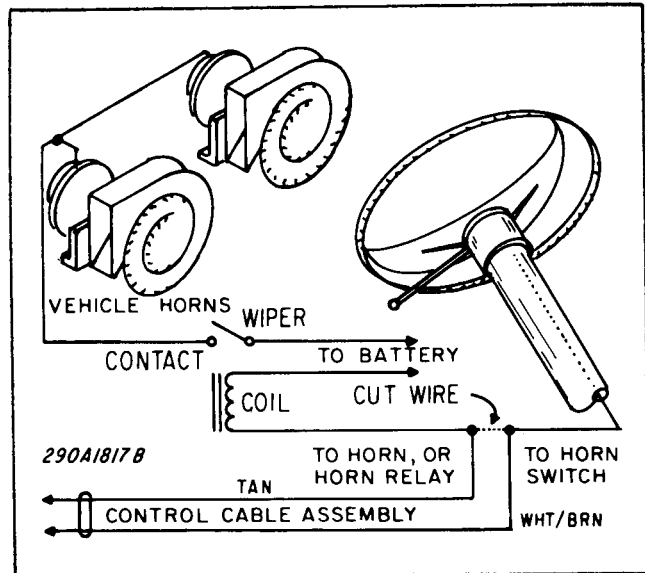


Figure 4. Horn Ring Connections.

e. Mount the relay in a suitable location.

f. Connect the horn side of the wire cut in step a. to the relay contact terminal.

g. Determine the "sense" of the vehicle's horn ring activation circuit, i.e. does the horn ring require a switched positive voltage or switched ground for activation.

h. Connect the relay wiper terminal to the positive or negative potential determined in step g.

i. Connect the tan wire in the accessory cable to one end of the relay coil.

j. Connect the other end of the relay coil to the opposite potential of that connected to the wiper in step h.

11. Connect the light bar red power lead, routed in Section II, to a fuse or circuit breaker rated at 50 amperes. Connect the other side of the fuse/circuit breaker to the +12VDC supply.

IV. ADAPTER MODULE INSTALLATION.

The JetSonic sound system can be used with an optional Federal Model MNCT Microphone or in common with the microphone included with the two-way radio installed in the vehicle. The Model MNCT Microphone is a transistorized, noise cancelling microphone that has the characteristics necessary to drive the siren audio amplifier.

In common microphone operation, an optional adapter module connects the control center to the two-way radio. The common microphone is electrically connected to the two-way radio in all control functions except PA. When the RAD/PA (Radio/Public Address) switch is set to PA, the microphone is connected to the siren amplifier so that announcements can be made over the siren speaker system.

A listing of the various types of adapter modules can be found in Table 2.

NOTE

If the control center is to be used in PA override operation with the Model MNCT Microphone, disregard the procedures in this paragraph and plug the microphone into the microphone jack. If common microphone operation or radio rebroadcast is to be used, follow the procedure in this paragraph.

If separate instructions are supplied with the adapter module, install the module following those instructions. However, if separate instructions are not supplied with the module, proceed as follows:

1. Insert the phone plug, on the adapter module, into the microphone jack supplied with the control center accessory cable.
2. Connect the power lead to the switched side of the ignition switch.
3. Insert the two-way radio microphone connector into its matching receptacle on the adapter module.
4. Insert the connector, on the short length of cable attached to the adapter module, into the microphone receptacle on the two-way radio.
5. Set the RAD/PA switch to RAD and turn-on the two-way radio.
6. The front panel GAIN control adjusts the audio level for both PA and radio rebroadcast. If the radio rebroadcast level is not sufficiently balanced to the PA level, follow the procedure in steps 7, 8 and 9.
7. Remove the control head from its plastic housing.
8. See Figure 3. Using a very small screwdriver, adjust R203 on the circuit board for the desired listening level outside the vehicle.
9. Cut JU201 for common mic configuration (figure 3). Do not connect mic connector to vehicle chassis. Reassemble the control center.

Table 2. Accessories (Optional)

Model MNCT	Transistorized Noise Cancelling Microphone
Model FN1001	Federal Model MNC or MR Microphone Adapter Module
Model FN1002	Federal Model VPII Microphone Adapter Module
Model FN1003	Motorola Microphone Adapter Module
Model FN1004	Motorola Micor Microphone Adapter Module
Model FN1005	RCA Microphone Adapter Module
Model FN1006	RCA 500 Microphone Adapter Module
Model FN1007	GE Microphone Adapter Module
Model FN1008	GE Master II Microphone Adapter Module
Model FN1009	GE TPL Microphone Adapter Module
Model FN1010	Federal Duty Patrol Microphone Adapter Module
Model FN1011	Aerotron MPAC6, 7, or 8 Microphone Adapter Module
Model FN1012	RF Communications Model RF-498 Control Head Adapter Module
Model FN1013	Motorola "Converta-Com" Microphone Adapter Module
Model FN1014	Motorola Maxar 80, TMN6134B Microphone Adapter Module
Model FN1015	RCA Veetac, TAC-200, TAC-400, MCA, Series MI-594000 Microphone Adapter Module

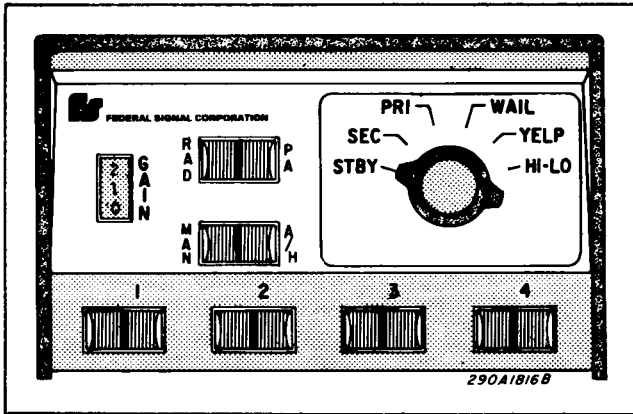


Figure 5. Control Head Front Panel.

V. OPERATION.

The control center front panel controls that are used in the operation of the light/sound system are shown in Figure 5. As shown in the figure, the operating controls consist of several rocker switches, a rotary switch, and a thumbwheel control. The function of the various switch positions and controls will be described in the following paragraphs. Also refer to Table 3 for a capsulized version of the switch and control functions.

A. GAIN.

The thumbwheel GAIN control controls the output sound level (volume) of radio rebroadcast and PA audio. Rotating the thumbwheel down increases signal volume; rotating the control up, decreases volume. The GAIN control has no effect on the volume of siren signals. Also, the GAIN control has an on/off detent position. When this control is rotated fully upward into the position, the control center and light will be turned off.

B. RAD/PA Switch (Radio/Public Address).

1. RAD.

Setting the switch to the RAD position allows incoming radio messages to be amplified by the siren amplifier and rebroadcast over the siren speaker system. The level of the output sound is determined by the setting of the front panel GAIN control.

2. PA.

In common microphone operation, setting the switch to PA connects the two-way radio microphone to the siren amplifier so that announcements can be made over the siren speaker system.

3. Center-Off.

Both PA and radio rebroadcast functions are disabled in this switch position. The switch must pass through this position when being switched from RAD to PA or vice-versa. If the system is wired for common microphone operation, the microphone is connected to the two-way radio when the switch is in the center position.

C. MAN/AH Switch (Manual/Air Horn).

If the rotary selector switch is set to STBY, SEC, PRI; moving the MAN/AH rocker switch to the left (MAN) produces a peak-and-hold-signal for as long as the switch is depressed. Releasing the switch causes the siren to coast down and cut-off. If the rotary selector switch is set to WAIL, YELP or HI-LO; moving the MAN/AH rocker switch to the left (MAN) provides a peak-and-hold signal for as long as the switch is depressed. Releasing the switch causes the siren to revert to its original siren sound.

The same results as outlined above, occur when the switch is moved to the right (AH) position except now the air horn signal is heard.

D. Rotary Selector Switch.

Refer to Table 3 for a complete listing of JetSonic functions.

1. STBY (Standby).

In STBY, the siren produces no sound unless the MAN or A/H position of the rocker switch is selected. MAN initiates the "peak-and-hold" signal and A/H initiates the air horn signal as previously described.

2. SEC (Secondary).

Setting the rotary switch to SEC activates the secondary warning light or warning light circuit.

3. PRI (Primary).

The PRI position energizes the primary warning light or rotating light circuit.

4. WAIL.

This position of the rotary switch causes the siren to produce a continuous Wailing sound. Rotating lights will remain on.

5. YELP.

The YELP position enables the siren to produce a continuous Yelp signal. Rotating lights will remain on.

6. HI-LO.

Setting the rotary switch to HI-LO causes the siren to produce a signal that alternates between two tones. Rotating lights will remain on.

E. TAP II.

If the rotary selector switch is set to PRI, the vehicle's horn ring will produce a manual siren. If the rotary selector switch is set to WAIL, the vehicle's horn ring will change the Wail signal to Yelp. A second momentary "tap" of the horn ring will change the operation of the siren back to Wail. If the rotary selector switch is in the Yelp position, Tap II will change the Yelp signal to Hi-Lo. A second momentary "tap" will change the siren sound back to Yelp. If the rotary selector switch is set to Hi-Lo, Tap II will change the Hi-Lo signal to Wail. A second momentary tap will change the siren sound back to Hi-Lo.

F. Switch Module.

1. Switch 1.

Switch 1 activates the left alley lamp, if installed.

Table 3. Control Center Switch and Control Functions.

SWITCH	LIGHT/SOUND SYSTEM	
1	Activates left alley lamp if installed.	
2 (right)	Activates directional strobe if installed.	
2 (left)	Activates takedown - if installed.	
3	Activates front cut-off (momentary left and right). Lamps remain off until rotary switch is turned.	
4	Activates right alley lamp - if installed.	
RAD	Turns-on radio rebroadcast circuit. Inhibits all other siren output.	
PA	Turns-on PA circuitry. PA is not amplified until mike button is depressed. If common microphone is installed, PA switch connects mike to PA.	
MAN	Siren produces peak sound.	
A/H	Siren produces air horn sound.	
Horn Ring Input	ROTARY SWITCH POS.	SIREN SOUND
	STBY	No effect.
	SEC	No effect.
	PRI	Goes to Manual
	WAIL	Changes to Yelp
	YELP	Changes to Hi-Lo
	HI-LO	Changes to Wail
STBY	Quiescent state. Power is on, but nothing activated.	
SEC	Rotating lights stop in home position and flash.	
PRI	Rotating lights rotate.	
WAIL	Siren produces Wail sound and rotating lights rotate.	
YELP	Siren produces Yelp sound and rotating lights rotate.	
HI-LO	Siren produces Hi-Lo sound and rotating lights rotate.	

2. Switch 2.

Moving Switch 2 to the right activates the directional strobe, if installed. Moving the switch to the left activates the takedown lamps, if installed.

3. Switch 3.

Moving Switch 3 either left or right activates the front cut-off feature. The lamps will remain off until the rotary switch is turned.

4. Switch 4.

Switch 4 activates the right alley lamp, if installed.

NOTE

Moving any of the switches from their "off" position causes the red L.E.D.s above them to light.

G. Light Programming.

The takedown, strobe and front cut-off functions may be programmed in the secondary and primary modes of operation. The unit comes from the factory wired so that in the secondary mode, front cut-off will be operational and takedown will not come on. In the primary mode, strobe and takedown will come on and front cut-off will be oper-

ational, if front cut-off optional mirrors are installed. Refer to Table 4 for changes to the programming format. Cutting the appropriate component or jumper listed in Table 4 will disable the option. The jumpers are located on the interface P.C. board in the light bar (see Figure 6).

CAUTION

To prevent damage to electronic components in the Siren Assembly, disconnect the main power from the vehicle battery prior to removing Siren Assembly cover.

Table 4. Programming Format Changes

Option	Jumper/ Component to cut	Mode of Operation
Takedown	CR602	PRI
Strobe	JU601	PRI
Strobe	JU602	SEC
Front	JU603	PRI
Cut-off		
Front	JU604	SEC
Cut-off		
*Man. Siren	Add JU301	SEC

*If Manual Siren is desired in SEC mode, add JU301 to the control head Multiplex PC board (see Figure 7).

The secondary flashing mode of operation is determined by JU605 (alternate flash) or JU606 (simultaneous flash). The unit comes from the factory with the alternate flash pattern built-in (JU605 installed). To change the simultaneous flashing mode, cut JU605 and install JU606.

Light only units come from the factory wired in the alternating flashing mode. To change to the simultaneous flashing mode, remove JU901 from the PC board and add JU902.

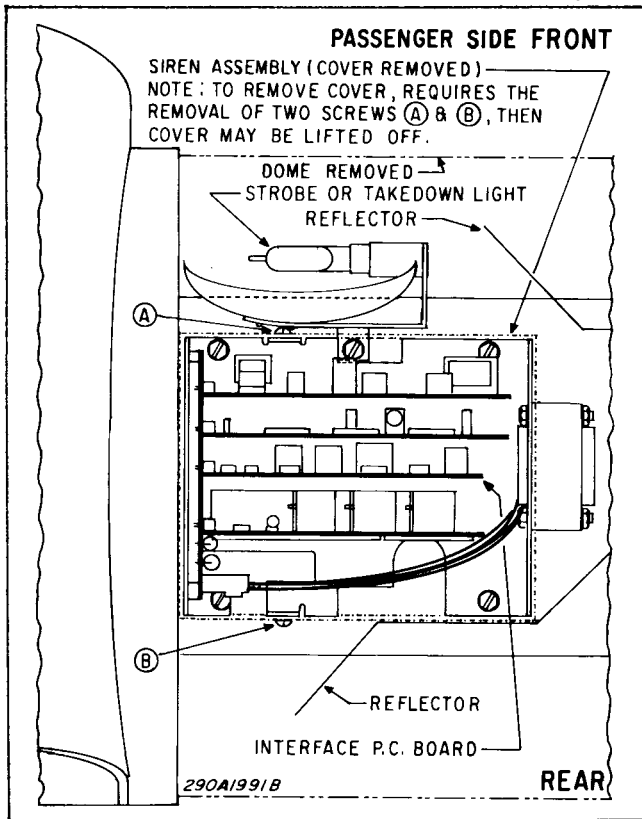


Figure 6. Interface PC Board Location.

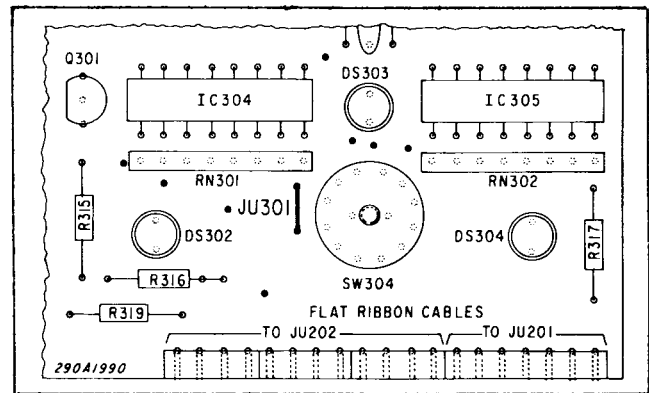


Figure 7. Multiplex PC Board.

VI. BASIC MAINTENANCE.

WARNING

High voltages are present inside the Light Assembly when the strobe light option is installed. Wait at least ten (10) minutes, after shutting off power, before servicing this unit.

A. Cleaning the Plastic Domes.

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 the domes, they can ordinarily be removed with Federal Dome and Chrome Cleaner (Federal Part No. 8287B349B). CAUTION: The use of other materials such as strong detergents, solvents, petroleum products, etc. can cause crazing (cracking) of the plastic domes.

B. Lamp Replacement.

CAUTION

Always allow lamps to cool before removing.

1. Replace 50-watt halogen lamps with Federal Part Number 8107A119 and 35-watt with 8548A028.

2. Replace strobe lamps with Federal part number 8107A127.

C. Lubrication.

At least once a year, lubricate the lamp shaft bearings with a drop of SAE10 oil and apply a film of light grease to the worm.

D. Cleaning Reflectors and Mirrors.

Use a soft tissue to clean the reflector and mirrors. Avoid heavy pressure and the use of caustic or petroleum base solvents which will scratch or dull the surface.

E. Strobe Power Supply Replacement.

WARNING

High voltages are present inside the Light Assembly. Wait at least ten (10) minutes, after shutting off power, before servicing this unit.

The strobe light power supply does not contain any user serviceable parts. Should a breakdown in the power supply occur, it should be returned to Federal for repair and replaced. To remove the power supply, proceed as follows:

1. Unplug the connector from the power supply.

2. Remove the two #10 screws which secure the power supply. NOTE: One of the screws secures the power supply ground wire. The other secures the strobe reflector.

3. Install the new power supply by performing the previous steps in reverse order.

F. Speaker Drive and Cone Replacement.

To replace the speaker driver and cone, proceed as follows (see Figure 8):

1. Remove the grille and rear cover from the speaker housing.

2. Unscrew the cone, being careful not to lose the five (5) washers.

3. Unscrew the wirenuts which connect the driver lead wires to the light assembly feed wires.

4. Remove the two (each) 1/4-20 screws, washers and lockwashers which secure the driver to the housing.

5. Remove the driver, being careful not to lose the two (2) washers.

B. Flashing Lights (Light/Sound System Only).

In the flashing light mode, each reflector assembly should be aimed perpendicular to the front or rear edge of the light bar. In units equipped with front cut-off, the rear reflector should be aimed at the center of its end mirror. This adjustment has been made at the factory and will ordinarily require no additional adjustment. However, should an adjustment be necessary, the reflector assembly may be re-aimed by performing the following procedure:

1. Operate unit in the flashing mode, to set the reflector assemblies in the initial aiming position.

2. Turn off power. Visually check each reflector to determine if adjustment is necessary.

- a. On units with no front cut-off, the reflector assemblies should be perpendicular in relation to the front and rear of the light bar (see Figure 9).

- b. On units with front cut-off, the front reflector assembly should be perpendicular to the front of the light bar. The rear reflector should be aimed at the center of its mirror as shown in Figure 10.

3. If the adjustment required is 10° or less, proceed as follows:

- a. Loosen the two screws which secure the reflector assembly to the gear (see Figure 9 or 10).

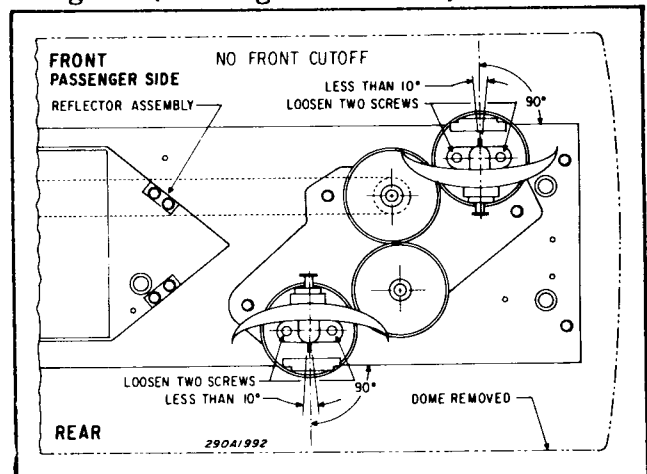


Figure 9. Reflector Assembly Adjustment. (No Front Cut-Off.)

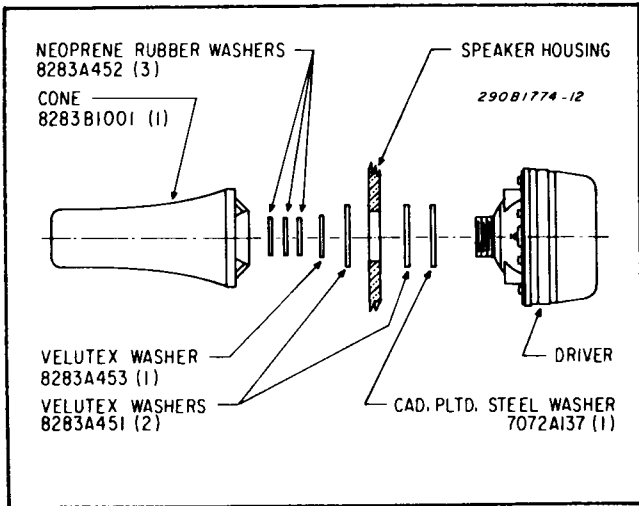


Figure 8. Speaker Driver and Cone Replacement.

6. Remove the leads from the old driver and connect to the new driver. 58-watt driver must be unsoldered and then re-soldered.

7. Reinstall the driver. Ensure that washers are installed correctly (see Figure 8). Reconnect the driver lead wires to the light assembly feed wires. Secure connections with wirenuts.

8. Reinstall cone. Ensure that washers are installed correctly (see Figure 8).

9. Replace grille and rear cover, (removed in step 1).

G. Service Manual.

A complete JetSonic Light/Sound System Service Manual is available and can be obtained by writing to:

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

VII. ADJUSTMENTS.

A. Alley Lights.

The alley lights may be adjusted up to 7° toward the front or rear. To adjust, loosen the center screw and rotate the reflector and socket assembly to the required angle. Tighten screw after completing adjustment.

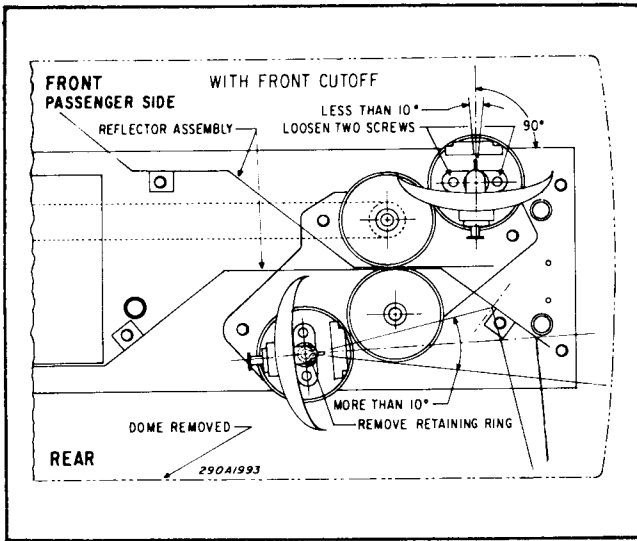


Figure 10. Reflector Assembly Adjustment.
(Front Cut-Off.)

b. Rotate the reflector assembly to the proper position and re-tighten the screws.

4. If the adjustment required is more than 10°, proceed as follows:

a. Remove the retaining ring (see Figure 9 or 10). Lift the gear and reflector assembly to disengage the gear teeth.

b. Rotate the assembly to the correct aiming position. Engage the gear teeth and reinstall the retaining ring.

c. To complete the adjustment, repeat step 3.

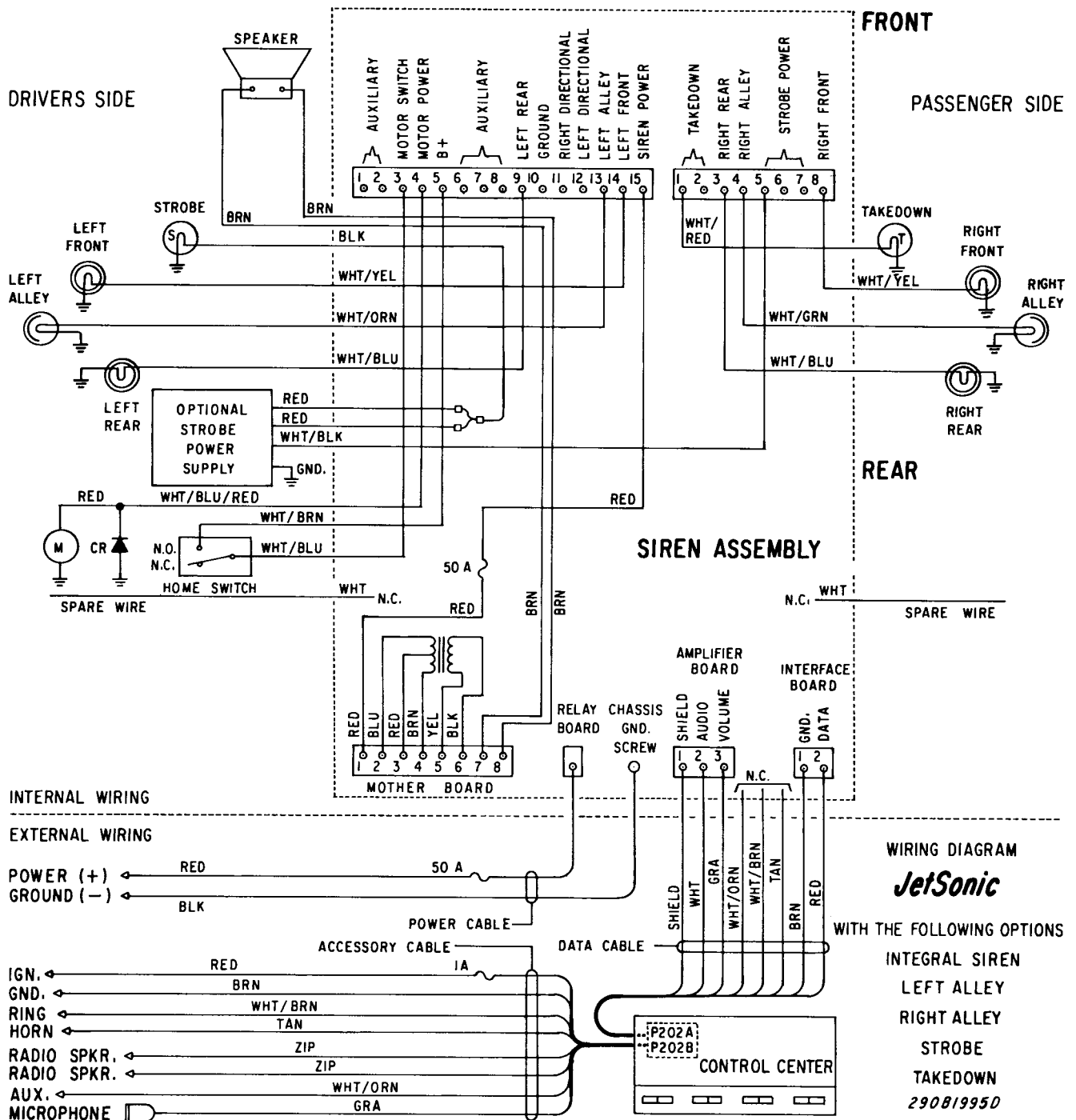


Figure 12. Wiring Diagram, Light/Sound System.

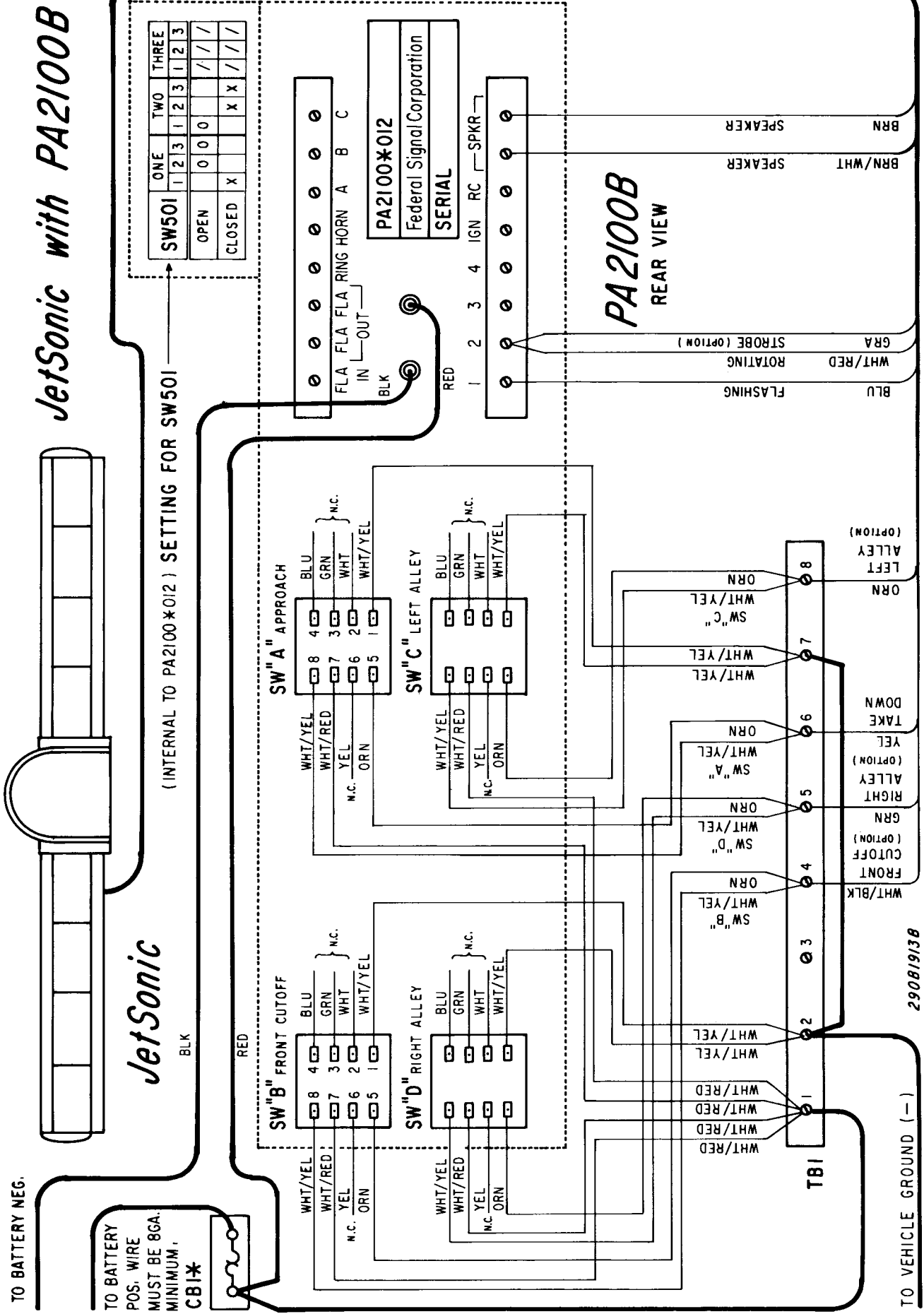


Figure 13. JetSonic with Model PA2100B.

JetSonic with USA* and TCC3*

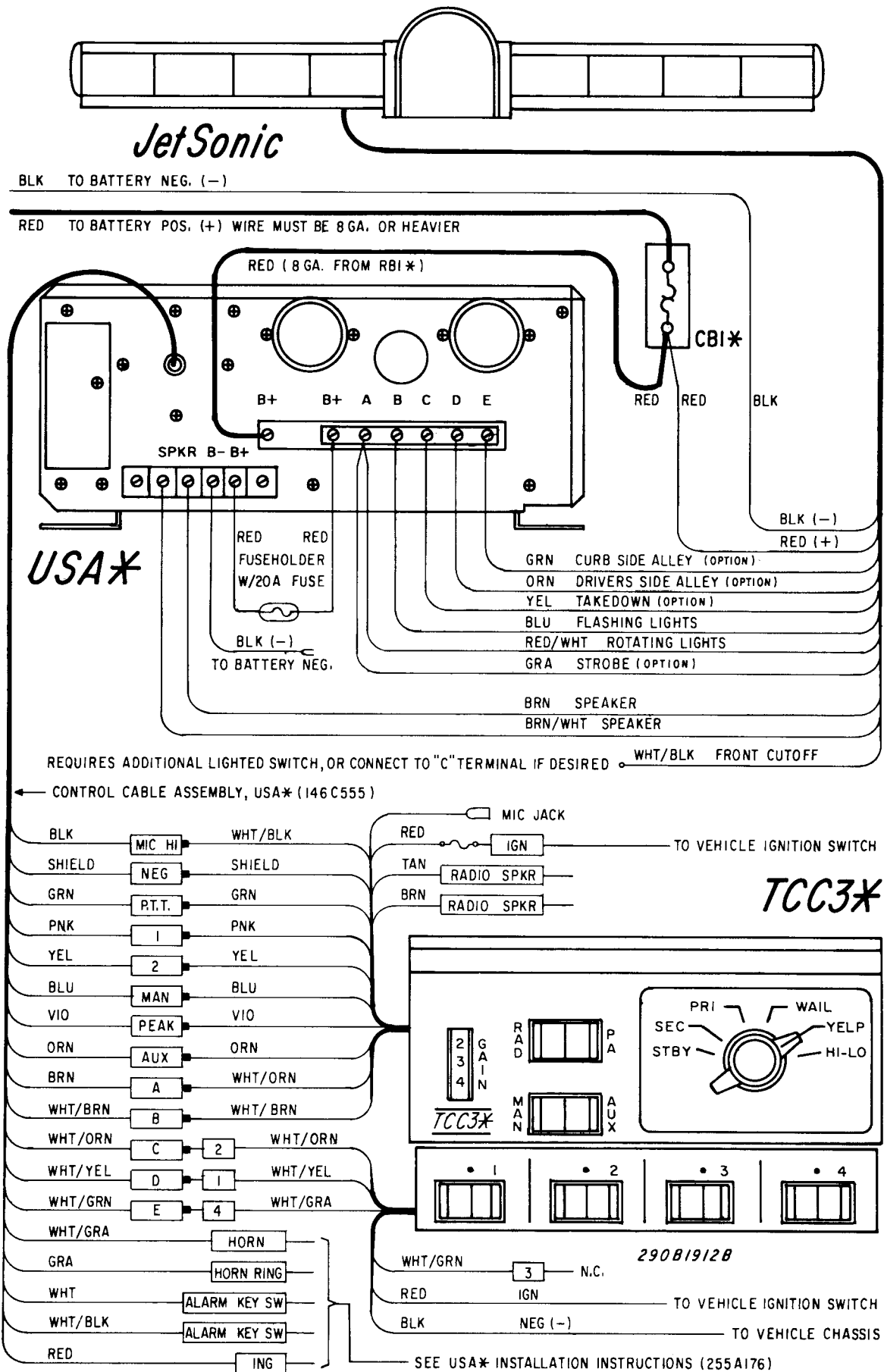


Figure 14. JetSonic with Models USA* and TCC3*.