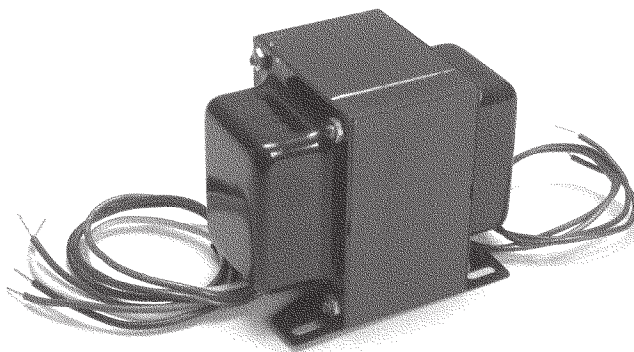


UBT-2

Single-Ended Audio Output Transformer



Description

The UBT-2 is a single-ended output transformer intended to be used in high-fidelity vacuum-tube audio amplifiers. It has a fairly high primary impedance making it suitable for use with classic triodes or pentodes.

The UBT-2 is manufactured in the United States to high quality commercial standards. The core is grain-oriented M6 (Microsil®) silicon steel. It is protected from moisture by a full vacuum-impregnation with varnish. Every UBT-2 transformer is tested for: inductance, turns ratio, and high frequency response.

Specifications

Primary impedance: 4800 Ω

Secondary impedances: 4, 8, and 16 Ω

Maximum DC primary current: 110 mA

Maximum output power: 13 to 18 Watts (depending on minimum expected low frequency response).

Primary resistance: 432 Ω nominal, 25° C

Primary inductance: 29 Henries nominal (at 110 mA)

Frequency and phase response: see graphs on next page.

Size: 3.375" x 4.25" x 2.85" (95 x 108 x 86 mm)

Weight: Approx. 5 lbs (2.25 kg)

Application Information

The UBT-1 transformer is a high-impedance transformer that is designed to be used with higher-voltage tubes. With such tubes, it is difficult to achieve the full power capable of the transformer, resulting in excellent bass "headroom". A computer program was written to simulate a single-ended triode output stage. Using this program, operating points for the following triodes or triode-connected pentodes connected to the UBT-2 were determined (power output and bias points are approximate):

Tube	Plate Voltage*	Plate Current	Grid Bias	Output Power
45	250 V	36 mA	-49V	2.2 W
300B	400 V	65 mA	-86V	9.5 W
6CA7/EL34	450 V	55 mA	-36V	8.2 W
50	450 V	55 mA	-84V	7.2 W
845	550 V	65 mA	-68V	9 W
SV811-3	550 V	82 mA	-100V	9.5 W
SV811-10	550 V	82 mA	-25V	4.5 W
811A†	440 V	95 mA	+24V	9 W

* – Plate Voltage is the voltage between plate and cathode or filament. The total DC plate supply voltage should also include about 20-30 volts for voltage drop in the primary, and drop across the cathode bias resistor, if any.

† – This is the transmitting type 811A run in class A₂ mode with positive grid bias. The average grid current is about 23 mA.

The UBT-2 can also be used with conventional beam power tubes or pentodes. Several excellent-sounding guitar amps have been built using the 6V6GT and 6L6GC with the UBT-2.

For best sound, it is recommended that the output transformer be driven by an impedance somewhat below the impedance that gives the maximum power output. The optimum output impedance for a triode power amplifier is highly dependent on the plate supply voltage, the optimum impedance rising as the voltage rises.

It is tempting to use high plate supply voltages to achieve higher output power. The maximum recommended plate supply voltage is 600 volts. However, at this voltage, special care must be taken to avoid transient conditions that would cause high plate voltages, such as uncontrolled oscillations or running the amplifier without a load.

Due to the high current flowing through the primary, it is normal for the UBT-2 transformer to become warm during operation. It is strongly recommended that a fuse

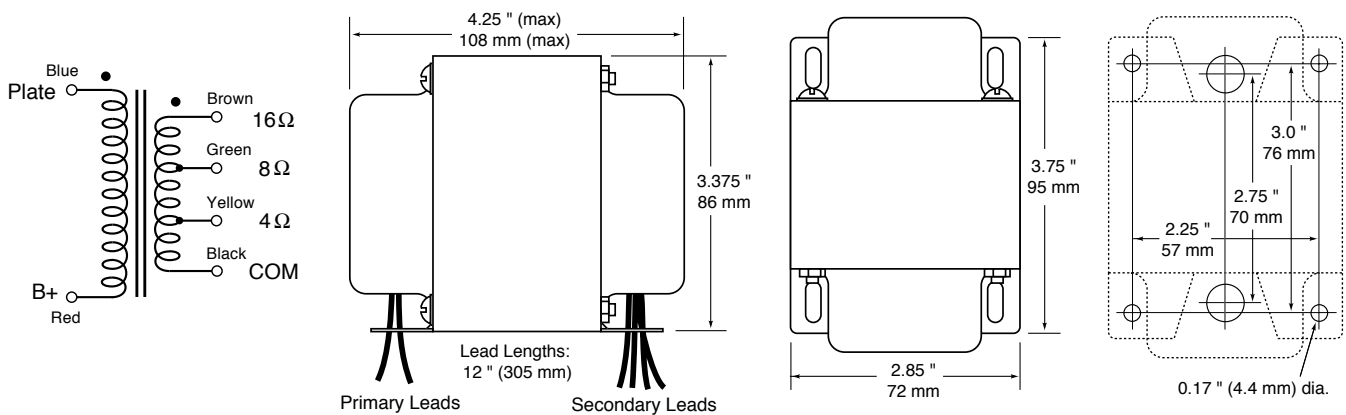
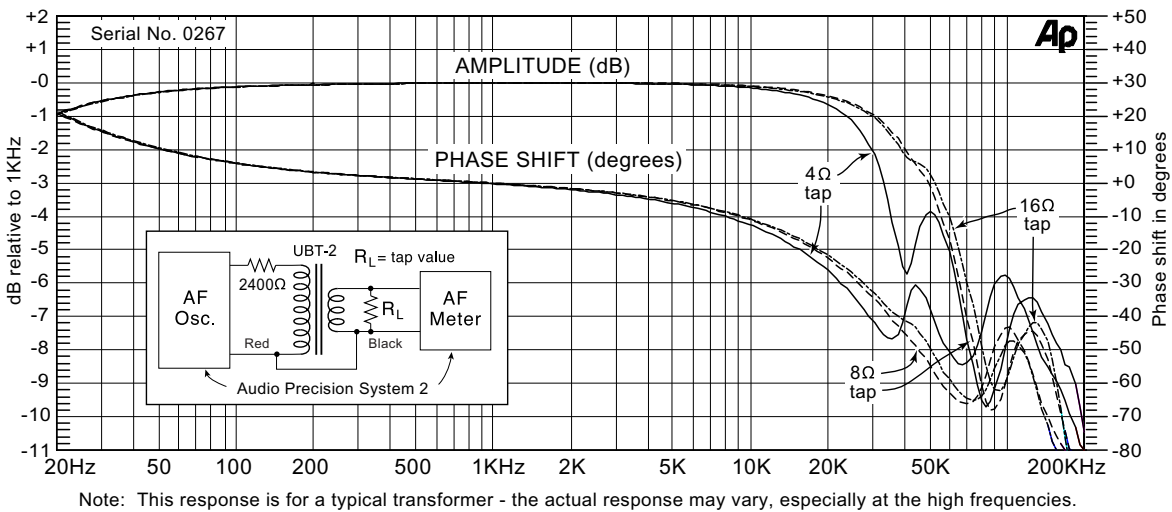
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be used in the B+ connection to the UBT-2 transformer. The relatively high voltage drop across the primary could prevent the AC line fuse from blowing if the output tube shorted or lost bias. A B+ fuse will help protect the transformer, as well as increase safety. A suggested value would be approximately twice the worst-case expected operating current.

As with any output transformer, the UBT-2 should always have a load connected when driven. If there is no load and the output tube is over-driven, the high inductance of the primary will cause extremely high voltages to be produced, damaging either the output tubes or the transformer.

The maximum power available from the UBT-2 is primarily limited by core saturation at low frequencies. At 15 watts output, the core begins to saturate below approximately 50 Hz, although at the power levels normally achieved with the UBT-2, saturation occurs well below this.

Even though the UBT-2 transformer can be the basis for excellent sounding amplifiers, it is meant to be used with relatively efficient speakers. If used with inefficient speakers (less than about 90 db/watt), used in a very large room, or used to play at deafening levels, a 10 to 15 watt amplifier will have insufficient power. That said, a single-ended triode amplifier, particularly without feedback, can sound much louder than its power ratings suggest.



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