

WHELEN[®]

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Installation/Operating Guide

Programmable Hand-held Siren/Light Control System

Models: HHS4200, HHS4206 & HHS4207 (12-volt)
HHS4400 (24-volt)

DANGER! Sirens produce extremely loud emergency warning tones! Exposure to these tones without proper and adequate hearing protection, could cause ear damage and/or hearing loss! The Occupational Safety & Health Administration (www.osha.gov) provides information necessary to determine safe exposure times in Occupational Noise Exposure Section 1910.95. Until you have determined the safe exposure times for your specific application, operators and anyone else in the immediate vicinity should be required to wear an approved hearing protection device. Failure to follow this recommendation could cause hearing loss!

Warnings to Installers

Whelen's emergency vehicle warning devices must be properly mounted and wired in order to be effective and safe. Read and follow all of Whelen's written instructions when installing or using this device. Emergency vehicles are often operated under high speed stressful conditions which must be accounted for when installing all emergency warning devices. Controls should be placed within convenient reach of the operator so that they can operate the system without taking their eyes off the roadway. Emergency warning devices can require high electrical voltages and/or currents. Properly protect and use caution around live electrical connections. Grounding or shorting of electrical connections can cause high current arcing, which can cause personal injury and/or vehicle damage, including fire. Many electronic devices used in emergency vehicles can create or be affected by electromagnetic interference. Therefore, after installation of any electronic device it is necessary to test all electronic equipment simultaneously to insure that they operate free of interference from other components within the vehicle. Never power emergency warning equipment from the same circuit or share the same grounding circuit with radio communication equipment. All devices should be mounted in accordance with the manufacturer's instructions and securely fastened to vehicle elements of sufficient strength to withstand the forces applied to the device. Driver and/or passenger air bags (SRS) will affect the way equipment should be mounted. This device should be mounted by permanent installation and within the zones specified by the vehicle manufacturer, if any. Any device mounted in the deployment area of an air bag will damage or reduce the effectiveness of the air bag and may damage or dislodge the device. Installer must be sure that this device, its mounting hardware and electrical supply wiring does not interfere with the air bag or the SRS wiring or sensors. Mounting the unit inside the vehicle by a method other than permanent installation is not recommended as unit may become dislodged during swerving; sudden braking or collision. Failure to follow instructions can result in personal injury. Whelen assumes no liability for any loss resulting from the use of this warning device. PROPER INSTALLATION COMBINED WITH OPERATOR TRAINING IN THE PROPER USE OF EMERGENCY WARNING DEVICES IS ESSENTIAL TO INSURE THE SAFETY OF EMERGENCY PERSONNEL AND THE PUBLIC.

Warnings to Users

Whelen's emergency vehicle warning devices are intended to alert other operators and pedestrians to the presence and operation of emergency vehicles and personnel. However, the use of this or any other Whelen emergency warning device does not guarantee that you will have the right-of-way or that other drivers and pedestrians will properly heed an emergency warning signal. Never assume you have the right-of-way. It is your responsibility to proceed safely before entering an intersection, driving against traffic, responding at a high rate of speed, or walking on or around traffic lanes. Emergency vehicle warning devices should be tested on a daily basis to ensure that they operate properly. When in actual use, the operator must ensure that both visual and audible warnings are not blocked by vehicle components (i.e.: open trunks or compartment doors), people, vehicles, or other obstructions. It is the user's responsibility to understand and obey all laws regarding emergency warning devices. The user should be familiar with all applicable laws and regulations prior to the use of any emergency vehicle warning device. Whelen's audible warning devices are designed to project sound in a forward direction away from the vehicle occupants. However, because sustained periodic exposure to loud sounds can cause hearing loss, all audible warning devices should be installed and operated in accordance with the standards established by the National Fire Protection Association.

Safety First

This document provides all the necessary information to allow your Whelen product to be properly and safely installed. Before beginning the installation and/or operation of your new product, the installation technician and operator must read this manual completely. Important information is contained herein that could prevent serious injury or damage.

⚠ WARNING: This product can expose you to chemicals including Methylene Chloride which is known to the State of California to cause cancer, and Bisphenol A, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

- Proper installation of this product requires the installer to have a good understanding of automotive electronics, systems and procedures.
- Whelen Engineering requires the use of waterproof butt splices and/or connectors if that connector could be exposed to moisture.
- Any holes, either created or utilized by this product, should be made both air- and watertight using a sealant recommended by your vehicle manufacturer.
- Failure to use specified installation parts and/or hardware will void the product warranty.
- If mounting this product requires drilling holes, the installer MUST be sure that no vehicle components or other vital parts could be damaged by the drilling process. Check both sides of the mounting surface before drilling begins. Also de-burr the holes and remove any metal shards or remnants. Install grommets into all wire passage holes.
- If this manual states that this product may be mounted with suction cups, magnets, tape or Velcro®, clean the mounting surface with a 50/50 mix of isopropyl alcohol and water and dry thoroughly.
- Do not install this product or route any wires in the deployment area of your air bag. Equipment mounted or located in the air bag deployment area will damage or reduce the effectiveness of the air bag, or become a projectile that could cause serious personal injury or death. Refer to your vehicle owner's manual for the air bag deployment area. The User/Installer assumes full responsibility to determine proper mounting location, based on providing ultimate safety to all passengers inside the vehicle.
- For this product to operate at optimum efficiency, a good electrical connection to chassis ground must be made. The recommended procedure requires the product ground wire to be connected directly to the NEGATIVE (-) battery post (this does not include products that use cigar power cords).
- If this product uses a remote device for activation or control, make sure that this device is located in an area that allows both the vehicle and the device to be operated safely in any driving condition.
- It is recommended that these instructions be stored in a safe place and referred to when performing maintenance and/or reinstallation of this product.
- FAILURE TO FOLLOW THESE SAFETY PRECAUTIONS AND INSTRUCTIONS COULD RESULT IN DAMAGE TO THE PRODUCT OR VEHICLE AND/OR SERIOUS INJURY TO YOU AND YOUR PASSENGERS!

**ACTIVATION OF THIS
SIREN MAY DAMAGE
UNPROTECTED EARS!**



CAUTION

Loud siren noise can cause hearing damage and/or loss. Refer to OSHA Section 1910.95 prior to putting ANY siren into service!

Installation:

1. Find a mounting location. A dry, cool compartment is a good choice.
 2. Position the amplifier on the mounting location. Mark the mounting surface where the mounting holes are to be drilled. Make sure that this mounting area allows sufficient ventilation for the siren.
- IMPORTANT: The siren case must be either mounted on, or grounded to the vehicle chassis.**
- IMPORTANT: Read all warnings before starting installation.**
3. Remove the siren from its mounting area, and using a drill bit sized for a #8 sheet metal screw, drill a hole in each of the areas scribed in the previous step.
 4. Return the siren to its mounting location and using #8 x3/4" sheet metal screws (provided), secure the siren onto its mounting surface. Be sure to install a #8 internal tooth lock washer (included) onto each mounting screw before mounting the unit.

Specifications:

Input Voltage	12.8 VDC ±20%
Siren Input Current	16 Amps Max.
Siren Input Fuse	24V=10 Amp 12V=20 Amp
Stand-by Current (backlight off)	< 1mA (typ)
Operating Temperature	-30°C to +60°C
Storage Temperature	-40°C to +70°C
Humidity	99% (Non-condensing)

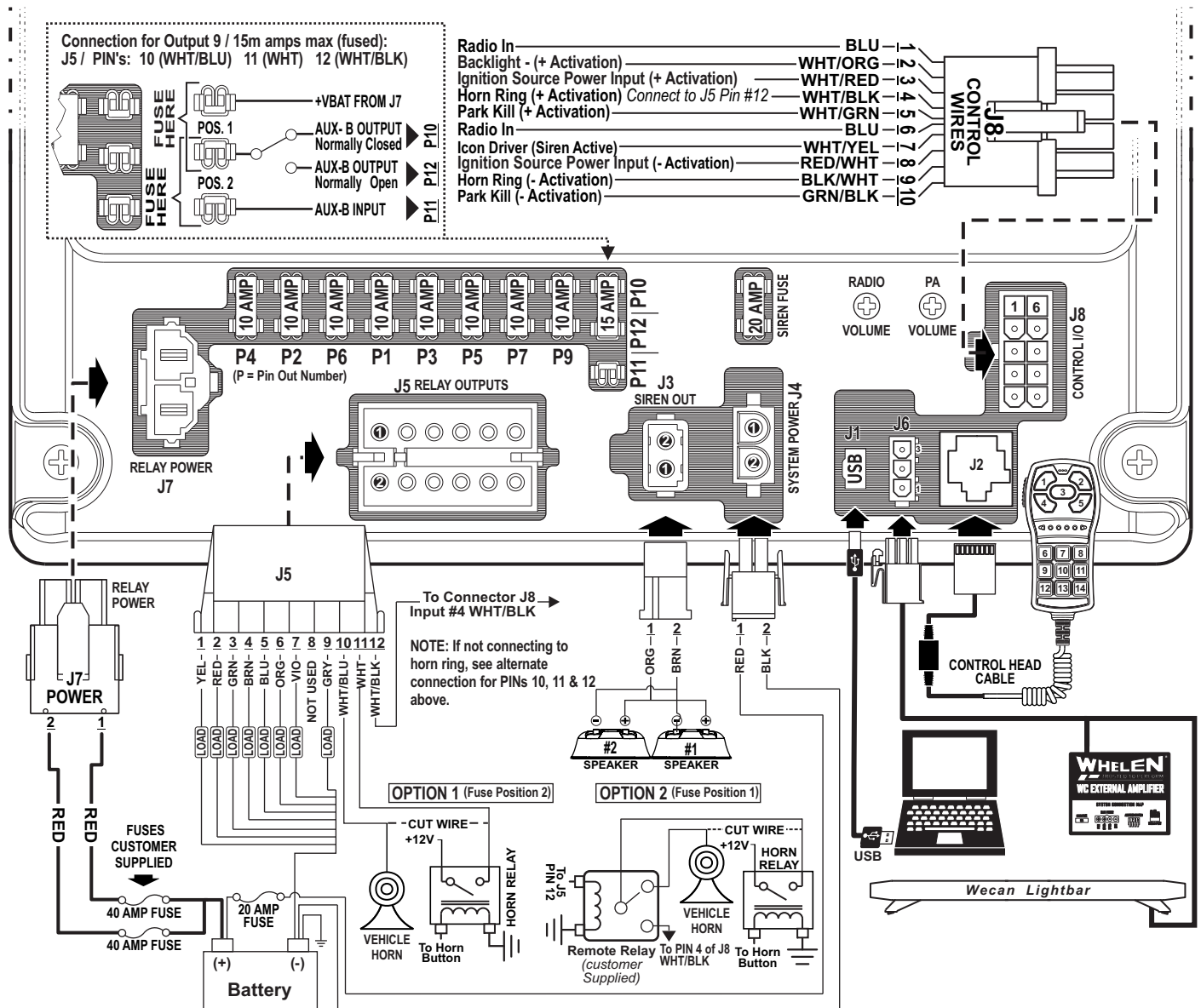
Output Current (J5 Wire)

Output 1	PIN 4 BRN	10 Amps Max. (fused)
Output 2	PIN 2 RED	10 Amps Max. (fused)
Output 3	PIN 6 ORG	10 Amps Max. (fused)
Output 4	PIN 1 YEL	10 Amps Max. (fused)
Output 5	PIN 3 GRN	10 Amps Max. (fused)
Output 6	PIN 5 BLU	10 Amps Max. (fused)
Output 7	PIN 7 VIO	10 Amps Max. (fused)
Output 8	PIN 9 GRY	10 Amps Max. (fused)
Output 9	PIN 10 WHT/BLU, 11 WHT, & 12 WHT/BLK	15 AMP Max. (Fused)

NOTE: Outputs 1 thru 9 are "Positive Switching". Loads connected to each relay output should be grounded to the battery. NOTE: Total current of Outputs 1 - 9 not to exceed 80 Amps

Dimensions (Amp/Relay Module)

Height	2.35 inches
Width (incl. mounting flanges)	8.49 inches
Depth	7.46 inches



Wiring

WARNING! All customer supplied wires that connect to the positive terminal of the battery must be sized to supply at least 125% of the maximum operating current and **FUSED** at the battery to carry that load. **DO NOT USE CIRCUIT BREAKERS WITH THIS PRODUCT!**

IMPORTANT! Wires connecting to the Amp/Relay Module have the proper terminals pre-installed from the factory. **WHELEN DOES NOT RECOMMEND RE-TERMINATING ANY WIRES.**

		Wire Gage (AWG)							
		20	18	16	14	12	10	8	6
Current Draw (AMPS)	10	5	7.5	12	19.5	31	49	78	124
	20	INS.	4	6	9.5	15.5	24.5	39	62
	30	INS.	INS.	4	6.5	10.5	16.5	26	41.5
	40	INS.	INS.	3	5	7.5	12.5	19.5	31
	50	INS.	INS.	INS.	4	6	10	15.5	25
	60	INS.	INS.	INS.	3	5	8	13	20.5
	70	INS.	INS.	INS.	3	4.5	7	11	17.5
	80	INS.	INS.	INS.	INS.	4	6	10	15.5
	INS. = Insufficient All Distances Shown Are In Feet								

Relay Power (J7)

1. Locate the High-Current Molex™ connector and wires (included) sized to fit into the relay power connectors.
2. Route the two RED wires from the amp/relay module to the POSITIVE battery terminal. Fuse **each** of these wires at 40 AMPS.

NOTE: These fuses must be located within 2 wire feet of the battery.

Do not install these fuses into their holders until all wiring connections are completed!

3. Complete the connections and plug the connectors into the Amp/Relay Module.

System Power (J4) - RED: Power - BLACK: Ground

1. Extend the RED wire toward the vehicle battery. Extend the BLACK wire toward the vehicle battery. To pass the RED and BLACK wires through, you may have to drill a hole in the firewall. Insert a grommet to protect the wires.
2. Route the RED and BLACK wires along the factory harness towards the battery and install a fuse block (user supplied) on the end of the RED wire. **Remove fuse from fuse block before connecting any wires to battery.**
3. Connect fuse block wire to POSITIVE terminal on battery. There must not be more than 2 feet of wire between fuse block and battery. The wire between the fuse and battery is "unprotected", do not allow it to chafe and short to ground. Connect the BLACK wire to the factory chassis ground.

Outputs:

Icon Driver

This output provides +12VDC with a maximum circuit capacity of 250 mA. This output becomes active whenever a siren tone is active and operating properly.

Siren Speaker (J3)

1. Route the ORANGE and BROWN wires (included) from Connector J3, Pins 1 & 2, to the siren speaker.
2. Connect ORANGE wire to the WHITE speaker wire (speaker high).
3. Connect BROWN wire to BLACK speaker wire (speaker low).

NOTE: For dual speaker installation, connect the second speakers wires to the same destinations as the first speakers wires (see wiring diagram).

Radio Rebroadcast

The wires from J8, PINS 1 and 6 are used to connect your two-way radio's external speaker for radio re-broadcast. This is an optional connection and will not effect the other operations.

Note: Radio re-broadcast will NOT work with amplified remote speakers! If your remote speaker is amplified (i.e.: contains a power amp circuit in the speaker assembly), do not enable the radio re-broadcast feature.

1. Locate the two wires that connect the external speaker to the two-way radio, cut one of them and splice one of the BLU wires into this circuit.
2. Cut the remaining speaker wire and splice the remaining BLU wire into this circuit.

Backlighting

Activate control head backlighting by applying +VBAT to this input.

Inputs:

Horn Ring Inputs

If Hands Free siren control is desired, the vehicle horn ring circuit must be integrated into the siren system as shown in the wiring diagram.

Ignition Source Power Inputs

This system is switched on (or activated) using Ignition Source Power Inputs. This is accomplished by connecting the appropriate Ignition Source Power Input wire to the desired signal. If the polarity of the signal to be used is Positive (+), switch J8 PIN 3, WHT/RED. If the polarity of the signal is Negative (-), switch J8 PIN 8, RED/WHT to vehicle ground.

Park-Kill (Optional Connection)

This feature will automatically suspend an active siren tone when the transmission is shifted into Park. If this feature is desired, the installer must first determine if the signal wire from the transmission neutral safety switch is switching the positive or negative side of the circuit. Use J8 PIN 5, WHT/GRN if the signal is switching Positive. Use J8 PIN 10, GRN/BLK if the signal is switching Negative. Using 18 to 22 gage wire, extend and connect the appropriate wire from the amp/relay module to the vehicle's transmission neutral safety switch signal wire.

Output 9 Operation: Output 9 can be used in one of three ways:

- As the Horn Ring transfer relay (Option 1 in wiring diagram).
- As a general purpose Powered Output to drive a remote Horn Ring transfer relay (Option 2 in wiring diagram).
- As an isolated normally open/normally closed relay to make or break contact of any circuit.

Output 9 as the Horn Ring Relay:

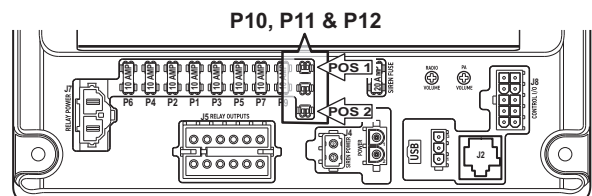
1. Route WHITE and WHT/BLU wires along factory wire harness and through the firewall at the same point as the RED and BLACK wires.
2. Route WHITE and WHT/BLU wires to vehicle's horn relay. If possible, follow the factory wire harness to this relay.
3. Cut the wire that connects the vehicle horn to the horn relay.
4. Connect the WHITE wire to the wire coming from the horn relay.
5. Connect the WHT/BLU wire to the wire coming from the horn.
6. Connect J5 - PIN 12 (WHT/BLK) to J8 - PIN 4.
7. Place fuse in position 2.

Output 9 as a General Purpose Powered Relay:

With the fuse in position 1, if output 9 is off, power from J7 is connected to PIN10 of J5 (normally closed), when output 9 is active, power from J7 is connected to PIN12 of J5 (normally open).

Output 9 as an Isolated Relay:

With the fuse in position 2, if output 9 is off, PIN11 of J5 is connected to PIN10 of J5 (normally closed), when output 9 is active, PIN11 of J5 is connected to PIN12 of J5 (normally open). Refer to the wiring diagram.



Amp/Relay Module Fuses

For ease of access, all of the amp/relay module fuses are accessible from outside the case.

PA Volume Adjustment

Locate the PA adjustment pot (potentiometer) on the amp/relay module (See wiring diagram). Using a small screwdriver, set the potentiometer to its middle position. With the system on, activate the PTT (Push To Talk) feature on the optional microphone. Adjust the potentiometer until a satisfactory PA volume level is achieved using a normal speaking voice.

Radio Repeat Volume Adjustment

To Adjust the Radio Repeat Levels: Before placing this unit into service, the Radio Repeat output volume must be adjusted to satisfactory operating levels. To adjust this level, a small screwdriver is needed. Locate the Radio Repeat adjustment potentiometer on the amp/relay module. Set the volume of the vehicle's two-way radio to it's normal operating level. Press the RAD

button on the control head to activate Radio Repeat. As incoming transmissions are received, adjust the Radio Repeat potentiometer to set the desired level. Turn the potentiometer clockwise to increase the level and counter-clockwise to decrease the level.

Hand-held Controller Default Push Button Operation Programming

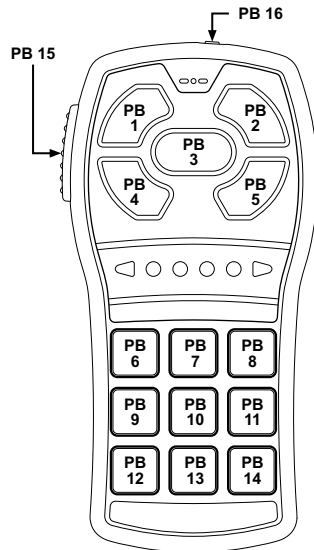
The button functions of the controller may be reprogrammed using the HHS4200 Configuration software. The Amp/Relay module must first be connected to the programming computer via the USB Port (J1).

Refer to the online help provided with the software for programming procedures.

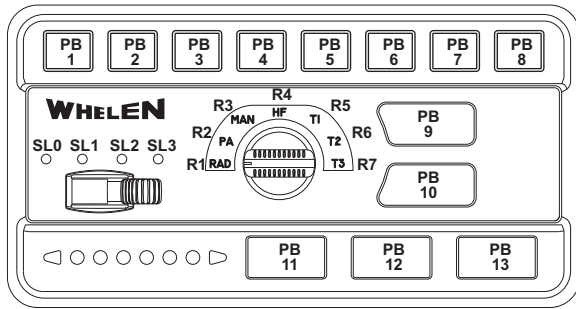
**Default Configuration:
HHS4200 & HHS4400**

**Control Head:
14+2 Button**

**Mounting Style:
Microphone Mount**



ID	Default Function	Description
PB 1	SL1	Activates Output 1.
PB 2	SL2	Activates Output 1 + 2.
PB 3	SL3	Activates Output 1 + 2 + 3.
PB 4	MAN	Initiates MANUAL tone. Applies OVERRIDE tone. Can cycle tones for Hands Free.
PB 5	AH	Broadcasts AIRHORN Tone.
PB 6	HF	Stand-by Mode, but Horn Ring or MAN button can activate the siren and be used to cycle through the Hands-Free buffer. Activates Horn Relay (Output 9).
PB 7	WAIL	Broadcasts the WAIL tone. Activates Horn Relay (Output 9).
PB 8	YELP	Broadcasts the YELP tone. Activates Horn Relay (Output 9).
PB 9	T3	Broadcasts PIERCER tone. Activates Horn Relay (Output 9).
PB 10	RAD	Rebroadcast radio output through siren speaker. Activates Horn Relay (Output 9)
PB 11	DIR	Cycles through Traffic Advisor: Left (Output 7) Right (Output 8) Split (Outputs 7 & 8) Off
PB 12	SW10	Activates Output 4.
PB 13	SW11	Activates Output 5.
PB 14	GL	Releases Gun Lock (Output6)
PB 15	P-T-T	Push-To-Talk (Microphone/PA)
PB 16	On/Off	Places system in Sleep mode.



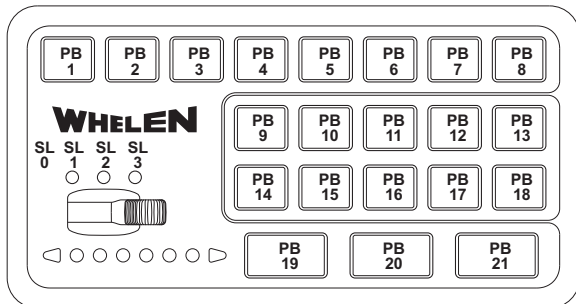
**Default Configuration:
HHS4206**

Control Head:
13 Button
w/Knob & Slide Switch

Mounting Style(s):
Bail Mount
Console Mount

Requires PA adaptor to use PA functions.

ID	Default Function	Description
PB 1	SW1	Activates Output 4.
PB 2	SW2	Activates Output 5
PB 3	SW3	
PB 4	SW4	
PB 5	SW5	
PB 6	SW6	
PB 7	SW7	
PB 8	GL	Activates Output 6
PB 9	MAN	Initiates Manual Tone. Applies Override Tone. Can cycle tones for Hands-Free.
PB 10	AH	Broadcast the Airhorn Tone.
PB 11	LT T/A	Activates Output 7.
PB 12	RT T/A	Activates Output 8
PB 13	FLSH	
R1	RAD	Rebroadcast radio output through the siren speaker. Activates Horn Relay (Output 9).
R2	PA	Activate PA Feature. Turns off Hands-Free.
R3	MAN	Changes functionality of Horn Ring Input.
R4	HF	Stand-By mode except that the Horn Ring (or the MAN button) can activate the siren and be used to cycle through the Hands-Free buffer. Activates Horn Relay (Output 9).
R5	T1	Broadcast WAIL tone. Activate Horn Relay (Output 9).
R6	T2	Broadcast YELP tone. Activate Horn Relay (Output 9).
R7	T3	Broadcast PIERCER tone. Activate Horn Relay (Output 9).
SL0	OFF	Stops All Functions.
SL1	1	Activates Output 1.
SL2	2	Activates Output 1 + 2.
SL3	3	Activates Output 1 + 2 + 3.



**Default Configuration:
HHS4207**

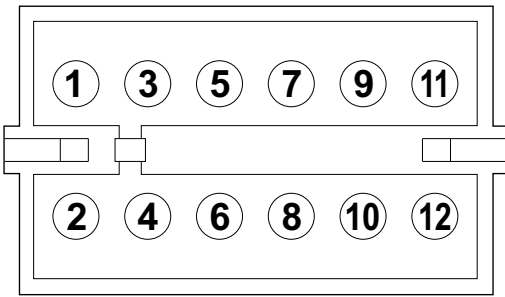
Control Head:
21 Button
w/Slide Switch

Mounting Style(s):
Bail Mount
Console Mount

Requires PA adaptor to use PA functions.

ID	Default Function	Description
PB 1	STBY	Clears all siren operations.
PB 2	RAD	Rebroadcast radio output through siren speaker. Activates Horn Relay (Output 9).
PB 3	HF	Stand-by Mode, but Horn Ring or MAN button can activate the siren and be used to cycle through the Hands-Free buffer. Activates Horn Relay (Output 9).
PB 4	T1	Broadcasts the WAIL tone. Activates Horn Relay (Output 9).
PB 5	T2	Broadcasts the YELP tone. Activates Horn Relay (Output 9).
PB 6	T3	Broadcasts the PIERCER tone. Activates Horn Relay (Output 9).
PB 7	MAN	Initiates MANUAL tone. Applies OVERRIDE tone. Can cycle tones for Hands Free.
PB 8	AH	Broadcasts the AIRHORN Tone.
PB 9	SW9	Activates Output 4.
PB 10	SW10	Activates Output 5.
PB 11	SW11	
PB 12	SW12	
PB 13	SW13	
PB 14	SW14	
PB 15	SW15	
PB 16	SW16	
PB 17	SW17	
PB 18	GL	Activates Output 6.
PB 19	LT T/A	Activates Output 7.
PB 20	RT T/A	Activates Output 8.
PB 21	FLSH	
SL 0	OFF	Stops All Siren and T/A functions.
SL 1	1	Activates Output 1.
SL 2	2	Activates Output 1 + 2.
SL 3	3	Activates Output 1 + 2 + 3. Turns on T1

J5 RELAY OUTPUTS



Configuration Record: For future reference, record the destination of each outlet and programmable input.

- Outlet 1 / PIN 4 - BRN** _____ 10 Amps Max.
- Outlet 2 / PIN 2 - RED** _____ 10 Amps Max.
- Outlet 3 / PIN 6 - ORG** _____ 10 Amps Max.
- Outlet 4 / PIN 1 - YEL** _____ 10 Amps Max.
- Outlet 5 / PIN 3 - GRN** _____ 10 Amps Max.
- Outlet 6 / PIN 5 - BLU** _____ 10 Amps Max.
- Outlet 7 / PIN 7 - VIO** _____ 10 Amps Max.
- Outlet 8 / PIN 9 - GRY** _____ 10 Amps Max.
- Outlet 9 / Dry Contact Relay / PIN 10 - WHT/BLU** _____ 15 Amps Max. (Fused)
- Outlet 9 / Dry Contact Relay / PIN 11 - WHT** _____ 15 Amps Max. (Fused)
- Outlet 9 / Dry Contact Relay / PIN 12 - WHT/BLK** _____ 15 Amps Max. (Fused)