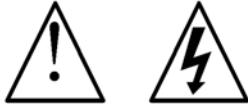




# Castanet

## Headphone Amp Kit Manual





## Warnings

This product uses dangerous and potentially lethal voltages. Extreme care must be taken while assembling this amplifier and should only be attempted by a skilled technician. The instructions in this manual are a suggested guide only and no liability is assumed by Hagerman Technology LLC.

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## Disclaimer

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# 1 Before You Begin

## Description

Congratulations! You have just purchased one of the highest performance-per-dollar audiophile products available. The Castanet is a no-hold-barred circuit topology designed to offer uncompromising sound. It provides robust output power with ample signal swing, all at low distortion with an exceedingly low noise floor. All amplification is provided by the high transconductance 6H30 vacuum tube, which is fed by a fully choke regulated power supply. No feedback is used anywhere.

## Features

- Vacuum tube amplification
- No feedback
- Choke rectification
- Two outputs

## Tools

This is a kit product and construction should only be attempted by skilled electronic technicians. Chassis metalworking is also required. You will need an array of shop tools and a good soldering iron. If you are at all unsure of this, send it back!

## Contents

- Castanet PCB (1)
- Nylon washers, thin (2)
- Nylon washer, thick (14)
- #6 screws (18)
- #4 screws (8)
- L brackets (2)
- O-rings (2)
- Rubber bumpers (5)
- Fuse clips (2)
- Tie wraps (3)

# 2 Parts to Buy

## Modifications

If you build using the stock chassis, a really nice upgrade is to buy pre-made front and rear panels from [www.frontpanelexpress.com](http://www.frontpanelexpress.com) (download files from [www.hagtech.com](http://www.hagtech.com)). Another potential change is to replace the three 3.3uF film capacitors with Hovland 3.0uF 200V capacitors from AES (#C-H3-200), although this may not necessarily be a sonic upgrade. Alternately, you can add smaller bypass films to these, such as your favorite audiophile 0.01uF to 0.1uF capacitor.

## Parts List

Parts should be ordered directly from [www.digikey.com](http://www.digikey.com), [www.tubesandmore.com](http://www.tubesandmore.com) (AES), [www.mouser.com](http://www.mouser.com), and [www.newsensor.com](http://www.newsensor.com).

Component	Qty	DigiKey	References
100uF 350V	4	P5938-ND	C4x, C5x
470uF 25V	2	P13124-ND	C9x
3.3uF 600V	3	338-1141-ND	C7, C10x
1uF 63V	4	BC2076-ND	C2, C3, C8x
10nF 250Vac	1	P11423CT-ND	C1
LED, Y panel	2	L10057-ND	D1, D2
LED, Y	1	L20167-ND	D5
Diode	2	UF4007CT-ND	D3, D4
Switch, power	1	EG1026-ND	S1
Switch, cap	1	EG1099-ND	
Pot, volume	1	P2T3503-ND	R10
Knob	1	226-3131-ND	
Ac input	1	Q219-ND	J1
Power cord	1	Q102-ND	
Fuse 0.5A	5*	F2632-ND	F1
Heat sink	1	HS372-ND	
22R2W	2	22W-2-ND	R1, R2
47k 2W	2	47KW-2-ND	R8, R9
1R0 1/2W	10*	1.0H-ND	R5x, R6x
300 1/2W	10*	300H-ND	R3, R4, R11x, R12x
1k 1/2W	5*	1.0KH-ND	R7x

\* Minimum quantity.

Component	Qty	AES	References
Socket, 9-pin	1	P-ST9-214G	V1
Tranny, power	1	P-T261C6	T1
Choke 9H	2	P-T156G	L1, L2
Choke 30H	2	P-T157G	L3x
Tranny, output	2	P-T119DA	T2x
Jack, phone	2	S-H504	J3, J4
Jack, RCA B	1	S-H267B	J2x
Jack, RCA R	1	S-H267R	J2x

Component	Qty	Mouser	References
Chassis	1	546-1402KV	

Component	Qty	NewSensor	References
6H30	1	6H30PiEHGOLD	V1

Component	Qty	FrontPanelExpress	References
Front	1		
Back	1		

# 3 Assembly

## Chassis

- ❑ Place the blank circuit board on the top panel, centered. Mark the center of the tube socket. Drill hole in cover to 1.125" diameter using a step bit or hole punch.
- ❑ Apply adhesive feet to bottom cover.

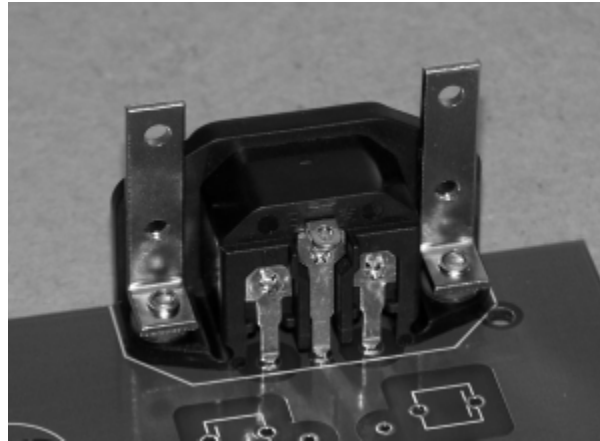
The extrusions come with their own mounting screws, but it works better if you can use a #4-40 tap to pre-thread the grooves so you can use the #4 oval head screws provided.

- ❑ Fabricate the front and back panels according to the drawings. Remove protective plastic and wash with soap, water, and sponge. The stock panels can obtain a really nice finish when cleaned. Or buy the pre-made panels from FPE.
- ❑ Install the RCA jacks into back panel. Add short (about 2") wires.
- ❑ Install LEDs into front panel.

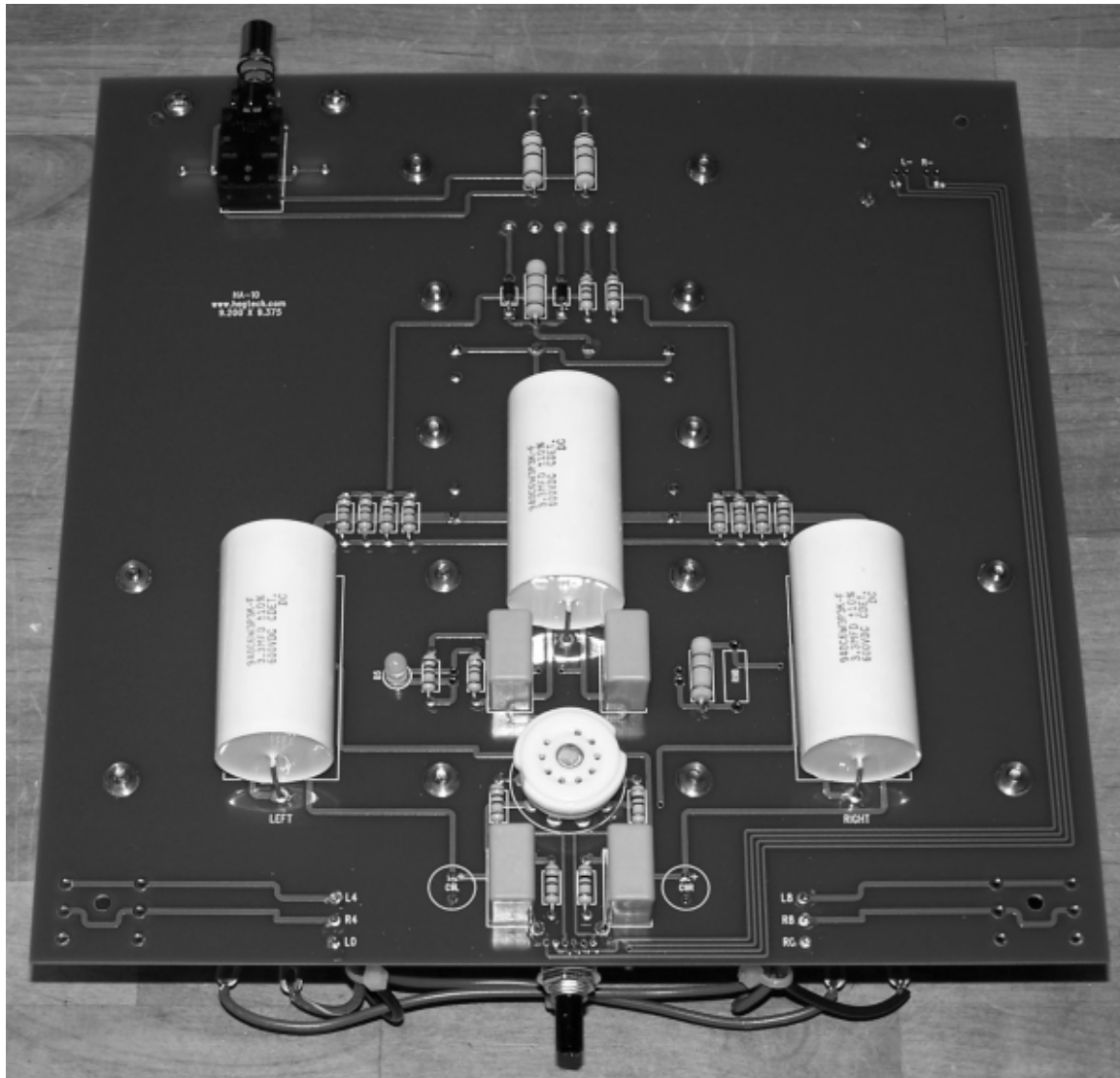
## Circuit Board

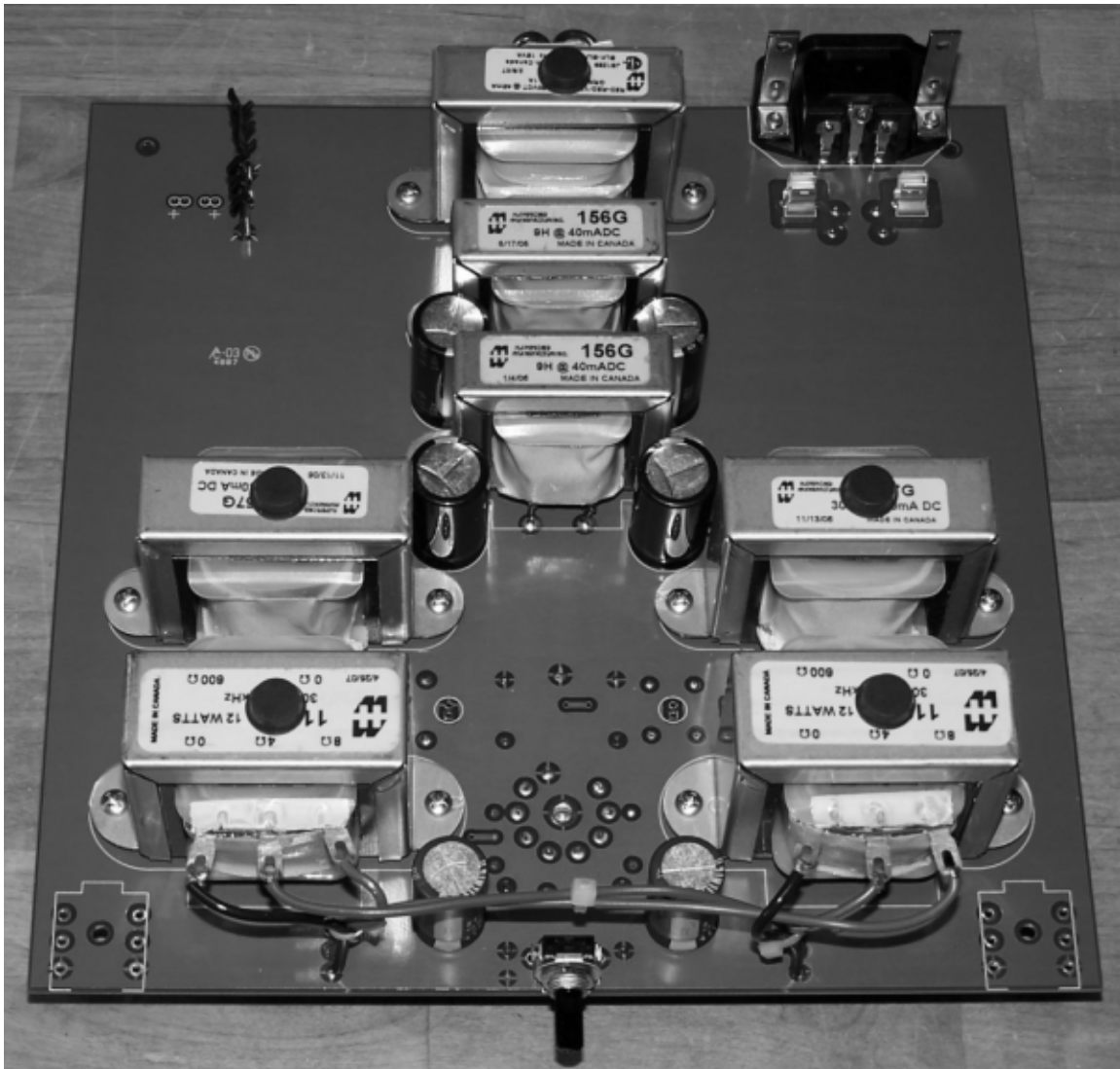
Assemble in the following order, soldering and clipping leads as you go. Parts are mounted on the side as shown by silkscreen. Refer to photos.

- ❑ Install all fixed resistors (not volume pot). R5 and R6 are each made up of four 1-ohm resistors in parallel. R9B is unused.
- ❑ Install two rectifier diodes and one LED (not the LEDs on wires).
- ❑ Install socket.
- ❑ Install 1uF (4).
- ❑ Install 470uF (2). Can be on either side of board. Beware of polarity.
- ❑ Mount ac connector. Use two #6 screws, through the board, connector, thin washers, and into the provided L-brackets. Solder in place.



- ❑ Install fuse clips (2).
- ❑ Remove the metal bracket from the power switch. Install, making it as horizontal as possible. Add switch cap.
- ❑ Install 100uF (4). Double check polarity.
- ❑ Trim wire length on power transformer to about 0.5" past the bottom of bracket. Remove insulation up to bracket level. Save the wires for later. Mount the transformer on top of two thick washers using #6 screws, having fed the stripped leads through the appropriate holes. Tighten, then solder.
- ❑ Install 10nF ac capacitor.
- ❑ Install 9H chokes (2) in the same fashion as above. Make sure the thick washers are used as standoffs.
- ❑ Install 30H chokes (2).
- ❑ Install 119DA output transformers (2).
- ❑ Install 3.3uF caps (3). Bend and trim leads to fit, you have to solder from component side. Leads must not protrude through board.
- ❑ Install volume pot (don't solder mounting tabs yet).
- ❑ Use the saved power transformer wires to wire the outputs of the 119DA to the board (labeling of holes is on other side). See photo. Probably best to use black as ground, green as 4-ohm, red as 8-ohm connections. Add tie wraps.
- ❑ Install heat sink.
- ❑ Add adhesive bumpers to power transformer, 30H chokes, and output transformers.

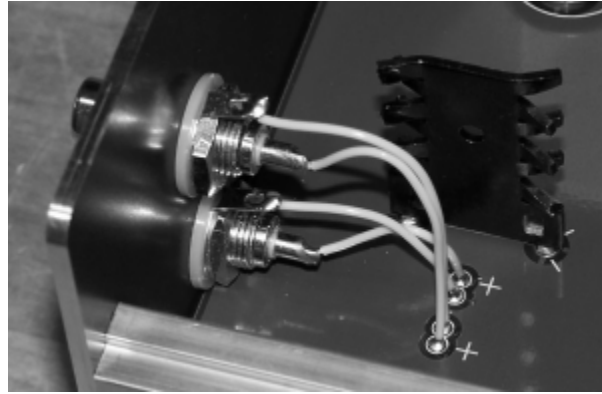




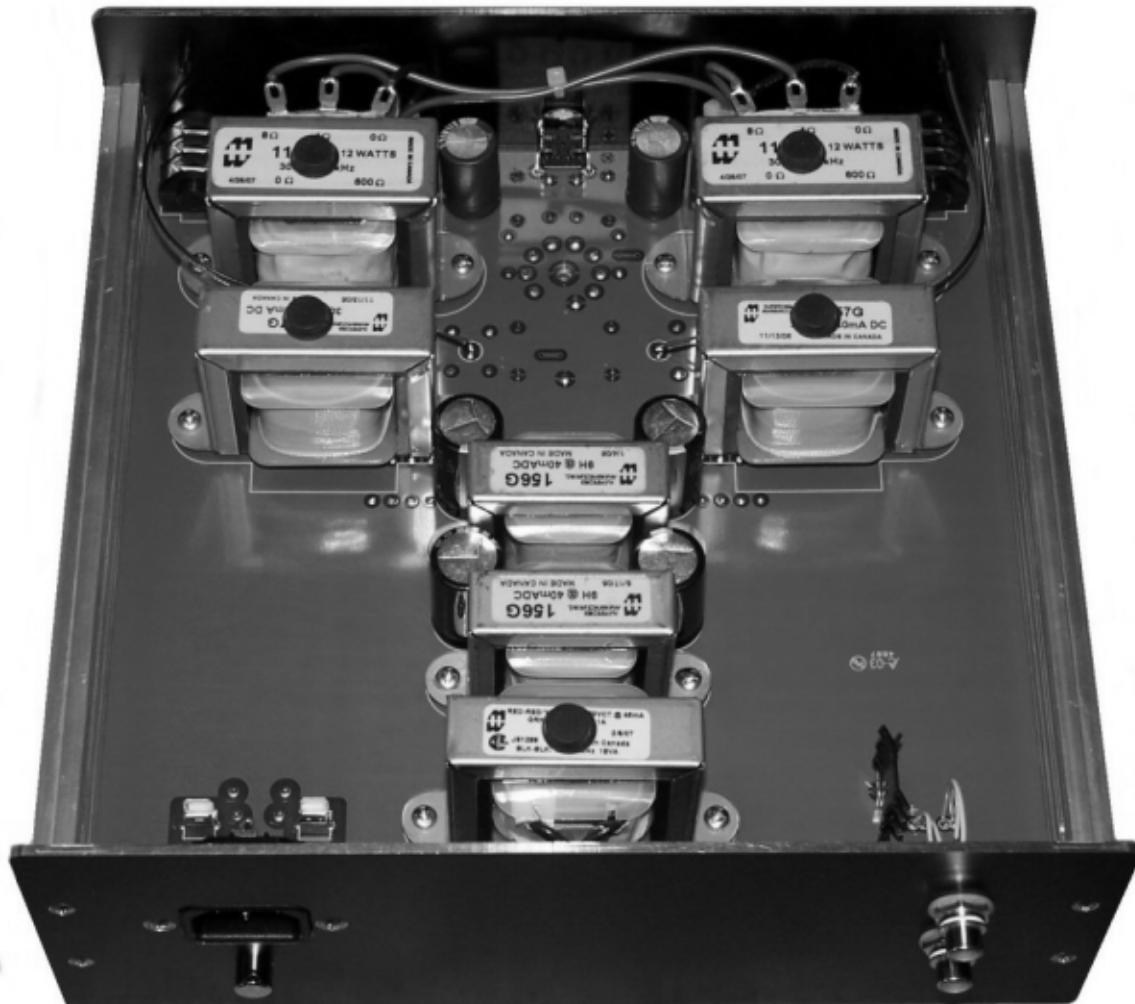
## Integration

- ❑ Mount the back panel onto board using two #6 screws into the ac connector.
- ❑ Mount the side extrusions using #4 screws. They act as card guides for the circuit board.
- ❑ Set headphone jacks in place, washers removed. Apply volume pot washer. Carefully mount front panel, securing in place with volume pot nut. Add nuts to phone jacks, but loosely.
- ❑ Solder one pin on each phone jack. Not with one finger pushing jack down into place on circuit board, heat up the soldered pin with soldering iron. Jack should not push down into proper position, flat on the circuit board. Do this to both sides. Solder remaining pins.

- ❑ Tighten all three nuts. Add knob to volume control (flat side opposite set screw).
- ❑ Solder LED wires. Square hole is red (positive) wire.
- ❑ Solder RCA wires into appropriate holes (labeling on other side).



- ❑ Install fuse, and tube. Apply o-rings to tube (microphonic damping).



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# 4 Testing & Installation

## Testing

Double-check all of your work before applying power. Always wear safety glasses. Look to make sure there are no solder balls, wire shards, loose items, or backward components.

- ❑ Install power cord. Apply power and watch for smoke. All LEDs should light up immediately.
- ❑ Measure heater voltage. It should be about 6.3Vac.
- ❑ Measure B+. It should overshoot to about 150Vdc on power up, and then drop to 100Vdc after the 6H30 warms up.
- ❑ Measure plate voltages. They should be approximately 92Vdc.
- ❑ Measure cathode voltages. Approximately 4.2Vdc.

If the above checks out, then everything is operating properly at bias. If possible, add a line level audio signal and check outputs on oscilloscope.

- ❑ Power down. Wait a minute until removing power cord (proper bleeding of supply capacitors).
- ❑ Remove tube.
- ❑ Mount assembly to bottom cover.
- ❑ Mount top cover.
- ❑ Re-install tube.

Your Castanet is now completed and ready for use.

# 5 Specifications

The following specifications are subject to change without notice.

Item	Specification
Input Impedance	50k
Gain	2.6dB
Sensitivity	3Vrms maximum
Output Impedance	9 ohms
Bandwidth (-3dB)	12Hz to 75kHz
Distortion	<0.5% @1kHz
SNR	98dB ref 1V A-weighted
Size (PCB)	9.200 x 9.375
Size (Chassis)	8 x 12 x 3 inches
Weight	9.5 lbs.
Input Power	120Vac @14W
Tube Compliment	6H30

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# 6 Warranty & Service

## Warranty

Hagerman Technology LLC warrants this product free of defects in materials and workmanship for 10 years (90 days for tubes). If you discover a defect, Hagerman Technology LLC will, at its option, repair or replace the product at no charge to you provided you return it during the warranty period, transportation charges prepaid to Hagerman Technology LLC. This warranty does not apply if the product has been damaged by negligence, accident, abuse or misuse or misapplication, has been damaged because it has been improperly connected to other equipment or has been modified without the express written permission of Hagerman Technology LLC. This warranty is limited to the replacement or repair of this product and not to damage to equipment of other manufacturers.

Any applicable implied warranties, including warranty of merchantability, are limited in duration to a period of the express warranty as provided herein beginning with the original date of purchase and no warranties, whether express or implied shall apply to the product thereafter.

Under no circumstances shall Hagerman Technology LLC be liable for any loss, direct, indirect, incidental, special, or consequential damage arising out of or in connection with the use of this product.

## Service

Refer to Chapter 4 for troubleshooting information. If the problem persists, contact Hagerman Technology for service at **[www.hagtech.com](http://www.hagtech.com)**.

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