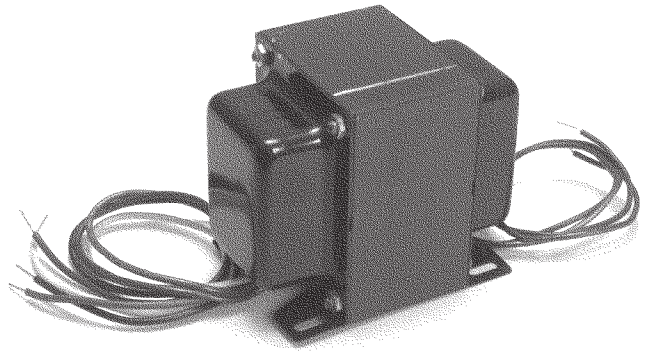


UBT-1

Single-Ended Audio Output Transformer



Description

The UBT-1 is a single-ended output transformer intended to be used in high-fidelity vacuum-tube audio amplifiers. It has a low primary impedance and a high primary current capability, making it suitable for use with low-impedance triodes or pentodes. Its relatively high power and current capability is complemented by outstanding frequency response characteristics.

The UBT-1 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-1 transformer is tested for: inductance, turns ratio, and high frequency response.

Specifications

- Primary impedance: 1600 Ω
- Secondary impedances: 4, 8, and 16 Ω
- Maximum DC primary current: 160 mA
- Maximum output power: 13 to 18 Watts (depending on minimum expected low frequency response).
- Primary resistance: 165 Ω nominal, 25° C
- Primary inductance: 8 Henries nominal (at 160 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 low-impedance transformer that is designed to be used with high-current, low-voltage tubes. It is definitely *not* suitable for use with tubes such as 10, 211, 845, etc. 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-1 were determined:

Quantity	Tube	Plate Voltage*	Total Plate Current	Output Power
3	2A3, 6B4G	295 V	140 mA	11.5 W
2	300B	350 V	155 mA	14 W
2	6CA7/EL34	350 V	115 mA	8 W
3	6CA7/EL34	400 V	150 mA	14.5 W
4	6W6GT	275 V	130 mA	10 W
4	6BQ5/EL84	305 V	120 mA	8 W
4	6CW5/EL86	275 V	130 mA	10.5 W
2	6550/KT88	385 V	140 mA	10 W
1†	6AS7G/6080	210 V	115 mA	8 W

* – Plate Voltage is the voltage between plate and cathode or filament. The total DC plate supply voltage should also include about 25-30 volts for voltage drop in the UBT-1 primary, and drop across the cathode bias resistor, if any.

† – Both sections paralleled.

The UBT-1 can also be used with low-impedance pentodes or beam power tubes. A 13 watt amplifier has been successfully built using a 6KG6/EL509 running 270 volts on the plate, at 150 ma, in “enhanced-triode” mode.

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. Also, be aware that 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.

Due to the high current flowing through the primary, it is normal for the UBT-1 transformer to become warm during operation. It is strongly recommended that a fuse be used in the B+ connection to the UBT-1 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

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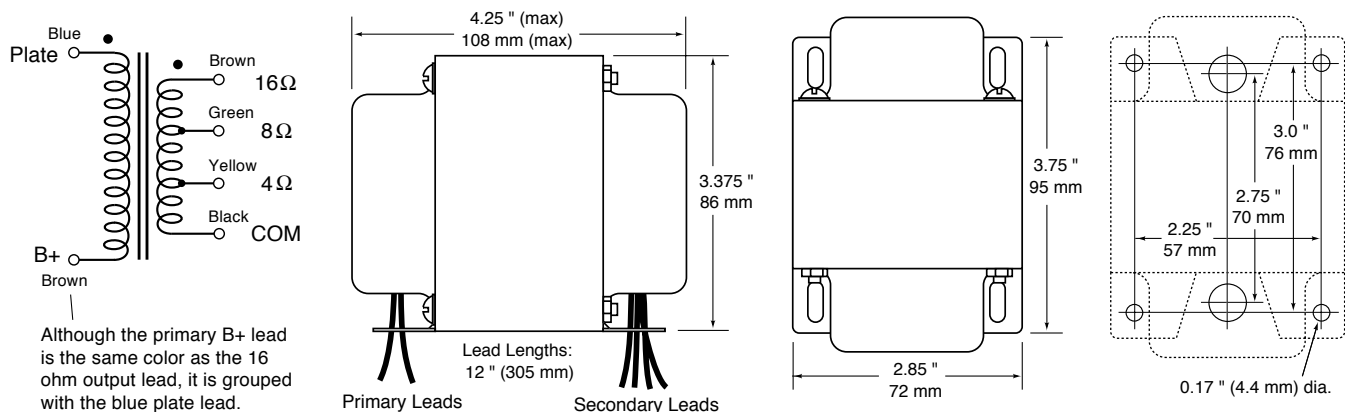
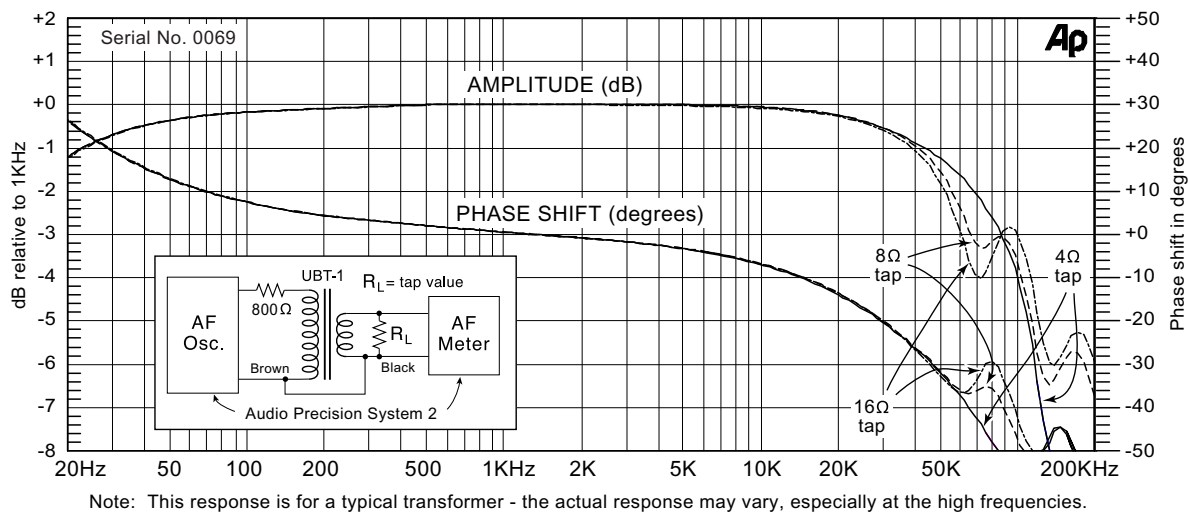
transformer, as well as increase safety. A suggested value would be approximately twice the worst-case expected operating current.

As with any output transformer, the UBT-1 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-1 is primarily limited by core saturation at low frequencies. At 15 watts output, the core begins to saturate below approximately 50 Hz. However, users of the UBT-1

report no lack of bass response in actual usage for amplifiers of about 13 watts output. If the UBT-1 is being used in the high-frequency amplifier of a bi- or tri-amped system, then more power can be obtained, although the maximum current specification should not be significantly exceeded.

Even though the UBT-1 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 85 to 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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