

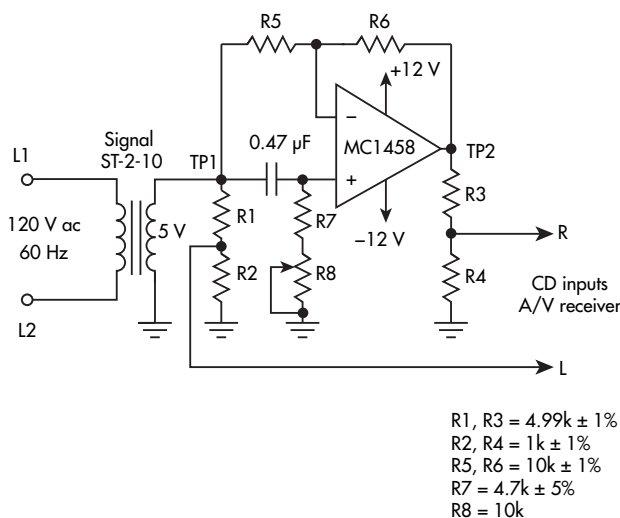
Transform Audio/Visual Receiver into Adjustable 3-Phase Power Supply

If you need an adjustable three-phase, 60-Hz power source, a standard consumer audio/visual (A/V) receiver can be converted into a fully functional three-phase power source.

By doing so, for example, a 100-W/channel receiver can supply up to 200 W by adding a simple adapter to the amplifier section of an A/V receiver, which converts it into a three-phase supply with corner-grounded open-delta output. CAUTION: Lethal voltages may be present in the output circuit.

To accomplish this, two low-level 60-Hz signals having 60-degree phase difference are required (Fig. 1). The first signal is obtained from the 5-V secondary winding of a small isolation transformer (Bel Fuse/Signal Transformer model ST-2-10); the second signal is obtained from the output of the all-pass filter, which has a 60-degree phase shift, with the output leading the input.

Only one general-purpose op amp (here, one half of an

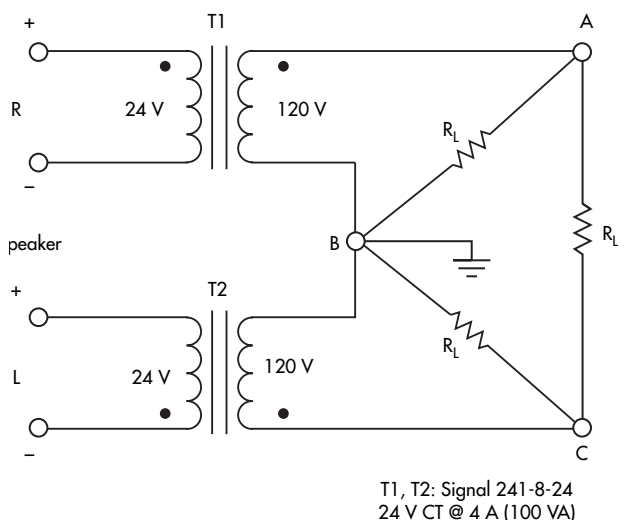


1. This simple op-amp circuit provides up to 60 degrees of adjustable phase-shift needed to create the split-phase inputs to the A/V receiver.

MC1458) is required for the all-phase filter, and the phase shift is adjustable to 60 degrees by the R8, a 10-k Ω potentiometer. If a phase meter isn't available, a simple procedure can be used to adjust the phase shift.

First, measure the voltage from Test Point 1 (TP1) to ground; it should be approximately 6 V_{RMS}. Next, measure the voltage from TP1 to TP2. Adjust the pot to make this reading equal to the reading from the previous step. When these two readings are equal, the phase shift is exactly 60 degrees. The output signals from the adapter are connected to the right and left CD inputs of the receiver.

Before connecting, set the receiver volume control to its minimum setting and the balance, treble, and bass controls to their center positions. The three-phase supply's output circuit consists of two 100-VA/24-V transformers T1 and T2 (Bel Fuse/Signal Transformer model 241-8-24) (Fig. 2). The pri-



2. A pair of standard, non-critical transformers converts the left and right receiver outputs into a three-phase topology.

mary and secondary windings are interchanged in this application, with the 24-V windings of the transformer connected to the receiver's speaker terminals, while the 120-V windings are connected in a corner-grounded open-delta configuration that can supply up to 200 W of three-phase power.

Phase-to-phase voltages can be adjusted over a 0- to 120-Vac range, and maximum phase current is approximately 0.5 A. By connecting a full-wave rectifier (total of six diodes, two diodes per phase) to the output terminals, the receiver becomes a variable 0- to 100-Vdc/1.5-A dc supply with very low ripple.

About the author

Henno Normet earned a BSEE from Purdue University (1955) and is the author of 17 Ideas for Design (and similar) items for *Electronic Design* and other publications (five were voted "Best Design of Issue"). He has 22 years of experience designing industrial controls and holds two patents.