



A Division of Star Headlight & Lantern Co., Inc.

INSTALLATION AND OPERATING INSTRUCTION MANUAL

SS651 & SS651MT SIREN AMPLIFIER



LCS653 SIREN AMPLIFIER AND LIGHT CONTROLLER



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INSTALLATION INFORMATION

MODELS: **SS651-008** **SS651MT-008** **LCS653**

SERIAL NO: _____

PURCHASE DATE: _____

DEALER: _____

INSTALLATION DATE: _____

INSTALLER: _____

OPTIONS

_____ Phaser Disabled

_____ Two-Tone Enabled

Model and serial number located on the top of the amplifier unit

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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. Signal Vehicle Products, Inc. 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. Signal Vehicle Products, Inc. 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.

Important Improper installation and/or use of these products may result in vehicular collision, personal injury and/or death. Star Headlight & Lantern Co., Inc., and its subsidiaries shall not be held responsible for damages directly or indirectly caused by improper installation or use of this product.

GENERAL DESCRIPTION

The SS651, SS651MT, and LCS653 Sirens are designed for single 100W speaker use. They come standard with the amplifier unit as well as a remote control head (switch panel). The primary operating modes are Wail, Yelp, Standby, Manual, and Horn. Both the Manual Control and the Horn function will override all other functions, and can be utilized at any time via a rocker switch. The Phaser function can be optionally disabled entirely with a program jumper.

The SS651, SS651MT, and LCS653 units are designed to allow maximum versatility in mounting. The control head is remote from the siren amplifier box creating a compact user interface panel that can be easily mounted under the dashboard. The amplifier box can then be mounted remotely in the trunk, under the dashboard, under the seat, or wherever convenient. The SS651MT offers a waterproof switch assembly for motorcycle and marine applications.

The siren amplifier has been designed with several protection features to provide exceptional field service. Excessively high voltage detection will disable the siren output to protect both the amplifier and the speaker. Fused inputs provide safety against reverse polarity. Speaker protection shuts down the output if the speaker output becomes electrically shorted.

CAUTION: These protection features will not guard against overloading the outputs.

GENERAL INSTALLATION

Proper installation of the unit is essential for years of safe, reliable operation. Please read all instructions **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 any damage is found, alert the carrier immediately. SS651 and LCS653 contents should include: an amplifier box with wiring pigtail, a control head (switch panel), (6) six 1/4" quick connect terminals, and these instructions. (Remote Panel with switches and terminals is not supplied with SS651-AMP version). SS651MT contents should include: an amplifier box with wiring pigtail, a weatherproof control head (switch panel), and these instructions. Please contact your supplier immediately if any components are missing.

INSTALLER-SELECTABLE OPTIONS

The SS651, SS651MT and LCS653 have Phaser Tone Disable and Two-Tone Enable options that can be selected during installation. An internal jumper on the printed circuit board inside the amplifier case allows the installer to select these options. These options should be set before installation of the unit.

Phaser Tone Disable – The Phaser function can be completely disabled by moving one of the option jumpers inside the amplifier unit from "Extra" position to the "TD" (Tone Disable) position. When Phaser is disabled, the Manual button (MAN or Phaser) will not have any effect on the tone while the siren is in the Yelp mode (in WAIL, it will still change the tone to YELP).

Two-Tone Enable - The Two-Tone function can be enabled by moving one of the option jumpers inside the amplifier unit from "Extra" to the "Two-Tone" position. When Two-Tone is enabled, a European Two-Tone (HI-LO) sound will replace the Phaser sound when the MAN or Phaser button is pressed while the siren is in the Yelp mode. (The tone will toggle between Yelp and Two-Tone each time the MAN or Phaser button is pressed).

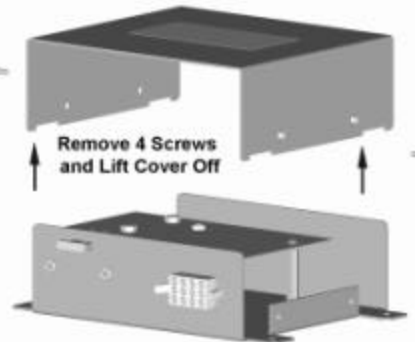
If you would like to disable the Phaser or enable Two-Tone, proceed with Amplifier Cover Removal below. If you do not need to set these options, proceed the MOUNTING section on the next page.

Amplifier Cover Removal

Remove the four Philip head screws located on the side of the amplifier unit.

DO NOT REMOVE THE TWO RECESSED SCREWS ON THE UNDERSIDE OF THE AMPLIFIER.

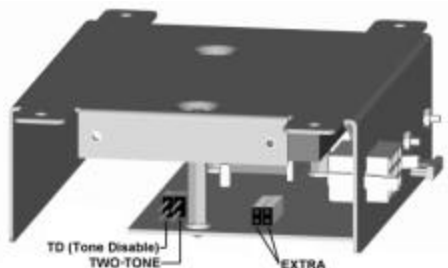
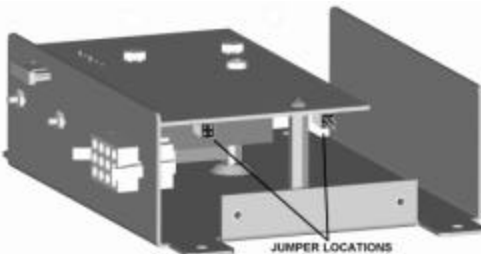
Carefully lift the cover off of the base.



Once the cover is removed, you may move the necessary jumpers over from the "Extra" slots.

Top View

Bottom View



MOUNTING

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.**



DO NOT mount in air bag deployment area.

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)

AMPLIFIER

The SS651-AMP (used in the SS651, SS651MT and the LCS653) should be mounted in a location such as the firewall, under the seat, in the trunk, or in the saddlebag. It is not recommended to mount the amplifier in the engine compartment or in an area that would be allowed direct exposure to weather elements. Choose a mounting location away from any air bag deployment areas. Assure adequate ventilation to prevent overheating.

The amplifier unit is provided with four mounting flanges with 1/4" holes. Using the amplifier unit itself as a template, mark the location of the four mounting holes to be drilled. Be sure to check for obstructions behind the mounting hole locations. Drill the four mounting holes and secure the amplifier using appropriate hardware (not supplied).

MOTORCYCLE/MARINE INSTALLATIONS (SS651MT ONLY!)

This SS651-AMP can be used on a motorcycle or for marine applications by sealing the case with silicone sealant along the mating edges and around the wire connector. In order to reduce water entry, the amplifier should be oriented with the wire connector faced down. Only the waterproof switch assembly found in the SS651MT (SS651MT-CH) should be used for wet location operation.

(Mounting CONT'D)

SS651-CH and LCS653-CH CONTROL HEADS

The control head is designed for mounting in an easily accessible location such as under the dash, in the overhead console, or in a center console.



SS651-CH



LCS653-CH

- Choose a mounting location convenient to the operator and away from any air bag deployment areas.
- Be sure to choose a location that has at least two inches of depth to accommodate the control head and cables.
- Consider wire routing and access to connections when selecting location as well.
- Using the switch panel unit itself as a template, mark the location of the two mounting holes to be drilled. Be sure to check for obstructions behind the mounting hole locations.
- Drill the two mounting holes and secure the switch panel using appropriate hardware (not supplied).



SS651MT-CH CONTROL HEAD

The SS651MT-CH weatherproof control head is designed for use in locations that may be exposed to water.

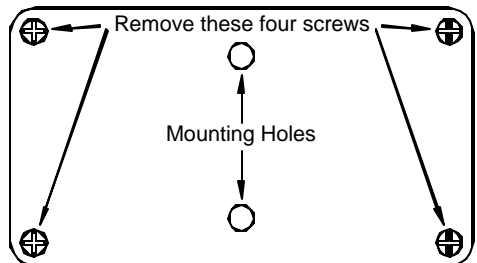


SS651MT-CH

- Choose a mounting location convenient to the operator and away from any air bag deployment areas.
- Be sure to choose a location that has at least two inches of space on the right side to accommodate the cable exiting the side of the control head.
- Consider wire routing when selecting location as well.

- The SS651MT-CH can be mounted through the two holes in the rear cover. To gain access to the mounting holes, detach the rear cover by removing the four screws affixing it to the control head.

- Secure the switch panel using appropriate hardware (not supplied).



Rear of SS651MT-CH

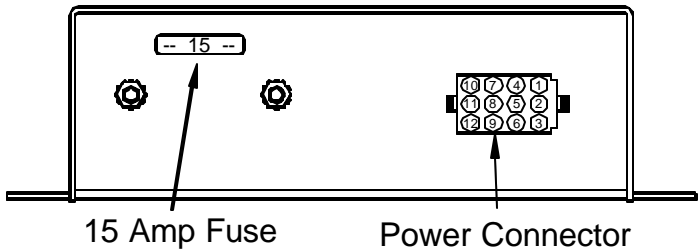
ELECTRICAL CONNECTIONS

WIRE SIZE AND TERMINATION

When running your wires and making your connections, please adhere to the following guidelines:

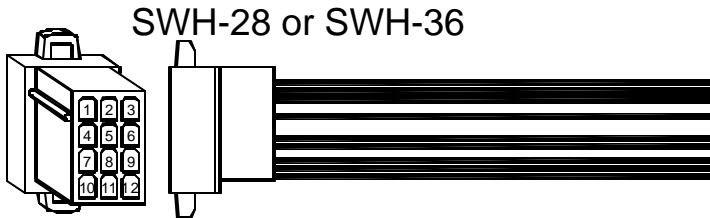
- The wiring diagrams on pages 12-13 show the minimum wire size used for each connection. If the wire is longer than 10 ft. we recommend the use of the next larger wire size.
- If using your own connectors, use only high quality crimp connectors.
- Make sure all connections are tight.
- Route wiring to prevent wear, overheating and interference with air bag deployment.
- Use grommets and sealant when passing through compartment walls.
- Minimize the number of splices to reduce voltage drop.
- Ground connections should only be made to substantial chassis components, preferably directly to the negative of the vehicle battery.
- Install and check all wiring before connection to the vehicle battery.

AMPLIFIER



All of the necessary electrical connections to the amplifier are made through a connector located on the back of the amplifier case.

You should also find enclosed with your siren a wiring harness. The SWH-28 wiring harness is used in the SS651 and LCS653. The SWH-36 comes with the SS651MT. They come with a 12-port connector using nine different colored leads.



You should make all electrical connections to the wiring harness before installing the connector on the SS651-AMP. If the amplifier ever needs service, the connector can be easily removed from the amp without unwiring it.

(Electrical Connections CONT'D)

CONTROL HEADS

SS651-CH and LCS653-CH

Electrical power connections to the SS651-CH and LCS653-CH control heads are made using the 1/4" quick connect terminals provided. After your wires are run, the terminals can be crimped on to the ends, then plugged into the appropriate terminals on the back of those control heads.

SS651MT-CH

The SS651MT-CH control head comes with 8' leads. They will be connected to the appropriate wires from the SWH-36 or lights by soldering or using appropriate connectors (user supplied) and/or additional wire when necessary.

CONNECTION OF WIRES FROM THE AMP

The wiring diagrams on pages 9-11 show the specific details of how to connect the wiring harness from the amplifier, and the different control heads, to each other and to the vehicle.

RED LEAD (PIN #1) – Used for Power

Connect the red wire from the amplifier to +12 VDC. It is strongly recommended that you connect to a 12 VDC source that is present only when the vehicle ignition is in the on position. A power relay may also be used. Be sure to use a minimum size #16 AWG wire. 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 unit is internally fused.

BLACK LEAD (PIN #2) - Ground

Connect the black wire from the amplifier to the negative side of the battery or to a good chassis ground. Be sure to use minimum size #16 AWG.

ORANGE LEAD (PIN #3) - Used for HORN control

SS651: Connect the Orange lead to terminal 1a (MAN) of SW2

LCS653: Connect the Orange lead to terminal 1a of SW4.

For the SS651, SS651MT and LCS653 on vehicles with ground-side (negative) switched horns, also connect the Orange wire to the wire between the horn switch on the vehicle and the horn itself (see wiring diagrams). Be sure to use a minimum size #18 AWG. The HORN button on your control head and the horn switch on your vehicle will act identically. Either one will activate both the vehicle horn and the siren horn at the same time. For the SS651MT, there is no HORN button on the control head. On motorcycles with ground-side switched horns, pressing the horn button on the motorcycle will activate both the motorcycle horn and the siren horn.

YELLOW LEAD (PIN #6) - Used for MANUAL control

SS651: Connect the Yellow lead to terminal 1b (HORN) of SW2

LCS653: Connect the Yellow lead to terminal 1b of SW4.

SS651MT: Connect the Yellow lead from the amp to the Yellow lead from the control head.

Be sure to use a minimum size #18 AWG wire.

(Electrical Connections CONT'D)

BROWN LEADS (PINS #7 and #12) - Used for siren output

Connect one Brown lead to each terminal or lead of the siren speaker. Be sure to use a minimum size #16 AWG wire.

GRAY LEAD (PIN #9) - Used for WAIL control

SS651: Connect the Gray lead to terminal 1a of SW1 (next to YELP label)

LCS653: Connect the Gray lead to terminal 1a of SW3 (next to YELP label)

SS651MT: Connect the Gray lead from the amp to the Gray wire from the SS651MT switch panel.

Be sure to use minimum size #18 AWG wire.

BLUE LEAD (PIN #11) - Used for YELP control

SS651: Connect the Blue lead to terminal 1b of SW1 (next to WAIL label)

LCS653: Connect the Blue lead to terminal 1b of SW3 (next to WAIL label)

SS651MT: Connect it to the Blue wire from the SS651MT switch panel.

Be sure to use minimum size #18 AWG wire.

Optional Connections:

GREEN LEAD: (PIN #10)- Used for remote or auxiliary HORN control

This wire is used in vehicles with a positive-side switched horn to synchronize the vehicle horn and the siren horn (similar to the Orange wire on vehicles with negative [ground-side] switched horns).

Connect the Green wire to the +12vdc switched horn ring circuit. Both the vehicle horn and the siren horn will be activated when the horn in the vehicle is pressed. When the HORN button on the control head is pressed (SS651 and LCS653 only), only the siren horn will sound.

NOTE: If you are not using this lead, cut it short & insulate it with electrical tape.

Please Note:

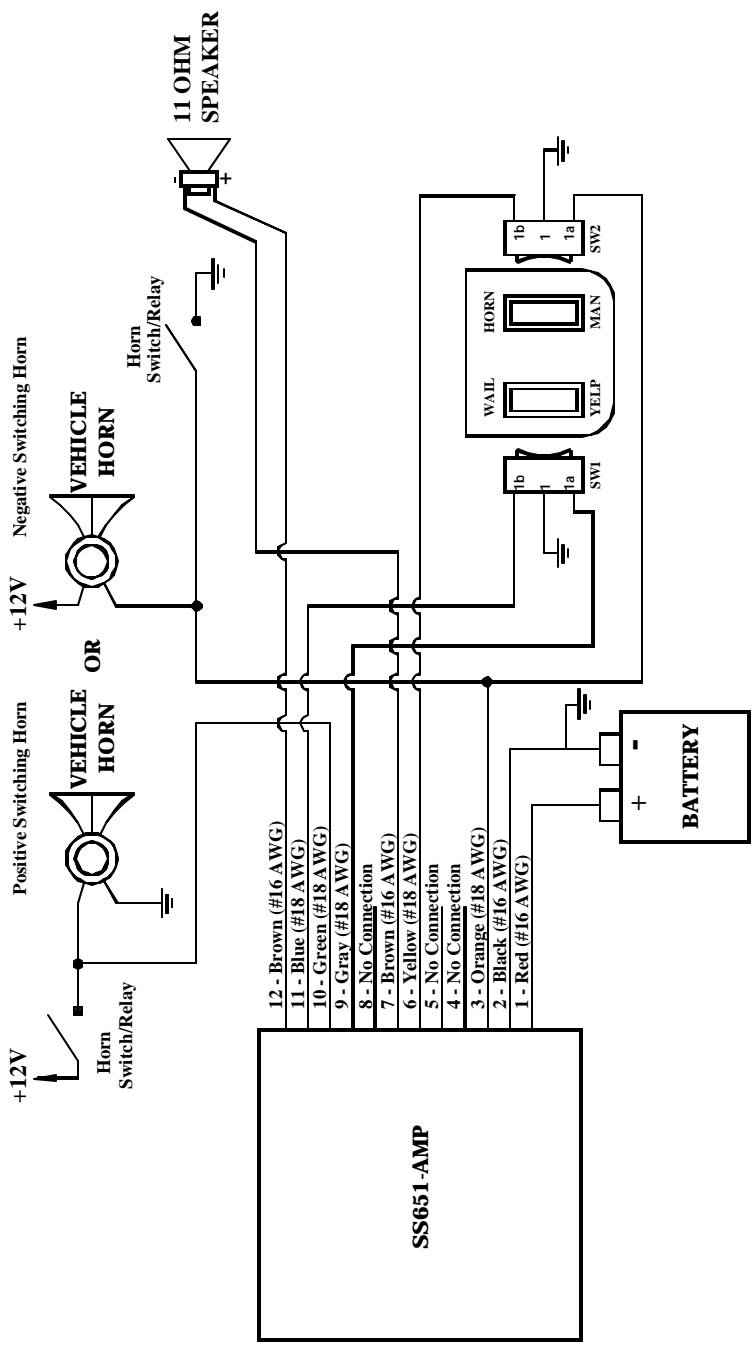
SS651 : Terminal 1 from both SW1 and SW2 on your SS651-CH must be attached to a Good Chassis Ground as pictured on the following page.

SS651MT: The Black wire from the control head should be connected to a Good Chassis Ground.

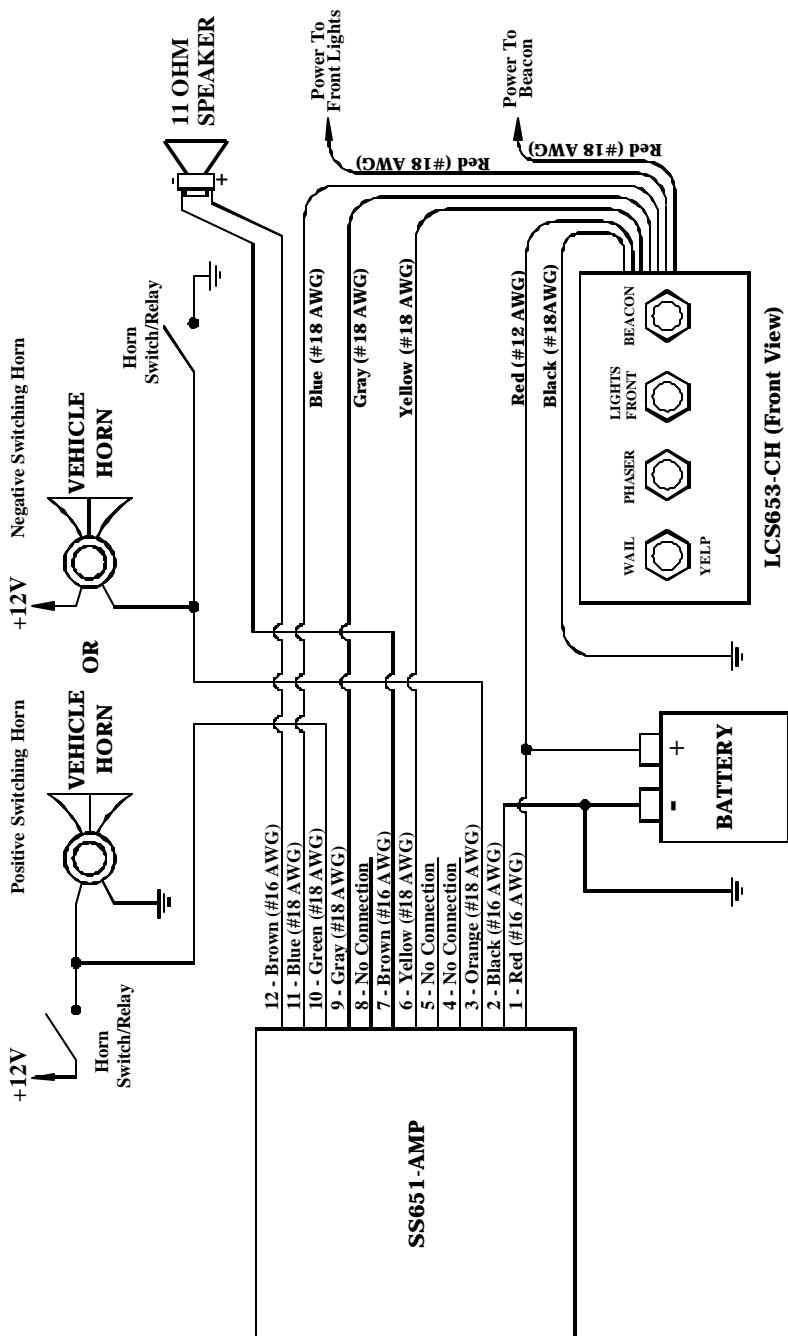
LCS653: Terminal 3 from SW1 & SW2 as well as Terminal 1 from SW3 & SW4, should be connected to a Good Chassis Ground.

Testing - Test all siren functions after installation to assure proper operation. Test vehicle operation to assure no damage to vehicle.

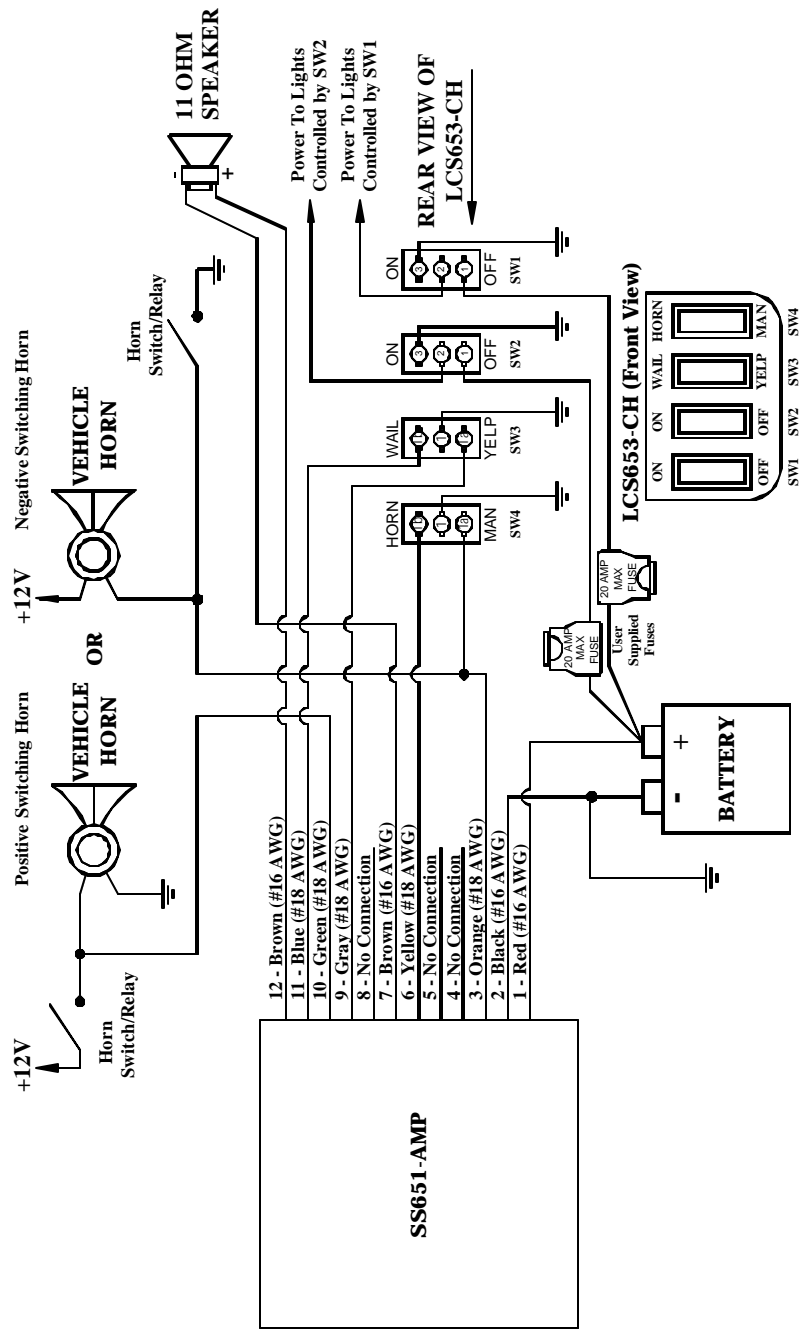
Wiring Using the SS651-CH Control Head



Wiring Using the SS651MT-CH Control Head



Wiring Using the LCS653-CH Control Head



OPERATION

These units are 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.

SELECTOR SWITCHES

There are three different control heads (switch panels) that work in conjunction with the SS651-AMP siren amplifier. The SS651-CH is used for the SS651 Siren. The SS651MT-CH is used for the SS651MT Siren. The LCS653-CH is used in the LCS653 Siren.

All three switch panels will contain a three-position switch labeled WAIL/YELP. This switch will control the primary operating function of the siren.

Wail - A normal rise-fall tone used on highways and areas with low traffic or constant traffic flow.

Center Off – **(Manual/Standby)** – A silent/standby mode that allows momentary push-button Manual (MAN) or Phaser and momentary push-button Horn. The siren output *winds down* when the Manual momentary switch is released.

Yelp- A rapid warble tone used in light to moderately congested areas.



SS651-CH



SS651MT-CH



LCS653-CH

MAN (SS651 and LCS653) or PHASER (SS651MT) Button

With the Wail/Yelp switch in the Center Off (Manual/Standby) position, the MAN or PHASER momentary switch provides a manually activated Wail siren tone.

With the Wail/Yelp switch in the Wail or Yelp position, this switch provides a generally quicker changing tone. A Wail tone will change to Yelp when this button is pressed and a Yelp tone will change to Phaser. (See tables on next page).

These quicker tones are used to momentarily alert motorists at intersections and very highly congested areas.

Pressing the button once changes to the next faster tone. Pressing the MAN or PHASER button again will toggle the siren back to the original tone.

Optional configuration allows disabling of the Phaser tone entirely. This option is selected during installation and may be governed by State or Local laws. (Refer to the INSTALLER SELECTABLE OPTIONS section on page 3).

HORN Button (SS651 and LCS653 only)

This momentary push-button switch 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 or in low noise areas. This tone will override all other siren tones.

SIREN OUTPUT:

Selector Switch Position:	Speaker Output	Pressing Manual Pushbutton
Wail	Wail	Yelp
Yelp	Yelp	Phaser (Remains Yelp if Phaser disabled)
Manual (Standby)	No Output	Creates a manual WAIL tone while button is being held that sweeps down when the button is released.

(NOTE: PHASER may be optionally disabled via program jumpers. See INSTALLER-SELECTABLE OPTIONS on page 3.)

Testing - Test all siren functions after installation to assure proper operation.
Test vehicle operation to assure no damage to vehicle.

TROUBLESHOOTING

Symptom	Possible Cause	Check
No power	Power source not turned on Connector loose Amplifier 15A fuse blown Loose connection at power source	Is ignition switch in AUX or ON position? Do you hear a “pop” when turned on? 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	High voltage protection Bad speaker or speaker wiring	Input voltage must be less than 16 volts. Check for a short or an open in the output.
Distorted siren sound	Speaker assembly loose Intermittent Aux. Input connection High vehicle voltage	Is the speaker bell or tip loose? Is the Aux. Input used and wired properly? Input voltage must be less than 16 volts.
Intermittent siren tone	High voltage protection Circuit breaker in supply Bad Connection Shorted speaker or speaker wire	Is the vehicle voltage regulator working properly? Is a circuit breaker used with at least a 50A rating? Is the connector tight on the back of the unit? Does the speaker have water damage, or is a wire pinched?
Horn function or Manual function stuck on	Horn switch stuck MAN push-button switch stuck Aux. Input improperly connected Aux. Horn Input Polarity reversed	Does the horn switch return fully when released? Does the MAN push-button switch return fully when released? Is the AUX Input used and wired properly? Is the Green horn wire wired for correct polarity?
Wrong siren tone	Two-Tone option jumper installed Aux. Horn Input Polarity reversed	Is the TT jumper option properly configured? Is the Green horn wire wired for correct polarity?
Phaser not working	Phaser disabled	Is the TD jumper option configured properly?

SPECIFICATIONS

Input Voltage	10 - 16 VDC (negative ground)
Input Current	8 Amps @ 13.6 VDC (100W speaker)
Standby Current	Less than 20 mA
Output Power	105 WATTS RMS MAX. (15.0 VDC - single 100W speaker)
Siren Frequency	675Hz - 1633Hz
High Voltage Protection	16 - 18 VDC will cause siren output to cease, resume at normal
Short Circuit Current	50 AMPS (supply circuit must be capable of supplying this)
Operating Temperature	-15° F to +140°F
Controls	3-position primary mode rocker switch (Wail, Yelp, and Standby) Momentary 3-position rocker switch (Horn and Manual) Phaser disable (jumper programmable)
Connections (12-Pin Connector)	Detachable, 12-pin, positive locking connector with pigtail leads for Amplifier. (1) Positive, (1) Negative, (2) Speaker, Wail, Yelp, Horn, Manual, and auxiliary positive switching Horn.
Size	Amplifier: 2" High, 6" Wide, 5¼" Deep (plus ¾" flange on each side) SS651-CH and LCS653-CH- Control Head (Switch Panel): 3" High x 2-1/4" Wide, x 1-1/2" Deep SS651MT-CH - Weatherproof Control Head: 2.5" High x 4.5" Wide x 2-1/8" Deep (3" Deep with switches)
Boxed Weight	SS651 and LCS653 - 3.5 lbs. SS651MT - 4.4 lbs.

PARTS

The following parts are available from Signal Vehicle Products:

Part	Description
P30235-18P	Amplifier Top Cover
P30234-18P	Amplifier Bottom Mounting Plate
SWH-28	SS651 and LCS653 Wiring Harness
SWH-36	SS651MT Wiring Harness
30050-28	Amplifier Case Screws
30028-6	15 Amp Automotive Blade Fuse for Amplifier
30032-8	TIP36C Power Transistor
30007-41	3-Position Rocker Selector Switch (WAIL/YELP)
30007-42	Momentary Rocker Switch (HORN/MAN)
SW-40	Lighted ON/OFF Rocker Switch (LCS653-CH)

LIMITED WARRANTY

Signal Vehicle Products warrants this new product to be free from defects in material and workmanship, under normal use and service, for a period of one (1) year from the date of delivery to the first user-purchaser.

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

This warranty does not cover labor charges for removal or re-installation of the product. Fuses and lamps are not covered under this warranty.

This warranty does not extend to any unit that has been subjected to abuse, misuse, improper installation or which has not been adequately maintained, nor to units which have problems related to service or modification at any facility other than the manufacturer.

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 SIGNAL VEHICLE PRODUCTS BE LIABLE FOR ANY LOSS OF PROFITS OR ANY INDIRECT OR CONSEQUENTIAL DAMAGES ARISING OUT OF ANY SUCH DEFECT IN MATERIALS OR WORKMANSHIP.

If you have any questions concerning this or any other SVP product, please contact our **Customer Service Department** at (585) 226-9025.

RETURN

If a product must be returned for any reason, please call 585-226-9025 and ask for the Repair Department. At that time the necessary paperwork can be filled out and you can obtain a Returned Goods Authorization number (RGA#) before you ship the product to SVP. Please write the RGA# clearly on the package near the mailing label.

Installation Notes



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