

**raleigh
audio**

Mark IV

**Standard
Power Supply**

**Assembly
Manual**

Kit version

Use this manual with the Raleigh Audio Standard Power Supply, version 2.3 and parts level B.

Required Tools and Supplies

35 to 50 Watt soldering iron
Diagonal cutting pliers
Long-nose pliers
Wire stripper
Solder

Warnings and Cautions

Caution – Use only solder that is intended for electrical circuits. Do not use acid or corrosive flux of any kind.

Support

You may contact us with questions on constructing this kit by sending an e-mail message to support@raleighaudio.com

Power Requirements

The Low Voltage Power Supply requires 120VAC at 100mA or 230VAC at 50mA.

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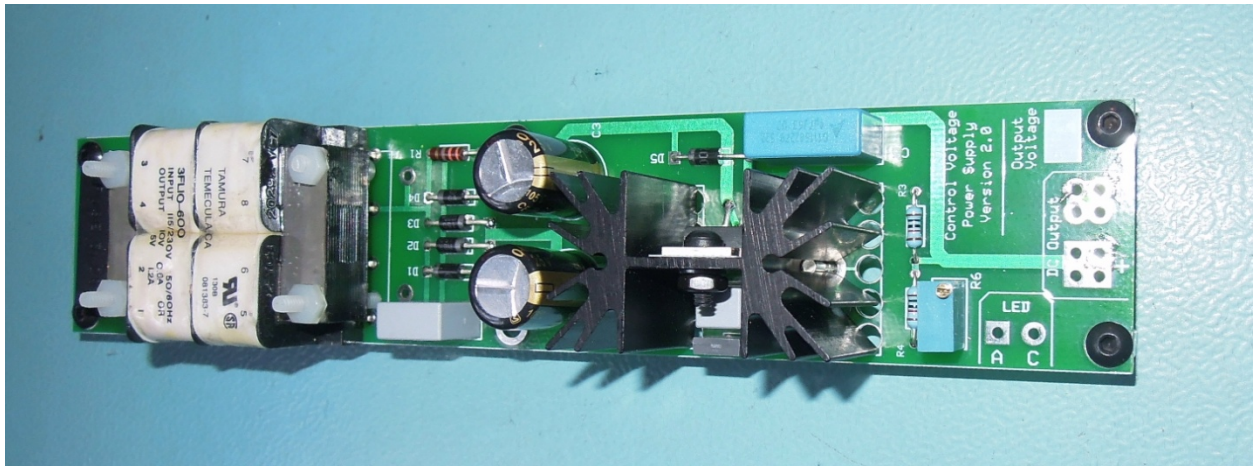
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Assembly Instructions

Before you start, read through the instructions completely to the end. Inventory the kit contents to become familiar with the parts and to make sure you have everything.

In the following steps you will populate the PC board. All of the components are mounted on the top of the board, which has the components labeled with white silkscreen.

Steps preceded by a “note” (J) deal with components which must be oriented properly.



The Low Voltage Power Supply takes the mains line voltage (120VAC or 230VAC) and produces a programmable DC output. It will usually have a 12V DC output.

Low Voltage Power Supply Assembly

1. Mount four $\frac{3}{8}$ " standoffs on the bottom of the board at the corners and secure with 6-32 x $\frac{1}{4}$ " screws.
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2. Mount a $\frac{3}{8}$ " standoff in the hole next to C2 and secure with a 6-32 x $\frac{1}{4}$ " screw.
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3. Insert a 1K (brown, black, black, brown, brown) resistor in the following two locations: R1 and R3.

Solder and trim the leads.

4. Insert a 10K (brown, black, black, red, brown) resistor in location R4.

Solder and trim the leads.



5. Insert an MBR150 (marked on body) diode in the following two locations: D2 and D3. Orient the diodes such that the end with the stripe is closest to capacitors C1 and C2.

Solder and trim the leads.



6. Insert an MBR150 (marked on body) diode in the following two locations: D1 and D4. Orient the diodes such that the end with the stripe is closest to Transformer T1.

Solder and trim the leads.



7. Insert a MBR150 (marked on body) diode in location D5. Orient the diode such that the end of the diode with the band is closest to capacitor C2.

Solder and trim the leads.

The output voltage of the Regulator is determined by the value of resistor R2.

Voltage	R2
5V	499.0K
8V	820K
10V	1.00M
12V	1.21M

There is a white square next to the output pads that may be used to indicate the output voltage. If your board has not been labeled, write the output value in the white square.

-
8. Install the appropriate Dale resistor in location R2.

Solder and trim the leads.

-
9. Insert the fuse holder in location F1.

Solder the pins.

-
10. Insert the proper fuse in the fuse holder cover and install the cover and fuse in the fuse holder.

The fuse should be:
100mA “slow-blow” (time delay) for 120VAC
50mA “slow-blow” (time delay) for 230VAC

-
11. Insert a 4.7uF (marked 4u7J63 on body) capacitor in location C3.

Solder and trim the leads.



12. Insert a 1,000 μ F, 25V capacitor in each of the following two locations: C1 and C2. Orient the capacitors such that their negative leads (marked on side) are closest to resistor R1.

Solder and trim the leads.

13. Wire the jumpers on the bottom of the board for your mains line voltage. You may use leads snipped from resistors to form the jumpers. Trim the leads flush on the top of the board.

For 120VAC:

Connect pad A to pad B

Connect pad C to pad D.

For 230VAC:

Connect pad E to pad F.

WARNING:

Non-conductive Nylon screws are provided to secure the transformer in the next step. Do not substitute metal screws, which will cause a short circuit that will damage the circuit and may cause bodily injury or even death.



14. Insert the transformer, T1, in its location. Align the transformer such that the pin numbers on the transformer match the pin numbers on the board. Secure the transformer with three 4-40 x 1" Nylon screws and Nylon nuts. Insert the screws from the bottom of the board with the nuts on the transformer frame. Tighten the screws snugly but do not over-tighten.

Note that a forth Nylon screw has already been mounted on the transformer in the hole closest to pin 7. This will ensure proper orientation of the transformer because there is no hole in the board for this location.

15. Solder and trim all eight pins on the transformer.
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16. Install the heatsink in its location.

Solder the pins.

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17. Insert the LT3080 regulator module in location U1.

- Insert an insulator between the regulator and the heatsink.
 - Secure with a 4-40 x $\frac{3}{8}$ " screw, lock washer and a nut, using an insulating bushing on the screw with the head of the screw on the side with the regulator.
 - Tighten the screw moderately tight.
 - Solder and trim the five pins on the regulator.
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Note: Resistor location R5 has been left vacant. This resistor determines the brightness of the power-on LED (if used) and is determined empirically. A value of 10K to 20K is suggested and a 16K resistor is provided to start experimenting.

Auxiliary Relay Board (optional)

Skip this section if you do not have an Auxiliary Relay Board.



1. Insert a 1N4007 (marked on body) diode in locations D6 and D7.
Orient the diodes such that the end of the diode with the band is the same as is marked on the board.

Solder and trim the leads.

TIP: When soldering a multi-pin component from the solder side of the board, first solder only one pin. Then pick up the board and holding the component, ensure that it is mounted straight while heating that one pin. Then solder the remaining pins.



2. Insert a small relay in location K1.

Solder the leads.



3. Insert a large relay in location K2.

Solder the leads.

All components should now be installed on the board. Check that all leads are soldered and that there are no “solder bridges” that connect things that should not be connected.

Final Assembly

Skip this section if you do not have an Auxiliary Relay Board.

An Auxiliary Relay Board is designed to mount on top of a Low Voltage Power Supply.

1. Remove the two $\frac{3}{8}$ " standoffs from the transformer end of the Control Voltage Power Supply.
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2. Mount two 1.25" (male/female) standoffs on the top of the Control Voltage Power Supply at the transformer end and secure each with a $\frac{3}{8}$ " standoff as a nut.
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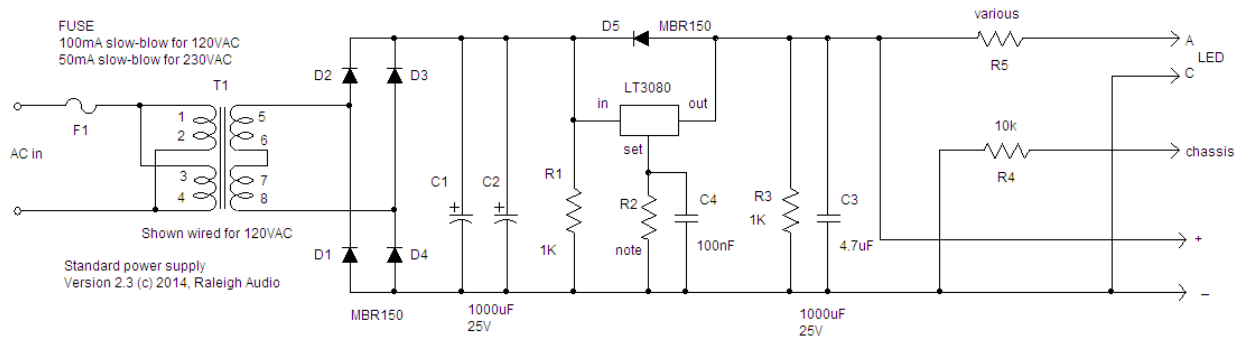
3. Mount a 1.25" (male/female) standoff on the top of the Control Voltage Power Supply next to resistor R1 and secure it with a $\frac{3}{8}$ " standoff as a nut.
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4. Mount a 1.25" (female/female) standoff on the top of the Control Voltage Power Supply next to capacitor C1 and secure it with a 6-32 x $\frac{1}{4}$ " screw.
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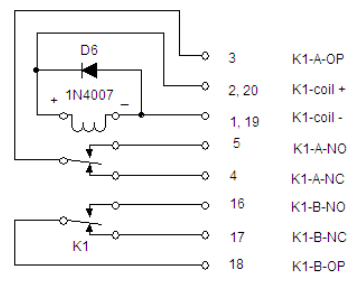
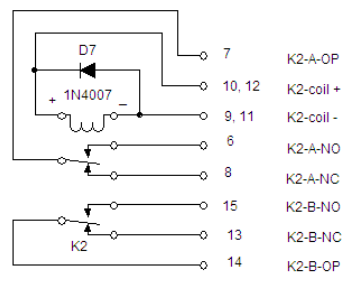


5. Set the Auxiliary Relay Board on top of the four standoffs on the Control Voltage Power Supply such that the large relay is closest to the center. Secure it with four 6-32 x $\frac{1}{4}$ " screw.
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Schematic Diagrams



note: R2
 499K for 5V out
 820K for 8V out
 1M for 10V out
 1.2 M for 12V out



Parts List (Level B)

Designator	Part	Description	Qty
	PC board	version 2.3	1
T1	Transformer, 5VA		1
D1- D5	Diode, MBR150	cylinder, value marked on body	5
U1	Regulator, LT3080	5-pin transistor	1
C1, C2	Capacitor, 1000 μ F, 25V	black cylinder	2
C4	Capacitor, 100nF	Grey square	1
C3	Capacitor, 4.7 μ F	Blue square	1
R1, R3	Resistor, 1K Ω	brown, black, black, brown, brown bands	2
R4	Resistor, 10K Ω	brown, black, black, red, brown bands	1
R2	Resistor, various Dale	brown cylinder, value marked on body	1
R5 (optional)	Resistor, 16K Ω	brown, blue, black, red, brown bands	1

	Standoff, 6-32 x 3/8"		5
	Screw, 6-32 x 1/4"		10
F1	Fuse holder	black rectangle	1
	Fuse holder cover		1
	Fuse, 50mA or 100mA "slow-blow" (time delay)	glass cylinder	1
	Screw, Nylon 4-40 x 1"		3
	Nut, Nylon 4-40		3
	heatsink, large, 1"		1
	screw, 4-40 x 3/8		1
	washer, lock, 4-40		1
	nut, 4-40		1
	insulating bushing	black cylinder	1
	insulator, heatsink	grey square	1

Auxiliary Relay Board

Designator	Part	Description	Qty
	PC board		
K1	small relay	black rectangle	1
K2	large relay	black rectangle	1
D1, D2	Diode, 1N4007	black cylinder	2
	Standoff, 6-32 x 1.25"	male/female	3
	Standoff, 6-32 x 1.25"	female/female	1
	Screw, 6-32 x 1/4"		1
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Document Version History

Version	Description
1.0	Original document to support parts level A
1.1	support parts level B

Parts Level History

Version	Description
A	Original production level
B	simplified circuit