



**ST160**  
**SIREN AMPLIFIER**  
**INSTALLATION AND OPERATING INSTRUCTIONS**



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## INSTALLATION INFORMATION

SERIAL NO: _____	MODEL: <b>ST160</b>
PURCHASE DATE: _____	<b>OPTIONS</b>
DEALER: _____	_____ Two-Tone Enabled
INSTALLATION DATE: _____	_____ Thunder/Man Auxiliary Override
INSTALLER: _____	_____ Thunder Disabled

Model and serial number located on bottom of unit

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## GENERAL DESCRIPTION

The ST160 Siren Amplifier is a premium 100W unit designed for single 100W speaker use. The primary operating modes are Thunder, Yelp, Wail, Hands Free, Manual, PA, and Radio. A Noise Canceling PA Override and push-button Horn Override are available in all modes. A manual push-button is provided for push-on/push-off tone toggle operation in the Thunder, Yelp, and Wail modes. It also allows manual siren control in the Manual or PA modes. The Thunder function can be optionally replaced by Two-Tone or disabled entirely with program jumpers. Another feature allows cycling through Wail, Yelp, Thunder, and Standby by providing a signal to the horn ring auxiliary wire when the function switch is in the Hands Free (HF) position. A Park Kill option is provided for connection to a door switch, etc. to disable the siren when exiting the vehicle. Radio and PA volume controls are provided on the front panel. The front panel is backlit with LED's for night visibility. This compact unit utilizes short circuit, high voltage, low voltage, and reverse polarity protection systems for maximum service life.



## No Hassle Guarantee

Providing quality products to professionals who protect and serve the public is our core purpose. If you aren't satisfied with a newly purchased item, simply return it to us so we can repair it, replace it or refund your money.

## To Return Merchandise...

**You don't need to call us if you have a problem with the merchandise you've received. Simply follow the instructions on the reverse side of the packing slip that comes with your order. Galls provides a preaddressed label for you to affix to the package. If you don't have your packing slip, place the item in the original packaging (along with a brief explanation for the return), then place in a second box to prevent damage. To assure speedy handling, please ship it directly to:**

Galls, Inc. Returns Department  
1340 Russell Cave Road, Lexington, KY 40505

If you have any questions concerning this or any other Gall's product, please contact our **Customer Service Department** at (800) 477-7766.

## SPECIFICATIONS

Input Voltage	10 - 16 VDC (negative ground)
Input Current	8.0 Amps @ 13.6 VDC (single 100W speaker)
Standby Current	Less than 150 mA
Audio Frequency	200Hz - 10 kHz $\pm$ 3db
Audio Output	40 watts @ 13.6 VDC
Output Power	105 WATTS RMS MAX. (15.0 VDC - single 100W speaker)
Siren Frequency	675Hz - 1633Hz
High Voltage Protection	16 - 18 VDC will cause siren output to cease, resumes at normal voltage
Short Circuit Current	50 AMPS (supply circuit must be capable of supplying this)
Operating Temperature	-15° F to +140°F
Controls	7-position rotary switch (Radio, PA, Manual, HF, Wail, Yelp, Thunder) Momentary Manual/Horn rocker switch Auxiliary input (jumper programmable) for positive or negative horn -Remote Manual or Hands Free operation Park Kill input (jumper programmable) for positive or negative activation Thunder (and Two-Tone) disable (jumper programmable) Two-Tone activation (swaps modes with Thunder) (jumper programmable)
Connections (12-Pin Connector)	Detachable, 12-pin, positive locking connector with pigtail leads. (1) Positive, (1) Negative, (1) Activation (on/off), (1) Backlighting, (2) Speaker, (2) Radio, Auxiliary, Park Kill
Size	6" Wide, 6-1/2" Deep, 2-1/2" High
Shipping Weight	6 lbs.

### LIMITED WARRANTY

*Galls warrants this new product to be free from defects in material and workmanship, under normal use and service, for a period of seven (7) years from the date of delivery to the first user-purchaser.*

*During this warranty period the obligation of Galls is limited to repairing or replacing, as Galls may elect, any part or parts of such product which after examination by the manufacturer is determined to be defective in material and/or workmanship.*

*This warranty does not cover labor charges for removal or re-installation of the product. Fuses and lamps are not covered under this warranty.*

*This warranty does not extend to any unit that has been subjected to abuse, misuse, improper installation or which has not been adequately maintained, nor to units which have problems related to service or modification at any facility other than the manufacturer.*

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

## INSTALLATION

Proper installation of the unit is essential for years of safe, reliable operation. Please read all instruction **before** installing the unit. Failure to follow these instructions can cause serious damage to the unit or vehicle and may void warranties.

**Qualifications** - The installer must have a firm knowledge of basic electricity, vehicle electrical systems and emergency equipment.

**Keep These Instructions** - Keep these instructions in the vehicle or other safe place for future reference. Advise the vehicle operator of the location.

**Unpacking** - Inspect contents for shipping damage. If found, alert carrier immediately. Contents should include unit with microphone, mounting bracket w/ 2 bolts, microphone bracket with 2 screws, wiring harness with connector, and these instructions. Contact your supplier immediately if any components are missing.

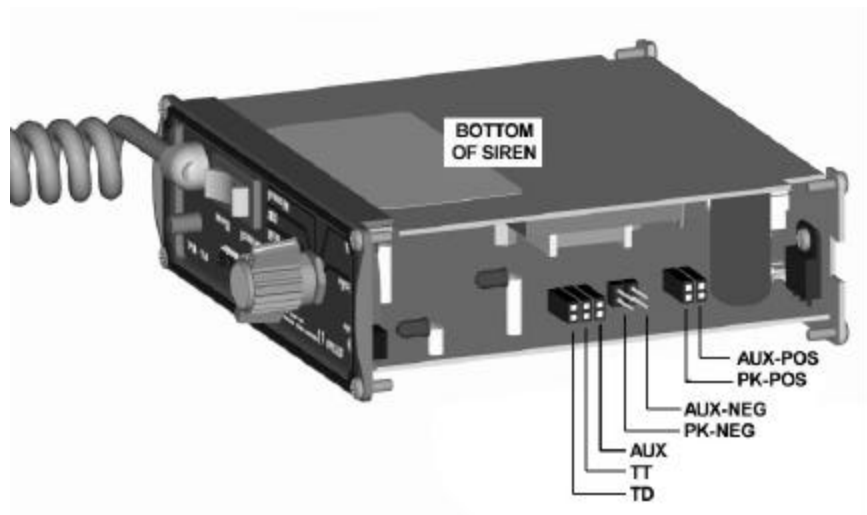
### Installer Selectable Options (Jumper Settings)

The ST160 has several options that can be selected during installation. Jumpers on the printed circuit board, inside the case, allow the installer to select these various options. These options should be set before installation of the unit.

**Cover Removal** - Remove the four Philip head screws located on the **back** of the unit. **DO NOT REMOVE THE SCREWS ON THE FRONT OF THE UNIT!** Slide the top cover back and away from the front face of the unit. This cover can be removed completely from the siren unit. **CAUTION!!! DO NOT OVER-TIGHTEN SCREWS.**

After the cover has been removed, find the location of the option jumpers (see diagram below).





**Auxiliary Input Polarity** - The auxiliary input (green wire) is normally activated by applying a positive voltage to the wire. To activate by connecting to ground (negative), move the jumper from the "AUX-POS" pins to the "AUX-NEG" pins.

**Park Kill Input Polarity** - The park kill (cutout) input turns off any siren tone output when activated (i.e. vehicle shifted into park, door opened, etc.), and remains off until a control on the siren is activated or changed. The wiring diagram on page 5 shows two connection examples.

The park kill input is normally activated by connecting the gray wire to positive voltage. To activate by connecting it to ground (negative) instead, move the jumper from the "PK-POS" pins to the "PK-NEG" pins.

**Auxiliary Input Function** - The auxiliary input (green wire) allows activation by an external source of either the Horn or the Manual push-button functions. This input is usually wired into the vehicle horn switch. The wiring diagram on page 5 shows two connection examples. NOTE: Permanent disconnection of the vehicle horn is NOT recommended.

The siren is factory shipped with the auxiliary input option defaulted as the Horn function (on only one of the "AUX" pins). To utilize the auxiliary input as the Manual function instead of the Horn function, move the "AUX" jumper from one pin onto both of the pins.

**Two-Tone** – The Thunder sound can be replaced by a Two-Tone sound by moving the "TT" jumper from one pin onto both of the "TT" pins.

**Thunder Disable** - The Thunder function can be completely disabled by moving the "TD" jumper from one pin to both pins. This will also disable the Two-Tone function used when the manual button is pressed while the mode switch is in the Thunder position.

## SERVICE

This unit is designed to provide years of reliable service under even the worst conditions. Many times there may appear to be a problem with the unit when the true problem is in the speaker(s) or improper installation. The following chart shows typical symptoms and possible causes.

## TROUBLESHOOTING

Symptom	Possible Cause	Check
No power	Yellow wire is not powered Connector loose Siren 15A fuse blown  Loose connection at power source	Is yellow wire connected to switched +12VDC? Check connector Is power hooked up backwards? Positive ground vehicle? Is an external fuse or circuit breaker used? Are the negative leads connected to a good ground?
No siren tone - PA works	High voltage protection Low voltage protection Microphone button stuck Park Kill polarity option set wrong Park Kill activated	The input voltage must be less than 16 volts. The input must be greater than 10V with the siren turned on. Does microphone button release properly? Is the PK jumper option properly configured? Does the siren work when Park Kill input is disconnected? Check for a short. Check for an open.
No siren tone - No sound	Bad speaker or speaker wiring	Check for a short. Check for an open.
No PA	PA volume not set properly	Have you tried turning the PA volume control?
Distorted siren sound	Speaker assembly loose Intermittent Aux. Input connection Low or high vehicle voltage	Is the speaker bell or tip loose? Is the Aux. Input used and wired properly? Input voltage must be between 10 & 16 volts while siren is on.
Intermittent siren tone	High voltage protection Low voltage protection  Microphone button activation Circuit breaker in supply connection Shorted speaker or speaker wire	Is the vehicle voltage regulator working properly? Is the connector tight on the back of the unit? Is there a loose connection on a power lead? The input must be greater than 10V with the siren turned on. Is something lying on the microphone? Is a circuit breaker used with at least a 50A rating? Does the speaker have water damage, or is a wire pinched?
Horn function or Manual or Thunder stuck on	Manual/Horn rocker switch stuck Aux. Input improperly connected Aux. Input Polarity Option set wrong	Does the switch return fully when released? Is the Aux. Input used and wired properly? Is the AUX jumper option properly configured?
No Radio	Unit not connected to radio Radio volume too low	Is the radio connected properly to the unit? Can you hear the radio in the vehicle?
No or Low Radio	Radio outputs not isolated and polarity hooked up backwards	Have you tried turning the Radio volume control? Are the radio wires connected to the correct polarity from the radio output?
Wrong siren tone	Two-Tone option jumper installed Aux. Input set to wrong function	Is the TT jumper option properly configured? Is the AUX jumper option configured properly?
Thunder not working	Thunder disabled	Is the TD jumper option configured properly?

## VOLUME CONTROLS

The *radio repeat volume* (Radio) control is recessed in the upper left hand corner of the front face. This should be set when the vehicle is parked. First set the volume level of the vehicle's two-way radio to its normal operating volume. Adjust the siren's rotary selector switch into the RADIO position. Insert a small, flat blade screwdriver into the RADIO volume adjustment port. Turn clockwise direction to increase the sound level.

The *PA volume* (PA Vol.) control is provided for public address volume. It is located in the upper right hand corner of the front face. This should be set when the vehicle is parked. Set the PA volume to the maximum level with no feedback (squeal).

## MICROPHONE

The attached noise-canceling microphone is used for public address operation and overrides any siren tone when its push-to-talk (button on the side) is pressed.

## AUXILIARY INPUT

During installation an auxiliary input may be connected to the vehicle horn ring or other switching device. It provides the same operation as pressing the Horn button or optionally (via internal jumpers) the Manual rocker switch.

## PARK KILL (CUTOUT)

During installation, the Park Kill input may be connected to a door switch. It will automatically turn off any siren tone when the door is opened. The siren tone will continue to be cut off even when the door is closed. Changing any switch or input will restore normal function.



## 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.

To prevent internal damage, the mounting bolts must not enter case more than 1/4".

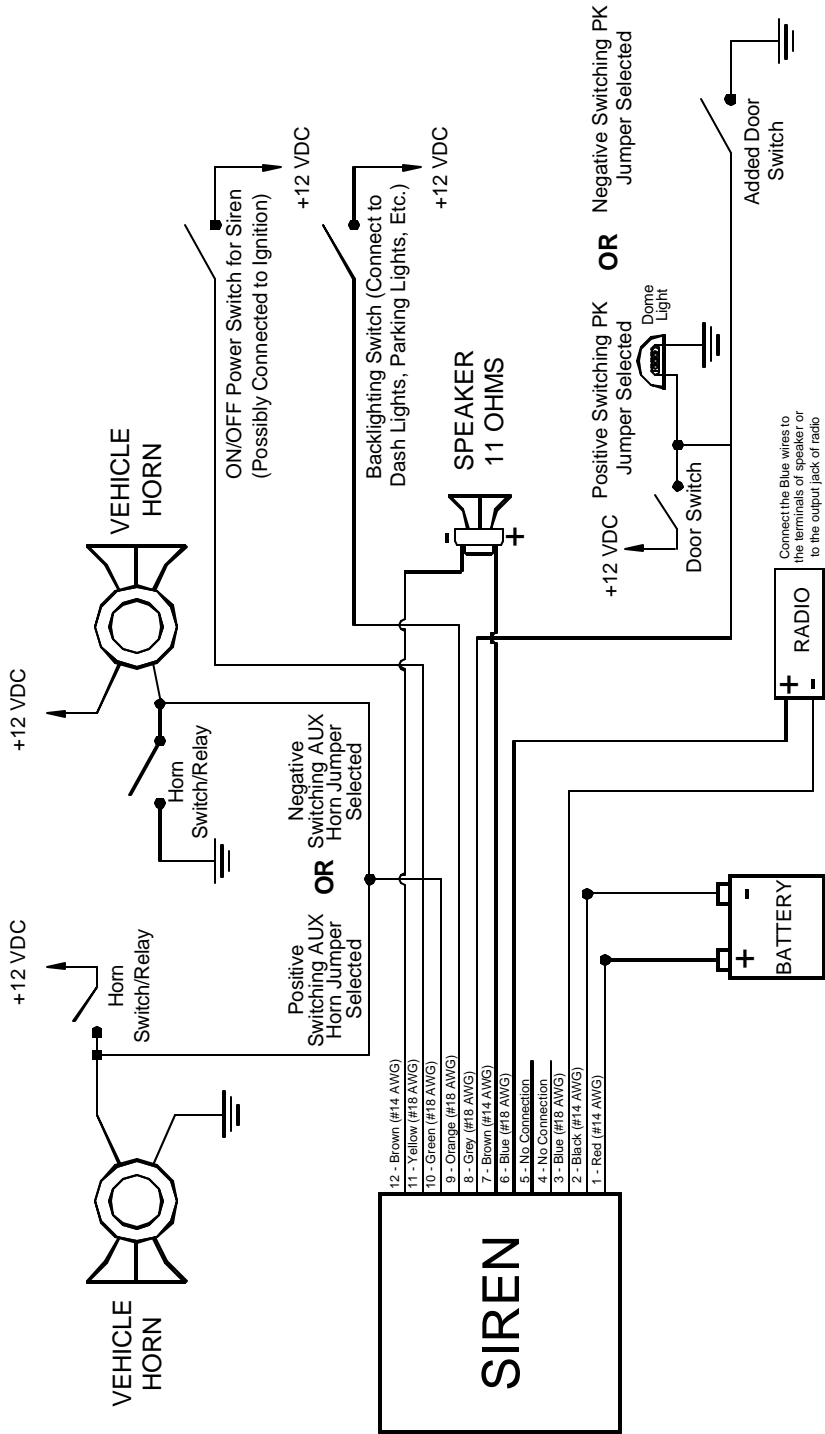
Sound levels produced by attached speakers can cause permanent hearing loss. Never operate this unit without adequate hearing protection for you and others in the area. (OSHA 1910.95)

The ST160 siren may be mounted above the dash, below the dash, on a tunnel, or in a rack with the mounting u-bracket provided. Choose a mounting location convenient to the operator and away from any air bag deployment areas. Inspect behind mounting area for clearance. Assure adequate ventilation to prevent overheating. Consider wire routing and access to connections, as well as microphone bracket placement. Install mounting bracket to vehicle using 1/4" hardware (not supplied). Drill two 1/8" size holes, and install microphone clip using the two screws provided with the clip.

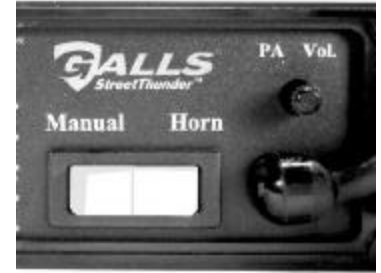
## ELECTRICAL CONNECTIONS

Electrical connections to the unit are made using a removable connector located on the back. If the unit needs service the connector can be easily removed without unwiring the connector.

The power supply of the 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. A wiring diagram on the next page shows detail of how to wire the siren to the vehicle.



## MANUAL / HORN MOMENTARY ROCKER SWITCH



The front panel of the ST160 contains a momentary rocker switch that operates the Manual function when the left side is depressed and the Air Horn when the right side is depressed.

**Manual** – Pressing the left side of this momentary rocker switch provides a generally quicker changing tone when the selector switch is in the Wail, Yelp or Thunder positions. (See table below). These quicker tones are used at intersections and very highly congested areas. Pressing the button once changes to the next faster tone and pressing again changes the tone back to original tone. With the selector switch in the Manual, PA or Hands Free position this switch provides a manually activated Wail siren tone while the button is being held. This is used to momentarily alert motorists or in low noise areas.

Optional operation includes replacement of the Thunder tone with Two-Tone or disabling the Thunder tone entirely. These options are selected during installation and may be governed by State or Local laws.

<i>With Rotary Switch in this Position:</i>	<i>Pressing the MANUAL Rocker Switch Does This:</i>
THUNDER	Toggles the Output to TWO-TONE
YELP	Toggles the Output to THUNDER
WAIL	Toggles the Output to YELP
HF (Hands Free)	Creates a manual WAIL tone while button is being held that sweeps down when the button is released.
MAN (Manual)	Creates a manual WAIL tone while button is being held that sweeps down when the button is released.
PA	Creates a manual WAIL tone while button is being held that stops immediately when the button is released.

(NOTE: THUNDER and TWO-TONE may be optionally swapped or disabled via program jumpers. See INSTALLER-SELECTABLE OPTIONS on pages 2-3.)

**Air Horn** – Pressing the right side of this momentary rocker 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 low noise areas. This tone will override all other siren tones.

**Wire Size and Termination** - The wiring diagram on the previous page shows the minimum wire size used for each connection, along with recommended lead color. If the wire is longer than 10 ft. then use the next larger wire size. Use only high quality crimp connectors. Make sure all connections are tight. Route wiring to prevent wear, overheating and interference with air bag deployment. Use grommets and sealant when passing through compartment walls. Minimize the number of splices to reduce voltage drop. Ground connections should only be made to substantial chassis components, preferably directly to the negative of the vehicle battery. Install and check all wiring before connection to vehicle battery.

**Wiring Connections:**

**BLACK LEAD:** Connect to the negative of the battery, or to a good chassis ground. Be sure to use minimum size #14 AWG wire.

**RED LEAD:** Connect to the positive side of the battery, or to a high current power buss. A power relay may also be used. Be sure to use minimum size #14 AWG wire.

**YELLOW LEAD:** Connect to +12VDC through a switched power supply (possibly ignition). This will turn the siren on and off. Be sure to use minimum size #18 AWG wire.

**ORANGE LEAD:** This lead supplies power for the backlighting of the siren. Connect it to +12VDC from the dash lights, parking lights or other switched source. Be sure to use minimum size #18 AWG wire.

**BROWN LEADS:** Connect one lead to each terminal or lead of the speaker. Be sure to use minimum size #14 AWG wire.

**Optional Connections:**

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

**GREEN LEAD:** Used for remote Manual control. Connect to the horn ring circuit or a remote switch. Circuit may be positive or negative with proper jumper selection. See INSTALLER-SELECTABLE OPTION section (page 2) for jumper details.

**NOTE:** Cut lead short if not used & insulate w/ electrical tape.

**GRAY LEAD:** Used for Park Kill (Cut-off). Connect to dome light or added door switch. Circuit may be positive or negative with proper jumper selection. See INSTALLER-SELECTABLE OPTION section (page 2) for jumper details.

**NOTE:** Be sure to cut lead short if not used and insulate with electrical tape.

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

**OPERATION**



**GENERAL**

This unit is designed for easy operation under the stress associated with high-speed pursuit. Most siren functions are accessible with one simple motion without repetitive activation of switches or automatic timed switching that can interfere with desired operation.

**SELECTOR SWITCH**

Whenever +12VDC is applied to the yellow wire, the ST160 will be "on". The rotary selector switch controls the primary operating function of the siren.



**Thunder** - Ultra-fast changing tone used for maximum attention.

**Yelp** - A rapidly changing tone used in congested areas.

**Wail** - A slower changing tone used on highways.

**HF (Hands Free)** - Also known as Horn Ring Cyclor, allows the user to cycle through Wail, Yelp, Thunder and Manual by repeatedly pressing the horn or other switch connected to the AUX input. Operating any other switch resumes normal operation. Please note that this mode disables the Manual push-button selection when a Wail, Yelp, or Thunder tone is cycled to.

**Manual** - A silent mode that allows push-button Manual, push-button Horn, and Public Address operation. The siren output *winds down* when the Manual momentary rocker switch is released.

**PA** - A silent mode that allows push-button Manual, push-button Horn and Public Address operation. The siren output *terminates immediately* when the Manual momentary rocker switch is released.

**Radio** - Also known as Radio Repeat, this function amplifies a radio speaker input for re-broadcast outside the vehicle. The PA remains functional, but no siren tones are available in this position.