

# OWNER'S MANUAL



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## INTRODUCTION

The Rockford Punch 45, Punch 75 and Punch 150 are automotive stereo power amplifiers which will provide state-of-the-art sound in cars, vans, boats, or wherever a 9 to 16 volt battery is available.

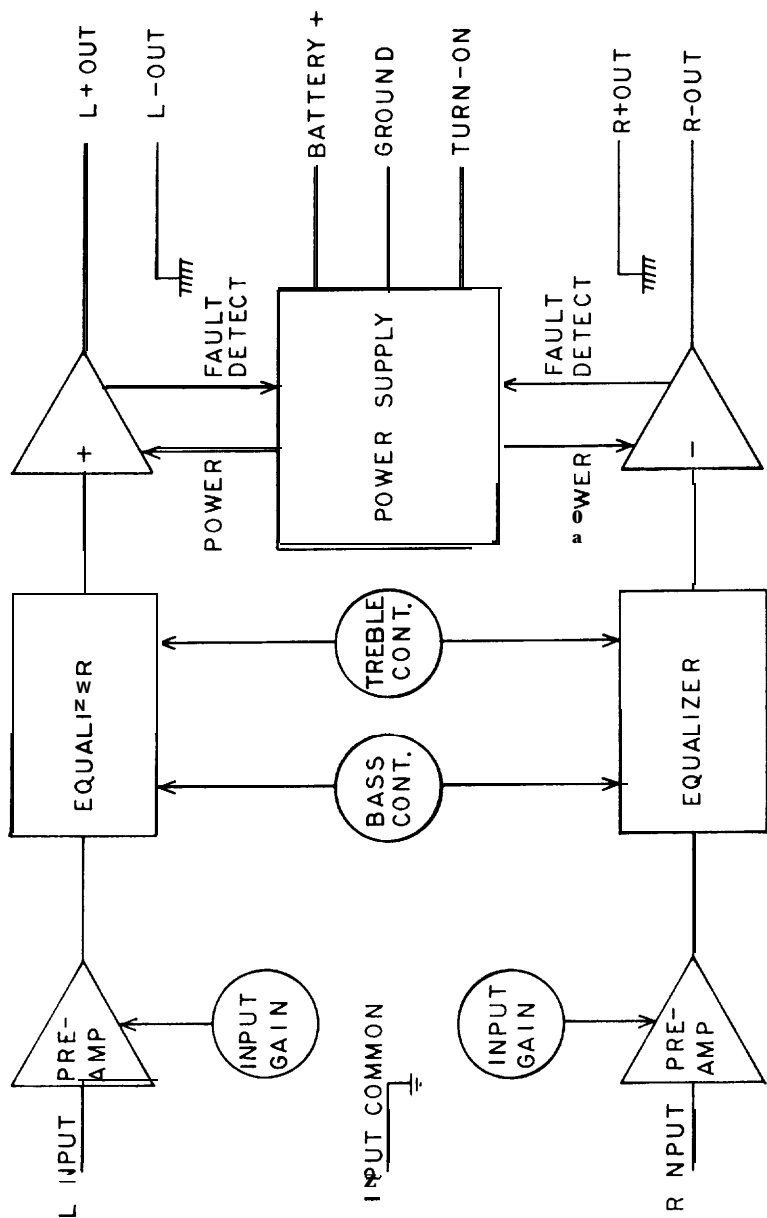
The Punch adjustable input circuits are designed to match almost any music source, from low preamp levels to speaker levels, with negligible noise. The amplifiers will drive all normal speaker types, impedances, and configurations.

Two rotary potentiometers control bass and treble equalization circuits specially designed to compensate for the response errors present in most mobile installations. Unlike conventional tone controls, the Punch equalization corrects the specific problems of poor low bass response and high frequency rolloff. The result is full-range sound without excessive boost in areas where it is not needed.

Internal fusing in the Punch amplifier prevents damage due to shorts, system power problems, or internal failures. The Punch incorporates internal battery line filtering and extensive noise prevention circuitry.

The Punch amplifier should be **PROFESSIONALLY INSTALLED**. The length and nature of your warranty are dramatically affected if you attempt to install it yourself (see Warranty).

This is because professional installers are experienced with making your car stereo system sound right the first time. They make their installations durable because they don't want continuing problems and complaints — their reputations are valuable.



## BLOCK DIAGRAM

## **PUNCH EQUALIZER**

The Punch equalizer incorporates unique, patented circuitry which is specifically designed to overcome the problems commonly found in mobile speaker installations. The design minimizes the unpleasant changes in midrange sound produced by most tone control and equalizer circuits.

## **INPUT CONNECTIONS (RCA PIN JACKS)**

The amplifier's signal input female pin jacks should be connected to the source unit's signal outputs.

If the source unit has "RCA" pin jack outputs, connect the Punch to the source with an "RCA" adapter cable. In some cases, system noise rejection will be improved by using high-quality braided-shield or double-shielded interconnecting cables.

When the source unit does not have pin jack outputs, wire the left signal output to the black center conductor of an adapter cable; the right signal output to the red conductor, and the ground to the shield lines, or use Rockford adapter cable No. AS-524.

Some higher-powered source units employ "bridged" output circuits ("BTL" outputs). Units with bridged outputs are normally rated at 15 to 25 Watts output by the manufacturer. To connect this type of unit to a Punch amplifier, the speaker positive (+) wires should go to the adapter cable center conductors, but the cable shield ground must be connected to the source chassis, NOT the speaker negative (-) wires.

Be sure to route the Punch signal input cable away from the white power wire and the car's wiring harnesses, to avoid noise coupling.

Pre-assembled interconnector adapters are available from Rockford Corporation for a wide variety of source units.

NOTE: In most Pioneer pre-amp output units, and some others, the audio shield ground is not at the source chassis common. For these units, connect the shield lines to both the audio shield and the chassis common.

## INPUT LEVEL CONTROLS

The Punch input level controls are accessible with a jeweler's screwdriver through two holes in the cover. The controls are factory-preset to a level which matches most 500 millivolt to 1 volt rated preamp-output source units.

If you are using the speaker-output leads of the source unit, turn the Punch input controls fully counterclockwise to their minimum gain position.

If the volume control of the source is "touchy" and/or noisy — that is, if just a little volume from the source drives the amplifier into distortion — reduce the Punch input gain controls so that the distortion doesn't start until the source volume is at about  $\frac{3}{4}$  of its rotation.

If maximum volume from the source won't drive the Punch into distortion, increase the Punch input gain controls until distortion starts at about  $\frac{3}{4}$  volume.

## POWER CONNECTION (WHITE 12-GAUGE WIRE)

The White wire must be connected directly to the positive terminal of the battery to provide a power source with a low voltage drop and low noise. If the power is connected to any other point (the fuse block, for instance) the amplifier's power output will be reduced and oscillations and noise may distort the sound. If the power wire must be extended, use only \_\_\_\_\_ or larger wire and make a good splice.

It is best to use as short a wire run as possible. DO NOT run the power wire next to the input cabling to the amplifier: it will induce noise.

Avoid running the white power wire near the radio's antenna or power leads, or near sensitive equipment or harnesses. The White power wire carries substantial currents and could induce noise.

The white wire is provided with an in-line fuse holder for an AGC (3AG) type fuse. Use \_\_\_\_\_ (for Punch 45), \_\_\_\_\_ Ampere (for Punch 75), or \_\_\_\_\_ (for Punch 150). Do not use excessively large fuses or the amplifier will not be adequately protected. See protection and fusing section for maximum fuse values.

## **FUSE SELECTION**

PUNCH 45	12-AMP
PUNCH 75	15-AMP
PUNCH 150	25-AMP

## **GROUND CONNECTION (BLACK 12 - GAUGE WIRE)**

The ground wire must be connected directly to the car chassis, near the amplifier. Ground loops are aggravated by the length of the ground wire or any resistance in the ground path. For this reason we don't recommend extending the ground wire in any installation. The ground point in the car should be a piece of chassis metal that is welded to the main body of the car. Painted surfaces should be scraped or sanded clean before the ground lug is bolted down. (Cover the bare-metal area with paint or grease to prevent rust.)

## **TURN-ON CONNECTION — (RED WIRE FROM 6-PIN CONNECTOR)**

The Punch is turned on by applying Positive 12 Volts to the red wire. Usually, the red wire is connected to the source unit's "Accessory" or "Auto-Antenna" lead, either of which will go positive when the source is turned on.

Although the majority of high-quality automotive source units have an Accessory or Auto-Antenna output, there are many which may require different turn-on methods. If the source has no Auto-Antenna lead (or if Auto-Antenna goes down during tape operation):

- a) Find the internal switched power voltage inside the source unit and solder a lead to it. Run the lead out through the back of the unit (being sure to use a grommet for insulation from the case) and connect to the Punch red turn-on wire.
- b) Or: Install a switch in the car with one terminal connected to +12 Volts and the other to the Punch red lead.
- c) Or: Connect the Punch red lead to the accessory point at the car's fuse block. In this case the amplifier will be on whenever the car is on. This method will allow the amplifier to amplify any noise and turn-on and turn-off transients, and may therefore be unsatisfactory.

## **SPEAKER CONNECTIONS — (WIRES FROM 6-PIN CONNECTOR)**

ORANGE — Left Positive

BLACK — Left Negative

YELLOW — Right Positive

BROWN — Right Negative

Be certain to observe speaker terminal polarity throughout the system. It is critical for the Punch to use the correct negative leads for the right and left channels, since the right negative lead (brown) is the “hot” lead for the right speaker. DO NOT chassis ground any of the speaker leads. Unstable operation may result.

### **SPEAKER WIRE**

We recommend that you always use substantial wire for speaker wiring harnesses. For short runs, \_\_\_\_\_ is the smallest we suggest; for runs over 6 feet, \_\_\_\_\_ should be used. Many users find that sound quality is improved by the use of specially-made heavy-duty speaker wiring from one of several manufacturers. The Punch output harness uses short runs of 16-Gauge wire and should not reduce any benefits gained from specialized speaker wiring.

### **SPEAKER IMPEDANCE**

The Punch is rated for operation into loads of 2-Ohms or greater in stereo operation.

The primary load on the amplifier comes from directly connected speakers (not isolated by capacitors), and the measured resistance for each side cannot be less than 1.8-Ohms. Single 4-Ohm woofers or parallel 4-Ohm pairs per side will form a high-performance system. The maximum direct load per side is a 4-Ohm speaker in parallel with a 4-Ohm speaker.

If the amplifier load drops below approximately 1.5 Ohms, the Punch 75 or Punch 150 amplifier will blow the internal fuses or overheat.

The heaviest load on the power amp normally comes from the woofers. In speaker systems where midrange speakers are



isolated with crossover capacitors, only the woofers impedance usually needs to be considered.

## **BRIDGING MODE**

The Punch amplifier is capable of driving 4-Ohm or 8-Ohm speakers in a bridged mono configuration to deliver full power into a single speaker. This is done by connecting the orange wire to the speaker's positive terminal and the brown wire to its negative terminal. This capability can be used to run a single woofer in a stereo system, to run two bridged amplifiers as a high-power stereo system, to run one amplifier with a bridged mono woofer and another as a high-frequency stereo amp, and many other applications. In any bridged application, DO NOT use speakers with less than 4-Ohms impedance.

## **SPEAKER FUSING**

The Punch amplifiers are supplied with in-line fuses for speaker protection. The Punch amplifiers are fully protected internally against loading problems, and external fuses are not required for amplifier protection. However, speakers are not normally capable of continuous full-power operation and should be fused to prevent damage due to overheating.

### **SPEAKER FUSING**

PUNCH 45

PUNCH 75

PUNCH 150

The amplifiers are provided with Type AGC (3AG) fuses of the correct value. This fuse value was selected to provide adequate protection for most high-power 4-Ohm speakers. If a light-duty speaker is found to fail frequently, a smaller fuse may be used for better protection. Always use fast-blow type fuses.

If the speaker fuses for the Punch are excessively large (see chart) or are eliminated, the internal fuses will blow if the speaker shorts. Replace only with recommended fuse.

## PASSIVE CROSSOVER IMPEDANCE

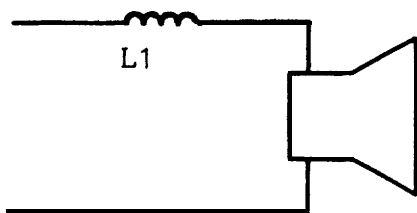
When passive crossover components are used in multiple-speaker systems, the crossover system's impedance must be considered along with the speaker's impedance in determining amplifier loading.

For 6-dB per Octave systems (where a single capacitor in series is used for high-pass or single inductor [choke] in series is used for low-pass) the net impedance of the system will be increased and problems are unlikely.

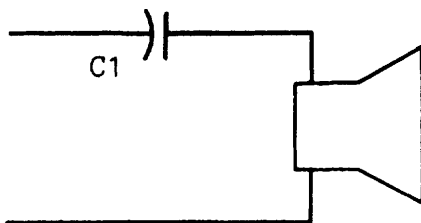
Twelve-dB per Octave systems (where both an inductor and a capacitor are used with each speaker) can cause trouble. A twelve-dB choke-capacitor pair forms a series-resonant circuit to ground whose impedance at resonance is determined by the speaker's dynamic impedance. For instance, if the speaker is open or disconnected, the crossover input impedance is theoretically ZERO at resonance — a direct short!

Since speaker impedance varies considerably from rated values at various frequencies, it is common to find that “standardized” 12-dB per Octave crossovers (which are designed for pure resistor loads) have serious impedance dips near their crossover frequencies, possibly causing overheating and fuse-blowing in the amplifier.

We recommend that you be cautious in using 12-dB/Octave crossover systems unless they are specifically designed to have minimal impedance variation for the speakers in use.



**6 dB/Octave Low Pass**



**6 dB/Octave High Pass**

Frequency Hertz	Speaker Impedance			
	4 Ohms		8 Ohms	
	L1	C1	L1	C1
80	8.2 nH	500 uF	16 nH	250 uF
100	6.2 nH	400 uF	12 nH	200 uF
130	4.7 nH	300 uF	10 nH	150 uF
200	3.3 nH	200 uF	6.8 nH	100 uF
260	2.4 nH	150 uF	4.7 nH	75 uF
400	1.6 nH	100 uF	3.3 nH	50 uF
600	1.0 nH	68 uF	2.0 nH	33 uF
800	.82 nH	50 uF	1.6 nH	25 uF
1000	.62 nH	39 uF	1.2 nH	20 uF
1200	.51 nH	33 uF	1.0 nH	16 uF
1800	.33 nH	22 uF	.68 nH	10 uF
4000	.16 nH	10 uF	.33 nH	5 uF
6000	10 nH	6.8 uF	.20 nH	3.3 uF
9000	.68 uH	4.7 uF	15 nH	2.2 uF
12000	51 uH	3.3 uF	100 uH	1.6 uF

**6 db/Octave High and Low Pass Filters**

**Table of Component Values**

A simple method of preventing problems is to be sure there is at least 6 feet of speaker lead between the amplifier and the piezo. All Punch amps are tested with piezo loads and 6 feet of lead, and they will have no problem.

Another method of taming the piezo is to insert a 1- to 10-Ohm resistor in series with one of its leads.

## **PUNCH 45 MOSFET PROTECTION AND FUSING**

The Punch 45 Mosfet is protected by power line fusing, power supply protection circuits, and by thermal sensing for overheating. In addition, in-line 3-Ampere fuses are provided on the power output wires for speaker protection (see **SPEAKER FUSING**).

The power line fuse supplied with the Punch 45 Mosfet is a 10-Ampere Type AGC (3AG) fast-blow fuse. This fuse should supply enough current for normal load and music conditions. For extreme load conditions, fuses up to 15-Ampere fast blow types may be substituted.

The thermal sensing circuit will turn off the amplifier for several minutes if the heatsink temperature rises above 90 degrees Celsius (195 degrees Fahrenheit).

## **PUNCH 75 PROTECTION AND FUSING**

The Punch 75 is protected by power line fusing, internal fuses, and by thermal sensing for overheating. In addition, in-line 5-Ampere fuses are provided on the power output wires for speaker protection (see **SPEAKER FUSING**).

The power line fuse supplied with the Punch 75 is a 15-Ampere Type AGC (3AG) fast-blow fuse. This fuse should supply enough current for normal load and music conditions. For extreme load conditions, fuses up to 20-Ampere fast blow types may be substituted.

Four internal fuses provide protection for the amplifier transistors. Replace **ONLY** with identical fuses.

The thermal sensing circuit will turn off the amplifier for several minutes if the heatsink temperature rises above 90 degrees Celcius (195 degrees Fahrenheit).

## **PUNCH 150 PROTECTION AND FUSING**

The Punch 150 is protected by power line fusing, internal fuses, and by thermal sensing for overheating. In addition, in-line 6-Ampere fuses are provided on the speaker wires for speaker protection (see **SPEAKER FUSING**).

The power line fuse supplied with the Punch 150 is a 25-Ampere . This fuse should supply enough current for normal load and music conditions. For extreme load conditions, fuses up to types may be substituted.

Four internal provide protection for the amplifier transistors. Replace **ONLY** with identical fuses.

The thermal-sensing circuit will turn off the amplifier for several minutes if the heatsink temperature rises above 90 degrees Celsius (195 degrees Fahrenheit).

## **MOUNTING THE PUNCH**

The mounting of the Punch will have a large effect on its ability to dissipate the heat generated in normal operation. The Punch has an ample heat sink for its heat dissipation, and internal overheating shutoff circuitry, so it is reasonably tolerant of mounting variations. However, care should be taken to be sure of adequate cooling.

## **TRUNK MOUNTING**

We have measured trunk temperatures as high as 175 degrees Fahrenheit in the summertime. Since the thermal shutoff point for the Punch is 195 degrees F, it is easy to see that the amp must be mounted for maximum cooling capability. Mounting the amp on the floor or top of the trunk will not allow convection air flow. Mounting the unit on a vertical surface is usually required for adequate convection cooling. This position allows vertical convection air flow across the fins. Even better is to mount the unit vertically on a vertical surface, so upward-flowing air follows the channels between the heatsink fins.

## **PASSENGER COMPARTMENT MOUNTING**

When the amp is mounted in the passenger compartment mounting requirements are considerably relaxed, since the driver will not often allow temperatures to stay anywhere near 175 degrees F. Floor mounting is usually satisfactory in the cab, and under the seat will work as long as there is at least 1 inch above the amplifier fins for air movement. Vertical mounting (for instance, the back of pickup cabs) is still the best. Under-dash mounting is satisfactory as well.

Any situation which allows moving air to be directed over the cooling fins will improve cooling dramatically. A simple fan blowing on the amplifier will improve cooling by a factor of 3. There are situations where it is feasible to direct some of the car's refrigeration air over the amplifier. In any case it is critical that the amp not be enclosed in a small box or covered so that air can't flow around the fins.

## **BATTERY AND CHARGING SYSTEM**

High-powered amplifiers will naturally put an extra load on the battery and charging system. A Punch 45 Mosfet may draw up to 5-9 Amperes average current when playing very loudly: a Punch 75 may draw up to 8-12 Amperes average current when playing loudly, and a Punch 150 up to 10-20 Amperes.

Stock electrical systems in good condition will typically handle the extra load of either Punch without problems, although battery and alternator life may be slightly reduced.

Some special situations will require greater attention to the electrical system:

1. If the sound system will be used often when the car is not running, the battery will obviously be discharged – perhaps enough to prevent restarting. The discharge/recharge cycle will reduce battery life, and alternator life will be shorter because of the high-current recharge requirements.

If problems arise:

- a) Use a premium battery or deep-discharge marine battery.
- b) Use a heavy duty alternator.

- c) Use a trickle-charger or battery charger.
  - d) Install a second battery with a switching system for recharge (paralleling batteries is not recommended).
2. If multiple amplifiers are installed, average currents may be high enough to overload the standard alternator and reduce alternator and battery life. In this case it's a good idea to use a heavy-duty alternator and a high-quality battery.

## **SPECIFICATIONS: PUNCH 45 MOSFET**

### **POWER RATINGS:**

- 4 Ohms: 22.5 Watts per channel continuous power, both channels driven into 4 Ohms, from 20 to 20,000 Hertz, with less than 0.05% THD+N (Total Harmonic Distortion plus Noise).
- 4 Ohms: 40 Watts per channel continuous power, both channels driven into 4 Ohms, at 1000 Hertz, with less than 10% THD+N.
- 2 Ohms: 35 Watts per channel continuous power, both channels driven into 2 Ohms, from 20 to 20,000 Hertz with less than 0.10% THD+N.

Frequency response: 20 to 20,000 Hertz  $\pm$  1.0dB

Bandwidth: 15 to 100,000 Hz.  $\pm$  3dB

Damping Factor: At circuit board:  
Over 200 (referred to 4 0 hms).

At speaker lead:  
Over 50 (referred to 4 Ohms).

Signal to noise ratio: Over 80 dB, unweighted.

Slew factor: over 5.

IM Distortion (IHF): Less than 0.05%.

Input Gain: Variable from 40 dBV to 14dBV.  
Factory pre-set at 26 dBV (correct for most 500 millivolt-rated source units).

## **EQUALIZATION:**

Bass Boost: 0 to +18 dB Maximum at 45 Hertz.

Treble Boost: 0 to +12 dB Maximum at 20,000 Hertz

## **PROTECTION:**

The Punch 45 Mosfet is protected by two 3-Ampere speaker-line fuses and by a 10-Ampere battery fuse. A thermal switch shuts down the amplifier in case of overheating. Internal circuitry shuts down the amplifier in case of overload.

## **DIMENSIONS:**

5.2" long by 8" wide by 1.9" high, exclusive of knobs and wiring.  
6.2" long by 8" wide by 1.9" high, minimum mounting dimensions.

**NOTE:** Specifications subject to change without notice.

## **SPECIFICATIONS: PUNCH 75**

### **POWER RATINGS:**

4 Ohms: 37.5 Watts per channel continuous power, both channels driven into 4 Ohms, from 20 to 20,000 Hertz, with less than 0.05% THD+N (Total Harmonic Distortion plus Noise).

4 Ohms: 60 Watts per channel continuous power, both channels driven into 4 Ohms at 1000 Hertz, with less than 10% THD+N.

2 Ohms: 60 Watts per channel continuous power, both channels driven into 2 Ohms, from 20 to 20,000 Hertz, with less than 0.1% THD+N.

Frequency response: 20 to 20,000 Hertz  $\pm$  1.0dB.

Bandwidth: 15 to 100,000 Hz.  $\pm$  3 dB.

Damping Factor: At circuit board:  
Over 200 (referred to 4 Ohms).

At speaker lead:  
Over 50 (referred to 4 Ohms).



Signal to noise ratio: Over 80 dB, unweighted.

Slew factor: over 5.

IM Distortion (IHF): Less than 0.05%.

Input Gain: Variable from 40 dBV to 14dBV.

Factory pre-set at 28 dBV (correct for most 500 millivolt-rated source units).

## **EQUALIZATION:**

Bass Boost: 0 to +18 dB Maximum at 45 Hertz.

Treble Boost: 0 to +12 dB Maximum at 20,000 Hertz

## **PROTECTION:**

The Punch 75 is protected by two 5-Ampere speaker-line fuses and by a 15-Ampere battery fuse. A thermal switch shuts down the amplifier in case of overheating. Four 5-Ampere Type AGA (IAG) fuses provide internal protection.

## **DIMENSIONS:**

6.2" long by 8" wide by 1.9" high, exclusive of knobs and wiring.  
7.2" long by 8" wide by 1.9" high, minimum mounting dimensions.

**NOTE:** Specifications subject to change without notice.

## **SPECIFICATIONS: PUNCH 150**

### **POWER RATINGS:**

- 4 Ohms: 75 Watts per channel continuous power, both channels driven into 4 Ohms, from 20 to 20,000 Hertz, with less than 0.05% THD+N (Total Harmonic Distortion plus Noise).
- 4 Ohms: 120 Watts per channel continuous power, both channels driven into 4 Ohms at 1000 Hertz, with less than 10% THD+N.
- 2 Ohms: 90 Watts per channel continuous power, both channels driven into 2 Ohms, from 20 to 20,000 Hertz, with less than 0.10% THD+N.

Frequency response: 20 to 20,000 Hertz  $\pm$  1.0dB.

Bandwidth: 15 to 100,000 Hz.  $\pm$  3 dB.

Damping Factor: At circuit board:  
Over 200 (referred to 4 Ohms).

At speaker lead:  
Over 50 (referred to 4 Ohms).

Signal to noise ratio: Over 80 dB, unweighted.

Slew factor: over 5.

IM Distortion (IHF): Less than 0.05%.

Input Gain: Variable from 40 dBV to 14 dBV.

Factory pre-set at 32 dBV (correct for most 500  
millivolt-rated source units).

## **EQUALIZATION:**

Bass Boost: 0 to +18 dB Maximum at 45 Hertz.

Treble Boost: 0 to +12 dB Maximum at 20,000 Hertz.

## **PROTECTION:**

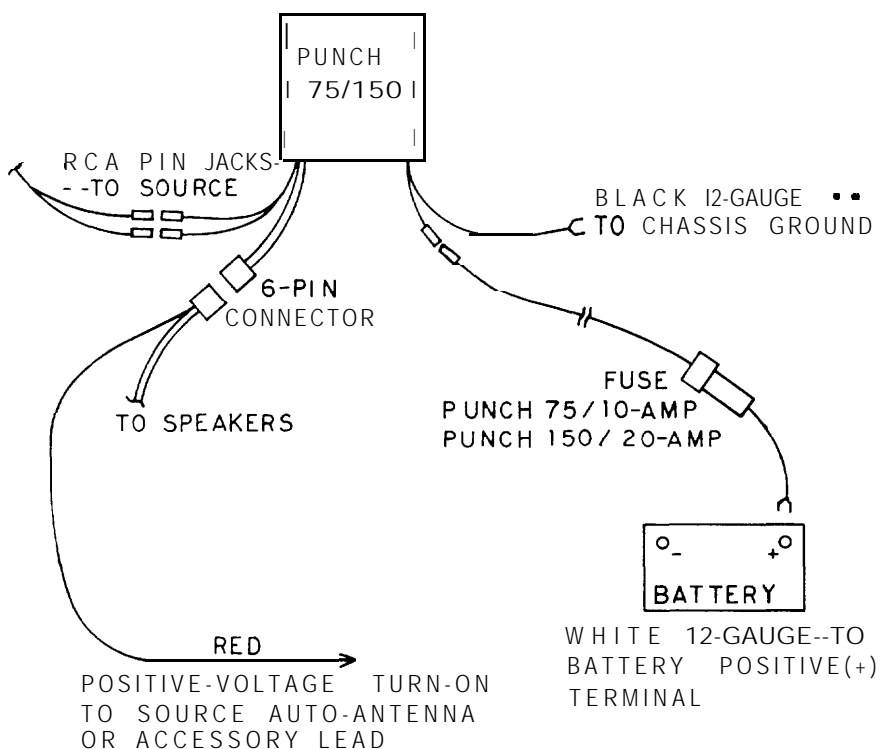
The Punch 150 is protected by two 6-Ampere speaker-line fuses and by a 25-Ampere battery fuse. A thermal switch shuts down the amplifier in case of overheating. Four 6-Ampere Type AGA (IAG) fuses provide internal protection.

## **DIMENSIONS:**

8.2" long by 8" wide by 2.2" high, exclusive of knobs and wiring.

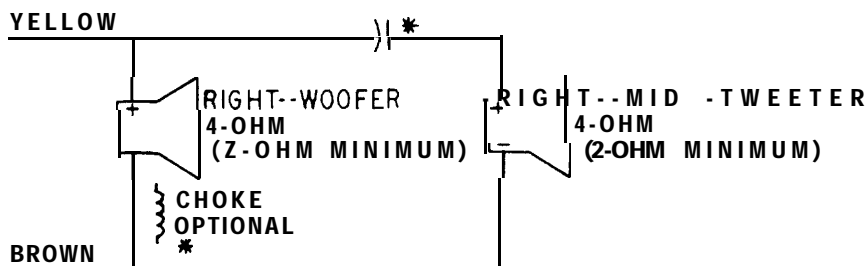
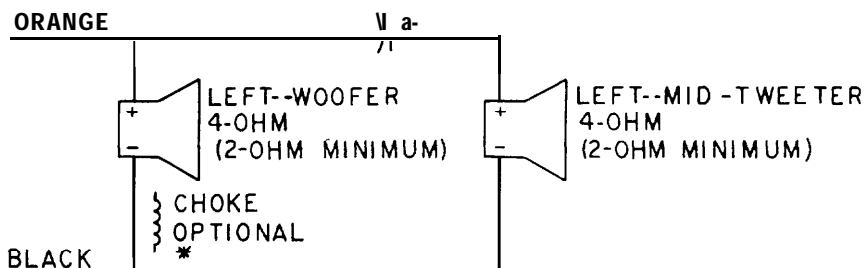
9.2" long by 8" wide by 2.2" high, minimum mounting dimensions.

**NOTE:** Specifications subject to change without notice.



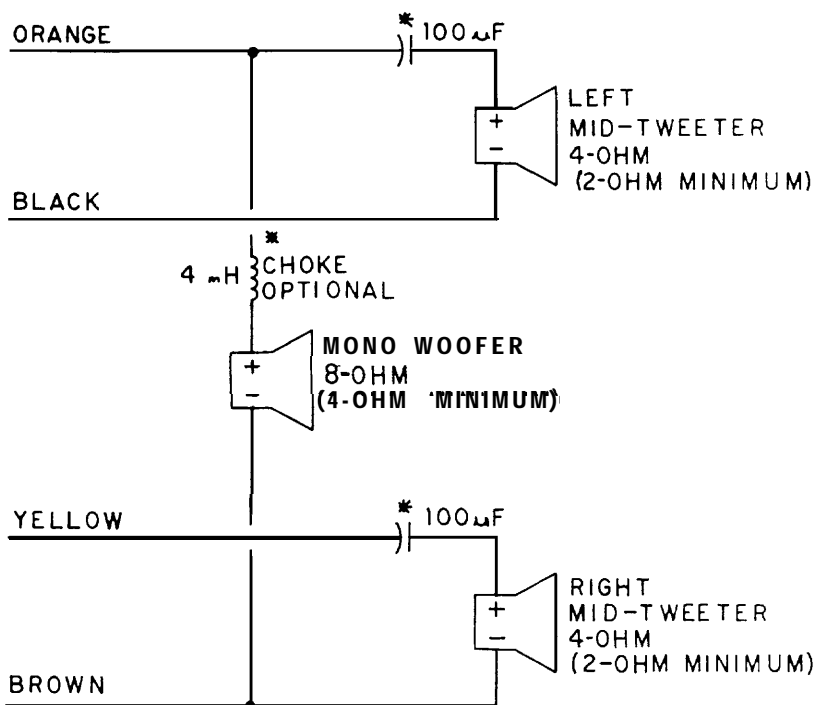
## **PUNCH 45/PUNCH 75/PUNCH 150** **POWER AND INPUT WIRING**

**\*REFER TO TABLE OF CROSSOVER  
VALUES TO FIND CAPACITOR AND  
INDUCTOR VALUES FOR ALL  
SPEAKER LOADS AND CROSSOVER  
FREQUENCIES.**



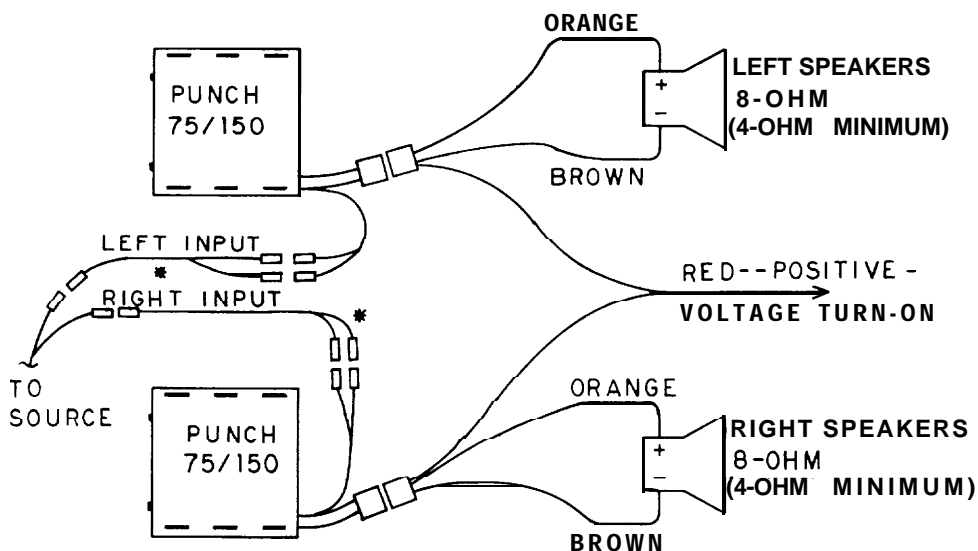
**NOTE-SPEAKER NEGATIVE (-)  
LEADS MAY NOT BE  
REVERSED OR GROUNDED**

## **PUNCH 45/PUNCH 75/PUNCH 150 SPEAKER WIRING**



\* FOR CAPACITOR AND INDUCTOR  
VALUES, REFER TO TABLE OF  
CROSSOVER VALUES FOR OTHER  
IMPEDANCES AND FREQUENCIES.  
ALL CAPACITORS TO BE NON-POLAR.

**PUNCH 45/PUNCH 75/PUNCH 150  
STEREO WITH BRIDGED MONO WOOFER**



\*FEMALE RCA TO TWIN MALE  
INPUT BRIDGING ADAPTER  
(ROCKFORD PART NO. )  
WO REQUIRED FOR STEREO.

## PUNCH 45/PUNCH 75/PUNCH 150 DUAL BRIDGED AMP SYSTEM DIAGRAM