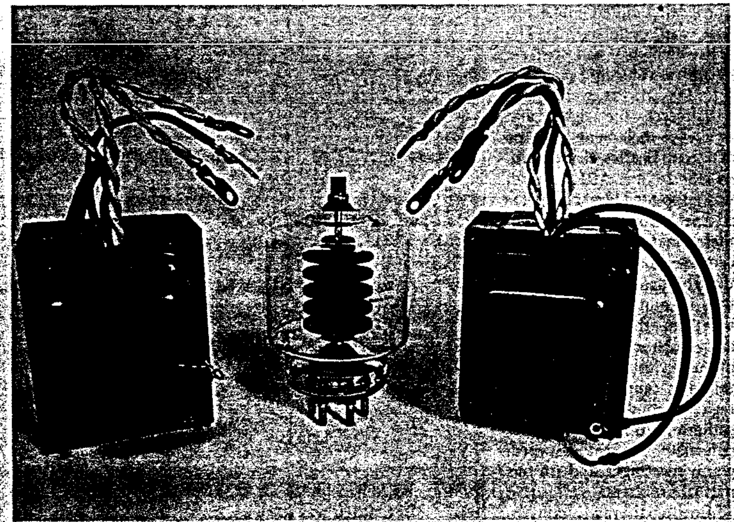

Wind Your Own

— cheap filament power for that linear

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A major expense when it comes to building that linear is the price of the filament transformer. Fortunately, one or two of those obsolete tube power transformers can get you over that expensive hurdle with only a little time and a few cents invested.

First weigh your transformer to determine capability. Refer to Fig. 1, which illustrates the relationship between weight and filament power capability. For example, if the power transformer weighs 4 pounds, it should have a filament power capability of 60 Watts.

Next determine if the transformer is adequate for your application. Let's say you have a transformer with a recycled capability of 60 Watts and you desire a new secondary for a 4CX1000A high power ceramic-metal tetrode. As the 4CX1000A has a maximum filament power requirement of 59.4 Watts (6 volts x 9.9 Amps), you could indeed use this transformer for your filament supply. You could also use two thirty or forty Watt transformers in parallel.

Once you have selected your transformer, disassemble the outer case and note the location of your primary winding in respect to the core of the transformer. The primary leads are usually color coded black. Make sure your transformer has a 110 volt, 60 Hz primary, as some surplus transformers have odd primary voltages that operate at other than 60 Hz. Also, some transformers do have their primary near the outer core and, generally, this type of transformer provides little area for your new secondary. Transformers that have the primary wound tightly around the center core provide the most area and versatility for your new secondary.

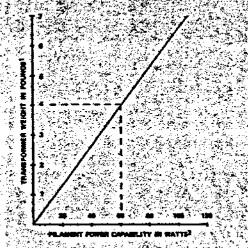

Fig. 1. [1] Weight excludes mounting fixtures. If case is of heavy steel construction, remove before weighing transformer. [2] Data based on an analysis of typical transformers.

After you have located the primary, cut off and remove with a hacksaw all secondary windings that are wound *around* the primary. Work slowly and take care not to cut or damage your primary winding.

After completion of your cutting, inspect the primary for damage. Next, wrap the primary winding with one layer of plastic tape. Securely attach and insulate the primary leads.

The number of load turns per volt must next be determined. Wind approximately 4 turns of no. 18 insulated wire around the primary as a temporary secondary. Apply the normal primary voltage (110 volts, 60 Hz) to the primary and measure the output voltage of your temporary secondary with an ac voltmeter. The voltmeter reading will determine turns per volt. For example, if you measure 2 volts, you know it took 4 turns on the secondary to produce this 2 volts; therefore, the turns per volt is 2 turns per 1 volt. Keep in mind this is the no-load turns per volt.

After removing the temporary secondary, wind your permanent secondary. I use two no. 14 wires in parallel for my secondaries, as this is quite easy to wind around the primary. Two no. 14 copper wires will be adequate for secondary current levels up to 10 Amps, 5 Amps per wire. The insulation on the wire should be capable of withstanding at least 10 times your output voltage. Example: If the secondary output is 7 volts, the insulation should provide protection up to at least 70 volts or higher.

Always allow about 50% more wire than your turns per volt indicated, as you will have to increase the number of turns to compensate for the transformer resistance when operated under load.

A filament transformer must have the correct output voltage under load; therefore you must load your secondary and take periodic measurements during its construction.

Let's say for example you require 6 volts at 10 Amps. According to Ohm's Law the load must be .6 Ohms.

$$R = \frac{E}{I} = \frac{6\ \text{volts}}{10\ \text{Amps}} = .6\ \text{Ohms}$$

Therefore you should load the secondary with a .6 Ohm resistor while measuring the output secondary voltage. Ohm's Law requires the power dissipation of the resistor be at least 60 W.

$$P = IE = (10\ \text{Amp})\ (6\ \text{volts}) = 60\ \text{Watts}$$

However, a much smaller wattage resistor may be used if you work rapidly and do not allow the resistor to heat up.

That's it; good luck on that linear. ■

Discriminator Output for the HR-2A

— check deviation and modulation

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A very simple addition can be made to the Regency HR-2A and other FM receivers which will provide output for a frequency shift meter, scope, tape recorder, or for whatever other purposes a discriminator output is required. A partial diagram of the HR-2A discriminator is shown in Fig. 1. Refer to the schematic diagram of your receiver to locate the equivalent takeoff point.

At test point TP-A, add a 10k resistor and a .01 capacitor, to filter out low frequency variations of the discriminator dc output. The other end of this filter connects to an unused terminal on the speaker terminal strip. Fig. 2 shows the circuit of the filter and output wiring. To use the discriminator for meter operation, connect a VTVM to terminals 3 and 4 of the speaker terminal strip and set the meter to the 5 volt dc range. Turn the receiver to a channel that doesn't have a signal coming through and adjust the meter for center scale reference (2.5 volts). You can now switch the receiver to any station that you may wish to check, and see how far they are off zero by the amount of the meter deflection.

In this particular set, the frequency shift is 30 kHz per division of the meter. To calculate how far off zero a station is, merely count the number of divisions above or below the zero center position that the meter indicates and multiply this by 30 kHz. As the frequency shift per division can vary from set to set, it's a good idea to check your own calibration.

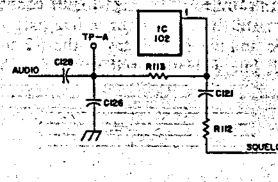

Fig. 1. Discriminator circuit.

Another useful application for the discriminator output is to check the modulation (deviation) of received signals. To do this, connect an ac scope input across terminals 3 and 4. Set the sweep frequency to a low value and observe the modulation peaks on the scope. Set the vertical gain control so that a normal signal deflects the scope to some convenient height. Now, as other stations come through you can tell whether their modulation is excessive or too low. This same hookup can also be used to set the level of a Touchtone pad. Have the operator of the station that you are checking whistle into his microphone, and observe the height of the scope pattern. Now have him press one of the buttons of his pad and adjust the output level control for the same deviation as produced by whistling. Although this may not be the optimum adjustment, it is a good starting point.

When not using the discriminator for any other purpose, it can be left connected to the AUX input of a cassette recorder. Now anytime that you wish to record an incoming signal, merely start up the recorder and adjust the record level control for proper operation. The volume control and tone controls of the receiver will have no effect on the discriminator, so it can be set to please yourself. There are many other uses for the discriminator output on a receiver, but only a few have been mentioned, just to start the mind working. ■

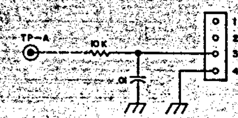

Fig. 2. Terminal connections.