INSTALLATION AND INSTRUCTION MANUAL

LCS880-008 & LCS881-8

SIREN AMPLIFIER & HAND-HELD LIGHT CONTROLLER

PROUDLY MADE IN THE USA
An ISO 9001:2008 Certified Company

Installation Information

MODEL: LCS_____

PURCHASE DATE: _____

DEALER: _____

INSTALLER: _____

INSTALLATION DATE: _____

AMPLIFIER SERIAL #: _____

CONTROL HEAD SERIAL #:_____

ARROWSTICK BOX SERIAL #:_____

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

CONTROL HEAD OPTION JUMPERS
_____ Audible Beep disable
_____ S4 Activates S1+S2+S3
_____ Momentary S3
_____ 8 sec. gun lock (S4)
_____ Auxiliary = Manual
_____ Wail Tone Auto-Activate
_____ TD WARN Auto-Activate (LCS881 only)

ARROW STICK OPTION JUMPERS
(LCS881 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

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 _____

SLIDE SWITCH

OFF L1 L2 L3
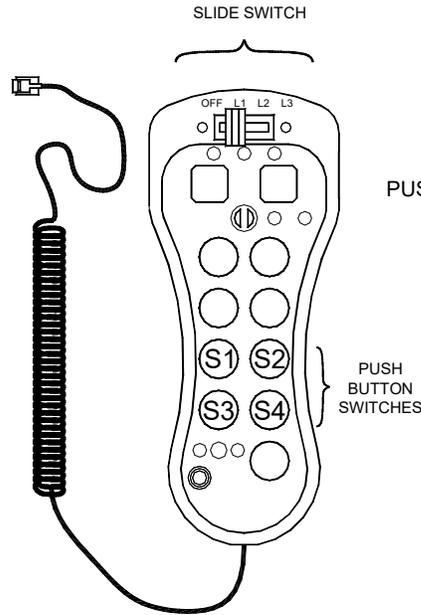
PUSH BUTTON SWITCH FUNCTIONS

S1 _____

S2 _____

S3 _____

S4 _____

S1 S2
S3 S4

PUSH
BUTTON
SWITCHES

Important: This product is used to **warn** traffic. Improper use may result in vehicular collision, personal injury and/or death. Star Headlight & Lantern Co., Inc., and its subsidiaries shall not be held responsible for damages directly or indirectly caused by improper use of this product.

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 Headlight & Lantern Co., 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 Headlight & Lantern Co., 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.

Table of Contents

General Description

The LCS880 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 hand-held 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 buttons that change color to indicate status. The face of the hand-held controller 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 LCS881 model adds an additional button for full arrow stick control.

The hand-held controller 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. There are six push buttons to operate the siren and four push buttons to control four different lighting or auxiliary functions. The LCS881 also adds an additional button for control of an arrow stick.

The LCS880 series is designed to allow maximum versatility in mounting. The hand-held controller 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 hand-held controller comes with a cradle for mounting. 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.

Siren operating modes include Wail, Yelp, Phaser, 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. Ten 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, and momentary vs. lock-on/lock-off switch operation. 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 LCS880 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 Horn Ring Transfer (HRT) output function is protected with a 2A in-line fuse. CAUTION: These protection features will not guard against overloading the outputs.

The LCS880 series is available in the following different versions:

LCS880-008   Standard version with slide switch, full siren controls, and light controls. Includes a remote hand-held controller with microphone and a siren amplifier/switch relay box.

LCS881-008   Enhanced version with all the standard controls plus arrow stick controls. Also includes the arrow stick control box.

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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 - Hand Held Controller
1 - Amplifier and Light Control Box
1 - Amplifier Wire Harness with Connector
1 - 25' Amplifier Communication Cable *(6-wire telephone style cable)*
1 - Extended Cable Adapter
1 - Mounting Hardware
1 - Label Set
1 – RFI Filter
1 - Installation and Operating Instructions
1 – TDC850 Arrow Stick Control Box *(LCS881 models only)*
1 - Arrow Stick Communication Cable *(telephone style cable) (LCS881 models only)*
1 - Communication Cable Splitter *(LCS881 models only)*
1 – 12" Communication Cable *(LCS881 models only)*

Installer Selectable Options

The LCS880 and LCS881 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 (LCS881 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)
- Audible beep disable
- Button S4=S3+S2+S1
- S3 = Momentary switch
- 8 second timed gun lock release (S4)
- Auxiliary control (Manual vs. Horn)
- WAIL Tone Auto Activate on Position L3 of Slide Switch
- Arrow Stick WARN Auto Activate on Position 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.
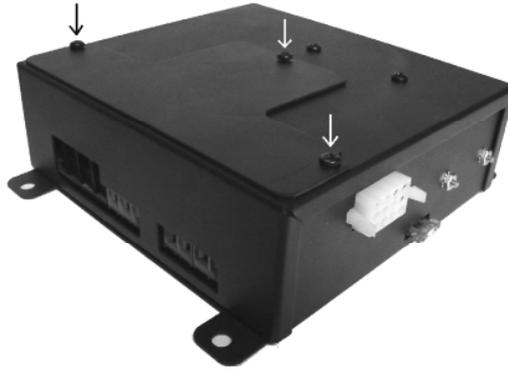
CAUTION:
DO NOT OVER TIGHTEN SCREWS!

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 instead have the AUX function activate when the green wire is connected to ground (negative) .
1. Turn "AUX POS" DIP switch off.
2. Turn "AUX NEG" DIP switch on.
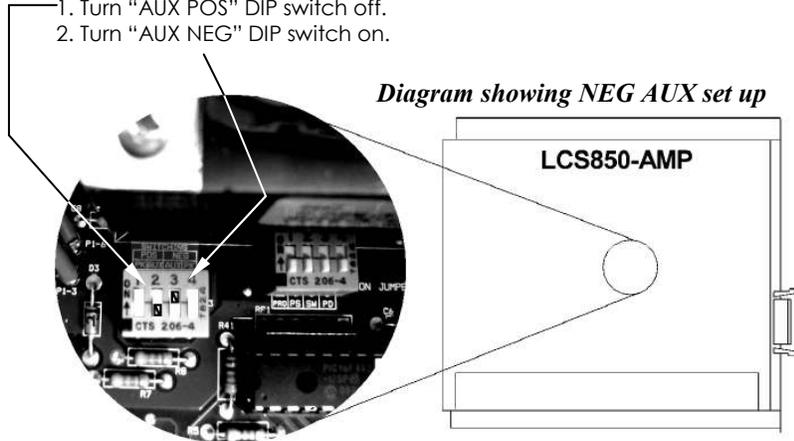
Diagram showing NEG AUX set up

LCS850-AMP

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VEHICLE PRODUCTS

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.
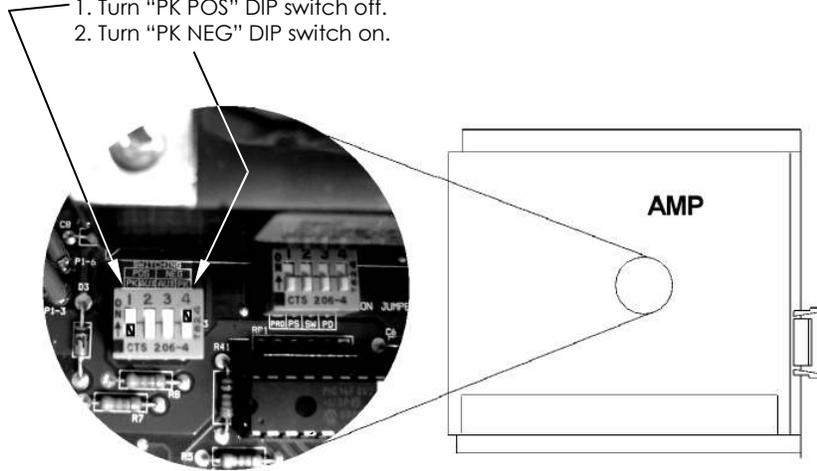
Two-Tone

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).
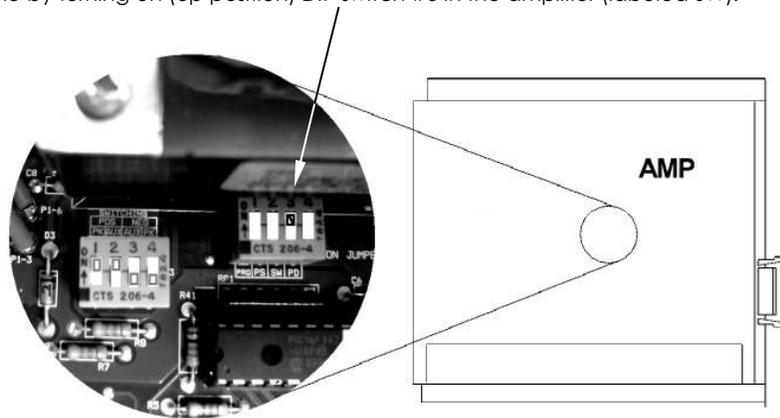
Phaser Disable

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).
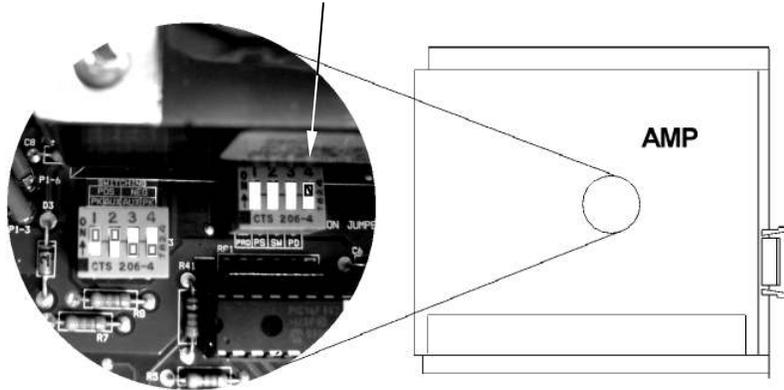
Pursuit Disable

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.

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VEHICLE PRODUCTS
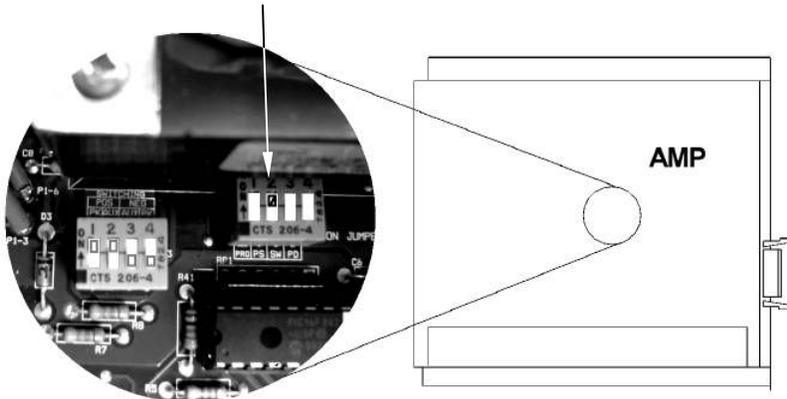
CONTROL HEAD OPTION JUMPERS

Five jumpers located inside the hand held controller can be used to select various options. Review the chart below to determine if you want to change any of the default settings.

Jumper Controlled Options

Jumper	Standard Setting *(jumper on both pins)*	Optional Setting *(jumper only on one pin)*
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.
S4=S3+S2+S1 *(LCS880 ONLY)*	S4 is an independent switch controlling output S4.	When pressed, S4 automatically activates S3, S2, and S1 buttons.
Momentary (S3)	Push button S3 is a standard ON/OFF button.	S3 becomes a momentary switch, thus only being active while being held in.
S4 Timer	Push button S4 is a standard ON/OFF button.	S4 used for Gun Lock - Stays activated for only 8 seconds when pressed.
Auxiliary Control *(Horn vs. Manual)*	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 RADIO.	AUX wire duplicates the function of the MAN push button instead of the HORN.

Programmable Options *(LCS881 ONLY)*

Jumper	Standard Setting	Optional Settings *(Programmed with PROGRAM jumper removed)*
WAIL Tone Auto-Activation With Slide Switch	WAIL tone auto-activated in slide switch position 3 (L3)	WAIL tone auto-activated in L1 or L2, WAIL tone NOT activated in L3
Traffic Director WARN Pattern Auto-Activation With Slide Switch	The WARN pattern on your Traffic Director will auto-activate in slide switch position 3 (L3)	TD WARN pattern auto-activated in L1 or L2. TD WARN pattern NOT activated in L3
S4=S3+S2+S1 *(LCS881 ONLY)*	S4 is an independent switch controlling output S4.	When pressed, S4 automatically activates S3, S2, and S1 buttons.

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VEHICLE PRODUCTS

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

Control Head Cover Removal

- Remove the three Philip head screws recessed in the back of the hand held controller.
- CAREFULLY remove rear cover using caution so as not to lift circuit board and membrane switch away from front faceplate.
- Locate the 10 jumpers located near the microphone coil cord strain relief.
- ***DO NOT REMOVE ANY OF THE FIVE JUMPERS ON THE RIGHT SIDE !!!***
- By default, the five jumpers on the left side come installed across both pins.

REMOVE THESE THREE SCREWS
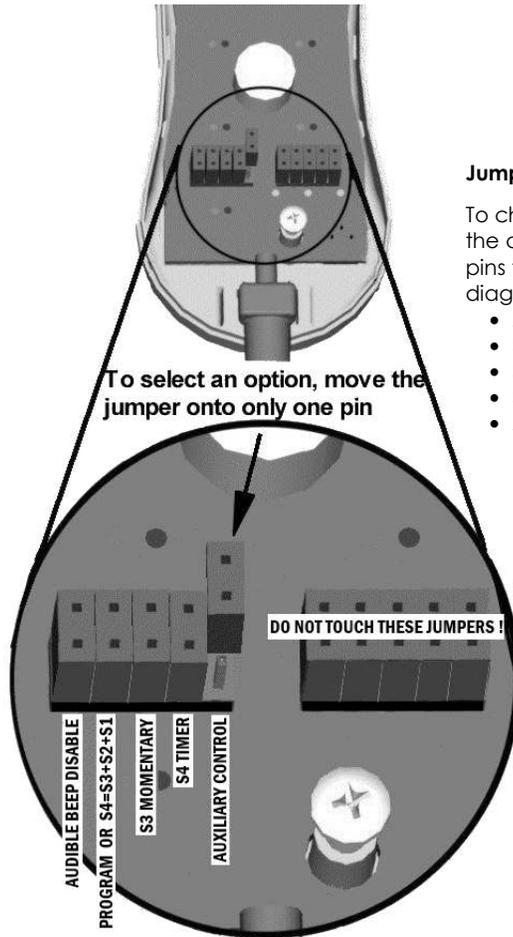
Jumper Controlled Options

To change any of these options, move the corresponding jumper from both pins to only the top pin as shown in the diagram to the left.

- *Audible Beep Disable*
- *S4=S3+S2+S1 (LCS880 only)*
- *S3 Momentary*
- *S4 Timer*
- *Auxiliary Control*

To select an option, move the jumper onto only one pin

DO NOT TOUCH THESE JUMPERS !

AUDIBLE BEEP DISABLE
PROGRAM OR S4=S3+S2+S1
S3 MOMENTARY
S4 TIMER
AUXILIARY CONTROL

STAR**SIGNAL** VEHICLE PRODUCTS

Programmable Options *(LCS881 ONLY)*

- *S4=S3+S2+S1*
- *WAIL Tone Auto-Activate By Slide Switch*
- *TD WARN Auto-Activate By Slide Switch*

The LCS881 has a number of additional programmable option that are NOT available in the LCS880. To program these options:

- Power up the unit and remove the PROGRAM jumper.
- With the slide switch in the OFF position, toggle PB4.
    Red : S4=S3+S2+S1
    Green: S4= Standard On Off Switch

- Move the slide switch to positions L1, L2, and L3.
- Toggle the WAIL button to program whether or not you want the WAIL tone to auto-activate whenever the slide switch is in each of those positions during normal operation.
- Toggle the LRCO button to program whether or not you want the Traffic Director to auto-activate into a WARN pattern whenever the slide switch is in each of those positions during normal operation.

Feature To Be Auto-Activated	Button	Slide Switch Position		
S4=S3+S2+S1	S4	OFF		
WAIL Tone	WAIL	L1	L2	L3
T.D. WARN	LRCO	L1	L2	L3

Red :   Enabled
Green: Disabled
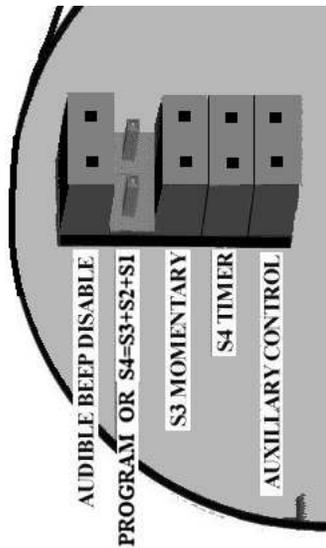
Mounting

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.***

> ⚠️ **WARNING!**
>
> **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 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).

CRADLE MOUNTING

- The LCS880 and LCS881 both include a cradle for storing the hand-held controller when it is not in use.

- Select a location so that the cable does not interfere with the vision of the driver or the operation of any controls, including, but not limited to, the steering wheel, gear shifter, and/or airbag.

- The cradle comes with four mounting holes predrilled in it. Only two screws are normally necessary to secure the cradle to the dash. Once you have selected a location, use the cradle as a template and mark the two mounting holes you will be using.

- Carefully drill two 1/16" pilot holes for your screws. Be sure to check for wiring and/or any other obstructions behind the mounting hole locations.

- Once the holes are drilled, use the two self-tapping Phillip head screws to secure your cradle.

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VEHICLE PRODUCTS
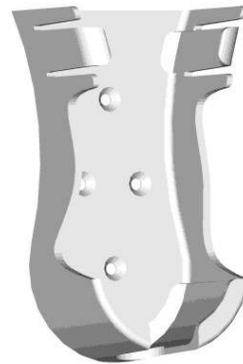
ARROW STICK CONTROL BOX MOUNTING *(MODEL LCS881 only)*

- **Review the Arrow Stick Settings and Connections** *(pages 18-22)* **section for details on any option jumper settings <u>prior to installing</u> 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.

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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 <u>at the battery</u> 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 <u>not</u> 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.*

Communication Jack

<u>Make all electrical connections to the power connector before installing the connector on the unit.</u>

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

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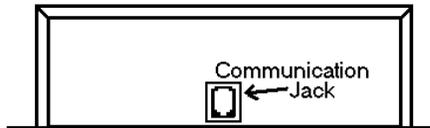
Siren electrical power connections to the amplifier are made using a removable connector located on the back of the amplifier case.

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.
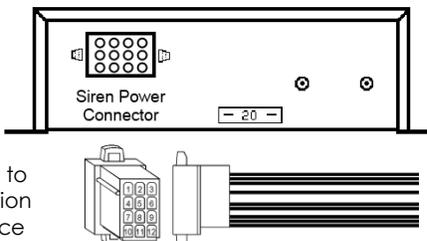
<u>Make all electrical connections to the power connector before installing the connector on the unit.</u>

Mandatory 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 <u>same</u> 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.

Optional Siren Wiring 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. <u>NOTE:</u> 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.
<u>NOTE:</u> 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 enabled whenever the handset is activated with the recessed On/Off switch on the side 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.
<u>NOTE:</u> If not used, cut lead short and insulate with electrical tape.

Siren Wiring Diagram

To High Current Device

+12 VDC

Optional Relay For Horn Ring Transfer or Other High Current Device (Activated When Hand-Held Controller Power Switch is Turned On)

SPEAKER 2
11 OHMS
(OPTIONAL)

Dome Light

Added Door Switch

Door Switch

+12 VDC

Positive Switching PK Jumper Selected

Negative Switching PK Jumper Selected

OR

VEHICLE HORN

Horn Switch/Relay

Negative Switching AUX Horn Jumper Selected

+12 VDC

OR

SPEAKER 1
11 OHMS

+12 VDC

Negative Switching AUX

RADIO

Connect the Blue wires to the terminals of speaker or to the output jack of radio

VEHICLE HORN

Positive Switching AUX Horn Jumper Selected

Positive Switching AUX

OR

2 Amp fuse

BATTERY

+12 VDC
Horn Switch/Relay

+12 VDC
Ignition controlled power or other switched power source

12 - Brown (#14 AWG)
11 - Pink (#18 AWG)
10 - Orange (#18 AWG)
9 - Green (#18 AWG)
8 - White (#18 AWG)
7 - Brown (#14 AWG)
6 - Blue (#18 AWG)
5 - Black (#14 AWG)
4 - Red (#14 AWG)
3 - Blue (#18 AWG)
2 - Black (#14 AWG)
1 - Red (#14 AWG)

SIREN AMPLIFIER

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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 when the handset is activated with the recessed On/Off switch on the side. The diagram below shows wiring for both positive and ground-side switched horns, using an installer-supplied relay.

+12 VDC

Cut your horn wire here and insert the installer supplied relay

VEHICLE HORN

Ground Side Horn Switch

Green Wire From Amp

Orange Wire From Amp

2 Amp fuse

Connect like this for Ground Side Horn Switch

Negative Switching
AUX Jumper Selected

OR

User Supplied Optional SPDT Relays
(Opened When Recessed On/Off Switch On Handset is Activated)

Connect like this for Positive Side Horn Switch

Positive Switching
AUX Jumper Selected

2 Amp fuse

Orange Wire From Amp

Green Wire From Amp

Positive Side Horn Switch

+12 VDC

Cut your horn wire here and insert the installer supplied relay

VEHICLE HORN

STAR**SIGNAL**
VEHICLE PRODUCTS

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. One of the RFI chokes (STAR P/N: P30039-57) should be placed around the communications cable at the back of the siren amplifier box.

6. The second RFI choke should be placed around the Red and Black wires exiting the siren amplifier box.

ANTENNA LEAD   RADIO POWER WIRES

2-WAY RADIO AMP

Minimum 3'

SIREN AMP

BATTERY

SIREN CONTROL HEAD

RADIO

SIREN COMMUNICATIONS CABLE

RFI CHOKES

SIREN POWER AND GROUND WIRES
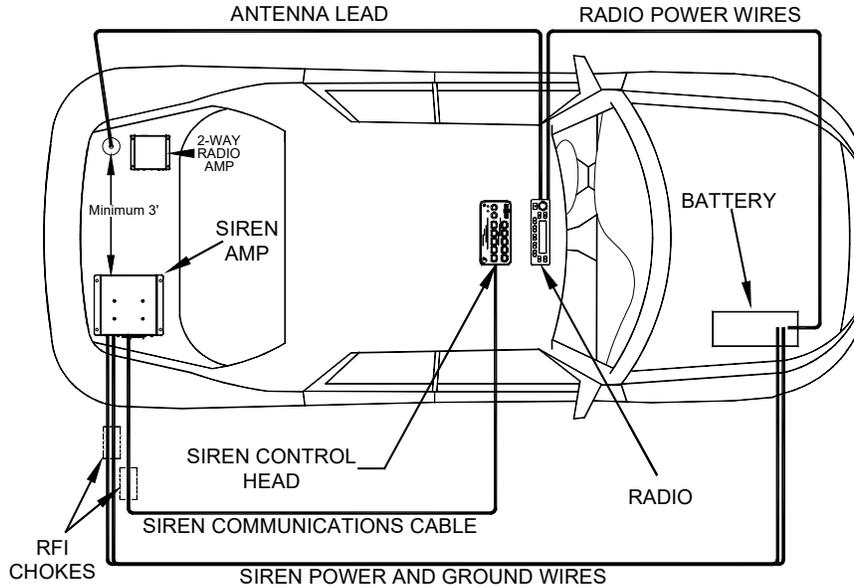
INPUT POWER AND SWITCH OUTPUT CONNECTIONS

Top View
(Cover Removed)

OFF   L1   L1+L2   L1+L2+L3

L1 L2 L3   S1 S2 S3 S4

Slide Switch Outputs   **Push Button Switch Outputs**

+12 VDC Input Power for Light Switches

LCS881   SPEAKERS

MAN   HORN
WAIL   YELP
PHSR   RADIO
S1   S2
S3   S4
WLRCO
PA   VOL

Signal

Input Power

Slide Switch Outputs

Push Button Outputs

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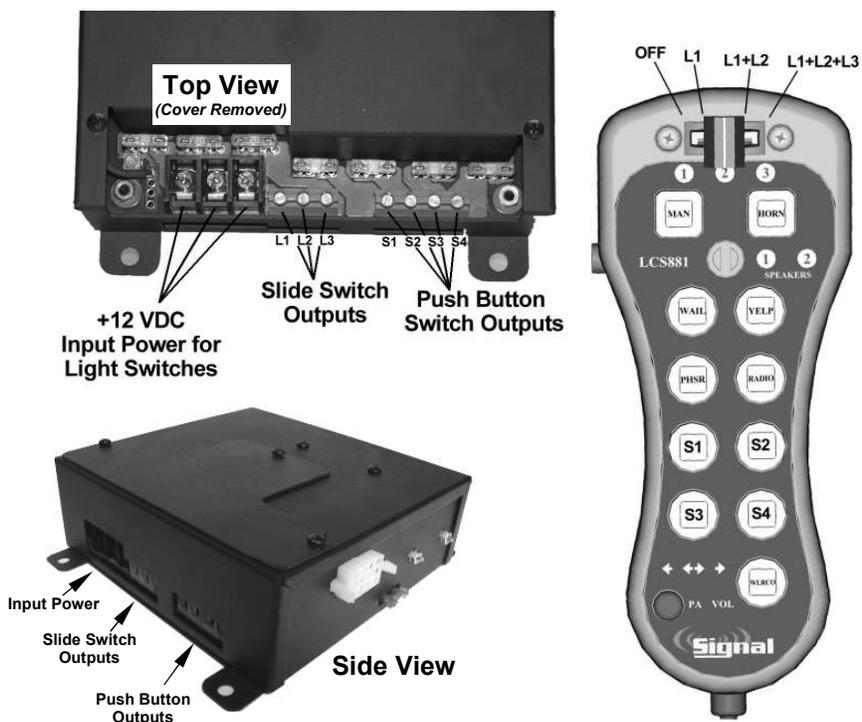
(REFER TO LIGHT WIRE DIAGRAM ON NEXT PAGE, AS WELL AS TO WIRE SIZE TABLE ON PAGE 11 FOR PROPER WIRE SIZES!)

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).

STAR**SIGNAL**
VEHICLE PRODUCTS

Light Wiring Diagram

Power to device activated by push button switch S4

Power to device activated by push button switch S3

Power to device activated by push button switch S2

Power to device activated by push button switch S1

Power to device activated in slide switch position 3

Power to device activated in slide switch positions 2 and 3

Power to device activated in slide switch positions 1, 2, and 3

S4 - (#12-16 AWG)
S3 - (#12-16 AWG)
S2 - (#12-16 AWG)
S1 - (#12-16 AWG)
L3 - (#12-16 AWG)
L2 - (#12-16 AWG)
L1 - (#12-16 AWG)
3 - Red (#8-12 AWG)
2 - Red (#8-12 AWG)
1 - Red (#8-12 AWG)

20A 20A 20A 20A 20A 20A 20A

LCS800 AMPLIFIER

BATTERY
+ -

SEE PAGE 11 FOR CORRECT WIRE SIZING!!!

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STARSIGNAL VEHICLE PRODUCTS

Arrow Stick Settings and Connections (LCS881 only)

The TDC850 controller that is shipped with the LCS881 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 LCS881 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.
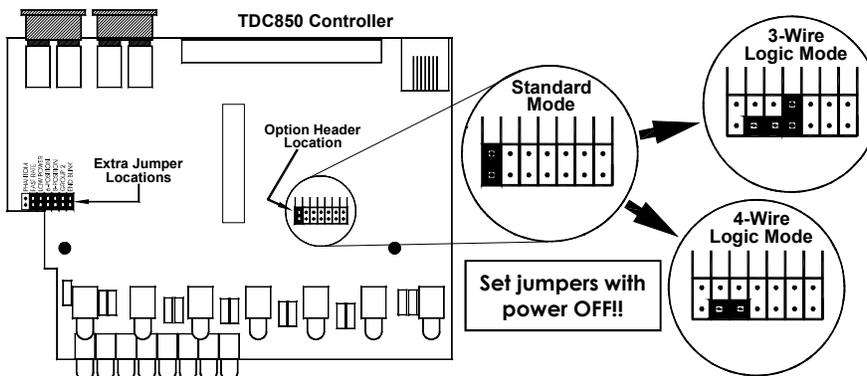
## Jumper Options for Independently Controlled Heads

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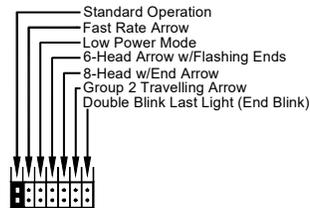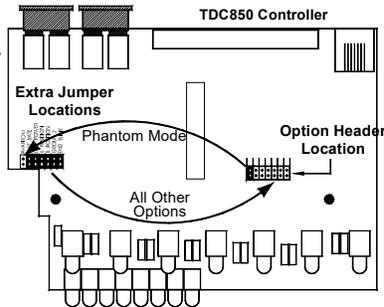
To set your control box for Phantom mode, move the 1st jumper in the Option Header Location back to the pins labeled *PHANTOM* in the Extra Jumper Locations.

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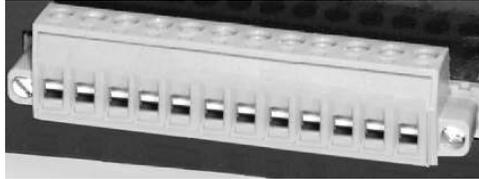
Double blink last head of arrow (end blink) †:

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.

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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). <u>**NOTE:**</u> *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

⚠️ *VERIFY MODE JUMPER SETTING ON PAGE 18 !!*

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

1	2	3	4	5	6	7	8	9	10	11	12
BROWN	RED	ORANGE	YELLOW	GREEN	BLUE	VIOLET	GRAY	CABLE SHIELD GROUND (BARE WIRE)	LARGE RED - POWER TO ARROW STICK	GROUND (BATTERY -)	BATTERY +12VDC

SWITCHED GROUND FOR EACH LIGHT
(6 head arrow sticks use 2-7 only)
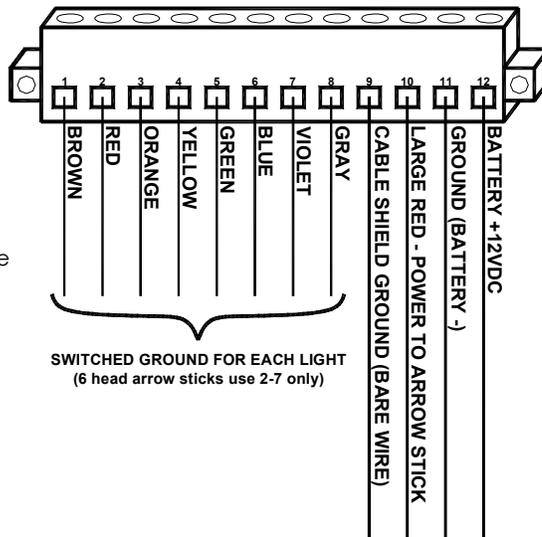
Arrowsticks With 3-Wire Logic Control

⚠ **VERIFY MODE JUMPER SETTING ON PAGE 18 !!**

Connector terminals 1–12:

1. EMPTY
2. EMPTY
3. EMPTY
4. ARROW STICK RIGHT WIRE
5. ARROW STICK LEFT WIRE
6. EMPTY
7. EMPTY
8. ARROW STICK WARN
9. ARROW STICK GROUND WIRE
10. POWER TO ARROW STICK
11. GROUND (BATTERY -)
12. BATTERY +12VDC
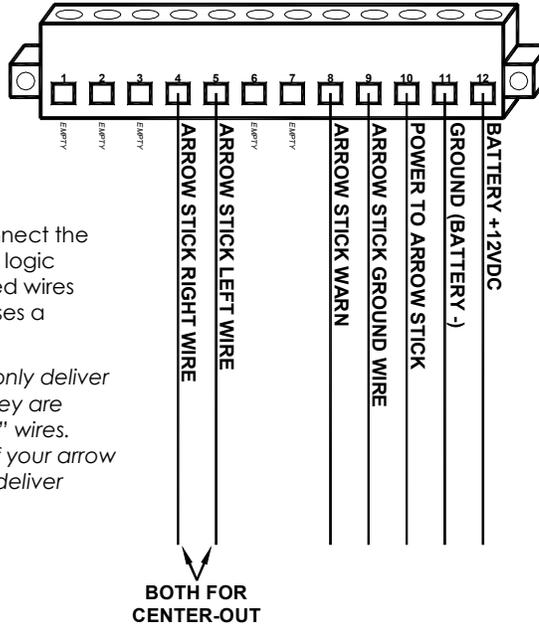
This diagram shows how to connect the wires from an arrow stick that is logic controlled by 3 positive switched wires (Right, Left, and WARN) AND uses a separate POWER wire.

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.

BOTH FOR CENTER-OUT

Arrowsticks With 4-Wire Logic Control

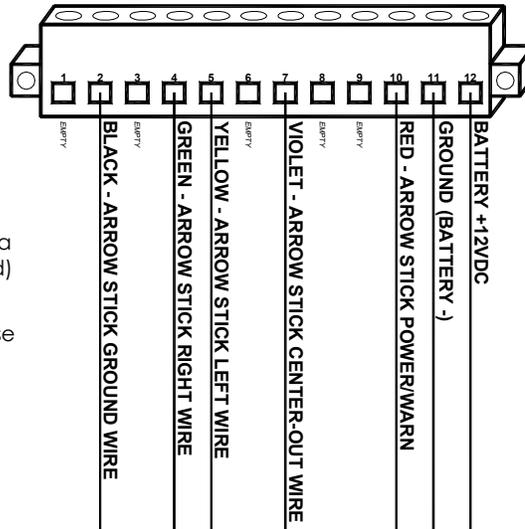⚠ **VERIFY MODE JUMPER SETTING ON PAGE 18 !!**

Connector terminals 1–12:

1. EMPTY
2. BLACK - ARROW STICK GROUND WIRE
3. EMPTY
4. GREEN - ARROW STICK RIGHT WIRE
5. YELLOW - ARROW STICK LEFT WIRE
6. EMPTY
7. VIOLET - ARROW STICK CENTER-OUT WIRE
8. EMPTY
9. EMPTY
10. RED - ARROW STICK POWER/WARN
11. GROUND (BATTERY -)
12. BATTERY +12VDC

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.

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STAR SIGNAL VEHICLE PRODUCTS

CAUTION: NOT REPLACEABLE WITH A STANDARD TELEPHONE CABLE

TDC850 ARROWSTICK POWER SUPPLY

20   2

SIREN AMPLIFIER

6-wire Cable Splitter

HAND-HELD CONTROLLER
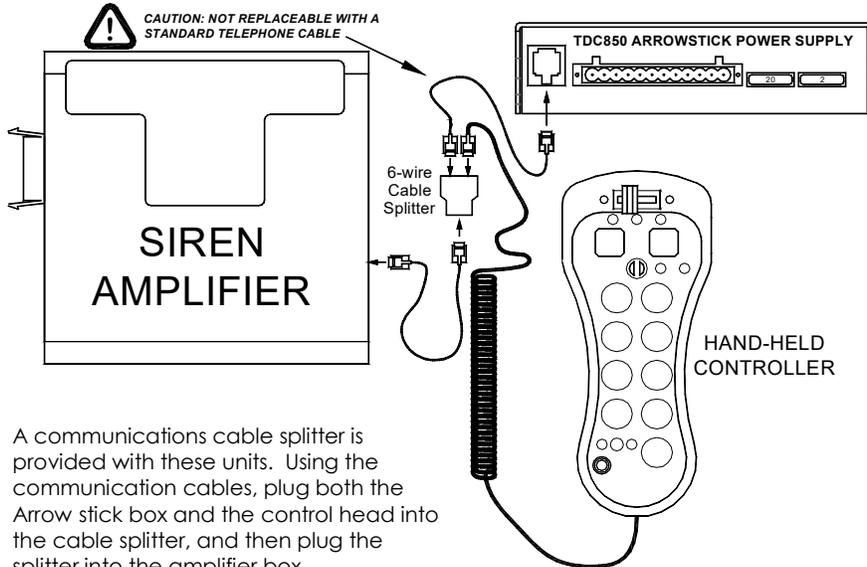
A communications cable splitter is provided with these units. Using the communication cables, plug both the Arrow stick box and the control head into the cable splitter, and then plug the splitter into the amplifier box.

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.*

Label Insertion

Once the wire connections have been, 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.

Inserted Label

Push Button Switch Cut-View

STAR**SIGNAL**
VEHICLE PRODUCTS
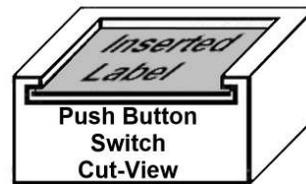
GENERAL

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

POWER

The unit is turned On and Off by a recessed switch on the side of the hand held controller. All functions are disabled until the unit is switched on.

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:** *(LCS881 only)* If you have the 1st jumper in the Arrow Stick Light Controller set for Phantom Mode - *(see page19)*, 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)
> - The siren (WAIL mode)
> - All of the Traffic Director lights will flash in a "WARN" pattern (LCS881 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).*
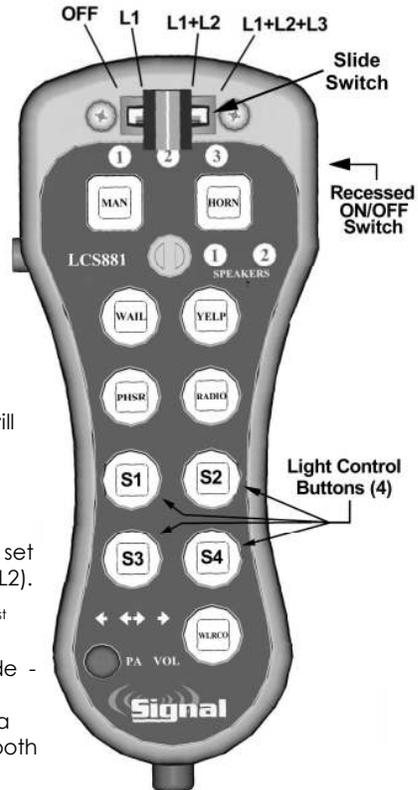
PUSH BUTTON SWITCHES

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, S4 can be set as a timed "Gun Lock" button, or S4 can be set to activate S1, S2, and S3 concurrently *(see **Control Head Option Jumpers** on pages 6-8)*.

STAR**SIGNAL** VEHICLE PRODUCTS

SIREN MODE BUTTONS:

The six push buttons towards the top 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.
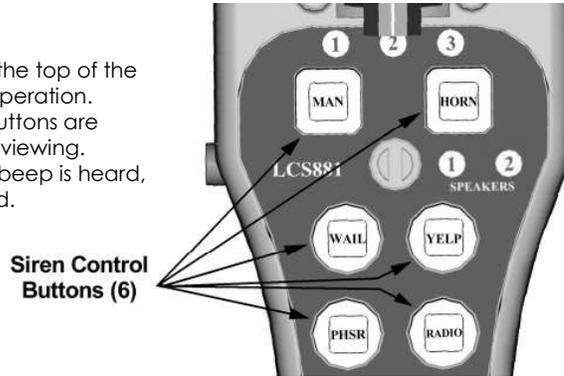
MAN (Manual)

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
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.

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

MICROPHONE and MICROPHONE BUTTON

The integrated noise-canceling microphone is used for public address operation and overrides any siren tone when the push-to-talk microphone button is pressed.

PA VOLUME

The PA volume control is provided for public address volume. This is in the bottom left corner of the control head. Turn it clockwise to increase the sound level.

ARROW STICK INDICATOR and
PUSH BUTTON SWITCH (LCS881 only)

The WLRCO push button toggles the arrow stick output through a different pattern with each push. (Warn, Left arrow, Right arrow, Center-Out arrow, and Off).

The LED indicator "simulates" the selected pattern.

SPEAKER DIAGNOSTICS

There are two diagnostic LEDs located in the lower left portion of the remote head controller. These LEDs 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.
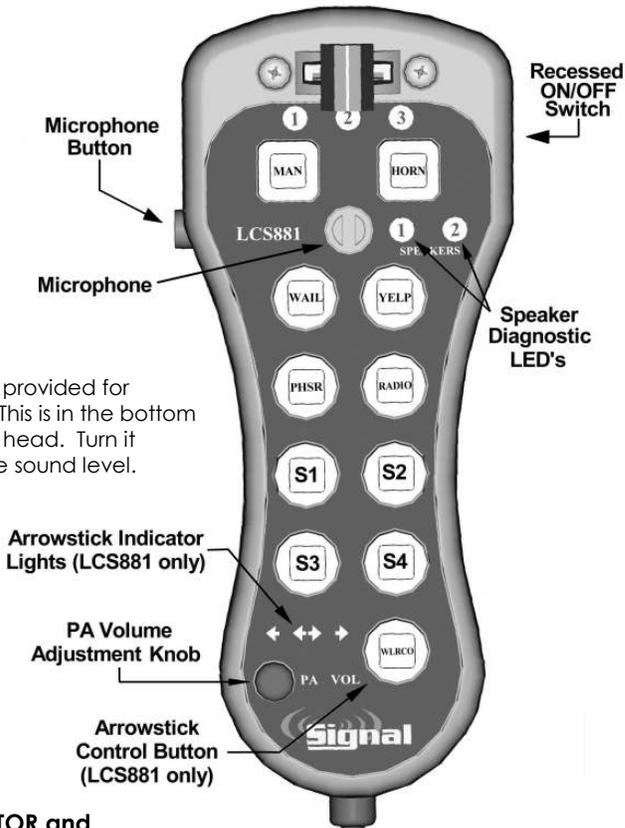
RADIO REPEAT VOLUME

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.

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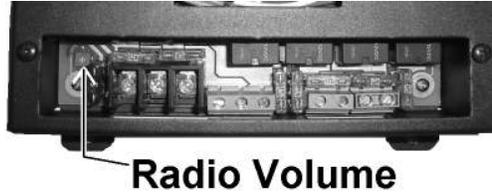
First set the volume level of the vehicle's two-way radio to its normal operating volume. Turn on the On/Off switch of the hand held controller and press the RADIO button. The radio should be rebroadcasting through the siren speaker(s). Using a small flat blade screwdriver, adjust the potentiometer as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

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.

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).*

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.

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.

Control Head Fuse

Slide Switch Fuses

Push Button Switch Fuses
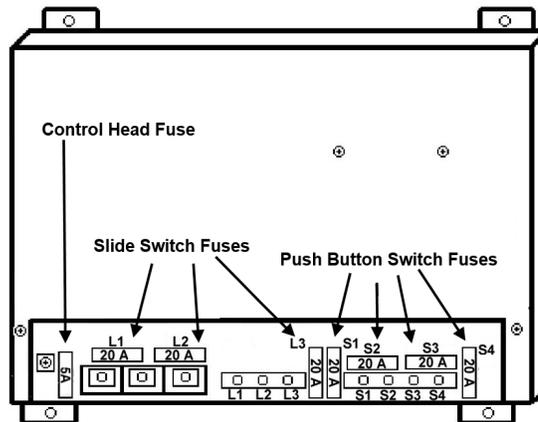
Service

TROUBLESHOOTING

Symptom	Possible Cause	Check
No power	No power supplied to +12 terminal block inputs in amplifier.	Does back-lighting come on?
	Connector loose	Do you hear a "pop" when turned on?
	Amplifier 20A fuse or 5A fuse blown	Is power hooked up backwards? Positive ground vehicle?
		Is an external fuse or circuit breaker used?
	Loose connection at power source	Are the negative leads connected to a good ground?
No siren tone - PA works	High voltage protection	The input voltage must be less than 16 volts.
	Low voltage protection	The input must be greater than 10V with the siren turned on.
	Microphone button stuck	Does microphone button release properly?
	Park Kill polarity option set wrong	Is the PK jumper option properly configured?
	Park Kill activated	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	Is the speaker bell or tip loose?
	Intermittent Aux. Input connection	Is the Aux. Input used and wired properly?
	Low or high vehicle voltage	Input voltage must be between 10 & 16 volts while siren is on.
Intermittent siren tone	High voltage protection	Is the vehicle voltage regulator working properly?
	Low voltage protection	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?
	Microphone button activation	Is a circuit breaker used with at least a 50A rating?
	Circuit breaker in supply connection	Does the speaker have water damage, or is a wire pinched?
	Shorted speaker or speaker wire	
Horn function or Manual function stuck on	Siren push button switch stuck	Does the Siren switch return fully when released?
	Aux. Input improperly connected	Is the AUX Input used and wired properly?
	Aux. Input Polarity Option set wrong	Is the AUX jumper option properly configured?
No Radio	Unit not connected to radio	Is the radio connected properly to the unit?
	Radio volume too low	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	Is the TT jumper option properly configured?
	Aux. Input set to wrong function	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	Fuse blown	Check fuses on arrow stick control box. Check communication cable.
Erratic arrow stick pattern Or 1st or 8th head not working	Arrow stick option jumpers not set properly	Is the 6 head stick option selected? Is 8 head stick option not selected?
	Poor connection	Is green connector screwed in tight to lock into arrow control box? Are all 12 terminal block connections tight?
	Using ignition switched power for arrowstick	Use constant power source for arrowstick, rather than one that is ignition switched

STAR**SIGNAL**
VEHICLE PRODUCTS

PARTS

Part	Description
LCS850-AMP8	Amplifier Only
LCS880-CH	Hand-Held Controller for LCS880
LCS881-C	Hand-Held Controller for LCS881
TDC850	Arrowstick Power Supply
P30255-43A	Amp Wiring Harness
30008-22	25' Communication Cable Between Control Head Cable and Amp*
30041-52	Female/Female RJ11 Connector for Communication Cables
30008-30	7' Communications Cable Between TDC850 and Amp (LCS881 only)*
P30041-188	Control Head/TDC850 Splitter for Communications Cable (LCS881 only)
SWH-140	12" Communication Cable (LCS881 only)
30028-8	5 Amp Automotive Blade Fuse inside Amplifier (also used in TDC850)
30028-1	20 Amp Automotive Blade Fuse for Amplifier (also used in TDC850)
30007-66-1	Knob for Slide Switch
S30007-66-2	Slide Switch Assembly (less control knob)
P30232-4	LCS880-CH/LCS881-CH Microphone
P30053-31	Amplifier Case Screws
P30032-8	TIP36C Power Transistor

* 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 10 mA when ignition is off
Audio Frequency	200Hz - 10 kHz $\pm$ 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	4 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) Hand Held Controller: 6" High X 2-1/2" Wide X 1-1/4" Deep Arrow Stick Control Box: 1-9/16" H X 6" W X 4-1/2" D (TDC850)
Boxed Weight	LCS880: 8.5 lbs. LCS881: 9.25 lbs.

STARSIGNAL VEHICLE PRODUCTS

ONE YEAR LIMITED WARRANTY

The manufacturer warrants each new product against factory defects in material and workmanship for one year after the date of purchase. 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, bulbs, strobe tubes, domes, and/or the finish. This warranty shall not apply to any light, 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**. The manufacturer 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) 226-9025.

If a product must be returned for any reason, please contact our Customer Service Department to obtain a Returned Materials Authorization number (RMA #) before you ship the product back. Please write the RMA # clearly on the package near the mailing label. Be sure to fill out the form on the following page in its entirety and enclosed it with the defective product.

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An ISO 9001:2008 Certified Company

(Service CONT'D)

If a problem with this product develops within the warranty period, please contact our Customer Service Department at (585) 226-9025. 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

/   /

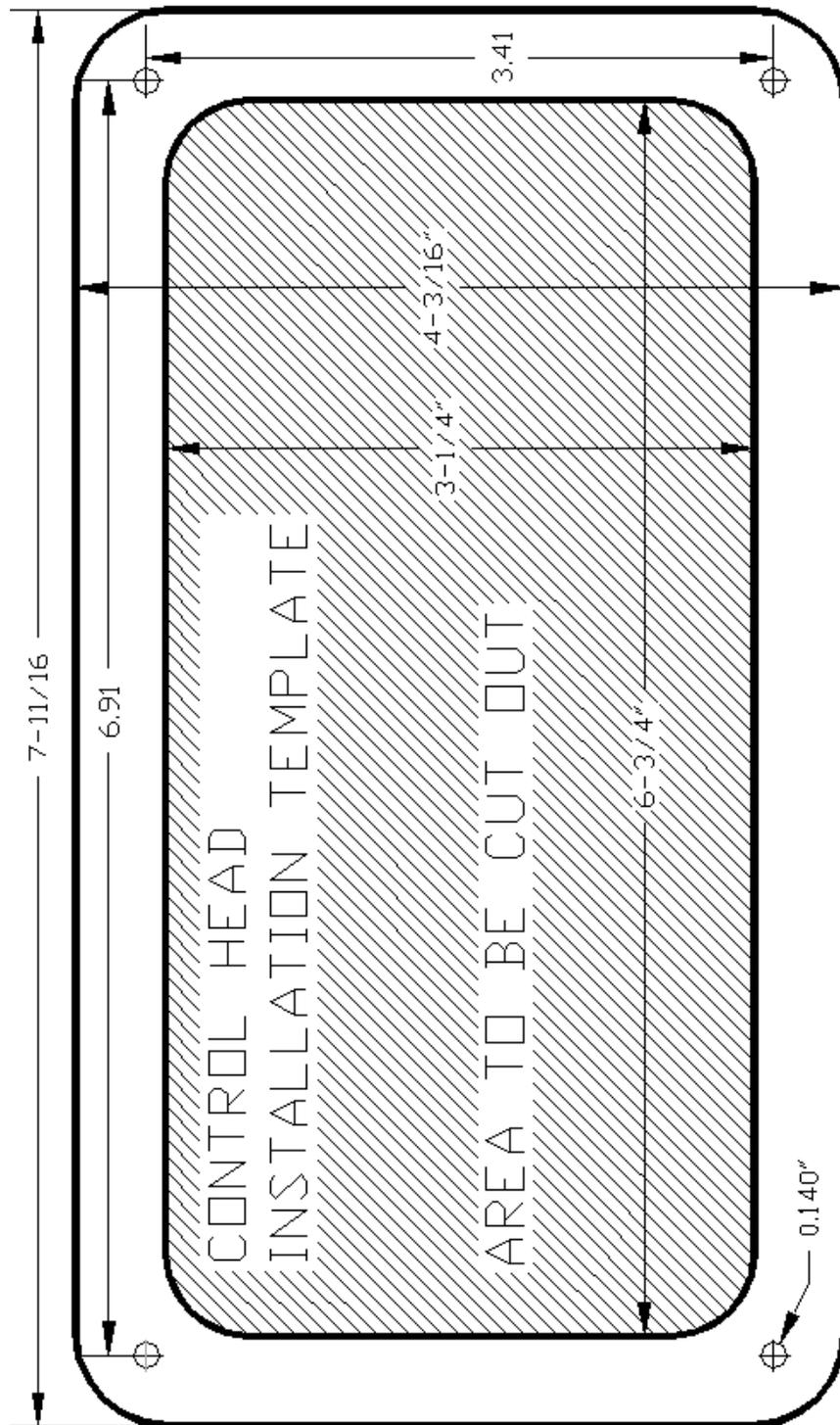**Customer Name:** _____

Company: _____

Address: _____

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

Phone: _____

Dealer: _____

Installer: _____

Briefly Describe the Problem:

STAR**SIGNAL**
VEHICLE PRODUCTS

CONTROL HEAD
INSTALLATION TEMPLATE

AREA TO BE CUT OUT

3.41

4-3/16"

3-1/4"

6-3/4"

7-11/16

6.91

0.140"

STARSIGNAL
VEHICLE PRODUCTS

STAR
125 YEARS
SINCE
1889

PROUDLY MADE IN THE USA
An ISO 9001:2008 Certified Company

STARSIGNAL
VEHICLE PRODUCTS