

INSTALLATION AND INSTRUCTION MANUAL

LCS800-008 & LCS850-8

UNI-STAR

Command Center SIREN AMPLIFIER & LIGHT CONTROLLER



STAR
Safety Technologies by *Grote*

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

PLITSTR301 REV. M 1/23/24

Installation Information

MODEL: LCS
PURCHASE DATE: _____
DEALER: _____
INSTALLER: _____
INSTALLATION DATE: _____
AMPLIFIER SERIAL #: _____
CONTROL HEAD SERIAL #: _____
ARROWSTICK BOX SERIAL #: _____

SIREN OPTION SWITCHES

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

CONTROL HEAD 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)

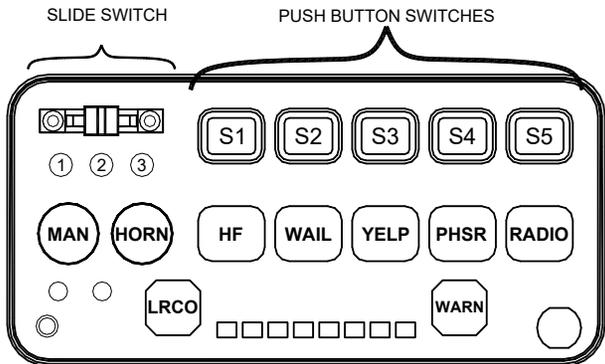
- _____ Phantom Mode
- _____ Fast rate arrow
- _____ Low power (Dim)
- _____ 6 head arrow (1 & 8 flash)
- _____ 8 head arrow
- _____ Group 2 Traveling arrow
- _____ Double blink end arrow

Please Note: These instructions are provided as a general guideline only. **Some vehicles may require special mounting, wiring, and/or weather-sealing. This is the sole responsibility of the installer.** Star Safety Technologies assumes no responsibility for the integrity of the installation for this or any of its products.

IMPORTANT: Please read all of the following instructions before installing your new light. Failure to follow these safety precautions may result in damage to your light or vehicle and may result in serious injury or death to you and your passengers.

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 _____	

Important: This product is used to warn traffic. Improper use may result in vehicular collision, personal injury and/or death. Star Safety Technologies shall not be held responsible for damages directly or indirectly caused by improper use of this product.

Table of Contents

INSTALLER INFORMATION	i-ii
GENERAL DESCRIPTION	1
INSTALLATION NOTES	2
INSTALLER SELECTABLE OPTIONS	2-7
Siren Option DIP Switches	3-5
Control Head Option Jumpers	6-7
MOUNTING	8-10
Siren Amp & Relay Control Box	8
Standard Control Head	8-9
Flange Mount Control Head	9
Microphone Bracket	10
Arrow Stick Control Box	10
ELECTRICAL CONNECTIONS	11-17
Wire Size And Termination	11
Siren Amplifier	11-12
Siren Wiring Diagram	13
Horn Ring Transfer Wiring Diagram	14
RFI Reduction	15
Input Power and Switch Output Connections	16-17
Light Wiring Diagram	17
ARROW STICK SETTINGS AND CONNECTIONS	18-22
Arrow Stick Option Jumpers	18-19
Arrow Stick Wiring	20-22
LABEL INSERTION	22
OPERATION	23-26
General	23
Slide Switch	23
Push Button Switches	23
Siren Mode Buttons	24
Arrow Stick Push Button Switches	25
Radio Repeat Volume	25
PA Volume	25
Microphone	25
Auxiliary Input	26
Park Kill	26
Speaker Diagnostics	26
Fuses	26
SERVICE	27-30
Troubleshooting	27
Parts	28
Specifications	28
Warranty	29
Returned Materials Authorization (RMA) Form	30
FLANGED CONTROL HEAD TEMPLATE	31

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 a 2A in-line fuse. CAUTION: These protection features will not guard against overloading the outputs.

There are currently four different sirens in the LCS800 series:

- LCS800-008** 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-F8** Flange mount version of the standard LCS800
- LCS850-8** Enhanced version with all the standard controls plus arrow stick controls. Also includes the arrow stick control box.
- LCS850-F8** Flange mount version of the standard LCS850

Installation Notes

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 a safe place for future reference. Advise the vehicle operator of the location.

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 - Label Set
- 1 - RFI Filter
- 1 - Installation and Operating Instructions
- 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 style cable) (LCS850 models only)
- 1 - Communication Cable Splitter (LCS850 models only)
- 1 - 12" Communication Cable (LCS850 models only)

Installer Selectable Options

The LCS800 and LCS850 have several options that can be selected during installation. Jumpers and DIP switches 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 DIP Switches (located in the amplifier case):

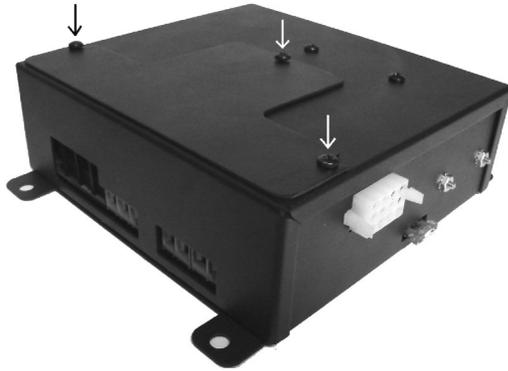
- Auxiliary input polarity
- Park Kill input polarity
- Two-tone replacement of Phaser tone
- Phaser Disable
- Slide Switch Pursuit Disable

Control Head 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

SIREN OPTION DIP SWITCHES Amplifier Cover Removal

Loosen the three **protruding** Philips head screws located on the **top** of the amplifier unit. Slide the cover off.



CAUTION:
DO NOT OVER
TIGHTEN SCREWS!

Auxiliary Input Polarity

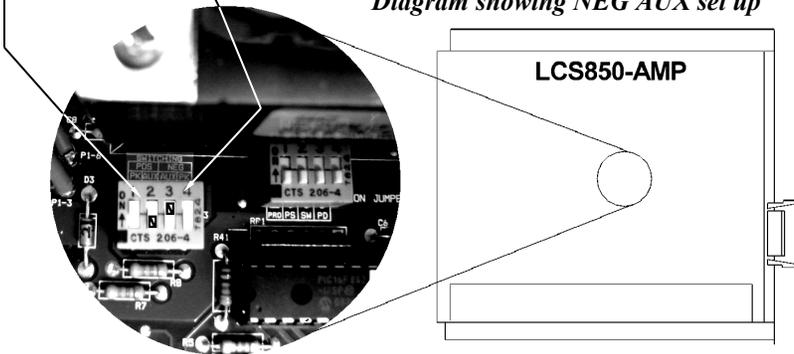
Applying a positive voltage to the green wire normally activates the auxiliary function (Air Horn standard/MANUAL function optional).

The wiring diagram on page 13 shows both connection examples.

To have the AUX function instead activate when the green wire is connected to ground (negative).

1. Turn "AUX POS" DIP switch off.
2. Turn "AUX NEG" DIP switch on.

Diagram showing NEG AUX set up

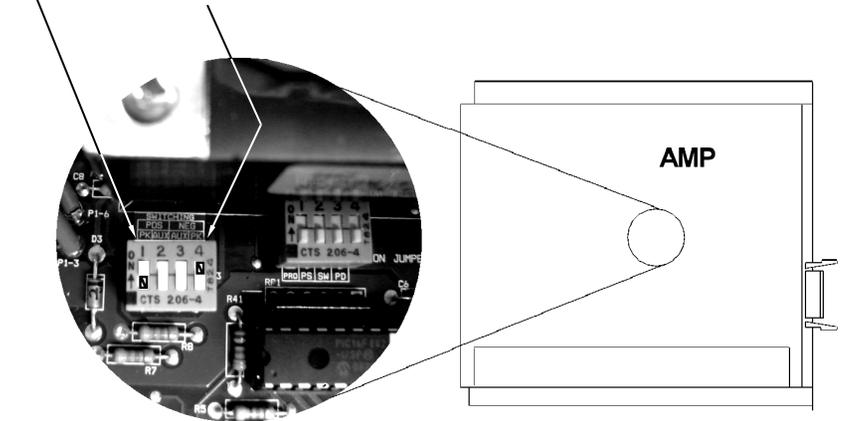


Park Kill Input Polarity

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 13 shows two connection examples.

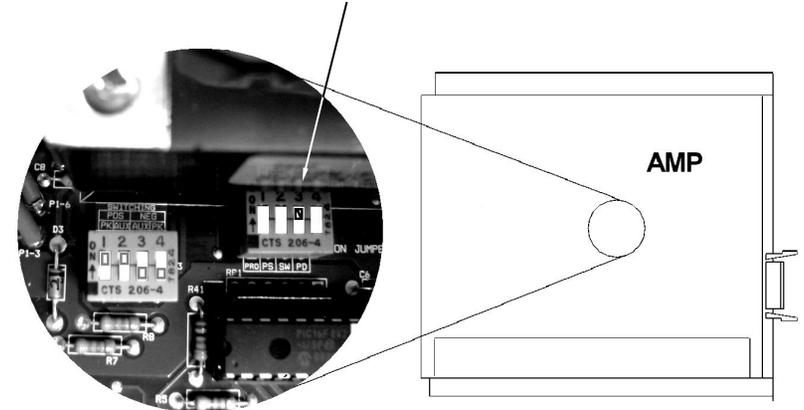
Connecting the white wire to positive (+12 VDC) normally activates the Park Kill input. To instead have it activate when the white wire is connected to ground (negative):

1. Turn "PK POS" DIP switch off.
2. Turn "PK NEG" DIP switch on.



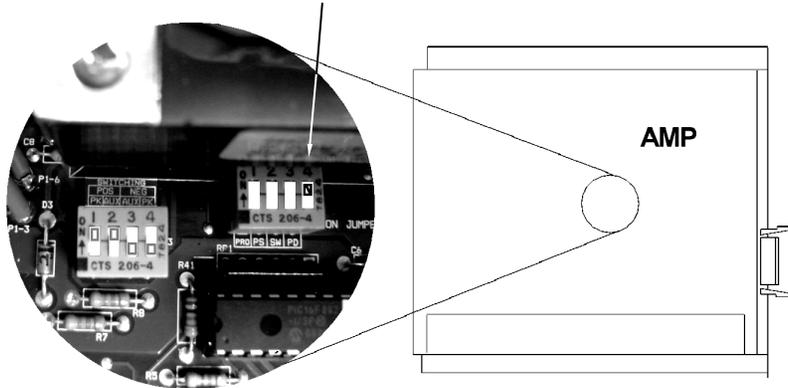
Two-Tone

If desired, the Phaser sound can be replaced with a Two-Tone sound. This can be done by turning on (up position) DIP switch #3 in the amplifier (labeled SW).



Phaser Disable

The Phaser function can be completely disabled by turning on (up position) DIP switch #4 in the amplifier (labeled PD). **This will also disable the MAN button while the siren is in Phaser mode** (which normally would produce a Two-Tone sound).

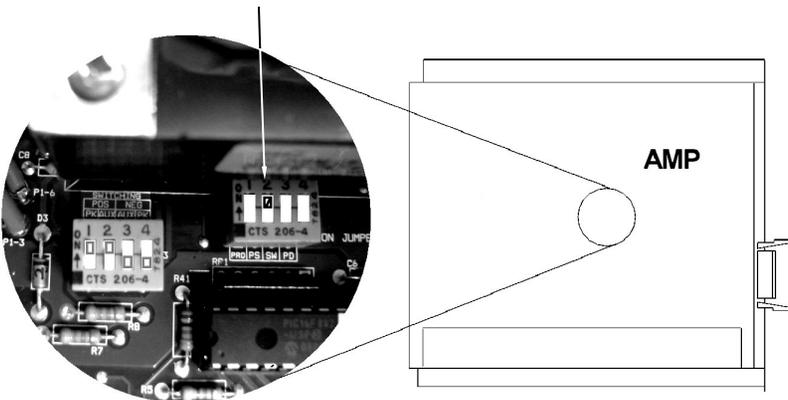


Pursuit Disable

Slide switch position 3 normally activates:

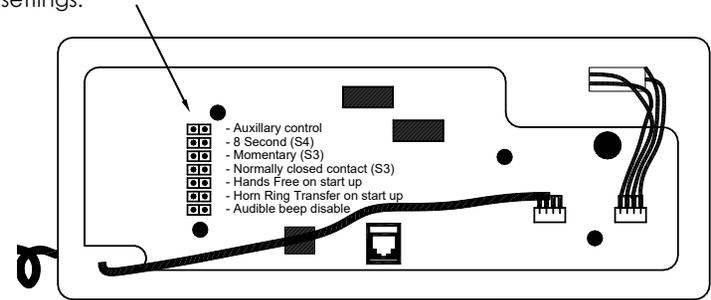
- All three light functions (L1, L2, & L3)
- The siren (into the Wail mode)
- Warn pattern on the Arrow Stick (LCS881 series only)

To disable the automatic activation of the siren and Arrow Stick, move DIP switch #2 in the amplifier (labeled PS) to the "UP" position.



CONTROL HEAD OPTION JUMPERS

Seven jumpers located inside the control head can be used to select various options. Review the chart below to determine if you want to change any of the default settings.



<u>Jumper</u>	<u>Standard Setting</u> <i>(jumper on both pins)</i>	<u>Optional Setting</u> <i>(jumper only on one pin)</i>
Auxiliary Control <i>(Horn vs. Manual)</i>	The green auxiliary (AUX) wire in the siren amplifier harness is connected to the vehicle horn ring, and activates the siren's AIR HORN for all siren modes except Hands Free (HF) mode.	AUX wire duplicates the function of the MAN push button instead of the HORN.
8 Second (S4)	Push button S4 is a standard ON/OFF button.	S4 used for Gun Lock - Stays activated for only 8 seconds when pressed.
Momentary (S3)	Push button S3 is a standard ON/OFF button.	S3 becomes a momentary switch, thus only being active while being held in.
Normally Closed Contact (S3)	Push button S3 is normally an open contact (OFF), that closes when pressed (ON).	S3 becomes a normally <u>closed</u> contact (ON) that <u>opens</u> (OFF) when pressed.
Hands Free On Start-Up	Siren in Standby mode when powered up.	Siren in Hands Free Mode when powered up.
Horn Ring Transfer On Start-Up	If you connect the Horn Ring Transfer option, it is OFF when the siren is powered up. Pressing push button (S5) automatically activates the HRT option.	HRT is ON when the siren is powered up. Pressing S5 will deactivate the HRT option.
Audible Beep Disable	An audible beep is heard when the buttons in the control head are pressed.	No beep when the buttons in the control head are pressed.
S3 Auto Activate	S3 not affected by slide switch.	S3 automatically activates (ON) when the slide switch is in positions L2 & L3 and turns off when the switch is moved back to L1 or OFF. <i>Please note: <u>Only</u> the S3 button can be programmed with this option. It is not available for any of the other buttons.</i>

(Installer Selectable Options CONT'D)

If you are NOT changing any of the options described on the previous page, skip this section.

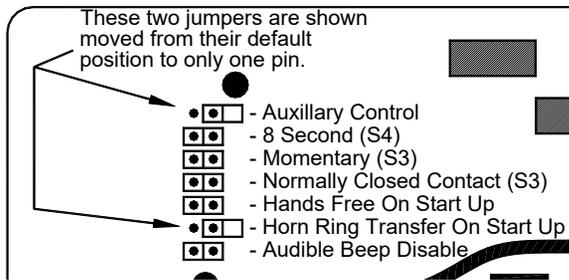
Control Head Cover Removal

- 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.

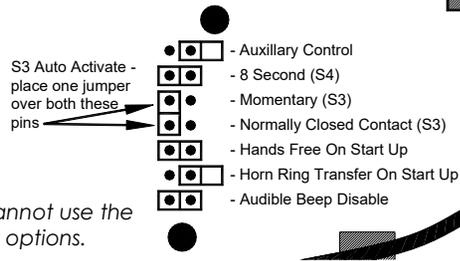


Setting the Jumpers

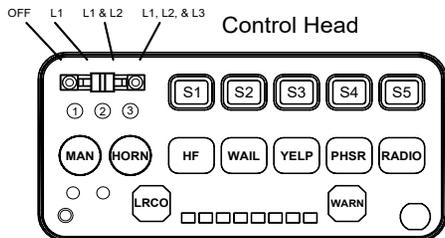
To change any of the options indicated on the previous page, move the corresponding jumper from both pins to only the right pin as shown in the diagram to the right.



To change the **S3 Auto Activate** option, completely remove the Momentary (S3) jumper. Then take the Normally Closed Contact (S3) jumper and place it across the first pin of both options as pictured to the right.



Note: If you are using this option, you cannot use the Momentary or Normally Closed Contact options.



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.



Mount the amplifier unit through the four 1/4" holes located in the flanges (two visible and two not shown in the picture to the right).

STANDARD CONTROL HEAD (MODELS LCS800 & LCS850)

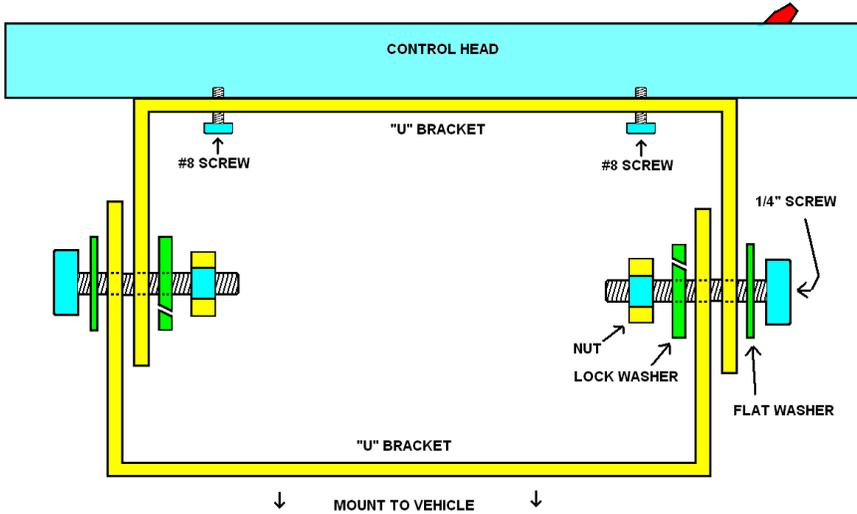


The standard control head can be mounted using the adjustable "U" bracket provided, or directly mounted to a plate or other flat surface. Select a location such as the dash, the overhead console, or a center console. Choose a mounting location convenient to the operator and away from any air bag deployment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

(Mounting: Standard Control Head CONT'D)

The standard control head comes with two interchangeable "U" brackets.

1. Mount one of the "U" brackets to your vehicle using installer-supplied hardware.
2. Attach the second "U" bracket to the backside of the control head using the two #8 screws provided.
3. Use the two 1/4" screws, two flat washers, two lock washers, and two nuts provided to attach the two U-brackets together as pictured below. Make any final adjustments before tightening the hardware.



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

The flange control head is designed to be flush mounted. Select a location that has at least two inches of depth to accommodate the control head and cables.



1. Mark the mounting hole locations and the area to be cut out using the control head installation template provided on the last page of the manual.
2. Carefully drill and cut.
3. After the option jumpers are set (see pages 6-7), connect the communication cable.
4. Mount the control head through the holes in the flange using the four #8 screws provided.

(Mounting CONT'D)

MICROPHONE BRACKET MOUNTING

A metal clip is provided for mounting the microphone.

Drill two 1/8" holes and install the bracket using the two #6 screws provided.



ARROW STICK CONTROL BOX MOUNTING (MODELS LCS850 and LCS850-F only)

- Review the Arrow Stick Settings and Connections (pages 18-22) section for details on any option jumper settings prior to installing this control box.
- The TDC850 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.
- The arrow stick controller comes 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.



Siren Electrical Connections

WIRE SIZE AND TERMINATION

- The wiring diagrams on pages 13 and 17 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 be made directly to the negative of the vehicle battery. If not possible, connect only to substantial chassis components.
- Install and check all wiring before connection to vehicle battery. SEE TABLE BELOW FOR CORRECT WIRE SIZING!
- All conductors should be constructed of stranded copper with thermoplastic insulation.



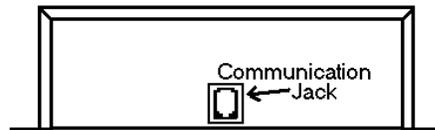
CAUTION: All wires should be rated for at least 125% of their maximum current load. All wires connected to the positive terminal of the battery should be fused at the battery for their rated load. The load can be calculated by adding all lamp wattages and dividing by 13. Load (Amps) = Total Watts / 13 volts. Do not use 1/4" diameter glass fuses, as they are not suitable for continuous duty above 20 amps.

RECOMMENDED WIRE SIZE, AMP CAPACITY & CONSTRUCTION

Ampacity Range	SAE Wire Size	Gauge/No. of Strands
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

SIREN AMPLIFIER

Communication between the control head and the amplifier is made via a communications cable using an RJ11 jack located on the opposite side of the power connector. **CAUTION: Please note that the cable used IS NOT a standard telephone cord and CANNOT be replaced with one.**

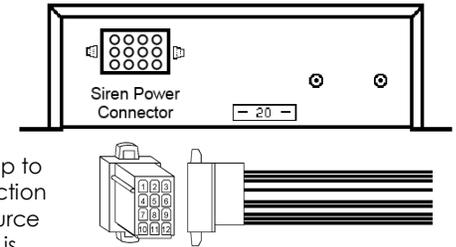


Make all electrical connections to the power connector before installing the connector on the unit.

If the unit needs service, both the communication cable and the power connector can be easily removed without unwiring the connector.

(Electrical Connections: Siren Amplifier CONT'D)

Siren electrical power connections to the amplifier are made using a removable connector located on the back of the amplifier case.



The power supply to 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 on the next page shows detail of how to wire the connector on the amplifier to the vehicle.

Make all electrical connections to the power connector before installing the connector on the unit.

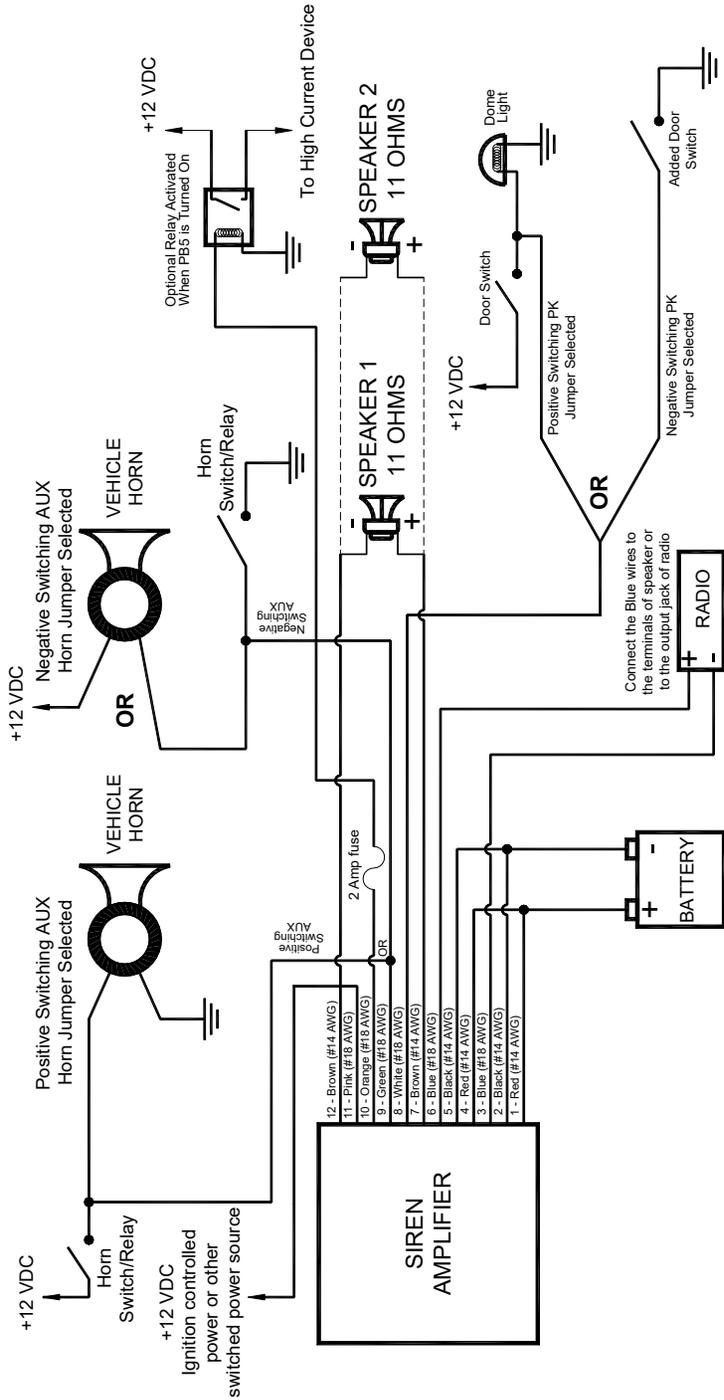
Siren Wiring Connections:

- BLACK LEADS:** (GROUND) - Connect BOTH black wires to the negative of the battery, or to a good chassis ground. Be sure to use minimum size #14 AWG wire.
- RED LEADS:** (POWER/+12VDC) - Connect BOTH red wires to the positive of the battery, or to a high current power buss. Be sure to use minimum size #14 AWG wire.
- BROWN LEADS:** (SPEAKER) - Connect one lead to each terminal or lead of the speaker. **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.**
- PINK LEAD:** (IGNITION SWITCHED POWER) - Connect the pink wire to your ignition-controlled power (or other switched power source). This will turn the power to your unit on and off.

Siren Optional Connections:

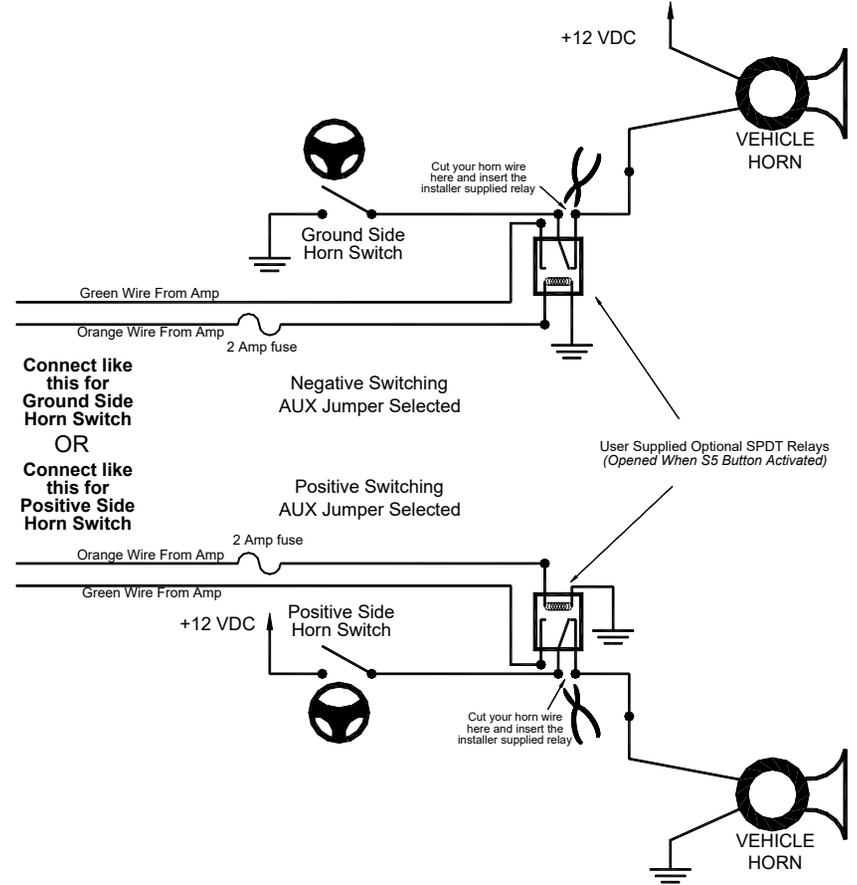
- BLUE LEADS:** (RADIO REPEAT) - Connect one blue lead to each terminal of the two-way radio speaker or output connector of the radio. Use #18 AWG wire.
- GREEN LEAD:** (AUX) - Use if you would like to activate the siren's AIR HORN when the vehicle horn is pressed. Connect to horn ring circuit or other remote switch. Circuit may be positive or negative with proper jumper selection. See **Auxiliary Input Polarity** section on page 3 for jumper details. **NOTE:** Cut lead short if not used & insulate with electrical tape. Optionally this may be used to mimic the Manual button function when the vehicle's horn is pressed. See **Auxiliary control** on pages 6-7 for Control Head jumper setting.
- WHITE LEAD:** ((PARK-KILL) - Connect to dome light or added door switch. Circuit may be positive or negative with proper jumper selection. See **Park Kill Input Polarity** section (page 4) for jumper details. **NOTE:** If not used, cut lead short and insulate with electrical tape.
- ORANGE LEAD:** (HORN RING TRANSFER or LOW CURRENT OUTPUT) - **You only need to connect this wire if you will also be connecting the green AUX wire to your horn ring circuit, thus enabling the driver to control the siren functions by using the vehicle horn.** This output is controlled by pushbutton switch S5 and it temporarily deactivates the vehicle's horn. This allows the use of the horn ring switch without actually sounding the vehicle's horn. Connect the Orange wire to the Horn Ring Transfer Relay as shown the **HRT Wiring Diagram** on page 14. **NOTE:** If not used, cut lead short and insulate with electrical tape.

Siren Wiring Diagram



Wiring Diagram for OPTIONAL Horn Ring Transfer (HRT)

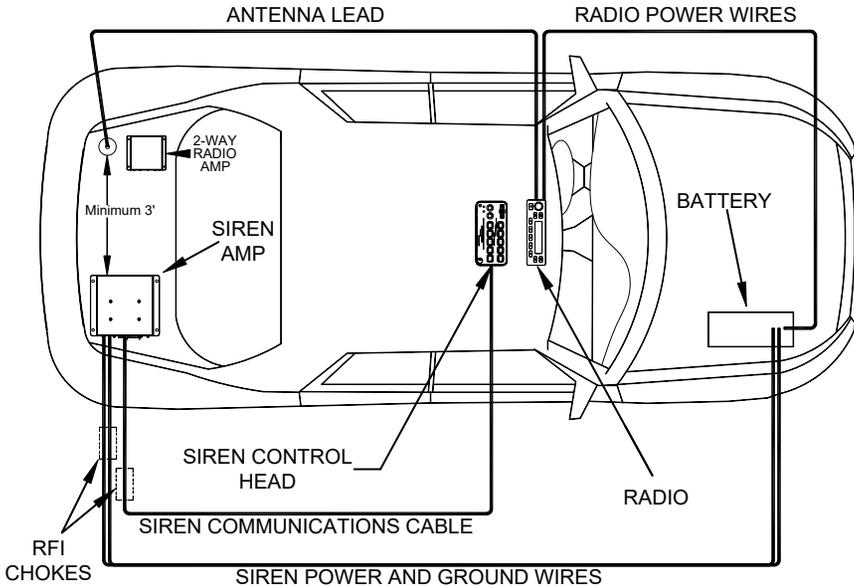
Use this wiring diagram if you are connecting the Orange wire to utilize the Horn Ring Transfer Feature. This feature de-activates the vehicle horn while pushbutton switch S5 is activated. The diagram below shows wiring for both positive and ground-side switched horns, using an installer-supplied relay.



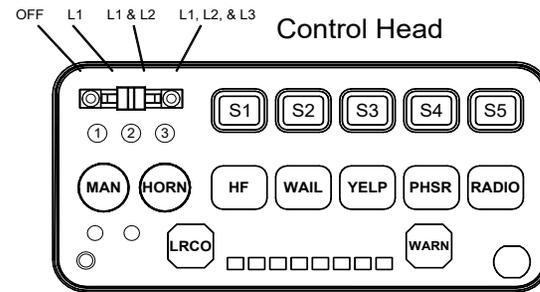
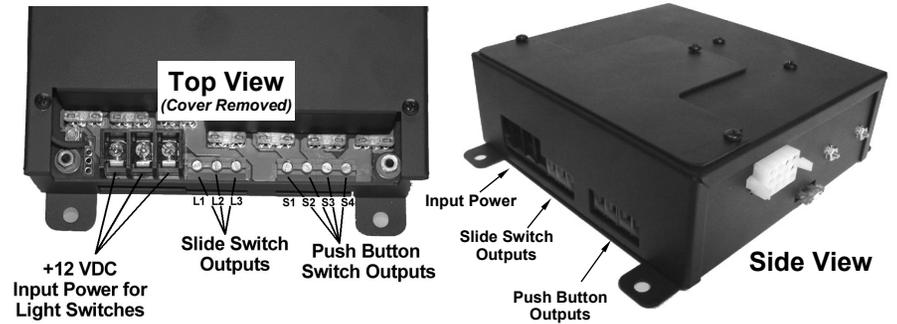
RFI REDUCTION AND RFI CHOKE INSTALLATION

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 amplifier as far away from the police radio 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. The RFI choke (STAR P/N: P30039-57) should be placed around the communications cable at the back of the siren amplifier box.
6. For additional protection, a second (optional) RFI choke (not included) can also be placed around the Red and Black wires exiting the siren amplifier box.



INPUT POWER AND SWITCH OUTPUT CONNECTIONS



(REFER TO LIGHT WIRE DIAGRAM ON NEXT PAGE, AS WELL AS TO WIRE SIZE TABLE ON PAGE 11 FOR PROPER WIRE SIZES!)

The electrical connections for input power, slide switch outputs, and the push button outputs are made to the control box (amplifier) using terminal blocks (top diagram above).

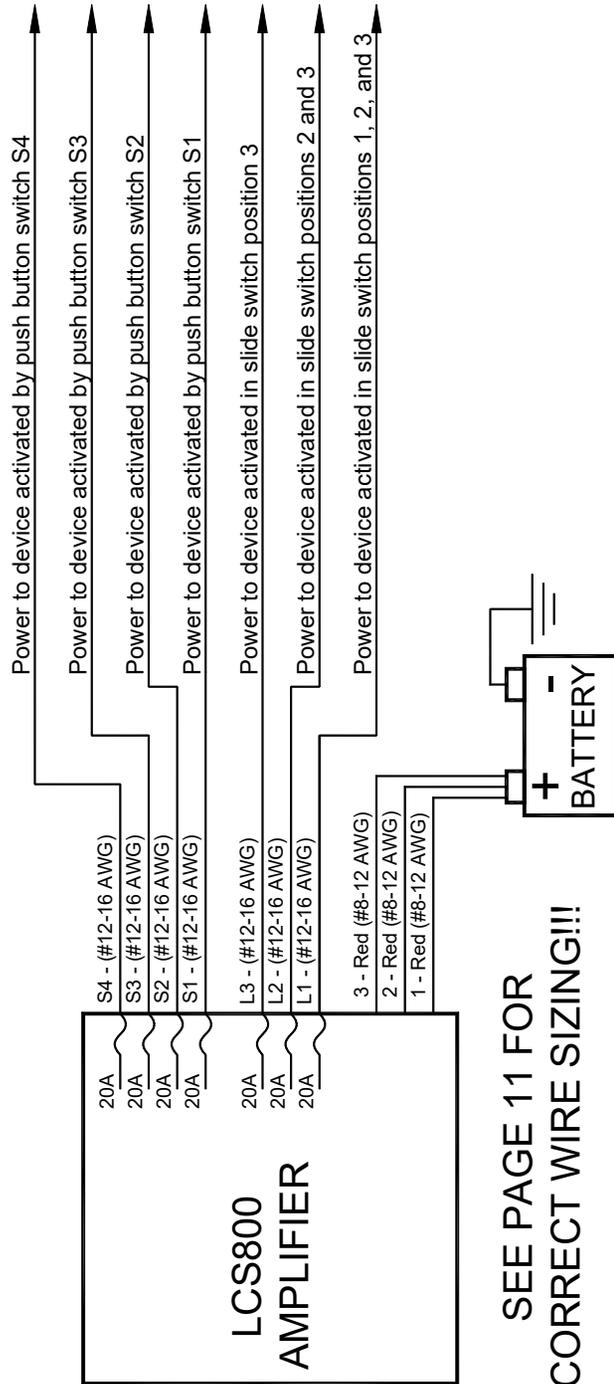
Input Power: (Left Terminal Block) Connect +12VDC to the 3 large barrier style terminals. When controlling lights with a large amount of current (>15A) power should be supplied to all three inputs.

Slide Switch Outputs: (Center Terminal Block) Connect the lights that you wish to activate in the corresponding slide switch positions to the L1, L2, and L3 outputs (20A max each). (Note: the second slide switch position activates both L1 and L2 and the third slide switch position activates L1, L2, and L3).

Push Button Outputs: (Right Terminal Block) Connect the lights that you wish to activate with corresponding pushbutton switches S1-S4 to the S1-S4 outputs (20A max each).

S5 Output: Push Button S5 switches low current power (2A or less) to the Orange wire in the wiring harness. It has an in-line 2A fuse. Typically the horn ring transfer relay is connected to this switch. This output should be connected to an external relay if more than 2 amps is required.

Light Wiring Diagram



SEE PAGE 11 FOR
CORRECT WIRE SIZING!!!

Arrow Stick Settings and Connections (LCS850 series only)

The TDC850 controller that is shipped with the LCS850 has been designed so that it can operate three different styles of traffic directors:

- **Independently Switched Heads:** Each Head is independently controlled by a ground-side switched wire.
- **3-Wire Logic Controlled Heads:** Left, Right, and Warn functions are controlled by delivering power to 3 separate wires. Center-Out function activated by delivering power to both Left and Right functions (wires) at the same time.
- **4-Wire Logic Controlled Heads:** Specifically designed for the DL15-30W. Power wire activates Warn function. Right, Left, and Center-Out functions controlled by delivering low current to 3 separate wires (in addition to Power wire).

Please review the instructions that came with your traffic director and then reference the corresponding section(s) in this manual for the type of traffic director that you will be installing.

ARROW STICK OPTION JUMPERS

Included with the LCS850 is the TDC850 arrow stick controller. There are several jumpers located inside the TDC850 that control different options for traffic directors.

Review the following section to determine if you need to open the case and change any of the jumper options inside the TDC850.

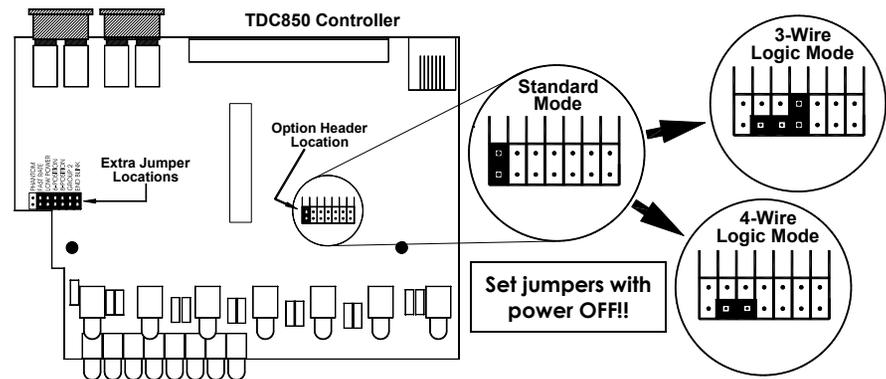
Arrow stick Control Box Cover Removal

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.



Arrow Stick Control Mode Setting

The Standard Mode is designed to control traffic directors with independently switched heads. If you have a 3- or 4-wire controlled arrow stick (as described above), check the Option Header Location and configure the jumpers as pictured below.



Jumper Options for Independently Controlled Heads

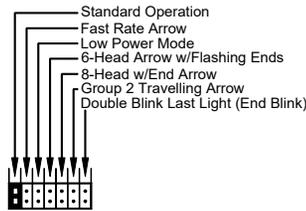
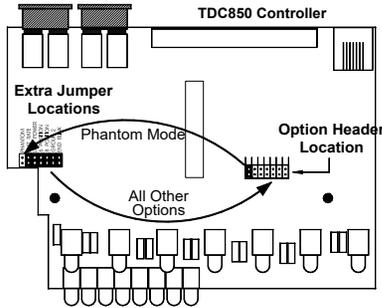
If you are installing a 3- or 4-wire logic controlled arrow stick, skip this section. The options described below only apply to arrow sticks with independently controlled heads.

Jumper Defaulted In Center Header

Phantom:

The TDC850 is shipped with the jumper in the *Standard Operation* position. In this mode, the end lights follow the normal "traffic directing" pattern you select. Optionally you can select Phantom Mode:

- In the "Phantom" mode, the end lights are **NOT** part of the "traffic directing" patterns.
- Both 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 lights will automatically flash in a "random flicker" pattern with the slide switch in position 3 (see SLIDE SWITCH on page 23).



To set your control box for Phantom mode, move the 1st jumper in the Option Header Location back to the pins labeled PHANTOM in the Extra Jumper Locations.

Jumpers Defaulted In Extra Jumper Location

To change one of these options, move one of the jumpers from the Extra Jumper Locations over to the corresponding Option Header Location.

Fast Rate Arrow:

This setting increases the flash rate of the arrow stick for high speed or high traffic areas where viewing time of the arrow is limited. In addition, selecting this option will also change the "Warn" pattern from an alternating pattern to a random pattern.

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 †:

Use this option 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.

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.

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.

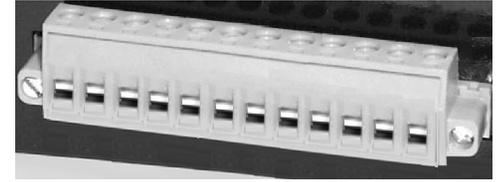
Double blink last head of arrow (end blink) †:

The last head to flash in an arrow can be optionally selected to blink twice at the end of the arrow sequence.

† - These options are disabled when the controller is in PHANTOM mode.

ARROW STICK WIRING

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 applicable terminal screws. This will open the wire entries. Make the power wire connections as described in the section that corresponds to the type of arrow stick you are connecting. Be 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.



Verify that your corresponding jumper setting shown on page 18 is correct for the type of arrowstick you are connecting and use the appropriate wiring diagram below or on the following page. All installations will require the Ground and Power connections described below.

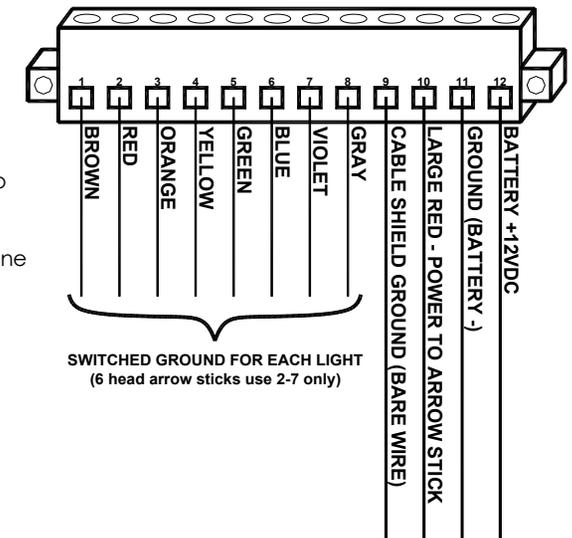
Ground: Connect to good chassis ground, or the negative of the vehicle battery.

Battery +12 VDC: Connect this terminal to the same **fused**, +12 VDC source that the pink wire from the amp is connected to (see pages 12-13). **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. For non-LED arrow sticks, use 12 AWG wire for all power and ground connections.

Arrowsticks With Independently Switched Heads



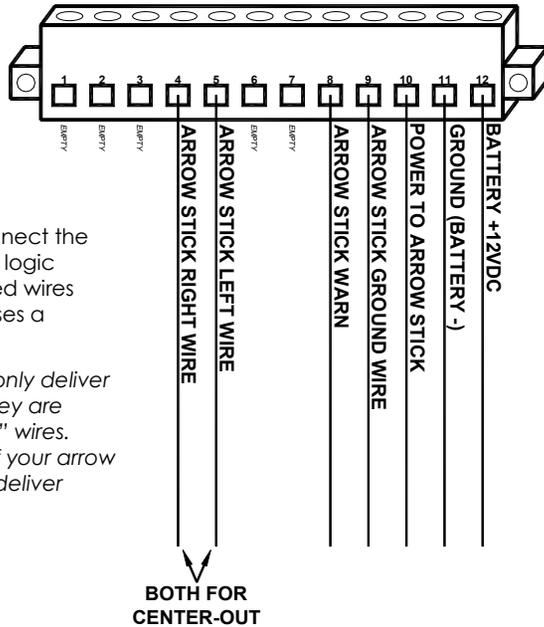
This diagram describes how to connect a standard traffic director that utilizes eight (8) ground side switched wires (one for each head).



(Arrow Stick Wiring CONT'D)

Arrowsticks With 3-Wire Logic Control

VERIFY MODE JUMPER SETTING ON PAGE 18 !!



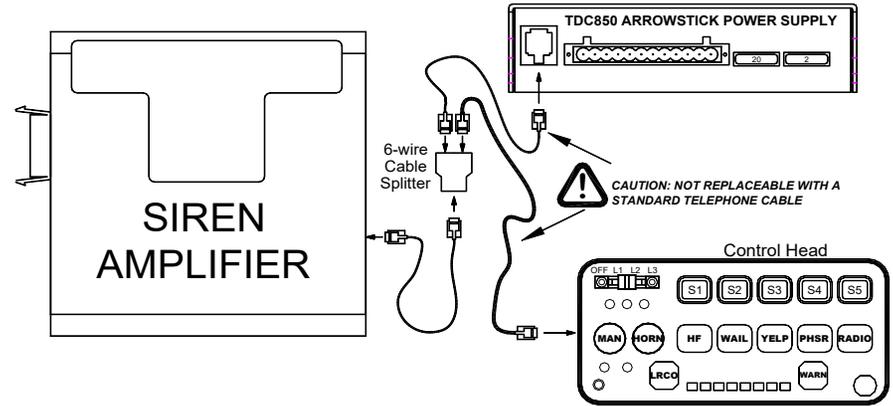
This diagram shows how to connect the wires from an arrow stick that is logic controlled by 3 positive switched wires (Right, Left, and WARN) AND uses a separate POWER wire.

Note: Terminals 4, 5, and 8 will only deliver a maximum output of 4mA. They are designed to be used as "signal" wires. You cannot use this controller if your arrow stick uses the function wires to deliver power for those functions.

(Arrow Stick Settings and Connections CONT'D)

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.

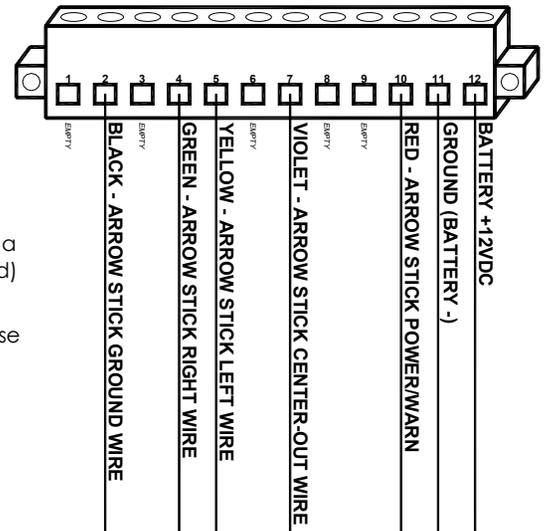
CAUTION: Please note that these cables ARE NOT standard telephone cords and CANNOT be replaced with one.



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

Arrowsticks With 4-Wire Logic Control

VERIFY MODE JUMPER SETTING ON PAGE 18 !!



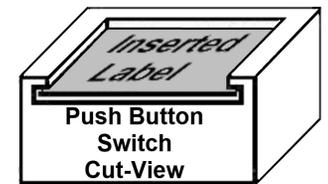
The diagram to the right shows how to connect the wires from a DL15-30W (or similarly controlled) arrow stick to the TDC850.

The colors shown represent those used in the DL15-30W harness. Wire colors may vary for other arrow sticks.

Label Insertion

Once the wire connections have been made, 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.



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.



SLIDE SWITCH

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

Position 1: Activates the first set of lights (connected to L1).

Position 2: Activates both the 1st and 2nd set of lights (connected to L1 and L2).

Position 1 & 2: (LCS850 only) If you have the 1st jumper in the Arrow Stick Light Controller set for Phantom mode (see page 19), the end lights in your traffic director will flash in a high speed "Warn" pattern in both positions 1 and 2.

Position 3: Generally used for the **FULL PURSUIT MODE**. It allows for quick activation of 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 "WARN" pattern (LCS850 series only)

Note: The auto-activation of the siren and the arrow stick may be disabled if desired. (Refer to the **Pursuit Disable** section on page 5).

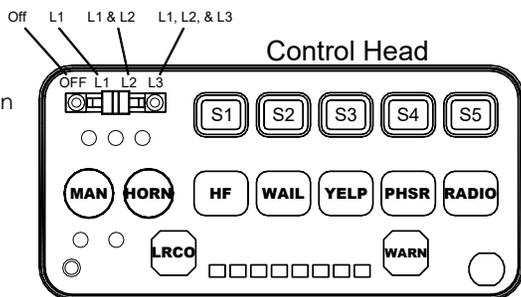
PUSH BUTTON SWITCHES

S1, S2, S3, and S4 control the devices connected to the corresponding output terminals described on pages 16-17. Press once to activate, then press again to deactivate.

Optionally, S3 can be set to be a momentary switch or normally closed (see *Control Head Option Jumpers* on pages 6-7).

Optionally, S4 can be set as a timed "Gun Lock" button (see *Control Head Option Jumpers* on pages 6-7).

S5 controls the low current device attached to the Orange wire. Typically it is used for the Horn Ring Transfer feature (see pages 12 and 14 for details).



(Operation CONT'D)

SIREN MODE BUTTONS:

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.



MAN (Manual)

This button is used to temporarily change the siren output. Review the chart below for a description of the various outputs, depending upon which mode you are in.

MAN BUTTON FUNCTIONS		
Siren Mode Selected:	Speaker Output:	Pressing the MAN 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	Radio Repeat	No Effect
NONE	No Output	Creates a manual WAIL tone while button is being held that sweeps down when the button is released.

HORN (Air 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.

HF (Hands Free):

Also known as Horn Ring Cyler, this mode allows the user to cycle through Wail, Yelp, Phaser, and Standby by repeatedly pressing the vehicle's horn or other switch connected to the AUX input (Green wire). Changing to any other mode (WAIL, YELP, PHSR, RADIO) resumes normal operation. Please note that this mode disables the Manual (MAN) button 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.

PHSR (Phaser)

Ultra-fast warble one used for maximum attention in highly congested areas.

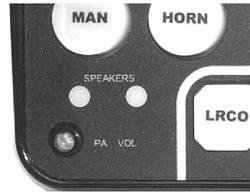
RADIO

Also known as Radio Repeat, this function amplifies a two-way 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.

Operation CONT'D)

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.

RADIO REPEAT VOLUME

The radio repeat volume is located within the rear access cover of the amplifier. This should be set during installation when the vehicle is parked. Under normal circumstances, you should not need to adjust it again.



First set the volume level of the vehicle's two-way radio to its normal operating volume. Turn on the On/Off switch of the hand held controller and press the RADIO button. The radio should be rebroadcasting through the siren speaker(s). Using a small flat blade screwdriver, adjust the potentiometer as desired.

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

The LRCO push button toggles the arrow stick 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. When used in conjunction with an arrow stick that has independently switched heads, the eight LED's in between the two buttons provide real time user feedback as to the output of the arrow stick. When used with logic controlled arrow sticks, the display "simulates" the pattern.

PARK KILL (White Wire)

During installation, the Park Kill input may be connected to a door switch. It will automatically deactivate any siren tone when the door is opened. The siren tone will remain off, even when the door is closed, until you change audio modes.

Operation CONT'D)

AUXILIARY INPUT (Green Wire)

During installation the vehicle horn ring (or other switching device) can be connected to the Auxiliary input (AUX/Green wire). Activating the AUX input will produce the same output as pressing the HORN button, and additionally allows use of the Hands Free mode (HF). Optionally, you can program the AUX function so that it mimics the MAN button rather than the HORN button. (See **Control Head Option Jumpers** on pages 6-7).

DEFAULT AUX WIRE FUNCTIONS		
Siren Mode Selected:	Speaker Output:	By Default, 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)	Standby/No Output	Steps through from Standby to Wail to Yelp to Phaser then repeats.
Radio	Radio Repeat	No Effect
NONE	No Output	Air Horn

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, or
 - There is over/under voltage.



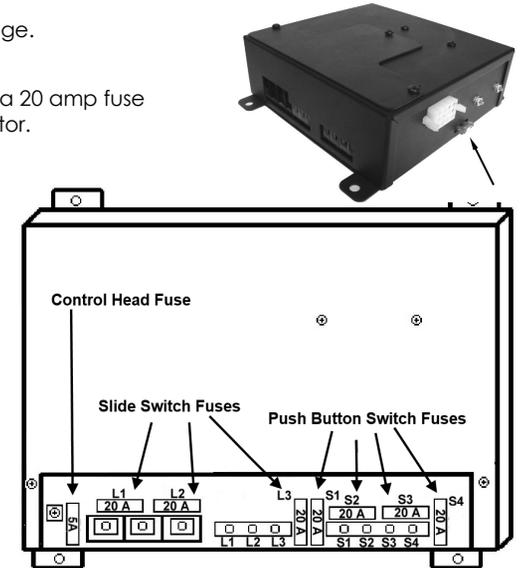
FUSES

The siren amp itself is protected by a 20 amp fuse located next to the power connector.

Each high current light output is also protected with a 20A automotive blade fuse located inside the fuse panel. The fuse panel is accessible by loosening the two screws in the cover plate on the amplifier. Refer to the diagram for proper fuse location.

The control head is protected with a 5A automotive blade fuse located in the amplifier fuse panel as well.

The HRT is protected with a 2A in-line fuse.



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	Is the 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 Using ignition switched power for arrowstick	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? Use constant power source for arrowstick, rather than one that is ignition switched

(Service CONT'D)

PARTS

Part	Description
LCS850-AMP8	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)*
P30041-188	Control Head/TDC850 Splitter for Communications Cable (LCS850 only)
SWH-140	12" Communication Cable (LCS850 only)
P30053-31	Amplifier Case Screws
P30028-8	5 Amp Automotive Blade Fuse
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

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 10 mA when ignition is off
Audio Frequency	200Hz - 10 kHz ± 3db
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	Detachable, 12-pin, positive locking connector with pigtail leads for Amplifier (12-Pin Connector) (2) Positive, (2) Negative, (2) Speaker, (2) Radio, Auxiliary, Park Kill (Telephone Comm. Con.)
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.

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, 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. Star 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.



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

If a problem with this product develops within the warranty period, please contact our Customer Service Department at (585) 226-9500. When contacting us about a product you have purchased, please have the product's serial number readily available. If the product needs to be returned, you will be issued an RMA number (Returned Materials Authorization Number). No returns will be allowed for product returns that are not listed on the RMA. Please fill out the form below and enclose it with the returned product(s).

Returned Materials Authorization Form

RMA #

Model No.

Serial No.

Purchase Date

Install Date

Customer Name: _____

Company: _____

Address: _____

City: _____ **ST:** _____ **ZIP:** _____

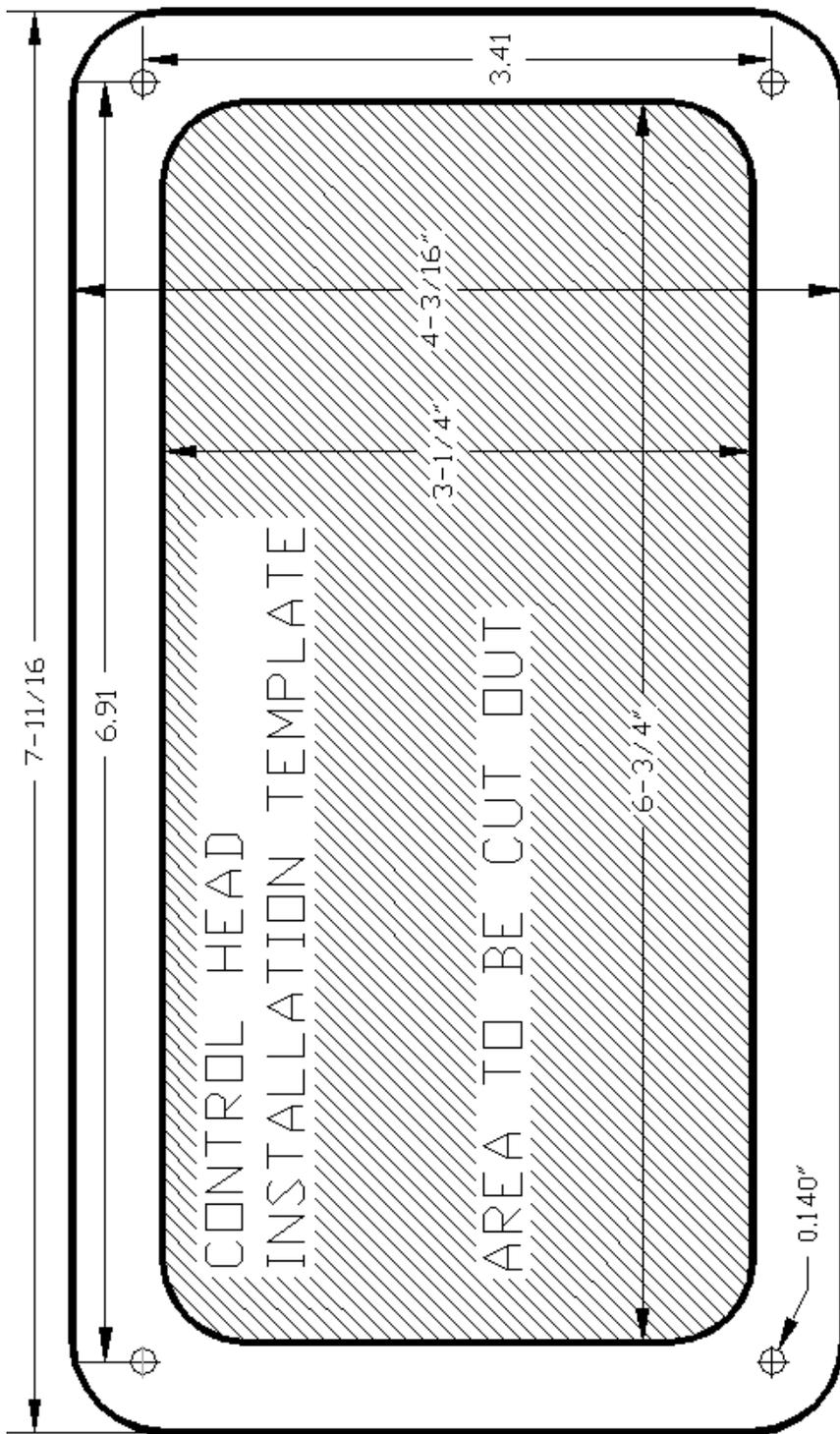
Phone: _____

Dealer: _____

Installer: _____

Briefly Describe the Problem:





STAR

Safety Technologies by Grote



PROUDLY MADE IN THE USA
An ISO 9001:2015 Certified Company