VELOCITY 150™

HIGH SPEED CURRENT FEEDBACK AMPLIFICATION

OWNER'S MANUAL

May be covered by one or more of the following:
U.S. Patents #4538297, 4647876, 4696044, 4745309,
4881047, 4893099.
Other patents pending.
Foreign patents pending.

ROCKTRON
GUITAR RACK TECHNOLOGY

!! WARNING !!

The Velocity 150™ is capable of producing extremely high sound pressure levels. The use of ear protection is essential in situations when prolonged exposure to such high sound pressure levels occurs. Failure to use caution and/or ear protection when using this amplifier may result in permanent hearing impairment or hearing loss. United States Government guidelines concerning safe noise exposure levels should be referred to before operating the amplifier at high levels. The manufacturer is not responsible for any damage resulting from the use of this product.

UNPACKING

Upon unpacking the Velocity 150™, save the carton and all packing materials in case it becomes necessary to ship the unit.

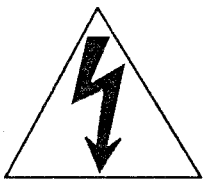
Be sure to thoroughly inspect your unit and it's carton for any signs of damage that may have occurred during shipment. If there are any signs of damage, contact your dealer immediately.

INSTALLATION

When installing the Velocity 150™ in your rack, it is best for ventilation and heat dissipation that the unit occupy the bottom 2 spaces of your rack. It is also recommended that a vacant space is left above the power amp, if possible, to further improve ventilation.

OPERATING TEMPERATURE

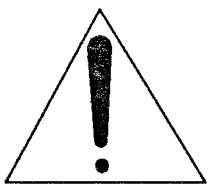
Do not expose this unit to excessively warm or cold temperatures. This unit is designed to operate between 32F and 104F (0C and 40C). This unit may not function properly under extreme temperatures.



The lightning flash with arrowhead symbol, appearing on the rear panel of the unit, is intended to alert the user of this product of the presence of uninsulated, dangerous voltage which may be of sufficient magnitude to constitute a risk of electric shock.

CAUTION

RISK OF ELECTRIC SHOCK DO NOT OPEN



The exclamation point symbol, which appears on the rear panel of the unit, is intended to alert the user of this product to the presence of important operating and maintenance instructions in the accompanying literature.

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK,

DO NOT REMOVE COVER (OR BACK)

NO USER-SERVICABLE PARTS INSIDE

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL

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1. INTRODUCTION

Congratulations on your purchase of the most innovative audio power amplifier available designed for guitar. Designed in a joint effort between Rocktron and renowned integrated-circuit design engineer Derek Bowers, the Velocity 150™ is the first commercially-available amplifier to be based on current-feedback technology. This technology provides extremely high speed, wide bandwidth amplification. The bandwidth of the power amp section is considerably higher than typical amplifiers based on voltage feedback designs - therefore providing much more punch and definition than previous designs have allowed for.

Another innovative feature lies in our patent-pending reactance simulation circuitry (controlled by the front panel "Reactance" control). We at Rocktron firmly believe we have unlocked the secrets of why the most expensive tube-type guitar amplifiers have traditionally exhibited sound characteristics considered to be smoother and of a more "musical" nature. At the minimum setting of the "Reactance" control, the Velocity 150™ will provide the added punch and improved transient response of the high speed current-feedback design. As this control is turned up, the Velocity 150™ will begin to simulate the interaction which takes place between the tube amplifier and the guitar speaker cabinet.

OTHER FEATURES:

*The Velocity 150™ provides up to 75 watts per channel stereo and up to 150 watts mono bridged.

*Aside from the unit's main power fuses, easily-accessable individual line fuses protect the unit's output devices from failure under extreme conditions.

*Switching the unit on and off is completely quiet - unlike many power amplifiers, no loud pops occur when the power switch is used.

*Clip LEDs for each channel.

2. VELOCITY 150™ DESIGN

Traditionally, the design of high-quality audio power amplifiers has evolved along the lines of a quasi-linear output stage with minimum overall feedback. The main reason for this is in an attempt to improve the poor large-signal dynamics associated with conventional "voltage feedback". The Velocity departs from this philosophy by using a "current feedback" architecture, where the feedback transconductance is set by a linear resistor, even under large signal conditions. This removes slew rate limitations so characteristic of "voltage feedback" amplifiers, and allows a high degree of overall feedback to be applied while maintaining excellent transient performance. The large amount of feedback results in a distortion performance comparable to the best studio amplifiers.

Another prevelant trend is the use of power MOSFETs as output stage devices. The usual justification given for this is that MOSFETs have "tube-like" transfer characteristics and therefore offer sonic quality similar to the best vacuum tube amplifiers. Actually, the resemblance between tubes and MOSFETs is not particularly strong, and in any case they are used in very different ways. The pleasing sound of tube amplifiers is in general attributable to good transient performance, which can also be achieved in a solid state amplifier by the use of "current feedback".

Compared to a MOSFET, the bipolar transistor requires much less headroom, and consequently operates with considerably higher efficiency. This, of course, results in lighter and cooler amplifiers. One advantage that the MOSFET does have is that it is inherently less prone to "thermal runaway" problems. The bipolar output stage used in the Velocity is a design with a self-stabilizing idling current which in fact reduces slightly as the amplifier warms up. This results in complete freedom from thermal runaway and an almost indestructable output stage.

By Derek Bowers

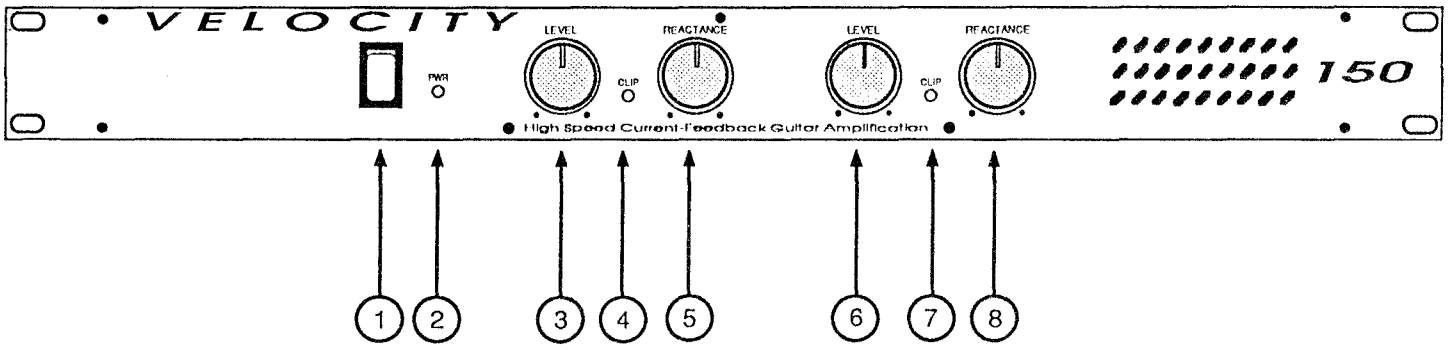
In addition to the high speed current-feedback design, the Velocity 150™ also incorporates Rocktron's unique "Speaker Reactance Simulation" circuitry. This patent-pending concept is unprecedented in a solid state amplifier and yields the much-sought-after sound of the most impressive tube amplifiers - without the added maintenance, cost and weight of a tube amp.

While other amplifier manufacturers seem to concentrate solely on the harmonic characteristics of the tube itself (and how to recreate them in a solid state circuit), we at Rocktron suggest such theories do not result in truly "tube-sounding" amplifier designs. When put to the test and compared directly with the most popular tube amps, these solid state designs still sound "cold" and "thin".

At the minimum setting of the REACTANCE control, no reactance simulation will take place and the Velocity™ will provide the pure characteristics of the high speed current-feedback design. The Velocity will exhibit better transient response and provide more punch than typical solid state amplifiers.

At the maximum setting of the REACTANCE control, the Velocity 150™ will instead sound like a tube amplifier, simulating the interaction between a tube amplifier and a guitar speaker cabinet. This resulting sound is much "warmer" and "fatter", and when directly compared to a tube amp, is virtually indistinguishable.

3. FRONT PANEL



1. POWER switch

2. POWER led:
When lit, indicates unit is powered and ready for operation.

3. LEVEL control (channel 1):
This control sets the volume level for channel 1.

4. CLIP led (channel 1):
When lit, this L.E.D. indicates that the level of the signal at the input of channel 1 is too high. This signal level must be reduced for optimal performance.

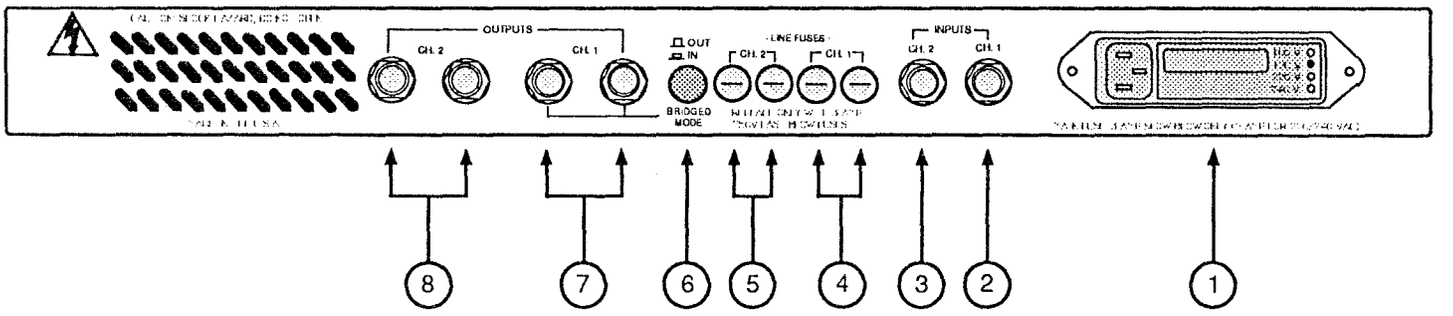
5. REACTANCE control (channel 1):
When this control is turned fully counter-clockwise, the Velocity 150™ will provide the pure characteristics of it's high speed current-feedback design (better transient response, more punch, etc.). As this control is turned clockwise, the Velocity 150™ will increasingly exhibit the characteristics of the interaction between a tube amplifier and a guitar speaker cabinet.

6. LEVEL control (channel 2):
This control sets the volume level for channel 2.

7. CLIP led (channel 2):
When lit, this L.E.D. indicates that the level of the signal at the input of channel 2 is too high. This signal level must be reduced for optimal performance.

8. REACTANCE control (channel 2):
When this control is turned fully counter-clockwise, the Velocity 150™ will provide the pure characteristics of it's high speed current-feedback design (better transient response, more punch, etc.). As this control is turned clockwise, the Velocity 150™ will increasingly exhibit the characteristics of the interaction between a tube amplifier and a guitar speaker cabinet.

4. REAR PANEL



1. POWER INLET **module:**

This module provides 3 functions:

- it provides connection of the power cord.

- it allows for selection of the proper line voltage (this is pre-set at the factory and should never require readjustment).

- it houses the main fuses of the unit (to change the fuses, pop off the cover next to the power cord connector). Replace only with 3 amp/250 volt slow-blow fuse.

2. INPUT **jack (channel 1):**

This standard 1/4" jack provides an input to channel 1 from the output of your preamp or last effect unit.

This jack is red to indicate that it should be used as the input jack when operating in the "BRIDGED" mode. The input jack to channel 2 will not operate in the "BRIDGED" mode.

3. INPUT **jack (channel 2):**

This standard 1/4" jack provides an input to channel 2 from the output of your preamp or last effect unit.

4. OUTPUT **fuses (channel 1):**

These 3 amp/250 volt fast-blow fuses protect the output stages of channel 1 when too much current is drawn. There are two fuses for this channel as one protects against an excessive current on the positive voltage swings, while the other protects against an excessive current on the negative voltage swings.

5. OUTPUT **fuses (channel 2):**

These 3 amp/250 volt fast-blow fuses protect the output stages of channel 2 when too much current is drawn. There are two fuses for this channel as one protects against an excessive current on the positive voltage swings, while the other protects against an excessive current on the negative voltage swings.

6. **BRIDGED MODE selector switch:**

When pressed "IN", the Velocity 150™ operates as a mono unit with increased output power (channel 2 becomes inoperable). In the "OUT" position the unit operates as a normal stereo amplifier.

7. **OUTPUT jacks (channel 1):**

These standard 1/4" jacks provide outputs for channel 1 to speaker cabinets. Do not connect these outputs to a load of less than 4 ohms.

These jacks are red to indicate the operable output jacks when using the Velocity 150™ in the "BRIDGED" mode. Channel 2's output jacks are inoperable in the "BRIDGED" mode.

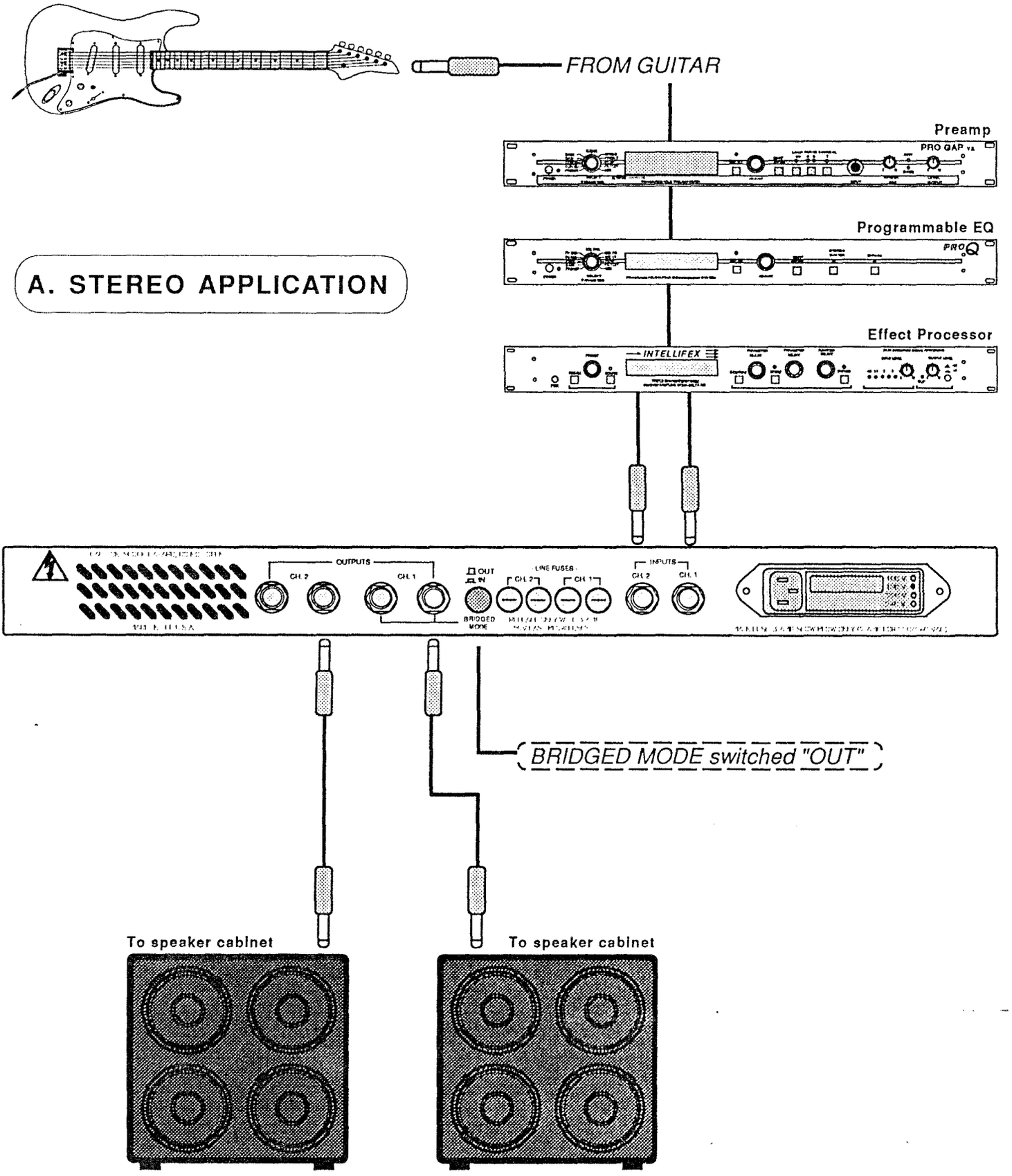
8. **OUTPUT jacks (channel 2):**

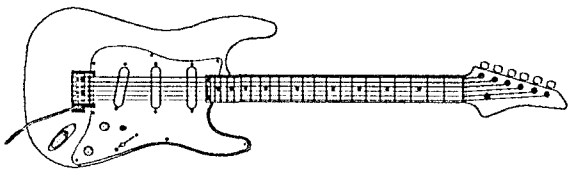
These standard 1/4" jacks provide outputs for channel 2 to speaker cabinets. Do not connect these outputs to a load of less than 4 ohms.

In the "BRIDGED" mode, these jacks become inoperable.

5. CONNECTIONS

A. STEREO APPLICATION





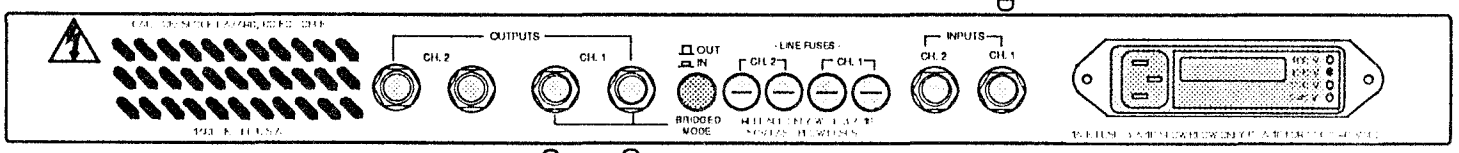
FROM GUITAR

Preamp

Programmable EQ

Effect Processor

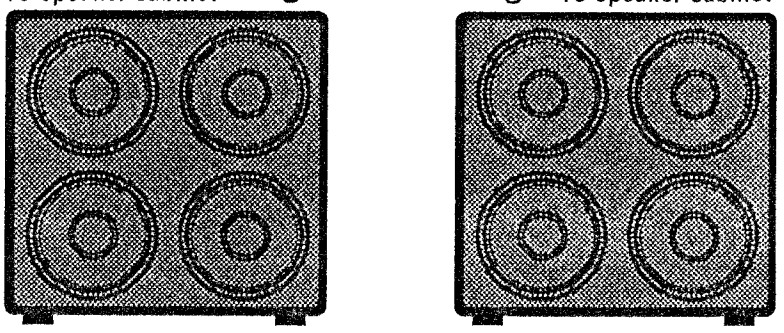
B. MONO BRIDGED APPLICATION



BRIDGED MODE switched "IN"

To speaker cabinet

To speaker cabinet



6. OPERATING PRECAUTIONS

While operation of the Velocity 150 is simple once the proper connections have been made, attention to the following precautions is essential.

A. POWER OUTPUT/SPEAKER LOAD

-This amplifier is capable of producing:

Stereo (per channel)	Bridged
35 watts into 16Ω	110 watts into 16Ω
60 watts into 8Ω	150 watts into 8Ω
75 watts into 4Ω	

-Always be certain to use speakers or speaker cabinets capable of withstanding the power provided in the above-mentioned applications. Rocktron is not responsible for speaker failure from use of this equipment.

-When using the Velocity 150™ as a stereo amplifer (unbridged), never connect the outputs to a load of less than 4Ω.

-When using the Velocity 150™ as a mono amplifier (bridged), never connect the outputs to a load of less than 8Ω.

-Never connect 2 outputs of the amplifier to the same speaker or speaker cabinet.

B. FUSE REPLACEMENT

-Always replace fuses with identically rated replacements-

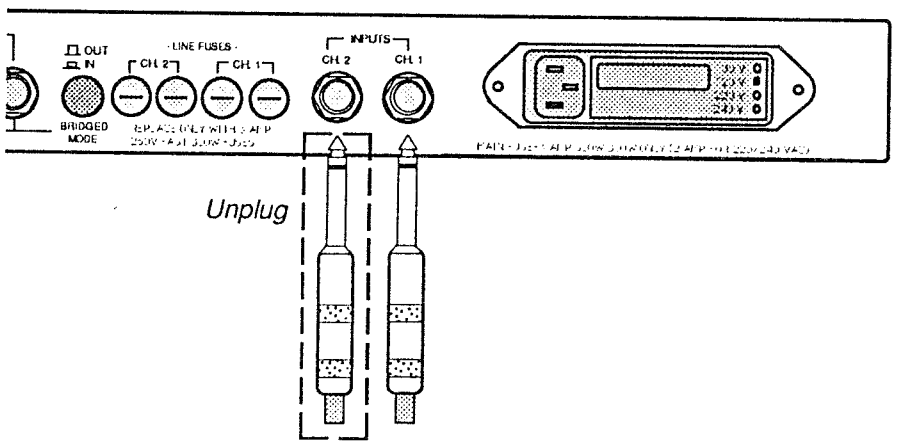
Main Fuses (located in power inlet module) - 3 amp 250V slow-blow type.

Line Fuses (located between input and output jacks) - 3 amp 250V AGC fast-blow type.

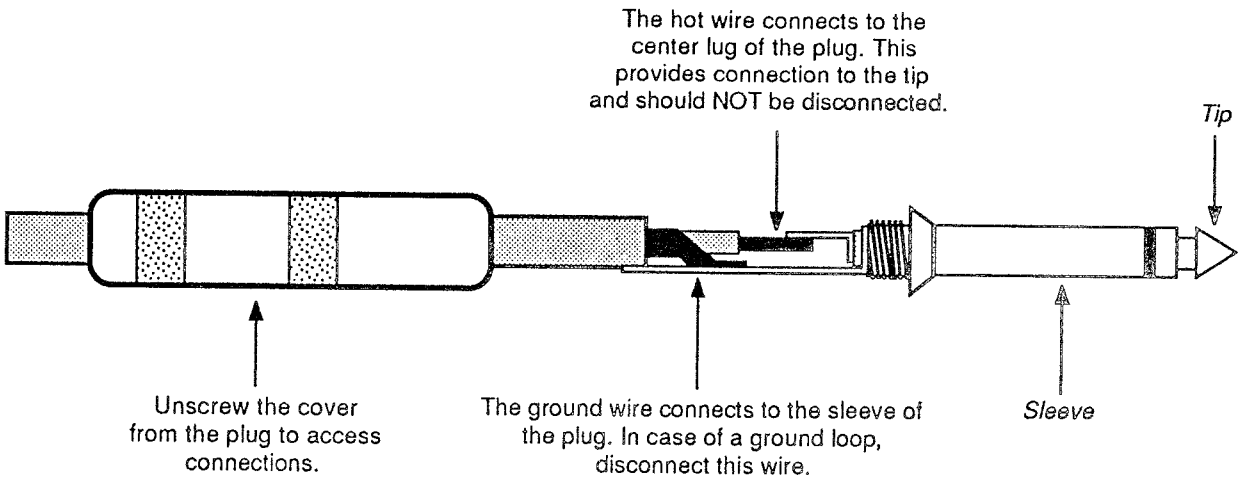
FAILURE TO HEED THESE WARNINGS MAY RESULT IN A VOIDED WARRANTY

C. GROUND LOOP HUM

Dependant upon the type of equipment used, it is sometimes possible that a ground loop may occur when using both channels of the Velocity 150™ (some degree of ground hum may occur when providing inputs to channel 1 and channel 2 from a single unit or common ground). Should this occur, it must first be determined if the hum originates in the power amp or prior to it. This can be determined by unplugging the input to channel 2. If the hum continues when channel 2 is unplugged, the problem is originating before the power amp. If the hum stops, it is then originating in the power amp and can be easily remedied by disconnecting the ground wire of the cord which connects to the input of channel 2.

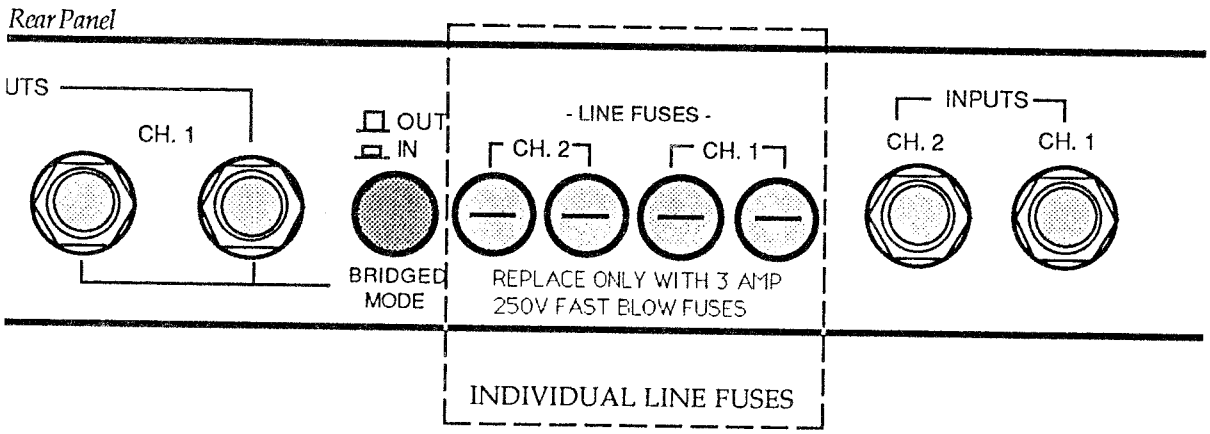


Simply unscrew the body from the plug (at either end) and disconnect the wire (either by clipping with wire clippers or desoldering) which connects to the sleeve of the plug (see below).



D. POWER FAILURE

If it should ever occur that your Velocity 150™ fails to produce an output signal from either channel, **always** check the four individual line fuses on the rear panel of the unit before assuming that the amplifier is damaged and sending it in to be repaired. This amplifier is designed such that these fuses will protect the unit against internal damage under extreme conditions.



7. SPECIFICATIONS

OUTPUT POWER	
(Unbridged)	75 watts @ 4Ω (per channel) 60 watts @ 8Ω (per channel) 35 watts @ 16Ω (per channel)
(Bridged)	150 watts @ 8Ω (mono) 110 watts @ 16Ω (mono)
MAXIMUM INPUT LEVEL	+22.5 dBu
MAXIMUM OUTPUT LEVEL	+30 dBu
MAXIMUM GAIN	40 dB
NOISE FLOOR (typ.)	-66 dBu (A-weighted)
DYNAMIC RANGE (typ.)	96 dBu (A-weighted)
DISTORTION (typ.)	.06% @ 16Ω .08% @ 8Ω .1% @ 4Ω
(bridged)	.09% @ 16Ω .13% @ 8Ω
FREQUENCY RESPONSE	±½ dB (20Hz - 20KHz)
DAMPING FACTOR	70 (@8Ω)
INPUT SENSITIVITY	.3V RMS (@ 8Ω to rated output)
SLEW RATE	100 v/μS (through power amp section)
CURRENT CONSUMPTION	420 watts @ 120VAC