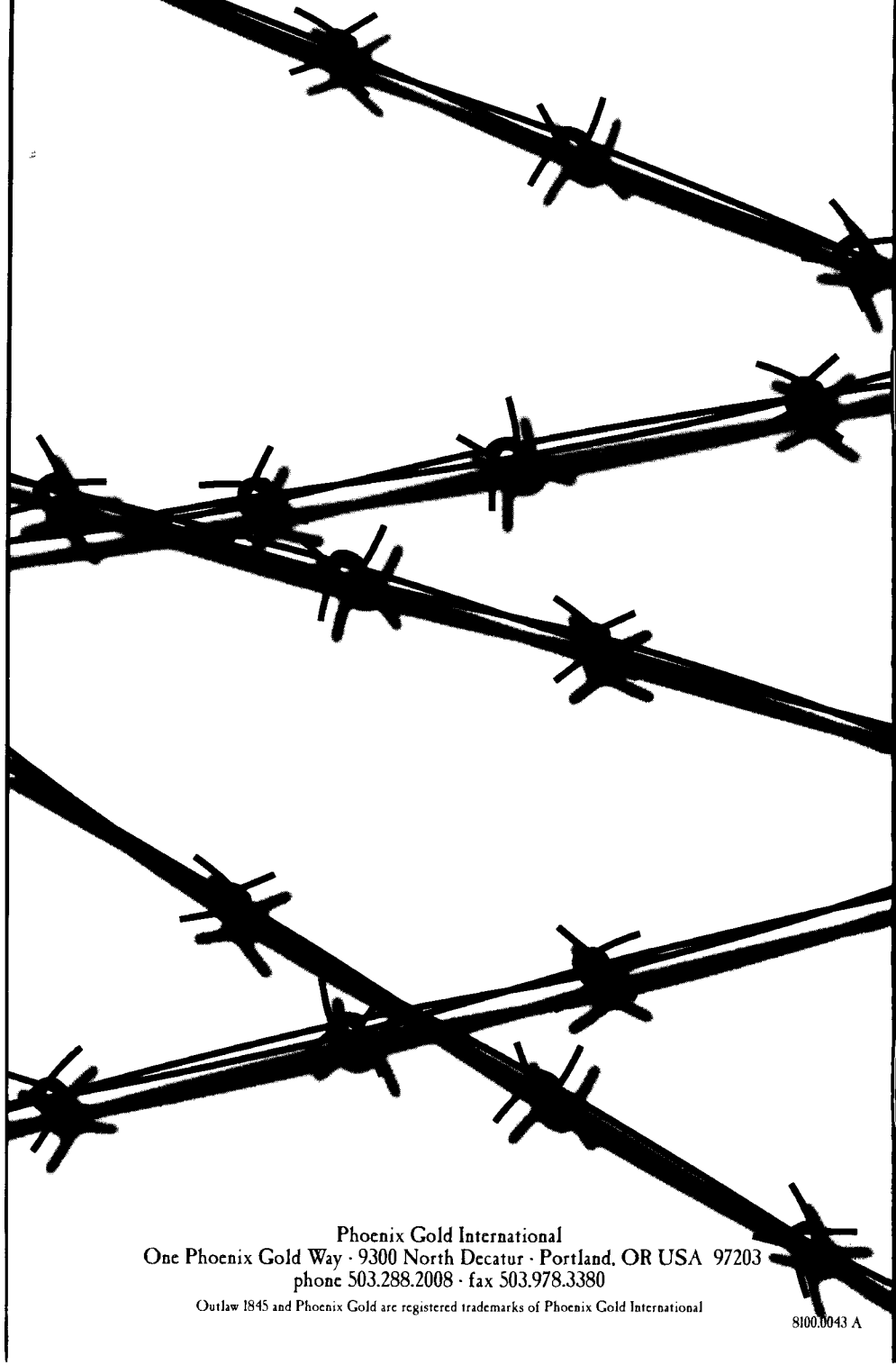
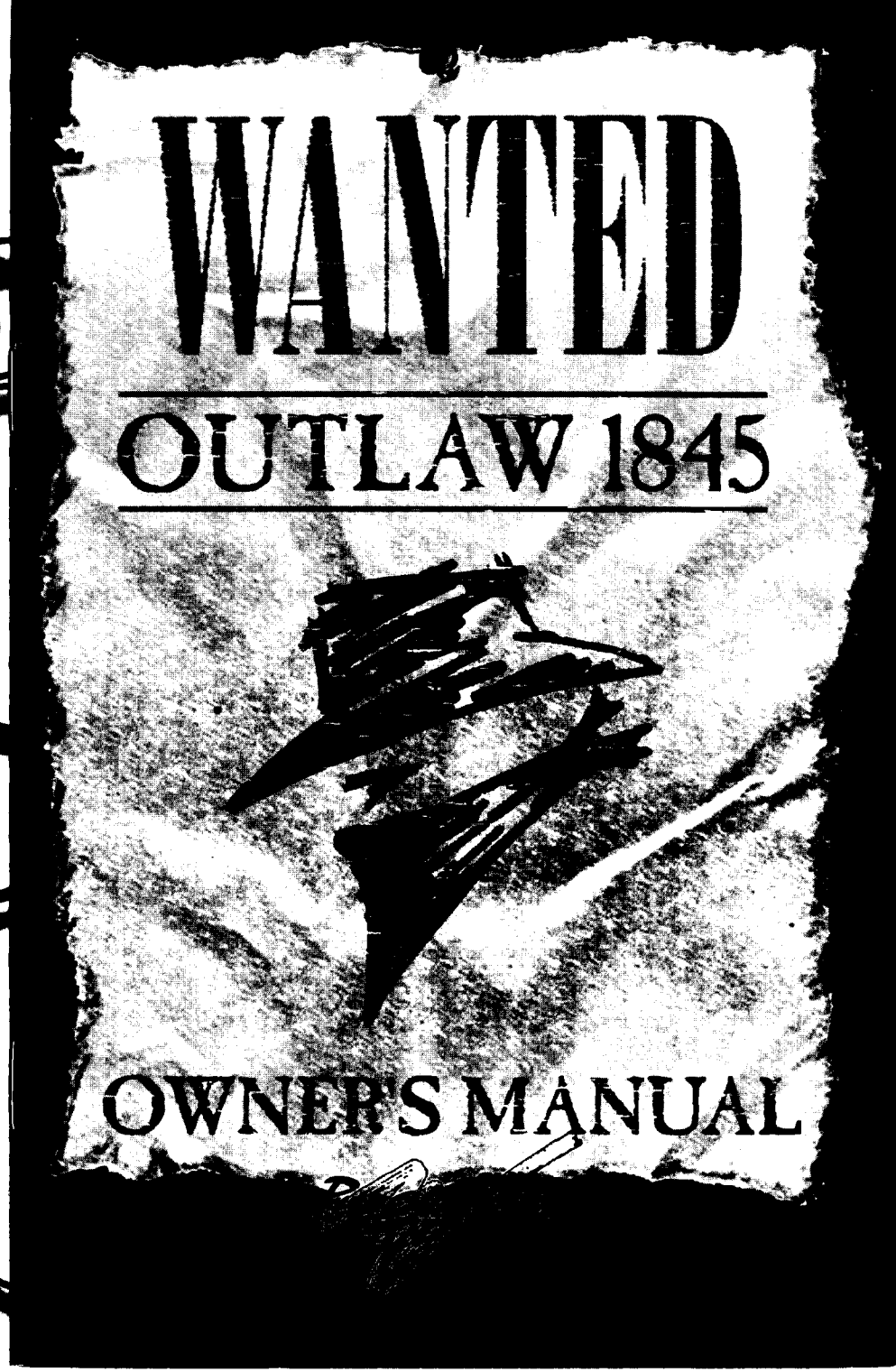


Phoenix Gold International
One Phoenix Gold Way · 9300 North Decatur · Portland, OR USA 97203
phone 503.288.2008 · fax 503.978.3380

8100.0043 A

WANTED

OUTLAW 1845



OWNER'S MANUAL

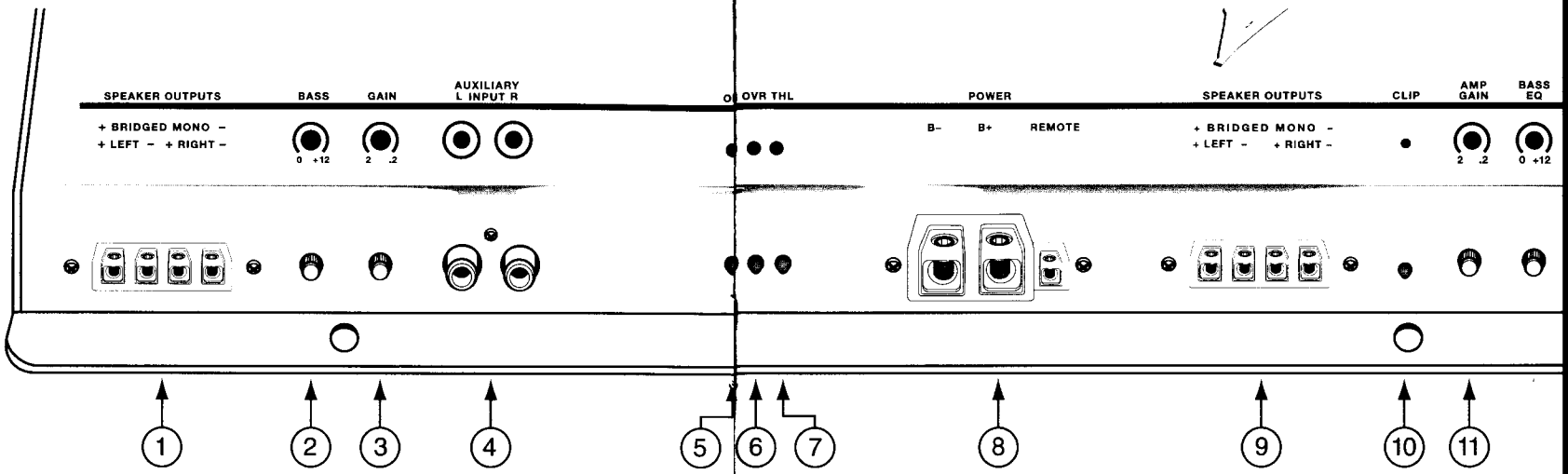
Outlaw 1845

Phoenix Gold Special Edition Amplifier

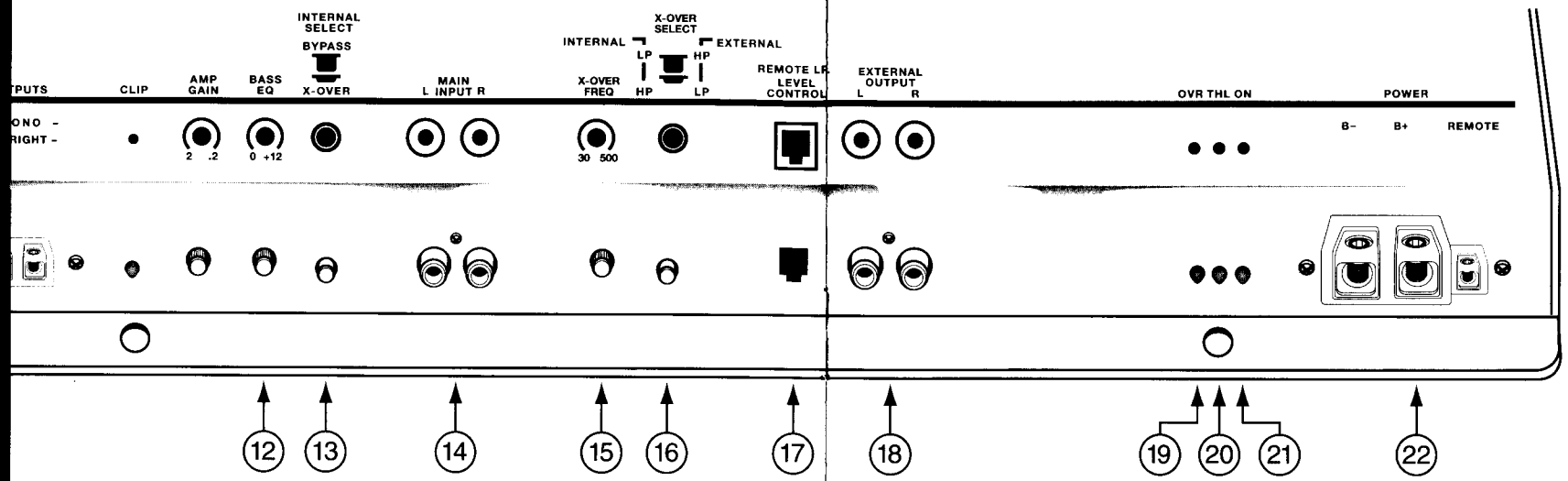
- 2 x 100 watts Per Channel
- Bridgeable Outputs
- Tri-Linear™ output capacity (simultaneous stereo & bridged mono operation)
- Stereo 12dB per octave, continuously variable crossover from 30 to 500Hz.
- Selectable HP, LP or Full Range for the internal amplifier and HP or LP for the external output.
- Adjustable High-Q Bass EQ (0 to +12dB) @ 45Hz
- Pulse Width Modulated MOSFET Switching Power Supply
- Stable into 1 ohm **stereo** or 2 ohm **mono** loads *
- High-Current Triple-Darlington Output Stage design
- Gold Plated 2 layer, 2 ounce Copper G10 Glass-Epoxy Printed Circuit Board
- Variable input sensitivity (200mV to 2V)
- Thermal Overload Protection
- Superior muting circuitry assures no turn on / turn off noise
- Optically isolated power supply
- VI limiting circuitry with overcurrent LED
- Extensive burn-in and QC testing for the ultimate in reliability
- Low RFI / EMI design
- Optional LPL44 input, for Dash Mount Subwoofer Level Control
- Made in the good ol' USA
- Output Power per Channel- Both Channels Driven
  - Into 4 ohms @ 12/13.8V DC ..... 100/185 WRMS
  - Into 2 ohms @ 12/13.8V DC ..... 200/230 WRMS
  - Bridged Power into 4 ohms @ 13.8V DC ..... 500 WRMS
- THD at rated power 4 ohms 0.05%
- SMPTE at rated power 4 ohms 0.05%
- DIM at rated power 4 ohms 0.02%
- Frequency response ..... 10Hz to 30kHz ±1dB
- Signal to Noise Ratio ..... > 100dB (20Hz to 20kHz)
- Input Sensitivity ..... 200mV to 2V
- Input Impedance ..... 100k ohms
- Idle Current 2A
- Current Consumption
  - @ 4 ohms stereo ..... 40 Amps
  - @ 2 ohms stereo or 4 ohms mono ..... 70 Amps
- Efficiency ..... > 80% (Power Supply)
- Damping Factor (20 to 200Hz) 250:1
- Min to Max Voltage requirements ..... 10.0 to 15.5V DC
- Dimensions ..... 29.25"L 10.63"W x 2.00"H

- 2 x 50 Watts per channel
- Bridgeable Outputs
- Tri-Linear™ output capability (simultaneous stereo & bridged mono operation)
- Adjustable High-Q Bass EQ (0 to +12dB) @ 45Hz
- Pulse Width Modulated MOSFET Switching Power Supply
- Stable into 1 ohm **stereo** or 2 ohm **mono** loads *
- High-Current Triple-Darlington Output Stage design
- Gold Plated 2 layer, 2 ounce Copper G10 Glass-Epoxy Printed Circuit Board
- Variable input sensitivity (200mV to 2V)
- Thermal Overload Protection
- Superior muting circuitry assures no turn on/turn off noise
- Optically isolated power supply
- VI limiting circuitry with overcurrent LED
- Extensive burn-in and QC testing for the ultimate in reliability
- Made in the good ol' USA
- Output Power per Channel: Both Channels Driven
  - Into 4 ohms @ 12/13.8 VDC ..... 50/80 WRMS
  - Into 2 ohms @ 12/13.8 VDC ..... 100/120 WRMS
  - Bridged Power into 4 ohms @ 13.8 VDC ..... 245 WRMS
- THD at rated power 4 ohms 0.5%
- SMPTE at rated power 4 ohms 0.05%
- DIM at rated power 4 ohms 0.02%
- Frequency response ..... 10Hz to 30kHz ±1dB
- Signal to Noise Ratio ..... > 100dB (20 to 20kHz)
- Input Sensitivity ..... 200mV to 2V
- Input Impedance ..... 10k ohms
- Damping Factor (50Hz @ 4 ohms) 250:1
- Idle Current 1.5A
- Current Consumption
  - @ 4 ohm stereo 15A
  - @ 2 ohm stereo or 4 ohms mono 35A
- Efficiency ..... > 80% (Power Supply)
- Min to Max Voltage requirements ..... 10.0 to 15.5V DC
- Dimensions ..... 29.25"L 10.63"W x 2.00"H

* Requires an auxiliary cooling fan system



1. Auxiliary SPEAKER OUTPUTS: The Outlaw Auxiliary amplifier's outputs are made available on this specially tooled nickel-plated connector which accommodates speaker cable conductors up to 10 gauge. Be sure to observe the polarity markings to ensure proper speaker phasing.
2. BASS: This control adjusts the bass boost equalization of the Outlaw Auxiliary amplifier. The level of bass boost ranges from 0dB to greater than 12dB. The equalization is a narrow band boost centered at 45Hz.
3. GAIN: This control adjusts the input gain of the Outlaw Auxiliary amplifier. Input gain is adjustable over a 10x (20dB) range, from 2V to 0.2V. With the gain control set to 2V (minimum gain), the amplifier is driven to full rated power 4 ohm with a 2VRMS input signal; a 0.2VRMS input signal will drive the amp to full rated 4 ohm power with the gain control set to 0.2V (maximum gain).
4. AUXILIARY INPUT: These RCA jacks allow direct signal input to the Outlaw Auxiliary amplifier. These are switching jacks: if no external input is plugged in, the output from the Outlaw Main amplifier's internal crossover is automatically routed to the Auxiliary amplifier's input. This allows both the Main and Auxiliary amplifiers to be driven by input signal applied to the Main Input alone.
5. ON: Green LED which lights when the Outlaw Auxiliary amplifier is operational.
6. OVR: Red LED which lights when the Outlaw Auxiliary amplifier is in overload protection. This protection circuit turns the amplifier off when sustained excessive output current levels are reached, but automatically turns the amplifier back on after a short pause. A delay is built into this circuit to avoid tripping the overload protection circuit during dynamic musical peaks.
7. THL: Amber LED which lights when the Outlaw Auxiliary amplifier is shut down for thermal protection. The amplifier turns off when the heatsink temperature reaches ~90°C and turns back on after cooling to ~80°C.
8. Auxiliary POWER Input: Specially tooled nickel-plated three position connector for battery power input to the Outlaw Auxiliary amplifier. The B- and B+ terminals accommodate up to 2 gauge wire.
   - Connect the B- terminal to chassis ground;
   - Connect the B+ terminal to a 12V source, fused appropriately (40A max); and
   - Connect the REMOTE terminal to a switched 12V source which can be used to turn the amplifier on and off, such as the power antenna output from a head unit.
9. Main SPEAKER OUTPUTS : The Outlaw Main amplifier's outputs are a specially tooled nickel-plated connector which accommodates speaker cable conductors up to 10 gauge. Be sure to observe the polarity markings to ensure proper speaker phasing.
10. CLIP: Red LED which lights when either channel of the Outlaw Main amplifier clips the output signal.
11. AMP GAIN: This control adjusts the input gain of the Outlaw Main amplifier section. Input gain is adjustable over a 10x (20dB) range, from 2V to 0.2V. With the gain control set to 2V (minimum gain), the amplifier is driven to full rated 4 ohm power with a 2VRMS input signal; a 0.2VRMS input signal will drive the amp to full rated 4 ohm power with the gain control set to 0.2V (maximum gain). This control affects only the Outlaw Main amplifier output.



12. BASS EQ: This control adjusts the bass boost equalization of the Outlaw Main amplifier. The level of bass boost ranges from 0dB to greater than 12dB. The equalization is a narrow band boost centered at 45Hz. This control affects only the Main amplifier output.
13. INTERNAL SELECT: This switch selects the signal source for the Outlaw Main amplifier. In the bypass position (pushbutton out), the input signal from the Main Input jacks is connected directly to the Main amplifier input. The X-Over position (pushbutton in) connects the output of the Main amplifier's internal crossover (as configured by the x-over select switch, #16 below) to the Main amplifier input.
14. MAIN INPUT: These RCA jacks supply input signal to the Outlaw Main amplifier and its internal crossover. Unbalanced line-level signals from any head unit or signal processor can be used.
15. X-OVER FREQuency: This control adjusts the highpass and lowpass corner frequency of the Outlaw Main amplifier's internal crossover. It is continuously variable between 30Hz and 500Hz.
16. X-OVER SELECT: This switch selects the output signal routing from the Outlaw Main amplifier's internal crossover. In the Internal LP/ External HP position (pushbutton out), the lowpass output from the internal crossover is routed to the Main amplifier input (subject to the setting of the internal select switch, #13 above), while the highpass output is routed to the external output RCA jacks and through the auxiliary input RCA jacks (default switching, no external input applied) to the Auxiliary amplifier's input. Setting the switch to Internal HP/ External LP position (pushbutton in) exchanges these connections.

17. REMOTE LPL LEVEL CONTROL: Modular jack for connection of an LPL44 Lowpass Level Control. When installed, this control allows remote signal level adjustment of the internal crossover's lowpass output.
18. EXTERNAL OUTPUT: These RCA jacks provide the selected high or lowpass output from the Outlaw Main amplifier's internal crossover for driving external amplifiers or signal processors.
19. OVR: Red LED which lights when the Outlaw Main amplifier is in overload protection. This protection circuit turns the amplifier off when sustained excessive output current levels are reached, but automatically turns the amplifier back on after a short pause. A delay is built into this circuit to avoid tripping the overload protection circuit during dynamic musical peaks.
20. ON: Green LED which lights when the Outlaw Main amplifier is operational.
21. THL: Amber LED which lights when the Outlaw Main amplifier is shut down for thermal protection. The amplifier turns off when the heatsink temperature reaches ~90°C and turns back on after cooling to ~80°C.
22. Main POWER Input: Specially tooled nickel-plated three position connector for battery power input to the Outlaw Main amplifier. The B- and B+ terminals accommodate up to 2 gauge wire.
    - Connect the B- terminal to chassis ground;
    - Connect the B+ terminal to a 12V source, fused appropriately (50A max); and
    - Connect the REMOTE terminal to a switched 12V source which can be used to turn the amplifier on and off, such as the power antenna output from a head unit.

Amplifier Location

The Outlaw has been designed to dissipate heat more efficiently than any other amplifier manufactured today. However, prolonged operation at high volumes or extremely low impedances without the aid of a fan shroud can cause the unit to overheat and protect itself. Regardless of where you decide to mount the Outlaw make sure that there is at least 2 inches of clearance above and around the amplifier.
The amplifier may be mounted either upright (Figure 1) or vertical (Figure 2), but never upside down (Figure 3)—a position which allows the rising heat to feed back into the amplifier, causing a premature system shut down.

The Outlaw should be protected from exposure to moisture and it is best to mount the amplifier on:

1. The back wall or floor of the trunk.
2. The side of the sub-woofer enclosure.

Place amplifier in the position that you wish to use and check for clearances around the amplifier.

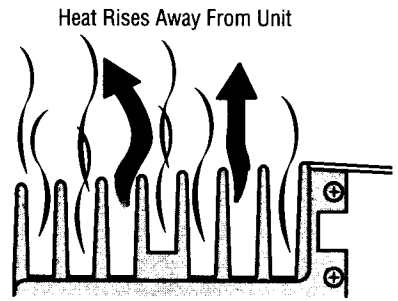


Figure 1: Upright Mount

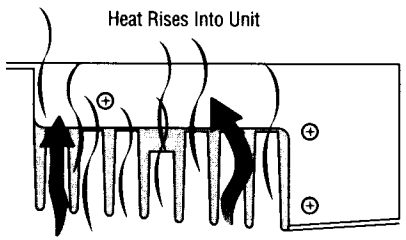


Figure 3: Upside Down Mount

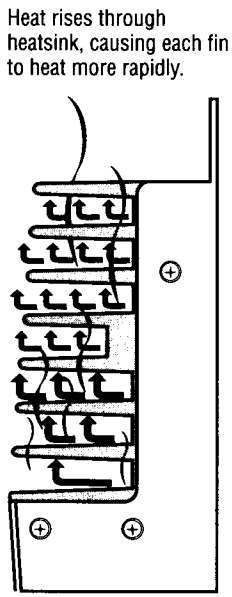


Figure 2: Vertical Mount

Amplifier Mounting

Is there enough space for the signal input plugs? Will the speaker cables be able to enter the terminal connectors straight? Will your mounting position allow easy viewing of indicator LEDs and amplifier controls?

1. Use the Outlaw as the template. Mark the mounting surface with a felt pen or pencil. (Placing masking tape on the surface first will make these marks more visible).
2. Drill 1/8 inch pilot holes.
3. Mount the amplifier with six (6) #10 by 3/4 inch panhead phillips screws.

Do not drill any holes while using the amplifier as a template. It is very easy to damage the amplifier's powder coated surface in this manner.

Electrical Installation—*Remember to always disconnect battery ground before working on a vehicle's electrical system!*

1. Always place a fuse or circuit breaker no more than 18 inches from the battery. This protection is only for the vehicle, not the stereo and should be no greater than 50 amps per amplifier.
2. For audio connections, we recommend using high-quality audio interconnects like the Phoenix Gold A540 Trans-Balanced or our compact CSI cables. The Phoenix Gold cables are the ultimate in sound quality and reducing or eliminating unwanted radiated noise from your system. Make sure that you run your audio cables away from your power wires. This will help reduce any noise caused by the power wire radiating into the audio cables.
3. Based on the current draw of your system, always use the largest gauge power and ground wire possible. (We recommend using Phoenix Gold PRO4 Ruby and PRO4 Onyx wire for Power and Ground.) The custom Outlaw power connector can handle up to 2 gauge wire (see Figure 6.) Utilizing large-gauge power and ground cables will give your system a high damping factor, resulting in the tightest and most accurate bass possible.
4. If the green LED is on the amplifier is on. If the amber LED is on the amplifier has thermaled, meaning that the heatsink has reached 90°C and the amplifier has protected itself. The red LED will only light if the amp is required to produce sustained, excessive output current levels.

Make sure that no speakers are shorted. A shorted output will not damage your Phoenix Gold Outlaw, but it will cause the protection circuitry to engage. This situation will be apparent when observing the three LEDs on the front panel. The green LED will flash on for a second and then the red LED will flash. This pattern will repeat several times.

Pre-Installation System Design

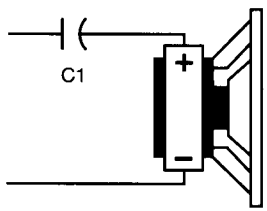
With the extreme flexibility of the Phoenix Gold Outlaw, we highly recommend that you carefully design the entire system before its installation. The following system diagram should be used as a guide in helping to design a truly awesome car audio system.

Remember that this amplifier likes to be driven hard. Whenever possible choose the Tri-Linear™ mode (i.e.,stereo & bridged mono simultaneously). Passive crossover networks must be utilized in order to protect drivers. When passive components (capacitors and inductors) are used in multiple speaker systems, the crossover's impedance and the speaker system combinations must be considered especially when determining the amplifier loading. 12dB per octave crossovers are good, but tend to create sonic problems if not utilized correctly. A 12dB per octave crossover (an inductor and capacitor for each speaker) forms a series resonant circuit to ground whose impedance at that resonance frequency is determined by the speakers dynamic impedance. If the speaker circuit, for whatever reason, becomes open or disconnected the crossover input impedance is theoretically zero (0). In other words, a direct short.

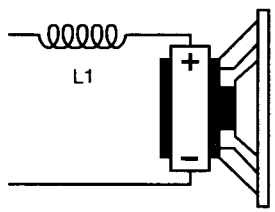
Fortunately, Phoenix Gold amplifiers are designed to withstand this type of treatment. Generally, most amplifiers do not like to see this condition. We recommend 6 dB or 18 dB per octave type crossovers, especially in automobiles. These crossover slopes are in phase and tend to sound better.

The following crossover slope charts are for your reference. Remember, we cannot take into account crossover component values for the system you have chosen since those values will be determined by the frequency you select for your crossover point and the impedance of the speakers at the crossover point selected for your system.

FREQUENCY HERTZ	SPEAKER IMPEDANCE					
	2 Ohm		4 Ohm		8 Ohm	
	L1	C1	L1	C1	L1	C1
80	4.1 mH	1000 µF	8.2 mH	500 µF	16 mH	250 µF
100	3.1 mH	800 µF	6.2 mH	400 µF	12 mH	200 µF
130	2.4 mH	600 µF	4.7 mH	300 µF	10 mH	150 µF
200	1.6 mH	400 µF	3.3 mH	200 µF	6.8 mH	100 µF
260	1.2 mH	300 µF	2.4 mH	150 µF	4.7 mH	75 µF
400	.8 mH	200 µF	1.6 mH	100 µF	3.3 mH	50 µF
600	.5 mH	136 µF	1.0 mH	68 µF	2.0 mH	33 µF
800	.41 mH	100 µF	.82 mH	50 µF	1.6 mH	25 µF
1000	.31 mH	78 µF	.62 mH	38 µF	1.2 mH	20 µF
1200	.25 mH	66 µF	.51 mH	33 µF	1.0 mH	16 µF
1800	.16 mH	44 µF	.33 mH	22 µF	.68 mH	10 µF
4000	80 mH	20 µF	.16 mH	10 µF	.33 mH	5 µF
6000	51 mH	14 µF	.10 mH	6.8 µF	.29 mH	3.3 µF
9000	34 mH	9.4 µF	68 mH	4.7 µF	.15 mH	2.2 µF
12000	25 mH	6.6 µF	51 mH	3.3 µF	.1 mH	1.6 µF

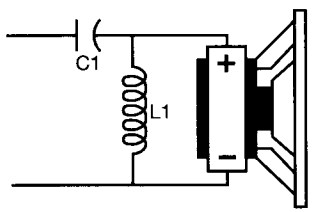


6 dB per Octave High-Pass Filter

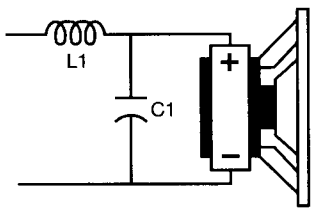


6 dB per Octave Low-Pass Filter

FREQUENCY HERTZ	SPEAKER IMPEDANCE					
	2 Ohm		4 Ohm		8 Ohm	
	L1	C1	L1	C1	L1	C1
80	5.5 mH	680 µF	11 mH	330 µF	22 mH	180 µF
100	4.7 mH	560 µF	9.1 mH	270 µF	18 mH	150 µF
130	3.3 mH	400 µF	6.8 mH	200 µF	15 mH	100 µF
200	2.2 mH	300 µF	4.7 mH	150 µF	9.1 mH	75 µF
260	1.8 mH	200 µF	3.6 mH	100 µF	6.8 mH	50 µF
400	1.1 mH	150 µF	2.2 mH	68 µF	4.7 mH	33 µF
600	.75 mH	100 µF	1.5 mH	47 µF	3.0 mH	27 µF
800	.50 mH	68 µF	1.0 mH	33 µF	2.0 mH	15 µF
1000	.47 mH	50 µF	.91 mH	27 µF	1.8 mH	13 µF
1200	.33 mH	44 µF	.75 mH	22 µF	1.5 mH	11 µF
1800	.27 mH	30 µF	.50 mH	15 µF	1.0 mH	6.8 µF
4000	.10 mH	15 µF	.22 mH	6.8 µF	.47 mH	3.3 µF
6000	75 mH	10 µF	.15 mH	4.7 µF	.33 mH	2.2 µF
9000	50 mH	6.8 µF	.10 mH	3.3 µF	.23 mH	1.5 µF
12000	39 mH	4.7 µF	75 mH	2.2 µF	.15 mH	1.0 µF

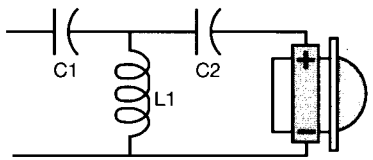


12 dB per Octave High-Pass Filter

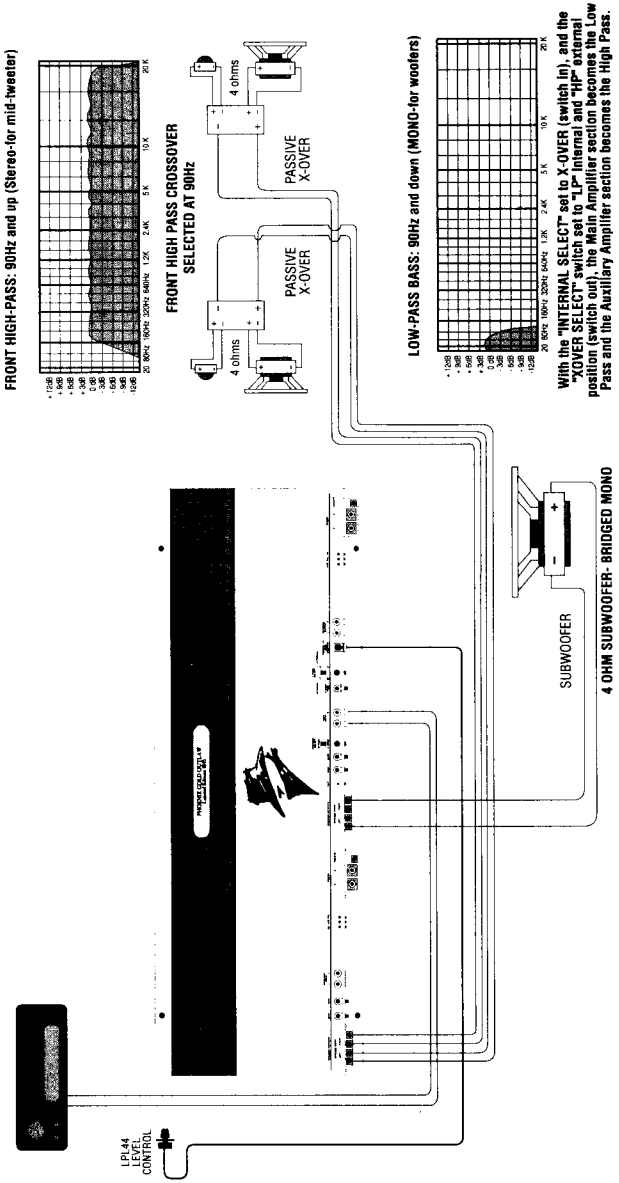


12 dB per Octave Low-Pass Filter

FREQUENCY HERTZ	SPEAKER IMPEDANCE					
	4 Ohm			8 Ohm		
	C1	L1	C2	C1	L1	C2
80	330 µF	6.0 mH	1000 µF	160 µF	12 mH	500 µF
100	270 µF	4.7 mH	800 µF	150 µF	10 mH	400 µF
130	200 µF	3.3 mH	600 µF	100 µF	7.5 mH	300 µF
200	150 µF	2.2 mH	400 µF	68 µF	5.4 mH	200 µF
260	100 µF	1.8 mH	300 µF	50 µF	3.3 mH	150 µF
400	68 µF	1.1 mH	200 µF	33 µF	2.4 mH	100 µF
600	47 µF	.80 mH	130 µF	21 µF	1.6 mH	68 uF
800	33 µF	.60 mH	100 µF	16 µF	1.2 mH	50 µF
1000	27 µF	.47 mH	75 µF	13 µF	.90 mH	39 µF
1200	22 µF	.39 mH	68 µF	11 µF	.80 mH	33 µF
1800	15 µF	.27 mH	47 µF	7.5 µF	.50 mH	22 µF
2000	13 µF	.24 mH	40 µF	6.8 µF	.47 mH	20 µF
3000	8.8 µF	.16 mH	27 µF	4.7 µF	.33 mH	14 µF
4000	6.8 µF	.12 mH	20 µF	3.3 µF	.24 mH	10 µF
6000	4.7 µF	82 mH	13 µF	2.2 µF	.21 mH	6.8 µF
8000	3.3 µF	60 mH	10 µF	1.5 µF	.12 mH	5.0 µF
10000	2.7 µF	47 mH	8.2 µF	1.3 µF	.10 mH	3.9 µF
12000	2.2 µF	38 mH	6.8 µF	1.1 µF	82 mH	3.3 µF



18 dB per Octave High-Pass Filter



Amplifier Adjustments

The Outlaw's Main and Auxiliary amplifier sections each have independent input sensitivity and Bass EQ adjustments. Care should be taken to adjust these properly as they each affect the other.

1. Start both adjustments at "0" or at minimum sensitivity (a counter-clockwise setting for Bass EQ and Gain).
2. Adjust the volume control on your head unit (C/D, Cassette, etc.) to approximately a 7/8 volume setting.
3. Turn the Gain setting adjustment on the Outlaw clock-wise (i.e. to the right) until you hear the amplifier distort. The amplifier clips very softly so this can sometimes be a difficult adjustment. Please listen carefully!
4. If, after adjusting the input gain the bass sound quality is to your liking, it would be best to not adjust the Bass EQ level control. Adding any EQ into the system either through an external equalizer or the built-in equalizer provided with the Outlaw can cause the amplifier to:
   A. Distort easier, or...
   B. Overheat at a much more rapid rate than is normal.
5. If you desire more Bass output, adjust the Bass EQ level clockwise. The adjustment range is from "0" to "+12 dB". We recommend using as little Bass EQ as possible. Remember, boosting +12 dB at 45Hz means the amplifier will clip a 45Hz signal 8 times faster!
6. If you need to boost the Bass EQ to the maximum level (+12 dB) to obtain the desired bass output, something is very wrong. Check the design notes for your subwoofer enclosure. More than likely the woofer and the enclosure are not working together correctly.

Your Installation Is Now Complete!

Relax and Enjoy...

If you experience any problems with your Outlaw amplifier, do not hesitate to contact us at (503) 288-2008. We are here to help.