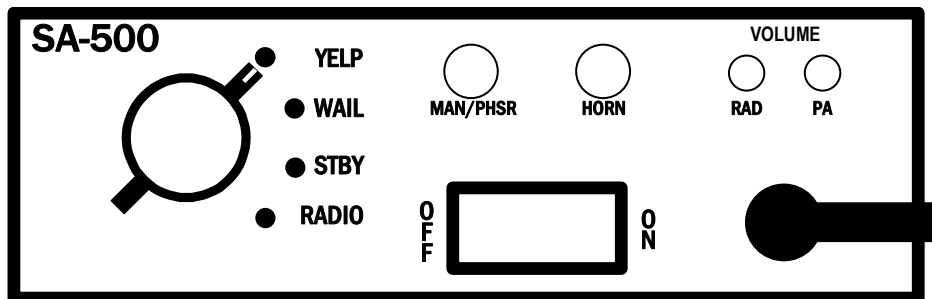# CARSON

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TECHNICAL BULLETIN

INSTALLATION AND OPERATING MANUAL

SA-500-10 14V
SA-500-10 28V

Carson is a trademark of Carson Manufacturing Company, Inc.

WARNING ⚠	**Sound Hazard** - Sound level from siren speaker (>120dBA @ 10 feet) may cause hearing damage. Do not operate siren without adequate hearing protection for you and anyone in immediate vicinity. (Ref. OSHA 1910.95 for occupational noise exposure guidelines)

SA-500-10   SPECIFICATIONS

AMPLIFIER INPUT POWER: 9-16 Volts DC, 8 Amps DC per 100W Speaker   (SA-500-10 14)
18-32 Volts DC, 4 Amps DC per 100W Speaker   (SA-500-10 28)

SIREN MODE
OUTPUT POWER: 15 VDC input, 100W speaker(s)   (SA-500-10 14)
30 VDC input, 100W speaker(s)   (SA-500-10 28)
One speaker – 105 Watts RMS
Two speakers - 180 Watts RMS

AUDIO MODE
OUTPUT POWER: 14 VDC input, 100W speaker(s)   (SA-500-10 14)
28 VDC input, 100W speaker(s)   (SA-500-10 28)
One speaker – 40 Watts RMS
Two speakers - 80 Watts RMS

SIREN
FREQUENCY: 700Hz - 1450Hz Nominal

CYCLE RATES: WAIL - 15 cycles/min
YELP - 210 cycles/min
PHASER - 15 cycle/sec
TWO-TONE – 1 cycle/min

AUDIO
RESPONSE: 200Hz - 10KHz +/-3db
Harmonic Distortion Less than 3% @ 1KHz   (SA-500-10 14)
Harmonic Distortion Less than 7% @ 1KHz   (SA-500-10 28)

RADIO INPUT
SENSITIVITY: 0.75VAC Input Min. for 40 Watts RMS Output (1 spkr)

OPERATING
TEMPERATURE: -15° F to +140° F

SIZE: 6-1/8" Wide X 2-3/4" High X 5-7/8" Deep

WEIGHT: 5 pounds

NIGHT VISIBILITY: Backlit front control panel when power is on

PROTECTION: High Voltage – Siren output stops with input voltage above highest rating
    Stops high output power from blowing speaker
Reverse Polarity – Fuse(s) blows when power is wired backwards
Shorted Output – Fuse(s) blows if speaker shorts (a common problem)

NOTICE

INSTALLATION

Proper installation of the unit is essential for years of safe, reliable operation. Please read all instruction **before** installing the unit. Failure to follow these instructions can cause serious damage to the unit or vehicle and may void warranties.

SAFETY PRECAUTIONS
For the safety of the installer, vehicle operator, passengers and the community please observe the following safety precautions. **Failure to follow all safety precautions and instructions may result in property damage, injury or death.**
Qualifications - The installer must have a firm knowledge of basic electricity, vehicle electrical systems and emergency equipment.

WARNING ⚠ 🎧	**Sound Hazard** - Sound level from siren speaker (>120dBA @ 10 feet) may cause hearing damage. Do not operate siren without adequate hearing protection for you and anyone in immediate vicinity. (Ref. OSHA 1910.95 for occupational noise exposure guidelines)

Mounting - Mount the unit for easy access by the vehicle operator. DO NOT mount in air bag deployment area. Assure clearances before drilling in vehicle. To prevent internal damage mounting bolts must not enter case more than 1/4".
Wiring - Use wiring capable of handling the current required. Make sure all connections are tight. Route wiring to prevent wear, overheating and interference with air bag deployment. Install and check all wiring before connection to vehicle battery.
Testing - Test all siren functions after installation to assure proper operation. Test vehicle operation to assure no damage to vehicle.
**Keep These Instructions** - Keep these instructions in the vehicle or other safe place for future reference. Advise the vehicle operator of the location.

MOUNTING
The mounting bracket supplied can be installed above or below the unit. Choose a mounting location convenient to the operator and away from any air bag deployment areas. Inspect behind mounting area for clearance. Assure adequate ventilation to prevent overheating. Consider wire routing and access to connections, as well as microphone bracket placement. Install mounting bracket to vehicle using 1/4" hardware (not supplied).
If mounting in a rack or console, make sure that mounting bolts do not enter case more than 1/4".

A microphone clip along with mounting screws (CP3633) holds the microphone in place.

CP3571 Mounting Bracket

1/4-20 Bolt (CP3966)

Bolt must not pass through cover more than 1/4"
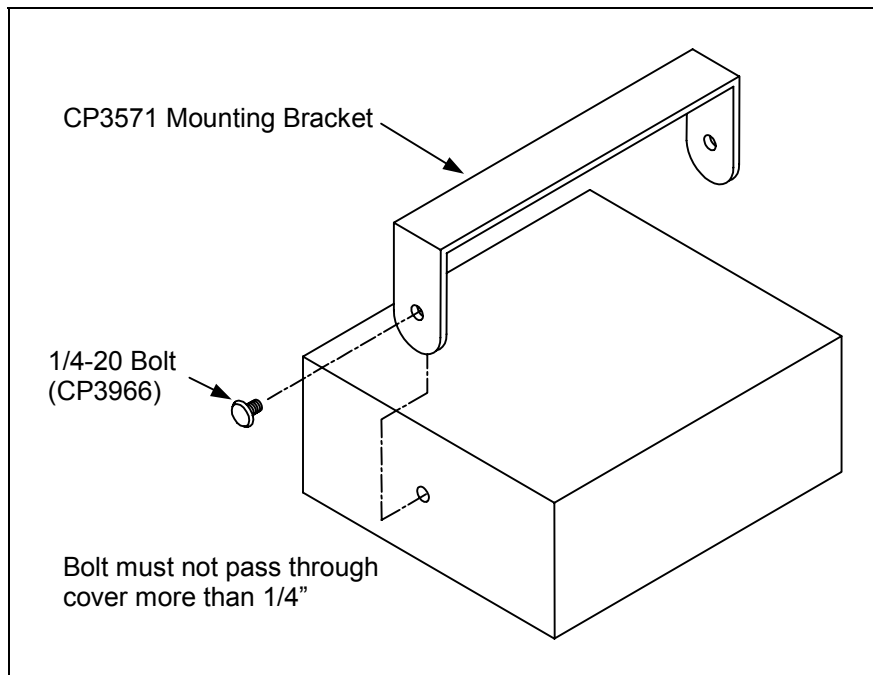
INSTALLER-SELECTABLE OPTIONS

Carefully cutting programming resistor jumpers or traces on the printed circuit board inside the case can select various options. The cover must be removed to access the jumpers. The cover is held in place by a snap-fastener on the back of the unit. Hold the unit with the front case flange on the edge of a hard surface and press hard on the back of the unit. The chassis will slide out the front of the cover.

Auxiliary Input Function - The auxiliary input normally activates the Horn function. To activate the Man/Phsr function with the auxiliary input cut the jumper resistor labeled "AUX I".

Auxiliary Input Polarity - The auxiliary input is normally activated by connecting to positive. To activate by connecting to ground cut the two jumper resistors labeled "AUX P".

Cutout Input Polarity - The cutout input is normally activated by connecting to positive. To activate by connecting to ground cut the two jumper resistors labeled "CUT P".

Two-Tone - Two-Tone can replace Phaser by cutting the jumper resistor labeled "T-T".

Phaser Disable - The Phaser function can be completely disabled by cutting the jumper resistor labeled "PHSR".

Horn Ring Cycler option (HRC) - This option allows selection of Wail, Yelp, Phaser and Standby by repeatedly pressing horn ring or other switch connected to the auxiliary input. It is selected by cutting both the "AUX I" and "PHSR" jumper resistors. This disables Phaser operation in the Wail or Yelp positions
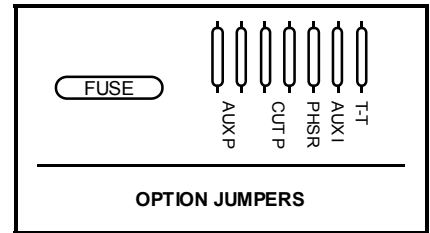
Horn Disable - The Horn function can b e disabled by cutting the trace on the back of the board at the location designated "cut to disable horn".
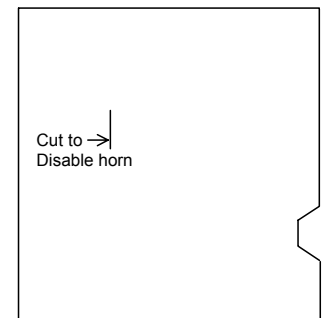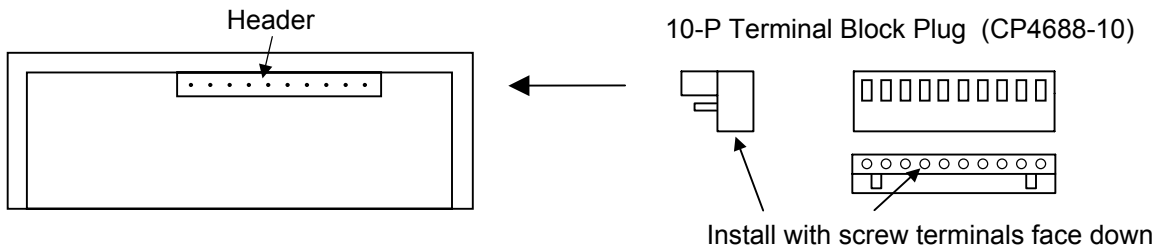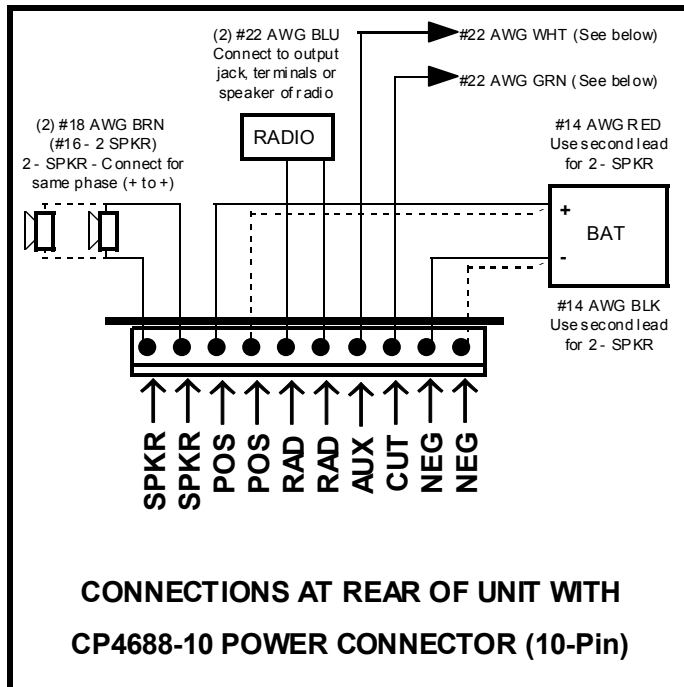
ELECTRICAL CONNECTIONS

Disconnect vehicle battery before making any electrical connections.

Electrical connections to the unit are made using a removable terminal block plug located on the back. A label on the unit identifies the terminal function. You should install the connector on the unit before wiring. If the unit needs service the connector can be easily removed without unwiring the connector.

The power supply of the unit must be capable of delivering peak currents up to 50 amps for adequate short circuit protection and reliable operation. The preferred source is directly at the vehicle battery. The unit is internally fused.

Attach leads by stripping 3/8", inserting into connector and clamp by tightening screw. Make sure the screw is tight and the wire can't be pulled out. **Failure to adequately tighten the screw can result in improper operation or burning the connector and wire**.

Wire Size and Termination - The diagram shows the minimum wire size used for each connection, along with recommended lead color. If the wire is longer than 10 ft. use the next larger wire size. Use only high quality crimp connectors for installation on the vehicle.


CONNECTIONS AT REAR OF UNIT WITH CP4688-10 POWER CONNECTOR (10-Pin)

10-P Terminal Block Plug (CP4688-10)

Install with screw terminals face down

Auxiliary Input Connection - The Auxiliary Input allows activation by an external source of either the Horn or Man/Phsr function. The adjacent diagram shows three connection examples. See the INSTALLER-SELECTABLE OPTIONS section for programming details.
NOTE: Permanent disconnection of the vehicle horn is NOT recommended.
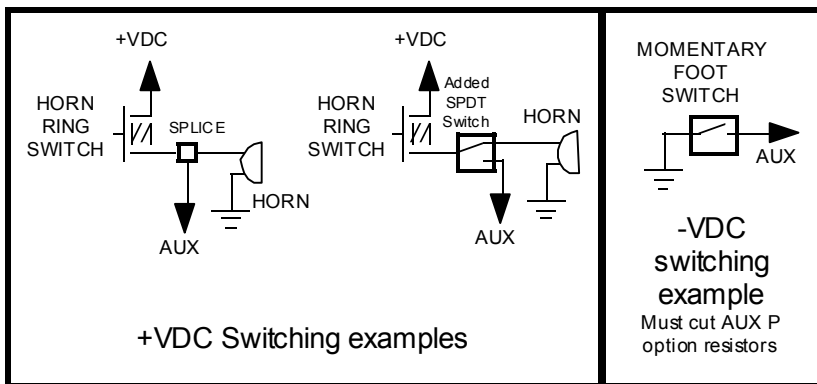
Cutout Input Connection - The Cutout Input turns off any siren tone output when activated, and remains off until a control is activated or changed. The adjacent diagram shows two connection examples. See the INSTALLER-SELECTABLE OPTIONS section for programming details.
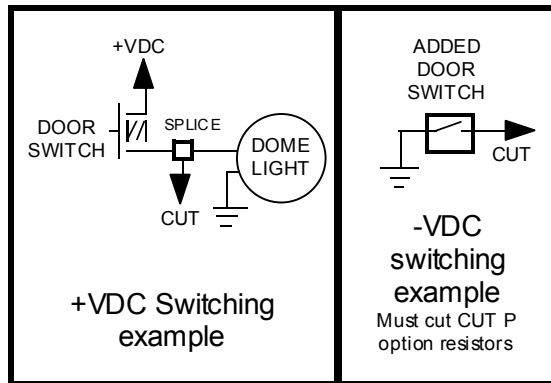
OPERATION

WARNING ⚠	**Sound Hazard** - Sound level from siren speaker (>120dBA @ 10 feet) may cause hearing damage. Do not operate siren without adequate hearing protection for you and anyone in immediate vicinity. (Ref. OSHA 1910.95 for occupational noise exposure guidelines)

The **OFF/ON** Rocker Power Switch controls the siren power. The siren may be left on any time the vehicle is in operation. The power should be turned off when vehicle is not being used to conserve battery power.

The Rotary Function Switch selects various operating modes. These modes are as follows:

Yelp: The siren produces a moderate warble tone. This mode may be used in lightly congested areas.

Wail: The siren produces a normal rise-fall tone pattern. This mode may be used on highways or areas with constant traffic flow.

Standby: A silent mode that allows Manual, Horn and Public Address operation.

Radio: This mode reproduces, or repeats, the output of a radio. The radio must be connected and RADIO VOLUME on the face adjusted. No siren tones or PA operation are available in this position.
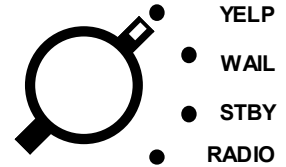
Manual / Phaser: With the mode switch in the Standby position this push-button switch provides Manual siren tone control, rising when pressed and falling when released. When the mode switch is in the Yelp or Wail positions, the push-button provides Phaser tone. This tone is a very fast warble tone used at intersections or in highly congested areas. Pressing the button once changes to the Phaser tone and pressing again changes the tone back to Yelp or Wail. Optional operation includes replacement of the Phaser tone with Two-Tone or disabling the Phaser tone entirely

Horn: This push-button switch provides a simulated air-horn tone while pressed. This can be used to supplement the normal vehicle horn and is useful at intersections or in low noise areas. This tone will override all other siren tones.

PA: Pressing the microphone button in any mode except Radio changes the unit to PA (Public Address). The siren mode resumes when the button is released. Adjust the PA Volume and hold the microphone close to your lips for proper operation.

Volume Controls
Volume controls are provided for radio repeat function volume and public address volume. These should be set when the vehicle is parked. Set the RAD volume with the selector switch in the Radio position and the radio volume set to desired level. Set the PA volume to the maximum level with no feedback (squeal).
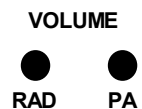
Auxiliary Input
During installation an auxiliary input may be connected to the horn ring or other switching device. It provides the same operation as pressing the Horn button or optionally the Man/Phsr button.

Cutout
During installation a cutout input may be connected to a door switch. It turns off any siren tone when the door is opened. The siren tone will continue to be cut off even when the door is closed. Changing any siren control switch or input will restore normal function.

Horn Ring Cycler (Optional)
During installation, the auxiliary input may be connected to the horn ring or other switching device, and the HRC option programmed. With the mode switch set to the Standby position, the horn ring can be pressed repeatedly to select the Wail, Yelp, Phaser and Standby tones or modes in succession. Operating any other switch resumes normal operation. Please note that this option disables Phaser selection in the Wail or Yelp selector switch positions.

SERVICE

This unit is designed to provide years of reliable service under even the worst conditions. Many times there may appear to be a problem with the unit when the true problem is in the speaker(s), controlled devices, or improper installation. The following chart shows typical symptoms and possible causes.

A blown internal fuse doesn't necessarily mean that the unit is bad. If a speaker or speaker lead is shorted this fuse will blow before the unit is damaged. Disconnect the SPKR leads and replace the fuse. If the unit itself emits a low level sound when in the Yelp position it is OK. Check the speaker(s) or leads for possible shorting.

PROBLEMS

Symptom	Possible Cause	Check
No Power or siren output	Power switch not turned on Bad Speaker Connector or connections loose Internal siren fuse blown Loose connection at power source	Does backlighting come on? Do you hear a "pop" when turned on? With siren on, yelp selected, listen for tone in amplifier. Is an external fuse or circuit breaker used? Are the power leads connected to a good buss?
No siren tone – PA works	High Voltage Protection Mic button stuck Cutout activated Cutout Polarity Option set wrong	The input voltage must be less than highest rating. Does mic button release properly? Does siren work when Cutout input is disconnected? Is the CUT P option properly configured?
No PA	PA volume not set properly Selector in Radio position	Try turning the PA volume control. PA is not available in the Radio position.
Distorted siren sound	Speaker assembly loose Intermittent Aux Input connection Low vehicle voltage	Is the speaker bell or tip loose? Is the Aux Input used and wired properly? The input voltage must be greater than lowest rating.
Intermittent siren tone	High Voltage Protection Connector or connections loose Loose connection at power source Mic button activation Circuit breaker in supply connection	Is the vehicle voltage regulator working properly? Is the connector tight on the back of the unit? Check for loose leads back to power source. Is something lying on the microphone? Is a circuit breaker used with at least 50A rating?
Horn or Manual or Phaser stuck on	Horn switch stuck Man/Phsr switch stuck Aux Input improperly connected Aux Input Polarity Option set wrong	Does the Horn switch return fully when released? Does the Man/Phsr switch return fully when released? Is the Aux Input used and wired properly? Is the AUX P option properly configured?
No Radio	Unit not connected to a radio Radio volume too low	Is the radio connected properly to the unit? Can you hear the radio in the vehicle? Try turning the RAD volume control.
Wrong siren tone	Two-Tone option installed. Aux Input set to wrong function	Is the T-T option jumper cut? Is the AUX I option jumper configured properly?
Phaser not working	Phaser disabled	Is the PHSR option jumper cut?
Horn not working	Horn disabled	Is the trace cut that disables the Horn switch?

RETURN

If you have any questions concerning this or any other Carson product, please contact our **Technical Service Department** at (888) 577-6877. Many issues can be handled over the phone. We can also be reached via e-mail at **service@carsonsirens.com**

If a product must be returned for any reason, please contact our Technical Service Department to obtain a Returned Merchandise Authorization number (RMA#) before you ship the product to Carson. Please write the RMA# clearly on the package near the mailing label. Be sure to provide a return address, contact and phone number, along with a brief description of the problem.

PARTS
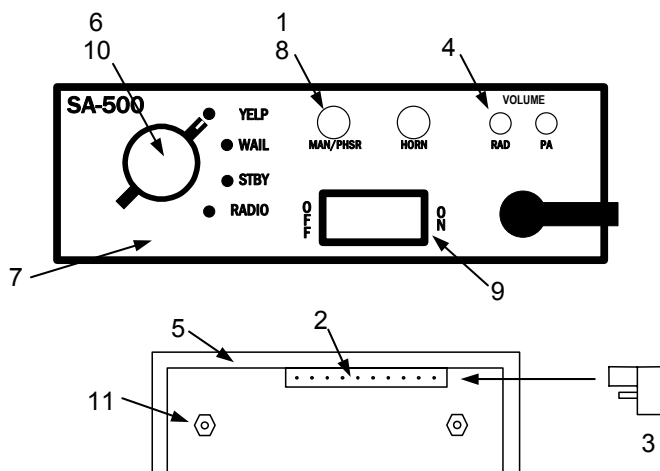
Item	Part #	Description
	CP3966	Bolt, mounting, 1/4-20 X 3/8 (2 required)
	CP3571	Bracket, mounting
1	CP4686	Button, white (for pushbutton switch) (substitute CP4837 red button)
2	CP4687-10	Connector, 10-P header
3	CP4688-10	Connector, 10-P terminal block plug
4	CP4684	Control, volume, PA or RAD (1K ohm)
5	CP4680-1	Cover with stud (does not include CP4679 Chassis)
	ATO/ATC 20A	Fuse, 20A Automotive (SA-500-10 14)
	ATO/ATC 10A	Fuse, 10A Automotive (SA-500-10 28)
6	CP4702	Knob, rotary switch black, (substitute CP4852 black knob)
7	CP4835	Label, front panel
	CP3570	Microphone, Noise Canceling
	CP3633	Microphone clip with mounting screws
	SR-15-1	Microphone strain relief
8	CP4685	Switch, pushbutton, Horn or Man/Phsr
9	CP3962	Switch, rocker power
10	CP4683	Switch, rotary function
11	CP4119	Transistor, output (2 required) (Industry standard TIP36C, Not Texas Instruments)
	ED1558	Kit, Hardware (includes CP3966 bolts, CP4688-10 connector, CP3633 mic clip)