



APPLICATION NOTES

TRANSISTORIZED

HI-FI PREAMPLIFIER

This TI Application Note describes a three-transistor hi-fi preamplifier for use with a magnetic cartridge. The recommended circuit should provide lower hum, more freedom from microphonics, a smaller package, and greater reliability than a comparable vacuum-tube preamp. The primary features of this design are a frequency response of ± 1 db from 30 to 15,000 cps, less than 1% total harmonic distortion, RIAA equalization, and separate bass and treble tone controls. The rated output is 1-volt peaks into a 2K-ohm load. The power supply voltage is not critical and may be obtained from 1) the high-voltage B supply in any vacuum-tube power amplifier, 2) a low-voltage supply from an all-transistor hi-fi system, or 3) a battery power source. These specifications should be acceptable to all but the most critical audiophile.

The circuit diagram of Fig. 1 shows the preamp with proper equalization for a G-E magnetic cartridge. Other cartridges can be used by changing three resistors. The necessary conditions for RIAA equalization are:

$$R1 = 22 R2, R2 = 100 R3, R3 = L/5$$

(where L is the inductance of the cartridge in mh)

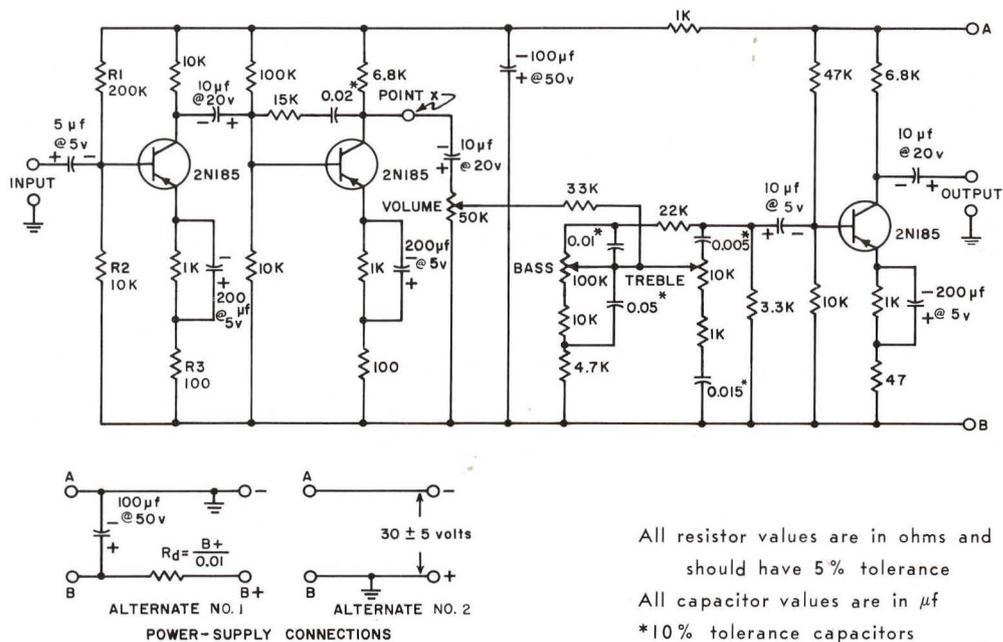
If a selector switch is placed at Point X, the volume and tone controls can also be used for tuners, tape players, etc. For good performance, the output impedance from such equipment should be 25K ohms or less, and the input signal should have a flat frequency response with an amplitude of 0.5 to 1.5 volts.

In Fig. 2, the family of solid curves shows the response of the preamp to signals applied at Point X with the tone controls in various positions. The dashed curve presents the output response of the preamp with tone controls in the flat position and a signal from a G-E magnetic cartridge tracking an RIAA test record.

All specifications can be realized by using TI type 2N185 transistors with other components of the tolerances noted. Although the frequency response may vary slightly with the selection of individual transistors, it will in all cases be better than ± 2 db from 30 to 15,000 cps when used with a magnetic cartridge source.

To achieve the same performance with different power supplies, the proper connections must be used: Alternate No. 1 for use with the B supply from a vacuum-tube power amplifier, and Alternate No. 2 for use with either a transistorized power amplifier or a battery power source.

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All resistor values are in ohms and should have 5% tolerance
 All capacitor values are in µf
 *10% tolerance capacitors

