

Triplet 3444A Power Supply Modification Notes

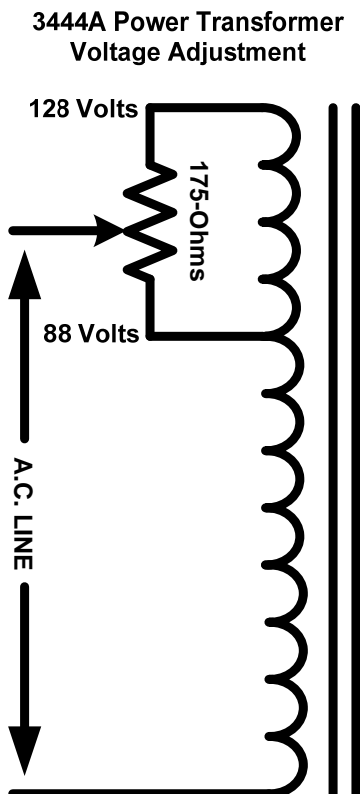
The Triplet 3444A is a superb Tube Test/Analyzer. Mutual Conductance is measured by inserting a small known AC signal on the Grid, and measuring the AC Plate current. The Mutual Conductance is displayed directly on a large meter.

The 3444A is self-calibrating, and the accuracy is as good as the 1% precision internal resistors. The unit tests tubes under conditions, of voltage and current similar to actual circuit parameters.

However the 3444A has a major shortcoming; the filament voltage swings very widely between testing, and non-testing conditions. For Power Tubes such as a 6L6 the filament voltage under test is 6.3 Volts, and rises to over 7 Volts when the 'VALUE' or 'LINE TEST' button is released. For rectifiers the voltage range is even greater.

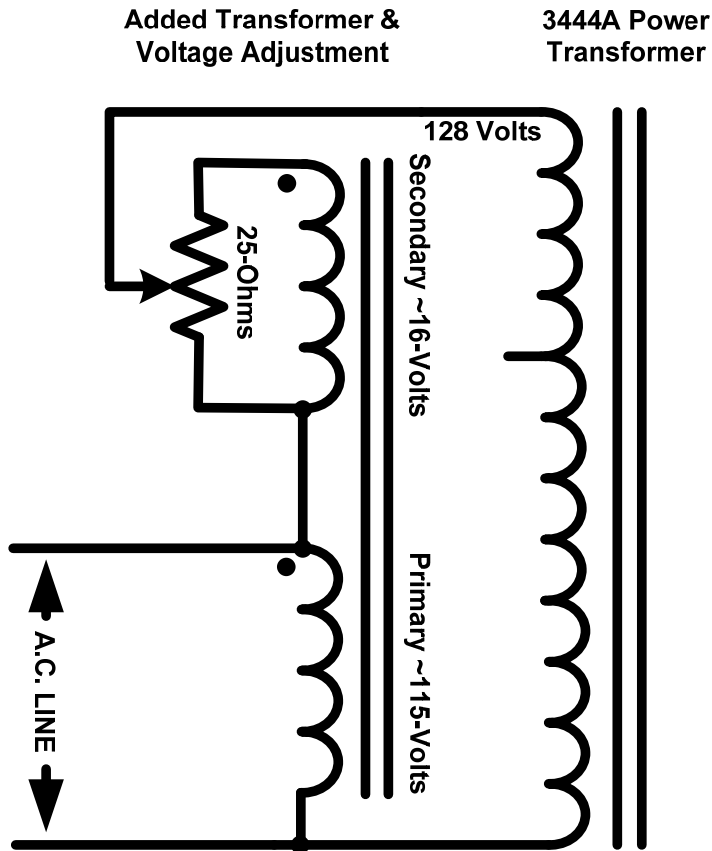
This significant overvoltage is great enough to make testing require some time for tube cathodes to cool down to the proper levels; so an accurate measurement may be read. In some cases the overvoltage may be great enough to damage the tube being tested.

The difficulty lies in the method and range of the Voltage Control for the tester. The Voltage input range is 88 to 128 Volts; 40 Volts! In North America the nominal line voltage is 120 Volts.



To achieve this range the power transformer has two taps one at 88 Volts, the other at 128 Volts. A 175-Ohm resistor bridges the transformer inputs, with the wiper going to the line. The circuit allows a wide adjustment range at the expense of introducing high impedance into the power input circuitry.

For North American operation a very significant improvement in performance can be gained by restricting the Voltage input range to 120 Volts +/- 8 Volts.



There are several ways to accomplish the necessary voltage control. A variable transformer (Variac) was considered, however space constraints were prohibitive.

A simple approach is to add an additional transformer in front of the existing transformer to step the nominal line voltage up to 128 Volts. The maximum current draw of the 3444A is ~ .5 Amps, so any transformer with a greater secondary current will do, the larger the better in terms of 'stiffness'. Because the span of the Secondary Voltage of the new transformer is only 16-Volts, the Variable resistor can have a much smaller value, while dissipating the same heat as the original resistor.

The 'Signal Transformer' 16-3000 was chosen for the task. It has a 3-Amp secondary (Well more than required), and is a 'Flat Pack' design, which is easily accommodated on the chassis of the 3444A.

Using the values shown the improvement in Voltage regulation should be a factor of seven better than the original circuit. The actual measured improvement with a 6L6 was a voltage excursion from 6.3 to 6.45 volts between 'Testing; and Non-Testing' modes.

The same technique could be used to improve the performance of the Triplet 3444 Tube Analyzer, and any other tester with a similar inappropriately wide input voltage range.

If you are interested in reviewing the calculations please contact me at: rag@designsuccess.net

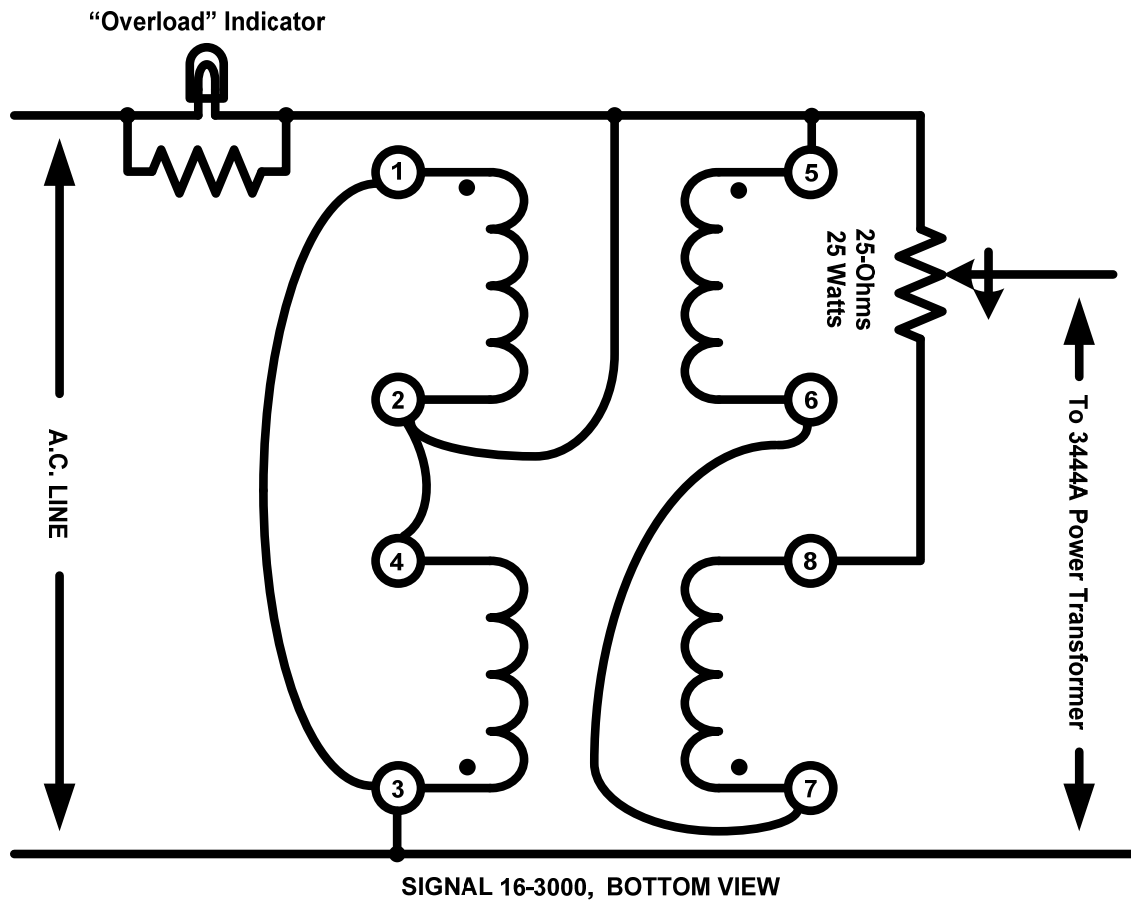
Wiring and Installation:

For those wishing to use the same transformer; I have included a few additional notes that should prove helpful?

The Signal 16-3000 is a 'Split Bobbin' dual winding transformer.
The Primary Windings should be connected in parallel for 120 Volt operation.
The Secondary Windings are connected in series.
The Secondary winding is also connected 'On top' of the Primary winding to provide a boost in voltage

The 175 Ohm, 25 Watt Variable Resistor is replaced with a 25-Ohm, 25 Watt Variable Resistor

Before beginning the modifications, identify the Power Transformer connections
A few additional wires will need to be added to complete the modification



The 16-3000 is a Flat Package which easily fits between the existing Power Transformer and the circuit board.

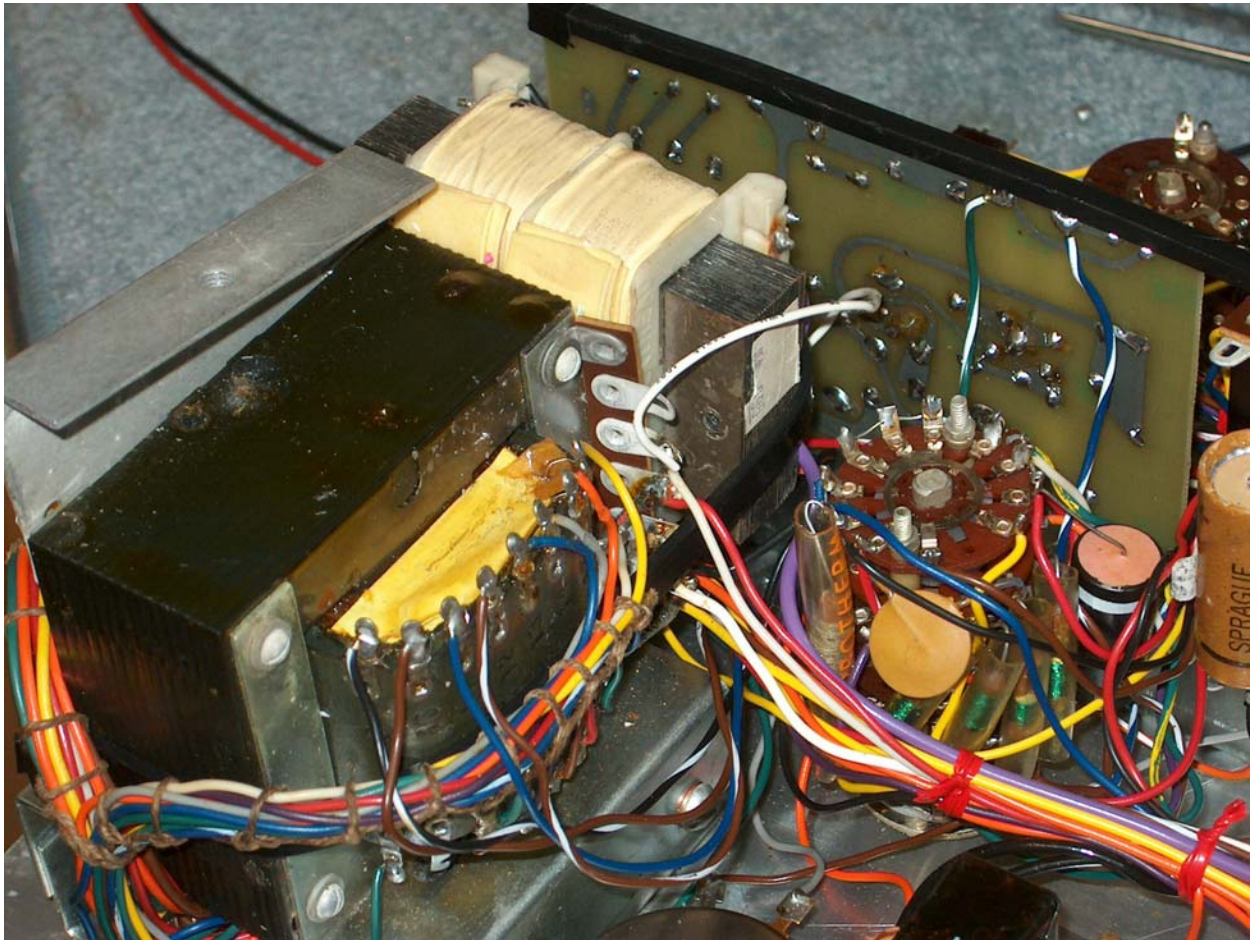
As shown in the Photograph, the unit is held in place by a large 'Wire-Tie'

The 16-3000 is held off from the Power Transformer by ~ 1/4 Inch of 'Double Sticky' Foam tape. The tape serves two purposes:

Mechanical stability

Separation of the Magnetic Fields

The magnetic fields are further isolated by mounting the two transformer cores at right angle to one another.



Flathead™ Low Profile Transformers Printed Circuit Mount

For Low Power and Critical Height Applications



Signal's LP transformers use hum-bucking (semi-toroidal) construction that minimizes radiated magnetic fields. These transformers are ideal for critical low-height PC board applications.

General Specifications

- Power - 2 VA to 48 VA
- Dielectric Strength - 1500 Vrms Hipot
- Primaries - Dual primaries, 115/230 V - 50/60Hz
- Secondaries - Series or parallel
- Height - 0.65" to 1.375" (16.5 mm to 34.9 mm)
- Insulation System - Class B, 130° C, UL 1446, E66312

Agency Certifications

- UL recognized to UL 506 / UL 5085-2, File # E63829
- CSA - NRTL/C22.2 #66.1, File # 221070



Part Number	VA	Secondary RMS Rating	
	Size	Series	Parallel
LP-10-250	2	10VCT @ 250mA	5V @ 500mA
LP-10-600	6	10VCT @ 600mA	5V @ 1.2A
LP-10-1200	12	10VCT @ 1200mA	5V @ 2.4A
LP-10-2400	24	10VCT @ 2.40A	5V @ 4.80A
LP-10-4800	48	10VCT @ 4.80A	5V @ 9.60A
LP-12-200	2	12.6VCT @ 200mA	6.3V @ 400mA
LP-12-450	6	12.6VCT @ 450mA	6.3V @ 900mA
LP-12-900	12	12.6VCT @ 900mA	6.3V @ 1.8A
LP-12-1900	24	12.6VCT @ 1.90A	6.3V @ 3.80A
LP-12-3800	48	12.6VCT @ 3.80A	6.3V @ 7.60A
LP-16-150	2	16VCT @ 150mA	8V @ 300mA
LP-16-350	6	16VCT @ 350mA	8V @ 700mA
LP-16-700	12	16VCT @ 700mA	8V @ 1.4A
LP-16-1500	24	16VCT @ 1.50A	8V @ 3.00A
LP-16-3000	48	16VCT @ 3.00A	8V @ 6.00A
LP-20-125	2	20VCT @ 125mA	10V @ 250mA
LP-20-300	6	20VCT @ 300mA	10V @ 600mA
LP-20-600	12	20VCT @ 600mA	10V @ 1.2A
LP-20-1200	24	20VCT @ 1.20A	10V @ 2.40A
LP-20-2400	48	20VCT @ 2.40A	10V @ 4.80A
LP-24-100	2	24VCT @ 100mA	12V @ 200mA
LP-24-250	6	24VCT @ 250mA	12V @ 500mA
LP-24-500	12	24VCT @ 500mA	12V @ 1.00A
LP-24-1000	24	24VCT @ 1.00A	12V @ 2.00A
LP-24-2000	48	24VCT @ 2.00A	12V @ 4.00A

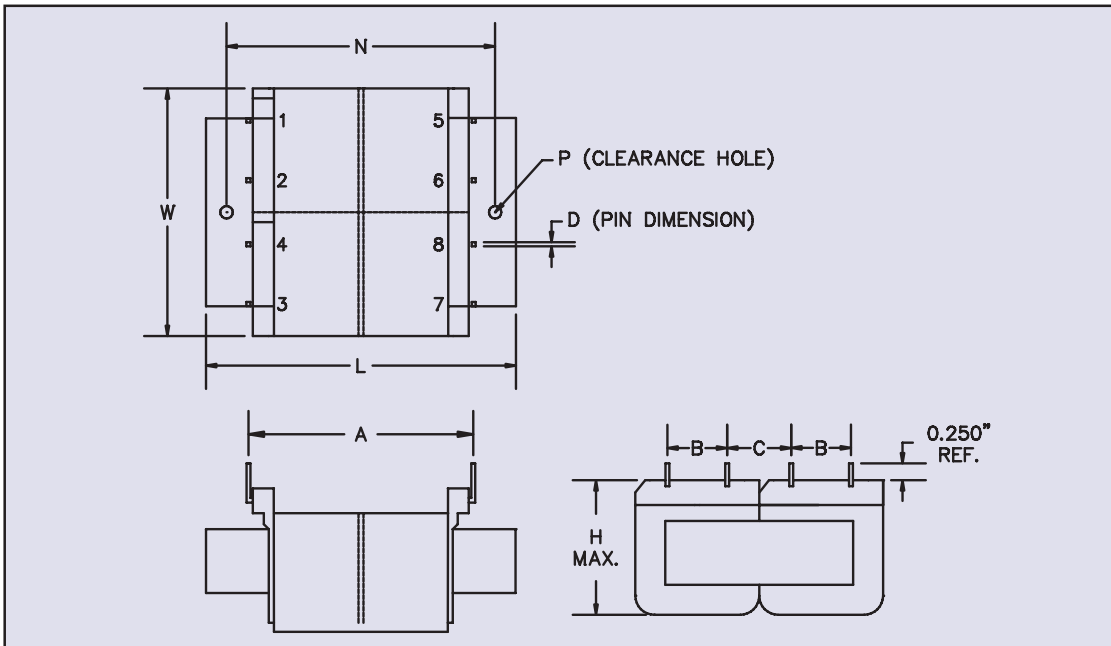
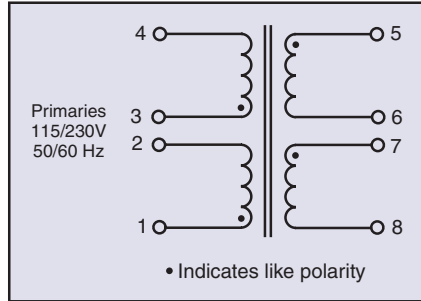
Part Number	VA	Secondary RMS Rating	
	Size	Series	Parallel
LP-30-85	2	30VCT @ 85mA	15V @ 170mA
LP-30-200	6	30VCT @ 200mA	15V @ 400mA
LP-30-400	12	30VCT @ 400mA	15V @ 800mA
LP-30-800	24	30VCT @ 800mA	15V @ 1.60A
LP-30-1600	48	30VCT @ 1.60A	15V @ 3.20A
LP-34-75	2	34VCT @ 75mA	17V @ 150mA
LP-34-170	6	34VCT @ 170mA	17V @ 340mA
LP-34-340	12	34VCT @ 340mA	17V @ 680mA
LP-34-700	24	34VCT @ 700mA	17V @ 1.40A
LP-34-1400	48	34VCT @ 1.40A	17V @ 2.80A
LP-40-60	2	40VCT @ 60mA	20V @ 120mA
LP-40-150	6	40VCT @ 150mA	20V @ 300mA
LP-40-300	12	40VCT @ 300mA	20V @ 600mA
LP-40-600	24	40VCT @ 600mA	20V @ 1.20A
LP-40-1200	48	40VCT @ 1.20A	20V @ 2.40A
LP-56-45	2	56VCT @ 45mA	28V @ 90mA
LP-56-100	6	56VCT @ 100mA	28V @ 200mA
LP-56-200	12	56VCT @ 200mA	28V @ 400mA
LP-56-425	24	56VCT @ 425mA	28V @ 850mA
LP-56-850	48	56VCT @ 850mA	28V @ 1.70A
LP-88-28	2	88VCT @ 28mA	44V @ 56mA
LP-88-65	6	88VCT @ 65mA	44V @ 130mA
LP-88-130	12	88VCT @ 130mA	44V @ 260mA
LP-120-20	2	120VCT @ 20mA	60V @ 40mA
LP-120-50	6	120VCT @ 50mA	60V @ 100mA
LP-120-100	12	120VCT @ 100mA	60V @ 200mA
LP-230-10	2	230VCT @ 10mA	115V @ 20mA
LP-230-25	6	230VCT @ 25mA	115V @ 50mA
LP-230-50	12	230VCT @ 50mA	115V @ 100mA

Custom versions available upon request.

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Flathead™ Low Profile Transformers Printed Circuit Mount

For Low Power and Critical Height Applications



VA	Dimensions									Weight
	A	B	C	L	W	H	N	D	P	
Size	Inches (mm)									oz (kg)
2	1.60 (40.6)	0.37 (9.5)	0.37 (9.5)	1.87 (47.5)	1.56 (39.6)	0.65 (16.5)	-	.041 x .020 (1.04 x 0.51)	-	5 (0.14)
6	1.60 (40.6)	0.37 (9.5)	0.37 (9.5)	1.87 (47.5)	1.56 (39.6)	0.85 (21.6)	-	.041 x .020 (1.04 x 0.51)	-	7 (0.20)
12	2.00 (50.8)	0.50 (12.7)	0.50 (12.7)	2.50 (63.5)	2.00 (50.8)	1.06 (27.1)	-	.041 x .020 (1.04 x 0.51)	-	11 (0.31)
24	1.90 (48.3)	0.60 (15.2)	0.53 (13.5)	2.87 (72.9)	2.25 (57.2)	1.25 (31.8)	2.41 (61.2)	.041 SQ pin (1.04 SQ mm)	Clearance Hole for #4 Screw	15 (0.43)
48	2.18 (55.4)	0.60 (15.2)	0.66 (16.8)	3.12 (79.2)	2.50 (63.5)	1.37 (34.9)	2.62 (66.5)	.041 SQ pin (1.04 SQ mm)	Clearance Hole for #6 Screw	21 (0.60)

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