KICKER®

WX**10000.1**

Technical Paper

WARHORSE

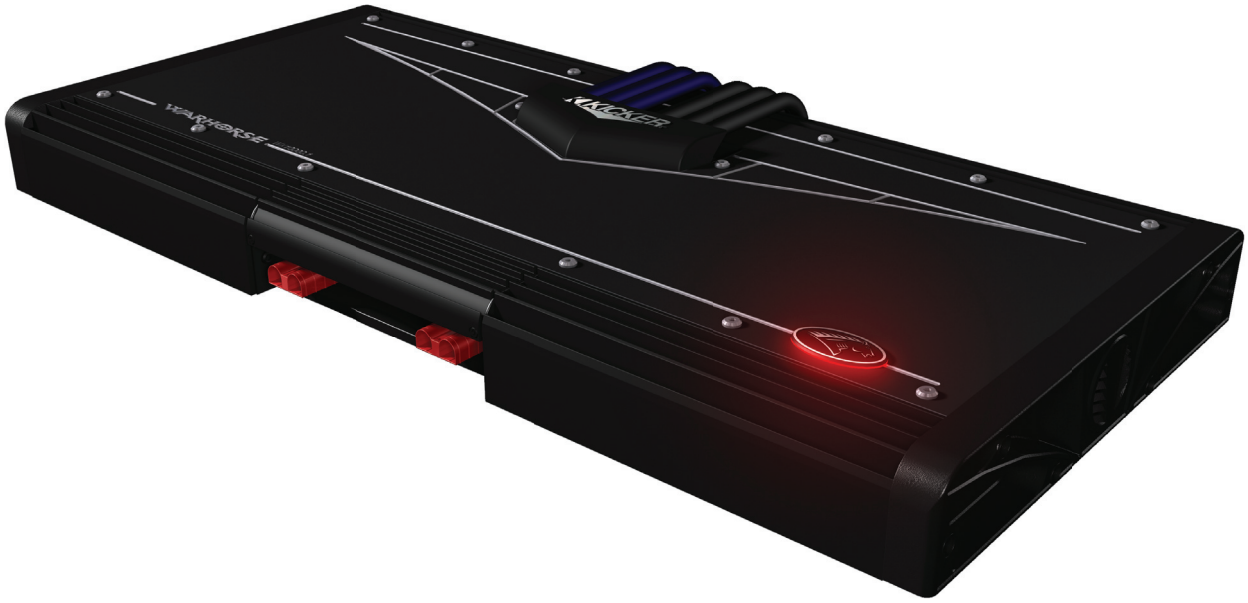
Signal*Modulated****Mono****Channel***
*Subwoofer****Amplifier***

STILLWATER Designs®

Warhorse: Defined as "Horses specially trained for use in battle or individual combat".

As early as the 19th Century BC the Warhorse was used in chariot warfare. By the first century BC the Warhorse carried Parthian archers into battle. By the Middle Ages the Warhorse had developed into a large horse with the strength and stamina to carry a Knight and his heavy armor into battle. The Warhorse of this era wore its own armor and was a magnificent beast. The best were selected for speed and trainability. It was an expensive feat to train and outfit these tools of war. It took a lot of time to overcome the natural aversion to the smell of blood and its natural disinclination to trample people. They were even trained to kick, strike and bite on command.

In light of all this, Kicker's newest and largest amplifier is named Warhorse. Born to do battle and trained to excel, the Warhorse is like nothing available in the car audio arena. Conventional wisdom and technology weren't good enough for Kicker when we designed this 10,000 watt beast. Traditional Class A/B design was entirely too inefficient and even more advanced Class D architecture wasted too much battery power.



Efficiency is the "Holy Grail" of car stereo amplification, especially in SPL competition lanes. Warhorse's ultra-high efficiency allows competitors (as well as power hungry consumers) to create the huge amounts of power they demand without relying on huge banks of amplifiers and the correspondingly huge charging systems required with conventional amplifiers. By approaching the challenge of delivering massive power from a new direction, Kicker engineers have created a system that lets users concentrate their investments where they count – in actual sound reproduction equipment, instead of batteries, alternators, or other charging system components. Signal quality is also critical to the demanding high-end user, so in addition to the amplifier's prodigious output capability, a full complement of built-in control (crossovers, subsonic filter, bass boost, limiter, and more) allow precise tuning of your bass. A broad assortment of protection and diagnostic circuits are also provided, allowing further performance optimization.

KICKER'S signal-modulated power supply technology represents the first significant advance in amplifier efficiency since Class D designs overtook Class A/B. Even though Class D was a great improvement over A/B, Around 30% of available power was still wasted. While earlier technologies use power supplies combined with gain circuits to amplify the audio signal, the Warhorse amplifies the audio signal directly

from its signal-modulated power supply, eliminating many power-wasting components common to conventional designs. The signal-modulated power supply amplifies each polarity of the audio signal separately through two voice coil outputs, each driving one coil of a dual-voice coil subwoofer or DVC subwoofer array. This fresh approach… essentially a power supply with gain… results in efficiencies greater than 90%! SPL competitors will find this very attractive and advantageous as they seek to wring those elusive last few decibels from their vehicle. Consumers anxious to experience cutting edge technology will appreciate the amplifier's ability to interface with a broad range of components and vehicles.

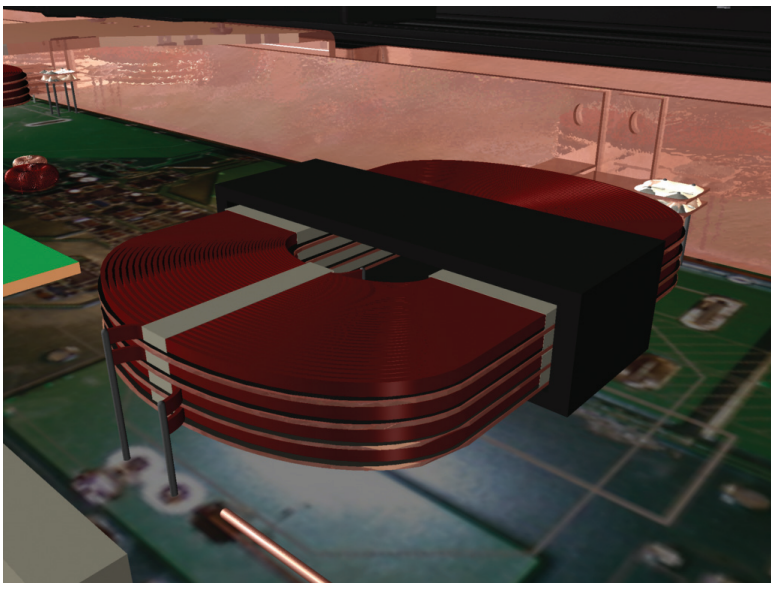
The idea of a signal modulated power supply directly driving the subwoofers is an idea that we have thought about for a few decades. Combining the conventional power supply with the amplifier section results in higher efficiency than is possible with established designs. When building an amplifier this powerful, efficient conversion of battery power to audio power is critical.

The basis for the Warhorse is anchored in conventional designs. There are two large DC-to-DC pulse width modulated converters with ratios of 1:19. One converter is a positive power supply and the other is a negative supply. Combined they are capable of 400V of peak to peak output. These power supplies are designed to have no output until they are told to by the audio signal. Without a signal the converters are running with the minimum pulse width.

These large converters have to be bulletproof. The MOSFETs used to do the switching are rated at 75 Volts and 170 Amps. Since there are 32 of these MOSFETs on each side of the power supply the combined current capability is 10,880 Amps! With the output short-circuit protected at 90 Amps, the maximum capability of the Warhorse is 12,690 Watts. That should qualify as overbuilt. The MOSFETs chosen are the best devices to get the job done. Their typical 3.6 mili-ohms of "on" resistance is the best available for this application, resulting in best-case efficiency.

The small-signal processing is done in the digital domain using a modern Texas Instruments 150 M Hz CMOS 32 bit CPU. This processor has a 12 bit ADC and 16 channels.

The Warhorse has multiple "housekeeping" power supplies to operate the processors, LEDs, protection circuits and preamp parts. They include a + 12 Volt, +/- 5 Volt and a +3.3 Volt supply.



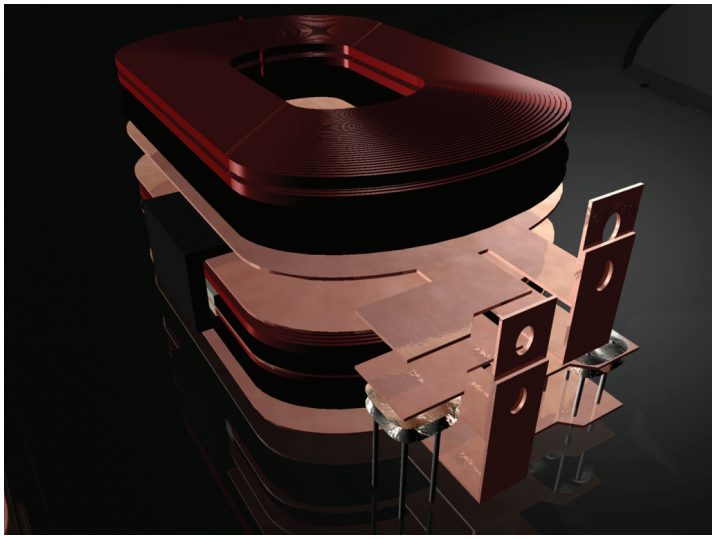
Transformers are among the most important parts in a high-powered mobile amplifier. KICKER engineers were tasked with building a no-compromise amplifier, so no-compromise transformers were paramount. Back in the 80's our military began using Planar transformer design for their desirable properties. We use very special proprietary Planar transformers designed and prototyped in the Kicker R&D department. Production of the transformers in quantity has been sourced from Tunisia. There is only one source for transformer cores this large. The cores are rated at 5,000 watts each and four are in each Warhorse amplifier.

There are five extremely good reasons why the Planar design is best for the Warhorse.

1. By design, a Planar style of transformer has the lowest leakage inductance. This is very important from an engineering standpoint because of the extremely high current level needed to produce 10,000 Watts. The coupling between the primary and secondary is much better than with any other design.

2. They have an ultra low profile for the electrical rating. With the winding being flat and glued to the ferrite core the transformers are very tough. The primary windings are screwed to the buss bars, increasing stability and providing reliable high-current connections.

3. Since they have the best surface-to-volume ratio, cooling is better than that of conventional toroidal transformers.



4. With other types of transformers, it is difficult to get consistent properties relating to the wrapping of the windings. The physical layout of the Planar transformer allows it to be built the same way each time for very consistent results.

5. A high turn ratio is impractical with the other transformer designs. In the Planar transformer we can easily reach the 19:1 ratio needed to get the voltage used in a 10,000 Watt amp.

The switching frequency is 24 KHz, yielding a much easier to filter 48 KHz ripple after the full wave rectifiers. The output of this signal-modulated power supply is filtered by two over-built toroidal output coils. Spike suppression is accomplished with filters utilizing eight 35 Watt snubber resistors. Worst case for these filters is seen at full output.

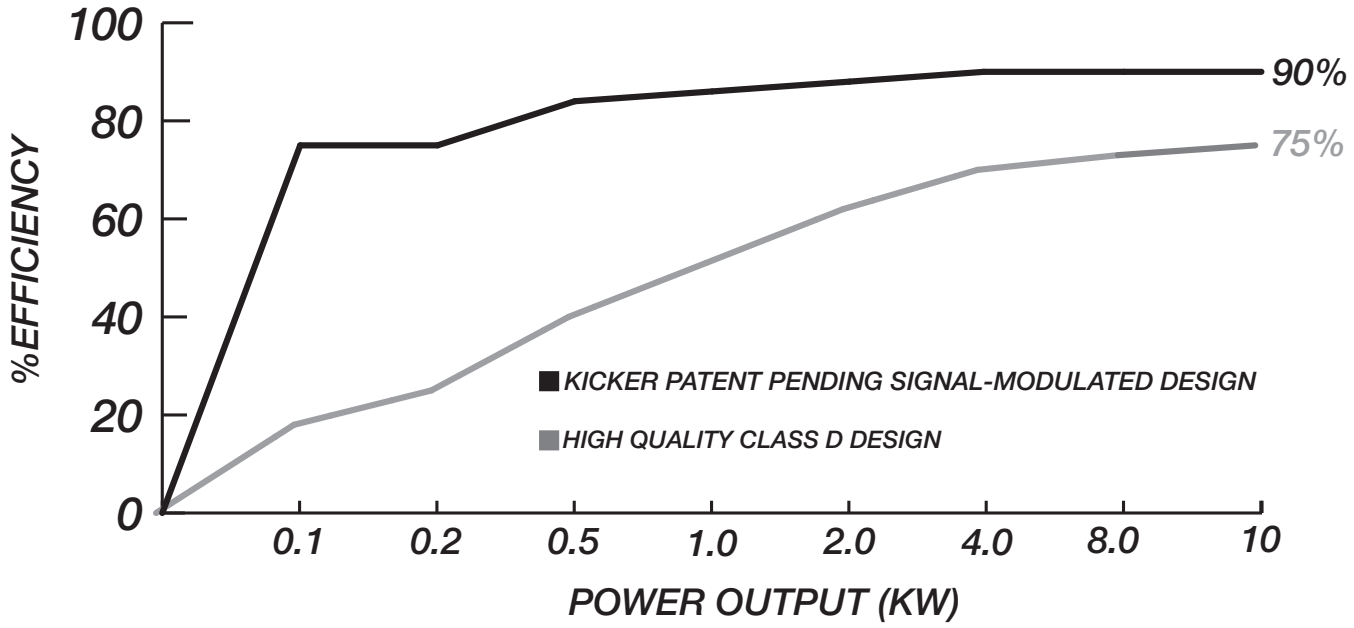
The printed circuit board (PCB) for an amplifier this large has to be stronger than normal. The Kicker Warhorse components are mounted on a thicker (.090", 2.5 mm) than usual fiberglass PCB with much heavier (4 ounce) copper traces.

In order to optimize the circuit board layout the battery power connectors needed to be near the top center of the amplifier chassis. There are three 1/0 gauge sized proprietary gold plated brass connectors for the negative ground connections and three more for the positive connections. These connectors are bolted to symmetrical copper buss bars for power distribution within the chassis.

Since the output current to the subwoofers can reach 90 amperes, the connectors must be extremely rugged. We chose Anderson™ connectors because they have been proven to hold up under demanding high current applications (such as industrial fork lifts). They are also ideal due to the fully enclosed design which helps eliminate the chance for electrocution. The output current is monitored by surface mount resistors that are referenced to ground and calibrated for 90 amps RMS. When that level is reached the DSP controller shuts the amplifier down in microseconds to prevent damage to any components.

The switching MOSFETs need to be bulletproof, so they utilize thermally conductive interface material. This insulated metal substrate minimizes the thermal impedance and conducts heat away from the MOSFETs more efficiently than conventional mounting methods.

In conclusion, the Kicker Warhorse WX10000.1 has the highest power output available in a single channel mobile amplifier, the best conversion efficiency from battery power to audio power, the lowest idle current and the best power to size/weight ratio.



*Signal-**Modulated**Mono**Channel** **Subwoofer**Amplifier*

Model: *WX**10000.1***

Congratulations on your KICKER purchase!

Please record your purchase information and keep your sales receipt for validation of warranty.

Authorized Kicker Dealer: _____

Purchase Date: _____

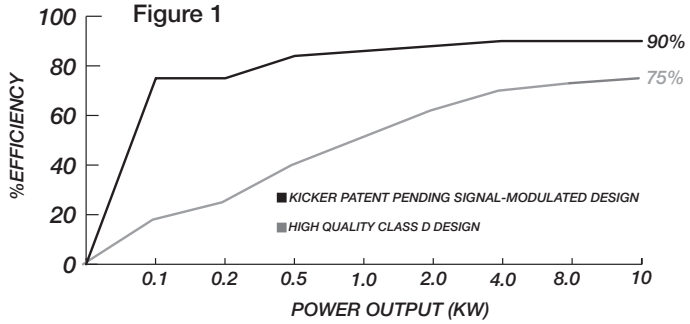
Amplifier Model Number: *WX**10000.1***

Amplifier Serial Number: _____

The Kicker Warhorse amplifier was specifically designed for competition car audio. Sporting 10,000 RMS watts of pure Kicker power, the ultra-high-efficiency design of the WX amplifier revolutionizes traditional methods of amplification. While most amplifiers use a power supply combined with an amplification circuit to amplify the audio signal, the Warhorse skips a step by amplifying the audio signal directly from its patent pending signal-modulated power supply. The signal-modulated power supply amplifies each polarity of the audio signal separately through its two voice coil outputs to optimally drive dual-voice coil subwoofers and provide a competitive edge in SPL contests. From gold plated power connectors and low profile planar transformers to the latest Texas Instruments DSP technology, no expense was spared to make the Warhorse the most powerful and efficient mono amplifier in mobile audio.

The patent pending signal-modulated design of the Warhorse amplifier is the most powerful and efficient design available in mobile audio, rated at 90% efficiency at full power with a 2 ohm load. The graph compares the Warhorse amplifier's efficiency ratings to those of industry standard Class D amplifiers.

Figure 1



Installation . . . as easy as 1, 2, 3

1. Mounting Choose a structurally sound location to mount your Kicker amplifier. The amplifier should be mounted as close as possible to the battery network and be electrically isolated from the vehicle ground. The distance from the battery network to the amplifier should not exceed 48" (122cm). It is important to mount the amplifier before running any wires or supplying power to the amplifier. The amplifier secures to the vehicle with an insertable mounting bracket used in combination with two mounting holes located on the bottom plate of the control panel. You are solely responsible for securely fastening the WX amplifier in your vehicle.

Before mounting the amplifier, the control panel shield must be removed. The control panel should remain accessible for adjustment, leaving enough room to access the mounting holes and remove or attach the control panel shield. Make sure there are no items behind the area where the screws will be driven. Choose a location that allows at least 4" (10cm) of open ventilation for the amplifier. After choosing the best location, secure the mounting bracket to the vehicle. Use the bracket as a template to drill nine (9) holes with a 3/16" (4.8mm) bit into the appropriate locations. Attach the bracket to the mounting location with the nine (9) supplied #10 (5mm) screws inserted through the nine (9) included screw insulators.

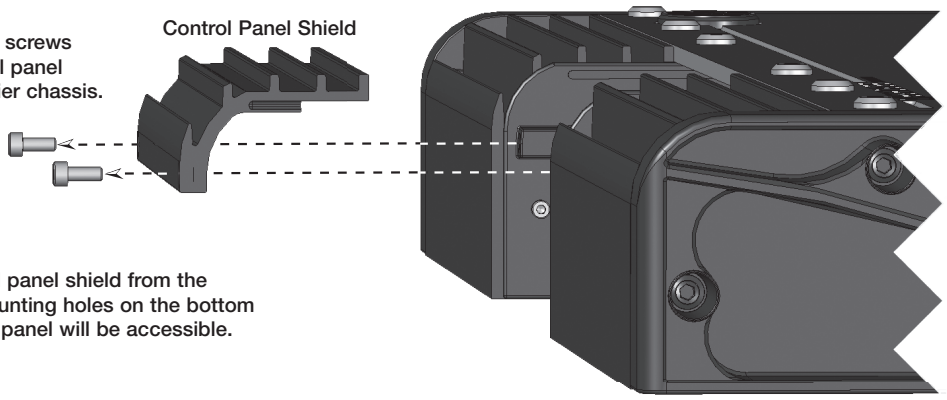
Next, slide the amplifier over the mounting bracket and into the mounting slot. Make sure the mounting bracket is properly inserted into the mounting slot and locate the two mounting holes on the bottom plate of the control panel. Use the mounting holes as a template and drill two (2) holes using a 3/16" (4.8mm) bit into the appropriate locations. Secure the bottom plate of the control panel with the two (2) #10 (5mm) screws.

Caution The Kicker WX amplifier outputs extremely high voltage signals from the voice coil (speaker) outputs and can cause serious injury or death from electrocution. It is imperative to read the manual carefully and follow all of the recommended safety precautions before installing the WX amplifier.

Figure 2

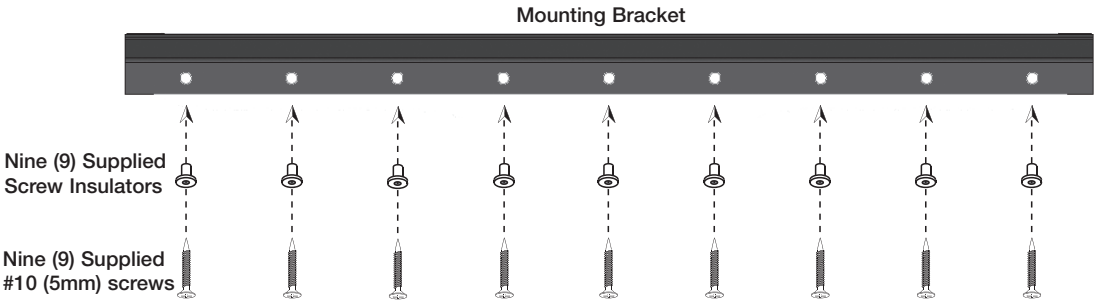
Before mounting the amplifier, be sure there is adequate space in the mounting position to take the control panel shield on or off and to easily access the amplifier's controls.

1. Remove the two (2) screws securing the control panel shield to the amplifier chassis.

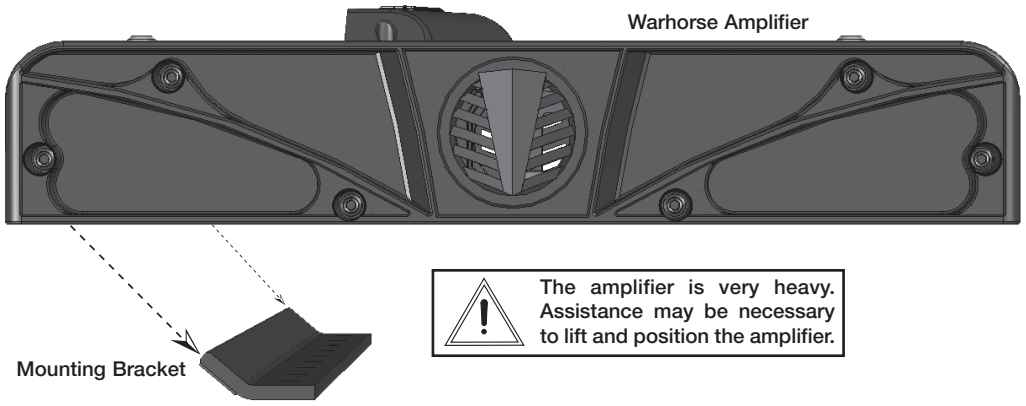


2. Remove the control panel shield from the amplifier so the mounting holes on the bottom plate of the control panel will be accessible.

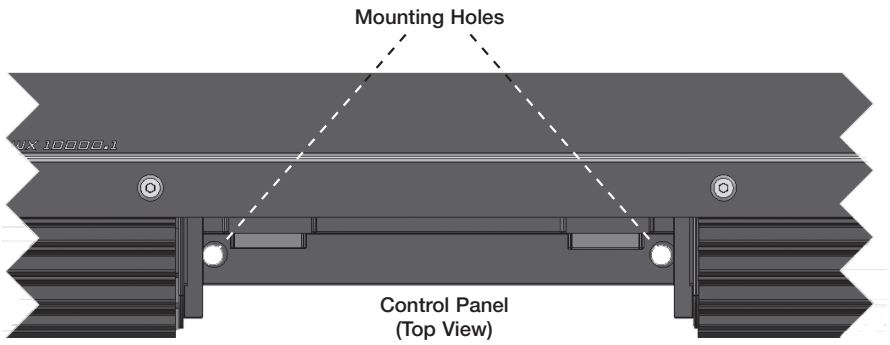
3. After determining the best mounting position for the amplifier, use the mounting bracket as a template to drill nine (9) holes with a 3/16" (4.8mm) bit into the appropriate locations. Attach the bracket to the mounting location with the nine (9) supplied #10 (5mm) screws inserted through the nine (9) included screw insulators.



4. Slide the Warhorse over the mounting bracket and insert the mounting bracket into the mounting slot on the bottom of the amplifier.



5. Locate the additional mounting holes on the bottom plate of the control panel. Use the mounting holes as a template to drill two holes using a 3/16" (4.8mm) bit into the appropriate locations. Secure the bottom plate of the control panel with the two (2) #10 (5mm) screws. You are solely responsible for securely fastening the amplifier in your vehicle.



2. Wiring Before wiring the Warhorse amplifier, disconnect the vehicle's batteries to avoid an electrical short. Eight (8) identical, high-quality, 800-cold-cranking-ampere (cca), 12-volt batteries are recommended to power the WX amplifier. All power and ground wires should be as short as possible and utilize 1/0 gauge wire. Remove the wire guide and power hood from the amplifier as shown in Figure 3. Connect three (3) ground wires from the amplifier's negative power connector to the negative terminals of three (3) batteries in the battery network.

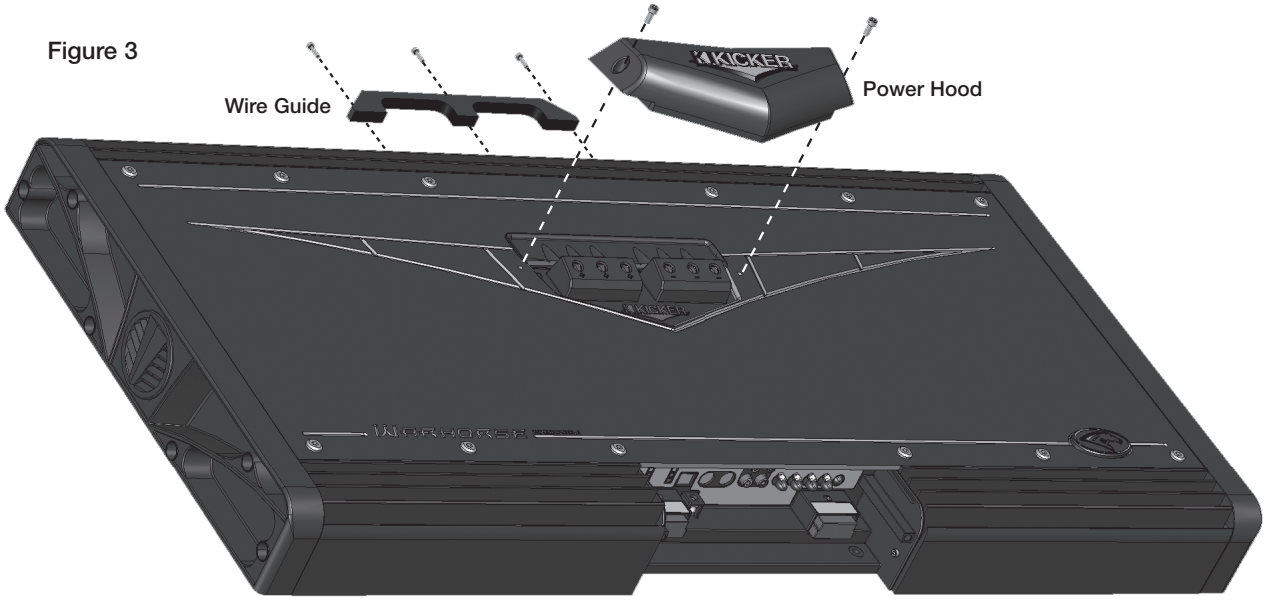
From two (2) of the batteries in the battery network, connect 1/0 gauge ground wire from the negative terminals of the batteries to a paint-free and corrosion-free solid-metal area of the vehicle's chassis. Make the ground wires short, 18" (45cm) or less. To reduce noise, make sure the ground wires connect to the same piece of metal and are within 18" (45cm) of each other.

With the control panel shield removed, connect a twisted pair of RCA (low-level) interconnect cable, carrying the incoming audio signal, to the RCA inputs on the amplifier. Connect the speaker wires to the supplied Anderson™ connectors. Use 8 gauge wire and strip 9/16" (14mm) from the end being inserted into the metal contacts. See Figure 5. The wire should be secured by placing the metal contact into a vise and melting solder inside the metal contact. Then, insert the stripped wire into the molten solder within the contact. Do not use acid core solder.

The Warhorse amplifier requires at least two (2) 200-ampere-output-capacity alternators. For each alternator, connect a 250 ampere fuse within 18" (45cm) of each alternator and a second 250 ampere fuse within 18" (45cm) of the battery network. Without adequate charging capability, the WX amplifier can draw enough current to shut down your vehicle's computer system. This may adversely affect your ability to control your vehicle. See Figure 4.

The three (3) positive 1/0 gauge power wires should be the last wires connected in the installation. Install the supplied Kicker three (3) gang ANL fuse holder within 18" (45cm) of the battery network and in-line with the three (3) power cables connected to the amplifier's positive power connector. Improper connections will damage the amplifier and/or cause serious injury or death. If you ever need to remove the amplifier from the vehicle after it has been installed, the ground wires should be the last wires disconnected from the amplifier, just the opposite as when you installed it. See Figure 4.

Figure 3



If you have more questions about the installation or operation of your new KICKER product, see the Authorized KICKER Dealer where you made your purchase. For more advice on installation, click on the SUPPORT tab on the Kicker homepage, www.kicker.com. Choose the TECHNICAL SUPPORT tab, choose the product or subject you are interested in, and then view the corresponding information. Please E-mail support@kicker.com or call Technical Services (405) 624-8583 for unanswered or specific questions.

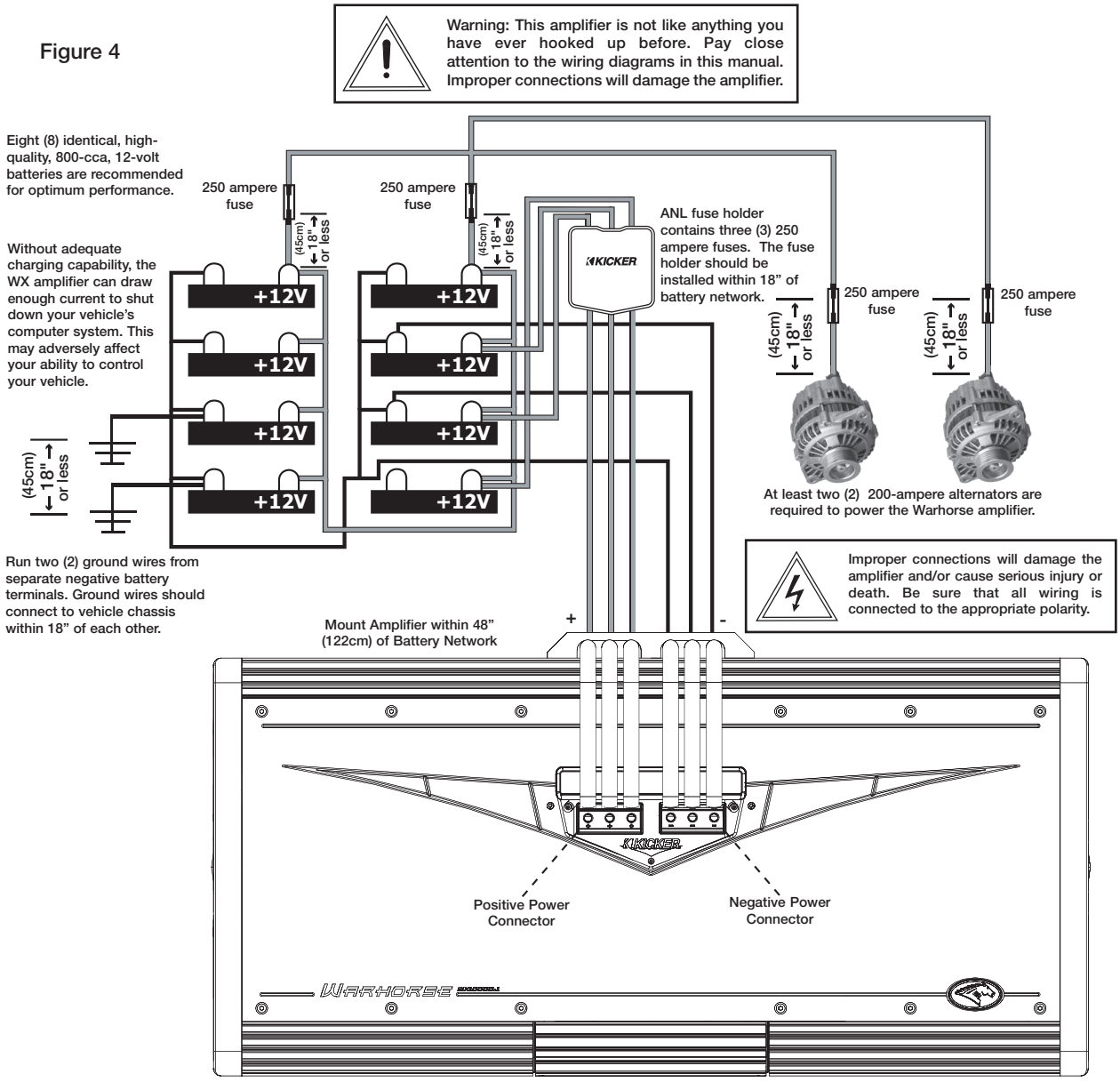
Note: To get the best performance from your new Kicker Amplifier, we recommend using genuine Kicker Accessories and Wiring. All specifications and performance figures are subject to change. Please visit the www.kicker.com for the most current information.

Caution The Kicker WX amplifier outputs extremely high voltage signals from the voice coil (speaker) outputs and can cause serious injury or death from electrocution. It is imperative to read the manual carefully and follow all of the recommended safety precautions before installing the WX amplifier.

3. Configuration The following diagram shows the recommended mono configuration for your Kicker WX amplifier. The WX amplifier can only drive extremely high-power-rated, dual-voice coil speakers. We recommend using one or more Kicker SoloX Subwoofers. Each voice coil (speaker) output is rated at 2 ohms minimum.

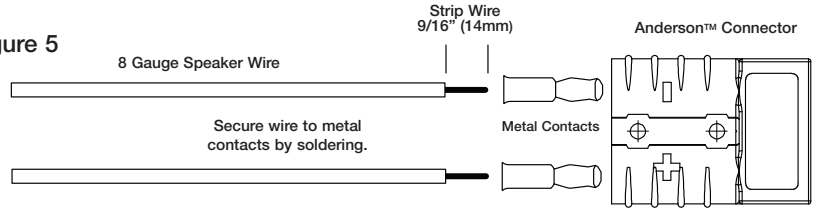
ModelWX**10000.1**	Fuse **Three (3) x 250 Ampere**	Power**Ground****Wire** **Three (3) x 1/0 Gauge**

Figure 4



The WX amplifier outputs dangerous voltage levels from the voice coil (speaker) outputs and can cause serious injury or death from electrocution. Never contact the voice coil outputs, connect speakers, or contact speaker wires while the amplifier is turned on.

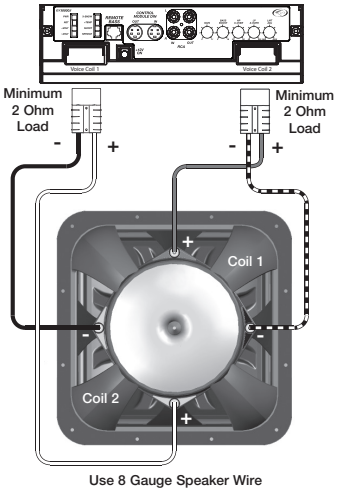
Figure 5



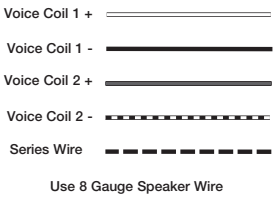
The WX amplifier outputs dangerous voltage levels from the voice coil (speaker) outputs and can cause serious injury or death from electrocution. Never contact the voice coil outputs, connect speakers, or contact speaker wires while the amplifier is turned on.

Figure 6

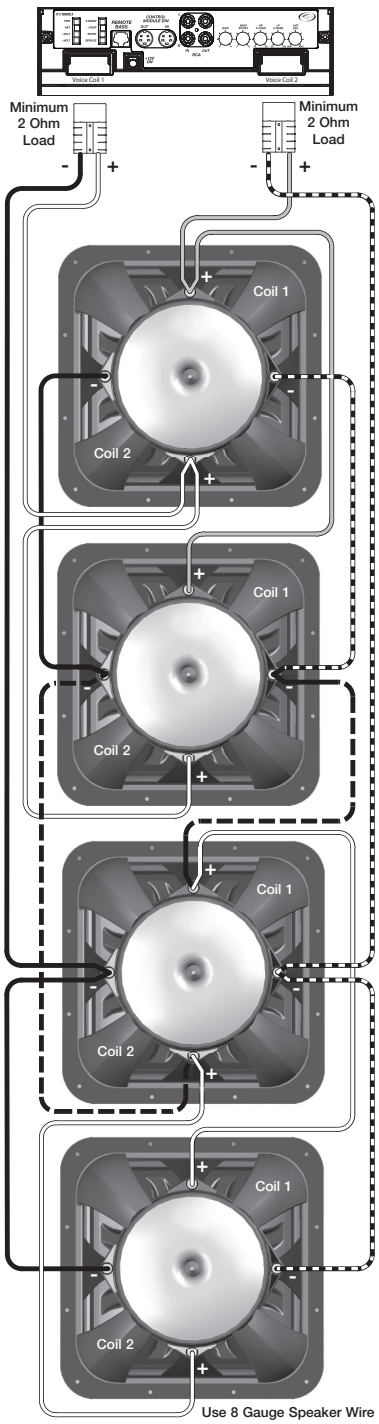
2 Ohm Dual-Voice Coil Subwoofer



Wiring Key



Four (4) 2 ohm Dual-Voice Coil Subwoofers



Two (2) 4 ohm Dual-Voice Coil Subwoofers

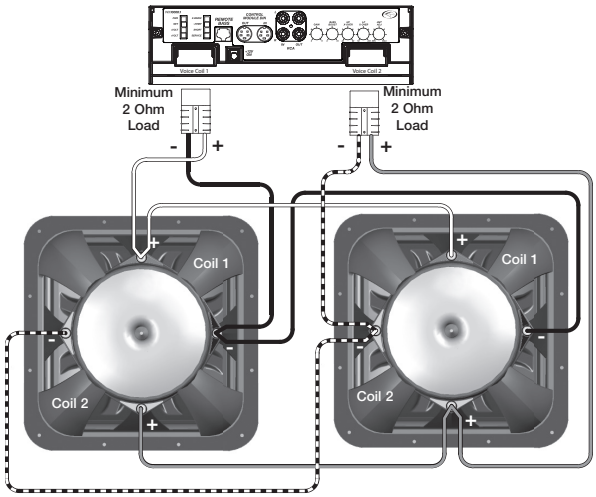


Figure 7

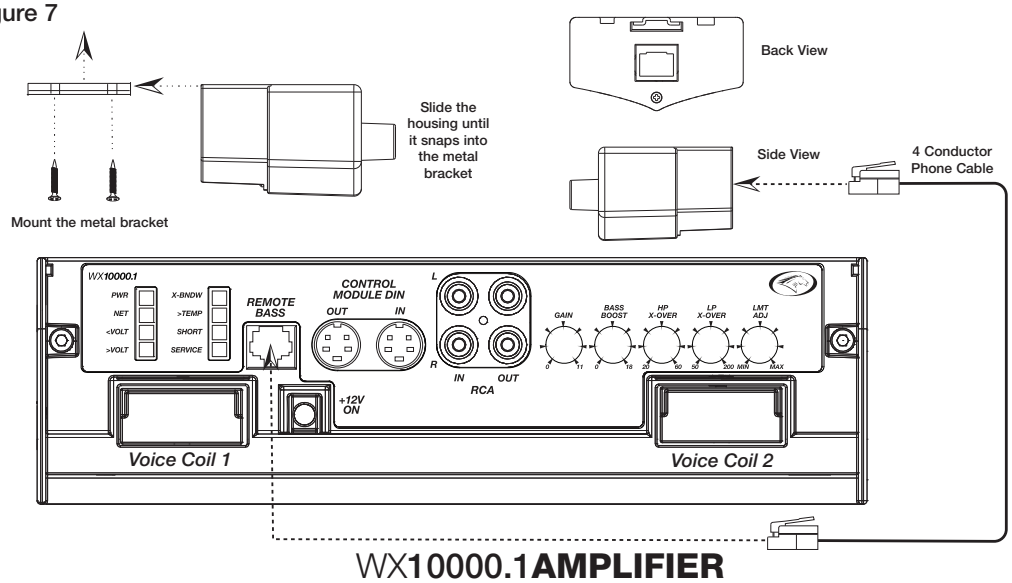
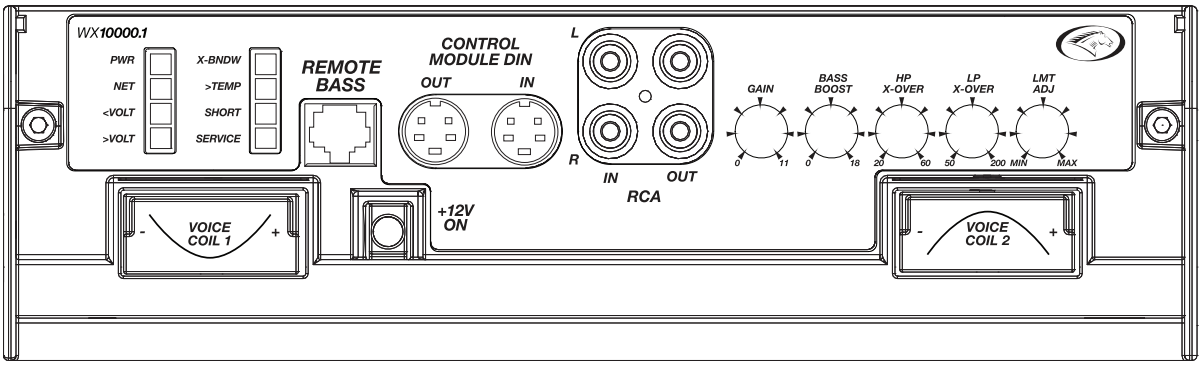


Figure 8



Operation

Within the control panel shield, the Kicker WX amplifier has five (5) rotary controls, input jacks for the Remote Bass level control, and input/output jacks for the optional WX control module. The control panel delivers a full range of options for processing the signal that powers your subwoofers. To remove the control panel shield, simply remove the two (2) screws as shown in Figure 5.

1. *Input***GainControl** The input gain control is not a volume control. It matches the output of the source unit to the input level of the amplifier. ***Please use hearing protection before performing the following procedure.*** Disconnect the Remote Bass level control and turn the source unit up to about 3/4 volume (if the source unit goes to 30, turn it to 25). Next, slowly turn (clockwise) the gain on the amplifier up until you can hear audible distortion, then turn it down a little.

2. *Bass***BoostControl** The bass boost control is designed to give you increased output 0 - 18dB at 40 Hz. The setting for this control is subjective. If you turn it up, you must go back and adjust the input gain control to avoid clipping the amplifier.

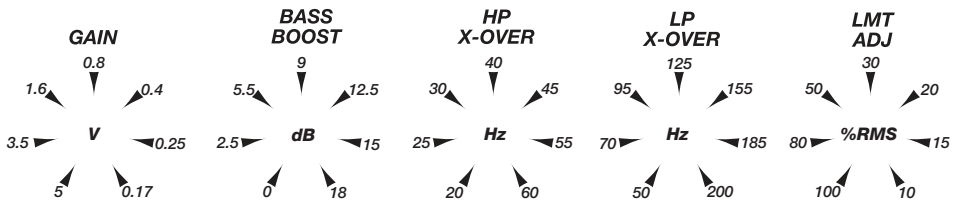
3. *High***PassSubsonicCrossover** The variable high-pass crossover located on the control panel utilizes a 24dB per octave 20 - 60Hz high-pass crossover. The setting for this control is subjective but should be adjusted to appropriately accommodate your enclosure in order to prevent damage from high excursion and increase the power handling of the subwoofer(s).

4. *Low***PassCrossover** The variable low-pass crossover located on the control panel utilizes a 24dB per octave 50 - 200Hz low-pass filter. The setting for this control is subjective; 80 Hz is a good place to start.

5. *Adjustable***LimiterControl** The limiter adjusts the maximum RMS output of the Warhorse. If your vehicle's charging system is inadequate to provide full power to the WX series amplifier, adjust the limiter control clockwise to reduce the amplifier's power consumption and maintain an operational level that will protect your subwoofer(s) from damage. If the <VOLT LED is on and the amplifier is frequently shutting down due to under voltage, try turning the limiter control up (clockwise) until this is no longer a problem.

Figure 9

The corresponding value for each marker is given for each of the Warhorse amplifier's rotary controls to assist in the precise adjustment of your system.



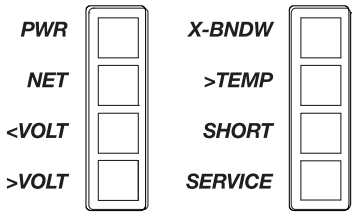
6. *Remote***Bass(Level Control)** With the remote bass level control, you have the ability to control the level of the subwoofer(s) remotely. To mount the remote bass level control, simply screw the metal bracket to the chosen location. Then slide the housing onto the bracket until it snaps into place. Run the cable from the controller to the "Remote Bass" jack on the amplifier chassis. See Figure 6.

7. *Warhorse***ControlModule** The optional Warhorse control module opens up a wide range of operational possibilities within the Warhorse. The control module can simultaneously control up to 16 WX amplifiers and puts additional signal processing features in the palm of your hand. These include bandpass crossover with adjustable slopes, limiter adjustment, phase inversion, single-band parametric equalization, voltage range adjustment, battery voltage display, tone generator, and individual amplifier muting. Contact your Kicker dealer for more information about the Warhorse control module and its features. It is necessary to purchase the control module to access the full range of possibilities available from your Kicker Warhorse amplifier.

*Trouble**Shooting***

If your amplifier does not appear to be working, check the obvious things first: such as blown fuses, poor or incorrect wiring connections, incorrect setting of crossover switch and gain controls, etc. There are eight LEDs on the control panel of your Kicker WX series amplifier. The LED display may help identify the problem. The amplifier's protection circuitry induces a muted safe mode if any excessive conditions have occurred outside of the amplifier's normal operational range. These conditions are indicated by the LEDs on the amplifier's control panel.

Figure 10



The Warhorse LED array displays the status of the amplifier's protective circuitry and can assist in troubleshooting problems that may occur while using the amplifier. The green LED's will turn on or off depending on the conditions listed in this section.

❍ ***1. PWR LED on/off*** Smart power indicator turns on when the amplifier is on and functioning properly.

❍ ***2. NET LED on/off*** Indicates the optional remote control module is connected to the Control Module DIN input on the amplifier. See Figure 8.

❍ ***3. <VOLT LED on/off*** The Under Voltage LED turns on when the voltage supplied to the amplifier drops below 9 volts. The amplifier will remain in the muted safe mode until the voltage supply increases to 9.5 volts. If the amplifier goes into mute mode often, as a result of under voltage, you may need to do one or more of the following: a) turn up the limiter control on the amplifier's control panel, b) check the connections, c) replace batteries with identical units or charge existing batteries, d) add additional identical batteries to the vehicle's battery network, e) add an additional alternator to your vehicle.

Without adequate charging capability, the WX amplifier can draw enough current to shut down your vehicle's computer system. This may adversely affect your ability to control your vehicle.

❍ ***4. >VOLT LED on/off*** The Over Voltage LED turns on when the voltage supplied to the amplifier exceeds 16 volts and the muted safe mode has been activated. After the voltage supply drops below 15.5 volts, the amplifier will automatically turn back on.

❍ ***5. X-BNDW LED on/off*** Because of the combined high pass and low pass filters built into the rotary control section of the amplifier, it is possible to cause a reduction in output by adjusting the bandwidth too narrow or overlapping the high and low pass crossover frequencies. The X-BNDW LED turns on if this has occurred and is causing a reduction in output.

❍ ***6. >TEMP LED on/off*** If the temperature of the amplifier's heatsink exceeds 158F (70C), it will activate the muted safe mode. When the temperature decreases to 149F (65C), the amplifier will automatically turn back on. If this LED is on, turn the amplifier off and test resistance at the speaker terminals with a digital multimeter (see Figure 6 in this manual for multiple speaker wiring suggestions). Also, check for adequate airflow around the amplifier.

The WX amplifier outputs dangerous voltage levels from the voice coil (speaker) outputs. Never contact the voice coil outputs, connect speakers, or speaker wires if the amplifier is turned on. Turning the amplifier on without loading both voice coil outputs or connecting the speaker(s) will increase the risk of electrical shock and could damage the amplifier.

❍ ***7. Short LED on/off*** The short LED will light up if the electrical current coming out of the amplifier's voice coil (speaker) outputs exceeds a peak of 130 ampere. The Warhorse Amplifier tests the outputs every three (3) seconds to protect the amplifier from electrical shorts and will turn off automatically if any short is detected. With the amplifier turned off and speakers disconnected, check for speaker wires shorted to each other or to the vehicle's chassis. Check for damaged speaker(s), or speaker(s) operating below the minimum recommended impedance. Because of the dangerous voltage output of the amplifier, it is important to turn the amplifier off before attempting to repair any short or problem with the voice coil output wiring.

❍ ***8. Service LED on/off*** If the service LED turns on, the amplifier most likely requires repair. In some cases, the service LED will illuminate if the voice coil (speaker) outputs are not both loaded at the same time. Turn the amplifier off and check the wiring for abrasions. Make sure that the amplifier is wired correctly to the speakers as indicated in Figure 6. If no problems are found with the speaker wire or connections and the service LED remains on, contact the Authorized Kicker dealer from whom you purchased the amplifier.

*Warhorse**Design**Features*

1. Patent Pending Signal-Modulated Power Supply The WX amplifier's patent pending signal modulated power supply combined with its custom planar transformers achieves efficiency ratings yet to be matched in mobile audio, operating at 90% efficiency at a 2 ohm load and 93% efficiency at a 4 ohm load at full power.

2. Planar Transformer Design The WX amplifier's four (4) planar transformers are excellent for high power applications and are custom designed to handle 5,000 watts each, leaving more than enough power headroom to operate reliably and consistently at full RMS with 20,000 watts of total capability.

3. Texas Instruments DSP The Warhorse uses the latest Texas Instruments industrial grade DSP to handle the amplifier's pulse-width modulation, manage signal processing, and control the amplifier's protection circuitry. han

4. Insulated Metal Substrate Cooling The Warhorse design uses insulated aluminum material for optimum heat transfer between power devices and the heatsink. Lower operating temperatures improve performance and durability while allowing for a smaller overall footprint.

5. Heavy Duty Industrial Bus Bars The Warhorse has been outfitted with solid copper industrial grade bus bars. With 70 square millimeters of cross sectional area, the WX amplifier's heavy duty bus bars are specifically engineered to maximize the current carrying capability within the amplifier.

6. Super Thick, 4 Ounce Double Sided PCB When you are livin' this loud, you have to have a strong foundation. The circuit board used in the Warhorse is 50% thicker t the industry standard and uses the heaviest available 4 ounce thick copper traces and plated-through holes. This assures the circuit board can transfer the current needed for an amplifier of this magnitude.

7. Oversized Gold Plated Power Connectors The Warhorse amplifier's gold plated power connectors were custom designed with multiple power terminals to maximize current carrying capability to the amplifier's signal-modulated power supply.

8. Industrial Grade Anderson™ Speaker Connectors The 50 ampere Anderson™ connectors packaged with the Warhorse amplifier allow minimal contact resistance at high current. The housing of the connectors was designed to prevent polarity mismatches when connecting speakers and also protects fingers or probes from touching the metal contacts to provide additional safety from the high voltage signals coming from the voice coil (speaker) outputs.

9. Dual Thermostatically-Controlled Push-Pull Cooling Fans Twin push-pull fans are mounted on the side of the amplifier to improve airflow and provide additional cooling for the amplifier.

Performance

Model	X**10000.1**
RMS Power in Watts	
@14.4V, 2Ω Mono, ≤1.5% THD+N	10000 x 1
@14.4V, 4Ω Mono, ≤1.5% THD+N	5000 x 1
Length:	35" (888mm)
Height:	3 3/4" (96mm)
Width:	17 3/4" (450mm)
Weight:	66.8 lb (30.3kg)
Frequency Response, + 0 / - 1 dB:	20 Hz - 200 Hz
Signal-to-Noise Ratio:	>95 dB, a-weighted, re: rated power
Input Sensitivity:	170 mV - 5 V low level,
Low Pass Crossover:	Variable Low-Pass, 50 - 200Hz, 24dB per octave
High Pass Sub-Sonic Crossover:	Variable High Pass, 20 - 60Hz, 24dB per octave
Bass Boost:	Variable 0 to +18 dB boost @ 40 Hz

Model WX**10000.1**
5000 x 1 @ 4 ohms, 14.4Vdc, 1% THD, CEA-2006 (Watts)
Signal to Noise Ratio -60 CEA-2006 (ref: 1W, A-weighted)