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Knight-Kit T-175 6/10-Meter Linear Amplifier



With the tremendous band openings on six and ten that are due this winter and next, a little extra power will help in getting through the QRM to work that new country or state. If you're presently getting along with a one-to-ten-watt peanut whistle such as the Knight-Kit TR-106, the T-175 linear amplifier is ideal. It is particularly useful with small transistor transmitters where you want a little more zap.

In addition to operation as a grounded-grid linear amplifier on AM, SSB and CW, it may also be plate modulated for high-level AM operation. It will run 120 watts on AM linear *and* plate-modulated AM, 150 watts on CW and 300 watts PEP on single sideband. Drive requirements for AM are one to four watts, seven watts on CW and up to 15 watts PEP on SSB. These requirements fall right in with several low-power trans-

mitters and transceivers currently on the market.

Although the T-175 linear is not a band-switching unit, it may be used on either six or ten meters by simply wiring in the proper final coil during construction. By using a coil which is designed specifically for the band in use, efficiency is considerably increased over a bandswitching arrangement where design compromises must be made.

When I first built the amplifier, I put in the ten-meter coil so I could run some comparisons with a popular five-band 300-watt sideband transceiver. With about 10 watts of SSB drive, I could load the T-175 up to the same power output as the transceiver. The DX stations I worked couldn't tell the difference when I switched from one unit to the other. A quick check with the scope showed no flattopping or distortion

when driven with the low-power exciter, but when drive exceeded about 15 watts, some distortion was discernible (on sideband).

Linear AM operation is much more critical than sideband, but when the T-175 is tuned up according to the instruction manual and the grid bias is properly adjusted, there is no distortion. Of course, there is no problem at all with CW operation and when plate modulated with an external 60-watt modulator, excellent results (and reports) are obtained.

After extensive testing and signal comparisons on ten, I pulled out the ten-meter coil and put in the six-meter coil. I had been running a low-power transverter for local contacts on six, and the extra power afforded by the T-175 was a welcome addition. DX stations I had called in vain during previous openings often came back after the first call. Since I live in a channel 2 fringe area, I was a little concerned with possible TVI problems, but even with no low-pass filters installed I didn't experience any difficulty until I got above about 52.5 MHz; TVI problems above this point in the band were quickly eliminated with a Drake low-pass filter.

The circuit of the T-175 linear amplifier is quite straight forward—two horizontal deflection tubes (6JE6A's) are connected in parallel grounded grid. With class-B operation, excellent performance is obtained on AM, SSB and CW. A fan is included to keep things on the cool side and a pi network is used to couple into coaxial lines from about 25 to 150 ohms.

One extremely nice feature of this amplifier is the built-in relay amplifier (12AT7). With this tube in play, no external switching is required to turn the linear on when you go to transmit. A small amount of rf energy is picked off the input, rectified and filtered, and fed to the 12AT7 grid. Normally this tube is cut off, but when transmitting, the rectified rf signal turns it on and picks up the relay in its plate lead. This relay connects the driver to the grid circuit of the power amplifier, connects the antenna to the output pi network and turns on the fan.

If you want to operate the exciter barefoot, you simply put the control switch on standby. This disconnects B+ from the relay amplifier, thereby preventing the control relay from being activated. In this configuration, the driving signal bypasses the power amplifier and is connected directly to the antenna. The relay amplifier is also used for

Knight-Kit T-175 Specifications

Frequency range:	Two coils provided; 27-30 MHz and 50-54 MHz.
Power input:	120 watts AM linear or plate-modulated AM; 150 watts CW; 300 watts PEP SSB.
Drive requirements:	1-4 watts AM; 7 watts CW; 15 watts PEP maximum SSB.
Input impedance:	50 ohms nominal.
Output impedance:	50 or 70 ohm coaxial line. SWR less than 3:1.
Tube lineup:	Two 6JE6A output amplifiers; 12AT7 relay amplifier.
Power supply:	Silicon rectifiers. Fullwave voltage-double high-voltage supply. Halfwave voltage-double bias supply.
Features:	Meters on front panel for plate current and grid current/relative power. Forced air cooling during transmit.
Power requirements:	110-130 Vac, 60 Hz, 220 watts maximum, 45 watts on standby.
Size and weight:	5½ x 13½ x 11 inches. 20 pounds.

CW operation, but above 12 WPM, the relay is too slow to follow the dots and dashes, and it must be continuously activated by a simple resistor substitution.

Construction of the T-175 linear amplifier is very straight forward and you shouldn't run into any difficulty if you follow the excellent instruction manual. All of the parts are clearly labeled and the hookup wire is provided in pre-cut lengths. Proper layout on six meters can sometimes be a problem, but in the T-175 no trouble was experienced within stability or parasitics. The design is simple, efficient and trouble free.

During the time I have been using this linear amplifier on the air, all the signal and audio reports have been excellent. When running AM linear, some of the operators I have worked have been quite surprised to find that I was *not* using high-level plate modulation. Television interference complaints, even on six meters, have been nil and the extra power available has aided immeasurably in adding states to my six-meter list.

If you're doodling along with low power on six or ten, here's an easy and economical way to really work out. A few evenings work and a good antenna, and you'll have one of the best signals on the block. And, when you add up the cost of the parts in the T-175, it would be pretty hard to come up with a comparable homebrew linear for the same price. At \$99.95 it's a darn good investment.

Oh yes, it will work on the 11-meter class-D citizens' band too, but don't do it in the United States, it's highly illegal!

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