HAGERMAN
TECHNOLOGY

Cornet

Phono Preamp Kit
User's 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

The information contained in this document is subject to change without notice. Hagerman Technology LLC shall not be liable for errors contained herein or for consequential damages in connection with the furnishing, performance, or use of this material. See Chapter 6 for warranty information.

1 Before You Begin

Description

Congratulations! You have just purchased one of the highest performance-per-dollar audiophile products available. The Cornet was designed to be a simple phono stage capable of achieving excellent sound quality. The circuit topology consists of common cathode class-A gain stages, passive equalization, and cathode follower output buffers. Vacuum tube rectification for the high voltage provides a gentle turn-on without the need for muting circuits. The moderate gain accommodates all moving magnet and high output moving coil cartridges.

Features

- All vacuum-tube signal path
- Pure class-A amplifier stages
- No feedback
- Cathode follower low impedance outputs
- Vacuum tube B+ rectification
- Constant current sinks

Tools

This is a kit product and construction should only be attempted by skilled electronic technicians (refer to warnings at the front of this manual). You will need an array of shop tools and a good soldering iron. If you are at all unsure of this, send it back!

2 Parts to Buy

Kit

The Cornet kit does not need to be built as specified. You may make any circuit and component changes you wish (but you had better know what you're doing). Feel free to substitute vacuum tubes or capacitor types. A recommended parts list is given below.

Parts List

This parts list is for a stock 43dB RIAA MM phono stage. Parts should be ordered directly from **www.digikey.com** and **www.tubesandmore.com** (AES). Included with your "box/2" kit are:

- Cornet circuit board (1)
- AC voltage select board (1)
- Chassis (1)
- #6 x ¼" self-tapping screws (20)
- Terminal ring (1)
- #10 x 1" screws (4)
- #10 nuts (8)
- #10 rubber washers (4)
- #8 x 1.75" screws (4)
- #8 nuts (4)

Upgrades

Signal coupling capacitors can be improved, substitute AES #CAUD1-450 and #CAU1-450 for C5 and C6 respectively, two each.

Component	Qty	DigiKey	AES	References
47uF 450V	5	493-1461-ND		C2, Cx, C10
10,000uF 10V	4	493-1275-ND		C13, C14, C15, C16
470uF 10V	2			Cx
1uF 630V PP	6	PF4105-ND		C1, C3, Cx
100nF 400V PP	2	PF4104-ND		C5
47nF 630V PP	2	P3517-ND		C7
1nF 630V PP	2	P3497-ND		C8
10nF 250Vac	2	P11423CT-ND		C9, C20
1N5821	4	1N5821DICT-ND		D1, D2, D3, D4
MJE340	2	MJE340G-ND		
Heat Sink	2	HS216-ND		
Power Cord	1	Q120-ND		
Ground Jack	1	J587-ND		
Standoffs 0.75”	10*	4818K-ND		
Feet	4	SJ5523-0		
AC Input	1	Q205-ND		
Fuse	5*	F2419-ND		
Switch	1	SW620		
Res. 220 1W	14	220W-1-ND		R6, R7, R8, R10, R11, R12, Ry
Res. 910 1W	8	910W-1-ND		R15, R17, Rx, Rz
Res. 3k3 1W	2	3.3KW-1-ND		R23
Res. 6k8 1W	5	6.8KW-1-ND		R2, R13, R20
Res. 10k 1W	4	10KW-1-ND		R1, R9
Res. 47k 1W	2	47KW-1-ND		R14
Res. 150k 1W	6	150KW-1-ND		R3, R5, R16
Res. 330k 1W	4	330KW-1-ND		R4, R19
Res. 1R8 5W	1	1.8W-5-ND		R21
RCA Jack, R	2		S-H267R	
RCA Jack, W	2		S-H267W	
Transformer	1		P-T370BX	
Socket 8 pin	1		P-ST8-193	V4
Socket 9 pin	3		P-ST9-214	V1, V2, V3
12AX7	2		12AX7	
12AU7	1		12AU7	
5AR4	1		5AR4	

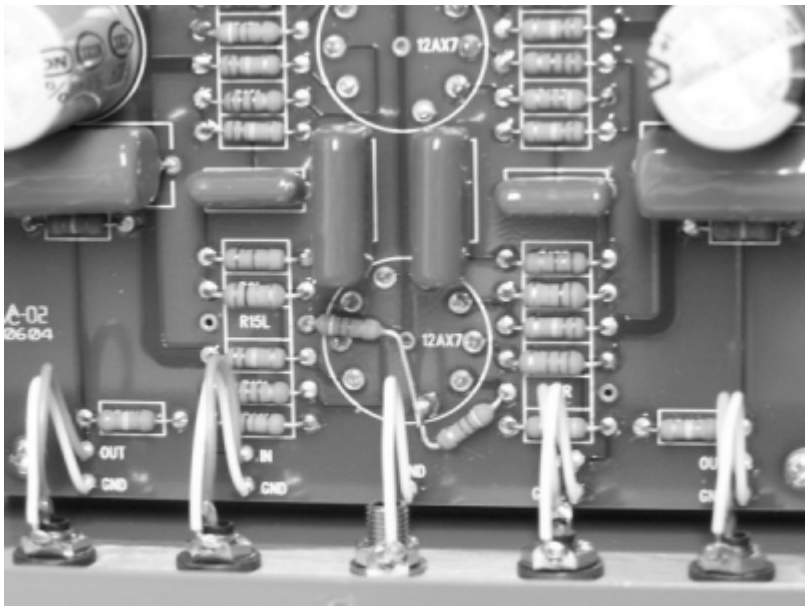
* Minimum quantity.

3 Assembly

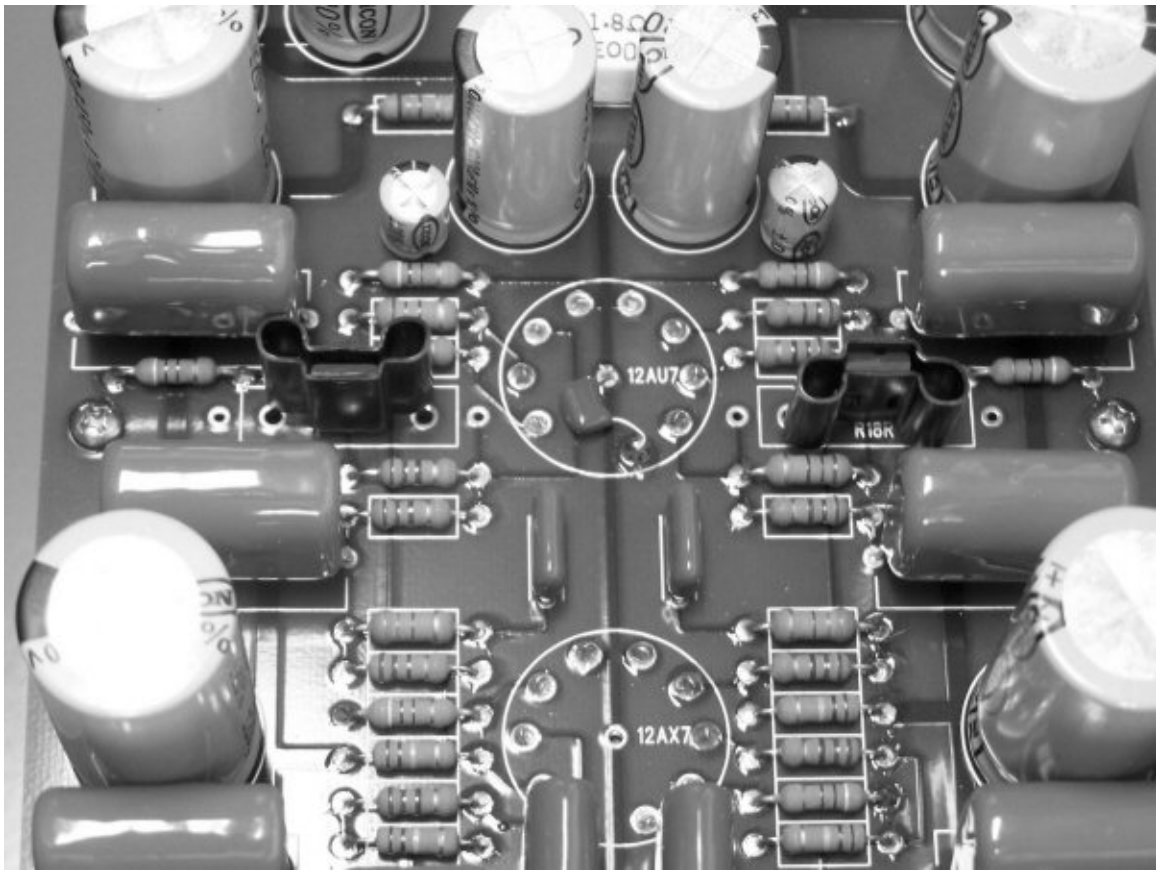
Circuit Board

Solder the sockets onto the backside of the circuit board. This is the side without silk screening. Make sure the orientation of the octal socket is correct! Then install the six standoffs (on socket side).

Install all of the resistors and solder in place (except R15s). Use the guide in the back of this manual. Don't forget to clip leads. Repeat for the diodes, signal capacitors, and finally the large electrolytic capacitors. Make sure the polarity of the electrolytics is correct ("+" is positive polarity). Install R15s as shown below, using the ground connection of the socket's pin 9. Use a wire for R22. C11 and C12 are unused, but you can add small 100nF caps if you desire.



Add heat sinks to MJE340 transistors and solder in place as shown. The heat sinks do not attach to board. The metal part of the transistor faces away from the mickey mouse ears.



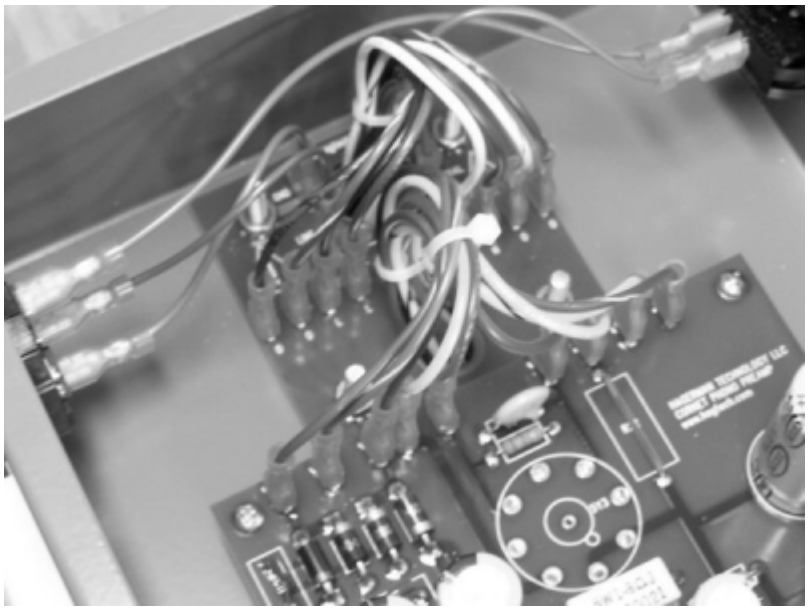
Finally, add short lengths (about 2") of signal wire to the input and output connections on the circuit board, including ground.

Chassis

Remove from plastic. Apply rubber feet to bottom panel, put aside. Install grounding jack with ring terminal on inside. Enlarge the RCA jack holes to 0.375" and install RCA jacks with their insulating washers. White pair goes on left, red on right. Insert power switch and ac input connector.

Mount the transformer with #10 screws, with washers between mounting tabs and chassis (do not tighten yet), with primary wires towards the outside. Inside the chassis, slide the AC voltage select board onto the screws. Put on nuts loosely. Ok, now tighten down the screws from above, securing the transformer in place. Do not over tighten or the washers will deform excessively. Tighten the nuts holding the board down on the inside. Finally, solder C1 (10nF 250Vac cap) into place.

Replace the #8 bolts holding the transformer together with the supplied stainless steel types (do not remove insulators). Mount circuit board inside.



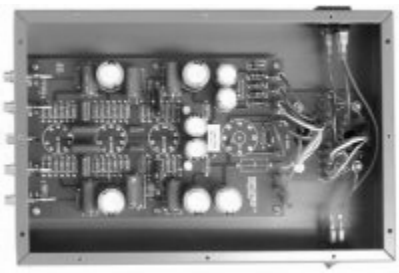
Wiring it up

You can optionally use #1285K-ND solder tabs and #A27804-ND crimp terminals for wiring to the circuit boards. This allows you to plug and unplug as in the photo above. Normally, you can solder wires straight to the boards.

Connect transformer secondary wires to the cornet circuit board. The violet wire is unused. Cut it short and insulate so that it touches nothing. Connect the primary wires to ac voltage select board. Refer to ac voltage chart on schematic for proper hookup.

Add ground wire from ac input connector to voltage select board. Add neutral wire. Add wire from line to power switch, and then another from there to voltage select board. Refer to schematic. You can use tie wraps or tape to bundle wires together. Keep primary wires separated from secondary. Trim input, output, and ground signal wires to an appropriate length, and solder to their respective RCA jacks and ground terminal.

Install tubes and fuse. Unit is now ready for testing.



4 Testing & Installation

Testing

Double-check all of your work before applying power. Wear safety glasses. Turn on the power and check for smoke. If all goes well, after 60 seconds of warm-up, check to make sure the power supply and tube voltages are as specified on the schematic. Check plate voltages on the 12AX7s, as they should be around 140V. If all is well, power down and install bottom cover.

Connections

Connect the Cornet just like any other phono stage. The input and output jacks are RCA types. Make sure the ground lead from the turntable is connected to the grounding screw between the input jacks.

5 Specifications

The following specifications are subject to change without notice.

Item	Specification
Gain	43dB
Input Impedance	47k ohm plus 40pF
Output Impedance	1k ohms
RIAA Response	+/-1dB from 25Hz to 25kHz
Bandwidth (-3dB)	15Hz to 30kHz (minimum)
Distortion	0.02% @1kHz
SNR	75dB ref 5mV A-weighted
Overload	250mV @1kHz
Size (PCB)	5.25” x 8.50”
Size (Chassis)	12” x 8”
Input Power	33W
Tube Compliment	12AX7 (ECC83) x 2, 12AU7 (ECC82) x 1, 5AR4 x 1

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 **http://www.hagtech.com**.

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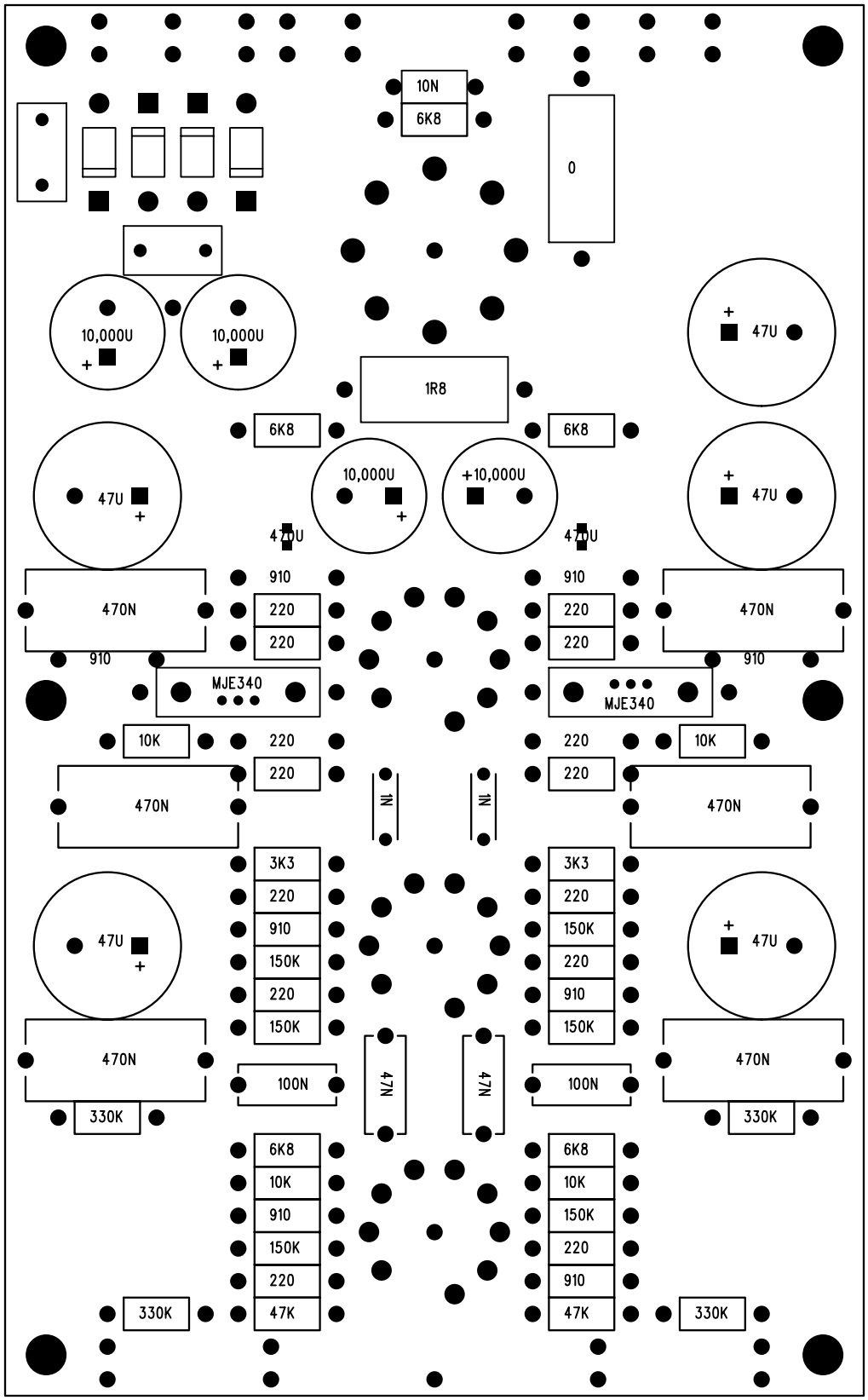
10N
6K8
0
10,000U
10,000U
47U
1R8
6K8
6K8
10,000U
+10,000U
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47U
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220
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470N
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910
MJE340
MJE340
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220
1N
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470N
470N
3K3
3K3
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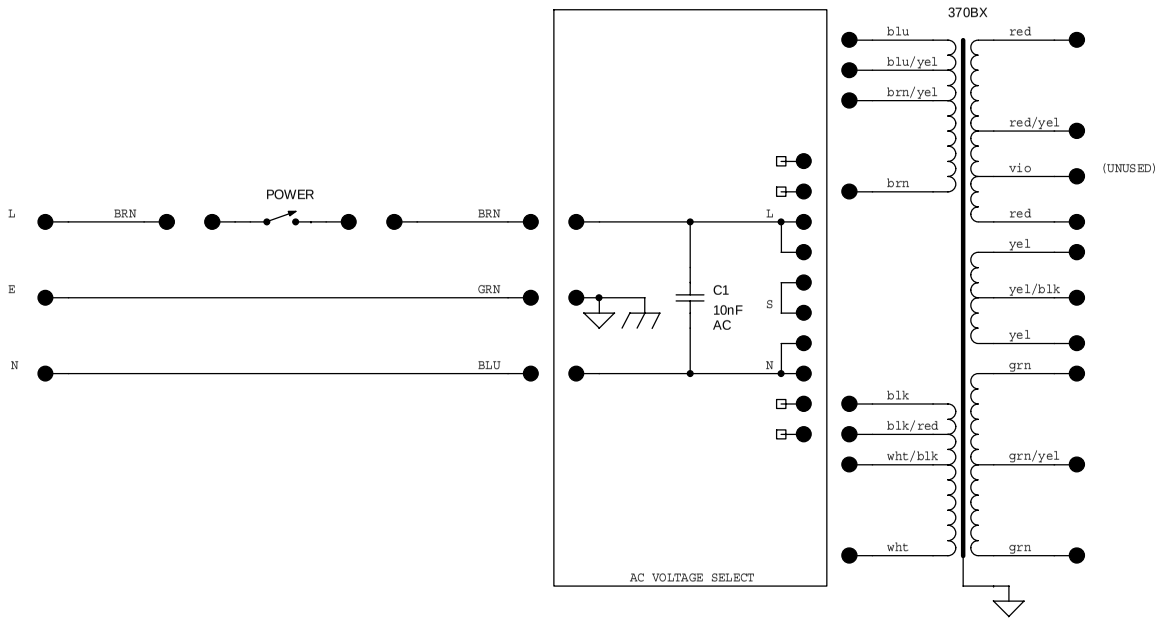

	100V	110V	120V	200V	220V	240V
Blu	NC	NC	L	NC	NC	L
Blu/Yel	NC	L	NC	NC	L	NC
Brn/Yel	L	NC	NC	L	NC	NC
Brn	N	N	N	S	S	S
Blk	NC	NC	L	NC	NC	S
Blk/Red	NC	L	NC	NC	S	NC
Wht/Blk	L	NC	NC	S	NC	NC
Wht	N	N	N	N	N	N

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Title
Cornet: AC Voltage Select

Size	Document Number	Rev
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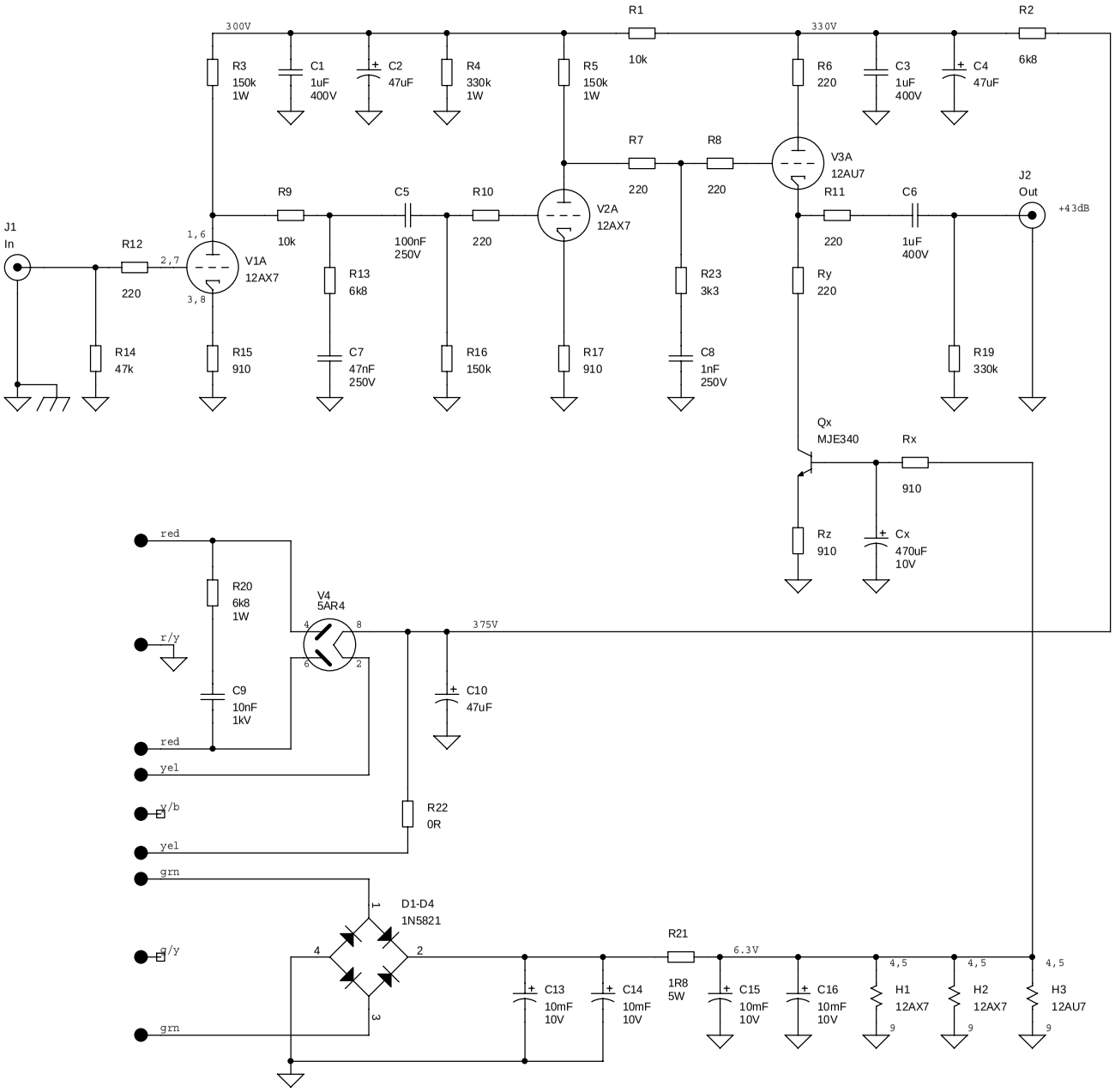
Date: **Friday, October 19, 2007** Sheet **1** of **1**



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Title
Cornet: Phono

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