

WHELEN®

ENGINEERING COMPANY INC.

51 Winthrop Road
 Chester, Connecticut 06412-0684
 Phone: (860) 526-9504
 Fax: (860) 526-4078
 Internet: www.whelen.com
 Sales e-mail: autosale@whelen.com
 Canadian Sales e-mail: canadiansales@whelen.com
 Customer Service e-mail: custserv@whelen.com

Installation/Operating Guide: CanTrol™ Siren/Light Control System

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!**

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.

- Proper installation of this product requires the installer to have a good understanding of automotive electronics, systems and procedures.
- 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 any 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.
- If this product uses a remote device to activate or control this product, make sure this control is located in an area that allows both the vehicle and the control to be operated safely in any driving condition. **DO NOT ATTEMPT TO ACTIVATE OR CONTROL THIS DEVICE IN A HAZARDOUS DRIVING SITUATION.**
- 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!**



**Wear
 Protection!**

CAUTION

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

For warranty information regarding this product, visit www.whelen.com/warranty

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Specifications

General

| | |
|---------------------------------|--|
| Input Voltage | 12 VDC \pm 20% Negative Ground Only |
| Main Input Current | 80 Amps Max. |
| Main Input Fuse | 2 Fuses @ 40 Amps ea. |
| Standby Current (backlight off) | Ign.On - 80mA (typ) / Ign.Off - 100 uA (typ) |
| Operating Temperature | -30°C to +60°C |
| Storage Temperature | -40°C to +70°C |
| Humidity | 99% (Non-condensing) |

Amp/Relay Module

| | |
|---------------------------------|----------------------------------|
| Wail | 725 to 1460 Hz (12 cycles/min.) |
| Yelp | 725 to 1460 Hz (180 cycles/min.) |
| Piercer™ | 725 to 1460 Hz (800 cycles/min.) |
| Hi/Low | 550 & 650 Hz (60 cycles/min.) |
| Airhorn | Composite (Constant) |
| Audio Bandwidth @ 25 Watts | 300 to 10000 Hz \pm 3db |
| Distortion @ 25Watts | 1% Maximum |
| Output Voltage @ 15VDC @11 ohms | 24Vrms Maximum |
| Speaker Impedance | 5.5 Ohms Minimum |

Outlet Current

| | |
|--------------------------------|--------------------------------|
| LED Outlets J2 & J4 (32 Total) | 2.5A Each (Internally Limited) |
|--------------------------------|--------------------------------|

Note: Total combined current not to exceed 40 Amps

| | |
|-----------------------------------|------------------|
| High Current Outlets J1 (8 Total) | 10A Each (Fused) |
|-----------------------------------|------------------|

Note: These may be Positive or Negative activated

Note: Total combined current not to exceed 40 Amps

| | |
|------------------------------------|---------------------------------|
| LC AUX Outlets (J4-1, J4-2, J4-11) | 250mA Each (Internally Limited) |
|------------------------------------|---------------------------------|

Input Operation

| | |
|-------------------|------------------------------------|
| Logic Inputs 1-4 | Positive or Negative Activation |
| Logic Inputs 5-8 | Positive Activation Only |
| Analog Inputs 1-3 | 0 - 12VDC |
| Ignition Sense | Connected to 12VDC Ignition Switch |

Dimensions (Amp/Relay Module)

| | |
|--------|-------------|
| Height | 3.25 inches |
| Width | 7.00 inches |
| Depth | 9.50 inches |

Dimensions (Control Head)

| | |
|--------|-------------|
| Height | 3.58 inches |
| Width | 6.85 inches |
| Depth | 1.32 inches |

Installation

CanTrol™ Module

1. Locate a suitable mounting location. A dry, cool compartment is a good choice.
2. Position the CanTrol™ Module on the proposed mounting location. Using an awl or similar tool, scribe the mounting surface where the mounting holes are to be drilled. Make sure that this mounting area allows sufficient ventilation for the CanTrol™ module's air vents and fans.

Caution: As mounting the CanTrol™ module will require drilling, it is absolutely necessary to make sure that no other vehicle components could be damaged in the process. Check both sides of the mounting surface before starting. If damage is likely, select a different mounting location.

3. Remove the module from its mounting area, and using a drill bit sized for a #10 sheet metal screw, drill a hole in each of the areas scribed in the previous step.
4. Return the module to its mounting location and using #10x3/4" sheet metal screws (provided), secure the module onto its mounting surface. Be sure to install a #10 internal tooth lock washer (included) onto each mounting screw before mounting the unit. **IMPORTANT:** The CanTrol™ module case must be either mounted on, or grounded to the vehicle chassis.

Control Head

The CanTrol™ control head features 18 push-buttons with active illumination, a 4-position slide switch (off, 1, 2 & 3) and a Traffic Advisor™ display that enables the operator to view a representation of the direction being displayed. There are two basic mounting brackets for the CanTrol™ control head. One allows the control head to be mounted into your vehicle's console (if so equipped). The other allows the control head to be mounted directly onto the dash or other surface through the use of a bail strap mounting bracket. **Regardless of the style selected, be sure to observe the air bag warning on the cover of this manual.**

Bail-strap mount

1. Position the bail strap in the selected mounting location. Using an awl or other suitable tool, scribe the surface where the mounting holes are to be drilled.

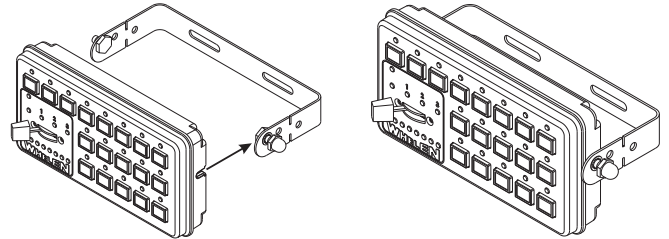
Caution: As mounting the control head will require drilling, it is absolutely necessary to make sure that no other vehicle components could be damaged in the process. Check both sides of the mounting surface before starting. If damage is likely, select a different mounting location.

2. Drill the mounting holes in the areas scribed in step 1. The size of the drill bit should be determined by the size of the mounting hardware (#10 sheet metal screw) and thickness of the mounting surface.

3. Using hardware provided (#10 x 3/4" sheet metal screw & #10 internal tooth lockwasher), secure the bail strap to the mounting location.

Note: *There are 3 sets of holes on the bail strap for positioning the control head at 3 different heights.*

4. With the bail strap in place, insert the #10 x 3/8" hex head bolt into the assembly hole from the inner side of the bail strap. Place the #10 internal-tooth lock washer and the acorn nut on the protruding bolt on the outer side of the bail strap. Loosely secure the acorn nut to the hex head bolt.



Now slide the control head onto the bolt heads. Once it is in the position that the customer has chosen, and the control head has fully engaged the bolt heads, tighten the acorn nuts until the unit is firmly secured.

A third pair of mounting holes are provided that will enable the control head to be located much closer to the bail strap than the other pairs allow. If this closer location is used, the tips of the bail bracket may be broken off at the notches shown.

Havis Console Mount

The Havis console mounting kit includes all the necessary hardware needed to secure the control head to the mounting bracket for installation on a Havis console. The control head mounts onto the console mount bracket the same way the control head mounts onto the bail bracket as outlined previously except for the addition of a flat washer that must be inserted between the control head and the bracket. Please refer to the manual included with your console for specific information on securing the control head/mounting bracket assembly onto the console.

For installation into consoles by other manufacturers, a control head bracket designed for your console must be obtained from the console manufacturer.

Microphone

A 1/4" port is provided on the CanTrol™ module for installation of the microphone.

If the optional 20' extension cord is used, install this cord as outlined above. Install the mic plug bracket (included with kit) in the desired area using #8 x 1/2" hardware (included). Route the cord to the plug bracket, install the cable end thru the bracket hole and fasten using the hex nut provided.

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 (see wire chart on page 9).

NOTE: Item numbers reference the illustration found on page 8 & page 9.

IMPORTANT! Wires connecting to the amp/relay module have the proper terminals pre-installed. If the customer needs to re-terminate these wires for any reason, the proper tool **MUST** be used to insure proper crimping.

System Power (Item 9)

1. Locate the 4-position Molex™ connector (item 9).
2. Using appropriately sized wire, extend the two RED wires to the Positive (+) battery terminal. Fuse each wire independently @ 40 Amps. DO NOT install these fuses until the wiring for the entire system has been completed.
3. Using appropriately sized wire, extend the two BLACK wires from the CanTrol™ module to the vehicle's chassis ground. This is typically adjacent to the battery.
4. Complete the connections and plug the connectors into the CanTrol™ module.

Ignition Sense (Item 13)

1. Locate the RED/WHT wire at J17-7.
2. Connect this wire to the vehicle ignition switch. This will allow the CanTrol™ system to be turned off with the ignition switch.

Outputs

CanTrol™ offers the following outlets:

- 32 LED outputs (2.5A Max. each)
- 8 High Current outputs (10A Max. each)
- 3 Aux. outputs (250mA Max each)

Siren Speaker (Item 9)

1. Route the ORG and BRN wires from the CanTrol™ module to the siren speaker.
2. Connect ORG wire to the WHT speaker wire (speaker high).
3. Connect BRN wire to BLK speaker wire (speaker low).

NOTE: For dual speaker installation, connect the second speakers wires to the same destinations as the first speakers wires (see page 10).

Radio Rebroadcast (Item 13)

Two BLU wires (J17-8 & J17-16) are used to connect your two-way radio's external speaker for radio rebroadcast. This is an optional connection and will not effect the other operations.

Note: Radio rebroadcast 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 rebroadcast 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 (Item 13)

1. Route the BLK/WHT wire (J17-9) from the CanTrol™ module to the vehicle's marker light circuit.
2. Splice this wire into this circuit to enable the control head backlighting to be active whenever the vehicle's marker light is active.

Inputs

The CanTrol™ system inputs operate as follows:

Logic Inputs - These are programable inputs and their default configuration and activation polarity is as follows:

Logic Input 1 (J17-1) - Horn Ring Input (Ground Activated). Identical in operation to the Manual button when the Horn Transfer Relay has been activated.

Logic Input 2 (J17-2) - Park Sense 1 (Ground Activated). Terminates siren operations.

Logic Input 3 (J17-3) - Park Sense 2 (+12V Activated). Terminates siren operations.

Inputs 2 & 3 should be connected to the vehicle's transmission neutral safety switch signal wire. **Always consult your vehicle's technical manual before altering your vehicle's wiring or using this feature. Wiring modifications may compromise your vehicle's safety and/or performance.**

Logic Input 4 (J17-4) - Horn Ring Input (+12V Activated). Identical in operation to the Manual button when the Horn Transfer Relay has been activated.

Logic Input 5 (J17-9) - Backlight (12V Activated). Activates Control Head backlight.

Logic Input 6 (J17-10) - Sync Lightbar (12V Activated). Synchronizes lightbar pattern with vehicle lighting.

Logic Input 7 (J17-11) - Rear Light Cutout (12V Activated). Changes operation of Master Cutout button from Front Cutout to Rear Cutout.

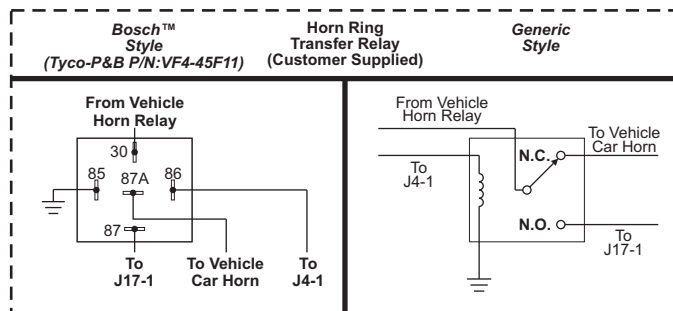
Logic Input 8 (J17-12) - Hands Free Lighting. Enables Warning Light pattern changes during Hands Free Siren operation. When enabled, cycling to Yelp in Hands Free will cause all active vehicle lighting patterns to change to DoubleFlash 150. Cycling to Piercer will cause all active vehicle lighting patterns to change to SingleFlash 300. Cycling to Wail returns all active vehicle lighting patterns to their default pattern.

Analog Inputs - There are three (3) analog inputs (J17-5, J17-13 and J17-6). Their input voltage may range from 0 to 12VDC. By default, these inputs are disabled and can be enabled as needed.

The remaining inputs are designated to be used for Ignition Sense (J17-7) and Radio Repeat (J17-8 & J17-16).

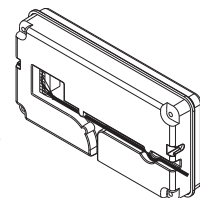
Hands-Free Siren (Items 4 & 13) (Optional)

1. Using a customer supplied relay capable of handling the current of your vehicle horn, connect as shown below.



Control Head Strain Relief

1. Route the control head cable (provided) from the CanTrol™ module to the designated mounting location. Plug this cable securely into the rear of the control head. Be sure to route the cable through either of the two recessed pathways (shown here). This will prevent the cable from being accidentally disconnected or pinched by the control head.



PA Volume Adjustment (Item 11)

Using a small, flat-blade screwdriver, set the potentiometer to its middle position. With the CanTrol™ 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 (Item 12)

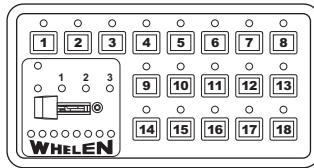
To Adjust the Radio Repeat Levels: Before placing this unit into service, the Radio Repeat output volume must be adjusted to satisfactory operating levels. To adjust this level, a small, flat-blade screwdriver is needed. Locate the Radio Repeat adjustment potentiometer on the left side of the CanTrol™ module. Set the volume of the vehicle's two-way radio to its 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.

Default Control Head Configuration:

There is an almost limitless number of configurations in which the CanTrol™ system can be programmed. Each of the available control heads operate differently from one another. This section will outline the default configurations for each control head.

Standard Control Head

The following defines the default operation of the standard CanTrol™ Control Head.



#1 (Stand-by) - This button clears all siren operations and forces the siren off.

#2 (Radio Repeat) - This button will rebroadcast your radio output through the siren speaker.

#3 (Hands-Free) - This button will put the siren into Hands-Free mode. This is similar to the stand-by mode except that the Horn Ring (or MAN button) can activate the siren and then cycle through the H/F buffer. To deactivate the siren, press STBY.

#4 (Wail) - This button will broadcast the Wail tone. The tone can be silenced by pressing the WAIL button a second time or by pressing the STBY button.

#5 (Yelp) - This button will broadcast the Yelp tone. The tone can be silenced by pressing the YELP button a second time or by pressing the STBY button.

#6 (Piercer) - This button will broadcast the Piercer tone. The tone can be silenced by pressing the PIER button a second time or by pressing the STBY button.

#7 (Manual) - This button has several functions. If the siren is inactive, the Manual button starts the "Siren Inactive Tone." If Wail, Yelp or T3 are active, then Manual can initiate the "Override mode." In Hands-Free mode, the Manual button can toggle through the buffered HF tones:

Cycle Hands-free - Pressing the MAN button while the system is in Hands-Free mode will generate a WAIL tone. A second press will change that tone to YELP. A third press will change that tone to T3. A subsequent press will cause the cycle to repeat beginning with WAIL.

Siren Inactive Tone - This is the tone that will be generated when the MAN button is pressed while no other tone is active. Ramp Stop is the default.

T3 Override Tone - This is the tone that will override T3 when the MAN button is pressed. Airhorn is the default

NOTE: Yelp always overrides the Wail tone, T3 always overrides the Yelp tone and the T3 Override tone selected in the previous paragraph overrides the T3 tone.

#8 (Airhorn) - This button will broadcast the Airhorn tone as long as the button is pressed, over-riding other siren tones.

#9 (Traffic Advisor) - This button operates the optional Traffic Advisor™. The button will sequence through the "LEFT", "RIGHT", "SPLIT" and "OFF" states. This button also activates High-current outputs in the following cycle: J1-7 then J1-8 then J1-7 & J1-8 simultaneously.

#10 (Cruise) - This button activates lightbar cruise lights.

#11 (Master Cut) - Activates Front Light Cutout by default. If Logic Input 7 (J17-11) is active, Rear Light Cutout will be activated instead.

#12 (AUX 3) - Activates high current output 6 (J1-6).

#13 (Low Power) - Activates Low Power on all active warning lights except lightbar corner modules.

#14 (Takedown) - Activates lightbar Takedown and/or worklights if present.

#15 (Left Alley) - Activates lightbar Left Alley if present.

#16 (Right Alley) - Activates lightbar Right Alley if present.

#17 (AUX 1) - Activates high current output 4 (J1-4).

#18 (AUX 2) - Activates high current output 5 (J1-5).

Slide Switch Position 0 - Shuts off siren and primary lighting.

Slide Switch Position 1 - Activates all rear warning lights. All vehicle warning lights will flash in Synchronous SignalAlert™ 75 (Alternating). The lightbar will also flash in Alternating SignalAlert 75, but asynchronously. To force the lightbar to flash synchronously, activate Logic Input 6 (J17-10).

Slide Switch Position 2 - Activates both front and rear warning lights. All vehicle warning lights will flash in Synchronous SignalAlert 75 (Alternating). The lightbar will also flash in Alternating SignalAlert 75, but asynchronously. To force the lightbar to flash synchronously, activate Logic Input 6 (J17-10).

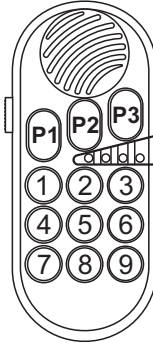
Slide Switch Position 3 - Activates all warning lights including wig-wigs, flashing Alleys and Takedowns. All vehicle lights will flash in Synchronous SignalAlert 75 (Alternating). The lightbar will also flash in Alternating SignalAlert 75, but Asynchronously. To force the lightbar to flash synchronously, activate Logic Input 6 (J17-10).

Control Head with Priority Button

This model operates the same as the standard control head except that the slide switch has been replaced with the Master Emergency Button. This button activates all warning lights including wig-wigs, flashing Alleys and Takedowns. All vehicle lights will flash in Synchronous SignalAlert 75 (Alternating). The lightbar will also flash in Alternating SignalAlert 75, but Asynchronously. To force the lightbar to flash synchronously, activate Logic Input 6 (J17-10).

Hand-held Control Head

Priority Button 1 - Activates all rear warning lights. All vehicle warning lights will flash in Synchronous Signal Alert 75 (Alternating). The lightbar will also flash in Alternating Signal Alert 75, but Asynchronously. To force the lightbar to flash synchronously, activate Logic Input 6 (J17-10).



Priority Button 2 - Activates both front and rear warning lights. All vehicle warning lights will flash in Synchronous Signal Alert 75 (Alternating). The lightbar will also flash in Alternating Signal Alert 75, but Asynchronously. To force the lightbar to flash synchronously, activate Logic Input 6 (J17-10).

Priority Button 3 - Activates all warning lights including wig-wigs, flashing Alleys and Takedowns. All vehicle lights will flash in Synchronous SignalAlert 75 (Alternating). The lightbar will also flash in Alternating SignalAlert 75, but Asynchronously. To force the lightbar to flash synchronously, activate Logic Input 6 (J17-10).

Button 1 (Hands Free) - Enables Hands Free operation.

Button 2 (Manual) - Activates Manual Stop siren tone, cycles Hands Free operation and toggles the siren override tone for Wail, Yelp and Piercer.

Button 3 (Air Horn) - Activates Air Horn tone.

Button 4 (Wail) - Activates Wail siren tone.

Button 5 (Radio) - Activates Radio Rebroadcast.

Button 6 (Alleys) - Activates Lightbar Alley Lights. First press is for Left Alley, second press is for Right Alley and the third press is for both Alleys.

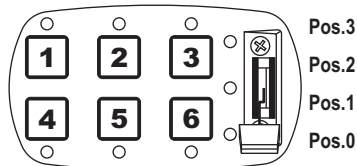
Button 7 (Traffic Advisor) - Activates both the integrated T/A and the lightbar T/A (if present). First press is for Right, second press is for Left and third press is for Split. This button also activates High-current outputs in the following cycle: J1-7 then J1-8 then J1-7 & J1-8 simultaneously.

Button 8 (AUX) - This button activates High Current Output 4 (J1-4).

Button 9 (Takedown) - Activates lightbar takedowns or work lights, if present.

Six-button Control Head

Slide Switch 1 - Activates all rear warning lights. All vehicle warning lights will flash in Synchronous Signal Alert 75 (Alternating). The lightbar will also flash in Alternating Signal Alert 75, but Asynchronously. To force the lightbar to flash synchronously, activate Logic Input 6 (J17-10).



Slide Switch 2 - Activates both front and rear warning lights. All vehicle warning lights will flash in Synchronous Signal Alert 75 (Alternating). The lightbar will also flash in Alternating Signal Alert 75, but Asynchronously. To force the lightbar to flash synchronously, activate Logic Input 6 (J17-10).

Slide Switch 3 - Activates all warning lights including wig-wigs, flashing Alleys and Takedowns. All vehicle lights will flash in Synchronous SignalAlert 75 (Alternating). The lightbar will also flash in Alternating SignalAlert 75, but Asynchronously. To force the lightbar to flash synchronously, activate Logic Input 6 (J17-10).

Button 1 (Hands Free) - Enables Hands Free operation.

Button 2 (Manual) - Activates Manual Stop siren tone, cycles Hands Free operation and toggles the siren override tone for Wail, Yelp and Piercer.

Button 3 (Air Horn) - Activates Air Horn tone.

Button 4 (Traffic Advisor) - Activates both the integrated T/A and the lightbar T/A (if present). First press is for Right, second press is for Left and third press is for Split. This button also activates High-current outputs in the following cycle: J1-7 then J1-8 then J1-7 & J1-8 simultaneously.

Button 5 - Activates the Takedowns and Alley lights as follows:

- First press activates Takedowns
- Second press activates Left Alley
- Third press activates Right Alley
- Fourth press activates Takedowns and Alley lights
- Fifth press is Off.

Button 6 (AUX) - This button activates High Current Output 4 (J1-4).

Dip Switch 1 (Front T/A) - Enables a second T/A in the front of the lightbar.



Dip Switch 2 (Cruise w/Backlight) - Enables Cruise light activation when backlight is active.

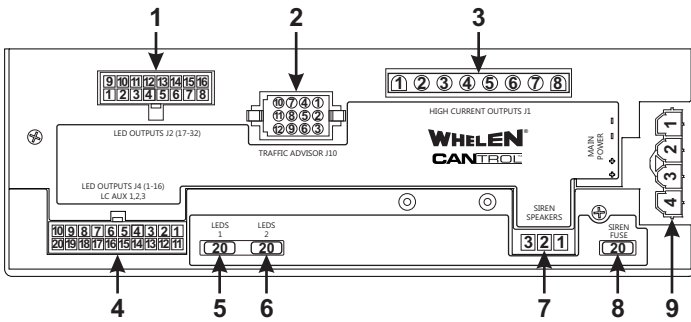


Dip Switch 3 (All Bar Patterns) - Replaces Asynchronous SignalAlert with an All Bar pattern on slide switch 1, 2 and 3.



Dip Switch 4 (Duo T/A) - Enables Duo T/A compatibility.





1 (J2) - LED Outputs 17-32

| Pos. | Output | Color | Location | Phase |
|-------|--------|---------|----------|-------|
| J2-1 | 17 | BRN | Front | 1 |
| J2-2 | 18 | RED | Front | 1 |
| J2-3 | 19 | ORG | Front | 1 |
| J2-4 | 20 | YEL | Front | 1 |
| J2-5 | 21 | WHT/BRN | Front | 2 |
| J2-6 | 22 | WHT/RED | Front | 2 |
| J2-7 | 23 | WHT/ORG | Front | 2 |
| J2-8 | 24 | WHT/YEL | Front | 2 |
| J2-9 | 25 | GRN | Rear | 1 |
| J2-10 | 26 | BLU | Rear | 1 |
| J2-11 | 27 | VIO | Rear | 1 |
| J2-12 | 28 | GRY | Rear | 1 |
| J2-13 | 29 | WHT/GRN | Rear | 2 |
| J2-14 | 30 | WHT/BLU | Rear | 2 |
| J2-15 | 31 | WHT/VIO | Rear | 2 |
| J2-16 | 32 | WHT/GRY | Rear | 2 |

2 (J10) - Traffic Advisor Outputs

| Pos. | Description |
|--------|----------------------|
| J10-1 | (BRN) - T/A 1 |
| J10-2 | (RED) - T/A 2 |
| J10-3 | (ORG) - T/A 3 |
| J10-4 | (YEL) - T/A 4 |
| J10-5 | (GRN) - T/A 5 |
| J10-6 | (BLU) - T/A 6 |
| J10-7 | (VIO) - T/A 7 |
| J10-8 | (GRY) - T/A 8 |
| J10-9 | (WHT) - Comm. (+12V) |
| J10-10 | Not Used |
| J10-11 | Not Used |
| J10-12 | Not Used |

3 (J1) - High Current Outputs

| Pos. | Activates with |
|------|---------------------------------------|
| J1-1 | (BRN) Slide Switch Positions 1, 2 & 3 |
| J1-2 | (RED) Slide Switch Positions 2 & 3 |
| J1-3 | (ORG) Slide Switch Position 3 |
| J1-4 | (YEL) Button AUX 1 |
| J1-5 | (GRN) Button AUX 2 |
| J1-6 | (BLU) Button AUX 3 |
| J1-7 | (VIO) T/A Left & Split |
| J1-8 | (GRY) T/A Right & Split |

4 (J4) - LED Outputs 1-16 + LC AUX 1, 2, 3

| Pos. | AUX | Color | Function |
|-------|-----|---------|-------------------------------|
| J4-1 | 1 | WHT/BLK | Horn Transfer Relay |
| J4-2 | 2 | RED/WHT | Wig-Wag |
| J4-11 | 3 | WHT | Camera Icon (Siren Activated) |

| Pos. | Output | Color | Location | Phase |
|-------|--------------|---------|----------|-------|
| J4-3 | 1 | BRN | Front | 1 |
| J4-4 | 2 | RED | Front | 1 |
| J4-5 | 3 | ORG | Front | 1 |
| J4-6 | 4 | YEL | Front | 1 |
| J4-7 | 5 | WHT/BRN | Front | 2 |
| J4-8 | 6 | WHT/RED | Front | 2 |
| J4-9 | 7 | WHT/ORG | Front | 2 |
| J4-10 | 8 | WHT/YEL | Front | 2 |
| J4-12 | - Not Used - | | | |
| J4-13 | 9 | GRN | Rear | 1 |
| J4-14 | 10 | BLU | Rear | 1 |
| J4-15 | 11 | VIO | Rear | 1 |
| J4-16 | 12 | GRY | Rear | 1 |
| J4-17 | 13 | WHT/GRN | Rear | 2 |
| J4-18 | 14 | WHT/BLU | Rear | 2 |
| J4-19 | 15 | WHT/VIO | Rear | 2 |
| J4-20 | 16 | WHT/GRY | Rear | 2 |

5 - LEDS1

This fuse (20A) protects Outputs 1 thru 8

6 - LEDS2

This fuse (20A) protects Outputs 9 thru 16

7 - Siren Speaker

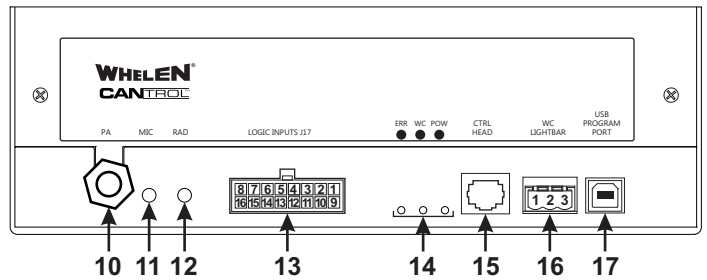
| Pos. | Description |
|------|-------------|
| 1 | Speaker (+) |
| 2 | Not Used |
| 3 | Speaker (-) |

8 - Siren Fuse

This fuse (20A) protects the Siren Output

9 - Main Power

| Pos. | Description |
|------|--------------------|
| 1 | GND |
| 2 | GND |
| 3 | +12VDC(Fuse @ 40A) |
| 4 | +12VDC(Fuse @ 40A) |



10 - PA Microphone Port

This port accepts a standard 1/4" Microphone plug for PA functions. NOTE: If your system uses the hand-held controller, this port should not be used.

11 - MIC Volume Adjustment

Used to set the PA broadcast level to the desired volume (see text).

12 - RAD Repeat Volume

Used to set the PA broadcast level to the desired volume (see text).

13 (J17) - Logic Inputs

| Pos. | Input | Color | Function |
|--------|-----------|---------|---------------------|
| J17-1 | Logic 1 | WHT/BRN | Horn Sense (Neg.) |
| J17-2 | Logic 2 | WHT/RED | Park Sense 1 (Neg.) |
| J17-3 | Logic 3 | WHT/ORG | Park Sense 2 (Pos.) |
| J17-4 | Logic 4 | WHT/YEL | Horn Sense (Pos.) |
| J17-9 | Logic 5 | BLK/WHT | Backlight |
| J17-10 | Logic 6 | WHT/GRN | SYNC Lightbar |
| J17-11 | Logic 7 | WHT | Rear Cut |
| J17-12 | Logic 8 | WHT/BLU | HF Lighting |
| J17-5 | Analog 1 | WHT/BLK | Unused |
| J17-13 | Analog 2 | WHT/GRY | Unused |
| J17-6 | Analog 3 | WHT/VIO | Unused |
| J17-7 | Ign.Sense | RED/WHT | Ignition |
| J17-8 | Radio | BLU | Radio Repeat |
| J17-16 | Radio | BLU | Radio Repeat |

14 - Diagnostic LEDs

ERR (Error) LED

| | |
|--------------|---|
| Steady | CanTrol Controller Bus is set to OFF. Check Interface Box. |
| Off | No Error. |
| Single Flash | Bad CanTrol connection. Check Lightbar I/O or Interface Box for proper operation. |
| Double Flash | Error Control Event. Check Lightbar I/O. |

WC (CanTrol Serial Data Bus) LED

| | |
|--------------|--|
| Steady | Good communication received from Lightbar. |
| Off | Check Power LED; If Off, turn on Controller. If On, check connections |
| Fast Blink | Pre-operational State (Boot-up). |
| Single Flash | Bad CanTrol connection or CanTrol off. Check lightbar I/O or Interface Box for proper operation. |

POW (Power) Status LED

| | |
|--------|------------------------|
| Steady | CanTrol system is On. |
| Off | CanTrol system is Off. |

15 - Control Head

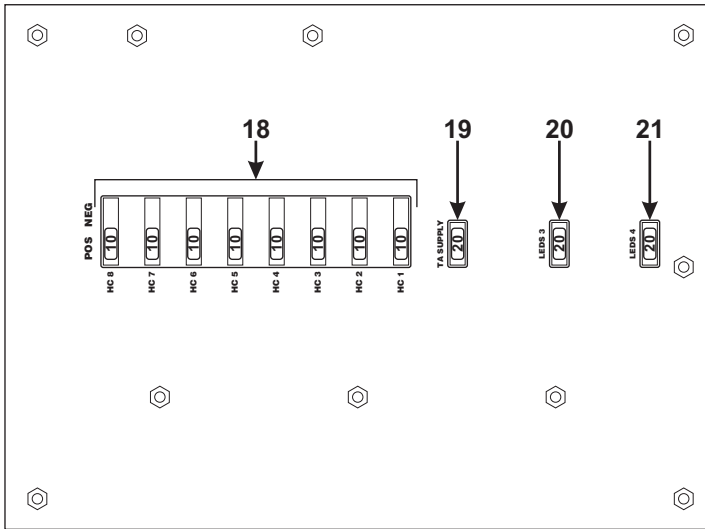
Used to connect the control head to the CanTrol system

16 - WC Lightbar

| Pos. | Description | Color |
|------|-------------|-------|
| 1 | CAN A | GRN |
| 2 | SHIELD | BARE |
| 3 | CAN B | GRY |

17 - USB Port

Used to connect a Windows™ based laptop or PC to the CanTrol System.



18 - High Current Output Fuses

| ID | Protects | Fuse |
|------|-------------|--------|
| HC 1 | Output J1-1 | 10 Amp |
| HC 2 | Output J1-2 | 10 Amp |
| HC 3 | Output J1-3 | 10 Amp |
| HC 4 | Output J1-4 | 10 Amp |
| HC 5 | Output J1-5 | 10 Amp |
| HC 6 | Output J1-6 | 10 Amp |
| HC 7 | Output J1-7 | 10 Amp |
| HC 8 | Output J1-8 | 10 Amp |

Note: The position for a given output fuse is determined by how that output is switched. If the output is switching +VDC, the fuse for that output should be in the POS position. If it is switching -VDC, the fuse should be in the NEG position.

19 - T/A Supply

This fuse (20 Amp) protects Traffic Advisor Output J10-9.

20 - LEDS3

This fuse (20 Amp) protects LED Outputs 17 thru 24 (J2-1 thru J2-8).

21 - LEDS4

This fuse (20 Amp) protects LED Outputs 25 thru 32 (J2-9 thru J2-16).

Wire Gauge Calculation Chart

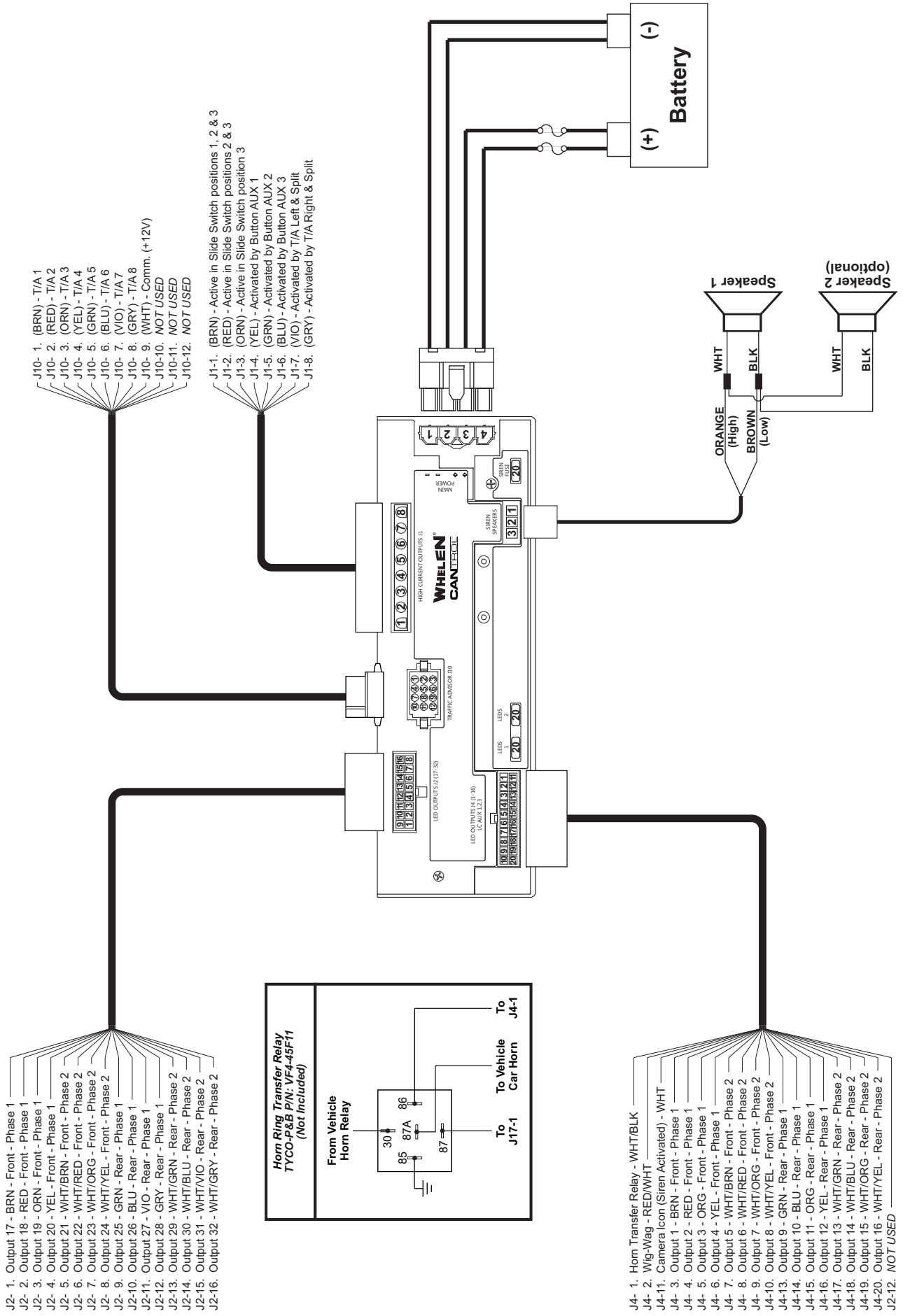
Maximum Current Draw Through The Wire

| Wire Gauge | Maximum Current Draw Through The Wire | | | | | | | | | | |
|------------|---------------------------------------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--|
| | 5 Amps | 10 Amps | 15 Amps | 20 Amps | 25 Amps | 30 Amps | 35 Amps | 40 Amps | 45 Amps | 50 Amps | |
| 22 AWG | 6 Feet | 3 Feet | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | |
| 20 AWG | 9.5 Feet | 5 Feet | 3 Feet | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | |
| 18 AWG | 15 Feet | 7.5 Feet | 5 Feet | 4 Feet | 3 Feet | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | |
| 16 AWG | 24.5 Feet | 12 Feet | 8 Feet | 6 Feet | 5 Feet | 4 Feet | 3.5 Feet | 3 Feet | Insufficient | Insufficient | |
| 14 AWG | 39 Feet | 19.5 Feet | 13 Feet | 9.5 Feet | 8 Feet | 6.5 Feet | 5.5 Feet | 5 Feet | 4.5 Feet | 4 Feet | |
| 12 AWG | 62 Feet | 31 Feet | 20.5 Feet | 15.5 Feet | 12.5 Feet | 10.5 Feet | 9 Feet | 7.5 Feet | 7 Feet | 6 Feet | |
| 10 AWG | 98 Feet | 49 Feet | 32.5 Feet | 24.5 Feet | 19.5 Feet | 16.5 Feet | 14 Feet | 12.5 Feet | 11 Feet | 10 Feet | |
| 8 AWG | 156 Feet | 78 Feet | 52 Feet | 39 Feet | 31 Feet | 26 Feet | 22.5 Feet | 19.5 Feet | 17.5 Feet | 15.5 Feet | |
| 6 AWG | 248.5 Feet | 124 Feet | 82.5 Feet | 62 Feet | 49.5 Feet | 41.5 Feet | 35.5 Feet | 31 Feet | 27.5 Feet | 25 Feet | |
| 4 AWG | 395 Feet | 197.5 Feet | 131 Feet | 98.5 Feet | 79 Feet | 66 Feet | 56.5 Feet | 49.5 Feet | 44 Feet | 39.5 Feet | |
| 2 AWG | 629 Feet | 314 Feet | 209 Feet | 157 Feet | 125.5 Feet | 104.5 Feet | 89.5 Feet | 78.5 Feet | 69.5 Feet | 63 Feet | |

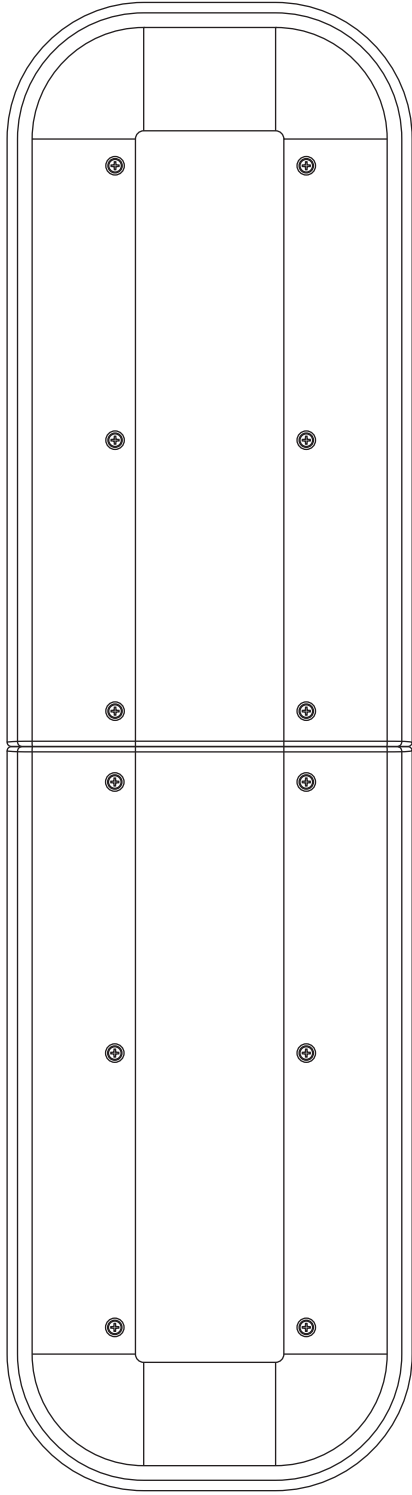
Maximum Current Draw Through The Wire

| Wire Gauge | Maximum Current Draw Through The Wire | | | | | | | | | | |
|------------|---------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--|
| | 55 Amps | 60 Amps | 65 Amps | 70 Amps | 75 Amps | 80 Amps | 85 Amps | 90 Amps | 95 Amps | 100 Amps | |
| 22 AWG | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | |
| 20 AWG | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | |
| 18 AWG | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | |
| 16 AWG | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | |
| 14 AWG | 3.5 Feet | 3 Feet | 3 Feet | 3 Feet | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | Insufficient | |
| 12 AWG | 5.5 Feet | 5 Feet | 5 Feet | 4.5 Feet | 4 Feet | 4 Feet | 3.5 Feet | 3.5 Feet | 3.5 Feet | 3 Feet | |
| 10 AWG | 9 Feet | 8 Feet | 7.5 Feet | 7 Feet | 6.5 Feet | 6 Feet | 6 Feet | 5.5 Feet | 5 Feet | 5 Feet | |
| 8 AWG | 14 Feet | 13 Feet | 12 Feet | 11 Feet | 10.5 Feet | 10 Feet | 9 Feet | 8.5 Feet | 8 Feet | 8 Feet | |
| 6 AWG | 22.5 Feet | 20.5 Feet | 19 Feet | 17.5 Feet | 16.5 Feet | 15.5 Feet | 14.5 Feet | 14 Feet | 13 Feet | 12.5 Feet | |
| 4 AWG | 36 Feet | 33 Feet | 30.5 Feet | 28 Feet | 26.5 Feet | 24.5 Feet | 23 Feet | 22 Feet | 21 Feet | 19.5 Feet | |
| 2 AWG | 57 Feet | 52.5 Feet | 48.5 Feet | 45 Feet | 42 Feet | 39 Feet | 37 Feet | 35 Feet | 33 Feet | 31.5 Feet | |

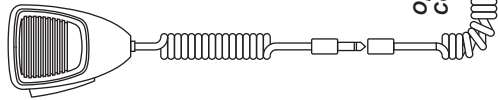
CanTrol™ System Wiring Guide - 1



CanTrol™ System Wiring Guide - 2

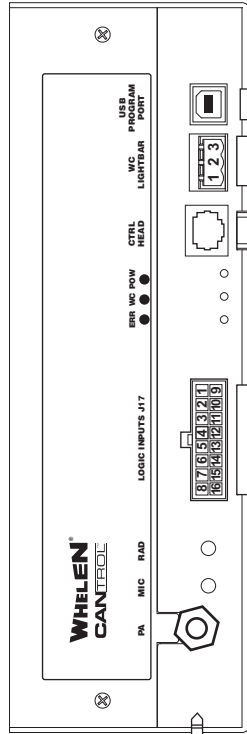


Microphone Not For Use With The CanTrol™ Hand-Held Controller

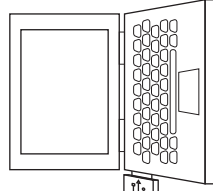
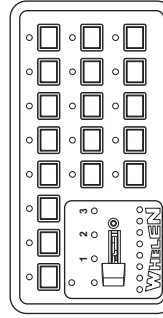


Optional Microphone Extension Cord Shown For Reference Only

Justice WC Lightbar Shown For Reference



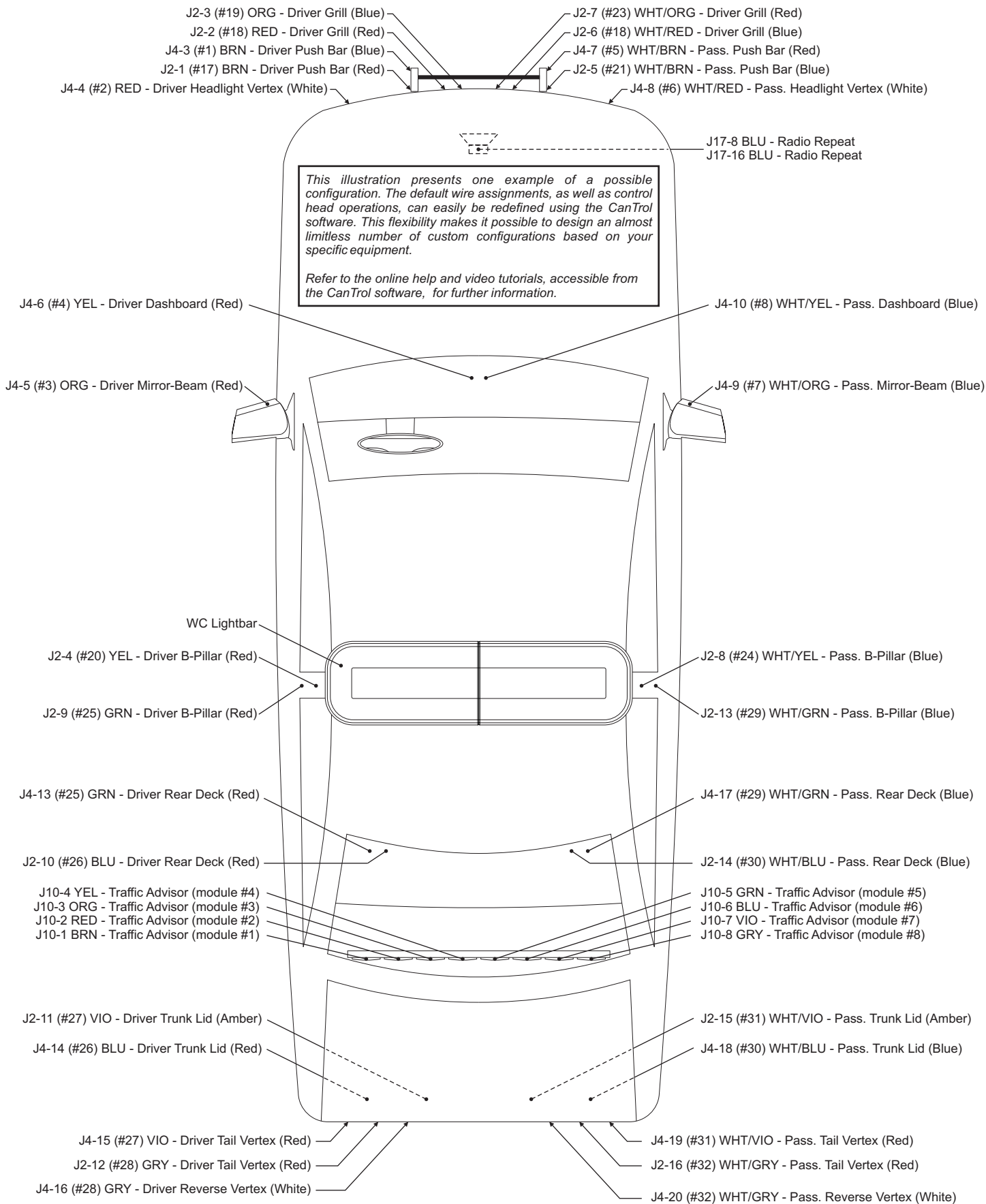
Standard CanTrol Control Head Shown For Reference



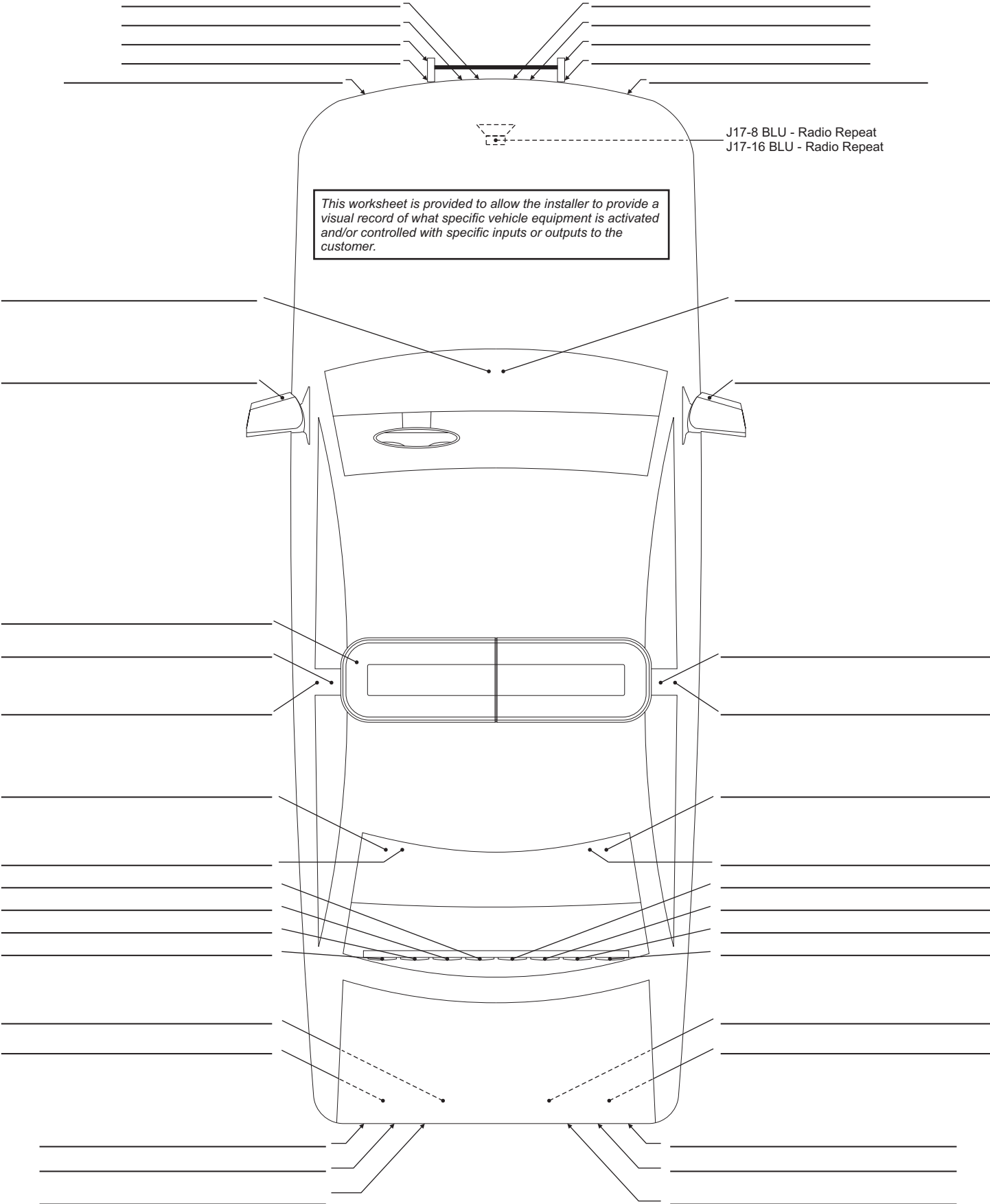
USB

- J17- 1. Logic Input 1 - WHT/BRN - Horn Sense (Neg.)
- J17- 2. Logic Input 2 - WHT/RED - Park Sense 1
- J17- 3. Logic Input 3 - WHT/ORN - Park Sense 2
- J17- 4. Logic Input 4 - WHT/YEL - Horn Sense (Pos.)
- J17- 9. Logic Input 5 - BLK/WHT - Backlight
- J17-10. Logic Input 6 - WHT/GRN - SYNC Lightbar
- J17-11. Logic Input 7 - WHT - Rear Cut
- J17-12. Logic Input 8 - WHT/BLU - HF Lighting
- J17- 5. Analog Input 1 - WHT/BLK - Unused
- J17-13. Analog Input 2 - WHT/GRY - Unused
- J17- 6. Analog Input 3 - WHT/VIO - Unused
- J17- 7. Ignition Sense - RED/WHT - Vehicle Ignition
- J17- 8. Radio - BLU - Radio Repeat
- J17-16. Radio - BLU - Radio Repeat
- J17-14. Not Used
- J17-15. Not Used

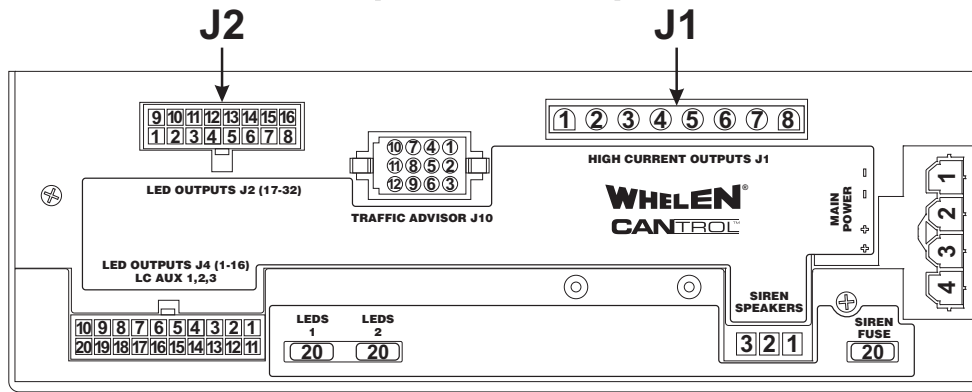
Sample CanTrol™ System



CanTrol™ System Worksheet



CanTrol™ Installation Worksheet (J-1 & J2)



J1 - High Current Outputs

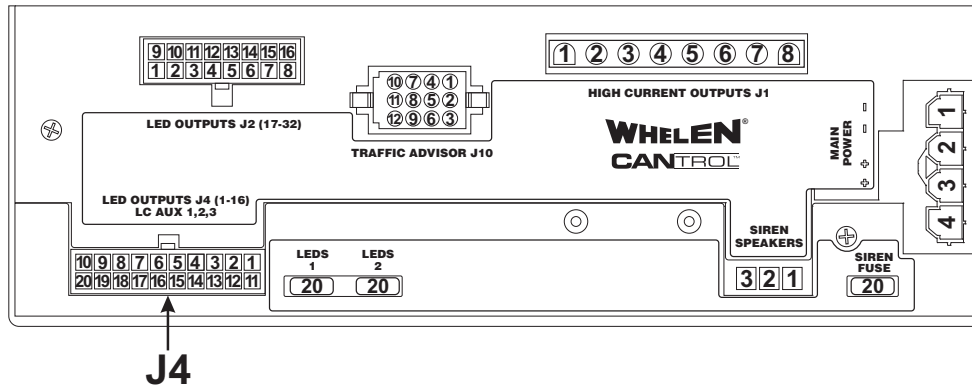
| Pos. | Output | Color | Function | Location | Activated By |
|------|--------|-------|----------|----------|--------------|
| J1-1 | 17 | BRN | _____ | _____ | _____ |
| J1-2 | 18 | RED | _____ | _____ | _____ |
| J1-3 | 19 | ORG | _____ | _____ | _____ |
| J1-4 | 20 | YEL | _____ | _____ | _____ |
| J1-5 | 17 | GRN | _____ | _____ | _____ |
| J1-6 | 18 | BLU | _____ | _____ | _____ |
| J1-7 | 19 | VIO | _____ | _____ | _____ |
| J1-8 | 20 | GRY | _____ | _____ | _____ |

J2 - Outputs 17-32

| Pos. | Output | Color | Function | Location | Activated By |
|-------|--------|---------|----------|----------|--------------|
| J2-1 | 17 | BRN | _____ | _____ | _____ |
| J2-2 | 18 | RED | _____ | _____ | _____ |
| J2-3 | 19 | ORG | _____ | _____ | _____ |
| J2-4 | 20 | YEL | _____ | _____ | _____ |
| J2-5 | 21 | WHT/BRN | _____ | _____ | _____ |
| J2-6 | 22 | WHT/RED | _____ | _____ | _____ |
| J2-7 | 23 | WHT/ORG | _____ | _____ | _____ |
| J2-8 | 24 | WHT/YEL | _____ | _____ | _____ |
| J2-9 | 25 | GRN | _____ | _____ | _____ |
| J2-10 | 26 | BLU | _____ | _____ | _____ |
| J2-11 | 27 | VIO | _____ | _____ | _____ |
| J2-12 | 28 | GRY | _____ | _____ | _____ |
| J2-13 | 29 | WHT/GRN | _____ | _____ | _____ |
| J2-14 | 30 | WHT/BLU | _____ | _____ | _____ |
| J2-15 | 31 | WHT/VIO | _____ | _____ | _____ |
| J2-16 | 32 | WHT/GRY | _____ | _____ | _____ |

This worksheet has been provided so that a written record of all Input, Output and Axillary connections may be created. After all pertinent installation data has been verified and recorded, store and retain this sheet for future reference.

CanTrol™ Installation Worksheet (J-4)

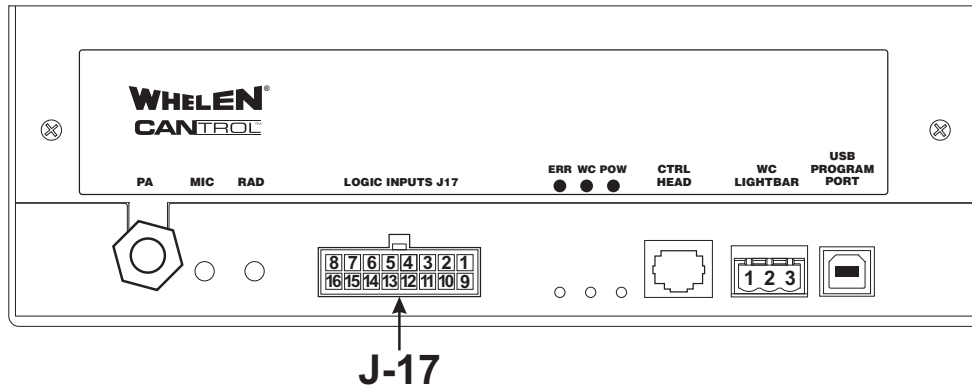


J4 - Outputs 1-16 + LC AUX 1, 2 & 3

| Pos. | AUX | Color | Function | Location | Activated By |
|-------|---------------------|---------|----------|----------|--------------|
| J4-1 | 1 | WHT/BLK | _____ | _____ | _____ |
| J4-2 | 2 | RED/WHT | _____ | _____ | _____ |
| J4-11 | 3 | WHT | _____ | _____ | _____ |
| Pos. | Output | Color | Function | Location | Activated By |
| J4-3 | 1 | BRN | _____ | _____ | _____ |
| J4-4 | 2 | RED | _____ | _____ | _____ |
| J4-5 | 3 | ORG | _____ | _____ | _____ |
| J4-6 | 4 | YEL | _____ | _____ | _____ |
| J4-7 | 5 | WHT/BRN | _____ | _____ | _____ |
| J4-8 | 6 | WHT/RED | _____ | _____ | _____ |
| J4-9 | 7 | WHT/ORG | _____ | _____ | _____ |
| J4-10 | 8 | WHT/YEL | _____ | _____ | _____ |
| J4-12 | - Not Used - | | | | |
| J4-13 | 9 | GRN | _____ | _____ | _____ |
| J4-14 | 10 | BLU | _____ | _____ | _____ |
| J4-15 | 11 | VIO | _____ | _____ | _____ |
| J4-16 | 12 | GRY | _____ | _____ | _____ |
| J4-17 | 13 | WHT/GRN | _____ | _____ | _____ |
| J4-18 | 14 | WHT/BLU | _____ | _____ | _____ |
| J4-19 | 15 | WHT/VIO | _____ | _____ | _____ |
| J4-20 | 16 | WHT/GRY | _____ | _____ | _____ |

This worksheet has been provided so that a written record of all Input, Output and Axillary connections may be created. After all pertinent installation data has been verified and recorded, store and retain this sheet for future reference.

CanTrol™ Installation Worksheet (J-17)



J17 - Logic Inputs

| Pos. | Color | Function |
|--------|--------------|--|
| J17-1 | WHT/BRN | _____ |
| J17-2 | WHT/RED | _____ |
| J17-3 | WHT/ORG | _____ |
| J17-4 | WHT/YEL | _____ |
| J17-5 | WHT/BLK | _____ |
| J17-6 | WHT/VIO | _____ |
| J17-7 | RED/WHT | Ignition (Pre-assigned and non-programmable) |
| J17-8 | BLU | Radio Repeat (Pre-assigned and non-programmable) |
| J17-9 | BLK/WHT | Backlight (Pre-assigned and non-programmable) |
| J17-10 | WHT/GRN | _____ |
| J17-11 | WHT | _____ |
| J17-12 | WHT/BLU | _____ |
| J17-13 | WHT/GRY | _____ |
| J17-14 | - Not Used - | (non-programmable) |
| J17-15 | - Not Used - | (non-programmable) |
| J17-16 | BLU | Radio Repeat (Pre-assigned and non-programmable) |

This worksheet has been provided so that a written record of all Input, Output and Axillary connections may be created. After all pertinent installation data has been verified and recorded, store and retain this sheet for future reference.