

INSTALLATION AND INSTRUCTION MANUAL

SS670-013

SIREN

Installation and Operating Instructions



STAR
Safety Technologies by *Grote*

455 Rochester Street Avon, NY 14414
585-226-9500 (F) 888-478-2797
www.StarSafetyTechnologies.com

Installation Information

MODEL: SS670-013 Serial #: _____
PURCHASE DATE: _____
INSTALLATION DATE: _____
INSTALLER: _____
DEALER: _____

Model and serial number located on bottom of unit

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General Description

The SS670 Siren Amplifier is a premium 100W unit designed for single 100W speaker use. The primary operating modes are Phaser, Yelp, Wail, Hands Free, Manual, Alert, and Radio. A Noise Canceling PA Override and push-button Horn Override are available in all modes. A manual push-button is provided for push-on/push-off tone toggle operation in the Phaser, Yelp, and Wail modes. It also allows manual siren control in the Manual or Alert modes. Any siren tone can be re-programmed to a more desired tone. Another feature allows cycling through Wail, Yelp, Phaser, and Standby by providing a signal to the horn ring auxiliary wire when the function switch is in the Hands Free (HF) position. Radio and PA volume controls are provided on the front panel. The front panel is backlighted with LED's for night visibility. This compact unit utilizes short circuit, high voltage, low voltage, and reverse polarity protection systems for maximum service life.

Installation Notes

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.

Qualifications - The installer must have a firm knowledge of basic electricity, vehicle electrical systems and emergency equipment.

Keep These Instructions - Keep these instructions in the vehicle or other safe place for future reference. Advise the vehicle operator of the location.

Unpacking - Inspect contents for shipping damage. If found, alert carrier immediately. Contents should include unit with microphone, mounting bracket w/ hardware, microphone bracket with 2 screws, wiring connector, and these instructions. Contact your supplier immediately if any components are missing.

Mounting Tips

- Mount in a location with adequate ventilation to prevent overheating.
- Devices should be mounted only in locations listed in SAE standard J1849.
- Controls should be placed within convenient reach of the driver.
- Assure clearances before drilling in vehicle.
- Sound levels produced by attached speakers can cause permanent hearing loss.
- Never operate this unit without adequate hearing protection for you and others in the area. (OSHA 1910.95)
- Consider wire routing and access to connections.
- Install mounting bracket to vehicle using 1/4" hardware (not supplied).



Care should be taken when positioning this unit and cord so that the unit and/or cord does not interfere with the proper operation of the driver-side or passenger-side airbag! Failure to heed this warning may result in serious or fatal injury!!!

Electrical Connections

Wire Size and Termination

Electrical connections to this unit are made through the green 12-terminal connector located in the rear of the unit (See below - Part # CPSS-153).

Examine the charts below to determine the proper gauge of the wire to use. Please review the following recommendations when making your electrical connections:

- Use only high quality crimp connectors. Make sure all connections are tight.
- Minimize the number of splices to reduce voltage drop.
- Route wiring to prevent wear, overheating, and interference with air bag deployment.
- Use grommets and sealant when passing through compartment walls.
- Ground connections should be made directly to the negative of the vehicle battery. Where not possible, only connect to substantial chassis components.
- Install and check all wiring before connection to vehicle battery.
- **CAUTION: All wires should be rated for at least 125% of their maximum current load. All wires connected to the positive terminal of the battery should be fused at the battery for their rated load.**
- Review the charts below that indicate the recommended wire gauge, based upon the length of the wire run and the current that will pass through the wire.

WIRING GUIDE

Terminal	Description	Typical Color	Typical Current
1	Power (+12VDC)	Red	10A
2	Not Used		
3	Ground	Black	10A
4	Not Used		
5	Speaker 1	Brown	4A
6	Speaker 2	Brown	4A
7	AUX In	Green	3A
8	Logic Power	Orange	0.06A
9	Radio Repeat	Blue	0.1A
10	Radio Repeat	Blue	0.1A
11	Backlighting Power	Yellow	0.1A
12	Not Used		

CPSS-153

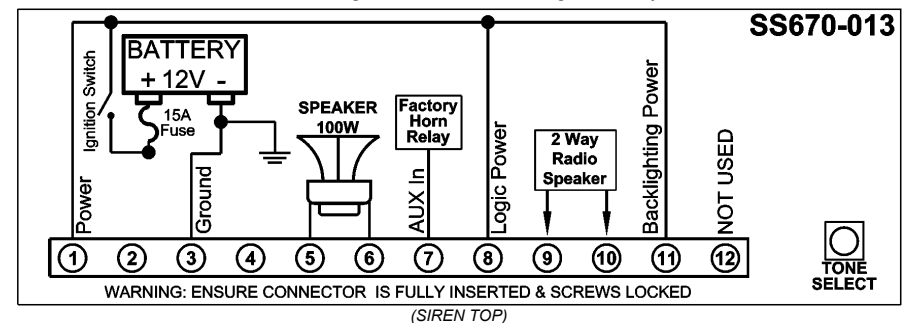


(Shown when viewing the siren upside down)

RECOMMENDED WIRE GAUGE

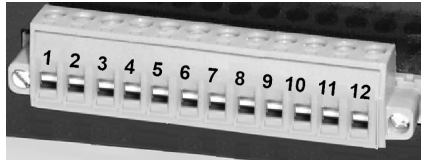
Current	10'	20'	25'
< 2.0A	22 AWG	18 AWG	18 AWG
2.0-4.0A	18 AWG	16 AWG	16 AWG
4.1-5.5A	18 AWG	16 AWG	14 AWG
5.6-8.0A	16 AWG	14 AWG	14 AWG
8.1-12.0A	16 AWG	12 AWG	12 AWG

Please note that the diagram below is when viewing the siren upside down.



(Electrical Connections CONT'D)

For ease of installation, you can remove the green connector from the siren while connecting your wires. Please note that when referencing terminal numbers using the wiring diagram on the previous page, the screw heads face **UP**, as pictured to the right.



Connections to the terminal block are summarized both in the chart and in the wiring diagram on the previous page. For more detailed information, review the section below.

Mandatory Electrical Connections

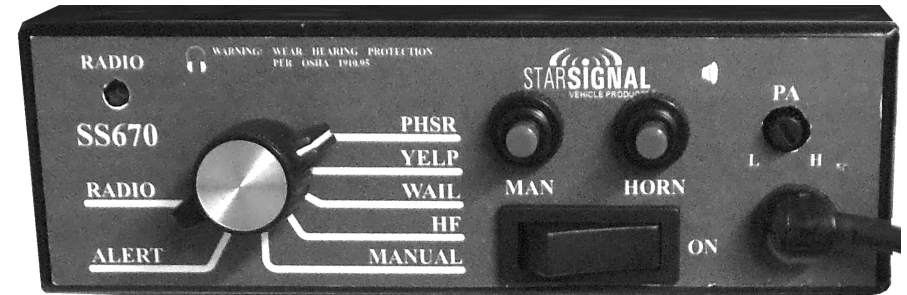
Note: As with any electronic device, fuse all connections to power at the battery. Use a 15A fuse (user-supplied).

- Ground:** (Terminal 3) - Connect to the negative terminal of the battery.
- Power:** (Terminal 1) - Using a minimum size #14 AWG wire, connect to a 10-16VDC ignition switched power source capable of supplying at least 15A.
- Logic Power:** (Terminal 8) - Connect to a 10-16VDC ignition switched power source.
⚠ (You MUST connect this terminal or the unit will not function!!)
- Speaker:** (Terminals 5 & 6) - Connect to your siren speaker.
⚠ (You MUST connect both of these terminals!!)

Optional Electrical Connections

- AUX IN:** (Terminal 7) - This terminal is typically connected to the steering wheel horn relay. It allows for several functions, including siren operation in HF mode (see page 6), Air Horn activation, or Manual "step up" function (see page 5).
If you will be using any of these features, connect terminal 7 to the output of your steering wheel relay.
⚠ (Only compatible with positive-side switched horn relays)
- Radio Repeat:** (Terminals 9 & 10) - If you would like the ability to re-broadcast your two-way radio over your siren speaker, connect these two terminals to the two-way radio speaker or output connector of the two-way radio.
- Backlighting:** (Terminal 11) - Connect to the dash lights, ignition switched power, or other switched 10-16VDC power source. This controls the backlighting for the face of the siren.

Optional Tone Programming



The SS670 will produce 7 different tones/sounds by activating its various functions:

Function	Default Tone
Phaser Step Up (PHSR+MAN)	Two-Tone
PHSR	Phaser
YELP	Yelp
WAIL	Wail
MAN	Ramp Up
HORN	Air Horn
AUX	Air Horn

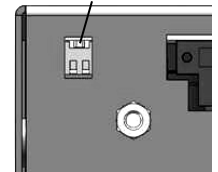
Each of these functions can be reprogrammed for a different tone, if desired. To change the sounds for any of the functions, proceed below.

1. **Power the unit** up.
2. Activate the function you wish to change.
 - For PHSR, WAIL, and YELP functions, rotate the selector knob into the corresponding position.
 - For the MAN, HORN, or AUX functions, rotate the selector knob into the MANUAL or ALERT position, then press **and hold** the **MAN** button, **HORN** button, or **steering wheel horn**, respectively.
 - For the *Phaser Step Up* function, rotate the knob into the **PHSR** position, then press and release the **MAN** button.

The tone currently programmed for that function will sound.

3. The **Tone Program** button can be found on the rear of the siren. Using a paper clip, press and release it to cycle through the list of optional tones. Review the chart on the following page for a list of optional tones.
4. De-activate the function to save the new tone.

Tone Program Button



Optional Tones

Tones For WAIL, YELP, and PHSR, and Phaser Step-Up Function		Tones For MAN Button and AUX Wire		Tones for Horn Button	
1	WAIL (Wail default) §, *, †	1	STANDARD AIR HORN (AUX default)	1	STANDARD AIR HORN (default)
2	YELP (Yelp default) §, *	2	LOW FREQUENCY AIR HORN	2	LOW FREQUENCY AIR HORN
3	PHASER (PHSR default)	3	RAPID AIR HORN	3	RAPID AIR HORN
4	TWO-TONE (PHSR Step Up default)	4	AIR HORN II	4	AIR HORN II
5	MECHANICAL WAIL (FIRE ENGINE) †	5	DOUBLE POST POP AIR HORN	5	DOUBLE POST POP AIR HORN
6	MAX YELP §, *	6	SINGLE AIR HORN	6	SINGLE AIR HORN
7	HOOT	7	SINGLE QUICK AIR HORN	7	SINGLE QUICK AIR HORN
8	RAPID HOOT	8	TWO TONE AIR HORN	8	TWO TONE AIR HORN
9	AIR HORN & YELP	9	MANUAL (MAN default) *		
10	GHOST	10	MECHANICAL MANUAL (FIRE ENGINE)		
11	RAPID GHOST				
12	SINGLE AIR HORN				
13	SINGLE QUICK				
14	DOUBLE POST POP AIR HORN				
15	TWO TONE AIR HORN				
16	STANDARD AIR HORN				
17	CONTINUOUS TONE				
18	CONTINUOUS BEEP				

§ = SAE approved
 * = California Title 13 approved
 † = See below

▶▶▶▶ System Reset ◀◀◀◀

If you would like to reset ALL of the siren programming options to their defaults, activate any tone and press the **Program button** for six (9) seconds. The LED will flash once, then twice, then three times, and all siren tones will stop.

Wind Down or Hard Stop Option

By default, the Wail tones indicated by the "†" above will "wind down" when they are de-activated. If you prefer to have them immediately stop (i.e. hard stop), hold the Program Button for 3 seconds (until the LED flashes once). This will change it to a hard stop. Repeat to change back to the wind down option.

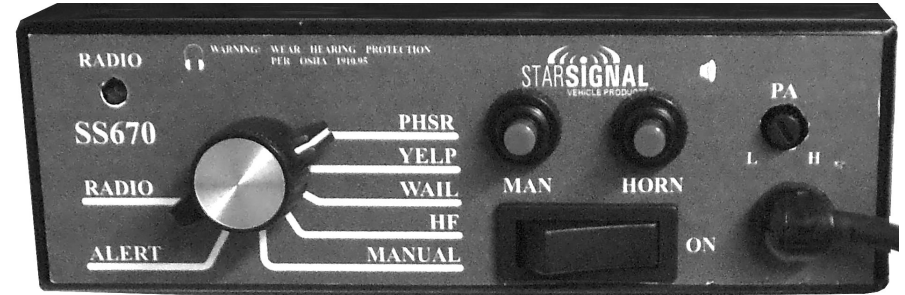
Tone Disable Option

Some municipalities may ban the use of specific tones, such as the **Phaser** tone. The *Phaser Disable* jumper option (found in our previous versions of the SS700) has been replaced with the *Optional Tone Programming* feature described on the previous page. This will allow you to reprogram the **PHSR** default tone from **Phaser** to any of the other tones listed. This new feature expands the former option (that was previously limited only to disabling the Phaser tone) to the ability to replacing ANY of the tones that may not be permitted (or desired).

Auxiliary-Manual Function Option

By default, when the siren is in **PHSR**, **YELP**, or **WAIL** modes, and the AUX function is activated (typically by the steering wheel horn relay), the siren will produce the standard Air Horn Tone (#1 in the chart above) and temporarily override the siren tone. If you would rather have the AUX function (i.e. steering wheel horn) mimic the MAN button (see *MAN button functions on page 7*), then you should program the AUX function for tone #9 (Manual) or #10 (Mechanical Manual).

Operation



General

This unit is designed for easy operation under the stress associated with high-speed pursuit. Most siren functions are accessible with one simple motion without repetitive activation of switches or automatic timed switching that can interfere with desired operation.

Power

The **Power** switch is located on in the center of the front panel. While in the OFF position none of the siren functions will work. The position of this switch does NOT affect the siren backlighting, which remains lit whenever power is applied to terminal 8 (see pages 2 and 3).

Selector Switch

The rotary selector switch controls the primary operating function of the siren.

PHSR - Ultra-fast changing tone used for maximum attention.

YELP - A rapidly changing tone used in congested areas.

WAIL - A slower changing tone used on highways.

HF - Hands Free - A silent standby mode also known as Horn Ring Cycler. Allows the user to cycle through the tones programmed for the WAIL, YELP, PHSR, and OFF by repeatedly pressing the horn or other switch connected to the AUX input. Changing the rotary knob to any other mode will resume normal siren operation.

MAN - A silent standby mode that allows push-button Manual, push-button Horn, and Public Address operation. The siren output winds down when the MAN button is released.

ALERT - A silent standby mode that allows push-button Manual, push-button Horn and Public Address operation. The siren output terminates immediately when the MAN button is released.

RADIO - Also known as Radio Repeat, this function amplifies a radio speaker input for re-broadcast outside the vehicle. The PA remains functional, but no siren tones are available in this position.

(Operation CONT'D)

The front panel of the SS670 contains two momentary push-button switches for the Manual function and the Air Horn.



MAN Button

Rotary Switch
Position

Function When MAN Pressed

MAN or HF

Produces a rising siren tone while being pressed. The siren output "winds down" when the MAN button is released.

ALERT

Also produces a rising tone, but the siren output immediately stops when the button is released.

PHSR/YELP/WAIL

The MAN button will "step" the siren up to the tone programmed for the next function:

(WAIL→YELP→PHSR→Phaser Step Up)

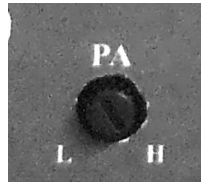
These quicker tones are used to momentarily alert motorists at intersections and very highly congested areas. Pressing the MAN button once changes to the next faster tone. Pressing the MAN button again, reverts the siren back to the original tone.

HORN Button

Pressing the HORN button provides a simulated air-horn tone while pressed. This can be used to either replace or to supplement the normal vehicle horn and is useful at intersections. This tone will override all other siren tones. See pages 4-5 for programming optional Air Horn tones.

PA VOL.

The PA knob is located in the upper right hand corner of the front face. It provides you the ability to adjust the public address volume. It should be set when the vehicle is parked. Typically you should set the PA volume to the maximum possible level with no feedback (squeal).



Radio Volume

The radio repeat volume (Radio) control is recessed in the upper left hand corner of the front face. This should be set when the vehicle is parked. First set the volume level of the vehicle's two-way radio to its normal operating volume. Adjust the siren's rotary selector switch into the RADIO position. Insert a small, flat blade screwdriver into the RADIO volume adjustment port. Turn in a clockwise direction to increase the sound level.



Microphone

The attached microphone is used for public address operation and overrides any siren tone when its push-to-talk (button on the side) is pressed.



Auxiliary Input

During installation an auxiliary input may be connected to the vehicle horn ring or other switching device (see page 3). It provides the same operation as pressing the HORN button or can be programmed to function like the MAN button (see page 5).

Troubleshooting

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) or improper installation. The following chart shows typical symptoms and possible causes.

Symptom	Possible Cause	Check
No power	Connector loose Siren 20A fuse blown Loose connection at power source	Check connector Is power hooked up backwards? Positive ground vehicle? Is an external fuse or circuit breaker used? Are the negative leads connected to a good ground?
No siren tone - PA works	High voltage protection Low voltage protection Microphone button stuck Park Kill polarity option set wrong Park Kill activated	The input voltage must be less than 16 volts. The input must be greater than 10V with the siren turned on. Does microphone button release properly? Is the PK jumper option properly configured? Does the siren work when Park Kill input is disconnected? Check for a short. Check for an open.
No siren tone - No sound	Bad speaker or speaker wiring	
No PA	PA volume not set properly	Have you tried turning the PA volume control?
Distorted siren sound	Speaker assembly loose Intermittent Aux. Input connection Low or high vehicle voltage	Is the speaker bell or tip loose? Is the Aux. Input connected properly to horn relay? Input voltage must be between 10 & 16 volts while siren is on and drawing full current.
Intermittent siren tone	High voltage protection Low voltage protection Microphone button activation Circuit breaker in supply connection Shorted speaker or speaker wire	Is the vehicle voltage regulator working properly? Is the connector tight on the back of the unit? Is there a loose connection on a power lead? The input must be greater than 10V with the siren on and drawing full current. Is something lying on the microphone? Is a circuit breaker used with at least a 50A rating? Does the speaker have water damage, or is a wire pinched?
Horn function or Manual or Phaser stuck on	Manual or Horn push buttons stuck Aux. Input improperly connected Aux. Input Polarity Option set wrong	Does the switch return fully when released? Is the Aux. Input used and wired properly? Is the AUX polarity jumper option properly configured?
No Radio	Unit not connected to radio Radio volume too low	Is the radio connected properly to the unit? Can you hear the radio in the vehicle? Adjust the Radio volume control
Wrong siren tone	Siren tones programmed incorrectly?	Re-program tones/Use System Reset (page 5)

Speaker Diagnostics

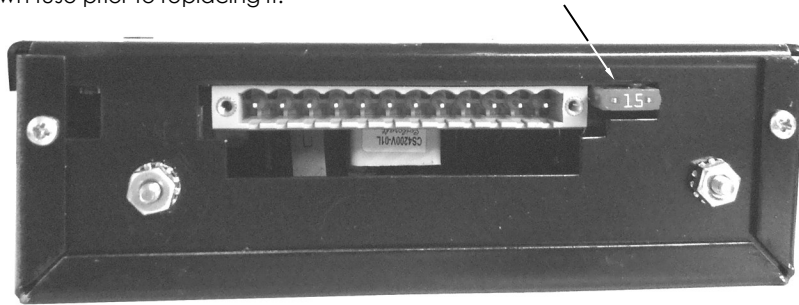
There is a diagnostic LED shaped like a speaker located in the upper right hand corner of the front panel. This LED will only turn on while a tone is trying to be generated. It can be used to help identify the siren/speaker status.



- Steady - Speaker is connected and operating properly.
- Single Flash - Standby Mode
- Double Flash - Short/Over Current
- Quad Flash - Improper Voltage (too high or low)
 - Off - No speaker is connected, or
 - The siren is Off, or
 - The speaker or wire connection has come loose or is electrically open

Fuse

This audio and logic circuitry in this unit is protected by a 15A automotive type fuse located on the back of the siren. If it blows, be sure to identify the cause of the blown fuse prior to replacing it.



Please note: There should also be separate user-supplied fuse(s) on any power input wires. (See pages 2-3).

Specifications

Input Voltage	10 - 16 VDC (negative ground)
Input Current	8.0 Amps @ 13.6 VDC (single 100W speaker)
Standby Current	Switch Off/Backlighting Off - Less than 4 mA Switch On/Backlighting Off - Less than 7 mA Switch Off/Backlighting On - Less than 18 mA Switch On/Backlighting On - Approx. 22 mA
Audio Frequency	200Hz - 10 kHz \pm 3db
Audio Output Power	105 Watts RMS MAX
Siren Frequency	675Hz - 1633Hz
High Voltage Protection	16 - 18 VDC will cause siren output to cease, resumes at normal voltage
Short Circuit Current	30 AMPS (supply circuit must be capable of supplying this)
Operating Temperature	-15° F to +140° F
Connections	Detachable 12-terminal connector
Size	6" Wide, 4.7" Deep, 2" High
Shipping Weight	6 lbs.

Service

Parts

Part	Description
S30235-15	Siren Top Cover
S30234-15	Siren Bottom Mounting Plate
SWH-152	Optional Wiring Harness
P30069-38	Microphone Bracket with Screws
P30056-16	1/4-20 x 3/8" Hex Locking Bolt
P30028-27	15 Amp Automotive Fuse
P30232-1	Noise Cancelling Microphone
P30208-10	Microphone Strain Relief
P30032-8	TIP36C Power Transistor
P30239-1	Rotary Selector Switch Knob
P30147-44	Mounting Bracket
P30050-14	Case Screws

ONE YEAR LIMITED WARRANTY

Star Safety Technologies warrants this product against factory defects in material and workmanship for one year after the date of manufacture. The owner will be responsible for returning to the Service Center any defective item(s) with the transportation costs prepaid. The manufacturer will, without charge, repair or replace at its option, products, or part(s), which its inspection determines to be defective. Repaired or replacement item(s) will be returned to the purchaser with transportation costs prepaid from the service point. A copy of the purchaser's receipt must be returned with the defective item(s) in order to qualify for the warranty coverage. Exclusions from this warranty include, but are not limited to the finish. This warranty shall not apply to any product, which has been altered, such that in the manufacturer's judgment, the performance or reliability has been affected, or if any damage has resulted from abnormal use or service.

There are no warranties expressed or implied (including any warranty of merchantability or fitness), which extend this warranty period. **The loss of use of the product, loss of time, inconvenience, commercial loss or consequential damages, including costs of any labor, are not covered.** Star reserves the right to change the design of the product without assuming any obligation to modify any product previously manufactured.

This warranty gives you specific legal rights. You might also have additional rights that may vary from state to state. Some states do not allow limitations on how long an implied warranty lasts. Some states do not allow the exclusion or limitation of incidental or consequential damages. Therefore, the above limitation(s) or exclusion(s) may not apply to you.

If you have any questions concerning this or any other product, please contact our **Customer Service Department** at (585) 226-9500.

NOTICE

Due to continuous product improvements, we must reserve the right to change any specifications and information, contained in this manual at any time without notice. Star Safety Technologies makes no warranty of any kind with regard to this manual, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Star Safety Technologies shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this manual.



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455 Rochester Street Avon, NY 14414
585-226-9500 (F) 888-478-2797
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