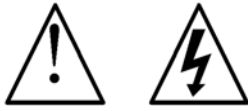




# Clarinet

## Linestage 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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# 1 Before You Begin

## Description

Congratulations! You have just purchased one of the highest performance-per-dollar audiophile products available. The Clarinet linestage is intended to bring high-end audio and construction quality into the hands of do-it-yourselfers. It is part of a line of vacuum tube products based on a common chassis and circuit board architecture. The design is optimized for both ease of assembly and sonic excellence.

Circuit topology is the classic SRPP (sometimes referred to as a mu-follower), which combines the desirable features of constant current plate loading and low output impedance. This circuit uses no feedback and runs in a class-A single-ended mode. Vacuum tube rectification provides a gentle turn-on without the need for muting circuits. A dc heater supply insures quiet, hum-free operation.

The Clarinet half-kit consists of these instructions, a blank circuit board, and a 1:1 drill guide. You must purchase the remaining components from a few other sources. Electronics are available from DigiKey and Antique Electronic Supply; the chassis from Lansing Instruments. You may also substitute parts from your own stock.

## Features

- All vacuum-tube signal path
- Pure class-A amplifier stages
- No feedback
- SRPP circuit for linearity and low output impedance
- Vacuum tube B+ rectification

## 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!

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# 2 Parts to Buy

## Kit

If you purchased a factory assembled Clarinet, skip to Chapter 5. The kit does not need to be built as specified, part substitutions or upgrades can be made at your discretion. It is recommended you read this entire manual before starting.

## Modifications

Here are a few simple modifications and upgrades possible to customize your unit.

- ❑ Upgrade signal capacitors to “auricap” brand: Change C302 to AES #CAUD1-450. Change C301 and C303 to AES #CAU1-450.
- ❑ Upgrade to gold plated RCA jacks: Buy RCJ-45 and RCJ-36 from [www.allelectronics.com](http://www.allelectronics.com). Even better, use AES #S-H267W (white) and #S-H267R (red).
- ❑ Customize knob color: Change knobs to AES #P-K300R (red) or P-K300W (white) or P-K300BU (blue) or P-K300Y (yellow) or P-K300C (cream).
- ❑ Change chassis anodize color from clear to black: Use Lansing #B2H12-V01B.

## Parts List

Parts should be ordered directly from [www.digikey.com](http://www.digikey.com) and [www.tubesandmore.com](http://www.tubesandmore.com) (AES), and [www.lansing-enclosures.com](http://www.lansing-enclosures.com). See lists on following pages.

Component	Qty	DigiKey	References
47uF 450V	3	493-1461-ND	C103, C300
10,000uF 10V	3	493-1275-ND	C106, C304, C305
0.1uF 50V	2	EF1104-ND	C102, C306
1uF 400V	4	PF4105-ND	C301, C303
0.1uF 400V	2	PF4104-ND	C302
0.01uF 2kV	2	490.4217	C100, C101
LED R/G	1	754-1235	D100
1N5821	4	1N5821DICT-ND	D101, D102, D103, D104
Grommet	10*	RP456-ND	
Power Cord	1	Q120-ND	
Heat Sink	6	HS372	
Feet	4	SJ5523-0-ND	
Standoff #4x1"	10*	4806K-ND	
Fuse	2	F2419	F100
Dome, LED	1	L30032-ND	
Grounding Post	1	J587-ND	
RCA-4	1	CP-1438	J304-5
RCA-6	1	CP-1441	J300-2
AC Input	1	CCM1647-ND	
Fuse Holder	1	WK0011-ND	
Terminal	30	1285K-ND	
Crimp	30	A27804-ND	
Switch, Select	1	GH7106	S300
2N3906	2	2N3906FS-ND	Q100, Q101
Pot, Volume	1	P2T3503	R301
Pot, Balance	1	P2R1503	R300
220 1W	15	220W-1-ND	R101, R102, R103, R303, R306, R307, R309, R311
680 1W	5	680W-1-ND	R104, R308, R310
6.8k 1W	5	6.8KW-1-ND	R100, R106, R108,
10k 1W	5	10KW-1-ND	R105, R304, R314
330k 1W	5	330KW-1-ND	R107, R302, R312
3.0 5W	1	3.0W-5-ND	R313

\* Minimum purchased quantity.

Component	Qty	AES	References
Knob	3	P-K300	
Socket, 8-pin	1	P-ST8-193G	
Socket, 9-pin	2	P-ST9-214G	
Transformer	1	P-T370BX	T100
12AU7	2	12AU7	V300, V301
5Y3GT	1	5Y3GT	V100
Screw #10	1*	P-H245	
Nut #10	1*	S-HHN1032	
Washer #10	1*	S-HLW10	
Screw #4	3*	S-HS440-14	
Nut #4	2*	S-HHN440	
Lug	1*	S-H112	

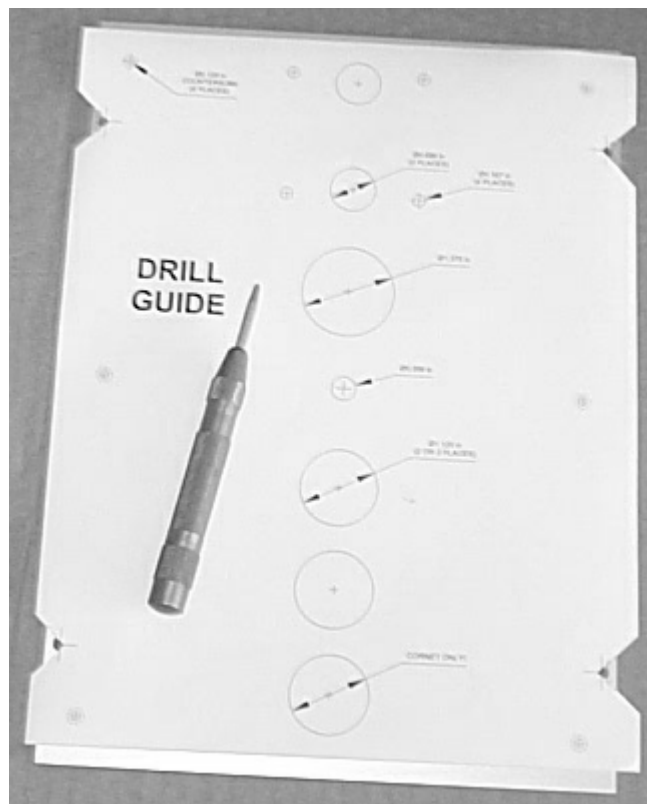
Component	Qty	Lansing	References
Chassis	1	B2H12-V01A	

# 3 Assembly

## Chassis

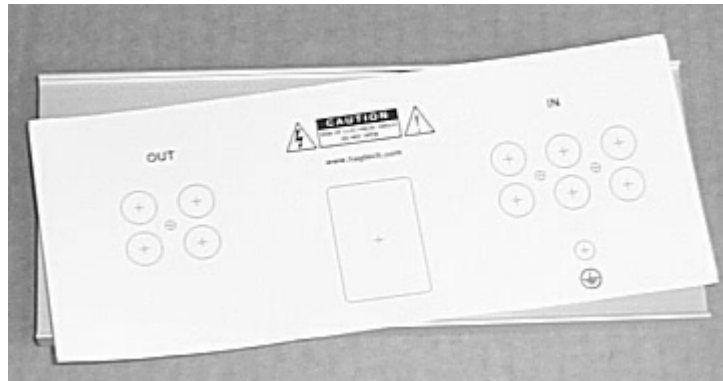
The instructions below refer specifically to the Lansing Instruments' enclosure. Nevertheless, you can still use a low-cost classic "Hammond" style chassis. Follow these step-by-step instructions to machine the chassis pieces. If you plan to use upgraded RCA jacks or other controls, some mounting holes will not be the same as those specified on the drill guides; they need to be lowered to prevent interference with the circuit board.

- ❑ Use a scissor to notch out the four alignment holes in the printed drill guide.
- ❑ Place the drill guide on top of a blank top cover; align so the mounting holes are centered in the crosshairs. Use a metal punch (sharp nail) to mark the center of each hole.



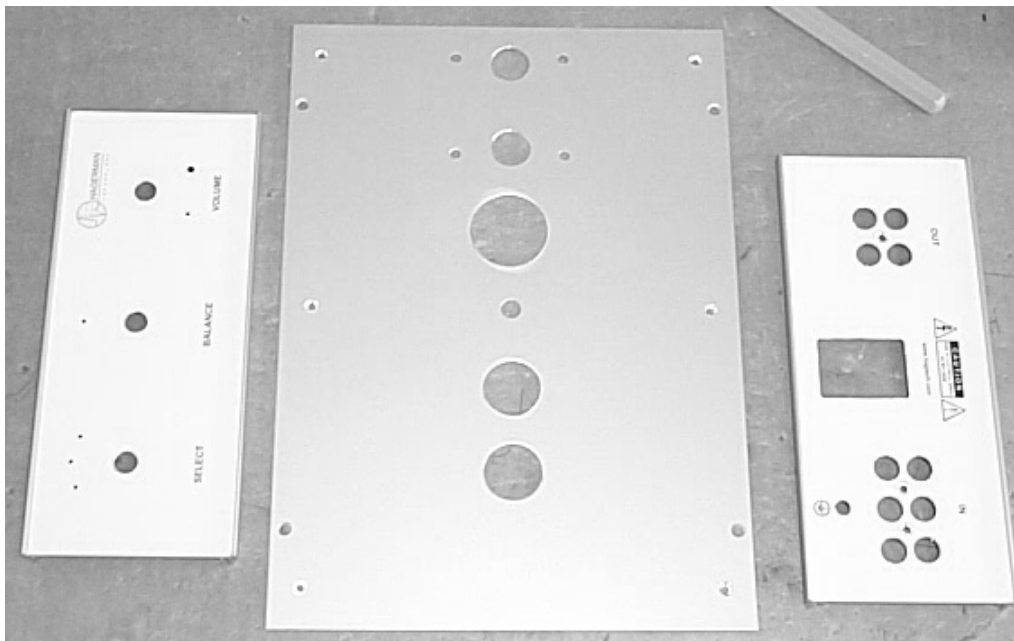
*Drill guide placed on top cover.*

- ❑ Cut out the front and rear panel drill guides using a straight edge and razor blade.



*Guide cut to fit rear panel.*

- ❑ Carefully drill holes on top cover, front and rear panels. Large holes are best done using punches, but a step-drill also works fine. A file may be needed to get a clean rectangular cutout on the rear panel.
- ❑ Wash the top cover with dishsoap to remove fingerprints and grime.



*Finished chassis pieces.*

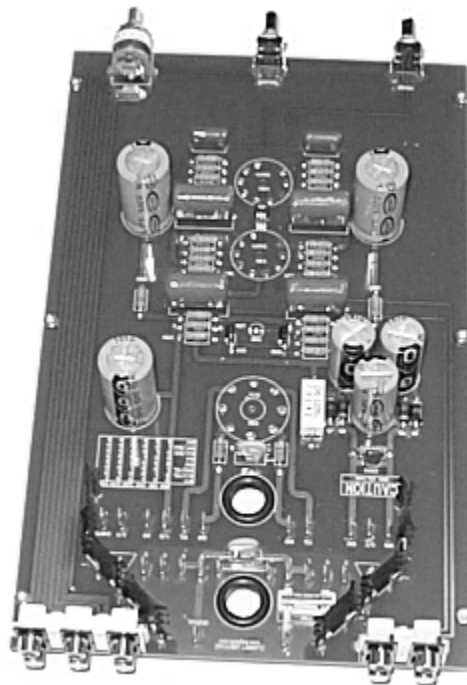
## Circuit Board

Assemble in the following order, solder and clip leads before continuing.

- ❑ Solder sockets onto the *backside* of circuit board. Insure rotation of octal socket is correct (see dimple).
- ❑ Add six standoffs to bottom of circuit board using #4 nuts.
- ❑ Add two grommets.



- ❑ Install quick release terminals (for transformer wiring).
- ❑ Install all resistors.
- ❑ Install diodes and transistors.
- ❑ Install all capacitors.
- ❑ Install fuse holder.
- ❑ Install RCA jacks.
- ❑ Clip the front metal feet off the volume & balance potentiometers. This is to prevent a short to a circuit trace below them. Install both.
- ❑ Install select switch. Set rotation so flat on shaft points to 7:30 o'clock. Insert miniature limit pins to locations at 12:00 and 3:00 o'clock. Add retaining sticker.
- ❑ Install heat sink shields near RCA connectors and transformer wiring.
- ❑ Install LED onto *backside* of circuit board. Keep leads as long as possible (about one inch). Tab on side labeled "LED\*".
- ❑ Soak and brush assembly in 99% isopropyl alcohol to remove solder flux residue. Blow dry.



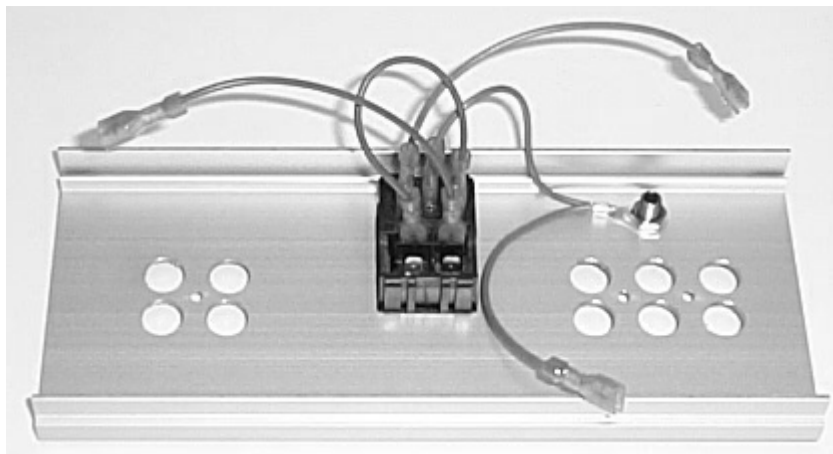
*Completed circuit board.*

## Integration

If built properly, everything should fit together like a glove.

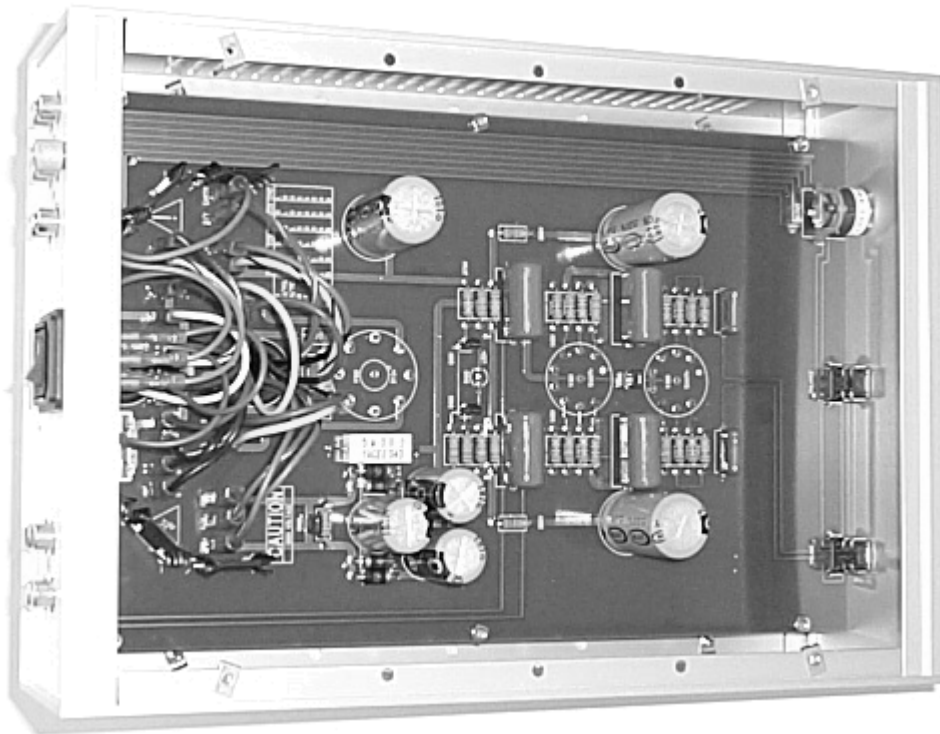
- ❑ Install rubber grommets to top cover.
- ❑ Install LED window to top cover.

- ❑ Mount transformer to top cover using the #10 hardware with primary wires towards outside.
- ❑ Mount circuit board assembly to top cover, routing transformer wires through grommets.
- ❑ Cut length of transformer wires to 5 inches above circuit board. Save the scraps!
- ❑ Add crimp terminals to all of the transformer wires.
- ❑ Plug in the transformer wires to the terminals on the circuit board. Use the silkscreened chart for proper voltage selection.
- ❑ Add crimp terminals to both ends of scrap wires colored brown, blue, and brown/yellow.
- ❑ Add crimp terminals to one end of scrap wires colored green and green/yellow.
- ❑ Solder both open ends of the green and green/yellow wires to the eyelet lug.
- ❑ Install the ground jack to rear panel with above eyelet lug secured under the nut.
- ❑ Install ac input connector.
- ❑ Connect the brown/yellow wire from the L terminal to a switch terminal. Connect the brown wire to the other switch terminal. Connect the blue wire to the N terminal, and the green/yellow wire to the E terminal.



*Rear panel showing wiring.*

- ❑ Connect L (brown), N (blue), and E (green) wires from rear panel to terminals on circuit board.
- ❑ Secure rear panel to assembly using #4 screws on the RCA jacks.
- ❑ Install front panel. Secure in place with switch and potentiometer nuts.
- ❑ Add chassis side panels.
- ❑ Add fuse.
- ❑ Turn select switch to center position. Apply knob pointing straight up.
- ❑ Set volume and balance controls with detent flat at center position. Add knobs pointing straight up.
- ❑ Install vacuum tubes
- ❑ Add feet to bottom cover. Do not install until after testing.



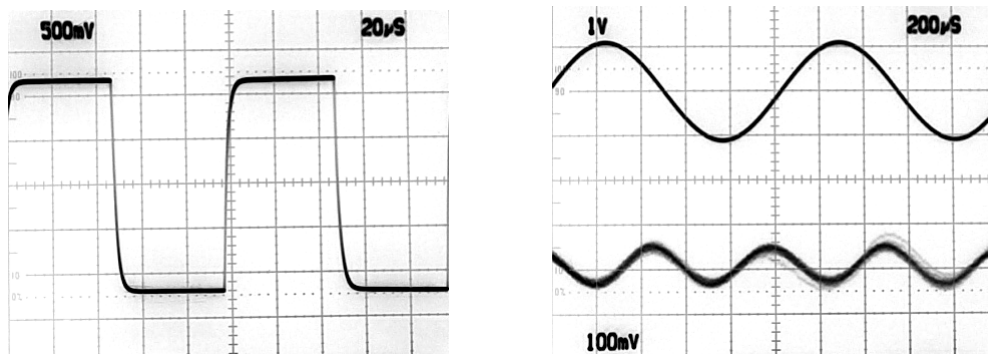
*Completed assembly.*

# 4 Testing & Installation

## Testing

Double-check all of your work before applying power. Wear safety glasses, turn on the power and check for smoke. The LED should be red, and then switch to green after about 20 seconds. This indicates both heater and high voltage circuits are working.

- ❑ Measure power supply and plate voltages using a DVM. Voltages are marked on circuit board and schematic. Due to tube variations, these voltages will range as much as +/-10V.
- ❑ Connect a 1kHz sinewave signal and observe output on oscilloscope. Insure all controls are functional.
- ❑ Turn off, remove power cord and install bottom cover.



*Square wave performance at 10kHz and 1kHz residual distortion.*

## Connections

The Clarinet connects to your audio system just like any other linestage. Top RCA jacks are left channel, bottom are right. Please note, the Clarinet inverts signal polarity. You can compensate for this by swapping speaker terminals.

- ❑ Listen. Roll tubes. Enjoy.

# 5 Specifications

The following specifications are subject to change without notice.

Item	Specification
Gain	15dB
Input Impedance	100k ohm
Output Impedance	3k ohm
Bandwidth	10Hz to 100kHz
Balance Control	+/-3dB
Distortion	0.08% @1kHz @1Vrms
SNR	83dB A-weighted
Phase	Inverted
Size (PCB)	7.25 x 11.65 inches
Size (Chassis)	8 x 12 x 3 inches
Input Power	25W
Input Voltage	100V, 110V, 120V, 200V, 220V, 240V
Tube Compliment	12AU7 (ECC82) x 2, 5Y3GT x 1



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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.

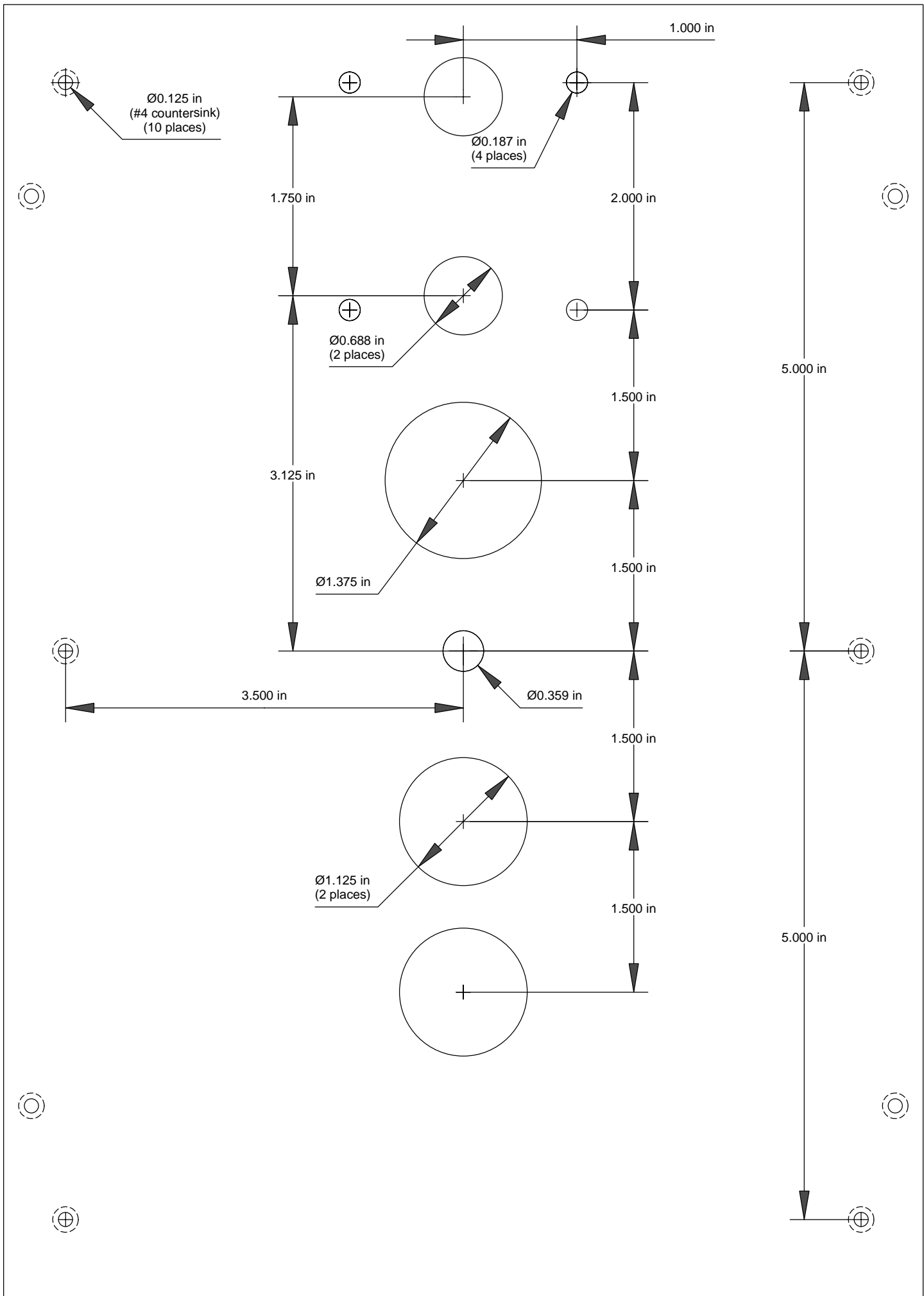
## Service

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

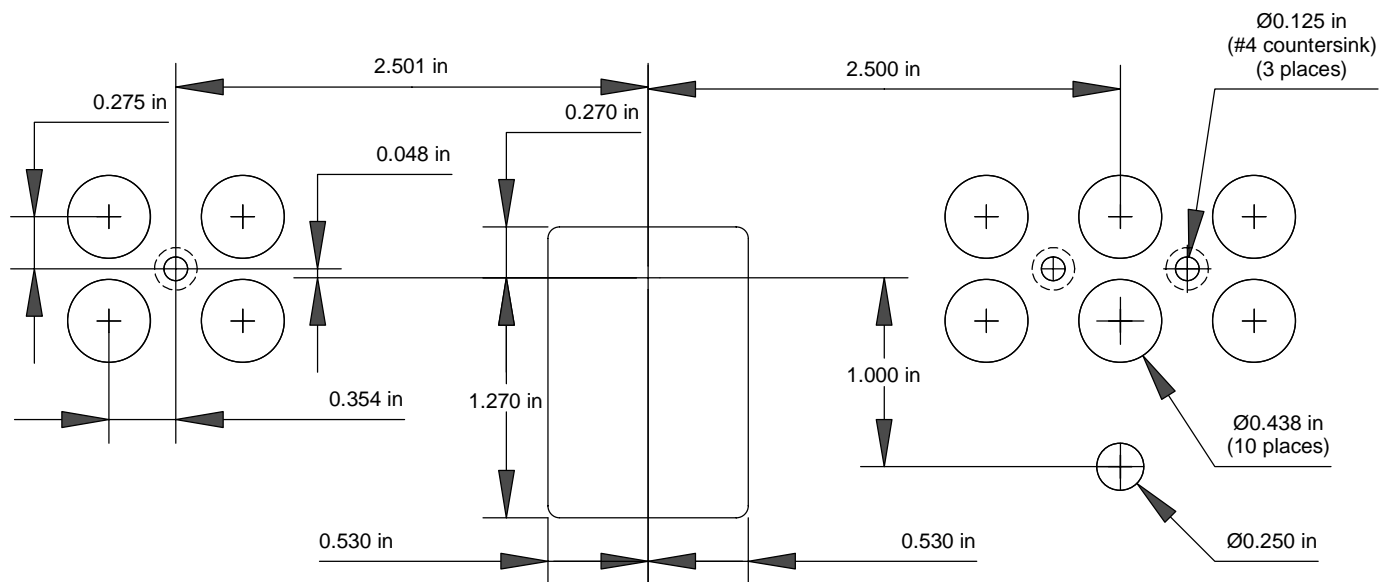
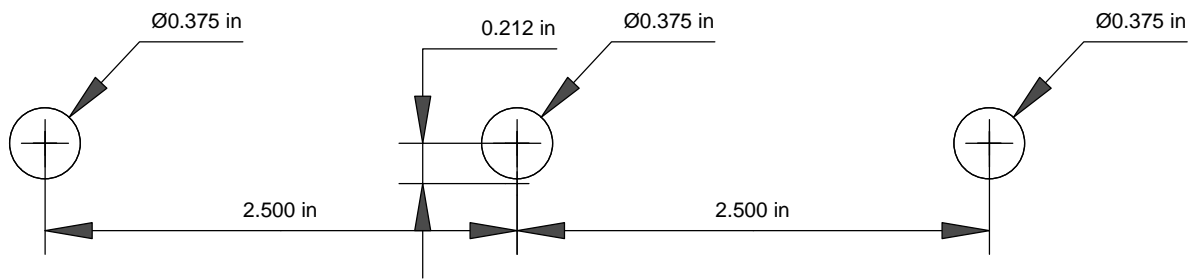
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PO Box 61911  
Honolulu, HI 96839 USA

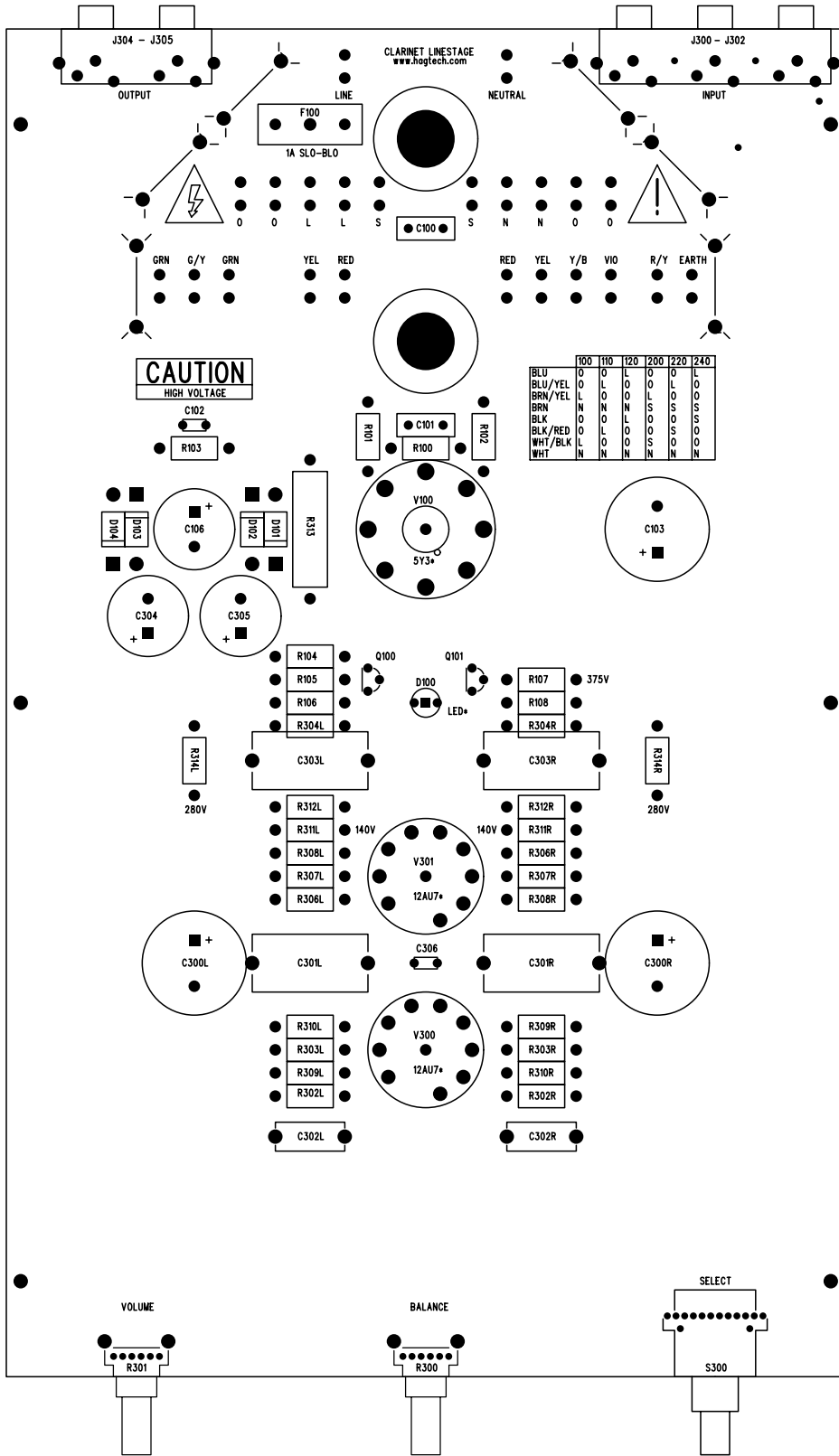
808-383-2704 (voice)



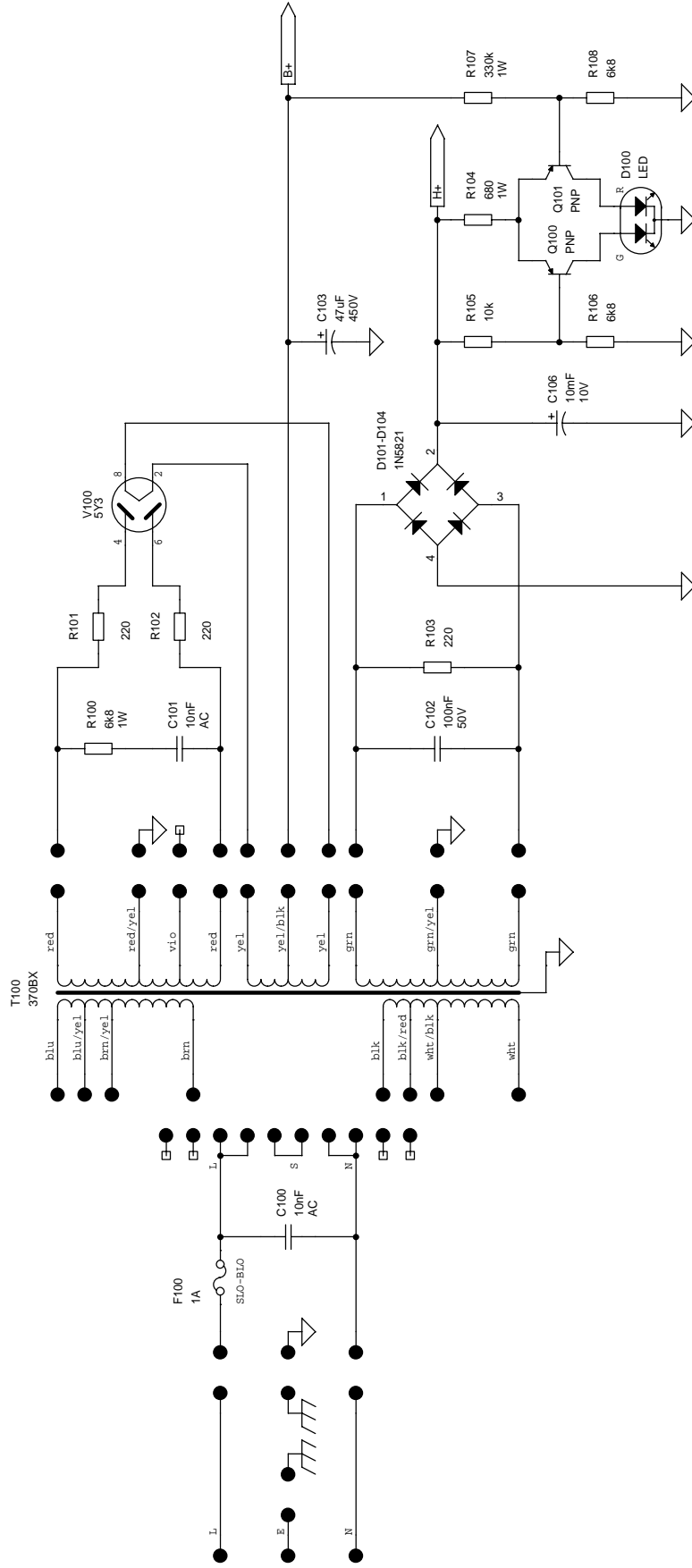








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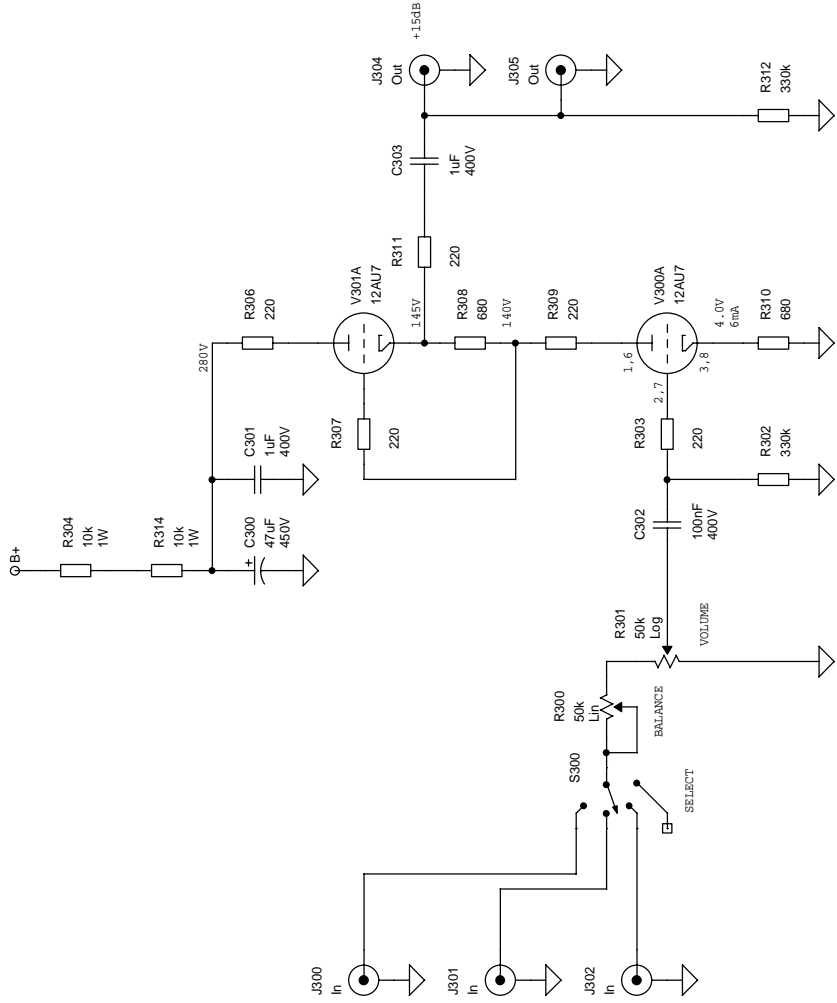
	100V	110V	120V	200V	220V	240V
Blu	NC	NC	L	NC	NC	L
Blu/Yel	NC	L	NC	L	NC	NC
Brn/Yel	L	NC	NC	L	NC	NC
Brn	N	N	S	S	S	S
Blk	NC	NC	L	NC	NC	S
Blk/Red	NC	L	NC	NC	S	NC
Wht/Blk	L	NC	NC	S	NC	NC
Wht	N	N	N	N	N	N

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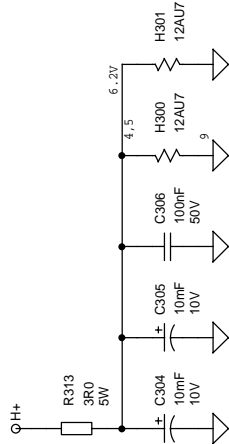
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Date: **Thursday, April 08, 2004**

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Title  
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