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

INSTALLATION AND OPERATING INSTRUCTIONS for

LCS800 & LCS850



Command Center

SIREN AMPLIFIER & LIGHT CONTROLLER



Star Headlight & Lantern Co., Inc.

455 Rochester Street Avon, NY 14414

Phone: 585-226-9787 FAX: 888-478-2797



www.starheadlight.com

INSTALLATION INFORMATION

MODEL: LCS
PURCHASE DATE: _____
DEALER: _____
INSTALLER: _____

AMPLIFIER SERIAL #: _____
CONTROL HEAD SERIAL #: _____
ARROWSTICK BOX SERIAL #: _____
INSTALLATION DATE: _____

SIREN OPTION JUMPERS

- _____ Two-Tone Enabled
- _____ Pursuit Disable
- _____ Phaser Disabled
- _____ Negative Park Kill Switching
- _____ Negative Auxiliary Switching

LIGHT CONTROL OPTION JUMPERS

- _____ 8 sec. gun lock S4
- _____ Momentary S3
- _____ Normally Closed S3
- _____ HRT on Start-up
- _____ Audible Beep disable
- _____ Auxiliary Override
- _____ HF on Start-up
- _____ S3 Auto Activate

**ARROW STICK OPTION JUMPERS
(LCS850 & LCS850-F ONLY)**

- _____ Phantom Mode
- _____ Fast rate arrow
- _____ Low power (Dim)
- _____ 6 head arrow (1 & 8 flash)
- _____ Double blink end arrow)
- _____ Traveling arrow
- _____ 8 head arrow

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.

GENERAL DESCRIPTION

The LCS800 series is a premium remote system that combines the siren amplifier, the siren controls, and light controls all in one system. A single slim-line remote control head combines the noise-canceling microphone with a built in siren, as well as many of the switch and light controls for the vehicle. The control head contains illuminated switches that change color to indicate status. The face of the control head is sealed around every push button to help prevent liquid from entering the electronics. The amplifier is a 200W siren amplifier unit designed for single or dual 100W speaker use. The LCS850 model adds full arrow stick controls.

The control head contains several distinct controls for operation of vehicle devices. The slide switch allows quick pursuit mode operation. The far right slide position can be set up to activate maximum lights and siren for pursuit mode. Five push buttons allow control of five different lighting or auxiliary functions. Seven additional push buttons allow full siren operation. The LCS850 also adds control of an arrow stick.

The LCS800 series is designed to allow maximum versatility in mounting. The control head is remote from the siren amplifier and light relay control box, creating a compact user interface that can be mounted onto the dashboard, overhead, or in the center console. The amplifier box and arrow stick control box can then be mounted remotely in the trunk, under the dashboard, under the seat, or wherever convenient. The control head is available with an adjustable "U" bracket or with a flange for recessed mounting.

Siren operating modes include Wail, Yelp, Phaser, Hands Free, and Radio. A Noise Canceling PA Override is available in all modes. A Manual button allows tone toggle operation and manual siren control. The Air Horn button will override any siren tone. The vehicle horn switch may also perform the Manual push button function via an auxiliary input. Twelve option jumpers allow the unit to be fully customized to the operators' needs. Options include: Phaser vs. Two-Tone, Phaser disable, 8 second timed gunlock release, momentary vs. lock-on/lock-off switch operation, N.O. contact vs. N.C. contact, auto horn ring transfer, and many more. A Park Kill option is provided for connection to a door switch, etc. to disable the siren when exiting the vehicle. Both a PA volume and a Radio volume are provided.

The LCS800 series has been designed with several protection features to provide exceptional field service. Excessive high or low voltage detection will disable the siren output, protecting both the amplifier and the speaker. Fused inputs provide safety against reverse polarity. Speaker diagnostics provides user feedback as well as shutdown protection against speaker opens and shorts. The first four light output functions are individually protected with 20A fuses, while the fifth light output function is protected with an internal 2A thermal fuse. CAUTION: These protection features will not guard against overloading the outputs.

There are currently four different sirens in the LCS800 series:

- LCS800** Standard version with slide switch, full siren controls, and light controls. Includes a remote head with microphone, the siren amplifier, and switch relay box.
- LCS800-F** Flange mount version of the standard LCS800
- LCS850** Enhanced version with all the standard controls plus arrow stick controls. Also includes the arrow stick control box.
- LCS850-F** Flange mount version of the standard LCS850

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 - Immediately inspect the contents for shipping damage. If any damage is found, alert the carrier immediately.

Contents should include:

- 1 - Remote Control Head
- 1 - Amplifier and Light Control Box
- 1 - Amplifier Wire Harness with Connector
- 1 - 25' Amplifier Communication Cable (*6-wire telephone style cable*)
- 1 - Mounting Hardware
- 1 - "U" Bracket (*not included with -F: flange mount units*)
- 1 - TDC850 Arrow Stick Control Box (*LCS850 models only*)
- 1 - Arrow Stick Communication Cable (*telephone cable*) (*LCS850 models only*)
- 1 - Communication Cable Splitter (*LCS850 models only*)
- 1 - Label Set
- 1 - RFI Filter
- 1 - Installation and Operating Instructions

Please contact your supplier immediately if any components are missing.

INSTALLER-SELECTABLE OPTIONS

The LCS800 and LCS850 have several options that can be selected during installation. Jumpers on the printed circuit board inside the amplifier case, inside the control head, and inside the arrow stick control box (LCS850 only) allow the installer to select these various options. *These options should be set before installation of the unit.*

Siren option jumpers (located in the amplifier case):

- Auxiliary input polarity
- Park Kill input polarity
- Two-tone replacement of Phaser tone
- Phaser Disable
- Slide Switch Pursuit Disable

Light control option jumpers (located inside the control head)

- Auxiliary control (Manual vs. Horn)
- 8 second timed gun lock release (S4)
- Momentary replacement of lock-on/lock-off switch operation (S3)
- Normally closed contact replacement of normally open (S3)
- Activate Hands Free on start-up
- Activate Horn Ring Transfer on start-up
- Audible beep disable
- S3 Auto Activate on Position L2 & L3 of Slide Switch

Arrow stick control option jumpers (located inside arrow stick control box):

- Phantom Mode
- Fast rate arrow
- Low power (night time and/or energy saving modes)
- 6 head arrow (heads 1 & 8 flash back and forth)*
- 8 head arrow*
- Traveling arrow (energy saving arrow – group 2)*
- Double blink last head of arrow (end blink)*

* These options are disabled in Phantom mode

SIREN OPTION JUMPERS

Amplifier Cover Removal

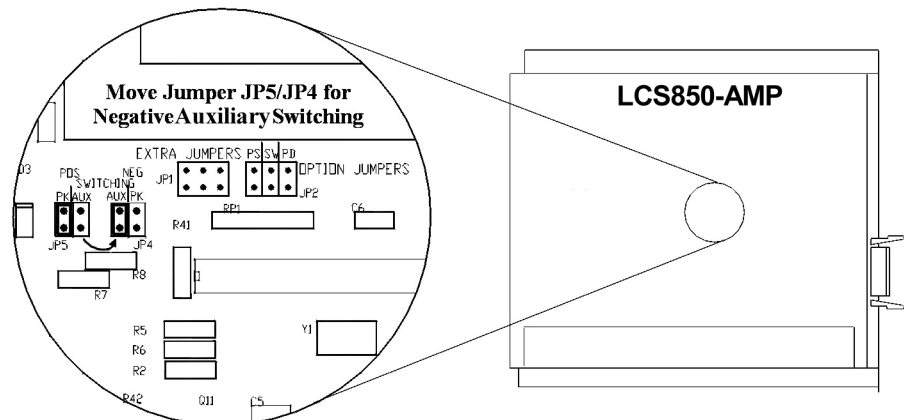


CAUTION: DO NOT OVER-TIGHTEN SCREWS!

Remove the four **protruding** Philip head screws located on the **top** of the amplifier unit. **DO NOT REMOVE THE FOUR RECESSED SCREWS ON THE UNDERSIDE OF THE AMPLIFIER!** Lift the top cover upwards. This cover can be removed completely from the amplifier unit.

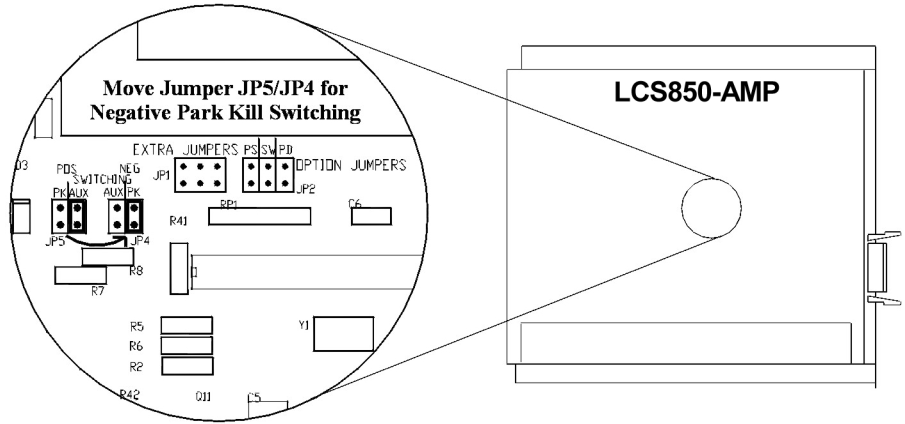
Auxiliary Input Polarity

Applying a positive voltage to the green wire normally activates the auxiliary input. To have it activate instead when the green wire is connected to ground (negative), move the “AUX” option jumper from the “Pos. Switching” pins to the “Neg. Switching” pins in the amplifier unit. (See Amplifier diagram to the right). The wiring diagram on page 9 shows two connection examples.

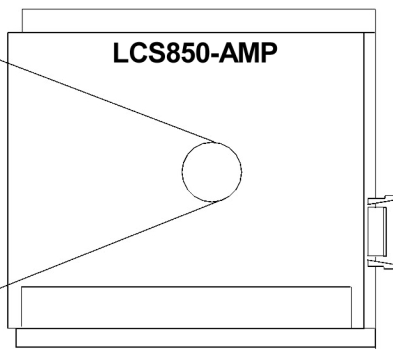
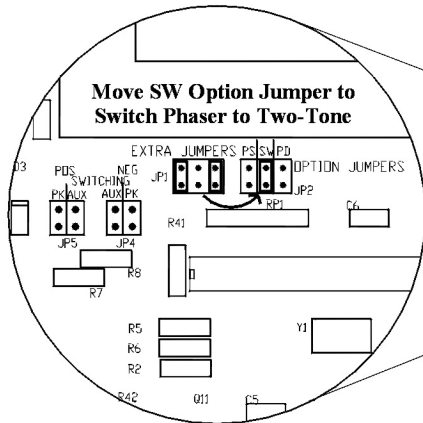


Park Kill Input Polarity

The Park Kill (Cutout) Input turns off any siren tone output when activated, and remains off until a control is activated or changed. The wiring diagram on page 9 shows two connection examples. Connecting the white wire to positive (+12 VDC) normally activates the Park Kill input. To have it activate instead when the white wire is connected to ground (negative), move the "PKILL" option jumper from the "Pos. Switching" pins to the "Neg. Switching" pins in the amplifier unit. (See Amplifier diagram to the right).



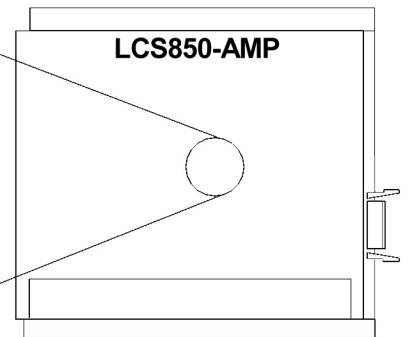
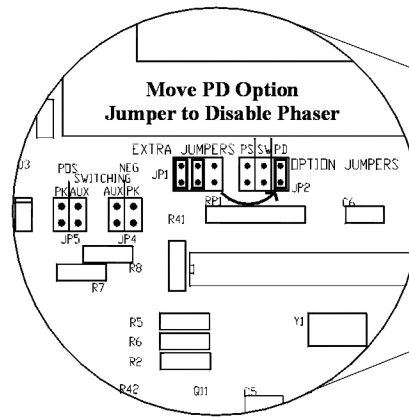
Two-Tone



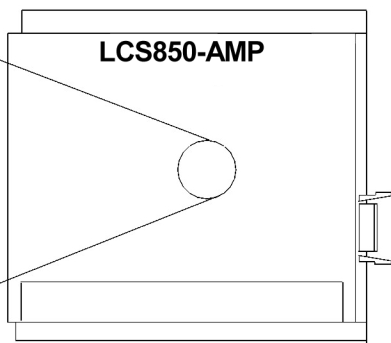
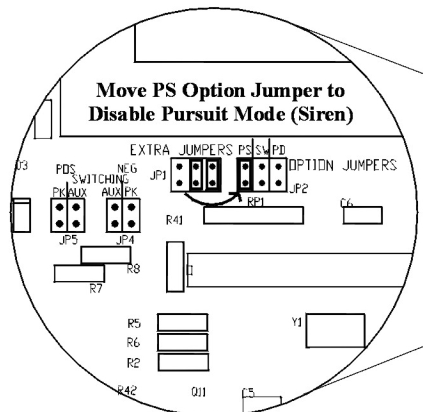
If desired, the Phaser sound can be replaced with a Two-Tone sound. This can be done by removing one of the extra jumpers from the Extra Jumpers block to the second Option Jumper (SW) in the amplifier. (See Amplifier diagram to the left).

Phaser Disable

If desired, the Phaser function can be completely disabled by removing one of the extra jumpers from the Extra Jumpers block to the third Option Jumper (PD) in the amplifier. This will also disable the manual button while the siren is in Phaser mode (which normally would produce a Two-Tone sound). (See Amplifier diagram to the right).



Pursuit Disable (Siren & Arrow Stick)



The farthest right slide switch position (L3) will normally activate the siren output in the wail mode (and arrow stick warn pattern for LCS850), along with all three light functions. Automatic activation of the siren and arrow stick can be disabled. If you prefer to NOT have the siren and arrow stick automatically activated when the slide switch is moved to position three, move one of the extra jumpers from the Extra Jumpers block to the first Option Jumper (PS) in the amplifier. (See Amplifier diagram to the left).

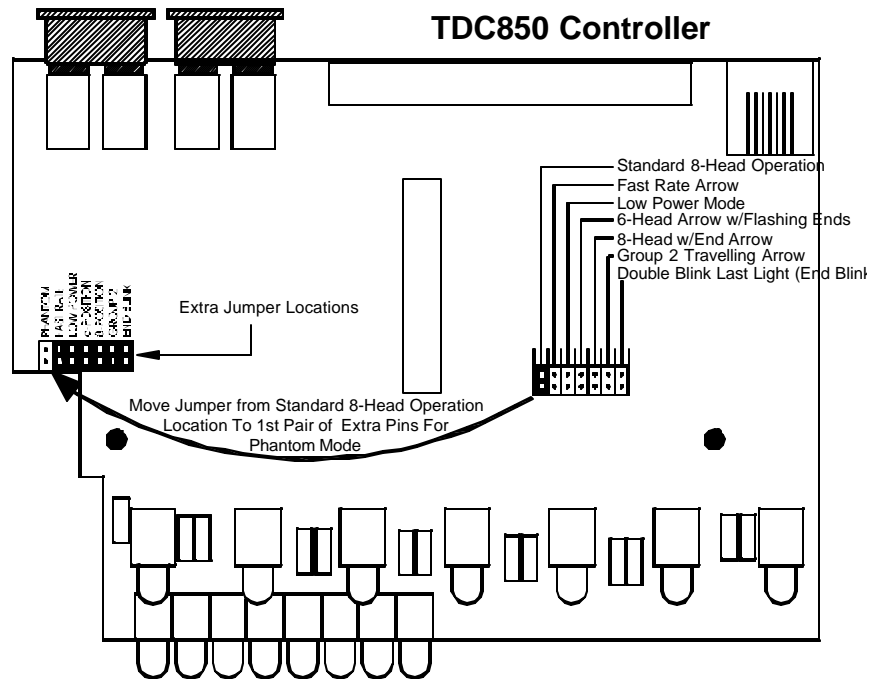
ARROW STICK CONTROL OPTION JUMPERS (LCS850 Only)

Included with the LCS850 is the TDC850 arrowstick controller.

There are seven jumpers located inside the TDC850 that control different options.

The TDC850 is shipped with the 1st extra jumper (labeled *PHANTOM*) moved to the 1st set of pins in the center jumper section (Standard 8-Head Operation). The remaining six jumpers will be in the Extra Jumper Locations (see the diagram to the right).

By moving one or more of the jumpers from the extra header to the option header, alternate options may be selected.



Phantom – The TDC850 is shipped with the jumper in the *Standard 8-Head Operation* position. In the *Standard 8-Head Operation* mode, the end lights will follow the normal “traffic directing” pattern you select on the control box. To switch to Phantom mode, move the 1st jumper in the center section of pins back to the pins labeled *PHANTOM* in the Extra Jumper Locations. **PHANTOM Mode** features:

- In the “Phantom” mode, the end lights are **NOT** part of the “traffic directing” patterns.
- Both of the end lights will flash back and forth in a high speed “warn” type display any time the slide switch is in position 1 or 2.
- ALL of the lights will automatically flash in a “random flicker” pattern with the slide switch in position 3 (see SLIDE SWITCH on page 13).

Fast Rate Arrow – The flash rate of the arrow stick may be increased during installation for high speed or high traffic areas where viewing time of the arrow is limited.

Low Power – If the arrow stick is to be used for nighttime operation, or you wish to reduce the power consumption of the arrow stick, the output can be reduced by 50%.

Six head arrow – This option should be used if your arrow stick contains only six heads. In this mode, under all patterns the 1st & 8th heads will alternate back & forth, operating as rear flashers. (This option is disabled when the controller is in PHANTOM mode.)

Eight head arrow – Many arrow sticks contain directional arrows on either end (the 1st and 8th heads). The factory preset arrow pattern will skip the first head in the right and left patterns so as to not confuse the driver with the incorrect arrow direction. If your arrow stick does not contain directional arrows on the ends and you wish to use all eight heads in your right and left patterns then set this option jumper. (This option is disabled when the controller is in PHANTOM mode.)

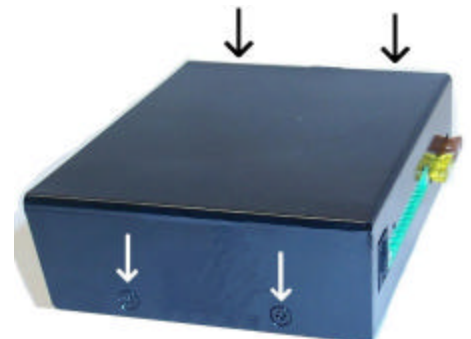
Group 2 Traveling arrow (energy saving arrow) – Optionally selected where energy saving is desired. In this case only two heads will remain lit during the arrow pattern, traveling across the arrow stick. (This option is disabled when the controller is in PHANTOM mode.)

Double blink last head of arrow (end blink) – The last head to flash in an arrow can be optionally selected to blink twice at the end of the arrow sequence. (This option is disabled when the controller is in PHANTOM mode.)

Arrow stick Control Box Cover Removal

1. Remove the four recessed Philip head screws (two on each side of the arrow stick control box).
2. Remove the top cover by sliding it towards the front of the unit.
3. Locate the extra jumper location near the fuses. Also find the “Option” jumper location near the center of the board. (See diagram above).

Please note: The TDC850 control box controls 8 light segments. If you are using this siren in conjunction with a ULB42-TD, the ULB42-TD will have 10 segments. The last two segments on either end are “tied” together and thus will flash together.



LIGHT CONTROL OPTION JUMPERS

Amplifier Cover Removal

Remove the four Philip head screws recessed in the back of the control head unit. CAREFULLY remove rear cover, use caution so as not to lift circuit board and membrane switch away from front faceplate. Locate the 7 jumpers located near the microphone coil cord strain relief. (See diagram below).



Auxiliary control (Manual vs. Horn) - The green auxiliary wire in the siren amplifier harness is typically connected to the vehicle horn, and normally provides remote activation of the air horn for all siren modes except Hands Free (HF) mode. In the HF mode, the auxiliary wire will make the siren step through from Standby to Wail to Yelp to Phaser. The auxiliary wire may be optionally selected to duplicate the Manual push button instead of the Horn. (See diagram below).

8 second timed gun lock release (S4) - The amplifier is shipped with the fourth push button (S4) as a standard on/off button. It can be optionally selected to stay activated for only 8 seconds when pressed. (See diagram below).

Momentary replacement of lock-on/lock-off switch operation (S3) - The amplifier is shipped with the third push button (S3) as a standard lock-on/lock-off switch. It can be changed to momentary operation, thus only being active while being pressed in. (See diagram below).

Normally open contact replacement of normally closed switch (S3) - The amplifier is shipped with the third push button (S3) as a normally open contact, which closes when pressed. It can be changed to a normally closed contact that opens when pressed. (See diagram below).

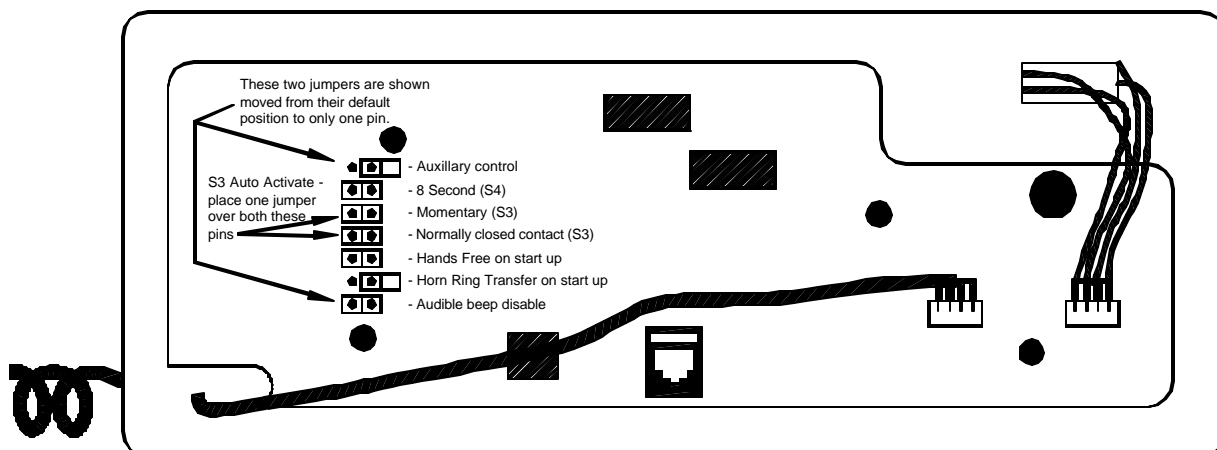
Activate Hands Free on start-up - If you wish to have the siren automatically activated in Hands Free Mode when the control head is powered up, you can select this option. (See diagram below).

Activate Horn Ring Transfer on start-up (S5) - If you wish to have the fifth push button (S5) automatically activated when the control head is powered up, you can select this option. S5 may be connected to the horn ring transfer relay if you wish to turn the Horn Ring Transfer feature on and off. (See diagram below, also refer to the wiring diagram on page 9).

Audible beep disable - The audible beep heard when the buttons in the control head are pressed can be disabled. (See diagram below).

S3 Auto Activate - S3 will turn on when the slide switch is in positions L2 & L3 and then will turn off when the switch is moved back to L1 or off.

The control heads are shipped with the standard features listed below. The seven jumpers are all installed across both pins when the siren is shipped. By moving the jumpers onto only one pin the alternate operation may be selected. (S3 Auto Activation is achieved by removing the "Momentary" and "Normally Closed" jumpers and placing one of them across both of the first pins.)



Standard Feature

Auxiliary wire activates Horn Function
 S4 is a standard push-on/push-off switch
 S3 is a standard push-on/push-off switch
 S3 is normally open when off
 Hands Free function off when powered up
 Horn Ring Transfer (S5) is off when powered up
 Audible beep heard when buttons are pressed
 S3 functions activated only with S3 switch

Moving Jumper to One Pin Only

Auxiliary wire activates Manual Function
 S4 closes for 8 seconds when pushed
 S3 becomes a momentary switch
 S3 becomes closed when off
 Hands Free function is on when unit powered up
 Horn Ring Transfer is auto selected on start-up
 Audible beep disabled
 S3 functions activated when slider in L2 or L3 positions
 (See above for special jumper setting for this)

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)

SIREN AMPLIFIER & RELAY CONTROL BOX



The LCS800 amplifier should be mounted in a location such as the driver compartment firewall, under the seat, or in the trunk. Do not 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 a mounting flange that contains four 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). Be sure that all wiring harness connections are made prior to connecting the harness to the amplifier unit.

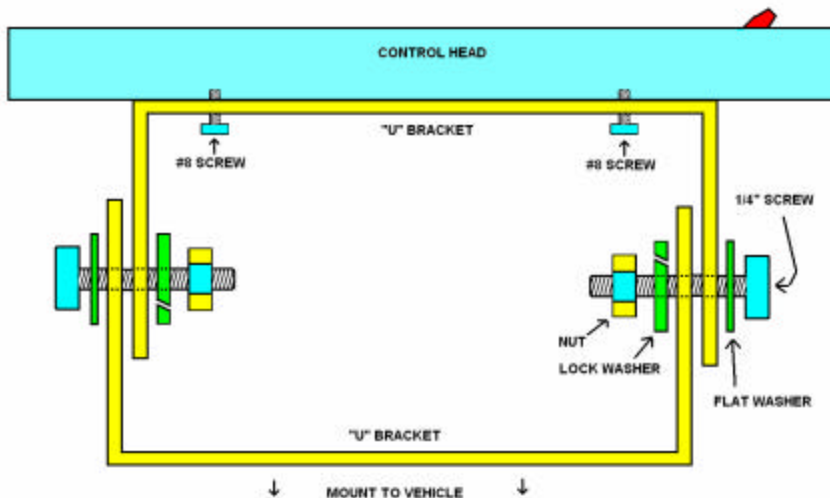
STANDARD CONTROL HEAD (MODELS LCS800 & LCS850)



The standard control head can be mounted using the adjustable "U" bracket provided, or mounted directly to a plate or other flat surface. Select a location such as the dash, the overhead console, or a center console. Choose a mounting location convenient to the operator and away from any air bag deployment areas. Consider wire routing and access to connections when selecting location as well.

The standard control head comes with two interchangeable "U" brackets. Using one of the two "U" brackets as a template, mark at least two mounting holes. Drill the mounting holes in the vehicle and mount one "U" bracket using installer-supplied hardware. If the control head option jumpers have not been previously set, refer to the Installer Selectable Options section on page 6.

Screw the second "U" bracket to the backside of the control head using the two #8 screws provided. The "U" bracket on the back of the control head can now be fastened to the "U" bracket previously mounted on the vehicle using the two 1/4" screws, two flat washers, two lock washers, and two nuts provided. (See diagram below).



Once fastened together, adjust the control head by rotating the "U" brackets and/or sliding the "U" brackets closer or farther apart. Tighten 1/4" screws.

FLANGE CONTROL HEAD (MODELS LCS800-F & LCS850-F)

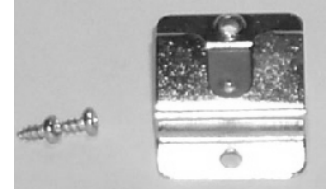
The flange control head is designed to be flush mounted. Select a location such as the dash, the overhead console, or a center console. Choose a mounting location convenient to the operator and away from any air bag deployment areas. Be sure to choose a location that has at least two inches of depth to accommodate the control head and cables. Consider wire routing and access to connections when selecting location as well.



Mark the mounting hole locations and the area to be cut out using the control head installation template provided on page 18. Carefully drill and cut. Temporarily place the control head in the cutout opening to verify the alignment of the unit. Remove the control head and connect the communication cable. If the option jumpers on the back of the control head have not been previously set, refer to the Installer Selectable Options section on page 6. Permanently mount the control using the four #8 screws provided.

MICROPHONE BRACKET

A metal clip is provided for mounting the microphone. Choose a location convenient to the operator and away from any air bag deployment areas. Using the mounting clip as a template, mark the two holes to be drilled. Using a 1/8" drill bit, drill the two mounting holes. Install the two #6 screws provided with the bracket.



ARROW STICK CONTROL BOX (MODELS LCS850 & LCS850-F)

The LCS850 arrow stick control box is usually mounted near the siren amplifier and relay control box in a location such as the driver compartment firewall, under the seat, or in the trunk. Do not 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. It comes standard with a 7-foot communication cable that must be plugged into the siren amplifier.

A "U" bracket is provided for mounting. The "U" bracket may be used as a template when locating and drilling mounting holes.



ELECTRICAL CONNECTIONS

Wire Size and Termination

The wiring diagrams on pages 9 and 11 show 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. 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 vehicle battery. SEE TABLE ABOVE FOR CORRECT WIRE SIZING!

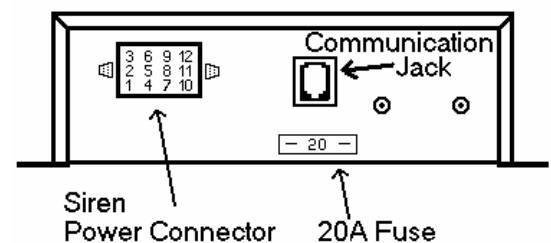
RECOMMENDED WIRE SIZE - AMP CAPACITY & CONSTRUCTION

<u>Ampacity Range</u>	<u>SAE Wire Size</u>	<u>Gauge/No. of Strands</u>
5A - 10A	#16	29/19
10A - 15A	#14	27/19
15A - 30A	#12	25/19
30A - 40A	#10	23/19
40A - 50A	#8	21/19

All conductors should be constructed of stranded copper with thermoplastic insulation. **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.** The load can be calculated by adding all lamp wattages and dividing by 13. Load (Amps) = Total Watts / 13 volts. Do not use 1/4" diameter glass fuses, as they are not suitable for continuous duty above 20 amps.

SIREN AMPLIFIER

Siren electrical power connections to the amplifier are made using a removable connector located on the back of the amplifier case. Communication between the control head and the amplifier are made via a communications cable with an RJ11 jack. **CAUTION: Please note that this cable IS NOT a standard telephone cord and CANNOT be replaced with one.** You should make all electrical connections to the power connector before installing the connector on the unit. If the unit needs service, both the communication cable and the power connector can be easily removed without unwiring the connector.



(SIREN AMPLIFIER (conf'd))

The power supply of the siren 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. The wiring diagram below shows detail of how to wire the power connector on the amplifier to the vehicle. The communication cable should have one end plugged into the amplifier (telephone style jack) and the other end plugged into the control head.

Siren Wiring Connections:

BLACK LEADS: You MUST connect BOTH black wires when using two 100W driver speakers. Connect to the negative of the battery, or to a good chassis ground. Be sure to use minimum size #14 AWG wire.

RED LEADS: You MUST connect BOTH red wires when using two 100W driver speakers. Connect to the positive of the battery, or to a high current power buss. A power relay may also be used. Be sure to use minimum size #14 AWG wire.

BROWN LEADS: Connect one lead to each terminal or lead of the speaker. Be sure to use minimum size #14 AWG wire. **If connecting a second speaker in parallel, you must observe the polarity of the speakers (phasing). Be sure that the positive terminals of both speakers are connected together to the same brown wire from the siren.** In which case, the negative terminals of both speakers would also be connected together to the other brown wire.

PINK LEAD: Connect the pink wire to you ignition-controlled power (or other switched power source). This will turn the power to your unit on and off.

Siren Optional Connections:

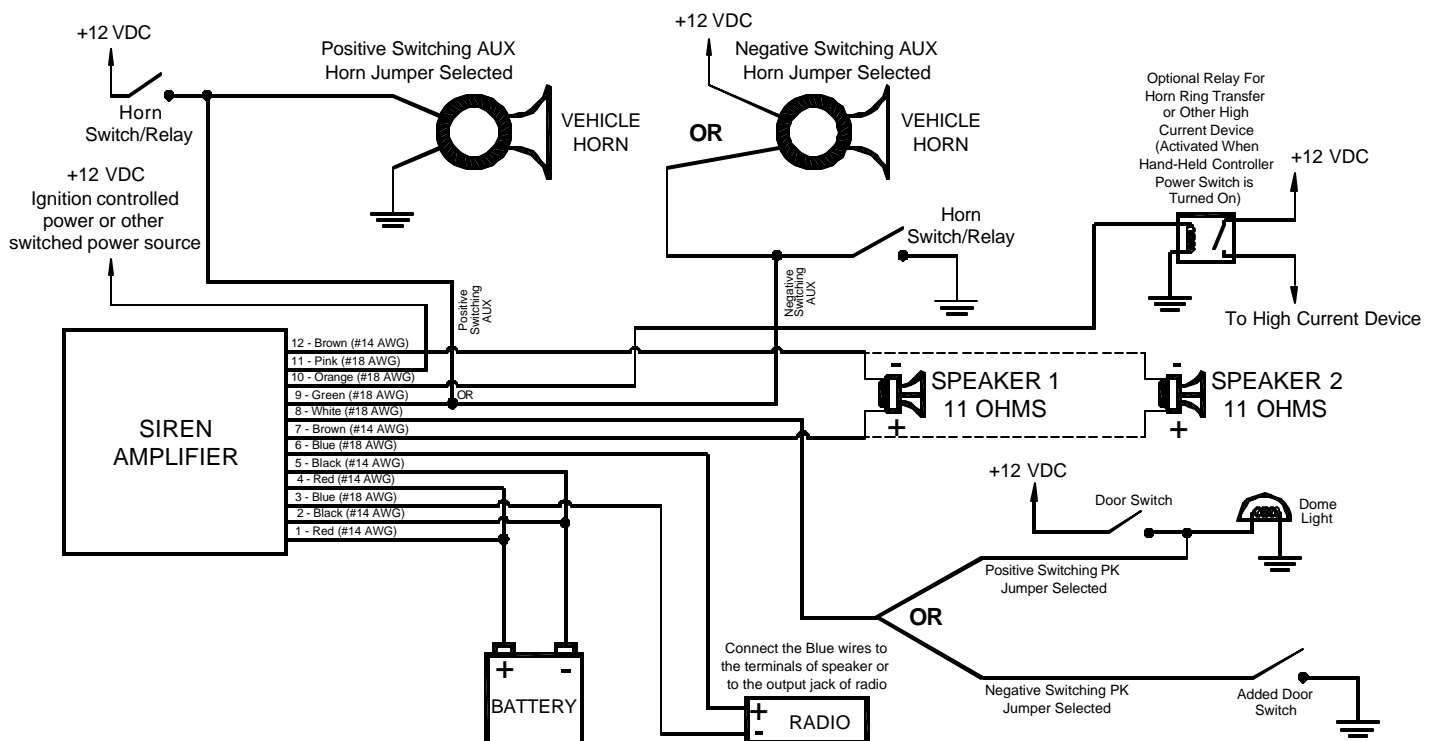
BLUE LEADS: Use for radio repeat. Connect one blue lead to each terminal of the radio speaker or output connector of the radio. Most radio outputs are isolated, in which polarity would not be important. Radios with polarity sensitive outputs should be connected w/ the blue wire from pin 6 to the positive radio output, and blue wire from pin 3 to the negative radio output. Use #18 AWG wire.

GREEN LEAD: Use for remote (Aux.) Manual control. Connect to horn ring circuit or remote switch. Circuit may be positive or negative with proper jumper selection. See INSTALLER-SELECTABLE OPTION section (page 3) for jumper details. **NOTE:** Cut lead short if not used & insulate with electrical tape.

WHITE LEAD: Used for Park Kill (Cut-off). Connect to dome light or added door switch. Circuit may be positive or negative with proper jumper selection. See INSTALLER-SELECTABLE OPTION section (page 4) for jumper details. **NOTE:** Be sure to cut lead short if not used and insulate with electrical tape.

ORANGE LEAD: Used for Horn Ring Transfer Relay, or other low current output. Connect Horn Ring Transfer Relay, gun lock, or other low current device (**Maximum 2A**) to the orange wire in the wiring harness. This output may also be used to drive an external relay when higher current is required. **NOTE:** Cut lead short if not used & insulate with electrical tape.

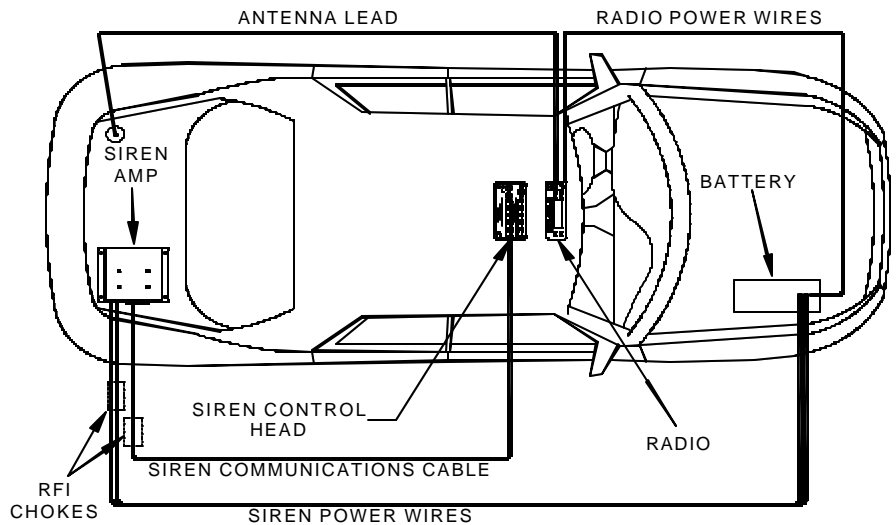
Siren Wiring Diagram



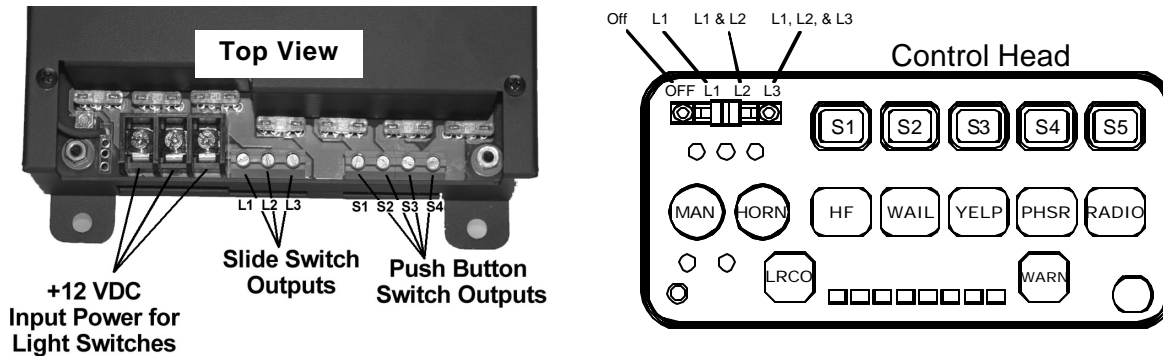
RFI REDUCTION

The following steps are recommended when installing, to help reduce RFI:

1. Make sure that both the control head and amp are securely attached to good chassis ground (i.e. no paint in-between the chassis and the grounding terminal).
2. Keep the siren control head and the police radio as far away from one another as is practical.
3. Check that the police radio antenna wire makes a right angle from the back of the police radio and runs on one side of the vehicle. The communications cable for the siren should make a right angle out of the back of the control head and exit in the opposite direction from both the police radio antenna wire and the police radio power wires.
4. Excess communication cable from the control head to the amp should be tightly bound back near the amplifier box.
5. An RFI choke (www.digikey.com P/N: 240-2066; STAR P/N: P30039-57) can be placed around the communications cable at the back of the siren amplifier box.
6. You can also place a second RFI choke around the Red and Black wires exiting the siren amplifier box.



LIGHT RELAY CONTROL BOX (Amplifier box)



Light Wiring Connections:

(REFER TO LIGHT WIRE DIAGRAM ON NEXT PAGE, AS WELL AS TO WIRE SIZE TABLE ON PAGE 9 FOR PROPER WIRE SIZES!)

The electrical connections for input power, for slide switch outputs, and for the push button light functions are coupled to the relay control box (amplifier) using terminal blocks.

+12 VDC Input: Input power to be terminated into the 3 large barrier style terminal blocks. When controlling lights with a large amount of current (>15A) power should be supplied to all three inputs.

L1, L2, L3 (Center Terminal Block): Connect lights to L1 (20A max.) that you wish to activate in the first slide switch position. Connect lights to L2 (20A max) that you wish to activate in the second slide switch position. (Note: the second slide switch position activates both L1 and L2). Connect lights to L3 (20A max.) that you wish to turn on in the third slide position. (Note: the third slide switch position activates L1, L2 and L3).

S1, S2, S3, S4 (Right Terminal Block): Connect lights to S1 (20A max.) that you wish to activate with the far left push button (L. Alley). Connect lights to S2 (20A max.) that you wish to activate with the second push button from the left (R. Alley). Connect lights to S3 (20A max.) that you wish to activate with the third push button from the left (Takedown). Connect lights to S4 of right side terminal block (20A max.) that you wish to activate with the fourth push button from the left (Auxiliary).

The fifth push button light switch (S5) is a low current (2A or less) output switch. It has an internal self-resetting 2A fuse. Connect low current device to the orange wire in the wiring harness. Typically the horn ring transfer relay is connected to this switch. This output may also be used to drive an external relay when higher current is required.

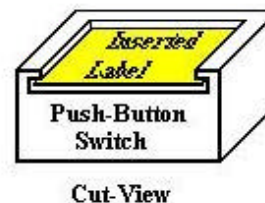
Note: S5 is wired through the siren wiring harness. See page 9.

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

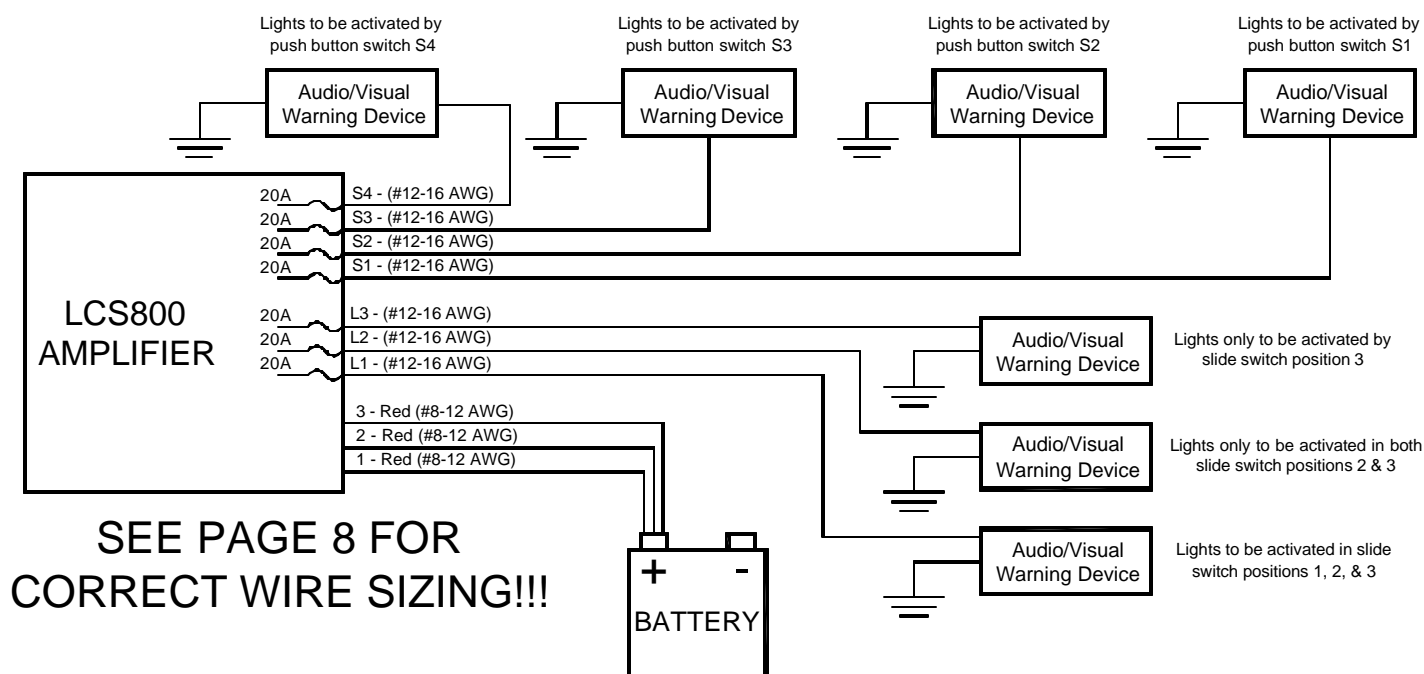
Label Insertion

Once the wire connections have been made to S1 through S4, labels can be inserted into the switches. The product is shipped with 30 different labels for these push buttons. Select the desired label inserts (provided). Insert the label into each button and tuck it under the lip of the switch.

The siren labels come pre-installed and may be used for reference when inserting light function labels

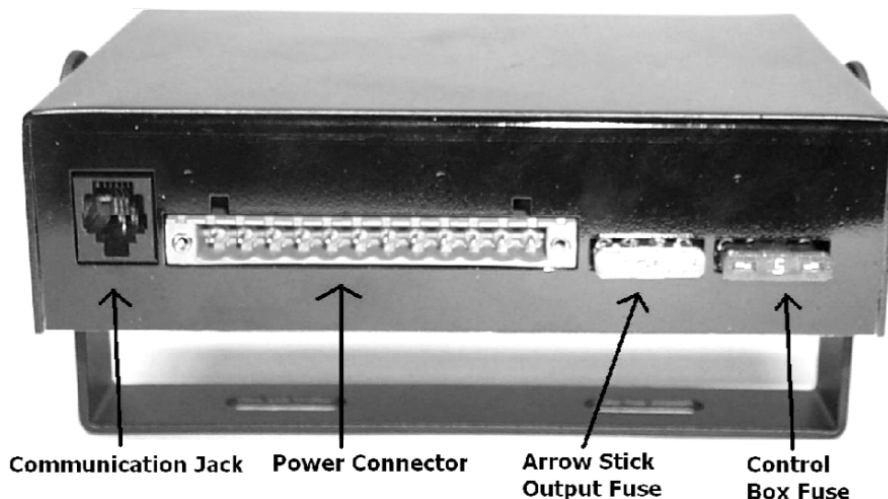


Light Wiring Diagram



Arrow Stick Wiring Connections (LCS850 & LCS850-F ONLY)

The arrow stick control box comes with a removable green terminal block connector (Power Connector). Remove the terminal block from control box and loosen all 12 terminal screws. This will open the wire entries. Make the power wire connections as shown on next page, being sure to tighten down each screw once the appropriate wire is inserted. After all power connections are complete, insert the terminal block into the mating receptacle in the back of the control box. Tighten the two terminal block locking screws on either end of the block to prevent it from vibrating loose.



(LCS850 & LCS850-F ONLY)

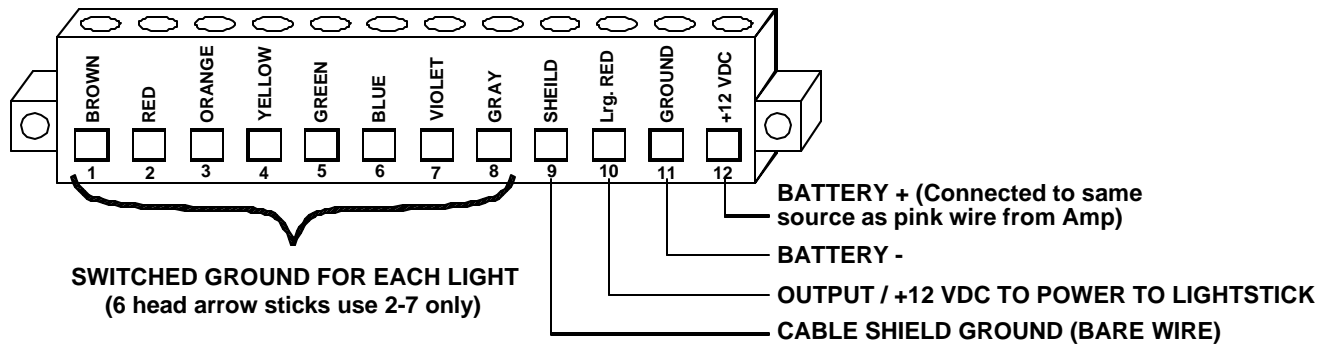
Ground: Connect to good chassis ground, or the negative of the vehicle battery. It is imperative that you supply a ground wire to the terminal marked "bat -" on the controller; you must **not** let the controller's case supply ground.

Large Red: This is the +12V output to supply power to the arrow stick.

Shield: This is the bare wire cable shield for the arrow stick. If there is no shield wire in the arrow stick you are using, leave this terminal open.

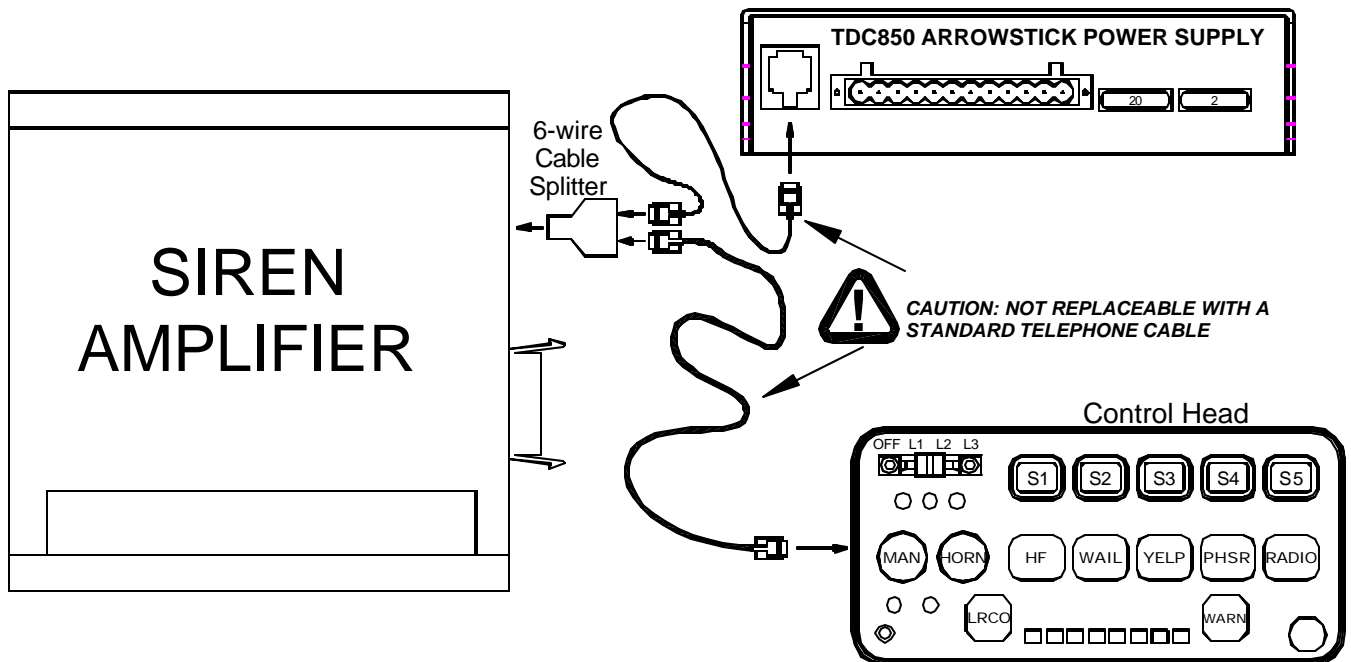
Brown – Gray: Connect to the ground-side of each light in the arrow stick. (Colors will coordinate with all Star/SVP arrow stick products).

+12 VDC: Connect this terminal to the same *fused*, +12 VDC source as the pink wire from the amp is connected to (see page 9). **NOTE:** This terminal must be connected to the same +12VDC source as the pink wire in order to prevent inadvertent momentary activation of one or more of the lights in your traffic director. The lamp brightness will be somewhat diminished if a large voltage drop exists between the vehicle's battery and the controller. If voltage drop is a problem, use a relay to control a direct battery feed. A generic relay designed for automotive lamp service should be available from most automotive stores for this purpose. If using a relay, don't forget to **fuse the feed and signal wires** at their source, with appropriate values. For non-LED arrow sticks, use 12 AWG wire for all power and ground connections.



(LCS850 & LCS850-F ONLY)

A communications cable splitter is provided with the LCS850 unit. Using the communication cables, plug both the Arrow stick box and the control head into the cable splitter, and then plug the splitter into the amplifier box. **CAUTION: Please note that these cables ARE NOT standard telephone cords and CANNOT be replaced with one.**



OPERATION

GENERAL

This unit is designed for easy operation under the stress associated with high-speed pursuit. Most light and siren functions are accessible with one simple motion of the slide switch.

LIGHT SLIDE SWITCH

The slide switch is designed for quick pursuit mode operation. The far left position (OFF) will not activate any outputs.

- **Position 1** will activate the first set of lights (connected to L1).
- **Position 2** activates both the 1st and second set of lights (connected to L1 and L2).
- **Position 1 & 2:** If you have the 1st jumper in the Arrow Stick Light Controller (for LCS850 only) set for Phantom mode, the end lights in your traffic director will flash in a high speed “warn” pattern in both positions 1 and 2.
- **Position 3** is generally used for the **FULL PURSUIT MODE**. It allows for a quick procedure that will activate both the lights and the siren in one motion.

When the slide switch is moved to **Position 3**, the following will activate:

- All three sets of lights (Connected to L1, L2 and L3 - Each output is protected with a 20A fuse)
- The siren (Wail mode)
- All of the Traffic Director lights will flash in a random flicker flash pattern (see page 5).

- **Position 3:** The siren and the arrow stick may be disabled in the pursuit mode during installation if desired. (Refer to the **INSTALLER SELECTABLE OPTIONS** section on page 3).



LIGHT PUSH BUTTON SWITCHES

Five push button switches are provided to enable five separate functions. The far left push button (possibly L. Alley) will control the item(s) connected to S1. The second push button (possibly R. Alley) will control the item(s) connected to S2. The third push button (possibly Takedown) will control the item(s) connected to S3. The fourth push button will control the item(s) connected to S4 (possibly gun lock). Each of these four outputs is protected with a 20A fuse. The fifth push button will control a relay or other low current (2A or less) device connected to the orange wire of the siren harness. This button may be connected to the horn ring transfer relay if you desire to switch that feature on and off. It may also be connected to an external relay for activating a high current device.

SIREN OPERATION:

The seven push buttons across the middle of the control head allow full siren operation. When not activated, these buttons are backlit in green for nighttime viewing. When activated, an audible beep is heard, and the backlighting turns red.



- Manual (MAN):** In the Hands Free Mode, this momentary push button switch provides a manually activated Wail siren tone while being pressed. With the Wail, Yelp, or Phaser mode selected, this switch provides a generally quicker changing tone (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 manual button again, reverts the siren back to the original tone. Optional configuration allows the replacement of the Phaser tone with Two-Tone, or the disabling the Phaser tone entirely. These options are selected during installation and may be governed by State or Local laws. (Refer to the **INSTALLER SELECTABLE OPTIONS** section on page 4).
- Air Horn (HORN):** 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 high noise areas. This tone will override all other siren tones.
- Hands Free (HF):** Also known as Horn Ring Cyler, allows the user to cycle through Wail, Yelp, Phaser, and Standby by repeatedly pressing the horn or other switch connected to the AUX input. Operating any other mode resumes normal operation. Please note that this mode disables the Manual (MAN) push button selection when a Wail, Yelp, or Phaser tone is cycled to.
- WAIL:** A normal rise-fall tone used on highways and areas with low traffic or constant traffic flow.
- YELP:** A rapid warble tone used in light to moderately congested areas.
- Phaser (PHSR):** Ultra-fast warble one used for maximum attention in highly congested areas.
- RADIO:** Also known as Radio Repeat, this function amplifies a radio speaker input for re-broadcast outside the vehicle through the siren speaker(s). PA is available, but no siren tones are available in this position.

Siren Mode Selected:	Speaker Output:	Activating the Green Auxiliary Wire Changes the Speaker Output to:
WAIL	Wail	Air Horn
YELP	Yelp	Air Horn
PHSR	Phaser	Air Horn
HF (Hands Free)	No Output	Steps through from Standby to Wail to Yelp to Phaser then repeats.
Radio	No Output	Air Horn
NONE	No Output	Air Horn

(NOTE: PHASER and TWO-TONE may be optionally swapped or disabled via program jumpers. See INSTALLER-SELECTABLE OPTIONS on pages 3 and 4.)

Siren Mode Selected:	Speaker Output:	Pressing the Manual Push button Changes the Speaker Output to:
WAIL	Wail	Yelp
YELP	Yelp	Phaser
PHSR	Phaser	Two-Tone
HF (Hands Free)	No Output	Creates a manual WAIL tone while button is being held that stops immediately when the button is released.
Radio	No Output	No Output
NONE	No Output	Creates a manual WAIL tone while button is being held that sweeps down when the button is released.

(NOTE: The auxiliary wire may be optionally selected to duplicate the Manual push button instead of the Horn. See INSTALLER-SELECTABLE OPTIONS on pages 3 and 4.)

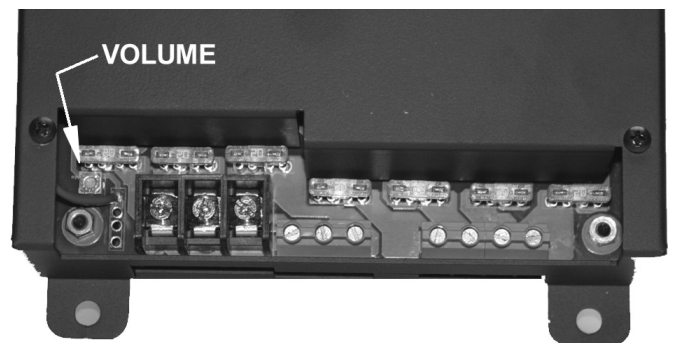
ARROW STICK PUSH BUTTON SWITCHES (LCS850 & LCS850-F only)



The LRCO push button toggles the arrow output through a different pattern with each push. (Left arrow, Right arrow, Center out arrow, and Off). The Warn button will override the LRCO button, and immediately produces a warning pattern on the arrow stick. The eight LED's in between the two buttons provide real time user feedback as to the output of the arrow stick.

RADIO REPEAT VOLUME

The radio repeat volume is located within the rear access cover of the amplifier. 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. Press the RADIO button of siren controls. Using a small flat blade screwdriver, adjust the potentiometer as desired.



PA VOLUME



The PA volume control is provided for public address volume. This is in the bottom left corner of the control head. Insert a small, flat blade screwdriver into the PA volume adjustment port. Turn counter-clockwise direction to increase the sound level.

MICROPHONE

The integrated noise-canceling 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. It provides the same operation as pressing the Horn button. NOTE: This may be changed to provide the same operation as the Manual button instead of the Horn button. (See INSTALLER-SELECTABLE OPTIONS on pages 3 and 4.)

PARK KILL (CUTOUT)

During installation, the Park Kill input may be connected to a door switch. It will automatically turn 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 switch or input will restore normal function.

SPEAKER DIAGNOSTICS

There are two diagnostic LED's located in the lower left portion of the remote head controller. These LED's will only turn on while a tone is trying to be generated. The status of the speakers is indicated as follows:

- Steady** - Speaker is connected and operating properly.
- Flashing** - There is an electrical short in the speaker or wires to the speaker.
- Off** - No speaker is connected, or
 - The siren is not activated to output a tone to the speaker, or
 - The speaker or wire connection is loose or is electrically open

SERVICE

TROUBLESHOOTING

Symptom	Possible Cause	Check
No power	No power supplied to +12 terminal block inputs in amplifier. Connector loose Amplifier 20A fuse or 5A fuse blown Loose connection at power source	Does back-lighting come on? 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 - 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?
No siren tone - No sound	Bad speaker or speaker wiring	Does either speaker diagnostic LED flash? Check for a short. Does neither speaker LED turn on steady? Check for an open.
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 used and wired properly? Input voltage must be between 10 & 16 volts while siren is on.
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? Loose connection on a power lead? The input must be greater than 10V w/ the siren turned on. 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 function stuck on	Siren push button switch stuck Aux. Input improperly connected Aux. Input Polarity Option set wrong	Does the Siren switch return fully when released? Is the AUX Input used and wired properly? Is the AUX 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? Have you tried turning the Radio volume control?
No or Low Radio	Radio outputs not isolated and polarity hooked up backwards	Are the radio wires connected to the correct polarity from the radio output?
Wrong siren tone	Two-Tone option jumper installed Aux. Input set to wrong function	Is the TT jumper option properly configured? Is the AUX jumper option configured properly?
Phaser not working	Phaser disabled	PD jumper option configured properly?
Lights not working	Overloaded or short circuit	Check fuse. Check wire connections.
Arrow stick not working Erratic arrow stick pattern Or 1 st or 8 th head not working	Fuse blown Arrow stick option jumpers not set properly Poor connection	Check fuses on arrow stick control box. Check communication cable. Is the 6 head stick option selected? Is 8 head stick option not selected? Is green connector screwed in tight to lock into arrow control box? Are all 12 terminal block connections tight?

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.

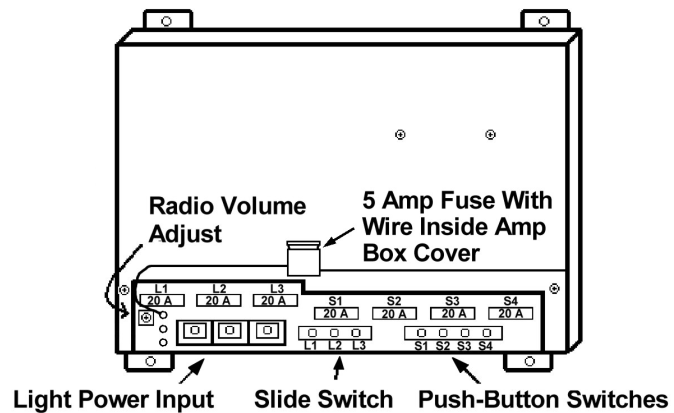
THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL SIGNAL VEHICLE PRODUCTS BE LIABLE FOR ANY LOSS OF PROFITS OR ANY INDIRECT OR CONSEQUENTIAL DAMAGES ARISING OUT OF ANY SUCH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

RETURNS

If you have any questions concerning this or any other SVP product, please contact our **Customer Service Department** at (585) 226-9025. If a product must be returned for any reason, please contact our Customer Service Department to 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.

SERVICING FUSES

The fuse panel is accessible by loosening the two screws in the cover plate on the amplifier. All high current light outputs are protected with a 20A automotive blade fuse. Refer to above diagram for proper fuse location. The control head is protected with a 5A automotive blade fuse located in the amplifier fuse panel. The HRT is protected internally with a 2A self-resetting fuse, that will self reset once the short is removed.



PARTS

Part	Description
LCS850-AMP	Amplifier Only
LCS800-CH	Remote Control Head for LCS800
LCS850-CH	Remote Control Head for LCS850
TDC850	Arrowstick Power Supply (LCS850 only)
SWH-43A	Amp Wiring Harness
30008-22	25' Communication Cable Between Control Head and Amp*
30008-30	7' Communications Cable Between TDC850 and Amp (LCS850 only)*
30041-69	Control Head/TDC850 Splitter for Communications Cable (LCS850 only)
P30235-5	Siren/Light Amplifier Top Cover
P30234-5	Siren/Light Amplifier Bottom Mounting Plate
P30235-5-1	Amplifier Access Cover
P30053-31	Amplifier Case Screws
P30028-8	5 Amp Automotive Blade Fuse for Control Head
P30028-1	20 Amp Automotive Blade Fuse for Amplifier
P30032-8	TIP36C Power Transistor
P30232-1	Noise Canceling Microphone
P30208-10	Microphone Strain Relief
P30069-38	Microphone Bracket with Screws

* **CAUTION:** These are not a standard telephone cables and CANNOT be replaced with one.

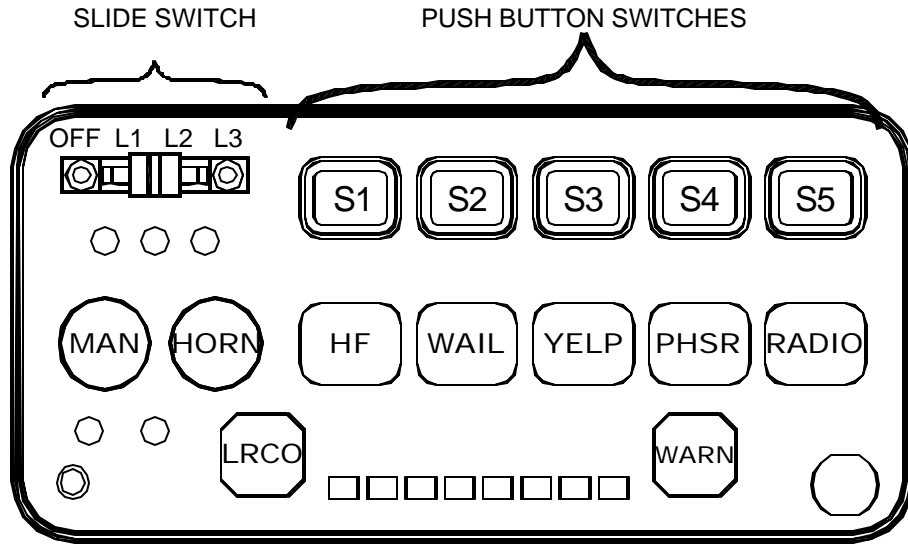
SPECIFICATIONS

Input Voltage	10 - 16 VDC (negative ground)
Siren Input Current	8.0 Amps @ 13.6 VDC (single 100W speaker), 16 Amps @ 13.6 VDC (dual 100W speakers)
Siren Standby Current	Less than 150 mA
Audio Frequency	200Hz - 10 kHz \pm 3db
Audio Output	40 watts @ 13.6 VDC (single 100W speaker)
Siren Output Power	105 WATTS RMS MAX. (15.0 VDC - single 100W speaker), 210 WATTS RMS MAX. (15.0 VDC - dual 100W speakers)
Siren Frequency	675Hz - 1633Hz
High Voltage Protection	16 - 18 VDC will cause siren output to temporarily cease, resume at normal
Short Circuit Current	50 AMPS (supply circuit must be capable of supplying this)
Operating Temperature	-15° F to +140°F
Siren Controls	5-illuminated push button switches (Hands Free, Wail, Yelp, Phaser, and Radio) Momentary push button Horn and Manual/Toggle switch Auxiliary input connection for remote Manual/Horn operation (jumper programmable for positive or negative horn) Park Kill input connection (jumper programmable for positive or negative activation) Phaser (and Two-Tone) disable (jumper programmable) Two-Tone activation swaps modes with Phaser (jumper programmable)
Diagnostic Indicators	Two LED indicators provide diagnostic feedback, one for each speaker
Light Controls	5 push-on/push-off buttons (1 programmable 8 sec. time delay) 4-position slide switch (Off, L1, L1 & L2, L1 & L2 & L3 & Wail)
Light Output Ratings	20A fuse on each of the 7 light outputs. (4 push buttons, 3 slide positions)
Siren Connections (12-Pin Connector) (Telephone Comm. Con.)	Detachable, 12-pin, positive locking connector with pigtail leads for Amplifier (2) Positive, (2) Negative, (2) Speaker, (2) Radio, Auxiliary, Park Kill Telephone style communication cable between Control Head and Amplifier
Light Control Connections	+12 - three position barrier style terminal block L1, L2, L3 (Slide Switch) 3-position Eurostyle terminal block S1, S2, S3, S4 (Push buttons) 4-position Eurostyle terminal block S5 (Push button) flying lead
Arrow Stick Connections	12 position, positive locking connector
Size	Amplifier: 2-1/2" High, 7" Wide, 7-3/8" Deep (plus 3/4" flange on each side) Arrow Stick Control Box: 1-9/16" H X 6" W X 4-1/2" D (LCS850 & 850-F) Control Head Face Plate: 3-5/16" High X 6-13/16" Wide X 11/16" Deep
Boxed Weight	LCS800: 8.5 lbs. LCS850: 9.25 lbs.

Use this chart to label the function of your switches.

SLIDE SWITCH FUNCTIONS

POSITION 1	POSITION 2	POSITION 3
L1 _____	L1 SAME AS IN POSITION 1 _____	L1 SAME AS IN POSITION 1 & 2 _____
	L2 _____	L2 SAME AS IN POSITION 2 _____
		L3 _____



PUSH BUTTON SWITCH FUNCTIONS

S1 _____	S3 _____	S5 _____
S2 _____	S4 _____	



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Control Head Installation Template

