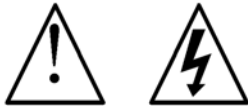


**HAGERMAN**  
TECHNOLOGY

# PowerSupply

For Bugle Phono





## Warnings

This product uses dangerous and potentially lethal voltages. Extreme care must be taken during assembling, which 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

The PowerSupply is designed expressly for the Bugle phono stage. However, it is quite generic and can be applied to many other low power preamplifiers. Just be sure the load current is under 100mA for each tap. The PowerSupply uses a very simple topology to produce regulated output voltages. Careful attention was paid to the rectification and filtering stages to insure quiet hash-free operation. Regulation is via common three-terminal regulators.

The PowerSupply half-kit comprises only a blank circuit board and these instructions. To complete it, you must purchase additional parts yourself from DigiKey ([www.digikey.com](http://www.digikey.com)).

## Features

- Clean, regulated +/-15Vdc outputs
- 0mA to 100mA output current
- Toroidal transformer
- Compact footprint
- 115Vac or 230Vac

## Tools

You will need a few basic shop tools (screwdriver, pliers, wire cutters, etc.) and a soldering iron to build this kit.

# 2 Parts to Buy

## Parts List

The following parts should be purchased from [www.digikey.com](http://www.digikey.com).

Component	Qty	Part Number	Reference Designators
4700uF 25V	4	P5159	C1, C2, C4, C5
470uF 25V	4	P5155	C3A, C3B, C6A, C6B
1 ohm	2	1.0W-1	R1, R11
10 ohm	2	10W-1	R2, R12
1k ohm	6	1.0KW-1	R3, R4, R6, R7, R9, R10
10k ohm	2	10KW-1	R5, R8
Diode	10*	MBR1100	D1, D2, D3, D4, D5, D6, D7, D8
Regulator, pos.	1	497-1454-5	U1
Regulator, neg.	1	497-1477-5	U2
Heat Sink	2	HS351	H1, H2
Transformer	1	TE70023	T1

\* Minimum order quantity

You will also need a few pieces of hardware to complete the board: two #4 x 1/4" screws and nuts to mount the regulators to the heat sink, and one #8 x 1/4" (actually M4) screw to mount the transformer.

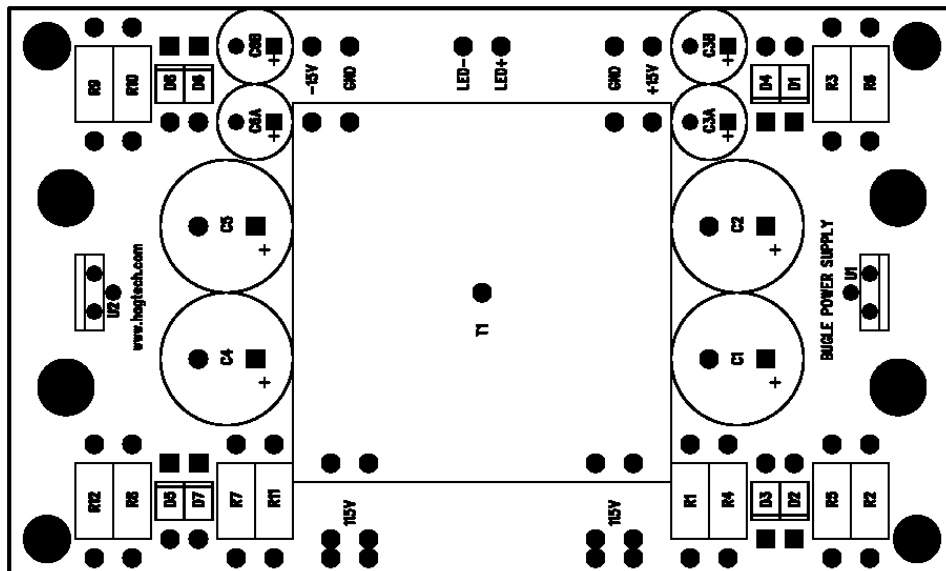
# 3 Board Assembly

## Step by Step

Please follow this systematic procedure for assembling the circuit board. Make sure you have purchased all necessary components before you begin.

- ❑ Bend and form the leads on the resistors and install into their proper places. Solder in place and cut leads.
- ❑ Install the diodes and solder in place. Make sure the cathodes go in the square holes.
- ❑ Install the transformer. Use a short #8 screw (actually an M4) to securely fasten in place. Solder the leads.
- ❑ Mount the regulators to heat sinks using #4 hardware. Place small #4 washers under the heat sink to prevent any contact to circuit board traces. Install heat sink/regulator assemblies onto the circuit board and solder in place. Make sure U1 is the positive (LM7815) regulator.
- ❑ Install the capacitors and solder in place. The electrolytic capacitors are polarized, put the long lead (positive) into the square hole.

That's it, however, there is one more recommended step, and that is to clean the flux and other surface contaminants from the board. To do this, soak the entire assembly in isopropyl alcohol. You can buy a bottle at any drug store. Soak for about ½ hour, and then use a paintbrush to dab in-between components scrubbing away any remaining residue. Use a strong fan (or leaf blower) to dry both sides. When finished, the circuit board will be shiny and clean. Cleanliness is key to eliminating leakage current paths that develop over time.



# 4 Testing & Installation

## Connections

The ac input to the PowerSupply can be strapped for 115V or 230V operation. For 115V, the input transformer coils are wired in parallel, and in series for 230V. The primary taps on the circuit board are laid out just like the schematic shows. That is, for 230V operation, the middle two are connected with a jumper, and the outer two are connected to 230Vac. For 115V, the top hole and third hole are connected to Line, the second and fourth holes are connected to Neutral.

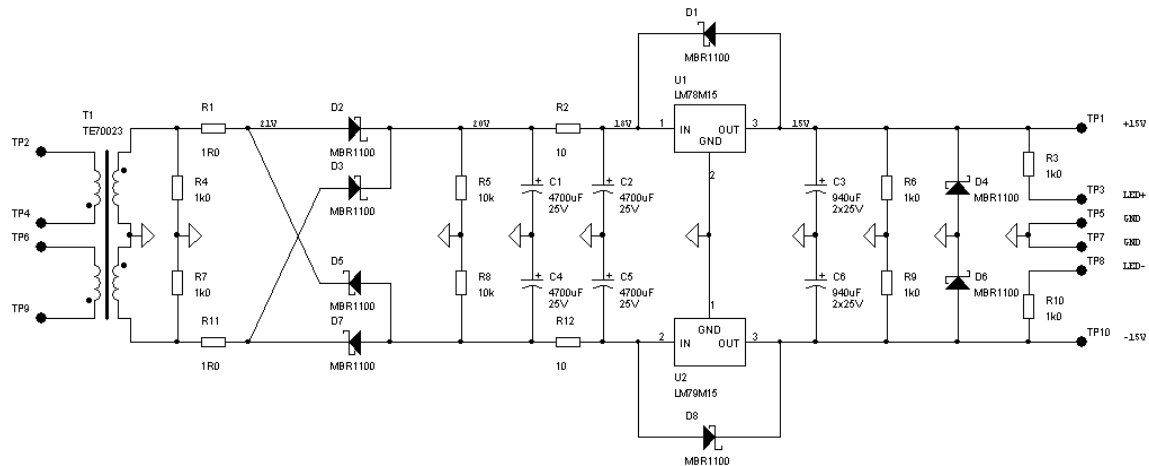


Figure 1. Schematic of PowerSupply.

Always make sure the chassis is connected to Earth ground for safety purposes. The output ground of the PowerSupply can be floated, but it is best to be connected to Earth ground. An LED can be wired between the LED+ and LED- outputs as a power-on indicator.

## Testing

The ac input should be wired through a power switch and 1/16<sup>th</sup> amp slo-blo fuse. Wear safety glasses prior to applying power. When ac power is applied, the LED should light up. Connect a DVM to the outputs to insure proper output voltages.

## Bugle Modifications

When used with a PowerSupply, the Bugle does not need the battery holders, power switch, or RCA jacks installed. You can use simple jumpers to bypass the on/off switch,

see Figure 2. Connect the +/-15V supplies to the holes previously used for the battery holders. The +15V supply goes to B1, and -15V to B2.

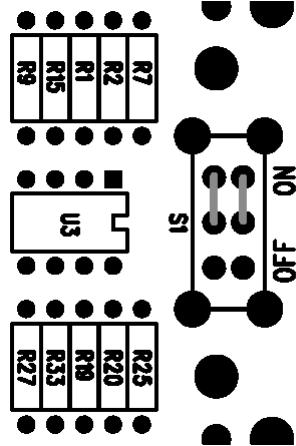


Figure 5. Bypass jumpers on Bugle.

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# 6 Specifications

The following specifications are subject to change without notice.

Item	Specification
Output Voltage	+15Vdc and -15Vdc, +/-5%
Output Current	0mA to 100mA
Board Size	3" x 5"



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# 7 Warranty & Service

## Warranty

Hagerman Technology LLC warrants this product free of defects in materials and workmanship for 10 years. 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.

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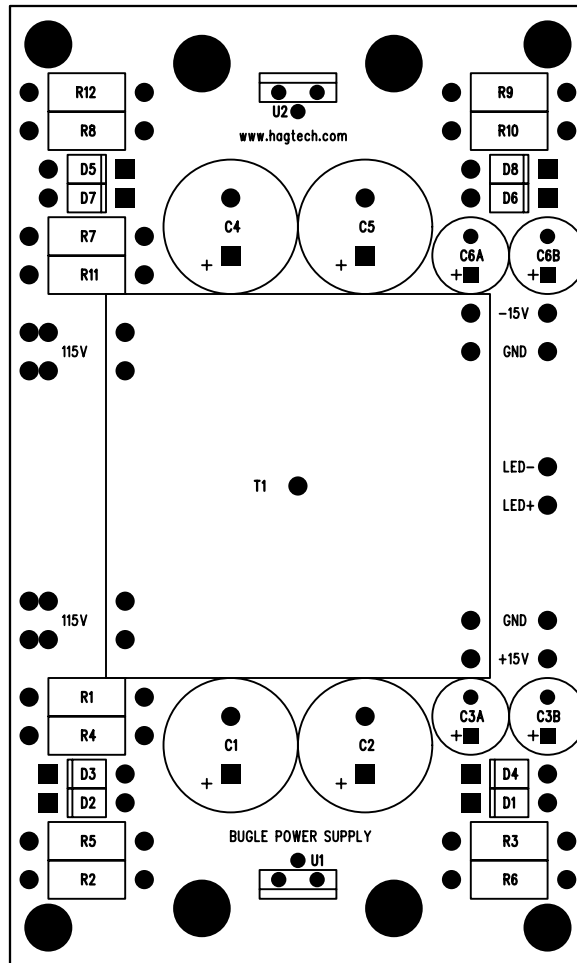
## Service

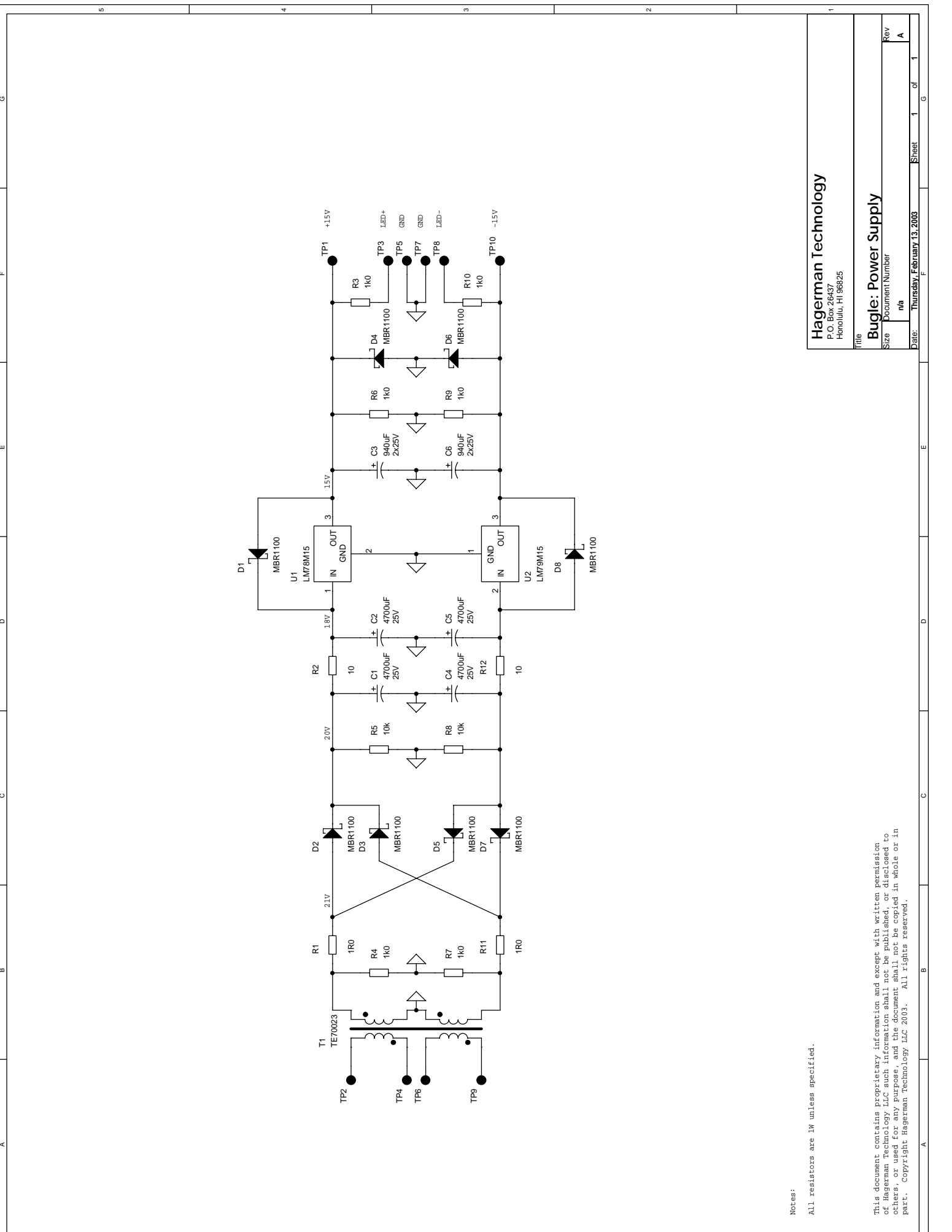
Refer to Chapter 4 for troubleshooting information. If the problem persists, contact Hagerman Technology for service at <http://www.hagtech.com>.

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Notes:

All resistors are 1W unless specified.

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Title Bugle: Power Supply

Size Document Number

Rev n/a

Date: Thursday, February 13, 2003

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